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Satellite Earth Stations and Systems (SES); Harmonised Standard for Receive-Only Mobile Earth Stations (ROMES) providing data communications operating in the 1,5 GHz frequency band; Radio Frequency (RF) specifications covering the essential requirements of article 3.2 of the Directive 2014/53/EU

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ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
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Foreword

This final draft Harmonised European Standard (EN) has been produced by ETSI Technical Committee Satellite Earth Stations and Systems (SES), and is now submitted for the Vote phase of the ETSI standards EN Approval Procedure.

The present document has been prepared under the Commission's standardisation request C(2015) 5376 final [i.1] to provide one voluntary means of conforming to the essential requirements of Directive 2014/53/EU on the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment and repealing Directive 1999/5/EC [3].

Once the present document is cited in the Official Journal of the European Union under that Directive, compliance with the normative clauses of the present document given in table C.1 confers, within the limits of the scope of the present document, a presumption of conformity with the corresponding essential requirements of that Directive, and associated EFTA regulations.

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

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the ETSI Drafting Rules (Verbal forms for the expression of provisions).

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1 Scope

The present document applies to the Receive-Only Mobile Earth Stations (ROMES) radio equipment operating under the Land Mobile Satellite Service (LMSS), in the frequency band 1 518 MHz to 1 559 MHz (space-to-earth bands).

The ROMESs operate as part of a satellite system providing one-way data communications.

ROMESs could have several configurations, including:

- either Portable Equipment (PE) or vehicle Installed Equipment (IE);
- a number of modules including a display/control interface to the user.

The present document is intended to cover the provisions of Directive 2014/53/EU [3] (RE Directive) article 3.2 which states that "*…radio equipment shall be so constructed that it both effectively uses and supports the efficient use of radio spectrum in order 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 Directive 2014/53/EU [3] may apply to equipment within the scope of the present document.

2 References

2.1 Normative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

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

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

The following referenced documents are necessary for the application of the present document.

[1] Void.

[2] ETSI ETS 300 133-5 (Edition 1) (1992): "Paging Systems (PS); Enhanced Radio MEssage System (ERMES); Part 5: Receiver conformance specification".

[3] Directive 2014/53/EU of the European Parliament and of the Council of 16 April 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment and repealing Directive 1999/5/EC.

2.2 Informative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

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

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

[i.1] Commission Implementing Decision C(2015) 5376 final of 4.8.2015 on a standardisation request to the European Committee for Electrotechnical Standardisation and to the European Telecommunications Standards Institute as regards radio equipment in support of Directive 2014/53/EU of the European Parliament and of the Council.

3 Definitions and abbreviations

3.1 Definitions

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

in-band signals: signals which are located in the operating band plus an offset of 10 MHz outside this operating band

operating frequency band: frequency band over which the ROMES is capable of operation

3.2 Abbreviations

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

BW	BandWith
CW	Continuous Wave
EC	European Commission
EFTA	European Free Trade Association
EIRP	Equivalent Isotropically Radiated Power
ETS	European Telecommunication Standard
EUT	Equipment Under Test
IE	Installed Equipment
LMSS	Land Mobile Satellite Service
LTE	Long Term Evolution
MSS	Mobile Satellite Service
PE	Portable Equipment
RF	Radio Frequency
ROMES	Receive-Only Mobile Earth Station
SNR	Signal to Noise Ratio
STE	Special Test Equipment

4 Test conditions

4.1 Test voltages

The nominal and extreme operational power supply voltages shall be stated by the manufacturer.

4.2 Test report

The test report shall contain:

- the results of the tests;
- all parameters and operational conditions;
- the value of the highest frequency conversion oscillator.

4.3 Special Test Equipment (STE)

To enable the tests specified in the present document to be carried out, the use of STE, supplied by the manufacturer or system provider, may be necessary. Since the STE will be specific for the particular equipment, it is not possible to provide detailed specifications in the present doucment. However, the following baseline is provided:

- the STE shall enable the ROMES to tune to every channel in the operating frequency band, to enable spurious emissions to be measured;
- if the connection of the STE affects any of the parameters specified in the present doucment then the effects shall clearly be stated by the manufacturer.

4.4 Equipment Under Test (EUT)

The EUT shall include all units necessary for the intended operation.

5 RF emission limits

Purpose:

To protect terrestrial and satellite radio services from emissions caused by ROMESs to which the present document applies.

Specification:

The radiated power from the equipment, including its antenna, shall not exceed the limits in table 1.

Table 1

Frequency range (MHz) (see note 1)	EIRP limit (dBpW) (see note 1)	Measurement bandwidth (kHz)
30,0 - 1 000,0	33	100
1 000,0 - 1 518,0	43 (see note 2)	100
1 518,0 - 1 559,0	17	3
1 559,0 - 12 750,0	43 (see note 2)	100
12 750,0 - 21 200,0	48 (see note 3)	100
21 200,0 - 40 000,0	60	100
NOTE 1: The lower limits shall apply at the transition frequency. NOTE 2: These figures shall be 48 dBpW prior to 1st January 1997. NOTE 3: This figure shall be 54 dBpW prior to 1st January 1997.		

Verification:

All RF tests in this clause shall be carried out with the test conditions given in annex A.

The equipment shall be tested according to the test procedure given in annex B. The upper frequency to which tests shall be performed shall be at least the 10th harmonic of the highest frequency conversion oscillator or ten times the highest operational frequency, whichever is greater.

6 Receiver Performance Requirements

6.1 General

This clause shall apply for all ROMES.

6.2 Receiver Adjacent Channel Selectivity

6.2.1 Purpose

To enable reception of a wanted signal in the presence of other signals in the adjacent channel.

Adjacent channel selectivity is a measure of a receiver's ability to receive a signal at its assigned channel frequency in the presence of a signal in the adjacent channel at a given frequency offset from the centre frequency of the assigned channel.

6.2.2 Technical requirements

The frequency offset and relative power level of the adjacent signal compared to the wanted signal shall take the values given in table 2. The adjacent signal shall occupy the same bandwidth as the wanted signal where BW is the wanted signal occupied bandwidth. There shall be no more than 0,5 dB degradation in the receiver signal to noise ratio under these conditions.

Table 2: Adjacent Channel frequency and power level

Signal	Centre frequency offset from wanted signal	Power level relative to wanted signal
Adjacent signal	BW	12 dB

6.2.3 Conformance test

Conformance tests shall be carried out in accordance with clause 7.2.

6.3 Receiver Blocking Characteristics

6.3.1 Purpose

To prevent high power signals outside the receive frequency band from blocking the reception of signals inside the receive frequency band.

The blocking characteristic is a measure of the receiver's ability to receive a wanted signal at its assigned channel frequency in the presence of an unwanted interferer on frequencies other than those of the spurious response or the adjacent channels, without this unwanted input signal causing a degradation of the performance of the receiver beyond a specified limit. Receiver blocking is specified for in-band signals. In-band signals are signals in the 1 508 MHz to 1 569 MHz band.

6.3.2 Technical requirements

The receiver performance degradation, in terms of signal to noise ratio, shall not exceed 1dB when the unwanted signal as specified in table 3 is present.

Table 3: Test parameters for in-band blocking characteristics

Interfering Signal	In-band Frequency Range (MHz)	Frequency offset from wanted carrier (MHz)	Level (dBm)
CW	1 508 to 1 569	5	-40 (see note)
NOTE: The -40 dBm level is set based on the performance of the design of MSS terminals. For ease of laboratory testing, the interfering signal is specified as a CW signal. Receiver blocking performance specification against a broadband signal blocking interferer, such as LTE, is under study.			

6.3.3 Conformance test

Conformance tests shall be carried out in accordance with clause 7.3.

7 Method of Testing for Receiver Performance

7.1 General

These test methods apply to all requirements in clause 6.

7.2 Receiver Adjacent Channel Selectivity

7.2.1 General

If the EUT is a ROMES that has been modified by the applicant for these tests then full documentation of such modification(s) shall be provided to prove that the modification(s) will simulate the required test condition.

For the purpose of this test, the EUT is the ROMES without its antenna connected.

7.2.2 Test arrangement

The equipment should be set-up as shown in figure 1.

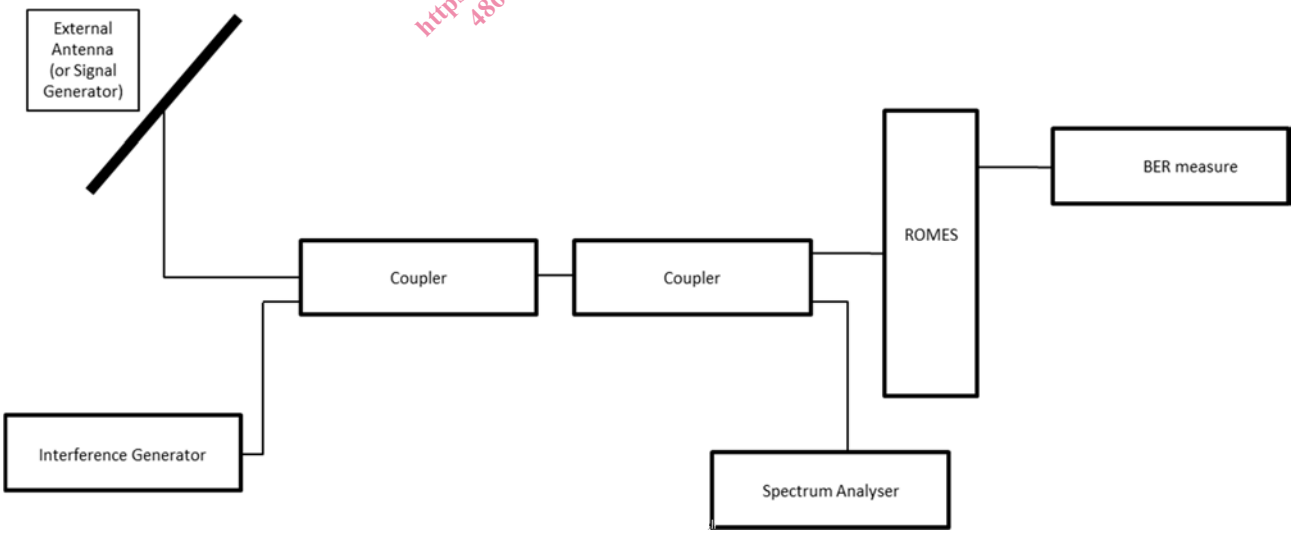

Figure 1: Measuring system set-up for Adjacent Channel Selectivity and Blocking Characteristics