
9`Y_fca U[bYfbUnXfi y`^j cghfØ A7L]b`nUXYj Yj`nj Yn]`n'fUX]`g_ Ja `gdY_fca `fØFAŁ!
GHUbXUfX`Y_Y_fca U[bYfbY`nXfi y`^j cgh]`fØ A7L`nUfUX]`g_c`cdfYa c`]b`ghcf]hj Y!`&&"
XY.`GdYV]Z bY`nUA hYj Y`nUnYa Y`g_c``a cV]bc`YhUbj`y_c`fUYfcbUj hj bcŁcdfYa c
J<: `]b`Z_gbc`fUX]`g_c`cdfYa c

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

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Candidate Harmonized European Standard (Telecommunications series)

**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**

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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).

The present document has been produced by ETSI in response to a mandate from the European Commission issued under Council Directive 98/34/EC [7] (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 Council Directive on the approximation of the laws of the Member States relating to electromagnetic compatibility ("the EMC Directive") (89/336/EEC [3] as amended) and 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 ("the R&TTE Directive" [2]).

The present document is part 8 of a multi-part deliverable. Full details of the entire series can be found in part 1 [1].

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1 Scope

The present document, together with EN 301 489-1 [1] covers the assessment of ground base station, ground mobile and hand-held/portable aeronautical VHF radio communications and associated ancillary equipment, in respect of ElectroMagnetic Compatibility (EMC).

Technical specifications related to the antenna port and emissions from the enclosure port of the radio equipment covered in this scope, are not included in the present document. Such technical specifications are found in the relevant product standards for the effective use of the radio spectrum.

The present document also covers EMC requirements for VDL Mode 2 and VDL Mode 4 ground base station radio equipment.

The present document specifies the applicable test conditions, performance assessment and performance criteria for ground based aeronautical radio equipment and associated ancillary equipment.

Definitions of types of ground base station, ground mobile and hand held/portable aeronautical VHF radio communications covered by the present document are given in annex A.

In case of differences (for instance concerning special conditions, definitions, abbreviations) between the present document and EN 301 489-1 [1], the provisions of the present document take precedence.

The environmental classification and the emission and immunity requirements used in the present document are as stated in EN 301 489-1 [1], except for any specific conditions included in the present document. The applicable environments referred to in EN 301 489-1 [1] where equipment covered by the scope of the present document may be used, shall be declared by the manufacturer.

The EMC requirements have been selected to ensure an adequate level of compatibility for apparatus within aerodrome, en route, vehicular and hand held/portable operational environments. The levels, however, do not cover extreme cases which may occur in any location but with a low probability of occurrence.

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2 References

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

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

- [1] ETSI EN 301 489-1: "Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements".
- [2] 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).
- [3] Council Directive 89/336/EEC of 3 May 1989 on the approximation of the laws of the Member States relating to electromagnetic compatibility (EMC Directive).
- [4] ETSI EN 300 676 (V1.2.1) (2000): "ElectroMagnetic Compatibility and Radio Spectrum Matters (ERM); Ground-based VHF hand-held, mobile and fixed radio transmitters, receivers and transceivers for the VHF aeronautical mobile service using amplitude modulation; Technical characteristics and methods of measurement".
- [5] ITU Radio Regulations (1998).

- [6] ITU-T Recommendation P.53: "Psophometer for use on telephone-type circuits".
- [7] Directive 98/34/EC of the European Parliament and of the Council of 22 June 1998 laying down a procedure for the provision of information in the field of technical standards and regulations.

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in EN 301 489-1 [1], clause 3 and the following apply:

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

integral antenna equipment: radio communications equipment with an antenna integrated into the equipment without the use of an external connector and considered to be part of the equipment

NOTE: An integral antenna may be internal or external to the equipment. In equipment of this type, a 50 Ω RF connection point shall be provided for test purposes.

necessary bandwidth: for a given class of emission, the width of the frequency band which is just sufficient to ensure the transmission of information at the rate and with the quality required under specified conditions (ITU Radio Regulations [5], clause 146)

occupied bandwidth: width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage $\beta/2$ of the total mean power of a given emission

NOTE: Unless otherwise specified by ITU-R for the appropriate class of emission, the value of $\beta/2$ should be taken as 0,5 % (ITU Radio Regulations [5]).

simplex: instantaneous one-way communications link

product standard: functional standard describing frequency management parameters of radio product

operating frequency range: range(s) of continuous radio frequencies covered by the Equipment Under Test (EUT)

3.2 Abbreviations

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

AC	Alternating Current
AM	Amplitude Modulation
BER	Bit Error Ratio
BW	BandWidth
D8PSK	Differentially Encoded 8 Phase Shift Keying
DC	Direct Current
DSB	Double Side Band full carrier
EM	ElectroMagnetic
EMC	ElectroMagnetic Compatibility
EUT	Equipment Under Test
F _c	Centre of transmitter necessary bandwidth
GFSK	Gaussian Frequency Shift Keying
PEP	Peak Envelope Power
RF	Radio Frequency
rms	root mean of squares
VDL	VHF Digital Link
VHF	Very High Frequency

4 Test conditions

For the purpose of the present document, the test conditions of EN 301 489-1 [1], clause 4 shall apply as appropriate. Further product related test conditions for VHF aeronautical radio equipment are specified in the present document.

4.1 General

For emission and immunity tests the test modulation, test arrangements, etc., as specified in the present document, clauses 4.2 to 4.5, shall apply.

4.2 Arrangements for test signals

The provisions of EN 301 489-1 [1], clause 4.2 shall apply with the following modification.

For integral antenna radio communications equipment a 50 Ω RF connection point shall be provided for connection to the measuring equipment.

4.2.1 Arrangement for test signals at the input to the transmitter

The provisions of EN 301 489-1 [1], clause 4.2.1 shall apply with the following modification.

The transmitter shall be modulated with normal test modulation by an internal or external signal source capable of producing the appropriate drive signal (see clause 4.5).

4.2.2 Arrangements for test signals at the output from the transmitter

The provisions of EN 301 489-1 [1], clause 4.2.2 shall apply with the following modifications.

The transmitter shall be operated at its maximum rated RF output (PEP), or at a level not less than -6 dB relative to that power level in the event of declared thermal limitations.

The RF output signal of the transmitter shall be coupled to the measuring equipment via a shielded transmission line such as a coaxial cable. The measuring equipment shall comprise a combination of a modulation analyser and an audio distortion meter.

For transmitters with an integral antenna, a 50 Ω RF connection point shall be provided for test purposes.

4.2.3 Arrangements for test signals at the input to the receiver

The provisions of EN 301 489-1 [1], clause 4.2.3 shall apply with the following modifications.

The wanted RF input signal coupled to the receiver shall be modulated with normal test modulation (see clause 4.5).

For receivers with an integral antenna, a 50 Ω RF connection point shall be provided for test purposes.

4.2.4 Arrangements for test signals at the output from the receiver

The provisions of EN 301 489-1 [1], clause 4.2.4 shall apply.

4.2.5 Arrangements for testing transmitters and receivers together (as a system)

The provisions of EN 301 489-1 [1], clause 4.2.5 shall apply.