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European Standard (Telecommunications series)

**Electromagnetic compatibility
and Radio spectrum Matters (ERM);
ElectroMagnetic Compatibility (EMC) standard for
Private land Mobile Radio (PMR) and ancillary equipment
(speech and/or non-speech)**



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ETSI

Postal address

F-06921 Sophia Antipolis Cedex - FRANCE

Office address

650 Route des Lucioles - Sophia Antipolis
Valbonne - 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
Sous-Préfecture de Grasse (06) N° 7803/88

Internet

secretariat@etsi.fr

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Foreword

This European Standard (Telecommunications series) has been produced by ETSI Technical Committee Electromagnetic compatibility and Radio spectrum Matters (ERM), and is now submitted for the Voting phase of the ETSI standards Two-step Approval Procedure.

The present document covers both analogue and digital equipment.

The present document, with one or more of the relevant following: ETS 300 086, ETS 300 113, ETS 300 296, ETS 300 341, ETS 300 390 and EN 301 166, is intended to become a Harmonized EMC Standard, the reference of which is intended to be published in the Official Journal of the European Communities referencing Council Directive 89/336/EEC (EMC Directive).

The present document is intended to become a Harmonized EMC Standard for equipment within the scope of I-ETS 300 219.

The technical specifications which are relevant to the EMC Directive are listed in annex A and annex B for I-ETS 300 219.

Annex C contains the ERC Decision which references the technical specifications in the present document for inclusion in national type approval regulations.

For equipment which can be connected to the AC mains supply, the requirements of EN 61000-3-2 and EN 61000-3-3 apply where appropriate from 1-1-2001.

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):	36 months after doa

1 Scope

The present document covers the assessment of radiocommunications and ancillary equipment in respect of ElectroMagnetic Compatibility (EMC). Technical specifications related to the antenna port and emissions for the enclosure port of radio equipment are found in the related product standards for the effective use of the radio spectrum.

The present document specifies the applicable EMC tests, the test methods, the limits and the minimum performance criteria for Private land Mobile Radio (PMR) equipment using analog and/or digital modulation technique (speech and/or non-speech) operating in the frequency range 30 MHz to 1 000 MHz, and the associated ancillary equipment.

The environmental classification used in the present document refers to the environment classification used in the Generic Standards EN 50081-1 [3], EN 50082-1 [4], except for the vehicular environment class which refers to ISO 7637 [12].

The EMC requirements have been selected to ensure an adequate level of compatibility for apparatus at residential, commercial, light industrial and vehicular environments. The levels do not cover extreme cases which may occur in any location but have a low probability of occurrence.

The present document may not cover those cases where a potential source of interference which is producing individually repeated transient phenomena or a continuous phenomena is permanently present, e.g. a radar or broadcast site in the near vicinity. In such a case it may be necessary to use special protection applied to either the source of interference or the interfered part or both.

Compliance of radio equipment to the requirements of the present document does not signify compliance to any requirements related to the use of the equipment (i.e. licensing requirements).

Compliance to the present document does not signify compliance to any safety requirements. However, it is the responsibility of the assessor of the equipment that any observations regarding apparatus becoming dangerous or unsafe as a result of the application of the tests of the present document, should be recorded in the test report.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.
- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

- [1] CISPR Publication No. 16-1: "Specification for radio disturbance and immunity measuring apparatus and methods. Part 1: Radio disturbance and immunity measuring apparatus".
- [2] EN 55022 (1994): "Limits and methods of measurement of radio disturbance characteristics of information technology equipment".
- [3] EN 50081-1 (1992): "Electromagnetic compatibility - Generic emission standard - Part 1: Residential, commercial and light industry".
- [4] EN 50082-1 (1998): "Electromagnetic compatibility - Generic immunity standard - Part 1: Residential, commercial and light industry".
- [5] EN 61000-4-1 (1994): "Electromagnetic compatibility (EMC) Part 4: Testing and measurement techniques Section 1: Overview of immunity tests".

- [6] EN 61000-4-2 (1995): "Electromagnetic compatibility (EMC) Part 4: Testing and measurement techniques Section 2: Electrostatic discharge immunity test".
- [7] EN 61000-4-3 (1997): "Electromagnetic compatibility (EMC) Part 4: Testing and measurement techniques Section 3: Radiated, radio-frequency, electromagnetic field immunity test".
- [8] EN 61000-4-4 (1995): "Electromagnetic compatibility (EMC) Part 4: Testing and measurement techniques Section 4: Electrical fast transient/burst immunity test".
- [9] EN 61000-4-5 (1995): "Electromagnetic compatibility (EMC) Part 4: Testing and measurement techniques Section 5: Surge immunity test".
- [10] EN 61000-4-6 (1996): "Electromagnetic compatibility (EMC) Part 4: Testing and measurement techniques Section 6: Immunity to conducted disturbances, induced by radio-frequency fields".
- [11] EN 61000-4-11 (1994): "Electromagnetic compatibility (EMC) Part 4: Testing and measurement techniques Section 11: Voltage dips, short interruptions and voltage variations immunity tests".
- [12] ISO 7637 (1990): "Road vehicles-Electrical disturbance by conduction and coupling; Part 1: Passenger cars and light commercial vehicles with nominal 12 V supply voltage"; and "Part 2: Commercial vehicles with nominal 24 V supply voltage - Electrical transient conduction along supply lines only".
- [13] I-ETS 300 219 (1993): "Radio Equipment and systems (RES); Land mobile service; Technical characteristics and test conditions for radio equipment transmitting signals to initiate a specific response in the receiver".

3 Definitions and abbreviations

3.1 Definitions

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

This type of radiocommunications equipment (apparatus) is used in a fixed, mobile or a portable application.

radiocommunications equipment: an apparatus which includes one or more transmitters and/or receivers and/or parts thereof.

ancillary equipment: equipment (apparatus), used in connection with a receiver, transmitter or transceiver is considered as an ancillary equipment (apparatus) if:

- the equipment is intended for use in conjunction with a receiver, transmitter or transceiver to provide additional operational and/or control features to the radio equipment (e.g. to extend control to another position or location); and
- the equipment cannot be used on a stand alone basis to provide user functions independently of a receiver, transmitter or transceiver; and
- the receiver, transmitter or transceiver 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.

enclosure port: the physical boundary of the apparatus onto which an electromagnetic field may radiate or impinge.

integral antenna: an antenna designed to be connected directly to the equipment with or without the use of an external connector and considered to be part of the equipment. An integral antenna may be fitted internally or externally to the equipment.

port: a particular interface of the specified equipment (apparatus) with the external electromagnetic environment.

3.2 Abbreviations

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

BER	Bit Error Ratio
CR	Continuous phenomena applied to Receivers
CT	Continuous phenomena applied to Transmitters
EUT	Equipment Under Test
LISN	Line Impedance Stabilizing Network
PMR	Private land Mobile Radio
TR	Transient phenomena applied to Receivers
TT	Transient phenomena applied to Transmitters

4 General test conditions

This clause defines the general test configuration and is relevant for clauses 8 and 9.

4.1 Test conditions and configurations

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.

Where portable (handheld) equipment is provided with a detachable integral antenna, it shall be tested with the antenna fitted in a manner typical of normal intended use, unless specified otherwise.

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 shall be connected to an ancillary equipment or to a representative piece of cable correctly terminated to simulate the impedance of the ancillary equipment, 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 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 Equipment Under Test (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 tests shall be carried out at a point within the specified normal operating environmental range at the rated supply voltage for the equipment.

The test conditions, test configuration and mode of operation shall be recorded in the test report.

4.1.1 Emission tests

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

- the measurement shall be made in the operation mode producing the largest emission in the frequency band being investigated consistent with normal applications;
- an attempt shall be made to maximize the detected radiated emission for example by moving the cables of the equipment.

4.1.2 Immunity tests

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

- the measurement shall be made in the mode of operation as required in subclause 4.1.2.1;

- for the immunity tests of ancillary equipment without 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.

4.1.2.1 Mode of operation

For the immunity tests of transmitters, the transmitter shall be operated at its maximum rated output power, modulated with normal test modulation (subclauses 4.1.2.2 and 4.1.2.3). A communication link shall be established (subclause 4.1.2.4) at the start of the test and maintained during the test.

For the immunity tests of receivers, the wanted input signal, coupled to the receiver, shall be modulated with normal test modulation (subclauses 4.1.2.2 and 4.1.2.5). A communication link shall be established (subclause 4.1.2.6) at the start of the test and maintained during the test.

For the immunity tests of duplex transceivers, the EUT may be configured in the repeater mode, consistent with the conditions given above.

4.1.2.2 Normal test modulation

For analogue speech equipment:

Angle modulated equipment:

- the receiver wanted input signal shall be set to the nominal frequency of the receiver modulated with a sinusoidal audio frequency of 1 000 Hz to a deviation of 60 % peak system;
- the transmitter of the EUT shall be modulated with a sinusoidal audio frequency of 1 000 Hz at a deviation of 60 % peak system deviation.

Non-angle modulated equipment:

- the receiver wanted input signal shall be set to the nominal frequency of the receiver suitably modulated with a sinusoidal audio frequency of 1 000 Hz, which represents normal operation;
- the transmitter of the EUT shall be suitably modulated with a sinusoidal audio frequency of 1 000 Hz, which represents normal operation;
- details concerning the modulation used shall be recorded in the test report.

For digital speech equipment:

- the receiver wanted input signal shall be set to the nominal frequency of the receiver modulated with a test signal specified by the manufacturer which represents normal operation which is in accordance with the appropriate radio product standard;
- the transmitter shall be modulated with a test signal which represents normal operation as specified by the manufacturer which is in accordance with the appropriate radio product standard;
- the manufacturer may have to supply the test modulation/de-modulation equipment;
- details concerning the modulation used shall be recorded in the test report.

For non-speech equipment (data, specific response, etc.):

- the receiver wanted input signal shall be set to the nominal frequency of the receiver modulated with a test signal specified by the manufacturer which represents normal operation which is in accordance with the appropriate radio product standard;
- the transmitter shall be modulated with a test signal which represents normal operation as specified by the manufacturer which is in accordance with the appropriate radio product standard;
- the manufacturer may have to supply the test modulation/de-modulation equipment;
- details concerning the modulation used shall be recorded in the test report.

The test signal generator (modulation) shall be able to produce a continuous stream of data or a repetitive message.

The test signal receiver (de-modulator) shall be, where appropriate, able to produce a readout of Bit Error Ratio (BER) of a continuous data stream or a repetitive readout of message acceptance.

4.1.2.3 Arrangements for test signals at the input of the transmitter

The transmitter shall be modulated with normal test modulation, by an internal or external signal source capable of delivering the normal test modulation.

4.1.2.4 Arrangements for test signals at the output of the transmitter

For equipment without an antenna connector, the wanted signal to establish a communication link shall be delivered from the equipment to an antenna located within the test environment. The measuring equipment for the wanted signal shall be located outside of the test environment. Adequate measures shall be taken to avoid the effect of the unwanted signal on the measuring equipment.

For equipment with an antenna connector, the wanted signal to establish a communication link shall be delivered from the antenna connector by a coaxial cable. The measuring equipment for the wanted signal shall be located outside of the test environment. Adequate measures shall be taken to avoid the effect of the unwanted signal on the measuring equipment.

4.1.2.5 Arrangements for test signals at the input of the receiver

For equipment without an antenna connector, the wanted input signal to establish a communication link shall be presented to the equipment from an antenna located within the test environment. It shall be approximately 40 dB above the minimum level necessary to achieve the performance criteria, measured while the power amplifiers generating the EMC disturbance are switched on but without excitation. This level of the wanted input signal is expected to represent a normal operation signal level and should be sufficient to avoid the broad band noise from the power amplifiers generating the EMC disturbance from influencing the measurement. The source of the wanted input signal shall be located outside of the test environment.

For equipment with an antenna connector, the wanted input signal to establish a communication link shall be presented to the antenna connector by a coaxial cable. The source of the wanted input signal shall be located outside of the test environment and shall be approximately 40 dB above the minimum level necessary to achieve the performance criteria, measured while the power amplifiers generating the EMC disturbance are switched on but without excitation.

4.1.2.6 Arrangements for test signals at the output of the receiver

For speech equipment the audio frequency output of the equipment should be coupled via an electrically non-conductive acoustic tube to an audio distortion meter or other measuring equipment outside of the test environment. Where it is not practical to use an electrically non-conductive acoustic tube, then other means of connecting the receiver output to an audio distortion meter or other measuring equipment shall be provided and recorded in the test report. Precautions shall be taken to ensure that any effect on the test is minimized.

For non-speech equipment the output of the receiver shall be coupled via an electrically non-conductive means to the test equipment outside the test environment. If the equipment has an output connector or port providing the receiver output then this port shall be used via a cable, consistent with the standard cable used in normal operation, connected to the test equipment outside the test environment. The test equipment may be supplied by the manufacturer. Precautions shall be taken to ensure that any effect on the test is minimized.

4.1.2.7 Receiver and receivers of transceivers exclusion band

The exclusion band for receivers and receivers of transceivers is the frequency range determined by the switching range, as declared by the manufacturer, extended as follows:

- the lower frequency of the exclusion band is the lower frequency of the switching range, minus 5 % of the centre frequency of the switching range, or minus 10 MHz, whichever will result in the lowest frequency;
- the upper frequency of the exclusion band is the upper frequency of the switching range, plus 5 % of the centre frequency of the switching range, or plus 10 MHz, which ever will result in the highest frequency.

The switching range is the maximum frequency range over which the receiver can be operated without reprogramming or realignment.

4.1.2.8 Transmitter exclusion band

The exclusion band for transmitters extends ± 25 kHz from the nominal operating frequency of the transmitter.

4.1.2.9 Narrow band responses on receivers and receivers of transceivers

Responses on receivers or receivers of transceivers occurring during the test at discrete frequencies which are narrow band responses (spurious responses) are identified by the following method.

If during the test an unwanted signal creates a degradation of the audio or data output, it is necessary to establish whether the degradation is due to a narrow band response or to a wide band phenomena. Therefore, the unwanted signal frequency is increased by an amount equal to twice the bandwidth of the receiver IF filter immediately preceding the demodulator, as declared by the manufacturer. The test is repeated with the frequency of the unwanted signal decreased by the same amount.

If the degradation disappears, then the response is considered as a narrow band response. If the degradation remains, this may be due to the fact that the offset has made the frequency of the unwanted signal correspond to the frequency of another narrow band response. Under these circumstances the procedure is repeated with the increase and decrease of the frequency of the unwanted signal adjusted two and one half times the bandwidth previously referred to.

If the degradation remains, the phenomena is considered wide band and therefore an EMC problem and the equipment fails the test.

Narrow band responses shall be disregarded.

5 Performance assessment

5.1 General

The manufacturer shall at the time of submission of the equipment for test, supply the following information to be recorded in the test report:

- the primary functions of the radio equipment to be tested during and after the EMC testing;
- the intended functions of the radio equipment which shall be in accordance with the documentation accompanying the equipment;
- the type of modulation, the characteristics of the transmission used for testing (random bit stream, message format, etc.) and the necessary test equipment delivered to enable the assessment of the EUT;
- the ancillary equipment to be combined with the radio equipment for testing (where applicable);
- an exhaustive list of ports, with the maximum cable lengths allowed, classified as either power or signal/control. Power ports shall further be classified as ac or dc power;
- the bandwidth of the IF filter immediately preceding the demodulator.

5.2 Equipment which can provide a continuous 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 continuous communications link

If the equipment is of a specialized nature (see subclause 6.1) which does not permit a communications link to be established or in the case of ancillary equipment tested in isolation, 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

At the manufacturers discretion an ancillary equipment may be:

- declared compliant separately (in isolation) from a receiver, transmitter or transceiver to all the applicable immunity and emission clauses of the present document;
- declared compliant to another appropriate harmonized EMC standard;
- tested with it connected to a receiver, transmitter or transceiver in which case compliance shall be demonstrated to the appropriate clauses of the present document.

5.5 Equipment classification

Portable equipment or combinations of equipment declared as capable of being powered by the battery in a vehicle shall additionally be considered as a vehicular mobile equipment.

Portable or mobile equipment or combinations of equipment declared as capable of being powered by ac mains shall additionally be considered as a base station equipment.

6 Performance criteria

6.1 General

The equipment shall meet the minimum performance criteria as specified in subclauses 6.2, 6.3, 6.4 and 6.5.

The establishment of the communication link at the start of the test, its maintenance and the assessment of the recovered signal are used as the performance criteria for the evaluation of the essential functions of the equipment during and after the test.

A portable equipment powered by the battery in a vehicle shall fulfil the applicable requirements set out by the present document for vehicular mobile equipment.

A portable or mobile equipment powered by ac mains shall fulfil the applicable requirements set out by the present document for base station equipment, although the tests performed are only those applicable to the input/output arrangements of the equipment, the performance criteria remain the same as the original class for the equipment.

If an equipment is of a specialized nature and the performance criteria specified in the table are not appropriate the manufacturer shall declare a substituted specification for an acceptable performance level or performance degradation as required by the present document. The performance specification shall be included in the test report and the product description and documentation.

The performance criteria specified by the manufacturer shall give the same degree of immunity protection as called for in the following subclauses.

6.2 Performance criteria for Continuous phenomena applied to Transmitters (CT)

For speech equipment, the distortion of the audio signal shall be measured during each individual exposure in the test sequence and shall not exceed 25 % measured in a post detection bandwidth determined by a first order band pass filter with a 3 dB bandwidth of 300 Hz to 3 kHz, without the use of psophometrical weighting filter.

For equipment which can be measured using continuous bit streams, a bit error shall not exceed 10^{-2} .

For other non-speech equipment four messages out of five or 90 % of the transmitted symbols shall be received correctly.

At the conclusion of the test the EUT shall operate as intended with no loss of user control functions or stored data, and the communication link shall have been maintained during the test.

Where the EUT is a transmitter only and can be operated in standby mode, tests shall be repeated with the EUT in this mode to ensure that unintentional transmission does not occur.

6.3 Performance criteria for Transient phenomena applied to Transmitters (TT)

At the conclusion of each exposure the EUT shall operate with no user noticeable loss of the communication link.

At the conclusion of the total test comprising the series of individual exposures the EUT shall operate as intended with no loss of user control functions or stored data, as declared by the manufacturer, and the communication link shall have been maintained during the test.

Where the EUT is a transmitter only and can be operated in standby mode, tests shall be repeated with the EUT in this mode to ensure that unintentional transmission does not occur.

6.4 Performance criteria for Continuous phenomena applied to Receivers (CR)

For speech equipment, the distortion of the audio signal shall be measured during each individual exposure in the test sequence and shall not exceed 25 % measured in a post detection bandwidth determined by a first order band pass filter with a 3 dB bandwidth of 300 Hz to 3 kHz, without the use of psophometrical weighting filter.

For equipment which can be measured using continuous bit streams, a bit error shall not exceed 10^{-2} .

For other non-speech equipment four messages out of five or 90 % of the transmitted symbols shall be received correctly.

At the conclusion of the test the EUT shall operate as intended with no loss of user control functions or stored data, and the communication link shall have been maintained during the test.

Where the EUT is a transceiver, under no circumstances shall the transmitter operate unintentionally during the test.

6.5 Performance criteria for Transient phenomena applied to Receivers (TR)

At the conclusion of each exposure the EUT shall operate with no user noticeable loss of the communication link.

At the conclusion of the total test comprising the series of individual exposures the EUT shall operate as intended with no loss of user control functions or stored data, as declared by the manufacturer, and the communication link shall have been maintained during the test.

Where the EUT is a transceiver, under no circumstances shall the transmitter operate unintentionally during the test.

7 Applicability overview tables

7.1 Emission

Table 1

Application	Equipment test requirement			Reference subclause in the present document	Reference document
	Base station and ancillary for fixed use	Mobile and ancillary for vehicular use	Portable and ancillary for portable use		
Enclosure, (stand alone ancillary equipment)	applicable	applicable	applicable	8.1	EN 55022 [2]
DC power input/output port	applicable	applicable	not applicable	8.2	EN 55022 [2] CISPR 16 [1]
AC mains power input/output port	applicable	not applicable	not applicable	8.3	EN 55022 [2]

7.2 Immunity

Table 2

Phenomena	Application	Equipment test requirement			Reference subclause in the present document	Reference document
		Base station and ancillary for fixed use	Mobile and ancillary for vehicular use	Portable and ancillary for portable use		
RF electro-magnetic field 80-1 000 MHz	Enclosure, radio equipment with or without ancillary connected	applicable	applicable	applicable	9.1	EN 61000-4-3 [7]
Electrostatic discharge	Enclosure	applicable	applicable	applicable	9.2	EN 61000-4-2 [6]
Fast transient common mode	Signal & control ports, dc & ac power input ports	applicable	not applicable	not applicable	9.3	EN 61000-4-4 [8]
RF common mode 0,15-80 MHz	Signal & control ports, dc & ac power input ports	applicable	not applicable	not applicable	9.4	EN 61000-4-6 [10]
Transients and surges	DC power input ports	not applicable	applicable	not applicable	9.5	ISO 7637 [12] parts 1&2
Voltage dips and interruptions	AC mains power input ports	applicable	not applicable	not applicable	9.6	EN 61000-4-1 [5]
Surges common and differential mode	AC mains power input ports	applicable	not applicable	not applicable	9.7	EN 61000-4-5 [9]

8 Test methods and limits for emission tests

8.1 Enclosure of ancillary equipment

This test is applicable to the enclosure of ancillary equipment intended to be tested separately, i.e. not connected to the radio equipment.

NOTE: For measurements of unwanted emission from the enclosure port of combinations of ancillary and radio equipment see clause 1, scope.

This test shall be performed on a representative configuration of ancillary equipment.

8.1.1 Definition

This test assesses the ability of ancillary equipment to limit unwanted emissions from the enclosure.

8.1.2 Test method

The test method shall be in accordance with EN 55022 [2].

8.1.3 Limits

The value of the limits from EN 55022 [2] (10 m measuring distance) shall be used for ancillary equipment tested in isolation.

Table 3: Limits for unwanted emissions for ancillary equipment tested in isolation

Frequency range	Limit (quasi-peak)
30 MHz to 230 MHz	30 dB μ V/m
> 230 MHz to 1 000 MHz	37 dB μ V/m

8.2 DC power input/output port

This test is applicable to equipment which may be connected to dc cables longer than 3 metres as stated by the manufacturer in subclause 5.1.

This test shall be performed on a representative configuration of the radio equipment or a representative configuration of the combination of radio and ancillary equipment.

8.2.1 Definition

This test assesses the ability of transmitters, receivers, transceivers and ancillary equipment to limit internal noise from the dc power input/output ports.

8.2.2 Test method

For equipment with a current consumption below 16 A the test method shall be in accordance with EN 55022 [2] and the Line Impedance Stabilizing Networks (LISNs) shall be connected to a dc power source.

For equipment with a current consumption above 16 A the dc power ports shall be connected to 5 μ H LISNs, with 50 Ω measurement ports. The LISNs shall be in accordance with the requirements of Section two of CISPR Publication 16-1 [1].

A measuring receiver shall be connected to each LISN measurement port in turn and the conducted emission recorded. The LISN measurement ports not being used for measurement shall be terminated with a 50 Ω load.

The equipment shall be installed with a ground plane as defined in EN 55022 [2] subclause 10.3. The reference earth point of the LISNs shall be connected to the reference ground plane with a conductor as short as possible.

The measurement receiver shall be in accordance with the requirements of section one of CISPR Publication 16-1 [1].

8.2.3 Limits

The equipment shall meet the limits below (including the average limit and the quasi-peak limit) when using, respectively, an average detector receiver and a quasi-peak detector receiver and measured in accordance with the method described in subclause 8.2.2. If the average limit is met when using a quasi-peak detector, the equipment shall be deemed to meet both limits and measurement with the average detector receiver is unnecessary.

The following limits shall apply:

Table 4: Limits for equipment required to be connected to a local dedicated dc source i.e. not an extensive dc network

Frequency range	Quasi-peak	Average
> 0,15 MHz to 0,5 MHz	79 dB μ V	66 dB μ V
> 0,5 MHz to 30 MHz	73 dB μ V	60 dB μ V

Table 5: Limits for equipment not required to be connected to a local dedicated dc source

Frequency range	Quasi-peak	Average
> 0,15 - 0,5 MHz	66 - 56 dB μ V	56 - 46 dB μ V
> 0,5 - 5 MHz	56 dB μ V	46 dB μ V
> 5 - 30 MHz	60 dB μ V	50 dB μ V
NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0,15 MHz to 0,50 MHz.		

8.3 AC mains power input/output port

This test is applicable to equipment powered by the ac mains.

This test shall be performed on a representative configuration of the radio equipment or a representative configuration of the combination of radio and ancillary equipment.

8.3.1 Definition

This test assesses the ability of transmitters, receivers, transceivers and ancillary equipment to limit internal noise from the ac mains power input/output ports.

8.3.2 Test method

The test method shall be in accordance with EN 55022 [2].

8.3.3 Limits

The value of the limits shall be according to EN 55022 [2].

Table 6: Limits for conducted spurious emissions

Frequency range	Quasi-peak	Average
> 0,15 - 0,5 MHz	66 - 56 dB μ V	56 - 46 dB μ V
> 0,5 - 5 MHz	56 dB μ V	46 dB μ V
> 5 - 30 MHz	60 dB μ V	50 dB μ V
NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0,15 MHz to 0,50 MHz.		

9 Test methods and levels for immunity tests

9.1 Radio frequency electromagnetic field (80-1 000 MHz)

This test is applicable for base station, mobile, portable and ancillary equipment.

This test shall be performed on a representative configuration of the radio equipment or a representative configuration of the combination of radio and ancillary equipment or a representative configuration of the ancillary equipment tested in isolation.

9.1.1 Definition

This test assesses the ability of transmitters, receivers, transceivers and ancillary equipment to operate as intended in the presence of a radio frequency electromagnetic field disturbance at the enclosure.

9.1.2 Test method

The test method shall be in accordance with EN 61000-4-3 [7] except that the following requirements and evaluation of test results shall apply:

- the test level shall be 3 V/m unmodulated. The test signal shall then be amplitude modulated to a depth of 80 % by a sinusoidal audio signal of 400 Hz;
- for receivers and transmitters only, the stepped frequency increments shall be 1 % of the momentary frequency;
- for transmitters in transceivers with a non-continuous duty cycle the stepped frequency increments may be 10 % of the momentary frequency;
- the test shall be performed over the frequency range 80 MHz to 1 000 MHz with the exception of an exclusion band for transmitters, (subclause 4.1.2.8), and for receivers and duplex transceivers, (subclause 4.1.2.7);
- the test shall be carried out on one surface. The surface selected to face the source of the interference signal shall be the one anticipated by the test house to be the most susceptible;
- responses on receivers and duplex transceivers occurring at discrete frequencies which are narrow band responses, are disregarded from the test (see subclause 4.1.2.9);
- the frequencies selected during the test shall be recorded in the test report.

9.1.3 Performance criteria

For transmitters the performance criteria CT (subclause 6.2) shall apply.

For receivers and duplex transceivers the performance criteria CR (subclause 6.4) shall apply.

For ancillary equipment the pass/fail criteria supplied by the manufacturer shall apply, unless the ancillary equipment is tested in connection with receivers, transmitters or transceivers in which case the corresponding performance criteria above shall apply.

9.2 Electrostatic discharge

This test is applicable for base station, mobile, portable and ancillary equipment.

This test shall be performed on a representative configuration of the radio equipment or a representative configuration of the combination of radio and ancillary equipment.

9.2.1 Definition

This test assesses the ability of transmitters, receivers, transceivers and ancillary equipment to operate as intended in the event of an electrostatic discharge.

9.2.2 Test method

The test method shall be in accordance with EN 61000-4-2 [6].

For transmitters, receivers, transceivers and ancillary equipment the following requirements and evaluation of test results shall apply:

- for contact discharge, the equipment shall be tested at ± 2 kV and ± 4 kV; for air discharge, the equipment shall be tested at ± 2 kV, ± 4 kV and ± 8 kV (see EN 61000-4-2 [6], clause 5);
- electrostatic discharges shall be applied to all exposed surfaces of the equipment except where the user documentation specifically indicates a requirement for appropriate protective measures. (EN 61000-4-2 [6], subclause 8.3.1).

9.2.3 Performance criteria

For transmitters the performance criteria TT (subclause 6.3) shall apply.

For receivers and duplex transceivers the performance criteria TR (subclause 6.5) shall apply.

For ancillary the pass/fail criteria supplied by the manufacturer shall apply, unless the ancillary is tested in connection with receivers, transmitters or transceivers in which case the corresponding performance criteria above shall apply.

9.3 Fast transients common mode

This test is applicable for base station equipment and ancillary equipment.

This test shall be performed on ac mains power input ports.

This test shall be performed on signal ports, control ports and dc power input ports when the manufacturer declares that the cables may be longer than 3 m.

Where this test is not carried out on any port because the manufacturer declares that it is not intended to be used with cables longer than 3 m, a list of ports which were not tested for this reason shall be included in the test report.

This test shall be performed on a representative configuration of the radio equipment or a representative configuration of the combination of radio and ancillary equipment.

9.3.1 Definition

This test assesses the ability of transmitters, receivers, transceivers and ancillary equipment to operate as intended in the event of fast transients on one of the input/output ports.

9.3.2 Test method

For transmitters, receivers, transceivers and ancillary equipment, which may have longer cables than 3 m, as declared by the manufacturer, or are connected to the ac mains, the test method shall be in accordance with EN 61000-4-4 [8] except that the following requirements and evaluation of test results shall apply:

- the test level for signal and control ports shall be 0,5 kV open circuit voltage as given in clause 5 of EN 61000-4-4 [8];
- the test level for dc power input ports shall be 0,5 kV open circuit voltage as given in clause 5 of EN 61000-4-4 [8];
- the test level for ac mains power input ports shall be 1 kV open circuit voltage as given in the table in clause 5 of EN 61000-4-4 [8].

For ac and dc power input ports the transients shall be applied (in parallel) to all the wires in the cable with reference to the cabinet reference ground, (true common mode), the source impedance shall be 50 Ω .

9.3.3 Performance criteria

For transmitters the performance criteria TT (subclause 6.3) shall apply.

For receivers and duplex transceivers the performance criteria TR (subclause 6.5) shall apply.

For ancillary equipment the pass/fail criteria supplied by the manufacturer shall apply, unless the ancillary equipment is tested in connection with receivers, transmitters or transceivers in which case the corresponding performance criteria shall apply.

9.4 RF common mode, 0,15 MHz - 80 MHz

This test is applicable for base station, and associated ancillary equipment.

This test shall be performed on signal, control, dc power and ac mains power input ports of base station and fixed ancillary equipment, where the manufacturer declares that the cables may be longer than 1 m.

Where this test is not carried out on any port because the manufacturer declares that it is not intended to be used with cables longer than 1 m (see above), a list of ports which were not tested for this reason shall be included in the test report.

This test shall be performed on a representative configuration of the radio equipment or a representative configuration of the combination of radio and ancillary equipment.

9.4.1 Definition

This test assesses the ability of transmitters, receivers, transceivers and ancillary equipment to operate as intended in the presence of a radio frequency electromagnetic disturbance.

9.4.2 Test method

This test should be performed using the intrusive or direct connection method, where appropriate, see EN 61000-4-6 [10]. The test method may be the current clamp injection method in accordance with EN 61000-4-6 [10]. The following requirements and evaluation of test results shall apply:

- the test level shall be severity level 2 as given in EN 61000-4-6 [10] corresponding to 3 V RMS unmodulated. The test signal shall then be amplitude modulated to a depth of 80 % by a sinusoidal audio signal of 400 Hz;
- the test shall be performed over the frequency range 150 kHz - 80 MHz with the exception of an exclusion band for transmitters, (see subclause 4.1.2.8), and for receivers and duplex transceivers, (see subclause 4.1.2.7);
- for receivers and transmitters only the stepped frequency increments shall be 50 kHz in the frequency range 150 kHz - 5 MHz and 1 % frequency increment of the momentary frequency in the frequency range 5 MHz - 80 MHz;
- for transmitters in transceivers with a non-continuous duty cycle the stepped frequency increments may be 500 kHz in the frequency range 150 kHz - 5 MHz and 10 % frequency increment of the momentary frequency in the frequency range 5 MHz - 80 MHz;
- no intrusive or direct connection shall be made to any of the lines of any input/output port, therefore the current clamp injection method shall be used;
- responses on receivers and duplex transceivers occurring at discrete frequencies which are narrow band responses, are disregarded from the test, (subclause 4.1.2.9);
- the frequencies selected during the test shall be recorded in the test report.

9.4.3 Performance criteria

For transmitters the performance criteria CT (subclause 6.2) shall apply.

For receivers and duplex transceivers the performance criteria CR (subclause 6.4) shall apply.

For ancillary equipment the pass/fail criteria supplied by the manufacturer shall apply, unless the ancillary equipment is tested in connection with receivers, transmitters or transceivers in which case the corresponding performance criteria above shall apply.

9.5 Transients and surges, vehicular environment

These tests are applicable for mobile and ancillary equipment intended for use in a vehicular environment.

These tests shall be performed on 12 V and 24 V dc power input ports of mobile and ancillary equipment, intended for vehicular use.

These test shall be performed on a representative configuration of the radio equipment or a representative configuration of the combination of radio and ancillary equipment.

9.5.1 Definition

These tests assess the ability of transmitters, receivers, transceivers and ancillary equipment to operate as intended in the event of transients and surges present on the dc power input ports in a vehicular environment.

9.5.2 Test method

The test method shall be in accordance with ISO 7637 [12], part 1 applicable for 12 V dc operated equipment and ISO 7637 [12], part 2 applicable for 24 V dc operated equipment except that the following requirements and evaluation of test results shall apply:

- equipment designed to operate at both 12 V and 24 V dc without component change, module change or adjustment shall be tested according to subclause 9.5.2.2;
- equipment designed to operate at both 12 V and 24 V dc but with component change, module change or adjustment shall be tested according to subclauses 9.5.2.1 and 9.5.2.2.

9.5.2.1 Requirements for 12 V dc powered equipment

Where the manufacturer in his installation documentation requires that the equipment to have a direct connection to the 12 V main vehicle battery the following pulses apply:

- pulse 3a and 3b, level II, with the test time reduced to 5 minutes for each;
- pulse 4, level II, 5 pulses, with the characteristics as follows:
 - $V_s = 5 \text{ V}$; $V_a = 2,5 \text{ V}$; $t_6 = 25 \text{ ms}$; $t_8 = 5 \text{ s}$; $t_f = 5 \text{ ms}$.

Where the manufacturer does not require a direct connection to the 12 V main vehicle battery, the following pulses apply, in addition to the pulses 3a, 3b and 4:

- pulse 1, level II: $t_1 = 2,5 \text{ s}$; 10 pulses;
- pulse 2, level II: $t_1 = 2,5 \text{ s}$; 10 pulses;
- pulse 7, level II: 5 pulses.

Where the tests for pulses 1, 2 and 7 are not performed because the manufacturer declares that the equipment requires a direct connection to the vehicle battery, this fact shall be recorded in the test report.

9.5.2.2 Requirements for 24 V dc powered equipment

Where the manufacturer in his installation documentation requires that the equipment to have a direct connection to the 24 V main vehicle battery the following pulses apply:

- pulse 3a and 3b, level II, with the test time reduced to 5 minutes for each;
- pulse 4, level II, 5 pulses, the test shall be carried out in accordance with ISO 7637 [12], part 1 but with the following characteristics:
 - $V_s = 10 \text{ V}$; $V_a = 5,0 \text{ V}$; $t_6 = 25 \text{ ms}$; $t_8 = 5 \text{ s}$; $t_f = 5 \text{ ms}$.

Where the manufacturer does not require a direct connection to the 24 V main vehicle battery, the following pulses apply, in addition to the pulses 3a, 3b and 4:

- pulse 1a, level II: $t_1 = 2,5 \text{ s}$; $R_i = 25 \Omega$; 10 pulses;
- pulse 1b, level II: $t_1 = 2,5 \text{ s}$; $R_i = 100 \Omega$; 10 pulses;
- pulse 2, level II: $t_1 = 2,5 \text{ s}$; 10 pulses.

Where the tests for pulses 1a, 1b and 2 are not performed because the manufacturer declares that the equipment requires a direct connection to the vehicle battery, this fact shall be recorded in the test report.

9.5.3 Performance criteria

For transmitters, pulses 3a and 3b, the performance criteria CT (subclause 6.2) shall apply. For pulses 1, 1a, 1b, 2, 4 and 7 the performance criteria TT (subclause 6.3) shall apply, with the exception that the communication link need not be maintained during exposure and may have to be re-established after the test.

For receivers and duplex transceivers pulses 3a and 3b the performance criteria CR (subclause 6.4) shall apply. For pulses 1, 1a, 1b, 2, 4 and 7 the performance criteria TR (subclause 6.5) shall apply, with the exception that the link need not be maintained during exposure and may have to be re-established.

For ancillary the pass/fail criteria supplied by the manufacturer shall apply, unless the ancillary is tested in connection with receivers, transmitters or transceivers in which case the corresponding performance criteria above shall apply.

9.6 Voltage dips and interruptions

These tests are applicable for base station and fixed ancillary equipment.

These tests shall be performed on ac mains power input ports.

These tests shall be performed on a representative configuration of the radio equipment or a representative configuration of the combination of radio and ancillary equipment.

9.6.1 Definition

These tests assesses the ability of transmitters, receivers, transceivers and ancillary equipment to operate as intended in the event of voltage dips and interruptions on the ac mains power input ports.

9.6.2 Test method

The test method shall be in accordance with EN 61000-4-11 [11] except that the following requirements and evaluation of test results shall apply.

The test levels shall be:

- a voltage dip corresponding to a reduction of the supply voltage of 30 % for 10 ms; and
- a voltage dip corresponding to a reduction of the supply voltage of 60 % for 100 ms; and
- a voltage interruption corresponding to a reduction of the supply voltage of > 95 % for 5 s.

9.6.3 Performance criteria

For a voltage dip corresponding to a reduction of the supply voltage of 30 % for 10 ms the following performance criteria apply:

- for transmitters the performance criteria CT (subclause 6.2);
- for stand alone receivers or receivers which are part of simplex or duplex transceivers the performance criteria CR (subclause 6.4);
- for ancillary equipment the pass/fail criteria supplied by the manufacturer shall apply, unless the ancillary equipment is tested in connection with receivers, transmitters or transceivers in which case the corresponding performance criteria above shall apply.

For a voltage dip corresponding to a reduction of the supply voltage of 60 % for 100 ms the following performance criteria apply:

- for transmitters the performance criteria TT (subclause 6.3);
- for stand alone receivers or receivers which are part of simplex or duplex transceivers the performance criteria TR (subclause 6.5);
- for ancillary equipment the pass/fail criteria supplied by the manufacturer shall apply, unless the ancillary equipment is tested in connection with receivers, transmitters or transceivers in which case the corresponding performance criteria above shall apply.

For a voltage dip corresponding to a reduction of the supply voltage of 60 % for 100 ms and/or a voltage interruption corresponding to a reduction of the supply voltage of > 95 % for 5 s the following performance criteria apply:

- in the case where the equipment is fitted with or connected to a battery back-up the performance criteria TT (subclause 6.3) or TR (subclause 6.5) apply as appropriate;
- in the case where the equipment is powered solely from the ac mains supply (without the use of a parallel battery back-up) the communications link need not be maintained and may have to be re-established and volatile user data may have been lost.

In the event of loss of the communications link or in the event of loss of user data, this fact shall be recorded in the test report, the product description and the user documentation.

9.7 Surges common and differential mode

These tests are applicable for base station and fixed ancillary equipment.

These tests shall be performed on ac mains power input ports.

These test shall be performed on a representative configuration of the radio equipment or a representative configuration of the combination of radio and ancillary equipment.

9.7.1 Definition

These tests assess the ability of transmitters, receivers, transceivers and ancillary equipment to operate as intended in the event of surges on the ac mains power input ports.

9.7.2 Test method

The test method shall be in accordance with EN 61000-4-5 [9] except that the following requirements and evaluation of test results shall apply:

- the test level shall be 1 kV open circuit voltage for common mode and 0,5 kV open circuit voltage for differential mode;
- the surges shall be applied (in parallel) to all the wires in the cable with reference to the cabinet reference ground, (true common mode), the series resistance shall be 10 Ω .

9.7.3 Performance criteria

For transmitters the performance criteria TT (subclause 6.3) shall apply.

For receivers and duplex transceivers the performance criteria TR (subclause 6.5) shall apply.

For ancillary the pass/fail criteria supplied by the manufacturer shall apply, unless the ancillary is tested in connection with receivers, transmitters or transceivers in which case the corresponding performance criteria above shall apply.

Annex A (normative): Subclauses of the present document relevant for compliance with the essential requirements of the EC Council Directives

Table A.1: Subclauses of the present document relevant for compliance with the essential requirements of the EC Council Directives

Clause/subclause number and title		Corresponding article of Council Directive 89/336/EEC	Qualifying remarks
8	Test methods and limits for emission tests		
8.1	Enclosure of ancillary equipment	4(a)	
8.2	DC power input/output port	4(a)	
8.3	AC mains power input/output port	4(a)	
9	Test methods and levels for immunity tests		
9.1	Radio frequency electromagnetic field (80 MHz to 1 000 MHz)	4(b)	
9.2	Electrostatic discharge	4(b)	
9.3	Fast transients common mode	4(b)	
9.4	RF common mode, 0,15 MHz - 80 MHz (current clamp injection)	4(b)	
9.5	Transients and surges, vehicular environment	4(b)	
9.6	Voltage dips and interruptions	4(b)	
9.7	Surges common and differential mode	4(b)	

Annex B (normative):

Subclauses of the present document relevant for compliance of equipment within the scope of I-ETS 300 219 with the essential requirements of the EC Council Directives

Table B.1: Subclauses of the present document relevant for compliance of equipment within the scope of I-ETS 300 219 with the essential requirements of the EC Council Directives

Clause/subclause number and title		Corresponding article of Council Directive 89/336/EEC	Qualifying remarks
B.1	Spurious emissions (transmitters)	4(a)	
B.4	Spurious radiations (receivers)	4(a)	
B.2	Spurious response rejection (receivers)	4(b)	
B.3	Blocking or desensitization (receivers)	4(b)	

B.1 Spurious emissions (transmitters)

For the definition and the measuring method see subclause 9.5 of I-ETS 300 219 [13].

The power of any spurious emission shall not exceed the values given in tables B.2 and B.3.

Table B.2: Conducted emissions

Frequency range	9 kHz to 1 GHz	> 1 to 4 GHz or > 1 to 12,75 GHz (note)
Tx operating	0,25 μ W (-36,0 dBm)	1,00 μ W (-30,0 dBm)
Tx standby	2,0 nW (-57,0 dBm)	20,0 nW (-47,0 dBm)
NOTE: The frequency range 9 kHz to 4 GHz applies for equipment operating on frequencies below 470 MHz; the frequency range of 9 kHz to 12,75 GHz applies for equipment operating on frequencies above 470 MHz.		

Table B.3: Radiated emissions

Frequency range	30 MHz to 1 GHz	> 1 to 4 GHz
Tx operating	0,25 μ W (-36,0 dBm)	1,00 μ W (-30,0 dBm)
Tx standby	2,0 nW (-57,0 dBm)	20,0 nW (-47,0 dBm)

B.2 Spurious response rejection (receivers)

For the definition and the measurement method see subclause 10.6 of I-ETS 300 219 [13].

At any frequency separated from the nominal frequency of the receiver by more than one channel, the spurious response rejection ratio shall not be less than 70,0 dB.

B.3 Blocking or desensitization (receivers)

For the definition and the measurement method see subclause 10.8 of I-ETS 300 219 [13].

The blocking ratio, for any frequency within the specified ranges, shall not be less than 84,0 dB, except at frequencies on which spurious responses are found (see subclause 10.6).

B.4 Spurious radiations (receivers)

For the definition and the measurement method see subclause 10.9 of I-ETS 300 219 [13].

The power of any spurious radiation shall not exceed the values given in table B.4 and B.5.

Table B.4: Conducted components

Frequency range	9 kHz to 1 GHz	> 1 to 4 GHz, or > 1 to 12,75 GHz, (note)
Limit	2,0 nW (-57,0 dBm)	20,0 nW (-47,0 dBm)
NOTE: The frequency range 9 kHz to 4 GHz applies for equipment operating on frequencies below 470 MHz; the frequency range of 9 kHz to 12,75 GHz applies for equipment operating on frequencies above 470 MHz.		

Table B.5: Radiated components

Frequency range	30 MHz to 1 GHz	> 1 to 4 GHz
Limit	2,0 nW (-57,0 dBm)	20,0 nW (-47,0 dBm)

Annex C (normative):

ERC Decision on the adoption of approval regulations for radio equipment to be used in the land mobile service for transmitting signals to initiate a specific response in the receiver based on the Interim European Telecommunications Standard (I-ETS) 300 219

This annex contains the ERC Decision which references the technical specifications in I-ETS 300 219 [13] for inclusion in national type approval regulations.

EUROPEAN RADIOCOMMUNICATIONS COMMITTEE

ERC Decision
of 1 November 1996
on the adoption of approval regulations for
radio equipment to be used
in the land mobile service for transmitting signals to initiate
a specific response in the receiver based on
the Interim European Telecommunications Standard
(I-ETS) 300 219
(ERC/DEC/(96)10)



EXPLANATORY MEMORANDUM

1. INTRODUCTION

The free movement of radiocommunications goods and the provision of Europe-wide services for radiocommunications are only achievable if there exist common regulations throughout Europe regarding availability of frequency bands, approval requirements and border crossing procedures. A basic requirement to fulfil these objectives is the Europe-wide implementation of national regulations based on the European Telecommunications Standards (ETSS) developed by the European Telecommunications Standards Institute (ETSI).

This Decision (ERC/DEC/(96)10) provides the necessary mechanism for CEPT Administrations to commit themselves to implement, within their national regimes, Interim European Telecommunications Standard (I-ETS) 300 219¹ and withdraw any conflicting national standard.

2. BACKGROUND

Both the ERC and ETSI are involved in the development of common regulations, as described in (1) above. The Memorandum of Understanding between ERC and ETSI explains the respective responsibilities of the two organisations and its annex describes the principles of co-operation. The ERC, for its part, should, *inter alia*, adopt Decisions on the introduction of ETSI standards into approval regimes.

I-ETS 300 219 has been prepared by the Radio Equipment and Systems (RES) Technical Committee of ETSI. The standard has undergone the ETSI standards approval procedure and is now published as an I-ETS. The I-ETS is based on CEPT Recommendation T/R 24-01 Annex V.

The ERC will normally produce decisions on the introduction of ETSI standards into approval regimes, once the relevant standard becomes a European Telecommunications Standard (ETS). This Decision has been produced, as an exception: I-ETS 300 219 is mature, in use, and has not been upgraded because of issues which affect other standards in the same series. This Decision will be reviewed when the standard is up-graded to an ETS.

The use of the frequency range (30-1000 MHz) covered by I-ETS 300 219 is not harmonised within CEPT. Although CEPT Recommendation T/R 25-08 provides preferred arrangements for some frequency bands designated for mobile radio systems, administrations have adopted different arrangements, to meet national requirements, for frequency bands, duplex separations and channel separations (12.5, 20 and 25 kHz). Further, the equipment used in this frequency range is subject to national licensing and frequency planning which requires specification of, *inter alia*, frequency of operation and equivalent isotropically radiated power (e.i.r.p.) and, in some cases, additional requirements to improve spectrum utilisation, for example timers to limit maximum duration of transmissions. Such parameters or requirements are considered as outside the scope of this Decision.

Nevertheless, there are a number of parameters, in particular those considered by the ERC as essential for spectrum management purposes², which can be harmonised by adopting within approval regulations the limit values and measurement methods provided in I-ETS 300 219.

3. REQUIREMENT FOR AN ERC DECISION

The allocation and assignment of radio frequencies and the complementary equipment approval regimes in CEPT Member countries are laid down by law, regulation or administrative action. The ERC recognises that for harmonised fixed and mobile radio services to be introduced successfully throughout Europe, manufacturers and operators must be given the confidence to make the necessary investment in the development and procurement of new systems. Commitment by CEPT Administrations to implement this ERC Decision will provide a clear indication that equipment conforming to approval regulations based on I-ETS 300 219 will have the benefit of a Europe-wide market.

¹ I-ETS 300 219: *"Technical characteristics and test conditions for radio equipment transmitting signals to initiate a specific response in the receiver" (Edition 1, 1993)*

² See Annex 1 of the Decision

**ERC Decision
of 1 November 1996**

**on the adoption of approval regulations for radio equipment
to be used in the land mobile service for transmitting
signals to initiate a specific response in the receiver
based on the Interim European Telecommunications Standard (I-ETS) 300 219**

(ERC/DEC/(96)10)

The European Conference of Postal and Telecommunications Administrations,

considering:

- a) that CEPT has a long term objective to harmonise the use of frequencies and the related regulatory regimes;
- b) that such harmonisation will benefit administrations, manufacturers, operators and users;
- c) that ETSI has published I-ETS 300 219 for equipment transmitting signals to initiate a specific response in the receiver, to be used in the land mobile service operating on radio frequencies between 30 MHz and 1000 MHz, with channel separations of 12.5 kHz, 20 kHz and 25 kHz;
- d) that, for combined speech/non-speech equipment, this I-ETS is complementary to ETS 300 086, which covers radio equipment for use in the land mobile service intended primarily for analogue speech;
- e) that, for the foreseeable future, many official, public and private networks will continue to use land mobile equipment having the technical characteristics described in (c) above;
- f) that, in accordance with the Memorandum of Understanding between ERC and ETSI, the ERC shall adopt ERC Decisions on the introduction of ETSI standards into approval regimes;
- g) that the use of radio equipment is subject to national licensing and frequency planning requirements, in particular for frequency of operation, limit of maximum duration of transmission (e.g. use of time-out/timers) and. e.i.r.p.;
- h) that suitable transitional arrangements are given in CEPT Recommendation T/R 01-05.

DECIDES

1. to adopt, by 1 March 1997, approval regulations for radio equipment to be used in the land mobile service for transmitting signals to initiate a specific response in the receiver, based on the limit values and measurement methods contained in I-ETS 300 219, with the exception of those parameters which are subject to national licensing requirements³. A list of the spectrum management parameters to be included in approval regulations is given in Annex 1;
2. to withdraw any conflicting national approval regulation(s);
3. that CEPT Member Administrations shall communicate the national measures implementing this Decision to the ERC Chairman and the ERO when the Decision is nationally implemented.

³ Annex 2 is provided for information to show which options have been adopted by each administration in those cases where I-ETS 300 219 offers a choice.

ANNEX 1

Parameters from I-ETS 300 219 to be included in approval regulations:

I-ETS 300 219	Section	Comments
Transmitter parameters (section 6.1) :		
Frequency error	6.1.1	Options for 12.5 and 20 and 25 kHz and frequency of operation
Carrier power variation (conducted)	6.1.2	
Effective radiated power	6.1.3	Subject to national licensing conditions
Adjacent channel power	6.1.4	Options for 12.5 and 20 and 25 kHz
Spurious emissions	6.1.5	
Intermodulation attenuation	6.1.6	Site engineering conditions in special cases
Transient frequency behaviour of a transmitter	6.1.7	
Receiver parameters (Section 6.2) :		
Receiver sensitivity (response)	6.2.1	
Maximum usable sensitivity (response, conducted)	6.2.2	
Maximum usable sensitivity (response, field strength)	6.2.3	Split into frequency bands
Co-channel rejection	6.2.4	Options for 12.5 and 20 and 25 kHz
Adjacent channel selectivity	6.2.5	Options for 12.5 and 20 and 25 kHz
Spurious response rejection	6.2.6	
Intermodulation response rejection	6.2.7	
Blocking or desensitisation	6.2.8	
Spurious radiation	6.2.9	
Duplex operation - receiver limits (Section 6.3) :		
Receiver desensitisation and maximum usable sensitivity	6.3.1	
Receiver spurious response rejection	6.3.2	

ANNEX 2

Adoption of I-ETS 300 219: National variations for channel spacing and temperature range⁴

Administration	Adoption of channel spacing options	Adoption of temperature range options
Albania		
Andorra		
Austria	U1, U2, U3, V1, V3	1
Belgium		
Bosnia and Herzegovina		
Bulgaria		
Croatia		
Cyprus		
Czech Republic		
Denmark		
Estonia		
Finland		
France		
Germany		
Greece		
Hungary	U1, U2, U3, V1, V2, V3	3
Iceland	U1, U3, V1, V3	
Ireland	U1, U3, V1	3
Italy		
Latvia		
Liechtenstein		
Lithuania	U1, U3, V1, V3	1
Luxembourg		
Malta		
Moldova		
Monaco		
Netherlands		
Norway		
Poland		
Portugal		
Romania		
Russian Federation		
San Marino		
Slovak Republic		
Slovenia		
Spain		
Sweden		
Switzerland		
The Former Yugoslav Republic of Macedonia		
Turkey	U1, U3, V1, V3	
Ukraine		
United Kingdom		
Vatican City		

Key: Channel spacing options: Temperature range options
U = UHF 1 = 12.5 kHz 1 = -25 to +55°C
V = VHF 2 = 20 kHz 2 = -15 to +55°C
 3 = 25 kHz 3 = -10 to +55°C

⁴ Harmonisation of temperature range is underway in ETSI.

European Radiocommunications Committee Decision

CEPT/ERC/DEC(96)10

on the adoption of approval regulations for radio equipment to be used in the land mobile service for transmitting signals to initiate a specific response in the receiver based on the Interim European Telecommunications Standard (I-ETS) 300 219

As of 1 February 1997 the following CEPT Members have committed themselves to apply the terms of this Decision:

Austria
Croatia
Iceland
Ireland
Italy
Lithuania
Norway
United Kingdom

After 1 February 1997 the undermentioned CEPT Members have committed themselves to apply the terms of this Decision:

Bulgaria
Germany
Hungary
Netherlands
Turkey

History

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