

9`Y_fca U[bYfbUnXfi y`fj cgh]b`nUXYj Yj`nj Ynj`nfUX]`g_`ja `gdY_fca `fØFAŁ!`HUb]
I <: `fUX]`g_]`cXXU`b_]`žgdfY`Ya b_]`j]b`gdfY`Ya b_]`!cXXU`b_]`nUI <: `UYfcbUj`h]`bc
a cV]`bc`ghcf]`hYj`ž_]`i dcfUV`U`Ua d`]hi Xbc`a cXi`UM]`c`!`%`XY.`HY b] bY
UfU`hYf]gh]`Y]b`a Yf]bY`a YtcXY

Electromagnetic compatibility and Radio spectrum Matters (ERM) - Ground-based UHF radio transmitters, receivers and transceivers for the UHF aeronautical mobile service using amplitude modulation - Part 1: Technical characteristics and methods of measurement

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Ground-based UHF radio transmitters, receivers
and transceivers for the UHF aeronautical mobile service
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Part 1: Technical characteristics and
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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 1 of a multi-part deliverable covering the Electromagnetic compatibility and Radio Spectrum Matters (ERM): Ground-based UHF radio transmitters, receivers and transceivers for the UHF aeronautical mobile service using amplitude modulation as identified below:

Part 1: "Technical characteristics and methods of measurement";

Part 2: "Harmonized EN covering essential requirements of article 3.2 of the R&TTE Directive".

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1 Scope

The present document states the minimum performance requirements for radio transmitters receivers and transceivers at ground-based aeronautical stations operating in the UHF band (225 MHz to 399,975 MHz) allocated to the aeronautical mobile service.

The present document applies to DSB AM systems, with channel separations of 25 kHz intended for analogue speech.

The scope of the present document is limited to ground base stations.

2 References

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.
- Non-specific reference may be made only to a complete document or a part thereof and only in the following cases:
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 - for informative references.

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2.1 Normative references

The following referenced documents are indispensable for the application of the present document. For dated references, only the edition cited applies. For non-specific references, the latest edition of the referenced document (including any amendments) applies.

- [1] ITU-T Recommendation O.41: "Psophometer for use on telephone-type circuits".

2.2 Informative references

The following referenced documents are not essential to the use of the present document but they assist the user with regard to a particular subject area. For non-specific references, the latest version of the referenced document (including any amendments) applies.

- [i.1] ETSI TR 100 028 (all parts): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics".
- [i.2] NATO STANAG 4205: "Technical Standards for Single Channel UHF Radio Equipment".
- [i.3] ETSI EN 300 113-1: "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".

3 Definitions and abbreviations

3.1 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

conducted measurements: measurements which are made using a direct RF connection to the equipment under test

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

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:

AF	Audio Frequency
AGC	Automatic Gain Control
AM	Amplitude Modulation
dBc	dB relative to the carrier power
DSB	Double Side Band
IF	Intermediate Frequency
ppm	parts per million
RF	Radio Frequency
rms	root mean square
SINAD	(Signal + Noise + Distortion)/(Noise + Distortion)
UHF	Ultra High Frequency
VSWR	Voltage Standing Wave Ratio

4 General requirements

25 kHz equipment shall be able to operate on the frequencies 225,000 MHz to 399,975 MHz.

It shall not be possible to transmit while any frequency synthesizer used within the transmitter is out of lock.

It shall not be possible to transmit during channel switching operations.

4.1 Controls and indicators

The equipment shall have the following controls and indicators as a minimum:

- a visual indication that the device is switched on;
- a facility to disable the squelch for test purposes (by local or remote control);
- a visual indication that the carrier is being produced.

The equipment shall also meet the following requirements:

- the user shall not have access to any control which, if unintentionally set, might impair the operating parameters of the equipment.

4.2 Class of emission and modulation characteristics

The equipment shall use Double Side Band (DSB) Amplitude Modulation (AM) full carrier, 6K80A3EJN with 25 kHz channel spacing.

4.3 Warm up

After being switched on the equipment shall meet the requirements of the present document within one minute under normal test conditions (see clause 5.3).

If the equipment includes parts which require to be heated in order to operate correctly (e.g. crystal ovens) a warming-up period of 10 minutes of those parts shall be allowed.

5 Test conditions, power sources and ambient temperatures

5.1 Normal and extreme test conditions

Measurements shall be made under normal test conditions (see clause 5.3) and also, where stated, under extreme test conditions (see clauses 5.4.1 and 5.4.2).

5.2 Test power source

During testing, the equipment shall be supplied from a test power source capable of producing normal and extreme test voltages.

The internal impedance of the test power source shall be low enough for its effect on the test results to be negligible. For the purpose of testing the power source voltage shall be measured at the input terminals of the equipment.

During testing, the power source voltages shall be maintained within a tolerance of ± 3 % relative to the voltage level at the beginning of each test.

5.3 Normal test conditions

5.3.1 Normal temperature and humidity

The normal temperature and humidity conditions for tests shall be a combination of temperature and humidity within the following ranges:

- temperature: +15 °C to +35 °C;
- relative humidity: 20 % to 75 %.

When it is impracticable to carry out the tests under these conditions, a note to this effect, stating the ambient temperature and relative humidity during the tests, shall be added to the test report.

5.3.2 Normal power sources

5.3.2.1 Mains voltage and frequency

The normal test voltage for equipment to be connected to the mains shall be the nominal mains voltage.

For the purpose of the present document, the nominal voltage shall be the declared voltage or any of the declared voltages for which the equipment was designed.

The frequency of the test power source corresponding to the AC mains shall be between 49 Hz and 51 Hz.

5.3.2.2 Other power sources

For operation from other power sources or types of battery (primary or secondary), the normal test voltage shall be that declared by the equipment manufacturer.

5.4 Extreme test conditions

5.4.1 Extreme temperatures

For tests at extreme temperatures, measurements shall be made in accordance with clause 5.5, at a lower temperature of -20 °C and an upper temperature of +55 °C. This test shall be performed at the nominal supply voltage as defined in clause 5.3.2.

5.4.2 Extreme values of test power sources

5.4.2.1 Mains voltage

The extreme test voltages shall be between 207 V and 253 V. This test shall be performed at the normal temperature and humidity as defined in clause 5.3.1.

The frequency of the test voltage shall be between 49 Hz and 51 Hz.

5.4.2.2 Other power sources

For equipment using other power sources, or capable of being operated from a variety of power sources, the extreme test voltages shall be those agreed between the equipment manufacturer and the testing laboratory and shall be recorded in the test report.

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5.5 Performance test

For the purposes of the present document, the term "performance test" shall be taken to mean the following measurements and limits:

- for the transmitter:
 - frequency error:
with the transmitter connected to a coaxial termination (see clause 6.2.1), the frequency error shall be as in clause 7.2;
 - carrier power:
with the transmitter connected to a coaxial termination (see clause 6.2.1), the transmitter shall be keyed without modulation and the output power shall be as defined in clause 7.3;
 - modulation:
with the transmitter connected to a coaxial termination (see clause 6.2.1), the transmitter shall be keyed. The modulation distortion shall be as in clause 7.4.3.
- for the receiver:
 - sensitivity:
with the AGC operative, a normal test signal (see clause 6.1.3) shall be applied to the receiver. The sensitivity shall be as defined in clause 8.1.