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ETSI EN 301 489-4 V2.1.1 (2012-11)



Harmonized European Standard

**Electromagnetic compatibility
and Radio spectrum Matters (ERM);
ElectroMagnetic Compatibility (EMC)
standard for radio equipment and services;
Part 4: Specific conditions for fixed radio links and
ancillary equipment** 

Reference

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Foreword

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

The present document has been produced by ETSI in response to a mandate from the European Commission issued under Directive 98/34/EC [i.2] as amended by Directive 98/48/EC [i.11].

The title and reference to the present document are intended to be included in the publication in the Official Journal of the European Union of titles and references of Harmonized Standard under the Directive 1999/5/EC [i.1].

See article 5.1 of Directive 1999/5/EC [i.1] for information on presumption of conformity and Harmonised Standards or parts thereof the references of which have been published in the Official Journal of the European Union.

The present document is part 4 of a multi-part deliverable. Full details of the entire series can be found in part 1 [1].

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Introduction

The present document is part of a set of standards developed by ETSI and is designed to fit in a modular structure to cover all radio and telecommunications terminal equipment within the scope of the R&TTE Directive [i.1]. The modular structure is shown in EG 201 399 [i.10].

1 Scope

The present document, together with EN 301 489-1 [1], covers the assessment of Fixed Radio Links and ancillary equipment in respect of ElectroMagnetic Compatibility (EMC).

Technical specifications related to the antenna port of the radio 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.

The present document specifies the applicable test conditions, performance assessment and performance criteria for Analogue and Digital Fixed Radio Links operating as fixed Point-to-Point, and Point-to-Multipoint systems as defined in annex A, including the associated ancillary equipment.

Examples of Fixed Radio Links are given in annex A.

In case of differences (for instance concerning special conditions, definitions, abbreviations) between the present document and EN 301 489-1 [1], the provisions of the present document take precedence.

The processing and protection switch, (de)modulator, transmitter, receiver, RF filters, branching networks, feeders are covered by the present document. The multiplexing and/or de-multiplexing elements are covered if they form part of the transmitter, receiver and/or transceiver.

The environmental classification and the emission and immunity requirements used in the present document are as stated in EN 301 489-1 [1], except for any special conditions included in 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 specific references, only the cited version applies. For non-specific references, the latest version of the reference 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.

2.1 Normative references

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

- [1] ETSI EN 301 489-1 (V1.9.2): "Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements". ↴

↴ 2.2 Informative references

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 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).
- [i.2] Directive 98/34/EC 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.
- [i.3] ITU-R Recommendation F.1191-1: "Bandwidths and unwanted emissions of digital radio-relay systems".

- [i.4] ITU-R Recommendation F.746-3: "Radio-frequency channel arrangements for radio-relay systems".
- [i.5] ETSI EN 302 217-2-2: "Fixed Radio Systems; Characteristics and requirements for point-to-point equipment and antennas; Part 2-2: Digital systems operating in frequency bands where frequency co-ordination is applied; Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive".
- [i.6] ETSI EN 302 217-3: "Fixed Radio Systems; Characteristics and requirements for point-to-point equipment and antennas; Part 3: Equipment operating in frequency bands where both frequency coordinated or uncoordinated deployment might be applied; Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive".
- [i.7] ETSI EN 302 326-2: "Fixed Radio Systems; Multipoint Equipment and Antennas; Part 2: Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive for Digital Multipoint Radio Equipment".
- [i.8] ETSI EN 301 460-1: "Fixed Radio Systems; Point-to-multipoint equipment; Part 1: Point-to-multipoint digital radio systems below 1 GHz - Common parameters".
- [i.9] ETSI EN 301 997-1: "Transmission and Multiplexing (TM); Multipoint equipment; Radio Equipment for use in Multimedia Wireless Systems (MWS) in the frequency band 40,5 GHz to 43,5 GHz; Part 1: General requirements".
- [i.10] ETSI EG 201 399: "Electromagnetic compatibility and Radio spectrum Matters (ERM); A guide to the production of Harmonized Standards for application under the R&TTE Directive".
- [i.11] Directive 98/48/EC of the European Parliament and of the Council of 20 July 1998 amending Directive 98/34/EC laying down a procedure for the provision of information in the field of technical standards and regulations.

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in EN 301 489-1 [1], clause 3 and the following apply:

Base Station (BS): alternative name for Central Station

Central Station (CS): which can be subdivided into two units:

- the exchange unit, also called Central Controller Station (CCS) - (interface to the local switch); and
- the radio unit, also called Central Radio Station (CRS) - (central base band/radio transceiver).

NOTE: In some deployments the term Base Station is also used in place of Central Station. For the purposes of the present standard either terms are assumed and are completely interchangeable.

CHannel Separation (CHS): CHannel Separation (CHS) is taken as $XS/2$ for alternated frequency channel arrangements according to ITU-R Recommendation F.1191-1 [i.3] and XS for co-channel and interleaved frequency channel arrangements as defined by ITU-R Recommendation F.746-3 [i.4], XS is the radio-frequency separation between the centre frequencies of adjacent radio-frequency channels on the same polarization and in the same direction of transmission.

operating frequency range: range(s) of radio frequencies covered by the Equipment Under Test (EUT) without any change of units

Repeater Station (RS): radio repeater outstations with or without subscriber interfaces

Terminal station (TS): outstations with subscriber interfaces

3.2 Abbreviations

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

AC	Alternating Current
BER	Bit Error Ratio
BS	Base Station
CCS	Central Controller Station
CHS	Channel Separation
CR	Continuous phenomena applied to Receivers
CRS	Central Radio Station
CS	Central Station
CT	Continous phenomena applied to Transmitters
DC	Direct Current
EM	ElectroMagnetic
EMC	ElectroMagnetic Compatibility
EUT	Equipment Under Test
RF	Radio Frequency
RS	Repeater Station
TR	Transient phenomena applied to Receivers
TS	Terminal Station
TT	Transient phenomena applied to Transmitters \blacktriangle

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 fixed radio links are specified in the present document.

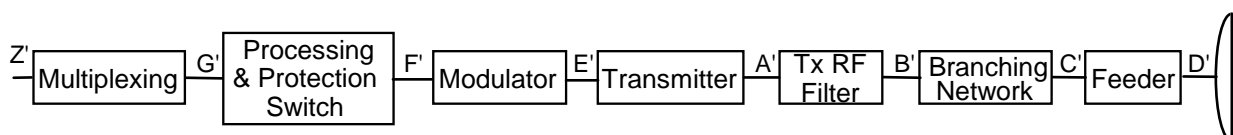
4.1 General

For emission and immunity tests the test modulation, test arrangements, etc., as specified in the present document, clauses 4.1.1 to 4.3.2, shall apply.

4.1.1 Test conditions and configurations

This clause defines the test conditions and configurations for the emission and immunity tests as follows:

- a transmitter shall, as a minimum, comprise the element between E' and A' of figure 1. Additionally the transmitter may comprise any of the other elements from the transmitter chain shown in figure 1. If these additional elements are part of the transmitter or system they shall also meet the requirements of the present document;

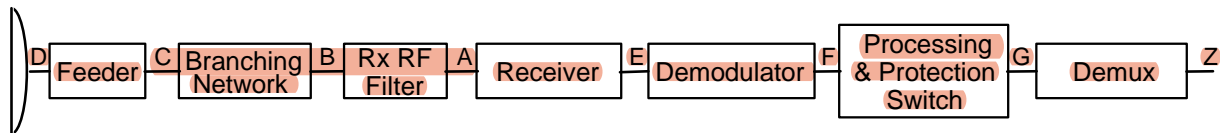


NOTE 1: For the purposes of defining the reference points, the branching network (B' to C') does not include a hybrid.

NOTE 2: Points B' and C' may coincide, dependent on the equipment configuration.

Figure 1: Elements of a transmitter

- a receiver shall, as a minimum, comprise the element between A and E of figure 2. Additionally the receiver may comprise any of the other elements from the receiver chain shown in figure 2. If these additional elements are part of the receiver or system they shall also meet the requirements of the present document;



NOTE 1: For the purposes of defining the reference points, the branching network (B to C) does not include a hybrid.

NOTE 2: Points B and C may coincide, dependent on the equipment configuration.

Figure 2: Elements of a receiver

- a transceiver shall comprise as a minimum the elements E' to A' and A to E shown in figures 1 and 2, and additionally it may comprise any combinations of the other elements. If these additional elements are part of the transceiver they shall also meet the requirements of the present document;
- the equipment shall be tested under conditions which are within the manufacturer's declared range of humidity, temperature and supply voltage;
- the test configuration shall be as close to normal intended use as possible;
- if the equipment is part of a system, or can be connected to ancillary equipment, then it shall be acceptable to test the equipment while connected to the minimum configuration of ancillary equipment necessary to exercise the ports;
- ports which in normal operation are connected to ancillary or other equipment shall be either connected to such equipment, or to a representative termination to simulate the input/output characteristics of the ancillary or other equipment. Radio Frequency (RF) input/output ports shall be correctly terminated; ▲
- ▲ • if the equipment has a large number of ports, then a sufficient number shall be selected to simulate actual operation conditions and to ensure that all the different types of termination are tested;
- ports which are not connected to cables during normal intended operation, e.g. service connectors, programming connectors, temporary connectors etc. shall not be connected to any cables for the purpose of ElectroMagnetic Compatibility (EMC) testing. Where cables have to be connected to these ports, or interconnecting cables have to be extended in length in order to exercise the EUT, precautions shall be taken to ensure that the evaluation of the EUT is not affected by the addition or extension of these cables;
- the test conditions, test configuration and mode of operation shall be recorded in the test report.

4.1.2 Emission tests

The provisions EN 301 489-1 [1], clause 8 shall apply with the following modification.

For Point-to-Multipoint systems a communications link shall be established, which shall comprise of the Central Station and a minimum of one Terminal Station. These stations are tested separately.

4.1.3 Immunity tests

The provisions of EN 301 489-1 [1], clause 9.1 shall apply with the following modifications.

The test configuration shall for transmitters be in accordance with the principle of figure 3, and for receivers it shall be in accordance with the principle of figure 4, and for transceiver shall be in accordance with the principle of figure 5.

The measuring equipment shall be located outside the test environment. Adequate measures shall be taken to avoid any effects of the unwanted signals on the measuring equipment.

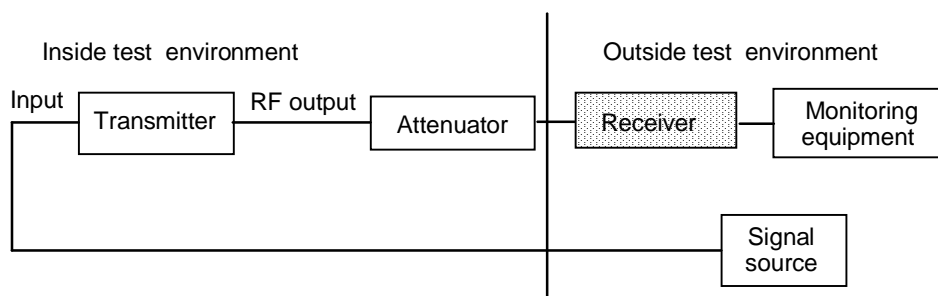


Figure 3: Test configuration for transmitters

During immunity tests the transmitter shall be operated at its rated output power. The input to the transmitter shall be in accordance with clause 4.2.1 (see figure 3). A communication link shall be established at the start of the test and be maintained during the test.

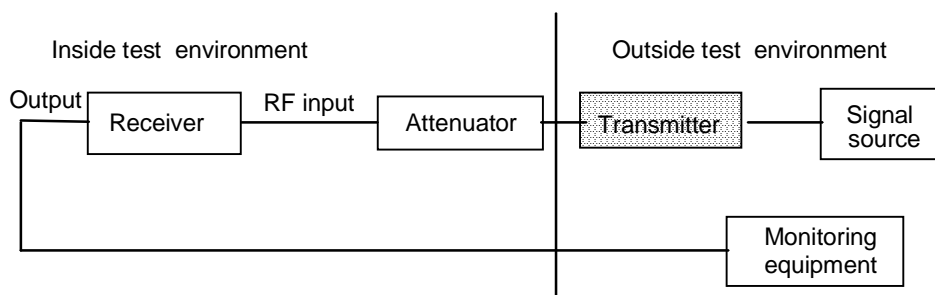


Figure 4: Test configuration for receivers

During immunity tests for receivers, the wanted RF input signal, coupled to the receiver, shall be in accordance with clause 4.2.3 (see figure 4). A communication link shall be established at the start of the test and be maintained during the test. ⚠

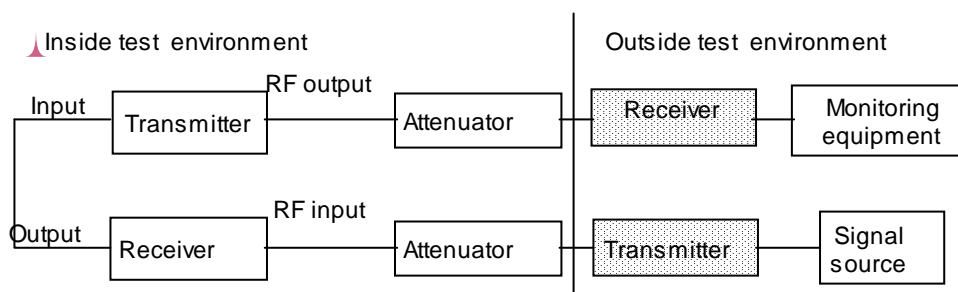


Figure 5: Test configuration of transceivers

In the case of duplex transceivers where the transmitter and receiver cannot operate at the same radio frequency, the wanted input signal, coupled to the receiver, shall be in accordance with clause 4.2.3. The transmitter shall be operated at its rated output power, and with its input coupled to the output of the receiver (repeater mode) (see figure 5).

The same test configuration also applies where the transmitters and receivers operate at the same radio frequency.

The measurement shall be made in the mode of operation as required in this clause.

A communication link shall be established at the start of the test and be maintained during the test.

For the immunity tests of ancillary equipment without a separate pass/fail criteria, the receiver, transmitter or transceiver coupled to the ancillary equipment, shall be used to judge whether the ancillary equipment passes or fails.

For Point-to-Multipoint systems the minimum configuration shall comprise of one Central Station and one terminal station, unless more terminal stations are required to establish a representative test configuration.

A communication link shall be established at the start of the test and maintained during the test, between the Central Station and a Terminal Station(s).

These stations are tested separately.

4.2 Arrangements for test signals

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

4.2.1 Arrangements for test signals at the input of the transmitter

The provisions of EN 301 489-1 [1], clause 4.2.1 shall apply with the following modifications.

The input of the transmitter shall be coupled via the normal input connector to the signal source shown in figures 3 and 5.

The wanted signal(s) shall be (a) representative baseband input signal(s) corresponding to normal operation.

4.2.2 Arrangements for test signals at the output of the transmitter

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

To establish a communication link the wanted output signal shall be delivered from the transmitter RF output via suitable attenuation through a coaxial cable or waveguide. Adequate measures shall be taken to minimize the effects of unwanted currents on the external conductor of the coaxial cable or waveguide at the point of entry to the EUT. Mismatch errors may be avoided by placing the attenuators close to the EUT.

If the transmitter RF output cannot be recovered via connection another antenna of the same type may be used to retrieve the wanted output signal from the transmitter. ▲

▲ 4.2.3 Arrangements for test signals at the input of the receiver

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

The wanted signal shall be a representative modulated RF input signal corresponding to normal operation.

To establish a communication link the wanted input signal shall be applied to the RF input of the receiver via a coaxial cable or waveguide. Adequate measures shall be taken to minimize the effects of unwanted currents on the external conductor of the coaxial cable or waveguide at the point of entry to the EUT. Mismatch errors may be avoided by placing the attenuators close to the EUT.

If the receiver RF input cannot be applied via connection another antenna of the same type may be used to apply the wanted input signal to the receiver. The source of the wanted input signal shall be located outside of the test environment.

For digital equipment, including Point-to-Multipoint equipment, the input signal level shall be at a nominal value of 15 dB above the receiver input level for a Bit Error Ratio (BER) of 1×10^{-5} .

The input signal level for analogue equipment shall be set to 15 dB above the input signal level that produces the reference signal to noise ratio. If the reference signal to noise ratio is not specified in the appropriate product standard, the level specified by the manufacturer shall be used.

These levels are close to normal operation and sufficient to avoid the broadband noise from the power amplifiers, which generate the disturbing EM phenomena, from influencing the measurement.

4.2.4 Arrangements for test signals at the output of the receiver

The provisions of EN 301 489-1 [1], clause 4.2.4 shall apply.

4.3 Exclusion bands

The provisions of EN 301 489-1 [1], clause 4.3 shall apply.

4.3.1 Exclusion bands for receivers

The exclusion band is the relevant operating frequency band, extended at each end by ± 5 % of the centre frequency.

4.3.2 Exclusion bands for transmitters

Exclusion bands shall not be applied when measuring transmitters in standby mode.

For the purpose of the present document, the exclusion band shall extend over the frequencies above and below the fundamental transmitting frequency, but separated from the centre frequency of the emission by 250 % of the relevant Channel Separation (CHS) of the radio-frequency channel arrangement where the system is to be placed. When the CHS is not defined the exclusion band shall extend over the frequencies above and below the fundamental transmitting frequency but separated from the centre frequency of the emission by 250 % of the necessary bandwidth.▲

▲ 5 Performance assessment

5.1 General

The provision of EN 301 489-1 [1], clause 5.1 shall apply.

5.2 Equipment which can provide a communications link

The test arrangement and signals given in clause 4 apply to radio equipment or a combination of a radio equipment and ancillary equipment which permits the establishment of a communications link.

5.3 Equipment which does not provide a communications link

If the equipment is of a specialized nature (see clause 6) which does not permit a communications link to be established, such as protection switching equipment, or ancillary equipment tested in isolation, (i.e. not connected to radio equipment), 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. The manufacturer shall provide the method of observing the degradation of performance of the equipment.

The performance assessment carried out shall be simple, but at the same time give adequate proof that the primary functions of the equipment are operational.

5.4 Ancillary equipment

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

5.5 Equipment classification

Radio link equipment covered by the present document is only intended for fixed use and powered either by AC mains or DC power supply.

Therefore, for emission and immunity tests only the requirements for radio and ancillary equipment for fixed used shall apply (see EN 301 489-1 [1], clauses 7.1 and 7.2, table 1 and table 2 respectively).

6 Performance criteria

The equipment shall meet the minimum performance criteria as specified in clauses 6.1, 6.2 and 6.3, as appropriate.▲▲▲

6.1 Performance criterion for Continuous phenomena applied to Transmitters (CT) and Receivers (CR)

The provision of EN 301 489-1 [1], clause 6.1 shall apply with the following modifications.

The communication link shall be maintained during and after the test.

The specific performance criteria of clause 6.3, for continuous phenomena, shall additionally apply.

6.2 Performance criterion for Transient phenomena applied to Transmitters (TT) and Receivers (TR)

The provision of EN 301 489-1 [1], clause 6.2 shall apply with the following modifications.

The communication link shall be maintained after the test.

The specific performance criteria of clause 6.3, for transient phenomena, shall additionally apply.

6.3 Specific performance criteria

6.3.1 Digital signal ports

The performance of the equipment shall be verified for digital signal ports:

- by measuring the number of induced bit errors on the main signal port during all exposures;
- by testing the functionality of the main signal port and the other signal ports after the exposure;
- by verifying that corruption of software and data held in memory has not occurred.

To allow for background errors which may occur at any time, the test can be repeated up to three times to determine any correlation between eventual errors and the EMC phenomena.

6.3.1.1 Performance criterion for continuous phenomena

The number of bit errors at each individual exposure shall not exceed the maximum number of errors stated by the manufacturer for intended operation.

The number of errors is calculated as:

$$(\text{the maximum bit error ratio specified by the manufacturer}) \times (\text{bit rate}) \times (\text{test time}).$$

The test time is taken to be the dwell time at each frequency of the exposure.

6.3.1.2 Performance criterion for transient phenomena

Loss of frame alignment or loss of synchronization is not allowed during each individual exposure. No alarms shall be generated as a result of the electromagnetic stress.

The above does not apply to surge testing where some loss of frame alignment may be expected. For this test, the EUT shall operate as intended following the cessation of the exposure.

6.3.2 Analogue voice frequency signal ports

The performance of the equipment shall be verified for analogue voice frequency signal ports:

- by measuring the audio signal break-through (demodulated 1 kHz) on the signal port during continuous exposures in both signal path directions covering both analogue to digital conversion and digital to analogue conversion;

- by testing the functionality of the main signal port and the other signal ports after the transient exposures;
- by verifying that corruption of software and data held in memory has not occurred.

6.3.2.1 Performance criterion for continuous phenomena

- The noise signal level received from the EUT measured in an impedance of 600 Ω shall not be greater than -40 dBm.▲

▲ 6.3.2.2 Performance criterion for transient phenomena

- The EUT shall return automatically to normal performance after the cessation of the exposure.

6.3.3 Ethernet and packet-data interfaces

To interfaces operating in packet mode the criteria below apply.

6.3.3.1 Performance criterion for continuous phenomena

For interfaces which are intended for the transmission of third party data traffic, a selected port shall be connected to test equipment (e.g. a data communications analyser) as a single point-to-point data link. This will avoid excessive failed transmission attempts caused by data collisions and bus contention problems.

The interface shall be suitably exercised and monitored throughout the test period for errored frames.

No more than 5 % additional errored frames above the quiescent level shall be permitted during the exposure.

6.3.3.2 Performance criterion for transient phenomena

The data link connection shall be maintained.

6.3.4 Service and maintenance interfaces

This type of ports is not intended to be permanently connected, and therefore is not subjected to immunity tests. After the conclusion of immunity tests it shall be verified that the performance of these ports meets the manufacturer's specifications.

6.3.5 Synchronization interfaces

The performance of slave clock ports shall be checked with the equipment synchronized with an external source.

6.3.5.1 Performance criterion for continuous phenomena

During the exposure, synchronization shall not be lost.

6.3.5.2 Performance criteria for transient phenomena

No alarm indications shall persist after the exposure.

The functional performance according to the manufacturer's specification shall be verified following cessation of the exposure.

6.3.6 Remote alarm interfaces

These interfaces are defined by the manufacturer.▲▲▲

6.3.6.1 Performance criterion for continuous phenomena

No false alarms shall occur during continuous exposures.

6.3.6.2 Performance criterion for transient phenomena

No false alarm indications shall persist after the exposure.

6.4 Performance criteria for ancillary equipment tested on a stand alone basis

The provision of EN 301 489-1 [1], clause 6.4 shall apply.

7 Applicability overview tables

7.1 Emission

7.1.1 General

The table 2 in EN 301 489-1 [1], contains the applicability of EMC emission measurements to the relevant ports of radio and/or associated ancillary equipment.

For fixed radio link equipment, only the part of table 2 which specifies the requirements for radio and ancillary equipment for fixed use shall apply.

7.1.2 Special conditions

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

Table 1: Special conditions for EMC emission tests

Reference to clauses in EN 301 489-1 [1]	Special product-related conditions, additional to or modifying the test conditions in EN 301 489-1 [1], clause 8
8.2.3: Limits; Enclosure of ancillary equipment measured on a stand alone basis	The radiated emissions from the enclosure of the radio equipment shall meet the same requirements as stated for the enclosure of ancillary equipment in EN 301 489-1 [1], clause 8.2.
8.3.3: Limits; DC power input/output port	The emission limits for DC power ports given in table 6 of EN 301 489-1 [1] shall apply.

7.2 Immunity

7.2.1 General

The table 3 in EN 301 489-1 [1], contains the applicability of EMC immunity measurements to the relevant ports of radio and/or associated ancillary equipment.

For fixed radio link equipment, only the part of table 3 of EN 301 489-1 [1] which specifies the requirements for radio and ancillary equipment for fixed use shall apply.

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 EN 301 489-1 [1], clause 9.

Table 2: Special conditions for EMC immunity tests

Reference to clauses in EN 301 489-1 [1]	Special product-related conditions, additional to or modifying the test conditions in EN 301 489-1 [1], clause 9
9.7.3: Performance criteria; Voltage dips and interruptions	Voltage interruptions: For voltage interruptions, temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls.

Annex A (informative): Examples of Fixed Radio Link equipment within the scope of the present document

The following clauses provide examples of the types of equipment covered by the present document.

A.1 Fixed Radio Systems; Point-to-point equipment; intended for operation in the frequency bands from 1,3 GHz to 86 GHz

The present document applies to Fixed radio link. Definitions of such Fixed Radio Link equipment and associated ancillary equipment are found in the following functional radio standards:

- EN 302 217-2-2 [i.5]: "Fixed Radio Systems; Characteristics and requirements for point-to-point equipment and antennas; Part 2-2: Digital systems operating in frequency bands where frequency co-ordination is applied; Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive".
- EN 302 217-3 [i.6]: "Fixed Radio Systems; Characteristics and requirements for point-to-point equipment and antennas; Part 3: Equipment operating in frequency bands where both frequency coordinated or uncoordinated deployment might be applied; Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive".

A.2 Fixed Radio Systems; Point-to-Multipoint equipment; intended for operation in the frequency band below 1 GHz and in frequency bands from 1 GHz to 40 GHz

The present document applies to Fixed radio link. Definitions of such Fixed Radio Link equipment and associated ancillary equipment are found in the following functional radio standards:

- EN 302 326-2 [i.7]: "Fixed Radio Systems; Multipoint Equipment and Antennas; Part 2: Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive for Digital Multipoint Radio Equipment".
- EN 301 460-1 [i.8]: "Fixed Radio Systems; Point-to-multipoint equipment; Part 1: Point-to-multipoint digital radio systems below 1 GHz - Common parameters".

▲ A.3 Fixed Radio Systems; Point-to-Multipoint equipment; intended for operation in the 40,5 GHz to 43,5 GHz frequency band

The present document applies to Fixed radio link. Definitions of such Fixed Radio Link equipment and associated ancillary equipment are found in the following functional radio standard:

- EN 301 997-1 [i.9]: "Transmission and Multiplexing (TM); Multipoint equipment; Radio Equipment for use in Multimedia Wireless Systems (MWS) in the frequency band 40,5 GHz to 43,5 GHz; Part 1: General requirements".

Annex B (informative):

Void

History

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