

ETSI EN 302 842-4 V1.2.2 (2010-12)

European Standard (Telecommunications series)

VHF air-ground and air-air Digital Link (VDL) Mode 4 radio equipment; Technical characteristics and methods of measurement for aeronautical mobile (airborne) equipment; Part 4: Point-to-point functions

iTeh Standards
(<https://standards.iteh.ai>)
Document Preview

[ETSI EN 302 842-4 V1.2.2 \(2010-12\)](https://standards.iteh.ai/catalog/standards/etsi/20221ff1-0d1e-4d59-99a8-ffdaf9063961/etsi-en-302-842-4-v1-2-2-2010-12)

<https://standards.iteh.ai/catalog/standards/etsi/20221ff1-0d1e-4d59-99a8-ffdaf9063961/etsi-en-302-842-4-v1-2-2-2010-12>



ReferenceREN/AERO-00007-4

Keywordsaeronautical, radio, testing, VHF, digital

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

(<https://standards.iteh.ai>)
Document Preview

Important notice

Individual copies of the present document can be downloaded from:

<http://www.etsi.org>

The present document may be made available in more than one electronic version or in print. In any case of existing or perceived difference in contents between such versions, the reference version is the Portable Document Format (PDF). In case of dispute, the reference shall be the printing on ETSI printers of the PDF version kept on a specific network drive within ETSI Secretariat.

Users of the present document should be aware that the document may be subject to revision or change of status. Information on the current status of this and other ETSI documents is available at

<http://portal.etsi.org/tb/status/status.asp>

If you find errors in the present document, please send your comment to one of the following services:

http://portal.etsi.org/chaicor/ETSI_support.asp

Copyright Notification

No part may be reproduced except as authorized by written permission.
The copyright and the foregoing restriction extend to reproduction in all media.

© European Telecommunications Standards Institute 2010.
All rights reserved.

DECT™, **PLUGTESTS™**, **UMTS™**, **TIPHON™**, the TIPHON logo and the ETSI logo are Trade Marks of ETSI registered for the benefit of its Members.

3GPP™ is a Trade Mark of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners.

LTE™ is a Trade Mark of ETSI currently being registered

for the benefit of its Members and of the 3GPP Organizational Partners.

GSM® and the GSM logo are Trade Marks registered and owned by the GSM Association.

Contents

Intellectual Property Rights	6
Foreword.....	6
Introduction	7
1 Scope	8
2 References	9
2.1 Normative references	9
2.2 Informative references.....	10
3 Definitions and abbreviations.....	10
3.1 Definitions.....	10
3.1.1 Basic reference model definitions.....	10
3.1.2 Service conventions definitions	10
3.1.3 General definitions.....	10
3.1.4 Definition of bit order	10
3.2 Abbreviations	11
4 General description of VDL Mode 4 mobile station point-to-point services	12
4.1 General	12
4.2 Data Link Service (DLS) and Link Management Entity (LME)	12
4.2.1 General.....	12
4.2.2 DLS timers.....	15
4.2.3 DLS counters	16
4.2.4 Toggle bit (T).....	16
4.2.5 State variables (T_r and T_f).....	16
4.2.6 Initialize Bit (IB).....	16
4.2.7 More bit (M)	17
4.2.8 Priority (pr)	17
4.2.9 Message fragmentation and concatenation	17
4.2.10 DLS procedures	17
4.2.10.1 Selection of DLS procedures.....	17
4.2.10.2 Short transmission procedures	17
4.2.10.3 Long transmission procedures.....	18
4.2.11 Linking transmissions	20
4.2.11.1 Types of linking	20
4.2.11.2 Combined RTS / DATA DLPDUs.....	20
4.2.11.3 Combined DATA / ACK DLPDUs.....	20
4.2.11.4 Combined RTS / ACK DLPDUs	20
4.2.11.5 Combined CTS / ACK DLPDUs	20
4.2.12 Ground-air link management	20
4.2.13 Air-air link management.....	21
4.3 Additional VSS services.....	21
5 Minimum performance specification under standard test conditions.....	21
5.1 DLS sublayer	21
5.1.1 General.....	21
5.1.1.1 Services	21
5.1.1.2 Data transfer	22
5.1.1.3 DATA DLPDU duplicate suppression and sequencing	22
5.1.1.4 Error detection.....	22
5.1.1.5 Station identification	22
5.1.1.6 Broadcast addressing.....	22
5.1.1.7 DLS Priority.....	23
5.1.1.8 DLS Link control DLPDUs	23
5.1.2 DLS protocol specification	23
5.1.2.1 State variables	23
5.1.2.2 DLS burst formats	23

5.1.3	DLS system parameters	27
5.1.4	DLS procedures	29
5.1.4.1	Setting of re-transmission parameter	29
5.1.4.2	Selection of user data packet for transmission	29
5.1.4.3	Selection of transmission procedures	31
5.1.4.4	Short transmission procedures	31
5.1.4.5	Long transmission procedures	32
5.1.4.6	No link with sender	35
5.1.4.7	User data packet reception	35
5.1.4.8	Receipt of ACK DLPDU	36
5.1.4.9	Link reset	36
5.1.4.10	Linking DLS DLPDU transmissions	37
5.1.4.11	CTRL DLPDU	38
5.1.4.12	Procedures for air-air communication	38
5.2	Link management entity sublayer	38
5.2.1	Services	38
5.2.1.1	General	38
5.2.1.2	Link provision	39
5.2.1.3	Link change notifications	39
5.2.1.4	CTRL DLPDU	39
5.2.1.5	Broadcast link management burst	40
5.2.2	Control (CTRL) parameter formats	40
5.2.2.1	Encoding	40
5.2.2.2	General purpose information parameters	40
5.2.2.3	Mobile-initiated information parameters	44
5.2.2.4	Ground-initiated modification parameters	45
5.2.2.5	Ground-initiated information parameters	48
5.2.3	LME timers and parameters	50
5.2.3.1	General	50
5.2.3.2	Timer TL1 (maximum link overlap time)	51
5.2.3.3	Parameters TL2 (link initialization time)	51
5.2.3.4	Timer TL4 (leave generation latency)	51
5.2.4	CTRL DLPDU types and procedures	52
5.2.5	CTRL transmission procedures	55
5.2.5a	Frequency management procedures	55
5.2.5.1	Link connectivity procedures	55
5.2.5.2	Ground Station Identification	55
5.2.5.3	Link establishment	56
5.2.5.4	Mobile-initiated handoff	57
5.2.5.5	Mobile-requested ground-initiated handoff	58
5.2.5.6	Ground-initiated handoff	58
5.2.5.7	Ground-requested mobile-initiated handoff	59
5.2.5.8	Ground-requested broadcast handoff	59
5.2.5.9	Ground-commanded autotune	60
5.2.6	VDL Mode 4 Mobile SubNetwork Dependent Convergence Function (SND CF)	60
5.2.6.1	Frame mode SND CF	60
5.3	Additional VSS requirements	60
5.3.1	Information transfer request protocol specification	60
5.3.1.1	Information transfer request parameters	60
5.3.1.2	Information transfer request transmission procedures	62
5.3.1.3	Information transfer request acknowledgement procedures	62
5.3.2	Void	63
5.3.3	Void	63
5.3.4	Retransmission procedures	63
6	General design requirements	63
7	Protocol test procedures	63
7.1	General	63
7.2	Required test rig	64
7.3	Protocol test-suite description methodology	64
7.4	Detailed protocol test procedures	65

7.4.1	Test-suite overview	65
7.4.2	Declarations	68
7.4.3	Constraints	68
7.4.3.1	Abbreviations	68
7.4.3.1.1	Subfield mnemonics	68
7.4.3.1.2	Special characters used in the subfield definitions	69
7.4.3.1.3	Station addresses and positions	69
7.4.3.1.4	VDL bursts	70
7.4.3.2	Test cases	99
7.4.3.2.1	Test case macros	100
7.4.3.2.2	Test case descriptions	102
Annex A (informative):	Cross reference matrix	177
History		190

iTeh Standards

(<https://standards.iteh.ai>)

Document Preview

[ETSI EN 302 842-4 V1.2.2 \(2010-12\)](#)

<https://standards.iteh.ai/catalog/standards/etsi/20221ff1-0d1e-4d59-99a8-ffdaf9063961/etsi-en-302-842-4-v1-2-2-2010-12>

Intellectual Property Rights

IPRs essential or potentially essential to the present document may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: *"Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards"*, which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (<http://webapp.etsi.org/IPR/home.asp>).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Foreword

This European Standard (Telecommunications series) has been produced by ETSI Technical Committee Aeronautics (AERO).

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

Part 1: "Physical layer";

Part 2: "General description and data link layer";

Part 3: "Additional broadcast aspects";

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

The present document is accompanied by an equivalent ground-based standard, EN 301 842 [4] parts 1 to 6, covering the VHF air-ground Data Link (VDL) Mode 4 radio equipment; Technical characteristics and methods of measurement for ground-based equipment.

NOTE: Minimum Operational Performance Specifications (MOPS) are also being developed for VDL Mode 4. EUROCAE have previously published Interim MOPS for VDL Mode 4 [i.1] which are a sub set of EN 302 842-1 [5], 2 [6], 3 [7] and 4 (the present document). EN 302 842-1 [5], 2 [6], 3 [7] and 4 (the present document) comply with the requirements of CEC Mandate M/318 [i.2].

National transposition dates

Date of latest announcement of this EN (doa):	31 March 2011
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	30 September 2011
Date of withdrawal of any conflicting National Standard (dow):	30 September 2011

Introduction

The present document states the technical specifications for Very High Frequency (VHF) Digital Link (VDL) Mode 4 aeronautical mobile (airborne) radio transmitters, transceivers and receivers for air-ground and air-air communications operating in the VHF band, using Gaussian Filtered Frequency Shift Keying (GFSK) modulation with 25 kHz channel spacing and capable of tuning to any of the 25 kHz channels from 118,000 MHz to 136,975 MHz as defined in ICAO VDL SARPs [2].

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 302 842-1 [5] and EN 302 842-2 [6].

NOTE: The present document has been produced with a view to maintaining consistency of numbering with the equivalent standard for ground equipment (EN 301 842 [4]). Where requirements are the same, they have been given the same number. Some new airborne requirements have been inserted between requirements that were sequential in EN 301 842 [4]. This has led to a non-standard form of numbering for new requirements in some places.

(<https://standards.iteh.ai>)
Document Preview

ETSI EN 302 842-4 V1.2.2 (2010-12)

<https://standards.iteh.ai/catalog/standards/etsi/20221ff1-0d1e-4d59-99a8-ffdaf9063961/etsi-en-302-842-4-v1-2-2-2010-12>