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**ElectroMagnetic Compatibility (EMC)
standard for radio equipment and services;
Part 2: Specific conditions for radio paging equipment;
Harmonised Standard covering the essential requirements
of article 3.1(b) of Directive 2014/53/EU**

Reference

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ETSI

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

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

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

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Foreword

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

The present document has been prepared under the Commission's standardisation request C(2015) 5376 final [i.2] to provide one voluntary means of conforming to the essential requirements of Directive 2014/53/EU on the harmonisation of the laws of the Member States relating to making available on the market of radio equipment and repealing Directive 1999/5/EC [i.1].

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

The present document is part 2 of a multi-part deliverable. Full details of the entire series can be found in part 1 [1].

National transposition dates	
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Modal verbs terminology

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

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1 Scope

The present document, together with ETSI EN 301 489-1 [1], specifies technical characteristics and methods of measurements for radio paging equipment (receivers, transmitters and combined equipment) and associated ancillary equipment.

NOTE 1: Examples of paging equipment are given in annex B.

The present document covers the essential requirements of article 3.1(b) of Directive 2014/53/EU [i.1] under the conditions identified in annex A.

Technical specifications related to the antenna ports and emissions from the enclosure ports of paging equipment, are not included in the present document.

NOTE 2: Such technical specifications are found in the relevant product standard for the effective use of the radio spectrum.

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

2 References

2.1 Normative references

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

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

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

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

[1] ETSI EN 301 489-1 (V2.2.0) (03-2017): "ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU and the essential requirements of article 6 of Directive 2014/30/EU".

[2] ETSI EN 300 224 (V2.0.0) (03-2017): "Land Mobile Service; Radio Equipment for use in a Paging Service operating within the frequency range 25 MHz - 470 MHz; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU".

2.2 Informative references

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

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

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

[i.1] Directive 2014/53/EU of the European Parliament and of the council of 16 April 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment and repealing Directive 1999/5/EC.

[i.2] Commission Implementing Decision C (2015) 5376 final of 4.8.2015 on a standardisation request to the European Committee for Electro-technical Standardisation and to the European Telecommunications Standards Institute as regards radio equipment in support of Directive 2014/53/EU of the European Parliament and of the Council.

3 Definitions and abbreviations

3.1 Definitions

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

alignment range: frequency range over which the receiver or transmitter can be programmed and/or re-aligned to operate without any physical change of components other than programmable and frequency controlling devices

base receiver: receiver at a fixed location

base transmitter: transmitter at a fixed location

calling function: transmission of a message via the base transmitter to the paging receiver in order to alert and/or inform the carrier of the paging receiver

paging receiver: equipment for the reception and decoding of paging transmissions; either fixed, or portable

pocket receiver: stand-alone pocket paging receiver, or a receiver being part of a pocket paging transceiver, typically for portable use (portable equipment)

pocket transmitter: stand-alone pocket paging transmitter using the return channel, or a transmitter being part of a pocket paging transceiver, typically for portable use (portable equipment)

standby mode (base transmitter): mode of operation in which the transmitter is ready to transmit, waiting for a start control signal to actual start transmitting

standby mode (pocket transmitter): mode of operation in which the transmitter is ready to transmit, waiting for a control signal to start the transmitting sequence

standby mode (receiver): mode of operation in which the receiver is capable of receiving calls

talk-back function: transmitting of a message from the pocket transmitter (normally combined in a transceiver) which is sent to a central receiver (base receiver) and further processed by the central processing unit

3.2 Abbreviations

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

CR	Continuous phenomena applied to Receivers
CT	Continuous phenomena applied to Transmitters
EUT	Equipment Under Test
RF	Radio Frequency
TR	Transient phenomena applied to Receivers
TT	Transient phenomena applied to Transmitters

4 Test conditions

4.1 General

4.1.1 Introduction

For the purposes of the present document, the test conditions of ETSI EN 301 489-1 [1], clause 4 shall apply as appropriate. Further product related test conditions for PMR equipment are specified in the present document.

For emission and immunity tests, the test modulation, test arrangements, etc., as specified in the present document clauses 4.1 to 4.5, shall apply.

4.1.2 Receivers

Whenever a receiver is provided with a detachable antenna, the EUT shall be tested with the antenna fitted in a manner typical of normal intended use.

The individual immunity tests shall be performed with the receiver in the standby mode.

Fixed, mobile or pocket paging receivers:

- before the individual tests the receiver shall be set into the standby mode, a communications link shall be established and the message memory of the receiver shall be loaded with recognizable messages, if applicable (performance check);
- during the individual tests the wanted RF input signal shall **not** be applied to the receiver, except for the spot frequency test as part of the radio frequency electromagnetic field immunity test;
- after the individual tests and the termination of the required performance assessment (e.g. by means of the stored messages in the message memory of the receiver, see clauses 6.3 and 6.4) the communications link shall be re-established and another performance check shall be carried out to verify that the EUT is still operational.

Base receivers:

- base receivers are not subject to the spot frequency test as part of the radio frequency electromagnetic field immunity test;
- before the individual tests the base receiver shall be set into the standby mode, a communications link shall be established and the output of the receiver shall be monitored (performance check);
- during the individual tests the wanted RF input signal (the unmodulated carrier, see clause 4.2) **remains applied** to the base receiver;
- after the individual tests of the base receiver (see clauses 6.3 and 6.4) and the termination of the required performance assessment (e.g. by means of audio breakthrough measurements at the output of the base receiver, see clauses 6.3 and 6.4) the maintained communications link is switched off and re-established to ensure that the base receiver is still able to receive new incoming requests.

4.1.3 Transmitters

Mobile and pocket transmitters:

- the mobile or pocket transmitter **is not** subject to the spot frequency test as part of the radio frequency electromagnetic field immunity test;
- the mobile or pocket transmitter shall operate in transmit mode with an unmodulated carrier, at its maximum rated output power. If unmodulated operation is not possible, the manufacturer shall specify the method of performance assessment and the acceptable degradation of performance.

Base transmitters:

- the base transmitter shall operate in the standby mode, except for the spot frequency test as part of the radio frequency electromagnetic field immunity test (see clause 7.2.2, table 1), where the transmitter shall be tested additionally operated at its maximum rated output power, modulated with normal test modulation (see clause 4.5.5).

4.2 Arrangements for test signals

4.2.1 General

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

4.2.2 Arrangements for test signals at the input of transmitters

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

Mobile and pocket transmitters:

- mobile or pocket transmitters are normally not equipped with an external modulation input port, if an external modulation input port is present, the arrangement for base transmitters shall apply.

Base transmitters:

- for base transmitters, the signal generator to be used for the normal test modulation (see clause 4.5) shall be located outside the test environment and connected to the modulation input port of the transmitter. Adequate measures shall be taken to protect the measuring equipment from the effect of all of the radiated immunity test fields within the test environment.

4.2.3 Arrangements for test signals at the output of transmitters

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

The transmitter shall be operated at its maximum rated RF output power, modulated with normal test modulation (see clause 4.5). Where the transmitter incorporates a RF antenna connector, the output signal of the transmitter shall be coupled to the measuring equipment via a shielded transmission line such as a coaxial cable. Where the transmitter does not incorporate a RF connector, the output signal of the transmitter shall be coupled to an antenna located within the test environment. This antenna shall be coupled by a shielded transmission line to the measuring equipment located outside of the test environment.

Base transmitters:

- base transmitters are subject to the spot frequency test as part of the radio frequency electromagnetic field immunity test (see clause 7.2.2, table 1). For this test the measuring equipment shall be a paging receiver and repetitive calls shall be transmitted and coupled to the input of the paging receiver, located outside the test environment.

4.2.4 Arrangements for test signals at the input of receivers

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

A communication link shall be established at the start of the test and maintained during the test. The level of the wanted RF input signal shall be chosen to a value significantly above the threshold sensitivity but below the overload characteristics of the receiver (the signal level should be 60 dB above the threshold sensitivity).

Where the receiver incorporates a RF antenna connector, the RF signal source shall be coupled to the input of the receiver via a shielded transmission line such as a coaxial cable. Where the receiver does not incorporate an RF connector, the RF signal source shall be presented to the receiver from another antenna located within the test environment. This antenna shall be coupled to the RF signal source via an adjustable attenuator.

Fixed, mobile and pocket paging receivers:

- for fixed, mobile or pocket paging receivers, the manufacturer shall at the time of submitting the equipment for testing, supply if necessary, a test fixture and a message generator as stated in clause 4.5, to generate the wanted RF input signal.

4.2.5 Arrangements for test signals at the output of receivers

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

Fixed, mobile and pocket paging receivers:

- for fixed, mobile, or pocket paging receivers, during the spot frequency test as part of the radio frequency immunity test (see clause 7.2.2, table 1), the call received signal output of the receiver shall be coupled to the measuring equipment, located outside the test environment (e.g. by non-metallic means such as an acoustic tube/ coupler) and it shall be possible to assess the performance of the equipment from the call received signal(s) of the receiver.

Base receivers:

- for base receivers, the audio signal output of the receiver shall be coupled to the measuring equipment, located outside the test environment. When the receiver does not have an audio signal output, the manufacturer shall specifiy the method of performance assessment and the comparable degradation of performance.

4.3 Exclusion bands

4.3.1 General

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

4.3.2 Receiver exclusion bands

The exclusion band for receivers (including receivers of pocket transceivers), is the frequency range determined by the alignment range, as declared by the manufacturer, extended as follows:

- for receivers operating in the frequency band 25 MHz to 80 MHz, the lower frequency of the exclusion band is the lower frequency of the alignment range, minus 10 % of the centre frequency of the alignment range or minus 5 MHz, whichever results in the lower frequency. For such receivers, the upper frequency of the exclusion band is the upper frequency of the alignment range, plus 10 % of the centre frequency of the alignment range or plus 5 MHz, whichever is greater;

- for receivers operating above 80 MHz, the lower frequency of the exclusion band is the lower frequency of the alignment range, minus 5 % of the centre frequency of the alignment range or 10 MHz, whichever results in the lower frequency and the upper frequency of the exclusion band, is the upper frequency of the alignment range plus 5 % of the centre frequency of the alignment range or plus 10 MHz, whichever is greater.

4.3.3 Transmitter exclusion band

For transmitters operating, or intended to operate, in a channelized frequency band, the exclusion band is five times the channel spacing designated to the relevant paging service in the used frequency band, centred around the operating frequency.

4.4 Narrow band responses of receivers

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