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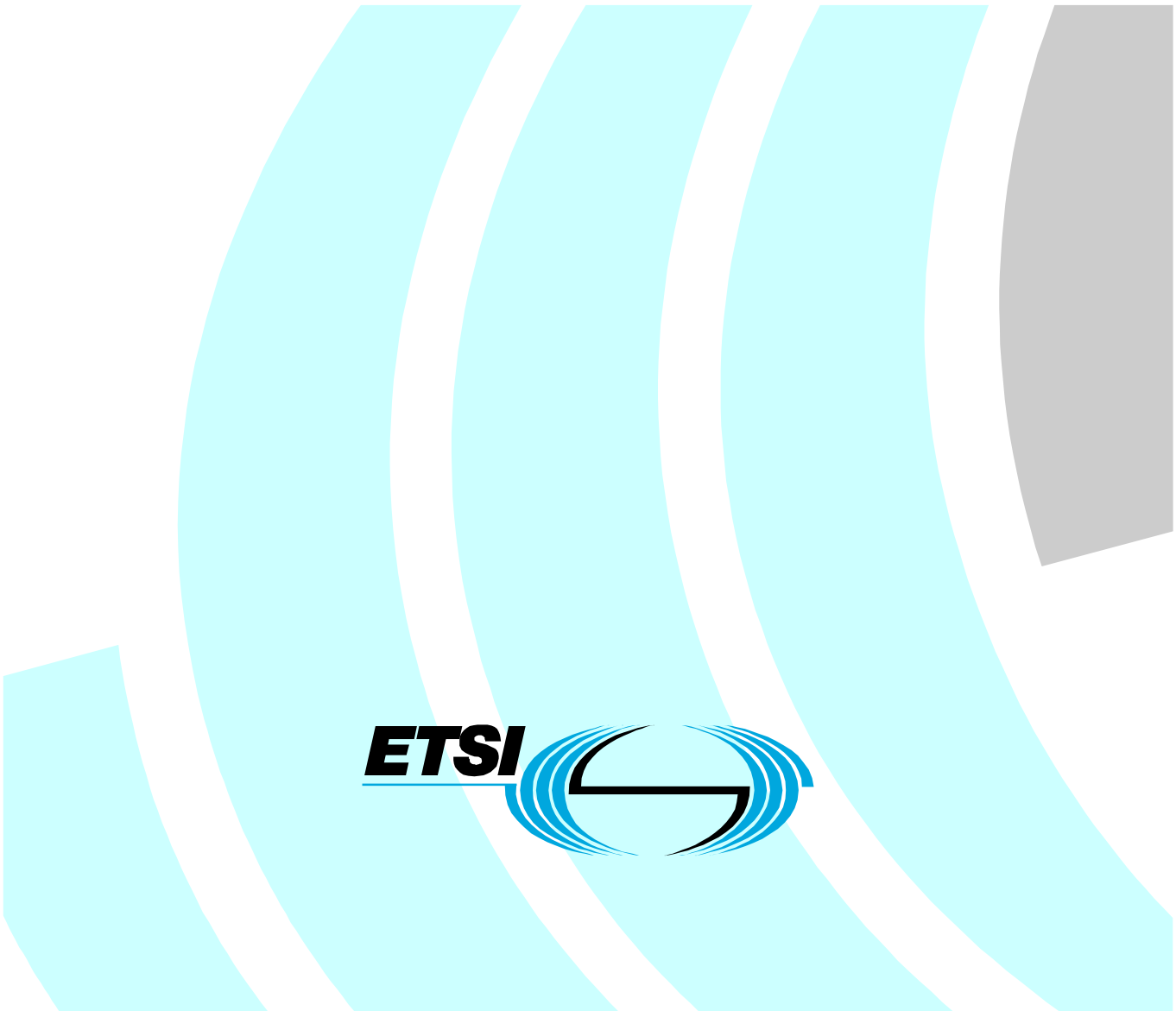
European Standard (Telecommunications series)

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 4: Point-to-point functions



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Contents

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Foreword

This European Standard (Telecommunications series) has been produced by ETSI Technical Committee Electromagnetic compatibility and Radio spectrum Matters (ERM), and is now submitted for the Public Enquiry phase of the ETSI standards Two-step Approval Procedure.

The present document is part 4 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".

The present document is accompanied by an equivalent airborne standard, EN 302 842 Parts 1 to 4, covering the VHF air-ground Data Link (VDL) Mode 4 radio equipment; Technical characteristics and methods of measurement for airborne equipment.

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

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 112,000 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 [2], EN 301 842-1 [4] and EN 301 842-2 [5].

1 Scope

The present document provides part 3 of the technical specifications for Very High Frequency (VHF) Digital Link (VDL) Mode 4 ground-based radio transmitters 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, ground stations and receivers may tune between 112,000 MHz to 117,975 MHz. [1].

A description of the scope of the VDL Mode 4 system is provided in part 2 of these technical specifications (see EN 301 842-2 [5] clause 1).

EN 301 842-1 [4] deals with tests of the physical layer, EN 301 842-2 [5] deals with core link layer functionality and EN 301 842-3 [6] with additional broadcast functionaltiy. The present document deals with tests of the datalink layer (DLS) and the link layer sufficient to support point-to-point functionality. Note that, as described in EN 301 842-2 [5], a system supporting point-to-point functionality is required to conform to EN 301 489-22 [2], EN 301 842-1 [4], EN 301 842-2 [5] and the specification in 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 point-to-point functions;
- clause 5 performance specifications for the VDL Mode 4 ground station;
- clause 6 provides general design requirements;
- clause 7 provide protocol tests for the point-to-point 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 [1].

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 point-to-point 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.

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.

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

[1] Annex 10 to the Convention on International Civil Aviation, International Civil Aviation Organization: "Draft ICAO Manual on Detailed Technical Specifications for the VDL Mode 4 Digital Link, 25th November 2003".

[2] 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".

[3] "Manual of Technical Provisions for the Aeronautical Telecommunications Network (ATN)", ICAO Doc 9705 - AN/956, Edition 3.0, 2002.

[4] ETSI EN 301 842-1: "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".

[5] ETSI EN 301 842-2: "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".

[6] ETSI EN 301 842-3: "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 3: Additional broadcast aspects".

3 Definitions and abbreviations

3.1 Definitions

3.1.1 Basic reference model definitions

See EN 301 842-2 [5] clause 3.1.1.

3.1.2 Service conventions definitions

See EN 301 842-2 [5] clause 3.1.2.

3.1.3 General definitions

For the purposes of the present document, the terms and definitions given in EN 301 842-1 [4] clause 3.1.3, EN 301 842-2 [5] clause 3.1.3 and the following apply:

long transmission procedure: procedure that allows transfer of DATA packets in reserved slots, avoiding the loss rates and delays associated with random access

NOTE: This includes the ability to link sequences of DATA packets, providing continuous transfer in reserved slots.

More bit (M): bit that controls message fragmentation and concatenation

NOTE: It is set to zero to indicate the end of a message. It is set to 1 to indicate that it is part of a fragmented message and that there are more fragments to follow.

Network Setup Connection Oriented Protocol (NSCOP): protocol that enables a ground-air link between mobiles

priority (pr): priority of a message, or, in the case of an RTS, the priority of the requested data

short transmission procedure: procedure for the sending of a single data packet. It contains a reservation for a subsequent acknowledgement

Toggle bit (T): bit that allows detection and rejection of duplicate DLPDUs

NOTE: The T bit is alternately set to 1 and 0 on each successive DATA transmission, except for retransmissions.

Zero-Overhead Connection-Orientated Protocol (ZOCOP): protocol that enables an air-air link between mobiles

3.2 Abbreviations

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

A/A	Air/Air communications
A/G	Air/Ground communications
ACK	ACKnowledgement (burst)
ADM	ADMinistration identifier
ADS-B	Automatic Dependent Surveillance Broadcast
ARS	Administration Region Selector
ATN	Aeronautical Telecommunication Network
CPR	Compact Position Reporting
CRC	Cyclic Redundancy Code
CTRL	ConTRoL (DLPDU)
CTS	Clear To Send (burst)
DLE	Data Link Entity
DLPDU	Data Link Protocol Data Unit
DLS	Data Link Service
DM	Disconnected Mode (DLPDU)
erid	extended reservation ID
FCS	Frame Check Sequence
FOM	Figure Of Merit
FRMR	Frame Reject (DLPDU)
GFSK	Gaussian filtered Frequency Shift Keying
GSC	Global Signalling Channel
GSIF	Ground Station Information Frame
hex	hexadecimal
IA-5	International Alphabet 5
IB	Initialize Bit
ICAO	International Civil Aviation Organization
ID	IDentity
INFO	INFOrmation (DLPDU)
ISO	International Organization for Standardization
IS-SME	Intermediate System - System Management Entity
lg	length
LME	Link Management Entity
M	More bit
MAC	Media Access Control
MOPS	Minimum Operational Performance Specification

NETs	Network Entity Titles
NM	Nautical Mile
NSCOP	Network Setup Connection Orientated Protocol
p	priority
PCO	Point of Control and Observation
PECT	Peer Entity Contact Table
RF	Radio Frequency
rid	reservation ID
RTS	Request To Send (DLPDU)
SARPs	Standards And Recommended Practices
SNDCF	Subnetwork Dependant Convergence Function
SZOM	Start Zero Overhead Mode (DLPDU)
T	Toggle bit
TCP	Trajectory Change Point
UCTRL	Unacknowledged ConTRoL data broadcast (DLPDU)
UINFO	Unacknowledged user INFOrmation data broadcast (DLPDU)
UDATA	Unacknowledged DATA broadcast (DLPDU)
VDL	VHF Digital Link
VHF	Very High Frequency
VME	VDL Management Entity
VSS	VDL Mode 4 Specific Services
ZOCOP	Zero Overhead Connection-Orientated Protocol

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

a) bit order in each burst subfield shall be indicated by subscript numbers. Bit 1 shall indicate the least significant bit; and

b) bits shall be transmitted octet by octet, starting with the first octet in each table, and within each octet the rightmost bit (as shown in the tables) shall be transmitted first.

4 General description of VDL Mode 4 ground station point-to-point services

4.1 General

A description of VDL Mode 4 is provided in EN 301 842-2 [5]. This clause provides a description of the datalink layer and associated services of the VSS and LME required to support point-to-point communications.

The specifications in the present document provide air-to-ground and air-to-air point-to-point services based on the ICAO Technical Manual. Part 4 includes:

- Point-to-point data and control data transfer functions from the DLS.
- Point-to-point link control within the LME.

Note that the present document covers the establishment, termination and handover of links between ground stations. Decisions to establish, terminate or handover links between ground stations are local issues and beyond the scope of these specifications.

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. Requirements on airborne stations are covered in EN 302 842 Parts 1 to 4.

The scope of the present document is for a ground station supporting point-to-point applications. Hence the ability to support broadcast 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 Data Link Service (DLS) and Link Management Entity (LME)

4.2.1 General

The Data Link Service (DLS) provides a point-to-point protocol supporting both ground/air and air/air exchanges. For ground/air exchanges, connection management is handled by the LME, using a negotiated setup connection-orientated protocol (NSCOP). For air/air exchanges, the DLS defines a ZOCOP protocol with link establishment and dis-establishment controlled by timers, allowing rapid link negotiation between aircraft.

The specifications in the present document assume that VDL Mode 4 will be used with a network based on ATN protocols [3]. It should be noted that, in future, it could support other network protocols.

The DLS is a simple information exchange protocol which provides:

a) Explicit acknowledgement of each DATA packet.

b) Mechanisms to provide data transfer in reserved slots, avoiding loss rates and delays associated with random access. This includes the ability to link sequences of DATA packets, providing continuous transfer in reserved slots.

c) Packet fragmentation, to allow long user data packets to be transferred across the link in fragments optimally matched to the link conditions.

d) Duplicate detection and suppression via a simple toggle bit mechanism.

e) Explicit support for the 15 priority levels defined for the ATN, including the ability for high priority messages to be sent in the middle of a fragmented low priority message.

As illustrated in figure 4.1, the DLS:

- Provides services to external users in order to support point-to-point, multi-cast and broadcast communications.
- Provides services to the LME to support link management.
- Supports services between peer DLSs.
- Uses the services of the VSS in order to send and receive messages.

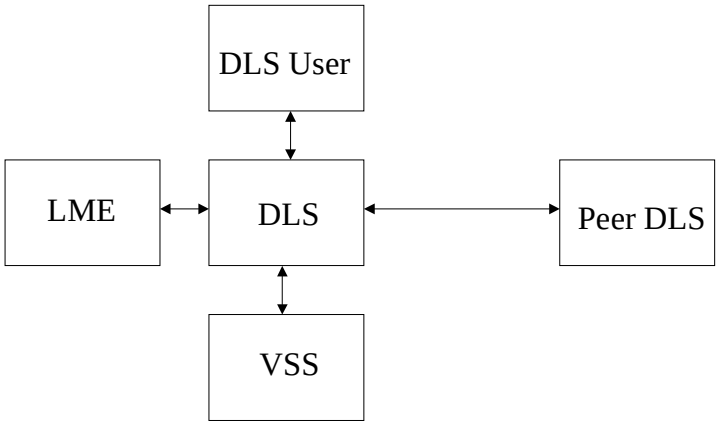


Figure 4.1: Functions of the DLS

Figure 4.2 illustrates the use of various services provided by the DLS and VSS in supporting the DLS User and the LME.

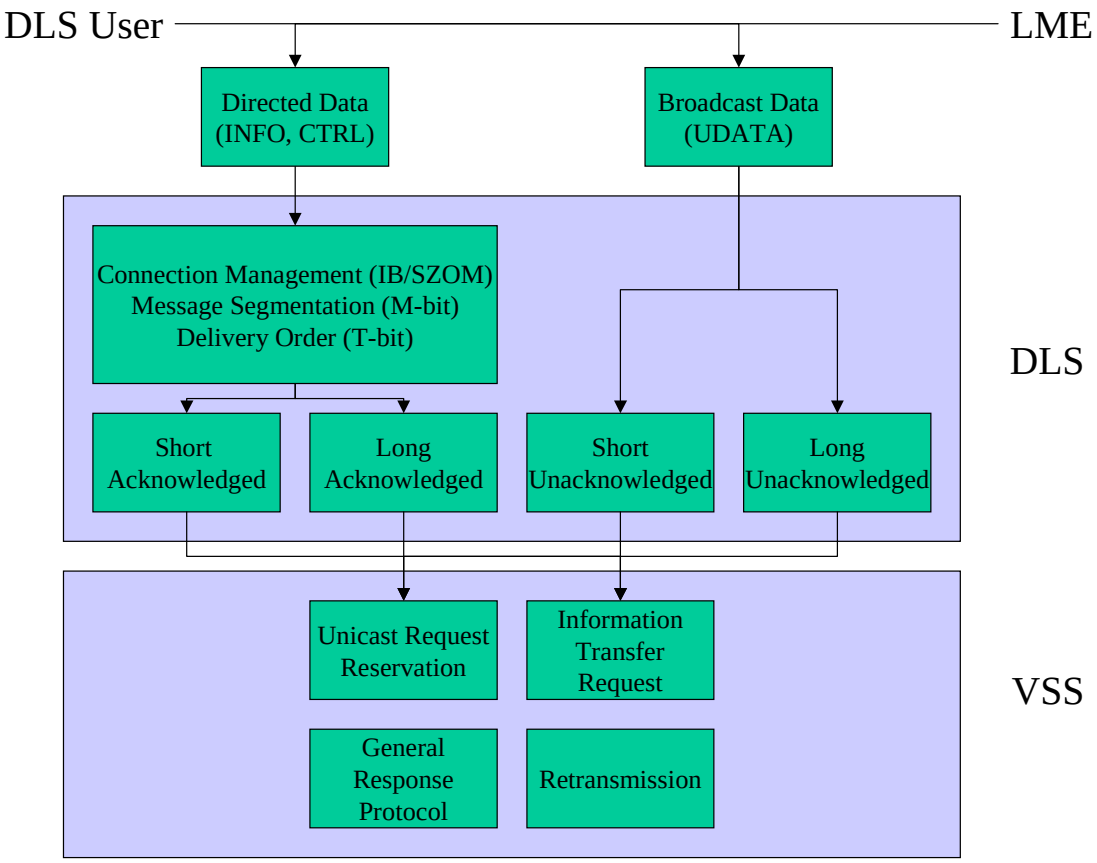


Figure 4.2: Services provided by the DLS and VSS

Protocols for short unacknowledged broadcast data have already been specified in the core link layer functionality (EN 301 842-2 [5]).

A DLS Burst consists of:

- Burst ID (fixed or variable).
- One or two DLPDUs.

The following DATA DLPDUs (data link protocol data units) are defined:

- CTRL - Used by the LME to establish and maintain links for NSCOP communication.
- INFO - Contains a user data field.
- UDATA - Enables the broadcast of user data - it is unacknowledged.

The following RTS DLPDUs are defined:

- CTRL_RTS - Sent to request the sending of link maintenance data.
- INFO_RTS - A request to send user data (for long transmission procedures).
- UDATA_RTS - A request to send broadcast data.

The following ACK, CTS and other DLS link control DLPDUs are defined:

- UDATA_CTS - This DLPDU is a clear to send in response to a UDATA_RTS.
- INFO_ACK - An acknowledgment of the previous INFO DLPDU.
- INFO_CTS - A clear to send (for long transmission procedures).
- CTRL_ACK - An acknowledgment of the previous CTRL DLPDU.
- FRMR - Used to reset the link.
- FRMR_ACK - Sent to acknowledge receipt of FRMR.
- DM/DISC (Disconnected Mode) - Used to indicate that a DLS DLPDU has been received when no link has been initialized.
- SZOM - sent in combination with an INFO, INFO_RTS or INFO_ACK to establish a link for ZOCOP communication.

The following table shows the DLS burst types.

	Toggle Bit (T)	More Bit (M)	Priority (p)	Negotiation subfield (neg)	Initialize bit IB	Length (lg)
CTRL	✓	✓				
INFO	✓	✓	✓			
UDATA						
CTRL_RTS	✓				✓	✓
INFO_RTS	✓		✓			✓
UDATA_RTS			✓			✓
UDATA_CTS						
INFO_ACK	✓					
CTRL_ACK	✓					
CTRL_CTS						
FRMR_ACK						
FRMR						
DM/DISC						
SZOM				✓		

Where:

- Toggle bit (T): This is used for duplicate detection and rejection.
- More bit (M): This is set to zero to indicate the end of a message. It is set to 1 to indicate that it is part of a fragmented message and that there are more fragments to follow.
- Priority (p): This is the priority of the message.
- Negotiation subfield (neg): This indicates the link management parameters to be used for air/air link control.
- Initialize Bit (IB): This bit causes the receiver to initialize the Tt and Tr state variables and to clear the send and receive arrays whilst processing the burst. It is set to zero and ignored on receipt unless otherwise stated.
- Length (lg): This is the length of the data message in slots.

4.2.2 DLS timers

The following timers are used in the DLS procedures:

- TD1: ZOCOP link transmit timer. This timer is reset when a burst is sent to the peer. If it expires, then Tt is set to 0 and the send channel array cleared.
- TD2: ZOCOP link receive reset timer. This timer is reset when a burst is received from the peer. If this timer expires then Tt is set to 0, the send channel array is cleared and the link is considered to be terminated.

4.2.3 DLS counters

The following counters are used in the DLS Procedures:

- ND1: Maximum number of octets that may be submitted to the DLS for transfer.
- ND2: Maximum length of a DLS transmission that may use the short transmission procedures.
- ND3: Maximum length of a fragment in slots with M-bit processing.

4.2.4 Toggle bit (T)

The T (Toggle) bit allows detection and rejection of duplicate DLPDUs. The T bit is alternately set to 1 and 0 on each successive DATA transmission, except for retransmissions. The associated RTS, CTS and ACK DLPDUs should have the same value T bit as the DATA packet.

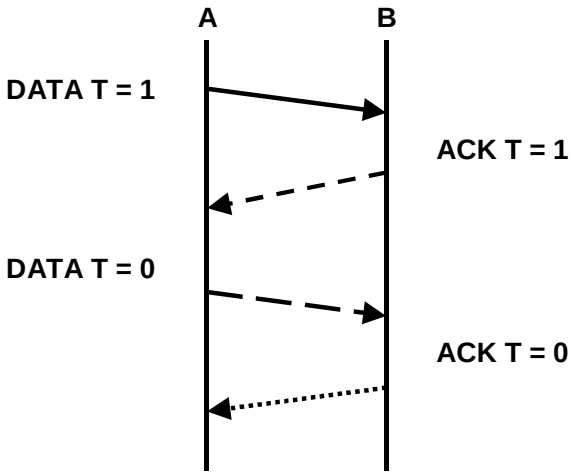


Figure 4.3: Use of the T bit in a short procedure

4.2.5 State variables (T_t and T_r)

When a message being transmitted is not the first message between the two stations, the sending station sets the T bit to the inverse value that it had for the previous message. The value it transmitted previously is stored in the state variable T_t.

The receiving station compares the value of the T bit it receives with the value it received previously, to check that the received T bit is of the correct value. The value it received previously is stored in the state variable T_r.

When the sending station receives an ACK or a CTS, it compares the value of the T bit with the value it sent, which was stored in T_t, to check that it has the correct value.

Messages may be discarded or re-sent if the T bit is found to be incorrect.

4.2.6 Initialize Bit (IB)

When the first message to another station is being transmitted, the sending station always sets the T bit to zero, and correspondingly sets its value of T_t to zero. For the first message transmitted between two stations, the receiving station should not compare the T bit it receives with a previous value of T_r.

Therefore there is an Initialize Bit (IB) in the messages, which is usually set to zero, but which for the first message is always set to 1. When the receiving station receives a message with IB = 1 and T = 0, it knows to reset its value of T_r to zero instead of performing a comparison.

4.2.7 More bit (M)

The more bit (M) controls message fragmentation and concatenation. It is set to zero to indicate the end of a message. It is set to 1 to indicate that it is part of a fragmented message and that there are more fragments to follow.

4.2.8 Priority (pr)

The priority (pr) is the priority of the message. The priority levels are defined by the Q1 quality of service parameter.

4.2.9 Message fragmentation and concatenation

If the length of the burst is longer than ND3 slots, then the sending station will fragment the message.

For single fragment messages:

- The M bit is set to zero.

For multiple fragment messages:

- The M bit is set to 1, except the last fragment, which is set to zero.

If any preceding message fragments have been received with the M bit set to 1, then the user data part of the DATA DLPDU is concatenated to the end of the message fragments.

If the M bit is set to zero then the user data part of the DATA DLPDU, along with any other message fragments received earlier, is passed to the DLS user as a single message.

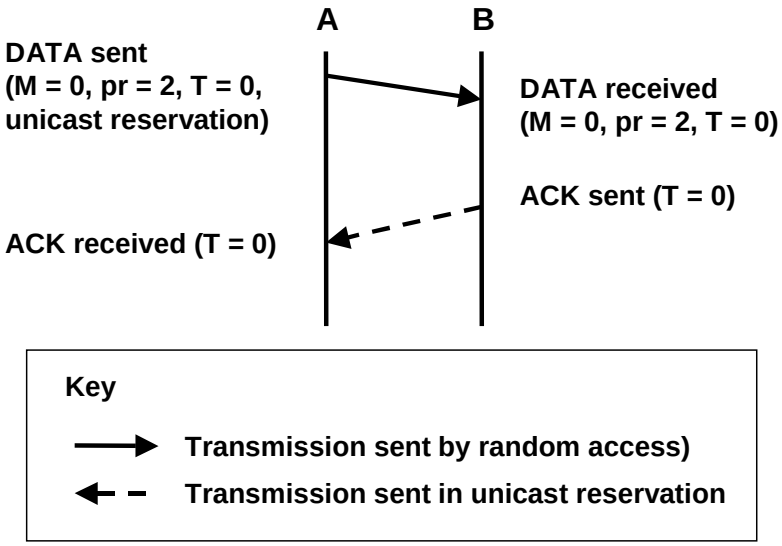
4.2.10 DLS procedures

4.2.10.1 Selection of DLS procedures

There are two types of DLS procedures, short and long. After receiving the burst (from the DLS user), the sending station calculates the total length of the transmission. If the total length is less than or equal to N3, then the station will use the short transmission procedures, otherwise, the station will use the long transmission procedures.

4.2.10.2 Short transmission procedures

The short transmission procedures involve the sending of a single data packet that contains a reservation for a subsequent acknowlegement.



NOTE: The values shown in the figure for pr and T are for the purpose of example.

Figure 4.4: Short transmission procedures

Transmission of DATA DLPDU

- The sending station transmits a burst containing a DATA DLPDU.
- The M bit is set to 0.
- The pr subfield is set to the priority of the DATA DLPDU.
- The T bit is set to 0 or 1 (inverse to previous transmission).
- The burst may include a CTRL or INFO DLPDU containing a unicast request reservation field for the acknowledgement.

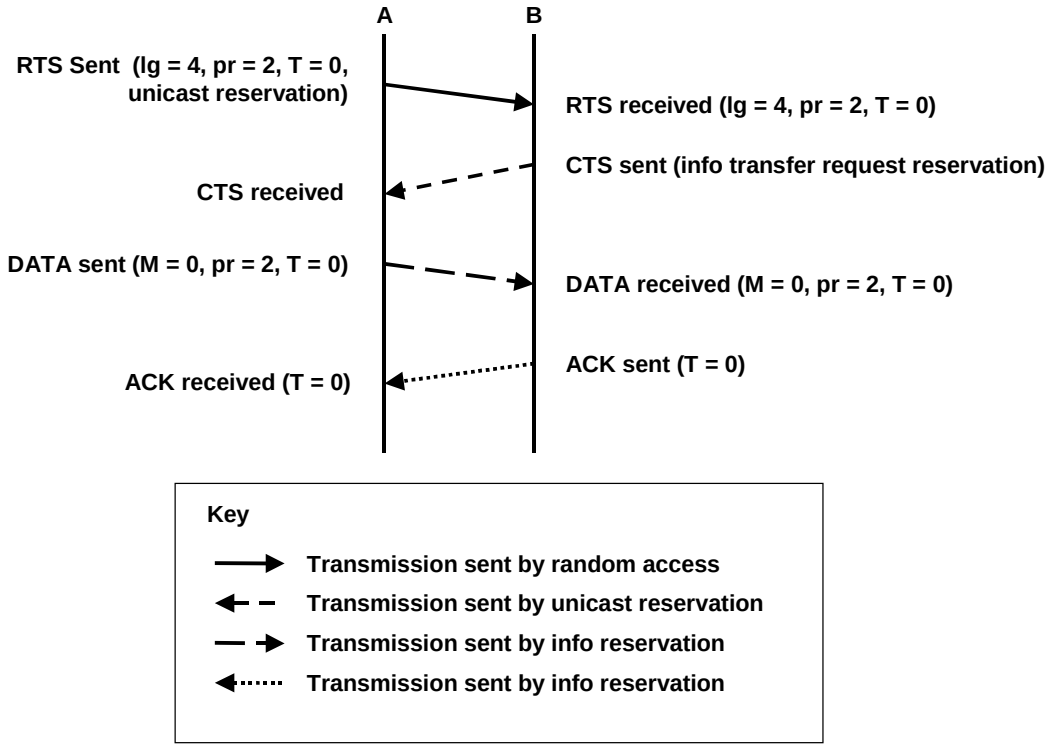
Transmission of ACK DLPDU

- The receiving station transmits a burst containing an ACK DLPDU in the slot reserved by the unicast request reservation in the received DATA DLPDU.
- The T bit is set to the value of the T bit in the received DATA DLPDU.

4.2.10.3 Long transmission procedures

The long transmission procedures allow transfer of DATA packets in reserved slots, avoiding the loss rates and delays associated with random access. This includes the ability to link sequences of DATA packets, providing continuous transfer in reserved slots.

The long transmission procedure starts with an Request-To-Send (RTS) being sent by random access. (The RTS is in general shorter than the DATA transmission so it is quicker to find an available slot for sending this by random access.). The receiving station responds by sending a Clear-To-Send (CTS), together with an information transfer request reservation - this reserves slots for the DATA from the sending station and for the subsequent ACK.



NOTE: The values shown in the figure for pr and T are for the purpose of example.

Figure 4.5: Long transmission procedures

Transmission of RTS

- The sending station transmits a burst containing an RTS DLPDU.
- The pr subfield is set to the priority of the INFO_RTS or UDATA_RTS DLPDU to be transmitted.
- The lg subfield is set to the length of the DLS burst required to contain the DATA DLPDU.
- The T bit is set to zero or 1 (inverse to previous transmission).

Transmission of CTS

- The receiving station transmits a burst containing a CTS DLPDU in the slot reserved by the unicast request reservation in the received RTS DLPDU.
- The burst also contains an information transfer request reservation to reserve slots for the expected DATA transmission and the subsequent acknowledgement.

Transmission of DATA DLPDU

- The sending station transmits a burst containing a DATA DLPDU.
- The M bit is set to 0 if the data fragment is not to be followed by any others, or 1 if it is.
- The T bit is set to the T bit of the RTS.

Transmission of ACK DLPDU

- The receiving station transmits a burst containing an ACK DLPDU in the slot reserved by the unicast request reservation in the received DATA DLPDU.
- The T bit is set to the value of the T bit in the received DATA DLPDU.

4.2.11 Linking transmissions

4.2.11.1 Types of linking

A station with a queue of transmissions for the same receiving station can link them in the following ways:

- Combine an RTS DLPDU with a DATA DLPDU.
- Combine a DATA DLPDU with an ACK DLPDU.
- Combine an RTS DLPDU with an ACK DLPDU.

4.2.11.2 Combined RTS / DATA DLPDUs

In the long transmission procedure, the sending station can send the DATA of the first message with an attached RTS for the DATA of the second message. The receiving station then sends an ACK for the first message along with a CTS for the second.

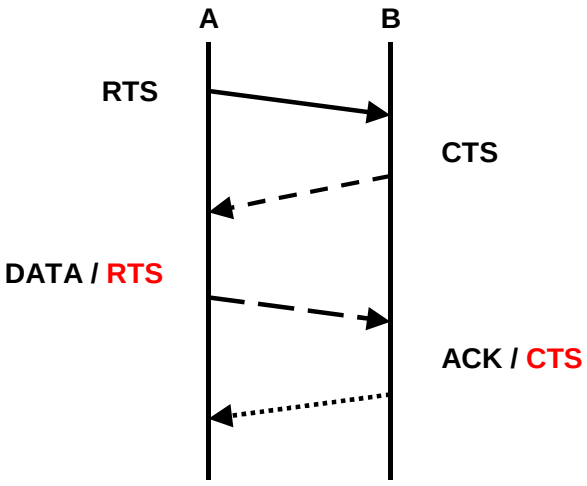


Figure 4.6: Linked transmissions

4.2.11.3 Combined DATA / ACK DLPDUs

If the receiving station has some data to send which would fit in one slot it can send it with the ACK transmission.

4.2.11.4 Combined RTS / ACK DLPDUs

A receiving station that has data to send that does not fit in one slot can send an RTS for itself with the ACK.

4.2.12 Ground-air link management

For ground-air link management, the CTRL DLPDU is used by the LME to establish and maintain the link. The CTRL_CMD is sent to initiate a link and the CTRL_RSP is sent in response. On receiving a CTRL_RSP the link as been made.

4.2.13 Air-air link management

Air-air link management is supported by a Zero-Overhead Connection Oriented Protocol (ZOCOP), which makes use of the SZOM DLPDU. A mobile wishing to send data to another mobile it does not currently have a connection with should:

- combine an SZOM with the first data transmission, if using the short transmission procedure;
- or combine an SZOM with the first RTS transmission, if using the long transmission procedure.

On receiving an ACK or CTS after transmission of the SZOM, the air-air link is considered established, the timers are set, and data exchange is carried out as previously described. The link is considered terminated when the timers expire.

4.3 Additional VSS Services

The correct operation of the DLS requires additional services from the VSS, namely:

a) Unicast request protocol.

b) Information transfer request protocol.

c) Retransmission procedures.

5 Minimum performance specification under standard test conditions

5.1 DLS Sublayer

5.1.1 General

5.1.1.1 Services

Requirement reference	
5.1.1.1.1	The VDL Link Layer shall provide a reliable point-to-point service using a connection oriented DLS sublayer.
5.1.1.1.2	The VDL Link Layer shall provide an unacknowledged broadcast service using a connectionless DLS sublayer as defined in EN 301 842-2 [5] clause 5.3.
5.1.1.1.3	The DLS shall support communications on a shared communications channel as described in this section.
5.1.1.1.4	The DLS shall support bit-orientated simplex communications using a Negotiated Setup Connection-Orientated Protocol (NSCOP) between DLE pairs.
5.1.1.1.5	The DLS shall provide the following services: a) transmission of user data; b) indication that user data has been sent; c) reception of user data; d) indication that DLS link has been established; e) indication that the DLS link has been broken.
5.1.1.1.6	Stations supporting the point-to-point communications functionality provided by the DLS shall simultaneously support at least 1 peer-to-peer links with each mobile station within operational range.

5.1.1.2 Data transfer

Requirement reference	
5.1.1.2.1	User data packets and LME data shall be transferred in the information fields of INFO, UDATA and CTRL Data Link Protocol Data Units (DLPDUs) which are collectively known as DATA DLPDUs.
5.1.1.2.2	LME data shall be contained in CTRL and UCTRL frames only.
5.1.1.2.3	The link layer shall process the largest packet size, specified in clause 5.1.3.8, without fragmenting.
5.1.1.2.4	Larger packets shall be fragmented according to the procedures of clauses 5.1.4.2.5 to 5.1.4.2.14.
5.1.1.2.5	Only one data link user packet shall be contained in a DATA DLPDU.

5.1.1.3 DATA DLPDU duplicate suppression and sequencing

Requirement reference	
5.1.1.3.1	On a point-to-point connection, the receiving DLS sub-layer shall ensure that duplicated DATA DLPDUs are discarded and that all DATA DLPDUs which are part of a fragmented packet are delivered in the same order in which they appear in the packet.

5.1.1.4 Error detection

Requirement reference	
5.1.1.4.1	The DLS shall rely on the MAC layer to ensure that DLPDUs corrupted during transmission are detected and discarded.

5.1.1.5 Station identification

Requirement reference	
5.1.1.5.1	A receiving station shall accept unicast DLPDUs addressed to its current station address.

5.1.1.6 Broadcast addressing

Requirement reference	
5.1.1.6.1	A VDL Mode 4 station shall accept broadcast DLPDUs and accept multicast DLPDUs that have been multicast to addresses to which it is listening.

5.1.1.7 DLS Priority

Requirement reference	
5.1.1.7.1	The DLS shall accept an indication of priority of the DATA DLPDUs as definied in table 5.8 of EN 301 842-2 [5].

5.1.1.8 DLS Link control DLPDUs

Requirement reference	
5.1.1.8.1	For the purposes of link control, the DLS shall provide the following DLS DLPDU types: 1 ACK DLPDUs, consisting of INFO_ACK and CTRL_ACK, for the purposes of acknowledgement of DATA DLPDUs and DLS link control DLPDUs respectively. 2 RTS DLPDUs, consisting of CTRL_RTS, INFO_RTS and UDATA_RTS, for the purposes of making reservations for the transfer of DATA DLPDUs. 3 CTS DLPDUs, consisting of CTRL_CTS, INFO_CTS and UDATA_CTS, for purposes of acknowledging RTS DLPDUs and providing slots for subsequent transmission of DATA DLPDUs. 4 Other DLS link control DLPDUs, consisting of SZOM FRMR, FRMR_ACK, DM/DISC and DM/FRMR, for purposes of link initialization, reset and maintenance.

5.1.2 DLS protocol specification

5.1.2.1 State Variables

Requirement reference	
5.1.2.1.1	The DLS shall maintain the state variables defined in table 5.1 for each data link between two peer DLEs.

Table 5.1: DLS state variables

State Variable	Usage
T_t	Current value of T bit (0 or 1) for transmitted DLPDUs.
T_r	Value of T bit (0 or 1) for last received DLPDU.
send array	an array storing user data packets and M-bit linked fragments queued for transmission (one per priority level).
receive array	an array storing received M-bit linked fragments queued for concatenation (one per priority level).

5.1.2.2 DLS burst formats

Requirement reference	
	DLS burst
5.1.2.2.1	A DLS station that implements the DLS protocol shall transmit the DLS bursts defined in table 5.2 with the VSS user supplied QoS and reservation parameters.

Table 5.2: Normal unicast DLS burst format

Description	Octet	Bit Number							
		8	**7**	**6**	**5**	**4**	**3**	**2**	**1**
message id,	5	res	res	res	res	1	1	0	1
DLS DLPDU	6	As per clauses 5.1.2.2.4 to 5.1.2.2.20							
	7								
	8								
	9								
	10								

Requirement reference	
5.1.2.2.2	The DLS burst shall consist of one or two DLS DLPDUs combined according to the procedures of clause 5.1.4.10.
5.1.2.2.3	A DATA DLPDU shall be the final field in the burst (and thus the burst can contain only one of these fields).
	DLS DLPDU encoding
5.1.2.2.4	The DLS DLPDU field shall indicate the DLPDU type and contain, as appropriate, the priority subfield, the more bit, the toggle bit, the initialize bit and length subfield.
5.1.2.2.5	DATA DLPDUs shall consist of a single octet containing link control information and a variable length information field.
5.1.2.2.6	DATA DLPDUs shall be encoded as defined in table 5.3.

Table 5.3: Data DLPDU encoding

Octet	**n**								**n+1**	**…….**	**n+ m**
Bit	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**			
CTRL	M	T	re	c/r	res	0	0	0	information field of length m octets		
INFO	M	T	pr_4	pr_3	pr_2	pr_1	1	0	information field of length m octets		
Reserved	X	X	X	X	0	1	0	0	information field of length m octets		
Reserved	0	0	0	0	1	1	0	0	information field of length m octets		
Reserved	X	X	X	1	1	1	0	0	information field of length m octets		
Reserved	X	X	1	0	1	1	0	0	information field of length m octets		
Reserved	X	1	0	0	1	1	0	0	information field of length m octets		
Reserved	1	0	0	0	1	1	0	0	information field of length m octets		
NOTE: "X" means 0 or 1.											

Requirement reference	
5.1.2.2.7	RTS DLPDUs shall consist of two octets containing link control information.
5.1.2.2.8	RTS DLPDUs shall be encoded as defined in table 5.4.

Table 5.4: Two-Octet DLPDUs Encoding

Octet	n								n+1							
Bit	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**
CTRL_RTS	0	T	IB	0	1	0	0	1	res	res	res	res	lg_4	lg_3	lg_2	lg_1
INFO_RTS	0	T	0	1	1	0	0	1	pr_4	pr_3	pr_2	pr_1	lg_4	lg_3	lg_2	lg_1
UDATA_RTS	0	0	1	1	1	0	0	1	pr_4	pr_3	pr_2	pr_1	lg_4	lg_3	lg_2	lg_1
Reserved	0	1	1	1	1	0	0	1	pr_4	pr_3	pr_2	pr_1	lg_4	lg_3	lg_2	lg_1
Reserved	1	X	X	0	1	0	0	1	X	X	X	X	X	X	X	X
Reserved	1	X	0	1	1	0	0	1	X	X	X	X	X	X	X	X
Reserved	1	0	1	1	1	0	0	1	X	X	X	X	X	X	X	X
Reserved	1	1	1	1	1	0	0	1	X	X	X	X	X	X	X	X
NOTE: "X" means 0 or 1.																

Requirement reference	
5.1.2.2.9	ACK, CTS and other DLS link control DLPDUs shall consist of one octet containing link control information.
5.1.2.2.10	These DLPDUs shall be encoded as defined in table 5.5.

Table 5.5: Single octet DLPDUs encoding

Octet	n							
Bit	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**
UDATA_CTS	0	0	1	1	1	0	1	1
INFO_ACK	0	T	0	1	0	0	0	1
INFO_CTS	0	res	0	1	1	0	1	1
CTRL_ACK	0	T	res	0	0	0	0	1
CTRL_CTS	0	res	res	0	1	0	1	1
Reserved	0	X	X	1	0	1	0	1
FRMR_ACK	1	0	0	1	0	0	0	1
FRMR	1	0	0	1	0	1	0	1
DM/DISC	1	0	1	1	0	1	0	1
DM/FRMR	1	1	1	1	0	1	0	1
Reserved	1	0	1	1	1	0	1	1
Reserved	1	1	0	1	0	0	0	1
Reserved	1	X	0	1	1	0	1	1
Reserved	1	X	X	0	0	0	0	1
Reserved	X	X	X	0	0	1	0	1
Reserved	1	X	X	0	1	0	1	1
Reserved	X	X	1	1	0	0	0	1
Reserved	X	X	X	X	0	0	1	1
Reserved	1	1	0	1	0	1	0	1
Reserved	X	X	X	X	0	1	1	1
Reserved	X	1	1	1	1	0	1	1
Reserved	X	X	X	X	1	1	1	1
NOTE: "X" means 0 or 1.								

Requirement reference	
5.1.2.2.11	All reserved header bits (labelled 'res') shall be set to zero on transmit and ignored on receipt.
5.1.2.2.12	A station receiving a reserved DLPDU from a peer with which it has a link shall reset the link in accordance with the procedures of clause 5.1.4.9.
5.1.2.2.13	A station receiving a reserved DLPDU from a peer with which it does not have a link shall either respond with a DM/DISC, DM/FRMR or simply ignore the DLPDU.
	Toggle bit
5.1.2.2.14	The T (Toggle) bit shall be alternately set to zero and one on each successful transmission.
5.1.2.2.15	At the start of a communication between two stations, or when the link is reset, the toggle bit shall be initiated according to the procedures of clauses 5.1.4.2.15 to 5.1.4.2.29 for NSCOP communication.
	More bit
5.1.2.2.16	The M (More) bit shall be set to zero to indicate the end of a user data packet and to one to indicate that this fragment is not the last fragment in a multi-fragment user data packet and that further fragments will be transmitted.
	Priority subfield
5.1.2.2.17	The priority subfield (pr) shall indicate the priority level of the transmission as defined in clause 5.1.1.6.
	Length subfield
5.1.2.2.18	The length subfield (lg) shall indicate the length of the DLS burst containing a DATA DLPDU in slots.
5.1.2.2.19	It shall be encoded as one less than the absolute length.
	Initialize bit
5.1.2.2.20	Prior to sending a CTRL_RTS or upon receipt of a CTRL_RTS with IB (Initialize) Bit set to one the station shall initialize the T_t and T_r state variables and clear the send and receive arrays.
	Compressed combined RTS/INFO DLPDU encoding (type 1)
5.1.2.2.21	A DLS station wishing to send a combined RTS and INFO DLPDU according to the procedures of clause 5.1.4.10 when the priority of the RTS is different to that of the INFO packet shall transmit the compressed combined RTS/INFO (type 1) burst defined in table 5.6 with the VSS user supplied QoS and reservation parameters.
5.1.2.2.22	The T bit for the RTS shall be the inverse of the INFO bit.

Table 5.6: Compressed combined RTS/INFO (type 1) burst format

Description	Octet	Bit Number							
		8	**7**	**6**	**5**	**4**	**3**	**2**	**1**
Message ID	5	1	0	0	1	0	1	0	1
RTS priority and length	6	pr_4	pr_3	pr_2	pr_1	lg_4	lg_3	lg_2	lg_1
INFO priority, M and T	7	M	T	pr_4	pr_3	pr_2	pr_1	res	res
Compressed RTS/INFO (type 1) DLPDU	8	Information field							
	9								
	10								
	11								
	12								

Requirement reference	
	Compressed combined RTS/INFO DLPDU encoding (type 2)
5.1.2.2.23	A DLS station wishing to send a combined RTS and INFO DLPDU according to the procedures of clause 5.1.4.10 when the priority of the RTS is the same as that of the INFO packet shall transmit the compressed combined RTS/INFO (type 2) burst defined in table 5.7 with the VSS user supplied QoS and reservation parameters.
5.1.2.2.24	The T bit for the RTS shall be the inverse of the INFO bit and the priority the same as the INFO priority.

Table 5.7: Compressed combined RTS/INFO (type 2) burst format

Description	Octet	Bit Number							
		8	7	6	5	4	3	2	1
Message ID	5	M	T	1	0	0	1	0	1
RTS/INFO priority and RTS length	6	pr_4	pr_3	pr_2	pr_1	lg_4	lg_3	lg_2	lg_1
Compressed RTS/INFO (type 2) DLPDU	7	Information field							
	8								
	9								
	10								
	11								
	12								

5.1.3 DLS system parameters

Requirement reference	
5.1.3.1	In addition to those defined in EN 301 842-2 [5] clause 5.3.2, the parameters needed by the DLS sublayer shall be as listed in table 5.8.
5.1.3.2	DLS parameters for NSCOP communications shall be determined during the exchange of CTRL DLPDUs, if the default values are not to be used.

Table 5.8: Data link service system parameters

Symbol	Parameter name	Minimum	Maximum	Default	Increment
ND1	Maximum number of octets in any user data packet	143 octets	2 063 octets	1 511 octets	1 octet
ND2	Maximum length of DLS transmission	2 octets	2 063 octets	86 octets	1 octet
ND3	Maximum length of fragment	1 slot	32 slots	5 slots	1 slot
NOTE:	The value of ND3 should be chosen such that the length of each DLS transmission containing the fragment is less than the maximum length of the DLS transmission defined by ND1 and greater than the maximum length of a short DLS transmission defined by ND2.				

Requirement reference	
	Parameter ND1 (maximum number of octets of any user data packet)
5.1.3.3	The parameter ND1 shall define the maximum number of octets in any user data packet that a DLS may accept from the data link user or from a peer station.
5.1.3.4	A station receiving a user data packet from a peer station greater in length than ND1 shall discard the packet and reset the link in accordance with the procedures of clause 5.1.4.9.
5.1.3.5	A station receiving a user data packet from a data link user greater in length than ND1 shall discard the packet.
	Parameter ND2 (maximum length of DLS transmission)
5.1.3.6	The parameter ND2 shall define the maximum size in octets of a short DLS transmission including flags and reservation data that shall be sent using the short transmission procedures defined in clause 5.1.4.4.
5.1.3.7	A burst occupying x slots shall contain up to 23 + (((x-1)×63)/2) octets of data including reservation data, CRC and flags.
	Parameter ND3 (maximum length of fragment)
5.1.3.8	The parameter ND3 shall define the maximum size in slots of a DLS burst.

5.1.4 DLS procedures

5.1.4.1 Setting of re-transmission parameter

Requirement reference	
5.1.4.1.1	For all DLS bursts containing CTRL, INFO, CTRL_RTS, INFO_RTS and UCTRL_RTS DLPDUs, the quality of service parameters Q5min, Q5max, Q5mult, Q5exp and Q5num shall be set as defined in table 5.9.

Table 5.9: Re-transmission parameters

Symbol	Parameter name		Default
Q5min	VSS retransmission parameters	Minimum	1 s
Q5max		Maximum	15 s
Q5mult		Multiplier	1,45
Q5exp		Exponent	1,7
Q5num		number of attempts	4
Q5wait		maximum time to wait for a reply	20 s

5.1.4.2 Selection of user data packet for transmission

Requirement reference	
	User data packet priority
5.1.4.2.1	A sending station shall maintain a prioritized queue of user data packets for transmission.
5.1.4.2.2	When determining which user data packet to transmit, the highest priority user data packet shall be sent first.
5.1.4.2.3	The DLS DLPDUs CTRL,and CTRL_RTS shall be classified as network management messages and given the highest priority.
5.1.4.2.4	The DLS DLPDUs INFO_RTS, and UDATA_RTS shall be assigned the same priority as the DATA DLPDU with which they are associated.
	User data packet fragmentation
	Determination of single or multiple fragment transmission
5.1.4.2.5	If the length of the DLS burst containing a CTRL or INFO DLPDU is greater than ND2 octets, the sending station shall fragment the user data packet into one or more fragments of maximum size ND3, and format it according to the procedures of clauses 5.1.4.2.11 to 5.1.4.2.14.
5.1.4.2.6	Otherwise the user data packet shall be sent as a single fragment formatted according to the procedures of clauses 5.1.4.2.8 to 5.1.4.2.10.
5.1.4.2.7	The fragmentation of a user data packet shall take account of whether the station is combining a CTRL or INFO DLPDU with another DLS DLPDU in accordance with the procedures of clause 5.1.4.10.
	Single fragment user data packet transmission
5.1.4.2.8	A single fragment user data packet shall be transferred as a CTRL or INFO DLPDU.
5.1.4.2.9	The M bit shall be set to zero.
5.1.4.2.10	For an INFO DLPDU, the pr bits shall indicate the priority of the DLPDU.
	Multiple fragment user data packet transmission
5.1.4.2.11	A multiple fragment user data packet shall be transferred as a series of CTRL or INFO DLPDUs using the long transmission procedures defined in clause 5.1.4.5.
5.1.4.2.12	The M bit shall be set to 1 for all fragments except the last fragment.
5.1.4.2.13	The M bit shall be set to 0 for the last fragment.
5.1.4.2.14	For INFO DLPDUs, the pr bits shall indicate the priority of the DLPDU.
	Setting of T bit
	T bit initialization for NSCOP communication
5.1.4.2.15	When there is no established link (or link in the process of being established) between a mobile DLE and a ground DLE and the LME of either station requests the transmission of a CTRL user data packet, the sending DLE shall send the CTRL DLPDU using the long transmission procedures (see clause 5.1.4.5).
5.1.4.2.16	In the CTRL_RTS, it shall set the IB bit to 1, the T bit to 0, and follow the procedures of clause 5.1.2.3.20.
5.1.4.2.17	On receipt of a CTRL_RTS DLPDU with IB = 1, the receiving DLE shall follow the procedures of clause 5.1.2.3.20.
5.1.4.2.18	The sender and receiver shall consider the link initialized.
5.1.4.2.19	The receiver shall immediately terminate any INFO transfers in progress.
5.1.4.2.20	Any partially received CTRL DLPDUs shall be discarded.
5.1.4.2.21	If any CTRL fragments had already been acknowledged, then the remainder of the CTRL DLPDU shall be abandoned.
5.1.4.2.22	however, if no CTRL_ACK had been received for a CTRL DLPDU, then its transfer shall continue unaffected.
5.1.4.2.23	The DLE shall consider the link connected upon direction from the LME.
5.1.4.2.24	INFO, INFO_RTS, INFO_ACK and INFO_CTS DLPDUs shall only be sent on links that are connected.
5.1.4.2.25	Although a DLE may receive INFO DLPDUs (and generate INFO_ACKs), it shall not transmit INFO DLPDUs until it receives a CTRL_ACK to its CTRL (M = 0).
5.1.4.2.26	On receipt of a CTRL_RTS,in a DLS burst addressed to it for which IB is equal to 1 and for which the T bit is equal to 1 a station shall send a DM/FRMR.
5.1.4.2.27	If a DLE with unininitialized state variables receives a CTRL_RTS DLPDU with IB equal to 0, then it shall respond with a DM/FRMR.
5.1.4.2.28	If a DLE receives an SZOM from a peer DLE, it shall respond with a DM/FRMR.
	Transfer after initialization
5.1.4.2.29	When the T bit has been initialized, the sending station shall set the T bit for transmitted DLPDUs to the value of Tt.

5.1.4.3 Selection of transmission procedures

Requirement reference	
5.1.4.3.1	After a packet has been selected for transmission according to the procedures of clause 5.1.4.2 the sending station shall calculate the total length in octets of the DLS burst required to contain the DLPDU queued for transmission using the short transmission procedures defined in clause 5.1.4.4.
5.1.4.3.2	The total length shall include the length of any reservation fields contained within the DLS burst, together with any flags.
5.1.4.3.3	The calculation of the length of the DLS burst shall take account of whether the station will combine a DATA DLPDU with another DLS DLPDU in accordance with the procedures of clause 5.1.4.10.
5.1.4.3.4	If the total length is less than or equal to ND2, then the station shall use short transmission procedures (clause 5.1.4.4) to transmit the queued data.
5.1.4.3.5	Otherwise, the station shall use the long transmission procedures (clause 5.1.4.5).
5.1.4.3.6	The M bit shall be set to 0 for a short transmission.
	Recommendation
5.1.4.3.7	If there are other DLPDUs queued for transmission, then the station should also include an RTS per clause 5.1.4.10.4.

5.1.4.4 Short transmission procedures

Requirement reference	
	Transmission of DATA DLPDU
5.1.4.4.1	After the selection of a short transmission procedure, the sending station shall transmit a DLS burst containing the DATA DLPDU queued for transmission with QoS parameters as defined in table 5.10 using the random access procedures.
5.1.4.4.2	For CTRL and INFO DLPDUs, the T bit shall be set to Tt.
5.1.4.4.3	A burst containing a CTRL or INFO DLPDU shall contain a unicast request reservation field for the acknowledgement with the parameters in table 5.10.
	Acknowledgement of DATA DLPDU
	Established link with sender
5.1.4.4.4	If a station receiving a CTRL or INFO DLPDU has an established link with the sender it shall transmit a DLS burst containing an ACK DLPDU in the slot reserved by the unicast request reservation field contained in the DATA DLPDU transmission.
5.1.4.4.5	a) A CTRL_ACK DLPDU shall be sent in response to a CTRL DLPDU and an INFO_ACK DLPDU sent in response to an INFO DLPDU.
5.1.4.4.6	b) The T bit shall be set to the value of the T bit in the received DATA DLPDU.
	Non-receipt of acknowledgement
5.1.4.4.7	If an acknowledgement to a CTRL or INFO DLPDU is not received from the receiving station, the sending station shall retransmit the DLS burst containing the CTRL or INFO DLPDU and a unicast request reservation field according to the procedures of clause 5.3.2.

Table 5.10: Short transmission INFO DLPDU parameters

Symbol	Parameter name	Default
V32	Minimum response delay	(54 ms) × M1/60 slots
V33	Maximum response delay	(5 s) × M1/60 slots
V34	Source/destination control	0
V35	Broadcast control	0
V36	Length of reserved block	1 slot
Q1	Priority	Priority of INFO DLPDU
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	FALSE
Q4	Number of available slots	3

5.1.4.5 Long transmission procedures

Requirement reference	
	Transmission of request to send
5.1.4.5.1	After the selection of a long transmission procedure, the sending station shall transmit a DLS burst containg an RTS DLPDU to the receiving station in the transmit queue with QoS parameters as defined in table 5.11.
5.1.4.5.2	When using the long transmission procedure: a) A station shall send a CTRL_RTS, INFO_RTS or UDATA_RTS DLPDU if a CTRL, INFO or UDATA DLPDU respectively is to be transmitted.
5.1.4.5.3	b) The pr subfield shall indicate the priority of the INFO_RTS and UDATA_RTS DLPDUs to be transmitted (see clause 5.1.1.6)
5.1.4.5.4	c) The length subfield shall indicate the length of the DLS burst required to contain the DATA DLPDU (see clause 5.1.2.3.18).
5.1.4.5.5	d) For CTRL_RTS and INFO_RTS DLPDUs, the T bit shall be set to Tt.
5.1.4.5.6	Each burst shall contain a unicast request reservation field with the parameters set as defined in table 5.11.

Table 5.11: Long transmission RTS DLPDU parameters

Symbol	Parameter name	Default
V32	Minimum response delay	(54 ms) × M1/60 slots
V33	Maximum response delay	(5 s) × M1/60 slots
V34	Source/destination control	0
V35	Broadcast control	0
V36	Length of reserved block	1 slot
Q1	Priority	Priority of RTS
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	FALSE
Q4	Number of available slots	3

Requirement reference	
	Response to RTS
	Response if a DATA DLPDU has not previously been received
5.1.4.5.7	If the responder has an established link with the sender and the received DLPDU is a UDATA_RTS or if the T bit within the CTRL_RTS or INFO_RTS DLPDU is not equal to Tr, then the receiving station shall transmit a CTS DLPDU in a DLS burst in the slot reserved by the RTS DLPDU.
5.1.4.5.8	A CTRL_CTS, INFO_CTS or UDATA_CTS DLPDU shall be sent in response to a CTRL_RTS, INFO_RTS or UDATA_RTS DLPDU respectively
5.1.4.5.9	For CTRL_CTS and INFO_CTS DLPDUs, the burst shall contain an information transfer request reservation field and be transmitted with the parameters in table 5.12, indicating the number of slots reserved for transfer of the DATA DLPDU.
5.1.4.5.10	For a UDATA_CTS DLPDU, the burst shall contain a unicast request reservation field and be transmitted with the parameters in table 5.11, indicating the number of slots reserved for transfer of the DATA DLPDU.
	Response if a DATA DLPDU has previously been received
5.1.4.5.11	If the responder has an established link with the sender and if the T bit within the CTRL_RTS or INFO_RTS DLPDU is equal to Tr, then the receiving station shall transmit an ACK DLPDU in the slot reserved by the RTS.
5.1.4.5.12	a) A CTRL_ACK or INFO_ACK DLPDU shall be sent in response to a CTRL_RTS or INFO_RTS DLPDU respectively
5.1.4.5.13	b) The T bit shall be set to the value of the T bit in the received DATA DLPDU.
5.1.4.5.14	The DLS burst containing the ACK DLPDU shall contain a response reservation type except as determined by the procedures of clause 5.1.4.10
	Channel too busy
5.1.4.5.15	If the channel is too busy (either the receiving station cannot find a sufficiently large series of contiguous slots or the priority is too low for the channel utilization), then the receiving station shall transmit either a general confirm including a unicast reservation with V34 = 1 indicating when the responder will transmit an information transfer request in response to the RTS or a general failure (clause 5.2.20 of EN 301 842-2 [5]) with error type = 01 hex.

Table 5.12: CTS DLPDU parameters

Symbol	Parameter name	Default
V42	Length of information transfer	Sufficient to include requested INFO DLPDUs
V43	Minimum information transfer delay	(54 ms) × M1/60 slots
V44	Maximum information transfer delay	(5 s) × M1/60 slots
V45	Minimum response delay	(54 ms) × M1/60 slots
V46	Maximum response delay	(5 s) × M1/ slots
Q1	Priority	Priority of RTS
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	FALSE
Q4	Number of available slots	3

Requirement reference	
	Response to CTS
	Transmission of DATA DLPDU
5.1.4.5.16	On receipt of a CTRL_CTS or INFO_CTS DLPDU in a DLS burst addressed to it and with an information transfer request reservation field a station shall transmit the requested DATA DLPDU in the allocated reservation with the T bit set to T_t.
5.1.4.5.17	The DLS burst containing the DATA DLPDU shall contain a response reservation type.
5.1.4.5.18	On receipt of a UDATA_CTS DLPDU in a DLS burst addressed to it with a unicast request reservation field a station shall transmit the requested UDATA DLPDU in the allocated reservation.
	Response if no information to transmit
5.1.4.5.19	If upon receipt of a CTS the station has nothing to transmit (e.g. after a reset), it shall transmit one of the following: a) an FRMR is the link is connected; b) a DM/DISC if the link is disconnected; c) a DM/FRMR if the link is in the process of connecting.
	Recommendation
5.1.4.5.20	If the station has not transmitted an INFO DLPDU and a higher priority user data packet arrived after the RTS had been transmitted, the station should transmit as much of the highest priority packets as will fit in the current reservation with the same value for T as contained in the RTS.
	Acknowledging the data
	DATA DLPDU received
5.1.4.5.21	A receiving station which transmitted a CTRL_CTS or INFO_CTS DLPDU in a DLS burst containing an information transfer request reservation field (and consequently has a reservation for an acknowledgement) and which has received the DATA DLPDU with a T bit not equal to T_r, shall follow the procedures of clauses 5.1.4.4.4 to 5.1.4.4.6.
	Response if DATA DLPDU not received
5.1.4.5.22	A receiving station which transmitted a CTRL_CTS or INFO_CTS DLPDU in a DLS burst containing an information transfer request reservation field (and consequently has a reservation for an acknowledgement) and which has not received the CTRL or INFO DLPDU with a T bit not equal to T_r, shall transmit in the slot reserved for an acknowledgement an ACK DLPDU in a DLS burst.
5.1.4.5.23	a) A CTRL_ACK or INFO_ACK DLPDU shall be sent in response to a CTRL or INFO DLPDU respectively.
5.1.4.5.24	b) The T bit shall be set to the inverse of the value of the T bit in the last received RTS DLPDU.
5.1.4.5.25	The DLS burst containing the ACK DLPDU shall contain a response reservation type.

5.1.4.6 No link with sender

Requirement reference	
5.1.4.6.1	If the responder to any DLPDU other than a CTRL_RTS DLPDU with IB equal to 1 neither has nor is attempting to establish a link with the sender, the responder shall send a DLS burst containing a DM/DISC DLPDU in the slot reserved by the unicast or information transfer request reservation field contained in the data DLPDU transmission.
5.1.4.6.2	If the responder is trying to establish a link with the sender, then it shall respond with a DM/FRMR to any DLPDU other than a CTRL-related DLPDU.

5.1.4.7 User data packet reception

Requirement reference	
	Receipt and forwarding of received DATA DLPDUs
5.1.4.7.1	When a CTRL or INFO DLPDU is received without errors from another station, the value of the T bit shall be inspected and recorded.
5.1.4.7.2	If the value of the T bit is not equal to Tr, then the user data packet or user data packet fragment shall be accepted and Tr set to the value of the T bit in the received INFO or CTRL DLPDU.
5.1.4.7.3	Otherwise, the received user data packet or user data packet fragment shall be discarded as a duplicate.
	Concatenation of multiple fragment user data packets
5.1.4.7.4	If any preceding user data packet fragments have been received with, in the case of an INFO DLPDU, the same value of pr subfield and with the M bit set to one, then the user data part of the received DATA DLPDU shall be concatenated to the end of the user data packet fragments.
5.1.4.7.5	If the M bit is set to zero on the received DATA DLPDU, then the user data part of the received DATA DLPDU, including any user data packet fragments received earlier and with which it has been concatenated, shall be passed to the service user as a single incoming user data packet.
	Unacknowledged DLPDUs
5.1.4.7.6	DM/DISC, DM/FRMR and all ACK DLPDUs shall be unacknowledged.

5.1.4.8 Receipt of ACK DLPDU

Requirement reference	
	Receipt of an expected ACK DLPDU
5.1.4.8.1	When an ACK DLPDU is received without errors from another station and there was an outstanding DATA DLPDU to be acknowledged, the value of the T bit shall be inspected and the following operations performed.
5.1.4.8.2	If T is equal to Tt, then the DATA DLPDU shall be assumed successfully received and the value of Tt set to the inverse of the current value of T_t.
5.1.4.8.3	If the ACK DLPDU is not received by the expected reserved slot, then the sending station shall re-send the DATA DLPDU using the short or long transmission procedures as determined by the procedures of clause 5.1.4.3.
5.1.4.8.4	When a DATA DLPDU has been successfully received, the highest priority fragment (either the next fragment of the current user data packet or the first fragment/complete DLPDU of the next user data packet) in the send queue, if any, shall be selected for transmission using the procedures of clause 5.1.4.2.
	Receipt of an unexpected ACK DLPDU
5.1.4.8.5	When an ACK DLPDU is received without errors from another station and there was no outstanding DATA DLPDUs to be acknowledged, the value of the T bit shall be inspected and the following operations performed.
5.1.4.8.6	If T is equal to T_t then the link shall be reset as per clause 5.1.4.9.
5.1.4.8.7	If T is not equal to T_t then the ACK shall be ignored.

5.1.4.9 Link reset

Requirement reference	
	Link reset during link setup
5.1.4.9.1	The sending station shall disconnect the link by sending a DM/FRMR DLPDU, which is transmitted in the reservation placed for the reply.
5.1.4.9.2	Upon receipt of a DM/FRMR DLPDU, the receiving station shall disconnect the link.
	Link reset of an established link
5.1.4.9.3	The sending station shall reset the link by sending a FRMR DLPDU in a DLS burst placing a unicast reservation for the response.
5.1.4.9.4	The sending station shall discard all outstanding user data packets in the send and receive arrays.
5.1.4.9.5	If a FRMR_ACK is not received in the reserved slot, the FRMR shall be sent again using the re-transmission procedures.
5.1.4.9.6	Only when a FRMR_ACK has been received shall the station attempt to re-send data to the receiving station using the procedures of clause 5.1.4.3.
5.1.4.9.7	If the sending station receives an INFO or RTS DLPDU from the peer whilst waiting for a FRMR_ACK, it shall send an FRMR in response.
5.1.4.9.8	Upon receipt of an unsolicited FRMR_ACK, a DLE shall respond with an FRMR.
5.1.4.9.9	On receipt of a FRMR DLPDU, the receiving station shall discard any outstanding fragments in the receive array and transmit a FRMR_ACK DLPDU in a DLS burst in the reserved slot.

5.1.4.10 Linking DLS DLPDU transmissions

Requirement reference	
5.1.4.10.1	An implementation of the DLS shall be capable of providing a combined DLPDU response even if the station does not initiate the use of combined DLPDUs.
	Recommendation
5.1.4.10.2	A station with a queue of transmissions to send to a receiving station should link transmissions using the procedures set out in this section.
	Allowed DLPDU combinations
5.1.4.10.3	It shall be possible to combine the following DLPDUs: - RTS/DATA; - ACK/CTS; - ACK/DATA; - ACK/RTS.
	Recommendation: Combined RTS/DATA DLPDUs
5.1.4.10.4	When a receiving station has selected a user data packet for transmission using the procedures of clause 5.1.4.2 it should also select the next user data packet with the highest priority and place an RTS DLPDU in the DLS burst containing the DATA DLPDU for the first user data packet, setting the T bit in the RTS to th inverse of T_t and append a response reservation type.
	Combined ACK/CTS DLPDUs
5.1.4.10.5	On receipt of a RTS/DATA DLS burst, a station shall process the DATA DLPDU first according to the procedures of clause 5.1.4.5.21.
5.1.4.10.6	If the station can find sufficient resources for a subsequent DATA DLPDU transfer, then the DLS burst containing the ACK DLPDU shall also contain a CTS DLPDU for the next DATA DLPDU transfer.
5.1.4.10.7	A CTRL_CTS, INFO_CTS or UDATA_CTS DLPDU shall be sent in response to a CTRL_RTS, INFO_RTS or UDATA_RTS DLPDU respectively.
5.1.4.10.8	In the case of CTRL_CTS and INFO_CTS DLPDUs, instead of the response reservation type required by the procedures of clause 5.1.4.5.21 the burst shall contain an information transfer request reservation field transmitted using the parameters defined in table 5.12, indicating the number of slots reserved for transfer of the DATA DLPDU.
	Combined DATA/ACK DLPDUs
5.1.4.10.9	A receiving station which has data that would fit into a single slot DLS burst containing an ACK DLPDU to send back to the sending station, shall include its own DATA DLPDU in this DLS burst.
5.1.4.10.10	The burst shall contain a unicast request reservation field with the parameters in table 5.11 for the acknowledgement of the DATA DLPDU.
	Combined ACK/RTS DLPDUs
5.1.4.10.11	If a receiving station has data to send back to the sending station which cannot fit into a single slot DLS burst containing an ACK DLPDU, then the station shall combine an RTS DLPDU for its own DATA DLPDU in the DLS burst containing the ACK DLPDU and use the long transmission procedures for the data transfer.
	Recommendation - Combined ACK/RTS DLPDUs to different peers
5.1.4.10.12	If a station is sending an ACK DLPDU to one destination and has data to send to a different destination, then the station should include a unicast reservation field with sdf = 1 with the DLS burst containing the ACK and then transmit an RTS DLPDU to the new destination in the reserved slot.

5.1.4.11 CTRL DLPDU

Requirement reference	
5.1.4.11.1	The CTRL DLPDU shall be used for the LME to establish and maintain links as defined in clause 5.2.

5.2 Link management entity sublayer

5.2.1 Services

5.2.1.1 General

Requirement reference	
5.2.1.1.1	The services of the LME shall be as follows: a) link provision; and b) link change notification.

5.2.1.2 Link provision

Requirement reference	
5.2.1.2.1	Each Ground System and each Mobile System supporting air/ground point-to-point communication services shall include the functionality of a VDL Management Entity (VME).
5.2.1.2.2	A VME shall be responsible for the data link management policy of the System.
5.2.1.2.3	In a Ground System, the VME shall be responsible for determining to which Mobile System(s) datalink communications are provided, through which Ground Station and, when the Ground System supports multiple frequency operations, which mobiles are assigned to which frequency
5.2.1.2.4	A VME shall have a Link Management Entity (LME) for each peer LME.
5.2.1.2.5	A ground VME shall have an LME per mobile
5.2.1.2.6	An LME shall establish a link between a local DLE and a remote DLE associated with its peer LME.
5.2.1.2.7	A ground LME shall determine if a mobile station is associated with its peer mobile LME by comparing the station address; two mobile stations with identical station addresses are associated with the same LME.
5.2.1.2.8	Each ground LME shall monitor all transmissions (both DLS and VSS) from its peer's stations to maintain a reliable link between some ground station and a mobile while the mobile is in coverage of an acceptable ground station in the ground system.

5.2.1.3 Link change notifications

Requirement reference	
5.2.1.3.1	The VME shall notify the Intermediate System - System Management Entity (IS-SME) of changes in link connectivity supplying information contained in the CTRL DLPDUs received.

5.2.1.4 CTRL DLPDU

Requirement reference	
5.2.1.4.1	Link management data directed to a particular peer shall be contained within a DLS burst encoded within the information field of a CTRL DLPDU (see table 5.3) as defined in table 5.13.

Table 5.13: CTRL DLPDU format

Description	Octet	Bit Number							
		8	7	6	5	4	3	2	1
CTRL DLPDU header	n	M	T	re	c/r	res	0	0	0
CTRL parameter 1: Parameter ID	n+1	id_8	id_7	id_6	id_5	id_4	id_3	id_2	id_1
Parameter length	n+2	lg_8	lg_7	lg_6	lg_5	lg_4	lg_3	lg_2	lg_1
Parameter value	n+3	$q1_8$	$q1_7$	$q1_6$	$q1_5$	$q1_4$	$q1_3$	$q1_2$	$q1_1$
	to	to							
	n+2 + lg	qlg_8	qlg_7	qlg_6	qlg_5	qlg_4	qlg_3	qlg_2	qlg_1
		more CTRL parameters							

Requirement reference	
5.2.1.4.2	The settings of the M, IB and T bits shall be as defined in clause 5.1.
5.2.1.4.3	The settings of the c/r and re bits shall be as defined in table 5.17.

5.2.1.5 Broadcast link management burst

Requirement reference	
5.2.1.5.1	ucid = 3 shall indicate that the UCTRL DLPDU contains a broadcast CTRL_CMD with the values of c/r and re, defined in clauses 5.2.2.2.6 to 5.2.2.2.10 , assumed to be equal to 0.
5.2.1.5.2	ucid = 4 indicates that the UCTRL DLPDU contains a UCTRL_DM parameter only as defined in clauses 5.2.2.2.30 to 5.2.2.2.34.

5.2.2 Control (CTRL) parameter formats

5.2.2.1 Encoding

Requirement reference	
5.2.2.1.1	The CTRL parameters described in this clause and also in EN 301 842-2 [5] clause 5.4.3 and EN 301 842-3 [6] clause 5.1.5 shall be included in the user data field of CTRL and UCTRL DLPDUs.

5.2.2.2 General purpose information parameters

Requirement reference	
5.2.2.2.1	VDL Mode 4 shall use the CTRL parameters defined below to allow mobile and ground-based LMEs to transfer basic information to each other.
	Parameter set identifier
5.2.2.2.2	The parameter set identifier shall be sent first in a group of non-VDL Mode 4 parameters and indicates to which set the parameters belong.
5.2.2.2.3	The parameter set identifier shall be encoded as per table 5.14.
5.2.2.2.4	There shall be no VDL Mode 4 parameter set identifier.
5.2.2.2.5	VDL Mode 4 parameters shall always be sent before any other parameter groups (see note).
NOTE: Parameter ID 00hex means change to different set, in which case the parameter value contains the identity of the new parameter set. A parameter set identity starting with 'X' (equals 58 hex) is proprietary and not defined in ICAO Technical Manuals. Parameter ID FFhex is reserved for upper layer data, in which case the parameter value contains upper layer data.	

Table 5.14: Parameter set identifer encoding

Field	Octet	Bit number								Notes
		8	7	6	5	4	3	2	1	
Parameter ID	**n + 1**	id_8	id_7	id_6	id_5	id_4	id_3	id_2	id_1	Parameter set identifier
Parameter length	**n + 2**	lg_8	lg_7	lg_6	lg_5	lg_4	lg_3	lg_2	lg_1	
Parameter value	**n + 3**	q_8	q_7	q_6	q_5	q_4	q_3	q_2	q_1	

Requirement reference	
	Connection management parameter
5.2.2.2.6	The connection management parameter shall define the type of CTRL sent and the connection options negotiated for that particular link.
5.2.2.2.7	The connection management parameter shall be used in CTRL DLPDUs sent during link establishment and ground-initiated ground station handoff.
5.2.2.2.8	The connection management parameter shall be encoded as per tables 5.15 to 5.17.
5.2.2.2.9	An LME shall set the reserved bits to 0 on transmission.
5.2.2.2.10	An LME shall ignore the value of the reserved bits on receipt.

Table 5.15: Connection management parameter

Field	Octet	Bit number								Notes
		8	7	6	5	4	3	2	1	
Parameter ID	**n + 1**	0	0	0	0	0	0	0	1	Connection management
Parameter length	**n + 2**	lg_8	lg_7	lg_6	lg_5	lg_4	lg_3	lg_2	lg_1	
Parameter value	**n + 3**	0	0	0	0	0	0	r	h	
NOTE: The value in the parameter length field is variable to allow for the possibility of additional options.										

Table 5.16: Connection management parameter values

Bit	Name	Encoding	
1	h	h = 0	No link currently established.
		h = 1	Link currently established.
2	r	r = 0	Link connection accepted.
		r = 1	Link connection refused.
3 to 8	Reserved	Set to 0	

Table 5.17: Abbreviated CTRL names

Name	c/r	re	h	r	Notes
GSIF	-	-	-	-	Ground Station Identification Frame - sent using format defined in clause 5.2.1.5
CTRL_CMD_LE	0	1	0	0	
CTRL_CMD_LCR	0	0	0	1	Link Connection Refused
CTRL_CMD_HO	0	1	1	0	If re = 1, then Initiating Handoff.
CTRL_CMD_HO	0	0	1	0	If broadcast and re = 0, then comanding a Broadcast Handoff. If unicast and re = 0, then Requesting Handoff.
CTRL_RSP_LE	1	1	0	0	
CTRL_RSP_LCR	1	1	0	1	
CTRL_RSP_HO	1	1	1	0	

Requirement reference	
	CTRL sequencing parameter
5.2.2.2.11	The CTRL sequencing parameter shall define the CTRL sequence number (sss) and a CTRL retransmission number (rrr).
5.2.2.2.12	The CTRL sequencing parameter shall be encoded as per table 5.18.
5.2.2.2.13	An LME shall increment the sequence number for every new CTRL (setting the retransmission field to 0 on the first transmission).
5.2.2.2.14	An LME shall increment the retransmission field after every retransmission.
5.2.2.2.15	In a CTRL_RSP, the sequence number shall be set to the value of the CTRL_CMD sequence number generating the response.
5.2.2.2.16	In a CTRL_RSP the retransmission field shall be set to 0 when transmitting and ignored when received.

Table 5.18: CTRL sequencing parameter

Field	Octet	Bit number								Notes
		8	**7**	**6**	**5**	**4**	**3**	**2**	**1**	
Parameter ID	**n + 1**	0	0	0	0	0	0	1	0	CTRL sequencing
Parameter length	**n + 2**	0	0	0	0	0	0	0	1	
Parameter value	**n + 3**	r_4	r_3	r_2	r_1	s_4	s_3	s_2	s_1	

Requirement reference	
	Protocol options parameter
5.2.2.2.17	The protocol options parameter shall define which protocol options are supported by the transmitting station.
5.2.2.2.18	The protocol options parameter shall be encoded as per tables 5.19 and 5.20.
5.2.2.2.19	When both this parameter and the Connection Management parameter are included in a CTRL, the bit values for those options which are included in both parameters shall be determined by the Connection Management parameter.

Table 5.19: Protocol options parameter

Field	Octet	Bit number								Notes
		8	**7**	**6**	**5**	**4**	**3**	**2**	**1**	
Parameter ID	**n + 1**	0	0	0	0	0	0	1	1	Protocol options
Parameter length	**n + 2**	0	0	0	0	0	0	0	1	
Parameter value	**n + 3**	0	0	0	0	0	b	i	0	

Table 5.20: Protocol options parameter values

Bit	Name	Encoding	
2	i	i = 0	Does not support initiated Handoff
		i = 1	Supports initiated Handoff
3	b	b = 0	Broadcast link handoff not supported
		b = 1	Broadcast link handoff supported
1, 4 to 8	Reserved	Set to 0	

Requirement reference	
	LCR cause parameter
5.2.2.2.20	The LCR cause parameter shall define the reason why the link connection request was refused.
5.2.2.2.21	The parameter, which may be repeated, shall consist of a rejection cause code (c bits), backoff delay time in seconds (d bits), and any additional data required by the various parameters.
5.2.2.2.22	The LCR cause parameter shall be encoded as per table 5.21.
5.2.2.2.23	Cause codes 00 hex to 7F hex shall apply to the responding station.
5.2.2.2.24	Cause codes 80 hex to FF hex shall apply to the responding system.
5.2.2.2.25	Cause codes shall be encoded as per table 5.22.
5.2.2.2.26	At least one copy of this parameter shall be included whenever the 'r' bit in the Connection Management parameter is set to 1.
5.2.2.2.27	This parameter shall not be included if the 'r' bit is set to 0.
5.2.2.2.28	An LME receiving an LCR Cause parameter less than 80 hex shall not transmit another CTRL_CMD to that peer station for the duration of time designated in the LCR Cause parameter.
5.2.2.2.29	An LME receiving an LCR Cause parameter greater than 7F hex shall not transmit another CTRL_CMD to that peer system for the duration of time designated in the LCR Cause parameter.

Table 5.21: LCR cause parameter

Field	Octet	Bit number								Notes
		8	**7**	**6**	**5**	**4**	**3**	**2**	**1**	
Parameter ID	**n + 1**	0	0	0	0	0	1	0	0	LCR cause
Parameter length	**n + 2**	lg_8	lg_7	lg_6	lg_5	lg_4	lg_3	lg_2	lg_1	
Parameter value	**n + 3**	c_8	c_7	c_6	c_5	c_4	c_3	c_2	c_1	cause
	n + 4	d_{16}	d_{15}	d_{14}	d_{13}	d_{12}	d_{11}	d_{10}	d_9	delay
	n + 5	d_8	d_7	d_6	d_5	d_4	d_3	d_2	d_1	
	n + 6	a_8	a_7	a_6	a_5	a_4	a_3	a_2	a_1	additional data

Table 5.22: Cause code table

Cause	Function	Additional data encoding
00h	Bad local parameter. The additional data block, which may be repeated, Contains the PI of a parameter which cannot be Satisfied by this ground station. This cause will not be Sent for an illegal Connection Management parameter.	g_8 g_7 g_6 g_5 g_4 g_3 g_2 g_1 p_8 p_7 p_6 p_5 p_4 p_3 p_2 p_1
01h 02h 03h 04h 05h 06h 07 to 7Eh 7Fh	Out of link layer resources. Out of packet layer resources. Terrestrial network not available. Terrestrial network congestion. Cannot support autotune. Station cannot support initiating handoff. Reserved Other unspecified local reason.	undefined
80h	Bad global parameter. The additional data block, which may be repeated, Contains the PI of a parameter which cannot be Satisfied by any ground station in the system. This cause Will not be sent for an illegal Connection Management Parameter.	identical to cause code 00
81h	Protocol Violation. The first octet of the additional data block contains: 1 - c/r bit (c bit) of the received CTRL; 2 - rebit of the received CTRL; 3 - Disconnected bit (d bit) shall be set to 1 if the LME has no links with the remote LME (the unexpected bit shall also be set to 1); 4 - Illegal bit (i bit) shall be set to 1 if the LME receives an illegal CTRL (i.e. not listed in table 5.42 and described in clause 5.3.4); 5 - Unexpected bit (u bit) shall be set to 1 if the LME receives a legal CTRL which is not legal in the context in which it was received. The remaining octets contains the parameter value of the Connection Management parameter (m bits) if included in the illegal CTRL. After transmitting or receiving an LCR with this cause Code, an LME shall delete all of its links.	0 0 0 u i d p c m_8 m_7 m_6 m_5 m_4 m_3 m_2 m_1
82h	Ground system out of resources.	
83 to FCh	Reserved	
FDh	Rejected for internal policy reasons	
	No response from VSS user.	
FFh	Other unspecified system reason.	

Requirement reference	
	UCTRL_DM parameter
5.2.2.2.30	The UCTRL_DM parameter shall define the period of time until an LME will accept new connections.
5.2.2.2.31	If the most significant bit is a one, then all existing connections shall be disconnected without any automatic recovery.
5.2.2.2.32	The seven least significant bits shall encode a field of 0 s to 127 s of time until new connections will be accepted.
5.2.2.2.33	If the UCTRL_DM parameter is included within a UCTRL DLPDU with the ucid subfield set to 4, then the UCTRL_DM parameer ID and parameter length shall be omitted and no other parameter including in the UCTRL.
5.2.2.2.34	The field shall be encoded per table 5.23.

Table 5.23: UCTRL_DM parameter

Field	Octet	Bit number								Notes
		8	7	6	5	4	3	2	1	
Parameter ID	**n + 1**	0	0	0	0	0	1	0	1	
Parameter length	**n + 2**	0	0	0	0	0	0	0	1	
Parameter value	**n + 3**	uda	nct_7	nct_6	nct_5	nct_4	nct_3	nct_2	nct_1	Bits 1-7: new connection timeout Bit 8: Disconnect All flag

5.2.2.3 Mobile-initiated information parameters

Requirement reference	
5.2.2.3.1	Ground LMEs shall not send mobile-initiated information parameters parameters.
	Modulation support parameter
5.2.2.3.2	The modulation support parameter shall be encoded as shown in tables 5.24 and 5.25.

Table 5.24: Modulation support list encoding

Field	Octet	Bit number								Notes
		8	7	6	5	4	3	2	1	
Parameter ID	**n + 1**	1	0	0	0	0	0	0	0	Modulation support
Parameter length	**n + 2**	lg_8	lg_7	lg_6	lg_5	lg_4	lg_3	lg_2	lg_1	
Parameter value	**n + 3**	res	res	res	res	m_4	m_3	m_2	m_1	Mode

Table 5.25: Modulation encoding

Encoding	Meaning
0 to 1	Reserved
2	VDL Mode 2
3	VDL Mode 3
4	VDL Mode 4 (GFSK modulation)
5 to F	Reserved

Requirement reference	
	Acceptable alternate ground station parameter
5.2.2.3.3	The acceptable alternate ground station parameter shall define a list of ground stations in order of preference.
5.2.2.3.4	This parameter shall be defined by a list of DLS addresses decoded as per table 5.26.
5.2.2.3.5	These ground stations shall be used by the ground LME during handoffs as possible alternate ground stations, if the proposed ground station is not acceptable to the ground LME.

Table 5.26: Acceptable alternate ground station parameter

Field	Octet	Bit number								Notes
		8	7	6	5	4	3	2	1	
Parameter ID	**n + 1**	1	0	0	0	0	0	0	1	Alternate ground station
Parameter length	**n + 2**	lg_8	lg_7	lg_6	lg_5	lg_4	lg_3	lg_2	lg_1	
Parameter value	**n + 3**	0	0	0	0	0	g_{27}	g_{26}	g_{25}	DLS Address
	n + 4	g_{24}	g_{23}	g_{22}	g_{21}	g_{20}	g_{19}	g_{18}	g_{17}	
	n + 5	g_{16}	g_{15}	g_{14}	g_{13}	g_{12}	g_{11}	g_{10}	g_9	
	n + 6	g_8	g_7	g_6	g_5	g_4	g_3	g_2	g_1	

Requirement reference	
	Destination airport parameter
5.2.2.3.6	The destination airport parameter parameter shall define the destination airport identifier of the mobile.
5.2.2.3.7	It shall be encoded as four 8-bit ISO IA-5 characters as defined in table 5.27.

Table 5.27: Destination airport parameter

Field	Octet	Bit number								Notes
		8	**7**	**6**	**5**	**4**	**3**	**2**	**1**	
Parameter ID	**n + 1**	1	0	0	0	0	0	1	0	Destination airport
Parameter length	**n + 2**	lg_8	lg_7	lg_6	lg_5	lg_4	lg_3	lg_2	lg_1	
Parameter value	**n + 3**	a_8	a_7	a_6	a_5	a_4	a_3	a_2	a_1	(first character)
	n + 4	b_8	b_7	b_6	b_5	b_4	b_3	b_2	b_1	
	n + 5	c_8	c_7	c_6	c_5	c_4	c_3	c_2	c_1	
	n + 6	d_8	d_7	d_6	d_5	d_4	d_3	d_2	d_1	(fourth character)

5.2.2.4 Ground-initiated modification parameters

Requirement reference	
	Data link service parameter
5.2.2.4.1	The data link service parameter parameter shall define the value of ND1, ND2, ND3, TD1, TD2 that a mobile is to use for priority levels Q1min to Q1max.
5.2.2.4.2	It shall be encoded as per table 5.28.

Table 5.28: Data link service parameter encoding

Field	Octet	Bit number								Notes
		8	**7**	**6**	**5**	**4**	**3**	**2**	**1**	
Parameter ID	**n + 1**	0	1	0	0	0	0	0	0	Data link service parameter
Parameter length	**n + 2**	lg_8	lg_7	lg_6	lg_5	lg_4	lg_3	lg_2	lg_1	
Parameter value	**n + 3**	$Q1max_4$	$Q1max_3$	$Q1max_2$	$Q1max_1$	$Q1min_4$	$Q1min_3$	$Q1min_2$	$Q1min_1$	minimum priority (Q1min), maximum priority (Q1max)
	n + 4	$ND1_8$	$ND1_7$	$ND1_6$	$ND1_5$	$ND1_4$	$ND1_3$	$ND1_2$	$ND1_1$	ND1
	n + 5	res	res	$TD2_{13}$	$TD1_{13}$	$ND2_9$	$ND1_{11}$	$ND1_{10}$	$ND1_9$	
	n + 6	$ND2_8$	$ND2_7$	$ND2_6$	$ND2_5$	$ND2_4$	$ND2_3$	$ND2_2$	$ND2_1$	ND2
	n + 7	$ND4_9$	$ND3_7$	$ND3_6$	$ND3_5$	$ND3_4$	$ND3_3$	$ND3_2$	$ND3_1$	ND3
	n + 8	$ND4_8$	$ND4_7$	$ND4_6$	$ND4_5$	$ND4_4$	$ND4_3$	$ND4_2$	$ND4_1$	ND4
	n + 9	$TD1_8$	$TD1_7$	$TD1_6$	$TD1_5$	$TD1_4$	$TD1_3$	$TD1_2$	$TD1_1$	TD1
	n + 10	$TD2_{12}$	$TD2_{11}$	$TD2_{10}$	$TD2_9$	$TD1_{12}$	$TD1_{11}$	$TD1_{10}$	$TD1_9$	
	n + 11	$TD2_8$	$TD2_7$	$TD2_6$	$TD2_5$	$TD2_4$	$TD2_3$	$TD2_2$	$TD2_1$	TD2

Requirement reference	
	Autotune frequency parameter
5.2.2.4.3	This parameter shall define the frequency and modulation scheme that a mobile LME shall use to reply to a ground station listed in the replacement ground station list parameter.
5.2.2.4.4	This parameter shall be sent by a ground LME when an autotune is required.
5.2.2.4.5	The parameter shall be encoded as a 16-bit field as per EN 301 842-2 [5] table 5.29.
5.2.2.4.6	The modulation subfield (m bits) shall be defined as per EN 301 842-2 [5] table 5.25.
5.2.2.4.7	The frequency subfield (f bits) shall be defined as per EN 301 842-2 [5] table 5.25.

Table 5.29: Autotune parameter encoding

Field	Octet	Bit number								Notes
		8	**7**	**6**	**5**	**4**	**3**	**2**	**1**	
Parameter ID	**n + 1**	0	1	0	0	0	1	0	1	Autotune frequency
Parameter length	**n + 2**	0	0	0	0	0	0	1	0	
Parameter value	**n + 3**	m_4	m_3	m_2	m_1	f_{12}	f_{11}	f_{10}	f_9	
	n + 4	f_8	f_7	f_6	f_5	f_4	f_3	f_2	f_1	

Requirement reference	
	Maximum number of missed reservations parameter
5.2.2.4.8	This parameter shall define the number of consecutive missed reservations that will be used to determine a station is unreachable.
5.2.2.4.9	This parameter shall be sent by a ground LME, as required, to adjust the timeliness of the LEAVE event.
5.2.2.4.10	The parameter shall be encoded as per table 5.30.
5.2.2.4.11	The parameters (L1, TL3 and TL4) shall be defined as per table 5.41.

Table 5.30: L1 parameter encoding

Field	Octet	Bit number								Notes
		8	**7**	**6**	**5**	**4**	**3**	**2**	**1**	
Parameter ID	**n + 1**	0	1	0	0	0	1	1	0	
Parameter length	**n + 2**	0	0	0	0	0	0	0	1	
Parameter value	**n + 3**	$L1_8$	$L1_7$	$L1_6$	$L1_5$	$L1_4$	$L1_3$	$L1_2$	$L1_1$	L1 counter
	n + 4	0	0	0	$TL3_5$	$TL3_4$	$TL3_3$	$TL3_2$	$TL3_1$	TL3 timer
	n + 5	$TL4_8$	$TL4_7$	$TL4_6$	$TL4_5$	$TL4_4$	$TL4_3$	$TL4_2$	$TL4_1$	TL4 timer
NOTE: When situated in the centre of the service volume the generation of the leave event should be suppressed for a period of time on the assumption that the datalink will become available again, thus the value of TL4 should provide sufficient time to complete a handoff. When on the edge of the service volume, a Leave event should be generated as soon as the unreachibility is declared internally, thus the value of TL4 should be low.										

Requirement reference	
	Replacement ground station list parameter
5.2.2.4.12	The replacement ground station list parameter shall define a list of ground stations in order of ground LME preference.
5.2.2.4.13	This parameter shall be encoded as a list of DLS addresses in 32-bit fields as per table 5.31.

Table 5.31: Replacement ground station list parameter encoding

Field	Octet	Bit number								Notes
		8	7	6	5	4	3	2	1	
Parameter ID	**n + 1**	0	1	0	0	0	1	1	1	Replacement ground station list parameter
Parameter length	**n + 2**	n_8	n_7	n_6	n_5	n_4	n_3	n_2	n_1	
Parameter value	**n + 3**	0	0	0	0	0	g_{27}	g_{26}	g_{25}	
	n + 4	g_{24}	g_{23}	g_{22}	g_{21}	g_{20}	g_{19}	g_{18}	g_{17}	
	n + 5	g_{16}	g_{15}	g_{14}	g_{13}	g_{12}	g_{11}	g_{10}	g_9	
	n + 6	g_8	g_7	g_6	g_5	g_4	g_3	g_2	g_1	

Requirement reference	
	Re-transmission parameter
5.2.2.4.14	The re-transmission parameter shall define the value of Q5 that a mobile MAC uses for priority levels Q1min to Q1max.
5.2.2.4.15	The re-transmission parameter shall be encoded as per table 5.32.

Table 5.32: Re-transmission parameter encoding

Field	Octet	Bit number								Notes
		8	7	6	5	4	3	2	1	
Parameter ID	**n + 1**	0	1	0	0	1	0	0	1	Re-transmission parameter
Parameter length	**n + 2**	lg_8	lg_7	lg_6	lg_5	lg_4	lg_3	lg_2	lg_1	
Parameter value	**n + 3**	$Q1max_4$	$Q1max_3$	$Q1max_2$	$Q1max_1$	$Q1min_4$	$Q1min_3$	$Q1min_2$	$Q1min_1$	minimum priority (Q1min), maximum priority (Q1max)
	n + 4	min_8	min_7	min_6	min_5	min_4	min_3	min_2	min_1	$Q5_{min}$
	n + 5	0	min_{15}	min_{14}	min_{13}	min_{12}	min_{11}	min_{10}	min_9	
	n + 6	max_8	max_7	max_6	max_5	max_4	max_3	max_2	max_1	$Q5_{max}$
	n + 7	0	max_{15}	max_{14}	max_{13}	max_{12}	max_{11}	max_{10}	max_9	
	n + 8	$mult_8$	$mult_7$	$mult_6$	$mult_5$	$mult_4$	$mult_3$	$mult_2$	$mult_1$	$Q5_{mult}$
	n + 9	exp_8	exp_7	exp_6	exp_5	exp_4	exp_3	exp_2	exp_1	$Q5_{exp}$
	n + 10	0	0	0	0	num_4	num_3	num_2	num_1	$Q5_{num}$
	n + 11	0	$wait_7$	$wait_6$	$wait_5$	$wait_4$	$wait_3$	$wait_2$	$wait_1$	$Q5_{wait}$

Requirement reference	
	Timer TL1 parameter
5.2.2.4.16	The timer TL1 parameter shall define the value of Timer TL1 (in seconds) that the initiating and responding LMEs use.
5.2.2.4.17	The Timer TL1 parameter shall be encoded as two 8-bit integers per table 5.33.

Table 5.33: Timer TL1 parameter encoding

Field	Octet	Bit number								Notes
		8	7	6	5	4	3	2	1	
Parameter ID	**n + 1**	0	1	0	0	1	0	1	0	Timer TL1 parameter
Parameter length	**n + 2**	0	0	0	0	0	0	1	0	
Parameter value	**n + 3**	i_8	i_7	i_6	i_5	i_4	i_3	i_2	i_1	(initiating)
	n + 4	r_8	r_7	r_6	r_5	r_4	r_3	r_2	r_1	(responding)

Requirement reference	
	Ground station address filter parameter
5.2.2.4.18	This parameter shall define the DLS address of the ground station from which links are handed-off.
5.2.2.4.19	This parameter shall be sent in a CTRL_CMD and the ground station address filter encoded as defined in table 5.34.

Table 5.34: Ground station address filter parameter

Field	Octet	Bit number								Notes
		8	**7**	**6**	**5**	**4**	**3**	**2**	**1**	
Parameter ID	**n + 1**	0	1	0	0	1	0	1	1	Ground station address filter
Parameter length	**n + 2**	0	0	0	0	0	1	0	0	
Parameter value	**n + 3**	0	0	0	0	0	g_{27}	g_{26}	g_{25}	DLS address
	n + 4	g_{24}	g_{23}	g_{22}	g_{21}	g_{20}	g_{19}	g_{18}	g_{17}	
	n + 5	g_{16}	g_{15}	g_{14}	g_{13}	g_{12}	g_{11}	g_{10}	g_9	
	n + 6	g_8	g_7	g_6	g_5	g_4	g_3	g_2	g_1	

Requirement reference	
	Broadcast connection parameter
5.2.2.4.20	The broadcast connection parameter shall define a single mobile"s link attributes for a new link, ie: the station address whose link was successfully established on the new link.
5.2.2.4.21	As per table 5.35, the mobile id subfield (a bits) shall be the station address.

Table 5.35: Broadcast connection parameter encoding

Field	Octet	Bit number								Notes
		8	**7**	**6**	**5**	**4**	**3**	**2**	**1**	
Parameter ID	**n + 1**	0	1	0	0	1	1	0	0	Ground station address filter parameter
Parameter length	**n + 2**	lg_8	lg_7	lg_6	lg_5	lg_4	lg_3	lg_2	lg_1	
Parameter value	**n + 3**	0	0	0	0	0	a_{27}	a_{26}	a_{25}	mobile ID
	n + 4	a_{24}	a_{23}	a_{22}	a_{21}	a_{20}	a_{19}	a_{18}	a_{17}	
	n + 5	a_{16}	a_{15}	a_{14}	a_{13}	a_{12}	a_{11}	a_{10}	a_9	
	n + 6	a_8	a_7	a_6	a_5	a_4	a_3	a_2	a_1	

5.2.2.5 Ground-initiated information parameters

Requirement reference	
	Airport coverage indication parameter
5.2.2.5.1	The airport coverage indication parameter shall define a list of four-character airport identifiers of airports for which the ground station can support communication with a mobile on the ground.
5.2.2.5.2	Each four-character identifier shall be encoded as four 8-bit ISO IA-5 characters as per table 5.36.

Table 5.36: Airport coverage indication parameter encoding

Field	Octet	Bit number								Notes
		8	7	6	5	4	3	2	1	
Parameter ID	**n + 1**	1	1	0	0	0	0	0	0	Airport coverage indication parameter
Parameter length	**n + 2**	lg_8	lg_7	lg_6	lg_5	lg_4	lg_3	lg_2	lg_1	
Parameter value	**n + 3**	a_8	a_7	a_6	a_5	a_4	a_3	a_2	a_1	(first character)
	n + 4	b_8	b_7	b_6	b_5	b_4	b_3	b_2	b_1	
	n + 5	c_8	c_7	c_6	c_5	c_4	c_3	c_2	c_1	
	n + 6	d_8	d_7	d_6	d_5	d_4	d_3	d_2	d_1	(fourth character)

Requirement reference	
	Nearest airport parameter
5.2.2.5.3	The nearest airport parameter shall define the four-character airport ID of the airport nearest the ground station.
5.2.2.5.4	It shall be encoded as four 8-bit ISO IA-5 characters as per table 5.37.
5.2.2.5.5	The nearest airport parameter shall not be included in a CTRL if the Airport Coverage Indication is included.

Table 5.37: Nearest airport parameter encoding

Field	Octet	Bit number								Notes
		8	7	6	5	4	3	2	1	
Parameter ID	**n + 1**	1	1	0	0	0	0	0	1	Nearest airport parameter
Parameter length	**n + 2**	0	0	0	0	0	1	0	0	
Parameter value	**n + 3**	a_8	a_7	a_6	a_5	a_4	a_3	a_2	a_1	(first character)
	n + 4	b_8	b_7	b_6	b_5	b_4	b_3	b_2	b_1	
	n + 5	c_8	c_7	c_6	c_5	c_4	c_3	c_2	c_1	
	n + 6	d_8	d_7	d_6	d_5	d_4	d_3	d_2	d_1	(fourth character)

Requirement reference	
	ATN router NETs parameter
5.2.2.5.6	The ATN router NETs parameter shall define a list of ATN air-ground routers identified by the "administration identifier" (ADM) and "administration region selector" (ARS) subfields of their network entity titles (NETs).
5.2.2.5.7	It shall be encoded as per table 5.38.

Table 5.38: ATN router NETs parameter encoding

Field	Octet	Bit number								Notes
		8	7	6	5	4	3	2	1	
Parameter ID	**n + 1**	1	1	0	0	0	0	1	0	ATN router NETs parameter
Parameter length	**n + 2**	lg_8	lg_7	lg_6	lg_5	lg_4	lg_3	lg_2	lg_1	
Parameter value	**n + 3**	a_{24}	a_{23}	a_{22}	a_{21}	a_{20}	a_{19}	a_{18}	a_{17}	ADM subfield
	n + 4	a_{16}	a_{15}	a_{14}	a_{13}	a_{12}	a_{11}	a_{10}	a_9	
	n + 5	a_8	a_7	a_6	a_5	a_4	a_3	a_2	a_1	
	n + 6	r_{24}	r_{23}	r_{22}	r_{21}	r_{20}	r_{19}	r_{18}	r_{17}	ARS subfield
	n + 7	r_{16}	r_{15}	r_{14}	r_{13}	r_{12}	r_{11}	r_{10}	r_9	
	n + 8	r_8	r_7	r_6	r_5	r_4	r_3	r_2	r_1	

Requirement reference	
	Ground-based system mask parameter
5.2.2.5.8	The ground-based system mask parameter shall define the ground-based system mask.
5.2.2.5.9	It shall be encoded as a 27-bit mask in a 32-bit field as per table 5.39.

Table 5.39: Ground-based system mask parameter encoding

Field	Octet	Bit number								Notes
		8	**7**	**6**	**5**	**4**	**3**	**2**	**1**	
Parameter ID	**n + 1**	1	1	0	0	0	0	1	1	Ground-based system mask parameter
Parameter length	**n + 2**	0	0	0	0	0	1	0	0	
Parameter value	**n + 3**	0	0	0	0	0	g_{27}	g_{26}	g_{25}	
	n + 4	g_{24}	g_{23}	g_{22}	g_{21}	g_{20}	g_{19}	g_{18}	g_{17}	
	n + 5	g_{16}	g_{15}	g_{14}	g_{13}	g_{12}	g_{11}	g_{10}	g_9	
	n + 6	g_8	g_7	g_6	g_5	g_4	g_3	g_2	g_1	

Requirement reference	
	Frequency support list
5.2.2.5.10	The frequency support list, encoded per table 5.40, shall provide the mode, frequency, ground station address information and the relative location of the ground station listed.
5.2.2.5.11	The location shall be encoded as an offset relative to the position of the source station:
5.2.2.5.12	Easterly offset (eo) (West is negative) and Northerly offset (no) (South is negative) shall each be 8 bit parameters with a resolution of 4 nmi encoded using two''s complement math.
5.2.2.5.13	The mode shall be encoded per EN 301 842-2 [5] table 5.25.
5.2.2.5.14	The frequency shall be encoded per EN 301 842-2 [5] table 5.25.

Table 5.40: Frequency support list encoding

Field	Octet	Bit number								Notes
		8	**7**	**6**	**5**	**4**	**3**	**2**	**1**	
Parameter ID	**n + 1**	1	1	0	0	0	1	0	0	frequency support list
Parameter length	**n + 2**	lg_8	lg_7	lg_6	lg_5	lg_4	lg_3	lg_2	lg_1	
Parameter value	**n + 3**	m_4	m_3	m_2	m_1	f_{12}	f_{11}	f_{10}	f_9	mode/frequency
	n + 4	f_8	f_7	f_6	f_5	f_4	f_3	f_2	f_1	
	n + 5	0	0	0	0	0	g_{27}	g_{26}	g_{25}	ground station identification
	n + 6	g_{24}	g_{23}	g_{22}	g_{21}	g_{20}	g_{19}	g_{18}	g_{17}	
	n + 7	g_{16}	g_{15}	g_{14}	g_{13}	g_{12}	g_{11}	g_{10}	g_9	
	n + 8	g_8	g_7	g_6	g_5	g_4	g_3	g_2	g_1	
	n + 9	eo_8	eo_7	eo_6	eo_5	eo_4	eo_3	eo_2	eo_1	easterly offset
	n + 10	no_8	no_7	no_6	no_5	no_4	no_3	no_2	no_1	northerly offset

5.2.3 LME timers and parameters

5.2.3.1 General

Requirement reference	
5.2.3.1.1	The LME service shall implement the system parameters defined in table 5.41.

Table 5.41: Management entity system parameters

Symbol	Parameter name	Minimum	Maximum	Default	Increment
L1	Maximum number of missed reservations	1	255	3	1
TL1	Maximum link overlap time initiating responding	 0 s 0 s	 255 s 255 s	 20 s 60 s	 1 s 1 s
TL2	Link initilization time	5 s	25 s	6 s	1 ms
TL3	Inter-miss timer	0 s	31 s	5 s	1 s
TL4	Leave event generation latency	0 s	255 s	20 s	1 s

5.2.3.2 Counter L1 (maximum number of missed reservations) and Timer TL3 (inter-miss timer)

Requirement reference	
5.2.3.2.1	Parameter L1 shall be the maximum number of missed reservations before a station assumes that a peer station is unreachable.
5.2.3.2.2	There shall be one counter L1 per peer station as well as one per frequency (per peer station).
5.2.3.2.3	Counter L1 (both the all-frequencies and the appropriate frequency elements of the counter) shall be set to zero when a transmission is received from a peer station.
5.2.3.2.4	Counter L1 shall be incremented when no transmission is received from a peer station for which there was a prior reservation made by the peer station for itself if the particular L1 has not been incremented in the prior TL3 seconds.
5.2.3.2.5	When the all-frequencies counter L1 exceeds the maximum number of missed reservations (the value of parameter L1), the peer station shall be marked as unreachable in the peer entity contact table (PECT) (see EN 301 842-2 [5] clause 5.4.4.2), and it shall attempt to handoff to another ground station following the procedures of clause 1.5.7.
5.2.3.2.6	Stations marked as unreachable shall be retained in the PECT for a period of time not less than 60 min.
5.2.3.2.7	When the single-frequency counter L1 exceeds the maximum number of missed reservations, the peer station shall be marked unreachable on that frequency.

5.2.3.3 Timer TL1 (maximum link overlap time)

Requirement reference	
5.2.3.3.1	Timer TL1 shall be set to the maximum time that initiating and responding LMEs will maintain the old link during handoffs.
5.2.3.3.2	The LME initiating the handoff shall start its Timer TL1 when it receives an CTRL_RSP_HO.
5.2.3.3.3	The LME responding to the handoff shall start its Timer TL1 when it transmits its CTRL_RSP_HO.
5.2.3.3.4	The initiating LME shall never restart its Timer TL1.
5.2.3.3.5	The responding LME shall restart its Timer TL1 if it retransmits a CTRL_RSP_HO.
5.2.3.3.6	Timer TL1 shall be cancelled if either the old or new link is prematurely disconnected.
5.2.3.3.7	After TL1 expires, each LME shall silently disconnect its half of the old link.

5.2.3.4 Parameters TL2 (link initialization time)

Requirement reference	
5.2.3.4.1	The parameter TL2 shall control the retransmission of CTRL DLPDU for which an expected response has not been received.
5.2.3.4.2	Timer TL2 shall be set after the transmission of a CTRL for which a response is expected.
5.2.3.4.3	Timer TL2 shall be cleared upon receipt of a CTRL DLPDU from the peer LME.
5.2.3.4.4	If Timer TL2 expires, the LME shall attempt to handoff to another ground station in accordance with the procedures of clause 5.2.5.

5.2.3.5 Timer TL4 (leave generation latency)

Requirement reference	
5.2.3.5.1	Timer TL4 shall control the triggering of Leave events.
5.2.3.5.2	Timer TL4 shall be set whenever the LME initiates a handoff because of an invalid link.
5.2.3.5.3	Timer TL4 shall be cancelled upon completion of a successful handoff.
5.2.3.5.4	If Timer TL4 expires, the LME shall generate a Leave event as described in clause 2.
5.2.3.5.5	Timer TL4 shall never be cancelled.

5.2.4 CTRL DLPDU types and procedures

Requirement reference	
5.2.4.1	The mobile and ground LMEs shall use the CTRL DLPDU types listed in table 5.42, and the procedures described below to provide a reliable connection between the mobile and ground-based system.
5.2.4.2	If an LME receives any valid CTRL_HO frame from a system with which it does not have a link, it shall respond with a CTRL_LCR with the 'd' bit set to 1 in the Protocol Violation Cause Code.

Table 5.42: CTRL parameters

		GSIF	Air initiated link establishment	
	Source address	**Ground station**	**Mobile**	**New ground station**
	Destination address	**All aircraft**	**Proposed ground station**	**Mobile**
CTRL parameters	PI hex	GSIF	CTRL_CMD_LE	CTRL_RSP_LE
Connection management	01h	N/A	M	M
CTRL sequencing	02h	N/A	M	M
Protocol options	03h	N/A	O	O
LCR cause	04h	N/A	N/A	N/A
UCTRL_DM	05h	O	N/A	N/A
Datalink service	40h	O	N/A	O
VSS sublayer	41h	O	N/A	O
Quality of Service	42h	O	N/A	O
m2 filter	43h	O	N/A	O
CG1 filter	44h	O	N/A	O
Autotune	45h	O	N/A	O
Maximum number of missed reservations	46h	N/A	N/A	O
Repl. Ground station	47h	O	N/A	O
Random access	48h	O	N/A	O
Re-transmission	49h	O	N/A	O
Timer TL1	4Ah	O	N/A	O
Ground Station Address filter	4Bh	N/A	N/A	N/A
Broadcast connection	4Ch	N/A	N/A	N/A
Modulation support	80h	N/A	O	N/A
Alternate grd stations	81h	N/A	O	N/A
Destination airport	82h	N/A	O	N/A
Airport coverage	C0h	O	N/A	O
Nearest airport	C1h	M[1]	N/A	O[2]
ATN router NETs	C2h	M[1]	N/A	O[2]
Ground-based system mask	C3h	M	N/A	M
Frequency support	C4h	O	N/A	O
Directory of service	C5h	O	N/A	O
Channel management	C6h	O	N/A	O

PI: Parameter Identifier.
M: Mandatory.
O: Optional.
N/A: Not Applicable.
H: hexadecimal.

NOTE 1: In a GSIF DLPDU it is mandatory to include either the Airport Coverage Indication parameter or the Nearest Airport Identifier parameter but not both.
NOTE 2: Where the Airport Coverage Indication parameter and the Nearest Airport Identifier parameter are marked as optional, either parameter may be included in the DLPDU or neither but not both.

Table 5.42 (continued): CTRL parameters

		Ground initiated handoff		Air initiated handoff	
	Source address	**Proposed ground station**	**Mobile**	**Mobile**	**New ground station**
	Destination address	**Mobile**	**New ground station**	**Proposed ground station**	**Mobile**
CTRL parameters	PI hex	CTRL_CMD_HO (re = 1)	CTRL_RSP_HO (re = 1)	CTRL_CMD_HO (re = 1)	CTRL_RSP_HO (re = 1)
Connection Management	01h	M	M	M	M
CTRL sequencing	02h	M	M	M	M
Protocol options	03h	O	O	O	O
LCR cause	04h	N/A	N/A	N/A	N/A
UCTRL_DM	05h	N/A	N/A	N/A	N/A
Datalink service	40h	O	N/A	N/A	O
VSS sublayer	41h	O	N/A	N/A	O
Quality of service	42h	O	N/A	N/A	O
m2 filter	43h	O	N/A	N/A	O
CG1 filter	44h	O	N/A	N/A	O
Autotune	45h	O	N/A	N/A	O
Maximum number of missed reservations	46h	O	N/A	N/A	O
Repl. Ground station	47h	O	N/A	N/A	O
Random access	48h	O	N/A	N/A	O
Re-transmission	49h	O	N/A	N/A	O
Timer TL1	4Ah	O	N/A	N/A	O
Ground Station Address filter	4Bh	N/A	N/A	N/A	N/A
Broadcast connection	4Ch	N/A	N/A	N/A	N/A
Modulation support	80h	N/A	N/A	N/A	N/A
Alternate ground stations	81h	N/A	N/A	O	N/A
Destination airport	82h	N/A	O	O	N/A
Airport coverage	C0h	O[1]	N/A	N/A	O[1]
Nearest airport ID	C1h	O[1]	N/A	N/A	O[1]
ATN router NETs	C2h	M	N/A	N/A	O
Ground-based system mask	C3h	M	N/A	N/A	O
Frequency support	C4h	O	N/A	N/A	O
Directory of service	C5h	O	N/A	N/A	O
Channel management	C6h	O	N/A	N/A	O

PI: Parameter identifier.
M: Mandatory.
O: Optional.
N/A: Not Applicable.
h: hexadecimal.

NOTE: Where the Airport Coverage Indication parameter and the Nearest Airport Identifier parameter are marked as optional, either parameter may be included in the DLPDU or neither but not both.

Table 5.42 (concluded): CTRL parameters

		Ground initiated handoff		Air initiated handoff	
	Source address	**Proposed ground station**	**Mobile**	**Mobile**	**New ground station**
	Destination address	**Mobile**	**New ground station**	**Proposed ground station**	**Mobile**
CTRL parameters	PI hex	CTRL_CMD_HO (re = 0)	CTRL_CMD_HO (re = 0)	CTRL_CMD_HO (re = 0)	CTRL_RSP_LCR CTRL_CMD_LCR
Connection management	01h	M	M	M	M
CTRL sequencing	02h	M	M	M	M
Protocol options	03h	O	O	O	O
LCR cause	04h	N/A	N/A	N/A	M
UCTRL_DM	05h	N/A	N/A	N/A	N/A
Data link service	40h	N/A	O	O	N/A
VSS sublayer	41h	N/A	O	O	N/A
Quality of service	42h	N/A	O	O	N/A
m2 filter	43h	N/A	O	O	N/A
CG1 filter	44h	N/A	O	O	N/A
Autotune	45h	N/A	O	O	N/A
Maximum number of missed reservations	46h	N/A	O	O	N/A
Repl. Ground station	47h	N/A	O	O	N/A
Random access	48h	N/A	O	O	N/A
Re-transmission	49h	N/A	O	O	N/A
Timer TL1	4Ah	N/A	O	O	N/A
Ground Station Address filter	4Bh	N/A	N/A	M	N/A
Broadcast connection	4Ch	N/A	N/A	N/A	N/A
Modulation support	80h	N/A	N/A	O	N/A
Alternate ground	81h	O	N/A	N/A	N/A
Destination airport	82h	O	N/A	N/A	N/A
Airport coverage	C0h	N/A	N/A	O[1]	N/A
Nearest airport	C1h	N/A	N/A	O[1]	N/A
ATN router NETs	C2h	N/A	O	M	N/A
Ground-based system mask	C3h	N/A	O	O	N/A
Frequency support	C4h	N/A	O	O	N/A
Directory of service	C5h	N/A	O	O	N/A
Channel management	C6h	N/A	O	O	N/A

PI: Parameter Identifier.
M: Mandatory.
O: Optional.
N/A: Not Applicable.
h: hexadecimal.

NOTE: Where the Airport Coverage Indication parameter and the Nearest Airport Identifier parameter are marked as optional, either parameter may be included in the DLPDU or neither but not both.

5.2.5 CTRL transmission procedures

5.2.5.1 Link connectivity procedures

Requirement reference	
5.2.5.1.1	The ground LME shall use the following procedures to maintain connectivity across the VHF link: a) ground station identification; b) initial link establishment; c) mobile-initiated handoff; d) mobile-requested ground-initiated handoff; e) ground-initiated handoff; f) ground-requested mobile-initiated handoff; g) ground-requested mobile-intiated handoff; h) autotune.

5.2.5.2 Ground Station Identification

Requirement reference	
5.2.5.2.1	A ground station providing a VDL Mode 4 service shall send a GSIF at least once per minute on each of the channels on which it offers the service, as well as on the GSCs by broadcasting a UCTRL (ucid = 0) with parameters as per table 5.42.
5.2.5.2.2	The operator of that ground station shall ensure that, in addition to transmitting GSIFs on the service frequency, GSIFs are transmitted on the GSCs.

5.2.5.3 Link establishment

Requirement reference	
	General ground response
5.2.5.3.1	If the ground LME receives the CTRL_CMD_LE, it shall confirm link establishment by sending a CTRL_RSP_LE DLPDU containing the parameters as per table 5.42.
5.2.5.3.2	The ground LME shall include in the CTRL_RSP_LE any optional parameters for which it is not using the default values.
5.2.5.3.3	If the CTRL_RSP_LE includes the Autotune parameter then the Replacement Ground Station List parameter shall be included indicating the ground stations on the new frequency with which the mobile LME can establish a new link using the operating parameters specified in the CTRL_RSP_LE.
5.2.5.3.4	If the CTRL_RSP_LE does not include the Autotune parameter, the ground LME shall include the Replacement Ground Station List parameter if it wishes to indicate the ground stations which can be reached on the current frequency using the same operating parameters as the transmitting station.
	Exceptional cases
5.2.5.3.5	If an LME receiving the CTRL_CMD_LE cannot establish the link with the sending LME, then it shall transmit a CTRL_RSP_LCR instead of a CTRL_RSP_LE.

5.2.5.4 Mobile-initiated handoff

Requirement reference	
	Interaction of LMEs
5.2.5.4.1	When a mobile VME hands off from a ground station in one ground-based system (and thus associated with one LME) to a ground station in another ground-based system (and thus associated with a different LME in the mobile), the new LME shall use the link establishment procedures.
5.2.5.4.2	The old LME shall send a DM/DISC when directed by the VME.
	General ground response
5.2.5.4.3	If the ground LME receives the CTRL_CMD_HO, it shall confirm link handoff by sending a CTRL_RSP_HO DLPDU containing the parameters as per table 5.42.
5.2.5.4.4	The ground LME shall include in the CTRL_RSP_HO the optional parameters for which it is not using the default values.
5.2.5.4.5	If the CTRL_RSP_HO includes the Autotune parameter, then the Replacement Ground Station List parameter shall be included to indicate the ground stations with which the mobile LME can establish a new link on the new frequency, using the operating parameters specified in the CTRL_RSP_HO.
5.2.5.4.6	If the CTRL_RSP_HO does not include the Autotune parameter, the ground LME shall include the Replacement Ground Station List parameter if it wishes to indicate the ground stations which can be reached on the current frequency using the same operating parameters as the transmitting station.
	Disconnecting old link
5.2.5.4.7	If the new and old ground stations are associated with different systems, then the procedures of clauses 5.2.5.4.1 and 5.2.5.4.2 shall be followed.
5.2.5.4.8	Otherwise, the mobile LME shall set Timer TL1 when it receives the CTRL_RSP_HO.
5.2.5.4.9	The ground LME shall set Timer TL1 after it transmits the CTRL_RSP_HO.
5.2.5.4.10	Both stations shall continue to operate on the old link until their respective Timer TL1 expires, after which each will consider the link disconnected without sending or receiving a DM/DISC.
	Exceptional cases
5.2.5.4.11	If the ground LME cannot satisfy the CTRL_CMD_HO, then it shall transmit a CTRL_RSP_LCR instead of a CTRL_RSP_HO.
5.2.5.4.12	In this case, the current link shall not be affected.

5.2.5.5 Mobile-requested ground-initiated handoff

Requirement reference	
	General ground response
5.2.5.5.1	If the ground LME receives the CTRL_CMD_HO , it shall commence a ground-initiated handoff (see clause 5.2.5.6) from a proposed ground station.
5.2.5.5.2	The ground LME shall only transmit the CTRL_CMD_HO (re = 1) once per CTRL_CMD_HO (re = 0) request that it receives.
	Exceptional cases
5.2.5.5.3	If the ground system cannot initiate the handoff, it shall send a CTRL_CMD_LCR (P = 0).
5.2.5.5.4	In this case, the current link shall not be affected.

5.2.5.6 Ground-initiated handoff

Requirement reference	
5.2.5.6.1	If a ground LME implements this section, then it shall set the 'I' bit in the Protocol Options parameter to 1.
5.2.5.6.2	Otherwise, it shall set the 'I' bit to 0.
	Ground action
5.2.5.6.3	To command a mobile, to which a link exists, to establish a new link to a proposed ground station on the same frequency, the ground LME shall send via that ground station a CTRL_CMD_HO (re = 1) to the mobile with parameters as per table 5.42.
5.2.5.6.4	If the ground LME will accept a handoff to other ground stations, the CTRL_CMD_HO shall include the Replacement Ground Station List parameter specifying the link layer address of those other stations.
5.2.5.6.5	Any operating parameters in the CTRL_CMD_HO (either modification or informational) shall be valid for the transmitting station and for all ground stations listed in the Replacement Ground Station List parameter, except the Airport Coverage Indication parameter and Nearest Airport parameter which are only valid for the transmitting ground station.
	Disconnecting old link
5.2.5.6.6	The ground LME shall set Timer TL1 when it receives the CTRL_RSP_HO.
5.2.5.6.7	Although new traffic will be sent over the new link, the old link shall not be disconnected immediately to allow any old traffic to be delivered.
	Exceptional cases
5.2.5.6.8	If the parameters in the CTRL_RSP_HO are not acceptable to the ground LME, then the ground LME shall transmit a DM/DISC to the mobile on the new link.
	Recommendation
5.2.5.6.9	If TL2 seconds have elapsed since the LME initiated the request to send the CTRL_CMD_HO, the ground LME **should** attempt to handoff via another station before disconnecting all links to the mobile.

5.2.5.7 Ground-requested mobile-initiated handoff

Requirement reference	
5.2.5.7.1	A ground LME shall not perform this clause with mobiles that do not support mobile-initiated handoff.
	Ground action
5.2.5.7.2	For the ground LME to request a mobile to initiate a handoff, it shall send a CTRL_CMD_HO (re = 0) on the current link with parameters as per table 5.42.
5.2.5.7.3	The parameters in the CTRL (both modification and information) shall be valid for all ground stations listed in the Replacement Ground Station List.
5.2.5.7.4	It shall only include operational parameters if it also includes the Replacement Ground Station List parameter.
5.2.5.7.5	If the Autotune parameter is included, then the Replacement Ground Station List parameter shall apply to the new frequency.
	Recommendation
5.2.5.7.6	If TL2 seconds have elapsed since the LME initiated the request to send the CTRL_CMD_HO, the ground LME **should** attempt to request a handoff via another station before disconnecting all links to the mobile.

5.2.5.8 Ground-requested broadcast handoff

Requirement reference	
5.2.5.8.1	If the ground LME supports broadcast link handoffs then it shall set the 'b ' bit in the protocol options parameter to 1.
5.2.5.8.2	Otherwise, it shall set the 'b' bit to 0.
	Ground action
5.2.5.8.3	If the ground LME supports broadcast link handoffs, for each mobile that indicates it supports broadcast link handoff, the ground LME shall confirm the link handoff by including the Broadcast Connection parameter per table 5.42.

5.2.5.9 Ground-commanded autotune

Requirement reference	
	Ground action
5.2.5.9.1	To command a mobile LME to handoff to a ground station on a different frequency, the ground LME shall include the Autotune and Replacement Ground Station List parameters in a CTRL it sends during a link establishment or handoff procedure.

5.2.6 VDL Mode 4 Mobile Subnetwork Dependent Convergence Function (SNDCF)

5.2.6.1 Frame Mode SNDCF

Requirement reference	
5.2.6.1.1	The VDL Mode 4 shall support the Frame Mode SNDCF as defined in [3], clause 5.7.8.
5.2.6.1.2	To support the interface, VDL Mode 4 shall generate a Join event upon reception of a CTRL_RSP_LE or a CTRL_RSP_HO.
5.2.6.1.3	and shall generate a Leave event whenever either the link is terminated, or the link is abandoned.
5.2.6.1.4	and shall provide a data transfer service as defined in clause 5.1.

5.3 Additional VSS Requirements

NOTE: The VSS requirements to support core link layer functionality are contained in EN 301 842-2 [5]. The requirements defined here are additional requirements to support the DLS.

5.3.1 Additional VSS quality of service parameters

5.3.1.1 Parameter Q5 (VSS retransmission parameters)

Requirement reference	
5.3.1.1.1	The parameters Q5min, Q5max, Q5mult, Q5num and Q5wait (defined in table 5.43) shall control the retransmission of bursts for which an expected response has not been received.

Table 5.43: VSS quality of service system parameters

Symbol	Parameter Name		Minimum	Maximum	Default	Increment
Q5min	VSS retransmission parameters	minimum	0 s	20 s	0	1 ms
Q5max		maximum	1 s	20 s	5 s	1 ms
Q5mult		multiplier	1	2,5	1	0,01
Q5exp		exponent	1	2,5	1,5	0,01
Q5num		number of attempts	1	15	4	1
Q5wait		maximum time to wait for a reply	1 s	120 s	60 s	1 s

5.3.2 Unicast request protocol specification

NOTE: This protocol is intended for a VSS user which requires a response from a peer VSS user.

5.3.2.1 Unicast request parameters

Requirement reference	
5.3.2.1.1	The unicast request protocol shall implement the system parameters as defined in table 5.44.

Table 5.44: Unicast request VSS system parameters

Symbol	Parameter name	Minimum	Maximum	Recommended default	Increment
V32	Minimum response delay	2 slot	500 slots	20 slots	1 slot
V33	Maximum response delay	2 slot	4 095 slots	1 000 slots	1 slot
V34	Source/destination control	0	1	0	1
V35	Broadcast control	0	1	0	1
V36	Length of reserved block	1 slot	256 slots	N/A	1 slot

Requirement reference	
5.3.2.1.2	The VSS user shall provide the destination address and any of the parameters V32, V33, V34, V35, V36 and Quality of Service parameters (Q2a to Q2d, Q4 and Q5) for which the default values are not desired.
	Parameter V32 (minimum response delay)
5.3.2.1.3	Parameter V32 shall be the minimum delay, measured in slot intervals, that a station will provide to a responder in order to ensure that the responder can generate the response before its reserved slot (see note 1).
	Parameter V33 (maximum response delay)
5.3.2.1.4	Parameter V33 shall be the maximum delay, measured in slot intervals, that a station will provide to a responder in order to ensure timely delivery in case a retransmission is required.
	Parameter V34 (source/destination control)
5.3.2.1.5	Parameter V34 shall control whether the unicast reservation protocol is used to reserve a slot for the destination station to transmit a response to the source (V34 = 0) or for the source station to transmit a response to the destination (V34 = 1).
5.3.2.1.6	If the broadcast control parameter (V35 = 1), the value of V34 shall be ignored (see note 2).
	Parameter V35 (broadcast control)
5.3.2.1.7	Parameter V35 shall control whether the lowest 24 bits of the destination subfield (d) are included in the reservation.
5.3.2.1.8	If V35 = 0, then the lowest 24 bits of the destination subfield shall be included and the reservation will be for the station to transmit to or receive from a peer station.
5.3.2.1.9	Otherwise the lowest 24 bits of the destination subfield shall be omitted, the address type field shall be set to 7 and the reservation will be for the station to make a broadcast transmission.
	Parameter V36 (length of reserved block)
5.3.2.1.10	Parameter V36 shall be the number of reserved slots required for the unicast reservation protocol response.
NOTE 1: $V32 \times 60/M1$ is the maximum time that a station is provided with to generate a response to the request.	
NOTE 2: If the destination subfield is omitted (V35 = 1), then the reservation is for the source to broadcast and the value of V34 has no meaning.	

5.3.2.2 Unicast request transmission procedures

Requirement reference	
	Selection of the transmission slot for the unicast request reservation
5.3.2.2.1	If no slot has been reserved for transmission of a unicast reservation, the station shall select a slot using the random access procedures (see EN 301 842-2 [5] clause 5.2.7).
5.3.2.2.2	The transmission slot (t_slot) shall be the slot containing the unicast request reservation transmission.
	Selection of the reserved slot for the response
5.3.2.2.3	A block of slots of length V36 to be reserved for the response (address type field ≠ 7) or broadcast transmission (address type field = 7) shall be selected using the slot selection procedure specified in EN 301 842-2 [5] clause 5.2.6.2, using VSS user supplied quality of service parameters, and candidate slots in the range V32 to V33 after the transmitted burst.
5.3.2.2.4	The reserved slot (r_slot) shall be the chosen slot or the first slot in the chosen group of slots.
	Unicast request burst transmission
5.3.2.2.5	A station sending a unicast request burst to its peer (V35 = 0) shall include the unicast request reservation field.
5.3.2.2.6	It shall set the destination (d) subfield to the destination of the burst, the response offset (ro) subfield to a value of (r_slot - t_slot -1), the length (lg) subfield equal to (V36 - 1), the priority (pr) subfield equal to the priority of the burst to be transmitted as defined by Q1 and the source/destination flag (sdf) to V34.
5.3.2.2.7	A station sending a unicast request burst to reserve a slot for a subsequent broadcast (V35 = 1) shall include the unicast request reservation field.
5.3.2.2.8	It shall set the response offset (ro) subfield to a value of (r_slot - t_slot - 1), the length (lg) subfield equal to (V36 - 1), the priority (pr) subfield equal to the priority of the burst to be transmitted as defined by Q1 and the address type field equal to 7.
	Retransmission after no response
5.3.2.2.9	In the case of address type subfield ≠ 7 and sdf = 0, if a response is not received by the end of the reserved response slot(s), then the station shall retransmit the unicast burst according to the procedures of clause 5.3.4.

5.3.3 Information transfer request protocol specification

NOTE: This protocol is intended for a VSS user which requires a peer VSS user to send a response of length, lg. The protocol also allows the requesting VSS user to place a reservation for an acknowledgement by the requesting VSS user to the response field.

5.3.3.1 Information transfer request parameters

Requirement reference	
5.3.3.1.1	The information transfer request protocol shall implement the system parameters defined in table 5.45.

Table 5.45: Information transfer request VSS system parameters

Symbol	Parameter name	Minimum	Maximum	Recommended default	Increment
V42	Length of information transfer	1 slot	256 slots	N/A (depends on information to be transmitted)	1 slot
V43	Minimum information transfer delay	2 slot	500 slots	20 slots	1 slot
V44	Maximum information transfer delay	2 slot	2 047 slots	1 000 slots	1 slot
V45	Minimum response delay	2 slot	500 slots	20 slots	1 slot
V46	Maximum response delay	2 slot	2 047 slots	1 000 slots	1 slot

Requirement reference	
5.3.3.1.2	The VSS user shall provide the destination address and any of the parameters V42, V43, V44, V45, V46 and quality of service parameters (Q2a to Q2d and Q4) for which the default values are not desired.
	Parameter V42 (length of information transfer)
5.3.3.1.3	Parameter V42 shall be the number of slots required for information transfer.
	Parameter V43 (minimum information transfer delay)
5.3.3.1.4	Parameter V43 shall be the minimum delay, measured in slot intervals, that a station will provide to a responder in order to ensure that the responder can generate the required information for transfer before its reserved slots (see note 1).
	Parameter V44 (maximum information.transfer delay)
5.3.3.1.5	Parameter V44 shall be the maximum delay, measured in slot intervals, that a station will provide to a responder in order to ensure timely delivery in case a retransmission is required.
	Parameter V45 (minimum response delay)
5.3.3.1.6	Parameter V45 shall be the minimum delay, measured in slot intervals after the information transfer that the requesting station will require in order to generate an acknowledgement to the information transfer in order to ensure that the requesting station can generate the acknowledgement before its reserved slot (see note 2).
	Parameter V46 (maximum response delay)
5.3.3.1.7	Parameter V46 shall be the maximum delay, measured in slot intervals after the information transfer that the requesting station will require in order to ensure timely delivery of the acknowledgement in case a retransmission is required.
NOTE 1: $V43 \times 60/M1$ is the maximum time that a station is provided with to generate a response to the request.	
NOTE 2: $V45 \times 60/M1$ is the maximum time that a station is provided with to generate an acknowledgement to the information transfer.	

5.3.3.2 Information transfer request transmission procedures

Requirement reference	
	Selection of the transmission slot for the information transfer request reservation
5.3.3.2.1	If no slot has been reserved for transmission of an information transfer request reservation, the station shall select a slot using the random access procedures (see clause 1.3.7).
5.3.3.2.2	The transmission slot (t_slot) shall be the slot containing the information transfer request reservation transmission.
	Selection of the reserved slots for the response
5.3.3.2.3	A block of slots of length V42 to be reserved for the response shall be selected using the slot selection procedure specified in clause 1.3.6.2, using VSS user supplied quality of service parameters, and candidate slots in the range V43 to V44 after the transmitted burst.
5.3.3.2.4	The reserved slot (r_slot) shall be the chosen slot or the first slot in the chosen group of slots.
	Selection of the reserved slot for the acknowledgement
5.3.3.2.5	The acknowledgement slot (a_slot) shall be selected using the slot selection procedure specified in EN 301 842-2 [5] clause 5.2.6.2, using VSS user supplied quality of service parameters, and candidate slots in the range V45 to V46 after the end of the slot or group of slots reserved for the response.
	Information transfer request burst transmission
5.3.3.2.6	A station sending an information transfer request burst to its peer shall include the information transfer request reservation field.
5.3.3.2.7	It shall set the destination (d) subfield to the destination of the burst, the response offset (ro) subfield to a value of (r_slot - t_slot -1), the length (lg) subfield equal to (V42-1), the frequency (f) subfield set to the channel on which information transfer is required and the acknowledgement offset (ao) subfield set to a value of (a_slot - r_slot - lg - 1).
	Action after no response
5.3.3.2.8	If a response is not received by the reserved information transfer slots, then the station shall inform the VSS user that no response has been received and carry out the actions defined by the VSS user (see note).
NOTE: For example, if the information transfer protocol is being used as part of DLS long transmission procedure, the defined action is to send a NACK in the slot reserved for the acknowledgement.	

5.3.3.3 Information transfer request acknowledgement procedures

Requirement reference	
5.3.3.3.1	The acknowledgement shall be on the same frequency as the information transfer reservation burst that was used to reserve a slot for the acknowledgement.

5.3.4 Retransmission procedures

Requirement reference	
5.3.4.1	After transmitting a burst containing a reservation for a peer station (i.e. unicast request reservation, directed request reservation, information transfer request reservation) and not receiving a response by the expected slot, a station shall either retransmit the request or inform the VSS user and LME if Q5num attempts have already been made or if more than Q5wait seconds have elapsed since the VSS user initiated the request.
5.3.4.2	The re-transmitting station shall wait for Q5min + *min*(U(x), Q5max) seconds before attempting to retransmit the burst, where: **U(x)** is a uniform random number generated between 0 and x; **x** is defined by Q5mult $\times$ (Q5exp^{retrans}) $\times$ M1 /(M1+ 1-u); **u** is the number of occupied slots within the past minute on the channel concerned; **retrans** is the number of times that a burst has been retransmitted (see note).
NOTE: If Q5num = 1, no re-transmission is attempted and hence parameters Q5max, Q5min, Q5mult, Q5exp are not used.	

6 General design requirements

The equipment shall meet the requirements of EN 301 842-2 [5] clause 6.

7 Protocol test procedures

7.1 General

The equipment shall meet the requirements of EN 301 842-2 [5] clause 7.1.

7.2 Required test rig

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

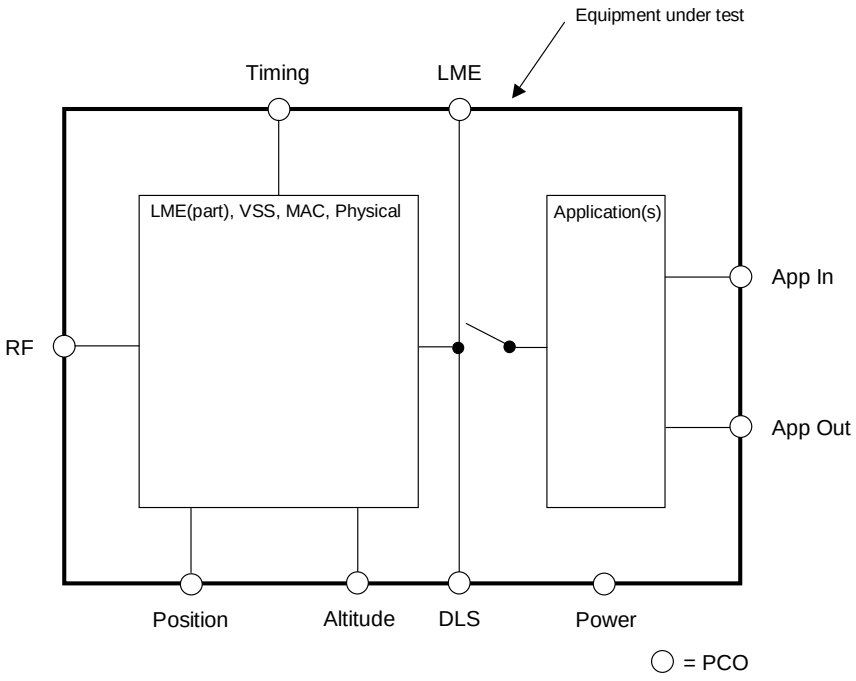


Figure 7.1: Location of PCOs

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

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

RF:

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

Timing:

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

- disabling of the input of reference time.

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

NOTE 2: In certain equipment architectures, the reference timing source may be incorporated internally within the equipment under test. Under such conditions, there is no requirement to expose the timing source itself, but a means 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 integrity (nic);
- disabling of the position source.

NOTE 3: Disabling of the position source is required to demonstrate that appropriate notification is provided by means of the Navigation Integrity Category 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 equipment shall meet the requirements of EN 301 842-2 [5] clause 7.3.

7.4 Detailed protocol test procedures

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

7.4.1 Test-suite overview

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

Table 7.1: Protocol test-suite overview

Test Case Name	Description
DLS_ND2	To demonstrate that a station will send data requiring a burst of length less than or equal to ND2 octets via the short transmission procedure, and a burst of length greater than ND2 via the long transmission procedure.
DLS_ND3	To demonstrate that fragmentation will not occur if a message is less than or equal to ND3 but will occur if it is greater than ND3 in length.
DLS_Data	To demonstrate that a station will only transmit one data link packet in a DATA DLPDU.
DLS_Duplicate_Short	To demonstrate that duplicate DATA DLPDUs received by the short transmission procedure are discarded.
DLS_Duplicate_Long	To demonstrate that duplicate DATA DLPDUs received by the long transmission procedure are discarded.
DLS_Long_Order	To demonstrate that DATA DLPDUs which are part of the same fragmented packet are concatenated and delivered to the DLS user in the same order in which they appear in the packet.

Test Case Name	Description
DLS_Long_T_Receive_A	To demonstrate that a station correctly sets the T bit when receiving non-combined data packets from another station.
DLS_Long_T_Receive_B	To demonstrate that a station correctly sets the T bit when receiving combined data packets from another station.
DLS_Long_TM_Send_A	To demonstrate that a station correctly sets the T and M bits when sending a single data packet to another mobile station with the long transmission procedure.
DLS_Long_TM_Send_B	To demonstrate that a station correctly sets the T and M bits when sending multiple data packets in sequence to another station with the long transmission procedure.
DLS_Length	To demonstrate that the length subfield (lg) of an RTS correctly indicates the length in slots of the DLS burst containing a DATA DLPDU.
DLS_Priority_Long	To demonstrate that a sending station will maintain a prioritized queue of data packets for transmission, and will transmit the highest priority packet first, when data requiring the long transmission procedure is queued to be sent.
DLS_Priority_Long_Short	To demonstrate that a sending station will maintain a prioritized queue of data packets for transmission, and will transmit the highest priority packet first, when data requiring a mixture of the long and short transmission procedures are queued to be sent.
DLS_Priority_Short	To demonstrate that a sending station will maintain a prioritized queue of data packets for transmission, and will transmit the highest priority packet first, when data requiring the short transmission procedure is queued to be sent.
DLS_Priority_CTRL	To demonstrate that a sending station will classify CTRL and CTRL_RTS as network management messages and assign the highest priority.
DLS_Priority_INFO_RTS	To demonstrate that an INFO_RTS will be assigned the same priority as the DATA DLPDU with which it is associated.
DLS_Long_UDATA_Send	To demonstrate that a single UDATA packet is sent correctly using the long transmission procedure, with the UDATA_RTS having the same priority and length fields as the DATA DLPDU with which it is associated.
DLS_Initialize_Send_Long	To demonstrate that a station displays correct behaviour and correctly sets the T and IB bits when sending data packets to another station during link initialization with the long transmission procedure.
DLS_Initialize_Receive_Long	To demonstrate that a station displays correct behaviour and correctly sets the T bit when receiving data packets from another station during link initialization with the long transmission procedure.
DLS_Short_T_Receive	To demonstrate that a station will respond with an ACK with the T bit set correctly when it receives a DATA DLPDU via the short transmission procedure.
DLS_Short_T_Send	To demonstrate that a station correctly sets the T and M bits when sending a single data packet to another mobile station with the short transmission procedure.
DLS_Short_DATA_ACK	To demonstrate that a station which has data to send back to the sending station that would fit into a single slot with the ACK, will include its own data DLPDU with the ACK.
DLS_Long_DATA_ACK	To demonstrate that a station which has data that would not fit into a single slot with the ACK, will send back to the sending station an RTS DLPDU with the ACK.
DLS_Short_NoAck	To demonstrate that a station will retransmit the DLS burst, according to the default DLS retransmission parameters, if an acknowledgement is not received.
DLS_Long_UDATA_Receive	To demonstrate that a station will correctly issue a CTS for an RTS_UDATA received via the long transmission procedure from another station.
DLS_Long_T_NoAck_A	To demonstrate that a station sends an ACK and correctly sets the T bit when in receipt of an RTS for a data packet that has already been received.
DLS_Long_Busy_A	To demonstrate that a station sends either a general confirm ìwith a unicast reservation, or a general failure, when in receipt of an RTS at a time that the channel is too busy to transmit the requested data.
DLS_Long_NoInfo_A	To demonstrate that a station will not transmit in response to a CTS when it has no information to transmit.
DLS_Long_NACK_A	To demonstrate that a station sends a NACK when an expected data DLPDU is not received.
DLS_Long_NoLink	To demonstrate that a station in receipt of a CTRL_RTS with IB = 0 transmits a DM/FRMR when it does not have a link with the sender.
DLS_Short_NoLink	To demonstrate that a station in receipt of a CTRL transmits a DM/DISC when it does not have a link with the sender.
DLS_Long_IB_Error	To demonstrate that a station in receipt of a CTRL_RTS with IB = 1 and T = 1 transmits a DM/FRMR.
DLS_Long_SZOM_Error	To demonstrate that a station in receipt of an SZOM from a station with which it will only communicate using NSCOP will transmit a DM/FRMR.

Test Case Name	Description
DLS_Short_SZOM_Error	To demonstrate that a station in receipt of an SZOM from a station with which it will only communicate using NSCOP will transmit a DM/FRMR.
DLS_ND1_Short_Receive	To demonstrate that a station in receipt of a data packet from another station that is greater in length than ND1 will discard the packet.
DLS_ND1_Short_Send	To demonstrate that a station requested to send a data packet by a DLS user that is greater in length than ND1 will discard the packet.
LME_CMD_LE_Receive	To demonstrate that a station displays correct behaviour when in receipt of a CTRL_CMD_LE from a mobile.
LME_CMD_LE_Receive_Option	To demonstrate that a station displays correct behaviour when in receipt of a CTRL_CMD_LE from a mobile which includes optional parameters.
LME_CMD_LE_Receive_Auto	To demonstrate that a station displays correct behaviour when in receipt of a CTRL_CMD_LE from a mobile and when an autotune is required.
LME_CMD_LE_Receive_Grd_Replace	To demonstrate that a station displays correct behaviour when in receipt of a CTRL_CMD_LE from a mobile and when an indication of other ground stations which can be reached is required.
LME_CMD_LE_Invalid	To demonstrate that a station sends a CTRL_RSP_LCR when in receipt of an invalid CTRL_CMD_LE from a mobile.
LME_CMD_LE_Receive_Option_Invalid	To demonstrate that a station displays correct behaviour when in receipt of an invalid CTRL_CMD_LE from a mobile which includes optional parameters.
LME_CMD_HO_Receive_A	To demonstrate that a station displays correct behaviour when in receipt of a CTRL_CMD_HO (re = 1) from a mobile.
LME_CMD_HO_Receive_Auto	To demonstrate that a station displays correct behaviour when in receipt of a CTRL_CMD_HO (re = 1) from a mobile and when an autotune is required.
LME_CMD_HO_Receive_Grd_Replace	To demonstrate that a station displays correct behaviour when in receipt of a CTRL_CMD_HO (re = 1) from a mobile and when an indication of other ground stations which can be reached is required.
LME_CMD_HO_Receive_Invalid_A	To demonstrate that a station displays correct behaviour when in receipt of an invalid CTRL_CMD_HO (re = 1) from a mobile.
LME_CMD_HO_Receive_B	To demonstrate that a station displays correct behaviour when in receipt of a CTRL_CMD_HO (re = 0) from a mobile.
LME_CMD_HO_Receive_Invalid_B	To demonstrate that a station displays correct behaviour when in receipt of an invalid CTRL_CMD_HO (re = 0) from a mobile.
LME_CMD_HO_Receive_Invalid_C	To demonstrate that a station displays correct behaviour when in receipt of a valid CTRL_CMD_HO (re = 1) from a mobile with which it does not have a link.
LME_CMD_HO_Send_A	To demonstrate that a station displays correct behaviour when requested to perform a ground-initiated handoff.
LME_CMD_HO_Send_B	To demonstrate that a station displays correct behaviour when requested to perform a ground- initiated handoff and when configured to accept handoff to other ground stations.
LME_CMD_HO_Send_C	To demonstrate that a station displays correct behaviour when requested to perform a ground-requested mobile-initiated handoff.
LME_CMD_HO_Send_Invalid_A	To demonstrate that a station displays correct behaviour when requested to perform a ground-initiated handoff, and when the mobile responds with an invalid CTRL_RSP_HO.
LME_CMD_HO_Send_Auto	To demonstrate that a station displays correct behaviour when requested to perform a ground-requested mobile-initiated handoff and when an autotune is required.
LME_CMD_HO_Send_D	To demonstrate that a station displays correct behaviour when requested to perform a ground-requested broadcast handoff.
LME_TL2	To demonstrate that a station displays correct application of the TL2 timer.
LME_TL1	To demonstrate that a station displays correct operation of timer TL1.
LME_L1	To demonstrate that a station displays correct operation of counter L1.
LME_GSIF	To demonstrate that a station will send a GSIF at least once per minute on each channel.

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

Table 7.2: Subfield mnemonics

Mnemonic	Meaning
a	Additional slots
a/d	Autonomous/directed flag
ao	Acknowledgement offset
b	Broadcast link handoff
bd	Backoff delay
c	CRC
cprf	CPR format even/odd
c/r	Command/response
d	Destination address
erid	Extended reservation ID
err	Error type
f	Frequency
flag	Flag delimiting burst
g	Ground station address
h	Link currently established
i	Supports initiated handoff
IB	Initialise bit
id	Information field identity
in	Information field
lg	Length
M	More bit
mi	Message ID
neg	Negotiation subfield
ok	Confirm/failure flag
pr	Priority
r	Link connection refused
r-mi	Requested message ID
re	Response expected
res	Reserved bit
rid	Reservation ID
ro	Response offset
rrr	CTRL Retransmission number
s	Source address
sdf	Source/destination flag
seq	Sequence subfield
sss	CTRL Sequence number
T	Toggle bit
ver	Version number

7.4.3.1.2 Special characters used in the subfield definitions

Table 7.3: 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.

Table 7.4: 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.

Table 7.5: 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.

Table 7.6: 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.

Table 7.7: 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

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

On generation of a burst, the test harness shall insert the value of the CRC field in accordance with clause 5.2.1.2.

Bursts are used in some test cases that are defined in EN 301 842-2 [5]. This clause defines additional bursts and frames not already defined in EN 301 842-2 [5].

Table 7.8: CTRL_RTS_a (CRa): CTRL_RTS DLPDU with unicast reservation

Description	Octet	Bit number							
		8	7	6	5	4	3	2	1
flag	-	0	1	1	1	1	1	1	0
a/d, rid, ver	1	s_{27}	s_{26}	s_{25}	ver_3	ver_2	ver_1	rid	a/d
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
burst id,	5	0	0	0	0	1	1	0	1
lg, T, IB	6	0	T	IB	0	1	0	0	1
pr	7	pr_4	pr_3	pr_2	pr_1	lg_4	lg_3	lg_2	lg_1
d	8	d_{24}	d_{23}	d_{22}	d_{21}	d_{20}	d_{19}	d_{18}	d_{17}
d	9	d_{16}	d_{15}	d_{14}	d_{13}	d_{12}	d_{11}	d_{10}	d_9
d	10	d_8	d_7	d_6	d_5	d_4	d_3	d_2	d_1
sdf	11	ro_{12}	ro_{11}	ro_{10}	ro_9	sdf	d_{27}	d_{26}	d_{25}
ro	12	ro_8	ro_7	ro_6	ro_5	ro_4	ro_3	ro_2	ro_1
lg	13	lg_8	lg_7	lg_6	lg_5	lg_4	lg_3	lg_2	lg_1
erid, pr	14	0	0	1	0	pr_4	pr_3	pr_2	pr_1
c	13	c_{16}	c_{15}	c_{14}	c_{13}	c_{12}	c_{11}	c_{10}	c_9
c	14	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

Table 7.9: INFO_RTS_a (IRa): INFO_RTS DLPDU with unicast reservation

Description	Octet	Bit number							
		8	**7**	**6**	**5**	**4**	**3**	**2**	**1**
flag	-	0	1	1	1	1	1	1	0
a/d, rid, ver	1	s_{27}	s_{26}	s_{25}	ver_3	ver_2	ver_1	rid	a/d
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
burst id,	5	0	0	0	0	1	1	0	1
lg, T, IB	6	0	T	0	1	1	0	0	1
pr	7	pr_4	pr_3	pr_2	pr_1	lg_4	lg_3	lg_2	lg_1
d	8	d_{24}	d_{23}	d_{22}	d_{21}	d_{20}	d_{19}	d_{18}	d_{17}
d	9	d_{16}	d_{15}	d_{14}	d_{13}	d_{12}	d_{11}	d_{10}	d_9
d	10	d_8	d_7	d_6	d_5	d_4	d_3	d_2	d_1
sdf	11	ro_{12}	ro_{11}	ro_{10}	ro_9	sdf	d_{27}	d_{26}	d_{25}
ro	12	ro_8	ro_7	ro_6	ro_5	ro_4	ro_3	ro_2	ro_1
lg	13	lg_8	lg_7	lg_6	lg_5	lg_4	lg_3	lg_2	lg_1
erid, pr	14	0	0	1	0	pr_4	pr_3	pr_2	pr_1
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

Table 7.10: INFO_CTS_a (ICa): INFO_CTS DLPDU with information transfer reservation

Description	Octet	Bit number							
		8	**7**	**6**	**5**	**4**	**3**	**2**	**1**
flag	-	0	1	1	1	1	1	1	0
a/d, rid, ver	1	s_{27}	s_{26}	s_{25}	ver_3	ver_2	ver_1	rid	a/d
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
burst id,	5	0	0	0	0	1	1	0	1
T	6	0	0	0	1	1	0	1	1
ao	7	0	ao_7	ao_6	ao_5	ao_4	ao_3	ao_2	ao_1
lg	8	lg_8	lg_7	lg_6	lg_5	lg_4	lg_3	lg_2	lg_1
ro	9	ro_8	ro_7	ro_6	ro_5	ro_4	ro_3	ro_2	ro_1
ro,f	10	ro_{12}	ro_{11}	ro_{10}	ro_9	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
d	12	d_{24}	d_{23}	d_{22}	d_{21}	d_{20}	d_{19}	d_{18}	d_{17}
d	13	d_{16}	d_{15}	d_{14}	d_{13}	d_{12}	d_{11}	d_{10}	d_9
d	14	d_8	d_7	d_6	d_5	d_4	d_3	d_2	d_1
erid, d	15	0	1	0	1	0	d_{27}	d_{26}	d_{25}
c	16	c_{16}	c_{15}	c_{14}	c_{13}	c_{12}	c_{11}	c_{10}	c_9
c	17	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

Table 7.11: CTRL_CTS_a (CCa): CTRL_CTS DLPDU with information transfer reservation

Description	Octet	Bit number							
		8	7	6	5	4	3	2	1
flag	-	0	1	1	1	1	1	1	0
a/d, rid, ver	1	s_{27}	s_{26}	s_{25}	ver_3	ver_2	ver_1	rid	a/d
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
burst id,	5	0	0	0	0	1	1	0	1
T, IB	6	0	0	0	0	1	0	1	1
ao	7	0	ao_7	ao_6	ao_5	ao_4	ao_3	ao_2	ao_1
lg	8	lg_8	lg_7	lg_6	lg_5	lg_4	lg_3	lg_2	lg_1
ro	9	ro_8	ro_7	ro_6	ro_5	ro_4	ro_3	ro_2	ro_1
ro,f	10	ro_{12}	ro_{11}	ro_{10}	ro_9	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
d	12	d_{24}	d_{23}	d_{22}	d_{21}	d_{20}	d_{19}	d_{18}	d_{17}
d	13	d_{16}	d_{15}	d_{14}	d_{13}	d_{12}	d_{11}	d_{10}	d_9
d	14	d_8	d_7	d_6	d_5	d_4	d_3	d_2	d_1
erid, d	15	0	1	0	1	0	d_{27}	d_{26}	d_{25}
c	16	c_{16}	c_{15}	c_{14}	c_{13}	c_{12}	c_{11}	c_{10}	c_9
c	17	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

Table 7.12: UDATA_CTS_a (UDCa): UDATA_CTS DLPDU with unicast reservation

Description	Octet	Bit number							
		8	7	6	5	4	3	2	1
flag	-	0	1	1	1	1	1	1	0
a/d, rid, ver	1	s_{27}	s_{26}	s_{25}	ver_3	ver_2	ver_1	rid	a/d
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
burst id,	5	0	0	0	0	1	1	0	1
lg, T, IB	6	0	0	1	1	1	0	1	1
d	7	d_{24}	d_{23}	d_{22}	d_{21}	d_{20}	d_{19}	d_{18}	d_{17}
d	8	d_{16}	d_{15}	d_{14}	d_{13}	d_{12}	d_{11}	d_{10}	d_9
d	9	d_8	d_7	d_6	d_5	d_4	d_3	d_2	d_1
sdf	10	ro_{12}	ro_{11}	ro_{10}	ro_9	sdf	d_{27}	d_{26}	d_{25}
ro	11	ro_8	ro_7	ro_6	ro_5	ro_4	ro_3	ro_2	ro_1
lg	12	lg_8	lg_7	lg_6	lg_5	lg_4	lg_3	lg_2	lg_1
erid, pr	13	0	0	1	0	pr_4	pr_3	pr_2	pr_1
c	14	c_{16}	c_{15}	c_{14}	c_{13}	c_{12}	c_{11}	c_{10}	c_9
c	15	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

Table 7.13: INFO_a (IFa): INFO DLPDU with unicast reservation

Description	Octet	Bit number							
		8	**7**	**6**	**5**	**4**	**3**	**2**	**1**
flag	-	0	1	1	1	1	1	1	0
a/d, rid, ver	1	s_{27}	s_{26}	s_{25}	ver_3	ver_2	ver_1	rid	a/d
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
burst id,	5	0	0	0	0	1	1	0	1
M, T, pr	6	M	T	pr_4	pr_3	pr_2	pr_1	1	0
in	7	information field							
d	8	d_{24}	d_{23}	d_{22}	d_{21}	d_{20}	d_{19}	d_{18}	d_{17}
d	9	d_{16}	d_{15}	d_{14}	d_{13}	d_{12}	d_{11}	d_{10}	d_9
d	10	d_8	d_7	d_6	d_5	d_4	d_3	d_2	d_1
sdf	11	ro_{12}	ro_{11}	ro_{10}	ro_9	sdf	d_{27}	d_{26}	d_{25}
ro	12	ro_8	ro_7	ro_6	ro_5	ro_4	ro_3	ro_2	ro_1
lg	13	lg_8	lg_7	lg_6	lg_5	lg_4	lg_3	lg_2	lg_1
erid, pr	14	0	0	1	0	pr_4	pr_3	pr_2	pr_1
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

Table 7.14: CTRL_a (CTa): CTRL DLPDU with unicast reservation

Description	Octet	Bit number							
		8	**7**	**6**	**5**	**4**	**3**	**2**	**1**
flag	-	0	1	1	1	1	1	1	0
a/d, rid, ver	1	s_{27}	s_{26}	s_{25}	ver_3	ver_2	ver_1	rid	a/d
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
burst id,	5	0	0	0	0	1	1	0	1
M, T, IB	6	M	T	re	c/r	0	0	0	0
in	7	information field							
d	8	d_{24}	d_{23}	d_{22}	d_{21}	d_{20}	d_{19}	d_{18}	d_{17}
d	9	d_{16}	d_{15}	d_{14}	d_{13}	d_{12}	d_{11}	d_{10}	d_9
d	10	d_8	d_7	d_6	d_5	d_4	d_3	d_2	d_1
sdf	11	ro_{12}	ro_{11}	ro_{10}	ro_9	sdf	d_{27}	d_{26}	d_{25}
ro	12	ro_8	ro_7	ro_6	ro_5	ro_4	ro_3	ro_2	ro_1
lg	13	lg_8	lg_7	lg_6	lg_5	lg_4	lg_3	lg_2	lg_1
erid, pr	14	0	0	1	0	pr_4	pr_3	pr_2	pr_1
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

Table 7.15: CTRL_b (CTb): CTRL DLPDU with response reservation

Description	Octet	Bit number							
		8	**7**	**6**	**5**	**4**	**3**	**2**	**1**
flag	-	0	1	1	1	1	1	1	0
a/d, rid, ver	1	s_{27}	s_{26}	s_{25}	ver_3	ver_2	ver_1	rid	a/d
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
burst id,	5	0	0	0	0	1	1	0	1
pr	6	M	T	re	c/r	0	0	0	0
in	7	information field							
d	8	d_{24}	d_{23}	d_{22}	d_{21}	d_{20}	d_{19}	d_{18}	d_{17}
d	9	d_{16}	d_{15}	d_{14}	d_{13}	d_{12}	d_{11}	d_{10}	d_9
d	10	d_8	d_7	d_6	d_5	d_4	d_3	d_2	d_1
erid, d	11	0	0	0	0	0	d_{27}	d_{26}	d_{25}
c	12	c_{16}	c_{15}	c_{14}	c_{13}	c_{12}	c_{11}	c_{10}	c_9
c	13	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

Table 7.16: CTRL_ACK_a (Caa): CTRL_ACK DLPDU with response reservation

Description	Octet	Bit number							
		8	**7**	**6**	**5**	**4**	**3**	**2**	**1**
flag	-	0	1	1	1	1	1	1	0
a/d, rid, ver	1	s_{27}	s_{26}	s_{25}	ver_3	ver_2	ver_1	rid	a/d
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
burst id,	5	0	0	0	0	1	1	0	1
T, IB	6	0	T	0	0	0	0	0	1
d	8	d_{24}	d_{23}	d_{22}	d_{21}	d_{20}	d_{19}	d_{18}	d_{17}
d	9	d_{16}	d_{15}	d_{14}	d_{13}	d_{12}	d_{11}	d_{10}	d_9
d	10	d_8	d_7	d_6	d_5	d_4	d_3	d_2	d_1
erid, d	11	0	0	0	0	0	d_{27}	d_{26}	d_{25}
c	12	c_{16}	c_{15}	c_{14}	c_{13}	c_{12}	c_{11}	c_{10}	c_9
c	13	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

Table 7.17: INFO_b (Ifb): INFO DLPDU with response reservation

Description	Octet	Bit number							
		8	**7**	**6**	**5**	**4**	**3**	**2**	**1**
flag	-	0	1	1	1	1	1	1	0
a/d, rid, ver	1	s_{27}	s_{26}	s_{25}	ver_3	ver_2	ver_1	rid	a/d
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
burst id,	5	0	0	0	0	1	1	0	1
M, T, pr	6	M	T	pr_4	pr_3	pr_2	pr_1	1	0
in	7	information field							
d	8	d_{24}	d_{23}	d_{22}	d_{21}	d_{20}	d_{19}	d_{18}	d_{17}
d	9	d_{16}	d_{15}	d_{14}	d_{13}	d_{12}	d_{11}	d_{10}	d_9
d	10	d_8	d_7	d_6	d_5	d_4	d_3	d_2	d_1
erid, d	11	0	0	0	0	0	d_{27}	d_{26}	d_{25}
c	12	c_{16}	c_{15}	c_{14}	c_{13}	c_{12}	c_{11}	c_{10}	c_9
c	13	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

Table 7.18: INFO_ACK_a (Iaa): INFO_ACK DLPDU with response reservation

Description	Octet	Bit number							
		8	**7**	**6**	**5**	**4**	**3**	**2**	**1**
flag	-	0	1	1	1	1	1	1	0
a/d, rid, ver	1	s_{27}	s_{26}	s_{25}	ver_3	ver_2	ver_1	rid	a/d
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
burst id,	5	0	0	0	0	1	1	0	1
T	6	0	T	0	1	0	0	0	1
d	7	d_{24}	d_{23}	d_{22}	d_{21}	d_{20}	d_{19}	d_{18}	d_{17}
d	8	d_{16}	d_{15}	d_{14}	d_{13}	d_{12}	d_{11}	d_{10}	d_9
d	9	d_8	d_7	d_6	d_5	d_4	d_3	d_2	d_1
erid, d	10	0	0	0	0	0	d_{27}	d_{26}	d_{25}
c	11	c_{16}	c_{15}	c_{14}	c_{13}	c_{12}	c_{11}	c_{10}	c_9
c	12	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

Table 7.19: INFO_RTS_SZOM_a (IRSZa): INFO_RTS DLPDU and SZOM DLPDU combined burst with unicast reservation

Description	Octet	Bit number							
		8	7	6	5	4	3	2	1
flag	-	0	1	1	1	1	1	1	0
a/d, rid, ver	1	s_{27}	s_{26}	s_{25}	ver_3	ver_2	ver_1	rid	a/d
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
burst id,	5	0	0	0	0	1	1	0	1
lg, T, IB	6	0	T	0	1	1	0	0	1
pr	7	pr_4	pr_3	pr_2	pr_1	lg_4	lg_3	lg_2	lg_1
neg	8	neg_4	neg_3	neg_2	neg_1	1	1	0	1
seq	9	seq_8	seq_7	seq_6	seq_5	seq_4	seq_3	seq_2	seq_1
d	10	d_{24}	d_{23}	d_{22}	d_{21}	d_{20}	d_{19}	d_{18}	d_{17}
d	11	d_{16}	d_{15}	d_{14}	d_{13}	d_{12}	d_{11}	d_{10}	d_9
d	12	d_8	d_7	d_6	d_5	d_4	d_3	d_2	d_1
sdf	13	ro_{12}	ro_{11}	ro_{10}	ro_9	sdf	d_{27}	d_{26}	d_{25}
ro	14	ro_8	ro_7	ro_6	ro_5	ro_4	ro_3	ro_2	ro_1
lg	15	lg_8	lg_7	lg_6	lg_5	lg_4	lg_3	lg_2	lg_1
erid, pr	16	0	0	1	0	pr_4	pr_3	pr_2	pr_1
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

Table 7.20: INFO_SZOM_a (IFSZa): INFO DLPDU and SZOM DLPDU combined burst with unicast reservation

Description	Octet	Bit number							
		8	7	6	5	4	3	2	1
flag	-	0	1	1	1	1	1	1	0
a/d, rid, ver	1	s_{27}	s_{26}	s_{25}	ver_3	ver_2	ver_1	rid	a/d
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
burst id,	5	0	0	0	0	1	1	0	1
pr	6	M	T	pr_4	pr_3	pr_2	pr_1	1	0
in	7	information field							
neg	8	neg_4	neg_3	neg_2	neg_1	1	1	0	1
seq	9	seq_8	seq_7	seq_6	seq_5	seq_4	seq_3	seq_2	seq_1
d	10	d_{24}	d_{23}	d_{22}	d_{21}	d_{20}	d_{19}	d_{18}	d_{17}
d	11	d_{16}	d_{15}	d_{14}	d_{13}	d_{12}	d_{11}	d_{10}	d_9
d	12	d_8	d_7	d_6	d_5	d_4	d_3	d_2	d_1
sdf	13	ro_{12}	ro_{11}	ro_{10}	ro_9	sdf	d_{27}	d_{26}	d_{25}
ro	14	ro_8	ro_7	ro_6	ro_5	ro_4	ro_3	ro_2	ro_1
lg	15	lg_8	lg_7	lg_6	lg_5	lg_4	lg_3	lg_2	lg_1
erid, pr	16	0	0	1	0	pr_4	pr_3	pr_2	pr_1
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

Table 7.21: INFO_RTS_INFO_b (IRIFb): INFO_RTS and INFO DLPDU combined burst with response reservation

Description	Octet	Bit number							
		8	**7**	**6**	**5**	**4**	**3**	**2**	**1**
flag	-	0	1	1	1	1	1	1	0
a/d, rid, ver	1	s_{27}	s_{26}	s_{25}	ver_3	ver_2	ver_1	rid	a/d
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
burst id,	5	0	0	0	0	1	1	0	1
lg, T, IB	6	0	T	0	1	1	0	0	1
pr	7	pr_4	pr_3	pr_2	pr_1	lg_4	lg_3	lg_2	lg_1
M, T, pr	8	M	T	pr_4	pr_3	pr_2	pr_1	1	0
in	9	information field							
d	10	d_{24}	d_{23}	d_{22}	d_{21}	d_{20}	d_{19}	d_{18}	d_{17}
d	11	d_{16}	d_{15}	d_{14}	d_{13}	d_{12}	d_{11}	d_{10}	d_9
d	12	d_8	d_7	d_6	d_5	d_4	d_3	d_2	d_1
erid, d	13	0	0	0	0	0	d_{27}	d_{26}	d_{25}
c	14	c_{16}	c_{15}	c_{14}	c_{13}	c_{12}	c_{11}	c_{10}	c_9
c	15	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

Table 7.22: CTRL_RTS_CTRL_b (CRCTb): CTRL_RTS DLPDU and CTRL DLPDU combined burst with response reservation

Description	Octet	Bit number							
		8	**7**	**6**	**5**	**4**	**3**	**2**	**1**
flag	-	0	1	1	1	1	1	1	0
a/d, rid, ver	1	s_{27}	s_{26}	s_{25}	ver_3	ver_2	ver_1	rid	a/d
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
burst id,	5	0	0	0	0	1	1	0	1
lg, T, IB	6	0	T	IB	0	1	0	0	1
lg	7	0	0	0	0	lg_4	lg_3	lg_2	lg_1
M, T, re, c/r	8	M	T	re	c/r	0	0	0	0
in	9	information field							
d	10	d_{24}	d_{23}	d_{22}	d_{21}	d_{20}	d_{19}	d_{18}	d_{17}
d	11	d_{16}	d_{15}	d_{14}	d_{13}	d_{12}	d_{11}	d_{10}	d_9
d	12	d_8	d_7	d_6	d_5	d_4	d_3	d_2	d_1
erid, d	13	0	0	0	0	0	d_{27}	d_{26}	d_{25}
c	14	c_{16}	c_{15}	c_{14}	c_{13}	c_{12}	c_{11}	c_{10}	c_9
c	15	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

Table 7.23: INFO_ACK_INFO_CTS_a (IAICa): INFO_ACK DLPDU and INFO_CTS DLPDU combined burst with information transfer reservation

Description	Octet	Bit number							
		8	7	6	5	4	3	2	1
flag	-	0	1	1	1	1	1	1	0
a/d, rid, ver	1	s_{27}	s_{26}	s_{25}	ver_3	ver_2	ver_1	rid	a/d
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
burst id,	5	0	0	0	0	1	1	0	1
T	6	0	T	0	1	0	0	0	1
T	7	0	0	0	1	1	0	1	1
ao	8	0	ao_7	ao_6	ao_5	ao_4	ao_3	ao_2	ao_1
lg	9	lg_8	lg_7	lg_6	lg_5	lg_4	lg_3	lg_2	lg_1
ro	10	ro_8	ro_7	ro_6	ro_5	ro_4	ro_3	ro_2	ro_1
ro,f	11	ro_{12}	ro_{11}	ro_{10}	ro_9	f_{12}	f_{11}	f_{10}	f_9
f	12	f_8	f_7	f_6	f_5	f_4	f_3	f_2	f_1
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	1	0	1	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

Table 7.24: CTRL_ACK_CTRL_CTS_a (CACCa): CTRL_ACK DLPDU and CTRL_CTS DLPDU combined burst with information transfer reservation

Description	Octet	Bit number							
		8	7	6	5	4	3	2	1
flag	-	0	1	1	1	1	1	1	0
a/d, rid, ver	1	s_{27}	s_{26}	s_{25}	ver_3	ver_2	ver_1	rid	a/d
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
burst id,	5	0	0	0	0	1	1	0	1
T	6	0	T	0	0	0	0	0	1
	7	0	0	0	0	1	0	1	1
ao	8	0	ao_7	ao_6	ao_5	ao_4	ao_3	ao_2	ao_1
lg	9	lg_8	lg_7	lg_6	lg_5	lg_4	lg_3	lg_2	lg_1
ro	10	ro_8	ro_7	ro_6	ro_5	ro_4	ro_3	ro_2	ro_1
ro,f	11	ro_{12}	ro_{11}	ro_{10}	ro_9	f_{12}	f_{11}	f_{10}	f_9
f	12	f_8	f_7	f_6	f_5	f_4	f_3	f_2	f_1
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	1	0	1	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

Table 7.25: DM_DISC_a (DMDCa): DM/DISC DLPDU with response reservation

Description	Octet	Bit number							
		8	7	6	5	4	3	2	1
flag	-	0	1	1	1	1	1	1	0
a/d, rid, ver	1	s_{27}	s_{26}	s_{25}	ver_3	ver_2	ver_1	rid	a/d
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
burst id,	5	0	0	0	0	1	1	0	1
burst id,	6	1	0	1	1	0	1	0	1
d	7	d_{24}	d_{23}	d_{22}	d_{21}	d_{20}	d_{19}	d_{18}	d_{17}
d	8	d_{16}	d_{15}	d_{14}	d_{13}	d_{12}	d_{11}	d_{10}	d_9
d	9	d_8	d_7	d_6	d_5	d_4	d_3	d_2	d_1
erid, d	10	0	0	0	0	0	d_{27}	d_{26}	d_{25}
c	11	c_{16}	c_{15}	c_{14}	c_{13}	c_{12}	c_{11}	c_{10}	c_9
c	12	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

Table 7.26: UINFO_a (Uia): UINFO DLPDU with response reservation with address type field equal to 7

Description	Octet	Bit number							
		8	7	6	5	4	3	2	1
flag	-	0	1	1	1	1	1	1	0
a/d, rid, ver	1	s_{27}	s_{26}	s_{25}	ver_3	ver_2	ver_1	rid	a/d
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
burst id	5	$ud1_5$	$ud1_4$	$ud1_3$	$ud1_2$	$ud1_1$	1	1	1
in	7	information field							
erid, d	8	0	0	0	0	0	1	1	1
c	9	c_{16}	c_{15}	c_{14}	c_{13}	c_{12}	c_{11}	c_{10}	c_9
c	10	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

Table 7.27: UCTRL_a (Uca): UCTRL DLPDU with response reservation with address type field equal to 7

Description	Octet	Bit number							
		8	7	6	5	4	3	2	1
flag	-	0	1	1	1	1	1	1	0
a/d, rid, ver	1	s_{27}	s_{26}	s_{25}	ver_3	ver_2	ver_1	rid	a/d
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
burst id	5	$ucid_5$	$ucid_4$	$ucid_3$	$ucid_2$	$ucid_1$	0	1	1
in	7	information field							
erid, d	8	0	0	0	0	0	1	1	1
c	9	c_{16}	c_{15}	c_{14}	c_{13}	c_{12}	c_{11}	c_{10}	c_9
c	10	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

Table 7.28: UCTRL_b (Ucb): UCTRL DLPDU with connection management, control sequencing, ground station address filter, broadcast connection, ATN router nets and response reservation with address type field equal to 7

Description	Octet	Bit number							
		8	7	6	5	4	3	2	1
flag	-	0	1	1	1	1	1	1	0
a/d, rid, ver	1	s_{27}	s_{26}	s_{25}	ver_3	ver_2	ver_1	rid	a/d
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
burst id	5	$ucid_5$	$ucid_4$	$ucid_3$	$ucid_2$	$ucid_1$	0	1	1
Cxn management	6	0	0	0	0	0	0	0	1
lg	7	lg_8	lg_7	lg_6	lg_5	lg_4	lg_3	lg_2	lg_1
r, h	8	0	0	0	0	0	0	r	h
CTRL sequencing	9	0	0	0	0	0	0	1	0
length	10	0	0	0	0	0	0	0	1
rrr, sss	11	rrr_4	rrr_3	rrr_2	rrr_1	sss_4	sss_3	sss_2	sss_1
Protocol options	12	0	0	0	0	0	0	1	1
length	13	0	0	0	0	0	0	0	1
b, i	14	0	0	0	0	0	b	i	0
Grd stn address filter	15	0	1	0	0	1	0	1	1
length	16	0	0	0	0	0	1	0	0
g	17	0	0	0	0	0	g_{27}	g_{26}	g_{25}
g	18	g_{24}	g_{23}	g_{22}	g_{21}	g_{20}	g_{19}	g_{18}	g_{17}
g	19	g_{16}	g_{15}	g_{14}	g_{13}	g_{12}	g_{11}	g_{10}	g_9
g	20	g_8	g_7	g_6	g_5	g_4	g_3	g_2	g_1
Broadcast connection	21	0	1	0	0	1	1	0	0
lg	22	lg_8	lg_7	lg_6	lg_5	lg_4	lg_3	lg_2	lg_1
a	23	0	0	0	0	0	a_{27}	a_{26}	a_{25}
a	24	a_{24}	a_{23}	a_{22}	a_{21}	a_{20}	a_{19}	a_{18}	a_{17}
a	25	a_{16}	a_{15}	a_{14}	a_{13}	a_{12}	a_{11}	a_{10}	a_9
a	26	a_8	a_7	a_6	a_5	a_4	a_3	a_2	a_1
ATN router NETs	27	1	1	0	0	0	0	1	0
length	28	lg_8	lg_7	lg_6	lg_5	lg_4	lg_3	lg_2	lg_1
a	29	a_{24}	a_{23}	a_{22}	a_{21}	a_{20}	a_{19}	a_{18}	a_{17}
a	30	a_{16}	a_{15}	a_{14}	a_{13}	a_{12}	a_{11}	a_{10}	a_9
a	31	a_8	a_7	a_6	a_5	a_4	a_3	a_2	a_1
r	32	r_{24}	r_{23}	r_{22}	r_{21}	r_{20}	r_{19}	r_{18}	r_{17}
r	33	r_{16}	r_{15}	r_{14}	r_{13}	r_{12}	r_{11}	r_{10}	r_9
r	34	r_8	r_7	r_6	r_5	r_4	r_3	r_2	r_1
erid, d	35	0	0	0	0	0	1	1	1
c	36	c_{16}	c_{15}	c_{14}	c_{13}	c_{12}	c_{11}	c_{10}	c_9
c	37	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

Table 7.29: UCTRL_c (Ucc): UCTRL DLPDU with nearest airport, ATN router nets, ground-based system mask and response reservation with address type field equal to 7

Description	Octet	Bit number							
		8	**7**	**6**	**5**	**4**	**3**	**2**	**1**
flag	-	0	1	1	1	1	1	1	0
a/d, rid, ver	1	s_{27}	s_{26}	s_{25}	ver_3	ver_2	ver_1	rid	a/d
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
burst id	5	$ucid_5$	$ucid_4$	$ucid_3$	$ucid_2$	$ucid_1$	0	1	1
Nearest airport	6	1	1	0	0	0	0	0	1
length	7	0	0	0	0	0	1	0	0
a	8	a_8	a_7	a_6	a_5	a_4	a_3	a_2	a_1
b	9	b_8	b_7	b_6	b_5	b_4	b_3	b_2	b_1
c	10	c_8	c_7	c_6	c_5	c_4	c_3	c_2	c_1
d	11	d_8	d_7	d_6	d_5	d_4	d_3	d_2	d_1
ATN router NETs	12	1	1	0	0	0	0	1	0
length	13	lg_8	lg_7	lg_6	lg_5	lg_4	lg_3	lg_2	lg_1
a	14	a_{24}	a_{23}	a_{22}	a_{21}	a_{20}	a_{19}	a_{18}	a_{17}
a	15	a_{16}	a_{15}	a_{14}	a_{13}	a_{12}	a_{11}	a_{10}	a_9
a	16	a_8	a_7	a_6	a_5	a_4	a_3	a_2	a_1
r	17	r_{24}	r_{23}	r_{22}	r_{21}	r_{20}	r_{19}	r_{18}	r_{17}
r	18	r_{16}	r_{15}	r_{14}	r_{13}	r_{12}	r_{11}	r_{10}	r_9
r	19	r_8	r_7	r_6	r_5	r_4	r_3	r_2	r_1
Ground-based system mask	20	1	1	0	0	0	0	1	1
lg	21	0	0	0	0	0	1	0	0
m	22	0	0	0	0	0	g_{25}	g_{26}	g_{27}
g	23	g_8	g_7	g_6	g_5	g_4	g_3	g_2	g_1
g	24	g_{16}	g_{15}	g_{14}	g_{13}	g_{12}	g_{11}	g_{10}	g_9
g	25	g_8	g_7	g_6	g_5	g_4	g_3	g_2	g_1
erid, d	26	0	0	0	0	0	1	1	1
c	27	c_{16}	c_{15}	c_{14}	c_{13}	c_{12}	c_{11}	c_{10}	c_9
c	28	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

Table 7.30: GEN_RESP_b (GRb): General response burst with unicast reservation

Description	Octet	Bit number							
		8	7	6	5	4	3	2	1
flag	-	0	1	1	1	1	1	1	0
s, ver, rid, a/d	1	s_{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	1	1	1	0	1	0	1
res, r-mi	6	0	$r\text{-}mi_7$	$r\text{-}mi_6$	$r\text{-}mi_5$	$r\text{-}mi_4$	$r\text{-}mi_3$	$r\text{-}mi_2$	$r\text{-}mi_1$
bd	7	bd_8	bd_7	bd_6	bd_5	bd_4	bd_3	bd_2	bd_1
err	8	err_8	err_7	err_6	err_5	err_4	err_3	err_2	err_1
d	9	d_{24}	d_{23}	d_{22}	d_{21}	d_{20}	d_{19}	d_{18}	d_{17}
d	10	d_{16}	d_{15}	d_{14}	d_{13}	d_{12}	d_{11}	d_{10}	d_9
d	11	d_8	d_7	d_6	d_5	d_4	d_3	d_2	d_1
erid, d	12	ro_{12}	ro_{11}	ro_{10}	ro_9	sdf	d_{27}	d_{26}	d_{25}
ro	13	ro_8	ro_7	ro_6	ro_5	ro_4	ro_3	ro_2	ro_1
lg	14	lg_8	lg_7	lg_6	lg_5	lg_4	lg_3	lg_2	lg_1
erid, pr	15	0	0	1	0	pr_4	pr_3	pr_2	pr_1
c	16	c_{16}	c_{15}	c_{14}	c_{13}	c_{12}	c_{11}	c_{10}	c_9
c	17	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

Table 7.31: INFO_ACK_INFO_a (IAIFa): INFO_ACK and INFO DLPDU combined burst with unicast reservation

Description	Octet	Bit number							
		8	7	6	5	4	3	2	1
flag	-	0	1	1	1	1	1	1	0
a/d, rid, ver	1	s_{27}	s_{26}	s_{25}	ver_3	ver_2	ver_1	rid	a/d
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
burst id	5	0	0	0	0	1	1	0	1
T	6	0	T	0	1	0	0	0	1
pr	7	M	T	pr_4	pr_3	pr_2	pr_1	1	0
in	8	information field							
d	9	d_{24}	d_{23}	d_{22}	d_{21}	d_{20}	d_{19}	d_{18}	d_{17}
d	10	d_{16}	d_{15}	d_{14}	d_{13}	d_{12}	d_{11}	d_{10}	d_9
d	11	d_8	d_7	d_6	d_5	d_4	d_3	d_2	d_1
sdf	12	ro_{12}	ro_{11}	ro_{10}	ro_9	sdf	d_{27}	d_{26}	d_{25}
ro	13	ro_8	ro_7	ro_6	ro_5	ro_4	ro_3	ro_2	ro_1
lg	14	lg_8	lg_7	lg_6	lg_5	lg_4	lg_3	lg_2	lg_1
erid, pr	15	0	0	1	0	pr_4	pr_3	pr_2	pr_1
c	16	c_{16}	c_{15}	c_{14}	c_{13}	c_{12}	c_{11}	c_{10}	c_9
c	17	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

Table 7.32: INFO_ACK_INFO_RTS_a (IAIRa): INFO_ACK and INFO_RTS DLPDU combined burst with unicast reservation

Description	Octet	Bit number							
		8	7	6	5	4	3	2	1
flag	-	0	1	1	1	1	1	1	0
a/d, rid, ver	1	s_{27}	s_{26}	s_{25}	ver_3	ver_2	ver_1	rid	a/d
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
burst id,	5	0	0	0	0	1	1	0	1
T	6	0	T	0	1	0	0	0	1
lg, T	7	0	T	0	1	1	0	0	1
pr, lg	8	pr_4	pr_3	pr_2	pr_1	lg_4	lg_3	lg_2	lg_1
d	9	d_{24}	d_{23}	d_{22}	d_{21}	d_{20}	d_{19}	d_{18}	d_{17}
d	10	d_{16}	d_{15}	d_{14}	d_{13}	d_{12}	d_{11}	d_{10}	d_9
d	11	d_8	d_7	d_6	d_5	d_4	d_3	d_2	d_1
sdf	12	ro_{12}	ro_{11}	ro_{10}	ro_9	sdf	d_{27}	d_{26}	d_{25}
ro	13	ro_8	ro_7	ro_6	ro_5	ro_4	ro_3	ro_2	ro_1
lg	14	lg_8	lg_7	lg_6	lg_5	lg_4	lg_3	lg_2	lg_1
erid, pr	15	0	0	1	0	pr_4	pr_3	pr_2	pr_1
c	16	c_{16}	c_{15}	c_{14}	c_{13}	c_{12}	c_{11}	c_{10}	c_9
c	17	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

Table 7.33: CTRL_c (CTc): CTRL DLPDU with connection management, control sequencing, and unicast reservation

Description	Octet	Bit number							
		8	7	6	5	4	3	2	1
flag	-	0	1	1	1	1	1	1	0
a/d, rid, ver	1	s_{27}	s_{26}	s_{25}	ver_3	ver_2	ver_1	rid	a/d
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
burst id,	5	0	0	0	0	1	1	0	1
M, T, IB	6	M	T	re	c/r	0	0	0	0
Cxn management	7	0	0	0	0	0	0	0	1
lg	8	lg_8	lg_7	lg_6	lg_5	lg_4	lg_3	lg_2	lg_1
r, h	9	0	0	0	0	0	0	r	h
CTRL sequencing	10	0	0	0	0	0	0	1	0
length	11	0	0	0	0	0	0	0	1
rrr, sss	12	rrr_4	rrr_3	rrr_2	rrr_1	sss_4	sss_3	sss_2	sss_1
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
sdf	16	ro_{12}	ro_{11}	ro_{10}	ro_9	sdf	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, pr	19	0	0	1	0	pr_4	pr_3	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

Table 7.34: CTRL_d (CTd): CTRL DLPDU with connection management, control sequencing, and response reservation

Description	Octet	Bit number							
		8	7	6	5	4	3	2	1
flag	-	0	1	1	1	1	1	1	0
a/d, rid, ver	1	s_{27}	s_{26}	s_{25}	ver_3	ver_2	ver_1	rid	a/d
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
burst id,	5	0	0	0	0	1	1	0	1
pr	6	M	T	re	c/r	0	0	0	0
Cxn management	7	0	0	0	0	0	0	0	1
lg	8	lg_8	lg_7	lg_6	lg_5	lg_4	lg_3	lg_2	lg_1
r, h	9	0	0	0	0	0	0	r	h
CTRL sequencing	10	0	0	0	0	0	0	1	0
length	11	0	0	0	0	0	0	0	1
rrr,sss	12	rrr_4	rrr_3	rrr_2	rrr_1	sss_4	sss_3	sss_2	sss_1
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

Table 7.35: CTRL_e (Cte): Invalid CTRL DLPDU with connection management, control sequencing, and response reservation

Description	Octet	Bit number							
		8	7	6	5	4	3	2	1
flag	-	0	1	1	1	1	1	1	0
a/d, rid, ver	1	s_{27}	s_{26}	s_{25}	ver_3	ver_2	ver_1	rid	a/d
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
burst id,	5	0	0	0	0	1	1	0	1
pr	6	M	T	re	c/r	0	0	0	0
Cxn management	7	0	0	0	0	0	0	0	1
lg	8	lg_8	lg_7	lg_6	lg_5	lg_4	lg_3	lg_2	lg_1
r, h	9	1	0	0	0	0	0	r	h
CTRL sequencing	10	0	0	0	0	0	0	1	0
length	11	0	0	0	0	0	0	0	1
rrr,sss	12	rrr_4	rrr_3	rrr_2	rrr_1	sss_4	sss_3	sss_2	sss_1
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

Table 7.36: CTRL_f (CTf): CTRL DLPDU with connection management, control sequencing, protocol options, modulation support, and response reservation

Description	Octet	Bit number							
		8	**7**	**6**	**5**	**4**	**3**	**2**	**1**
flag	-	0	1	1	1	1	1	1	0
a/d, rid, ver	1	s_{27}	s_{26}	s_{25}	ver_3	ver_2	ver_1	rid	a/d
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
burst id,	5	0	0	0	0	1	1	0	1
pr	6	M	T	re	c/r	0	0	0	0
Cxn management	7	0	0	0	0	0	0	0	1
lg	8	lg_8	lg_7	lg_6	lg_5	lg_4	lg_3	lg_2	lg_1
r, h	9	0	0	0	0	0	0	r	h
CTRL sequencing	10	0	0	0	0	0	0	1	0
length	11	0	0	0	0	0	0	0	1
rrr, sss	12	rrr_4	rrr_3	rrr_2	rrr_1	sss_4	sss_3	sss_2	sss_1
Protocol options	13	0	0	0	0	0	0	1	1
length	14	0	0	0	0	0	0	0	1
b, i	15	0	0	0	0	0	b	i	0
Modulation support	16	1	0	0	0	0	0	0	0
lg	17	lg_8	lg_7	lg_6	lg_5	lg_4	lg_3	lg_2	lg_1
m	18	0	0	0	0	m_4	m_3	m_2	m_1
d	19	d_{24}	d_{23}	d_{22}	d_{21}	d_{20}	d_{19}	d_{18}	d_{17}
d	20	d_{16}	d_{15}	d_{14}	d_{13}	d_{12}	d_{11}	d_{10}	d_9
d	21	d_8	d_7	d_6	d_5	d_4	d_3	d_2	d_1
erid, d	22	0	0	0	0	0	d_{27}	d_{26}	d_{25}
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

Table 7.37: CTRL_g (CTg): Invalid CTRL DLPDU with connection management, control sequencing, and unicast reservation

Description	Octet	Bit number							
		8	**7**	**6**	**5**	**4**	**3**	**2**	**1**
flag	-	0	1	1	1	1	1	1	0
a/d, rid, ver	1	s_{27}	s_{26}	s_{25}	ver_3	ver_2	ver_1	rid	a/d
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
burst id,	5	0	0	0	0	1	1	0	1
M, T, IB	6	M	T	re	c/r	0	0	0	0
Cxn management	7	0	0	0	0	0	0	0	1
lg	8	lg_8	lg_7	lg_6	lg_5	lg_4	lg_3	lg_2	lg_1
r, h	9	0	1	0	0	0	0	r	h
CTRL sequencing	10	0	0	0	0	0	0	1	0
length	11	0	0	0	0	0	0	0	1
rrr,sss	12	rrr_4	rrr_3	rrr_2	rrr_1	sss_4	sss_3	sss_2	sss_1
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
sdf	16	ro_{12}	ro_{11}	ro_{10}	ro_9	sdf	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, pr	19	0	0	1	0	pr_4	pr_3	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

Table 7.38: CTRL_ACK_CTRL_a (CACa): CTRL_ACK and CTRL DLPDU with connection management, control sequencing, and unicast reservation

Description	Octet	Bit number							
		8	7	6	5	4	3	2	1
flag	-	0	1	1	1	1	1	1	0
a/d, rid, ver	1	s_{27}	s_{26}	s_{25}	ver_3	ver_2	ver_1	rid	a/d
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
burst id,	5	0	0	0	0	1	1	0	1
T	6	0	T	0	0	0	0	0	1
M, T, IB	7	M	T	re	c/r	0	0	0	0
Cxn management	8	0	0	0	0	0	0	0	1
lg	9	lg_8	lg_7	lg_6	lg_5	lg_4	lg_3	lg_2	lg_1
r, h	10	0	0	0	0	0	0	r	h
CTRL sequencing	11	0	0	0	0	0	0	1	0
length	12	0	0	0	0	0	0	0	1
rrr,sss	13	rrr_4	rrr_3	rrr_2	rrr_1	sss_4	sss_3	sss_2	sss_1
d	14	d_{24}	d_{23}	d_{22}	d_{21}	d_{20}	d_{19}	d_{18}	d_{17}
d	15	d_{16}	d_{15}	d_{14}	d_{13}	d_{12}	d_{11}	d_{10}	d_9
d	16	d_8	d_7	d_6	d_5	d_4	d_3	d_2	d_1
sdf	17	ro_{12}	ro_{11}	ro_{10}	ro_9	sdf	d_{27}	d_{26}	d_{25}
ro	18	ro_8	ro_7	ro_6	ro_5	ro_4	ro_3	ro_2	ro_1
lg	19	lg_8	lg_7	lg_6	lg_5	lg_4	lg_3	lg_2	lg_1
erid, pr	20	0	0	1	0	pr_4	pr_3	pr_2	pr_1
c	21	c_{16}	c_{15}	c_{14}	c_{13}	c_{12}	c_{11}	c_{10}	c_9
c	22	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

Table 7.39: CTRL_h (CTh): CTRL DLPDU with connection management, control sequencing, ATN router NETs, ground-based system mask, and response reservation

Description	Octet	Bit number							
		8	**7**	**6**	**5**	**4**	**3**	**2**	**1**
flag	-	0	1	1	1	1	1	1	0
a/d, rid, ver	1	s_{27}	s_{26}	s_{25}	ver_3	ver_2	ver_1	rid	a/d
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
burst id,	5	0	0	0	0	1	1	0	1
pr	6	M	T	re	c/r	0	0	0	0
Cxn management	7	0	0	0	0	0	0	0	1
lg	8	lg_8	lg_7	lg_6	lg_5	lg_4	lg_3	lg_2	lg_1
r, h	9	0	0	0	0	0	0	r	h
CTRL sequencing	10	0	0	0	0	0	0	1	0
length	11	0	0	0	0	0	0	0	1
rrr, sss	12	rrr_4	rrr_3	rrr_2	rrr_1	sss_4	sss_3	sss_2	sss_1
Protocol options	13	0	0	0	0	0	0	1	1
length	14	0	0	0	0	0	0	0	1
b, i	15	0	0	0	0	0	b	i	0
ATN router NETs	16	1	1	0	0	0	0	1	0
length	17	lg_8	lg_7	lg_6	lg_5	lg_4	lg_3	lg_2	lg_1
a	18	a_{24}	a_{23}	a_{22}	a_{21}	a_{20}	a_{19}	a_{18}	a_{17}
a	19	a_{16}	a_{15}	a_{14}	a_{13}	a_{12}	a_{11}	a_{10}	a_9
a	20	a_8	a_7	a_6	a_5	a_4	a_3	a_2	a_1
r	21	r_{24}	r_{23}	r_{22}	r_{21}	r_{20}	r_{19}	r_{18}	r_{17}
r	22	r_{16}	r_{15}	r_{14}	r_{13}	r_{12}	r_{11}	r_{10}	r_9
r	23	r_8	r_7	r_6	r_5	r_4	r_3	r_2	r_1
Ground-based system mask	24	1	1	0	0	0	0	1	1
lg	25	0	0	0	0	0	1	0	0
m	26	0	0	0	0	0	g_{25}	g_{26}	g_{27}
g	27	g_8	g_7	g_6	g_5	g_4	g_3	g_2	g_1
g	28	g_{16}	g_{15}	g_{14}	g_{13}	g_{12}	g_{11}	g_{10}	g_9
g	29	g_8	g_7	g_6	g_5	g_4	g_3	g_2	g_1
d	30	d_{24}	d_{23}	d_{22}	d_{21}	d_{20}	d_{19}	d_{18}	d_{17}
d	31	d_{16}	d_{15}	d_{14}	d_{13}	d_{12}	d_{11}	d_{10}	d_9
d	32	d_8	d_7	d_6	d_5	d_4	d_3	d_2	d_1
erid, d	33	0	0	0	0	0	d_{27}	d_{26}	d_{25}
c	34	c_{16}	c_{15}	c_{14}	c_{13}	c_{12}	c_{11}	c_{10}	c_9
c	35	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

Table 7.40: CTRL_I (Cti): CTRL DLPDU with connection management, control sequencing, ATN router NETs, ground-based system mask, replacement ground station list, and response reservation

Description	Octet	Bit number							
		8	7	6	5	4	3	2	1
flag	-	0	1	1	1	1	1	1	0
a/d, rid, ver	1	s_{27}	s_{26}	s_{25}	ver_3	ver_2	ver_1	rid	a/d
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
burst id,	5	0	0	0	0	1	1	0	1
pr	6	M	T	re	c/r	0	0	0	0
Cxn management	7	0	0	0	0	0	0	0	1
lg	8	lg_8	lg_7	lg_6	lg_5	lg_4	lg_3	lg_2	lg_1
r, h	9	0	0	0	0	0	0	r	h
CTRL sequencing	10	0	0	0	0	0	0	1	0
length	11	0	0	0	0	0	0	0	1
rrr, sss	12	rrr_4	rrr_3	rrr_2	rrr_1	sss_4	sss_3	sss_2	sss_1
ATN router NETs	13	1	1	0	0	0	0	1	0
length	14	lg_8	lg_7	lg_6	lg_5	lg_4	lg_3	lg_2	lg_1
a	15	a_{24}	a_{23}	a_{22}	a_{21}	a_{20}	a_{19}	a_{18}	a_{17}
a	16	a_{16}	a_{15}	a_{14}	a_{13}	a_{12}	a_{11}	a_{10}	a_9
a	17	a_8	a_7	a_6	a_5	a_4	a_3	a_2	a_1
r	18	r_{24}	r_{23}	r_{22}	r_{21}	r_{20}	r_{19}	r_{18}	r_{17}
r	19	r_{16}	r_{15}	r_{14}	r_{13}	r_{12}	r_{11}	r_{10}	r_9
r	20	r_8	r_7	r_6	r_5	r_4	r_3	r_2	r_1
Ground-based system mask	21	1	1	0	0	0	0	1	1
lg	22	0	0	0	0	0	1	0	0
m	23	0	0	0	0	0	g_{25}	g_{26}	g_{27}
g	24	g_8	g_7	g_6	g_5	g_4	g_3	g_2	g_1
g	25	g_{16}	g_{15}	g_{14}	g_{13}	g_{12}	g_{11}	g_{10}	g_9
g	26	g_8	g_7	g_6	g_5	g_4	g_3	g_2	g_1
Replacement ground station list	27	0	1	0	0	0	1	1	1
lg	28	lg_8	lg_7	lg_6	lg_5	lg_4	lg_3	lg_2	lg_1
g	29	0	0	0	0	0	g_{27}	g_{26}	g_{25}
g	30	g_{24}	g_{23}	g_{22}	g_{21}	g_{20}	g_{19}	g_{18}	g_{17}
g	31	g_{16}	g_{15}	g_{14}	g_{13}	g_{12}	g_{11}	g_{10}	g_9
g	32	g_8	g_7	g_6	g_5	g_4	g_3	g_2	g_1
d	33	d_{24}	d_{23}	d_{22}	d_{21}	d_{20}	d_{19}	d_{18}	d_{17}
d	34	d_{16}	d_{15}	d_{14}	d_{13}	d_{12}	d_{11}	d_{10}	d_9
d	35	d_8	d_7	d_6	d_5	d_4	d_3	d_2	d_1
erid, d	36	0	0	0	0	0	d_{27}	d_{26}	d_{25}
c	37	c_{16}	c_{15}	c_{14}	c_{13}	c_{12}	c_{11}	c_{10}	c_9
c	38	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

Table 7.41: CTRL_k (CTk): CTRL DLPDU with connection management, control sequencing, autotune, replacement ground station list, and response reservation

Description	Octet	Bit number							
		8	**7**	**6**	**5**	**4**	**3**	**2**	**1**
flag	-	0	1	1	1	1	1	1	0
a/d, rid, ver	1	s_{27}	s_{26}	s_{25}	ver_3	ver_2	ver_1	rid	a/d
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
burst id,	5	0	0	0	0	1	1	0	1
pr	6	M	T	re	c/r	0	0	0	0
Cxn management	7	0	0	0	0	0	0	0	1
lg	8	lg_8	lg_7	lg_6	lg_5	lg_4	lg_3	lg_2	lg_1
r, h	9	0	0	0	0	0	0	r	h
CTRL sequencing	10	0	0	0	0	0	0	1	0
length	11	0	0	0	0	0	0	0	1
rrr,sss	12	rrr_4	rrr_3	rrr_2	rrr_1	sss_4	sss_3	sss_2	sss_1
Autotune	13	0	1	0	0	0	1	0	1
length	14	0	0	0	0	0	0	1	0
m, f	15	m_4	m_3	m_2	m_1	f_{12}	f_{11}	f_{10}	f_9
f	16	f_8	f_7	f_6	f_5	f_4	f_3	f_2	f_1
Repl Grd Station List	17	0	1	0	0	0	1	1	1
lg	18	lg_8	lg_7	lg_6	lg_5	lg_4	lg_3	lg_2	lg_1
g	19	0	0	0	0	0	g_{27}	g_{26}	g_{25}
g	20	g_{24}	g_{23}	g_{22}	g_{21}	g_{20}	g_{19}	g_{18}	g_{17}
g	21	g_{16}	g_{15}	g_{14}	g_{13}	g_{12}	g_{11}	g_{10}	g_9
g	22	g_8	g_7	g_6	g_5	g_4	g_3	g_2	g_1
d	23	d_{24}	d_{23}	d_{22}	d_{21}	d_{20}	d_{19}	d_{18}	d_{17}
d	24	d_{16}	d_{15}	d_{14}	d_{13}	d_{12}	d_{11}	d_{10}	d_9
d	25	d_8	d_7	d_6	d_5	d_4	d_3	d_2	d_1
erid, d	26	0	0	0	0	0	d_{27}	d_{26}	d_{25}
c	27	c_{16}	c_{15}	c_{14}	c_{13}	c_{12}	c_{11}	c_{10}	c_9
c	28	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

Table 7.42: CTRL_ACK_CTRL_RTS_a (CACRa): CTRL_ACK and CTRL_RTS DLPDU combined burst with unicast reservation

Description	Octet	Bit number							
		8	**7**	**6**	**5**	**4**	**3**	**2**	**1**
flag	-	0	1	1	1	1	1	1	0
a/d, rid, ver	1	s_{27}	s_{26}	s_{25}	ver_3	ver_2	ver_1	rid	a/d
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
burst id,	5	0	0	0	0	1	1	0	1
T	6	0	T	0	0	0	0	0	1
lg, T, IB	7	0	T	IB	0	1	0	0	1
pr, lg	8	0	0	0	0	lg_4	lg_3	lg_2	lg_1
d	9	d_{24}	d_{23}	d_{22}	d_{21}	d_{20}	d_{19}	d_{18}	d_{17}
d	10	d_{16}	d_{15}	d_{14}	d_{13}	d_{12}	d_{11}	d_{10}	d_9
d	11	d_8	d_7	d_6	d_5	d_4	d_3	d_2	d_1
sdf	12	ro_{12}	ro_{11}	ro_{10}	ro_9	sdf	d_{27}	d_{26}	d_{25}
ro	13	ro_8	ro_7	ro_6	ro_5	ro_4	ro_3	ro_2	ro_1
lg	14	lg_8	lg_7	lg_6	lg_5	lg_4	lg_3	lg_2	lg_1
erid, pr	15	0	0	1	0	pr_4	pr_3	pr_2	pr_1
c	16	c_{16}	c_{15}	c_{14}	c_{13}	c_{12}	c_{11}	c_{10}	c_9
c	17	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

Table 7.43: CTRL_I (CTI): CTRL DLPDU with connection management, control sequencing, replacement ground station list, and response reservation

Description	Octet	Bit number							
		8	**7**	**6**	**5**	**4**	**3**	**2**	**1**
flag	-	0	1	1	1	1	1	1	0
a/d, rid, ver	1	s_{27}	s_{26}	s_{25}	ver_3	ver_2	ver_1	rid	a/d
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
burst id,	5	0	0	0	0	1	1	0	1
pr	6	M	T	re	c/r	0	0	0	0
Cxn management	7	0	0	0	0	0	0	0	1
lg	8	lg_8	lg_7	lg_6	lg_5	lg_4	lg_3	lg_2	lg_1
r, h	9	0	0	0	0	0	0	r	h
CTRL sequencing	10	0	0	0	0	0	0	1	0
length	11	0	0	0	0	0	0	0	1
rrr,sss	12	rrr_4	rrr_3	rrr_2	rrr_1	sss_4	sss_3	sss_2	sss_1
Repl Grd Station List	13	0	1	0	0	0	1	1	1
lg	14	lg_8	lg_7	lg_6	lg_5	lg_4	lg_3	lg_2	lg_1
g	15	0	0	0	0	0	g_{27}	g_{26}	g_{25}
g	16	g_{24}	g_{23}	g_{22}	g_{21}	g_{20}	g_{19}	g_{18}	g_{17}
g	17	g_{16}	g_{15}	g_{14}	g_{13}	g_{12}	g_{11}	g_{10}	g_9
g	18	g_8	g_7	g_6	g_5	g_4	g_3	g_2	g_1
d	19	d_{24}	d_{23}	d_{22}	d_{21}	d_{20}	d_{19}	d_{18}	d_{17}
d	20	d_{16}	d_{15}	d_{14}	d_{13}	d_{12}	d_{11}	d_{10}	d_9
d	21	d_8	d_7	d_6	d_5	d_4	d_3	d_2	d_1
erid, d	22	0	0	0	0	0	d_{27}	d_{26}	d_{25}
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

Table 7.44: CTRL_j (CTj): CTRL DLPDU with connection management, control sequencing, replacement ground station list, and unicast reservation

Description	Octet	Bit number							
		8	7	6	5	4	3	2	1
flag	-	0	1	1	1	1	1	1	0
a/d, rid, ver	1	s_{27}	s_{26}	s_{25}	ver_3	ver_2	ver_1	rid	a/d
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
burst id,	5	0	0	0	0	1	1	0	1
pr	6	M	T	re	c/r	0	0	0	0
Cxn management	7	0	0	0	0	0	0	0	1
lg	8	lg_8	lg_7	lg_6	lg_5	lg_4	lg_3	lg_2	lg_1
r, h	9	0	0	0	0	0	0	r	h
CTRL sequencing	10	0	0	0	0	0	0	1	0
length	11	0	0	0	0	0	0	0	1
rrr, sss	12	rrr_4	rrr_3	rrr_2	rrr_1	sss_4	sss_3	sss_2	sss_1
Repl Grd Station List	13	0	1	0	0	0	1	1	1
lg	14	lg_8	lg_7	lg_6	lg_5	lg_4	lg_3	lg_2	lg_1
g	15	0	0	0	0	0	g_{27}	g_{26}	g_{25}
g	16	g_{24}	g_{23}	g_{22}	g_{21}	g_{20}	g_{19}	g_{18}	g_{17}
g	17	g_{16}	g_{15}	g_{14}	g_{13}	g_{12}	g_{11}	g_{10}	g_9
g	18	g_8	g_7	g_6	g_5	g_4	g_3	g_2	g_1
d	19	d_{24}	d_{23}	d_{22}	d_{21}	d_{20}	d_{19}	d_{18}	d_{17}
d	20	d_{16}	d_{15}	d_{14}	d_{13}	d_{12}	d_{11}	d_{10}	d_9
d	21	d_8	d_7	d_6	d_5	d_4	d_3	d_2	d_1
sdf	22	ro_{12}	ro_{11}	ro_{10}	ro_9	sdf	d_{27}	d_{26}	d_{25}
ro	23	ro_8	ro_7	ro_6	ro_5	ro_4	ro_3	ro_2	ro_1
lg	24	lg_8	lg_7	lg_6	lg_5	lg_4	lg_3	lg_2	lg_1
erid, pr	25	0	0	1	0	pr_4	pr_3	pr_2	pr_1
c	26	c_{16}	c_{15}	c_{14}	c_{13}	c_{12}	c_{11}	c_{10}	c_9
c	27	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

Test case macros shall be as defined in EN 301 842-2 [5] clause 7.4.3.2.1 with the following additional macros.

Macro Name: **M_INITIALIZE_NSCOP**				Performs initial exchange for NSCOP communication.		
Parameters:						
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
macro	1	send	RF	CTRL_RTS_a (s:= add_B; d:= add_A; IB:= 1; T:= 0; lg:= 7)	Cra	Send an RTS using the long transmission procedures from a simulated station B, with IB = 1 and T = 0, indicating this is the first transmission from station B to station A. The RTS contains a unicast reservation for a response.
	2	verify	RF	CTRL_CTS_a (s = add_A; d = add_B) in the slot reserved by the RTS	Cca	Verify that a CTRL_CTS is sent by the station under test in the slot reserved by the RTS. The CTS contains an information transfer reservation that also includes a reservation for an acknowledgement.
	3	send	RF	CTRL_b (s:= add_B; d:= add_A; T:= 0) in the slot reserved by the CTS	CTb	Send a CTRL DLPDU from station B with T = 0 in the slot reserved by the CTS.
	4	verify	RF	CTRL_ACK_a (s = add_A; d = add_B; T = 0) in the ack slot reserved by the CTS	Caa	Verify that a CTRL_ACK is sent by the station under test in the ack slot reserved by the CTS.
Comments:						

Macro Name: **M_LME_INITIALIZE_LINK**				Performs link establishment at the LME.		
Parameters:						
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
macro	1	send	RF	CTRL_RTS_a (s:= add_B; d:= add_A; IB:= 1; T:= 0; lg:= 1)	Cra	Send a CTRL_RTS using the long transmission procedures from a simulated station B to the station under test, with IB = 1 and T = 0, indicating this is the first transmission from station B to station A. The burst contains a unicast reservation reserving a slot for A"s response.
	2	await	RF	BURST from station under test		Wait for a burst from the station under test.
	3	verify	RF	CTRL_CTS_a (s = add_A; d = add_B) in slot reserved by the RTS	Cca	Verify that a CTRL_CTS is sent by the station under test in the slot reserved by the RTS. The CTS contains an information transfer reservation that also includes a reservation for an acknowledgement.
	4	send	RF	CTRL_d (s:= add_B; d:= add_A; M:= 0; T:= 0; re:= 1; c/r:= 0; h:= 0; r:= 0; lg:= 1; rrr:= 0; sss:= 0) in slot reserved by the CTS	CTd	Send, in the slot reserved by the CTS, a CTRL DLPDU from station B with parameters indicating a CTRL_CMD_LE.
	5	verify	LME	CTRL_CMD_LE (re = 1) received		Verify that a CTRL_CMD_LE (re = 1) is received at the LME of the station under test.
	6	await	RF	BURST from station under test		Wait for a burst from the station under test.
	7	verify	RF	**EITHER** CTRL_ACK_a (s = add_A; d = add_B) in ack slot reserved by the CTS followed by transmission of CTRL_c (s:= add_A; d:= add_B; M:= 0; T:= 0; re:= 1; c/r:= 1; h:= 0; r:= 0; lg:= 1; rrr:= 0; sss:= 0) **OR** CTRL_ACK_CTRL_a (s = add_A; d = add_B; CTRL (M:= 0; T:= 0; re:= 1; c/r:= 1; h:= 0; r:= 0; lg:= 1; rrr:= 0; sss:= 0)) in the ack slot reserved by the CTS	Caa CTc, CACa	Verify that either: a CTRL_ACK is sent by the station under test in the acknowledgement slot reserved by the CTS, followed by transmission of a CTRL burst indicating a CTRL_RSP_LE; or a CTRL_ACK / CTRL combined burst is sent by the station under test in the acknowledgement slot reserved by the CTS, with the CTRL indicating a CTRL_RSP_LE.
	8	send	RF	CTRL_ACK_a (s:= add_B; d:= add_A; T:= 0) in ack slot reserved by unicast reservation in CRTL_c or CTRL_ACK_CTRL_a	Caa	Send an ACK from station B in the acknowledgement slot reserved by the CTRL or CTRL_ACK / CTRL combined burst, in response to the completed message.
Comments:						

7.4.3.2.2 Test case descriptions

Test Case Name:	**DLS_ND2**					
Purpose:	To demonstrate that a station will send data requiring a burst of length less than or equal to ND2 octets via the short transmission procedure, and a burst of length greater than ND2 via the long transmission procedure.					
Reference:						
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble	1	do		M_POWER_UP		Prepare the transceiver for testing.
	2	do		SET PARAMETERS (ND3:= 5 slots; ND2:= 86 octets)		Set the parameter ND3 = 5 slots and ND2 = 86 octets (3 slots).
	3	do		M_INITIALIZE_NSCOP		Initialize the ground-air link.
Test body	4	rep 3		l1:= {1, 2, 3}		
	5	send	DLS	REQUEST TO TRANSMIT DATA DLPDU (s:= add_A; d:= add_B) with length requiring burst = l1 slots		Send a request from a DLS user to the station under test to send a DATA DLPDU to a simulated station B requiring a burst of length l1 slots.
	6	await	RF	BURST transmitted by station A		Wait for a burst to be transmitted by station A.
	7	verify	RF	INFO_a (s = add_A; d = add_B)	Ifa	Verify that the station under test sends a DATA DLPDU by the short transmission procedures. The burst contains a unicast reservation for an acknowledgement.
	8	verify	RF	M = 0 in INFO_a	Ifa	Verify that the more bit M = 0 in the DATA DLPDU transmitted by the short transmission procedure.
	9	send	RF	INFO_ACK (s:= add_B; d:= add_A) in slot reserved by the INFO	Iaa	Send an ACK from station B in the slot reserved by the INFO to the station under test.
	10	endrep		next l1		
	11	send	DLS	REQUEST TO TRANSMIT DATA DLPDU (s:= add_A; d:= add_B) with length requiring burst = 4 slots		Send a request from a DLS user to the station under test to transmit a DATA DLPDU to a simulated station B, requiring a burst of length 4 slots.
	12	await	RF	BURST transmitted by station A		Wait for a burst to be transmitted by station A.
	13	verify	RF	INFO_RTS_a (s = add_A; d = add_B)	Ira	Verify that an RTS is sent by the station under test, indicating initiation of a long transmission procedure. The RTS contains a unicast reservation for a response.
	14	send	RF	INFO_CTS_a (s:= add_B; d:= add_A)	Ica	Send a CTS in response from station B to station A in the slot reserved by the RTS. The CTS contains an information transfer reservation that also includes a reservation for an acknowledgement.
	15	await	RF	BURST transmitted by station A		Wait for a burst to be transmitted by station A.
	16	verify	RF	INFO_b (s = add_A; d = add_B) in slot reserved by the CTS	Ifb	Verify that a DATA DLPDU is sent by station A in the reserved slot.
	17	verify	RF	M = 0 in INFO_b	Ifb	Verify that the more bit M = 0 in the DATA DLPDU transmitted by the long transmission procedure.
	18	send	RF	INFO_ACK_a (s:= add_B; d:= add_A) in the ack slot reserved by the CTS	Iaa	Send an ACK from station B in response in the slot reserved for the acknowledgement.
Postamble	19					
Comments:						

Test Case Name:	**DLS_ND3**					
Purpose:	To demonstrate that fragmentation will not occur if a message is less than or equal to ND3 but will occur if it is greater than ND3 in length.					
Reference:						
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble	1	do		M_POWER_UP		Prepare the transceiver for testing.
	2	do		SET PARAMETERS (ND3:= 6 slots; ND2:= 86 octets)		Set the parameter ND3 = 6 and ND2 = 86 octets (3 slots).
	3	do		M_INITIALIZE_NSCOP		Initialize the ground-air link.
Test body	4	rep 3		l1:= {4, 5, 6}		
	5	send	DLS	REQUEST TO TRANSMIT DATA DLPDU (s:= add_A; d:= add_B) with length = l1 slots		Send a request from a DLS user to the station under test to send a DATA DLPDU requiring a length of l1 slots.
	6	verify	RF	INFO_RTS_a (s = add_A; d = add_B)	Ira	Verify that an RTS is sent by the station under test, , indicating initiation of a long transmission procedure. The burst contains a unicast reservation reserving a slot for a response.
	7	send	RF	INFO_CTS_a (s:= add_B; d:= add_A) in slot reserved by RTS	Ica	Send a CTS in response from station B to station A in the slot reserved by the RTS. The CTS contains an information transfer reservation that also includes a reservation for an acknowledgement.
	8	verify	RF	INFO_b (s = add_A; d = add_B) in slot reserved by CTS	Ifb	Verify that a DATA DLPDU is sent by station A in the slot reserved by the CTS.
	9	send	RF	INFO_ACK_a (s:= add_B; d:= add_A)	Iaa	Send an ACK from station B in the ack slot reserved by the CTS in response to the completed message.
	10	endrep		next l1		
	11	rep 3		l1:= {7, 8, 9}		
	12	send	DLS	REQUEST TO TRANSMIT DATA DLPDU (s:= add_A; d := add_B) with length = l1 slots		Send a request from a DLS user to the station under test to send a DATA DLPDU requiring a length of l1 slots.
	13	verify	RF	INFO_RTS_a (s = add_A; d = add_B)	Ira	Verify that an RTS is sent by the station under test, indicating the beginning of a long transmission procedure. The RTS contains a unicast reservation for a response.
	14	send	RF	INFO_CTS_a (s:= add_B; d:= add_A) in the slot reserved by the RTS	Ica	Send a CTS in response from station B to station A in the slot reserved by the RTS. The CTS contains an information transfer reservation that also includes a reservation for an acknowledgement.
	15	verify	RF	INFO_RTS_INFO_b (s = add_A; d = add_B) in the slot reserved by the CTS	IRIFb	Verify that an RTS / DATA is sent by station A in the slot reserved by the CTS. The RTS reserves another slot for the rest of the data.
	16	send	RF	INFO_ACK_INFO_CTS_a (s:= add_B; d:= add_A) in the ack slot reserved by the previous CTS	IAICa	Send an ACK / CTS from station B in response, in the ack slot reserved by the previous CTS. The CTS contains an information transfer reservation that also includes a reservation for an acknowledgement.
	17	verify	RF	INFO_b (s = add_A; d = add_B) in the slot reserved by the last CTS	Ifb	Verify that the DATA DLPDU is sent by station A in the slot reserved by the last CTS.

Test Case Name:	**DLS_ND3**					
Purpose:	To demonstrate that fragmentation will not occur if a message is less than or equal to ND3 but will occur if it is greater than ND3 in length.					
Reference:						
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
	18	send	RF	INFO_ACK_a (s:= add_B; d:= add_A) in the ack slot reserved by the last CTS	Iaa	Send an ACK from station B in response to the completed message, in the ack slot reserved by the last CTS.
	19	endrep		next l1		
postamble	20					
Comments:						

Test Case Name:	**DLS_Data**					
Purpose:	To demonstrate that a station will only transmit one data link packet in a DATA DLPDU.					
Reference:						
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble	1	do		M_POWER_UP		Prepare the transceiver for testing.
	2	do		SET PARAMETERS (ND3:=5 slots; ND2:= 4 slots)		Set parameter ND3 = 5 and ND2 = 118 octets (4 slots).
	3	do		M_INITIALIZE_NSCOP		Initialize the ground-air link.
Test body	4	send	DLS	REQUEST TO TRANSMIT DATA DLPDU (s:= add_A; d:= add_B; pr:= 2) with length = 2 slots		Send a request from a DLS user to the station under test to send a DATA DLPDU with length = 2 slots.
	5	send	DLS	REQUEST TO TRANSMIT DATA DLPDU (s:= add_A; d:= add_B; pr:= 3) with length = 2 slots		Send a request from a DLS user to the station under test to send a DATA DLPDU with length = 2 slots.
	6	verify	RF	INFO_a (s = add_A; d = add_B; pr = 3))	Cta	Verify that a DATA DLPDU is sent by the station under test, indicating the beginning of a short transmission procedure. The burst includes a unicast request reservation for a response.
	7	send	RF	INFO_ACK_a (s:= add_B; d:= add_A) in the slot reserved by the INFO with pr = 3	Caa	Send an ACK from station B as an acknowledgement in the slot reserved by the INFO with pr = 3.
	8	verify	RF	INFO_a (s = add_A; d = add_B; pr = 2)	Cta	Verify that a DATA DLPDU is sent by station A indicating the beginning of a short transmission procedure. The burst includes a unicast request reservation for a response.
	9	send	RF	INFO_ACK_a (s:= add_B; d:= add_A) in the slot reserved by the INFO with pr = 2	Caa	Send an ACK from station B as an acknowledgement in the slot reserved by the INFO with pr = 2.
Postamble	10					
Comments:						

Test Case Name:	**DLS_Duplicate_Short**					
Purpose:	To demonstrate that duplicate DATA DLPDUs received by the short transmission procedure are discarded.					
Reference:						
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble	1	do		M_POWER_UP		Prepare the transceiver for testing.
	2	do		M_INITIALIZE_NSCOP		Initialize the ground-air link.
Test body	3	send	RF	INFO_a (s:= add_B; d:= add_A; T:= 1; in:= info1)	Ifa	Send a message with T = 1 and information field = info1 from a simulated station B to the station under test via the short transmission procedure. The burst contains a unicast reservation reserving a slot for a response.
	4	send	RF	INFO_a (s:= add_B; d:= add_A; T:= 1; in:= info2)	Ifa	Send a second message with T = 1 and information field = info2 from station B to the station under test. The burst contains a unicast reservation reserving a slot for a response.
	5	verify	DLS	INFO_a (s = add_B; d = add_A; T:= 1; in = info1) passed to DLS user	Ifa	Verify that only the first INFO_a message is passed to the DLS user by the station under test and therefore that the duplicate message was discarded.
	6	verify	RF	INFO_ACK (s = add_A; d = add_B) sent by the station under test in the slot reserved by the first INFO	Iaa	Verify that an ACK is sent to station B by the station under test in the slot reserved by the first INFO.
	7	verify	RF	INFO_ACK (s = add_A; d = add_B) sent by the station under test in the slot reserved by the INFO message	Iaa	Verify that an ACK is sent to station B by the station under test in the slot reserved by the second INFO.
Postamble	8					
Comments:						

Test Case Name:	**DLS_Duplicate_Long**					
Purpose:	To demonstrate that duplicate DATA DLPDUs received by the long transmission procedure are discarded.					
Reference:						
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble	1	do		M_POWER_UP		Prepare the transceiver for testing.
	2	do		SET PARAMETERS (ND3:= 5 slots; ND2:= 86 octets)		Set the parameter ND3 = 5 slots and ND2 = 86 octets (3 slots).
	3	do		M_INITIALIZE_NSCOP		Initialize the air-ground link.
Test body	4	send	RF	INFO_RTS_a (s:= add_B; d:= add_A; T:= 1; pr:= 3; lg:= 5)	Ira	Send an INFO_RTS using the long transmission procedures from a simulated station B, with T = 1, indicating this is the first transmission in the sequence from station B to station A following the initialization. The burst contains a unicast reservation for a response.
	5	await		BURST transmitted by station A		Wait for a burst transmitted by station A.
	6	verify	RF	INFO_CTS_a (s = add_A; d = add_B) in slot reserved by RTS	Ica	Verify that a CTS is transmitted by station A in the slot reserved by the RTS. The CTS contains an information transfer reservation that also includes a reservation for an acknowledgement.
	7	send	RF	INFO_b (s:= add_B; d:= add_A; T:= 1) in slot reserved by CTS	Ifb	Send the DATA DLPDU from station B with T = 1 in the slot reserved by the CTS.
	8	verify	DLS	INFO_b (s:= add_B; d:= add_A; T:= 1) passed to DLS user	Ifb	Verify that the INFO_a message is passed to the DLS user by the station under test.
	9	await		BURST transmitted by station A		Wait for a burst transmitted by station A.
	10	verify	RF	INFO_ACK_a (s = add_A; d = add_B) in ack slot reserved by CTS	Iaa	Verify that an ACK is transmitted by station A in the acknowledgement slot reserved by the CTS.
	11	verify	RF	T = 1 in INFO_ACK_a (s = add_A; d = add_B)	Iaa	Verify that the ACK contains T = 1.
	12	send	RF	INFO_RTS_a (s:= add_B; d:= add_A; T:= 0; pr:= 3; lg:= 5)	Ira	Send an INFO_RTS using the long transmission procedures from a simulated station B, with T = 0. The burst contains a unicast reservation for a response.
	13	await		BURST transmitted by station A		Wait for a burst transmitted by station A.
	14	verify	RF	INFO_CTS_a (s = add_A; d = add_B) in slot reserved by RTS	Ica	Verify that a CTS is transmitted by station A in the slot reserved by the RTS. The CTS contains an information transfer reservation that also includes a reservation for an acknowledgement.
	15	send	RF	INFO_b (s:= add_B; d:= add_A; T:= 1) in slot reserved by CTS	Ifb	Send the DATA DLPDU from station B with T = 1 in the slot reserved by the CTS. This is incorrectly a duplicate INFO burst, since T has the same value as for the last INFO.
	16	verify	DLS	INFO_b (s:= add_B; d:= add_A; T:= 1) not passed to DLS user	Ifb	Verify that the second INFO_a message with T = 1 is not passed to the DLS user by the station under test, and is discarded as a duplicate.
	17	await		BURST transmitted by station A		Wait for a burst transmitted by station A.
	18	verify	RF	INFO_ACK_a (s = add_A; d = add_B)	Iaa	Verify that an ACK is transmitted by station A.
	19	verify	RF	T = 1 in INFO_ACK_a (s = add_A; d = add_B)	Iaa	Verify that the ACK contains T = 1.
Postamble	20					
Comments:						

Test Case Name:	**DLS_Long_Order**					
Purpose:	To demonstrate that DATA DLPDUs which are part of the same fragmented packet are concatenated and delivered to the DLS user in the same order in which they appear in the packet.					
Reference:	**1.4.1.2 a**					
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble	1	do		M_POWER_UP		Prepare the transceiver for testing.
	2	do		M_INITIALIZE_NSCOP		Initialize the air-ground link.
		Do		SET PARAMETERS (ND3:= 5 slots; ND2:= 86 octets)		Set the parameter ND3 = 5 slots and ND2 = 86 octets (3 slots).
Test body	3	send	RF	INFO_RTS_a (s:= add_B; d:= add_A; pr:= 3; lg:= 5)	Ira	Send an initial RTS to the station under test. The RTS contains a unicast reservation for a response.
	4	verify	RF	INFO_CTS_a (s = add_A; d = add_B)	Ica	Verify that the station under test sends a CTS in the slot reserved by the RTS. The CTS contains an information transfer reservation that also includes a reservation for an acknowledgement.
	5	rep 5		info:= {info1, info2, info3, info4, info5}		Repeat cycle of RTS / DATA followed by ACK / CTS in order to send a total of 6 fragments of the same packet to the station under test.
	6	send	RF	INFO_RTS_INFO_b (s:= add_B; d:= add_A; in:= info; INFO (M:= 1; pr:= 3)) in the slot reserved by the CTS	IRIFb	Send an RTS / DATA to the station under test in the slot reserved by the CTS, with the INFO packets containing M = 1.
	7	verify	RF	INFO_ACK_INFO_CTS_a (s = add_B; d = add_A) in the ack slot reserved by the previous CTS	IAICa	Verify that the station under test sends a CTS / ACK, in the acknowledgement slot reserved by the previous CTS, in response to the RTS / DATA.
	8	endrep		next info		
	9	send	RF	INFO_b (s:= add_A; d:= add_B; in:= info6; M:= 0; pr:= 3) in the slot reserved by the CTS	Ifb	Send the final INFO burst to the station under test, in the slot reserved by the CTS, with M = 0.
	10	verify	DLS	Fragments delivered to DLS user concatenated and in the correct order: info1(first), info2, info3, info4, info5, info6 (last)		Verify that the fragments of the data packet (with the same priority) are delivered to the DLS user of the station under test in the correct order.
	11	verify	RF	INFO_ACK_a (s = add_B; d = add_A) in the ack slot reserved by the CTS	Iaa	Verify that the station under test sends an ACK, in the ack slot reserved by the CTS, in response to the final INFO.
Postamble	12					
Comments:						

Test Case Name:	**DLS_Long_T_Receive_A**					
Purpose:	To demonstrate that a station correctly sets the T bit when receiving non-combined data packets from another station.					
Reference:	**1.4.2.3.3 a, 1.4.2.3.3 b**					
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble	1	do		M_POWER_UP		Prepare the transceiver for testing.
	2	do		SET PARAMETERS (ND3:= 5 slots; ND2:= 86 octets)		Set the parameter ND3 = 5 slots and ND2 = 86 octets (3 slots).
	3	do		M_INITIALIZE_NSCOP		Initialize the air-ground link.
Test body	4	send	RF	INFO_RTS_a (s:= add_B; d:= add_A; T:= 1; pr:= 3; lg:= 7)	Ira	Send an INFO_RTS using the long transmission procedures from a simulated station B, with T = 1, indicating this is the first transmission in the sequence from station B to station A following the initialization. The RTS contains a unicast reservation for a response.
	5	await		BURST transmitted by station A		Wait for a burst transmitted by station A.
	6	verify	RF	INFO_CTS_a (s = add_A; d = add_B) transmitted in the slot reserved by the RTS	Ica	Verify that a CTS is transmitted by station A in the slot reserved by the RTS. The CTS contains an information transfer reservation that also includes a reservation for an acknowledgement.
	7	send	RF	INFO_b (s:= add_B; d:= add_A; T:= 1) in the slot reserved by the CTS	Ifb	Send the DATA DLPDU from station B with T = 1 in the slot reserved by the CTS.
	8	await		BURST transmitted by station A		Wait for a burst transmitted by station A.
	9	verify	RF	INFO_ACK_a (s = add_A; d = add_B) transmitted in the ack slot reserved by the CTS	Iaa	Verify that an ACK is transmitted by station A in the ack slot reserved by the CTS.
	10	verify	RF	T = 1 in INFO_ACK_a (s = add_A; d = add_B)	Iaa	Verify that the ACK contains T = 1.
	11	send	RF	INFO_RTS_a (s:= add_B; d:= add_A; T:= 0; pr:= 3; lg:= 4)	Ira	Send the next RTS from station B with T = 0. The RTS contains a unicast reservation for a response.
	12	await		BURST transmitted by station A		Wait for a burst transmitted by station A.
	13	verify	RF	INFO_CTS_a (s = add_A; d = add_B) transmitted in the slot reserved by the RTS	Ica	Verify that a CTS is transmitted by station A in the slot reserved by the RTS. The CTS contains an information transfer reservation that also includes a reservation for an acknowledgement.
	14	send	RF	INFO_b (s:= add_B; d:= add_A; T:= 0) in the slot reserved by the CTS	Ifb	Send the DATA DLPDU from station B with T = 0 in the slot reserved by the CTS.
	15	await		BURST transmitted by station A		Wait for a burst transmitted by station A.
	16	verify	RF	INFO_ACK_a (s = add_A; d = add_B) transmitted in the ack slot reserved by the CTS	Iaa	Verify that an ACK is transmitted by station A in the ack slot reserved by the CTS.
	17	verify	RF	T = 0 in INFO_ACK_a (s = add_A; d = add_B)	Iaa	Verify that the ACK contains T = 0.
Postamble	18					
Comments:						

Test Case Name:	**DLS_Long_T_Receive_B**					
Purpose:	To demonstrate that a station correctly sets the T bit when receiving combined data packets from another station.					
Reference:	**1.4.2.3.3 a, 1.4.2.3.3 b**					
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble	1	do		M_POWER_UP		Prepare the transceiver for testing.
	2	do		SET PARAMETERS (ND3:= 5 slots; ND2:= 86 octets)		Set the parameter ND3 = 5 slots and ND2 = 86 octets (3 slots).
	3	do		M_INITIALIZE_NSCOP		Initialize the air-ground link.
Test body	4	send	RF	INFO_RTS_a (s:= add_B; d:= add_A; T:= 1; pr:= 3; lg:= 12)	Ira	Send an INFO_RTS using the long transmission procedures from a simulated station B, with T = 1, indicating this is the first transmission in the sequence from station B to station A following the initialization. The RTS contains a unicast reservation for a response.
	5	await		BURST transmitted by station A		Wait for a burst transmitted by station A.
	6	verify	RF	INFO_CTS_a (s = add_A; d = add_B) in the slot reserved by the RTS	Ica	Verify that a CTS is transmitted by station A in the slot reserved by the RTS. The CTS contains an information transfer reservation that also includes a reservation for an acknowledgement.
	7	send	RF	INFO_RTS_INFO_b (s:= add_B; d:= add_A; INFO (T:= 1); RTS (T:= 0)) in the slot reserved by the CTS	IRIFb	Send an RTS / DATA DLPDU from station B, in the slot reserved by the CTS, with T = 1 in the INFO DLPDU and T = 0 in the RTS.
	8	await		BURST transmitted by station A		Wait for a burst transmitted by station A.
	9	verify	RF	INFO_ACK_INFO_CTS_a (s = add_A; d = add_B) in the ack slot reserved by the CTS	IAICa	Verify that a CTS / ACK is transmitted by station A in the ack slot reserved by the previous CTS. The CTS contains an information transfer reservation that also includes a reservation for an acknowledgement.
	10	verify	RF	T = 1 in INFO_ACK DLPDU contained in INFO_ACK_INFO_CTS_a (s = add_A; d = add_B)	IAICa	Verify that T = 1 in the INFO_ACK DLPDU in the combined burst.
	11	send	RF	INFO_RTS_INFO_b (s:= add_B; d:= add_A; INFO (T:= 0); RTS (T:= 1)) in the slot reserved by the CTS	IRIFb	Send an RTS / DATA DLPDU from station B, in the slot reserved by the CTS, with T = 0 in the INFO DLPDU and T = 1 in the RTS.
	12	await		BURST transmitted by station A		Wait for a burst transmitted by station A.
	13	verify	RF	INFO_ACK_INFO_CTS_a (s = add_A; d = add_B) in the ack slot reserved by the CTS	IAICa	Verify that a CTS / ACK is transmitted by station A in the ack slot reserved by the previous CTS. The CTS contains an information transfer reservation that also includes a reservation for an acknowledgement.
	14	verify	RF	T = 0 in INFO_ACK DLPDU contained in INFO_ACK_INFO_CTS_a (s = add_A; d = add_B)	IAICa	Verify that T = 0 in the INFO_ACK DLPDU and that T = 1 in the INFO DLPDU in the combined burst.
	15	send	RF	INFO_b (s:= add_B; d:= add_A; T:= 1) in the slot reserved by the CTS	Ifb	Send the DATA DLPDU from station B, in the slot reserved by the CTS, with T = 1.
	16	await		BURST transmitted by station A		Wait for a burst transmitted by station A.
	17	verify	RF	INFO_ACK_a (s = add_A; d = add_B) in the ack slot reserved by the CTS	Iaa	Verify that an ACK is transmitted by station A in the ack slot reserved by the CTS.
	18	verify	RF	T = 1 in INFO_ACK_a (s = add_A; d = add_B)	Iaa	Verify that the ACK contains T = 1.
Postamble	19					
Comments:						

Test Case Name:	**DLS_Long_TM_Send_A**					
Purpose:	To demonstrate that a station correctly sets the T and M bits when sending a single data packet to another mobile station with the long transmission procedure.					
Reference:	**1.4.2.3.3 a, 1.4.2.3.3 b**					
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble	1	do		M_POWER_UP		Prepare the transceiver for testing.
	2	do		SET PARAMETERS (ND3:= 5 slots; ND2:= 86 octets)		Set the parameter ND3 = 5 slots and ND2 = 86 octets (3 slots).
	3	do		M_INITIALIZE_NSCOP		Initialize the air-ground link.
Test body	4	send	DLS	REQUEST TO TRANSMIT DATA DLPDU (s:= add_A; d := add_B) with length = 4 slots		Send a request from a DLS user to the station under test to send a DATA DLPDU requiring a length of 4 slots.
	5	await		BURST transmitted by station A		Wait for a burst transmitted by station A.
	6	verify	RF	INFO_RTS_a (s = add_A; d = add_B)	Ira	Verify that an INFO_RTS is sent by the station under test. The RTS contains a unicast reservation for a response.
	7	verify	RF	T = 1 in INFO_RTS_a (s = add_A; d = add_B)	Ira	Verify that T = 1 in the RTS, as this is the first transmission in the sequence from station A to station B following the initialization.
	8	send	RF	INFO_CTS_a (s:= add_B; d:= add_A)	Ica	Send a CTS in response from station B to station A in the slot reserved by the RTS. The CTS contains an information transfer reservation that also includes a reservation for an acknowledgement.
	9	await		BURST transmitted by station A		Wait for a burst transmitted by station A.
	10	verify	RF	INFO_b (s = add_A; d = add_B) in the slot reserved by the CTS	Ifb	Verify that a DATA DLPDU is sent by station A in the slot reserved by the CTS.
	11	verify	RF	T = 1 and M = 0 in INFO_b (s = add_A; d = add_B)	Ifb	Verify that T = 1 and M = 0 in the INFO DLPDU from station A.
	12	send	RF	INFO_ACK_a (s:= add_B; d:= add_A; T:= 1) in the ack slot reserved by the CTS	Iaa	Send the ACK from station B, in the ack slot reserved by the CTS, in response to the completed message with T = 1.
Postamble	13					
Comments:						

Test Case Name:	**DLS_Long_TM_Send_B**					
Purpose:	To demonstrate that a station correctly sets the T and M bits when sending multiple data packets in sequence to another station with the long transmission procedure.					
Reference:	**1.4.2.3.3 a, 1.4.2.3.3 b**					
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble	1	do		M_POWER_UP		Prepare the transceiver for testing.
	2	do		SET PARAMETERS (ND3:= 5 slots; ND2:= 86 octets)		Set the parameter ND3 = 5 slots and ND2 = 86 octets (3 slots).
	3	do		M_INITIALIZE_NSCOP		Initialize the air-ground link.
Test body	4	rep 3		p:= {2, 13, 12}		Start loop.
	5	send	DLS	REQUEST TO TRANSMIT DATA DLPDU (s:= add_A; d := add_B; pr:= p) with length = 12 slots		Send a request from a DLS user to the station under test to send a DATA DLPDU requiring a length of 12 slots.
	6	await		BURST transmitted by station A		Wait for a burst transmitted by station A.
	7	verify	RF	INFO_RTS_a (s = add_A; d = add_B)	Ira	Verify that an INFO_RTS is sent by the station under test, which is the beginning of a long transmission procedure. The RTS contains a unicast reservation for a response.
	8	verify	RF	T = 1 in INFO_RTS_a (s = add_A; d = add_B)	Ira	Verify that T = 1 in the RTS, as this is the first transmission from station A to station B following the initialization.
	9	record		priority(1):= pr in INFO_RTS_a	Ira	Record the priority of the INFO_RTS.
	10	send	RF	INFO_CTS_a (s:= add_B; d:= add_A) in the slot reserved by the RTS	Ica	Send a CTS in response from station B to station A in the slot reserved by the RTS. The CTS contains an information transfer reservation that also includes a reservation for an acknowledgement.
	11	await		BURST transmitted by station A		Wait for a burst transmitted by station A.
	12	verify	RF	INFO_RTS_INFO_b (s = add_A; d = add_B) in the slot reserved by the CTS	IRIFb	Verify that an RTS / DATA is sent by station A in the slot reserved by the CTS.
	13	verify	RF	T = 0 in INFO_RTS DLPDU and T = 1 and M = 1 in INFO DLPDU contained in INFO_RTS_INFO_b (s = add_A; d = add_B)	IRIFb	Verify that T = 0 in the INFO_RTS DLPDU and that T = 1 and M = 1 in the INFO DLPDU in the combined burst.
	14	record		priority(2):= pr in INFO_RTS priority(3):= pr in INFO		Record the priority of the INFO_RTS and of the INFO.
	15	send	RF	INFO_ACK_INFO_CTS_a (s:= add_B; d:= add_A; INFO_ACK (T:= 1)) in the ack slot reserved by the CTS	IAICa	Send a CTS / ACK from station B in response, in the ack slot reserved by the previous CTS, with T = 1 in the ACK. The CTS contains an information transfer reservation that also includes a reservation for an acknowledgement.
	16	await		BURST transmitted by station A		Wait for a burst transmitted by station A.
	17	verify	RF	INFO_RTS_INFO_b (s = add_A; d = add_B) in the slot reserved by the CTS	IRIFb	Verify that an RTS / DATA is sent by station A in the slot reserved by the CTS.
	18	verify	RF	T = 1 in INFO_RTS DLPDU and T = 0 and M = 1 in INFO DLPDU contained in INFO_RTS_INFO_b (s = add_A; d = add_B)	IRIFb	Verify that T = 1 in the INFO_RTS DLPDU and that T = 0 and M = 1 in the INFO DLPDU in the combined burst.
	19	record		priority(4):= pr in INFO_RTS priority(5):= pr in INFO		Record the priority of the INFO_RTS and of the INFO.

Test Case Name:	**DLS_Long_TM_Send_B**					
Purpose:	To demonstrate that a station correctly sets the T and M bits when sending multiple data packets in sequence to another station with the long transmission procedure.					
Reference:	**1.4.2.3.3 a, 1.4.2.3.3 b**					
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
	20	send	RF	INFO_ACK_INFO_CTS_a (s:= add_B; d:= add_A; INFO_ACK (T:= 0)) in the ack slot reserved by the CTS	IAICa	Send a CTS / ACK from station B in response, in the ack slot reserved by the previous CTS, with T = 0 in the ACK. The CTS contains an information transfer reservation that also includes a reservation for an acknowledgement.
	21	await		BURST transmitted by station A		Wait for a burst transmitted by station A.
	22	verify	RF	INFO_b (s = add_A; d = add_B) in the slot reserved by the CTS	Ifb	Verify that a DATA DLPDU is sent by station A in the slot reserved by the CTS.
	23	verify	RF	T = 1 and M = 0 in INFO_b (s = add_A; d = add_B)	Ifb	Verify that T = 1 and M = 0 in the INFO DLPDU from station A.
	24	record		priority(6):= pr in INFO_b	Ifb	Record the priority of the INFO.
	25	send	RF	INFO_ACK_a (s:= add_B; d:= add_A; T:= 1) in the ack slot reserved by the CTS	Iaa	Send the ACK from station B, in the ack slot reserved by the CTS, in response to the completed message.
	26	verify		priority(n) = p for n = 1 to 6		Verify that the priorities were correctly set in the DLPDUs.
	27	endrep		next p		
postamble	28					
Comments:						

Test Case Name:	**DLS_Length**					
Purpose:	To demonstrate that the length subfield (lg) of an RTS correctly indicates the length in slots of the DLS burst containing a DATA DLPDU.					
Reference:	**1.4.2.3.6 a**					
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble	1	do		M_POWER_UP		Prepare the transceiver for testing.
	2	do		SET PARAMETERS (ND3:= 5 slots; ND2:= 86 octets)		Set the parameter ND3 = 5 slots and ND2 = 86 octets (3 slots).
	3	do		M_INITIALIZE_NSCOP		Initialize the ground-air link.
Test body	4	rep 4		lg1:= {6, 7, 8}		Repeat with different values of length.
	5	send	DLS	REQUEST TO TRANSMIT DATA DLPDU (s:= add_A; d:= add_B; pr:= 3; lg:= lg1)		Request that station A send a message to simulated station B that is lg1 slots in length.
	6	await	RF	BURST transmitted by station A		Wait for a burst transmitted by station A.
	7	verify	RF	INFO_RTS_a (s = add_A; d = add_B)	Ira	Verify the transmission of the RTS from station A. The RTS contains a unicast reservation for a response.
	8	record	RF	length:= lg from INFO_RTS_a	Ira	Record the length specified in the RTS.
	9	send	RF	INFO_CTS_a (s:= add_B; d:= add_A) in the slot reserved by the RTS	Ica	Send a CTS from station B to station A in the slot reserved by the RTS. The CTS contains an information transfer reservation that also includes a reservation for an acknowledgement.
	10	await	Rf	BURST transmitted by station A		Wait for a burst transmitted by station A.
	11	verify	RF	INFO_RTS_INFO_b (s = add_A; d = add_B) in the slot reserved by the CTS	IRIFb	Verify the transmission of the RTS / INFO from station A in the slot reserved by the CTS. The RTS contains a unicast reservation for a response.

Test Case Name:	**DLS_Length**					
Purpose:	To demonstrate that the length subfield (lg) of an RTS correctly indicates the length in slots of the DLS burst containing a DATA DLPDU.					
Reference:	**1.4.2.3.6 a**					
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
	12	record	RF	timestart:= time of first slot INFO_RTS_INFO_b is transmitted in	IRIFb	Record the time of the start of the message.
	13	record	RF	timeend:= time of end of transmission of INFO_RTS_INFO_b	IRIFb	Record the time of the end of the message.
	14	verify		timeend - timestart = (length * 60) / 4 500 seconds		Verify that the length specified in the RTS is equal to the length of the DATA DLPDU.
	15	record	RF	length2:= lg in INFO_RTS in combined message		Record the length specified in the combined RTS.
	16	send	RF	INFO_ACK_INFO_CTS_a (s:= add_B; d:= add_A) in the ack slot reserved by the CTS	IAICa	Send a CTS / ACK from station B to station A in the ack slot reserved by the previous CTS. The CTS contains an information transfer reservation that also includes a reservation for an acknowledgement.
	17	await	RF	BURST transmitted by station A		Wait for a burst transmitted by station A.
	18	verify	RF	INFO_b (s = add_A; d = add_B) in the slot reserved by the CTS	Ifb	Verify the transmission of the INFO from station A in the slot reserved by the CTS.
	19	record	RF	timestart:= time of first slot INFO_b is transmitted in	Ifb	Record the time of the start of the message.
	20	record	RF	timeend:= time of end of transmission of INFO_b	Ifb	Record the time of the end of the message.
	21	verify		timeend - timestart = (length2 * 60) / 4 500 seconds		Verify that the length specified in the RTS is equal to the length of the DATA DLPDU.
	22	send	RF	INFO_ACK_a (s:= add_B; d:= add_A) in the ack slot reserved by the CTS	Iaa	Send an ACK in response from station B in the ack slot reserved by the CTS.
	23	next		lg1		Repeat with the next value of lg1.
Postamble	24					
Comments: Is lg still always valid for the combined burst?						

Test Case Name:	**DLS_Priority_Long**					
Purpose:	To demonstrate that a sending station will maintain a prioritized queue of data packets for transmission, and will transmit the highest priority packet first, when data requiring the long transmission procedure is queued to be sent.					
Reference:	**1.4.4.3.1a, 1.4.4.3.1b**					
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble	1	do		M_POWER_UP		Prepare the transceiver for testing.
	2	do		M_INITIALIZE_NSCOP		Initialize the ground-air link.
	3	do		SET PARAMETERS (ND3:= 5 slots; ND2:= 86 octets)		Set the parameter ND3 = 5 slots and ND2 = 86 octets (3 slots).
Test body	4	rep 8		p:= {2, 3, 5, 7, 12, 6, 8, 13}		
	5	send	DLS	REQUEST TO TRANSMIT DATA DLPDU (s:= add_A; d: = add_B; pr:= p) with length 4 slots		Send requests from a DLS user to the station under test to send a series of 8 DATA DLPDUs with different priorities, all requiring use of the long transmission procedure.
	6	endrep		next p		

Test Case Name:	**DLS_Priority_Long**					
Purpose:	To demonstrate that a sending station will maintain a prioritized queue of data packets for transmission, and will transmit the highest priority packet first, when data requiring the long transmission procedure is queued to be sent.					
Reference:	**1.4.4.3.1a, 1.4.4.3.1b**					
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
	7	await	RF	INFO_RTS_a (s = add_A; d = add_B)	Ira	Await the transmission of the RTS from station A. The RTS contains a unicast reservation for a response.
	8	send	RF	INFO_CTS_a (s:= add_B; d:= add_A) in the slot reserved by the RTS	Ica	Send a CTS in response from station B to station A in the slot reserved by the RTS. The CTS contains an information transfer reservation that also includes a reservation for an acknowledgement.
	9	rep 7		n:= 1		Start loop.
	10	await	RF	INFO_RTS_INFO_b (s = add_A; d = add_B) in the slot reserved by the CTS	IRIFb	Wait for the RTS / DATA sent by station A in the slot reserved by the CTS.
	11	record	RF	priority(n):= pr from INFO_b mbit(n): = value of M in INFO_b	Ifb	Record the priority of the DATA and the value of the M bit.
	12	send	RF	INFO_ACK_INFO_CTS_a (s:= add_B; d:= add_A) in the ack slot reserved by the previous CTS	IAICa	Send a CTS / ACK from station B in response in the ack slot reserved by the previous CTS. The CTS contains an information transfer reservation that also includes a reservation for an acknowledgement.
	13	endrep		next n		
	14	await	RF	INFO_b (s = add_A; d = add_B) in the slot reserved by the CTS	Ifb	Wait for the DATA sent by station A in the slot reserved by the CTS.
	15	record	RF	priority(8):= pr from INFO_b mbit(8): = value of M in INFO_b	Ifb	Record the priority of the DATA and the value of the M bit.
	16	send	RF	INFO_ACK_a (s:= add_B; d:= add_A) in the ack slot reserved by the CTS	Iaa	Send an ACK from station B, in the ack slot reserved by the CTS, in response to the completed message.
	17	verify		priority(1) = 13 priority(2) = 12 priority(3) = 8 priority(4) = 7 priority(5) = 6 priority(6) = 5 priority(7) = 3 priority(8) = 2		Verify that the bursts were transmitted in the order of priority, highest priority being transmitted first.
	18	verify		mbit(n) = 0 for n = 1 to 8		Verify that the M bit was set to 0 in all DATA DLPDUs.
Postamble	19					
Comments:						

Test Case Name:	**DLS_Priority_Long_Short**					
Purpose:	To demonstrate that a sending station will maintain a prioritized queue of data packets for transmission, and will transmit the highest priority packet first, when data requiring a mixture of the long and short transmission procedures are queued to be sent.					
Reference:	**1.4.4.3.1a, 1.4.4.3.1b**					
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble	1	do		M_POWER_UP		Prepare the transceiver for testing.
	2	do		M_INITIALIZE_NSCOP		Initialize the ground-air link.
	3	do		SET PARAMETERS (ND3:= 5 slots; ND2:= 86 octets)		Set the parameter ND3 = 5 slots and ND2 = 86 octets (3 slots).
Test body	4	rep 8		p:= {2, 3, 8, 13}		
	5	send	DLS	REQUEST TO TRANSMIT DATA DLPDU (s:= add_A; d: = add_B; pr:= p) with length 4 slots		Send requests from a DLS user to the station under test to send a series of 4 DATA DLPDUs with different priorities, all requiring use of the long transmission procedure.
	6	endrep		next p		
	7	rep 8		p:= {1, 14, 9, 14}		
	8	send	DLS	REQUEST TO TRANSMIT DATA DLPDU (s:= add_A; d: = add_B; pr:= p) with length 3 slots		Send requests from a DLS user to the station under test to send a series of 4 DATA DLPDUs with different priorities, all requiring use of the short transmission procedure.
	9	endrep		next p		
	10	rep 2		n:= 1		Start loop.
	11	await	RF	INFO_a (s = add_A; d = add_B)	Ifa	Wait for the first DATA sent by station A. The RTS contains a unicast reservation for a response.
	12	record	RF	priority(n):= pr from INFO_a mbit(n): = value of M in INFO_a	Ifa	Record the priority of the DATA and the value of the M bit.
	13	send	RF	INFO_ACK_a (s:= add_B; d:= add_A) in the slot reserved by the INFO	Iaa	Send an ACK from station B, in the slot reserved by the INFO.
	14	endrep		next n		
	15	verify		priority(1) = 14 priority(2) = 14		Verify that the correct burst has been sent according to priority order.
	16	await	RF	INFO_RTS_a (s = add_A; d = add_B)	Ira	Await the transmission of the RTS from station A. The RTS contains a unicast reservation for a response.
	17	send	RF	INFO_CTS_a (s:= add_B; d:= add_A) in the slot reserved by the RTS	Ica	Send a CTS in response from station B to station A in the slot reserved by the RTS.
	18	await	RF	INFO_b (s = add_A; d = add_B) in the slot reserved by the CTS	IRIFb	Wait for the RTS / DATA sent by station A in the slot reserved by the CTS.
	19	record	RF	priority(3):= pr from INFO_b mbit(3): = value of M in INFO_b	Ifb	Record the priority of the DATA and the value of the M bit.
	20	verify		priority(3) = 13		Verify that the correct burst has been sent according to priority order.
	21	send	RF	INFO_ACK_a (s:= add_B; d:= add_A) in the ack slot reserved by the CTS	IAICa	Send an ACK from station B in the ack slot reserved by the CTS.
	22	await	RF	INFO_a (s = add_A; d = add_B)	Ifa	Wait for the DATA sent by station A in the reserved slot. The INFO contains a unicast reservation for a response.
	23	record	RF	priority(4):= pr from INFO_a mbit(4): = value of M in INFO_a	Ifa	Record the priority of the DATA and the value of the M bit.

Test Case Name:	**DLS_Priority_Long_Short**					
Purpose:	To demonstrate that a sending station will maintain a prioritized queue of data packets for transmission, and will transmit the highest priority packet first, when data requiring a mixture of the long and short transmission procedures are queued to be sent.					
Reference:	**1.4.4.3.1a, 1.4.4.3.1b**					
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
	24	verify		priority(4) = 9		Verify that the correct burst has been sent according to priority order.
	25	send	RF	INFO_ACK_a (s:= add_B; d:= add_A) in the slot reserved by the INFO	Iaa	Send an ACK from station B in the slot reserved by the INFO.
	26	await	RF	INFO_RTS_a (s = add_A; d = add_B)	Ira	Await the transmission of the RTS from station A. The RTS contains a unicast reservation for a response.
	27	send	RF	INFO_CTS_a (s:= add_B; d:= add_A) in the slot reserved by the RTS	Ica	Send a CTS in response from station B to station A in the slot reserved by the RTS. The CTS contains an information transfer reservation that also includes a reservation for an acknowledgement.
	28	await	RF	INFO_RTS_INFO_b (s = add_A; d = add_B) in the slot reserved by the CTS	IRIFb	Wait for the RTS / DATA sent by station A in the slot reserved by the CTS. The RTS contains a unicast reservation for a response.
	29	record	RF	priority(5):= pr from INFO_b mbit(5): = value of M in INFO_b	Ifb	Record the priority of the DATA and the value of the M bit.
	30	verify		priority(5) = 8		Verify that the correct burst has been sent according to priority order.
	31	send	RF	INFO_ACK_INFO_CTS_a (s:= add_B; d:= add_A) in the slot reserved by the RTS	IAICa	Send a CTS / ACK from station B in the slot reserved by the RTS. The CTS contains an information transfer reservation that also includes a reservation for an acknowledgement.
	32	await	RF	INFO_RTS_INFO_b (s = add_A; d = add_B) in the slot reserved by the CTS	IRIFb	Wait for the RTS / DATA sent by station A in the slot reserved by the CTS. The RTS contains a unicast reservation for a response.
	33	record	RF	priority(6):= pr from INFO_b mbit(6): = value of M in INFO_b	Ifb	Record the priority of the DATA and the value of the M bit.
	34	verify		priority(6) = 3		Verify that the correct burst has been sent according to priority order.
	35	send	RF	INFO_ACK_INFO_CTS_a (s:= add_B; d:= add_A) in the ack slot reserved by the previous CTS	IAICa	Send a CTS / ACK from station B in the ack slot reserved by the previous CTS.
	36	await	RF	INFO_b (s = add_A; d = add_B) in the slot reserved by the CTS	Ifb	Wait for the DATA sent by station A in the slot reserved by the CTS.
	37	record	RF	priority(7):= pr from INFO_b mbit(7): = value of M in INFO_b	Ifb	Record the priority of the DATA and the value of the M bit.
	38	verify		priority(7) = 2		Verify that the correct burst has been sent according to priority order.
	39	send	RF	INFO_ACK_a (s:= add_B; d:= add_A) in the ack slot reserved by the CTS	Iaa	Send an ACK from station B in the ack slot reserved by the CTS.
	40	await	RF	INFO_a (s = add_A; d = add_B)	Ifa	Wait for the DATA sent by station A in the reserved slot. The INFO contains a unicast reservation for a response.
	41	record	RF	priority(8):= pr from INFO_a mbit(8): = value of M in INFO_a	Ifa	Record the priority of the DATA and the value of the M bit.
	42	verify		priority(8) = 1		Verify that the correct burst has been sent according to priority order.

Test Case Name:	**DLS_Priority_Long_Short**					
Purpose:	To demonstrate that a sending station will maintain a prioritized queue of data packets for transmission, and will transmit the highest priority packet first, when data requiring a mixture of the long and short transmission procedures are queued to be sent.					
Reference:	**1.4.4.3.1a, 1.4.4.3.1b**					
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
	43	send	RF	INFO_ACK_a (s:= add_B; d:= add_A) in the slot reserved by the INFO	Iaa	Send an ACK from station B in response.
	44	verify		mbit(n) = 0 for n = 1 to 8		Verify that the M bit was set to 0 in all DATA DLPDUs.
Postamble	45					
Comments:						

Test Case Name:	**DLS_Priority_Short**					
Purpose:	To demonstrate that a sending station will maintain a prioritized queue of data packets for transmission, and will transmit the highest priority packet first, when data requiring the short transmission procedure is queued to be sent.					
Reference:	**1.4.4.3.1a, 1.4.4.3.1b**					
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble	1	do		M_POWER_UP		Prepare the transceiver for testing.
	2	do		M_INITIALIZE_NSCOP		Initialize the ground-air link.
	3	do		SET PARAMETERS (ND3:= 5 slots; ND2:= 86 octets)		Set the parameter ND3 = 5 slots and ND2 = 86 octets (3 slots).
Test body	4	rep 8		p:= {1, 14, 5, 7, 12, 6, 9, 14}		
	5	send	DLS	REQUEST TO TRANSMIT DATA DLPDU (s:= add_A; d: = add_B; pr:= p) with length 3 slots		Send requests from a DLS user to the station under test to send a series of 8 DATA DLPDUs with different priorities, all requiring use of the short transmission procedure.
	6	endrep		next p		
	7	rep 8		n:= 1		Start loop.
	8	await	RF	INFO_a (s = add_A; d = add_B)	Ifa	Wait for the DATA sent by station A in the reserved slot. The RTS contains a unicast reservation for a response.
	9	record	RF	priority(n):= pr from INFO_a mbit(n): = value of M in INFO_a	Ifa	Record the priority of the DATA and the value of the M bit.
	10	send	RF	INFO_ACK_a (s:= add_B; d:= add_A) in the slot reserved by the INFO	Iaa	Send an ACK from station B in response to the completed message.
	11	endrep		n:= n + 1		
	12	verify		priority(1) = 14 priority(2) = 14 priority(3) = 12 priority(4) = 9 priority(5) = 7 priority(6) = 6 priority(7) = 5 priority(8) = 1		Verify that the bursts were transmitted in the order of priority, highest priority being transmitted first.
	13	verify		mbit(n) = 0 for all n values used		Verify that the M bit was set to 0 in all DATA DLPDUs.

Test Case Name:	**DLS_Priority_Short**					
Purpose:	To demonstrate that a sending station will maintain a prioritized queue of data packets for transmission, and will transmit the highest priority packet first, when data requiring the short transmission procedure is queued to be sent.					
Reference:	**1.4.4.3.1a, 1.4.4.3.1b**					
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
Postamble	14					
Comments:						

Test Case Name:	**DLS_Priority_CTRL**					
Purpose:	To demonstrate that a sending station will classify CTRL and CTRL_RTS as network management messages and assign the highest priority.					
Reference:	**1.4.4.3.1c**					
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble	1	do		M_POWER_UP		Prepare the transceiver for testing.
Test body	2	send	DLS	REQUEST TO TRANSMIT CTRL DLPDU (s:= add_A; d: = add_B; pr:= 2)		Send a request from a DLS user to the station under test to send a CTRL DLPDU with priority = 2 to a simulated station B.
	3	await	RF	CTRL_RTS_a (s = add_A; d = add_B; IB:= 1; T:= 0)	Cra	Await the transmission of the RTS from station A. The RTS contains a unicast reservation for a response.
	4	record	RF	priority:= pr from CTRL_RTS_a	Cra	Record the priority specified in the CTRL_RTS.
	5	verify	RF	priority = 14		Verify that the message has been assigned the highest priority of 14 for network management messages.
	6	send	RF	CTRL_CTS_a (s:= add_B; d:= add_A; IB:= 1; T:= 0) in the slot reserved by the RTS	Cca	Send a CTS in response from station B to station A in the slot reserved by the RTS.
	7	await	RF	CTRL_b (s = add_A; d = add_B) in the slot reserved by the CTS	CTb	Wait for the DATA DLPDU sent by station A in the slot reserved by the CTS.
	8	record	RF	priority:= pr from CTRL_b	CTb	Record the priority specified in the CTRL.
	9	verify	RF	priority = 14		Verify that the message has been assigned the highest priority of 14 for network management messages.
	10	send	RF	INFO_ACK (s:= add_B; d:= add_A) in the ack slot reserved by the CTS	Iaa	Send an ACK in response to the completed message, in the ack slot reserved by the CTS.
Postamble	11					
Comments:						

Test Case Name:	**DLS_Priority_INFO_RTS**					
Purpose:	To demonstrate that an INFO_RTS will be assigned the same priority as the DATA DLPDU with which it is associated.					
Reference:	**1.4.4.3.1d**					
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble	1	do		M_POWER_UP		Prepare the transceiver for testing.
	2	do		M_INITIALIZE_NSCOP		
	3	do		SET PARAMETERS (ND3:= 5 slots; ND2:= 86 octets)		Set the parameter ND3 = 5 slots and ND2 = 86 octets (3 slots).
Test body	4	rep 5		p:= {2, 3, 5, 7, 8}		
	5	send	DLS	REQUEST TO TRANSMIT INFO DLPDU (s:= add_A; d: = add_B; pr:= p) with length 4 slots		Send a request from a DLS user to the station under test to send an INFO DLPDU with priority = 2, requiring use of the long transmission procedure.
	6	await	RF	INFO_RTS_a (s = add_A; d = add_B)	Ira	Await the transmission of the RTS from station A. The RTS contains a unicast reservation for a response.
	7	record	RF	priority:= pr in INFO_RTS_a	Ira	Record the priority specified in the CTRL_RTS.
	8	verify	RF	priority = p		Verify that the message has been assigned the same priority as the INFO burst requested.
	9	send	RF	INFO_CTS_a (s:= add_B; d:= add_A) in the slot reserved by the RTS	Ica	Send a CTS in response from station B to station A in the slot reserved by the RTS.
	10	await	RF	INFO_b (s = add_A; d = add_B) in the slot reserved by the CTS	Ifb	Wait for the DATA DLPDU sent by station A in the slot reserved by the CTS.
	11	record	RF	priority:= pr from INFO_b	Ifb	Record the priority specified in the CTRL.
	12	verify	RF	priority = p		Verify that the priority is the same as that of the requested burst and also the same as that of the INFO_RTS.
	13	endrep		next p		
	14	send	RF	INFO_ACK (s:= add_B; d:= add_A) in the ack slot reserved by the CTS		Send an ACK in response to the completed message, in the ack slot reserved by the CTS.
Postamble	15					
Comments:						

Test Case Name:	**DLS_Long_UDATA_Send**					
Purpose:	To demonstrate that a single UDATA packet is sent correctly using the long transmission procedure, with the UDATA_RTS having the same priority and length fields as the DATA DLPDU with which it is associated.					
Reference:	**1.4.4.3.1d**					
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble	1	do		M_POWER_UP		Prepare the transceiver for testing.
	2	do		M_INITIALIZE_NSCOP		Initialize the ground-air link.
	3	do		SET PARAMETERS (ND3:= 7 slots; ND2:= 86 octets)		Set the parameter ND3 = 7 slots and ND2 = 86 octets (3 slots).
Test body	4	rep 4		p:= {2, 3, 5, 8}, l1:= {4, 5, 6, 7}		
	5	send	DLS	REQUEST TO TRANSMIT UDATA DLPDU (s:= add_A; d: = add_B; pr:= p) with length l1 slots		Send a request from a DLS user to the station under test to send a UDATA DLPDU requiring use of the long transmission procedure.
	6	await		BURST transmitted by station A		Wait for a burst transmitted by station A.

Test Case Name:	**DLS_Long_UDATA_Send**					
Purpose:	To demonstrate that a single UDATA packet is sent correctly using the long transmission procedure, with the UDATA_RTS having the same priority and length fields as the DATA DLPDU with which it is associated.					
Reference:	**1.4.4.3.1d**					
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
	7	verify	RF	UDATA_RTS_a (s = add_A; d = add_B)	Ura	Verify that a UDATA_RTS is transmitted by station A. The UDATA_RTS contains a unicast reservation for a response.
	8	record	RF	priority:= pr length:= lg in UDATA_RTS_a	Ura	Record the priority and the length specified in the UDATA_RTS.
	9	verify	RF	priority = p length = l1		Verify that the message has been assigned the same priority and length as the UDATA burst requested.
	10	send	RF	UDATA_CTS_a (s:= add_B; d:= add_A) in the slot reserved by the UDATA_RTS	UDCa	Send a UDATA_CTS in response from station B to station A, in the slot reserved by the UDATA_RTS. The UDATA_CTS contains a unicast reservation that also includes a reservation for an acknowledgement.
	11	await		BURST transmitted by station A		Wait for a burst transmitted by station A.
	12	verify	RF	UINFO_a (s = add_A) in the slot reserved by the UDATA_CTS	Uia	Verify that a UINFO DLPDU is broadcast by station A in the reserved slot.
	13	endrep		next p, l1		
postamble	14					
Comments:						

Test Case Name:	**DLS_Initialize_Send_Long**					
Purpose:	To demonstrate that a station displays correct behaviour and correctly sets the T and IB bits when sending data packets to another station during link initialization with the long transmission procedure.					
Reference:	**1.4.2.3.3 a, 1.4.2.3.3 b**					
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble	1	do		M_POWER_UP		Prepare the transceiver for testing.
	2	do		SET PARAMETERS (ND3:= 5 slots; ND2:= 86 octets)		Set the parameter ND3 = 5 slots and ND2 = 86 octets (3 slots).
Test body	3	send	LME	REQUEST TO TRANSMIT CTRL DLPDU (s:= add_A; d := add_B) with length = 4 slots		Send a request from the LME to the station under test to send a DATA DLPDU requiring a length of 4 slots.
	4	await		BURST from station under test		Wait for a burst from the station under test.
	5	verify	RF	CTRL_RTS_a (s = add_A; d = add_B)	Cra	Verify that a CTRL_RTS DLPDU is sent by the station under test, indicating the start of a long transmission procedure. The RTS contains a unicast reservation for a response.
	6	verify	RF	IB = 1 and T = 0 and lg = 4 in CTRL_RTS_a (s = add_A; d = add_B)	Cra	Verify that IB = 1 and T = 0 anf lg = 4 in the CTRL_RTS, as this is the first transmission from station A to station B.
	7	send	RF	CTRL_CTS_a (s:= add_B; d:= add_A) in the slot reserved by the RTS	Cca	Send a CTS in response from station B to station A in the slot reserved by the RTS.
	8	await		BURST from station under test		Wait for a burst from the station under test.
	9	verify	RF	CTRL_b (s = add_A; d = add_B) in the slot reserved by the CTS	CTb	Verify that the station under test sends a CTRL DLPDU to station B in the slot reserved by the CTS.
	10	verify	RF	T = 0 in CTRL_b DLPDU	CTb	Verify that T = 0 in the CTRL DLPDU.
	11	send	RF	CTRL_ACK_a (s:= add_B; d:= add_A; T:= 0) in the ack slot reserved by the CTS	Caa	Send the ACK from station B in response to the completed message in the ack slot reserved by the CTS.
	12	send	RF	INFO_a (s:= add_B; d:= add_A; T:= 0)	Ifa	Send an INFO DLPDU to the station under test. The INFO contains a unicast reservation for a response.
	13	await		BURST from station under test		Wait for a burst from the station under test.
	14	verify	RF	INFO_ACK_a (s:= add_A; d:= add_B) in the slot reserved by the INFO	Iaa	Verify that the station under test sends an INFO_ACK, in the slot reserved by the INFO, and not a DM / DISC, thus indicating that the station under test considers the link established.
Postamble	15					
Comments:						

Test Case Name:	**DLS_Initialize_Receive_Long**					
Purpose:	To demonstrate that a station displays correct behaviour and correctly sets the T bit when receiving data packets from another station during link initialization with the long transmission procedure.					
Reference:	**1.4.2.3.3 a, 1.4.2.3.3 b**					
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble	1	do		M_POWER_UP		Prepare the transceiver for testing.
	2	do		SET PARAMETERS (ND3:= 5 slots; ND2:= 86 octets)		Set the parameter ND3 = 5 slots and ND2 = 86 octets (3 slots).
Test body	3	send	RF	CTRL_RTS_a (s:= add_B; d:= add_A; IB:= 1; T:= 0; lg:= 7)	Cra	Send an RTS using the long transmission procedures from a simulated station B, with IB = 1 and T = 0, indicating this is the first transmission from station B to station A. The RTS contains a unicast reservation for a response.
	4	await	RF	BURST from station under test		Wait for a burst from the station under test.
	5	verify	RF	CTRL_CTS_a (s = add_A; d = add_B) in the slot reserved by the RTS	Cca	Verify that a CTRL_CTS is sent by the station under test in the slot reserved by the RTS. The CTS contains an information transfer reservation that also includes a reservation for an acknowledgement.
	6	send	RF	CTRL_b (s:= add_B; d:= add_A; T:= 0) in the slot reserved by the CTS	CTb	Send a CTRL DLPDU from station B with T = 0 in the slot reserved by the CTS.
	7	await		BURST from station under test		Wait for a burst from the station under test.
	8	verify	RF	CTRL_ACK_a (s = add_A; d = add_B) in the ack slot reserved by the CTS	Caa	Verify that a CTRL_ACK is sent by the station under test in the ack slot reserved by the CTS.
	9	verify	RF	T = 0 in CTRL_ACK_a (s = add_A; d = add_B)	Caa	Verify that the CTRL_ACK contains T = 0.
	10	send	RF	INFO_a (s:= add_B; d:= add_A; T:= 0)	Ifa	Send an INFO DLPDU to the station under test. The INFO contains a unicast reservation for a response.
	11	await		BURST from station under test		Wait for a burst from the station under test.
	12	verify	RF	INFO_ACK_a (s:= add_A; d:= add_B) in the slot reserved by the INFO	Iaa	Verify that the station under test sends an INFO_ACK, in the slot reserved by the INFO, and not a DM / DISC, thus indicating that the station under test considers the link established.
Postamble	13					
Comments:						

Test Case Name:	**DLS_Short_T_Receive**					
Purpose:	To demonstrate that a station will respond with an ACK with the T bit set correctly when it receives a DATA DLPDU via the short transmission procedure.					
Reference:						
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble	1	do		M_POWER_UP		Prepare the transceiver for testing.
	2	do		SET PARAMETERS (ND3:= 5 slots; ND2:= 86 octets)		Set the parameter ND3 = 5 slots and ND2 = 86 octets (3 slots).
	3	do		M_INITIALIZE_NSCOP		Initialize the ground-air link.
Test body	4	send	RF	INFO_a (s = add_B; d = add_A; T = 1)	Ifa	Send a DATA DLPDU by the short transmission procedure to the station under test with T = 1. The INFO contains a unicast reservation for a response.
	5	verify	DLS	Data in INFO_a (s:= add_B; d = add_A) passed to DLS user	Ifa	Verify that the data in the DATA DLPDU is passed to the DLS user.
	6	await	RF	BURST transmitted by station A		Wait for a burst to be transmitted by station A.
	7	verify	RF	INFO_ACK_a (s = add_A; d = add_B) in the slot reserved by the INFO	Iaa	Verify that the station under test sends an ACK in response, in the slot reserved by the INFO.
	8	verify	RF	T = 1 in INFO_ACK	Iaa	Verify that T = 1 in the ACK.
	9	send	RF	INFO_a (s = add_B; d = add_A; T = 0)	Ifa	Send a DATA DLPDU by the short transmission procedure to the station under test with T = 0. The INFO contains a unicast reservation for the response
	10	verify	DLS	Data in INFO_a (s:= add_B; d = add_A) passed to DLS user	Ifa	Verify that the data in the DATA DLPDU is passed to the DLS user.
	11	await	RF	BURST transmitted by station A		Wait for a burst to be transmitted by station A.
	12	verify	RF	INFO_ACK_a (s = add_A; d = add_B) in the slot reserved by the INFO	Iaa	Verify that the station under test sends an ACK in response, in the slot reserved by the INFO.
	13	verify	RF	T = 0 in INFO_ACK	Iaa	Verify that T = 0 in the ACK.
Postamble	14					
Comments:						

Test Case Name:	**DLS_Short_T_Send**					
Purpose:	To demonstrate that a station correctly sets the T and M bits when sending a single data packet to another mobile station with the short transmission procedure.					
Reference:	**1.4.2.3.3 a, 1.4.2.3.3 b**					
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble	1	do		M_POWER_UP		Prepare the transceiver for testing.
	2	do		SET PARAMETERS (ND3:= 5 slots; ND2:= 86 octets)		Set the parameter ND3 = 5 slots and ND2 = 86 octets (3 slots).
	3	do		M_INITIALIZE_NSCOP		Initialize the air-ground link.
Test body	4	rep 3		l1:= {1, 2, 3}; p:= {3, 14, 11}		
	5	send	DLS	REQUEST TO TRANSMIT DATA DLPDU (s:= add_A; d := add_B; pr:= p) with length = l1 slots		Send a request from a DLS user to the station under test to send a DATA DLPDU requiring a length of l1 slots.
	6	await		BURST transmitted by station A		Wait for a burst transmitted by station A.
	7	verify	RF	INFO_a (s = add_A; d = add_B)	Ifa	Verify that an INFO DLPDU is sent by the station under test. The INFO contains a unicast reservation for a response.
	8	verify	RF	T = 1 in INFO_a (s = add_A; d = add_B)	Ifa	Verify that T = 1 in the INFO DLPDU, as this is the first transmission in the sequence from station A to station B following the initialization.
	9	verify	RF	M = 0 in INFO_a (s = add_A; d = add_B)	Ifa	Verify that M = 0 as required for a short transmission.
	10	verify	RF	pr = p in INFO_a (s = add_A; d = add_B)	Ifa	
	11	send	RF	INFO_ACK_a (s:= add_B; d:= add_A; T:= 1) in the slot reserved by the INFO	Iaa	Send the ACK from station B, in the slot reserved by the INFO, in response to the completed message with T = 1.
	12	endrep		next l1, next p		
postamble	13					
Comments:						

Test Case Name:	**DLS_Short_DATA_ACK**					
Purpose:	To demonstrate that a station which has data to send back to the sending station that would fit into a single slot with the ACK, will include its own data DLPDU with the ACK.					
Reference:						
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble	1	do		M_POWER_UP		Prepare the transceiver for testing.
	2	do		M_INITIALIZE_NSCOP		Initialize the ground-air link between station B and the station under test.
Test body	3	send	RF	INFO_a (s = add_B; d = add_A; T = 1)	Ifa	Send a DATA DLPDU by the short transmission procedure to the station under test with T = 1. The INFO contains a unicast reservation for a response.
	4	send	DLS	At the same time as the start of the slot in the previous step REQUEST TO TRANSMIT DATA DLPDU (s:= add_A; d := add_B; pr:= 3) with (length + ACK) < 1 slot		Send a request from a DLS user to the station under test to send a DATA DLPDU that together with the ACK will fit into 1 slot. Send this request at the start of the slot containing the INFO_a burst.
	5	await	RF	BURST transmitted by station A		Wait for a burst to be transmitted by station A.
	6	verify	RF	INFO_ACK_INFO_a (s = add_A; d = add_B) in the slot reserved by the INFO	IAIFa	Verify that the station under test sends an ACK combined with an INFO in the slot reserved by the previous INFO. The INFO contains a unicast reservation for a response.
	7	verify	RF	T = 1 in INFO_ACK and T = 0 in INFO in INFO_ACK_INFO_a (s = add_A; d = add_B)	IAIFa	Verify that T = 1 in the ACK, and that T = 0 in the INFO DLPDU since this is the first DATA transmission from A to B.
	8	send	RF	INFO_ACK_a (s = add_B; d = add_A; T = 0) in the slot reserved by the INFO	Ifa	Send an ACK from station B to the station under test with T = 0, in the slot reserved by the INFO.
Postamble	9					
Comments:						

Test Case Name:	**DLS_Long_DATA_ACK**					
Purpose:	To demonstrate that a station which has data that would not fit into a single slot with the ACK, will send back to the sending station an RTS DLPDU with the ACK.					
Reference:						
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble	1	do		M_POWER_UP		Prepare the transceiver for testing.
	2	do		M_INITIALIZE_NSCOP		Initialize the ground-air link between station B and the station under test.
Test body	3	send	RF	INFO_a (s = add_B; d = add_A; T = 1)	Ifa	Send a DATA DLPDU by the short transmission procedure to the station under test with T = 1. The INFO contains a unicast reservation for a response.
	4	send	DLS	At the same time as the start of the slot in the previous step REQUEST TO TRANSMIT DATA DLPDU (s:= add_A; d := add_B; pr:= 3) with length = 2 slots		Send a request from a DLS user to the station under test to send a DATA DLPDU requiring 2 slots. Send this request at the start of the slot containing the INFO_a burst.
	5	await	RF	BURST transmitted by station A		Wait for a burst to be transmitted by station A.
	6	verify	RF	INFO_ACK_INFO_RTS_a (s = add_A; d = add_B) in the slot reserved by the INFO	IAIRa	Verify that the station under test sends an ACK combined with an RTS in the slot reserved by the INFO. The RTS contains a unicast reservation for a response.
	7	verify	RF	T = 1 in INFO_ACK and T = 0 in INFO_RTS in INFO_ACK_INFO_RTS_a (s = add_A; d = add_B)	IAIRa	Verify that T = 1 in the ACK, and that T = 0 in the RTS DLPDU since this is the first DATA transmission from A to B.
	8	send	RF	INFO_CTS_a (s:= add_B; d:= add_A) in the slot reserved by the RTS	Ica	Send a CTS in response from station B to station A in the slot reserved by the RTS. The CTS contains an information transfer reservation that also includes a reservation for an acknowledgement.
	9	await	RF	BURST transmitted by station A		Wait for a burst transmitted by station A.
	10	verify	RF	INFO_b (s = add_A; d = add_B) in the slot reserved by the CTS	Ifb	Verify that a DATA DLPDU is sent by station A in the slot reserved by the CTS.
	11	verify	RF	T = 0 and M = 0 in INFO_b (s = add_A; d = add_B)	Ifb	Verify that T = 0 and M = 0 in the INFO DLPDU from station A.
	12	send	RF	INFO_ACK_a (s:= add_B; d:= add_A; T:= 0) in the ack slot reserved by the CTS	Iaa	Send the ACK from station B in response to the completed message with T = 0, in the ack slot reserved by the CTS.
Postamble	13					
Comments:						

Test Case Name:	**DLS_Short_NoAck**					
Purpose:	To demonstrate that a station will retransmit the DLS burst, according to the default DLS retransmission parameters, if an acknowledgement is not received.					
Reference:						
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble	1	do		M_POWER_UP		Prepare the transceiver for testing.
	2	do		SET PARAMETERS (ND3:= 5 slots; ND2:= 86 octets)		Set the parameter ND3 = 5 slots and ND2 = 86 octets (3 slots).
	3	do		M_INITIALIZE_NSCOP		Initialize the ground-air link.
Test body	4	rep 3		l1:= {1, 2, 3}		
	5	send	DLS	REQUEST TO TRANSMIT DATA DLPDU (s:= add_A; d:= add_B) with length requiring burst = l1 slots		Send a request from a DLS user to the station under test to send a DATA DLPDU to a simulated station B requiring a burst of length l1 slots.
	6	await	RF	BURST transmitted by station A		Wait for a burst to be transmitted by station A.
	7	verify	RF	INFO_a (s = add_A; d = add_B) transmitted	Ifa	Verify that the station under test sends a DATA DLPDU by the short transmission procedures. The INFO contains a unicast reservation for a response.
	8	record	RF	timedata1:= time at beginning of slot containing INFO_a (s = add_A; d = add_B)	Ifa	Record the time that the DATA was transmitted by the station under test.
	10	await	RF	BURST transmitted by station A		Wait for a burst to be transmitted by station A.
	11	verify	RF	INFO_a (s = add_A; d = add_B) transmitted before time:= timedata1 + 2.45	Ifa	Verify that the station under test attempts to retransmit the data. The INFO contains a unicast reservation for a response.
	12	record	RF	timedata2:= time at beginning of slot containing INFO_a (s = add_A; d = add_B)	Ifa	Record the time that the DATA was retransmitted by the station under test.
	13	await	RF	BURST transmitted by station A		Wait for a burst to be transmitted by station A.
	14	verify	RF	INFO_a (s = add_A; d = add_B) transmitted before time:= timedata2 + 3.465	Ifa	Verify that the station under test attempts to retransmit the data. The INFO contains a unicast reservation for a response.
	15	record	RF	timedata3:= time at beginning of slot containing INFO_a (s = add_A; d = add_B)	Ifa	Record the time that the DATA was retransmitted by the station under test.
	16	await	RF	BURST transmitted by station A		Wait for a burst to be transmitted by station A.
	17	verify	RF	INFO_a (s = add_A; d = add_B) transmitted before time:= timedata3 + 4.1905	Ifa	Verify that the station under test attempts to retransmit the data. The INFO contains a unicast reservation for a response.
	18	record	RF	timedata4:= time at beginning of slot containing INFO_a (s = add_A; d = add_B)	Ifa	Record the time that the DATA was retransmitted by the station under test.
	19	await	RF	BURST transmitted by station A		Wait for a burst to be transmitted by station A.
	20	verify	RF	INFO_a (s = add_A; d = add_B) transmitted before time:= timedata4 + 8.12385	Ifa	Verify that the station under test attempts to retransmit the data. The INFO contains a unicast reservation for a response.
	21	verify	VSS and LME	notification received that Q5num attempts have been made to transmit INFO_a with no ACK		Verify that the station notifies the VSS user and the LME that Q5num attempts have been made, and that no ACK was received following any of the attempts.
	22	do		SET PARAMETERS (Q5wait:= 1)		Set the parameter Q5wait to the minimum value.
	23	send	DLS	REQUEST TO TRANSMIT DATA DLPDU (s:= add_A; d:= add_B) with length requiring burst = l1 slots		Send a request from a DLS user to the station under test to send a DATA DLPDU to a simulated station B requiring a burst of length l1 slots.
	24	await	RF	BURST transmitted by station A		Wait for a burst to be transmitted by station A.

Test Case Name:	**DLS_Short_NoAck**					
Purpose:	To demonstrate that a station will retransmit the DLS burst, according to the default DLS retransmission parameters, if an acknowledgement is not received.					
Reference:						
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
	25	verify	RF	INFO_a (s = add_A; d = add_B) transmitted	Ifa	Verify that the station under test sends a DATA DLPDU by the short transmission procedures. The INFO contains a unicast reservation for a response.
	26	record	RF	timedata:= time at beginning of slot containing INFO_a (s = add_A; d = add_B)	Ifa	Record the time that the DATA was transmitted by the station under test.
	27	await	RF	BURST transmitted by station A		Wait for a burst to be transmitted by station A.
	28	verify	RF	INFO_a (s = add_A; d = add_B) transmitted before time:= timedata + 1	Ifa	Verify that the station under test attempts to retransmit the data. The INFO contains a unicast reservation for a response.
	29	verify	VSS and LME	notification received that the station has waited more than Q5wait seconds to transmit INFO_a with no ACK		Verify that the station notifies the VSS user and the LME that it has waited more than Q5wait seconds, and that no ACK was received.
Postamble	30	do		SET PARAMETERS (Q5wait:= 60)		Reset the parameter Q5wait to the default value.
Comments:						

Test Case Name:	**DLS_Long_UDATA_Receive**					
Purpose:	To demonstrate that a station will correctly issue a CTS for an RTS_UDATA received via the long transmission procedure from another station.					
Reference:						
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble	1	do		M_POWER_UP		Prepare the transceiver for testing.
	2	do		M_INITIALIZE_NSCOP		Initialize the ground-air link.
Test body	3	send	RF	UDATA_RTS_a (s = add_B; d = add_A; pr:= 3; lg:= 4)	Ura	Send a UDATA_RTS DLPDU to the station under test. The UDATA_RTS contains a unicast reservation for a response.
	4	await		BURST transmitted by station A		Wait for a burst transmitted by station A.
	5	verify	RF	UDATA_CTS_a (s:= add_A; d:= add_B) in the slot reserved by the UDATA_RTS	UDCa	Verify that a UDATA_CTS is transmitted by station A in the slot reserved by the UDATA_RTS. The burst contains a unicast request reservation for a response.
	6	send	RF	UINFO_a (s = add_B) in the slot reserved by the UDATA_CTS	Uia	Broadcast the UINFO DLPDU from station B, in the slot reserved by the UDATA_CTS.
	7	verify	DLS	Data in UINFO_a (s:= add_B) passed to DLS user	Uia	Verify that the data in the UDATA DLPDU is passed to the DLS user.
	8	verify	RF	No ACK transmitted by station A		Verify that the station under test does not generate an ACK in response to the UDATA DLPDU.
Postamble	9					
Comments:						

Test Case Name:	**DLS_Long_T_NoAck_A**					
Purpose:	To demonstrate that a station sends an ACK and correctly sets the T bit when in receipt of an RTS for a data packet that has already been received.					
Reference:						
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble	1	do		M_POWER_UP		Prepare the transceiver for testing.
	2	do		SET PARAMETERS (ND3:= 5 slots; ND2:= 86 octets)		Set the parameter ND3 = 5 slots and ND2 = 86 octets (3 slots).
Test body	3	send	RF	INFO_RTS_a (s:= add_B; d:= add_A; T:= 1; pr:= 3; lg:= 7)	Ira	Send an INFO_RTS using the long transmission procedures from a simulated station B, with T = 1, indicating this is the first transmission in the sequence from station B to station A following the initialization. The RTS contains a unicast reservation for a response.
	4	await		BURST transmitted by station A		Wait for a burst transmitted by station A.
	5	verify	RF	INFO_CTS_a (s = add_A; d = add_B) in the slot reserved by the RTS	Ica	Verify that a CTS is transmitted by station A in the slot reserved by the RTS. The CTS contains an information transfer reservation that also includes a reservation for an acknowledgement.
	6	send	RF	INFO_b (s:= add_B; d:= add_A; T:= 1) in the slot reserved by the CTS	Ifb	Send the DATA DLPDU from station B with T = 1 in the slot reserved by the CTS.
	7	await		BURST transmitted by station A		Wait for a burst transmitted by station A.
	8	verify	RF	INFO_ACK_a (s = add_A; d = add_B) in the ack slot reserved by the CTS	Iaa	Verify that an ACK is transmitted by station A in the ack slot reserved by the CTS.
	9	verify	RF	T = 1 in INFO_ACK_a (s = add_A; d = add_B)	Iaa	Verify that the ACK contains T = 1.
	10	send	RF	INFO_RTS_a (s:= add_B; d:= add_A; T:= 1; pr:= 3; lg:= 7)	Ira	Send an RTS from station B with T = 1, to simulate the effect of the ACK not having been received by station B. The RTS contains a unicast reservation for a response.
	11	await		BURST transmitted by station A		Wait for a burst transmitted by station A.
	12	verify	RF	INFO_ACK_a (s = add_A; d = add_B) in the slot reserved by the RTS	Iaa	Verify that an ACK is transmitted by station A in the slot reserved by the RTS.
	13	verify	RF	T = 1 in INFO_ACK_a (s = add_A; d = add_B)	Iaa	Verify that the ACK contains T = 1.
Postamble	14					
Comments:						

Test Case Name:	**DLS_Long_Busy_A**					
Purpose:	To demonstrate that a station sends either a general confirm ìwith a unicast reservation, or a general failure, when in receipt of an RTS at a time that the channel is too busy to transmit the requested data.					
Reference:						
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble	1	do		M_POWER_UP		Prepare the transceiver for testing.
	2	do		SET PARAMETERS (ND3:= 5 slots; ND2:= 86 octets)		Set the parameter ND3 = 5 slots and ND2 = 86 octets (3 slots).
	3	do		M_INITIALIZE_NSCOP		Initialize the air-ground link.
	4	send	RF	INFO_RTS_a (s:= add_B; d:= add_A; T:= 1; pr:= 3; lg:= 7 (INFO length); ro:= 30; lg:= 1 (unicast length))	Ira	Send an INFO_RTS using the long transmission procedures from a simulated station B, with T = 1, indicating this is the first transmission in the sequence from station B to station A following the initialization. The RTS contains a unicast reservation for a response.
	5	record	RF	timestart:= time at beginning of slot in which INFO_RTS_a transmitted		Record the time that the INFO_RTS was transmitted
	6	rep 13		n:= 1		
	7	send	RF	In slot beginning at time:= timestart + n: UNI_BURST_a (s:= add_C; d:= add_D; sdf:= 1; ro:= 30 + 30 * (n - 1); lg:= 15; pr:= 13)	Ua	Send a unicast burst from a simulated station C to a simulated station D, reserving successive blocks of 15 slots after the slot reserved by the unicast reservation in the RTS.
	8	send	RF	In slot beginning at time:= timestart + 1+ n: UNI_BURST_a (s:= add_E; d:= add_F; sdf:= 1; ro:= 45 + 30 * (n - 1); lg:= 15; pr:= 13)	Ua	Send a unicast burst from a simulated station E to a simulated station F, reserving successive blocks of 15 slots after the slot reserved by the unicast reservation in the RTS.
	9	endrep		n:= n + 1		
	10	await		BURST transmitted by station A		Wait for a burst transmitted by station A.
	11	verify	RF	In the slot reserved by the RTS: GEN_RESP_b (s = add_A; d = add_B; r-mi = 00001101; ok = 1; err = 01 hex; sdf = 1; lg = 0; pr = 3) OR GEN_RESP_a (s = add_A; d = add_B; r-mi = 00001101; ok = 0; err = 01 hex)	GRb, Gra	Verify that station A transmits, in the slot reserved by the RTS, either a general confirm with a unicast reservation with sdf = 1, indicating when it will transmit a CTS in the future, or a general failure, with error type set to 01 hex, due to there being no slots available for transmission of the data.
Postamble	12					
Comments:						

Test Case Name:	**DLS_Long_NoInfo_A**					
Purpose:	To demonstrate that a station will not transmit in response to a CTS when it has no information to transmit.					
Reference:						
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble	1	do		M_POWER_UP		Prepare the transceiver for testing.
	2	do		SET PARAMETERS (ND3:= 5 slots; ND2:= 86 octets)		Set the parameter ND3 = 5 slots and ND2 = 86 octets (3 slots).
	3	do		M_INITIALIZE_NSCOP		Initialize the air-ground link.
Test body	4	send	DLS	REQUEST TO TRANSMIT DATA DLPDU (s:= add_A; d := add_B) with length = 4 slots		Send a request from a DLS user to the station under test to send a DATA DLPDU requiring a length of 4 slots.
	5	await		BURST transmitted by station A		Wait for a burst transmitted by station A.
	6	verify	RF	INFO_RTS_a (s = add_A; d = add_B)	Ira	Verify that an INFO_RTS is sent by the station under test. The RTS contains a unicast reservation for a response.
	7	verify	RF	T = 1 in INFO_RTS_a (s = add_A; d = add_B)	Ira	Verify that T = 1 in the RTS, as this is the first transmission in the sequence from station A to station B following the initialization.
	8	send	DLS	REQUEST TO NOT TRANSMIT DATA DLPDU (s:= add_A; d := add_B) with length = 4 slots		Send a request from a DLS user to the station under test to not transmit the DATA DLPDU,as instructed by the previous command.
	9	send	RF	INFO_CTS_a (s:= add_B; d:= add_A) in the slot reserved by the RTS	Ica	Send a CTS in response from station B to station A in the slot reserved by the RTS.
	10	await		BURST transmitted by station A		Wait for a burst transmitted by station A.
	11	verify	RF	No DATA DLPDU transmitted by station A in the slot reserved by the CTS		Verify that station A does not transmit a DATA DLPDU in the slot reserved by the CTS.
Postamble	12					
Comments:						

Test Case Name:	**DLS_Long_NACK_A**					
Purpose:	To demonstrate that a station sends a NACK when an expected data DLPDU is not received.					
Reference:						
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble	1	do		M_POWER_UP		Prepare the transceiver for testing.
	2	do		SET PARAMETERS (ND3:= 5 slots; ND2:= 86 octets)		Set the parameter ND3 = 5 slots and ND2 = 86 octets (3 slots).
	3	do		M_INITIALIZE_NSCOP		Initialize the air-ground link.
Test body	4	send	RF	INFO_RTS_a (s:= add_B; d:= add_A; T:= 1; pr:= 3; lg:= 7)	Ira	Send an INFO_RTS using the long transmission procedures from a simulated station B, with T = 1, indicating this is the first transmission in the sequence from station B to station A following the initialization. The RTS contains a unicast reservation for a response.
	5	await		BURST transmitted by station A		Wait for a burst transmitted by station A.
	6	verify	RF	INFO_CTS_a (s = add_A; d = add_B) in the slot reserved by the RTS	Ica	Verify that a CTS is transmitted by station A in the slot reserved by the RTS.
	7	await		BURST transmitted by station A		Wait for a burst transmitted by station A.
	8	verify	RF	INFO_ACK_a (s = add_A; d = add_B) in the ack slot reserved by the CTS	Iaa	Verify that an ACK is transmitted by station A in the ack slot reserved by the CTS.
	9	verify	RF	T = 0 in INFO_ACK_a (s = add_A; d = add_B)	Iaa	Verify that the ACK contains T = 0, indicating a negative acknowledgement, or NACK.
Postamble	10					
Comments:						

Test Case Name:	**DLS_Long_NoLink**					
Purpose:	To demonstrate that a station in receipt of a CTRL_RTS with IB = 0 transmits a DM/FRMR when it does not have a link with the sender.					
Reference:						
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble	1	do		M_POWER_UP		Prepare the transceiver for testing.
Test body	2	send	RF	CTRL_RTS_a (s:= add_B; d:= add_A; IB:= 0; T:= 0; pr:= 3; lg:= 7)	Cra	Send an RTS using the long transmission procedures from a simulated station B, with IB = 0 and T = 0. The RTS contains a unicast reservation for a response.
	3	await		BURST transmitted by station A		Wait for a burst transmitted by station A.
	4	verify	RF	DM_FRMR_a (s:= add_A; d:= add_B) in the slot reserved by the RTS	Dda Dfa	Verify that a DM/FRMR is transmitted by station A in the slot reserved by the RTS.
Postamble	5					
Comments:						

Test Case Name:	**DLS_Short_NoLink**					
Purpose:	To demonstrate that a station in receipt of a CTRL transmits a DM/DISC when it does not have a link with the sender.					
Reference:						
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble	1	do		M_POWER_UP		Prepare the transceiver for testing.
Test body	2	send	RF	CTRL_a (s:= add_B; d:= add_A; T:= 0)	Cta	Send a CTRL using the short transmission procedures from a simulated station B, with T = 0. The CTRL contains a unicast reservation for a response.
	3	await		BURST transmitted by station A		Wait for a burst transmitted by station A.
	4	verify	RF	DM_DISC_a (s:= add_A; d:= add_B) in the slot reserved by the CTRL	Dda Dfa	Verify that a DM/DISC is transmitted by station A in the slot reserved by the CTRL.
Postamble	5					
Comments:						

Test Case Name:	**DLS_Long_IB_Error**					
Purpose:	To demonstrate that a station in receipt of a CTRL_RTS with IB = 1 and T = 1 transmits a DM/FRMR.					
Reference:						
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble	1	do		M_POWER_UP		Prepare the transceiver for testing.
Test body	2	send	RF	CTRL_RTS_a (s:= add_B; d:= add_A; IB:= 1; T:= 1; pr:= 3; lg:= 7)	Cra	Send an RTS using the long transmission procedures from a simulated station B, with IB = 1 and T = 1. The RTS contains a unicast reservation for a response.
	3	await		BURST transmitted by station A		Wait for a burst transmitted by station A.
	4	verify	RF	DM_FRMR_a (s:= add_A; d:= add_B) in the slot reserved by the RTS	Dfa	Verify that a DM/FRMR is transmitted by station A in the slot reserved by the RTS.
Postamble	5					
Comments:						

Test Case Name:	**DLS_Long_SZOM_Error**					
Purpose:	To demonstrate that a station in receipt of an SZOM from a station with which it will only communicate using NSCOP will transmit a DM/FRMR.					
Reference:						
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble	1	do		M_POWER_UP		Prepare the transceiver for testing.
Test body	2	send	RF	INFO_RTS_SZOM_a (s:= add_B; d:= add_A; T:= 0; pr:= 3; lg:= 7)	IRSZa	Send an INFO_RTS / SZOM using the long transmission procedures from a simulated station B, with T = 0, indicating this is the first transmission from station B to A. The burst contains a unicast reservation for a response.
	3	await		BURST transmitted by station A		Wait for a burst transmitted by station A.
	4	verify	RF	DM_FRMR_a (s:= add_A; d:= add_B) in the slot reserved by the INFO_RTS_SZOM	Dfa	Verify that a DM/FRMR is transmitted by station A in the slot reserved by the INFO_RTS / SZOM.
Postamble	5					
Comments:						

Test Case Name:	**DLS_Short_SZOM_Error**					
Purpose:	To demonstrate that a station in receipt of an SZOM from a station with which it will only communicate using NSCOP will transmit a DM/FRMR.					
Reference:						
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble	1	do		M_POWER_UP		Prepare the transceiver for testing.
Test body	2	send	RF	INFO_SZOM_a (s:= add_B; d:= add_A; T:= 0)	IFSZa	Send an INFO / SZOM using the short transmission procedures from a simulated station B, with T = 0, indicating this is the first transmission from station B to A. The burst contains a unicast reservation for a response.
	3	await		BURST transmitted by station A		Wait for a burst transmitted by station A.
	4	verify	RF	DM_FRMR_a (s:= add_A; d:= add_B) in the slot reserved by the INFO_SZOM	Dfa	Verify that a DM/FRMR is transmitted by station A in the slot reserved by the INFO_SZOM.
Postamble	5					
Comments:						

Test Case Name:	**DLS_ND1_Short_Receive**					
Purpose:	To demonstrate that a station in receipt of a data packet from another station that is greater in length than ND1 will discard the packet.					
Reference:						
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble	1	do		M_POWER_UP		Prepare the transceiver for testing.
	2	do		SET PARAMETERS (ND1:= 150 octets; ND2:= 209 octets)		Set the parameter ND1 = 150 octets and ND2 = 209 octets (7 slots).
	3	do		M_INITIALIZE_NSCOP		Initialize the ground-air link.
Test body	4	send	RF	INFO_a (s = add_B; d = add_A; T = 1; in:= 163 octets of zeros)	Ifa	Send a DATA DLPDU by the short transmission procedure to the station under test with T = 1 and a length of 6 slots. The INFO contains a unicast reservation for a response.
	5	verify	DLS	INFO_a has been discarded by station under test	Ifa	Verify that the corrupted message has been discarded by the station under test.
	6	await	RF	BURST transmitted by station A		Wait for a burst to be transmitted by station A.
	7	verify	RF	INFO_ACK_a (s = add_A; d = add_B) in the slot reserved by the INFO	Iaa	Verify that the station under test sends an ACK in response in the slot reserved by the INFO.
	8	verify	RF	T = 1 in INFO_ACK	Iaa	Verify that T = 1 in the ACK.
Postamble	9	do		SET PARAMETERS (ND1:= 1 511 octets; ND2:= 86 octets)		Set the parameters to their default values.
Comments:						

Test Case Name:	**DLS_ND1_Short_Send**					
Purpose:	To demonstrate that a station requested to send a data packet by a DLS user that is greater in length than ND1 will discard the packet.					
Reference:						
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble	1	do		M_POWER_UP		Prepare the transceiver for testing.
	2	do		SET PARAMETERS (ND1:= 150 octets)		Set the parameter ND1 = 150 octets.
	3	do		M_INITIALIZE_NSCOP		Initialize the ground-air link.
Test body	4	send	DLS	REQUEST TO TRANSMIT DATA DLPDU (s = add_A; d = add_B; T = 1; in:= 163 octets of zeros)		Send a request from a DLS user to the station under test to send a DATA DLPDU to a simulated station B requiring a burst of length 6 slots.
	5	verify	RF	No BURST transmitted by station A		Verify that no burst has been transmitted by the station under test and hence that the corrupted message has been discarded by the station under test.
Postamble	6	do		SET PARAMETERS (ND1:= 1 511 octets)		Set the parameter ND1 to its default value.
Comments:						

Test Case Name:	**LME_CMD_LE_Receive**					
Purpose:	To demonstrate that a station displays correct behaviour when in receipt of a CTRL_CMD_LE from a mobile.					
Reference:						
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble	1	do		M_POWER_UP		Prepare the transceiver for testing.
Test body	2	send	RF	CTRL_RTS_a (s:= add_B; d:= add_A; IB:= 1; T:= 0; lg:= 1)	Cra	Send an RTS using the long transmission procedures from a simulated station B, with IB = 1 and T = 0, indicating this is the first transmission from station B to station A. The RTS contains a unicast reservation for a response.
	3	await	RF	BURST from station under test		Wait for a burst from the station under test.
	4	verify	RF	CTRL_CTS_a (s = add_A; d = add_B; T = 0) in the slot reserved by the RTS	Cca	Verify that a CTRL_CTS is sent by the station under test.
	5	send	RF	CTRL_d (s:= add_B; d:= add_A; M:= 0; T:= 0; re:= 1; c/r:= 0; h:= 0; r:= 0; lg:= 1; rrr:= 0; sss:= 0) in the slot reserved by the CTS	CTd	Send a CTRL DLPDU from station B with parameters indicating a CTRL_CMD_LE.
	6	verify	LME	CTRL_CMD_LE (re = 1) received		Verify that a CTRL_CMD_LE (re = 1) is received at the LME of the station under test.
	7	await	RF	BURST from station under test		Wait for a burst from the station under test.
	8	verify	RF	CTRL_ACK_CTRL_RTS_a (s = add_A; d = add_B; lg:= 2) in the ack slot reserved by the CTS	CACRa	Verify that a CTRL_ACK / CTRL_RTS is sent by the station under test.
	9	send	RF	CTRL_CTS_a (s = add_B; d = add_A) in the slot reserved by the RTS	Cca	Send a CTRL_CTS to the station under test.
	10	verify	RF	CTRL_c (s:= add_A; d:= add_B; M:= 0; T:= 0; re:= 1; c/r:= 1; h:= 0; r:= 0; lg:= 1; rrr:= 0; sss:= 0) in the slot reserved by the CTS	CTc	Verify that a CTRL burst indicating a CTRL_RSP_LE is sent by the station under test.
	11	send	RF	CTRL_ACK_a (s:= add_B; d:= add_A; T:= 0) in the ack slot reserved by the CTS	Caa	Send the ACK from station B in response to the completed message.
Postamble	12					
Comments:						

Test Case Name:	**LME_CMD_LE_Receive_Option**					
Purpose:	To demonstrate that a station displays correct behaviour when in receipt of a CTRL_CMD_LE from a mobile which includes optional parameters.					
Reference:						
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble	1	do		M_POWER_UP		Prepare the transceiver for testing.
Test body	2	send	RF	CTRL_RTS_a (s:= add_B; d:= add_A; IB:= 1; T:= 0; lg:= 1)	Cra	Send an RTS using the long transmission procedures from a simulated station B, with IB = 1 and T = 0, indicating this is the first transmission from station B to station A. The RTS contains a unicast reservation for a response.
	3	await	RF	BURST from station under test		Wait for a burst from the station under test.
	4	verify	RF	CTRL_CTS_a (s = add_A; d = add_B; T = 0) in the slot reserved by the RTS	Cca	Verify that a CTRL_CTS is sent by the station under test.
	5	send	RF	CTRL_f (s:= add_B; d:= add_A; M:= 0; T:= 0; re:= 1; c/r:= 0; h:= 0; r:= 0; lg:= 1; rrr:= 0; sss:= 0; I:= 1; b:= 1; lg:= 1; m:= 4) in the slot reserved by the CTS	CTf	Send a CTRL DLPDU from station B with parameters indicating a CTRL_CMD_LE, and the optional parameters: protocol options parameter and modulation support parameter.
	6	verify	LME	CTRL_CMD_LE (re = 1) received		Verify that a CTRL_CMD_LE (re = 1) is received at the LME of the station under test.
	7	await	RF	BURST from station under test		Wait for a burst from the station under test.
	8	verify	RF	CTRL_ACK_CTRL_RTS_a (s = add_A; d = add_B; lg:= 2) in the ack slot reserved by the CTS	CACRa	Verify that a CTRL_ACK / CTRL_RTS is sent by the station under test.
	9	send	RF	CTRL_CTS_a (s = add_B; d = add_A) in the slot reserved by the RTS	Cca	Send a CTRL_CTS to the station under test.
	10	verify	RF	CTRL_c (s:= add_A; d:= add_B; M:= 0; T:= 0; re:= 1; c/r:= 1; h:= 0; r:= 0; lg:= 1; rrr:= 0; sss:= 0) in the slot reserved by the CTS	CTc	Verify that a CTRL burst indicating a CTRL_RSP_LE is sent by the station under test.
	11	send	RF	CTRL_ACK_a (s:= add_B; d:= add_A; T:= 0) in the ack slot reserved by the CTS	Caa	Send the ACK from station B in response to the completed message.
Postamble	12					
Comments:						

Test Case Name:	**LME_CMD_LE_Receive_Auto**					
Purpose:	To demonstrate that a station displays correct behaviour when in receipt of a CTRL_CMD_LE from a mobile and when an autotune is required.					
Reference:						
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble	1	do		M_POWER_UP		Prepare the transceiver for testing.
	2	do		CONFIGURE STATION UNDER TEST TO INCLUDE AUTOTUNE PARAMETER ON CONNECTION FOR NEW FREQUENCY f2		Configure the station under test to include the autotune parameter on connection for new frequency f2.
Test body	3	send	RF	CTRL_RTS_a (s:= add_B; d:= add_A; IB:= 1; T:= 0; lg:= 1)	Cra	Send an RTS using the long transmission procedures from a simulated station B, with IB = 1 and T = 0, indicating this is the first transmission from station B to station A. The RTS contains a unicast reservation for a response.
	4	await	RF	BURST from station under test		Wait for a burst from the station under test.
	5	verify	RF	CTRL_CTS_a (s = add_A; d = add_B) in the slot reserved by the RTS	Cca	Verify that a CTRL_CTS is sent by the station under test.
	6	send	RF	CTRL_d (s:= add_B; d:= add_A; M:= 0; T:= 0; re:= 1; c/r:= 0; h:= 0; r:= 0; lg:= 1; rrr:= 0; sss:= 0) in the slot reserved by the CTS	CTd	Send a CTRL DLPDU from station B with parameters indicating a CTRL_CMD_LE.
	7	verify	LME	CTRL_CMD_LE (re = 1) received		Verify that a CTRL_CMD_LE (re = 1) is received at the LME of the station under test.
	8	await	RF	BURST from station under test		Wait for a burst from the station under test.
	9	verify	RF	CTRL_ACK_CTRL_RTS_a (s = add_A; d = add_B; lg:= 2) in the ack slot reserved by the CTS	CACRa	Verify that a CTRL_ACK / CTRL_RTS is sent by the station under test.
	10	send	RF	CTRL_CTS_a (s = add_B; d = add_A) in the slot reserved by the RTS	Cca	Send a CTRL_CTS to the station under test.
	11	verify	RF	CTRL_k (s:= add_A; d:= add_B; re:= 1; c/r:= 1; h:= 0; r:= 0; lg:= 1; rrr:= 0; sss:= 0 m:= 4; f:= 1 000; lg:=4; g:= add_G) in the slot reserved by the CTS	CTk	Verify that the ground station sends a CTRL indicating a CTRL_RSP_LE, including the autotune and replacement ground station list parameters.
	12	send	RF	CTRL_ACK_a (s:= add_B; d:= add_A; T:= 0) in the ack slot reserved by the CTS	Caa	Send the ACK from station B in response to the completed message.
Postamble	13					
Comments:						

Test Case Name:	**LME_CMD_LE_Receive_Grd_Replace**					
Purpose:	To demonstrate that a station displays correct behaviour when in receipt of a CTRL_CMD_LE from a mobile and when an indication of other ground stations which can be reached is required.					
Reference:						
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble	1	do		M_POWER_UP		Prepare the transceiver for testing.
	2	do		CONFIGURE STATION UNDER TEST TO INCLUDE REPLACEMENT GROUND STATION INFORMATION ON CONNECTION		Configure the station under test to include replacement ground station information on connection.
Test body	3	send	RF	CTRL_RTS_a (s:= add_B; d:= add_A; IB:= 1; T:= 0; lg:= 1)	Cra	Send an RTS using the long transmission procedures from a simulated station B, with IB = 1 and T = 0, indicating this is the first transmission from station B to station A. The RTS contains a unicast reservation for a response.
	4	await	RF	BURST from station under test		Wait for a burst from the station under test.
	5	verify	RF	CTRL_CTS_a (s = add_A; d = add_B) in the slot reserved by the RTS	Cca	Verify that a CTRL_CTS is sent by the station under test.
	6	send	RF	CTRL_d (s:= add_B; d:= add_A; M:= 0; T:= 0; re:= 1; c/r:= 0; h:= 0; r:= 0; lg:= 1; rrr:= 0; sss:= 0) in the slot reserved by the CTS	CTd	Send a CTRL DLPDU from station B with parameters indicating a CTRL_CMD_LE.
	7	verify	LME	CTRL_CMD_LE (re = 1) received		Verify that a CTRL_CMD_LE (re = 1) is received at the LME of the station under test.
	8	await	RF	BURST from station under test		Wait for a burst from the station under test.
	9	verify	RF	CTRL_ACK_CTRL_RTS_a (s = add_A; d = add_B; lg:= 2) in the ack slot reserved by the CTS	CACRa	Verify that a CTRL_ACK / CTRL_RTS is sent by the station under test.
	10	send	RF	CTRL_CTS_a (s = add_B; d = add_A) in the slot reserved by the RTS	Cca	Send a CTRL_CTS to the station under test.
	11	verify	RF	CTRL_I (s:= add_A; d:= add_B; re:= 1; c/r:= 1; h:= 0; r:= 0; lg:= 1; rrr:= 0; sss:= 0) in the slot reserved by the CTS	CTI	Verify that the ground station sends a CTRL indicating a CTRL_RSP_LE, including the replacement ground station list parameter.
	12	send	RF	CTRL_ACK_a (s:= add_B; d:= add_A; T:= 0) in the ack slot reserved by the CTS	Caa	Send the ACK from station B in response to the completed message.
Postamble	13					
Comments:						

Test Case Name:	**LME_CMD_LE_Invalid**					
Purpose:	To demonstrate that a station sends a CTRL_RSP_LCR when in receipt of an invalid CTRL_CMD_LE from a mobile.					
Reference:						
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble	1	do		M_POWER_UP		Prepare the transceiver for testing.
Test body	2	send	RF	CTRL_RTS_a (s:= add_B; d:= add_A; IB:= 1; T:= 0; lg:= 1)	Cra	Send an RTS using the long transmission procedures from a simulated station B, with IB = 1 and T = 0, indicating this is the first transmission from station B to station A. The RTS contains a unicast reservation for a response.
	3	await	RF	BURST from station under test		Wait for a burst from the station under test.
	4	verify	RF	CTRL_CTS_a (s = add_A; d = add_B) in the slot reserved by the RTS	Cca	Verify that a CTRL_CTS is sent by the station under test.
	5	send	RF	CTRL_e (s:= add_B; d:= add_A; M:= 0; T:= 0; re:= 1; c/r:= 0; h:= 0; r:= 0; lg:= 1; rrr:= 0; sss:= 0) in the slot reserved by the CTS	Cte	Send a CTRL DLPDU from station B with parameters indicating an invalid CTRL_CMD_LE (the burst format specified has a "1" instead of a "0" in the ninth octet).
	6	await	RF	BURST from station under test		Wait for a burst from the station under test.
	7	verify	RF	CTRL_ACK_CTRL_RTS_a (s = add_A; d = add_B; lg:= 2) in the ack slot reserved by the CTS	CACRa	Verify that a CTRL_ACK / CTRL_RTS is sent by the station under test.
	8	send	RF	CTRL_CTS_a (s = add_B; d = add_A) in the slot reserved by the RTS	Cca	Send a CTRL_CTS to the station under test.
	9	verify	RF	CTRL_c (s:= add_A; d:= add_B; M:= 0; T:= 0; re:= 1; c/r:= 1; h:= 0; r:= 1; lg:= 1; rrr:= 0; sss:= 0) in the slot reserved by the CTS	CTc	Verify that a CTRL burst indicating a CTRL_RSP_LCR is sent by the station under test.
	10	send	RF	CTRL_ACK_a (s:= add_B; d:= add_A; T:= 0) in the ack slot reserved by the CTS	Caa	Send the ACK from station B in response to the completed message.
Postamble	11					
Comments:						

Test Case Name:	**LME_CMD_LE_Receive_Option_Invalid**					
Purpose:	To demonstrate that a station displays correct behaviour when in receipt of an invalid CTRL_CMD_LE from a mobile which includes optional parameters.					
Reference:						
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble	1	do		M_POWER_UP		Prepare the transceiver for testing.
Test body	2	send	RF	CTRL_RTS_a (s:= add_B; d:= add_A; IB:= 1; T:= 0; lg:= 2)	Cra	Send an RTS using the long transmission procedures from a simulated station B, with IB = 1 and T = 0, indicating this is the first transmission from station B to station A. The RTS contains a unicast reservation for a response.
	3	await	RF	BURST from station under test		Wait for a burst from the station under test.
	4	verify	RF	CTRL_CTS_a (s = add_A; d = add_B) in the slot reserved by the RTS	Cca	Verify that a CTRL_CTS is sent by the station under test.
	5	send	RF	CTRL_f (s:= add_B; d:= add_A; M:= 0; T:= 0; re:= 1; c/r:= 0; h:= 0; r:= 0; lg:= 1; rrr:= 0; sss:= 0; I:= 1; b:= 1; lg:= 1; m:= F hex) in the slot reserved by the CTS	CTf	Send a CTRL DLPDU from station B with parameters indicating an invalid CTRL_CMD_LE, and the optional parameters: protocol options parameter and modulation support parameter (the modulation support parameter is given an invalid assignment).

Test Case Name:	**LME_CMD_LE_Receive_Option_Invalid**					
Purpose:	To demonstrate that a station displays correct behaviour when in receipt of an invalid CTRL_CMD_LE from a mobile which includes optional parameters.					
Reference:						
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
	6	await	RF	BURST from station under test		Wait for a burst from the station under test.
	7	verify	RF	CTRL_ACK_CTRL_RTS_a (s = add_A; d = add_B; lg:= 2) in the ack slot reserved by the CTS	CACRa	Verify that a CTRL_ACK / CTRL_RTS is sent by the station under test.
	8	send	RF	CTRL_CTS_a (s = add_B; d = add_A) in the slot reserved by the RTS	Cca	Send a CTRL_CTS to the station under test.
	9	verify	RF	CTRL_c (s:= add_A; d:= add_B; M:= 0; T:= 0; re:= 1; c/r:= 1; h:= 0; r:= 1; lg:= 1; rrr:= 0; sss:= 0) in the slot reserved by the CTS	CTc	Verify that a CTRL burst indicating a CTRL_RSP_LCR is sent by the station under test.
	10	send	RF	CTRL_ACK_a (s:= add_B; d:= add_A; T:= 0) in the ack slot reserved by the CTS	Caa	Send the ACK from station B in response to the completed message.
Postamble	11					
Comments:						

Test Case Name:	**LME_CMD_HO_Receive_A**					
Purpose:	To demonstrate that a station displays correct behaviour when in receipt of a CTRL_CMD_HO (re = 1) from a mobile.					
Reference:						
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble	1	do		M_POWER_UP		Prepare the transceiver for testing.
Test body	2	do		M_LME_INITIALIZE_LINK		Perform link establishment initiated by the mobile.
	3	send	RF	CTRL_c (s:= add_A; d:= add_B; M:= 0; T:= 1; re:= 1; c/r:= 0; h:= 1; r:= 0; lg:= 1; rrr:= 0; sss:= 0)	CTc	Send a CTRL DLPDU from simulated station B with parameters indicating a CTRL_CMD_HO (re = 1). The CTRL contains a unicast reservation for a response.
	4	await	RF	BURST from station under test		Wait for a burst from the station under test.
	5	verify	RF	CTRL_ACK_CTRL_RTS_a (s = add_A; d = add_B; lg:= 2) in the ack slot reserved by the CTRL	CACRa	Verify that a CTRL_ACK / CTRL_RTS is sent by the station under test.
	6	send	RF	CTRL_CTS_a (s = add_B; d = add_A) in the slot reserved by the RTS	Cca	Send a CTRL_CTS to the station under test.
	7	verify	RF	CTRL_c (s:= add_A; d:= add_B; M:= 0; T:= 0; re:= 1; c/r:= 1; h:= 1; r:= 0; lg:= 1; rrr:= 0; sss:= 0) in the slot reserved by the CTS	CTc	Verify that a CTRL burst indicating a CTRL_RSP_HO is sent by the station under test.
	8	send	RF	CTRL_ACK_a (s:= add_B; d:= add_A; T:= 0) in the ack slot reserved by the CTS	Caa	Send the ACK from station B in response to the completed message.
Postamble	9					
Comments:						

Test Case Name:	**LME_CMD_HO_Receive_Auto**					
Purpose:	To demonstrate that a station displays correct behaviour when in receipt of a CTRL_CMD_HO (re = 1) from a mobile and when an autotune is required.					
Reference:						
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble	1	do		M_POWER_UP		Prepare the transceiver for testing.
Test body	2	do		M_LME_INITIALIZE_LINK		Perform link establishment initiated by the mobile.
	3	send	RF	CTRL_c (s:= add_A; d:= add_B; M:= 0; T:= 1; re:= 1; c/r:= 0; h:= 1; r:= 0; lg:= 1; rrr:= 0; sss:= 0)	CTc	Send a CTRL DLPDU from simulated station B with parameters indicating a CTRL_CMD_HO (re = 1). The CTRL contains a unicast reservation for a response.
	4	await	RF	BURST from station under test		Wait for a burst from the station under test.
	5	verify	RF	CTRL_ACK_CTRL_RTS_a (s = add_A; d = add_B; lg:= 2) in the slot reserved by the CTRL	CACRa	Verify that a CTRL_ACK / CTRL_RTS is sent by the station under test.
	6	send	RF	CTRL_CTS_a (s = add_B; d = add_A) in the slot reserved by the RTS	Cca	Send a CTRL_CTS to the station under test.
	7	verify	RF	CTRL_k (s:= add_A; d:= add_B; re:= 1; c/r:= 1; h:= 1; r:= 0; lg:= 1; rrr:= 0; sss:= 0; m:= 4; f:= 1 000; lg:=4; g:= add_G) in the slot reserved by the CTS	CTk	Verify that the ground station sends a CTRL indicating a CTRL_RSP_HO, including the autotune and replacement ground station list parameters.
	8	send	RF	CTRL_ACK_a (s:= add_B; d:= add_A; T:= 0) in the ack slot reserved by the CTS	Caa	Send the ACK from station B in response to the completed message.
Postamble	9					
Comments:						

Test Case Name:	**LME_CMD_HO_Receive_Grd_Replace**					
Purpose:	To demonstrate that a station displays correct behaviour when in receipt of a CTRL_CMD_HO (re = 1) from a mobile and when an indication of other ground stations which can be reached is required.					
Reference:						
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble	1	do		M_POWER_UP		Prepare the transceiver for testing.
Test body	2	do		M_LME_INITIALIZE_LINK		Perform link establishment initiated by the mobile.
	3	send	RF	CTRL_c (s:= add_A; d:= add_B; M:= 0; T:= 1; re:= 1; c/r:= 0; h:= 1; r:= 0; lg:= 1; rrr:= 0; sss:= 0)	CTc	Send a CTRL DLPDU from simulated station B with parameters indicating a CTRL_CMD_HO (re = 1). The CTRL contains a unicast reservation for a response.
	4	await	RF	BURST from station under test		Wait for a burst from the station under test.
	5	verify	RF	CTRL_ACK_CTRL_RTS_a (s = add_A; d = add_B; lg:= 2) in the slot reserved by the CTRL	CACRa	Verify that a CTRL_ACK / CTRL_RTS is sent by the station under test.
	6	send	RF	CTRL_CTS_a (s = add_B; d = add_A) in the slot reserved by the RTS	Cca	Send a CTRL_CTS to the station under test.
	7	verify	RF	CTRL_l (s:= add_A; d:= add_B; re:= 1; c/r:= 1; h:= 1; r:= 0; lg:= 1; rrr:= 0; sss:= 0; lg:= 4; g:= add_G) in the slot reserved by the CTS	CTl	Verify that the ground station sends a CTRL indicating a CTRL_RSP_HO, including the replacement ground station list parameter.
	8	send	RF	CTRL_ACK_a (s:= add_B; d:= add_A; T:= 0) in the ack slot reserved by the CTS	Caa	Send the ACK from station B in response to the completed message.
Postamble	9					
Comments:						

Test Case Name:	**LME_CMD_HO_Receive_Invalid_A**					
Purpose:	To demonstrate that a station displays correct behaviour when in receipt of an invalid CTRL_CMD_HO (re = 1) from a mobile.					
Reference:						
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble	1	do		M_POWER_UP		Prepare the transceiver for testing.
Test body	2	do		M_LME_INITIALIZE_LINK		Perform link establishment initiated by the mobile.
	3	send	RF	CTRL_g (s:= add_A; d:= add_B; M:= 0; T:= 0; re:= 1; c/r:= 0; h:= 1; r:= 0; lg:= 1; rrr:= 0; sss:= 0)	CTg	Send an invalid CTRL DLPDU from simulated station B with parameters indicating a CTRL_CMD_HO (re = 1) (the burst defined has a "1" instead of a zero in octet 9). The CTRL contains a unicast reservation for a response.
	4	await	RF	BURST from station under test		Wait for a burst from the station under test.
	5	verify	RF	CTRL_ACK_CTRL_RTS_a (s = add_A; d = add_B; lg:= 2) in the slot reserved by the CTRL	CACRa	Verify that a CTRL_ACK / CTRL_RTS is sent by the station under test.
	6	send	RF	CTRL_CTS_a (s = add_B; d = add_A) in the slot reserved by the RTS	Cca	Send a CTRL_CTS to the station under test.
	7	verify	RF	CTRL_c (s:= add_A; d:= add_B; M:= 0; T:= 0; re:= 1; c/r:= 1; h:= 0; r:= 1; lg:= 1; rrr:= 0; sss:= 0) in the slot reserved by the CTS	CTc	Verify that a CTRL burst indicating a CTRL_RSP_LCR is sent by the station under test.
	8	send	RF	CTRL_ACK_a (s:= add_B; d:= add_A; T:= 0) in the ack slot reserved by the CTS	Caa	Send the ACK from station B in response to the completed message.
Postamble	9					
Comments:						

Test Case Name:	**LME_CMD_HO_Receive_B**					
Purpose:	To demonstrate that a station displays correct behaviour when in receipt of a CTRL_CMD_HO (re = 0) from a mobile.					
Reference:						
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble	1	do		M_POWER_UP		Prepare the transceiver for testing.
Test body	2	do		M_LME_INITIALIZE_LINK		Perform link establishment initiated by the mobile.
	3	send	RF	CTRL_c (s:= add_A; d:= add_B; M:= 0; T:= 1; re:= 0; c/r:= 0; h:= 1; r:= 0; lg:= 1; rrr:= 0; sss:= 0)	CTc	Send a CTRL DLPDU from simulated station B with parameters indicating a CTRL_CMD_HO (re = 0). The CTRL contains a unicast reservation for a response.
	4	await	RF	BURST from station under test		Wait for a burst from the station under test.
	5	verify	RF	CTRL_ACK_CTRL_RTS_a (s = add_A; d = add_B; lg:= 2) in the slot reserved by the CTRL	CACRa	Verify that a CTRL_ACK / CTRL_RTS is sent by the station under test.
	6	send	RF	CTRL_CTS_a (s = add_B; d = add_A) in the slot reserved by the RTS	Cca	Send a CTRL_CTS to the station under test.
	7	verify	RF	CTRL_c (s:= add_A; d:= add_B; M:= 0; T:= 0; re:= 1; c/r:= 0; h:= 1; r:= 0; lg:= 1; rrr:= 0; sss:= 0) in the slot reserved by the CTS	CTc	Verify that a CTRL burst indicating a CTRL_CMD_HO (re = 1) is sent by the station under test.
	8	send	RF	CTRL_ACK_a (s:= add_B; d:= add_A; T:= 0) in the ack slot reserved by the CTS	Caa	Send the ACK from station B in response to the completed message.

Test Case Name:	**LME_CMD_HO_Receive_B**					
Purpose:	To demonstrate that a station displays correct behaviour when in receipt of a CTRL_CMD_HO (re = 0) from a mobile.					
Reference:						
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
Postamble	9					
Comments:						

Test Case Name:	**LME_CMD_HO_Receive_Invalid_B**					
Purpose:	To demonstrate that a station displays correct behaviour when in receipt of an invalid CTRL_CMD_HO (re = 0) from a mobile.					
Reference:						
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble	1	do		M_POWER_UP		Prepare the transceiver for testing.
Test body	2	do		M_LME_INITIALIZE_LINK		Perform link establishment initiated by the mobile.
	3	send	RF	CTRL_g (s:= add_A; d:= add_B; M:= 0; T:= 1; re:= 0; c/r:= 0; h:= 1; r:= 0; lg:= 1; rrr:= 0; sss:= 0)	CTg	Send an invalid CTRL DLPDU from simulated station B with parameters indicating a CTRL_CMD_HO (re = 0) (the burst defined has a "1" instead of a zero in octet 9). The CTRL contains a unicast reservation for a response.
	4	await	RF	BURST from station under test		Wait for a burst from the station under test.
	5	verify	RF	CTRL_ACK_CTRL_RTS_a (s = add_A; d = add_B; lg:= 2) in the slot reserved by the CTRL	CACRa	Verify that a CTRL_ACK / CTRL_RTS is sent by the station under test.
	6	send	RF	CTRL_CTS_a (s = add_B; d = add_A) in the slot reserved by the RTS	Cca	Send a CTRL_CTS to the station under test.
	7	verify	RF	CTRL_c (s:= add_A; d:= add_B; M:= 0; T:= 0; re:= 0; c/r:= 0; h:= 0; r:= 1; lg:= 1; rrr:= 0; sss:= 0) in the slot reserved by the CTS	CTc	Verify that a CTRL burst indicating a CTRL_CMD_LCR (re = 0) is sent by the station under test.
	8	send	RF	CTRL_ACK_a (s:= add_B; d:= add_A; T:= 0) in the ack slot reserved by the CTS	Caa	Send the ACK from station B in response to the completed message.
Postamble	9					
Comments:						

Test Case Name:	**LME_CMD_HO_Receive_Invalid_C**					
Purpose:	To demonstrate that a station displays correct behaviour when in receipt of a valid CTRL_CMD_HO (re = 1) from a mobile with which it does not have a link.					
Reference:						
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble	1	do		M_POWER_UP		Prepare the transceiver for testing.
Test body	2	send	RF	CTRL_RTS_a (s:= add_B; d:= add_A; IB:= 1; T:= 0; lg:= 1)	Cra	Send an RTS using the long transmission procedures from a simulated station B, with IB = 1 and T = 0, indicating this is the first transmission from station B to station A. The RTS contains a unicast reservation for a response.
	3	await	RF	BURST from station under test		Wait for a burst from the station under test.
	4	verify	RF	CTRL_CTS_a (s = add_A; d = add_B) in the slot reserved by the RTS	Cca	Verify that a CTRL_CTS is sent by the station under test.

Test Case Name:	**LME_CMD_HO_Receive_Invalid_C**					
Purpose:	To demonstrate that a station displays correct behaviour when in receipt of a valid CTRL_CMD_HO (re = 1) from a mobile with which it does not have a link.					
Reference:						
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
	5	send	RF	CTRL_d (s:= add_B; d:= add_A; M:= 0; T:= 0; re:= 1; c/r:= 0; h:= 1; r:= 0; lg:= 1; rrr:= 0; sss:= 0) in the slot reserved by the CTS	CTd	Send a valid CTRL DLPDU from station B with parameters indicating a CTRL_CMD_HO (re = 1).
	6	await	RF	BURST from station under test		Wait for a burst from the station under test.
	7	verify	RF	CTRL_ACK_CTRL_RTS_a (s = add_A; d = add_B; lg:= 2) in the ack slot reserved by the CTS	CACRa	Verify that a CTRL_ACK / CTRL_RTS is sent by the station under test.
	8	send	RF	CTRL_CTS_a (s = add_B; d = add_A) in the slot reserved by the RTS	Cca	Send a CTRL_CTS to the station under test.
	9	verify	RF	CTRL_c (s:= add_A; d:= add_B; M:= 0; T:= 0; re:= 1; c/r:= 1; h:= 0; r:= 1; lg:= 1; rrr:= 0; sss:= 0) in the slot reserved by the CTS	CTc	Verify that a CTRL burst indicating a CTRL_RSP_LCR is sent by the station under test.
	10	send	RF	CTRL_ACK_a (s:= add_B; d:= add_A; T:= 0) in the ack slot reserved by the CTS	Caa	Send the ACK from station B in response to the completed message.
Postamble	9					
Comments:						

Test Case Name:	**LME_CMD_HO_Send_A**					
Purpose:	To demonstrate that a station displays correct behaviour when requested to perform a ground-initiated handoff.					
Reference:						
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble	1	do		M_POWER_UP		Prepare the transceiver for testing.
Test body	2	do		M_LME_INITIALIZE_LINK		Perform link establishment initiated by the mobile.
	3	send	LME	REQUEST TO TRANSMIT GROUND-INITIATED HANDOFF to station B		Send a request at the LME of the station under test to transmit a ground-initiated handoff for the link with station B.
	4	await	RF	BURST from station under test		Wait for a burst from the station under test.
	5	verify	RF	CTRL_RTS_a (s:= add_A; d:= add_B; IB:= 0; lg:= 2)	Cra	Verify that the station under test sends an RTS using the long transmission procedures to simulated station B. The RTS contains a unicast reservation for a response.
	6	send	RF	CTRL_CTS_a (s = add_B; d = add_A) in the slot reserved by the RTS	Cca	Send a CTRL_CTS to the station under test.
	7	verify	RF	CTRL_h (s:= add_A; d:= add_B; re:= 1; c/r:= 0; lg:= 1; h:= 1; r:= 0; rrr:= 0; sss:= 0; b:=0; I:= 1; lg:= 6; a:= ADM; r:= ARS; g:= add_G) in the slot reserved by the CTS	CTh	Verify that the station under test sends a CTRL DLPDU to station B with parameters indicating a CTRL_CMD_HO (re = 1), including the protocol options, ATN router NETs, and ground-based system mask parameters.
	8	send	RF	CTRL_ACK_CTRL_RTS_a (s = add_B; d = add_A; lg:= 2) in the ack slot reserved by the CTS	CACRa	Send a CTRL_ACK / CTRL_RTS from station B.
	9	await	RF	BURST from station under test		Wait for a burst from the station under test.
	10	verify	RF	CTRL_CTS_a (s = add_A; d = add_B) in the slot reserved by the RTS	Cca	Verify that the station under test sends a CTRL_CTS to station B.

Test Case Name:	**LME_CMD_HO_Send_A**					
Purpose:	To demonstrate that a station displays correct behaviour when requested to perform a ground-initiated handoff.					
Reference:						
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
	11	send	RF	CTRL_c (s:= add_B; d:= add_A; re:= 1; c/r:= 1; h:= 1; r:= 0; lg:= 1; rrr:= 0; sss:= 0) in the slot reserved by the CTS	CTc	Send a CTRL burst indicating a CTRL_RSP_HO from station B.
	12	verify	RF	CTRL_ACK_a (s:= add_A; d:= add_B) in the ack slot reserved by the CTS	Caa	Verify that the station under test sends an ACK in response to the completed message.
Postamble	13					
Comments: Assumes the ground LME will not accept a handoff to other ground stations.						

Test Case Name:	**LME_CMD_HO_Send_B**					
Purpose:	To demonstrate that a station displays correct behaviour when requested to perform a ground-initiated handoff and when configured to accept handoff to other ground stations.					
Reference:						
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble	1	do		M_POWER_UP		Prepare the transceiver for testing.
	2	do		CONFIGURE GROUND LME TO ACCEPT HANDOFF TO OTHER GROUND STATIONS		Configure the LME to accept a handoff to other ground stations.
Test body	3	do		M_LME_INITIALIZE_LINK		Perform link establishment initiated by the mobile.
	4	send	LME	REQUEST TO TRANSMIT GROUND-INITIATED HANDOFF to station B		Send a request at the LME of the station under test to transmit a ground-initiated handoff for the link with station B.
	5	await	RF	BURST from station under test		Wait for a burst from the station under test.
	6	verify	RF	CTRL_RTS_a (s:= add_A; d:= add_B; IB:= 0; lg:= 2)	Cra	Verify that the station under test sends an RTS using the long transmission procedures to simulated station B. The RTS contains a unicast reservation for a response.
	7	send	RF	CTRL_CTS_a (s = add_B; d = add_A) in the slot reserved by the RTS	Cca	Send a CTRL_CTS to the station under test.
	8	verify	RF	CTRL_I (s:= add_A; d:= add_B; re:= 1; c/r:= 0; lg:= 1; h:= 1; r:= 0; rrr:= 0; sss:= 0; lg:= 4; g:= add_G) in the slot reserved by the CTS	CTI	Verify that the station under test sends a CTRL DLPDU to station B with parameters indicating a CTRL_CMD_HO (re = 1), with the optional parameter: replacement ground station list parameter.
	9	send	RF	CTRL_ACK_CTRL_RTS_a (s = add_B; d = add_A; lg:= 2) in the ack slot reserved by the CTS	CACRa	Send a CTRL_ACK / CTRL_RTS from station B.
	10	await	RF	BURST from station under test		Wait for a burst from the station under test.
	11	verify	RF	CTRL_CTS_a (s = add_A; d = add_B) in the slot reserved by the RTS	Cca	Verify that the station under test sends a CTRL_CTS to station B.
	12	send	RF	CTRL_c (s:= add_B; d:= add_A; re:= 1; c/r:= 1; h:= 1; r:= 0; lg:= 1; rrr:= 0; sss:= 0) in the slot reserved by the CTS	CTc	Send a CTRL burst indicating a CTRL_RSP_HO from station B.
	13	verify	RF	CTRL_ACK_a (s:= add_A; d:= add_B) in the ack slot reserved by the CTS	Caa	Verify that the station under test sends an ACK in response to the completed message.
Postamble	14					
Comments:						

Test Case Name:	**LME_CMD_HO_Send_C**					
Purpose:	To demonstrate that a station displays correct behaviour when requested to perform a ground-requested mobile-initiated handoff.					
Reference:						
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble	1	do		M_POWER_UP		Prepare the transceiver for testing.
Test body	2	do		M_LME_INITIALIZE_LINK		Perform link establishment initiated by the mobile.
	3	send	LME	REQUEST TO TRANSMIT GROUND-REQUESTED MOBILE-INITIATED HANDOFF to station B		Send a request at the LME of the station under test to transmit a ground-requested mobile-initiated handoff for the link with station B.
	4	await	RF	BURST from station under test		Wait for a burst from the station under test.
	5	verify	RF	CTRL_c (s:= add_A; d:= add_B; re:= 0; c/r:= 0; h:= 1; r:= 0; lg:= 1; rrr:= 0; sss:= 0)	CTc	Verify the station under test sends a CTRL DLPDU to simulated station B with parameters indicating a CTRL_CMD_HO (re = 0). The CTRL contains a unicast reservation for a response.
	6	send	RF	CTRL_ACK_CTRL_RTS_a (s = add_B; d = add_A; lg:= 2) in the slot reserved by the CTRL	CACRa	Send a CTRL_ACK / CTRL_RTS from station B.
	7	await	RF	BURST from station under test		Wait for a burst from the station under test.
	8	verify	RF	CTRL_CTS_a (s = add_A; d = add_B) in the slot reserved by the RTS	Cca	Verify that the station under test sends a CTRL_CTS to station B.
	9	send	RF	CTRL_d (s:= add_B; d:= add_A; M:= 0; re:= 1; c/r:= 0; h:= 0; r:= 0; lg:= 1; rrr:= 0; sss:= 0) in the slot reserved by the CTS	CTd	Send a CTRL DLPDU from station B with parameters indicating a CTRL_CMD_LE.
	10	await	RF	BURST from station under test		Wait for a burst from the station under test.
	11	verify	RF	CTRL_ACK_CTRL_RTS_a (s = add_A; d = add_B; lg:= 2) in the ack slot reserved by the CTS	CACRa	Verify that a CTRL_ACK / CTRL_RTS is sent by the station under test.
	12	send	RF	CTRL_CTS_a (s = add_B; d = add_A) in the slot reserved by the RTS	Cca	Send a CTRL_CTS to the station under test.
	13	verify	RF	CTRL_c (s:= add_A; d:= add_B; M:= 0; re:= 1; c/r:= 1; h:= 0; r:= 0; lg:= 1; rrr:= 0; sss:= 0) in the slot reserved by the CTS	CTc	Verify that a CTRL burst indicating a CTRL_RSP_LE is sent by the station under test.
	14	send	RF	CTRL_ACK_a (s:= add_B; d:= add_A) in the ack slot reserved by the CTS	Caa	Send the ACK from station B in response to the completed message.
Postamble	15					
Comments:						

Test Case Name:	**LME_CMD_HO_Send_Invalid_A**					
Purpose:	To demonstrate that a station displays correct behaviour when requested to perform a ground-initiated handoff, and when the mobile responds with an invalid CTRL_RSP_HO.					
Reference:						
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble	1	do		M_POWER_UP		Prepare the transceiver for testing.
Test body	2	do		M_LME_INITIALIZE_LINK		Perform link establishment initiated by the mobile.
	3	send	LME	REQUEST TO TRANSMIT GROUND-INITIATED HANDOFF to station B		Send a request at the LME of the station under test to transmit a ground-initiated handoff for the link with station B.
	4	await	RF	BURST from station under test		Wait for a burst from the station under test.
	5	verify	RF	CTRL_RTS_a (s:= add_A; d:= add_B; IB:= 0; lg:= 2)	Cra	Verify that the station under test sends an RTS using the long transmission procedures to simulated station B. The RTS contains a unicast reservation for a response.
	6	send	RF	CTRL_CTS_a (s = add_B; d = add_A) in the slot reserved by the RTS	Cca	Send a CTRL_CTS to the station under test.
	7	verify	RF	CTRL_h (s:= add_A; d:= add_B; re:= 1; c/r:= 0; lg:= 1; h:= 1; r:= 0; rrr:= 0; sss:= 0; b:=0; I:= 1; lg:= 6; a:= ADM; r:= ARS; g:= add_G) in the slot reserved by the CTS	CTh	Verify that the station under test sends a CTRL DLPDU to station B with parameters indicating a CTRL_CMD_HO (re = 1), including the protocol options, ATN router NETs, and ground-based system mask parameters.
	8	send	RF	CTRL_ACK_CTRL_RTS_a (s = add_B; d = add_A; lg:= 2) in the ack slot reserved by the CTS	CACRa	Send a CTRL_ACK / CTRL_RTS from station B.
	9	await	RF	BURST from station under test		Wait for a burst from the station under test.
	10	verify	RF	CTRL_CTS_a (s = add_A; d = add_B) in the slot reserved by the RTS	Cca	Verify that the station under test sends a CTRL_CTS to station B.
	11	send	RF	CTRL_g (s:= add_B; d:= add_A; re:= 1; c/r:= 1; h:= 1; r:= 0; lg:= 1; rrr:= 0; sss:= 0) in the slot reserved by the CTS	CTg	Send an invalid CTRL burst indicating a CTRL_RSP_HO from station B (the burst defined has a "1" in place of a "0" in the ninth octet).
	12	await	RF	BURST from station under test		Wait for a burst from the station under test.
	13	verify	RF	DM_DISC_a (s:= add_A; d:= add_B) in the ack slot reserved by the CTS	Dda Dfa	Verify that a DM/DISC is transmitted by the station under test.
Postamble	14					
Comments: Assumes the ground LME will not accept a handoff to other ground stations.						

Test Case Name:	**LME_CMD_HO_Send_Auto**					
Purpose:	To demonstrate that a station displays correct behaviour when requested to perform a ground-requested mobile-initiated handoff and when an autotune is required.					
Reference:						
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble	1	do		M_POWER_UP		Prepare the transceiver for testing.
Test body	2	do		M_LME_INITIALIZE_LINK		Perform link establishment initiated by the mobile.
	3	send	LME	REQUEST TO TRANSMIT GROUND-REQUESTED MOBILE-INITIATED HANDOFF to station B		Send a request at the LME of the station under test to transmit a ground-requested mobile-initiated handoff for the link with station B.
	4	await	RF	BURST from station under test		Wait for a burst from the station under test.
	5	verify	RF	CTRL_k (s:= add_A; d:= add_B; re:= 0; c/r:= 0; h:= 1; r:= 0; lg:= 1; rrr:= 0; sss:= 0 m:= 4; f:= 1 000; lg:=4; g:= add_G)	CTk	Verify the station under test sends a CTRL DLPDU from simulated station B with parameters indicating a CTRL_CMD_HO (re = 0), and including the autotune and replacement ground station list parameters. The CTRL contains a unicast reservation for a response.
	6	send	RF	CTRL_ACK_a (s:= add_B; d:= add_A) in the slot reserved by the CTRL	Caa	Send the ACK from station B in response to the completed message.
Postamble	7					
Comments:						

Test Case Name:	**LME_CMD_HO_Send_D**					
Purpose:	To demonstrate that a station displays correct behaviour when requested to perform a ground-requested broadcast handoff.					
Reference:						
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble	1	do		M_POWER_UP		Prepare the transceiver for testing.
	2	do		CONFIGURE GROUND LME TO SUPPORT BROADCAST LINK HANDOFFS		Configure the LME to accept a handoff to other ground stations.
Test body	3	do		M_LME_INITIALIZE_LINK		Perform link establishment initiated by the mobile.
	4	send	LME	REQUEST TO TRANSMIT GROUND-REQUESTED BROADCAST HANDOFF to station B		Send a request at the LME of the station under test to transmit a ground-requested broadcast handoff for the link with station B.
	5	await	RF	BURST from station under test		Wait for a burst from the station under test.
	6	verify	RF	CTRL_RTS_a (s:= add_A; d:= add_B; IB:= 0; lg:= 2)	Cra	Verify that the station under test sends an RTS using the long transmission procedures to simulated station B. The RTS contains a unicast reservation for a response.
	7	send	RF	CTRL_CTS_a (s = add_B; d = add_A) in the slot reserved by the RTS	Cca	Send a CTRL_CTS to the station under test.
	8	verify	RF	UCTRL_b (s:= add_A; ucid:= 3; re:= 0; c/r:= 0; lg:= 1; h:= 1; r:= 0; rrr:= 0; sss:= 0; I:= 0; b:= 1; g:= add_G; lg:= 4; a:= add_B; lg:= 6; a:= ADM; r:= ARS) in the slot reserved by the CTS	Ucb	Verify that the station under test broadcasts a UCTRL DLPDU with parameters indicating a CTRL_CMD_HO (re = 0), including the protocol options, broadcast connection, ground station address filter and ATN router NETs parameters.
Postamble	9					
Comments:						

Test Case Name:	**LME_TL2**					
Purpose:	To demonstrate that a station displays correct application of the TL2 timer.					
Reference:						
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble	1	do		M_POWER_UP		Prepare the transceiver for testing.
Test body	2	rep 5		m:= {6, 7, 8, 9, 10}		
	3	do		M_LME_INITIALIZE_LINK		Perform link establishment initiated by the mobile.
	4	send	LME	REQUEST TO TRANSMIT GROUND-INITIATED HANDOFF to station B		Send a request at the LME of the station under test to transmit a ground-initiated handoff for the link with station B.
	5	await	RF	BURST from station under test		Wait for a burst from the station under test.
	6	verify	RF	CTRL_RTS_a (s:= add_A; d:= add_B; IB:= 0; lg:= 2)	Cra	Verify that the station under test sends an RTS using the long transmission procedures to simulated station B. The RTS contains a unicast reservation for a response.
	7	send	RF	CTRL_CTS_a (s = add_B; d = add_A) in the slot reserved by the RTS	Cca	Send a CTRL_CTS to the station under test.
	8	verify	RF	CTRL_h (s:= add_A; d:= add_B; re:= 1; c/r:= 0; lg:= 1; h:= 1; r:= 0; rrr:= 0; sss:= 0; b:=0; I:= 1; lg:= 6; a:= ADM; r:= ARS; g:= add_G) in the slot reserved by the CTS	CTh	Verify that the station under test sends a CTRL DLPDU to station B with parameters indicating a CTRL_CMD_HO (re = 1), including the protocol options, ATN router NETs, and ground-based system mask parameters.
	9	send	RF	CTRL_ACK_a (s:= add_B; d:= add_A)	Caa	Send the ACK from station B in response to the completed message.
	10	record	RF	timestart:= time at beginning of slot in which CTRL_h transmitted	CTh	Record the time at which the CTRL DLPDU was transmitted.
	11	await		time:= timestart + m		
	12	verify	RF	CTRL_j (s:= add_A; d:= add_B; re:= 1; c/r:= 1; h:= 1; r:= 0; lg:= 1; rrr:= 0; sss:= 0; g:= address of proposed new ground station)	CTj	Verify that the station under test attempts to handoff to another ground station by sending a CTRL indicating a CTRL_CMD_HO, including the replacement ground station list parameter, with the address of a new ground station. The CTRL contains a unicast reservation for a response.
	13	send	Rf	CTRL_ACK_a (s:= add_B; d:= add_A)	Caa	Send the ACK from station B in response to the completed message.
	14	endrep		next m		
postamble	15					
Comments:						

Test Case Name:	**LME_TL1**					
Purpose:	To demonstrate that a station displays correct operation of timer TL1.					
Reference:						
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble	1	do		M_POWER_UP		Prepare the transceiver for testing.
Test body	2	do		M_LME_INITIALIZE_LINK		Perform link establishment initiated by the mobile.
	3	send	RF	CTRL_c (s:= add_A; d:= add_B; M:= 0; T:= 1; re:= 1; c/r:= 0; h:= 1; r:= 0; lg:= 1; rrr:= 0; sss:= 0)	CTc	Send a CTRL DLPDU from simulated station B with parameters indicating a CTRL_CMD_HO (re = 1). The CTRL contains a unicast reservation for a response.
	4	await	RF	BURST from station under test		Wait for a burst from the station under test.
	5	verify	RF	CTRL_ACK_CTRL_RTS_a (s = add_A; d = add_B; lg:= 2) in the slot reserved by the CTRL	CACRa	Verify that a CTRL_ACK / CTRL_RTS is sent by the station under test.
	6	send	RF	CTRL_CTS_a (s = add_B; d = add_A) in the slot reserved by the RTS	Cca	Send a CTRL_CTS to the station under test.
	7	verify	RF	CTRL_c (s:= add_A; d:= add_B; M:= 0; T:= 0; re:= 1; c/r:= 1; h:= 1; r:= 0; lg:= 1; rrr:= 0; sss:= 0) in the slot reserved by the CTS	CTc	Verify that a CTRL burst indicating a CTRL_RSP_HO is sent by the station under test.
	8	send	RF	CTRL_ACK_a (s:= add_B; d:= add_A) in the ack slot reserved by the CTS	Caa	Send the ACK from station B in response to the completed message.
	9	record	RF	timestart:= time at beginning of slot in which CTRL_c transmitted	CTc	Record the time at which the CTRL_RSP_HO was transmitted.
	10	rep 5		m:= {20, 30, 40, 50, 59}; info:= {info1, info2, info3, info4, info5}		Start loop. All the "infox" packets require a short transmission.
	11	await		time:= timestart + m		Wait for a specified time after the CTRL_RSP_HO was transmitted
	12	send	RF	INFO_a (s:= add_B; d:= add_A; in:= info; M:= 0; pr:= 3)	Ifa	Send an INFO burst to the station under test with M = 0. The INFO contains a unicast reservation for a response.
	13	verify	RF	INFO_ACK_a (s:= add_A; d:= add_B) in the slot reserved by the INFO	Iaa	Verify INFO_ACK received from the station under test.
	14	endrep				End loop.
	15	rep 4		m:= {60, 70, 80, 90}; info:= {info6, info7, info8, info9}		Start loop.
	16	await		time:= timestart + m		Wait for a specified time after the CTRL_RSP_HO was transmitted
	17	send	RF	INFO_a (s:= add_B; d:= add_A; in:= info; M:= 0; pr:= 3)	Ifa	Send an INFO burst to the station under test with M = 0. The INFO contains a unicast reservation for a response.
	18	verify	DLS	DM_DISC_a (s:= add_A; d:= add_B) in the slot reserved by the INFO	DMDCa	Verify DM_DISC received from station A.
	19	endrep				End loop.
Postamble	20					
Comments:						

Test Case Name:	**LME_L1**					
Purpose:	To demonstrate that a station displays correct operation of counter L1.					
Reference:						
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble	1	do		M_POWER_UP		Prepare the transceiver for testing.
Test body	2	do		M_LME_INITIALIZE_LINK		Perform link establishment initiated by the mobile.
	3	rep 3		infoshort:= {info1, info2, info3}		Start loop to send a few data packets to establish that data is being sent normally. Both the "infox" packets require a short transmission.
	4	send	AppIn	REQUEST TO TRANSMIT DATA to station B (in:= infoshort)		Send a request to the station under test to transmit data to station B.
	5	verify	RF	INFO_a (s:= add_A; d:= add_B; in:= infoshort; M:= 0)	Ifa	Verify that the station under test sends an INFO burst to station B. The INFO contains a unicast reservation for a response.
		Send	RF	INFO_ACK_a (s:= add_B; d:= add_A) in the slot reserved by the INFO	Iaa	Send the ACK from station B in response.
	6	endrep				End loop.
	7	send	AppIn	REQUEST TO TRANSMIT DATA to station B (in:= infolong)		Send a request to the station under test to transmit data to station B. The "info" packet requires a long transmission, and therefore an RTS will be generated.
	8	verify	RF	INFO_RTS_a (s:= add_A; d:= add_B) transmitted		Verify that an RTS is transmitted. The RTS contains a unicast reservation for a response.
	9	rep 3		n:= 1		Start loop.
	10	record	RF	timestart:= time at beginning of slot in which INFO_RTS_a transmitted	Ira	Record the time at which the INFO_RTS_a was transmitted.
	11	await		time:= timestart + 5		Wait for TL3 seconds specified time after the RTS was transmitted
	12	verify	DLS	INFO_RTS_a (s:= add_A; d:= add_B) transmitted		Verify at the DLS that an RTS is re-transmitted. The RTS contains a unicast reservation for a response.
	13	endrep				End loop.
	15	send	RF	INFO_RTS_a (s = add_B; d = add_A)	Ira	Send an INFO_RTS from station B to the station under test. The RTS contains a unicast reservation for a response.
	16	verify	RF	DM_DISC_a (s:= add_A; d:= add_B) in the slot reserved by the RTS	DMDCa	Verify that a DM_DISC is sent by the station under test because it has marked station B as unreachable.
Postamble	17					
Comments:						

Test Case Name:	**LME_GSIF**					
Purpose:	To demonstrate that a station will send a GSIF at least once per minute on each channel.					
Reference:						
Context	**Step**	**Action**	**PCO**	**Action Qualifier**	**Ref**	**Comment**
preamble	1	do		M_POWER_UP		Prepare the transceiver for testing.
Test body	2	await	RF	BURST from station under test		Wait for a burst from the station under test.
	3	verify	RF	UCTRL_c (s:= add_A; ucid:= 0)		Verify that the station under test broadcasts a GSIF.
	4	record	RF	time(0):= time at beginning of slot in which UCTRL_c transmitted	Ucc	
	5	rep 10		n:= 1		
	6	await	RF	BURST from station under test		Wait for a burst from the station under test.
	7	verify	RF	UCTRL_c (s:= add_A; ucid:= 0)		Verify that the station under test broadcasts a GSIF.
	8	record	RF	time(n):= time at beginning of slot in which UCTRL_c transmitted	Ucc	
	9	endrep		n:= n + 1	Ucc	
	10	verify		time(10) - time(0) is less than or equal to 10 minutes		Verify that the station broadcasts a GSIF at least once per minute.
Postamble	11					
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 the present document;
- column 5 is a reference to testing requirements specified elsewhere in the present document. Several tests verify a whole group of requirements. They are only mentioned in the first row of such a group, usually a headline. The applicability of these tests to the subordinated requirements is indicated by ditto marks (') in the rows following the first instance of a test case name. Amplification of individual entries is provided by the following notes.

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	1.4		DLS SUBLAYER	see note 1
5.1.1			General	see note 1
5.1.1.1	1.4.1		Services	see note 1
5.1.1.1.1	1.1.2.1	a		see note 2
5.1.1.1.2	1.1.2.2	a		see note 2
5.1.1.1.3	1.4	a		see note 2
5.1.1.1.4	1.4.1	a		see note 2
5.1.1.1.5	1.4.1	c		see note 2
5.1.1.1.6	1.4.1	d		see note 2
5.1.1.2	1.4.1.1		Data transfer	see note 1
5.1.1.2.1	1.4.1.1	a		see note 2
5.1.1.2.2	1.4.1.1	b		see note 1a
5.1.1.2.3	1.4.1.1	c		DLS_ND3
5.1.1.2.4	1.4.1.1	d		DLS_ND3
5.1.1.2.5	1.4.1.1	e		DLS_Data
5.1.1.3	1.4.1.2		DATA DLPDU duplicate suppression and sequencing	see note 1
5.1.1.3.1	1.4.1.2	a		DLS_Duplicate_Short DLS_Long_Order

Requirement reference	Reference in [1]	Req	Title	Test Case
5.1.1.4	1.4.1.3		Error detection	see note 1
5.1.1.4.1	1.4.1.3	a		see note 2
5.1.1.5	1.4.1.4		Station identification	see note 1
5.1.1.5.1	1.4.1.4	a		see note 2
5.1.1.6	1.4.1.5		Broadcast addressing	see note 1
5.1.1.6.1	1.4.1.5	a		see note 2
5.1.1.7	1.4.1.6		DLS Priority	see note 1
5.1.1.7.1	1.4.1.6	a		see note 2
5.1.1.8	1.4.1.7		DLS link control DLPDUs	see note 1
5.1.1.8.1	1.4.1.7	a		see note 2
5.1.2	1.4.2		DLS protocol specification	see note 1
5.1.2.1	1.4.2.1		State Variables	see note 1
5.1.2.1.1	1.4.2.1	a		see note 1a
5.1.2.2	1.4.2.3		DLS burst formats	see note 1
5.1.2.2.1	1.4.2.3.1	a		see note 1a
5.1.2.2.2	1.4.2.3.1	c		see note 1a
5.1.2.2.3	1.4.2.3.1	d		see note 1a
5.1.2.2.4	1.4.2.3.2	a		see note 1a
5.1.2.2.5	1.4.2.3.2	b		see note 1a
5.1.2.2.6	1.4.2.3.2	c		see note 1a
5.1.2.2.7	1.4.2.3.2	d		see note 1a
5.1.2.2.8	1.4.2.3.2	e		see note 1a
5.1.2.2.9	1.4.2.3.2	f		see note 1a
5.1.2.2.10	1.4.2.3.2	g		see note 1a
5.1.2.2.11	1.4.2.3.2	h		see note 1a
5.1.2.2.12	1.4.2.3.2	I		see note 2
5.1.2.2.13	1.4.2.3.2	j		see note 2
5.1.2.2.14	1.4.2.3.3	a		DLS_Long_TM_Send_A DLS_Long_TM_Send_B DLS_Long_T_Receive_A DLS_Long_T_Receive_B DLS_Short_T_Receive DLS_Short_T_Send
5.1.2.2.15	1.4.2.3.3	b		DLS_Initialize_NSCOP_Send
5.1.2.2.16	1.4.2.3.4	a		DLS_Long_TM_Send_A DLS_Long_TM_Send_B
5.1.2.2.17	1.4.2.3.5	a		see note 1a
5.1.2.2.18	1.4.2.3.6	a		DLS_Length
5.1.2.2.19	1.4.2.3.6	b		see note 1a
5.1.2.2.20	1.4.2.3.7	a		see note 2
5.1.2.2.21	1.4.2.3.11	a		see note 2
5.1.2.2.22	1.4.2.3.11	b		see note 2
5.1.2.2.23	1.4.2.3.12	a		see note 2
5.1.2.2.24	1.4.2.3.12	b		see note 2
5.1.3	1.4.3		DLS system parameters	see note 1
5.1.3.1	1.4.3	a		see note 1a
5.1.3.2	1.4.3	b		see note 2
5.1.3.3	1.4.3.3	a		see note 1a
5.1.3.4	1.4.3.3	b		DLS_ND1_Short_Receive
5.1.3.5	1.4.3.3	c		DLS_ND1_Short_Send
5.1.3.6	1.4.3.4	a		DLS_ND2
5.1.3.7	1.4.3.4	b		see note 1a
5.1.3.8	1.4.3.5	a		DLS_ND3
5.1.4	1.4.4		DLS procedures	see note 1
5.1.4.1	1.4.4.2		Setting of re-transmission parameter	see note 1
5.1.4.1.1	1.4.4.2	a		DLS_Short_NoAck
5.1.4.2	1.4.4.3		Selection of user data packet for transmission	see note 1
5.1.4.2.1	1.4.4.3.1	a		DLS_Priority_Long DLS_Priority_Long_Short DLS_Priority_Short
5.1.4.2.2	1.4.4.3.1	b		DLS_Priority_Long DLS_Priority_Long_Short DLS_Priority_Short
5.1.4.2.3	1.4.4.3.1	c		DLS_Priority_CTRL

Requirement reference	Reference in [1]	Req	Title	Test Case
5.1.4.2.4	1.4.4.3.1	d		DLS_Priority_INFO_RTS DLS_Long_UDATA_Send
5.1.4.2.5	1.4.4.3.2.1	a		DLS_ND3
5.1.4.2.6	1.4.4.3.2.1	b		DLS_ND3
5.1.4.2.7	1.4.4.3.2.1	c		see note 2
5.1.4.2.8	1.4.4.3.2.2	a		DLS_ND3 DLS_Short_T_Send
5.1.4.2.9	1.4.4.3.2.2	b		DLS_Long_TM_Send_A DLS_Priority_Long DLS_Priority_Long_Short DLS_Priority_Short DLS_Short_T_Send
5.1.4.2.10	1.4.4.3.2.2	c		DLS_Priority_Long DLS_Priority_Long_Short DLS_Priority_Short DLS_Short_T_Send
5.1.4.2.11	1.4.4.3.2.3	a		DLS_ND3 DLS_Long_TM_Send_B
5.1.4.2.12	1.4.4.3.2.3	b		DLS_Long_TM_Send_B
5.1.4.2.13	1.4.4.3.2.3	c		DLS_Long_TM_Send_B
5.1.4.2.14	1.4.4.3.2.3	d		DLS_Long_TM_Send_B
5.1.4.2.15	1.4.4.3.3.1	a		DLS_Initialize_Send_Long
5.1.4.2.16	1.4.4.3.3.1	b		DLS_Initialize_Send_Long
5.1.4.2.17	1.4.4.3.3.1	c		DLS_Initialize_Receive_Long
5.1.4.2.18	1.4.4.3.3.1	d		DLS_Initialize_Send_Long DLS_Initialize_Receive_Long
5.1.4.2.19	1.4.4.3.3.1	e		see note 2
5.1.4.2.20	1.4.4.3.3.1	f		see note 2
5.1.4.2.21	1.4.4.3.3.1	g		see note 2
5.1.4.2.22	1.4.4.3.3.1	h		see note 2
5.1.4.2.23	1.4.4.3.3.1	I		see note 2
5.1.4.2.24	1.4.4.3.3.1	j		see note 2
5.1.4.2.25	1.4.4.3.3.1	k		see note 2
5.1.4.2.26	1.4.4.3.3.1	l		DLS_Long_IB_Error
5.1.4.2.27	1.4.4.3.3.1	m		DLS_Long_NoLink DLS_Short_NoLink
5.1.4.2.28	1.4.4.3.3.1	n		DLS_Long_SZOM_Error DLS_Short_SZOM_Error
5.1.4.2.29	1.4.4.3.3.3	a		see note 2
5.1.4.3	1.4.4.4		Selection of transmission procedures	see note 1
5.1.4.3.1	1.4.4.4	a		DLS_ND2
5.1.4.3.2	1.4.4.4	b		see note 1a
5.1.4.3.3	1.4.4.4	c		see note 2
5.1.4.3.4	1.4.4.4	d		DLS_ND2
5.1.4.3.5	1.4.4.4	e		DLS_ND2
5.1.4.3.6	1.4.4.4	f		DLS_ND2 DLS_Short_T_Send
5.1.4.3.7	1.4.4.4.1	a		see note 4
5.1.4.4	1.4.4.5		Short transmission procedures	see note 1
5.1.4.4.1	1.4.4.5.1	a		DLS_Short_T_Send
5.1.4.4.2	1.4.4.5.1	b		DLS_Short_T_Send
5.1.4.4.3	1.4.4.5.1	c		DLS_Short_T_Send
5.1.4.4.4	1.4.4.5.2.1	a		DLS_Short_T_Receive
5.1.4.4.5	1.4.4.5.2.1	b		DLS_Short_T_Receive
5.1.4.4.6	1.4.4.5.2.1	c		DLS_Short_T_Receive
5.4.1.5.7	1.4.4.5.3	a		DLS_Short_NoAck
5.1.4.5	1.4.4.6		Long transmission procedures	see note 1
5.1.4.5.1	1.4.4.6.1	a		DLS_ND2 DLS_Long_TM_Send_A DLS_Long_TM_Send_B DLS_Initialize_Send_Long DLS_Long_UDATA_Send

Requirement reference	Reference in [1]	Req	Title	Test Case
5.1.4.5.2	1.4.4.6.1	b		DLS_Long_TM_Send_A DLS_Long_TM_Send_B DLS_Initialize_Send_Long DLS_Long_UDATA_Send
5.1.4.5.3	1.4.4.6.1	c		DLS_Priority_INFO_RTS DLS_Long_UDATA_Send
5.1.4.5.4	1.4.4.6.1	d		DLS_Length DLS_Initialize_Send_Long DLS_Long_UDATA_Send
5.1.4.5.5	1.4.4.6.1	e		DLS_Long_TM_Send_A DLS_Long_TM_Send_B DLS_Initialize_Send_Long
5.1.4.5.6	1.4.4.6.1	f		DLS_Long_TM_Send_A DLS_Long_TM_Send_B DLS_Initialize_Send_Long DLS_Long_UDATA_Send
5.1.4.5.7	1.4.4.6.3.1	a		DLS_Long_T_Receive_A DLS_Initialize_Receive_Long DLS_Long_UDATA_Receive
5.1.4.5.8	1.4.4.6.3.1	b		DLS_Long_T_Receive_A DLS_Initialize_Receive_Long DLS_Long_UDATA_Receive
5.1.4.5.9	1.4.4.6.3.1	c		DLS_Long_T_Receive_A DLS_Initialize_Receive_Long
5.1.4.5.10	1.4.4.6.3.1	d		DLS_Long_UDATA_Receive
5.1.4.5.11	1.4.4.6.3.2	a		DLS_Long_T_NoAck_A
5.1.4.5.12	1.4.4.6.3.2	b		DLS_Long_T_NoAck_A
5.1.4.5.13	1.4.4.6.3.2	c		DLS_Long_T_NoAck_A
5.1.4.5.14	1.4.4.6.3.2	d		DLS_Long_T_NoAck_A
5.1.4.5.15	1.4.4.6.3.3	a		DLS_Long_Busy_A
5.1.4.5.16	1.4.4.6.4.1	a		DLS_Long_TM_Send_A DLS_Long_TM_Send_B DLS_Initialize_Send_Long
5.1.4.5.17	1.4.4.6.4.1	b		DLS_Long_TM_Send_A DLS_Long_TM_Send_B DLS_Initialize_Send_Long
5.1.4.5.18	1.4.4.6.4.1	c		DLS_Long_UDATA_Send
5.1.4.5.19	1.4.4.6.4.2	a		DLS_Long_NoInfo_A
5.1.4.5.20	1.4.4.6.4.3	a		see note 4
5.1.4.5.21	1.4.4.6.5.1	a		DLS_Long_T_Receive_A DLS_Initialize_Receive_Long
5.1.4.5.22	1.4.4.6.5.2	a		DLS_Long_NACK_A
5.1.4.5.23	1.4.4.6.5.2	b		DLS_Long_NACK_A
5.1.4.5.24	1.4.4.6.5.2	c		DLS_Long_NACK_A
5.1.4.5.25	1.4.4.6.5.2	d		DLS_Long_NACK_A
5.1.4.6	1.4.4.8		No link with sender	see note 1
5.1.4.6.1	1.4.4.8	a		DLS_Long_NoLink DLS_Short_NoLink
5.1.4.6.2	1.4.4.8	b		DLS_Long_NoLink DLS_Short_NoLink
5.1.4.7	1.4.4.9		User data packet reception	see note 1
5.1.4.7.1	1.4.4.9.1	a		DLS_Short_T_Receive
5.1.4.7.2	1.4.4.9.1	b		DLS_Short_T_Receive
5.1.4.7.3	1.4.4.9.1	c		DLS_Duplicate_Short DLS_Duplicate_Long
5.1.4.7.4	1.4.4.9.2	a		DLS_Long_Order
5.1.4.7.5	1.4.4.9.2	b		DLS_Long_Order
5.1.4.7.6	1.4.4.9.3	a		see note 2
5.1.4.8	1.4.4.10		Receipt of ACK DLPDU	see note 1
5.1.4.8.1	1.4.4.10.1	a		DLS_Short_T_Receive DLS_Long_T_Receive_A
5.1.4.8.2	1.4.4.10.1	b		DLS_Short_T_Receive DLS_Long_T_Receive_A
5.1.4.8.3	1.4.4.10.1	c		DLS_Short_NoAck
5.1.4.8.4	1.4.4.10.1	d		DLS_Priority_Long_Short

Requirement reference	Reference in [1]	Req	Title	Test Case
5.1.4.8.5	1.4.4.10.2	a		see note 2
5.1.4.8.6	1.4.4.10.2	b		see note 2
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Annex B (informative): Bibliography

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

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History

Document history			
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