



SLOVENSKI STANDARD

SIST EN 301 841-2 V1.1.1:2006

01-marec-2006

9`Y_lfca U[bYfbUnXfi y`1j cgh]b`nUXYj Y`j `nj Yn]`n`fUX]`g_`ja `gdY_lfca `fØFAŁĚ
8][]HJbY`dcj YnUj Y`J<: `nfU_!hUž&`bU]b`Ě`HY b] bY`_UFU_hYf]gh`_Y]b`a Yf]bY
a YtcXY`nUHJbc`cdfYa c`Ě`&`XY. N[cfb`Y`d`Ugh]

Electromagnetic compatibility and Radio spectrum Matters (ERM); VHF air-ground Digital Link (VDL) Mode 2; Technical characteristics and methods of measurement for ground-based equipment; Part 2: Upper layers

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Ta slovenski standard je istoveten z: EN 301 841-2 Version 1.1.1

ICS:

33.060.99	Druga oprema za radijske komunikacije	Other equipment for radiocommunications
33.100.01	Elektromagnetna združljivost na splošno	Electromagnetic compatibility in general

SIST EN 301 841-2 V1.1.1:2006 en

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<https://standards.iteh.ai/catalog/standards/sist/f0249e54-62fd-48e8-a07e-ab12c5c2fa7b/sist-en-301-841-2-v1-1-1-2006>

ETSI EN 301 841-2 V1.1.1 (2004-03)

European Standard (Telecommunications series)

**Electromagnetic compatibility
and Radio spectrum Matters (ERM);
VHF air-ground Digital Link (VDL) Mode 2;
Technical characteristics and
methods of measurement
for ground-based equipment;
Part 2: Upper layers**

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Reference

DEN/ERM-TG25-015-2

Keywords

aeronautical, radio, testing

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

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SIST EN 301 841-2 V1.1.1:2006<https://standards.iteh.ai/catalog/standards/sist/f0249e54-62fd-48e8-a07e-ab12c5c2fa17854df-301-841-2-v1-1-1-2006>
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Foreword

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

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

Part 1: "Physical layer and MAC sublayer";

Part 2: "Upper layers".

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National transposition dates

Date of adoption of this EN:	26 March 2004
Date of latest announcement of this EN (doa):	30 June 2004
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	31 December 2004
Date of withdrawal of any conflicting National Standard (dow):	31 December 2004

Introduction

The present document states the technical specifications for ground-based equipment implementing Very High Frequency (VHF) Digital Link (VDL) Mode 2 air interface, operating in the VHF band (117,975 MHz to 137 MHz) with 25 kHz channel spacing.

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

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.

1 Scope

The present document applies to VDL Mode 2 ground-air digital communications using Differential Eight Phase Shift Keying (D8PSK), intended for channel separations of 25 kHz. The VDL Mode 2 system provides data communication exchanges between aircraft and ground based systems. The scope of the present document is limited to ground based stations.

The VDL Mode 2 system is designed to be an Air/Ground sub-system of the Aeronautical Telecommunication Network (ATN) using the AM(R)S band and it is organized according to the Open Systems Interconnection (OSI) model (defined by ISO). It shall provide reliable subnetwork services to the ATN system.

The present document provides functional specifications for ground-based radio transmitters, receivers, and transceivers intended to be used for ground-air data communications. The present document is derived from the following documents:

- VDL Mode 2 SARPs version 3.0. ICAO, annex 10 Volume III part I [1];
 - Minimum Operational Performance Standards for Airborne Radio Communications Equipment Operating within the Radio Frequency Range 117,975 MHz to 137,000 MHz [2];
- that specify the airborne transmission system.

The present document consists of two parts:

- The first part provides functional specifications and test procedures for physical layer.
- The second part provides functional specifications and test procedures for link and sub-network access layers.

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2 References

SIST EN 301 841-2 V1.1.1:2006

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

<https://standards.iteh.ai/catalog/standards/sist/f0249e54-62fd-48e8-a07e-ab12c5c2fa7b/sist-en-301-841-2-v1-1-1-2006>

- 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.

NOTE: The standards for Mode 2 are still in a process of evolution at the time of preparation of the present document. The revised standards material has been accepted for publication in annex 10 although there is likely to be a small amount of final editing and correction. The most up to date references consist of two documents (1a - 1b in the table below) which represent the output from the seventh meeting of the Aeronautical Mobile Communications Panel (AMCP), 22nd March to 30th March 2000, Montreal.

1a	VHF Air-Ground Digital Link (VDL) Standards and Recommended Practices (SARPs), Appendix A to the Report on Agenda Item 2, AMCP/7-WP/81
1b	Manual on VHF Digital Link (VDL) Mode 2 Technical Specifications, Appendix A to the Report on Agenda Item 5, AMCP/7-WP/81

- [2] DO-186A: "Minimum Operational Performance Standards for Airborne Radio Communications Equipment Operating within the Radio Frequency Range 117.975 - 137.000 MHz".

- [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] ISO/IEC 8208 (2000): "Information technology - Data communications - X.25 Packet Layer Protocol for Data Terminal Equipment".
- [6] ISO/IEC 15802-1 (1995): "Information technology - Telecommunications and information exchange between systems - Local and metropolitan area networks - Common specifications - Part 1: Medium Access Control (MAC) service definition".
- [7] ISO/IEC 13239 (2002): "Information technology - Telecommunications and information exchange between systems - High-level data link control (HDLC) procedures".
- [8] ETSI EN 301 841-1: "Electromagnetic compatibility and Radio spectrum Matters (ERM); VHF air-ground Digital Link (VDL) Mode 2; Technical characteristics and methods of measurement for ground-based equipment; Part 1: Physical layer and MAC sub-layer".
- [9] ITU-T Recommendation X.25: "Interface between Data Terminal Equipment (DTE) and Data Circuit-terminating Equipment (DCE) for terminals operating in the packet mode and connected to public data networks by dedicated circuit".

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;
- sublayer;
- 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.

3.1.3 General definitions

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

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

data rate: Mode 2 symbol rate shall be 10 500 symbols/s, with a nominal data rate of 31 500 bits/s

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

mobile equipment: radio equipment designed for installation into vehicles

radiated measurements: measurements which involve the measurement of a radiated field

3.2 Abbreviations

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

ABM	Asynchronous Balanced Mode
ACK	ACKnowledge(ment)
ADM	Asynchronous Disconnected Mode
AM(R)S	Aeronautical Mobile (Route) Service
ARS	Administration Region Selector
ATN	Aeronautical Telecommunication Network
AV2M	Aviation VHF Data Link Mode 2 Mac Layer
AV2MAP	AV2M Access Point
AV2MDU	AV2M Data Unit
AV2MPDU	AV2M Packet Data Unit
AVDLC	Aviation VHF Data Link Control
AVLC	Aviation VHF Link Control
AVLC-SN	AVLC-Sequence Number
BCD	Binary Coded Decimal
C/R	Command/Response (bit)
CCIR	International Radio Consultative Committee
CMD	CoMmanD (frame)
CSC	Common Signalling Channel
CSMA	Carrier Sense Multiple Access
D8PSK	Differentially encoded 8 Phase Shift Keying
D-bit	ISO/IEC 8208 Delivery bit
DCE	Data Circuit-terminating Equipment
DISC	DISConnect (frame)
DLE	Data Link Entity
DLS	Data Link Service
DM	Disconnected Mode (frame)
DTE	Data Terminal Equipment
DXE	Either: Data terminal Equipment or Data circuit-terminating Equipment
FCS	Frame Check Sequence
FEC	Forward Error Correction
FRM	Frame Reject Mode
GSIF	Ground Station Information Frame
HDLC	High-level Data Link Control
HO	Hand-Off
HTC	Highest Two-way Channel
IA5	The character set defined in ISO/IEC 646, table 5
ICAO	International Civil Aviation Organization
ID	IDentification (identifier)