



**ElectroMagnetic Compatibility (EMC) standard
for radio equipment and services;
Part 20: Specific conditions for Mobile Earth Stations (MES)
used in the Mobile Satellite Services (MSS);
Harmonised Standard for ElectroMagnetic Compatibility**

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Foreword

This draft Harmonised European Standard (EN) has been produced by ETSI Technical Committee Electromagnetic compatibility and Radio spectrum Matters (ERM), and is now submitted for the combined Public Enquiry and 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.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 20 of a multi-part deliverable. Full details of the entire series can be found in part 1 [1].

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
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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 specifies technical characteristics and methods of measurement for Mobile Earth Stations (MESs) operating in the Mobile Satellite Services (MSSs) as defined in annex B, and ancillary equipment in respect of ElectroMagnetic Compatibility (EMC).

Technical specifications related to the antenna port and emissions from the enclosure port of the equipment 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, see table 1.

Table 1: Radio Technologies in scope of the present document

Technology	ETSI Standard
Low data rate Land Mobile satellite Earth Stations (LMES) and Maritime Mobile satellite Earth Stations (MMES) operating in the 1 518 MHz to 1 675 MHz frequency bands	ETSI EN 301 426 [i.3]
Low data rate Land Mobile satellite Earth Stations (LMES) operating in the 11/12/14 GHz frequency bands	ETSI EN 301 427 [i.4]
Mobile Earth Stations (MESs), including handheld earth stations, for Satellite Personal Communications Networks (S-PCN) in the 1 610 MHz to 2 500 MHz frequency bands under the Mobile Satellite Service (MSS)	ETSI EN 301 441 [i.5]
Mobile Earth Stations (MESs), including handheld earth stations, for Satellite Personal Communications Networks (S-PCN) in the 1 980 MHz to 2 200 MHz frequency bands under the Mobile Satellite Service (MSS)	ETSI EN 301 442 [i.6]
Land Mobile Earth Stations (LMES) and Maritime Mobile Earth Stations (MMES) operating in the 1 518 MHz to 1 675 MHz frequency bands providing voice and/or data communications	ETSI EN 301 444 [i.7]
Mobile Earth Stations (MES) providing Low Bit Rate Data Communications (LBRDC) using Low Earth Orbiting (LEO) satellites operating in the 137 MHz to 401 MHz frequency bands	ETSI EN 301 721 [i.8]
Land Mobile Earth Stations (LMES) and Maritime Mobile Earth Stations (MMES) of Geostationary mobile satellite systems, including handheld earth stations, for Satellite Personal Communications Networks (S-PCN) under the Mobile Satellite Service (MSS), operating in the 1 518 MHz to 1 675 MHz frequency bands	ETSI EN 301 681 [i.9]
Aircraft Earth Stations (AES) providing Aeronautical Mobile Satellite Service (AMSS)/Mobile Satellite Service (MSS) and/or the Aeronautical Mobile Satellite on Route Service (AMS(R)S)/Mobile Satellite Service (MSS), operating in the 1 518 MHz to 2 500 MHz frequency bands	ETSI EN 301 473 [i.10]

The environmental classification used in the present document are as stated in ETSI EN 301 489-1 [1].

For a multimode radio station, the present document only applies to the radio station when operated in the Mobile Satellite Service mode.

NOTE: The relationship between the present document and essential requirements of article 3.1(b) of Directive 2014/53/EU [i.1] is given in annex A.

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 <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 (V2.2.3) (11-2019): "ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonised Standard for ElectroMagnetic Compatibility".
- [2] Void.
- [3] Void.
- [4] ITU-R Radio Regulations (2020).
- [5] Void.
- [6] EN 61000-3-3 (2013) +A1 (2019): "Electromagnetic compatibility (EMC) - Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection" (produced by CENELEC).

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 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.
- [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 2014/53/EU of the European Parliament and of the Council.
- [i.3] ETSI EN 301 426: "Satellite Earth Stations and Systems (SES); Harmonised Standard for Low data rate Land Mobile satellite Earth Stations (LMES) and Maritime Mobile satellite Earth Stations (MMES) not intended for distress and safety communications operating in the 1,5 GHz/1,6 GHz frequency bands covering the essential requirements of article 3.2 of the Directive 2014/53/EU".
- [i.4] ETSI EN 301 427: "Satellite Earth Stations and Systems (SES); Harmonised Standard for low data rate Mobile satellite Earth Stations (MES) except aeronautical mobile satellite earth stations, operating in the 11/12/14 GHz frequency bands covering the essential requirements of article 3.2 of the Directive 2014/53/EU".
- [i.5] ETSI EN 301 441: "Satellite Earth Stations and Systems (SES); Harmonised Standard for Mobile Earth Stations (MES), including handheld earth stations, for Satellite Personal Communications Networks (S-PCN) operating in the 1,6 GHz/2,4 GHz frequency band under the Mobile Satellite Service (MSS) covering the essential requirements of article 3.2 of the Directive 2014/53/EU".
- [i.6] ETSI EN 301 442: "Satellite Earth Stations and Systems (SES); Harmonised Standard for NGSO Mobile Earth Stations (MES) including handheld earth stations, for Satellite Personal Communications Networks (S-PCN) operating in the 1 980 MHz to 2 010 MHz (earth-to-space) and 2 170 MHz to 2 200 MHz (space-to-earth) frequency bands under the Mobile Satellite Service (MSS) covering the essential requirements of article 3.2 of the Directive 2014/53/EU".

- [i.7] ETSI EN 301 444: "Satellite Earth Stations and Systems (SES); Land Mobile Earth Stations (LMES) and Maritime Mobile Earth Stations (MMES) providing voice and/or data communications, operating in the 1,5 GHz and 1,6 GHz frequency bands; Harmonised Standard for access to radio spectrum".
- [i.8] ETSI EN 301 721: "Satellite Earth Stations and Systems (SES); Harmonised Standard for Mobile Earth Stations (MES) providing Low Bit Rate Data Communications (LBRDC) using Low Earth Orbiting (LEO) satellites operating below 1 GHz frequency band covering the essential requirements of article 3.2 of the Directive 2014/53/EU".
- [i.9] ETSI EN 301 681: "Satellite Earth Stations and Systems (SES); Harmonised Standard for Mobile Earth Stations (MES) of Geostationary mobile satellite systems, including handheld earth stations, for Satellite Personal Communications Networks (S-PCN) under the Mobile Satellite Service (MSS), operating in the 1,5 GHz and 1,6 GHz frequency bands covering the essential requirements of article 3.2 of the Directive 2014/53/EU".
- [i.10] ETSI EN 301 473: "Satellite Earth Stations and Systems (SES); Harmonised Standard for Aircraft Earth Stations (AES) providing Aeronautical Mobile Satellite Service (AMSS)/Mobile Satellite Service (MSS) and/or the Aeronautical Mobile Satellite on Route Service (AMS(R)S)/Mobile Satellite Service (MSS), operating in the frequency band below 3 GHz covering the essential requirements of article 3.2 of the Directive 2014/53/EU".

3 Definition of terms, symbols and abbreviations

3.1 Terms

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

ancillary equipment: electrical or electronic equipment, that is intended to be used with a receiver or transmitter

NOTE 1: It is considered as an ancillary equipment if:

- the equipment is intended for use with a receiver or transmitter to provide additional operational and/or control features to the radio equipment (e.g. to extend control to another position or location);
- the ancillary equipment cannot be used without being connected to radio equipment to provide user functions independently of a receiver or transmitter; and
- the receiver or transmitter, to which it is connected, is capable of providing some intended operation such as transmitting and/or receiving without the ancillary equipment (i.e. it is not a sub-unit of the main equipment essential to the main equipment basic functions).

NOTE 2: An example of ancillary equipment would be a docking station for radio equipment whose interface is dedicated to a particular product or range of products.

carrier-off state (idle mode): state of an MES when it is powered-on but not transmitting a signal, i.e. not in a carrier-on state

carrier-on state (allocated a channel): state of an MES when it is transmitting a signal in a continuous or a non-continuous mode

critical stored data: data that is essential for an EUT to perform a primary function in accordance with that EUT's specification

NOTE: This may include data previously stored by the user.

drive equipment: equipment used to enable the EUT to operate as intended during the test process

Externally Mounted Equipment (EME): equipment consisting of those of the modules of the Installable Equipment (IE) which are intended to be mounted externally to the vehicle as stated by the manufacturer

host equipment: any equipment which has complete user functionality when not connected to the MES, and to which connection is necessary for the MES to offer additional functionality

Installable Equipment (IE): equipment which is intended to be fitted to a vehicle

NOTE: An IE may consist of one or several interconnected modules.

integral antenna: antenna designed for permanent connection to the equipment and considered part of the enclosure port

Internally Mounted Equipment (IME): IE modules which are not defined as EME

multimode MES: equipment that accommodates radio stations of different radio systems

occupied bandwidth: See ITU-R Radio Regulations [4], part A, chapter 1, Terminology RR 147.

Portable Equipment (PE): radio equipment intended for portable use and powered by integral batteries or battery

NOTE 1: A PE would normally consist of a single module, but may consist of several interconnected modules.

NOTE 2: More than one of the equipment classifications can apply to certain equipment, as described in clause 5.4, dependent upon the manufacturer's declaration of normal intended use.

transmission disabled state: state of an MES when it is not authorized to transmit by the Network Control Facilities (NCF)

3.2 Symbols

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

P_{min} minimum power required to establish a communication link

3.3 Abbreviations

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

AC	Alternating Current
AES	Aeronautical Earth Station
BER	Bit Error Ratio
DC	Direct Current
EFTA	European Free Trade Association
EMC	ElectroMagnetic Compatibility
EME	Externally Mounted Equipment
EUT	Equipment Under Test
F-MES	Fixed MES
IE	Installable Equipment
IME	Internally Mounted Equipment
LBRDC	Low Bit Rate Data Communication
LEO	Low Earth Orbit
LMES	Land Mobile Earth Station
MES	Mobile Earth Station
MMES	Maritime Mobile Earth Station
MSS	Mobile Satellite Service
NCF	Network Control Facilities
PE	Portable Equipment
PEP	Peak Envelope Power
P-MES	Portable MES
QTMA	Quality of Transmission Measurement Apparatus
RF	Radio Frequency
S-PCN	Satellite Personal Communications Network
V-MES	Vehicle mounted MES

4 Test conditions

4.1 General

For the purposes of the present document, the test conditions of ETSI EN 301 489-1 [1], clause 4, shall apply with the following additions. Further product related test conditions for MES are specified in the present document.

For MESs with ancillary equipment and/or various ports, the selection of test configurations shall be determined. The assessment shall include sufficient representative configurations of the MES to adequately exercise the equipment. These configurations shall be recorded in the test report.

In clauses 4.2 and 4.3, the Equipment Under Test (EUT) is the MES with the selected configurations of ancillary equipment.

The EUT operational frequencies used during the test, shall be recorded in the test report.

For testing, any physically separated voltage converter from the MES, shall form part of the EUT.

Where radio equipment is provided with an integral antenna, it shall be tested with the antenna fitted in a manner representative of intended use.

4.2 Arrangements for test signals

4.2.0 General

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

In order to measure the system emissions and electromagnetic immunity under operational conditions, the following arrangements shall be provided:

- a) a Drive Equipment to put the MES terminal in its normal operating mode, and providing the MES with a receive signal to emulate the operational conditions of reception. This equipment shall control the EUT, when it is capable of transmission, so that it switches between the transmission disabled, carrier-on and carrier-off states. This Equipment may also be used to achieve loop back mode operation;
- b) a Quality of Transmission Measurement Apparatus (QTMA).

EXAMPLE: The quality of transmission may concern:

- the audio signal;
- the BER;
- the message throughput;
- the continuity of the communication link; or
- a combination of them.

For the immunity tests of the EUT, a communications link shall be established between the EUT and the testing system. The EUT shall be placed in the normal operating mode.

4.2.1 Arrangements for test signals at the input of transmitters

The provisions of ETSI EN 301 489-1 [1], clause 4.2.1 shall apply.

4.2.2 Arrangements for test signals at the output of transmitters

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

For transmitters, the EUT shall be operated at its maximum rated RF output Peak Envelope Power (PEP). The transmitter shall be modulated with a test signal which represents normal operation. A communication link shall be established at the start of the test and be maintained throughout the test. A suggested test configuration is shown in figure 1.

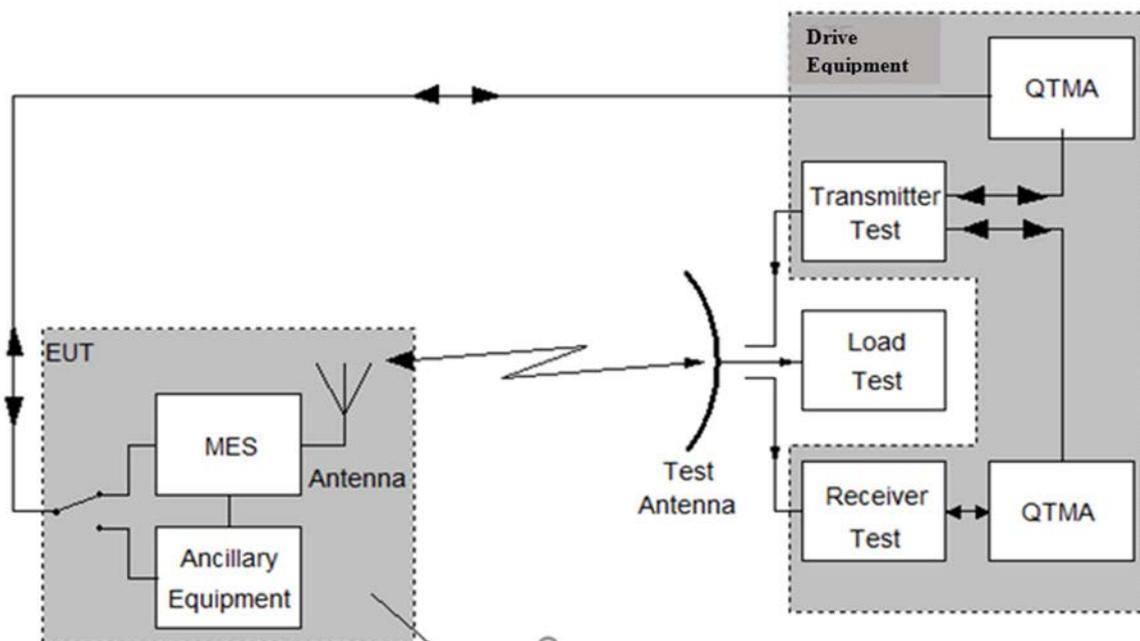


Figure 1: Test configuration

4.2.3 Arrangements for test signals at the input of receivers

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

For radiated immunity, the level of the wanted signal at the input of the receiver or the enclosure terrestrial port of the EUT, shall be 20 dB (± 3 dB) above the P_{min} for the EUT. For all other tests the level of the wanted signal, required to establish a communication link, shall be representative of the EUT intended use.

NOTE: A simple method to establish the required communication link is establish link, reduce power to point of link failure then increase by 20 dB.

4.2.4 Arrangements for test signals at the output of receivers

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

For the quality of transmission measurements the MES shall be put in a mode of operation where the received data are looped back to the modulation input of the transmitter part of the EUT.

4.3 Exclusion bands

4.3.0 General

Exclusion bands shall be in accordance with clauses 4.3.1 and 4.3.2. There shall be no exclusion bands for the ancillary equipment.

4.3.1 Transmitter exclusion band

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

The lower frequency of the transmitter exclusion band is the centre frequency minus twice the occupied bandwidth.

The upper frequency of the transmitter exclusion band is the centre frequency plus twice the occupied bandwidth.

4.3.2 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.

5 Performance assessment

5.1 Void

5.2 MES connected to host equipment

5.2.0 General

For MES parts for which connection to or integration with a host equipment is necessary in order to offer additional functionality, two alternative approaches are permitted.

5.2.1 Alternative A: combined equipment

A combination of a MES and a specific type of host equipment shall be used for testing according to the present document.

5.2.2 Alternative B: use of a test jig

Where the MES is intended for use with a variety of host equipment, a suitable test jig that is representative of the range of host equipment shall be used. The test jig shall allow the MES part to be powered and stimulated in a way similar to the way it would be powered and stimulated when connected to or inserted into the host equipment. Measurements shall be made to all requirements of the present document.

5.3 Ancillary equipment

The provision of ETSI EN 301 489-1 [1], clause 5 shall apply.

5.4 Equipment classification

The MES shall be classified in one or a combination of the following classes:

- Vehicle mounted MES (V-MES) intended to be powered by the vehicle main battery.
- Portable MES (P-MES) powered by a stand-alone battery.
- Fixed MES (F-MES) powered either by a DC or AC mains.

A V-MES is an Installable Equipment (IE); a P-MES is a Portable Equipment (PE).

6 Performance criteria

6.1 General

Only the performance criteria specified in the present document or in ETSI EN 301 489-1 [1] where referenced shall apply.

The equipment shall meet the minimum performance criteria as specified in clauses 6.2 and 6.3.

The establishment of a communications link at the start of the test, the maintenance of the communications link and the assessment of the recovered signal information is used as the performance criteria to ensure that the essential functions of the EUT are evaluated during and after the test.

6.2 Performance criteria for Continuous Phenomena

The EUT shall be considered to satisfy the immunity requirements if the provisions of ETSI EN 301 489-1 [1], clause 6.1 are met.

6.3 Performance criteria for Transient Phenomena

The EUT shall be considered to satisfy the immunity requirements if the provisions of ETSI EN 301 489-1 [1], clause 6.2 are met.

7 Requirements

7.1 Emission

7.1.1 General

Table 2 contains the applicability of EMC emission requirements to the relevant ports of radio and/or associated ancillary equipment.

Table 2: Emission requirements

Phenomenon	Port	Applicability			Reference clause
		Fixed equipment	Vehicular equipment	Portable equipment	
Radiated emission	Enclosure port of ancillary equipment	Applicable	Applicable	Applicable	ETSI EN 301 489-1 [1], clause 8.2
Conducted emission	DC power input/output port	Applicable	Applicable	Not applicable	7.1.2
Conducted emission	AC mains input/output port	Applicable	Not applicable	Not applicable	ETSI EN 301 489-1 [1], clause 8.4
Harmonic current emissions	AC mains input port	Applicable	Not applicable	Not applicable	ETSI EN 301 489-1 [1], clause 8.5
Voltage fluctuations and flicker	AC mains input port	Applicable	Not applicable	Not applicable	7.1.2
Conducted emission	Wired network port	Applicable	Not applicable	Not applicable	ETSI EN 301 489-1 [1], clause 8.7

7.1.2 Special conditions

The following special conditions set out in table 3 relate to the EMC emission measurements and limits used in ETSI EN 301 489-1 [1], clause 8.

Table 3: Special conditions for EMC emission 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 8
8.3 DC power input/output ports	The requirements of ETSI EN 301 489-1 [1] clause 8.3 shall be applied where the cable length exceeds 3 m or is connected to a vehicle power supply.
8.6 Voltage fluctuations and flicker	The requirements of ETSI EN 301 489-1 [1] clause 8.6 shall be applied with the exception of the first paragraph of clause 6.1 of EN 61000-3-3 [6].

7.2 Immunity

7.2.1 General

Table 4 contains the applicability of EMC immunity measurements to the relevant ports of radio and/or associated ancillary equipment.

Table 4: Immunity requirements

Phenomenon	Port	Applicability			Reference clause	Performance criteria clause
		Fixed equipment	Vehicular equipment	Portable equipment		
RF electromagnetic field (80 MHz to 6 000 MHz)	Enclosure	Applicable	Applicable	Applicable	ETSI EN 301 489-1 [1], clause 9.2 and clause 7.2.2 of present document	6.2
Electrostatic discharge	Enclosure	Applicable	Applicable	Applicable	ETSI EN 301 489-1 [1], clause 9.3 and clause 7.2.2 of present document	6.3
Fast transients common mode	Signal, wired network and control	Applicable	Not applicable	Not applicable	ETSI EN 301 489-1 [1], clause 9.4 and clause 7.2.2 of present document	6.3
	DC power	Applicable	Not applicable	Not applicable		
	AC mains power	Applicable	Not applicable	Not applicable		
RF common mode 0,15 MHz to 80 MHz	signal, wired network and control	Applicable	Not applicable	Not applicable	ETSI EN 301 489-1 [1], clause 9.5	6.2
	DC power	Applicable	Applicable	Not applicable		
	AC mains power	Applicable	Applicable	Not applicable		
Transients and surges	DC power input	not applicable	Applicable	Not applicable	ETSI EN 301 489-1 [1], clause 9.6	6.3
Voltage dips and interruptions	AC mains power input	Applicable	Not applicable	Not applicable	ETSI EN 301 489-1 [1] clause 9.7 and clause 7.2.2 of present document	6.3
Surges, line to line and line to ground	AC mains power input ports, wired network ports	Applicable	Not applicable	Not applicable	ETSI EN 301 489-1 [1], clause 9.8 and clause 7.2.2 of present document	6.3
	Wired network	Applicable	Not applicable	Not applicable		

Portable equipment, or combinations of equipment, capable of being powered for intended use by the main battery of a vehicle shall additionally be considered as vehicular equipment.

Portable or vehicular equipment, or combinations of equipment, capable of being powered for intended use by AC mains shall additionally be considered as fixed equipment.

7.2.2 Special conditions

The following special conditions set out in table 5, relate to the immunity test methods and performance criteria used in ETSI EN 301 489-1 [1], clause 9.

Table 5: 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
9.7.3 Performance criteria; Voltage dips and interruptions	For a voltage dip corresponding to a reduction of the supply voltage of 30 % for 10 ms the performance criteria shall apply (see clause 6.2).

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 301 489-20					
Requirement				Requirement Conditionality	
No	Description	Essential requirements of Directive	Clause(s) of the present document	U/C	Condition
1	Emissions: Enclosure of ancillary equipment measured on a stand-alone basis	3.1(b)	7.1	U	
2	Emissions: DC power input/output ports	3.1(b)	7.1	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	3.1(b)	7.1	C	Only where equipment has AC mains power input and/or output ports
4	Emissions: Harmonic current emission (AC mains input port)	3.1(b)	7.1	C	Only where equipment has AC mains power input ports
5	Emissions: Voltage fluctuations and flicker (AC mains input ports)	3.1(b)	7.1	C	Only where equipment has AC mains power input ports
6	Emissions: Wired network ports	3.1(b)	7.1	C	Only where equipment has wired network ports
7	Immunity: Radio frequency electromagnetic field (80 MHz to 6 000 MHz)	3.1(b)	7.2	U	
8	Immunity: Electrostatic discharge	3.1(b)	7.2	U	
9	Immunity: Fast transients common mode	3.1(b)	7.2	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	3.1(b)	7.2	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	3.1(b)	7.2	C	Only where equipment is fitted to a vehicle power supply
12	Immunity: Voltage dips and interruptions	3.1(b)	7.2	C	Only where equipment has AC mains power input ports
13	Immunity: Surges, line to line and line to ground	3.1(b)	7.2	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.

Essential requirements of Directive

Identification of article(s) defining the requirement in the Directive.

Clause(s) of the present document

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 (informative): Definitions of MESs within the scope of the present document

B.0 General

The present document covers types of MES equipment as set out below.

B.1 MESs operating within 1,6 GHz/2,4 GHz band

The present document applies to Mobile Earth Stations (MESs), with both transmit and receive capabilities for operation in a Satellite Personal Communications Network (S-PCN).

MES equipment may be handheld, portable or vehicle mounted. Unless otherwise stated in the present document, the present document only applies to the MES component of a multi-mode terminal.

The Mobile Satellite Service (MSS) frequency bands within which the MESs operate are given in table B.1.

Table B.1: Mobile Satellite Service (MSS) frequency bands

Mode of operation	MSS frequency bands
MESs transmit	1 610 MHz to 1 626,5 MHz
MESs receive	1 613,8 MHz to 1 626,5 MHz 2 483,5 MHz to 2 500 MHz

B.2 MESs operating within the 1,5 GHz/1,6 GHz

The present document applies to Mobile Earth Stations (MESs), with both transmit and receive capabilities for operation in a Satellite Personal Communications Network (S-PCN).

MES equipment may be portable, vehicle mounted or fixed. Unless otherwise stated in the present document, the present document only applies to the MES component of a multi-mode terminal.

The Mobile Satellite Service (MSS) frequency bands within which the MESs operate are given in table B.2.

Table B.2: Mobile Satellite Service (MSS) frequency bands

Mode of operation	MSS frequency bands
MESs transmit	1 626,5 MHz to 1 660,5 MHz 1 668,0 MHz to 1 675,0 MHz
MESs receive	1 518 MHz to 1 559 MHz

B.3 MESs operating within 2,0 GHz band

The present document applies to Mobile Earth Stations (MESs), with both transmit and receive capabilities for operation in a Satellite Personal Communications Network (S-PCN).

MES equipment may be handheld, portable or vehicle mounted. Unless otherwise stated in the present document, the present document only applies to the MES component of a multi-mode terminal.

The Mobile Satellite Service (MSS) frequency bands within which the MESs operate are given in table B.3.

Table B.3: Mobile Satellite Service (MSS) frequency bands

Mode of operation	MSS frequency bands
MESs transmit	1 980 MHz to 2 010 MHz
MESs receive	2 170 MHz to 2 200 MHz

B.4 MESs operating below 1 GHz

The present document applies to Mobile Earth Stations (MESs), with both transmit and receive capabilities for operation in a Low Earth Orbits (LEOs) Network providing Low Bit Rate Data Communications (LBRDCs).

MES equipment may be handheld, portable or vehicle mounted.

The Mobile Satellite Service (MSS) frequency bands within which the MESs operate are given in table B.4.

Table B.4: Mobile Satellite Service (MSS) frequency bands

Mode of operation	MSS frequency bands
MESs transmit	148 MHz to 150,05 MHz 235 MHz to 322 MHz 335,4 MHz to 399,9 MHz 399,9 MHz to 400,05 MHz
MESs receive	137 MHz to 138 MHz 235 MHz to 322 MHz 335,4 MHz to 399,9 MHz 400,15 MHz to 401 MHz

B.5 MESs operating in the 11 GHz/12 GHz/14 GHz frequency bands

The present document applies to Mobile Earth Stations (MESs), transmitting data via geostationary satellites.

MES equipment may be vehicle mounted or portable.

The frequency bands within which the MESs operate are given in table B.5.

Table B.5: Frequency bands

Mode of operation	MSS frequency bands
MESs transmit	14,00 GHz to 14,25 GHz
MESs receive	10,70 GHz to 11,70 GHz 12,50 GHz to 12,75 GHz

Annex C (informative): Change history

Version	Information about changes
2.1.1	Updated for RED compliance
2.1.2	Alignment with EC feedback and the mapping of requirements with ETSI EN 301 489-1 (V2.2.3)

History

Document history		
V1.1.1	December 2000	Publication
V1.2.1	November 2002	Publication
V2.1.1	April 2019	Publication
V2.1.2	March 2021	EN Approval Procedure AP 20210622: 2021-03-24 to 2021-06-22