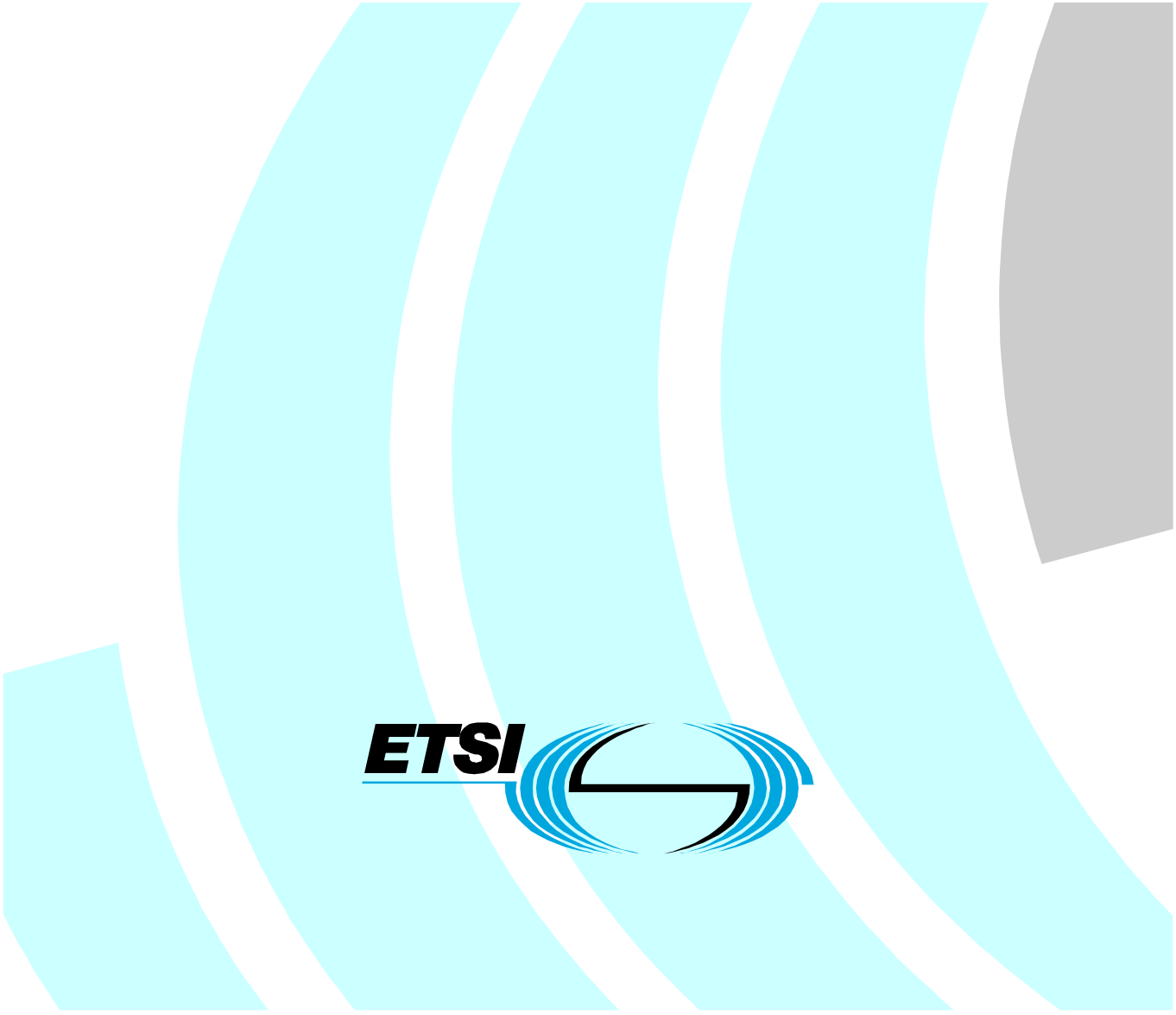
ETSI EN 301 842-2 V1.1.1 (2002-08)

European Standard (Telecommunications series)

Electromagnetic compatibility and Radio spectrum Matters (ERM); VHF air-ground Data Link (VDL) Mode 4 radio equipment; Technical characteristics and methods of measurement for ground-based equipment; Part 2: Data link layer



Reference
DEN/ERM-RP05-016-2

Keywords
aeronautical, radio, testing, VHF, digital

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Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

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Foreword

This European Standard (Telecommunications series) has been produced by ETSI Technical Committee Electromagnetic compatibility and Radio spectrum Matters (ERM).

The present document is part 2 of a multi-part deliverable covering the VHF air-ground Data Link (VDL) Mode 4 radio equipment; Technical characteristics and methods of measurement for ground-based equipment, as identified below:

Part 1: "General description and physical layer";

Part 2: "Data link layer";

Part 3: "Additional broadcast aspects";

Part 4: "Point-to-point functions".

National transposition dates	
Date of adoption of this EN:	2 August 2002
Date of latest announcement of this EN (doa):	30 November 2002
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	31 May 2003
Date of withdrawal of any conflicting National Standard (dow):	31 May 2003

Introduction

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 (117,975 MHz to 136,975 MHz), using Gaussian-filtered Frequency Shift Keying (GFSK) Modulation with 25 kHz channel spacing. Optionally, the transmitters, transceivers and receivers may tune between 113 MHz to 117,975 MHz.

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 [3].

1 Scope

The present document states the minimum performance requirements for radio transmitters, receivers and transceivers for ground-based VHF Datalink mode 4 (VDL mode 4) equipment intended to be used for air-ground data communications, operating in the VHF band (117,95 MHz to 137 MHz and optionally 113 MHz to 117,95 MHz) allocated to the aeronautical mobile service. It 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) and VDL Mode 4 Technical Manual (TM) [1].

Manufacturers should note that in the future, all or part of the frequency band 108,000 MHz to 117,975 MHz might become available for aeronautical communications.

The present document applies to Gaussian-filtered Frequency Shift Keying (GFSK) systems, with channel separations of 25 kHz intended for air-ground communications. The scope of the present document is limited to ground base stations.

The VDL system provides data communication exchanges between aircraft and ground based systems supporting surveillance applications. The supported modes of communication include:

- broadcast and point-to-point communication;
- air-air and ground-air;
- operation without ground infrastructure.

VDL Mode 4 is designed to be an Air/Ground subsystem of the Aeronautical Telecommunication Network (ATN) using the AM(R)S band and it is organized according to the Open Systems Interconnection (OSI) model (defined by ISO). It provides reliable sub network services to the ATN system.

The present document specifies functional specifications of radio transmitters, receivers and transceivers at ground-based VHF communication equipment intended to be used for air-ground and air-air data communications. The present document is derived from the specifications:

- Mode 4 standards produced under the auspices of the International Civil Aviation Organization (ICAO) [1].
- Other relevant standards as defined in clause 2.

EN 301 842-1 [5] deals with tests of the physical layer. The present document deals with tests of the link layer sufficient to support broadcast functionality. The present document also includes requirements and tests sufficient to recognize and respond to transmissions associated with point-to-point communication. Detailed requirements for point-to-point communication are beyond the scope of the present document.

The present document includes:

- references, definitions, abbreviations and symbols are provided in clauses 2 and 3;
- clause 4 describes the VDL Mode 4 ground station link layer;
- clause 5 performance specifications for the VDL Mode 4 ground station;
- clause 6 provides general design requirements;
- clause 7 provide protocol tests which emphasis the ADS-B functions of the system;
- a document history is contained in clause 8;
- clause A provides a detailed cross-reference to the relevant requirements contained in reference [1];
- annex B provides a description of the ISO/IEC 9646 [8] Test Methodology.

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 ADS-B functionality and to provide tests of those remaining requirements which, if wrongly implemented, could cause a deterioration in the service offered by other VDL Mode 4 stations. Therefore:

- a detailed set of protocol tests are provided for the broadcast functionality necessary to support ADS-B functions;
- a detailed test of position encoding and decoding is provided because of the importance of position in the management of the VDL Mode 4 link specifically and the need to support ADS-B applications in general.

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

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication and/or edition number or version number) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.

[1] Annex 10 to the Convention on International Civil Aviation, International Civil Aviation Organization (VDL Mode 4 Technical Manual).

[2] EUROCAE ED-108: "Interim MOPS for VDL Mode 4 Aircraft Transceiver for ADS-B".

[3] ETSI EN 301 489-22: "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".

[4] ISO/IEC 3309 (1993): "Information technology - Telecommunications and information exchange between systems - High-level data link control (HDLC) procedures - Frame structure".

[5] ETSI EN 301 842-1 (V1.1.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); VHF air-ground Data Link (VDL) Mode 4 radio equipment; Technical characteristics and methods of measurement for ground-based equipment; Part 1: General description and physical layer".

[6] ISO/IEC 7498-1 (1994): "Information technology - Open Systems Interconnection - Basic Reference Model: The Basic Model".

[7] ISO/IEC 10731 (1994): "Information technology - Open Systems Interconnection - Basic Reference Model - Conventions for the definition of OSI services".

[8] ISO/IEC 9646: "Information technology - Open Systems Interconnection - Conformance testing methodology and framework".

[9] ED-14D/DO-160D: "Environmental conditions and Test Procedures for Airborne Equipment".

3 Definitions and abbreviations

3.1 Definitions

3.1.1 Basic reference model definitions

The present document is based on the concepts developed in the open systems interconnect basic reference model and makes use of the following terms defined in ISO/IEC 7498-1 [6]:

- layer;
- sublayer;
- entity;
- service;
- physical layer;
- data link layer.

3.1.2 Service conventions definitions

For the purposes of the present document, the terms and definitions given in ISO/IEC 10731 [7] apply:

- service provider;
- request;
- indication;
- confirm.

3.1.3 General definitions

For the purposes of the present document, the following terms and definitions apply:

aeronautical mobile service: mobile service between aeronautical stations and aircraft stations, or between aircraft stations, in which survival craft stations may participate

Aeronautical Telecommunications Network (ATN): internetwork architecture that allows ground, air/ground, and aircraft data sub networks to interoperate by adopting common interface services and protocols based on the International Organization for Standardization Open Systems Interconnection Reference Model

aircraft address: unique combination of 24 bits available for assignment to an aircraft for the purpose of air-ground communications, navigation and surveillance

NOTE: An aircraft may choose not to use this unique address and can use instead a non-unique address.

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

NOTE: ADS-B is a surveillance service based on aircraft self-determination of position/velocity/time and automatic, periodic or random, broadcast of this information along with auxiliary data such as aircraft identity (ID), 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.

autotune function: function, performed by the Link Management Entity, which allows a ground VDL Mode 4 station to command an aircraft to change the operating characteristics of synchronization burst transmissions

burst: VHF Digital Link (VDL) specific services burst is composed of a sequence of source address, burst ID, information, slot reservation, and Frame Check Sequence (FCS) fields, bracketed by opening and closing flag sequences.

NOTE: The start of a burst may occur only at quantized time intervals and this constraint allows the propagation delay between the transmission and reception to be derived.

burst length: number of slots across which the VDL Mode 4 burst is transmitted

current slot: slot in which a received transmission begins

delayed burst: VDL Mode 4 burst that begins sufficiently after the beginning of a slot so that the transmitting VDL Mode 4 station is confident that no other VDL Mode 4 station that it could receive from and is within the guard range is transmitting in the slot.

NOTE: The delayed VDL Mode 4 burst terminates by the end of the slot in which it began (its length is shortened to ensure completion by the nominal time).

Global Signalling Channel (GSC): channel available on a world wide basis which provides for communication control

ground base station: aeronautical station equipment, in the aeronautical mobile service, for use with an external antenna and intended for use at a fixed location

link: connects a mobile DLE and a ground DLE and is uniquely specified by the combination of mobile DLS address and the ground DLS address

NOTE: A different sub network entity resides above every link endpoint.

link layer: lies immediately above the physical layer in the Open Systems Interconnection protocol model

NOTE: The link layer provides for the reliable transfer of information across the physical media. It is subdivided into the data link sublayer and the media access control sublayer.

Link Management Entity (LME): protocol state machine capable of acquiring, establishing, and maintaining a connection to a single peer system

NOTE: A LME establishes data link and sub network connections, 'hands-off' those connections, and manages the media access control sublayer and physical layer. An aircraft LME tracks how well it can communicate with the ground stations of a single ground system. An aircraft VDL Management Entity (VME) instantiates an LME for each ground station that it monitors. Similarly, the ground VME instantiates an LME for each aircraft that it monitors. An LME is deleted when communication with the peer system is no longer viable.

Media Access Control (MAC): the sublayer that acquires the data path and controls the movement of bits over the data path

mobile: radio equipment designed for installation into vehicles

mode 4: data link using a Gaussian Filtered Frequency Shift Keying modulation scheme and self organizing time division multiple access

NOTE: Mode 4 has been validated for surveillance applications.

physical layer: lowest level layer in the Open Systems Interconnection protocol model

NOTE: The physical layer is concerned with only the transmission of binary information over the physical medium (e.g. VHF radio).

primary time source: normal operation timing mode in which a VDL Mode 4 station maintains time synchronization to Universal Time Coordinated (UTC) second

private parameters: contained in exchange identity (XID) frames and that are unique to the VHF digital link environment

secondary time source: timing source used in a failure mode, which applies when the primary time source fails, in which a VDL Mode 4 station maintains time synchronization to UTC second

slot: In VDL Mode 4, time is divided into a series of time slots of equal period. Each VDL Mode 4 burst transmission starts at the beginning of a slot.

station: VDL Mode 4 Specific Services (VSS)-capable entity

NOTE: A station may be either a mobile station or a ground station. A station is a physical entity that transmits and receives bursts over the RF interface (either A/G or air-to-air (A/A)) and comprises, at a minimum: a physical layer, media access control sublayer, and a unique VSS address. A station which is also a DLS station has the same address.

superframe: group of slots that span a period of one minute

NOTE: The start of the current superframe is aligned with the start of the slot that is currently being used for transmission. The next superframe starts one minute after the current slot.

synchronization burst (or "sync" burst): VDL Mode 4 burst which announces, as a minimum, existence and position

NOTE: Ground stations announce existence, position, and the current time. Mobile stations lacking timing information can then derive the slot structure from ground synchronization bursts. Mobile stations lacking position information can derive position from both mobile and ground synchronization bursts. This periodic information is used in various ways including ADS-B, secondary navigation, and simplifying the LME algorithms.

tertiary time source: timing source used in a failure mode, which applies when the primary and secondary time sources fail, in which a VDL Mode 4 station maintains time synchronization to an estimate of the mean slot start times of a set of VDL Mode 4 stations

VDL Mode 4 Burst: VHF Digital Link (VDL) Mode 4 burst is composed of a sequence of source address, burst ID, information, slot reservation, and Frame Check Sequence (FCS) fields, bracketed by opening and closing flag sequences

NOTE: The start of a burst may occur only at quantized time intervals and this constraint allows the propagation delay between the transmission and reception to be derived.

VDL Mode 4 Specific Services (VSS) sublayer: resides above the MAC sublayer and provides VDL Mode 4 specific access protocols including reserved, random and fixed protocols

VSS user: user of the VDL Mode 4 Specific Services

NOTE: The VSS user could be higher layers in the VDL Mode 4 TM or an external application using VDL Mode 4.

VDL Management Entity (VME): VDL-specific entity that provides the quality of service requested by the ATN-defined sub network system management entity

NOTE: A VME uses the LMEs (that it creates and destroys) to acquire the quality of service available from peer systems.

VDL Mode 4 station: physical entity that transmits and receives VDL Mode 4 bursts over the RF interface (either A/G or air-to-air (A/A)) and comprises, as a minimum: a physical layer, Media Access Control sublayer and a VSS sublayer

NOTE: A VDL Mode 4 station may either be a mobile VDL Mode 4 station or a ground VDL Mode 4 station.

VDL Mode 4 Station Address: 27-bit identifier used to uniquely identify a VDL Mode 4 station

VDL Station: VDL-capable entity

NOTE: A station may either be a mobile station or a ground station. A station is a physical entity that transmits and receives frames over the Air/Ground (A/G) interface and comprises, at a minimum: a physical layer, media access control sublayer, and a unique DLS address. The particular initiating process (i.e. DLE or LME) in the station cannot be determined by the source DLS address. The particular destination process cannot be determined by the destination DLS address. These can be determined only by the context of these frames as well as the current operational state of the DLEs.

VDL System: VDL-capable entity

NOTE: A system comprises one or more stations and the associated VDL management entity. A system may either be a mobile system or a ground system.

3.2 Abbreviations

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

A/A	Air-to-Air
A/G	Air/Ground
ADS-B	Automatic Dependent Surveillance Broadcast
AM(R)S	Aeronautical Mobile (Route) Service
ATN	Aeronautical Telecommunication Network
BND	Big Negative Dither
CCI	Co-Channel Interference
CRC	Cyclic Redundancy Code
dB	deciBel
DLE	Data Link Entity
DLS	Data Link Service
DOS	Directory Of Services
erid	extended reservation ID
FCS	Frame Check Sequence
FOM	Figure Of Merit
GFSK	Gaussian Filtered Frequency Shift Keying
GNSS	Global aeronautical Navigation Satellite System
GSC	Global Signalling Channel
hex	hexadecimal
ICAO	International Civil Aviation Organization
ID	IDentity
INFO	INFOrmation (frame)
ISO	International Organization for Standardization
LCI	Logical Channel Identifier
LME	Link Management Entity
MAC	Media Access Control
MOPS	Minimum Operational Performance Specification
NM	Nautical Mile
OSI	Open Systems Interconnection
PCO	Point of Control and Observation
RF	Radio Frequency
rid	reservation ID
RTS	Request To Send (burst)
SARPs	Standards And Recommended Practices
TCP	Transmission Control Protocol
UTC	Universal Time Coordinated
VDL	VHF Digital Link
VHF	Very High Frequency
VME	VDL Management Entity
VSS	VDL Mode 4 Specific Services
XID	eXchange IDentity (frame)

4 General description of VDL Mode 4 ground station link layer

4.1 General

A description of VDL Mode 4 is provided in EN 301 842-1 [5]. 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 which 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 provided by the ground station and the impact on the requirements is summarized in this clause.

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.

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 Ground quarantine

VDL Mode 4 includes the ability to reserve slots for ground station use only. Mobile stations will avoid use of these slots unless commanded by a ground station.

It is assumed that the ground stations are utilized as part of a coordinated network of ground stations and hence a particular ground station is able to transmit in ground reserved slots. Specific requirements are included which allows the ground station user to specify which slots should be used for a transmission or which group of candidate slots should be used for selection of slots for placing reservations. These requirements may be seen as a development of the VDL Mode 4 fixed access protocol.

Note that the standard does not cover ground stations which are not coordinated and which might be required to avoid ground reserved slots.

Note that the ground station will not take action when receiving superframe block or second frame block reservations since they are allowed to override this. Note also that a ground station will not re-transmit the block information.

4.3 System timing

It is assumed that the ground station will include a source of timing that is sufficient to maintain the primary time requirements for 1 hour after a GNSS outage. Furthermore, it is assumed that if primary time cannot be maintained, the ground station will switch to a time source that can support secondary time indefinitely or, if this is not possible, stop transmitting. The ground station will not derive secondary time from measurements made on bursts received from mobiles and will not support the tertiary timing mode.

Note that it is possible that in future a ground station may have to carry out time of arrival measurements for the purpose of verification of mobile station range. However such a requirement is not included in the present document.

4.4 Net entry

It is assumed that a ground station will start operating on a particular channel by first listening to that channel for a minimum period of 1 minute so as to build up a complete picture of the reservations of other stations. Hence a ground station does not need to support entry by plea or half slot BND.

However the ground station will recognize pleas and BND reservations made by other stations and will provide a plea response if requested by a mobile.

It is also assumed that net entry will occur under user command and not by detection of the level of exposure to other aircraft. Hence the ground station will not maintain an exposure filter.

4.5 Autotune capability

Ground stations are required to a) be able to issue autotunes b) to recognize them. However, it is assumed that an autotune will not be directed from one ground station to another and hence there are no requirements to respond to an autotune issued by another ground station.

Note that in the event of a mobile failing to respond to an autotune command from a ground station, the ground station is required in the ICAO standards to re-transmit the request using the re-transmission procedures. However, the choice of which mobiles to autotune is a dynamic process for the ground station user and, in the event that an autotune fails, it may be better to choose a different mobile. Hence it is felt to be preferable to refer a non-response back to the ground station user rather than to use the re-transmission procedures.

4.6 Autonomous and fixed access

It is assumed that the ground station is able to place reservations and select the slots for these reservations autonomously. It will also support the fixed transmission protocol.

5 Minimum performance specification under standard test conditions

5.1 MAC sublayer

5.1.1 Services

Requirement reference	
5.1.1.1	The MAC sublayer shall acquire the shared communication path so as to provide the services defined in clause 5.1.2.

5.1.2 MAC sublayer services

Requirement reference	
5.1.2.1	The MAC sublayer shall accept from the Physical layer a continuous indication of channel idle/busy status.
5.1.2.2	The MAC sublayer shall accept from the VSS sublayer a burst or frame for transmission, accompanied by the time to transmit it.
5.1.2.3	The MAC sublayer shall provide to the VSS sublayer the received burst and frame data, slot busy/idle status, and the status of bursts sent for transmission.

5.1.3 MAC sublayer parameters

Requirement reference	
5.1.3.1	MAC service system parameters shall be as described in table 5.1.

Table 5.1: MAC service system parameters

Symbol	Parameter Name	Minimum	Maximum	Default	Increment
M1	Number of slots per superframe	60 slots	15 360 slots	4 500 slots	60 slots

5.1.3.1 Void

5.1.3.2 Parameter M1 (number of slots per superframe)

Requirement reference	
5.1.3.2.1	The parameter M1 shall be the number of available slots per superframe.
5.1.3.2.2	A superframe shall span a period of 60 s.

5.1.4 Time synchronization

5.1.4.1 Primary

Requirement reference	
5.1.4.1.1	Under normal operating conditions, a station shall maintain time synchronization such that the start of each successive group of M1/60 slots is synchronized with the start of any to Universal Time Coordinated (UTC) second to within a two-sigma value of 400 ns.

5.1.4.2 Secondary

Requirement reference	
5.1.4.2.1	A station shall be capable of maintaining time synchronization such that the start of each successive group of M1/60 slots is synchronized with the start of any UTC second to within a two-sigma value of 15 μs.
5.1.4.2.2	Only when the primary source fails shall secondary time be used.
5.1.4.2.3	A station using secondary time shall revert to primary time whenever primary time is available.
5.1.4.2.4	A station that is unable to support either primary or secondary time shall not transmit.

5.1.4.3 Alignment to UTC second

Requirement reference	
5.1.4.3.1	For stations maintaining primary or secondary time, the start of each successive group of M1/60 slots shall be aligned with a UTC second.

5.1.4.4 Data quality level

Requirement reference	
5.1.4.4.1	The certified quality level shall indicate that timing and position information provided by the station can be used by other stations as a means of deriving position information.
5.1.4.4.2	The secondary timing level shall not indicate the certified quality level.

5.1.5 Slot idle/busy notification

5.1.5.1 Slot idle detection

Requirement reference	
5.1.5.1.1	A station shall consider the slot idle if the channel idle/busy status supplied by the physical layer is idle at the start of the slot.

5.1.5.2 Slot busy detection

Requirement reference	
5.1.5.2.1	A station shall consider the slot busy if the channel idle/busy status is busy at the start of the slot.

5.1.5.3 Slot occupied detection

Requirement reference	
5.1.5.3.1	A slot shall be considered occupied if the channel is considered to be continuously busy for a period of at least 5 ms during the slot.

5.1.6 Transmission processing

Requirement reference	
5.1.6.1	Bursts and frames received from the MAC sublayer shall be forwarded to the physical layer, together with the time for transmission.
5.1.6.2	A station shall begin transmissions only at the beginning of the slot boundary as determined by its local clock.

5.1.7 Received transmission processing

Requirement reference	
5.1.7.1	Bursts and frames with an invalid cyclic redundancy code (CRC) shall be discarded.
5.1.7.2	Bursts and frames with valid CRCs shall be forwarded to the VSS sublayer, along with the received time of transmission and signal quality parameters.

5.2 VSS sublayer

5.2.1 Services

5.2.1.1 Error detection

Requirement reference	
5.2.1.1.1	The VSS sublayer shall compute a 16 bit CRC according to ISO/IEC 3309 [4] to facilitate detection by the MAC sublayer (see clause 5.1.7) of data corruption during transmission.

5.2.1.2 Channel congestion

Requirement reference	
5.2.1.2.1	The VSS sublayer shall notify the LME sublayer whenever channel congestion is detected (see clause 5.2.7.2).

5.2.2 Burst format

5.2.2.1 VSS burst structure

Requirement reference	
5.2.2.1.1	VSS bursts shall conform to ISO/IEC 3309 [4] frame structure except as specified in table 5.2.

Table 5.2: Burst format

Description	Octet	Bit number							
		8	7	6	5	4	3	2	1
flag	-	0	1	1	1	1	1	1	0
TCP change flag (tc), reservation ID (rid), version number (ver)	1	s_{27}	s_{26}	s_{25}	ver_3	ver_2	ver_1	rid	tc
source address (s)	2	s_{24}	s_{23}	s_{22}	s_{21}	s_{20}	s_{19}	s_{18}	s_{17}
	3	s_{16}	s_{15}	s_{14}	s_{13}	s_{12}	s_{11}	s_{10}	s_9
	4	s_8	s_7	s_6	s_5	s_4	s_3	s_2	s_1
message ID (mi)	5	in_k	mi_k	. . . . .		mi_4	mi_3	mi_2	mi_1
information	6								
	7 - n-5			. . . . .					
	n-4								
reservation data (rd)	n-3		in_1	rd_k	. . . . .				
extended reservation ID (erid)	n-2	$erid_k$	. . . . .			$erid_1$			rd_1
CRC (c)	n-1	c_9	c_{10}	c_{11}	c_{12}	c_{13}	c_{14}	c_{15}	c_{16}
	n	c_1	c_2	c_3	c_4	c_5	c_6	c_7	c_8
flag	-	0	1	1	1	1	1	1	0

. . . . . Denotes variable length field

Requirement reference	
5.2.2.1.2	The maximum burst length shall be N1 bits.

5.2.2.2 Version number

Requirement reference	
5.2.2.2.1	The version number (ver) subfield shall indicate the version of VDL Mode 4 supported by the station.
5.2.2.2.2	It shall be set to 000 on transmit.
5.2.2.2.3	If the station receives a burst in which the version number is non-zero, it shall inform the VSS user that a non-zero version number has been received and ignore the rest of the burst.

5.2.2.3 Source address

Requirement reference	
5.2.2.3.1	The source address (s) of the transmitting station shall be encoded in the 27-bit field as defined in table 5.2.
5.2.2.3.2	The address format shall be as described in clause 5.2.2.4.

5.2.2.4 Station address encoding

Requirement reference	
5.2.2.4.1	The address type field is described in table 5.3.

Table 5.3: Address type field encoding

Bit encoding			Description type	Bits 1 to 24
27	26	25		
0	0	0	Mobile	Non-unique identity
0	0	1	Mobile	24-bit ICAO address
0	1	0	Reserved	Future use
0	1	1	Reserved	Future use
1	0	0	Ground station	ICAO-administered address space
1	0	1	Ground station	ICAO-delegated address space
1	1	0	Reserved	Future use
1	1	1	All stations broadcast	All stations

5.2.2.5 Message ID

Requirement reference	
5.2.2.5.1	The message ID (mi) of the burst shall be encoded in the variable length field as defined in table 5.2.
5.2.2.5.2	The first four bits of the burst message ID field shall be as defined in table 5.4.

Table 5.4: Message ID assignment

Message ID field							Assigned burst type	VSS user
mi_7	mi_6	mi_5	mi_4	mi_3	mi_2	mi_1		
x	x	x	x	x	0	0	Autonomous synchronization burst (see clause 5.3.4.1)	LME
x	x	x	x	x	1	0	Directed synchronization burst (see clause 5.3.4.1)	LME
0	0	0	0	0	0	1	General request burst	Defined by r-mi
0	0	0	0	1	0	1	No operation	
0	0	0	1	0	0	1	Reserved for future use	
0	0	0	1	1	0	1	Reserved for future use	
0	0	1	0	0	0	1	General response burst	Defined by r-mi
0	0	1	0	1	0	1		
			to		0	1	Reserved for future use	
0	0	1	1	1	0	1		
0	1	0	0	0	0	1	RTS burst format	DLS
0	1	0	0	1	0	1		
0	1	0	1	0	0	1	Reserved for future use	
0	1	0	1	1	0	1		
0	1	1	0	0	0	1	Compressed frame burst format	DLS
0	1	1	0	1	0	1	Reserved for future use	
0	1	1	1	0	0	1	Reserved for future use	
0	1	1	1	1	0	1	Compressed XID burst	LME
1	0	0	0	0	0	1	RTX burst	LME
1	0	0	0	1	0	1	Network entry burst	VSS
1	0	0	1	0	0	1	Bursts defined in ADS-B application standards	ADS-B application
1	0	0	1	1	0	1		
			to		0	1	Reserved for future use	
1	1	1	1	1	0	1		
0	0	0	0	0	1	1		
			to		1	1	Reserved for future use	
1	1	1	1	1	1	1		

Requirement reference	
5.2.2.5.3	The message ID shall define the VSS user which is responsible for handling the message, following completion of processing required within the VSS.

5.2.2.6 Information field

Requirement reference	
5.2.2.6.1	The optional information field (in) shall contain VSS user defined data.

5.2.2.7 Reservation fields

Requirement reference	
5.2.2.7.1	The reservation ID (rid) of the burst shall be encoded in the 1-bit field as defined in table 5.2.
5.2.2.7.2	If the reservation ID equals 1, this shall indicate that the reservation type is either a null reservation (see clause 5.2.9), a periodic broadcast reservation (see clause 5.2.10) or a combined periodic broadcast and incremental broadcast reservation (see clause 5.2.12) and that there is no extended reservation ID (erid); otherwise, the extended reservation ID field shall indicate other reservation types as defined in table 5.5.

Table 5.5: Extended reservation ID field (erid)

Extended reservation ID field (erid)					Reservation type
Octet n-2					
Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	
0	0	0	0	0	Response burst (no reservation)
0	0	0	0	1	Big negative dither (BND) reservation
0	0	0	1	0	Superframe block reservation
0	0	0	1	1	Second frame block reservation
0	0	1	0	x	Unicast request reservation
0	0	1	1	0	Reserved for future allocation
to					
0	1	0	0	1	
0	1	0	1	0	Information transfer request reservation
0	1	0	1	1	Reserved for future allocation
0	1	1	0	0	Directed request reservation
0	1	1	0	1	Reserved for future allocation
to					
0	1	1	1	1	
1	0	x	x	x	Incremental broadcast reservation
1	1	0	0	0	Reserved for future allocation
to					
1	1	1	1	1	

5.2.2.8 TCP change flag

Requirement reference	
5.2.2.8.1	The TCP change flag (tc) shall be encoded as defined in clause 3.6 if the message ID (see table 5.4) indicates that the burst is a directed synchronization burst.
5.2.2.8.2	Otherwise it shall be reserved for future definition and set equal to 1.

5.2.3 VSS sublayer parameters

Requirement reference	
5.2.3.1	VSS service system parameters shall be as described in table 5.6.

Table 5.6: VSS sublayer parameters

Symbol	Parameter name	Minimum	Maximum	GFSK default	Increment
VS1	Number of ground quarantined slots	0 slots	15 slots	4 slots	1 slot
VS2	Minimum CCI performance	P2 dB	60 dB	12 dB	1 dB
VS4	Quarantine slot re-use range	0	1 000 nmi	300 nmi	10 nmi

5.2.3.1 Void

5.2.3.2 Parameter VS1 (number of ground quarantined slots)

Requirement reference	
5.2.3.2.1	The parameter VS1 shall define the number of ground quarantined slots.
5.2.3.2.2	Quarantined slots shall be slots which may not be used by a mobile station unless directed by a ground station.
5.2.3.2.3	Quarantined slots shall be established by a ground station or network of coordinated ground stations under the following circumstances: a) a mobile station, A, will not reserve a slot or transmit on the slot boundary of the VS1 slots after a slot which has been reserved by a ground station, B, using a periodic broadcast reservation or which has been reserved by a mobile, C, using a synchronization burst with the autonomous/directed bit set to 1 and a periodic broadcast reservation field, unless the station (B or C) that has reserved the slot is at a range greater than VS4 from station A, in which case station A will consider the slot to be unreserved. b) If a mobile station receives a periodic broadcast burst with the periodic offset (po) subfield set to 0 and the periodic timeout (pt) subfield set to 0, then it will maintain ground quarantine for the current slot and for M1 slots after the current slot if it had previously contained a reservation associated with the same stream. Ground quarantine behaviour for any other slots associated with the same stream will be cancelled. c) A mobile station, A, will not reserve a slot or transmit in slots which have been reserved by a ground station, B, or a mobile station, C, using a block reservation, unless the station (B or C) that has reserved the slot is at a range greater than VS4 from station A, in which case station A will consider the slot to be unreserved.

5.2.3.3 Parameter VS2 (minimum CCI performance)

Requirement reference	
5.2.3.3.1	The parameter VS2 shall be used to control the CCI conditions by which a station may transmit given that another station has reserved the same slot.
5.2.3.3.2	In the case where a station X and Y transmit in the same slot and station Y's transmission is directed to another station Z, CCI conditions shall be fulfilled if the ratio defined below: $$ratio = 10\log\left(\frac{dist(Y \mid Z)^2}{dist(X \mid Z)^2}\right)$$ is greater than VS2.

5.2.3.4 Parameter VS4 (quarantine slot re-use range)

Requirement reference	
5.2.3.4.1	The parameter VS4 shall be used to control the range at which a quarantined slot may be re-used by a distant station.

5.2.4 VSS quality of service parameters

Requirement reference	
5.2.4.1	Every burst processed by the VSS sublayer for transmission shall be associated with the parameters defined in table 5.7.

Table 5.7: VSS quality of service system parameters

Symbol	Parameter Name	Minimum	Maximum	Default	Increment
Q1	Priority	0	2	2	1
Q2a	Slot selection range constraint for level 1	0	1 000 nmi	150 nmi	1 nmi
Q2b	Slot selection range constraint for level 2	0	1 000 nmi	150 nmi	1 nmi
Q2c	Slot selection range constraint for level 3	0	1 000 nmi	0 nmi	1 nmi
Q2d	Slot selection range constraint for level 4	0	1 000 nmi	300 nmi	1 nmi
Q3	Replace queued data	FALSE	TRUE	FALSE	--
Q4	Number of available slots	1	20	3	1

5.2.4.1 Void

5.2.4.2 Parameter Q1 (priority)

Requirement reference	
5.2.4.2.1	The parameter Q1 shall be the priority of the transmission and shall be as defined in table 5.8.

Table 5.8: Priority levels

Message categories	Priority	Q1
Network/systems management	high	2
Distress communications	high	2
Urgent communications	high	2
High priority flight safety messages	high	2
Normal priority flight safety messages	high	2
Meteorological communications	medium	1
Flight regularity communications	medium	1
Aeronautical information service messages	medium	1
Network/systems administration	medium	1
Aeronautical administrative messages	low	0
Urgent priority administrative and UN charter communications	low	0
High priority administrative and state/government communications	low	0
Normal priority administrative	low	0
Low priority administrative	low	0

5.2.4.3 Parameters Q2a to Q2d (slot selection range constraint for level n)

Requirement reference	
5.2.4.3.1	The parameters Q2a to Q2d shall be used to impose range constraints on the slot selection process for levels 1 to 4 defined by table 5.9.

Table 5.9: Slot selection criteria

	Selection conditions		
Selection priority	**Planned transmission by station A**	**Previously reserved transmission by station B**	**Minimum distance between station A and station B**
Level 0	Any	Unreserved	Not applicable
Level 1	Broadcast or CCI protected communication with station C	CCI protected communication with station D	Q2a
Level 2	Broadcast or CCI protected communication with station C	Broadcast	Q2b
Level 3	Broadcast or CCI protected communication with station C	Broadcast or CCI protected communication with station D	Q2c
Level 4	Broadcast or CCI protected communication with station C	Any transmission	Q2d

5.2.4.4 Parameter Q3 (replace queued data)

Requirement reference	
5.2.4.4.1	The parameter Q3 shall be a Boolean switch that shall be used to control queuing of repeated bursts on a congested channel.
5.2.4.4.2	If Q3 = TRUE, then a new data field shall replace a queued data field of the same type.
5.2.4.4.3	Otherwise, both the old and new data fields shall be transmitted.

5.2.4.5 Parameter Q4 (number of available slots)

Requirement reference	
5.2.4.5.1	The parameter Q4 shall be used to control the number of slots added to the available slot list during the slot selection process (see clause 5.2.6.2).

5.2.5 Received transmission processing

Requirement reference	
5.2.5.1	Valid bursts shall be forwarded to the appropriate VSS user, along with the time of receipt of transmission.
5.2.5.2	The received signal quality and the time of receipt of the bursts shall be passed to the VME.
5.2.5.3	A station shall be capable of recognizing and processing all possible reservation types as defined in clauses 5.2.9 through 5.2.18.
5.2.5.4	When a station receives a burst with an unrecognized reservation type, it shall discard the burst without updating the reservation table.
5.2.5.5	When a station receives a known reservation type with an invalid subfield, or a known reservation type with valid subfields but an invalid combination, it shall reserve the slots indicated by the valid sub-fields; however, the station shall not transmit a response, nor shall the burst be passed to a VSS user.
5.2.5.6	When a station receives a burst with a known reservation type and a non-zero reserved subfield, it shall ignore the data in the reserved subfield.
5.2.5.7	The current slot for a burst shall be the slot in which the received transmission begins.
5.2.5.8	The burst length (bl) shall be the number of slots across which the burst is transmitted.
5.2.5.9	If the appropriate VSS user cannot be identified (i.e. the message ID is reserved or that functionality is not implemented) and the burst contains one or more reservations for the receiving station only, then the station shall transmit a General Failure (see clause 5.2.20) with an error type of 00 hex or 80 hex (i.e. unsupported function) in the first slot of each of the reservations.

5.2.6 Reserved access protocol specification

5.2.6.1 Reservation table

Requirement reference	
5.2.6.1.1	A station shall maintain a table of all reservations in the next 4xM1 + 128 slots.
5.2.6.1.2	For each reserved slot, the reservation table entry shall consist of the 27-bit address of the intended transmitter, the 27-bit address of the destination (if any) and the type of reservation made.
5.2.6.1.3	For periodic broadcast reservations (see clause 5.2.10) and directed request reservations (see clause 5.2.16), the reservation table shall also include pointers to all other reserved slots associated with the same reservation stream.
5.2.6.1.4	The reservation table shall be updated before the end of the first slot after the end of the burst.
5.2.6.1.5	With the exception of cases where a station has been directed to transmit by another station, a station shall wait for at least M1 slots after starting to listen to a channel, before starting to transmit or reserve slots.

5.2.6.2 Selecting slots for transmission or reservation

Requirement reference	
5.2.6.2.1	A station shall select slots for transmission or for reservation for later transmissions using the algorithm specified below.
5.2.6.2.2	The VSS user shall specify one or more groups of Quality of Service parameters Q2a, Q2b, Q2c, Q2d and Q4 for slot selection.
5.2.6.2.3	The station shall attempt to select slots using the first group of Quality of Service parameters.
5.2.6.2.4	If slot selection is unsuccessful, the station shall use the next group and continue with successive groups until a slot has been selected.
5.2.6.2.5	If, having used all groups of Quality of Service parameters, no slot has been selected, the VSS user shall be informed that slot selection has been unsuccessful.
	Specification of candidate slots
5.2.6.2.6	The VSS user shall specify a range of candidate slots for slot selection.

Requirement reference	
	Derivation of a list of available slots
	Slot selection criteria
5.2.6.2.7	A list of available slots shall be chosen from the candidate slots using the following rules:
5.2.6.2.8	All unreserved slots shall be added to the list of available slots (shown as level 0 in table 5.9).
5.2.6.2.9	If, having completed stage a), the number of available slots is less than Q4, further available slots shall be selected from slots that have been previously reserved by other stations.
5.2.6.2.10	The station shall initially select from slots which obey conditions specified as level 1 in table 5.9 until Q4 available slots have been chosen.
5.2.6.2.11	If, having applied level 1 conditions, the number of available slots is still less than Q4, slot selection shall continue using level 2 conditions.
5.2.6.2.12	The process shall continue using subsequent levels until Q4 slots have been selected or until all levels have been applied.
5.2.6.2.13	At each level, selection shall start with slots reserved by the most distant station and proceed in decreasing range order.
5.2.6.2.14	In table 5.9, the following definitions and specifications shall apply:

Station A	The station attempting to select a slot.
Station B	A station that has previously reserved a slot.
Station C	A station to which station A wishes to address a point-to-point communication.
Station D	A station for which station B has reserved a slot for point-to-point communication.
CCI protected	A point-to-point communication between two stations which fulfils the CCI conditions as defined in clause 5.2.3.3 and is therefore protected if a third station simultaneously transmits in the same slot.

Requirement reference	
5.2.6.2.15	Recommendation: In selecting the list of available slots at level 0, priority should be given to candidate slots which are not reserved for transmission on any channel monitored by the station, and which also do not violate quarantine constraints on the desired transmit channel.
	Additional considerations for slot selection for transmission
5.2.6.2.16	A mobile station A, when selecting the list of available slots for transmission in a channel for itself or another mobile station B, shall exclude from consideration the specific slots, which the station A knows are reserved for transmission for the intended station (either A or B) in other channels monitored by A.

Requirement reference	
	Selection of slots from available slots
5.2.6.2.17	If, having completed the derivation of a list of available slots, the number of available slots is zero, no slot shall be selected and the VSS user shall be informed that slot selection was unsuccessful.
5.2.6.2.18	If the number of available slots is greater than or equal to 1, a slot shall be chosen from the list of available slots such that the probability of choosing a given slot is the same as the probability of choosing any other slot.
	Selection of slots for burst lengths greater than 1
5.2.6.2.19	For burst lengths greater than 1, the process specified in clause 5.2.6.2.7 shall be applied to continuous blocks of slots of length equal to the burst length.
5.2.6.2.20	A block of slots shall be regarded as available at a particular level number (see table 5.9) if all slots within the block are available at the same or lower level number.
5.2.6.2.21	The procedure described in clause 5.2.6.2 shall then be used to select one of the available blocks.
	Limits on selection of reserved slots
5.2.6.2.22	A station, A, which has selected a slot, that was reserved by another station, B, shall not select another slot reserved by that station within M1 - 1 slots after the selected slot.

5.2.6.3 Reserved transmissions

Requirement reference	
5.2.6.3.1	When a station a burst to transmit for which it has a reservation, it shall transmit the scheduled data in the reserved slots, except as noted below.
	Unavailable data
5.2.6.3.2	If the data for a burst for which a slot was reserved is unavailable when it is time to transmit, then the station shall send a General Failure (see clause 5.2.20).
	Reservation no longer valid
5.2.6.3.3	A station shall check that a reservation is valid according to the procedures of clause 5.2.6.4 before transmitting.

5.2.6.4 Reservation conflicts

Requirement reference	
5.2.6.4.1	If a station, A, receives a burst containing a reservation from another station, B, for a slot which has already been reserved for station A to transmit, then station A shall take the following action:
5.2.6.4.2	If the conflicting reservation from station B also requires station A to transmit, then station A shall transmit (i) the response with the higher priority (as determined by Q1), or (ii) the first requested transmission in the case of equal priority, or else;
5.2.6.4.3	If station A no longer requires to transmit in the existing reservation, or does not have the necessary information to transfer, then it shall not transmit in the slot, or else;
5.2.6.4.4	If the existing reservation for station A to transmit was made by a station other than A (i.e. by a unicast request (sdf = 0), information transfer, or directed request reservation), then A shall transmit in the slot in accordance with the existing reservation, or else;
5.2.6.4.5	If the existing reservation for station A to transmit was made by A itself, then A shall apply the procedure described in clause 5.2.6.2 to determine whether, in the knowledge of the reservation made by station B, the slot is available at any level 1, 2, 3 or 4, using the same values of Q2 and other parameters as originally used to select the slot;
5.2.6.4.6	If the slot is determined to be available by this process, then A shall transmit according to its existing reservation;
5.2.6.4.7	If the slot is no longer available, the actions specified in table 5.10 shall be performed.

Table 5.10: Action in the event of reservation conflict

Protocol for A's existing reservation (made by A)	Protocol for B's conflicting reservation	Action by A
Slots reserved by station A using ground quarantine	Any	Transmit according to existing reservation.
Periodic broadcast	Incremental broadcast, big negative dither unicast request, or information transfer	Transmit according to existing reservation.
Periodic broadcast	Periodic broadcast (autonomous/directed), directed request, slots reserved by ground quarantine	If the conflict occurs later than A's next transmission in the stream, then select a new transmission slot and reduce the value of TV11 so as to cause the stream to dither to the new slot prior to the conflict; otherwise, do not transmit in the former slot, and re-establish the stream in a new slot.
Incremental broadcast	Any	Do not transmit in the existing reservation, and make the transmission in an alternative slot by random access (see clause 5.2.7).

5.2.7 Random access protocol specification

Requirement reference	
5.2.7.1	The station shall implement a non-adaptive p-persistent algorithm to allow equitably all stations the opportunity to transmit while maximizing system throughput, minimizing transit delays, and minimizing collisions.

5.2.7.1 Void

5.2.7.2 Random access parameters

Requirement reference	
	Timer TM2 (channel busy timer)
5.2.7.2.1	Timer TM2 indicates the number of slots (TM2) that a sublayer shall wait after receiving a request to transmit.
5.2.7.2.2	This timer shall be started if it is not already running, when the VSS sublayer receives a request for random transmission.
5.2.7.2.3	Upon a successful random transmission access attempt, the timer shall be cleared if the random transmit queue is empty and reset if it is not empty.
5.2.7.2.4	When the timer expires, the VSS user shall be informed that the channel is congested.
	Parameter p (persistence)
5.2.7.2.5	Parameter p shall be the probability that the station will transmit on any random access attempt.
	Counter VS3 (maximum number of access attempts)
5.2.7.2.6	Counter VS3 shall be used to limit the maximum number of random access attempts (VS3) that a station will make for any transmission request.
5.2.7.2.7	This counter shall be cleared upon system initialization, Timer TM2 expiring, or a successful access attempt.
5.2.7.2.8	The counter shall be incremented after every unsuccessful random access attempt.
5.2.7.2.9	When the counter reaches the maximum number of random access attempts, authorization to transmit shall be granted as soon as the channel is available.

5.2.7.3 Random access procedures

Requirement reference	
	Random access procedures
5.2.7.3.1	When the station has one or more bursts to transmit for which it does not have a reservation, it shall use a p-persistent algorithm as defined in [1], with the additional constraints defined below:
5.2.7.3.2	Access attempts shall only be made and transmission shall only begin on a slot boundary of available slots.
5.2.7.3.3	A station shall regard a slot or block of slots as available for a random transmission if it conforms to the criteria of any of Levels 0 through 2 in table 5.9 using default or VSS user-supplied quality of service parameters.
5.2.7.3.4	Transmission shall not begin if the station has not previously made or received a reservation for the prior slot, and the slot is busy as defined in clause 5.1.5 at the slot boundary.
5.2.7.3.5	If the station is unable to select a slot, this shall be regarded as an unsuccessful random access attempt.
	Recommendation
5.2.7.3.6	When possible, a station should use the reserved access protocols described in clause 5.2.6 to reserve slots for new transmissions by adding reservation fields to transmissions for which slots have already been reserved.
5.2.7.3.7	The random access protocol should be used only if there is no suitable opportunity to reserve a slot.
	Recommendation
5.2.7.3.8	When possible, if there has been no previous reservation, a ground station should use ground quarantined slots for transmission.
5.2.7.3.9	The random access protocol should be used only if there is no suitable opportunity to use ground quarantined slots.
	Transmit queue management
5.2.7.3.10	There shall be a single queue for all random transmissions which do not have reserved slots for transmission.
5.2.7.3.11	This queue shall be sorted in priority order, with a higher value of Q1 being transmitted before a lower value of Q1.
5.2.7.3.12	If Q3 is TRUE, then the queue shall be searched to determine if a burst or frame of the same type has been queued.

5.2.8 Fixed access protocol specification

Requirement reference	
5.2.8.1	A ground station shall be capable of being pre-programmed either to not transmit in certain slots with starting times expressed in UTC or to transmit specific transmissions in specific slots with starting times expressed in UTC (without necessarily announcing a reservation).

5.2.8.1 Void

5.2.8.2 Recommendation

Requirement reference	
5.2.8.2.1	The user should specify the use of an appropriate reservation protocol to protect future fixed transmissions.

5.2.9 Null reservation protocol specification

5.2.9.1 Null reservation burst format

Requirement reference	
5.2.9.1.1	A reservation ID (rid) = 1 and a reservation data (rd) field in accordance with table 5.11 shall indicate a null reservation.

Table 5.11: Null reservation bit encoding

Description	Octet	Bit number							
		8	7	6	5	4	3	2	1
reservation data (rd) field	n-3	x	x	x	x	x	x	0	0
	n-2	0	0	0	0	0	0	0	0

Requirement reference	
5.2.9.1.2	In this case, the information field shall extend up to the last 10 bits prior to the CRC.

5.2.10 Periodic broadcast protocol specification

5.2.10.1 Periodic broadcast reservation burst format

Requirement reference	
5.2.10.1.1	A reservation ID (rid) = 1 and a reservation field in accordance with table 5.12 shall indicate a periodic broadcast reservation. In this case, the information field shall extend up to but excluding the last 10 bits prior to the CRC.

Table 5.12: Periodic broadcast reservation bit encoding

Description	Octet	Bit number							
		8	7	6	5	4	3	2	1
periodic timeout (pt)	n-3	x	x	x	x	x	x	pt_2	pt_1
periodic offset (po)	n-2	po_8	po_7	po_6	po_5	po_4	po_3	po_2	po_1

Requirement reference	
5.2.10.1.2	The subfields shall be as defined in table 5.13.

Table 5.13: Periodic broadcast reservation field encoding

Subfield	Range	Encoding	Definitions
periodic offset (po)	-127 to +127	two's complement math po = -128 is invalid	po identifies a slot relative to the first slot of the transmission in a future superframe.
periodic timeout (pt)	0 to 3		pt is the number of superframes in the future for which a reservation is being made.

Requirement reference	
5.2.10.1.3	po identifies a slot relative to the first slot of the transmission in a future superframe.
5.2.10.1.4	pt is the number of superframes in the future for which a reservation is being made.

5.2.10.2 Periodic broadcast timers

Requirement reference	
	Timer TV11 (reservation hold timer)
5.2.10.2.1	The timer TV11 shall control the number of successive superframes which will use the same slot for transmission (see clause 5.2.10.5) before moving to a new slot.
5.2.10.2.2	There shall be one TV11 timer for each slot used for periodic broadcasts.

5.2.10.3 Periodic broadcast parameters

Requirement reference	
5.2.10.3.1	The periodic broadcast protocol shall implement the system parameters defined in table 5.14.

Table 5.14: Periodic broadcast VSS system parameters

Symbol	Parameter name	Minimum	Maximum	Recommended default	Increment
TV11min	Reservation hold timer minimum value	0 superframes	15 superframes	4 superframes	1 superframe
TV11max	Reservation hold timer maximum value	1 superframe	16 superframes	8 superframes	1 superframe
V11	Nominal periodic rate	1 per superframe	60 per superframe	1 per superframe	1 per superframe
V12	Periodic dither range	(2/M1) x V11	1,00	0,10	0,01

Requirement reference	
5.2.10.3.2	TV11 min shall be less or equal to TV11 max.
5.2.10.3.3	The VSS user shall provide any of the parameters TV11 min, TV11 max, V11, V12 and Quality of Service parameters (Q2a to Q2d, Q4 and Q5) for which the default values are not desired.
	Parameters TV11min and TV11max (reservation hold timer minimum and maximum values)
5.2.10.3.4	Parameters TV11min and TV11max shall be used to determine the start value for the TV11 timer, consistent with the procedure defined in clause 5.2.10.5, "Transmission in a new slot".
	Parameter V11 (nominal periodic rate)
5.2.10.3.5	The parameter V11 shall be the number of times per superframe that a VSS user will transmit a burst.
	Parameter V12 (periodic dither range)
5.2.10.3.6	The parameter V12 shall define the range for candidate slots on either side of the nominal slot (see clause 5.2.10.5, "Selection of nominal slots") from which the station shall choose a slot or group of slots to be reserved for transmission once the TV11 timer expires.
5.2.10.3.7	V12 shall be specified as a fraction of the nominal periodic rate.

5.2.10.4 Periodic broadcast reception procedures

Requirement reference	
5.2.10.4.1	Upon receipt of a burst containing a periodic broadcast reservation, the station shall update its reservation table and carry out the actions as specified in table 5.15.

Table 5.15: Action on receipt of periodic broadcast reservation burst

Periodic offset (po)	Periodic timeout (pt)	Action
0	0	No reservation (see note 1)
Any except 0	0, 1 or 2	Reserve the following slots for the source to broadcast: if pt = 1 or 2 then for j = 1 to pt, the slots equal to (j x M1) through (bl - 1 + (j x M1)) after the first slot of the received burst AND for j = pt + 1 to 4, the slots equal to (po + (j x M1)) through (bl - 1 + (po + (j x M1))) slots after the first slot of the received burst
0	1 or 2	Reserve the following slots for the source to broadcast: for j = 1 to pt, the slots equal to (j x M1) through (bl - 1 + (j x M1)) after the first slot of the received burst
any	3	Reserve the following slots for the source to broadcast: for j = 1 to 4, the slots equal to (j x M1) through (bl - 1 + (j x M1)) after the first slot of the received burst (see note 2)
NOTE 1: Reservation format is the same as null reservation (see clause 5.2.9). NOTE 2: The interpretation of the periodic offset subfield in the case of periodic timeout = 3 and io ≠ 0 binary is described in clause 5.2.12.		

Requirement reference	
5.2.10.4.2	All reservations associated with a single periodic broadcast reservation burst shall be known as a stream.
5.2.10.4.3	The actions defined in table 5.15 shall cancel any previous reservations for the same stream.
5.2.10.4.4	If a station was expecting to receive a transmission from a peer station containing a periodic broadcast reservation, but receives a transmission from the peer station containing an incremental reservation (see clause 5.2.11) or a unicast request with the source/destination flag set equal to 1 (see clause 5.2.14), the station shall cancel the periodic broadcast reservation stream for the peer station.

5.2.10.5 Periodic broadcast transmission procedures

Requirement reference	
	Selection of nominal slots
5.2.10.5.1	When operating without any directed-slot reservations (see clause 5.2.16, "Autotune reservation burst format") for a given VSS User application which requires periodic broadcast transmissions, a station shall select nominal slots (n_slot) which form a periodic sequence in time, considering all frequencies used, with a variation of no more than ±1 slot as required to accommodate the constraints imposed by the nominal reporting rate for the application and the slot rate on the channel.
5.2.10.5.2	When operating with a mixture of directed-slot reservations (see clause 5.2.16, "Autotune reservation burst format"), autonomous and directed-rate reservations (see clause 5.2.16, "Autotune reservation burst format") for a given VSS User application which requires periodic broadcast transmissions, a station shall select nominal slots (n_slot) for the autonomous or directed rate which form a periodic sequence in time, considering all frequencies used, with a variation of no more than ±1 slot as required to accommodate the constraints imposed by the nominal reporting rate for the application and the slot rate on the channel.
	Selection of slots for a periodic broadcast transmission
5.2.10.5.3	If there is no existing periodic reservation for the VSS user, the station shall select a current transmission slot (ct_slot) corresponding to each nominal slot by inspection of the reservation table data, using the following procedure:
5.2.10.5.4	The station shall use the slot selection procedure specified in clause 5.2.6.2 using all slots that are within truncate((V12/2) × (M1/V11))) of n_slot and within 127 slots of n_slot, as candidate slots, and the parameter settings defined in table 5.16.

Table 5.16: Periodic broadcast QoS parameters

Symbol	Parameter name	Default
Q2a	Slot selection range constraint for level 1	300 nmi
Q2b	Slot selection range constraint for level 2	300 nmi
Q2c	Slot selection range constraint for level 3	1 000 nmi
Q2d	Slot selection range constraint for level 4	1 000 nmi
Q4	Number of available slots	3

Requirement reference	
5.2.10.5.5	If slot selection is unsuccessful, the station shall re-apply this slot selection, using the same candidate slots and VSS user supplied quality of service parameters.
	Calculation of slot availability
5.2.10.5.6	After selection of a new current transmission slot, the station shall compute the slot availability (s_avail), indicating how many consecutive superframes are available until the equivalent slot is reserved by another user.
5.2.10.5.7	The value of s_avail shall indicate the slot (ct_slot + s_avail × M1) which is reserved by another user and shall range from 1 (for a slot that is reserved in the next superframe) to 4 (for slots that currently have no reservation for at least 3 superframes)
5.2.10.5.8	The calculation of s_avail shall use the following rules:
5.2.10.5.9	If the current transmission slot has not been previously reserved, s_avail shall be the number of superframes that are left before the equivalent slot is reserved;
5.2.10.5.10	If the current transmission slot has been previously reserved by a station, s_avail shall be the number of superframes that are left before the equivalent slot is reserved by a different user.
	Transmission in a new slot
5.2.10.5.11	If there is no prior reservation or if the station is using for the first time a slot for which there has been a prior reservation, the station shall start the timer TV11 at a value equal to s_avail, if s_avail = 1, 2 or 3, and otherwise equal to a random value uniformly chosen between TV11 min and TV11 max.
	Transmission for TV11 greater than 3
5.2.10.5.12	If the TV11 timer is greater than 3 and there is no requirement to associate the current transmission with an incremental reservation, the station shall transmit a burst containing a periodic broadcast reservation in the current transmission slot with io = 0 and pt = 3.
5.2.10.5.13	After transmission, the timer TV11 shall be decremented by one and the current transmission slot shall be incremented by M1.
	Reservation of a new slot for TV11 equal to 1, 2, or 3
5.2.10.5.14	If the TV11 timer is equal to 1, 2 or 3 and if the VSS user requires that periodic broadcast reservations are maintained after the current transmission slot reservation expires, the station shall reserve a future transmission slot (ft_slot) for subsequent transmissions.
5.2.10.5.15	If a future transmission slot has already been selected, there shall be no further slot selection.
5.2.10.5.16	Otherwise, selection of ft_slot shall be carried out using the procedure set out in clause 5.2.10.5, "Selection of slots for a periodic broadcast transmission" using all slots that are within truncate((V12/2) × (M1/V11))) of n_slot and within 127 slots of n_slot and within 127 slots of ct_slot, except slot (ct_slot + TV11 × M1), as candidate slots.

Requirement reference	
	Transmission for TV11 equal to 1, 2 or 3
5.2.10.5.17	If the TV11 timer is equal to 1, 2 or 3 the station shall transmit a burst containing a periodic broadcast reservation in the current transmission slot with po = (ft_slot - ct_slot) and pt = TV11 - 1.
5.2.10.5.18	If a future transmission slot has not been selected and the VSS user does not require the reservation to be maintained, the value of the po shall be set to 0.
5.2.10.5.19	After transmission, the timer TV11 shall be decremented and the current transmission slot set equal to ct_slot + M1.
	TV11 equal to 0
5.2.10.5.20	If the TV11 timer is equal to 0, and the VSS user requires a reservation to be maintained, then if a new slot has not been selected for further periodic broadcasts, the station shall select a new current transmission slot using the procedures set out in clause 5.2.10.5, "Selection of slots for a periodic broadcast transmission".
5.2.10.5.21	If a new slot has been selected for further periodic broadcasts, the station shall set the current transmission slot equal to the future transmission slot.
5.2.10.5.22	The station shall start to transmit in the new current transmission slot carrying out the procedures set out in clause 5.2.10.5, "Calculation of slot availability" to clause 5.2.10.5, "TV11 equal to 0".
5.2.10.5.23	If the VSS user does not require a reservation to be maintained, no further action shall be taken.
	Reservation cancellation
5.2.10.5.24	A station wishing to cancel a stream or reservations for its own transmissions, in the absence of a reservation conflict, shall transmit a periodic broadcast reservation burst with po = 0 and pt = 0 in the next reserved slot and the timer TV11 shall be cleared.
5.2.10.5.25	A station receiving such a burst shall clear all reservations known to be associated with the stream.

5.2.11 Incremental broadcast protocol specification

5.2.11.1 Incremental broadcast reservation burst format

Requirement reference	
5.2.11.1.1	A reservation ID (rid) = 0 with extended reservation ID and reservation fields set in accordance with table 5.17 shall indicate an incremental broadcast reservation.

Table 5.17: Incremental broadcast reservation bit encoding

Description	Octet	Bit Number							
		8	7	6	5	4	3	2	1
	n-3	x	x	x	x	x	x	io_8	io_7
incremental offset (io)	n-2	1	0	io_6	io_5	io_4	io_3	io_2	io_1

Requirement reference	
5.2.11.1.2	In this case, the information field shall extend up to but excluding the last 10 bits prior to the CRC.
5.2.11.1.3	The subfields shall be as defined in table 5.18.

Table 5.18: Incremental broadcast reservation field encoding

Subfield	Range	Encoding	Definitions
incremental offset (io)	0 to 255	(see clause 5.2.11.4)	io identifies a slot relative to the first slot of the transmission

Requirement reference	
5.2.11.1.4	io identifies a slot relative to the first slot of the transmission.

5.2.11.2 Incremental broadcast parameters

Requirement reference	
5.2.11.2.1	The incremental broadcast protocol shall implement the system parameters defined in table 5.19.

Table 5.19: Incremental broadcast VSS system parameters

Symbol	Parameter name	Minimum	Maximum	Recommended default	Increment
V21	Nominal incremental period	960/M1 s	60 480/M1 s	1,0 s	0,1 s
V22	Maximum incremental dither range	720/(V21 x M1)	MIN(1.001-240/ (V21 x M1), 61 200/ (V21 x M1) - 0,999)	MIN(0,75, maximum allowed value of V22)	0,001

Requirement reference	
5.2.11.2.2	The VSS user shall provide any of the parameters V21, V22 and Quality of Service parameters (Q2a to Q2d, Q4 and Q5) for which the default values are not desired.
	Parameter V21 (nominal incremental period)
5.2.11.2.3	The parameter V21 shall be the nominal time after the first slot of the incremental broadcast transmission that a VSS user will transmit a burst.
	Parameter V22 (maximum incremental dither range)
5.2.11.2.4	The parameter V22 shall define the range for candidate slots on either side of the nominal slot from which the station shall choose a slot or group of slots to be reserved for transmission.
5.2.11.2.5	V22 shall be specified as a fraction of the nominal incremental period.

5.2.11.3 Incremental broadcast reception procedures

Requirement reference	
5.2.11.3.1	Upon receipt of a burst containing an incremental broadcast reservation, a station shall reserve the slot equal to (4 × io) through (bl - 1 + 4 × io) after the first slot of the received burst for the source to broadcast.
5.2.11.3.2	When a burst contains an incremental broadcast reservation with io = 0, then no incremental reservation shall be placed.

5.2.11.4 Incremental broadcast transmission procedures

Requirement reference	
	Selection of the transmission slot for the incremental broadcast reservation
5.2.11.4.1	If no slot or group of consecutive slots, has been reserved for transmission of an incremental reservation, and if the incremental reservation is not to be combined with a periodic broadcast reservation (see clause 5.2.12), the station shall select a slot or group of consecutive slots using the random access procedures (see clause 5.2.7).
5.2.11.4.2	The transmission slot (t_slot) shall be the first slot of the incremental broadcast transmission.
	Selection of the reserved slot for the incremental broadcast reservation
5.2.11.4.3	The station shall choose a slot or group of consecutive slots to reserve using the slot selection procedure specified in clause 5.2.6.2: a) using VSS user supplied quality of service parameters, and; b) candidate slots in the range (V21 × M1/60 - V22 × V21 × M1/60) through (V21 × M1/60 + V21 × M1,60 + bl - 1) such that the chosen slot, or the first slot in the chosen group of slots, is an exact modulo 4 difference from t_slot.
5.2.11.4.4	The reserved slot (r_slot) shall be the chosen slot or the first slot in the chosen group of slots.
	Incremental broadcast burst transmission
5.2.11.4.5	The station shall transmit an incremental broadcast burst in the transmission slot with the io set to (r_slot - t_slot) / 4.

5.2.12 Combined periodic broadcast and incremental broadcast protocol specification

5.2.12.1 Combined periodic broadcast and incremental broadcast reservation burst

Requirement reference	
5.2.12.1.1	A reservation ID (rid) = 1 and a reservation field in accordance with table 5.20 shall indicate a combined periodic broadcast and incremental broadcast reservation.

Table 5.20: Combined periodic/incremental broadcast reservation bit encoding

Description	Octet	Bit number							
		8	7	6	5	4	3	2	1
periodic timeout (pt) = 3	n-3	x	x	x	x	x	x	1	1
incremental offset (io)	n-2	io_8	io_7	io_6	io_5	io_4	io_3	io_2	io_1
NOTE: Bits denoted x are available for use within the information field.									

Requirement reference	
5.2.12.1.2	In this case, the information field shall extend up to the last 10 bits prior to the CRC.
5.2.12.1.3	The periodic timeout (pt) subfield shall be set to 3.
5.2.12.1.4	The incremental offset subfield (io) shall be as defined in clause 5.2.11.1.
5.2.12.1.5	All other parameters and procedures shall be as specified in clauses 5.2.10 and 5.2.11.

5.2.13 Big negative dither (BND) broadcast protocol specifications

5.2.13.1 BND reservation burst format

Requirement reference	
5.2.13.1.1	A reservation ID (rid) = 0, an extended reservation ID (erid) = 00001 binary, and reservation data set in accordance with table 5.21 shall indicate a Big Negative Dither (BND).

Table 5.21: BND broadcast reservation bit encoding

Description	Octet	Bit number							
		8	7	6	5	4	3	2	1
negative dither (nd)	n-3	x	x	x	x	x	x	nd_5	nd_4
extended reservation ID (erid)	n-2	0	0	0	0	1	nd_3	nd_2	nd_1
NOTE: Bits denoted x are not used by this reservation type and shall be available for use within the information field.									

Requirement reference	
5.2.13.1.2	The subfields shall be as defined in table 5.22.

Table 5.22: BND broadcast reservation parameters

Subfield	Range	Encoding	Definitions
negative dither (nd)	0 to 31		nd identifies a slot relative to and earlier than the current slot + M1 - 128 slots.

5.2.13.2 BND broadcast parameters

Requirement reference	
5.2.13.2.1	There are no BND parameters.

5.2.13.3 BND broadcast reception procedures

Requirement reference	
5.2.13.3.1	Upon receipt of a burst containing a BND broadcast reservation, a station shall reserve the slots from (M1 - 128 - (4 × nd)) through (M1 - 128 - (4 × nd) + (bl - 1)) after the first slot of the received burst for the source to broadcast.

5.2.14 Unicast request protocol specification

5.2.14.1 Unicast request reservation burst format

Requirement reference	
5.2.14.1.1	A reservation ID (rid) = 0 with an extended reservation ID and reservation fields set in accordance with table 5.23 shall indicate a unicast request reservation.

Table 5.23: Unicast request reservation bit encoding

Description	Octet	Bit number							
		8	7	6	5	4	3	2	1
destination address (d)	n-8	d_{24}	d_{23}	d_{22}	d_{21}	d_{20}	d_{19}	d_{18}	d_{17}
	n-7	d_{16}	d_{15}	d_{14}	d_{13}	d_{12}	d_{11}	d_{10}	d_9
	n-6	d_8	d_7	d_6	d_5	d_4	d_3	d_2	d_1
	n-5	ro_{12}	ro_{11}	ro_{10}	ro_9	res	d_{27}	d_{26}	d_{25}
response offset (ro)	n-4	ro_8	ro_7	ro_6	ro_5	ro_4	ro_3	ro_2	ro_1
length (lg)	n-3	lg_8	lg_7	lg_6	lg_5	lg_4	lg_3	lg_2	lg_1
source/destination flag (sdf), priority (pr)	n-2	0	0	1	0	sdf	res	pr_2	pr_1

Requirement reference	
5.2.14.1.2	The subfields and associated actions shall be as defined in table 5.24.

Table 5.24: Unicast request reservation field encoding

Subfield	Range	Encoding/Actions	Definitions
response offset (ro)	0 to 4 095		ro identifies a slot relative to the first slot of the transmission.
destination address (d)	0 to 2^{27}-1	See clause 5.2.2.4.	d is the 27-bit address of the destination station.
source/destination flag (sdf)	Boolean	If sdf = 0, reserve the response slot for the destination station to transmit. If sdf = 1, reserve the response slot for the source station to transmit.	sdf indicates which station will respond in the reserved response slot. Note that the source station is the station placing the reservation.
length (lg)	0 to 255		lg is one less than the number of slots that are reserved for the response.
priority (pr)	0 to 2	See table 5.8.	

Requirement reference	
5.2.14.1.3	Bits 25, 26 and 27 of the destination address (d) subfield shall be the address type field.
5.2.14.1.4	In the case that the address type field is equal to 7, bits 1 through 24 of the destination subfield (d) shall be absent and the information field shall extend up to the last four octets prior to the CRC.
5.2.14.1.5	Otherwise, the information field shall extend up to the last seven octets prior to the CRC and the burst shall include the all of the destination subfield (d).

5.2.14.2 Unicast request reception procedures

Requirement reference	
5.2.14.2.1	Upon receipt of a burst containing a unicast request reservation, a station shall reserve all of the slots from (1 + ro) through (1 + ro + lg) after the first slot of the received burst for: a) the destination to transmit a response to the source (if sdf = 0 and address type field <> 7); b) or for the source to transmit a response to the destination (if sdf = 1 and address type field <> 7); c) or for the source to make a broadcast transmission (if address type field = 7).

5.2.15 Information transfer request protocol specification

5.2.15.1 Information transfer request reservation burst format

Requirement reference	
5.2.15.1.1	A reservation ID (rid) = 0 with extended reservation ID (erid) = 01010 binary and reservation fields set in accordance with table 5.25 shall indicate an information transfer request reservation.

Table 5.25: Information transfer request reservation bit encoding

Description	Octet	Bit number							
		8	7	6	5	4	3	2	1
acknowledgement offset (ao)	n-10	res	ao_7	ao_6	ao_5	ao_4	ao_3	ao_2	ao_1
length (lg)	n-9	lg_8	lg_7	lg_6	lg_5	lg_4	lg_3	lg_2	lg_1
response offset (ro)	n-8	ro_8	ro_7	ro_6	ro_5	ro_4	ro_3	ro_2	ro_1
	n-7	ro_{12}	ro_{11}	ro_{10}	ro_9	f_{12}	f_{11}	f_{10}	f_9
frequency (f) destination address (d)	n-6	f_8	f_7	f_6	f_5	f_4	f_3	f_2	f_1
	n-5	d_{24}	d_{23}	d_{22}	d_{21}	d_{20}	d_{19}	d_{18}	d_{17}
	n-4	d_{16}	d_{15}	d_{14}	d_{13}	d_{12}	d_{11}	d_{10}	d_9
	n-3	d_8	d_7	d_6	d_5	d_4	d_3	d_2	d_1
	n-2	0	1	0	1	0	d_{27}	d_{26}	d_{25}

Requirement reference	
5.2.15.1.2	In this case, the information field shall extend up to the last nine octets prior to the CRC.
5.2.15.1.3	The subfields shall be as defined in table 5.26.

Table 5.26: Information transfer reservation field encoding

Subfield	Range		Encoding
response offset (ro)	See table 5.24.		
length (lg)	See table 5.24.		lg is one less than the number of slots that are reserved for the response.
acknowledgement offset (ao)	0 to 127		ao identifies a slot relative to the end of the block of slots reserved by the response offset and length subfields.
response offset (ro)	See table 5.24.		ro identifies a slot relative to the first slot of the transmission.
destination address (d)	See clause 5.2.2.4.		d is the 27-bit address of the destination station for which the block of slots is being reserved.
frequency (f)	bit 12: frequency band indicator: 0: VHF band 108 - 136,975 MHz 1: reserved for future allocation bits 1 to 11: frequency allocation for bit 12 = 0: 1 to 1 160 per frequency band in 25 kHz increments. 1 161 to 2 047 reserved for future allocation. 1 indicates bottom of band. f = 001 hex = 108,000 MHz f = 000 hex if the subfield is to be ignored.		The frequency subfield (f) identifies the frequency on which the reservation is to be made for the response.

5.2.15.2 Information transfer request reception procedures

Requirement reference	
5.2.15.2.1	Upon receipt of a burst containing an information transfer request reservation, a station shall reserve on the specified frequency all of the slots from (1 + ro) through (1 + ro + lg) after the first slot of the received burst for the destination to transmit one or more information frames to the source.
5.2.15.2.2	Also, the slot equal to (2 + ro + lg + ao) after the first slot of the received burst shall be reserved for the source to transmit an acknowledgement to the destination.

5.2.16 Directed request protocol specification

5.2.16.1 Directed request reservation burst format

Requirement reference	
5.2.16.1.1	A reservation ID (rid) = 0, an extended reservation ID (erid) = 01100 binary, and reservation fields set in accordance with table 5.27 shall indicate a directed request reservation.

Table 5.27: Directed request reservation bit encoding

Description	Octet	Bit number							
		8	7	6	5	4	3	2	1
identification of additional reservation data	n-15								
	n-14								
	n-13								
	n-12								
	n-11		per table 5.29, table 5.31 through table 5.32						
	n-10								
	n-9								
	n-8								
	n-7								
nominal update rate (nr); plea response flag (pr_flag)	n-6				pr_flag	nr_4	nr_3	nr_2	nr_1
destination address (d)	n-5	d_{24}	d_{23}	d_{22}	d_{21}	d_{20}	d_{19}	d_{18}	d_{17}
	n-4	d_{16}	d_{15}	d_{14}	d_{13}	d_{12}	d_{11}	d_{10}	d_9
	n-3	d_8	d_7	d_6	d_5	d_4	d_3	d_2	d_1
extended reservation ID (erid)	n-2	0	1	1	0	0	d_{27}	d_{26}	d_{25}

Requirement reference	
5.2.16.1.2	The length of the reservation field shall be determined by the value of the plea response flag (pr_flag).
5.2.16.1.3	For the case of pr_flag = 1, the information field shall extend up to the last fourteen octets prior to the CRC.
5.2.16.1.4	For the case of pr_flag = 0, the information field shall extend up to the last ten octets prior to the CRC.
5.2.16.1.5	The nominal update rate (nr) field shall be encoded in accordance with table 5.28.

Table 5.28: Nominal update rate encoding

Encoded data				Nominal update rate (transmissions per minute)
nr_4	nr_3	nr_2	nr_1	nr
0	0	0	0	1
0	0	0	1	2
0	0	1	0	3
0	0	1	1	4
0	1	0	0	5
0	1	0	1	6
0	1	1	0	8
0	1	1	1	Invalid
1	0	0	0	10
1	0	0	1	12
1	0	1	0	15
1	0	1	1	20
1	1	0	0	30
1	1	0	1	60
1	1	1	0	0
1	1	1	1	Special

Requirement reference	
5.2.16.1.6	The 27-bit destination address (d) shall be the 27-bit address of the destination station for whom reservations are being created.
	Autotune reservation burst format
5.2.16.1.7	A directed request reservation burst with pr_flag = 0 shall indicate an autotune reservation.
5.2.16.1.8	Additional reservation data shall be set in accordance with table 5.29 with subfields defined in accordance with table 5.30.

Table 5.29: Encoding of additional data in autotune reservation burst

Description	Octet	Bit number							
		8	7	6	5	4	3	2	1
directed timeout (dt)	n-11	dt_4	dt_3	dt_2	dt_1	f_{12}	f_{11}	f_{10}	f_9
frequency (f)	n-10	f_8	f_7	F_6	f_5	f_4	f_3	f_2	f_1
length (lg)	n-9	lg_8	lg_7	lg_6	lg_5	lg_4	lg_3	lg_2	lg_1
transmit control (trmt)	n-8	res	res	trmt	do_{13}	do_{12}	do_{11}	do_{10}	do_9
directed offset (do)	n-7	do_8	do_7	do_6	do_5	do_4	do_3	do_2	do_1
override flag (or); receiver control (rcvr); nominal update rate (nr); pr_flag = 0	n-6	or	$rcvr_2$	$rcvr_1$	0	nr_4	nr_3	nr_2	nr_1

Table 5.30: Directed request reservation field encoding

Subfield	Range	Encoding	Definitions
length (lg)	0 to 255	See table 5.24	lg is one less than the number of slots that are reserved.
directed timeout (dt)	0 to 15	A value of 15 cancels the reservation	dt = the number of planned future transmissions reserved in slots spaced M1 slots apart.
nominal rate (nr)	0 to 60	See table 5.28 When pr_flag = 0, nr = special is invalid	See table 5.28.
override flag (or)	0 to 1	See clause 5.2.16.3	or indicates whether the current directed request reservation burst overrides all previous directed request reservations issued by the station on the indicated frequency.
receiver control (rcvr)	0 to 3	00 = Station must continue to monitor the current frequency; 01 = Station must monitor the indicated frequency; 10 = Autonomous decision; 11 = Station must continue to monitor the current frequency and also the indicated frequency	Defines handling of receiver tuned to frequency used to receive this burst.
transmit control (trmt)	0 to 1	0 = cancel transmissions on the current frequency (see 5.2.10.5, "Reservation cancellation") 1 = continue transmission on the current frequency	
directed offset (do)	0 or 2 to 2^{13} - 1	do = 1: invalid	do = 0 implies directed rate reservation. do > 1 implies directed slot reservation. For do > 1, do = the first slot in which to transmit.
offset to first reserved slot (off)	2 to 2^9-1	off = 0,1: invalid	off = the first slot in which to transmit (for plea response)
additional slots (a_j)	1 to 2^k - 1 (k = 6,12)	a_j = 20 hex and nr ≠ special: invalid Note: k is the number of bits in each a_j. k = 6 for nr ≠ "special", and k = 12 for nr = "special". j is the number of additional slots	For nr ≠ "special", a_j is encoded as two's complement offset about a nominal slot defined by the offset to the first slot, and the nominal rate. For nr = special, a is encoded as a binary increment from the previously-reserved slot. a_j refers to the additional slot.
frequency (f)	See table 5.26	See table 5.26	Defines new frequency for transmissions of required data.
plea response flag (pr_flag)	See clause 5.2.16.1		

Requirement reference	
5.2.16.1.9	A reservation with do = 0, rcvr = 00 binary and f <> current frequency is invalid and shall be handled as per clause 5.2.5.
	Plea response burst format
5.2.16.1.10	A directed request reservation with pr_flag = 1 shall indicate a network entry plea response.
5.2.16.1.11	In this case, the reservation data not previously defined shall be encoded as indicated in tables 5.31 and 5.32 with subfields set in accordance with table 5.30, and shall consist of: a) the offset to a first reserved slot; and b) offsets to an additional n reserved slots as appropriate.

Table 5.31: Encoding of additional data with nr ≠ "special"

Description	Octet	Bit number							
		8	7	6	5	4	3	2	1
additional slots (a_j)	n-15	$a_{11,6}$	$a_{11,5}$	$a_{8,6}$	$a_{8,5}$	$a_{8,4}$	$a_{8,3}$	$a_{8,2}$	$a_{8,1}$
	n-14	$a_{11,4}$	$a_{11,3}$	$a_{7,6}$	$a_{7,5}$	$a_{7,4}$	$a_{7,3}$	$a_{7,2}$	$a_{7,1}$
	n-13	$a_{11,2}$	$a_{11,1}$	$a_{6,6}$	$a_{6,5}$	$a_{6,4}$	$a_{6,3}$	$a_{6,2}$	$a_{6,1}$
	n-12	$a_{10,6}$	$a_{10,5}$	$a_{5,6}$	$a_{5,5}$	$a_{5,4}$	$a_{5,3}$	$a_{5,2}$	$a_{5,1}$
	n-11	$a_{10,4}$	$a_{10,3}$	$a_{4,6}$	$a_{4,5}$	$a_{4,4}$	$a_{4,3}$	$a_{4,2}$	$a_{4,1}$
	n-10	$a_{10,2}$	$a_{10,1}$	$a_{3,6}$	$a_{3,5}$	$a_{3,4}$	$a_{3,3}$	$a_{3,2}$	$a_{3,1}$
	n-9	$a_{9,6}$	$a_{9,5}$	$a_{2,6}$	$a_{2,5}$	$a_{2,4}$	$a_{2,3}$	$a_{2,2}$	$a_{2,1}$
	n-8	$a_{9,4}$	$a_{9,3}$	$a_{1,6}$	$a_{1,5}$	$a_{1,4}$	$a_{1,3}$	$a_{1,2}$	$a_{1,1}$
offset to first reserved slot (off)	n-7	$a_{9,2}$	$a_{9,1}$	off_9	off_8	off_7	off_6	off_5	off_4
nominal rate(nr); pr_flag = 1	n-6	off_3	off_2	off_1	1	nr_4	nr_3	nr_2	nr_1

Table 5.32: Encoding of additional data for nr = "special"

Description	Octet	Bit number							
		8	7	6	5	4	3	2	1
additional slots (a_j)	n-15	res	res	res	res	$a_{5,12}$	$a_{5,11}$	$a_{5,10}$	$a_{5,9}$
	n-14	$a_{5,8}$	$a_{5,7}$	$a_{5,6}$	$a_{5,5}$	$a_{5,4}$	$a_{5,3}$	$a_{5,2}$	$a_{5,1}$
	n-13	$a_{4,8}$	$a_{4,7}$	$a_{4,6}$	$a_{4,5}$	$a_{4,4}$	$a_{4,3}$	$a_{4,2}$	$a_{4,1}$
	n-12	$a_{4,12}$	$a_{4,11}$	$a_{4,10}$	$a_{4,9}$	$a_{3,12}$	$a_{3,11}$	$a_{3,10}$	$a_{3,9}$
	n-11	$a_{3,8}$	$a_{3,7}$	$a_{3,6}$	$a_{3,5}$	$a_{3,4}$	$a_{3,3}$	$a_{3,2}$	$a_{3,1}$
	n-10	$a_{2,8}$	$a_{2,7}$	$a_{2,6}$	$a_{2,5}$	$a_{2,4}$	$a_{2,3}$	$a_{2,2}$	$a_{2,1}$
	n-9	$a_{2,12}$	$a_{2,11}$	$a_{2,10}$	$a_{2,9}$	$a_{1,12}$	$a_{1,11}$	$a_{1,10}$	$a_{1,9}$
	n-8	$a_{1,8}$	$a_{1,7}$	$a_{1,6}$	$a_{1,5}$	$a_{1,4}$	$a_{1,3}$	$a_{1,2}$	$a_{1,1}$
offset to first reserved slot (off)	n-7	res	res	off_9	off_8	off_7	off_6	off_5	off_4
nominal rate (nr); pr_flag = 1	n-6	off_3	off_2	off_1	1	1	1	1	1

Requirement reference	
5.2.16.1.12	Additional reserved slots shall be encoded as follows: slots 1 to n shall be encoded in additional slots a1 to an; additional slots an + 1 to aN, where N is the maximum number of additional slots that can be accommodated in the formats defined by table 5.31 and table 5.32, shall be set to zero.

5.2.16.2 Directed request parameters

Requirement reference	
5.2.16.2.1	The directed request protocol shall implement the system parameters defined in table 5.33.

Table 5.33: Directed request VSS system parameters

Symbol	Parameter Name	Minimum	Maximum	Recommended default	Increment
V52	Minimum response delay	1 slot	500 slots	20 slots	1 slot

Requirement reference	
5.2.16.2.2	The VSS user shall provide the destination address and any of the parameters V52 and Quality of Service parameters (Q2a to Q2d, Q4 and Q5) for which the default values are not desired.
	Parameter V52 (minimum response delay)
5.2.16.2.3	Parameter V52 shall be the minimum time that a station will provide to a responder in order to ensure timely delivery in case a retransmission is required.

5.2.16.3 Directed request reception procedures

Requirement reference	
	Autotune reception procedures
5.2.16.3.1	Upon receipt of a burst containing an autotune reservation (pr_flag = 0), the station shall update its reservation table and carry out the actions as specified in table 5.34.

Table 5.34: Action on receipt of an autotune reservation burst

Directed offset (do)	Directed timeout (dt)	Action
0	any	Operate autonomously.
1	any	Invalid
1 < do < M1	dt < 15	Reserve the following slots for the destination to broadcast: for j equal to 0 to 3 and k equal to 0 to nr - 1, the slots equal to truncate (do + (k x M1/nr) + j x M1) through (lg + truncate (do + (k x M1/nr) + j x M1)) after the first slot of the received burst
1 < do < M1	dt = 15	Reserve the following slots for the destination to broadcast: for k equal to 0 to nr - 1, the slots equal to truncate (do + (k x M1/nr)) through (lg + truncate (do + (k x M1/nr))) after the first slot of the received burst
do > M1-1	any	Invalid

Requirement reference	
5.2.16.3.2	The burst is invalid, and shall be handled as per clause 5.2.5, if the frequency subfield is equal to 000 hex, or fails to map to a known frequency, or indicates a frequency on which the transmitter cannot transmit.
	Plea response reception procedures
5.2.16.3.3	Upon receipt of a burst containing a plea response reservation (pr_flag = 1), a station shall reserve the slots equal to 'off' after the first slot of the received burst and the series of slots rj for the destination to broadcast.
5.2.16.3.4	If nr <> 'special', then rj shall be: rj = (off + (j × nsr) + aj) for j = 1 to N, where N is the maximum number of additional slots defined in the additional slots subfield (see clause 5.2.16.1, "Plea response burst format").
5.2.16.3.5	If nr = 'special', then rj shall be defined as: rj = (off + [sum from m = 1 to j] am) for j = 1 to N.

5.2.16.4 Directed request transmission procedures

Requirement reference	
	Recommendation
5.2.16.4.1	The directed request protocol with pr_flag = 0 (autotune reservation) should only be used by ground stations and should use fixed transmission procedures to select slots for transmission of the autotune reservation burst and to form contiguous blocks of directed reservations.
5.2.16.4.2	The transmitting station should ensure that, if two users are allocated the same slots, they are sufficiently separated and on divergent paths such that the possible loss of communications between them is not significant.
	Autotune transmission procedures
5.2.16.4.3	A station sending an autotune reservation (pr_flag = 0) to its peer shall set the destination (d) subfield to the destination of the burst, the frequency (f) subfield to the frequency on which the responder shall transmit, the directed offset (do) subfield to either 0 (for a directed rate reservation), or the offset from the first slot of the autotune reservation burst to the first slot in which to transmit (for a directed slot reservation), the nominal rate (nr) subfield to the number of times per M1 slots that a response is requested using the encoding defined in table 5.28, and the directed time-out (dt) subfield to the span of dtxM1 slots over which the destination shall transmit.
5.2.16.4.4	The value of the directed offset (do) subfield shall be greater than V52.

Requirement reference	
	Retransmission after no response
5.2.16.4.5	There shall be no automatic retransmission of plea response bursts (pr_flag = 1).
5.2.16.4.6	For autotune reservation bursts (pr_flag = 0), if a response is not received in the first directed slot after the autotune burst was transmitted, then the station shall retransmit the autotune reservation burst and inform the VSS user of the need for the re-transmission.
5.2.16.4.7	Further re-transmission shall only be made at the request of the VSS User.
	Cancellation of autotune reservation
5.2.16.4.8	A station shall cancel an autotune reservation (pr_flag = 0) by transmitting an autotune reservation field with the directed time-out subfield set to 15.
5.2.16.4.9	It shall set the destination subfield to the destination of the burst, the frequency subfield to the frequency on which the responder has previously been directed to broadcast, the directed offset (do) to the offset from the first slot of the autotune reservation burst to the first slot for which a reservation shall be cancelled and the nominal rate subfield to the number of slots per M1 slots for which a reservation shall be cancelled.
	Plea response transmission procedures
5.2.16.4.10	A station transmitting a plea response (pr_flag = 1) shall set the destination (d) to the destination of the burst, the offset (off) subfield to the offset from the first slot of the reservation burst to the first slot in which to transmit, and the nominal rate (nr) subfield to the nominal number of times per M1 slots that a synchronization burst is to be sent on the frequency used for transmission.
5.2.16.4.11	The value of the offset (off) subfield shall be greater than V52.
5.2.16.4.12	A station shall ensure that the slots selected in the transmission satisfy the nominal update rate requirements and all of the requirements of clause 5.2.6.2.
5.2.16.4.13	A station shall check to determine if a previous plea response had been sent to the mobile making the plea (i.e. the destination ID for this plea response), and if so, it shall begin the list of reserved slots with the remaining (future) reservations from the earlier plea response.
	Recommendation
5.2.16.4.14	To simplify and ease the reversion from a) directed slot operations on local channels, to b) directed rate or autonomous mode operations on another channel, ground stations should attempt to autotune mobile stations (using a directed slot reservation) to the new channel, for a period of at least 60 s, prior to release.

5.2.17 Block reservation protocols specification

5.2.17.1 Superframe block reservation burst format

Requirement reference	
5.2.17.1.1	A reservation ID (rid) = 0, an extended reservation ID (erid) = 110, and reservation fields set in accordance with table 5.35, with subfields defined in accordance with table 5.36, shall indicate a superframe block reservation.

Table 5.35: Superframe block reservation bit encoding

Description	Octet	Bit number							
		8	7	6	5	4	3	2	1
destination address (d)	n-10	d_{24}	d_{23}	d_{22}	d_{21}	d_{20}	d_{19}	d_{18}	d_{17}
	n-9	d_{16}	d_{15}	d_{14}	d_{13}	d_{12}	d_{11}	d_{10}	d_9
	n-8	d_8	d_7	d_6	d_5	d_4	d_3	d_2	d_1
block length (blg)	n-7	blg_5	blg_4	blg_3	blg_2	blg_1	d_{27}	d_{26}	d_{25}
re-broadcast offset (roff)	n-6	$roff_8$	$roff_7$	$roff_6$	$roff_5$	$roff_4$	$roff_3$	$roff_2$	$roff_1$
block repeat rate (br)	n-5	res	res	res	res	br_4	br_3	br_2	br_1
block start (bs)	n-4	bs_8	bs_7	bs_6	bs_5	bs_4	bs_3	bs_2	bs_1
block offset (bo)	n-3	bo_8	bo_7	bo_6	bo_5	bo_4	bo_3	bo_2	bo_1
extended reservation ID (erid), block timeout (bt)	n-2	0	0	0	1	0	res	bt_2	bt_1

Table 5.36: Superframe reservation field encoding

Subfield	Range	Encoding	Definitions
block timeout (bt)	0 to 3		bt x M1 = the number of slots for which the block reservation should be maintained.
block repeat rate (br)	1 to 60	See table 5.28. Codes 0111, 1110 and 1111 are invalid	Defines the number of blocks per minute.
re-broadcast offset (roff)	2 to 255	bs = 0,1 invalid	roff indicates the slot in which the re-broadcast transmission should be made.
block start (bs)	2 to 255	bs = 0,1 invalid	bs identifies a slot relative to the transmission slot which is the first slot of the first reserved block.
block offset (bo)	-127 to +127	Two's complement math	bo identifies an offset of each reserved block at a future time defined by bt x M1.
block length (blg)	0 to 31		blg is one less than the number of slots reserved for the block.
destination address (d)	See table 5.24	Ignored if ro = bs and octets n - 10 through n - 8 available for use within the information field.	d is the 27-bit address of the destination station which is required to re-broadcast the blocking message.

Requirement reference	
5.2.17.1.2	The information field shall extend up to the last nine octets prior to the CRC.
5.2.17.1.3	A burst containing a superframe block reservation shall not exceed twenty-one octets (not including the CRC).

5.2.17.2 Second frame block reservation burst format

Requirement reference	
5.2.17.2.1	A reservation ID (rid) = 0, an extended reservation ID (erid) = 00011, and reservation fields set in accordance with table 5.37, with subfields defined in accordance with table 5.38, shall indicate a second frame block reservation.

Table 5.37: Second frame block reservation bit encoding

Description	Octet	Bit number							
		8	7	6	5	4	3	2	1
timeout (vt)	n - 3	vt_6	vt_5	vt_4	vt_3	vt_2	vt_1	sz_5	sz_4
size (sz)	n - 2	0	0	0	1	1	sz_3	sz_2	sz_1

Table 5.38: Second frame block reservation field encoding

Subfield	Range	Definitions
size (sz)	0 to 31	Number of slots to block after the start of each UTC second.
timeout (vt)	1 to 60	Value of TV61.

Requirement reference	
5.2.17.2.2	The information field shall extend up to the last octet prior to the CRC.

5.2.17.3 Superframe block reservation parameters

Requirement reference	
5.2.17.3.1	The superframe block reservation protocol shall implement the system parameters defined in table 5.39.

Table 5.39: Superframe block reservation VSS system parameters

Symbol	Parameter name	Minimum	Maximum	Default	Increment
V61	Superframe block start offset	2	255	20	1
V62	Superframe block length	1	32	3	1
V63	Superframe block repeat rate	1	60	5	See table 5.28 for allowed values
V64	Superframe block re-broadcast request	No	Yes	No	-
V65	Superframe block re-broadcast offset	2	255	10	1

Requirement reference	
5.2.17.3.2	For each superframe block reservation, the VSS user shall provide one or more sets of parameters consisting of: a) the time of the required superframe block ground transmission; b) the parameters V61 and V65 for which the default values are not desired; c) Quality of Service parameters (Q2a to Q2d, Q4 and Q5) for which the default values are not desired.
5.2.17.3.3	The station shall use the first set of parameters to calculate the position and subfield settings for the first ground station transmission as specified in clause 1.3.17.7.1 and then use each following sets to move the position of the reserved blocks.

Requirement reference	
5.2.17.3.4	Where possible, the station shall pre-announce that a block is to move using the block offset subfield as defined in clause 5.2.17.7, "Recommendation".
	Parameter V61 (superframe block start offset)
5.2.17.3.5	Parameter V61 shall be the offset to the start of the first reserved block from the slot containing the ground transmission.
	Parameter V62 (superframe block length)
5.2.17.3.6	Parameter V62 shall be the length in slots of each reserved block.
	Parameter V63 (superframe block repeat rate)
5.2.17.3.7	Parameter V63 shall be number of reserved slots per M1 slots encoded as defined in table 5.28.
	Parameter V64 (superframe block re-broadcast request)
5.2.17.3.8	Parameter V64 shall determine whether the superframe block reservation request is to be re-broadcast by a mobile using the procedures defined in clause 5.2.17.7, "Procedures for establishment of reserved blocks of slots".
	Parameter V65 (superframe block re-broadcast offset)
5.2.17.3.9	Parameter V65 shall be the offset to the slot containing the re-broadcast from the slot containing the ground transmission.

5.2.17.4 Superframe block reservation reception procedures

Requirement reference	
5.2.17.4.1	Upon receipt of a burst containing a superframe block reservation, the station shall take no action, update its reservation table and carry out the actions as specified in tables 5.40 and 5.41.

Table 5.40: Actions on receipt of a superframe block reservation burst

Block start (bs)	Block offset (bo)	Block timeout (bt)	Action
bs < 2	Any	Any	Invalid
bs ≥ 2	Any except 0	0, 1 or 2	Reserve the following slots for the source or a mobile directed by the source to broadcast: if bt = 1 or 2 then for j equal to 0 to bt and k equal to 0 to br - 1, the slots equal to truncate (bs + (k x M1 / br) + j x M1) through (blg + truncate (bs + (k x M1 / br) + j x M1)) after the first slot of the received burst and for j equal to bt + 1 to 3 and k equal to 0 to br - 1, the slots equal to truncate (bs + bo + (k x M1 / br) + j x M1) through (blg + truncate (bs + bo + (k x M1 / br) + j x M1)) after the first slot of the received burst
bs ≥ 2	0	0, 1 or 2	Reserve the following slots for the source or a mobile directed by the source to broadcast: for j equal to 0 to bt and k equal to 0 to br - 1, the slots equal to truncate (bs + (k x M1 / br) + j x M1) through (blg + truncate (bs + (k x M1 / br) + j x M1)) after the first slot of the received burst Thereafter, terminate the reservations.
bs ≥ 2	Any	3	Reserve the following slots for the source or a mobile directed by the source to broadcast: for j equal to 0 to bt and k equal to 0 to br - 1, the slots equal to truncate (bs + (k x M1 / br) + j x M1) through (blg + truncate (bs + (k x M1 / br) + j x M1)) after the first slot of the received burst
NOTE: The actions in table 5.41 reserve the slot used by the station to provide a superframe block reservation in subsequent superframes.			

Table 5.41: Further actions on receipt of a superframe block reservation burst

Block offset (bo)	Block timeout (bt)	Action
Any except 0	0, 1, 2	Reserve the following slots for the source to broadcast: if bt = 1 or 2 then for j equal to 1 to bt, the slot equal to (j x M1) after the first slot of the received burst AND for j equal to bt + 1 to 3, the slot equal to (bo + j x M1) after the first slot of the received burst
0	0, 1 or 2	Reserve the following slots for the source to broadcast: for j equal to 1 to bt, the slot equal to (j x M1) after the first slot of the received burst Thereafter, terminate the reservations.
Any	3	Reserve the following slots for the destination to broadcast: for j equal to 1 to bt, the slot equal to (j x M1) after the first slot of the received burst

5.2.17.5 Second frame block reservation parameters

Requirement reference	
5.2.17.5.1	The VSS user shall provide a value for the parameter TV61, defined in table 5.42, for which the default values are not desired.

Table 5.42: Second frame block reservation parameters

Symbol	Parameter Name	Minimum	Maximum	Default	Increment
TV61	Second frame block reservation timeout	1 superframe	60 superframes	4 superframes	1 superframe
V66	Second frame block size	0	31	8	1
V67	Second frame block repeat rate	0	60	3	See table 5.28 for allowed values

Requirement reference	
5.2.17.5.2	For each second frame block reservation, the VSS user shall provide one or more sets of parameters consisting of the parameters V66 and V67 for which the default values are not desired and Quality of Service parameters (Q2a to Q2d, Q4 and Q5) for which the default values are not desired.
	Parameter V66 (second frame block size)
5.2.17.5.3	Parameter V66 shall be the size of the second frame block.
	Parameter V67 (second frame block repeat rate)
5.2.17.5.4	Parameter V67 shall be number of times per M1 slots that a second frame reservation transmission is repeated encoded as defined in table 5.28.

5.2.17.6 Second frame block reservation reception procedures

Requirement reference	
5.2.17.6.1	Upon receipt of a burst containing a second frame block reservation, the station shall take no action (update its reservation table by reserving the first sz slots of every UTC second and set the timer TV61).

5.2.17.7 Superframe block reservation transmission procedures

Requirement reference	
	Recommendation
5.2.17.7.1	The superframe block reservation protocol should only be used by ground stations and should use fixed transmission procedures to select slots for transmission of the superframe block reservation bursts.
	Procedures for establishment of reserved blocks of slots
5.2.17.7.2	A station shall establish reserved blocks of slots by broadcasting a superframe block reservation.
5.2.17.7.3	The station shall set the block start (bs) subfield to the offset from the first slot of the transmitted burst to the first slot of the first reserved block of slots as defined by parameter V61, the block repeat rate (br) subfield to the number of blocks per M1 slots defined by V63 using the encoding defined in table 5.28, the block length (blg) equal to one less than V62 and the block timeout (bt) subfield to the span of bt × M1 slots over which the reservations defined by bs and br should be maintained.
5.2.17.7.4	If the value of bt is equal to 0, 1 or 2, the value of the block offset (bo) subfield shall be set to 0 if it is intended that the superframe block reservation shall terminate after bt × M1 slots, or the offset from the first slot of the first reserved block if it is intended that the block reservation shall move after bt × M1 slots.
5.2.17.7.5	The value of bt shall not be set to -128.
	Cancellation of reserved blocks of slots
5.2.17.7.6	A station shall cancel a superframe block reservation by transmitting a superframe block reservation field with bt equal to 0, 1 or 2 and bo equal to 0, in which case the superframe block reservation will be cancelled after M1 × bt + bs slots.
5.2.17.7.7	It shall set the block start (bs) to the offset from the first slot of the transmitted burst to the first slot of the first block for which a reservation shall be cancelled as defined by parameter V61, the block length (blg) equal to one less than V62 and the block repeat rate (br) subfield to the number of blocks per M1 slots defined by parameter V63 for which a superframe block reservation shall be cancelled, using the encoding defined in table 5.28.
	Procedures to request re-broadcasting of a superframe block reservation
5.2.17.7.8	To request that a station, B, re-broadcast the superframe block reservation, station A shall transmit a superframe block reservation.
5.2.17.7.9	Station A shall set the destination (d) to the address of station B and set the re-broadcast offset (roff) subfield to the offset from the first slot of the reservation burst to the first slot in which B should transmit.
5.2.17.7.10	The value of the re-broadcast offset (roff) subfield shall be less than the value of the block start (bs) subfield.
5.2.17.7.11	If no re-broadcast of the superframe block message is required, the ground station shall set the re-broadcast offset (roff) subfield equal to the block start (bs) subfield and shall not include a destination (d) subfield.

5.2.17.8 Second frame block reservation transmission procedures

Requirement reference	
	Recommendation
5.2.17.8.1	A ground station infrastructure which needs to maintain a Virtual Link Management Channel (VLMC) should not set the size (sz) subfield to zero.
	Procedures for establishment of reserved blocks of slots
5.2.17.8.2	When a ground station wishes to modify the length of the reserved blocks of slots in each second, it shall broadcast a second frame block reservation, V67 times per M1 slots.
5.2.17.8.3	The station shall set the block size (sz) subfield to the desired number of slots after the start of each UTC second as defined by parameter V66.

5.2.18 Response protocol specification

5.2.18.1 Response burst format

Requirement reference	
5.2.18.1.1	A reservation ID (erid) = 00000 binary with extended reservation ID and reservation fields set in accordance with table 5.43 shall indicate a response burst.

Table 5.43: Response burst reservation bit encoding

Description	Octet	Bit Number							
		8	7	6	5	4	3	2	1
destination address (d)	n-5	d_{24}	d_{23}	d_{22}	d_{21}	d_{20}	d_{19}	d_{18}	d_{17}
	n-4	d_{16}	d_{15}	d_{14}	d_{13}	d_{12}	d_{11}	d_{10}	d_9
	n-3	d_8	d_7	d_6	d_5	d_4	d_3	d_2	d_1
reservation ID	n-2	0	0	0	0	0	d_{27}	d_{26}	d_{25}

Requirement reference	
5.2.18.1.2	In the case that the address type field (see clause 5.2.14.1) is equal to 7, bits 1 through 24 of the destination subfield (d) shall be absent and the information field shall extend up to the last one octet prior to the CRC.
5.2.18.1.3	Otherwise, the information field shall extend up to the last four octets prior to the CRC and the destination subfield (d) shall be the 27-bit address of the destination station (for which the response is addressed).
5.2.18.1.4	No reservation shall be made as a result of receiving a response burst.
5.2.18.1.5	The VSS user shall provide the destination address.

5.2.19 General request protocol specification

5.2.19.1 General request burst format

Requirement reference	
5.2.19.1.1	To request a peer station to transmit a particular burst, a station shall send the burst described in table 5.44 to the desired destination station.

Table 5.44: General request bit encoding

Description	Octet	Bit number							
		8	7	6	5	4	3	2	1
	5	r-mi$_1$	0	0	0	0	0	0	1
requested message ID (r-mi)	6	x	r-mi$_n$	. . . . .					r-mi$_2$
VSS user specific parameter (prm)	7	prm$_{18}$	prm$_{17}$	prm$_{16}$	prm$_{15}$	prm$_{14}$	prm$_{13}$	prm$_{12}$	prm$_{11}$
	8	prm$_{28}$	prm$_{27}$	prm$_{26}$	prm$_{25}$	prm$_{24}$	prm$_{23}$	prm$_{22}$	prm$_{21}$
	9	prm$_{38}$	prm$_{37}$	prm$_{36}$	prm$_{35}$	prm$_{34}$	prm$_{33}$	prm$_{32}$	prm$_{31}$

	. . . . .		Denotes variable length field

Requirement reference	
5.2.19.1.2	VSS user-specific parameters shall be encoded starting in the octet following the most significant (high order) bit of the r-mi field.
5.2.19.1.3	Unused bits (x) shall be filled with 0 on transmit and shall be ignored on receive.
5.2.19.1.4	The values of the subfields shall be computed as defined in table 5.45.

Table 5.45: General request field encoding

Subfield	Range	Encoding	Notes
requested message ID (r-mi)	See clause 5.2.2.5		
VSS user specific parameter (prm)			defined by the VSS user

Requirement reference	
5.2.19.1.5	The requested message ID (r-mi) shall define the VSS user, in accordance with table 5.4, which is responsible for handling the request.

5.2.19.2 General request procedures

Requirement reference	Requester action
5.2.19.2.1	For a VSS user to request that a peer VSS user transmit (either broadcast or unicast request response) certain information, the VSS user shall transmit a general request burst with the requested ID (r-mi) field set to the desired response.
5.2.19.2.2	The unicast request reservation field shall be used if a single response is required from a single station.
5.2.19.2.3	The directed request reservation field shall be used if multiple responses are required from a single station.

5.2.20 General response protocol specification

5.2.20.1 General response burst format

Requirement reference	
5.2.20.1.1	A station shall transmit a general response burst (either a General Failure or General Confirm) as defined in table 5.46 with the parameters defined in table 5.47 in response to certain requests from another station as described below.

Table 5.46: General response bit encoding

Description	Octet	Bit number							
		8	7	6	5	4	3	2	1
confirm/failure flag (ok)	5	ok	0	0	1	0	0	0	1
requested message ID (r-mi)	6	res	$r\text{-}mi_k$	. . .					$r\text{-}mi_1$
reserved bit (res)	7	res	res	res	res	res	res	res	res
backoff delay (bd)	8	bd_8	bd_7	bd_6	bd_5	bd_4	bd_3	bd_2	bd_1
error type (err)	9	err_8	err_7	err_6	err_5	err_4	err_3	err_2	err_1
VSS user specific parameter (prm)	10	prm_{18}	prm_{17}	prm_{16}	prm_{15}	prm_{14}	prm_{13}	prm_{12}	prm_{11}
	11	prm_{28}	prm_{27}	prm_{26}	prm_{25}	prm_{24}	prm_{23}	prm_{22}	prm_{21}
	12	prm_{38}	prm_{37}	prm_{36}	prm_{35}	prm_{34}	prm_{33}	prm_{32}	prm_{31}

	. . . . .		Denotes variable length field

Table 5.47: General response field encoding

Subfield	Range	Encoding	Notes
confirm/failure flag (ok)		1 = General confirm 0 = General failure	
requested message ID (r-mi)	See clause 5.2.2.5		Can extend into octet 7 for long extended ids.
reserved bit (res)	0	0	Send 0, ignore on receive.
backoff delay (bd)	0 to 255	integer s, FF hex = forever	In s, ignore on confirm.
error type (err)	See table 5.48		
VSS user specific parameter (prm)	Defined by the VSS user		

Requirement reference	
5.2.20.1.2	The requested message ID (r-mi) shall indicate the identity of the peer VSS user to which a response is being generated.
5.2.20.1.3	The general response burst shall include one of the following reservation fields: unicast request reservation, information transfer request or response.
5.2.20.1.4	The destination subfield contained in the reservation field shall indicate which VSS user is being responded to.
5.2.20.1.5	The requested message ID (r-mi) shall define the VSS user, in accordance with table 5.4, which is responsible for handling the response.
5.2.20.1.6	If the ok bit is set to 1 (i.e. a General Confirm), and the response does not utilize the parameter field, the information field shall contain the requested message ID (r-mi) subfield only and the remaining parameters shall be omitted.
5.2.20.1.7	If the ok bit is set to 1 and the parameter field is used, then the bd and err fields shall be included and set to 00 hex.
5.2.20.1.8	If the ok bit is set to 0 (i.e. a General Failure), then the remaining parameters shall define the reason why the request failed.
5.2.20.1.9	Error type (err) shall be encoded in accordance with table 5.48; error types 00 hex to 7F hex shall apply to the responding station; error types 80 hex to FF hex shall apply to the responding system.

Table 5.48: Error type definition

Cause	Function	Parameter Encoding (prm bits 1 to 8)							
		8	7	6	5	4	3	2	1
00 hex	Unsupported local function. The parameters (defining the protocol options supported) will be filled in when defined.	0	0	0	0	0	0	0	0
01 hex	Out of local resources.	Reserved.							
02 hex	VSS user-specific local error.	Defined by the VSS user.							
03 hex	Terrestrial network not available.	Reserved. Set to zero on transmit, ignore on receipt.							
04 hex	Terrestrial network congestion.								
05 to 7D hex	Reserved.								
7E hex	No response from VSS user.								
7F hex	Other unspecified local reason.								
80 hex	Unsupported global function. The parameters (defining the protocol options supported) will be filled in when defined.	0	0	0	0	0	0	0	0
81 hex	Out of global resources.	Reserved.							
82 hex	VSS user-specific global error.	Defined by the VSS user.							
83 to FD hex	Reserved.	Reserved. Set to zero on transmit, ignore on receipt.							
FE hex	No response from VSS user.								
FF hex	Other unspecified system reason.								

5.2.20.2 General response procedures

Requirement reference	
5.2.20.2.1	If a reservation has been placed for a response or acknowledgement but the VSS sublayer has not received the response or acknowledgement from the VSS user in time for the scheduled reservation, the station shall send a General Failure (see clause 5.2.20) with cause code 7E hex or FE hex.
5.2.20.2.2	If a response is received, the VSS shall inform the VSS user.

5.3 Link Management Entity sublayer

5.3.1 Services

Requirement reference	
5.3.1.1	The services of the LME shall support the provision of broadcast services.

5.3.2 Synchronization burst format

Requirement reference	
5.3.2.1	All VDL Mode 4 stations shall transmit synchronization bursts to support link management.

5.3.2.1 Void

5.3.2.2 Fixed and variable data fields

Requirement reference	
5.3.2.2.1	The synchronization burst shall consist of two portions: a fixed data field containing information that must be sent with each synchronization burst and a variable data field containing additional system management information that does not need to be included in each synchronization burst.

5.3.2.3 Fixed data field format

Requirement reference	
5.3.2.3.1	Stations shall have fixed data fields as defined in table 5.49.

Table 5.49: Synchronization burst format

Description	Octet	Bit number							
		8	7	6	5	4	3	2	1
autonomous/directed flag (a/d) baro/geo altitude (b/g) CPR Format even/odd (cprf) position uncertainty (nucp)	5	$nucp_4$	$nucp_3$	$nucp_2$	$nucp_1$	cprf	b/g	a/d	0
latitude (lat)	6	lat_8	lat_7	lat_6	lat_5	lat_4	lat_3	lat_2	lat_1
base altitude (balt)	7	$balt_{12}$	$balt_{11}$	$balt_{10}$	$balt_9$	lat_{12}	lat_{11}	lat_{10}	lat_9
	8	$balt_8$	$balt_7$	$balt_6$	$balt_5$	$balt_4$	$balt_3$	$balt_2$	$balt_1$
longitude (lon)	9	lon_8	lon_7	lon_6	lon_5	lon_4	lon_3	lon_2	lon_1
time figure of merit (tfom)	10	$tfom_2$	$tfom_1$	lon_{14}	lon_{13}	lon_{12}	lon_{11}	lon_{10}	lon_9
data age (da) information field ID (id)	11	da_4	da_3	da_2	da_1	id_4	id_3	id_2	id_1
ID extension 1 (id1) ID extension 2 (id2)	12	$id1_4$	$id1_3$	$id1_2$	$id1_1$	$id2_4$	$id2_3$	$id2_2$	$id2_1$
ID extension 3 (id3)	13	$id3_4$	$id3_3$	$id3_2$	$id3_1$	in_k			
information field (in)	14								
	15			. . . . .					
	16								
	17	in_{14}	in_{13}	in_{12}	in_{11}	in_{10}	in_9	in_8	in_7
	18	in_6	in_5	in_4	in_3	in_2	in_1		
NOTE: Mobile and ground stations are identified by the address type field in the 27-bit code (see clause 5.2.2.4).									

. . . . . Denotes variable length field

Requirement reference	
5.3.2.3.2	The subfields shall be computed as defined in table 5.50.

Table 5.50: Synchronization burst field encoding (fixed data field)

Subfield	Range	Encoding	Notes
autonomous/ directed (a/d)	Boolean	0 = autonomous slot selection (including directed rate), 1 = directed slot selection or ground station transmission	Identifies whether the synchronization burst is an autonomous or directed burst.
time figure of merit (tfom)	0 to 3	0 = primary certified 1 = primary/non-certified 2 = secondary 3 = tertiary	See clause 5.1.4.
position navigation uncertainty category (nucp)	0 to 9	See table 5.51	
latitude (lat)	-90 to + 90°	12-bit low-resolution encoding according to the CPR encoding algorithm adapted for VDL Mode 4, as described in clause 4 of [1]	The 12-bit CPR encoding provides position to a resolution of approximately ±140 m, within a segment (patch) of approximately 600 nmi.

Subfield	Range	Encoding	Notes
longitude (lon)	-180°to + 180°	14-bit low-resolution encoding according to the CPR encoding algorithm adapted for VDL Mode 4, as described in clause 4 of [1]	The 14-bit CPR encoding provides position to a resolution of approximately ±120 m, within a segment (patch) of approximately 600 nmi.
CPR format even/odd	0 to 1	0 = even 1 = odd The CPR flag shall apply to all CPR encoded sub-fields included in the synchronization burst	
base altitude (balt)	0 to 4 095	Base altitude is reported as specified in table 5.52	
baro/geo altitude (b/g)	0 to 1	0 = barometric 1 = geometric	Indicates whether barometric or geometric base altitude is reported.
data age (da)	0 to 15	See table 5.53	
information field ID (id)	0 to 15	As defined by application standards. Some values for the information field ID are pre-reserved and defined in clause 3	Provides the information field identity contained in the variable data field (see clause 5.3.2.4).
ID extension	0 to 15	See below	Provides a means of increasing the number of variable fields that can be accommodated.
information field (in)	-	As defined by application standards	The information field contained in the variable data field (see clause 5.3.2.4).

Requirement reference	
5.3.2.3.3	The information field ID (id) and ID extension (idn) subfields shall provide addresses for information fields (in) as follows:
5.3.2.3.4	1) An information field ID (id) equal to F hex shall indicate that no information field is present.
5.3.2.3.5	2) An information field ID (id) subfield equal to 0 hex to 9 hex or B hex to E hex shall indicate one of 14 information fields of length 54 bits.
5.3.2.3.6	3) ID extension 1 (id1) subfield shall only be present if the information field ID (id) is equal to A hex.
5.3.2.3.7	4) An ID extension 1 (id1) subfield equal to 0 hex to 9 hex or B hex to F hex shall indicate one of 15 information fields of length 50 bits.
5.3.2.3.8	5) ID extension n (idn) subfield shall only be present if the ID extension n-1 (idn - 1) subfield is equal to A hex.
5.3.2.3.9	An ID extension n (idn) subfield equal to 0 hex to 9 hex or B hex to F hex shall indicate one of 15 information fields of length 54 - 4n bits.
5.3.2.3.10	The station shall encode its navigation uncertainty category of position (nucp) in accordance with table 5.51.

Table 5.51: Encoding of position navigation uncertainty category (nucp)

nucp	Required Navigation Performance (RNP) class	Horizontal Protection Limit (HPL) (0.9999999 integrity bound) (nmi)	Horizontal error (nmi unless otherwise stated)	Vertical error (ft)
			Horizontal and vertical errors are 95 % numbers.	
0	N/A	N/A	N/A	N/A
1	RNP-10	< 20	< 10	reserved
2	RNP-5	< 10	< 5	reserved
3	RNP-1	< 2	< 1	reserved
4	RNP-0,5	< 1	< 0,5	reserved
5	e.g. NPA, DME-DME	< 0,5	< 0,25	reserved
6	e.g. GPS-SPS	< 0,2	< 0,1	reserved
7	e.g. GNSS (no SA)	< 0,1	< 0,05	reserved
8	e.g. SBAS	reserved	< 10 m	< 15 m
9	e.g. GBAS	reserved	< 3 m	< 4 m

Requirement reference	
5.3.2.3.11	The station shall encode base altitude in accordance with table 5.52.

Table 5.52: Base altitude encoding

Actual base altitude of transmitting station (feet)	Transmitted value of altitude	Decoded base altitude (feet) (geo = WGS84 height except as noted)
Unknown	0	altitude unknown
altitude < -1 305	1	less than -1 300
-1 305 ≤ altitude < -1 295	2	-1 300
-1 295 ≤ altitude < -1 285	3	-1 290
↓	↓	↓
-15 ≤ altitude < -5	131	-10
-5 ≤ altitude < 5	132	0
5 ≤ altitude < 15	133	10
↓	↓	↓
7 995 ≤ altitude < 8 005	932	8 000
8 005 ≤ altitude < 8 015	933	8 010
8 015 ≤ altitude < 8 037,5	934	8 025
8 037,5 ≤ altitude < 8 062,5	935	8 050
8 062,5 ≤ altitude < 8 087,5	936	8 075
↓	↓	↓
71 912,5 ≤ altitude < 71 950	3 490	71 925
71 950 ≤ altitude < 72 050	3 491	72 000
72 050 ≤ altitude < 72 150	3 492	72 100
72 050 ≤ altitude < 72 250	3 493	72 200
72 250 ≤ altitude < 72 350	3 494	72 300
72 350 ≤ altitude < 72 450	3 495	72 400
↓	↓	↓
129 950 ≤ altitude < 130 050	4 072	130 000
130 050 ≤ altitude	4 073	more than or equal to 130 100
	4 074 to 4 094	reserved
station on ground	4 095	station at 0 AGL

Requirement reference	
5.3.2.3.12	The data age (da) subfield shall be encoded based on the report latency which shall be the difference between the time of validity of the horizontal position data (latitude and longitude) and the time of transmission, in accordance with table 5.53.

Table 5.53: Report latency encoding and decoding

Report latency (ms)	Transmitted value of data age (da)	Decoded latency (ms)
difference < 100	0	50
100 ≤ difference < 200	1	150
200 ≤ difference < 300	2	250
↓	↓	↓
900 ≤ difference < 1 000	9	950
1 000 ≤ difference < 1 200	10	1 100
1 200 ≤ difference < 1 500	11	1 350
1 500 ≤ difference < 2 000	12	1 750
2 000 ≤ difference < 3 000	13	2 500
3 000 ≤ difference < 4 000	14	3 500
4 000 ≤ difference or unknown	15	unknown

Requirement reference	
5.3.2.3.13	If the report latency is greater than 4 s, then nucp shall be set to 0.

5.3.2.4 Variable data field format

Requirement reference	
5.3.2.4.1	The variable data field shall be available to carry additional information as may be required by another VSS user or application.
5.3.2.4.2	The content and format of the variable data field shall be identified by the information field ID (id).
5.3.2.4.3	The format of the variable data field corresponding to a given id shall be as specified in the appropriate application standard.

5.3.2.5 Synchronization burst request

Requirement reference	
5.3.2.5.1	To request that a station transmit a synchronization burst with a specific information field, a station shall transmit a general request burst to the appropriate application process as defined in clause 3.4 of [1].

5.3.2.6 XID burst

Requirement reference	
5.3.2.6.1	XID data shall be contained within a compressed XID burst defined in table 5.54.

Table 5.54: Compressed XID burst format

Parameter field	Octet	Bit position within octet							
		8	7	6	5	4	3	2	1
message ID, directory of services flag (dos)	5	dos	0	1	1	1	1	0	1
information field	6	in_k							
	7 - n-5			.....					
	n-4								
	n-3						in_1		

. . . . . Denotes variable length field

Requirement reference	
5.3.2.6.2	A value for the directory of services (dos) flag equal to 1 shall indicate that the XID parameter DOS Message (see clause 5.3.3) is present in the burst.
5.3.2.6.3	Otherwise the XID parameter DOS Message shall be absent.
5.3.2.6.4	If present, XID parameter DOS message shall always appear last.
5.3.2.6.5	For XID parameter DOS message, the parameter length shall be absent and the DOS Message parameter shall end at the end of the information field.

5.3.3 Exchange identity (XID) parameter formats

Requirement reference	
	VS1 parameter
5.3.3.1.1	This parameter defines the value of VS1 that an aircraft shall use, encoded as a 4-bit unsigned integer as per table 5.55.

Table 5.55: VS1 parameter encoding

Field	Bit position								Notes
Parameter ID	0	1	0	0	0	0	0	1	VS1 parameter
Parameter length	0	0	0	0	0	0	0	1	
Parameter value	0	0	0	0	n_4	n_3	n_2	n_1	

Requirement reference	
	VS2 parameter
5.3.3.1.2	This parameter defines the value of VS2 in dB that an aircraft shall use, encoded as a 6-bit unsigned integer as per table 5.56.

Table 5.56: VS2 parameter encoding

Field	Bit position								Notes
Parameter ID	0	1	0	0	0	0	1	0	VS2 parameter
Parameter length	0	0	0	0	0	0	0	1	
Parameter value	0	0	n_6	n_5	n_4	n_3	n_2	n_1	

Requirement reference	
	Q4 parameter
5.3.3.1.3	This parameter defines the value of Q4 that an aircraft shall use, encoded as a 5-bit unsigned integer as per table 5.57.

Table 5.57: Q4 parameter encoding

Field	Bit position								Notes
Parameter ID	0	1	0	0	0	0	1	1	Q4 parameter
Parameter length	0	0	0	0	0	0	0	1	
Parameter value	0	0	0	n_5	n_4	n_3	n_2	n_1	

Requirement reference	
	VS4 parameter
5.3.3.1.4	This parameter defines the value of VS4 in nmi that an aircraft shall use, encoded as a 7-bit unsigned integer as per table 5.58.

Table 5.58: VS4 parameter encoding

Field	Bit Position								Notes
Parameter ID	0	1	0	0	0	1	0	0	VS4 parameter
Parameter length	0	0	0	0	0	0	0	1	
Parameter value	0	n_7	n_6	n_5	n_4	n_3	n_2	n_1	

Requirement reference	
	m2 filter parameters
5.3.3.1.5	Table 5.59 defines the values of parameters used for the m2 filter [1] that an aircraft shall use.

Table 5.59: m2 filter parameter encoding

Field	Bit position								Notes
Parameter ID	0	1	0	0	0	1	0	1	m2 filter parameters
Parameter length	0	0	0	0	0	0	1	1	
M2inc parameter value	i_8	i_7	i_6	i_5	i_4	i_3	i_2	i_1	M2inc
M2limit parameter value	l_{16}	l_{15}	l_{14}	l_{13}	l_{12}	i_{11}	i_{10}	l_9	M2limit
	l_8	l_7	l_6	l_5	l_4	l_3	l_2	l_1	

Requirement reference	
5.3.3.1.6	M2inc shall be encoded as an 8-bit unsigned integer.
5.3.3.1.7	M2limit shall be encoded as a 16-bit unsigned integer.
	CG1 filter parameters
5.3.3.1.8	Table 5.60 defines the values of parameters used for the CG1 [1] filter that an aircraft shall use.

Table 5.60: CGI filter parameter encoding

Field	Bit position								Notes
Parameter ID	0	1	0	0	0	1	1	0	CG1 filter parameters
Parameter length	0	0	0	0	0	1	1	1	
CG1_plea parameter value	p_8	p_7	p_6	p_5	p_4	p_3	p_2	p_1	CG1_plea
CG1_range parameter value	r_8	r_7	r_6	r_5	r_4	r_3	r_2	r_1	CG1_range
TG6 parameter value	t_8	t_7	t_6	t_5	t_4	t_3	t_2	t_1	TG6
CG1_limit parameter value	l_{16}	l_{15}	l_{14}	l_{13}	l_{12}	i_{11}	i_{10}	l_9	CG1_limit
	l_8	l_7	l_6	l_5	l_4	l_3	l_2	l_1	
CG1_inc parameter value	i_8	i_7	i_6	i_5	i_4	i_3	i_2	i_1	CG1_inc
1/CG1_decay parameter value	d_8	d_7	d_6	d_5	d_4	d_3	d_2	d_1	1/CG1_decay

Requirement reference	
5.3.3.1.9	CG1_plea shall be encoded as an 8-bit unsigned integer.
5.3.3.1.10	CG1_range shall be encoded as an 8-bit unsigned integer.
5.3.3.1.11	TG6 shall be encoded as an 8-bit unsigned integer.
5.3.3.1.12	CG1_inc shall be encoded as an 8-bit unsigned integer.
5.3.3.1.13	1/CG1_decay shall be encoded as an 8-bit unsigned integer.
5.3.3.1.14	CG1_limit shall be encoded as a 16-bit unsigned integer.
	Directory of Service (DOS) message
5.3.3.1.15	The Directory of Service message shall be encoded as defined in table 5.61.

Table 5.61: Directory of service message encoding

Field	Bit position								Notes
	8	7	6	5	4	3	2	1	
parameter ID	1	1	0	0	0	1	0	1	DOS message
Parameter length	n_8	n_7	n_6	n_5	n_4	n_3	n_2	n_1	
parameter value	gsc	ai_3	ai_2	ai_1	ent_4	ent_3	ent_2	ent_1	entry number (ent), **current channel subfield** additional service info (ai); GSC flag (gsc)
	si_8	si_7	si_6	si_5	si_4	si_3	si_2	si_1	service information (si)
	res	res	res	res	$anum_4$	$anum_3$	$anum_2$	$anum_1$	application number (anum) res field absent if anum field is absent.
	a_{18}	a_{17}	a_{16}	a_{15}	a_{14}	a_{13}	a_{12}	a_{11}	application 1 (a_1)
					to				
	a_{k8}	a_{k7}	a_{k6}	a_{k5}	a_{k4}	a_{k3}	a_{k2}	a_{k1}	application k (a_k)
	gsc	ai_3	ai_2	ai_1	f_{12}	f_{11}	f_{10}	f_9	**channel subfield:** additional service info (ai); GSC flag (gsc)
	f_8	f_7	f_6	f_5	f_4	f_3	f_2	f_1	frequency (f)
	si_8	si_7	si_6	si_5	si_4	si_3	si_2	si_1	service information (si)
	res	res	res	res	$anum_4$	$anum_3$	$anum_2$	$anum_1$	application number (anum)
	a_{18}	a_{17}	a_{16}	a_{15}	a_{14}	a_{13}	a_{12}	a_{11}	application 1 (a_1)
					to				
	a_{k8}	a_{k7}	a_{k6}	a_{k5}	a_{k4}	a_{k3}	a_{k2}	a_{k1}	application k (a_k)
	sit_6	sit_5	sit_4	sit_3	sit_2	sit_1	x	x	service information type (sit)
NOTE: Bits denoted "x" may be used within the reservation field.									

Requirement reference	
5.3.3.1.16	The current channel subfield shall always be present.
5.3.3.1.17	1, 2 or more other channel subfields (channel 1, channel 2 etc) shall be added as required in a continuous bit sequence.
5.3.3.1.18	The contents of the channel subfields shall be determined by the ai subfield as defined in table 5.62.

Table 5.62: Directory of service message subfield encoding

Subfield	Range	Encoding	Notes
entry number (ent)	0 - 15	ent = entry number of Directory of Services message.	up to 16 different DOS messages can be accommodated associated with each ground station transmitting DOS messages.
frequency (f)		See table 5.26 Absent in current channel subfield.	indicates the channel on which the DOS service is provided.
GSC flag (gsc)	0 - 1	set to 1 if channel is a GSC	
additional service information (ai)	0 - 7	bit 1: set to 1 if si field included bit 2: set to 1 if anum field present. bit 3: set to 1 if application (a) subfield(s) present.	
service information type (sit)	0 - 63	Defines services indicated by each bit in the service information field. As defined by application standards.	
service information (si)	Contains 8 single bit flags	Bits indicate the services provided on the indicated channel. bit set if service is available. Meaning of bits defined by application standards. field absent if ai bit 0 = 0.	
application number (anum)	0 - 15	Indicates the number of application fields present. field absent if ai bit 1 = 0.	
application (a)	0 - 255	Identifies a single service defined by application standards field absent if ai bit 2 = 0 if ai bit 1 = 0 and ai bit 2 ≠ 0, only one application subfield shall be present.	

Requirement reference	
5.3.3.1.19	The service information type (sit) subfield shall follow the last channel subfield.
5.3.3.1.20	The subfields within each channel subfield shall be computed as defined in table 5.62.
5.3.3.1.21	Each DOS message shall override any previous DOS message from the same ground station with the same entry number (ent).
5.3.3.1.22	The upper bit of the application field shall be used as an extension field, so that a 0 indicates a one byte field and a 1 indicates that the ID continues in the next byte.
5.3.3.1.23	Application fields shall be allocated as defined in table 5.63.

Table 5.63: Allocation of application fields

Encoding (decimal equivalent)	Allocation
0 - 31	reserved for future allocation by ICAO
32 - 63	reserved for private allocation by service provider
64 -127	reserved for future allocation by ICAO delegated authority
128 - 255	reserved for future use (extension of application field)

Requirement reference	
5.3.3.1.24	Service information type (sit) fields shall be allocated as defined in table 5.64.

Table 5.64: Allocation of service information type fields

Encoding (decimal equivalent)	Allocation
0 - 31	reserved for future allocation by ICAO
32 - 47	reserved for private allocation by service provider
48 -63	reserved for future allocation by ICAO delegated authority

5.3.4 LME procedures

5.3.4.1 Synchronization burst procedures

Requirement reference	
5.3.4.1.1	All stations shall transmit the appropriate synchronization burst defined in clause 5.3.2 depending on whether it is a mobile station or a ground station with the QoS and either the periodic broadcast or incremental broadcast parameters defined in table 5.65.

Table 5.65: Synchronization burst parameters

Symbol	Parameter name		Default
TV11min	Reservation	Minimum	4
TV11max	Hold timer	Maximum	8
V11	Nominal periodic rate		6
V12	Periodic dither range		0,1
V21	Nominal rate		100
V22	Max Dither range		31
Q1	Priority		As per information field
Q2a	Slot selection range constraint for level 1		150 nmi
Q2b	Slot selection range constraint for level 2		150 nmi
Q2c	Slot selection range constraint for level 3		0 nmi
Q2d	Slot selection range constraint for level 4		300 nmi
Q3	Replace queued data		TRUE
Q4	Number of available slots		3

Requirement reference	
5.3.4.1.2	The values of the subfields shall be the latest available data that can be obtained by the station at the start of the slot immediately preceding the first slot of the intended transmission.
5.3.4.1.3	Where time is used to calculate fields in the transmission, it shall be the time associated with the latitude and longitude data contained in the transmission.
5.3.4.1.4	A station transmitting a synchronization burst shall set the a/d bit to 1.
	Transmission of synchronization bursts supporting applications
5.3.4.1.5	The station shall transmit additional synchronization bursts required to meet the demands of any application.
	Mobile stations
5.3.4.1.6	Whenever mobile stations are not directed to transmit synchronization bursts on any frequency, they shall transmit mobile synchronization bursts on all GSCs which they can receive at least once per M1 slots.
5.3.4.1.7	When transmitting autonomously on the GSCs, mobile stations shall use the standard parameters defined in table 5.50.
	Ground stations
	Recommendation
5.3.4.1.8	A set of ground stations should ensure that sufficient synchronization bursts are available to support the derivation of secondary timing.
	Procedures for conflict resolution
5.3.4.1.9	For the purposes of assessing whether another reservation conflicts with a reservation for a synchronization burst, the station shall apply the procedures defined in clause 5.2.6.4 except that the default quality of service parameters defined in table 5.66 shall be applied to the synchronization burst reservation.

Table 5.66: Synchronization burst parameters for conflict resolution

Symbol	Parameter name	Default
Q1	Priority	As per information field
Q2a	Slot selection range constraint for level 1	150 nmi
Q2b	Slot selection range constraint for level 2	150 nmi
Q2c	Slot selection range constraint for level 3	75 nmi
Q2d	Slot selection range constraint for level 4	300 nmi

5.3.4.2 Network entry protocol specifications

Requirement reference	
	Parameter TG6 (maximum delay for plea response)
5.3.4.2.1	TG6 shall specify the maximum allowed time interval between receiving a plea and transmitting a plea response.
5.3.4.2.2	A station receiving a plea shall attempt to respond as quickly as possible.
5.3.4.2.3	If a response cannot be generated in TG6 s, the station shall purge the plea and not respond.
	Conditions for application of network entry procedures
5.3.4.2.4	When entering the network, a VSS user shall apply the network entry procedures defined in clause 5.3.4.2, "Network entry by full-slot random transmission".
	Network entry using plea/response procedures
	Plea response transmission procedures
5.3.4.2.5	Upon receiving a network entry burst with a response reservation addressed to itself (i.e. a plea), a station shall take the following actions.
5.3.4.2.6	If the station has observed the given frequency for at least the previous 60 s, and has not initiated a network entry or re-entry procedure within the previous 60 s, it shall transmit a synchronization burst request with a plea response reservation containing min (12, number of reservations required to allow one minute of transmissions at the default sync burst rate for this channel) reservations or else if the transmission rate is not known once per 10 s reservations.
5.3.4.2.7	These reservations shall be identified as follows: 1) unexpired reservations from any prior plea response addressed to the requesting station; 2) any periodic reservations for the requesting station, not otherwise contained in a prior plea response and which a) do not conflict with other known reservations, and b) can be appended to a possible list of reservations in accordance with item (1) above (considering the encoding constraints of the plea response); 3) additional reservations as required, using the selection parameters of table 5.67.

Table 5.67: Plea response parameters

Symbol	Parameter name	Default
Q1	Priority	2
Q2a	Slot selection range constraint for level 1	150 nmi
Q2b	Slot selection range constraint for level 2	150 nmi
Q2c	Slot selection range constraint for level 3	0 nmi
Q2d	Slot selection range constraint for level 4	300 nmi
Q3	Replace queued data	TRUE
Q4	Number of available slots	3

Requirement reference	
5.3.4.2.8	Otherwise the station shall ignore the burst.
5.3.4.2.9	If the station cannot transmit the plea response within TG6 s of receiving the plea, the plea response shall be purged and not transmitted.
	Recommendation
5.3.4.2.10	The station should attempt to transmit the plea response as soon as possible following the plea (while still selecting the transmit slot randomly).
5.3.4.2.11	The first reservation contained in the plea response should occur as soon as possible in time following the plea response, but not sooner than V52 slots.
5.3.4.2.12	The station should attempt to reserve slots which are currently unreserved.
	Network entry by full-slot random transmission
5.3.4.2.13	In the event that a station has listened to a channel for a full minute prior to net entry, a station shall use default random transmission protocols with combined periodic/incremental reservation types to place each new periodic reservation and to simultaneously reserve the next selected slot in the same superframe for the transmission containing the next periodic reservation.

5.4 Additional requirements for ground stations

5.4.1 System timing requirements

5.4.1.1 Maintenance of Primary time

Requirement reference	
5.4.1.1.1	The ground station shall be capable of maintaining primary time for 1 hour after a GNSS outage.

5.4.2 Ground station interface requirements

5.4.2.1 Ground station coordination

Requirement reference	
5.4.2.1.1	The ground station shall be capable of coordinating its transmissions with other ground stations using an absolute time reference based on UTC.

5.4.2.2 Fixed transmission parameters

Requirement reference	
5.4.2.2.1	To support the use of the fixed transmission protocol, the ground station shall allow a user to define the contents of the fields used in all reservation protocol burst formats and to specify the absolute time position of candidate slots used in the reserved access protocols. NOTE: For the mobile, the user interacts via the VSS user parameters. However, in the ground station, the user can specify specific times and requires the ability to set reservation parameters to protect future transmissions. Hence, for example, if a user plans two transmission in sequence, positioned using fixed access, the user needs to be able to specify in the first transmission where the second one will go via an appropriate reservation block containing user specified reservation parameters.

5.4.2.3 Protection of fixed access protocol transmissions by ground quarantine

Requirement reference	
5.4.2.3.1	If required by the user, the ground station shall position fixed access protocol transmissions within a slot or slots protected by pre-established ground quarantine NOTE: This requirement is a more flexible extension of the general requirement to allow users to specify a time for ground transmissions. The ground station decides the exact position of the transmission.

5.4.2.4 Protection of fixed access protocol transmissions by use of appropriate reservation protocols

Requirement reference	
5.4.2.4.1	If required by the user, the ground station shall append appropriate reservation blocks to protect each transmission within a series of ground transmissions. Alternatively the user shall be able to specify appropriate reservation protocols. NOTE: This requirement is in addition to the general recommendation to allow users to specify an appropriate reservation protocol.

5.4.2.5 Restriction of autotune reservations

Requirement reference	
5.4.2.5.1	The user shall be able to control which mobiles are placed under ground direction using the autotune reservation protocol via the following user options: 1) Selection by mobile aircraft address; 2) Selection of a fraction of all mobiles within a defined geographical area including ground position and altitude.

5.4.2.6 Transmission time for autotune reservations

Requirement reference	
5.4.2.6.1	The user shall be able to restrict the timing of autotune transmission by the ground station to specified pre-existing quarantined blocks.

5.4.2.7 Reporting of channel usage

Requirement reference	
5.4.2.7.1	A ground station shall be able to report its current view of the reservation table for each channel to a local and/or remote management entity. The following options shall be available: 1) a list of the current ground quarantined blocks established by the ground station; 2) a list of the current blocks of slots that are known to be used by other ground stations (and hence avoided by the ground station); 3) statistics on the channel usage including percentage of slots for which there are reservations; 4) a list of mobiles currently under the direction of the ground station including identity, position and slots used; 5) data on specific mobiles within defined geographical regions including identity, position and slots reserved. NOTE: This is an initial list which establishes the principle of "real time" monitoring of the ground station. Some of this information may be useful to other ground stations via a managed network. For example, the existence of mobiles in regions hidden to other ground stations could be used to avoid garbled slots. The information could be used to supplement a ground stations Peer Entity Contact table.

6 General design requirements

6.1 Controls and indicators

The equipment shall meet the requirements of EN 301 842-1 [5], clause 7.1.

6.2 Operation of controls

The operation of controls intended for use during normal operation, in all possible positions, combinations and sequences, shall not result in a condition whose presence or continuation would be detrimental to the continued performance of the equipment.

6.3 Warm up

The equipment shall meet the requirements of EN 301 842-1 [5], clause 7.3.

6.4 Effects of tests

Unless otherwise stated, the design of the equipment shall be such that, during and after the application of the specified tests, no condition exists which would be detrimental to the subsequent performance of the equipment.

6.5 Software management

The software criticality level of the VDL Mode 4 Ground station shall be level C.

6.6 Recovery from failure

6.6.1 Failure of the VDL equipment

If a failure within the VDL Mode 4 Ground station occurs, it may be necessary to perform a power up restart, which ensures that the equipment is in the initialization state and re-acquires a reservation table prior to re-establishing synchronization bursts, after the problem has been resolved. Such a restart is likely to result in a delay before ADS-B information becomes available again, due to the time needed to re-acquire the reservation table.

For ground stations providing time reference information at the certified level, it shall be required to provide multiple redundant VDL Mode 4 receivers and transmitters (i.e. a "hot" standby unit) with crosslinks between them.

Failure of the VDL Mode 4 ground equipment shall not impair the function of other VDL Mode 4 stations.

6.7 Monitoring of proper operation

The VDL Mode 4 Ground station shall contain Built-in Test Equipment (BITE) which shall test the equipment upon power up and at other times when commanded by the flight crew.

Automatic monitoring of correct operation of the equipment shall take place continuously throughout the flight, reflecting any impaired functionality of associated equipment (i.e. sources of position and time).

An indication shall be given to a local and/or remote management entity of any failure.

NOTE: An acceptable means of compliance would be to provide system status monitor(s) and built-in test functions which would detect and indicate to the flight crew a failure of the VDL Mode 4 system due to any of the following:

a) loss of system electrical power;

b) failure of digital interfaces;

c) failure of the equipment to perform intended functions;

d) removal of the equipment from the aircraft.

7 Protocol test procedures

7.1 General

7.1.1 Input voltage

Unless otherwise specified, all tests shall be conducted with the power input voltage adjusted to design voltage ±2 %. The input voltage shall be measured at the input terminals of the equipment under test.

7.1.2 Power input frequency

- In the case of equipment designed for operation from an AC source of essentially constant frequency (e.g. 400 Hz), the input frequency shall be adjusted to design frequency ±2 %.
- In the case of equipment designed for operation from an AC source of variable frequency (e.g. 300 Hz to 1 000 Hz), unless otherwise specified, tests shall be conducted with the input frequency adjusted to within 5 % of a selected frequency and within the range for which the equipment is designed.

7.1.3 Adjustment of equipment

The circuits of the equipment under test shall be properly aligned and otherwise adjusted in accordance with the manufacturer's recommended practices prior to application of the specified tests. Unless otherwise specified, no adjustments may be made once the test procedures have started.

7.1.4 Equipment configuration

Replacement or substitution of components or circuit modules within the equipment under test is not permitted once the test procedures have started.

The VDL Mode 4 Transceiver shall undergo all testing with its operational software installed in the equipment. The software version number shall reflect the revision that is intended for approval.

The configuration data shall be set up so as to be representative of a real ground installation. This configuration data set shall be completely documented. The configuration setup shall not be altered during the entire testing procedure.

7.1.5 Test equipment

All equipment used in the performance of the tests should be identified by make, model and serial number where appropriate, and its latest calibration date. The specification of the accuracy of the test equipment is left to the calibration process prescribed by the agency which certifies the testing facility.

7.1.6 Test equipment precautions

Precautions shall be taken during conduct of the tests to prevent the introduction of errors resulting from the improper connection of test instruments across the input and/or output impedances of the equipment under test.

If used to terminate the input or output of the equipment under test, the test instruments shall present the equivalent impedance to the equipment under test for which it was designed. Otherwise, the equipment under test shall be connected to loads having the impedance values for which it was designed.

7.1.7 Ambient conditions

Unless otherwise specified, all tests should be conducted under conditions of ambient room temperature, pressure and humidity, as defined in ED-14D/DO-160D [9], clause 3.5.

7.1.8 Connected loads

Unless otherwise specified, all tests shall be performed with the equipment connected to loads having the impedance values for which it is designed.

7.1.9 Warm-up period

Unless otherwise specified, all tests shall be conducted after a warm-up period of not less than 5 minutes.

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.

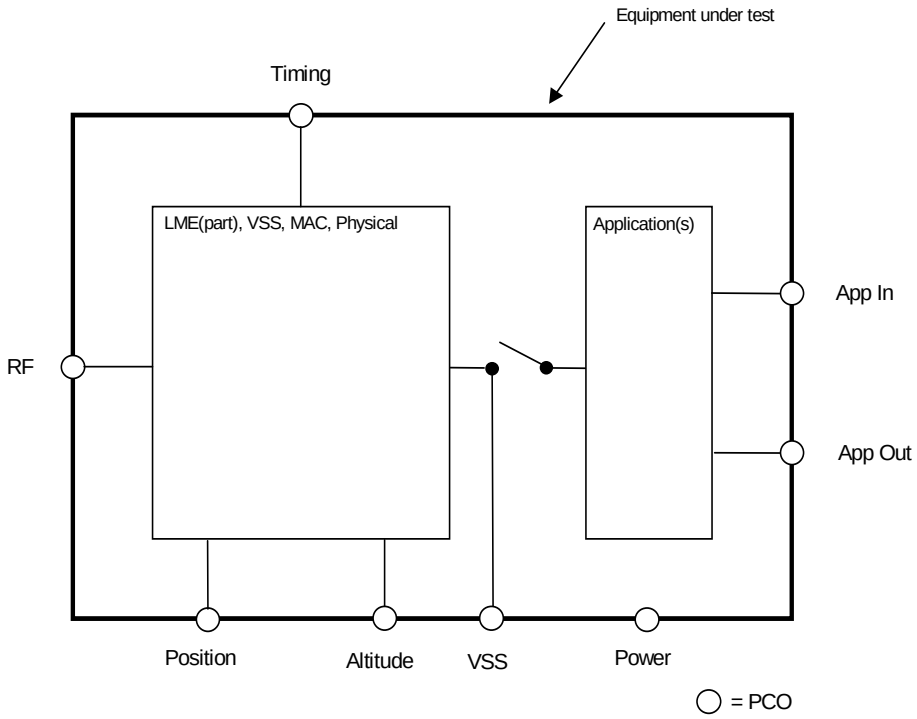

Figure 7.1: location of PCOs

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 must 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 uncertainty (nucp);
- 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 Uncertainty of Position 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 must 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. Tests for application functionality are outside the scope of the present document, and manufacturers are required to specify tests to demonstrate correct operation of any applications supported, including appropriate inputs via this PCO.

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. Tests for application functionality are outside the scope of the present document, and manufacturers are required to specify such tests to demonstrate correct operation of any applications supported, including appropriate outputs via this PCO.

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 precise rules which control the functions of computer based equipment like the VDL Mode 4 ground station, which involve sequential logic, require a rigorous interpretation which cannot always be readily achieved by plain text description. Therefore, a formal description has been used based on ISO/IEC 9646 [8]. The concepts of ISO/IEC 9646 [8] were, to maximum extent, applied to the VDL Mode 4 test procedures included in the present document. For convenience the underlying basic concepts are described in annex B.

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
Timing_Primary	To demonstrate that when primary timing is available, a transmission from the station complies with primary timing performance.
Timing_Secondary	To demonstrate that when primary timing is unavailable, a transmission from the station complies with secondary timing performance.
Timing_Secondary_Recover	To demonstrate that when primary timing becomes available to a station which is transmitting on secondary time, it reverts to using primary time.
CRC_Norm	To demonstrate that a station transmitting a burst will insert a valid CRC.
CRC_Rej	To demonstrate that a station receiving a burst with an invalid CRC will reject the burst.
Version_NonZero	To demonstrate that a station receiving a burst containing a non-zero version number will ignore the burst and inform the VSS user.
Queue_Replace	To demonstrate that a burst submitted to the VSS layer with Q3 set to TRUE will replace any queued data of the same type.
Queue_Norm	To demonstrate that a burst submitted to the VSS layer with Q3 set to FALSE will not replace any queued data of the same type.
MessageID_Invalid_A	To demonstrate that a unicast burst received with an invalid message ID will cause a General Failure burst to be transmitted.
MessageID_Invalid_B	To demonstrate that a burst with an invalid message ID not making a reservation for reply, causes no response to be made.
Reservation_Unrecognized	To demonstrate that an unrecognized reservation type will cause the packet to be rejected and an error logged.
Reservation_Recognition	To demonstrate that a reservation will be recognized prior to the end of the slot following the transmission in which it was carried.
SlotSel_Level0_A	To demonstrate that a station will select a slot at level 0 when no slots are reserved.
SlotSel_Level0_B	To demonstrate that a station will select a slot at level 0, excluding those not meeting the criteria of any other level.
SlotSel_Level0_C	To demonstrate that a station will select a slot at level 0 in preference to those slots available at level 1.
SlotSel_Level0_D	To demonstrate that a station will select a slot at level 0 in preference to those slots available at level 2.
SlotSel_Level0_E	To demonstrate that a station will select a slot at level 0 in preference to those slots available at level 3.
SlotSel_Level0_F	To demonstrate that a station will select a slot at level 0 in preference to those slots available at level 4.
SlotSel_Level1_A	To demonstrate that a station will select a slot at level 1 when the appropriate criteria are satisfied.
SlotSel_Level1_B	To demonstrate that a station will select a slot at level 1, excluding those slots not meeting the criteria of level 1 or any lower priority level.
SlotSel_Level1_C	To demonstrate that a station will select a slot at level 1 in preference to those available at level 2.
SlotSel_Level1_D	To demonstrate that a station will select a slot at level 1 in preference to those available at level 3.
SlotSel_Level1_E	To demonstrate that a station will select a slot at level 1, in preference to those available at level 4. To demonstrate that a station will select a slot at level 1, in preference to those available at level 4.

Test Case Name	Description
SlotSel_Level1_F	To demonstrate that a station will select slots at level 1 from a more distant station in preference to a closer station.
SlotSel_Level2_A	To demonstrate that a station will select a slot at level 2 when the appropriate criteria are satisfied.
SlotSel_Level2_B	To demonstrate that a station will select a slot at level 2, excluding those slots not meeting the criteria of level 2 or any lower priority level.
SlotSel_Level2_C	To demonstrate that a station will select a slot at level 2 in preference to those available at level 3.
SlotSel_Level2_D	To demonstrate that a station will select a slot at level 2 in preference to those available at level 4.
SlotSel_Level2_E	To demonstrate that a station will select slots at level 2 from a more distant station in preference to a closer station.
SlotSel_Level3_A	To demonstrate that a station will select a slot at level 3 when the appropriate criteria are satisfied.
SlotSel_Level3_B	To demonstrate that a station will select a slot at level 3, excluding those slots not meeting the criteria of level 3 or any lower priority level.
SlotSel_Level3_C	To demonstrate that a station will select a slot at level 3 in preference to those available at level 4.
SlotSel_Level3_D	To demonstrate that a station will select slots at level 3 from a more distant station in preference to a closer station.
SlotSel_Level4_A	To demonstrate that a station will select a slot at level 4 when the appropriate criteria are satisfied.
SlotSel_Level4_B	To demonstrate that a station will select a slot at level 4, excluding those slots not meeting the criteria of level 4.
SlotSel_Level4_C	To demonstrate that a station will select a slot at level 4 from a more distant station in preference to a closer station.
SlotSel_Block_Level0_A	To demonstrate that a station will select a block of slots at level 0 when no slots are reserved.
SlotSel_Block_Level0_B	To demonstrate that a station will select a block of slots at level 0, excluding those not meeting the criteria of any other level.
SlotSel_Block_MixedLevel	To demonstrate that a station will select a block of slots from slots available at different levels.
SlotSel_Reselection	To demonstrate that a station after selecting a slot which has been reserved by another station will not select a slot which has been reserved by the same station within the next M1-1 slots.
SlotSel_Unsuccessful	To demonstrate that a station will fail to select a slot when no slots are available which are compatible with the QoS parameters.
SlotSel_QoSGroup	To demonstrate that a station will select a slot using a second group of QoS parameters when no slot has been selected by means of the first group.
SlotSel_Exclusion	To demonstrate that a station does not select a slot for transmission when the station is required to transmit in that slot on another channel.
Conflict_Periodic_A	To demonstrate that a station will continue to transmit a periodic stream without action in the event of a conflicting non-periodic transmission from another station.
Conflict_Periodic_B	To demonstrate that a station will dither a periodic stream to resolve a conflict with a periodic stream from another station.
Conflict_Periodic_C	To demonstrate that a station will move a periodic stream to a new location in the event of a conflict with a periodic stream from another station that does not allow the original stream to be dithered.
Conflict_NoAction	To demonstrate that a station will continue to transmit a periodic stream without action in the event of receiving a conflicting reservation such that the slot remains available.
Conflict_Incremental	To demonstrate that a station will not transmit in a slot previously reserved by an incremental broadcast reservation in the event of receiving a conflicting reservation, and will make the broadcast in an alternative slot by random access.
Conflict_Priority	To demonstrate that a station required to transmit in the same slot by conflicting requests will transmit the response of highest priority.
Conflict_FirstRequest	To demonstrate that a station required to transmit in the same slot by conflicting requests of equal priority will transmit the response to the first request.
Slot_Boundary	To demonstrate that a transmission from the station complies with timing performance requirements at the slot boundary.
Rand_Busy	To demonstrate that a station will not make a random access transmission in a slot perceived to be busy at the start of the slot (e.g. a transmission which extends beyond the guard time).
Rand_Congestion	To demonstrate that the VSS User is informed if a request to make a random transmission is not successful within TM2 slots.

Test Case Name	Description
Rand_Persistence	To demonstrate that a random transmission is made with probability p.
Rand_MaxAttempts	To demonstrate that the station will authorize a random transmission as soon as the channel is available after VS3 unsuccessful attempts
Rand_Priority	To demonstrate that bursts queued for transmission by random access are transmitted in order of priority.
Rand_TM2Reset	To demonstrate that timer TM2 is reset following a successful random transmission when a further burst is queued for transmission.
Rand_TM2Clear	To demonstrate that timer TM2 is cleared following a successful random transmission when no further bursts are queued for transmission.
Rand_VS3Clear	To demonstrate that if a request to make a random transmission is not successful within TM2 slots then the VS3 counter is cleared and no transmission is made.
Rand_Availability	To demonstrate that a station makes random access attempts in slots available only at levels 0 to 2.
Null_Reservation	To demonstrate that no slot is reserved following the receipt of a null reservation.
Periodic_InitialRes	To demonstrate that in the absence of any conflicting reservation, a station will maintain a periodic reservation in a constant position in the superframe, with pt = 3 and po = 0, until announcing a further dither.
Periodic_NonDitherRes	To demonstrate that a station receiving a periodic broadcast reservation specifying no dither will reserve the appropriate slots.
Periodic_DitherRes	To demonstrate that a station receiving a periodic broadcast reservation specifying dither will reserve the appropriate slots.
Periodic_DitherRange	To demonstrate that a station will maintain a periodic stream within the dither range in accordance with the V11 and V12 parameters.
Periodic_DitherOffset_A	To demonstrate that in the absence of a conflicting reservation, a station will announce a dither to a periodic stream three superframes before the dither occurs.
Periodic_DitherOffset_B	To demonstrate that in the absence of a conflicting reservation, following announcement of a dither to a periodic stream, the same dithered slot will be reserved by each of the subsequent two transmissions, containing decrementing values of pt.
Periodic_DitherOffset_C	To demonstrate that a station will always dither away from the current transmission slot.
Periodic_DitherOffset_D	To demonstrate that following announcement of a dither to a periodic stream, the transmission slot will be adjusted to occupy the reserved slot.
Periodic_IndependentStreams	To demonstrate that separate streams of periodic broadcasts dither independently.
Periodic_Replacement	To demonstrate that a station receiving a periodic broadcast reservation in a slot previously by a periodic broadcast will replace the previous reservations by those carried in the new transmission.
Periodic_Availability_A	To demonstrate that a station will take account of the availability of the current transmission slot when dithering to a new slot.
Periodic_Availability_B	To demonstrate that when the current transmission slot is occupied at the dither of a periodic broadcast, the slot availability is determined from the first occupancy of the slot by a different station.
Periodic_Rate	To demonstrate that the station will establish a set of periodic streams at a nominal periodic rate according to the V11 parameter.
Periodic_TV11	To demonstrate that in the absence of any conflicting reservation a station will set the value of TV11 uniformly between the minimum and maximum values.
Periodic_Cancel	To demonstrate that a station receiving a periodic broadcast cancellation in a slot previously reserved for a periodic broadcast will replace the previous reservations by those carried in the new transmission.
Periodic_CancelIncremental	To demonstrate that upon receipt of an incremental broadcast in a slot expected to contain a periodic broadcast from the same peer station, the periodic stream is cancelled.
Periodic_CancelUnicast	To demonstrate that upon receipt of a unicast request with source/destination flag set to 1 in a slot expected to contain a periodic broadcast from the same peer station, the periodic stream is cancelled.
Periodic_SlotSel_A	To demonstrate that slot selection is first attempted for a periodic broadcast using QoS parameters specified for the periodic broadcast.
Periodic_SlotSel_B	To demonstrate that slot selection for a periodic broadcast is re-applied with VSS User defined QoS parameters if unsuccessful with QoS parameters for periodic broadcasts.
Incremental_Reservation_A	To demonstrate that a station receiving an incremental broadcast reservation will reserve the appropriate slots.

Test Case Name	Description
Incremental_Reservation_B	To demonstrate that an incremental broadcast with io= 0 causes no reservation to be made.
Incremental_Request	To demonstrate that a station will select and reserve a series of future transmission slots by means of the incremental broadcast protocol.
Incremental_SlotSel	To demonstrate that a slot is selected for an incremental broadcast reservation from the appropriate candidate range.
Combined_Reservation	To demonstrate that receipt of a combined periodic and incremental broadcast reservation causes the appropriate slots to be reserved.
BND_Reservation	To demonstrate that reception of a BND reservation causes the appropriate slots to be reserved.
Unicast_Reservation_A	To demonstrate that reception of a point-to-point unicast reservation for the destination station to transmit causes the appropriate slots to be reserved.
Unicast_Reservation_B	To demonstrate that a reception of a point-to-point unicast reservation for the source station to transmit causes the appropriate slots to be reserved.
Unicast_Reservation_C	To demonstrate that a reception of a broadcast unicast reservation causes the appropriate slots to be reserved.
Info_Reservation	To demonstrate that a station receiving a burst containing an information transfer request reservation addressed to another station will reserve the slots identified for the information transfer and acknowledgement.
Autotune_Reservation	To demonstrate that a station receiving a directed request from a ground station addressed to another station will reserve the directed slots.
Autotune_CancelAbsent	To demonstrate that a station receiving a directed request addressed to another station will take no action upon receipt of a directed cancellation from the directing station alone.
PleaResponse_Reservation_A	To demonstrate that receipt of a plea response with a standard nominal rate causes the appropriate slots to be reserved.
PleaResponse_Reservation_B	To demonstrate that receipt of a plea response with a special nominal rate causes the appropriate slots to be reserved.
PleaResponse_Transmission_A	To demonstrate that receipt of a plea addressed to a station results in transmission of a plea response of the appropriate format.
PleaResponse_Transmission_B	To demonstrate that a second plea addressed to a station results in transmission of a plea response containing the remaining future slots from the previous plea response.
PleaResponse_Retransmission	To demonstrate that a plea response is not re-transmitted.
Response_Reservation	To demonstrate that a response reservation field is recognized and causes no reservation to be made.
Request_Unsupported	To demonstrate that a station will respond to a general request burst that cannot be supported with a general failure burst.
Sync_Format	To demonstrate that an autonomous synch burst is emitted in the format corresponding to a mobile station, with a/d = 0 and tc = 1.
Sync_Latency	To demonstrate that the latency of ADS data reported by the station is within acceptable limits.
Sync_Rate	To demonstrate that the station outputs autonomous synch bursts at a rate of at least one per M1 slots on all Global Signalling Channels (GSCs).
Sync_Interval	To demonstrate that a station outputs autonomous synch bursts with a uniform interval between nominal slots on each GSC.
Sync_Fixed_Nucp	To demonstrate that a station sets the navigation uncertainty category appropriately.
Sync_Fixed_BaseAlt	To demonstrate that a station sets the base altitude in the fixed part of the sync burst in accordance with the input altitude data.
Sync_Fixed_DataAge	To demonstrate that a station sets the data age subfield of a sync burst appropriately.
NetEntry_Periodic	To demonstrate that a station which desires to gain entry to a network using the combined periodic and incremental broadcast protocols is able to set up a series of regularly spaced streams.
NetEntry_Delayed	To demonstrate that a station which desires to perform network entry using a delayed transmission will make such a transmission in an otherwise unoccupied slot.
NetEntry_Receive	To demonstrate that a station in receipt of a delayed transmission containing a plea will generate a reply to the source station with slots for it to transmit in, if it has some slots which it could make available.
NetEntry_OneMinute	To demonstrate that a station which desires to transmit for the first time without using network entry protocols, will listen to the channel on which it desires to transmit for 1 minute prior to making any transmissions.

Test Case Name	Description
ADS_Report_Receive	To demonstrate that a station receiving a sequence of ADS reports from a peer station will generate an appropriate output for display to the aircrew.
ADS_Report_Simultaneous	To demonstrate that a station is capable of receiving ADS reports simultaneously on both GSCs.
CPR_Encode	To demonstrate that a series of latitude and longitude positions may be correctly encoded in the sync burst using the CPR algorithm.
CPR_Decode	To demonstrate that a series of latitude and longitude positions may be correctly decoded from the sync burst using the CPR algorithm.

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

7.4.3.1.1 Subfield mnemonics

Mnemonic	Meaning
a	Additional slots
a/d	Autonomous/directed flag
auto	Autonomous information
balt	Base altitude
b/g	Baro/geo altitude
blg	Block length
bo	Block offset
br	Block repeat rate
bs	Block start
bt	Block timeout
c	CRC
cprf	CPR format even/odd
d	Destination address
da	Data age
dos	Directory of services flag
erid	Extended reservation ID
f	Frequency
flag	Flag delimiting burst
id	Information field identity
in	Information field
io	Incremental offset
lat	Latitude
lon	Longitude
mi	Message ID
nd	Negative dither
nr	Nominal update rate
nucp	Position navigation uncertainty category
off	Offset to first reserved slot
ok	Confirm/failure flag
po	Periodic offset
pr	Priority
pr_flag	Plea response flag
prm	VSS user specific parameter
pt	Periodic timeout
r-b/a	Requested baro/geo altitude
r-mi	Requested message ID
rcvr	Receiver control
rd	Reservation data
res	Reserved bit

Mnemonic	Meaning
rid	Reservation ID
ro	Response offset
roff	Re-broadcast offset
s	Source address
sdf	Source/destination flag
sleep	Autonomous monitoring
sz	Size
tc	Trajectory Change Point change flag
tfom	Time FOM
ver	Version number
vt	Timeout

7.4.3.1.2 Special characters used in the subfield definitions

Character	Meaning
-	Subfield not applicable (0 bit length)
x	the value of this subfield is do not care
	The subfield is defined in an extra table

7.4.3.1.3 Station addresses and positions

add_A = address of station under test (station A);

add_B = address of simulated station B;

add_D = address of simulated station D;

add_E = address of simulated station E;

add_G = address of simulated station G.

The test station (station A) is assumed to be at 0° latitude and at 0° longitude. 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. Two macros (CPR_LAT and CPR_LON) 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 [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 positions of the simulated stations in the tests have been given on the basis of the following set of values of the Q2 parameters. This set is used as the default in the tests and referred to as Q2 Set 1. The default values are used for the parameters Q2a, Q2b, and Q2d. The default value of Q2c = 120 NM is used in order to allow testing of conditions it would not be possible to test if Q2c = 0.

Q2 Parameters: Q2 Set 1 (Default for all tests)

Symbol	Parameter Name	Value
Q2a	Slot selection range constraint for level 1	150 NM
Q2b	Slot selection range constraint for level 2	150 NM
Q2c	Slot selection range constraint for level 3	120 NM
Q2d	Slot selection range constraint for level 4	300 NM

For some tests, a second less stringent set of values for the Q2 parameters is specified, to be used when slot selection fails using Set 1. This set is defined below and referred to as Q2 Set 2:

Q2 Parameters: Q2 Set 2

Symbol	Parameter Name	Value
Q2a	Slot selection range constraint for level 1	100 NM
Q2b	Slot selection range constraint for level 2	100 NM
Q2c	Slot selection range constraint for level 3	80 NM
Q2d	Slot selection range constraint for level 4	200 NM

For some tests, the following set of values for the Q2 parameters is used:

Q2 Parameters: Q2 Set 3

Symbol	Parameter Name	Value
Q2a	Slot selection range constraint for level 1	150 NM
Q2b	Slot selection range constraint for level 2	150 NM
Q2c	Slot selection range constraint for level 3	120 NM
Q2d	Slot selection range constraint for level 4	120 NM

For assessment of conflict resolution, the following set of values for the Q2 parameters is used, as specified in ICAO VDL Mode 4 Technical Manual [1], clause 1.5.6.1.4:

Q2 Parameters: Q2 Set 4

Symbol	Parameter Name	Value
Q2a	Slot selection range constraint for level 1	150 NM
Q2b	Slot selection range constraint for level 2	150 NM
Q2c	Slot selection range constraint for level 3	75 NM
Q2d	Slot selection range constraint for level 4	300 NM

7.4.3.1.4 VDL bursts and frames

In the following definitions, the function int(x) shall be taken to mean the largest integer less than or equal to x. A subfield value of "x" means "do not care".

DATA_a(*m*) (Da(*m*)): Definition: Fill m bits of data with "0"s followed by "1"s. Bit number 1 is "0".

m odd

bit_m	bit_{m-1}	bit_{m-2}		bit_4	bit_3	bit_2	bit_1
0	1	0		1	0	1	0

m even

bit_m	bit_{m-1}	bit_{m-2}		bit_4	bit_3	bit_2	bit_1
1	0	1		1	0	1	0

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.

Furthermore, on generation of a burst, the test harness shall insert the value of the CRC field in accordance with [1].

SYNC_BURST_a (Sa): Information field contains "0"s. Occupies one slot. Lat and Lon specified

Description	Octet	Bit number							
		8	7	6	5	4	3	2	1
flag	-	0	1	1	1	1	1	1	0
s, ver, rid	1	s_{27}	s_{26}	s_{25}	0	0	0	1	1
s	2	s_{24}	s_{23}	s_{22}	s_{21}	s_{20}	s_{19}	s_{18}	s_{17}
s	3	s_{16}	s_{15}	s_{14}	s_{13}	s_{12}	s_{11}	s_{10}	s_9
s	4	s_8	s_7	s_6	s_5	s_4	s_3	s_2	s_1
nucp, cprf, b/g, a/d	5	x	x	x	x	x	x	a/d	0
lat	6	lat_8	lat_7	lat_6	lat_5	lat_4	lat_3	lat_2	lat_1
balt	7	x	x	x	x	lat_{12}	lat_{11}	lat_{10}	lat_9
balt	8	x	x	x	x	x	x	x	x
lon	9	lon_8	lon_7	lon_6	lon_5	lon_4	lon_3	lon_2	lon_1
tfom, lon	10	x	x	lon_{14}	lon_{13}	lon_{12}	lon_{11}	lon_{10}	lon_9
da, id	11	x	x	x	x	0	0	0	0
in	12	0	0	0	0	0	0	0	0
in	13	0	0	0	0	0	0	0	0
in	14	0	0	0	0	0	0	0	0
in	15	0	0	0	0	0	0	0	0
in	16	0	0	0	0	0	0	0	0
in	17	0	0	0	0	0	0	0	0
in, pt	18	0	0	0	0	0	0	pt_2	pt_1
po	19	po_8	po_7	po_6	po_5	po_4	po_3	po_2	po_1
c	20	c_{16}	c_{15}	c_{14}	c_{13}	c_{12}	c_{11}	c_{10}	c_9
c	21	c_8	c_7	c_6	c_5	c_4	c_3	c_2	c_1
flag	-	0	1	1	1	1	1	1	0

SYNC_BURST_b (Sb): Information field contains "0"s. 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	1	s_{27}	s_{26}	s_{25}	0	0	0	1	1
s	2	s_{24}	s_{23}	s_{22}	s_{21}	s_{20}	s_{19}	s_{18}	s_{17}
s	3	s_{16}	s_{15}	s_{14}	s_{13}	s_{12}	s_{11}	s_{10}	s_9
s	4	s_8	s_7	s_6	s_5	s_4	s_3	s_2	s_1
nucp, cprf, b/g, a/d	5	x	x	x	x	x	x	a/d	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	0	0	0	0	0	0	0	0
in	13	0	0	0	0	0	0	0	0
in	14	0	0	0	0	0	0	0	0
in	15	0	0	0	0	0	0	0	0
in	16	0	0	0	0	0	0	0	0
in	17	0	0	0	0	0	0	0	0
in, pt	18	0	0	0	0	0	0	pt_2	pt_1
po	19	po_8	po_7	po_6	po_5	po_4	po_3	po_2	po_1
c	20	c_{16}	c_{15}	c_{14}	c_{13}	c_{12}	c_{11}	c_{10}	c_9
c	21	c_8	c_7	c_6	c_5	c_4	c_3	c_2	c_1
flag	-	0	1	1	1	1	1	1	0

SYNC_BURST_c (Sc): Occupies one slot. Autonomous burst, 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	1	s_{27}	s_{26}	s_{25}	0	0	0	1	1
s	2	s_{24}	s_{23}	s_{22}	s_{21}	s_{20}	s_{19}	s_{18}	s_{17}
s	3	s_{16}	s_{15}	s_{14}	s_{13}	s_{12}	s_{11}	s_{10}	s_9
s	4	s_8	s_7	s_6	s_5	s_4	s_3	s_2	s_1
nucp, cprf, b/g, a/d	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_2	pt_1
po	19	po_8	po_7	po_6	po_5	po_4	po_3	po_2	po_1
c	20	c_{16}	c_{15}	c_{14}	c_{13}	c_{12}	c_{11}	c_{10}	c_9
c	21	c_8	c_7	c_6	c_5	c_4	c_3	c_2	c_1
flag	-	0	1	1	1	1	1	1	0
NOTE: The above format includes the tc flag encoded as a one in bit 1 of octet 1.									

SYNC_BURST_d(*k*) (Sd(*k*)): Information field contains "0"s. Occupies exactly k 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	1	s_{27}	s_{26}	s_{25}	0	0	0	1	1
s	2	s_{24}	s_{23}	s_{22}	s_{21}	s_{20}	s_{19}	s_{18}	s_{17}
s	3	s_{16}	s_{15}	s_{14}	s_{13}	s_{12}	s_{11}	s_{10}	s_9
s	4	s_8	s_7	s_6	s_5	s_4	s_3	s_2	s_1
nucp, cprf, b/g, a/d	5	x	x	x	x	x	x	a/d	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	0	0	0	0	0	0	0	0
in	13	0	0	0	0	0	0	0	0
in	14	0	0	0	0	0	0	0	0
			Insert int(31,5 x (*k* - 1)) repeat rows						
in	15 + int(31,5 x (*k* - 1))	0	0	0	0	0	0	0	0
in	16 + int(31,5 x (*k* - 1))	0	0	0	0	0	0	0	0
in	17 + int(31,5) x (*k* - 1)	0	0	0	0	0	0	0	0
in, pt	18 + int(31,5 x (*k* - 1))	0	0	0	0	0	0	pt_2	pt_1
po	19 + int(31,5 x (*k* - 1))	po_8	po_7	po_6	po_5	po_4	po_3	po_2	po_1
c	20 + int(31,5 x (*k* - 1))	c_{16}	c_{15}	c_{14}	c_{13}	c_{12}	c_{11}	c_{10}	c_9
c	21 + int(31,5 x (*k* - 1))	c_8	c_7	c_6	c_5	c_4	c_3	c_2	c_1
flag	-	0	1	1	1	1	1	1	0

SYNC_BURST_e (Se): Information field contains "0"s. Extends past one slot boundary by 3 octets

Description	Octet	Bit number							
		8	7	6	5	4	3	2	1
flag	-	0	1	1	1	1	1	1	0
s, ver, rid	1	s_{27}	s_{26}	s_{25}	0	0	0	1	1
s	2	s_{24}	s_{23}	s_{22}	s_{21}	s_{20}	s_{19}	s_{18}	s_{17}
s	3	s_{16}	s_{15}	s_{14}	s_{13}	s_{12}	s_{11}	s_{10}	s_9
s	4	s_8	s_7	s_6	s_5	s_4	s_3	s_2	s_1
nucp, cprf, b/g, a/d	5	x	x	x	x	x	x	a/d	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	0	0	0	0	0	0	0	0
in	13	0	0	0	0	0	0	0	0
in	14	0	0	0	0	0	0	0	0
in	15	0	0	0	0	0	0	0	0
in	16	0	0	0	0	0	0	0	0
in	17	0	0	0	0	0	0	0	0
in	18	0	0	0	0	0	0	0	0
in	19	0	0	0	0	0	0	0	0
in	20	0	0	0	0	0	0	0	0
in, pt	21	0	0	0	0	0	0	pt_2	pt_1
po	22	po_8	po_7	po_6	po_5	po_4	po_3	po_2	po_1
c	23	c_{16}	c_{15}	c_{14}	c_{13}	c_{12}	c_{11}	c_{10}	c_9
c	24	c_8	c_7	c_6	c_5	c_4	c_3	c_2	c_1
flag	-	0	1	1	1	1	1	1	0

SYNC_BURST_f(*k*) (Sf(*k*)): Non-zero version number. Information field contains "0"s Occupies exactly k 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	1	s_{27}	s_{26}	s_{25}	0	0	1	1	1
s	2	s_{24}	s_{23}	s_{22}	s_{21}	s_{20}	s_{19}	s_{18}	s_{17}
s	3	s_{16}	s_{15}	s_{14}	s_{13}	s_{12}	s_{11}	s_{10}	s_9
s	4	s_8	s_7	s_6	s_5	s_4	s_3	s_2	s_1
nucp, cprf, b/g, a/d	5	x	x	x	x	x	x	a/d	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	0	0	0	0	0	0	0	0
in	13	0	0	0	0	0	0	0	0
in	14	0	0	0	0	0	0	0	0
			Insert int(31,5 x (*k* - 1)) repeat rows						
in	15 + int(31,5 x (*k* - 1))	0	0	0	0	0	0	0	0
in	16 + int(31,5 x (*k* - 1))	0	0	0	0	0	0	0	0
in	17 + int(31,5 x (*k* - 1))	0	0	0	0	0	0	0	0
in, pt	18 + int(31,5 x (*k* - 1))	0	0	0	0	0	0	pt_2	pt_1
po	19 + int(31,5 x (*k* - 1))	po_8	po_7	po_6	po_5	po_4	po_3	po_2	po_1
c	20 + int(31,5 x (*k* - 1))	c_{16}	c_{15}	c_{14}	c_{13}	c_{12}	c_{11}	c_{10}	c_9
c	21 + int(31,5 x (*k* - 1))	c_8	c_7	c_6	c_5	c_4	c_3	c_2	c_1
flag	-	0	1	1	1	1	1	1	0

SYNC_BURST_g (Sg): Occupies one slot. Autonomous burst, basic variable part Lat6 and lon6 specified

Description	Octet	Bit number							
		8	7	6	5	4	3	2	1
flag	-	0	1	1	1	1	1	1	0
s, ver, rid	1	s_{27}	s_{26}	s_{25}	0	0	0	1	1
s	2	s_{24}	s_{23}	s_{22}	s_{21}	s_{20}	s_{19}	s_{18}	s_{17}
s	3	s_{16}	s_{15}	s_{14}	s_{13}	s_{12}	s_{11}	s_{10}	s_9
s	4	s_8	s_7	s_6	s_5	s_4	s_3	s_2	s_1
nucp, cprf, b/g, a/d	5	x	x	x	x	cprf	x	1	0
lat	6	lat_8	lat_7	lat_6	lat_5	lat_4	lat_3	lat_2	lat_1
balt	7	x	x	x	x	lat_{12}	lat_{11}	lat_{10}	lat_9
balt	8	x	x	x	x	x	x	x	x
lon	9	lon_8	lon_7	lon_6	lon_5	lon_4	lon_3	lon_2	lon_1
tfom, lon	10	x	x	lon_{14}	lon_{13}	lon_{12}	lon_{11}	lon_{10}	lon_9
da, id	11	x	x	x	x	0	0	0	0
in	12	x	x	$lat6_6$	$lat6_5$	$lat6_4$	$lat6_3$	$lat6_2$	$lat6_1$
in	13	x	x	$lon6_6$	$lon6_5$	$lon6_4$	$lon6_3$	$lon6_2$	$lon6_1$
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_2	pt_1
po	19	po_8	po_7	po_6	po_5	po_4	po_3	po_2	po_1
c	20	c_{16}	c_{15}	c_{14}	c_{13}	c_{12}	c_{11}	c_{10}	c_9
c	21	c_8	c_7	c_6	c_5	c_4	c_3	c_2	c_1
flag	-	0	1	1	1	1	1	1	0

SYNC_BURST_h (Sh): Occupies one slot. Autonomous burst, basic ground variable part Lat4, lon4, and pid specified

Description	Octet	Bit number							
		8	7	6	5	4	3	2	1
flag	-	0	1	1	1	1	1	1	0
s, ver, rid	1	s_{27}	s_{26}	s_{25}	0	0	0	1	1
s	2	s_{24}	s_{23}	s_{22}	s_{21}	s_{20}	s_{19}	s_{18}	s_{17}
s	3	s_{16}	s_{15}	s_{14}	s_{13}	s_{12}	s_{11}	s_{10}	s_{9}
s	4	s_{8}	s_{7}	s_{6}	s_{5}	s_{4}	s_{3}	s_{2}	s_{1}
nucp, cprf, b/g, a/d	5	x	x	x	x	cprf	x	1	0
lat	6	lat_{8}	lat_{7}	lat_{6}	lat_{5}	lat_{4}	lat_{3}	lat_{2}	lat_{1}
balt	7	x	x	x	x	lat_{12}	lat_{11}	lat_{10}	lat_{9}
balt	8	x	x	x	x	x	x	x	x
lon	9	lon_{8}	lon_{7}	lon_{6}	lon_{5}	lon_{4}	lon_{3}	lon_{2}	lon_{1}
tfom, lon	10	x	x	lon_{14}	lon_{13}	lon_{12}	lon_{11}	lon_{10}	lon_{9}
da, id	11	x	x	x	x	0	0	1	1
in	12	x	x	x	x	x	x	x	x
in	13	pid_{10}	pid_{9}	x	x	x	x	x	x
in	14	pid_{8}	pid_{7}	pid_{6}	pid_{5}	pid_{4}	pid_{3}	pid_{2}	pid_{1}
in	15	x	x	x	x	x	x	x	x
in	16	x	x	x	x	x	x	x	x
in	17	$lon4_{4}$	$lon4_{3}$	$lon4_{2}$	$lon4_{1}$	$lat4_{4}$	$lat4_{3}$	$lat4_{2}$	$lat4_{1}$
in, pt	18	x	x	x	x	x	x	pt_{2}	pt_{1}
po	19	po_{8}	po_{7}	po_{6}	po_{5}	po_{4}	po_{3}	po_{2}	po_{1}
c	20	c_{16}	c_{15}	c_{14}	c_{13}	c_{12}	c_{11}	c_{10}	c_{9}
c	21	c_{8}	c_{7}	c_{6}	c_{5}	c_{4}	c_{3}	c_{2}	c_{1}
flag	-	0	1	1	1	1	1	1	0

SYNC_BURST_i (Si): Occupies one slot. Autonomous burst, high resolution variable part Lat8 and lon8 specified

Description	Octet	Bit number							
		8	7	6	5	4	3	2	1
flag	-	0	1	1	1	1	1	1	0
s, ver, rid	1	s_{27}	s_{26}	s_{25}	0	0	0	1	1
s	2	s_{24}	s_{23}	s_{22}	s_{21}	s_{20}	s_{19}	s_{18}	s_{17}
s	3	s_{16}	s_{15}	s_{14}	s_{13}	s_{12}	s_{11}	s_{10}	s_9
s	4	s_8	s_7	s_6	s_5	s_4	s_3	s_2	s_1
nucp, cprf, b/g, a/d	5	x	x	x	x	cprf	x	1	0
lat	6	lat_8	lat_7	lat_6	lat_5	lat_4	lat_3	lat_2	lat_1
balt	7	x	x	x	x	lat_{12}	lat_{11}	lat_{10}	lat_9
balt	8	x	x	x	x	x	x	x	x
lon	9	lon_8	lon_7	lon_6	lon_5	lon_4	lon_3	lon_2	lon_1
tfom, lon	10	x	x	lon_{14}	lon_{13}	lon_{12}	lon_{11}	lon_{10}	lon_9
da, id	11	x	x	x	x	1	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	$lon8_8$	$lon8_7$	$lon8_6$	$lon8_5$	$lon8_4$	$lon8_3$	$lon8_2$	$lon8_1$
in	16	$lat8_8$	$lat8_7$	$lat8_6$	$lat8_5$	$lat8_4$	$lat8_3$	$lat8_2$	$lat8_1$
in	17	x	x	x	x	x	x	x	x
in, pt	18	x	x	x	x	x	x	pt_2	pt_1
po	19	po_8	po_7	po_6	po_5	po_4	po_3	po_2	po_1
c	20	c_{16}	c_{15}	c_{14}	c_{13}	c_{12}	c_{11}	c_{10}	c_9
c	21	c_8	c_7	c_6	c_5	c_4	c_3	c_2	c_1
flag	-	0	1	1	1	1	1	1	0

SYNC_BURST_j (Sj): Occupies one slot. Autonomous burst, basic ground 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	1	s_{27}	s_{26}	s_{25}	0	0	0	1	1
s	2	s_{24}	s_{23}	s_{22}	s_{21}	s_{20}	s_{19}	s_{18}	s_{17}
s	3	s_{16}	s_{15}	s_{14}	s_{13}	s_{12}	s_{11}	s_{10}	s_9
s	4	s_8	s_7	s_6	s_5	s_4	s_3	s_2	s_1
nucp, cprf, b/g, a/d	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	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_2	pt_1
po	19	po_8	po_7	po_6	po_5	po_4	po_3	po_2	po_1
c	20	c_{16}	c_{15}	c_{14}	c_{13}	c_{12}	c_{11}	c_{10}	c_9
c	21	c_8	c_7	c_6	c_5	c_4	c_3	c_2	c_1
flag	-	0	1	1	1	1	1	1	0

SYNC_BURST_k(*k*) (Sd(*k*)): Information field contains "0"s. Occupies exactly k slots Lat and lon specified

Description	Octet	Bit number							
		8	7	6	5	4	3	2	1
flag	-	0	1	1	1	1	1	1	0
s, ver, rid	1	s_{27}	s_{26}	s_{25}	0	0	0	1	1
s	2	s_{24}	s_{23}	s_{22}	s_{21}	s_{20}	s_{19}	s_{18}	s_{17}
s	3	s_{16}	s_{15}	s_{14}	s_{13}	s_{12}	s_{11}	s_{10}	s_9
s	4	s_8	s_7	s_6	s_5	s_4	s_3	s_2	s_1
nucp, cprf, b/g, a/d	5	x	x	x	x	x	x	a/d	0
lat	6	lat_8	lat_7	lat_6	lat_5	lat_4	lat_3	lat_2	lat_1
balt	7	x	x	x	x	lat_{12}	lat_{11}	lat_{10}	lat_9
balt	8	x	x	x	x	x	x	x	x
lon	9	lon_8	lon_7	lon_6	lon_5	lon_4	lon_3	lon_2	lon_1
tfom, lon	10	x	x	lon_{14}	lon_{13}	lon_{12}	lon_{11}	lon_{10}	lon_9
da, id	11	x	x	x	x	0	0	0	0
in	12	0	0	0	0	0	0	0	0
in	13	0	0	0	0	0	0	0	0
in	14	0	0	0	0	0	0	0	0
			Insert int(31,5 x (*k* - 1)) repeat rows						
in	15 + int(31,5 x (*k* - 1))	0	0	0	0	0	0	0	0
in	16 + int(31,5 x (*k*- 1))	0	0	0	0	0	0	0	0
in	17 + int(31,5 x (*k* - 1))	0	0	0	0	0	0	0	0
in, pt	18 + int(31,5 x (*k* - 1))	0	0	0	0	0	0	pt_2	pt_1
po	19 + int(31,5 x (*k* - 1))	po_8	po_7	po_6	po_5	po_4	po_3	po_2	po_1
c	20 + int(31,5 x (*k* - 1))	c_{16}	c_{15}	c_{14}	c_{13}	c_{12}	c_{11}	c_{10}	c_9
c	21 + int(31,5 x (*k* - 1))	c_8	c_7	c_6	c_5	c_4	c_3	c_2	c_1
flag	-	0	1	1	1	1	1	1	0

SYNC_BURST_I (SI): Autonomous burst. Occupies one slot. Lat and Lon specified

Description	Octet	Bit number							
		8	7	6	5	4	3	2	1
flag	-	0	1	1	1	1	1	1	0
s, ver, rid	1	s_{27}	s_{26}	s_{25}	0	0	0	1	1
s	2	s_{24}	s_{23}	s_{22}	s_{21}	s_{20}	s_{19}	s_{18}	s_{17}
s	3	s_{16}	s_{15}	s_{14}	s_{13}	s_{12}	s_{11}	s_{10}	s_9
s	4	s_8	s_7	s_6	s_5	s_4	s_3	s_2	s_1
nucp, cprf, b/g, a/d	5	x	x	x	x	x	x	0	0
lat	6	lat_8	lat_7	lat_6	lat_5	lat_4	lat_3	lat_2	lat_1
balt	7	x	x	x	x	lat_{12}	lat_{11}	lat_{10}	lat_9
balt	8	x	x	x	x	x	x	x	x
lon	9	lon_8	lon_7	lon_6	lon_5	lon_4	lon_3	lon_2	lon_1
tfom, lon	10	x	x	lon_{14}	lon_{13}	lon_{12}	lon_{11}	lon_{10}	lon_9
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_2	pt_1
po	19	po_8	po_7	po_6	po_5	po_4	po_3	po_2	po_1
c	20	c_{16}	c_{15}	c_{14}	c_{13}	c_{12}	c_{11}	c_{10}	c_9
c	21	c_8	c_7	c_6	c_5	c_4	c_3	c_2	c_1
flag	-	0	1	1	1	1	1	1	0

SYNC_BURST_m (Sm): With response reservation. Occupies one slot. Directed. 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	1	s_{27}	s_{26}	s_{25}	0	0	0	1	1
s	2	s_{24}	s_{23}	s_{22}	s_{21}	s_{20}	s_{19}	s_{18}	s_{17}
s	3	s_{16}	s_{15}	s_{14}	s_{13}	s_{12}	s_{11}	s_{10}	s_9
s	4	s_8	s_7	s_6	s_5	s_4	s_3	s_2	s_1
nucp, cprf, b/g, a/d	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_2	pt_1
po	19	po_8	po_7	po_6	po_5	po_4	po_3	po_2	po_1
c	20	c_{16}	c_{15}	c_{14}	c_{13}	c_{12}	c_{11}	c_{10}	c_9
c	21	c_8	c_7	c_6	c_5	c_4	c_3	c_2	c_1
flag	-	0	1	1	1	1	1	1	0

SYNC_BURST_n (Sn): Information field contains "0"s. Extends past one slot boundary by 2 octets

Description	Octet	Bit number							
		8	7	6	5	4	3	2	1
flag	-	0	1	1	1	1	1	1	0
s, ver, rid	1	s_{27}	s_{26}	s_{25}	0	0	0	1	1
s	2	s_{24}	s_{23}	s_{22}	s_{21}	s_{20}	s_{19}	s_{18}	s_{17}
s	3	s_{16}	s_{15}	s_{14}	s_{13}	s_{12}	s_{11}	s_{10}	s_9
s	4	s_8	s_7	s_6	s_5	s_4	s_3	s_2	s_1
nucp, cprf, b/g, a/d	5	x	x	x	x	x	x	a/d	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	0	0	0	0	0	0	0	0
in	13	0	0	0	0	0	0	0	0
in	14	0	0	0	0	0	0	0	0
in	15	0	0	0	0	0	0	0	0
in	16	0	0	0	0	0	0	0	0
in	17	0	0	0	0	0	0	0	0
in	18	0	0	0	0	0	0	0	0
in	19	0	0	0	0	0	0	0	0
in, pt	20	0	0	0	0	0	0	pt_2	pt_1
po	21	po_8	po_7	po_6	po_5	po_4	po_3	po_2	po_1
c	22	c_{16}	c_{15}	c_{14}	c_{13}	c_{12}	c_{11}	c_{10}	c_9
c	23	c_8	c_7	c_6	c_5	c_4	c_3	c_2	c_1
flag	-	0	1	1	1	1	1	1	0

RAND_ACC_DATA_a (Ra): Information field contains "01"s. 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	1	s_{27}	s_{26}	s_{25}	0	0	0	0	1
s	2	s_{24}	s_{23}	s_{22}	s_{21}	s_{20}	s_{19}	s_{18}	s_{17}
s	3	s_{16}	s_{15}	s_{14}	s_{13}	s_{12}	s_{11}	s_{10}	s_9
s	4	s_8	s_7	s_6	s_5	s_4	s_3	s_2	s_1
in, mi	5	1	0	0	0	0	1	0	1
in	6	0	1	0	1	0	1	0	1
in	7	0	1	0	1	0	1	0	1
in	8	0	1	0	1	0	1	0	1
in	9	0	1	0	1	0	1	0	1
in	10	0	1	0	1	0	1	0	1
in	11	0	1	0	1	0	1	0	1
in	12	0	1	0	1	0	1	0	1
in	13	0	1	0	1	0	1	0	1
in	14	0	1	0	1	0	1	0	1
in	15	0	1	0	1	0	1	0	1
in	16	0	1	0	1	0	1	0	1
in	17	0	1	0	1	0	1	0	1
in	18	0	1	0	1	0	1	0	1
erid, in	19	0	0	0	0	0	0	1	0
c	20	c_{16}	c_{15}	c_{14}	c_{13}	c_{12}	c_{11}	c_{10}	c_9
c	21	c_8	c_7	c_6	c_5	c_4	c_3	c_2	c_1
flag	-	0	1	1	1	1	1	1	0

BURST_UNREC_a (Ba): Information field contains "0"s. 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	1	s_{27}	s_{26}	s_{25}	0	0	0	0	1
s	2	s_{24}	s_{23}	s_{22}	s_{21}	s_{20}	s_{19}	s_{18}	s_{17}
s	3	s_{16}	s_{15}	s_{14}	s_{13}	s_{12}	s_{11}	s_{10}	s_9
s	4	s_8	s_7	s_6	s_5	s_4	s_3	s_2	s_1
in, mi	5	0	0	0	0	0	1	0	1
in	6	0	0	0	0	0	0	0	0
in	7	0	0	0	0	0	0	0	0
in	8	0	0	0	0	0	0	0	0
in	9	0	0	0	0	0	0	0	0
in	10	0	0	0	0	0	0	0	0
in	11	0	0	0	0	0	0	0	0
in	12	0	0	0	0	0	0	0	0
in	13	0	0	0	0	0	0	0	0
in	14	0	0	0	0	0	0	0	0
in	15	0	0	0	0	0	0	0	0
in	16	0	0	0	0	0	0	0	0
in	17	0	0	0	0	0	0	0	0
in	18	0	0	0	0	0	0	1	1
[erid], [io]	19	0	0	1	1	1	1	1	1
c	20	c_{16}	c_{15}	c_{14}	c_{13}	c_{12}	c_{11}	c_{10}	c_9
c	21	c_8	c_7	c_6	c_5	c_4	c_3	c_2	c_1
flag	-	0	1	1	1	1	1	1	0

UNI_BURST_a (Ua): Information field contains "0"s. 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	1	s_{27}	s_{26}	s_{25}	0	0	0	0	1
s	2	s_{24}	s_{23}	s_{22}	s_{21}	s_{20}	s_{19}	s_{18}	s_{17}
s	3	s_{16}	s_{15}	s_{14}	s_{13}	s_{12}	s_{11}	s_{10}	s_9
s	4	s_8	s_7	s_6	s_5	s_4	s_3	s_2	s_1
in, mi	5	0	0	0	0	0	1	0	1
in	6	0	0	0	0	0	0	0	0
in	7	0	0	0	0	0	0	0	0
in	8	0	0	0	0	0	0	0	0
in	9	0	0	0	0	0	0	0	0
in	10	0	0	0	0	0	0	0	0
in	11	0	0	0	0	0	0	0	0
in	12	0	0	0	0	0	0	0	0
d	13	d_{24}	d_{23}	d_{22}	d_{21}	d_{20}	d_{19}	d_{18}	d_{17}
d	14	d_{16}	d_{15}	d_{14}	d_{13}	d_{12}	d_{11}	d_{10}	d_9
d	15	d_8	d_7	d_6	d_5	d_4	d_3	d_2	d_1
ro	16	ro_{12}	ro_{11}	ro_{10}	ro_9	0	d_{27}	d_{26}	d_{25}
ro	17	ro_8	ro_7	ro_6	ro_5	ro_4	ro_3	ro_2	ro_1
lg	18	lg_8	lg_7	lg_6	lg_5	lg_4	lg_3	lg_2	lg_1
erid, sdf, res, pr	19	0	0	1	0	sdf	0	pr_2	pr_1
c	20	c_{16}	c_{15}	c_{14}	c_{13}	c_{12}	c_{11}	c_{10}	c_9
c	21	c_8	c_7	c_6	c_5	c_4	c_3	c_2	c_1
flag	-	0	1	1	1	1	1	1	0

UNI_BURST_b (Ub): Invalid message ID. Information field contains "0"s. 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	1	s_{27}	s_{26}	s_{25}	0	0	0	0	1
s	2	s_{24}	s_{23}	s_{22}	s_{21}	s_{20}	s_{19}	s_{18}	s_{17}
s	3	s_{16}	s_{15}	s_{14}	s_{13}	s_{12}	s_{11}	s_{10}	s_9
s	4	s_8	s_7	s_6	s_5	s_4	s_3	s_2	s_1
in, mi	5	0	1	0	1	0	1	0	1
in	6	0	0	0	0	0	0	0	0
in	7	0	0	0	0	0	0	0	0
in	8	0	0	0	0	0	0	0	0
in	9	0	0	0	0	0	0	0	0
in	10	0	0	0	0	0	0	0	0
in	11	0	0	0	0	0	0	0	0
in	12	0	0	0	0	0	0	0	0
d	13	d_{24}	d_{23}	d_{22}	d_{21}	d_{20}	d_{19}	d_{18}	d_{17}
d	14	d_{16}	d_{15}	d_{14}	d_{13}	d_{12}	d_{11}	d_{10}	d_9
d	15	d_8	d_7	d_6	d_5	d_4	d_3	d_2	d_1
ro	16	ro_{12}	ro_{11}	ro_{10}	ro_9	0	d_{27}	d_{26}	d_{25}
ro	17	ro_8	ro_7	ro_6	ro_5	ro_4	ro_3	ro_2	ro_1
lg	18	lg_8	lg_7	lg_6	lg_5	lg_4	lg_3	lg_2	lg_1
erid, sdf, res, pr	19	0	0	1	0	sdf	0	pr_2	pr_1
c	20	c_{16}	c_{15}	c_{14}	c_{13}	c_{12}	c_{11}	c_{10}	c_9
c	21	c_8	c_7	c_6	c_5	c_4	c_3	c_2	c_1
flag	-	0	1	1	1	1	1	1	0

UNI_BURST_c (Uc): For source to broadcast. Information field contains "0"s. 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	1	s_{27}	s_{26}	s_{25}	0	0	0	0	1
s	2	s_{24}	s_{23}	s_{22}	s_{21}	s_{20}	s_{19}	s_{18}	s_{17}
s	3	s_{16}	s_{15}	s_{14}	s_{13}	s_{12}	s_{11}	s_{10}	s_9
s	4	s_8	s_7	s_6	s_5	s_4	s_3	s_2	s_1
in, mi	5	0	0	0	0	0	1	0	1
in	6	0	0	0	0	0	0	0	0
in	7	0	0	0	0	0	0	0	0
in	8	0	0	0	0	0	0	0	0
in	9	0	0	0	0	0	0	0	0
in	10	0	0	0	0	0	0	0	0
in	11	0	0	0	0	0	0	0	0
in	12	0	0	0	0	0	0	0	0
in	13	0	0	0	0	0	0	0	0
in	14	0	0	0	0	0	0	0	0
in	15	0	0	0	0	0	0	0	0
ro	16	ro_{12}	ro_{11}	ro_{10}	ro_9	0	1	1	1
ro	17	ro_8	ro_7	ro_6	ro_5	ro_4	ro_3	ro_2	ro_1
lg	18	lg_8	lg_7	lg_6	lg_5	lg_4	lg_3	lg_2	lg_1
erid, sdf, res, pr	19	0	0	1	0	0	0	pr_2	pr_1
c	20	c_{16}	c_{15}	c_{14}	c_{13}	c_{12}	c_{11}	c_{10}	c_9
c	21	c_8	c_7	c_6	c_5	c_4	c_3	c_2	c_1
flag	-	0	1	1	1	1	1	1	0

UNI_BURST_d (Ud): Contains general request. Information field contains "0"s. 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	1	s_{27}	s_{26}	s_{25}	0	0	0	0	1
s	2	s_{24}	s_{23}	s_{22}	s_{21}	s_{20}	s_{19}	s_{18}	s_{17}
s	3	s_{16}	s_{15}	s_{14}	s_{13}	s_{12}	s_{11}	s_{10}	s_9
s	4	s_8	s_7	s_6	s_5	s_4	s_3	s_2	s_1
r-mi, mi	5	$r\text{-}mi_1$	0	0	0	0	0	0	1
res, r-mi	6	0	0	$r\text{-}mi_7$	$r\text{-}mi_6$	$r\text{-}mi_5$	$r\text{-}mi_4$	$r\text{-}mi_3$	$r\text{-}mi_2$
prm	7	prm_{18}	prm_{17}	prm_{16}	prm_{15}	prm_{14}	prm_{13}	prm_{12}	prm_{11}
prm	8	prm_{28}	prm_{27}	prm_{26}	prm_{25}	prm_{24}	prm_{23}	prm_{22}	prm_{21}
prm	9	prm_{38}	prm_{37}	prm_{36}	prm_{35}	prm_{34}	prm_{33}	prm_{32}	prm_{31}
in	10	0	0	0	0	0	0	0	0
in	11	0	0	0	0	0	0	0	0
in	12	0	0	0	0	0	0	0	0
d	13	d_{24}	d_{23}	d_{22}	d_{21}	d_{20}	d_{19}	d_{18}	d_{17}
d	14	d_{16}	d_{15}	d_{14}	d_{13}	d_{12}	d_{11}	d_{10}	d_9
d	15	d_8	d_7	d_6	d_5	d_4	d_3	d_2	d_1
ro	16	ro_{12}	ro_{11}	ro_{10}	ro_9	0	d_{27}	d_{26}	d_{25}
ro	17	ro_8	ro_7	ro_6	ro_5	ro_4	ro_3	ro_2	ro_1
lg	18	lg_8	lg_7	lg_6	lg_5	lg_4	lg_3	lg_2	lg_1
erid, sdf, res, pr	19	0	0	1	0	sdf	0	pr_2	pr_1
c	20	c_{16}	c_{15}	c_{14}	c_{13}	c_{12}	c_{11}	c_{10}	c_9
c	21	c_8	c_7	c_6	c_5	c_4	c_3	c_2	c_1
flag	-	0	1	1	1	1	1	1	0

INCREM_BURST_a (Ia): Information field contains "0"s. 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	1	s_{27}	s_{26}	s_{25}	0	0	0	0	1
s	2	s_{24}	s_{23}	s_{22}	s_{21}	s_{20}	s_{19}	s_{18}	s_{17}
s	3	s_{16}	s_{15}	s_{14}	s_{13}	s_{12}	s_{11}	s_{10}	s_9
s	4	s_8	s_7	s_6	s_5	s_4	s_3	s_2	s_1
in, mi	5	0	0	0	0	0	1	0	1
in	6	0	0	0	0	0	0	0	0
in	7	0	0	0	0	0	0	0	0
in	8	0	0	0	0	0	0	0	0
in	9	0	0	0	0	0	0	0	0
in	10	0	0	0	0	0	0	0	0
in	11	0	0	0	0	0	0	0	0
in	12	0	0	0	0	0	0	0	0
in	13	0	0	0	0	0	0	0	0
in	14	0	0	0	0	0	0	0	0
in	15	0	0	0	0	0	0	0	0
in	16	0	0	0	0	0	0	0	0
in	17	0	0	0	0	0	0	0	0
in	18	0	0	0	0	0	0	io_8	io_7
[erid], [io]	19	1	0	io_6	io_5	io_4	io_3	io_2	io_1
c	20	c_{16}	c_{15}	c_{14}	c_{13}	c_{12}	c_{11}	c_{10}	c_9
c	21	c_8	c_7	c_6	c_5	c_4	c_3	c_2	c_1
flag	-	0	1	1	1	1	1	1	0

INCREM_BURST_b(k) (Ib(k)): Information field contains "0"s. Occupies exactly k 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	1	s_{27}	s_{26}	s_{25}	0	0	0	0	1
s	2	s_{24}	s_{23}	s_{22}	s_{21}	s_{20}	s_{19}	s_{18}	s_{17}
s	3	s_{16}	s_{15}	s_{14}	s_{13}	s_{12}	s_{11}	s_{10}	s_9
s	4	s_8	s_7	s_6	s_5	s_4	s_3	s_2	s_1
in, mi	5	0	0	0	0	0	1	0	1
in	6	0	0	0	0	0	0	0	0
in	7	0	0	0	0	0	0	0	0
in	8	0	0	0	0	0	0	0	0
in	9	0	0	0	0	0	0	0	0
in	10	0	0	0	0	0	0	0	0
in	11	0	0	0	0	0	0	0	0
			Insert int(31,5 x (*k* - 1)) repeat rows						
in	12 + int(31,5 x (*k* - 1))	0	0	0	0	0	0	0	0
in	13 + int(31,5 x (*k* - 1))	0	0	0	0	0	0	0	0
in	14 + int(31,5 x (*k* - 1))	0	0	0	0	0	0	0	0
in	15 + int(31,5 x (*k* - 1))	0	0	0	0	0	0	0	0
in	16 + int(31,5 x (*k* - 1))	0	0	0	0	0	0	0	0
in	17 + int(31,5 x (*k* - 1))	0	0	0	0	0	0	0	0
in	18 + int(31,5 x (*k* - 1))	0	0	0	0	0	0	io_8	io_7
[erid], [io]	19 + int(31,5 x (*k* - 1))	1	0	io_6	io_5	io_4	io_3	io_2	io_1
c	20 + int(31,5 x (*k* - 1))	c_{16}	c_{15}	c_{14}	c_{13}	c_{12}	c_{11}	c_{10}	c_9
c	21 + int(31,5 x (*k* - 1))	c_8	c_7	c_6	c_5	c_4	c_3	c_2	c_1
flag	-	0	1	1	1	1	1	1	0

INCREM_BURST_c (Ic): Invalid message ID. Information field contains "0"s. 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	1	s_{27}	s_{26}	s_{25}	0	0	0	0	1
s	2	s_{24}	s_{23}	s_{22}	s_{21}	s_{20}	s_{19}	s_{18}	s_{17}
s	3	s_{16}	s_{15}	s_{14}	s_{13}	s_{12}	s_{11}	s_{10}	s_9
s	4	s_8	s_7	s_6	s_5	s_4	s_3	s_2	s_1
in, mi	5	0	1	0	1	0	1	0	1
in	6	0	0	0	0	0	0	0	0
in	7	0	0	0	0	0	0	0	0
in	8	0	0	0	0	0	0	0	0
in	9	0	0	0	0	0	0	0	0
in	10	0	0	0	0	0	0	0	0
in	11	0	0	0	0	0	0	0	0
in	12	0	0	0	0	0	0	0	0
in	13	0	0	0	0	0	0	0	0
in	14	0	0	0	0	0	0	0	0
in	15	0	0	0	0	0	0	0	0
in	16	0	0	0	0	0	0	0	0
in	17	0	0	0	0	0	0	0	0
in	18	0	0	0	0	0	0	io_8	io_7
[erid], [io]	19	1	0	io_6	io_5	io_4	io_3	io_2	io_1
c	20	c_{16}	c_{15}	c_{14}	c_{13}	c_{12}	c_{11}	c_{10}	c_9
c	21	c_8	c_7	c_6	c_5	c_4	c_3	c_2	c_1
flag	-	0	1	1	1	1	1	1	0

NULL_RES_a (Na): Information field contains "0"s. 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	1	s_{27}	s_{26}	s_{25}	0	0	0	1	1
s	2	s_{24}	s_{23}	s_{22}	s_{21}	s_{20}	s_{19}	s_{18}	s_{17}
s	3	s_{16}	s_{15}	s_{14}	s_{13}	s_{12}	s_{11}	s_{10}	s_9
s	4	s_8	s_7	s_6	s_5	s_4	s_3	s_2	s_1
in, mi	5	0	0	0	0	0	1	0	1
in	6	0	0	0	0	0	0	0	0
in	7	0	0	0	0	0	0	0	0
in	8	0	0	0	0	0	0	0	0
in	9	0	0	0	0	0	0	0	0
in	10	0	0	0	0	0	0	0	0
in	11	0	0	0	0	0	0	0	0
in	12	0	0	0	0	0	0	0	0
in	13	0	0	0	0	0	0	0	0
in	14	0	0	0	0	0	0	0	0
in	15	0	0	0	0	0	0	0	0
in	16	0	0	0	0	0	0	0	0
in	17	0	0	0	0	0	0	0	0
in	18	0	0	0	0	0	0	0	0
rd	19	0	0	0	0	0	0	0	0
c	20	c_{16}	c_{15}	c_{14}	c_{13}	c_{12}	c_{11}	c_{10}	c_9
c	21	c_8	c_7	c_6	c_5	c_4	c_3	c_2	c_1
flag	-	0	1	1	1	1	1	1	0

INF_TRANS_a (ITa): Information field contains "0"s. 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	1	s_{27}	s_{26}	s_{25}	0	0	0	0	1
s	2	s_{24}	s_{23}	s_{22}	s_{21}	s_{20}	s_{19}	s_{18}	s_{17}
s	3	s_{16}	s_{15}	s_{14}	s_{13}	s_{12}	s_{11}	s_{10}	s_9
s	4	s_8	s_7	s_6	s_5	s_4	s_3	s_2	s_1
in, mi	5	0	0	0	0	0	1	0	1
in	6	0	0	0	0	0	0	0	0
in	7	0	0	0	0	0	0	0	0
in	8	0	0	0	0	0	0	0	0
in	9	0	0	0	0	0	0	0	0
in	10	0	0	0	0	0	0	0	0
in	11	0	ao_7	ao_6	ao_5	ao_4	ao_3	ao_2	ao_1
lg	12	lg_8	lg_7	lg_6	lg_5	lg_4	lg_3	lg_2	lg_1
ro	13	ro_8	ro_7	ro_6	ro_5	ro_4	ro_3	ro_2	ro_1
ro, f	14	ro_{12}	ro_{11}	ro_{10}	ro_9	f_{12}	f_{11}	f_{10}	f_9
f	15	f_8	f_7	f_6	f_5	f_4	f_3	f_2	f_1
d	16	d_{24}	d_{23}	d_{22}	d_{21}	d_{20}	d_{19}	d_{18}	d_{17}
d	17	d_{16}	d_{15}	d_{14}	d_{13}	d_{12}	d_{11}	d_{10}	d_9
d	18	d_8	d_7	d_6	d_5	d_4	d_3	d_2	d_1
erid, sdf, d	19	0	1	0	1	0	d_{27}	d_{26}	d_{25}
c	20	c_{16}	c_{15}	c_{14}	c_{13}	c_{12}	c_{11}	c_{10}	c_9
c	21	c_8	c_7	c_6	c_5	c_4	c_3	c_2	c_1
flag	-	0	1	1	1	1	1	1	0

DIR_REQ_a (Da): Contains general request. 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	1	s_{27}	s_{26}	s_{25}	0	0	0	0	1
s	2	s_{24}	s_{23}	s_{22}	s_{21}	s_{20}	s_{19}	s_{18}	s_{17}
s	3	s_{16}	s_{15}	s_{14}	s_{13}	s_{12}	s_{11}	s_{10}	s_9
s	4	s_8	s_7	s_6	s_5	s_4	s_3	s_2	s_1
r-mi, mi	5	$r\text{-}mi_1$	0	0	0	0	0	0	1
res, r-mi	6	0	0	$r\text{-}mi_7$	$r\text{-}mi_6$	$r\text{-}mi_5$	$r\text{-}mi_4$	$r\text{-}mi_3$	$r\text{-}mi_2$
prm	7	prm_{18}	prm_{17}	prm_{16}	prm_{15}	prm_{14}	prm_{13}	prm_{12}	prm_{11}
prm	8	prm_{28}	prm_{27}	prm_{26}	prm_{25}	prm_{24}	prm_{23}	prm_{22}	prm_{21}
prm	9	prm_{38}	prm_{37}	prm_{36}	prm_{35}	prm_{34}	prm_{33}	prm_{32}	prm_{31}
dt, f	10	dt_4	dt_3	dt_2	dt_1	f_{12}	f_{11}	f_{10}	f_9
f	11	f_8	f_7	f_6	f_5	f_4	f_3	f_2	f_1
lg	12	lg_8	lg_7	lg_6	lg_5	lg_4	lg_3	lg_2	lg_1
lg, res, do	13	res	res	trmt	do_{13}	do_{12}	do_{11}	do_{10}	do_9
do	14	do_8	do_7	do_6	do_5	do_4	do_3	do_2	do_1
or, rcvr, pr_flag, nr	15	or	$rcvr_2$	$rcvr_1$	pr_flag	nr_4	nr_3	nr_2	nr_1
d	16	d_{24}	d_{23}	d_{22}	d_{21}	d_{20}	d_{19}	d_{18}	d_{17}
d	17	d_{16}	d_{15}	d_{14}	d_{13}	d_{12}	d_{11}	d_{10}	d_9
d	18	d_8	d_7	d_6	d_5	d_4	d_3	d_2	d_1
erid, d	19	0	1	1	0	0	d_{27}	d_{26}	d_{25}
c	20	c_{16}	c_{15}	c_{14}	c_{13}	c_{12}	c_{11}	c_{10}	c_9
c	21	c_8	c_7	c_6	c_5	c_4	c_3	c_2	c_1
flag	-	0	1	1	1	1	1	1	0

DIR_REQ_b (Db): Contains general request. Information field contains "0"s. 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	1	s_{27}	s_{26}	s_{25}	0	0	0	0	1
s	2	s_{24}	s_{23}	s_{22}	s_{21}	s_{20}	s_{19}	s_{18}	s_{17}
s	3	s_{16}	s_{15}	s_{14}	s_{13}	s_{12}	s_{11}	s_{10}	s_9
s	4	s_8	s_7	s_6	s_5	s_4	s_3	s_2	s_1
in, mi	5	0	0	0	0	0	1	0	1
in	6	0	0	0	0	0	0	0	0
in	7	0	0	0	0	0	0	0	0
in	8	0	0	0	0	0	0	0	0
in	9	0	0	0	0	0	0	0	0
dt, f	10	dt_4	dt_3	dt_2	dt_1	f_{12}	f_{11}	f_{10}	f_9
f	11	f_8	f_7	f_6	f_5	f_4	f_3	f_2	f_1
lg	12	lg_8	lg_7	lg_6	lg_5	lg_4	lg_3	lg_2	lg_1
lg, res, do	13	res	res	trmt	do_{13}	do_{12}	do_{11}	do_{10}	do_9
do	14	do_8	do_7	do_6	do_5	do_4	do_3	do_2	do_1
or, rcvr, pr_flag, nr	15	or	$rcvr_2$	$rcvr_1$	pr_flag	nr_4	nr_3	nr_2	nr_1
d	16	d_{24}	d_{23}	d_{22}	d_{21}	d_{20}	d_{19}	d_{18}	d_{17}
d	17	d_{16}	d_{15}	d_{14}	d_{13}	d_{12}	d_{11}	d_{10}	d_9
d	18	d_8	d_7	d_6	d_5	d_4	d_3	d_2	d_1
erid, d	19	0	1	1	0	0	d_{27}	d_{26}	d_{25}
c	20	c_{16}	c_{15}	c_{14}	c_{13}	c_{12}	c_{11}	c_{10}	c_9
c	21	c_8	c_7	c_6	c_5	c_4	c_3	c_2	c_1
flag	-	0	1	1	1	1	1	1	0

GEN_RESP_a (GRa): General response 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	1	s_{27}	s_{26}	s_{25}	0	0	0	0	1
s	2	s_{24}	s_{23}	s_{22}	s_{21}	s_{20}	s_{19}	s_{18}	s_{17}
s	3	s_{16}	s_{15}	s_{14}	s_{13}	s_{12}	s_{11}	s_{10}	s_9
s	4	s_8	s_7	s_6	s_5	s_4	s_3	s_2	s_1
ok, mi	5	ok	0	0	1	0	0	0	1
res, r-mi	6	0	$r\text{-}mi_7$	$r\text{-}mi_6$	$r\text{-}mi_5$	$r\text{-}mi_4$	$r\text{-}mi_3$	$r\text{-}mi_2$	$r\text{-}mi_1$
res	7	0	0	0	0	0	0	0	0
bd	8	bd_8	bd_7	bd_6	bd_5	bd_4	bd_3	bd_2	bd_1
err	9	err_8	err_7	err_6	err_5	err_4	err_3	err_2	err_1
prm	10	prm_{18}	prm_{17}	prm_{16}	prm_{15}	prm_{14}	prm_{13}	prm_{12}	prm_{11}
prm	11	prm_{28}	prm_{27}	prm_{26}	prm_{25}	prm_{24}	prm_{23}	prm_{22}	prm_{21}
prm	12	prm_{38}	prm_{37}	prm_{36}	prm_{35}	prm_{34}	prm_{33}	prm_{32}	prm_{31}
d	13	d_{24}	d_{23}	d_{22}	d_{21}	d_{20}	d_{19}	d_{18}	d_{17}
d	14	d_{16}	d_{15}	d_{14}	d_{13}	d_{12}	d_{11}	d_{10}	d_9
d	15	d_8	d_7	d_6	d_5	d_4	d_3	d_2	d_1
erid, d	16	0	0	0	0	0	d_{27}	d_{26}	d_{25}
c	17	c_{16}	c_{15}	c_{14}	c_{13}	c_{12}	c_{11}	c_{10}	c_9
c	18	c_8	c_7	c_6	c_5	c_4	c_3	c_2	c_1
flag	-	0	1	1	1	1	1	1	0

GEN_RESP_b (GRb): General response to unsupported general request 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	1	s_{27}	s_{26}	s_{25}	0	0	0	0	1
s	2	s_{24}	s_{23}	s_{22}	s_{21}	s_{20}	s_{19}	s_{18}	s_{17}
s	3	s_{16}	s_{15}	s_{14}	s_{13}	s_{12}	s_{11}	s_{10}	s_9
s	4	s_8	s_7	s_6	s_5	s_4	s_3	s_2	s_1
ok, mi	5	0	0	0	1	0	0	0	1
res, r-mi	6	0	1	1	1	1	1	1	1
res	7	0	0	0	0	0	0	0	0
bd	8	1	1	1	1	1	1	1	1
err	9	0	0	0	0	0	0	0	0
prm	10	prm_{18}	prm_{17}	prm_{16}	prm_{15}	prm_{14}	prm_{13}	prm_{12}	prm_{11}
prm	11	prm_{28}	prm_{27}	prm_{26}	prm_{25}	prm_{24}	prm_{23}	prm_{22}	prm_{21}
prm	12	prm_{38}	prm_{37}	prm_{36}	prm_{35}	prm_{34}	prm_{33}	prm_{32}	prm_{31}
d	13	d_{24}	d_{23}	d_{22}	d_{21}	d_{20}	d_{19}	d_{18}	d_{17}
d	14	d_{16}	d_{15}	d_{14}	d_{13}	d_{12}	d_{11}	d_{10}	d_9
d	15	d_8	d_7	d_6	d_5	d_4	d_3	d_2	d_1
erid, d	16	0	0	0	0	0	d_{27}	d_{26}	d_{25}
c	17	c_{16}	c_{15}	c_{14}	c_{13}	c_{12}	c_{11}	c_{10}	c_9
c	18	c_8	c_7	c_6	c_5	c_4	c_3	c_2	c_1
flag	-	0	1	1	1	1	1	1	0

ADSB_REQ_a (ADa): ADS-B general request 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	1	s_{27}	s_{26}	s_{25}	0	0	0	0	1
s	2	s_{24}	s_{23}	s_{22}	s_{21}	s_{20}	s_{19}	s_{18}	s_{17}
s	3	s_{16}	s_{15}	s_{14}	s_{13}	s_{12}	s_{11}	s_{10}	s_9
s	4	s_8	s_7	s_6	s_5	s_4	s_3	s_2	s_1
r-mi, mi	5	0	0	0	0	0	0	0	1
sleep, auto, res, r-b/a	6	0	1	0	0	0	0	0	0
lg, aux	7	0	0	0	0	$r\text{-}id_4$	$r\text{-}id_3$	$r\text{-}id_2$	$r\text{-}id_1$
prm	8	prm_{18}	prm_{17}	prm_{16}	prm_{15}	prm_{14}	prm_{13}	prm_{12}	prm_{11}
prm	9	prm_{28}	prm_{27}	prm_{26}	prm_{25}	prm_{24}	prm_{23}	prm_{22}	prm_{21}
prm	10	prm_{38}	prm_{37}	prm_{36}	prm_{35}	prm_{34}	prm_{33}	prm_{32}	prm_{31}
d	11	d_{24}	d_{23}	d_{22}	d_{21}	d_{20}	d_{19}	d_{18}	d_{17}
d	12	d_{16}	d_{15}	d_{14}	d_{13}	d_{12}	d_{11}	d_{10}	d_9
d	13	d_8	d_7	d_6	d_5	d_4	d_3	d_2	d_1
erid, d	14	0	0	0	0	0	d_{27}	d_{26}	d_{25}
c	15	c_{16}	c_{15}	c_{14}	c_{13}	c_{12}	c_{11}	c_{10}	c_9
c	16	c_8	c_7	c_6	c_5	c_4	c_3	c_2	c_1
flag	-	0	1	1	1	1	1	1	0

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	1	s_{27}	s_{26}	s_{25}	0	0	0	0	1
s	2	s_{24}	s_{23}	s_{22}	s_{21}	s_{20}	s_{19}	s_{18}	s_{17}
s	3	s_{16}	s_{15}	s_{14}	s_{13}	s_{12}	s_{11}	s_{10}	s_9
s	4	s_8	s_7	s_6	s_5	s_4	s_3	s_2	s_1
in, mi	5	0	1	0	0	0	1	0	1
d	6	d_{24}	d_{23}	d_{22}	d_{21}	d_{20}	d_{19}	d_{18}	d_{17}
d	7	d_{16}	d_{15}	d_{14}	d_{13}	d_{12}	d_{11}	d_{10}	d_9
d	8	d_8	d_7	d_6	d_5	d_4	d_3	d_2	d_1
erid, d	9	0	0	0	0	0	d_{27}	d_{26}	d_{25}
c	10	c_{16}	c_{15}	c_{14}	c_{13}	c_{12}	c_{11}	c_{10}	c_9
c	11	c_8	c_7	c_6	c_5	c_4	c_3	c_2	c_1
flag	-	0	1	1	1	1	1	1	0

COMP_XID_g (CXg): Compressed XID burst for VS1 parameter 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	1	s_{27}	s_{26}	s_{25}	0	0	0	1	1
s	2	s_{24}	s_{23}	s_{22}	s_{21}	s_{20}	s_{19}	s_{18}	s_{17}
s	3	s_{16}	s_{15}	s_{14}	s_{13}	s_{12}	s_{11}	s_{10}	s_9
s	4	s_8	s_7	s_6	s_5	s_4	s_3	s_2	s_1
dos, mi	5	0	0	1	1	1	1	0	1
VS1 parameter id	6	0	1	0	0	0	0	0	1
parameter length	7	0	0	0	0	0	0	0	1
parameter value	8	0	0	0	0	n_4	n_3	n_2	n_1
erid, d	9	0	0	0	0	0	d_{27}	d_{26}	d_{25}
c	10	c_{16}	c_{15}	c_{14}	c_{13}	c_{12}	c_{11}	c_{10}	c_9
c	11	c_8	c_7	c_6	c_5	c_4	c_3	c_2	c_1
flag	-	0	1	1	1	1	1	1	0

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	1	s_{27}	s_{26}	s_{25}	0	0	0	0	1
s	2	s_{24}	s_{23}	s_{22}	s_{21}	s_{20}	s_{19}	s_{18}	s_{17}
s	3	s_{16}	s_{15}	s_{14}	s_{13}	s_{12}	s_{11}	s_{10}	s_9
s	4	s_8	s_7	s_6	s_5	s_4	s_3	s_2	s_1
res, mi	5	0	1	0	0	0	1	0	1
a	6	$a_{11,6}$	$a_{11,5}$	$a_{8,6}$	$a_{8,5}$	$a_{8,4}$	$a_{8,3}$	$a_{8,2}$	$a_{8,1}$
a	7	$a_{11,4}$	$a_{11,3}$	$a_{7,6}$	$a_{7,5}$	$a_{7,4}$	$a_{7,3}$	$a_{7,2}$	$a_{7,1}$
a	8	$a_{11,2}$	$a_{11,1}$	$a_{6,6}$	$a_{6,5}$	$a_{6,4}$	$a_{6,3}$	$a_{6,2}$	$a_{6,1}$
a	9	$a_{10,6}$	$a_{10,5}$	$a_{5,6}$	$a_{5,5}$	$a_{5,4}$	$a_{5,3}$	$a_{5,2}$	$a_{5,1}$
a	10	$a_{10,4}$	$a_{10,3}$	$a_{4,6}$	$a_{4,5}$	$a_{4,4}$	$a_{4,3}$	$a_{4,2}$	$a_{4,1}$
a	11	$a_{10,2}$	$a_{10,1}$	$a_{3,6}$	$a_{3,5}$	$a_{3,4}$	$a_{3,3}$	$a_{3,2}$	$a_{3,1}$
a	12	$a_{9,6}$	$a_{9,5}$	$a_{2,6}$	$a_{2,5}$	$a_{2,4}$	$a_{2,3}$	$a_{2,2}$	$a_{2,1}$
a	13	$a_{9,4}$	$a_{9,3}$	$a_{1,6}$	$a_{1,5}$	$a_{1,4}$	$a_{1,3}$	$a_{1,2}$	$a_{1,1}$
a, off	14	$a_{9,2}$	$a_{9,1}$	off_9	off_8	off_7	off_6	off_5	off_4
off, pr_flag, nr	15	off_3	off_2	off_1	1	nr_4	nr_3	nr_2	nr_1
d	16	d_{24}	d_{23}	d_{22}	d_{21}	d_{20}	d_{19}	d_{18}	d_{17}
d	17	d_{16}	d_{15}	d_{14}	d_{13}	d_{12}	d_{11}	d_{10}	d_9
d	18	d_8	d_7	d_6	d_5	d_4	d_3	d_2	d_1
erid, d	19	0	1	1	0	0	d_{27}	d_{26}	d_{25}
c	20	c_{16}	c_{15}	c_{14}	c_{13}	c_{12}	c_{11}	c_{10}	c_9
c	21	c_8	c_7	c_6	c_5	c_4	c_3	c_2	c_1
flag	-	0	1	1	1	1	1	1	0

PLEA_RESP_b (PRb): 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	1	s_{27}	s_{26}	s_{25}	0	0	0	0	1
s	2	s_{24}	s_{23}	s_{22}	s_{21}	s_{20}	s_{19}	s_{18}	s_{17}
s	3	s_{16}	s_{15}	s_{14}	s_{13}	s_{12}	s_{11}	s_{10}	s_9
s	4	s_8	s_7	s_6	s_5	s_4	s_3	s_2	s_1
res, mi	5	0	1	0	0	0	1	0	1
res, a	6	0	0	0	0	$a_{5,12}$	$a_{5,11}$	$a_{5,10}$	$a_{5,9}$
a	7	$a_{5,8}$	$a_{5,7}$	$a_{5,6}$	$a_{5,5}$	$a_{5,4}$	$a_{5,3}$	$a_{5,2}$	$a_{5,1}$
a	8	$a_{4,8}$	$a_{4,7}$	$a_{4,6}$	$a_{4,5}$	$a_{4,4}$	$a_{4,3}$	$a_{4,2}$	$a_{4,1}$
a	9	$a_{4,12}$	$a_{4,11}$	$a_{4,10}$	$a_{4,9}$	$a_{3,12}$	$a_{3,11}$	$a_{3,10}$	$a_{3,9}$
a	10	$a_{3,8}$	$a_{3,7}$	$a_{3,6}$	$a_{3,5}$	$a_{3,4}$	$a_{3,3}$	$a_{3,2}$	$a_{3,1}$
a	11	$a_{2,8}$	$a_{2,7}$	$a_{2,6}$	$a_{2,5}$	$a_{2,4}$	$a_{2,3}$	$a_{2,2}$	$a_{2,1}$
a	12	$a_{2,12}$	$a_{2,11}$	$a_{2,10}$	$a_{2,9}$	$a_{1,12}$	$a_{1,11}$	$a_{1,10}$	$a_{1,9}$
a	13	$a_{1,8}$	$a_{1,7}$	$a_{1,6}$	$a_{1,5}$	$a_{1,4}$	$a_{1,3}$	$a_{1,2}$	$a_{1,1}$
res, off	14	0	off_{10}	off_9	off_8	off_7	off_6	off_5	off_4
off, pr_flag, nr	15	off_3	off_2	off_1	1	1	1	1	1
d	16	d_{24}	d_{23}	d_{22}	d_{21}	d_{20}	d_{19}	d_{18}	d_{17}
d	17	d_{16}	d_{15}	d_{14}	d_{13}	d_{12}	d_{11}	d_{10}	d_9
d	18	d_8	d_7	d_6	d_5	d_4	d_3	d_2	d_1
erid, d	19	0	1	1	0	0	d_{27}	d_{26}	d_{25}
c	20	c_{16}	c_{15}	c_{14}	c_{13}	c_{12}	c_{11}	c_{10}	c_9
c	21	c_8	c_7	c_6	c_5	c_4	c_3	c_2	c_1
flag	-	0	1	1	1	1	1	1	0

BND_DELAYED_a (BDa): Contains BND reservation. 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	1	s_{27}	s_{26}	s_{25}	0	0	0	0	1
s	2	s_{24}	s_{23}	s_{22}	s_{21}	s_{20}	s_{19}	s_{18}	s_{17}
s	3	s_{16}	s_{15}	s_{14}	s_{13}	s_{12}	s_{11}	s_{10}	s_9
s	4	s_8	s_7	s_6	s_5	s_4	s_3	s_2	s_1
in, mi	5	0	1	0	0	0	1	0	1
res, nd	6	0	0	0	0	0	0	nd_5	nd_4
erid, nd	7	0	0	0	0	1	nd_3	nd_2	nd_1
c	8	c_{16}	c_{15}	c_{14}	c_{13}	c_{12}	c_{11}	c_{10}	c_9
c	9	c_8	c_7	c_6	c_5	c_4	c_3	c_2	c_1
flag	-	0	1	1	1	1	1	1	0

BND_LONG_b (BDb): Contains BND reservation. 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	1	s_{27}	s_{26}	s_{25}	0	0	0	0	1
s	2	s_{24}	s_{23}	s_{22}	s_{21}	s_{20}	s_{19}	s_{18}	s_{17}
s	3	s_{16}	s_{15}	s_{14}	s_{13}	s_{12}	s_{11}	s_{10}	s_9
s	4	s_8	s_7	s_6	s_5	s_4	s_3	s_2	s_1
in, mi	5	0	1	0	0	0	1	0	1
res	6	0	0	0	0	0	0	0	0
res	7	0	0	0	0	0	0	0	0
res	8	0	0	0	0	0	0	0	0
res	9	0	0	0	0	0	0	0	0
res	10	0	0	0	0	0	0	0	0
res	11	0	0	0	0	0	0	0	0
res	12	0	0	0	0	0	0	0	0
res	13	0	0	0	0	0	0	0	0
res	14	0	0	0	0	0	0	0	0
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, nd	18	0	0	0	0	0	0	nd_5	nd_4
erid, nd	19	0	0	0	0	1	nd_3	nd_2	nd_1
c	20	c_{16}	c_{15}	c_{14}	c_{13}	c_{12}	c_{11}	c_{10}	c_9
c	21	c_8	c_7	c_6	c_5	c_4	c_3	c_2	c_1
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.

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

The following macros are used in several test cases.

Macro Name: M_POWER_UP				VDL4 transceiver power up.		
Parameters:						
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
macro		do		Switch on VDL4 transceiver		
		verify	Self test	Successful VDL4 transceiver BITE self test		Verify that the VDL4 transceiver has successfully passed BITE power-up test.
		wait		3 minutes		Wait for transceiver to acquire reservation table and default into idle state.
		send	Position	Input test station's ADS position		Inform station under test of its own position.
		record		*add_A*:= address of station under test		
		send	VSS	SET PARAMETERS (V66:= 0)		Set the second frame block reservation to 0.
Comments: This macro prepares the VDL4 transceiver for testing. It brings the VDL4 transceiver into the defined idle state.						

Macro Name: M_RAND_ACC (sf)				Establish a queue of random access transmissions over a number of superframes.		
Parameters: (sf = number of superframes to transmit over)						
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
macro		repx		*n*:= 0; *sf*:= no. of superframes to transmit over		Maintains transmissions over sf superframes.
		queue	VSS	DATA_a(*m*)	Da(*m*)	Send packets of data (labelled DATA_a) to the station under test for subsequent transmission by the random access protocol. Identify packets with repeating 10101010 bit sequence over *m* bits.
		until		*n* = *sf* x M1; *n*:= *n* + 1		Send M1 x *sf* random access transmissions.
Comments: Establishes a queue of random access transmissions over a defined number of superframes. Each random access is transmitted as a discrete burst, requiring the station under test to verify the state of the channel at the slot boundary prior to transmission. Flow control must be implemented at the VSS User PCO to ensure that the station under test is not flooded.						

Macro Name: M_RAND_ACC (slots)				Establish a queue of random access transmissions over a number of slots.		
Parameters: (slots = number of slots to transmit over)						
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
macro		repx		*n*:= 0; *slots*:= no. of slots to transmit over		Maintains transmissions over sf superframes.
		queue	VSS	DATA_a(*m*)	Da(*m*)	Send packets of data (labelled DATA_a) to the station under test for subsequent transmission by the random access protocol. Identify packets with repeating 10101010 bit sequence over *m* bits.
		until		*n* = *slots*; *n*:= *n* + 1		Send *slots* random access transmissions.
Comments: Establishes a queue of random access transmissions over a defined number of superframes. Each random access is transmitted as a discrete burst, requiring the station under test to verify the state of the channel at the slot boundary prior to transmission. Flow control must be implemented at the VSS User PCO to ensure that the station under test is not flooded.						

Macro Name: **M_ASSIGN_SLOTS (pos1, pos2)**				Chooses two random slot positions.		
Parameters: (pos1 = variable to which first slot position is assigned, pos2 = variable to which second slot position is assigned)						
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
macro		record		*pos1*:= 64 + 4 x RAND(0, 5)		Slot to reserve within each candidate range, chosen at random from the six possible candidate slots.
		repx				
				pos2:= 64 + 4 x RAND(0, 5)		Choose another slot position within the candidate range.
		until		*pos2* ≠ *pos1*		Ensure *random_position_2* differs from *random_position_1*.
		do		**IF** *pos2* < *pos1* **THEN** *buffer*:= *pos1* *pos1*:= *pos2* *pos2*:= *buffer*		Swap order of slot positions if necessary.
Comments: Chooses two random slot positions from the incremental broadcast candidate range used in a number of test cases.						

7.4.3.2.2 Test case descriptions

Test Case Name:				**Timing_Primary**		
Purpose:				**To demonstrate that when primary timing is available, a transmission from the station complies with primary timing performance.**		
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		do	TIME	ESTABLISH PRIMARY TIME INPUT		Establish source of primary time information.
test body		rep 10		*n*:= 1		
		await	RF	SYNC_BURST_c (s = *add_A*)	Sc	Wait for an autonomous sync burst.
		verify	RF	For SYNC_BURST_c (s = *add_A*) tfom = 0 or 1	Sc	Verify that the time figure of merit of the autonomous sync burst indicates either certified or non-certified primary time.
		record	RF	*t*:= time at which first data is transmitted in the slot containing the sync burst, measured from the test equipment's UTC slot start time		
		verify	RF	*t* = 2083,3 ± 1,1 µs		Verify that the time at which data is first transmitted in the slot is compliant with the requirements of primary timing.
		endrep		*n*:= *n* + 1		
postamble						
Comments: The first bit of data is required to be transmitted within ±0,6 µs from the start of the slot. The primary time source is required to be synchronized to UTC time with a precision of 0,4 µs two sigma, and can thus be expected to be within 0,5 µs on 99 % of occasions. Thus, the worst case timing error at the RF PCO is expected to be within 0,6 + 0,5 = 1,1 µs.						

Test Case Name:		**Timing_Secondary**				
Purpose:		**To demonstrate that when primary timing is unavailable, a transmission from the station complies with secondary timing performance.**				
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		do	TIME	DISCONNECT PRIMARY TIME INPUT		Disconnect source of primary time.
test body		rep 10		*n*:= 1		
		send	RF	SYNC_BURST_a (tfom= 0; s = *add_B*; CPR_LAT(0); lon:= CPR_LON(E 10 NM))	Sa	Send a sync burst from a simulated station B declaring certified primary time. The start of the burst shall be delayed from the slot start time to simulate the delay caused by the time-of-flight from station B.
		await	RF	SYNC_BURST_c (s = *add_A*)	Sc	Wait for an autonomous sync burst.
		record	RF	*tfom_A* = tfom contained in SYNC_BURST_c (s = *add_A*)	Sc	Time figure of merit of the autonomous sync burst.
		record	RF	*t*:= time at which first data is transmitted in the slot containing the sync burst, measured from the test equipment's UTC slot start time		
		verify	RF	**IF** *tfom_A* = 0 or 1 **THEN** *t* = 2 083,3 ± 1,1 µs **ELSE** *tfom_A* = 2 **AND** *t* = 2083,3 ± 20 µs		Verify that the time at which data is first transmitted in the slot is compliant with the requirements of either primary or secondary timing.
		endrep		*n*:= *n* + 1		
postamble		do	TIME	ESTABLISH PRIMARY TIME INPUT		Re-establish source of primary time information.
Comments: The first bit of data is required to be transmitted within ±0,6 µs from the start of the slot. The secondary time source is required to be synchronized to UTC time with a precision of 15 µs two sigma, and can thus be expected to be within 19,3 µs on 99 % of occasions. Thus, the worst case timing error at the RF PCO is expected to be within 0,6 + 19,3 ≈ 20 µs						

Test Case Name:				Timing_Secondary_Recover		
Purpose:	**To demonstrate that when primary timing becomes available to a station which is transmitting on secondary time, it reverts to using primary time.**					
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
test body		rep 10		*n*:= 1		
		do	TIME	DISCONNECT PRIMARY TIME INPUT		Disconnect source of primary time.
		send	RF	SYNC_BURST_a (tfom= 0; s = *add_B*; CPR_LAT(0); lon:= CPR_LON(E 10 NM))	Sa	Send a sync burst from a simulated station B declaring certified primary time. The start of the burst shall be delayed from the slot start time to simulate the delay caused by the time-of-flight from station B.
		await	RF	SYNC_BURST_c (s = *add_A*)	Sc	Wait for an autonomous sync burst.
		verify	RF	For SYNC_BURST_c (s = *add_A*) tfom = 0, 1 or 2	Sc	Verify that the time figure of merit of the autonomous sync burst indicates primary or secondary time.
		do	TIME	ESTABLISH PRIMARY TIME INPUT		Establish source of primary time.
		verify	RF	For SYNC_BURST_c (s = *add_A*) tfom = 0 or 1	Sc	Verify that the time figure of merit of the autonomous sync burst indicates primary time.
		record	RF	*t*:= time at which first data is transmitted in the slot containing the sync burst, measured from the test equipment's UTC slot start time		
		verify	RF	t = 2 083,3 ± 1,1 µs		Verify that the time at which data is first transmitted in the slot is compliant with the requirements of primary timing.
		endrep		*n*:= *n* + 1		
postamble						
Comments:						

Test Case Name:				CRC_Norm		
Purpose:	**To demonstrate that a station transmitting a burst will insert a valid CRC.**					
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
		send	VSS	SET PARAMETERS (p:= 1)		Ensure 100 % chance of transmission on access.
test body		queue	VSS	DATA_a(*m*)	Da(*m*)	Send a packet of data (labelled DATA_a) to the station under test for subsequent transmission by the random access protocol. Identify packets with repeating 10101010 bit sequence over *m* bits
		await	RF	RAND_ACC_DATA_a (s = *add_A*)	Ra	Await random access transmission containing DATA a(*m*).
		verify	RF	c in RAND_ACC_DATA_a (s = *add_A*) has the correct value	Ra	Verify that the CRC code in the transmitted burst corresponds to the correct value.
postamble		send	VSS	SET PARAMETERS (p:= 64/256)		Reset to default value.
		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
Comments:						

Test Case Name:				CRC_Rej		
Purpose:				**To demonstrate that a station receiving a burst with an invalid CRC will reject the burst.**		
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
		send	VSS	SET PARAMETERS (p:= 1)		Ensure 100 % chance of transmission on access.
test body		send	RF	SYNC_BURST_d(*k*) (pt:= 3; po:= 0; c:= *invalid*; s = *add_B*)	Sd(*k*)	Send a sync burst from a simulated station B reserving a block of slots with an invalid CRC. Information field filled with zeros extending reservation over k slots (burst length = k).
		macro		M_RAND_ACC (*sf*:= 2)		Queue random access transmissions over 2 superframes.
		await	RF	RAND_ACC_DATA_a (s = *add_A*)	Ra	Await random access transmission containing DATA a(*m*).
		record	RF	*start_time*:= time at beginning of slot containing RAND_ACC_DATA_a (s = *add_A*)	Ra	Define a reference time to measure relative times from during the test.
		rep 2xM1		*n*:= 1		
		verify	RF	RAND_ACC_DATA_a (s = *add_A*) in slot beginning at *time* = *start_time* + *n* x 60/M1	Ra	Verify that random access transmissions are made by the station under test in all slots over 2 superframes.
		endrep		*n*:= *n* + 1		
postamble		send	VSS	SET PARAMETERS (p:= 64/256)		Reset to default value.
		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
Comments:						

Test Case Name:		**Version_NonZero**				
Purpose:		**To demonstrate that a station receiving a burst containing a non-zero version number will ignore the burst and inform the VSS user.**				
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
		send	VSS	SET PARAMETERS (p:= 1)		Ensure 100 % chance of transmission on access.
test body		send	RF	SYNC_BURST_f(*k*) (pt:= 3; po:= 0; s = *add_B*)	Sf(*k*)	Send a sync burst from a simulated station B reserving a block of slots but with a non-zero version number (ver set to 001binary). Information field filled with zeros extending reservation over k slots (burst length = *k*).
		macro		M_RAND_ACC (*sf*:= 2)		Queue random access transmissions over 2 superframes.
		await	RF	RAND_ACC_DATA_a (s = *add_A*)	Ra	Await random access transmission containing DATA_a(*m*).
		record	RF	*start_time*:= time at beginning of slot containing RAND_ACC_DATA_a (s = *add_A*)	Ra	Define a reference time to measure relative times from during the test.
		rep 2xM1		*n*:= 1		
		verify	RF	RAND_ACC_DATA_a (s = *add_A*) in slot beginning at *time* = *start_time* + *n* x 60/M1	Ra	Verify that random access transmissions are made by the station under test in all slots over 2 superframes.
		endrep		*n*:= *n* + 1		
		verify	VSS	Non-zero version number error message		Verify VSS user informed of receipt of reservation with non-zero version number.
postamble		send	VSS	SET PARAMETERS (p:= 64/256)		Reset to default value.
		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
Comments:						

Test Case Name:		**Queue_Replace**				
Purpose:		**To demonstrate that a burst submitted to the VSS layer with Q3 set to TRUE will replace any queued data of the same type.**				
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SET PARAMETERS (p:= 1; Q3:= TRUE)		Ensure 100 % chance of transmission on access.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
test body		send	RF	SYNC_BURST_d(25) (pt:= 3; po:= 0; s:= *add_B*)	Sd(25)	Send a sync burst from a simulated station B extending over 25 slots.
		record	RF	*sync_time*:= time at beginning of first slot occupied by SYNC_BURST_d(25) (s = *add_A*)	Sd(25)	Record the time at the start of the sync burst.
		await		*time*:= *sync_time* + 60		The reservation from the sync burst of station B prevents the station under test from transmitting for the next 25 slots.
		send	VSS	SYNC BURST TRANSMISSION (RANDOM ACCESS) request (INFO:= BASIC variable part)		Queue a request for transmission by random access of a sync burst with the basic variable part.
		send	VSS	SYNC BURST TRANSMISSION (RANDOM ACCESS) request (INFO:= BASIC GROUND variable part)		Queue a request for transmission by random access of a sync burst with the basic ground variable part.
		await		*time*:= *sync_time* + 86		Wait until the channel is free of reservations.
		verify	RF	SYNC_BURST_j (s = *add_A*) transmitted **AND** SYNC_BURST_c (s = *add_A*) not transmitted after *time*:= *sync_time* + 60	Sj, Sc	Verify that only the second sync burst is transmitted by the station under test.
postamble		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
		send	VSS	SET PARAMETERS (p:= 64/256; Q3:= FALSE)		Reset to default value.
Comments:						

Test Case Name:				Queue_Norm		
Purpose:				**To demonstrate that a burst submitted to the VSS layer with Q3 set to FALSE will not replace any queued data of the same type.**		
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SET PARAMETERS (p:= 1)		Ensure 100 % chance of transmission on access. Q3 set to FALSE by default.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
test body		send	RF	SYNC_BURST_d(25) (pt:= 3; po:= 0; s:= *add_B*)	Sd(25)	Send a sync burst from a simulated station B extending over 25 slots.
		record	RF	*sync_time*:= time at beginning of first slot occupied by SYNC_BURST_d(25) (s = *add_A*)	Sd(25)	Record the time at the start of the sync burst.
		await		*time*:= *sync_time* + 60		The reservation from the sync burst of station B prevents the station under test from transmitting for the next 25 slots.
		send	VSS	SYNC BURST TRANSMISSION (RANDOM ACCESS) request (INFO:= BASIC variable part)		Queue a request for transmission by random access of a sync burst with the basic variable part.
		send	VSS	SYNC BURST TRANSMISSION (RANDOM ACCESS) request (INFO:= BASIC GROUND variable part)		Queue a request for transmission by random access of a sync burst with the basic ground variable part.
		await		*time*:= *sync_time* + 86		Wait until the channel is free of reservations.
		verify	RF	SYNC_BURST_j (s = *add_A*) transmitted **AND** SYNC_BURST_c (s = *add_A*) transmitted after *time*:= *sync_time* + 60	Sj, Sc	Verify that both sync bursts are transmitted by the station under test.
postamble		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
		send	VSS	SET PARAMETERS (p:= 64/256)		Reset to default value.
Comments:						

Test Case Name:				MessageID_Invalid_A		
Purpose:				**To demonstrate that a unicast burst received with an invalid message ID will cause a General Failure burst to be transmitted.**		
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
test body		send	RF	UNI_BURST_b (sdf:= 0; ro:= 50; lg:= 0; pr:= 0; s:= *add_B*; d:= *add_A*)	Ub	Send a unicast reservation from station B with message ID set to an invalid value.
		record	RF	*uni_time*:= time at beginning of first slot occupied by UNI_BURST_b (s = *add_B*)	Ub	Record the time at the start of the unicast burst.
		await		*time*:= *uni_time* + 51		Wait for the slot reserved by the unicast reservation.
		verify	RF	GEN_RESP_a (ok= 0; r-mi= 1010101binary; err= 00 hex; bd = 0; s = *add_A*; d:= *add_B*) in slot beginning at *time*:= *uni_time* + 51	GRa	Verify that a General Failure burst is sent in the slot reserved by the unicast reservation.
postamble		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
Comments:						

Test Case Name:				MessageID_Invalid_B		
Purpose:				**To demonstrate that a burst with an invalid message ID not making a reservation for reply, causes no response to be made.**		
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
test body		send	RF	INCREM_BURST_c (io:= 10; s:= *add_B*)	Ic	Send an incremental broadcast reservation from station B with message ID set to an invalid value.
		record	RF	*increm_time*:= time at beginning of first slot occupied by INCREM_BURST_c (s = *add_B*)	Ic	Record the time at the start of the incremental burst.
		rep M1		*n*:= 1		Wait for the slot reserved by the incremental reservation.
		verify	RF	No response from the station under test in slot beginning at *time*:= *increm_time* + *n* x 60/M1		Verify that no response is made by the station under test in the following superframe.
		endrep		*n*:= *n* + 1		
postamble		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
Comments:						

Test Case Name:		**Reservation_Unrecognized**				
Reference:				**1.3.5** b		
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
		send	VSS	SET PARAMETERS (p:= 1)		Ensure 100 % chance of transmission on access.
test body		send	RF	BURST_UNREC_a (s = *add_B*)	Ba	Send a burst from a simulated station B with extended reservation ID (erid) field set to 00111binary, incremental offset (io) field set to 255, and reservation ID (rid) set to 0. The value of the extended reservation ID is currently reserved for future allocation and does not denote a recognized reservation type. The burst also resembles an incremental broadcast reservation with io = 255, reserving a slot 13,6 s later but with the erid field incorrectly set.
		macro		M_RAND_ACC (*sf*:= 2)		Queue random access transmissions over 2 superframes.
		await	RF	RAND_ACC_DATA_a (s = *add_A*)	Ra	Await random access transmission containing DATA_a(*m*). The first random access transmission shall be within 13 s of the unrecognized reservation burst for the test to be valid.
		record	RF	*start_time*:= time at beginning of slot containing RAND_ACC_DATA_a (s = *add_A*)	Ra	Define a reference time to measure relative times from during the test.
		rep 2 x M1		*n*:= 1		
		verify	RF	RAND_ACC_DATA_a (s:= *add_A*) in slot beginning at *time = start_time* + *n* x 60/M1	Ra	Verify that random access transmissions are made by the station under test in all slots over 2 superframes.
		endrep		*n*:= *n* + 1		
		verify	VSS	Unrecognized reservation type error message		Verify VSS user informed of receipt of reservation with an unrecognized extended reservation id field.
postamble		send	VSS	SET PARAMETERS (p:= 64/256)		Reset to default value.
		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
Comments:						

Test Case Name:		**Reservation_Recognition**				
Purpose:		**To demonstrate that a reservation will be recognized prior to the end of the slot following the transmission in which it was carried.**				
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
		send	VSS	SET PARAMETERS (p:= 1)		Ensure 100 % chance of transmission on access.
test body		send	RF	UNI_BURST_a (sdf:= 1; ro:= 2 000; lg:= 0; pr:= 0; s:= *add_B*; d:= *add_A*)	Ua	Send a unicast burst from a simulated station B, reserving a slot (r_slot) 2 001 slots after the transmission slot (t_slot) for the source to transmit in (r_slot = t_slot + ro + 1).
		record	RF	*reserve_time*:= time at beginning of slot containing UNI_BURST_a	Ua	Record the time of the slot containing the unicast reservation (*reserve_time* is the time at the beginning of t_slot).
		macro		M_RAND_ACC (*sf*:= 1)		Queue random access transmissions over 1 superframe.
		await	RF	RAND_ACC_DATA_a (s = *add_A*)	Ra	First random access transmission shall occur before the slot reserved by the unicast reservation.
		record	RF	*start_time*:= time at beginning of slot containing RAND_ACC_DATA_a (s = *add_A*)	Ra	Define a reference time to measure relative times from during the test.
		repx		*n*:= 1		
		verify	RF	RAND_ACC_DATA_a (s = *add_A*) in slot beginning at *time* = *start_time* + *n* x 60/M1	Ra	Verify that random access transmissions are made by the station under test in the slots preceding the reserved slot.
		until		*time* = *reserve_time* + 2 000 x 60/M1 (in previous step); *n*:= *n* + 1		End the loop when the slot immediately preceding the reserved slot is reached in the loop and checked for data.
		await		*time* = *reserve_time* + 2 001 x 60/M1		
		send	RF	UNI_BURST_a (sdf:= 1; ro:= 1; lg:= 0; pr:= 0; s:= *add_B*; d:= *add_A*) in slot beginning at *time* = *reserve_time* + 2 001 x 60/M1	Ua	Send a unicast burst from a simulated station B, reserving a slot 2 slots in the future.
		repx		*n*:= 1		
		verify verify	RF RF	**IF** *n* = 2 **THEN** no transmission present in slot beginning at *time* = *reserve_slot* + (*n* + 2 001) x 60/M1 **ELSE** RAND_ACC_DATA_a (s = *add_A*) in slot beginning at *time* = *reserve_slot* + (*n* + 2 001) x 60/M1	Ra	Verify that random access transmissions are made by the station under test in all slots except the reserved slot.
		until		*time* = *start_time* + 60; *n*:= *n* + 1		End the loop 1 minute after the first random access transmission was sent. Verification therefore takes place over 1 superframe + 1 slot.
postamble		send	VSS	SET PARAMETERS (p:= 64/256)		Reset to default value.
		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
Comments:						

Test Case Name:		SlotSel_Level0_A				
Purpose:		**To demonstrate that a station will select a slot at level 0 when no slots are reserved.**				
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
test body		send	VSS	PERIODIC BROADCAST request to transmit SYNC_BURST_b (Q4:= 11; $TV11_{min}$:= 1; $TV11_{max}$:= 1; V11:= 10; V12:= (10/M1) x V11)		Set up a series of periodic streams of one-slot messages from the station under test. Q4 set to 11; equals number of slots in dither range available for selection. TV11 reservation hold timer set to force dither in next frame. V11 set to 10 bursts within M1 slots. V12 set to give dither range of ±5.
		rep 111		n:= 1		Repeat test 111 times to generate statistical sample.
		await	RF	SYNC_BURST_b (pt:= 0; s = add_A)	Sb	
		record	RF	sync_time(n):= time at beginning of slot of n^{th} SYNC_BURST_b diff_time:= sync_time(n) - sync_time(1) - (n - 1) x 6 slot_diff(n):= diff_time x M1/60	Sb	Record the time of the n^{th} sync burst. sync_time(1) defines a reference time to measure relative times from during the test. Calculate the relative time differences between each ct_slot and the ct_slot of the first burst and transpose to a common time frame. Convert time differences to slot differences.
		endrep		n:= n + 1		
		verify		MAX(slot_diff(n)) - MIN(slot_diff(n)) ≤ V12 x M1/V11		Verify distribution of slots is over candidate slot range.
		record		num_slot_diff(m):= 0 for all m		Initialize the number of slots in each candidate slot position to zero.
		rep 111		n:= 2		
		record		num_slot_diff(slot_diff(n)):= num_slot_diff(slot_diff(n)) + 1		Record the frequency of occurrence of slots in each candidate slot position.
		endrep		n:= n + 1		
		rep m		m:= MIN(slot_diff(n)); chi_squared:= 0		Set initial value of m to the minimum value of slot_diff.
		record		chi_squared:= chi_squared + $(num\_slot\_diff(m) - 10)^2/10$		The distribution is tested for uniformity by calculating the value of chi_squared.
		until		m:= MAX(slot_diff(n))		
		verify		chi_squared < 15,99		Value of chi_squared shall be less than 15,99 for 90 % confidence that the distribution is uniform (10 degrees of freedom).
postamble		send	VSS	CANCEL PERIODIC RESERVATION request		Cancel established periodic streams.
		send	VSS	SET PARAMETERS (Q4:= 3; $TV11_{min}$:= 4; $TV11_{max}$:= 8; V11:= 6; V12:= 0.1)		Reset to default values.
		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
Comments:						

Test Case Name:				SlotSel_Level0_B		
Purpose:				**To demonstrate that a station will select a slot at level 0, excluding those not meeting the criteria of any other level.**		
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SET PARAMETERS (Q4:= 6; V22:= 720/(V21 x M1))		Q4 set to 6; equals the number of slots in the incremental broadcast dither range available for selection. V21 (nominal incremental reserved slot position) equals default value of 1,0 s. V22 (max incremental dither range) set to minimum; gives maximum dither range of 75 ± 12 after the incremental broadcast transmission slot (allowed slots of 64, 68, 72, 76, 80, 84).
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts.
test body		send	VSS	INCREMENTAL BROADCAST request to transmit INCREM_BURST_a followed by successive INCREM_BURST_a in reserved slots	Ia	Request to send incremental broadcast reservation and to place another incremental broadcast reservation in each reserved slot, thus creating an automatic succession of incremental broadcast reservations.
		await	RF	INCREM_BURST_a (s = add_A)	Ia	Wait for the incremental broadcast reservation.
		record	RF	current_inc_time:= time at beginning of slot containing INCREM_BURST_a (s = add_A)	Ia	Record the time of the incremental reservation transmission slot as current_inc_time.
		record	RF	IO(0):= io contained in INCREM_BURST _a (s = add_A)	Ia	Record value of io given in the incremental broadcast reservation.
		record		random_position:= 64 + 4 x RAND(0, 5)		Slot to reserve within each candidate range, chosen at random from the six possible candidate slots.
		record		no_IO(m):= 0 for m:= {64, 68, 72, 76, 80, 84}		Initialize the number of slots in each candidate slot position to zero.
		rep 50		n:= 1		Repeat 50 times.
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; s:= add_B; lat:= CPR_LAT(0); lon:= CPR_LON(E 110 NM)) (position of station B is < Q2a, b, c, d away from station under test) in slot beginning at time = current_inc_time + 5 x 60/M1	Sa	Send a sync burst from a simulated station B < Q2a, b, c, d away from the station under test, reporting B's position.
		record		reserve_slot:= 4 x IO(n - 1) + random_position		Slot position to reserve within the next-but-one incremental broadcast candidate range.
		send	RF	INCREM_BURST_a (io:= (reserve_slot - 16)/4; s:= add_B) in slot beginning at time = current_inc_time + 16 x 60/M1	Ia	Send a broadcast burst from station B < Q2a, b, c, d away from A. The burst reserves a slot in the candidate range of the next-but-one incremental broadcast reservation.
		await	RF	INCREM_BURST_a (s = add_A)	Ia	Wait for the next incremental broadcast reservation.
		record	RF	current_inc_time:= time at beginning of slot containing INCREM_BURST_a (s = add_A)	Ia	Record the time of the incremental reservation transmission slot as current_inc_time.
		record	RF	IO(n):= io contained in INCREM_BURST _a (s = add_A) no_IO(IO(n)):= no_IO(IO(n)) + 1	Ia	Record value of io given in the incremental broadcast reservation. Record the frequency of occurrence of slots in each candidate slot position.
		endrep		n:= n + 1		

Context	Step	Action	PCO	Action Qualifier	Ref	Comment
		verify		no_IO(random_position) = 0		Verify that no transmission is made in the slot reserved by station B.
		rep 6		m:= 64; chi_squared:= 0		Set value of m to the minimum value of the candidate range. Initialize chi_squared.
		record		**IF** m ≠ random_position **THEN** chi_squared:= chi_squared + $(no\_IO(m) - 10)^2/10$		For all the other slots the distribution is tested for uniformity by calculating the value of chi_squared.
		endrep		m:= m + 4		
		verify		chi_squared < 7,779		Value of chi_squared shall be less than 7,779 for 90 % confidence that the distribution is uniform (4 degrees of freedom).
postamble		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
		send	VSS	SET PARAMETERS (Q4:= 3; V22:= MIN (0,75, maximum allowed value of V22))		Reset to default values.
Comments:						

Test Case Name:				SlotSel_Level0_C		
Purpose:				**To demonstrate that a station will select a slot at level 0 in preference to those slots available at level 1.**		
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SET PARAMETERS (Q4:= 5; V22:= 720/(V21 x M1))		Q4 set to 5; equals one less than the number of slots in the incremental broadcast dither range available for selection. V21 (nominal incremental reserved slot position) equals default value of 1,0 s. V22 (max incremental dither range) set to minimum; gives maximum dither range of 75 ± 12 after the incremental broadcast transmission slot (allowed slots of 64, 68, 72, 76, 80, 84).
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts.
test body		send	VSS	INCREMENTAL BROADCAST request to transmit INCREM_BURST_a followed by successive INCREM_BURST_a in reserved slots	Ia	Request to send incremental broadcast reservation and to place another incremental broadcast reservation in each reserved slot, thus creating an automatic succession of incremental broadcast reservations.
		await	RF	INCREM_BURST_a (s = add_A)	Ia	Wait for the incremental broadcast reservation.
		record	RF	current_inc_time:= time at beginning of slot containing INCREM_BURST_a (s = add_A)	Ia	Record the time of the incremental reservation transmission slot as current_inc_time.
		record	RF	IO(0):= io contained in INCREM_BURST _a (s = add_A)	Ia	Record value of io given in the incremental broadcast reservation.
		record		random_position:= 64 + 4 x RAND(0, 5)		Slot to reserve within each candidate range, chosen at random from the six possible candidate slots.
		record		no_IO(m):= 0 for m:= {64, 68, 72, 76, 80, 84}		Initialize the number of slots in each candidate slot position to zero.
		rep 50		n:= 1		Repeat 50 times.
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; s:= add_B; lat:= CPR_LAT(0); lon:= CPR_LON(E 160 NM)) (position of station B is > Q2a away from station under test) in slot beginning at time = current_inc_time + 5 x 60/M1	Sa	Send a sync burst from a simulated station B > Q2a away from the station under test, reporting B's position.
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; s:= add_D; lat:= CPR_LAT(0); lon:= CPR_LON(E 170 NM)) (position of station D is such that a transmission from B to D is CCI protected) in slot beginning at time = current_inc_time + 10 x 60/M1	Sa	Send a sync burst from a simulated station D, reporting D's position, which is such that a transmission from B to D is CCI protected.
		record		reserve_slot:= 4 x IO(n - 1) + random_position		Slot position to reserve within the next-but-one incremental broadcast candidate range.
		send	RF	UNI_BURST_a (sdf:= 1; ro:= reserve_slot - 15 - 1; lg:= 0; pr:= 0; s:= add_B; d:= add_D) in slot beginning at time = current_inc_time + 15 x 60/M1	Ua	Send a unicast burst from station B > Q2a away from A, reserving a slot for transmission to station D. The distance from the station under test (station A) to station D is > (CCI ratio) times the distance from station B to station D, so that the transmission from B to D is CCI protected. The burst reserves a slot in the candidate range of the next-but-one incremental broadcast reservation.
		await	RF	INCREM_BURST_a (s = add_A)	Ia	Wait for the next incremental broadcast reservation.

Context	Step	Action	PCO	Action Qualifier	Ref	Comment
		record	RF	current_inc_time:= time at beginning of slot containing INCREM_BURST_a (s = add_A)	Ia	Record the time of the incremental reservation transmission slot as current_inc_time.
		record	RF	IO(n):= io contained in INCREM_BURST _a (s = add_A) no_IO(IO(n)):= no_IO(IO(n)) + 1	Ia	Record value of io given in the incremental broadcast reservation. Record the frequency of occurrence of slots in each candidate slot position.
		endrep		n:= n + 1		
		verify		no_IO(random_position) = 0		Verify that no transmission is made in the slot reserved by station B.
		rep 6		m:= 64; chi_squared:= 0		Set value of m to the minimum value of the candidate range. Initialize chi_squared.
		record		**IF** m ≠ random_position **THEN** chi_squared:= chi_squared + $(no\_IO(m) - 10)^2/10$		For all the other slots the distribution is tested for uniformity by calculating the value of chi_squared.
		endrep		m:= m + 4		
		verify		chi_squared < 7,779		Value of chi_squared shall be less than 7,779 for 90 % confidence that the distribution is uniform (4 degrees of freedom).
postamble		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
		send	VSS	SET PARAMETERS (Q4:= 3; V22:= MIN(0,75, maximum allowed value of V22))		Reset to default values.
Comments:						

Test Case Name:				SlotSel_Level0_D		
Purpose:				**To demonstrate that a station will select a slot at level 0 in preference to those slots available at level 2.**		
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SET PARAMETERS (Q4:= 5; V22:= 720/ (V21 x M1))		Q4 set to 5; equals one less than the number of slots in the incremental broadcast dither range available for selection. V21 (nominal incremental reserved slot position) equals default value of 1,0 s. V22 (max incremental dither range) set to minimum; gives maximum dither range of 75 ± 12 after the incremental broadcast transmission slot (allowed slots of 64, 68, 72, 76, 80, 84).
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts.
test body		send	VSS	INCREMENTAL BROADCAST request to transmit INCREM_BURST_a followed by successive INCREM_BURST_a in reserved slots	Ia	Request to send incremental broadcast reservation and to place another incremental broadcast reservation in each reserved slot, thus creating an automatic succession of incremental broadcast reservations.
		await	RF	INCREM_BURST_a (s = add_A)	Ia	Wait for the incremental broadcast reservation.
		record	RF	current_inc_time:= time at beginning of slot containing INCREM_BURST_a (s = add_A)	Ia	Record the time of the incremental reservation transmission slot as current_inc_time.
		record	RF	IO(0):= io contained in INCREM_BURST _a (s = add_A)	Ia	Record value of io given in the incremental broadcast reservation.
		record		random_position:= 64 + 4 x RAND(0, 5)		Slot to reserve within each candidate range, chosen at random from the six possible candidate slots.
		record		no_IO(m):= 0 for m:= {64, 68, 72, 76, 80, 84}		Initialize the number of slots in each candidate slot position to zero.
		rep 50		n:= 1		Repeat 50 times.
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; s:= add_B; lat:= CPR_LAT(0); lon:= CPR_LON(E 160 NM)) (position of station B is > Q2b away from station under test) in slot beginning at time = current_inc_time + 5 x 60/M1	Sa	Send a sync burst from a simulated station B > Q2b away from the station under test, reporting B's position.
		record		reserve_slot:= 4 x IO(n - 1) + random_position		Slot position to reserve within the next-but-one incremental broadcast candidate range.
		send	RF	INCREM_BURST_a (io:= (reserve_slot - 16)/4; s:= add_B) in slot beginning at time = current_inc_time + 16 x 60/M1	Ia	Send a broadcast burst from station B > Q2b away from A. The burst reserves a slot in the candidate range of the next-but-one incremental broadcast reservation.
		await	RF	INCREM_BURST_a (s = add_A)	Ia	Wait for the next incremental broadcast reservation.
		record	RF	current_inc_time:= time at beginning of slot containing INCREM_BURST_a (s = add_A)	Ia	Record the time of the incremental reservation transmission slot as current_inc_time.
		record	RF	IO(n):= io contained in INCREM_BURST _a (s = add_A) no_IO(IO(n)):= no_IO(IO(n)) + 1	Ia	Record value of io given in the incremental broadcast reservation. Record the frequency of occurrence of slots in each candidate slot position.
		endrep		n:= n + 1		

Context	Step	Action	PCO	Action Qualifier	Ref	Comment
		verify		no_IO(random_position) = 0		Verify that no transmission is made in the slot reserved by station B.
		rep 6		m:= 64; chi_squared:= 0		Set value of m to the minimum value of the candidate range. Initialize chi_squared.
		record		**IF** m ≠ random_position **THEN** chi_squared:= chi_squared + $(no\_IO(m) - 10)^2/10$		For all the other slots the distribution is tested for uniformity by calculating the value of chi_squared.
		endrep		m:= m + 4		
		verify		chi_squared < 7,779		Value of chi_squared shall be less than 7,779 for 90 % confidence that the distribution is uniform (4 degrees of freedom).
postamble		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
		send	VSS	SET PARAMETERS (Q4:= 3; V22:= MIN(0,75, maximum allowed value of V22))		Reset to default values.
Comments:						

Test Case Name:		SlotSel_Level0_E				
Purpose:		**To demonstrate that a station will select a slot at level 0 in preference to those slots available at level 3.**				
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SET PARAMETERS (Q4:= 5; V22:= 720/ (V21 x M1))		Q4 set to 5; equals one less than the number of slots in the incremental broadcast dither range available for selection. V21 (nominal incremental reserved slot position) equals default value of 1,0 s. V22 (max incremental dither range) set to minimum; gives maximum dither range of 75 ± 12 after the incremental broadcast transmission slot (allowed slots of 64, 68, 72, 76, 80, 84).
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts.
test body		send	VSS	INCREMENTAL BROADCAST request to transmit INCREM_BURST_a followed by successive INCREM_BURST_a in reserved slots	Ia	Request to send incremental broadcast reservation and to place another incremental broadcast reservation in each reserved slot, thus creating an automatic succession of incremental broadcast reservations.
		await	RF	INCREM_BURST_a (s = add_A)	Ia	Wait for the incremental broadcast reservation.
		record	RF	current_inc_time:= time at beginning of slot containing INCREM_BURST_a (s = add_A)	Ia	Record the time of the incremental reservation transmission slot as current_inc_time.
		record	RF	IO(0):= io contained in INCREM_BURST _a (s = add_A)	Ia	Record value of io given in the incremental broadcast reservation.
		record		random_position:= 64 + 4 x RAND(0, 5)		Slot to reserve within each candidate range, chosen at random from the six possible candidate slots.
		record		no_IO(m):= 0 for m:= {64, 68, 72, 76, 80, 84}		Initialize the number of slots in each candidate slot position to zero.
		rep 50		n:= 1		Repeat 50 times.
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; s:= add_B; lat:= CPR_LAT(0); lon:= CPR_LON(E 130 NM)) (position of station B is > Q2c away from station under test) in slot beginning at time = current_inc_time + 5 x 60/M1	Sa	Send a sync burst from a simulated station B > Q2c away from the station under test, reporting B's position.
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; s:= add_D; lat:= CPR_LAT(0); lon:= CPR_LON(E 140 NM)) (position of station D is such that a transmission from B to D is CCI protected) in slot beginning at time = current_inc_time + 10 x 60/M1	Sa	Send a sync burst from a simulated station D, reporting D's position, which is such that a transmission from B to D is CCI protected.
		record		reserve_slot:= 4 x IO(n - 1) + random_position		Slot position to reserve within the next-but-one incremental broadcast candidate range.
		send	RF	UNI_BURST_a (sdf:= 1; ro:= reserve_slot - 15 - 1; lg:= 0; pr:= 0; s:= add_B; d:= add_D) in slot beginning at time = current_inc_time + 15 x 60/M1	Ua	Send a unicast burst from station B > Q2c away from A, reserving a slot for transmission to station D. The distance from the station under test (station A) to station D is > (CCI ratio) times the distance from station B to station D, so that the transmission from B to D is CCI protected. The burst reserves a slot in the candidate range of the next-but-one incremental broadcast reservation.

Context	Step	Action	PCO	Action Qualifier	Ref	Comment
		await	RF	INCREM_BURST_a (s = add_A)	Ia	Wait for the next incremental broadcast reservation.
		record	RF	current_inc_time:= time at beginning of slot containing INCREM_BURST_a (s = add_A)	Ia	Record the time of the incremental reservation transmission slot as current_inc_time.
		record	RF	IO(n):= io contained in INCREM_BURST _a (s = add_A) no_IO(IO(n)):= no_IO(IO(n)) + 1	Ia	Record value of io given in the incremental broadcast reservation. Record the frequency of occurrence of slots in each candidate slot position.
		endrep		n:= n + 1		
		verify		no_IO(random_position) = 0		Verify that no transmission is made in the slot reserved by station B.
		rep 6		m:= 64; chi_squared:= 0		Set value of m to the minimum value of the candidate range. Initialize chi_squared.
		record		**IF** m ≠ random_position **THEN** chi_squared:= chi_squared + $(no\_IO(m) - 10)^2/10$		For all the other slots the distribution is tested for uniformity by calculating the value of chi_squared.
		endrep		m:= m + 4		
		verify		chi_squared < 7,779		Value of chi_squared shall be less than 7,779 for 90 % confidence that the distribution is uniform (4 degrees of freedom).
postamble		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
		send	VSS	SET PARAMETERS (Q4:= 3; V22:= MIN(0,75, maximum allowed value of V22))		Reset to default values.
Comments:						

Test Case Name:		SlotSel_Level0_F				
Purpose:		**To demonstrate that a station will select a slot at level 0 in preference to those slots available at level 4.**				
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SET PARAMETERS (Q4:= 5; V22:= 720/(V21xM1))		Q4 set to 5; equals one less than the number of slots in the incremental broadcast dither range available for selection. V21 (nominal incremental reserved slot position) equals default value of 1,0 s. V22 (max incremental dither range) set to minimum; gives maximum dither range of 75 ± 12 after the incremental broadcast transmission slot (allowed slots of 64, 68, 72, 76, 80, 84).
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts.
test body		send	VSS	INCREMENTAL BROADCAST request to transmit INCREM_BURST_a followed by successive INCREM_BURST_a in reserved slots	Ia	Request to send incremental broadcast reservation and to place another incremental broadcast reservation in each reserved slot, thus creating an automatic succession of incremental broadcast reservations.
		await	RF	INCREM_BURST_a (s = add_A)	Ia	Wait for the incremental broadcast reservation.
		record	RF	current_inc_time:= time at beginning of slot containing INCREM_BURST_a (s = add_A)	Ia	Record the time of the incremental reservation transmission slot as current_inc_time.
		record	RF	IO(0):= io contained in INCREM_BURST _a (s = add_A)	Ia	Record value of io given in the incremental broadcast reservation.
		record		random_position:= 64 + 4 x RAND(0, 5)		Slot to reserve within each candidate range, chosen at random from the six possible candidate slots.
		record		no_IO(m):= 0 for m:= {64, 68, 72, 76, 80, 84}		Initialize the number of slots in each candidate slot position to zero.
		rep 50		n:= 1		Repeat 50 times.
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; s:= add_B; lat:= CPR_LAT(0); lon:= CPR_LON(E 310 NM)) (position of station B is > Q2d away from station under test) in slot beginning at time = current_inc_time + 5 x 60/M1	Sa	Send a sync burst from a simulated station B > Q2d away from the station under test, reporting B's position.
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; s:= add_D; lat:= CPR_LAT(0); lon:= CPR_LON(E 160 NM)) (position of station D is such that a transmission from B to D is not CCI protected) in slot beginning at time = current_inc_time + 10 x 60/M1	Sa	Send a sync burst from a simulated station D, reporting D's position, which is such that a transmission from B to D is not CCI protected.
		record		reserve_slot:= 4 x IO(n - 1) + random_position		Slot position to reserve within the next-but-one incremental broadcast candidate range.
		send	RF	UNI_BURST_a (sdf:= 1; ro:= reserve_slot - 15 - 1; lg:= 0; pr:= 0; s:= add_B; d:= add_D) in slot beginning at time = current_inc_time + 15 x 60/M1	Ua	Send a unicast burst from station B > Q2d away from A, reserving a slot for transmission to station D. The distance from the station under test (station A) to station D is > (CCI ratio) times the distance from station B to station D, so that the transmission from B to D is not CCI protected. The burst reserves a slot in the candidate range of the next-but-one incremental broadcast reservation.

Context	Step	Action	PCO	Action Qualifier	Ref	Comment
		await	RF	INCREM_BURST_a (s = add_A)	Ia	Wait for the next incremental broadcast reservation.
		record	RF	current_inc_time:= time at beginning of slot containing INCREM_BURST_a (s = add_A)	Ia	Record the time of the incremental reservation transmission slot as current_inc_time.
		record	RF	IO(n):= io contained in INCREM_BURST _a (s = add_A) no_IO(IO(n)):= no_IO(IO(n)) + 1	Ia	Record value of io given in the incremental broadcast reservation. Record the frequency of occurrence of slots in each candidate slot position.
		endrep		n:= n + 1		
		verify		no_IO(random_position) = 0		Verify that no transmission is made in the slot reserved by station B.
		rep 6		m:= 64; chi_squared:= 0		Set value of m to the minimum value of the candidate range. Initialize chi_squared.
		record		**IF** m ≠ random_position **THEN** chi_squared:= chi_squared + $(no\_IO(m) - 10)^2/10$		For all the other slots the distribution is tested for uniformity by calculating the value of chi_squared.
		endrep		m:= m + 4		
		verify		chi_squared < 7,779		Value of chi_squared shall be less than 7,779 for 90 % confidence that the distribution is uniform (4 degrees of freedom).
postamble		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
		send	VSS	SET PARAMETERS (Q4:= 3; V22:= MIN(0,75, maximum allowed value of V22))		Reset to default values.
Comments:						

Test Case Name:		SlotSel_Level1_A				
Purpose:		**To demonstrate that a station will select a slot at level 1 when the appropriate criteria are satisfied.**				
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SET PARAMETERS (Q4:= 6; V22:= 720/(V21xM1))		Q4 set to 6; equals the number of slots in the incremental broadcast dither range available for selection. V21 (nominal reserved slot position) equals default value of 1,0 s. V22 (max incremental dither range) set to minimum; gives maximum dither range of 75 ± 12 after the incremental broadcast transmission slot (allowed slots of 64, 68, 72, 76, 80, 84).
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts.
test body		send	VSS	INCREMENTAL BROADCAST request to transmit INCREM_BURST_a followed by successive INCREM_BURST_a in reserved slots	Ia	Request to send incremental broadcast reservation and to place another incremental broadcast reservation in each reserved slot, thus creating an automatic succession of incremental broadcast reservations.
		await	RF	INCREM_BURST_a (s = add_A)	Ia	Wait for the incremental broadcast reservation.
		record	RF	current_inc_time:= time at beginning of slot containing INCREM_BURST_a (s = add_A)	Ia	Record the time of the incremental reservation transmission slot as current_inc_time.
		record	RF	IO(0):= io contained in INCREM_BURST _a (s = add_A)	Ia	Record value of io given in the incremental broadcast reservation.
		record		random_position:= 64 + 4 x RAND(0, 5)		Slot to reserve within each candidate range, chosen at random from the six possible candidate slots.
		record		no_IO(m):= 0 for m:= {64, 68, 72, 76, 80, 84}		Initialize the number of slots in each candidate slot position to zero.
		rep 60		n:= 1		Repeat 60 times.
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; s:= add_B; lat:= CPR_LAT(0); lon:= CPR_LON(E 160 NM)) (position of station B is > Q2a away from station under test) in slot beginning at time = current_inc_time + 5 x 60/M1	Sa	Send a sync burst from a simulated station B > Q2a away from the station under test, reporting B's position.
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; s:= add_D; lat:= CPR_LAT(0); lon:= CPR_LON(E 170 NM)) (position of station D is such that a transmission from B to D is CCI protected) in slot beginning at time = current_inc_time + 10 x 60/M1	Sa	Send a sync burst from a simulated station D, reporting D's position, which is such that a transmission from B to D is CCI protected.
		record		reserve_slot:= 4 x IO(n - 1) + random_position		Slot position to reserve within the next-but-one incremental broadcast candidate range.
		send	RF	UNI_BURST_a (sdf:= 1; ro:= reserve_slot - 15 - 1; lg:= 0; pr:= 0; s:= add_B; d:= add_D) in slot beginning at time = current_inc_time + 15 x 60/M1	Ua	Send a unicast burst from station B > Q2a away from A, reserving a slot for transmission to station D. The distance from the station under test (station A) to station D is > (CCI ratio) times the distance from station B to station D, so that the transmission from B to D is CCI protected. The burst reserves a slot in the candidate range of the next-but-one incremental broadcast reservation.

Context	Step	Action	PCO	Action Qualifier	Ref	Comment
		await	RF	INCREM_BURST_a (s = add_A)	Ia	Wait for the next incremental broadcast reservation.
		record	RF	current_inc_time:= time at beginning of slot containing INCREM_BURST_a (s = add_A)	Ia	Record the time of the incremental reservation transmission slot as current_inc_time.
		record	RF	IO(n):= io contained in INCREM_BURST _a (s = add_A) no_IO(IO(n)):= no_IO(IO(n)) + 1	Ia	Record value of io given in the incremental broadcast reservation. Record the frequency of occurrence of slots in each candidate slot position.
		endrep		n:= n + 1		
		rep 6		m:= 64; chi_squared:= 0		Set value of m to the minimum value of the candidate range. Initialize chi_squared.
		record		chi_squared:= chi_squared + (no_IO(m) - 10)^2/10		The distribution is tested for uniformity by calculating the value of chi_squared.
		endrep		m:= m + 4		
		verify		chi_squared < 9,236		Value of chi_squared shall be less than 9,236 for 90 % confidence that the distribution is uniform (5 degrees of freedom).
postamble		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
		send	VSS	SET PARAMETERS (Q4:= 3; V22:= MIN(0,75, maximum allowed value of V22))		Reset to default values.
Comments:						

Test Case Name:		SlotSel_Level1_B				
Purpose:		**To demonstrate that a station will select a slot at level 1, excluding those slots not meeting the criteria of level 1 or any lower priority level.**				
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SET PARAMETERS (Q4:= 6; V22:= 720/(V21 x M1))		Q4 set to 6; equals the number of slots in the incremental broadcast dither range available for selection. V21 (nominal incremental reserved slot position) equals default value of 1,0 s. V22 (max incremental dither range) set to minimum; gives maximum dither range of 75 ± 12 after the incremental broadcast transmission slot (allowed slots of 64, 68, 72, 76, 80, 84).
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts.
test body		send	VSS	INCREMENTAL BROADCAST request to transmit INCREM_BURST_a followed by successive INCREM_BURST_a in reserved slots	Ia	Request to send incremental broadcast reservation and to place another incremental broadcast reservation in each reserved slot, thus creating an automatic succession of incremental broadcast reservations.
		await	RF	INCREM_BURST_a (s = add_A)	Ia	Wait for the incremental broadcast reservation.
		record	RF	current_inc_time:= time at beginning of slot containing INCREM_BURST_a (s = add_A)	Ia	Record the time of the incremental reservation transmission slot as current_inc_time.
		record	RF	IO(0):= io contained in INCREM_BURST _a (s = add_A)	Ia	Record value of io given in the incremental broadcast reservation.
		record		M_ASSIGN_SLOTS (random_position_1, random_position_2)		Slot to reserve within each candidate range, chosen at random from the six possible candidate slots.
		record		no_IO(m):= 0 for m:= {64, 68, 72, 76, 80, 84}		Initialize the number of slots in each candidate slot position to zero.
		rep 50		n:= 1		Repeat 50 times.
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; s:= add_B; lat:= CPR_LAT(0); lon:= CPR_LON(E 160 NM)) (position of station B is > Q2a away from station under test) in slot beginning at time = current_inc_time + 5 x 60/M1	Sa	Send a sync burst from a simulated station B > Q2a away from the station under test, reporting B's position.
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; s:= add_E; lat:= CPR_LAT(0); lon:= CPR_LON(E 110 NM)) (position of station E is < Q2a, b, c, d away from station under test) in slot beginning at time = current_inc_time + 7 x 60/M1	Sa	Send a sync burst from a simulated station E < Q2a, b, c, d away from the station under test, reporting E's position.
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; s:= add_D; lat:= CPR_LAT(0); lon:= CPR_LON(E 130 NM)) (position of station D is such that a transmission from B to D is CCI protected and that a transmission from E to D is CCI protected) in slot beginning at time = current_inc_time + 10 x 60/M1	Sa	Send a sync burst from a simulated station D, reporting D's position, which is such that a transmission from B to D is CCI protected and that a transmission from E to D is CCI protected.

Context	Step	Action	PCO	Action Qualifier	Ref	Comment
		record		reserve_slot_1:= 4 x IO(n - 1) + random_position_1 reserve_slot_2:= 4 x IO(n - 1) + random_position_2		Slot positions to reserve within the next-but-one incremental broadcast candidate range.
		send	RF	UNI_BURST_a (sdf:= 1; ro:= reserve_slot_1 - 15 - 1; lg:= 0; pr:= 0; s:= add_B; d:= add_D) in slot beginning at time = current_inc_time + 15 x 60/M1	Ua	Send a unicast burst from station B > Q2a away from A, reserving a slot for transmission to station D. The distance from the station under test (station A) to station D is > (CCI ratio) times the distance from station B to station D, so that the transmission from B to D is CCI protected. The burst reserves a slot in the candidate range of the next-but-one incremental broadcast reservation.
		send	RF	UNI_BURST_a (sdf:= 1; ro:= reserve_slot_2 - 20 - 1; lg:= 0; pr:= 0; s:= add_E; d:= add_D) in slot beginning at time = current_inc_time + 20 x 60/M1	Ua	Send a unicast burst from station E < Q2a,b,c,d away from A, reserving a slot for transmission to station D. The distance from the station under test (station A) to station D is > (CCI ratio) times the distance from station E to station D, so that the transmission from E to D is CCI protected. The burst reserves a slot in the candidate range of the next-but-one incremental broadcast reservation.
		await	RF	INCREM_BURST_a (s = add_A)	Ia	Wait for the next incremental broadcast reservation.
		record	RF	current_inc_time:= time at beginning of slot containing INCREM_BURST_a (s = add_A)	Ia	Record the time of the incremental reservation transmission slot as current_inc_time.
		record	RF	IO(n):= io contained in INCREM_BURST _a (s = add_A) no_IO(IO(n)):= no_IO(IO(n)) + 1	Ia	Record value of io given in the incremental broadcast reservation. Record the frequency of occurrence of slots in each candidate slot position.
		endrep		n:= n + 1		
		verify		no_IO(random_position) = 0		Verify that no transmission is made in the slot reserved by station E.
		rep 6		m:= 64; chi_squared:= 0		Set value of m to the minimum value of the candidate range. Initialize chi_squared.
		record		**IF** m ≠ random_position **THEN** chi_squared:= chi_squared + $(no\_IO(m) - 10)^2/10$		For all the other slots the distribution is tested for uniformity by calculating the value of chi_squared.
		endrep		m:= m + 4		
		verify		chi_squared < 7,779		Value of chi_squared shall be less than 7,779 for 90 % confidence that the distribution is uniform (4 degrees of freedom).
postamble		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
		send	VSS	SET PARAMETERS (Q4:= 3; V22:= MIN(0,75, maximum allowed value of V22))		Reset to default values.
Comments:						

Test Case Name:		SlotSel_Level1_C				
Purpose:		**To demonstrate that a station will select a slot at level 1 in preference to those available at level 2.**				
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SET PARAMETERS (Q4:= 5; V22:= 720/(V21 x M1))		Q4 set to 5; equals one less than the number of slots in the incremental broadcast dither range available for selection. V21 (nominal incremental reserved slot position) equals default value of 1,0 s. V22 (max incremental dither range) set to minimum; gives maximum dither range of 75 ± 12 after the incremental broadcast transmission slot (allowed slots of 64, 68, 72, 76, 80, 84).
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts.
test body		send	VSS	INCREMENTAL BROADCAST request to transmit INCREM_BURST_a followed by successive INCREM_BURST_a in reserved slots	Ia	Request to send incremental broadcast reservation and to place another incremental broadcast reservation in each reserved slot, thus creating an automatic succession of incremental broadcast reservations.
		await	RF	INCREM_BURST_a (s = add_A)	Ia	Wait for the incremental broadcast reservation.
		record	RF	current_inc_time:= time at beginning of slot containing INCREM_BURST_a (s = add_A)	Ia	Record the time of the incremental reservation transmission slot as current_inc_time.
		record	RF	IO(0):= io contained in INCREM_BURST _a (s = add_A)	Ia	Record value of io given in the incremental broadcast reservation.
		record		M_ASSIGN_SLOTS (random_position_1, random_position_2)		Slot to reserve within each candidate range, chosen at random from the six possible candidate slots.
		record		no_IO(m):= 0 for m:= {64, 68, 72, 76, 80, 84}		Initialize the number of slots in each candidate slot position to zero.
		rep 50		n:= 1		Repeat 50 times.
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; s:= add_B; lat:= CPR_LAT(0); lon:= CPR_LON(E 160 NM)) (position of station B is > Q2a away from station under test) in slot beginning at time = current_inc_time + 5 x 60/M1	Sa	Send a sync burst from a simulated station B > Q2a away from the station under test, reporting B's position.
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; s:= add_E; lat:= CPR_LAT(0); lon:= CPR_LON(E 170 NM)) (position of station E is > Q2b away from station under test) in slot beginning at time = current_inc_time + 7 x 60/M1	Sa	Send a sync burst from a simulated station E > Q2b away from the station under test, reporting E's position.
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; s:= add_D; lat:= CPR_LAT(0); lon:= CPR_LON(E 180 NM)) (position of station D is such that a transmission from B to D is CCI protected) in slot beginning at time = current_inc_time + 10 x 60/M1	Sa	Send a sync burst from a simulated station D, reporting D's position, which is such that a transmission from B to D is CCI protected.
		record		reserve_slot_1:= 4 x IO(n - 1) + random_position_1 reserve_slot_2:= 4 x IO(n - 1) + random_position_2		Slot positions to reserve within the next-but-one incremental broadcast candidate range.

Context	Step	Action	PCO	Action Qualifier	Ref	Comment
		send	RF	UNI_BURST_a (sdf:= 1; ro:= reserve_slot_1 - 15 - 1; lg:= 0; pr:= 0; s:= add_B; d:= add_D) in slot beginning at time = current_inc_time + 15 x 60/M1	Ua	Send a unicast burst from station B > Q2a away from A, reserving a slot for transmission to station D. The distance from the station under test (station A) to station D is > (CCI ratio) times the distance from station B to station D, so that the transmission from B to D is CCI protected. The burst reserves a slot in the candidate range of the next-but-one incremental broadcast reservation.
		send	RF	INCREM_BURST_a (io:= (reserve_slot_2 - 20)/4; s:= add_E) in slot beginning at time = current_inc_time + 20 x 60/M1	Ia	Send a broadcast burst from station E > Q2b away from A. The burst reserves a slot in the candidate range of the next-but-one incremental broadcast reservation.
		await	RF	INCREM_BURST_a (s = add_A)	Ia	Wait for the next incremental broadcast reservation.
		record	RF	current_inc_time:= time at beginning of slot containing INCREM_BURST_a (s = add_A)	Ia	Record the time of the incremental reservation transmission slot as current_inc_time.
		record	RF	IO(n):= io contained in INCREM_BURST _a (s = add_A) no_IO(IO(n)):= no_IO(IO(n)) + 1	Ia	Record value of io given in the incremental broadcast reservation. Record the frequency of occurrence of slots in each candidate slot position.
		endrep		n:= n + 1		
		verify		no_IO(random_position) = 0		Verify that no transmission is made in the slot reserved by station E.
		rep 6		m:= 64; chi_squared:= 0		Set value of m to the minimum value of the candidate range. Initialize chi_squared.
		record		**IF** m ≠ random_position **THEN** chi_squared:= chi_squared + $(no\_IO(m) - 10)^2/10$		For all the other slots the distribution is tested for uniformity by calculating the value of chi_squared.
		endrep		m:= m + 4		
		verify		chi_squared < 7,779		Value of chi_squared shall be less than 7,779 for 90 % confidence that the distribution is uniform (4 degrees of freedom).
postamble		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
		send	VSS	SET PARAMETERS (Q4:= 3; V22:= MIN(0,75, maximum allowed value of V22))		Reset to default values.
Comments:						

Test Case Name:		SlotSel_Level1_D				
Purpose:		**To demonstrate that a station will select a slot at level 1 in preference to those available at level 3.**				
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SET PARAMETERS (Q4:= 5; V22:= 720/(V21 x M1))		Q4 set to 5; equals the number of slots in the incremental broadcast dither range available for selection. V21 (nominal incremental reserved slot position) equals default value of 1,0 s. V22 (max incremental dither range) set to minimum; gives maximum dither range of 75 ± 12 after the incremental broadcast transmission slot (allowed slots of 64, 68, 72, 76, 80, 84).
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts.
test body		send	VSS	INCREMENTAL BROADCAST request to transmit INCREM_BURST_a followed by successive INCREM_BURST_a in reserved slots	Ia	Request to send incremental broadcast reservation and to place another incremental broadcast reservation in each reserved slot, thus creating an automatic succession of incremental broadcast reservations.
		await	RF	INCREM_BURST_a (s = add_A)	Ia	Wait for the incremental broadcast reservation.
		record	RF	current_inc_time:= time at beginning of slot containing INCREM_BURST_a (s = add_A)	Ia	Record the time of the incremental reservation transmission slot as current_inc_time.
		record	RF	IO(0):= io contained in INCREM_BURST _a (s = add_A)	Ia	Record value of io given in the incremental broadcast reservation.
		record		M_ASSIGN_SLOTS (random_position_1, random_position_2)		Slot to reserve within each candidate range, chosen at random from the six possible candidate slots.
		record		no_IO(m):= 0 for m:= {64, 68, 72, 76, 80, 84}		Initialize the number of slots in each candidate slot position to zero.
		rep 50		n:= 1		Repeat 50 times.
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; s:= add_B; lat:= CPR_LAT(0); lon:= CPR_LON(E 160 NM)) (position of station B is > Q2a away from station under test) in slot beginning at time = current_inc_time + 5 x 60/M1	Sa	Send a sync burst from a simulated station B > Q2a away from the station under test, reporting B's position.
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; s:= add_E; lat:= CPR_LAT(0); lon:= CPR_LON(E 130 NM)) (position of station E is > Q2c away from station under test) in slot beginning at time = current_inc_time + 7 x 60/M1	Sa	Send a sync burst from a simulated station E > Q2c away from the station under test, reporting E's position.
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; s:= add_D; lat:= CPR_LAT(0); lon:= CPR_LON(E 140 NM)) (position of station D is such that a transmission from B to D is CCI protected and that a transmission from E to D is CCI protected) in slot beginning at time = current_inc_time + 10 x 60/M1	Sa	Send a sync burst from a simulated station D, reporting D's position, which is such that a transmission from B to D is CCI protected and that a transmission from E to D is CCI protected.

Context	Step	Action	PCO	Action Qualifier	Ref	Comment
		record		reserve_slot_1:= 4 x IO(n - 1) + random_position_1 reserve_slot_2:= 4 x IO(n - 1) + random_position_2		Slot positions to reserve within the next-but-one incremental broadcast candidate range.
		send	RF	UNI_BURST_a (sdf:= 1; ro:= reserve_slot_1 - 15 - 1; lg:= 0; pr:= 0; s:= add_B; d:= add_D) in slot beginning at time = current_inc_time + 15 x 60/M1	Ua	Send a unicast burst from station B > Q2a away from A, reserving a slot for transmission to station D. The distance from the station under test (station A) to station D is > (CCI ratio) times the distance from station B to station D, so that the transmission from B to D is CCI protected. The burst reserves a slot in the candidate range of the next-but-one incremental broadcast reservation.
		send	RF	UNI_BURST_a (sdf:= 1; ro:= reserve_slot_2 - 20 - 1; lg:= 0; pr:= 0; s:= add_E; d:= add_D) in slot beginning at time = current_inc_time + 20 x 60/M1	Ua	Send a unicast burst from station E > Q2c away from A, reserving a slot for transmission to station D. The distance from the station under test (station A) to station D is > (CCI ratio) times the distance from station E to station D, so that the transmission from E to D is CCI protected. The burst reserves a slot in the candidate range of the next-but-one incremental broadcast reservation.
		await	RF	INCREM_BURST_a (s = add_A)	Ia	Wait for the next incremental broadcast reservation.
		record	RF	current_inc_time:= time at beginning of slot containing INCREM_BURST_a (s = add_A)	Ia	Record the time of the incremental reservation transmission slot as current_inc_time.
		record	RF	IO(n):= io contained in INCREM_BURST _a (s = add_A) no_IO(IO(n)):= no_IO(IO(n)) + 1	Ia	Record value of io given in the incremental broadcast reservation. Record the frequency of occurrence of slots in each candidate slot position.
		endrep		n:= n + 1		
		verify		no_IO(random_position) = 0		Verify that no transmission is made in the slot reserved by station E.
		rep 6		m:= 64; chi_squared:= 0		Set value of m to the minimum value of the candidate range. Initialize chi_squared.
		record		**IF** m ≠ random_position **THEN** chi_squared:= chi_squared + $(no\_IO(m) - 10)^2/10$		For all the other slots the distribution is tested for uniformity by calculating the value of chi_squared.
		endrep		m:= m + 4		
		verify		chi_squared < 7,779		Value of chi_squared shall be less than 7,779 for 90 % confidence that the distribution is uniform (4 degrees of freedom).
postamble		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
		send	VSS	SET PARAMETERS (Q4:= 3; V22:= MIN(0,75, maximum allowed value of V22))		Reset to default values.
Comments:						

Test Case Name:				SlotSel_Level1_E		
Purpose:				**To demonstrate that a station will select a slot at level 1, in preference to those available at level 4.** **To demonstrate that a station will select a slot at level 1, in preference to those available at level 4.**		
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SET PARAMETERS (Q4:= 5; V22:= 720/(V21 x M1))		Q4 set to 5; equals the number of slots in the incremental broadcast dither range available for selection. V21 (nominal incremental reserved slot position) equals default value of 1,0 s. V22 (max incremental dither range) set to minimum; gives maximum dither range of 75 ± 12 after the incremental broadcast transmission slot (allowed slots of 64, 68, 72, 76, 80, 84).
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts.
test body		send	VSS	INCREMENTAL BROADCAST request to transmit INCREM_BURST_a followed by successive INCREM_BURST_a in reserved slots	Ia	Request to send incremental broadcast reservation and to place another incremental broadcast reservation in each reserved slot, thus creating an automatic succession of incremental broadcast reservations.
		await	RF	INCREM_BURST_a (s = add_A)	Ia	Wait for the incremental broadcast reservation.
		record	RF	current_inc_time:= time at beginning of slot containing INCREM_BURST_a (s = add_A)	Ia	Record the time of the incremental reservation transmission slot as current_inc_time.
		record	RF	IO(0):= io contained in INCREM_BURST _a (s = add_A)	Ia	Record value of io given in the incremental broadcast reservation.
		record		M_ASSIGN_SLOTS (random_position_1, random_position_2)		Slot to reserve within each candidate range, chosen at random from the six possible candidate slots.
		record		no_IO(m):= 0 for m:= {64, 68, 72, 76, 80, 84}		Initialize the number of slots in each candidate slot position to zero.
		rep 50		n:= 1		Repeat 50 times.
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; s:= add_B; lat:= CPR_LAT(0); lon:= CPR_LON(E 160 NM)) (position of station B is > Q2a away from station under test) in slot beginning at time = current_inc_time + 5 x 60/M1	Sa	Send a sync burst from a simulated station B > Q2a away from the station under test, reporting B's position.
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; s:= add_E; lat:= CPR_LAT(0); lon:= CPR_LON(E 310 NM)) (position of station E is > Q2d away from station under test) in slot beginning at time = current_inc_time + 7 x 60/M1	Sa	Send a sync burst from a simulated station E > Q2d away from the station under test, reporting E's position.
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; s:= add_D; lat:= CPR_LAT(0); lon:= CPR_LON(E 140 NM)) (position of station D is such that a transmission from B to D is CCI protected and that a transmission from E to D is not CCI protected) in slot beginning at time = current_inc_time + 10 x 60/M1	Sa	Send a sync burst from a simulated station D, reporting D's position, which is such that a transmission from B to D is CCI protected and that a transmission from E to D is not CCI protected.

Context	Step	Action	PCO	Action Qualifier	Ref	Comment
		record		reserve_slot_1:= 4 x IO(n - 1) + random_position_1 reserve_slot_2:= 4 x IO(n - 1) + random_position_2		Slot positions to reserve within the next-but-one incremental broadcast candidate range.
		send	RF	UNI_BURST_a (sdf:= 1; ro:= reserve_slot_1 - 15 - 1; lg:= 0; pr:= 0; s:= add_B; d:= add_D) in slot beginning at time = current_inc_time + 15 x 60/M1	Ua	Send a unicast burst from station B > Q2a away from A, reserving a slot for transmission to station D. The distance from the station under test (station A) to station D is > (CCI ratio) times the distance from station B to station D, so that the transmission from B to D is CCI protected. The burst reserves a slot in the candidate range of the next-but-one incremental broadcast reservation.
		send	RF	UNI_BURST_a (sdf:= 1; ro:= reserve_slot_2 - 20 - 1; lg:= 0; pr:= 0; s:= add_E; d:= add_D) in slot beginning at time = current_inc_time + 20 x 60/M1	Ua	Send a unicast burst from station E > Q2d away from A, reserving a slot for transmission to station D. The distance from the station under test (station A) to station D is < (CCI ratio) times the distance from station E to station D, so that the transmission from E to D is not CCI protected. The burst reserves a slot in the candidate range of the next-but-one incremental broadcast reservation.
		await	RF	INCREM_BURST_a (s = add_A)	Ia	Wait for the next incremental broadcast reservation.
		record	RF	current_inc_time:= time at beginning of slot containing INCREM_BURST_a (s = add_A)	Ia	Record the time of the incremental reservation transmission slot as current_inc_time.
		record	RF	IO(n):= io contained in INCREM_BURST _a (s = add_A) no_IO(IO(n)):= no_IO(IO(n)) + 1	Ia	Record value of io given in the incremental broadcast reservation. Record the frequency of occurrence of slots in each candidate slot position.
		endrep		n:= n + 1		
		verify		no_IO(random_position) = 0		Verify that no transmission is made in the slot reserved by station E.
		rep 6		m:= 64; chi_squared:= 0		Set value of m to the minimum value of the candidate range. Initialize chi_squared.
		record		**IF** m ≠ random_position **THEN** chi_squared:= chi_squared + $(no\_IO(m) - 10)^2/10$		For all the other slots the distribution is tested for uniformity by calculating the value of chi_squared.
		endrep		m:= m + 4		
		verify		chi_squared < 7,779		Value of chi_squared shall be less than 7,779 for 90 % confidence that the distribution is uniform (4 degrees of freedom).
postamble		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
		send	VSS	SET PARAMETERS (Q4:= 3; V22:= MIN(0,75, maximum allowed value of V22))		Reset to default values.
Comments:						

Test Case Name:				SlotSel_Level1_F		
Purpose:				**To demonstrate that a station will select slots at level 1 from a more distant station in preference to a closer station.**		
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SET PARAMETERS (Q4:= 5; V22:= 720/ (V21 x M1))		Q4 set to 5; equals the number of slots in the incremental broadcast dither range available for selection. V21 (nominal incremental reserved slot position) equals default value of 1,0 s. V22 (max incremental dither range) set to minimum; gives maximum dither range of 75 ± 12 after the incremental broadcast transmission slot (allowed slots of 64, 68, 72, 76, 80, 84).
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts.
test body		send	VSS	INCREMENTAL BROADCAST request to transmit INCREM_BURST_a followed by successive INCREM_BURST_a in reserved slots	Ia	Request to send incremental broadcast reservation and to place another incremental broadcast reservation in each reserved slot, thus creating an automatic succession of incremental broadcast reservations.
		await	RF	INCREM_BURST_a (s = add_A)	Ia	Wait for the incremental broadcast reservation.
		record	RF	current_inc_time:= time at beginning of slot containing INCREM_BURST_a (s = add_A)	Ia	Record the time of the incremental reservation transmission slot as current_inc_time.
		record	RF	IO(0):= io contained in INCREM_BURST _a (s = add_A)	Ia	Record value of io given in the incremental broadcast reservation.
		record		M_ASSIGN_SLOTS (random_position_1, random_position_2)		Slot to reserve within each candidate range, chosen at random from the six possible candidate slots.
		record		no_IO(m):= 0 for m:= {64, 68, 72, 76, 80, 84}		Initialize the number of slots in each candidate slot position to zero.
		rep 50		n:= 1		Repeat 50 times.
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; s:= add_B; lat:= CPR_LAT(0); lon:= CPR_LON(E 170 NM)) (position of station B is > Q2a away from station under test) in slot beginning at time = current_inc_time + 5 x 60/M1	Sa	Send a sync burst from a simulated station B > Q2a away from the station under test, reporting B's position.
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; s:= add_E; lat:= CPR_LAT(0); lon:= CPR_LON(E 160 NM)) (position of station E is > Q2a away from station under test but closer to the station under test than station B) in slot beginning at time = current_inc_time + 7 x 60/M1	Sa	Send a sync burst from a simulated station E > Q2a away from the station under test, reporting E's position. Station E is closer to the station under test than station B.
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; s:= add_D; lat:= CPR_LAT(0); lon:= CPR_LON(E 180 NM)) (position of station D is such that a transmission from B to D is CCI protected and that a transmission from E to D is CCI protected) in slot beginning at time = current_inc_time + 10 x 60/M1	Sa	Send a sync burst from a simulated station D, reporting D's position, which is such that a transmission from B to D is CCI protected and that a transmission from E to D is CCI protected.

Context	Step	Action	PCO	Action Qualifier	Ref	Comment
		record		reserve_slot_1:= 4 x IO(n - 1) + random_position_1 reserve_slot_2:= 4 x IO(n - 1) + random_position_2		Slot positions to reserve within the next-but-one incremental broadcast candidate range.
		send	RF	UNI_BURST_a (sdf:= 1; ro:= reserve_slot_1 - 15 - 1; lg:= 0; pr:= 0; s:= add_B; d:= add_D) in slot beginning at time = current_inc_time + 15 x 60/M1	Ua	Send a unicast burst from station B > Q2a away from A, reserving a slot for transmission to station D. The distance from the station under test (station A) to station D is > (CCI ratio) times the distance from station B to station D, so that the transmission from B to D is CCI protected. The burst reserves a slot in the candidate range of the next-but-one incremental broadcast reservation.
		send	RF	UNI_BURST_a (sdf:= 1; ro:= reserve_slot_2 - 20 - 1; lg:= 0; pr:= 0; s:= add_E; d:= add_D) in slot beginning at time = current_inc_time + 20 x 60/M1	Ua	Send a unicast burst from station E > Q2a away from A, reserving a slot for transmission to station D. Station E is closer to the station under test than station B. The distance from the station under test (station A) to station D is > (CCI ratio) times the distance from station E to station D, so that the transmission from E to D is CCI protected. The burst reserves a slot in the candidate range of the next-but-one incremental broadcast reservation.
		await	RF	INCREM_BURST_a (s = add_A)	Ia	Wait for the next incremental broadcast reservation.
		record	RF	current_inc_time:= time at beginning of slot containing INCREM_BURST_a (s = add_A)	Ia	Record the time of the incremental reservation transmission slot as current_inc_time.
		record	RF	IO(n):= io contained in INCREM_BURST _a (s = add_A) no_IO(IO(n)):= no_IO(IO(n)) + 1	Ia	Record value of io given in the incremental broadcast reservation. Record the frequency of occurrence of slots in each candidate slot position.
		endrep		n:= n + 1		
		verify		no_IO(random_position) = 0		Verify that no transmission is made in the slot reserved by station E.
		rep 6		m:= 64; chi_squared:= 0		Set value of m to the minimum value of the candidate range. Initialize chi_squared.
		record		**IF** m ≠ random_position **THEN** chi_squared:= chi_squared + $(no\_IO(m) - 10)^2/10$		For all the other slots the distribution is tested for uniformity by calculating the value of chi_squared.
		endrep		m:= m + 4		
		verify		chi_squared < 7,779		Value of chi_squared shall be less than 7,779 for 90 % confidence that the distribution is uniform (4 degrees of freedom).
postamble		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
		send	VSS	SET PARAMETERS (Q4:= 3; V22:= MIN(0,75, maximum allowed value of V22))		Reset to default values.
Comments:						

Test Case Name:		SlotSel_Level2_A				
Purpose:		**To demonstrate that a station will select a slot at level 2 when the appropriate criteria are satisfied.**				
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SET PARAMETERS (Q4:= 6; V22:= 720/(V21 x M1))		Q4 set to 6; equals the number of slots in the incremental broadcast dither range available for selection. V21 (nominal reserved slot position) equals default value of 1,0 s. V22 (max incremental dither range) set to minimum; gives maximum dither range of 75 ± 12 after the incremental broadcast transmission slot (allowed slots of 64, 68, 72, 76, 80, 84).
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts.
test body		send	VSS	INCREMENTAL BROADCAST request to transmit INCREM_BURST_a followed by successive INCREM_BURST_a in reserved slots	Ia	Request to send incremental broadcast reservation and to place another incremental broadcast reservation in each reserved slot, thus creating an automatic succession of incremental broadcast reservations.
		await	RF	INCREM_BURST_a (s = add_A)	Ia	Wait for the incremental broadcast reservation.
		record	RF	current_inc_time:= time at beginning of slot containing INCREM_BURST_a (s = add_A)	Ia	Record the time of the incremental reservation transmission slot as current_inc_time.
		record	RF	IO(0):= io contained in INCREM_BURST _a (s = add_A)	Ia	Record value of io given in the incremental broadcast reservation.
		record		random_position:= 64 + 4 x RAND(0, 5)		Slot to reserve within each candidate range, chosen at random from the six possible candidate slots.
		record		no_IO(m):= 0 for m:= {64, 68, 72, 76, 80, 84}		Initialize the number of slots in each candidate slot position to zero.
		rep 60		n:= 1		Repeat 60 times.
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; s:= add_B; lat:= CPR_LAT(0); lon:= CPR_LON(E 160 NM)) (position of station B is > Q2b away from station under test) in slot beginning at time = current_inc_time + 5 x 60/M1	Sa	Send a sync burst from a simulated station B > Q2b away from the station under test, reporting B's position.
		record		reserve_slot:= 4 x IO(n - 1) + random_position		Slot position to reserve within the next-but-one incremental broadcast candidate range.
		send	RF	INCREM_BURST_a (io:= (reserve_slot - 16)/4; s:= add_B) in slot beginning at time = current_inc_time + 16 x 60/M1	Ia	Send a broadcast burst from station B > Q2b away from A. The burst reserves a slot in the candidate range of the next-but-one incremental broadcast reservation.
		await	RF	INCREM_BURST_a (s = add_A)	Ia	Wait for the next incremental broadcast reservation.
		record	RF	current_inc_time:= time at beginning of slot containing INCREM_BURST_a (s = add_A)	Ia	Record the time of the incremental reservation transmission slot as current_inc_time.
		record	RF	IO(n):= io contained in INCREM_BURST _a (s = add_A) no_IO(IO(n)):= no_IO(IO(n)) + 1	Ia	Record value of io given in the incremental broadcast reservation. Record the frequency of occurrence of slots in each candidate slot position.
		endrep		n:= n + 1		

Context	Step	Action	PCO	Action Qualifier	Ref	Comment
		rep 6		m:= 64; chi_squared:= 0		Set value of m to the minimum value of the candidate range. Initialize chi_squared.
		record		chi_squared:= chi_squared + (no_IO(m) - 10)^2/10		The distribution is tested for uniformity by calculating the value of chi_squared.
		endrep		m:= m + 4		
		verify		chi_squared < 9,236		Value of chi_squared shall be less than 9,236 for 90 % confidence that the distribution is uniform (5 degrees of freedom).
postamble		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
		send	VSS	SET PARAMETERS (Q4:= 3; V22:= MIN(0,75, maximum allowed value of V22))		Reset to default values.
Comments:						

Test Case Name:		SlotSel_Level2_B				
Purpose:		**To demonstrate that a station will select a slot at level 2, excluding those slots not meeting the criteria of level 2 or any lower priority level.**				
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SET PARAMETERS (Q4:= 6; V22:= 720/ (V21 x M1))		Q4 set to 6; equals the number of slots in the incremental broadcast dither range available for selection. V21 (nominal incremental reserved slot position) equals default value of 1,0 s. V22 (max incremental dither range) set to minimum; gives maximum dither range of 75 ± 12 after the incremental broadcast transmission slot (allowed slots of 64, 68, 72, 76, 80, 84).
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts.
test body		send	VSS	INCREMENTAL BROADCAST request to transmit INCREM_BURST_a followed by successive INCREM_BURST_a in reserved slots	Ia	Request to send incremental broadcast reservation and to place another incremental broadcast reservation in each reserved slot, thus creating an automatic succession of incremental broadcast reservations.
		await	RF	INCREM_BURST_a (s = add_A)	Ia	Wait for the incremental broadcast reservation.
		record	RF	current_inc_time:= time at beginning of slot containing INCREM_BURST_a (s = add_A)	Ia	Record the time of the incremental reservation transmission slot as current_inc_time.
		record	RF	IO(0):= io contained in INCREM_BURST _a (s = add_A)	Ia	Record value of io given in the incremental broadcast reservation.
		record		M_ASSIGN_SLOTS (random_position_1, random_position_2)		Slot to reserve within each candidate range, chosen at random from the six possible candidate slots.
		record		no_IO(m):= 0 for m:= {64, 68, 72, 76, 80, 84}		Initialize the number of slots in each candidate slot position to zero.
		rep 50		n:= 1		Repeat 50 times.
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; s:= add_B; lat:= CPR_LAT(0); lon:= CPR_LON(E 160 NM)) (position of station B is > Q2b away from station under test) in slot beginning at time = current_inc_time + 5 x 60/M1	Sa	Send a sync burst from a simulated station B > Q2b away from the station under test, reporting B's position.
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; s:= add_E; lat:= CPR_LAT(0); lon:= CPR_LON(E 110 NM)) (position of station E is < Q2a, b, c, d away from station under test) in slot beginning at time = current_inc_time + 7 x 60/M1	Sa	Send a sync burst from a simulated station E < Q2a, b, c, d away from the station under test, reporting E's position.
		record		reserve_slot_1:= 4 x IO(n - 1) + random_position_1 reserve_slot_2:= 4 x IO(n - 1) + random_position_2		Slot positions to reserve within the next-but-one incremental broadcast candidate range.
		send	RF	INCREM_BURST_a (io:= (reserve_slot_1 - 16)/4; s:= add_B) in slot beginning at time = current_inc_time + 16 x 60/M1	Ia	Send a broadcast burst from station B > Q2b away from A. The burst reserves a slot in the candidate range of the next-but-one incremental broadcast reservation.

Context	Step	Action	PCO	Action Qualifier	Ref	Comment
		send	RF	INCREM_BURST_a (io:= (reserve_slot_2 - 20)/4; s:= add_E) in slot beginning at time = current_inc_time + 20 x 60/M1	Ia	Send a broadcast burst from station E < Q2a,b,c,d away from A. The burst reserves a slot in the candidate range of the next-but-one incremental broadcast reservation.
		await	RF	INCREM_BURST_a (s = add_A)	Ia	Wait for the next incremental broadcast reservation.
		record	RF	current_inc_time:= time at beginning of slot containing INCREM_BURST_a (s = add_A)	Ia	Record the time of the incremental reservation transmission slot as current_inc_time.
		record	RF	IO(n):= io contained in INCREM_BURST _a (s = add_A) no_IO(IO(n)):= no_IO(IO(n)) + 1	Ia	Record value of io given in the incremental broadcast reservation. Record the frequency of occurrence of slots in each candidate slot position.
		endrep		n:= n + 1		
		verify		no_IO(random_position) = 0		Verify that no transmission is made in the slot reserved by station E.
		rep 6		m:= 64; chi_squared:= 0		Set value of m to the minimum value of the candidate range. Initialize chi_squared.
		record		**IF** m ≠ random_position **THEN** chi_squared:= chi_squared + $(no\_IO(m) - 10)^2/10$		For all the other slots the distribution is tested for uniformity by calculating the value of chi_squared.
		endrep		m:= m + 4		
		verify		chi_squared < 7,779		Value of chi_squared shall be less than 7,779 for 90 % confidence that the distribution is uniform (4 degrees of freedom).
postamble		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
		send	VSS	SET PARAMETERS (Q4:= 3; V22:= MIN(0,75, maximum allowed value of V22))		Reset to default values.
Comments:						

Test Case Name:		SlotSel_Level2_C				
Purpose:		**To demonstrate that a station will select a slot at level 2 in preference to those available at level 3.**				
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SET PARAMETERS (Q4:= 5; V22:= 720/(V21 x M1))		Q4 set to 5; equals the number of slots in the incremental broadcast dither range available for selection. V21 (nominal incremental reserved slot position) equals default value of 1,0 s. V22 (max incremental dither range) set to minimum; gives maximum dither range of 75 ± 12 after the incremental broadcast transmission slot (allowed slots of 64, 68, 72, 76, 80, 84).
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts.
test body		send	VSS	INCREMENTAL BROADCAST request to transmit INCREM_BURST_a followed by successive INCREM_BURST_a in reserved slots	Ia	Request to send incremental broadcast reservation and to place another incremental broadcast reservation in each reserved slot, thus creating an automatic succession of incremental broadcast reservations.
		await	RF	INCREM_BURST_a (s = add_A)	Ia	Wait for the incremental broadcast reservation.
		record	RF	current_inc_time:= time at beginning of slot containing INCREM_BURST_a (s = add_A)	Ia	Record the time of the incremental reservation transmission slot as current_inc_time.
		record	RF	IO(0):= io contained in INCREM_BURST _a (s = add_A)	Ia	Record value of io given in the incremental broadcast reservation.
		record		M_ASSIGN_SLOTS (random_position_1, random_position_2)		Slot to reserve within each candidate range, chosen at random from the six possible candidate slots.
		record		no_IO(m):= 0 for m:= {64, 68, 72, 76, 80, 84}		Initialize the number of slots in each candidate slot position to zero.
		rep 50		n:= 1		Repeat 50 times.
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; s:= add_B; lat:= CPR_LAT(0); lon:= CPR_LON(E 160 NM)) (position of station B is > Q2a away from station under test) in slot beginning at time = current_inc_time + 5 x 60/M1	Sa	Send a sync burst from a simulated station B > Q2b away from the station under test, reporting B's position.
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; s:= add_E; lat:= CPR_LAT(0); lon:= CPR_LON(E 130 NM)) (position of station E is > Q2c away from station under test) in slot beginning at time = current_inc_time + 7 x 60/M1	Sa	Send a sync burst from a simulated station E > Q2c away from the station under test, reporting E's position.
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; s:= add_D; lat:= CPR_LAT(0); lon:= CPR_LON(E 140 NM)) (position of station D is such that a transmission from E to D is CCI protected) in slot beginning at time = current_inc_time + 10 x 60/M1	Sa	Send a sync burst from a simulated station D, reporting D's position, which is such that a transmission from E to D is CCI protected.
		record		reserve_slot_1:= 4 x IO(n - 1) + random_position_1 reserve_slot_2:= 4 x IO(n - 1) + random_position_2		Slot positions to reserve within the next-but-one incremental broadcast candidate range.

Context	Step	Action	PCO	Action Qualifier	Ref	Comment
		send	RF	INCREM_BURST_a (io:= (reserve_slot_1 - 16)/4; s:= add_B) in slot beginning at time = current_inc_time + 16 x 60/M1	Ia	Send a broadcast burst from station B > Q2b away from A. The burst reserves a slot in the candidate range of the next-but-one incremental broadcast reservation.
		send	RF	UNI_BURST_a (sdf:= 1; ro:= reserve_slot_2 - 20 - 1; lg:= 0; pr:= 0; s:= add_E; d:= add_D) in slot beginning at time = current_inc_time + 20 x 60/M1	Ua	Send a unicast burst from station E > Q2c away from A, reserving a slot for transmission to station D. The distance from the station under test (station A) to station D is > (CCI ratio) times the distance from station E to station D, so that the transmission from E to D is CCI protected. The burst reserves a slot in the candidate range of the next-but-one incremental broadcast reservation.
		await	RF	INCREM_BURST_a (s = add_A)	Ia	Wait for the next incremental broadcast reservation.
		record	RF	current_inc_time:= time at beginning of slot containing INCREM_BURST_a (s = add_A)	Ia	Record the time of the incremental reservation transmission slot as current_inc_time.
		record	RF	IO(n):= io contained in INCREM_BURST _a (s = add_A) no_IO(IO(n)):= no_IO(IO(n)) + 1	Ia	Record value of io given in the incremental broadcast reservation. Record the frequency of occurrence of slots in each candidate slot position.
		endrep		n:= n + 1		
		verify		no_IO(random_position) = 0		Verify that no transmission is made in the slot reserved by station E.
		rep 6		m:= 64; chi_squared:= 0		Set value of m to the minimum value of the candidate range. Initialize chi_squared.
		record		**IF** m ≠ random_position **THEN** chi_squared:= chi_squared + $(no\_IO(m) - 10)^2/10$		For all the other slots the distribution is tested for uniformity by calculating the value of chi_squared.
		endrep		m:= m + 4		
		verify		chi_squared < 7,779		Value of chi_squared shall be less than 7,779 for 90 % confidence that the distribution is uniform (4 degrees of freedom).
postamble		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
		send	VSS	SET PARAMETERS (Q4:= 3; V22:= MIN(0,75, maximum allowed value of V22))		Reset to default values.
Comments:						

Test Case Name:				SlotSel_Level2_D		
Purpose:				**To demonstrate that a station will select a slot at level 2 in preference to those available at level 4.**		
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SET PARAMETERS (Q4:= 5; V22:= 720/(V21 x M1))		Q4 set to 5; equals the number of slots in the incremental broadcast dither range available for selection. V21 (nominal incremental reserved slot position) equals default value of 1,0 s. V22 (max incremental dither range) set to minimum; gives maximum dither range of 75 ± 12 after the incremental broadcast transmission slot (allowed slots of 64, 68, 72, 76, 80, 84).
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts.
test body		send	VSS	INCREMENTAL BROADCAST request to transmit INCREM_BURST_a followed by successive INCREM_BURST_a in reserved slots	Ia	Request to send incremental broadcast reservation and to place another incremental broadcast reservation in each reserved slot, thus creating an automatic succession of incremental broadcast reservations.
		await	RF	INCREM_BURST_a (s = add_A)	Ia	Wait for the incremental broadcast reservation.
		record	RF	current_inc_time:= time at beginning of slot containing INCREM_BURST_a (s = add_A)	Ia	Record the time of the incremental reservation transmission slot as current_inc_time.
		record	RF	IO(0):= io contained in INCREM_BURST _a (s = add_A)	Ia	Record value of io given in the incremental broadcast reservation.
		record		M_ASSIGN_SLOTS (random_position_1, random_position_2)		Slot to reserve within each candidate range, chosen at random from the six possible candidate slots.
		record		no_IO(m):= 0 for m:= {64, 68, 72, 76, 80, 84}		Initialize the number of slots in each candidate slot position to zero.
		rep 50		n:= 1		Repeat 50 times.
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; s:= add_B; lat:= CPR_LAT(0); lon:= CPR_LON(E 160 NM)) (position of station B is > Q2a away from station under test) in slot beginning at time = current_inc_time + 5 x 60/M1	Sa	Send a sync burst from a simulated station B > Q2b away from the station under test, reporting B's position.
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; s:= add_E; lat:= CPR_LAT(0); lon:= CPR_LON(E 310 NM)) (position of station E is > Q2d away from station under test) in slot beginning at time = current_inc_time + 7 x 60/M1	Sa	Send a sync burst from a simulated station E > Q2d away from the station under test, reporting E's position.
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; s:= add_D; lat:= CPR_LAT(0); lon:= CPR_LON(E 140 NM)) (position of station D is such that a transmission from E to D is not CCI protected) in slot beginning at time = current_inc_time + 10 x 60/M1	Sa	Send a sync burst from a simulated station D, reporting D's position, which is such that a transmission from E to D is not CCI protected.
		record		reserve_slot_1:= 4 x IO(n - 1) + random_position_1 reserve_slot_2:= 4 x IO(n - 1) + random_position_2		Slot positions to reserve within the next-but-one incremental broadcast candidate range.

Context	Step	Action	PCO	Action Qualifier	Ref	Comment
		send	RF	INCREM_BURST_a (io:= (reserve_slot_1 - 16)/4; s:= add_B) in slot beginning at time = current_inc_time + 16 x 60/M1	Ia	Send a broadcast burst from station B > Q2b away from A. The burst reserves a slot in the candidate range of the next-but-one incremental broadcast reservation.
		send	RF	UNI_BURST_a (sdf:= 1; ro:= reserve_slot_2 - 20 - 1; lg:= 0; pr:= 0; s:= add_E; d:= add_D) in slot beginning at time = current_inc_time + 20 x 60/M1	Ua	Send a unicast burst from station E > Q2c away from A, reserving a slot for transmission to station D. The distance from the station under test (station A) to station D is < (CCI ratio) times the distance from station E to station D, so that the transmission from E to D is not CCI protected. The burst reserves a slot in the candidate range of the next-but-one incremental broadcast reservation.
		await	RF	INCREM_BURST_a (s = add_A)	Ia	Wait for the next incremental broadcast reservation.
		record	RF	current_inc_time:= time at beginning of slot containing INCREM_BURST_a (s = add_A)	Ia	Record the time of the incremental reservation transmission slot as current_inc_time.
		record	RF	IO(n):= io contained in INCREM_BURST _a (s = add_A) no_IO(IO(n)):= no_IO(IO(n)) + 1	Ia	Record value of io given in the incremental broadcast reservation. Record the frequency of occurrence of slots in each candidate slot position.
		endrep		n:= n + 1		
		verify		no_IO(random_position) = 0		Verify that no transmission is made in the slot reserved by station E.
		rep 6		m:= 64; chi_squared:= 0		Set value of m to the minimum value of the candidate range. Initialize chi_squared.
		record		**IF** m ≠ random_position **THEN** chi_squared:= chi_squared + $(no\_IO(m) - 10)^2/10$		For all the other slots the distribution is tested for uniformity by calculating the value of chi_squared.
		endrep		m:= m + 4		
		verify		chi_squared < 7,779		Value of chi_squared shall be less than 7,779 for 90 % confidence that the distribution is uniform (4 degrees of freedom).
postamble		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
		send	VSS	SET PARAMETERS (Q4:= 3; V22:= MIN(0,75, maximum allowed value of V22))		Reset to default values.
Comments:						

Test Case Name:				SlotSel_Level2_E		
Purpose:				**To demonstrate that a station will select slots at level 2 from a more distant station in preference to a closer station.**		
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SET PARAMETERS (Q4:= 6; V22:= 720/(V21 x M1))		Q4 set to 6; equals the number of slots in the incremental broadcast dither range available for selection. V21 (nominal incremental reserved slot position) equals default value of 1,0 s. V22 (max incremental dither range) set to minimum; gives maximum dither range of 75 ± 12 after the incremental broadcast transmission slot (allowed slots of 64, 68, 72, 76, 80, 84).
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts.
test body		send	VSS	INCREMENTAL BROADCAST request to transmit INCREM_BURST_a followed by successive INCREM_BURST_a in reserved slots	Ia	Request to send incremental broadcast reservation and to place another incremental broadcast reservation in each reserved slot, thus creating an automatic succession of incremental broadcast reservations.
		await	RF	INCREM_BURST_a (s = add_A)	Ia	Wait for the incremental broadcast reservation.
		record	RF	current_inc_time:= time at beginning of slot containing INCREM_BURST_a (s = add_A)	Ia	Record the time of the incremental reservation transmission slot as current_inc_time.
		record	RF	IO(0):= io contained in INCREM_BURST _a (s = add_A)	Ia	Record value of io given in the incremental broadcast reservation.
		record		M_ASSIGN_SLOTS (random_position_1, random_position_2)		Slot to reserve within each candidate range, chosen at random from the six possible candidate slots.
		record		no_IO(m):= 0 for m:= {64, 68, 72, 76, 80, 84}		Initialize the number of slots in each candidate slot position to zero.
		rep 50		n:= 1		Repeat 50 times.
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; s:= add_B; lat:= CPR_LAT(0); lon:= CPR_LON(E 170 NM)) (position of station B is > Q2b away from station under test) in slot beginning at time = current_inc_time + 5 x 60/M1	Sa	Send a sync burst from a simulated station B > Q2b away from the station under test, reporting B's position.
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; s:= add_E; lat:= CPR_LAT(0); lon:= CPR_LON(E 160 NM)) (position of station E is > Q2b away from station under test, but closer to the station under test than station B) in slot beginning at time = current_inc_time + 7 x 60/M1	Sa	Send a sync burst from a simulated station E > Q2b away from the station under test, reporting E's position. Station E is closer to the station under test than station B.
		record		reserve_slot_1:= 4 x IO(n - 1) + random_position_1 reserve_slot_2:= 4 x IO(n - 1) + random_position_2		Slot positions to reserve within the next-but-one incremental broadcast candidate range.
		send	RF	INCREM_BURST_a (io:= (reserve_slot_1 - 16)/4; s:= add_B) in slot beginning at time = current_inc_time + 16 x 60/M1	Ia	Send a broadcast burst from station B > Q2b away from A. The burst reserves a slot in the candidate range of the next-but-one incremental broadcast reservation.

Context	Step	Action	PCO	Action Qualifier	Ref	Comment
		send	RF	INCREM_BURST_a (io:= (reserve_slot_2 - 20)/4; s:= add_E) in slot beginning at time = current_inc_time + 20 x 60/M1	Ia	Send a broadcast burst from station E > Q2b away from A. Station E is closer to the station under test than station B. The burst reserves a slot in the candidate range of the next-but-one incremental broadcast reservation.
		await	RF	INCREM_BURST_a (s = add_A)	Ia	Wait for the next incremental broadcast reservation.
		record	RF	current_inc_time:= time at beginning of slot containing INCREM_BURST_a (s = add_A)	Ia	Record the time of the incremental reservation transmission slot as current_inc_time.
		record	RF	IO(n):= io contained in INCREM_BURST _a (s = add_A) no_IO(IO(n)):= no_IO(IO(n)) + 1	Ia	Record value of io given in the incremental broadcast reservation. Record the frequency of occurrence of slots in each candidate slot position.
		endrep		n:= n + 1		
		verify		no_IO(random_position) = 0		Verify that no transmission is made in the slot reserved by station E.
		rep 6		m:= 64; chi_squared:= 0		Set value of m to the minimum value of the candidate range. Initialize chi_squared.
		record		**IF** m ≠ random_position **THEN** chi_squared:= chi_squared + $(no\_IO(m) - 10)^2/10$		For all the other slots the distribution is tested for uniformity by calculating the value of chi_squared.
		endrep		m:= m + 4		
		verify		chi_squared < 7,779		Value of chi_squared shall be less than 7,779 for 90 % confidence that the distribution is uniform (4 degrees of freedom).
postamble		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
		send	VSS	SET PARAMETERS (Q4:= 3; V22:= MIN(0,75, maximum allowed value of V22))		Reset to default values.
Comments:						

Test Case Name:		SlotSel_Level3_A				
Purpose:		**To demonstrate that a station will select a slot at level 3 when the appropriate criteria are satisfied.**				
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SET PARAMETERS (Q4:= 6; V22:= 720/(V21 x M1))		Q4 set to 6; equals the number of slots in the incremental broadcast dither range available for selection. V21 (nominal reserved slot position) equals default value of 1,0 s. V22 (max incremental dither range) set to minimum; gives maximum dither range of 75 ± 12 after the incremental broadcast transmission slot (allowed slots of 64, 68, 72, 76, 80, 84).
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts.
test body		send	VSS	INCREMENTAL BROADCAST request to transmit INCREM_BURST_a followed by successive INCREM_BURST_a in reserved slots	Ia	Request to send incremental broadcast reservation and to place another incremental broadcast reservation in each reserved slot, thus creating an automatic succession of incremental broadcast reservations.
		await	RF	INCREM_BURST_a (s = add_A)	Ia	Wait for the incremental broadcast reservation.
		record	RF	current_inc_time:= time at beginning of slot containing INCREM_BURST_a (s = add_A)	Ia	Record the time of the incremental reservation transmission slot as current_inc_time.
		record	RF	IO(0):= io contained in INCREM_BURST _a (s = add_A)	Ia	Record value of io given in the incremental broadcast reservation.
		record		random_position:= 64 + 4 x RAND(0, 5)		Slot to reserve within each candidate range, chosen at random from the six possible candidate slots.
		record		no_IO(m):= 0 for m:= {64, 68, 72, 76, 80, 84}		Initialize the number of slots in each candidate slot position to zero.
		rep 60		n:= 1		Repeat 60 times.
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; s:= add_B; lat:= CPR_LAT(0); lon:= CPR_LON(E 130 NM)) (position of station B is > Q2c away from station under test) in slot beginning at time = current_inc_time + 5 x 60/M1	Sa	Send a sync burst from a simulated station B > Q2c away from the station under test, reporting B's position.
		record		reserve_slot:= 4 x IO(n - 1) + random_position		Slot position to reserve within the next-but-one incremental broadcast candidate range.
		send	RF	INCREM_BURST_a (io:= (reserve_slot - 16)/4; s:= add_B) in slot beginning at time = current_inc_time + 16 x 60/M1	Ia	Send a broadcast burst from station B > Q2c away from A. The burst reserves a slot in the candidate range of the next-but-one incremental broadcast reservation.
		await	RF	INCREM_BURST_a (s = add_A)	Ia	Wait for the next incremental broadcast reservation.
		record	RF	current_inc_time:= time at beginning of slot containing INCREM_BURST_a (s = add_A)	Ia	Record the time of the incremental reservation transmission slot as current_inc_time.
		record	RF	IO(n):= io contained in INCREM_BURST _a (s = add_A) no_IO(IO(n)):= no_IO(IO(n)) + 1	Ia	Record value of io given in the incremental broadcast reservation. Record the frequency of occurrence of slots in each candidate slot position.
		endrep		n:= n + 1		

Context	Step	Action	PCO	Action Qualifier	Ref	Comment
		rep 6		m:= 64; chi_squared:= 0		Set value of m to the minimum value of the candidate range. Initialize chi_squared.
		record		chi_squared:= chi_squared + (no_IO(m) - 10)^2/10		The distribution is tested for uniformity by calculating the value of chi_squared.
		endrep		m:= m + 4		
		verify		chi_squared < 9,236		Value of chi_squared shall be less than 9,236 for 90 % confidence that the distribution is uniform (5 degrees of freedom).
postamble		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
		send	VSS	SET PARAMETERS (Q4:= 3; V22:= MIN(0,75, maximum allowed value of V22))		Reset to default values.
Comments:						

Test Case Name:		SlotSel_Level3_B				
Purpose:		**To demonstrate that a station will select a slot at level 3, excluding those slots not meeting the criteria of level 3 or any lower priority level.**				
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SET PARAMETERS (Q4:= 6; V22:= 720/(V21 x M1))		Q4 set to 6; equals the number of slots in the incremental broadcast dither range available for selection. V21 (nominal incremental reserved slot position) equals default value of 1,0 s. V22 (max incremental dither range) set to minimum; gives maximum dither range of 75 ± 12 after the incremental broadcast transmission slot (allowed slots of 64, 68, 72, 76, 80, 84).
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts.
test body		send	VSS	INCREMENTAL BROADCAST request to transmit INCREM_BURST_a followed by successive INCREM_BURST_a in reserved slots	Ia	Request to send incremental broadcast reservation and to place another incremental broadcast reservation in each reserved slot, thus creating an automatic succession of incremental broadcast reservations.
		await	RF	INCREM_BURST_a (s = add_A)	Ia	Wait for the incremental broadcast reservation.
		record	RF	current_inc_time:= time at beginning of slot containing INCREM_BURST_a (s = add_A)	Ia	Record the time of the incremental reservation transmission slot as current_inc_time.
		record	RF	IO(0):= io contained in INCREM_BURST _a (s = add_A)	Ia	Record value of io given in the incremental broadcast reservation.
		record		M_ASSIGN_SLOTS (random_position_1, random_position_2)		Slot to reserve within each candidate range, chosen at random from the six possible candidate slots.
		record		no_IO(m):= 0 for m:= {64, 68, 72, 76, 80, 84}		Initialize the number of slots in each candidate slot position to zero.
		rep 50		n:= 1		Repeat 50 times.
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; s:= add_B; lat:= CPR_LAT(0); lon:= CPR_LON(E 140 NM)) (position of station B is > Q2a away from station under test) in slot beginning at time = current_inc_time + 5 x 60/M1	Sa	Send a sync burst from a simulated station B > Q2c away from the station under test, reporting B's position.
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; s:= add_E; lat:= CPR_LAT(0); lon:= CPR_LON(E 110 NM)) (position of station E is < Q2a, b, c, d away from station under test) in slot beginning at time = current_inc_time + 7 x 60/M1	Sa	Send a sync burst from a simulated station E < Q2a, b, c, d away from the station under test, reporting E's position.
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; s:= add_D; lat:= CPR_LAT(0); lon:= CPR_LON(E 130 NM)) (position of station D is such that a transmission from B to D is CCI protected and that a transmission from E to D is CCI protected) in slot beginning at time = current_inc_time + 10 x 60/M1	Sa	Send a sync burst from a simulated station D, reporting D's position, which is such that a transmission from B to D is CCI protected and that a transmission from E to D is CCI protected.

Context	Step	Action	PCO	Action Qualifier	Ref	Comment
		record		reserve_slot_1:= 4 x IO(n - 1) + random_position_1 reserve_slot_2:= 4 x IO(n - 1) + random_position_2		Slot positions to reserve within the next-but-one incremental broadcast candidate range.
		send	RF	UNI_BURST_a (sdf:= 1; ro:= reserve_slot_1 - 15 - 1; lg:= 0; pr:= 0; s:= add_B; d:= add_D) in slot beginning at time = current_inc_time + 15 x 60/M1	Ua	Send a unicast burst from station B > Q2c away from A, reserving a slot for transmission to station D. The distance from the station under test (station A) to station D is > (CCI ratio) times the distance from station B to station D, so that the transmission from B to D is CCI protected. The burst reserves a slot in the candidate range of the next-but-one incremental broadcast reservation.
		send	RF	UNI_BURST_a (sdf:= 1; ro:= reserve_slot_2 - 20 - 1; lg:= 0; pr:= 0; s:= add_E; d:= add_D) in slot beginning at time = current_inc_time + 20 x 60/M1	Ua	Send a unicast burst from station E < Q2a, b, c, d away from A, reserving a slot for transmission to station D. The distance from the station under test (station A) to station D is > (CCI ratio) times the distance from station E to station D, so that the transmission from E to D is CCI protected. The burst reserves a slot in the candidate range of the next-but-one incremental broadcast reservation.
		await	RF	INCREM_BURST_a (s = add_A)	Ia	Wait for the next incremental broadcast reservation.
		record	RF	current_inc_time:= time at beginning of slot containing INCREM_BURST_a (s = add_A)	Ia	Record the time of the incremental reservation transmission slot as current_inc_time.
		record	RF	IO(n):= io contained in INCREM_BURST _a (s = add_A) no_IO(IO(n)):= no_IO(IO(n)) + 1	Ia	Record value of io given in the incremental broadcast reservation. Record the frequency of occurrence of slots in each candidate slot position.
		endrep		n:= n + 1		
		verify		no_IO(random_position) = 0		Verify that no transmission is made in the slot reserved by station E.
		rep 6		m:= 64; chi_squared:= 0		Set value of m to the minimum value of the candidate range. Initialize chi_squared.
		record		**IF** m ≠ random_position **THEN** chi_squared:= chi_squared + $(no\_IO(m) - 10)^2/10$		For all the other slots the distribution is tested for uniformity by calculating the value of chi_squared.
		endrep		m:= m + 4		
		verify		chi_squared < 7,779		Value of chi_squared shall be less than 7,779 for 90 % confidence that the distribution is uniform (4 degrees of freedom).
postamble		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
		send	VSS	SET PARAMETERS (Q4:= 3; V22:= MIN(0,75, maximum allowed value of V22))		Reset to default values.
Comments:						

Test Case Name:		SlotSel_Level3_C				
Purpose:		**To demonstrate that a station will select a slot at level 3 in preference to those available at level 4.**				
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SET PARAMETERS (Q4:= 5; V22:= 720/(V21 x M1))		Q4 set to 5; equals the number of slots in the incremental broadcast dither range available for selection. V21 (nominal incremental reserved slot position) equals default value of 1,0 s. V22 (max incremental dither range) set to minimum; gives maximum dither range of 75 ± 12 after the incremental broadcast transmission slot (allowed slots of 64, 68, 72, 76, 80, 84).
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts.
test body		send	VSS	INCREMENTAL BROADCAST request to transmit INCREM_BURST_a followed by successive INCREM_BURST_a in reserved slots	Ia	Request to send incremental broadcast reservation and to place another incremental broadcast reservation in each reserved slot, thus creating an automatic succession of incremental broadcast reservations.
		await	RF	INCREM_BURST_a (s = add_A)	Ia	Wait for the incremental broadcast reservation.
		record	RF	current_inc_time:= time at beginning of slot containing INCREM_BURST_a (s = add_A)	Ia	Record the time of the incremental reservation transmission slot as current_inc_time.
		record	RF	IO(0):= io contained in INCREM_BURST _a (s = add_A)	Ia	Record value of io given in the incremental broadcast reservation.
		record		M_ASSIGN_SLOTS (random_position_1, random_position_2)		Slot to reserve within each candidate range, chosen at random from the six possible candidate slots.
		record		no_IO(m):= 0 for m:= {64, 68, 72, 76, 80, 84}		Initialize the number of slots in each candidate slot position to zero.
		rep 50		n:= 1		Repeat 50 times.
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; s:= add_B; lat:= CPR_LAT(0); lon:= CPR_LON(E 130 NM)) (position of station B is > Q2c away from station under test) in slot beginning at time = current_inc_time + 5 x 60/M1	Sa	Send a sync burst from a simulated station B > Q2c away from the station under test, reporting B's position.
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; s:= add_E; lat:= CPR_LAT(0); lon:= CPR_LON(E 310 NM)) (position of station E is > Q2d away from station under test) in slot beginning at time = current_inc_time + 7 x 60/M1	Sa	Send a sync burst from a simulated station E > Q2d away from the station under test, reporting E's position.
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; s:= add_D; lat:= CPR_LAT(0); lon:= CPR_LON(E 140 NM)) (position of station D is such that a transmission from B to D is CCI protected and that a transmission from E to D is not CCI protected) in slot beginning at time = current_inc_time + 10 x 60/M1	Sa	Send a sync burst from a simulated station D, reporting D's position, which is such that a transmission from B to D is CCI protected and that a transmission from E to D is not CCI protected.

Context	Step	Action	PCO	Action Qualifier	Ref	Comment
		record		reserve_slot_1:= 4 x IO(n - 1) + random_position_1 reserve_slot_2:= 4 x IO(n - 1) + random_position_2		Slot positions to reserve within the next-but-one incremental broadcast candidate range.
		send	RF	UNI_BURST_a (sdf:= 1; ro:= reserve_slot_1 - 15 - 1; lg:= 0; pr:= 0; s:= add_B; d:= add_D) in slot beginning at time = current_inc_time + 15 x 60/M1	Ua	Send a unicast burst from station B > Q2c away from A, reserving a slot for transmission to station D. The distance from the station under test (station A) to station D is > (CCI ratio) times the distance from station B to station D, so that the transmission from B to D is CCI protected. The burst reserves a slot in the candidate range of the next-but-one incremental broadcast reservation.
		send	RF	UNI_BURST_a (sdf:= 1; ro:= reserve_slot_2 - 20 - 1; lg:= 0; pr:= 0; s:= add_E; d:= add_D) in slot beginning at time = current_inc_time + 20 x 60/M1	Ua	Send a unicast burst from station E > Q2d away from A, reserving a slot for transmission to station D. The distance from the station under test (station A) to station D is < (CCI ratio) times the distance from station E to station D, so that the transmission from E to D is not CCI protected. The burst reserves a slot in the candidate range of the next-but-one incremental broadcast reservation.
		await	RF	INCREM_BURST_a (s = add_A)	Ia	Wait for the next incremental broadcast reservation.
		record	RF	current_inc_time:= time at beginning of slot containing INCREM_BURST_a (s = add_A)	Ia	Record the time of the incremental reservation transmission slot as current_inc_time.
		record	RF	IO(n):= io contained in INCREM_BURST _a (s = add_A) no_IO(IO(n)):= no_IO(IO(n)) + 1	Ia	Record value of io given in the incremental broadcast reservation. Record the frequency of occurrence of slots in each candidate slot position.
		endrep		n:= n + 1		
		verify		no_IO(random_position) = 0		Verify that no transmission is made in the slot reserved by station E.
		rep 6		m:= 64; chi_squared:= 0		Set value of m to the minimum value of the candidate range. Initialize chi_squared.
		record		**IF** m ≠ random_position **THEN** chi_squared:= chi_squared + $(no\_IO(m) - 10)^2/10$		For all the other slots the distribution is tested for uniformity by calculating the value of chi_squared.
		endrep		m:= m + 4		
		verify		chi_squared < 7,779		Value of chi_squared shall be less than 7,779 for 90 % confidence that the distribution is uniform (4 degrees of freedom).
postamble		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
		send	VSS	SET PARAMETERS (Q4:= 3; V22:= MIN(0,75, maximum allowed value of V22))		Reset to default values.
Comments:						

Test Case Name:		SlotSel_Level3_D				
Purpose:		**To demonstrate that a station will select slots at level 3 from a more distant station in preference to a closer station.**				
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SET PARAMETERS (Q4:= 5; V22:= 720/(V21 x M1))		Q4 set to 5; equals the number of slots in the incremental broadcast dither range available for selection. V21 (nominal incremental reserved slot position) equals default value of 1,0 s. V22 (max incremental dither range) set to minimum; gives maximum dither range of 75 ± 12 after the incremental broadcast transmission slot (allowed slots of 64, 68, 72, 76, 80, 84).
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts.
test body		send	VSS	INCREMENTAL BROADCAST request to transmit INCREM_BURST_a followed by successive INCREM_BURST_a in reserved slots	Ia	Request to send incremental broadcast reservation and to place another incremental broadcast reservation in each reserved slot, thus creating an automatic succession of incremental broadcast reservations.
		await	RF	INCREM_BURST_a (s = add_A)	Ia	Wait for the incremental broadcast reservation.
		record	RF	current_inc_time:= time at beginning of slot containing INCREM_BURST_a (s = add_A)	Ia	Record the time of the incremental reservation transmission slot as current_inc_time.
		record	RF	IO(0):= io contained in INCREM_BURST _a (s = add_A)	Ia	Record value of io given in the incremental broadcast reservation.
		record		M_ASSIGN_SLOTS (random_position_1, random_position_2)		Slot to reserve within each candidate range, chosen at random from the six possible candidate slots.
		record		no_IO(m):= 0 for m:= {64, 68, 72, 76, 80, 84}		Initialize the number of slots in each candidate slot position to zero.
		rep 50		n:= 1		Repeat 50 times.
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; s:= add_B; lat:= CPR_LAT(0); lon:= CPR_LON(E 140 NM)) (position of station B is > Q2c away from station under test) in slot beginning at time = current_inc_time + 5 x 60/M1	Sa	Send a sync burst from a simulated station B > Q2c away from the station under test, reporting B's position.
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; s:= add_E; lat:= CPR_LAT(0); lon:= CPR_LON(E 130 NM)) (position of station E is > Q2c away from station under test but closer to the station under test than station B) in slot beginning at time = current_inc_time + 7 x 60/M1	Sa	Send a sync burst from a simulated station E > Q2c away from the station under test, reporting E's position. Station E is closer to the station under test than station B.
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; s:= add_D; lat:= CPR_LAT(0); lon:= CPR_LON(E 150 NM)) (position of station D is such that a transmission from B to D is CCI protected and that a transmission from E to D is CCI protected) in slot beginning at time = current_inc_time + 10 x 60/M1	Sa	Send a sync burst from a simulated station D, reporting D's position, which is such that a transmission from B to D is CCI protected and that a transmission from E to D is CCI protected.

Context	Step	Action	PCO	Action Qualifier	Ref	Comment
		record		reserve_slot_1:= 4 x IO(n - 1) + random_position_1 reserve_slot_2:= 4 x IO(n - 1) + random_position_2		Slot positions to reserve within the next-but-one incremental broadcast candidate range.
		send	RF	UNI_BURST_a (sdf:= 1; ro:= reserve_slot_1 - 15 - 1; lg:= 0; pr:= 0; s:= add_B; d:= add_D) in slot beginning at time = current_inc_time + 15 x 60/M1	Ua	Send a unicast burst from station B > Q2c away from A, reserving a slot for transmission to station D. The distance from the station under test (station A) to station D is > (CCI ratio) times the distance from station B to station D, so that the transmission from B to D is CCI protected. The burst reserves a slot in the candidate range of the next-but-one incremental broadcast reservation.
		send	RF	UNI_BURST_a (sdf:= 1; ro:= reserve_slot_2 - 20 - 1; lg:= 0; pr:= 0; s:= add_E; d:= add_D) in slot beginning at time = current_inc_time + 20 x 60/M1	Ua	Send a unicast burst from station E > Q2c away from A, reserving a slot for transmission to station D. Station E is closer to the station under test than station B. The distance from the station under test (station A) to station D is > (CCI ratio) times the distance from station E to station D, so that the transmission from E to D is CCI protected. The burst reserves a slot in the candidate range of the next-but-one incremental broadcast reservation.
		await	RF	INCREM_BURST_a (s = add_A)	Ia	Wait for the next incremental broadcast reservation.
		record	RF	current_inc_time:= time at beginning of slot containing INCREM_BURST_a (s = add_A)	Ia	Record the time of the incremental reservation transmission slot as current_inc_time.
		record	RF	IO(n):= io contained in INCREM_BURST _a (s = add_A) no_IO(IO(n)):= no_IO(IO(n)) + 1	Ia	Record value of io given in the incremental broadcast reservation. Record the frequency of occurrence of slots in each candidate slot position.
		endrep		n:= n + 1		
		verify		no_IO(random_position) = 0		Verify that no transmission is made in the slot reserved by station E.
		rep 6		m:= 64; chi_squared:= 0		Set value of m to the minimum value of the candidate range. Initialize chi_squared.
		record		**IF** m ≠ random_position **THEN** chi_squared:= chi_squared + $(no\_IO(m) - 10)^2/10$		For all the other slots the distribution is tested for uniformity by calculating the value of chi_squared.
		endrep		m:= m + 4		
		verify		chi_squared < 7,779		Value of chi_squared shall be less than 7,779 for 90 % confidence that the distribution is uniform (4 degrees of freedom).
postamble		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
		send	VSS	SET PARAMETERS (Q4:= 3; V22:= MIN(0,75, maximum allowed value of V22))		Reset to default values.
Comments:						

Test Case Name:		SlotSel_Level4_A				
Purpose:		**To demonstrate that a station will select a slot at level 4 when the appropriate criteria are satisfied.**				
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SET PARAMETERS (Q4:= 6; V22:= 720/(V21 x M1))		Q4 set to 6; equals the number of slots in the incremental broadcast dither range available for selection. V21 (nominal reserved slot position) equals default value of 1,0 s. V22 (max incremental dither range) set to minimum; gives maximum dither range of 75 ± 12 after the incremental broadcast transmission slot (allowed slots of 64, 68, 72, 76, 80, 84).
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts.
test body		send	VSS	INCREMENTAL BROADCAST request to transmit INCREM_BURST_a followed by successive INCREM_BURST_a in reserved slots	Ia	Request to send incremental broadcast reservation and to place another incremental broadcast reservation in each reserved slot, thus creating an automatic succession of incremental broadcast reservations.
		await	RF	INCREM_BURST_a (s = add_A)	Ia	Wait for the incremental broadcast reservation.
		record	RF	current_inc_time:= time at beginning of slot containing INCREM_BURST_a (s = add_A)	Ia	Record the time of the incremental reservation transmission slot as current_inc_time.
		record	RF	IO(0):= io contained in INCREM_BURST _a (s = add_A)	Ia	Record value of io given in the incremental broadcast reservation.
		record		random_position:= 64 + 4 x RAND(0, 5)		Slot to reserve within each candidate range, chosen at random from the six possible candidate slots.
		record		no_IO(m):= 0 for m:= {64, 68, 72, 76, 80, 84}		Initialize the number of slots in each candidate slot position to zero.
		rep 60		n:= 1		Repeat 60 times.
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; s:= add_B; lat:= CPR_LAT(0); lon:= CPR_LON(E 310 NM)) (position of station B is > Q2a away from station under test) in slot beginning at time = current_inc_time + 5 x 60/M1	Sa	Send a sync burst from a simulated station B > Q2d away from the station under test, reporting B's position.
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; s:= add_D; lat:= CPR_LAT(0); lon:= CPR_LON(E 140 NM)) (position of station D is such that a transmission from B to D is not CCI protected) in slot beginning at time = current_inc_time + 10 x 60/M1	Sa	Send a sync burst from a simulated station D, reporting D's position, which is such that a transmission from B to D is not CCI protected.
		record		reserve_slot:= 4 x IO(n - 1) + random_position		Slot position to reserve within the next-but-one incremental broadcast candidate range.
		send	RF	UNI_BURST_a (sdf:= 1; ro:= reserve_slot - 15 - 1; lg:= 0; pr:= 0; s:= add_B; d:= add_D) in slot beginning at time = current_inc_time + 15 x 60/M1	Ua	Send a unicast burst from station B > Q2d away from A, reserving a slot for transmission to station D. The distance from the station under test (station A) to station D is < (CCI ratio) times the distance from station B to station D, so that the transmission from B to D is not CCI protected. The burst reserves a slot in the candidate range of the next-but-one incremental broadcast reservation.

Context	Step	Action	PCO	Action Qualifier	Ref	Comment
		await	RF	INCREM_BURST_a (s = add_A)	Ia	Wait for the next incremental broadcast reservation.
		record	RF	current_inc_time:= time at beginning of slot containing INCREM_BURST_a (s = add_A)	Ia	Record the time of the incremental reservation transmission slot as current_inc_time.
		record	RF	IO(n):= io contained in INCREM_BURST _a (s = add_A) no_IO(IO(n)):= no_IO(IO(n)) + 1	Ia	Record value of io given in the incremental broadcast reservation. Record the frequency of occurrence of slots in each candidate slot position.
		endrep		n:= n + 1		
		rep 6		m:= 64; chi_squared:= 0		Set value of m to the minimum value of the candidate range. Initialize chi_squared.
		record		chi_squared:= chi_squared + (no_IO(m) - 10)^2/10		The distribution is tested for uniformity by calculating the value of chi_squared.
		endrep		m:= m + 4		
		verify		chi_squared < 9,236		Value of chi_squared shall be less than 9,236 for 90 % confidence that the distribution is uniform (5 degrees of freedom).
postamble		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
		send	VSS	SET PARAMETERS (Q4:= 3; V22:= MIN(0,75, maximum allowed value of V22))		Reset to default values.
Comments:						

Test Case Name:		SlotSel_Level4_B				
Purpose:		**To demonstrate that a station will select a slot at level 4, excluding those slots not meeting the criteria of level 4.**				
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SET PARAMETERS (Q4:= 6; V22:= 720/(V21 x M1))		Q4 set to 6; equals the number of slots in the incremental broadcast dither range available for selection. V21 (nominal incremental reserved slot position) equals default value of 1,0 s. V22 (max incremental dither range) set to minimum; gives maximum dither range of 75 ± 12 after the incremental broadcast transmission slot (allowed slots of 64, 68, 72, 76, 80, 84).
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts.
test body		send	VSS	INCREMENTAL BROADCAST request to transmit INCREM_BURST_a followed by successive INCREM_BURST_a in reserved slots	Ia	Request to send incremental broadcast reservation and to place another incremental broadcast reservation in each reserved slot, thus creating an automatic succession of incremental broadcast reservations.
		await	RF	INCREM_BURST_a (s = add_A)	Ia	Wait for the incremental broadcast reservation.
		record	RF	current_inc_time:= time at beginning of slot containing INCREM_BURST_a (s = add_A)	Ia	Record the time of the incremental reservation transmission slot as current_inc_time.
		record	RF	IO(0):= io contained in INCREM_BURST _a (s = add_A)	Ia	Record value of io given in the incremental broadcast reservation.
		record		M_ASSIGN_SLOTS (random_position_1, random_position_2)		Slot to reserve within each candidate range, chosen at random from the six possible candidate slots.
		record		no_IO(m):= 0 for m:= {64, 68, 72, 76, 80, 84}		Initialize the number of slots in each candidate slot position to zero.
		rep 50		n:= 1		Repeat 50 times.
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; s:= add_B; lat:= CPR_LAT(0); lon:= CPR_LON(E 310 NM)) (position of station B is > Q2d away from station under test) in slot beginning at time = current_inc_time + 5 x 60/M1	Sa	Send a sync burst from a simulated station B > Q2d away from the station under test, reporting B's position.
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; s:= add_E; lat:= CPR_LAT(0); lon:= CPR_LON(E 110 NM)) (position of station E is < Q2a, b, c, d away from station under test) in slot beginning at time = current_inc_time + 7 x 60/M1	Sa	Send a sync burst from a simulated station E < Q2a, b, c, d away from the station under test, reporting E's position.
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; s:= add_D; lat:= CPR_LAT(0); lon:= CPR_LON(E 50 NM)) (position of station D is such that a transmission from B to D is not CCI protected and that a transmission from E to D is not CCI protected) in slot beginning at time = current_inc_time + 10 x 60/M1	Sa	Send a sync burst from a simulated station D, reporting D's position, which is such that a transmission from B to D is not CCI protected and that a transmission from E to D is not CCI protected.

Context	Step	Action	PCO	Action Qualifier	Ref	Comment
		record		reserve_slot_1:= 4 x IO(n - 1) + random_position_1 reserve_slot_2:= 4 x IO(n - 1) + random_position_2		Slot positions to reserve within the next-but-one incremental broadcast candidate range.
		send	RF	UNI_BURST_a (sdf:= 1; ro:= reserve_slot_1 - 15 - 1; lg:= 0; pr:= 0; s:= add_B; d:= add_D) in slot beginning at time = current_inc_time + 15 x 60/M1	Ua	Send a unicast burst from station B > Q2d away from A, reserving a slot for transmission to station D. The distance from the station under test (station A) to station D is < (CCI ratio) times the distance from station B to station D, so that the transmission from B to D is not CCI protected. The burst reserves a slot in the candidate range of the next-but-one incremental broadcast reservation.
		send	RF	UNI_BURST_a (sdf:= 1; ro:= reserve_slot_2 - 20 - 1; lg:= 0; pr:= 0; s:= add_E; d:= add_D) in slot beginning at time = current_inc_time + 20 x 60/M1	Ua	Send a unicast burst from station E < Q2a, b, c, d away from A, reserving a slot for transmission to station D. The distance from the station under test (station A) to station D is < (CCI ratio) times the distance from station E to station D, so that the transmission from E to D is not CCI protected. The burst reserves a slot in the candidate range of the next-but-one incremental broadcast reservation.
		await	RF	INCREM_BURST_a (s = add_A)	Ia	Wait for the next incremental broadcast reservation.
		record	RF	current_inc_time:= time at beginning of slot containing INCREM_BURST_a (s = add_A)	Ia	Record the time of the incremental reservation transmission slot as current_inc_time.
		record	RF	IO(n):= io contained in INCREM_BURST _a (s = add_A) no_IO(IO(n)):= no_IO(IO(n)) + 1	Ia	Record value of io given in the incremental broadcast reservation. Record the frequency of occurrence of slots in each candidate slot position.
		endrep		n:= n + 1		
		verify		no_IO(random_position) = 0		Verify that no transmission is made in the slot reserved by station E.
		rep 6		m:= 64; chi_squared:= 0		Set value of m to the minimum value of the candidate range. Initialize chi_squared.
		record		**IF** m ≠ random_position **THEN** chi_squared:= chi_squared + $(no\_IO(m) - 10)^2/10$		For all the other slots the distribution is tested for uniformity by calculating the value of chi_squared.
		endrep		m:= m + 4		
		verify		chi_squared < 7,779		Value of chi_squared shall be less than 7,779 for 90 % confidence that the distribution is uniform (4 degrees of freedom).
postamble		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
		send	VSS	SET PARAMETERS (Q4:= 3; V22:= MIN(0,75, maximum allowed value of V22))		Reset to default values.
Comments:						

Test Case Name:				SlotSel_Level4_C		
Purpose:				**To demonstrate that a station will select a slot at level 4 from a more distant station in preference to a closer station.**		
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SET PARAMETERS (Q4:= 5; V22:= 720/(V21 x M1))		Q4 set to 5; equals the number of slots in the incremental broadcast dither range available for selection. V21 (nominal incremental reserved slot position) equals default value of 1,0 s. V22 (max incremental dither range) set to minimum; gives maximum dither range of 75 ± 12 after the incremental broadcast transmission slot (allowed slots of 64, 68, 72, 76, 80, 84).
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts.
test body		send	VSS	INCREMENTAL BROADCAST request to transmit INCREM_BURST_a followed by successive INCREM_BURST_a in reserved slots	Ia	Request to send incremental broadcast reservation and to place another incremental broadcast reservation in each reserved slot, thus creating an automatic succession of incremental broadcast reservations.
		await	RF	INCREM_BURST_a (s = add_A)	Ia	Wait for the incremental broadcast reservation.
		record	RF	current_inc_time:= time at beginning of slot containing INCREM_BURST_a (s = add_A)	Ia	Record the time of the incremental reservation transmission slot as current_inc_time.
		record	RF	IO(0):= io contained in INCREM_BURST _a (s = add_A)	Ia	Record value of io given in the incremental broadcast reservation.
		record		M_ASSIGN_SLOTS (random_position_1, random_position_2)		Slot to reserve within each candidate range, chosen at random from the six possible candidate slots.
		record		no_IO(m):= 0 for m:= {64, 68, 72, 76, 80, 84}		Initialize the number of slots in each candidate slot position to zero.
		rep 50		n:= 1		Repeat 50 times.
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; s:= add_B; lat:= CPR_LAT(0); lon:= CPR_LON(E 320 NM)) (position of station B is > Q2d away from station under test) in slot beginning at time = current_inc_time + 5 x 60/M1	Sa	Send a sync burst from a simulated station B > Q2d away from the station under test, reporting B's position.
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; s:= add_E; lat:= CPR_LAT(0); lon:= CPR_LON(E 310 NM)) (position of station E is > Q2d away from station under test but closer to the station under test than station B) in slot beginning at time = current_inc_time + 7 x 60/M1	Sa	Send a sync burst from a simulated station E > Q2d away from the station under test, reporting E's position. Station E is closer to the station under test than station B.
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; s:= add_D; lat:= CPR_LAT(0); lon:= CPR_LON(E 140 NM)) (position of station D is such that a transmission from B to D is not CCI protected and that a transmission from E to D is not CCI protected) in slot beginning at time = current_inc_time + 10 x 60/M1	Sa	Send a sync burst from a simulated station D, reporting D's position, which is such that a transmission from B to D is not CCI protected and that a transmission from E to D is not CCI protected.

Context	Step	Action	PCO	Action Qualifier	Ref	Comment
		record		reserve_slot_1:= 4 x IO(n - 1) + random_position_1 reserve_slot_2:= 4 x IO(n - 1) + random_position_2		Slot positions to reserve within the next-but-one incremental broadcast candidate range.
		send	RF	UNI_BURST_a (sdf:= 1; ro:= reserve_slot_1 - 15 - 1; lg:= 0; pr:= 0; s:= add_B; d:= add_D) in slot beginning at time = current_inc_time + 15 x 60/M1	Ua	Send a unicast burst from station B > Q2d away from A, reserving a slot for transmission to station D. The distance from the station under test (station A) to station D is < (CCI ratio) times the distance from station B to station D, so that the transmission from B to D is not CCI protected. The burst reserves a slot in the candidate range of the next-but-one incremental broadcast reservation.
		send	RF	UNI_BURST_a (sdf:= 1; ro:= reserve_slot_2 - 20 - 1; lg:= 0; pr:= 0; s:= add_E; d:= add_D) in slot beginning at time = current_inc_time + 20 x 60/M1	Ua	Send a unicast burst from station E > Q2d away from A, reserving a slot for transmission to station D. Station E is closer to the station under test than station B. The distance from the station under test (station A) to station D is < (CCI ratio) times the distance from station E to station D, so that the transmission from E to D is not CCI protected. The burst reserves a slot in the candidate range of the next-but-one incremental broadcast reservation.
		await	RF	INCREM_BURST_a (s = add_A)	Ia	Wait for the next incremental broadcast reservation.
		record	RF	current_inc_time:= time at beginning of slot containing INCREM_BURST_a (s = add_A)	Ia	Record the time of the incremental reservation transmission slot as current_inc_time.
		record	RF	IO(n):= io contained in INCREM_BURST _a (s = add_A) no_IO(IO(n)):= no_IO(IO(n)) + 1	Ia	Record value of io given in the incremental broadcast reservation. Record the frequency of occurrence of slots in each candidate slot position.
		endrep		n:= n + 1		
		verify		no_IO(random_position) = 0		Verify that no transmission is made in the slot reserved by station E.
		rep 6		m:= 64; chi_squared:= 0		Set value of m to the minimum value of the candidate range. Initialize chi_squared.
		record		**IF** m ≠ random_position **THEN** chi_squared:= chi_squared + $(no\_IO(m) - 10)^2/10$		For all the other slots the distribution is tested for uniformity by calculating the value of chi_squared.
		endrep		m:= m + 4		
		verify		chi_squared < 7,779		Value of chi_squared shall be less than 7,779 for 90 % confidence that the distribution is uniform (4 degrees of freedom).
postamble		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
		send	VSS	SET PARAMETERS (Q4:= 3; V22:= MIN(0,75, maximum allowed value of V22))		Reset to default values.
Comments:						

Test Case Name:		SlotSel_Block_Level0_A				
Purpose:		**To demonstrate that a station will select a block of slots at level 0 when no slots are reserved.**				
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
test body		send	VSS	PERIODIC BROADCAST request to transmit SYNC_BURST_d(2) (Q4:= 10; $TV11_{min}$:= 1; $TV11_{max}$:= 1; V11:= 10; V12:= (10/M1) x V11)	Sd(2)	Set up a series of periodic streams of two-slot messages from the station under test. Q4 set to 10; equals one less than the number of slots in the dither range available for selection. TV11 reservation hold timer set to force dither in next frame. V11 set to 10 bursts within M1 slots. V12 set to give dither range of ±5.
		rep 111		n:= 1		Repeat test 111 times to generate statistical sample.
		await	RF	SYNC_BURST_d(2) (pt:= 0; s = add_A)	Sd(2)	
		record	RF	sync_time(n):= time at beginning of first slot of n^{th} SYNC_BURST_d(2) diff_time:= sync_time(n) - ((n - 1)/10) x 60 - sync_time(1) slot_diff(n):= diff_time x M1/60	Sd(2)	Record the time of the first slot of the n^{th} sync burst. sync_time(1) defines a reference time to measure relative times from during the test. Calculate the relative time differences between each ct_slot and the ct_slot of the first burst and transpose to a common time frame. Convert time differences to slot differences.
		endrep		n:= n + 1		
		verify		MAX(slot_diff(n)) - MIN(slot_diff(n)) + 1 ≤ V12 x M1/V11		Verify distribution of blocks of slots is over candidate slot range.
		record		num_slot_diff(m):= 0 for all m		Initialize the number of blocks of slots in each candidate slot position to zero.
		rep 111		n:= 2		
		record		num_slot_diff(slot_diff(n)):= num_slot_diff(slot_diff(n)) + 1		Record the frequency of occurrence of blocks of slots in each candidate slot position.
		endrep		n:= n + 1		
		rep m		m:= MIN(slot_diff(n)); chi_squared:= 0		Set initial value of m to the minimum value of slot_diff.
		record		chi_squared:= chi_squared + (num_slot_diff(m) - 10)^2/10		The distribution is tested for uniformity by calculating the value of chi_squared.
		until		m:= MAX(slot_diff(n))		
		verify		chi_squared < 15,99		Value of chi_squared shall be less than 15,99 for 90 % confidence that the distribution is uniform (10 degrees of freedom).
postamble		send	VSS	CANCEL PERIODIC RESERVATION request		Cancel established periodic streams.
		send	VSS	SET PARAMETERS (Q4:= 3; $TV11_{min}$:= 4; $TV11_{max}$:= 8; V11:= 6; V12:= 0,1)		Reset to default values.
		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
Comments:						

Test Case Name:		SlotSel_Block_Level0_B				
Purpose:		**To demonstrate that a station will select a block of slots at level 0, excluding those not meeting the criteria of any other level.**				
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
test body		send	VSS	PERIODIC BROADCAST request to transmit SYNC_BURST_d(2) (Q4:= 6; $TV11_{min}$:= 1; $TV11_{max}$:= 1; V11:= 1; V12:= (6/M1) x V11; INFO:= [246 bits]{0})	Sd(2)	Set up a periodic stream of two-slot messages from the station under test. Q4 set to 6; equals one less than the number of slots in the dither range available for selection. TV11 reservation hold timer set to force dither in next frame. V11 set to 1. V12 set to give dither range of ±3.
		await	RF	SYNC_BURST_d(2) (s = add_A)	Sd(2)	
		record	RF	reserve_time:= time at the beginning of the first slot of SYNC_BURST_d(2) (s = add_A)	Sd(2)	Define a reference time to measure relative times from during the test. This slot position will be used for the reserved slot after the station under test has dithered away from this slot.
		await		time = reserve_time + 60 - 50/M1x 60		Wait for reserve_time plus 1 superframe minus 50 slots.
		send	RF	SYNC_BURST_a (pt:= 0; po:= 50; s:= add_B; lat:= CPR_LAT(0); lon:= CPR_LON(E 110 NM)) (position of station B is < Q2a, b, c, d away from the station under test) in slot beginning at time = reserve_time + 60 - 50/M1x 60	Sa	Send a sync burst from a simulated station B < Q2a, b, c, d away from the station under test. This sync burst is outside the dither range of the station under test but is set to dither into the reserved slot (which is within the dither range of the station under test) in the following superframe.
		await		time = reserve_time + 120		Wait for reserve_time plus 2 superframes.
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; s:= add_B; lat:= CPR_LAT(0); lon:= CPR_LON(E 110 NM)) (position of station B is < Q2a, b, c, d away from the station under test) in slot beginning at time = reserve_time + 120	Sa	Send a sync burst from station B < Q2a, b, c, d away from the station under test, which reserves the same slot for the following 4 superframes.
		await		time = reserve_time + 150		Wait until after the sync burst from the station under test has occurred in the current superframe.
		rep p		p:= 0		Start an outer loop that contains a reservation renewal.
		rep 3		n:= 1 + (4 x p)		Start an inner loop that records the times of the sync bursts made by the station under test. The variables are defined to label each recorded time according to the relative superframe in which it occurred. The definition takes into account superframes in which no time is recorded because an action to renew the reservation by station B has been undertaken instead.
		await	RF	SYNC_BURST_d(2) (s = add_A)	Sd(2)	

Context	Step	Action	PCO	Action Qualifier	Ref	Comment
		record	RF	sync_time(n):= time at beginning of first slot of n^{th} SYNC_BURST_d(2) (s = add_A) diff_time:= sync_time(n) - (n - 1) x 60 - sync_time(1) ct_slot_diff(n):= diff_time x M1/60	Sd(2)	Record the time of the first slot of the n^{th} sync burst. sync_time(1) defines a reference time to measure relative times from during the test. Calculate the relative time differences between each ct_slot and the ct_slot of the first burst and transpose to a common time frame. Convert time differences to slot differences.
		endrep		n:= n + 1		The inner loop makes recordings for 3 successive frames before exiting to the outer loop that makes an action in the next successive frame.
		await		time = reserve_time + 4 x (p + 1) x 60 + 120		Await the last reserved slot out of the four reserved by the last sync burst from station B.
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; s:= add_B; lat:= CPR_LAT(0); lon:= CPR_LON(E 110 NM)) (position of station B is < Q2a, b, c, d away from the station under test) in slot beginning at time = reserve_time + 4 x (p + 1) x 60 + 120	Sa	Every fourth superframe, send a sync burst from station B < Q2a, b, c, d away from the station under test, renewing the reservation for another 4 superframes.
		until		p:= 19; p:= p + 1		
		verify		MAX(ct_slot_diff(n)) - MIN(ct_slot_diff(n)) + 1 ≤ V12 x M1/V11		Verify distribution of blocks of slots is equal to or less than the candidate slot range.
		record		no_ct_slot_diff(m):= 0 for all m		Initialize array of variables to store frequency of occurrence of blocks of slots in each candidate slot position.
		rep 35		n:= 2		
		record		no_ct_slot_diff(ct_slot_diff(n)):= no_ct_slot_diff(ct_slot_diff(n)) + 1		Record the frequency of occurrence of blocks of slots in each candidate slot position.
		endrep		n:= n + 1		
		record		m_res_slot:= (reserve_time + 180 -sync_time(1)) x M1/60		Calculate relative slot difference between the reserved slot and the reference slot when transposed onto a common frame
		verify		no_ct_slot_diff(m_res_slot) = 0		Verify that no transmission is made in the slot reserved by station B.
		rep m		m:= MIN(slot_diff(n)); chi_squared:= 0		Set value of m to the minimum value of slot_diff
		record record		**IF** m ≠ m_res_slot **THEN** **{** **IF** m_res_slot = MIN(slot_diff(n)) **OR** m_res_slot = MIN(slot_diff(n)) +6 **THEN** chi_squared:= chi_squared + (no_ct_slot_diff(m) - (10))^2 /(10) **ELSE** chi_squared:= chi_squared + (no_ct_slot_diff(m) - (12))^2 /(12) **}**		For all the other slots the distribution is tested for uniformity by calculating the value of chi_squared.

Context	Step	Action	PCO	Action Qualifier	Ref	Comment
		until		m:= MAX(slot_diff(n))		
		verify		**IF** m_res_slot = MIN(slot_diff(n)) **OR** m_res_slot = MIN(slot_diff(n)) +6 **THEN** chi_squared < 9,236 **ELSE** chi_squared < 7,779		If the reserved slot is either the first or the last slot in the dither range, then the value of chi_squared shall be less than 9,236 for 90 % confidence that the distribution is uniform (5 degrees of freedom). Otherwise the value of chi_squared shall be less than 7,779 for 90 % confidence that the distribution is uniform (4 degrees of freedom).
postamble		send	VSS	CANCEL PERIODIC RESERVATION request		Cancel established periodic streams.
		send	VSS	SET PARAMETERS (Q4:= 3; $TV11_{min}$:= 4; $TV11_{max}$:= 8; V11:= 6; V12:= 0,1)		Reset to default values.
		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
Comments:						

Test Case Name:		SlotSel_Block_MixedLevel				
Purpose:		**To demonstrate that a station will select a block of slots from slots available at different levels.**				
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
test body		send	VSS	PERIODIC BROADCAST request to transmit SYNC_BURST_d(2) (Q4:= 6; $TV11_{min}$:= 1; $TV11_{max}$:= 1; V11:= 1; V12:= (6/M1) x V11; INFO:= [246 bits]{0})	Sd(2)	Set up a periodic stream of two-slot messages from the station under test. Q4 set to 6; equals one less than the number of slots in the dither range available for selection. TV11 reservation hold timer set to force dither in next frame. V11 set to 1. V12 set to give dither range of ±3.
		await	RF	SYNC_BURST_d(2) (s = add_A)	Sd(2)	
		record	RF	reserve_time:= time at the beginning of the first slot of SYNC_BURST_d(2) (s = add_A)	Sd(2)	Define a reference time to measure relative times from during the test. This slot position will be used for the reserved slot after the station under test has dithered away from this slot.
		await		time = reserve_time + 60 - 50/M1x 60		Wait for reserve_time plus 1 superframe minus 50 slots.
		send	RF	SYNC_BURST_a (pt:= 0; po:= 50; s:= add_B; lat:= CPR_LAT(0); lon:= CPR_LON(E 140 NM)) (position of station B is < Q2a, b, c, d away from the station under test) in slot beginning at time = reserve_time + 60 - 50/M1x 60	Sa	Send a sync burst from a simulated station B < Q2a away from the station under test. This sync burst is outside the dither range of the station under test but is set to dither into the reserved slot (which is within the dither range of the station under test) in the following superframe.
		await		time = reserve_time + 120		Wait for reserve_time plus 2 superframes.
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; s:= add_B; lat:= CPR_LAT(0); lon:= CPR_LON(E 140 NM)) (position of station B is < Q2a away from the station under test) in slot beginning at time = reserve_time + 120	Sa	Send a sync burst from station B < Q2a away from the station under test, which reserves the same slot for the following 4 superframes.
		await		time = reserve_time + 150		Wait until after the sync burst from the station under test has occurred in the current superframe.
		rep p		p:= 0		Start an outer loop that contains a reservation renewal.
		rep 3		n:= 1 + (4 x p)		Start an inner loop that records the times of the sync bursts made by the station under test. The variables are defined to label each recorded time according to the relative superframe in which it occurred. The definition takes into account superframes in which no time is recorded because an action to renew the reservation by station B has been undertaken instead.
		await	RF	SYNC_BURST_d(2) (s = add_A)	Sd(2)	

Context	Step	Action	PCO	Action Qualifier	Ref	Comment
		record	RF	sync_time(n):= time at beginning of first slot of n^{th} SYNC_BURST_d(2) (s = add_A) diff_time:= sync_time(n) - (n - 1) x 60 - sync_time(1) ct_slot_diff(n):= diff_time x M1/60	Sd(2)	Record the time of the first slot of the n^{th} sync burst. sync_time(1) defines a reference time to measure relative times from during the test. Calculate the relative time differences between each ct_slot and the ct_slot of the first burst and transpose to a common time frame. Convert time differences to slot differences.
		endrep		n:= n + 1		The inner loop makes recordings for 3 successive frames before exiting to the outer loop that makes an action in the next successive frame.
		await		time = reserve_time + 4 x (p + 1) x 60 + 120		Await the last reserved slot out of the four reserved by the last sync burst from station B.
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; s:= add_B; lat:= CPR_LAT(0); lon:= CPR_LON(E 140 NM)) (position of station B is < Q2a away from the station under test) in slot beginning at time = reserve_time + 4 x (p + 1) x 60 + 120	Sa	Every fourth superframe, send a sync burst from station B < Q2a away from the station under test, renewing the reservation for another 4 superframes.
		until		p:= 23; p:= p + 1		
		verify		MAX(ct_slot_diff(n)) - MIN(ct_slot_diff(n)) + 1 ≤ V12 x M1/V11		Verify distribution of blocks of slots is equal to or less than the candidate slot range.
		record		no_ct_slot_diff(m):= 0 for all m		Initialize array of variables to store frequency of occurrence of blocks of slots in each candidate slot position.
		rep 35		n:= 2		
		record		no_ct_slot_diff(ct_slot_diff(n)):= no_ct_slot_diff(ct_slot_diff(n)) + 1		Record the frequency of occurrence of blocks of slots in each candidate slot position.
		endrep		n:= n + 1		
		rep m		m:= MIN(slot_diff(n)); chi_squared:= 0		Set value of m to the minimum value of slot_diff
		record		chi_squared:= chi_squared + (no_ct_slot_diff(m) - $(72/7))^2$ /(72/7)		The distribution is tested for uniformity by calculating the value of chi_squared.
		until		m:= MAX(slot_diff(n))		
		verify		chi_squared < 10,645		Value of chi_squared shall be less than 10,645 for 90 % confidence that the distribution is uniform (6 degrees of freedom).
postamble		send	VSS	CANCEL PERIODIC RESERVATION request		Cancel established periodic streams.
		send	VSS	SET PARAMETERS (Q4:= 3; $TV11_{min}$:= 4; $TV11_{max}$:= 8; V11:= 6; V12:= 0,1)		Reset to default values.
		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
Comments:						

Test Case Name:		SlotSel_Reselection				
Purpose:	**To demonstrate that a station after selecting a slot which has been reserved by another station will not select a slot which has been reserved by the same station within the next M1-1 slots.**					
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
test body		send	VSS	PERIODIC BROADCAST request to transmit SYNC_BURST_b ($TV11_{min}$:= 1; $TV11_{max}$:= 1; V11:= 2; V12:= (2/M1) x V11)	Sb	Set up two periodic streams of one-slot messages from the station under test. Q4 has default value of 3; equals number of slots in dither range available for selection. TV11 reservation hold timer set to force dither in next frame. V11 set to 2 bursts within M1 slots. V12 set to minimum; equals dither range of ±1.
		rep 16		n:= 1		Repeat test 16 times to establish boundaries of candidate slot range for the two streams.
		await	RF	SYNC_BURST_b (pt = 0; s = add_A)	Sb	Await periodic stream 1.
		record	RF	sync_time1(n):= time at beginning of slot of n^{th} SYNC_BURST_b (s = add_A) diff_time:= sync_time1(n) - (n - 1) x 60 - sync_time1(1) slot_diff1(n):= diff_time x M1/60	Sb	Record the time of the n^{th} sync burst. sync_time1(1) defines a reference time to measure relative times from during the test. Calculate the relative time differences between each ct_slot and the ct_slot of the first burst and transpose to a common time frame. Convert time differences to slot differences.
		await	RF	SYNC_BURST_b (pt = 0; s = add_A)	Sb	Await periodic stream 2.
		record	RF	sync_time2(n):= time at beginning of slot of n^{th} SYNC_BURST_b (s = add_A) diff_time:= sync_time2(n) - (n - 1) x 60 - sync_time2(1) slot_diff2(n):= diff_time x M1/60	Sb	Record the time of the n^{th} sync burst. sync_time2(1) defines a reference time to measure relative times from during the test. Calculate the relative time differences between each ct_slot and the ct_slot of the first burst and transpose to a common time frame. Convert time differences to slot differences.
		endrep		n:= n + 1		
		verify		MAX(slot_diff1(n)) - MIN(slot_diff1(n)) ≤ V12 x M1/V11		Verify distribution of slots is over candidate range for stream 1.
		verify		MAX(slot_diff2(n)) - MIN(slot_diff2(n)) ≤ V12 x M1/V11		Verify distribution of slots is over candidate range for stream 2.
		record		reserve_time1:= sync_time1(1) + (18 + (MIN(slot_diff(n))/M1)) x 60 reserve_time2:= sync_time2(1) + (18 + (MIN(slot_diff(n))/M1)) x 60		Select the first slot in the candidate range to make a reservation.
		await		time = reserve_time1 - 50 x 60/M1		

Context	Step	Action	PCO	Action Qualifier	Ref	Comment
		send	RF	SYNC_BURST_d(3) (pt:= 1; po:= 50; s:= add_B; lat:= CPR_LAT(0); lon:= CPR_LON(E 160 NM)) (position of station B is > Q2b away from the station under test) in slot beginning at time = reserve_time1 - 50 x 60/M1	Sd(3)	Send a sync burst from a simulated station B > Q2b away from the station under test. This sync burst is outside the candidate range of stream 1 but is set to dither into the first slot of the candidate range of this stream in the next but one superframe. The burst reserves 3 slots and will thus extend over the whole of the candidate range when it dithers.
		await		time = reserve_time2 - 50 x 60/M1		
		send	RF	SYNC_BURST_d(3) (pt:= 1; po:= 50; s:= add_B; lat:= CPR_LAT(0); lon:= CPR_LON(E 160 NM)) (position of station B is > Q2b away from the station under test) in slot beginning at time = reserve_time1 - 50 x 60/M1	Sd(3)	Send a sync burst from a simulated station B > Q2b away from the station under test. This sync burst is outside the candidate range of stream 2 but is set to dither into the first slot of the candidate range of this stream in the next but one superframe. The burst reserves 3 slots and will thus extend over the whole of the candidate range when it dithers.
		await		time = reserve_time1 + 120		Wait for the beginning of the reservation across the candidate range of stream 1.
		verify	RF	SYNC_BURST_b (s = add_A) transmitted before time = reserve_time1 + 3 x 60/M1 + 120	Sb	Verify that a sync burst is transmitted by the station under test within the candidate range of stream 1, even though it conflicts with the reservation made by station B.
		await		time = reserve_time2 + 120		Wait for the beginning of the reservation across the candidate range of stream 2.
		verify	RF	no SYNC_BURST_b (s = add_A) transmitted before time = reserve_time2 + 3 x 60/M1 + 120	Sb	Verify that no sync burst is transmitted by the station under test in the candidate range of stream 2, and therefore within M1 slots of the last transmission made in a slot reserved by station B.
		verify	VSS	no slot available for selection		Verify that the VSS user is informed that no slot was available for selection.
postamble		send	VSS	CANCEL PERIODIC RESERVATION request		Cancel established periodic streams.
		send	VSS	SET PARAMETERS (Q4:= 3; $TV11_{min}$:= 4; $TV11_{max}$:= 8; V11:= 6; V12:= 0,1)		Reset to default values.
		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
Comments:						

Test Case Name:		SlotSel_Unsuccessful				
Purpose:		**To demonstrate that a station will fail to select a slot when no slots are available which are compatible with the QoS parameters.**				
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SET PARAMETERS (Q4:= 6; V22:= 720/(V21 x M1))		Q4 set to 6; equals the number of slots in the incremental broadcast dither range available for selection. V21 (nominal incremental reserved slot position) equals default value of 1,0 s. V22 (max incremental dither range) set to minimum; gives maximum dither range of 75 ± 12 after the incremental broadcast transmission slot (allowed slots of 64, 68, 72, 76, 80, 84).
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts.
test body		send	VSS	INCREMENTAL BROADCAST request to transmit INCREM_BURST_a followed by successive INCREM_BURST_a in reserved slots	Ia	Request to send incremental broadcast reservation and to place another incremental broadcast reservation in each reserved slot, thus creating an automatic succession of incremental broadcast reservations.
		await	RF	INCREM_BURST_a (s = add_A)	Ia	Wait for the first incremental broadcast reservation (incremental burst 1) from the station under test.
		record	RF	inc_time:= time at beginning of slot containing INCREM_BURST_a (s = add_A)	Ia	Record the time of the incremental reservation transmission slot as current_inc_time.
		record	RF	IO(0):= io contained in INCREM_BURST _a (s = add_A)	Ia	Record value of io given in the incremental broadcast reservation.
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; s:= add_B; lat:= CPR_LAT(0); lon:= CPR_LON(E 110 NM)) (position of station B is < Q2a, b, c, d away from station under test) in slot beginning at time = inc_time + 5 x 60/M1	Sa	Send a sync burst from a simulated station B < Q2a, b, c, d away from the station under test, reporting B's position.
		send	RF	INCREM_BURST_b(25) (io:= 24; s = add_B) in slot beginning at time = inc_time + (4 x IO + 63 - 96) x 60/M1	Ib(k)	Send an incremental burst from station B < Q2a, b, c, d away reserving a series of 25 slots that conflict with the candidate range of the next incremental burst from the station under test.
		await		time = inc_time + (4 x IO) x 60/M1		Wait for the slot reserved by the station under test for its next incremental broadcast reservation.
		verify	RF	No incremental broadcast reservation in slot beginning at time = inc_time + (4 x IO) x 60/M1		Verify that the reserved slot does not contain an incremental broadcast reservation (incremental burst 2) because the slot which it needed to reserve could not be selected.
		verify	VSS	VSS user informed that no slot could be selected for a further incremental broadcast reservation		Verify that the VSS user is informed that no slot could be selected for a further incremental broadcast reservation (incremental burst 3).
		rep 25		n:= 1		
		verify	RF	No transmission from station under test in slot beginning at time = inc_time + (4 x IO + 63 + n) x 60/M1		Verify that in the candidate range in which the station under test was attempting to reserve a slot, there is no incremental burst (incremental burst 3) from the station under test.
		endrep		n:= n + 1		

Context	Step	Action	PCO	Action Qualifier	Ref	Comment
postamble		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
		send	VSS	SET PARAMETERS (Q4:= 3; V22:= MIN(0,75, maximum allowed value of V22))		Reset to default values.
Comments:						

Test Case Name:				SlotSel_QoSGroup		
Purpose:	**To demonstrate that a station will select a slot using a second group of QoS parameters when no slot has been selected by means of the first group.**					
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SET PARAMETERS (Q4:= 6; V22:= 720/(V21 x M1))		Q4 set to 6; equals the number of slots in the incremental broadcast dither range available for selection. V21 (nominal incremental reserved slot position) equals default value of 1,0 s. V22 (max incremental dither range) set to minimum; gives maximum dither range of 75 ± 12 after the incremental broadcast transmission slot (allowed slots of 64, 68, 72, 76, 80, 84).
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts.
		send	VSS	INPUT Q2 SET 2	Q2 Set 2	Send to the station under test the Q2 Set 2 parameters in addition to the default Set 1, allowing it to use the less stringent Q2 Set 2 parameters when slot selection is unsuccessful with the first set.
test body		send	VSS	INCREMENTAL BROADCAST request to transmit INCREM_BURST_a followed by successive INCREM_BURST_a in reserved slots	Ia	Request to send incremental broadcast reservation and to place another incremental broadcast reservation in each reserved slot, thus creating an automatic succession of incremental broadcast reservations.
		await	RF	INCREM_BURST_a (s = add_A)	Ia	Wait for the first incremental broadcast reservation from the station under test (incremental burst 1).
		record	RF	inc_time:= time at beginning of slot containing INCREM_BURST_a (s = add_A)	Ia	Record the time of the incremental reservation transmission slot as current_inc_time.
		record	RF	IO:= io contained in INCREM_BURST _a (s = add_A)	Ia	Record value of io given in the incremental broadcast reservation.
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; s:= add_B; lat:= CPR_LAT(0); lon:= CPR_LON(E 110 NM)) (position of station B is < Q2a, b, c, d away from station under test) in slot beginning at time = inc_time + 5 x 60/M1	Sa	Send a sync burst from a simulated station B < Q2a, b, c, d away from the station under test, reporting B's position.
		send	RF	INCREM_BURST_b(25) (io:= 24; s = add_B) in slot beginning at time = inc_time + (4 x IO + 63 - 96) x 60/M1	Ib(25)	Send an incremental burst from station B < Q2a, b, c, d away reserving a series of 25 slots that conflict with the candidate range of the next incremental burst from the station under test.
		verify	RF	INCREM_BURST_a (s = add_A) in slot beginning at time = inc_time + (4 x IO) x 60/M1	Ia	Verify that the station under test makes use of the Q2 Set 2 parameters by being able to select a slot within the range of slots reserved by station B, when it would not be able to do so without the Q2 Set 2. This slot therefore contains an incremental broadcast reservation (incremental burst 2) pointing to the selected slot.
		record	RF	inc_time:= time at beginning of slot containing INCREM_BURST_a (s = add_A)	Ia	Record the time of the incremental reservation transmission slot as current_inc_time.
		record	RF	IO2:= io contained in INCREM_BURST _a (s = add_A)	Ia	Record value of io given in the incremental broadcast reservation.

Context	Step	Action	PCO	Action Qualifier	Ref	Comment
		verify	RF	INCREM_BURST_a (s = add_A) in slot beginning at time = inc_time_2 + (4 x IO2) x 60/M1	Ia	Verify that the selected slot is used by the station under test to transmit a further incremental broadcast (incremental burst 3).
postamble		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
		send	VSS	SET PARAMETERS (Q4:= 3; V22:= MIN(0,75, maximum allowed value of V22))		Reset to default values.
Comments:						

Test Case Name:		SlotSel_Exclusion				
Purpose:		**To demonstrate that a station does not select a slot for transmission when the station is required to transmit in that slot on another channel.**				
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
test body		send	VSS	PERIODIC BROADCAST request to transmit SYNC_BURST_b (Q4:= 5; $TV11_{min}$:= 1; $TV11_{max}$:= 1; V11:= 1; V12:= (4/M1) x V11; f:= f0)	Sb	Set up a periodic stream of one-slot messages on channel with frequency f0 from the station under test. Q4 set to 5; equals number of slots in dither range available for selection. TV11 reservation hold timer set to force dither in next frame. V11 set to 1. V12 set to give dither range of ±2.
		await	RF(f0)	SYNC_BURST_b (s = add_A)	Sb	
		record	RF(f0)	reserve_time:= time at the beginning of slot containing SYNC_BURST_b (s = add_A)	Sb	Define a reference time to measure relative times from during the test. This slot position will be used for the reserved slot after the station under test has dithered away from this slot.
		await		time = reserve_time + 60 - 50/M1x 60		Wait for reserve_time plus 1 superframe minus 50 slots.
		send	RF	DIR_REQ_a (or:= 0; pr_flag:= 0; dt:= 4; nr:= 4; do:= 50; lg:= 0; rcvr:= 0; f:= f1; r-mi:= 0; trmt:= 0; r-mi:= xxxxx10; s:= add_G (address indicating source is a ground station); d:= add_A) in slot beginning at time = reserve_time + 60 - 50/M1x 60	Da	Send a directed burst from a simulated ground station G and with the transmit control (trmt) flag set to 0, requesting the station under test to transmit at a rate of 4 bursts per superframe for 5 superframes on frequency f1.
		rep 21		n:= 1		
		await	RF(f0)	SYNC_BURST_b (s = add_A)	Sb	
		record	RF(f0)	sync_time(n):= time at beginning of slot of n^{th} SYNC_BURST_b (s = add_A) diff_time:= sync_time(n) - (n - 1) x 60 - sync_time(1) ct_slot_diff(n):= diff_time x M1/60	Sb	Record the time of the n^{th} sync burst. sync_time(1) defines a reference time to measure relative times from during the test. Calculate the relative time differences between each ct_slot and the ct_slot of the first burst and transpose to a common time frame. Convert time differences to slot differences.
		endrep		n:= n + 1		
		verify		MAX(ct_slot_diff(n)) - MIN(ct_slot_diff(n)) ≤ V12 x M1/V11		Verify distribution of slots is equal to or less than the candidate slot range.
		record		no_ct_slot_diff(m):= 0 for all m		Initialize array of variables to store frequency of occurrence of slots in each candidate slot position.
		rep 21		n:= 2		
		record		no_ct_slot_diff(ct_slot_diff(n)):= no_ct_slot_diff(ct_slot_diff(n)) + 1		Record the frequency of occurrence of slots in each candidate slot position.
		endrep		n:= n + 1		
		record		m_res_slot:= (reserve_time + 180 - sync_time(1)) x M1/60		Calculate relative slot difference between the reserved slot and the reference slot when transposed onto a common frame
		verify		no_ct_slot_diff(m_res_slot) = 0		Verify that no transmission is made on channel f0 in the slot reserved by station B.

Context	Step	Action	PCO	Action Qualifier	Ref	Comment
		rep m		m:= MIN(slot_diff(n)); chi_squared:= 0		Set value of m to the minimum value of slot_diff
		record		**IF** $m \neq m\_res\_slot$ **THEN** chi_squared:= chi_squared + $(no\_ct\_slot\_diff(m) - (21/4))^2$ /(21/4)		For all the other slots the distribution is tested for uniformity by calculating the value of chi_squared.
		until		m:= MAX(slot_diff(n))		
		verify		chi_squared < 6,251		Value of chi_squared shall be less than 6,251 for 90 % confidence that the distribution is uniform (3 degrees of freedom).
postamble		send	VSS	CANCEL PERIODIC RESERVATION request		Cancel established periodic streams.
		send	VSS	SET PARAMETERS (Q4:= 3; $TV11_{min}$:= 4; $TV11_{max}$:= 8; V11:= 6; V12:= 0,10)		Reset to default values.
		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
Comments:						

Test Case Name:				Conflict_Periodic_A		
Purpose:	**To demonstrate that a station will continue to transmit a periodic stream without action in the event of a conflicting non-periodic transmission from another station.**					
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SET PARAMETERS ($TV11_{min}$:= 15; $TV11_{max}$: = 16; V11:= 1)		Set $TV11_{min}$ and $TV11_{max}$ to their maximum values. Set V11 to 1 burst per superframe.
test body		await	RF	First SYNC_BURST_c (s = add_A) following dither to a new slot in the superframe	Sc	Await the first sync burst following a dither to a new slot.
		record	RF	sync_time:= time at the beginning of slot containing SYNC_BURST_c (s = add_A)	Sc	Define a reference time to measure relative times from during the test.
		await		time = sync_time + 50 x 60/M1		
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; s:= add_B; lat:= CPR_LAT(0); lon:= CPR_LON(E 110 NM)) (position of station B is < Q2a, b, c, d away from station under test) in slot beginning at time = sync_time + 50 x 60/M1	Sa	Send a sync burst from a simulated station B < Q2a, b, c, d away from the station under test, reporting B's position (see note).
		await		time = sync_time + (M1 - 1 280) x 60/M1		
		send	RF	INCREM_BURST_a (io:= 320; s:= add_B) (position of station B is < Q2a, b, c, d away from station under test) in slot beginning at time = sync_time + (M1 - 1 280) x 60/M1	Ia	Send an incremental burst from the simulated station B < Q2a, b, c, d away from the station under test, reserving a slot that conflicts with the periodic stream (see note).
		rep 2		n:= 1		
		verify	RF	SYNC_BURST_c (s = add_A) in slot beginning at time = sync_time + n x 60	Sc	Verify that the periodic stream from the station under test continues without change.
		endrep		n:= n + 1		
postamble		send	VSS	SET PARAMETERS (V11:= 6; TV11min:= 4; $TV11_{max}$:= 8)		Reset to default values
Comments:						
NOTE: The value of the Q2a, b, c, d parameters used here is that specified within the Q2 Set 4 parameters shown in clause 5.2.4.3.1.4 and defined in ICAO VDL Mode 4 Technical Manual [1], clause 1.5.6.1.4.						

Test Case Name:				**Conflict_Periodic_B**		
Purpose:				**To demonstrate that a station will dither a periodic stream to resolve a conflict with a periodic stream from another station.**		
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SET PARAMETERS ($TV11_{min}$:= 15; $TV11_{max}$: = 16; V11:= 1)		Set $TV11_{min}$ and $TV11_{max}$ to their maximum values. Set V11 to 1 burst per superframe.
test body		await	RF	First SYNC_BURST_c (s = add_A) following dither to a new slot in the superframe	Sc	Await the first sync burst following a dither to a new slot.
		record	RF	sync_time:= time at the beginning of slot containing SYNC_BURST_c (s = add_A)	Sc	Define a reference time to measure relative times from during the test.
		await		time = sync_time + 50 x 60/M1		
		send	RF	SYNC_BURST_a (pt:= 1; po:= -50; s:= add_B; lat:= CPR_LAT(0); lon:= CPR_LON(E 110 NM)) (position of station B is < Q2a, b, c, d away from station under test) in slot beginning at time = sync_time + 50 x 60/M1	Sa	Send a periodic reservation from a simulated station B < Q2a, b, c, d away from the station under test, with a periodic offset value reserving slots that conflict with the test station stream, and a periodic timer value such that the conflicting reservation starts 2 frames in the future (see note).
		await	RF	SYNC_BURST_c (s = add_A) in slot beginning at time = sync_time + 60	Sc	Wait for the sync burst in the superframe before the reservation conflict.
		record	RF	PO:= po of SYNC_BURST_c PT:= pt of SYNC_BURST_c	Sc	Record the value of the periodic timer indicating that the stream will dither in the next superframe, and that of the periodic offset identifying the slot to which it will dither.
		verify		PO ≠ 0 **AND** PO ≠ -128 **AND** PT = 0		Verify valid values for pt and po indicating that the station will dither to avoid conflict.
		await		time = sync_time + (2 x M1 + PO) x 60/M1		
		verify	RF	SYNC_BURST_c (s = add_A) in slot beginning at time = sync_time + (2 x M1 + PO) x 60/M1	Sc	Verify that the station under test has dithered the periodic stream to the announced slot in order to avoid conflict.
postamble		send	VSS	SET PARAMETERS (V11:= 6; TV11min:= 4; $TV11_{max}$:= 8)		Reset to default values

Comments:

NOTE: The value of the Q2a, b, c, d parameters used here is that specified within the Q2 Set 4 parameters shown in clause 5.2.4.3.1.4 and defined in ICAO VDL Mode 4 Technical Manual [1], clause 1.5.6.1.4.

Test Case Name:				Conflict_Periodic_C		
Purpose:	**To demonstrate that a station will move a periodic stream to a new location in the event of a conflict with a periodic stream from another station that does not allow the original stream to be dithered.**					
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SET PARAMETERS ($TV11_{max}$:= 4; V11:= 1; V12:= (2/M1) x V11)		Set $TV11_{max}$ to use dither every 4 superframes. Set V11 to 1 burst per superframe. Set V12 to minimum to give a dither range of ±1.
test body		await	RF	First SYNC_BURST_c (s = add_A) following dither to a new slot in the superframe	Sc	Await the first sync burst following a dither to a new slot.
		record	RF	sync_time:= time at the beginning of slot containing SYNC_BURST_c (s = add_A)	Sc	Define a reference time to measure relative times from during the test.
		await	RF	SYNC_BURST_c (s = add_A) in slot beginning at time = sync_time + 60	Sc	Wait for the second sync burst in the stream.
		record	RF	PO:= po of SYNC_BURST_c PT:= pt of SYNC_BURST_c	Sc	Record the periodic offset and periodic timer values. pt shall have a value of 2 (pt = TV11 - 1) here indicating continuing reservations in current slot for 2 more superframes before the stream dithers to a new slot as identified by po.
		await		time = sync_time + (M1 + 50) x 60/M1		
		send	RF	SYNC_BURST_a (pt:= 0; po:= -50; s:= add_B; lat:= CPR_LAT(0); lon:= CPR_LON(E 110 NM)) (position of station B is < Q2a, b, c, d away from station under test) in slot beginning at time = sync_time + (M1 + 50) x 60/M1	Sa	Send a periodic reservation from a simulated station B < Q2a, b, c, d away from the station under test, with a periodic offset value reserving slots that conflict with the test station stream, and a periodic timer value such that the conflicting reservation is in the next scheduled test station sync burst (third burst in stream). NOTE: The value of the Q2a, b, c, d parameters used here is that specified within the Q2 Set 4 parameters shown in clause 5.2.4.3.1.4 and defined in ICAO VDL Mode 4 Technical Manual [1], clause 1.5.6.1.4.
		await	RF	SYNC_BURST_c (s = add_A)	Sc	Await the next burst from the station under test which should be the first burst of new stream.
		record	RF	new_sync_time:= time at the beginning of the slot containing SYNC_BURST_c (s = add_A)	Sc	
		rep 2		n:= 1		
		verify		new_sync_time ≠ sync_time + (n + 1) x 60		Verify that the sync burst has moved from its ct_slot so as to avoid a conflict with the reserved slots.
		endrep		n:= n + 1		
postamble		send	VSS	SET PARAMETERS (V11:= 6; V12:= 0,1; TV11min:= 4; $TV11_{max}$:= 8)		Reset to default values
Comments:						

Test Case Name:				**Conflict_NoAction**		
Purpose:				**To demonstrate that a station will continue to transmit a periodic stream without action in the event of receiving a conflicting reservation such that the slot remains available.**		
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SET PARAMETERS ($TV11_{min}$:= 15; $TV11_{max}$:= 16; V11:= 1)		Set $TV11_{min}$ and $TV11_{max}$ to their maximum values. Set V11 to 1 burst per superframe.
test body		await	RF	First SYNC_BURST_c (s = add_A) following dither to a new slot in the superframe	Sc	Await the first sync burst following a dither to a new slot.
		record	RF	sync_time:= time at the beginning of slot containing SYNC_BURST_c (s = add_A)	Sc	Define a reference time to measure relative times from during the test.
		await		time = sync_time + 50 x 60/M1		
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; s:= add_B; lat:= CPR_LAT(0); lon:= CPR_LON(E 200 NM)) (position of station B is > Q2b away from station under test) in slot beginning at time = sync_time + 50 x 60/M1	Sa	Send a sync burst from a simulated station B > Q2b away from the station under test, reporting B's position. NOTE: The value of the Q2b parameter used here is that specified within the Q2 Set 4 parameters shown in clause 5.2.4.3.1.4 and defined in ICAO VDL Mode 4 Technical Manual [1], clause 1.5.6.1.4.
		await		time = sync_time + (M1 - 1 280) x 60/M1		
		send	RF	INCREM_BURST_a (io:= 320; s = add_B) in slot beginning at time = sync_time + (M1 - 1 280) x 60/M1	Ia	Send an incremental burst from a station B > Q2b away from the station under test, reserving a slot that conflicts with the periodic stream.
		rep 2		n:= 1		
		verify	RF	SYNC_BURST_c (s = add_A) in slot beginning at time = sync_time + n x 60	Sc	Verify that the periodic stream continues without change.
		endrep		n:= n + 1		
postamble		send	VSS	SET PARAMETERS ($TV11_{min}$:= 4; $TV11_{max}$:= 8; V11:= 6)		Reset to default values.
Comments:						

Test Case Name:				**Conflict_Incremental**		
Purpose:				**To demonstrate that a station will not transmit in a slot previously reserved by an incremental broadcast reservation in the event of receiving a conflicting reservation, and will make the broadcast in an alternative slot by random access.**		
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
test body		send	VSS	INCREMENTAL BROADCAST request to transmit INCREM_BURST_a followed by successive INCREM_BURST_a in reserved slots (io:= 300)	Ia	Set up a series of incremental broadcasts from the station under test to transmit every 1 200 slots.
		await	RF	INCREM_BURST_a (io= 300; s = add_A)	Ia	Wait for first incremental burst.
		record	RF	sync_time:= time at the beginning of slot containing INCREM_BURST_a (io= 300; s = add_A)	Ia	Define a reference time to measure relative times from during the test.
		await		time = sync_time + 300 x 60/M1		
		send	RF	SYNC_BURST_b (pt:= 3; po:= 0; s = add_B) in slot beginning at time:= sync_time + 300 x 60/M1	Sb	Send a sync burst from a station B with a reservation conflicting with a future incremental broadcast from the station under test.
		await	RF	INCREM_BURST_a (io:= 300; s = add_B) in slot beginning at time = sync_time + 3 600 x 60/M1	Ia	
		verify	RF	next INCREM_BURST_a (io:= 300; s = add_B) occurs in or after slot beginning at time = sync_time + 4 350 x 60/M1 and in or before slot beginning at time = sync_time + 5 250 x 60/M1	Ia, Sb	Verify that the incremental broadcast is moved to a new slot to avoid the conflict (using the random access protocol).
				AND		
		verify	RF	slot beginning at time = sync_time + 4 800 x 60/M1 contains SYNC_BURST_b (po:= 0; pt:= 2; s = add_B)		
postamble		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
Comments:						

Test Case Name:		Conflict_Priority				
Purpose:		**To demonstrate that a station required to transmit in the same slot by conflicting requests will transmit the response of highest priority.**				
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
test body		rep 10		n:= 1		
		send	RF	UNI_BURST_d (ro:= 100; lg:= 0; sdf:= 0; pr:= 1; r mi:= xxxxx10; s:= add_B; d:= add_A)	Ud	Send a unicast request burst from a simulated station B to the station under test with priority pr = 1 carrying a general request for a sync burst.
		record	RF	uni_start:= time at beginning of slot containing UNI_BURST_d	Ud	Record the time the unicast burst was sent.
		send	RF	UNI_BURST_d (ro:= 97; lg:= 0; sdf:= 0; pr:= 2; r mi:= xxxxx10; s:= add_C; d:= add_A) in slot beginning at time = uni_start + 3	Ud	Send a unicast request burst from a simulated station C to the station under test with priority pr = 1 carrying a general request for a sync burst. The transmission reserves the same slot for a response as the transmission from station B.
		verify	RF	SYNC_BURST_m (s:= add_A; d:= add_C) in slot beginning at time = uni_start + 100	Sm	Verify that the station under test responds to station C in the reserved slot with a sync burst with the response reservation address set to the address of station C.
		endrep		n:= n + 1		
postamble		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
Comments: Certain stations, such as those with low power (Type B) transmitters, will not support a general request for a sync burst using a unicast reservation. For such stations, this test is inapplicable.						

Test Case Name:				Conflict_FirstRequest		
Purpose:				**To demonstrate that a station required to transmit in the same slot by conflicting requests of equal priority will transmit the response to the first request.**		
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
test body		rep 10		n:= 1		
		send	RF	UNI_BURST_d (ro:= 100; lg:= 0; sdf:= 0; pr:= 2; r mi:= xxxxx10; s:= add_B; d:= add_A)	Ud	Send a unicast burst from a simulated station B to the station under test, with sdf = 0 and priority pr = 2, carrying a general request for a sync burst.
		record	RF	uni_start:= time at beginning of slot containing UNI_BURST_d	Ud	Record the time the compressed frame burst was sent.
		send	RF	UNI_BURST_d (ro:= 97; lg:= 0; sdf:= 0; pr:= 2; r-mi:= xxxxx10; s:= add_C; d:= add_A) in slot beginning at time = uni_start + 3	Ud	Send a unicast burst from a simulated station C to the station under test, with sdf = 0 and priority pr = 2, carrying a general request for a sync burst. The transmission reserves the same slot for a response as the transmission from station B.
		verify	RF	SYNC_BURST_m (s:= add_A; d:= add_B) in slot beginning at time = uni_start + 100	Sm	Verify that the station under test responds to station B in the reserved slot with a sync burst with the response reservation address set to the address of station B.
		endrep		n:= n + 1		
postamble		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
Comments: Certain stations, such as those with low power (Type B) transmitters, will not support a general request for a sync burst using a unicast reservation. For such stations, this test is inapplicable.						

Test Case Name:		**Slot_Boundary**				
Purpose:		**To demonstrate that a transmission from the station complies with timing performance requirements at the slot boundary.**				
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
		send	VSS	SET PARAMETERS (p:= 1)		Ensure 100 % chance of transmission on access.
		do		MEASURE NOISE FLOOR		Measure the channel idle power level in order to estimate the noise floor.
test body		macro		M_RAND_ACC (sf:= 1)		Queue random access transmissions over 1 superframes.
		await	RF	RAND_ACC_DATA_a (s = add_A)	Ra	Wait for the start of the random access transmissions.
		rep 10		n:= 1		
		await	RF	RAND_ACC_DATA_a (s = add_A)	Ra	Wait for the next random access transmission.
		await	RF	500 µs before end of slot containing RAND_ACC_DATA_a (s = add_A) (measured from the test equipment's UTC slot start time)	Ra	Wait until 500 µs before the end of the slot.
		record	RF	start_time:= time 500 µs before end of next slot containing RAND_ACC_DATA_a (s = add_A)	Ra	
		rep 20 000		p:= 0		Define a sequence of points at which to measure the transmission amplitude.
		record record	RF	Measure transmission amplitude trans_amp at time:= start_time + p x 10^{-7} Calculate transmission power trans_power(trans_amp)		Measure the transmission amplitude at each point. Calculate the transmission power at each point with respect to noise floor.
		endrep		p:= p + 1		
		record		steady_power:= trans_power averaged over last 4 000 points		Measure the steady state channel busy power level.
		verify verify		trans_amp = 0 before nominal slot start time (measured from the test equipment's UTC slot start time) **AND** trans_power ≥ 0.9 x steady_power at 833.3 ± 5 µs after the nominal slot start time (measured from the test equipment's UTC slot start time)		Verify that the transmission does not begin before the nominal start of the slot, and that 16 symbol periods (833,3 ± 5 µs) after the nominal start of the slot, the transmitter power level has increased to at least 90 % of the steady state channel busy power level.
		endrep		n:= n + 1		
postamble		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
Comments:						

Test Case Name:		**Rand_Busy**				
Purpose:		**To demonstrate that a station will not make a random access transmission in a slot perceived to be busy at the start of the slot (e.g. a transmission which extends beyond the guard time).**				
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
		send	VSS	SET PARAMETERS (p:= 1)		Ensure 100 % chance of transmission on access.
test body		send	RF	SYNC_BURST_b (pt:= 1; po:= 0; s:= add_B)	Sb	Send a sync burst (burst length 1) from a simulated station B reserving the same transmission slot in the next superframe, but thereafter terminating the stream.
		record	RF	periodic_start:= time at beginning of slot containing the sync burst		Provides a reference time for the next burst from station B.
		macro		M_RAND_ACC (sf:= 1)		Queue random access transmissions over 1 superframe.
		await	RF	RAND_ACC_DATA_a (s = add_A)	Ra	
		record	RF	start_time:= time at beginning of slot containing RAND_ACC_DATA_a (s = add_A)	Ra	Define a reference time to measure relative times from during the test.
		repx		n:= 1		
		verify	RF	RAND_ACC_DATA_a (s = add_A) in slot beginning at time = start_time + n x 60/M1	Ra	Verify that random access transmissions are made by the station under test in all slots up to the reserved slot.
		until		time = periodic_start + (M1 - 1) x 60/M1 in previous step; n:= n + 1		
		await		time = periodic_start + 60		Wait for the start of the next superframe.
		send	RF	SYNC_BURST_e (pt:= 3; po:= 0; s = add_B) in slot beginning at time:= periodic_start + 60	Se	Send a burst with pt = 3 and po = 0 from station B extending over one slot boundary into the following slot.
		repx		n:= 1		
		verify verify	RF RF	**IF** n = 1 **THEN** no transmission from station under test present in slot beginning at time = periodic_start + (n + M1) x 60/M1 **ELSE** RAND_ACC_DATA_a (s = add_A) in slot beginning at time = periodic_start + (n + M1) x 60/M1	Ra	Verify that random access transmissions are made by the station under test in all slots except the slot following the reserved slot.
		until		time = start_time + 60; n:= n + 1		Ends the loop 1 minute after the first random access transmission was sent, i.e. verification takes place over 1 superframe + 1 slot.
postamble		send	VSS	SET PARAMETERS (p:= 64/256)		Reset to default value.
		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
Comments:						

Test Case Name:		Rand_Congestion				
Purpose:		**To demonstrate that the VSS User is informed if a request to make a random transmission is not successful within TM2 slots.**				
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
test body		send	RF	SYNC_BURST_d(25) (s = add_B)	Sd(25)	Send a sync burst from a simulated station B extending over 25 slots.
		send	VSS	RANDOM TRANSMISSION request to transmit RAND_ACC_DATA_a (TM2:= 20)		Send (VSS) a request for a random transmission (with TM2 = 20 slots).
		verify	VSS	message sent to vss user notifying congestion		Verify (VSS) that congestion is notified.
postamble		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
Comments:						

Test Case Name:		Rand_Persistence				
Purpose:		**To demonstrate that a random transmission is made with probability p.**				
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
test body		rep 2		m:= {104/256, 50/256}; exp(104/256, k):= {40,63, 24,12, 14,32, 8,50, 5,05, 7,38} for k = 1 to 6; exp(48/256, k):= {18,75, 15,23, 12,38, 10,06, 8,17, 35,41} for k = 1 to 6		m defines the two values to be used for the probability of transmission for a random access attempt. exp(m, k) gives the expected numbers of actual transmissions in each of the five slots following the request for random access transmission.
		send	VSS	SET PARAMETERS (p:= m)		Set the probability of transmission p for a random access attempt.
		record		no_slot(k):= 0 for k:= 1 to 6		Initialize to zero the number of transmissions in each slot position after the request for random transmission.
		rep 100		n:= 1		
		send	VSS	RANDOM TRANSMISSION request to transmit RAND_ACC_DATA_a		Send (VSS) a request for a random transmission.
		record	VSS	req_time:= time of first slot boundary after RANDOM TRANSMISSION request is sent		Record the time of the first slot boundary after the request for random transmission is sent.
		rep 5		x:= 1; inslot:= FALSE		
		record	RF	**IF** transmission present in slot beginning at time = req_time + (x - 1) x 60/M1 **THEN** no_slot(x):= no_slot(x) + 1 **AND** inslot:= TRUE		
		endrep		x:= x + 1		
		record		**IF** inslot:= FALSE **THEN** no_slot(6):= no_slot(6) + 1		
		await		req_time + 50 x 60/M1		
		endrep		n:= n + 1		
		rep 6		k:= 1; chi_squared:= 0		Initialize value of k to correspond to the first slot after the requests. Initialize chi_squared.
		record		chi_squared:= chi_squared + (no_slot(k) - exp (m, k))^2 / exp(m, k)		The distribution is tested for consistency with the value chosen for the probability of transmission p, by calculating the value of chi_squared.
		endrep		k:= k + 1		
		verify		chi_squared < 9,236		Value of chi_squared shall be less than 9,236 for 90 % confidence that the distribution is consistent with the value chosen for p (5 degrees of freedom).
		endrep		next m		

Context	Step	Action	PCO	Action Qualifier	Ref	Comment
postamble		send	VSS	SET PARAMETERS (p:= 64/256)		Reset to default values.
		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
Comments:						

Test Case Name:		Rand_MaxAttempts				
Purpose:		**To demonstrate that the station will authorize a random transmission as soon as the channel is available after VS3 unsuccessful attempts**				
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
		send	VSS	SET PARAMETERS (p:= 5/256)		Set probability of transmission on access to near minimum value.
test body		rep 2		m:= {4, 9}; exp(4, k):= {10, 9,8, 9,61, 9,42, 473,16} for k = 1 to 5; exp(9, k):= {10, 9,8, 9,61, 9,42, 9,24, 9,06, 8,88, 8,71, 8,54, 428,72} for k = 1 to 10		m defines the two values to be used for the maximum number of access attempts VS3. exp(m, k) gives the expected numbers of actual transmissions in each of the m + 1 slots following the request for random access transmission.
		send	VSS	RANDOM TRANSMISSION request to transmit RAND_ACC_DATA_a (VS3:= m)		Send (VSS) a request for a random transmission (with TM2 = 20 slots).
		record		no_slot(k):= 0 for k:= 1 to 5		Initialize to zero the number of transmissions in each slot position after the request for random transmission.
		rep 512		n:= 1		
		send	VSS	RANDOM TRANSMISSION request to transmit RAND_ACC_DATA_a		Send (VSS) a request for a random transmission.
		record	VSS	req_time:= time of first slot boundary after RANDOM TRANSMISSION request is sent		Record the time of the first slot boundary after the request for random transmission is sent.
		rep 12		x:= 1		
		record	RF	**IF** transmission present in slot beginning at time = req_time + (x - 1) x 60/M1 **THEN** no_slot(x):= no_slot(x) + 1		
		endrep		x:= x + 1		
		endrep		n:= n + 1		
		repx		k:= 1; chi_squared:= 0		Initialize value of k to correspond to the first slot after the requests. Initialize chi_squared.
		record		chi_squared:= chi_squared + (no_slot(k) - exp(m, k))^2 / exp(m, k)		The distribution is tested for consistency with the value chosen for the maximum number of access attempts VS3, by calculating the value of chi_squared.
		until		k:= m + 1; k:= k + 1		
		verify verify		**IF** m:= 4 **THEN** chi_squared < 7,779 **ELSE** chi_squared < 14,68		When m = 4, the value of chi_squared shall be less than 7,779 for 90 % confidence that the distribution is consistent with the value chosen for VS3 (4 degrees of freedom). When m = 9, the value of chi_squared shall be less than 14,68 for 90 % confidence that the distribution is consistent with the value chosen for VS3 (9 degrees of freedom).
		endrep		next m		

Context	Step	Action	PCO	Action Qualifier	Ref	Comment
postamble		send	VSS	SET PARAMETERS (p:= 64/256)		Reset to default values.
		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
Comments:						

Test Case Name:		**Rand_Priority**				
Purpose:		**To demonstrate that bursts queued for transmission by random access are transmitted in order of priority.**				
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
		send	VSS	SET PARAMETERS (p:= 1)		Ensure 100 % chance of transmission on access.
test body		send	RF	SYNC_BURST_b (po:= 0; pt:= 1; s = add_B)	Sb	Send a sync burst from a simulated station B reserving a slot in the next superframe.
		record	RF	sync_time:= time at beginning of slot containing SYNC_BURST_b	Sb	
		rep 49		p:= 1		
		send	RF	SYNC_BURST_b (po:= 0; pt:= 1; s = add_B) in slot beginning at time = sync_time + p x 60/M1	Sb	Send a sync burst from station B in each slot, each one reserving a slot in the next superframe.
		endrep		p:= p + 1		
		await		time:= sync_time + 60		
		send	VSS	SET PARAMETERS (Q1:= 0)		Set priority of transmissions to low.
		rep 5		n:= 1		Maintains transmissions over sf superframes.
		queue	VSS	DATA_a(m)	Da(m)	Send packets of data (DATA_a) to the station under test for subsequent transmission by the random access protocol. Packets consist of repeating 10101010 bit sequence over m bits.
		endrep		n:= n + 1		Send slots random access transmissions.
		send	VSS	SET PARAMETERS (Q1:= 1)		Set priority of transmissions to medium.
		rep 5		n:= 1		Maintains transmissions over sf superframes.
		queue	VSS	DATA_a(m)	Da(m)	Send packets of data (DATA_a) to the station under test for subsequent transmission by the random access protocol.
		endrep		n:= n + 1		Send slots random access transmissions.
		send	VSS	SET PARAMETERS (Q1:= 1)		Set priority of transmissions to high.
		rep 5		n:= 1		Maintains transmissions over sf superframes.
		queue	VSS	DATA_a(m)	Da(m)	Send packets of data (DATA_a) to the station under test for subsequent transmission by the random access protocol.
		endrep		n:= n + 1		Send slots random access transmissions.
		await		time:= sync_time + 60 + 50 x 60/M1		
		rep 15		n:= 1		

Context	Step	Action	PCO	Action Qualifier	Ref	Comment
				IF n = {1,2,3,4,5} **THEN**	Ra	Verify that random access bursts are transmitted in order of priority (highest first).
		verify	RF	RAND_ACC_DATA_a (s = add_A) of high priority transmitted in slot beginning at time = start_time + 60 + (50 + n) x 60/M1		
				ELSE IF n = {6,7,8,9,10} **THEN**		
		verify	RF	RAND_ACC_DATA_a (s = add_A) of medium priority transmitted in slot beginning at time = start_time + 60 + (50 + n) x 60/M1		
				ELSE IF n = {11,12,13,14,15} **THEN**		
		verify	RF	RAND_ACC_DATA_a (s = add_A) of low priority transmitted in slot beginning at time = start_time + 60 + (50 + n) x 60/M1		
		endrep		n:= n + 1		
postamble		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
		send	VSS	SET PARAMETERS (p:= 64/256)		Reset to default values.
Comments:						

Test Case Name:		Rand_TM2Reset				
Purpose:		**To demonstrate that timer TM2 is reset following a successful random transmission when a further burst is queued for transmission.**				
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
		send	VSS	SET PARAMETERS (TM2:= 20; p:= 1)		Ensure 100 % chance of transmission on access.
test body		send	RF	SYNC_BURST_k(12) (pt:= 1; po:= 0; a/d:= 0; s:= add_B, address indicating source is a ground station; lat:= CPR_LAT(0); lon:= CPR_LON (E 100 NM)) (position of station B is < Q2a, b away from station under test)	Sk(12)	Send a sync burst 12 slots in length from a simulated station B <Q2a, b away from the station under test, reserving slots for a burst >TM2/2 slots long.
		record	RF	sync_time:= time at beginning of slot containing SYNC_BURST_k(12)	Sk(12)	
		await		time:= sync_time + 13 x 60/M1		Leave one slot between the two sync bursts.
		send	RF	SYNC_BURST_k(12) (pt:= 1; po:= 0; a/d:= 0; s:= add_B, address indicating source is a ground station; lat:= CPR_LAT(0); lon:= CPR_LON(E 100 NM)) (position of station B is < Q2a, b away from station under test)	Sk(12)	Send a second sync burst 12 slots in length from station B <Q2a, b away from the station under test, reserving slots for a burst >TM2/2 slots long.
		await		time:= sync_time + 60		
		send	RF	SYNC_BURST_k(12) (pt:= 0; po:= 0; a/d:= 0; s:= add_B, address indicating source is a ground station; lat:= CPR_LAT(0); lon:= CPR_LON (E 100 NM)) in slot beginning at time = sync_time + 60 (position of station B is < Q2a, b away from station under test)	Sk(12)	Send a sync burst 12 slots in length from a simulated station B <Q2a, b away from the station under test, reserving slots for a burst >TM2/2 slots long.
		macro		M_RAND_ACC (slots:= 2) at time = sync_time + 60		Queue random access transmissions over 2 slots.
		await		time:= sync_time + 60 + 12 x 60/M1		
		verify	RF	RAND_ACC_DATA_a (s = add_A) transmitted in slot beginning at time = sync_time + 60 + 12 x 60/M1	Ra	Verify that the first random access transmission is made in the vacant slot following the first burst from simulated station B.
		await		time:= sync_time + 60 + 13 x 60/M1		
		send	RF	SYNC_BURST_k(12) (pt:= 0; po:= 0; a/d:= 0; s:= add_B, address indicating source is a ground station; lat:= CPR_LAT(0); lon:= CPR_LON (E 100 NM)) in slot beginning at time = sync_time + 60 + 13 x 60/M1 (position of station B is < Q2a, b away from station under test)	Sk(12)	Send a sync burst 12 slots in length from a simulated station B <Q2a, b away from the station under test, reserving slots for a burst >TM2/2 slots long.

Context	Step	Action	PCO	Action Qualifier	Ref	Comment
		verify	RF	RAND_ACC_DATA_a (s = add_A) transmitted in slot beginning at time = sync_time + 60 + 25 x 60/M1	Ra	Verify that the second random access transmission is made in the next vacant slot.
		verify	VSS	No notification of congestion has been delivered.		Verify that no notification of congestion is delivered to the VSS user.
postamble		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
		send	VSS	SET PARAMETERS (TM2:= 1 500; p:= 64/256)		Reset to default values.
Comments:						

Test Case Name:		Rand_TM2Clear				
Purpose:		**To demonstrate that timer TM2 is cleared following a successful random transmission when no further bursts are queued for transmission.**				
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
		send	VSS	SET PARAMETERS (TM2:= 20; p:= 1)		Ensure 100 % chance of transmission on access.
test body		send	RF	SYNC_BURST_k(12) (pt:= 1; po:= 0; a/d:= 0; s:= add_B, address indicating source is a ground station; lat:= CPR_LAT(0); lon:= CPR_LON (E 100 NM)) (position of station B is < Q2a, b away from station under test)	Sk(12)	Send a sync burst 12 slots in length from a simulated station B <Q2a, b away from the station under test, reserving slots for a burst >TM2/2 slots long.
		record	RF	sync_time:= time at beginning of slot containing SYNC_BURST_k(12)	Sk(12)	
		await		time:= sync_time + 13 x 60/M1		Leave one slot between the two sync bursts.
		send	RF	SYNC_BURST_k(12) (pt:= 1; po:= 0; a/d:= 0; s:= add_B, address indicating source is a ground station; lat:= CPR_LAT(0); lon:= CPR_LON (E 100 NM)) (position of station B is < Q2a, b away from station under test)	Sk(12)	Send a second sync burst 12 slots in length from station B <Q2a, b away from the station under test, reserving slots for a burst >TM2/2 slots long.
		await		time:= sync_time + 60		
		send	RF	SYNC_BURST_k(12) (pt:= 0; po:= 0; a/d:= 0; s:= add_B, address indicating source is a ground station; lat:= CPR_LAT(0); lon:= CPR_LON (E 100 NM)) in slot beginning at time = sync_time + 60 (position of station B is < Q2a, b away from station under test)	Sk(12)	Send a sync burst 12 slots in length from a simulated station B <Q2a, b away from the station under test, reserving slots for a burst >TM2/2 slots long.
		macro		M_RAND_ACC (slots:= 1) at time = sync_time + 60		Queue a random access transmission over 1 slot.
		await		time:= sync_time + 60 + 12 x 60/M1		
		verify	RF	RAND_ACC_DATA_a (s = add_A) transmitted in slot beginning at time = sync_time + 60 + 12 x 60/M1	Ra	Verify that the random access transmission is made in the vacant slot following the first burst from simulated station B.
		await		time:= sync_time + 60 + 13 x 60/M1		
		send	RF	SYNC_BURST_k(12) (pt:= 0; po:= 0; a/d:= 0; s:= add_B, address indicating source is a ground station; lat:= CPR_LAT(0); lon:= CPR_LON (E 100 NM)) in slot beginning at time = sync_time + 60 + 13 x 60/M1 (position of station B is < Q2a, b away from station under test)	Sk(12)	Send a sync burst 12 slots in length from a simulated station B <Q2a, b away from the station under test, reserving slots for a burst >TM2/2 slots long.

Context	Step	Action	PCO	Action Qualifier	Ref	Comment
		macro		M_RAND_ACC (slots:= 1) at time = sync_time + 60 + 13 x 60/M1		Queue a second random access transmission over 1 slot.
		verify	RF	RAND_ACC_DATA_a (s = add_A) transmitted in slot beginning at time = sync_time + 60 + 25 x 60/M1	Ra	Verify that the second random access transmission is made in the next vacant slot.
		verify	VSS	No notification of congestion has been delivered.		Verify that no notification of congestion is delivered to the VSS user.
postamble		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
		send	VSS	SET PARAMETERS (TM2:= 1 500; p:= 64/256)		Reset to default values.
Comments:						

Test Case Name:	**Rand_VS3Clear**					
Purpose:	**To demonstrate that if a request to make a random transmission is not successful within TM2 slots then the VS3 counter is cleared and no transmission is made.**					
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
		send	VSS	SET PARAMETERS (TM2:= 20; p:= 1; VS3:= 5)		Ensure 100 % chance of transmission on access.
test body		send	RF	SYNC_BURST_k(30) (pt:= 0; po:= 0; a/d:= 0; s:= add_B, address indicating source is a ground station; lat:= CPR_LAT(0); lon:= CPR_LON (E 100 NM)) (position of station B is < Q2a, b away from station under test)	Sk(30)	Send a sync burst 30 slots in length from a simulated station B.
		record	RF	sync_time:= time at beginning of slot containing SYNC_BURST_k(30)	Sk(30)	
		macro		M_RAND_ACC (slots:= 1) at time = sync_time		Queue a random access transmission over 1 slot.
		await		time:= sync_time + 35 x 60/M1		
		verify	RF	No random transmission has been made.		Verify that the second random access transmission is made in the next vacant slot.
postamble		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
		send	VSS	SET PARAMETERS (TM2:= 1 500; p:= 64/256; VS3:= 24)		Reset to default values.
Comments:						

Test Case Name:		Rand_Availability				
Purpose:		**To demonstrate that a station makes random access attempts in slots available only at levels 0 to 2.**				
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
		send	VSS	SET PARAMETERS (TM2:= 20; p:= 1; VS3:= 5)		Ensure 100 % chance of transmission on access.
		send	VSS	INPUT Q2 SET 3	Q2 Set 3	Send to the station under test the VSS User defined Q2 Set 3 parameters.
test body		send	RF	SYNC_BURST_a (pt:= 1; po:= 0; s:= add_B; lat:= CPR_LAT(0); lon:= CPR_LON(E 140 NM)) (position of station B is > Q2c and < Q2a away from station under test)	Sa	Send a sync burst from a simulated station B > Q2c and < Q2a away from the station under test.
		record	RF	sync_time:= time at beginning of slot containing SYNC_BURST_a	Sa	
		send	RF	SYNC_BURST_a (pt:= 1; po:= 0; s:= add_C; lat:= CPR_LAT(0); lon:= CPR_LON(E 160 NM)) (position of station C is > Q2a away from station under test) in slot beginning at time = sync_time + 1 x 60/M1	Sa	Send a sync burst from a simulated station C > Q2a away from the station under test.
		send	RF	SYNC_BURST_a (pt:= 0; po:= 0; s:= add_D; lat:= CPR_LAT(0); lon:= CPR_LON(E 170 NM)) (position of station D is such that a transmission from C to D is CCI protected) in slot beginning at time = sync_time + 50 x 60/M1	Sa	Send a sync burst from a simulated station C > Q2a away from the station under test.
		send	RF	UNI_BURST_a (sdf:= 1; ro:= 19; lg:= 0; pr:= 0; s:= add_C; d:= add_D) in slot beginning at time = sync_time + 60 - 18 x 60/M1	Ua	Send a unicast burst from station B > Q2c away from A, reserving a slot for transmission to station D. The distance from the station under test (station A) to station D is > (CCI ratio) times the distance from station B to station D, so that the transmission from B to D is CCI protected.
		await		time:= sync_time + 60		
		macro		M_RAND_ACC (slots:= 4) at time = sync_time + 60		Queue a random access transmission over 4 slots.
		send	RF	SYNC_BURST_a (pt:= 0; po:= 0; s:= add_B; lat:= CPR_LAT(0); lon:= CPR_LON(E 140 NM)) (position of station B is > Q2c and < Q2a away from station under test) in slot beginning at time = sync_time + 60	Sa	Send a sync burst from a simulated station B > Q2c and < Q2a away from the station under test.
		verify	RF	No RAND_ACC_DATA_a (s = add_A) transmitted in slot beginning at time = sync_time + 60	Ra	Verify that a random access transmission is not made in this slot.

Context	Step	Action	PCO	Action Qualifier	Ref	Comment
		send	RF	SYNC_BURST_a (pt:= 0; po:= 0; s:= add_C; lat:= CPR_LAT(0); lon:= CPR_LON(E 160 NM)) (position of station C is > Q2a away from station under test) in slot beginning at time = sync_time + 60 + 1 x 60/M1	Sa	Send a sync burst from a simulated station C > Q2a away from the station under test.
		verify	RF	RAND_ACC_DATA_a (s = add_A) transmitted in slot beginning at time = sync_time + 60 + 1 x 60/M1	Ra	Verify that a random access transmission is made in this slot.
		send	RF	UNI_BURST_a (sdf:= 0; ro:= 19; lg:= 0; pr:= 0; s:= add_C; d:= add_D) in slot beginning at time = sync_time + 60 + 2 x 60/M1	Ua	Send a unicast burst from station B > Q2c away from A, reserving a slot for transmission to station D. The distance from the station under test (station A) to station D is > (CCI ratio) times the distance from station B to station D, so that the transmission from B to D is CCI protected.
		verify	RF	RAND_ACC_DATA_a (s = add_A) was transmitted in slot beginning at time = sync_time + 60 + 2 x 60/M1 **AND**	Ra	Verify that random access transmissions are made in these slots.
		verify	RF	RAND_ACC_DATA_a (s = add_A) was transmitted in slot beginning at time = sync_time + 60 + 3 x 60/M1		
postamble		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
		send	VSS	SET PARAMETERS (TM2:= 1 500; p:= 64/256)		Reset to default values.
Comments:						

Test Case Name:		Null_Reservation				
Purpose:		**To demonstrate that no slot is reserved following the receipt of a null reservation.**				
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
		send	VSS	SET PARAMETERS (p:= 1)		Ensure 100 % chance of transmission on access.
test body		send	RF	SYNC_BURST_b (pt:= 1; po:= 0; s:= add_B)	Sb	Send a sync burst (burst length 1) from a simulated station B, reserving the same transmission slot in the next superframe, but thereafter terminating the stream.
		record	RF	periodic_start:= time at beginning of slot containing the sync burst		Provides a reference time for the next burst from station B.
		macro		M_RAND_ACC (sf:= 5)		Queue random access transmissions over 5 superframes.
		await	RF	RAND_ACC_DATA_a (s = add_A)	Ra	
		await		time = periodic_start + 60		Wait for the start of the next superframe.
		send	RF	NULL_RES_a (s = add_B) in slot beginning at time = periodic_start + 60	Na	Send a null reservation from station B (burst length 1).
		rep 4xM1		n:= 1		Repeat over 4 superframes.
		verify	RF	RAND_ACC_DATA_a (s = add_A) in slot beginning at time = periodic_start + (n + M1) x 60/M1	Ra	Verify that random access transmissions are made by the station under test in all slots.
		endrep		n:= n + 1		
postamble		send	VSS	SET PARAMETERS (p:= 64/256)		Reset to default value.
		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
Comments:						

Test Case Name:		Periodic_InitialRes				
Purpose:		**To demonstrate that in the absence of any conflicting reservation, a station will maintain a periodic reservation in a constant position in the superframe, with pt = 3 and po = 0, until announcing a further dither.**				
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
test body		send	VSS	PERIODIC BROADCAST request to transmit SYNC_BURST_b ($TV11_{min}$:= 8; V11:= 1; V12:= (2/M1) x V11)	Sb	Set up a periodic stream of one-slot messages from the station under test. $TV11_{max}$ equals 8 by default. $TV11_{min}$ set to 8 to cause dither after 8 superframes. V11 set to 1. V12 set to minimum; equals dither range of ±1.
		await	RF	SYNC_BURST_b (s = add_A)	Sb	
		record	RF	sync_time:= time at the beginning of slot containing SYNC_BURST_b (s = add_A)	Sb	Define a reference time to measure relative times from during the test.
		await	RF	SYNC_BURST_b (s = add_A) beginning at time = sync_time + 7 x 60	Sb	For the sync burst before the first dither, record the po value in order to know where the stream will be in the following superframe.
		record	RF	PO(0):= po of SYNC_BURST_b	Sb	
		rep n		n:= 1		Repeat test n times.
		repx		k:= 1		
		verify verify	RF RF	SYNC_BURST_b (s = add_A) is present in slot beginning at time = sync_time + (n x 8 + k - 1 + PO(n - 1)/M1) x 60 pt = 3 and po = 0 in SYNC_BURST_b	Sb	After each dither, verify that the stream continues in the same position in the superframe with pt = 3 and po = 0, until the next dither is announced.
		until		k:= 5; k:= k + 1		
		await	RF	SYNC_BURST_b (s = add_A) beginning at time = sync_time + (n x 8 + 7 + PO(n - 1)/M1) x 60	Sb	For the sync burst before each dither, record the po value in order to know where the stream will be in the following superframe.
		verify		pt = 0		
		record	RF	PO(n):= po of SYNC_BURST_b	Sb	
		endrep		n:= n + 1		
postamble		send	VSS	CANCEL PERIODIC RESERVATION request		Cancel established periodic streams.
		send	VSS	SET PARAMETERS ($TV11_{min}$:= 4; V11:= 6; V12:= 0,1)		Reset to default values.
		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
Comments:						

Test Case Name:		Periodic_NonDitherRes				
Purpose:		**To demonstrate that a station receiving a periodic broadcast reservation specifying no dither will reserve the appropriate slots.**				
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
		send	VSS	SET PARAMETERS (p:= 1)		Ensure 100 % chance of transmission on access.
test body		send	RF	SYNC_BURST_b (pt:= 3; po:= 0; s:= add_B)	Sb	Send a sync burst (burst length 1) from a simulated station B, reserving the same transmission slot in the next 4 superframes.
		record	RF	periodic_start:= time at beginning of slot containing the sync burst		Provides a reference time for the next burst from station B.
		macro		M_RAND_ACC (sf:= 5)		Queue random access transmissions over 5 superframes.
		await	RF	RAND_ACC_DATA_a (s = add_A)	Ra	
		await		time = periodic_start + 60		Wait for the start of the next superframe.
		send	RF	SYNC_BURST_b (pt:= 3; po:= 0; s:= add_B) in slot beginning at time = periodic_start + 60	Sb	Send a sync burst (burst length 1) from station B in the reserved slot reserving the same transmission slot in the next 4 superframes.
		rep 4 x M1		n:= 1		Repeat over 4 superframes.
				IF n = {M1, 2 x M1, 3 x M1, 4 x M1} **THEN**	Ra	Verify that random access transmissions are made by the station under test in all slots except the reserved slot and the slot following the reserved slot.
		verify	RF	no transmission present in slot beginning at time = periodic_start + (n + M1) x 60/M1		
				ELSE		
		verify	RF	RAND_ACC_DATA_a (s = add_A) in slot beginning at time = periodic_start + (n + M1) x 60/M1		
		endrep		n:= n + 1		
postamble		send	VSS	SET PARAMETERS (p:= 64/256)		Reset to default value.
		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
Comments:						

Test Case Name:		Periodic_DitherRes				
Purpose:		**To demonstrate that a station receiving a periodic broadcast reservation specifying dither will reserve the appropriate slots.**				
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
		send	VSS	SET PARAMETERS (p:= 1)		100 % chance of transmission on access
test body		rep 3		m:= 0; l():= {1; 0; 0} k():= {1; 1; 0} PO():= {50; -100; 25}		Set up loop to repeat test for different values of the periodic timer and the periodic offset Vectors set up to point to relevant dithered slots (with respect to pt) in the verify statement.
		send	RF	SYNC_BURST_b (pt:= m; po:= PO; s:= add_B)	Sb	Send a sync burst (burst length 1) from a simulated station B specifying dither in the m + 1^{th} superframe following the current superframe.
		record	RF	periodic_start:= time at beginning of slot containing the sync burst		Provides a reference time for the reserved slots of station B.
		macro		M_RAND_ACC (sf:= 5)		Queue random access transmissions over 5 superframes.
		await	RF	RAND_ACC_DATA_a (s = add_A)	Ra	Wait for the start of the random access transmissions.
		await		time = periodic_start + 60		Wait until 60 s after the sync burst from station B.
		rep 4 x M1		n:= 1		Verify over 4 superframes.
				IF n = {PO x l, M1 + (PO x k), (2 x M1) + PO, (3 x M1) + PO} **THEN**	Ra	Verify that random access transmissions are made by the station under test in all slots except the reserved slots (i.e. original reserved slots and dithered slots).
		verify	RF	no transmission present in slot beginning at time = periodic_start + (n + M1) x 60/M1		
				ELSE		
		verify	RF	RAND_ACC_DATA_a (s = add_A) in slot beginning at time = periodic_start + (n + M1) x 60/M1		
		endrep		n:= n + 1		Repeat verification for next slot loop.
		wait		60 s		Wait until all the random access transmissions have cleared.
		endrep		m:= m + 1		Repeat test with new values loop.
postamble		send	VSS	SET PARAMETERS (p:= 64/256)		Reset to default value.
		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
Comments:						

Test Case Name:		Periodic_DitherRange				
Purpose:		**To demonstrate that a station will maintain a periodic stream within the dither range in accordance with the V11 and V12 parameters.**				
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
test body		send	VSS	PERIODIC BROADCAST request to transmit SYNC_BURST_b ($TV11_{min}$:= 1; $TV11_{max}$:= 1; V11:= 1; V12:= (2/M1) x V11)	Sb	Set up a periodic stream of one-slot messages from the station under test. TV11 reservation hold timer set to cause dither after every superframe. V11 set to 1. V12 set to minimum; equals dither range of ±1.
		rep 10		n:= 1		Repeat test 10 times to generate statistical sample.
		await	RF	SYNC_BURST_b (s = add_A)	Sb	
		record	RF	sync_time(n):= time at beginning of slot of n^{th} SYNC_BURST_b (s = add_A) diff_time:= sync_time(n) - sync_time(1) - (n - 1) x 60 slot_diff(n):= diff_time x M1/60	Sb	Record the time of the n^{th} sync burst. sync_time(1) defines a reference time to measure relative times from during the test. Calculate the relative time differences between each ct_slot and the ct_slot of the first burst and transpose to a common time frame. Convert time differences to slot differences.
		endrep		n:= n + 1		
		verify		MAX(slot_diff(n)) - MIN(slot_diff(n)) ≤ V12 x M1/V11		Verify (RF) that the transmission is always made within the specified dither range.
		send	VSS	CANCEL PERIODIC RESERVATION request		Cancel established periodic streams.
		send	VSS	PERIODIC BROADCAST request to transmit SYNC_BURST_b ($TV11_{min}$:= 1; $TV11_{max}$:= 1; V11:= 1; V12:= (4/M1) x V11)	Sb	Set up a periodic stream of one-slot messages from the station under test. TV11 reservation hold timer set to cause dither after every superframe. V11 set to 1. V12 increased for repeat of above test; equals dither range of ±2.
		rep 10		n:= 1		Repeat test 10 times to generate statistical sample.
		await	RF	SYNC_BURST_b (s = add_A)	Sb	
		record	RF	sync_time(n):= time at beginning of slot of n^{th} SYNC_BURST_b (s = add_A) diff_time:= sync_time(n) - sync_time(1) - (n - 1) x 60 slot_diff(n):= diff_time x M1/60	Sb	Record the time of the n^{th} sync burst. sync_time(1) defines a reference time to measure relative times from during the test. Calculate the relative time differences between each ct_slot and the ct_slot of the first burst and transpose to a common time frame. Convert time differences to slot differences.
		endrep		n:= n + 1		
		verify		MAX(slot_diff(n)) - MIN(slot_diff(n)) ≤ V12 x M1/V11		Verify (RF) that the transmission is always made within the specified dither range.

Context	Step	Action	PCO	Action Qualifier	Ref	Comment
postamble		send	VSS	CANCEL PERIODIC RESERVATION request		Cancel established periodic streams.
		send	VSS	SET PARAMETERS ($TV11_{min}$:= 4; $TV11_{max}$:= 8; V11:= 6; V12:= 0,1)		Reset to default values.
		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
Comments:						

Test Case Name:		Periodic_DitherOffset_A				
Purpose:		**To demonstrate that in the absence of a conflicting reservation, a station will announce a dither to a periodic stream three superframes before the dither occurs.**				
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
test body		send	VSS	PERIODIC BROADCAST request to transmit SYNC_BURST_b ($TV11_{min}$:= 8; V11:= 1; V12:= (2/M1) x V11)	Sb	Set up a periodic stream of one-slot messages from the station under test. $TV11_{max}$ equals 8 by default. $TV11_{min}$ set to 8 to cause dither after 8 superframes. V11 set to 1. V12 set to minimum; equals dither range of ±1.
		await	RF	SYNC_BURST_b (s = add_A)	Sb	
		record	RF	sync_time:= time at the beginning of slot containing SYNC_BURST_b (s = add_A)	Sb	Define a reference time to measure relative times from during the test.
		await	RF	SYNC_BURST_b (s = add_A) beginning at time = sync_time + 7 x 60	Sb	For the sync burst before the first dither, record the po value in order to know where the stream will be in the following superframe.
		record	RF	PO(0):= po of SYNC_BURST_b	Sb	
		rep n		n:= 1		Repeat test n times.
		repx		k:= 1		
		verify	RF	SYNC_BURST_b (s = add_A) is present in slot beginning at time = sync_time + (n x 8 + k - 1 + PO(n - 1)/M1) x 60	Sb	Verify that after a dither is announced, the stream dithers to the announced slot.
		until		k:= 5; k:= k + 1		
		await	RF	SYNC_BURST_b (s = add_A) beginning at time = sync_time + (n x 8 + 5 + PO(n - 1)/M1) x 60	Sb	
		verify		pt = 2		Verify that a dither is first announced by a transmission with pt = 2.
		await	RF	SYNC_BURST_b (s = add_A) beginning at time = sync_time + (n x 8 + 7 + PO(n - 1)/M1) x 60	Sb	For the sync burst before each dither, record the po value in order to know where the stream will be in the following superframe.
		verify		pt = 0		
		record	RF	PO(n):= po of SYNC_BURST_b	Sb	
		endrep		n:= n + 1		
postamble		send	VSS	CANCEL PERIODIC RESERVATION request		Cancel established periodic streams.
		send	VSS	SET PARAMETERS ($TV11_{min}$:= 4; V11:= 6; V12:= 0,1)		Reset to default values.
		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
Comments:						

Test Case Name:				**Periodic_DitherOffset_B**		
Purpose:				**To demonstrate that in the absence of a conflicting reservation, following announcement of a dither to a periodic stream, the same dithered slot will be reserved by each of the subsequent two transmissions, containing decrementing values of pt.**		
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
test body		send	VSS	PERIODIC BROADCAST request to transmit SYNC_BURST_b ($TV11_{min}$:= 8; V11:= 1; V12:= (2/M1) x V11)	Sb	Set up a periodic stream of one-slot messages from the station under test. $TV11_{max}$ equals 8 by default. $TV11_{min}$ set to 8 to cause dither after 8 superframes. V11 set to 1. V12 set to minimum; equals dither range of ±1.
		await	RF	SYNC_BURST_b (s = add_A)	Sb	
		record	RF	sync_time:= time at the beginning of slot containing SYNC_BURST_b (s = add_A)	Sb	Define a reference time to measure relative times from during the test.
		await	RF	SYNC_BURST_b (s = add_A) beginning at time = sync_time + 7 x 60	Sb	For the sync burst before the first dither, record the po value in order to know where the stream will be in the following superframe.
		record	RF	PO(0):= po of SYNC_BURST_b	Sb	
		rep n		n:= 1		Repeat test n times.
		repx		k:= 1		
		verify	RF	SYNC_BURST_b (s = add_A) is present in slot beginning at time = sync_time + (n x 8 + k - 1 + PO(n - 1)/M1) x 60	Sb	Verify that after a dither is announced, the stream dithers to the announced slot.
		until		k:= 5; k:= k + 1		
		await	RF	SYNC_BURST_b (s = add_A) beginning at time = sync_time + (n x 8 + 5 + PO(n - 1)/M1) x 60	Sb	
		verify	RF	pt = 2		Verify that a dither is first announced by a transmission with pt = 2.
		record	RF	PO2(n):= po of SYNC_BURST_b	Sb	Record value of po given when pt = 2.
		await	RF	SYNC_BURST_b (s = add_A) beginning at time = sync_time + (n x 8 + 6 + PO(n - 1)/M1) x 60	Sb	
		verify	RF	pt = 1		
		record	RF	PO1(n):= po of SYNC_BURST_b	Sb	Record value of po given when pt = 1.
		await	RF	SYNC_BURST_b (s = add_A) beginning at time = sync_time + (n x 8 + 7 + PO(n - 1)/M1) x 60	Sb	For the sync burst before each dither, record the po value in order to know where the stream will be in the following superframe.
		verify	RF	pt = 0		
		record	RF	PO(n):= po of SYNC_BURST_b	Sb	
		verify		PO2(n) = PO1(n) = PO(n)		Verify that following announcement of a dither by a transmission with pt = 2, the same value of po is contained in subsequent transmissions with pt = 1 and pt = 0.
		endrep		n:= n + 1		
postamble		send	VSS	CANCEL PERIODIC RESERVATION request		Cancel established periodic streams.
		send	VSS	SET PARAMETERS ($TV11_{min}$:= 4; V11:= 6; V12:= 0,1)		Reset to default values.
		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
Comments:						

Test Case Name:				Periodic_DitherOffset_C		
Purpose:				**To demonstrate that a station will always dither away from the current transmission slot.**		
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
test body		send	VSS	PERIODIC BROADCAST request to transmit SYNC_BURST_b ($TV11_{min}$:= 8; V11:= 1; V12:= (2/M1) x V11)	Sb	Set up a periodic stream of one-slot messages from the station under test. $TV11_{max}$ equals 8 by default. $TV11_{min}$ set to 8 to cause dither after 8 superframes. V11 set to 1. V12 set to minimum; equals dither range of ±1.
		await	RF	SYNC_BURST_b (s = add_A)	Sb	
		record	RF	sync_time:= time at the beginning of slot containing SYNC_BURST_b (s = add_A)	Sb	Define a reference time to measure relative times from during the test.
		await	RF	SYNC_BURST_b (s = add_A) beginning at time = sync_time + 7 x 60	Sb	For the sync burst before the first dither, record the po value in order to know where the stream will be in the following superframe.
		record	RF	PO(0):= po of SYNC_BURST_b	Sb	
		rep n		n:= 1		Repeat test n times.
		repx		k:= 1		
		verify	RF	SYNC_BURST_b (s = add_A) is present in slot beginning at time = sync_time + (n x 8 + k - 1 + PO(n - 1)/M1) x 60	Sb	Verify that after a dither is announced, the stream dithers to the announced slot.
		until		k:= 5; k:= k + 1		
		await	RF	SYNC_BURST_b (s = add_A) beginning at time = sync_time + (n x 8 + 5 + PO(n - 1)/M1) x 60	Sb	
		verify	RF	pt = 2		Verify that a dither is first announced by a transmission with pt = 2.
		record	RF	PO2(n):= po of SYNC_BURST_b	Sb	Record value of po given when pt = 2.
		await	RF	SYNC_BURST_b (s = add_A) beginning at time = sync_time + (n x 8 + 6 + PO(n - 1)/M1) x 60	Sb	
		verify	RF	pt = 1		
		record	RF	PO1(n):= po of SYNC_BURST_b	Sb	Record value of po given when pt = 1.
		await	RF	SYNC_BURST_b (s = add_A) beginning at time = sync_time + (n x 8 + 7 + PO(n - 1)/M1) x 60	Sb	For the sync burst before each dither, record the po value in order to know where the stream will be in the following superframe.
		verify	RF	pt = 0		
		record	RF	PO(n):= po of SYNC_BURST_b	Sb	
		verify		PO2(n) ≠ 0; PO1(n) ≠ 0; PO(n) ≠ 0		Verify (RF) that when a dither is announced by a transmission with pt = 0, 1 or 2, a non-zero value of po is specified, so that the station will dither away from the current transmission slot.
		endrep		n:= n + 1		
postamble		send	VSS	CANCEL PERIODIC RESERVATION request		Cancel established periodic streams.
		send	VSS	SET PARAMETERS ($TV11_{min}$:= 4; V11:= 6; V12:= 0,1)		Reset to default values.
		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
Comments:						

Test Case Name:		Periodic_DitherOffset_D				
Purpose:	**To demonstrate that following announcement of a dither to a periodic stream, the transmission slot will be adjusted to occupy the reserved slot.**					
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
test body		send	VSS	PERIODIC BROADCAST request to transmit SYNC_BURST_b ($TV11_{min}$:= 8; V11:= 1; V12:= (2/M1) x V11)		Set up a periodic stream of one-slot messages from the station under test. $TV11_{max}$ equals 8 by default. $TV11_{min}$ set to 8 to cause dither after 8 superframes. V11 set to 1. V12 set to minimum; equals dither range of ±1.
		await	RF	SYNC_BURST_b (s = add_A)	Sb	
		record	RF	sync_time:= time at the beginning of slot containing SYNC_BURST_b (s = add_A)	Sb	Define a reference time to measure relative times from during the test.
		await	RF	SYNC_BURST_b (s = add_A) beginning at time = sync_time + 7 x 60	Sb	For the sync burst before the first dither, record the po value in order to know where the stream will be in the following superframe.
		record	RF	PO(0):= po		
		rep n		n:= 1		Repeat test n times.
		repx		k:= 1		
		verify	RF	SYNC_BURST_b (s = add_A) is present in slot beginning at time = sync_time + (n x 8 + k - 1 + PO(n - 1)/M1) x 60	Sb	Verify that after a dither is announced by a transmission with pt = 0, 1, or 2, the stream dithers to the announced slot.
		until		k:= 5; k:= k + 1		
		await	RF	SYNC_BURST_b (s = add_A) beginning at time = sync_time + (n x 8 + 7 + PO(n - 1)/M1) x 60	Sb	For the sync burst before each dither, record the po value in order to know where the stream will be in the following superframe.
		verify	RF	pt = 0		
		record	RF	PO(n):= po		
		endrep		n:= n + 1		
postamble		send	VSS	CANCEL PERIODIC RESERVATION request		Cancel established periodic streams.
		send	VSS	SET PARAMETERS ($TV11_{min}$:= 4; V11:= 6; V12:= 0,1)		Reset to default values.
		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
Comments:						

Test Case Name:		Periodic_IndependentStreams				
Purpose:		**To demonstrate that separate streams of periodic broadcasts dither independently.**				
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
test body		send	VSS	PERIODIC BROADCAST request to transmit SYNC_BURST_b ($TV11_{min}$:= 15; $TV11_{max}$:= 15; V11:= 3)	Sb	Set up a series of periodic streams of one-slot messages from the station under test. TV11 reservation hold timer set to prevent dither for 15 frames. V11 set to 3 bursts within M1 slots.
		rep 10		n:= 1		Record the times of the sync bursts in each of the three streams for 10 superframes.
		await	RF	SYNC_BURST_b (s = add_A)	Sb	
		record	RF	s1_time_(n):= time at beginning of slot containing SYNC_BURST_b	Sb	
		await	RF	SYNC_BURST_b (s = add_A)	Sb	
		record	RF	s2_time_(n):= time at beginning of slot containing SYNC_BURST_b	Sb	
		await	RF	SYNC_BURST_b (s = add_A)	Sb	
		record	RF	s3_time_(n):= time at beginning of slot containing SYNC_BURST_b	Sb	
		record		diff1(n):= s1_time_(n) - s1_time_(n - 1)		
		record		diff2(n):= s2_time_(n) - s2_time_(n - 1)		
		record		diff3(n):= s3_time_(n) - s3_time_(n - 1)		
		endrep		n:= n + 1		
		rep 10		n:= 1		Verify that the streams dither independently.

Context	Step	Action	PCO	Action Qualifier	Ref	Comment
		verify **AND** verify **AND** verify **}** **OR** **{** **{** **IF** verify **THEN** verify **}** **AND** **{** **IF** verify **THEN** verify **}** **AND** **{** **IF** verify **THEN** verify **}** **}**	**{** diff1(n) ≠ diff2(n) diff1(n) ≠ diff3(n) diff2(n) ≠ diff3(n) diff1(n) = diff2(n) diff1(n - 1) ≠ diff2(n - 1) diff1(n) = diff2(n) diff1(n - 1) ≠ diff2(n - 1) diff1(n) = diff2(n) diff1(n - 1) ≠ diff2(n - 1)		
		endrep		n:= n + 1		
postamble		send	VSS	CANCEL PERIODIC RESERVATION request		Cancel established periodic streams.
		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
		send	VSS	SET PARAMETERS ($TV11_{min}$:= 4; $TV11_{max}$:= 8; V11:= 6)		Reset to default values.
Comments:						

Test Case Name:		Periodic_Replacement				
Purpose:		**To demonstrate that a station receiving a periodic broadcast reservation in a slot previously reserved by a periodic broadcast will replace the previous reservations by those carried in the new transmission.**				
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
		send	VSS	SET PARAMETERS (p:= 1)		Ensure 100 % chance of transmission on access.
test body		send	RF	SYNC_BURST_b (pt:= 3; po:= 0; s:= add_B)	Sb	Send a sync burst (burst length 1) from a simulated station B reserving the same transmission slot in the next 4 superframes.
		record	RF	periodic_start:= time at beginning of slot containing the sync burst		Provides a reference time for the reserved slots of station B.
		macro		M_RAND_ACC (sf:= 5)		Queue random access transmissions over 5 superframes.
		await	RF	RAND_ACC_DATA_a (s = add_A)	Ra	Wait for the start of the random access transmissions.
		await		time = periodic_start + 60		Wait for the expected reserved slot for station B.
		send	RF	SYNC_BURST_b (pt:= 0; po:= -50) in slot beginning at time = periodic_start + 60	Sb	Send a sync burst (burst length 1) specifying dither in the next superframe.
		rep 4 x M1		n:= 1		Verify over 4 superframes.
				IF n = {M1 - 50, M2 - 50, M3 - 50, M4 - 50} **THEN**	Ra	Verify that random access transmissions are made by the station under test in all slots except the reserved dithered slots.
		verify	RF	no transmission present in slot beginning at time = periodic_start + (n + M1) x 60/M1		
				ELSE		
		verify	RF	RAND_ACC_DATA_a (s = add_A) in slot beginning at time = periodic_start + (n + M1) x 60/M1		
		endrep		n:= n + 1		
postamble		send	VSS	SET PARAMETERS (p:= 64/256)		Reset to default value.
		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
Comments:						

Test Case Name:		**Periodic_Availability_A**				
Purpose:		**To demonstrate that a station will take account of the availability of the current transmission slot when dithering to a new slot.**				
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
test body		send	VSS	PERIODIC BROADCAST request to transmit SYNC_BURST_b (V12:= (10/M1) x V11)	Sb	Set up a periodic stream of one-slot messages from the station under test. V12 set to give dither range of ±5.
		await	RF	SYNC_BURST_b (s = add_A; pt = 2; po ≠ 0)	Sb	
		record	RF	sync_time:= time at the beginning of slot containing SYNC_BURST_b (s = add_A; pt = 2; po ≠ 0) PO:= po	Sb	Define a reference time to measure relative times from during the test. Record value of po indicating where the station will dither to.
		await		time = sync_time + (2 + 20/M1) x 60		
		send	RF	SYNC_BURST_b (pt:= 2; po:= PO - 20; s:= add_B) in slot beginning at time = sync_time + (2 + 20/M1) x 60	Sb	Send a sync burst from a simulated station B < Q2b away from the station under test. The burst specifies dither to the same slot that the station under test has announced it will dither to, but two superframes later.
		await		time:= sync_time + (3 + PO/M1) x 60		
		verify	RF	SYNC_BURST_b (s:= add_A) present in slot beginning at time:= sync_time + (3 + PO/M1) x 60	Sb	Verify that the stream from the station under test has dithered into the specified slot.
		verify verify	RF Rf	For SYNC_BURST_b (s:= add_A) pt = 1 **AND** po ≠ 0	Sb	Verify that the sync burst from the station under test will dither after the following superframe so as to avoid the slot reserved by station B in two superframe's time.
postamble		send	VSS	CANCEL PERIODIC RESERVATION request		Cancel established periodic streams.
		send	VSS	SET PARAMETERS (V12:= 0,1)		Reset to default values.
		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
Comments:						

Test Case Name:				Periodic_Availability_B		
Purpose:				**To demonstrate that when the current transmission slot is occupied at the dither of a periodic broadcast, the slot availability is determined from the first occupancy of the slot by a different station.**		
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
test body		send	VSS	PERIODIC BROADCAST request to transmit SYNC_BURST_b ($TV11_{max}$:= 4; V11:= 1; V12:= (10/M1) x V11)	Sb	Set up a periodic stream of one-slot messages from the station under test. $TV11_{min}$ equals 4 by default. $TV11_{max}$ set to cause dither after every 4^{th} superframe. V11 set to 1. V12 set to small range; equals dither range of ±5.
		await	RF	SYNC_BURST_b (s = add_A)	Sb	
		record	RF	sync_time:= time at the beginning of slot containing SYNC_BURST_b (s = add_A)	Sb	Define a reference time to measure relative times from during the test.
		await	RF	time = sync_time + 60		
		verify	RF	pt = 2 and po ≠ 0 in SYNC_BURST_b (s = add_A) in slot beginning at time = sync_time + 60	Sb	Verify that the periodic stream is announcing a dither to occur after three superframes.
		record	RF	PO:= po in SYNC_BURST_b (s = add_A)	Sb	
		await		time = sync_time + 60 + 10 + PO		
		send	RF	SYNC_BURST_a (pt:= 1; po:= -5; a/d:= 0; s:= add_B; lat:= CPR_LAT(0); lon:= CPR_LON (E 350 NM)) in slot beginning at time = sync_time + 60 + 10 + PO	Sa	Send a sync burst from a simulated station B, > 300 NM away from the station under test, with pt = 1, which is set to dither into the slot which the station under test has specified but to do so one superframe earlier.
		await		time = sync_time + 3 x 60 + 20 + PO		
		send	RF	SYNC_BURST_a (pt:= 2; po:= -10; a/d:= 0; s:= add_C; lat:= CPR_LAT(0); lon:= CPR_LON (E 320 NM)) in slot beginning at time = sync_time + 3 x 60 + 20 + PO	Sa	Send a sync burst from a simulated station C, > 300 NM away from the station under test, with pt = 2, which is set to dither into the slot which the station under test has specified but to do so two superframes later.
		await		time = sync_time + 4 x 60 + PO		
		verify	RF	pt = 1 in SYNC_BURST_b (s = add_A) in slot beginning at time = sync_time + 4 x 60 + PO	Sb	
postamble		send	VSS	CANCEL PERIODIC RESERVATION request		Cancel established periodic streams.
		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
		send	VSS	SET PARAMETERS ($TV11_{max}$:= 8; V11:= 6; V12:= 0,10)		Reset to default values.
Comments:						

Test Case Name:				Periodic_Rate		
Purpose:				**To demonstrate that the station will establish a set of periodic streams at a nominal periodic rate according to the V11 parameter.**		
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
test body		send	VSS	PERIODIC BROADCAST request to transmit SYNC_BURST_b (V11:= 30; V12:= (4/M1) x V11)	Sb	Set up a series of periodic streams of one-slot messages from the station under test. V11 set to 30 bursts within M1 slots. V12 set to give dither range of ±2.
		rep 30		n:= 1		Repeat test 30 times to generate statistical sample.
		await	RF	SYNC_BURST_b (s = add_A)	Sb	
		record	RF	sync_time(n):= time at beginning of slot of n^{th} SYNC_BURST_b (s = add_A) diff_time:= sync_time(n) - sync_time(1) - (n - 1) x 2 slot_diff(n):= diff_time x M1/60	Sb	Record the time of the n^{th} sync burst. sync_time(1) defines a reference time to measure relative times from during the test. Calculate the relative time differences between each ct_slot and the ct_slot of the first burst and transpose to a common time frame. Convert time differences to slot differences.
		endrep		n:= n + 1		
		verify		MAX(slot_diff(n)) - MIN(slot_diff(n)) ≤ V12 x M1/V11		Verify distribution of slots is over candidate slot range.
		await		time:= sync_time(1) + 60		
		rep M1		n:= 0		
		verify		**IF** n:= {0, (sync_time(2) - sync_time(1)) x M1/60, (sync_time(3) - sync_time(1)) x M1/60,....., (sync_time(30) - sync_time(1)) x M1/60) **THEN** SYNC_BURST_b (s = add_A) present in slot beginning at time:= sync_time(1) + 60 + n x 60/M1 **ELSE** no transmission in slot	Sb	Verify that the same sync bursts are present in the following superframe.
		endrep		n:= n + 1		
		record		num_slot_diff(m):= 0 for all m		Initialize the number of slots in each candidate slot position to zero.
		rep 30		n:= 1		
		record		num_slot_diff(slot_diff(n)):= num_slot_diff(slot_diff(n)) + 1		Record the frequency of occurrence of slots in each candidate slot position.
		endrep		n:= n + 1		
		rep m		m:= MIN(slot_diff(n)); chi_squared:= 0		Set initial value of m to the minimum value of slot_diff.
		record		chi_squared:= chi_squared + $(num\_slot\_diff(m) - 6)^2/6$		The distribution is tested for uniformity by calculating the value of chi_squared.
		until		m:= MAX(slot_diff(n))		

Context	Step	Action	PCO	Action Qualifier	Ref	Comment
		verify		chi_squared < 7,779		Value of chi_squared shall be less than 7,779 for 90 % confidence that the distribution is uniform (4 degrees of freedom).
		send	VSS	CANCEL PERIODIC RESERVATION request		Cancel established periodic streams.
		send	VSS	PERIODIC BROADCAST request to transmit SYNC_BURST_b (V11:= 40; V12:= (4/M1) x V11)	Sb	Repeat test with different value of V11. Set up a series of periodic streams of one-slot messages from the station under test. V11 set to 40 bursts within M1 slots. V12 set to give dither range of ±2.
		rep 40		n:= 1		Repeat test 40 times to generate statistical sample.
		await	RF	SYNC_BURST_b (s = add_A)	Sb	
		record	RF	sync_time(n):= time at beginning of slot of n^{th} SYNC_BURST_b (s = add_A) diff_time:= sync_time(n) - sync_time(1) - (n - 1) x 1,5 slot_diff(n):= diff_time x M1/60	Sb	Record the time of the n^{th} sync burst. sync_time(1) defines a reference time to measure relative times from during the test. Calculate the relative time differences between each ct_slot and the ct_slot of the first burst and transpose to a common time frame. Convert time differences to slot differences.
		endrep		n:= n + 1		
		verify		MAX(slot_diff(n)) - MIN(slot_diff(n)) ≤ V12 x M1/V11		Verify distribution of slots is over candidate slot range.
		await		time:= sync_time(1) + 60		
		rep M1		n:= 0		
		verify		**IF** n:= {0, (sync_time(2) - sync_time(1)) x M1/60, (sync_time(3) - sync_time(1)) x M1/60,....., (sync_time(40) - sync_time(1)) x M1/60) **THEN** SYNC_BURST_b (s = add_A) present in slot beginning at time:= sync_time(1) + 60 + n x 60/M1 **ELSE** no transmission in slot	Sb	Verify that the same sync bursts are present in the following superframe.
		endrep		n:= n + 1		
		record		num_slot_diff(m):= 0 for all m		Initialize the number of slots in each candidate slot position to zero.
		rep 40		n:= 1		
		record		num_slot_diff(slot_diff(n)):= num_slot_diff(slot_diff(n)) + 1		Record the frequency of occurrence of slots in each candidate slot position.
		endrep		n:= n + 1		
		rep m		m:= MIN(slot_diff(n)); chi_squared:= 0		Set initial value of m to the minimum value of slot_diff.
		record		chi_squared:= chi_squared + (num_slot_diff(m) - 8)^2/8		The distribution is tested for uniformity by calculating the value of chi_squared.
		until		m:= MAX(slot_diff(n))		
		verify		chi_squared < 7,779		Value of chi_squared shall be less than 7,779 for 90 % confidence that the distribution is uniform (4 degrees of freedom).

Context	Step	Action	PCO	Action Qualifier	Ref	Comment
postamble		send	VSS	CANCEL PERIODIC RESERVATION request		Cancel established periodic streams.
		send	VSS	SET PARAMETERS (V11:= 6; V12:= 0,1)		Reset to default values.
		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
Comments:						

Test Case Name:		Periodic_TV11				
Purpose:		**To demonstrate that in the absence of any conflicting reservation a station will set the value of TV11 uniformly between the minimum and maximum values.**				
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
test body		send	VSS	PERIODIC BROADCAST request to transmit SYNC_BURST_b ($TV11_{max}$:= 7; V11:= 60)	Sb	Set up a series of periodic streams of one-slot messages from the station under test. $TV11_{min}$ equals 4 by default $TV11_{max}$ set to give four possible values for TV11: 4, 5, 6, and 7. V11 set to give 60 streams.
		await	RF	SYNC_BURST_b (s = add_A)	Sb	
		record	RF	sync_time:= time at the beginning of slot containing SYNC_BURST_b (s = add_A)	Sb	Define a reference time to measure relative times from during the test.
		repx		n:= 1		
		repx		k:= 1; dithered(k):= 0; num(n):= 0		
		await	RF	time = sync_time + (n - 1) x 60 + k - 1		
		verify	RF	**IF** n < 5 **THEN** SYNC_BURST_b (s = add_A) present in slot	Sb	In the first to fourth superframes check that the slots have not yet dithered.

		record	RF	**IF**
				n ≥ 5
				AND
				no transmission present in slot
				AND
				dithered(k) = 0
				THEN
				{
				dithered(k):= 1
				num(n):= num(n) + 1
				}
						In the fifth to eighth superframes, see whether slots have dithered or not. If they have dithered, record in which superframe it happened, and thus count the number of bursts which had each of the four possible TV11 values 4, 5, 6, and 7.

		until		k:= 60; k:= k + 1		
		until		n:= 8; n:= n + 1		
		repx		n:= 1		
		await		time = sync_time + (8 x 60 + n - 1)		Wait for ninth superframe.
		verify	RF	No transmission present in slot		Confirm that the slots have all dithered from their original positions.
		until		n:= 60; n:= n + 1		
		repx		n:= 5; chi_squared:= 0		
				chi_squared:= chi_squared + $(num(n) - 15)^2/15$		
		until		n:= 8; n:= n + 1		

Context	Step	Action	PCO	Action Qualifier	Ref	Comment
		verify		chi_squared < 6,251		Verify that the TV11 values were evenly distributed between $TV11_{min}$ = 4 and $TV11_{max}$ = 7. Value of chi_squared shall be less than 6,251 for 90 % confidence that the distribution is uniform (3 degrees of freedom). Thus verify that the time between dithers is set uniformly between $TV11_{min}$ and $TV11_{max}$.
postamble		send	VSS	CANCEL PERIODIC RESERVATION request		Cancel established periodic streams.
		send	VSS	SET PARAMETERS ($TV11_{max}$:= 8; V11:= 6)		Reset to default values.
		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
Comments:						

Test Case Name:		**Periodic_Cancel**				
Purpose:		**To demonstrate that a station receiving a periodic broadcast cancellation in a slot previously reserved for a periodic broadcast will replace the previous reservations by those carried in the new transmission.**				
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
		send	VSS	SET PARAMETERS (p:= 1)		Ensure 100 % chance of transmission on access.
test body		send	RF	SYNC_BURST_b (pt:= 3; po:= 0; s:= add_B)	Sb	Send a sync burst (burst length 1) from a simulated station B reserving the same transmission slot in the next 4 superframes.
		record	RF	periodic_start:= time at beginning of slot containing the sync burst		Provides a reference time for the reserved slots of station B.
		macro		M_RAND_ACC (sf:= 5)		Queue random access transmissions over 5 superframes.
		await	RF	RAND_ACC_DATA_a (s = add_A)	Ra	Wait for the start of the random access transmissions
		await		time = periodic_start + 60		Wait for the expected reserved slot for station B.
		send	RF	SYNC_BURST_b (pt:= 0; po:= -128) in slot beginning at time = periodic_start + 60	Sb	Send a sync burst (burst length 1) specifying dither in the next superframe.
		rep 4xM1		n:= 1		Verify over 4 superframes.
		verify	RF	RAND_ACC_DATA_a (s = add_A) in slot beginning at time = periodic_start + (n + M1) x 60/M1	Ra	Verify that random access transmissions are made by the station under test in all slots over 4 superframes.
		endrep		n:= n + 1		
postamble		send	VSS	SET PARAMETERS (p:= 64/256)		Reset to default value.
		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
Comments:						

Test Case Name:				Periodic_CancelIncremental		
Purpose:				**To demonstrate that upon receipt of an incremental broadcast in a slot expected to contain a periodic broadcast from the same peer station, the periodic stream is cancelled.**		
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
		send	VSS	SET PARAMETERS (p:= 1)		Ensure 100 % chance of transmission on access.
test body		send	RF	SYNC_BURST_b (pt:= 3; po:= 0; a/d:= 0; s:= add_B)	Sb	Send a sync burst from a simulated station B.
		record	RF	sync_time:= time at beginning of slot containing SYNC_BURST_b	Sb	
		macro		M_RAND_ACC (sf:= 4)		Queue random access transmissions over 4 superframes.
		await	RF	RAND_ACC_DATA_a (s = add_A)	Ra	Wait for the start of the random access transmissions.
		await		time = sync_time + 60		
		send	RF	INCREM_BURST_a (io:= 4; s = add_B) in slot beginning at time = sync_time + 60	Ia	Send an incremental burst from station B in the slot originally reserved for the next sync burst in the periodic stream.
		await		time = sync_time + 90		
		rep 3xM1		n:= 0		
		verify	RF	RAND_ACC_DATA_a (s = add_A) in slot beginning at time = sync_time + n x 60/M1	Ra	Verify that random access transmissions are made by the station under test in all slots, including those reserved by the block reservation, over 4 superframes.
		endrep		n:= n + 1		
postamble		send	VSS	SET PARAMETERS (p:= 64/256)		Reset to default values.
		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
Comments:						

Test Case Name:				Periodic_CancelUnicast		
Purpose:				**To demonstrate that upon receipt of a unicast request with source/destination flag set to 1 in a slot expected to contain a periodic broadcast from the same peer station, the periodic stream is cancelled.**		
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
		send	VSS	SET PARAMETERS (p:= 1)		Ensure 100 % chance of transmission on access.
test body		send	RF	SYNC_BURST_b (pt:= 3; po:= 0; a/d:= 0; s:= add_B)	Sb	Send a sync burst from a simulated station B.
		record	RF	sync_time:= time at beginning of slot containing SYNC_BURST_b	Sb	
		macro		M_RAND_ACC (sf:= 4)		Queue random access transmissions over 4 superframes.
		await	RF	RAND_ACC_DATA_a (s = add_A)	Ra	Wait for the start of the random access transmissions.
		await		time = sync_time + 60		
		send	RF	UNI_BURST_a (sdf:= 1; ro:= 5; lg:= 0; pr:= 0; s:= add_B; d:= add_A) in slot beginning at time = sync_time + 60	Ua	Send a unicast burst from station B with source/destination flag set to 1 in the slot originally reserved for the next sync burst in the periodic stream.
		await		time = sync_time + 90		
		rep 3xM1		n:= 0		
		verify	RF	RAND_ACC_DATA_a (s = add_A) in slot beginning at time = sync_time + n x 60/M1	Ra	Verify that random access transmissions are made by the station under test in all slots, including those reserved by the block reservation, over 4 superframes.
		endrep		n:= n + 1		
postamble		send	VSS	SET PARAMETERS (p:= 64/256)		Reset to default values.
		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
Comments:						

Test Case Name:		Periodic_SlotSel_A				
Purpose:		**To demonstrate that slot selection is first attempted for a periodic broadcast using QoS parameters specified for the periodic broadcast.**				
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
test body		send	VSS	PERIODIC BROADCAST request to transmit SYNC_BURST_b ($TV11_{min}$:= 0; $TV11_{max}$:= 1; V11:= 1; V12:= (4/M1) x V11; Q4:= 4; Q2a:= 100 NM; Q2b:= 100 NM; Q2c:= 100 NM; Q2d:= 100 NM)	Sb	Set up a periodic stream of one-slot messages from the station under test. $TV11_{max}$ and $TV11_{min}$ set to cause dither after each superframe. V11 set to 1. V12 set to small range; equals dither range of ±2. Q2a, b, c, d all set by VSS user to 100 NM.
		await	RF	SYNC_BURST_b (s = add_A)	Sb	
		record	RF	sync_time:= time at the beginning of slot containing SYNC_BURST_b (s = add_A)	Sb	Define a reference time to measure relative times from during the test.
		verify	RF	pt = 0 and po ≠ 0 in SYNC_BURST_b (s = add_A)	Sb	Verify that the periodic stream is set to dither in the following superframe.
		await		time = sync_time + 60		
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; a/d:= 0; s:= add_B; lat:= CPR_LAT(0); lon:= CPR_LON(E 200 NM)) in slot beginning at time = sync_time + 60	Sa	Send a sync burst from a simulated station B, 200 NM away from the station under test with pt = 3 and po = 0 in the slot previously occupied by the sync burst from the station under test.
		rep 20		n:= 1		
		await		time = sync_time + (n + 1) x 60		
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; a/d:= 0; s:= add_B; lat:= CPR_LAT(0); lon:= CPR_LON(E 200 NM)) in slot beginning at time = sync_time + (n + 1) x 60	Sa	Send repeat sync bursts from station B, 200 NM away from the station under test with pt = 3 and po = 0.
		verify	RF	No periodic broadcast from station under test in slot beginning at time = sync_time + (n + 1) x 60		Verify that no periodic broadcast is made by the station under test in the slot occupied by station B.
		endrep		n:= n + 1		
postamble		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
		send	VSS	SET PARAMETERS (Q4:= 3; $TV11_{min}$:= 4; $TV11_{max}$:= 8; V11:= 6; V12:= 0,10)		Reset to default values.
Comments:						

Test Case Name:		Periodic_SlotSel_B				
Purpose:		**To demonstrate that slot selection for a periodic broadcast is re-applied with VSS User defined QoS parameters if unsuccessful with QoS parameters for periodic broadcasts.**				
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
test body		send	VSS	PERIODIC BROADCAST request to transmit SYNC_BURST_b ($TV11_{max}$:= 4; V11:= 1; V12:= (2/M1) x V11; Q2a:= 100 NM; Q2b:= 100 NM; Q2c:= 100 NM; Q2d:= 100 NM)	Sb	Set up a periodic stream of one-slot messages from the station under test. $TV11_{min}$ equals 4 by default. $TV11_{max}$ set to cause dither after every 4^{th} superframe. V11 set to 1. V12 set to small range; equals dither range of ±1. Q4 equals 3 by default. Q2a, b, c, d all set by VSS user to 100 NM.
		await	RF	SYNC_BURST_b (s = add_A)	Sb	
		record	RF	sync_time:= time at the beginning of slot containing SYNC_BURST_b (s = add_A)	Sb	Define a reference time to measure relative times from during the test.
		await	RF	time = sync_time + 3 x 60		
		verify	RF	pt = 0 and po ≠ 0 in SYNC_BURST_b (s = add_A) in slot beginning at time = sync_time + 3 x 60	Sb	Verify that the periodic stream is set to dither in the following superframe.
		record	RF	POa:= po in SYNC_BURST_b (s = add_A)	Sb	
		rep 3		n:= 1		
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; a/d:= 0; s:= add_B; lat:= CPR_LAT(0); lon:= CPR_LON(E 200 NM)) in slot beginning at time = sync_time + (3 + n) x 60	Sa	Send sync bursts for three superframes from a simulated station B, 200 NM away from the station under test, with pt = 3 and po = 0, in the slot previously occupied by the stream from the station under test.
		endrep		n:= n + 1		

Context	Step	Action	PCO	Action Qualifier	Ref	Comment
				IF POa < 0 **THEN** **{**	Sb, Sa	Send another sync burst from station B in the slot previously occupied by the sync burst from the station under test. Verify that the stream from the station under test is about to dither a second time and record where it will dither to.
		verify	RF	pt = 0 and po ≠ 0 in SYNC_BURST_b (s = add_A) in slot beginning at time = sync_time + 7 x 60 + POa		
				AND		
		record	RF	POb:= po in SYNC_BURST_b (s = add_A)		
				AND		
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; a/d:= 0; s:= add_B; lat:= CPR_LAT(0); lon:= CPR_LON(E 200 NM)) in slot beginning at time = sync_time + 7 x 60		
				} **ELSE** **{**		
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; a/d:= 0; s:= add_B; lat:= CPR_LAT(0); lon:= CPR_LON(E 200 NM)) in slot beginning at time = sync_time + 7 x 60		
				AND		
		verify	RF	pt = 0 and po ≠ 0 in SYNC_BURST_b (s = add_A) in slot beginning at time = sync_time + 7 x 60 + POa		
				AND		
		record	RF	POb:= po in SYNC_BURST_b (s = add_A) **}**		
		record		**IF** POa < 0 **THEN** timeA = POa, timeB = 0 **ELSE** timeA = 0**,** timeB = POa		
		rep 4		n:= 1		Following the second dither by the stream from the station under test, send sync bursts for four superframes from station B, 200 NM away from the station under test, with pt = 3 and po = 0, in both slots previously occupied by the stream from the station under test.

Context	Step	Action	PCO	Action Qualifier	Ref	Comment
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; a/d:= 0; s:= add_B; lat:= CPR_LAT(0); lon:= CPR_LON(E 200 NM)) in slot beginning at time = sync_time + (7 + n) x 60 + timeA	Sa	
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; a/d:= 0; s:= add_B; lat:= CPR_LAT(0); lon:= CPR_LON(E 200 NM)) in slot beginning at time = sync_time + (7 + n) x 60 + timeB	Sa	
		endrep		n:= n + 1		
		record		no_slot(m):= 0 for m:= {0, 1, 2}		Initialize the number of broadcasts recorded in each candidate slot position to zero.
		record		timeC = MIN(POa, POb, 0)		
		rep 30		n:= 1		Following the third dither by the stream from the station under test, send sync bursts for a number superframes from station B, 200 NM away from the station under test, with pt = 3 and po = 0, in each of the three slots previously occupied by the stream from the station under test. The station under test will be forced to re-apply the slot selection criteria using VSS user defined QoS parameters having been unsuccessful with QoS parameters for periodic broadcasts. During the loop, the slot occupied by the station under test (which will coincide with that occupied by one of the sync bursts from station B) is recorded.
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; a/d:= 0; s:= add_B; lat:= CPR_LAT(0); lon:= CPR_LON(E 200 NM)) in slot beginning at time = sync_time + (11 + n) x 60 + timeC	Sa	
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; a/d:= 0; s:= add_B; lat:= CPR_LAT(0); lon:= CPR_LON(E 200 NM)) in slot beginning at time = sync_time + (11 + n) x 60 + timeC + 1 x 60/M1	Sa	
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; a/d:= 0; s:= add_B; lat:= CPR_LAT(0); lon:= CPR_LON(E 200 NM)) in slot beginning at time = sync_time + (11 + n) x 60 + timeC + 2 x 60/M1	Sa	
		record	RF	timeP = time at beginning of slot containing SYNC_BURST_b (s = add_A) slotP = (timeP - sync_time - (11 + n) x 60 - timeC) x M1/60 no_slot(slotP):= no_slot(slotP) + 1	Sb	Record the time at the beginning of the slot occupied by the station under test. Convert the time to a normalized slot position. Increment the counter recording the frequency in this slot position.
		endrep		n:= n + 1		

Context	Step	Action	PCO	Action Qualifier	Ref	Comment
		rep 3		m:= 0; chi_squared:= 0		Set value of m to correspond to the first slot in the candidate range. Initialize chi_squared.
		record		chi_squared:= chi_squared + (no_IO(m) - 10)^2/10		The distribution is tested for uniformity by calculating the value of chi_squared.
		endrep		m:= m + 1		
		verify		chi_squared < 4,605		Value of chi_squared shall be less than 4,605 for 90 % confidence that the distribution over the Q4 candidate slots is uniform (2 degrees of freedom).
postamble		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
		send	VSS	SET PARAMETERS (Q4:= 3; $TV11_{max}$:= 8; V11:= 6; V12:= 0,10)		Reset to default values.
Comments:						

Test Case Name:				Incremental_Reservation_A		
Purpose:				**To demonstrate that a station receiving an incremental broadcast reservation will reserve the appropriate slots.**		
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
		send	VSS	SET PARAMETERS (p:= 1)		Ensure 100 % chance of transmission on access.
test body		send	RF	INCREM_BURST_a (io:= 510; s:= add_B)	Ia	Send an incremental burst (burst length 1) from a simulated station B reserving a slot 2 040 slots away from the t_slot.
		record	RF	incremental_start:= time at beginning of slot containing the incremental burst		Provide a reference time for the reserved slot of station B.
		macro		M_RAND_ACC (sf:= 1)		Queue random access transmissions over 1 superframe.
		await	RF	RAND_ACC_DATA_a (s = add_A)	Ra	Wait for the start of the random access transmissions.
		record	RF	start_time:= time at beginning of slot containing RAND_ACC_DATA_a (s = add_A)	Ra	Define a reference time to measure relative times from during the test.
		repx		n:= 1		
		verify	RF	RAND_ACC_DATA_a (s = add_A) in slot beginning at time = start_time + n x 60/M1	Ra	Verify that random access transmissions are made by the station under test in slots preceding the reserved slot.
		until		time = incremental_start + (2 040 - 1) x 60/M1 in previous step; n:= n + 1		End loop in slot immediately preceding reserved slot (r_slot = t_slot + io x 4).
		await		time = incremental_start + 2 040 x 60/M1		
		send	RF	INCREM_BURST_a (io:= 100; s:= add_B) in slot beginning at time = incremental_start + 2 040 x 60/M1	Ia	Send an incremental burst (bl = 1) from station B in the reserved slot, reserving a slot 400 slots after the t_slot.
		repx		n:= 1		
				IF n = 400 **THEN**	Ra	Verify that random access transmissions are made by the station under test in all slots except the reserved slots.
		verify	RF	no transmission present in slot beginning at time = incremental_start + (n + 2 040) x 60/M1		
				ELSE		
		verify	RF	RAND_ACC_DATA_a (s = add_A) in slot beginning at time = incremental_start + (n + 2 040) x 60/M1		
		until		time = start_time + 60; n:= n + 1		Verify until the start of the next superframe after the first random access transmission.
postamble		send	VSS	SET PARAMETERS (p:= 64/256)		Reset to default values.
		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
Comments:						

Test Case Name:				Incremental_Reservation_B		
Purpose:				**To demonstrate that an incremental broadcast with io= 0 causes no reservation to be made.**		
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
		send	VSS	SET PARAMETERS (p:= 1)		Ensure 100 % chance of transmission on access.
test body		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; a/d:= 0; s:= add_B; lat:= CPR_LAT(0); lon:= CPR_LON(E 100 NM)) (position of mobile B is < Q2b away from station under test)	Sa	Send a sync burst from a simulated station B with position data showing that it is < Q2b away from the station under test.
		send	RF	INCREM_BURST_a (io:= 20; s = add_B)	Ia	Send an incremental burst from station B < Q2b away from the station under test, reserving a slot for B to transmit in.
		record	RF	inc_time:= time at beginning of slot containing INCREM_BURST_a	Ia	
		macro		M_RAND_ACC (sf:= 1)		Queue random access transmissions over 1 superframe.
		await	RF	RAND_ACC_DATA_a (s = add_A)	Ra	Wait for the start of the random access transmissions.
		await		time = inc_time + 80		
		send	RF	INCREM_BURST_a (io:= 0; s = add_B)	Ia	Send an incremental burst from station B with io = 0.
		rep M1		p:= 0		
		verify	RF	RAND_ACC_DATA_a (s = add_A) in slot beginning at time = inc_time + 81 + p x 60/M1	Ra	Verify that random access transmissions are made by the station under test in consecutive slots for 1 superframe.
		endrep		p:= p + 1		
postamble		send	VSS	SET PARAMETERS (p:= 64/256)		Reset to default values.
		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
Comments:						

Test Case Name:		Incremental_Request				
Purpose:		**To demonstrate that a station will select and reserve a series of future transmission slots by means of the incremental broadcast protocol.**				
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
		send	VSS	SET PARAMETERS (V21:= 2; V22:= 720/ (V21 x M1))		V21 (nominal incremental reserved slot position) set to 2 s. V22 (max incremental dither range) set to minimum; gives maximum dither range of 150 ± 12 after the incremental broadcast transmission slot (allowed slots of 140, 144, 148, 152, 156, 160).
test body		send	VSS	INCREMENTAL BROADCAST request to transmit INCREM_BURST_a followed by successive INCREM_BURST_a in reserved slots	Ia	Request to send incremental broadcast reservation and to place another incremental broadcast reservation in each reserved slot, thus creating an automatic succession of incremental broadcast reservations.
		await	RF	INCREM_BURST_a (s = add_A)	Ia	Wait for an incremental broadcast reservation.
		record	RF	current_inc_time:= time at beginning of slot containing INCREM_BURST_a (s = add_A)	Ia	Record the time of the incremental reservation transmission slot as current_inc_time.
		record	RF	IO(0):= io contained in INCREM_BURST _a (s = add_A)	Ia	Record value of io given in the incremental broadcast reservation.
		record		no_IO(m):= 0 for m:= {140, 144, 148, 152, 156, 160}		Initialize the number of slots in each candidate slot position to zero.
		rep 60		n:= 1		
		await	RF	INCREM_BURST_a (s = add_A)	Ia	Wait for the next incremental broadcast reservation.
		verify		INCREM_BURST_a (s = add_A) occupies slot beginning at time = current_inc_time + IO(n - 1)	Ia	
		record	RF	current_inc_time:= time at beginning of slot containing INCREM_BURST_a (s = add_A)	Ia	Record the time of the incremental reservation transmission slot as current_inc_time.
		record verify record	RF	IO(n):= io contained in INCREM_BURST _a (s = add_A) IO(n) is in the range {140, 144, 148, 152, 156, 160} no_IO(IO(n)):= no_IO(IO(n)) + 1	Ia	Record value of io given in the incremental broadcast reservation. Verify IO(n) is in the expected range. Record the frequency of occurrence of slots in each candidate slot position.
		rep 6		m:= 64; chi_squared:= 0		Set value of m to the minimum value in the candidate range. Initialize chi_squared.
		record		chi_squared:= chi_squared + (no_IO(m) - 10)^2/10		The distribution is tested for uniformity by calculating the value of chi_squared.
		endrep		m:= m + 4		
		verify		chi_squared < 9,236		Value of chi_squared shall be less than 9,236 for 90 % confidence that the distribution is uniform (5 degrees of freedom).
		endrep		n:= n + 1		
postamble		send	VSS	SET PARAMETERS (V21:= 1; V22:= MIN(0,75, maximum allowed value of V22))		Reset to default values.
		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
Comments:						

Test Case Name:				Incremental_SlotSel		
Purpose:				**To demonstrate that a slot is selected for an incremental broadcast reservation from the appropriate candidate range.**		
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
		send	VSS	SET PARAMETERS (V22:= 720/(V21xM1))		V21 (nominal incremental reserved slot position) equals default value of 1,0 s. V22 (max incremental dither range) set to minimum; gives maximum dither range of 75 ± 12 after the incremental broadcast transmission slot (allowed slots of 64, 68, 72, 76, 80, 84).
test body		send	VSS	INCREMENTAL BROADCAST request to transmit INCREM_BURST_a followed by successive INCREM_BURST_a in reserved slots	Ia	Request to send incremental broadcast reservation and to place another incremental broadcast reservation in each reserved slot, thus creating an automatic succession of incremental broadcast reservations.
		await	RF	INCREM_BURST_a (s = add_A)	Ia	Wait for the incremental broadcast reservation.
		record		no_IO(m):= 0 for m:= {64, 68, 72, 76, 80, 84}		Initialize the number of slots in each candidate slot position to zero.
		rep 60		n:= 1		Repeat 50 times.
		await	RF	INCREM_BURST_a (s = add_A)	Ia	Wait for the next incremental broadcast reservation.
		record	RF	IO(n):= io contained in INCREM_BURST _a (s = add_A) no_IO(4 x IO(n)):= no_IO(4 x IO(n)) + 1	Ia	Record value of io given in the incremental broadcast reservation. Record the frequency of occurrence of slots in each candidate slot position.
		endrep		n:= n + 1		
		rep 6		m:= 64; chi_squared:= 0		Set value of m to the minimum value of the candidate range. Initialize chi_squared.
		record		chi_squared:= chi_squared + (no_IO(m) - 10)^2/10		The distribution is tested for uniformity by calculating the value of chi_squared.
		endrep		m:= m + 4		
		verify		chi_squared < 9,236		Value of chi_squared shall be less than 9,236 for 90 % confidence that the distribution of the reserved slot over the candidate slots is uniform (5 degrees of freedom).
postamble		send	VSS	SET PARAMETERS (V22:= MIN(0,75, maximum allowed value of V22))		Reset to default values.
		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
Comments:						

Test Case Name:		Combined_Reservation				
Purpose:		**To demonstrate that receipt of a combined periodic and incremental broadcast reservation causes the appropriate slots to be reserved.**				
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
		send	VSS	SET PARAMETERS (p:= 1)		Ensure 100 % chance of transmission on access.
test body		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; a/d:= 0; s:= add_B; lat:= CPR_LAT(0); lon:= CPR_LON (E 100 NM)) (position of mobile B is < Q2b away from station under test)	Sa	Send a sync burst from a simulated station B with position data showing that it is < Q2b away from the station under test.
		send	RF	INCREM_BURST_a (io:= 20; s = add_B)	Ia	Send an incremental burst from station B < Q2b away from the station under test, reserving a slot for B to transmit in.
		record	RF	inc_time:= time at beginning of slot containing INCREM_BURST_a	Ia	
		macro		M_RAND_ACC (sf:= 1)		Queue random access transmissions over 1 superframe.
		await	RF	RAND_ACC_DATA_a (s = add_A)	Ra	Wait for the start of the random access transmissions.
		await		time = inc_time + 80		
		send	RF	INCREM_BURST_a (io:= 0; s = add_B)	Ia	Send an incremental burst from station B with io = 0.
		rep M1		p:= 0		
		verify	RF	RAND_ACC_DATA_a (s = add_A) in slot beginning at time = inc_time + 81 + p x 60/M1	Ra	Verify that random access transmissions are not made by the station under test in quarantined slots following the periodic cancellation, but are made in all following slots.
		endrep		p:= p + 1		
postamble		send	VSS	SET PARAMETERS (p:= 64/256)		Reset to default values.
		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
Comments:						

Test Case Name:		BND_Reservation				
Purpose:		**To demonstrate that reception of a BND reservation causes the appropriate slots to be reserved.**				
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
		send	VSS	SET PARAMETERS (p:= 1)		Ensure 100 % chance of transmission on access.
test body		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; a/d:= 0; s:= add_B; lat:= CPR_LAT(0); lon:= CPR_LON(E 100 NM)) (position of mobile B is < Q2b away from station under test)	Sa	Send a sync burst from a simulated station B with position data showing that it is < Q2b away from the station under test.
		send	RF	BND_DELAYED_a (nd:= 5)	BDa	Send a delayed burst from station B containing a BND reservation.
		record	RF	bnd_time1:= time at beginning of slot containing BND_DELAYED_a	BDa	
		macro		M_RAND_ACC (sf:= 1)		Queue random access transmissions over 1 superframe.
		await	RF	RAND_ACC_DATA_a (s = add_A)	Ra	Wait for the start of the random access transmissions.
		await		time = bnd_time1 + M1 - 126 - 20		
		verify	RF	No transmission by station under test in slot beginning at time = bnd_time1 + M1 - 126 - 20		Verify that no transmission is made by the station under test in the slot reserved by the BND reservation.
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; a/d:= 0; s:= add_B; lat:= CPR_LAT(0); lon:= CPR_LON(E 100 NM)) (position of mobile B is < Q2b away from station under test)	Sa	Send a sync burst from a simulated station B with position data showing that it is < Q2b away from the station under test.
		send	RF	BND_LONG_b (nd:= 20)	BDb	Send a single slot burst from station B containing a BND reservation.
		record	RF	bnd_time2:= time at beginning of slot containing BND_LONG_b	BDb	
		macro		M_RAND_ACC (sf:= 1)		Queue random access transmissions over 1 superframe.
		await	RF	RAND_ACC_DATA_a (s = add_A)	Ra	Wait for the start of the random access transmissions.
		await		time = bnd_time2 + M1 - 126 - 80		
		verify	RF	No transmission by station under test in slot beginning at time = bnd_time2 + M1 - 126 - 80		Verify that no transmission is made by the station under test in the slot reserved by the BND reservation.
postamble		send	VSS	SET PARAMETERS (p:= 64/256)		Reset to default values.
		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
Comments:						

Test Case Name:		Unicast_Reservation_A				
Purpose:		**To demonstrate that reception of a point-to-point unicast reservation for the destination station to transmit causes the appropriate slots to be reserved.**				
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
		send	VSS	SET PARAMETERS (p:= 1)		Ensure 100 % chance of transmission on access.
test body		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; a/d:= 0; s:= add_B; lat:= CPR_LAT(0); lon:= CPR_LON(E 200 NM)) (position of mobile B is > Q2a away from station under test)	Sa	Send a sync burst from a simulated station B with position data showing that it is > Q2a away from the station under test.
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; a/d:= 0; s:= add_C; lat:= CPR_LAT(0); lon:= CPR_LON(E 100 NM)) (position of mobile C is < Q2a away from station under test)	Sa	Send a sync burst from a simulated station C with position data showing that it is < Q2a away from the station under test.
		send	RF	UNI_BURST_a (sdf:= 0; ro:= 100; lg:= 0; pr:= 0; s:= add_B; d:= add_C)	Ua	Send a unicast burst from station B to station C, with sdf = 0, reserving a slot for C to transmit.
		record	RF	uni_time:= time at beginning of slot containing UNI_BURST_a	Ua	
		macro		M_RAND_ACC (sf:= 1)		Queue random access transmissions over 1 superframe.
		await	RF	RAND_ACC_DATA_a (s = add_A)	Ra	Wait for the start of the random access transmissions.
		verify	RF	No transmission by station under test in slot beginning at time = uni_time + 101		Verify that no transmission is made by the station under test in the slot reserved by the unicast reservation.
postamble		send	VSS	SET PARAMETERS (p:= 64/256)		Reset to default values.
		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
Comments:						

Test Case Name:		Unicast_Reservation_B				
Purpose:	**To demonstrate that a reception of a point-to-point unicast reservation for the source station to transmit causes the appropriate slots to be reserved.**					
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
		send	VSS	SET PARAMETERS (p:= 1)		Ensure 100 % chance of transmission on access.
test body		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; a/d:= 0; s:= add_B; lat:= CPR_LAT(0); lon:= CPR_LON(E 100 NM)) (position of mobile B is < Q2a away from station under test)	Sa	Send a sync burst from a simulated station B with position data showing that it is < Q2a away from the station under test.
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; a/d:= 0; s:= add_C; lat:= CPR_LAT(0); lon:= CPR_LON(E 200 NM)) (position of mobile C is > Q2a away from station under test)	Sa	Send a sync burst from a simulated station C with position data showing that it is > Q2a away from the station under test.
		send	RF	UNI_BURST_a (sdf:= 1; ro:= 100; lg:= 0; pr:= 0; s:= add_B; d:= add_C)	Ua	Send a unicast burst from station B to station C, with sdf = 1, reserving a slot for B to transmit.
		record	RF	uni_time:= time at beginning of slot containing UNI_BURST_a	Ua	
		macro		M_RAND_ACC (sf:= 1)		Queue random access transmissions over 1 superframe.
		await	RF	RAND_ACC_DATA_a (s = add_A)	Ra	Wait for the start of the random access transmissions.
		verify	RF	No transmission by station under test in slot beginning at time = uni_time + 101		Verify that no transmission is made by the station under test in the slot reserved by the unicast reservation.
postamble		send	VSS	SET PARAMETERS (p:= 64/256)		Reset to default values.
		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
Comments:						

Test Case Name:				Unicast_Reservation_C		
Purpose:				**To demonstrate that a reception of a broadcast unicast reservation causes the appropriate slots to be reserved.**		
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
		send	VSS	SET PARAMETERS (p:= 1)		Ensure 100 % chance of transmission on access.
test body		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; a/d:= 0; s:= add_B; lat:= CPR_LAT(0); lon:= CPR_LON(E 100 NM)) (position of mobile B is < Q2b away from station under test)	Sa	Send a sync burst from a simulated station B with position data showing that it is < Q2b away from the station under test.
		send	RF	UNI_BURST_c (ro:= 100; lg:= 0; pr:= 0; s:= add_B)	Uc	Send a unicast burst from station B to a broadcast address, reserving a slot for B to broadcast.
		record	RF	uni_time:= time at beginning of slot containing UNI_BURST_c	Uc	
		macro		M_RAND_ACC (sf:= 1)		Queue random access transmissions over 1 superframe.
		await	RF	RAND_ACC_DATA_a (s = add_A)	Ra	Wait for the start of the random access transmissions.
		verify	RF	No transmission by station under test in slot beginning at time = uni_time + 101		Verify that no transmission is made by the station under test in the slot reserved by the unicast reservation.
postamble		send	VSS	SET PARAMETERS (p:= 64/256)		Reset to default values.
		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
Comments:						

Test Case Name:				Info_Reservation		
Purpose:	**To demonstrate that a station receiving a burst containing an information transfer request reservation addressed to another station will reserve the slots identified for the information transfer and acknowledgement.**					
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
		send	VSS	SET PARAMETERS (p:= 1)		Ensure 100 % chance of transmission on access.
test body		send	RF	INF_TRANS_a (ro:= 2 000; lg:= 5; ao:= 75; f:= 0; s:= add_B; d:= add_D)	IFa	Send an information transfer burst (burst length 1) from a simulated station B, addressed to a simulated station D. The burst reserves a slot 2 001 slots away from the t_slot for station D to transmit in, and a slot 2 001 + 6 + 75 slots after t_slot for station B to make an acknowledgement to station D.
		record	RF	transfer_start:= time at beginning of slot containing the incremental burst		Provides a reference time for the reserved slots.
		macro		M_RAND_ACC (sf:= 1)		Queue random access transmissions over 1 superframe.
		await	RF	RAND_ACC_DATA_a (s = add_A)	Ra	Wait for the start of the random access transmissions.
		record	RF	start_time:= time at beginning of slot containing RAND_ACC_DATA_a (s = add_A)	Ra	Define a reference time to measure relative times from during the test.
		repx		n:= 1		
		verify	RF	RAND_ACC_DATA_a (s = add_A) in slot beginning at time = start_time + n x 60/M1	Ra	Verify that random access transmissions are made by the station under test in slots preceding the reserved slots.
		until		time = transfer_start + 2 000 x 60/M1 in previous step; n:= n + 1		End loop in slot immediately preceding reserved slot (r_slot = t_slot + ro + 1).
		rep 81		n:= 0		Verify up to the slot preceding the acknowledgement slot.
				IF n = {0, 1, 2, 3, 4} **THEN**	Ra	Verify that random access transmissions are made by the station under test in all slots except the block of reserved slots (6).
		verify	RF	no transmission present in slot beginning at time = transfer_start + (n + 2 001) x 60/M1		
				ELSE		
		verify	RF	RAND_ACC_DATA_a (s = add_A) in slot beginning at time = transfer_start + (n + 2 001) x 60/M1		
		endrep		n:= n + 1		
		await		time = transfer_start + 2 082 x 60/M1		
		send	RF	INF_TRANS_a (ro:= 300; lg:= 10; ao:= 50; f:= 0; d:= address of a station other than the station under test) in slot beginning at time = transfer_start + 2 082 x 60/M1	IFa	Send an information transfer burst (bl = 1) in the acknowledgement slot from station B, addressed to station D, reserving a slot 301 slots after the t_slot for station D to transmit in.

Context	Step	Action	PCO	Action Qualifier	Ref	Comment
		repx		n:= 0		
		verify verify	RF RF	**IF** n = {301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 362} **THEN** no transmission present in slot beginning at time = transfer_start + (n + 2 082) x 60/M1 **ELSE** RAND_ACC_DATA_a (s = add_A) in slot beginning at time = transfer_start + (n + 2 001) x 60/M1	Ra	Verify that random access transmissions are made by the station under test in all slots except the block of reserved slots and the acknowledgement slot.
		until		time = start_time + 60; n:= n + 1		Verify until start of the next superframe after the first random access transmission.
postamble		send	VSS	SET PARAMETERS (p:= 64/256)		Reset to default values.
		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
Comments:						

Test Case Name:		Autotune_Reservation				
Purpose:	**To demonstrate that a station receiving a directed request from a ground station addressed to another station will reserve the directed slots.**					
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
		send	VSS	SET PARAMETERS (p:= 1)		Ensure 100 % chance of transmission on access.
test body		send	RF	DIR_REQ_a (or:= 0; pr_flag:= 0; dt:= 4; nr:= 4; do:= 1 125; lg:= 0; f:= 0; rcvr:= 0; trmt:= 0; r-mi:= xxxxx10; s:= add_G; d:= add_D)	Da	Send a directed burst from a simulated ground station G, requesting transmission by a simulated station D and specifying slots for D to transmit in.
		record	RF	directed_time:= time at beginning of slot containing directed request reservation		Define a reference time to measure relative times from during the test.
		macro		M_RAND_ACC (sf:= 6)		Queue random access transmissions over 6 superframes.
		await	RF	RAND_ACC_DATA_a (s = add_A)	Ra	
		record	RF	start_time:= time at beginning of slot containing RAND_ACC_DATA_a (s = add_A)	Ra	Define a reference time to measure relative times from during the test.
		repx		n:= 1		
		verify	RF	RAND_ACC_DATA_a (s = add_A) in slot beginning at time = start_time + n x 60/M1	Ra	Verify that random access transmissions are made by the station under test in all slots up to the reserved slot.
		until		time = directed_time + (do - 1) x 60/M1 in previous step; n:= n + 1		End loop before first directed reservation.
		rep 5xm1		n:= 0		Verify over the 5 superframes containing the directed reservations.
		verify verify	RF RF	**IF** n = {0, 1 125, 2 250, 3 375, 4 500, 5 625, 6 750, 7 875, 9 000, 10 125, 11 250, 12 375, 13 500, 14 625, 15 750, 16 875, 18 000, 19 125, 20 250, 21 375} **THEN** no transmission present in slot beginning at time:= directed_time + (do + n) x 60/M1 **ELSE** RAND_ACC_DATA_a (s = add_A) in slot beginning at time:= directed_time + (do + n) x 60/M1)	Ra	Verify that no transmissions are made in the reserved slots given by slots do + k x (M1/nr) + j x M1 after the first slot of the received burst for j = 0 to dt and k = 0 to nr - 1. Verify that random access transmissions are made by the station under test in all slots except the reserved slots.
		endrep		n:= n + 1		
postamble		send	VSS	SET PARAMETERS (p:= 64/256)		Reset to default value.
		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
Comments:						

Test Case Name:		AutotuneCancelAbsent				
Purpose:	**To demonstrate that a station receiving a directed request addressed to another station will take no action upon receipt of a directed cancellation from the directing station alone.**					
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
		send	VSS	SET PARAMETERS (p:= 1)		Ensure 100 % chance of transmission on access.
test body		send	RF	DIR_REQ_a (or:= 0; pr_flag:= 0; dt:= 4; nr:= 4; do:= 1 125; lg:= 0; f:= 0; rcvr:= 0; trmt:= 0; r-mi:= xxxxx10; s:= add_G; d:= add_D)	Da	Send a directed request reservation from a simulated ground station G, requesting a simulated station D to transmit at a rate of 4 bursts per superframe for 5 superframes in the directed slots, starting in the slot do slots after the first slot of the received burst.
		record	RF	directed_time:= time at beginning of slot containing directed request reservation		Define a reference time to measure relative times from during the test.
		await		time = directed_time + 625 x 60/M1		
		send	RF	DIR_REQ_b (or:= 0; pr_flag:= 0; dt:= 15; nr:= 4; do:= 500; lg:= 0; f:= 0; rcvr:= 0; trmt:= 0; s:= add_G; d:= add_D) in slot beginning at time = directed_time + 625 x 60/M1	Db	Send a directed request reservation from station G, addressed to station D, with do pointing to a slot reserved by the previous directed request, and with dt = 15 so as to cause station D to cancel the reserved streams after this superframe.
		macro		M_RAND_ACC (sf:= 6)		Queue random access transmissions over 6 superframes.
		await	RF	RAND_ACC_DATA_a (s = add_A)	Ra	
		record	RF	start_time:= time at beginning of slot containing RAND_ACC_DATA_a (s = add_A)	Ra	Define a reference time to measure relative times from during the test.
		repx		n:= 1		
		verify	RF	RAND_ACC_DATA_a (s = add_A) in slot beginning at time = start_time + n x 60/M1	Ra	Verify that random access transmissions are made by the station under test in all slots up to the reserved slot.
		until		time = directed_time + 1 124 x 60/M1 in previous step; n:= n + 1		End loop before first directed reservation.
		rep 5 x M1		n:= 0		Verify over the 5 superframes containing the directed reservations.
				IF n = {0, 1 125, 2 250, 3 375, 4 500, 5 625, 6 750, 7 875, 9 000, 10 125, 11 250, 12 375, 13 500, 14 625, 15 750, 16 875, 18 000, 19 125, 20 250, 21 375} **THEN**	Ra	Verify that no transmissions are made by the station under test in slots originally reserved by the directed request. The reserved slots are given by do + k x (M1/nr) + j x M1 after the first slot of the received burst for j = 0 to dt and k = 0 to nr - 1. Verify that random access transmissions are made by the station under test in all slots except the reserved slots.
		verify	RF	no transmission present in slot beginning at time = directed_time + (1 125 + n) x 60/M1		
				ELSE		
		verify	RF	RAND_ACC_DATA_a (s = add_A) in slot beginning at time = directed_time + (1 125 + n) x 60/M1)		

Context	Step	Action	PCO	Action Qualifier	Ref	Comment
		endrep		n:= n + 1		
postamble		send	VSS	SET PARAMETERS (p:= 64/256)		Reset to default value.
		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
Comments:						

Test Case Name:		PleaResponse_Reservation_A				
Purpose:		**To demonstrate that receipt of a plea response with a standard nominal rate causes the appropriate slots to be reserved.**				
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
		send	VSS	SET PARAMETERS (p:= 1)		Ensure 100 % chance of transmission on access.
test body		send	RF	PLEA_RESP_a (a_1:= 1; a_2:= 2; a_3:= 3; a_4 to a_{11}:= 0; nr:= 2; off:= 10; s = add_B; d = add_C)	PRa	Send a plea response from a simulated station B to a simulated station B with nr ≠ special. The burst reserves an initial slot 10 slots after the transmission slot followed by two groups of three slots.
		record	RF	plea_time:= time at beginning of slot containing PLEA_RESP_a	PRa	
		macro		M_RAND_ACC (sf:= 1)		Queue random access transmissions over 1 superframe.
		await	RF	RAND_ACC_DATA_a (s = add_A)	Ra	Wait for the start of the random access transmissions.
		rep M1		p:= 0		
		verify	RF	**IF** p = {10, 2 261, 2 262, 2 263, 4 511, 4 512, 4 513} **THEN** No RAND_ACC_DATA_a (s = add_A) in slot beginning at time = plea_time + p x 60/M1	Ra	Verify that no random access transmissions are made by the station under test in slots reserved by the plea response.
		endrep		p:= p + 1		
		send	RF	PLEA_RESP_a (a_1:= -20; a_2:= -40; a_3 to a_{11}:= 0; nr:= 3; off:= 100; s = add_B; d = add_C)	PRa	Send a plea response from a simulated station B to a simulated station B with nr ≠ special. The burst reserves an initial slot 10 slots after the transmission slot followed by two groups of three slots.
		record	RF	plea_time:= time at beginning of slot containing PLEA_RESP_a	PRa	
		macro		M_RAND_ACC (sf:= 1)		Queue random access transmissions over 1 superframe.
		await	RF	RAND_ACC_DATA_a (s = add_A)	Ra	Wait for the start of the random access transmissions.
		rep M1		p:= 0		
		verify	RF	**IF** p = {100, 1 560, 1 580, 3 060, 3 080, 4 560, 4 580} **THEN** No RAND_ACC_DATA_a (s = add_A) in slot beginning at time = plea_time + p x 60/M1	Ra	Verify that no random access transmissions are made by the station under test in slots reserved by the plea response.
		endrep		p:= p + 1		
postamble		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
		send	VSS	SET PARAMETERS (p:= 64/256)		Reset to default values.
Comments:						

Test Case Name:		PleaResponse_Reservation_B				
Purpose:		**To demonstrate that receipt of a plea response with a special nominal rate causes the appropriate slots to be reserved.**				
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
		send	VSS	SET PARAMETERS (p:= 1)		Ensure 100 % chance of transmission on access.
test body		send	RF	PLEA_RESP_b (a_1:= 100; a_2:= 200; a_3:= 300; a_4 to a_5:= 0; off:= 500; s = add_B; d = add_C)	PRb	Send a plea response from a simulated station B to a simulated station B with nr = special. The burst reserves an initial slot 10 slots after the transmission slot followed by two groups of three slots.
		record	RF	plea_time:= time at beginning of slot containing PLEA_RESP_b	PRb	
		macro		M_RAND_ACC (sf:= 1)		Queue random access transmissions over 1 superframe.
		await	RF	RAND_ACC_DATA_a (s = add_A)	Ra	Wait for the start of the random access transmissions.
		rep M1		p:= 0		
		verify	RF	**IF** p = {500, 600, 700, 800} **THEN** No RAND_ACC_DATA_a (s = add_A) in slot beginning at time = plea_time + p x 60/M1	Ra	Verify that no random access transmissions are made by the station under test in slots reserved by the plea response.
		endrep		p:= p + 1		
		send	RF	PLEA_RESP_b (a_1:= 250; a_2:= 750; a_3 to a_5:= 0; off:= 150; s = add_B; d = add_C)	PRb	Send a plea response from a simulated station B to a simulated station B with nr = special. The burst reserves an initial slot 10 slots after the transmission slot followed by two groups of three slots.
		record	RF	plea_time:= time at beginning of slot containing PLEA_RESP_b	PRb	
		macro		M_RAND_ACC (sf:= 1)		Queue random access transmissions over 1 superframe.
		await	RF	RAND_ACC_DATA_a (s = add_A)	Ra	Wait for the start of the random access transmissions.
		rep M1		p:= 0		
		verify	RF	**IF** p = {150, 400, 900} **THEN** No RAND_ACC_DATA_a (s = add_A) in slot beginning at time = plea_time + p x 60/M1	Ra	Verify that no random access transmissions are made by the station under test in slots reserved by the plea response.
		endrep		p:= p + 1		
postamble		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
		send	VSS	SET PARAMETERS (p:= 64/256)		Reset to default values.
Comments:						

Test Case Name:		PleaResponse_Transmission_A				
Purpose:		**To demonstrate that receipt of a plea addressed to a station results in transmission of a plea response of the appropriate format.**				
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
test body		send	RF	PLEA_a (s = add_B; d = add_A)	Pa	Send a plea transmission from a simulated station B to the station under test.
		record	RF	plea_time:= time at beginning of slot containing PLEA_a	Pa	
		await		time = plea_time + 2		Wait for TG6 s.
		verify	RF	PLEA_RESP_a (s = add_A; d = add_B) with $a_1 \neq 0$ **OR** PLEA_RESP_b (s = add_A; d = add_B) with $a_1 \neq 0$ transmitted before time:= plea_time + 2	PRa, PRb	Verify that a plea response is issued by the station under test addressed to station B within TG6 s.
postamble		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
Comments:						

Test Case Name:				PleaResponse_Transmission_B		
Purpose:	**To demonstrate that a second plea addressed to a station results in transmission of a plea response containing the remaining future slots from the previous plea response.**					
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
test body		send	RF	PLEA_a (s = add_B; d = add_A)	Pa	Send a plea transmission from a simulated station B to the station under test.
		await	RF	PLEA_RESP_a (s = add_A; d = add_B) with $a_1 \neq 0$ **OR** PLEA_RESP_b (s = add_A; d = add_B) with $a_1 \neq 0$	PRa, PRb	Wait for the plea response issued by the station under test addressed to station B.
		record	RF	pr_time:= time at beginning of slot containing PLEA_RESP_a **OR** PLEA_RESP_b	PRa, PRb	
		record	RF	LIST1:= list of slot reservations provided in PLEA_RESP_a **OR** PLEA_RESP_b	PRa, PRb	
		await		time = pr_time + 30		Wait for half a superframe.
		send	RF	PLEA_a (s = add_B; d = add_A)	Pa	Send a second plea transmission from a simulated station B to the station under test.
		await	RF	PLEA_RESP_a (s = add_A; d = add_B) with $a_1 \neq 0$ **OR** PLEA_RESP_b (s = add_A; d = add_B) with $a_1 \neq 0$	PRa, PRb	Wait for the second plea response issued by the station under test addressed to station B.
		record	RF	LIST2:= list of slot reservations provided in PLEA_RESP_a **OR** PLEA_RESP_b	PRa, PRb	
		verify	RF	Remaining reservations in LIST1 are included in LIST2		Verify that all remaining reservations provided in the first plea response are included in the second plea response.
postamble		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
Comments:						

Test Case Name:		PleaResponse_Retransmission				
Purpose:		**To demonstrate that a plea response is not re-transmitted.**				
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
test body		send	RF	PLEA_a (s = add_B; d = add_A)	Pa	Send a plea transmission from a simulated station B to the station under test.
		await	RF	PLEA_RESP_a (s = add_A; d = add_B) with $a_1 \neq 0$ **OR** PLEA_RESP_b (s = add_A; d = add_B) with $a_1 \neq 0$	PRa, PRb	Wait for the plea response is issued by the station under test addressed to station B.
		record	RF	pr_time:= time at beginning of slot containing PLEA_RESP_a **OR** PLEA_RESP_b	PRa, PRb	
		await		time = pr_time + 60		Wait for one superframe.
		verify	RF	No re-transmission of PLEA_RESP_a **OR** PLEA_RESP_b by station under test	PRa, PRb	Verify that no re-transmission of the plea response occurs.
postamble		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
Comments:						

Test Case Name:		Response_Reservation				
Purpose:		**To demonstrate that a response reservation field is recognized and causes no reservation to be made.**				
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
		send	VSS	SET PARAMETERS (p:= 1)		Ensure 100 % chance of transmission on access.
test body		send	RF	COMP_XID_g (n:= 4; s:= add_B; d:= 7)	CXg	Send a Compressed XID with response reservation to the station under test with the destination address equal to 7 indicating an equivalent to a null reservation (see note).
		macro		M_RAND_ACC (sf:= 4)		Queue random access transmissions over 4 superframes.
		await	RF	RAND_ACC_DATA_a (s = add_A)	Ra	Wait for the start of the random access transmissions.
		record	RF	start_time:= time at beginning of slot containing RAND_ACC_DATA_a (s = add_A)	Ra	
		rep 4xM1		n:= 0		
		verify	RF	RAND_ACC_DATA_a (s = add_A) in slot beginning at time = start_time + n x 60/M1	Ra	Verify that random access transmissions are made by the station under test in consecutive slots for 4 superframes.
		endrep		n:= n + 1		
postamble		send	VSS	SET PARAMETERS (p:= 64/256)		Reset to default values.
		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
Comments:						
NOTE: The destination address d set to 7 implies that bits 1 through 24 of the destination subfield d are absent, and that bits 25 to 27 are set to 111 binary.						

Test Case Name:				Request_Unsupported		
Purpose:				**To demonstrate that a station will respond to a general request burst that cannot be supported with a general failure burst.**		
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
test body		send	RF	UNI_BURST_d (ro:= 100; lg:= 0; sdf:= 0; pr:= 1; r mi:= 1111111; s:= add_G; d:= add_A)	GQa	Send a general request burst from a simulated ground station G, addressed to the station under test, with the requested message ID set to 1111111 binary which is reserved for future use and therefore not supported.
		verify	RF	GEN_RESP_b (s:= add_A; d:= add_G)	GRb	Verify that the station under test responds with a general response, with ok = 0 indicating a general failure, to a general request that cannot be supported.
postamble		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
Comments: Certain stations, such as those with low power (Type B) transmitters, will not support a general request for a sync burst using a unicast reservation. For such stations, this test is inapplicable.						

Test Case Name:				Sync_Format		
Purpose:				**To demonstrate that an autonomous synch burst is emitted in the format corresponding to a mobile station, with a/d = 0 and tc = 1.**		
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
test body		await	RF	SYNC_BURST_c (s = add_A)	Sc	
		verify	RF	SYNC_BURST_c format corresponds to that specified by the requirements in the present document and that a/d = 0	Sc	Verify that the format of the station's synch burst corresponds to that specified by the requirements in the present document with a/d = 0 and tc = 1.
postamble						
Comments:						

Test Case Name:				Sync_Latency		
Purpose:				**To demonstrate that the latency of ADS data reported by the station is within acceptable limits.**		
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
test body		send	VSS	SET PARAMETERS ($TV11_{min}$:= 8; V11:= 10) associated with sync burst generation		$TV11_{max}$ equals 8 by default. $TV11_{min}$ set to 8 to cause dither after 8 superframes. V11 set to 10 bursts within M1 slots.
		send	Position	Input position ADS parameters as: lat:= 21; lon:= 21		Send (Position) initial ADS position data.
		await	RF	SYNC_BURST_I (s = add_A; lat:= 21; lon:= 21)	SI	
		record	RF	sync_time:= time at the beginning of slot containing SYNC_BURST_I (s = add_A; lat:= 21; lon:= 21)	SI	Define a reference time to measure relative times from during the test.
		rep 50		n:= 1		Repeat test 50 times.
		await		time = sync_time + n x 6 - 0,05 - 0.1 x (n - 1)		Wait until dt before next ADS report. The length of dt begins at 50 ms and is subsequently increased in 100 ms steps.
		send	Position	Update ADS position parameters to: lat:= 21 + n; lon:= 21 + n		Send (Position) revised ADS position data.
		await	RF	SYNC_BURST_I (s = add_A; lat:= 21 + n; lon:= 21 + n) at time = sync_time + n x 6	SI	
		verify	RF	lat = 21 + n and lon = 21 + n appear in SYNC_BURST_I	SI	Verify (RF) that revised ADS position data appears in burst.
		record	RF	DA(n):= da of SYNC_BURST_I	SI	Record data age (latency) given for data in sync burst.

Context	Step	Action	PCO	Action Qualifier	Ref	Comment
		verify	RF	**FOR** n ≤ 10: da = n - 1 **FOR** n > 10: **IF** n = 11 or n = 12 **THEN** da = 10 **IF** n = 13 or n = 14 or n = 15 **THEN** da = 11 **IF** n = 16 to 20 **THEN** da = 12 **IF** n = 21 to 30 **THEN** da = 13 **IF** n = 31 to 40 **THEN** da = 14 **FOR** n > 40: da = 15		Verify that the values of da given in the sync burst agree with the actual values.
		endrep		n:= n + 1		
postamble		send	VSS	SET PARAMETERS ($TV11_{min}$:= 4; V11:= 6) associated with sync burst generation		Reset to default values.
Comments:						

Test Case Name:		Sync_Rate				
Purpose:	**To demonstrate that the station outputs autonomous synch bursts at a rate of at least 6 per M1 slots on each Global Signalling Channel (GSC).**					
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
test body		await	RF	SYNC_BURST_c (s = add_A)	Sc	
		record	RF	sync_time:= time at the beginning of slot containing SYNC_BURST_c (s = add_A)	Sc	Define a reference time to measure relative times from during the test.
		rep 60		n:= 1		Repeat test on GSC1 60 times.
		await	RF (GSC1)	SYNC_BURST_c (s = add_A)	Sc	
		record	RF	**IF** n = 60 **THEN** time(n) = time at the beginning of slot containing SYNC_BURST_c (s = add_A)	Sc	
		endrep		n:= n + 1		
		verify		time(60) - sync_time ≤ 10 x M1		Verify that on GSC1 the station emits at least 6 synch bursts per M1 slots.
		rep 60		n:= 1		Repeat test on GSC2 60 times.
		await	RF (GSC2)	SYNC_BURST_c (s = add_A)	Sc	
		record	RF	**IF** n = 60 **THEN** time(n) = time at the beginning of slot containing SYNC_BURST_c (s = add_A)	Sc	
		endrep		n:= n + 1		
		verify		time(60) - sync_time ≤ 10 x M1		Verify that on GSC1 the station emits at least 6 synch bursts per M1 slots.
postamble						
Comments:						

Test Case Name:				Sync_Interval		
Purpose:				**To demonstrate that a station outputs autonomous synch bursts with a uniform interval between nominal slots on each GSC.**		
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SET PARAMETERS ($TV11_{min}$:= 1; $TV11_{max}$:= 1; V12:= (10/M1) x V11) associated with sync burst generation		TV11 reservation hold timer set to cause dither after every superframe. V12 set to give dither range of ±5.
test body		rep 55		k:= 1		Repeat test 55 times to generate statistical sample.
		record		n:= 2k - 1		
		await	RF (GSC1)	SYNC_BURST_c (s = add_A)	Sc	Wait for an autonomous sync burst to be transmitted on GSC1.
		record	RF	sync_time(n):= time at beginning of slot of n^{th} SYNC_BURST_c (s = add_A) diff_time:= sync_time(n) - sync_time(1) - (n - 1) x 5 slot_diff(n):= diff_time x M1/60	Sc	Record the time of the n^{th} sync burst. sync_time(1) defines a reference time to measure relative times from during the test. Calculate the relative time differences between each ct_slot and the ct_slot of the first burst and transpose to a common time frame. Convert time differences to slot differences.
		await	RF (GSC2)	SYNC_BURST_c (s = add_A)	Sc	Wait for an autonomous sync burst to be transmitted on GSC1.
		record	RF	sync_time(n + 1):= time at beginning of slot of n^{th} SYNC_BURST_c (s = add_A) diff_time:= sync_time(n + 1) - sync_time(1) - n x 5 slot_diff(n):= diff_time x M1/60	Sc	Record the time of the n^{th} sync burst. sync_time(1) defines a reference time to measure relative times from during the test. Calculate the relative time differences between each ct_slot and the ct_slot of the first burst and transpose to a common time frame. Convert time differences to slot differences.
		endrep		k:= k + 1		
		verify		MAX(slot_diff(n)) - MIN(slot_diff(n)) ≤ V12 x M1/V11		Verify distribution of slots is over candidate slot range.
		record		num_slot_diff(m):= 0 for all m		Initialize the number of slots in each candidate slot position to zero.
		rep 110		n:= 1		
		record		num_slot_diff(slot_diff(n)):= num_slot_diff(slot_diff(n)) + 1		Record the frequency of occurrence of slots in each candidate slot position.
		endrep		n:= n + 1		
		rep m		m:= MIN(slot_diff(n)); chi_squared:= 0		Set initial value of m to the minimum value of slot_diff.
		record		chi_squared:= chi_squared + (num_slot_diff(m) - 10)^2/10		The distribution is tested for uniformity by calculating the value of chi_squared.
		until		m:= MAX(slot_diff(n))		
		verify		chi_squared < 15.99		Value of chi_squared shall be less than 15,99 for 90 % confidence that the distribution is uniform (10 degrees of freedom).
postamble		send	VSS	SET PARAMETERS ($TV11_{min}$:= 4; $TV11_{max}$:= 8; V12:= 0,1) associated with sync burst generation		Reset to default values.
Comments:						

Test Case Name:		Sync_Fixed_Nucp				
Purpose:		**To demonstrate that a station sets the navigation uncertainty category appropriately.**				
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
		rep 2		nu:= {3, 6}		Repeat for two values of nucp.
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
test body		send	Position	From a source with nucp:= nu apply position ADS parameters as: lat:= 21; lon:= 21		Apply ADS position data of known nucp category to Position PCO.
		await	RF	SYNC_BURST_I (s = add_A; lat:= 21; lon:= 21)	SI	Wait for a sync burst from the station under test.
		record	RF	NUCP:= nucp		Record the nucp value.
		verify		NUCP = 3		Verify that the nucp value is appropriate to the source of position data.
		do	Position	Remove previously applied ADS parameters		Remove ADS position data from Position PCO.
		wait		4 s		Wait 4 s.
		await	RF	SYNC_BURST_I (s = add_A)	SI	
		record	RF	NUCP:= nucp		
		verify		NUCP = 0		Verify nucp field indicates no position data available.
postamble						
		endrep		next nu		Repeat for second value of nucp.
Comments:						

Test Case Name:		Sync_Fixed_BaseAlt				
Purpose:		**To demonstrate that a station sets the base altitude in the fixed part of the sync burst in accordance with the input altitude data.**				
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
test body		rep 8		n:= {-1 399, -6, 7 999, 8 015, 71 912.5, 72 400, 130 049.5, 130 051}; m:= {1, 131, 932, 934, 3 490, 3 495, 4 072, 4 073}		
		send	Altitude	Apply base altitude ADS parameter as: altitude = n **AND** Apply baro/geo altitude parameter as: baro/geo = 0		Apply ADS altitude data and baro/geo altitude parameter to Altitude PCO.
		await	RF	SYNC_BURST_I (s = add_A)	SI	Wait for a sync burst from the station under test.
		record	RF	BALT:= balt B/G:= b/g		Record the balt value.
		verify		BALT = m B/G:= 0		Verify that balt and b/g are correctly transmitted in the sync burst.
		endrep		next n		
		send	Altitude	Apply base altitude ADS parameter as: altitude = station on ground **AND** Apply baro/geo altitude parameter as: baro/geo = 0		Apply ADS altitude 'station on ground' and baro/geo altitude parameter to Altitude PCO.
		await	RF	SYNC_BURST_I (s = add_A)	SI	Wait for a sync burst from the station under test.
		record	RF	BALT:= balt B/G:= b/g		Record the balt value.
		verify		BALT = 4 095 B/G:= 0		Verify that balt and b/g are correctly transmitted in the sync burst.
		do	Altitude	Remove previously applied altitude ADS parameter		Remove data at altitude PCO.
		await	RF	SYNC_BURST_I (s = add_A)	SI	Wait for a sync burst from the station under test.
		record	RF	BALT:= balt		Record the balt value.
		verify		BALT = 0		Verify that balt = 0 is transmitted in the sync burst.
Comments:						

Test Case Name:				Sync_Fixed_DataAge		
Purpose:				**To demonstrate that a station sets the data age subfield of a sync burst appropriately.**		
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
test body		send	VSS	SET PARAMETERS (V11:= 60) associated with sync burst generation		Set the station under test to transmit bursts at the rate of 1 a second.
		send	Position	Apply position ADS parameters as: lat:= 21; lon:= 21		Apply ADS position data of known nucp category to Position PCO.
		await	RF	SYNC_BURST_I (s = add_A; lat:= 21; lon:= 21)	SI	Wait for a sync burst from the station under test.
		record	RF	NUCP:= nucp		Record the nucp value.
		verify		$1 \leq$ NUCP ≤ 9		Verify that the nucp value indicates valid position data.
		do	Position	Remove previously applied ADS parameters		Remove ADS position data from Position PCO.
		await	RF	SYNC_BURST_I (s = add_A)	SI	Wait for the next sync burst.
		record	RF	DA:= da		
		await	RF	SYNC_BURST_I (s = add_A)	SI	Wait for the following sync burst.
		record	RF	DA2:= da		
		verify		decoded_latency(DA2) - decoded_latency(DA) = 1 000 $\pm$ 200 ms		Verify data age subfield represents 1 second ($\pm$200 ms) greater than the data age subfield in the previous sync burst.
		await	RF	SYNC_BURST_I (s = add_A)	SI	Wait for the following sync burst.
		record	RF	DA3:= da		
		verify		decoded_latency(DA3) - decoded_latency(DA) = 2 000 $\pm$ 200 ms		Verify data age subfield represents 1 second ($\pm$200 ms) greater than the data age subfield in the previous sync burst.
		await	RF	SYNC_BURST_I (s = add_A)	SI	Wait for the following sync burst.
		record	RF	DA4:= da		
		verify		decoded_latency(DA4) - decoded_latency(DA) = 3 000 $\pm$ 200 ms		Verify data age subfield represents 1 second ($\pm$200 ms) greater than the data age subfield in the previous sync burst.
postamble		send	VSS	SET PARAMETERS (V11:= 6) associated with sync burst generation		Reset to default values.
Comments:						

Test Case Name:		NetEntry_Periodic				
Purpose:		**To demonstrate that a station which desires to gain entry to a network using the combined periodic and incremental broadcast protocols is able to set up a series of regularly spaced streams.**				
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		switch on VDL4 transceiver		
		verify	Self test	successful VDL4 transceiver self test		Verify that the VDL4 transceiver passes power-up self-test.
		do		SET NETWORK ENTRY BY PERIODIC AND INCREMENTAL		Ensure transceiver is set to perform network entry by a combination of periodic and incremental broadcasts as opposed to other means.
test body		rep 10		n:= 1		Repeat the test n times.
		do		switch off VDL4 transceiver		
		wait		15 s		Ensure network entry will be triggered by waiting a sufficient time.
		do		switch on VDL4 transceiver		
		verify	Self test	successful VDL4 transceiver self test		Verify that the VDL4 transceiver passes power-up self-test.
		record		t:= time at beginning of first slot at which transceiver is able to receive incoming transmissions		
		verify	RF	No transmissions from the station under test before time:= t + 60		Ensure there are no transmissions from the station under test for a period of one minute after start up, in which time the station shall be listening to the channel to build up a complete slot map.
		await	RF	SYNC_BURST_c (s = add_A) transmitted at or after time:= t + 60	Sc	Verify an autonomous sync burst is then transmitted.
		record	RF	sync_time:= time at beginning of slot occupied by SYNC_BURST_c (s = add_A)	Sc	
		verify	RF	SYNC_BURST_c (s = add_A) contains pt = 3 **AND** io $\neq$ 0 (or po $\neq$ 0)	Sc	Verify that the first sync burst transmitted contains pt and io (or po) values compatible with a combined periodic and incremental broadcast reservation.
		record	RF	IO:= io contained in SYNC_BURST_c (s = add_A)	Sc	
		await		time:= sync_time + IO x 60/M1		
		verify	RF	SYNC_BURST_c (s = add_A) contained in slot at time:= sync_time + IO x 60/M1	Sc	Verify that a further sync burst is made in the slot identified by the io value contained in the first sync burst.
		await		time:= sync_time + 60		
		verify	RF	SYNC_BURST_c (s = add_A) contained in slot at time:= sync_time + 60	Sc	Verify that a sync burst is contained in the slot that occurs one superframe after the first sync burst.
		verify	RF	**IF** SYNC_BURST_c (s = add_A) in slot at time:= sync_time + 60 contains pt = 3 **THEN** po = 0	Sc	Verify that if this sync burst contains pt = 3 that it also contains po = 0.
		endrep		n:= n + 1		
postamble						
Comments: This test requires waiting for one minute to perform net entry. If this is not supported by a station, then this test does not apply.						

Test Case Name:		NetEntry_Receive				
Purpose:		**To demonstrate that a station in receipt of a delayed transmission containing a plea will generate a reply to the source station with slots for it to transmit in, if it has some slots which it could make available.**				
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
test body		send	VSS	PERIODIC BROADCAST request to transmit SYNC_BURST_b (V11:= 10)	Sb	Set up a series of periodic streams of one-slot messages from the station under test. V11 set to 10 bursts within M1 slots.
		await	RF	SYNC_BURST_b (s = add_A)	Sb	Wait for the first sync burst to be transmitted by the station under test.
		send	RF	PLEA_a (s = add_B; d = add_A)	Pa	Send a delayed plea transmission from a simulated station B to the station under test.
		record	RF	plea_time:= time at beginning of slot containing PLEA_a (s = add_B; d = add_A)	Pa	
		verify	RF	PLEA_RESP_a (s = add_A; d = add_B) with $a_1 \neq 0$ **OR** PLEA_RESP_b (s = add_A; d = add_B) with $a_1 \neq 0$ transmitted before time:= plea_time + 2	PRa, PRb	Verify that a plea response is issued by the station under test addressed to station B within TG6 s and that it contains at least one slot position (in a_1) for station B to use for transmission.
postamble		send	VSS	SET PARAMETERS (V11:= 6)		Reset to default values.
Comments:						

Test Case Name:		NetEntry_OneMinute				
Purpose:	**To demonstrate that a station which desires to transmit for the first time without using network entry protocols, will listen to the channel on which it desires to transmit for 1 minute prior to making any transmissions.**					
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		switch on VDL4 transceiver		
		verify	Self test	successful VDL4 transceiver self test		Verify that the VDL4 transceiver passes power-up self-test.
		do		SET NETWORK ENTRY BY WAITING ONE MINUTE		Ensure transceiver is set to perform network entry by waiting for one minute as opposed to other means.
test body		rep 10		n:= 1		Repeat the test n times.
		do		switch off VDL4 transceiver		
		wait		15 s		Ensure network entry will be triggered by waiting a sufficient time.
		do		switch on VDL4 transceiver		
		verify	Self test	successful VDL4 transceiver self test		Verify that the VDL4 transceiver passes power-up self-test.
		record		t:= time at beginning of first slot at which transceiver is able to receive incoming transmissions		
		verify	RF	No transmissions from the station under test before time:= t + 60		Ensure there are no transmissions from the station under test for a period of one minute after start up, in which time the station shall be listening to the channel to build up a complete slot map.
		verify	RF	SYNC_BURST_c (s = add_A) transmitted at or after time:= t + 60	Sc	Verify an autonomous sync burst is then transmitted.
		endrep		n:= n + 1		
postamble						
Comments: Network entry by waiting one minute is not mandated by ICAO standards. Step 3 is provided to ensure that this means of net entry is selected in preference to other means. In the event that the transceiver under test does not support network entry by waiting one minute, then this test does not apply.						

Test Case Name:		ADS_Report_Receive				
Purpose:	**To demonstrate that a station receiving a sequence of ADS reports from a peer station will generate an appropriate output for display to the aircrew.**					
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
test body		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; s:= add_B; lat:= CPR_LAT(S 25 NM); lon:= CPR_LON(E 35 NM))	Sa	Send a sync burst from a simulated station B containing position information in the fixed data field.
		record	RF	sync_time:= time at start of slot containing sync burst		Define a reference time to measure relative times from during the test.
		rep 5		n:= 1; lat_data(n):= {CPR_LAT(S 30 NM), CPR_LAT(S 35 NM), CPR_LAT(S 40 NM), CPR_LAT(S 45 NM), CPR_LAT(S 50 NM)}; lon_data(n):= {CPR_LON(E 40 NM), CPR_LON (E 45 NM), CPR_LON(E 50 NM), CPR_LON (E 55 NM), CPR_LON(E 60 NM)}		Set up an array containing the sequence of positional data to be used in the test.
		await		time = sync_time + n x 30		
		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; s:= add_B; lat:= lat_data(n); lon:= lon_data(n))	Sa	Send a sync burst containing the next position report in the sequence every 30 s for 5 minutes.
		record	AppOut	LAT DATA OUT, LON DATA OUT		Wait for the next received packet of data to be processed by the station and sent to the position output.
		endrep		n:= n + 1		Repeat for each report.
		verify	AppOut	LAT DATA OUT = {S 30 NM, S 35 NM, S 40 NM, S 45 NM, S 50 NM} **AND** LON DATA OUT = {E 40 NM, E 45 NM, E 50 NM, E 55 NM, E 60 NM}		Verify that the station under test generates the appropriate output for display to the aircrew.
postamble		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
Comments:						

Test Case Name:				ADS_Report_Simultaneous		
Purpose:				**To demonstrate that a station is capable of receiving ADS reports simultaneously on both GSCs.**		
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
test body		send	RF	SYNC_BURST_a (pt:= 3; po:= 0; s:= add_B; lat:= CPR_LAT(0); lon:= CPR_LON(0)) on GSC 1 **AND** SYNC_BURST_a (pt:= 3; po:= 0; s:= add_C; lat:= CPR_LAT(N 10 NM); lon:= CPR_LON (E 10 NM)) on GSC 2	Sa	Send a sync burst from a simulated station B on GSC 1 and from simulated station C in the same slot on GSC 2, both containing position information in the fixed data fields.
		await	AppOut	LAT DATA OUT B, LON DATA OUT B **AND** LAT DATA OUT C, LON DATA OUT C		Wait for the received reports from stations B and C to be processed by the station and sent to the position output.
		verify	AppOut	LAT DATA OUT B = 0 **AND** LON DATA OUT B = 0 **AND** LAT DATA OUT C = N 10 NM **AND** LON DATA OUT C = E 10 NM		Verify that the station under test processes the data and generates the appropriate output for display to the aircrew.
postamble		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
Comments:						

Test Case Name:				**CPR_Encode**		
Purpose:				**To demonstrate that a series of latitude and longitude positions may be correctly encoded in the sync burst using the CPR algorithm.**		
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
		send	VSS	SET PARAMETERS (p:= 1)		Ensure 100 % chance of transmission on access to hasten sync burst responses following a general request.
test body		rep 2 166		n:= 1; Initialize p		
		send	Position	Input to station under test: LAT(n):= 12,8557 + n x 0,163LON(n):= -0,8150 + n x 0,163	CE(r, c)	Send test values of latitude and longitude from CPR_ENC_TABLE to the station under test.
		rep 135		k:= 1		
		do		**IF** LAT(n) = CPR_ENC_TABLE (k, latitude) for row k of table **AND** LON(n) = CPR_ENC_TABLE (k, longitude) for row k of table **THEN** p:= k continue with following test steps within loop using current p value **ELSE** go to next n bypassing all the steps before the end of the loop		
		endrep		k:= k + 1		
		send	RF	ADSB_REQ_a (r-id:= 0 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 basic variable information field.
		await	RF	SYNC_BURST_g (s = add_A)	Sg	
		do		**IF** cprf in fixed part of SYNC_BURST_g (s = add_A) equals 0 **THEN** continue with following test steps within n loop **ELSE** 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. 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.
		verify verify verify	RF RF RF	In fixed part of SYNC_BURST_g (s = add_A): cprf = CPR_ENC_TABLE (p, cpr_type) **AND** lat = CPR_ENC_TABLE (p, lat_enc) **AND** lon = CPR_ENC_TABLE (p, lon_enc)	Sg, 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.

Context	Step	Action	PCO	Action Qualifier	Ref	Comment
		verify	RF	In variable part of SYNC_BURST_g (s = add_A): pid = CPR_ENC_TABLE (p, pid_enc) **AND** lat6(bits 1-5) = CPR_ENC_TABLE (p, lat6(1-5)) **AND** lat6(bit 6) = CPR_ENC_TABLE (p, lat6(6) **AND** lon6(bits 1-5) = CPR_ENC_TABLE (p, lon6(1-5)) **AND** lon6(bit 6) = CPR_ENC_TABLE (p, lon6(6))	Sg, 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.
		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.
		await	RF	SYNC_BURST_h (s = add_A)	Sh	
		verify	RF	In variable part of SYNC_BURST_h (s = add_A): lat4(bits 1-3) = CPR_ENC_TABLE (p, lat4(1-3)) **AND** lat4(bit 4) = CPR_ENC_TABLE (p, lat4(4)) **AND** lon4(bits 1-3) = CPR_ENC_TABLE (p, lon4(1-3)) **AND** lon4(bit 4) = CPR_ENC_TABLE (p, lon4(4))	Sh, 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.
		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.
		await	RF	SYNC_BURST_h (s = add_A)	Sh	
		verify	RF	In variable part of SYNC_BURST_h (s = add_A): pid = CPR_ENC_TABLE (p, pid_enc)	Sh, CE(r, c)	Verify that the encoded values of pid in the variable part of the sync burst from the station under test agree with the values given in CPR_ENC_TABLE.
		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.
		await	RF	SYNC_BURST_i (s = add_A)	Si	
		verify	RF	In variable part of SYNC_BURST_i (s = add_A): lat8(bits 1-7) = CPR_ENC_TABLE (p, lat8(1-7)) **AND** lat8(bit 8) = CPR_ENC_TABLE (p, lat8(8)) **AND** lon8(bits 1-7) = CPR_ENC_TABLE (p, lon8(1-7)) **AND** lon8(bit 8) = CPR_ENC_TABLE (p, lon8(8))	Si, 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.
		endrep		n:= n + 1		
postamble		send	VSS	SET PARAMETERS (p:= 64/256)		Restore to default value.
		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
Comments:						

Test Case Name:		CPR_Decode				
Purpose:		**To demonstrate that a series of latitude and longitude positions may be correctly decoded from the sync burst using the CPR algorithm.**				
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble		do		M_POWER_UP		Prepare the transceiver for testing.
		send	VSS	SUPPRESS AUTONOMOUS SYNC BURSTS		Suppress the autonomous sync bursts to avoid possible confliction.
		send	VSS	SET PARAMETERS (G1:= 10)		Set the maximum number of missed reservations to 10.
test body		rep 135		n:= 1		

		send	RF	SYNC_BURST_g (po:= 0; pt:= 0; s:= add_B;
				lat:= CPR_ENC_TABLE (n, lat_enc);
				lon:= CPR_ENC_TABLE (n, lon_enc);
				lat6(bits 1-5):= CPR_ENC_TABLE (n, lat6(1-5));
				lat6(bit 6):= CPR_ENC_TABLE (n, lat6(6);
				lon6(bits 1-5):= CPR_ENC_TABLE (n, lon6(1-5))
				lon6(bit 6):= CPR_ENC_TABLE (n, lon6(6)))
					Sg,
					CE(r, c)
						Send a sync burst from a simulated station B with a basic variable information field.
						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.

		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.
		verify	AppOut	LAT DATA OUT = CPR_DEC_TABLE (n, decoded 6-bit high-res lat) **AND** 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.

		send	RF	SYNC_BURST_h (po:= 0; pt:= 0; s:= add_B;
				pid:= CPR_ENC_TABLE (n, pid_enc);
				lat:= CPR_ENC_TABLE (n, lat_enc);
				lon:= CPR_ENC_TABLE (n, lon_enc);
				lat4(bits 1-3):= CPR_ENC_TABLE (n, lat4(1-3));
				lat4(bit 4):= CPR_ENC_TABLE (n, lat4(4);
				lon4(bits 1-3):= CPR_ENC_TABLE (n, lon4(1-3))
				lon4(bit 4):= CPR_ENC_TABLE (n, lon4(4)))
					Sh,
					CE(r, c)
						Send a sync burst from a simulated station B with a basic ground variable information field.
						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.

		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.
		verify	AppOut	LAT DATA OUT = CPR_DEC_TABLE (n, decoded 4-bit high-res lat) **AND** 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.

		send	RF	SYNC_BURST_i (po:= 0; pt:= 0; s:= add_B;
				lat:= CPR_ENC_TABLE (n, lat_enc);
				lon:= CPR_ENC_TABLE (n, lon_enc);
				lat8(bits 1-7):= CPR_ENC_TABLE (n, lat8(1-7));
				lat8(bit 8):= CPR_ENC_TABLE (n, lat8(8);
				lon8(bits 1-7):= CPR_ENC_TABLE (n, lon8(1-7))
				lon8(bit 8):= CPR_ENC_TABLE (n, lon8(8)))
					Si,
					CE(r, c)
						Send a sync burst from a simulated station B with a basic variable information field.
						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.

Context	Step	Action	PCO	Action Qualifier	Ref	Comment
		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.
		verify	AppOut	LAT DATA OUT = CPR_DEC_TABLE (n, decoded 8-bit high-res lat) **AND** 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.
		endrep		n:= n + 1		
postamble		send	VSS	SET PARAMETERS (G1:= 3)		Restore to default value.
		send	VSS	REINSTATE AUTONOMOUS SYNC BURSTS		Reinstate the autonomous sync bursts.
Comments:						

Annex A (informative): Cross reference matrix

Table A.1 outlines the mapping between the VDL Mode 4 Ground station 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. The cross reference applies to the version of [1] applicable at 1 October 2001. In these tables:

- column 1 is a reference to the requirement in the present document;
- column 2 is a reference to the equivalent requirements in [1];
- column 3 identifies individual requirements within [1];
- column 4 identifies clause titles taken from [1];
- 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:

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 requirement 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 implementor 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 implementor may be required to satisfy the authorities by separate technical evidence.

NOTE 3: The requirement 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.

Table A.1: VDL Mode 4 requirements according to ICAO TM

Requirement reference	Reference in [1]	Req	Title	Test Case
5.1	1.2		MAC sublayer.	see note 1
5.1.1.1	1.2	a		see note 2
5.1.2	1.2.1		MAC sublayer services.	see note 1
5.1.2.1	1.2.1	a		see note 2
5.1.2.2	1.2.1	b		see note 2
5.1.2.3	1.2.1	c		see note 2
5.1.3	1.2.2		MAC sublayer parameters.	see note 1
5.1.3.1	1.2.2	a		see note 1a
5.1.3.2	1.2.2.1		Parameter M1 (number of slots per superframe).	see note 1
5.1.3.2.1	1.2.2.1	a		see note 1a
5.1.3.2.2	1.2.2.1	b		see note 1a
5.1.4	1.2.3		Time synchronization.	see note 1
5.1.4.1	1.2.3.1		Primary.	see note 1
5.1.4.1.1	1.2.3.1	a		Timing_Primary
5.1.4.2	1.2.3.2		Secondary.	see note 1
5.1.4.2.1	1.2.3.2	a		Timing_Secondary
5.1.4.2.2	1.2.3.2	b		Timing_Secondary
5.1.4.2.3	1.2.3.2	c		Timing_Secondary_Recover
5.1.4.3	1.2.3.3		Alignment to UTC second.	see note 1
5.1.4.3.1	1.2.3.3	a		see note 1a
5.1.4.4	1.2.3.5		Data quality level.	see note 1
5.1.4.4.1	1.2.3.5	a		see note 1a
5.1.4.4.2	1.2.3.5	c		see note 1a
5.1.5	1.2.4		Slot idle/busy notification.	see note 1
5.1.5.1	1.2.4.1		Slot idle detection.	see note 1
5.1.5.1.1	1.2.4.1	a	c	see note 1a
5.1.5.2	1.2.4.2		Slot busy detection.	see note 1
5.1.5.2.1	1.2.4.2	a		see note 1a
5.1.5.3	1.2.4.3		Slot occupied detection.	see note 1
5.1.5.3.1	1.2.4.3	a		see note 1a
5.1.6	1.2.5		Transmission processing.	see note 1
5.1.6.1	1.2.5	a		see note 2
5.1.6.2	1.2.5	b		Slot_Boundary
5.1.7	1.2.6		Received transmission processing.	see note 1
5.1.7.1	1.2.6	a		CRC_Rej
5.1.7.2	1.2.6	b		Periodic_NonDitherRes ADS_Report_Receive
5.2	1.3		VSS sublayer.	see note 1
5.2.1	1.3.1		Services.	see note 1
5.2.1.1	1.3.1.2		Error detection.	see note 1
5.2.1.1.1	1.3.1.2	a		CRC_Norm
5.2.1.2	1.3.1.3		Channel congestion.	see note 1
5.2.1.2.1	1.3.1.3	a		see note 2
5.2.2	1.3.2		Burst format.	see note 1
5.2.2.1	1.3.2	a		Sync_Format
5.2.2.1.2	1.3.2	b		see note 2
5.2.2.2	1.3.2.1		Version number.	see note 1
5.2.2.2.1	1.3.2.1	a		see note 1a
5.2.2.2.2	1.3.2.1	b		Sync_Format
5.2.2.2.3	1.3.2.1	c		Version_NonZero
5.2.2.3	1.3.2.2		Source address.	see note 1
5.2.2.3.1	1.3.2.2	a		see note 1a
5.2.2.3.2	1.3.2.2	b		see note 1a
5.2.2.4	1.4.2.1		Station address encoding.	
5.2.2.5	1.3.2.3		Message ID.	see note 1
5.2.2.5.1	1.3.2.3	a		see note 1a
5.2.2.5.2	1.3.2.3	b		see note 1a
5.2.2.5.3	1.3.2.3	c		see note 2
5.2.2.6	1.3.2.4		Information field.	see note 1
5.2.2.6.1	1.3.2.4	a		see note 2
5.2.2.7	1.3.2.5		Reservation fields.	see note 1

Requirement reference	Reference in [1]	Req	Title	Test Case
5.2.2.7.1	1.3.2.5	a		see note 1a
5.2.2.7.2	1.3.2.5	b		see note 1a
5.2.2.8	1.3.2.6		TCP change flag.	see note 1
5.2.2.8.1	1.3.2.6	a		see note 2
5.2.2.8.2	1.3.2.6	b		Sync_Format
5.2.3	1.3.3		VSS sublayer parameters.	see note 1
5.2.3.1	1.3.3	a		see note 2
5.2.3.2	1.3.3.1		Parameter VS1 (number of ground quarantined slots).	see note 1
5.2.3.2.1	1.3.3.1	a		see note 1a
5.2.3.2.2/5.2.3.2.3	1.3.6.4			see note 1
5.2.3.3	1.3.3.2		Parameter VS2 (minimum CCI performance).	see note 1
5.2.3.3.1	1.3.3.2	a		see note 1a
5.2.3.3.2	1.3.3.2	b		see note 1a
5.2.3.4	1.3.3.3		Parameter VS4 (quarantine slot re-use range).	see note 1
5.2.3.4.1	1.3.3.3	a		see note 1a
5.2.4	1.3.4		VSS quality of service parameters.	see note 1
5.2.4.1	1.3.4	a		see note 2
5.2.4.2	1.3.4.1		Parameter Q1 (priority).	see note 1
5.2.4.2.1	1.3.4.1	a		see note 2
5.2.4.3	1.3.4.2		Parameters Q2a to Q2d (slot selection range constraint for level n).	see note 1
5.2.4.3.1	1.3.4.2	a		see note 1a
5.2.4.4	1.3.4.3		Parameter Q3 (replace queued data).	see note 1
5.2.4.4.1	1.3.4.3	a		see note 1a
5.2.4.4.2	1.3.4.3	b		Queue_Replace
5.2.4.4.3	1.3.4.3	c		Queue_Norm
5.2.4.5	1.3.4.4		Parameter Q4 (number of available slots).	see note 1
5.2.4.5.1	1.3.4.4	a		see note 1a
5.2.5	1.3.5		Received transmission processing.	see note 1
5.2.5.1	1.3.5	g		see note 2
5.2.5.2	1.3.5	h		see note 2
5.2.5.3	1.3.5	a		Periodic_NonDitherRes Periodic_DitherRes Periodic_Replacement Periodic_Cancel Incremental_Reservation_A Unicast_Reservation_A Info_Reservation Autotune_Reservation Autotune_CancelAbsent
5.2.5.4	1.3.5	b		Reservation_Unrecognized
5.2.5.5	1.3.5	c		see note 2
5.2.5.6	1.3.5	d		see note 2
5.2.5.7	1.3.5	e		see note 1a
5.2.5.8	1.3.5	f		see note 1a
5.2.5.9	1.3.5	i		MessageID_Invalid_A MessageID_Invalid_B
5.2.6	1.3.6		Reserved access protocol specification.	see note 1
5.2.6.1	1.3.6.1		Reservation table.	see note 1
5.2.6.1.1	1.3.6.1	a		see note 2
5.2.6.1.2	1.3.6.1	b		see note 2
5.2.6.1.3	1.3.6.1	c		see note 2
5.2.6.1.4	1.3.6.1	d		Reservation_Recognition
5.2.6.1.5	1.3.6.1	e		NetEntry_OneMinute
5.2.6.2	1.3.6.2		Selecting slots for transmission or reservation.	see note 1

Requirement reference	Reference in [1]	Req	Title	Test Case
5.2.6.2.1	1.3.6.2	a		SlotSel_Level0_A SlotSel_Level0_B SlotSel_Level0_C SlotSel_Level0_D SlotSel_Level0_E SlotSel_Level0_F SlotSel_Level1_A SlotSel_Level1_B SlotSel_Level1_C SlotSel_Level1_D SlotSel_Level1_E SlotSel_Level1_F SlotSel_Level2_A SlotSel_Level2_B SlotSel_Level2_C SlotSel_Level2_D SlotSel_Level2_E SlotSel_Level3_A SlotSel_Level3_B SlotSel_Level3_C SlotSel_Level3_D SlotSel_Level4_A SlotSel_Level4_B SlotSel_Level4_C SlotSel_Unsuccessful
5.2.6.2.2	1.3.6.2	b		see note 2
5.2.6.2.3	1.3.6.2	c		SlotSel_Level0_A SlotSel_Level0_B SlotSel_Level0_C SlotSel_Level0_D SlotSel_Level0_E SlotSel_Level0_F SlotSel_Level1_A SlotSel_Level1_B SlotSel_Level1_C SlotSel_Level1_D SlotSel_Level1_E SlotSel_Level1_F SlotSel_Level2_A SlotSel_Level2_B SlotSel_Level2_C SlotSel_Level2_D SlotSel_Level2_E SlotSel_Level3_A SlotSel_Level3_B SlotSel_Level3_C SlotSel_Level3_D SlotSel_Level4_A SlotSel_Level4_B SlotSel_Level4_C SlotSel_Unsuccessful
5.2.6.2.4	1.3.6.2	d		SlotSel_QoSGroup
5.2.6.2.5	1.3.6.2	e		SlotSel_Unsuccessful
5.2.6.2.6	1.3.6.2.1	a		see note 2

Requirement reference	Reference in [1]	Req	Title	Test Case
5.2.6.2.7	1.3.6.2.2	a		SlotSel_Level0_A SlotSel_Level0_B SlotSel_Level0_C SlotSel_Level0_D SlotSel_Level0_E SlotSel_Level0_F SlotSel_Level1_A SlotSel_Level1_B SlotSel_Level1_C SlotSel_Level1_D SlotSel_Level1_E SlotSel_Level1_F SlotSel_Level2_A SlotSel_Level2_B SlotSel_Level2_C SlotSel_Level2_D SlotSel_Level2_E SlotSel_Level3_A SlotSel_Level3_B SlotSel_Level3_C SlotSel_Level3_D SlotSel_Level4_A SlotSel_Level4_B SlotSel_Level4_C
5.2.6.2.8	1.3.6.2.2	b		"
5.2.6.2.9	1.3.6.2.2	c		"
5.2.6.2.10	1.3.6.2.2	d		"
5.2.6.2.11	1.3.6.2.2	e		"
5.2.6.2.12	1.3.6.2.2	f		"
5.2.6.2.13	1.3.6.2.2	g		"
5.2.6.2.14	1.3.6.2.2	h		"
5.2.6.2.15	1.3.6.2.2.2	a		see note 4
5.2.6.2.16	1.3.6.2.2.4	a		SlotSel_Exclusion
5.2.6.2.17	1.3.6.2.4	a		SlotSel_Unsuccessful
5.2.6.2.18	1.3.6.2.4	b		SlotSel_Level0_A SlotSel_Level0_B SlotSel_Level0_C SlotSel_Level0_D SlotSel_Level0_E SlotSel_Level0_F SlotSel_Level1_A SlotSel_Level1_B SlotSel_Level1_C SlotSel_Level1_D SlotSel_Level1_E SlotSel_Level1_F SlotSel_Level2_A SlotSel_Level2_B SlotSel_Level2_C SlotSel_Level2_D SlotSel_Level2_E SlotSel_Level3_A SlotSel_Level3_B SlotSel_Level3_C SlotSel_Level3_D SlotSel_Level4_A SlotSel_Level4_B SlotSel_Level4_C
5.2.6.2.19	1.3.6.2.5	a		SlotSel_Block_Level0_A SlotSel_Block_Level0_B SlotSel_Block_MixedLevel
5.2.6.2.20	1.3.6.2.5	b		SlotSel_Block_MixedLevel
5.2.6.2.21	1.3.6.2.5	c		SlotSel_Block_Level0_A SlotSel_Block_Level0_B SlotSel_Block_MixedLevel
5.2.6.2.22	1.3.6.2.6	a		SlotSel_Reselection

Requirement reference	Reference in [1]	Req	Title	Test Case
5.2.6.3	1.3.6.3		Reserved transmissions.	see note 1
5.2.6.3.1	1.3.6.3	a		see note 2
5.2.6.3.2	1.3.6.3.1	a		see note 2
5.2.6.3.3	1.3.6.3.2	a		see note 2
5.2.6.4	1.3.6.5		Reservation conflicts.	see note 1
5.2.6.4.1	1.3.6.5	a		Conflict_Periodic_A Conflict_Periodic_B Conflict_Periodic_C Conflict_NoAction Conflict_Incremental Conflict_Priority Conflict_FirstRequest
5.2.6.4.2	1.3.6.5	b		Conflict_Priority Conflict_FirstRequest
5.2.6.4.3	1.3.6.5	c		see note 2
5.2.6.4.4	1.3.6.5	d		see note 4
5.2.6.4.5	1.3.6.5	e		see note 2
5.2.6.4.6	1.3.6.5	f		Conflict_NoAction
5.2.6.4.7	1.3.6.5	g		Conflict_Periodic_A Conflict_Periodic_B Conflict_Periodic_C Conflict_Incremental
5.2.7	1.3.7		Random access protocol specification.	see note 1
5.2.7.1	1.3.7	a		Rand_Persistence
5.2.7.2	1.3.7.1		Random access parameters.	see note 1
5.2.7.2.1	1.3.7.1.1	a		see note 1a
5.2.7.2.2	1.3.7.1.1	b		Rand_Congestion
5.2.7.2.3	1.3.7.1.1	c		Rand_TM2Clear Rand_TM2Reset
5.2.7.2.4	1.3.7.1.1	d		Rand_Congestion
5.2.7.2.5	1.3.7.1.2	a		see note 1a
5.2.7.2.6	1.3.7.1.3	a		Rand_MaxAttempts
5.2.7.2.7	1.3.7.1.3	b		Rand_MaxAttempts Rand_VS3Clear
5.2.7.2.8	1.3.7.1.3	c		Rand_MaxAttempts
5.2.7.2.9	1.3.7.1.3	d		Rand_MaxAttempts
5.2.7.3	1.3.7.2		Random access procedures.	see note 1
5.2.7.3.1	1.3.7.2.1	a		Rand_Persistence
5.2.7.3.2	1.3.7.2.1	b		Periodic_DitherRes Incremental_Reservation_A Unicast_Reservation_A Info_Reservation Autotune_Reservation Slot_Boundary
5.2.7.3.3	1.3.7.2.1	c		Rand_Availability
5.2.7.3.4	1.3.7.2.1	d		Rand_Busy
5.2.7.3.5	1.3.7.2.1	e		Rand_Congestion
5.2.7.3.6	1.3.7.2.3	a		see note 4
5.2.7.3.7	1.3.7.2.3	b		see note 4
5.2.7.3.8	1.3.7.2.4	a		see note 4
5.2.7.3.9	1.3.7.2.4	b		see note 4
5.2.7.3.10	1.3.7.2.5	a		see note 2
5.2.7.3.11	1.3.7.2.5	b		Rand_Priority
5.2.7.3.12	1.3.7.2.5	c		Queue_Replace Queue_Norm
5.2.8	1.3.8		Fixed access protocol specification.	see note 1
5.2.8.1	1.3.8	a		see note 4
5.2.8.2	1.3.8.1		Recommendation.	see note 1
5.2.8.2.1	1.3.8.1	a		see note 4
5.2.9	1.3.9		Null reservation protocol specification.	see note 1
5.2.9.1	1.3.9.1		Null reservation burst format.	see note 1
5.2.9.1.1	1.3.9.1	a		Null_Reservation
5.2.9.1.2	1.3.9.1	b		see note 1a
5.2.10	1.3.10		Periodic broadcast protocol specification.	see note 1

Requirement reference	Reference in [1]	Req	Title	Test Case
5.2.10.1	1.3.10.1		Periodic broadcast reservation burst format.	see note 1
5.2.10.1.1	1.3.10.1	a		Periodic_NonDither_Res Periodic_DitherRes
5.2.10.1.2	1.3.10.1	b		see note 1a
5.2.10.1.3	1.3.10.1	c		Periodic_DitherRes
5.2.10.1.4	1.3.10.1	d		Periodic_NonDitherRes
5.2.10.2	1.3.10.2		Periodic broadcast timers.	see note 1
5.2.10.2.1	1.3.10.2.1	a		see note 2
5.2.10.2.2	1.3.10.2.1	b		Periodic_IndependentStreams
5.2.10.3	1.3.10.3		Periodic broadcast parameters.	see note 1
5.2.10.3.1	1.3.10.3	a		see note 2
5.2.10.3.2	1.3.10.3	b		see note 2
5.2.10.3.3	1.3.10.3	c		see note 2
5.2.10.3.4	1.3.10.3.1	a		Periodic_TV11
5.2.10.3.5	1.3.10.3.2	a		Periodic_Rate
5.2.10.3.6	1.3.10.3.3	a		Periodic_DitherRange
5.2.10.3.7	1.3.10.3.3	b		Periodic_DitherRange
5.2.10.4	1.3.10.4		Periodic broadcast reception procedures.	see note 1
5.2.10.4.1	1.3.10.4	a		Periodic_NonDitherRes Periodic_DitherRes Periodic_Cancel
5.2.10.4.2	1.3.10.4	b		see note 1a
5.2.10.4.3	1.3.10.4	c		Periodic_Replacement
5.2.10.4.4	1.3.10.4	d		Periodic_CancelIncremental Periodic_CancelUnicast
5.2.10.5	1.3.10.5		Periodic broadcast transmission procedures.	see note 1
5.2.10.5.1	1.3.10.5.1	a		Periodic_Rate Sync_Interval
5.2.10.5.2	1.3.10.5.1	b		see note 2
5.2.10.5.3	1.3.10.5.2	a		Periodic_Rate
5.2.10.5.4	1.3.10.5.2	b		Periodic_DitherRange Periodic_SlotSel_A
5.2.10.5.5	1.3.10.5.2	c		Periodic_SlotSel_B
5.2.10.5.6	1.3.10.5.3	a		see note 2
5.2.10.5.7	1.3.10.5.3	b		see note 2
5.2.10.5.8	1.3.10.5.3	c		Periodic_Availability_A Periodic_Availability_B
5.2.10.5.9	1.3.10.5.3	d		Periodic_Availability_A
5.2.10.5.10	1.3.10.5.3	e		Periodic_Availability_B
5.2.10.5.11	1.3.10.5.4	a		Periodic_TV11
5.2.10.5.12	1.3.10.5.5	a		Periodic_InitialRes
5.2.10.5.13	1.3.10.5.5	b		Periodic_InitialRes
5.2.10.5.14	1.3.10.5.6	a		Periodic_DitherOffset_A
5.2.10.5.15	1.3.10.5.6	b		Periodic_DitherOffset_B
5.2.10.5.16	1.3.10.5.6	c		Periodic_DitherRange Periodic_DitherOffset_C
5.2.10.5.17	1.3.10.5.7	a		Periodic_DitherOffset_B
5.2.10.5.18	1.3.10.5.7	b		see note 2
5.2.10.5.19	1.3.10.5.7	c		Periodic_InitialRes
5.2.10.5.20	1.3.10.5.8	a		see note 2
5.2.10.5.21	1.3.10.5.8	b		Periodic_DitherOffset_D
5.2.10.5.22	1.3.10.5.8	c		Periodic_Availability_A Periodic_Availability_B
5.2.10.5.23	1.3.10.5.8	d		see note 2
5.2.10.5.24	1.3.10.5.9	a		see note 2
5.2.10.5.25	1.3.10.5.9	b		Periodic_Cancel
5.2.11	1.3.11		Incremental broadcast protocol specification.	see note 1
5.2.11.1	1.3.11.1		Incremental broadcast reservation burst format.	see note 1
5.2.11.1.1	1.3.11.1	a		Incremental_Reservation_A
5.2.11.1.2	1.3.11.1	b		see note 1a
5.2.11.1.3	1.3.11.1	c		see note 1a
5.2.11.1.4	1.3.11.1	d		Incremental_Reservation_A
5.2.11.2	1.3.11.2		Incremental broadcast parameters.	see note 1

Requirement reference	Reference in [1]	Req	Title	Test Case
5.2.11.2.1	1.3.11.2	a		see note 2
5.2.11.2.2	1.3.11.2	b		see note 2
5.2.11.2.3	1.3.11.2.1	a		Incremental_Request
5.2.11.2.4	1.3.11.2.2	a		Incremental_Request
5.2.11.2.5	1.3.11.2.2	b		Incremental_Request
5.2.11.3	1.3.11.3		Incremental broadcast reception procedures.	see note 1
5.2.11.3.1	1.3.11.3	a		Incremental_Reservation_A
5.2.11.3.2	1.3.11.3	b		Incremental_Reservation_B
5.2.11.4	1.3.11.4		Incremental broadcast transmission procedures.	see note 1
5.2.11.4.1	1.3.11.4.1	a		see note 2
5.2.11.4.2	1.3.11.4.1	b		see note 1a
5.2.11.4.3	1.3.11.4.2	a		Incremental_SlotSel
5.2.11.4.4	1.3.11.4.2	b		see note 1a
5.2.11.4.5	1.3.11.4.3	a		Incremental_Request
5.2.12	1.3.12		Combined periodic broadcast and incremental broadcast protocol specification.	see note 1
5.2.12.1	1.3.12.1		Combined periodic broadcast and incremental broadcast reservation burst.	see note 1
5.2.12.1.1	1.3.12.1	a		Combined_Reservation NetEntry_Periodic
5.2.12.1.2	1.3.12.1	b		see note 1a
5.2.12.1.3	1.3.12.1	c		see note 1a
5.2.12.1.4	1.3.12.1	d		see note 1a
5.2.12.1.5	1.3.12.1	e		Combined_Reservation
5.2.13	1.3.13		Big negative dither (BND) broadcast protocol specifications.	see note 1
5.2.13.1	1.3.13.1		BND reservation burst format	see note 1
5.2.13.1.1	1.3.13.1	a		BND_Reservation
5.2.13.1.2	1.3.13.1	b		see note 1a
5.2.13.2	1.3.13.2		BND broadcast parameters.	see note 1
5.2.13.2.1	1.3.13.2	a		see note 1a
5.2.13.3	1.3.13.3		BND broadcast reception procedures.	see note 1
5.2.13.3.1	1.3.13.3	a		BND_Reservation
5.2.14	1.3.14		Unicast request protocol specification.	see note 1
5.2.14.1	1.3.14.1		Unicast request reservation burst format.	see note 1
5.2.14.1.1	1.3.14.1	a		Unicast_Reservation_A
5.2.14.1.2	1.3.14.1	c		see note 1a
5.2.14.1.3	1.3.14.1	d		see note 1a
5.2.14.1.4	1.3.14.1	e		see note 1a
5.2.14.1.5	1.3.14.1	f		see note 1a
5.2.14.2	1.3.14.3		Unicast request reception procedures.	see note 1
5.2.14.2.1	1.3.14.3	a		Unicast_Reservation_A Unicast_Reservation_B Unicast_Reservation_C
5.2.15	1.3.15		Information transfer request protocol specification.	see note 1
5.2.15.1	1.3.15.1		Information transfer request reservation burst format.	see note 1
5.2.15.1.1	1.3.15.1	a		Info_Reservation
5.2.15.1.2	1.3.15.1	b		see note 1a
5.2.15.1.3	1.3.15.1	c		see note 1a
5.2.15.2	1.3.15.3		Information transfer request reception procedures.	see note 1
5.2.15.2.1	1.3.15.3	a		Info_Reservation
5.2.15.2.2	1.3.15.3	b		Info_Reservation
5.2.16	1.3.16		Directed request protocol specification.	see note 1
5.2.16.1	1.3.16.1		Directed request reservation burst format.	see note 1
5.2.16.1.1	1.3.16.1	a		Autotune_Reservation
5.2.16.1.2	1.3.16.1	b		see note 2
5.2.16.1.3	1.3.16.1	c		see note 1a
5.2.16.1.4	1.3.16.1	d		see note 1a
5.2.16.1.5	1.3.16.1	e		see note 1a
5.2.16.1.6	1.3.16.1	f		see note 1a

Requirement reference	Reference in [1]	Req	Title	Test Case
5.2.16.1.7	1.3.16.1.1	a		see note 1a
5.2.16.1.8	1.3.16.1.1	b		see note 1a
5.2.16.1.9	1.3.16.1.1	c		PleaResponse_Reservation_A PleaResponse_Reservation_B
5.2.16.1.10	1.3.16.1.2	a		see note 1a
5.2.16.1.11	1.3.16.1.2	b		see note 1a
5.2.16.1.12	1.3.16.1.2	c		see note 1a
5.2.16.2	1.3.16.2		Directed request parameters.	see note 1
5.2.16.2.1	1.3.16.2	a		see note 2
5.2.16.2.2	1.3.16.2	b		see note 2
5.2.16.2.3	1.3.16.2.1	a		see note 1a
5.2.16.3	1.3.16.3		Directed request reception procedures.	see note 1
5.2.16.3.1	1.3.16.3.1	a		Autotune_Reservation Autotune_CancelAbsent
5.2.16.3.2	1.3.16.3.1	c		Autotune_Invalid_B
5.2.16.3.3	1.3.16.3.2	a		PleaResponse_Reservation_A PleaResponse_Reservation_B
5.2.16.3.4	1.3.16.3.2	b		PleaResponse_Reservation_A
5.2.16.3.5	1.3.16.3.2	c		PleaResponse_Reservation_B
5.2.16.4	1.3.16.4		Directed request transmission procedures.	see note 1
5.2.16.4.1	1.3.16.4.1	a		see note 4
5.2.16.4.2	1.3.16.4.1	b		see note 4
5.2.16.4.3	1.3.16.4.2	a		see note 4
5.2.16.4.4	1.3.16.4.2	b		see note 4
5.2.16.4.5	1.3.16.4.3	a		PleaResponse_Retransmission
5.2.16.4.6	1.3.16.4.3	b		see note 4
5.2.16.4.7	1.3.16.4.4	a		see note 4
5.2.16.4.8	1.3.16.4.4	b		see note 4
5.2.16.4.9	1.3.16.4.5	a		PleaResponse_Transmission_A
5.2.16.4.10	1.3.16.4.5	b		PleaResponse_Transmission_A
5.2.16.4.11	1.3.16.4.5	c		see note 2
5.2.16.4.12	1.3.16.4.5	d		PleaResponse_Transmission_B
5.2.16.4.13	1.3.16.5.1.1	a		see note 4
5.2.17	1.3.17		Block reservation protocols specification.	see note 1
5.2.17.1	1.3.17.1		Superframe block reservation burst format.	see note 1
5.2.17.1.1	1.3.17.1	a		see note 4
5.2.17.1.2	1.3.17.1	b		see note 1a
5.2.17.1.3	1.3.17.1	c		see note 1
5.2.17.2	1.3.17.2		Second frame block reservation burst format.	see note 1
5.2.17.2.1	1.3.17.2	a		see note 4
5.2.17.2.2	1.3.17.2	b		see note 1a
5.2.17.3	1.3.17.3		Superframe block reservation parameters.	see note 1
5.2.17.3.1	1.3.17.3	a		see note 4
5.2.17.3.2	1.3.17.3	b		see note 4
5.2.17.3.3	1.3.17.3	c		see note 4
5.2.17.3.4	1.3.17.3	d		see note 4
5.2.17.3.5	1.3.17.3.1	a		see note 4
5.2.17.3.6	1.3.17.3.2	a		see note 4
5.2.17.3.7	1.3.17.3.3	a		see note 4
5.2.17.3.8	1.3.17.3.4	a		see note 4
5.2.17.3.9	1.3.17.3.5	a		see note 4
5.2.17.4	1.3.17.4		Superframe block reservation reception procedures.	see note 1
5.2.17.4.1	1.3.17.4	a		see note 4
5.2.17.5	1.3.17.5		Second frame block reservation parameters.	see note 1
5.2.17.5.1	1.3.17.5	a		see note 4
5.2.17.5.2	1.3.17.5	b		see note 4
5.2.17.5.3	1.3.17.5.2	a		see note 4
5.2.17.5.4	1.3.17.5.3	a		see note 4
5.2.17.6	1.3.17.6		Second frame block reservation reception procedures.	see note 1
5.2.17.6.1	1.3.17.6	a		see note 4
5.2.17.7	1.3.17.7		Superframe block reservation transmission procedures.	see note 1

Requirement reference	Reference in [1]	Req	Title	Test Case
5.2.17.7.1	1.3.17.7.1	a		see note 4
5.2.17.7.2	1.3.17.7.2	a		see note 4
5.2.17.7.3	1.3.17.7.2	b		see note 4
5.2.17.7.4	1.3.17.7.2	c		see note 4
5.2.17.7.5	1.3.17.7.2	d		see note 4
5.2.17.7.6	1.3.17.7.3	a		see note 4
5.2.17.7.7	1.3.17.7.3	b		see note 4
5.2.17.7.8	1.3.17.7.4	a		see note 4
5.2.17.7.9	1.3.17.7.4	b		see note 4
5.2.17.7.10	1.3.17.7.4	c		see note 4
5.2.17.7.11	1.3.17.7.4	d		see note 4
5.2.17.8	1.3.17.9		Second frame block reservation transmission procedures.	see note 1
5.2.17.8.1	1.3.17.9.1	a		see note 4
5.2.17.8.2	1.3.17.9.2	a		see note 4
5.2.17.8.3	1.3.17.9.2	b		see note 4
5.2.18	1.3.18		Response protocol specification.	see note 1
5.2.18.1	1.3.18.1		Response burst format.	see note 1
5.2.18.1.1	1.3.18.1	a		Response_Reservation
5.2.18.1.2	1.3.18.1	b		Response_Reservation
5.2.18.1.3	1.3.18.1	c		see note 2
5.2.18.1.4	1.3.18.1	d		Response_Reservation
5.2.18.1.5	1.3.18.1	e		see note 2
5.2.19	1.3.19		General request protocol specification.	see note 1
5.2.19.1	1.3.19.1		General request burst format.	see note 1
5.2.19.1.1	1.3.19.1	a		see note 4
5.2.19.1.2	1.3.19.1	b		see note 4
5.2.19.1.3	1.3.19.1	bb		see note 2
5.2.19.1.4	1.3.19.1	c		see note 1a
5.2.19.1.5	1.3.19.1	d		see note 2
5.2.19.2	1.3.19.2		General request procedures.	see note 1
5.2.19.2.1	1.3.19.2.1	a		see note 4
5.2.19.2.2	1.3.19.2.1	b		see note 4
5.2.19.2.3	1.3.19.2.1	c		see note 4
5.2.20	1.3.20		General response protocol specification.	see note 1
5.2.20.1	1.3.20.1		General response burst format.	see note 1
5.2.20.1.1	1.3.20.1	a		Request_Unsupported
5.2.20.1.2	1.3.20.1	b		Request_Unsupported
5.2.20.1.3	1.3.20.1	c		Request_Unsupported
5.2.20.1.4	1.3.20.1	d		Request_Unsupported
5.2.20.1.5	1.3.20.1	e		Request_Unsupported
5.2.20.1.6	1.3.20.1	f		see note 2
5.2.20.1.7	1.3.20.1	g		see note 2
5.2.20.1.8	1.3.20.1	h		Request_Unsupported
5.2.20.1.9	1.3.20.1	i		see note 1a
5.2.20.2	1.3.20.2		General response procedures.	see note 1
5.2.20.2.1	1.3.20.2	a		see note 2
5.2.20.2.2	1.3.20.2	b		see note 2
5.3	1.5		Link Management Entity sublayer.	see note 1
5.3.1	1.5.1		Services.	see note 1
5.3.1.1	1.5.1	a		see note 4
5.3.2	1.5.2		Synchronization burst format.	see note 1
5.3.2.1	1.5.2	a		Sync_Format
5.3.2.2	1.5.2.1		Fixed and variable data fields.	see note 1
5.3.2.2.1	1.5.2.1	a		see note 1a
5.3.2.3	1.5.2.2		Fixed data field format.	see note 1
5.3.2.3.1	1.5.2.2	a		Sync_Format
5.3.2.3.2	1.5.2.2	b		Sync_Fixed_Nucp Sync_Fixed_BaseAlt Sync_Fixed_DataAge CPR_Encode CPR_Decode

Requirement reference	Reference in [1]	Req	Title	Test Case
5.3.2.3.3	1.5.2.2	c		see note 1a
5.3.2.3.4	1.5.2.2	d		see note 1a
5.3.2.3.5	1.5.2.2	e		see note 1a
5.3.2.3.6	1.5.2.2	f		see note 1a
5.3.2.3.7	1.5.2.2	g		see note 1a
5.3.2.3.8	1.5.2.2	h		see note 1a
5.3.2.3.9	1.5.2.2	i		see note 1a
5.3.2.3.10	1.5.2.2	j		Sync_Fixed_Nucp
5.3.2.3.11	1.5.2.2	k		Sync_Fixed_BaseAlt
5.3.2.3.12	1.5.2.2	l		Sync_Fixed_DataAge
5.3.2.3.13	1.5.2.2	m		Sync_Fixed_Nucp
5.3.2.4	1.5.2.3		Variable data field format.	see note 1
5.3.2.4.1	1.5.2.3	a		see note 2
5.3.2.4.2	1.5.2.3	b		see note 2
5.3.2.4.3	1.5.2.3	c		see note 2
5.3.2.5	1.5.2.4		Synchronization burst request.	see note 1
5.3.2.5.1	1.5.2.4	a		see note 2
5.3.2.6	1.5.3.2		XID burst.	see note 1
5.3.2.6.1	1.5.3.2	a		see note 4
5.3.2.6.2	1.5.3.2	b		see note 1a
5.3.2.6.3	1.5.3.2	c		see note 1a
5.3.2.6.4	1.5.3.2	l		see note 1a
5.3.2.6.5	1.5.3.2	m		see note 1a
5.3.3	1.5.4		Exchange identity (XID) parameter formats.	see note 1
5.3.3.1.1	1.5.4.3.2	a		see note 4
5.3.3.1.2	1.5.4.3.3	a		see note 4
5.3.3.1.3	1.5.4.3.4	a		see note 4
5.3.3.1.4	1.5.4.3.5	a		see note 4
5.3.3.1.5	1.5.4.3.6	a		see note 1a
5.3.3.1.6	1.5.4.3.6	b		see note 4
5.3.3.1.7	1.5.4.3.6	c		see note 4
5.3.3.1.8	1.5.4.3.7	a		see note 1a
5.3.3.1.9	1.5.4.3.7	b		see note 2
5.3.3.1.10	1.5.4.3.7	c		see note 4
5.3.3.1.11	1.5.4.3.7	d		see note 2
5.3.3.1.12	1.5.4.3.7	e		see note 4
5.3.3.1.13	1.5.4.3.7	f		see note 4
5.3.3.1.14	1.5.4.3.7	g		see note 4
5.3.3.1.15	1.5.4.4.2	a		see note 1a
5.3.3.1.16	1.5.4.4.2	b		see note 1a
5.3.3.1.17	1.5.4.4.2	c		see note 1a
5.3.3.1.18	1.5.4.4.2	d		see note 1a
5.3.3.1.19	1.5.4.4.2	e		see note 1a
5.3.3.1.20	1.5.4.4.2	f		see note 1a
5.3.3.1.21	1.5.4.4.2	g		see note 2
5.3.3.1.22	1.5.4.4.2	h		see note 2
5.3.3.1.23	1.5.4.4.2	i		see note 2
5.3.3.1.24	1.5.4.4.2	j		see note 2
5.3.4	1.5.6		LME procedures.	see note 1
5.3.4.1	1.5.6.1		Synchronization burst procedures.	see note 1
5.3.4.1.1	1.5.6.1	a		Sync_Format
5.3.4.1.2	1.5.6.1	b		Sync_Latency
5.3.4.1.3	1.5.6.1	c		see note 2
5.3.4.1.4	1.5.6.1	d		Sync_Format
5.3.4.1.5	1.5.6.1.1	b		see note 2
5.3.4.1.6	1.5.6.1.2	a		Sync_Rate
5.3.4.1.7	1.5.6.1.2	b		Sync_Format
5.3.4.1.8	1.5.6.1.3.1	a		
5.3.4.1.9	1.5.6.1.4	a		Conflict_Periodic_B Conflict_NoAction
5.3.4.2	1.5.6.3		Network entry protocol specifications.	see note 1
5.3.4.2.1	1.5.6.3.1.3	a		see note 2
5.3.4.2.2	1.5.6.3.1.3	b		see note 2

Requirement reference	Reference in [1]	Req	Title	Test Case
5.3.4.2.3	1.5.6.3.1.3	c		see note 2
5.3.4.2.4	1.5.6.3.2	a		NetEntry_OneMinute
5.3.4.2.5	1.5.6.3.3.2	a		see note 2
5.3.4.2.6	1.5.6.3.3.2	b		NetEntry_Receive
5.3.4.2.7	1.5.6.3.3.2	c		see note 2
5.3.4.2.8	1.5.6.3.3.2	d		see note 2
5.3.4.2.9	1.5.6.3.3.2	e		see note 2
5.3.4.2.10	1.5.6.3.3.3	a		see note 4
5.3.4.2.11	1.5.6.3.3.3	b		see note 4
5.3.4.2.12	1.5.6.3.3.3	d		see note 4
5.3.4.2.13	1.5.6.3.5	a		NetEntry_OneMinute
[1], clause 3.4	3		Additional material for ADS-B applications.	see note 2
[1], clause 4	4		Definitions for compact position reporting.	CPR_Encode CPR_Decode

Annex B (informative): Description of ISO 9646 Test Methodology

B.1 Overview of the Structure of the ISO 9646 Test-Suites

A test-suite covers all tests required to test a piece of equipment. In the ISO/IEC 9646 [8] sense it should consist of the following elements:

Test-Suite Overview

The Test-Suite Overview presents the general structure of the test-suite. This part primarily contains an index in which the reference between the requirements and the related test cases is outlined.

Declarations Part

The Declarations Part outlines the test environment. Here the test equipment is defined. It also introduces the Points of Control and Observation (PCOs). These points are defined in the test setup where stimuli are injected and were the test results are observed.

Constraints Part

The Constraints Part contains the definitions of the packets and parameters which are used in the test steps. The individual fields of the packets are defined there.

Detailed Test Cases (Dynamic Part)

The Detailed Test Cases Part provides the actual test cases. Each test case is designed for the verification of a distinct function of the test object. In order to allow the performance of individual test cases in any sequence, the test cases are designed to be independent from the history of the test campaign (i.e. they contain all necessary steps required to reach the test objective). Each test case therefore starts at a well defined idle state of the test object. In order to avoid effects on successive test cases each test case must leave the test object in the defined idle state after the execution of the test case.

A test case consists of a sequence of test steps. Some steps in the beginning of the test case are required to prepare the test object for the actual verification. These steps form the preamble of the test case. The successive steps which perform the actual verification belong to the test body. The steps which bring the equipment under test back to the defined idle state make up the postamble.

B.2 The Test Case Description

ISO/IEC 9646 [8] provides a formal syntax to describe test-suites for communication equipment. This syntax is called the Tree and Tabular Combined Notation (TTCN). The use of TTCN is recommended by ISO/IEC 9646 [8] but not mandated. TTCN is a powerful semi-formal language defined to facilitate computerized test tools for any kind of communication equipment. However, TTCN is, due to its abstractness, not so human friendly as plain text. In order to keep the test cases readable to a maximum extent while making them as formal as necessary, it has been decided to use a simpler formal notation in the description of the test cases.

A more comprehensive description of the syntax follows on the next pages. It is important for the understanding of the test cases to be familiar with the syntax. The following table defines the meaning of entries in individual test cases.

Meaning of entries in the test case table:

Table B.1

field name	Description	
Test Case Name	the name of the test case. This name is used to reference a specific test case in the test-suite.	
Long Designator	the long designator directly following the test case name provides the test case scope.	
Purpose	describes the intention of the test case	
Reference	provides the reference to the clauses of the requirements which are addressed by the tests.	
Context	indicates which part of the test case is executed. The following entries are foreseen:	
	preamble:	in this part of the test case the equipment under test is brought into an appropriate state to begin the actual verification
	test body:	in this part of the test case the actual test steps required for the verification objective are executed
	postamble:	in this part of the test case the equipment under test is brought into the defined idle state
Step	numbers the individual test steps	
Action	holds the action to be performed during the test.	
	send:	send a the specified entity
	queue:	maintain a queue for input at the specified PCO, respecting any local flow control procedures, so that at least one of the specified entity is always available
	verify:	verify that a result matches a given outcome (if an outcome is not observed, then the test has failed and the test case must be abandoned !)
	record:	record a value
	await:	wait until a certain event takes place (the test step has failed if more than 30 s expire before the event is observed !)
	wait:	wait a specified time
	macro:	execute a named macro
	do:	do something special which is described in the Action Qualifier column
	rep*x:* endrep:	repeat the following steps x times in a loop indicates the end of the loop statements
	rep*x:* until:	repeat the following steps in a loop until a condition is true indicates the end of the loop statements and holds the termination condition
PCO	Point of Control and Observation, which indicates where in the test setup the action shall be performed. The following entries are used:	
	RF	RF antenna connection
	Timing	Timing source input
	Position	Position source input
	Altitude	Altitude source input
	VSS	VSS user
	App in	Application data input
	App out	Application data output
	Self test	Self test passed indication

field name	description	
Action Qualifier	further qualifies the action. It either holds one or more of the entries shown below:	
		the transaction type to be used together with specific field values. Principally the field values are those presented in the constraints clause. Different field values are stated explicitly like (LCI:= 316 or UD:= [5]{1...5}). The content of data fields which normally consist of several bytes is written like: [n]{val} (e.g. [20]{85}): n bytes with byte value val (decimal values only) [n]{n1...n2} (e.g. [128]{0...127}): n bytes in ascending order from n1 to n2 (decimal values only) [n]{k1,k2,k3,k4,...,kn} (e.g. [5]{4,6,8,10,12}): n bytes according to explicit list (decimal values only)
		the name of a macro plus one or more parameter values required by the macro like: M-NAME (LCI:= 316,CH:= 15)
		a time to wait
		none, timeout = x s no event to be expected, do not wait longer than x s
		an event to await
		parameters of a rep construct in the row with action rep*x* or endrep
		any free text which further qualifies the action
	if alternative events are expected in one test step, then they are presented in individual lines but in one row of the table (i.e. only one step number is allocated). Two different cases need to be distinguished: 1) Several events stated in one row without an additional keyword must all appear. Any sequence of the results is valid. 2) Several events combined with an OR may appear alternatively either one or more. Any sequence of the results is valid.	
Ref	A reference to the definition of a basic version of a packet as described in the constraints clause	
Comment	a comment which adds information for understanding of the actual step	
Comments	Overall Comments on the test case, if necessary	

B.3 The Queue Action

The action "queue" is applied to the VSS User PCO to maintain a constant stream of random access requests. Each request represents a discrete request and results in a single burst with a transmitter ramp up and down at the start and end of the burst. It is not expected that the item under test should be capable of buffering all the random access transmissions demanded by this procedure. The test set should provide a suitable mechanism (e.g. buffer) to maintain a stream of inputs through the VSS User PCO, subject only to the flow control imposed by the item under test.

B.4 The Repeat Construct

To express test steps which need to be executed repetitively in a loop, the repeat construct is used. A repeat construct consists of the two delimiting keywords:

- **rep*x*** and
- **endrep**.

In this the parameter "x" stands for the number of loops to be performed. "x" may either be an integer constant or an integer expression. In order to provide the test steps of the loop with possibly required variables, an arbitrary number of variables may be initialized in the Action Qualifier column in the row of the **rep*x*** keyword like:

```
n:= 1;

p( ): =
        {
            CALL REQUEST;
            RECEIVE NOT READY;
            CLEAR REQUEST
        }
```

In the above statements n is initialized to 1. In the second line a vector p( ), holding packets to be used during the loop, is Initialized. Each element of the vector may be addressed by an integer index. The first element is addressed by the index 1.

A **rep** statement is used to prepare for a loop of successive statements. There is no test step executed in the rep statement line itself. The loop defined by rep and endrep actually begins in the line following the rep statement line (i.e. the initialization in the rep statement line is only performed once !).

In most loops certain variables need to be modified while the loop is performed several times. The modification is stated by one ore more equation(s) in the **endrep** line, like:

```
n:= n + 1; i:= i -1
```

Nested loops are allowed.

An alternative to the repeat construct which ends after a certain number of loops have been performed is the **repeat until** construct, which consists of the two delimiting keywords:

- **rep*x*** and
- **until.**

In the line with the keyword until the condition is mentioned which terminates the loop. This condition is enclosed by brackets ( ).The parameter x may still be used to indicate a maximum number of loops to be performed. This allows to terminate possible endless loops if the termination condition is not reached due to an error. In such a case the test has failed and must be abandoned!

B.5 Macro Definitions

Macros are used to express sequences of steps which are used frequently. A macro may not include verification statements. A macro name is preceded by 'M-' for distinction from normal test cases. Macros may be called with parameters. The parameters are mentioned in ( ) behind the macro name the macro is called.

B.6 Test Case Naming

The individual test cases are named for reference. In order to obtain a systematic name, the name is composed in a hierarchical manner, with subsidiary naming levels separated by the underscore character.

List of tables

History

Document history				
V1.1.1	December 2001	Public Enquiry	PE 20020426:	2001-12-26 to 2002-04-26
V1.1.1	June 2002	Vote	V 20020802:	2002-06-03 to 2002-08-02
V1.1.1	August 2002	Publication		