

**VHF air-ground Digital Link (VDL) Mode 4 radio equipment;  
Technical characteristics and methods of measurement  
for ground-based equipment;  
Part 3: Additional broadcast aspects**

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Reference

REN/AERO-00006-3

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Keywords

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## Foreword

This final draft European Standard (EN) has been produced by ETSI Technical Committee Aeronautics (AERO), and is now submitted for the Vote phase of the ETSI standards Two-step Approval Procedure.

The present document is part 3 of a multi-part deliverable covering the VHF air-ground Digital Link (VDL) Mode 4 radio equipment; Technical characteristics and methods of measurement for ground-based equipment, as identified below:

- Part 1: "EN for ground equipment";
- Part 2: "General description and data link layer";
- Part 3: "Additional broadcast aspects";**
- Part 4: "Point-to-point functions";
- Part 5: "Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive".

The present document is accompanied by an equivalent airborne standard, EN 302 842 [6], [7], [8] and [9] parts 1-4, covering the VHF air-ground Digital Link (VDL) Mode 4 radio equipment; Technical characteristics and methods of measurement for airborne equipment.

NOTE: Following the decision taken at the ICAO Aeronautical Communication Panel (Bangkok, February 2011), it is expected that ICAO Annex 10 will be amended in 2012 changing the frequency range from 108-137.975 MHz to 112-137.975 MHz. The present deliverable will be updated accordingly once the amendment is publicly available.

| <b>Proposed national transposition dates</b>   |                                 |
|--|---------------------------------|
| Date of latest announcement of this EN (doa):  | 3 months after ETSI publication |
| Date of latest publication of new National Standard or endorsement of this EN (dop/e): | 6 months after doa              |
| Date of withdrawal of any conflicting National Standard (dow):                         | 6 months after doa              |

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## Introduction

The present document is part of a set of deliverables developed by ETSI and is designed to fit in a modular structure to cover all radio and telecommunications terminal equipment within the scope of the R&TTE Directive [i.5]. The modular structure is shown in EG 201 399 [i.7].

The present document states the technical specifications for Very High Frequency (VHF) Digital Link (VDL) Mode 4 ground-based radio transmitters, transceivers and receivers for air-ground communications operating in the VHF band, using Gaussian-filtered Frequency Shift Keying (GFSK) Modulation with 25 kHz channel spacing and capable of tuning to any of the 25 kHz channels from 118,000 MHz to 136,975 MHz as defined in ICAO VHF Digital Link (VDL) Standards and Recommended Practices (SARPs) [i.4].

The present document considers the additional broadcast functionality required to support ADS-B, TIS-B, FIS-B, and GNS-B services.

The present document may be used to produce tests for the assessment of the performance of the equipment. The performance of the equipment submitted for type testing should be representative of the performance of the corresponding production model.

The present document has been written on the assumption that:

- the type test measurements will be performed only once, in an accredited test laboratory and the measurements accepted by the various authorities in order to grant type approval;
- if equipment available on the market is required to be checked it will be tested in accordance with the methods of measurement specified in the present document or a documented alternative approved by the certifying authority;
- equipment comply with EN 301 489-22 [1], EN 301 842-1 [2] and EN 301 842-2 [3].

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# 1 Scope

The present document applies to the following radio equipment types:

- Very High Frequency (VHF) Digital Link (VDL) Mode 4 ground-based radio transmitters and receivers for air-ground communications operating in the VHF band, using Gaussian-filtered Frequency Shift Keying (GFSK) Modulation with 25 kHz channel spacing and capable of tuning to any of the 25 kHz channels from 118,000 MHz to 136,975 MHz as defined in ICAO VHF Digital Link (VDL) Standards and Recommended Practices (SARPs) [i.4].

The present document provides part 3 of the technical specifications.

The present document is designed to ensure that equipment certified to it will be compatible with the relevant ICAO VHF Digital Link (VDL) Standards and Recommended Practices (SARPs) [i.4] and VDL Mode 4 Technical Manual (TM) [i.1].

Manufacturers should note that in future the tuning range for the ground transceivers may also cover any 25 kHz channel from 108,000 MHz to 117,975 MHz.

The scope of the present document is limited to ground stations. The equivalent specification for airborne stations is EN 302 842 [6], [7], [8] and [9].

A description of the scope of the VDL Mode 4 system is provided in EN 301 842-2 [3], clause 1.

EN 301 842-1 [2] deals with tests of the physical layer. EN 301 842-2 [3] deals with tests of the link layer sufficient to support broadcast functionality including requirements and tests sufficient to recognize and respond to transmissions associated with point-to-point communication. The present document provides technical specifications for a VDL Mode 4 ground-based transceiver supporting a full Automatic Dependent Surveillance-Broadcast (ADS-B) capability and, optionally, the additional functionality of either, or a combination of, the following services:

- Traffic Information Service-Broadcast (TIS-B);
- Flight Information Service-Broadcast (FIS-B);
- GNSS Augmentation Service-Broadcast (GNS-B).

The TIS-B, FIS-B or GNS-B functionality in the ground-based equipment is expected to be provided by a TIS-B, FIS-B or GNS-B processor, which could be contained within the VDL Mode 4 transceiver, but could also be housed in a separate physical unit. Therefore to support TIS-B, FIS-B or GNS-B, the minimum functionality demanded of a basic VDL Mode 4 ground-based transceiver unit (i.e. one that does not have a TIS-B, FIS-B or GNS-B processor housed within it) is to receive, from the TIS-B, FIS-B or GNS-B processor, all messages to be transmitted, and to transmit them. In the case of FIS-B there is an additional requirement to receive report request messages (from other VDL4 stations) and to pass those messages to the FIS-B processor.

It should be noted that the specifications for TIS-B, FIS-B and GNS-B in the present document represent a first step towards defining these applications, based on the work carried out as part of the NUP and MEDUP Programmes, and changes to the specifications for these services may therefore occur in the future.

The present document is organized as follows:

- clause 2 provides references to relevant documents;
- clause 3 provides general definitions, abbreviations and symbols used;
- clause 4 describes the VDL Mode 4 ground station functionality to support ADS-B, TIS-B, FIS-B and GNS B;
- clause 5 provides performance specifications for the VDL Mode 4 ground station supporting ADS-B, TIS-B, FIS-B and GNS-B Services;
- clause 6 provides general design requirements;
- clause 7 provides protocol tests which emphasis the ADS-B, TIS-B, FIS-B and GNS-B functions of the system;

- annex A provides a detailed cross-reference to the relevant requirements contained in [i.1];
- annex B provides a Bibliography;
- a document history.

Note that the system can support a very wide range of functions. It is not practical to provide specific tests for all aspects of functionality. The approach used is to provide detailed tests for the core functionality to support ADS-B, FIS B, TIS-B and GNS-B focusing on the system requirements which, if wrongly implemented, could cause a deterioration in the service offered by other VDL Mode 4 stations.

#### Mandating and Recommendation Phrases

a) "Shall":

the use of the word "Shall" indicates a mandated criterion; i.e. compliance with the particular procedure or specification is mandatory and no alternative may be applied.

b) "Should":

the use of the word "Should" (and phrases such as "It is recommended that...", etc.) indicates that though the procedure or criterion is regarded as the preferred option, alternative procedures, specifications or criteria may be applied, provided that the manufacturer, installer or tester can provide information or data to adequately support and justify the alternative.

---

## 2 References.

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

Referenced documents which are not found to be publicly available in the expected location might be found at <http://docbox.etsi.org/Reference>.

NOTE: While any hyperlinks included in this clause were valid at the time of publication ETSI cannot guarantee their long term validity.

### 2.1 Normative references

The following referenced documents are necessary for the application of the present document.

- [1] ETSI EN 301 489-22 (V1.3.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 22: Specific conditions for ground based VHF aeronautical mobile and fixed radio equipment".
- [2] ETSI EN 301 842-1 (V1.3.3): "VHF air-ground Digital Link (VDL) Mode 4 radio equipment; Technical characteristics and methods of measurement for ground-based equipment; Part 1: EN for ground equipment".
- [3] ETSI EN 301 842-2 (V1.6.1): "VHF air-ground Digital Link (VDL) Mode 4 radio equipment; Technical characteristics and methods of measurement for ground-based equipment; Part 2: General description and data link layer".
- [4] ETSI EN 301 842-4 (V1.2.2): "VHF air-ground Digital Link (VDL) Mode 4 radio equipment; Technical characteristics and methods of measurement for ground-based equipment; Part 4: Point-to-point functions".
- [5] EUROCAE ED-114 (September 2003): "MOPS for a GBAS ground facility to support CAT I approach and landing".



- [6] ETSI EN 302 842-1 (V1.2.3): "VHF air-ground and air-air Digital Link (VDL) Mode 4 radio equipment; Technical characteristics and methods of measurement for aeronautical mobile (airborne) equipment; Part 1: Physical layer".
- [7] ETSI EN 302 842-2 (V1.3.1): "VHF air-ground and air-air Digital Link (VDL) Mode 4 radio equipment; Technical characteristics and methods of measurement for aeronautical mobile (airborne) equipment; Part 2: General description and data link layer".
- [8] ETSI EN 302 842-3 (V1.3.1): "VHF air-ground and air-air Digital Link (VDL) Mode 4 radio equipment; Technical characteristics and methods of measurement for aeronautical mobile (airborne) equipment; Part 3: Additional broadcast aspects".
- [9] ETSI EN 302 842-4 (V1.2.2): "VHF air-ground and air-air Digital Link (VDL) Mode 4 radio equipment; Technical characteristics and methods of measurement for aeronautical mobile (airborne) equipment; Part 4: Point-to-point functions".

## 2.2 Informative references

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

- [i.1] ICAO Doc 9816 AN/448 (First Edition 2004): "Manual on VHF Digital Link (VDL) Mode 4, Part 2: Detailed Technical Specifications".
- [i.2] RTCA DO-242A: "Minimum Aviation System Performance Standards for Automatic Dependent Surveillance Broadcast (ADS-B)".
- [i.3] Amendments 76 and 77 to Volume I of Annex 10 to the Convention on International Civil Aviation, International Civil Aviation Organization: appendix B-B2, 3.6 Ground-Based Augmentation System (GBAS).
- [i.4] ICAO Annex 10 to the Convention on International Civil Aviation: "Aeronautical Telecommunications, Volume III: Communication Systems, Part I: Digital Data Communication Systems, chapter 6".
- [i.5] Directive 1999/5/EC of the European Parliament and of the Council of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity (R&TTE Directive).
- [i.6] Void.
- [i.7] ETSI EG 201 399: "Electromagnetic compatibility and Radio spectrum Matters (ERM); A guide to the production of Harmonized Standards for application under the R&TTE Directive".
- [i.8] WMO Publication No306: "Manual on Codes Vol 1.1, Part A".

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## 3 Definitions and abbreviations

### 3.1 Definitions

#### 3.1.1 Basic reference model definitions

See EN 301 842-2 [3], clause 3.1.1.

#### 3.1.2 Service conventions definitions

See EN 301 842-2 [3], clause 3.1.2.

### 3.1.3 General definitions

For the purposes of the present document, the terms and definitions given in EN 301 842-1 [2], clause 3.1.3, EN 301 842-2 [3], clause 3.1.3 and the following apply:

**Automatic Dependent Surveillance-Broadcast (ADS-B):** surveillance application transmitting parameters, such as position, track, ground speed and time via a broadcast mode data link for use by any air and ground users requiring it

NOTE: ADS-B is a surveillance service based on aircraft self-determination of position/velocity/time and automatic, periodic, broadcast of this information along with auxiliary data such as aircraft identity (ID), intent information and communications control parameters, etc. ADS-B is intended to support multiple high-level applications and associated services such as cockpit display of traffic information, traffic alert and collision avoidance functionality, enhanced traffic management in the air and on the ground, search and rescue support and others.

**Automatic Terminal Information Service (ATIS):** report generated by a ground station that includes weather conditions, operating procedures, runways and approaches in use, and any other information that may affect the departure, runway, and landing phase of flight

**Flight Information Service-Broadcast (FIS-B):** uplink broadcast application providing local airborne traffic with information

**GNSS augmentation Service-Broadcast (GNS-B):** uplink broadcast application providing aircraft with GNSS augmentation and integrity data

**METeorological Aerodrome Report (METAR):** report generated by a ground station that broadcasts meteorological conditions at aerodromes, officially recoded and communicated at regular intervals

**SIGNificant METeorological information (SIGMET):** report generated by a ground station that broadcasts information about weather phenomena that may have an impact on aircraft at subsonic, transonic and supersonic cruising levels including thunderstorms, cyclones, turbulence and icing

**SPECIAL observations and reports (SPECI):** report generated by a ground station that is issued when meteorological conditions change sufficiently to affect aviation operations. The SPECI report contains the same information as a METAR

**Traffic Information Service-Broadcast (TIS-B):** uplink surveillance service that derives traffic information from one or more ground surveillance sources and broadcasts that information to suitably equipped aircraft or surface vehicles

**Traffic Information Volume (TIV):** volume of airspace for which surveillance information is provided for all targets

NOTE: Inside the TIV, a pilot knows he can rely on the surveillance picture presented to him; outside the TIV, ADS-B reports may be received but TIS-B reports may not be available.

## 3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

|         |  |
|---------|--|
| ADS-B   | Automatic Dependent Surveillance-Broadcast         |
| ATIS    | Automatic Terminal Information Service             |
| CCI     | Co-Channel Interference                            |
| CPR     | Compact Position Reporting                         |
| CRC     | Cyclic Redundancy Code                             |
| DLPDU   | Data Link Protocol Data Unit                       |
| DLS     | Data Link Service                                  |
| DOS     | Directory Of Services                              |
| erid    | extended reservation ID                            |
| EUROCAE | EURopean Organization for Civil Aviation Equipment |
| FAS     | Final Approach Segment                             |
| FIS-B   | Flight Information Service-Broadcast               |
| FPAP    | Flight Path Alignment Point                        |
| fpm     | feet per minute                                    |
| fps     | feet per second                                    |

|         |   |
|---------|---|
| FTP     | Fictitious Threshold Point                                |
| GBAS    | Ground-Based Augmentation System                          |
| GCID    | GNS-B Continuity / Integrity Designator                   |
| GFSK    | Gaussian filtered Frequency Shift Keying                  |
| GLONASS | GLObal NAVigation Satellite System (Russian system)       |
| GNS-B   | GNSS augmentation Service-Broadcast                       |
| GNSS    | Global Navigation Satellite System                        |
| GPA     | Glide Path Angle  |
| GPS     | Global Positioning System                                 |
| GRAS    | Ground-based Regional Augmentation System                 |
| GSC     | Global Signalling Channel                                 |
| hex     | hexadecimal   |
| IA-5    | International Alphabet 5                                  |
| ICAO    | International Civil Aviation Organization                 |
| ID      | IDentity  |
| LTP     | Landing Threshold Point                                   |
| MASPS   | Minimum Aviation System Performance Standards             |
| MEDUP   | MEDiterranean Update Programme                            |
| METAR   | METEorological Aerodrome Report                           |
| MOPS    | Minimum Operational Performance Specification             |
| NEAN    | North European ADS-B Network                              |
| NIC     | Navigation Integrity Category                             |
| NM      | Nautical Mile   |
| NUP     | NEAN Update Programme                                     |
| PCO     | Point of Control and Observation                          |
| PRN     | Pseudo Random Noise                                       |
| R&TTE   | Radio equipment and Telecommunications Terminal Equipment |
| RCN     | Runway Condition  |
| RF      | Radio Frequency   |
| rid     | reservation ID  |
| SARPs   | Standards And Recommended Practices                       |
| SBAS    | Space-Based Augmentation System                           |
| SIGMET  | SIGNificant METeorological event                          |
| SPECI   | SPECIal observations and reports                          |
| SVQ     | State Vector Quality                                      |
| TCH     | Threshold Crossing Height                                 |
| TCP     | Trajectory Change Point                                   |
| TIS-B   | Traffic Information Service-Broadcast                     |
| TIV     | Traffic Information Volume                                |
| TV      | Transmission Volume                                       |
| UTC     | Universal Time Coordinated                                |
| VDL     | VHF Digital Link  |
| VHF     | Very High Frequency                                       |
| VSS     | VDL Mode 4 Specific Services                              |

In the tables included in the present document to illustrate the format of bursts, the following order is implied:

- a) bit order in each burst subfield shall be indicated by subscript numbers. Bit 1 shall indicate the least significant bit; and
- b) bits shall be transmitted octet by octet, starting with the first octet in each table, and within each octet the rightmost bit (as shown in the tables) shall be transmitted first.

---

## 4 General description of VDL Mode 4 ground station link layer

### 4.1 General

A description of VDL Mode 4 is provided in EN 301 842-2 [3]. This clause provides a description of the assumptions made in the derivation of the requirements for the VDL Mode 4 ground station.

In most respects, the VDL Mode 4 ground station follows the provisions of the ICAO standards material for VDL Mode 4. Within the ICAO standard, there are some requirements that apply explicitly only to airborne stations. A number of other requirements will also not apply because of the assumed services provided by the ground station. For example, it is assumed that the ground station will have no need to support net entry on a timescale shorter than one minute. The assumed services are provided by the ground station and the impact on the requirements is summarized in the rest of clause 4.

The scope of the present document is for a ground station supporting broadcast applications. Hence the ability to support point-to-point communication is not included in the present document. Those requirements are presented in EN 301 842-4 [4].

Note that, although certain protocols will not be used by the ground station, the ability to recognize the use by mobiles of these protocols and to respond in a consistent manner is a ground station requirement and is included in the present document.

### 4.2 Automatic Dependant Surveillance-Broadcast

Automatic Dependent Surveillance-Broadcast (ADS-B) is a surveillance application in which aircraft, vehicles and ground stations broadcast their identity, position, velocity, time, intent and other information, enabling other aircraft, vehicles and ground stations to develop a surveillance picture. ADS-B relies on the regular and frequent transmission of position reports via a broadcast data link. The position reports are sent periodically by the aircraft with no intervention from the ground. Position reports may be received by any recipient in range of the transmitting aircraft. Recipients may be other aircraft, ground vehicles or fixed ground sites.

ADS-B offers data delivery from aircraft-to-aircraft or from aircraft-to-ground. Transmitting data directly from air to air means that there is no need for a ground infrastructure to be present for airborne surveillance to be performed. By using position reports received from surrounding aircraft, a traffic surveillance picture can be generated in the cockpits of all of the aircraft. This potentially allows new applications or new manoeuvres to be performed by pilots.

The transmitting aircraft does not know which, if any, recipients are receiving and processing the position reports. Unlike a point-to-point link, position reports are not acknowledged. The concept with ADS-B is that position reports are transmitted so frequently that the loss of a small number of position reports is not operationally significant.

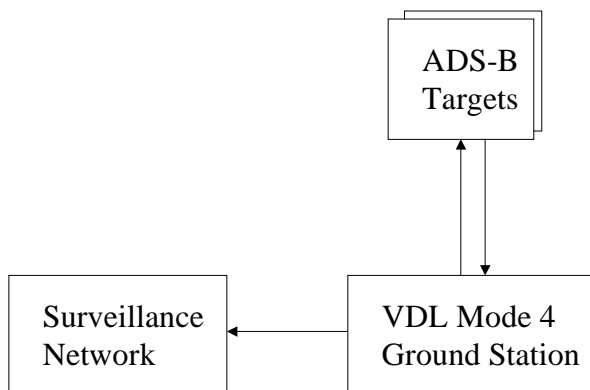
ADS-B messages are broadcast and received by appropriately equipped participant subsystems. ADS-B subsystems include aircraft, vehicles and ground subsystems. The capabilities of participant subsystems will vary based upon class of equipage. The ADS-B aircraft subsystem may interact with other onboard systems such as flight management systems, pilot display equipment and the aircraft navigation system. The ADS-B ground subsystem may interact with other ground systems such as flight data processing systems, ATM applications and controller display processing equipment.

If received by a data acquisition unit, the position report will be processed with other surveillance data and may be forwarded to a controller/pilot display.

Ground stations play an active part in the ADS-B application by broadcasting their own position (the information is used by other stations in selecting transmission slots). In addition:

- Ground Stations receive and process ADS-B reports from aircraft and other vehicles, passing the results to a surveillance server.
- Ground Stations may also transmit ADS-B requests in order to control the rate and content of the ADS-B reports generated by aircraft and other vehicles.

Figure 4.1 illustrates the context for the ground station supporting ADS-B functions.



**Figure 4.1: Ground station supporting ADS-B functions**

The requirements for ADS-B are taken from the ICAO VDL Mode 4 Technical Manual [i.1].

### 4.3 Traffic Information Service-Broadcast

Traffic Information Service-Broadcast (TIS-B) is a surveillance service that derives traffic information from one or more ground surveillance sources and broadcasts that information to suitably equipped aircraft or surface vehicles.

The purpose of TIS-B is to complement the surveillance information provided from ADS-B aircraft to ensure that a full surveillance picture is available to airborne systems.

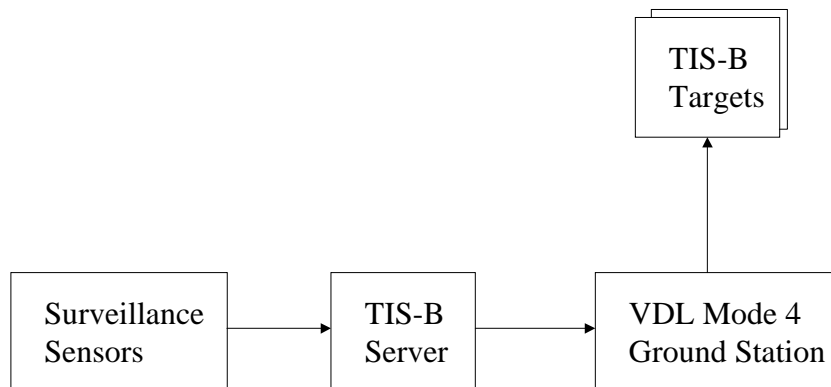
The TIS-B service is provided within an area known as the Traffic Information Volume (TIV), which is the volume of airspace for which surveillance information is provided for all targets. Inside the TIV, a pilot knows he can rely on the surveillance picture presented to him; outside the TIV, ADS-B reports may be received but TIS-B reports may not be available.

A TIS-B service either provides a "full surveillance picture" or a "gap filler service". For the full surveillance picture information is provided on all targets, the "gap filler service" information is only provided for targets which do not support ADS-B via VDL Mode 4.

TIS-B Ground Stations broadcast two main sorts of message:

- a) Management Messages: contain information about the TIS-B service and the TIV.
- b) Target Messages: contain information about aircraft or ground vehicle targets.

Figure 4.2 illustrates the context for the ground station supporting TIS-B functions.



**Figure 4.2: Ground station supporting TIS-B functions**

The TIS-B server generates Target Messages from information provided by surveillance sensors and passes them on to the VDL Mode 4 ground station for onward broadcast transmission to targets.

The specifications for TIS-B as presented in the present document are derived from the TIS-B Service Description developed by the Near Update Programme (NUP) and Mediterranean UpDate Programme (MEDUP). A reference to the NUP TIS-B Service Description is contained in the bibliography.

## 4.4 Flight Information Service-Broadcast

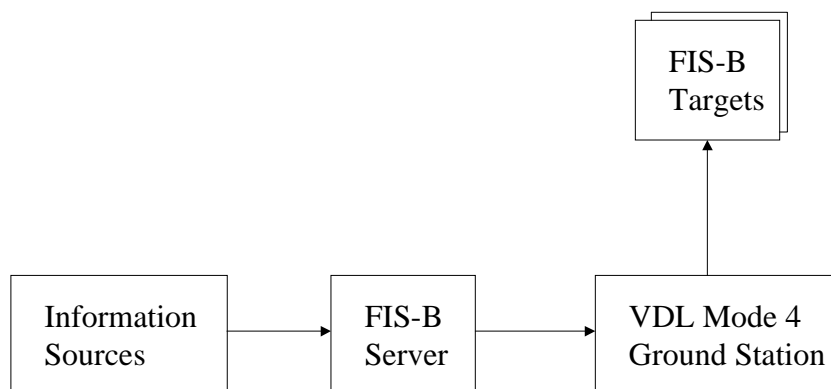
Flight Information Service-Broadcast (FIS-B) is an uplink broadcast application providing local traffic with information concerning:

The following message types are supported:

- a) **Meteorological Aerodrome Report (METAR):** METAR reports are of meteorological conditions at aerodromes, officially recoded and communicated at regular intervals. Intermediate observations are also recorded and communicated when meteorological conditions change sufficiently to affect aviation operations (see SPECI).
- b) **Automatic Terminal Information Service (ATIS):** ATIS reports are broadcasts that include weather conditions, operating procedures, runways and approaches in use, and any other information that may affect the departure, runway and landing phase of flight.
- c) **Runway Condition (RCN):** RCN reports include information about the current runway visual range conditions and any other runway condition that may affect the departure, runway and landing phases of flight.
- d) **SIGNificant Meteorological Information (SIGMET):** A SIGMET report broadcasts information about weather phenomena which may have an impact on aircraft at subsonic, transonic and supersonic cruising levels including thunderstorms, cyclones, turbulence and icing.
- e) **SPECIal Observations and Reports (SPECI):** A SPECI message is generated when meteorological conditions change sufficiently to affect aviation operations. The SPECI report contains the same information as a METAR.
- f) **REPORT REQUEST:** The FIS-B report request enables an aircraft to request specific FIS data.

The FIS-B service is provided within the Transmission Volume (TV) which is defined as the area in which FIS-B reception is possible.

Figure 4.3 illustrates the context for the ground station supporting FIS-B functions.



**Figure 4.3: Ground station supporting FIS-B functions**

The FIS-B server generates reports from relevant information sources and passes them to the VDL Mode 4 ground station for onward broadcast transmission to targets.

The specifications for FIS-B as presented in the present document are derived from the FIS-B Service Description developed by the Near Update Programme (NUP) and Mediterranean Update Programme (MEDUP). A reference to the NUP FIS-B Service Description is contained in the bibliography.

## 4.5 GNSS Augmentation Service-Broadcast (GNS-B)

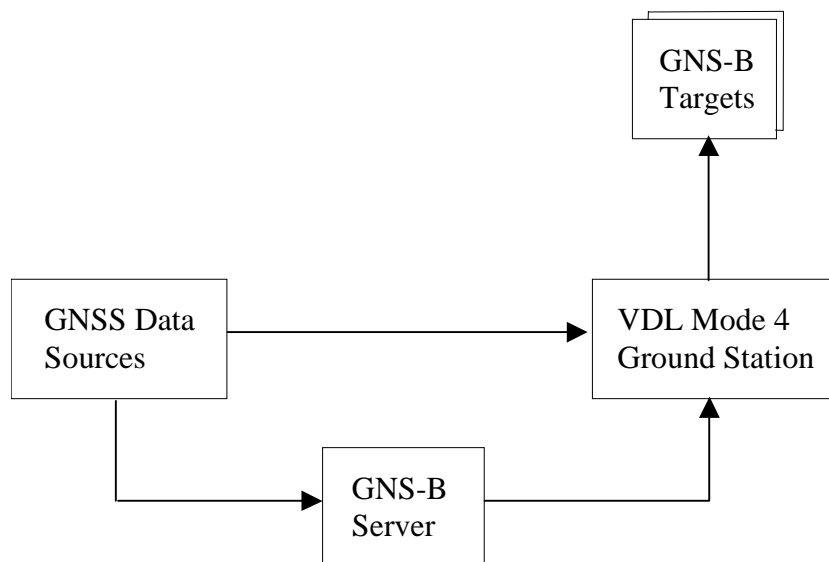
Each ground station will need to support a set of minimum requirements for the uplinking of GNSS Augmentation to enhance accuracy and integrity of GNSS. The GNSS Augmentation Service-Broadcast (GNS-B) is intended to support a range of applications such as airport surface surveillance, terminal area and en-route operations, especially at high latitudes where space based augmentation systems is outside of coverage. This function could be provided by a single ground station or as an element within a ground network.

The specifications for GNS-B shall include broadcast of:

- a) Pseudorange corrections (Message Type 1);
- b) GNS-B related data (Message Type 2);
- c) Final Approach Segment Data (Message Type 4).

Clause 5.4 of the present document includes detailed message and encoding descriptions. Broadcast rates and type of message are dependent on the applications that should be supported and are not specified in the present document.

Figure 4.4 illustrates the context for the ground station supporting GNS-B functions.



**Figure 4.4: Ground station supporting GNS-B functions**

The specifications for GNS-B as presented in the present document are derived from the GBAS specifications included in ICAO GNSS SARPs [i.3] and from the GRAS Service Description developed by the Nean Update Programme (NUP) and Mediterranean Update Programme (MEDUP). A reference to the NUP GRAS Service Description is contained in the bibliography.

## 4.6 Ground Station Coordination

The overall requirements for a network of ground stations are beyond the scope of the current document. However, each ground station will need to support a set of minimum requirements which will enable it to function as an element within a ground network. These minimum requirements shall include:

- a) receiving messages from other elements of a ground network and transmitting these messages to airborne stations;
- b) transferring messages received from airborne stations to other elements of the ground network;
- c) receiving control messages from other elements of the ground network specifying slots for transmission of particular messages;
- d) setting up reserved blocks of slots for ground use only;

- e) maintaining a ground UTC-minute time reference frame for coordination with other elements of the ground network.

Ground station coordination requirements have been derived from requirements used for the MEDUP and NUP programmes. It should be noted that much of the MEDUP and NUP programme requirements apply to the ground network as a whole and, specifically, to ground-based servers. The derived requirements provide the minimum functionality to enable the ground station to operate within such a network.

Additional requirements for ground station co-ordination can be found in EN 301 842-2 [3].

## 5 Minimum performance specification under standard test conditions

### 5.1 Requirements for ADS-B

#### 5.1.1 Information Field Formats

| Requirement reference |  |
|-----------------------|--|
| 5.1.1.1               | The information field formats that have been assigned for use by the ADS-B application shall be as defined in table 5.1. |

**Table 5.1: ADS-B information fields**

| Information field ID (id) | ID extension 1 (id1) | ID extension 2 (id2) | Information field name   |
|---------------------------|----------------------|----------------------|--|
| 0 hex                     | not present          | not present          | Basic  |
| 1 hex                     | not present          | not present          | High dynamic   |
| 2 hex                     | not present          | not present          | Full position  |
| 3 hex                     | not present          | not present          | Basic ground   |
| 4 hex                     | not present          | not present          | UTC time   |
| 5 hex                     | not present          | not present          | Single Slot SVQ  |
| 6 hex                     | Not present          | Not present          | Aircraft ID data   |
| 7 hex                     | not present          | not present          | Available for future use   |
| 8 hex                     | not present          | not present          | Two slot TCP/SVQ   |
| 9 hex                     | not present          | not present          | Single slot TCP  |
| A hex                     | 0 hex                | not present          | Available for future use   |
| A hex                     | 1 hex                | not present          | Aircraft data (call sign, category, status)                          |
| A hex                     | 2 hex to 9 hex       | not present          | Available for future use   |
| A hex                     | A hex                | 0 hex                | High resolution  |
| A hex                     | A hex                | 1 hex to 9 hex       | Available for future use   |
| A hex                     | A hex                | A hex                | Extension (available for future use via further ID extension fields) |
| A hex                     | A hex                | B hex to F hex       | Available for future use   |
| A hex                     | B hex to F hex       | not present          | Available for future use   |
| B hex to E hex            | not present          | not present          | Available for future use   |
| F hex                     | not present          | not present          | No information field provided  |

| Requirement reference |   |
|-----------------------|---|
| 5.1.1.2               | For each information field, data shall be encoded as defined in tables 5.2 to 5.11.   |
| NOTE:                 | Bits 1 and 2 in the last row of each of tables 5.2 to 5.11 are reserved for part of the reservation field (e.g. the periodic broadcast reservation field). If a reservation field is appended that does not use these bits, they should be set to zero. |



Table 5.2: Information field 0 hex - Basic

| Description  | Octet | Bit number        |                   |                               |                               |                               |                               |                               |                               |
|--|-------|-------------------|-------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
|  |       | 8                 | 7                 | 6                             | 5                             | 4                             | 3                             | 2                             | 1                             |
| information field ID   | 11    | x                 | x                 | x                             | x                             | 0                             | 0                             | 0                             | 0                             |
| Surveillance Integrity Level (SIL)<br>6-bit latitude offset (lat6)                               | 12    | sil <sub>2</sub>  | sil <sub>1</sub>  | lat <sub>6</sub> <sub>6</sub> | lat <sub>6</sub> <sub>5</sub> | lat <sub>6</sub> <sub>4</sub> | lat <sub>6</sub> <sub>3</sub> | lat <sub>6</sub> <sub>2</sub> | lat <sub>6</sub> <sub>1</sub> |
| 6-bit longitude offset (lon6)<br>baro rate/geo rate (br/gr),<br>special position indicator (spi) | 13    | spi               | br/gr             | lon <sub>6</sub> <sub>6</sub> | lon <sub>6</sub> <sub>5</sub> | lon <sub>6</sub> <sub>4</sub> | lon <sub>6</sub> <sub>3</sub> | lon <sub>6</sub> <sub>2</sub> | lon <sub>6</sub> <sub>1</sub> |
| baro/geo offset (bgo)  | 14    | altr <sub>9</sub> | bgo <sub>7</sub>  | bgo <sub>6</sub>              | bgo <sub>5</sub>              | bgo <sub>4</sub>              | bgo <sub>3</sub>              | bgo <sub>2</sub>              | bgo <sub>1</sub>              |
| altitude rate (altr)   | 15    | altr <sub>8</sub> | altr <sub>7</sub> | altr <sub>6</sub>             | altr <sub>5</sub>             | altr <sub>4</sub>             | altr <sub>3</sub>             | altr <sub>2</sub>             | altr <sub>1</sub>             |
| ground speed (gs)  | 16    | gs <sub>8</sub>   | gs <sub>7</sub>   | gs <sub>6</sub>               | gs <sub>5</sub>               | gs <sub>4</sub>               | gs <sub>3</sub>               | gs <sub>2</sub>               | gs <sub>1</sub>               |
| ground track (gt)  | 17    | gs <sub>11</sub>  | gs <sub>10</sub>  | gs <sub>9</sub>               | gt <sub>5</sub>               | gt <sub>4</sub>               | gt <sub>3</sub>               | gt <sub>2</sub>               | gt <sub>1</sub>               |
|  | 18    | gt <sub>11</sub>  | gt <sub>10</sub>  | gt <sub>9</sub>               | gt <sub>8</sub>               | gt <sub>7</sub>               | gt <sub>6</sub>               |                               |                               |

NOTE: "x" denotes part of fixed data field.

Table 5.3: Information field 1 hex - High dynamic

| Description  | Octet | Bit number                    |                               |                               |                               |                               |                               |                               |                               |
|--|-------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
|  |       | 8                             | 7                             | 6                             | 5                             | 4                             | 3                             | 2                             | 1                             |
| information field ID   | 11    | X                             | x                             | x                             | x                             | 0                             | 0                             | 0                             | 1                             |
| baro rate/geo rate (br/gr),<br>baro/geo offset (bgo)           | 12    | br/gr                         | bgo <sub>7</sub>              | bgo <sub>6</sub>              | bgo <sub>5</sub>              | bgo <sub>4</sub>              | bgo <sub>3</sub>              | bgo <sub>2</sub>              | bgo <sub>1</sub>              |
| altitude rate (altr)   | 13    | altr <sub>8</sub>             | altr <sub>7</sub>             | altr <sub>6</sub>             | altr <sub>5</sub>             | altr <sub>4</sub>             | altr <sub>3</sub>             | altr <sub>2</sub>             | altr <sub>1</sub>             |
| rate uncertainty (nucl)  | 14    | altr <sub>9</sub>             | res                           | sil <sub>2</sub>              | sil <sub>1</sub>              | gs <sub>12</sub>              | gs <sub>11</sub>              | gs <sub>10</sub>              | gs <sub>9</sub>               |
| ground speed (gs)  | 15    | gs <sub>8</sub>               | gs <sub>7</sub>               | gs <sub>6</sub>               | gs <sub>5</sub>               | gs <sub>4</sub>               | gs <sub>3</sub>               | gs <sub>2</sub>               | gs <sub>1</sub>               |
| 4-bit longitude offset (lon4),<br>4-bit latitude offset (lat4) | 16    | lon <sub>4</sub> <sub>4</sub> | lon <sub>4</sub> <sub>3</sub> | lon <sub>4</sub> <sub>2</sub> | lon <sub>4</sub> <sub>1</sub> | lat <sub>4</sub> <sub>4</sub> | lat <sub>4</sub> <sub>3</sub> | lat <sub>4</sub> <sub>2</sub> | lat <sub>4</sub> <sub>1</sub> |
| ground track (gt)  | 17    | gt <sub>8</sub>               | gt <sub>7</sub>               | gt <sub>6</sub>               | gt <sub>5</sub>               | gt <sub>4</sub>               | gt <sub>3</sub>               | gt <sub>2</sub>               | gt <sub>1</sub>               |
|  | 18    | gt <sub>12</sub>              | gt <sub>11</sub>              | gt <sub>10</sub>              | gt <sub>9</sub>               | res                           | res                           |                               |                               |

NOTE 1: "x" denotes part of fixed data field.  
NOTE 2: "res" denotes currently unused.

Table 5.4: Information field 2 hex - Full position

| Description                        | Octet | Bit number        |                  |                               |                               |                               |                               |                               |                               |
|------------------------------------|-------|-------------------|------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
|                                    |       | 8                 | 7                | 6                             | 5                             | 4                             | 3                             | 2                             | 1                             |
| information field ID               | 11    | X                 | x                | x                             | x                             | 0                             | 0                             | 1                             | 0                             |
| 6-bit latitude offset (lat6)       | 12    | pid <sub>10</sub> | pid <sub>9</sub> | lat <sub>6</sub> <sub>6</sub> | lat <sub>6</sub> <sub>5</sub> | lat <sub>6</sub> <sub>4</sub> | lat <sub>6</sub> <sub>3</sub> | lat <sub>6</sub> <sub>2</sub> | lat <sub>6</sub> <sub>1</sub> |
| patch ID (pid)                     | 13    | pid <sub>8</sub>  | pid <sub>7</sub> | pid <sub>6</sub>              | pid <sub>5</sub>              | pid <sub>4</sub>              | pid <sub>3</sub>              | pid <sub>2</sub>              | pid <sub>1</sub>              |
| baro/geo offset (bgo)              | 14    | gt <sub>11</sub>  | bgo <sub>7</sub> | bgo <sub>6</sub>              | bgo <sub>5</sub>              | bgo <sub>4</sub>              | bgo <sub>3</sub>              | bgo <sub>2</sub>              | bgo <sub>1</sub>              |
| 6-bit longitude offset (lon6)      | 15    | gt <sub>10</sub>  | gt <sub>9</sub>  | lon <sub>6</sub> <sub>6</sub> | lon <sub>6</sub> <sub>5</sub> | lon <sub>6</sub> <sub>4</sub> | lon <sub>6</sub> <sub>3</sub> | lon <sub>6</sub> <sub>2</sub> | lon <sub>6</sub> <sub>1</sub> |
| ground track (gt)                  | 16    | gt <sub>8</sub>   | gt <sub>7</sub>  | gt <sub>6</sub>               | gt <sub>5</sub>               | gt <sub>4</sub>               | gt <sub>3</sub>               | gt <sub>2</sub>               | gt <sub>1</sub>               |
| ground speed (gs)                  | 17    | gs <sub>8</sub>   | gs <sub>7</sub>  | gs <sub>6</sub>               | gs <sub>5</sub>               | gs <sub>4</sub>               | gs <sub>3</sub>               | gs <sub>2</sub>               | gs <sub>1</sub>               |
| Surveillance Integrity Level (sil) | 18    | gs <sub>11</sub>  | gs <sub>10</sub> | gs <sub>9</sub>               | res                           | sil <sub>2</sub>              | sil <sub>1</sub>              |                               |                               |

NOTE: "x" denotes part of fixed data field.

Table 5.5: Information field 3 hex - Basic ground

| Description  | Octet | Bit number                    |                               |                               |                               |                               |                               |                               |                               |
|--|-------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
|  |       | 8                             | 7                             | 6                             | 5                             | 4                             | 3                             | 2                             | 1                             |
| information field ID   | 11    | x                             | x                             | x                             | x                             | 0                             | 0                             | 1                             | 1                             |
| UTC hours (h)  | 12    | res                           | res                           | res                           | h <sub>5</sub>                | h <sub>4</sub>                | h <sub>3</sub>                | h <sub>2</sub>                | h <sub>1</sub>                |
| UTC minute (min)   | 13    | pid <sub>10</sub>             | pid <sub>9</sub>              | min <sub>6</sub>              | min <sub>5</sub>              | min <sub>4</sub>              | min <sub>3</sub>              | min <sub>2</sub>              | min <sub>1</sub>              |
| patch ID (pid)   | 14    | pid <sub>8</sub>              | pid <sub>7</sub>              | pid <sub>6</sub>              | pid <sub>5</sub>              | pid <sub>4</sub>              | pid <sub>3</sub>              | pid <sub>2</sub>              | pid <sub>1</sub>              |
| baro/geo offset (bgo)  | 15    | res                           | bgo <sub>7</sub>              | bgo <sub>6</sub>              | bgo <sub>5</sub>              | bgo <sub>4</sub>              | bgo <sub>3</sub>              | bgo <sub>2</sub>              | bgo <sub>1</sub>              |
| slot (slt)   | 16    | slt <sub>8</sub>              | slt <sub>7</sub>              | slt <sub>6</sub>              | slt <sub>5</sub>              | slt <sub>4</sub>              | slt <sub>3</sub>              | slt <sub>2</sub>              | slt <sub>1</sub>              |
| 4-bit longitude offset (lon <sub>4</sub> ),<br>4-bit latitude offset (lat <sub>4</sub> ) | 17    | lon <sub>4</sub> <sub>4</sub> | lon <sub>4</sub> <sub>3</sub> | lon <sub>4</sub> <sub>2</sub> | lon <sub>4</sub> <sub>1</sub> | lat <sub>4</sub> <sub>4</sub> | lat <sub>4</sub> <sub>3</sub> | lat <sub>4</sub> <sub>2</sub> | lat <sub>4</sub> <sub>1</sub> |
| UTC second (sec)   | 18    | sec <sub>6</sub>              | sec <sub>5</sub>              | sec <sub>4</sub>              | sec <sub>3</sub>              | sec <sub>2</sub>              | sec <sub>1</sub>              |                               |                               |

NOTE 1: "res" denotes currently unused.  
NOTE 2: "x" denotes part of fixed data field.

Table 5.6: Information field 4 hex - UTC time

| Description  | Octet | Bit number                    |                               |                               |                               |                               |                               |                               |                               |
|--|-------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
|  |       | 8                             | 7                             | 6                             | 5                             | 4                             | 3                             | 2                             | 1                             |
| information field ID   | 11    | X                             | x                             | x                             | x                             | 0                             | 1                             | 0                             | 0                             |
| UTC day (day)  | 12    | res                           | res                           | res                           | day <sub>5</sub>              | day <sub>4</sub>              | day <sub>3</sub>              | day <sub>2</sub>              | day <sub>1</sub>              |
| UTC year (yr)  | 13    | yr <sub>8</sub>               | yr <sub>7</sub>               | yr <sub>6</sub>               | yr <sub>5</sub>               | yr <sub>4</sub>               | yr <sub>3</sub>               | yr <sub>2</sub>               | yr <sub>1</sub>               |
| UTC hours (h), UTC month<br>(mon)  | 14    | h <sub>4</sub>                | h <sub>3</sub>                | h <sub>2</sub>                | h <sub>1</sub>                | mon <sub>4</sub>              | mon <sub>3</sub>              | mon <sub>2</sub>              | mon <sub>1</sub>              |
| UTC minute (min)   | 15    | res                           | h <sub>5</sub>                | min <sub>6</sub>              | min <sub>5</sub>              | min <sub>4</sub>              | min <sub>3</sub>              | min <sub>2</sub>              | min <sub>1</sub>              |
| slot (slt)   | 16    | slt <sub>8</sub>              | slt <sub>7</sub>              | slt <sub>6</sub>              | slt <sub>5</sub>              | slt <sub>4</sub>              | slt <sub>3</sub>              | slt <sub>2</sub>              | slt <sub>1</sub>              |
| 4-bit longitude offset (lon <sub>4</sub> ),<br>4-bit latitude offset (lat <sub>4</sub> ) | 17    | lon <sub>4</sub> <sub>4</sub> | lon <sub>4</sub> <sub>3</sub> | lon <sub>4</sub> <sub>2</sub> | lon <sub>4</sub> <sub>1</sub> | lat <sub>4</sub> <sub>4</sub> | lat <sub>4</sub> <sub>3</sub> | lat <sub>4</sub> <sub>2</sub> | lat <sub>4</sub> <sub>1</sub> |
| UTC second (sec)   | 18    | sec <sub>6</sub>              | sec <sub>5</sub>              | sec <sub>4</sub>              | sec <sub>3</sub>              | sec <sub>2</sub>              | sec <sub>1</sub>              |                               |                               |

NOTE: "res" denotes currently unused. "x" denotes part of fixed data field.

Table 5.7: Information field 8 hex - Two slot TCP/SVQ

| Description                    | Octet | Bit number         |                    |                    |                   |                   |                   |                   |                   |
|--------------------------------|-------|--------------------|--------------------|--------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
|                                |       | 8                  | 7                  | 6                  | 5                 | 4                 | 3                 | 2                 | 1                 |
| information field ID           | 11    | x                  | x                  | x                  | x                 | 1                 | 0                 | 0                 | 0                 |
| <b>TCP</b><br>latitude (lat)   | 12    | lat <sub>8</sub>   | lat <sub>7</sub>   | lat <sub>6</sub>   | lat <sub>5</sub>  | lat <sub>4</sub>  | lat <sub>3</sub>  | lat <sub>2</sub>  | lat <sub>1</sub>  |
|                                | 13    | balt <sub>12</sub> | balt <sub>11</sub> | balt <sub>10</sub> | balt <sub>9</sub> | lat <sub>12</sub> | lat <sub>11</sub> | lat <sub>10</sub> | lat <sub>9</sub>  |
| base altitude (balt)           | 14    | balt <sub>8</sub>  | balt <sub>7</sub>  | balt <sub>6</sub>  | balt <sub>5</sub> | balt <sub>4</sub> | balt <sub>3</sub> | balt <sub>2</sub> | balt <sub>1</sub> |
| longitude (lon)                | 15    | lon <sub>8</sub>   | lon <sub>7</sub>   | lon <sub>6</sub>   | lon <sub>5</sub>  | lon <sub>4</sub>  | lon <sub>3</sub>  | lon <sub>2</sub>  | lon <sub>1</sub>  |
|                                | 16    | ttg <sub>6</sub>   | ttg <sub>5</sub>   | lon <sub>14</sub>  | lon <sub>13</sub> | lon <sub>12</sub> | lon <sub>11</sub> | lon <sub>10</sub> | lon <sub>9</sub>  |
| time to go (ttg)               | 17    | ttg <sub>4</sub>   | ttg <sub>3</sub>   | ttg <sub>2</sub>   | ttg <sub>1</sub>  | res               | res               | res               | res               |
| <b>TCP+1</b><br>latitude (lat) | 18    | lat <sub>8</sub>   | lat <sub>7</sub>   | lat <sub>6</sub>   | lat <sub>5</sub>  | lat <sub>4</sub>  | lat <sub>3</sub>  | lat <sub>2</sub>  | lat <sub>1</sub>  |
|                                | 19    | balt <sub>12</sub> | balt <sub>11</sub> | balt <sub>10</sub> | balt <sub>9</sub> | lat <sub>12</sub> | lat <sub>11</sub> | lat <sub>10</sub> | lat <sub>9</sub>  |
| base altitude (balt)           | 20    | balt <sub>8</sub>  | balt <sub>7</sub>  | balt <sub>6</sub>  | balt <sub>5</sub> | balt <sub>4</sub> | balt <sub>3</sub> | balt <sub>2</sub> | balt <sub>1</sub> |
| longitude (lon)                | 21    | lon <sub>8</sub>   | lon <sub>7</sub>   | lon <sub>6</sub>   | lon <sub>5</sub>  | lon <sub>4</sub>  | lon <sub>3</sub>  | lon <sub>2</sub>  | lon <sub>1</sub>  |
|                                | 22    | ttg <sub>6</sub>   | ttg <sub>5</sub>   | lon <sub>14</sub>  | lon <sub>13</sub> | lon <sub>12</sub> | lon <sub>11</sub> | lon <sub>10</sub> | lon <sub>9</sub>  |
| time to go (ttg)               | 23    | ttg <sub>4</sub>   | ttg <sub>3</sub>   | ttg <sub>2</sub>   | ttg <sub>1</sub>  | res               | res               | res               | res               |

| Description   | Octet | Bit number         |                    |                               |                               |                               |                               |                               |                               |
|---|-------|--------------------|--------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
|   |       | 8                  | 7                  | 6                             | 5                             | 4                             | 3                             | 2                             | 1                             |
| <b>TCP+2</b><br>latitude (lat)  | 24    | lat <sub>8</sub>   | lat <sub>7</sub>   | lat <sub>6</sub>              | lat <sub>5</sub>              | lat <sub>4</sub>              | lat <sub>3</sub>              | lat <sub>2</sub>              | lat <sub>1</sub>              |
|   | 25    | balt <sub>12</sub> | balt <sub>11</sub> | balt <sub>10</sub>            | balt <sub>9</sub>             | lat <sub>12</sub>             | lat <sub>11</sub>             | lat <sub>10</sub>             | lat <sub>9</sub>              |
| base altitude (balt)  | 26    | balt <sub>8</sub>  | balt <sub>7</sub>  | balt <sub>6</sub>             | balt <sub>5</sub>             | balt <sub>4</sub>             | balt <sub>3</sub>             | balt <sub>2</sub>             | balt <sub>1</sub>             |
| longitude (lon)   | 27    | lon <sub>8</sub>   | lon <sub>7</sub>   | lon <sub>6</sub>              | lon <sub>5</sub>              | lon <sub>4</sub>              | lon <sub>3</sub>              | lon <sub>2</sub>              | lon <sub>1</sub>              |
|   | 28    | ttg <sub>6</sub>   | ttg <sub>5</sub>   | lon <sub>14</sub>             | lon <sub>13</sub>             | lon <sub>12</sub>             | lon <sub>11</sub>             | lon <sub>10</sub>             | lon <sub>9</sub>              |
| time to go (ttg)  | 29    | ttg <sub>4</sub>   | ttg <sub>3</sub>   | ttg <sub>2</sub>              | ttg <sub>1</sub>              | res                           | res                           | res                           | res                           |
| <b>TCP+3</b><br>latitude (lat)  | 30    | lat <sub>8</sub>   | lat <sub>7</sub>   | lat <sub>6</sub>              | lat <sub>5</sub>              | lat <sub>4</sub>              | lat <sub>3</sub>              | lat <sub>2</sub>              | lat <sub>1</sub>              |
|   | 31    | balt <sub>12</sub> | balt <sub>11</sub> | balt <sub>10</sub>            | balt <sub>9</sub>             | lat <sub>12</sub>             | lat <sub>11</sub>             | lat <sub>10</sub>             | lat <sub>9</sub>              |
| base altitude (balt)  | 32    | balt <sub>8</sub>  | balt <sub>7</sub>  | balt <sub>6</sub>             | balt <sub>5</sub>             | balt <sub>4</sub>             | balt <sub>3</sub>             | balt <sub>2</sub>             | balt <sub>1</sub>             |
| longitude (lon)   | 33    | lon <sub>8</sub>   | lon <sub>7</sub>   | lon <sub>6</sub>              | lon <sub>5</sub>              | lon <sub>4</sub>              | lon <sub>3</sub>              | lon <sub>2</sub>              | lon <sub>1</sub>              |
|   | 34    | ttg <sub>6</sub>   | ttg <sub>5</sub>   | lon <sub>14</sub>             | lon <sub>13</sub>             | lon <sub>12</sub>             | lon <sub>11</sub>             | lon <sub>10</sub>             | lon <sub>9</sub>              |
| time to go (ttg)  | 35    | ttg <sub>4</sub>   | ttg <sub>3</sub>   | ttg <sub>2</sub>              | ttg <sub>1</sub>              | res                           | res                           | res                           | res                           |
| call sign left (csl)  | 36    | csl <sub>8</sub>   | csl <sub>7</sub>   | csl <sub>6</sub>              | csl <sub>5</sub>              | csl <sub>4</sub>              | csl <sub>3</sub>              | csl <sub>2</sub>              | csl <sub>1</sub>              |
|   | 37    | csl <sub>16</sub>  | csl <sub>15</sub>  | csl <sub>14</sub>             | csl <sub>13</sub>             | csl <sub>12</sub>             | csl <sub>11</sub>             | csl <sub>10</sub>             | csl <sub>9</sub>              |
| status (st)   | 38    | st <sub>3</sub>    | st <sub>2</sub>    | st <sub>1</sub>               | csl <sub>21</sub>             | csl <sub>20</sub>             | csl <sub>19</sub>             | csl <sub>18</sub>             | csl <sub>17</sub>             |
| call sign right (csr)   | 39    | csr <sub>8</sub>   | csr <sub>7</sub>   | csr <sub>6</sub>              | csr <sub>5</sub>              | csr <sub>4</sub>              | csr <sub>3</sub>              | csr <sub>2</sub>              | csr <sub>1</sub>              |
|   | 40    | csr <sub>16</sub>  | csr <sub>15</sub>  | csr <sub>14</sub>             | csr <sub>13</sub>             | csr <sub>12</sub>             | csr <sub>11</sub>             | csr <sub>10</sub>             | csr <sub>9</sub>              |
| SVQ NAC, (nacv)   | 41    | nacv <sub>3</sub>  | nacv <sub>2</sub>  | nacv <sub>1</sub>             | csr <sub>21</sub>             | csr <sub>20</sub>             | csr <sub>19</sub>             | csr <sub>18</sub>             | csr <sub>17</sub>             |
| Resolution Advisory active flag (ra), ACAS operational flag (acas), NIC <sub>baro</sub> (nicb), CDTI display capability (cdti), NAC <sub>n</sub> (nacp) | 42    | nacp <sub>4</sub>  | nacp <sub>3</sub>  | nacp <sub>2</sub>             | nacp <sub>1</sub>             | cdti                          | nicb                          | acas                          | ra                            |
| current patch ID (pid)  | 43    | pid <sub>8</sub>   | pid <sub>7</sub>   | pid <sub>6</sub>              | pid <sub>5</sub>              | pid <sub>4</sub>              | pid <sub>3</sub>              | pid <sub>2</sub>              | pid <sub>1</sub>              |
| 6-bit latitude offset (lat6)  | 44    | pid <sub>10</sub>  | pid <sub>9</sub>   | lat <sub>6</sub> <sub>6</sub> | lat <sub>6</sub> <sub>5</sub> | lat <sub>6</sub> <sub>4</sub> | lat <sub>6</sub> <sub>3</sub> | lat <sub>6</sub> <sub>2</sub> | lat <sub>6</sub> <sub>1</sub> |
| 6-bit longitude offset (lon6)<br>baro rate/geo rate (br/gr)   | 45    | altr <sub>9</sub>  | br/gr              | lon <sub>6</sub> <sub>6</sub> | lon <sub>6</sub> <sub>5</sub> | lon <sub>6</sub> <sub>4</sub> | lon <sub>6</sub> <sub>3</sub> | lon <sub>6</sub> <sub>2</sub> | lon <sub>6</sub> <sub>1</sub> |
| altitude rate (altr)  | 46    | altr <sub>8</sub>  | altr <sub>7</sub>  | altr <sub>6</sub>             | altr <sub>5</sub>             | altr <sub>4</sub>             | altr <sub>3</sub>             | altr <sub>2</sub>             | altr <sub>1</sub>             |
| aircraft category (ac)<br>SIL (sil)   | 47    | res                | sil <sub>2</sub>   | sil <sub>1</sub>              | ac <sub>5</sub>               | ac <sub>4</sub>               | ac <sub>3</sub>               | ac <sub>2</sub>               | ac <sub>1</sub>               |
| ground speed (gs)   | 48    | gs <sub>8</sub>    | gs <sub>7</sub>    | gs <sub>6</sub>               | gs <sub>5</sub>               | gs <sub>4</sub>               | gs <sub>3</sub>               | gs <sub>2</sub>               | gs <sub>1</sub>               |
| ground track (gt)   | 49    | gs <sub>11</sub>   | gs <sub>10</sub>   | gs <sub>9</sub>               | gt <sub>5</sub>               | gt <sub>4</sub>               | gt <sub>3</sub>               | gt <sub>2</sub>               | gt <sub>1</sub>               |
|   | 50    | gt <sub>11</sub>   | gt <sub>10</sub>   | gt <sub>9</sub>               | gt <sub>8</sub>               | gt <sub>7</sub>               | gt <sub>6</sub>               |                               |                               |

NOTE 1: "x" denotes part of fixed data field; "res" denotes currently unused.  
NOTE 2: This burst definition allows a further octet of payload to complete the two slots.  
NOTE 3: The detailed definition of the TCP information fields and their operational usage is still under discussion in the aviation community. As a consequence, the TCP format definition described above may be subject to future revision.

Table 5.8: Information field 9 hex - Single slot TCP

| Description          | Octet | Bit number         |                    |                    |                   |                   |                   |                   |                   |
|----------------------|-------|--------------------|--------------------|--------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
|                      |       | 8                  | 7                  | 6                  | 5                 | 4                 | 3                 | 2                 | 1                 |
| information field ID | 11    | x                  | x                  | x                  | x                 | 1                 | 0                 | 0                 | 1                 |
| base altitude (balt) | 12    | balt <sub>8</sub>  | balt <sub>7</sub>  | balt <sub>6</sub>  | balt <sub>5</sub> | balt <sub>4</sub> | balt <sub>3</sub> | balt <sub>2</sub> | balt <sub>1</sub> |
| TCP number (no)      | 13    | balt <sub>12</sub> | balt <sub>11</sub> | balt <sub>10</sub> | balt <sub>9</sub> | no <sub>2</sub>   | no <sub>1</sub>   | pid <sub>10</sub> | pid <sub>9</sub>  |
| patch ID (pid)       | 14    | pid <sub>8</sub>   | pid <sub>7</sub>   | pid <sub>6</sub>   | pid <sub>5</sub>  | pid <sub>4</sub>  | pid <sub>3</sub>  | pid <sub>2</sub>  | pid <sub>1</sub>  |
| latitude (lat)       | 15    | lat <sub>8</sub>   | lat <sub>7</sub>   | lat <sub>6</sub>   | lat <sub>5</sub>  | lat <sub>4</sub>  | lat <sub>3</sub>  | lat <sub>2</sub>  | lat <sub>1</sub>  |
| longitude (lon)      | 16    | lat <sub>12</sub>  | lat <sub>11</sub>  | lat <sub>10</sub>  | lat <sub>9</sub>  | lon <sub>14</sub> | lon <sub>13</sub> | lon <sub>12</sub> | lon <sub>11</sub> |
|                      | 17    | lon <sub>10</sub>  | lon <sub>9</sub>   | lon <sub>8</sub>   | lon <sub>7</sub>  | lon <sub>6</sub>  | lon <sub>5</sub>  | lon <sub>4</sub>  | lon <sub>3</sub>  |
| time to go (ttg)     | 18    | ttg <sub>6</sub>   | ttg <sub>5</sub>   | ttg <sub>4</sub>   | ttg <sub>3</sub>  | ttg <sub>2</sub>  | ttg <sub>1</sub>  |                   |                   |

NOTE: "x" denotes part of fixed data field.

Table 5.9: Information field 5 hex - Single Slot SVQ

| Description  | Octet | Bit number        |                   |                   |                  |                   |                   |                   |                   |
|--|-------|-------------------|-------------------|-------------------|------------------|-------------------|-------------------|-------------------|-------------------|
|  |       | 8                 | 7                 | 6                 | 5                | 4                 | 3                 | 2                 | 1                 |
| information field ID   | 11    | x                 | x                 | x                 | x                | 0                 | 1                 | 0                 | 1                 |
| NAC <sub>p</sub>   | 12    | 0                 | 0                 | 0                 | 1                | nacp <sub>4</sub> | nacp <sub>3</sub> | nacp <sub>2</sub> | nacp <sub>1</sub> |
| NAC <sub>v</sub> (nacv), SIL (sil),<br>NIC <sub>baro</sub> (nicb), ACAS<br>operational flag (acas),<br>Resolution Advisory active<br>flag (ra) | 13    | nacv <sub>3</sub> | nacv <sub>2</sub> | nacv <sub>1</sub> | sil <sub>2</sub> | sil <sub>1</sub>  | nicb              | acas              | ra                |
| status (st) and aircraft<br>category (ac)  | 14    | st <sub>3</sub>   | st <sub>2</sub>   | st <sub>1</sub>   | ac <sub>5</sub>  | ac <sub>4</sub>   | ac <sub>3</sub>   | ac <sub>2</sub>   | ac <sub>1</sub>   |
| Reserved for future definition   | 15    | res               | res               | res               | res              | res               | res               | res               | res               |
| Reserved for future definition   | 16    | res               | res               | res               | res              | res               | res               | res               | res               |
| Reserved for future definition   | 17    | res               | res               | res               | res              | res               | res               | res               | res               |
| Reserved for future definition   | 18    | res               | res               | res               | res              | res               | res               |                   |                   |

NOTE 1: "x" denotes part of fixed data field.  
NOTE 2: "res" denotes currently unused.  
NOTE 3: The detailed definition of the SVQ information fields and their operational usage is still under discussion in the aviation community. As a consequence, the SVQ format definition described above may be subject to future revision. Currently there is a discussion in the aviation community to provide further information such as describing the ADS-B position reference point, the length and width, the capability classes (e.g. information for TCAS/ACAS, CDTI etc) and the operational mode codes (receiving ATC services, etc). There are spare octets to provide this information, when agreed in the future, but at this stage they are left unassigned to facilitate the future assignment.

Table 5.10: Information field A1 hex - Aircraft data

| Description            | Octet | Bit number        |                   |                   |                   |                   |                   |                   |                   |
|------------------------|-------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
|                        |       | 8                 | 7                 | 6                 | 5                 | 4                 | 3                 | 2                 | 1                 |
| information field ID   | 11    | x                 | x                 | x                 | x                 | 1                 | 0                 | 1                 | 0                 |
| aircraft category (ac) | 12    | 0                 | 0                 | 0                 | 1                 | ac <sub>4</sub>   | ac <sub>3</sub>   | ac <sub>2</sub>   | ac <sub>1</sub>   |
| status (st)            | 13    | ac <sub>5</sub>   | st <sub>3</sub>   | st <sub>2</sub>   | st <sub>1</sub>   | csl <sub>12</sub> | csl <sub>11</sub> | csl <sub>10</sub> | csl <sub>9</sub>  |
| call sign left (csl)   | 14    | csl <sub>8</sub>  | csl <sub>7</sub>  | csl <sub>6</sub>  | csl <sub>5</sub>  | csl <sub>4</sub>  | csl <sub>3</sub>  | csl <sub>2</sub>  | csl <sub>1</sub>  |
|                        | 15    | csl <sub>20</sub> | csl <sub>19</sub> | csl <sub>18</sub> | csl <sub>17</sub> | csl <sub>16</sub> | csl <sub>15</sub> | csl <sub>14</sub> | csl <sub>13</sub> |
| call sign right (csr)  | 16    | csl <sub>21</sub> | csr <sub>7</sub>  | csr <sub>6</sub>  | csr <sub>5</sub>  | csr <sub>4</sub>  | csr <sub>3</sub>  | csr <sub>2</sub>  | csr <sub>1</sub>  |
|                        | 17    | csr <sub>15</sub> | csr <sub>14</sub> | csr <sub>13</sub> | csr <sub>12</sub> | csr <sub>11</sub> | csr <sub>10</sub> | csr <sub>9</sub>  | csr <sub>8</sub>  |
|                        | 18    | csr <sub>21</sub> | csr <sub>20</sub> | csr <sub>19</sub> | csr <sub>18</sub> | csr <sub>17</sub> | csr <sub>16</sub> |                   |                   |

NOTE: "x" denotes part of fixed data field.

Table 5.10a: Information field 6 Hex - Aircraft ID data

| Description           | Octet | Bit number        |                   |                   |                   |                   |                   |                   |                   |
|-----------------------|-------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
|                       |       | 8                 | 7                 | 6                 | 5                 | 4                 | 3                 | 2                 | 1                 |
| Information field ID  | 11    | ma <sub>4</sub>   | ma <sub>3</sub>   | ma <sub>2</sub>   | ma <sub>1</sub>   | 0                 | 1                 | 1                 | 0                 |
| Mode A code (ma)      | 12    | ma <sub>12</sub>  | ma <sub>11</sub>  | ma <sub>10</sub>  | ma <sub>9</sub>   | ma <sub>8</sub>   | ma <sub>7</sub>   | ma <sub>6</sub>   | ma <sub>5</sub>   |
| Call sign left (csl)  | 13    | csl <sub>8</sub>  | csl <sub>7</sub>  | csl <sub>6</sub>  | csl <sub>5</sub>  | csl <sub>4</sub>  | csl <sub>3</sub>  | csl <sub>2</sub>  | csl <sub>1</sub>  |
|                       |       | csl <sub>16</sub> | csl <sub>15</sub> | csl <sub>14</sub> | csl <sub>13</sub> | csl <sub>12</sub> | csl <sub>11</sub> | csl <sub>10</sub> | csl <sub>9</sub>  |
|                       | 14    | csr <sub>3</sub>  | csr <sub>2</sub>  | csr <sub>1</sub>  | csl <sub>21</sub> | csl <sub>20</sub> | csl <sub>19</sub> | csl <sub>18</sub> | csl <sub>17</sub> |
| Call sign right (csr) | 15    | csr <sub>11</sub> | csr <sub>10</sub> | csr <sub>9</sub>  | csr <sub>8</sub>  | csr <sub>7</sub>  | csr <sub>6</sub>  | csr <sub>5</sub>  | csr <sub>4</sub>  |
|                       | 16    | csr <sub>19</sub> | csr <sub>18</sub> | csr <sub>17</sub> | csr <sub>16</sub> | csr <sub>15</sub> | csr <sub>14</sub> | csr <sub>13</sub> | csr <sub>12</sub> |
|                       | 17    | csr <sub>21</sub> | csr <sub>20</sub> |                   |                   |                   |                   |                   |                   |

NOTE 1: The call sign field provides up to eight characters of flight ID data. While ADS-B interoperability requirements require just seven characters to be represented, the last digit will be encoded with a null, per Table 5.12.  
NOTE 2: This variable part is intended for use in any type of airspace when an aircraft is not equipped with a Mode A transponder.  
NOTE 3: The provision of Mode A data is mandatory in US airspace for both ADS-B-NRA and ADS-B-RAD applications.

Table 5.11: Information field AA0 hex - High resolution

| Description                        | Octet | Bit number        |                   |                   |                   |                   |                   |                   |                   |
|------------------------------------|-------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
|                                    |       | 8                 | 7                 | 6                 | 5                 | 4                 | 3                 | 2                 | 1                 |
| information field ID               | 11    | x                 | x                 | x                 | x                 | 1                 | 0                 | 1                 | 0                 |
|                                    | 12    | 1                 | 0                 | 1                 | 0                 | 0                 | 0                 | 0                 | 0                 |
| Surveillance Integrity Level (sil) | 13    | res               | res               | sil <sub>2</sub>  | sil <sub>1</sub>  | gs <sub>12</sub>  | gs <sub>11</sub>  | gs <sub>10</sub>  | gs <sub>9</sub>   |
| ground speed (gs)                  | 14    | gs <sub>8</sub>   | gs <sub>7</sub>   | gs <sub>6</sub>   | gs <sub>5</sub>   | gs <sub>4</sub>   | gs <sub>3</sub>   | gs <sub>2</sub>   | gs <sub>1</sub>   |
| 8-bit longitude offset (lon8)      | 15    | lon8 <sub>8</sub> | lon8 <sub>7</sub> | lon8 <sub>6</sub> | lon8 <sub>5</sub> | lon8 <sub>4</sub> | lon8 <sub>3</sub> | lon8 <sub>2</sub> | lon8 <sub>1</sub> |
| 8-bit latitude offset (lat8)       | 16    | lat8 <sub>8</sub> | lat8 <sub>7</sub> | lat8 <sub>6</sub> | lat8 <sub>5</sub> | lat8 <sub>4</sub> | lat8 <sub>3</sub> | lat8 <sub>2</sub> | lat8 <sub>1</sub> |
| ground track (gt)                  | 17    | gt <sub>8</sub>   | gt <sub>7</sub>   | gt <sub>6</sub>   | gt <sub>5</sub>   | gt <sub>4</sub>   | gt <sub>3</sub>   | gt <sub>2</sub>   | gt <sub>1</sub>   |
| turn indication (tind)             | 18    | gt <sub>12</sub>  | gt <sub>11</sub>  | gt <sub>10</sub>  | gt <sub>9</sub>   | tind <sub>2</sub> | tind <sub>1</sub> |                   |                   |

NOTE 1: "x" denotes part of fixed data field.  
NOTE 2: "res" refers to bits available for the information field.

| Requirement reference |  |
|-----------------------|--|
| 5.1.1.3               | The values of the information field subfields shall be as defined in table 5.12. |

Table 5.12: Information field encoding (variable data field)

| Subfield  | Range    | Encoding  | Notes |
|---|----------|---|-------|
| Surveillance Integrity Level SIL (sil)                        | 0 to 3   | Values 0, 1, 2, 3 in accordance with the four SIL categories specified for ADS-B MASPS by RTCA DO-242A [i.2] clause 2.1.2.15.   |       |
| Position Navigation Accuracy Category NAC <sub>p</sub> (nacp) | 0 to 11  | Values 0 through 11 in accordance with the twelve NAC <sub>p</sub> categories specified for ADS-B MASPS by RTCA DO-242A [i.2] clause 2.1.2.13.  |       |
| Velocity Navigation Accuracy Category NAC <sub>v</sub> (nacv) | 0 to 4   | Values 0, 1, 2, 3, 4 in accordance with the five NAC <sub>v</sub> categories specified for ADS-B MASPS by RTCA DO-242A [i.2] clause 2.1.2.14.   |       |
| NIC <sub>baro</sub> (nicb)                                    | Binary   | 0 = Barometric pressure altitude has not been cross checked against another source of pressure altitude.<br>1 = There is more than one source of barometric pressure altitude data and cross checking of one source against another has been performed. |       |
| 4-bit latitude (lat4)   | -        | A high-resolution component to enhance the 12-bit low-resolution encoding transmitted in the fixed part (see [3] clause 5.4.2.3). Encoding of this high-resolution component is described in clause 5.1.6.  |       |
| 6-bit latitude (lat6)   | -        | See encoding for lat4.  |       |
| 8-bit latitude (lat8)   | -        | See encoding for lat4.  |       |
| 4-bit longitude (lon4)  | -        | A high-resolution component to enhance the 14-bit low-resolution encoding transmitted in the fixed part (see [3] clause 5.4.2.3). Encoding of this high-resolution component is described in clause 5.1.6.  |       |
| 6-bit longitude (lon6)  | -        | See encoding for lon4.  |       |
| 8-bit longitude (lon8)  | -        | See encoding for lon4.  |       |
| baro/geo offset (bgo)   | 0 to 127 | bgo = barometric - geometric altitude<br>Encoding as in table 5.13.   |       |
| baro rate/geo rate (br/gr)                                    | Binary   | 0 = altitude rate is barometric altitude rate.<br>1 = altitude rate is geometric altitude rate.   |       |

| Subfield                                    | Range                            | Encoding  | Notes   |
|---|----------------------------------|---|---|
| altitude rate (altr)                        | -32 100 fpm<br>to<br>+32 100 fpm | Bit $altr_0$ encodes the sign of altitude rate of change with 0 = climb and 1 = descend.<br>$altr_0$ shall be set to 0 if the magnitude of altitude rate is unknown<br>Bits $altr_8 \dots altr_1$ encode the magnitude of altitude rate of change as specified in table 5.15.   |   |
| ground speed (gs)                           | 0 to $\geq 11$<br>256 knots      | Encoding as in table 5.14.  | Range is 0 to 3 069 knots for 11 bits and 0 to 11 256 for 12 bits. Resolution steps from 1 knot to 4 knots. Note that bit 12 is only available in the high dynamic variable part. |
| ground track (gt)                           | 0° to<br>359,912°                | due North $\pm \frac{1}{2}N+1$ degrees coded as 0 and decoded as due North.<br>Resolution is $360/2^N$ degrees.   | Ground track is the same as true track. N is the number of bits (either 11 or 12) assigned in the variable field for ground track.  |
| turn indication (tind)                      | 0 to 3                           | 0 = Unknown, 1 = Left, 2 = Right<br>and 3 = Straight  | The threshold between straight and turning is an operational issue that will be specified elsewhere.  |
| patch ID (pid)                              | -                                | Encoding is described in clause 5.1.6.4.  |   |
| UTC year (yr)                               | 1 to 255                         | current year = 1970, 0 = N/A.   |   |
| UTC month (mon)                             | 1 to 12                          | integer months.   |   |
| UTC day (day)                               | 1 to 31                          | integer days, 00= N/A.  |   |
| UTC hours (h)                               | 0 to 23                          | integer hours.  |   |
| UTC minute (min)                            | 0 to 59                          | integer minutes.  |   |
| UTC second (sec)                            | 0 to 60                          | integer seconds.  | Seconds run up to 60 to allow for leap seconds.   |
| slot (slt)                                  | 0 to 255                         | integer slots, 0 indicates the first slot in the second frame.  |   |
| TCP number (no)                             | 0 to 3                           | 0 = current<br>1 = next<br>2 = next + 1<br>3 = next + 2   |   |
| TCP time to go (ttg)                        | 0 to 63                          | Indicates the time to reach the indicated TCP from either the current position (no = 0) or from the previous TCP (no = 1, 2 or 3).<br>Encoding as in table 5.18.  |   |
| call sign left (csl), call sign right (csr) |                                  | Encoding for call sign:<br>1) Call sign shall be left justified.<br>2) Only valid characters are A-Z, 0 - 9 and null: Assign A-Z = 0 - 25, 0 - 9 = 26 - 35, null = 36.<br>3) Call sign shall be an eight character string " $c_1, c_2, c_3, c_4, c_5, c_6, c_7, c_8$ ".<br>4) $csl = c_1 37^3 + c_2 37^2 + c_3 37 + c_4$ .<br>5) $csr = c_5 37^3 + c_6 37^2 + c_7 37 + c_8$ . |   |
| aircraft category (ac)                      | 0 to 31                          | Encoding as in table 5.16.  |   |
| status (st)                                 | 0 to 7                           | Encoding as in table 5.17.  |   |
| CDTI flag (cdti)                            | Binary                           | 0 = not CDTI equipped.<br>1 = CDTI equipment installed and operational.   |   |
| Special position indicator (spi)            | Binary                           | 0 = No SPI<br>1 = SPI set (IDENT button selected)   |   |

| Requirement reference  |  |
|--|--|
| 5.1.1.4  | For TCP transmission, position encoding shall use the Patch ID encoding described in clause 5.1.6.4.                                       |
| 5.1.1.5  | For transmission of the single slot TCP variable part (information field 9 hex), bits 1 and 2 of the longitude subfield shall not be sent. |
| 5.1.1.6  | On receipt of a single slot TCP variable part, the value of bits 1 and 2 shall be assumed to be equal to 0.                                |
| 5.1.1.7  | The encoding of the baro/geo offset (bgo) subfield shall be as defined in table 5.13.  |
| NOTE: The longitude (lon) subfield is truncated by two bits. This means that the available resolution will be $\pm 150$ m, except at high latitudes where the resolution will decrease to $\pm 450$ m. |  |

**Table 5.13: Baro/geo offset encoding (variable data field)**

| Barometric/geometric altitude offset of transmitting station (ft) |                                     | Transmitted value of bgo | Decoded offset (ft)       |                               |
|---|-------------------------------------|--------------------------|---------------------------|-------------------------------|
| base alt $\leq 24\,012,5$   | $24\,012,5 < \text{base alt}$       |                          | base alt $\leq 24\,012,5$ | $24\,012,5 < \text{base alt}$ |
| bgo $< -2\,075$   | bgo $< -5\,050$                     | 1                        | $< -2\,075$               | $< -5\,050$                   |
| $-2\,075 \leq \text{bgo} < -2\,025$                               | $-5\,050 \leq \text{bgo} < -4\,950$ | 2                        | -2 050                    | -5 000                        |
| $-2\,025 \leq \text{bgo} < -1\,975$                               | $-4\,950 \leq \text{bgo} < -4\,850$ | 3                        | -2 000                    | -4 900                        |
| $-1\,975 \leq \text{bgo} < -1\,925$                               | $-4\,850 \leq \text{bgo} < -4\,750$ | 4                        | -1 950                    | -4 800                        |
| $-1\,925 \leq \text{bgo} < -1\,875$                               | $-4\,750 \leq \text{bgo} < -4\,650$ | 5                        | -1 900                    | -4 700                        |
| $-1\,875 \leq \text{bgo} < -1\,825$                               | $-4\,650 \leq \text{bgo} < -4\,550$ | 6                        | -1 850                    | -4 600                        |
| ↓   | ↓                                   | ↓                        | ↓                         | ↓                             |
| $3\,975 \leq \text{bgo} < 4\,025$                                 | $7\,050 \leq \text{bgo} < 7\,150$   | 123                      | 4 000                     | 7 100                         |
| $4\,025 \leq \text{bgo} < 4\,075$                                 | $7\,150 \leq \text{bgo} < 7\,250$   | 124                      | 4 050                     | 7 200                         |
| $4\,075 \leq \text{bgo} < 4\,125$                                 | $7\,250 \leq \text{bgo} < 7\,350$   | 125                      | 4 100                     | 7 300                         |
| bgo $\geq 4\,125$   | bgo $\geq 7\,350$                   | 126                      | $> 4\,125$                | $> 7\,350$                    |
| reserved  |                                     | 127                      | error                     |                               |
| offset unknown  |                                     | 0                        | offset unknown            |                               |

| Requirement reference |   |
|-----------------------|---|
| 5.1.1.8               | The encoding of the ground speed (gs) subfield shall be as defined in table 5.14. |

Table 5.14: Ground speed encoding (variable data field)

| Actual speed over ground of transmitting station (knots) | Transmitted value of gs (decimal equivalent of field) | Decoded speed over ground (knots) |
|--|---|-----------------------------------|
| unknown  | 0   | unknown                           |
| $0 \leq \text{speed} < 0,5$                              | 1   | 0                                 |
| $0,5 \leq \text{speed} < 1,5$                            | 2   | 1                                 |
| $1,5 \leq \text{speed} < 2,5$                            | 3   | 2                                 |
| $2,5 \leq \text{speed} < 3,5$                            | 4   | 3                                 |
| $3,5 \leq \text{speed} < 4,5$                            | 5   | 4                                 |
| ↓  | ↓   | ↓                                 |
| $10\ 215 \leq \text{speed} < 1\ 022,5$                   | 1 023   | 1 022                             |
| $10\ 225 \leq \text{speed} < 1\ 024$                     | 1 024   | 1 023                             |
| $1\ 024 \leq \text{speed} < 1\ 026$                      | 1 025   | 1 025                             |
| $1\ 026 \leq \text{speed} < 1\ 028$                      | 1 026   | 1 027                             |
| ↓  | ↓   | ↓                                 |
| $3\ 068 \leq \text{speed} < 3\ 070$                      | 2 047   | 3 069                             |
| $3\ 070 \leq \text{speed} < 3\ 074$                      | 2 048   | 3 072                             |
| $3\ 074 \leq \text{speed} < 3\ 078$                      | 2 049   | 3 076                             |
| $3\ 078 \leq \text{speed} < 3\ 082$                      | 2 050   | 3 080                             |
| ↓  | ↓   | ↓                                 |
| $11\ 250 \leq \text{speed} < 11\ 254$                    | 4 093   | 11 252                            |
| $11\ 254 \leq \text{speed} < 11\ 258$                    | 4 094   | 11 256                            |
| $11\ 258 \leq \text{speed}$                              | 4 095   | more than or equal to 11 258      |

NOTE: The time over which the ground speed is computed is station-dependent.

| Requirement reference |  |
|-----------------------|--|
| 5.1.1.9               | The encoding of the magnitude part of the altitude rate (altr) subfield (bits 1 to 8) shall be as defined in table 5.15. |

NOTE: The quantization step size of altitude rate (100 fpm) is equivalent to one sigma error of 0,5 fps.

Table 5.15: Altitude rate magnitude encoding and decoding

| Actual altitude rate of transmitting station (fpm) | Transmitted decimal value of $\text{altr}_8 \dots \text{altr}_1$ | Decoded magnitude of altitude rate (fpm) |
|--|--|--|
| unknown  | 0  | unknown                                  |
| $ \text{arate}  < 50$                              | 1  | 0  |
| $50 \leq  \text{arate}  < 150$                     | 2  | 100                                      |
| $150 \leq  \text{arate}  < 250$                    | 3  | 200                                      |
| $250 \leq  \text{arate}  < 350$                    | 4  | 300                                      |
| ↓  | ↓  | ↓  |
| $19\ 950 \leq  \text{arate}  < 20\ 050$            | 201  | 20 000                                   |
| $20\ 050 \leq  \text{arate}  < 20\ 300$            | 202  | 20 200                                   |
| $20\ 300 \leq  \text{arate}  < 20\ 500$            | 203  | 20 400                                   |
| ↓  | ↓  | ↓  |
| $29\ 900 \leq  \text{arate}  < 30\ 100$            | 251  | 30 000                                   |
| $30\ 100 \leq  \text{arate}  < 30\ 500$            | 252  | 30 250                                   |
| $30\ 500 \leq  \text{arate}  < 31\ 000$            | 253  | 30 750                                   |
| $31\ 000 \leq  \text{arate}  < 32\ 000$            | 254  | 31 500                                   |
| $32\ 000 \leq  \text{arate} $                      | 255  | more than or equal to 32 000             |

| Requirement reference |  |
|-----------------------|--|
| 5.1.1.10              | The encoding of the aircraft category (ac) subfield shall be as defined in table 5.16. |



Table 5.16: Aircraft category encoding

| Encoded value              | Aircraft/vehicle category            | Comments   |
|----------------------------|--------------------------------------|--|
| 0                          | light a/c                            | 7 000 kg (15 500 lbs) or less  |
| 1                          | reserved                             |  |
| 2                          | medium a/c                           | more than 7 000 kg (15 500 lbs) and less than 136 000 kg (300 000 lbs) |
| 3                          | reserved                             |  |
| 4                          | heavy a/c                            | 136 000 kg (300 000 lbs) or more                                       |
| 5                          | highly manoeuvrable and high speed   | > 5 g acceleration capability and > 400 knots                          |
| 6, 7, 8                    | reserved                             |  |
| 9                          | rotorcraft                           |  |
| 10                         | glider/sailplane                     |  |
| 11                         | lighter than air                     |  |
| 12                         | unmanned aerial vehicle              |  |
| 13                         | space/transatmospheric vehicle       |  |
| 14                         | ultra-light/hang-glider/para-glider  |  |
| 15                         | parachutist/skydiver                 |  |
| 16, 17, 18                 | reserved                             |  |
| 19                         | surface vehicle - emergency vehicle  |  |
| 20                         | surface vehicle - service vehicle    |  |
| 21                         | fixed ground or tethered obstruction |  |
| 22, 23                     | reserved                             |  |
| 24, 25, 26, 27, 28, 29, 30 | reserved                             |  |
| 31                         | unknown                              |  |

| Requirement reference |
|-----------------------|
|-----------------------|

|          |  |
|----------|--|
| 5.1.1.11 | The encoding of the aircraft status (st) subfield shall be as defined in table 5.17. |
|----------|--|

Table 5.17: Aircraft status (emergency/priority status) encoding

| Encoded value | Status                    |
|---------------|---------------------------|
| 0             | no emergency/not reported |
| 1             | general emergency         |
| 2             | lifeguard/medical         |
| 3             | minimal fuel              |
| 4             | no communications         |
| 5             | unlawful interference     |
| 6, 7          | reserved                  |

| Requirement reference |
|-----------------------|
|-----------------------|

|          |  |
|----------|--|
| 5.1.1.12 | The encoding of the time to go (ttg) subfield shall be as defined in table 5.18. |
|----------|--|

Table 5.18: Time to go subfield encoding

| Actual time to go (minutes)  | Transmitted decimal value of ttg | Decoded magnitude of time to go (minutes) |
|------------------------------|----------------------------------|---|
| unknown                      | 0                                | No time to go information available       |
| time to go < 0,125           | 1                                | 0   |
| 0,125 ≤ time to go < 0,375   | 2                                | 0,25                                      |
| 0,375 ≤ time to go < 0,625   | 3                                | 0,5                                       |
| ↓                            | ↓                                | ↓   |
| 15,125 ≤ time to go < 15,375 | 62                               | 15,25                                     |
| 15,375 ≤ time to go          | 63                               | more than or equal to 15,375              |

| Requirement reference |   |
|-----------------------|---|
|                       | <b>Use of information fields</b>  |
| 5.1.1.13              | Information fields 3 hex and 4 hex shall only be transmitted by ground stations.  |
| 5.1.1.14              | Information fields 0 hex, 1 hex, 2 hex, 8 hex, 9 hex, 5 hex, A1 hex, and AA0 hex shall not be transmitted by ground stations. |

## 5.1.2 ADS-B Request

### 5.1.2.1 ADS-B request format

| Requirement reference |   |
|-----------------------|---|
| 5.1.2.1.1             | To request that a station transmit an ADS-B report consisting of a synchronization burst a station shall transmit a general request burst with $r-mi_1 = 0$ .   |
| 5.1.2.1.2             | To request that a station transmit an ADS-B report consisting of a synchronization burst a station shall include the auxiliary information as shown in tables 5.19, 5.20 and 5.21, as appropriate given the values of the sleep and auto bits in octet 5. |
| 5.1.2.1.3             | The information subfields shall be encoded according to table 5.22.   |
| 5.1.2.1.4             | Parameter blocks shall be included only if the respective parameter flag bit is 1.  |
| 5.1.2.1.5             | Parameter blocks shall be included in the order (most significant to least significant) of the parameter flag bits.   |
|                       | <b>Recommendation</b>   |
| 5.1.2.1.6             | A ground station should use the channel management command in preference to an ADS-B request.   |

### 5.1.2.2 Sleep Mode

| Requirement reference |  |
|-----------------------|--|
| 5.1.2.2.1             | If the requesting station desires the responding station to respond at one specified rate as a default, but a different specified rate in the event certain position or velocity deviation thresholds are exceeded, the requesting station shall set the sleep bit equal to 1 and octets 6 to 7 in table 5.20 shall be sent. |
| 5.1.2.2.2             | Otherwise, the sleep bit shall be set = 0 and octets 6 to 7 in table 5.20 shall not be sent.   |
| NOTE:                 | The default reporting rate is defined by the reservation data. The contingency reporting rate, in the event that certain position or velocity deviation thresholds are exceeded, is defined by the secondary reporting rate (snr) field.   |

### 5.1.2.3 Automatic Selection of Variable Information Fields

| Requirement reference |   |
|-----------------------|---|
| 5.1.2.3.1             | If the requesting station desires the responding station to respond with synchronization burst variable parts selected autonomously by the responding station, the requesting station shall set the auto bit = 0 and octet k in table 5.21 shall not be sent.   |
| 5.1.2.3.2             | Otherwise, the station shall set the auto bit = 1 and the desired variable part ID shall be encoded as indicated in table 5.21.   |
| NOTE 1:               | The value of k = 6 if the autonomous monitoring (sleep) bit = 0 (implying that the auxiliary information for sleep mode is not transmitted), and k = 8 if the sleep bit = 1.  |
| NOTE 2:               | The requested information ID (r-id) field, which is of variable length, should be encoded in the minimum length allowed. Then, for r-id selections supported within 4 bits, the parameter set enabled by the autonomous information (auto) bit fits in a single octet while the overall ADS-B request (with the autonomous monitoring (sleep) parameters and requested variable part identification) fits in a single-slot message of length = 19 octets.   |
| NOTE 3:               | As an example, an ADS-B request for an aircraft off the airport movement area, which is stopped, could potentially be sent with the encoding of table 5.22a. This encoding imposes sleep mode with wake up parameters, i.e. maximum sleep velocity (vel) = 4 knots and maximum sleep position (pos) = 10 m, and requests the high resolution variable part. The secondary reporting rate (snr) field indicates that the station should transmit once every second in the event that the velocity or position deviation thresholds are exceeded. |

Table 5.19: ADS-B request bit encoding

| Description   | Octet  | Bit number               |      |                    |                    |   |   |   |   |
|---|--------|--------------------------|------|--------------------|--------------------|---|---|---|---|
|   |        | 8                        | 7    | 6                  | 5                  | 4 | 3 | 2 | 1 |
| burst ID<br>autonomous monitoring (sleep),<br>autonomous information (auto),<br>requested base altitude (r-b/a) | 5      | sleep                    | auto | r-b/a <sub>2</sub> | r-b/a <sub>1</sub> | 0 | 0 | 0 | 1 |
|   | 6 to m | See tables 5.20 and 5.21 |      |                    |                    |   |   |   |   |

Table 5.20: ADS-B request bit encoding for sleep mode parameters when sleep bit = 1

| Description   | Octet | Bit number       |                  |                  |                  |                  |                  |                  |                  |
|---|-------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
|   |       | 8                | 7                | 6                | 5                | 4                | 3                | 2                | 1                |
| secondary reporting rate (snr),<br>maximum sleep velocity (vel) | 6     | snr <sub>4</sub> | snr <sub>3</sub> | snr <sub>2</sub> | snr <sub>1</sub> | vel <sub>4</sub> | vel <sub>3</sub> | vel <sub>2</sub> | vel <sub>1</sub> |
| maximum sleep position (pos)                                    | 7     | pos <sub>8</sub> | pos <sub>7</sub> | pos <sub>6</sub> | pos <sub>5</sub> | pos <sub>4</sub> | pos <sub>3</sub> | pos <sub>2</sub> | pos <sub>1</sub> |

Table 5.21: ADS-B request bit encoding for auto parameters when auto bit = 1

| Description  | Octet | Bit number      |                 |                  |                  |                   |                   |                   |                   |
|--|-------|-----------------|-----------------|------------------|------------------|-------------------|-------------------|-------------------|-------------------|
|  |       | 8               | 7               | 6                | 5                | 4                 | 3                 | 2                 | 1                 |
| length (lg), auxiliary data (aux),<br>requested information field ID (r-id)<br>(see note)          | k     | lg <sub>2</sub> | lg <sub>1</sub> | aux <sub>2</sub> | aux <sub>1</sub> | r-id <sub>4</sub> | r-id <sub>3</sub> | r-id <sub>2</sub> | r-id <sub>1</sub> |
| NOTE: The r-id field may continue into additional octets depending on the variable part requested. |       |                 |                 |                  |                  |                   |                   |                   |                   |

Table 5.22: ADS-B request field encoding

| Subfield                        | Range                   | Encoding  | Out of Scale                       | Notes   |
|---------------------------------|-------------------------|---|------------------------------------|---|
| sleep                           | Boolean                 | 0 = no sleep mode;<br>1 = sleep mode  | n/a                                | if 1, additional information describing sleep mode parameters is provided as a first additional information subfield starting in octet 6.   |
| autonomous information (auto)   | Boolean                 | 0 = autonomously select transmitted information field<br>1 = provide requested information field only   | n/a                                | if 1, additional information describing requested information is provided as an additional information subfield starting in octet 6 (if sleep = 0 implying lack of sleep mode parameters), or octet 8 (if sleep = 1). |
| requested information ID (r-id) | Binary; variable length | see table 5.2   | A value not contained in table 5.2 | Requests the information field identity contained in the variable data field.   |
| maximum sleep velocity (vel)    | 1 to 15 knots           | integer knots   | 0= ignore                          |   |
| maximum sleep position (pos)    | 1 to 255 metres         | integer metres  | 0= ignore                          |   |
| secondary reporting rate (snr)  | same as nr              | see [3], table 5.28   | n/a                                |   |
| parameter group length (lg)     | 0 to 3                  | Binary  | n/a                                | Indicates number of additional octets in parameter block (e.g. a parameter block comprising a single octet is encoded as 0).  |
| auxiliary parameters (aux)      | 0 to 3                  | If r-id = 0 or 1 hex, then:<br>00 = baro rate;<br>01 = geo rate<br>10 = reserved<br>11 = do not care.<br><br>If r-id = 9 <sub>hex</sub> , then:<br>00 = current TCP;<br>01 = next TCP,<br>10 = next + 1 TCP,<br>11 = next + 2 TCP.<br><br>If r-id = 2, 3, 4, 8, A1, or AA0 hex then:<br>aux = 00 on transmit and ignored on receipt |                                    | Interpretation depends on value of r-id field.<br><br>Unassigned values are reserved.   |
| requested base altitude (r-b/a) | 0 to 3                  | See [3], table 5.76   |                                    |   |

Table 5.22a: Example of ADS-B request bit encoding for sleep mode with request for high precision variable part

| Description   | Octet | Bit number              |                         |                         |                         |                          |                          |                          |                          |
|---|-------|-------------------------|-------------------------|-------------------------|-------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
|   |       | 8                       | 7                       | 6                       | 5                       | 4                        | 3                        | 2                        | 1                        |
| requested message ID (r-mi <sub>1</sub> )<br>(bit 4 = 0), burst ID, Autonomous monitoring (sleep), Autonomous information (auto), requested base altitude (r-b/a) | 5     | sleep<br>(1)            | auto<br>(1)             | r-<br>b/a <sub>2</sub>  | r-b/a <sub>1</sub>      | 0                        | 0                        | 0                        | 1                        |
| secondary reporting rate (snr), maximum sleep velocity (vel)  | 6     | snr <sub>4</sub><br>(1) | snr <sub>3</sub><br>(1) | snr <sub>2</sub><br>(0) | snr <sub>1</sub><br>(1) | vel <sub>4</sub><br>(0)  | vel <sub>3</sub><br>(1)  | vel <sub>2</sub><br>(0)  | vel <sub>1</sub><br>(0)  |
| maximum sleep position (pos)  | 7     | pos <sub>8</sub><br>(0) | pos <sub>7</sub><br>(0) | pos <sub>6</sub><br>(0) | pos <sub>5</sub><br>(0) | pos <sub>4</sub><br>(1)  | pos <sub>3</sub><br>(0)  | pos <sub>2</sub><br>(1)  | pos <sub>1</sub><br>(0)  |
| requested information field ID (r-id)   | 8     | lg <sub>2</sub> (0)     | lg <sub>1</sub> (0)     | aux <sub>2</sub><br>(0) | aux <sub>1</sub><br>(0) | r-id <sub>4</sub><br>(1) | r-id <sub>3</sub><br>(0) | r-id <sub>2</sub><br>(1) | r-id <sub>1</sub><br>(0) |

### 5.1.3 Default ADS-B Reporting

| Requirement reference |   |
|-----------------------|---|
| 5.1.3.1               | In the absence of an ADS-B request from a peer station or a request from the ADS-B application in the station, the station shall transmit at least 12 synchronization bursts per minute averaged over the two GSCs. |
|                       | <b>Recommendation</b>   |
| 5.1.3.2               | A station should aim to distribute its transmissions evenly between the two GSCs.   |

### 5.1.4 ADS-B Procedures

| Requirement reference   |  |
|---|--|
|   | <b>ADS-B request procedures</b>  |
| 5.1.4.1   | A station issuing an ADS-B request shall set the auto bit to 1 and include the r-id field when requesting a specific information field.  |
| 5.1.4.2   | The requesting station shall set the auto bit to 0 and not include the r-id field when it desires that the responding unit determine which information field is the most important at any point in time.   |
| 5.1.4.3   | The requesting station shall set the sleep bit to 0 when requesting a single response (e.g. via a unicast request reservation).  |
| 5.1.4.4   | The requesting station shall set the sleep bit to 1 and include position and velocity thresholds when it wants the responding station to transmit a synchronization burst in directed slots at one rate, but transmit at a higher rate under certain circumstances (see note). |
|   | <b>Transmission of time synchronization request</b>  |
| 5.1.4.5   | A station requesting the UTC time synchronization information field (information field ID 24) shall only transmit a request to a station that has announced that it is operating with a primary time source (tfom = 0 or 1).   |
|   | <b>Information field priority</b>  |
| 5.1.4.6   | When a station is requested to transmit a series of sync bursts with different variable part content, information fields 0, 1, 2, 3, 4 and A1 hex shall have priority over other information fields.   |
|   | <b>TCP/SVQ change procedures</b>   |
| 5.1.4.7   | When a mobile has set its TCP/SVQ change flag to 0, only ground stations shall be allowed to respond by issuing an ADS-B request burst requesting that the mobile transmit a synchronization burst containing the two slot TCP/SVQ variable part.                              |
| NOTE: The procedures for sleep mode apply to vertical as well as horizontal movement. |  |

### 5.1.5 CTRL Parameters

#### 5.1.5.1 Directory of Service (DOS) message

| Requirement reference |  |
|-----------------------|--|
| 5.1.5.1.1             | Directory of service information shall be transmitted by a ground station only using the CTRL DOS parameter defined in [3], clauses 5.4.3.4.2 to 5.4.3.4.12. |
| 5.1.5.1.2             | The application fields shall be encoded as defined in table 5.23.  |

**Table 5.23: Encoding of application fields**

| Encoding (decimal equivalent) | Implied meaning                 |
|-------------------------------|---------------------------------|
| 0                             | ADS-B                           |
| 1                             | TIS-B                           |
| 2                             | Secondary navigation capability |
| 3                             | FIS-B                           |
| 4                             | GNS-B                           |

| Requirement reference |  |
|-----------------------|--|
| 5.1.5.1.3             | The service information (si) field for service information type (sit) field equal to hex 00 shall be as defined in table 5.24. |

**Table 5.24: Encoding of service information field for sit = hex 00**

| Service information (si) field bit number | Service                         | Equivalent application field (see table 5.23) |
|---|---------------------------------|---|
| 1   | ADS-B                           | 0   |
| 2   | TIS-B                           | 1   |
| 3   | Secondary navigation capability | 2   |
| 4   | FIS-B                           | 3   |
| 5   | GNS-B                           | 4   |
| 6 to 8                                    | Reserved                        |   |

### 5.1.5.2 Channel Management Parameter

| Requirement reference |   |
|-----------------------|---|
| 5.1.5.2.1             | The channel management parameter shall have a parameter ID equal to C6h.  |
| 5.1.5.2.2             | If the channel management parameter is included within a UCTRL DLPDU with the ucid subfield set to 2, the channel management parameter ID and parameter length shall be omitted and no other parameter included in the UCTRL_DLPDU. |
| 5.1.5.2.3             | The channel management parameter shall be divided into component blocks as described in table 5.25.   |
| 5.1.5.2.4             | If present, each component block shall appear in the channel management parameter in the order shown in table 5.25.   |

**Table 5.25: Component blocks of channel management parameter**

| Blocks                        | Description   |
|-------------------------------|---|
| Header block                  | Contains the CTRL header and the non-repetitive information for each of the sub-elements.   |
| Destination block             | Contains a list of zero or more destinations or a geographic region, along with the timeout and slot offset from the current slot to the start of the script (zero destinations included implies broadcast).  |
| Transmission definition block | Contains from 0 to 15 transmission definitions in an unordered list. Each definition describes a particular desired transmission (one not already specified in SARPs) and all relevant options. The location of a particular transmission block in this list defines an implicit pointer used in the script block (i.e. thereby specifying a particular message). |
| Frequency block               | Contains from 1 to 7 frequencies in an ordered list and optional sleep parameters to use on each frequency. The location of a particular frequency block in this list defines an implicit pointer used in the script block (i.e. thereby specifying a particular frequency).  |
| Parameter block               | Contains QoS and other transmission parameters to use with the elements of this script.   |
| Script block                  | Contains a repeat rate and from 1 to N script elements in an ordered list. Each script element consists of an optional repeat count, a frequency block pointer, and a transmission block pointer.   |

| Requirement reference | Header block encoding  |
|-----------------------|--|
| 5.1.5.2.5             | The channel management parameter header block shall appear first in the channel management parameter and be encoded as defined in table 5.26 with subfield encodings as defined in table 5.27. |

Table 5.26: Header block bit encoding

| Description  | Octet | Bit number        |                   |                   |                   |                  |                  |                  |                 |
|--|-------|-------------------|-------------------|-------------------|-------------------|------------------|------------------|------------------|-----------------|
|  |       | 8                 | 7                 | 6                 | 5                 | 4                | 3                | 2                | 1               |
| directed timeout (dt)  | m+2   | dt <sub>4</sub>   | dt <sub>3</sub>   | dt <sub>2</sub>   | dt <sub>1</sub>   | do <sub>12</sub> | do <sub>11</sub> | do <sub>10</sub> | do <sub>9</sub> |
| directed offset (do)   | m+3   | do <sub>8</sub>   | do <sub>7</sub>   | do <sub>6</sub>   | do <sub>5</sub>   | do <sub>4</sub>  | do <sub>3</sub>  | do <sub>2</sub>  | do <sub>1</sub> |
| destination count (dc)   | m+4   | dc <sub>8</sub>   | dc <sub>7</sub>   | dc <sub>6</sub>   | dc <sub>5</sub>   | dc <sub>4</sub>  | dc <sub>3</sub>  | dc <sub>2</sub>  | dc <sub>1</sub> |
| command set ID (csid),<br>transmission definition count (tc)           | m+5   | csid <sub>4</sub> | csid <sub>3</sub> | csid <sub>2</sub> | csid <sub>1</sub> | tc <sub>4</sub>  | tc <sub>3</sub>  | tc <sub>2</sub>  | tc <sub>1</sub> |
| frequency count (fc), script duration<br>type (styp), script rate (sr) | m+6   | fc <sub>3</sub>   | fc <sub>2</sub>   | fc <sub>1</sub>   | styp              | sr <sub>4</sub>  | sr <sub>3</sub>  | sr <sub>2</sub>  | sr <sub>1</sub> |
| transmit parameter count (pc)  | m+7   | res               | res               | pc <sub>6</sub>   | pc <sub>5</sub>   | pc <sub>4</sub>  | pc <sub>3</sub>  | pc <sub>2</sub>  | pc <sub>1</sub> |
| script count (sc)  | m+8   | sc <sub>8</sub>   | sc <sub>7</sub>   | sc <sub>6</sub>   | sc <sub>5</sub>   | sc <sub>4</sub>  | sc <sub>3</sub>  | sc <sub>2</sub>  | sc <sub>1</sub> |

Table 5.27: Header block field encoding

| Subfield                           | Encoding  | Notes  |
|------------------------------------|---|--|
| directed timeout (dt)              | See [3], table 5.30.  |  |
| directed offset (do)               | See [3], table 5.30.  |  |
| destination count (dc)             | 0: destination block absent (see clause 5.1.5.2.9)<br>1 to 255 : number of octets in destination block  | 0 implies broadcast.                             |
| command set ID (csid)              | 0 to 14 : valid csid identifiers<br>15 : cancel all prior commands  | identifier specifying this command (see note).   |
| transmission definition count (tc) | 0: transmission block absent<br>1 to 15 : number of elements in the transmission definition block   |  |
| frequency count (fc)               | 0: no freq listed (csid = 15)<br>1 to 7 : number of frequencies   | The number of elements in the frequency block.   |
| script duration type (styp)        | styp = 0: interpret sr as the number of times the entire script repeats per minute;<br>styp = 1: interpret sr as the number of minutes until script repeats.  |  |
| script rate (sr)                   | 0 to 15.<br>Interpreted based on styp.<br>For styp = 0, sr is encoded per nr in [3], table 5.28.<br>For styp = 1, sr is encoded as minutes between 2 (encoded as 0) and 17 minutes.   |  |
| script count (sc)                  | 1 (encoded as 0) to 256   | Number of bytes in script block.                 |
| transmit parameter count (pc)      | 0 to 63   | Number of bytes in the transmit parameter block. |
| NOTE:                              | The command set ID (csid) allows a ground station to uplink several (up to 15) separate commands to each aircraft or set of aircraft (including all aircraft in view) which are each processed separately. A transmission with csid = x overrides operations specified in a previous transmission with csid = x, but does not affect operations dictated by previous transmissions with csid not equal to x. Hence a ground station can command multiple sets of messages (each set containing various types of transmissions), and the transmissions can have different report periods from one set to another. An example is a sequence of sync bursts on two or more frequencies defined by command set csid = 0, and a separate sequence of TCPs on the same or different frequency(ies) defined by command set csid = 1. The use of different command sets allows directed-slot operation for both command sets even though the two sets of commanded transmissions may have different burst lengths (e.g. one slot for sync bursts and two slots for TCPs). |  |

| Requirement reference  |   |
|--|---|
| 5.1.5.2.6  | The number of elements in the script (total number of transmissions over one repeat cycle) shall be designated NES. |
| 5.1.5.2.7  | The number of transmissions per minute shall be designated NTM.   |
| NOTE 1: A repeat cycle can be less than a submultiple of one minute, exactly one minute, or multiple minutes.  |   |
| NOTE 2: The definition of the script block is provided in clause 5.1.5.2.25ff. The script consists of one or more single octet fields each referring to a single transmission and one or more two octet fields each referring to one or more transmissions (as defined in the repeat count subfield). If there are n single octet fields, m double octet fields and, for each double octet field, a number of transmissions pm, then: $NES = n + \sum (m pm)$ and $sc = n + 2 m$ . |   |
| NOTE 3: The length of a single channel management parameter is limited to 255 octets because a single octet CTRL length field is used in the CTRL parameter format.  |   |

| Requirement reference   |   |
|---|---|
| <b>Destination block encoding</b>   |   |
| 5.1.5.2.8   | The destination block shall consist of zero destinations (a broadcast), one or more addressed destinations, or a regional definition, as defined in the following clauses.            |
| <b>Broadcast destination</b>  |   |
| 5.1.5.2.9   | If the destination count (dc) in the header block is zero, then the channel management parameter shall apply to all stations.   |
| <b>Addressed destination</b>  |   |
| 5.1.5.2.10  | If bit 8 of the first octet in the destination block is a zero, then the destination block shall consist of one or more addresses per table 5.28 with encoding defined in table 5.29. |
| NOTE 1: If the destination block is an implied broadcast (dc = 0 per table 5.27), it is considered to match the receiving station's ID.   |   |
| NOTE 2: Bit 8 of the first octet is used to indicate the start of the addressed destination block. If set to zero, the addressed destination block is present. If set to one a regional multicast block is present (see clause 5.1.5.2.11). Hence the individual offset for the first destination in the addressed destination block is limited to 0 to 15 and not 0 to 31. |   |

Table 5.28: Addressed destination block bit encoding

| Description             | Octet | Bit number      |                  |                  |                  |                  |                 |                 |                 |
|-------------------------|-------|-----------------|------------------|------------------|------------------|------------------|-----------------|-----------------|-----------------|
|                         |       | 8               | 7                | 6                | 5                | 4                | 3               | 2               | 1               |
| individual offset (ido) | 1     | 0               | ido <sub>4</sub> | ido <sub>3</sub> | ido <sub>2</sub> | ido <sub>1</sub> | d <sub>27</sub> | d <sub>26</sub> | d <sub>25</sub> |
| destination address (d) | 2     | d <sub>24</sub> | d <sub>23</sub>  | d <sub>22</sub>  | d <sub>21</sub>  | d <sub>20</sub>  | d <sub>19</sub> | d <sub>18</sub> | d <sub>17</sub> |
|                         | 3     | d <sub>16</sub> | d <sub>15</sub>  | d <sub>14</sub>  | d <sub>13</sub>  | d <sub>12</sub>  | d <sub>11</sub> | d <sub>10</sub> | d <sub>9</sub>  |
|                         | 4     | d <sub>8</sub>  | d <sub>7</sub>   | d <sub>6</sub>   | d <sub>5</sub>   | d <sub>4</sub>   | d <sub>3</sub>  | d <sub>2</sub>  | d <sub>1</sub>  |

Table 5.29: Addressed destination block field encoding

| Subfield                | Encoding  | Notes                           |
|-------------------------|---|---------------------------------|
| individual offset (ido) | 0 to 15 for the first address in the addressed destination block<br>0 to 31 otherwise | See description of usage below. |
| destination address (d) | See [3], clause 5.3.1.2   |                                 |



| Requirement reference  |  |
|--|--|
|  | <b>Directed Rate Operations</b>  |
| 5.1.5.2.11   | A ground station shall set the individual offset (ido) equal to zero in the destination block with a mobile station's address if it desires that the addressed station operate in directed rate mode.  |
| 5.1.5.2.12   | A ground station shall set the destination count (dc) equal to zero in the header block if it desires that all mobiles shall operate in directed rate mode.  |
|  | <b>Directed Slot Operations</b>  |
| 5.1.5.2.13   | The transmitting station shall set the directed offset (do) not equal to zero, and set the individual offset (ido) not equal to zero in a destination block with the station's address, if it desires the addressed station to operate in directed slot mode.  |
| 5.1.5.2.14   | The sum of the individual offset parameter ido for each addressed station and directed offset (do) subfield shall indicate the number of slots by which the transmissions of that station are to be offset from the first slot of the channel management command.  |
| 5.1.5.2.15   | A station transmitting a channel management parameter for which the directed offset (do) is not equal to zero, and containing one or more addressed destination blocks for which the individual offset (ido) is not equal to zero, shall first ensure that the slots which will be used by addressed stations have first been reserved using block reservation protocols (see [3] clause 5.2.17) or ground quarantine (see [3], clause 5.2.3.2). |
| NOTE: Directed slot operation is announced by setting bit 1 of octet 1 of the transmitted burst = 1. |  |

| Requirement reference   |  |
|---|--|
|   | <b>Regional multicast</b>  |
| 5.1.5.2.16  | The transmitting station shall set bit 8 of the first octet of the destination block to 1 and include the regional multicast block per table 5.30 with encoding defined in table 5.31 if it desires that all mobiles within the specified region transmit according to the channel management parameter.   |
| 5.1.5.2.17  | <p>The following conditions shall determine whether the mobile is expected to act on the channel management command:</p> <p>The mobile will be considered to be in the defined region if Condition 1 is true and either Condition 2a or Condition 2b is true:</p> <p>Condition 1: altitude compliance</p> <ul style="list-style-type: none"> <li>- the station altitude (using baro altitude if available, otherwise geo altitude) is greater than or equal to the lower altitude and less than or equal to the upper altitude.</li> </ul> <p>Condition 2a: radial range compliance when there is at least one vertex k with radial k less than or equal to the station's radial from the centre of the defined region</p> <ul style="list-style-type: none"> <li>- the station distance from the centre of the region, assuming a spherical Earth, is less than or equal to the distance k associated with the vertex k having greatest radial k less than or equal to the station's radial from the centre of the defined region; or</li> </ul> <p>Condition 2b: radial range compliance when there is no vertex with radial k less than or equal to the station's radial from the centre of the defined region</p> <ul style="list-style-type: none"> <li>- the station distance from the centre of the region, assuming a spherical Earth, is less than or equal to the distance kvc associated with the last vertex in the list.</li> </ul> |
| NOTE 1: The (radial, range) pairs may be parsed in a clockwise direction around the defined centre of the region. Each range applies at its associated radial and in a clockwise direction until another radial is encountered. |  |
| NOTE 2: A station that matches the regional broadcast filter operates according to the directed rate mechanism.   |  |

Table 5.30: Regional multicast block bit encoding

| Description                  | Octet                        | Bit number                    |                               |                               |                               |                               |                               |                               |                               |                  |
|------------------------------|------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|------------------|
|                              |                              | 8                             | 7                             | 6                             | 5                             | 4                             | 3                             | 2                             | 1                             |                  |
| vertex count (vc)            | 1                            | 1                             | res                           | lon <sub>14</sub>             | lon <sub>13</sub>             | vc <sub>4</sub>               | vc <sub>3</sub>               | vc <sub>2</sub>               | vc <sub>1</sub>               |                  |
| centre latitude (lat, lat4)  | 2                            | lon <sub>8</sub>              | lon <sub>7</sub>              | lon <sub>6</sub>              | lon <sub>5</sub>              | lon <sub>4</sub>              | lon <sub>3</sub>              | lon <sub>2</sub>              | lon <sub>1</sub>              |                  |
|                              | 3                            | lon <sub>12</sub>             | lon <sub>11</sub>             | lon <sub>10</sub>             | lon <sub>9</sub>              | lat <sub>12</sub>             | lat <sub>11</sub>             | lat <sub>10</sub>             | lat <sub>9</sub>              |                  |
| centre longitude (lon, lon4) | 4                            | lat <sub>8</sub>              | lat <sub>7</sub>              | lat <sub>6</sub>              | lat <sub>5</sub>              | lat <sub>4</sub>              | lat <sub>3</sub>              | lat <sub>2</sub>              | lat <sub>1</sub>              |                  |
|                              | 5                            | lon <sub>4</sub> <sub>4</sub> | lon <sub>4</sub> <sub>3</sub> | lon <sub>4</sub> <sub>2</sub> | lon <sub>4</sub> <sub>1</sub> | lat <sub>4</sub> <sub>4</sub> | lat <sub>4</sub> <sub>3</sub> | lat <sub>4</sub> <sub>2</sub> | lat <sub>4</sub> <sub>1</sub> |                  |
| lower altitude (lalt)        | 6                            | lalt <sub>8</sub>             | lalt <sub>7</sub>             | lalt <sub>6</sub>             | lalt <sub>5</sub>             | lalt <sub>4</sub>             | lalt <sub>3</sub>             | lalt <sub>2</sub>             | lalt <sub>1</sub>             |                  |
| upper altitude (ualt)        | 7                            | ualt <sub>8</sub>             | ualt <sub>7</sub>             | ualt <sub>6</sub>             | ualt <sub>5</sub>             | ualt <sub>4</sub>             | ualt <sub>3</sub>             | ualt <sub>2</sub>             | ualt <sub>1</sub>             |                  |
| vertex 1                     | radial 1 (r <sub>1</sub> )   | 8                             | r <sub>1,8</sub>              | r <sub>1,7</sub>              | r <sub>1,6</sub>              | r <sub>1,5</sub>              | r <sub>1,4</sub>              | r <sub>1,3</sub>              | r <sub>1,2</sub>              | r <sub>1,1</sub> |
|                              | distance 1 (d <sub>1</sub> ) | 9                             | d <sub>1,8</sub>              | d <sub>1,7</sub>              | d <sub>1,6</sub>              | d <sub>1,5</sub>              | d <sub>1,4</sub>              | d <sub>1,3</sub>              | d <sub>1,2</sub>              | d <sub>1,1</sub> |
| vertex 2<br>(as needed)      | radial 2 (r <sub>2</sub> )   | 10                            | r <sub>2,8</sub>              | r <sub>2,7</sub>              | r <sub>2,6</sub>              | r <sub>2,5</sub>              | r <sub>2,4</sub>              | r <sub>2,3</sub>              | r <sub>2,2</sub>              | r <sub>2,1</sub> |
|                              | distance 2 (d <sub>2</sub> ) | 11                            | d <sub>2,8</sub>              | d <sub>2,7</sub>              | d <sub>2,6</sub>              | d <sub>2,5</sub>              | d <sub>2,4</sub>              | d <sub>2,3</sub>              | d <sub>2,2</sub>              | d <sub>2,1</sub> |

Table 5.31: Regional multicast block field encoding

| Subfield  | Encoding  | Notes  |
|---|---|--|
| Vertex count (vc)   | 0: vertex 1<br>1 to 15: vertex 2 to vertex 16   | vertex k corresponds to radial k and distance k.   |
| centre latitude (lat, lat4)<br>centre longitude (lon, lon4) | lat, lon, lat4, lon4 are CPR encoded per clause 5.1.6. and per EN 301 842-2 [3], clause 5.6.                                | Sent using type=0, reference position is location of station transmitting this parameter.  |
| lower altitude (lalt)<br>upper altitude (ualt)              | 0: alt = -1 500 feet<br>1: alt = -1 250 feet<br>2 to 254: 250 ft linear increments up to 63 500 feet<br>255: no upper limit | Station only matches the broadcast if its altitude (baro if available, otherwise geo) is between lower and upper altitudes. Altitude code 255 is not valid for lower altitude. |
| distance (d)  | See table 5.32.   | Vertex blocks are listed in monotonically increasing radial order (clockwise around centre).   |
| radial (r)  | due North coded as 0. Resolution is 360/256 degrees, linear.  |  |

Table 5.32: Vertex distance encoding

| Transmitted value of distance<br>(decimal equivalent of field) | Within region if:  |
|--|--------------------|
| 0  | distance < 0,5 NM  |
| 1  | distance < 1,0 NM  |
| ↓  | ↓                  |
| 59   | distance < 29,5 NM |
| 60   | distance < 30 NM   |
| 61   | distance < 31 NM   |
| ↓  | ↓                  |
| 89   | distance < 59 NM   |
| 90   | distance < 60 NM   |
| 91   | distance < 62 NM   |
| ↓  | ↓                  |
| 119  | distance < 118 NM  |
| 120  | distance < 120 NM  |
| 121  | distance < 124 NM  |
| ↓  | ↓                  |
| 254  | distance < 656 NM  |
| 255  | distance < 660 NM  |

| Requirement reference |  |
|-----------------------|--|
|                       | <b>Cancellation of channel management parameter command</b>  |
| 5.1.5.2.18            | A station shall cancel a channel management parameter command with known csid by transmitting a channel management parameter with the directed timeout subfield set to 15, the directed offset (do) set to the offset from the first slot of the cancellation channel management parameter to the first slot for which the reservation shall be cancelled, and all other subfields set to the same values as in the original channel management parameter to be cancelled. |
| 5.1.5.2.19            | A station shall cancel the set of all channel management parameter commands for a station or set of stations by transmitting a channel management parameter with csid = 15.  |
|                       | <b>Transmission block encoding</b>   |
|                       | <b>Pre-defined transmission block definitions</b>  |
| 5.1.5.2.20            | The ordered list of pre-defined transmission blocks defined in table 5.33 shall be referenced by the transmission definition index (txd) subfield (see table 5.42) in the script block when the non-standard definition (nsd) subfield (see table 5.42) is equal to zero.  |

**Table 5.33: Pre-defined transmission block definition encoding**

| Encoding | Transmission definition  |
|----------|--|
| 0        | Sync burst with baro altitude, no sleep parameters, basic variable field, baro alt rate. |
| 1        | Sync burst with geo altitude, no sleep parameters, basic variable field, geo alt rate.   |
| 2        | Sync burst with baro altitude, no sleep parameters, full position variable field.        |
| 3        | Sync burst with baro altitude, no sleep parameters, aircraft data variable field.        |
| 4 to 15  | reserved.  |

NOTE: If the preferred altitude encoding is not available, then send the other if it is available.

| Requirement reference |  |
|-----------------------|--|
|                       | <b>User-defined transmission block</b>   |
| 5.1.5.2.21            | Zero to fifteen user-defined transmission blocks shall be defined in the transmission block definition clause as indicated by the tc field (see table 5.27). |
| 5.1.5.2.22            | User-defined transmission blocks shall be encoded as defined in tables 5.34 and 5.36.  |

NOTE: Octets 3 through to len+2 are all application-specific.

**Table 5.34: User-defined synchronization burst transmission block bit encoding**

| Description                | Octet | Bit number       |                  |                  |                  |                  |                  |                  |                  |
|----------------------------|-------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
|                            |       | 8                | 7                | 6                | 5                | 4                | 3                | 2                | 1                |
| ID (id)                    | 1     | id <sub>4</sub>  | id <sub>3</sub>  | id <sub>2</sub>  | id <sub>1</sub>  | aux <sub>2</sub> | aux <sub>1</sub> | b/g              | 0                |
| ID-extension (if required) | 2     | id <sub>14</sub> | id <sub>13</sub> | id <sub>12</sub> | id <sub>11</sub> | id <sub>24</sub> | id <sub>23</sub> | id <sub>22</sub> | id <sub>21</sub> |

NOTE 1: "aux" refers to auxiliary parameter.  
NOTE 2: "b/g" refers to baro/geo altitude.

**Table 5.35: User-defined synchronization burst transmission block field encoding**

| Subfield                           | Encoding  | Notes   |
|------------------------------------|---|---|
| baro/geo selection (b/g)           | b/g = 0: send baro<br>b/g = 1: send geo   | If the preferred altitude encoding is not available, then send the other if it is available.  |
| variable field ID (and extensions) | Per table 5.1   | Octet 2 is only included when necessary.  |
| auxiliary selection (aux)          | For those variable fields with a selection (e.g. basic, high dynamic, TCP), send selection = aux. | If the requested data is not available, but the alternate is, then send the alternate. As an example, for the basic variable field, aux=0 means send baro rate. |

**Table 5.36: Non-sync burst transmission block bit encoding**

| Description                              | Octet | Bit number       |                    |                  |                  |                  |                  |                  |                  |
|--|-------|------------------|--------------------|------------------|------------------|------------------|------------------|------------------|------------------|
|  |       | 8                | 7                  | 6                | 5                | 4                | 3                | 2                | 1                |
| message ID (mid)                         | 1     | mid <sub>8</sub> | mid <sub>7</sub>   | mid <sub>6</sub> | mid <sub>5</sub> | mid <sub>4</sub> | mid <sub>3</sub> | mid <sub>2</sub> | mid <sub>1</sub> |
| length (len), application specific (app) | 2     | app <sub>j</sub> | app <sub>j-1</sub> | .....            | app <sub>1</sub> | len <sub>4</sub> | len <sub>3</sub> | len <sub>2</sub> | len <sub>1</sub> |

NOTE: Octets 2 through to len+2 are all application specific.

! ..... ! ----- Denotes variable length field

**Table 5.37: Non-sync burst transmission block field encoding**

| Subfield                        | Encoding           | Notes   |
|---------------------------------|--------------------|---|
| application specific data (app) |                    | Defined by the application specified by the message ID.   |
| length (len)                    | 0 to 15            | Number of octets following the length (i.e. an application requiring only 4 bits of parameters would encode a 0 for length).  |
| message ID (mid)                | Per [3], table 5.3 | Note that mid <sub>1</sub> equals 1 for all message types except the synchronization burst - hence this bit distinguishes the format of table 5.34 from that of table 5.36. |

| Requirement reference           |  |
|---------------------------------|--|
| <b>Frequency block encoding</b> |  |
| 5.1.5.2.23                      | Zero to seven frequencies (as indicated by the fc field in the header block) shall be encoded as defined in table 5.38 with subfield encodings as defined in table 5.39. |
| 5.1.5.2.23aa                    | The frequencies in the frequency block shall be ordered in priority such that mandatory frequencies are listed first.  |
| 5.1.5.2.23ab                    | The GSC channels shall always be included in the frequency block as mandatory frequencies (rcv = 1), and always listed before non-GSC frequencies.                       |

**Table 5.38: Frequency block bit encoding**

| Description | Octet | Bit number     |                |                |                |                 |                 |                 |                |
|-------------|-------|----------------|----------------|----------------|----------------|-----------------|-----------------|-----------------|----------------|
|             |       | 8              | 7              | 6              | 5              | 4               | 3               | 2               | 1              |
| flags       | 1     | sleep          | auto           | rcv            | res            | f <sub>12</sub> | f <sub>11</sub> | f <sub>10</sub> | f <sub>9</sub> |
| freq        | 2     | f <sub>8</sub> | f <sub>7</sub> | f <sub>6</sub> | f <sub>5</sub> | f <sub>4</sub>  | f <sub>3</sub>  | f <sub>2</sub>  | f <sub>1</sub> |

NOTE 1: "sleep" denotes autonomous monitoring.  
NOTE 2: "auto" denotes autonomous information.  
NOTE 3: "rcv" denotes Must Receive.  
NOTE 4: "res" denotes reserved bit.

Table 5.39: Frequency block field encoding

| Subfield           | Encoding   | Notes   |
|--------------------|--|---|
| frequency (f)      | See [3], table 5.26  |   |
| must receive (rcv) | rcv = 0: reception on the specified frequency is optional.<br>rcv = 1: reception on the specified frequency is mandatory.  | As the list is ordered in priority, a station receiving a list with a frequency with rcv=0 before a frequency with rcv=1 shall discard the entire channel management parameter. |
| sleep              | Per clauses 5.1.2.2 and 5.1.2.3.   | If the sleep bit is set, then the octets defined in table 5.20 are appended.  |
| auto               | auto = 0: the receiving station shall choose its transmissions autonomously and ignore any reference to this frequency in the script block.<br>auto = 1: the receiving station shall transmit on this frequency according to the definition in the script block. | If the auto bit is set to 0, the script block shall not refer to this frequency.  |

| Requirement reference   | Parameter block definition   |
|---|--|
| 5.1.5.2.24  | The transmitting station shall include parameter octets defined in table 5.40 if it desires the receiving station to transmit all of the streams defined in the script using those parameters. |
| NOTE: Transmit parameter count (pc) would be greater than the length of table 5.40 if more parameters were added after the software was released. |  |

Table 5.40: Parameter block bit encoding

| Description        | Octet | Bit number        |                  |                   |                  |                   |                  |                   |                  |
|--------------------|-------|-------------------|------------------|-------------------|------------------|-------------------|------------------|-------------------|------------------|
|                    |       | 8                 | 7                | 6                 | 5                | 4                 | 3                | 2                 | 1                |
| Q2a                | 1     | Q2a <sub>8</sub>  | Q2a <sub>7</sub> | Q2a <sub>6</sub>  | Q2a <sub>5</sub> | Q2a <sub>4</sub>  | Q2a <sub>3</sub> | Q2a <sub>2</sub>  | Q2a <sub>1</sub> |
| Q2b                | 2     | Q2b <sub>8</sub>  | Q2b <sub>7</sub> | Q2b <sub>6</sub>  | Q2b <sub>5</sub> | Q2b <sub>4</sub>  | Q2b <sub>3</sub> | Q2b <sub>2</sub>  | Q2b <sub>1</sub> |
| Q2c                | 3     | Q2c <sub>8</sub>  | Q2c <sub>7</sub> | Q2c <sub>6</sub>  | Q2c <sub>5</sub> | Q2c <sub>4</sub>  | Q2c <sub>3</sub> | Q2c <sub>2</sub>  | Q2c <sub>1</sub> |
| Q2d                | 4     | Q2d <sub>8</sub>  | Q2d <sub>7</sub> | Q2d <sub>6</sub>  | Q2d <sub>5</sub> | Q2d <sub>4</sub>  | Q2d <sub>3</sub> | Q2d <sub>2</sub>  | Q2d <sub>1</sub> |
| Q2a, Q2b, Q2c, Q2d | 5     | Q2d <sub>10</sub> | Q2d <sub>9</sub> | Q2c <sub>10</sub> | Q2c <sub>9</sub> | Q2b <sub>10</sub> | Q2b <sub>9</sub> | Q2a <sub>10</sub> | Q2a <sub>9</sub> |
| Q1, Q4             | 6     | Q1 <sub>3</sub>   | Q1 <sub>2</sub>  | Q1 <sub>1</sub>   | Q4 <sub>5</sub>  | Q4 <sub>4</sub>   | Q4 <sub>3</sub>  | Q4 <sub>2</sub>   | Q4 <sub>1</sub>  |
| Q1, V12            | 7     | Q1 <sub>4</sub>   | V12 <sub>7</sub> | V12 <sub>6</sub>  | V12 <sub>5</sub> | V12 <sub>4</sub>  | V12 <sub>3</sub> | V12 <sub>2</sub>  | V12 <sub>1</sub> |
| VS2 (db)           | 8     | res               | res              | VS2 <sub>6</sub>  | VS2 <sub>5</sub> | VS2 <sub>4</sub>  | VS2 <sub>3</sub> | VS2 <sub>2</sub>  | VS2 <sub>1</sub> |
| VS4 (NM)           | 9     | res               | VS4 <sub>7</sub> | VS4 <sub>6</sub>  | VS4 <sub>5</sub> | VS4 <sub>4</sub>  | VS4 <sub>3</sub> | VS4 <sub>2</sub>  | VS4 <sub>1</sub> |

NOTE: "res" refers to bits available for the information field.

| Requirement reference | Script block definition  |
|-----------------------|--|
| 5.1.5.2.25            | The channel management parameter script shall be encoded as defined in table 5.41 with subfield encoding as defined in table 5.42. |
| 5.1.5.2.26            | The script block shall contain one or more script elements.  |
| 5.1.5.2.27            | The two types of script elements shall be as shown in table 5.41.  |
| 5.1.5.2.28            | A transmitting station shall not transmit a script block with two consecutive octets having bits 6 to 8 equal to "111".            |

**Table 5.41: Script block bit encoding**

| Description   | Octet | Bit number        |                   |                   |                  |                  |                  |                  |                  |
|---|-------|-------------------|-------------------|-------------------|------------------|------------------|------------------|------------------|------------------|
|   |       | 8                 | 7                 | 6                 | 5                | 4                | 3                | 2                | 1                |
| freq index (freq), transmission definition index (txd)                                | 1     | freq <sub>3</sub> | freq <sub>2</sub> | freq <sub>1</sub> | nsd              | txd <sub>4</sub> | txd <sub>3</sub> | txd <sub>2</sub> | txd <sub>1</sub> |
|   |       |                   |                   |                   | or               |                  |                  |                  |                  |
| repeat count (rpt)  | 1     | 1                 | 1                 | 1                 | rpt <sub>5</sub> | rpt <sub>4</sub> | rpt <sub>3</sub> | rpt <sub>2</sub> | rpt <sub>1</sub> |
| freq index (freq), non-standard definition (nsd), transmission definition index (txd) | 2     | freq <sub>3</sub> | freq <sub>2</sub> | freq <sub>1</sub> | nsd              | txd <sub>4</sub> | txd <sub>3</sub> | txd <sub>2</sub> | txd <sub>1</sub> |

**Table 5.42: Script block field encoding**

| Subfield                            | Encoding  | Notes   |
|-------------------------------------|---|---|
| Frequency index (freq)              | 0 to 6 : integer index into freq block<br>7 : repeat flag (second octet with freq index follows).   | The offset from the beginning of the frequency list. (An encoding of 0 refers to the first element in the frequency block.)   |
| Non-standard definition (nsd)       | nsd = 0: txd encoded as defined in table 5.33.<br>nsd = 1: txd indicates offset from beginning of transmission definition list (see clause 5.1.5.2.18). |   |
| Transmission definition index (txd) | 0 to 15   | The offset from the beginning of the transmission definition list (An encoding of 0 refers to the first element in the list.) |
| Repeat count (rpt)                  | 3 (encoded as 0) to 34  | The number of times to repeat the frequency and (nsd, txd) listed in octet 2.   |

## 5.1.6 Definitions for Compact Position Reporting

### 5.1.6.1 Information Field Offset Encoding

| Requirement reference |  |
|-----------------------|--|
|                       | <b>General</b>   |
| 5.1.6.1.1             | Given a position and its fixed data field encoding, a high resolution offset encoding of size <i>bits</i> together with an additional bit indicating the sign of the offset shall be computed as defined below.  |
| 5.1.6.1.2             | The offset shall be encoded in the sub-fields lat4, lon4 (for <i>bits</i> = 3), lat6, lon6 (for <i>bits</i> = 5) or lat8, lon8 (for <i>bits</i> = 7) dependent on which synchronization burst variable part is to be transmitted.  |
|                       | <b>Input parameters</b>  |
| 5.1.6.1.3             | The input parameters used for information field offset encoding shall be defined as follows:<br><i>clat<sub>in</sub></i> = latitude to be encoded.<br><i>clon<sub>in</sub></i> = longitude to be encoded.<br><i>lat</i> = the CPR encoded latitude.<br><i>lon</i> = the CPR encoded longitude.<br><i>type</i> = type of CPR (odd or even).<br><i>bits</i> = number of bits in magnitude of the offset.   |
|                       | <b>Calculations</b>  |
|                       | <b>Supporting functions</b>  |
| 5.1.6.1.4             | The supporting function for calculating the information field offset shall be as follows:<br>$diff(pos_1, pos_2) = \begin{cases} pos_1 - pos_2 - MAX_C - 1 & \text{if } pos_1 > pos_2 + MAX_C / 2 \\ pos_1 - pos_2 + MAX_C + 1 & \text{if } pos_2 > pos_1 + MAX_C / 2 \\ pos_1 - pos_2 & \text{else} \end{cases}$ $sign(pos_1, pos_2) = \begin{cases} 1 & \text{if } diff(pos_1, pos_2) \geq 0 \\ 0 & \text{else} \end{cases}$   |
|                       | <b>Latitude</b>  |
| 5.1.6.1.5             | The encoded fixed latitude offset shall be calculated as follows:<br>$lat = enc_{lat}(clat_{in}, type)$<br>$clat_{dec} = dec_{lat}(clat_{in}, lat, type)$<br>$tmp_7 = \frac{MAX_C}{2 \cdot nz(type) \cdot MAX_T^{lat} \cdot (2^{bits} - 1)}$ $offset_{enc}^{lat}(clat_{in}, clat_{dec}, bits, type) = \frac{ diff(clat_{in}, clat_{dec})  + \frac{tmp_7}{2}}{tmp_7}$ $lat4(bits\ 1\ to\ 3) = offset_{enc}^{lat}(clat_{in}, clat_{dec}, 3, type)$<br>$lat6(bits\ 1\ to\ 5) = offset_{enc}^{lat}(clat_{in}, clat_{dec}, 5, type)$<br>$lat8(bits\ 1\ to\ 7) = offset_{enc}^{lat}(clat_{in}, clat_{dec}, 7, type)$<br>$lat4(bit\ 4) = lat6(bit\ 6) = lat8(bit\ 8) = sign(clat_{in}, clat_{dec})$ |

| Requirement reference | Longitude   |
|-----------------------|---|
| 5.1.6.1.6             | <p>The encoded fixed longitude offset shall be calculated as follows:</p> $lon = enc_{lon}(clat_{dec}, clon_{in}, type)$ $clon_{dec} = dec_{lon}(clat_{dec}, clon_{in}, lon, lon, type)$ $tmp_8 = \frac{MAX_C}{2 \cdot nl(clat_{dec}, type) \cdot MAX_T^{lon} \cdot (2^{bits} - 1)}$ $offset_{enc}^{lon}(clat_{dec}, clon_{in}, clon_{dec}, bits, type) = \frac{ diff(clon_{in}, clon_{dec})  + \frac{tmp_8}{2}}{tmp_8}$ $lon4(bits\ 1\ to\ 3) = offset_{enc}^{lon}(clat_{dec}, clon_{in}, clon_{dec}, 3, type)$ $lon6(bits\ 1\ to\ 5) = offset_{enc}^{lon}(clat_{dec}, clon_{in}, clon_{dec}, 5, type)$ $lon8(bits\ 1\ to\ 7) = offset_{enc}^{lon}(clat_{dec}, clon_{in}, clon_{dec}, 7, type)$ $lon4(bit\ 4) = lon6(bit\ 6) = lon8(bit\ 8) = sign(clon_{in}, clon_{dec})$ |



## 5.1.6.2 Information Field Offset Decoding

| Requirement reference |  |
|-----------------------|--|
|                       | <b>General</b>   |
| 5.1.6.2.1             | To decode the information field latitude and longitude offsets, the offset values defined below shall be added to the position from the fixed data field position decoding (either local or global) to determine the actual target position.   |
|                       | <b>Input parameters</b>  |
| 5.1.6.2.2             | The input parameters used for information field offset decoding shall be defined as follows:<br><br><i>lat4, lat6, lat8</i> = received latitude offset.<br><i>lon4, lon6, lon8</i> = received longitude offset.<br><i>type</i> = type of encoding (odd or even).<br><i>clatdec</i> = the target's decoded latitude.  |
|                       | Calculations   |
|                       | Latitude   |
| 5.1.6.2.3             | The decoded fixed latitude offset shall be calculated as follows:<br><br>$bits = \begin{cases} 3 & \text{if } lat4, lon4 \text{ provided as input} \\ 5 & \text{if } lat6, lon6 \text{ provided as input} \\ 7 & \text{if } lat8, lon8 \text{ provided as input} \end{cases}$ $lat_{offs} = \begin{cases} lat4(bits\ 1\ to\ 3) & \text{if } lat4, lon4 \text{ provided as input} \\ lat6(bits\ 1\ to\ 5) & \text{if } lat6, lon6 \text{ provided as input} \\ lat8(bits\ 1\ to\ 7) & \text{if } lat8, lon8 \text{ provided as input} \end{cases}$ $s_{lat} = \begin{cases} lat4(bit\ 4) & \text{if } lat4, lon4 \text{ provided as input} \\ lat6(bit\ 6) & \text{if } lat6, lon6 \text{ provided as input} \\ lat8(bit\ 8) & \text{if } lat8, lon8 \text{ provided as input} \end{cases}$ $tmp_9 = \frac{MAX_c}{2 \cdot nz(type) \cdot MAX_T^{lat} \cdot (2^{bits} - 1)}$ $offset_{dec}^{lat}(lat_{offs}, s_{lat}, bits, type) = \begin{cases} lat_{offs} \cdot tmp_7 & \text{if } s_{lat} = 1 \\ -lat_{offs} \cdot tmp_7 & \text{if } s_{lat} = 0 \end{cases}$ |
|                       | <b>Longitude</b>   |
| 5.1.6.2.4             | The decoded fixed longitude offset shall be calculated as follows:<br><br>$lon_{offs} = \begin{cases} lon4(bits\ 1\ to\ 3) & \text{if } lat4, lon4 \text{ provided as input} \\ lon6(bits\ 1\ to\ 5) & \text{if } lat6, lon6 \text{ provided as input} \\ lon8(bits\ 1\ to\ 7) & \text{if } lat8, lon8 \text{ provided as input} \end{cases}$ $s_{lon} = \begin{cases} lon4(bit\ 4) & \text{if } lat4, lon4 \text{ provided as input} \\ lon6(bit\ 6) & \text{if } lat6, lon6 \text{ provided as input} \\ lon8(bit\ 8) & \text{if } lat8, lon8 \text{ provided as input} \end{cases}$ $tmp_{10} = \frac{MAX_c}{2 \cdot nl(clat_{dec}, type) \cdot MAX_T^{lon} \cdot (2^{bits} - 1)}$ $offset_{dec}^{lon}(clat_{dec}, lon_{offs}, s_{lon}, bits, type) = \begin{cases} lon_{offs} \cdot tmp_8 & \text{if } s_{lon} = 1 \\ -lon_{offs} \cdot tmp_8 & \text{if } s_{lon} = 0 \end{cases}$  |
|                       | NOTE 1: $tmp_7$ is defined in 5.1.6.1.5.<br>NOTE 2: $tmp_8$ is defined in 5.1.6.1.6.   |

## 5.1.6.3 Patch ID Encoding

| Requirement reference |  |
|-----------------------|--|
|                       | <b>General</b>   |
| 5.1.6.3.1             | When a station sends an unambiguous global position in a single message, then it shall transmit the value of $enc_{patch}()$ as the patch ID ( $pid$ ).  |
|                       | <b>Input parameters</b>  |
| 5.1.6.3.2             | The input parameters used for patch ID encoding shall be defined as follows:<br>$clat_{in}$ = latitude to encode.<br>$clon_{in}$ = longitude to encode.<br>$type$ = type of encoding (odd or even).  |
|                       | <b>Calculations</b>  |
| 5.1.6.3.3             | The encoded patch ID shall be calculated as follows:<br>$lat_p = \begin{cases} \frac{clat_{in}}{dlat(type)} & \text{if } 0 \leq clat_{in} \leq \frac{MAX_c}{4} \\ \frac{clat_{in}}{dlat(type)} - 16 & \text{if } clat_{in} > \frac{MAX_c}{4} \end{cases}$ $lat = enc_{lat}(clat_{in}, type)$ $clat_{dec} = dec_{lat}(clat_{in}, lat, lat, type)$ $lon_p = \frac{clon_{in}}{dlon(clat_{dec}, type)}$ $pid = enc_{patch}(lat_p, lon_p) = 36 \cdot lat_p + lon_p$ $offset_{dec}^{lat}(lat_{offs}, s_{lat}, bits, type) = \begin{cases} lat_{offs} \cdot tmp_7 & \text{if } s_{lat} = 1 \\ -lat_{offs} \cdot tmp_7 & \text{if } s_{lat} = 0 \end{cases}$ |

## 5.1.6.4 Patch ID Decoding

| Requirement reference |   |
|-----------------------|---|
|                       | <b>General</b>  |
| 5.1.6.4.1             | The patch ID decoding shall use the received patch ID, lat and lon subfields and decode this to a position in latitude and longitude, which is globally unambiguous.  |
|                       | <b>Input parameters</b>   |
| 5.1.6.4.2             | The input parameters used for patch ID decoding shall be defined as follows:<br>$lat$ = CPR latitude to decode.<br>$lon$ = CPR longitude to be decode.<br>$type$ = type of encoding (odd or even).<br>$pid$ = encoded patch id.   |
|                       | <b>Calculations</b>   |
|                       | <b>Latitude</b>   |
| 5.1.6.4.3             | The decoded latitude component of the patch ID shall be calculated as follows:<br>$lat_p = \begin{cases} \frac{pid}{36} & \text{if } 0 \leq pid \leq 359 \\ \frac{pid}{36} + 16 & \text{if } pid > 359 \end{cases}$ $fullDec_{lat}(lat, lat_p, type) = \frac{\left( \left( \frac{MAX_c}{MAX_T^{lat}} \right) \cdot lat \right)}{nz(type)} + dlat(type) \cdot lat_p$ |

| <b>Longitude</b> |  |
|------------------|--|
| 5.1.6.4.4        | <p>The patch ID longitude component shall be calculated as follows:</p> $lon_p = \text{mod}(pid, 36)$ $clat_{dec} = \text{fullDec}_{lat}(lat, lat_p, type)$ $\text{fullDec}_{lon}(clat_{dec}, lon, lon_p, type) = \left( \frac{\left( \frac{MAX_c}{MAX_T^{lon}} \right) \cdot lon}{nl(clat_{dec}, type)} \right) + dlon(clat_{dec}, type) \cdot lon_p$ |

## 5.1.7 Encoding of UDATA (udid)

| Requirement reference |   |
|-----------------------|---|
| 5.1.7.1               | The UDATA ID (udid) field shall be encoded as defined in table 5.42a. |

**Table 5.42a: Encoding of UDATA ID (udid)**

| Service  | UDATA ID (udid)      |
|----------|----------------------|
| TIS-B    | 00000bin             |
| FIS-B    | 00001bin             |
| Reserved | 00010bin             |
| GNS-B    | 00011bin             |
| Reserved | 00100bin to 11101bin |

## 5.2 Requirements for TIS-B

### 5.2.1 Traffic Information Volume (TIV)

| Requirement reference |  |
|-----------------------|--|
| 5.2.1.1               | Each ground station shall support between 1 and 8 TIVs (airborne and/or ground).   |
| 5.2.1.2               | Each TIV from a ground station shall be identified by a TIV identity code (TIV ID).  |
| 5.2.1.3               | Each TIV shall be uniquely determined by the combination of the ground station 24-bit ICAO address (sent in every VDL Mode 4 burst) and the TIV ID.  |
| 5.2.1.4               | <p>A TIV shall be either a polygon shape with a maximum of 10 vertices, or a circle with a radius defined by one vertex.</p> <p>NOTE 1: A polygon TIV may be concave or convex.</p> <p>NOTE 2: Other TIV shapes may be defined in future by encoding only one or two vertices.</p> |
| 5.2.1.5               | The TIV polygon shall be two-dimensional and not have any crossing borders.  |
| 5.2.1.6               | No vertices shall be the same for a TIV.   |
| 5.2.1.7               | <p>Each TIV shall have a minimum altitude limit and a greater maximum altitude limit.</p> <p>NOTE: The minimum and maximum altitude limits should not be the same. The altitude limit applies in the whole TIV.</p>  |
| 5.2.1.8               | A TIV shall support the provision of either a "full surveillance picture" or a "gap filler service".   |
| 5.2.1.9               | The target with the lowest position quality (i.e. accuracy) in each TIV shall be used as the quality parameter of the whole TIV and broadcast in the management message.   |
| 5.2.1.10              | All targets inside a TIV shall have position accuracy appropriate to the quality parameter of the TIV or better.   |
| 5.2.1.11              | A single TIS-B target update rate shall be applied in the TIV.   |
| 5.2.1.12              | A TIV shall be suspended before it is overloaded and no target messages shall be broadcast for the overloaded TIV.   |
| 5.2.1.13              | The status information (OK, not OK, or overloaded) of a TIV shall be sent in the management message.   |

## 5.2.2 Message transmission

### 5.2.2.1 Management messages

| Requirement reference |  |
|-----------------------|--|
| 5.2.2.1.1             | Management messages shall be transmitted once each TIV update period.  |
| 5.2.2.1.2             | Each TIV update period shall start with a management message.  |
| 5.2.2.1.3             | Each management message shall include information about one TIV.<br>NOTE: Each TIV has one management message.   |
| 5.2.2.1.4             | The transmission of the management message for the following TIV period shall not be initiated before all target messages of the current TIV period are transmitted. |

### 5.2.2.2 Target messages

| Requirement reference |   |
|-----------------------|---|
| 5.2.2.2.1             | Each target message shall be transmitted once every update period for each TIV the target is included in.   |
| 5.2.2.2.2             | In Gap-filler mode a target message shall be transmitted for an ADS-B equipped aircraft if either of the following circumstances occur: <ul style="list-style-type: none"> <li>• ADS-B equipment on aircraft fails or is out of tolerance margins.</li> <li>• Insufficient ADS-B performance.</li> </ul> NOTE: Full surveillance shall be used carefully. The link load is significantly increased for a full surveillance TIV compared with a gap-filler TIV. Special cases are volumes with known shadings (e.g. buildings on an airport, mountains). |
| 5.2.2.2.3             | The ground system shall only uplink the most recently available TIS-B report for an aircraft.   |
| 5.2.2.2.4             | The ground system shall cease to transmit target reports for an aircraft when no radar data has been received for that aircraft for a specified period of time.   |

### 5.2.2.3 Airport operation

| Requirement reference |  |
|-----------------------|--|
| 5.2.2.3.1             | For a ground TIV, targets shall be identified as either aircraft or ground vehicles and the appropriate message format transmitted accordingly.  |
| 5.2.2.3.2             | All latitude and longitude positions shall be transmitted with higher resolution for a ground TIV than for an airspace TIV.  |
| 5.2.2.3.3             | For a ground TIV, if no information is available for a target to confirm that it is an aircraft (27 bit ICAO code, Mode A code, callsign, registration marking or emitter category), then it shall be transmitted as a vehicle target until further information is provided. |

### 5.2.3 Message format

| Requirement reference |  |
|-----------------------|--|
| 5.2.3.1               | A TIS-B burst shall be sent in a DLS UDATA DLPDU burst of type UINFO as described clause 5.3 of EN 301 842-2 [3].  |
| 5.2.3.2               | The UDATA ID (udid) field in octet 5 of a TIS-B burst shall be set to "00000" (see clause 5.3.1.3 of EN 301 842-2 [3]).  |
| 5.2.3.3               | TIS-B messages shall be placed in the information field of a VDL Mode 4 burst, with the first message starting in bit 1 of octet 6.  |
| 5.2.3.4               | Where more than one TIS-B message is sent in one TIS-B burst, each additional TIS-B message shall start in bit 1 of the octet following the last octet occupied by the previous TIS-B message.   |
| 5.2.3.5               | Where more than one TIS-B message is sent in one TIS-B burst, if the previous TIS-B message does not finish at an octet boundary, up to 7 bits of zeros shall be added to complete the octet, prior to the start of the subsequent TIS-B message.  |
| 5.2.3.6               | Each TIS-B message shall start with a TIS-B message identifier (tmi), as defined in table 5.43.  |
| 5.2.3.7               | To indicate a TIS-B message identifier greater than 14, bits 1 to 4 of octet n+1 shall be set to 15, and a further 8 bits of tmi1 shall be inserted starting in bit 5 of octet n+1 and ending in bit 4 of octet n+2, so that $tmi = 15 + tmi1$ .   |
| 5.2.3.8               | Each TIS-B burst shall use either: <ul style="list-style-type: none"> <li>• a reservation ID (rid) equal to 1, with the burst appended by a null reservation field as defined in clause 5.2.9 of EN 301 842-2 [3];</li> <li>• or a reservation ID (rid) equal to 0 and an extended reservation ID (erid) equal to 00000binary, with the burst appended by a response reservation field as defined in clause 5.2.18 of EN 301 842-2 [3], with address type field equal to 7;</li> <li>• a reservation ID (rid) equal to 1, with the burst appended by a periodic broadcast reservation field as defined in clause 5.2.10 of EN 301 842-2 [3];</li> <li>• a reservation ID (rid) equal to 0, with the burst appended by an incremental broadcast reservation field as defined in clause 5.2.11 of EN 301 842-2 [3];</li> <li>• a reservation ID (rid) equal to 1, with the burst appended by a combined periodic broadcast and incremental broadcast reservation field as defined in clause 5.2.12 of EN 301 842-2 [3];</li> <li>• or a reservation ID (rid) equal to 0, with the burst appended by a unicast reservation field with sdf=1 as defined in clause 5.2.14 of EN 301 842-2 [3];</li> <li>• or a reservation ID (rid) equal to 0, with the burst appended by a second frame reservation field as defined in clause 5.2.17 of EN 301 842-2 [3];</li> <li>• or a reservation ID (rid) equal to 0, with the burst appended by a superframe reservation field as defined in clause 5.2.17 of EN 301 842-2 [3].</li> </ul> |

**Table 5.43: TIS-B message identifier encoding**

| Message                                       | TIS-B Message ID Encoded value | 8-bit Message ID Extension (tmi1) Encoded value |
|---|--------------------------------|---|
| Management message                            | 0                              | not present                                     |
| Aircraft target (airborne TIV)                | 1                              | not present                                     |
| Aircraft target (ground TIV)                  | 2                              | not present                                     |
| Ground vehicle target (ground TIV)            | 3                              | not present                                     |
| Reserved for future use                       | 4 to 14                        | not present                                     |
| Available for future use with 8-bit extension | 15                             | 0 to 255  |

## 5.2.4 Management message

| Requirement reference |  |
|-----------------------|--|
| 5.2.4.1               | The management message shall be encoded as defined in table 5.44.  |
| 5.2.4.2               | Fields in the management message shall be encoded as defined in table 5.45.  |
| 5.2.4.3               | The latitude/longitude coordinates of a fixed virtual reference position shall be sent in the management message and given in absolute WGS-84 coordinates. |
| 5.2.4.4               | The latitude/longitude positions of the TIV vertices sent in the management message shall be encoded as an offset from the reference position.             |
| 5.2.4.5               | All latitude/longitude positions in the target messages shall be encoded as an offset from the reference position.   |

**Table 5.44: Management message bit encoding**

| Description   | Octet     | Bit number         |                    |                    |                    |                    |                    |                    |                    |
|---|-----------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
|   |           | 8                  | 7                  | 6                  | 5                  | 4                  | 3                  | 2                  | 1                  |
| udid, ucd   | 5         | 0                  | 0                  | 0                  | 0                  | 0                  | 1                  | 1                  | 1                  |
| TIS-B message ID (tmi)<br>version number (vers)     | n         | vers <sub>4</sub>  | vers <sub>3</sub>  | vers <sub>2</sub>  | vers <sub>1</sub>  | tmi <sub>4</sub>   | tmi <sub>3</sub>   | tmi <sub>2</sub>   | tmi <sub>1</sub>   |
| TIV ID (tivid)<br>update period (up)                | n + 1     | up <sub>5</sub>    | up <sub>4</sub>    | up <sub>3</sub>    | up <sub>2</sub>    | up <sub>1</sub>    | tivid <sub>3</sub> | tivid <sub>2</sub> | tivid <sub>1</sub> |
| TIV status (tivs)<br>TIS-B target resolution (tacc) | n + 2     | lat <sub>1</sub>   | tacc <sub>4</sub>  | tacc <sub>3</sub>  | tacc <sub>2</sub>  | tacc <sub>1</sub>  | tivs <sub>2</sub>  | tivs <sub>1</sub>  | up <sub>6</sub>    |
| reference point latitude (lat)                      | n + 3     | lat <sub>9</sub>   | lat <sub>8</sub>   | lat <sub>7</sub>   | lat <sub>6</sub>   | lat <sub>5</sub>   | lat <sub>4</sub>   | lat <sub>3</sub>   | lat <sub>2</sub>   |
| reference point longitude (long)                    | n + 4     | long <sub>3</sub>  | long <sub>2</sub>  | long <sub>1</sub>  | lat <sub>14</sub>  | lat <sub>13</sub>  | lat <sub>12</sub>  | lat <sub>11</sub>  | lat <sub>10</sub>  |
|   | n + 5     | long <sub>11</sub> | long <sub>10</sub> | long <sub>9</sub>  | long <sub>8</sub>  | long <sub>7</sub>  | long <sub>6</sub>  | long <sub>5</sub>  | long <sub>4</sub>  |
| lower barometric altitude (lbar)                    | n + 6     | lbar <sub>4</sub>  | lbar <sub>3</sub>  | lbar <sub>2</sub>  | lbar <sub>1</sub>  | long <sub>15</sub> | long <sub>14</sub> | long <sub>13</sub> | long <sub>12</sub> |
| upper barometric altitude (ubar)                    | n + 7     | ubar <sub>4</sub>  | ubar <sub>3</sub>  | ubar <sub>2</sub>  | ubar <sub>1</sub>  | lbar <sub>8</sub>  | lbar <sub>7</sub>  | lbar <sub>6</sub>  | lbar <sub>5</sub>  |
| number of vertices (nvert)                          | n + 8     | nvert <sub>4</sub> | nvert <sub>3</sub> | nvert <sub>2</sub> | nvert <sub>1</sub> | ubar <sub>8</sub>  | ubar <sub>7</sub>  | ubar <sub>6</sub>  | ubar <sub>5</sub>  |
| vertex latitude (vlat(1-k))                         | n + 9     | vlat <sub>18</sub> | vlat <sub>17</sub> | vlat <sub>16</sub> | vlat <sub>15</sub> | vlat <sub>14</sub> | vlat <sub>13</sub> | vlat <sub>12</sub> | vlat <sub>11</sub> |
| vertex longitude (vlg(1 -k))                        | n + 10    | vlg <sub>18</sub>  | vlg <sub>17</sub>  | vlg <sub>16</sub>  | vlg <sub>15</sub>  | vlg <sub>14</sub>  | vlg <sub>13</sub>  | vlg <sub>12</sub>  | vlg <sub>11</sub>  |
|   |           | .....              |                    |                    |                    |                    |                    |                    |                    |
|   | n + 2k +7 | vlat <sub>k8</sub> | vlat <sub>k7</sub> | vlat <sub>k6</sub> | vlat <sub>k5</sub> | vlat <sub>k4</sub> | vlat <sub>k3</sub> | vlat <sub>k2</sub> | vlat <sub>k1</sub> |
|   | n + 2k +8 | vlg <sub>k8</sub>  | vlg <sub>k7</sub>  | vlg <sub>k6</sub>  | vlg <sub>k5</sub>  | vlg <sub>k4</sub>  | vlg <sub>k3</sub>  | vlg <sub>k2</sub>  | vlg <sub>k1</sub>  |

..... Denotes variable length field

Table 5.45: Management message field encoding

| Data field                | Definition   | Encoded Value                            |
|---------------------------|--|--|
| TIS-B message ID          | See table 5.43   | 0  |
| TIS-B service version     | TIS-B as defined in the present document<br>Unused   | 0<br>1 to 15                             |
| TIV ID                    | 1 to 8   | 0 to 7                                   |
| Update period             | 0,5 s<br>1,0 s<br>2,0 s<br>3,0 s<br>↓<br>60 s<br>Unused  | 0<br>1<br>2<br>3<br>↓<br>60<br>61 to 63  |
| TIV status                | OK<br>Not OK<br>Overloaded<br>Unused   | 0<br>1<br>2<br>3                         |
| TIS-B target resolution   | See position Navigation Integrity Category (NIC) encoding in table 5.59 in clause 5.4.2.3 of EN 301 842-2 [3].   |  |
| Reference point latitude  | Encoded reference point latitude = (latitude) × 60 + 5 400, where latitude has an increment of 1/60 <sup>th</sup> of a degree and range between -90 degrees and +90 degrees<br><br>Unused  | 0 to 10 800<br><br>10 801 to 16 383      |
| Reference point longitude | Encoded reference point longitude = (longitude) × 60 + 10 800, where longitude has an increment of 1/60 <sup>th</sup> of a degree and range between -180 degrees and +180 degrees.<br><br>Unused   | 0 to 21 600<br><br>21 601 to 32 767      |
| Lower barometric altitude | -1 500 feet<br>-1 250 feet<br>250 ft linear increments up to 63 500 feet<br>Encoding of 255 is not allowed   | 0<br>1<br>2 to 254                       |
| Upper barometric altitude | -1 500 feet<br>-1 250 feet<br>250 ft linear increments up to 63 500 feet<br>No upper limit   | 0<br>1<br>2 to 254<br>255                |
| Number of vertices        | Defines a specific TIV shape or the number of polygon vertices:<br><br>Circle with centre at reference position and radius specified by one vertex position (comprising vlat1 and vlg1);<br><br>No. of polygon vertices (3 to 10);<br><br>Unused (see note);<br><br>Other method of TIV shape definition or an indication of additional number of vertices is defined in an additional octet in row n+9. | 0<br><br>1 to 8<br><br>9 to 14<br><br>15 |
| TIV vertex latitude       | Encoded as an offset from the reference position (see clause 5.2.8).   |  |
| TIV vertex longitude      | Encoded as an offset from the reference position (see clause 5.2.8).   |  |
| NOTE:                     | Encodings 9 to 14 could be used in future to encode a number of fixed shapes to save defining all vertices, or to encode further vertices, depending on future requirements. To encode fixed shapes, one or two vertices would be sufficient to define the complete TIV: e.g. square, regular hexagons (two different orientations), rectangle, "stretched" hexagons (two different orientations).       |  |

## 5.2.5 Aircraft target messages (airborne TIV)

| Requirement reference |   |
|-----------------------|---|
| 5.2.5.1               | The aircraft target message (airborne TIV) shall be encoded as defined in table 5.46.   |
| 5.2.5.2               | The aircraft target message (airborne TIV) shall consist of a fixed and an optional field.  |
| 5.2.5.3               | The optional field shall consist of flight ID type, flight ID and aircraft category.  |
| 5.2.5.4               | Flight ID shall be one of the following: <ul style="list-style-type: none"> <li>• callsign;</li> <li>• registration marking.</li> </ul> |
| 5.2.5.5               | For each target, the optional field shall be transmitted every 3 TIV update periods, or more frequently.                                |
| 5.2.5.6               | If more than one Flight ID is available for a target, then these will be sent in alternate target messages.                             |
| 5.2.5.7               | Fields in the aircraft target message (airborne TIV) shall be encoded as defined in table 5.47.   |

**Table 5.46: Aircraft target message (airborne TIV) bit encoding  
(with callsign as an example flight ID)**

| Description   | Octet  | Bit number         |                    |                    |                    |                    |                    |                    |                    |
|---|--------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
|   |        | 8                  | 7                  | 6                  | 5                  | 4                  | 3                  | 2                  | 1                  |
| udid, ucd   | 5      | 0                  | 0                  | 0                  | 0                  | 0                  | 1                  | 1                  | 1                  |
| TIS-B message ID (tmi)<br>TIV ID (tivid)<br>target identifier flag (tflg)       | n      | tflg               | tivid <sub>3</sub> | tivid <sub>2</sub> | tivid <sub>1</sub> | tmi <sub>4</sub>   | tmi <sub>3</sub>   | tmi <sub>2</sub>   | tmi <sub>1</sub>   |
| radar/fusion flag (rflg)<br>ADS-B fault flag (adsff)<br>flight ID flag (fidflg) | n + 1  | tid <sub>5</sub>   | tid <sub>4</sub>   | tid <sub>3</sub>   | tid <sub>2</sub>   | tid <sub>1</sub>   | fidflg             | adsff              | rflg               |
| target identifier (tid)   | n + 2  | tid <sub>13</sub>  | tid <sub>12</sub>  | tid <sub>11</sub>  | tid <sub>10</sub>  | tid <sub>9</sub>   | tid <sub>8</sub>   | tid <sub>7</sub>   | tid <sub>6</sub>   |
|   | n + 3  | tid <sub>21</sub>  | tid <sub>20</sub>  | tid <sub>19</sub>  | tid <sub>18</sub>  | tid <sub>17</sub>  | tid <sub>16</sub>  | tid <sub>15</sub>  | tid <sub>14</sub>  |
| latitude (rlat)   | n + 4  | rlat <sub>5</sub>  | rlat <sub>4</sub>  | rlat <sub>3</sub>  | rlat <sub>2</sub>  | rlat <sub>1</sub>  | tid <sub>24</sub>  | tid <sub>23</sub>  | tid <sub>22</sub>  |
|   | n + 5  | rlat <sub>13</sub> | rlat <sub>12</sub> | rlat <sub>11</sub> | rlat <sub>10</sub> | rlat <sub>9</sub>  | rlat <sub>8</sub>  | rlat <sub>7</sub>  | rlat <sub>6</sub>  |
| longitude (rlg)   | n + 6  | rlg <sub>5</sub>   | rlg <sub>4</sub>   | rlg <sub>3</sub>   | rlg <sub>2</sub>   | rlg <sub>1</sub>   | rlat <sub>16</sub> | rlat <sub>15</sub> | rlat <sub>14</sub> |
|   | n + 7  | rlg <sub>13</sub>  | rlg <sub>12</sub>  | rlg <sub>11</sub>  | rlg <sub>10</sub>  | rlg <sub>9</sub>   | rlg <sub>8</sub>   | rlg <sub>7</sub>   | rlg <sub>6</sub>   |
| ground track (gtk)  | n + 8  | gtk <sub>5</sub>   | gtk <sub>4</sub>   | gtk <sub>3</sub>   | gtk <sub>2</sub>   | gtk <sub>1</sub>   | rlg <sub>16</sub>  | rlg <sub>15</sub>  | rlg <sub>14</sub>  |
| barometric altitude (bar)   | n + 9  | bar <sub>5</sub>   | bar <sub>4</sub>   | bar <sub>3</sub>   | bar <sub>2</sub>   | bar <sub>1</sub>   | gtk <sub>8</sub>   | gtk <sub>7</sub>   | gtk <sub>6</sub>   |
| ground speed (gsp)  | n + 10 | gsp <sub>1</sub>   | bar <sub>12</sub>  | bar <sub>11</sub>  | bar <sub>10</sub>  | bar <sub>9</sub>   | bar <sub>8</sub>   | bar <sub>7</sub>   | bar <sub>6</sub>   |
|   | n + 11 | gsp <sub>9</sub>   | gsp <sub>8</sub>   | gsp <sub>7</sub>   | gsp <sub>6</sub>   | gsp <sub>5</sub>   | gsp <sub>4</sub>   | gsp <sub>3</sub>   | gsp <sub>2</sub>   |
| time stamp (tag)  | n + 12 | tag <sub>6</sub>   | tag <sub>5</sub>   | tag <sub>4</sub>   | tag <sub>3</sub>   | tag <sub>2</sub>   | tag <sub>1</sub>   | gsp <sub>11</sub>  | gsp <sub>10</sub>  |
| flight ID type (fidty)  | n + 13 | call <sub>7</sub>  | call <sub>6</sub>  | call <sub>5</sub>  | call <sub>4</sub>  | call <sub>3</sub>  | call <sub>2</sub>  | call <sub>1</sub>  | fidty              |
| callsign (call)(example)  | n + 14 | call <sub>15</sub> | call <sub>14</sub> | call <sub>13</sub> | call <sub>12</sub> | call <sub>11</sub> | call <sub>10</sub> | call <sub>9</sub>  | call <sub>8</sub>  |
|   | n + 15 | call <sub>23</sub> | call <sub>22</sub> | call <sub>21</sub> | call <sub>20</sub> | call <sub>19</sub> | call <sub>18</sub> | call <sub>17</sub> | call <sub>16</sub> |
|   | n + 16 | call <sub>31</sub> | call <sub>30</sub> | call <sub>29</sub> | call <sub>28</sub> | call <sub>27</sub> | call <sub>26</sub> | call <sub>25</sub> | call <sub>24</sub> |
|   | n + 17 | call <sub>39</sub> | call <sub>38</sub> | call <sub>37</sub> | call <sub>36</sub> | call <sub>35</sub> | call <sub>34</sub> | call <sub>33</sub> | call <sub>32</sub> |
| aircraft category (cat)   | n + 18 | cat <sub>5</sub>   | cat <sub>4</sub>   | cat <sub>3</sub>   | cat <sub>2</sub>   | cat <sub>1</sub>   | call <sub>42</sub> | call <sub>41</sub> | call <sub>40</sub> |



Table 5.47: Aircraft target message (airborne TIV) field encoding

| Data field                         | Definition  | Encoded Value                      |
|------------------------------------|---|------------------------------------|
| TIS-B message ID                   | See table 5.43.   | 1                                  |
| TIV ID                             | Identifies TIV for ground stations configured to transmit more than one TIV.  | 0 to 7                             |
| Target identifier flag             | Aircraft address (24-bit ICAO address)<br>Special identifier (See note).  | 0<br>1                             |
| Radar fusion flag                  | TIS-B target based only on radar or multilateration data<br>TIS-B target includes ADS-B as a data source.   | 0<br>1                             |
| ADS-B fault flag                   | ADS-B data corresponds with TIS-B data<br>TIS-B data should be used in preference to ADS-B data.  | 0<br>1                             |
| Flight ID Flag                     | Optional information is not present.<br>Optional information is present.  | 0<br>1                             |
| Target identifier                  | Either aircraft address (24-bit ICAO address) or a special identifier.  |                                    |
| Latitude                           | Encoded as an offset from the reference position (see clause 5.2.8).  |                                    |
| Longitude                          | Encoded as an offset from the reference position (see clause 5.2.8).  |                                    |
| Ground track                       | See ground track encoding in table 5.12.  |                                    |
| Barometric altitude                | See altitude encoding in table 5.52 of EN 301 842-2 [3].  |                                    |
| Ground speed                       | See ground speed encoding in table 5.14.  |                                    |
| Time stamp (relative)              | time reference<br>200 ms after time reference<br>400 ms after time reference<br>↓<br>11,8 s after time reference<br>Unused  | 0<br>1<br>2<br>↓<br>59<br>60 to 63 |
| Flight ID type                     | Callsign<br>Registration marking (tail number)  | 0<br>1                             |
| Callsign<br>(See table 5.11)       | Callsign is left justified. Valid characters are A - Z, 0 - 9 and null: Assigned A - Z = 0 - 25, 0 - 9 = 26 - 35, null = 36.<br>Callsign is an eight character string "c <sub>1</sub> , c <sub>2</sub> , c <sub>3</sub> , c <sub>4</sub> , c <sub>5</sub> , c <sub>6</sub> , c <sub>7</sub> , c <sub>8</sub> ", where:<br>$csl = c_1 37^3 + c_2 37^2 + c_3 37 + c_4$<br>$csr = c_5 37^3 + c_6 37^2 + c_7 37 + c_8$<br>csl = left hand part of the callsign, and csr = right hand part |                                    |
| Registration marking (tail number) | Encoding as for callsign.   |                                    |
| Aircraft category                  | See aircraft category encoding in table 5.16.   |                                    |
| NOTE:                              | This is code defined by the ground system. It is unique in the TIV at any time. The first part of the identification could be the Mode A code or the tracker identification for that target followed by a unique number allocated by the ground system.   |                                    |

## 5.2.6 Aircraft target messages (ground TIV)

| Requirement reference |  |
|-----------------------|--|
| 5.2.6.1               | The aircraft target message (ground TIV) shall be encoded as defined in table 5.48.  |
| 5.2.6.2               | The aircraft target message (ground TIV) shall consist of a fixed and an optional field.   |
| 5.2.6.3               | The optional field shall consist of flight ID type, flight ID and aircraft category.   |
| 5.2.6.4               | Flight ID shall be one of the following: <ul style="list-style-type: none"> <li>• callsign;</li> <li>• registration marking;</li> <li>• or Mode A code.</li> </ul> |
| 5.2.6.5               | For each target, the optional field shall be transmitted every 3 TIV update periods, or more frequently.   |
| 5.2.6.6               | If more than 1 Flight ID is available for a target, then these will be sent in alternate target messages.  |
| 5.2.6.7               | Fields in the aircraft target messages (ground TIV) report shall be encoded as defined in table 5.49.  |

**Table 5.48: Aircraft target message (ground TIV) bit encoding  
(with callsign as an example flight ID)**

| Description                   | Octet  | Bit number         |                    |                    |                    |                    |                    |                    |                    |
|-------------------------------|--------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
|                               |        | 8                  | 7                  | 6                  | 5                  | 4                  | 3                  | 2                  | 1                  |
| udid, ucd                     | 5      | 0                  | 0                  | 0                  | 0                  | 0                  | 1                  | 1                  | 1                  |
| TIS-B message ID (tmi)        | n      | tflg               | tivid <sub>3</sub> | tivid <sub>2</sub> | tivid <sub>1</sub> | tmi <sub>4</sub>   | tmi <sub>3</sub>   | tmi <sub>2</sub>   | tmi <sub>1</sub>   |
| TIV ID (tivid)                |        |                    |                    |                    |                    |                    |                    |                    |                    |
| target identifier flag (tflg) | n + 1  | tid <sub>5</sub>   | tid <sub>4</sub>   | tid <sub>3</sub>   | tid <sub>2</sub>   | tid <sub>1</sub>   | fidflg             | adsff              | rflg               |
| radar/fusion flag (rflg)      |        |                    |                    |                    |                    |                    |                    |                    |                    |
| ADS-B fault flag (adsff)      |        |                    |                    |                    |                    |                    |                    |                    |                    |
| flight ID flag (fidflg)       | n + 2  | tid <sub>13</sub>  | tid <sub>12</sub>  | tid <sub>11</sub>  | tid <sub>10</sub>  | tid <sub>9</sub>   | tid <sub>8</sub>   | tid <sub>7</sub>   | tid <sub>6</sub>   |
| target identifier (tid)       |        |                    |                    |                    |                    |                    |                    |                    |                    |
|                               | n + 3  | tid <sub>21</sub>  | tid <sub>20</sub>  | tid <sub>19</sub>  | tid <sub>18</sub>  | tid <sub>17</sub>  | tid <sub>16</sub>  | tid <sub>15</sub>  | tid <sub>14</sub>  |
| latitude (rlat)               | n + 4  | rlat <sub>5</sub>  | rlat <sub>4</sub>  | rlat <sub>3</sub>  | rlat <sub>2</sub>  | rlat <sub>1</sub>  | tid <sub>24</sub>  | tid <sub>23</sub>  | tid <sub>22</sub>  |
|                               | n + 5  | rlat <sub>13</sub> | rlat <sub>12</sub> | rlat <sub>11</sub> | rlat <sub>10</sub> | rlat <sub>9</sub>  | rlat <sub>8</sub>  | rlat <sub>7</sub>  | rlat <sub>6</sub>  |
| longitude (rlg)               | n + 6  | rlg <sub>1</sub>   | rlg <sub>20</sub>  | rlg <sub>19</sub>  | rlg <sub>18</sub>  | rlg <sub>17</sub>  | rlg <sub>16</sub>  | rlg <sub>15</sub>  | rlg <sub>14</sub>  |
|                               | n + 7  | rlg <sub>9</sub>   | rlg <sub>8</sub>   | rlg <sub>7</sub>   | rlg <sub>6</sub>   | rlg <sub>5</sub>   | rlg <sub>4</sub>   | rlg <sub>3</sub>   | rlg <sub>2</sub>   |
|                               | n + 8  | rlg <sub>17</sub>  | rlg <sub>16</sub>  | rlg <sub>15</sub>  | rlg <sub>14</sub>  | rlg <sub>13</sub>  | rlg <sub>12</sub>  | rlg <sub>11</sub>  | rlg <sub>10</sub>  |
| ground track (gtk)            | n + 9  | gtk <sub>5</sub>   | gtk <sub>4</sub>   | gtk <sub>3</sub>   | gtk <sub>2</sub>   | gtk <sub>1</sub>   | rlg <sub>20</sub>  | rlg <sub>19</sub>  | rlg <sub>18</sub>  |
| ground speed (gsp)            | n + 10 | gsp <sub>5</sub>   | gsp <sub>4</sub>   | gsp <sub>3</sub>   | gsp <sub>2</sub>   | gsp <sub>1</sub>   | gtk <sub>8</sub>   | gtk <sub>7</sub>   | gtk <sub>6</sub>   |
| time stamp (tag)              | n + 11 | tag <sub>2</sub>   | tag <sub>1</sub>   | gsp <sub>11</sub>  | gsp <sub>10</sub>  | gsp <sub>9</sub>   | gsp <sub>8</sub>   | gsp <sub>7</sub>   | gsp <sub>6</sub>   |
| flight ID type (fidty)        | n + 12 | res                | res                | res                | res                | tag <sub>6</sub>   | tag <sub>5</sub>   | tag <sub>4</sub>   | tag <sub>3</sub>   |
| callsign (call)               | n + 13 | call <sub>7</sub>  | call <sub>6</sub>  | call <sub>5</sub>  | call <sub>4</sub>  | call <sub>3</sub>  | call <sub>2</sub>  | call <sub>1</sub>  | fidty              |
|                               | n + 14 | call <sub>15</sub> | call <sub>14</sub> | call <sub>13</sub> | call <sub>12</sub> | call <sub>11</sub> | call <sub>10</sub> | call <sub>9</sub>  | call <sub>8</sub>  |
|                               | n + 15 | call <sub>23</sub> | call <sub>22</sub> | call <sub>21</sub> | call <sub>20</sub> | call <sub>19</sub> | call <sub>18</sub> | call <sub>17</sub> | call <sub>16</sub> |
|                               | n + 16 | call <sub>31</sub> | call <sub>30</sub> | call <sub>29</sub> | call <sub>28</sub> | call <sub>27</sub> | call <sub>26</sub> | call <sub>25</sub> | call <sub>24</sub> |
|                               | n + 17 | call <sub>39</sub> | call <sub>38</sub> | call <sub>37</sub> | call <sub>36</sub> | call <sub>35</sub> | call <sub>34</sub> | call <sub>33</sub> | call <sub>32</sub> |
| aircraft category (cat)       | n + 18 | cat <sub>5</sub>   | cat <sub>4</sub>   | cat <sub>3</sub>   | cat <sub>2</sub>   | cat <sub>1</sub>   | call <sub>42</sub> | call <sub>41</sub> | call <sub>40</sub> |

**Table 5.49: Aircraft target message (ground TIV) field encoding**

| Data field  | Definition  | Encoded Value |
|---|---|---------------|
| TIS-B message ID  | See table 5.43.   | 2             |
| TIV ID  | Identifies TIV for ground stations configured to transmit more than one TIV.                              | 0 to 7        |
| Target identifier flag  | Aircraft address (24-bit ICAO address)<br>Special identifier (See note).                                  | 0<br>1        |
| Radar fusion flag   | TIS-B target based only on radar or multilateration data<br>TIS-B target includes ADS-B as a data source. | 0<br>1        |
| ADS-B fault flag  | ADS-B data corresponds with TIS-B data<br>TIS-B data should be used in preference to ADS-B data.          | 0<br>1        |
| Flight ID Flag  | Optional information is not present.<br>Optional information is present.                                  | 0<br>1        |
| Target identifier   | Either aircraft address (24-bit ICAO address) or a special identifier.                                    |               |
| Latitude  | Encoded as an offset from the reference position (see clause 5.2.8).                                      |               |
| Longitude   | Encoded as an offset from the reference position (see clause 5.2.8).                                      |               |
| Ground track  | See ground track encoding in table 5.12.  |               |
| Ground speed  | See ground speed encoding in table 5.14.  |               |
| Time Stamp (relative)   | See table 5.47.   |               |
| Flight ID type  | See table 5.47.   |               |
| Callsign (See table 5.11)   | See table 5.47.   |               |
| Registration marking (tail number)  | See table 5.47.   |               |
| Aircraft category   | See table 5.47.   |               |
| NOTE: This is code defined by the ground system. It is unique in the TIV at any time. The first part of the identification could be the Mode A code or the tracker identification for that target followed by a unique number allocated by the ground system. |   |               |

## 5.2.7 Ground vehicle target messages (ground TIV)

| Requirement reference |   |
|-----------------------|---|
| 5.2.7.1               | The ground vehicle target message (ground TIV) shall be encoded as defined in table 5.50.           |
| 5.2.7.2               | Fields in the ground vehicle target message (ground TIV) shall be encoded as defined in table 5.51. |

**Table 5.50: Vehicle target message (ground TIV) bit encoding**

| Description                              | Octet | Bit number         |                    |                    |                    |                    |                    |                    |                    |
|--|-------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
|  |       | 8                  | 7                  | 6                  | 5                  | 4                  | 3                  | 2                  | 1                  |
| udid, ucd                                | 5     | 0                  | 0                  | 0                  | 0                  | 0                  | 1                  | 1                  | 1                  |
| TIS-B message ID (tmi)<br>TIV ID (tivid) | n     | tid <sub>1</sub>   | tivid <sub>3</sub> | tivid <sub>2</sub> | tivid <sub>1</sub> | tmi <sub>4</sub>   | tmi <sub>3</sub>   | tmi <sub>2</sub>   | tmi <sub>1</sub>   |
| target identifier (tid)                  | n + 1 | tid <sub>9</sub>   | tid <sub>8</sub>   | tid <sub>7</sub>   | tid <sub>6</sub>   | tid <sub>5</sub>   | tid <sub>4</sub>   | tid <sub>3</sub>   | tid <sub>2</sub>   |
| ADS-B fault flag (adsff)                 | n + 2 | tag <sub>5</sub>   | tag <sub>4</sub>   | tag <sub>3</sub>   | tag <sub>2</sub>   | tag <sub>1</sub>   | adsff              | tid <sub>11</sub>  | tid <sub>10</sub>  |
| time stamp(tag)<br>latitude (rlat)       | n + 3 | rlat <sub>7</sub>  | rlat <sub>6</sub>  | rlat <sub>5</sub>  | rlat <sub>4</sub>  | rlat <sub>3</sub>  | rlat <sub>2</sub>  | rlat <sub>1</sub>  | tag <sub>6</sub>   |
|  | n + 4 | rlat <sub>15</sub> | rlat <sub>14</sub> | rlat <sub>13</sub> | rlat <sub>12</sub> | rlat <sub>11</sub> | rlat <sub>10</sub> | rlat <sub>9</sub>  | rlat <sub>8</sub>  |
| longitude (rlg)                          | n + 5 | rlg <sub>3</sub>   | rlg <sub>2</sub>   | rlg <sub>1</sub>   | rlat <sub>20</sub> | rlat <sub>19</sub> | rlat <sub>18</sub> | rlat <sub>17</sub> | rlat <sub>16</sub> |
|  | n + 6 | rlg <sub>11</sub>  | rlg <sub>10</sub>  | rlg <sub>9</sub>   | rlg <sub>8</sub>   | rlg <sub>7</sub>   | rlg <sub>6</sub>   | rlg <sub>5</sub>   | rlg <sub>4</sub>   |
|  | n + 7 | rlg <sub>19</sub>  | rlg <sub>18</sub>  | rlg <sub>17</sub>  | rlg <sub>16</sub>  | rlg <sub>15</sub>  | rlg <sub>14</sub>  | rlg <sub>13</sub>  | rlg <sub>12</sub>  |
| ground track (gtk)                       | n + 8 | gtk <sub>7</sub>   | gtk <sub>6</sub>   | gtk <sub>5</sub>   | gtk <sub>4</sub>   | gtk <sub>3</sub>   | gtk <sub>2</sub>   | gtk <sub>1</sub>   | rlg <sub>20</sub>  |
| ground speed (gsp)                       | n + 9 | gsp <sub>7</sub>   | gsp <sub>6</sub>   | gsp <sub>5</sub>   | gsp <sub>4</sub>   | gsp <sub>3</sub>   | gsp <sub>2</sub>   | gsp <sub>1</sub>   | gtk <sub>8</sub>   |

**Table 5.51: Ground vehicle target message (ground TIV) field encoding**

| Data field        | Definition   | Encoded value |
|-------------------|--|---------------|
| TIS-B message ID  | See table 5.43.  | 3             |
| TIV ID            | Identifies TIV for ground stations configured to transmit more than one TIV.                     | 0 to 7        |
| Target identifier | Unique 11-bit code allocated by ground systems to vehicle target.                                |               |
| ADS-B fault flag  | ADS-B data corresponds with TIS-B data<br>TIS-B data should be used in preference to ADS-B data. | 0<br>1        |
| Time Stamp        | See table 5.47.  |               |
| Latitude          | Encoded as an offset from the reference position (see clause 5.2.8).                             |               |
| Longitude         | Encoded as an offset from the reference position (see clause 5.2.8).                             |               |
| Ground speed      | See ground speed encoding in table 5.14.   |               |
| Ground track      | See ground track encoding in table 5.12.   |               |

## 5.2.8 TIS-B offset encoding

| Requirement reference |   |
|-----------------------|---|
| 5.2.8.1               | A fixed (virtual) reference position shall be chosen that is no more than 240 NM away from the centre of the TIV.   |
| 5.2.8.2               | The TIV vertex and target latitude and longitude positions shall be encoded as offsets from the reference position by subtracting the coordinates of the fixed reference position from those of the vertex or target position as defined in table 5.53. |
| 5.2.8.3               | The TIV vertex and target longitude offsets from the reference position shall be multiplied by the function corr(lat) as defined in table 5.52, where lat = RND(latitude) is the vertex or target latitude rounded down to the nearest half degree.     |

**Table 5.52: Values for scaling function corr(lat) used to encode target longitude**

| lat  | corr  | lat  | corr  | lat  | corr  | lat  | corr  | lat  | corr  | lat  | corr  |
|------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|
| 0    | 8 175 | 15   | 7 878 | 30   | 7 044 | 45   | 5 730 | 60   | 4 026 | 75   | 2 047 |
| 0,5  | 8 174 | 15,5 | 7 858 | 30,5 | 7 007 | 45,5 | 5 679 | 60,5 | 3 963 | 75,5 | 1 978 |
| 1    | 8 172 | 16   | 7 838 | 31   | 6 970 | 46   | 5 627 | 61   | 3 901 | 76   | 1 908 |
| 1,5  | 8 170 | 16,5 | 7 818 | 31,5 | 6 933 | 46,5 | 5 575 | 61,5 | 3 838 | 76,5 | 1 839 |
| 2    | 8 167 | 17   | 7 797 | 32   | 6 895 | 47   | 5 523 | 62   | 3 775 | 77   | 1 769 |
| 2,5  | 8 164 | 17,5 | 7 775 | 32,5 | 6 856 | 47,5 | 5 470 | 62,5 | 3 711 | 77,5 | 1 700 |
| 3    | 8 160 | 18   | 7 753 | 33   | 6 817 | 48   | 5 417 | 63   | 3 648 | 78   | 1 630 |
| 3,5  | 8 155 | 18,5 | 7 730 | 33,5 | 6 777 | 48,5 | 5 363 | 63,5 | 3 584 | 78,5 | 1 560 |
| 4    | 8 150 | 19   | 7 706 | 34   | 6 737 | 49   | 5 309 | 64   | 3 519 | 79   | 1 490 |
| 4,5  | 8 144 | 19,5 | 7 682 | 34,5 | 6 697 | 49,5 | 5 255 | 64,5 | 3 455 | 79,5 | 1 420 |
| 5    | 8 137 | 20   | 7 657 | 35   | 6 655 | 50   | 5 200 | 65   | 3 390 | 80   | 1 349 |
| 5,5  | 8 130 | 20,5 | 7 632 | 35,5 | 6 614 | 50,5 | 5 145 | 65,5 | 3 325 | 80,5 | 1 279 |
| 6    | 8 122 | 21   | 7 606 | 36   | 6 572 | 51   | 5 089 | 66   | 3 260 | 81   | 1 208 |
| 6,5  | 8 114 | 21,5 | 7 580 | 36,5 | 6 529 | 51,5 | 5 033 | 66,5 | 3 194 | 81,5 | 1 138 |
| 7    | 8 105 | 22   | 7 553 | 37   | 6 486 | 52   | 4 977 | 67   | 3 128 | 82   | 1 067 |
| 7,5  | 8 095 | 22,5 | 7 525 | 37,5 | 6 442 | 52,5 | 4 920 | 67,5 | 3 062 | 82,5 | 996   |
| 8    | 8 085 | 23   | 7 497 | 38   | 6 398 | 53   | 4 863 | 68   | 2 996 | 83   | 925   |
| 8,5  | 8 074 | 23,5 | 7 468 | 38,5 | 6 353 | 53,5 | 4 805 | 68,5 | 2 930 | 83,5 | 855   |
| 9    | 8 063 | 24   | 7 439 | 39   | 6 308 | 54   | 4 747 | 69   | 2 863 | 84   | 784   |
| 9,5  | 8 051 | 24,5 | 7 409 | 39,5 | 6 262 | 54,5 | 4 689 | 69,5 | 2 796 | 84,5 | 712   |
| 10   | 8 038 | 25   | 7 379 | 40   | 6 216 | 55   | 4 630 | 70   | 2 729 | 85   | 641   |
| 10,5 | 8 025 | 25,5 | 7 348 | 40,5 | 6 170 | 55,5 | 4 571 | 70,5 | 2 662 | 85,5 | 570   |
| 11   | 8 011 | 26   | 7 316 | 41   | 6 123 | 56   | 4 512 | 71   | 2 594 | 86   | 499   |
| 11,5 | 7 996 | 26,5 | 7 284 | 41,5 | 6 075 | 56,5 | 4 452 | 71,5 | 2 526 | 86,5 | 428   |
| 12   | 7 981 | 27   | 7 251 | 42   | 6 027 | 57   | 4 392 | 72   | 2 458 | 87   | 357   |
| 12,5 | 7 965 | 27,5 | 7 218 | 42,5 | 5 979 | 57,5 | 4 332 | 72,5 | 2 390 | 87,5 | 285   |
| 13   | 7 949 | 28   | 7 184 | 43   | 5 930 | 58   | 4 271 | 73   | 2 322 | 88   | 214   |
| 13,5 | 7 932 | 28,5 | 7 150 | 43,5 | 5 881 | 58,5 | 4 210 | 73,5 | 2 253 | 88,5 | 182   |
| 14   | 7 915 | 29   | 7 115 | 44   | 5 831 | 59   | 4 149 | 74   | 2 185 | 89   | 182   |
| 14,5 | 7 896 | 29,5 | 7 080 | 44,5 | 5 781 | 59,5 | 4 088 | 74,5 | 2 116 | 89,5 | 182   |

**Table 5.53: Definition of offset encoding fields**

| Data Field      | Definition   | Encoded Value |
|-----------------|--|---------------|
| Vertex latitude | Dlat = vertex latitude - reference latitude; Dlat is in degrees  |               |
|                 | For Dlat between -4 and $-(1+1/15)$ degrees:<br>Encoded vertex latitude = $Dlat \times 15 + 60$<br>(Dlat has an increment of 1/15 of a degree or 4 NM; range from -240 NM to -64 NM)     | 0 to 44       |
|                 | For Dlat between -1 and $-(1/3 + 1/60)$ degrees:<br>Encoded vertex latitude = $Dlat \times 60 + 105$<br>(Dlat has an increment of 1/60 of a degree or 1 NM; range from -60 NM to -21 NM) | 45 to 84      |
|                 | For Dlat between -1/3 and +1/3 degrees:<br>Encoded vertex latitude = $Dlat \times 120 + 125$<br>(Dlat has an increment of 1/120 of a degree or 0,5 NM; range from -20 NM to +20 NM)      | 85 to 165     |
|                 | For Dlat between $(1/3 + 1/60)$ and +1 degrees:<br>Encoded vertex latitude = $Dlat \times 60 + 145$<br>(Dlat has an increment of 1/60 of a degree or 1 NM; range from +21 NM to +60 NM)  | 166 to 205    |
|                 | For Dlat between $(1+1/15)$ and +4 degrees:<br>Encoded vertex latitude = $Dlat \times 15 + 190$<br>(Dlat has an increment of 1/15 of a degree or 4 NM; range from +64 NM to +240 NM)     | 206 to 250    |
|                 | Unused   | 251 to 255    |

| Data Field                | Definition  | Encoded Value   |
|---------------------------|---|---|
| Vertex longitude          | <p><math>Dlon = \text{vertex longitude} - \text{reference longitude}</math>; Dlon is in degrees</p> <p>To encode a longitude offset in degrees, first convert to an offset in nautical miles (NM) (using the known latitude) in order to know which of the following encodings apply. Then perform the encoding with Dlon in degrees.</p> <p>For Dlon (converted to NM) between -240 NM and -64 NM:<br/>           Encoded vertex longitude = <math>\text{INT}(Dlon \times \text{corr}(\text{vertex latitude}) / 545 + 60)</math><br/>           (increment and range in degrees depends on latitude: increment in NM is 4 NM or 1/15 of a degree at equator; range is between -4 and <math>-(1+1/15)</math> degrees at equator; range is between -180 degrees and -48 degrees near the poles).</p> <p>For Dlon (converted to NM) between -60 NM and -21 NM:<br/>           Encoded vertex longitude = <math>\text{INT}(Dlon \times \text{corr}(\text{vertex latitude}) \times 4 / 545 + 105)</math><br/>           (increment and range in degrees depends on latitude: increment in NM is 1 NM or 1/60 of a degree at equator; range is between -1 and <math>-(1/3 + 1/60)</math> degrees at equator; range is between -45 degrees and -15,75 degrees near the poles).</p> <p>For Dlon (converted to NM) between -20 NM and +20 NM:<br/>           Encoded vertex longitude = <math>\text{INT}(Dlon \times \text{corr}(\text{vertex latitude}) \times 8 / 545 + 125)</math><br/>           (increment and range in degrees depends on latitude: increment in NM is 0,5 NM or 1/120 of a degree at equator; range is between -1/3 and +1/3 degrees at equator; range is between -15 degrees and +15 degrees near the poles).</p> <p>For Dlon (converted to NM) between +21 NM and +60 NM:<br/>           Encoded vertex longitude = <math>\text{INT}(Dlon \times \text{corr}(\text{vertex latitude}) \times 4 / 545 + 145)</math><br/>           (increment and range in degrees depends on latitude: increment in NM is 1 NM or 1/60 of a degree at equator; range is between <math>(1/3 + 1/60)</math> and +1 degrees at equator; range is between +15,75 degrees and +45 degrees near the poles).</p> <p>For Dlon (converted to NM) between +64 NM and +240 NM:<br/>           Encoded vertex longitude = <math>\text{INT}(Dlon \times \text{corr}(\text{vertex latitude}) / 545 + 190)</math><br/>           (increment and range in degrees depends on latitude: increment in NM is 4 NM or 1/15 of a degree at equator; range is between <math>(1+1/15)</math> and +4 degrees at equator; range is between +48 degrees and +180 degrees near the poles).</p> <p>Unused</p> | <p>0 to 44</p> <p>45 to 84</p> <p>85 to 165</p> <p>166 to 205</p> <p>206 to 250</p> <p>251 to 255</p> |
| Airborne target latitude  | <p><math>Dtlat = \text{target latitude} - \text{reference latitude}</math>; Dtlat is in degrees</p> <p>For Dtlat between -4 degrees and +4 degrees:<br/>           Encoded target latitude = <math>Dtlat \times 8\,175 + 32\,700</math><br/>           (Dtlat has an increment of 1/8175 of a degree; target resolution <math>\pm 7</math> m; range from -240 NM to +240 NM).</p> <p>Unused</p>   | <p>0 to 65 400</p> <p>65 401 to 65 536</p>  |
| Airborne target longitude | <p><math>Dtlon = \text{target longitude} - \text{reference longitude}</math>; Dtlon is in degrees</p> <p>For Dtlon (converted to NM) between -240 NM and +240 NM:<br/>           Encoded target longitude = <math>\text{INT}(Dtlon \times \text{corr}(\text{target latitude}) + 32\,700)</math><br/>           (Dtlon has an increment of 1/8175 of a degree at the equator; target resolution <math>\pm 7</math> m; range in degrees depends on latitude: range is between -4 degrees and +4 degrees at the equator; range is between -180 degrees and +180 degrees near the poles).</p> <p>Unused</p>   | <p>0 to 65 400</p> <p>65 401 to 65 536</p>  |

| Data Field              | Definition   | Encoded Value   |
|-------------------------|--|---|
| Ground target latitude  | <p>Dglat = target latitude - reference latitude; Dglat is in degrees</p> <p>For Dglat between -4 degrees and +4 degrees:<br/>           Encoded target latitude = <math>Dglat \times 130\,800 + 523\,200</math><br/>           (Dglat has an increment of 1/130 800 of a degree; target resolution <math>\pm 0.45</math> m; range from -240 NM to +240 NM).</p> <p>Unused</p>  | <p>0 to<br/>1 046 400</p> <p>1 046 401 to<br/>1 048 575</p> |
| Ground target longitude | <p>Dglon = target longitude - reference longitude; Dglon is in degrees</p> <p>For Dglon (converted to NM) between -240 NM and +240 NM:<br/>           Encoded target longitude = <math>INT(Dglon \times \text{corr}(\text{target latitude}) \times 16 + 523\,200)</math><br/>           (Dglon has an increment of 1/130 800 of a degree at the equator; target resolution <math>\pm 0.45</math> m; range in degrees depends on latitude: range is between -4 degrees and +4 degrees at the equator; range is between -180 degrees and +180 degrees near the poles).</p> <p>Unused</p> | <p>0 to<br/>1 046 400</p> <p>1 046 401 to<br/>1 048 575</p> |

## 5.3 Requirements for FIS-B

### 5.3.1 Message format

| Requirement reference |   |
|-----------------------|---|
| 5.3.1.1               | A FIS-B message shall be sent in a DLS UDATA DLPDU burst of type UINFO as described clause 5.3 of EN 301 842-2 [3].   |
| 5.3.1.2               | To indicate a FIS-B service, the UDATA ID (udid) field shall be set to "00001" to indicate that a FIS-B service is applied (see clause 5.3.1.3 of EN 301 842-2 [3]).  |
| 5.3.1.3               | The FIS-B data shall be placed in the information field of the VDL Mode 4 burst.  |
| 5.3.1.4               | The information field of each FIS-B burst shall start with a FIS-B message identifier, as defined in table 5.54.  |
| 5.3.1.5               | To indicate a FIS-B message identifier greater than 14, bits 1 to 4 of octet 6 shall be set to 15, and a further 4 bits of fmi1 shall be inserted starting in bit 5 of octet 6 and ending in bit 8 of octet 6, so that $fmi = 15 + fmi1$ .  |
| 5.3.1.6               | <p>Each FIS-B message shall use either:</p> <ul style="list-style-type: none"> <li>• a reservation ID (rid) equal to 1, with the burst appended by a null reservation field as defined in clause 5.2.9 of EN 301 842-2 [3]; or</li> <li>• a reservation ID (rid) equal to 0 and an extended reservation ID (erid) equal to 00000binary, with the burst appended by a response reservation field as defined in clause 5.2.18 of EN 301 842-2 [3], with address type field equal to 7;</li> <li>• a reservation ID (rid) equal to 1, with the burst appended by a periodic broadcast reservation field as defined in clause 5.2.10 of EN 301 842-2 [3];</li> <li>• a reservation ID (rid) equal to 0, with the burst appended by an incremental broadcast reservation field as defined in clause 5.2.11 of EN 301 842-2 [3];</li> <li>• a reservation ID (rid) equal to 1, with the burst appended by a combined periodic broadcast and incremental broadcast reservation field as defined in clause 5.2.12 of EN 301 842-2 [3]; or</li> <li>• a reservation ID (rid) equal to 0, with the burst appended by a unicast reservation field with sdf=1 as defined in clause 5.2.14 of EN 301 842-2 [3]; or</li> <li>• a reservation ID (rid) equal to 0, with the burst appended by a second frame reservation field as defined in clause 5.2.17 of EN 301 842-2 [3]; or</li> <li>• a reservation ID (rid) equal to 0, with the burst appended by a superframe reservation field as defined in clause 5.2.17 of EN 301 842-2 [3].</li> </ul> |

Table 5.54: FIS-B message identifier encoding

| Message                                       | FIS-B Message ID Encoded value | 4-bit Message ID Extension (fmi1) Encoded value |
|---|--------------------------------|---|
| METAR   | 0                              | not present                                     |
| ATIS  | 1                              | not present                                     |
| RCN   | 2                              | not present                                     |
| SIGMET  | 3                              | not present                                     |
| SPECI   | 4                              | not present                                     |
| REPORT REQUEST                                | 5                              | not present                                     |
| TSA   | 6                              | not present                                     |
| Reserved for future use                       | 7 to 14                        | not present                                     |
| Available for future use with 4-bit extension | 15                             | 0 to 15   |

### 5.3.2 Meteorological Aerodrome Report (METAR) message

| Requirement reference |   |
|-----------------------|---|
| 5.3.2.1               | The METAR message shall be encoded as defined in table 5.55.  |
| 5.3.2.2               | METAR reports shall be transmitted once during each update period.  |
| 5.3.2.3               | Fields in the METAR report shall be encoded as defined in table 5.56.   |
| 5.3.2.4               | If a TREND report is contained in the message, it shall always be included before the free text message.  |
| 5.3.2.5               | If a TREND report is present, its end shall be signalled by the ASCII code "100100", corresponding to the character "\$".   |
| 5.3.2.6               | The "\$" character shall be excluded from any FIS-B message.  |
| 5.3.2.7               | ICAO Weather codes shall be encoded as defined in table 5.57.   |
| 5.3.2.8               | The CAVOK flag shall indicate the CAVOK condition.  |
| 5.3.2.9               | When the CAVOK flag is set to "1", the fields for visibility (mas, masd, mis, misd), the 3 possible present weather fields (pw), the 4 possible cloud coverage fields (cc, ch, cty), the cloud number flag (cno), and the present weather flag (pwf) shall not be sent. |

Table 5.55: METAR message bit encoding

| Description   | Octet | Bit number         |                    |                    |                    |                    |                    |                    |                    |
|---|-------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
|   |       | 8                  | 7                  | 6                  | 5                  | 4                  | 3                  | 2                  | 1                  |
|   | 5     | 0                  | 0                  | 0                  | 0                  | 1                  | 1                  | 1                  | 1                  |
| FIS-B message ID (fmi)<br>FIS-B version ID (vers)   | 6     | vers <sub>4</sub>  | vers <sub>3</sub>  | vers <sub>2</sub>  | vers <sub>1</sub>  | fmi <sub>4</sub>   | fmi <sub>3</sub>   | fmi <sub>2</sub>   | fmi <sub>1</sub>   |
| message edition (med)<br>local ID (locl)  | 7     | locl <sub>5</sub>  | locl <sub>4</sub>  | locl <sub>3</sub>  | locl <sub>2</sub>  | locl <sub>1</sub>  | med <sub>3</sub>   | med <sub>2</sub>   | med <sub>1</sub>   |
|   | 8     | locl <sub>13</sub> | locl <sub>12</sub> | locl <sub>11</sub> | locl <sub>10</sub> | locl <sub>9</sub>  | locl <sub>8</sub>  | locl <sub>7</sub>  | locl <sub>6</sub>  |
| date (date)   | 9     | date <sub>1</sub>  | locl <sub>20</sub> | locl <sub>19</sub> | locl <sub>18</sub> | locl <sub>17</sub> | locl <sub>16</sub> | locl <sub>15</sub> | locl <sub>14</sub> |
| time (ti)   | 10    | ti <sub>4</sub>    | ti <sub>3</sub>    | ti <sub>2</sub>    | ti <sub>1</sub>    | date <sub>5</sub>  | date <sub>4</sub>  | date <sub>3</sub>  | date <sub>2</sub>  |
| wind direction (wdi)  | 11    | wdi <sub>1</sub>   | ti <sub>11</sub>   | ti <sub>10</sub>   | ti <sub>9</sub>    | ti <sub>8</sub>    | ti <sub>7</sub>    | ti <sub>6</sub>    | ti <sub>5</sub>    |
| wind speed (wsp)  | 12    | wsp <sub>3</sub>   | wsp <sub>2</sub>   | wsp <sub>1</sub>   | wdi <sub>6</sub>   | wdi <sub>5</sub>   | wdi <sub>4</sub>   | wdi <sub>3</sub>   | wdi <sub>2</sub>   |
| free text flag (ftxt)<br>max wind flag (mxw)<br>CAVOK flag (cav)<br>TREND report flag (trd)     | 13    | trd                | cav                | mxw                | ftxt               | wsp <sub>7</sub>   | wsp <sub>6</sub>   | wsp <sub>5</sub>   | wsp <sub>4</sub>   |
| present weather flag (pwf)<br>recent weather flag (rwf)<br>QFE flag (qfef)<br>temperature (tem) | 14    | tem <sub>3</sub>   | tem <sub>2</sub>   | tem <sub>1</sub>   | qfef               | rwf <sub>2</sub>   | rwf <sub>1</sub>   | pwf <sub>2</sub>   | pwf <sub>1</sub>   |
| dew point temperature (dew)   | 15    | dew <sub>3</sub>   | dew <sub>2</sub>   | dew <sub>1</sub>   | tem <sub>8</sub>   | tem <sub>7</sub>   | tem <sub>6</sub>   | tem <sub>5</sub>   | tem <sub>4</sub>   |
| QNH (qnh)   | 16    | qnh <sub>3</sub>   | qnh <sub>2</sub>   | qnh <sub>1</sub>   | dew <sub>8</sub>   | dew <sub>7</sub>   | dew <sub>6</sub>   | dew <sub>5</sub>   | dew <sub>4</sub>   |
| wind shear flag (wsf)<br>sea flag (ssf)<br>variable wind direction to (vdit)                    | 17    | vdit <sub>1</sub>  | ssf                | wsf                | qnh <sub>8</sub>   | qnh <sub>7</sub>   | qnh <sub>6</sub>   | qnh <sub>5</sub>   | qnh <sub>4</sub>   |



| Description   | Octet | Bit number        |                    |                    |                   |                   |                   |                   |                   |
|---|-------|-------------------|--------------------|--------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
|   |       | 8                 | 7                  | 6                  | 5                 | 4                 | 3                 | 2                 | 1                 |
| variable wind direction from (vdif)                             | 18    | vdif <sub>3</sub> | vdif <sub>2</sub>  | vdif <sub>1</sub>  | vdi <sub>t6</sub> | vdi <sub>t5</sub> | vdi <sub>t4</sub> | vdi <sub>t3</sub> | vdi <sub>t2</sub> |
| wind gust indicator (wgi)                                       | 19    | wgi <sub>5</sub>  | wgi <sub>4</sub>   | wgi <sub>3</sub>   | wgi <sub>2</sub>  | wgi <sub>1</sub>  | vdif <sub>6</sub> | vdif <sub>5</sub> | vdif <sub>4</sub> |
| minimum visibility (mis)  | 20    | mis <sub>6</sub>  | mis <sub>5</sub>   | mis <sub>4</sub>   | mis <sub>3</sub>  | mis <sub>2</sub>  | mis <sub>1</sub>  | wgi <sub>7</sub>  | wgi <sub>6</sub>  |
| minimum visibility direction (misd)<br>maximum visibility (mas) | 21    | mas <sub>5</sub>  | mas <sub>4</sub>   | mas <sub>3</sub>   | mas <sub>2</sub>  | mas <sub>1</sub>  | misd <sub>3</sub> | misd <sub>2</sub> | misd <sub>1</sub> |
| maximum visibility direction (masd)<br>present weather (pw)     | 22    | pw <sub>4</sub>   | pw <sub>3</sub>    | pw <sub>2</sub>    | pw <sub>1</sub>   | masd <sub>3</sub> | masd <sub>2</sub> | masd <sub>1</sub> | mas <sub>6</sub>  |
| cloud no. flag (cno)<br>cloud coverage (cc)                     | 23    | cc <sub>3</sub>   | cc <sub>2</sub>    | cc <sub>1</sub>    | cno <sub>2</sub>  | cno <sub>1</sub>  | pw <sub>7</sub>   | pw <sub>6</sub>   | pw <sub>5</sub>   |
| cloud height (ch)   | 24    | ch <sub>8</sub>   | ch <sub>7</sub>    | ch <sub>6</sub>    | ch <sub>5</sub>   | ch <sub>4</sub>   | ch <sub>3</sub>   | ch <sub>2</sub>   | ch <sub>1</sub>   |
| cloud type (cty)<br>QFE (qfe)                                   | 25    | qfe <sub>6</sub>  | qfe <sub>5</sub>   | qfe <sub>4</sub>   | qfe <sub>3</sub>  | qfe <sub>2</sub>  | qfe <sub>1</sub>  | cty <sub>2</sub>  | cty <sub>1</sub>  |
| recent weather (rw)   | 26    | rw <sub>6</sub>   | rw <sub>5</sub>    | rw <sub>4</sub>    | rw <sub>3</sub>   | rw <sub>2</sub>   | rw <sub>1</sub>   | qfe <sub>8</sub>  | qfe <sub>7</sub>  |
| wind shear (ws)   | 27    | ws <sub>7</sub>   | ws <sub>6</sub>    | ws <sub>5</sub>    | ws <sub>4</sub>   | ws <sub>3</sub>   | ws <sub>2</sub>   | ws <sub>1</sub>   | rw <sub>7</sub>   |
| sea-surface temperature (sst)<br>state of the sea (ss)          | 29    | ss <sub>1</sub>   | sst <sub>6</sub>   | sst <sub>5</sub>   | sst <sub>4</sub>  | sst <sub>3</sub>  | sst <sub>2</sub>  | sst <sub>1</sub>  | ws <sub>8</sub>   |
| free text message (txt)   | 30    | txt <sub>5</sub>  | txt <sub>4</sub>   | txt <sub>3</sub>   | txt <sub>2</sub>  | txt <sub>1</sub>  | ss <sub>4</sub>   | ss <sub>3</sub>   | ss <sub>2</sub>   |
|   | 31    | txt <sub>j</sub>  | txt <sub>j-1</sub> | txt <sub>j-2</sub> | .....             | txt <sub>9</sub>  | txt <sub>8</sub>  | txt <sub>7</sub>  | txt <sub>6</sub>  |

! ..... ! Denotes variable length field

Table 5.56: METAR message field encoding

| Data field         | Definition  | Encoded value   | Decoded value<br>(if different)                      |
|--------------------|---|---|--|
| FIS-B Message ID   | See table 5.54  | 0   |  |
| Version ID         | FIS-B as defined in the present document<br>Reserved for future use   | 0<br>1 to 15  |  |
| Message edition    | Edition of the METAR message<br>(increments when message changes)<br>A, B, C, D, E, F, G, H   | 0 to 7  |  |
| Local ID           | ICAO airport designator<br>4 Letter Code, A to Z. Each letter encoded<br>as a 5 bit binary<br>A<br>B<br>C<br>↓<br>Y<br>Z<br>Unused  | 00001<br>00010<br>00011<br>↓<br>11001<br>11010<br>11011 to 11111          |  |
| Date               | Unknown<br>1<br>2<br>3<br>↓<br>30<br>31   | 0<br>1<br>2<br>3<br>↓<br>30<br>31   |  |
| Time (minutes)     | Unknown<br>$0 \leq \text{time} < 1$<br>$1 \leq \text{time} < 2$<br>$2 \leq \text{time} < 3$<br>$3 \leq \text{time} < 4$<br>↓<br>$1\ 438 \leq \text{time} < 1\ 439$<br>$1\ 439 \leq \text{time} < 1\ 440$<br>Unused  | 0<br>1<br>2<br>3<br>4<br>↓<br>1 439<br>1 440<br>1 441 to 2 047            | 0<br>1<br>2<br>3<br><br>1 438<br>1 439               |
| Wind Direction (°) | Unknown<br>$355 \leq \text{heading} < 5$<br>$5 \leq \text{heading} < 15$<br>$15 \leq \text{heading} < 25$<br>$25 \leq \text{heading} < 35$<br>↓<br>$315 \leq \text{heading} < 325$<br>$325 \leq \text{heading} < 335$<br>$335 \leq \text{heading} < 345$<br>$345 \leq \text{heading} < 355$<br>Unused                           | 0<br>1<br>2<br>3<br>4<br>↓<br>33<br>34<br>35<br>36<br>37 to 63            | 0<br>10<br>20<br>30<br>↓<br>320<br>330<br>340<br>350 |
| Wind Speed (kts)   | Unknown<br>$0 < \text{speed} < 0,5$<br>$0,5 \leq \text{speed} < 1,5$<br>$1,5 \leq \text{speed} < 2,5$<br>$2,5 \leq \text{speed} < 3,5$<br>↓<br>$96,5 \leq \text{speed} < 97,5$<br>$97,5 \leq \text{speed} < 98,5$<br>$98,5 \leq \text{speed} < 99,5$<br>$99,5 \leq \text{speed} < 100,5$<br>$100,5 \leq \text{speed}$<br>Unused | 0<br>1<br>2<br>3<br>4<br>↓<br>98<br>99<br>100<br>101<br>102<br>103 to 127 | 0<br>1<br>2<br>3<br>↓<br>97<br>98<br>99<br>100       |

| Data field            | Definition   | Encoded value  | Decoded value<br>(if different)                            |
|-----------------------|--|--|--|
| Free text flag (ftxt) | Refers to following field; Free text in the free text field. This flag does not affect the existence of a TREND report in the free text field.<br>None<br>Message  | 0<br>1   |  |
| Max wind flag         | Refers to following field; Wind Gust Indicator<br>None<br>Gusts present  | 0<br>1   |  |
| CAVOK flag            | Refers to following field; Visibility (mas, masd, mis, misd), the 3 possible present weather fields (pw) and the 4 possible cloud coverage characteristics fields (cc, ch, cty), the cloud number flag (cno) and the present weather flag (pwf). Under CAVOK conditions these will not be sent.<br>No CAVOK<br>CAVOK | 0<br>1   |  |
| TREND flag            | No TREND report<br>TREND report present  | 0<br>1   |  |
| Present weather flag  | Number of present weather fields to follow (max 3)<br>Refers to following field; Present weather<br>1 weather field included<br>2 weather fields included<br>3 weather fields included<br>reserved for future use  | 0<br>1<br>2<br>3   |  |
| Recent weather flag   | Number of recent weather fields to follow (max 3)<br>Refers to following field; Recent weather<br>1 weather field included<br>2 weather fields included<br>3 weather fields included<br>reserved for future use  | 0<br>1<br>2<br>3   |  |
| QFE flag              | Present<br>Not present   | 0<br>1   |  |
| Temperature (°C)      | Unknown<br>-80 < temp ≤ -79<br>-79 < temp ≤ -78<br>-78 < temp ≤ -77<br>↓<br>-1 < temp ≤ 0<br>0 < temp ≤ 1<br>1 < temp ≤ 2<br>↓<br>59 < temp ≤ 60<br>60 < temp<br>Unused  | 0<br>1<br>2<br>3<br>↓<br>80<br>81<br>82<br>↓<br>140<br>141<br>142 to 255 | -79<br>-78<br>-77<br>↓<br>0<br>1<br>2<br>↓<br>60           |
| Dew point (°C)        | As for temperature   |  |  |
| QNH (hPa)             | Unknown<br>850 ≤ QNH < 851<br>851 ≤ QNH < 852<br>852 ≤ QNH < 853<br>↓<br>1 097 ≤ QNH < 1 098<br>1 098 ≤ QNH < 1 099<br>1 099 ≤ QNH < 1 100<br>1 100 ≤ QNH < 1 101<br>Unused  | 0<br>1<br>2<br>3<br>↓<br>248<br>249<br>250<br>251<br>252 to 255          | 850<br>851<br>852<br>↓<br>1 097<br>1 098<br>1 099<br>1 100 |

| Data field                             | Definition   | Encoded value   | Decoded value<br>(if different)   |
|--|--|---|---|
| Sea Flag                               | Refers to following fields: state of the sea (ss) and sea temperature (sst)<br>Present<br>Not present  | 0<br>1  |   |
| Variable wind direction to (degrees)   | Unknown<br><br>355 ≤ variable < 5<br>5 ≤ variable < 15<br>15 ≤ variable < 25<br>25 ≤ variable < 35<br>↓<br>315 ≤ variable < 325<br>325 ≤ variable < 335<br>335 ≤ variable < 345<br>345 ≤ variable < 355<br>Unused  | 0<br><br>1<br>2<br>3<br>4<br>↓<br>33<br>34<br>35<br>36<br>37 to 63                                    | <br><br>0<br>10<br>20<br>30<br>↓<br>320<br>330<br>340<br>350  |
| Variable wind direction from (degrees) | As above   |   |   |
| Wind Gust Indicator                    | As for wind speed  |   |   |
| Minimum visibility (metres)            | Unknown<br><br>0 ≤ visibility < 100<br>100 ≤ visibility < 150<br>150 ≤ visibility < 200<br>200 ≤ visibility < 250<br>↓<br>700 ≤ visibility < 750<br>750 ≤ visibility < 800<br>800 ≤ visibility < 900<br>900 ≤ visibility < 1 000<br>↓<br>6 000 ≤ visibility < 7 000<br>7 000 ≤ visibility < 8 000<br>8 000 ≤ visibility < 9 000<br>9 000 ≤ visibility < 10 000<br>10 000 ≤ visibility < 11 000<br>Unused | 0<br><br>1<br>2<br>3<br>4<br>↓<br>14<br>15<br>16<br>17<br>↓<br>41<br>42<br>43<br>44<br>45<br>46 to 63 | <br><br>50<br>100<br>150<br>200<br>↓<br>700<br>750<br>800<br>900<br>↓<br>6 000<br>7 000<br>8 000<br>9 000<br>10 000 |
| Minimum visibility direction           | North<br><br>North East<br>East<br>South East<br>South<br>South West<br>West<br>North West   | 0<br><br>1<br>2<br>3<br>4<br>5<br>6<br>7  | 0<br><br>1<br>2<br>3<br>4<br>5<br>6<br>7  |
| Maximum visibility (metres)            | As for minimum visibility  |   |   |
| Maximum visibility direction           | As for minimum visibility direction  |   |   |
| Present weather                        | See weather codes in table 5.57<br>Encoded values not specified in table 5.57 are unused   |   |   |
| Cloud no. flag                         | Number of cloud fields to follow (max 4)<br>Referred to following fields; Cloud coverage, Cloud Height, Cloud Type<br>1<br>2<br>3<br>4   | 0<br>1<br>2<br>3  |   |

| Data field                      | Definition  | Encoded value   | Decoded value<br>(if different)  |
|---------------------------------|---|---|--|
| Cloud coverage                  | Unknown<br>Few<br>Scattered<br>Broken<br>Overcast<br>Sky clear<br>Unused  | 0<br>1<br>2<br>3<br>4<br>5<br>6 to 7  |  |
| Cloud height (m)                | 0 ≤ heading < 60<br>60 ≤ heading < 90<br>90 ≤ heading < 120<br>120 ≤ heading < 150<br>150 ≤ heading < 180<br>↓<br>2 910 ≤ heading < 2 940<br>2 940 ≤ heading < 2 970<br>2 970 ≤ heading < 3 000<br>3 000 ≤ heading < 3 300<br>↓<br>19 800 ≤ heading < 20 100<br>20 100 ≤ heading < 20 400<br>Unused | 0<br>1<br>2<br>3<br>4<br>↓<br>96<br>97<br>98<br>99<br>↓<br>155<br>156<br>157 to 255 | 30<br>60<br>90<br>120<br>150<br>↓<br>2 910<br>2 940<br>2 970<br>3 000<br>↓<br>19 800<br>20 100 |
| Cloud type                      | No clouds of concern<br>Cumulonimbus<br>Towering cumulus<br>Future use  | 0<br>1<br>2<br>3  |  |
| QFE (hPa)                       | Unknown<br>850 ≤ QFE < 851<br>851 ≤ QFE < 852<br>852 ≤ QFE < 853<br>↓<br>1 097 ≤ QFE < 1 098<br>1 098 ≤ QFE < 1 099<br>1 099 ≤ QFE < 1 100<br>1 100 ≤ QFE < 1 101<br>Unused   | 0<br>1<br>2<br>3<br>↓<br>248<br>249<br>250<br>251<br>252 to 255                     | 850<br>851<br>852<br>↓<br>1 097<br>1 098<br>1 099<br>1 100                                     |
| Recent weather                  | See weather codes in table 5.57<br>Encoded values not specified in table 5.57<br>are unused   |   |  |
| Sea-surface temperature<br>(°C) | Unknown<br>-10 ≤ SST < -9<br>-9 ≤ SST < -8<br>-8 ≤ SST < -7<br>↓<br>36 ≤ SST < 37<br>37 ≤ SST < 38<br>38 ≤ SST < 39<br>39 ≤ SST < 40<br>40 ≤ SST<br>Unused  | 0<br>1<br>2<br>3<br>↓<br>47<br>48<br>49<br>50<br>51<br>52 to 63                     | -10<br>-9<br>-8<br>↓<br>36<br>37<br>38<br>39<br>40   |

| Data field   | Definition  | Encoded value  | Decoded value<br>(if different) |
|--|---|--|---------------------------------|
| State of the sea   | Unknown<br>0<br>1<br>2<br>3<br>4<br>5<br>6<br>7<br>8<br>9<br>Unused         | 0<br>1<br>2<br>3<br>4<br>5<br>6<br>7<br>8<br>9<br>10<br>11 to 15 |                                 |
| Free text message  | Variable field length (6-bit converted ASCII characters)<br>See table 5.57a |  |                                 |
| NOTE: See WMO Publication No306, Manual on Codes Vol 1.1, Part A [i.8] for interpretation. |   |  |                                 |

Table 5.57: Encoding for ICAO Weather codes

| Explanation                                | Encoded Value |
|--|---------------|
| <b>No precipitation during observation</b> |               |
| Fume - smoke                               | 4             |
| Dust haze                                  | 5             |
| Rising dust and sand                       | 7             |
| Dust devil                                 | 8             |
| Brume - mist                               | 10            |
| Mince fog - shallow fog                    | 11            |
| Mince fog                                  | 12            |
| Thunderstorm                               | 17            |
| Funnel cloud                               | 18            |
| Recent drizzle                             | 20            |
| Recent rain                                | 21            |
| Recent snow                                | 22            |
| Recent rain and snow                       | 23            |
| Recent freezing rain                       | 24            |
| Recent showers                             | 25            |
| Recent snow showers                        | 26            |
| Recent grain(hail)                         | 27            |
| Recent thunderstorm                        | 29            |
| Sand or dust storm                         | 30            |
| Heavy sand storm                           | 33            |
| Low drifting snow                          | 36            |
| Blowing snow                               | 38            |
| Fog patches                                | 40            |
| Fog  | 42            |
| Freezing fog                               | 48            |
| <b>Precipitation during observation</b>    |               |
| Drizzle                                    | 50            |
| Heavy drizzle                              | 54            |
| Freezing drizzle                           | 56            |
| Heavy freezing drizzle                     | 57            |
| Rain                                       | 58            |
| Heavy rain                                 | 64            |
| Freezing rain                              | 66            |
| Heavy freezing rain                        | 67            |
| Rain and snow                              | 68            |
| Snow                                       | 70            |
| Heavy snow                                 | 74            |
| Snow grains                                | 77            |
| Ice pellets                                | 79            |
| Showers                                    | 80            |
| Heavy showers                              | 81            |
| Showers of rain and snow                   | 83            |
| Snow showers                               | 85            |
| Soft hail                                  | 87            |
| Hail                                       | 89            |
| Thunderstorm                               | 95            |
| Thunderstorm with hail                     | 96            |
| Heavy thunderstorm                         | 97            |

Table 5.57a: Free text 6-bit character encoding (converted from ASCII 8-bit)

| First 32 characters |           |                | Last 32 characters |           |                |
|---------------------|-----------|----------------|--------------------|-----------|----------------|
| Character           | (Decimal) | Encoded Binary | Character          | (Decimal) | Encoded Binary |
| @                   | 0         | 000000         | [space]            | 32        | 100000         |
| A                   | 1         | 000001         | !                  | 33        | 100001         |
| B                   | 2         | 000010         | "                  | 34        | 100010         |
| C                   | 3         | 000011         | #                  | 35        | 100011         |
| D                   | 4         | 000100         | \$                 | 36        | 100100         |
| E                   | 5         | 000101         | %                  | 37        | 100101         |
| F                   | 6         | 000110         | &                  | 38        | 100110         |
| G                   | 7         | 000111         | '                  | 39        | 100111         |
| H                   | 8         | 001000         | (                  | 40        | 101000         |
| I                   | 9         | 001001         | )                  | 41        | 101001         |
| J                   | 10        | 001010         | *                  | 42        | 101010         |
| K                   | 11        | 001011         | +                  | 43        | 101011         |
| L                   | 12        | 001100         | ,                  | 44        | 101100         |
| M                   | 13        | 001101         | -                  | 45        | 101101         |
| N                   | 14        | 001110         | .                  | 46        | 101110         |
| O                   | 15        | 001111         | /                  | 47        | 101111         |
| P                   | 16        | 010000         | 0                  | 48        | 110000         |
| Q                   | 17        | 010001         | 1                  | 49        | 110001         |
| R                   | 18        | 010010         | 2                  | 50        | 110010         |
| S                   | 19        | 010011         | 3                  | 51        | 110011         |
| T                   | 20        | 010100         | 4                  | 52        | 110100         |
| U                   | 21        | 010101         | 5                  | 53        | 110101         |
| V                   | 22        | 010110         | 6                  | 54        | 110110         |
| W                   | 23        | 010111         | 7                  | 55        | 110111         |
| X                   | 24        | 011000         | 8                  | 56        | 111000         |
| Y                   | 25        | 011001         | 9                  | 57        | 111001         |
| Z                   | 26        | 011010         | :                  | 58        | 111010         |
| [                   | 27        | 011011         | ;                  | 59        | 111011         |
| \                   | 28        | 011100         | <                  | 60        | 111100         |
| ]                   | 29        | 011101         | =                  | 61        | 111101         |
| ^                   | 30        | 011110         | >                  | 62        | 111110         |
| _                   | 31        | 011111         | ?                  | 63        | 111111         |

### 5.3.3 Special Observations and Reports (SPECI) message

| Requirement reference |   |
|-----------------------|---|
| 5.3.3.1               | The SPECI report shall be encoded as defined for the METAR message in table 5.55 and table 5.56, with the FIS-B message ID set to 4, and the message edition indicating the edition of the SPECI message. |



### 5.3.4 Automatic Terminal Information Service (ATIS) message

| Requirement reference |   |
|-----------------------|---|
| 5.3.4.1               | The ATIS report shall be encoded as defined in table 5.58.  |
| 5.3.4.2               | If a TREND report is contained in the message, it shall always be transmitted before the free text message.   |
| 5.3.4.3               | If a TREND report is present, its end shall be signalled by the ASCII code "100100", corresponding to the character "\$".   |
| 5.3.4.4               | The "\$" character shall be excluded from any FIS-B message.  |
| 5.3.4.5               | Fields in the ATIS message shall be encoded as defined in table 5.59.   |
| 5.3.4.6               | The CAVOK flag shall indicate the CAVOK condition.  |
| 5.3.4.7               | When the CAVOK flag is set to "1", the fields for visibility (mas, masd, mis, misd), the 3 possible present weather fields (pw), the 4 possible cloud coverage fields (cc, ch, cty), the cloud number flag (cno), and the present weather flag (pwf) shall not be sent. |

Table 5.58: ATIS message bit encoding

| Description  | Octet | Bit number         |                    |                    |                    |                    |                    |                    |                    |
|--|-------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
|  |       | 8                  | 7                  | 6                  | 5                  | 4                  | 3                  | 2                  | 1                  |
| FIS-B message ID (fmi)<br>FIS-B version ID (vers)<br>message edition (med)   | 6     | 0                  | 0                  | 0                  | 0                  | 1                  | 1                  | 1                  | 1                  |
| local ID(locl)   | 7     | vers <sub>4</sub>  | vers <sub>3</sub>  | vers <sub>2</sub>  | vers <sub>1</sub>  | fmi <sub>4</sub>   | fmi <sub>3</sub>   | fmi <sub>2</sub>   | fmi <sub>1</sub>   |
|  | 8     | locl <sub>5</sub>  | locl <sub>4</sub>  | locl <sub>3</sub>  | locl <sub>2</sub>  | locl <sub>1</sub>  | med <sub>3</sub>   | med <sub>2</sub>   | med <sub>1</sub>   |
| date (date)  | 9     | locl <sub>13</sub> | locl <sub>12</sub> | locl <sub>11</sub> | locl <sub>10</sub> | locl <sub>9</sub>  | locl <sub>8</sub>  | locl <sub>7</sub>  | locl <sub>6</sub>  |
| time (ti)  | 10    | date <sub>1</sub>  | locl <sub>20</sub> | locl <sub>19</sub> | locl <sub>18</sub> | locl <sub>17</sub> | locl <sub>16</sub> | locl <sub>15</sub> | locl <sub>14</sub> |
| holding delay (hd)   | 11    | ti <sub>4</sub>    | ti <sub>3</sub>    | ti <sub>2</sub>    | ti <sub>1</sub>    | date <sub>5</sub>  | date <sub>4</sub>  | date <sub>3</sub>  | date <sub>2</sub>  |
| transition level (tran)  | 12    | hd <sub>1</sub>    | ti <sub>11</sub>   | ti <sub>10</sub>   | ti <sub>9</sub>    | ti <sub>8</sub>    | ti <sub>7</sub>    | ti <sub>6</sub>    | ti <sub>5</sub>    |
| other op. activity flag (othf)<br>other op. activity (oth)<br>airport availability (aavl)  | 13    | tran <sub>5</sub>  | tran <sub>4</sub>  | tran <sub>3</sub>  | tran <sub>2</sub>  | tran <sub>1</sub>  | hd <sub>4</sub>    | hd <sub>3</sub>    | hd <sub>2</sub>    |
|  | 14    | aavl <sub>3</sub>  | aavl <sub>2</sub>  | aavl <sub>1</sub>  | oth <sub>3</sub>   | oth <sub>2</sub>   | oth <sub>1</sub>   | othf               | tran <sub>6</sub>  |
| wind direction (wdi)<br>wind speed (wsp)   | 15    | aavl <sub>11</sub> | aavl <sub>10</sub> | aavl <sub>9</sub>  | aavl <sub>8</sub>  | aavl <sub>7</sub>  | aavl <sub>6</sub>  | aavl <sub>5</sub>  | aavl <sub>4</sub>  |
| temperature (tem)  | 16    | wsp <sub>1</sub>   | wdi <sub>6</sub>   | wdi <sub>5</sub>   | wdi <sub>4</sub>   | wdi <sub>3</sub>   | wdi <sub>2</sub>   | wdi <sub>1</sub>   | aavl <sub>12</sub> |
| dew point (dew)  | 17    | tem <sub>2</sub>   | tem <sub>1</sub>   | wsp <sub>7</sub>   | wsp <sub>6</sub>   | wsp <sub>5</sub>   | wsp <sub>4</sub>   | wsp <sub>3</sub>   | wsp <sub>2</sub>   |
| QNH (qnh)  | 18    | dew <sub>2</sub>   | dew <sub>1</sub>   | tem <sub>8</sub>   | tem <sub>7</sub>   | tem <sub>6</sub>   | tem <sub>5</sub>   | tem <sub>4</sub>   | tem <sub>3</sub>   |
| free text flag (ftxt)<br>max wind flag (mxw)<br>CAVOK flag (cav)   | 19    | qnh <sub>2</sub>   | qnh <sub>1</sub>   | dew <sub>8</sub>   | dew <sub>7</sub>   | dew <sub>6</sub>   | dew <sub>5</sub>   | dew <sub>4</sub>   | dew <sub>3</sub>   |
| TREND report flag (trd)<br>QFE flag (qfef)<br>wind shear flag (ws)<br>Present weather flag (pwf)<br>Recent weather flag (rwf)<br>variable wind direction to (vdit) | 20    | mxw                | ftxt               | qnh <sub>8</sub>   | qnh <sub>7</sub>   | qnh <sub>6</sub>   | qnh <sub>5</sub>   | qnh <sub>4</sub>   | qnh <sub>3</sub>   |
| variable wind direction from (vdif)  | 21    | rwf <sub>2</sub>   | rwf <sub>1</sub>   | pwf <sub>2</sub>   | pwf <sub>1</sub>   | ws                 | qfef               | trd                | cav                |
| wind gust indicator (wgi)  | 22    | vdif <sub>2</sub>  | vdif <sub>1</sub>  | vdit <sub>6</sub>  | vdit <sub>5</sub>  | vdit <sub>4</sub>  | vdit <sub>3</sub>  | vdit <sub>2</sub>  | vdit <sub>1</sub>  |
| Minimum visibility (mis)   | 23    | wgi <sub>4</sub>   | wgi <sub>3</sub>   | wgi <sub>2</sub>   | wgi <sub>1</sub>   | vdif <sub>6</sub>  | vdif <sub>5</sub>  | vdif <sub>4</sub>  | vdif <sub>3</sub>  |
| Minimum visibility direction (misd)<br>Maximum visibility (mas)  | 24    | mis <sub>5</sub>   | mis <sub>4</sub>   | mis <sub>3</sub>   | mis <sub>2</sub>   | mis <sub>1</sub>   | wgi <sub>7</sub>   | wgi <sub>6</sub>   | wgi <sub>5</sub>   |
| Maximum visibility direction (masd)<br>cloud no. flag (cno)<br>cloud coverage (cc)   | 25    | mas <sub>4</sub>   | mas <sub>3</sub>   | mas <sub>2</sub>   | mas <sub>1</sub>   | misd <sub>3</sub>  | misd <sub>2</sub>  | misd <sub>1</sub>  | mis <sub>6</sub>   |
| cloud height (ch)  | 26    | cc <sub>1</sub>    | cno <sub>2</sub>   | cno <sub>1</sub>   | masd <sub>3</sub>  | masd <sub>2</sub>  | masd <sub>1</sub>  | mas <sub>6</sub>   | mas <sub>5</sub>   |
| cloud type (cty)<br>present weather (pw)   | 27    | ch <sub>6</sub>    | ch <sub>5</sub>    | ch <sub>4</sub>    | ch <sub>3</sub>    | ch <sub>2</sub>    | ch <sub>1</sub>    | cc <sub>3</sub>    | cc <sub>2</sub>    |
| recent weather (rw)  | 28    | pw <sub>4</sub>    | pw <sub>3</sub>    | pw <sub>2</sub>    | pw <sub>1</sub>    | cty <sub>2</sub>   | cty <sub>1</sub>   | ch <sub>8</sub>    | ch <sub>7</sub>    |
| QFE (qfe)  | 29    | rw <sub>5</sub>    | rw <sub>4</sub>    | rw <sub>3</sub>    | rw <sub>2</sub>    | rw <sub>1</sub>    | pw <sub>7</sub>    | pw <sub>6</sub>    | pw <sub>5</sub>    |
| free text message (txt)  | 30    | qfe <sub>6</sub>   | qfe <sub>5</sub>   | qfe <sub>4</sub>   | qfe <sub>3</sub>   | qfe <sub>2</sub>   | qfe <sub>1</sub>   | rw <sub>7</sub>    | rw <sub>6</sub>    |
|  | 31    | txt <sub>6</sub>   | txt <sub>5</sub>   | txt <sub>4</sub>   | txt <sub>3</sub>   | txt <sub>2</sub>   | txt <sub>1</sub>   | qfe <sub>8</sub>   | qfe <sub>7</sub>   |
|  |       | txt <sub>j</sub>   | txt <sub>j-1</sub> | txt <sub>j-2</sub> | .....              | txt <sub>10</sub>  | txt <sub>9</sub>   | txt <sub>8</sub>   | txt <sub>7</sub>   |

..... Denotes variable length field

Table 5.59: ATIS message field encoding

| Data field                      | Definition   | Encoded value  | Decoded value (if different) |
|---------------------------------|--|--|------------------------------|
| FIS-B Message ID                | See table 5.54.  | 1  |                              |
| Version ID                      | FIS-B as defined in the present document<br>Reserved for future use.   | 0<br>1 to 15   |                              |
| Message edition                 | See definition in table 5.56.  |  |                              |
| Local ID                        | See definition in table 5.56.  |  |                              |
| Date                            | See definition in table 5.56.  |  |                              |
| Time                            | See definition in table 5.56.  |  |                              |
| Holding Delay                   | No Delay.<br>5 min<br>10 min<br>15 min<br>20 min<br>25 min<br>30 min<br>35 min<br>40 min<br>45 min<br>50 min<br>55 min<br>60 min<br>Unused<br>Unused<br>Unknown Delay. | 0<br>1<br>2<br>3<br>4<br>5<br>6<br>7<br>8<br>9<br>10<br>11<br>12<br>13<br>14<br>15 |                              |
| Transition level                | Unknown.<br>0<br>5<br>10<br>15<br>↓<br>285<br>290<br>295<br>300<br>Reserved for future use.  | 0<br>1<br>2<br>3<br>4<br>↓<br>58<br>59<br>60<br>61<br>62 to 63                     |                              |
| Other operational activity flag | Present.<br>Not present.   | 0<br>1   |                              |
| Other operational activity      | Reserved for future use. ( <i>e.g. bird activity</i> ).  | 0 to 7   |                              |
| Airport availability            | Bits 1 to 11: as for Time in table 5.56.<br>Bit 12:<br>Open.<br>Closed.  | 1<br>0   |                              |
| Wind Direction (°)              | See definition in table 5.56.  |  |                              |
| Wind Speed (kts)                | See definition in table 5.56.  |  |                              |
| Temperature (degrees)           | See definition in table 5.56.  |  |                              |
| Dew point (degrees)             | As for temperature.  |  |                              |
| QNH                             | See definition in table 5.56.  |  |                              |
| Free text flag                  | Refers to following field: Free text in the free text field. This flag does not affect the existence of a TREND report in the free text field.<br>None.<br>Message.    | 0<br>1   |                              |
| Max wind flag                   | Refers to following field: Wind Gust Indicator.<br>None.<br>Gusts present.   | 0<br>1   |                              |

| Data field                              | Definition  | Encoded value | Decoded value (if different) |
|---|---|---------------|------------------------------|
| CAVOK flag                              | Refers to following fields: visibility (mas, masd, mis, misd), the 3 possible present weather fields (pw), the 4 possible cloud coverage fields (cc, ch, cty), the cloud number flag (cno), and the present weather flag (pwf). Under CAVOK conditions these will not be sent.<br>No CAVOK.<br>CAVOK. | 0<br>1        |                              |
| TREND flag                              | None.<br>Message.   | 0<br>1        |                              |
| QFE flag                                | Present.<br>Not present.  | 0<br>1        |                              |
| Present weather flag                    | See definition in table 5.56.   |               |                              |
| Recent weather flag                     | See definition in table 5.56.   |               |                              |
| Variable wind directions to (degrees)   | See definition in table 5.56.   |               |                              |
| Variable wind directions from (degrees) | As above.   |               |                              |
| Wind gust indicator                     | As for wind speed.  |               |                              |
| Minimum visibility (metres)             | See definition in table 5.56.   |               |                              |
| Minimum visibility direction            | See definition in table 5.56.   |               |                              |
| Maximum visibility (metres)             | As for minimum visibility.  |               |                              |
| Maximum visibility direction            | As for minimum visibility direction.  |               |                              |
| Cloud no. flag                          | See definition in table 5.56.   |               |                              |
| Cloud coverage                          | See definition in table 5.56.   |               |                              |
| Cloud Height (m)                        | See definition in table 5.56.   |               |                              |
| Cloud Type                              | See definition in table 5.56.   |               |                              |
| Present weather                         | See weather codes in table 5.57.<br>Encoded values not specified in table 5.57 are unused.  |               |                              |
| Recent weather                          | See weather codes in table 5.57.<br>Encoded values not specified in table 5.57 are unused.  |               |                              |
| QFE                                     | See definition in table 5.56.   |               |                              |
| Free text message                       | Variable field length (6-bit converted ASCII characters).<br>See table 5.57a.   |               |                              |

### 5.3.5 Runway Condition (RCN) message

| Requirement reference |  |
|-----------------------|--|
| 5.3.5.1               | The RCN message shall be encoded as defined in table 5.60.           |
| 5.3.5.2               | Fields in the RCN message shall be encoded as defined in table 5.61. |

Table 5.60: RCN message bit encoding

| Description                 | Octet | Bit number         |                    |                    |                    |                    |                    |                    |                    |
|-----------------------------|-------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
|                             |       | 8                  | 7                  | 6                  | 5                  | 4                  | 3                  | 2                  | 1                  |
|                             | 5     | 0                  | 0                  | 0                  | 0                  | 1                  | 1                  | 1                  | 1                  |
| FIS-B message ID (fmi)      | 6     | vers <sub>4</sub>  | vers <sub>3</sub>  | vers <sub>2</sub>  | vers <sub>1</sub>  | fmi <sub>4</sub>   | fmi <sub>3</sub>   | fmi <sub>2</sub>   | fmi <sub>1</sub>   |
| FIS-B version ID (vers)     |       |                    |                    |                    |                    |                    |                    |                    |                    |
| message edition (med)       | 7     | locl <sub>5</sub>  | locl <sub>4</sub>  | locl <sub>3</sub>  | locl <sub>2</sub>  | locl <sub>1</sub>  | med <sub>3</sub>   | med <sub>2</sub>   | med <sub>1</sub>   |
| local ID (locl)             |       |                    |                    |                    |                    |                    |                    |                    |                    |
|                             | 8     | locl <sub>13</sub> | locl <sub>12</sub> | locl <sub>11</sub> | locl <sub>10</sub> | locl <sub>9</sub>  | locl <sub>8</sub>  | locl <sub>7</sub>  | locl <sub>6</sub>  |
| date (date)                 | 9     | date <sub>1</sub>  | locl <sub>20</sub> | locl <sub>19</sub> | locl <sub>18</sub> | locl <sub>17</sub> | locl <sub>16</sub> | locl <sub>15</sub> | locl <sub>14</sub> |
| time (ti)                   | 10    | ti <sub>4</sub>    | ti <sub>3</sub>    | ti <sub>2</sub>    | ti <sub>1</sub>    | date <sub>5</sub>  | date <sub>4</sub>  | date <sub>3</sub>  | date <sub>2</sub>  |
| braking action (brk)        | 11    | brk <sub>1</sub>   | ti <sub>11</sub>   | ti <sub>10</sub>   | ti <sub>9</sub>    | ti <sub>8</sub>    | ti <sub>7</sub>    | ti <sub>6</sub>    | ti <sub>5</sub>    |
| runway ID (run)             | 12    | run <sub>6</sub>   | run <sub>5</sub>   | run <sub>4</sub>   | run <sub>3</sub>   | run <sub>2</sub>   | run <sub>1</sub>   | brk <sub>3</sub>   | brk <sub>2</sub>   |
| Approach type flag (aptf)   | 13    | apty <sub>4</sub>  | apty <sub>3</sub>  | apty <sub>2</sub>  | apty <sub>1</sub>  | aptf <sub>2</sub>  | aptf <sub>1</sub>  | run <sub>8</sub>   | run <sub>7</sub>   |
| Approach type (apty)        |       |                    |                    |                    |                    |                    |                    |                    |                    |
| reduced runway length (rrl) | 14    | rrl <sub>8</sub>   | rrl <sub>7</sub>   | rrl <sub>6</sub>   | rrl <sub>5</sub>   | rrl <sub>4</sub>   | rrl <sub>3</sub>   | rrl <sub>2</sub>   | rrl <sub>1</sub>   |
| reduced runway width (rrw)  | 15    | rdp <sub>1</sub>   | rrw <sub>7</sub>   | rrw <sub>6</sub>   | rrw <sub>5</sub>   | rrw <sub>4</sub>   | rrw <sub>3</sub>   | rrw <sub>2</sub>   | rrw <sub>1</sub>   |
| runway deposits (rdp)       |       |                    |                    |                    |                    |                    |                    |                    |                    |
| runway contamination (rcon) | 16    | dod <sub>2</sub>   | dod <sub>1</sub>   | rcon <sub>3</sub>  | rcon <sub>2</sub>  | rcon <sub>1</sub>  | rdp <sub>4</sub>   | rdp <sub>3</sub>   | rdp <sub>2</sub>   |
| depth of deposit (dod)      |       |                    |                    |                    |                    |                    |                    |                    |                    |
| RVR touchdown (rvt)         | 17    | rvt <sub>3</sub>   | rvt <sub>2</sub>   | rvt <sub>1</sub>   | dod <sub>7</sub>   | dod <sub>6</sub>   | dod <sub>5</sub>   | dod <sub>4</sub>   | dod <sub>3</sub>   |
| RVR midpoint (rvm)          | 18    | rvm <sub>5</sub>   | rvm <sub>4</sub>   | rvm <sub>3</sub>   | rvm <sub>2</sub>   | rvm <sub>1</sub>   | rvt <sub>6</sub>   | rvt <sub>5</sub>   | rvt <sub>4</sub>   |
| RVR endpoint (rve)          | 19    | rso <sub>1</sub>   | rve <sub>6</sub>   | rve <sub>5</sub>   | rve <sub>4</sub>   | rve <sub>3</sub>   | rve <sub>2</sub>   | rve <sub>1</sub>   | rvm <sub>6</sub>   |
| RVR source (rso)            |       |                    |                    |                    |                    |                    |                    |                    |                    |
| runway in use (rus)         | 20    | ravl <sub>5</sub>  | ravl <sub>4</sub>  | ravl <sub>3</sub>  | ravl <sub>2</sub>  | ravl <sub>1</sub>  | rus <sub>2</sub>   | rus <sub>1</sub>   | rso <sub>2</sub>   |
| runway availability (ravl)  |       |                    |                    |                    |                    |                    |                    |                    |                    |
| wind shear                  | 21    | ws                 | ravl <sub>12</sub> | ravl <sub>11</sub> | ravl <sub>10</sub> | ravl <sub>9</sub>  | ravl <sub>8</sub>  | ravl <sub>7</sub>  | ravl <sub>6</sub>  |

Table 5.61: RCN message field encoding

| Data field         | Definition  | Encoded Value                        | Decoded value (if different) |
|--------------------|---|--------------------------------------|------------------------------|
| FIS-B Message ID   | See table 5.54.   | 2                                    |                              |
| Version ID         | FIS-B as defined in the present document.<br>Reserved for future use.   | 0<br>1 to 15                         |                              |
| Message edition    | See definition in table 5.56.   |                                      |                              |
| Local ID           | See definition in table 5.56.   |                                      |                              |
| Date               | See definition in table 5.56.   | 0                                    |                              |
| Time               | See definition in table 5.56.   | 0                                    |                              |
| Braking action     | Braking action not reported.<br>Braking action: Poor.<br>Braking action: Medium/Poor.<br>Braking action: Medium.<br>Braking action: Medium/Good.<br>Braking action: Good.<br>Figures unreliable.<br>Unused. | 0<br>1<br>2<br>3<br>4<br>5<br>6<br>7 |                              |
| Runway ID          | Bits 1 to 6:<br>01 to 36<br>Bits 7 to 8:<br>Single runway.<br>Left runway.<br>Right runway.<br>Centre runway.   | 0 to 35<br><br>0<br>1<br>2<br>3      |                              |
| Approach type flag | 1 approach field included.<br>2 approach field included.<br>3 approach field included.<br>Unused.   | 0<br>1<br>2<br>3                     |                              |

| Data field                        | Definition  | Encoded Value   | Decoded value<br>(if different)                               |
|-----------------------------------|---|---|---|
| Approach type                     | ILS CAT I<br>ILS CAT II<br>ILS CAT III<br>VOR<br>VOR/DME<br>NDB<br>Radar Vectoring.<br>VDF<br>MLS<br>VISUAL<br>Unused.  | 0<br>1<br>2<br>3<br>4<br>5<br>6<br>7<br>8<br>9<br>10 to 15                      |   |
| Reduced runway length<br>(metres) | Not reported.<br><br>0 ≤ length < 50.<br>50 ≤ length < 100.<br>100 ≤ length < 150.<br>150 ≤ length < 200.<br>↓<br>6 300 ≤ length < 6 350.<br>6 350 ≤ length < 6 400.<br>6 400 ≤ length < 6 450.<br>6 450 ≤ length.<br>Unused.<br>Full length. | 0<br><br>1<br>2<br>3<br>4<br>↓<br>127<br>128<br>129<br>130<br>131 to 254<br>255 | <br><br>25<br>75<br>125<br>175<br><br>6 325<br>6 375<br>6 425 |
| Reduced runway width<br>(metres)  | Not reported.<br><br>0 ≤ width < 1.<br>1 ≤ width < 2.<br>2 ≤ width < 3.<br>3 ≤ width < 4.<br>↓<br>67 ≤ width < 68.<br>68 ≤ width < 69.<br>69 ≤ width < 70.<br>70 ≤ width.<br>Unused.<br>Full width.   | 0<br><br>1<br>2<br>3<br>4<br>↓<br>68<br>69<br>70<br>71<br>72 to 126<br>127      | <br><br>1<br>2<br>3<br>4<br><br>68<br>69<br>70                |
| Runway deposits                   | Clear and dry.<br>Damp.<br>Wet and water patches.<br>Rime or frost covered.<br>Dry snow.<br>Wet snow.<br>Slush.<br>Ice.<br>Compacted or rolled snow.<br>Frozen ruts or ridges.<br>Type of deposit not reported.<br>Unused.                    | 0<br>1<br>2<br>3<br>4<br>5<br>6<br>7<br>8<br>9<br>10<br>11 to 15                |   |
| Runway contamination              | None.<br>10 % or less.<br>11 % to 25 %.<br>26 % to 50 %.<br>51 % to 100 %.<br>Unused.<br>Unused.<br>Not reported.   | 0<br>1<br>2<br>3<br>4<br>5<br>6<br>7  |   |

| Data field  | Definition  | Encoded Value | Decoded value<br>(if different) |
|---|---|---------------|---------------------------------|
| Depth of Deposit  | less than 1 mm.   | 0             |                                 |
|   | 1 mm  | 1             |                                 |
|   | 2 mm  | 2             |                                 |
|   | 3 mm  | 3             |                                 |
|   | ↓   | ↓             |                                 |
|   | 89 mm   | 89            |                                 |
|   | 90 mm   | 90            |                                 |
|   | 10 cm   | 91            |                                 |
|   | 15 cm   | 92            |                                 |
|   | 20 cm   | 93            |                                 |
|   | ↓   | ↓             |                                 |
|   | 35 cm   | 96            |                                 |
|   | 40 cm or more   | 97            |                                 |
|   | Runway not operational due to snow, slush, ice,<br>large drifts or runway clearance, and depth not<br>reported. | 98            |                                 |
| Depth deposit operationally not significant or not<br>measurable. | 99  |               |                                 |
| Unused.   | 100 to 127  |               |                                 |
| RVR - Touchdown<br>(metres)                                       | Not reported.   | 0             |                                 |
|   | 0 < RVR < 25.   | 1             | 0                               |
|   | 25 < RVR < 50.  | 2             | 25                              |
|   | 50 < RVR < 75.  | 3             | 50                              |
|   | ↓.  | ↓             |                                 |
|   | 350 < RVR < 375.  | 15            | 350                             |
|   | 375 < RVR < 400.  | 16            | 375                             |
|   | 400 < RVR < 450.  | 17            | 400                             |
|   | 450 < RVR < 500.  | 18            | 450                             |
|   | ↓   | ↓             |                                 |
|   | 700 < RVR < 750.  | 23            | 700                             |
|   | 750 < RVR < 800.  | 24            | 750                             |
|   | 800 < RVR < 900.  | 25            | 800                             |
|   | 900 < RVR < 1 000.  | 26            | 900                             |
| ↓   | ↓   |               |                                 |
| 1 300 < RVR < 1 400.  | 30  | 1 300         |                                 |
| 1 400 < RVR < 1 500.  | 31  | 1 400         |                                 |
| 1 500 < RVR < 1 600.  | 32  | 1 500         |                                 |
| Unused.   | 33 to 63  |               |                                 |
| RVR - Midpoint  | As for RVR - Touchdown.   |               |                                 |
| RVR - Endpoint  | As for RVR - Touchdown.   |               |                                 |
| RVR source  | Unknown.  | 0             |                                 |
|   | Human Observer.   | 1             |                                 |
|   | Instrumented RVR system (IRVR).   | 2             |                                 |
|   | Reserved for future use.  | 3             |                                 |
| Runway in use   | Yes - for arrivals.   | 0             |                                 |
|   | Yes - for departures.   | 1             |                                 |
|   | Yes - mixed operations.   | 2             |                                 |
|   | No.   | 3             |                                 |
| Runway availability   | Bits 1 to 11: as for Time in table 5.56.  |               |                                 |
|   | Bit 12:<br>Open.  | 1             |                                 |
|   | Closed.   | 0             |                                 |
| Windshear   | No.   | 0             |                                 |
|   | Yes.  | 1             |                                 |

### 5.3.6 SIGnificant METeorological Information (SIGMET) message

| Requirement reference |  |
|-----------------------|--|
| 5.3.6.1               | The SIGMET message shall be encoded as defined in table 5.62   |
| 5.3.6.2               | The SIGMET message shall include a free text message encoded in the free text message field (txt) using 6 bit ASCII characters.  |
| 5.3.6.3               | <p>The information contained within the free text portion of the SIGMET message shall include the following information detailed in abbreviated plain language using approved ICAO abbreviations:</p> <ul style="list-style-type: none"> <li>• <b>Application FIR:</b> The name of the flight information region or control area for which the SIGMET message is issued shall be detailed;</li> <li>• <b>Type of Information:</b> This will detail whether the weather phenomenon is an observed or forecast condition. If the weather condition is an observed condition the time of observation shall be indicated in UTC;</li> <li>• <b>Location and Level:</b> This will give an indication, referring where possible to latitude and longitude and/or locations or geographic features known well internationally;</li> <li>• <b>Movement and Speed:</b> The movement or expected movement of the phenomenon shall be given with reference to one of the eight points of the compass and given in terms of kilometres per hour, knots per hour, or stationary;</li> <li>• <b>Changes in Intensity:</b> The free text shall indicate the changes in intensity of the weather condition expressing this in terms of intensifying, weakening or no change;</li> <li>• <b>Additional Information:</b> Additional information shall detail any further pertinent information to the weather phenomenon. This may also include an outlook providing information beyond the period for which the SIGMET is valid.</li> </ul> |
| 5.3.6.4               | Fields within the SIGMET message shall be encoded as defined in table 5.63.  |

**Table 5.62: SIGMET message bit encoding**

| Description  | Octet | Bit number         |                    |                    |                    |                    |                    |                    |                    |
|--|-------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
|  |       | 8                  | 7                  | 6                  | 5                  | 4                  | 3                  | 2                  | 1                  |
|  | 5     | 0                  | 0                  | 0                  | 0                  | 1                  | 1                  | 1                  | 1                  |
| FIS-B message ID (fmi)<br>FIS-B sequence number (sqn)                                  | 6     | sqn <sub>4</sub>   | sqn <sub>3</sub>   | sqn <sub>2</sub>   | sqn <sub>1</sub>   | fmi <sub>4</sub>   | fmi <sub>3</sub>   | fmi <sub>2</sub>   | fmi <sub>1</sub>   |
| message edition (med)  | 7     | loci <sub>5</sub>  | loci <sub>4</sub>  | loci <sub>3</sub>  | loci <sub>2</sub>  | loci <sub>1</sub>  | med <sub>3</sub>   | med <sub>2</sub>   | med <sub>1</sub>   |
| location indicator (loci)  | 8     | loci <sub>13</sub> | loci <sub>12</sub> | loci <sub>11</sub> | loci <sub>10</sub> | loci <sub>9</sub>  | loci <sub>8</sub>  | loci <sub>7</sub>  | loci <sub>6</sub>  |
| originator indicator (ori)   | 9     | ori <sub>1</sub>   | loci <sub>20</sub> | loci <sub>19</sub> | loci <sub>18</sub> | loci <sub>17</sub> | loci <sub>16</sub> | loci <sub>15</sub> | loci <sub>14</sub> |
|  | 10    | ori <sub>9</sub>   | ori <sub>8</sub>   | ori <sub>7</sub>   | ori <sub>6</sub>   | ori <sub>5</sub>   | ori <sub>4</sub>   | ori <sub>3</sub>   | ori <sub>2</sub>   |
|  | 11    | ori <sub>17</sub>  | ori <sub>16</sub>  | ori <sub>15</sub>  | ori <sub>14</sub>  | ori <sub>13</sub>  | ori <sub>12</sub>  | ori <sub>11</sub>  | ori <sub>10</sub>  |
| date issued (di)   | 12    | di <sub>5</sub>    | di <sub>4</sub>    | di <sub>3</sub>    | di <sub>2</sub>    | di <sub>1</sub>    | ori <sub>20</sub>  | ori <sub>19</sub>  | ori <sub>18</sub>  |
| time issued (ti)   | 13    | ti <sub>8</sub>    | ti <sub>7</sub>    | ti <sub>6</sub>    | ti <sub>5</sub>    | ti <sub>4</sub>    | ti <sub>3</sub>    | ti <sub>2</sub>    | ti <sub>1</sub>    |
| date valid to (dvt)  | 14    | dvt <sub>5</sub>   | dvt <sub>4</sub>   | dvt <sub>3</sub>   | dvt <sub>2</sub>   | dvt <sub>1</sub>   | ti <sub>11</sub>   | ti <sub>10</sub>   | ti <sub>9</sub>    |
| time valid to (tvt)  | 15    | tvt <sub>8</sub>   | tvt <sub>7</sub>   | tvt <sub>6</sub>   | tvt <sub>5</sub>   | tvt <sub>4</sub>   | tvt <sub>3</sub>   | tvt <sub>2</sub>   | tvt <sub>1</sub>   |
| SIGMET flag (sfl)<br>free text flag (ftxt)<br>phenomenon / condition<br>reported (crp) | 14    | crp <sub>3</sub>   | crp <sub>2</sub>   | crp <sub>1</sub>   | ftxt               | sfl                | tvt <sub>11</sub>  | tvt <sub>10</sub>  | tvt <sub>9</sub>   |
| free text message (txt)  | 15    | txt <sub>6</sub>   | txt <sub>5</sub>   | txt <sub>4</sub>   | txt <sub>3</sub>   | txt <sub>2</sub>   | txt <sub>1</sub>   | crp <sub>5</sub>   | crp <sub>4</sub>   |
|  | 16    | txt <sub>j</sub>   | txt <sub>j-1</sub> | txt <sub>j-2</sub> | .....              | txt <sub>10</sub>  | txt <sub>9</sub>   | txt <sub>8</sub>   | txt <sub>7</sub>   |

..... Denotes variable length field



Table 5.63: SIGMET message field encoding

| Data field                      | Definition   | Encoded value |
|---------------------------------|--|---------------|
| FIS-B Message ID                | See table 5.54.  | 3             |
| FIS-B sequence number           | 1 to 16.   | 0 to 15       |
| Message edition                 | See definition in table 5.56.  |               |
| Location indicator              | See definition for local ID in table 5.56.                                   |               |
| Originator indicator            | WMO originator office encoded as ICAO aerodrome.                             |               |
| Date issued                     | See definition in table 5.56.  |               |
| Time issued                     | See definition in table 5.56.  |               |
| Date valid to                   | See definition in table 5.56.  |               |
| Time valid to                   | See definition in table 5.56.  |               |
| Free text flag                  | None.  | 0             |
|                                 | Message.   | 1             |
| SIGMET flag                     | Normal.  | 0             |
|                                 | Convective SIGMET.   | 1             |
| Phenomenon / Condition reported | Condition reported in free text.   | 0             |
|                                 | Thunderstorm.  | 1             |
|                                 | Thunderstorm obscured.   | 2             |
|                                 | Thunderstorm embedded.   | 3             |
|                                 | Thunderstorm frequent.   | 4             |
|                                 | Thunderstorm squall line.  | 5             |
|                                 | Thunderstorm obscured with heavy hail.                                       | 6             |
|                                 | Thunderstorm embedded with heavy hail.                                       | 7             |
|                                 | Thunderstorm frequent with heavy hail.                                       | 8             |
|                                 | Thunderstorm squall line with heavy hail.                                    | 9             |
|                                 | Tropical cyclone.  | 10            |
|                                 | Freezing rain.   | 11            |
|                                 | Moderate turbulence.   | 12            |
|                                 | Severe turbulence.   | 13            |
|                                 | Severe icing.  | 14            |
|                                 | Severe icing due to freezing rain.   | 15            |
|                                 | Severe mountain waves.   | 16            |
| Heavy dust storm.               | 17   |               |
| Heavy sand storm.               | 18   |               |
| Volcanic ash.                   | 19   |               |
| Isolated cumulonimbus.          | 20   |               |
| Occasional cumulonimbus.        | 21   |               |
| Frequent cumulonimbus.          | 22   |               |
| Reserved for future use.        | 23 to 31   |               |
| Free text message               | Variable field length (6-bit converted ASCII characters)<br>See table 5.57a. |               |

### 5.3.7 Temporary Segregated Areas (TSA) message

| Requirement reference |   |
|-----------------------|---|
| 5.3.7.1               | The TSA message shall be encoded as defined in table 5.64 and either table 5.65 or table 5.66.  |
| 5.3.7.2               | The fixed field defined in table 5.64 shall be sent in all TSA messages.  |
| 5.3.7.3               | If the message is of type Control Zone, the octets defined in table 5.65 shall be appended to the fixed field at octet 10.                                    |
| 5.3.7.4               | If the message is of type Restricted Area, Danger Area or Prohibited Area, the octets defined in table 5.66 shall be appended to the fixed field at octet 10. |
| 5.3.7.5               | Fields within the TSA message shall be encoded as defined in table 5.67.  |

Table 5.64: TSA message fixed field bit encoding

| Description  | Octet | Bit number        |                   |                   |                   |                   |                  |                  |                  |
|--|-------|-------------------|-------------------|-------------------|-------------------|-------------------|------------------|------------------|------------------|
|  |       | 8                 | 7                 | 6                 | 5                 | 4                 | 3                | 2                | 1                |
|  | 5     | 0                 | 0                 | 0                 | 0                 | 1                 | 1                | 1                | 1                |
| FIS-B message ID (fmi)<br>version ID (vers)<br>message edition (med) | 6     | vers <sub>4</sub> | vers <sub>3</sub> | vers <sub>2</sub> | vers <sub>1</sub> | fmi <sub>4</sub>  | fmi <sub>3</sub> | fmi <sub>2</sub> | fmi <sub>1</sub> |
| date (date)  | 7     | date <sub>5</sub> | date <sub>4</sub> | date <sub>3</sub> | date <sub>2</sub> | date <sub>1</sub> | med <sub>3</sub> | med <sub>2</sub> | med <sub>1</sub> |
| time (ti)  | 8     | ti <sub>8</sub>   | ti <sub>7</sub>   | ti <sub>6</sub>   | ti <sub>5</sub>   | ti <sub>4</sub>   | ti <sub>3</sub>  | ti <sub>2</sub>  | ti <sub>1</sub>  |
| Number of TSAs (NoT)   | 9     | NoT <sub>5</sub>  | NoT <sub>4</sub>  | NoT <sub>3</sub>  | NoT <sub>2</sub>  | NoT <sub>1</sub>  | ti <sub>11</sub> | ti <sub>10</sub> | ti <sub>9</sub>  |
| Information field  | 10-n  |                   |                   |                   |                   |                   |                  |                  |                  |

Table 5.65: TSA message bit encoding for area Control Zone

| Description  | Octet | Bit number          |                     |                     |                     |                     |                    |                     |                     |
|--|-------|---------------------|---------------------|---------------------|---------------------|---------------------|--------------------|---------------------|---------------------|
|  |       | 8                   | 7                   | 6                   | 5                   | 4                   | 3                  | 2                   | 1                   |
| Type of Area (toa)<br>Active flag (act)<br>local ID (locl)   | 10    | locl <sub>4</sub>   | locl <sub>3</sub>   | locl <sub>2</sub>   | locl <sub>1</sub>   | act <sub>1</sub>    | toa <sub>3</sub>   | toa <sub>2</sub>    | toa <sub>1</sub>    |
|  | 11    | locl <sub>12</sub>  | locl <sub>11</sub>  | locl <sub>10</sub>  | locl <sub>9</sub>   | locl <sub>8</sub>   | locl <sub>7</sub>  | locl <sub>6</sub>   | locl <sub>5</sub>   |
|  | 12    | locl <sub>20</sub>  | locl <sub>19</sub>  | locl <sub>18</sub>  | locl <sub>17</sub>  | locl <sub>16</sub>  | locl <sub>15</sub> | locl <sub>14</sub>  | locl <sub>13</sub>  |
| supplement to local ID (sloc)<br>active from/to date (actdat)<br>active from/to time (actim)<br>TWR frequency (freq) | 13    | actdat <sub>3</sub> | actdat <sub>2</sub> | actdat <sub>1</sub> | sloc <sub>5</sub>   | sloc <sub>4</sub>   | sloc <sub>3</sub>  | sloc <sub>2</sub>   | sloc <sub>1</sub>   |
|  | 14    | actim <sub>6</sub>  | actim <sub>5</sub>  | actim <sub>4</sub>  | actim <sub>3</sub>  | actim <sub>2</sub>  | actim <sub>1</sub> | actdat <sub>5</sub> | actdat <sub>4</sub> |
|  | 15    | freq <sub>3</sub>   | freq <sub>2</sub>   | freq <sub>1</sub>   | actim <sub>11</sub> | actim <sub>10</sub> | actim <sub>9</sub> | actim <sub>8</sub>  | actim <sub>7</sub>  |
|  | 16    | freq <sub>11</sub>  | freq <sub>10</sub>  | freq <sub>9</sub>   | freq <sub>8</sub>   | freq <sub>7</sub>   | freq <sub>6</sub>  | freq <sub>5</sub>   | freq <sub>4</sub>   |
| ..... next TSA....   | 17-n  |                     |                     |                     |                     |                     |                    |                     |                     |

Table 5.66: TSA message bit encoding for Restricted, Danger, or Prohibited area

| Description  | Octet | Bit number          |                     |                    |                     |                     |                     |                     |                     |
|--|-------|---------------------|---------------------|--------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
|  |       | 8                   | 7                   | 6                  | 5                   | 4                   | 3                   | 2                   | 1                   |
| Type of Area (toa)<br>Active flag (act)<br>state ID (stid)<br>Area leap number (aln) | 10    | stid <sub>4</sub>   | stid <sub>3</sub>   | stid <sub>2</sub>  | stid <sub>1</sub>   | act <sub>1</sub>    | toa <sub>3</sub>    | toa <sub>2</sub>    | toa <sub>1</sub>    |
|  | 11    | aln <sub>2</sub>    | aln <sub>1</sub>    | stid <sub>10</sub> | stid <sub>9</sub>   | stid <sub>8</sub>   | stid <sub>7</sub>   | stid <sub>6</sub>   | stid <sub>5</sub>   |
|  | 12    | aln <sub>10</sub>   | aln <sub>9</sub>    | aln <sub>8</sub>   | aln <sub>7</sub>    | aln <sub>6</sub>    | aln <sub>5</sub>    | aln <sub>4</sub>    | aln <sub>3</sub>    |
| Supplement to area leap number (saln)  | 13    | saln <sub>5</sub>   | saln <sub>4</sub>   | saln <sub>3</sub>  | saln <sub>2</sub>   | saln <sub>1</sub>   | aln <sub>13</sub>   | aln <sub>12</sub>   | aln <sub>11</sub>   |
| active from/to date (actdat)<br>active from/to time (actim)                          | 14    | actim <sub>3</sub>  | actim <sub>2</sub>  | actim <sub>1</sub> | actdat <sub>5</sub> | actdat <sub>4</sub> | actdat <sub>3</sub> | actdat <sub>2</sub> | actdat <sub>1</sub> |
|  | 15    | actim <sub>11</sub> | actim <sub>10</sub> | actim <sub>9</sub> | actim <sub>8</sub>  | actim <sub>7</sub>  | actim <sub>6</sub>  | actim <sub>5</sub>  | actim <sub>4</sub>  |
| ..... next TSA....   | 16-n  |                     |                     |                    |                     |                     |                     |                     |                     |

Table 5.67: TSA message field encoding

| Data field             | Definition   | Encoded Value  |
|------------------------|--|--|
| FIS-B Message ID       | See table 5.54.  | 6  |
| Version ID             | FIS-B as defined in the present document<br>Reserved for future use.   | 0<br>1 to 15   |
| Message edition        | See definition in table 5.56.  |  |
| Local ID               | See definition in table 5.56.  |  |
| Date                   | See definition in table 5.56.  |  |
| Time                   | See definition in table 5.56.  |  |
| Number of TSA"s        | 1 TSA<br>2 TSAs<br>↓<br>32 TSAs  | 0<br>1<br>↓<br>31  |
| Type of Area           | Describes the type of TSA:<br>Control zone.<br>Restricted Area.<br>Danger Area.<br>Prohibited Area.<br>Reserved for future use.  | 0<br>1<br>2<br>3<br>4 to 7   |
| ACTIVE FLAG            | Denotes whether the TSA is active or not (A TSA could be transmitted a certain time before it becomes active).<br>Not Active.<br>Active.   | 0<br>1   |
| Supplement to local ID | Some control zones can have different extensions depending on neighbouring control zones being open or not. To distinguish between the different parts of the control zone referred to, a letter is added to the local ID, this letter corresponds to a certain part of the control zone.<br>1 Letter code A to Z encoded as a 5-bit binary.<br>A<br>B<br>C<br>↓<br>Y<br>Z | 00001<br>00010<br>00011<br>↓<br>11001<br>11010                     |
| Active from/to date    | If the TSA is not yet active (active flag set to 0) this field shows which date the area will become active.<br>If the TSA is already active (active flag set to 1) this field shows which date the area will become not active.<br>See date definition in table 5.56.   |  |
| Active from/to time    | If the TSA is not yet active (active flag set to 0) this field shows which time the area will become active.<br>If the TSA is already active (active flag set to 1) this field shows which time the area will become not active.<br>See time definition in table 5.56.   |  |
| TWR frequency          | The frequency used to contact TWR.<br>Unknown.<br>108,000<br>108,025<br>108,050<br>↓<br>136,925<br>136,950<br>136,975<br>Unused.   | 0<br>1<br>2<br>3<br>↓<br>1 158<br>1 159<br>1 160<br>1 161 to 2 047 |
| State ID               | Each restricted, danger or prohibited area has a state ID connected to it, for example ES for Sweden. 2 letter code. Each letter encoded as a 5 bit binary.<br>A<br>B<br>C<br>↓<br>Y<br>Z  | 00001<br>00010<br>00011<br>↓<br>11001<br>11010                     |

| Data field                     | Definition   | Encoded Value                                  |
|--------------------------------|--|--|
| Area leap number               | All restricted, danger and prohibited areas have a leap number attached to it, for example Restricted area number 242 in Sweden is written as ES R242. Area leap number in this case would be 242.<br>1<br>2<br>↓<br>8 192   | 0<br>1<br>↓<br>8 191                           |
| Supplement to area leap number | A restricted, danger and prohibited area can be divided into several smaller areas denoted with a letter after the leap number. For example ES R242C means sub area C of restricted area 242 in Sweden. Thus, the supplement to the area number would be C in this case. 1 letter encoded as a 5 bit binary.<br>A<br>B<br>C<br>↓<br>Y<br>Z | 00001<br>00010<br>00011<br>↓<br>11001<br>11010 |

### 5.3.8 FIS-B report request message

| Requirement reference |  |
|-----------------------|--|
| 5.3.8.1               | The FIS-B report request message shall use the general request burst format as defined in EN 301 842-2 [3] in table 5.44.  |
| 5.3.8.2               | The FIS-B report request message shall be encoded as defined in table 5.68.  |
| 5.3.8.3               | Fields within the FIS-B report request message shall be encoded as defined in table 5.69.  |
| 5.3.8.4               | The requested message ID (r-mi) shall be set to the FIS-B service indicator "00001111".  |
| 5.3.8.5               | The FIS-B message identifier (fmi) shall indicate a report request message and be encoded as defined in table 5.54.  |
| 5.3.8.6               | The message request field (mrq) shall be used to request that a particular FIS-B message is transmitted by the addressed station and be encoded as defined in table 5.54.  |
| 5.3.8.7               | A FIS-B report request message shall have appended one of the following VDL Mode 4 reservation types: <ul style="list-style-type: none"> <li>• a null reservation;</li> <li>• a response burst with a specific ground station address, or broadcast using address type field = 7;</li> <li>• a unicast reservation with a specific ground station address, or broadcast using address type field = 7;</li> <li>• a periodic broadcast;</li> <li>• an incremental broadcast;</li> <li>• a combined periodic and incremental broadcast;</li> <li>• a BND reservation.</li> </ul> |
| 5.3.8.8               | A ground station providing coverage of the TV in which a mobile is located, which receives a broadcast report request message from the mobile that does not reserve a specific slot or group of consecutive slots for the response, shall broadcast the requested information once per minute for 3 minutes.   |
| 5.3.8.9               | A ground station providing coverage of the TV in which a mobile is located, which receives a broadcast report request message from the mobile that reserves a specific slot or group of consecutive slots for the response, shall broadcast the requested information in the slot or group of consecutive slots provided, provided that the ground station has previously established with all other ground stations within range a procedure to avoid multiple broadcasts by ground stations in the same slot.  |

| Requirement reference |   |
|-----------------------|---|
| 5.3.8.10              | A ground station providing coverage of the TV in which a mobile is located, which receives a report request message from the mobile, addressed to the ground station, that does not reserve a specific slot or group of consecutive slots, shall broadcast the requested information once per minute for 3 minutes.                               |
| 5.3.8.11              | A ground station providing coverage of the TV in which a mobile is located, which receives a report request message from the mobile, addressed to the ground station, that reserves a specific slot or group of consecutive slots for the response, shall broadcast the requested information in the slot or group of consecutive slots provided. |

Table 5.68: FIS-B report request message bit encoding

| Description  | Octet | Bit number         |                    |                    |                    |                    |                    |                    |                    |
|--|-------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
|  |       | 8                  | 7                  | 6                  | 5                  | 4                  | 3                  | 2                  | 1                  |
| mi = general request burst<br>r-mi = FIS-B service indicator | 5     | 0                  | 1                  | 1                  | 1                  | 1                  | 0                  | 0                  | 1                  |
| FIS-B message ID (fmi)<br>message requested (mrq)            | 6     | mrq <sub>1</sub>   | fmi <sub>4</sub>   | fmi <sub>3</sub>   | fmi <sub>2</sub>   | fmi <sub>1</sub>   | 0                  | 0                  | 0                  |
| local ID (locl)  | 7     | locl <sub>5</sub>  | locl <sub>4</sub>  | locl <sub>3</sub>  | locl <sub>2</sub>  | locl <sub>1</sub>  | mrq <sub>4</sub>   | mrq <sub>3</sub>   | mrq <sub>2</sub>   |
|  | 8     | locl <sub>13</sub> | locl <sub>12</sub> | locl <sub>11</sub> | locl <sub>10</sub> | locl <sub>9</sub>  | locl <sub>8</sub>  | locl <sub>7</sub>  | locl <sub>6</sub>  |
| reserved (res)   | 9     | res                | locl <sub>20</sub> | locl <sub>19</sub> | locl <sub>18</sub> | locl <sub>17</sub> | locl <sub>16</sub> | locl <sub>15</sub> | locl <sub>14</sub> |

Table 5.69: FIS-B report request message field encoding

| Data field              | Definition                   | Encoded value |
|-------------------------|------------------------------|---------------|
| FIS-B Message ID        | See table 5.54               | 5             |
| message requested (mrq) | See table 5.54               |               |
| Local ID                | See definition in table 5.56 |               |

### 5.3.9 Ground system functions

| Requirement reference |   |
|-----------------------|---|
| 5.3.9.1               | The ground station shall transmit FIS-B messages.   |
| 5.3.9.2               | The ground station shall manage the use of VDL Mode 4 slots.  |
| 5.3.9.3               | The ground station shall accept FIS-B data from the FIS-B server.   |
| 5.3.9.4               | The ground station shall accept control instructions from the FIS-B server related to the slots in which the ground station may send FIS-B messages.                  |
| 5.3.9.5               | The ground station shall be able to receive VDL Mode 4 FIS-B report request transmissions.  |
| 5.3.9.6               | The ground station shall pass requests for additional information to the FIS-B server.  |
| 5.3.9.7               | The ground station shall forward FIS-B requests to the FIS-B server.  |
| 5.3.9.8               | The ground station shall keep a queue of targets to be transmitted.   |
| 5.3.9.9               | The ground station shall ensure that data relating to targets that is too old is deleted from the queue.  |
| 5.3.9.10              | The ground station shall ensure that if a newer report enters the queue for an existing target then it will replace any existing report for that target in the queue. |

## 5.4 Requirements for GNSS Augmentation Service Broadcast (GNS-B) message

### 5.4.1 Message format

| Requirement reference |  |
|-----------------------|--|
| 5.4.1.1               | A GNS-B message shall be sent in a DLS UDATA DLPDU burst of type UINFO as described clause 5.3 of EN 301 842-2 [3].  |
| 5.4.1.2               | To indicate a GNS-B service, the UDATA ID (udid) field shall be set to "00011" to indicate that a GNS-B service is applied (see clause 5.3.1.3 of EN 301 842-2 [3]).   |
| 5.4.1.3               | The GNS-B data shall be placed in the information field of the VDL Mode 4 burst.   |
| 5.4.1.4               | The information field of each GNS-B burst shall start with a GNS-B message identifier, as defined in table 5.70.   |
| 5.4.1.5               | Each GNS-B message shall use either: <ul style="list-style-type: none"> <li>• a reservation ID (rid) equal to 1, with the burst appended by a null reservation field as defined in clause 5.2.9 of EN 301 842-2 [3];</li> <li>• or a reservation ID (rid) equal to 0 and an extended reservation ID (erid) equal to 00000binary, with the burst appended by a response reservation field as defined in clause 5.2.18 of EN 301 842-2 [3], with address type field equal to 7;</li> <li>• a reservation ID (rid) equal to 1, with the burst appended by a periodic broadcast reservation field as defined in clause 5.2.10 of EN 301 842-2 [3];</li> <li>• a reservation ID (rid) equal to 0, with the burst appended by an incremental broadcast reservation field as defined in clause 5.2.11 of EN 301 842-2 [3];</li> <li>• a reservation ID (rid) equal to 1, with the burst appended by a combined periodic broadcast and incremental broadcast reservation field as defined in clause 5.2.12 of EN 301 842-2 [3];</li> <li>• or a reservation ID (rid) equal to 0, with the burst appended by a unicast reservation field with sdf=1 as defined in clause 5.2.14 of EN 301 842-2 [3];</li> <li>• or a reservation ID (rid) equal to 0, with the burst appended by a second frame reservation field as defined in clause 5.2.17 of EN 301 842-2 [3];</li> <li>• or a reservation ID (rid) equal to 0, with the burst appended by a superframe reservation field as defined in clause 5.2.17 of EN 301 842-2 [3].</li> </ul> |

**Table 5.70: GNS-B message identifier (gmi)**

| Message                                      | GNS-B Message ID Encoded value |
|--|--------------------------------|
| Type 1 Message (Pseudorange corrections)     | 1                              |
| Type 2 Message (GNS-B related data)          | 2                              |
| Type 4 Message (Final Approach Segment Data) | 4                              |

### 5.4.2 Message Type 1

| Requirement reference |   |
|-----------------------|---|
| 5.4.2.1               | The GNS-B message type 1 shall be encoded as defined in table 5.71.   |
| 5.4.2.2               | Fields in the message type 1 shall be encoded as defined in table 5.72.   |
| 5.4.2.3               | Data for up to 12 satellites shall be transmitted using Message Type 1.   |
| 5.4.2.4               | The GPS Ephemeris decorrelation parameter and Ephemeris CRC may both be set to zero in Message Type 1 if the GPS receivers do not provide GPS Ephemeris, in which case they shall be ignored. |
| 5.4.2.5               | The GNS-B message CRC shall be calculated in accordance with the algorithm in clause 5.4.5.1.   |
| 5.4.2.6               | All of B1, B2, B3 and B4 may be set to Bin10000000 in one or more measurement blocks, in which case they shall be ignored for that measurement block.   |

Table 5.71: GNS-B Message Type 1 bit encoding

| Description  | Octet       | Bit number        |                   |                   |                   |                   |                   |                   |                   |
|--|-------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
|  |             | 8                 | 7                 | 6                 | 5                 | 4                 | 3                 | 2                 | 1                 |
|  | 5           | 0                 | 0                 | 0                 | 1                 | 1                 | 1                 | 1                 | 1                 |
| message block identifier (mbi)                                   | 6           | mbi <sub>8</sub>  | mbi <sub>7</sub>  | mbi <sub>6</sub>  | mbi <sub>5</sub>  | mbi <sub>4</sub>  | mbi <sub>3</sub>  | mbi <sub>2</sub>  | mbi <sub>1</sub>  |
| GNS-B ID (gid)   | 7           | gid <sub>8</sub>  | gid <sub>7</sub>  | gid <sub>6</sub>  | gid <sub>5</sub>  | gid <sub>4</sub>  | gid <sub>3</sub>  | gid <sub>2</sub>  | gid <sub>1</sub>  |
|  | 8           | gid <sub>16</sub> | gid <sub>15</sub> | gid <sub>14</sub> | gid <sub>13</sub> | gid <sub>12</sub> | gid <sub>11</sub> | gid <sub>10</sub> | gid <sub>9</sub>  |
|  | 9           | gid <sub>24</sub> | gid <sub>23</sub> | gid <sub>22</sub> | gid <sub>21</sub> | gid <sub>20</sub> | gid <sub>19</sub> | gid <sub>18</sub> | gid <sub>17</sub> |
| message identifier (gmi)   | 10          | 0                 | 0                 | 0                 | 0                 | 0                 | gmi <sub>3</sub>  | gmi <sub>2</sub>  | gmi <sub>1</sub>  |
| message length (len)   | 11          | len <sub>8</sub>  | len <sub>7</sub>  | len <sub>6</sub>  | len <sub>5</sub>  | len <sub>4</sub>  | len <sub>3</sub>  | len <sub>2</sub>  | len <sub>1</sub>  |
| modified Z-count (zc)  | 12          | zc <sub>8</sub>   | zc <sub>7</sub>   | zc <sub>6</sub>   | zc <sub>5</sub>   | zc <sub>4</sub>   | zc <sub>3</sub>   | zc <sub>2</sub>   | zc <sub>1</sub>   |
| additional message flag (amf)                                    | 13          | amf <sub>2</sub>  | amf <sub>1</sub>  | zc <sub>14</sub>  | zc <sub>13</sub>  | zc <sub>12</sub>  | zc <sub>11</sub>  | zc <sub>10</sub>  | zc <sub>9</sub>   |
| number of measurements (n)<br>measurement type (t)               | 14          | t <sub>3</sub>    | t <sub>2</sub>    | t <sub>1</sub>    | n <sub>5</sub>    | n <sub>4</sub>    | n <sub>3</sub>    | n <sub>2</sub>    | n <sub>1</sub>    |
| ephemeris decorrelation parameter (edp)                          | 15          | edp <sub>8</sub>  | edp <sub>7</sub>  | edp <sub>6</sub>  | edp <sub>5</sub>  | edp <sub>4</sub>  | edp <sub>3</sub>  | edp <sub>2</sub>  | edp <sub>1</sub>  |
| ephemeris CRC(ec)  | 16          | ec <sub>8</sub>   | ec <sub>7</sub>   | ec <sub>6</sub>   | ec <sub>5</sub>   | ec <sub>4</sub>   | ec <sub>3</sub>   | ec <sub>2</sub>   | ec <sub>1</sub>   |
|  | 17          | ec <sub>16</sub>  | ec <sub>15</sub>  | ec <sub>14</sub>  | ec <sub>13</sub>  | ec <sub>12</sub>  | ec <sub>11</sub>  | ec <sub>10</sub>  | ec <sub>9</sub>   |
| source availability duration (ad)                                | 18          | ad <sub>8</sub>   | ad <sub>7</sub>   | ad <sub>6</sub>   | ad <sub>5</sub>   | ad <sub>4</sub>   | ad <sub>3</sub>   | ad <sub>2</sub>   | ad <sub>1</sub>   |
| For N measurement blocks (i=1 to i=N):<br>ranging source ID (id) | 19+(i-1)x11 | id <sub>8</sub>   | id <sub>7</sub>   | id <sub>6</sub>   | id <sub>5</sub>   | id <sub>4</sub>   | id <sub>3</sub>   | id <sub>2</sub>   | id <sub>1</sub>   |
| issue of data (iod)  | 20+(i-1)x11 | iod <sub>8</sub>  | iod <sub>7</sub>  | iod <sub>6</sub>  | iod <sub>5</sub>  | iod <sub>4</sub>  | iod <sub>3</sub>  | iod <sub>2</sub>  | iod <sub>1</sub>  |
| pseudo range correction (prc)                                    | 21+(i-1)x11 | prc <sub>8</sub>  | prc <sub>7</sub>  | prc <sub>6</sub>  | prc <sub>5</sub>  | prc <sub>4</sub>  | prc <sub>3</sub>  | prc <sub>2</sub>  | prc <sub>1</sub>  |
|  | 22+(i-1)x11 | prc <sub>16</sub> | prc <sub>15</sub> | prc <sub>14</sub> | prc <sub>13</sub> | prc <sub>12</sub> | prc <sub>11</sub> | prc <sub>10</sub> | prc <sub>9</sub>  |
| range rate correction (rrc)                                      | 23+(i-1)x11 | rrc <sub>8</sub>  | rrc <sub>7</sub>  | rrc <sub>6</sub>  | rrc <sub>5</sub>  | rrc <sub>4</sub>  | rrc <sub>3</sub>  | rrc <sub>2</sub>  | rrc <sub>1</sub>  |
|  | 24+(i-1)x11 | rrc <sub>16</sub> | rrc <sub>15</sub> | rrc <sub>14</sub> | rrc <sub>13</sub> | rrc <sub>12</sub> | rrc <sub>11</sub> | rrc <sub>10</sub> | rrc <sub>9</sub>  |
| $\sigma_{pr\_gnd}$ (sd)  | 25+(i-1)x11 | sd <sub>8</sub>   | sd <sub>7</sub>   | sd <sub>6</sub>   | sd <sub>5</sub>   | sd <sub>4</sub>   | sd <sub>3</sub>   | sd <sub>2</sub>   | sd <sub>1</sub>   |
| integrity parameter B1 (b1)                                      | 26+(i-1)x11 | b1 <sub>8</sub>   | b1 <sub>7</sub>   | b1 <sub>6</sub>   | b1 <sub>5</sub>   | b1 <sub>4</sub>   | b1 <sub>3</sub>   | b1 <sub>2</sub>   | b1 <sub>1</sub>   |
| integrity parameter B2 (b2)                                      | 27+(i-1)x11 | b2 <sub>8</sub>   | b2 <sub>7</sub>   | b2 <sub>6</sub>   | b2 <sub>5</sub>   | b2 <sub>4</sub>   | b2 <sub>3</sub>   | b2 <sub>2</sub>   | b2 <sub>1</sub>   |
| integrity parameter B3 (b3)                                      | 28+(i-1)x11 | b3 <sub>8</sub>   | b3 <sub>7</sub>   | b3 <sub>6</sub>   | b3 <sub>5</sub>   | b3 <sub>4</sub>   | b3 <sub>3</sub>   | b3 <sub>2</sub>   | b3 <sub>1</sub>   |
| integrity parameter B4 (b4)                                      | 29+(i-1)x11 | b4 <sub>8</sub>   | b4 <sub>7</sub>   | b4 <sub>6</sub>   | b4 <sub>5</sub>   | b4 <sub>4</sub>   | b4 <sub>3</sub>   | b4 <sub>2</sub>   | b4 <sub>1</sub>   |
| GNS-B message CRC (gc)   | 30+(N-1)x11 | gc <sub>8</sub>   | gc <sub>7</sub>   | gc <sub>6</sub>   | gc <sub>5</sub>   | gc <sub>4</sub>   | gc <sub>3</sub>   | gc <sub>2</sub>   | gc <sub>1</sub>   |
|  | 31+(N-1)x11 | gc <sub>16</sub>  | gc <sub>15</sub>  | gc <sub>14</sub>  | gc <sub>13</sub>  | gc <sub>12</sub>  | gc <sub>11</sub>  | gc <sub>10</sub>  | gc <sub>9</sub>   |
|  | 32+(N-1)x11 | gc <sub>24</sub>  | gc <sub>23</sub>  | gc <sub>22</sub>  | gc <sub>21</sub>  | gc <sub>20</sub>  | gc <sub>19</sub>  | gc <sub>18</sub>  | gc <sub>17</sub>  |
|  | 33+(N-1)x11 | gc <sub>32</sub>  | gc <sub>31</sub>  | gc <sub>30</sub>  | gc <sub>29</sub>  | gc <sub>28</sub>  | gc <sub>27</sub>  | gc <sub>26</sub>  | gc <sub>25</sub>  |

Table 5.72: GNS-B Message Type 1 field encoding

| Data field                           | Definition  | Encoded Value   | Decoded value (if different) |
|--------------------------------------|---|---|------------------------------|
| Message Identifier (gmi)             | See table 5.70.   | 1   |                              |
| GNS-B message block identifier (mbi) | This represents the operating mode of the GNS-B message block.<br>Normal GNS-B message.<br>Test GNS-B message.  | 10101010<br>11111111  |                              |
| GNS-B ID (gid)                       | 4-character GNS-B identification included to differentiate between broadcasting stations. Each character is coded using the lower 6 bits of its International Alphabet No. 5 (IA-5) representation. Only upper case letters, numeric digits and IA-5 "blank" are used. The right-most character is transmitted first. For a 3-character GNS-B ID, the right most (first transmitted) character shall be IA-5 "blank".<br>NOTE: The GNS-B ID is normally identical to the location indicator at the nearest airport. Assignment of GNS-B IDs will be co-ordinated as appropriate to avoid conflicts. |   |                              |
| Message length (len)                 | length of the message in 8-bit bytes including the 6-byte message block header (i.e. GNS-B Message block identifier, GNS-B ID, Message Type Identifier, Message Length), the message and the 4-byte message CRC code.<br>Unused.<br>10 bytes<br>11 bytes<br>.....<br>255 bytes  | 0 to 9<br>10<br>11<br>.....<br>255                              |                              |
| Modified Z-count (zc)                | The modified Z-count defines the reference time for all the message parameters in this message (including pseudorange correction and range-rate correction). The modified Z-count resets on the hour (xx:00), 20 minutes past the hour (xx:20) and 40 minutes past the hour (xx:40) referenced to GPS time.<br>00 minutes 00,0 s<br>00 minutes 00,1 s<br>00 minutes 00,2 s<br>.....<br>01 minute 00,0 s<br>01 minute 00,1 s<br>.....<br>19 minutes 59,9 s<br>20 minutes 00,0 s  | 0<br>1<br>2<br>.....<br>600<br>601<br>.....<br>11 999<br>12 000 |                              |
| Additional message flag (amf)        | Identifies whether measurement blocks are contained in one or two Type 1 messages in a single frame.<br>All measurement blocks are contained in one Type 1 Message.<br>This is the first of two Type 1 Messages in a frame containing measurement blocks.<br>Unused.<br>This is the second of two Type 1 Messages in a frame containing measurement blocks.   | 0<br>1<br>2<br>3  |                              |
| Number of measurements (n)           | This parameter identifies the number of measurement blocks in the message.<br>0 blocks.<br>1 block.<br>.....<br>12 blocks.  | 0<br>1<br>.....<br>12   |                              |



| Data field  | Definition  | Encoded Value   | Decoded value (if different) |
|---|---|---|------------------------------|
| Measurement type (t)  | This parameter identifies the type of ranging signal from which the corrections have been computed.<br>C/A or CSA code L1.<br>Reserved.<br>Reserved.<br>Reserved.<br>Unused.  | 0<br>1<br>2<br>3<br>4 to 7  |                              |
| Ephemeris decorrelation parameter (edp)                       | This parameter characterizes the impact of residual ephemeris errors due to decorrelation for the first measurement block in the message.<br>SBAS Geostationary Satellite.<br>0 m/m<br>$5 \times 10^{-6}$ m/m<br>$10 \times 10^{-6}$ m/m<br>.....<br>$1,275 \times 10^{-3}$ m/m   | 0<br>0<br>1<br>2<br>.....<br>255  |                              |
| Ephemeris CRC (ec):   | This parameter characterizes the impact of residual ephemeris errors due to decorrelation for the first measurement block in the message.   | See clause 5.4.5.3  |                              |
| Source availability duration (ad)                             | The predicted duration for which corrections for the ranging source are expected to remain available, relative to the modified Z-count for the first measurement block.<br>0 s<br>10 s<br>20 s<br>.....<br>2 530 s<br>$2\ 540\ \text{s} \leq \text{duration}$<br>Prediction of source availability duration not provided. | 0<br>1<br>2<br>.....<br>253<br>254<br>255                                       |                              |
| For N measurement blocks (ranging from i=1 to i=N): Nmax = 12 |   |   |                              |
| Ranging source ID (id)  | This parameter defines the identity of the ranging source to which subsequent message block data are applicable.<br>GPS satellite IDs (PRN).<br>Reserved.<br>GLONASS satellite IDs.<br>Unused.<br>SBAS satellite IDs (PRN).<br>Unused.  | 1 to 36<br>37<br>38 to 61<br>62 to 119<br>120 to 138<br>139 to 255              |                              |
| Issue of data (iod)   | The issue of data associated with the ephemeris data used to determine pseudorange and range rate corrections.<br>For GPS, IOD encode GPS IODE parameter.<br>For GLONASS, IOD encode GLONASS $t_b$ parameter.<br>For SBAS, IOD.   | 255   |                              |
| Pseudorange correction (prc)                                  | The correction to the ranging source pseudorange transmitted to the airborne subsystem.<br>-327,67 m<br>-327,66 m<br>-327,65 m<br>.....<br>0 m<br>0,01 m<br>.....<br>+327,66 m<br>+327,67 m<br>Unused   | 0<br>1<br>2<br>.....<br>32 767<br>32 768<br>.....<br>65 533<br>65 534<br>65 535 |                              |

| Data field                            | Definition   | Encoded Value   | Decoded value<br>(if different) |
|---------------------------------------|--|---|---------------------------------|
| Range rate correction<br>(rrc)        | The rate of change of the pseudorange correction.<br>-32,767 m<br>-32,766 m<br>-32,765 m<br>.....<br>0 m<br>0,001 m<br>.....<br>+32,766 m<br>+32,767 m<br>Unused   | 0<br>1<br>2<br>.....<br>32 767<br>32 768<br>.....<br>65 533<br>65 534<br>65 535 |                                 |
| $\sigma_{pr\_gnd}$ (sd)               | The standard deviation of a normal distribution associated with the signal in space contribution of the pseudorange error.<br>0 m<br>0,02 m<br>0,04 m<br>.....<br>5,06 m<br>5,08 m<br>Ranging source correction invalid.   | 0<br>1<br>2<br>.....<br>253<br>254<br>255                                       |                                 |
| B1 (b1), B2 (b2), B3 (b3),<br>B4 (b4) | The integrity parameters associated with the pseudorange corrections provided in the same measurement block (see ICAO Annex 10 [i.3] and GBAS MOPS [5], clause A.2.1).<br>Bit 8:<br>Positive.<br>Negative.<br>Bits 1 to 7:<br>0 m<br>0,05 m<br>.....<br>6,34 m<br>6,35 m<br>Reference receiver was not used to compute the pseudorange correction. | 0<br>1<br>.....<br>0<br>1<br>.....<br>126<br>127<br>10 000 000                  |                                 |
| GNS-B Message CRC<br>(gc)             | See clause 5.4.5.1.  |   |                                 |

### 5.4.3 Message Type 2

| Requirement reference |   |
|-----------------------|---|
| 5.4.3.1               | The GNS-B message type 2 shall be encoded as defined in table 5.73.     |
| 5.4.3.2               | Fields in the message type 2 shall be encoded as defined in table 5.74. |

Table 5.73: GNS-B message type 2 bit encoding

| Description                                 | Octet | Bit number        |                   |                   |                   |                   |                   |                   |                   |
|---|-------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
|   |       | 8                 | 7                 | 6                 | 5                 | 4                 | 3                 | 2                 | 1                 |
|   | 5     | 0                 | 0                 | 0                 | 1                 | 1                 | 1                 | 1                 | 1                 |
| message block identifier (mbi)              | 6     | mbi <sub>8</sub>  | mbi <sub>7</sub>  | mbi <sub>6</sub>  | mbi <sub>5</sub>  | mbi <sub>4</sub>  | mbi <sub>3</sub>  | mbi <sub>2</sub>  | mbi <sub>1</sub>  |
| GNS-B ID (gid)                              | 7     | gid <sub>8</sub>  | gid <sub>7</sub>  | gid <sub>6</sub>  | gid <sub>5</sub>  | gid <sub>4</sub>  | gid <sub>3</sub>  | gid <sub>2</sub>  | gid <sub>1</sub>  |
|   | 8     | gid <sub>16</sub> | gid <sub>15</sub> | gid <sub>14</sub> | gid <sub>13</sub> | gid <sub>12</sub> | gid <sub>11</sub> | gid <sub>10</sub> | gid <sub>9</sub>  |
|   | 9     | gid <sub>24</sub> | gid <sub>23</sub> | gid <sub>22</sub> | gid <sub>21</sub> | gid <sub>20</sub> | gid <sub>19</sub> | gid <sub>18</sub> | gid <sub>17</sub> |
| message identifier (gmi)                    | 10    | 0                 | 0                 | 0                 | 0                 | 0                 | gmi <sub>3</sub>  | gmi <sub>2</sub>  | gmi <sub>1</sub>  |
| message length (len)                        | 11    | len <sub>8</sub>  | len <sub>7</sub>  | len <sub>6</sub>  | len <sub>5</sub>  | len <sub>4</sub>  | len <sub>3</sub>  | len <sub>2</sub>  | len <sub>1</sub>  |
| GNS-B reference receivers (r)               | 12    | cid <sub>3</sub>  | cid <sub>2</sub>  | cid <sub>1</sub>  | res               | ac <sub>2</sub>   | ac <sub>1</sub>   | r <sub>2</sub>    | r <sub>1</sub>    |
| GNS-B accuracy designator letter (ac)       |       |                   |                   |                   |                   |                   |                   |                   |                   |
| GNS-B continuity/integrity designator (cid) |       |                   |                   |                   |                   |                   |                   |                   |                   |
| local magnetic variation (v)                | 13    | v <sub>8</sub>    | v <sub>7</sub>    | v <sub>6</sub>    | v <sub>5</sub>    | v <sub>4</sub>    | v <sub>3</sub>    | v <sub>2</sub>    | v <sub>1</sub>    |
| res   | 14    | res               | res               | res               | res               | res               | v <sub>11</sub>   | v <sub>10</sub>   | v <sub>9</sub>    |
| $\sigma$ vert iono grad (vi)                | 15    | vi <sub>8</sub>   | vi <sub>7</sub>   | vi <sub>6</sub>   | vi <sub>5</sub>   | vi <sub>4</sub>   | vi <sub>3</sub>   | vi <sub>2</sub>   | vi <sub>1</sub>   |
| refractivity index (i)                      | 16    | i <sub>8</sub>    | i <sub>7</sub>    | i <sub>6</sub>    | i <sub>5</sub>    | i <sub>4</sub>    | i <sub>3</sub>    | i <sub>2</sub>    | i <sub>1</sub>    |
| scale height (h)                            | 17    | h <sub>8</sub>    | h <sub>7</sub>    | h <sub>6</sub>    | h <sub>5</sub>    | h <sub>4</sub>    | h <sub>3</sub>    | h <sub>2</sub>    | h <sub>1</sub>    |
| refractivity uncertainty (u)                | 18    | u <sub>8</sub>    | u <sub>7</sub>    | u <sub>6</sub>    | u <sub>5</sub>    | u <sub>4</sub>    | u <sub>3</sub>    | u <sub>2</sub>    | u <sub>1</sub>    |
| latitude (lat)                              | 19    | lat <sub>8</sub>  | lat <sub>7</sub>  | lat <sub>6</sub>  | lat <sub>5</sub>  | lat <sub>4</sub>  | lat <sub>3</sub>  | lat <sub>2</sub>  | lat <sub>1</sub>  |
|   | 20    | lat <sub>16</sub> | lat <sub>15</sub> | lat <sub>14</sub> | lat <sub>13</sub> | lat <sub>12</sub> | lat <sub>11</sub> | lat <sub>10</sub> | lat <sub>9</sub>  |
|   | 21    | lat <sub>24</sub> | lat <sub>23</sub> | lat <sub>22</sub> | lat <sub>21</sub> | lat <sub>20</sub> | lat <sub>19</sub> | lat <sub>18</sub> | lat <sub>17</sub> |
|   | 22    | lat <sub>32</sub> | lat <sub>31</sub> | lat <sub>30</sub> | lat <sub>29</sub> | lat <sub>28</sub> | lat <sub>27</sub> | lat <sub>26</sub> | lat <sub>25</sub> |
| longitude (lon)                             | 23    | lon <sub>8</sub>  | lon <sub>7</sub>  | lon <sub>6</sub>  | lon <sub>5</sub>  | lon <sub>4</sub>  | lon <sub>3</sub>  | lon <sub>2</sub>  | lon <sub>1</sub>  |
|   | 24    | lon <sub>16</sub> | lon <sub>15</sub> | lon <sub>14</sub> | lon <sub>13</sub> | lon <sub>12</sub> | lon <sub>11</sub> | lon <sub>10</sub> | lon <sub>9</sub>  |
|   | 25    | lon <sub>24</sub> | lon <sub>23</sub> | lon <sub>22</sub> | lon <sub>21</sub> | lon <sub>20</sub> | lon <sub>19</sub> | lon <sub>18</sub> | lon <sub>17</sub> |
|   | 26    | lon <sub>32</sub> | lon <sub>31</sub> | lon <sub>30</sub> | lon <sub>29</sub> | lon <sub>28</sub> | lon <sub>27</sub> | lon <sub>26</sub> | lon <sub>25</sub> |
| ellipsoid height (h)                        | 27    | h <sub>8</sub>    | h <sub>7</sub>    | h <sub>6</sub>    | h <sub>5</sub>    | h <sub>4</sub>    | h <sub>3</sub>    | h <sub>2</sub>    | h <sub>1</sub>    |
|   | 28    | h <sub>16</sub>   | h <sub>15</sub>   | h <sub>14</sub>   | h <sub>13</sub>   | h <sub>12</sub>   | h <sub>11</sub>   | h <sub>10</sub>   | h <sub>9</sub>    |
|   | 29    | h <sub>24</sub>   | h <sub>23</sub>   | h <sub>22</sub>   | h <sub>21</sub>   | h <sub>20</sub>   | h <sub>19</sub>   | h <sub>18</sub>   | h <sub>17</sub>   |
| GNS-B Message CRC (gc)                      | 30    | gc <sub>8</sub>   | gc <sub>7</sub>   | gc <sub>6</sub>   | gc <sub>5</sub>   | gc <sub>4</sub>   | gc <sub>3</sub>   | gc <sub>2</sub>   | gc <sub>1</sub>   |
|   | 31    | gc <sub>16</sub>  | gc <sub>15</sub>  | gc <sub>14</sub>  | gc <sub>13</sub>  | gc <sub>12</sub>  | gc <sub>11</sub>  | gc <sub>10</sub>  | gc <sub>9</sub>   |
|   | 32    | gc <sub>24</sub>  | gc <sub>23</sub>  | gc <sub>22</sub>  | gc <sub>21</sub>  | gc <sub>20</sub>  | gc <sub>19</sub>  | gc <sub>18</sub>  | gc <sub>17</sub>  |
|   | 33    | gc <sub>32</sub>  | gc <sub>31</sub>  | gc <sub>30</sub>  | gc <sub>29</sub>  | gc <sub>28</sub>  | gc <sub>27</sub>  | gc <sub>26</sub>  | gc <sub>25</sub>  |

Table 5.74: GNS-B message type 2 field encoding

| Data field                                  | Definition  | Encoded Value   | Decoded value (if different) |
|---|---|---|------------------------------|
| Message Identifier (gmi)                    | See table 5.70.   | 2   |                              |
| GNS-B message block identifier (mbi)        | As defined in GNS-B message type 1 encoding.  |   |                              |
| GNS-B ID (gid)                              | As defined in GNS-B message type 1 encoding.  |   |                              |
| Message length (len)                        | As defined in GNS-B message type 1 encoding.  |   |                              |
| GNS-B reference receivers (r)               | This defines the number of GNSS reference receivers installed:<br>GNS-B installed with 2 reference receivers.<br>GNS-B installed with 3 reference receivers.<br>GNS-B installed with 4 reference receivers.<br>Reserved.  | 0<br>1<br>2<br>3                                      |                              |
| GNS-B accuracy designator letter (ac)       | This parameter defines the letter designator indicating the minimum signal-in-space accuracy performance provided by GNS-B:<br>GNS-B has accuracy designation A.<br>GNS-B has accuracy designation B.<br>GNS-B has accuracy designation C.<br>Reserved.   | 0<br>1<br>2<br>3                                      |                              |
| GNS-B continuity/integrity designator (cid) | The GNS-B Continuity / Integrity Designator (GCID) is a numerical designator which defines the operational performance of the GNS-B:<br>Reserved.<br>GCID 1<br>GCID 2<br>GCID 3<br>GCID 4<br>Reserved.<br>Reserved.<br>GNS-B unhealthy.   | 0<br>1<br>2<br>3<br>4<br>5<br>6<br>7                  |                              |
| Local magnetic variation (v)                | This data parameter defines the published magnetic variation at the GNS-B reference point:<br>Bit 1:<br>Positive, denotes eastward variation (clockwise from due north).<br>Negative, denotes west variation (counter-clockwise from true north).<br>Bits 2 to 11:<br>0 degree<br>0,25 degrees<br>0,50 degrees<br>.....<br>180 degrees<br>Unused. | 0<br>1<br>0<br>1<br>2<br>.....<br>720<br>721 to 1 023 |                              |
| $\sigma$ vert iono grad (vi)                | This data parameter represents the standard deviation of a normal distribution associated with the residual ionospheric uncertainty due to spatial decorrelation.<br>0<br>$0,1 \times 10^{-6}$ m/m<br>$0,2 \times 10^{-6}$ m/m<br>.....<br>$25,5 \times 10^{-6}$ m/m  | 0<br>1<br>2<br>.....<br>255                           |                              |

| Data field                   | Definition   | Encoded Value  | Decoded value<br>(if different) |
|------------------------------|--|--|---------------------------------|
| Refractivity index (i)       | This defines the refractivity index parameter value stored in the GNS-B Ground Subsystem.<br>Bit 8:<br>Positive.<br>Negative.<br>Bits 1 to 7:<br>0<br>3<br>.....<br>378<br>381   | 0<br>1<br><br>0<br>1<br>.....<br>126<br>127  |                                 |
| Scale height (h)             | This defines the scale height parameter value stored in the GNS-B Ground Subsystem.<br>0<br>100<br>200<br>.....<br>25 400<br>25 500  | 0<br>1<br>2<br>.....<br>254<br>255   |                                 |
| Refractivity uncertainty (u) | This defines the refractivity uncertainty parameter value stored in the GNS-B Ground Subsystem.<br>0<br>1<br>2<br>.....<br>255   | 0<br>1<br>2<br>.....<br>255  |                                 |
| Latitude (lat)               | This defines the GNS-B Reference Point latitude parameter value as stored in GNS-B Ground Subsystem.<br>Bit 32:<br>Positive (North).<br>Negative (South).<br>Bits 1 to 31:<br>0 degree 0 minute 0 arc s.<br>0 degree 0 minute 0,0005 arc s.<br>0 degree 0 minute 0,00010 arc s.<br>.....<br>89 degrees 59 minutes 59,9995 arc s.<br>90 degrees 0 minute 0 arc s.<br>Unused.  | 0<br>1<br><br>0<br>1<br>2<br>.....<br>647 999 999<br>648 000 000<br>648 000 001<br>to<br>2 147 483 647                             |                                 |
| Longitude (lon)              | This defines the GNS-B Reference Point longitude parameter value as stored in the GNS-B Ground Subsystem.<br>Bit 32:<br>Positive (East).<br>Negative (West).<br>Bits 1 to 31:<br>0 degree 0 minute 0 arc s.<br>0 degree 0 minute 0,0005 arc s.<br>0 degree 0 minute 0,00010 arc s.<br>.....<br>89 degrees 59 minutes 59,9995 arc s.<br>90 degrees 0 minute 0 arc s.<br>.....<br>180 degrees 0 minute 0 arc s.<br>Unused. | 0<br>1<br><br>0<br>1<br>2<br>.....<br>647 999 999<br>648 000 000<br>.....<br>1 296 000 000<br>1 296 000 001<br>to<br>2 147 483 647 |                                 |

| Data field             | Definition   | Encoded Value                          | Decoded value (if different) |
|------------------------|--|--|------------------------------|
| Ellipsoid height (h)   | This defines the GNS-B reference point height above the WGS-84 ellipsoid parameter as stored in the GNS-B ground subsystem.<br>Bit 24:<br>Positive.<br>Negative.<br>Bits 1 to 23:<br>0 m<br>0,01 m<br>.....<br>83 886,07 m | 0<br>1<br>0<br>1<br>.....<br>8 388 607 |                              |
| GNS-B Message CRC (gc) | See clause 5.4.5.1.  |  |                              |

#### 5.4.4 Message Type 4

| Requirement reference |   |
|-----------------------|---|
| 5.4.4.1               | The GNS-B message type 4 shall be encoded as defined in table 5.75.   |
| 5.4.4.2               | Fields in the message type 4 shall be encoded as defined in table 5.76.   |
| 5.4.4.3               | Message Type 4 shall contain up to eight Final Approach Segment Data (FAS) blocks.  |
| 5.4.4.3a              | Each FAS data block shall be encoded according to ICAO Annex 10 [i.3] and A.2.4 in GBAS MOPS [5] if not specified otherwise here. |
| 5.4.4.4               | All the FAS blocks, stored in the ground station shall be transmitted in sequence.  |
| 5.4.4.5               | The GNS-B reference point shall be defined as the WGS-84 co-ordinates of a single RR antenna location for each installation.      |

**Table 5.75: GNS-B message type 4 bit encoding**

| Description   | Octet       | Bit number        |                   |                   |                   |                   |                   |                   |                   |
|---|-------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
|   |             | 8                 | 7                 | 6                 | 5                 | 4                 | 3                 | 2                 | 1                 |
|   | 5           | 0                 | 0                 | 0                 | 1                 | 1                 | 1                 | 1                 | 1                 |
| message block identifier (mbi)  | 6           | mbi <sub>8</sub>  | mbi <sub>7</sub>  | mbi <sub>6</sub>  | mbi <sub>5</sub>  | mbi <sub>4</sub>  | mbi <sub>3</sub>  | mbi <sub>2</sub>  | mbi <sub>1</sub>  |
| GNS-B ID (gid)  | 7           | gid <sub>8</sub>  | gid <sub>7</sub>  | gid <sub>6</sub>  | gid <sub>5</sub>  | gid <sub>4</sub>  | gid <sub>3</sub>  | gid <sub>2</sub>  | gid <sub>1</sub>  |
|   | 8           | gid <sub>16</sub> | gid <sub>15</sub> | gid <sub>14</sub> | gid <sub>13</sub> | gid <sub>12</sub> | gid <sub>11</sub> | gid <sub>10</sub> | gid <sub>9</sub>  |
|   | 9           | gid <sub>24</sub> | gid <sub>23</sub> | gid <sub>22</sub> | gid <sub>21</sub> | gid <sub>20</sub> | gid <sub>19</sub> | gid <sub>18</sub> | gid <sub>17</sub> |
| message identifier (gmi)  | 10          | 0                 | 0                 | 0                 | 0                 | 0                 | gmi <sub>3</sub>  | gmi <sub>2</sub>  | gmi <sub>1</sub>  |
| message length (len)  | 11          | len <sub>8</sub>  | len <sub>7</sub>  | len <sub>6</sub>  | len <sub>5</sub>  | len <sub>4</sub>  | len <sub>3</sub>  | len <sub>2</sub>  | len <sub>1</sub>  |
| data set length (l)   | 12          | l <sub>8</sub>    | l <sub>7</sub>    | l <sub>6</sub>    | l <sub>5</sub>    | l <sub>4</sub>    | l <sub>3</sub>    | l <sub>2</sub>    | l <sub>1</sub>    |
| For N FAS data blocks (i=1 to i=N):<br>operation type (ot)<br>SBAS provider ID (sp) | 13+(i-1)x40 | sp <sub>4</sub>   | sp <sub>3</sub>   | sp <sub>2</sub>   | sp <sub>1</sub>   | ot <sub>4</sub>   | ot <sub>3</sub>   | ot <sub>2</sub>   | ot <sub>1</sub>   |
| airport ID (ai)   | 14+(i-1)x40 | ai <sub>8</sub>   | ai <sub>7</sub>   | ai <sub>6</sub>   | ai <sub>5</sub>   | ai <sub>4</sub>   | ai <sub>3</sub>   | ai <sub>2</sub>   | ai <sub>1</sub>   |
|   | 15+(i-1)x40 | ai <sub>16</sub>  | ai <sub>15</sub>  | ai <sub>14</sub>  | ai <sub>13</sub>  | ai <sub>12</sub>  | ai <sub>11</sub>  | ai <sub>10</sub>  | ai <sub>9</sub>   |
|   | 16+(i-1)x40 | ai <sub>24</sub>  | ai <sub>23</sub>  | ai <sub>22</sub>  | ai <sub>21</sub>  | ai <sub>20</sub>  | ai <sub>19</sub>  | ai <sub>18</sub>  | ai <sub>17</sub>  |
|   | 17+(i-1)x40 | ai <sub>32</sub>  | ai <sub>31</sub>  | ai <sub>30</sub>  | ai <sub>29</sub>  | ai <sub>28</sub>  | ai <sub>27</sub>  | ai <sub>26</sub>  | ai <sub>25</sub>  |
| runway number (rn)<br>runway letter (rl)  | 18+(i-1)x40 | rl <sub>2</sub>   | rl <sub>1</sub>   | rn <sub>6</sub>   | rn <sub>5</sub>   | rn <sub>4</sub>   | rn <sub>3</sub>   | rn <sub>2</sub>   | rn <sub>1</sub>   |
| approach performance designator (apd)<br>route indicator (ri)                       | 19+(i-1)x40 | ri <sub>5</sub>   | ri <sub>4</sub>   | ri <sub>3</sub>   | ri <sub>2</sub>   | ri <sub>1</sub>   | apd <sub>3</sub>  | apd <sub>2</sub>  | apd <sub>1</sub>  |
| reference path data selector (rps)  | 20+(i-1)x40 | rps <sub>8</sub>  | rps <sub>7</sub>  | rps <sub>6</sub>  | rps <sub>5</sub>  | rps <sub>4</sub>  | rps <sub>3</sub>  | rps <sub>2</sub>  | rps <sub>1</sub>  |
| reference path ID (rpi)   | 21+(i-1)x40 | rpi <sub>8</sub>  | rpi <sub>7</sub>  | rpi <sub>6</sub>  | rpi <sub>5</sub>  | rpi <sub>4</sub>  | rpi <sub>3</sub>  | rpi <sub>2</sub>  | rpi <sub>1</sub>  |
|   | 22+(i-1)x40 | rpi <sub>16</sub> | rpi <sub>15</sub> | rpi <sub>14</sub> | rpi <sub>13</sub> | rpi <sub>12</sub> | rpi <sub>11</sub> | rpi <sub>10</sub> | rpi <sub>9</sub>  |
|   | 23+(i-1)x40 | rpi <sub>24</sub> | rpi <sub>23</sub> | rpi <sub>22</sub> | rpi <sub>21</sub> | rpi <sub>20</sub> | rpi <sub>19</sub> | rpi <sub>18</sub> | rpi <sub>17</sub> |
|   | 24+(i-1)x40 | rpi <sub>32</sub> | rpi <sub>31</sub> | rpi <sub>30</sub> | rpi <sub>29</sub> | rpi <sub>28</sub> | rpi <sub>27</sub> | rpi <sub>26</sub> | rpi <sub>25</sub> |

| Description                                    | Octet       | Bit number         |                    |                    |                    |                    |                    |                    |                    |
|--|-------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
|  |             | 8                  | 7                  | 6                  | 5                  | 4                  | 3                  | 2                  | 1                  |
| LTP/FTP latitude (ltla)                        | 25+(i-1)x40 | ltla <sub>8</sub>  | ltla <sub>7</sub>  | ltla <sub>6</sub>  | ltla <sub>5</sub>  | ltla <sub>4</sub>  | ltla <sub>3</sub>  | ltla <sub>2</sub>  | ltla <sub>1</sub>  |
|  | 26+(i-1)x40 | ltla <sub>16</sub> | ltla <sub>15</sub> | ltla <sub>14</sub> | ltla <sub>13</sub> | ltla <sub>12</sub> | ltla <sub>11</sub> | ltla <sub>10</sub> | ltla <sub>9</sub>  |
|  | 27+(i-1)x40 | ltla <sub>24</sub> | ltla <sub>23</sub> | ltla <sub>22</sub> | ltla <sub>21</sub> | ltla <sub>20</sub> | ltla <sub>19</sub> | ltla <sub>18</sub> | ltla <sub>17</sub> |
|  | 28+(i-1)x40 | ltla <sub>32</sub> | ltla <sub>31</sub> | ltla <sub>30</sub> | ltla <sub>29</sub> | ltla <sub>28</sub> | ltla <sub>27</sub> | ltla <sub>26</sub> | ltla <sub>25</sub> |
| LTP/FTP longitude (ltlo)                       | 29+(i-1)x40 | ltlo <sub>8</sub>  | ltlo <sub>7</sub>  | ltlo <sub>6</sub>  | ltlo <sub>5</sub>  | ltlo <sub>4</sub>  | ltlo <sub>3</sub>  | ltlo <sub>2</sub>  | ltlo <sub>1</sub>  |
|  | 30+(i-1)x40 | ltlo <sub>16</sub> | ltlo <sub>15</sub> | ltlo <sub>14</sub> | ltlo <sub>13</sub> | ltlo <sub>12</sub> | ltlo <sub>11</sub> | ltlo <sub>10</sub> | ltlo <sub>9</sub>  |
|  | 31+(i-1)x40 | ltlo <sub>24</sub> | ltlo <sub>23</sub> | ltlo <sub>22</sub> | ltlo <sub>21</sub> | ltlo <sub>20</sub> | ltlo <sub>19</sub> | ltlo <sub>18</sub> | ltlo <sub>17</sub> |
|  | 32+(i-1)x40 | ltlo <sub>32</sub> | ltlo <sub>31</sub> | ltlo <sub>30</sub> | ltlo <sub>29</sub> | ltlo <sub>28</sub> | ltlo <sub>27</sub> | ltlo <sub>26</sub> | ltlo <sub>25</sub> |
| LTP/FTP height (lth)                           | 33+(i-1)x40 | lth <sub>8</sub>   | lth <sub>7</sub>   | lth <sub>6</sub>   | lth <sub>5</sub>   | lth <sub>4</sub>   | lth <sub>3</sub>   | lth <sub>2</sub>   | lth <sub>1</sub>   |
|  | 34+(i-1)x40 | lth <sub>16</sub>  | lth <sub>15</sub>  | lth <sub>14</sub>  | lth <sub>13</sub>  | lth <sub>12</sub>  | lth <sub>11</sub>  | lth <sub>10</sub>  | lth <sub>9</sub>   |
| DFPAP latitude (fpla)                          | 35+(i-1)x40 | fpla <sub>8</sub>  | fpla <sub>7</sub>  | fpla <sub>6</sub>  | fpla <sub>5</sub>  | fpla <sub>4</sub>  | fpla <sub>3</sub>  | fpla <sub>2</sub>  | fpla <sub>1</sub>  |
|  | 36+(i-1)x40 | fpla <sub>16</sub> | fpla <sub>15</sub> | fpla <sub>14</sub> | fpla <sub>13</sub> | fpla <sub>12</sub> | fpla <sub>11</sub> | fpla <sub>10</sub> | fpla <sub>9</sub>  |
|  | 37+(i-1)x40 | fpla <sub>24</sub> | fpla <sub>23</sub> | fpla <sub>22</sub> | fpla <sub>21</sub> | fpla <sub>20</sub> | fpla <sub>19</sub> | fpla <sub>18</sub> | fpla <sub>17</sub> |
| DFPAP longitude (fplo)                         | 38+(i-1)x40 | fplo <sub>8</sub>  | fplo <sub>7</sub>  | fplo <sub>6</sub>  | fplo <sub>5</sub>  | fplo <sub>4</sub>  | fplo <sub>3</sub>  | fplo <sub>2</sub>  | fplo <sub>1</sub>  |
|  | 39+(i-1)x40 | fplo <sub>16</sub> | fplo <sub>15</sub> | fplo <sub>14</sub> | fplo <sub>13</sub> | fplo <sub>12</sub> | fplo <sub>11</sub> | fplo <sub>10</sub> | fplo <sub>9</sub>  |
|  | 40+(i-1)x40 | fplo <sub>24</sub> | fplo <sub>23</sub> | fplo <sub>22</sub> | fplo <sub>21</sub> | fplo <sub>20</sub> | fplo <sub>19</sub> | fplo <sub>18</sub> | fplo <sub>17</sub> |
| approach threshold crossing height (apth)      | 41+(i-1)x40 | apth <sub>8</sub>  | apth <sub>7</sub>  | apth <sub>6</sub>  | apth <sub>5</sub>  | apth <sub>4</sub>  | apth <sub>3</sub>  | apth <sub>2</sub>  | apth <sub>1</sub>  |
| approach TCH units selector (aptu)             | 42+(i-1)x40 | aptu <sub>1</sub>  | apth <sub>15</sub> | apth <sub>14</sub> | apth <sub>13</sub> | apth <sub>12</sub> | apth <sub>11</sub> | apth <sub>10</sub> | apth <sub>9</sub>  |
| glide path angle (gpa)                         | 43+(i-1)x40 | gpa <sub>8</sub>   | gpa <sub>7</sub>   | gpa <sub>6</sub>   | gpa <sub>5</sub>   | gpa <sub>4</sub>   | gpa <sub>3</sub>   | gpa <sub>2</sub>   | gpa <sub>1</sub>   |
|  | 44+(i-1)x40 | gpa <sub>16</sub>  | gpa <sub>15</sub>  | gpa <sub>14</sub>  | gpa <sub>13</sub>  | gpa <sub>12</sub>  | gpa <sub>11</sub>  | gpa <sub>10</sub>  | gpa <sub>9</sub>   |
| course width (cw)                              | 45+(i-1)x40 | cw <sub>8</sub>    | cw <sub>7</sub>    | cw <sub>6</sub>    | cw <sub>5</sub>    | cw <sub>4</sub>    | cw <sub>3</sub>    | cw <sub>2</sub>    | cw <sub>1</sub>    |
| DLength offset (dlo)                           | 46+(i-1)x40 | dlo <sub>8</sub>   | dlo <sub>7</sub>   | dlo <sub>6</sub>   | dlo <sub>5</sub>   | dlo <sub>4</sub>   | dlo <sub>3</sub>   | dlo <sub>2</sub>   | dlo <sub>1</sub>   |
| FAS CRC (fc)                                   | 47+(i-1)x40 | fc <sub>8</sub>    | fc <sub>7</sub>    | fc <sub>6</sub>    | fc <sub>5</sub>    | fc <sub>4</sub>    | fc <sub>3</sub>    | fc <sub>2</sub>    | fc <sub>1</sub>    |
|  | 48+(i-1)x40 | fc <sub>16</sub>   | fc <sub>15</sub>   | fc <sub>14</sub>   | fc <sub>13</sub>   | fc <sub>12</sub>   | fc <sub>11</sub>   | fc <sub>10</sub>   | fc <sub>9</sub>    |
|  | 49+(i-1)x40 | fc <sub>24</sub>   | fc <sub>23</sub>   | fc <sub>22</sub>   | fc <sub>21</sub>   | fc <sub>20</sub>   | fc <sub>19</sub>   | fc <sub>18</sub>   | fc <sub>17</sub>   |
|  | 50+(i-1)x40 | fc <sub>32</sub>   | fc <sub>31</sub>   | fc <sub>30</sub>   | fc <sub>29</sub>   | fc <sub>28</sub>   | fc <sub>27</sub>   | fc <sub>26</sub>   | fc <sub>25</sub>   |
| FAS vertical alert limit /approach status (va) | 51+(i-1)x40 | va <sub>8</sub>    | va <sub>7</sub>    | va <sub>6</sub>    | va <sub>5</sub>    | va <sub>4</sub>    | va <sub>3</sub>    | va <sub>2</sub>    | va <sub>1</sub>    |
| FAS lateral alert limit/approach status (la)   | 52+(i-1)x40 | la <sub>8</sub>    | la <sub>7</sub>    | la <sub>6</sub>    | la <sub>5</sub>    | la <sub>4</sub>    | la <sub>3</sub>    | la <sub>2</sub>    | la <sub>1</sub>    |
| GNS-B message CRC (gc)                         | 53+(i-1)x40 | gc <sub>8</sub>    | gc <sub>7</sub>    | gc <sub>6</sub>    | gc <sub>5</sub>    | gc <sub>4</sub>    | gc <sub>3</sub>    | gc <sub>2</sub>    | gc <sub>1</sub>    |
|  | 54+(i-1)x40 | gc <sub>16</sub>   | gc <sub>15</sub>   | gc <sub>14</sub>   | gc <sub>13</sub>   | gc <sub>12</sub>   | gc <sub>11</sub>   | gc <sub>10</sub>   | gc <sub>9</sub>    |
|  | 55+(i-1)x40 | gc <sub>24</sub>   | gc <sub>23</sub>   | gc <sub>22</sub>   | gc <sub>21</sub>   | gc <sub>20</sub>   | gc <sub>19</sub>   | gc <sub>18</sub>   | gc <sub>17</sub>   |
|  | 56+(i-1)x40 | gc <sub>32</sub>   | gc <sub>31</sub>   | gc <sub>30</sub>   | gc <sub>29</sub>   | gc <sub>28</sub>   | gc <sub>27</sub>   | gc <sub>26</sub>   | gc <sub>25</sub>   |

Table 5.76: GNS-B message type 4 field encoding

| Data field                           | Definition  | Encoded Value                                  | Decoded value (if different) |
|--------------------------------------|---|--|------------------------------|
| Message Identifier (gmi)             | See table 5.70.   | 4  |                              |
| GNS-B message block identifier (mbi) | As defined in GNS-B message type 1 encoding.  |  |                              |
| GNS-B ID (gid)                       | As defined in GNS-B message type 1 encoding.  |  |                              |
| Message length (len)                 | As defined in GNS-B message type 1 encoding.  |  |                              |
| Data set length (l)                  | This field denotes the Type 4 Message data set length, which indicates the number of bytes in the data set.<br>Unused.<br>2<br>3<br>.....<br>212<br>Unused. | 0 to 1<br>2<br>3<br>.....<br>212<br>212 to 255 |                              |

| Data field                            | Definition   | Encoded Value                      | Decoded value (if different) |
|---------------------------------------|--|------------------------------------|------------------------------|
| FAS data block (f)                    | See encoding for data fields below.  |                                    |                              |
| Operation type (ot)                   | This defines the operation type parameter value as stored in the GNS-B Ground Subsystem and shall be set to the code applicable to "straight in approach".<br><br>Straight in approach procedure.<br>Reserved.   | 0<br>1 to 15                       |                              |
| SBAS provider ID (sp)                 | This defines the SBAS service provider ID parameter value as stored in the GNS-B Ground Subsystem.<br>Note: this parameter is not used for approaches conducted using the GNS-B Ground Subsystem corrections.<br>WAAS<br>EGNOS<br>MSAS<br>Reserved<br>FAS data block is to be used with GBAS only.<br>FAS data block can be used with any SBAS service provider.   | 0<br>1<br>2<br>3 to 13<br>14<br>15 |                              |
| Airport ID (ai)                       | This defines the airport identification parameter value as stored in the GNS-B Ground Subsystem.<br><br>Each character is coded using the lower 6 bits of its IA-5 representation. For each character $b_i$ is transmitted first, and 2 zero bits are appended after $b_6$ , so that 8 bits are transmitted for each character. Only upper case letters, numeric digits and IA-5 "space" are used. The rightmost character is transmitted first. For a three-character GBAS ID, the rightmost (first transmitted) character shall be IA-5 "space". |                                    |                              |
| Runway number (rn)                    | This defines the runway number parameter value as stored in the GNS-B Ground Subsystem.<br>Heliport.<br>Runway number.   | 0<br>1 to 36                       |                              |
| Runway letter (rl)                    | This defines the runway letter parameter value as stored in the GNS-B Ground Subsystem.<br>No letter<br>R (right)<br>C (centre)<br>L (left)  | 0<br>1<br>2<br>3                   |                              |
| Approach performance designator (apd) | This defines the code applicable to Category 1 approach.<br>Reserved.<br>Category I.<br>Reserved for Category II.<br>Reserved for Category III.<br>Reserved.   | 0<br>1<br>2<br>3<br>4 to 7         |                              |
| Route indicator (ri)                  | This defines the route indicator parameter value as stored in the GNS-B Ground Subsystem.<br><br>The letter is coded using bits $b_1$ through $b_5$ of its IA-5 representation. Bit $b_1$ is transmitted first. Only upper case letters, excluding "I" and "O", or IA-5 "space" are used.  |                                    |                              |



| Data field                         | Definition   | Encoded Value  | Decoded value<br>(if different) |
|------------------------------------|--|--|---------------------------------|
| Reference path data selector (rps) | This defines the reference path data selector parameter value as stored in the GNS-B Ground Subsystem.<br>0<br>1<br>.....<br>48<br>Unused.   | 0<br>1<br>.....<br>48<br>49 to 255   |                                 |
| Reference path ID (rpi)            | This defines the reference path identifier parameter value as stored in the GNS-B Ground Subsystem.<br><br>Each character is coded using bits $b_1$ through $b_6$ of its IA-5 representation. For each character, $b_1$ is transmitted first, and 2 zero bits are appended after $b_6$ so that 8 bits are transmitted for each character. Only upper case letters, numeric digits and IA-5 "space" are used. The rightmost character is transmitted first. For a three-character reference path identifier, the rightmost (first transmitted) character shall be IA-5 "space". |  |                                 |
| LTP/FTP latitude (Itla)            | This defines the LTP/FTP latitude parameter value as stored in the GNS-B Ground Subsystem and shall represent the latitude (in arc s) of the LTP/FTP point defined in WGS-84 co-ordinates.<br>Bit 32:<br>Positive (North).<br>Negative (South).<br>Bits 1 to 31:<br>0 degree 0 minute 0 arc s<br>0 degree 0 minute 0,0005 arc s<br>0 degree 0 minute 0,00010 arc s<br>.....<br>89 degrees 59 minutes 59,9995 arc s<br>90 degrees 0 minute 0 arc s<br>Unused.   | 0<br>1<br>0<br>1<br>2<br>.....<br>647 999 999<br>648 000 000<br>648 000 001<br>to<br>2 147 483 647                             |                                 |
| LTP/FTP longitude (Itlo)           | This defines the LTP/FTP longitude parameter value as stored in the GNS-B Ground Subsystem and shall represent the longitude (in arc s) of the LTP/FTP point defined in WGS-84 co-ordinates.<br>Bit 32:<br>Positive (East).<br>Negative (West).<br>Bits 1 to 31:<br>0 degree 0 minute 0 arc s<br>0 degree 0 minute 0,0005 arc s<br>0 degree 0 minute 0,00010 arc s<br>.....<br>89 degrees 59 minutes 59,9995 arc s<br>90 degrees 0 minute 0 arc s<br>.....<br>180 degrees 0 minute 0 arc s<br>Unused.  | 0<br>1<br>0<br>1<br>2<br>.....<br>647 999 999<br>648 000 000<br>.....<br>1 296 000 000<br>1 296 000 001<br>to<br>2 147 483 647 |                                 |

| Data field                                | Definition   | Encoded Value  | Decoded value<br>(if different) |
|---|--|--|---------------------------------|
| LTP/FTP height (lth)                      | This defines the LTP/FTP height parameter value as stored in the GNS-B Ground Subsystem.<br>-512,0 m<br>-511,9 m<br>.....<br>0,0 m<br>0,1 m<br>.....<br>6 041,5 m  | 0<br>1<br>.....<br>5 120<br>5 121<br>.....<br>65 535                         |                                 |
| DFPAP latitude (fpla)                     | The delta Flight Path Alignment Point (FPAP) Latitude field defines the delta FPAP latitude parameter value as stored in the GNS-B Ground Subsystem.<br>Bit 24<br>Positive.<br>Negative.<br>Bits 1 to 23<br>0 degree 0 minute 0 arc s<br>0 degree 0 minute 0,0005 arc s<br>.....<br>1 degree 0 minute 0 arc s<br>Unused.   | 0<br>1<br>.....<br>0<br>1<br>.....<br>7 200 000<br>7 200 001 to<br>8 388 607 |                                 |
| DFPAP longitude (fplo)                    | The delta Flight Path Alignment Point (FPAP) Longitude field defines the delta FPAP longitude parameter value as stored in the GNS-B Ground Subsystem.<br>Bit 24<br>Positive.<br>Negative.<br>Bits 1 to 23<br>0 degree 0 minute 0 arc s<br>0 degree 0 minute 0,0005 arc s<br>.....<br>1 degree 0 minute 0 arc s<br>Unused. | 0<br>1<br>.....<br>0<br>1<br>.....<br>7 200 000<br>7 200 001 to<br>8 388 607 |                                 |
| Approach threshold crossing height (apth) | The approach Threshold Crossing Height (TCH) field defines the TCH parameter value as stored in the GNS-B Ground Subsystem.<br>In Metres:<br>0 m<br>0,05 m<br>.....<br>1 638,35 m<br>Alternatively.<br>In Feet:<br>0 ft<br>0,1 ft<br>.....<br>3 276,7 ft   | 0<br>1<br>.....<br>32 767<br>.....<br>0<br>1<br>.....<br>32 767              |                                 |
| Approach TCH units selector (aptu)        | This defines the TCH Unit Selector parameter value as stored in the GNS-B Ground Subsystem.<br>Feet<br>Metres  | 0<br>1   |                                 |

| Data field                                     | Definition   | Encoded Value   | Decoded value (if different) |
|--|--|---|------------------------------|
| Glide path angle (gpa)                         | The Glide Path Angle (GPA) field defines the GPA parameter value as stored in the GNS-B Ground Subsystem and shall represent the glidepath angle of the FAS path with respect to the horizontal plane tangent to the WGS-84 ellipsoid at the LTP/FTP.<br>0 degree<br>0,01 degrees<br>0,02 degrees<br>.....<br>89,99 degrees<br>90 degrees<br>Unused. | 0<br>1<br>2<br>.....<br>8 999<br>9 000<br>9 001 to 65 535 |                              |
| Course width (cw)                              | This defines the course width parameter value as stored in the GNS-B Ground Subsystem and shall represent the lateral displacement at which full-scale deflection of a course deviation indicator from the path defined by the FAS at the LTP/FTP is attained.<br>80 m<br>80,25 m<br>80,50 m<br>.....<br>143,75 m                                    | 0<br>1<br>2<br>.....<br>255                               |                              |
| DLength offset (dlo)                           | This defines the delta length offset parameter value as stored in the GNS-B Ground Subsystem and shall represent the distance from the stop end of the runway to the FAS Path Alignment Point.<br>0 m<br>8 m<br>16 m<br>24 m<br>.....<br>2 032 m<br>Not provided.  | 0<br>1<br>2<br>3<br>.....<br>254<br>255                   |                              |
| Final Approach Segment CRC (fc)                | This defines the FAS CRC value as stored in the GNS-B Ground Subsystem. The 32 bit cyclic redundancy check is appended to the end of each FAS data block in order to ensure FAS data integrity. The length of the CRC shall be k = 32 bits. For encoding see clause 5.5.5.2.   |   |                              |
| FAS vertical alert limit /approach status (va) | Vertical Alert Limit.<br>0 m<br>0,1 m<br>0,2 m<br>.....<br>25,4 m<br>Do not use vertical deviations.   | 0<br>1<br>2<br>.....<br>254<br>255                        |                              |
| FAS lateral alert limit /approach status (la)  | Lateral Alert Limit.<br>0 m<br>0,2 m<br>0,4 m<br>.....<br>50,8 m<br>Do not use approach  | 0<br>1<br>2<br>.....<br>254<br>255                        |                              |
| GNS-B Message CRC (gc)                         | See clause 5.4.5.1.  |   |                              |

## 5.4.5 CRC Calculation

### 5.4.5.1 GNS-B CRC

| Requirement reference |  |
|-----------------------|--|
| 5.4.5.1.1             | The GNS-B CRC generator polynomial shall be:<br>$G(x) = x^{32} + x^{31} + x^{24} + x^{22} + x^{16} + x^{14} + x^8 + x^7 + x^5 + x^3 + x + 1$   |
| 5.4.5.1.2             | The CRC information field, $M(x)$ , shall be:<br>$M(x) = \sum_{i=1}^n m_i x^{n-i} = m_1 x^{n-1} + m_2 x^{n-2} + \dots + m_n x^0$   |
| 5.4.5.1.3             | $M(x)$ shall be formed from the 48 bit GNS-B message block header and all bits of the variable-length message, excluding the CRC.  |
| 5.4.5.1.4             | Bits shall be arranged in the order transmitted, such that $m_1$ corresponds to the first transmitted bit of the message block header, and $m_n$ corresponds to the last transmitted bit of the (n-48) message bits. |
| 5.4.5.1.5             | The following variables shall be used to compute the CRC-value. Start Value shall be 0. Reflect on input shall be done. Reflect on output shall be done. XOR on output shall not be done (XOR value shall be 0).     |

### 5.4.5.2 FAS CRC

| Requirement reference |  |
|-----------------------|--|
| 5.4.5.2.1             | The FAS CRC generator polynomial shall be:<br>$G(x) = x^{32} + x^{31} + x^{24} + x^{22} + x^{16} + x^{14} + x^8 + x^7 + x^5 + x^3 + x + 1$   |
| 5.4.5.2.2             | The CRC information field, $M(x)$ , shall be:<br>$M(x) = \sum_{i=1}^{272} m_i x^{272-i} = m_1 x^{271} + m_2 x^{270} + \dots + m_{272} x^0$   |
| 5.4.5.2.3             | $M(x)$ shall be formed from all bits of the associated FAS data block, excluding the CRC.  |
| 5.4.5.2.4             | Bits shall be arranged in the order transmitted, such that $m_1$ corresponds to the LSB of the operation type field, and $m_{272}$ corresponds to the MSB of the $\Delta$ Length Offset.                         |
| 5.4.5.2.5             | The following variables shall be used to compute the CRC-value. Start Value shall be 0. Reflect on input shall be done. Reflect on output shall be done. XOR on output shall not be done (XOR value shall be 0). |

### 5.4.5.3 Ephemeris CRC

| Requirement reference |   |
|-----------------------|---|
| 5.4.5.3.1             | The "Ephemeris CRC" field shall contain the Ephemeris CRC computed for the ranging source associated with the first ranging source measurement block in the Type 1 Message.   |
| 5.4.5.3.2             | For a SBAS geostationary satellite, the Ephemeris CRC shall be coded as all zeros.  |
| 5.4.5.3.3             | The ephemeris CRC generator polynomial shall be:<br>$G(x) = x^{16} + x^{12} + x^5 + 1$  |
| 5.4.5.3.4             | The CRC information field, M(x), for a given satellite shall be:<br>$M(x) = \sum_{i=1}^n m_i x^{n-i} = m_1 x^{n-1} + m_2 x^{n-2} + \dots + m_n x^0$   |
| 5.4.5.3.5             | For a GPS satellite, M(x) shall be of length n = 576 bits.  |
| 5.4.5.3.6             | M(x) for a GPS satellite shall be calculated using the first 24 bits from each of Words 3 through 10 of subframes 1, 2 and 3 of the data transmission from that satellite, ANDed with the GPS satellite ephemeris mask shown in table 5.77.   |
| 5.4.5.3.7             | After the AND operation, M(x) shall be arranged in the order that bytes are transmitted by the GPS satellite, but with each byte ordered least-significant bit first, such that m <sub>1</sub> corresponds to bit 68 of subframe 1 (LSB of subframe 1, word 3), and m <sub>576</sub> corresponds to bit 287 of subframe 3 (MSB of subframe 3, word 10). |
| 5.4.5.3.8             | The CRC shall be ordered such that r <sub>1</sub> is the first bit transmitted and r <sub>16</sub> is the last bit transmitted.   |
| 5.4.5.3.9             | The following variables shall be used to compute the CRC-value. Start Value shall be 0. Reflect on input shall be done. Reflect on output shall be done. XOR on output shall not be done (XOR value shall be 0).  |

**Table 5.77: GPS Satellite ephemeris mask**

| Subframe 1: | Byte 1    | Byte 2    | Byte 3    |         | Byte 1    | Byte 2    | Byte 3    |
|-------------|-----------|-----------|-----------|---------|-----------|-----------|-----------|
| Word 3      | 0000 0000 | 0000 0000 | 0000 0011 | Word 4  | 0000 0000 | 0000 0000 | 0000 0000 |
| Word 5      | 0000 0000 | 0000 0000 | 0000 0000 | Word 6  | 0000 0000 | 0000 0000 | 0000 0000 |
| Word 7      | 0000 0000 | 0000 0000 | 1111 1111 | Word 7  | 1111 1111 | 1111 1111 | 1111 1111 |
| Word 9      | 1111 1111 | 1111 1111 | 1111 1111 | Word 10 | 1111 1111 | 1111 1111 | 1111 1100 |
| Subframe 2: | Byte 1    | Byte 2    | Byte 3    |         | Byte 1    | Byte 2    | Byte 3    |
| Word 3      | 1111 1111 | 1111 1111 | 1111 1111 | Word 4  | 1111 1111 | 1111 1111 | 1111 1111 |
| Word 5      | 1111 1111 | 1111 1111 | 1111 1111 | Word 6  | 1111 1111 | 1111 1111 | 1111 1111 |
| Word 7      | 1111 1111 | 1111 1111 | 1111 1111 | Word 7  | 1111 1111 | 1111 1111 | 1111 1111 |
| Word 9      | 1111 1111 | 1111 1111 | 1111 1111 | Word 10 | 1111 1111 | 1111 1111 | 0000 0000 |
| Subframe 3: | Byte 1    | Byte 2    | Byte 3    |         | Byte 1    | Byte 2    | Byte 3    |
| Word 3      | 1111 1111 | 1111 1111 | 1111 1111 | Word 4  | 1111 1111 | 1111 1111 | 1111 1111 |
| Word 5      | 1111 1111 | 1111 1111 | 1111 1111 | Word 6  | 1111 1111 | 1111 1111 | 1111 1111 |
| Word 7      | 1111 1111 | 1111 1111 | 1111 1111 | Word 7  | 1111 1111 | 1111 1111 | 1111 1111 |
| Word 9      | 1111 1111 | 1111 1111 | 1111 1111 | Word 10 | 1111 1111 | 1111 1111 | 1111 1100 |

## 6 General design requirements

The equipment shall meet the requirements of EN 301 842-2 [3] clause 6.

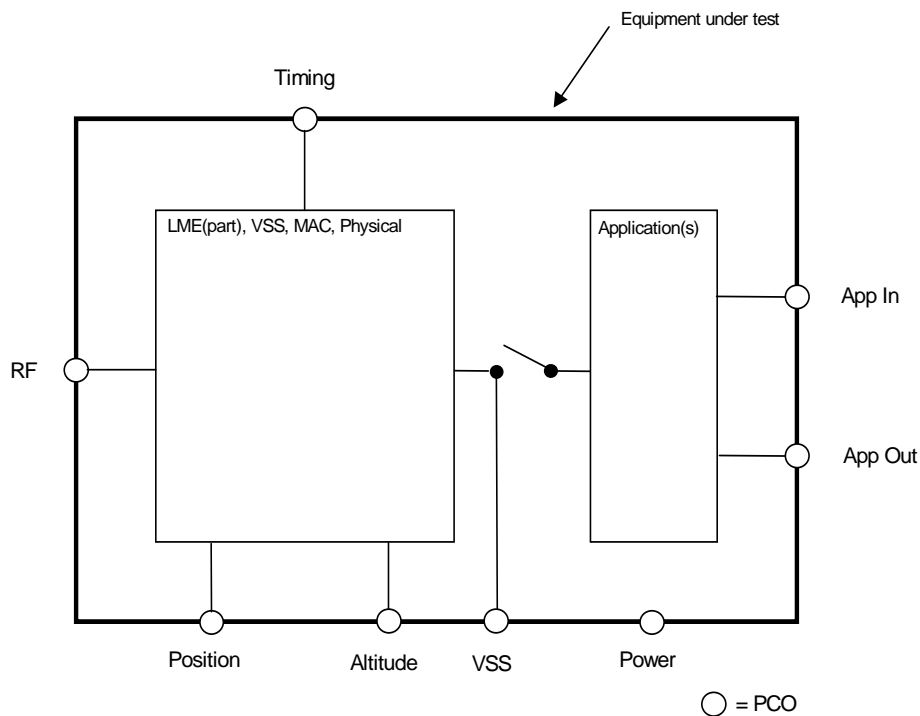
## 7 Protocol test procedures

### 7.1 General

The equipment shall meet the requirements of EN 301 842-2 [3] clause 7.1.

## 7.2 Required test rig

An overview of the PCOs identified as required for the conduct of test cases is illustrated in figure 7.1.



**Figure 7.1: Location of PCOs**

In addition, it shall be possible to verify that the equipment under test has passed the self test procedure.

The PCOs identified in this figure are each associated with a test set which shall support the following:

RF:

- input to the equipment under test of a single burst or sequence of bursts, of specified content, one or more slots in length, commencing in a slot at a specified time, on a specified channel;
- recording of the time at which a burst containing specified content (per field) is output by the equipment under test, on any of three channels;
- simultaneous input to the equipment of bursts of specified content, commencing in a slot at a specified time, on two separate channels.

Timing:

- input of a reference time source compliant with the requirements of the present document;
- disabling of the input of reference time.

NOTE 1: Disabling of the timing source is required to force the equipment under test into secondary or tertiary timing mode.

NOTE 2: In certain equipment architectures, the reference timing source may be incorporated internally within the equipment under test. Under such conditions, there is no requirement to expose the timing source itself, but a means should be provided to disable it as identified above.

## Position:

- input to the equipment under test of a specified geographical position at a specified time;
- input to the equipment under test of position validity/quality to allow determination of position integrity (nic);
- disabling of the position source.

NOTE 3: Disabling of the position source is required to demonstrate that appropriate notification is provided by means of the Navigation Integrity Category (NIC) field.

NOTE 4: In certain equipment architectures, the position source may be incorporated internally into the equipment under test. Under such conditions, manufacturers will be required to perform alternative tests to those specified in the present document to demonstrate correct operation of the position encoding/decoding algorithms. In addition, a means should be provided to disable the position source as stated above.

## Altitude:

- input to the equipment under test of a specified altitude at a specified time;
- disabling of the altitude source;
- configuration information identifying whether geometric or barometric altitude is provided.

NOTE 5: Disabling of the altitude source is required to demonstrate that appropriate notification is provided by means of the fixed synchronization burst.

NOTE 6: In certain equipment architectures, the altitude source may be incorporated internally into the equipment under test. Under such conditions, manufacturers will be required to perform alternative tests to those specified in the present document to demonstrate correct operation of the position encoding/decoding algorithms. In addition, a means must be provided to disable the position source as stated above.

## VSS:

The VSS User PCO is not normally exposed during operational use of the VDL Mode 4 ADS-B system. It is available only during test mode, in which the internal application(s) are disconnected from the VSS and lower layers, as illustrated above.

The VSS User PCO is intended to provide a means to stimulate the VDL Mode 4 system independently of the internal applications, and to offer a mechanism to use test such features of the VSS sub-layer such as slot selection and reservation conflict processing which could not be tested adequately by any other means. At this PCO, functionality shall be provided to allow the User (i.e. test set) to:

- enable/disable autonomous synch bursts, and control of parameters TV11 min, TV11 max and V11 associated with their transmission;
- maintain a queue of random access transmissions, of user specified content, such that at least one burst is always in the transmit queue;
- establish a sequence of streams of periodic broadcasts, of user specified content, defined by parameters TV11 min, TV11 max, V11, V12, together with Quality of Service parameters Q2a to Q2d, Q4 and Q5;
- cancel an existing sequence of periodic streams;
- establish a sequence of incremental broadcasts, of user specified content, defined by parameters V21, V22, together with Quality of Service parameters Q2a to Q2d, Q4 and Q5;
- receive a notification that a non-zero version number has been detected;
- receive a notification in response to a request for transmission that no slot was available for selection.

## AppIn:

Input to the equipment under test of any additional data required to support any internal applications. This interface is specifically used to support tests of TIS-B and FIS-B.

AppOut:

Output from the equipment under test of any data associated with internal application(s). Examples include ADS-B, TIS-B, FIS-B data for output to the crew.

NOTE 7: A display of ADS-B data built into the equipment may represent this PCO.

Power:

Power shall be applied at this PCO in accordance with clauses 7.1.1 and 7.1.2. The facility shall be provided to interrupt the power supply for a period between 150 ms and 15 s, upon an event being signalled from the surrounding test harness.

## 7.3 Protocol test-suite description methodology

The equipment shall meet the requirements of [3] clause 7.3.

## 7.4 Detailed protocol test procedures

The test procedures set forth below constitute a satisfactory method of determining the required VDL Mode 4 ground station performance. Although specific test procedures are cited, it is recognized that other methods may be preferred. Such alternate methods may be used if the manufacturer can show that they provide at least equivalent information. Therefore, the procedures cited herein should be used as one criterion in evaluating the acceptability of the alternate procedures.

### 7.4.1 Test-suite overview

The test-suite overview shown in table 7.1 on the following pages lists the test cases by their name. The second column holds a short description of the test case objective. A cross reference between the test case names and the applicable requirements is provided in annex A.

**Table 7.1: Protocol test-suite overview**

| Test Case Name    | Description   |
|-------------------|---|
| ADSB_request_A    | To demonstrate that a station which desires another station to transmit a single autonomous synchronization burst will transmit an ADS-B request burst with the sleep and auto bits set to zero.  |
| ADSB_request_B    | To demonstrate that a station which desires another station to transmit a single autonomous synchronization burst with a specified variable part, will transmit an ADS-B request burst with sleep=0 and auto=1 and shall include the auto parameters.                       |
| ADSB_request_C    | To demonstrate that a station which desires another station to transmit synchronization bursts autonomously with the use of sleep mode, will transmit an ADS-B request burst with sleep=1 and auto=0 and shall include the sleep parameters.                                |
| ADSB_request_D    | To demonstrate that a station which desires another station to transmit synchronization bursts with a specified variable part and with the use of sleep mode, will transmit an ADS-B request burst with sleep=1 and auto=1 and shall include the auto and sleep parameters. |
| ADSB_reporting    | To demonstrate that a station will send at least 12 sync bursts a minute averaged over the two GSCs.  |
| ADSB_request_time | To show that a station requesting the time synchronization information field (information field ID 2) shall only transmit a request to a station that has announced that it is operating with a primary time source (tfom = 0 or 1).  |
| ADSB_priority     | To show that information fields 0, 1, 2, 3, 4 and A1 hex have priority over other information fields.   |
| ADSB_TCP_flag_C   | To show that a ground station, when configured to respond in this way, will request a mobile which has transmitted a TCP/SVQ flag of zero to transmit a sync burst with a two-slot TCP or SVQ variable part.  |
| ADSB_DOS_A        | To demonstrate that a station will broadcast a Directory of Service message with the correct format.  |
| ADSB_Channel_A    | To demonstrate that a station will broadcast a channel management message with the correct format.  |



| Test Case Name              | Description  |
|-----------------------------|--|
| ADSB_Channel_B              | To demonstrate that a station instructed to cancel its previously issued channel management message will broadcast a channel management message with csid=15, with do pointing to the slot from which cancellation shall begin, and with other subfields the same as the original message. |
| ADSB_Channel_C              | To demonstrate that a station will broadcast a channel management message with repeated script block elements with the correct format.   |
| ADSB_Channel_D              | To demonstrate that a station will broadcast a channel management message with a regional multicast with the correct format.   |
| ADSB_Directed_Slot_A        | To demonstrate that a station broadcasting a channel management message with a non-zero individual offset for a destination station shall ensure that the slot referred to has been reserved using block protocols or ground quarantine.   |
| ADSB_Basic_Ground_A         | To demonstrate that a station will correctly broadcast a sync burst with basic ground information field.   |
| ADSB_UTC_Time_A             | To demonstrate that a station will correctly broadcast a sync burst with UTC time information field.   |
| ADSB_Basic_Rec_A            | To demonstrate that a station will correctly process a received sync burst with basic information field.   |
| ADSB_High_Dynamic_Rec_A     | To demonstrate that a station will correctly process a received sync burst with high dynamic information field.  |
| ADSB_Full_Position_Rec_A    | To demonstrate that a station will correctly process a received sync burst with full position information field.   |
| ADSB_Two_Slot_TCP/SVQ_Rec_A | To demonstrate that a station will correctly process a received sync burst with two slot TCP/SVQ information field.  |
| ADSB_Single_Slot_TCP_Rec_A  | To demonstrate that a station will correctly process a received sync burst with single slot TCP information field.   |
| ADSB_Single_Slot_SVQ_Rec_A  | To demonstrate that a station will correctly process a received sync burst with single slot SVQ information field.   |
| ADSB_Aircraft_Data_Rec_A    | To demonstrate that a station will correctly process a received sync burst with Aircraft data information field.   |
| ADSB_High_Resolution_Rec_A  | To demonstrate that a station will correctly process a received sync burst with High Resolution information field.   |
| CPR_Encode_Offset           | To demonstrate that offset latitude and longitude positions are correctly encoded in the sync burst information fields using the CPR algorithm.  |
| CPR_Decode_Offset           | To demonstrate that offset latitude and longitude positions are correctly decoded from the sync burst information fields using the CPR algorithm.  |
| TIS_Manage_C                | To demonstrate that a station will transmit management messages once in each TIS-B update period.  |
| TIS_Manage_B                | To demonstrate that the transmission of the management message for the following TIS-B period shall not be initiated before all target messages of the current TIS-B period are transmitted.   |
| TIS_Channel_B               | To demonstrate that all TIS-B targets for a single TIV are transmitted with the same update period.  |
| TIS_Target_Update_A         | To demonstrate that each airborne target message is sent once every update period for each airborne TIV the target is included in.   |
| TIS_Target_Update_B         | To demonstrate that each aircraft ground target message is sent once every update period for each ground TIV the target is included in.  |
| TIS_Target_Update_C         | To demonstrate that each ground vehicle target message is sent once every update period for each ground TIV the target is included in.   |
| TIS_Target_Update_D         | To demonstrate that each aircraft ground target message is sent once every update period for each ground and airborne TIV the target is included in.   |
| TIS_Target_Ground           | To demonstrate that for a ground TIV, appropriate target messages are broadcast depending on whether they are identified as either aircraft or ground vehicles.  |
| TIS_Manage_A                | To demonstrate that a station will broadcast a management message with the correct format.   |
| TIS_Aircraft_Air_A          | To demonstrate that a station will broadcast an aircraft target message (airborne TIV) with the correct format.  |
| TIS_Flight_ID_A             | To demonstrate that the flight ID for a target shall be transmitted every 3 TIS-B update periods or better.  |
| TIS_Flight_ID_B             | To demonstrate that if more than 1 flight ID is sent, then this will be alternated for the target in question.   |
| TIS_Aircraft_Grd_A          | To demonstrate that a station will broadcast aircraft target messages (ground TIV) with the correct format.  |
| TIS_Grd_Veh_A               | To demonstrate that a station will broadcast a ground vehicle target messages (ground TIV) with the correct format.  |

| Test Case Name      | Description   |
|---------------------|---|
| TIS_Veh_Default_A   | To demonstrate that if no information for a target is provided implying that it is an aircraft (Mode A code, callsign, registration marking or emitter category), then it will be regarded as a vehicle target until further information is provided. |
| FIS_METAR_A         | To demonstrate that a station will broadcast a METAR message with the correct format.   |
| FIS_SPECI_A         | To demonstrate that a station will broadcast a SPECI message with the correct format.   |
| FIS_METAR_C         | To demonstrate that a station will transmit METAR reports once during each update period.   |
| FIS_ATIS_A          | To demonstrate that a station will broadcast an ATIS message with the correct format.   |
| FIS_RCN_A           | To demonstrate that a station will broadcast an RCN message with the correct format.  |
| FIS_SIGMET_A        | To demonstrate that a station will broadcast a SIGMET message with the correct format.  |
| FIS_TSA_CTR_A       | To demonstrate that a station will broadcast a TSA message for control zones with the correct format.   |
| FIS_TSA_DNG_A       | To demonstrate that a station will broadcast a TSA message for restricted, danger or prohibited zones with the correct format.  |
| FIS_Request_C       | To demonstrate that a ground station which receives a broadcast report request message from a mobile that does not reserve slot(s) for the response, will broadcast the information at the required rate.   |
| FIS_Request_D       | To demonstrate that a ground station which receives an addressed report request message from a mobile that reserves a specific slot for the response, will broadcast the requested information in the reserved slot.                                  |
| FIS_Request_E       | To demonstrate that a ground station which receives an addressed report request message from a mobile that does not reserve slot(s) for the response, will broadcast the information at the required rate.  |
| FIS_Request_F       | To demonstrate that a ground station which receives a broadcast report request message from a mobile that reserves a specific slot for the response, will broadcast the requested information in the reserved slot.                                   |
| FIS_Queue_A         | To demonstrate that a station will correctly manage a queue of targets to be transmitted.   |
| FIS_Slot_A          | To demonstrate that a station will transmit FIS-B messages in slots as instructed by the FIS-B server.  |
| FIS_AddInfo_A       | To demonstrate that a station passes requests for additional information to the FIS-B server.   |
| FIS_Request_Rec_A   | To demonstrate that a station will correctly process a received FIS-B report request message with a null reservation.   |
| FIS_Request_Rec_B   | To demonstrate that a station will correctly process a received FIS-B report request message with a unicast reservation.  |
| GNS_Type1_Message_A | To demonstrate that a station will broadcast a GNS-B Type 1 message with the correct format.  |
| GNS_Type2_Message_A | To demonstrate that a station will broadcast a GNS-B Type 2 message with the correct format.  |
| GNS_Type4_Message_A | To demonstrate that a station will broadcast a GNS-B Type 4 message with the correct format.  |

## 7.4.2 Declarations

For the performance of the tests, stimuli are applied and test results are observed at the Points of Control and Observation (PCO) as defined in clause 7.2.

## 7.4.3 Constraints

### 7.4.3.1 Abbreviations

Abbreviations and other terms for protocol test cases are given in EN 301 842-2 [3] clause 7.4.3.1 unless stated below.

## 7.4.3.1.1

## Subfield mnemonics

Table 7.2: Subfield mnemonics

| Mnemonic | Meaning                         |
|----------|---------------------------------|
| a        | Additional slots                |
| aavl     | Airport availability            |
| ac       | Aircraft category               |
| a/d      | Autonomous/directed flag        |
| adsff    | ADS-B fault flag                |
| aflg     | Altitude resolution flag        |
| ai       | Additional service Information  |
| altr     | Altitude rate                   |
| anum     | Application number              |
| aptf     | Approach type flag              |
| apty     | Approach type                   |
| atis     | No of ADS-B targets             |
| auto     | Autonomous information          |
| aux      | Auxiliary selection             |
| balt     | Base altitude                   |
| bar      | Barometric altitude             |
| b/g      | Baro/geo altitude               |
| bgo      | Baro/geo offset                 |
| blg      | Block length                    |
| bo       | Block offset                    |
| br       | Block repeat rate               |
| br       | Baro rate                       |
| brk      | Braking action                  |
| bs       | Block start                     |
| bt       | Block timeout                   |
| c        | CRC                             |
| call     | Callsign                        |
| cat      | Aircraft category               |
| cav      | CAVOK flag                      |
| cc       | Cloud coverage                  |
| ch       | Cloud height                    |
| cno      | Cloud number flag               |
| cprf     | CPR format even/odd             |
| crp      | Phenomenon / condition reported |
| csid     | Command set ID                  |
| csl      | Call sign left                  |
| csr      | Call sign right                 |
| cty      | Cloud type                      |
| d        | Destination address             |
| da       | Data age                        |
| date     | Date                            |
| day      | UTC day                         |
| dc       | Directory count                 |
| dew      | Dew point temperature           |
| di       | Date issued                     |
| DLPDU    | Data Link Protocol Data Unit    |
| do       | Directed offset                 |
| dod      | Depth of deposit                |
| dos      | Directory of services flag      |
| dt       | Directed timeout                |
| dvt      | Date valid to                   |
| erid     | Extended reservation ID         |
| f        | Frequency                       |
| fc       | Frequency count                 |
| fidflg   | Flight ID flag                  |
| fidty    | Flight ID type                  |
| flag     | Flag delimiting burst           |
| fmi      | FIS-B message ID                |
| freq     | Frequency                       |

| <b>Mnemonic</b> | <b>Meaning</b>                              |
|-----------------|---|
| frq             | Frequency index                             |
| ftxt            | Free text flag                              |
| gr              | Geo rate                                    |
| gs              | Ground speed                                |
| gsc             | Global Signalling Channel (GSC)             |
| gsp             | Ground speed                                |
| gt              | Ground track                                |
| gtk             | Ground track                                |
| h               | UTC hour                                    |
| hd              | Holding delay                               |
| id              | Information field identity                  |
| ido             | Individual offset                           |
| in              | Information field                           |
| io              | Incremental offset                          |
| lat             | Latitude                                    |
| lat4            | 4-bit latitude offset                       |
| lat6            | 6-bit latitude offset                       |
| lat8            | 8-bit latitude offset                       |
| lbar            | Lower barometric altitude                   |
| lg              | Length                                      |
| loci            | Location indicator                          |
| locl            | Local ID                                    |
| lon             | Longitude                                   |
| lon4            | 4-bit longitude offset                      |
| lon6            | 6-bit longitude offset                      |
| lon8            | 8-bit longitude offset                      |
| long            | Reference point longitude                   |
| mas             | Maximum visibility                          |
| masd            | Maximum visibility direction                |
| med             | Message edition                             |
| mi              | Message ID                                  |
| min             | UTC minute                                  |
| mis             | Minimum visibility                          |
| misd            | Minimum visibility direction                |
| mon             | UTC month                                   |
| mrq             | Message requested                           |
| mxw             | max wind flag                               |
| n               | CTRL length                                 |
| nd              | Negative dither                             |
| no              | TCP number                                  |
| nr              | Nominal update rate                         |
| nsd             | Non-standard definition                     |
| ntis            | No of TIS-B targets                         |
| nic             | Position navigation integrity category      |
| nucr            | Rate uncertainty                            |
| nvert           | Number of vertices                          |
| off             | Offset to first reserved slot               |
| ok              | Confirm/failure flag                        |
| or              | Override flag                               |
| ori             | Originator indicator                        |
| oth             | Other operational activity                  |
| pc              | Parameter count                             |
| pid             | Patch ID                                    |
| po              | Periodic offset                             |
| pos             | Position                                    |
| pr              | Priority                                    |
| pr_flag         | Plea response flag                          |
| prm             | VSS user specific parameter                 |
| pt              | Periodic timeout                            |
| pw              | Present weather                             |
| pwf             | Present weather flag                        |
| Q1              | Priority                                    |
| Q2a             | Slot selection range constraint for level n |

| <b>Mnemonic</b> | <b>Meaning</b>                              |
|-----------------|---|
| Q2b             | Slot selection range constraint for level n |
| Q2c             | Slot selection range constraint for level n |
| Q2d             | Slot selection range constraint for level n |
| Q4              | Number of available slots                   |
| qfe             | QFE   |
| qfef            | QFE flag                                    |
| qnh             | QNH   |
| ravl            | Runway availability                         |
| r-b/a           | Requested baro/geo altitude                 |
| rlat            | Latitude                                    |
| r-mi            | Requested message ID                        |
| ro              | Response offset                             |
| roff            | Re-broadcast offset                         |
| rso             | RVR source                                  |
| rcon            | Runway contamination                        |
| rcvr            | Receiver control                            |
| rd              | Reservation data                            |
| rdp             | Runway deposits                             |
| res             | Reserved bit                                |
| rflg            | Radar fusion flag                           |
| rri             | Reduced runway length                       |
| rrw             | Reduced runway width                        |
| rid             | Reservation ID                              |
| r-id            | Requested information ID subfield           |
| rlg             | Longitude                                   |
| ro              | Response offset                             |
| roff            | Re-broadcast offset                         |
| ruf             | Runway flag                                 |
| run             | Runway ID                                   |
| rus             | Runway in use                               |
| rve             | RVR endpoint                                |
| rvm             | RVR midpoint                                |
| rvt             | RVR touchdown                               |
| rw              | Recent weather                              |
| rwf             | Recent weather flag                         |
| s               | Source address                              |
| sc              | Script count                                |
| sdf             | Source/destination flag                     |
| sec             | UTC second                                  |
| sfl             | SIGMET flag                                 |
| sleep           | Autonomous monitoring                       |
| si              | Service information                         |
| sit             | Service information type                    |
| slt             | Slot  |
| snr             | Secondary reporting rate                    |
| sqn             | FIS-B sequence number                       |
| sr              | Script rate                                 |
| ss              | State of the sea                            |
| ssf             | Sea flag                                    |
| sst             | Sea surface temperature                     |
| st              | Status                                      |
| styp            | Script duration type                        |
| sz              | Size  |
| tacc            | TIS-B target resolution                     |
| tag             | Time stamp                                  |
| tem             | Temperature                                 |
| tqc             | TCP/SVQ change flag                         |
| tflg            | Target identifier flag                      |
| tfom            | Time figure of merit                        |
| ti              | Time  |
| tid             | Target Identifier                           |
| tind            | Turn indication                             |
| tivid           | TIV ID                                      |

| Mnemonic | Meaning                             |
|----------|-------------------------------------|
| tmi      | TIS-B message ID                    |
| tran     | Transition time                     |
| trd      | TREND report flag                   |
| trmt     | Transmit control                    |
| ttg      | Time to go                          |
| TV11max  | Reservation hold time maximum value |
| TV11min  | Reservation hold time minimum value |
| tvf      | Time valid to                       |
| txd      | Transmission definition index       |
| txt      | Free text message                   |
| typ      | TCP type                            |
| ubar     | Upper barometric altitude           |
| ucid     | UCTRL identity                      |
| up       | Update period                       |
| vdif     | Variable wind direction from        |
| vdit     | Variable wind direction to          |
| vel      | Maximum sleep velocity              |
| ver      | Version number                      |
| vers     | FIS-B version ID                    |
| vlat     | Vertex latitude                     |
| vlg      | Vertex longitude                    |
| vt       | Timeout                             |
| V11      | Nominal periodic rate               |
| wdi      | Wind direction                      |
| wgi      | Wind gust indicator                 |
| ws       | Wind shear                          |
| wsf      | Wind shear flag                     |
| wsp      | Wind speed                          |
| yr       | UTC year                            |

#### 7.4.3.1.2 Station addresses and positions

Station addresses are referred to in the test cases in the following format:

- add\_A = address of the station under test (station A);
- add\_B = address of simulated station B (simulated by the test equipment);
- add\_C = address of simulated station C;
- with the pattern continuing for other stations. A simulated ground station is normally named G, with address "add\_G".

The test station (station A) and other simulated stations are assumed to be at 0° latitude and at 0° longitude, unless otherwise specified. The positions of other stations are given in terms of the direction (East, E, is used for all cases) and distance in nautical miles with respect to the position of station A.

The test station (station A) and other simulated stations are assumed to be at an altitude of zero feet, unless otherwise specified.

The following functions:

- lat:= CPR\_LAT(y);
- lon:= CPR\_LON(x);

are used to indicate that the given position will need to be encoded using the CPR encoding algorithm, currently defined in the VDL Mode 4 Technical Manual [i.1].

For example, the encoded position of the test station (station A) is:

- lat:= CPR\_LAT(0);
- lon:= CPR\_LON(0);

while the encoded position of a simulated station B, that is 325 NM away from A, will be expressed as:

- lat:= CPR\_LAT(0);
- lon:= CPR\_LON(E 325 NM).

The encoded offsets are written in the test scripts as follows:

- lat4:= CPR\_LAT4(y);
- lon4:= CPR\_LON4(x);
- lat6:= CPR\_LAT6(y);
- lon6:= CPR\_LON6(x);
- lat8:= CPR\_LAT8(y);
- lon8:= CPR\_LON8(x).

#### 7.4.3.1.3 Tables of values for use in CPR test cases

The following tables are used in the CPR test cases.

**Table 7.3: Void**

**Table 7.4: Key to CPR encoding table in following clause**

| Table heading | Description  |
|---------------|--|
| latitude      | latitude to be encoded.  |
| longitude     | longitude to be encoded.   |
| cpr type      | CPR type of position report.   |
| lat enc       | encoded latitude for transmission in fixed part of sync burst.                                       |
| lon enc       | encoded longitude for transmission in fixed part of sync burst.                                      |
| pid enc       | encoded patch id for transmission in variable part of sync burst.                                    |
| lat4(1-3)     | encoded 4-bit high resolution latitude offset for transmission in variable part of sync burst.       |
| lat4(4)       | encoded 4-bit high resolution latitude offset sign for transmission in variable part of sync burst.  |
| lat6(1-5)     | encoded 6-bit high resolution latitude offset for transmission in variable part of sync burst.       |
| lat6(6)       | encoded 6-bit high resolution latitude offset sign for transmission in variable part of sync burst.  |
| lat8(1-7)     | encoded 8-bit high resolution latitude offset for transmission in variable part of sync burst.       |
| lat8(8)       | encoded 8-bit high resolution latitude offset sign for transmission in variable part of sync burst.  |
| lat4(1-3)     | encoded 4-bit high resolution longitude offset for transmission in variable part of sync burst.      |
| lat4(4)       | encoded 4-bit high resolution longitude offset sign for transmission in variable part of sync burst. |
| lat6(1-5)     | encoded 6-bit high resolution longitude offset for transmission in variable part of sync burst.      |
| lat6(6)       | encoded 6-bit high resolution longitude offset sign for transmission in variable part of sync burst. |
| lat8(1-7)     | encoded 8-bit high resolution longitude offset for transmission in variable part of sync burst.      |
| lat8(8)       | encoded 8-bit high resolution longitude offset sign for transmission in variable part of sync burst. |

7.4.3.1.3.1 Table of test values for CPR position report encoding CPR\_ENC\_TABLE (row, column) (CE(r, c))

(For the key to this table see clause 7.4.3.1.3.)

The CPR test values have been designed assuming an aircraft travelling at constant velocity in a north-easterly direction and transmitting its position with a CPR report every 10 s. The receiving station is assumed to miss many of the transmitted reports, and in a way which allows this test to pass through all the various operations of the state machine during the decoding process (see table in clause 5.2.4.3.2.7). The missed positions, which are not relevant here, are excluded from the encoding table below and from the decoding table in clause 5.2.4.3.2.7 for clarity. The target is assumed to become unreachable during the elapsed time represented by the missed reports (gaps in the table), due to expiration of L1.

The input latitude and longitude values in the first two columns of the encoding table below (and in the first four columns of the table in clause 5.2.4.3.2.7) vary for the purpose of the test up to the fourth decimal place, but are required to be accurate to 9 decimal places as shown, in order to achieve the given encoded values.



Table 7.5: Table of test values for CPR position report encoding CPR\_ENC\_TABLE (row, column) (CE(r, c))

| latitude     | longitude    | cpr_type | lat_enc | lon_enc | pid_enc | lat4(1-3) | lat4(4) | lat6(1-5) | lat6(6) | lat8(1-7) | lat8(8) | lon4(1-3) | lon4(4) | lon6(1-5) | lon6(6) | lon8(1-7) | lon8(8) |
|--------------|--------------|----------|---------|---------|---------|-----------|---------|-----------|---------|-----------|---------|-----------|---------|-----------|---------|-----------|---------|
| 12,855700000 | -0,815000000 | 0        | 1 169   | 15 085  | 70      | 6         | 1       | 25        | 1       | 104       | 1       | 2         | 0       | 8         | 0       | 32        | 0       |
| 12,872000000 | -0,798700000 | 1        | 1 030   | 15 147  | 69      | 5         | 0       | 21        | 0       | 85        | 0       | 3         | 1       | 11        | 1       | 47        | 1       |
| 12,888300000 | -0,782400000 | 0        | 1 183   | 15 137  | 70      | 3         | 0       | 15        | 0       | 61        | 0       | 3         | 0       | 12        | 0       | 51        | 0       |
| 12,904600000 | -0,766100000 | 1        | 1 043   | 15 198  | 69      | 5         | 0       | 22        | 0       | 90        | 0       | 5         | 0       | 23        | 0       | 95        | 0       |
| 12,920900000 | -0,749800000 | 0        | 1 196   | 15 189  | 70      | 2         | 1       | 7         | 1       | 28        | 1       | 4         | 0       | 17        | 0       | 70        | 0       |
| 12,953500000 | -0,717200000 | 0        | 1 209   | 15 241  | 70      | 6         | 1       | 28        | 1       | 116       | 1       | 5         | 0       | 22        | 0       | 89        | 0       |
| 12,969800000 | -0,700900000 | 1        | 1 069   | 15 299  | 69      | 6         | 0       | 25        | 0       | 101       | 0       | 7         | 0       | 30        | 0       | 125       | 0       |
| 13,002400000 | -0,668300000 | 1        | 1 082   | 15 349  | 69      | 6         | 0       | 26        | 0       | 107       | 0       | 1         | 0       | 3         | 0       | 13        | 0       |
| 13,051300000 | -0,619400000 | 0        | 1 250   | 15 396  | 70      | 7         | 0       | 31        | 0       | 125       | 0       | 6         | 1       | 26        | 1       | 108       | 1       |
| 13,100200000 | -0,570500000 | 1        | 1 121   | 15 500  | 69      | 7         | 0       | 30        | 0       | 123       | 0       | 4         | 1       | 17        | 1       | 70        | 1       |
| 13,165400000 | -0,505300000 | 1        | 1 146   | 15 601  | 69      | 7         | 1       | 29        | 1       | 121       | 1       | 2         | 1       | 10        | 1       | 40        | 1       |
| 13,279500000 | -0,391200000 | 0        | 1 343   | 15 760  | 70      | 1         | 0       | 3         | 0       | 11        | 0       | 1         | 0       | 6         | 0       | 25        | 0       |
| 13,312100000 | -0,358600000 | 0        | 1 356   | 15 812  | 70      | 4         | 1       | 19        | 1       | 77        | 1       | 2         | 0       | 11        | 0       | 44        | 0       |
| 13,328400000 | -0,342300000 | 1        | 1 211   | 15 853  | 69      | 5         | 1       | 23        | 1       | 94        | 1       | 5         | 1       | 23        | 1       | 93        | 1       |
| 13,409900000 | -0,260800000 | 0        | 1 396   | 15 968  | 70      | 5         | 1       | 22        | 1       | 90        | 1       | 6         | 0       | 25        | 0       | 102       | 0       |
| 13,426200000 | -0,244500000 | 1        | 1 250   | 16 005  | 69      | 4         | 1       | 19        | 1       | 78        | 1       | 4         | 0       | 19        | 0       | 79        | 0       |
| 13,442500000 | -0,228200000 | 0        | 1 410   | 16 020  | 70      | 4         | 0       | 18        | 0       | 75        | 0       | 7         | 0       | 29        | 0       | 121       | 0       |
| 13,475100000 | -0,195600000 | 0        | 1 423   | 16 071  | 70      | 1         | 1       | 3         | 1       | 14        | 1       | 6         | 1       | 28        | 1       | 114       | 1       |
| 13,491400000 | -0,179300000 | 1        | 1 276   | 16 106  | 69      | 4         | 1       | 16        | 1       | 67        | 1       | 6         | 0       | 27        | 0       | 109       | 0       |
| 13,507700000 | -0,163000000 | 0        | 1 436   | 16 123  | 70      | 6         | 1       | 25        | 1       | 102       | 1       | 5         | 1       | 23        | 1       | 95        | 1       |
| 13,524000000 | -0,146700000 | 1        | 1 289   | 16 163  | 68      | 3         | 1       | 15        | 1       | 62        | 1       | 4         | 0       | 19        | 0       | 79        | 0       |
| 13,540300000 | -0,130400000 | 0        | 1 450   | 16 181  | 69      | 3         | 0       | 15        | 0       | 63        | 0       | 3         | 1       | 15        | 1       | 60        | 1       |
| 13,556600000 | -0,114100000 | 1        | 1 302   | 16 212  | 68      | 3         | 1       | 14        | 1       | 56        | 1       | 5         | 0       | 22        | 0       | 90        | 0       |
| 13,589200000 | -0,081500000 | 1        | 1 315   | 16 261  | 68      | 3         | 1       | 12        | 1       | 51        | 1       | 6         | 0       | 24        | 0       | 100       | 0       |
| 13,654400000 | -0,016300000 | 1        | 1 341   | 16 359  | 68      | 2         | 1       | 10        | 1       | 40        | 1       | 7         | 0       | 30        | 0       | 122       | 0       |
| 13,735900000 | 0,065200000  | 0        | 1 530   | 101     | 36      | 2         | 0       | 9         | 0       | 38        | 0       | 2         | 0       | 7         | 0       | 30        | 0       |
| 13,850000000 | 0,179300000  | 1        | 1 419   | 269     | 36      | 0         | 1       | 2         | 1       | 8         | 1       | 4         | 1       | 17        | 1       | 68        | 1       |
| 13,866300000 | 0,195600000  | 0        | 1 583   | 303     | 36      | 3         | 1       | 15        | 1       | 63        | 1       | 5         | 0       | 22        | 0       | 89        | 0       |
| 13,996700000 | 0,326000000  | 0        | 1 637   | 504     | 36      | 5         | 0       | 22        | 0       | 89        | 0       | 6         | 1       | 26        | 1       | 105       | 1       |
| 14,013000000 | 0,342300000  | 1        | 1 484   | 514     | 36      | 1         | 0       | 5         | 0       | 19        | 0       | 1         | 1       | 4         | 1       | 15        | 1       |
| 14,143400000 | 0,472700000  | 1        | 1 536   | 710     | 36      | 2         | 0       | 10        | 0       | 40        | 0       | 2         | 0       | 7         | 0       | 28        | 0       |
| 14,208600000 | 0,537900000  | 1        | 1 562   | 808     | 36      | 3         | 0       | 12        | 0       | 51        | 0       | 3         | 0       | 12        | 0       | 50        | 0       |
| 14,290100000 | 0,619400000  | 0        | 1 757   | 958     | 36      | 3         | 0       | 13        | 0       | 52        | 0       | 5         | 1       | 24        | 1       | 98        | 1       |
| 14,322700000 | 0,652000000  | 0        | 1 770   | 1 009   | 36      | 2         | 1       | 9         | 1       | 37        | 1       | 2         | 0       | 11        | 0       | 44        | 0       |
| 14,404200000 | 0,733500000  | 1        | 1 640   | 1 102   | 36      | 5         | 0       | 20        | 0       | 83        | 0       | 6         | 0       | 28        | 0       | 114       | 0       |
| 14,436800000 | 0,766100000  | 1        | 1 653   | 1 151   | 36      | 5         | 0       | 22        | 0       | 89        | 0       | 7         | 0       | 30        | 0       | 125       | 0       |
| 14,518300000 | 0,847600000  | 0        | 1 850   | 1 311   | 36      | 3         | 1       | 15        | 1       | 62        | 1       | 7         | 1       | 30        | 1       | 121       | 1       |
| 14,550900000 | 0,880200000  | 0        | 1 864   | 1 362   | 36      | 6         | 0       | 25        | 0       | 103       | 0       | 1         | 0       | 5         | 0       | 21        | 0       |
| 14,632400000 | 0,961700000  | 1        | 1 731   | 1 444   | 36      | 7         | 0       | 29        | 0       | 121       | 0       | 4         | 1       | 16        | 1       | 65        | 1       |
| 14,713900000 | 1,043200000  | 0        | 1 930   | 1 614   | 36      | 5         | 1       | 21        | 1       | 87        | 1       | 2         | 1       | 8         | 1       | 32        | 1       |
| 14,746500000 | 1,075800000  | 0        | 1 944   | 1 665   | 36      | 4         | 0       | 19        | 0       | 78        | 0       | 6         | 0       | 27        | 0       | 110       | 0       |
| 14,762800000 | 1,092100000  | 1        | 1 782   | 1 640   | 36      | 6         | 1       | 27        | 1       | 112       | 1       | 1         | 1       | 5         | 1       | 22        | 1       |
| 14,876900000 | 1,206200000  | 0        | 1 997   | 1 866   | 36      | 1         | 1       | 6         | 1       | 23        | 1       | 5         | 1       | 21        | 1       | 85        | 1       |
| 14,893200000 | 1,222500000  | 1        | 1 834   | 1 836   | 36      | 5         | 1       | 22        | 1       | 90        | 1       | 1         | 0       | 5         | 0       | 20        | 0       |
| 15,007300000 | 1,336600000  | 0        | 2 050   | 2 068   | 36      | 7         | 1       | 30        | 1       | 124       | 1       | 1         | 1       | 6         | 1       | 25        | 1       |
| 15,088800000 | 1,418100000  | 1        | 1 912   | 2 130   | 36      | 3         | 1       | 14        | 1       | 58        | 1       | 5         | 0       | 21        | 0       | 85        | 0       |

| latitude     | longitude    | cpr_type | lat_enc | lon_enc | pid_enc | lat4(1-3) | lat4(4) | lat6(1-5) | lat6(6) | lat8(1-7) | lat8(8) | lon4(1-3) | lon4(4) | lon6(1-5) | lon6(6) | lon8(1-7) | lon8(8) |
|--------------|--------------|----------|---------|---------|---------|-----------|---------|-----------|---------|-----------|---------|-----------|---------|-----------|---------|-----------|---------|
| 15,121400000 | 1,450700000  | 1        | 1 925   | 2 179   | 36      | 3         | 1       | 13        | 1       | 53        | 1       | 5         | 0       | 23        | 0       | 95        | 0       |
| 15,154000000 | 1,483300000  | 1        | 1 938   | 2 228   | 36      | 3         | 1       | 12        | 1       | 47        | 1       | 6         | 0       | 26        | 0       | 106       | 0       |
| 15,235500000 | 1,564800000  | 0        | 2 144   | 2 421   | 36      | 1         | 0       | 4         | 0       | 16        | 0       | 3         | 1       | 12        | 1       | 48        | 1       |
| 15,268100000 | 1,597400000  | 0        | 2 157   | 2 472   | 36      | 4         | 1       | 18        | 1       | 73        | 1       | 5         | 0       | 23        | 0       | 94        | 0       |
| 15,349600000 | 1,678900000  | 1        | 2 016   | 2 521   | 36      | 1         | 1       | 4         | 1       | 15        | 1       | 5         | 1       | 20        | 1       | 84        | 1       |
| 15,365900000 | 1,695200000  | 0        | 2 197   | 2 623   | 36      | 5         | 1       | 21        | 1       | 85        | 1       | 1         | 0       | 3         | 0       | 12        | 0       |
| 15,480000000 | 1,809300000  | 1        | 2 068   | 2 717   | 36      | 0         | 0       | 2         | 0       | 6         | 0       | 2         | 1       | 10        | 1       | 41        | 1       |
| 15,496300000 | 1,825600000  | 0        | 2 251   | 2 825   | 36      | 4         | 0       | 16        | 0       | 67        | 0       | 4         | 0       | 17        | 0       | 71        | 0       |
| 15,610400000 | 1,939700000  | 1        | 2 120   | 2 913   | 36      | 2         | 0       | 7         | 0       | 28        | 0       | 0         | 0       | 0         | 0       | 2         | 0       |
| 15,626700000 | 1,956000000  | 0        | 2 304   | 3 026   | 36      | 2         | 1       | 8         | 1       | 34        | 1       | 7         | 1       | 30        | 1       | 123       | 1       |
| 15,740800000 | 2,070100000  | 1        | 2 172   | 3 109   | 36      | 3         | 0       | 12        | 0       | 49        | 0       | 2         | 0       | 11        | 0       | 45        | 0       |
| 15,757100000 | 2,086400000  | 0        | 2 358   | 3 228   | 36      | 7         | 0       | 29        | 0       | 119       | 0       | 4         | 1       | 16        | 1       | 64        | 1       |
| 15,871200000 | 2,200500000  | 1        | 2 224   | 3 305   | 36      | 4         | 0       | 17        | 0       | 71        | 0       | 5         | 0       | 21        | 0       | 87        | 0       |
| 15,887500000 | 2,216800000  | 0        | 2 411   | 3 430   | 36      | 1         | 0       | 4         | 0       | 17        | 0       | 0         | 1       | 1         | 1       | 4         | 1       |
| 15,903800000 | 2,233100000  | 1        | 2 237   | 3 354   | 36      | 4         | 0       | 19        | 0       | 76        | 0       | 5         | 0       | 24        | 0       | 98        | 0       |
| 15,920100000 | 2,249400000  | 0        | 2 424   | 3 480   | 36      | 4         | 1       | 17        | 1       | 71        | 1       | 6         | 1       | 28        | 1       | 117       | 1       |
|              |              |          |         |         |         |           |         |           |         |           |         |           |         |           |         |           |         |
| 19,098600000 | 5,427900000  | 1        | 3 509   | 8 151   | 36      | 5         | 0       | 23        | 0       | 94        | 0       | 7         | 1       | 30        | 1       | 123       | 1       |
| 19,114900000 | 5,444200000  | 0        | 3 733   | 8 424   | 36      | 6         | 0       | 28        | 0       | 114       | 0       | 4         | 0       | 17        | 0       | 71        | 0       |
| 19,131200000 | 5,460500000  | 1        | 3 522   | 8 200   | 36      | 5         | 0       | 24        | 0       | 99        | 0       | 6         | 1       | 27        | 1       | 112       | 1       |
| 19,147500000 | 5,476800000  | 0        | 3 746   | 8 474   | 36      | 1         | 0       | 6         | 0       | 25        | 0       | 2         | 1       | 10        | 1       | 41        | 1       |
| 19,163800000 | 5,493100000  | 1        | 3 535   | 7 999   | 36      | 6         | 0       | 26        | 0       | 105       | 0       | 6         | 1       | 26        | 1       | 106       | 1       |
| 19,180100000 | 5,509400000  | 0        | 3 759   | 8 274   | 36      | 4         | 1       | 16        | 1       | 64        | 1       | 2         | 0       | 7         | 0       | 31        | 0       |
|              |              |          |         |         |         |           |         |           |         |           |         |           |         |           |         |           |         |
| 23,483300000 | 9,812600000  | 1        | 1 159   | 14 290  | 72      | 4         | 1       | 18        | 1       | 73        | 1       | 3         | 0       | 15        | 0       | 60        | 0       |
| 23,499600000 | 9,828900000  | 0        | 1 433   | 14 761  | 72      | 1         | 1       | 5         | 1       | 22        | 1       | 3         | 0       | 13        | 0       | 52        | 0       |
| 23,515900000 | 9,845200000  | 1        | 1 172   | 14 337  | 72      | 4         | 1       | 17        | 1       | 68        | 1       | 3         | 1       | 15        | 1       | 60        | 1       |
| 23,532200000 | 9,861500000  | 0        | 1 446   | 14 361  | 72      | 6         | 1       | 27        | 1       | 111       | 1       | 0         | 0       | 2         | 0       | 7         | 0       |
| 23,548500000 | 9,877800000  | 1        | 1 185   | 13 935  | 72      | 3         | 1       | 15        | 1       | 63        | 1       | 3         | 1       | 12        | 1       | 48        | 1       |
|              |              |          |         |         |         |           |         |           |         |           |         |           |         |           |         |           |         |
| 27,167100000 | 13,496400000 | 0        | 2 935   | 3 271   | 73      | 1         | 0       | 4         | 0       | 18        | 0       | 5         | 1       | 22        | 1       | 91        | 1       |
| 27,183400000 | 13,512700000 | 1        | 2 632   | 2 680   | 73      | 5         | 1       | 24        | 1       | 99        | 1       | 2         | 1       | 10        | 1       | 39        | 1       |
| 27,199700000 | 13,529000000 | 0        | 2 948   | 3 319   | 73      | 4         | 1       | 17        | 1       | 70        | 1       | 2         | 0       | 10        | 0       | 43        | 0       |
| 27,216000000 | 13,545300000 | 1        | 2 645   | 2 726   | 73      | 5         | 1       | 23        | 1       | 94        | 1       | 2         | 1       | 9         | 1       | 37        | 1       |
| 27,232300000 | 13,561600000 | 0        | 2 962   | 2 749   | 73      | 5         | 0       | 23        | 0       | 95        | 0       | 2         | 1       | 9         | 1       | 36        | 1       |
| 27,248600000 | 13,577900000 | 1        | 2 658   | 2 154   | 73      | 5         | 1       | 22        | 1       | 89        | 1       | 3         | 1       | 14        | 1       | 58        | 1       |
|              |              |          |         |         |         |           |         |           |         |           |         |           |         |           |         |           |         |
| 30,361900000 | 16,691200000 | 0        | 148     | 7 164   | 109     | 3         | 1       | 12        | 1       | 50        | 1       | 3         | 1       | 15        | 1       | 63        | 1       |
| 30,378200000 | 16,707500000 | 1        | 3 904   | 6 427   | 73      | 4         | 1       | 20        | 1       | 82        | 1       | 1         | 0       | 5         | 0       | 22        | 0       |
| 30,394500000 | 16,723800000 | 0        | 162     | 7 210   | 109     | 6         | 0       | 28        | 0       | 115       | 0       | 3         | 1       | 15        | 1       | 61        | 1       |
| 30,508600000 | 16,837900000 | 1        | 3 956   | 6 605   | 73      | 3         | 1       | 15        | 1       | 60        | 1       | 1         | 0       | 4         | 0       | 14        | 0       |
| 30,524900000 | 16,854200000 | 0        | 215     | 6 627   | 109     | 1         | 0       | 3         | 0       | 14        | 0       | 3         | 1       | 12        | 1       | 50        | 1       |
| 30,541200000 | 16,870500000 | 1        | 3 969   | 5 882   | 73      | 3         | 1       | 13        | 1       | 55        | 1       | 4         | 0       | 18        | 0       | 76        | 0       |
| 30,557500000 | 16,886800000 | 0        | 228     | 6 672   | 109     | 4         | 1       | 18        | 1       | 75        | 1       | 4         | 0       | 18        | 0       | 75        | 0       |
|              |              |          |         |         |         |           |         |           |         |           |         |           |         |           |         |           |         |
| 33,361100000 | 19,690400000 | 0        | 1 376   | 10 499  | 109     | 5         | 1       | 23        | 1       | 94        | 1       | 4         | 1       | 20        | 1       | 81        | 1       |
| 33,377400000 | 19,706700000 | 1        | 1 003   | 9 625   | 109     | 5         | 1       | 23        | 1       | 96        | 1       | 3         | 0       | 15        | 0       | 63        | 0       |
| 33,393700000 | 19,723000000 | 0        | 1 390   | 10 544  | 109     | 4         | 0       | 17        | 0       | 71        | 0       | 2         | 0       | 11        | 0       | 44        | 0       |
| 33,507800000 | 19,837100000 | 1        | 1 055   | 9 797   | 109     | 4         | 1       | 18        | 1       | 74        | 1       | 2         | 0       | 9         | 0       | 39        | 0       |

| latitude     | longitude    | cpr_type | lat_enc | lon_enc | pid_enc | lat4(1-3) | lat4(4) | lat6(1-5) | lat6(6) | lat8(1-7) | lat8(8) | lon4(1-3) | lon4(4) | lon6(1-5) | lon6(6) | lon8(1-7) | lon8(8) |
|--------------|--------------|----------|---------|---------|---------|-----------|---------|-----------|---------|-----------|---------|-----------|---------|-----------|---------|-----------|---------|
| 33,524100000 | 19,853400000 | 0        | 1 443   | 9 818   | 109     | 2         | 1       | 7         | 1       | 30        | 1       | 5         | 1       | 22        | 1       | 91        | 1       |
| 33,540400000 | 19,869700000 | 1        | 1 068   | 8 936   | 109     | 4         | 1       | 17        | 1       | 69        | 1       | 5         | 0       | 23        | 0       | 93        | 0       |
| 33,556700000 | 19,886000000 | 0        | 1 456   | 9 861   | 109     | 7         | 1       | 29        | 1       | 119       | 1       | 5         | 1       | 24        | 1       | 97        | 1       |
|              |              |          |         |         |         |           |         |           |         |           |         |           |         |           |         |           |         |
| 36,132100000 | 22,461400000 | 1        | 2 100   | 12 238  | 109     | 1         | 1       | 6         | 1       | 23        | 1       | 1         | 1       | 4         | 1       | 16        | 1       |
| 36,148400000 | 22,477700000 | 0        | 2 518   | 13 282  | 109     | 3         | 0       | 14        | 0       | 58        | 0       | 3         | 0       | 15        | 0       | 62        | 0       |
| 36,164700000 | 22,494000000 | 1        | 2 113   | 12 280  | 109     | 1         | 1       | 4         | 1       | 18        | 1       | 6         | 0       | 25        | 0       | 100       | 0       |
| 36,278800000 | 22,608100000 | 0        | 2 571   | 13 454  | 109     | 2         | 1       | 10        | 1       | 43        | 1       | 2         | 0       | 9         | 0       | 38        | 0       |
| 36,295100000 | 22,624400000 | 1        | 2 165   | 11 416  | 109     | 0         | 0       | 1         | 0       | 3         | 0       | 2         | 1       | 10        | 1       | 42        | 1       |
| 36,311400000 | 22,640700000 | 0        | 2 585   | 12 467  | 109     | 7         | 0       | 30        | 0       | 122       | 0       | 7         | 0       | 29        | 0       | 118       | 0       |
| 36,327700000 | 22,657000000 | 1        | 2 178   | 11 456  | 109     | 0         | 0       | 2         | 0       | 9         | 0       | 3         | 1       | 14        | 1       | 56        | 1       |
|              |              |          |         |         |         |           |         |           |         |           |         |           |         |           |         |           |         |
| 38,723800000 | 25,053100000 | 1        | 3 132   | 14 400  | 109     | 1         | 0       | 5         | 0       | 22        | 0       | 5         | 1       | 23        | 1       | 94        | 1       |
| 38,740100000 | 25,069400000 | 0        | 3 579   | 15 561  | 109     | 1         | 1       | 4         | 1       | 18        | 1       | 4         | 1       | 16        | 1       | 67        | 1       |
| 38,756400000 | 25,085700000 | 1        | 3 145   | 14 440  | 109     | 2         | 0       | 7         | 0       | 27        | 0       | 6         | 1       | 26        | 1       | 108       | 1       |
| 38,870500000 | 25,199800000 | 0        | 3 632   | 15 727  | 109     | 7         | 1       | 29        | 1       | 119       | 1       | 6         | 1       | 26        | 1       | 108       | 1       |
| 38,886800000 | 25,216100000 | 1        | 3 197   | 13 453  | 109     | 3         | 0       | 12        | 0       | 49        | 0       | 2         | 1       | 7         | 1       | 28        | 1       |
| 38,903100000 | 25,232400000 | 0        | 3 646   | 14 621  | 109     | 3         | 0       | 11        | 0       | 46        | 0       | 4         | 0       | 20        | 0       | 81        | 0       |
| 38,919400000 | 25,248700000 | 1        | 3 210   | 13 492  | 109     | 3         | 0       | 13        | 0       | 54        | 0       | 4         | 0       | 20        | 0       | 81        | 0       |
|              |              |          |         |         |         |           |         |           |         |           |         |           |         |           |         |           |         |
| 41,185100000 | 27,514400000 | 0        | 485     | 1 042   | 146     | 4         | 1       | 19        | 1       | 76        | 1       | 5         | 0       | 23        | 0       | 94        | 0       |
| 41,201400000 | 27,530700000 | 1        | 23      | 16 192  | 145     | 4         | 1       | 19        | 1       | 78        | 1       | 3         | 0       | 13        | 0       | 55        | 0       |
| 41,217700000 | 27,547000000 | 0        | 499     | 1 082   | 146     | 5         | 0       | 22        | 0       | 89        | 0       | 4         | 0       | 19        | 0       | 79        | 0       |
| 41,331800000 | 27,661100000 | 1        | 75      | 16 346  | 145     | 3         | 1       | 14        | 1       | 57        | 1       | 1         | 1       | 5         | 1       | 19        | 1       |
| 41,348100000 | 27,677400000 | 0        | 552     | 16 365  | 145     | 1         | 1       | 3         | 1       | 12        | 1       | 5         | 1       | 22        | 1       | 92        | 1       |
| 41,364400000 | 27,693700000 | 1        | 88      | 15 124  | 145     | 3         | 1       | 13        | 1       | 51        | 1       | 5         | 1       | 22        | 1       | 90        | 1       |
| 41,380700000 | 27,710000000 | 0        | 565     | 21      | 146     | 6         | 1       | 25        | 1       | 101       | 1       | 1         | 0       | 4         | 0       | 17        | 0       |
|              |              |          |         |         |         |           |         |           |         |           |         |           |         |           |         |           |         |
| 43,532300000 | 29,861600000 | 0        | 1 446   | 2 567   | 146     | 7         | 1       | 30        | 1       | 121       | 1       | 4         | 0       | 16        | 0       | 65        | 0       |
| 43,548600000 | 29,877900000 | 1        | 958     | 1 226   | 146     | 3         | 0       | 13        | 0       | 54        | 0       | 5         | 1       | 21        | 1       | 85        | 1       |
| 43,564900000 | 29,894200000 | 0        | 1 460   | 2 605   | 146     | 2         | 0       | 11        | 0       | 44        | 0       | 4         | 1       | 20        | 1       | 80        | 1       |
| 43,679000000 | 30,008300000 | 1        | 1 010   | 1 375   | 146     | 4         | 0       | 18        | 0       | 76        | 0       | 4         | 0       | 19        | 0       | 78        | 0       |
| 43,695300000 | 30,024600000 | 0        | 1 513   | 1 393   | 146     | 3         | 1       | 14        | 1       | 57        | 1       | 3         | 1       | 15        | 1       | 60        | 1       |
| 43,711600000 | 30,040900000 | 1        | 1 023   | 45      | 146     | 4         | 0       | 20        | 0       | 81        | 0       | 5         | 0       | 20        | 0       | 84        | 0       |
| 43,727900000 | 30,057200000 | 0        | 1 527   | 1 430   | 146     | 6         | 0       | 26        | 0       | 108       | 0       | 5         | 1       | 20        | 1       | 83        | 1       |
|              |              |          |         |         |         |           |         |           |         |           |         |           |         |           |         |           |         |
| 45,781700000 | 32,111000000 | 1        | 1 847   | 2 306   | 146     | 2         | 0       | 10        | 0       | 41        | 0       | 5         | 0       | 23        | 0       | 93        | 0       |
| 45,798000000 | 32,127300000 | 0        | 2 374   | 3 785   | 146     | 4         | 1       | 17        | 1       | 71        | 1       | 7         | 1       | 31        | 1       | 126       | 1       |
| 45,814300000 | 32,143600000 | 1        | 1 860   | 2 341   | 146     | 3         | 0       | 11        | 0       | 46        | 0       | 3         | 1       | 15        | 1       | 61        | 1       |
| 45,928400000 | 32,257700000 | 0        | 2 428   | 3 934   | 146     | 4         | 0       | 20        | 0       | 81        | 0       | 2         | 0       | 9         | 0       | 37        | 0       |
| 45,944700000 | 32,274000000 | 1        | 1 912   | 1 015   | 146     | 4         | 0       | 17        | 0       | 68        | 0       | 1         | 0       | 5         | 0       | 19        | 0       |
| 45,961000000 | 32,290300000 | 0        | 2 441   | 2 501   | 146     | 0         | 1       | 2         | 1       | 7         | 1       | 7         | 1       | 29        | 1       | 118       | 1       |
| 45,977300000 | 32,306600000 | 1        | 1 925   | 1 049   | 146     | 4         | 0       | 18        | 0       | 73        | 0       | 1         | 1       | 3         | 1       | 12        | 1       |
|              |              |          |         |         |         |           |         |           |         |           |         |           |         |           |         |           |         |
| 47,949600000 | 34,278900000 | 1        | 2 710   | 3 113   | 146     | 1         | 0       | 4         | 0       | 17        | 0       | 6         | 1       | 27        | 1       | 111       | 1       |
| 47,965900000 | 34,295200000 | 0        | 3 262   | 4 691   | 146     | 1         | 1       | 2         | 1       | 9         | 1       | 3         | 1       | 13        | 1       | 55        | 1       |
| 47,982200000 | 34,311500000 | 1        | 2 723   | 3 148   | 146     | 1         | 0       | 5         | 0       | 22        | 0       | 6         | 0       | 27        | 0       | 111       | 0       |
| 48,096300000 | 34,425600000 | 0        | 3 315   | 4 834   | 146     | 6         | 1       | 27        | 1       | 110       | 1       | 5         | 0       | 22        | 0       | 91        | 0       |
| 48,112600000 | 34,441900000 | 1        | 2 775   | 1 717   | 146     | 2         | 0       | 11        | 0       | 43        | 0       | 5         | 0       | 21        | 0       | 87        | 0       |

| latitude     | longitude    | cpr_type | lat_enc | lon_enc | pid_enc | lat4(1-3) | lat4(4) | lat6(1-5) | lat6(6) | lat8(1-7) | lat8(8) | lon4(1-3) | lon4(4) | lon6(1-5) | lon6(6) | lon8(1-7) | lon8(8) |
|--------------|--------------|----------|---------|---------|---------|-----------|---------|-----------|---------|-----------|---------|-----------|---------|-----------|---------|-----------|---------|
| 48,128900000 | 34,458200000 | 0        | 3 329   | 3 301   | 146     | 3         | 0       | 13        | 0       | 55        | 0       | 2         | 1       | 7         | 1       | 28        | 1       |
| 48,145200000 | 34,474500000 | 1        | 2 788   | 1 749   | 146     | 3         | 0       | 12        | 0       | 49        | 0       | 4         | 1       | 18        | 1       | 75        | 1       |

#### 7.4.3.1.3.2 CPR test value tolerances

The number of decimal places afforded to the decoded latitude and longitude values in the last eight columns of the table in clause 5.2.4.3.2.7 varies according to the resolution expected from the decoding algorithm (see table 7.6). When using the table in clause 5.2.4.3.2.7 to test the validity of an installed algorithm, the given decoded latitude and longitude values should be interpreted using the tolerances given in the last column of table 7.6.

**Table 7.6: CPR test value tolerances**

| Decoded Parameter | Total number of bits used to encode | Approximate max decoded error (degrees) | Number of decimal places given to decoded values | Tolerance to be given on decoded values during test of algorithm (degrees) |
|-------------------|-------------------------------------|---|--|--|
| Decoded lat       | 12                                  | $\pm 0,0012$                            | 4  | $\pm 0,0003$   |
| Decoded lon       | 14                                  | $\pm 0,0012^*$                          | 5  | $\pm 0,0003$   |
| Decoded 4-bit lat | 16                                  | $\pm 0,000076$                          | 6  | $\pm 0,00002$  |
| Decoded 4-bit lon | 18                                  | $\pm 0,000076^*$                        | 6  | $\pm 0,00002$  |
| Decoded 6-bit lat | 18                                  | $\pm 0,000019$                          | 6  | $\pm 0,000005$   |
| Decoded 6-bit lon | 20                                  | $\pm 0,000019^*$                        | 7  | $\pm 0,000005$   |
| Decoded 8-bit lat | 20                                  | $\pm 0,0000048$                         | 7  | $\pm 0,0000012$  |
| Decoded 8-bit lon | 22                                  | $\pm 0,0000048^*$                       | 7  | $\pm 0,0000012$  |

NOTE 1: The figures marked "\*" take into account that in the case of longitude the maximum error in the decoded value is up to four times greater at high latitudes.

NOTE 2: Since the figures given in the table in clause 7.4.3.1.5 are designed to be used to test the CPR algorithm, the decoded figures in the last eight columns of the table are given to more decimal places than the number of decimal places to which the decoded results may be relied upon for position reporting.

## 7.4.3.1.3.3 Key to CPR decoding table in following clause

**Table 7.7: Key to CPR decoding table in following clause**

| <b>Table heading</b> | <b>Description</b>   |
|----------------------|--|
| lat sut              | latitude of the station under test.  |
| lon sut              | longitude of the station under test.   |
| lat last             | input latitude from last position.   |
| lat prev             | input latitude from previous (last but one) position.                              |
| lon last             | input longitude from last position.  |
| lon prev             | input longitude from previous (last but one) position.                             |
| tl                   | input CPR type from last position.   |
| tp                   | input CPR type from previous (last but one) position.                              |
| tr                   | indicates 1 if the two points straddle a transition latitude (and 0 otherwise).    |
| i                    | initial state in CPR state machine.  |
| p                    | indicates 1 if a patch ID is available for decoding (and 0 otherwise).             |
| tim                  | time in s since last report received.  |
| o                    | indicates whether the receiver knows its own position.                             |
| op                   | state machine operation used (see Op field in tables in ED-108 Part 1 Appendix C). |
| cal                  | calculation determined by state machine operation.                                 |
| f                    | final state in CPR state machine.  |
| decoded lat          | decoded latitude without high resolution offset.                                   |
| decoded lon          | decoded longitude without high resolution offset.                                  |
| decoded 4-bit lat    | decoded latitude with 4-bit high resolution offset.                                |
| decoded 4-bit lon    | decoded longitude with 4-bit high resolution offset.                               |
| decoded 6-bit lat    | decoded latitude with 6-bit high resolution offset.                                |
| decoded 6-bit lon    | decoded longitude with 6-bit high resolution offset.                               |
| decoded 8-bit lat    | decoded latitude with 8-bit high resolution offset.                                |
| decoded 8-bit lon    | decoded longitude with 8-bit high resolution offset.                               |

## 7.4.3.1.3.4 Table of test values for CPR position report decoding CPR\_DEC\_TABLE (row, column) (CD(r, c))

(For the key to this table see clause 7.4.3.1.3.3.)

The encoding for the latitude and longitude values contained in the first four columns of the decoding table below is given in the encoding table in clause 5.2.4.3.2.4.

The decoding operation used in the table below is determined by the state machine tables in clauses 5.2.4.3.2.1 and 5.2.4.3.2.2, and referred to in this table using the column with heading "op". The time since a report was last received is indicated by the column headed "tim". When plotted, the decoded positions form a straight line in a north-easterly direction (allowing for the expected decoding errors), with gaps in the line corresponding to the missed reports. The position of the station under test is varied, since this must remain within plus or minus 300.5 NM of the received position for local decode to be carried out (which uses the position of the station under test as a reference).

**NOTE:** Although a ground station is expected to be capable of operation in a range of locations, it is recognized that variation of the position of the ground station as described in this test is unrealistic. A future version of the present document may contain a set of test values that do not require variation of the input of ground station's own position.



| lat<br>sut | lon<br>sut | lat<br>last  | lat<br>prev  | lon<br>last  | lon<br>prev  | tl | tp | tr | i | p | tim | o | op  | cal | f | decoded<br>lat | decoded<br>lon | decoded<br>4-bit lat | decoded<br>4-bit lon | decoded<br>6-bit lat | decoded<br>6-bit lon | decoded<br>8-bit lat | decoded<br>8-bit lon |
|------------|------------|--------------|--------------|--------------|--------------|----|----|----|---|---|-----|---|-----|-----|---|----------------|----------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| 15,1       | 1,5        | 15,121400000 | 15,088800000 | 1,450700000  | 1,418100000  | 1  | 1  | 0  | 3 | n | 20  | n | 3m  | NO  | 2 | NO CALC        | NO CALC        | NO CALC              | NO CALC              | NO CALC              | NO CALC              | NO CALC              | NO CALC              |
| 15,2       | 1,5        | 15,154000000 | 15,121400000 | 1,483300000  | 1,450700000  | 1  | 1  | 0  | 2 | n | 20  | y | 2j  | L1  | 3 | 15,1535        | 1,48358        | 15,154070            | 1,483292             | 15,154018            | 1,4832985            | 15,1539970           | 1,4832999            |
| 15,2       | 1,6        | 15,235500000 | 15,154000000 | 1,564800000  | 1,483300000  | 0  | 1  | 0  | 3 | n | 50  | n | 3g  | NO  | 2 | NO CALC        | NO CALC        | NO CALC              | NO CALC              | NO CALC              | NO CALC              | NO CALC              | NO CALC              |
| 15,3       | 1,6        | 15,268100000 | 15,235500000 | 1,597400000  | 1,564800000  | 0  | 0  | 0  | 2 | n | 20  | y | 2b  | L1  | 3 | 15,2674        | 1,59764        | 15,268097            | 1,597408             | 15,268108            | 1,5973991            | 15,2681011           | 1,5973997            |
| 15,3       | 1,7        | 15,349600000 | 15,268100000 | 1,678900000  | 1,597400000  | 1  | 0  | 0  | 3 | n | 50  | n | 3l  | NO  | 2 | NO CALC        | NO CALC        | NO CALC              | NO CALC              | NO CALC              | NO CALC              | NO CALC              | NO CALC              |
| 15,4       | 1,7        | 15,365900000 | 15,349600000 | 1,695200000  | 1,678900000  | 0  | 1  | 0  | 2 | n | 10  | n | 2f  | GL  | 4 | 15,3651        | 1,69523        | 15,365952            | 1,695183             | 15,365906            | 1,6951980            | 15,3658966           | 1,6951987            |
| 15,5       | 1,8        | 15,480000000 | 15,365900000 | 1,809300000  | 1,695200000  | 1  | 0  | 0  | 4 | n | 70  | n | 4u  | NO  | 2 | NO CALC        | NO CALC        | NO CALC              | NO CALC              | NO CALC              | NO CALC              | NO CALC              | NO CALC              |
| 15,5       | 1,8        | 15,496300000 | 15,480000000 | 1,825600000  | 1,809300000  | 0  | 1  | 0  | 2 | n | 10  | y | 2c  | GL  | 4 | 15,4969        | 1,82578        | 15,496250            | 1,825596             | 15,496317            | 1,8256035            | 15,4963033           | 1,8256000            |
| 15,6       | 1,9        | 15,610400000 | 15,496300000 | 1,939700000  | 1,825600000  | 1  | 0  | 0  | 4 | n | 70  | y | 4p  | L1  | 3 | 15,6107        | 1,93970        | 15,610316            | 1,939705             | 15,610391            | 1,9397047            | 15,6103982           | 1,9396994            |
| 15,6       | 2,0        | 15,626700000 | 15,610400000 | 1,956000000  | 1,939700000  | 0  | 1  | 0  | 3 | n | 10  | n | 3f  | GL  | 4 | 15,6264        | 1,95569        | 15,626722            | 1,956009             | 15,626689            | 1,9559985            | 15,6267005           | 1,9559987            |
| 15,7       | 2,1        | 15,740800000 | 15,626700000 | 2,070100000  | 1,956000000  | 1  | 0  | 0  | 4 | n | 70  | n | 4u  | NO  | 2 | NO CALC        | NO CALC        | NO CALC              | NO CALC              | NO CALC              | NO CALC              | NO CALC              | NO CALC              |
| 15,8       | 2,1        | 15,757100000 | 15,740800000 | 2,086400000  | 2,070100000  | 0  | 1  | 0  | 2 | y | 10  | n | 2a  | GP  | 4 | 15,7582        | 2,08624        | 15,757021            | 2,086422             | 15,757100            | 2,0864040            | 15,7570977           | 2,0864000            |
| 15,9       | 2,2        | 15,871200000 | 15,757100000 | 2,200500000  | 2,086400000  | 1  | 0  | 0  | 4 | n | 70  | y | 4p  | L1  | 3 | 15,8719        | 2,20073        | 15,871182            | 2,200491             | 15,871211            | 2,2005036            | 15,8711974           | 2,2005011            |
| 15,9       | 2,2        | 15,887500000 | 15,871200000 | 2,216800000  | 2,200500000  | 0  | 1  | 0  | 3 | y | 10  | n | 3a  | GP  | 4 | 15,8877        | 2,21679        | 15,887493            | 2,216789             | 15,887510            | 2,2167990            | 15,8875044           | 2,2167987            |
| 15,9       | 2,2        | 15,903800000 | 15,887500000 | 2,233100000  | 2,216800000  | 1  | 0  | 0  | 4 | y | 10  | n | 4a  | GP  | 4 | 15,9046        | 2,23336        | 15,903835            | 2,233119             | 15,903783            | 2,2330994            | 15,9038010           | 2,2331003            |
| 15,9       | 2,2        | 15,920100000 | 15,903800000 | 2,249400000  | 2,233100000  | 0  | 1  | 0  | 4 | n | 10  | n | 4i  | GL  | 4 | 15,9194        | 2,24910        | 15,920112            | 2,249380             | 15,920084            | 2,2493951            | 15,9200965           | 2,2494010            |
| 19,1       | 5,4        | 19,098600000 | -            | 5,427900000  | -            | 1  | -  | -  | 1 | n | -   | n | 1e  | NO  | 2 | NO CALC        | NO CALC        | NO CALC              | NO CALC              | NO CALC              | NO CALC              | NO CALC              | NO CALC              |
| 19,1       | 5,4        | 19,114900000 | 19,098600000 | 5,444200000  | 5,427900000  | 0  | 1  | 0  | 2 | n | 10  | n | 2f  | GL  | 4 | 19,1160        | 5,44438        | 19,114949            | 5,444196             | 19,114892            | 5,4442038            | 19,1148991           | 5,4442004            |
| 19,1       | 5,5        | 19,131200000 | 19,114900000 | 5,460500000  | 5,444200000  | 1  | 0  | 0  | 4 | n | 10  | n | 4q  | GL  | 4 | 19,1322        | 5,46021        | 19,131285            | 5,460491             | 19,131210            | 5,4604954            | 19,1312031           | 5,4604990            |
| 19,1       | 5,5        | 19,147500000 | 19,131200000 | 5,476800000  | 5,460500000  | 0  | 1  | 0  | 4 | n | 10  | n | 4i  | GL  | 4 | 19,1477        | 5,47670        | 19,147567            | 5,476788             | 19,147505            | 5,4768000            | 19,1475008           | 5,4768000            |
| 19,2       | 5,5        | 19,163800000 | 19,147500000 | 5,493100000  | 5,476800000  | 1  | 0  | 1  | 4 | n | 10  | n | 4zb | L2  | 4 | 19,1648        | 5,49281        | 19,163759            | 5,493107             | 19,163782            | 5,4931006            | 19,1637968           | 5,4930992            |
| 19,2       | 5,5        | 19,180100000 | 19,163800000 | 5,509400000  | 5,493100000  | 0  | 1  | 0  | 4 | n | 10  | n | 4i  | GL  | 4 | 19,1795        | 5,50948        | 19,180185            | 5,509385             | 19,180117            | 5,5094053            | 19,1801025           | 5,5093992            |
| 23,5       | 9,8        | 23,483300000 | -            | 9,812600000  | -            | 1  | -  | -  | 1 | n | -   | y | 1d  | L1  | 3 | 23,4826        | 9,81276        | 23,483292            | 9,812616             | 23,483304            | 9,8125971            | 23,4832965           | 9,8126010            |
| 23,5       | 9,8        | 23,499600000 | 23,483300000 | 9,828900000  | 9,812600000  | 0  | 1  | 0  | 3 | n | 10  | y | 3c  | GL  | 4 | 23,4994        | 9,82904        | 23,499564            | 9,828893             | 23,499586            | 9,8288960            | 23,4996010           | 9,8288993            |
| 23,5       | 9,8        | 23,515900000 | 23,499600000 | 9,845200000  | 9,828900000  | 1  | 0  | 0  | 4 | n | 10  | y | 4l  | GL  | 4 | 23,5152        | 9,84504        | 23,515945            | 9,845185             | 23,515916            | 9,8452037            | 23,5159001           | 9,8451997            |
| 23,5       | 9,9        | 23,532200000 | 23,515900000 | 9,861500000  | 9,845200000  | 0  | 1  | 1  | 4 | n | 10  | y | 4v  | L2  | 4 | 23,5311        | 9,86152        | 23,532182            | 9,861518             | 23,532199            | 9,8614959            | 23,5322027           | 9,8614991            |
| 23,5       | 9,9        | 23,548500000 | 23,532200000 | 9,877800000  | 9,861500000  | 1  | 0  | 0  | 4 | n | 10  | y | 4l  | GL  | 4 | 23,5479        | 9,87767        | 23,548419            | 9,877818             | 23,548488            | 9,8778035            | 23,5485037           | 9,8778002            |
| 27,2       | 13,5       | 27,167100000 | -            | 13,496400000 | -            | 0  | -  | -  | 1 | n | -   | y | 1b  | L1  | 3 | 27,1673        | 13,49615       | 27,167103            | 13,496400            | 27,167120            | 13,4963982           | 27,1671041           | 13,4964006           |
| 27,2       | 13,5       | 27,183400000 | 27,167100000 | 13,512700000 | 13,496400000 | 1  | 0  | 0  | 3 | n | 10  | y | 3h  | GL  | 4 | 27,1824        | 13,51259       | 27,183315            | 13,512692            | 27,183390            | 13,5127051           | 27,1833966           | 13,5126996           |
| 27,2       | 13,5       | 27,199700000 | 27,183400000 | 13,529000000 | 13,512700000 | 0  | 1  | 0  | 4 | n | 10  | n | 4i  | GL  | 4 | 27,1990        | 13,52912       | 27,199721            | 13,529017            | 27,199693            | 13,5290048           | 27,1996962           | 13,5289993           |
| 27,2       | 13,5       | 27,216000000 | 27,199700000 | 13,545300000 | 13,529000000 | 1  | 0  | 0  | 4 | n | 10  | n | 4q  | GL  | 4 | 27,2151        | 13,54520       | 27,215968            | 13,545299            | 27,216002            | 13,5453002           | 27,2160002           | 13,5453006           |
| 27,2       | 13,6       | 27,232300000 | 27,216000000 | 13,561600000 | 13,545300000 | 0  | 1  | 1  | 4 | n | 10  | n | 4x  | L2  | 4 | 27,2332        | 13,56150       | 27,232339            | 13,561602            | 27,232305            | 13,5616035           | 27,2322979           | 13,5616011           |
| 27,2       | 13,6       | 27,248600000 | 27,232300000 | 13,577900000 | 13,561600000 | 1  | 0  | 0  | 4 | n | 10  | n | 4q  | GL  | 4 | 27,2477        | 13,57773       | 27,248621            | 13,577890            | 27,248615            | 13,5778984           | 27,2486038           | 13,5779003           |
| 30,4       | 16,7       | 30,361900000 | -            | 16,691200000 | -            | 0  | -  | -  | 1 | n | -   | y | 1b  | L1  | 3 | 30,3614        | 16,69102       | 30,361940            | 16,691175            | 30,361889            | 16,6911946           | 30,3618971           | 16,6911990           |
| 30,4       | 16,7       | 30,378200000 | 30,361900000 | 16,707500000 | 16,691200000 | 1  | 0  | 0  | 3 | n | 10  | y | 3h  | GL  | 4 | 30,3774        | 16,70756       | 30,378112            | 16,707510            | 30,378204            | 16,7075036           | 30,3782049           | 16,7074993           |
| 30,4       | 16,7       | 30,394500000 | 30,378200000 | 16,723800000 | 16,707500000 | 0  | 1  | 0  | 4 | n | 10  | y | 4d  | GL  | 4 | 30,3956        | 16,72363       | 30,394558            | 16,723782            | 30,394502            | 16,7238012           | 30,3944988           | 16,7238000           |
| 30,5       | 16,8       | 30,508600000 | 30,394500000 | 16,837900000 | 16,723800000 | 1  | 0  | 0  | 4 | n | 70  | n | 4u  | NO  | 2 | NO CALC        | NO CALC        | NO CALC              | NO CALC              | NO CALC              | NO CALC              | NO CALC              | NO CALC              |
| 30,5       | 16,9       | 30,524900000 | 30,508600000 | 16,854200000 | 16,837900000 | 0  | 1  | 1  | 2 | n | 10  | n | 2o  | NO  | 2 | NO CALC        | NO CALC        | NO CALC              | NO CALC              | NO CALC              | NO CALC              | NO CALC              | NO CALC              |
| 30,5       | 16,9       | 30,541200000 | 30,524900000 | 16,870500000 | 16,854200000 | 1  | 0  | 0  | 2 | n | 10  | n | 2k  | GL  | 4 | 30,5407        | 16,87073       | 30,541198            | 16,870509            | 30,541186            | 16,8705060           | 30,5412032           | 16,8704992           |
| 30,6       | 16,9       | 30,557500000 | 30,541200000 | 16,886800000 | 16,870500000 | 0  | 1  | 0  | 4 | n | 10  | n | 4i  | GL  | 4 | 30,5568        | 16,88702       | 30,557474            | 16,886808            | 30,557486            | 16,8868044           | 30,5574976           | 16,8868008           |
| 33,4       | 19,7       | 33,361100000 | -            | 19,690400000 | -            | 0  | -  | -  | 1 | y | -   | y | 1a  | GP  | 4 | 33,3602        | 19,69017       | 33,361068            | 19,690376            | 33,361101            | 19,6904029           | 33,3610991           | 19,6904002           |
| 33,4       | 19,7       | 33,377400000 | 33,361100000 | 19,706700000 | 19,690400000 | 1  | 0  | 0  | 4 | n | 10  | y | 4l  | GL  | 4 | 33,3765        | 19,70689       | 33,377349            | 19,706725            | 33,377384            | 19,7067038           | 33,3774015           | 19,7066991           |
| 33,4       | 19,7       | 33,393700000 | 33,377400000 | 19,723000000 | 19,706700000 | 0  | 1  | 0  | 4 | n | 10  | y | 4d  | GL  | 4 | 33,3944        | 19,72313       | 33,393686            | 19,723023            | 33,393714            | 19,7229977           | 33,3937008           | 19,7230007           |

| lat<br>sut | lon<br>sut | lat<br>last  | lat<br>prev  | lon<br>last  | lon<br>prev  | tl | tp | tr | i | p | tim | o | op | cal | f | decoded<br>lat | decoded<br>lon | decoded<br>4-bit lat | decoded<br>4-bit lon | decoded<br>6-bit lat | decoded<br>6-bit lon | decoded<br>8-bit lat | decoded<br>8-bit lon |         |
|------------|------------|--------------|--------------|--------------|--------------|----|----|----|---|---|-----|---|----|-----|---|----------------|----------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|---------|
| 33,5       | 19,8       | 33,507800000 | 33,393700000 | 19,837100000 | 19,723000000 | 1  | 0  | 0  | 4 | n | 70  | y | 4p | L1  | 3 | 33,5071        | 19,83722       | 33,507782            | 19,837107            | 33,507794            | 19,8371056           | 33,5077961           | 19,8370993           |         |
| 33,5       | 19,9       | 33,524100000 | 33,507800000 | 19,853400000 | 19,837100000 | 0  | 1  | 1  | 3 | n | 10  | y | 3n | L1  | 3 | 33,5238        | 19,85313       | 33,524158            | 19,853398            | 33,524085            | 19,8533967           | 33,5240979           | 19,8533993           |         |
| 33,5       | 19,9       | 33,540400000 | 33,524100000 | 19,869700000 | 19,853400000 | 1  | 0  | 0  | 3 | n | 10  | y | 3h | GL  | 4 | 33,5397        | 19,86999       | 33,540435            | 19,869707            | 33,540406            | 19,8696961           | 33,5403998           | 19,8696998           |         |
| 33,6       | 19,9       | 33,556700000 | 33,540400000 | 19,886000000 | 19,869700000 | 0  | 1  | 0  | 4 | n | 10  | y | 4d | GL  | 4 | 33,5556        | 19,88571       | 33,556777            | 19,885981            | 33,556698            | 19,8860033           | 33,5566996           | 19,8859993           |         |
| 36,1       | 22,5       | 36,132100000 | -            | 22,461400000 | -            | 1  | -  | -  | 1 | y | -   | y | 1a | GP  | 4 | 36,1319        | 22,46135       | 36,132048            | 22,461405            | 36,132111            | 22,4613999           | 36,1320956           | 22,4613987           |         |
| 36,1       | 22,5       | 36,148400000 | 36,132100000 | 22,477700000 | 22,461400000 | 0  | 1  | 0  | 4 | n | 10  | y | 4d | GL  | 4 | 36,1490        | 22,47788       | 36,148439            | 22,477722            | 36,148411            | 22,4777006           | 36,1484045           | 22,4776990           |         |
| 36,2       | 22,5       | 36,164700000 | 36,148400000 | 22,494000000 | 22,477700000 | 1  | 0  | 0  | 4 | n | 10  | y | 4l | GL  | 4 | 36,1645        | 22,49431       | 36,164701            | 22,493974            | 36,164683            | 22,4939939           | 36,1646992           | 22,4940013           |         |
| 36,3       | 22,6       | 36,278800000 | 36,164700000 | 22,608100000 | 22,494000000 | 0  | 1  | 0  | 4 | n | 70  | y | 4f | L1  | 3 | 36,2784        | 22,60821       | 36,278737            | 22,608104            | 36,278782            | 22,6081025           | 36,2788017           | 22,6080991           |         |
| 36,3       | 22,6       | 36,295100000 | 36,278800000 | 22,624400000 | 22,608100000 | 1  | 0  | 1  | 3 | n | 10  | n | 3q | NO  | 2 | NO CALC        | NO CALC        | NO CALC              | NO CALC              | NO CALC              | NO CALC              | NO CALC              | NO CALC              | NO CALC |
| 36,3       | 22,6       | 36,311400000 | 36,295100000 | 22,640700000 | 22,624400000 | 0  | 1  | 0  | 2 | n | 10  | n | 2f | GL  | 4 | 36,3126        | 22,64107       | 36,311355            | 22,640673            | 36,311395            | 22,6406981           | 36,3114034           | 22,6407006           |         |
| 36,3       | 22,7       | 36,327700000 | 36,311400000 | 22,657000000 | 22,640700000 | 1  | 0  | 0  | 4 | n | 10  | n | 4q | GL  | 4 | 36,3278        | 22,65682       | 36,327786            | 22,656993            | 36,327705            | 22,6570028           | 36,3276975           | 22,6569985           |         |
| 38,7       | 25,1       | 38,723800000 | -            | 25,053100000 | -            | 1  | -  | -  | 1 | y | -   | n | 1a | GP  | 4 | 38,7240        | 25,05280       | 38,723839            | 25,053089            | 38,723816            | 25,0531005           | 38,7238013           | 25,0530998           |         |
| 38,7       | 25,1       | 38,740100000 | 38,723800000 | 25,069400000 | 25,053100000 | 0  | 1  | 0  | 4 | n | 10  | n | 4i | GL  | 4 | 38,7399        | 25,06919       | 38,740101            | 25,069416            | 38,740084            | 25,0693945           | 38,7400998           | 25,0693989           |         |
| 38,8       | 25,1       | 38,756400000 | 38,740100000 | 25,085700000 | 25,069400000 | 1  | 0  | 0  | 4 | n | 10  | n | 4q | GL  | 4 | 38,7567        | 25,08535       | 38,756313            | 25,085701            | 38,756388            | 25,0856940           | 38,7564049           | 25,0856988           |         |
| 38,9       | 25,2       | 38,870500000 | 38,756400000 | 25,199800000 | 25,085700000 | 0  | 1  | 0  | 4 | n | 70  | n | 4k | NO  | 2 | NO CALC        | NO CALC        | NO CALC              | NO CALC              | NO CALC              | NO CALC              | NO CALC              | NO CALC              | NO CALC |
| 38,9       | 25,2       | 38,886800000 | 38,870500000 | 25,216100000 | 25,199800000 | 1  | 0  | 1  | 2 | n | 10  | y | 2p | L1  | 3 | 38,8873        | 25,21601       | 38,886746            | 25,216128            | 38,886798            | 25,2161026           | 38,8867996           | 25,2161004           |         |
| 38,9       | 25,2       | 38,903100000 | 38,886800000 | 25,232400000 | 25,216100000 | 0  | 1  | 0  | 3 | n | 10  | y | 3c | GL  | 4 | 38,9035        | 25,23266       | 38,903018            | 25,232427            | 38,903108            | 25,2323973           | 38,9030987           | 25,2324003           |         |
| 38,9       | 25,2       | 38,919400000 | 38,903100000 | 25,248700000 | 25,232400000 | 1  | 0  | 0  | 4 | n | 10  | y | 4l | GL  | 4 | 38,9199        | 25,24897       | 38,919399            | 25,248727            | 38,919411            | 25,2486956           | 38,9194032           | 25,2486987           |         |
| 41,2       | 27,5       | 41,185100000 | -            | 27,514400000 | -            | 0  | -  | -  | 1 | n | -   | y | 1b | L1  | 3 | 41,1844        | 27,51470       | 41,185069            | 27,514410            | 41,185120            | 27,5143983           | 41,1851019           | 27,5143990           |         |
| 41,2       | 27,5       | 41,201400000 | 41,185100000 | 27,530700000 | 27,514400000 | 1  | 0  | 0  | 3 | n | 10  | y | 3h | GL  | 4 | 41,2006        | 27,53088       | 41,201346            | 27,530702            | 41,201398            | 27,5307061           | 41,2013993           | 27,5307003           |         |
| 41,2       | 27,5       | 41,217700000 | 41,201400000 | 27,547000000 | 27,530700000 | 0  | 1  | 0  | 4 | n | 10  | y | 4d | GL  | 4 | 41,2186        | 27,54725       | 41,217687            | 27,547022            | 41,217693            | 27,5470049           | 41,2177036           | 27,5470011           |         |
| 41,3       | 27,7       | 41,331800000 | 41,217700000 | 27,661100000 | 27,547000000 | 1  | 0  | 0  | 4 | n | 70  | y | 4p | L1  | 3 | 41,3312        | 27,66104       | 41,331778            | 27,661097            | 41,331807            | 27,6611052           | 41,3318039           | 27,6611002           |         |
| 41,3       | 27,7       | 41,348100000 | 41,331800000 | 27,677400000 | 27,661100000 | 0  | 1  | 1  | 3 | n | 10  | n | 3o | NO  | 2 | NO CALC        | NO CALC        | NO CALC              | NO CALC              | NO CALC              | NO CALC              | NO CALC              | NO CALC              | NO CALC |
| 41,4       | 27,7       | 41,364400000 | 41,348100000 | 27,693700000 | 27,677400000 | 1  | 0  | 0  | 2 | n | 10  | n | 2k | GL  | 4 | 41,3639        | 27,69339       | 41,364431            | 27,693703            | 41,364420            | 27,6937014           | 41,3643976           | 27,6937009           |         |
| 41,4       | 27,7       | 41,380700000 | 41,364400000 | 27,710000000 | 27,693700000 | 0  | 1  | 0  | 4 | n | 10  | n | 4i | GL  | 4 | 41,3797        | 27,71006       | 41,380778            | 27,709996            | 41,380716            | 27,7100014           | 41,3807024           | 27,7099994           |         |
| 43,5       | 29,9       | 43,532300000 | -            | 29,861600000 | -            | 0  | -  | -  | 1 | y | -   | y | 1a | GP  | 4 | 43,5311        | 29,86182       | 43,532357            | 29,861576            | 43,532317            | 29,8615993           | 43,5322988           | 29,8616011           |         |
| 43,5       | 29,9       | 43,548600000 | 43,532300000 | 29,877900000 | 29,861600000 | 1  | 0  | 0  | 4 | n | 10  | y | 4l | GL  | 4 | 43,5491        | 29,87760       | 43,548598            | 29,877919            | 43,548610            | 29,8779025           | 43,5486026           | 29,8778990           |         |
| 43,6       | 29,9       | 43,564900000 | 43,548600000 | 29,894200000 | 29,877900000 | 0  | 1  | 0  | 4 | n | 10  | y | 4d | GL  | 4 | 43,5653        | 29,89393       | 43,564975            | 29,894175            | 43,564890            | 29,8942058           | 43,5649005           | 29,8941994           |         |
| 43,7       | 30,0       | 43,679000000 | 43,564900000 | 30,008300000 | 29,894200000 | 1  | 0  | 0  | 4 | n | 70  | n | 4u | NO  | 2 | NO CALC        | NO CALC        | NO CALC              | NO CALC              | NO CALC              | NO CALC              | NO CALC              | NO CALC              | NO CALC |
| 43,7       | 30,0       | 43,695300000 | 43,679000000 | 30,024600000 | 30,008300000 | 0  | 1  | 1  | 2 | n | 10  | y | 2n | L1  | 3 | 43,6947        | 30,02439       | 43,695273            | 30,024579            | 43,695301            | 30,0246038           | 43,6952977           | 30,0245988           |         |
| 43,7       | 30,0       | 43,711600000 | 43,695300000 | 30,040900000 | 30,024600000 | 1  | 0  | 0  | 3 | n | 10  | y | 3h | GL  | 4 | 43,7124        | 30,04120       | 43,711684            | 30,040874            | 43,711592            | 30,0409059           | 43,7116009           | 30,0408985           |         |
| 43,7       | 30,1       | 43,727900000 | 43,711600000 | 30,057200000 | 30,040900000 | 0  | 1  | 0  | 4 | n | 10  | y | 4d | GL  | 4 | 43,7289        | 30,05691       | 43,727891            | 30,057227            | 43,727914            | 30,0571962           | 43,7278994           | 30,0571999           |         |
| 45,8       | 32,1       | 45,781700000 | -            | 32,111000000 | -            | 1  | -  | -  | 1 | y | -   | y | 1a | GP  | 4 | 45,7821        | 32,11133       | 45,781745            | 32,111008            | 45,781698            | 32,1109953           | 45,7816982           | 32,1109997           |         |
| 45,8       | 32,1       | 45,798000000 | 45,781700000 | 32,127300000 | 32,111000000 | 0  | 1  | 0  | 4 | n | 10  | y | 4d | GL  | 4 | 45,7973        | 32,12686       | 45,798012            | 32,127303            | 45,797983            | 32,1273027           | 45,7979964           | 32,1272992           |         |
| 45,8       | 32,1       | 45,814300000 | 45,798000000 | 32,143600000 | 32,127300000 | 1  | 0  | 0  | 4 | n | 10  | y | 4l | GL  | 4 | 45,8148        | 32,14338       | 45,814218            | 32,143577            | 45,814311            | 32,1436018           | 45,8143018           | 32,1436002           |         |
| 45,9       | 32,3       | 45,928400000 | 45,814300000 | 32,257700000 | 32,143600000 | 0  | 1  | 0  | 4 | n | 70  | n | 4k | NO  | 2 | NO CALC        | NO CALC        | NO CALC              | NO CALC              | NO CALC              | NO CALC              | NO CALC              | NO CALC              | NO CALC |
| 45,9       | 32,3       | 45,944700000 | 45,928400000 | 32,274000000 | 32,257700000 | 1  | 0  | 1  | 2 | n | 10  | n | 2q | NO  | 2 | NO CALC        | NO CALC        | NO CALC              | NO CALC              | NO CALC              | NO CALC              | NO CALC              | NO CALC              | NO CALC |
| 46,0       | 32,3       | 45,961000000 | 45,944700000 | 32,290300000 | 32,274000000 | 0  | 1  | 0  | 2 | n | 10  | n | 2f | GL  | 4 | 45,9609        | 32,28987       | 45,960928            | 32,290331            | 45,961007            | 32,2903019           | 45,9609953           | 32,2902990           |         |
| 46,0       | 32,3       | 45,977300000 | 45,961000000 | 32,306600000 | 32,290300000 | 1  | 0  | 0  | 4 | n | 10  | n | 4q | GL  | 4 | 45,9780        | 32,30655       | 45,977304            | 32,306621            | 45,977293            | 32,3065994           | 45,9773001           | 32,3065983           |         |



| lat<br>sut | lon<br>sut | lat<br>last  | lat<br>prev  | lon<br>last  | lon<br>prev  | tl | tp | tr | i | p | tim | o | op | cal | f | decoded<br>lat | decoded<br>lon | decoded<br>4-bit lat | decoded<br>4-bit lon | decoded<br>6-bit lat | decoded<br>6-bit lon | decoded<br>8-bit lat | decoded<br>8-bit lon |
|------------|------------|--------------|--------------|--------------|--------------|----|----|----|---|---|-----|---|----|-----|---|----------------|----------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| 47,9       | 34,3       | 47,949600000 | -            | 34,278900000 | -            | 1  | -  | -  | 1 | y | -   | n | 1a | GP  | 4 | 47,9498        | 34,27848       | 47,949585            | 34,278890            | 47,949602            | 34,2788967           | 47,9495964           | 34,2788981           |
| 48,0       | 34,3       | 47,965900000 | 47,949600000 | 34,295200000 | 34,278900000 | 0  | 1  | 0  | 4 | n | 10  | n | 4i | GL  | 4 | 47,9658        | 34,29500       | 47,965986            | 34,295197            | 47,965891            | 34,2951929           | 47,9658985           | 34,2951992           |
| 48,0       | 34,3       | 47,982200000 | 47,965900000 | 34,311500000 | 34,295200000 | 1  | 0  | 0  | 4 | n | 10  | n | 4q | GL  | 4 | 47,9824        | 34,31192       | 47,982238            | 34,311510            | 47,982215            | 34,3115032           | 47,9822000           | 34,3115018           |
| 48,1       | 34,4       | 48,096300000 | 47,982200000 | 34,425600000 | 34,311500000 | 0  | 1  | 0  | 4 | n | 70  | y | 4f | L1  | 3 | 48,0952        | 34,42593       | 48,096285            | 34,425602            | 48,096302            | 34,4256044           | 48,0962957           | 34,4256013           |
| 48,1       | 34,4       | 48,112600000 | 48,096300000 | 34,441900000 | 34,425600000 | 1  | 0  | 1  | 3 | n | 10  | y | 3p | L1  | 3 | 48,1130        | 34,44224       | 48,112671            | 34,441887            | 48,112584            | 34,4419050           | 48,1126046           | 34,4419012           |
| 48,1       | 34,5       | 48,128900000 | 48,112600000 | 34,458200000 | 34,441900000 | 0  | 1  | 0  | 3 | n | 10  | y | 3c | GL  | 4 | 48,1294        | 34,45809       | 48,128903            | 34,458231            | 48,128914            | 34,4582020           | 48,1288973           | 34,4581995           |
| 48,1       | 34,5       | 48,145200000 | 48,128900000 | 34,474500000 | 34,458200000 | 1  | 0  | 0  | 4 | n | 10  | y | 4l | GL  | 4 | 48,1457        | 34,47421       | 48,145145            | 34,474491            | 48,145197            | 34,4744955           | 48,1451983           | 34,4745005           |

#### 7.4.3.1.4 Tables of values for use in content checking test cases

**Table 7.9: Values for use in the test "ADSB\_DOS\_A"**

|  | ADSB_DOS_APPIN_PARAMETERS(x)            |                                     |   |                                     | ADSB_DOS_RF_OUT_PARAMETERS(x) |                |                |                 |
|--|---|-------------------------------------|---|-------------------------------------|-------------------------------|----------------|----------------|-----------------|
|  | Set P<br>(middle range)                 | Set Q<br>(min)                      | Set R<br>(max)                          | Set S<br>(zero)                     | Set P<br>(middle<br>range)    | Set Q<br>(min) | Set R<br>(max) | Set S<br>(zero) |
| s  | add_A                                   | add_A                               | add_A                                   | add_A                               | add_A                         | add_A          | add_A          | add_A           |
| Entry number (ent)                           | 1 DOS message                           | 1 DOS message                       | 1 DOS message                           | 1 DOS message                       | 1                             | 1              | 1              | 1               |
| Additional service<br>information (ai) Bit 1 | si field included                       | si field not included               | si field included                       | si field not included               | 1                             | 0              | 1              | 0               |
| Additional service<br>information (ai) Bit 2 | anum field included                     | anum field not<br>included          | anum field included                     | anum field not<br>included          | 1                             | 0              | 1              | 0               |
| Additional service<br>information (ai) Bit 3 | application (a)<br>subfield not present | application (a)<br>subfield present | application (a)<br>subfield not present | application (a)<br>subfield present | 0                             | 1              | 0              | 1               |
| GSC flag (gsc)                               | Channel is a GSC                        | Channel is a GSC                    | Channel is a GSC                        | Channel is a GSC                    | 1                             | 1              | 1              | 1               |
| Service information<br>(si)                  |   | NOT TRANSMITTED                     |   | NOT TRANSMITTED                     |                               |                |                |                 |
| Application number<br>(anum)                 | Zero application fields<br>present      | NOT TRANSMITTED                     | Zero application fields<br>present      | NOT TRANSMITTED                     | 0                             |                | 0              |                 |

Table 7.10: Values for use in the test "ADSB\_Channel\_A"

|                                    | ADSB_CHANNEL_APPIN_PARAMETERS(x)  |  |   |   | ADSB_CHANNEL_RF_OUT_PARAMETERS(x) |                                 |                                 |                                 |
|------------------------------------|---|--|---|---|-----------------------------------|---------------------------------|---------------------------------|---------------------------------|
|                                    | Set P<br>(middle range)   | Set Q<br>(min)   | Set R<br>(max)  | Set S<br>(zero)   | Set P<br>(middle range)           | Set Q<br>(min)                  | Set R<br>(max)                  | Set S<br>(zero)                 |
| s                                  | add_A   | add_A  | add_A   | add_A   | add_A                             | add_A                           | add_A                           | add_A                           |
| Directed timeout (dt)              | 5 planned future transmissions reserved in slots spaced M1 slots apart                  | 1 planned future transmissions reserved in slots spaced M1 slots apart   | 14 planned future transmissions reserved in slots spaced M1 slots apart                 | 0 planned future transmissions reserved in slots spaced M1 slots apart                        | 5                                 | 1                               | 14                              | 0                               |
| Directed offset (do)               | Directed a slot reservation, transmit in slot 100                                       | Directed a slot reservation, transmit in slot 2                          | Directed a slot reservation, transmit in slot 4 095                                     | Directed rate reservation   | 100                               | 2                               | 4 095                           | 0                               |
| Destination Count (dc)             | 1 octet in destination block  | 1 octet in destination block   | 1 octet in destination block  | Destination block absent: Channel management message applies to all stations (i.e. broadcast) | 1                                 | 1                               | 1                               | 0                               |
| Command set ID (csid)              | 1 command per aircraft  | 1 command per aircraft   | 1 command per aircraft  | cancel all previous commands  | 0                                 | 0                               | 0                               | 15                              |
| transmission definition count (tc) | 1 element in transmission definition block  | 1 element in transmission definition block                               | 1 element in transmission definition block  | 1 element in transmission definition block  | 1                                 | 1                               | 1                               | 1                               |
| frequency count (fc)               | 1 element in the frequency block  | 1 element in the frequency block   | 1 element in the frequency block  | 1 element in the frequency block  | 1                                 | 1                               | 1                               | 1                               |
| script duration type (styp)        | Interpret script rate (sr) as the number of times the entire script repeats per minute. | Interpret script rate (sr) as the number of minutes until script repeats | Interpret script rate (sr) as the number of times the entire script repeats per minute. | Interpret script rate (sr) as the number of minutes until script repeats                      | 0                                 | 1                               | 0                               | 1                               |
| script rate (sr)                   | 8 transmissions per minute  | 2 minutes between a transmission   | 60 transmissions per minute   | 15 minutes between a transmission   | 6                                 | 0                               | 13                              | 13                              |
| transmit parameter count (ps)      | 1 octet in the transmit parameter block   | 1 octet in the transmit parameter block                                  | 1 octet in the transmit parameter block   | 1 octet in the transmit parameter block   | 1                                 | 1                               | 1                               | 1                               |
| script count (sc)                  | 1 octet in script block   | 1 octet in script block  | 1 octet in script block   | 1 octet in script block   | 0                                 | 0                               | 0                               | 0                               |
| ido                                | 0 individual offset   | 1 individual offset  | 2 individual offset   | 1 individual offset   | 0                                 | 1                               | 2                               | 1                               |
| d                                  | 0000 10 101 010 00 00 0000 0001   | 0000 10 101 010 00 00 0000 0010  | 0000 10 101 010 00 00 0000 0011   | 0000 10 101 010 00 00 0000 0010   | 0000 10 101 010 00 00 0000 0001   | 0000 10 101 010 00 00 0000 0010 | 0000 10 101 010 00 00 0000 0011 | 0000 10 101 010 00 00 0000 0010 |
| destination address (d) bit 25     | Aircraft  | Aircraft   | Mobile  | Aircraft  | 0                                 | 0                               | 0                               | 0                               |
| destination address (d) bit 26     |   |  |   |   | 0                                 | 0                               | 0                               |                                 |

| ADSB_CHANNEL_APPIN_PARAMETERS(x)                        |   |   |   |   | ADSB_CHANNEL_RF_OUT_PARAMETERS(x) |                |                |                 |
|---|---|---|---|---|-----------------------------------|----------------|----------------|-----------------|
|   | Set P<br>(middle range)                                 | Set Q<br>(min)  | Set R<br>(max)  | Set S<br>(zero)   | Set P<br>(middle range)           | Set Q<br>(min) | Set R<br>(max) | Set S<br>(zero) |
| destination address<br>(d) bit 27                       |   |   |   |   | 1                                 | 1              | 0              |                 |
| sleep   | No sleep mode   | No sleep mode   | No sleep mode   | No sleep mode   | 0                                 | 0              | 0              | 0               |
| auto  | Autonomously select<br>transmitted<br>information field | Autonomously select<br>transmitted<br>information field | Autonomously select<br>transmitted<br>information field | Autonomously select<br>transmitted<br>information field | 0                                 | 0              | 0              | 0               |
| Must receive (rcv)                                      | Reception on this<br>specific frequency is<br>mandatory | Reception on this<br>specific frequency is<br>mandatory | Reception on this<br>specific frequency is<br>mandatory | Reception on this<br>specific frequency is<br>optional  | 1                                 | 1              | 1              | 0               |
| Frequency (f)   | 108 MHz   | 108,025 MHz   | 135,075 MHz   | 128,025 MHz   | 1                                 | 2              | 1 083          | 801             |
| Frequency (f) bit 12                                    | VHF band<br>108 MHz to<br>136,975 MHz                   | VHF band<br>108 MHz to<br>136,975 MHz                   | VHF band<br>108 MHz to<br>136,975 MHz                   | VHF band<br>108 MHz to<br>136,975 MHz                   | 0                                 | 0              | 0              | 0               |
| Slot selection range<br>constraint for level 1<br>(Q2a) | 150   | 0   | 1 000   | 0   | 150                               | 0              | 1 000          | 0               |
| Slot selection range<br>constraint for level 2<br>(Q2b) | 150   | 0   | 1 000   | 0   | 150                               | 0              | 1 000          | 0               |
| Slot selection range<br>constraint for level 3<br>(Q2c) | 0   | 0   | 1 000   | 0   | 0                                 | 0              | 1 000          | 0               |
| Slot selection range<br>constraint for level 4<br>(Q2d) | 300   | 0   | 1 000   | 0   | 300                               | 0              | 1 000          | 0               |
| Priority (Q1)   | 11  | 0   | 15  | 0   | 11                                | 0              | 15             | 0               |
| No of available slots<br>(Q4)                           | 3   | 1   | 20  | 1   | 3                                 | 1              | 20             | 1               |
| Reservation hold<br>timer minimum value<br>(TV11min)    | 4   | 0   | 15  | 0   | 4                                 | 0              | 15             | 0               |
| Reservation hold<br>timer minimum value<br>(TV11max)    | 8   | 1   | 16  | 1   | 8                                 | 1              | 16             | 1               |
| Number of ground<br>quarantined slots<br>(V11)          | 4   | 0   | 15  | 0   | 0                                 | 4              | 15             | 0               |
| Minimum CCI<br>performance (VS2)                        | 12  | 60  | 12  | 12  | 0                                 | 0              | 48             | 0               |

| ADSB_CHANNEL_APPIN_PARAMETERS(x)    |  |  |  |  | ADSB_CHANNEL_RF_OUT_PARAMETERS(x) |                |                |                 |
|-------------------------------------|--|--|--|--|-----------------------------------|----------------|----------------|-----------------|
|                                     | Set P<br>(middle range)  | Set Q<br>(min)   | Set R<br>(max)   | Set S<br>(zero)  | Set P<br>(middle range)           | Set Q<br>(min) | Set R<br>(max) | Set S<br>(zero) |
| Quarantine slot reuse range (VS4)   | 300  | 0  | 1 000  | 0  | 30                                | 0              | 100            | 0               |
| Frequency index (frq)               | First element in frequency block   | First element in frequency block   | First element in frequency block   | First element in frequency block   | 0                                 | 0              | 0              | 0               |
| Transmission definition index (txd) | Sync burst with baro altitude, no sleep parameters, basic variable field baro alt rate | Sync burst with geo altitude, no sleep parameters, basic variable field geo alt rate | Sync burst with baro altitude, no sleep parameters, basic variable field baro alt rate | Sync burst with geo altitude, no sleep parameters, basic variable field geo alt rate | 0                                 | 1              | 0              | 1               |
| nsd                                 | txd indicates offset from beginning of transmission definition list                    | txd indicates offset from beginning of transmission definition list                  | txd indicates offset from beginning of transmission definition list                    | txd indicates offset from beginning of transmission definition list                  | 1                                 | 1              | 1              | 1               |

Table 7.11: Values for use in the test "ADSB\_Channel\_D"

| ADSB_CHANNEL_D_APPIN_PARAMETERS(x) |   |   |   |   | ADSB_CHANNEL_D_RF_OUT_PARAMETERS(x) |                |                |                 |
|------------------------------------|---|---|---|---|-------------------------------------|----------------|----------------|-----------------|
|                                    | Set P<br>(middle range)   | Set Q<br>(min)  | Set R<br>(max)  | Set S<br>(zero)   | Set P<br>(middle range)             | Set Q<br>(min) | Set R<br>(max) | Set S<br>(zero) |
| s                                  | add_A   | add_A   | add_A   | add_A   | add_A                               | add_A          | add_A          | add_A           |
| Directed timeout (dt)              | 5 planned future transmissions reserved in slots spaced M1 slots apart                        | 1 planned future transmissions reserved in slots spaced M1 slots apart                        | 14 planned future transmissions reserved in slots spaced M1 slots apart                       | 0 planned future transmissions reserved in slots spaced M1 slots apart                        | 5                                   | 1              | 14             | 0               |
| Directed offset (do)               | Directed a slot reservation, transmit in slot 100   | Directed a slot reservation, transmit in slot 2   | Directed a slot reservation, transmit in slot 4 095   | Directed rate reservation   | 100                                 | 2              | 4 095          | 0               |
| Destination Count (dc)             | Destination block absent: Channel management message applies to all stations (i.e. broadcast) | Destination block absent: Channel management message applies to all stations (i.e. broadcast) | Destination block absent: Channel management message applies to all stations (i.e. broadcast) | Destination block absent: Channel management message applies to all stations (i.e. broadcast) | 0                                   | 0              | 0              | 0               |
| Command set ID (csid)              | 1 command per aircraft  | 1 command per aircraft  | 1 command per aircraft  | cancel all previous commands  | 0                                   | 0              | 0              | 15              |
| transmission definition count (tc) | transmission block absent   | transmission block absent   | transmission block absent   | transmission block absent   | 0                                   | 0              | 0              | 0               |
| frequency count (fc)               | 1 element in the frequency block  | 1 element in the frequency block  | 1 element in the frequency block  | No frequency listed   | 1                                   | 1              | 1              | 0               |

| ADSB_CHANNEL_D_APPIN_PARAMETERS(x)                |   |  |   |  | ADSB_CHANNEL_D_RF_OUT_PARAMETERS(x) |                |                |                 |
|---|---|--|---|--|-------------------------------------|----------------|----------------|-----------------|
|   | Set P<br>(middle range)   | Set Q<br>(min)   | Set R<br>(max)  | Set S<br>(zero)  | Set P<br>(middle range)             | Set Q<br>(min) | Set R<br>(max) | Set S<br>(zero) |
| script duration type (styp)                       | Interpret script rate (sr) as the number of times the entire script repeats per minute. | Interpret script rate (sr) as the number of minutes until script repeats | Interpret script rate (sr) as the number of times the entire script repeats per minute. | Interpret script rate (sr) as the number of minutes until script repeats | 0                                   | 1              | 0              | 1               |
| script rate (sr)                                  | 8 transmissions per minute  | 2 minutes between a transmission   | 60 transmissions per minute   | 15 minutes between a transmission  | 6                                   | 0              | 13             | 13              |
| transmit parameter count (ps)                     | 1 octet in the transmit parameter block   | 1 octet in the transmit parameter block                                  | 1 octet in the transmit parameter block   | 1 octet in the transmit parameter block                                  | 1                                   | 1              | 1              | 1               |
| script count (sc)                                 | 1 octet in script block   | 1 octet in script block  | 1 octet in script block   | 1 octet in script block  | 0                                   | 0              | 0              | 0               |
| vertex count (vc)                                 | 2 vertices  | 2 vertices   | 2 vertices  | 2 vertices   | 1                                   | 1              | 1              | 1               |
| centre latitude (lat, lat4)                       | As encoded in test CPR_Encode   | As encoded in test CPR_Encode  | As encoded in test CPR_Encode   | As encoded in test CPR_Encode  |                                     |                |                |                 |
| centre longitude (lon,lon4)                       | As encoded in test CPR_Encode   | As encoded in test CPR_Encode  | As encoded in test CPR_Encode   | As encoded in test CPR_Encode  |                                     |                |                |                 |
| lower altitude (lalt)                             | -1 500 ft   | -1 500 ft  | 1 000 feet  | 0 feet   | 0                                   | 0              | 10             | 6               |
| upper altitude (ualt)                             | 50 000 ft   | 1 000 ft   | no upper limit  | 1 000 ft   | 206                                 | 10             | 255            | 10              |
| vertex 1 radial 1 (r1)                            | 10 degrees clockwise from north   | 20 degrees clockwise from north  | 30 degrees clockwise from north   | 40 degrees clockwise from north  | 7                                   | 14             | 21             | 28              |
| vertex 1 distance 1 (d1)                          | < 60 NM   | < 0,5 NM   | < 660 NM  | < 62 NM  | 90                                  | 0              | 255            | 91              |
| vertex 2 radial 2 (r2)                            | 20 degrees clockwise from north   | 30 degrees clockwise from north  | 40 degrees clockwise from north   | 50 degrees clockwise from north  | 14                                  | 21             | 28             | 35              |
| vertex 2 distance 2 (d2)                          | < 60 NM   | < 0,5 NM   | < 660 NM  | < 62 NM  | 90                                  | 0              | 255            | 91              |
| sleep   | No sleep mode   | No sleep mode  | No sleep mode   | No sleep mode  | 0                                   | 0              | 0              | 0               |
| auto  | Autonomously select transmitted information field                                       | Autonomously select transmitted information field                        | Autonomously select transmitted information field                                       | Autonomously select transmitted information field                        | 0                                   | 0              | 0              | 0               |
| Must receive (rcv)                                | Reception on this specific frequency is mandatory                                       | Reception on this specific frequency is mandatory                        | Reception on this specific frequency is mandatory                                       | Reception on this specific frequency is optional                         | 1                                   | 1              | 1              | 0               |
| Frequency (f)                                     | 108 MHz   | 108,025 MHz  | 135,075 MHz   | 128,025 MHz  | 1                                   | 2              | 1 083          | 801             |
| Frequency (f) bit 12                              | VHF band 108 MHz to 136,975 MHz   | VHF band 108 MHz to 136,975 MHz  | VHF band 108 MHz to 136,975 MHz   | VHF band 108 MHz to 136,975 MHz  | 0                                   | 0              | 0              | 0               |
| Slot selection range constraint for level 1 (Q2a) | 150   | 0  | 1 000   | 0  | 150                                 | 0              | 1 000          | 0               |
| Slot selection range constraint for level 2       | 150   | 0  | 1 000   | 0  | 150                                 | 0              | 1 000          | 0               |

| ADSB_CHANNEL_D_APPIN_PARAMETERS(x)                      |  |  |  |  | ADSB_CHANNEL_D_RF_OUT_PARAMETERS(x) |                |                |                 |
|---|--|--|--|--|-------------------------------------|----------------|----------------|-----------------|
|   | Set P<br>(middle range)  | Set Q<br>(min)   | Set R<br>(max)   | Set S<br>(zero)  | Set P<br>(middle<br>range)          | Set Q<br>(min) | Set R<br>(max) | Set S<br>(zero) |
| (Q2b)   |  |  |  |  |                                     |                |                |                 |
| Slot selection range<br>constraint for level 3<br>(Q2c) | 0  | 0  | 1 000  | 0  | 0                                   | 0              | 1 000          | 0               |
| Slot selection range<br>constraint for level 4<br>(Q2d) | 300  | 0  | 1 000  | 0  | 300                                 | 0              | 1 000          | 0               |
| Priority (Q1)   | 11   | 0  | 15   | 0  | 11                                  | 0              | 15             | 0               |
| No of available slots<br>(Q4)                           | 3  | 1  | 20   | 1  | 3                                   | 1              | 20             | 1               |
| Reservation hold<br>timer minimum value<br>(TV11min)    | 4  | 0  | 15   | 0  | 4                                   | 0              | 15             | 0               |
| Reservation hold<br>timer minimum value<br>(TV11max)    | 8  | 1  | 16   | 1  | 8                                   | 1              | 16             | 1               |
| Number of ground<br>quarantined slots<br>(V11)          | 4  | 0  | 15   | 0  | 0                                   | 4              | 15             | 0               |
| Minimum CCI<br>performance (VS2)                        | 12   | 60   | 12   | 12   | 0                                   | 0              | 48             | 0               |
| Quarantine slot reuse<br>range (VS4)                    | 300  | 0  | 1 000  | 0  | 30                                  | 0              | 100            | 0               |
| Frequency index (frq)                                   | First element in<br>frequency block  | First element in<br>frequency block  | First element in<br>frequency block  | First element in<br>frequency block  | 0                                   | 0              | 0              | 0               |
| Transmission<br>definition index (txd)                  | Sync burst with baro<br>altitude, no sleep<br>parameters, basic<br>variable field baro alt<br>rate | Sync burst with geo<br>altitude, no sleep<br>parameters, basic<br>variable field geo alt<br>rate | Sync burst with baro<br>altitude, no sleep<br>parameters, basic<br>variable field baro alt<br>rate | Sync burst with geo<br>altitude, no sleep<br>parameters, basic<br>variable field geo alt<br>rate | 0                                   | 1              | 0              | 1               |
| nsd   | txd encoded as<br>defined in table 3.34  | txd encoded as<br>defined in table 3.34  | txd encoded as<br>defined in table 3.34  | txd encoded as<br>defined in table 3.34  | 0                                   | 0              | 0              | 0               |

Table 7.12: Values for use in the test "ADSB\_Basic\_Ground\_A"

| ADSB_BASIC_GROUND_APPIN_PARAMETERS(x)                               |                                  |                                  |                                  |                                  | ADSB_BASIC_GROUND_RF_OUT_PARAMETERS(x) |                                  |                                  |                                  |
|---|----------------------------------|----------------------------------|----------------------------------|----------------------------------|--|----------------------------------|----------------------------------|----------------------------------|
|   | Set P<br>(middle range)          | Set Q<br>(min)                   | Set R<br>(max)                   | Set S<br>(zero)                  | Set P<br>(middle range)                | Set Q<br>(min)                   | Set R<br>(max)                   | Set S<br>(zero)                  |
| s   | add_A                            | add_A                            | add_A                            | add_A                            | add_A                                  | add_A                            | add_A                            | add_A                            |
| h   | 5am                              | 1am                              | 11pm                             | midnight                         | 5                                      | 1                                | 23                               | 0                                |
| min   | 27 minutes                       | 1 minute                         | 59 minutes                       | 0 minutes                        | 27                                     | 1                                | 59                               | 0                                |
| pid   | As encoded in test<br>CPR_Encode | As encoded in test<br>CPR_Encode | As encoded in test<br>CPR_Encode | As encoded in test<br>CPR_Encode | As encoded in test<br>CPR_Encode       | As encoded in test<br>CPR_Encode | As encoded in test<br>CPR_Encode | As encoded in test<br>CPR_Encode |
| bgo   | 4 000 ft                         | -2 000 ft                        | -5 000 ft                        | 7 200 ft                         | 123                                    | 3                                | 2                                | 124                              |
| slt   | slot 50                          | slot 2                           | slot 256                         | first slot in s frame            | 49                                     | 1                                | 255                              | 0                                |
| lat4  | As encoded in test<br>CPR_Encode | As encoded in test<br>CPR_Encode | As encoded in test<br>CPR_Encode | As encoded in test<br>CPR_Encode | As encoded in test<br>CPR_Encode       | As encoded in test<br>CPR_Encode | As encoded in test<br>CPR_Encode | As encoded in test<br>CPR_Encode |
| lon4  | As encoded in test<br>CPR_Encode | As encoded in test<br>CPR_Encode | As encoded in test<br>CPR_Encode | As encoded in test<br>CPR_Encode | As encoded in test<br>CPR_Encode       | As encoded in test<br>CPR_Encode | As encoded in test<br>CPR_Encode | As encoded in test<br>CPR_Encode |
| Assumed altitude to<br>calculate baro/geo<br>offset (bgo) from (ft) | 20 000 feet                      | 20 000 feet                      | 30 000 feet                      | 30 000 feet                      | N/A                                    | N/A                              | N/A                              | N/A                              |

Table 7.13: Values for use in the test "ADSB.UTC\_Time\_A"

| ADSB.UTC_TIME_APPIN_PARAMETERS(x) |                                  |                                  |                                  |                                  | ADSB.UTC_TIME_RF_OUT_PARAMETERS(x) |                                  |                                  |                                  |
|-----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|------------------------------------|----------------------------------|----------------------------------|----------------------------------|
|                                   | Set P<br>(middle range)          | Set Q<br>(min)                   | Set R<br>(max)                   | Set S<br>(zero)                  | Set P<br>(middle range)            | Set Q<br>(min)                   | Set R<br>(max)                   | Set S<br>(zero)                  |
| s                                 | add_A                            | add_A                            | add_A                            | add_A                            | add_A                              | add_A                            | add_A                            | add_A                            |
| day                               | day 6                            | day 1                            | day 31                           | day 1                            | 6                                  | 1                                | 31                               | 1                                |
| year                              | 2 003                            | 2 004                            | 2 003                            | 2 005                            | 33                                 | 34                               | 33                               | 35                               |
| h                                 | 5am                              | 1am                              | 11pm                             | midnight                         | 5                                  | 1                                | 23                               | 0                                |
| min                               | 27 minutes                       | 1 minute                         | 59 minutes                       | 0 minutes                        | 27                                 | 1                                | 59                               | 0                                |
| slt                               | slot 50                          | slot 2                           | slot 256                         | first slot in s frame            | 49                                 | 1                                | 255                              | 0                                |
| lat4                              | As encoded in test<br>CPR_Encode | As encoded in test<br>CPR_Encode | As encoded in test<br>CPR_Encode | As encoded in test<br>CPR_Encode | As encoded in test<br>CPR_Encode   | As encoded in test<br>CPR_Encode | As encoded in test<br>CPR_Encode | As encoded in test<br>CPR_Encode |
| lon4                              | As encoded in test<br>CPR_Encode | As encoded in test<br>CPR_Encode | As encoded in test<br>CPR_Encode | As encoded in test<br>CPR_Encode | As encoded in test<br>CPR_Encode   | As encoded in test<br>CPR_Encode | As encoded in test<br>CPR_Encode | As encoded in test<br>CPR_Encode |
| sec                               | 25 s                             | 0 s                              | 60 s                             | 0 s                              | 25 s                               | 0 s                              | 60 s                             | 0 s                              |



Table 7.14: Values for use in the test "ADSB\_Basic\_Rec\_A"

|   | ADSB_BASIC_RF_IN_PARAMETERS(x) |                               |                               |                               | ADSB_BASIC_APOUT_PARAMETERS(x)  |   |   |   |
|---|--------------------------------|-------------------------------|-------------------------------|-------------------------------|---|---|---|---|
|   | Set P<br>(middle<br>range)     | Set Q<br>(min)                | Set R<br>(max)                | Set S<br>(zero)               | Set P<br>(middle range)   | Set Q<br>(min)  | Set R<br>(max)  | Set S<br>(zero)   |
| s   | add_B                          | add_B                         | add_B                         | add_B                         | add_B   | add_B   | add_B   | add_B   |
| sil   | 0                              | 1                             | 2                             | 3                             | Probability of exceeding the R <sub>c</sub> integrity containment radius without detection: unknown | Probability of exceeding the R <sub>c</sub> integrity containment radius without detection: 1 × 10 <sup>-3</sup> per flight hour or per operation | Probability of exceeding the R <sub>c</sub> integrity containment radius without detection: 1 × 10 <sup>-5</sup> per flight hour or per operation | Probability of exceeding the R <sub>c</sub> integrity containment radius without detection: 1 × 10 <sup>-7</sup> per flight hour or per operation |
| lat6  | As encoded in test CPR_Decode  | As encoded in test CPR_Decode | As encoded in test CPR_Decode | As encoded in test CPR_Decode | As encoded in test CPR_Decode   | As encoded in test CPR_Decode   | As encoded in test CPR_Decode   | As encoded in test CPR_Decode   |
| br/gr   | 0                              | 0                             | 0                             | 1                             | Barometric altitude rate  | Barometric altitude rate  | Barometric altitude rate  | Geometric altitude rate   |
| lon6  | As encoded in test CPR_Decode  | As encoded in test CPR_Decode | As encoded in test CPR_Decode | As encoded in test CPR_Decode | As encoded in test CPR_Decode   | As encoded in test CPR_Decode   | As encoded in test CPR_Decode   | As encoded in test CPR_Decode   |
| altr bit 9  | 0                              | 0                             | 1                             | 1                             | Climbing  | Climbing  | Descending  | Descending  |
| altr bits 1 to 8  | 201                            | 1                             | 255                           | 0                             | 20 000 fpm  | 0 fpm   | 32 000 fpm  | Unknown   |
| bgo   | 123                            | 3                             | 2                             | 124                           | 4 000 ft  | -2 000 ft   | -5 000 ft   | 7 200 ft  |
| gs  | 1 023                          | 1                             | 2 047                         | 0                             | 1 022   | 0   | 3 069   | unknown   |
| gt  | 290                            | 0                             | 2 042                         | 0                             | 51 degrees  | 0 degree (north)  | 359 degrees   | 0 degree (north)  |
| Assumed altitude to calculate baro/geo offset (bgo) from (ft) | N/A                            | N/A                           | N/A                           | N/A                           | 20 000 feet   | 20 000 feet   | 30 000 feet   | 30 000 feet   |

Table 7.15: Values for use in the test "ADSB\_High\_Dynamic\_Rec\_A"

| ADSB_HIGH_DYNAMIC_RF_IN_PARAMETERS(x)                               |                                     |                                     |                                     |                                     | ADSB_HIGH_DYNAMIC_APPOUT_PARAMETERS(x)  |   |   |   |
|---|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|---|---|---|---|
|   | Set P<br>(middle<br>range)          | Set Q<br>(min)                      | Set R<br>(max)                      | Set S<br>(zero)                     | Set P<br>(middle range)   | Set Q<br>(min)  | Set R<br>(max)  | Set S<br>(zero)   |
| s   | add_B                               | add_B                               | add_B                               | add_B                               | add_B   | add_B   | add_B   | add_B   |
| lat4  | As encoded<br>in test<br>CPR_Encode | As encoded in<br>test<br>CPR_Encode | As encoded<br>in test<br>CPR_Encode | As encoded<br>in test<br>CPR_Encode | As encoded in<br>test<br>CPR_Encode   | As encoded in test<br>CPR_Encode  | As encoded in test<br>CPR_Encode  | As encoded in test<br>CPR_Encode  |
| br/gr   | 0                                   | 0                                   | 0                                   | 1                                   | Barometric<br>altitude rate   | Barometric altitude<br>rate   | Barometric altitude<br>rate   | Geometric altitude rate   |
| lon4  | As encoded<br>in test<br>CPR_Encode | As encoded in<br>test<br>CPR_Encode | As encoded<br>in test<br>CPR_Encode | As encoded<br>in test<br>CPR_Encode | As encoded in<br>test<br>CPR_Encode   | As encoded in test<br>CPR_Encode  | As encoded in test<br>CPR_Encode  | As encoded in test<br>CPR_Encode  |
| altr bit 9  | 0                                   | 0                                   | 1                                   | 1                                   | Climbing  | Climbing  | Descending  | Descending  |
| altr bits 1 to 8  | 201                                 | 1                                   | 255                                 | 0                                   | 20 000 fpm  | 0 fpm   | 32 000 fpm  | Unknown   |
| sil   | 0                                   | 1                                   | 2                                   | 3                                   | Probability of<br>exceeding the<br>R <sub>C</sub> integrity<br>containment<br>radius without<br>detection:<br>unknown | Probability of<br>exceeding the R <sub>C</sub><br>integrity containment<br>radius without<br>detection: 1 × 10 <sup>-3</sup> per<br>flight hour or per<br>operation | Probability of<br>exceeding the R <sub>C</sub><br>integrity containment<br>radius without<br>detection: 1 × 10 <sup>-5</sup> per<br>flight hour or per<br>operation | Probability of<br>exceeding the R <sub>C</sub><br>integrity containment<br>radius without<br>detection: 1 × 10 <sup>-7</sup> per<br>flight hour or per<br>operation |
| bgo   | 123                                 | 3                                   | 2                                   | 124                                 | 4 000 ft  | -2 000 ft   | -5 000 ft   | 7 200 ft  |
| gs  | 1 023                               | 1                                   | 2 047                               | 0                                   | 1 022   | 0   | 3 069   | unknown   |
| gt  | 580                                 | 0                                   | 4 085                               | 0                                   | 51 degrees  | 0 degree (north)  | 359 degrees   | 0 degree (north)  |
| Assumed altitude to<br>calculate baro/geo<br>offset (bgo) from (ft) | N/A                                 | N/A                                 | N/A                                 | N/A                                 | 20 000 feet   | 20 000 feet   | 30 000 feet   | 30 000 feet   |

Table 7.16: Values for use in the test "ADSB\_Full\_Position\_Rec\_A"

| ADSB_FULL_POSITION_RF_IN_PARAMETERS(x)                                 |                                     |                                     |                                     |                                     | ADSB_FULL_POSITION_APOUT_PARAMETERS(x)  |   |   |   |
|--|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|---|---|---|---|
|  | Set P<br>(middle<br>range)          | Set Q<br>(min)                      | Set R<br>(max)                      | Set S<br>(zero)                     | Set P<br>(middle range)   | Set Q<br>(min)  | Set R<br>(max)  | Set S<br>(zero)   |
| s  | add_B                               | add_B                               | add_B                               | add_B                               | add_B   | add_B   | add_B   | add_B   |
| lat6   | As decoded<br>in test<br>CPR_Decode | As decoded<br>in test<br>CPR_Decode | As decoded in<br>test<br>CPR_Decode | As decoded<br>in test<br>CPR_Decode | As decoded in test<br>CPR_Decode  | As decoded in test<br>CPR_Decode  | As decoded in test<br>CPR_Decode  | As decoded in test<br>CPR_Decode  |
| pid  | As decoded<br>in test<br>CPR_Decode | As decoded<br>in test<br>CPR_Decode | As decoded in<br>test<br>CPR_Decode | As decoded<br>in test<br>CPR_Decode | As decoded in test<br>CPR_Decode  | As decoded in test<br>CPR_Decode  | As decoded in test<br>CPR_Decode  | As decoded in test<br>CPR_Decode  |
| lon6   | As decoded<br>in test<br>CPR_Decode | As decoded<br>in test<br>CPR_Decode | As decoded in<br>test<br>CPR_Decode | As decoded<br>in test<br>CPR_Decode | As decoded in test<br>CPR_Decode  | As decoded in test<br>CPR_Decode  | As decoded in test<br>CPR_Decode  | As decoded in test<br>CPR_Decode  |
| bgo  | 123                                 | 3                                   | 2                                   | 124                                 | 4 000 ft  | -2 000 ft   | -5 000 ft   | 7 200 ft  |
| sil  | 0                                   | 1                                   | 2                                   | 3                                   | Probability of<br>exceeding the R <sub>c</sub><br>integrity<br>containment<br>radius without<br>detection:<br>unknown | Probability of<br>exceeding the R <sub>c</sub><br>integrity containment<br>radius without<br>detection: 1 × 10 <sup>-3</sup> per<br>flight hour or per<br>operation | Probability of<br>exceeding the R <sub>c</sub><br>integrity containment<br>radius without<br>detection: 1 × 10 <sup>-5</sup> per<br>flight hour or per<br>operation | Probability of<br>exceeding the R <sub>c</sub><br>integrity containment<br>radius without<br>detection: 1 × 10 <sup>-7</sup> per<br>flight hour or per<br>operation |
| gs   | 1 023                               | 1                                   | 2 047                               | 0                                   | 1 022   | 0   | 3 069   | unknown   |
| gt   | 290                                 | 0                                   | 2 042                               | 0                                   | 51 degrees  | 0 degree (north)  | 359 degrees   | 0 degree (north)  |
| Assumed altitude<br>to calculate<br>baro/geo offset<br>(bgo) from (ft) | N/A                                 | N/A                                 | N/A                                 | N/A                                 | 20 000 feet   | 20 000 feet   | 30 000 feet   | 30 000 feet   |

Table 7.17: Values for use in the test "ADSB\_Two\_Slot\_TCP/SVQ\_Rec\_A"

| ADSB_TWO_SLOT_TCP/SVQ_RF_IN_PARAMETERS(x) |                               |                               |                               |                               | ADSB_TWO_SLOT_TCP/SVQ_APPOUT_PARAMETERS(x) |                               |                               |                               |
|---|-------------------------------|-------------------------------|-------------------------------|-------------------------------|--|-------------------------------|-------------------------------|-------------------------------|
|   | Set P<br>(middle range)       | Set Q<br>(min)                | Set R<br>(max)                | Set S<br>(zero)               | Set P<br>(middle range)                    | Set Q<br>(min)                | Set R<br>(max)                | Set S<br>(zero)               |
| s   | add_B                         | add_B                         | add_B                         | add_B                         | add_B                                      | add_B                         | add_B                         | add_B                         |
| lat                                       | As encoded in test CPR_Encode | As encoded in test CPR_Encode | As encoded in test CPR_Encode | As encoded in test CPR_Encode | As encoded in test CPR_Encode              | As encoded in test CPR_Encode | As encoded in test CPR_Encode | As encoded in test CPR_Encode |
| balt                                      | 936                           | 2                             | 4 072                         | 132                           | 8 025 feet                                 | -1 300 feet                   | 130 000 feet                  | 0 feet                        |
| lon                                       | As encoded in test CPR_Encode | As encoded in test CPR_Encode | As encoded in test CPR_Encode | As encoded in test CPR_Encode | As encoded in test CPR_Encode              | As encoded in test CPR_Encode | As encoded in test CPR_Encode | As encoded in test CPR_Encode |
| ttg                                       | 3                             | 0                             | 62                            | 0                             | 0,5 minutes                                | 0 minute                      | 15,25 minutes                 | 0 minute                      |
| lat                                       | As encoded in test CPR_Encode | As encoded in test CPR_Encode | As encoded in test CPR_Encode | As encoded in test CPR_Encode | As encoded in test CPR_Encode              | As encoded in test CPR_Encode | As encoded in test CPR_Encode | As encoded in test CPR_Encode |
| balt                                      | 936                           | 2                             | 4 072                         | 132                           | 8 025 feet                                 | -1 300 feet                   | 130 000 feet                  | 0 feet                        |
| lon                                       | As encoded in test CPR_Encode | As encoded in test CPR_Encode | As encoded in test CPR_Encode | As encoded in test CPR_Encode | As encoded in test CPR_Encode              | As encoded in test CPR_Encode | As encoded in test CPR_Encode | As encoded in test CPR_Encode |
| ttg                                       | 4                             | 0                             | 62                            | 0                             | 0,75 minutes                               | 0 minute                      | 15,25 minutes                 | 0 minute                      |
| lat                                       | As encoded in test CPR_Encode | As encoded in test CPR_Encode | As encoded in test CPR_Encode | As encoded in test CPR_Encode | As encoded in test CPR_Encode              | As encoded in test CPR_Encode | As encoded in test CPR_Encode | As encoded in test CPR_Encode |
| balt                                      | 936                           | 2                             | 4 072                         | 132                           | 8 025 feet                                 | -1 300 feet                   | 130 000 feet                  | 0 feet                        |
| lon                                       | As encoded in test CPR_Encode | As encoded in test CPR_Encode | As encoded in test CPR_Encode | As encoded in test CPR_Encode | As encoded in test CPR_Encode              | As encoded in test CPR_Encode | As encoded in test CPR_Encode | As encoded in test CPR_Encode |
| ttg                                       | 5                             | 0                             | 62                            | 0                             | 1 minutes                                  | 0 minute                      | 15,25 minutes                 | 0 minute                      |
| lat                                       | As encoded in test CPR_Encode | As encoded in test CPR_Encode | As encoded in test CPR_Encode | As encoded in test CPR_Encode | As encoded in test CPR_Encode              | As encoded in test CPR_Encode | As encoded in test CPR_Encode | As encoded in test CPR_Encode |
| balt                                      | 936                           | 2                             | 4 072                         | 132                           | 8 025 feet                                 | -1 300 feet                   | 130 000 feet                  | 0 feet                        |
| lon                                       | As encoded in test CPR_Encode | As encoded in test CPR_Encode | As encoded in test CPR_Encode | As encoded in test CPR_Encode | As encoded in test CPR_Encode              | As encoded in test CPR_Encode | As encoded in test CPR_Encode | As encoded in test CPR_Encode |
| ttg                                       | 6                             | 0                             | 62                            | 0                             | 1,25 minutes                               | 0 minute                      | 15,25 minutes                 | 0 minute                      |

| ADSB_TWO_SLOT_TCP/SVQ_RF_IN_PARAMETERS(x) |                               |                               |                               |                               | ADSB_TWO_SLOT_TCP/SVQ_APOUT_PARAMETERS(x)   |   |   |   |
|---|-------------------------------|-------------------------------|-------------------------------|-------------------------------|---|---|---|---|
|   | Set P<br>(middle range)       | Set Q<br>(min)                | Set R<br>(max)                | Set S<br>(zero)               | Set P<br>(middle range)   | Set Q<br>(min)  | Set R<br>(max)  | Set S<br>(zero)   |
| csi                                       | 00 00 00 00                   | 01 01 01 01                   | 02 02 02 02                   | 03 03 03 03                   | AAAA  | BBBB  | CCCC  | DDDD  |
| st  | 0                             | 1                             | 4                             | 5                             | no emergency/not reported   | general emergency   | no communications   | unlawful interference   |
| csr                                       | 26 26 26 26                   | 27 27 27 27                   | 28 28 28 28                   | 29 29 29 29                   | 0000  | 1111  | 2222  | 3333  |
| nacv                                      | 1                             | 2                             | 3                             | 4                             | Horizontal velocity error (95 %) < 10 m/s   | Horizontal velocity error (95 %) < 3 m/s  | Horizontal velocity error (95 %) < 1 m/s  | Horizontal velocity error (95 %) < 0,3 m/s  |
| nacp                                      | 2                             | 0                             | 6                             | 11                            | EPU < 7,408 Km (4NM)  | EPU ≥ 18,52 Km (10NM)   | EPU < 555,6 m (0,3 NM)  | EPU < 3 m and VEPU < 4 m  |
| cdti                                      | 1                             | 1                             | 0                             | 0                             | CDTI equipment installed and operational  | CDTI equipment installed and operational  | not CDTI equipped   | not CDTI equipped   |
| nicb                                      | 1                             | 0                             | 1                             | 0.                            | Barometric pressure altitude has been cross checked against another source of pressure altitude | Barometric pressure altitude has not been cross checked against another source of pressure altitude | Barometric pressure altitude has been cross checked against another source of pressure altitude | Barometric pressure altitude has not been cross checked against another source of pressure altitude |
| acas                                      | 1                             | 1                             | 1                             | 1                             | ACAS installed and operational  | ACAS installed and operational  | ACAS installed and operational  | ACAS installed and operational  |
| ra  | 1                             | 1                             | 1                             | 0                             | Resolution activity active  | Resolution activity not active  | Resolution activity active  | Resolution activity not active  |
| pid                                       | As encoded in test CPR_Encode | As encoded in test CPR_Encode | As encoded in test CPR_Encode | As encoded in test CPR_Encode | As encoded in test CPR_Encode   | As encoded in test CPR_Encode   | As encoded in test CPR_Encode   | As encoded in test CPR_Encode   |
| lat6                                      | As encoded in test CPR_Encode | As encoded in test CPR_Encode | As encoded in test CPR_Encode | As encoded in test CPR_Encode | As encoded in test CPR_Encode   | As encoded in test CPR_Encode   | As encoded in test CPR_Encode   | As encoded in test CPR_Encode   |
| nacv                                      | 0                             | 1                             | 2                             | 3                             | Horizontal velocity error unknown   | Horizontal velocity error < 10 m/s  | Horizontal velocity error < 3 m/s   | Horizontal velocity error < 1 m/s   |

| ADSB_TWO_SLOT_TCP/SVQ_RF_IN_PARAMETERS(x) |                                  |                                  |                                  |                                  | ADSB_TWO_SLOT_TCP/SVQ_APPOUT_PARAMETERS(x)   |  |  |  |
|---|----------------------------------|----------------------------------|----------------------------------|----------------------------------|--|--|--|--|
|   | Set P<br>(middle range)          | Set Q<br>(min)                   | Set R<br>(max)                   | Set S<br>(zero)                  | Set P<br>(middle range)  | Set Q<br>(min)   | Set R<br>(max)   | Set S<br>(zero)  |
| lon6                                      | As encoded in test<br>CPR_Encode | As encoded in test<br>CPR_Encode | As encoded in test<br>CPR_Encode | As encoded in test<br>CPR_Encode | As encoded in test<br>CPR_Encode   | As encoded in test<br>CPR_Encode   | As encoded in test<br>CPR_Encode   | As encoded in test<br>CPR_Encode   |
| br/gr                                     | 0                                | 0                                | 0                                | 1                                | Barometric altitude rate   | Barometric altitude rate   | Barometric altitude rate   | Geometric altitude rate  |
| altr bit 9                                | 0                                | 0                                | 1                                | 1                                | Climbing   | Climbing   | Descending   | Descending   |
| altr bits 1 to 8                          | 201                              | 1                                | 255                              | 0                                | 20 000 fpm   | 0 fpm  | 32 000 fpm   | Unknown  |
| ac  | 4                                | 2                                | 0                                | 2                                | heavy a/c  | medium a/c   | light a/c  | medium a/c   |
| sil                                       | 0                                | 1                                | 2                                | 3                                | Probability of exceeding the $R_c$ integrity containment radius without detection: unknown | Probability of exceeding the $R_c$ integrity containment radius without detection: $1 \times 10^{-3}$ per flight hour or per operation | Probability of exceeding the $R_c$ integrity containment radius without detection: $1 \times 10^{-5}$ per flight hour or per operation | Probability of exceeding the $R_c$ integrity containment radius without detection: $1 \times 10^{-7}$ per flight hour or per operation |
| gs  | 1 023                            | 1                                | 2 047                            | 0                                | 1 022  | 0  | 3 069  | unknown  |
| gt  | 290                              | 0                                | 2 042                            | 0                                | 51 degrees   | 0 degree (north)   | 359 degrees  | 0 degree (north)   |

Table 7.18: Values for use in the test "ADSB\_Single\_Slot\_TCP\_Rec\_A"

| ADSB_SINGLE_SLOT_TCP_RF_IN_PARAMETERS(x) |   |   |   |   | ADSB_SINGLE_SLOT_TCP_APPOUT_PARAMETERS(x) |                                  |                                  |                                  |
|--|---|---|---|---|---|----------------------------------|----------------------------------|----------------------------------|
|  | Set P<br>(middle<br>range)              | Set Q<br>(min)                          | Set R<br>(max)                          | Set S<br>(zero)                         | Set P<br>(middle range)                   | Set Q<br>(min)                   | Set R<br>(max)                   | Set S<br>(zero)                  |
| s  | add_B                                   | add_B                                   | add_B                                   | add_B                                   | add_B                                     | add_B                            | add_B                            | add_B                            |
| balt                                     | 936                                     | 2                                       | 4 072                                   | 132                                     | 8 025 feet                                | -1 300 feet                      | 130 000 feet                     | 0 feet                           |
| no                                       | 0                                       | 1                                       | 2                                       | 3                                       | Current TCP                               | Next TCP                         | Next +1 TCP                      | Next +2 TCP                      |
| Patch ID                                 | As encoded<br>in test<br>CPR_Enco<br>de | As encoded<br>in test<br>CPR_Enco<br>de | As encoded<br>in test<br>CPR_Enco<br>de | As encoded<br>in test<br>CPR_Enco<br>de | As encoded in test<br>CPR_Encode          | As encoded in test<br>CPR_Encode | As encoded in test<br>CPR_Encode | As encoded in test<br>CPR_Encode |
| lat                                      | As encoded<br>in test<br>CPR_Enco<br>de | As encoded<br>in test<br>CPR_Enco<br>de | As encoded<br>in test<br>CPR_Enco<br>de | As encoded<br>in test<br>CPR_Enco<br>de | As encoded in test<br>CPR_Encode          | As encoded in test<br>CPR_Encode | As encoded in test<br>CPR_Encode | As encoded in test<br>CPR_Encode |
| lon                                      | As encoded<br>in test<br>CPR_Enco<br>de | As encoded<br>in test<br>CPR_Enco<br>de | As encoded<br>in test<br>CPR_Enco<br>de | As encoded<br>in test<br>CPR_Enco<br>de | As encoded in test<br>CPR_Encode          | As encoded in test<br>CPR_Encode | As encoded in test<br>CPR_Encode | As encoded in test<br>CPR_Encode |
| ttg                                      | 4                                       | 0                                       | 62                                      | 0                                       | 0,75 minute                               | 0 minute                         | 15,25 minutes                    | 0 minute                         |

Table 7.19: Values for use in the test "ADSB\_Single\_Slot\_SVQ\_Rec\_A"

| ADSB_SINGLE_SLOT_SVQ_RF_IN_PARAMETERS(x) |                            |                |                |                 | ADSB_SINGLE_SLOT_SVQ_APPOUT_PARAMETERS(x)   |   |   |   |
|--|----------------------------|----------------|----------------|-----------------|---|---|---|---|
|  | Set P<br>(middle<br>range) | Set Q<br>(min) | Set R<br>(max) | Set S<br>(zero) | Set P<br>(middle range)   | Set Q<br>(min)  | Set R<br>(max)  | Set S<br>(zero)   |
| s  | add_B                      | add_B          | add_B          | add_B           | add_B   | add_B   | add_B   | add_B   |
| nacp                                     | 2                          | 0              | 6              | 11              | EPU < 7,408 Km<br>(4 NM)  | EPU ≥ 18,52 Km<br>(10 NM)   | EPU < 555,6 m<br>(0,3 NM)   | EPU < 3 m and VEPU<br>< 4 m   |
| sil                                      | 0                          | 1              | 2              | 3               | Probability of<br>exceeding the R <sub>C</sub><br>integrity containment<br>radius without<br>detection: unknown | Probability of<br>exceeding the R <sub>C</sub><br>integrity containment<br>radius without<br>detection: 1 × 10 <sup>-3</sup> per<br>flight hour or per<br>operation | Probability of<br>exceeding the R <sub>C</sub><br>integrity containment<br>radius without<br>detection: 1 × 10 <sup>-5</sup> per<br>flight hour or per<br>operation | Probability of<br>exceeding the R <sub>C</sub><br>integrity containment<br>radius without<br>detection: 1 × 10 <sup>-7</sup> per<br>flight hour or per<br>operation |
| nicb                                     | 1                          | 0              | 1              | 0.              | Barometric pressure<br>altitude has been<br>cross checked against<br>another source of<br>pressure altitude     | Barometric pressure<br>altitude has not been<br>cross checked against<br>another source of<br>pressure altitude   | Barometric pressure<br>altitude has been<br>cross checked against<br>another source of<br>pressure altitude   | Barometric pressure<br>altitude has not been<br>cross checked against<br>another source of<br>pressure altitude   |
| acas                                     | 1                          | 1              | 1              | 1               | ACAS installed and<br>operational   | ACAS installed and<br>operational   | ACAS installed and<br>operational   | ACAS installed and<br>operational   |
| ra                                       | 1                          | 1              | 1              | 0               | Resolution activity<br>active   | Resolution activity not<br>active   | Resolution activity<br>active   | Resolution activity not<br>active   |
| st                                       | 0                          | 1              | 4              | 5               | No emergency/not<br>reported  | General emergency   | No communications   | Unlawful interference   |
| ac                                       | 9                          | 12             | 2              | 2               | Rotorcraft  | Unmanned aerial<br>vehicle  | Medium a/c  | Medium a/c  |



Table 7.20: Values for use in the test "ADSB\_Aircraft\_Data\_Rec\_A"

| ADSB_AIRCRAFT_DATA_RF_IN_PARAMETERS(x) |                            |                |                |                 | ADSB_AIRCRAFT_DATA_APOUT_PARAMETERS(x) |                            |                   |                       |
|--|----------------------------|----------------|----------------|-----------------|--|----------------------------|-------------------|-----------------------|
|  | Set P<br>(middle<br>range) | Set Q<br>(min) | Set R<br>(max) | Set S<br>(zero) | Set P<br>(middle range)                | Set Q<br>(min)             | Set R<br>(max)    | Set S<br>(zero)       |
| s                                      | add_B                      | add_B          | add_B          | add_B           | add_B                                  | add_B                      | add_B             | add_B                 |
| ac                                     | 9                          | 12             | 2              | 2               | rotorcraft                             | unmanned aerial<br>vehicle | medium a/c        | medium a/c            |
| st                                     | 0                          | 1              | 4              | 5               | no emergency/not<br>reported           | general emergency          | no communications | unlawful interference |
| csi                                    | 00 00 00 00                | 01 01 01 01    | 02 02 02 02    | 03 03 03 03     | AAAA                                   | BBBB                       | CCCC              | DDDD                  |
| csr                                    | 26 26 26 26                | 27 27 27 27    | 28 28 28 28    | 29 29 29 29     | 0000                                   | 1111                       | 2222              | 3333                  |

Table 7.21: Values for use in the test "ADSB\_High\_Resolution\_Rec\_A"

| ADSB_HIGH_RESOLUTION_RF_IN_PARAMETERS(x) |                                  |                                  |                                  |                                  | ADSB_HIGH_RESOLUTION_APOUT_PARAMETERS(x)   |  |  |  |
|--|----------------------------------|----------------------------------|----------------------------------|----------------------------------|--|--|--|--|
|  | Set P<br>(middle<br>range)       | Set Q<br>(min)                   | Set R<br>(max)                   | Set S<br>(zero)                  | Set P<br>(middle range)  | Set Q<br>(min)   | Set R<br>(max)   | Set S<br>(zero)  |
| s  | add_B                            | add_B                            | add_B                            | add_B                            | add_B  | add_B  | add_B  | add_B  |
| sil                                      | 0                                | 1                                | 2                                | 3                                | Probability of<br>exceeding the $R_c$<br>integrity containment<br>radius without<br>detection: unknown | Probability of<br>exceeding the $R_c$<br>integrity containment<br>radius without<br>detection: $1 \times 10^{-3}$ per<br>flight hour or per<br>operation | Probability of<br>exceeding the $R_c$<br>integrity containment<br>radius without<br>detection: $1 \times 10^{-5}$ per<br>flight hour or per<br>operation | Probability of<br>exceeding the $R_c$<br>integrity containment<br>radius without<br>detection: $1 \times 10^{-7}$ per<br>flight hour or per<br>operation |
| gs                                       | 1 022                            | 0                                | 3 069                            | unknown                          | 1 023  | 1  | 2 047  | 0  |
| lon8                                     | As encoded in test<br>CPR_Decode | As encoded in test<br>CPR_Decode | As encoded in test<br>CPR_Decode | As encoded in test<br>CPR_Decode | As encoded in test<br>CPR_Decode   | As encoded in test<br>CPR_Decode   | As encoded in test<br>CPR_Decode   | As encoded in test<br>CPR_Decode   |
| lat8                                     | As encoded in test<br>CPR_Decode | As encoded in test<br>CPR_Decode | As encoded in test<br>CPR_Decode | As encoded in test<br>CPR_Decode | As encoded in test<br>CPR_Decode   | As encoded in test<br>CPR_Decode   | As encoded in test<br>CPR_Decode   | As encoded in test<br>CPR_Decode   |
| gt                                       | 51 degrees                       | 0 degree<br>(north)              | 359<br>degrees                   | 0 degree<br>(north)              | 290  | 0  | 2 042  | 0  |
| tind                                     | 0                                | 1                                | 2                                | 3                                | Unknown  | Left   | Right  | Straight   |

Table 7.22: Values for use in the test "TIS\_Manage\_A"

|  | TIS_MANAGE_APPIN_PARAMETERS(x)           |  |  |  | TIS_MANAGE_RF_OUT_PARAMETERS(x) |                |                |                 |
|--|--|--|--|--|---------------------------------|----------------|----------------|-----------------|
|  | Set P<br>(middle range)                  | Set Q<br>(min)                           | Set R<br>(max)   | Set S<br>(zero)                          | Set P<br>(middle<br>range)      | Set Q<br>(min) | Set R<br>(max) | Set S<br>(zero) |
| s  | add_A                                    | add_A                                    | add_A  | add_A                                    | add_A                           | add_A          | add_A          | add_A           |
| TIS-B message ID                                       | Management message                       | Management message                       | Management message   | Management message                       | 0                               | 0              | 0              | 0               |
| TIS-B service version                                  | TIS-B as defined in the present document | TIS-B as defined in the present document | TIS-B as defined in the present document   | TIS-B as defined in the present document | 0                               | 0              | 0              | 0               |
| TIV ID   | 2  | 1  | 4  | 3  | 1                               | 0              | 3              | 2               |
| Update period (s)                                      | 10 s                                     | 0,5 s                                    | 60 s   | 27 s                                     | 11                              | 1              | 61             | 28              |
|  |  |  |  |  |                                 |                |                |                 |
| Accuracy of TIS-B targets (NM unless otherwise stated) | < 0,1 NM                                 | < 3 m                                    | < 10 NM  | unknown                                  | 6                               | 9              | 1              | 0               |
| Reference point (latitude)                             | 51 degrees 22 minutes north              | 51 degrees 22 minutes north              | 51 degrees 22 minutes north  | 51 degrees 22 minutes south              | 3 082                           | 3 082          | 3 082          | -3 082          |
| Reference point (longitude)                            | 0 degree 41 minutes west                 | 0 degree 41 minutes west                 | 0 degree 41 minutes west   | 0 degree 41 minutes west                 | -41                             | -41            | -41            | -41             |
| Barometric Lower barometric altitude (ft)              | 18 500 ft                                | -1 500 ft                                | 63 500 ft  | -1 500 ft                                | 80                              | 0              | 254            | 0               |
| Upper barometric altitude (ft)                         | 38 500 ft                                | -1 500 ft                                | 63 500 ft  | -1 500 ft                                | 160                             | 0              | 254            | 0               |
| Number of vertices                                     | 3 vertices                               | 3 vertices                               | Circle with centre at reference position and radius specified by one vertex position | 3 vertices                               | 1                               | 1              | 0              | 1               |
| TIV1 vertex latitude                                   | -3 degrees 56 minutes                    | -3 degrees 56 minutes                    | -3 degrees 56 minutes  | -3 degrees 56 minutes                    | 1                               | 1              | 1              | 1               |
| TIV1 vertex longitude                                  | 2 degrees 11 minutes                     | 2 degrees 11 minutes                     | 2 degrees 11 minutes   | 2 degrees 11 minutes                     | 212                             | 212            | 212            | 212             |
| TIV2 vertex latitude                                   | -0 degree 41 minutes                     | -0 degree 41 minutes                     | NOT TRANSMITTED  | -0 degree 41 minutes                     | 64                              | 64             |                | 64              |
| TIV2 vertex longitude                                  | -3 degrees 1 minute                      | -3 degrees 1 minute                      | NOT TRANSMITTED  | -3 degrees 1 minute                      | 31                              | 31             |                | 31              |
| TIV3 vertex latitude                                   | 2 degrees 2 minutes                      | 2 degrees 2 minutes                      | NOT TRANSMITTED  | 2 degrees 2 minutes                      | 220                             | 220            |                | 220             |
| TIV3 vertex longitude                                  | 0 degree 5 minutes                       | 0 degree 5 minutes                       | NOT TRANSMITTED  | 0 degree 5 minutes                       | 130                             | 130            |                | 130             |

Table 7.23: Values for use in the test "TIS\_Aircraft\_Air\_A"

|                                 | TIS_AIRCRAFT_AIR_APPIN_PARAMETERS(x)                     |  |  |  | TIS_AIRCRAFT_AIR_RF_OUT_PARAMETERS(x) |                                       |                                       |                 |
|---------------------------------|--|--|--|--|---------------------------------------|---------------------------------------|---------------------------------------|-----------------|
|                                 | Set P<br>(middle range)                                  | Set Q<br>(min)                                     | Set R<br>(max)   | Set S<br>(zero)                                    | Set P<br>(middle range)               | Set Q<br>(min)                        | Set R<br>(max)                        | Set S<br>(zero) |
| s                               | add_A  | add_A  | add_A  | add_A  | add_A                                 | add_A                                 | add_A                                 | add_A           |
| TIS-B message ID                | Aircraft target<br>(airborne service)<br>message         | Aircraft target<br>(airborne service)<br>message   | Aircraft target<br>(airborne service)<br>message         | Aircraft target<br>(airborne service)<br>message   | 1                                     | 1                                     | 1                                     | 1               |
| TIV ID                          | 2  | 1  | 4  | 3  | 1                                     | 0                                     | 3                                     | 2               |
| Target Identifier               | 0000 10 101 010 00<br>00 0000 0001                       | 0000 10 101 010 00<br>00 0000 0010                 | 0000 10 101 010 00<br>00 0000 0011                       | 1200   | 0000 10 101<br>010 00 00<br>0000 0001 | 0000 10 101<br>010 00 00<br>0000 0010 | 0000 10 101<br>010 00 00<br>0000 0011 | 1200            |
| Target Identifier flag          | Aircraft address   | Aircraft address                                   | Aircraft address   | Special Identifier                                 | 0                                     | 0                                     | 0                                     | 1               |
| Radar fusion flag               | TIS-B target based<br>only on radar or<br>multilat. data | TIS-B target includes<br>ADB-B as a data<br>source | TIS-B target based<br>only on radar or<br>multilat. data | TIS-B target includes<br>ADB-B as a data<br>source | 0                                     | 1                                     | 0                                     | 1               |
| ADS-B fault flag                | NOT TRANSMITTED  | ADS-B corresponds<br>with TIS-B                    | NOT TRANSMITTED  | ADS-B diverts from<br>TIS-B                        |                                       | 0                                     |                                       | 1               |
| Latitude                        | 50 degrees 1 minute<br>north                             | 50 degrees 1 minute<br>north                       | 50 degrees 1 minute<br>north                             | 50 degrees 1 minute<br>north                       | -11 036                               | -11 036                               | -11 036                               | -11 036         |
| Longitude                       | 1 degree 51 minutes<br>west                              | 1 degree 51 minutes<br>west                        | 1 degree 51 minutes<br>west                              | 1 degree 51 minutes<br>west                        | -13 173                               | -13 173                               | -13 173                               | -13 173         |
| Barometric altitude             | 4 000 feet   | -1 300 feet  | 130 000 feet   | 0 feet   | 532                                   | 2                                     | 4 072                                 | 132             |
| Ground speed                    | 1 022 knots  | 0 knot   | 3 069 knots  | Unknown  | 1 023                                 | 1                                     | 2 047                                 | 0               |
| Ground track                    | 44,00 degrees  | 0,00 degree  | 359,70 degrees   | 0,00 degree  | 31                                    | 0                                     | 255                                   | 0               |
| Time Stamp                      | 4 000 ms after time<br>reference                         | Time reference                                     | 11,8 s after time<br>reference                           | Time reference                                     | 20                                    | 0                                     | 59                                    | 0               |
| Flight ID Flag                  | Optional information is<br>present                       | Optional information is<br>present                 | Optional information is<br>present                       | Optional information is<br>not present             | 1                                     | 1                                     | 1                                     | 0               |
| Flight ID type<br>(optional)    | Callsign   | Registration marking<br>(tail number)              | Registration marking<br>(tail number)                    |  | 0                                     | 1                                     | 1                                     |                 |
| Aircraft category<br>(optional) | Rotorcraft   | Highly manoeuvrable<br>and high speed              | Glider/sailplane   |  | 9                                     | 5                                     | 10                                    |                 |

Table 7.24: Values for use in the test "TIS\_Aircraft\_Grd\_A"

|                              | TIS_AIRCRAFT_GRD_APPIN_PARAMETERS(x)               |  |  |  | TIS_AIRCRAFT_GRD_RF_OUT_PARAMETERS(x) |                                 |                                 |                 |
|------------------------------|--|--|--|--|---------------------------------------|---------------------------------|---------------------------------|-----------------|
|                              | Set P<br>(middle range)                            | Set Q<br>(min)                               | Set R<br>(max)                                     | Set S<br>(zero)                              | Set P<br>(middle range)               | Set Q<br>(min)                  | Set R<br>(max)                  | Set S<br>(zero) |
| s                            | add_A  | add_A  | add_A  | add_A  | add_A                                 | add_A                           | add_A                           | add_A           |
| TIS-B message ID             | Aircraft target (ground service) message           | Aircraft target (ground service) message     | Aircraft target (ground service) message           | Aircraft target (ground service) message     | 2                                     | 2                               | 2                               | 2               |
| TIV ID                       | 2  | 1  | 4  | 3  | 1                                     | 0                               | 3                               | 2               |
| Target Identifier            | 0000 10 101 010 00 00 0000 0001                    | 0000 10 101 010 00 00 0000 0010              | 0000 10 101 010 00 00 0000 0011                    | 1200   | 0000 10 101 010 00 00 0000 0001       | 0000 10 101 010 00 00 0000 0010 | 0000 10 101 010 00 00 0000 0011 | 1200            |
| Target Identifier flag       | Aircraft address                                   | Aircraft address                             | Aircraft address                                   | Special Identifier                           | 0                                     | 0                               | 0                               | 1               |
| Radar fusion flag            | TIS-B target based only on radar or multilat. data | TIS-B target includes ADB-B as a data source | TIS-B target based only on radar or multilat. data | TIS-B target includes ADB-B as a data source | 0                                     | 1                               | 0                               | 1               |
| ADS-B fault flag             | NOT TRANSMITTED                                    | ADS-B corresponds with TIS-B                 | NOT TRANSMITTED                                    | ADS-B diverts from TIS-B                     |                                       | 0                               |                                 | 1               |
| Latitude (Bits 1 to 15 Bits) | 50,0166 degrees                                    | 50,0166 degrees                              | 50,0166 degrees                                    | 50,0166 degrees                              | -215 820                              | -215 820                        | -215 820                        | -215 820        |
| Longitude (Bits 1 - 15 Bits) | 1,8499 degrees                                     | 1,8499 degrees                               | 1,8499 degrees                                     | 1,8499 degrees                               | -210 773                              | -210 773                        | -210 773                        | -210 773        |
| Ground speed                 | 1 022 knots  | 0 knot                                       | 3 069 knots  | Unknown                                      | 1 023                                 | 1                               | 2 047                           | 0               |
| Ground track                 | 44,00 degrees                                      | 0,00 degree                                  | 359,70 degrees                                     | 0,00 degree                                  | 31                                    | 0                               | 255                             | 0               |
| Time Stamp                   | 4 000 ms after time reference                      | Time reference                               | 11,8 s after time reference                        | Time reference                               | 20                                    | 0                               | 59                              | 0               |
| Flight ID Flag               | Optional information is present                    | Optional information is present              | Optional information is present                    | Optional information is not present          | 1                                     | 1                               | 1                               | 0               |
| Flight ID type (optional)    | Callsign   | Registration marking (tail number)           | Registration marking (tail number)                 |  | 0                                     | 1                               | 1                               |                 |
| Aircraft category (optional) | Rotorcraft   | Highly manoeuvrable and high speed           | Glider/sailplane                                   |  | 9                                     | 5                               | 10                              |                 |

Table 7.25: Values for use in the test "TIS\_Grd\_Veh\_A"

|                        | TIS_GRD_VEH_APPIN_PARAMETERS(x)                          |  |  |  | TIS_GRD_VEH_RF_OUT_PARAMETERS(x)      |                                       |                                       |                 |
|------------------------|--|--|--|--|---------------------------------------|---------------------------------------|---------------------------------------|-----------------|
|                        | Set P<br>(middle range)                                  | Set Q<br>(min)                                       | Set R<br>(max)   | Set S<br>(zero)                                      | Set P<br>(middle range)               | Set Q<br>(min)                        | Set R<br>(max)                        | Set S<br>(zero) |
| s                      | add_A  | add_A  | add_A  | add_A  | add_A                                 | add_A                                 | add_A                                 | add_A           |
| TIS-B message ID       | Ground Vehicle target<br>(ground service)<br>message     | Ground Vehicle target<br>(ground service)<br>message | Ground Vehicle target<br>(ground service)<br>message     | Ground Vehicle target<br>(ground service)<br>message | 3                                     | 3                                     | 3                                     | 3               |
| TIV ID                 | 2  | 1  | 4  | 3  | 1                                     | 0                                     | 3                                     | 2               |
| Target Identifier      | 0000 10 101 010 00<br>00 0000 0001                       | 0000 10 101 010 00<br>00 0000 0010                   | 0000 10 101 010 00<br>00 0000 0011                       | 1200   | 0000 10 101<br>010 00 00<br>0000 0001 | 0000 10 101<br>010 00 00<br>0000 0010 | 0000 10 101<br>010 00 00<br>0000 0011 | 1200            |
| Target Identifier flag | Aircraft address   | Aircraft address                                     | Aircraft address   | Special Identifier                                   | 0                                     | 0                                     | 0                                     | 1               |
| Radar fusion flag      | TIS-B target based<br>only on radar or<br>multilat. data | TIS-B target includes<br>ADB-B as a data<br>source   | TIS-B target based<br>only on radar or<br>multilat. data | TIS-B target includes<br>ADB-B as a data<br>source   | 0                                     | 1                                     | 0                                     | 1               |
| ADS-B fault flag       | NOT TRANSMITTED  | ADS-B corresponds<br>with TIS-B                      | NOT TRANSMITTED  | ADS-B diverts from<br>TIS-B                          |                                       | 0                                     |                                       | 1               |
| Latitude               | 50,0166 degrees<br>north                                 | 50,0166 degrees<br>north                             | 50,0166 degrees<br>north                                 | 50,0166 degrees<br>north                             | -215 820                              | -215 820                              | -215 820                              | -215 820        |
| Longitude              | 1,8499 degrees west                                      | 1,8499 degrees west                                  | 1,8499 degrees west                                      | 1,8499 degrees west                                  | -210 773                              | -210 773                              | -210 773                              | -210 773        |
| Ground speed           | 1 022 knots  | 0 knot   | 126 knots  | Unknown  | 1 023                                 | 1                                     | 127                                   | 0               |
| Ground track           | 44,00 degrees  | 0,00 degree  | 359,70 degrees   | 0,00 degree  | 31                                    | 0                                     | 255                                   | 0               |
| Time Stamp             | 4 000 ms after time<br>reference                         | Time reference                                       | 11,8 s after time<br>reference                           | Time reference                                       | 20                                    | 0                                     | 59                                    | 0               |

Table 7.26: Values for use in the test "FIS\_METAR\_A"

|      | FIS_METAR_APPIN_PARAMETERS(x)                           |   |   |   | FIS_METAR_RF_OUT_PARAMETERS(x) |                |                |                 |
|------|---|---|---|---|--------------------------------|----------------|----------------|-----------------|
|      | Set P<br>(middle range)                                 | Set Q<br>(min)                                      | Set R<br>(max)  | Set S<br>(zero)                                     | Set P<br>(middle range)        | Set Q<br>(min) | Set R<br>(max) | Set S<br>(zero) |
| s    | add_G   | add_G   | add_G   | add_G   | add_G                          | add_G          | add_G          | add_G           |
| fmi  | METAR message   | METAR message                                       | METAR message   | METAR message                                       | 0                              | 0              | 0              | 0               |
| vers | 0   | 0   | 0   | 0   | 0                              | 0              | 0              | 0               |
| med  | 4   | 0   | 7   | 0   | 4                              | 0              | 7              | 0               |
| locl | EGLL  | LFPG  | LEBL  | EDDF  | 05 07 12 12                    | 12 06 16 07    | 12 05 02 12    | 05 04 04 06     |
| date | day 16  | day 1   | day 31  | Unknown   | 16                             | 1              | 31             | 0               |
| ti   | 723 minutes   | 0 minute  | 1 439 minutes   | 0 minute  | 724                            | 1              | 1 440          | 1               |
| wdi  | 150 degrees   | 0 degree  | 350 degrees   | 0 minute  | 16                             | 1              | 36             | 1               |
| wsp  | 50 kts  | 0 kt  | 100,5 kts   | 0 kt  | 51                             | 1              | 102            | 1               |
| ftxt | Message   | None  | None  | Message   | 1                              | 0              | 0              | 1               |
| mxw  | Gusts present   | Gusts present                                       | Gusts present   | None  | 1                              | 1              | 1              | 0               |
| cav  | No CAVOK  | No CAVOK  | No CAVOK  | CAVOK   | 1                              | 0              | 1              | 0               |
| trd  | TREND report present                                    | No TREND report                                     | TREND report present                                    | No TREND report                                     | 1                              | 0              | 1              | 0               |
| pwf  | 2 weather fields included                               | 1 weather field included                            | 3 weather fields included                               | NOT TRANSMITTED                                     | 1                              | 0              | 2              |                 |
| rwf  | 2 weather fields included                               | 1 weather field included                            | 3 weather fields included                               | 1 weather field included                            | 1                              | 0              | 2              | 0               |
| qfef | Present   | Present   | Present   | Not present   | 0                              | 0              | 0              | 1               |
| tem  | +18 degrees centigrade                                  | -79 degrees centigrade                              | +60 degrees centigrade                                  | 0 degree centigrade                                 | 98                             | 1              | 140            | 80              |
| dew  | +23 degrees centigrade                                  | -79 degrees centigrade                              | +60 degrees centigrade                                  | 0 degree centigrade                                 | 103                            | 1              | 140            | 80              |
| qnh  | 1 097   | 850,5   | 1 100,5   | Unknown   | 248                            | 1              | 251            | 0               |
| ssf  | State of the sea and sea temperature fields not present | State of the sea and sea temperature fields present | State of the sea and sea temperature fields not present | State of the sea and sea temperature fields present | 1                              | 0              | 1              | 0               |
| vdit | 160 degrees   | 0 degree  | 350 degrees   | 0 degree  | 17                             | 1              | 36             | 1               |
| vdif | 140 degrees   | 0 degree  | 350 degrees   | 0 degree  | 15                             | 1              | 36             | 1               |
| wgi  | 49,0 kts  | 0,0 kts   | 100,5 kts   | NOT TRANSMITTED                                     | 50                             | 1              | 102            |                 |
| mis  | 700 metres  | 0 metre   | 10 000 metres   | NOT TRANSMITTED                                     | 14                             | 1              | 45             |                 |
| misd | North   | North East  | South West  | NOT TRANSMITTED                                     | 0                              | 1              | 5              |                 |
| mas  | 850 metres  | 0 metre   | 10 000 metres   | NOT TRANSMITTED                                     | 16                             | 1              | 45             |                 |
| masd | North West  | South   | East  | NOT TRANSMITTED                                     | 7                              | 4              | 2              |                 |
| pw1  | No precipitation during observation, funnel clouds      | No precipitation during observation, brune-mist     | No precipitation during observation, funnel clouds      | NOT TRANSMITTED                                     | 18                             | 10             | 18             |                 |
| pw2  | Precipitation during observation, heavy rain            | NOT TRANSMITTED                                     | No precipitation during observation, fog patches        | NOT TRANSMITTED                                     | 64                             |                | 40             |                 |

| FIS_METAR_APPIN_PARAMETERS(x) |   |  |  |   | FIS_METAR_RF_OUT_PARAMETERS(x) |                |                |                 |
|-------------------------------|---|--|--|---|--------------------------------|----------------|----------------|-----------------|
|                               | Set P<br>(middle range)                         | Set Q<br>(min)                                 | Set R<br>(max)   | Set S<br>(zero)                                   | Set P<br>(middle<br>range)     | Set Q<br>(min) | Set R<br>(max) | Set S<br>(zero) |
| pw3                           | NOT TRANSMITTED                                 | NOT TRANSMITTED                                | Precipitation during observation, soft hail                | NOT TRANSMITTED                                   |                                |                | 87             |                 |
| cno                           | 1 cloud field to follow                         | 3 cloud fields to follow                       | 4 cloud fields to follow                                   | NOT TRANSMITTED                                   | 0                              | 2              | 3              |                 |
| ch1                           | 2 970 metres                                    | 0 metre  | 20 100 metres  | NOT TRANSMITTED                                   | 98                             | 0              | 156            |                 |
| ch2                           | NOT TRANSMITTED                                 | 90 metres                                      | 150 metres   | NOT TRANSMITTED                                   |                                | 2              | 4              |                 |
| ch3                           | NOT TRANSMITTED                                 | 1 530 metres                                   | 19 800 metres  | NOT TRANSMITTED                                   |                                | 50             | 155            |                 |
| ch4                           | NOT TRANSMITTED                                 | NOT TRANSMITTED                                | 2 910 metres   | NOT TRANSMITTED                                   |                                |                | 96             |                 |
| cc1                           | Overcast  | Few  | Overcast   | NOT TRANSMITTED                                   | 4                              | 1              | 4              |                 |
| cc2                           | NOT TRANSMITTED                                 | scattered                                      | Few  | NOT TRANSMITTED                                   |                                | 2              | 1              |                 |
| cc3                           | NOT TRANSMITTED                                 | broken   | Sky clear  | NOT TRANSMITTED                                   |                                | 3              | 5              |                 |
| cc4                           | NOT TRANSMITTED                                 | NOT TRANSMITTED                                | Few  | NOT TRANSMITTED                                   |                                |                | 1              |                 |
| cty1                          | Towering cumulus                                | No clouds of concern                           | Towering cumulus   | NOT TRANSMITTED                                   | 2                              | 0              | 2              |                 |
| cty2                          | NOT TRANSMITTED                                 | Cumulonimbus                                   | No clouds of concern                                       | NOT TRANSMITTED                                   |                                | 1              | 0              |                 |
| cty3                          | NOT TRANSMITTED                                 | Towering cumulus                               | Cumulonimbus   | NOT TRANSMITTED                                   |                                | 2              | 1              |                 |
| cty4                          | NOT TRANSMITTED                                 | NOT TRANSMITTED                                | No clouds of concern                                       | NOT TRANSMITTED                                   |                                |                | 0              |                 |
| qfe                           | 1 000,5   | 850,5  | 1 100,5  | Unknown   | 151                            | 1              | 251            | 0               |
| rw1                           | Precipitation during observation, rain and snow | No precipitation during observation, dust haze | Precipitation during observation, heavy thunderstorm       | No precipitation during observation, funnel cloud | 68                             | 05             | 97             | 18              |
| rw2                           | Precipitation during observation, freezing rain | NOT TRANSMITTED                                | Precipitation during observation, showers of rain and snow | NOT TRANSMITTED                                   | 56                             |                | 83             |                 |
| rw3                           | NOT TRANSMITTED                                 | NOT TRANSMITTED                                | Precipitation during observation, ice pellets              | NOT TRANSMITTED                                   |                                |                | 79             |                 |
| sst                           | +24,5 degrees centigrade                        | -9,5 degrees centigrade                        | +40 degrees centigrade                                     | 0 degree centigrade                               | 35                             | 1              | 51             | 11              |
| ss                            | 3   | 0  | 9  | Unknown   | 4                              | 1              | 10             | 0               |
| txt<br>(TREND)                | TREND MESSAGE                                   | NOT TRANSMITTED                                | TREND MESSAGE  | NOT TRANSMITTED                                   | TREND MESSAGE                  |                | TREND MESSAGE  | TEST FREE TEXT  |
| txt<br>(FREE TEXT)            | TEST FREE TEXT                                  | NOT TRANSMITTED                                | NOT TRANSMITTED  | TEST FREE TEXT                                    | \$ TEST FREE TEXT              |                | \$             |                 |

Table 7.27: Values for use in the test "FIS\_SPECI\_A"

|      | FIS_SPECI_APPIN_PARAMETERS(x)                           |   |   |   | FIS_SPECI_RF_OUT_PARAMETERS(x) |                |                |                 |
|------|---|---|---|---|--------------------------------|----------------|----------------|-----------------|
|      | Set P<br>(middle range)                                 | Set Q<br>(min)                                      | Set R<br>(max)  | Set S<br>(zero)                                     | Set P<br>(middle range)        | Set Q<br>(min) | Set R<br>(max) | Set S<br>(zero) |
| s    | add_G   | add_G   | add_G   | add_G   | add_G                          | add_G          | add_G          | add_G           |
| fmi  | SPECI message   | SPECI message                                       | SPECI message   | SPECI message                                       | 4                              | 4              | 4              | 4               |
| vers | 0   | 0   | 0   | 0   | 0                              | 0              | 0              | 0               |
| med  | 3   | 0   | 7   | 0   | 3                              | 0              | 7              | 0               |
| locl | EGLL  | LFPG  | LEBL  | EDDF  | 05 07 12 12                    | 12 06 16 07    | 12 05 02 12    | 05 04 04 06     |
| date | day 14  | day 1   | day 31  | unknown   | 14                             | 1              | 31             | 0               |
| ti   | 698 minutes   | 0 minute  | 1 439 minutes   | 0 minute  | 699                            | 1              | 1 440          | 1               |
| wdi  | 140 degrees   | 0 degree  | 350 degrees   | 0 minute  | 15                             | 1              | 36             | 1               |
| wsp  | 45 kts  | 0 kts   | 100,5 kts   | 0 kts   | 46                             | 1              | 102            | 1               |
| ftxt | Message   | None  | None  | Message   | 1                              | 0              | 0              | 1               |
| mxw  | Gusts present   | Gusts present                                       | Gusts present   | None  | 1                              | 1              | 1              | 0               |
| cav  | No CAVOK  | No CAVOK  | No CAVOK  | CAVOK   | 1                              | 0              | 1              | 0               |
| trd  | TREND report present                                    | No TREND report                                     | TREND report present                                    | No TREND report                                     | 1                              | 0              | 1              | 0               |
| pwf  | 2 weather fields included                               | 1 weather field included                            | 3 weather fields included                               | NOT TRANSMITTED                                     | 1                              | 0              | 2              |                 |
| rwf  | 2 weather fields included                               | 1 weather field included                            | 3 weather fields included                               | 1 weather field included                            | 1                              | 0              | 2              | 0               |
| qfef | Present   | Present   | Present   | Not present   | 0                              | 0              | 0              | 1               |
| tem  | +20 degrees centigrade                                  | -79 degrees centigrade                              | +60 degrees centigrade                                  | 0 degree centigrade                                 | 100                            | 1              | 140            | 80              |
| dew  | +22 degrees centigrade                                  | -79 degrees centigrade                              | +60 degrees centigrade                                  | 0 degree centigrade                                 | 102                            | 1              | 140            | 80              |
| qnh  | 1 002,5   | 850,5   | 1 100,5   | Unknown   | 153                            | 1              | 251            | 0               |
| ssf  | State of the sea and sea temperature fields not present | State of the sea and sea temperature fields present | State of the sea and sea temperature fields not present | State of the sea and sea temperature fields present | 1                              | 0              | 1              | 0               |
| vdit | 150 degrees   | 0 degree  | 350 degrees   | 0 degree  | 16                             | 1              | 36             | 1               |
| vdif | 150 degrees   | 0 degree  | 350 degrees   | 0 degree  | 16                             | 1              | 36             | 1               |
| wgi  | 46,0 kts  | 0,0 kts   | 100,5 kts   | NOT TRANSMITTED                                     | 47                             | 1              | 102            |                 |
| mis  | 800 metres  | 0 metre   | 10 000 metres   | NOT TRANSMITTED                                     | 16                             | 1              | 45             |                 |
| misd | North   | North East  | South West  | NOT TRANSMITTED                                     | 0                              | 1              | 5              |                 |
| mas  | 1 000 metres  | 0 metre   | 10 000 metres   | NOT TRANSMITTED                                     | 18                             | 1              | 45             |                 |
| masd | North West  | South   | East  | NOT TRANSMITTED                                     | 7                              | 4              | 2              |                 |
| pw1  | No precipitation during observation, funnel clouds      | No precipitation during observation, brune-mist     | No precipitation during observation, funnel clouds      | NOT TRANSMITTED                                     | 18                             | 10             | 18             |                 |



| FIS_SPECI_APPIN_PARAMETERS(x) |   |  |  |   | FIS_SPECI_RF_OUT_PARAMETERS(x) |                |                |                 |
|-------------------------------|---|--|--|---|--------------------------------|----------------|----------------|-----------------|
|                               | Set P<br>(middle range)                         | Set Q<br>(min)                                 | Set R<br>(max)   | Set S<br>(zero)                                   | Set P<br>(middle<br>range)     | Set Q<br>(min) | Set R<br>(max) | Set S<br>(zero) |
| pw2                           | Precipitation during observation, heavy rain    | NOT TRANSMITTED                                | No precipitation during observation, fog patches           | NOT TRANSMITTED                                   | 64                             |                | 40             |                 |
| pw3                           | NOT TRANSMITTED                                 | NOT TRANSMITTED                                | Precipitation during observation, soft hail                | NOT TRANSMITTED                                   |                                |                | 87             |                 |
| cno                           | 1 cloud field to follow                         | 3 cloud fields to follow                       | 4 cloud fields to follow                                   | NOT TRANSMITTED                                   | 0                              | 2              | 3              |                 |
| ch1                           | 2 970 metres                                    | 0 metre  | 20 100 metres  | NOT TRANSMITTED                                   | 98                             | 0              | 156            |                 |
| ch2                           | NOT TRANSMITTED                                 | 90 metres                                      | 150 metres   | NOT TRANSMITTED                                   |                                | 2              | 4              |                 |
| ch3                           | NOT TRANSMITTED                                 | 1 530 metres                                   | 19 800 metres  | NOT TRANSMITTED                                   |                                | 50             | 155            |                 |
| ch4                           | NOT TRANSMITTED                                 | NOT TRANSMITTED                                | 2 910 metres   | NOT TRANSMITTED                                   |                                |                | 96             |                 |
| cc1                           | Overcast  | Few  | Overcast   | NOT TRANSMITTED                                   | 4                              | 1              | 4              |                 |
| cc2                           | NOT TRANSMITTED                                 | scattered                                      | Few  | NOT TRANSMITTED                                   |                                | 2              | 1              |                 |
| cc3                           | NOT TRANSMITTED                                 | broken   | Sky clear  | NOT TRANSMITTED                                   |                                | 3              | 5              |                 |
| cc4                           | NOT TRANSMITTED                                 | NOT TRANSMITTED                                | Few  | NOT TRANSMITTED                                   |                                |                | 1              |                 |
| cty1                          | Towering cumulus                                | No clouds of concern                           | Towering cumulus   | NOT TRANSMITTED                                   | 2                              | 0              | 2              |                 |
| cty2                          | NOT TRANSMITTED                                 | cumulonimbus                                   | No cloud of concern  | NOT TRANSMITTED                                   |                                | 1              | 0              |                 |
| cty3                          | NOT TRANSMITTED                                 | towering cumulus                               | Cumulonimbus   | NOT TRANSMITTED                                   |                                | 2              | 1              |                 |
| cty4                          | NOT TRANSMITTED                                 | NOT TRANSMITTED                                | No cloud of concern  | NOT TRANSMITTED                                   |                                |                | 0              |                 |
| cfe                           | 999,5   | 850,5  | 1 100,5  | NOT TRANSMITTED                                   | 150                            | 1              | 251            |                 |
| rw1                           | Precipitation during observation, rain and snow | No precipitation during observation, dust haze | Precipitation during observation, heavy thunderstorm       | No precipitation during observation, funnel cloud | 68                             | 05             | 97             | 18              |
| rw2                           | Precipitation during observation, freezing rain | NOT TRANSMITTED                                | Precipitation during observation, showers of rain and snow | NOT TRANSMITTED                                   | 56                             |                | 83             |                 |
| rw3                           | NOT TRANSMITTED                                 | NOT TRANSMITTED                                | Precipitation during observation, ice pellets              | NOT TRANSMITTED                                   |                                |                | 79             |                 |
| sst                           | +24,5 degrees centigrade                        | -9,5 degrees centigrade                        | +40 degrees centigrade                                     | 0 degree centigrade                               | 35                             | 1              | 51             | 11              |
| ss                            | 3   | 0  | 9  | Unknown   | 4                              | 1              | 10             | 0               |
| txt<br>(TREND)                | TREND MESSGAE                                   | NOT TRANSMITTED                                | TREND MESSGAE  | NOT TRANSMITTED                                   | TREND MESSAGE                  |                | TREND MESSAGE  | TEST FREE TEXT  |
| txt<br>(FREE TEXT)            | TEST FREE TEXT                                  | NOT TRANSMITTED                                | NOT TRANSMITTED  | TEST FREE TEXT                                    | \$ TEST FREE TEXT              |                | \$             |                 |

Table 7.28: Values for use in the test "FIS\_ATIS\_A"

|                          | FIS ATIS_APPIN_PARAMETERS(x) |                          |                           |                           | FIS ATIS_RF_OUT_PARAMETERS(x) |                |                |                 |
|--------------------------|------------------------------|--------------------------|---------------------------|---------------------------|-------------------------------|----------------|----------------|-----------------|
|                          | Set P<br>(middle range)      | Set Q                    | Set R                     | Set S                     | Set P<br>(middle range)       | Set Q<br>(min) | Set R<br>(max) | Set S<br>(zero) |
| s                        | Add_G                        | add_G                    | add_G                     | Add_G                     | add_G                         | add_G          | add_G          | add_G           |
| fmi                      | ATIS message                 | ATIS message             | ATIS message              | ATIS message              | 1                             | 1              | 1              | 1               |
| vers                     | 0                            | 0                        | 0                         | 0                         | 0                             | 0              | 0              | 0               |
| med                      | 3                            | 0                        | 7                         | 0                         | 3                             | 0              | 7              | 0               |
| locl                     | EGLL                         | LFPG                     | LEBL                      | EDDF                      | 05 07 12 12                   | 12 06 16 07    | 12 05 02 12    | 05 04 04 06     |
| date                     | day 17                       | day 1                    | day 31                    | 0                         | 17                            | 1              | 31             | 0               |
| ti                       | 632 minutes                  | 1 minute                 | 1 439 minutes             | 0 minute                  | 633                           | 2              | 1 440          | 1               |
| hd                       | 30 minutes                   | 0 minute                 | 60 minutes                | 0 minute                  | 6                             | 0              | 12             | 0               |
| trans                    | 100                          | 0                        | 300                       | 0                         | 21                            | 1              | 61             | 1               |
| oth                      |                              |                          |                           |                           |                               |                |                |                 |
| aavl (bit 12)            | Open                         | Closed                   | Open                      | Open                      | 1                             | 0              | 1              | 1               |
| aavl (bits 1 to 11 bits) | 256                          | 0                        | 1 439                     | 0                         | 257                           | 1              | 1 440          | 1               |
| wdi                      | 140 degrees                  | 0 degree                 | 350 degrees               | 0 degree                  | 15                            | 1              | 36             | 1               |
| wsp                      | 45 kts                       | 0 kts                    | 100,5 kts                 | 0 kts                     | 46                            | 1              | 102            | 1               |
| tem                      | +18 degrees centigrade       | -79 degrees centigrade   | +60 degrees centigrade    | 0 degree centigrade       | 98                            | 1              | 140            | 80              |
| dew                      | +23 degrees centigrade       | -79 degrees centigrade   | +60 degrees centigrade    | 0 degree centigrade       | 103                           | 1              | 140            | 80              |
| qnh                      | 1 002,5                      | 850,5                    | 1 100,5                   | Unknown                   | 153                           | 1              | 251            | 0               |
| ruf                      | 3 runway fields              | 1 runway field           | 4 runway fields           | 2 runway fields           | 1                             | 0              | 3              | 1               |
| ftxt                     | Message                      | Message                  | Message                   | None                      | 1                             | 1              | 1              | 0               |
| mxw                      | Gusts present                | None                     | Gusts present             | None                      | 1                             | 0              | 1              | 0               |
| cav                      | No CAVOK                     | No CAVOK                 | No CAVOK                  | CAVOK                     | 0                             | 0              | 0              | 1               |
| trd                      | Message                      | None                     | Message                   | Message                   | 1                             | 0              | 1              | 1               |
| qfef                     | Present                      | Present                  | Not present               | Present                   | 0                             | 0              | 1              | 0               |
| pwf                      | 2 weather fields included    | 1 weather field included | 3 weather fields included | NOT TRANSMITTED           | 1                             | 0              | 2              |                 |
| rwf                      | 3 weather fields included    | 1 weather field included | 3 weather fields included | 2 weather fields included | 2                             | 0              | 2              | 1               |
| vdit                     | 170 degrees                  | 0 degree                 | 350 degrees               | Unknown                   | 18                            | 1              | 36             | 0               |
| vdif                     | 150 degrees                  | 0 degree                 | 350 degrees               | Unknown                   | 16                            | 1              | 36             | 0               |
| wgi                      | 46 kts                       | 0,1 kts                  | 100,5 kts                 | 0 kts                     | 47                            | 1              | 102            | 1               |
| mis                      | 775 metres                   | 50 metres                | 10 500 metres             | NOT TRANSMITTED           | 15                            | 1              | 45             |                 |
| misd                     | South East                   | North                    | South West                | NOT TRANSMITTED           | 3                             | 0              | 5              |                 |
| mas                      | 6 500 metres                 | 50 metres                | 10 500 metres             | NOT TRANSMITTED           | 41                            | 1              | 45             |                 |
| masd                     | South West                   | North East               | West                      | NOT TRANSMITTED           | 5                             | 1              | 6              |                 |
| cno                      | 2 cloud fields to follow     | 1 cloud field to follow  | 4 cloud fields to follow  | NOT TRANSMITTED           | 1                             | 0              | 3              |                 |
| cc1                      | Broken                       | Few                      | Scattered                 | NOT TRANSMITTED           | 4                             | 1              | 2              |                 |
| cc2                      | Overcast                     | NOT TRANSMITTED          | Broken                    | NOT TRANSMITTED           | 3                             |                | 3              |                 |
| cc3                      | NOT TRANSMITTED              | NOT TRANSMITTED          | Overcast                  | NOT TRANSMITTED           |                               |                | 4              |                 |

| FIS ATIS_APPIN_PARAMETERS(x) |   |   |  |   | FIS_ATIS_RF_OUT_PARAMETERS(x)         |                |                     |                 |
|------------------------------|---|---|--|---|---------------------------------------|----------------|---------------------|-----------------|
|                              | Set P<br>(middle range)                           | Set Q   | Set R  | Set S   | Set P<br>(middle range)               | Set Q<br>(min) | Set R<br>(max)      | Set S<br>(zero) |
| cc4                          | NOT TRANSMITTED                                   | NOT TRANSMITTED                                 | Sky clear  | NOT TRANSMITTED                                   |                                       |                | 5                   |                 |
| ch1                          | 2 980 metres                                      | 30 metres                                       | 20 300 metres  | NOT TRANSMITTED                                   | 98                                    | 0              | 156                 |                 |
| ch2                          | 2 980 metres                                      | NOT TRANSMITTED                                 | 3 300 metres   | NOT TRANSMITTED                                   | 98                                    |                | 100                 |                 |
| ch3                          | NOT TRANSMITTED                                   | NOT TRANSMITTED                                 | 2 960 metres   | NOT TRANSMITTED                                   |                                       |                | 97                  |                 |
| ch4                          | NOT TRANSMITTED                                   | NOT TRANSMITTED                                 | 20 300 metres  | NOT TRANSMITTED                                   |                                       |                | 156                 |                 |
| cty1                         | Cumulonimbus                                      | No cloud of concern                             | Towering cumulus   | NOT TRANSMITTED                                   | 1                                     | 0              | 2                   |                 |
| cty2                         | Towering Cumulus                                  | NOT TRANSMITTED                                 | Cumulonimbus   | NOT TRANSMITTED                                   | 2                                     |                | 1                   |                 |
| cty3                         | NOT TRANSMITTED                                   | NOT TRANSMITTED                                 | No cloud of concern                                      | NOT TRANSMITTED                                   |                                       |                | 0                   |                 |
| cty4                         | NOT TRANSMITTED                                   | NOT TRANSMITTED                                 | Towering Cumulus   | NOT TRANSMITTED                                   |                                       |                | 2                   |                 |
| pw1                          | No precipitation during observation, blowing snow | No precipitation during observation, fume-smoke | Precipitation during observation, heavy thunderstorms    | NOT TRANSMITTED                                   | 38                                    | 04             | 97                  |                 |
| pw2                          | No precipitation during observation, fume-smoke   | NOT TRANSMITTED                                 | No precipitation during observation, recent drizzle      | NOT TRANSMITTED                                   | 04                                    |                | 20                  |                 |
| pw3                          | NOT TRANSMITTED                                   | NOT TRANSMITTED                                 | No precipitation during observation, heavy sand storm    | NOT TRANSMITTED                                   |                                       |                | 33                  |                 |
| rw1                          | Precipitation during observation, rain and snow   | No precipitation during observation, dust haze  | Precipitation during observation, heavy thunderstorm     | No precipitation during observation, funnel cloud | 68                                    | 05             | 97                  | 18              |
| rw2                          | Precipitation during observation, rain            | NOT TRANSMITTED                                 | No precipitation during observation, blowing snow        | No precipitation during observation, blowing snow | 58                                    |                | 38                  | 38              |
| rw3                          | Precipitation during observation, soft hail       | NOT TRANSMITTED                                 | Precipitation during observation, heavy freezing drizzle | NOT TRANSMITTED                                   | 87                                    |                | 57                  |                 |
| qfe                          | 1 000,5   | 850,5   | NOT TRANSMITTED  | Unknown   | 151                                   | 1              |                     | 0               |
| txt<br>(TREND)               | TREND MESSGAE                                     | NOT TRANSMITTED                                 | TREND MESSGAE  | NOT TRANSMITTED                                   | TREND MESSAGE<br>\$ TEST<br>FREE TEXT |                | TREND MESSAGE<br>\$ | TEST FREE TEXT  |
| txt<br>(FREE TEXT)           | TEST FREE TEXT                                    | NOT TRANSMITTED                                 | NOT TRANSMITTED  | TEST FREE TEXT                                    |                                       |                |                     |                 |

Table 7.29: Values for use in the test "FIS\_RCN\_A"

| FIS_RCN_APPIN_PARAMETERS(x) |                               |                              |                                   |   | FIS_RCN_RF_OUT_PARAMETERS(x) |                |                |                 |
|-----------------------------|-------------------------------|------------------------------|-----------------------------------|---|------------------------------|----------------|----------------|-----------------|
|                             | Set P<br>(middle range)       | Set Q                        | Set R                             | Set S   | Set P<br>(middle range)      | Set Q<br>(min) | Set R<br>(max) | Set S<br>(zero) |
| s                           | Add_G                         | add_G                        | add_G                             | Add_G   | add_G                        | add_G          | add_G          | add_G           |
| fmi                         | RCN message                   | RCN message                  | RCN message                       | RCN message   | 1                            | 1              | 1              | 1               |
| vers                        | 0                             | 0                            | 0                                 | 0   | 0                            | 0              | 0              | 0               |
| med                         | 3                             | 0                            | 7                                 | 0   | 3                            | 0              | 7              | 0               |
| locl                        | EGLL                          | LFPG                         | LEBL                              | EDDF  | 05 07 12 12                  | 12 06 16 07    | 12 05 02 12    | 05 04 04 06     |
| date                        | day 17                        | day 1                        | day 31                            | 0   | 17                           | 1              | 31             | 0               |
| ti                          | 632 minutes                   | 1 minute                     | 1 439 minutes                     | 0 minute  | 633                          | 2              | 1 440          | 1               |
| brk                         | Braking action:<br>medium     | Braking action: good         | Braking action:<br>medium/good    | Figures unreliable  | 3                            | 5              | 4              | 6               |
| rdp                         | Damp                          | Clear and dry                | Slush                             | Clear and dry   | 1                            | 0              | 6              | 0               |
| rcon                        | 30 %                          | None                         | 100 %                             | 53 %  | 3                            | 0              | 4              | 4               |
| dod                         | 15 mm                         | 0 mm                         | 40 cm                             | Runway not<br>operational due to<br>snow, ice, large drifts<br>or runway clearance<br>and depth not<br>reported | 15                           | 0              | 97             | 98              |
| run (bits 7 to 8)           | Right runway                  | Single runway                | Single runway                     | Single runway   | 2                            | 0              | 0              | 0               |
| run (bits 1 to 7)           | 14                            | 01                           | 24                                | 30  | 13                           | 0              | 23             | 29              |
| aptf                        | 2 approach fields<br>included | 1 approach field<br>included | 3 approach fields<br>included     | 1 approach field<br>included  | 1                            | 0              | 2              | 0               |
| apty1                       | ILS CAT II                    | ILS CAT I                    | Visual                            | MLS   | 1                            | 0              | 9              | 8               |
| apty2                       | VOR                           | NOT TRANSMITTED              | MLS                               | NOT TRANSMITTED   | 3                            |                | 8              |                 |
| apty3                       | NOT TRANSMITTED               | NOT TRANSMITTED              | VDF                               | NOT TRANSMITTED   |                              |                | 7              |                 |
| rrl                         | 2 475 metres                  | 0 metre                      | Full length                       | 0 metre   | 50                           | 0              | 255            | 0               |
| rrw                         | 32 metres                     | 0 metre                      | Full width                        | 0 metre   | 33                           | 1              | 127            | 1               |
| rdp                         | Negative                      | Negative                     | Positive                          | Positive  | 1                            | 1              | 0              | 0               |
| rvt                         | 700 metres                    | 0 metre                      | 1 500 metres                      | NOT TRANSMITTED   | 23                           | 1              | 32             |                 |
| rvm                         | 650 metres                    | 0 metre                      | 1 527 metres                      | NOT TRANSMITTED   | 22                           | 1              | 32             |                 |
| rve                         | 750 metres                    | 0 metre                      | 1 500 metres                      | NOT TRANSMITTED   | 24                           | 1              | 32             |                 |
| rso                         | Human Observer                | Unknown                      | Instrumented RVR<br>system (IRVR) | Human Observer  | 1                            | 0              | 2              | 1               |
| rus                         | Yes - for arrivals            | Yes - mixed<br>operations    | Yes - mixed<br>operations         | Yes - mixed<br>operations   | 0                            | 2              | 2              | 2               |
| ravl (bit 12)               | Open                          | Closed                       | Open                              | Closed  | 1                            | 0              | 1              | 0               |
| ravl (bits 1 to 11)         | 256                           | 0                            | 123                               | Unknown   | 257                          | 1              | 124            | 0               |
| ws                          | Yes                           | Yes                          | Yes                               | No  | 1                            | 1              | 1              | 0               |

Table 7.30: Values for use in the test "FIS\_SIGMET\_A"

| FIS_SIGMET_APPIN_PARAMETERS(x) |                         |                          |                                 |                   | FIS_SIGMET_RF_OUT_PARAMETERS(x) |                |                |                 |
|--------------------------------|-------------------------|--------------------------|---------------------------------|-------------------|---------------------------------|----------------|----------------|-----------------|
|                                | Set P<br>(middle range) | Set Q<br>(min)           | Set R<br>(max)                  | Set S<br>(zero)   | Set P<br>(middle range)         | Set Q<br>(min) | Set R<br>(max) | Set S<br>(zero) |
| s                              | add_G                   | add_G                    | add_G                           | add_G             | add_G                           | add_G          | add_G          | add_G           |
| fmi                            | SIGMET message          | SIGMET message           | SIGMET message                  | SIGMET message    | 3                               | 3              | 3              | 3               |
| sqn                            | 7                       | 1                        | 16                              | 5                 | 6                               | 0              | 15             | 4               |
| med                            | C                       | A                        | H                               | D                 | 2                               | 0              | 7              | 3               |
| locl                           | EGLL                    | LFPG                     | LEBL                            | EDDF              | 5 7 12 12                       | 12 06 06 07    | 12 05 02 12    | 05 04 04 06     |
| ori                            | EGLL                    | LFPG                     | LEBL                            | EDDF              | 5 7 12 12                       | 12 06 06 07    | 12 05 02 12    | 05 04 04 06     |
| di                             | day 14                  | day 1                    | day 31                          | Unknown           | 14                              | 1              | 31             | 0               |
| ti                             | 698 minutes             | 0 minute                 | 1 439 minutes                   | 0 minute          | 699                             | 1              | 1 440          | 1               |
| di                             | day 14                  | day 1                    | day 31                          | Unknown           | 14                              | 1              | 31             | 0               |
| ti                             | 720 minutes             | 1 minutes                | 1 439 minutes                   | 0 minute          | 721                             | 2              | 1 440          | 1               |
| ftxt                           | Message                 | Message                  | Message                         | None              | 1                               | 1              | 1              | 0               |
| sfl                            | Normal                  | Convective SIGMET        | Normal                          | Convective SIGMET | 0                               | 1              | 0              | 1               |
| crp                            | Heavy dust storm        | Thunderstorm squall line | Condition reported in free text | Severe turbulence | 17                              | 5              | 0              | 13              |
| txt                            | Test free text          | Test free text           | Test free text                  | NOT TRANSMITTED   | Test free text                  | Test free text | Test free text |                 |

Table 7.31: Values for use in the test "FIS\_TSA\_CTR\_A"

| FIS_TSA_CTR_APPIN_PARAMETERS(x) |                         |                |                |                 | FIS_TSA_CTR_RF_OUT_PARAMETERS(x) |                |                |                 |
|---------------------------------|-------------------------|----------------|----------------|-----------------|----------------------------------|----------------|----------------|-----------------|
|                                 | Set P<br>(middle range) | Set Q<br>(min) | Set R<br>(max) | Set S<br>(zero) | Set P<br>(middle range)          | Set Q<br>(min) | Set R<br>(max) | Set S<br>(zero) |
| s                               | add_G                   | add_G          | add_G          | add_G           | add_G                            | add_G          | add_G          | add_G           |
| fmi                             | TSA message             | TSA message    | TSA message    | TSA message     | 6                                | 6              | 6              | 6               |
| vers                            | 0                       | 0              | 0              | 0               | 0                                | 0              | 0              | 0               |
| med                             | 2                       | 0              | 7              | 3               | 14                               | 1              | 31             | 0               |
| date                            | day 14                  | day 1          | day 31         | Unknown         | 14                               | 1              | 31             | 0               |
| time                            | 698 minutes             | 0 minutes      | 1 439 minutes  | 0 minute        | 699                              | 1              | 1 440          | 1               |
| not                             | 1 TSA                   | 1 TSA          | 1 TSA          | 1 TSA           | 0                                | 0              | 0              | 0               |
| toa                             | Control Zone            | Control Zone   | Control Zone   | Control Zone    | 0                                | 0              | 0              | 0               |
| act                             | TSA Not Active          | TSA Active     | TSA Active     | TSA Active      | 0                                | 1              | 1              | 1               |
| locl                            | EGLL                    | LFPG           | LEBL           | EDDF            | 05 07 12 12                      | 12 06 16 07    | 12 05 02 12    | 05 04 04 06     |
| sloc                            | A                       | B              | C              | D               | 1                                | 2              | 3              | 4               |
| actdat                          | Day 14                  | Day 2          | Day 1          | Day 5           | 14                               | 2              | 31             | 5               |
| actim                           | 702 minutes             | 5 minutes      | 5 minutes      | 55 minutes      | 703                              | 6              | 6              | 56              |
| freq                            | 110,025                 | 108,000        | 136,975        | Unknown         | 81                               | 1              | 1 160          | 0               |

Table 7.32: Values for use in the test "FIS\_TSA\_DNG\_A"

| FIS_TSA_DNG_APPIN_PARAMETERS(x) |                         |                     |                 |                    | FIS_TSA_DNG_RF_OUT_PARAMETERS(x) |                |                |                 |
|---------------------------------|-------------------------|---------------------|-----------------|--------------------|----------------------------------|----------------|----------------|-----------------|
|                                 | Set P<br>(middle range) | Set Q<br>(min)      | Set R<br>(max)  | Set S<br>(zero)    | Set P<br>(middle range)          | Set Q<br>(min) | Set R<br>(max) | Set S<br>(zero) |
| s                               | add_G                   | add_G               | add_G           | add_G              | add_G                            | add_G          | add_G          | add_G           |
| fmi                             | TSA message             | TSA message         | TSA message     | TSA message        | 6                                | 6              | 6              | 6               |
| vers                            | 0                       | 0                   | 0               | 0                  | 0                                | 0              | 0              | 0               |
| med                             | 2                       | 0                   | 7               | 3                  | 14                               | 1              | 31             | 0               |
| date                            | Day 14                  | Day 1               | Day 31          | Unknown            | 14                               | 1              | 31             | 0               |
| time                            | 698 minutes             | 0 minutes           | 1 439 minutes   | 0 minute           | 699                              | 1              | 1 440          | 1               |
| not                             | 1 TSA                   | 1 TSA               | 1 TSA           | 1 TSA              | 0                                | 0              | 0              | 0               |
| toa                             | Danger zone             | Restricted zone     | Prohibited zone | Danger zone        | 2                                | 1              | 3              | 2               |
| act                             | TSA not active          | TSA active          | TSA active      | TSA active         | 0                                | 1              | 1              | 1               |
| stid                            | Sweden (ES)             | United Kingdom (EG) | Romania (LR)    | Liechtenstein (LO) | 05 19                            | 05 07          | 12 18          | 12 15           |
| aln                             | 44                      | 1                   | 8 192           | 1                  | 43                               | 0              | 8 171          | 0               |
| saln                            | D                       | C                   | B               | A                  | 4                                | 3              | 2              | 1               |
| actdat                          | Day 14                  | Day 2               | Day 1           | Day 5              | 14                               | 2              | 31             | 5               |
| actim                           | 702 minutes             | 5 minutes           | 5 minutes       | 55 minutes         | 703                              | 6              | 6              | 56              |

Table 7.33: Values for use in the tests "FIS\_Request\_Rec\_A" and "FIS\_Request\_Rec\_B"

| FIS_REQUEST_RF_IN_PARAMETERS(x) |                         |                |                |                 | FIS_REQUEST_APPOUT_PARAMETERS(x) |                |                |                 |
|---------------------------------|-------------------------|----------------|----------------|-----------------|----------------------------------|----------------|----------------|-----------------|
|                                 | Set P<br>(middle range) | Set Q<br>(min) | Set R<br>(max) | Set S<br>(zero) | Set P<br>(middle range)          | Set Q<br>(min) | Set R<br>(max) | Set S<br>(zero) |
| s                               | add_G                   | add_G          | add_G          | add_G           | add_G                            | add_G          | add_G          | add_G           |
| fmi                             | 5                       | 5              | 5              | 5               | REPORT REQUEST                   | REPORT REQUEST | REPORT REQUEST | REPORT REQUEST  |
| mrq                             | 0                       | 3              | 2              | 1               | METAR message                    | SIGMET message | RCN message    | ATIS message    |
| locl                            | 05 07 12 12             | 12 06 06 07    | 12 05 02 12    | 05 04 04 06     | EGLL                             | LFPG           | LEBL           | EDDF            |

Table 7.34: Values for use in the test "GNS\_Type1\_Message\_A"

| GNS_TYPE1_APPIN_PARAMETERS(x) |   |  |  |  | GNS_TYPE1_RF_OUT_PARAMETERS(x) |                    |                    |                    |
|-------------------------------|---|--|--|--|--------------------------------|--------------------|--------------------|--------------------|
|                               | Set P<br>(middle range)   | Set Q<br>(min)   | Set R<br>(max)   | Set S<br>(zero)  | Set P<br>(middle range)        | Set Q<br>(min)     | Set R<br>(max)     | Set S<br>(zero)    |
| s                             | Add_G   | add_G  | add_G  | Add_G  | add_G                          | add_G              | add_G              | add_G              |
| mbi                           | Test GNS-B message  | Normal GNS-B message                                       | Test GNS-B message   | Normal GNS-B message                                       | 11111                          | 10101              | 11111              | 10101              |
| gid                           | EGLL  | LFPG   | LEBL   | EDDF   | 5 7 12 12                      | 12 06 06 07        | 12 05 02 12        | 05 04 04 06        |
| gmi                           | Type 1 message  | Type 1 message   | Type 1 message   | Type 1 message   | 1                              | 1                  | 1                  | 1                  |
| len                           | 28 bytes  | 28 bytes   | 28 bytes   | 28 bytes   | 28                             | 28                 | 28                 | 27                 |
| amf                           | This is the first of two Type 1 Messages in a frame containing measurement blocks | All measurement blocks are contained in one Type 1 Message | This is the second of two Type 1 Messages in a frame containing measurement blocks | All measurement blocks are contained in one Type 1 Message | 1                              | 0                  | 3                  | 0                  |
| zc                            | 01 minute 00,0 s  | 00 minutes 00,0 s  | 20 minutes 00,0 s  | 00 minutes 00,0 s  | 600                            | 0                  | 12 000             | 0                  |
| n                             | 1 block   | 1 block  | 1 block  | 1 block  | 1                              | 1                  | 1                  | 1                  |
| t                             | C/A or CSA code L1  | C/A or CSA code L1   | C/A or CSA code L1   | C/A or CSA code L1   | 0                              | 0                  | 0                  | 0                  |
| edp                           | $5 \times 10^{-6}$ m/m  | 0 m/m  | $1,270 \times 10^{-3}$ m/m   | 0 m/m  | 2                              | 1                  | 255                | 1                  |
| ec                            | See clause 5.4.5.3  | See clause 5.4.5.3   | See clause 5.4.5.3   | See clause 5.4.5.3   | See clause 5.4.5.3             | See clause 5.4.5.3 | See clause 5.4.5.3 | See clause 5.4.5.3 |
| ad                            | 10 s  | 0 s  | Prediction of source availability duration not provided                            | 0 s  | 1                              | 0                  | 255                | 0                  |
| id                            | ID2   | ID1  | ID138  | ID1  | 2                              | 1                  | 138                | 1                  |
| iod                           | GLONASS   | GPS  | SBAS   | GPS  | 1                              | 0                  | 2                  | 0                  |
| prc                           | -327,66 m   | -327,67 m  | +327,67 m  | 0 m  | 1                              | 0                  | 65 534             | 32 767             |
| rrc                           | -32,766 m   | -32,767 m  | +32,767 m  | 0 m  | 1                              | 0                  | 65 534             | 32 767             |
| sd                            | 0,02 m  | 0 m  | Ranging source correction invalid  | 0 m  | 1                              | 0                  | 255                | 0                  |
| b1 (bit 8)                    | Negative  | Positive   | Negative   | Positive   | 1                              | 0                  | 1                  | 0                  |
| b1 (bits 1 to 7)              | 0,05 m  | 0 m  | 6,35 m   | 0 m  | 1                              | 0                  | 127                | 0                  |
| b2 (bit 8)                    | Negative  | Positive   | Negative   | Positive   | 1                              | 0                  | 1                  | 0                  |
| b2 (bits 1 to 7)              | 6,34 m  | 0 m  | 6,35 m   | 0 m  | 126                            | 0                  | 127                | 0                  |
| b3 (bit 8)                    | Reference receiver was not used to compute the pseudorange correction             | Positive   | Negative   | Positive   | 1                              | 0                  | 1                  | 0                  |
| b3 (bits 1 to 7)              | Reference receiver was not used to compute the pseudorange correction             | 0 m  | 6,35 m   | 0 m  | 0                              | 0                  | 127                | 0                  |
| b4 (bit 8)                    | Positive  | Positive   | Negative   | Positive   | 0                              | 0                  | 1                  | 0                  |

| GNS_TYPE1_APPIN_PARAMETERS(x) |                         |                  |                  |                  | GNS_TYPE1_RF_OUT_PARAMETERS(x) |                  |                  |                  |
|-------------------------------|-------------------------|------------------|------------------|------------------|--------------------------------|------------------|------------------|------------------|
|                               | Set P<br>(middle range) | Set Q<br>(min)   | Set R<br>(max)   | Set S<br>(zero)  | Set P<br>(middle range)        | Set Q<br>(min)   | Set R<br>(max)   | Set S<br>(zero)  |
| b4 (bits 1 to 7)              | 6,34 m                  | 0 m              | 6,35 m           | 0 m              | 126                            | 0                | 127              | 0                |
| gc                            | See clause 5.5.5        | See clause 5.5.5 | See clause 5.5.5 | See clause 5.5.5 | See clause 5.5.5               | See clause 5.5.5 | See clause 5.5.5 | See clause 5.5.5 |

Table 7.35: Values for use in the test "GNS\_Type2\_Message\_A"

| GNS_TYPE2_APPIN_PARAMETERS(x) |   |  |   |  | GNS_TYPE2_RF_OUT_PARAMETERS(x) |                |                |                 |
|-------------------------------|---|--|---|--|--------------------------------|----------------|----------------|-----------------|
|                               | Set P<br>(middle range)   | Set Q<br>(min)   | Set R<br>(max)  | Set S<br>(zero)  | Set P<br>(middle range)        | Set Q<br>(min) | Set R<br>(max) | Set S<br>(zero) |
| s                             | Add_G   | add_G  | add_G   | Add_G  | add_G                          | add_G          | add_G          | add_G           |
| mbi                           | Test GNS-B message  | Normal GNS-B message   | Test GNS-B message  | Normal GNS-B message   | 11111                          | 10101          | 11111          | 10101           |
| gid                           | EGLL  | LFPG   | LEBL  | EDDF   | 5 7 12 12                      | 12 06 06 07    | 12 05 02 12    | 05 04 04 06     |
| gmi                           | Type 1 message  | Type 1 message   | Type 1 message  | Type 1 message   | 1                              | 1              | 1              | 1               |
| len                           | 28 bytes  | 28 bytes   | 28 bytes  | 28 bytes   | 28                             | 28             | 28             | 27              |
| r                             | GNS-B installed with 3 reference receivers                          | GNS-B installed with 2 reference receivers                     | GNS-B installed with 4 reference receivers                          | GNS-B installed with 2 reference receivers                     | 1                              | 0              | 2              | 0               |
| ac                            | GNS-B has accuracy designation B                                    | GNS-B has accuracy designation A                               | GNS-B has accuracy designation C                                    | GNS-B has accuracy designation A                               | 1                              | 0              | 2              | 0               |
| cid                           | GCID 1  | GCID 1   | GNS-B not healthy   | GCID 1   | 1                              | 1              | 7              | 1               |
| v (bit 1)                     | Negative denotes west variation (counter-clockwise from true north) | Positive denotes eastward variation (clockwise from due north) | Negative denotes west variation (counter-clockwise from true north) | Positive denotes eastward variation (clockwise from due north) | 1                              | 0              | 1              | 0               |
| v (bits 2 to 11)              | 0,25 degrees  | 0 degree   | 180,00 degrees  | 0 degree   | 1                              | 0              | 720            | 0               |
| vi                            | $0,1 \times 10^{-6}$  | 0  | $25,5 \times 10^{-6}$   | 0  | 1                              | 0              | 255            | 0               |
| i (bit 8)                     | 1   | 0  | 1   | 0  | 1                              | 0              | 1              | 0               |
| i (bits 1 to 7)               | 3   | 0  | 381   | 0  | 1                              | 0              | 127            | 0               |
| h                             | 100   | 0  | 25 500  | 0  | 1                              | 0              | 255            | 0               |
| u                             | 1   | 0  | 255   | 0  | 1                              | 0              | 255            | 0               |
| lat (bit 32)                  | Positive  | Negative   | Positive  | Negative   | 1                              | 0              | 1              | 0               |
| lat (bits 1 - 31)             | 0 degree 0 minute<br>0,0005 arc s                                   | 0 degree 0 minute<br>0 arc s                                   | 90 degrees 0 minute<br>0 arc s                                      | 0 degree 0 minute<br>0 arc s                                   | 1                              | 0              | 648 000 000    | 0               |
| lon (bit 32)                  | Positive  | Negative   | Positive  | Negative   | 1                              | 0              | 1              | 0               |



| GNS_TYPE2_APPIN_PARAMETERS(x) |                                   |                              |                                 |                              | GNS_TYPE2_RF_OUT_PARAMETERS(x) |                        |                     |                     |
|-------------------------------|-----------------------------------|------------------------------|---------------------------------|------------------------------|--------------------------------|------------------------|---------------------|---------------------|
|                               | Set P<br>(middle range)           | Set Q<br>(min)               | Set R<br>(max)                  | Set S<br>(zero)              | Set P<br>(middle range)        | Set Q<br>(min)         | Set R<br>(max)      | Set S<br>(zero)     |
| lon (bits 1 to 31)            | 0 degree 0 minute<br>0,0005 arc s | 0 degree 0 minute<br>0 arc s | 180 degrees 0 minute<br>0 arc s | 0 degree 0 minute<br>0 arc s | 1                              | 0                      | 1 296 000<br>000    | 0                   |
| h (bit 24)                    | Positive                          | Negative                     | Positive                        | Negative                     | 1                              | 0                      | 1                   | 0                   |
| h (bits 1 to 23)              | 0,01 m                            | 0 m                          | 83 886,07 m                     | 0 m                          | 1                              | 0                      | 8 388 607           | 0                   |
| gc                            | See clause 5.5.5                  | See clause 5.5.5             | See clause 5.5.5                | See clause 5.5.5             | See<br>clause 5.5.5            | See<br>clause<br>5.5.5 | See<br>clause 5.5.5 | See<br>clause 5.5.5 |

Table 7.36: Values for use in the test "GNS\_Type4\_Message\_A"

| GNS_TYPE4_APPIN_PARAMETERS(x)         |                                   |                              |                                |                              | GNS_TYPE4_RF_OUT_PARAMETERS(x) |                |                |                 |
|---------------------------------------|-----------------------------------|------------------------------|--------------------------------|------------------------------|--------------------------------|----------------|----------------|-----------------|
|                                       | Set P<br>(middle range)           | Set Q<br>(min)               | Set R<br>(max)                 | Set S<br>(zero)              | Set P<br>(middle range)        | Set Q<br>(min) | Set R<br>(max) | Set S<br>(zero) |
| s                                     | Add_G                             | add_G                        | add_G                          | Add_G                        | add_G                          | add_G          | add_G          | add_G           |
| mbi                                   | Test GNS-B message                | Normal GNS-B<br>message      | Test GNS-B message             | Normal GNS-B<br>message      | 11111                          | 10101          | 11111          | 10101           |
| gid                                   | EGLL                              | LFPG                         | LEBL                           | EDDF                         | 5 7 12 12                      | 12 06 06 07    | 12 05 02 12    | 05 04 04 06     |
| gmi                                   | Type 1 message                    | Type 1 message               | Type 1 message                 | Type 1 message               | 1                              | 1              | 1              | 1               |
| len                                   | 51 bytes                          | 51 bytes                     | 51 bytes                       | 51 bytes                     | 51                             | 51             | 51             | 51              |
| l                                     | 3                                 | 2                            | 212                            | 2                            | 1                              | 0              | 210            | 0               |
| Operation Type                        | 1                                 | 0                            | 15                             | 0                            | 1                              | 0              | 15             | 0               |
| SBAS provider ID                      | 1                                 | 0                            | 15                             | 0                            | 1                              | 0              | 15             | 0               |
| Airport ID                            | LFBO                              | EGCC                         | EGKK                           | EDDS                         | 12 6 2 15                      | 5 7 3 3        | 5 7 11 11      | 5 4 4 19        |
| Runway Number                         | 1                                 | 0                            | 35                             | 0                            | 1                              | 0              | 35             | 0               |
| Runway Letter                         | Left runway                       | Single runway                | Centre runway                  | Single runway                | 1                              | 0              | 3              | 0               |
| Approach<br>performance<br>Designator | 1                                 | 0                            | 7                              | 0                            | 1                              | 0              | 7              | 0               |
| Route Indicator                       | C                                 | A                            | Z                              | A                            | 3                              | 1              | 26             | 1               |
| Reference Path Data<br>Selector       | 1                                 | 0                            | 48                             | 0                            | 1                              | 0              | 48             | 0               |
| Reference Path ID                     | GTBS                              | GTCT                         | GTDU                           | GTEV                         | 7 20 2 19                      | 7 20 3 20      | 7 20 4 21      | 7 20 5 22       |
| LTP/FTP Latitude<br>(bit 32)          | Positive                          | Negative                     | Positive                       | Negative                     | 1                              | 0              | 1              | 0               |
| LTP/FTP Latitude<br>(bits 1 to 31)    | 0 degree 0 minute<br>0,0005 arc s | 0 degree 0 minute<br>0 arc s | 90 degrees 0 minute<br>0 arc s | 0 degree 0 minute<br>0 arc s | 1                              | 0              | 648 000 000    | 0               |
| LTP/FTP Longitude<br>(bit 32)         | Positive                          | Negative                     | Positive                       | Negative                     | 1                              | 0              | 1              | 0               |

| GNS_TYPE4_APPIN_PARAMETERS(x)                  |                                   |                              |                                 |                              | GNS_TYPE4_RF_OUT_PARAMETERS(x) |                       |                       |                       |
|--|-----------------------------------|------------------------------|---------------------------------|------------------------------|--------------------------------|-----------------------|-----------------------|-----------------------|
|  | Set P<br>(middle range)           | Set Q<br>(min)               | Set R<br>(max)                  | Set S<br>(zero)              | Set P<br>(middle<br>range)     | Set Q<br>(min)        | Set R<br>(max)        | Set S<br>(zero)       |
| LTP/FTP Longitude<br>(bits 1 to 31)            | 0 degree 0 minute<br>0,0005 arc s | 0 degree 0 minute<br>0 arc s | 180 degrees 0 minute<br>0 arc s | 0 degree 0 minute<br>0 arc s | 1                              | 0                     | 1 296 000 000         | 0                     |
| LTP/FTP Height                                 | -511,9 m                          | -512,0 m                     | 6 041,5 m                       | 0,0 m                        | 1                              | 0                     | 65 535                | 5 120                 |
| ΔFPAP Latitude<br>(bit 24)                     | Positive                          | Negative                     | Positive                        | Negative                     | 1                              | 0                     | 1                     | 0                     |
| ΔFPAP Latitude<br>(bits 1 to 23)               | 0 degree 0 minute<br>0,0005 arc s | 0 degree 0 minute<br>0 arc s | 1 degree 0 minute<br>0 arc s    | 0 degree 0 minute<br>0 arc s | 1                              | 0                     | 1 200 000             | 0                     |
| ΔFPAP Longitude<br>(bit 24)                    | Positive                          | Negative                     | Positive                        | Negative                     | 1                              | 0                     | 1                     | 0                     |
| ΔFPAP Longitude<br>(bits 1 to 23)              | 0 degree 0 minute<br>0,0005 arc s | 0 degree 0 minute<br>0 arc s | 1 degree 0 minute<br>0 arc s    | 0 degree 0 minute<br>0 arc s | 1                              | 0                     | 1 200 000             | 0                     |
| Approach Threshold<br>Crossing Height<br>(TCH) | 0,05                              | 0                            | 1 635,35                        | 0                            | 1                              | 0                     | 32 707                | 0                     |
| Approach TCH Units<br>Selector                 | Metres                            | Metres                       | Metres                          | Metres                       | 1                              | 1                     | 1                     | 1                     |
| Glidepath Angle<br>(GPA)                       | 0,01 degrees                      | 0 degree                     | 90 degrees                      | 0 degree                     | 1                              | 0                     | 9 000                 | 0                     |
| Course width                                   | 80,25 metres                      | 80 metres                    | 143,75 metres                   | 80 metres                    | 1                              | 0                     | 255                   | 0                     |
| Δlength offset                                 | 8 metres                          | 0 metre                      | 2 032 metres                    | 0 metre                      | 1                              | 0                     | 254                   | 0                     |
| Final Approach<br>Segment CRC                  | See clause 5.5.5.2                | See clause 5.5.5.2           | See clause 5.5.5.2              | See clause 5.5.5.2           | See clause<br>5.5.5.2          | See clause<br>5.5.5.2 | See clause<br>5.5.5.2 | See clause<br>5.5.5.2 |
| va   | 0,1                               | 0                            | 25,4 m                          | 0                            | 1                              | 0                     | 254                   | 0                     |
| la   | 0,2                               | 0                            | 50,8                            | 0                            | 1                              | 0                     | 254                   | 0                     |
| gc   | See clause 5.5.5                  | See clause 5.5.5             | See clause 5.5.5                | See clause 5.5.5             | See clause<br>5.5.5            | See clause<br>5.5.5   | See clause<br>5.5.5   | See clause<br>5.5.5   |

### 7.4.3.1.5 VDL4 Burst formats

A subfield value of "x" shall mean that the parameter value may be ignored for the purpose of the particular test.

The following burst formats do not include the effect of bit stuffing. On generation of a burst at the RF PCO by the test harness, a logical 0 shall be inserted following a consecutive sequence of five logical 1s, except when arising in a flag. During recording of a burst by the test harness at the RF PCO, a sequence of five logical 1s followed by a 0 shall cause the 0 to be removed.

On generation of a burst, the test harness shall insert the value of the CRC field in accordance with clause 5.2.1.1.

Bursts are used in some test cases that are defined in EN 301 842-2 [3]. This clause defines additional bursts and frames not already defined in EN 301 842-2 [3].

#### 7.4.3.1.5.1 Bursts defined for ADS-B tests

**Table 7.37: DIR\_REQ\_a (Da): Contains general request**

| Description           | Octet | Bit number        |                   |                   |                   |                   |                   |                   |                   |
|-----------------------|-------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
|                       |       | 8                 | 7                 | 6                 | 5                 | 4                 | 3                 | 2                 | 1                 |
| flag                  | -     | 0                 | 1                 | 1                 | 1                 | 1                 | 1                 | 1                 | 0                 |
| s, ver, rid, a/d      | 1     | s <sub>27</sub>   | s <sub>26</sub>   | s <sub>25</sub>   | 0                 | 0                 | 0                 | 0                 | 1                 |
| s                     | 2     | s <sub>24</sub>   | s <sub>23</sub>   | s <sub>22</sub>   | s <sub>21</sub>   | s <sub>20</sub>   | s <sub>19</sub>   | s <sub>18</sub>   | s <sub>17</sub>   |
| s                     | 3     | s <sub>16</sub>   | s <sub>15</sub>   | s <sub>14</sub>   | s <sub>13</sub>   | s <sub>12</sub>   | s <sub>11</sub>   | s <sub>10</sub>   | s <sub>9</sub>    |
| s                     | 4     | s <sub>8</sub>    | s <sub>7</sub>    | s <sub>6</sub>    | s <sub>5</sub>    | s <sub>4</sub>    | s <sub>3</sub>    | s <sub>2</sub>    | s <sub>1</sub>    |
| r-mi, mi              | 5     | r-mi <sub>1</sub> | 0                 | 0                 | 0                 | 0                 | 0                 | 0                 | 1                 |
| res, r-mi             | 6     | 0                 | 0                 | r-mi <sub>7</sub> | r-mi <sub>6</sub> | r-mi <sub>5</sub> | r-mi <sub>4</sub> | r-mi <sub>3</sub> | r-mi <sub>2</sub> |
| dt, f                 | 7     | dt <sub>4</sub>   | dt <sub>3</sub>   | dt <sub>2</sub>   | dt <sub>1</sub>   | f <sub>12</sub>   | f <sub>11</sub>   | f <sub>10</sub>   | f <sub>9</sub>    |
| f                     | 8     | f <sub>8</sub>    | f <sub>7</sub>    | f <sub>6</sub>    | f <sub>5</sub>    | f <sub>4</sub>    | f <sub>3</sub>    | f <sub>2</sub>    | f <sub>1</sub>    |
| lg                    | 9     | lg <sub>8</sub>   | lg <sub>7</sub>   | lg <sub>6</sub>   | lg <sub>5</sub>   | lg <sub>4</sub>   | lg <sub>3</sub>   | lg <sub>2</sub>   | lg <sub>1</sub>   |
| lg, res, do           | 10    | res               | res               | trmt              | do <sub>13</sub>  | do <sub>12</sub>  | do <sub>11</sub>  | do <sub>10</sub>  | do <sub>9</sub>   |
| do                    | 11    | do <sub>8</sub>   | do <sub>7</sub>   | do <sub>6</sub>   | do <sub>5</sub>   | do <sub>4</sub>   | do <sub>3</sub>   | do <sub>2</sub>   | do <sub>1</sub>   |
| or, rcvr, pr_flag, nr | 12    | or                | rcvr <sub>2</sub> | rcvr <sub>1</sub> | pr_flag           | nr <sub>4</sub>   | nr <sub>3</sub>   | nr <sub>2</sub>   | nr <sub>1</sub>   |
| d                     | 13    | d <sub>24</sub>   | d <sub>23</sub>   | d <sub>22</sub>   | d <sub>21</sub>   | d <sub>20</sub>   | d <sub>19</sub>   | d <sub>18</sub>   | d <sub>17</sub>   |
| d                     | 14    | d <sub>16</sub>   | d <sub>15</sub>   | d <sub>14</sub>   | d <sub>13</sub>   | d <sub>12</sub>   | d <sub>11</sub>   | d <sub>10</sub>   | d <sub>9</sub>    |
| d                     | 15    | d <sub>8</sub>    | d <sub>7</sub>    | d <sub>6</sub>    | d <sub>5</sub>    | d <sub>4</sub>    | d <sub>3</sub>    | d <sub>2</sub>    | d <sub>1</sub>    |
| erid, d               | 16    | 0                 | 1                 | 1                 | 0                 | 0                 | d <sub>27</sub>   | d <sub>26</sub>   | d <sub>25</sub>   |
| c                     | 17    | c <sub>9</sub>    | c <sub>10</sub>   | c <sub>11</sub>   | c <sub>12</sub>   | c <sub>13</sub>   | c <sub>14</sub>   | c <sub>15</sub>   | c <sub>16</sub>   |
| c                     | 18    | c <sub>1</sub>    | c <sub>2</sub>    | c <sub>3</sub>    | c <sub>4</sub>    | c <sub>5</sub>    | c <sub>6</sub>    | c <sub>7</sub>    | c <sub>8</sub>    |
| flag                  | -     | 0                 | 1                 | 1                 | 1                 | 1                 | 1                 | 1                 | 0                 |

Table 7.38: DIR\_SYNC\_BURST\_a (DSa): Directed sync burst. Occupies one slot. Basic variable part

| Description         | Octet | Bit number      |                 |                 |                 |                 |                 |                 |                 |
|---------------------|-------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|                     |       | 8               | 7               | 6               | 5               | 4               | 3               | 2               | 1               |
| flag                | -     | 0               | 1               | 1               | 1               | 1               | 1               | 1               | 0               |
| s, ver, rid, a/d    | 1     | s <sub>27</sub> | s <sub>26</sub> | s <sub>25</sub> | 0               | 0               | 0               | 1               | 1               |
| s                   | 2     | s <sub>24</sub> | s <sub>23</sub> | s <sub>22</sub> | s <sub>21</sub> | s <sub>20</sub> | s <sub>19</sub> | s <sub>18</sub> | s <sub>17</sub> |
| s                   | 3     | s <sub>16</sub> | s <sub>15</sub> | s <sub>14</sub> | s <sub>13</sub> | s <sub>12</sub> | s <sub>11</sub> | s <sub>10</sub> | s <sub>9</sub>  |
| s                   | 4     | s <sub>8</sub>  | s <sub>7</sub>  | s <sub>6</sub>  | s <sub>5</sub>  | s <sub>4</sub>  | s <sub>3</sub>  | s <sub>2</sub>  | s <sub>1</sub>  |
| nic, cprf, b/g, tqc | 5     | x               | x               | x               | x               | x               | x               | 1               | 0               |
| lat                 | 6     | x               | x               | x               | x               | x               | x               | x               | x               |
| balt                | 7     | x               | x               | x               | x               | x               | x               | x               | x               |
| balt                | 8     | x               | x               | x               | x               | x               | x               | x               | x               |
| lon                 | 9     | x               | x               | x               | x               | x               | x               | x               | x               |
| tfom, lon           | 10    | x               | x               | x               | x               | x               | x               | x               | x               |
| da, id              | 11    | x               | x               | x               | x               | 0               | 0               | 0               | 0               |
| in                  | 12    | x               | x               | x               | x               | x               | x               | x               | x               |
| in                  | 13    | x               | x               | x               | x               | x               | x               | x               | x               |
| in                  | 14    | x               | x               | x               | x               | x               | x               | x               | x               |
| in                  | 15    | x               | x               | x               | x               | x               | x               | x               | x               |
| in                  | 16    | x               | x               | x               | x               | x               | x               | x               | x               |
| in                  | 17    | x               | x               | x               | x               | x               | x               | x               | x               |
| in, pt              | 18    | x               | x               | x               | x               | x               | x               | pt <sub>2</sub> | pt <sub>1</sub> |
| po                  | 19    | po <sub>8</sub> | po <sub>7</sub> | po <sub>6</sub> | po <sub>5</sub> | po <sub>4</sub> | po <sub>3</sub> | po <sub>2</sub> | po <sub>1</sub> |
| c                   | 20    | c <sub>9</sub>  | c <sub>10</sub> | c <sub>11</sub> | c <sub>12</sub> | c <sub>13</sub> | c <sub>14</sub> | c <sub>15</sub> | c <sub>16</sub> |
| c                   | 21    | c <sub>1</sub>  | c <sub>2</sub>  | c <sub>3</sub>  | c <sub>4</sub>  | c <sub>5</sub>  | c <sub>6</sub>  | c <sub>7</sub>  | c <sub>8</sub>  |
| flag                | -     | 0               | 1               | 1               | 1               | 1               | 1               | 1               | 0               |

Table 7.39: PLEA\_a (Pa): Information field contains destination address. Fits within delayed burst

| Description      | Octet | Bit number      |                 |                 |                 |                 |                 |                 |                 |
|------------------|-------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|                  |       | 8               | 7               | 6               | 5               | 4               | 3               | 2               | 1               |
| flag             | -     | 0               | 1               | 1               | 1               | 1               | 1               | 1               | 0               |
| s, ver, rid, a/d | 1     | s <sub>27</sub> | s <sub>26</sub> | s <sub>25</sub> | 0               | 0               | 0               | 0               | 1               |
| s                | 2     | s <sub>24</sub> | s <sub>23</sub> | s <sub>22</sub> | s <sub>21</sub> | s <sub>20</sub> | s <sub>19</sub> | s <sub>18</sub> | s <sub>17</sub> |
| s                | 3     | s <sub>16</sub> | s <sub>15</sub> | s <sub>14</sub> | s <sub>13</sub> | s <sub>12</sub> | s <sub>11</sub> | s <sub>10</sub> | s <sub>9</sub>  |
| s                | 4     | s <sub>8</sub>  | s <sub>7</sub>  | s <sub>6</sub>  | s <sub>5</sub>  | s <sub>4</sub>  | s <sub>3</sub>  | s <sub>2</sub>  | s <sub>1</sub>  |
| in, mi           | 5     | 0               | 1               | 0               | 0               | 0               | 1               | 0               | 1               |
| d                | 6     | d <sub>24</sub> | d <sub>23</sub> | d <sub>22</sub> | d <sub>21</sub> | d <sub>20</sub> | d <sub>19</sub> | d <sub>18</sub> | d <sub>17</sub> |
| d                | 7     | d <sub>16</sub> | d <sub>15</sub> | d <sub>14</sub> | d <sub>13</sub> | d <sub>12</sub> | d <sub>11</sub> | d <sub>10</sub> | d <sub>9</sub>  |
| d                | 8     | d <sub>8</sub>  | d <sub>7</sub>  | d <sub>6</sub>  | d <sub>5</sub>  | d <sub>4</sub>  | d <sub>3</sub>  | d <sub>2</sub>  | d <sub>1</sub>  |
| erid, d          | 9     | 0               | 0               | 0               | 0               | 0               | d <sub>27</sub> | d <sub>26</sub> | d <sub>25</sub> |
| c                | 10    | c <sub>9</sub>  | c <sub>10</sub> | c <sub>11</sub> | c <sub>12</sub> | c <sub>13</sub> | c <sub>14</sub> | c <sub>15</sub> | c <sub>16</sub> |
| c                | 11    | c <sub>1</sub>  | c <sub>2</sub>  | c <sub>3</sub>  | c <sub>4</sub>  | c <sub>5</sub>  | c <sub>6</sub>  | c <sub>7</sub>  | c <sub>8</sub>  |
| flag             | -     | 0               | 1               | 1               | 1               | 1               | 1               | 1               | 0               |

Table 7.40: PLEA\_RESP\_a (PRa): Directed request with pr\_flag = 1, nr ≠ "special"

| Description      | Octet | Bit number        |                   |                  |                  |                  |                  |                  |                  |
|------------------|-------|-------------------|-------------------|------------------|------------------|------------------|------------------|------------------|------------------|
|                  |       | 8                 | 7                 | 6                | 5                | 4                | 3                | 2                | 1                |
| flag             | -     | 0                 | 1                 | 1                | 1                | 1                | 1                | 1                | 0                |
| s, ver, rid, a/d | 1     | s <sub>27</sub>   | s <sub>26</sub>   | s <sub>25</sub>  | 0                | 0                | 0                | 0                | 1                |
| s                | 2     | s <sub>24</sub>   | s <sub>23</sub>   | s <sub>22</sub>  | s <sub>21</sub>  | s <sub>20</sub>  | s <sub>19</sub>  | s <sub>18</sub>  | s <sub>17</sub>  |
| s                | 3     | s <sub>16</sub>   | s <sub>15</sub>   | s <sub>14</sub>  | s <sub>13</sub>  | s <sub>12</sub>  | s <sub>11</sub>  | s <sub>10</sub>  | s <sub>9</sub>   |
| s                | 4     | s <sub>8</sub>    | s <sub>7</sub>    | s <sub>6</sub>   | s <sub>5</sub>   | s <sub>4</sub>   | s <sub>3</sub>   | s <sub>2</sub>   | s <sub>1</sub>   |
| res, mi          | 5     | 0                 | 1                 | 0                | 0                | 0                | 1                | 0                | 1                |
| a                | 6     | a <sub>11,6</sub> | a <sub>11,5</sub> | a <sub>8,6</sub> | a <sub>8,5</sub> | a <sub>8,4</sub> | a <sub>8,3</sub> | a <sub>8,2</sub> | a <sub>8,1</sub> |
| a                | 7     | a <sub>11,4</sub> | a <sub>11,3</sub> | a <sub>7,6</sub> | a <sub>7,5</sub> | a <sub>7,4</sub> | a <sub>7,3</sub> | a <sub>7,2</sub> | a <sub>7,1</sub> |
| a                | 8     | a <sub>11,2</sub> | a <sub>11,1</sub> | a <sub>6,6</sub> | a <sub>6,5</sub> | a <sub>6,4</sub> | a <sub>6,3</sub> | a <sub>6,2</sub> | a <sub>6,1</sub> |
| a                | 9     | a <sub>10,6</sub> | a <sub>10,5</sub> | a <sub>5,6</sub> | a <sub>5,5</sub> | a <sub>5,4</sub> | a <sub>5,3</sub> | a <sub>5,2</sub> | a <sub>5,1</sub> |
| a                | 10    | a <sub>10,4</sub> | a <sub>10,3</sub> | a <sub>4,6</sub> | a <sub>4,5</sub> | a <sub>4,4</sub> | a <sub>4,3</sub> | a <sub>4,2</sub> | a <sub>4,1</sub> |
| a                | 11    | a <sub>10,2</sub> | a <sub>10,1</sub> | a <sub>3,6</sub> | a <sub>3,5</sub> | a <sub>3,4</sub> | a <sub>3,3</sub> | a <sub>3,2</sub> | a <sub>3,1</sub> |
| a                | 12    | a <sub>9,6</sub>  | a <sub>9,5</sub>  | a <sub>2,6</sub> | a <sub>2,5</sub> | a <sub>2,4</sub> | a <sub>2,3</sub> | a <sub>2,2</sub> | a <sub>2,1</sub> |
| a                | 13    | a <sub>9,4</sub>  | a <sub>9,3</sub>  | a <sub>1,6</sub> | a <sub>1,5</sub> | a <sub>1,4</sub> | a <sub>1,3</sub> | a <sub>1,2</sub> | a <sub>1,1</sub> |
| a, off           | 14    | a <sub>9,2</sub>  | a <sub>9,1</sub>  | off <sub>9</sub> | off <sub>8</sub> | off <sub>7</sub> | off <sub>6</sub> | off <sub>5</sub> | off <sub>4</sub> |
| off, pr_flag, nr | 15    | off <sub>3</sub>  | off <sub>2</sub>  | off <sub>1</sub> | 1                | nr <sub>4</sub>  | nr <sub>3</sub>  | nr <sub>2</sub>  | nr <sub>1</sub>  |
| d                | 16    | d <sub>24</sub>   | d <sub>23</sub>   | d <sub>22</sub>  | d <sub>21</sub>  | d <sub>20</sub>  | d <sub>19</sub>  | d <sub>18</sub>  | d <sub>17</sub>  |
| d                | 17    | d <sub>16</sub>   | d <sub>15</sub>   | d <sub>14</sub>  | d <sub>13</sub>  | d <sub>12</sub>  | d <sub>11</sub>  | d <sub>10</sub>  | d <sub>9</sub>   |
| d                | 18    | d <sub>8</sub>    | d <sub>7</sub>    | d <sub>6</sub>   | d <sub>5</sub>   | d <sub>4</sub>   | d <sub>3</sub>   | d <sub>2</sub>   | d <sub>1</sub>   |
| erid, d          | 19    | 0                 | 1                 | 1                | 0                | 0                | d <sub>27</sub>  | d <sub>26</sub>  | d <sub>25</sub>  |
| c                | 20    | c <sub>9</sub>    | c <sub>10</sub>   | c <sub>11</sub>  | c <sub>12</sub>  | c <sub>13</sub>  | c <sub>14</sub>  | c <sub>15</sub>  | c <sub>16</sub>  |
| c                | 21    | c <sub>1</sub>    | c <sub>2</sub>    | c <sub>3</sub>   | c <sub>4</sub>   | c <sub>5</sub>   | c <sub>6</sub>   | c <sub>7</sub>   | c <sub>8</sub>   |
| flag             | -     | 0                 | 1                 | 1                | 1                | 1                | 1                | 1                | 0                |

Table 7.41: ADSB\_REQUEST\_a (ARa): Includes unicast reservation, sleep = 0, auto = 0

| Description                  | Octet | Bit number       |                  |                  |                 |                 |                 |                 |                 |
|------------------------------|-------|------------------|------------------|------------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|                              |       | 8                | 7                | 6                | 5               | 4               | 3               | 2               | 1               |
| flag                         | -     | 0                | 1                | 1                | 1               | 1               | 1               | 1               | 0               |
| s, ver, rid a/d              | 1     | s <sub>27</sub>  | s <sub>26</sub>  | s <sub>25</sub>  | 0               | 0               | 0               | 0               | 1               |
| s                            | 2     | s <sub>24</sub>  | s <sub>23</sub>  | s <sub>22</sub>  | s <sub>21</sub> | s <sub>20</sub> | s <sub>19</sub> | s <sub>18</sub> | s <sub>17</sub> |
| s                            | 3     | s <sub>16</sub>  | s <sub>15</sub>  | s <sub>14</sub>  | s <sub>13</sub> | s <sub>12</sub> | s <sub>11</sub> | s <sub>10</sub> | s <sub>9</sub>  |
| s                            | 4     | s <sub>8</sub>   | s <sub>7</sub>   | s <sub>6</sub>   | s <sub>5</sub>  | s <sub>4</sub>  | s <sub>3</sub>  | s <sub>2</sub>  | s <sub>1</sub>  |
| sleep, auto, r-b/a, burst ID | 5     | 0                | 0                | 0                | 0               | 0               | 0               | 0               | 1               |
| d                            | 6     | d <sub>24</sub>  | d <sub>23</sub>  | d <sub>22</sub>  | d <sub>21</sub> | d <sub>20</sub> | d <sub>19</sub> | d <sub>18</sub> | d <sub>17</sub> |
| d                            | 7     | d <sub>16</sub>  | d <sub>15</sub>  | d <sub>14</sub>  | d <sub>13</sub> | d <sub>12</sub> | d <sub>11</sub> | d <sub>10</sub> | d <sub>9</sub>  |
| d                            | 8     | d <sub>8</sub>   | d <sub>7</sub>   | d <sub>6</sub>   | d <sub>5</sub>  | d <sub>4</sub>  | d <sub>3</sub>  | d <sub>2</sub>  | d <sub>1</sub>  |
| sdf, d                       | 9     | ro <sub>12</sub> | ro <sub>11</sub> | ro <sub>10</sub> | ro <sub>9</sub> | sdf             | d <sub>27</sub> | d <sub>26</sub> | d <sub>25</sub> |
| ro                           | 10    | ro <sub>8</sub>  | ro <sub>7</sub>  | ro <sub>6</sub>  | ro <sub>5</sub> | ro <sub>4</sub> | ro <sub>3</sub> | ro <sub>2</sub> | ro <sub>1</sub> |
| lg                           | 11    | lg <sub>8</sub>  | lg <sub>7</sub>  | lg <sub>6</sub>  | lg <sub>5</sub> | lg <sub>4</sub> | lg <sub>3</sub> | lg <sub>2</sub> | lg <sub>1</sub> |
| pr                           | 12    | 0                | 0                | 1                | 0               | pr <sub>4</sub> | pr <sub>3</sub> | pr <sub>2</sub> | pr <sub>1</sub> |
| c                            | 13    | c <sub>9</sub>   | c <sub>10</sub>  | c <sub>11</sub>  | c <sub>12</sub> | c <sub>13</sub> | c <sub>14</sub> | c <sub>15</sub> | c <sub>16</sub> |
| c                            | 14    | c <sub>1</sub>   | c <sub>2</sub>   | c <sub>3</sub>   | c <sub>4</sub>  | c <sub>5</sub>  | c <sub>6</sub>  | c <sub>7</sub>  | c <sub>8</sub>  |
| flag                         | -     | 0                | 1                | 1                | 1               | 1               | 1               | 1               | 0               |

Table 7.42: ADSB\_REQUEST\_b (ARb): Includes unicast reservation, sleep = 0, auto = 1

| Description                  | Octet | Bit number       |                  |                  |                  |                   |                   |                   |                   |
|------------------------------|-------|------------------|------------------|------------------|------------------|-------------------|-------------------|-------------------|-------------------|
|                              |       | 8                | 7                | 6                | 5                | 4                 | 3                 | 2                 | 1                 |
| flag                         | -     | 0                | 1                | 1                | 1                | 1                 | 1                 | 1                 | 0                 |
| s, ver, rid, a/d             | 1     | s <sub>27</sub>  | s <sub>26</sub>  | s <sub>25</sub>  | 0                | 0                 | 0                 | 0                 | 1                 |
| s                            | 2     | s <sub>24</sub>  | s <sub>23</sub>  | s <sub>22</sub>  | s <sub>21</sub>  | s <sub>20</sub>   | s <sub>19</sub>   | s <sub>18</sub>   | s <sub>17</sub>   |
| s                            | 3     | s <sub>16</sub>  | s <sub>15</sub>  | s <sub>14</sub>  | s <sub>13</sub>  | s <sub>12</sub>   | s <sub>11</sub>   | s <sub>10</sub>   | s <sub>9</sub>    |
| s                            | 4     | s <sub>8</sub>   | s <sub>7</sub>   | s <sub>6</sub>   | s <sub>5</sub>   | s <sub>4</sub>    | s <sub>3</sub>    | s <sub>2</sub>    | s <sub>1</sub>    |
| sleep, auto, r-b/a, burst ID | 5     | 0                | 1                | 0                | 0                | 0                 | 0                 | 0                 | 1                 |
| lg, aux, r-id                | 6     | lg <sub>2</sub>  | lg <sub>1</sub>  | aux <sub>2</sub> | aux <sub>1</sub> | r-id <sub>4</sub> | r-id <sub>3</sub> | r-id <sub>2</sub> | r-id <sub>1</sub> |
| d                            | 7     | d <sub>24</sub>  | d <sub>23</sub>  | d <sub>22</sub>  | d <sub>21</sub>  | d <sub>20</sub>   | d <sub>19</sub>   | d <sub>18</sub>   | d <sub>17</sub>   |
| d                            | 8     | d <sub>16</sub>  | d <sub>15</sub>  | d <sub>14</sub>  | d <sub>13</sub>  | d <sub>12</sub>   | d <sub>11</sub>   | d <sub>10</sub>   | d <sub>9</sub>    |
| d                            | 9     | d <sub>8</sub>   | d <sub>7</sub>   | d <sub>6</sub>   | d <sub>5</sub>   | d <sub>4</sub>    | d <sub>3</sub>    | d <sub>2</sub>    | d <sub>1</sub>    |
| sdf, d                       | 10    | ro <sub>12</sub> | ro <sub>11</sub> | ro <sub>10</sub> | ro <sub>9</sub>  | sdf               | d <sub>27</sub>   | d <sub>26</sub>   | d <sub>25</sub>   |
| ro                           | 11    | ro <sub>8</sub>  | ro <sub>7</sub>  | ro <sub>6</sub>  | ro <sub>5</sub>  | ro <sub>4</sub>   | ro <sub>3</sub>   | ro <sub>2</sub>   | ro <sub>1</sub>   |
| lg                           | 12    | lg <sub>8</sub>  | lg <sub>7</sub>  | lg <sub>6</sub>  | lg <sub>5</sub>  | lg <sub>4</sub>   | lg <sub>3</sub>   | lg <sub>2</sub>   | lg <sub>1</sub>   |
| pr                           | 13    | 0                | 0                | 1                | 0                | pr <sub>4</sub>   | pr <sub>3</sub>   | pr <sub>2</sub>   | pr <sub>1</sub>   |
| c                            | 14    | c <sub>9</sub>   | c <sub>10</sub>  | c <sub>11</sub>  | c <sub>12</sub>  | c <sub>13</sub>   | c <sub>14</sub>   | c <sub>15</sub>   | c <sub>16</sub>   |
| c                            | 15    | c <sub>1</sub>   | c <sub>2</sub>   | c <sub>3</sub>   | c <sub>4</sub>   | c <sub>5</sub>    | c <sub>6</sub>    | c <sub>7</sub>    | c <sub>8</sub>    |
| flag                         | -     | 0                | 1                | 1                | 1                | 1                 | 1                 | 1                 | 0                 |

Table 7.43: ADSB\_REQUEST\_c (ARc): Includes directed request reservation, sleep = 1, auto = 0

| Description                  | Octet | Bit number       |                   |                   |                  |                  |                  |                  |                  |
|------------------------------|-------|------------------|-------------------|-------------------|------------------|------------------|------------------|------------------|------------------|
|                              |       | 8                | 7                 | 6                 | 5                | 4                | 3                | 2                | 1                |
| flag                         | -     | 0                | 1                 | 1                 | 1                | 1                | 1                | 1                | 0                |
| s, ver, rid, a/d             | 1     | s <sub>27</sub>  | s <sub>26</sub>   | s <sub>25</sub>   | 0                | 0                | 0                | 0                | 1                |
| s                            | 2     | s <sub>24</sub>  | s <sub>23</sub>   | s <sub>22</sub>   | s <sub>21</sub>  | s <sub>20</sub>  | s <sub>19</sub>  | s <sub>18</sub>  | s <sub>17</sub>  |
| s                            | 3     | s <sub>16</sub>  | s <sub>15</sub>   | s <sub>14</sub>   | s <sub>13</sub>  | s <sub>12</sub>  | s <sub>11</sub>  | s <sub>10</sub>  | s <sub>9</sub>   |
| s                            | 4     | s <sub>8</sub>   | s <sub>7</sub>    | s <sub>6</sub>    | s <sub>5</sub>   | s <sub>4</sub>   | s <sub>3</sub>   | s <sub>2</sub>   | s <sub>1</sub>   |
| sleep, auto, r-b/a, burst ID | 5     | 1                | 0                 | 0                 | 0                | 0                | 0                | 0                | 1                |
| snr, vel                     | 6     | snr <sub>4</sub> | snr <sub>3</sub>  | snr <sub>2</sub>  | snr <sub>1</sub> | vel <sub>4</sub> | vel <sub>3</sub> | vel <sub>2</sub> | vel <sub>1</sub> |
| pos                          | 7     | pos <sub>8</sub> | pos <sub>7</sub>  | pos <sub>6</sub>  | pos <sub>5</sub> | pos <sub>4</sub> | pos <sub>3</sub> | pos <sub>2</sub> | pos <sub>1</sub> |
| dt                           | 8     | dt <sub>4</sub>  | dt <sub>3</sub>   | dt <sub>2</sub>   | dt <sub>1</sub>  | f <sub>12</sub>  | f <sub>11</sub>  | f <sub>10</sub>  | f <sub>9</sub>   |
| f                            | 9     | f <sub>8</sub>   | f <sub>7</sub>    | f <sub>6</sub>    | f <sub>5</sub>   | f <sub>4</sub>   | f <sub>3</sub>   | f <sub>2</sub>   | f <sub>1</sub>   |
| lg                           | 10    | lg <sub>8</sub>  | lg <sub>7</sub>   | lg <sub>6</sub>   | lg <sub>5</sub>  | lg <sub>4</sub>  | lg <sub>3</sub>  | lg <sub>2</sub>  | lg <sub>1</sub>  |
| trmt                         | 11    | res              | res               | trmt              | do <sub>13</sub> | do <sub>12</sub> | do <sub>11</sub> | do <sub>10</sub> | do <sub>9</sub>  |
| do                           | 12    | do <sub>8</sub>  | do <sub>7</sub>   | do <sub>6</sub>   | do <sub>5</sub>  | do <sub>4</sub>  | do <sub>3</sub>  | do <sub>2</sub>  | do <sub>1</sub>  |
| or; rcvr, nr; pr_flag = 0    | 13    | or               | rcvr <sub>2</sub> | rcvr <sub>1</sub> | 0                | nr <sub>4</sub>  | nr <sub>3</sub>  | nr <sub>2</sub>  | nr <sub>1</sub>  |
| d                            | 14    | d <sub>24</sub>  | d <sub>23</sub>   | d <sub>22</sub>   | d <sub>21</sub>  | d <sub>20</sub>  | d <sub>19</sub>  | d <sub>18</sub>  | d <sub>17</sub>  |
| d                            | 15    | d <sub>16</sub>  | d <sub>15</sub>   | d <sub>14</sub>   | d <sub>13</sub>  | d <sub>12</sub>  | d <sub>11</sub>  | d <sub>10</sub>  | d <sub>9</sub>   |
| d                            | 16    | d <sub>8</sub>   | d <sub>7</sub>    | d <sub>6</sub>    | d <sub>5</sub>   | d <sub>4</sub>   | d <sub>3</sub>   | d <sub>2</sub>   | d <sub>1</sub>   |
| erid                         | 17    | 0                | 1                 | 1                 | 0                | 0                | d <sub>27</sub>  | d <sub>26</sub>  | d <sub>25</sub>  |
| c                            | 18    | c <sub>9</sub>   | c <sub>10</sub>   | c <sub>11</sub>   | c <sub>12</sub>  | c <sub>13</sub>  | c <sub>14</sub>  | c <sub>15</sub>  | c <sub>16</sub>  |
| c                            | 19    | c <sub>1</sub>   | c <sub>2</sub>    | c <sub>3</sub>    | c <sub>4</sub>   | c <sub>5</sub>   | c <sub>6</sub>   | c <sub>7</sub>   | c <sub>8</sub>   |
| flag                         | -     | 0                | 1                 | 1                 | 1                | 1                | 1                | 1                | 0                |

Table 7.44: ADSB\_REQUEST\_d (ARd) Includes directed request reservation, sleep = 1, auto = 1

| Description                  | Octet | Bit number       |                   |                   |                  |                   |                   |                   |                   |
|------------------------------|-------|------------------|-------------------|-------------------|------------------|-------------------|-------------------|-------------------|-------------------|
|                              |       | 8                | 7                 | 6                 | 5                | 4                 | 3                 | 2                 | 1                 |
| flag                         | -     | 0                | 1                 | 1                 | 1                | 1                 | 1                 | 1                 | 0                 |
| s, ver, rid, a/d             | 1     | s <sub>27</sub>  | s <sub>26</sub>   | s <sub>25</sub>   | 0                | 0                 | 0                 | 0                 | 1                 |
| s                            | 2     | s <sub>24</sub>  | s <sub>23</sub>   | s <sub>22</sub>   | s <sub>21</sub>  | s <sub>20</sub>   | s <sub>19</sub>   | s <sub>18</sub>   | s <sub>17</sub>   |
| s                            | 3     | s <sub>16</sub>  | s <sub>15</sub>   | s <sub>14</sub>   | s <sub>13</sub>  | s <sub>12</sub>   | s <sub>11</sub>   | s <sub>10</sub>   | s <sub>9</sub>    |
| s                            | 4     | s <sub>8</sub>   | s <sub>7</sub>    | s <sub>6</sub>    | s <sub>5</sub>   | s <sub>4</sub>    | s <sub>3</sub>    | s <sub>2</sub>    | s <sub>1</sub>    |
| sleep, auto, r-b/a, burst ID | 5     | 1                | 1                 | 0                 | 0                | 0                 | 0                 | 0                 | 1                 |
| snr, vel                     | 6     | snr <sub>4</sub> | snr <sub>3</sub>  | snr <sub>2</sub>  | snr <sub>1</sub> | vel <sub>4</sub>  | vel <sub>3</sub>  | vel <sub>2</sub>  | vel <sub>1</sub>  |
| pos                          | 7     | pos <sub>8</sub> | pos <sub>7</sub>  | pos <sub>6</sub>  | pos <sub>5</sub> | pos <sub>4</sub>  | pos <sub>3</sub>  | pos <sub>2</sub>  | pos <sub>1</sub>  |
| lg, aux, r-id                | 8     | lg <sub>2</sub>  | lg <sub>1</sub>   | aux <sub>2</sub>  | aux <sub>1</sub> | r-id <sub>4</sub> | r-id <sub>3</sub> | r-id <sub>2</sub> | r-id <sub>1</sub> |
| dt                           | 9     | dt <sub>4</sub>  | dt <sub>3</sub>   | dt <sub>2</sub>   | dt <sub>1</sub>  | f <sub>12</sub>   | f <sub>11</sub>   | f <sub>10</sub>   | f <sub>9</sub>    |
| f                            | 10    | f <sub>8</sub>   | f <sub>7</sub>    | f <sub>6</sub>    | f <sub>5</sub>   | f <sub>4</sub>    | f <sub>3</sub>    | f <sub>2</sub>    | f <sub>1</sub>    |
| lg                           | 11    | lg <sub>8</sub>  | lg <sub>7</sub>   | lg <sub>6</sub>   | lg <sub>5</sub>  | lg <sub>4</sub>   | lg <sub>3</sub>   | lg <sub>2</sub>   | lg <sub>1</sub>   |
| trmt                         | 12    | res              | res               | trmt              | do <sub>13</sub> | do <sub>12</sub>  | do <sub>11</sub>  | do <sub>10</sub>  | do <sub>9</sub>   |
| do                           | 13    | do <sub>8</sub>  | do <sub>7</sub>   | do <sub>6</sub>   | do <sub>5</sub>  | do <sub>4</sub>   | do <sub>3</sub>   | do <sub>2</sub>   | do <sub>1</sub>   |
| or; rcvr, nr; pr_flag = 0    | 14    | or               | rcvr <sub>2</sub> | rcvr <sub>1</sub> | 0                | nr <sub>4</sub>   | nr <sub>3</sub>   | nr <sub>2</sub>   | nr <sub>1</sub>   |
| d                            | 15    | d <sub>24</sub>  | d <sub>23</sub>   | d <sub>22</sub>   | d <sub>21</sub>  | d <sub>20</sub>   | d <sub>19</sub>   | d <sub>18</sub>   | d <sub>17</sub>   |
| d                            | 16    | d <sub>16</sub>  | d <sub>15</sub>   | d <sub>14</sub>   | d <sub>13</sub>  | d <sub>12</sub>   | d <sub>11</sub>   | d <sub>10</sub>   | d <sub>9</sub>    |
| d                            | 17    | d <sub>8</sub>   | d <sub>7</sub>    | d <sub>6</sub>    | d <sub>5</sub>   | d <sub>4</sub>    | d <sub>3</sub>    | d <sub>2</sub>    | d <sub>1</sub>    |
| erid                         | 18    | 0                | 1                 | 1                 | 0                | 0                 | d <sub>27</sub>   | d <sub>26</sub>   | d <sub>25</sub>   |
| c                            | 19    | c <sub>9</sub>   | c <sub>10</sub>   | c <sub>11</sub>   | c <sub>12</sub>  | c <sub>13</sub>   | c <sub>14</sub>   | c <sub>15</sub>   | c <sub>16</sub>   |
| c                            | 20    | c <sub>1</sub>   | c <sub>2</sub>    | c <sub>3</sub>    | c <sub>4</sub>   | c <sub>5</sub>    | c <sub>6</sub>    | c <sub>7</sub>    | c <sub>8</sub>    |
| flag                         | -     | 0                | 1                 | 1                 | 1                | 1                 | 1                 | 1                 | 0                 |

Table 7.45: ADSB\_REQUEST\_e (ARe) Includes directed request reservation, sleep = 0, auto = 1

| Description                  | Octet | Bit number      |                   |                   |                  |                   |                   |                   |                   |
|------------------------------|-------|-----------------|-------------------|-------------------|------------------|-------------------|-------------------|-------------------|-------------------|
|                              |       | 8               | 7                 | 6                 | 5                | 4                 | 3                 | 2                 | 1                 |
| flag                         | -     | 0               | 1                 | 1                 | 1                | 1                 | 1                 | 1                 | 0                 |
| s, ver, rid, a/d             | 1     | s <sub>27</sub> | s <sub>26</sub>   | s <sub>25</sub>   | 0                | 0                 | 0                 | 0                 | 1                 |
| s                            | 2     | s <sub>24</sub> | s <sub>23</sub>   | s <sub>22</sub>   | s <sub>21</sub>  | s <sub>20</sub>   | s <sub>19</sub>   | s <sub>18</sub>   | s <sub>17</sub>   |
| s                            | 3     | s <sub>16</sub> | s <sub>15</sub>   | s <sub>14</sub>   | s <sub>13</sub>  | s <sub>12</sub>   | s <sub>11</sub>   | s <sub>10</sub>   | s <sub>9</sub>    |
| s                            | 4     | s <sub>8</sub>  | s <sub>7</sub>    | s <sub>6</sub>    | s <sub>5</sub>   | s <sub>4</sub>    | s <sub>3</sub>    | s <sub>2</sub>    | s <sub>1</sub>    |
| sleep, auto, r-b/a, burst ID | 5     | 0               | 1                 | 0                 | 0                | 0                 | 0                 | 0                 | 1                 |
| lg, aux, r-id                | 6     | lg <sub>2</sub> | lg <sub>1</sub>   | aux <sub>2</sub>  | aux <sub>1</sub> | r-id <sub>4</sub> | r-id <sub>3</sub> | r-id <sub>2</sub> | r-id <sub>1</sub> |
| dt                           | 7     | dt <sub>4</sub> | dt <sub>3</sub>   | dt <sub>2</sub>   | dt <sub>1</sub>  | f <sub>12</sub>   | f <sub>11</sub>   | f <sub>10</sub>   | f <sub>9</sub>    |
| f                            | 8     | f <sub>8</sub>  | f <sub>7</sub>    | f <sub>6</sub>    | f <sub>5</sub>   | f <sub>4</sub>    | f <sub>3</sub>    | f <sub>2</sub>    | f <sub>1</sub>    |
| lg                           | 9     | lg <sub>8</sub> | lg <sub>7</sub>   | lg <sub>6</sub>   | lg <sub>5</sub>  | lg <sub>4</sub>   | lg <sub>3</sub>   | lg <sub>2</sub>   | lg <sub>1</sub>   |
| trmt                         | 10    | res             | res               | trmt              | do <sub>13</sub> | do <sub>12</sub>  | do <sub>11</sub>  | do <sub>10</sub>  | do <sub>9</sub>   |
| do                           | 11    | do <sub>8</sub> | do <sub>7</sub>   | do <sub>6</sub>   | do <sub>5</sub>  | do <sub>4</sub>   | do <sub>3</sub>   | do <sub>2</sub>   | do <sub>1</sub>   |
| or; rcvr, nr; pr_flag = 0    | 12    | or              | rcvr <sub>2</sub> | rcvr <sub>1</sub> | 0                | nr <sub>4</sub>   | nr <sub>3</sub>   | nr <sub>2</sub>   | nr <sub>1</sub>   |
| d                            | 13    | d <sub>24</sub> | d <sub>23</sub>   | d <sub>22</sub>   | d <sub>21</sub>  | d <sub>20</sub>   | d <sub>19</sub>   | d <sub>18</sub>   | d <sub>17</sub>   |
| d                            | 14    | d <sub>16</sub> | d <sub>15</sub>   | d <sub>14</sub>   | d <sub>13</sub>  | d <sub>12</sub>   | d <sub>11</sub>   | d <sub>10</sub>   | d <sub>9</sub>    |
| d                            | 15    | d <sub>8</sub>  | d <sub>7</sub>    | d <sub>6</sub>    | d <sub>5</sub>   | d <sub>4</sub>    | d <sub>3</sub>    | d <sub>2</sub>    | d <sub>1</sub>    |
| erid                         | 16    | 0               | 1                 | 1                 | 0                | 0                 | d <sub>27</sub>   | d <sub>26</sub>   | d <sub>25</sub>   |
| c                            | 17    | c <sub>9</sub>  | c <sub>10</sub>   | c <sub>11</sub>   | c <sub>12</sub>  | c <sub>13</sub>   | c <sub>14</sub>   | c <sub>15</sub>   | c <sub>16</sub>   |
| c                            | 18    | c <sub>1</sub>  | c <sub>2</sub>    | c <sub>3</sub>    | c <sub>4</sub>   | c <sub>5</sub>    | c <sub>6</sub>    | c <sub>7</sub>    | c <sub>8</sub>    |
| flag                         | -     | 0               | 1                 | 1                 | 1                | 1                 | 1                 | 1                 | 0                 |

**Table 7.46: DIR\_SYNC\_BURST\_b (DSb): Directed sync burst. Occupies one slot.  
Full position variable part**

| Description         | Octet | Bit number      |                 |                 |                 |                 |                 |                 |                 |
|---------------------|-------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|                     |       | 8               | 7               | 6               | 5               | 4               | 3               | 2               | 1               |
| flag                | -     | 0               | 1               | 1               | 1               | 1               | 1               | 1               | 0               |
| s, ver, rid, a/d    | 1     | s <sub>27</sub> | s <sub>26</sub> | s <sub>25</sub> | 0               | 0               | 0               | 1               | 1               |
| s                   | 2     | s <sub>24</sub> | s <sub>23</sub> | s <sub>22</sub> | s <sub>21</sub> | s <sub>20</sub> | s <sub>19</sub> | s <sub>18</sub> | s <sub>17</sub> |
| s                   | 3     | s <sub>16</sub> | s <sub>15</sub> | s <sub>14</sub> | s <sub>13</sub> | s <sub>12</sub> | s <sub>11</sub> | s <sub>10</sub> | s <sub>9</sub>  |
| s                   | 4     | s <sub>8</sub>  | s <sub>7</sub>  | s <sub>6</sub>  | s <sub>5</sub>  | s <sub>4</sub>  | s <sub>3</sub>  | s <sub>2</sub>  | s <sub>1</sub>  |
| nic, cprf, b/g, tqc | 5     | x               | x               | x               | x               | x               | x               | 1               | 0               |
| lat                 | 6     | x               | x               | x               | x               | x               | x               | x               | x               |
| balt                | 7     | x               | x               | x               | x               | x               | x               | x               | x               |
| balt                | 8     | x               | x               | x               | x               | x               | x               | x               | x               |
| lon                 | 9     | x               | x               | x               | x               | x               | x               | x               | x               |
| tfom, lon           | 10    | x               | x               | x               | x               | x               | x               | x               | x               |
| da, id              | 11    | x               | x               | x               | x               | 0               | 0               | 1               | 0               |
| in                  | 12    | x               | x               | x               | x               | x               | x               | x               | x               |
| in                  | 13    | x               | x               | x               | x               | x               | x               | x               | x               |
| in                  | 14    | x               | x               | x               | x               | x               | x               | x               | x               |
| in                  | 15    | x               | x               | x               | x               | x               | x               | x               | x               |
| in                  | 16    | x               | x               | x               | x               | x               | x               | x               | x               |
| in                  | 17    | x               | x               | x               | x               | x               | x               | x               | x               |
| in, pt              | 18    | x               | x               | x               | x               | x               | x               | pt <sub>2</sub> | pt <sub>1</sub> |
| po                  | 19    | po <sub>8</sub> | po <sub>7</sub> | po <sub>6</sub> | po <sub>5</sub> | po <sub>4</sub> | po <sub>3</sub> | po <sub>2</sub> | po <sub>1</sub> |
| c                   | 20    | c <sub>9</sub>  | c <sub>10</sub> | c <sub>11</sub> | c <sub>12</sub> | c <sub>13</sub> | c <sub>14</sub> | c <sub>15</sub> | c <sub>16</sub> |
| c                   | 21    | c <sub>1</sub>  | c <sub>2</sub>  | c <sub>3</sub>  | c <sub>4</sub>  | c <sub>5</sub>  | c <sub>6</sub>  | c <sub>7</sub>  | c <sub>8</sub>  |
| flag                | -     | 0               | 1               | 1               | 1               | 1               | 1               | 1               | 0               |



**Table 7.47: DIR\_SYNC\_BURST\_c (DSc): Directed sync burst. Occupies one slot.  
Two-slot TCP variable part**

| Description         | Octet | Bit number      |                 |                 |                 |                 |                 |                 |                 |
|---------------------|-------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|                     |       | 8               | 7               | 6               | 5               | 4               | 3               | 2               | 1               |
| flag                | -     | 0               | 1               | 1               | 1               | 1               | 1               | 1               | 0               |
| s, ver, rid, a/d    | 1     | s <sub>27</sub> | s <sub>26</sub> | s <sub>25</sub> | 0               | 0               | 0               | 1               | 1               |
| s                   | 2     | s <sub>24</sub> | s <sub>23</sub> | s <sub>22</sub> | s <sub>21</sub> | s <sub>20</sub> | s <sub>19</sub> | s <sub>18</sub> | s <sub>17</sub> |
| s                   | 3     | s <sub>16</sub> | s <sub>15</sub> | s <sub>14</sub> | s <sub>13</sub> | s <sub>12</sub> | s <sub>11</sub> | s <sub>10</sub> | s <sub>9</sub>  |
| s                   | 4     | s <sub>8</sub>  | s <sub>7</sub>  | s <sub>6</sub>  | s <sub>5</sub>  | s <sub>4</sub>  | s <sub>3</sub>  | s <sub>2</sub>  | s <sub>1</sub>  |
| nic, cprf, b/g, tqc | 5     | x               | x               | x               | x               | x               | x               | 1               | 0               |
| lat                 | 6     | x               | x               | x               | x               | x               | x               | x               | x               |
| balt                | 7     | x               | x               | x               | x               | x               | x               | x               | x               |
| balt                | 8     | x               | x               | x               | x               | x               | x               | x               | x               |
| lon                 | 9     | x               | x               | x               | x               | x               | x               | x               | x               |
| tfom, lon           | 10    | x               | x               | x               | x               | x               | x               | x               | x               |
| da, id              | 11    | x               | x               | x               | x               | 1               | 0               | 0               | 0               |
| in                  | 12    | x               | x               | x               | x               | x               | x               | x               | x               |
| in                  | 13    | x               | x               | x               | x               | x               | x               | x               | x               |
| in                  | 14    | x               | x               | x               | x               | x               | x               | x               | x               |
| in                  | 15    | x               | x               | x               | x               | x               | x               | x               | x               |
| in                  | 16    | x               | x               | x               | x               | x               | x               | x               | x               |
| in                  | 17    | x               | x               | x               | x               | x               | x               | x               | x               |
| in                  | 18    | x               | x               | x               | x               | x               | x               | x               | x               |
| in                  | 19    | x               | x               | x               | x               | x               | x               | x               | x               |
| in                  | 20    | x               | x               | x               | x               | x               | x               | x               | x               |
| in                  | 21    | x               | x               | x               | x               | x               | x               | x               | x               |
| in                  | 22    | x               | x               | x               | x               | x               | x               | x               | x               |
| in                  | 23    | x               | x               | x               | x               | x               | x               | x               | x               |
| in                  | 24    | x               | x               | x               | x               | x               | x               | x               | x               |
| in                  | 25    | x               | x               | x               | x               | x               | x               | x               | x               |
| in                  | 26    | x               | x               | x               | x               | x               | x               | x               | x               |
| in                  | 27    | x               | x               | x               | x               | x               | x               | x               | x               |
| in                  | 28    | x               | x               | x               | x               | x               | x               | x               | x               |
| in                  | 29    | x               | x               | x               | x               | x               | x               | x               | x               |
| in                  | 30    | x               | x               | x               | x               | x               | x               | x               | x               |
| in                  | 31    | x               | x               | x               | x               | x               | x               | x               | x               |
| in                  | 32    | x               | x               | x               | x               | x               | x               | x               | x               |
| in                  | 33    | x               | x               | x               | x               | x               | x               | x               | x               |
| in                  | 34    | x               | x               | x               | x               | x               | x               | x               | x               |
| in                  | 35    | x               | x               | x               | x               | x               | x               | x               | x               |
| in                  | 36    | x               | x               | x               | x               | x               | x               | x               | x               |
| in                  | 37    | x               | x               | x               | x               | x               | x               | x               | x               |
| in                  | 38    | x               | x               | x               | x               | x               | x               | x               | x               |
| in                  | 39    | x               | x               | x               | x               | x               | x               | x               | x               |
| in                  | 40    | x               | x               | x               | x               | x               | x               | x               | x               |
| in                  | 41    | x               | x               | x               | x               | x               | x               | x               | x               |
| in                  | 42    | x               | x               | x               | x               | x               | x               | x               | x               |
| in                  | 43    | x               | x               | x               | x               | x               | x               | x               | x               |
| in                  | 44    | x               | x               | x               | x               | x               | x               | x               | x               |
| in                  | 45    | x               | x               | x               | x               | x               | x               | x               | x               |
| in                  | 46    | x               | x               | x               | x               | x               | x               | x               | x               |
| in                  | 47    | x               | x               | x               | x               | x               | x               | x               | x               |
| in                  | 48    | x               | x               | x               | x               | x               | x               | x               | x               |
| in, pt              | 49    | x               | x               | x               | x               | x               | x               | pt <sub>2</sub> | pt <sub>1</sub> |
| po                  | 50    | po <sub>8</sub> | po <sub>7</sub> | po <sub>6</sub> | po <sub>5</sub> | po <sub>4</sub> | po <sub>3</sub> | po <sub>2</sub> | po <sub>1</sub> |
| c                   | 51    | c <sub>9</sub>  | c <sub>10</sub> | c <sub>11</sub> | c <sub>12</sub> | c <sub>13</sub> | c <sub>14</sub> | c <sub>15</sub> | c <sub>16</sub> |
| c                   | 52    | c <sub>1</sub>  | c <sub>2</sub>  | c <sub>3</sub>  | c <sub>4</sub>  | c <sub>5</sub>  | c <sub>6</sub>  | c <sub>7</sub>  | c <sub>8</sub>  |
| flag                | -     | 0               | 1               | 1               | 1               | 1               | 1               | 1               | 0               |

**Table 7.48: DIR\_SYNC\_BURST\_d (DSd): Directed sync burst. Occupies one slot. High dynamic variable part**

| Description         | Octet | Bit number      |                 |                 |                 |                 |                 |                 |                 |
|---------------------|-------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|                     |       | 8               | 7               | 6               | 5               | 4               | 3               | 2               | 1               |
| flag                | -     | 0               | 1               | 1               | 1               | 1               | 1               | 1               | 0               |
| s, ver, rid, a/d    | 1     | s <sub>27</sub> | s <sub>26</sub> | s <sub>25</sub> | 0               | 0               | 0               | 1               | 1               |
| s                   | 2     | s <sub>24</sub> | s <sub>23</sub> | s <sub>22</sub> | s <sub>21</sub> | s <sub>20</sub> | s <sub>19</sub> | s <sub>18</sub> | s <sub>17</sub> |
| s                   | 3     | s <sub>16</sub> | s <sub>15</sub> | s <sub>14</sub> | s <sub>13</sub> | s <sub>12</sub> | s <sub>11</sub> | s <sub>10</sub> | s <sub>9</sub>  |
| s                   | 4     | s <sub>8</sub>  | s <sub>7</sub>  | s <sub>6</sub>  | s <sub>5</sub>  | s <sub>4</sub>  | s <sub>3</sub>  | s <sub>2</sub>  | s <sub>1</sub>  |
| nic, cprf, b/g, tqc | 5     | x               | x               | x               | x               | x               | x               | 1               | 0               |
| lat                 | 6     | x               | x               | x               | x               | x               | x               | x               | x               |
| balt                | 7     | x               | x               | x               | x               | x               | x               | x               | x               |
| balt                | 8     | x               | x               | x               | x               | x               | x               | x               | x               |
| lon                 | 9     | x               | x               | x               | x               | x               | x               | x               | x               |
| tfom, lon           | 10    | x               | x               | x               | x               | x               | x               | x               | x               |
| da, id              | 11    | x               | x               | x               | x               | 0               | 0               | 0               | 1               |
| in                  | 12    | x               | x               | x               | x               | x               | x               | x               | x               |
| in                  | 13    | x               | x               | x               | x               | x               | x               | x               | x               |
| in                  | 14    | x               | x               | x               | x               | x               | x               | x               | x               |
| in                  | 15    | x               | x               | x               | x               | x               | x               | x               | x               |
| in                  | 16    | x               | x               | x               | x               | x               | x               | x               | x               |
| in                  | 17    | x               | x               | x               | x               | x               | x               | x               | x               |
| in, pt              | 18    | x               | x               | x               | x               | x               | x               | pt <sub>2</sub> | pt <sub>1</sub> |
| po                  | 19    | po <sub>8</sub> | po <sub>7</sub> | po <sub>6</sub> | po <sub>5</sub> | po <sub>4</sub> | po <sub>3</sub> | po <sub>2</sub> | po <sub>1</sub> |
| c                   | 20    | c <sub>9</sub>  | c <sub>10</sub> | c <sub>11</sub> | c <sub>12</sub> | c <sub>13</sub> | c <sub>14</sub> | c <sub>15</sub> | c <sub>16</sub> |
| c                   | 21    | c <sub>1</sub>  | c <sub>2</sub>  | c <sub>3</sub>  | c <sub>4</sub>  | c <sub>5</sub>  | c <sub>6</sub>  | c <sub>7</sub>  | c <sub>8</sub>  |
| flag                | -     | 0               | 1               | 1               | 1               | 1               | 1               | 1               | 0               |

**Table 7.49: CTRL\_CHAN\_k (Cck): Channel management burst with 1 header, 1 destination, 1 transmission, 1 frequency, 1 parameter and 1 script block**

| Description          | Octet | Bit number           |                      |                      |                      |                      |                      |                      |                      |
|----------------------|-------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
|                      |       | 8                    | 7                    | 6                    | 5                    | 4                    | 3                    | 2                    | 1                    |
| flag                 | -     | 0                    | 1                    | 1                    | 1                    | 1                    | 1                    | 1                    | 0                    |
| s, ver, rid, a/d     | 1     | s <sub>27</sub>      | s <sub>26</sub>      | s <sub>25</sub>      | ver <sub>3</sub>     | ver <sub>2</sub>     | ver <sub>1</sub>     | rid                  | a/d                  |
| s                    | 2     | s <sub>24</sub>      | s <sub>23</sub>      | s <sub>22</sub>      | s <sub>21</sub>      | s <sub>20</sub>      | s <sub>19</sub>      | s <sub>18</sub>      | s <sub>17</sub>      |
| s                    | 3     | s <sub>16</sub>      | s <sub>15</sub>      | s <sub>14</sub>      | s <sub>13</sub>      | s <sub>12</sub>      | s <sub>11</sub>      | s <sub>10</sub>      | s <sub>9</sub>       |
| s                    | 4     | s <sub>8</sub>       | s <sub>7</sub>       | s <sub>6</sub>       | s <sub>5</sub>       | s <sub>4</sub>       | s <sub>3</sub>       | s <sub>2</sub>       | s <sub>1</sub>       |
| res, mi              | 5     | 0                    | 0                    | 1                    | 1                    | 0                    | 0                    | 0                    | 1                    |
| ucid, UCTRL<br>DLPDU | 6     | 0                    | 0                    | 1                    | 0                    | 0                    | 1                    | 0                    | 0                    |
| n                    | 7     | n <sub>8</sub>       | n <sub>7</sub>       | n <sub>6</sub>       | n <sub>5</sub>       | n <sub>4</sub>       | n <sub>3</sub>       | n <sub>2</sub>       | n <sub>1</sub>       |
| dt                   | 8     | dt <sub>4</sub>      | dt <sub>3</sub>      | dt <sub>2</sub>      | dt <sub>1</sub>      | do <sub>12</sub>     | do <sub>11</sub>     | do <sub>10</sub>     | do <sub>9</sub>      |
| do                   | 9     | do <sub>8</sub>      | do <sub>7</sub>      | do <sub>6</sub>      | do <sub>5</sub>      | do <sub>4</sub>      | do <sub>3</sub>      | do <sub>2</sub>      | do <sub>1</sub>      |
| dc                   | 10    | dc <sub>8</sub>      | dc <sub>7</sub>      | dc <sub>6</sub>      | dc <sub>5</sub>      | dc <sub>4</sub>      | dc <sub>3</sub>      | dc <sub>2</sub>      | dc <sub>1</sub>      |
| csid, tc             | 11    | csid <sub>4</sub>    | csid <sub>3</sub>    | csid <sub>2</sub>    | csid <sub>1</sub>    | tc <sub>4</sub>      | tc <sub>3</sub>      | tc <sub>2</sub>      | tc <sub>1</sub>      |
| fc, styp, sr         | 12    | fc <sub>3</sub>      | fc <sub>2</sub>      | fc <sub>1</sub>      | styp                 | sr <sub>4</sub>      | sr <sub>3</sub>      | sr <sub>2</sub>      | sr <sub>1</sub>      |
| pc                   | 13    | res                  | res                  | pc <sub>6</sub>      | pc <sub>5</sub>      | pc <sub>4</sub>      | pc <sub>3</sub>      | pc <sub>2</sub>      | pc <sub>1</sub>      |
| sc                   | 14    | sc <sub>8</sub>      | sc <sub>7</sub>      | sc <sub>6</sub>      | sc <sub>5</sub>      | sc <sub>4</sub>      | sc <sub>3</sub>      | sc <sub>2</sub>      | sc <sub>1</sub>      |
| ido                  | 15    | 0                    | ido <sub>4</sub>     | ido <sub>3</sub>     | ido <sub>2</sub>     | ido <sub>1</sub>     | d <sub>27</sub>      | d <sub>26</sub>      | d <sub>25</sub>      |
| d                    | 16    | d <sub>24</sub>      | d <sub>23</sub>      | d <sub>22</sub>      | d <sub>21</sub>      | d <sub>20</sub>      | d <sub>19</sub>      | d <sub>18</sub>      | d <sub>17</sub>      |
| d                    | 17    | d <sub>16</sub>      | d <sub>15</sub>      | d <sub>14</sub>      | d <sub>13</sub>      | d <sub>12</sub>      | d <sub>11</sub>      | d <sub>10</sub>      | d <sub>9</sub>       |
| d                    | 18    | d <sub>8</sub>       | d <sub>7</sub>       | d <sub>6</sub>       | d <sub>5</sub>       | d <sub>4</sub>       | d <sub>3</sub>       | d <sub>2</sub>       | d <sub>1</sub>       |
| id                   | 19    | id <sub>4</sub>      | id <sub>3</sub>      | id <sub>2</sub>      | id <sub>1</sub>      | aux                  | b/g                  | res                  | 0                    |
| flags                | 20    | sleep                | auto                 | rcv                  | res                  | f <sub>12</sub>      | f <sub>11</sub>      | f <sub>10</sub>      | f <sub>9</sub>       |
| freq                 | 21    | f <sub>8</sub>       | f <sub>7</sub>       | f <sub>6</sub>       | f <sub>5</sub>       | f <sub>4</sub>       | f <sub>3</sub>       | f <sub>2</sub>       | f <sub>1</sub>       |
| Q1, Q4               | 22    | Q1 <sub>2</sub>      | Q1 <sub>1</sub>      | res                  | Q4 <sub>5</sub>      | Q4 <sub>4</sub>      | Q4 <sub>3</sub>      | Q4 <sub>2</sub>      | Q4 <sub>1</sub>      |
| Q2 <sub>a</sub>      | 23    | Q2a <sub>8</sub>     | Q2a <sub>7</sub>     | Q2a <sub>6</sub>     | Q2a <sub>5</sub>     | Q2a <sub>4</sub>     | Q2a <sub>3</sub>     | Q2a <sub>2</sub>     | Q2a <sub>1</sub>     |
|                      | 24    | Q2a <sub>12</sub>    | Q2a <sub>11</sub>    | Q2a <sub>10</sub>    | Q2a <sub>9</sub>     | Q2b <sub>12</sub>    | Q2b <sub>11</sub>    | Q2b <sub>10</sub>    | Q2b <sub>9</sub>     |
| Q2b                  | 25    | Q2b <sub>8</sub>     | Q2b <sub>7</sub>     | Q2b <sub>6</sub>     | Q2b <sub>5</sub>     | Q2b <sub>4</sub>     | Q2b <sub>3</sub>     | Q2b <sub>2</sub>     | Q2b <sub>1</sub>     |
| Q2c                  | 26    | Q2c <sub>8</sub>     | Q2c <sub>7</sub>     | Q2c <sub>6</sub>     | Q2c <sub>5</sub>     | Q2c <sub>4</sub>     | Q2c <sub>3</sub>     | Q2c <sub>2</sub>     | Q2c <sub>1</sub>     |
|                      | 27    | Q2c <sub>12</sub>    | Q2c <sub>11</sub>    | Q2c <sub>10</sub>    | Q2c <sub>9</sub>     | Q2d <sub>12</sub>    | Q2d <sub>11</sub>    | Q2d <sub>10</sub>    | Q2d <sub>9</sub>     |
| Q2d                  | 28    | Q2d <sub>8</sub>     | Q2d <sub>7</sub>     | Q2d <sub>6</sub>     | Q2d <sub>5</sub>     | Q2d <sub>4</sub>     | Q2d <sub>3</sub>     | Q2d <sub>2</sub>     | Q2d <sub>1</sub>     |
| TV11min,<br>TV11max  | 29    | TV11min <sub>4</sub> | TV11min <sub>3</sub> | TV11min <sub>2</sub> | TV11min <sub>1</sub> | TV11max <sub>4</sub> | TV11max <sub>3</sub> | TV11max <sub>2</sub> | TV11max <sub>1</sub> |
| V11                  | 30    | res                  | res                  | V11 <sub>6</sub>     | V11 <sub>5</sub>     | V11 <sub>4</sub>     | V11 <sub>3</sub>     | V11 <sub>2</sub>     | V11 <sub>1</sub>     |

| Description   | Octet | Bit number       |                  |                  |                  |                  |                  |                  |                  |
|---------------|-------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
|               |       | 8                | 7                | 6                | 5                | 4                | 3                | 2                | 1                |
| V12           | 31    | res              | V12 <sub>7</sub> | V12 <sub>6</sub> | V12 <sub>5</sub> | V12 <sub>4</sub> | V12 <sub>3</sub> | V12 <sub>2</sub> | V12 <sub>1</sub> |
| VS2           | 32    | res              | res              | VS2 <sub>6</sub> | VS2 <sub>5</sub> | VS2 <sub>4</sub> | VS2 <sub>3</sub> | VS2 <sub>2</sub> | VS2 <sub>1</sub> |
| VS4           | 33    | res              | VS4 <sub>7</sub> | VS4 <sub>6</sub> | VS4 <sub>5</sub> | VS4 <sub>4</sub> | VS4 <sub>3</sub> | VS4 <sub>2</sub> | VS4 <sub>1</sub> |
| frq, nsd, txd | 34    | frq <sub>3</sub> | frq <sub>2</sub> | frq <sub>1</sub> | nsd              | txd <sub>4</sub> | txd <sub>3</sub> | txd <sub>2</sub> | txd <sub>1</sub> |
| erid          | 35    | 0                | 1                | 1                | 0                | 0                | d <sub>27</sub>  | d <sub>26</sub>  | d <sub>25</sub>  |
| c             | 36    | c <sub>9</sub>   | c <sub>10</sub>  | c <sub>11</sub>  | c <sub>12</sub>  | c <sub>13</sub>  | c <sub>14</sub>  | c <sub>15</sub>  | c <sub>16</sub>  |
| c             | 37    | c <sub>1</sub>   | c <sub>2</sub>   | c <sub>3</sub>   | c <sub>4</sub>   | c <sub>5</sub>   | c <sub>6</sub>   | c <sub>7</sub>   | c <sub>8</sub>   |
| flag          | -     | 0                | 1                | 1                | 1                | 1                | 1                | 1                | 0                |

**Table 7.50: CTRL\_CHAN\_p (CCp): Channel management burst with 1 header, a regional multicast, 1 transmission, 1 frequency, 1 parameter and 1 script block**

| Description       | Octet | Bit number        |                   |                   |                   |                   |                   |                   |                   |
|-------------------|-------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
|                   |       | 8                 | 7                 | 6                 | 5                 | 4                 | 3                 | 2                 | 1                 |
| flag              | -     | 0                 | 1                 | 1                 | 1                 | 1                 | 1                 | 1                 | 0                 |
| s, ver, rid, a/d  | 1     | s <sub>27</sub>   | s <sub>26</sub>   | s <sub>25</sub>   | ver <sub>3</sub>  | ver <sub>2</sub>  | ver <sub>1</sub>  | rid               | a/d               |
| s                 | 2     | s <sub>24</sub>   | s <sub>23</sub>   | s <sub>22</sub>   | s <sub>21</sub>   | s <sub>20</sub>   | s <sub>19</sub>   | s <sub>18</sub>   | s <sub>17</sub>   |
| s                 | 3     | s <sub>16</sub>   | s <sub>15</sub>   | s <sub>14</sub>   | s <sub>13</sub>   | s <sub>12</sub>   | s <sub>11</sub>   | s <sub>10</sub>   | s <sub>9</sub>    |
| s                 | 4     | s <sub>8</sub>    | s <sub>7</sub>    | s <sub>6</sub>    | s <sub>5</sub>    | s <sub>4</sub>    | s <sub>3</sub>    | s <sub>2</sub>    | s <sub>1</sub>    |
| res, mi           | 5     | 0                 | 0                 | 1                 | 1                 | 0                 | 0                 | 0                 | 1                 |
| ucid, UCTRL DLPDU | 6     | 0                 | 0                 | 1                 | 0                 | 0                 | 1                 | 0                 | 0                 |
| n                 | 7     | n <sub>8</sub>    | n <sub>7</sub>    | n <sub>6</sub>    | n <sub>5</sub>    | n <sub>4</sub>    | n <sub>3</sub>    | n <sub>2</sub>    | n <sub>1</sub>    |
| dt                | 8     | dt <sub>4</sub>   | dt <sub>3</sub>   | dt <sub>2</sub>   | dt <sub>1</sub>   | do <sub>12</sub>  | do <sub>11</sub>  | do <sub>10</sub>  | do <sub>9</sub>   |
| do                | 9     | do <sub>8</sub>   | do <sub>7</sub>   | do <sub>6</sub>   | do <sub>5</sub>   | do <sub>4</sub>   | do <sub>3</sub>   | do <sub>2</sub>   | do <sub>1</sub>   |
| dc                | 10    | dc <sub>8</sub>   | dc <sub>7</sub>   | dc <sub>6</sub>   | dc <sub>5</sub>   | dc <sub>4</sub>   | dc <sub>3</sub>   | dc <sub>2</sub>   | dc <sub>1</sub>   |
| csid, tc          | 11    | csid <sub>4</sub> | csid <sub>3</sub> | csid <sub>2</sub> | csid <sub>1</sub> | tc <sub>4</sub>   | tc <sub>3</sub>   | tc <sub>2</sub>   | tc <sub>1</sub>   |
| fc, styp, sr      | 12    | fc <sub>3</sub>   | fc <sub>2</sub>   | fc <sub>1</sub>   | styp              | sr <sub>4</sub>   | sr <sub>3</sub>   | sr <sub>2</sub>   | sr <sub>1</sub>   |
| pc                | 13    | res               | res               | pc <sub>6</sub>   | pc <sub>5</sub>   | pc <sub>4</sub>   | pc <sub>3</sub>   | pc <sub>2</sub>   | pc <sub>1</sub>   |
| sc                | 14    | sc <sub>8</sub>   | sc <sub>7</sub>   | sc <sub>6</sub>   | sc <sub>5</sub>   | sc <sub>4</sub>   | sc <sub>3</sub>   | sc <sub>2</sub>   | sc <sub>1</sub>   |
| vc, lon           | 15    | 1                 | res               | lon <sub>14</sub> | lon <sub>13</sub> | vc <sub>4</sub>   | vc <sub>3</sub>   | vc <sub>2</sub>   | vc <sub>1</sub>   |
| lon               | 16    | lon <sub>8</sub>  | lon <sub>7</sub>  | lon <sub>6</sub>  | lon <sub>5</sub>  | lon <sub>4</sub>  | lon <sub>3</sub>  | lon <sub>2</sub>  | lon <sub>1</sub>  |
| lon, lat          | 17    | lon <sub>12</sub> | lon <sub>11</sub> | lon <sub>10</sub> | lon <sub>9</sub>  | lat <sub>12</sub> | lat <sub>11</sub> | lat <sub>10</sub> | lat <sub>9</sub>  |
| lat               | 18    | lat <sub>8</sub>  | lat <sub>7</sub>  | lat <sub>6</sub>  | lat <sub>5</sub>  | lat <sub>4</sub>  | lat <sub>3</sub>  | lat <sub>2</sub>  | lat <sub>1</sub>  |
| lon4, lat4        | 19    | lon <sub>44</sub> | lon <sub>43</sub> | lon <sub>42</sub> | lon <sub>41</sub> | lat <sub>44</sub> | lat <sub>43</sub> | lat <sub>42</sub> | lat <sub>41</sub> |
| lalt              | 20    | lalt <sub>8</sub> | lalt <sub>7</sub> | lalt <sub>6</sub> | lalt <sub>5</sub> | lalt <sub>4</sub> | lalt <sub>3</sub> | lalt <sub>2</sub> | lalt <sub>1</sub> |

| Description      | Octet | Bit number           |                      |                      |                      |                      |                      |                      |                      |
|------------------|-------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
|                  |       | 8                    | 7                    | 6                    | 5                    | 4                    | 3                    | 2                    | 1                    |
| uait             | 21    | uait <sub>8</sub>    | uait <sub>7</sub>    | uait <sub>6</sub>    | uait <sub>5</sub>    | uait <sub>4</sub>    | uait <sub>3</sub>    | uait <sub>2</sub>    | uait <sub>1</sub>    |
| v1r1             | 22    | r <sub>1,8</sub>     | r <sub>1,7</sub>     | r <sub>1,6</sub>     | r <sub>1,5</sub>     | r <sub>1,4</sub>     | r <sub>1,3</sub>     | r <sub>1,2</sub>     | r <sub>1,1</sub>     |
| v1d1             | 23    | d <sub>1,8</sub>     | d <sub>1,7</sub>     | d <sub>1,6</sub>     | d <sub>1,5</sub>     | d <sub>1,4</sub>     | d <sub>1,3</sub>     | d <sub>1,2</sub>     | d <sub>1,1</sub>     |
| v2r2             | 24    | r <sub>2,8</sub>     | r <sub>2,7</sub>     | r <sub>2,6</sub>     | r <sub>2,5</sub>     | r <sub>2,4</sub>     | r <sub>2,3</sub>     | r <sub>2,2</sub>     | r <sub>2,1</sub>     |
| v2d2             | 25    | d <sub>2,8</sub>     | d <sub>2,7</sub>     | d <sub>2,6</sub>     | d <sub>2,5</sub>     | d <sub>2,4</sub>     | d <sub>2,3</sub>     | d <sub>2,2</sub>     | d <sub>2,1</sub>     |
| flags            | 26    | sleep                | auto                 | rcv                  | res                  | f <sub>12</sub>      | f <sub>11</sub>      | f <sub>10</sub>      | f <sub>9</sub>       |
| freq             | 27    | f <sub>8</sub>       | f <sub>7</sub>       | f <sub>6</sub>       | f <sub>5</sub>       | f <sub>4</sub>       | f <sub>3</sub>       | f <sub>2</sub>       | f <sub>1</sub>       |
| Q1, Q4           | 28    | Q1 <sub>2</sub>      | Q1 <sub>1</sub>      | res                  | Q4 <sub>5</sub>      | Q4 <sub>4</sub>      | Q4 <sub>3</sub>      | Q4 <sub>2</sub>      | Q4 <sub>1</sub>      |
| Q2 <sub>a</sub>  | 29    | Q2a <sub>8</sub>     | Q2a <sub>7</sub>     | Q2a <sub>6</sub>     | Q2a <sub>5</sub>     | Q2a <sub>4</sub>     | Q2a <sub>3</sub>     | Q2a <sub>2</sub>     | Q2a <sub>1</sub>     |
|                  | 30    | Q2a <sub>12</sub>    | Q2a <sub>11</sub>    | Q2a <sub>10</sub>    | Q2a <sub>9</sub>     | Q2b <sub>12</sub>    | Q2b <sub>11</sub>    | Q2b <sub>10</sub>    | Q2b <sub>9</sub>     |
| Q2b              | 31    | Q2b <sub>8</sub>     | Q2b <sub>7</sub>     | Q2b <sub>6</sub>     | Q2b <sub>5</sub>     | Q2b <sub>4</sub>     | Q2b <sub>3</sub>     | Q2b <sub>2</sub>     | Q2b <sub>1</sub>     |
| Q2c              | 32    | Q2c <sub>8</sub>     | Q2c <sub>7</sub>     | Q2c <sub>6</sub>     | Q2c <sub>5</sub>     | Q2c <sub>4</sub>     | Q2c <sub>3</sub>     | Q2c <sub>2</sub>     | Q2c <sub>1</sub>     |
|                  | 33    | Q2c <sub>12</sub>    | Q2c <sub>11</sub>    | Q2c <sub>10</sub>    | Q2c <sub>9</sub>     | Q2d <sub>12</sub>    | Q2d <sub>11</sub>    | Q2d <sub>10</sub>    | Q2d <sub>9</sub>     |
| Q2d              | 34    | Q2d <sub>8</sub>     | Q2d <sub>7</sub>     | Q2d <sub>6</sub>     | Q2d <sub>5</sub>     | Q2d <sub>4</sub>     | Q2d <sub>3</sub>     | Q2d <sub>2</sub>     | Q2d <sub>1</sub>     |
| TV11min, TV11max | 35    | TV11min <sub>4</sub> | TV11min <sub>3</sub> | TV11min <sub>2</sub> | TV11min <sub>1</sub> | TV11max <sub>4</sub> | TV11max <sub>3</sub> | TV11max <sub>2</sub> | TV11max <sub>1</sub> |
| V11              | 36    | res                  | res                  | V11 <sub>6</sub>     | V11 <sub>5</sub>     | V11 <sub>4</sub>     | V11 <sub>3</sub>     | V11 <sub>2</sub>     | V11 <sub>1</sub>     |
| V12              | 37    | res                  | V12 <sub>7</sub>     | V12 <sub>6</sub>     | V12 <sub>5</sub>     | V12 <sub>4</sub>     | V12 <sub>3</sub>     | V12 <sub>2</sub>     | V12 <sub>1</sub>     |
| VS2              | 38    | res                  | res                  | VS2 <sub>6</sub>     | VS2 <sub>5</sub>     | VS2 <sub>4</sub>     | VS2 <sub>3</sub>     | VS2 <sub>2</sub>     | VS2 <sub>1</sub>     |
| VS4              | 39    | res                  | VS4 <sub>7</sub>     | VS4 <sub>6</sub>     | VS4 <sub>5</sub>     | VS4 <sub>4</sub>     | VS4 <sub>3</sub>     | VS4 <sub>2</sub>     | VS4 <sub>1</sub>     |
| frq, nsd, txd    | 40    | frq <sub>3</sub>     | frq <sub>2</sub>     | frq <sub>1</sub>     | nsd                  | txd <sub>4</sub>     | txd <sub>3</sub>     | txd <sub>2</sub>     | txd <sub>1</sub>     |
| erid             | 41    | 0                    | 1                    | 1                    | 0                    | 0                    | d <sub>27</sub>      | d <sub>26</sub>      | d <sub>25</sub>      |
| c                | 42    | c <sub>9</sub>       | c <sub>10</sub>      | c <sub>11</sub>      | c <sub>12</sub>      | c <sub>13</sub>      | c <sub>14</sub>      | c <sub>15</sub>      | c <sub>16</sub>      |
| c                | 43    | c <sub>1</sub>       | c <sub>2</sub>       | c <sub>3</sub>       | c <sub>4</sub>       | c <sub>5</sub>       | c <sub>6</sub>       | c <sub>7</sub>       | c <sub>8</sub>       |
| flag             | -     | 0                    | 1                    | 1                    | 1                    | 1                    | 1                    | 1                    | 0                    |

Table 7.51: SYNC\_BASIC\_a (SBa): Basic variable part. Occupies one slot

| Description         | Octet | Bit number         |                    |                    |                   |                   |                   |                   |                   |
|---------------------|-------|--------------------|--------------------|--------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
|                     |       | 8                  | 7                  | 6                  | 5                 | 4                 | 3                 | 2                 | 1                 |
| flag                | -     | 0                  | 1                  | 1                  | 1                 | 1                 | 1                 | 1                 | 0                 |
| s, ver, rid, a/d    | 1     | s <sub>27</sub>    | s <sub>26</sub>    | s <sub>25</sub>    | 0                 | 0                 | 0                 | 1                 | 0                 |
| s                   | 2     | s <sub>24</sub>    | s <sub>23</sub>    | s <sub>22</sub>    | s <sub>21</sub>   | s <sub>20</sub>   | s <sub>19</sub>   | s <sub>18</sub>   | s <sub>17</sub>   |
| s                   | 3     | s <sub>16</sub>    | s <sub>15</sub>    | s <sub>14</sub>    | s <sub>13</sub>   | s <sub>12</sub>   | s <sub>11</sub>   | s <sub>10</sub>   | s <sub>9</sub>    |
| s                   | 4     | s <sub>8</sub>     | s <sub>7</sub>     | s <sub>6</sub>     | s <sub>5</sub>    | s <sub>4</sub>    | s <sub>3</sub>    | s <sub>2</sub>    | s <sub>1</sub>    |
| nic, cprf, b/g, tqc | 5     | nic <sub>4</sub>   | nic <sub>3</sub>   | nic <sub>2</sub>   | nic <sub>1</sub>  | cprf              | b/g               | 1                 | 0                 |
| lat                 | 6     | lat <sub>8</sub>   | lat <sub>7</sub>   | lat <sub>6</sub>   | lat <sub>5</sub>  | lat <sub>4</sub>  | lat <sub>3</sub>  | lat <sub>2</sub>  | lat <sub>1</sub>  |
| balt                | 7     | balt <sub>12</sub> | balt <sub>11</sub> | balt <sub>10</sub> | balt <sub>9</sub> | lat <sub>12</sub> | lat <sub>11</sub> | lat <sub>10</sub> | lat <sub>9</sub>  |
| balt                | 8     | balt <sub>8</sub>  | balt <sub>7</sub>  | balt <sub>6</sub>  | balt <sub>5</sub> | balt <sub>4</sub> | balt <sub>3</sub> | balt <sub>2</sub> | balt <sub>1</sub> |
| lon                 | 9     | lon <sub>8</sub>   | lon <sub>7</sub>   | lon <sub>6</sub>   | lon <sub>5</sub>  | lon <sub>4</sub>  | lon <sub>3</sub>  | lon <sub>2</sub>  | lon <sub>1</sub>  |
| tfom, lon           | 10    | tfom <sub>2</sub>  | tfom <sub>1</sub>  | lon <sub>14</sub>  | lon <sub>13</sub> | lon <sub>12</sub> | lon <sub>11</sub> | lon <sub>10</sub> | lon <sub>9</sub>  |
| da, id              | 11    | da <sub>4</sub>    | da <sub>3</sub>    | da <sub>2</sub>    | da <sub>1</sub>   | 0                 | 0                 | 0                 | 0                 |
| sil, lat6           | 12    | sil <sub>2</sub>   | sil <sub>1</sub>   | lat <sub>6</sub>   | lat <sub>5</sub>  | lat <sub>4</sub>  | lat <sub>3</sub>  | lat <sub>2</sub>  | lat <sub>1</sub>  |
| br/gr, lon6         | 13    | res <sub>3</sub>   | br/gr              | lon <sub>6</sub>   | lon <sub>5</sub>  | lon <sub>4</sub>  | lon <sub>3</sub>  | lon <sub>2</sub>  | lon <sub>1</sub>  |
| altr, bgo           | 14    | altr <sub>9</sub>  | bgo <sub>7</sub>   | bgo <sub>6</sub>   | bgo <sub>5</sub>  | bgo <sub>4</sub>  | bgo <sub>3</sub>  | bgo <sub>2</sub>  | bgo <sub>1</sub>  |
| altr                | 15    | altr <sub>8</sub>  | altr <sub>7</sub>  | altr <sub>6</sub>  | altr <sub>5</sub> | altr <sub>4</sub> | altr <sub>3</sub> | altr <sub>2</sub> | altr <sub>1</sub> |
| gs                  | 16    | gs <sub>8</sub>    | gs <sub>7</sub>    | gs <sub>6</sub>    | gs <sub>5</sub>   | gs <sub>4</sub>   | gs <sub>3</sub>   | gs <sub>2</sub>   | gs <sub>1</sub>   |
| gs, gt              | 17    | gs <sub>11</sub>   | gs <sub>10</sub>   | gs <sub>9</sub>    | gt <sub>5</sub>   | gt <sub>4</sub>   | gt <sub>3</sub>   | gt <sub>2</sub>   | gt <sub>1</sub>   |
| gt, pt              | 18    | gt <sub>11</sub>   | gt <sub>10</sub>   | gt <sub>9</sub>    | gt <sub>8</sub>   | gt <sub>7</sub>   | gt <sub>6</sub>   | pt <sub>2</sub>   | pt <sub>1</sub>   |
| po                  | 19    | po <sub>8</sub>    | po <sub>7</sub>    | po <sub>6</sub>    | po <sub>5</sub>   | po <sub>4</sub>   | po <sub>3</sub>   | po <sub>2</sub>   | po <sub>1</sub>   |
| c                   | 20    | c <sub>9</sub>     | c <sub>10</sub>    | c <sub>11</sub>    | c <sub>12</sub>   | c <sub>13</sub>   | c <sub>14</sub>   | c <sub>15</sub>   | c <sub>16</sub>   |
| c                   | 21    | c <sub>1</sub>     | c <sub>2</sub>     | c <sub>3</sub>     | c <sub>4</sub>    | c <sub>5</sub>    | c <sub>6</sub>    | c <sub>7</sub>    | c <sub>8</sub>    |
| flag                | -     | 0                  | 1                  | 1                  | 1                 | 1                 | 1                 | 1                 | 0                 |

Table 7.52: SYNC\_HIGH\_DYNAMIC\_a (SHA): High dynamic variable part. Occupies one slot

| Description         | Octet | Bit number         |                    |                    |                   |                   |                   |                   |                   |
|---------------------|-------|--------------------|--------------------|--------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
|                     |       | 8                  | 7                  | 6                  | 5                 | 4                 | 3                 | 2                 | 1                 |
| flag                | -     | 0                  | 1                  | 1                  | 1                 | 1                 | 1                 | 1                 | 0                 |
| s, ver, rid, a/d    | 1     | s <sub>27</sub>    | s <sub>26</sub>    | s <sub>25</sub>    | 0                 | 0                 | 0                 | 1                 | 0                 |
| s                   | 2     | s <sub>24</sub>    | s <sub>23</sub>    | s <sub>22</sub>    | s <sub>21</sub>   | s <sub>20</sub>   | s <sub>19</sub>   | s <sub>18</sub>   | s <sub>17</sub>   |
| s                   | 3     | s <sub>16</sub>    | s <sub>15</sub>    | s <sub>14</sub>    | s <sub>13</sub>   | s <sub>12</sub>   | s <sub>11</sub>   | s <sub>10</sub>   | s <sub>9</sub>    |
| s                   | 4     | s <sub>8</sub>     | s <sub>7</sub>     | s <sub>6</sub>     | s <sub>5</sub>    | s <sub>4</sub>    | s <sub>3</sub>    | s <sub>2</sub>    | s <sub>1</sub>    |
| nic, cprf, b/g, tqc | 5     | nic <sub>4</sub>   | nic <sub>3</sub>   | nic <sub>2</sub>   | nic <sub>1</sub>  | cprf              | b/g               | 1                 | 0                 |
| lat                 | 6     | lat <sub>8</sub>   | lat <sub>7</sub>   | lat <sub>6</sub>   | lat <sub>5</sub>  | lat <sub>4</sub>  | lat <sub>3</sub>  | lat <sub>2</sub>  | lat <sub>1</sub>  |
| balt                | 7     | balt <sub>12</sub> | balt <sub>11</sub> | balt <sub>10</sub> | balt <sub>9</sub> | lat <sub>12</sub> | lat <sub>11</sub> | lat <sub>10</sub> | lat <sub>9</sub>  |
| balt                | 8     | balt <sub>8</sub>  | balt <sub>7</sub>  | balt <sub>6</sub>  | balt <sub>5</sub> | balt <sub>4</sub> | balt <sub>3</sub> | balt <sub>2</sub> | balt <sub>1</sub> |
| lon                 | 9     | lon <sub>8</sub>   | lon <sub>7</sub>   | lon <sub>6</sub>   | lon <sub>5</sub>  | lon <sub>4</sub>  | lon <sub>3</sub>  | lon <sub>2</sub>  | lon <sub>1</sub>  |
| tfom, lon           | 10    | tfom <sub>2</sub>  | tfom <sub>1</sub>  | lon <sub>14</sub>  | lon <sub>13</sub> | lon <sub>12</sub> | lon <sub>11</sub> | lon <sub>10</sub> | lon <sub>9</sub>  |
| da, id              | 11    | da <sub>4</sub>    | da <sub>3</sub>    | da <sub>2</sub>    | da <sub>1</sub>   | 0                 | 0                 | 0                 | 1                 |
| br/gr, bgo          | 12    | br/gr              | bgo <sub>7</sub>   | bgo <sub>6</sub>   | bgo <sub>5</sub>  | bgo <sub>4</sub>  | bgo <sub>3</sub>  | bgo <sub>2</sub>  | bgo <sub>1</sub>  |
| altr                | 13    | altr <sub>8</sub>  | altr <sub>7</sub>  | altr <sub>6</sub>  | altr <sub>5</sub> | altr <sub>4</sub> | altr <sub>3</sub> | altr <sub>2</sub> | altr <sub>1</sub> |
| altr, sil, gs       | 14    | altr <sub>9</sub>  | res <sub>3</sub>   | sil <sub>2</sub>   | sil <sub>1</sub>  | gs <sub>12</sub>  | gs <sub>11</sub>  | gs <sub>10</sub>  | gs <sub>9</sub>   |
| gs                  | 15    | gs <sub>8</sub>    | gs <sub>7</sub>    | gs <sub>6</sub>    | gs <sub>5</sub>   | gs <sub>4</sub>   | gs <sub>3</sub>   | gs <sub>2</sub>   | gs <sub>1</sub>   |
| lon4,lat4           | 16    | lon <sub>44</sub>  | lon <sub>43</sub>  | lon <sub>42</sub>  | lon <sub>41</sub> | lat <sub>44</sub> | lat <sub>43</sub> | lat <sub>42</sub> | lat <sub>41</sub> |
| gt                  | 17    | gt <sub>8</sub>    | gt <sub>7</sub>    | gt <sub>6</sub>    | gt <sub>5</sub>   | gt <sub>4</sub>   | gt <sub>3</sub>   | gt <sub>2</sub>   | gt <sub>1</sub>   |
| gt, pt              | 18    | gt <sub>12</sub>   | gt <sub>11</sub>   | gt <sub>10</sub>   | gt <sub>9</sub>   | res               | res               | pt <sub>2</sub>   | pt <sub>1</sub>   |
| po                  | 19    | po <sub>8</sub>    | po <sub>7</sub>    | po <sub>6</sub>    | po <sub>5</sub>   | po <sub>4</sub>   | po <sub>3</sub>   | po <sub>2</sub>   | po <sub>1</sub>   |
| c                   | 20    | c <sub>9</sub>     | c <sub>10</sub>    | c <sub>11</sub>    | c <sub>12</sub>   | c <sub>13</sub>   | c <sub>14</sub>   | c <sub>15</sub>   | c <sub>16</sub>   |
| c                   | 21    | c <sub>1</sub>     | c <sub>2</sub>     | c <sub>3</sub>     | c <sub>4</sub>    | c <sub>5</sub>    | c <sub>6</sub>    | c <sub>7</sub>    | c <sub>8</sub>    |
| flag                | -     | 0                  | 1                  | 1                  | 1                 | 1                 | 1                 | 1                 | 0                 |

Table 7.53: SYNC\_FULL\_POSITION\_a (SPa): Full Position variable part. Occupies one slot

| Description         | Octet | Bit number         |                    |                               |                               |                               |                               |                               |                               |
|---------------------|-------|--------------------|--------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
|                     |       | 8                  | 7                  | 6                             | 5                             | 4                             | 3                             | 2                             | 1                             |
| flag                | -     | 0                  | 1                  | 1                             | 1                             | 1                             | 1                             | 1                             | 0                             |
| s, ver, rid, a/d    | 1     | s <sub>27</sub>    | s <sub>26</sub>    | s <sub>25</sub>               | 0                             | 0                             | 0                             | 1                             | 0                             |
| s                   | 2     | s <sub>24</sub>    | s <sub>23</sub>    | s <sub>22</sub>               | s <sub>21</sub>               | s <sub>20</sub>               | s <sub>19</sub>               | s <sub>18</sub>               | s <sub>17</sub>               |
| s                   | 3     | s <sub>16</sub>    | s <sub>15</sub>    | s <sub>14</sub>               | s <sub>13</sub>               | s <sub>12</sub>               | s <sub>11</sub>               | s <sub>10</sub>               | s <sub>9</sub>                |
| s                   | 4     | s <sub>8</sub>     | s <sub>7</sub>     | s <sub>6</sub>                | s <sub>5</sub>                | s <sub>4</sub>                | s <sub>3</sub>                | s <sub>2</sub>                | s <sub>1</sub>                |
| nic, cprf, b/g, tqc | 5     | nic <sub>4</sub>   | nic <sub>3</sub>   | nic <sub>2</sub>              | nic <sub>1</sub>              | cprf                          | b/g                           | 1                             | 0                             |
| lat                 | 6     | lat <sub>8</sub>   | lat <sub>7</sub>   | lat <sub>6</sub>              | lat <sub>5</sub>              | lat <sub>4</sub>              | lat <sub>3</sub>              | lat <sub>2</sub>              | lat <sub>1</sub>              |
| balt                | 7     | balt <sub>12</sub> | balt <sub>11</sub> | balt <sub>10</sub>            | balt <sub>9</sub>             | lat <sub>12</sub>             | lat <sub>11</sub>             | lat <sub>10</sub>             | lat <sub>9</sub>              |
| balt                | 8     | balt <sub>8</sub>  | balt <sub>7</sub>  | balt <sub>6</sub>             | balt <sub>5</sub>             | balt <sub>4</sub>             | balt <sub>3</sub>             | balt <sub>2</sub>             | balt <sub>1</sub>             |
| lon                 | 9     | lon <sub>8</sub>   | lon <sub>7</sub>   | lon <sub>6</sub>              | lon <sub>5</sub>              | lon <sub>4</sub>              | lon <sub>3</sub>              | lon <sub>2</sub>              | lon <sub>1</sub>              |
| tfom, lon           | 10    | tfom <sub>2</sub>  | tfom <sub>1</sub>  | lon <sub>14</sub>             | lon <sub>13</sub>             | lon <sub>12</sub>             | lon <sub>11</sub>             | lon <sub>10</sub>             | lon <sub>9</sub>              |
| da, id              | 11    | da <sub>4</sub>    | da <sub>3</sub>    | da <sub>2</sub>               | da <sub>1</sub>               | 0                             | 0                             | 1                             | 0                             |
| pid, lat6           | 12    | pid <sub>10</sub>  | pid <sub>9</sub>   | lat <sub>6</sub> <sub>6</sub> | lat <sub>6</sub> <sub>5</sub> | lat <sub>6</sub> <sub>4</sub> | lat <sub>6</sub> <sub>3</sub> | lat <sub>6</sub> <sub>2</sub> | lat <sub>6</sub> <sub>1</sub> |
| pid                 | 13    | pid <sub>8</sub>   | pid <sub>7</sub>   | pid <sub>6</sub>              | pid <sub>5</sub>              | pid <sub>4</sub>              | pid <sub>3</sub>              | pid <sub>2</sub>              | pid <sub>1</sub>              |
| gt, bgo             | 14    | gt <sub>11</sub>   | bgo <sub>7</sub>   | bgo <sub>6</sub>              | bgo <sub>5</sub>              | bgo <sub>4</sub>              | bgo <sub>3</sub>              | bgo <sub>2</sub>              | bgo <sub>1</sub>              |
| gt, lon6            | 15    | gt <sub>10</sub>   | gt <sub>9</sub>    | lon <sub>6</sub> <sub>6</sub> | lon <sub>6</sub> <sub>5</sub> | lon <sub>6</sub> <sub>4</sub> | lon <sub>6</sub> <sub>3</sub> | lon <sub>6</sub> <sub>2</sub> | lon <sub>6</sub> <sub>1</sub> |
| gt                  | 16    | gt <sub>8</sub>    | gt <sub>7</sub>    | gt <sub>6</sub>               | gt <sub>5</sub>               | gt <sub>4</sub>               | gt <sub>3</sub>               | gt <sub>2</sub>               | gt <sub>1</sub>               |
| gs                  | 17    | gs <sub>8</sub>    | gs <sub>7</sub>    | gs <sub>6</sub>               | gs <sub>5</sub>               | gs <sub>4</sub>               | gs <sub>3</sub>               | gs <sub>2</sub>               | gs <sub>1</sub>               |
| gs, sil, pt         | 18    | gs <sub>11</sub>   | gs <sub>10</sub>   | gs <sub>9</sub>               | res <sub>3</sub>              | sil <sub>2</sub>              | sil <sub>1</sub>              | pt <sub>2</sub>               | pt <sub>1</sub>               |
| po                  | 19    | po <sub>8</sub>    | po <sub>7</sub>    | po <sub>6</sub>               | po <sub>5</sub>               | po <sub>4</sub>               | po <sub>3</sub>               | po <sub>2</sub>               | po <sub>1</sub>               |
| c                   | 20    | c <sub>9</sub>     | c <sub>10</sub>    | c <sub>11</sub>               | c <sub>12</sub>               | c <sub>13</sub>               | c <sub>14</sub>               | c <sub>15</sub>               | c <sub>16</sub>               |
| c                   | 21    | c <sub>1</sub>     | c <sub>2</sub>     | c <sub>3</sub>                | c <sub>4</sub>                | c <sub>5</sub>                | c <sub>6</sub>                | c <sub>7</sub>                | c <sub>8</sub>                |
| flag                | -     | 0                  | 1                  | 1                             | 1                             | 1                             | 1                             | 1                             | 0                             |



Table 7.54: SYNC\_BASIC\_GROUND\_a (BGa): Basic Ground variable part. Occupies one slot

| Description         | Octet | Bit number                    |                               |                               |                               |                               |                               |                               |                               |
|---------------------|-------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
|                     |       | 8                             | 7                             | 6                             | 5                             | 4                             | 3                             | 2                             | 1                             |
| flag                | -     | 0                             | 1                             | 1                             | 1                             | 1                             | 1                             | 1                             | 0                             |
| s, ver, rid, a/d    | 1     | s <sub>27</sub>               | s <sub>26</sub>               | s <sub>25</sub>               | 0                             | 0                             | 0                             | 1                             | 0                             |
| s                   | 2     | s <sub>24</sub>               | s <sub>23</sub>               | s <sub>22</sub>               | s <sub>21</sub>               | s <sub>20</sub>               | s <sub>19</sub>               | s <sub>18</sub>               | s <sub>17</sub>               |
| s                   | 3     | s <sub>16</sub>               | s <sub>15</sub>               | s <sub>14</sub>               | s <sub>13</sub>               | s <sub>12</sub>               | s <sub>11</sub>               | s <sub>10</sub>               | s <sub>9</sub>                |
| s                   | 4     | s <sub>8</sub>                | s <sub>7</sub>                | s <sub>6</sub>                | s <sub>5</sub>                | s <sub>4</sub>                | s <sub>3</sub>                | s <sub>2</sub>                | s <sub>1</sub>                |
| nic, cprf, b/g, tqc | 5     | nic <sub>4</sub>              | nic <sub>3</sub>              | nic <sub>2</sub>              | nic <sub>1</sub>              | cprf                          | b/g                           | 1                             | 0                             |
| lat                 | 6     | lat <sub>8</sub>              | lat <sub>7</sub>              | lat <sub>6</sub>              | lat <sub>5</sub>              | lat <sub>4</sub>              | lat <sub>3</sub>              | lat <sub>2</sub>              | lat <sub>1</sub>              |
| balt                | 7     | balt <sub>12</sub>            | balt <sub>11</sub>            | balt <sub>10</sub>            | balt <sub>9</sub>             | lat <sub>12</sub>             | lat <sub>11</sub>             | lat <sub>10</sub>             | lat <sub>9</sub>              |
| balt                | 8     | balt <sub>8</sub>             | balt <sub>7</sub>             | balt <sub>6</sub>             | balt <sub>5</sub>             | balt <sub>4</sub>             | balt <sub>3</sub>             | balt <sub>2</sub>             | balt <sub>1</sub>             |
| lon                 | 9     | lon <sub>8</sub>              | lon <sub>7</sub>              | lon <sub>6</sub>              | lon <sub>5</sub>              | lon <sub>4</sub>              | lon <sub>3</sub>              | lon <sub>2</sub>              | lon <sub>1</sub>              |
| tfom, lon           | 10    | tfom <sub>2</sub>             | tfom <sub>1</sub>             | lon <sub>14</sub>             | lon <sub>13</sub>             | lon <sub>12</sub>             | lon <sub>11</sub>             | lon <sub>10</sub>             | lon <sub>9</sub>              |
| da, id              | 11    | da <sub>4</sub>               | da <sub>3</sub>               | da <sub>2</sub>               | da <sub>1</sub>               | 0                             | 0                             | 1                             | 1                             |
| h                   | 12    | res                           | res                           | res                           | h <sub>5</sub>                | h <sub>4</sub>                | h <sub>3</sub>                | h <sub>2</sub>                | h <sub>1</sub>                |
| pid, min            | 13    | pid <sub>10</sub>             | pid <sub>9</sub>              | min <sub>6</sub>              | min <sub>5</sub>              | min <sub>4</sub>              | min <sub>3</sub>              | min <sub>2</sub>              | min <sub>1</sub>              |
| pid                 | 14    | pid <sub>8</sub>              | pid <sub>7</sub>              | pid <sub>6</sub>              | pid <sub>5</sub>              | pid <sub>4</sub>              | pid <sub>3</sub>              | pid <sub>2</sub>              | pid <sub>1</sub>              |
| bgo                 | 15    | res                           | bgo <sub>7</sub>              | bgo <sub>6</sub>              | bgo <sub>5</sub>              | bgo <sub>4</sub>              | bgo <sub>3</sub>              | bgo <sub>2</sub>              | bgo <sub>1</sub>              |
| slt                 | 16    | slt <sub>8</sub>              | slt <sub>7</sub>              | slt <sub>6</sub>              | slt <sub>5</sub>              | slt <sub>4</sub>              | slt <sub>3</sub>              | slt <sub>2</sub>              | slt <sub>1</sub>              |
| lon4, lat4          | 17    | lon <sub>4</sub> <sub>4</sub> | lon <sub>4</sub> <sub>3</sub> | lon <sub>4</sub> <sub>2</sub> | lon <sub>4</sub> <sub>1</sub> | lat <sub>4</sub> <sub>4</sub> | lat <sub>4</sub> <sub>3</sub> | lat <sub>4</sub> <sub>2</sub> | lat <sub>4</sub> <sub>1</sub> |
| sec, pt             | 18    | sec <sub>6</sub>              | sec <sub>5</sub>              | sec <sub>4</sub>              | sec <sub>3</sub>              | sec <sub>2</sub>              | sec <sub>1</sub>              | pt <sub>2</sub>               | pt <sub>1</sub>               |
| po                  | 19    | po <sub>8</sub>               | po <sub>7</sub>               | po <sub>6</sub>               | po <sub>5</sub>               | po <sub>4</sub>               | po <sub>3</sub>               | po <sub>2</sub>               | po <sub>1</sub>               |
| c                   | 20    | c <sub>9</sub>                | c <sub>10</sub>               | c <sub>11</sub>               | c <sub>12</sub>               | c <sub>13</sub>               | c <sub>14</sub>               | c <sub>15</sub>               | c <sub>16</sub>               |
| c                   | 21    | c <sub>1</sub>                | c <sub>2</sub>                | c <sub>3</sub>                | c <sub>4</sub>                | c <sub>5</sub>                | c <sub>6</sub>                | c <sub>7</sub>                | c <sub>8</sub>                |
| flag                | -     | 0                             | 1                             | 1                             | 1                             | 1                             | 1                             | 1                             | 0                             |

Table 7.55: SYNC.UTC.TIME\_a (UTCa): UTC Time variable part. Occupies one slot

| Description         | Octet | Bit number         |                    |                    |                   |                   |                   |                   |                   |
|---------------------|-------|--------------------|--------------------|--------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
|                     |       | 8                  | 7                  | 6                  | 5                 | 4                 | 3                 | 2                 | 1                 |
| flag                | -     | 0                  | 1                  | 1                  | 1                 | 1                 | 1                 | 1                 | 0                 |
| s, ver, rid, a/d    | 1     | s <sub>27</sub>    | s <sub>26</sub>    | s <sub>25</sub>    | 0                 | 0                 | 0                 | 1                 | 0                 |
| s                   | 2     | s <sub>24</sub>    | s <sub>23</sub>    | s <sub>22</sub>    | s <sub>21</sub>   | s <sub>20</sub>   | s <sub>19</sub>   | s <sub>18</sub>   | s <sub>17</sub>   |
| s                   | 3     | s <sub>16</sub>    | s <sub>15</sub>    | s <sub>14</sub>    | s <sub>13</sub>   | s <sub>12</sub>   | s <sub>11</sub>   | s <sub>10</sub>   | s <sub>9</sub>    |
| s                   | 4     | s <sub>8</sub>     | s <sub>7</sub>     | s <sub>6</sub>     | s <sub>5</sub>    | s <sub>4</sub>    | s <sub>3</sub>    | s <sub>2</sub>    | s <sub>1</sub>    |
| nic, cprf, b/g, tqc | 5     | nic <sub>4</sub>   | nic <sub>3</sub>   | nic <sub>2</sub>   | nic <sub>1</sub>  | cprf              | b/g               | 1                 | 0                 |
| lat                 | 6     | lat <sub>8</sub>   | lat <sub>7</sub>   | lat <sub>6</sub>   | lat <sub>5</sub>  | lat <sub>4</sub>  | lat <sub>3</sub>  | lat <sub>2</sub>  | lat <sub>1</sub>  |
| balt                | 7     | balt <sub>12</sub> | balt <sub>11</sub> | balt <sub>10</sub> | balt <sub>9</sub> | lat <sub>12</sub> | lat <sub>11</sub> | lat <sub>10</sub> | lat <sub>9</sub>  |
| balt                | 8     | balt <sub>8</sub>  | balt <sub>7</sub>  | balt <sub>6</sub>  | balt <sub>5</sub> | balt <sub>4</sub> | balt <sub>3</sub> | balt <sub>2</sub> | balt <sub>1</sub> |
| lon                 | 9     | lon <sub>8</sub>   | lon <sub>7</sub>   | lon <sub>6</sub>   | lon <sub>5</sub>  | lon <sub>4</sub>  | lon <sub>3</sub>  | lon <sub>2</sub>  | lon <sub>1</sub>  |
| tfom, lon           | 10    | tfom <sub>2</sub>  | tfom <sub>1</sub>  | lon <sub>14</sub>  | lon <sub>13</sub> | lon <sub>12</sub> | lon <sub>11</sub> | lon <sub>10</sub> | lon <sub>9</sub>  |
| da, id              | 11    | da <sub>4</sub>    | da <sub>3</sub>    | da <sub>2</sub>    | da <sub>1</sub>   | 0                 | 1                 | 0                 | 0                 |
| day                 | 12    | res                | res                | res                | day <sub>5</sub>  | day <sub>4</sub>  | day <sub>3</sub>  | day <sub>2</sub>  | day <sub>1</sub>  |
| yr                  | 13    | yr <sub>8</sub>    | yr <sub>7</sub>    | yr <sub>6</sub>    | yr <sub>5</sub>   | yr <sub>4</sub>   | yr <sub>3</sub>   | yr <sub>2</sub>   | yr <sub>1</sub>   |
| h, mon              | 14    | h <sub>4</sub>     | h <sub>3</sub>     | h <sub>2</sub>     | h <sub>1</sub>    | mon <sub>4</sub>  | mon <sub>3</sub>  | mon <sub>2</sub>  | mon <sub>1</sub>  |
| h, min              | 15    | res                | h <sub>5</sub>     | min <sub>6</sub>   | min <sub>5</sub>  | min <sub>4</sub>  | min <sub>3</sub>  | min <sub>2</sub>  | min <sub>1</sub>  |
| slt                 | 16    | slt <sub>8</sub>   | slt <sub>7</sub>   | slt <sub>6</sub>   | slt <sub>5</sub>  | slt <sub>4</sub>  | slt <sub>3</sub>  | slt <sub>2</sub>  | slt <sub>1</sub>  |
| lon4, lat4          | 17    | lon <sub>44</sub>  | lon <sub>43</sub>  | lon <sub>42</sub>  | lon <sub>41</sub> | lat <sub>44</sub> | lat <sub>43</sub> | lat <sub>42</sub> | lat <sub>41</sub> |
| sec, pt             | 18    | sec <sub>6</sub>   | sec <sub>5</sub>   | sec <sub>4</sub>   | sec <sub>3</sub>  | sec <sub>2</sub>  | sec <sub>1</sub>  | pt <sub>2</sub>   | pt <sub>1</sub>   |
| po                  | 19    | po <sub>8</sub>    | po <sub>7</sub>    | po <sub>6</sub>    | po <sub>5</sub>   | po <sub>4</sub>   | po <sub>3</sub>   | po <sub>2</sub>   | po <sub>1</sub>   |
| c                   | 20    | c <sub>9</sub>     | c <sub>10</sub>    | c <sub>11</sub>    | c <sub>12</sub>   | c <sub>13</sub>   | c <sub>14</sub>   | c <sub>15</sub>   | c <sub>16</sub>   |
| c                   | 21    | c <sub>1</sub>     | c <sub>2</sub>     | c <sub>3</sub>     | c <sub>4</sub>    | c <sub>5</sub>    | c <sub>6</sub>    | c <sub>7</sub>    | c <sub>8</sub>    |
| flag                | -     | 0                  | 1                  | 1                  | 1                 | 1                 | 1                 | 1                 | 0                 |

Table 7.56: SYNC\_TWO\_SLOT\_TCP/SVQ\_a (STa): Two-slot TCP variable part. Occupies two slots

| Description                | Octet | Bit number         |                    |                    |                   |                   |                   |                   |                   |
|----------------------------|-------|--------------------|--------------------|--------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
|                            |       | 8                  | 7                  | 6                  | 5                 | 4                 | 3                 | 2                 | 1                 |
| flag                       | -     | 0                  | 1                  | 1                  | 1                 | 1                 | 1                 | 1                 | 0                 |
| s, ver, rid, a/d           | 1     | s <sub>27</sub>    | s <sub>26</sub>    | s <sub>25</sub>    | 0                 | 0                 | 0                 | 1                 | 0                 |
| s                          | 2     | s <sub>24</sub>    | s <sub>23</sub>    | s <sub>22</sub>    | s <sub>21</sub>   | s <sub>20</sub>   | s <sub>19</sub>   | s <sub>18</sub>   | s <sub>17</sub>   |
| s                          | 3     | s <sub>16</sub>    | s <sub>15</sub>    | s <sub>14</sub>    | s <sub>13</sub>   | s <sub>12</sub>   | s <sub>11</sub>   | s <sub>10</sub>   | s <sub>9</sub>    |
| s                          | 4     | s <sub>8</sub>     | s <sub>7</sub>     | s <sub>6</sub>     | s <sub>5</sub>    | s <sub>4</sub>    | s <sub>3</sub>    | s <sub>2</sub>    | s <sub>1</sub>    |
| nic, cprf, b/g, tqc        | 5     | nic <sub>4</sub>   | nic <sub>3</sub>   | nic <sub>2</sub>   | nic <sub>1</sub>  | cprf              | b/g               | 1                 | 0                 |
| lat                        | 6     | lat <sub>8</sub>   | lat <sub>7</sub>   | lat <sub>6</sub>   | lat <sub>5</sub>  | lat <sub>4</sub>  | lat <sub>3</sub>  | lat <sub>2</sub>  | lat <sub>1</sub>  |
| balt                       | 7     | balt <sub>12</sub> | balt <sub>11</sub> | balt <sub>10</sub> | balt <sub>9</sub> | lat <sub>12</sub> | lat <sub>11</sub> | lat <sub>10</sub> | lat <sub>9</sub>  |
| balt                       | 8     | balt <sub>8</sub>  | balt <sub>7</sub>  | balt <sub>6</sub>  | balt <sub>5</sub> | balt <sub>4</sub> | balt <sub>3</sub> | balt <sub>2</sub> | balt <sub>1</sub> |
| lon                        | 9     | lon <sub>8</sub>   | lon <sub>7</sub>   | lon <sub>6</sub>   | lon <sub>5</sub>  | lon <sub>4</sub>  | lon <sub>3</sub>  | lon <sub>2</sub>  | lon <sub>1</sub>  |
| tfom, lon                  | 10    | tfom <sub>2</sub>  | tfom <sub>1</sub>  | lon <sub>14</sub>  | lon <sub>13</sub> | lon <sub>12</sub> | lon <sub>11</sub> | lon <sub>10</sub> | lon <sub>9</sub>  |
| da, id                     | 11    | da <sub>4</sub>    | da <sub>3</sub>    | da <sub>2</sub>    | da <sub>1</sub>   | 1                 | 0                 | 0                 | 0                 |
| lat                        | 12    | lat <sub>8</sub>   | lat <sub>7</sub>   | lat <sub>6</sub>   | lat <sub>5</sub>  | lat <sub>4</sub>  | lat <sub>3</sub>  | lat <sub>2</sub>  | lat <sub>1</sub>  |
| balt, lat                  | 13    | balt <sub>12</sub> | balt <sub>11</sub> | balt <sub>10</sub> | balt <sub>9</sub> | lat <sub>12</sub> | lat <sub>11</sub> | lat <sub>10</sub> | lat <sub>9</sub>  |
| balt                       | 14    | balt <sub>8</sub>  | balt <sub>7</sub>  | balt <sub>6</sub>  | balt <sub>5</sub> | balt <sub>4</sub> | balt <sub>3</sub> | balt <sub>2</sub> | balt <sub>1</sub> |
| lon                        | 15    | lon <sub>8</sub>   | lon <sub>7</sub>   | lon <sub>6</sub>   | lon <sub>5</sub>  | lon <sub>4</sub>  | lon <sub>3</sub>  | lon <sub>2</sub>  | lon <sub>1</sub>  |
| ttg, lon                   | 16    | ttg <sub>6</sub>   | ttg <sub>5</sub>   | lon <sub>14</sub>  | lon <sub>13</sub> | lon <sub>12</sub> | lon <sub>11</sub> | lon <sub>10</sub> | lon <sub>9</sub>  |
| ttg                        | 17    | ttg <sub>4</sub>   | ttg <sub>3</sub>   | ttg <sub>2</sub>   | ttg <sub>1</sub>  | res               | res               | res               | res               |
| lat                        | 18    | lat <sub>8</sub>   | lat <sub>7</sub>   | lat <sub>6</sub>   | lat <sub>5</sub>  | lat <sub>4</sub>  | lat <sub>3</sub>  | lat <sub>2</sub>  | lat <sub>1</sub>  |
| balt, lat                  | 19    | balt <sub>12</sub> | balt <sub>11</sub> | balt <sub>10</sub> | balt <sub>9</sub> | lat <sub>12</sub> | lat <sub>11</sub> | lat <sub>10</sub> | lat <sub>9</sub>  |
| balt                       | 20    | balt <sub>8</sub>  | balt <sub>7</sub>  | balt <sub>6</sub>  | balt <sub>5</sub> | balt <sub>4</sub> | balt <sub>3</sub> | balt <sub>2</sub> | balt <sub>1</sub> |
| lon                        | 21    | lon <sub>8</sub>   | lon <sub>7</sub>   | lon <sub>6</sub>   | lon <sub>5</sub>  | lon <sub>4</sub>  | lon <sub>3</sub>  | lon <sub>2</sub>  | lon <sub>1</sub>  |
| ttg, lon                   | 22    | ttg <sub>6</sub>   | ttg <sub>5</sub>   | lon <sub>14</sub>  | lon <sub>13</sub> | lon <sub>12</sub> | lon <sub>11</sub> | lon <sub>10</sub> | lon <sub>9</sub>  |
| ttg                        | 23    | ttg <sub>4</sub>   | ttg <sub>3</sub>   | ttg <sub>2</sub>   | ttg <sub>1</sub>  | res               | res               | res               | res               |
| lat                        | 24    | lat <sub>8</sub>   | lat <sub>7</sub>   | lat <sub>6</sub>   | lat <sub>5</sub>  | lat <sub>4</sub>  | lat <sub>3</sub>  | lat <sub>2</sub>  | lat <sub>1</sub>  |
| balt, lat                  | 25    | balt <sub>12</sub> | balt <sub>11</sub> | balt <sub>10</sub> | balt <sub>9</sub> | lat <sub>12</sub> | lat <sub>11</sub> | lat <sub>10</sub> | lat <sub>9</sub>  |
| balt                       | 26    | balt <sub>8</sub>  | balt <sub>7</sub>  | balt <sub>6</sub>  | balt <sub>5</sub> | balt <sub>4</sub> | balt <sub>3</sub> | balt <sub>2</sub> | balt <sub>1</sub> |
| lon                        | 27    | lon <sub>8</sub>   | lon <sub>7</sub>   | lon <sub>6</sub>   | lon <sub>5</sub>  | lon <sub>4</sub>  | lon <sub>3</sub>  | lon <sub>2</sub>  | lon <sub>1</sub>  |
| ttg, lon                   | 28    | ttg <sub>6</sub>   | ttg <sub>5</sub>   | lon <sub>14</sub>  | lon <sub>13</sub> | lon <sub>12</sub> | lon <sub>11</sub> | lon <sub>10</sub> | lon <sub>9</sub>  |
| ttg                        | 29    | ttg <sub>4</sub>   | ttg <sub>3</sub>   | ttg <sub>2</sub>   | ttg <sub>1</sub>  | res               | res               | res               | res               |
| lat                        | 30    | lat <sub>8</sub>   | lat <sub>7</sub>   | lat <sub>6</sub>   | lat <sub>5</sub>  | lat <sub>4</sub>  | lat <sub>3</sub>  | lat <sub>2</sub>  | lat <sub>1</sub>  |
| balt, lat                  | 31    | balt <sub>12</sub> | balt <sub>11</sub> | balt <sub>10</sub> | balt <sub>9</sub> | lat <sub>12</sub> | lat <sub>11</sub> | lat <sub>10</sub> | lat <sub>9</sub>  |
| balt                       | 32    | balt <sub>8</sub>  | balt <sub>7</sub>  | balt <sub>6</sub>  | balt <sub>5</sub> | balt <sub>4</sub> | balt <sub>3</sub> | balt <sub>2</sub> | balt <sub>1</sub> |
| lon                        | 33    | lon <sub>8</sub>   | lon <sub>7</sub>   | lon <sub>6</sub>   | lon <sub>5</sub>  | lon <sub>4</sub>  | lon <sub>3</sub>  | lon <sub>2</sub>  | lon <sub>1</sub>  |
| ttg, lon                   | 34    | ttg <sub>6</sub>   | ttg <sub>5</sub>   | lon <sub>14</sub>  | lon <sub>13</sub> | lon <sub>12</sub> | lon <sub>11</sub> | lon <sub>10</sub> | lon <sub>9</sub>  |
| ttg                        | 35    | ttg <sub>4</sub>   | ttg <sub>3</sub>   | ttg <sub>2</sub>   | ttg <sub>1</sub>  | res               | res               | res               | res               |
| csl                        | 36    | csl <sub>8</sub>   | csl <sub>7</sub>   | csl <sub>6</sub>   | csl <sub>5</sub>  | csl <sub>4</sub>  | csl <sub>3</sub>  | csl <sub>2</sub>  | csl <sub>1</sub>  |
| csl                        | 37    | csl <sub>16</sub>  | csl <sub>15</sub>  | csl <sub>14</sub>  | csl <sub>13</sub> | csl <sub>12</sub> | csl <sub>11</sub> | csl <sub>10</sub> | csl <sub>9</sub>  |
| st, csl                    | 38    | st <sub>3</sub>    | st <sub>2</sub>    | st <sub>1</sub>    | csl <sub>21</sub> | csl <sub>20</sub> | csl <sub>19</sub> | csl <sub>18</sub> | csl <sub>17</sub> |
| csr                        | 39    | csr <sub>8</sub>   | csr <sub>7</sub>   | csr <sub>6</sub>   | csr <sub>5</sub>  | csr <sub>4</sub>  | csr <sub>3</sub>  | csr <sub>2</sub>  | csr <sub>1</sub>  |
| csr                        | 40    | csr <sub>16</sub>  | csr <sub>15</sub>  | csr <sub>14</sub>  | csr <sub>13</sub> | csr <sub>12</sub> | csr <sub>11</sub> | csr <sub>10</sub> | csr <sub>9</sub>  |
| nacv, csr                  | 41    | nacv <sub>3</sub>  | nacv <sub>2</sub>  | nacv <sub>1</sub>  | csr <sub>21</sub> | csr <sub>20</sub> | csr <sub>19</sub> | csr <sub>18</sub> | csr <sub>17</sub> |
| nacp, cdti, nicb, acas, ra | 42    | nacp <sub>4</sub>  | nacp <sub>3</sub>  | nacp <sub>2</sub>  | nacp <sub>1</sub> | cdti              | nicb              | acas              | ra                |
| pid                        | 43    | pid <sub>8</sub>   | pid <sub>7</sub>   | pid <sub>6</sub>   | pid <sub>5</sub>  | pid <sub>4</sub>  | pid <sub>3</sub>  | pid <sub>2</sub>  | pid <sub>1</sub>  |
| pid, lat6                  | 44    | pid <sub>10</sub>  | pid <sub>9</sub>   | lat <sub>6</sub>   | lat <sub>6</sub>  | lat <sub>6</sub>  | lat <sub>6</sub>  | lat <sub>6</sub>  | lat <sub>6</sub>  |
| altr, nucr, br/gr, lon6    | 45    | altr <sub>9</sub>  | br/gr              | lon <sub>6</sub>   | lon <sub>6</sub>  | lon <sub>6</sub>  | lon <sub>6</sub>  | lon <sub>6</sub>  | lon <sub>6</sub>  |
| altr                       | 46    | altr <sub>8</sub>  | altr <sub>7</sub>  | altr <sub>6</sub>  | altr <sub>5</sub> | altr <sub>4</sub> | altr <sub>3</sub> | altr <sub>2</sub> | altr <sub>1</sub> |
| sil, ac                    | 47    | res                | sil <sub>2</sub>   | sil <sub>1</sub>   | ac <sub>5</sub>   | ac <sub>4</sub>   | ac <sub>3</sub>   | ac <sub>2</sub>   | ac <sub>1</sub>   |

| Description | Octet | Bit number       |                  |                 |                 |                 |                 |                 |                 |
|-------------|-------|------------------|------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|             |       | 8                | 7                | 6               | 5               | 4               | 3               | 2               | 1               |
| gs          | 48    | gs <sub>8</sub>  | gs <sub>7</sub>  | gs <sub>6</sub> | gs <sub>5</sub> | gs <sub>4</sub> | gs <sub>3</sub> | gs <sub>2</sub> | gs <sub>1</sub> |
| gs, gt      | 49    | gs <sub>11</sub> | gs <sub>10</sub> | gs <sub>9</sub> | gt <sub>5</sub> | gt <sub>4</sub> | gt <sub>3</sub> | gt <sub>2</sub> | gt <sub>1</sub> |
| gt, pt      | 50    | gt <sub>11</sub> | gt <sub>10</sub> | gt <sub>9</sub> | gt <sub>8</sub> | gt <sub>7</sub> | gt <sub>6</sub> | pt <sub>2</sub> | pt <sub>1</sub> |
| po          | 51    | po <sub>8</sub>  | po <sub>7</sub>  | po <sub>6</sub> | po <sub>5</sub> | po <sub>4</sub> | po <sub>3</sub> | po <sub>2</sub> | po <sub>1</sub> |
| c           | 52    | c <sub>9</sub>   | c <sub>10</sub>  | c <sub>11</sub> | c <sub>12</sub> | c <sub>13</sub> | c <sub>14</sub> | c <sub>15</sub> | c <sub>16</sub> |
| c           | 53    | c <sub>1</sub>   | c <sub>2</sub>   | c <sub>3</sub>  | c <sub>4</sub>  | c <sub>5</sub>  | c <sub>6</sub>  | c <sub>7</sub>  | c <sub>8</sub>  |
| flag        | -     | 0                | 1                | 1               | 1               | 1               | 1               | 1               | 0               |

**Table 7.57: SYNC\_SINGLE\_SLOT\_TCP\_a (SSa): Single Slot TCP variable part. Occupies one slot**

| Description         | Octet | Bit number         |                    |                    |                   |                   |                   |                   |                   |
|---------------------|-------|--------------------|--------------------|--------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
|                     |       | 8                  | 7                  | 6                  | 5                 | 4                 | 3                 | 2                 | 1                 |
| flag                | -     | 0                  | 1                  | 1                  | 1                 | 1                 | 1                 | 1                 | 0                 |
| s, ver, rid, a/d    | 1     | s <sub>27</sub>    | s <sub>26</sub>    | s <sub>25</sub>    | 0                 | 0                 | 0                 | 1                 | 0                 |
| s                   | 2     | s <sub>24</sub>    | s <sub>23</sub>    | s <sub>22</sub>    | s <sub>21</sub>   | s <sub>20</sub>   | s <sub>19</sub>   | s <sub>18</sub>   | s <sub>17</sub>   |
| s                   | 3     | s <sub>16</sub>    | s <sub>15</sub>    | s <sub>14</sub>    | s <sub>13</sub>   | s <sub>12</sub>   | s <sub>11</sub>   | s <sub>10</sub>   | s <sub>9</sub>    |
| s                   | 4     | s <sub>8</sub>     | s <sub>7</sub>     | s <sub>6</sub>     | s <sub>5</sub>    | s <sub>4</sub>    | s <sub>3</sub>    | s <sub>2</sub>    | s <sub>1</sub>    |
| nic, cprf, b/g, tqc | 5     | nic <sub>4</sub>   | nic <sub>3</sub>   | nic <sub>2</sub>   | nic <sub>1</sub>  | cprf              | b/g               | 1                 | 0                 |
| lat                 | 6     | lat <sub>8</sub>   | lat <sub>7</sub>   | lat <sub>6</sub>   | lat <sub>5</sub>  | lat <sub>4</sub>  | lat <sub>3</sub>  | lat <sub>2</sub>  | lat <sub>1</sub>  |
| balt                | 7     | balt <sub>12</sub> | balt <sub>11</sub> | balt <sub>10</sub> | balt <sub>9</sub> | lat <sub>12</sub> | lat <sub>11</sub> | lat <sub>10</sub> | lat <sub>9</sub>  |
| balt                | 8     | balt <sub>8</sub>  | balt <sub>7</sub>  | balt <sub>6</sub>  | balt <sub>5</sub> | balt <sub>4</sub> | balt <sub>3</sub> | balt <sub>2</sub> | balt <sub>1</sub> |
| lon                 | 9     | lon <sub>8</sub>   | lon <sub>7</sub>   | lon <sub>6</sub>   | lon <sub>5</sub>  | lon <sub>4</sub>  | lon <sub>3</sub>  | lon <sub>2</sub>  | lon <sub>1</sub>  |
| tfom, lon           | 10    | tfom <sub>2</sub>  | tfom <sub>1</sub>  | lon <sub>14</sub>  | lon <sub>13</sub> | lon <sub>12</sub> | lon <sub>11</sub> | lon <sub>10</sub> | lon <sub>9</sub>  |
| da, id              | 11    | da <sub>4</sub>    | da <sub>3</sub>    | da <sub>2</sub>    | da <sub>1</sub>   | 1                 | 0                 | 0                 | 1                 |
| balt                | 12    | balt <sub>8</sub>  | balt <sub>7</sub>  | balt <sub>6</sub>  | balt <sub>5</sub> | balt <sub>4</sub> | balt <sub>3</sub> | balt <sub>2</sub> | balt <sub>1</sub> |
| balt, no, pid       | 13    | balt <sub>12</sub> | balt <sub>11</sub> | balt <sub>10</sub> | no <sub>2</sub>   | no <sub>1</sub>   | pid <sub>3</sub>  | pid <sub>2</sub>  | pid <sub>1</sub>  |
| pid                 | 14    | pid <sub>8</sub>   | pid <sub>7</sub>   | pid <sub>6</sub>   | pid <sub>5</sub>  | pid <sub>4</sub>  | pid <sub>3</sub>  | pid <sub>2</sub>  | pid <sub>1</sub>  |
| lat                 | 15    | lat <sub>8</sub>   | lat <sub>7</sub>   | lat <sub>6</sub>   | lat <sub>5</sub>  | lat <sub>4</sub>  | lat <sub>3</sub>  | lat <sub>2</sub>  | lat <sub>1</sub>  |
| lat, lon            | 16    | lat <sub>12</sub>  | lat <sub>11</sub>  | lat <sub>10</sub>  | lat <sub>9</sub>  | lon <sub>14</sub> | lon <sub>13</sub> | lon <sub>12</sub> | lon <sub>11</sub> |
| lon                 | 17    | lon <sub>10</sub>  | lon <sub>9</sub>   | lon <sub>8</sub>   | lon <sub>7</sub>  | lon <sub>6</sub>  | lon <sub>5</sub>  | lon <sub>4</sub>  | lon <sub>3</sub>  |
| ttg, pt             | 18    | ttg <sub>6</sub>   | ttg <sub>5</sub>   | ttg <sub>4</sub>   | ttg <sub>3</sub>  | ttg <sub>2</sub>  | ttg <sub>1</sub>  | pt <sub>2</sub>   | pt <sub>1</sub>   |
| po                  | 19    | po <sub>8</sub>    | po <sub>7</sub>    | po <sub>6</sub>    | po <sub>5</sub>   | po <sub>4</sub>   | po <sub>3</sub>   | po <sub>2</sub>   | po <sub>1</sub>   |
| c                   | 20    | c <sub>9</sub>     | c <sub>10</sub>    | c <sub>11</sub>    | c <sub>12</sub>   | c <sub>13</sub>   | c <sub>14</sub>   | c <sub>15</sub>   | c <sub>16</sub>   |
| c                   | 21    | c <sub>1</sub>     | c <sub>2</sub>     | c <sub>3</sub>     | c <sub>4</sub>    | c <sub>5</sub>    | c <sub>6</sub>    | c <sub>7</sub>    | c <sub>8</sub>    |
| flag                | -     | 0                  | 1                  | 1                  | 1                 | 1                 | 1                 | 1                 | 0                 |

Table 7.58: SYNC\_SINGLE\_SLOT\_SVQ\_a (SVa): Single Slot SVQ variable part. Occupies one slot

| Description               | Octet | Bit number         |                    |                    |                   |                   |                   |                   |                   |
|---------------------------|-------|--------------------|--------------------|--------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
|                           |       | 8                  | 7                  | 6                  | 5                 | 4                 | 3                 | 2                 | 1                 |
| flag                      | -     | 0                  | 1                  | 1                  | 1                 | 1                 | 1                 | 1                 | 0                 |
| s, ver, rid, a/d          | 1     | s <sub>27</sub>    | s <sub>26</sub>    | s <sub>25</sub>    | 0                 | 0                 | 0                 | 1                 | 0                 |
| s                         | 2     | s <sub>24</sub>    | s <sub>23</sub>    | s <sub>22</sub>    | s <sub>21</sub>   | s <sub>20</sub>   | s <sub>19</sub>   | s <sub>18</sub>   | s <sub>17</sub>   |
| s                         | 3     | s <sub>16</sub>    | s <sub>15</sub>    | s <sub>14</sub>    | s <sub>13</sub>   | s <sub>12</sub>   | s <sub>11</sub>   | s <sub>10</sub>   | s <sub>9</sub>    |
| s                         | 4     | s <sub>8</sub>     | s <sub>7</sub>     | s <sub>6</sub>     | s <sub>5</sub>    | s <sub>4</sub>    | s <sub>3</sub>    | s <sub>2</sub>    | s <sub>1</sub>    |
| nic, cprf, b/g, tqc       | 5     | nic <sub>4</sub>   | nic <sub>3</sub>   | nic <sub>2</sub>   | nic <sub>1</sub>  | cprf              | b/g               | 1                 | 0                 |
| lat                       | 6     | lat <sub>8</sub>   | lat <sub>7</sub>   | lat <sub>6</sub>   | lat <sub>5</sub>  | lat <sub>4</sub>  | lat <sub>3</sub>  | lat <sub>2</sub>  | lat <sub>1</sub>  |
| balt                      | 7     | balt <sub>12</sub> | balt <sub>11</sub> | balt <sub>10</sub> | balt <sub>9</sub> | lat <sub>12</sub> | lat <sub>11</sub> | lat <sub>10</sub> | lat <sub>9</sub>  |
| balt                      | 8     | balt <sub>8</sub>  | balt <sub>7</sub>  | balt <sub>6</sub>  | balt <sub>5</sub> | balt <sub>4</sub> | balt <sub>3</sub> | balt <sub>2</sub> | balt <sub>1</sub> |
| lon                       | 9     | lon <sub>8</sub>   | lon <sub>7</sub>   | lon <sub>6</sub>   | lon <sub>5</sub>  | lon <sub>4</sub>  | lon <sub>3</sub>  | lon <sub>2</sub>  | lon <sub>1</sub>  |
| tfom, lon                 | 10    | tfom <sub>2</sub>  | tfom <sub>1</sub>  | lon <sub>14</sub>  | lon <sub>13</sub> | lon <sub>12</sub> | lon <sub>11</sub> | lon <sub>10</sub> | lon <sub>9</sub>  |
| da, id                    | 11    | da <sub>4</sub>    | da <sub>3</sub>    | da <sub>2</sub>    | da <sub>1</sub>   | 0                 | 1                 | 0                 | 1                 |
| nacp                      | 12    | 0                  | 0                  | 0                  | 1                 | nacp <sub>4</sub> | nacp <sub>3</sub> | nacp <sub>2</sub> | nacp <sub>1</sub> |
| nacv, sil, nicb, acas, ra | 13    | nacv <sub>3</sub>  | nacv <sub>2</sub>  | nacv <sub>1</sub>  | sil <sub>2</sub>  | sil <sub>1</sub>  | nicb              | acas              | ra                |
| st, ac                    | 14    | st <sub>3</sub>    | st <sub>2</sub>    | st <sub>1</sub>    | ac <sub>5</sub>   | ac <sub>4</sub>   | ac <sub>3</sub>   | ac <sub>2</sub>   | ac <sub>1</sub>   |
| res                       | 15    | 0                  | 0                  | 0                  | 0                 | 0                 | 0                 | 0                 | 0                 |
| res                       | 16    | 0                  | 0                  | 0                  | 0                 | 0                 | 0                 | 0                 | 0                 |
| res                       | 17    | 0                  | 0                  | 0                  | 0                 | 0                 | 0                 | 0                 | 0                 |
| res, pt                   | 18    | 0                  | 0                  | 0                  | 0                 | 0                 | 0                 | pt <sub>2</sub>   | pt <sub>1</sub>   |
| po                        | 19    | po <sub>8</sub>    | po <sub>7</sub>    | po <sub>6</sub>    | po <sub>5</sub>   | po <sub>4</sub>   | po <sub>3</sub>   | po <sub>2</sub>   | po <sub>1</sub>   |
| c                         | 20    | c <sub>9</sub>     | c <sub>10</sub>    | c <sub>11</sub>    | c <sub>12</sub>   | c <sub>13</sub>   | c <sub>14</sub>   | c <sub>15</sub>   | c <sub>16</sub>   |
| c                         | 21    | c <sub>1</sub>     | c <sub>2</sub>     | c <sub>3</sub>     | c <sub>4</sub>    | c <sub>5</sub>    | c <sub>6</sub>    | c <sub>7</sub>    | c <sub>8</sub>    |
| flag                      | -     | 0                  | 1                  | 1                  | 1                 | 1                 | 1                 | 1                 | 0                 |

Table 7.59: SYNC\_AIRCRAFT\_DATA\_a (SDa): Aircraft data variable part. Occupies one slot

| Description         | Octet | Bit number         |                    |                    |                   |                   |                   |                   |                   |
|---------------------|-------|--------------------|--------------------|--------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
|                     |       | 8                  | 7                  | 6                  | 5                 | 4                 | 3                 | 2                 | 1                 |
| flag                | -     | 0                  | 1                  | 1                  | 1                 | 1                 | 1                 | 1                 | 0                 |
| s, ver, rid, a/d    | 1     | s <sub>27</sub>    | s <sub>26</sub>    | s <sub>25</sub>    | 0                 | 0                 | 0                 | 1                 | 0                 |
| s                   | 2     | s <sub>24</sub>    | s <sub>23</sub>    | s <sub>22</sub>    | s <sub>21</sub>   | s <sub>20</sub>   | s <sub>19</sub>   | s <sub>18</sub>   | s <sub>17</sub>   |
| s                   | 3     | s <sub>16</sub>    | s <sub>15</sub>    | s <sub>14</sub>    | s <sub>13</sub>   | s <sub>12</sub>   | s <sub>11</sub>   | s <sub>10</sub>   | s <sub>9</sub>    |
| s                   | 4     | s <sub>8</sub>     | s <sub>7</sub>     | s <sub>6</sub>     | s <sub>5</sub>    | s <sub>4</sub>    | s <sub>3</sub>    | s <sub>2</sub>    | s <sub>1</sub>    |
| nic, cprf, b/g, tqc | 5     | nic <sub>4</sub>   | nic <sub>3</sub>   | nic <sub>2</sub>   | nic <sub>1</sub>  | cprf              | b/g               | 1                 | 0                 |
| lat                 | 6     | lat <sub>8</sub>   | lat <sub>7</sub>   | lat <sub>6</sub>   | lat <sub>5</sub>  | lat <sub>4</sub>  | lat <sub>3</sub>  | lat <sub>2</sub>  | lat <sub>1</sub>  |
| balt                | 7     | balt <sub>12</sub> | balt <sub>11</sub> | balt <sub>10</sub> | balt <sub>9</sub> | lat <sub>12</sub> | lat <sub>11</sub> | lat <sub>10</sub> | lat <sub>9</sub>  |
| balt                | 8     | balt <sub>8</sub>  | balt <sub>7</sub>  | balt <sub>6</sub>  | balt <sub>5</sub> | balt <sub>4</sub> | balt <sub>3</sub> | balt <sub>2</sub> | balt <sub>1</sub> |
| lon                 | 9     | lon <sub>8</sub>   | lon <sub>7</sub>   | lon <sub>6</sub>   | lon <sub>5</sub>  | lon <sub>4</sub>  | lon <sub>3</sub>  | lon <sub>2</sub>  | lon <sub>1</sub>  |
| tfom, lon           | 10    | tfom <sub>2</sub>  | tfom <sub>1</sub>  | lon <sub>14</sub>  | lon <sub>13</sub> | lon <sub>12</sub> | lon <sub>11</sub> | lon <sub>10</sub> | lon <sub>9</sub>  |
| da, id              | 11    | da <sub>4</sub>    | da <sub>3</sub>    | da <sub>2</sub>    | da <sub>1</sub>   | 1                 | 0                 | 1                 | 0                 |
| ac                  | 12    | 0                  | 0                  | 0                  | 1                 | ac <sub>4</sub>   | ac <sub>3</sub>   | ac <sub>2</sub>   | ac <sub>1</sub>   |
| ac, st, csl         | 13    | ac <sub>5</sub>    | st <sub>3</sub>    | st <sub>2</sub>    | st <sub>1</sub>   | csl <sub>12</sub> | csl <sub>11</sub> | csl <sub>10</sub> | csl <sub>9</sub>  |
| csl                 | 14    | csl <sub>8</sub>   | csl <sub>7</sub>   | csl <sub>6</sub>   | csl <sub>5</sub>  | csl <sub>4</sub>  | csl <sub>3</sub>  | csl <sub>2</sub>  | csl <sub>1</sub>  |
| csl                 | 15    | csl <sub>20</sub>  | csl <sub>19</sub>  | csl <sub>18</sub>  | csl <sub>17</sub> | csl <sub>16</sub> | csl <sub>15</sub> | csl <sub>14</sub> | csl <sub>13</sub> |
| csl, csr            | 16    | csl <sub>21</sub>  | csr <sub>7</sub>   | csr <sub>6</sub>   | csr <sub>5</sub>  | csr <sub>4</sub>  | csr <sub>3</sub>  | csr <sub>2</sub>  | csr <sub>1</sub>  |
| csr                 | 17    | csr <sub>15</sub>  | csr <sub>14</sub>  | csr <sub>13</sub>  | csr <sub>12</sub> | csr <sub>11</sub> | csr <sub>10</sub> | csr <sub>9</sub>  | csr <sub>8</sub>  |
| csr, pt             | 18    | csr <sub>21</sub>  | csr <sub>20</sub>  | csr <sub>19</sub>  | csr <sub>18</sub> | csr <sub>17</sub> | csr <sub>16</sub> | pt <sub>2</sub>   | pt <sub>1</sub>   |
| po                  | 19    | po <sub>8</sub>    | po <sub>7</sub>    | po <sub>6</sub>    | po <sub>5</sub>   | po <sub>4</sub>   | po <sub>3</sub>   | po <sub>2</sub>   | po <sub>1</sub>   |
| c                   | 20    | c <sub>9</sub>     | c <sub>10</sub>    | c <sub>11</sub>    | c <sub>12</sub>   | c <sub>13</sub>   | c <sub>14</sub>   | c <sub>15</sub>   | c <sub>16</sub>   |
| c                   | 21    | c <sub>1</sub>     | c <sub>2</sub>     | c <sub>3</sub>     | c <sub>4</sub>    | c <sub>5</sub>    | c <sub>6</sub>    | c <sub>7</sub>    | c <sub>8</sub>    |
| flag                | -     | 0                  | 1                  | 1                  | 1                 | 1                 | 1                 | 1                 | 0                 |

Table 7.60: SYNC\_HIGH\_RESOLUTION\_a (SRa): High resolution variable part. Occupies one slot

| Description         | Octet | Bit number         |                    |                    |                   |                   |                   |                   |                   |
|---------------------|-------|--------------------|--------------------|--------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
|                     |       | 8                  | 7                  | 6                  | 5                 | 4                 | 3                 | 2                 | 1                 |
| flag                | -     | 0                  | 1                  | 1                  | 1                 | 1                 | 1                 | 1                 | 0                 |
| s, ver, rid, a/d    | 1     | s <sub>27</sub>    | s <sub>26</sub>    | s <sub>25</sub>    | 0                 | 0                 | 0                 | 1                 | 0                 |
| s                   | 2     | s <sub>24</sub>    | s <sub>23</sub>    | s <sub>22</sub>    | s <sub>21</sub>   | s <sub>20</sub>   | s <sub>19</sub>   | s <sub>18</sub>   | s <sub>17</sub>   |
| s                   | 3     | s <sub>16</sub>    | s <sub>15</sub>    | s <sub>14</sub>    | s <sub>13</sub>   | s <sub>12</sub>   | s <sub>11</sub>   | s <sub>10</sub>   | s <sub>9</sub>    |
| s                   | 4     | s <sub>8</sub>     | s <sub>7</sub>     | s <sub>6</sub>     | s <sub>5</sub>    | s <sub>4</sub>    | s <sub>3</sub>    | s <sub>2</sub>    | s <sub>1</sub>    |
| nic, cprf, b/g, tqc | 5     | nic <sub>4</sub>   | nic <sub>3</sub>   | nic <sub>2</sub>   | nic <sub>1</sub>  | cprf              | b/g               | 1                 | 0                 |
| lat                 | 6     | lat <sub>8</sub>   | lat <sub>7</sub>   | lat <sub>6</sub>   | lat <sub>5</sub>  | lat <sub>4</sub>  | lat <sub>3</sub>  | lat <sub>2</sub>  | lat <sub>1</sub>  |
| balt                | 7     | balt <sub>12</sub> | balt <sub>11</sub> | balt <sub>10</sub> | balt <sub>9</sub> | lat <sub>12</sub> | lat <sub>11</sub> | lat <sub>10</sub> | lat <sub>9</sub>  |
| balt                | 8     | balt <sub>8</sub>  | balt <sub>7</sub>  | balt <sub>6</sub>  | balt <sub>5</sub> | balt <sub>4</sub> | balt <sub>3</sub> | balt <sub>2</sub> | balt <sub>1</sub> |
| lon                 | 9     | lon <sub>8</sub>   | lon <sub>7</sub>   | lon <sub>6</sub>   | lon <sub>5</sub>  | lon <sub>4</sub>  | lon <sub>3</sub>  | lon <sub>2</sub>  | lon <sub>1</sub>  |
| tfom, lon           | 10    | tfom <sub>2</sub>  | tfom <sub>1</sub>  | lon <sub>14</sub>  | lon <sub>13</sub> | lon <sub>12</sub> | lon <sub>11</sub> | lon <sub>10</sub> | lon <sub>9</sub>  |
| da, id              | 11    | da <sub>4</sub>    | da <sub>3</sub>    | da <sub>2</sub>    | da <sub>1</sub>   | 1                 | 0                 | 1                 | 0                 |
| id                  | 12    | 1                  | 0                  | 1                  | 0                 | 0                 | 0                 | 0                 | 0                 |
| nucl, gs            | 13    | res                | nucl <sub>3</sub>  | nucl <sub>2</sub>  | nucl <sub>1</sub> | gs <sub>12</sub>  | gs <sub>11</sub>  | gs <sub>10</sub>  | gs <sub>9</sub>   |
| gs                  | 14    | gs <sub>8</sub>    | gs <sub>7</sub>    | gs <sub>6</sub>    | gs <sub>5</sub>   | gs <sub>4</sub>   | gs <sub>3</sub>   | gs <sub>2</sub>   | gs <sub>1</sub>   |
| lon8                | 15    | lon8 <sub>8</sub>  | lon8 <sub>7</sub>  | lon8 <sub>6</sub>  | lon8 <sub>5</sub> | lon8 <sub>4</sub> | lon8 <sub>3</sub> | lon8 <sub>2</sub> | lon8 <sub>1</sub> |
| lat8                | 16    | lat8 <sub>8</sub>  | lat8 <sub>7</sub>  | lat8 <sub>6</sub>  | lat8 <sub>5</sub> | lat8 <sub>4</sub> | lat8 <sub>3</sub> | lat8 <sub>2</sub> | lat8 <sub>1</sub> |
| gt                  | 17    | gt <sub>8</sub>    | gt <sub>7</sub>    | gt <sub>6</sub>    | gt <sub>5</sub>   | gt <sub>4</sub>   | gt <sub>3</sub>   | gt <sub>2</sub>   | gt <sub>1</sub>   |
| gt, tind, pt        | 18    | gt <sub>12</sub>   | gt <sub>11</sub>   | gt <sub>10</sub>   | gt <sub>9</sub>   | tind <sub>2</sub> | tind <sub>1</sub> | pt <sub>2</sub>   | pt <sub>1</sub>   |
| po                  | 19    | po <sub>8</sub>    | po <sub>7</sub>    | po <sub>6</sub>    | po <sub>5</sub>   | po <sub>4</sub>   | po <sub>3</sub>   | po <sub>2</sub>   | po <sub>1</sub>   |
| c                   | 20    | c <sub>9</sub>     | c <sub>10</sub>    | c <sub>11</sub>    | c <sub>12</sub>   | c <sub>13</sub>   | c <sub>14</sub>   | c <sub>15</sub>   | c <sub>16</sub>   |
| c                   | 21    | c <sub>1</sub>     | c <sub>2</sub>     | c <sub>3</sub>     | c <sub>4</sub>    | c <sub>5</sub>    | c <sub>6</sub>    | c <sub>7</sub>    | c <sub>8</sub>    |
| flag                | -     | 0                  | 1                  | 1                  | 1                 | 1                 | 1                 | 1                 | 0                 |

Table 7.61: CTRL\_DOS\_a (CDa): Directory of Service(DOS) message. Fits within one slot

| Description           | Octet | Bit number       |                  |                  |                  |                  |                  |                  |                  |
|-----------------------|-------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
|                       |       | 8                | 7                | 6                | 5                | 4                | 3                | 2                | 1                |
| flag                  | -     | 0                | 1                | 1                | 1                | 1                | 1                | 1                | 0                |
| s, ver, rid, a/d      | 1     | s <sub>27</sub>  | s <sub>26</sub>  | s <sub>25</sub>  | 0                | 0                | 0                | 1                | 1                |
| s                     | 2     | s <sub>24</sub>  | s <sub>23</sub>  | s <sub>22</sub>  | s <sub>21</sub>  | s <sub>20</sub>  | s <sub>19</sub>  | s <sub>18</sub>  | s <sub>17</sub>  |
| s                     | 3     | s <sub>16</sub>  | s <sub>15</sub>  | s <sub>14</sub>  | s <sub>13</sub>  | s <sub>12</sub>  | s <sub>11</sub>  | s <sub>10</sub>  | s <sub>9</sub>   |
| s                     | 4     | s <sub>8</sub>   | s <sub>7</sub>   | s <sub>6</sub>   | s <sub>5</sub>   | s <sub>4</sub>   | s <sub>3</sub>   | s <sub>2</sub>   | s <sub>1</sub>   |
| res, mi               | 5     | 0                | 0                | 1                | 1                | 0                | 0                | 0                | 1                |
| ucid, UCTRL DLPDU     | 6     | 0                | 0                | 0                | 1                | 0                | 1                | 0                | 0                |
| CTRL parameter ID     | 7     | 1                | 1                | 0                | 0                | 0                | 1                | 1                | 0                |
| n                     | 8     | n <sub>8</sub>   | n <sub>7</sub>   | n <sub>6</sub>   | n <sub>5</sub>   | n <sub>4</sub>   | n <sub>3</sub>   | n <sub>2</sub>   | n <sub>1</sub>   |
| gsc, ai               | 9     | gsc              | 1                | 1                | 1                | ent <sub>4</sub> | ent <sub>3</sub> | ent <sub>2</sub> | ent <sub>1</sub> |
| si                    | 10    | si <sub>8</sub>  | si <sub>7</sub>  | si <sub>6</sub>  | si <sub>5</sub>  | si <sub>4</sub>  | si <sub>3</sub>  | si <sub>2</sub>  | si <sub>1</sub>  |
| res, anum             | 11    | 0                | 0                | 0                | 0                | 0                | 0                | 0                | 1                |
| a                     | 12    | a <sub>8</sub>   | a <sub>7</sub>   | a <sub>6</sub>   | a <sub>5</sub>   | a <sub>4</sub>   | a <sub>3</sub>   | a <sub>2</sub>   | a <sub>1</sub>   |
| gsc, ai, f            | 13    | gsc              | 1                | 1                | 1                | f <sub>12</sub>  | f <sub>11</sub>  | f <sub>10</sub>  | f <sub>9</sub>   |
| f                     | 14    | f <sub>8</sub>   | f <sub>7</sub>   | f <sub>6</sub>   | f <sub>5</sub>   | f <sub>4</sub>   | f <sub>3</sub>   | f <sub>2</sub>   | f <sub>1</sub>   |
| si                    | 15    | si <sub>8</sub>  | si <sub>7</sub>  | si <sub>6</sub>  | si <sub>5</sub>  | si <sub>4</sub>  | si <sub>3</sub>  | si <sub>2</sub>  | si <sub>1</sub>  |
| res, anum             | 16    | 0                | 0                | 0                | 0                | 0                | 0                | 0                | 1                |
| a                     | 17    | a <sub>8</sub>   | a <sub>7</sub>   | a <sub>6</sub>   | a <sub>5</sub>   | a <sub>4</sub>   | a <sub>3</sub>   | a <sub>2</sub>   | a <sub>1</sub>   |
| sit, null reservation | 18    | sit <sub>6</sub> | sit <sub>5</sub> | sit <sub>4</sub> | sit <sub>3</sub> | sit <sub>2</sub> | sit <sub>1</sub> | 0                | 0                |
| null reservation      | 19    | 0                | 0                | 0                | 0                | 0                | 0                | 0                | 0                |
| c                     | 20    | c <sub>9</sub>   | c <sub>10</sub>  | c <sub>11</sub>  | c <sub>12</sub>  | c <sub>13</sub>  | c <sub>14</sub>  | c <sub>15</sub>  | c <sub>16</sub>  |
| c                     | 21    | c <sub>1</sub>   | c <sub>2</sub>   | c <sub>3</sub>   | c <sub>4</sub>   | c <sub>5</sub>   | c <sub>6</sub>   | c <sub>7</sub>   | c <sub>8</sub>   |
| flag                  | -     | 0                | 1                | 1                | 1                | 1                | 1                | 1                | 0                |

## 7.4.3.1.5.2

## Bursts defined for TIS-B tests

Table 7.62: TIS\_MAN\_a (TMA): Management message with response reservation

| Description   | Octet | Bit number         |                    |                    |                    |                    |                    |                    |                    |
|---|-------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
|   |       | 8                  | 7                  | 6                  | 5                  | 4                  | 3                  | 2                  | 1                  |
| flag  | -     | 0                  | 1                  | 1                  | 1                  | 1                  | 1                  | 1                  | 0                  |
| s, ver, rid, a/d                                    | 1     | s <sub>27</sub>    | s <sub>26</sub>    | s <sub>25</sub>    | 0                  | 0                  | 0                  | 0                  | 1                  |
| s   | 2     | s <sub>24</sub>    | s <sub>23</sub>    | s <sub>22</sub>    | s <sub>21</sub>    | s <sub>20</sub>    | s <sub>19</sub>    | s <sub>18</sub>    | s <sub>17</sub>    |
| s   | 3     | s <sub>16</sub>    | s <sub>15</sub>    | s <sub>14</sub>    | s <sub>13</sub>    | s <sub>12</sub>    | s <sub>11</sub>    | s <sub>10</sub>    | s <sub>9</sub>     |
| s   | 4     | s <sub>8</sub>     | s <sub>7</sub>     | s <sub>6</sub>     | s <sub>5</sub>     | s <sub>4</sub>     | s <sub>3</sub>     | s <sub>2</sub>     | s <sub>1</sub>     |
| udid, ucd   | 5     | 0                  | 0                  | 0                  | 0                  | 0                  | 1                  | 1                  | 1                  |
| TIS-B message ID (tmi)<br>version number (vers)     | 6     | vers <sub>4</sub>  | vers <sub>3</sub>  | vers <sub>2</sub>  | vers <sub>1</sub>  | tmi <sub>4</sub>   | tmi <sub>3</sub>   | tmi <sub>2</sub>   | tmi <sub>1</sub>   |
| TIV ID (tivid)<br>update period (up)                | 7     | up <sub>5</sub>    | up <sub>4</sub>    | up <sub>3</sub>    | up <sub>2</sub>    | up <sub>1</sub>    | tivid <sub>3</sub> | tivid <sub>2</sub> | tivid <sub>1</sub> |
| TIV status (tivs)<br>TIS-B target resolution (tacc) | 8     | lat <sub>1</sub>   | tacc <sub>4</sub>  | tacc <sub>3</sub>  | tacc <sub>2</sub>  | tacc <sub>1</sub>  | tivs <sub>2</sub>  | tivs <sub>1</sub>  | up <sub>6</sub>    |
| reference point latitude (lat)                      | 9     | lat <sub>9</sub>   | lat <sub>8</sub>   | lat <sub>7</sub>   | lat <sub>6</sub>   | lat <sub>5</sub>   | lat <sub>4</sub>   | lat <sub>3</sub>   | lat <sub>2</sub>   |
| reference point longitude (long)                    | 10    | long <sub>3</sub>  | long <sub>2</sub>  | long <sub>1</sub>  | lat <sub>14</sub>  | lat <sub>13</sub>  | lat <sub>12</sub>  | lat <sub>11</sub>  | lat <sub>10</sub>  |
|   | 11    | long <sub>11</sub> | long <sub>10</sub> | long <sub>9</sub>  | long <sub>8</sub>  | long <sub>7</sub>  | long <sub>6</sub>  | long <sub>5</sub>  | long <sub>4</sub>  |
| lower barometric altitude (lbar)                    | 12    | lbar <sub>4</sub>  | lbar <sub>3</sub>  | lbar <sub>2</sub>  | lbar <sub>1</sub>  | long <sub>15</sub> | long <sub>14</sub> | long <sub>13</sub> | long <sub>12</sub> |
| upper barometric altitude (ubar)                    | 13    | ubar <sub>4</sub>  | ubar <sub>3</sub>  | ubar <sub>2</sub>  | ubar <sub>1</sub>  | lbar <sub>8</sub>  | lbar <sub>7</sub>  | lbar <sub>6</sub>  | lbar <sub>5</sub>  |
| number of vertices (nvert)                          | 14    | nvert <sub>4</sub> | nvert <sub>3</sub> | nvert <sub>2</sub> | nvert <sub>1</sub> | ubar <sub>8</sub>  | ubar <sub>7</sub>  | ubar <sub>6</sub>  | ubar <sub>5</sub>  |
| vertex latitude (vlat(1-k))                         | 15    | vlat <sub>18</sub> | vlat <sub>17</sub> | vlat <sub>16</sub> | vlat <sub>15</sub> | vlat <sub>14</sub> | vlat <sub>13</sub> | vlat <sub>12</sub> | vlat <sub>11</sub> |
| vertex longitude (vlg(1-k))                         | 16    | vlg <sub>18</sub>  | vlg <sub>17</sub>  | vlg <sub>16</sub>  | vlg <sub>15</sub>  | vlg <sub>14</sub>  | vlg <sub>13</sub>  | vlg <sub>12</sub>  | vlg <sub>11</sub>  |
|   |       |                    |                    |                    | .....              |                    |                    |                    |                    |
|   | m-4   | vlatk <sub>8</sub> | vlatk <sub>7</sub> | vlatk <sub>6</sub> | vlatk <sub>5</sub> | vlatk <sub>4</sub> | vlatk <sub>3</sub> | vlatk <sub>2</sub> | vlatk <sub>1</sub> |
|   | m-3   | vlgk <sub>8</sub>  | vlgk <sub>7</sub>  | vlgk <sub>6</sub>  | vlgk <sub>5</sub>  | vlgk <sub>4</sub>  | vlgk <sub>3</sub>  | vlgk <sub>2</sub>  | vlgk <sub>1</sub>  |
| response reservation                                | m-2   | 0                  | 0                  | 0                  | 0                  | 0                  | 1                  | 1                  | 1                  |
| c   | m-1   | c <sub>9</sub>     | c <sub>10</sub>    | c <sub>11</sub>    | c <sub>12</sub>    | c <sub>13</sub>    | c <sub>14</sub>    | c <sub>15</sub>    | c <sub>16</sub>    |
| c   | m     | c <sub>1</sub>     | c <sub>2</sub>     | c <sub>3</sub>     | c <sub>4</sub>     | c <sub>5</sub>     | c <sub>6</sub>     | c <sub>7</sub>     | c <sub>8</sub>     |
| flag  | -     | 0                  | 1                  | 1                  | 1                  | 1                  | 1                  | 1                  | 0                  |



Table 7.63: TIS\_AC\_AIR\_a (TAa): Aircraft target message (airborne TIV) with response reservation

| Description  | Octet | Bit number         |                    |                    |                    |                    |                    |                    |                    |
|--|-------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
|  |       | 8                  | 7                  | 6                  | 5                  | 4                  | 3                  | 2                  | 1                  |
| flag   | -     | 0                  | 1                  | 1                  | 1                  | 1                  | 1                  | 1                  | 0                  |
| s, ver, rid, a/d   | 1     | s <sub>27</sub>    | s <sub>26</sub>    | s <sub>25</sub>    | 0                  | 0                  | 0                  | 0                  | 1                  |
| s  | 2     | s <sub>24</sub>    | s <sub>23</sub>    | s <sub>22</sub>    | s <sub>21</sub>    | s <sub>20</sub>    | s <sub>19</sub>    | s <sub>18</sub>    | s <sub>17</sub>    |
| s  | 3     | s <sub>16</sub>    | s <sub>15</sub>    | s <sub>14</sub>    | s <sub>13</sub>    | s <sub>12</sub>    | s <sub>11</sub>    | s <sub>10</sub>    | s <sub>9</sub>     |
| s  | 4     | s <sub>8</sub>     | s <sub>7</sub>     | s <sub>6</sub>     | s <sub>5</sub>     | s <sub>4</sub>     | s <sub>3</sub>     | s <sub>2</sub>     | s <sub>1</sub>     |
| udid, ucd  | 5     | 0                  | 0                  | 0                  | 0                  | 0                  | 1                  | 1                  | 1                  |
| TIS-B message ID (tmi)<br>TIV ID (tivid)<br>target identifier flag (tflg)                                  | 6     | tflg               | tivid <sub>3</sub> | tivid <sub>2</sub> | tivid <sub>1</sub> | tmi <sub>4</sub>   | tmi <sub>3</sub>   | tmi <sub>2</sub>   | tmi <sub>1</sub>   |
| radar/fusion flag (rflg)<br>ADS-B fault flag (adsff)<br>flight ID flag (fidflg)<br>target identifier (tid) | 7     | tid <sub>5</sub>   | tid <sub>4</sub>   | tid <sub>3</sub>   | tid <sub>2</sub>   | tid <sub>1</sub>   | fidflg             | adsff              | rflg               |
|  | 8     | tid <sub>13</sub>  | tid <sub>12</sub>  | tid <sub>11</sub>  | tid <sub>10</sub>  | tid <sub>9</sub>   | tid <sub>8</sub>   | tid <sub>7</sub>   | tid <sub>6</sub>   |
|  | 9     | tid <sub>21</sub>  | tid <sub>20</sub>  | tid <sub>19</sub>  | tid <sub>18</sub>  | tid <sub>17</sub>  | tid <sub>16</sub>  | tid <sub>15</sub>  | tid <sub>14</sub>  |
| latitude (rlat)  | 10    | rlat <sub>5</sub>  | rlat <sub>4</sub>  | rlat <sub>3</sub>  | rlat <sub>2</sub>  | rlat <sub>1</sub>  | tid <sub>24</sub>  | tid <sub>23</sub>  | tid <sub>22</sub>  |
|  | 11    | rlat <sub>13</sub> | rlat <sub>12</sub> | rlat <sub>11</sub> | rlat <sub>10</sub> | rlat <sub>9</sub>  | rlat <sub>8</sub>  | rlat <sub>7</sub>  | rlat <sub>6</sub>  |
| longitude (rlg)  | 12    | rlg <sub>5</sub>   | rlg <sub>4</sub>   | rlg <sub>3</sub>   | rlg <sub>2</sub>   | rlg <sub>1</sub>   | rlat <sub>16</sub> | rlat <sub>15</sub> | rlat <sub>14</sub> |
|  | 13    | rlg <sub>13</sub>  | rlg <sub>12</sub>  | rlg <sub>11</sub>  | rlg <sub>10</sub>  | rlg <sub>9</sub>   | rlg <sub>8</sub>   | rlg <sub>7</sub>   | rlg <sub>6</sub>   |
| ground track (gtk)   | 14    | gtk <sub>5</sub>   | gtk <sub>4</sub>   | gtk <sub>3</sub>   | gtk <sub>2</sub>   | gtk <sub>1</sub>   | rlg <sub>16</sub>  | rlg <sub>15</sub>  | rlg <sub>14</sub>  |
| barometric altitude (bar)  | 15    | bar <sub>5</sub>   | bar <sub>4</sub>   | bar <sub>3</sub>   | bar <sub>2</sub>   | bar <sub>1</sub>   | gtk <sub>8</sub>   | gtk <sub>7</sub>   | gtk <sub>6</sub>   |
| ground speed (gsp)   | 16    | gsp <sub>1</sub>   | bar <sub>12</sub>  | bar <sub>11</sub>  | bar <sub>10</sub>  | bar <sub>9</sub>   | bar <sub>8</sub>   | bar <sub>7</sub>   | bar <sub>6</sub>   |
|  | 17    | gsp <sub>9</sub>   | gsp <sub>8</sub>   | gsp <sub>7</sub>   | gsp <sub>6</sub>   | gsp <sub>5</sub>   | gsp <sub>4</sub>   | gsp <sub>3</sub>   | gsp <sub>2</sub>   |
| time stamp (tag)   | 18    | tag <sub>6</sub>   | tag <sub>5</sub>   | tag <sub>4</sub>   | tag <sub>3</sub>   | tag <sub>2</sub>   | tag <sub>1</sub>   | gsp <sub>11</sub>  | gsp <sub>10</sub>  |
| flight ID type (fidty)   | 19    | call <sub>7</sub>  | call <sub>6</sub>  | call <sub>5</sub>  | call <sub>4</sub>  | call <sub>3</sub>  | call <sub>2</sub>  | call <sub>1</sub>  | fidty              |
| callsign (call)(example)   | 20    | call <sub>15</sub> | call <sub>14</sub> | call <sub>13</sub> | call <sub>12</sub> | call <sub>11</sub> | call <sub>10</sub> | call <sub>9</sub>  | call <sub>8</sub>  |
|  | 21    | call <sub>23</sub> | call <sub>22</sub> | call <sub>21</sub> | call <sub>20</sub> | call <sub>19</sub> | call <sub>18</sub> | call <sub>17</sub> | call <sub>16</sub> |
|  | 22    | call <sub>31</sub> | call <sub>30</sub> | call <sub>29</sub> | call <sub>28</sub> | call <sub>27</sub> | call <sub>26</sub> | call <sub>25</sub> | call <sub>24</sub> |
|  | 23    | call <sub>39</sub> | call <sub>38</sub> | call <sub>37</sub> | call <sub>36</sub> | call <sub>35</sub> | call <sub>34</sub> | call <sub>33</sub> | call <sub>32</sub> |
| aircraft category (cat)  | 24    | cat <sub>5</sub>   | cat <sub>4</sub>   | cat <sub>3</sub>   | cat <sub>2</sub>   | cat <sub>1</sub>   | call <sub>42</sub> | call <sub>41</sub> | call <sub>40</sub> |
| response reservation   | 25    | 0                  | 0                  | 0                  | 0                  | 0                  | 1                  | 1                  | 1                  |
| c  | 26    | c <sub>9</sub>     | c <sub>10</sub>    | c <sub>11</sub>    | c <sub>12</sub>    | c <sub>13</sub>    | c <sub>14</sub>    | c <sub>15</sub>    | c <sub>16</sub>    |
| c  | 27    | c <sub>1</sub>     | c <sub>2</sub>     | c <sub>3</sub>     | c <sub>4</sub>     | c <sub>5</sub>     | c <sub>6</sub>     | c <sub>7</sub>     | c <sub>8</sub>     |
| flag   | -     | 0                  | 1                  | 1                  | 1                  | 1                  | 1                  | 1                  | 0                  |

Table 7.64: TIS\_AC\_GRD\_a (TGa): Aircraft target message (ground TIV) with response reservation

| Description  | Octet | Bit number         |                    |                    |                    |                    |                    |                    |                    |
|--|-------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
|  |       | 8                  | 7                  | 6                  | 5                  | 4                  | 3                  | 2                  | 1                  |
| flag   | -     | 0                  | 1                  | 1                  | 1                  | 1                  | 1                  | 1                  | 0                  |
| s, ver, rid, a/d   | 1     | s <sub>27</sub>    | s <sub>26</sub>    | s <sub>25</sub>    | 0                  | 0                  | 0                  | 0                  | 1                  |
| s  | 2     | s <sub>24</sub>    | s <sub>23</sub>    | s <sub>22</sub>    | s <sub>21</sub>    | s <sub>20</sub>    | s <sub>19</sub>    | s <sub>18</sub>    | s <sub>17</sub>    |
| s  | 3     | s <sub>16</sub>    | s <sub>15</sub>    | s <sub>14</sub>    | s <sub>13</sub>    | s <sub>12</sub>    | s <sub>11</sub>    | s <sub>10</sub>    | s <sub>9</sub>     |
| s  | 4     | s <sub>8</sub>     | s <sub>7</sub>     | s <sub>6</sub>     | s <sub>5</sub>     | s <sub>4</sub>     | s <sub>3</sub>     | s <sub>2</sub>     | s <sub>1</sub>     |
| udid, ucd  | 5     | 0                  | 0                  | 0                  | 0                  | 0                  | 1                  | 1                  | 1                  |
| TIS-B message ID (tmi)<br>TIV ID (tivid)<br>target identifier flag (tflg)                                  | 6     | tflg               | tivid <sub>3</sub> | tivid <sub>2</sub> | tivid <sub>1</sub> | tmi <sub>4</sub>   | tmi <sub>3</sub>   | tmi <sub>2</sub>   | tmi <sub>1</sub>   |
| radar/fusion flag (rflg)<br>ADS-B fault flag (adsff)<br>flight ID flag (fidflg)<br>target identifier (tid) | 7     | tid <sub>5</sub>   | tid <sub>4</sub>   | tid <sub>3</sub>   | tid <sub>2</sub>   | tid <sub>1</sub>   | fidflg             | adsff              | rflg               |
|  | 8     | tid <sub>13</sub>  | tid <sub>12</sub>  | tid <sub>11</sub>  | tid <sub>10</sub>  | tid <sub>9</sub>   | tid <sub>8</sub>   | tid <sub>7</sub>   | tid <sub>6</sub>   |
|  | 9     | tid <sub>21</sub>  | tid <sub>20</sub>  | tid <sub>19</sub>  | tid <sub>18</sub>  | tid <sub>17</sub>  | tid <sub>16</sub>  | tid <sub>15</sub>  | tid <sub>14</sub>  |
| latitude (rlat)  | 10    | rlat <sub>5</sub>  | rlat <sub>4</sub>  | rlat <sub>3</sub>  | rlat <sub>2</sub>  | rlat <sub>1</sub>  | tid <sub>24</sub>  | tid <sub>23</sub>  | tid <sub>22</sub>  |
|  | 11    | rlat <sub>13</sub> | rlat <sub>12</sub> | rlat <sub>11</sub> | rlat <sub>10</sub> | rlat <sub>9</sub>  | rlat <sub>8</sub>  | rlat <sub>7</sub>  | rlat <sub>6</sub>  |
| longitude (rlg)  | 12    | rlg <sub>1</sub>   | rlg <sub>20</sub>  | rlg <sub>19</sub>  | rlg <sub>18</sub>  | rlg <sub>17</sub>  | rlg <sub>16</sub>  | rlg <sub>15</sub>  | rlg <sub>14</sub>  |
|  | 13    | rlg <sub>9</sub>   | rlg <sub>8</sub>   | rlg <sub>7</sub>   | rlg <sub>6</sub>   | rlg <sub>5</sub>   | rlg <sub>4</sub>   | rlg <sub>3</sub>   | rlg <sub>2</sub>   |
|  | 14    | rlg <sub>17</sub>  | rlg <sub>16</sub>  | rlg <sub>15</sub>  | rlg <sub>14</sub>  | rlg <sub>13</sub>  | rlg <sub>12</sub>  | rlg <sub>11</sub>  | rlg <sub>10</sub>  |
| ground track (gtk)   | 15    | gtk <sub>5</sub>   | gtk <sub>4</sub>   | gtk <sub>3</sub>   | gtk <sub>2</sub>   | gtk <sub>1</sub>   | rlg <sub>20</sub>  | rlg <sub>19</sub>  | rlg <sub>18</sub>  |
| ground speed (gsp)   | 16    | gsp <sub>5</sub>   | gsp <sub>4</sub>   | gsp <sub>3</sub>   | gsp <sub>2</sub>   | gsp <sub>1</sub>   | gtk <sub>8</sub>   | gtk <sub>7</sub>   | gtk <sub>6</sub>   |
| time stamp (tag)   | 17    | tag <sub>2</sub>   | tag <sub>1</sub>   | gsp <sub>11</sub>  | gsp <sub>10</sub>  | gsp <sub>9</sub>   | gsp <sub>8</sub>   | gsp <sub>7</sub>   | gsp <sub>6</sub>   |
| flight ID type (fidty)   | 18    | res                | res                | res                | res                | tag <sub>6</sub>   | tag <sub>5</sub>   | tag <sub>4</sub>   | tag <sub>3</sub>   |
| callsign (call)  | 19    | call <sub>7</sub>  | call <sub>6</sub>  | call <sub>5</sub>  | call <sub>4</sub>  | call <sub>3</sub>  | call <sub>2</sub>  | call <sub>1</sub>  | fidty              |
|  | 20    | call <sub>15</sub> | call <sub>14</sub> | call <sub>13</sub> | call <sub>12</sub> | call <sub>11</sub> | call <sub>10</sub> | call <sub>9</sub>  | call <sub>8</sub>  |
|  | 21    | call <sub>23</sub> | call <sub>22</sub> | call <sub>21</sub> | call <sub>20</sub> | call <sub>19</sub> | call <sub>18</sub> | call <sub>17</sub> | call <sub>16</sub> |
|  | 22    | call <sub>31</sub> | call <sub>30</sub> | call <sub>29</sub> | call <sub>28</sub> | call <sub>27</sub> | call <sub>26</sub> | call <sub>25</sub> | call <sub>24</sub> |
|  | 23    | call <sub>39</sub> | call <sub>38</sub> | call <sub>37</sub> | call <sub>36</sub> | call <sub>35</sub> | call <sub>34</sub> | call <sub>33</sub> | call <sub>32</sub> |
| aircraft category (cat)  | 24    | cat <sub>5</sub>   | cat <sub>4</sub>   | cat <sub>3</sub>   | cat <sub>2</sub>   | cat <sub>1</sub>   | call <sub>42</sub> | call <sub>41</sub> | call <sub>40</sub> |
| response reservation   | 25    | 0                  | 0                  | 0                  | 0                  | 0                  | 1                  | 1                  | 1                  |
| c  | 26    | c <sub>9</sub>     | c <sub>10</sub>    | c <sub>11</sub>    | c <sub>12</sub>    | c <sub>13</sub>    | c <sub>14</sub>    | c <sub>15</sub>    | c <sub>16</sub>    |
| c  | 27    | c <sub>1</sub>     | c <sub>2</sub>     | c <sub>3</sub>     | c <sub>4</sub>     | c <sub>5</sub>     | c <sub>6</sub>     | c <sub>7</sub>     | c <sub>8</sub>     |
| flag   | -     | 0                  | 1                  | 1                  | 1                  | 1                  | 1                  | 1                  | 0                  |

Table 7.65: TIS\_GRD\_VEH\_a (TVa): Ground vehicle target message with response reservation

| Description                              | Octet | Bit number         |                    |                    |                    |                    |                    |                    |                    |
|--|-------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
|  |       | 8                  | 7                  | 6                  | 5                  | 4                  | 3                  | 2                  | 1                  |
| flag                                     | -     | 0                  | 1                  | 1                  | 1                  | 1                  | 1                  | 1                  | 0                  |
| s, ver, rid, a/d                         | 1     | s <sub>27</sub>    | s <sub>26</sub>    | s <sub>25</sub>    | 0                  | 0                  | 0                  | 0                  | 1                  |
| s  | 2     | s <sub>24</sub>    | s <sub>23</sub>    | s <sub>22</sub>    | s <sub>21</sub>    | s <sub>20</sub>    | s <sub>19</sub>    | s <sub>18</sub>    | s <sub>17</sub>    |
| s  | 3     | s <sub>16</sub>    | s <sub>15</sub>    | s <sub>14</sub>    | s <sub>13</sub>    | s <sub>12</sub>    | s <sub>11</sub>    | s <sub>10</sub>    | s <sub>9</sub>     |
| s  | 4     | s <sub>8</sub>     | s <sub>7</sub>     | s <sub>6</sub>     | s <sub>5</sub>     | s <sub>4</sub>     | s <sub>3</sub>     | s <sub>2</sub>     | s <sub>1</sub>     |
| udid, ucd                                | 5     | 0                  | 0                  | 0                  | 0                  | 0                  | 1                  | 1                  | 1                  |
| TIS-B message ID (tmi)<br>TIV ID (tivid) | 6     | tid <sub>1</sub>   | tivid <sub>3</sub> | tivid <sub>2</sub> | tivid <sub>1</sub> | tmi <sub>4</sub>   | tmi <sub>3</sub>   | tmi <sub>2</sub>   | tmi <sub>1</sub>   |
| target identifier (tid)                  | 7     | tid <sub>9</sub>   | tid <sub>8</sub>   | tid <sub>7</sub>   | tid <sub>6</sub>   | tid <sub>5</sub>   | tid <sub>4</sub>   | tid <sub>3</sub>   | tid <sub>2</sub>   |
| ADS-B fault flag (adsff)                 | 8     | tag <sub>5</sub>   | tag <sub>4</sub>   | tag <sub>3</sub>   | tag <sub>2</sub>   | tag <sub>1</sub>   | adsff              | tid <sub>11</sub>  | tid <sub>10</sub>  |
| time stamp(tag)<br>latitude (rlat)       | 9     | rlat <sub>7</sub>  | rlat <sub>6</sub>  | rlat <sub>5</sub>  | rlat <sub>4</sub>  | rlat <sub>3</sub>  | rlat <sub>2</sub>  | rlat <sub>1</sub>  | tag <sub>6</sub>   |
|  | 10    | rlat <sub>15</sub> | rlat <sub>14</sub> | rlat <sub>13</sub> | rlat <sub>12</sub> | rlat <sub>11</sub> | rlat <sub>10</sub> | rlat <sub>9</sub>  | rlat <sub>8</sub>  |
| longitude (rlg)                          | 11    | rlg <sub>3</sub>   | rlg <sub>2</sub>   | rlg <sub>1</sub>   | rlat <sub>20</sub> | rlat <sub>19</sub> | rlat <sub>18</sub> | rlat <sub>17</sub> | rlat <sub>16</sub> |
|  | 12    | rlg <sub>11</sub>  | rlg <sub>10</sub>  | rlg <sub>9</sub>   | rlg <sub>8</sub>   | rlg <sub>7</sub>   | rlg <sub>6</sub>   | rlg <sub>5</sub>   | rlg <sub>4</sub>   |
|  | 13    | rlg <sub>19</sub>  | rlg <sub>18</sub>  | rlg <sub>17</sub>  | rlg <sub>16</sub>  | rlg <sub>15</sub>  | rlg <sub>14</sub>  | rlg <sub>13</sub>  | rlg <sub>12</sub>  |
| ground track (gtk)                       | 14    | gtk <sub>7</sub>   | gtk <sub>6</sub>   | gtk <sub>5</sub>   | gtk <sub>4</sub>   | gtk <sub>3</sub>   | gtk <sub>2</sub>   | gtk <sub>1</sub>   | rlg <sub>20</sub>  |
| ground speed (gsp)                       | 15    | gsp <sub>7</sub>   | gsp <sub>6</sub>   | gsp <sub>5</sub>   | gsp <sub>4</sub>   | gsp <sub>3</sub>   | gsp <sub>2</sub>   | gsp <sub>1</sub>   | gtk <sub>8</sub>   |
| response reservation                     | 16    | 0                  | 0                  | 0                  | 0                  | 0                  | 1                  | 1                  | 1                  |
| c  | 18    | c <sub>9</sub>     | c <sub>10</sub>    | c <sub>11</sub>    | c <sub>12</sub>    | c <sub>13</sub>    | c <sub>14</sub>    | c <sub>15</sub>    | c <sub>16</sub>    |
| c  | 19    | c <sub>1</sub>     | c <sub>2</sub>     | c <sub>3</sub>     | c <sub>4</sub>     | c <sub>5</sub>     | c <sub>6</sub>     | c <sub>7</sub>     | c <sub>8</sub>     |
| flag                                     | -     | 0                  | 1                  | 1                  | 1                  | 1                  | 1                  | 1                  | 0                  |

## 7.4.3.1.5.3

## Bursts defined for FIS-B tests

Table 7.66: FIS\_METAR\_a (FMa): METAR message with response reservation

| Description  | Octet | Bit number         |                    |                    |                    |                    |                    |                    |                    |
|--|-------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
|  |       | 8                  | 7                  | 6                  | 5                  | 4                  | 3                  | 2                  | 1                  |
| flag   | -     | 0                  | 1                  | 1                  | 1                  | 1                  | 1                  | 1                  | 0                  |
| s, ver, rid, a/d   | 1     | s <sub>27</sub>    | s <sub>26</sub>    | s <sub>25</sub>    | 0                  | 0                  | 0                  | 0                  | 1                  |
| s  | 2     | s <sub>24</sub>    | s <sub>23</sub>    | s <sub>22</sub>    | s <sub>21</sub>    | s <sub>20</sub>    | s <sub>19</sub>    | s <sub>18</sub>    | s <sub>17</sub>    |
| s  | 3     | s <sub>16</sub>    | s <sub>15</sub>    | s <sub>14</sub>    | s <sub>13</sub>    | s <sub>12</sub>    | s <sub>11</sub>    | s <sub>10</sub>    | s <sub>9</sub>     |
| s  | 4     | s <sub>8</sub>     | s <sub>7</sub>     | s <sub>6</sub>     | s <sub>5</sub>     | s <sub>4</sub>     | s <sub>3</sub>     | s <sub>2</sub>     | s <sub>1</sub>     |
| mi   | 5     | 0                  | 0                  | 0                  | 0                  | 1                  | 1                  | 1                  | 1                  |
| FIS-B message ID (fmi)<br>FIS-B version ID (vers)  | 6     | vers <sub>4</sub>  | vers <sub>3</sub>  | vers <sub>2</sub>  | vers <sub>1</sub>  | 0                  | 0                  | 0                  | 0                  |
| message edition (med)<br>local ID (locl)   | 7     | locl <sub>5</sub>  | locl <sub>4</sub>  | locl <sub>3</sub>  | locl <sub>2</sub>  | locl <sub>1</sub>  | med <sub>3</sub>   | med <sub>2</sub>   | med <sub>1</sub>   |
|  | 8     | locl <sub>13</sub> | locl <sub>12</sub> | locl <sub>11</sub> | locl <sub>10</sub> | locl <sub>9</sub>  | locl <sub>8</sub>  | locl <sub>7</sub>  | locl <sub>6</sub>  |
| date (date)  | 9     | date <sub>1</sub>  | locl <sub>20</sub> | locl <sub>19</sub> | locl <sub>18</sub> | locl <sub>17</sub> | locl <sub>16</sub> | locl <sub>15</sub> | locl <sub>14</sub> |
| time (ti)  | 10    | ti <sub>4</sub>    | ti <sub>3</sub>    | ti <sub>2</sub>    | ti <sub>1</sub>    | date <sub>5</sub>  | date <sub>4</sub>  | date <sub>3</sub>  | date <sub>2</sub>  |
| wind direction (wdi)   | 11    | wdi <sub>1</sub>   | ti <sub>11</sub>   | ti <sub>10</sub>   | ti <sub>9</sub>    | ti <sub>8</sub>    | ti <sub>7</sub>    | ti <sub>6</sub>    | ti <sub>5</sub>    |
| wind speed (wsp)   | 12    | wsp <sub>3</sub>   | wsp <sub>2</sub>   | wsp <sub>1</sub>   | wdi <sub>6</sub>   | wdi <sub>5</sub>   | wdi <sub>4</sub>   | wdi <sub>3</sub>   | wdi <sub>2</sub>   |
| free text flag (ftxt)<br>max wind flag (mxw)<br>CAVOK flag (cav)<br>TREND report flag (trd)                          | 13    | trd                | cav                | mxw                | ftxt               | wsp <sub>7</sub>   | wsp <sub>6</sub>   | wsp <sub>5</sub>   | wsp <sub>4</sub>   |
| present weather flag (pwf)<br>recent weather flag (rwf)<br>QFE flag (qfef)<br>temperature (tem)                      | 14    | tem <sub>3</sub>   | tem <sub>2</sub>   | tem <sub>1</sub>   | qfef               | rwf <sub>2</sub>   | rwf <sub>1</sub>   | pwf <sub>2</sub>   | pwf <sub>1</sub>   |
| dew point temperature (dew)  | 15    | dew <sub>3</sub>   | dew <sub>2</sub>   | dew <sub>1</sub>   | tem <sub>8</sub>   | tem <sub>7</sub>   | tem <sub>6</sub>   | tem <sub>5</sub>   | tem <sub>4</sub>   |
| QNH (qnh)  | 16    | qnh <sub>3</sub>   | qnh <sub>2</sub>   | qnh <sub>1</sub>   | dew <sub>8</sub>   | dew <sub>7</sub>   | dew <sub>6</sub>   | dew <sub>5</sub>   | dew <sub>4</sub>   |
| wind shear flag (wsf)<br>Ssea flag (ssf)<br>variable wind direction to (vdit)<br>variable wind direction from (vdif) | 17    | vdi <sub>1</sub>   | ssf                | wsf                | qnh <sub>8</sub>   | qnh <sub>7</sub>   | qnh <sub>6</sub>   | qnh <sub>5</sub>   | qnh <sub>4</sub>   |
| wind gust indicator (wgi)  | 18    | vdif <sub>3</sub>  | vdif <sub>2</sub>  | vdif <sub>1</sub>  | vdi <sub>6</sub>   | vdi <sub>5</sub>   | vdi <sub>4</sub>   | vdi <sub>3</sub>   | vdi <sub>2</sub>   |
| wind gust indicator (wgi)  | 19    | wgi <sub>5</sub>   | wgi <sub>4</sub>   | wgi <sub>3</sub>   | wgi <sub>2</sub>   | wgi <sub>1</sub>   | vdif <sub>6</sub>  | vdif <sub>5</sub>  | vdif <sub>4</sub>  |
| minimum visibility (mis)   | 20    | mis <sub>6</sub>   | mis <sub>5</sub>   | mis <sub>4</sub>   | mis <sub>3</sub>   | mis <sub>2</sub>   | mis <sub>1</sub>   | wgi <sub>7</sub>   | wgi <sub>6</sub>   |
| minimum visibility direction (misd)<br>maximum visibility (mas)  | 21    | mas <sub>5</sub>   | mas <sub>4</sub>   | mas <sub>3</sub>   | mas <sub>2</sub>   | mas <sub>1</sub>   | misd <sub>3</sub>  | misd <sub>2</sub>  | misd <sub>1</sub>  |
| maximum visibility direction (masd)<br>present weather (pw)  | 22    | pw <sub>4</sub>    | pw <sub>3</sub>    | pw <sub>2</sub>    | pw <sub>1</sub>    | masd <sub>3</sub>  | masd <sub>2</sub>  | masd <sub>1</sub>  | mas <sub>6</sub>   |
| cloud no. flag (cno)<br>cloud coverage (cc)  | 23    | cc <sub>3</sub>    | cc <sub>2</sub>    | cc <sub>1</sub>    | cno <sub>2</sub>   | cno <sub>1</sub>   | pw <sub>7</sub>    | pw <sub>6</sub>    | pw <sub>5</sub>    |
| cloud height (ch)  | 24    | ch <sub>8</sub>    | ch <sub>7</sub>    | ch <sub>6</sub>    | ch <sub>5</sub>    | ch <sub>4</sub>    | ch <sub>3</sub>    | ch <sub>2</sub>    | ch <sub>1</sub>    |
| cloud type (cty)<br>QFE (qfe)  | 25    | qfe <sub>6</sub>   | qfe <sub>5</sub>   | qfe <sub>4</sub>   | qfe <sub>3</sub>   | qfe <sub>2</sub>   | qfe <sub>1</sub>   | cty <sub>2</sub>   | cty <sub>1</sub>   |
| recent weather (rw)  | 26    | rw <sub>6</sub>    | rw <sub>5</sub>    | rw <sub>4</sub>    | rw <sub>3</sub>    | rw <sub>2</sub>    | rw <sub>1</sub>    | qfe <sub>8</sub>   | qfe <sub>7</sub>   |
| wind shear (ws)  | 27    | ws <sub>7</sub>    | ws <sub>6</sub>    | ws <sub>5</sub>    | ws <sub>4</sub>    | ws <sub>3</sub>    | ws <sub>2</sub>    | ws <sub>1</sub>    | rw <sub>7</sub>    |
| sea-surface temperature (sst)<br>state of the sea (ss)   | 29    | ss <sub>1</sub>    | sst <sub>6</sub>   | sst <sub>5</sub>   | sst <sub>4</sub>   | sst <sub>3</sub>   | sst <sub>2</sub>   | sst <sub>1</sub>   | ws <sub>8</sub>    |
| free text message (txt)  | 30    | txt <sub>5</sub>   | txt <sub>4</sub>   | txt <sub>3</sub>   | txt <sub>2</sub>   | txt <sub>1</sub>   | ss <sub>4</sub>    | ss <sub>3</sub>    | ss <sub>2</sub>    |
|  | 31    | txt <sub>j</sub>   | txt <sub>j-1</sub> | txt <sub>j-2</sub> | .....              | txt <sub>9</sub>   | txt <sub>8</sub>   | txt <sub>7</sub>   | txt <sub>6</sub>   |
| response reservation   | n-2   | 0                  | 0                  | 0                  | 0                  | 0                  | 1                  | 1                  | 1                  |
| c  | n-1   | c <sub>9</sub>     | c <sub>10</sub>    | c <sub>11</sub>    | c <sub>12</sub>    | c <sub>13</sub>    | c <sub>14</sub>    | c <sub>15</sub>    | c <sub>16</sub>    |
| c  | n     | c <sub>1</sub>     | c <sub>2</sub>     | c <sub>3</sub>     | c <sub>4</sub>     | c <sub>5</sub>     | c <sub>6</sub>     | c <sub>7</sub>     | c <sub>8</sub>     |
| flag   | -     | 0                  | 1                  | 1                  | 1                  | 1                  | 1                  | 1                  | 0                  |

Table 7.67: FIS\_SPECI\_a (FSa): SPECI message with response reservation

| Description   | Octet | Bit number         |                    |                    |                    |                    |                    |                    |                    |
|---|-------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
|   |       | 8                  | 7                  | 6                  | 5                  | 4                  | 3                  | 2                  | 1                  |
| flag  | -     | 0                  | 1                  | 1                  | 1                  | 1                  | 1                  | 1                  | 0                  |
| s, ver, rid, a/d  | 1     | s <sub>27</sub>    | s <sub>26</sub>    | s <sub>25</sub>    | 0                  | 0                  | 0                  | 0                  | 1                  |
| s   | 2     | s <sub>24</sub>    | s <sub>23</sub>    | s <sub>22</sub>    | s <sub>21</sub>    | s <sub>20</sub>    | s <sub>19</sub>    | s <sub>18</sub>    | s <sub>17</sub>    |
| s   | 3     | s <sub>16</sub>    | s <sub>15</sub>    | s <sub>14</sub>    | s <sub>13</sub>    | s <sub>12</sub>    | s <sub>11</sub>    | s <sub>10</sub>    | s <sub>9</sub>     |
| s   | 4     | s <sub>8</sub>     | s <sub>7</sub>     | s <sub>6</sub>     | s <sub>5</sub>     | s <sub>4</sub>     | s <sub>3</sub>     | s <sub>2</sub>     | s <sub>1</sub>     |
| mi  | 5     | 0                  | 0                  | 0                  | 0                  | 1                  | 1                  | 1                  | 1                  |
| FIS-B message ID (fmi)<br>FIS-B version ID (vers)   | 6     | vers <sub>4</sub>  | vers <sub>3</sub>  | vers <sub>2</sub>  | vers <sub>1</sub>  | 0                  | 1                  | 0                  | 0                  |
| message edition (med)<br>local ID (locl)  | 7     | locl <sub>5</sub>  | locl <sub>4</sub>  | locl <sub>3</sub>  | locl <sub>2</sub>  | locl <sub>1</sub>  | med <sub>3</sub>   | med <sub>2</sub>   | med <sub>1</sub>   |
|   | 8     | locl <sub>13</sub> | locl <sub>12</sub> | locl <sub>11</sub> | locl <sub>10</sub> | locl <sub>9</sub>  | locl <sub>8</sub>  | locl <sub>7</sub>  | locl <sub>6</sub>  |
| date (date)   | 9     | date <sub>1</sub>  | locl <sub>20</sub> | locl <sub>19</sub> | locl <sub>18</sub> | locl <sub>17</sub> | locl <sub>16</sub> | locl <sub>15</sub> | locl <sub>14</sub> |
| time (ti)   | 10    | ti <sub>4</sub>    | ti <sub>3</sub>    | ti <sub>2</sub>    | ti <sub>1</sub>    | date <sub>5</sub>  | date <sub>4</sub>  | date <sub>3</sub>  | date <sub>2</sub>  |
| wind direction (wdi)  | 11    | wdi <sub>1</sub>   | ti <sub>11</sub>   | ti <sub>10</sub>   | ti <sub>9</sub>    | ti <sub>8</sub>    | ti <sub>7</sub>    | ti <sub>6</sub>    | ti <sub>5</sub>    |
| wind speed (wsp)  | 12    | wsp <sub>3</sub>   | wsp <sub>2</sub>   | wsp <sub>1</sub>   | wdi <sub>6</sub>   | wdi <sub>5</sub>   | wdi <sub>4</sub>   | wdi <sub>3</sub>   | wdi <sub>2</sub>   |
| free text flag (ftxt)<br>max wind flag (mxw)<br>CAVOK flag (cav)<br>TREND report flag (trd)     | 13    | trd                | cav                | mxw                | ftxt               | wsp <sub>7</sub>   | wsp <sub>6</sub>   | wsp <sub>5</sub>   | wsp <sub>4</sub>   |
| present weather flag (pwf)<br>recent weather flag (rwf)<br>QFE flag (qfef)<br>temperature (tem) | 14    | tem <sub>3</sub>   | tem <sub>2</sub>   | tem <sub>1</sub>   | qfef               | rwf <sub>2</sub>   | rwf <sub>1</sub>   | pwf <sub>2</sub>   | pwf <sub>1</sub>   |
| dew point temperature (dew)   | 15    | dew <sub>3</sub>   | dew <sub>2</sub>   | dew <sub>1</sub>   | tem <sub>8</sub>   | tem <sub>7</sub>   | tem <sub>6</sub>   | tem <sub>5</sub>   | tem <sub>4</sub>   |
| QNH (qnh)   | 16    | qnh <sub>3</sub>   | qnh <sub>2</sub>   | qnh <sub>1</sub>   | dew <sub>8</sub>   | dew <sub>7</sub>   | dew <sub>6</sub>   | dew <sub>5</sub>   | dew <sub>4</sub>   |
| wind shear flag (wsf)<br>sea flag (ssf)<br>variable wind direction to (vdit)                    | 17    | vdi <sub>1</sub>   | ssf                | wsf                | qnh <sub>8</sub>   | qnh <sub>7</sub>   | qnh <sub>6</sub>   | qnh <sub>5</sub>   | qnh <sub>4</sub>   |
| variable wind direction from (vdif)   | 18    | vdif <sub>3</sub>  | vdif <sub>2</sub>  | vdif <sub>1</sub>  | vdi <sub>6</sub>   | vdi <sub>5</sub>   | vdi <sub>4</sub>   | vdi <sub>3</sub>   | vdi <sub>2</sub>   |
| wind gust indicator (wgi)   | 19    | wgi <sub>5</sub>   | wgi <sub>4</sub>   | wgi <sub>3</sub>   | wgi <sub>2</sub>   | wgi <sub>1</sub>   | vdif <sub>6</sub>  | vdif <sub>5</sub>  | vdif <sub>4</sub>  |
| minimum visibility (mis)  | 20    | mis <sub>6</sub>   | mis <sub>5</sub>   | mis <sub>4</sub>   | mis <sub>3</sub>   | mis <sub>2</sub>   | mis <sub>1</sub>   | wgi <sub>7</sub>   | wgi <sub>6</sub>   |
| minimum visibility direction (misd)<br>maximum visibility (mas)                                 | 21    | mas <sub>5</sub>   | mas <sub>4</sub>   | mas <sub>3</sub>   | mas <sub>2</sub>   | mas <sub>1</sub>   | misd <sub>3</sub>  | misd <sub>2</sub>  | misd <sub>1</sub>  |
| maximum visibility direction (masd)<br>present weather (pw)                                     | 22    | pw <sub>4</sub>    | pw <sub>3</sub>    | pw <sub>2</sub>    | pw <sub>1</sub>    | masd <sub>3</sub>  | masd <sub>2</sub>  | masd <sub>1</sub>  | mas <sub>6</sub>   |
| cloud no. flag (cno)<br>cloud coverage (cc)   | 23    | cc <sub>3</sub>    | cc <sub>2</sub>    | cc <sub>1</sub>    | cno <sub>2</sub>   | cno <sub>1</sub>   | pw <sub>7</sub>    | pw <sub>6</sub>    | pw <sub>5</sub>    |
| cloud height (ch)   | 24    | ch <sub>8</sub>    | ch <sub>7</sub>    | ch <sub>6</sub>    | ch <sub>5</sub>    | ch <sub>4</sub>    | ch <sub>3</sub>    | ch <sub>2</sub>    | ch <sub>1</sub>    |
| cloud type (cty)<br>QFE (qfe)   | 25    | qfe <sub>6</sub>   | qfe <sub>5</sub>   | qfe <sub>4</sub>   | qfe <sub>3</sub>   | qfe <sub>2</sub>   | qfe <sub>1</sub>   | cty <sub>2</sub>   | cty <sub>1</sub>   |
| recent weather (rw)   | 26    | rw <sub>6</sub>    | rw <sub>5</sub>    | rw <sub>4</sub>    | rw <sub>3</sub>    | rw <sub>2</sub>    | rw <sub>1</sub>    | qfe <sub>8</sub>   | qfe <sub>7</sub>   |
| wind shear (ws)   | 27    | ws <sub>7</sub>    | ws <sub>6</sub>    | ws <sub>5</sub>    | ws <sub>4</sub>    | ws <sub>3</sub>    | ws <sub>2</sub>    | ws <sub>1</sub>    | rw <sub>7</sub>    |
| sea-surface temperature (sst)<br>state of the sea (ss)  | 29    | ss <sub>1</sub>    | sst <sub>6</sub>   | sst <sub>5</sub>   | sst <sub>4</sub>   | sst <sub>3</sub>   | sst <sub>2</sub>   | sst <sub>1</sub>   | ws <sub>8</sub>    |
| free text message (txt)   | 30    | txt <sub>5</sub>   | txt <sub>4</sub>   | txt <sub>3</sub>   | txt <sub>2</sub>   | txt <sub>1</sub>   | ss <sub>4</sub>    | ss <sub>3</sub>    | ss <sub>2</sub>    |
|   | 31    | txt <sub>j</sub>   | txt <sub>j-1</sub> | txt <sub>j-2</sub> | .....              | txt <sub>9</sub>   | txt <sub>8</sub>   | txt <sub>7</sub>   | txt <sub>6</sub>   |
| response reservation  | n-2   | 0                  | 0                  | 0                  | 0                  | 0                  | 1                  | 1                  | 1                  |
| c   | n-1   | c <sub>9</sub>     | c <sub>10</sub>    | c <sub>11</sub>    | c <sub>12</sub>    | c <sub>13</sub>    | c <sub>14</sub>    | c <sub>15</sub>    | c <sub>16</sub>    |
| c   | n     | c <sub>1</sub>     | c <sub>2</sub>     | c <sub>3</sub>     | c <sub>4</sub>     | c <sub>5</sub>     | c <sub>6</sub>     | c <sub>7</sub>     | c <sub>8</sub>     |
| flag  | -     | 0                  | 1                  | 1                  | 1                  | 1                  | 1                  | 1                  | 0                  |

Table 7.68: FIS\_ATIS\_a (FAa): ATIS message with response reservation

| Description  | Octet | Bit number         |                    |                    |                    |                    |                    |                    |                    |
|--|-------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
|  |       | 8                  | 7                  | 6                  | 5                  | 4                  | 3                  | 2                  | 1                  |
| flag   | -     | 0                  | 1                  | 1                  | 1                  | 1                  | 1                  | 1                  | 0                  |
| s, ver, rid, a/d   | 1     | s <sub>27</sub>    | s <sub>26</sub>    | s <sub>25</sub>    | 0                  | 0                  | 0                  | 0                  | 1                  |
| s  | 2     | s <sub>24</sub>    | s <sub>23</sub>    | s <sub>22</sub>    | s <sub>21</sub>    | s <sub>20</sub>    | s <sub>19</sub>    | s <sub>18</sub>    | s <sub>17</sub>    |
| s  | 3     | s <sub>16</sub>    | s <sub>15</sub>    | s <sub>14</sub>    | s <sub>13</sub>    | s <sub>12</sub>    | s <sub>11</sub>    | s <sub>10</sub>    | s <sub>9</sub>     |
| s  | 4     | s <sub>8</sub>     | s <sub>7</sub>     | s <sub>6</sub>     | s <sub>5</sub>     | s <sub>4</sub>     | s <sub>3</sub>     | s <sub>2</sub>     | s <sub>1</sub>     |
| mi   | 5     | 0                  | 0                  | 0                  | 0                  | 1                  | 1                  | 1                  | 1                  |
| FIS-B message ID (fmi)<br>FIS-B version ID (vers)<br>message edition (med)   | 6     | vers <sub>4</sub>  | vers <sub>3</sub>  | vers <sub>2</sub>  | vers <sub>1</sub>  | 0                  | 0                  | 0                  | 1                  |
| local ID(locl)   | 7     | locl <sub>5</sub>  | locl <sub>4</sub>  | locl <sub>3</sub>  | locl <sub>2</sub>  | locl <sub>1</sub>  | med <sub>3</sub>   | med <sub>2</sub>   | med <sub>1</sub>   |
|  | 8     | locl <sub>13</sub> | locl <sub>12</sub> | locl <sub>11</sub> | locl <sub>10</sub> | locl <sub>9</sub>  | locl <sub>8</sub>  | locl <sub>7</sub>  | locl <sub>6</sub>  |
| date (date)  | 9     | date <sub>1</sub>  | locl <sub>20</sub> | locl <sub>19</sub> | locl <sub>18</sub> | locl <sub>17</sub> | locl <sub>16</sub> | locl <sub>15</sub> | locl <sub>14</sub> |
| time (ti)  | 10    | ti <sub>4</sub>    | ti <sub>3</sub>    | ti <sub>2</sub>    | ti <sub>1</sub>    | date <sub>5</sub>  | date <sub>4</sub>  | date <sub>3</sub>  | date <sub>2</sub>  |
| holding delay (hd)   | 11    | hd <sub>1</sub>    | ti <sub>11</sub>   | ti <sub>10</sub>   | ti <sub>9</sub>    | ti <sub>8</sub>    | ti <sub>7</sub>    | ti <sub>6</sub>    | ti <sub>5</sub>    |
| transition level (tran)  | 12    | tran <sub>5</sub>  | tran <sub>4</sub>  | tran <sub>3</sub>  | tran <sub>2</sub>  | tran <sub>1</sub>  | hd <sub>4</sub>    | hd <sub>3</sub>    | hd <sub>2</sub>    |
| other op. activity flag (othf)<br>other op. activity (oth)<br>airport availability (aavl)  | 13    | aavl <sub>3</sub>  | aavl <sub>2</sub>  | aavl <sub>1</sub>  | oth <sub>3</sub>   | oth <sub>2</sub>   | oth <sub>1</sub>   | othf               | tran <sub>6</sub>  |
|  | 14    | aavl <sub>11</sub> | aavl <sub>10</sub> | aavl <sub>9</sub>  | aavl <sub>8</sub>  | aavl <sub>7</sub>  | aavl <sub>6</sub>  | aavl <sub>5</sub>  | aavl <sub>4</sub>  |
| wind direction (wdi)<br>wind speed (wsp)   | 15    | wsp <sub>1</sub>   | wdi <sub>6</sub>   | wdi <sub>5</sub>   | wdi <sub>4</sub>   | wdi <sub>3</sub>   | wdi <sub>2</sub>   | wdi <sub>1</sub>   | aavl <sub>12</sub> |
| temperature (tem)  | 16    | tem <sub>2</sub>   | tem <sub>1</sub>   | wsp <sub>7</sub>   | wsp <sub>6</sub>   | wsp <sub>5</sub>   | wsp <sub>4</sub>   | wsp <sub>3</sub>   | wsp <sub>2</sub>   |
| dew point (dew)  | 17    | dew <sub>2</sub>   | dew <sub>1</sub>   | tem <sub>8</sub>   | tem <sub>7</sub>   | tem <sub>6</sub>   | tem <sub>5</sub>   | tem <sub>4</sub>   | tem <sub>3</sub>   |
| QNH (qnh)  | 18    | qnh <sub>2</sub>   | qnh <sub>1</sub>   | dew <sub>8</sub>   | dew <sub>7</sub>   | dew <sub>6</sub>   | dew <sub>5</sub>   | dew <sub>4</sub>   | dew <sub>3</sub>   |
| free text flag (ftxt)<br>max wind flag (mxw)<br>CAVOK flag (cav)   | 19    | mxw                | ftxt               | qnh <sub>8</sub>   | qnh <sub>7</sub>   | qnh <sub>6</sub>   | qnh <sub>5</sub>   | qnh <sub>4</sub>   | qnh <sub>3</sub>   |
| TREND report flag (trd)<br>QFE flag (qfef)<br>wind shear flag (ws)<br>present weather flag (pwf)<br>recent weather flag (rwf)<br>variable wind direction to (vdit) | 20    | rwf <sub>2</sub>   | rwf <sub>1</sub>   | pwf <sub>2</sub>   | pwf <sub>1</sub>   | ws                 | qfef               | trd                | cav                |
| variable wind direction from (vdif)  | 21    | vdif <sub>2</sub>  | vdif <sub>1</sub>  | vdit <sub>6</sub>  | vdit <sub>5</sub>  | vdit <sub>4</sub>  | vdit <sub>3</sub>  | vdit <sub>2</sub>  | vdit <sub>1</sub>  |
| wind gust indicator (wgi)  | 22    | wgi <sub>4</sub>   | wgi <sub>3</sub>   | wgi <sub>2</sub>   | wgi <sub>1</sub>   | vdif <sub>6</sub>  | vdif <sub>5</sub>  | vdif <sub>4</sub>  | vdif <sub>3</sub>  |
| minimum visibility (mis)   | 23    | mis <sub>5</sub>   | mis <sub>4</sub>   | mis <sub>3</sub>   | mis <sub>2</sub>   | mis <sub>1</sub>   | wgi <sub>7</sub>   | wgi <sub>6</sub>   | wgi <sub>5</sub>   |
| minimum visibility direction (misd)<br>maximum visibility (mas)  | 24    | mas <sub>4</sub>   | mas <sub>3</sub>   | mas <sub>2</sub>   | mas <sub>1</sub>   | misd <sub>3</sub>  | misd <sub>2</sub>  | misd <sub>1</sub>  | mis <sub>6</sub>   |
| maximum visibility direction (masd)<br>cloud no. flag (cno)<br>cloud coverage (cc)   | 25    | cc <sub>1</sub>    | cno <sub>2</sub>   | cno <sub>1</sub>   | masd <sub>3</sub>  | masd <sub>2</sub>  | masd <sub>1</sub>  | mas <sub>6</sub>   | mas <sub>5</sub>   |
| cloud height (ch)  | 26    | ch <sub>6</sub>    | ch <sub>5</sub>    | ch <sub>4</sub>    | ch <sub>3</sub>    | ch <sub>2</sub>    | ch <sub>1</sub>    | cc <sub>3</sub>    | cc <sub>2</sub>    |
| cloud type (cty)<br>present weather (pw)<br>recent weather (rw)  | 27    | pw <sub>4</sub>    | pw <sub>3</sub>    | pw <sub>2</sub>    | pw <sub>1</sub>    | cty <sub>2</sub>   | cty <sub>1</sub>   | ch <sub>8</sub>    | ch <sub>7</sub>    |
| QFE (qfe)  | 28    | rw <sub>5</sub>    | rw <sub>4</sub>    | rw <sub>3</sub>    | rw <sub>2</sub>    | rw <sub>1</sub>    | pw <sub>7</sub>    | pw <sub>6</sub>    | pw <sub>5</sub>    |
| free text message (txt)  | 29    | qfe <sub>6</sub>   | qfe <sub>5</sub>   | qfe <sub>4</sub>   | qfe <sub>3</sub>   | qfe <sub>2</sub>   | qfe <sub>1</sub>   | rw <sub>7</sub>    | rw <sub>6</sub>    |
|  | 30    | txt <sub>6</sub>   | txt <sub>5</sub>   | txt <sub>4</sub>   | txt <sub>3</sub>   | txt <sub>2</sub>   | txt <sub>1</sub>   | qfe <sub>8</sub>   | qfe <sub>7</sub>   |
|  | 31    | txt <sub>j</sub>   | txt <sub>j-1</sub> | txt <sub>j-2</sub> | .....              | txt <sub>10</sub>  | txt <sub>9</sub>   | txt <sub>8</sub>   | txt <sub>7</sub>   |
| response reservation field   | n-2   | 0                  | 0                  | 0                  | 0                  | 0                  | 1                  | 1                  | 1                  |
| c  | n-1   | c <sub>9</sub>     | c <sub>10</sub>    | c <sub>11</sub>    | c <sub>12</sub>    | c <sub>13</sub>    | c <sub>14</sub>    | c <sub>15</sub>    | c <sub>16</sub>    |
| c  | n     | c <sub>1</sub>     | c <sub>2</sub>     | c <sub>3</sub>     | c <sub>4</sub>     | c <sub>5</sub>     | c <sub>6</sub>     | c <sub>7</sub>     | c <sub>8</sub>     |
| flag   | -     | 0                  | 1                  | 1                  | 1                  | 1                  | 1                  | 1                  | 0                  |

Table 7.69: FIS\_RCN\_A (FRa): RCN message burst format with response reservation

| Description   | Octet | Bit number         |                    |                    |                    |                    |                    |                    |                    |
|---|-------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
|   |       | 8                  | 7                  | 6                  | 5                  | 4                  | 3                  | 2                  | 1                  |
| flag  | -     | 0                  | 1                  | 1                  | 1                  | 1                  | 1                  | 1                  | 0                  |
| s, ver, rid, a/d                                      | 1     | s <sub>27</sub>    | s <sub>26</sub>    | s <sub>25</sub>    | 0                  | 0                  | 0                  | 0                  | 1                  |
| s   | 2     | s <sub>24</sub>    | s <sub>23</sub>    | s <sub>22</sub>    | s <sub>21</sub>    | s <sub>20</sub>    | s <sub>19</sub>    | s <sub>18</sub>    | s <sub>17</sub>    |
| s   | 3     | s <sub>16</sub>    | s <sub>15</sub>    | s <sub>14</sub>    | s <sub>13</sub>    | s <sub>12</sub>    | s <sub>11</sub>    | s <sub>10</sub>    | s <sub>9</sub>     |
| s   | 4     | s <sub>8</sub>     | s <sub>7</sub>     | s <sub>6</sub>     | s <sub>5</sub>     | s <sub>4</sub>     | s <sub>3</sub>     | s <sub>2</sub>     | s <sub>1</sub>     |
| mi  | 5     | 0                  | 0                  | 0                  | 0                  | 1                  | 1                  | 1                  | 1                  |
| FIS-B message ID (fmi)<br>FIS-B version ID (vers)     | 6     | vers <sub>4</sub>  | vers <sub>3</sub>  | vers <sub>2</sub>  | vers <sub>1</sub>  | 0                  | 0                  | 1                  | 0                  |
| message edition (med)<br>local ID (locl)              | 7     | locl <sub>5</sub>  | locl <sub>4</sub>  | locl <sub>3</sub>  | locl <sub>2</sub>  | locl <sub>1</sub>  | med <sub>3</sub>   | med <sub>2</sub>   | med <sub>1</sub>   |
|   | 8     | locl <sub>13</sub> | locl <sub>12</sub> | locl <sub>11</sub> | locl <sub>10</sub> | locl <sub>9</sub>  | locl <sub>8</sub>  | locl <sub>7</sub>  | locl <sub>6</sub>  |
| date (date)   | 9     | date <sub>1</sub>  | locl <sub>20</sub> | locl <sub>19</sub> | locl <sub>18</sub> | locl <sub>17</sub> | locl <sub>16</sub> | locl <sub>15</sub> | locl <sub>14</sub> |
| time (ti)   | 10    | ti <sub>4</sub>    | ti <sub>3</sub>    | ti <sub>2</sub>    | ti <sub>1</sub>    | date <sub>5</sub>  | date <sub>4</sub>  | date <sub>3</sub>  | date <sub>2</sub>  |
| braking action (brk)                                  | 11    | brk <sub>1</sub>   | ti <sub>11</sub>   | ti <sub>10</sub>   | ti <sub>9</sub>    | ti <sub>8</sub>    | ti <sub>7</sub>    | ti <sub>6</sub>    | ti <sub>5</sub>    |
| runway ID (run)                                       | 12    | run <sub>6</sub>   | run <sub>5</sub>   | run <sub>4</sub>   | run <sub>3</sub>   | run <sub>2</sub>   | run <sub>1</sub>   | brk <sub>3</sub>   | brk <sub>2</sub>   |
| approach type flag (aptf)<br>approach type (apty)     | 13    | apty <sub>4</sub>  | apty <sub>3</sub>  | apty <sub>2</sub>  | apty <sub>1</sub>  | aptf <sub>2</sub>  | aptf <sub>1</sub>  | run <sub>8</sub>   | run <sub>7</sub>   |
| reduced runway length (rrl)                           | 14    | rrl <sub>8</sub>   | rrl <sub>7</sub>   | rrl <sub>6</sub>   | rrl <sub>5</sub>   | rrl <sub>4</sub>   | rrl <sub>3</sub>   | rrl <sub>2</sub>   | rrl <sub>1</sub>   |
| reduced runway width (rrw)<br>runway deposits (rdp)   | 15    | rdp <sub>1</sub>   | rrw <sub>7</sub>   | rrw <sub>6</sub>   | rrw <sub>5</sub>   | rrw <sub>4</sub>   | rrw <sub>3</sub>   | rrw <sub>2</sub>   | rrw <sub>1</sub>   |
| runway contamination (rcon)<br>depth of deposit (dod) | 16    | dod <sub>2</sub>   | dod <sub>1</sub>   | rcon <sub>3</sub>  | rcon <sub>2</sub>  | rcon <sub>1</sub>  | rdp <sub>4</sub>   | rdp <sub>3</sub>   | rdp <sub>2</sub>   |
| RVR touchdown (rvt)                                   | 17    | rvt <sub>3</sub>   | rvt <sub>2</sub>   | rvt <sub>1</sub>   | dod <sub>7</sub>   | dod <sub>6</sub>   | dod <sub>5</sub>   | dod <sub>4</sub>   | dod <sub>3</sub>   |
| RVR midpoint (rvm)                                    | 18    | rvm <sub>5</sub>   | rvm <sub>4</sub>   | rvm <sub>3</sub>   | rvm <sub>2</sub>   | rvm <sub>1</sub>   | rvt <sub>6</sub>   | rvt <sub>5</sub>   | rvt <sub>4</sub>   |
| RVR endpoint (rve)<br>RVR source (rso)                | 19    | rso <sub>1</sub>   | rve <sub>6</sub>   | rve <sub>5</sub>   | rve <sub>4</sub>   | rve <sub>3</sub>   | rve <sub>2</sub>   | rve <sub>1</sub>   | rvm <sub>6</sub>   |
| runway in use (rus)<br>runway availability (ravl)     | 20    | ravl <sub>5</sub>  | ravl <sub>4</sub>  | ravl <sub>3</sub>  | ravl <sub>2</sub>  | ravl <sub>1</sub>  | rus <sub>2</sub>   | rus <sub>1</sub>   | rso <sub>2</sub>   |
| wind shear  | 21    | ws                 | ravl <sub>12</sub> | ravl <sub>11</sub> | ravl <sub>10</sub> | ravl <sub>9</sub>  | ravl <sub>8</sub>  | ravl <sub>7</sub>  | ravl <sub>6</sub>  |
| response reservation field                            | 22    | 0                  | 0                  | 0                  | 0                  | 0                  | 1                  | 1                  | 1                  |
| c   | 23    | c <sub>9</sub>     | c <sub>10</sub>    | c <sub>11</sub>    | c <sub>12</sub>    | c <sub>13</sub>    | c <sub>14</sub>    | c <sub>15</sub>    | c <sub>16</sub>    |
| c   | 24    | c <sub>1</sub>     | c <sub>2</sub>     | c <sub>3</sub>     | c <sub>4</sub>     | c <sub>5</sub>     | c <sub>6</sub>     | c <sub>7</sub>     | c <sub>8</sub>     |
| flag  | -     | 0                  | 1                  | 1                  | 1                  | 1                  | 1                  | 1                  | 0                  |

Table 7.70: FIS\_SIGMET\_a (FSa): SIGMET message with response reservation

| Description   | Octet | Bit number         |                    |                    |                    |                    |                    |                    |                    |
|---|-------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
|   |       | 8                  | 7                  | 6                  | 5                  | 4                  | 3                  | 2                  | 1                  |
| flag  | -     | 0                  | 1                  | 1                  | 1                  | 1                  | 1                  | 1                  | 0                  |
| s, ver, rid, a/d  | 1     | s <sub>27</sub>    | s <sub>26</sub>    | s <sub>25</sub>    | 0                  | 0                  | 0                  | 0                  | 1                  |
| s   | 2     | s <sub>24</sub>    | s <sub>23</sub>    | s <sub>22</sub>    | s <sub>21</sub>    | s <sub>20</sub>    | s <sub>19</sub>    | s <sub>18</sub>    | s <sub>17</sub>    |
| s   | 3     | s <sub>16</sub>    | s <sub>15</sub>    | s <sub>14</sub>    | s <sub>13</sub>    | s <sub>12</sub>    | s <sub>11</sub>    | s <sub>10</sub>    | s <sub>9</sub>     |
| s   | 4     | s <sub>8</sub>     | s <sub>7</sub>     | s <sub>6</sub>     | s <sub>5</sub>     | s <sub>4</sub>     | s <sub>3</sub>     | s <sub>2</sub>     | s <sub>1</sub>     |
| mi  | 5     | 0                  | 0                  | 0                  | 0                  | 1                  | 1                  | 1                  | 1                  |
| FIS-B message ID (fmi)<br>FIS-B sequence number (sqn)                               | 6     | sqn <sub>4</sub>   | sqn <sub>3</sub>   | sqn <sub>2</sub>   | sqn <sub>1</sub>   | 0                  | 0                  | 1                  | 1                  |
| message edition (med)   | 7     | loci <sub>5</sub>  | loci <sub>4</sub>  | loci <sub>3</sub>  | loci <sub>2</sub>  | loci <sub>1</sub>  | med <sub>3</sub>   | med <sub>2</sub>   | med <sub>1</sub>   |
| location indicator (loci)   | 8     | loci <sub>13</sub> | loci <sub>12</sub> | loci <sub>11</sub> | loci <sub>10</sub> | loci <sub>9</sub>  | loci <sub>8</sub>  | loci <sub>7</sub>  | loci <sub>6</sub>  |
| originator indicator (ori)  | 9     | ori <sub>1</sub>   | loci <sub>20</sub> | loci <sub>19</sub> | loci <sub>18</sub> | loci <sub>17</sub> | loci <sub>16</sub> | loci <sub>15</sub> | loci <sub>14</sub> |
|   | 10    | ori <sub>9</sub>   | ori <sub>8</sub>   | ori <sub>7</sub>   | ori <sub>6</sub>   | ori <sub>5</sub>   | ori <sub>4</sub>   | ori <sub>3</sub>   | ori <sub>2</sub>   |
|   | 11    | ori <sub>17</sub>  | ori <sub>16</sub>  | ori <sub>15</sub>  | ori <sub>14</sub>  | ori <sub>13</sub>  | ori <sub>12</sub>  | ori <sub>11</sub>  | ori <sub>10</sub>  |
| date issued (di)  | 12    | di <sub>5</sub>    | di <sub>4</sub>    | di <sub>3</sub>    | di <sub>2</sub>    | di <sub>1</sub>    | ori <sub>20</sub>  | ori <sub>19</sub>  | ori <sub>18</sub>  |
| time issued (ti)  | 13    | ti <sub>8</sub>    | ti <sub>7</sub>    | ti <sub>6</sub>    | ti <sub>5</sub>    | ti <sub>4</sub>    | ti <sub>3</sub>    | ti <sub>2</sub>    | ti <sub>1</sub>    |
| date valid to (dvt)   | 14    | dvt <sub>5</sub>   | dvt <sub>4</sub>   | dvt <sub>3</sub>   | dvt <sub>2</sub>   | dvt <sub>1</sub>   | ti <sub>11</sub>   | ti <sub>10</sub>   | ti <sub>9</sub>    |
| time valid to (tvt)   | 15    | tvt <sub>8</sub>   | tvt <sub>7</sub>   | tvt <sub>6</sub>   | tvt <sub>5</sub>   | tvt <sub>4</sub>   | tvt <sub>3</sub>   | tvt <sub>2</sub>   | tvt <sub>1</sub>   |
| SIGMET flag (sfl)<br>free text flag (ftxt)<br>phenomenon / condition reported (crp) | 14    | crp <sub>3</sub>   | crp <sub>2</sub>   | crp <sub>1</sub>   | ftxt               | sfl                | tvt <sub>11</sub>  | tvt <sub>10</sub>  | tvt <sub>9</sub>   |
| free text message (txt)   | 15    | txt <sub>6</sub>   | txt <sub>5</sub>   | txt <sub>4</sub>   | txt <sub>3</sub>   | txt <sub>2</sub>   | txt <sub>1</sub>   | crp <sub>5</sub>   | crp <sub>4</sub>   |
|   | 16    | txt <sub>j</sub>   | txt <sub>j-1</sub> | txt <sub>j-2</sub> | .....              | txt <sub>10</sub>  | txt <sub>9</sub>   | txt <sub>8</sub>   | txt <sub>7</sub>   |
| response reservation field  | n-2   | 0                  | 0                  | 0                  | 0                  | 0                  | 1                  | 1                  | 1                  |
| c   | n-1   | c <sub>9</sub>     | c <sub>10</sub>    | c <sub>11</sub>    | c <sub>12</sub>    | c <sub>13</sub>    | c <sub>14</sub>    | c <sub>15</sub>    | c <sub>16</sub>    |
| c   | n     | c <sub>1</sub>     | c <sub>2</sub>     | c <sub>3</sub>     | c <sub>4</sub>     | c <sub>5</sub>     | c <sub>6</sub>     | c <sub>7</sub>     | c <sub>8</sub>     |
| flag  | -     | 0                  | 1                  | 1                  | 1                  | 1                  | 1                  | 1                  | 0                  |



Table 7.71: FIS\_TSA\_CTR\_a (FTCa): TSA CTR Zone message with response reservation

| Description  | Octet | Bit number         |                    |                    |                     |                     |                    |                    |                    |
|--|-------|--------------------|--------------------|--------------------|---------------------|---------------------|--------------------|--------------------|--------------------|
|  |       | 8                  | 7                  | 6                  | 5                   | 4                   | 3                  | 2                  | 1                  |
| flag   | -     | 0                  | 1                  | 1                  | 1                   | 1                   | 1                  | 1                  | 0                  |
| s, ver, rid, a/d   | 1     | s <sub>27</sub>    | s <sub>26</sub>    | s <sub>25</sub>    | 0                   | 0                   | 0                  | 0                  | 1                  |
| s  | 2     | s <sub>24</sub>    | s <sub>23</sub>    | s <sub>22</sub>    | s <sub>21</sub>     | s <sub>20</sub>     | s <sub>19</sub>    | s <sub>18</sub>    | s <sub>17</sub>    |
| s  | 3     | s <sub>16</sub>    | s <sub>15</sub>    | s <sub>14</sub>    | s <sub>13</sub>     | s <sub>12</sub>     | s <sub>11</sub>    | s <sub>10</sub>    | s <sub>9</sub>     |
| s  | 4     | s <sub>8</sub>     | s <sub>7</sub>     | s <sub>6</sub>     | s <sub>5</sub>      | s <sub>4</sub>      | s <sub>3</sub>     | s <sub>2</sub>     | s <sub>1</sub>     |
| mi   | 5     | 0                  | 0                  | 0                  | 0                   | 1                   | 1                  | 1                  | 1                  |
| FIS-B message ID (fmi)<br>version ID (vers)<br>message edition (med) | 6     | vers <sub>4</sub>  | vers <sub>3</sub>  | vers <sub>2</sub>  | vers <sub>1</sub>   | 0                   | 1                  | 1                  | 0                  |
| date (date)  | 7     | date <sub>5</sub>  | date <sub>4</sub>  | date <sub>3</sub>  | date <sub>2</sub>   | date <sub>1</sub>   | med <sub>3</sub>   | med <sub>2</sub>   | med <sub>1</sub>   |
| time (ti)  | 8     | ti <sub>8</sub>    | ti <sub>7</sub>    | ti <sub>6</sub>    | ti <sub>5</sub>     | ti <sub>4</sub>     | ti <sub>3</sub>    | ti <sub>2</sub>    | ti <sub>1</sub>    |
| number of TSAs (NoT)   | 9     | NoT <sub>5</sub>   | NoT <sub>4</sub>   | NoT <sub>3</sub>   | NoT <sub>2</sub>    | NoT <sub>1</sub>    | ti <sub>11</sub>   | ti <sub>10</sub>   | ti <sub>9</sub>    |
| type of area (toa)<br>Active flag (act)<br>local ID (locl)           | 10    | locl <sub>4</sub>  | locl <sub>3</sub>  | locl <sub>2</sub>  | locl <sub>1</sub>   | act <sub>1</sub>    | toa <sub>3</sub>   | toa <sub>2</sub>   | toa <sub>1</sub>   |
|  | 11    | locl <sub>12</sub> | locl <sub>11</sub> | locl <sub>10</sub> | locl <sub>9</sub>   | locl <sub>8</sub>   | locl <sub>7</sub>  | locl <sub>6</sub>  | locl <sub>5</sub>  |
|  | 12    | locl <sub>20</sub> | locl <sub>19</sub> | locl <sub>18</sub> | locl <sub>17</sub>  | locl <sub>16</sub>  | locl <sub>15</sub> | locl <sub>14</sub> | locl <sub>13</sub> |
| supplement to local ID (sloc)<br>active from/to date (actdat)        | 13    | acdat <sub>3</sub> | acdat <sub>2</sub> | acdat <sub>1</sub> | sloc <sub>5</sub>   | sloc <sub>4</sub>   | sloc <sub>3</sub>  | sloc <sub>2</sub>  | sloc <sub>1</sub>  |
| active from/to time (actim)  | 14    | actim <sub>6</sub> | actim <sub>5</sub> | actim <sub>4</sub> | actim <sub>3</sub>  | actim <sub>2</sub>  | actim <sub>1</sub> | acdat <sub>5</sub> | acdat <sub>4</sub> |
| TWR frequency (freq)   | 15    | freq <sub>3</sub>  | freq <sub>2</sub>  | freq <sub>1</sub>  | actim <sub>11</sub> | actim <sub>10</sub> | actim <sub>9</sub> | actim <sub>8</sub> | actim <sub>7</sub> |
|  | 16    | freq <sub>11</sub> | freq <sub>10</sub> | freq <sub>9</sub>  | freq <sub>8</sub>   | freq <sub>7</sub>   | freq <sub>6</sub>  | freq <sub>5</sub>  | freq <sub>4</sub>  |
| response reservation field   | n-2   | 0                  | 0                  | 0                  | 0                   | 0                   | 1                  | 1                  | 1                  |
| c  | n-1   | c <sub>9</sub>     | c <sub>10</sub>    | c <sub>11</sub>    | c <sub>12</sub>     | c <sub>13</sub>     | c <sub>14</sub>    | c <sub>15</sub>    | c <sub>16</sub>    |
| c  | n     | c <sub>1</sub>     | c <sub>2</sub>     | c <sub>3</sub>     | c <sub>4</sub>      | c <sub>5</sub>      | c <sub>6</sub>     | c <sub>7</sub>     | c <sub>8</sub>     |
| flag   | -     | 0                  | 1                  | 1                  | 1                   | 1                   | 1                  | 1                  | 0                  |

Table 7.72: FIS\_TSA\_DNG\_a (FTDa): TSA DNG Zone message with response reservation

| Description  | Octet | Bit number          |                     |                    |                    |                    |                    |                    |                    |
|--|-------|---------------------|---------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
|  |       | 8                   | 7                   | 6                  | 5                  | 4                  | 3                  | 2                  | 1                  |
| flag   | -     | 0                   | 1                   | 1                  | 1                  | 1                  | 1                  | 1                  | 0                  |
| s, ver, rid, a/d   | 1     | s <sub>27</sub>     | s <sub>26</sub>     | s <sub>25</sub>    | 0                  | 0                  | 0                  | 0                  | 1                  |
| s  | 2     | s <sub>24</sub>     | s <sub>23</sub>     | s <sub>22</sub>    | s <sub>21</sub>    | s <sub>20</sub>    | s <sub>19</sub>    | s <sub>18</sub>    | s <sub>17</sub>    |
| s  | 3     | s <sub>16</sub>     | s <sub>15</sub>     | s <sub>14</sub>    | s <sub>13</sub>    | s <sub>12</sub>    | s <sub>11</sub>    | s <sub>10</sub>    | s <sub>9</sub>     |
| s  | 4     | s <sub>8</sub>      | s <sub>7</sub>      | s <sub>6</sub>     | s <sub>5</sub>     | s <sub>4</sub>     | s <sub>3</sub>     | s <sub>2</sub>     | s <sub>1</sub>     |
| mi   | 5     | 0                   | 0                   | 0                  | 0                  | 1                  | 1                  | 1                  | 1                  |
| FIS-B message ID (fmi)<br>version ID (vers)<br>message edition (med) | 6     | vers <sub>4</sub>   | vers <sub>3</sub>   | vers <sub>2</sub>  | vers <sub>1</sub>  | 0                  | 1                  | 1                  | 0                  |
| date (date)  | 7     | date <sub>5</sub>   | date <sub>4</sub>   | date <sub>3</sub>  | date <sub>2</sub>  | date <sub>1</sub>  | med <sub>3</sub>   | med <sub>2</sub>   | med <sub>1</sub>   |
| time (ti)  | 8     | ti <sub>8</sub>     | ti <sub>7</sub>     | ti <sub>6</sub>    | ti <sub>5</sub>    | ti <sub>4</sub>    | ti <sub>3</sub>    | ti <sub>2</sub>    | ti <sub>1</sub>    |
| number of TSAs (NoT)   | 9     | NoT <sub>5</sub>    | NoT <sub>4</sub>    | NoT <sub>3</sub>   | NoT <sub>2</sub>   | NoT <sub>1</sub>   | ti <sub>11</sub>   | ti <sub>10</sub>   | ti <sub>9</sub>    |
| type of area (toa)<br>active flag (act)<br>state ID (stid)           | 10    | stid <sub>4</sub>   | stid <sub>3</sub>   | stid <sub>2</sub>  | stid <sub>1</sub>  | act <sub>1</sub>   | toa <sub>3</sub>   | toa <sub>2</sub>   | toa <sub>1</sub>   |
| area leap number (aln)   | 11    | aln <sub>2</sub>    | aln <sub>1</sub>    | stid <sub>10</sub> | stid <sub>9</sub>  | stid <sub>8</sub>  | stid <sub>7</sub>  | stid <sub>6</sub>  | stid <sub>5</sub>  |
|  | 12    | aln <sub>10</sub>   | aln <sub>9</sub>    | aln <sub>8</sub>   | aln <sub>7</sub>   | aln <sub>6</sub>   | aln <sub>5</sub>   | aln <sub>4</sub>   | aln <sub>3</sub>   |
| supplement to area leap number (saln)                                | 13    | saln <sub>5</sub>   | saln <sub>4</sub>   | saln <sub>3</sub>  | saln <sub>2</sub>  | saln <sub>1</sub>  | aln <sub>13</sub>  | aln <sub>12</sub>  | aln <sub>11</sub>  |
| active from/to date (actdat)<br>active from/to time (actim)          | 14    | actim <sub>3</sub>  | actim <sub>2</sub>  | actim <sub>1</sub> | acdat <sub>5</sub> | acdat <sub>4</sub> | acdat <sub>3</sub> | acdat <sub>2</sub> | acdat <sub>1</sub> |
|  | 15    | actim <sub>11</sub> | actim <sub>10</sub> | actim <sub>9</sub> | actim <sub>8</sub> | actim <sub>7</sub> | actim <sub>6</sub> | actim <sub>5</sub> | actim <sub>4</sub> |
| response reservation field   | n-2   | 0                   | 0                   | 0                  | 0                  | 0                  | 1                  | 1                  | 1                  |
| c  | n-1   | c <sub>9</sub>      | c <sub>10</sub>     | c <sub>11</sub>    | c <sub>12</sub>    | c <sub>13</sub>    | c <sub>14</sub>    | c <sub>15</sub>    | c <sub>16</sub>    |
| c  | n     | c <sub>1</sub>      | c <sub>2</sub>      | c <sub>3</sub>     | c <sub>4</sub>     | c <sub>5</sub>     | c <sub>6</sub>     | c <sub>7</sub>     | c <sub>8</sub>     |
| flag   | -     | 0                   | 1                   | 1                  | 1                  | 1                  | 1                  | 1                  | 0                  |

Table 7.73: FIS\_REQUEST\_a (FQa): Request message with a null reservation

| Description  | Octet | Bit number         |                    |                    |                    |                    |                    |                    |                    |
|--|-------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
|  |       | 8                  | 7                  | 6                  | 5                  | 4                  | 3                  | 2                  | 1                  |
| flag   | -     | 0                  | 1                  | 1                  | 1                  | 1                  | 1                  | 1                  | 0                  |
| s, ver, rid, a/d   | 1     | s <sub>27</sub>    | s <sub>26</sub>    | s <sub>25</sub>    | 0                  | 0                  | 0                  | 1                  | 1                  |
| s  | 2     | s <sub>24</sub>    | s <sub>23</sub>    | s <sub>22</sub>    | s <sub>21</sub>    | s <sub>20</sub>    | s <sub>19</sub>    | s <sub>18</sub>    | s <sub>17</sub>    |
| s  | 3     | s <sub>16</sub>    | s <sub>15</sub>    | s <sub>14</sub>    | s <sub>13</sub>    | s <sub>12</sub>    | s <sub>11</sub>    | s <sub>10</sub>    | s <sub>9</sub>     |
| s  | 4     | s <sub>8</sub>     | s <sub>7</sub>     | s <sub>6</sub>     | s <sub>5</sub>     | s <sub>4</sub>     | s <sub>3</sub>     | s <sub>2</sub>     | s <sub>1</sub>     |
| mi = general request burst<br>r-mi = FIS-B service indicator | 5     | 0                  | 1                  | 1                  | 1                  | 1                  | 0                  | 0                  | 1                  |
| FIS-B message ID (fmi)<br>message requested (mrq)            | 6     | mrq <sub>1</sub>   | 0                  | 1                  | 0                  | 1                  | 0                  | 0                  | 0                  |
| local ID (locl)  | 7     | locl <sub>5</sub>  | locl <sub>4</sub>  | locl <sub>3</sub>  | locl <sub>2</sub>  | locl <sub>1</sub>  | mrq <sub>4</sub>   | mrq <sub>3</sub>   | mrq <sub>2</sub>   |
|  | 8     | locl <sub>13</sub> | locl <sub>12</sub> | locl <sub>11</sub> | locl <sub>10</sub> | locl <sub>9</sub>  | locl <sub>8</sub>  | locl <sub>7</sub>  | locl <sub>6</sub>  |
| res  | 9     | res                | locl <sub>20</sub> | locl <sub>19</sub> | locl <sub>18</sub> | locl <sub>17</sub> | locl <sub>16</sub> | locl <sub>15</sub> | locl <sub>14</sub> |
| res, null res field  | 10    | res                | res                | res                | res                | res                | res                | 0                  | 0                  |
| null res field   | 11    | 0                  | 0                  | 0                  | 0                  | 0                  | 0                  | 0                  | 0                  |
| c  | 12    | c <sub>9</sub>     | c <sub>10</sub>    | c <sub>11</sub>    | c <sub>12</sub>    | c <sub>13</sub>    | c <sub>14</sub>    | c <sub>15</sub>    | c <sub>16</sub>    |
| c  | 13    | c <sub>1</sub>     | c <sub>2</sub>     | c <sub>3</sub>     | c <sub>4</sub>     | c <sub>5</sub>     | c <sub>6</sub>     | c <sub>7</sub>     | c <sub>8</sub>     |
| flag   | -     | 0                  | 1                  | 1                  | 1                  | 1                  | 1                  | 1                  | 0                  |

Table 7.74: FIS\_REQUEST\_b (FQb): Request message with a unicast reservation

| Description  | Octet | Bit number         |                    |                    |                    |                    |                    |                    |                    |
|--|-------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
|  |       | 8                  | 7                  | 6                  | 5                  | 4                  | 3                  | 2                  | 1                  |
| flag   | -     | 0                  | 1                  | 1                  | 1                  | 1                  | 1                  | 1                  | 0                  |
| s, ver, rid, a/d   | 1     | s <sub>27</sub>    | s <sub>26</sub>    | s <sub>25</sub>    | 0                  | 0                  | 0                  | 0                  | 1                  |
| s  | 2     | s <sub>24</sub>    | s <sub>23</sub>    | s <sub>22</sub>    | s <sub>21</sub>    | s <sub>20</sub>    | s <sub>19</sub>    | s <sub>18</sub>    | s <sub>17</sub>    |
| s  | 3     | s <sub>16</sub>    | s <sub>15</sub>    | s <sub>14</sub>    | s <sub>13</sub>    | s <sub>12</sub>    | s <sub>11</sub>    | s <sub>10</sub>    | s <sub>9</sub>     |
| s  | 4     | s <sub>8</sub>     | s <sub>7</sub>     | s <sub>6</sub>     | s <sub>5</sub>     | s <sub>4</sub>     | s <sub>3</sub>     | s <sub>2</sub>     | s <sub>1</sub>     |
| mi = general request burst<br>r-mi = FIS-B service indicator | 5     | 0                  | 1                  | 1                  | 1                  | 1                  | 0                  | 0                  | 1                  |
| FIS-B message ID (fmi)<br>message requested (mrq)            | 6     | mrq <sub>1</sub>   | 0                  | 1                  | 0                  | 1                  | 0                  | 0                  | 0                  |
| local ID (locl)  | 7     | locl <sub>5</sub>  | locl <sub>4</sub>  | locl <sub>3</sub>  | locl <sub>2</sub>  | locl <sub>1</sub>  | mrq <sub>4</sub>   | mrq <sub>3</sub>   | mrq <sub>2</sub>   |
|  | 8     | locl <sub>13</sub> | locl <sub>12</sub> | locl <sub>11</sub> | locl <sub>10</sub> | locl <sub>9</sub>  | locl <sub>8</sub>  | locl <sub>7</sub>  | locl <sub>6</sub>  |
| res  | 9     | res                | locl <sub>20</sub> | locl <sub>19</sub> | locl <sub>18</sub> | locl <sub>17</sub> | locl <sub>16</sub> | locl <sub>15</sub> | locl <sub>14</sub> |
| d  | 10    | d <sub>24</sub>    | d <sub>23</sub>    | d <sub>22</sub>    | d <sub>21</sub>    | d <sub>20</sub>    | d <sub>19</sub>    | d <sub>18</sub>    | d <sub>17</sub>    |
| d  | 11    | d <sub>16</sub>    | d <sub>15</sub>    | d <sub>14</sub>    | d <sub>13</sub>    | d <sub>12</sub>    | d <sub>11</sub>    | d <sub>10</sub>    | d <sub>9</sub>     |
| d  | 12    | d <sub>8</sub>     | d <sub>7</sub>     | d <sub>6</sub>     | d <sub>5</sub>     | d <sub>4</sub>     | d <sub>3</sub>     | d <sub>2</sub>     | d <sub>1</sub>     |
| ro, sdf, d   | 13    | ro <sub>12</sub>   | ro <sub>11</sub>   | ro <sub>10</sub>   | ro <sub>9</sub>    | sdf                | d <sub>27</sub>    | d <sub>26</sub>    | d <sub>25</sub>    |
| ro   | 14    | ro <sub>8</sub>    | ro <sub>7</sub>    | ro <sub>6</sub>    | ro <sub>5</sub>    | ro <sub>4</sub>    | ro <sub>3</sub>    | ro <sub>2</sub>    | ro <sub>1</sub>    |
| lg   | 15    | lg <sub>8</sub>    | lg <sub>7</sub>    | lg <sub>6</sub>    | lg <sub>5</sub>    | lg <sub>4</sub>    | lg <sub>3</sub>    | lg <sub>2</sub>    | lg <sub>1</sub>    |
| pr   | 16    | 0                  | 0                  | 1                  | 0                  | pr <sub>4</sub>    | pr <sub>3</sub>    | pr <sub>2</sub>    | pr <sub>1</sub>    |
| c  | 17    | c <sub>9</sub>     | c <sub>10</sub>    | c <sub>11</sub>    | c <sub>12</sub>    | c <sub>13</sub>    | c <sub>14</sub>    | c <sub>15</sub>    | c <sub>16</sub>    |
| c  | 18    | c <sub>1</sub>     | c <sub>2</sub>     | c <sub>3</sub>     | c <sub>4</sub>     | c <sub>5</sub>     | c <sub>6</sub>     | c <sub>7</sub>     | c <sub>8</sub>     |
| flag   | -     | 0                  | 1                  | 1                  | 1                  | 1                  | 1                  | 1                  | 0                  |

Table 7.75: FIS\_REQUEST\_c (FQc): Request message with a response reservation

| Description  | Octet | Bit number         |                    |                    |                    |                    |                    |                    |                    |
|--|-------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
|  |       | 8                  | 7                  | 6                  | 5                  | 4                  | 3                  | 2                  | 1                  |
| flag   | -     | 0                  | 1                  | 1                  | 1                  | 1                  | 1                  | 1                  | 0                  |
| s, ver, rid, a/d   | 1     | s <sub>27</sub>    | s <sub>26</sub>    | s <sub>25</sub>    | 0                  | 0                  | 0                  | 0                  | 1                  |
| s  | 2     | s <sub>24</sub>    | s <sub>23</sub>    | s <sub>22</sub>    | s <sub>21</sub>    | s <sub>20</sub>    | s <sub>19</sub>    | s <sub>18</sub>    | s <sub>17</sub>    |
| s  | 3     | s <sub>16</sub>    | s <sub>15</sub>    | s <sub>14</sub>    | s <sub>13</sub>    | s <sub>12</sub>    | s <sub>11</sub>    | s <sub>10</sub>    | s <sub>9</sub>     |
| s  | 4     | s <sub>8</sub>     | s <sub>7</sub>     | s <sub>6</sub>     | s <sub>5</sub>     | s <sub>4</sub>     | s <sub>3</sub>     | s <sub>2</sub>     | s <sub>1</sub>     |
| mi = general request burst<br>r-mi = FIS-B service indicator | 5     | 0                  | 1                  | 1                  | 1                  | 1                  | 0                  | 0                  | 1                  |
| FIS-B message ID (fmi)<br>message requested (mrq)            | 6     | mrq <sub>1</sub>   | 0                  | 1                  | 0                  | 1                  | 0                  | 0                  | 0                  |
| local ID (locl)  | 7     | locl <sub>5</sub>  | locl <sub>4</sub>  | locl <sub>3</sub>  | locl <sub>2</sub>  | locl <sub>1</sub>  | mrq <sub>4</sub>   | mrq <sub>3</sub>   | mrq <sub>2</sub>   |
|  | 8     | locl <sub>13</sub> | locl <sub>12</sub> | locl <sub>11</sub> | locl <sub>10</sub> | locl <sub>9</sub>  | locl <sub>8</sub>  | locl <sub>7</sub>  | locl <sub>6</sub>  |
| res  | 9     | res                | locl <sub>20</sub> | locl <sub>19</sub> | locl <sub>18</sub> | locl <sub>17</sub> | locl <sub>16</sub> | locl <sub>15</sub> | locl <sub>14</sub> |
| d  | 10    | d <sub>24</sub>    | d <sub>23</sub>    | d <sub>22</sub>    | d <sub>21</sub>    | d <sub>20</sub>    | d <sub>19</sub>    | d <sub>18</sub>    | d <sub>17</sub>    |
| d  | 11    | d <sub>16</sub>    | d <sub>15</sub>    | d <sub>14</sub>    | d <sub>13</sub>    | d <sub>12</sub>    | d <sub>11</sub>    | d <sub>10</sub>    | d <sub>9</sub>     |
| d  | 12    | d <sub>8</sub>     | d <sub>7</sub>     | d <sub>6</sub>     | d <sub>5</sub>     | d <sub>4</sub>     | d <sub>3</sub>     | d <sub>2</sub>     | d <sub>1</sub>     |
| response res, d  | 13    | 0                  | 0                  | 0                  | 0                  | 0                  | d <sub>27</sub>    | d <sub>26</sub>    | d <sub>25</sub>    |
| c  | 14    | c <sub>9</sub>     | c <sub>10</sub>    | c <sub>11</sub>    | c <sub>12</sub>    | c <sub>13</sub>    | c <sub>14</sub>    | c <sub>15</sub>    | c <sub>16</sub>    |
| c  | 15    | c <sub>1</sub>     | c <sub>2</sub>     | c <sub>3</sub>     | c <sub>4</sub>     | c <sub>5</sub>     | c <sub>6</sub>     | c <sub>7</sub>     | c <sub>8</sub>     |
| flag   | -     | 0                  | 1                  | 1                  | 1                  | 1                  | 1                  | 1                  | 0                  |

Table 7.76: FIS\_REQUEST\_d (FQd): Request message with a broadcast unicast reservation

| Description  | Octet | Bit number         |                    |                    |                    |                    |                    |                    |                    |
|--|-------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
|  |       | 8                  | 7                  | 6                  | 5                  | 4                  | 3                  | 2                  | 1                  |
| flag   | -     | 0                  | 1                  | 1                  | 1                  | 1                  | 1                  | 1                  | 0                  |
| s, ver, rid, a/d   | 1     | s <sub>27</sub>    | s <sub>26</sub>    | s <sub>25</sub>    | 0                  | 0                  | 0                  | 1                  | 1                  |
| s  | 2     | s <sub>24</sub>    | s <sub>23</sub>    | s <sub>22</sub>    | s <sub>21</sub>    | s <sub>20</sub>    | s <sub>19</sub>    | s <sub>18</sub>    | s <sub>17</sub>    |
| s  | 3     | s <sub>16</sub>    | s <sub>15</sub>    | s <sub>14</sub>    | s <sub>13</sub>    | s <sub>12</sub>    | s <sub>11</sub>    | s <sub>10</sub>    | s <sub>9</sub>     |
| s  | 4     | s <sub>8</sub>     | s <sub>7</sub>     | s <sub>6</sub>     | s <sub>5</sub>     | s <sub>4</sub>     | s <sub>3</sub>     | s <sub>2</sub>     | s <sub>1</sub>     |
| mi = general request burst<br>r-mi = FIS-B service indicator | 5     | 0                  | 1                  | 1                  | 1                  | 1                  | 0                  | 0                  | 1                  |
| FIS-B message ID (fmi)<br>message requested (mrq)            | 6     | mrq <sub>1</sub>   | 0                  | 1                  | 0                  | 1                  | 0                  | 0                  | 0                  |
| local ID (locl)  | 7     | locl <sub>5</sub>  | locl <sub>4</sub>  | locl <sub>3</sub>  | locl <sub>2</sub>  | locl <sub>1</sub>  | mrq <sub>4</sub>   | mrq <sub>3</sub>   | mrq <sub>2</sub>   |
|  | 8     | locl <sub>13</sub> | locl <sub>12</sub> | locl <sub>11</sub> | locl <sub>10</sub> | locl <sub>9</sub>  | locl <sub>8</sub>  | locl <sub>7</sub>  | locl <sub>6</sub>  |
| res  | 9     | res                | locl <sub>20</sub> | locl <sub>19</sub> | locl <sub>18</sub> | locl <sub>17</sub> | locl <sub>16</sub> | locl <sub>15</sub> | locl <sub>14</sub> |
| ro, sdf, d   | 10    | ro <sub>12</sub>   | ro <sub>11</sub>   | ro <sub>10</sub>   | ro <sub>9</sub>    | sdf                | d <sub>27</sub>    | d <sub>26</sub>    | d <sub>25</sub>    |
| ro   | 11    | ro <sub>8</sub>    | ro <sub>7</sub>    | ro <sub>6</sub>    | ro <sub>5</sub>    | ro <sub>4</sub>    | ro <sub>3</sub>    | ro <sub>2</sub>    | ro <sub>1</sub>    |
| lg   | 12    | lg <sub>8</sub>    | lg <sub>7</sub>    | lg <sub>6</sub>    | lg <sub>5</sub>    | lg <sub>4</sub>    | lg <sub>3</sub>    | lg <sub>2</sub>    | lg <sub>1</sub>    |
| pr   | 13    | 0                  | 0                  | 1                  | 0                  | pr <sub>4</sub>    | pr <sub>3</sub>    | pr <sub>2</sub>    | pr <sub>1</sub>    |
| c  | 14    | c <sub>9</sub>     | c <sub>10</sub>    | c <sub>11</sub>    | c <sub>12</sub>    | c <sub>13</sub>    | c <sub>14</sub>    | c <sub>15</sub>    | c <sub>16</sub>    |
| c  | 15    | c <sub>1</sub>     | c <sub>2</sub>     | c <sub>3</sub>     | c <sub>4</sub>     | c <sub>5</sub>     | c <sub>6</sub>     | c <sub>7</sub>     | c <sub>8</sub>     |
| flag   | -     | 0                  | 1                  | 1                  | 1                  | 1                  | 1                  | 1                  | 0                  |

## 7.4.3.1.5.4

## Bursts defined for GNS-B tests

Table 7.77: GNS\_TYPE1\_a (G1a): GNS-B Type 1 message with response reservation

| Description  | Octet       | Bit number        |                   |                   |                   |                   |                   |                   |                   |
|--|-------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
|  |             | 8                 | 7                 | 6                 | 5                 | 4                 | 3                 | 2                 | 1                 |
| flag   | -           | 0                 | 1                 | 1                 | 1                 | 1                 | 1                 | 1                 | 0                 |
| s, ver, rid, a/d   | 1           | s <sub>27</sub>   | s <sub>26</sub>   | s <sub>25</sub>   | 0                 | 0                 | 0                 | 0                 | 1                 |
| s  | 2           | s <sub>24</sub>   | s <sub>23</sub>   | s <sub>22</sub>   | s <sub>21</sub>   | s <sub>20</sub>   | s <sub>19</sub>   | s <sub>18</sub>   | s <sub>17</sub>   |
| s  | 3           | s <sub>16</sub>   | s <sub>15</sub>   | s <sub>14</sub>   | s <sub>13</sub>   | s <sub>12</sub>   | s <sub>11</sub>   | s <sub>10</sub>   | s <sub>9</sub>    |
| s  | 4           | s <sub>8</sub>    | s <sub>7</sub>    | s <sub>6</sub>    | s <sub>5</sub>    | s <sub>4</sub>    | s <sub>3</sub>    | s <sub>2</sub>    | s <sub>1</sub>    |
| udid, uccd, mi   | 5           | 0                 | 0                 | 0                 | 1                 | 1                 | 1                 | 1                 | 1                 |
| message block identifier (mbi)                                   | 6           | mbi <sub>8</sub>  | mbi <sub>7</sub>  | mbi <sub>6</sub>  | mbi <sub>5</sub>  | mbi <sub>4</sub>  | mbi <sub>3</sub>  | mbi <sub>2</sub>  | mbi <sub>1</sub>  |
| GNS-B ID (gid)   | 7           | gid <sub>8</sub>  | gid <sub>7</sub>  | gid <sub>6</sub>  | gid <sub>5</sub>  | gid <sub>4</sub>  | gid <sub>3</sub>  | gid <sub>2</sub>  | gid <sub>1</sub>  |
|  | 8           | gid <sub>16</sub> | gid <sub>15</sub> | gid <sub>14</sub> | gid <sub>13</sub> | gid <sub>12</sub> | gid <sub>11</sub> | gid <sub>10</sub> | gid <sub>9</sub>  |
|  | 9           | gid <sub>24</sub> | gid <sub>23</sub> | gid <sub>22</sub> | gid <sub>21</sub> | gid <sub>20</sub> | gid <sub>19</sub> | gid <sub>18</sub> | gid <sub>17</sub> |
| message identifier (gmi)   | 10          | 0                 | 0                 | 0                 | 0                 | 0                 | 0                 | 0                 | 1                 |
| message length (len)   | 11          | len <sub>8</sub>  | len <sub>7</sub>  | len <sub>6</sub>  | len <sub>5</sub>  | len <sub>4</sub>  | len <sub>3</sub>  | len <sub>2</sub>  | len <sub>1</sub>  |
| modified Z-count (zc)  | 12          | zc <sub>8</sub>   | zc <sub>7</sub>   | zc <sub>6</sub>   | zc <sub>5</sub>   | zc <sub>4</sub>   | zc <sub>3</sub>   | zc <sub>2</sub>   | zc <sub>1</sub>   |
| additional message flag (amf)                                    | 13          | amf <sub>2</sub>  | amf <sub>1</sub>  | zc <sub>14</sub>  | zc <sub>13</sub>  | zc <sub>12</sub>  | zc <sub>11</sub>  | zc <sub>10</sub>  | zc <sub>9</sub>   |
| number of measurements (n)<br>measurement type (t)               | 14          | t <sub>3</sub>    | t <sub>2</sub>    | t <sub>1</sub>    | n <sub>5</sub>    | n <sub>4</sub>    | n <sub>3</sub>    | n <sub>2</sub>    | n <sub>1</sub>    |
| ephemeris decorrelation parameter<br>(edp)                       | 15          | edp <sub>8</sub>  | edp <sub>7</sub>  | edp <sub>6</sub>  | edp <sub>5</sub>  | edp <sub>4</sub>  | edp <sub>3</sub>  | edp <sub>2</sub>  | edp <sub>1</sub>  |
| ephemeris CRC(ec)  | 16          | ec <sub>8</sub>   | ec <sub>7</sub>   | ec <sub>6</sub>   | ec <sub>5</sub>   | ec <sub>4</sub>   | ec <sub>3</sub>   | ec <sub>2</sub>   | ec <sub>1</sub>   |
|  | 17          | ec <sub>16</sub>  | ec <sub>15</sub>  | ec <sub>14</sub>  | ec <sub>13</sub>  | ec <sub>12</sub>  | ec <sub>11</sub>  | ec <sub>10</sub>  | ec <sub>9</sub>   |
| source availability duration (ad)                                | 18          | ad <sub>8</sub>   | ad <sub>7</sub>   | ad <sub>6</sub>   | ad <sub>5</sub>   | ad <sub>4</sub>   | ad <sub>3</sub>   | ad <sub>2</sub>   | ad <sub>1</sub>   |
| for N measurement blocks (i=1 to i=N):<br>ranging source ID (id) | 19+(i-1)x11 | id <sub>8</sub>   | id <sub>7</sub>   | id <sub>6</sub>   | id <sub>5</sub>   | id <sub>4</sub>   | id <sub>3</sub>   | id <sub>2</sub>   | id <sub>1</sub>   |
| issue of data (iod)  | 20+(i-1)x11 | iod <sub>8</sub>  | iod <sub>7</sub>  | iod <sub>6</sub>  | iod <sub>5</sub>  | iod <sub>4</sub>  | iod <sub>3</sub>  | iod <sub>2</sub>  | iod <sub>1</sub>  |
| pseudorange correction (prc)                                     | 21+(i-1)x11 | prc <sub>8</sub>  | prc <sub>7</sub>  | prc <sub>6</sub>  | prc <sub>5</sub>  | prc <sub>4</sub>  | prc <sub>3</sub>  | prc <sub>2</sub>  | prc <sub>1</sub>  |

| Description                 | Octet       | Bit number        |                   |                   |                   |                   |                   |                   |                  |
|-----------------------------|-------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|------------------|
|                             |             | 8                 | 7                 | 6                 | 5                 | 4                 | 3                 | 2                 | 1                |
|                             | 22+(i-1)x11 | prc <sub>16</sub> | prc <sub>15</sub> | prc <sub>14</sub> | prc <sub>13</sub> | prc <sub>12</sub> | prc <sub>11</sub> | prc <sub>10</sub> | prc <sub>9</sub> |
| range rate correction (rrc) | 23+(i-1)x11 | rrc <sub>8</sub>  | rrc <sub>7</sub>  | rrc <sub>6</sub>  | rrc <sub>5</sub>  | rrc <sub>4</sub>  | rrc <sub>3</sub>  | rrc <sub>2</sub>  | rrc <sub>1</sub> |
|                             | 24+(i-1)x11 | rrc <sub>16</sub> | rrc <sub>15</sub> | rrc <sub>14</sub> | rrc <sub>13</sub> | rrc <sub>12</sub> | rrc <sub>11</sub> | rrc <sub>10</sub> | rrc <sub>9</sub> |
| $\sigma_{pr\_gnd}$ (sd)     | 25+(i-1)x11 | sd <sub>8</sub>   | sd <sub>7</sub>   | sd <sub>6</sub>   | sd <sub>5</sub>   | sd <sub>4</sub>   | sd <sub>3</sub>   | sd <sub>2</sub>   | sd <sub>1</sub>  |
| integrity parameter B1 (b1) | 26+(i-1)x11 | b1 <sub>8</sub>   | b1 <sub>7</sub>   | b1 <sub>6</sub>   | b1 <sub>5</sub>   | b1 <sub>4</sub>   | b1 <sub>3</sub>   | b1 <sub>2</sub>   | b1 <sub>1</sub>  |
| integrity parameter B2 (b2) | 27+(i-1)x11 | b2 <sub>8</sub>   | b2 <sub>7</sub>   | b2 <sub>6</sub>   | b2 <sub>5</sub>   | b2 <sub>4</sub>   | b2 <sub>3</sub>   | b2 <sub>2</sub>   | b2 <sub>1</sub>  |
| integrity parameter B3 (b3) | 28+(i-1)x11 | b3 <sub>8</sub>   | b3 <sub>7</sub>   | b3 <sub>6</sub>   | b3 <sub>5</sub>   | b3 <sub>4</sub>   | b3 <sub>3</sub>   | b3 <sub>2</sub>   | b3 <sub>1</sub>  |
| integrity parameter B4 (b4) | 29+(i-1)x11 | b4 <sub>8</sub>   | b4 <sub>7</sub>   | b4 <sub>6</sub>   | b4 <sub>5</sub>   | b4 <sub>4</sub>   | b4 <sub>3</sub>   | b4 <sub>2</sub>   | b4 <sub>1</sub>  |
| GNS-B message CRC (gc)      | 30+(N-1)x11 | gc <sub>8</sub>   | gc <sub>7</sub>   | gc <sub>6</sub>   | gc <sub>5</sub>   | gc <sub>4</sub>   | gc <sub>3</sub>   | gc <sub>2</sub>   | gc <sub>1</sub>  |
|                             | 31+(N-1)x11 | gc <sub>16</sub>  | gc <sub>15</sub>  | gc <sub>14</sub>  | gc <sub>13</sub>  | gc <sub>12</sub>  | gc <sub>11</sub>  | gc <sub>10</sub>  | gc <sub>9</sub>  |
|                             | 32+(N-1)x11 | gc <sub>24</sub>  | gc <sub>23</sub>  | gc <sub>22</sub>  | gc <sub>21</sub>  | gc <sub>20</sub>  | gc <sub>19</sub>  | gc <sub>18</sub>  | gc <sub>17</sub> |
|                             | 33+(N-1)x11 | gc <sub>32</sub>  | gc <sub>31</sub>  | gc <sub>30</sub>  | gc <sub>29</sub>  | gc <sub>28</sub>  | gc <sub>27</sub>  | gc <sub>26</sub>  | gc <sub>25</sub> |
| response reservation field  | 34+(N-1)x11 | 0                 | 0                 | 0                 | 0                 | 0                 | 1                 | 1                 | 1                |
| c                           | 35+(N-1)x11 | c <sub>9</sub>    | c <sub>10</sub>   | c <sub>11</sub>   | c <sub>12</sub>   | c <sub>13</sub>   | c <sub>14</sub>   | c <sub>15</sub>   | c <sub>16</sub>  |
| c                           | 36+(N-1)x11 | c <sub>1</sub>    | c <sub>2</sub>    | c <sub>3</sub>    | c <sub>4</sub>    | c <sub>5</sub>    | c <sub>6</sub>    | c <sub>7</sub>    | c <sub>8</sub>   |
| flag                        | -           | 0                 | 1                 | 1                 | 1                 | 1                 | 1                 | 1                 | 0                |

Table 7.78: GNS\_TYPE2\_a (G2a): GNS-B Type 2 message with response reservation

| Description   | Octet | Bit number        |                   |                   |                   |                   |                   |                   |                   |
|---|-------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
|   |       | 8                 | 7                 | 6                 | 5                 | 4                 | 3                 | 2                 | 1                 |
| flag  | -     | 0                 | 1                 | 1                 | 1                 | 1                 | 1                 | 1                 | 0                 |
| s, ver, rid, a/d  | 1     | s <sub>27</sub>   | s <sub>26</sub>   | s <sub>25</sub>   | 0                 | 0                 | 0                 | 0                 | 1                 |
| s   | 2     | s <sub>24</sub>   | s <sub>23</sub>   | s <sub>22</sub>   | s <sub>21</sub>   | s <sub>20</sub>   | s <sub>19</sub>   | s <sub>18</sub>   | s <sub>17</sub>   |
| s   | 3     | s <sub>16</sub>   | s <sub>15</sub>   | s <sub>14</sub>   | s <sub>13</sub>   | s <sub>12</sub>   | s <sub>11</sub>   | s <sub>10</sub>   | s <sub>9</sub>    |
| s   | 4     | s <sub>8</sub>    | s <sub>7</sub>    | s <sub>6</sub>    | s <sub>5</sub>    | s <sub>4</sub>    | s <sub>3</sub>    | s <sub>2</sub>    | s <sub>1</sub>    |
| udid, ucd, mi   | 5     | 0                 | 0                 | 0                 | 1                 | 1                 | 1                 | 1                 | 1                 |
| message block identifier (mbi)  | 6     | mbi <sub>8</sub>  | mbi <sub>7</sub>  | mbi <sub>6</sub>  | mbi <sub>5</sub>  | mbi <sub>4</sub>  | mbi <sub>3</sub>  | mbi <sub>2</sub>  | mbi <sub>1</sub>  |
| GNS-B ID (gid)  | 7     | gid <sub>8</sub>  | gid <sub>7</sub>  | gid <sub>6</sub>  | gid <sub>5</sub>  | gid <sub>4</sub>  | gid <sub>3</sub>  | gid <sub>2</sub>  | gid <sub>1</sub>  |
|   | 8     | gid <sub>16</sub> | gid <sub>15</sub> | gid <sub>14</sub> | gid <sub>13</sub> | gid <sub>12</sub> | gid <sub>11</sub> | gid <sub>10</sub> | gid <sub>9</sub>  |
|   | 9     | gid <sub>24</sub> | gid <sub>23</sub> | gid <sub>22</sub> | gid <sub>21</sub> | gid <sub>20</sub> | gid <sub>19</sub> | gid <sub>18</sub> | gid <sub>17</sub> |
| message identifier (gmi)  | 10    | 0                 | 0                 | 0                 | 0                 | 0                 | 0                 | 1                 | 0                 |
| message length (len)  | 11    | len <sub>8</sub>  | len <sub>7</sub>  | len <sub>6</sub>  | len <sub>5</sub>  | len <sub>4</sub>  | len <sub>3</sub>  | len <sub>2</sub>  | len <sub>1</sub>  |
| GNS-B reference receivers (r)<br>GNS-B accuracy designator letter (ac)<br>GNS-B continuity/integrity designator (cid) | 12    | cid <sub>3</sub>  | cid <sub>2</sub>  | cid <sub>1</sub>  | res               | ac <sub>2</sub>   | ac <sub>1</sub>   | r <sub>2</sub>    | r <sub>1</sub>    |
| local magnetic variation (v)  | 13    | v <sub>8</sub>    | v <sub>7</sub>    | v <sub>6</sub>    | v <sub>5</sub>    | v <sub>4</sub>    | v <sub>3</sub>    | v <sub>2</sub>    | v <sub>1</sub>    |
| res   | 14    | res               | res               | res               | res               | res               | v <sub>11</sub>   | v <sub>10</sub>   | v <sub>9</sub>    |
| $\sigma$ vert iono grad (vi)  | 15    | vi <sub>8</sub>   | vi <sub>7</sub>   | vi <sub>6</sub>   | vi <sub>5</sub>   | vi <sub>4</sub>   | vi <sub>3</sub>   | vi <sub>2</sub>   | vi <sub>1</sub>   |
| refractivity index (i)  | 16    | i <sub>8</sub>    | i <sub>7</sub>    | i <sub>6</sub>    | i <sub>5</sub>    | i <sub>4</sub>    | i <sub>3</sub>    | i <sub>2</sub>    | i <sub>1</sub>    |
| scale height (h)  | 17    | h <sub>8</sub>    | h <sub>7</sub>    | h <sub>6</sub>    | h <sub>5</sub>    | h <sub>4</sub>    | h <sub>3</sub>    | h <sub>2</sub>    | h <sub>1</sub>    |
| refractivity uncertainty (u)  | 18    | u <sub>8</sub>    | u <sub>7</sub>    | u <sub>6</sub>    | u <sub>5</sub>    | u <sub>4</sub>    | u <sub>3</sub>    | u <sub>2</sub>    | u <sub>1</sub>    |
| latitude (lat)  | 19    | lat <sub>8</sub>  | lat <sub>7</sub>  | lat <sub>6</sub>  | lat <sub>5</sub>  | lat <sub>4</sub>  | lat <sub>3</sub>  | lat <sub>2</sub>  | lat <sub>1</sub>  |
|   | 20    | lat <sub>16</sub> | lat <sub>15</sub> | lat <sub>14</sub> | lat <sub>13</sub> | lat <sub>12</sub> | lat <sub>11</sub> | lat <sub>10</sub> | lat <sub>9</sub>  |
|   | 21    | lat <sub>24</sub> | lat <sub>23</sub> | lat <sub>22</sub> | lat <sub>21</sub> | lat <sub>20</sub> | lat <sub>19</sub> | lat <sub>18</sub> | lat <sub>17</sub> |
|   | 22    | lat <sub>32</sub> | lat <sub>31</sub> | lat <sub>30</sub> | lat <sub>29</sub> | lat <sub>28</sub> | lat <sub>27</sub> | lat <sub>26</sub> | lat <sub>25</sub> |

| Description                | Octet | Bit number        |                   |                   |                   |                   |                   |                   |                   |
|----------------------------|-------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
|                            |       | 8                 | 7                 | 6                 | 5                 | 4                 | 3                 | 2                 | 1                 |
| longitude (lon)            | 23    | lon <sub>8</sub>  | lon <sub>7</sub>  | lon <sub>6</sub>  | lon <sub>5</sub>  | lon <sub>4</sub>  | lon <sub>3</sub>  | lon <sub>2</sub>  | lon <sub>1</sub>  |
|                            | 24    | lon <sub>16</sub> | lon <sub>15</sub> | lon <sub>14</sub> | lon <sub>13</sub> | lon <sub>12</sub> | lon <sub>11</sub> | lon <sub>10</sub> | lon <sub>9</sub>  |
|                            | 25    | lon <sub>24</sub> | lon <sub>23</sub> | lon <sub>22</sub> | lon <sub>21</sub> | lon <sub>20</sub> | lon <sub>19</sub> | lon <sub>18</sub> | lon <sub>17</sub> |
|                            | 26    | lon <sub>32</sub> | lon <sub>31</sub> | lon <sub>30</sub> | lon <sub>29</sub> | lon <sub>28</sub> | lon <sub>27</sub> | lon <sub>26</sub> | lon <sub>25</sub> |
| ellipsoid height (h)       | 27    | h <sub>8</sub>    | h <sub>7</sub>    | h <sub>6</sub>    | h <sub>5</sub>    | h <sub>4</sub>    | h <sub>3</sub>    | h <sub>2</sub>    | h <sub>1</sub>    |
|                            | 28    | h <sub>16</sub>   | h <sub>15</sub>   | h <sub>14</sub>   | h <sub>13</sub>   | h <sub>12</sub>   | h <sub>11</sub>   | h <sub>10</sub>   | h <sub>9</sub>    |
|                            | 29    | h <sub>24</sub>   | h <sub>23</sub>   | h <sub>22</sub>   | h <sub>21</sub>   | h <sub>20</sub>   | h <sub>19</sub>   | h <sub>18</sub>   | h <sub>17</sub>   |
| GNS-B Message CRC (gc)     | 30    | gc <sub>8</sub>   | gc <sub>7</sub>   | gc <sub>6</sub>   | gc <sub>5</sub>   | gc <sub>4</sub>   | gc <sub>3</sub>   | gc <sub>2</sub>   | gc <sub>1</sub>   |
|                            | 31    | gc <sub>16</sub>  | gc <sub>15</sub>  | gc <sub>14</sub>  | gc <sub>13</sub>  | gc <sub>12</sub>  | gc <sub>11</sub>  | gc <sub>10</sub>  | gc <sub>9</sub>   |
|                            | 32    | gc <sub>24</sub>  | gc <sub>23</sub>  | gc <sub>22</sub>  | gc <sub>21</sub>  | gc <sub>20</sub>  | gc <sub>19</sub>  | gc <sub>18</sub>  | gc <sub>17</sub>  |
|                            | 33    | gc <sub>32</sub>  | gc <sub>31</sub>  | gc <sub>30</sub>  | gc <sub>29</sub>  | gc <sub>28</sub>  | gc <sub>27</sub>  | gc <sub>26</sub>  | gc <sub>25</sub>  |
| response reservation field | 34    | 0                 | 0                 | 0                 | 0                 | 0                 | 1                 | 1                 | 1                 |
| c                          | 35    | c <sub>9</sub>    | c <sub>10</sub>   | c <sub>11</sub>   | c <sub>12</sub>   | c <sub>13</sub>   | c <sub>14</sub>   | c <sub>15</sub>   | c <sub>16</sub>   |
| c                          | 36    | c <sub>1</sub>    | c <sub>2</sub>    | c <sub>3</sub>    | c <sub>4</sub>    | c <sub>5</sub>    | c <sub>6</sub>    | c <sub>7</sub>    | c <sub>8</sub>    |
| flag                       | -     | 0                 | 1                 | 1                 | 1                 | 1                 | 1                 | 1                 | 0                 |

Table 7.79: GNS\_TYPE4\_a (G4a): GNS-B Type 4 message with response reservation

| Description   | Octet       | Bit number        |                   |                   |                   |                   |                   |                   |                   |
|---|-------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
|   |             | 8                 | 7                 | 6                 | 5                 | 4                 | 3                 | 2                 | 1                 |
| flag  | -           | 0                 | 1                 | 1                 | 1                 | 1                 | 1                 | 1                 | 0                 |
| s, ver, rid, a/d  | 1           | s <sub>27</sub>   | s <sub>26</sub>   | s <sub>25</sub>   | 0                 | 0                 | 0                 | 0                 | 1                 |
| s   | 2           | s <sub>24</sub>   | s <sub>23</sub>   | s <sub>22</sub>   | s <sub>21</sub>   | s <sub>20</sub>   | s <sub>19</sub>   | s <sub>18</sub>   | s <sub>17</sub>   |
| s   | 3           | s <sub>16</sub>   | s <sub>15</sub>   | s <sub>14</sub>   | s <sub>13</sub>   | s <sub>12</sub>   | s <sub>11</sub>   | s <sub>10</sub>   | s <sub>9</sub>    |
| s   | 4           | s <sub>8</sub>    | s <sub>7</sub>    | s <sub>6</sub>    | s <sub>5</sub>    | s <sub>4</sub>    | s <sub>3</sub>    | s <sub>2</sub>    | s <sub>1</sub>    |
| udid, ucd, mi   | 5           | 0                 | 0                 | 0                 | 1                 | 1                 | 1                 | 1                 | 1                 |
| message block identifier (mbi)  | 6           | mbi <sub>8</sub>  | mbi <sub>7</sub>  | mbi <sub>6</sub>  | mbi <sub>5</sub>  | mbi <sub>4</sub>  | mbi <sub>3</sub>  | mbi <sub>2</sub>  | mbi <sub>1</sub>  |
| GNS-B ID (gid)  | 7           | gid <sub>8</sub>  | gid <sub>7</sub>  | gid <sub>6</sub>  | gid <sub>5</sub>  | gid <sub>4</sub>  | gid <sub>3</sub>  | gid <sub>2</sub>  | gid <sub>1</sub>  |
|   | 8           | gid <sub>16</sub> | gid <sub>15</sub> | gid <sub>14</sub> | gid <sub>13</sub> | gid <sub>12</sub> | gid <sub>11</sub> | gid <sub>10</sub> | gid <sub>9</sub>  |
|   | 9           | gid <sub>24</sub> | gid <sub>23</sub> | gid <sub>22</sub> | gid <sub>21</sub> | gid <sub>20</sub> | gid <sub>19</sub> | gid <sub>18</sub> | gid <sub>17</sub> |
| message identifier (gmi)  | 10          | 0                 | 0                 | 0                 | 0                 | 0                 | 1                 | 0                 | 0                 |
| message length (len)  | 11          | len <sub>8</sub>  | len <sub>7</sub>  | len <sub>6</sub>  | len <sub>5</sub>  | len <sub>4</sub>  | len <sub>3</sub>  | len <sub>2</sub>  | len <sub>1</sub>  |
| data set length (l)   | 12          | l <sub>8</sub>    | l <sub>7</sub>    | l <sub>6</sub>    | l <sub>5</sub>    | l <sub>4</sub>    | l <sub>3</sub>    | l <sub>2</sub>    | l <sub>1</sub>    |
| for N FAS data blocks (i=1 to i=N):<br>operation type (ot)<br>SBAS provider ID (sp) | 13+(i-1)x40 | sp <sub>4</sub>   | sp <sub>3</sub>   | sp <sub>2</sub>   | sp <sub>1</sub>   | ot <sub>4</sub>   | ot <sub>3</sub>   | ot <sub>2</sub>   | ot <sub>1</sub>   |
| airport ID (ai)   | 14+(i-1)x40 | ai <sub>8</sub>   | ai <sub>7</sub>   | ai <sub>6</sub>   | ai <sub>5</sub>   | ai <sub>4</sub>   | ai <sub>3</sub>   | ai <sub>2</sub>   | ai <sub>1</sub>   |
|   | 15+(i-1)x40 | ai <sub>16</sub>  | ai <sub>15</sub>  | ai <sub>14</sub>  | ai <sub>13</sub>  | ai <sub>12</sub>  | ai <sub>11</sub>  | ai <sub>10</sub>  | ai <sub>9</sub>   |
|   | 16+(i-1)x40 | ai <sub>24</sub>  | ai <sub>23</sub>  | ai <sub>22</sub>  | ai <sub>21</sub>  | ai <sub>20</sub>  | ai <sub>19</sub>  | ai <sub>18</sub>  | ai <sub>17</sub>  |
|   | 17+(i-1)x40 | ai <sub>32</sub>  | ai <sub>31</sub>  | ai <sub>30</sub>  | ai <sub>29</sub>  | ai <sub>28</sub>  | ai <sub>27</sub>  | ai <sub>26</sub>  | ai <sub>25</sub>  |
| runway number (rn)<br>runway letter (rl)  | 18+(i-1)x40 | rl <sub>2</sub>   | rl <sub>1</sub>   | rn <sub>6</sub>   | rn <sub>5</sub>   | rn <sub>4</sub>   | rn <sub>3</sub>   | rn <sub>2</sub>   | rn <sub>1</sub>   |
| approach performance designator (apd)<br>route indicator (ri)                       | 19+(i-1)x40 | ri <sub>5</sub>   | ri <sub>4</sub>   | ri <sub>3</sub>   | ri <sub>2</sub>   | ri <sub>1</sub>   | apd <sub>3</sub>  | apd <sub>2</sub>  | apd <sub>1</sub>  |
| reference path data selector (rps)  | 20+(i-1)x40 | rps <sub>8</sub>  | rps <sub>7</sub>  | rps <sub>6</sub>  | rps <sub>5</sub>  | rps <sub>4</sub>  | rps <sub>3</sub>  | rps <sub>2</sub>  | rps <sub>1</sub>  |
| reference path ID (rpi)   | 21+(i-1)x40 | rpi <sub>8</sub>  | rpi <sub>7</sub>  | rpi <sub>6</sub>  | rpi <sub>5</sub>  | rpi <sub>4</sub>  | rpi <sub>3</sub>  | rpi <sub>2</sub>  | rpi <sub>1</sub>  |
|   | 22+(i-1)x40 | rpi <sub>16</sub> | rpi <sub>15</sub> | rpi <sub>14</sub> | rpi <sub>13</sub> | rpi <sub>12</sub> | rpi <sub>11</sub> | rpi <sub>10</sub> | rpi <sub>9</sub>  |
|   | 23+(i-1)x40 | rpi <sub>24</sub> | rpi <sub>23</sub> | rpi <sub>22</sub> | rpi <sub>21</sub> | rpi <sub>20</sub> | rpi <sub>19</sub> | rpi <sub>18</sub> | rpi <sub>17</sub> |
|   | 24+(i-1)x40 | rpi <sub>32</sub> | rpi <sub>31</sub> | rpi <sub>30</sub> | rpi <sub>29</sub> | rpi <sub>28</sub> | rpi <sub>27</sub> | rpi <sub>26</sub> | rpi <sub>25</sub> |

| Description                                    | Octet       | Bit number         |                    |                    |                    |                    |                    |                    |                    |
|--|-------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
|  |             | 8                  | 7                  | 6                  | 5                  | 4                  | 3                  | 2                  | 1                  |
| LTP/FTP latitude (ltla)                        | 25+(i-1)x40 | ltla <sub>8</sub>  | ltla <sub>7</sub>  | ltla <sub>6</sub>  | ltla <sub>5</sub>  | ltla <sub>4</sub>  | ltla <sub>3</sub>  | ltla <sub>2</sub>  | ltla <sub>1</sub>  |
|  | 26+(i-1)x40 | ltla <sub>16</sub> | ltla <sub>15</sub> | ltla <sub>14</sub> | ltla <sub>13</sub> | ltla <sub>12</sub> | ltla <sub>11</sub> | ltla <sub>10</sub> | ltla <sub>9</sub>  |
|  | 27+(i-1)x40 | ltla <sub>24</sub> | ltla <sub>23</sub> | ltla <sub>22</sub> | ltla <sub>21</sub> | ltla <sub>20</sub> | ltla <sub>19</sub> | ltla <sub>18</sub> | ltla <sub>17</sub> |
|  | 28+(i-1)x40 | ltla <sub>32</sub> | ltla <sub>31</sub> | ltla <sub>30</sub> | ltla <sub>29</sub> | ltla <sub>28</sub> | ltla <sub>27</sub> | ltla <sub>26</sub> | ltla <sub>25</sub> |
| LTP/FTP longitude (ltlo)                       | 29+(i-1)x40 | ltlo <sub>8</sub>  | ltlo <sub>7</sub>  | ltlo <sub>6</sub>  | ltlo <sub>5</sub>  | ltlo <sub>4</sub>  | ltlo <sub>3</sub>  | ltlo <sub>2</sub>  | ltlo <sub>1</sub>  |
|  | 30+(i-1)x40 | ltlo <sub>16</sub> | ltlo <sub>15</sub> | ltlo <sub>14</sub> | ltlo <sub>13</sub> | ltlo <sub>12</sub> | ltlo <sub>11</sub> | ltlo <sub>10</sub> | ltlo <sub>9</sub>  |
|  | 31+(i-1)x40 | ltlo <sub>24</sub> | ltlo <sub>23</sub> | ltlo <sub>22</sub> | ltlo <sub>21</sub> | ltlo <sub>20</sub> | ltlo <sub>19</sub> | ltlo <sub>18</sub> | ltlo <sub>17</sub> |
|  | 32+(i-1)x40 | ltlo <sub>32</sub> | ltlo <sub>31</sub> | ltlo <sub>30</sub> | ltlo <sub>29</sub> | ltlo <sub>28</sub> | ltlo <sub>27</sub> | ltlo <sub>26</sub> | ltlo <sub>25</sub> |
| LTP/FTP height (lth)                           | 33+(i-1)x40 | lth <sub>8</sub>   | lth <sub>7</sub>   | lth <sub>6</sub>   | lth <sub>5</sub>   | lth <sub>4</sub>   | lth <sub>3</sub>   | lth <sub>2</sub>   | lth <sub>1</sub>   |
|  | 34+(i-1)x40 | lth <sub>16</sub>  | lth <sub>15</sub>  | lth <sub>14</sub>  | lth <sub>13</sub>  | lth <sub>12</sub>  | lth <sub>11</sub>  | lth <sub>10</sub>  | lth <sub>9</sub>   |
| DFPAP latitude (fpla)                          | 35+(i-1)x40 | fpla <sub>8</sub>  | fpla <sub>7</sub>  | fpla <sub>6</sub>  | fpla <sub>5</sub>  | fpla <sub>4</sub>  | fpla <sub>3</sub>  | fpla <sub>2</sub>  | fpla <sub>1</sub>  |
|  | 36+(i-1)x40 | fpla <sub>16</sub> | fpla <sub>15</sub> | fpla <sub>14</sub> | fpla <sub>13</sub> | fpla <sub>12</sub> | fpla <sub>11</sub> | fpla <sub>10</sub> | fpla <sub>9</sub>  |
|  | 37+(i-1)x40 | fpla <sub>24</sub> | fpla <sub>23</sub> | fpla <sub>22</sub> | fpla <sub>21</sub> | fpla <sub>20</sub> | fpla <sub>19</sub> | fpla <sub>18</sub> | fpla <sub>17</sub> |
| DFPAP longitude (fplo)                         | 38+(i-1)x40 | fplo <sub>8</sub>  | fplo <sub>7</sub>  | fplo <sub>6</sub>  | fplo <sub>5</sub>  | fplo <sub>4</sub>  | fplo <sub>3</sub>  | fplo <sub>2</sub>  | fplo <sub>1</sub>  |
|  | 39+(i-1)x40 | fplo <sub>16</sub> | fplo <sub>15</sub> | fplo <sub>14</sub> | fplo <sub>13</sub> | fplo <sub>12</sub> | fplo <sub>11</sub> | fplo <sub>10</sub> | fplo <sub>9</sub>  |
|  | 40+(i-1)x40 | fplo <sub>24</sub> | fplo <sub>23</sub> | fplo <sub>22</sub> | fplo <sub>21</sub> | fplo <sub>20</sub> | fplo <sub>19</sub> | fplo <sub>18</sub> | fplo <sub>17</sub> |
| approach threshold crossing height (apth)      | 41+(i-1)x40 | apth <sub>8</sub>  | apth <sub>7</sub>  | apth <sub>6</sub>  | apth <sub>5</sub>  | apth <sub>4</sub>  | apth <sub>3</sub>  | apth <sub>2</sub>  | apth <sub>1</sub>  |
| approach TCH units selector (aptu)             | 42+(i-1)x40 | aptu <sub>1</sub>  | apth <sub>15</sub> | apth <sub>14</sub> | apth <sub>13</sub> | apth <sub>12</sub> | apth <sub>11</sub> | apth <sub>10</sub> | apth <sub>9</sub>  |
| glide path angle (gpa)                         | 43+(i-1)x40 | gpa <sub>8</sub>   | gpa <sub>7</sub>   | gpa <sub>6</sub>   | gpa <sub>5</sub>   | gpa <sub>4</sub>   | gpa <sub>3</sub>   | gpa <sub>2</sub>   | gpa <sub>1</sub>   |
|  | 44+(i-1)x40 | gpa <sub>16</sub>  | gpa <sub>15</sub>  | gpa <sub>14</sub>  | gpa <sub>13</sub>  | gpa <sub>12</sub>  | gpa <sub>11</sub>  | gpa <sub>10</sub>  | gpa <sub>9</sub>   |
| course width (cw)                              | 45+(i-1)x40 | cw <sub>8</sub>    | cw <sub>7</sub>    | cw <sub>6</sub>    | cw <sub>5</sub>    | cw <sub>4</sub>    | cw <sub>3</sub>    | cw <sub>2</sub>    | cw <sub>1</sub>    |
| DLength offset (dlo)                           | 46+(i-1)x40 | dlo <sub>8</sub>   | dlo <sub>7</sub>   | dlo <sub>6</sub>   | dlo <sub>5</sub>   | dlo <sub>4</sub>   | dlo <sub>3</sub>   | dlo <sub>2</sub>   | dlo <sub>1</sub>   |
| FAS CRC (fc)                                   | 47+(i-1)x40 | fc <sub>8</sub>    | fc <sub>7</sub>    | fc <sub>6</sub>    | fc <sub>5</sub>    | fc <sub>4</sub>    | fc <sub>3</sub>    | fc <sub>2</sub>    | fc <sub>1</sub>    |
|  | 48+(i-1)x40 | fc <sub>16</sub>   | fc <sub>15</sub>   | fc <sub>14</sub>   | fc <sub>13</sub>   | fc <sub>12</sub>   | fc <sub>11</sub>   | fc <sub>10</sub>   | fc <sub>9</sub>    |
|  | 49+(i-1)x40 | fc <sub>24</sub>   | fc <sub>23</sub>   | fc <sub>22</sub>   | fc <sub>21</sub>   | fc <sub>20</sub>   | fc <sub>19</sub>   | fc <sub>18</sub>   | fc <sub>17</sub>   |
|  | 50+(i-1)x40 | fc <sub>32</sub>   | fc <sub>31</sub>   | fc <sub>30</sub>   | fc <sub>29</sub>   | fc <sub>28</sub>   | fc <sub>27</sub>   | fc <sub>26</sub>   | fc <sub>25</sub>   |
| FAS vertical alert limit /approach status (va) | 51+(i-1)x40 | va <sub>8</sub>    | va <sub>7</sub>    | va <sub>6</sub>    | va <sub>5</sub>    | va <sub>4</sub>    | va <sub>3</sub>    | va <sub>2</sub>    | va <sub>1</sub>    |
| FAS lateral alert limit/approach status (la)   | 52+(i-1)x40 | la <sub>8</sub>    | la <sub>7</sub>    | la <sub>6</sub>    | la <sub>5</sub>    | la <sub>4</sub>    | la <sub>3</sub>    | la <sub>2</sub>    | la <sub>1</sub>    |
| GNS-B message CRC (gc)                         | 53+(i-1)x40 | gc <sub>8</sub>    | gc <sub>7</sub>    | gc <sub>6</sub>    | gc <sub>5</sub>    | gc <sub>4</sub>    | gc <sub>3</sub>    | gc <sub>2</sub>    | gc <sub>1</sub>    |
|  | 54+(i-1)x40 | gc <sub>16</sub>   | gc <sub>15</sub>   | gc <sub>14</sub>   | gc <sub>13</sub>   | gc <sub>12</sub>   | gc <sub>11</sub>   | gc <sub>10</sub>   | gc <sub>9</sub>    |
|  | 55+(i-1)x40 | gc <sub>24</sub>   | gc <sub>23</sub>   | gc <sub>22</sub>   | gc <sub>21</sub>   | gc <sub>20</sub>   | gc <sub>19</sub>   | gc <sub>18</sub>   | gc <sub>17</sub>   |
|  | 56+(i-1)x40 | gc <sub>32</sub>   | gc <sub>31</sub>   | gc <sub>30</sub>   | gc <sub>29</sub>   | gc <sub>28</sub>   | gc <sub>27</sub>   | gc <sub>26</sub>   | gc <sub>25</sub>   |
| response reservation field                     | 57+(i-1)x40 | 0                  | 0                  | 0                  | 0                  | 0                  | 1                  | 1                  | 1                  |
| c  | 58+(i-1)x40 | c <sub>9</sub>     | c <sub>10</sub>    | c <sub>11</sub>    | c <sub>12</sub>    | c <sub>13</sub>    | c <sub>14</sub>    | c <sub>15</sub>    | c <sub>16</sub>    |
| c  | 59+(i-1)x40 | c <sub>1</sub>     | c <sub>2</sub>     | c <sub>3</sub>     | c <sub>4</sub>     | c <sub>5</sub>     | c <sub>6</sub>     | c <sub>7</sub>     | c <sub>8</sub>     |
| flag   | -           | 0                  | 1                  | 1                  | 1                  | 1                  | 1                  | 1                  | 0                  |

### 7.4.3.2 Test cases

The equipment under test must be brought into the defined idle state before the performance of the individual test cases. Each test case starts in this state and leaves the equipment in that state after completion. The idle state is the state which the equipment enters after successful completion of the power up sequence. To perform several test cases in sequence the power on macro M\_POWER\_UP must only be executed at the beginning.

All protocol test cases shall be performed on a GSC channel (GSC1 or GSC2) unless stated otherwise in the test case itself.

Whenever a burst is specified in a test without values being given for all the parameters in a burst, and where the test does not instantiate the values, then the values of these parameters may be ignored.

If an expected test result mentioned in a test step is not observed during the execution of a test case, then the test case must be terminated and the equipment initialized before a new test case is executed. Further verification in that test case may not provide any valid results.

#### 7.4.3.2.1 Test case macros

Test case macros shall be as defined in EN 301 842-2 [3] clause 7.4.3.2.1.



## 7.4.3.2.2 Test case descriptions

| Test Case Name:  |      | ADSB_request_A   |       |   |     |   |
|------------------|------|--|-------|---|-----|---|
| Purpose:         |      | To demonstrate that a station which desires another station to transmit a single autonomous synchronization burst will transmit an ADS-B request burst with the sleep and auto bits set to zero. |       |   |     |   |
| Context          | Step | Action   | PCO   | Action Qualifier  | Ref | Comment   |
| preamble         | 1    | do   |       | M_POWER_UP.   |     | Prepare the transceiver for testing.  |
| test body        | 2    | send   | RF    | SYNC_BURST_b (s:= add_B).   | Sb  | Send a sync burst from station B.   |
|                  | 3    | send   | Appln | REQUEST TO TRANSMIT ADS-B REQUEST MESSAGE (SINGLE RESPONSE, AUTONOMOUS SELECTION) TO STATION B.   |     | Instruct station A to send an ADS-B request to station B, requesting a single response in the specified slot and autonomous selection of variable field by station B. |
|                  | 4    | await  | RF    | ADSB_REQUEST_a (s = add_A, d = add_B) transmitted by station A.   | ARa | Wait for the ADS-B request to be transmitted by station A.  |
|                  | 5    | verify   | RF    | For ADSB_REQUEST_a (s = add_A; d =add_B): burst is a general request with r-mi <sub>1</sub> := 0; includes unicast reservation field; has burst format as defined in clause 9.2.3.4.3; sleep = 0; auto = 0. |     | Verify that a general request burst has been sent by station A to station B with the format in clause 9.2.3.4.3 and with sleep = 0 and auto = 0.                      |
| postamble        | 6    |  |       |   |     | Bring test equipment into idle state.   |
| <b>Comments:</b> |      |  |       |   |     |   |

| Test Case Name: ADSB_request_B   |      |        |       |  |     |  |
|--|------|--------|-------|--|-----|--|
| Purpose: To demonstrate that a station which desires another station to transmit a single autonomous synchronization burst with a specified variable part, will transmit an ADS-B request burst with sleep=0 and auto=1 and shall include the auto parameters. |      |        |       |  |     |  |
| Context  | Step | Action | PCO   | Action Qualifier   | Ref | Comment  |
| preamble   | 1    | do     |       | M_POWER_UP.  |     | Prepare the transceiver for testing.   |
| test body  | 2    | send   | RF    | SYNC_BURST_b (s:= add_B).  | Sb  | Send a sync burst from station B.  |
|  | 3    | send   | Appln | REQUEST TO TRANSMIT ADS-B REQUEST MESSAGE (SINGLE RESPONSE, BASIC VARIABLE PART, GEOMETRIC ALTITUDE RATE) TO STATION B.  |     | Instruct station A to send an ADS-B request to station B, requesting a single response, a specified variable part in the specified slot, and a specified type of altitude rate.  |
|  | 4    | await  | RF    | ADSB_REQUEST_b (s = add_A; d = add_B) sent by station A.   | ARb | Wait for the ADS-B request to be transmitted by station A.   |
|  | 5    | verify | RF    | For ADSB_REQUEST_b (s = add_A, d =add_B):<br>burst is a general request with r-mi <sub>1</sub> = 0;<br>includes unicast reservation field;<br>has burst format as defined in clause 9.2.3.4.3;<br>sleep = 0;<br>auto = 1;<br>r-id = 0;<br>aux = 1. |     | Verify that a general request burst has been sent by station A to station B with the format in clause 8.2.3.4.3 and with sleep = 0 and auto = 1. Verify that the auto parameters are included with r-id = 0 and aux = 1. |
| postamble  | 6    |        |       |  |     | Bring test equipment into idle state.  |
| <b>Comments:</b>   |      |        |       |  |     |  |

| Test Case Name:  |      | ADSB_request_C   |       |  |     |   |
|------------------|------|--|-------|--|-----|---|
| Purpose:         |      | To demonstrate that a station which desires another station to transmit synchronization bursts autonomously with the use of sleep mode, will transmit an ADS-B request burst with sleep=1 and auto=0 and shall include the sleep parameters. |       |  |     |   |
| Context          | Step | Action   | PCO   | Action Qualifier   | Ref | Comment   |
| preamble         | 1    | do   |       | M_POWER_UP.  |     | Prepare the transceiver for testing.  |
| test body        | 2    | send   | RF    | SYNC_BURST_b (s:= add_B)   | Sb  | Send a sync burst from station B.   |
|                  | 3    | send   | Appln | REQUEST TO TRANSMIT ADS-B REQUEST MESSAGE (SLEEP MODE, AUTONOMOUS SELECTION) (snr:=15; vel:=10; pos:=100) TO STATION B.  |     | Instruct station A to send an ADS-B request to station B, requesting sleep mode and autonomous selection of variable field by station B.  |
|                  | 4    | await  | RF    | ADSB_REQUEST_c (s = add_A; d = add_B) sent by station A.   | ARc | Wait for the ADS-B request to be transmitted by station A.  |
|                  | 5    | verify   | RF    | For ADSB_REQUEST_c (s:= add_A; d:= add_B):<br>burst is a general request with r-mi <sub>1</sub> = 0;<br>includes autotune reservation field;<br>has the burst format defined in clause 9.2.3.4.3;<br>sleep:= 1;<br>auto = 0;<br>snr = 15;<br>vel = 10;<br>pos = 100. |     | Verify that a general request burst has been sent by station A to station B with the format in clause 9.2.3.4.3, with sleep = 1 and auto = 0, the sleep parameters included, and the correct values of snr, vel and pos used. |
| postamble        | 6    |  |       |  |     | Bring test equipment into idle state.   |
| <b>Comments:</b> |      |  |       |  |     |   |

| Test Case Name:  |      | ADSB_request_D  |       |  |     |  |
|------------------|------|---|-------|--|-----|--|
| Purpose:         |      | To demonstrate that a station which desires another station to transmit synchronization bursts with a specified variable part and with the use of sleep mode, will transmit an ADS-B request burst with sleep=1 and auto=1 and shall include the auto and sleep parameters. |       |  |     |  |
| Context          | Step | Action  | PCO   | Action Qualifier   | Ref | Comment  |
| preamble         | 1    | do  |       | M_POWER_UP.  |     | Prepare the transceiver for testing.   |
| test body        | 2    | send  | RF    | SYNC_BURST_b (s:= add_B).  | Sb  | Send a sync burst from station B.  |
|                  | 3    | send  | Appln | REQUEST TO TRANSMIT ADS-B REQUEST MESSAGE (SLEEP MODE, FULL POSITION VARIABLE PART) (snr:=6, vel:= 5, pos:= 150) TO STATION B.   |     | Instruct station A to send an ADS-B request to station B, requesting use of sleep mode and a specified variable part in the specified slots.   |
|                  | 4    | await   | RF    | ADSB_REQUEST_d (s = add_A, d = add_B) sent by station A.   | ARd | Wait for the ADS-B request to be transmitted by station A.   |
|                  | 5    | verify  | RF    | For ADSB_REQUEST_d (s = add_A, d =add_B):<br>burst is a general request with r-mi <sub>1</sub> = 0;<br>includes autotune reservation field;<br>has the burst format defined in clause 9.2.3.4.3;<br>sleep = 1;<br>auto = 1;<br>r-id = 2;<br>snr = 15;<br>vel = 10;<br>pos = 100. | ARd | Verify that a general request burst has been sent by station A to station B with the format in clause 9.2.3.4.3, with sleep = 1 and auto = 1, the sleep and auto parameters included and the correct values of snr, vel and pos. |
| postamble        | 6    |   |       |  |     | Bring test equipment into idle state.  |
| <b>Comments:</b> |      |   |       |  |     |  |

| Test Case Name:  |      | ADSB_reporting   |                             |  |     |  |
|------------------|------|--|-----------------------------|--|-----|--|
| Purpose:         |      | To demonstrate that a station will send at least 12 sync bursts a minute averaged over the two GSCs. |                             |  |     |  |
| Context          | Step | Action   | PCO                         | Action Qualifier   | Ref | Comment  |
| preamble         | 1    | do   |                             | M_POWER_UP.  |     | Prepare the transceiver for testing.   |
| test body        | 2    | rep 60   |                             | n:= 1.   |     | Set n equal to 1.  |
|                  | 3    | await  | RF<br>(GSC1<br>and<br>GSC2) | SYNC_BURST_b (s = add_A).  | Sb  | Monitoring both GSC1 and GSC2, await a sync burst from station A.  |
|                  | 4    | record   | RF<br>(GSC1<br>and<br>GSC2) | time(n):= time at the beginning of slot containing SYNC_BURST_b (s = add_A). | Sb  | Record the time at which each sync burst is transmitted.   |
|                  | 5    | verify   |                             | time(n) - time(n - 1) = 5 ± 2 secs.  |     | Verify that the bursts are transmitted about 5 s apart.  |
|                  | 6    | endrep   |                             | n:= n + 1.   |     | Add 1 to the value of n and repeat test on GSC1/GSC2 60 times.   |
|                  | 7    | verify   |                             | time(60) - time(1) <= 5 mins.  |     | Verify that averaged over the two GSCs the station emits on average at least 12 synch bursts per minute. |
| postamble        | 8    |  |                             |  |     | Bring test equipment into idle state.  |
| <b>Comments:</b> |      |  |                             |  |     |  |

| Test Case Name:  |      | TIS_Flight_ID_A |       |  |     |  |
|--|------|-----------------|-------|--|-----|--|
| Purpose: To demonstrate that the flight ID for a target shall be transmitted every 3 TIS-B update periods or better. |      |                 |       |  |     |  |
| Context  | Step | Action          | PCO   | Action Qualifier   | Ref | Comment  |
| preamble   | 1    | do              |       | M_POWER_UP.  |     | Prepare the transceiver for testing.   |
| test body  | 2    | send            | Appln | SET UPDATE PERIOD:= once every s.  |     | Define the update period.  |
|  | 3    | send            | Appln | REQUEST TO TRANSMIT AIRCRAFT AIRBORNE TARGET MESSAGE (s:= add_A; tivid:= 1; tflg:= 0; rflg:= 0; adsff:= 0; tid:= 1100 10 000 000 111 001 100 101; rlat:= 50N; rlg:= 3E; bar:= 1000; aflg:= 0; gsp:= 400; gtk:= 100; tag:= 3; fidty:= 1; call:= BA1234; cat:= 2). |     | Send an instruction at the App In PCO to the station under test to transmit an aircraft target message (airborne service). Inclusion of "fidty" and "call" information here does not imply these parameters will necessarily be broadcast. |
|  | 4    | rep 15          |       | n:= 1; flightid:= 0.   |     | Start loop. Set initial variables.   |
|  | 5    | await           | RF    | TIS_AC_AIR_a (s:= add_A)   | TAa | Wait for the target message to be broadcast by station A.  |
|  | 7    | record          | RF    | IF call:= BA1234 IS INCLUDED IN TIS_AC_AIR_a (s:= add_A)<br><b>THEN</b><br>flightid:= flightid+ 1.   |     | Record the number of times the flight ID is included.  |
|  | 8    | end rep         |       | n:= n + 1  |     | End loop.  |
|  | 9    | verify          |       | flightid ≥ 5.  |     | Verify that the flight ID is transmitted at least once every 3 update periods.   |
|  | 10   | send            | Appln | REQUEST TO TRANSMIT AIRCRAFT GROUND TARGET MESSAGE (s:= add_A; tivid:= 1; tflg:= 0; rflg:= 0; adsff:= 0; tid:= 1100 10 000 000 111 001 100 101; rlat:= 50N; rlg:= 3E; gsp:= 400; gtk:= 100; tag:= 3; fidty:= 1; call:= BA1234; cat:= 2).                         |     | Send an instruction at the App In PCO to the station under test to transmit an aircraft target message (ground service). Inclusion of "fidty" and "call" information here does not imply these parameters will necessarily be broadcast.   |
|  | 11   | rep 15          |       | n:= 1, flightid:= 0.   |     | Start loop. Set initial variables.   |
|  | 12   | await           | RF    | TIS_AC_GRD_a (s:= add_A).  | TGa | Wait for the target message to be broadcast by station A.  |
|  | 14   | record          | RF    | IF call:= BA1234 IS INCLUDED IN TIS_AC_GRD_a (s:= add_A)<br><b>THEN</b><br>flightid:= flightid+ 1.   |     | Record the number of times the flight ID is included.  |
|  | 15   | end rep         |       | n:= n + 1.   |     | End loop.  |
|  | 16   | verify          |       | flightid ≥ 5.  |     | Verify that the flight ID is transmitted at least once every 3 update periods.   |
| postamble  | 17   |                 |       |  |     | Bring test equipment into idle state.  |
| <b>Comments:</b>   |      |                 |       |  |     |  |

| Test Case Name: |      | TIS_Flight_ID_B  |       |   |     |   |
|-----------------|------|--|-------|---|-----|---|
| Purpose:        |      | To demonstrate that if more than 1 flight ID is sent, then this will be alternated for the target in question. |       |   |     |   |
| Context         | Step | Action   | PCO   | Action Qualifier  | Ref | Comment   |
| preamble        | 1    | do   |       | M_POWER_UP.   |     | Prepare the transceiver for testing.  |
| test body       | 2    | send   | Appln | update period:= 2 s.  |     | define update period.   |
|                 | 3    | send   | Appln | REQUEST TO TRANSMIT AIRCRAFT AIRBORNE TARGET MESSAGE (s:= add_A; tivid:= 1; tflg:= 0; rflg:= 0; adsff:= 0; tid:= 1100 10 000 000 111 001 100 101; rlat:= 50N; rlg:= 3E; bar:= 1000; aflg:= 0; gsp:= 400; gtk:= 100; tag:= 3; fidflg:= 1; fidty:= 1; call:= BA1234; tailno:= 654321; cat:= 2).               |     | Send an instruction at the App In PCO to the station under test to transmit an aircraft target message (airborne service), with two types of flight ID (callsign and tailnumber). |
|                 | 4    | rep 30   |       | n:=1; calltid:= 0; tailid:= 0; callflag:= false; tailflag:= false.  |     | Start loop. Set initial variables.  |
|                 | 5    | await  | RF    | TIS_AC_AIR_a (s:= add_A).   | TAa | Wait for the target message to be broadcast by station A.   |
|                 | 7    | record   |       | <b>IF</b> callflag:= false AND call:= BA1234 IS INCLUDED IN TIS_AC_AIR_a THEN<br>callid:= callid+ 1<br>callflag:= true<br>tailflag:= false<br><b>ELSE IF</b> tailflag:= false AND tailno:= 654321 IS INCLUDED IN TIS_AC_AIR_a<br><b>THEN</b><br>tailid:= tailid + 1<br>tailflag:= true<br>callflag:= false. | TAa | Record the number of times the call sign and the tail number are transmitted alternately.   |
|                 | 8    | end rep  |       | n:= n + 1.  |     | End loop.   |
|                 | 9    | verify   |       | callid ≥ 5 AND tailid ≥ 5.  |     | Verify that the Flight ID is transmitted at least once every 3 update periods, and that the flight ID is alternated.  |
|                 | 10   | send   | Appln | REQUEST TO TRANSMIT AIRCRAFT GROUND TARGET MESSAGE (s:= add_A; tivid:= 1; tflg:= 0; rflg:= 0; adsff:= 0; tid:= 1100 10 000 000 111 001 100 101; rlat:= 50N; rlg:= 3E; gsp:= 400; gtk:= 100; tag:= 3; fidflg:= 1; fidty:= 1; call:= BA1234; tailno:= 654321; cat:= 2).                                       | TGa | Send an instruction at the App In PCO to the station under test to transmit an aircraft target message (ground service) with two types of flight ID (callsign and tailnumber).    |
|                 | 11   | rep 15   |       | n:=1; calltid:= 0; tailid:= 0; callflag:= false; tailflag:= false.  |     | Start loop. Set initial variables.  |
|                 | 12   | await  | RF    | TIS_AC_GRD_a (s:= add_A).   | TGa | Wait for the target message to be broadcast by station A.   |

| Test Case Name: TIS_Flight_ID_B   |      |         |     |   |     |  |
|---|------|---------|-----|---|-----|--|
| Purpose: To demonstrate that if more than 1 flight ID is sent, then this will be alternated for the target in question. |      |         |     |   |     |  |
| Context   | Step | Action  | PCO | Action Qualifier  | Ref | Comment  |
|   | 14   | record  |     | <b>IF</b> callflag:= false AND call:= BA1234 IS INCLUDED IN TIS_AC_GRD_a<br><b>THEN</b><br>callid:= callid+ 1<br>callflag:= true<br>tailflag:= false<br><b>ELSE IF</b> tailflag:= false AND tailno:= E7654321<br><b>THEN</b><br>tailid:= tailid + 1<br>tailflag:= true<br>callflag:= false. | TGa | Record the number of times the call sign and the tail number are transmitted alternately.                            |
|   | 15   | end rep |     | n:= n + 1.  |     | End loop.  |
|   | 16   | verify  |     | callid ≥ 5 AND tailid ≥ 5.  |     | Verify that the Flight ID is transmitted at least once every 3 update periods, and that the flight ID is alternated. |
| postamble   | 17   |         |     |   |     | Bring test equipment into idle state.  |
| <b>Comments:</b>  |      |         |     |   |     |  |

| Test Case Name: TIS_Aircraft_Grd_A   |      |         |       |  |     |   |
|--|------|---------|-------|--|-----|---|
| Purpose: To demonstrate that a station will broadcast aircraft target messages (ground TIV) with the correct format. |      |         |       |  |     |   |
| Context  | Step | Action  | PCO   | Action Qualifier   | Ref | Comment   |
| preamble   | 1    | do      |       | M_POWER_UP.  |     | Prepare the transceiver for testing.  |
| test body  | 2    | rep x   |       | x:={P,Q,R,S}.  |     | Repeat test for 4 sets of parameters.   |
|  | 3    | send    | AppIn | REQUEST TO TRANSMIT TIS_AIRCRAFT_GRD_A (TIS_AIRCRAFT_GRD_APPIN_PARAMETERS(x)). |     | Send an instruction at the App In PCO to the station under test to transmit an aircraft target message (ground service) Inclusion of "fidty" and "call" information here does not imply these parameters will necessarily be broadcast. |
|  | 4    | await   | RF    | BURST (s:= add_A) broadcast by station under test.                             |     | Wait for the target message to be broadcast by station under test.  |
|  | 5    | verify  | RF    | BURST (s:= add_A) has the format of "TIS_AC_GRD_a".                            | TGa | Verify that the transmitted burst is the same as "TIS_AC_GRD_a" set out in burst format section.  |
|  | 6    | verify  | RF    | TIS_AIRCRAFT_GRD_RF_OUT_PARAMETERS(x)  |     | Verify that the content of the information output by station under test at the RF PCO is correct.   |
|  | 7    | end rep |       | next x.  |     |   |
| postamble  | 8    |         |       |  |     | Bring test equipment into idle state.   |
| <b>Comments:</b>   |      |         |       |  |     |   |



| Test Case Name: TIS_Grd_Veh_A  |      |         |       |  |     |  |
|--|------|---------|-------|--|-----|--|
| Purpose: To demonstrate that a station will broadcast a ground vehicle target messages (ground TIV) with the correct format. |      |         |       |  |     |  |
| Context  | Step | Action  | PCO   | Action Qualifier   | Ref | Comment  |
| preamble   | 1    | do      |       | M_POWER_UP.  |     | Prepare the transceiver for testing.   |
| test body  | 2    | rep x   |       | x:={P,Q,R,S}.  |     | Repeat test for 4 sets of parameters.  |
|  | 3    | send    | AppIn | REQUEST TO TRANSMIT GROUND VEHICLE TARGET MESSAGE (TIS_GRD_VEH_APPIN_PARAMETERS(x)). |     | Send an instruction at the App In PCO to the station under test to transmit a ground vehicle target message. |
|  | 4    | await   | RF    | BURST (s:= add_A) broadcast by station A.  |     | Wait for the target message to be broadcast by station A.  |
|  | 5    | verify  | RF    | BURST (s:= add_A) has the format of "TIS_GRD_VEH_a".                                 | TVa | Verify that the transmitted burst is the same as "TIS_GRD_VEH_a" set out in burst format section.            |
|  | 6    | verify  | RF    | TIS_GRD_VEH_RF_OUT_PARAMETERS(x).  |     | Verify that the content of the information output by station under test at the RF PCO is correct.            |
|  | 7    | end rep |       | next x.  |     |  |
| postamble  | 6    |         |       |  |     | Bring test equipment into idle state.  |
| <b>Comments:</b>   |      |         |       |  |     |  |

| Test Case Name: TIS_Veh_Default_A  |      |        |       |   |     |  |
|--|------|--------|-------|---|-----|--|
| Purpose: To demonstrate that if no information for a target is provided implying that it is an aircraft (Mode A code, callsign, registration marking or emitter category), then it will be regarded as a vehicle target until further information is provided. |      |        |       |   |     |  |
| Context  | Step | Action | PCO   | Action Qualifier  | Ref | Comment  |
| preamble   | 1    | do     |       | M_POWER_UP.   |     | Prepare the transceiver for testing.   |
| test body  | 2    | send   | AppIn | REQUEST TO TRANSMIT TARGET MESSAGE (s:= add_A; tivid:= 2; rflg:= 0; adsff:= 0; tag:= 3; rlat:= 50N; rlg:= 3E; gtk:= 10; gsp:= 50).              |     | Send an instruction at the App In PCO to the station under test to transmit a target message, without specific information that it is an aircraft. |
|  | 3    | await  | RF    | BURST (s:= add_A) broadcast by station A.   |     | Wait for the target message to be broadcast by station A.  |
|  | 4    | verify | RF    | TIS_GRD_AIR_a (s = add_A; tivid = 2; rflg = 0; adsff = 0; tag = 3; rlat = 50N; rlg = 3E; gtk = 10; gsp = 50) transmitted by station under test. | TVa | Verify that the corresponding transmitted target message is the appropriate message for a ground vehicle.  |
| postamble  | 5    |        |       |   |     | Bring test equipment into idle state.  |
| <b>Comments:</b>   |      |        |       |   |     |  |

| Test Case Name: FIS_METAR_A  |      |        |       |  |     |   |
|--|------|--------|-------|--|-----|---|
| Purpose: To demonstrate that a station will broadcast a METAR message with the correct format. |      |        |       |  |     |   |
| Context  | Step | Action | PCO   | Action Qualifier   | Ref | Comment   |
| preamble   | 1    | do     |       | M_POWER_UP.  |     | Prepare the transceiver for testing.  |
| test body  | 2    | rep x  |       | x:= {P, Q, R, S}.  |     | Repeat test for 4 different sets of parameters.   |
|  | 3    | send   | Appln | REQUEST TO TRANSMIT FIS_METAR_a (FIS_METAR_APPIN_PARAMETERS(x)). | FMa | Instruct the station under test to broadcast a METAR message.   |
|  | 4    | await  | RF    | BURST broadcast by the station under test.                       |     | Wait for the sync burst to be broadcast by the station under test.                                      |
|  | 5    | verify | RF    | BURST (s:= add_A) has the format of "FIS_METAR_a".               | FMa | Verify that the transmitted burst has the same format as "FIS_METAR_a" set out in burst format section. |
|  | 6    | verify | RF    | FIS_METAR_RF_OUT_PARAMETERS(x).                                  |     | Verify that the content of the information output by station under test at the RF PCO is correct.       |
|  | 7    | endrep |       | next x.  |     |   |
| postamble  | 8    |        |       |  |     | Bring test equipment into idle state.   |
| <b>Comments:</b>   |      |        |       |  |     |   |

| Test Case Name: FIS_SPECI_A  |      |        |       |  |     |   |
|--|------|--------|-------|--|-----|---|
| Purpose: To demonstrate that a station will broadcast a SPECI message with the correct format. |      |        |       |  |     |   |
| Context  | Step | Action | PCO   | Action Qualifier   | Ref | Comment   |
| preamble   | 1    | do     |       | M_POWER_UP.  |     | Prepare the transceiver for testing.  |
| test body  | 2    | rep x  |       | x:= {P, Q, R, S}.  |     | Repeat test for 4 different sets of parameters.   |
|  | 3    | send   | Appln | REQUEST TO TRANSMIT FIS_SPECI_a (FIS_SPECI_APPIN_PARAMETERS(x)). | FSa | Instruct the station under test to broadcast a SPECI message.   |
|  | 4    | await  | RF    | BURST broadcast by the station under test.                       |     | Wait for the sync burst to be broadcast by the station under test.                                      |
|  | 5    | verify | RF    | BURST (s:= add_A) has the format of "FIS_SPECI_a".               | FSa | Verify that the transmitted burst has the same format as "FIS_SPECI_a" set out in burst format section. |
|  | 6    | verify | RF    | FIS_SPECI_RF_OUT_PARAMETERS(x).                                  |     | Verify that the content of the information output by station under test at the RF PCO is correct.       |
|  | 7    | Endrep |       | next x.  |     |   |
| postamble  | 8    |        |       |  |     | Bring test equipment into idle state.   |
| <b>Comments:</b>   |      |        |       |  |     |   |

| Test Case Name: FIS_METAR_C  |      |        |       |  |     |  |
|--|------|--------|-------|--|-----|--|
| Purpose: To demonstrate that a station will transmit METAR reports once during each update period. |      |        |       |  |     |  |
| Context  | Step | Action | PCO   | Action Qualifier   | Ref | Comment  |
| preamble   | 1    | do     |       | M_POWER_UP.  |     | Prepare the transceiver for testing.   |
| test body  | 2    | rep t  |       | t={1, 2, 5}.   |     | Start loop for repeat of the test with different update periods.   |
|  | 3    | send   | AppIn | REQUEST TO TRANSMIT METAR MESSAGES WITH PERIOD t MINUTES.                  |     | Instruct the station under test to transmit regular METAR reports according to the required update period. |
|  | 4    | await  | RF    | FIS_METAR_a (s = add_A) transmitted by station under test.                 | FMa | Wait for the first METAR message to be transmitted by the station under test.                              |
|  | 5    | record | RF    | metar_time:= time at beginning of slot in which FIS_METAR_a was broadcast. | FMa | Record the time at which the METAR message was broadcast.  |
|  | 6    | rep 10 |       | n:= 1.   |     | Start loop to count 10 bursts.   |
|  | 7    | wait   |       | time = metar_time + (n x 60 - 12)xt.                                       |     | Wait for time t minutes less 20 % of a period.   |
|  | 8    | verify | RF    | FIS_METAR_a received before time = metar_time + (n x 60 + 12)xt.           | FMa | Verify that before time t minutes plus 20 % of a period, a METAR message has been received.                |
|  | 9    | endrep |       | n:= n + 1.   |     | Repeat with n incremented.   |
|  | 10   | endrep |       | next t.  |     | Repeat with the next update period.  |
| postamble  | 11   |        |       |  |     | Bring test equipment into idle state.  |
| <b>Comments:</b>   |      |        |       |  |     |  |

| Test Case Name: FIS_ATIS_A   |      |        |       |  |     |  |
|--|------|--------|-------|--|-----|--|
| Purpose: To demonstrate that a station will broadcast an ATIS message with the correct format. |      |        |       |  |     |  |
| Context  | Step | Action | PCO   | Action Qualifier   | Ref | Comment  |
| Preamble   | 1    | do     |       | M_POWER_UP.  |     | Prepare the transceiver for testing.   |
| test body  | 2    | rep x  |       | x:= {P, Q, R, S}.  |     | Repeat test for 4 different sets of parameters.  |
|  | 3    | send   | AppIn | REQUEST TO TRANSMIT FIS_ATIS_a (FIS_ATIS_APPIN_PARAMETERS(x)). | FAa | Instruct the station under test to broadcast an ATIS message.  |
|  | 4    | await  | RF    | BURST (s:=add_A) broadcast by the station under test.          |     | Wait for the ATIS message to be broadcast by the station under test.                                   |
|  | 5    | verify | RF    | BURST (s:= add_A) has the format of "FIS_ATIS_a".              | FAa | Verify that the transmitted burst has the same format as "FIS_ATIS_a" set out in burst format section. |
|  | 6    | verify | RF    | FIS_ATIS_RF_OUT_PARAMETERS(x).                                 |     | Verify that the content of the information output by station under test at the RF PCO is correct.      |
|  | 7    | Endrep |       | next x.  |     |  |
| Postamble  | 8    |        |       |  |     | Bring test equipment into idle state.  |
| <b>Comments:</b>   |      |        |       |  |     |  |

| Test Case Name: FIS_RCN_A   |      |        |       |  |     |   |
|---|------|--------|-------|--|-----|---|
| Purpose: To demonstrate that a station will broadcast an RCN message with the correct format. |      |        |       |  |     |   |
| Context   | Step | Action | PCO   | Action Qualifier   | Ref | Comment   |
| preamble  | 1    | do     |       | M_POWER_UP.  |     | Prepare the transceiver for testing.  |
| test body   | 2    | rep x  |       | x:={P,Q,R,S}.  |     | Repeat test for 4 different sets of parameters.   |
|   | 3    | send   | Appln | REQUEST TO TRANSMIT FIS_RCN_A (FIS_RCN_APPIN_PARAMETERS(x)). | FRa | Instruct the station under test to broadcast an RCN message.  |
|   | 4    | await  | RF    | BURST broadcast by the station under test.                   |     | Wait for the sync burst to be broadcast by the station under test.                                    |
|   | 5    | verify | RF    | BURST (s:= add_A) has the format of "FIS_RCN_a".             |     | Verify that the transmitted burst is the same as "FIS_RCN_a" set out in burst format section.         |
|   | 6    | verify | RF    | FIS_RCN_RF_OUT_PARAMETERS(x).                                |     | Verify that the content of the information output by the station under test at the RF PCO is correct. |
|   | 7    | endrep |       | next x.  |     | Verify that the other fields are correct.   |
| postamble   | 9    |        |       |  |     | Bring test equipment into idle state.   |
| <b>Comments:</b>  |      |        |       |  |     |   |

| Test Case Name: FIS_SIGMET_A  |      |        |       |  |     |   |
|---|------|--------|-------|--|-----|---|
| Purpose: To demonstrate that a station will broadcast a SIGMET message with the correct format. |      |        |       |  |     |   |
| Context   | Step | Action | PCO   | Action Qualifier   | Ref | Comment   |
| preamble  | 1    | do     |       | M_POWER_UP.  |     | Prepare the transceiver for testing.  |
| test body   | 2    | rep x  |       | x:={P,Q,R,S}.  |     | Repeat test for 4 sets of parameters.   |
|   | 3    | send   | Appln | REQUEST TO TRANSMIT FIS_SIGMET_A (FIS_SIGMET_APPIN_PARAMETERS(x)). |     | Instruct the station under test to broadcast a SIGMET message.  |
|   | 4    | await  | RF    | BURST broadcast by the station under test.                         |     | Wait for the SIGMET message to be broadcast by the station under test.                                      |
|   | 5    | verify | RF    | BURST (s:= add_A) has the format of "FIS_SIGMET_a".                | FSa | Verify that the transmitted burst is the same as "FIS_SIGMET_a" VDL4 burst set out in burst format section. |
|   | 6    | verify | RF    | FIS_SIGMET_RF_OUT_PARAMETERS(x).                                   |     | Verify that the content of the information output by station under test at the RF PCO is correct.           |
|   | 7    | endrep |       | next x.  |     |   |
| postamble   | 8    |        |       |  |     | Bring test equipment into idle state.   |
| <b>Comments:</b>  |      |        |       |  |     |   |

| Test Case Name: FIS_TSA_CTR_A  |      |        |       |   |      |   |
|--|------|--------|-------|---|------|---|
| Purpose: To demonstrate that a station will broadcast a TSA message for control zones with the correct format. |      |        |       |   |      |   |
| Context  | Step | Action | PCO   | Action Qualifier  | Ref  | Comment   |
| preamble   | 1    | do     |       | M_POWER_UP.   |      | Prepare the transceiver for testing.  |
| test body  | 2    | rep x  |       | x:= {P, Q, R, S}.   |      | Repeat test for 4 different sets of parameters.   |
|  | 3    | send   | Appln | REQUEST TO TRANSMIT FIS_TSA_CTR_A" (TSA_CTR_APPIN_PARAMETERS(x)). | FTCa | Instruct the station under test to broadcast a TSA message.   |
|  | 4    | await  | RF    | BURST broadcast by the station under test.                        |      | Wait for the sync burst to be broadcast by the station under test.  |
|  | 5    | verify | RF    | BURST (s:= add_A) has the format of "FIS_TSA_CTR_A".              | FTCa | Verify that the transmitted burst has the same format as "FIS_TSA_CTR_A" set out in burst format section. |
|  | 6    | verify | RF    | FIS_TSA_CTR_RF_OUT_PARAMETERS(x).                                 |      | Verify that the content of the information output by station under test at the RF PCO is correct.         |
|  | 7    | Endrep |       | next x.   |      |   |
| postamble  | 8    |        |       |   |      | Bring test equipment into idle state.   |
| <b>Comments:</b>   |      |        |       |   |      |   |

| Test Case Name: FIS_TSA_DNG_A   |      |        |       |   |      |   |
|---|------|--------|-------|---|------|---|
| Purpose: To demonstrate that a station will broadcast a TSA message for restricted, danger or prohibited zones with the correct format. |      |        |       |   |      |   |
| Context   | Step | Action | PCO   | Action Qualifier  | Ref  | Comment   |
| preamble  | 1    | do     |       | M_POWER_UP.   |      | Prepare the transceiver for testing.  |
| test body   | 2    | rep x  |       | x:= {P, Q, R, S}.   |      | Repeat test for 4 different sets of parameters.   |
|   | 3    | send   | Appln | REQUEST TO TRANSMIT FIS_TSA_DNG_A" (FIS_TSA_DNG_APPIN_PARAMETERS(x)). | FTDa | Instruct the station under test to broadcast a TSA message.   |
|   | 4    | await  | RF    | BURST broadcast by the station under test.                            |      | Wait for the sync burst to be broadcast by the station under test.  |
|   | 5    | verify | RF    | BURST (s:= add_A) has the format of "FIS_TSA_DNG_A".                  | FTDa | Verify that the transmitted burst has the same format as "FIS_TSA_DNG_A" set out in burst format section. |
|   | 6    | verify | RF    | FIS_TSA_DNG_RF_OUT_PARAMETERS(x).                                     |      | Verify that the content of the information output by station under test at the RF PCO is correct.         |
|   | 7    | Endrep |       | next x.   |      |   |
| postamble   | 8    |        |       |   |      | Bring test equipment into idle state.   |
| <b>Comments:</b>  |      |        |       |   |      |   |

| Test Case Name:  |      | FIS_Request_C   |     |  |            |  |
|------------------|------|---|-----|--|------------|--|
| Purpose:         |      | To demonstrate that a ground station which receives a broadcast report request message from a mobile that does not reserve slot(s) for the response, will broadcast the information at the required rate. |     |  |            |  |
| Context          | Step | Action  | PCO | Action Qualifier   | Ref        | Comment  |
| preamble         | 1    | do  |     | M_POWER_UP.  |            | Prepare the transceiver for testing.   |
| test body        | 2    | rep 2   |     | n:=1.  |            | Start loop.  |
|                  | 3    | send  | RF  | <b>IF</b> n=1 <b>THEN</b><br>FIS_REQUEST_a (s:=add_B; fmi:=5; mrq:= 1; locl:=EGLL).  | FQa        | Send a broadcast report request message with a null reservation from a simulated station B to the station under test.  |
|                  | 4    | send  | RF  | <b>IF</b> n=2 <b>THEN</b><br>FIS_REQUEST_a (s:=add_B; fmi:=5; mrq:= 2; locl:=EGLC).  | FQa        | A different request message is sent when the test is repeated.   |
|                  | 5    | record  | RF  | burst_time:= time at beginning of slot in which FIS_REQUEST_a was transmitted.   | FQa        | Record the time at which the FIS request message was transmitted by the simulated station B.   |
|                  | 6    | rep 3   |     | m:=1.  |            | Start loop to measure transmission times.  |
|                  | 7    | wait  | RF  | time = burst_time + m × 60 - 12.   |            | Wait for m minutes less 20 % of a minute.  |
|                  | 8    | verify  | RF  | FIS-B BURST (s:= add_A) transmitted by the station under test before<br>time = burst_time + m × 60 + 12.   |            | Verify that the requested message is received before time m minutes plus 20 % of a minute.   |
|                  | 9    | verify  |     | FIS-B BURST (s:= add_A) has the format of:<br><b>IF</b> n = 1 <b>THEN</b> FIS_ATIS_a<br><b>IF</b> n = 2 <b>THEN</b> FIS_RCN_a<br>FIS-B BURST (s:= add_A) provides information for the requested airport. | FAa<br>FRa | Verify that the transmitted burst is of the correct format as set out in the burst format section.<br>Verify the message provides the information for the requested airport. |
|                  | 10   | endrep  |     | m:= m + 1.   |            | End loop.  |
|                  | 11   | endrep  |     | n:=n + 1.  |            | End loop.  |
| postamble        | 12   |   |     |  |            | Bring test equipment into idle state.  |
| <b>Comments:</b> |      |   |     |  |            |  |

| Test Case Name:  |      | FIS_Request_D  |     |   |            |  |
|------------------|------|--|-----|---|------------|--|
| Purpose:         |      | To demonstrate that a ground station which receives an addressed report request message from a mobile that reserves a specific slot for the response, will broadcast the requested information in the reserved slot. |     |   |            |  |
| Context          | Step | Action   | PCO | Action Qualifier  | Ref        | Comment  |
| preamble         | 1    | do   |     | M_POWER_UP.   |            | Prepare the transceiver for testing.   |
| test body        | 2    | rep 2  |     | n:=1.   |            | Start loop.  |
|                  | 3    | send   | RF  | <b>IF</b> n=1 <b>THEN</b><br>FIS_REQUEST_b (s:=add_B; d:=add_A; fmi:=5;<br>mrq:= 1; locl:=EGLL; sdf:=0; ro:=500; lg:=2; pr:=12)   | FQb        | Send a report request message with a unicast reservation from a simulated station B to the station under test.   |
|                  | 4    | send   | RF  | <b>IF</b> n=2 <b>THEN</b><br>FIS_REQUEST_b (s:=add_B; d:=add_A; fmi:=5;<br>mrq:= 2; locl:=EGLC; sdf:=0; ro:=500; lg:=2;<br>pr:=12).   | FQb        | A different request message is sent when the test is repeated.   |
|                  | 5    | record   | RF  | burst_time:= time at beginning of slot in which<br>FIS_REQUEST_b was transmitted.   | FQb        | Record the time at which the FIS request message was transmitted by the simulated station B.   |
|                  | 6    | wait   |     | time = burst_time + 500 x (60/M1)   |            | Wait for the reserved slot.  |
|                  | 7    | verify   | RF  | FIS-B BURST (s:= add_A) transmitted by the<br>station under test in slot beginning at<br>time = burst_time + 500 x (60/M1).   |            | Verify that the requested message is received in the reserved slot.  |
|                  | 8    | verify   | RF  | FIS-B BURST (s:= add_A) has the format of:<br><b>IF</b> n = 1 <b>THEN</b> FIS_ATIS_a<br><b>IF</b> n = 2 <b>THEN</b> FIS_RCN_a<br><br>FIS-B BURST (s:= add_A) provides information for<br>the requested airport. | FAa<br>FRa | Verify that the transmitted burst is the correct as set out in the burst format section.<br>Verify the message provides the information for the requested airport. |
|                  | 9    | endrep   |     | n:=n + 1.   |            | End loop.  |
| postamble        | 10   |  |     |   |            | Bring test equipment into idle state.  |
| <b>Comments:</b> |      |  |     |   |            |  |

| Test Case Name:  |      | FIS_Request_E  |     |  |            |  |
|------------------|------|--|-----|--|------------|--|
| Purpose:         |      | To demonstrate that a ground station which receives an addressed report request message from a mobile that does not reserve slot(s) for the response, will broadcast the information at the required rate. |     |  |            |  |
| Context          | Step | Action   | PCO | Action Qualifier   | Ref        | Comment  |
| preamble         | 1    | do   |     | M_POWER_UP.  |            | Prepare the transceiver for testing.   |
| test body        | 2    | rep 2  |     | n:=1.  |            | Start loop.  |
|                  | 3    | send   | RF  | <b>IF</b> n=1 <b>THEN</b><br>FIS_REQUEST_c (s:=add_B; d:=add_A; fmi:=5; mrq:= 1; locl:=EGLL).  | FQc        | Send a report request message with a null reservation from a simulated station B to the station under test.  |
|                  | 4    | send   | RF  | <b>IF</b> n=2 <b>THEN</b><br>FIS_REQUEST_c (s:=add_B; d:=add_A; fmi:=5; mrq:= 2; locl:=EGLC).  | FQc        | A different request message is sent when the test is repeated.   |
|                  | 5    | record   | RF  | burst_time:= time at beginning of slot in which FIS_REQUEST_c was transmitted.   | FQc        | Record the time at which the FIS request message was transmitted by simulated station B.   |
|                  | 6    | rep 3  |     | m:=1.  |            | Start loop to measure transmission times.  |
|                  | 7    | wait   | RF  | time = burst_time + m × 60 - 12.   |            | Wait for m minutes less 20 % of a minute.  |
|                  | 8    | verify   | RF  | FIS-B BURST (s:= add_A) transmitted by the station under test before<br>time = burst_time + m × 60 + 12.   |            | Verify that the requested message is received before time m minutes plus 20 % of a minute.   |
|                  | 9    | verify   |     | FIS-B BURST (s:= add_A) has the format of:<br><b>IF</b> n = 1 <b>THEN</b> FIS_ATIS_a<br><b>IF</b> n = 2 <b>THEN</b> FIS_RCN_a<br><br>FIS-B BURST (s:= add_A) provides information for the requested airport. | FAa<br>FRa | Verify that the transmitted burst is of the correct format as set out in the burst format section.<br>Verify the message provides the information for the requested airport. |
|                  | 10   | endrep   |     | m:= m + 1.   |            | End loop.  |
|                  | 11   | endrep   |     | n:=n + 1.  |            | End loop.  |
| postamble        | 12   |  |     |  |            | Bring test equipment into idle state.  |
| <b>Comments:</b> |      |  |     |  |            |  |



| Test Case Name:  |      | FIS_Request_F   |     |   |            |  |
|------------------|------|---|-----|---|------------|--|
| Purpose:         |      | To demonstrate that a ground station which receives a broadcast report request message from a mobile that reserves a specific slot for the response, will broadcast the requested information in the reserved slot. |     |   |            |  |
| Context          | Step | Action  | PCO | Action Qualifier  | Ref        | Comment  |
| preamble         | 1    | do  |     | M_POWER_UP.   |            | Prepare the transceiver for testing.   |
| test body        | 2    | rep 2   |     | n:=1.   |            | Start loop.  |
|                  | 3    | send  | RF  | <b>IF</b> n=1 <b>THEN</b><br>FIS_REQUEST_b (s:=add_B; d:= 7; fmi:=5;<br>mrq:= 1; locl:=EGLL; sdf:=0; ro:=500; lg:=2; pr:=12).   | FQb        | Send a broadcast report request message with a unicast reservation from a simulated station B to the station under test.   |
|                  | 4    | send  | RF  | <b>IF</b> n=2 <b>THEN</b><br>FIS_REQUEST_b (s:=add_B; d:=7; fmi:=5;<br>mrq:= 2; locl:=EGLC; sdf:=0; ro:=500; lg:=2; pr:=12).  | FQb        | A different request message is sent when the test is repeated.   |
|                  | 5    | record  | RF  | burst_time:= time at beginning of slot in which<br>FIS_REQUEST_b burst was transmitted.   | FQb        | Record the time at which the FIS request message was transmitted by the simulated station B.   |
|                  | 6    | wait  |     | time = burst_time + 500 x (60/M1).  |            | Wait for the reserved slot.  |
|                  | 7    | verify  | RF  | FIS-B BURST (s:= add_A) transmitted by the station<br>under test in slot beginning at<br>time = burst_time + 500 x (60/M1).   |            | Verify that the requested message is received in the reserved slot.  |
|                  | 8    | verify  | RF  | FIS-B BURST (s:= add_A) has the format of:<br><b>IF</b> n = 1 <b>THEN</b> FIS_ATIS_a<br><b>IF</b> n = 2 <b>THEN</b> FIS_RCN_a<br><br>FIS-B BURST (s:= add_A) provides information for<br>the requested airport. | FAa<br>FRa | Verify that the transmitted burst is the correct as set out in the burst format section.<br>Verify the message provides the information for the requested airport. |
|                  | 9    | endrep  |     | n:=n + 1.   |            | End loop.  |
| postamble        | 10   |   |     |   |            | Bring test equipment into idle state.  |
| <b>Comments:</b> |      |   |     |   |            |  |

| Test Case Name:   |      | FIS_Queue_A |       |  |     |   |
|---|------|-------------|-------|--|-----|---|
| Purpose:  |      |             |       |  |     |   |
| To demonstrate that a station will correctly manage a queue of targets to be transmitted. |      |             |       |  |     |   |
| Context   | Step | Action      | PCO   | Action Qualifier   | Ref | Comment   |
| preamble  | 1    | do          |       | M_POWER_UP.  |     | Prepare the transceiver for testing.  |
| test body   | 2    | send        | Appln | <p>REQUEST TO TRANSMIT METAR MESSAGES:<br/>           FIS_METAR_a(1) (s:= add_A; fmi:= 0; vers:= 0; med:= 0; locl:=EGLL; date:=28; ti:=605; wdi:=4; wsp:=30; mxw:=1; cav:=1; trd:=1; pwf:=0; rwf:=0; qfef:=0; tem(bit 8):=0; tem(bits 1-7):=51; dew(bit 8):=0; dew(bits 1-7):=3; qnh=0; wsf:=0; ssf:=0; vdit:= 6; vdif:= 4; wgi:=7; mis:=15; misd:=4; mas:=41; masd:=7; pw:=42; cno:=2; ch:=10; cc:=3; cty:=2; qfe:=3; rw:=50; ws:=0; sst:=47; ss:=5; txt:= "METAR EGLL 0920Z 26005KT CAVOK 15/14 Q1013 NOSIG")</p> <p>FIS_METAR_a(2) (ws:=1; other parameters as above)<br/>           FIS_METAR_a(3) (qnh=2; other parameters as above)<br/>           FIS_METAR_a(4) (mis:=14; other parameters as above)<br/>           FIS_METAR_a(5) (misd:=3; other parameters as above)<br/>           FIS_METAR_a(6) (mas:=17; other parameters as above)<br/>           FIS_METAR_a(7) (masd:=5; other parameters as above)<br/>           FIS_METAR_a(8) (cty:=3; other parameters as above)<br/>           FIS_METAR_a(9) (sst:=50; other parameters as above)<br/>           FIS_METAR_a(10) (date:=10; other parameters as above).</p> | FMa | Send (as if from a FIS-B server) to the station under test all at once, ten different METAR messages to be transmitted. Note that index immediately following FIS_METAR_a is not a transmitted parameter. |
|   | 3    | rep 4       |       | n:= 1.   |     | Start loop.   |
|   | 4    | verify      | RF    | FIS_METAR_a(n) (s=add_A; med=0) transmitted.   | FMa | Verify that the first four METAR messages have been transmitted.  |
|   | 5    | endrep      |       | n:=n + 1.  |     | End loop.   |
|   | 6    | send        | Appln | <p>REQUEST TO TRANSMIT METAR MESSAGES:<br/>           FIS_METAR_a(6) (med:=1; mas:=15)<br/>           FIS_METAR_a(8) (med:=1; cty:=2)<br/>           FIS_METAR_a(9) (med:=1; sst:=40).</p>   | FMa | Send updated messages for three of the METAR messages that have not yet been transmitted by the ground station, each with a higher message edition number.  |
|   | 7    | rep 3       |       | n:= {5, 7, 10}.  |     | Start loop.   |

| Test Case Name:  |      | FIS_Queue_A |     |  |     |  |
|--|------|-------------|-----|--|-----|--|
| Purpose: To demonstrate that a station will correctly manage a queue of targets to be transmitted. |      |             |     |  |     |  |
| Context  | Step | Action      | PCO | Action Qualifier   | Ref | Comment  |
|  | 8    | verify      | RF  | FIS_METAR_a(n) (s=add_A; med=0) transmitted<br>IF n=5 THEN misd=3<br>IF n=7 THEN masd=5<br>IF n=10 THEN date=10. | FMa | Verify that the METAR messages for which updates where not provided are still transmitted.                             |
|  | 9    | endrep      |     | next n.  |     | End loop.  |
|  | 10   | rep 3       |     | n:= {6, 8, 9}.   |     | Start loop.  |
|  | 11   | verify      | RF  | FIS_METAR_a(n) (s=add_A; med:=1) transmitted<br>IF n=6 THEN mas=15<br>IF n=8 THEN cty=2<br>IF n=9 THEN sst=40.   | FMa | Verify that for the three messages that were updated, the updated messages are sent in place of the original messages. |
|  | 12   | endrep      |     | next n.  |     | End loop.  |
| postamble  | 13   |             |     |  |     | Bring test equipment into idle state.  |
| <b>Comments:</b>   |      |             |     |  |     |  |

| Test Case Name:   |      | FIS_Slot_A |       |  |     |  |
|---|------|------------|-------|--|-----|--|
| Purpose: To demonstrate that a station will transmit FIS-B messages in slots as instructed by the FIS-B server. |      |            |       |  |     |  |
| Context   | Step | Action     | PCO   | Action Qualifier   | Ref | Comment  |
| preamble  | 1    | do         |       | M_POWER_UP.  |     | Prepare the transceiver for testing.   |
| test body   | 2    | send       | Appln | REQUEST TO TRANSMIT ATIS MESSAGE<br>(s:= add_A; fmi:= 1; vers:= 0; med:= 0; locl:=EGLL;<br>date:=28; ti:=605; hd:=3; tran:=3; oth:=0;<br>aavl(bits 1-11):=615; aavl(bit 12):=1; wdi:=4;<br>wsp:=30; tem(bit8):=0; tem(bits1-7):=5;<br>dew(bit8):=0; dew(bits 1-7):=5; qnh:=3; ruf:=0;<br>ftxt:=1; mxw:=1; cav:=0; trd:=1; qfef:=0; wsf:=1;<br>pwf:=1; rwf:=0; vdit:= 6; vdif:= 4; wgi:=7; mis:=15;<br>misd:=4; mas:=41; masd:=7; cno:=2; cc:=3;<br>ch:=10 cty:=2; pw:=18; rw:=50; qfe:=248;<br>run(bits 1-6):=25; run(bits7-8):=2; aptf:=0; apty:= 3;<br>rdp:=1; rcon:=1; dod:=0; brk:=1; rrl:=127; rrw:=68;<br>rvt:=15; rvm:=18; rve:=24; ravl(bits 1-11):=605;<br>ravl(bit 12):= 1; rus:=3; ws:=0; txt:= "ATIS RWY:<br>25R /18 TL: 70 SR:0538 SS:1647 ETOU RWY:<br>26")<br><br>TRANSMIT IN FIRST AVAILABLE SLOT<br>TRANSMIT 3 TIMES PER MINUTE FOR THREE<br>MINUTES. |     | Instruct (as if a FIS-B server) the station under test to transmit an ATIS message in the first slot available, and thereafter three times per minute for three minutes. |
|   | 3    | await      |       | Next available slot.   |     | Wait for the next available slot.  |
|   | 4    | verify     | RF    | FIS_ATIS_a (s:=add_A) transmitted in the available slot.   | FAa | Verify that ATIS message was transmitted by the station under test in the first free slot available.   |
|   | 5    | record     | RF    | atis_time:= time at beginning of slot in which FIS_ATIS_a (s:=add_A) transmitted.  | FAa | Record the time that the ATIS message was transmitted.   |
|   | 6    | rep 9      |       | n:= 1.   |     | Start loop.  |
|   | 7    | wait       |       | time:= atis_time + (20 - 4) x n  |     | Wait for the expected time at which the ATIS message is next transmitted less 20 %.  |
|   | 8    | verify     | RF    | FIS_ATIS_a (s:=add_A) transmitted before time:= atis_time + (20 + 4) x n.  | FAa | Verify that the ATIS message is transmitted before the expected time plus 20 %.  |
|   | 9    | endrep     |       | n:= n + 1.   |     | End loop.  |

| Test Case Name:   |      | FIS_Slot_A |       |  |     |  |
|---|------|------------|-------|--|-----|--|
| Purpose: To demonstrate that a station will transmit FIS-B messages in slots as instructed by the FIS-B server. |      |            |       |  |     |  |
| Context   | Step | Action     | PCO   | Action Qualifier   | Ref | Comment  |
|   | 10   | send       | Appln | REQUEST TO TRANSMIT ATIS MESSAGE<br>(s:= add_G; fmi:= 1; vers:= 0; med:= 0; locl:=EGLL;<br>date:=28; ti:=605; hd:=3; tran:=3; oth:=0;<br>aavl(bits 1-11):=615; aavl(bit 12):=1; wdi:=4;<br>wsp:=30; tem(bit8):=0; tem(bits1-7):=5;<br>dew(bit8):=0; dew(bits 1-7):=5; qnh:=3; ruf:=0;<br>fxt:=1; mxw:=1; cav:=0; trd:=1; qfef:=0; wsf:=1;<br>pwf:=1; rwf:=0; vdit:= 6; vdf:= 4; wgi:=7; mis:=15;<br>misd:=4; mas:=41; masd:=7; cno:=2; cc:=3;<br>ch:=10 cty:=2; pw:=18; rw:=50; qfe:=248;<br>run(bits 1-6):=25; run(bits7-8):=2; aptf:=0; apty:= 3;<br>rdp:=1; rcon:=1; dod:=0; brk:=1; rrl:=127; rrw:=68;<br>rvt:=15; rvm:=18; rve:=24; ravl(bits 1-11):=605;<br>ravl(bit 12):= 1; rus:=3; ws:=0; txt:= "ATIS RWY:<br>25R /18 TL: 70 SR:0538 SS:1647 ETOU RWY:<br>26")<br><br>TRANSMIT IN SECOND SLOT OF THE UTC<br>SECOND<br>TRANSMIT 3 TIMES PER MINUTE FOR THREE<br>MINUTES. |     | Instruct the station under test to transmit in the second slot of the UTC second, and then three times per minute for three minutes. |
|   | 11   | await      |       | Next slot that is the second slot in a UTC second.   |     | Wait for the next slot that is the second slot in a UTC second.  |
|   | 12   | verify     | RF    | FIS_ATIS_a (s:=add_A) transmitted in second slot of UTC second.  |     | Verify that ATIS message was transmitted by the station under test in the second slot of the UTC second.                             |
|   | 13   | record     | RF    | atis_time:= time at beginning of slot in which FIS_ATIS_a (s:=add_A) transmitted.  | FAa | Record the time that the ATIS message was transmitted.   |
|   | 14   | rep 9      |       | n:= 1.   |     | Start loop.  |
|   | 15   | wait       |       | time:= atis_time + (20 - 4) x n.   |     | Wait for the expected time at which the ATIS message is next transmitted less 20 %.  |
|   | 16   | verify     | RF    | FIS_ATIS_a (s:=add_A) transmitted before time:= atis_time + (20 + 4) x n.  | FAa | Verify the ATIS message is transmitted before the expected time plus 20 %.   |
|   | 17   | endrep     |       | n:= n + 1.   |     | End loop.  |

| Test Case Name:   |      | FIS_Slot_A |        |  |     |  |
|---|------|------------|--------|--|-----|--|
| Purpose: To demonstrate that a station will transmit FIS-B messages in slots as instructed by the FIS-B server. |      |            |        |  |     |  |
| Context   | Step | Action     | PCO    | Action Qualifier   | Ref | Comment  |
|   | 18   | send       | App_In | REQUEST TO TRANSMIT ATIS MESSAGE<br>(s:= add_G; fmi:= 1; vers:= 0; med:= 0; locl:=EGLL;<br>date:=28; ti:=605; hd:=3; tran:=3; oth:=0;<br>aavl(bits 1-11):=615; aavl(bit 12):=1; wdi:=4;<br>wsp:=30; tem(bit8):=0; tem(bits1-7):=5;<br>dew(bit8):=0; dew(bits 1-7):=5; qnh:=3; ruf:=0;<br>ftxt:=1; mxw:=1; cav:=0; trd:=1; qfef:=0; wsf:=1;<br>pwf:=1; rwf:=0; vdit:= 6; vdif:= 4; wgi:=7; mis:=15;<br>misd:=4; mas:=41; masd:=7; cno:=2; cc:=3;<br>ch:=10 cty:=2; pw:=18; rw:=50; qfe:=248; run(bits<br>1-6):=25; run(bits7-8):=2; aptf:=0; apty:= 3; rdp:=1;<br>rcon:=1; dod:=0; brk:=1; rrl:=127; rrw:=68; rvt:=15;<br>rvm:=18; rve:=24; ravl(bits 1-11):=605;<br>ravl(bit 12):= 1; rus:=3; ws:=0; txt:= "ATIS RWY:<br>25R /18 TL: 70 SR:0538 SS:1647 ETOU RWY:<br>26")<br><br>TRANSMIT IN TENTH SLOT AFTER CURRENT<br>SLOT<br>TRANSMIT 3 TIMES PER MINUTE FOR THREE<br>MINUTES. |     | Instruct the station under test to transmit in the tenth slot after the current slot, and then three times per minute for three minutes. |
|   | 19   | record     | Appln  | instruct_time:= time at beginning of slot after instruction from FIS-B server was transmitted.   | FAa | Record the time that the ATIS message was transmitted.   |
|   | 20   | verify     | RF     | FIS_ATIS_a (s:=add_A) transmitted in slot beginning at time:= instruct_time + 10 x (60/M1).  |     | Verify that the ATIS message was transmitted by the station under test in the tenth slot after the current slot.                         |
|   | 21   | record     | RF     | atis_time:= time at beginning of slot in which FIS_ATIS_a (s:=add_A) transmitted.  | FAa | Record the time that the ATIS message was transmitted.   |
|   | 22   | rep 9      |        | n:= 1.   |     | Start loop.  |
|   | 23   | wait       |        | time:= atis_time + (20 - 4) x n.   |     | Wait for the expected time at which the ATIS message is next transmitted less 20 %.  |
|   | 24   | verify     | RF     | FIS_ATIS_a (s:=add_A) transmitted before time:= atis_time + (20 + 4) x n.  | FAa | Verify that the ATIS message is transmitted before the expected time plus 20 %.  |
|   | 25   | endrep     |        | n:= n + 1.   |     | End loop.  |
| postamble   | 26   |            |        |  |     | Bring test equipment into idle state.  |
| <b>Comments:</b>  |      |            |        |  |     |  |

| Test Case Name: FIS_AddInfo_A  |      |        |        |  |     |   |
|--|------|--------|--------|--|-----|---|
| Purpose: To demonstrate that a station passes requests for additional information to the FIS-B server. |      |        |        |  |     |   |
| Context  | Step | Action | PCO    | Action Qualifier   | Ref | Comment   |
| preamble   | 1    | do     |        | M_POWER_UP.  |     | Prepare the transceiver for testing.  |
| test body  | 2    | send   | RF     | FIS_REQUEST_a (s:=add_B; fmi:=5; mrq:= 1; loci:=EGLL).                 | FQa | Send a report request message with a null reservation from a simulated station B to the station under test.         |
|  | 3    | verify | AppOut | MESSAGE TO FIS-B SERVER: REQUEST FOR UPDATED ATIS MESSAGE INFORMATION. |     | Wait for a message to be sent by the station under test to the FIS-B server requesting additional ATIS information. |
|  | 4    | send   | RF     | FIS_REQUEST_a (s:=add_C; fmi:=5; mrq:= 2; loci:=EGLC).                 | FQa | Send a report request message with a null reservation from a simulated station C to the station under test.         |
|  | 5    | verify | AppOut | MESSAGE TO FIS-B SERVER: REQUEST FOR UPDATED RCN MESSAGE INFORMATION.  |     | Wait for a message to be sent by the station under test to the FIS-B server requesting additional RCN information.  |
| postamble  | 6    |        |        |  |     | Bring test equipment into idle state.   |
| <b>Comments:</b>   |      |        |        |  |     |   |

| Test Case Name: FIS_Request_Rec_A  |      |        |        |  |     |   |
|--|------|--------|--------|--|-----|---|
| Purpose: To demonstrate that a station will correctly process a received FIS-B report request message with a null reservation. |      |        |        |  |     |   |
| Context  | Step | Action | PCO    | Action Qualifier   | Ref | Comment   |
| preamble   | 1    | do     |        | M_POWER_UP.  |     | Prepare the transceiver for testing.  |
| test body  | 2    | rep x  |        | x:={P, Q, R, S}.   |     | Repeat test for 4 different sets of parameters.   |
|  | 3    | send   | RF     | FIS_REQUEST_a (s:= add_B) (FIS_REQUEST_RF_IN_PARAMETERS(x)). | FQa | Send a report request message with null reservation to the station under test from a simulated station B. |
|  | 4    | await  | AppOut | REQUEST MESSAGE INFORMATION.                                 |     | Wait for the message information to be output by station under test at the AppOut PCO.                    |
|  | 5    | verify | AppOut | FIS_REQUEST_APPOUT_PARAMETERS(x).                            |     | Verify that the content of the information output by station under test at the AppOut PCO is correct.     |
|  | 6    | endrep |        | next x.  |     |   |
| postamble  | 7    |        |        |  |     | Bring test equipment into idle state.   |
| <b>Comments:</b>   |      |        |        |  |     |   |

| Test Case Name: FIS_Request_Rec_B   |      |        |        |   |     |  |
|---|------|--------|--------|---|-----|--|
| Purpose: To demonstrate that a station will correctly process a received FIS-B report request message with a unicast reservation. |      |        |        |   |     |  |
| Context   | Step | Action | PCO    | Action Qualifier  | Ref | Comment  |
| preamble  | 1    | do     |        | M_POWER_UP.   |     | Prepare the transceiver for testing.   |
| test body   | 2    | rep x  |        | x:={P, Q, R, S}.  |     | Repeat test for 4 different sets of parameters.  |
|   | 3    | send   | RF     | FIS_REQUEST_b (s:= add_B)<br>(FIS_REQUEST_RF_IN_PARAMETERS(x)). | FQb | Send a report request message with a unicast reservation to the station under test from a simulated station B. |
|   | 4    | await  | AppOut | REQUEST MESSAGE INFORMATION.                                    |     | Wait for the message information to be output by station under test at the AppOut PCO.                         |
|   | 5    | verify | AppOut | FIS_REQUEST_APPOUT_PARAMETERS(x).                               |     | Verify that the content of the information output by station under test at the AppOut PCO is correct.          |
|   | 6    | endrep |        | next x.   |     |  |
| postamble   | 7    |        |        |   |     | Bring test equipment into idle state.  |
| <b>Comments:</b>  |      |        |        |   |     |  |

| Test Case Name: GNS_Type1_Message_A   |      |        |       |   |     |   |
|---|------|--------|-------|---|-----|---|
| Purpose: To demonstrate that a station will broadcast a GNS-B Type 1 message with the correct format. |      |        |       |   |     |   |
| Context   | Step | Action | PCO   | Action Qualifier  | Ref | Comment   |
| preamble  | 1    | do     |       | M_POWER_UP.   |     | Prepare the transceiver for testing.  |
| test body   | 2    | rep x  |       | x:= {P, Q, R, S}.   |     | Repeat test for 4 different sets of parameters.   |
|   | 3    | send   | AppIn | REQUEST TO TRANSMIT GNS_TYPE1_a<br>(GNS_TYPE1_APPIN_PARAMETERS(x)). | G1a | Instruct the station under test to broadcast a GNS Type 1 message.                                      |
|   | 4    | await  | RF    | BURST (s:=add_A) broadcast by the station under test.               |     | Wait for the GNS message to be broadcast by the station under test.                                     |
|   | 5    | verify | RF    | BURST (s:= add_A) has the format of "GNS_TYPE1_a".                  | G1a | Verify that the transmitted burst has the same format as "GNS_TYPE1_a" set out in burst format section. |
|   | 6    | verify | RF    | GNS_TYPE1_RF_OUT_PARAMETERS(x).                                     |     | Verify that the content of the information output by station under test at the RF PCO is correct.       |
|   | 7    | Endrep |       | next x.   |     | End loop.   |
| postamble   | 8    |        |       |   |     | Bring test equipment into idle state.   |
| <b>Comments:</b>  |      |        |       |   |     |   |



| Test Case Name: GNS_Type2_Message_A   |      |        |       |  |     |   |
|---|------|--------|-------|--|-----|---|
| Purpose: To demonstrate that a station will broadcast a GNS-B Type 2 message with the correct format. |      |        |       |  |     |   |
| Context   | Step | Action | PCO   | Action Qualifier   | Ref | Comment   |
| preamble  | 1    | do     |       | M_POWER_UP.  |     | Prepare the transceiver for testing.  |
| test body   | 2    | rep x  |       | x:= {P, Q, R, S}.  |     | Repeat test for 4 different sets of parameters.   |
|   | 3    | send   | Appln | REQUEST TO TRANSMIT GNS_TYPE2_a (GNS_TYPE2_APPIN_PARAMETERS(x)). | G2a | Instruct the station under test to broadcast a GNS Type 2 message.                                      |
|   | 4    | await  | RF    | BURST (s:=add_A) broadcast by the station under test.            |     | Wait for the GNS message to be broadcast by the station under test.                                     |
|   | 5    | verify | RF    | BURST (s:= add_A) has the format of "GNS_TYPE2_a".               | G2a | Verify that the transmitted burst has the same format as "GNS_TYPE2_a" set out in burst format section. |
|   | 6    | verify | RF    | GNS_TYPE2_RF_OUT_PARAMETERS(x).                                  |     | Verify that the content of the information output by station under test at the RF PCO is correct.       |
|   | 7    | Endrep |       | next x.  |     | End loop.   |
| postamble   | 8    |        |       |  |     | Bring test equipment into idle state.   |
| <b>Comments:</b>  |      |        |       |  |     |   |

| Test Case Name: GNS_Type4_Message_A   |      |        |       |  |     |   |
|---|------|--------|-------|--|-----|---|
| Purpose: To demonstrate that a station will broadcast a GNS-B Type 4 message with the correct format. |      |        |       |  |     |   |
| Context   | Step | Action | PCO   | Action Qualifier   | Ref | Comment   |
| preamble  | 1    | do     |       | M_POWER_UP.  |     | Prepare the transceiver for testing.  |
| test body   | 2    | rep x  |       | x:= {P, Q, R, S}.  |     | Repeat test for 4 different sets of parameters.   |
|   | 3    | send   | Appln | REQUEST TO TRANSMIT GNS_TYPE4_a (GNS_TYPE4_APPIN_PARAMETERS(x)). | G4a | Instruct the station under test to broadcast a GNS Type 4 message.                                      |
|   | 4    | await  | RF    | BURST (s:=add_A) broadcast by the station under test.            |     | Wait for the GNS message to be broadcast by the station under test.                                     |
|   | 5    | verify | RF    | BURST (s:= add_A) has the format of "GNS_TYPE4_a".               | G4a | Verify that the transmitted burst has the same format as "GNS_TYPE4_a" set out in burst format section. |
|   | 6    | verify | RF    | GNS_TYPE4_RF_OUT_PARAMETERS(x).                                  |     | Verify that the content of the information output by station under test at the RF PCO is correct.       |
|   | 7    | Endrep |       | next x.  |     | End loop.   |
| postamble   | 8    |        |       |  |     | Bring test equipment into idle state.   |
| <b>Comments:</b>  |      |        |       |  |     |   |

| Test Case Name: |           | ADSB_request_time  |       |  |     |  |
|-----------------|-----------|--|-------|--|-----|--|
| Purpose:        |           | To show that a station requesting the time synchronization information field (information field ID 2) shall only transmit a request to a station that has announced that it is operating with a primary time source (tfom = 0 or 1). |       |  |     |  |
| Context         | Step      | Action   | PCO   | Action Qualifier   | Ref | Comment  |
| preamble        | 1         | do   |       | M_POWER_UP.  |     | Prepare the transceiver for testing.   |
| test body       | 2         | send   | RF    | SYNC_BURST_b (s:= add_B; tfom:= 2).                                      | Sb  | Sync burst from station B, secondary time given.   |
|                 | 3         | send   | RF    | SYNC_BURST_b (s:= add_C; tfom:= 0).                                      | Sb  | Sync burst from station C, certified primary time given.   |
|                 | 4         | send   | RF    | SYNC_BURST_b (s:= add_D; tfom:= 2).                                      | Sb  | Sync burst from station D, secondary time given.   |
|                 | 5         | send   | RF    | SYNC_BURST_b (s:= add_E; tfom:= 1).                                      | Sb  | Sync burst from station E, non-certified primary time given.   |
|                 | 6         | send   | RF    | SYNC_BURST_b (s:= add_F; tfom:= 0).                                      | Sb  | Sync burst from station F, certified primary time given.   |
|                 | 7         | send   | Appln | REQUEST TO TRANSMIT ADS-B REQUEST MESSAGE (s:=add_A; d:=add_B; r-id:=4). |     | Instruct station A via the Appln PCO to send a request burst to station B requesting UTC time information field. |
|                 | 8         | send   | Appln | REQUEST TO TRANSMIT ADS-B REQUEST MESSAGE (s:=add_A; d:=add_C; r-id:=4). |     | Instruct station A via the Appln PCO to send a request burst to station C requesting UTC time information field. |
|                 | 9         | send   | Appln | REQUEST TO TRANSMIT ADS-B REQUEST MESSAGE (s:=add_A; d:=add_D; r-id:=4). |     | Instruct station A via the Appln PCO to send a request burst to station D requesting UTC time information field. |
|                 | 10        | send   | Appln | REQUEST TO TRANSMIT ADS-B REQUEST MESSAGE (s:=add_A; d:=add_E; r-id:=4). |     | Instruct station A via the Appln PCO to send a request burst to station E requesting UTC time information field. |
|                 | 11        | send   | Appln | REQUEST TO TRANSMIT ADS-B REQUEST MESSAGE (s:=add_A; d:=add_F; r-id:=4). |     | Instruct station A via the Appln PCO to send a request burst to station F requesting UTC time information field. |
|                 | 12        | rep 5  |       | n:= 1.   |     | Start loop.  |
|                 | 13        | await  | RF    | ADSB_REQUEST_b (s = add_A).  | ARb | Wait for an ADSB request message.  |
|                 | 14        | record   | RF    | DEST(n) = value of d given in ADSB_REQUEST_b (s = add_A).                | ARb | Record the destination address in the ADSB request.  |
|                 | 15        | verify   | RF    | DEST(n) = add_C, add_E or add_F not add_B or add_D.                      |     | Verify that requests were only sent to those that had declared primary time.                                     |
|                 | 16        | endrep   |       | n:= n + 1.   |     | End loop.  |
|                 | postamble | 17   |       |  |     | Bring test equipment into idle state.  |

**Comments:**

| Test Case Name: <b>ADSB_priority</b>  |      |         |       |   |     |   |
|---|------|---------|-------|---|-----|---|
| Purpose: <b>To show that information fields 0, 1, 2, 3, 4 and A1 hex have priority over other information fields.</b> |      |         |       |   |     |   |
| Context   | Step | Action  | PCO   | Action Qualifier  | Ref | Comment   |
| preamble  | 1    | do      |       | M_POWER_UP.   |     | Prepare the transceiver for testing.  |
|   | 2    | rep 10  |       | n:= 1.  |     | Set n equal to 1.   |
| test body   | 3    | send    | Appln | REQUEST TO TRANSMIT ADS-B REQUEST MESSAGE (SINGLE RESPONSE, AUTONOMOUS SELECTION) TO STATION B. |     | Instruct station A to send an ADS-B request to station B, requesting a single response in the specified slot and autonomous selection of the variable field by station B. |
|   | 4    | await   | RF    | ADSB_REQUEST_a (s:= add_A; d:= add_B) sent by station A.  | ARa | Wait for the ADS-B request to be transmitted by station A.  |
|   | 5    | verify  |       | r-id is equal to one of {0, 1, 2, 3, 4, A1} hex.  |     | Show that station A chooses an information field from the set {0, 1, 2, 3, 4, A1}.  |
|   | 6    | end rep |       | n:= n + 1.  |     | End loop.   |
| postamble   | 7    |         |       |   |     | Bring test equipment into idle state.   |
| <b>Comments:</b>  |      |         |       |   |     |   |

| Test Case Name: <b>ADSB_TCP_flag_C</b>   |      |        |       |   |     |  |
|--|------|--------|-------|---|-----|--|
| Purpose: <b>To show that a ground station, when configured to respond in this way, will request a mobile which has transmitted a TCP/SVQ flag of zero to transmit a sync burst with a two-slot TCP or SVQ variable part.</b> |      |        |       |   |     |  |
| Context  | Step | Action | PCO   | Action Qualifier  | Ref | Comment  |
| preamble   | 1    | do     |       | M_POWER_UP.   |     | Prepare the transceiver for testing.   |
| test body  | 2    | send   | Appln | REQUEST TO RESPOND TO TCP/SVQ FLAG SET TO ZERO WITH ADS-B REQUEST FOR 2-SLOT TCP OR SVQ.                    |     | Configure the station under test to respond to reception of directed sync bursts with TCP/SVQ flag set to zero by issuing an ADSB request for a sync burst with 2-slot TCP or SVQ variable part. |
|  | 3    | send   | RF    | DIR_SYNC_BURST_a (s:= add_B; tqc:= 0).  | DSa | Send a directed sync burst from a simulated station B, with a basic variable part, to the station under test, with the TCP/SVQ flag set to zero.   |
|  | 4    | verify | RF    | ADSB_Request_e (s:= add_A; d:= add_A; sleep:= 0; auto:= 1; r-id:= 8 hex or 5 hex) transmitted by station A. | ARe | Verify that the station under test sends an ADSB request burst addressed to station B, requesting transmission of a sync burst with the 2-slot TCP or SVQ variable field.                        |
| postamble  | 5    |        |       |   |     | Bring test equipment into idle state.  |
| <b>Comments:</b>   |      |        |       |   |     |  |

| Test Case Name: ADSB_DOS_A  |      |        |       |   |     |  |
|---|------|--------|-------|---|-----|--|
| Purpose: To demonstrate that a station will broadcast a Directory of Service message with the correct format. |      |        |       |   |     |  |
| Context   | Step | Action | PCO   | Action Qualifier  | Ref | Comment  |
| preamble  | 1    | do     |       | M_POWER_UP.   |     | Prepare the transceiver for testing.   |
| test body   | 2    | rep x  |       | x:={P,Q,R,S}.   |     | Repeat test for 4 sets of parameters.  |
|   | 3    | send   | Appln | REQUEST TO TRANSMIT DOS MESSAGE (ADSB_DOS_APPIN_PARAMETERS(x)). |     | Send an instruction at the Appln PCO to the station under test to transmit a DOS message.      |
|   | 4    | await  | RF    | BURST (s:= add_A) broadcast by station A.                       |     | Wait for the DOS message to be broadcast by station under test.                                |
|   | 5    | verify | RF    | BURST (s:= add_A) has the format of "CTRL_DOS_a".               | CDa | Verify that the transmitted burst conforms to "CTRL_DOS_a" as set out in burst format section. |
|   | 6    | verify | RF    | ADSB_DOS_RF_OUT_PARAMETERS(x).                                  |     | Verify that the parameters have been correctly encoded in the message.                         |
|   | 7    | endrep |       | next x.   |     |  |
| postamble   | 8    |        |       |   |     | Bring test equipment into idle state.  |
| <b>Comments:</b>  |      |        |       |   |     |  |

| Test Case Name: ADSB_Channel_A  |      |        |       |  |     |   |
|---|------|--------|-------|--|-----|---|
| Purpose: To demonstrate that a station will broadcast a channel management message with the correct format. |      |        |       |  |     |   |
| Context   | Step | Action | PCO   | Action Qualifier   | Ref | Comment   |
| preamble  | 1    | do     |       | M_POWER_UP.  |     | Prepare the transceiver for testing.  |
| test body   | 2    | rep x  |       | x:={P,Q,R,S}.  |     | Repeat test for 4 sets of parameters.   |
|   | 3    | send   | Appln | REQUEST TO TRANSMIT CHANNEL MANAGEMENT MESSAGE (ADSB_CHANNEL_APPIN_PARAMETERS(x)). |     | Send an instruction at the Appln PCO to the station under test to transmit a channel management message including address of station B. |
|   | 4    | await  | RF    | BURST (s:= add_A) broadcast by station A.  |     | Wait for the channel management message to be broadcast by station under test.  |
|   | 5    | verify | RF    | BURST (s:= add_A) has the format of "CTRL_CHAN_k".                                 | CCK | Verify that the transmitted burst conforms to "CTRL_CHAN_k" as set out in burst format section.   |
|   | 6    | verify | RF    | ADSB_CHANNEL_RF_OUT_PARAMETERS(x).   |     | Verify that the parameters have been correctly encoded in the message.  |
|   | 7    | endrep |       | next x.  |     |   |
| postamble   | 8    |        |       |  |     | Bring test equipment into idle state.   |
| <b>Comments:</b>  |      |        |       |  |     |   |

| Test Case Name: ADSB_Channel_B  |      |        |       |  |     |  |
|---|------|--------|-------|--|-----|--|
| Purpose: To demonstrate that a station instructed to cancel its previously issued channel management message will broadcast a channel management message with csid=15, with do pointing to the slot from which cancellation shall begin, and with other subfields the same as the original message. |      |        |       |  |     |  |
| Context   | Step | Action | PCO   | Action Qualifier   | Ref | Comment  |
| preamble  | 1    | do     |       | M_POWER_UP.  |     | Prepare the transceiver for testing.   |
| test body   | 2    | send   | Appln | REQUEST TO TRANSMIT CHANNEL MANAGEMENT MESSAGE (s:= add_A; dt:=5; do:=100; dc:=1; csid:=1; tc:=1; fc:=1; styp:=0; sr:=6; pc:=0; sc:=0; d:= add_B; ido:= 15; id:= id1 hex; aux:= 0; b/g:= 0; f := transmit freq; sleep:= 0; auto:=0; rcv:= 0; Q1:= 10; Q4:= 2; Q2a = 150; Q2b:= 150; Q2c:= 0, Q2d:= 300; TV11min:= 4; TV11max:= 8; V11:= 0; V12:= 10; VS2:= 12; VS4 = 300; nsd:=1; txd:=0; frq:=0). |     | Send an instruction at the Appln PCO to the station under test to transmit a channel management message including address of station B.                                  |
|   | 3    | await  | RF    | CTRL_CHAN_k (s:= add_A) broadcast by station A.  |     | Wait for the channel management message to be broadcast by station A.  |
|   | 4    | send   | Appln | REQUEST TO CANCEL CHANNEL MANAGEMENT MESSAGE.  |     | Send a request to the station under test via the Appln PCO to cancel the management message just sent.   |
|   | 5    | verify | RF    | CTRL_CHAN_k (s:= add_A; dt:=5; do:=2; dc:=1; csid:=15; tc:=1; fc:=1; styp:=0; sr:=6; pc:=0; sc:=0; d:= add_B; ido:= 15; id:= id1 hex; aux:= 0; b/g:= 0; f := transmit freq; sleep:= 0; auto:=0; rcv:= 0; Q1:= 10; Q4:= 2; Q2a = 150; Q2b:= 150; Q2c:= 0, Q2d:= 300; TV11min:= 4; TV11max:= 8; V11:= 0; V12:= 10; VS2:= 12; VS4 = 300; nsd:=1; txd:=0; frq:=0).                                     |     | Verify that the station under test issues a channel management message with the same parameters as before but with csid = 15 and "do" set to the minimum value possible. |
| postamble   | 6    |        |       |  |     | Bring test equipment into idle state.  |
| <b>Comments:</b>  |      |        |       |  |     |  |

| Test Case Name: ADSB_Channel_C  |      |        |       |   |     |  |
|---|------|--------|-------|---|-----|--|
| Purpose: To demonstrate that a station will broadcast a channel management message with repeated script block elements with the correct format. |      |        |       |   |     |  |
| Context   | Step | Action | PCO   | Action Qualifier  | Ref | Comment  |
| preamble  | 1    | do     |       | M_POWER_UP.   |     | Prepare the transceiver for testing.   |
| test body   | 2    | send   | Appln | REQUEST TO TRANSMIT CHANNEL MANAGEMENT MESSAGE (s:= add_A; dt:=5; do:=100; dc:=1; csid:=1; tc:=1; fc:=1; styp:=0; sr:=6; pc:=0; sc:=1; d:= add_B; ido:= 15; id:= id1 hex; aux:= 0; b/g:= 0; f := transmit freq; sleep:= 0; auto:=0; rcv:= 0; Q1:= 10; Q4:= 2; Q2a = 150; Q2b:= 150; Q2c:= 0, Q2d:= 300; TV11min:= 4; TV11max:= 8; V11:= 0; V12:= 10; VS2:= 12; VS4 = 300; nsd:=1; txd:=0; frq:=0; rpt:= 0). |     | Send an instruction at the Appln PCO to the station under test to transmit a channel management message including address of station B, which specifies three repeats of one script element. |
|   | 3    | await  | RF    | CTRL_CHAN_k (s:= add_A) broadcast by station A.   | Cck | Wait for the channel management message to be broadcast by station A.  |
|   | 4    | verify | RF    | CTRL_CHAN_k (s:= add_A) does not include two consecutive repeat count octets.   | Cck | Verify that the transmitted burst does not include two consecutive repeat count octets.  |
| postamble   | 5    |        |       |   |     | Bring test equipment into idle state.  |
| <b>Comments:</b>  |      |        |       |   |     |  |

| Test Case Name: ADSB_Channel_D  |      |        |       |  |     |   |
|---|------|--------|-------|--|-----|---|
| Purpose: To demonstrate that a station will broadcast a channel management message with a regional multicast with the correct format. |      |        |       |  |     |   |
| Context   | Step | Action | PCO   | Action Qualifier   | Ref | Comment   |
| preamble  | 1    | do     |       | M_POWER_UP.  |     | Prepare the transceiver for testing.  |
| test body   | 2    | rep x  |       | x:={P,Q,R,S}.  |     | Repeat test for 4 sets of parameters.   |
|   | 3    | send   | Appln | REQUEST TO TRANSMIT CHANNEL MANAGEMENT MESSAGE (ADSB_CHANNEL_D_APPIN_PARAMETERS(x)). |     | Send an instruction at the Appln PCO to the station under test to transmit a regional multicast channel management message. |
|   | 4    | await  | RF    | BURST (s:= add_A) broadcast by station A.  |     | Wait for the channel management message to be broadcast by station under test.  |
|   | 5    | verify | RF    | BURST (s:= add_A) has the format of "CTRL_CHAN_p".                                   | CCp | Verify that the transmitted burst conforms to "CTRL_CHAN_p" as set out in burst format section.                             |
|   | 6    | verify | RF    | ADSB_CHANNEL_RF_OUT_PARAMETERS(x).   |     | Verify that the parameters have been correctly encoded in the message.  |
|   | 7    | endrep |       | next x.  |     |   |
| postamble   | 8    |        |       |  |     | Bring test equipment into idle state.   |
| <b>Comments:</b>  |      |        |       |  |     |   |

| Test Case Name:  |      | ADSB_Directed_Slot_A   |       |  |     |  |
|------------------|------|--|-------|--|-----|--|
| Purpose:         |      | To demonstrate that a station broadcasting a channel management message with a non-zero individual offset for a destination station shall ensure that the slot referred to has been reserved using block protocols or ground quarantine. |       |  |     |  |
| Context          | Step | Action   | PCO   | Action Qualifier   | Ref | Comment  |
| preamble         | 1    | do   |       | M_POWER_UP.  |     | Prepare the transceiver for testing.   |
| test body        | 2    | send   | Appln | REQUEST TO RESERVE BLOCKS WITH SECOND FRAME RESERVATION (s:=add_B; sz:=20; vt:=6), REPEATING RESERVATION CONTINUOUSLY.   |     | Instruct the station under test to establish on a continuous basis reserved blocks of 20 slots with the second frame reservation protocol, each reservation lasting for 6 superframes. |
|                  | 3    | await  | RF    | SECOND_BLOCK_a (s=add_A; sz=20; vt=6).   | SCa | Wait for the second frame block reservation to be transmitted.   |
|                  | 4    | send   | Appln | REQUEST TO TRANSMIT CHANNEL MANAGEMENT MESSAGE (s:= add_A; dt:=5; do:=100; dc:=1; csid:=1; tc:=1; fc:=1; styp:=0; sr:=6; pc:=0; sc:=0; d:= add_B; ido:= 15; id:= id1 hex; aux:= 0; b/g:= 0; f := transmit freq; sleep:= 0; auto:=0; rcv:= 0; Q1:= 10; Q4:= 2; Q2a = 150; Q2b:= 150; Q2c:= 0, Q2d:= 300; TV11min:= 4; TV11max:= 8; V11:= 0; V12:= 10; VS2:= 12; VS4 = 300; nsd:=1; txd:=0; frq:=0). |     | Send an instruction at the Appln PCO to the station under test to transmit a channel management message with non-zero ido with address of station B.                                   |
|                  | 5    | await  | RF    | CTRL_CHAN_k (s:= add_A) broadcast by station A.  | CCK | Wait for the channel management message to be broadcast by station A.  |
|                  | 6    | verify   | RF    | CTRL_CHAN_k (s:= add_A) sent in first five slots of UTC s.   | CCK | Verify that the transmitted burst is transmitted in one of five slots that will put the slot referred to by the ido parameter within a protected block.                                |
| postamble        | 7    |  |       |  |     | Bring test equipment into idle state.  |
| <b>Comments:</b> |      |  |       |  |     |  |

| Test Case Name: ADSB_Basic_Ground_A  |      |        |       |  |     |   |
|--|------|--------|-------|--|-----|---|
| Purpose: To demonstrate that a station will broadcast a basic ground sync burst message with the correct format. |      |        |       |  |     |   |
| Context  | Step | Action | PCO   | Action Qualifier   | Ref | Comment   |
| preamble   | 1    | do     |       | M_POWER_UP.  |     | Prepare the transceiver for testing.  |
| test body  | 2    | rep x  |       | x:={P,Q,R,S}.  |     | Repeat test for 4 sets of parameters.   |
|  | 2    | send   | Appln | REQUEST TO TRANSMIT BASIC GROUND SYNC BURST (ADSB_BASIC_GROUND_APPIN_PARAMETERS(x)). |     | Send an instruction at the Appln PCO to the station under test to transmit a basic ground sync burst.       |
|  | 3    | await  | RF    | BURST (s:= add_A) broadcast by station A.  |     | Wait for the message to be broadcast by the station under test.   |
|  | 4    | verify | RF    | BURST (s:= add_A) has the format of "SYNC_BASIC_GROUND_a".                           | BGa | Verify that the transmitted burst conforms to "SYNC_BASIC_GROUND_a" as set out in the burst format section. |
|  | 5    | verify | RF    | ADSB_BASIC_GROUND_RF_OUT_PARAMETER S(x).   |     | Verify that the parameters have been correctly encoded in the message.                                      |
|  | 6    | endrep |       | next x.  |     | Go to next parameter set.   |
| postamble  | 7    |        |       |  |     | Bring test equipment into idle state.   |
| <b>Comments:</b>   |      |        |       |  |     |   |

| Test Case Name: ADSB.UTC_Time_A  |      |        |       |  |     |   |
|--|------|--------|-------|--|-----|---|
| Purpose: To demonstrate that a station will broadcast a UTC time sync burst message with the correct format. |      |        |       |  |     |   |
| Context  | Step | Action | PCO   | Action Qualifier   | Ref | Comment   |
| preamble   | 1    | do     |       | M_POWER_UP.  |     | Prepare the transceiver for testing.  |
| test body  | 2    | rep x  |       | x:={P,Q,R,S}.  |     | Repeat test for 4 sets of parameters  |
|  | 2    | send   | Appln | REQUEST TO TRANSMIT A UTC TIME SYNC BURST (ADSB.UTC_TIME_APPIN_PARAMETERS(x)). |     | Send an instruction at the Appln PCO to the station under test to transmit a UTC time sync burst.       |
|  | 3    | await  | RF    | BURST (s:= add_A) broadcast by station A.                                      |     | Wait for the message to be broadcast by the station under test.   |
|  | 4    | verify | RF    | BURST (s:= add_A) has the format of "SYNC.UTC_TIME_a".                         | SBa | Verify that the transmitted burst conforms to "SYNC.UTC_TIME_a" as set out in the burst format section. |
|  | 5    | verify | RF    | ADSB.UTC_TIME_RF_OUT_PARAMETERS(x).  |     | Verify that the parameters have been correctly encoded in the message.                                  |
|  | 6    | endrep |       | next x.  |     | Go to next parameter set.   |
| postamble  | 7    |        |       |  |     | Bring test equipment into idle state.   |
| <b>Comments:</b>   |      |        |       |  |     |   |



| Test Case Name: ADSB_Basic_Rec_A   |      |        |        |  |     |   |
|--|------|--------|--------|--|-----|---|
| Purpose: To demonstrate that a station will correctly process a received basic sync burst. |      |        |        |  |     |   |
| Context  | Step | Action | PCO    | Action Qualifier                               | Ref | Comment   |
| preamble   | 1    | do     |        | M_POWER_UP.                                    |     | Prepare the transceiver for testing.  |
| test body  | 2    | rep x  |        | x:= {P, Q, R, S}.                              |     | Repeat test for 4 different sets of parameters.   |
|  | 2    | send   | RF     | SYNC_BASIC_a (ADSB_BASIC_RF_IN_PARAMETERS(x)). | SBa | Send a message to the station under test from a simulated station B.                                      |
|  | 3    | await  | AppOut | SYNC_BASIC_a MESSAGE INFORMATION.              | SBa | Wait for the message information to be output by the station under test at the AppOut PCO.                |
|  | 4    | verify | AppOut | ADSB_BASIC_APPOUT_PARAMETERS(x).               |     | Verify that the content of the information output by the station under test at the AppOut PCO is correct. |
|  | 5    | endrep |        | next x.  |     | Go to next parameter set.   |
| postamble  | 6    |        |        |  |     | Bring test equipment into idle state.   |
| <b>Comments:</b>   |      |        |        |  |     |   |

| Test Case Name: ADSB_High_Dynamic_Rec_A   |      |        |        |  |     |   |
|---|------|--------|--------|--|-----|---|
| Purpose: To demonstrate that a station will correctly process a received high dynamic sync burst. |      |        |        |  |     |   |
| Context   | Step | Action | PCO    | Action Qualifier   | Ref | Comment   |
| preamble  | 1    | do     |        | M_POWER_UP.  |     | Prepare the transceiver for testing.  |
| test body   | 2    | rep x  |        | x:= {P, Q, R, S}.  |     | Repeat test for 4 different sets of parameters.   |
|   | 2    | send   | RF     | SYNC_HIGH_DYNAMIC_a (ADSB_HIGH_DYNAMIC_RF_IN_PARAMETERS(x)). | SHa | Send a message to the station under test from a simulated station B.                                      |
|   | 3    | await  | AppOut | SYNC_HIGH_DYNAMIC_a MESSAGE INFORMATION.                     | SHa | Wait for the message information to be output by the station under test at the AppOut PCO.                |
|   | 4    | verify | AppOut | ADSB_HIGH_DYNAMIC_APPOUT_PARAMETERS(x).                      |     | Verify that the content of the information output by the station under test at the AppOut PCO is correct. |
|   | 5    | endrep |        | next x.  |     | Go to next parameter set.   |
| postamble   | 6    |        |        |  |     | Bring test equipment into idle state.   |
| <b>Comments:</b>  |      |        |        |  |     |   |

| Test Case Name: <b>ADSB_Full_Position_Rec_A</b>   |      |        |        |   |     |   |
|---|------|--------|--------|---|-----|---|
| Purpose: <b>To demonstrate that a station will correctly process a received full position sync burst.</b> |      |        |        |   |     |   |
| Context   | Step | Action | PCO    | Action Qualifier  | Ref | Comment   |
| preamble  | 1    | do     |        | M_POWER_UP.   |     | Prepare the transceiver for testing.  |
| test body   | 2    | rep x  |        | x:= {P, Q, R, S}.   |     | Repeat test for 4 different sets of parameters.   |
|   | 2    | send   | RF     | SYNC_FULL_POSITION_a<br>(ADSB_FULL_POSITION_RF_IN_PARAMETERS(x)). | SPa | Send a message to the station under test from a simulated station B.                                      |
|   | 3    | await  | AppOut | SYNC_FULL_POSITION_a MESSAGE<br>INFORMATION.                      | SPa | Wait for the message information to be output by the station under test at the AppOut PCO.                |
|   | 4    | verify | AppOut | ADSB_FULL_POSITION_APPOUT_PARAMETERS(x).                          |     | Verify that the content of the information output by the station under test at the AppOut PCO is correct. |
|   | 5    | endrep |        | next x.   |     | Go to next parameter set.   |
| postamble   | 6    |        |        |   |     | Bring test equipment into idle state.   |
| <b>Comments:</b>  |      |        |        |   |     |   |

| Test Case Name: <b>ADSB_Two_Slot_TCP/SVQ_Rec_A</b>  |      |        |        |   |     |   |
|---|------|--------|--------|---|-----|---|
| Purpose: <b>To demonstrate that a station will correctly process a received two slot TCP/SVQ message.</b> |      |        |        |   |     |   |
| Context   | Step | Action | PCO    | Action Qualifier  | Ref | Comment   |
| preamble  | 1    | do     |        | M_POWER_UP.   |     | Prepare the transceiver for testing.  |
| test body   | 2    | rep x  |        | x:= {P, Q, R, S}.   |     | Repeat test for 4 different sets of parameters.   |
|   | 2    | send   | RF     | SYNC_TWO_SLOT_TCP/SVQ_a<br>(ADSB_TWO_SLOT_TCP/SVQ_RF_IN_PARAMETERS(x)). | STa | Send a message to the station under test from a simulated station B.                                      |
|   | 3    | await  | AppOut | SYNC_TWO_SLOT_TCP/SVQ_a MESSAGE<br>INFORMATION.                         | STa | Wait for the message information to be output by the station under test at the AppOut PCO.                |
|   | 4    | verify | AppOut | ADSB_TWO_SLOT_TCP/SVQ_APPOUT_PARAMETERS(x).                             |     | Verify that the content of the information output by the station under test at the AppOut PCO is correct. |
|   | 5    | endrep |        | next x.   |     | Go to next parameter set.   |
| postamble   | 6    |        |        |   |     | Bring test equipment into idle state.   |
| <b>Comments:</b>  |      |        |        |   |     |   |

| Test Case Name: <b>ADSB_Single_Slot_TCP_Rec_A</b>  |      |        |        |  |     |   |
|--|------|--------|--------|--|-----|---|
| Purpose: <b>To demonstrate that a station will correctly process a received single slot TCP message.</b> |      |        |        |  |     |   |
| Context  | Step | Action | PCO    | Action Qualifier   | Ref | Comment   |
| preamble   | 1    | do     |        | M_POWER_UP.  |     | Prepare the transceiver for testing.  |
| test body  | 2    | rep x  |        | x:= {P, Q, R, S}.  |     | Repeat test for 4 different sets of parameters.   |
|  | 2    | send   | RF     | SYNC_SINGLE_SLOT_TCP_a (ADSB_SINGLE_SLOT_TCP_RF_IN_PARAMETERS(x)). | SSa | Send a message to the station under test from a simulated station B.                                      |
|  | 3    | await  | AppOut | SYNC_SINGLE_SLOT_TCP_a MESSAGE INFORMATION.                        | SSa | Wait for the message information to be output by the station under test at the AppOut PCO.                |
|  | 4    | verify | AppOut | ADSB_SINGLE_SLOT_TCP_APPOUT_PARAMETERS(x).                         |     | Verify that the content of the information output by the station under test at the AppOut PCO is correct. |
|  | 5    | endrep |        | next x.  |     | Go to next parameter set.   |
| postamble  | 6    |        |        |  |     | Bring test equipment into idle state.   |
| <b>Comments:</b>   |      |        |        |  |     |   |

| Test Case Name: <b>ADSB_Single_Slot_SVQ_Rec_A</b>  |      |        |        |  |     |   |
|--|------|--------|--------|--|-----|---|
| Purpose: <b>To demonstrate that a station will correctly process a received single slot SVQ message.</b> |      |        |        |  |     |   |
| Context  | Step | Action | PCO    | Action Qualifier   | Ref | Comment   |
| preamble   | 1    | do     |        | M_POWER_UP.  |     | Prepare the transceiver for testing.  |
| test body  | 2    | rep x  |        | x:= {P, Q, R, S}.  |     | Repeat test for 4 different sets of parameters.   |
|  | 2    | send   | RF     | SYNC_SINGLE_SLOT_SVQ_a (ADSB_SINGLE_SLOT_SVQ_RF_IN_PARAMETERS(x)). | SVa | Send a message to the station under test from a simulated station B.                                      |
|  | 3    | await  | AppOut | SYNC_SINGLE_SLOT_SVQ_a MESSAGE INFORMATION.                        | SVa | Wait for the message information to be output by the station under test at the AppOut PCO.                |
|  | 4    | verify | AppOut | ADSB_SINGLE_SLOT_SVQ_APPOUT_PARAMETERS(x).                         |     | Verify that the content of the information output by the station under test at the AppOut PCO is correct. |
|  | 5    | endrep |        | next x.  |     | Go to next parameter set.   |
| postamble  | 6    |        |        |  |     | Bring test equipment into idle state.   |
| <b>Comments:</b>   |      |        |        |  |     |   |

| Test Case Name: <b>ADSB_Aircraft_Data_Rec_A</b>  |      |        |        |   |     |   |
|--|------|--------|--------|---|-----|---|
| Purpose: <b>To demonstrate that a station will correctly process a received aircraft data message.</b> |      |        |        |   |     |   |
| Context  | Step | Action | PCO    | Action Qualifier  | Ref | Comment   |
| preamble   | 1    | do     |        | M_POWER_UP.   |     | Prepare the transceiver for testing.  |
| test body  | 2    | rep x  |        | x:= {P, Q, R, S}.   |     | Repeat test for 4 different sets of parameters.   |
|  | 2    | send   | RF     | SYNC_AIRCRAFT_DATA_a<br>(ADSB_AIRCRAFT_DATA_RF_IN_PARAMETERS(x)). | SDa | Send a message to the station under test from a simulated station B.                                      |
|  | 3    | await  | AppOut | SYNC_AIRCRAFT_DATA_a MESSAGE<br>INFORMATION.                      | SDa | Wait for the message information to be output by the station under test at the AppOut PCO.                |
|  | 4    | verify | AppOut | ADSB_AIRCRAFT_DATA_APPOUT_PARAMETERS(x)                           |     | Verify that the content of the information output by the station under test at the AppOut PCO is correct. |
|  | 5    | endrep |        | next x.   |     | Go to next parameter set.   |
| postamble  | 6    |        |        |   |     | Bring test equipment into idle state.   |
| <b>Comments:</b>   |      |        |        |   |     |   |

| Test Case Name: <b>ADSB_High_Resolution_Rec_A</b>  |      |        |        |   |     |   |
|--|------|--------|--------|---|-----|---|
| Purpose: <b>To demonstrate that a station will correctly process a received high resolution message.</b> |      |        |        |   |     |   |
| Context  | Step | Action | PCO    | Action Qualifier  | Ref | Comment   |
| preamble   | 1    | do     |        | M_POWER_UP.   |     | Prepare the transceiver for testing.  |
| test body  | 2    | rep x  |        | x:= {P, Q, R, S}.   |     | Repeat test for 4 different sets of parameters.   |
|  | 2    | send   | RF     | SYNC_HIGH_RESOLUTION_a<br>(ADSB_HIGH_RESOLUTION_RF_IN_PARAMETERS(x)). | SRa | Send a message to the station under test from a simulated station B.                                      |
|  | 3    | await  | AppOut | SYNC_HIGH_RESOLUTION_a MESSAGE<br>INFORMATION.                        | SRa | Wait for the message information to be output by the station under test at the AppOut PCO.                |
|  | 4    | verify | AppOut | ADSB_HIGH_RESOLUTION_APPOUT_PARAMETERS(x)                             |     | Verify that the content of the information output by the station under test at the AppOut PCO is correct. |
|  | 5    | endrep |        | next x.   |     | Go to next parameter set.   |
| postamble  | 6    |        |        |   |     | Bring test equipment into idle state.   |
| <b>Comments:</b>   |      |        |        |   |     |   |

| Test Case Name:  |      | CPR_Encode_Offset |          |  |                 |   |
|--|------|-------------------|----------|--|-----------------|---|
| Purpose: To demonstrate that offset latitude and longitude positions are correctly encoded in the sync burst information fields using the CPR algorithm. |      |                   |          |  |                 |   |
| Context  | Step | Action            | PCO      | Action Qualifier   | Ref             | Comment   |
| preamble   | 1    | do                |          | M_POWER_UP.  |                 | Prepare the transceiver for testing.  |
|  | 2    | send              | VSS      | SUPPRESS AUTONOMOUS SYNC BURSTS.   |                 | Suppress the autonomous sync bursts to avoid possible confliction.  |
|  | 3    | send              | VSS      | SET PARAMETERS (p:= 1).  |                 | Ensure 100 % chance of transmission on access to hasten sync burst responses following a general request.   |
| test body  | 4    | rep 2166          |          | n:= 1; initialize p.   |                 |   |
|  | 5    | send              | Position | Input to station under test:<br>LAT(n):= 12,8557 + n × 0,163<br>LON(n):= -0,8150 + n × 0,163   | CE(r, c)        | Send test values of latitude and longitude from CPR_ENC_TABLE to the station under test.  |
|  | 6    | rep 135           |          | k:= 1  |                 |   |
|  | 7    | do                |          | <b>IF</b><br>LAT(n) = CPR_ENC_TABLE (k, latitude) for row k of table<br><b>AND</b><br>LON(n) = CPR_ENC_TABLE (k, longitude) for row k of table<br><b>THEN</b><br>p:= k<br>continue with following test steps within loop using current p value<br><b>ELSE</b><br>go to next n bypassing all the steps before the end of the loop |                 |   |
|  | 8    | endrep            |          | k:= k + 1.   |                 |   |
|  | 9    | send              | RF       | ADSB_REQ_a (r-id:= 2 hex; s= add_B)  | ADa             | Send a General Request burst from a simulated station B, requesting the station under test to transmit a sync burst with a full position variable information field.  |
|  | 10   | await             | RF       | SYNC_BURST_g (s= add_A)  | Sg              |   |
|  | 11   | do                |          | <b>IF</b><br>cprf in fixed part of SYNC_BURST_g (s= add_A) equals 0<br><b>THEN</b><br>continue with following test steps within n loop<br><b>ELSE</b><br>exit n loop and start n loop again with n:=1  |                 | Restart n loop if for the first pair of latitude and longitude values which coincides with those in the first row of CPR_ENC_TABLE, the CPR type cprf is not zero.<br><br>Note: The test values provided in the CPR_ENC_TABLE can only be used if the CPR type happens to correspond to the type for which the test values were calculated. If this is not the case when the n test loop starts for the first time, the n test loop must be restarted until this happens. |
|  | 12   | verify            | RF       | In fixed part of SYNC_BURST_g (s= add_A):<br>cprf = CPR_ENC_TABLE (p, cpr_type)  | Sg,<br>CE(r, c) | Verify that the encoded values of latitude, longitude, and CPR type in the sync burst from the station under test agree with the values given in CPR_ENC_TABLE.   |
|  |      | verify            | RF       | <b>AND</b><br>lat = CPR_ENC_TABLE (p, lat_enc)   |                 |   |
|  |      | verify            | RF       | <b>AND</b><br>lon = CPR_ENC_TABLE (p, lon_enc)   |                 |   |

| Test Case Name:  |      | CPR_Encode_Offset |     |  |                 |  |
|--|------|-------------------|-----|--|-----------------|--|
| Purpose: To demonstrate that offset latitude and longitude positions are correctly encoded in the sync burst information fields using the CPR algorithm. |      |                   |     |  |                 |  |
| Context  | Step | Action            | PCO | Action Qualifier   | Ref             | Comment  |
|  | 13   | verify            | RF  | In variable part of SYNC_BURST_g (s= add_A):<br>pid = CPR_ENC_TABLE (p, pid_enc)<br><b>AND</b><br>lat6(bits 1-5) = CPR_ENC_TABLE (p, lat6(1-5))<br><b>AND</b><br>lat6(bit 6) = CPR_ENC_TABLE (p, lat6(6))<br><b>AND</b><br>lon6(bits 1-5) = CPR_ENC_TABLE (p, lon6(1-5))<br><b>AND</b><br>lon6(bit 6) = CPR_ENC_TABLE (p, lon6(6)) | Sg,<br>CE(r, c) | Verify that the encoded values of pid, lat6, and lon6 in the variable part of the sync burst from the station under test agree with the values given in CPR_ENC_TABLE. |
|  | 14   | send              | RF  | ADSB_REQ_a (r-id:= 1 hex; s= add_B).   | ADa             | Send a General Request burst from a simulated station B, requesting the station under test to transmit a sync burst with a high dynamic variable information field.    |
|  | 15   | await             | RF  | SYNC_BURST_h (s= add_A).   | Sh              |  |
|  | 16   | verify            | RF  | In variable part of SYNC_BURST_h (s= add_A):<br>lat4(bits 1-3) = CPR_ENC_TABLE (p, lat4(1-3))<br><b>AND</b><br>lat4(bit 4) = CPR_ENC_TABLE (p, lat4(4))<br><b>AND</b><br>lon4(bits 1-3) = CPR_ENC_TABLE (p, lon4(1-3))<br><b>AND</b><br>lon4(bit 4) = CPR_ENC_TABLE (p, lon4(4))   | Sh,<br>CE(r, c) | Verify that the encoded values of lat4 and lon4 in the variable part of the sync burst from the station under test agree with the values given in CPR_ENC_TABLE.       |
|  | 17   | send              | RF  | ADSB_REQ_a (r-id:= AA0 hex; s= add_B).   | ADa             | Send a General Request burst from a simulated station B, requesting the station under test to transmit a sync burst with a high resolution variable information field. |
|  | 18   | await             | RF  | SYNC_BURST_i (s= add_A)  | Si              |  |
|  | 19   | verify            | RF  | In variable part of SYNC_BURST_i (s= add_A):<br>lat8(bits 1-7) = CPR_ENC_TABLE (p, lat8(1-7))<br><b>AND</b><br>lat8(bit 8) = CPR_ENC_TABLE (p, lat8(8))<br><b>AND</b><br>lon8(bits 1-7) = CPR_ENC_TABLE (p, lon8(1-7))<br><b>AND</b><br>lon8(bit 8) = CPR_ENC_TABLE (p, lon8(8))   | Si,<br>CE(r, c) | Verify that the encoded values of lat8 and lon8 in the variable part of the sync burst from the station under test agree with the values given in CPR_ENC_TABLE.       |
|  | 20   | endrep            |     | n:= n + 1.   |                 |  |
| postamble  | 21   | send              | VSS | SET PARAMETERS (p:= 64/256).   |                 | Restore to default value.  |
|  | 22   | send              | VSS | REINSTATE AUTONOMOUS SYNC BURSTS.  |                 | Reinstate the autonomous sync bursts.  |
| <b>Comments:</b>   |      |                   |     |  |                 |  |

| Test Case Name:  |      | CPR_Decode_Offset |        |  |                 |   |
|--|------|-------------------|--------|--|-----------------|---|
| Purpose: To demonstrate that offset latitude and longitude positions are correctly decoded from the sync burst information fields using the CPR algorithm. |      |                   |        |  |                 |   |
| Context  | Step | Action            | PCO    | Action Qualifier   | Ref             | Comment   |
| preamble   | 1    | do                |        | M_POWER_UP.  |                 | Prepare the transceiver for testing.  |
|  | 2    | send              | VSS    | SUPPRESS AUTONOMOUS SYNC BURSTS.   |                 | Suppress the autonomous sync bursts to avoid possible confliction.  |
|  | 3    | send              | VSS    | SET PARAMETERS (G1:= 10).  |                 | Set the maximum number of missed reservations to 10.  |
| test body  | 4    | rep 135           |        | n:= 1.   |                 |   |
|  | 5    | send              | RF     | SYNC_BURST_g (po:= 0; pt:= 0; s:= add_B;<br>lat:= CPR_ENC_TABLE (n, lat_enc);<br>lon:= CPR_ENC_TABLE (n, lon_enc);<br>lat6(bits 1-5):= CPR_ENC_TABLE (n, lat6(1-5));<br>lat6(bit 6):= CPR_ENC_TABLE (n, lat6(6));<br>lon6(bits 1-5):= CPR_ENC_TABLE (n, lon6(1-5))<br>lon6(bit 6):= CPR_ENC_TABLE (n, lon6(6))). | Sg,<br>CE(r, c) | Send a sync burst from a simulated station B with a basic variable information field.<br>The encoded values for lat and lon in the fixed part of the burst, and for lat6 and lon6 in the variable part, are taken from row n of CPR_ENC_TABLE.              |
|  | 6    | await             | AppOut | LAT DATA OUT, LON DATA OUT.  |                 | Wait for the received sync burst to be processed by the station under test and sent to the ADS application output.  |
|  | 7    | verify            | AppOut | LAT DATA OUT = CPR_DEC_TABLE (n, decoded 6-bit high-res lat)<br><b>AND</b><br>LON DATA OUT = CPR_DEC_TABLE (n, decoded 6-bit high-res lon).  | CD(r, c)        | Verify that the station under test processes the data and generates the appropriate output for display to the aircrew.  |
|  | 8    | send              | RF     | SYNC_BURST_j (po:= 0; pt:= 0; s:= add_B;<br>lat:= CPR_ENC_TABLE (n, lat_enc);<br>lon:= CPR_ENC_TABLE (n, lon_enc);<br>lat4(bits 1-3):= CPR_ENC_TABLE (n, lat4(1-3));<br>lat4(bit 4):= CPR_ENC_TABLE (n, lat4(4));<br>lon4(bits 1-3):= CPR_ENC_TABLE (n, lon4(1-3))<br>lon4(bit 4):= CPR_ENC_TABLE (n, lon4(4))). | Sj,<br>CE(r, c) | Send a sync burst from a simulated station B with a high dynamic variable information field.<br>The encoded values for lat and lon in the fixed part of the burst, and for pid, lat4, and lon4 in the variable part, are taken from row n of CPR_ENC_TABLE. |
|  | 9    | await             | AppOut | LAT DATA OUT, LON DATA OUT.  |                 | Wait for the received sync burst to be processed by the station under test and sent to the ADS application output.  |
|  | 10   | verify            | AppOut | LAT DATA OUT = CPR_DEC_TABLE (n, decoded 4-bit high-res lat)<br><b>AND</b><br>LON DATA OUT = CPR_DEC_TABLE (n, decoded 4-bit high-res lon).  | CD(r, c)        | Verify that the station under test processes the data and generates the appropriate output for display to the aircrew.  |
|  | 11   | send              | RF     | SYNC_BURST_i (po:= 0; pt:= 0; s:= add_B;<br>lat:= CPR_ENC_TABLE (n, lat_enc);<br>lon:= CPR_ENC_TABLE (n, lon_enc);<br>lat8(bits 1-7):= CPR_ENC_TABLE (n, lat8(1-7));<br>lat8(bit 8):= CPR_ENC_TABLE (n, lat8(8));<br>lon8(bits 1-7):= CPR_ENC_TABLE (n, lon8(1-7))<br>lon8(bit 8):= CPR_ENC_TABLE (n, lon8(8))). | Si,<br>CE(r, c) | Send a sync burst from a simulated station B with a high resolution information field.<br>The encoded values for lat and lon in the fixed part of the burst, and for lat8 and lon8 in the variable part, are taken from row n of CPR_ENC_TABLE.             |
|  | 12   | await             | AppOut | LAT DATA OUT, LON DATA OUT   |                 | Wait for the received sync burst to be processed by the station under test and sent to the ADS application output.  |

| Test Case Name: CPR_Decode_Offset  |      |        |        |   |          |  |
|--|------|--------|--------|---|----------|--|
| Purpose: To demonstrate that offset latitude and longitude positions are correctly decoded from the sync burst information fields using the CPR algorithm. |      |        |        |   |          |  |
| Context  | Step | Action | PCO    | Action Qualifier  | Ref      | Comment  |
|  | 13   | verify | AppOut | LAT DATA OUT = CPR_DEC_TABLE (n, decoded 8-bit high-res lat)<br><b>AND</b><br>LON DATA OUT = CPR_DEC_TABLE (n, decoded 8-bit high-res lon). | CD(r, c) | Verify that the station under test processes the data and generates the appropriate output for display to the aircrew. |
|  | 14   | endrep |        | n:= n + 1.  |          |  |
| postamble  | 15   | send   | VSS    | SET PARAMETERS (G1:= 3).  |          | Restore to default value.  |
|  | 16   | send   | VSS    | REINSTATE AUTONOMOUS SYNC BURSTS.   |          | Reinstate the autonomous sync bursts.  |
| <b>Comments:</b> Not reviewed by MGS.  |      |        |        |   |          |  |

| Test Case Name: TIS_Manage_C   |      |        |       |   |     |  |
|--|------|--------|-------|---|-----|--|
| Purpose: To demonstrate that a station will transmit management messages once in each TIS-B update period. |      |        |       |   |     |  |
| Context  | Step | Action | PCO   | Action Qualifier  | Ref | Comment  |
| preamble   | 1    | do     |       | M_POWER_UP.   |     | Prepare the transceiver for testing.   |
| test body  | 2    | rep 3  |       | t:= {6, 21, 61}.  |     | Start loop for repeat of the test with update periods of 5 s, 20 s, and 60 s.                                    |
|  | 3    | send   | AppIn | REQUEST TO TRANSMIT MANAGEMENT MESSAGE (s:= add_A; up:= t; tmi:= 0).                  |     | Instruct the station under test to transmit regular management messages according to the required update period. |
|  | 4    | await  | RF    | TIS_MAN_a (s:= add_A) transmitted by station under test.                              | TMa | Wait for the first management message to be transmitted by the station under test.                               |
|  | 5    | record | RF    | manage_time:= time at beginning of slot in which TIS_MAN_a (s = add_A) was broadcast. | TMa | Record the time at which the management message was broadcast.   |
|  | 6    | rep 10 |       | n:= 1.  |     | Start loop to count 10 bursts.   |
|  | 7    | wait   |       | time = manage_time + (n - 0,2) x (t - 1).   | TMa | Wait for time t minutes less 20 % of a period.   |
|  | 8    | verify | RF    | TIS_MAN_a received before time = manage_time + (n + 0,2) x (t - 1).                   | TMa | Verify that before time t minutes plus 20 % of a period, a management message has been received.                 |
|  | 9    | endrep |       | n:= n+ 1.   |     | Repeat with n incremented.   |
|  | 10   | endrep |       | next t.   |     | Repeat with the next update period.  |
| postamble  | 11   |        |       |   |     | Bring test equipment into idle state.  |
| <b>Comments:</b>   |      |        |       |   |     |  |



| Test Case Name:  |      | TIS_Manage_B   |       |  |     |   |
|------------------|------|--|-------|--|-----|---|
| Purpose:         |      | To demonstrate that the transmission of the management message for the following TIS-B period shall not be initiated before all target messages of the current TIS-B period are transmitted. |       |  |     |   |
| Context          | Step | Action   | PCO   | Action Qualifier   | Ref | Comment   |
| preamble         | 1    | do   |       | M_POWER_UP.  |     | Prepare the transceiver for testing.  |
| test body        | 2    | rep t  |       | t:= {6, 21, 61}.   |     | Input update periods as 5 s, 20 s, and 60 s respectively.   |
|                  | 3    | send   | Appln | REQUEST TO TRANSMIT MANAGEMENT MESSAGE (s:= add_A; up:= t; tmi:= 0).   |     | Instruct the station under test to transmit regular management messages according to the required update period.                                |
|                  | 4    | send   | Appln | REQUEST TO TRANSMIT AIRCRAFT AIRBORNE TARGET MESSAGE (s:= add_A; tmi:= 1; tivid:= 1; tflg:= 0; rflg:= 0; adsff:=0; rlat:= 10; rlg:= 12; bar:= 1000; aflg:= 1; gsp:= 350; gtk:= 5; tag:= 1; fidflg:= 1; fidty:= 1; call:= BA1234; cat:= 2). |     | Instruct the station under test to transmit a target message for aircraft BA1234.   |
|                  | 5    | send   | Appln | REQUEST TO TRANSMIT AIRCRAFT AIRBORNE TARGET MESSAGE (s:= add_A; tmi:= 1; tivid:= 1; tflg:= 0; rflg:= 0; adsff:=0; rlat:= 11; rlg:= 13; bar:= 1002; aflg:= 1; gsp:= 350; gtk:= 5; tag:= 1; fidflg:= 1; fidty:= 1; call:= LH4567; cat:= 2). |     | Instruct the station under test to transmit a target message for aircraft LH4567.   |
|                  | 6    | send   | Appln | REQUEST TO TRANSMIT AIRCRAFT AIRBORNE TARGET MESSAGE (s:= add_A; tmi:= 1; tivid:= 1; tflg:= 0; rflg:= 0; adsff:=0; rlat:= 9; rlg:= 12; bar:= 1005; aflg:= 1; gsp:= 350; gtk:= 5; tag:= 1; fidflg:= 1; fidty:= 1; call:= AF3344; cat:= 2).  |     | Instruct the station under test to transmit a target message for aircraft AF3344.   |
|                  | 7    | rep 10   |       | n:= 1.   |     | Set n equal to 1. Repeat ten times for 10 update periods.   |
|                  | 8    | verify   | RF    | TIS_MAN_a (s:= add_A) received before target messages of current period and after any target messages of the previous period.  | TMa | Verify the management burst is received before the target messages of the current period, and after any target messages of the previous period. |
|                  | 9    | verify   | RF    | TIS_AC_AIR_a (s:= add_A) received for call:= BA1234.   | TAa | Verify that the target message is received for aircraft BA1234.   |
|                  | 10   | verify   | RF    | TIS_AC_AIR_a (s:= add_A) received for call:= LH4567.   | TAa | Verify that the target message is received for aircraft LH4567.   |
|                  | 11   | verify   | RF    | TIS_AC_AIR_a (s:= add_A) received for call:= AF3344.   | TAa | Verify that the target message is received for aircraft AF3344.   |
|                  | 12   | end rep  |       | n:= n+ 1.  |     | At the end of the loop add 1 to n.  |
|                  | 13   | end rep  |       | next up1.  |     | Repeat with the next update period.   |
| postamble        | 14   |  |       |  |     | Bring test equipment into idle state.   |
| <b>Comments:</b> |      |  |       |  |     |   |

| Test Case Name: |      | TIS_Channel_B   |       |  |     |  |
|-----------------|------|---|-------|--|-----|--|
| Purpose:        |      | To demonstrate that all TIS-B targets for a single TIV are transmitted with the same update period. |       |  |     |  |
| Context         | Step | Action  | PCO   | Action Qualifier   | Ref | Comment  |
| preamble        | 1    | do  |       | M_POWER_UP.  |     | Prepare the transceiver for testing.   |
| test body       | 2    | send  | Appln | SET FREQUENCIES:<br>Channel1:= freq1, Channel2:= freq2,<br>Channel3:= freq3.   |     | Set up three TIS-B channels with different frequencies.  |
|                 | 3    | send  | Appln | SET TIV COORDINATES:<br>tivid:= 1, nvert:= 0, centre is lat:= N 50 NM,<br>long:= 0<br>tivid:= 2, nvert:= 0, centre is lat:= N 50 NM,<br>long:= E 1 NM<br>tivid:= 3, nvert:= 0, centre is lat:= N 51 NM,<br>long:= E 2 NM.        |     | Set up three TIVs.   |
|                 | 4    | send  | Appln | REQUEST TO TRANSMIT AIRCRAFT AIRBORNE TARGET MESSAGE (s:= add_A; tmi:= 1; tivid:= 1; tflg:= 0; rflg:= 0; adsff:=0; rlat:= 9; rlg:= 12; bar:= 1005; gsp:= 350; gtk:= 5; tag:= 1; fidflg:= 1; fidty:= 1; call:= BA1234; cat:= 2).  |     | Instruct the station under test to send an aircraft (airborne) target message for aircraft BA1234 in airborne TIV 1. |
|                 | 5    | send  | Appln | REQUEST TO TRANSMIT AIRCRAFT AIRBORNE TARGET MESSAGE (s:= add_A; tmi:= 1; tivid:= 1; tflg:= 0; rflg:= 0; adsff:=0; rlat:= 10; rlg:= 12; bar:= 1000; gsp:= 350; gtk:= 5; tag:= 1; fidflg:= 1; fidty:= 1; call:= LH5678; cat:= 2). |     | Instruct the station under test to send an aircraft (airborne) target message for aircraft LH5678 in airborne TIV 1. |
|                 | 6    | send  | Appln | REQUEST TO TRANSMIT AIRCRAFT AIRBORNE TARGET MESSAGE (s:= add_A; tmi:= 1; tivid:= 1; tflg:= 0; rflg:= 0; adsff:=0; rlat:= 11; rlg:= 12; bar:= 1002; gsp:= 350; gtk:= 5; tag:= 1; fidflg:= 1; fidty:= 1; call:= AF3344; cat:= 2)  |     | Instruct the station under test to send an aircraft (airborne) target message for aircraft AF3344 in airborne TIV 1. |
|                 | 7    | send  | Appln | REQUEST TO TRANSMIT AIRCRAFT AIRBORNE TARGET MESSAGE (s:= add_A; tmi:= 1; tivid:= 2; tflg:= 0; rflg:= 0; adsff:=0; rlat:= 9; rlg:= 12; bar:= 1005; gsp:= 350; gtk:= 5; tag:= 1; fidflg:= 1; fidty:= 1; call:= BD4444; cat:= 2).  |     | Instruct the station under test to send an aircraft (airborne) target message for aircraft BD4444 in airborne TIV 2. |
|                 | 8    | send  | Appln | REQUEST TO TRANSMIT AIRCRAFT AIRBORNE TARGET MESSAGE (s:= add_A; tmi:= 1; tivid:= 2; tflg:= 0; rflg:= 0; adsff:=0; rlat:= 10; rlg:= 12; bar:= 1000; gsp:= 350; gtk:= 5; tag:= 1; fidflg:= 1; fidty:= 1; call:= AA2222; cat:= 2)  |     | Instruct the station under test to send an aircraft (airborne) target message for aircraft AA2222 in airborne TIV 2. |
|                 | 9    | send  | Appln | REQUEST TO TRANSMIT AIRCRAFT AIRBORNE TARGET MESSAGE (s:= add_A; tmi:= 1; tivid:= 2; tflg:= 0; rflg:= 0; adsff:=0; rlat:= 11; rlg:= 12; bar:= 1002; gsp:= 350; gtk:= 5; tag:= 1; fidflg:= 1; fidty:= 1; call:= TV3333; cat:= 2). |     | Instruct the station under test to send an aircraft (airborne) target message for aircraft TV3333 in airborne TIV 2. |

| Test Case Name: |      | TIS_Channel_B   |       |   |     |  |
|-----------------|------|---|-------|---|-----|--|
| Purpose:        |      | To demonstrate that all TIS-B targets for a single TIV are transmitted with the same update period. |       |   |     |  |
| Context         | Step | Action  | PCO   | Action Qualifier  | Ref | Comment  |
|                 | 10   | send  | Appln | REQUEST TO TRANSMIT AIRCRAFT GROUND TARGET MESSAGE (s:= add_A; tmi:= 2; tivid:=3; tflg:= 0; rflg:= 0; adsff:= 0; fidflg:= 1; rlat:= 9; rlg:= 12,5; gsp:=350; gtk:= 5; tag:=1; fidty:= 1; call:= BD2222; cat:=2)   |     | Instruct the station under test to send an aircraft (ground) target message for aircraft BD2222 in ground TIV 3. |
|                 | 11   | send  | Appln | REQUEST TO TRANSMIT AIRCRAFT GROUND TARGET MESSAGE (s:= add_A; tmi:= 2; tivid:=3; tflg:= 0; rflg:= 0; adsff:= 0; fidflg:= 1; rlat:= 10; rlg:= 12,5; gsp:=350; gtk:= 5; tag:=1; fidty:= 1; call:= KL1000; cat:=2). |     | Instruct the station under test to send an aircraft (ground) target message for aircraft KL1000 in ground TIV 3. |
|                 | 12   | send  | Appln | REQUEST TO TRANSMIT AIRCRAFT GROUND TARGET MESSAGE (s:= add_A; tmi:= 2; tivid:=3; tflg:= 0; rflg:= 0; adsff:= 0; fidflg:= 1; rlat:= 11; rlg:= 12,5; gsp:=350; gtk:= 5; tag:=1; fidty:= 1; call:= NZ6666; cat:=2). |     | Instruct the station under test to send an aircraft (ground) target message for aircraft NZ6666 in ground TIV 3. |
|                 | 13   | send  | Appln | REQUEST TO TRANSMIT GROUND VEHICLE MESSAGE (s:= add_A; tmi:= 3; tivid:= 3; tid:= 1000; rflg:= 0; adsff:= 0; tag:= 2; rlat:= 9; rlg:= 12; gtk:= 5; gsp:= 10).  |     | Instruct the station under test to send a ground vehicle message for vehicle 1000 in ground TIV 3.               |
|                 | 14   | send  | Appln | REQUEST TO TRANSMIT GROUND VEHICLE MESSAGE (s:= add_A; tmi:= 3; tivid:= 3; tid:= 1001; rflg:= 0; adsff:= 0; tag:= 2; rlat:= 10; rlg:= 12; gtk:= 6; gsp:= 10).   |     | Instruct the station under test to send a ground vehicle message for vehicle 1001 in ground TIV 3.               |
|                 | 15   | send  | Appln | REQUEST TO TRANSMIT GROUND VEHICLE MESSAGE (s:= add_A; tmi:= 3; tivid:=3; tid:= 1002; rflg:= 0; adsff:= 0; tag:= 2; rlat:= 11; rlg:= 12; gtk:= 6; gsp:= 10).  |     | Instruct the station under test to send a ground vehicle message for vehicle 1002 in ground TIV 3.               |
|                 | 16   | await   | RF    | TIS_MAN_a (s:= add_A; tivid:=1).  | TMa | Await the management burst for the TIV 1.  |
|                 | 17   | record  | RF    | timeMAN(n):= time at the beginning of the slot containing TIS_MAN_a (s:= add_A; tivid:=1).  | TMa | Record a reference time.   |
|                 | 18   | rep 10  |       | n:= 1.  |     | Repeat ten times   |
|                 | 19   | record  | RF    | timeBA(n):= time at the beginning of the slot containing TIS_AC_AIR_a (s:= add_A; tivid:=1; call:= BA1234).   | TAa | Record the time of the aircraft airborne burst for BA1234.   |
|                 | 20   | record  | RF    | timeLH(n):= time at the beginning of the slot containing TIS_AC_AIR_a (s:= add_A; tivid:=1; call:= LH5678).   | TAa | Record the time of the aircraft airborne burst for LH5678.   |
|                 | 21   | record  | RF    | timeAF(n):= time at the beginning of the slot containing TIS_AC_AIR_a (s:= add_A; tivid:=1; call:= AF3344).   | TAa | Record the time of the aircraft airborne burst for AF3344.   |

| Test Case Name:  |      | TIS_Channel_B |     |   |     |   |
|--|------|---------------|-----|---|-----|---|
| Purpose: To demonstrate that all TIS-B targets for a single TIV are transmitted with the same update period. |      |               |     |   |     |   |
| Context  | Step | Action        | PCO | Action Qualifier  | Ref | Comment   |
|  | 22   | verify        |     | For $n > 1$ :<br>timeBA(n) - timeBA(n - 1) = timeLH(n) - timeLH(n - 1) = timeAF(n) - timeAF(n - 1).         |     | Verify that the target messages pertaining to a particular (airborne) TIV are sent with the same update period. |
|  | 23   | endrep        |     | $n := n + 1$ .  |     |   |
|  | 24   | await         | RF  | TIS_MAN_a (s:= add_A; tivid:=2).  | TMa | Await the management burst for the TIV 2.   |
|  | 25   | record        | RF  | timeMAN(n):= time at the beginning of the slot containing TIS_MAN_a (s:= add_A; tivid:=2).                  | TMa | Record a reference time.  |
|  | 26   | rep 10        |     | $n := 1$ .  |     | Repeat ten times  |
|  | 27   | record        | RF  | timeBD(n):= time at the beginning of the slot containing TIS_AC_AIR_a (s:= add_A; tivid:=2; call:= BD4444). | TAa | Record the time of the aircraft airborne burst for BD4444.  |
|  | 28   | record        | RF  | timeAA(n):= time at the beginning of the slot containing TIS_AC_AIR_a (s:= add_A; tivid:=2; call:= AA2222). | TAa | Record the time of the aircraft airborne burst for AA2222.  |
|  | 29   | record        | RF  | timeTV(n):= time at the beginning of the slot containing TIS_AC_AIR_a (s:= add_A; tivid:=2; call:= TV3333). | TAa | Record the time of the aircraft airborne burst for TV3333.  |
|  | 30   | verify        |     | For $n > 1$ :<br>timeBD(n) - timeBD(n - 1) = timeAA(n) - timeAA(n - 1) = timeTV(n) - timeTV(n - 1).         |     | Verify that the target messages pertaining to a particular (airborne) TIV are sent with the same update period. |
|  | 31   | endrep        |     | $n := n + 1$ .  |     |   |
|  | 32   | await         | RF  | TIS_MAN_a (s:= add_A; tivid:=3).  | TMa | Await the management burst for the TIV 3.   |
|  | 33   | record        | RF  | timeMAN(n):= time at the beginning of the slot containing TIS_MAN_a (s:= add_A; tivid:=3).                  | TMa | Record a reference time.  |
|  | 34   | rep 10        |     | $n := 1$ .  |     | Repeat ten times  |
|  | 35   | record        | RF  | timeBD(n):= time at the beginning of the slot containing TIS_AC_GRD_a (s:= add_A; tivid:=3; call:= BD2222). | TGa | Record the time of the aircraft airborne burst for BD2222.  |
|  | 36   | record        | RF  | timeKL(n):= time at the beginning of the slot containing TIS_AC_GRD_a (s:= add_A; tivid:=3; call:= KL1000). | TGa | Record the time of the aircraft airborne burst for KL1000.  |
|  | 37   | record        | RF  | timeNZ(n):= time at the beginning of the slot containing TIS_AC_GRD_a (s:= add_A; tivid:=3; call:= NZ6666). | TGa | Record the time of the aircraft airborne burst for NZ6666.  |
|  | 38   | record        | RF  | time1000(n):= time at the beginning of the slot containing TIS_GRD_VEH_a (s:= add_A; tivid:=3; tid:= 1000). | TVa | Record the time of the aircraft airborne burst for vehicle 1000.  |
|  | 39   | record        | RF  | time1001(n):= time at the beginning of the slot containing TIS_GRD_VEH_a (s:= add_A; tivid:=3; tid:= 1001). | TVa | Record the time of the aircraft airborne burst for vehicle 1001.  |

| Test Case Name:  |      | TIS_Channel_B   |     |  |     |   |
|------------------|------|---|-----|--|-----|---|
| Purpose:         |      | To demonstrate that all TIS-B targets for a single TIV are transmitted with the same update period. |     |  |     |   |
| Context          | Step | Action  | PCO | Action Qualifier   | Ref | Comment   |
|                  | 40   | record  | RF  | time1002(n):= time at the beginning of the slot containing TIS_GRD_VEH_a (s:= add_A; tivid:=3; tid:= 1002).  | TVa | Record the time of the aircraft airborne burst for vehicle 1002.  |
|                  | 41   | verify  |     | For n>1:<br>timeBD(n) - timeBD(n - 1) = timeKL(n) - timeKL(n - 1) = timeNZ(n) - timeNZ(n - 1) = time1000(n) - time1000(n - 1) = time1001(n) - time1001(n - 1) = time1002(n) - time1002(n - 1). |     | Verify that the target messages pertaining to a particular (ground) TIV are sent with the same update period. |
|                  | 42   | endrep  |     | n:= n + 1.   |     |   |
| postamble        | 43   |   |     |  |     | Bring test equipment into idle state.   |
| <b>Comments:</b> |      |   |     |  |     |   |

| Test Case Name: TIS_Target_Update_A   |      |        |       |   |     |  |
|---|------|--------|-------|---|-----|--|
| Purpose: To demonstrate that each airborne target message is sent once every update period for each airborne TIV the target is included in. |      |        |       |   |     |  |
| Context   | Step | Action | PCO   | Action Qualifier  | Ref | Comment  |
| preamble  | 1    | do     |       | M_POWER_UP.   |     | Prepare the transceiver for testing.   |
| test body   | 2    | rep 3  |       | t:= {6, 21, 61}.  |     | Start loop for repeat of the test with update periods of 5 s, 20 s, and 60 s.  |
|   | 3    | send   | AppIn | SET UPDATE PERIOD:<br>up:= t.   |     | Input the update period for management and target messages into the station under test.  |
|   | 4    | send   | AppIn | SET TIV COORDINATES:<br>(airborne) tivid:= 1, nvert:= 0,<br>centre is lat:= N 51 NM, long:= E 7,6 NM<br>(airborne) tivid:= 2, nvert:= 0,<br>centre is lat:= N 50,9 NM, long:= E 6,9 NM. |     | Setup two airborne TIVs that overlap so that an aircraft can be in both TIVs.  |
|   | 5    | send   | AppIn | REQUEST TO TRANSMIT AIRCRAFT AIRBORNE TARGET WITH COORDINATES:<br>lat:= N 51 NM; long:= E 7 NM.   |     | Input to the station under test the coordinates of an airborne target that is within both TIVs.  |
|   | 6    | await  | RF    | TIS_MAN_a (s:= add_A) transmitted by station under test.  | TMa | Wait for the first management message to be transmitted by the station under test.   |
|   | 7    | record | RF    | manage_time:= time at beginning of slot in which TIS_MAN_a (s = add_A) was broadcast.   | TMa | Record the time at which the management message was broadcast.   |
|   | 8    | rep 10 |       | n:= 1.  |     | Start loop to repeat 10 times.   |
|   | 9    | verify | RF    | TIS_AC_AIR_a (s:= add_A; tivid:= 1) received before<br>time:= manage_time + n × (t - 1).  | TAa | Verify that the target message for the aircraft broadcast by the station under test for TIV 1 is received before the end of the current report period. |
|   | 10   | verify | RF    | TIS_AC_AIR_a (s:= add_A; tivid:= 2) received before<br>time:= manage_time + n × (t - 1).  | TAa | Verify that the target message for the aircraft broadcast by the station under test for TIV 2 is received before the end of the current report period. |
|   | 11   | endrep |       | n:= n + 1.  |     | End loop.  |
|   | 12   | endrep |       | next t.   |     | Repeat with next value of t.   |
| postamble   | 13   |        |       |   |     | Bring test equipment into idle state.  |
| <b>Comments:</b> Still confused by the "t - 1".   |      |        |       |   |     |  |

| Test Case Name: TIS_Target_Update_B  |      |        |       |   |     |  |
|--|------|--------|-------|---|-----|--|
| Purpose: To demonstrate that each aircraft ground target message is sent once every update period for each ground TIV the target is included in. |      |        |       |   |     |  |
| Context  | Step | Action | PCO   | Action Qualifier  | Ref | Comment  |
| preamble   | 1    | do     |       | M_POWER_UP  |     | Prepare the transceiver for testing.   |
| test body  | 2    | rep 3  |       | t:= {6, 21, 61}   |     | Start loop for repeat of the test with update periods of 5 s, 20 s, and 60 s.  |
|  | 3    | send   | AppIn | SET UPDATE PERIOD:<br>up:= t.   |     | Input the update period for management and target messages into the station under test. Update period equals once per 60 s.                            |
|  | 4    | send   | AppIn | SET TIV COORDINATES:<br>(ground) tivid:= 1, nvert:= 0,<br>centre is lat:= N 51 NM, long:= E 7,6 NM<br>(ground) tivid:= 2, nvert:= 0,<br>centre is lat:= N 50,9 NM, long:= E 6,9 NM. |     | Setup two TIVs that overlap so that an aircraft can be in both TIVs.   |
|  | 5    | send   | AppIn | REQUEST TO TRANSMIT AIRCRAFT GROUND TARGET WITH COORDINATES:<br>lat:= N 51 NM; long:= E 7 NM.   |     | Input to the station under test the coordinates of an aircraft ground target that is within both TIVs.   |
|  | 6    | await  | RF    | TIS_MAN_a (s:= add_A) transmitted by station under test.  | TMa | Wait for the first management message to be transmitted by the station under test.   |
|  | 7    | record | RF    | manage_time:= time at beginning of slot in which TIS_MAN_a (s = add_A) was broadcast.   | TMa | Record the time at which the management message was broadcast.   |
|  | 8    | rep 10 |       | n:= 1.  |     | Start loop to repeat 10 times.   |
|  | 9    | verify | RF    | TIS_AC_GRD_a (s:= add_A; tivid:= 1) received before<br>time:= manage_time + n × (t - 1).  | TGa | Verify that the target message for the aircraft broadcast by the station under test for TIV 1 is received before the end of the current report period. |
|  | 10   | verify | RF    | TIS_AC_GRD_a (s:= add_A; tivid:= 2) received before<br>time:= manage_time + n × (t - 1).  | TGa | Verify that the target message for the aircraft broadcast by the station under test for TIV 2 is received before the end of the current report period. |
|  | 11   | endrep |       | n:= n+1.  |     | End loop.  |
|  | 12   | endrep |       | next t.   |     | Repeat with next value of t.   |
| postamble  | 13   |        |       |   |     | Bring test equipment into idle state.  |
| <b>Comments:</b>   |      |        |       |   |     |  |

| Test Case Name: TIS_Target_Update_C   |      |        |       |   |     |  |
|---|------|--------|-------|---|-----|--|
| Purpose: To demonstrate that each ground vehicle target message is sent once every update period for each ground TIV the target is included in. |      |        |       |   |     |  |
| Context   | Step | Action | PCO   | Action Qualifier  | Ref | Comment  |
| preamble  | 1    | do     |       | M_POWER_UP.   |     | Prepare the transceiver for testing.   |
| test body   | 2    | rep 3  |       | t:= {6, 21, 61}.  |     | Start loop for repeat of the test with update periods of 5 s, 20 s and 60 s.   |
|   | 3    | send   | AppIn | SET UPDATE PERIOD:<br>up:= t.   |     | Input the update period for management and target messages into the station under test. Update period equals once per 60 s.                            |
|   | 4    | send   | AppIn | SET TIV COORDINATES:<br>tivid:= 1, nvert:= 0, centre is lat:= N 51 NM,<br>long:= E 7,6 NM<br>tivid:= 2, nvert:= 0, centre is lat:= N 50,9 NM,<br>long:= E 6,9 NM. |     | Setup two TIVs that overlap so that an aircraft can be in both TIVs.   |
|   | 5    | send   | AppIn | REQUEST TO TRANSMIT GROUND VEHICLE<br>TARGET WITH COORDINATES:<br>lat:= N 51 NM; long:= E 7 NM.   |     | Input to the station under test the coordinates of a ground vehicle target that is within both TIVs.   |
|   | 6    | await  | RF    | TIS_MAN_a (s:= add_A) transmitted by station<br>under test.   | TMa | Wait for the first management message to be transmitted by the station under test.   |
|   | 7    | record | RF    | manage_time:= time at beginning of slot in which<br>TIS_MAN_a (s = add_A) was broadcast.  | TMa | Record the time at which the management message was broadcast.   |
|   | 8    | rep 10 |       | n:= 1.  |     | Start loop to repeat 10 times.   |
|   | 9    | verify | RF    | TIS_GRD_VEH_a (s:= add_A; tidid:= 1) received<br>before<br>time:= manage_time + n × (t - 1).  | TVa | Verify that the target message for the aircraft broadcast by the station under test for TIV 1 is received before the end of the current report period. |
|   | 10   | verify | RF    | TIS_GRD_VEH_a (s:= add_A; tidid:= 2) received<br>before<br>time:= manage_time + n × (t - 1).  | TVa | Verify that the target message for the aircraft broadcast by the station under test for TIV 2 is received before the end of the current report period. |
|   | 11   | endrep |       | n:= n + 1.  |     | End loop.  |
|   | 12   | endrep |       | next t.   |     | Repeat with next value of t.   |
| postamble   | 13   |        |       |   |     | Bring test equipment into idle state.  |
| <b>Comments:</b>  |      |        |       |   |     |  |



| Test Case Name:  |      | TIS_Target_Update_D  |       |   |     |  |
|------------------|------|--|-------|---|-----|--|
| Purpose:         |      | To demonstrate that each aircraft ground target message is sent once every update period for each ground and airborne TIV the target is included in. |       |   |     |  |
| Context          | Step | Action   | PCO   | Action Qualifier  | Ref | Comment  |
| preamble         | 1    | do   |       | M_POWER_UP.   |     | Prepare the transceiver for testing.   |
| test body        | 2    | rep 3  |       | t:= {6, 21, 61}.  |     | Start loop for repeat of the test with update periods of 5 s, 20 s and 60 s.   |
|                  | 3    | send   | Appln | SET UPDATE PERIOD:<br>up:= t.   |     | Input the update period for management and target messages into the station under test. Update period equals once per 60 s.                            |
|                  | 4    | send   | Appln | SET TIV COORDINATES:<br>(ground) tivid:= 1, nvert:= 0,<br>centre is lat:= N 51 NM, long:= E 7,6 NM<br>(airborne) tivid:= 2, nvert:= 0,<br>centre is lat:= N 50,9 NM, long:= E 6,9 NM. |     | Setup two TIVs that overlap so that an aircraft can be in both TIVs, one TIV being a ground TIV and the other an airborne TIV.                         |
|                  | 5    | send   | Appln | REQUEST TO TRANSMIT AIRCRAFT GROUND TARGET WITH COORDINATES:<br>lat:= N 51 NM; long:= E 7 NM.   |     | Input to the station under test the coordinates of an aircraft ground target that is within both TIVs.   |
|                  | 6    | await  | RF    | TIS_MAN_a (s:= add_A) transmitted by station under test.  | TMa | Wait for the first management message to be transmitted by the station under test.   |
|                  | 7    | record   | RF    | manage_time:= time at beginning of slot in which TIS_MAN_a (s = add_A) was broadcast.   | TMa | Record the time at which the management message was broadcast.   |
|                  | 8    | rep 10   |       | n:= 1.  |     | Start loop to repeat 10 times.   |
|                  | 9    | verify   | RF    | TIS_AC_GRD_a (s:= add_A; tivid:= 1) received before<br>time:= manage_time + n x (t - 1).  | TGa | Verify that the target message for the aircraft broadcast by the station under test for TIV 1 is received before the end of the current report period. |
|                  | 10   | verify   | RF    | TIS_AC_GRD_a (s:= add_A; tivid:= 2) received before<br>time:= manage_time + n x (t - 1).  | TGa | Verify that the target message for the aircraft broadcast by the station under test for TIV 2 is received before the end of the current report period. |
|                  | 11   | endrep   |       | n:= n+1.  |     | End loop.  |
|                  | 12   | endrep   |       | next t.   |     | Repeat with next value of t.   |
| postamble        | 13   |  |       |   |     | Bring test equipment into idle state.  |
| <b>Comments:</b> |      |  |       |   |     |  |

| Test Case Name: |      | TIS_Target_Ground   |       |   |     |  |
|-----------------|------|---|-------|---|-----|--|
| Purpose:        |      | To demonstrate that for a ground TIV, appropriate target messages are broadcast depending on whether they are identified as either aircraft or ground vehicles. |       |   |     |  |
| Context         | Step | Action  | PCO   | Action Qualifier  | Ref | Comment  |
| preamble        | 1    | do  |       | M_POWER_UP  |     | Prepare the transceiver for testing.   |
| test body       | 2    | send  | Appln | SET TIV COORDINATES:<br>(airborne) tivid:= 1; nvert:= 0;<br>centre is lat:= N 51 NM; long:= E 7,6 NM<br>(ground) tivid:= 2; nvert:= 0;<br>centre is lat:= N 50,9 NM; long:= E 6,9 NM.                     |     | Setup two TIVs that overlap so that an aircraft can be in both TIVs.   |
|                 | 3    | send  | Appln | REQUEST TO TRANSMIT AIRCRAFT AIRBORNE TARGETS WITH COORDINATES:<br>AIRCRAFT A: lat:= N 50,6 NM; lng:= E 4,5 NM<br>AIRCRAFT B: lat:= N 53 NM; lng:= E 4,6 NM<br>AIRCRAFT C: lat:= N 52,9 NM; lng:= E 7 NM. |     | Input target data from three aircraft (airborne).  |
|                 | 4    | send  | Appln | REQUEST TO TRANSMIT AIRCRAFT GROUND TARGETS WITH COORDINATES:<br>AIRCRAFT D: lat:= N 51 NM; lng:= E 7,6 NM<br>AIRCRAFT E: lat:= N 51,5 NM; lng:= E 6,7 NM<br>AIRCRAFT F: lat:= N 51,8 NM; lng:= E 7,7 NM. |     | Input target data from three aircraft on the ground (within both a ground TIV and an airborne TIV at the same time).   |
|                 | 5    | send  | Appln | REQUEST TO TRANSMIT GROUND VEHICLE TARGETS WITH COORDINATES:<br>VEHICLE G: lat:= N 53 NM; lng:= E 5,9 NM<br>VEHICLE H: lat:= N 52,3 NM; lng:= E 7,2 NM<br>VEHICLE I: lat:= N 50,9 NM; lng:= E 6,7 NM.     |     | Input target data from three ground vehicles to the station under test.  |
|                 | 6    | rep 3   |       | n:= {A, B, C}.  |     | Repeat for different aircraft.   |
|                 | 7    | await   | RF    | TARGET MESSAGE FOR AIRBORNE AIRCRAFT n.   |     | Wait for a target message for the airborne aircraft.   |
|                 | 8    | verify  | RF    | TARGET MESSAGE FOR AIRBORNE AIRCRAFT n HAS FORMAT TIS_AC_AIR_a (s = add_A; tivid = 1) (16 bits assigned to rlat, 16 bits assigned to rlg).  | TAa | Show that the target messages for the airborne aircraft are the correct aircraft airborne target messages with the 16-bit resolution for latitude and longitude. |
|                 | 9    | end rep   |       | next n.   |     | End loop.  |
|                 | 10   | rep 2   |       | tiv := { 1, 2}.   |     | Repeat for both TIVs.  |
|                 | 11   | rep 3   |       | n:= {D, E, F}.  |     | Repeat for different aircraft.   |
|                 | 12   | await   | RF    | TARGET MESSAGE FOR GROUND AIRCRAFT n.   |     | Wait for a target message for the aircraft on ground.  |
|                 | 13   | verify  | RF    | TARGET MESSAGE FOR GROUND AIRCRAFT n HAS FORMAT TIS_AC_GRD_a (s:= add_A; tivid = tiv) (20 bits assigned to rlat, 20 bits assigned to rlg).  | TGa | Show that the target messages for the aircraft on ground are the correct aircraft ground target messages with the 20-bit resolution for latitude and longitude.  |
|                 | 14   | end rep   |       | next n.   |     | End loop.  |
|                 | 15   | end rep   |       | next tiv.   |     | Select the next value of tivid and repeat.   |
|                 | 16   | rep 3   |       | n:= {G, H, I}.  |     | Repeat for different vehicles.   |
|                 | 17   | await   | RF    | TARGET MESSAGE FOR GROUND VEHICLE n.  |     | Wait for a target message for the ground vehicle.  |

| Test Case Name: TIS_Target_Ground  |      |         |     |  |     |   |
|--|------|---------|-----|--|-----|---|
| Purpose: To demonstrate that for a ground TIV, appropriate target messages are broadcast depending on whether they are identified as either aircraft or ground vehicles. |      |         |     |  |     |   |
| Context  | Step | Action  | PCO | Action Qualifier   | Ref | Comment   |
|  | 18   | verify  |     | TARGET MESSAGE FOR GROUND VEHICLE n HAS FORMAT TIS_GRD_VEH_a (s = add_A; tivid = 2) (20 bits assigned to rlat, 20 bits assigned to rlg). | TVa | Show that the target messages for the ground vehicles are the correct ground vehicle target messages with the 20-bit resolution for latitude and longitude. |
|  | 19   | end rep |     | next n.  |     | End loop.   |
| postamble  | 20   |         |     |  |     | Bring test equipment into idle state.   |
| <b>Comments:</b>   |      |         |     |  |     |   |

| Test Case Name: TIS_Manage_A   |      |        |       |  |     |   |
|--|------|--------|-------|--|-----|---|
| Purpose: To demonstrate that a station will broadcast a management message with the correct format.                          |      |        |       |  |     |   |
| Context  | Step | Action | PCO   | Action Qualifier   | Ref | Comment   |
| preamble   | 1    | do     |       | M_POWER_UP.  |     | Prepare the transceiver for testing.  |
| test body  | 2    | rep x  |       | x:={P,Q,R,S}.  |     | Repeat test for 4 sets of parameters.   |
|  | 3    | send   | AppIn | REQUEST TO TRANSMIT TIS_MANAGE_A (TIS_MANAGE_APPIN_PARAMETERS(x)). |     | Send an instruction at the App In PCO to the station under test to transmit a TIS-B management message. |
|  | 4    | await  | RF    | BURST (s:= add_A) broadcast by station under test .                |     | Wait for the management message to be broadcast by station under test.                                  |
|  | 5    | verify | RF    | BURST (s:= add_A) has the format of "TIS_MAN_a".                   | TMa | Verify that the transmitted burst is the same as "TIS_MANAGE_a" set out in burst format section.        |
|  | 6    | verify | RF    | TIS_MANAGE_RF_OUT_PARAMETERS(x).                                   |     | Verify that the content of the information output by station under test at the RF PCO is correct.       |
|  | 7    | endrep |       | next x.  |     |   |
| postamble  | 8    |        |       |  |     | Bring test equipment into idle state.   |
| <b>Comments:</b> Not yet reviewed by MGS.<br>Inserted bring test equipment back to its idle state line, maybe not necessary. |      |        |       |  |     |   |

| Test Case Name:  |      | TIS_Aircraft_Air_A  |       |  |     |  |
|------------------|------|---|-------|--|-----|--|
| Purpose:         |      | To demonstrate that a station will broadcast an aircraft target message (airborne TIV) with the correct format. |       |  |     |  |
| Context          | Step | Action  | PCO   | Action Qualifier   | Ref | Comment  |
| preamble         | 1    | do  |       | M_POWER_UP.  |     | Prepare the transceiver for testing.   |
| test body        | 2    | rep x   |       | x:={P,Q,R,S}.  |     | Repeat test for 4 sets of parameters.  |
|                  | 3    | send  | AppIn | REQUEST TO TRANSMIT<br>TIS_AIRCRAFT_AIR_A<br>(TIS_AIRCRAFT_AIR_APPIN_PARAMETERS(x)). |     | Send an instruction at the App In PCO to the station under test to transmit an aircraft target message (airborne service). Inclusion of "fidty" and "call" information here does not imply these parameters will necessarily be broadcast. |
|                  | 4    | await   | RF    | BURST (s:= add_A) broadcast by station A.  |     | Wait for the target message to be broadcast by station under test.   |
|                  | 5    | verify  | RF    | BURST (s:= add_A) has the format of "TIS_AC_AIR_a".                                  | TAa | Verify that the transmitted burst is the same as "TIS_AIRCRAFT_AIR_A" set out in burst format section.   |
|                  | 6    | verify  | RF    | TIS_AIRCRAFT_AIR_RF_OUT_PARAMETERS(x)  |     | Verify that the content of the information output by station under test at the RF PCO is correct.  |
|                  | 7    | end rep   |       | next x.  |     |  |
| postamble        | 8    |   |       |  |     | Bring test equipment into idle state.  |
| <b>Comments:</b> |      |   |       |  |     |  |

| Test Case Name:  |      | TIS_Flight_ID_A |       |  |     |  |
|--|------|-----------------|-------|--|-----|--|
| Purpose: To demonstrate that the flight ID for a target shall be transmitted every 3 TIS-B update periods or better. |      |                 |       |  |     |  |
| Context  | Step | Action          | PCO   | Action Qualifier   | Ref | Comment  |
| preamble   | 1    | do              |       | M_POWER_UP.  |     | Prepare the transceiver for testing.   |
| test body  | 2    | send            | Appln | SET UPDATE PERIOD:= once every s.  |     | Define the update period.  |
|  | 3    | send            | Appln | REQUEST TO TRANSMIT AIRCRAFT AIRBORNE TARGET MESSAGE (s:= add_A; tivid:= 1; tflg:= 0; rflg:= 0; adsff:= 0; tid:= 1100 10 000 000 111 001 100 101; rlat:= 50N; rlg:= 3E; bar:= 1000; aflg:= 0; gsp:= 400; gtk:= 100; tag:= 3; fidty:= 1; call:= BA1234; cat:= 2). |     | Send an instruction at the App In PCO to the station under test to transmit an aircraft target message (airborne service). Inclusion of "fidty" and "call" information here does not imply these parameters will necessarily be broadcast. |
|  | 4    | rep 15          |       | n:= 1; flightid:= 0.   |     | Start loop. Set initial variables.   |
|  | 5    | await           | RF    | TIS_AC_AIR_a (s:= add_A)   | TAa | Wait for the target message to be broadcast by station A.  |
|  | 7    | record          | RF    | IF call:= BA1234 IS INCLUDED IN TIS_AC_AIR_a (s:= add_A)<br><b>THEN</b><br>flightid:= flightid+ 1.   |     | Record the number of times the flight ID is included.  |
|  | 8    | end rep         |       | n:= n + 1  |     | End loop.  |
|  | 9    | verify          |       | flightid ≥ 5.  |     | Verify that the flight ID is transmitted at least once every 3 update periods.   |
|  | 10   | send            | Appln | REQUEST TO TRANSMIT AIRCRAFT GROUND TARGET MESSAGE (s:= add_A; tivid:= 1; tflg:= 0; rflg:= 0; adsff:= 0; tid:= 1100 10 000 000 111 001 100 101; rlat:= 50N; rlg:= 3E; gsp:= 400; gtk:= 100; tag:= 3; fidty:= 1; call:= BA1234; cat:= 2).                         |     | Send an instruction at the App In PCO to the station under test to transmit an aircraft target message (ground service). Inclusion of "fidty" and "call" information here does not imply these parameters will necessarily be broadcast.   |
|  | 11   | rep 15          |       | n:= 1, flightid:= 0.   |     | Start loop. Set initial variables.   |
|  | 12   | await           | RF    | TIS_AC_GRD_a (s:= add_A).  | TGa | Wait for the target message to be broadcast by station A.  |
|  | 14   | record          | RF    | IF call:= BA1234 IS INCLUDED IN TIS_AC_GRD_a (s:= add_A)<br><b>THEN</b><br>flightid:= flightid+ 1.   |     | Record the number of times the flight ID is included.  |
|  | 15   | end rep         |       | n:= n + 1.   |     | End loop.  |
|  | 16   | verify          |       | flightid ≥ 5.  |     | Verify that the flight ID is transmitted at least once every 3 update periods.   |
| postamble  | 17   |                 |       |  |     | Bring test equipment into idle state.  |
| <b>Comments:</b>   |      |                 |       |  |     |  |

| Test Case Name: |      | TIS_Flight_ID_B  |       |   |     |   |
|-----------------|------|--|-------|---|-----|---|
| Purpose:        |      | To demonstrate that if more than 1 flight ID is sent, then this will be alternated for the target in question. |       |   |     |   |
| Context         | Step | Action   | PCO   | Action Qualifier  | Ref | Comment   |
| preamble        | 1    | do   |       | M_POWER_UP.   |     | Prepare the transceiver for testing.  |
| test body       | 2    | send   | Appln | update period:= 2 s.  |     | define update period.   |
|                 | 3    | send   | Appln | REQUEST TO TRANSMIT AIRCRAFT AIRBORNE TARGET MESSAGE (s:= add_A; tivid:= 1; tflg:= 0; rflg:= 0; adsff:= 0; tid:= 1100 10 000 000 111 001 100 101; rlat:= 50N; rlg:= 3E; bar:= 1000; aflg:= 0; gsp:= 400; gtk:= 100; tag:= 3; fidflg:= 1; fidty:= 1; call:= BA1234; tailno:= 654321; cat:= 2).               |     | Send an instruction at the App In PCO to the station under test to transmit an aircraft target message (airborne service), with two types of flight ID (callsign and tailnumber). |
|                 | 4    | rep 30   |       | n:=1; calltid:= 0; tailid:= 0; callflag:= false; tailflag:= false.  |     | Start loop. Set initial variables.  |
|                 | 5    | await  | RF    | TIS_AC_AIR_a (s:= add_A).   | TAa | Wait for the target message to be broadcast by station A.   |
|                 | 7    | record   |       | <b>IF</b> callflag:= false AND call:= BA1234 IS INCLUDED IN TIS_AC_AIR_a THEN<br>callid:= callid+ 1<br>callflag:= true<br>tailflag:= false<br><b>ELSE IF</b> tailflag:= false AND tailno:= 654321 IS INCLUDED IN TIS_AC_AIR_a<br><b>THEN</b><br>tailid:= tailid + 1<br>tailflag:= true<br>callflag:= false. | TAa | Record the number of times the call sign and the tail number are transmitted alternately.   |
|                 | 8    | end rep  |       | n:= n + 1.  |     | End loop.   |
|                 | 9    | verify   |       | callid ≥ 5 AND tailid ≥ 5.  |     | Verify that the Flight ID is transmitted at least once every 3 update periods, and that the flight ID is alternated.  |
|                 | 10   | send   | Appln | REQUEST TO TRANSMIT AIRCRAFT GROUND TARGET MESSAGE (s:= add_A; tivid:= 1; tflg:= 0; rflg:= 0; adsff:= 0; tid:= 1100 10 000 000 111 001 100 101; rlat:= 50N; rlg:= 3E; gsp:= 400; gtk:= 100; tag:= 3; fidflg:= 1; fidty:= 1; call:= BA1234; tailno:= 654321; cat:= 2).                                       | TGa | Send an instruction at the App In PCO to the station under test to transmit an aircraft target message (ground service) with two types of flight ID (callsign and tailnumber).    |
|                 | 11   | rep 15   |       | n:=1; calltid:= 0; tailid:= 0; callflag:= false; tailflag:= false.  |     | Start loop. Set initial variables.  |
|                 | 12   | await  | RF    | TIS_AC_GRD_a (s:= add_A).   | TGa | Wait for the target message to be broadcast by station A.   |

| Test Case Name: TIS_Flight_ID_B   |      |         |     |   |     |  |
|---|------|---------|-----|---|-----|--|
| Purpose: To demonstrate that if more than 1 flight ID is sent, then this will be alternated for the target in question. |      |         |     |   |     |  |
| Context   | Step | Action  | PCO | Action Qualifier  | Ref | Comment  |
|   | 14   | record  |     | <b>IF</b> callflag:= false AND call:= BA1234 IS INCLUDED IN TIS_AC_GRD_a<br><b>THEN</b><br>callid:= callid+ 1<br>callflag:= true<br>tailflag:= false<br><b>ELSE IF</b> tailflag:= false AND tailno:= E7654321<br><b>THEN</b><br>tailid:= tailid + 1<br>tailflag:= true<br>callflag:= false. | TGa | Record the number of times the call sign and the tail number are transmitted alternately.                            |
|   | 15   | end rep |     | n:= n + 1.  |     | End loop.  |
|   | 16   | verify  |     | callid ≥ 5 AND tailid ≥ 5.  |     | Verify that the Flight ID is transmitted at least once every 3 update periods, and that the flight ID is alternated. |
| postamble   | 17   |         |     |   |     | Bring test equipment into idle state.  |
| <b>Comments:</b>  |      |         |     |   |     |  |

| Test Case Name: TIS_Aircraft_Grd_A   |      |         |       |  |     |   |
|--|------|---------|-------|--|-----|---|
| Purpose: To demonstrate that a station will broadcast aircraft target messages (ground TIV) with the correct format. |      |         |       |  |     |   |
| Context  | Step | Action  | PCO   | Action Qualifier   | Ref | Comment   |
| preamble   | 1    | do      |       | M_POWER_UP.  |     | Prepare the transceiver for testing.  |
| test body  | 2    | rep x   |       | x:={P,Q,R,S}.  |     | Repeat test for 4 sets of parameters.   |
|  | 3    | send    | AppIn | REQUEST TO TRANSMIT TIS_AIRCRAFT_GRD_A (TIS_AIRCRAFT_GRD_APPIN_PARAMETERS(x)). |     | Send an instruction at the App In PCO to the station under test to transmit an aircraft target message (ground service) Inclusion of "fidty" and "call" information here does not imply these parameters will necessarily be broadcast. |
|  | 4    | await   | RF    | BURST (s:= add_A) broadcast by station under test.                             |     | Wait for the target message to be broadcast by station under test.  |
|  | 5    | verify  | RF    | BURST (s:= add_A) has the format of "TIS_AC_GRD_a".                            | TGa | Verify that the transmitted burst is the same as "TIS_AC_GRD_a" set out in burst format section.  |
|  | 6    | verify  | RF    | TIS_AIRCRAFT_GRD_RF_OUT_PARAMETERS(x)  |     | Verify that the content of the information output by station under test at the RF PCO is correct.   |
|  | 7    | end rep |       | next x.  |     |   |
| postamble  | 8    |         |       |  |     | Bring test equipment into idle state.   |
| <b>Comments:</b>   |      |         |       |  |     |   |

| Test Case Name: TIS_Grd_Veh_A  |      |         |       |  |     |  |
|--|------|---------|-------|--|-----|--|
| Purpose: To demonstrate that a station will broadcast a ground vehicle target messages (ground TIV) with the correct format. |      |         |       |  |     |  |
| Context  | Step | Action  | PCO   | Action Qualifier   | Ref | Comment  |
| preamble   | 1    | do      |       | M_POWER_UP.  |     | Prepare the transceiver for testing.   |
| test body  | 2    | rep x   |       | x:={P,Q,R,S}.  |     | Repeat test for 4 sets of parameters.  |
|  | 3    | send    | AppIn | REQUEST TO TRANSMIT GROUND VEHICLE TARGET MESSAGE (TIS_GRD_VEH_APPIN_PARAMETERS(x)). |     | Send an instruction at the App In PCO to the station under test to transmit a ground vehicle target message. |
|  | 4    | await   | RF    | BURST (s:= add_A) broadcast by station A.  |     | Wait for the target message to be broadcast by station A.  |
|  | 5    | verify  | RF    | BURST (s:= add_A) has the format of "TIS_GRD_VEH_a".                                 | TVa | Verify that the transmitted burst is the same as "TIS_GRD_VEH_a" set out in burst format section.            |
|  | 6    | verify  | RF    | TIS_GRD_VEH_RF_OUT_PARAMETERS(x).  |     | Verify that the content of the information output by station under test at the RF PCO is correct.            |
|  | 7    | end rep |       | next x.  |     |  |
| postamble  | 6    |         |       |  |     | Bring test equipment into idle state.  |
| <b>Comments:</b>   |      |         |       |  |     |  |

| Test Case Name: TIS_Veh_Default_A  |      |        |       |   |     |  |
|--|------|--------|-------|---|-----|--|
| Purpose: To demonstrate that if no information for a target is provided implying that it is an aircraft (Mode A code, callsign, registration marking or emitter category), then it will be regarded as a vehicle target until further information is provided. |      |        |       |   |     |  |
| Context  | Step | Action | PCO   | Action Qualifier  | Ref | Comment  |
| preamble   | 1    | do     |       | M_POWER_UP.   |     | Prepare the transceiver for testing.   |
| test body  | 2    | send   | AppIn | REQUEST TO TRANSMIT TARGET MESSAGE (s:= add_A; tivid:= 2; rflg:= 0; adsff:= 0; tag:= 3; rlat:= 50N; rlg:= 3E; gtk:= 10; gsp:= 50).              |     | Send an instruction at the App In PCO to the station under test to transmit a target message, without specific information that it is an aircraft. |
|  | 3    | await  | RF    | BURST (s:= add_A) broadcast by station A.   |     | Wait for the target message to be broadcast by station A.  |
|  | 4    | verify | RF    | TIS_GRD_AIR_a (s = add_A; tivid = 2; rflg = 0; adsff = 0; tag = 3; rlat = 50N; rlg = 3E; gtk = 10; gsp = 50) transmitted by station under test. | TVa | Verify that the corresponding transmitted target message is the appropriate message for a ground vehicle.  |
| postamble  | 5    |        |       |   |     | Bring test equipment into idle state.  |
| <b>Comments:</b>   |      |        |       |   |     |  |



| Test Case Name: FIS_METAR_A  |      |        |       |  |     |   |
|--|------|--------|-------|--|-----|---|
| Purpose: To demonstrate that a station will broadcast a METAR message with the correct format. |      |        |       |  |     |   |
| Context  | Step | Action | PCO   | Action Qualifier   | Ref | Comment   |
| preamble   | 1    | do     |       | M_POWER_UP.  |     | Prepare the transceiver for testing.  |
| test body  | 2    | rep x  |       | x:= {P, Q, R, S}.  |     | Repeat test for 4 different sets of parameters.   |
|  | 3    | send   | Appln | REQUEST TO TRANSMIT FIS_METAR_a (FIS_METAR_APPIN_PARAMETERS(x)). | FMa | Instruct the station under test to broadcast a METAR message.   |
|  | 4    | await  | RF    | BURST broadcast by the station under test.                       |     | Wait for the sync burst to be broadcast by the station under test.                                      |
|  | 5    | verify | RF    | BURST (s:= add_A) has the format of "FIS_METAR_a".               | FMa | Verify that the transmitted burst has the same format as "FIS_METAR_a" set out in burst format section. |
|  | 6    | verify | RF    | FIS_METAR_RF_OUT_PARAMETERS(x).                                  |     | Verify that the content of the information output by station under test at the RF PCO is correct.       |
|  | 7    | endrep |       | next x.  |     |   |
| postamble  | 8    |        |       |  |     | Bring test equipment into idle state.   |
| <b>Comments:</b>   |      |        |       |  |     |   |

| Test Case Name: FIS_SPECI_A  |      |        |       |  |     |   |
|--|------|--------|-------|--|-----|---|
| Purpose: To demonstrate that a station will broadcast a SPECI message with the correct format. |      |        |       |  |     |   |
| Context  | Step | Action | PCO   | Action Qualifier   | Ref | Comment   |
| preamble   | 1    | do     |       | M_POWER_UP.  |     | Prepare the transceiver for testing.  |
| test body  | 2    | rep x  |       | x:= {P, Q, R, S}.  |     | Repeat test for 4 different sets of parameters.   |
|  | 3    | send   | Appln | REQUEST TO TRANSMIT FIS_SPECI_a (FIS_SPECI_APPIN_PARAMETERS(x)). | FSa | Instruct the station under test to broadcast a SPECI message.   |
|  | 4    | await  | RF    | BURST broadcast by the station under test.                       |     | Wait for the sync burst to be broadcast by the station under test.                                      |
|  | 5    | verify | RF    | BURST (s:= add_A) has the format of "FIS_SPECI_a".               | FSa | Verify that the transmitted burst has the same format as "FIS_SPECI_a" set out in burst format section. |
|  | 6    | verify | RF    | FIS_SPECI_RF_OUT_PARAMETERS(x).                                  |     | Verify that the content of the information output by station under test at the RF PCO is correct.       |
|  | 7    | Endrep |       | next x.  |     |   |
| postamble  | 8    |        |       |  |     | Bring test equipment into idle state.   |
| <b>Comments:</b>   |      |        |       |  |     |   |

| Test Case Name: FIS_METAR_C  |      |        |       |  |     |  |
|--|------|--------|-------|--|-----|--|
| Purpose: To demonstrate that a station will transmit METAR reports once during each update period. |      |        |       |  |     |  |
| Context  | Step | Action | PCO   | Action Qualifier   | Ref | Comment  |
| preamble   | 1    | do     |       | M_POWER_UP.  |     | Prepare the transceiver for testing.   |
| test body  | 2    | rep t  |       | t={1, 2, 5}.   |     | Start loop for repeat of the test with different update periods.   |
|  | 3    | send   | AppIn | REQUEST TO TRANSMIT METAR MESSAGES WITH PERIOD t MINUTES.                  |     | Instruct the station under test to transmit regular METAR reports according to the required update period. |
|  | 4    | await  | RF    | FIS_METAR_a (s = add_A) transmitted by station under test.                 | FMa | Wait for the first METAR message to be transmitted by the station under test.                              |
|  | 5    | record | RF    | metar_time:= time at beginning of slot in which FIS_METAR_a was broadcast. | FMa | Record the time at which the METAR message was broadcast.  |
|  | 6    | rep 10 |       | n:= 1.   |     | Start loop to count 10 bursts.   |
|  | 7    | wait   |       | time = metar_time + (n x 60 - 12)xt.                                       |     | Wait for time t minutes less 20 % of a period.   |
|  | 8    | verify | RF    | FIS_METAR_a received before time = metar_time + (n x 60 + 12)xt.           | FMa | Verify that before time t minutes plus 20 % of a period, a METAR message has been received.                |
|  | 9    | endrep |       | n:= n + 1.   |     | Repeat with n incremented.   |
|  | 10   | endrep |       | next t.  |     | Repeat with the next update period.  |
| postamble  | 11   |        |       |  |     | Bring test equipment into idle state.  |
| <b>Comments:</b>   |      |        |       |  |     |  |

| Test Case Name: FIS_ATIS_A   |      |        |       |  |     |  |
|--|------|--------|-------|--|-----|--|
| Purpose: To demonstrate that a station will broadcast an ATIS message with the correct format. |      |        |       |  |     |  |
| Context  | Step | Action | PCO   | Action Qualifier   | Ref | Comment  |
| Preamble   | 1    | do     |       | M_POWER_UP.  |     | Prepare the transceiver for testing.   |
| test body  | 2    | rep x  |       | x:= {P, Q, R, S}.  |     | Repeat test for 4 different sets of parameters.  |
|  | 3    | send   | AppIn | REQUEST TO TRANSMIT FIS_ATIS_a (FIS_ATIS_APPIN_PARAMETERS(x)). | FAa | Instruct the station under test to broadcast an ATIS message.  |
|  | 4    | await  | RF    | BURST (s:=add_A) broadcast by the station under test.          |     | Wait for the ATIS message to be broadcast by the station under test.                                   |
|  | 5    | verify | RF    | BURST (s:= add_A) has the format of "FIS_ATIS_a".              | FAa | Verify that the transmitted burst has the same format as "FIS_ATIS_a" set out in burst format section. |
|  | 6    | verify | RF    | FIS_ATIS_RF_OUT_PARAMETERS(x).                                 |     | Verify that the content of the information output by station under test at the RF PCO is correct.      |
|  | 7    | Endrep |       | next x.  |     |  |
| Postamble  | 8    |        |       |  |     | Bring test equipment into idle state.  |
| <b>Comments:</b>   |      |        |       |  |     |  |

| Test Case Name: FIS_RCN_A   |      |        |       |  |     |   |
|---|------|--------|-------|--|-----|---|
| Purpose: To demonstrate that a station will broadcast an RCN message with the correct format. |      |        |       |  |     |   |
| Context   | Step | Action | PCO   | Action Qualifier   | Ref | Comment   |
| preamble  | 1    | do     |       | M_POWER_UP.  |     | Prepare the transceiver for testing.  |
| test body   | 2    | rep x  |       | x:={P,Q,R,S}.  |     | Repeat test for 4 different sets of parameters.   |
|   | 3    | send   | Appln | REQUEST TO TRANSMIT FIS_RCN_A (FIS_RCN_APPIN_PARAMETERS(x)). | FRa | Instruct the station under test to broadcast an RCN message.  |
|   | 4    | await  | RF    | BURST broadcast by the station under test.                   |     | Wait for the sync burst to be broadcast by the station under test.                                    |
|   | 5    | verify | RF    | BURST (s:= add_A) has the format of "FIS_RCN_a".             |     | Verify that the transmitted burst is the same as "FIS_RCN_a" set out in burst format section.         |
|   | 6    | verify | RF    | FIS_RCN_RF_OUT_PARAMETERS(x).                                |     | Verify that the content of the information output by the station under test at the RF PCO is correct. |
|   | 7    | endrep |       | next x.  |     | Verify that the other fields are correct.   |
| postamble   | 9    |        |       |  |     | Bring test equipment into idle state.   |
| <b>Comments:</b>  |      |        |       |  |     |   |

| Test Case Name: FIS_SIGMET_A  |      |        |       |  |     |   |
|---|------|--------|-------|--|-----|---|
| Purpose: To demonstrate that a station will broadcast a SIGMET message with the correct format. |      |        |       |  |     |   |
| Context   | Step | Action | PCO   | Action Qualifier   | Ref | Comment   |
| preamble  | 1    | do     |       | M_POWER_UP.  |     | Prepare the transceiver for testing.  |
| test body   | 2    | rep x  |       | x:={P,Q,R,S}.  |     | Repeat test for 4 sets of parameters.   |
|   | 3    | send   | Appln | REQUEST TO TRANSMIT FIS_SIGMET_A (FIS_SIGMET_APPIN_PARAMETERS(x)). |     | Instruct the station under test to broadcast a SIGMET message.  |
|   | 4    | await  | RF    | BURST broadcast by the station under test.                         |     | Wait for the SIGMET message to be broadcast by the station under test.                                      |
|   | 5    | verify | RF    | BURST (s:= add_A) has the format of "FIS_SIGMET_a".                | FSa | Verify that the transmitted burst is the same as "FIS_SIGMET_a" VDL4 burst set out in burst format section. |
|   | 6    | verify | RF    | FIS_SIGMET_RF_OUT_PARAMETERS(x).                                   |     | Verify that the content of the information output by station under test at the RF PCO is correct.           |
|   | 7    | endrep |       | next x.  |     |   |
| postamble   | 8    |        |       |  |     | Bring test equipment into idle state.   |
| <b>Comments:</b>  |      |        |       |  |     |   |

| Test Case Name: FIS_TSA_CTR_A  |      |        |       |   |      |   |
|--|------|--------|-------|---|------|---|
| Purpose: To demonstrate that a station will broadcast a TSA message for control zones with the correct format. |      |        |       |   |      |   |
| Context  | Step | Action | PCO   | Action Qualifier  | Ref  | Comment   |
| preamble   | 1    | do     |       | M_POWER_UP.   |      | Prepare the transceiver for testing.  |
| test body  | 2    | rep x  |       | x:= {P, Q, R, S}.   |      | Repeat test for 4 different sets of parameters.   |
|  | 3    | send   | Appln | REQUEST TO TRANSMIT FIS_TSA_CTR_A" (TSA_CTR_APPIN_PARAMETERS(x)). | FTCa | Instruct the station under test to broadcast a TSA message.   |
|  | 4    | await  | RF    | BURST broadcast by the station under test.                        |      | Wait for the sync burst to be broadcast by the station under test.  |
|  | 5    | verify | RF    | BURST (s:= add_A) has the format of "FIS_TSA_CTR_A".              | FTCa | Verify that the transmitted burst has the same format as "FIS_TSA_CTR_A" set out in burst format section. |
|  | 6    | verify | RF    | FIS_TSA_CTR_RF_OUT_PARAMETERS(x).                                 |      | Verify that the content of the information output by station under test at the RF PCO is correct.         |
|  | 7    | Endrep |       | next x.   |      |   |
| postamble  | 8    |        |       |   |      | Bring test equipment into idle state.   |
| <b>Comments:</b>   |      |        |       |   |      |   |

| Test Case Name: FIS_TSA_DNG_A   |      |        |       |   |      |   |
|---|------|--------|-------|---|------|---|
| Purpose: To demonstrate that a station will broadcast a TSA message for restricted, danger or prohibited zones with the correct format. |      |        |       |   |      |   |
| Context   | Step | Action | PCO   | Action Qualifier  | Ref  | Comment   |
| preamble  | 1    | do     |       | M_POWER_UP.   |      | Prepare the transceiver for testing.  |
| test body   | 2    | rep x  |       | x:= {P, Q, R, S}.   |      | Repeat test for 4 different sets of parameters.   |
|   | 3    | send   | Appln | REQUEST TO TRANSMIT FIS_TSA_DNG_A" (FIS_TSA_DNG_APPIN_PARAMETERS(x)). | FTDa | Instruct the station under test to broadcast a TSA message.   |
|   | 4    | await  | RF    | BURST broadcast by the station under test.                            |      | Wait for the sync burst to be broadcast by the station under test.  |
|   | 5    | verify | RF    | BURST (s:= add_A) has the format of "FIS_TSA_DNG_A".                  | FTDa | Verify that the transmitted burst has the same format as "FIS_TSA_DNG_A" set out in burst format section. |
|   | 6    | verify | RF    | FIS_TSA_DNG_RF_OUT_PARAMETERS(x).                                     |      | Verify that the content of the information output by station under test at the RF PCO is correct.         |
|   | 7    | Endrep |       | next x.   |      |   |
| postamble   | 8    |        |       |   |      | Bring test equipment into idle state.   |
| <b>Comments:</b>  |      |        |       |   |      |   |

| Test Case Name:  |      | FIS_Request_C   |     |  |            |  |
|------------------|------|---|-----|--|------------|--|
| Purpose:         |      | To demonstrate that a ground station which receives a broadcast report request message from a mobile that does not reserve slot(s) for the response, will broadcast the information at the required rate. |     |  |            |  |
| Context          | Step | Action  | PCO | Action Qualifier   | Ref        | Comment  |
| preamble         | 1    | do  |     | M_POWER_UP.  |            | Prepare the transceiver for testing.   |
| test body        | 2    | rep 2   |     | n:=1.  |            | Start loop.  |
|                  | 3    | send  | RF  | <b>IF</b> n=1 <b>THEN</b><br>FIS_REQUEST_a (s:=add_B; fmi:=5; mrq:= 1; locl:=EGLL).  | FQa        | Send a broadcast report request message with a null reservation from a simulated station B to the station under test.  |
|                  | 4    | send  | RF  | <b>IF</b> n=2 <b>THEN</b><br>FIS_REQUEST_a (s:=add_B; fmi:=5; mrq:= 2; locl:=EGLC).  | FQa        | A different request message is sent when the test is repeated.   |
|                  | 5    | record  | RF  | burst_time:= time at beginning of slot in which FIS_REQUEST_a was transmitted.   | FQa        | Record the time at which the FIS request message was transmitted by the simulated station B.   |
|                  | 6    | rep 3   |     | m:=1.  |            | Start loop to measure transmission times.  |
|                  | 7    | wait  | RF  | time = burst_time + m × 60 - 12.   |            | Wait for m minutes less 20 % of a minute.  |
|                  | 8    | verify  | RF  | FIS-B BURST (s:= add_A) transmitted by the station under test before<br>time = burst_time + m × 60 + 12.   |            | Verify that the requested message is received before time m minutes plus 20 % of a minute.   |
|                  | 9    | verify  |     | FIS-B BURST (s:= add_A) has the format of:<br><b>IF</b> n = 1 <b>THEN</b> FIS_ATIS_a<br><b>IF</b> n = 2 <b>THEN</b> FIS_RCN_a<br>FIS-B BURST (s:= add_A) provides information for the requested airport. | FAa<br>FRa | Verify that the transmitted burst is of the correct format as set out in the burst format section.<br>Verify the message provides the information for the requested airport. |
|                  | 10   | endrep  |     | m:= m + 1.   |            | End loop.  |
|                  | 11   | endrep  |     | n:=n + 1.  |            | End loop.  |
| postamble        | 12   |   |     |  |            | Bring test equipment into idle state.  |
| <b>Comments:</b> |      |   |     |  |            |  |

| Test Case Name:  |      | FIS_Request_D  |     |  |            |  |
|------------------|------|--|-----|--|------------|--|
| Purpose:         |      | To demonstrate that a ground station which receives an addressed report request message from a mobile that reserves a specific slot for the response, will broadcast the requested information in the reserved slot. |     |  |            |  |
| Context          | Step | Action   | PCO | Action Qualifier   | Ref        | Comment  |
| preamble         | 1    | do   |     | M_POWER_UP.  |            | Prepare the transceiver for testing.   |
| test body        | 2    | rep 2  |     | n:=1.  |            | Start loop.  |
|                  | 3    | send   | RF  | <b>IF</b> n=1 <b>THEN</b><br>FIS_REQUEST_b (s:=add_B; d:=add_A; fmi:=5; mrq:= 1; locl:=EGLL; sdf:=0; ro:=500; lg:=2; pr:=12)   | FQb        | Send a report request message with a unicast reservation from a simulated station B to the station under test.   |
|                  | 4    | send   | RF  | <b>IF</b> n=2 <b>THEN</b><br>FIS_REQUEST_b (s:=add_B; d:=add_A; fmi:=5; mrq:= 2; locl:=EGLC; sdf:=0; ro:=500; lg:=2; pr:=12).  | FQb        | A different request message is sent when the test is repeated.   |
|                  | 5    | record   | RF  | burst_time:= time at beginning of slot in which FIS_REQUEST_b was transmitted.   | FQb        | Record the time at which the FIS request message was transmitted by the simulated station B.   |
|                  | 6    | wait   |     | time = burst_time + 500 x (60/M1)  |            | Wait for the reserved slot.  |
|                  | 7    | verify   | RF  | FIS-B BURST (s:= add_A) transmitted by the station under test in slot beginning at time = burst_time + 500 x (60/M1).  |            | Verify that the requested message is received in the reserved slot.  |
|                  | 8    | verify   | RF  | FIS-B BURST (s:= add_A) has the format of:<br><b>IF</b> n = 1 <b>THEN</b> FIS_ATIS_a<br><b>IF</b> n = 2 <b>THEN</b> FIS_RCN_a<br><br>FIS-B BURST (s:= add_A) provides information for the requested airport. | FAa<br>FRa | Verify that the transmitted burst is the correct as set out in the burst format section.<br>Verify the message provides the information for the requested airport. |
|                  | 9    | endrep   |     | n:=n + 1.  |            | End loop.  |
| postamble        | 10   |  |     |  |            | Bring test equipment into idle state.  |
| <b>Comments:</b> |      |  |     |  |            |  |

| Test Case Name:  |      | FIS_Request_E  |     |  |            |  |
|------------------|------|--|-----|--|------------|--|
| Purpose:         |      | To demonstrate that a ground station which receives an addressed report request message from a mobile that does not reserve slot(s) for the response, will broadcast the information at the required rate. |     |  |            |  |
| Context          | Step | Action   | PCO | Action Qualifier   | Ref        | Comment  |
| preamble         | 1    | do   |     | M_POWER_UP.  |            | Prepare the transceiver for testing.   |
| test body        | 2    | rep 2  |     | n:=1.  |            | Start loop.  |
|                  | 3    | send   | RF  | <b>IF</b> n=1 <b>THEN</b><br>FIS_REQUEST_c (s:=add_B; d:=add_A; fmi:=5; mrq:= 1; locl:=EGLL).  | FQc        | Send a report request message with a null reservation from a simulated station B to the station under test.  |
|                  | 4    | send   | RF  | <b>IF</b> n=2 <b>THEN</b><br>FIS_REQUEST_c (s:=add_B; d:=add_A; fmi:=5; mrq:= 2; locl:=EGLC).  | FQc        | A different request message is sent when the test is repeated.   |
|                  | 5    | record   | RF  | burst_time:= time at beginning of slot in which FIS_REQUEST_c was transmitted.   | FQc        | Record the time at which the FIS request message was transmitted by simulated station B.   |
|                  | 6    | rep 3  |     | m:=1.  |            | Start loop to measure transmission times.  |
|                  | 7    | wait   | RF  | time = burst_time + m × 60 - 12.   |            | Wait for m minutes less 20 % of a minute.  |
|                  | 8    | verify   | RF  | FIS-B BURST (s:= add_A) transmitted by the station under test before<br>time = burst_time + m × 60 + 12.   |            | Verify that the requested message is received before time m minutes plus 20 % of a minute.   |
|                  | 9    | verify   |     | FIS-B BURST (s:= add_A) has the format of:<br><b>IF</b> n = 1 <b>THEN</b> FIS_ATIS_a<br><b>IF</b> n = 2 <b>THEN</b> FIS_RCN_a<br><br>FIS-B BURST (s:= add_A) provides information for the requested airport. | FAa<br>FRa | Verify that the transmitted burst is of the correct format as set out in the burst format section.<br>Verify the message provides the information for the requested airport. |
|                  | 10   | endrep   |     | m:= m + 1.   |            | End loop.  |
|                  | 11   | endrep   |     | n:=n + 1.  |            | End loop.  |
| postamble        | 12   |  |     |  |            | Bring test equipment into idle state.  |
| <b>Comments:</b> |      |  |     |  |            |  |

| Test Case Name:  |      | FIS_Request_F   |     |   |            |  |
|------------------|------|---|-----|---|------------|--|
| Purpose:         |      | To demonstrate that a ground station which receives a broadcast report request message from a mobile that reserves a specific slot for the response, will broadcast the requested information in the reserved slot. |     |   |            |  |
| Context          | Step | Action  | PCO | Action Qualifier  | Ref        | Comment  |
| preamble         | 1    | do  |     | M_POWER_UP.   |            | Prepare the transceiver for testing.   |
| test body        | 2    | rep 2   |     | n:=1.   |            | Start loop.  |
|                  | 3    | send  | RF  | <b>IF</b> n=1 <b>THEN</b><br>FIS_REQUEST_b (s:=add_B; d:= 7; fmi:=5;<br>mrq:= 1; locl:=EGLL; sdf:=0; ro:=500; lg:=2; pr:=12).   | FQb        | Send a broadcast report request message with a unicast reservation from a simulated station B to the station under test.   |
|                  | 4    | send  | RF  | <b>IF</b> n=2 <b>THEN</b><br>FIS_REQUEST_b (s:=add_B; d:=7; fmi:=5;<br>mrq:= 2; locl:=EGLC; sdf:=0; ro:=500; lg:=2; pr:=12).  | FQb        | A different request message is sent when the test is repeated.   |
|                  | 5    | record  | RF  | burst_time:= time at beginning of slot in which<br>FIS_REQUEST_b burst was transmitted.   | FQb        | Record the time at which the FIS request message was transmitted by the simulated station B.   |
|                  | 6    | wait  |     | time = burst_time + 500 x (60/M1).  |            | Wait for the reserved slot.  |
|                  | 7    | verify  | RF  | FIS-B BURST (s:= add_A) transmitted by the station<br>under test in slot beginning at<br>time = burst_time + 500 x (60/M1).   |            | Verify that the requested message is received in the reserved slot.  |
|                  | 8    | verify  | RF  | FIS-B BURST (s:= add_A) has the format of:<br><b>IF</b> n = 1 <b>THEN</b> FIS_ATIS_a<br><b>IF</b> n = 2 <b>THEN</b> FIS_RCN_a<br><br>FIS-B BURST (s:= add_A) provides information for<br>the requested airport. | FAa<br>FRa | Verify that the transmitted burst is the correct as set out in the burst format section.<br>Verify the message provides the information for the requested airport. |
|                  | 9    | endrep  |     | n:=n + 1.   |            | End loop.  |
| postamble        | 10   |   |     |   |            | Bring test equipment into idle state.  |
| <b>Comments:</b> |      |   |     |   |            |  |



| Test Case Name:  |      | FIS_Queue_A |       |  |     |   |
|--|------|-------------|-------|--|-----|---|
| Purpose: To demonstrate that a station will correctly manage a queue of targets to be transmitted. |      |             |       |  |     |   |
| Context  | Step | Action      | PCO   | Action Qualifier   | Ref | Comment   |
| preamble   | 1    | do          |       | M_POWER_UP.  |     | Prepare the transceiver for testing.  |
| test body  | 2    | send        | Appln | <p>REQUEST TO TRANSMIT METAR MESSAGES:<br/>           FIS_METAR_a(1) (s:= add_A; fmi:= 0; vers:= 0; med:= 0; locl:=EGLL; date:=28; ti:=605; wdi:=4; wsp:=30; mxw:=1; cav:=1; trd:=1; pwf:=0; rwf:=0; qfef:=0; tem(bit 8):=0; tem(bits 1-7):=51; dew(bit 8):=0; dew(bits 1-7):=3; qnh=0; wsf:=0; ssf:=0; vdit:= 6; vdif:= 4; wgi:=7; mis:=15; misd:=4; mas:=41; masd:=7; pw:=42; cno:=2; ch:=10; cc:=3; cty:=2; qfe:=3; rw:=50; ws:=0; sst:=47; ss:=5; txt:= "METAR EGLL 0920Z 26005KT CAVOK 15/14 Q1013 NOSIG")</p> <p>FIS_METAR_a(2) (ws:=1; other parameters as above)<br/>           FIS_METAR_a(3) (qnh=2; other parameters as above)<br/>           FIS_METAR_a(4) (mis:=14; other parameters as above)<br/>           FIS_METAR_a(5) (misd:=3; other parameters as above)<br/>           FIS_METAR_a(6) (mas:=17; other parameters as above)<br/>           FIS_METAR_a(7) (masd:=5; other parameters as above)<br/>           FIS_METAR_a(8) (cty:=3; other parameters as above)<br/>           FIS_METAR_a(9) (sst:=50; other parameters as above)<br/>           FIS_METAR_a(10) (date:=10; other parameters as above).</p> | FMa | Send (as if from a FIS-B server) to the station under test all at once, ten different METAR messages to be transmitted. Note that index immediately following FIS_METAR_a is not a transmitted parameter. |
|  | 3    | rep 4       |       | n:= 1.   |     | Start loop.   |
|  | 4    | verify      | RF    | FIS_METAR_a(n) (s=add_A; med=0) transmitted.   | FMa | Verify that the first four METAR messages have been transmitted.  |
|  | 5    | endrep      |       | n:=n + 1.  |     | End loop.   |
|  | 6    | send        | Appln | <p>REQUEST TO TRANSMIT METAR MESSAGES:<br/>           FIS_METAR_a(6) (med:=1; mas:=15)<br/>           FIS_METAR_a(8) (med:=1; cty:=2)<br/>           FIS_METAR_a(9) (med:=1; sst:=40).</p>   | FMa | Send updated messages for three of the METAR messages that have not yet been transmitted by the ground station, each with a higher message edition number.  |
|  | 7    | rep 3       |       | n:= {5, 7, 10}.  |     | Start loop.   |

| Test Case Name:  |      | FIS_Queue_A |     |  |     |  |
|--|------|-------------|-----|--|-----|--|
| Purpose: To demonstrate that a station will correctly manage a queue of targets to be transmitted. |      |             |     |  |     |  |
| Context  | Step | Action      | PCO | Action Qualifier   | Ref | Comment  |
|  | 8    | verify      | RF  | FIS_METAR_a(n) (s=add_A; med=0) transmitted<br>IF n=5 THEN misd=3<br>IF n=7 THEN masd=5<br>IF n=10 THEN date=10. | FMa | Verify that the METAR messages for which updates where not provided are still transmitted.                             |
|  | 9    | endrep      |     | next n.  |     | End loop.  |
|  | 10   | rep 3       |     | n:= {6, 8, 9}.   |     | Start loop.  |
|  | 11   | verify      | RF  | FIS_METAR_a(n) (s=add_A; med:=1) transmitted<br>IF n=6 THEN mas=15<br>IF n=8 THEN cty=2<br>IF n=9 THEN sst=40.   | FMa | Verify that for the three messages that were updated, the updated messages are sent in place of the original messages. |
|  | 12   | endrep      |     | next n.  |     | End loop.  |
| postamble  | 13   |             |     |  |     | Bring test equipment into idle state.  |
| <b>Comments:</b>   |      |             |     |  |     |  |

| Test Case Name:   |      | FIS_Slot_A |       |  |     |  |
|---|------|------------|-------|--|-----|--|
| Purpose: To demonstrate that a station will transmit FIS-B messages in slots as instructed by the FIS-B server. |      |            |       |  |     |  |
| Context   | Step | Action     | PCO   | Action Qualifier   | Ref | Comment  |
| preamble  | 1    | do         |       | M_POWER_UP.  |     | Prepare the transceiver for testing.   |
| test body   | 2    | send       | Appln | REQUEST TO TRANSMIT ATIS MESSAGE<br>(s:= add_A; fmi:= 1; vers:= 0; med:= 0; locl:=EGLL;<br>date:=28; ti:=605; hd:=3; tran:=3; oth:=0;<br>aavl(bits 1-11):=615; aavl(bit 12):=1; wdi:=4;<br>wsp:=30; tem(bit8):=0; tem(bits1-7):=5;<br>dew(bit8):=0; dew(bits 1-7):=5; qnh:=3; ruf:=0;<br>ftxt:=1; mxw:=1; cav:=0; trd:=1; qfef:=0; wsf:=1;<br>pwf:=1; rwf:=0; vdit:= 6; vdif:= 4; wgi:=7; mis:=15;<br>misd:=4; mas:=41; masd:=7; cno:=2; cc:=3;<br>ch:=10 cty:=2; pw:=18; rw:=50; qfe:=248;<br>run(bits 1-6):=25; run(bits7-8):=2; aptf:=0; apty:= 3;<br>rdp:=1; rcon:=1; dod:=0; brk:=1; rrl:=127; rrw:=68;<br>rvt:=15; rvm:=18; rve:=24; ravl(bits 1-11):=605;<br>ravl(bit 12):= 1; rus:=3; ws:=0; txt:= "ATIS RWY:<br>25R /18 TL: 70 SR:0538 SS:1647 ETOU RWY:<br>26")<br><br>TRANSMIT IN FIRST AVAILABLE SLOT<br>TRANSMIT 3 TIMES PER MINUTE FOR THREE<br>MINUTES. |     | Instruct (as if a FIS-B server) the station under test to transmit an ATIS message in the first slot available, and thereafter three times per minute for three minutes. |
|   | 3    | await      |       | Next available slot.   |     | Wait for the next available slot.  |
|   | 4    | verify     | RF    | FIS_ATIS_a (s:=add_A) transmitted in the available slot.   | FAa | Verify that ATIS message was transmitted by the station under test in the first free slot available.   |
|   | 5    | record     | RF    | atis_time:= time at beginning of slot in which FIS_ATIS_a (s:=add_A) transmitted.  | FAa | Record the time that the ATIS message was transmitted.   |
|   | 6    | rep 9      |       | n:= 1.   |     | Start loop.  |
|   | 7    | wait       |       | time:= atis_time + (20 - 4) x n  |     | Wait for the expected time at which the ATIS message is next transmitted less 20 %.  |
|   | 8    | verify     | RF    | FIS_ATIS_a (s:=add_A) transmitted before time:= atis_time + (20 + 4) x n.  | FAa | Verify that the ATIS message is transmitted before the expected time plus 20 %.  |
|   | 9    | endrep     |       | n:= n + 1.   |     | End loop.  |

| Test Case Name:   |      | FIS_Slot_A |       |   |     |  |
|---|------|------------|-------|---|-----|--|
| Purpose: To demonstrate that a station will transmit FIS-B messages in slots as instructed by the FIS-B server. |      |            |       |   |     |  |
| Context   | Step | Action     | PCO   | Action Qualifier  | Ref | Comment  |
|   | 10   | send       | Appln | REQUEST TO TRANSMIT ATIS MESSAGE<br>(s:= add_G; fmi:= 1; vers:= 0; med:= 0; locl:=EGLL;<br>date:=28; ti:=605; hd:=3; tran:=3; oth:=0;<br>aavl(bits 1-11):=615; aavl(bit 12):=1; wdi:=4;<br>wsp:=30; tem(bit8):=0; tem(bits1-7):=5;<br>dew(bit8):=0; dew(bits 1-7):=5; qnh:=3; ruf:=0;<br>fxt:=1; mxw:=1; cav:=0; trd:=1; qfef:=0; wsf:=1;<br>pwf:=1; rwf:=0; vdit:= 6; vdif:= 4; wgi:=7; mis:=15;<br>misd:=4; mas:=41; masd:=7; cno:=2; cc:=3;<br>ch:=10 cty:=2; pw:=18; rw:=50; qfe:=248;<br>run(bits 1-6):=25; run(bits7-8):=2; aptf:=0; apty:= 3;<br>rdp:=1; rcon:=1; dod:=0; brk:=1; rrl:=127; rrw:=68;<br>rvt:=15; rvm:=18; rve:=24; ravl(bits 1-11):=605;<br>ravl(bit 12):= 1; rus:=3; ws:=0; txt:= "ATIS RWY:<br>25R /18 TL: 70 SR:0538 SS:1647 ETOU RWY:<br>26")<br><br>TRANSMIT IN SECOND SLOT OF THE UTC<br>SECOND<br>TRANSMIT 3 TIMES PER MINUTE FOR THREE<br>MINUTES. |     | Instruct the station under test to transmit in the second slot of the UTC second, and then three times per minute for three minutes. |
|   | 11   | await      |       | Next slot that is the second slot in a UTC second.  |     | Wait for the next slot that is the second slot in a UTC second.  |
|   | 12   | verify     | RF    | FIS_ATIS_a (s:=add_A) transmitted in second slot of UTC second.   |     | Verify that ATIS message was transmitted by the station under test in the second slot of the UTC second.                             |
|   | 13   | record     | RF    | atis_time:= time at beginning of slot in which FIS_ATIS_a (s:=add_A) transmitted.   | FAa | Record the time that the ATIS message was transmitted.   |
|   | 14   | rep 9      |       | n:= 1.  |     | Start loop.  |
|   | 15   | wait       |       | time:= atis_time + (20 - 4) x n.  |     | Wait for the expected time at which the ATIS message is next transmitted less 20 %.  |
|   | 16   | verify     | RF    | FIS_ATIS_a (s:=add_A) transmitted before time:= atis_time + (20 + 4) x n.   | FAa | Verify the ATIS message is transmitted before the expected time plus 20 %.   |
|   | 17   | endrep     |       | n:= n + 1.  |     | End loop.  |

| Test Case Name:   |      | FIS_Slot_A |        |  |     |  |
|---|------|------------|--------|--|-----|--|
| Purpose: To demonstrate that a station will transmit FIS-B messages in slots as instructed by the FIS-B server. |      |            |        |  |     |  |
| Context   | Step | Action     | PCO    | Action Qualifier   | Ref | Comment  |
|   | 18   | send       | App_In | REQUEST TO TRANSMIT ATIS MESSAGE<br>(s:= add_G; fmi:= 1; vers:= 0; med:= 0; locl:=EGLL;<br>date:=28; ti:=605; hd:=3; tran:=3; oth:=0;<br>aavl(bits 1-11):=615; aavl(bit 12):=1; wdi:=4;<br>wsp:=30; tem(bit8):=0; tem(bits1-7):=5;<br>dew(bit8):=0; dew(bits 1-7):=5; qnh:=3; ruf:=0;<br>ftxt:=1; mxw:=1; cav:=0; trd:=1; qfef:=0; wsf:=1;<br>pwf:=1; rwf:=0; vdit:= 6; vdif:= 4; wgi:=7; mis:=15;<br>misd:=4; mas:=41; masd:=7; cno:=2; cc:=3;<br>ch:=10 cty:=2; pw:=18; rw:=50; qfe:=248; run(bits<br>1-6):=25; run(bits7-8):=2; aptf:=0; apty:= 3; rdp:=1;<br>rcon:=1; dod:=0; brk:=1; rrl:=127; rrw:=68; rvt:=15;<br>rvm:=18; rve:=24; ravl(bits 1-11):=605;<br>ravl(bit 12):= 1; rus:=3; ws:=0; txt:= "ATIS RWY:<br>25R /18 TL: 70 SR:0538 SS:1647 ETOU RWY:<br>26")<br><br>TRANSMIT IN TENTH SLOT AFTER CURRENT<br>SLOT<br>TRANSMIT 3 TIMES PER MINUTE FOR THREE<br>MINUTES. |     | Instruct the station under test to transmit in the tenth slot after the current slot, and then three times per minute for three minutes. |
|   | 19   | record     | Appln  | instruct_time:= time at beginning of slot after instruction from FIS-B server was transmitted.   | FAa | Record the time that the ATIS message was transmitted.   |
|   | 20   | verify     | RF     | FIS_ATIS_a (s:=add_A) transmitted in slot beginning at time:= instruct_time + 10 x (60/M1).  |     | Verify that the ATIS message was transmitted by the station under test in the tenth slot after the current slot.                         |
|   | 21   | record     | RF     | atis_time:= time at beginning of slot in which FIS_ATIS_a (s:=add_A) transmitted.  | FAa | Record the time that the ATIS message was transmitted.   |
|   | 22   | rep 9      |        | n:= 1.   |     | Start loop.  |
|   | 23   | wait       |        | time:= atis_time + (20 - 4) x n.   |     | Wait for the expected time at which the ATIS message is next transmitted less 20 %.  |
|   | 24   | verify     | RF     | FIS_ATIS_a (s:=add_A) transmitted before time:= atis_time + (20 + 4) x n.  | FAa | Verify that the ATIS message is transmitted before the expected time plus 20 %.  |
|   | 25   | endrep     |        | n:= n + 1.   |     | End loop.  |
| postamble   | 26   |            |        |  |     | Bring test equipment into idle state.  |
| <b>Comments:</b>  |      |            |        |  |     |  |

| Test Case Name: FIS_AddInfo_A  |      |        |        |  |     |   |
|--|------|--------|--------|--|-----|---|
| Purpose: To demonstrate that a station passes requests for additional information to the FIS-B server. |      |        |        |  |     |   |
| Context  | Step | Action | PCO    | Action Qualifier   | Ref | Comment   |
| preamble   | 1    | do     |        | M_POWER_UP.  |     | Prepare the transceiver for testing.  |
| test body  | 2    | send   | RF     | FIS_REQUEST_a (s:=add_B; fmi:=5; mrq:= 1; loci:=EGLL).                 | FQa | Send a report request message with a null reservation from a simulated station B to the station under test.         |
|  | 3    | verify | AppOut | MESSAGE TO FIS-B SERVER: REQUEST FOR UPDATED ATIS MESSAGE INFORMATION. |     | Wait for a message to be sent by the station under test to the FIS-B server requesting additional ATIS information. |
|  | 4    | send   | RF     | FIS_REQUEST_a (s:=add_C; fmi:=5; mrq:= 2; loci:=EGLC).                 | FQa | Send a report request message with a null reservation from a simulated station C to the station under test.         |
|  | 5    | verify | AppOut | MESSAGE TO FIS-B SERVER: REQUEST FOR UPDATED RCN MESSAGE INFORMATION.  |     | Wait for a message to be sent by the station under test to the FIS-B server requesting additional RCN information.  |
| postamble  | 6    |        |        |  |     | Bring test equipment into idle state.   |
| <b>Comments:</b>   |      |        |        |  |     |   |

| Test Case Name: FIS_Request_Rec_A  |      |        |        |  |     |   |
|--|------|--------|--------|--|-----|---|
| Purpose: To demonstrate that a station will correctly process a received FIS-B report request message with a null reservation. |      |        |        |  |     |   |
| Context  | Step | Action | PCO    | Action Qualifier   | Ref | Comment   |
| preamble   | 1    | do     |        | M_POWER_UP.  |     | Prepare the transceiver for testing.  |
| test body  | 2    | rep x  |        | x:={P, Q, R, S}.   |     | Repeat test for 4 different sets of parameters.   |
|  | 3    | send   | RF     | FIS_REQUEST_a (s:= add_B) (FIS_REQUEST_RF_IN_PARAMETERS(x)). | FQa | Send a report request message with null reservation to the station under test from a simulated station B. |
|  | 4    | await  | AppOut | REQUEST MESSAGE INFORMATION.                                 |     | Wait for the message information to be output by station under test at the AppOut PCO.                    |
|  | 5    | verify | AppOut | FIS_REQUEST_APPOUT_PARAMETERS(x).                            |     | Verify that the content of the information output by station under test at the AppOut PCO is correct.     |
|  | 6    | endrep |        | next x.  |     |   |
| postamble  | 7    |        |        |  |     | Bring test equipment into idle state.   |
| <b>Comments:</b>   |      |        |        |  |     |   |

| Test Case Name: FIS_Request_Rec_B   |      |        |        |   |     |  |
|---|------|--------|--------|---|-----|--|
| Purpose: To demonstrate that a station will correctly process a received FIS-B report request message with a unicast reservation. |      |        |        |   |     |  |
| Context   | Step | Action | PCO    | Action Qualifier  | Ref | Comment  |
| preamble  | 1    | do     |        | M_POWER_UP.   |     | Prepare the transceiver for testing.   |
| test body   | 2    | rep x  |        | x:={P, Q, R, S}.  |     | Repeat test for 4 different sets of parameters.  |
|   | 3    | send   | RF     | FIS_REQUEST_b (s:= add_B)<br>(FIS_REQUEST_RF_IN_PARAMETERS(x)). | FQb | Send a report request message with a unicast reservation to the station under test from a simulated station B. |
|   | 4    | await  | AppOut | REQUEST MESSAGE INFORMATION.                                    |     | Wait for the message information to be output by station under test at the AppOut PCO.                         |
|   | 5    | verify | AppOut | FIS_REQUEST_APPOUT_PARAMETERS(x).                               |     | Verify that the content of the information output by station under test at the AppOut PCO is correct.          |
|   | 6    | endrep |        | next x.   |     |  |
| postamble   | 7    |        |        |   |     | Bring test equipment into idle state.  |
| <b>Comments:</b>  |      |        |        |   |     |  |

| Test Case Name: GNS_Type1_Message_A   |      |        |       |   |     |   |
|---|------|--------|-------|---|-----|---|
| Purpose: To demonstrate that a station will broadcast a GNS-B Type 1 message with the correct format. |      |        |       |   |     |   |
| Context   | Step | Action | PCO   | Action Qualifier  | Ref | Comment   |
| preamble  | 1    | do     |       | M_POWER_UP.   |     | Prepare the transceiver for testing.  |
| test body   | 2    | rep x  |       | x:= {P, Q, R, S}.   |     | Repeat test for 4 different sets of parameters.   |
|   | 3    | send   | AppIn | REQUEST TO TRANSMIT GNS_TYPE1_a<br>(GNS_TYPE1_APPIN_PARAMETERS(x)). | G1a | Instruct the station under test to broadcast a GNS Type 1 message.                                      |
|   | 4    | await  | RF    | BURST (s:=add_A) broadcast by the station under test.               |     | Wait for the GNS message to be broadcast by the station under test.                                     |
|   | 5    | verify | RF    | BURST (s:= add_A) has the format of "GNS_TYPE1_a".                  | G1a | Verify that the transmitted burst has the same format as "GNS_TYPE1_a" set out in burst format section. |
|   | 6    | verify | RF    | GNS_TYPE1_RF_OUT_PARAMETERS(x).                                     |     | Verify that the content of the information output by station under test at the RF PCO is correct.       |
|   | 7    | Endrep |       | next x.   |     | End loop.   |
| postamble   | 8    |        |       |   |     | Bring test equipment into idle state.   |
| <b>Comments:</b>  |      |        |       |   |     |   |

| Test Case Name: GNS_Type2_Message_A   |      |        |       |  |     |   |
|---|------|--------|-------|--|-----|---|
| Purpose: To demonstrate that a station will broadcast a GNS-B Type 2 message with the correct format. |      |        |       |  |     |   |
| Context   | Step | Action | PCO   | Action Qualifier   | Ref | Comment   |
| preamble  | 1    | do     |       | M_POWER_UP.  |     | Prepare the transceiver for testing.  |
| test body   | 2    | rep x  |       | x:= {P, Q, R, S}.  |     | Repeat test for 4 different sets of parameters.   |
|   | 3    | send   | Appln | REQUEST TO TRANSMIT GNS_TYPE2_a (GNS_TYPE2_APPIN_PARAMETERS(x)). | G2a | Instruct the station under test to broadcast a GNS Type 2 message.                                      |
|   | 4    | await  | RF    | BURST (s:=add_A) broadcast by the station under test.            |     | Wait for the GNS message to be broadcast by the station under test.                                     |
|   | 5    | verify | RF    | BURST (s:= add_A) has the format of "GNS_TYPE2_a".               | G2a | Verify that the transmitted burst has the same format as "GNS_TYPE2_a" set out in burst format section. |
|   | 6    | verify | RF    | GNS_TYPE2_RF_OUT_PARAMETERS(x).                                  |     | Verify that the content of the information output by station under test at the RF PCO is correct.       |
|   | 7    | Endrep |       | next x.  |     | End loop.   |
| postamble   | 8    |        |       |  |     | Bring test equipment into idle state.   |
| <b>Comments:</b>  |      |        |       |  |     |   |

| Test Case Name: GNS_Type4_Message_A   |      |        |       |  |     |   |
|---|------|--------|-------|--|-----|---|
| Purpose: To demonstrate that a station will broadcast a GNS-B Type 4 message with the correct format. |      |        |       |  |     |   |
| Context   | Step | Action | PCO   | Action Qualifier   | Ref | Comment   |
| preamble  | 1    | do     |       | M_POWER_UP.  |     | Prepare the transceiver for testing.  |
| test body   | 2    | rep x  |       | x:= {P, Q, R, S}.  |     | Repeat test for 4 different sets of parameters.   |
|   | 3    | send   | Appln | REQUEST TO TRANSMIT GNS_TYPE4_a (GNS_TYPE4_APPIN_PARAMETERS(x)). | G4a | Instruct the station under test to broadcast a GNS Type 4 message.                                      |
|   | 4    | await  | RF    | BURST (s:=add_A) broadcast by the station under test.            |     | Wait for the GNS message to be broadcast by the station under test.                                     |
|   | 5    | verify | RF    | BURST (s:= add_A) has the format of "GNS_TYPE4_a".               | G4a | Verify that the transmitted burst has the same format as "GNS_TYPE4_a" set out in burst format section. |
|   | 6    | verify | RF    | GNS_TYPE4_RF_OUT_PARAMETERS(x).                                  |     | Verify that the content of the information output by station under test at the RF PCO is correct.       |
|   | 7    | Endrep |       | next x.  |     | End loop.   |
| postamble   | 8    |        |       |  |     | Bring test equipment into idle state.   |
| <b>Comments:</b>  |      |        |       |  |     |   |



## Annex A (informative): Cross reference matrix

Table A.1 outlines the mapping between the VDL Mode 4 Ground station ADS-B requirements and the related test procedures. The table also provides a cross reference to the ICAO reference material from which many of the requirements within the present document are derived. In these tables:

- column 1 is a reference to the requirements in the present document;
- column 2 is a reference to the equivalent requirements in [i.1];
- column 3 identifies individual requirements within [i.1];
- column 4 identifies clause titles taken from the present document;
- column 5 is a reference to testing requirements specified elsewhere in the present document. Several tests verify a whole group of requirements. They are only mentioned in the first row of such a group, usually a headline. The applicability of these tests to the subordinated requirements is indicated by ditto marks ( " ) in the rows following the first instance of a test case name. Amplification of individual entries is provided by the following notes.
- column 6 qualifies each test procedure to be:
  - Essential: meaning that it is included with the Essential Radio Test Suite and therefore the requirement should be demonstrated to be met in accordance with the referenced procedures.
  - Other: meaning that the test procedure is illustrative but other means of demonstrating compliance with the requirement are permitted.
  - eXcluded: meaning that there is no specific test for the requirement.

NOTE 1: The clause number in column 1 is a headline or an introduction to requirements that are detailed in subsequent clauses. No test can be applied.

NOTE 1a: The clause number in column 1 is a definition. No test can be applied.

NOTE 2: The requirements listed in column 1 does not allow definition of a satisfactory go/no go test, for example, because it would be technically infeasible, or economically unreasonable. There are circumstances where the implementer can provide reasoned argument or test evidence that the implementation under test does conform to the requirements in column 1. For each of these circumstances the implementer may be required to satisfy the authorities by separate technical evidence.

NOTE 3: The requirements listed in column 1 is applicable only to VDL Mode 4 airborne equipment. No ground equipment test is required.

NOTE 4: This topic is heavily dependent on the implementation or results from a recommendation. No particular test is therefore provided in the present document.

NOTE 5: All tests whether "E" or "O" are relevant to the requirements. Rows designated "E" collectively make up the Essential Radio Test Suite; those designated "O" make up the Other Test Suite; for those designated "X" there is no test specified corresponding to the requirement . All tests classified "E" should be performed as specified with satisfactory outcomes as a necessary condition for a presumption of conformity. Requirements associated with tests classified "O" or "X" should be complied with as a necessary condition for presumption of conformity, although conformance with the requirement may be claimed by an equivalent test or by manufacturer's assertion supported by appropriate entries in the technical construction file.

Table A.1: VDL Mode 4 requirements for ADS-B

| Requirement reference | Reference in [i.1] | Req | Title  | Test Case  | E/O/X |
|-----------------------|--------------------|-----|--|--|-------|
| 5.1.1                 | 3.3                |     | Information Field Formats                          | See note 1   | X     |
| 5.1.1.1               | 3.3.1              | a   |  | See note 1a  | X     |
| 5.1.1.2               | 3.3.2              | a   |  | ADSB_Basic_Rec_A<br>ADSB_High_Dynamic_Rec_A<br>ADSB_Full_Position_Rec_A<br>ADSB_Basic_Ground_A<br>ADSB_UTC_Time_A<br>ADSB_Two_Slot_TCP/SVQ_Rec_A<br>ADSB_Single_Slot_TCP_Rec_A<br>ADSB_Single_Slot_SVQ_Rec_A<br>ADSB_Aircraft_Data_Rec_A<br>ADSB_High_Resolution_Rec_A | E     |
| 5.1.1.3               | 3.3.3              | a   |  | See note 1a  | X     |
| 5.1.1.4               | 3.3.3.1            | a   |  | See note 1a  | X     |
| 5.1.1.5               | 3.3.3.2            | a   |  | See note 1a  | X     |
| 5.1.1.6               | 3.3.3.2            | b   |  | See note 1a  | X     |
| 5.1.1.7               | 3.3.4              | a   |  | See note 1a  | X     |
| 5.1.1.8               | 3.3.5              | a   |  | See note 1a  | X     |
| 5.1.1.9               | 3.3.6              | a   |  | See note 1a  | X     |
| 5.1.1.10              | 3.3.7              | a   |  | See note 1a  | X     |
| 5.1.1.11              | 3.3.8              | a   |  | See note 1a  | X     |
| 5.1.1.12              | 3.3.9              | a   |  | See note 1a  | X     |
| 5.1.1.13              |                    |     |  | See note 1a  | X     |
| 5.1.1.14              |                    |     |  | See note 1a  | X     |
| 5.1.2                 | 3.4                |     | ADS-B Request                                      | See note 1   | X     |
| 5.1.2.1               | 3.4.1              |     | ADS-B Request Format                               | See note 1   | X     |
| 5.1.2.1.1             | 3.4.1              | a   |  | ADSB_Request_A   | E     |
| 5.1.2.1.2             | 3.4.1              | b   |  | ADSB_Request_A<br>ADSB_Request_B<br>ADSB_Request_C<br>ADSB_Request_D   | E     |
| 5.1.2.1.3             | 3.4.1              | c   |  | See note 1a  | X     |
| 5.1.2.1.4             | 3.4.1              | d   |  | See note 1a  | X     |
| 5.1.2.1.5             | 3.4.1              | e   |  | See note 1a  | X     |
| 5.1.2.2               | 3.4.2              |     | Sleep Mode   | See note 1   | X     |
| 5.1.2.2.1             | 3.4.2              | a   |  | ADSB_Request_C<br>ADSB_Request_D   | E     |
| 5.1.2.2.2             | 3.4.2              | b   |  | ADSB_Request_A<br>ADSB_Request_B   | E     |
| 5.1.2.3               | 3.4.3              |     | Automatic Selection of Variable Information Fields | See note 1   | X     |
| 5.1.2.3.1             | 3.4.3              | a   |  | ADSB_Request_A<br>ADSB_Request_C   | E     |
| 5.1.2.3.2             | 3.4.3              | b   |  | ADSB_Request_A<br>ADSB_Request_C   | E     |
| 5.1.3                 | 3.5                |     | Default ADS-B Reporting                            | See note 1   | X     |
| 5.1.3.1               | 3.5a               | a   |  | ADSB_reporting   | E     |
| 5.1.3.2               | 3.5.1              | a   |  | See note 4   | O     |
| 5.1.4                 | 3.6                |     | ADS-B Procedures                                   | See note 1   | X     |
| 5.1.4.1               | 3.6.1.1            | a   |  | ADSB_Request_B<br>ADSB_Request_D   | E     |
| 5.1.4.2               | 3.6.1.1            | b   |  | ADSB_Request_A<br>ADSB_Request_C   | E     |
| 5.1.4.3               | 3.6.1.1            | c   |  | ADSB_Request_A<br>ADSB_Request_B   | E     |
| 5.1.4.4               | 3.6.1.2            | a   |  | ADSB_Request_C<br>ADSB_Request_D   | E     |
| 5.1.4.5               | 3.6.2              | a   |  | ADSB_request_time  | E     |
| 5.1.4.6               | 3.6.3              | a   |  | ADSB_priority  | E     |
| 5.1.4.7               | 3.6.4              | f   |  | ADSB_TCP_flag_C  | E     |

| Requirement reference | Reference in [i.1] | Req | Title                                      | Test Case            | E/O/X |
|-----------------------|--------------------|-----|--|----------------------|-------|
| 5.1.5                 | 3.7                |     | CTRL Parameters                            | See note 1           | X     |
| 5.1.5.1               | 3.7.1              |     | Directory of Service (DOS) Message         | See note 1           | X     |
| 5.1.5.1.1             | 3.7.1.1            | a   |  | ADSB_DOS_A           | E     |
| 5.1.5.1.2             | 3.7.1.1            | b   |  | See note 1a          | X     |
| 5.1.5.1.3             | 3.7.1.2            | a   |  | See note 1a          | X     |
| 5.1.5.2               | 3.7.2              |     | Channel Management Parameter               | See note 1           | X     |
| 5.1.5.2.1             | 1.5.3.6.7.1        | a   |  | See note 1a          | X     |
| 5.1.5.2.2             | 1.5.3.6.7.2        | a   |  | See note 1a          | X     |
| 5.1.5.2.3             | 3.7.2              | a   |  | ADSB_Channel_A       | E     |
| 5.1.5.2.4             | 3.7.2              | b   |  | ADSB_Channel_A       | E     |
| 5.1.5.2.5             | 3.7.2.1.1          | a   |  | ADSB_Channel_A       | E     |
| 5.1.5.2.6             | 3.7.2.1.2          | b   |  | See note 1a          | X     |
| 5.1.5.2.7             | 3.7.2.1.2          | b   |  | See note 1a          | X     |
| 5.1.5.2.8             | 3.7.2.2            | a   |  | ADSB_Channel_A       | E     |
| 5.1.5.2.9             | 3.7.2.2.1          | a   |  | See note 1a          | X     |
| 5.1.5.2.10            | 3.7.2.2.2          | a   |  | ADSB_Channel_A       | E     |
| 5.1.5.2.11            | 3.7.2.2.3.1        | a   |  | ADSB_Channel_A       | E     |
| 5.1.5.2.12            | 3.7.2.2.3.2        | a   |  | ADSB_Channel_A       | E     |
| 5.1.5.2.13            | 3.7.2.2.4.1        | a   |  | ADSB_Channel_A       | E     |
| 5.1.5.2.14            | 3.7.2.2.4.1        | b   |  | ADSB_Channel_A       | E     |
| 5.1.5.2.15            | 3.7.2.2.4.2        | a   |  | ADSB_Directed_Slot_A | E     |
| 5.1.5.2.16            | 3.7.2.2.5          | a   |  | ADSB_Channel_D       | E     |
| 5.1.5.2.17            | 3.7.2.2.5          | b   |  | See note 1a          | X     |
| 5.1.5.2.18            | 3.7.2.4.1          | a   |  | ADSB_Channel_B       | E     |
| 5.1.5.2.19            | 3.7.2.4.2          | a   |  | ADSB_Channel_B       | E     |
| 5.1.5.2.20            | 3.7.2.6.1          | a   |  | ADSB_Channel_D       | E     |
| 5.1.5.2.21            | 3.7.2.6.2.1        | a   |  | ADSB_Channel_A       | E     |
| 5.1.5.2.22            | 3.7.2.6.2.1        | b   |  | ADSB_Channel_A       | E     |
| 5.1.5.2.23            | 3.7.2.7            | a   |  | ADSB_Channel_A       | E     |
| 5.1.5.2.24            | 3.7.2.8            | a   |  | ADSB_Channel_A       | E     |
| 5.1.5.2.25            | 3.7.2.9.1          | a   |  | ADSB_Channel_A       | E     |
| 5.1.5.2.26            | 3.7.2.9.2          | a   |  | ADSB_Channel_A       | E     |
| 5.1.5.2.27            | 3.7.2.9.2          | b   |  | ADSB_Channel_A       | E     |
| 5.1.5.2.28            | 3.7.2.9.2          | c   |  | ADSB_Channel_C       | E     |
| 5.1.6                 | 4                  |     | Definitions for Compact Position Reporting | See note 1           | X     |
| 5.1.6.1               | 4.6                |     | Information Field Offset Encoding          | See note 1           | X     |
| 5.1.6.1.1             | 4.6.1              | a   |  | CPR_Encode_Offset    | E     |
| 5.1.6.1.2             | 4.6.1              | b   |  | CPR_Encode_Offset    | E     |
| 5.1.6.1.3             | 4.6.2              | a   |  | See note 1a          | X     |
| 5.1.6.1.4             | 4.6.3.1            | a   |  | See note 1a          | X     |
| 5.1.6.1.5             | 4.6.3.2            | a   |  | See note 1a          | X     |
| 5.1.6.1.6             | 4.6.3.3            | a   |  | See note 1a          | X     |
| 5.1.6.2               | 4.7                |     | Information Field Offset Decoding          | See note 1           | X     |
| 5.1.6.2.1             | 4.7.1              | a   |  | CPR_Decode_Offset    | E     |
| 5.1.6.2.2             | 4.7.2              | a   |  | See note 1a          | X     |
| 5.1.6.2.3             | 4.7.3.1            | a   |  | See note 1a          | X     |
| 5.1.6.2.4             | 4.7.3.2            | a   |  | See note 1a          | X     |
| 5.1.6.3               | 4.8                |     | Patch ID Encoding                          | See note 1           | X     |
| 5.1.6.3.1             | 4.8.1              | a   |  | CPR_Encode_Offset    | E     |
| 5.1.6.3.2             | 4.8.2              | a   |  | See note 1a          | X     |
| 5.1.6.3.3             | 4.8.3              | a   |  | See note 1a          | X     |
| 5.1.6.4               | 4.9                |     | Patch ID Decoding                          | See note 1           | X     |
| 5.1.6.4.1             | 4.9.1              | a   |  | CPR_Decode_Offset    | E     |
| 5.1.6.4.2             | 4.9.2              | a   |  | See note 1a          | X     |
| 5.1.6.4.3             | 4.9.3.1            | a   |  | See note 1a          | X     |
| 5.1.6.4.4             | 4.9.3.2            | a   |  | See note 1a          | X     |

Table A.2 outlines the mapping between the VDL Mode 4 Ground station TIS-B requirements and the related test procedures. In these tables:

- column 1 is a reference to the requirement in the present document;
- column 2 identifies clause titles taken from the present document;
- column 3 qualifies each test procedure to be:
  - Essential: meaning that it is included with the Essential Radio Test Suite and therefore the requirement should be demonstrated to be met in accordance with the referenced procedures.
  - Other: meaning that the test procedure is illustrative but other means of demonstrating compliance with the requirement are permitted.
  - eXcluded: meaning that there is no specific test for the requirement.

NOTE 1: The clause number in column 1 is a headline or an introduction to requirements that are detailed in subsequent clauses. No test can be applied.

NOTE 1a: The clause number in column 1 is a definition. No test can be applied.

NOTE 2: The requirements listed in column 1 does not allow definition of a satisfactory go/no go test, for example, because it would be technically infeasible, or economically unreasonable. There are circumstances where the implementer can provide reasoned argument or test evidence that the implementation under test does conform to the requirements in column 1. For each of these circumstances the implementer may be required to satisfy the authorities by separate technical evidence.

NOTE 3: All tests whether "E" or "O" are relevant to the requirements. Rows designated "E" collectively make up the Essential Radio Test Suite; those designated "O" make up the Other Test Suite; for those designated "X" there is no test specified corresponding to the requirement . All tests classified "E" should be performed as specified with satisfactory outcomes as a necessary condition for a presumption of conformity. Requirements associated with tests classified "O" or "X" should be complied with as a necessary condition for presumption of conformity, although conformance with the requirement may be claimed by an equivalent test or by manufacturer's assertion supported by appropriate entries in the technical construction file.

Table A.2: VDL Mode 4 requirements for TIS-B

| Requirement reference | Title                      | Test Case  | E/O/X |
|-----------------------|----------------------------|--|-------|
| 5.2                   | Requirements for TIS-B     | See note 1   | X     |
| 5.2.1                 | Traffic information volume | See note 1   | X     |
| 5.2.1.1               |                            | See note 1a  | X     |
| 5.2.1.2               |                            | See note 1a  | X     |
| 5.2.1.3               |                            | See note 1a  | X     |
| 5.2.1.4               |                            | See note 1a  | X     |
| 5.2.1.5               |                            | See note 1a  | X     |
| 5.2.1.6               |                            | See note 1a  | X     |
| 5.2.1.7               |                            | See note 1a  | X     |
| 5.2.1.8               |                            | See note 2   | O     |
| 5.2.1.9               |                            | See note 2   | O     |
| 5.2.1.10              |                            | See note 2   | O     |
| 5.2.1.11              |                            | TIS_Channel_B  | E     |
| 5.2.1.12              |                            | See note 2   | O     |
| 5.2.1.13              |                            | TIS_Manage_A   | E     |
| 5.2.2                 | Message transmission       | See note 1   | X     |
| 5.2.2.1               | Management messages        | See note 1   | X     |
| 5.2.2.1.1             |                            | TIS_Manage_C   | E     |
| 5.2.2.1.2             |                            | TIS_Manage_B   | E     |
| 5.2.2.1.3             |                            | TIS_Manage_A   | E     |
| 5.2.2.1.4             |                            | TIS_Manage_B   | E     |
| 5.2.2.2               | Target Messages            | See note 1   | X     |
| 5.2.2.2.1             |                            | TIS_Target_Update_A<br>TIS_Target_Update_B<br>TIS_Target_Update_C<br>TIS_Target_Update_D | E     |
| 5.2.2.2.2             |                            | See note 2   | O     |
| 5.2.2.2.3             |                            | See note 2   | O     |
| 5.2.2.3               | Airport operation          | See note 1   | X     |
| 5.2.2.3.1             |                            | TIS_Target_Ground  | E     |
| 5.2.2.3.2             |                            | TIS_Target_Ground  | E     |
| 5.2.2.3.3             |                            | TIS_Veh_Default_A  | E     |
| 5.2.3                 | Message format             | See note 1   | X     |
| 5.2.3.1               |                            | TIS_Manage_A<br>TIS_Aircraft_Air_A<br>TIS_Aircraft_Grd_A<br>TIS_Grd_Veh_A                | E     |
| 5.2.3.2               |                            | TIS_Manage_A<br>TIS_Aircraft_Air_A<br>TIS_Aircraft_Grd_A<br>TIS_Grd_Veh_A                | E     |
| 5.2.3.3               |                            | TIS_Manage_A<br>TIS_Aircraft_Air_A<br>TIS_Aircraft_Grd_A<br>TIS_Grd_Veh_A                | E     |
| 5.2.3.4               |                            | See note 2   | O     |
| 5.2.3.5               |                            | See note 2   | O     |
| 5.2.3.6               |                            | TIS_Manage_A<br>TIS_Aircraft_Air_A<br>TIS_Aircraft_Grd_A<br>TIS_Grd_Veh_A                | E     |
| 5.2.3.7               |                            | TIS_Manage_A<br>TIS_Aircraft_Air_A<br>TIS_Aircraft_Grd_A<br>TIS_Grd_Veh_A                | E     |
| 5.2.3.8               |                            | TIS_Manage_A<br>TIS_Aircraft_Air_A<br>TIS_Aircraft_Grd_A<br>TIS_Grd_Veh_A                | E     |
| 5.2.4                 | Management message         | See note 1   | X     |
| 5.2.4.1               |                            | TIS_Manage_A   | E     |
| 5.2.4.2               |                            | TIS_Manage_A   | E     |

| Requirement reference | Title                                       | Test Case          | E/O/X |
|-----------------------|---|--------------------|-------|
| 5.2.4.3               |   | TIS_Manage_A       | E     |
| 5.2.4.4               |   | TIS_Manage_A       | E     |
| 5.2.4.5               |   | TIS_Manage_A       | E     |
| 5.2.5                 | Aircraft target messages (airborne TIV)     | See note 1         | X     |
| 5.2.5.1               |   | TIS_Aircraft_Air_A | E     |
| 5.2.5.2               |   | TIS_Aircraft_Air_A | E     |
| 5.2.5.3               |   | TIS_Aircraft_Air_A | E     |
| 5.2.5.4               |   | TIS_Aircraft_Air_A | E     |
| 5.2.5.5               |   | TIS_Flight_ID_A    | E     |
| 5.2.5.6               |   | TIS_Flight_ID_B    | E     |
| 5.2.5.7               |   | TIS_Aircraft_Air_A | E     |
| 5.2.6                 | Aircraft target messages (ground TIV)       | See note 1         | X     |
| 5.2.6.1               |   | TIS_Aircraft_Grd_A | E     |
| 5.2.6.2               |   | TIS_Aircraft_Grd_A | E     |
| 5.2.6.3               |   | TIS_Aircraft_Grd_A | E     |
| 5.2.6.4               |   | TIS_Aircraft_Grd_A | E     |
| 5.2.6.5               |   | TIS_Flight_ID_A    | E     |
| 5.2.6.6               |   | TIS_Flight_ID_B    | E     |
| 5.2.6.7               |   | TIS_Aircraft_Grd_A | E     |
| 5.2.7                 | Ground vehicle target messages (ground TIV) | See note 1         | X     |
| 5.2.7.1               |   | TIS_Grd_Veh_A      | E     |
| 5.2.7.2               |   | TIS_Grd_Veh_A      | E     |
| 5.2.8                 | Offset coding                               | See note 1         | X     |
| 5.2.8.1               |   | See note 1a        | X     |
| 5.2.8.1               |   | See note 1a        | X     |
| 5.2.8.1               |   | See note 1a        | X     |

Table A.3 outlines the mapping between the VDL Mode 4 Ground station FIS-B requirements and the related test procedures. In these tables:

- column 1 is a reference to the requirement in the present document;
- column 2 identifies clause titles taken from the present document;
- column 3 qualifies each test procedure to be:
  - Essential: meaning that it is included with the Essential Radio Test Suite and therefore the requirement should be demonstrated to be met in accordance with the referenced procedures.
  - Other: meaning that the test procedure is illustrative but other means of demonstrating compliance with the requirement are permitted.
  - eXcluded: meaning that there is no specific test for the requirement.

NOTE 1: The clause number in column 1 is a headline or an introduction to requirements that are detailed in subsequent clauses. No test can be applied.

NOTE 1a: The clause number in column 1 is a definition. No test can be applied.

NOTE 2: The requirements listed in column 1 does not allow definition of a satisfactory go/no go test, for example, because it would be technically infeasible, or economically unreasonable. There are circumstances where the implementer can provide reasoned argument or test evidence that the implementation under test does conform to the requirements in column 1. For each of these circumstances the implementer may be required to satisfy the authorities by separate technical evidence.

NOTE 3: All tests whether "E" or "O" are relevant to the requirements. Rows designated "E" collectively make up the Essential Radio Test Suite; those designated "O" make up the Other Test Suite; for those designated "X" there is no test specified corresponding to the requirement. All tests classified "E" should be performed as specified with satisfactory outcomes as a necessary condition for a presumption of conformity. Requirements associated with tests classified "O" or "X" should be complied with as a necessary condition for presumption of conformity, although conformance with the requirement may be claimed by an equivalent test or by manufacturer's assertion supported by appropriate entries in the technical construction file.

**Table A.3: VDL Mode 4 requirements for FIS-B**

| Requirement reference | Title   | Test Case   | E/O/X |
|-----------------------|---|---|-------|
| 5.3                   | Requirements for FIS-B                          | See note 1  | X     |
| 5.3.1                 | Message format                                  | See note 1  | X     |
| 5.3.1.1               |   | FIS_METAR_A<br>FIS_ATIS_A<br>FIS_RCN_A<br>FIS_SIGMET_A<br>FIS_SPECI_A<br>FIS_TSA_CTR_A<br>FIS_TSA_DNG_A | E     |
| 5.3.1.2               |   | FIS_METAR_A<br>FIS_ATIS_A<br>FIS_RCN_A<br>FIS_SIGMET_A<br>FIS_SPECI_A<br>FIS_TSA_CTR_A<br>FIS_TSA_DNG_A | E     |
| 5.3.1.3               |   | FIS_METAR_A<br>FIS_ATIS_A<br>FIS_RCN_A<br>FIS_SIGMET_A<br>FIS_SPECI_A<br>FIS_TSA_CTR_A<br>FIS_TSA_DNG_A | E     |
| 5.3.1.4               |   | FIS_METAR_A<br>FIS_ATIS_A<br>FIS_RCN_A<br>FIS_SIGMET_A<br>FIS_SPECI_A<br>FIS_TSA_CTR_A<br>FIS_TSA_DNG_A | E     |
| 5.3.1.5               |   | FIS_METAR_A<br>FIS_ATIS_A<br>FIS_RCN_A<br>FIS_SIGMET_A<br>FIS_SPECI_A<br>FIS_TSA_CTR_A<br>FIS_TSA_DNG_A | E     |
| 5.3.1.6               |   | FIS_METAR_A<br>FIS_ATIS_A<br>FIS_RCN_A<br>FIS_SIGMET_A<br>FIS_SPECI_A<br>FIS_TSA_CTR_A<br>FIS_TSA_DNG_A | E     |
| 5.3.2                 | Meteorological Aerodrome Report (METAR) message | See note 1  | X     |
| 5.3.2.1               |   | FIS_METAR_A   | E     |
| 5.3.2.2               |   | FIS_METAR_C   | E     |
| 5.3.2.3               |   | FIS_METAR_A   | E     |
| 5.3.2.4               |   | FIS_METAR_A   | E     |
| 5.3.2.5               |   | FIS_METAR_A   | E     |
| 5.3.2.6               |   | FIS_METAR_A   | E     |

| Requirement reference | Title   | Test Case   | E/O/X |
|-----------------------|---|---|-------|
| 5.3.2.7               |   | FIS_METAR_A   | E     |
| 5.3.2.8               |   | FIS_METAR_A   | E     |
| 5.3.2.9               |   | FIS_METAR_A   | E     |
| 5.3.3                 | Special Observations and Reports (SPECI) message      | See note 1  | X     |
| 5.3.3.1               |   | FIS_SPECI_A   | E     |
| 5.3.4                 | Automatic Terminal Information Service (ATIS) message | See note 1  | X     |
| 5.3.4.1               |   | FIS_ATIS_A  | E     |
| 5.3.4.2               |   | FIS_ATIS_A  | E     |
| 5.3.4.3               |   | FIS_ATIS_A  | E     |
| 5.3.4.4               |   | FIS_ATIS_A  | E     |
| 5.3.4.5               |   | FIS_ATIS_A  | E     |
| 5.3.4.6               |   | FIS_ATIS_A  | E     |
| 5.3.4.7               |   | FIS_ATIS_A  | E     |
| 5.3.5                 | Runway Condition (RCN) message                        | See note 1  | X     |
| 5.3.5.1               |   | FIS_RCN_A   | E     |
| 5.3.5.2               |   | FIS_RCN_A   | E     |
| 5.3.6                 | SIGMET Reports  | See note 1  | X     |
| 5.3.6.1               |   | FIS_SIGMET_A  | E     |
| 5.3.6.2               |   | FIS_SIGMET_A  | E     |
| 5.3.6.3               |   | FIS_SIGMET_A  | E     |
| 5.3.6.4               |   | FIS_SIGMET_A  | E     |
| 5.3.7                 | Temporary Segregated Areas (TSA) message              | See note 1  | X     |
| 5.3.7.1               |   | FIS_TSA_CTR_A<br>FIS_TSA_DNG_A  | E     |
| 5.3.7.2               |   | FIS_TSA_CTR_A<br>FIS_TSA_DNG_A  | E     |
| 5.3.7.3               |   | FIS_TSA_CTR_A   | E     |
| 5.3.7.4               |   | FIS_TSA_DNG_A   | E     |
| 5.3.7.5               |   | FIS_TSA_CTR_A<br>FIS_TSA_DNG_A  | E     |
| 5.3.8                 | FIS report request message                            | See note 1  | X     |
| 5.3.8.1               |   | FIS_Request_Rec_A   | E     |
| 5.3.8.2               |   | FIS_Request_Rec_A   | E     |
| 5.3.8.3               |   | FIS_Request_Rec_A   | E     |
| 5.3.8.4               |   | FIS_Request_Rec_A   | E     |
| 5.3.8.5               |   | FIS_Request_Rec_A   | E     |
| 5.3.8.6               |   | FIS_Request_Rec_A   | E     |
| 5.3.8.7               |   | FIS_Request_Rec_A   | E     |
| 5.3.8.8               |   | FIS_Request_C   | E     |
| 5.3.8.9               |   | FIS_Request_F   | E     |
| 5.3.8.10              |   | FIS_Request_E   | E     |
| 5.3.8.11              |   | FIS_Request_D   | E     |
| 5.3.9                 | Ground system functions                               | See note 1  | X     |
| 5.3.9.1               |   | FIS_METAR_A<br>FIS_ATIS_A<br>FIS_RCN_A<br>FIS_SIGMET_A<br>FIS_SPECI_A<br>FIS_TSA_CTR_A<br>FIS_TSA_DNG_A | E     |
| 5.3.9.2               |   | FIS_Slot_A  | E     |
| 5.3.9.3               |   | FIS_Slot_A  | E     |
| 5.3.9.4               |   | FIS_Slot_A  | E     |
| 5.3.9.5               |   | FIS_AddInfo_A   | E     |
| 5.3.9.6               |   | FIS_AddInfo_A   | E     |
| 5.3.9.7               |   | FIS_AddInfo_A   | E     |
| 5.3.9.8               |   | FIS_Queue_A   | E     |
| 5.3.9.9               |   | FIS_Queue_A   | E     |
| 5.3.9.10              |   | FIS_Queue_A   | E     |



Table A.4 outlines the mapping between the VDL Mode 4 Ground station GNS-B requirements and the related test procedures. In these tables:

- column 1 is a reference to the requirement in the present document;
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NOTE 1: The clause number in column 1 is a headline or an introduction to requirements that are detailed in subsequent clauses. No test can be applied.

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NOTE 3: All tests whether "E" or "O" are relevant to the requirements. Rows designated "E" collectively make up the Essential Radio Test Suite; those designated "O" make up the Other Test Suite; for those designated "X" there is no test specified corresponding to the requirement . All tests classified "E" should be performed as specified with satisfactory outcomes as a necessary condition for a presumption of conformity. Requirements associated with tests classified "O" or "X" should be complied with as a necessary condition for presumption of conformity, although conformance with the requirement may be claimed by an equivalent test or by manufacturer's assertion supported by appropriate entries in the technical construction file.

Table A.4: VDL Mode 4 requirements for GNS-B

| Requirement reference | Title  | Test Case   | E/O/X |
|-----------------------|--|---|-------|
| 5.4                   | Requirements for GNSS Augmentation Service Broadcast (GNS-B) message | See note 1  | X     |
| 5.4.1                 | Message format   | See note 1  | X     |
| 5.4.1.1               |  | GNS_Type1_Message_A<br>GNS_Type2_Message_A<br>GNS_Type4_Message_A | E     |
| 5.4.1.2               |  | GNS_Type1_Message_A<br>GNS_Type2_Message_A<br>GNS_Type4_Message_A | E     |
| 5.4.1.3               |  | GNS_Type1_Message_A<br>GNS_Type2_Message_A<br>GNS_Type4_Message_A | E     |
| 5.4.1.4               |  | GNS_Type1_Message_A<br>GNS_Type2_Message_A<br>GNS_Type4_Message_A | E     |
| 5.4.1.5               |  | GNS_Type1_Message_A<br>GNS_Type2_Message_A<br>GNS_Type4_Message_A | E     |
| 5.4.2                 | Message Type 1   | See note 1  | X     |
| 5.4.2.1               |  | GNS_Type1_Message_A   | E     |
| 5.4.2.2               |  | GNS_Type1_Message_A   | E     |
| 5.4.2.3               |  | GNS_Type1_Message_A   | E     |
| 5.4.2.4               |  | See note 2  | O     |
| 5.4.2.5               |  | See note 1a   | X     |
| 5.4.2.6               |  | See note 2  | O     |
| 5.4.3                 | Message Type 2   | See note 1  | X     |
| 5.4.3.1               |  | GNS_Type2_Message_A   | E     |
| 5.4.3.2               |  | GNS_Type2_Message_A   | E     |
| 5.4.4                 | Message Type 4   | See note 1  | X     |
| 5.4.4.1               |  | GNS_Type4_Message_A   | E     |
| 5.4.4.2               |  | GNS_Type4_Message_A   | E     |
| 5.4.4.3               |  | GNS_Type4_Message_A   | E     |
| 5.4.4.4               |  | GNS_Type4_Message_A   | E     |
| 5.4.4.5               |  | see note 2  | O     |
| 5.4.5                 | CRC Calculation  | See note 1  | X     |
| 5.4.5.1               | GNS-B CRC  | See note 1  | X     |
| 5.4.5.1.1             |  | See note 1a   | X     |
| 5.4.5.1.2             |  | See note 1a   | X     |
| 5.4.5.1.3             |  | See note 1a   | X     |
| 5.4.5.1.4             |  | See note 1a   | X     |
| 5.4.5.1               | FAS CRC  | See note 1  | X     |
| 5.4.5.1.1             |  | See note 1a   | X     |
| 5.4.5.1.2             |  | See note 1a   | X     |
| 5.4.5.1.3             |  | See note 1a   | X     |
| 5.4.5.1.4             |  | See note 1a   | X     |
| 5.4.5.3               | Ephemeris CRC  | See note 1  | X     |
| 5.4.5.3.1             |  | See note 1a   | X     |
| 5.4.5.3.2             |  | See note 1a   | X     |
| 5.4.5.3.3             |  | See note 1a   | X     |
| 5.4.5.3.4             |  | See note 1a   | X     |
| 5.4.5.3.5             |  | See note 1a   | X     |
| 5.4.5.3.6             |  | See note 1a   | X     |
| 5.4.5.3.7             |  | See note 1a   | X     |
| 5.4.5.3.8             |  | See note 1a   | X     |

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## Annex B (informative): Bibliography

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- North European ADS-B Network Update Programme: "GRAS Service Description" V1.2, 19<sup>th</sup> November 2003.
- EUROCAE ED-108A: "MOPS for VDL Mode 4 Aircraft Transceiver for ADS-B".

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## History

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