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PREDSTANDARD

september 2006

**Elektromagnetna združljivost in zadeve v zvezi z radijskim spektrom (ERM) –
Radijska oprema za digitalne povezave VHF zrak-tla (VDL), 4. način –
Tehnične karakteristike in merilne metode za talno opremo – 6. del:
Harmonizirani EN, ki zajema bistvene zahteve člena 3.2 direktive R&TTE**

Electromagnetic compatibility and Radio spectrum Matters (ERM) - VHF air-ground
Digital Link (VDL) Mode 4 radio equipment - Technical characteristics and methods
of measurement for ground-based equipment - Part 6: Harmonized EN covering
essential requirements of article 3.2 of the R&TTE Directive

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Candidate Harmonized European Standard (Telecommunications series)

**Electromagnetic compatibility
and Radio spectrum Matters (ERM);
VHF air-ground Digital Link (VDL) Mode 4 radio equipment;
Technical characteristics and methods of measurement
for ground-based equipment;
Part 6: Harmonized EN covering essential requirements
of article 3.2 of the R&TTE Directive**

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Contents

Intellectual Property Rights	5
Foreword.....	5
Introduction	6
1 Scope	7
2 References	8
3 Definitions and abbreviations.....	9
3.1 Definitions	9
3.1.1 Basic reference model definitions.....	9
3.1.2 Service conventions definitions	9
3.1.3 General definitions.....	10
3.2 Abbreviations	11
4 General description and architecture of VDL Mode 4	11
5 Technical requirements specifications	11
5.1 Environmental profile.....	11
5.2 Conformance requirements	12
5.2.1 Receiver requirements	12
5.2.1.1 Conducted spurious emission.....	12
5.2.1.2 FM Broadcast Intermodulation	12
5.2.1.3 In-band Intermodulation.....	12
5.2.1.4 Cabinet radiation	12
5.2.2 Transmitter requirements.....	12
5.2.2.1 Transmitter operating range	12
5.2.2.2 Channel Bit Rate	12
5.2.2.3 Manufacturer's declared output power	12
5.2.2.4 RF power rise time	12
5.2.2.5 RF power release time.....	12
5.2.2.6 Conducted Spurious emissions.....	12
5.2.2.7 Adjacent channel power	12
5.2.2.8 Wide-band noise	12
5.2.2.9 Frequency Tolerance.....	13
5.2.2.10 Load VSWR capability	13
5.2.2.11 Cabinet radiation	13
5.2.3 Transceiver requirements.....	13
5.2.3.1 Start of transmission.....	13
5.2.3.2 Automatic transmitter shutdown	13
5.2.3.3 System timing requirements.....	13
6 Testing for compliance with technical requirements.....	13
6.1 Environmental conditions for testing	13
6.2 Interpretation of the measurement results	13
6.3 Essential radio test suites.....	13
6.3.1 Receiver requirements	14
6.3.1.1 Conducted spurious emission.....	14
6.3.1.2 FM Broadcast Intermodulation	14
6.3.1.3 In-band Intermodulation.....	14
6.3.2 Transmitter requirements.....	14
6.3.2.1 Channel Bit Rate	14
6.3.2.2 Manufacturer's declared output power	14
6.3.2.3 RF power rise time	14
6.3.2.4 RF power release time.....	14
6.3.2.5 Conducted Spurious emissions.....	14
6.3.2.6 Adjacent channel power	14
6.3.2.7 Wide-band noise	14

6.3.2.8	Frequency Tolerance	14
6.3.2.9	Load VSWR capability	14
6.4	Other test suites	15
6.4.1	Transmitter requirements	15
6.4.1.1	Transmitter operating range	15
6.4.2	Transceiver requirements	15
6.4.2.1	Start of transmission	15
Annex A (normative):	HS Requirement and conformance Test specifications Table (HS-RTT)	16
Annex B (informative):	The EN title in the official languages	19
Annex C (informative):	Bibliography	20
History		22

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Foreword

This Candidate Harmonized 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 has been produced by ETSI in response to a mandate from the European Commission issued under Council Directive 98/34/EC (as amended) laying down a procedure for the provision of information in the field of technical standards and regulations.

The present document is intended to become a Harmonized Standard, the reference of which will be published in the Official Journal of the European Communities referencing the Directive 1999/5/EC [11] of the European Parliament and of the Council of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity ("the R&TTE Directive").

The present document provides the technical procedures and limits for compliance with the R&TTE directive. For use in civil ground to air communications the full requirements of the latest version of EN 301 842 parts 1 to 5 and such requirements as defined by the Single European Sky regulations are required to be met before the equipment can be brought into operation.

The present document is part 6 of a multi-part deliverable covering the VHF air-ground Digital Link (VDL) Mode 4 radio equipment; Technical characteristics and methods of measurement for ground-based equipment, as identified below:

- Part 1: "EN for ground equipment";
- Part 2: "General description and data link layer";
- Part 3: "Additional broadcast aspects";
- Part 4: "Point-to-point functions";
- Part 5: "VDL 4 ground based equipment compliance with the SES 552/2004 interoperability Regulation";
- Part 6: "Harmonized EN covering essential requirements of article 3.2 of the R&TTE Directive".**

The present document is accompanied by an equivalent airborne standard, EN 302 842 [10] parts 1 to 5, covering the VHF air-ground Digital 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):	18 months after doa

Introduction

The present document is part of a set of standards developed by ETSI and is designed to fit in a modular structure to cover all radio and telecommunications terminal equipment within the scope of the R&TTE Directive [11]. The modular structure is shown in EG 201 399 [13].

The present document states the essential requirements for Very High Frequency (VHF) Digital Link (VDL) Mode 4 ground-based radio transmitters, transceivers and receivers for air-ground communications operating in the VHF band, using Gaussian-filtered Frequency Shift Keying (GFSK) Modulation with 25 kHz channel spacing and capable of tuning to any of the 25 kHz channels from 118,000 MHz to 136,975 MHz as defined in ICAO VHF Digital Link (VDL) Standards and Recommended Practices (SARPs) [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 will be accepted by the various authorities in order to grant type approval;
- if equipment available on the market is required to be checked, it may 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 [6].

The present document also indicates VDL Mode 4 compliance with the SES 552/2004 Regulation [12].

1 Scope

The present document applies to the following radio equipment types:

- 1) Very High Frequency (VHF) Digital Link (VDL) Mode 4 ground-based radio transmitters and receivers for air-ground communications operating in the VHF band, using Gaussian-filtered Frequency Shift Keying (GFSK) Modulation with 25 kHz channel spacing and capable of tuning to any of the 25 kHz channels from 118,000 MHz to 136,975 MHz as defined in ICAO VHF Digital Link (VDL) Standards and Recommended Practices (SARPs) [2].

The present document provides part 6 of the technical specifications.

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

The scope of the present document is limited to ground stations. The equivalent specification for airborne stations is EN 302 842 [10].

The VDL Mode 4 system provides digital communication exchanges between aircraft and ground-based systems and other aircraft supporting surveillance and communication applications. The supported modes of communication include:

- broadcast and point-to-point communication;
- broadcast services including Automatic Dependent Surveillance - Broadcast (ADS-B), Traffic Information Service - Broadcast (TIS-B) and Flight Information Service - Broadcast (FIS-B) capabilities;
- air-air, air-to-ground, and ground-to-air services;
- operation without ground infrastructure.

The present document is derived from the specifications:

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

It is envisaged that manufacturers may provide equipment supporting:

- broadcast services only;
- point-to-point services only;
- both broadcast and point-to-point services.

The present document is intended to cover the provisions of Directive 1999/5/EC [11] (R&TTE Directive):

Article 3.2, which states that "..... radio equipment shall be so constructed that it effectively uses the spectrum allocated to terrestrial/space radio communications and orbital resources so as to avoid harmful interference".

The present document includes:

- clause 2 provides references to relevant documents;
- clause 3 provides general definitions, abbreviations and symbols used;
- clause 4 refers to a general description and architecture of VDL Mode 4 contained in EN 301 842-2 [8];
- clause 5 provides technical requirements specifications applicable to Article 3.2;
- clause 6 provides a description of testing for compliance with the technical requirements;
- annex A provides the HS Requirement & conformance Test specifications Table (HS-RTT);

- annex B provides the EN title in the official languages;
- annex C provides a Bibliography;
- a document history.

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.) indicate 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>.

- <https://standards.iteh.ai/catalog/standards/sist/23133e17-069a-4313-83eb-051811111111/etsi-en-301-842-6-v1-1-1-2006>
- [1] ICAO Doc 9816 (First Edition 2004): "Manual on VHF Digital Link (VDL) Mode 4".
- [2] ICAO Annex 10 to the Convention on International Civil Aviation: "Aeronautical Telecommunications, Volume III: Communication Systems, Part I: Digital Data Communication Systems, Chapter 6".
- [3] ISO/IEC 7498-1 (1994): "Information technology - Open Systems Interconnection - Basic Reference Model: The Basic Model".
- [4] ISO/IEC 10731 (1994): "Information technology - Open Systems Interconnection - Basic Reference Model - Conventions for the definition of OSI services".
- [5] ETSI EN 300 113-1 (V1.5.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Land mobile service; Radio equipment intended for the transmission of data (and/or speech) using constant or non-constant envelope modulation and having an antenna connector; Part 1: Technical characteristics and methods of measurement".
- [6] ETSI EN 301 489-22 (V1.3.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 22: Specific conditions for ground based VHF aeronautical mobile and fixed radio equipment".
- [7] ETSI EN 301 842-1 (V1.3.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); VHF air-ground Digital Link (VDL) Mode 4 radio equipment; Technical characteristics and methods of measurement for ground-based equipment; Part 1: EN for ground equipment".
- [8] ETSI EN 301 842-2 (V1.5.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); VHF air-ground Digital Link (VDL) Mode 4 radio equipment; Technical characteristics and methods of measurement for ground-based equipment Part 2: General description and data link layer".

- [9] ETSI EN 301 842-4 (V1.2.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); VHF air-ground Digital Link (VDL) Mode 4 radio equipment; Technical characteristics and methods of measurement for ground-based equipment Part 4: Point to point functions".
- [10] ETSI EN 302 842 (all parts V1.2.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); VHF air-ground and air-air Digital Link (VDL) Mode 4 radio equipment; Technical characteristics and methods of measurement for aeronautical mobile (airborne) equipment".
- [11] Directive 1999/5/EC of the European Parliament and of the Council of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity (R&TTE Directive).
- [12] Regulation (EC) No 552/2004 of the European Parliament and of the Council of 10 March 2004 on the interoperability of the European Air Traffic Management network (the interoperability Regulation).
- [13] ETSI EG 201 399: "Electromagnetic compatibility and Radio spectrum Matters (ERM); A guide to the production of candidate Harmonized Standards for application under the R&TTE Directive".

3 Definitions and abbreviations

3.1 Definitions

3.1.1 Basic reference model definitions

The present document is based on the concepts developed in the open systems interconnect basic reference model and makes use of the following terms defined in ISO/IEC 7498-1 [3]:

- layer, [oSIST prEN 301 842-6 V1.1.1:2006](https://standards.iteh.ai/catalog/standards/sist/23133e17-069a-4313-83eb-243eb3bd1435/osist-pren-301-842-6-v1-1-1-2006)
- sublayer, <https://standards.iteh.ai/catalog/standards/sist/23133e17-069a-4313-83eb-243eb3bd1435/osist-pren-301-842-6-v1-1-1-2006>
- entity,
- service,
- service access point,
- service data unit,
- physical layer,
- data link layer.

3.1.2 Service conventions definitions

The present document makes use of the following terms defined in ISO/IEC 10731 [4]:

- service provider,
- service user,
- service primitive,
- request,
- indication,
- confirm.