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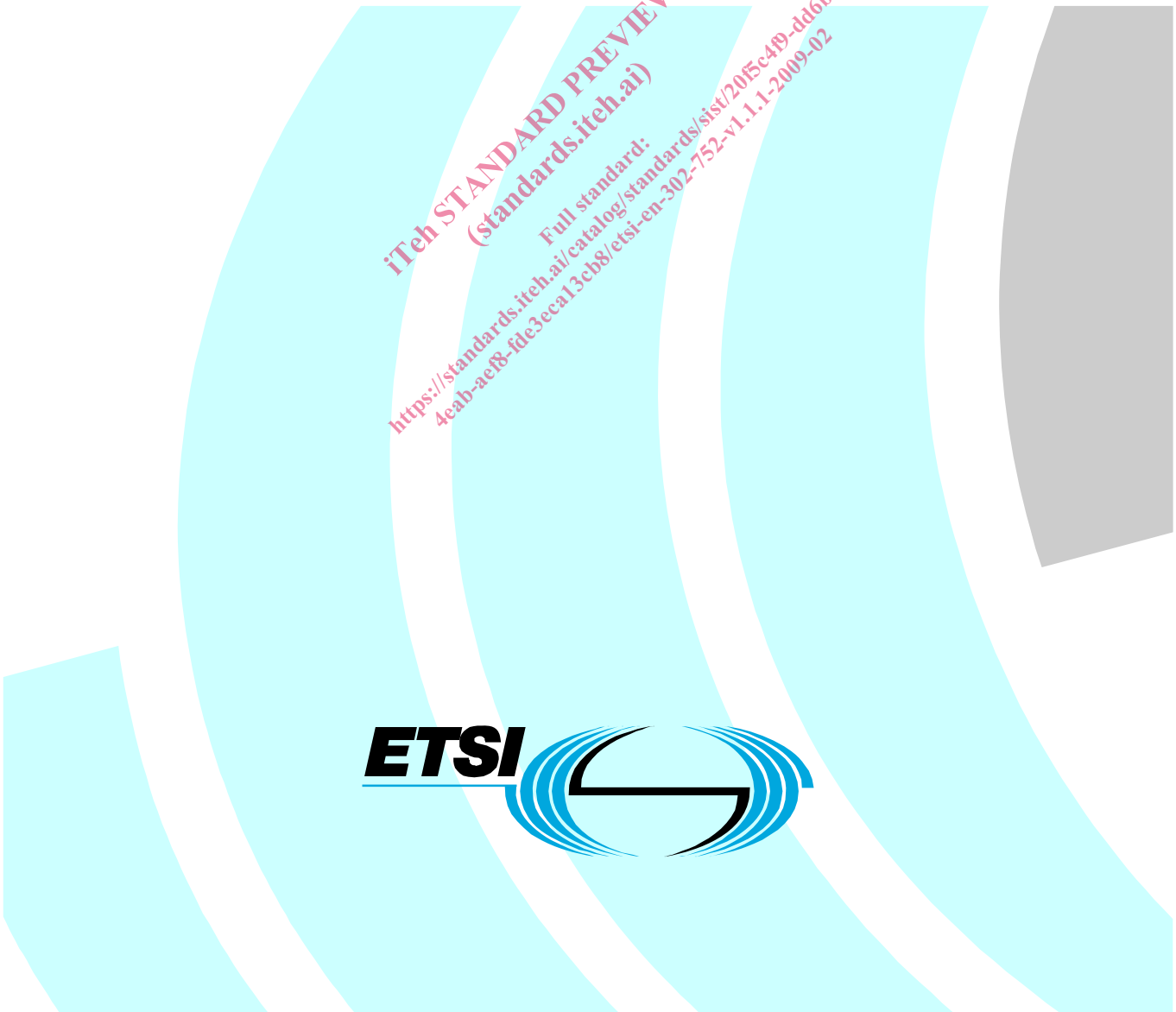
Harmonized European Standard (Telecommunications series)

Electromagnetic compatibility and Radio spectrum Matters (ERM); Active radar target enhancers; Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive



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Contents

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Foreword

This 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 [1] 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").

Technical specifications relevant to Directive 1999/5/EC are given in annex A.

The present document is a harmonized EN covering the essential requirements under article 3.2 of the R&TTE directive for active radar target enhancers.

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

1 Scope

The present document applies to active radar target enhancers which operate in the frequency range 2 900 MHz to 3 100 MHz and/or 9 300 MHz to 9 500 MHz allocated to the radio navigation service as defined in article 5 of the Radio Regulations [2].

The present document does not necessarily include all the characteristics which may be required by a user, nor does it necessarily represent the optimum performance achievable.

The present document is intended to cover the provisions of Directive 1999/5/EC [1] (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".

In addition to the present document, other ENs that specify technical requirements in respect of essential requirements under other parts of Article 3 of the R&TTE Directive [2] may apply to equipment within the scope of the present document.

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:
  - if it is accepted that it will be possible to use all future changes of the referenced document for the purposes of the referring document;
  - for informative references.

Referenced documents which are not found to be publicly available in the expected location might be found at http://docbox.etsi.org/Reference.

For online referenced documents, information sufficient to identify and locate the source shall be provided. Preferably, the primary source of the referenced document should be cited, in order to ensure traceability. Furthermore, the reference should, as far as possible, remain valid for the expected life of the document. The reference shall include the method of access to the referenced document and the full network address, with the same punctuation and use of upper case and lower case letters.

NOTE: While any hyperlinks included in this clause were valid at the time of publication ETSI cannot guarantee their long term validity.

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] 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).

[2] ITU Radio Regulations (2004).

[3] CENELEC EN 60945 (Edition 4 - 2002): "Maritime navigation and radiocommunication equipment and systems - General requirements - Methods of testing and required test results".

[4] ITU-R Recommendation SM.329-10 (2003): "Unwanted emissions in the spurious domain".

[5] Void.

[6] ITU-R Recommendation SM.1541-1 (2002): "Unwanted emissions in the out-of-band domain".

[7] ANSI C63.5 (2006): "American National Standard for Electromagnetic Compatibility - Radiated Emission Measurements in Electromagnetic Interference (EMI) Control - Calibration of Antennas (9 kHz to 40 GHz)".

[8] ETSI TR 102 273 (2001) (all parts): "Electromagnetic compatibility and Radio spectrum Matters (ERM);Improvement on Radiated Methods of Measurement (using test site) and evaluation of the corresponding measurement uncertainties".

[9] ETSI TR 100 028 (2001) (all parts): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics".

[10] ITU-R Recommendation M.1176 (1995): "Technical parameters of radar target enhancers".

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.

[11] Directive 98/34/EC of the European Parliament and of the Council laying down a procedure for the provision of information in the field of technical standards and regulations and of rules on information society services.

[12] IEC 62388: "Maritime navigation and radiocommunication equipment and systems - Shipborne radar - Performance requirements, methods of testing and required test results".

[13] IEC 62252: "Maritime navigation and radiocommunication equipment and systems - Radar for craft not in compliance with IMO SOLAS Chapter V - Performance requirements, methods of test and required test results".

3 Abbreviations

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

e.i.r.p.	equivalent isotropically radiated power
HS	Harmonized Standard
OATS	Open Area Test Site
OoB	Out of Band
RCS	Radar Cross Section
RF	Radio Frequency
RTE	Radar Target Enhancer

4 Technical requirements

4.1 Environmental profile

Tests defined in the present document shall be carried out at representative points within the boundary limits of the declared operational environmental profile which, as a minimum, shall be that specified in the test conditions contained in the present document.

As technical performance varies subject to environmental conditions, tests shall be carried out under a sufficient variety of environmental conditions as specified in the present document to give confidence of compliance for the affected technical requirements (which shall also be within the boundary limits of the declared operational environmental profile).

4.2 Conformance requirements

4.2.1 Radiated emissions

4.2.1.1 Definition

Radiated electromagnetic emissions are to be understood as any signals radiated by the completely assembled and operated radar equipment, other than the operating frequency, with its spectra, which can potentially disturb other equipment on the ship, such as radio receivers or rate of turn indicators.

4.2.1.2 Limits

In the frequency range 150 kHz to 2 GHz, the measured radio frequency field strength at a distance of 3 m caused by the RTE shall not exceed the limits shown in table 1.

Table 1: Radiated electromagnetic emission

Frequency range	Measuring Bandwidth	Limits
150 kHz to 300 kHz	9 kHz	10 mV/m to 316 µV/m (80 dBµV/m to 52 dBµV/m)
300 kHz to 30 MHz	9 kHz	316 µV /m to 50 µV/m (52 dBµV/m to 34 dBµV/m)
30 MHz to 2 GHz except for	120 kHz	500 µV /m (54 dBµV/m)
156 MHz to 165 MHz	9 kHz	16 µV /m (24 dBµV/m) quasi peak or 32 µV /m (30 dBµV/m) peak

4.2.1.3 Conformance

Conformance tests as defined in clause 5.3.1 shall be carried out.

4.2.2 Operating frequency

4.2.2.1 Definition

Radar target enhancers simply amplify a received signal and then retransmit it at a higher power without any form of frequency translation. The frequency of the input and output signals is always the same (see ITU-R Recommendation M.1176 [10]).

4.2.2.2 Limits

The difference in frequency between the input exciting signal and the RTE output signal shall not exceed ±1 MHz.

4.2.2.3 Conformance

Conformance tests as defined in clause 5.3.2 shall be carried out.

4.2.3 Radiated output power

4.2.3.1 Definition

The radiated output power of the RTE is the maximum RF output including the transmit antenna gain achievable at the point of saturation of the power amplifier.

4.2.3.2 Limits

The maximum radiated output power of the RTE shall be less than 10 W e.i.r.p.

4.2.3.3 Conformance

Conformance tests as defined in clause 5.3.3 shall be carried out.

4.2.4 Stability

4.2.4.1 Definition

This is where the input/output isolation of the RTE equipment is insufficient to prevent parasitic oscillation and should be such that adjacent reflective objects (passing ship or radar reflector on channel bouy) does not induce parasitic oscillation.

4.2.4.2 Limits

There shall be no observable emissions due to parasitic oscillation.

4.2.4.3 Conformance

Conformance tests as defined in clause 5.3.4 shall be carried out.

4.2.5 Radiated spurious emissions

4.2.5.1 Definition

Spurious emissions as described in ITU-R Recommendation SM.329-10 [4] are defined as the entity of all emissions in the frequency range of 70 % of the cut-off frequency of the waveguide to 26 GHz, but outside the OoB-boundaries.

They include:

- harmonic emissions (whole multiples of the operating frequency);
- parasitic emissions (independent, accidentally);
- intermodulation (between oscillator- and operation frequency or between oscillator and harmonics).

4.2.5.2 Limits

Out of band domain emissions do not apply to devices of this power (see ITU-R Recommendation SM.1541-1 [6]) and so only the Spurious domain emission limits will apply to an active reflector. The reflector shall meet the requirements of ITU-R Recommendation SM.329-10 [4] with the Category A limits for radiodetermination service equipment.

4.2.5.3 Conformance

Conformance tests as defined in clause 5.3.5 shall be carried out.

5 Testing for compliance with technical requirements

5.1 Test conditions, power supply and ambient temperatures

5.1.1 Standard operating mode of the RTE equipment

Unless otherwise stated the RTE equipment shall be set to the standard operating mode as indicated in the manufacturers instructions.

5.1.2 Normal test conditions

5.1.2.1 Normal temperature and humidity

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

a) temperature: +15 ºC to +35 °C; or within the manufacturers stated operating range and stated in the report

b) relative humidity: 20 % to 75 %.

When the relative humidity is lower than 20 %, it shall be stated in the test report.

5.1.2.2 Normal test power supply

5.1.2.2.1 AC test power supply

The test voltage for equipment to be connected to an AC supply shall be the nominal mains voltage declared by the manufacturer -10 % to +10 %. 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 is indicated as having been designed. The frequency of the test voltage shall be 50 Hz ± 1 Hz.

5.1.2.2.2 DC test power supply

Where the equipment is designed to operate from a DC source, the normal test voltage shall be the nominal voltage as declared by the manufacturer -10 % to +20 %.

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.

5.1.3 Extreme test conditions

5.1.3.1 Extreme temperatures

5.1.3.1.1 Indoor unit

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

a) temperature: 0 °C to +40 °C;

b) relative humidity: 20 % to 75 %.

When the relative humidity is lower than 20 %, it shall be stated in the test report.