

ETSI EN 301 489-19 V2.1.1 (2019-04)



**ElectroMagnetic Compatibility (EMC)
standard for radio equipment and services;
Part 19: Specific conditions for Receive Only Mobile
Earth Stations (ROMES) operating in the 1,5 GHz band
providing data communications and GNSS receivers
operating in the RNSS band (ROGNSS)
providing positioning, navigation, and timing data;
Harmonised Standard covering the essential requirements
of article 3.1(b) of Directive 2014/53/EU**

Reference

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Foreword

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

The present document has been prepared under the Commission's standardisation request C(2015) 5376 final [i.2] 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 [i.1].

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 A.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.

The present document is part 19 of a multi-part deliverable. Full details of the entire series can be found in part 1 [1].

National transposition dates	
Date of adoption of this EN:	12 June 2017
Date of latest announcement of this EN (doa):	31 July 2019
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	31 January 2020
Date of withdrawal of any conflicting National Standard (dow):	31 January 2021

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, together with ETSI EN 301 489-1 [1], covers the assessment of Receive Only Mobile Earth Stations (ROMES) and GNSS receivers operating in the RNSS band (ROGNSS), as defined in annex AB, and associated ancillary equipment in respect of ElectroMagnetic Compatibility (EMC).

Technical specifications related to the antenna port and emissions from the enclosure port of ROMES 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 specifies the applicable test conditions, performance assessment and performance criteria for ROMES and associated ancillary equipment.

ROMESs can have several configurations, including:

- –portable equipment;
- –fixed equipment;
- –a number of modules including a display/control interface to the user.

The performance criteria used in the present document require that the satellite communications system of which the ROMES is a part provides reliable delivery of data or messages.

In case of differences (for instance concerning special conditions, definitions, abbreviations) between the present document and ETSI 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 ETSI EN 301 489-1 [1], except for any special conditions included in the present document. The applicable environments referred to in ETSI EN 301 489-1 [1] where ROMES and or ROGNSS may be used ~~shall~~ should be declared by the manufacturer.

2 References

2.1 Normative references

References are specific, identified by date of publication and/or edition number or version number. Only the cited version applies.

Referenced documents which are not found to be publicly available in the expected location might be found at <https://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] ETSI EN 301 489-1 (V2.2.0) (03-2017): "ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU and the essential requirements of article 6 of Directive 2014/30/EU".

[2] ITU-R Radio Regulations (2016).

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] ~~Directive 1999/5/EC~~2014/53/EU of the European Parliament and of the Council of ~~9 March 1999~~16 April 2014 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~~the harmonisation of the laws of the Member States relating to ~~electromagnetic compatibility (EMC Directive).~~the making available on the market of radio equipment and repealing Directive 1999/5/EC.
- [4] ~~[i.2] 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 98/34/EC~~2014/53/EU 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.~~
- [5] ~~ITU R Radio Regulations (1998).~~

3 Definitions and abbreviations

3.1 Definitions

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

stand-by mode of operation: mode of operation in which the receiver is capable of receiving calls

3.2 Abbreviations

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

CR	Continuous phenomena applied to ROMES <u>and ROGNSS</u>
EMC	ElectroMagnetic Compatibility
EUT	Equipment Under Test
<u>GNSS</u>	<u>Global Navigation Satellite System</u>
LMSS	Land Mobile Satellite Service
RF	Radio Frequency
<u>RNSS</u>	<u>Radio-Navigation Satellite Service</u>
<u>ROGNSS</u>	<u>Receive Only Global Navigation Satellite System</u>
ROMES	Receive Only Mobile Earth Station
TR	Transient phenomena applied to ROMES <u>and ROGNSS</u>

4 Test conditions

~~For the purposes 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 ROMES 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 4.1 to 4.5, shall apply.

In the following clauses, the Equipment Under Test (EUT) is the ROMES and (ROGNSS) with the selected configuration of ancillary equipment.

4.2 Arrangements for test signals

4.2.0 General

The provisions of ETSI EN 301 489-1 [1], clause 4.2 shall apply.

4.2.1 Arrangements for test signals at the input of ROMES and ROGNSS receivers (~~ROMES~~)

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

The manufacturer may, at the time of submitting the ROMES and ROGNSS for testing, supply, if necessary, a test fixture and a message generator to generate the wanted input signal.

The wanted RF input signal level for ROMES and ROGNSS, modulated with the normal test modulation, shall be set to a value significantly above the threshold sensitivity but below the overload characteristics of the ROMES and ROGNSS (the threshold sensitivity and overload characteristic shall be specified by the manufacturer).

The source of the wanted input signal, modulated with normal test modulation (see clause 4.5), shall be located outside the test environment and the signal level used shall be chosen to be a value significantly above the threshold sensitivity but below the overload characteristics of the ROMES and ROGNSS (the threshold sensitivity and overload characteristic shall be specified by the manufacturer). Adequate measures shall be taken to protect the measuring equipment from the effect of the test environment.

4.2.2 Arrangements for test signals at the output of ROMES and ROGNSS receivers (~~ROMES~~)

The provisions of ETSI EN 301 489-1 [1], clause 4.2.4 shall apply with the following modifications.

For the performance check before and after the test it shall be possible to assess the performance of the ROMES and ROGNSS from the presented messages and/or the call received alert signal(s) of the ROMES and ROGNSS.

During the spot frequency test of the immunity test with radiated RF electromagnetic fields (ETSI EN 301 489-1 [1], clause 9.2) the call received alert signal output of the ROMES and ROGNSS shall be coupled to the outside of the test environment and it shall be possible to assess the performance of the equipment from the call received alert signal(s) of the ROMES and ROGNSS.

4.3 Exclusion bands

4.3.0 General

The provision of ETSI EN 301 489-1 [1], clause 4.3 shall apply with the following modifications:

- the receiver exclusion band as defined below shall apply;
- there shall be no exclusion bands for the ancillary equipment.

4.3.1 Receiver exclusion band

The receiver exclusion band is the band of frequencies over which no tests of radiated immunity of a receiver are made.

The lower frequency of the receiver exclusion band is the lower frequency of the complete receive band of the EUT minus 5 % of that lower frequency.

The upper frequency of the receiver exclusion band is the upper frequency of the complete receive band of the EUT plus 5-% of that upper frequency.

4.4 Narrow band responses of receivers

The provision of ETSI EN 301 489-1 [1], clause 4.4 shall apply.

4.5 Normal test modulation

The test modulation signal to be used for the calling function shall be a signal representing selective messages generated by a signal generator. The signal generator may be supplied by the manufacturer.

5 Performance assessment

5.1 General

The provision of ETSI EN 301 489-1 [1], clause 5.1 shall apply with the following modification.

If the ~~ROMES~~EUT has several optional features or configurations, tests shall be performed on the minimum representative configuration of the EUT.

In all cases, the minimum configuration of the EUT as marketed, shall comply with the EMC requirements of the present document.

The manufacturer shall keep on record information about the ancillary equipment intended for use with the ~~ROMES~~EUT and make this information available to the user.

In addition to the information requested from the manufacturer in ETSI EN 301 489-1 [1], clause 5.1, the manufacturer shall keep on record the following information:

- the optional features of the equipment and the actual features of the equipment which are assessed for the performance or degradation of performance.

5.2 Equipment which can provide a continuous communications link

The provision of ETSI EN 301 489-1 [1], clause 5.2 shall apply.

5.3 Equipment which does not provide a continuous communications link

The provision of ETSI EN 301 489-1 [1], clause 5.3 shall apply.

5.4 Ancillary equipment

The provision of ETSI EN 301 489-1 [1], clause 5.4 shall apply.

5.5 Equipment classification

The provision of ETSI EN 301 489-1 [1], clause 5.5 shall apply.

6 Performance criteria

6.1 General performance criteria

If the EUT is a ~~ROMES~~ of a non specialized nature or ~~ROMES equipment~~ the EUT is combined with an ancillary equipment, the test modulation, test arrangements, etc. as required in clause 4 shall apply.

The ~~ROMES~~EUT, for all immunity tests according to the present document, except the spot frequency test of the immunity test with radiated RF electromagnetic fields (see ETSI EN 301 489-1 [1], clause 9.2), shall be assessed for:

- the storage of messages in the memory of the ~~ROMES~~EUT at the start of the test;
- unintentional responses of the ~~ROMES~~EUT during the test;
- the maintenance of the ~~ROMES~~EUT memory assessed at the conclusion of the test;
- the ability to receive and store messages at the conclusion of the test.

For the spot frequency test of the immunity test with radiated RF electromagnetic fields (see ETSI EN 301 489-1 [1], clause 9.2) the ~~ROMES~~EUT shall be assessed by monitoring the accuracy of the call received alert signal.

6.2 Performance criteria for Continuous phenomena applied to ROMES and ROGNSS receivers (CR)

For ~~ROMES~~the EUT, excluding spot frequency tests as part of the immunity test with radiated RF electromagnetic fields (see ETSI EN 301 489-1 [1], clause 9.2):

- the general performance criteria set out in clause 6.1;
- during the test no false calls shall occur;
- at the conclusion of the test comprising the series of individual exposures the ~~ROMES~~EUT shall operate as intended with no loss of functions or stored data (messages), as declared by the manufacturer.

For the spot frequency test as part of the immunity test with radiated RF electromagnetic fields (see ETSI EN 301 489-1 [1], clause 9.2) the ~~ROMES~~EUT shall be assessed by monitoring the accuracy of the call received alert signal.

6.3 Performance criteria for Transient phenomena applied to ROMES and ROGNSS receivers (TR)

For ~~ROMES~~the EUT:

- the general performance criteria set out in clause 6.1;
- during the test no false calls shall occur;
- at the conclusion of the test comprising the series of individual exposures, the ~~ROMES~~EUT shall operate as intended with no loss of function and/or stored data (messages), as declared by the manufacturer.

6.4 Performance criteria for equipment which does not provide a continuous communication link

The provision of ETSI EN 301 489-1 [1], clause 6.3 shall apply with the following modifications.

For ~~ROMES~~EUTs of a specialized nature and/or ancillary equipment tested on a stand alone basis the manufacturer shall define the method of test to determine the acceptable level of performance or degradation of performance during and/or after the test. Under these circumstances the manufacturer will also provide the following information:

- the primary functions of the equipment to be tested during and after EMC stress;
- the intended functions of the EUT which shall be in accordance with the documentation accompanying the equipment;
- the pass/failure criteria for the equipment;
- the method of observing a degradation of performance of the equipment.

The assessment of the performance or the degradation of performance which shall be carried out during and/or at the conclusion of the tests, shall be simple, but at the same time give adequate proof that the primary functions of the equipment are operational.

7 Applicability overview

7.1 Emission

7.1.1 General

ETSI EN 301 489-1 [1], table 2₁, contains the applicability of EMC emission measurements to the relevant ports of radio and/or associated ancillary equipment.

7.1.2 Special conditions

The following special conditions set out in table 1, relate to the emission test methods used in ETSI EN 301 489-1 [1], clause 8.

Table 1: Special conditions for EMC emission measurements

Reference to clauses in ETSI EN 301 489-1 [1]	Special product-related conditions, additional to or modifying the test conditions in ETSI EN 301 489-1 [1], clause 8
8.1 Test configuration; Methods of measurement and limits for EMC emissions	The message memory shall be loaded with recognizable messages.

7.2 Immunity

7.2.1 General

ETSI EN 301 489-1 [1], table 32, contains the applicability of EMC immunity measurements to the relevant ports of radio and/or associated ancillary equipment.

7.2.2 Special conditions

The following special conditions set out in table 2, relate to the immunity test methods and performance criteria used in ETSI EN 301 489-1 [1], clause 9.

Table 2: Special conditions for EMC immunity tests

Reference to clauses in ETSI EN 301 489-1 [1]	Special product-related conditions, additional to or modifying the test conditions in ETSI EN 301 489-1 [1], clause 9
9.1 Test configuration; Test methods and levels for immunity tests	The message memory shall be loaded with recognizable messages. The ROMES EUT shall operate in stand-by mode of operation, except for the spot frequency test as part of the immunity test with radiated RF electromagnetic fields (see ETSI EN 301 489-1 [1], clause 9.2) where repetitive calls shall be coupled to the input of the receiver. <ul style="list-style-type: none"> for the immunity tests of ancillary equipment, without a separate pass/fail criteria, a ROMESan EUT coupled to the ancillary equipment shall be used to judge whether the ancillary equipment passes or fails.
9.2.2 Test method; Radio frequency electromagnetic field	Spot frequency test: A spot frequency test shall additionally be performed at: <ul style="list-style-type: none"> –80 MHz; –104 MHz; –136 MHz; –165 MHz; –200 MHz; –260 MHz; –330 MHz; –430 MHz; –560 MHz; –715 MHz \pm 1 MHz; –a spot frequency test shall be performed at 920 MHz \pm 1 MHz using a test level of 3 V/m (measured unmodulated) 100 % modulated by 200 Hz pulses of equal mark to space ratio.

Annex A (informative): Relationship between the present document and the essential requirements of Directive 2014/53/EU

The present document has been prepared under the Commission's standardisation request C(2015) 5376 final [i.2] 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 [i.1].

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 A.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.

Table A.1: Relationship between the present document and the essential requirements of Directive 2014/53/EU

Harmonised Standard ETSI EN 301 489-19				
Requirement			Requirement Conditionality	
No	Description	Reference: Clause No	U/C	Condition
1	Emissions: Enclosure of ancillary equipment measured on a stand alone basis	ETSI EN 301 489-1 [1], clause 8.2	U	
2	Emissions: DC power input/output ports	7.1 and ETSI EN 301 489-1 [1], clause 8.3	C	Only where equipment has DC power input and/or output ports with a cable length greater than 3 m or from a vehicle power supply
3	Emissions: AC mains power input/output ports	7.1 and ETSI EN 301 489-1 [1], clause 8.4	C	Only where equipment has AC mains power input and/or output ports
4	Emissions: Harmonic current emission (AC mains input port)	7.1 and ETSI EN 301 489-1 [1], clause 8.5	C	Only where equipment has AC mains power input ports
5	Emissions: Voltage fluctuations and flicker (AC mains input ports)	7.1 and ETSI EN 301 489-1 [1], clause 8.6	C	Only where equipment has AC mains power input ports
6	Emissions: Wired network ports	7.1 and ETSI EN 301 489-1 [1], clause 8.7	C	Only where equipment has wired network ports
7	Immunity: Radio frequency electromagnetic field (80 MHz to 6 000 MHz)	7.2 and ETSI EN 301 489-1 [1], clause 9.2	U	
8	Immunity: Electrostatic discharge	7.2 and ETSI EN 301 489-1 [1], clause 9.3	U	
9	Immunity: Fast transients common mode	7.2 and ETSI EN 301 489-1 [1], clause 9.4	C	Only where equipment has AC mains power input ports or DC power ports or wired network ports with cables longer than 3 m
10	Immunity: Radio frequency common mode	7.2 and ETSI EN 301 489-1 [1], clause 9.5	C	Only where equipment has AC mains power input ports or DC power ports or wired network ports with cables longer than 3 m
11	Immunity: Transients and surges in the vehicular environment	7.2 and ETSI EN 301 489-1 [1], clause 9.6	C	Only where equipment is fitted to a vehicle power supply
12	Immunity: Voltage dips and interruptions	7.2 and ETSI EN 301 489-1 [1], clause 9.7	C	Only where equipment has AC mains power input ports
13	Immunity: Surges, line to line and line to ground	7.2 and ETSI EN 301 489-1 [1], clause 9.8	C	Only where equipment has AC mains power input ports and/or wired network ports

Key to columns:**Requirement:**

No A unique identifier for one row of the table which may be used to identify a requirement.

Description A textual reference to the requirement.

Clause Number Identification of clause(s) defining the requirement in the present document unless another document is referenced explicitly.

Requirement Conditionality:

U/C Indicates whether the requirement is unconditionally applicable (U) or is conditional upon the manufacturer's claimed functionality of the equipment (C).

Condition Explains the conditions when the requirement is or is not applicable for a requirement which is classified "conditional".

Presumption of conformity stays valid only as long as a reference to the present document is maintained in the list published in the Official Journal of the European Union. Users of the present document should consult frequently the latest list published in the Official Journal of the European Union.

Other Union legislation may be applicable to the product(s) falling within the scope of the present document.

Annex B (normative): Definitions of ROMES and GNSS receivers operating in the RNSS band within the scope of the present document

~~The present document covers types of ROMES as set out below.~~

AB.1 Receive Only Mobile Earth Stations (ROMES) operating in the 1,5 GHz band

The present document applies to ROMES which operate in the Land Mobile Satellite Service (LMSS) space to earth bands, 1 525 MHz to 1 544 MHz and 1 555 MHz to 1 559 MHz, allocated by the ITU-R Radio Regulations [5]-2]. The ROMES operate as part of a satellite system providing one way data communications.

B.2 GNSS Receivers operating in the RNSS band

The present document applies to Receive Only Global Navigation Satellite System (GNSS) operating as part of one or more radionavigation-satellite service (RNSS) systems in the RNSS frequency bands given in table B.1.

Table B.1: Radionavigation-satellite service (RNSS) frequency bands

<u>RNSS frequency bands</u>	<u>Comments</u>
<u>1 164 MHz to 1 300 MHz</u>	<u>space-to-Earth</u>
<u>1 559 MHz to 1 610 MHz</u>	<u>space-to-Earth</u>

The ROGNSS receives radio signals from one or more GNSS for the purpose of radiodetermination of the position, velocity, and/or other characteristics of an object, or the obtaining of information relating to those parameters, by means of the propagation properties of radio waves. RNSS is defined as "A radiodetermination-satellite service used for the purpose of radionavigation" (article 1.43 of ITU Radio Regulations [2]).

Annex BC (informative): Bibliography

- ETSI ETS 300 487: "Satellite Earth Stations and Systems (SES); Receive-Only Mobile Earth Stations (ROMESs) operating in the 1,5 GHz band providing data communications; Radio Frequency (RF) specifications".
- ETSI EN 303 413: "Satellite Earth Stations and Systems (SES); Global Navigation Satellite System (GNSS) Receiver: Radio equipment operating in the 1 164 MHz to 1 300 MHz and 1 559 to 1 610 MHz frequency bands".

Annex D (informative): Change history

<u>Version</u>	<u>Information about changes</u>
<u>2.1.0</u>	<u>Addition of GNSS receivers</u>

History

Document history		
V1.1.1	December 2000	Publication
V1.2.1	November 2002	Publication
V2.1.0	March 2017	EN Approval Procedure AP 20170611: 2017-03-13 to 2017-06-12
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