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ElectroMagnetic Compatibility (EMC) standard for combined and/or integrated radio and non-radio equipment; Part 2: Requirements for equipment intended to be used in industrial locations

Reference

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Foreword

This draft European Standard (EN) has been produced by ETSI Technical Committee Electromagnetic compatibility and Radio spectrum Matters (ERM), and is now submitted for the combined Public Enquiry and Vote phase of the ETSI standards EN Approval Procedure.

The present document is part 2 of a multi-part deliverable covering ElectroMagnetic Compatibility (EMC) for combined and/or integrated equipment, as identified below:

Part 1: "Requirements for equipment intended to be used in residential, commercial and light industry locations";

Part 2: "Requirements for equipment intended to be used in industrial locations".

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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):	6 months after doa

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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Introduction

The present document is not intended for citation under any new approach Directive.

The present document is based on the principles given in ETSI EG 203 367 [i.3] "Guide to the application of harmonised standards covering articles 3.1(b) and 3.2 of the Directive 2014/53/EU (RED) to multi-radio and combined radio and non-radio equipment".

The present document contains the measurements, emission limits and performance criteria that are necessary for the assessment of a combination of a non-radio and a radio product (which is called "Δ" in ETSI EG 203 367 [i.3]).

1 Scope

The present document defines requirements in respect of ElectroMagnetic Compatibility (EMC) for combined and/or integrated equipment intended to be used within industrial locations.

The present document is only applicable to combined and/or integrated equipment where the radio function is within the scope of one or more of the standards listed in clause 2.1.2 (covering references [1] to [8]) and where the non-radio function is within the scope of one or more of the standards listed in clause 2.1.3 (covering references [9] to [50]).

Requirements applicable to the antenna port specifically related to the efficient use of radio spectrum are not included in the present document.

NOTE: These requirements are generally found in the applicable product standard(s) for the effective use of the radio spectrum.

2 References

2.1 Normative references

2.1.1 General

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

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

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

In addition, within the present document, some references are non-specific. The applicable version listed in the OJEU under the Directives 2014/53/EU [i.1] or 2014/30/EU [i.2] may be used.

NOTE 2: Before the date of withdrawal, a preceding version may be used (see clause 2.4 of the Technical Working Procedures in the ETSI Directives).

2.1.2 Radio EMC standards

[1] ETSI EN 301 489-1: "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 301 489-3: "ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 3: Specific conditions for Short-Range Devices (SRD) operating on frequencies between 9 kHz and 246 GHz; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU".

[3] ETSI EN 301 489-5: "ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 5: Specific conditions for Private land Mobile Radio (PMR) and ancillary equipment (speech and non-speech) and Terrestrial Trunked Radio (TETRA); Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU".

[4] ETSI EN 301 489-6: "Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 6: Specific conditions for Digital Enhanced Cordless Telecommunications (DECT) equipment".

[5] ETSI EN 301 489-17: "ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for Broadband Data Transmission Systems; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU".

[6] ETSI EN 301 489-19: "Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 19: Specific conditions for Receive Only Mobile Earth Stations (ROMES) operating in the 1,5 GHz band providing data communications".

[7] ETSI EN 301 489-33: "ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 33: Specific conditions for Ultra-WideBand (UWB) devices; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU".

[8] ETSI EN 301 489-51: "ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 51: Specific conditions for Automotive, Ground based Vehicles and Surveillance Radar Devices using 24,05 GHz to 24,25 GHz, 24,05 GHz to 24,5 GHz, 76 GHz to 77 GHz and 77 GHz to 81 GHz; Harmonised Standard covering the essential requirements of article 3.1b of Directive 2014/53/EU".

2.1.3 Non-radio EMC standards

[9] CENELEC EN 50121-3-2: "Railway applications - Electromagnetic compatibility - Part 3-2: Rolling stock - Apparatus".

[10] CENELEC EN 50121-4: "Railway applications - Electromagnetic compatibility - Part 4: Emission and immunity of the signalling and telecommunications apparatus".

[11] CENELEC EN 50121-5: "Railway applications - Electromagnetic compatibility - Part 5: Emission and immunity of fixed power supply installations and apparatus".

[12] CENELEC EN 50270: "Electromagnetic compatibility. Electrical apparatus for the detection and measurement of combustible gases, toxic gases or oxygen".

[13] CENELEC EN 50293: "Road traffic signal systems - Electromagnetic compatibility".

[14] CENELEC EN 50370-1: "Electromagnetic compatibility (EMC) - Product family standard for machine tools - Part 1: Emission".

[15] CENELEC EN 50370-2: "Electromagnetic compatibility (EMC) - Product family standard for machine tools - Part 2: Immunity".

[16] CENELEC EN 50491-5-1: "General requirements for Home and Building Electronic Systems (HBES) and Building Automation and Control Systems (BACS) - Part 5-1: EMC requirements, conditions and test set-up".

[17] CENELEC EN 50491-5-3: "General requirements for Home and Building Electronic Systems (HBES) and Building Automation and Control Systems (BACS) - Part 5-3: EMC requirements for HBES/BACS used in industry environment".

[18] CENELEC EN 55011: "Industrial, scientific and medical equipment. Radio-frequency disturbance characteristics. Limits and methods of measurement".

[19] CENELEC EN 55015: "Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment".

[20] CENELEC EN 60730-1: "Automatic electrical controls - Part 1: General requirements".

[21] CENELEC EN 60947-1: "Low-voltage switchgear and controlgear - Part 1: General rules".

[22] CENELEC EN 60947-2: "Low-voltage switchgear and controlgear - Part 2: Circuit-breakers".

[23] CENELEC EN 60947-3: "Low-voltage switchgear and controlgear - Part 3: Switches, disconnectors, switch-disconnectors and fuse-combination units".

[24] CENELEC EN 60947-4-1: "Low-voltage switchgear and controlgear - Part 4-1: Contactors and motor-starters - Electromechanical contactors and motor-starters".

[25] CENELEC EN 60947-4-2: "Low-voltage switchgear and controlgear - Part 4-2: Contactors and motor-starters - AC semiconductor motor controllers and starters".

[26] CENELEC EN 60947-4-3: "Low-voltage switchgear and controlgear - Part 4-3: Contactors and motor-starters - AC semiconductor controllers and contactors for non-motor loads".

[27] CENELEC EN 60947-5-1: "Low-voltage switchgear and controlgear - Part 5-1: Control circuit devices and switching elements - Electromechanical control circuit devices".

[28] CENELEC EN 60947-5-2: "Low-voltage switchgear and controlgear - Part 5-2: Control circuit devices and switching elements - Proximity switches".

[29] CENELEC EN 60947-5-6: "Low-voltage switchgear and controlgear - Part 5-6: Control circuit devices and switching elements - DC interface for proximity sensors and switching amplifiers (NAMUR)".

[30] CENELEC EN 60947-5-7: "Low-voltage switchgear and controlgear - Part 5-7: Control circuit devices and switching elements - Requirements for proximity devices with analogue output".

[31] CENELEC EN 60947-5-9: "Low-voltage switchgear and controlgear - Part 5-9: Control circuit devices and switching elements - Flow rate switches".

[32] CENELEC EN 60947-6-1: "Low-voltage switchgear and controlgear - Part 6-1: Multiple function equipment - Transfer switching equipment".

[33] CENELEC EN 60947-6-2: "Low-voltage switchgear and controlgear - Part 6-2: Multiple function equipment - Control and protective switching devices (or equipment) (CPS)".

[34] CENELEC EN 60947-8: "Low-voltage switchgear and controlgear - Part 8: Control units for built-in thermal protection (PTC) for rotating electrical machines".

[35] CENELEC EN 60974-10: "Arc welding equipment - Part 10: Electromagnetic compatibility (EMC) requirements".

[36] CENELEC EN 61000-6-2: "Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity standard for industrial environments".

[37] CENELEC EN 61000-6-4: "Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments".

[38] CENELEC EN 61131-2: "Programmable controllers - Part 2: Equipment requirements and tests".

[39] CENELEC EN 61204-3: "Low voltage power supplies, d.c. output - Part 3: Electromagnetic compatibility (EMC)".

[40] CENELEC EN 61326-1: "Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1: General requirements".

[41] CENELEC EN 61326-2-2: "Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 2-2: Particular requirements - Test configurations, operational conditions and performance criteria for portable test, measuring and monitoring equipment used in low-voltage distribution systems".

[42] CENELEC EN 61326-2-3: "Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 2-3: Particular requirements - Test configuration, operational conditions and performance criteria for transducers with integrated or remote signal conditioning".

[43] CENELEC EN 61326-2-4: "Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 2-4: Particular requirements - Test configurations, operational conditions and performance criteria for insulation monitoring devices according to IEC 61557-8 and for equipment for insulation fault location according to IEC 61557-9".

[44] CENELEC EN 61326-2-5: "Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 2-5: Particular requirements - Test configurations, operational conditions and performance criteria for devices with field bus interfaces according to IEC 61784-1".

[45] CENELEC EN 61439-2: "Low-voltage switchgear and controlgear assemblies - Part 2: Power switchgear and controlgear assemblies".

[46] CENELEC EN 61439-3: "Low-voltage switchgear and controlgear assemblies - Part 3: Distribution boards intended to be operated by ordinary persons (DBO)".

[47] CENELEC EN 61557-12: "Electrical safety in low voltage distribution systems up to 1 000 V a.c. and 1 500 V d.c. - Equipment for testing, measuring or monitoring of protective measures - Part 12: Performance measuring and monitoring devices (PMD)".

[48] CENELEC EN 61800-3: "Adjustable speed electrical power drive systems - Part 3: EMC requirements and specific test methods".

[49] CENELEC EN 62135-2: "Resistance welding equipment - Part 2: Electromagnetic compatibility (EMC) requirements".

[50] ETSI EN 300 386: "Telecommunication network equipment; ElectroMagnetic Compatibility (EMC) requirements; Harmonised Standard covering the essential requirements of the Directive 2014/30/EU".

2.1.4 Other EMC standards

[51] CENELEC EN 55032 (2015) and AC (2016): "Electromagnetic compatibility of multimedia equipment - Emission requirements".

[52] CENELEC EN 50561-1 (2013) and AC (2015): "Power line communication apparatus used in low-voltage installations - Radio disturbance characteristics - Limits and methods of measurement - Part 1: Apparatus for in-home use".

[53] CENELEC EN 50561-3 (2016): "Power line communication apparatus used in low-voltage installations - Radio disturbance characteristics - Limits and methods of measurement - Part 3: Apparatus operating above 30 MHz".

[54] CENELEC EN 61000-6-4 (2007) and A1 (2011): "Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments".

NOTE: The standards referenced in clause 2.1.4 do not directly fall into the scope of the present document. They are only referenced in the sense of a basic standard for a specific measurement.

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] Directive 2014/30/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to electromagnetic compatibility (recast).

[i.3] ETSI EG 203 367: "Guide to the application of harmonised standards covering articles 3.1b and 3.2 of the Directive 2014/53/EU (RED) to multi-radio and combined radio and non-radio equipment".

[i.4] ETSI EN 303 446-1: "ElectroMagnetic Compatibility (EMC) standard for combined and/or integrated radio and non-radio equipment; Part 1: Requirements for equipment intended to be used in residential, commercial and light industry locations".

[i.5] CENELEC EN 61000-6-3: "Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments".

[i.6] Recommendation ITU-R SM.329: "Unwanted emissions in the spurious domain".

3 Definition of terms, symbols and abbreviations

3.1 Terms

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

AC mains power port: port that connects to the low voltage AC mains power network for the sole purpose of supplying electrical energy to the EUT

antenna port: port, for connection of an antenna used for intentional transmission and/or reception of radiated RF energy

auxiliary equipment: equipment needed to exercise and/or monitor the operation of the EUT

NOTE 1: Auxiliary equipment may be either local (within the measurement or test area) or remote.

NOTE 2: This is also known as associated equipment in other standards (e.g. CENELEC EN 55032 [51]).

combined equipment: equipment consisting of two or more products where at least one of which is radio communication or radio determination equipment and at least one of which is non-radio equipment

EXAMPLE: A radio enabled pressure sensor, where the radio functionality is embedded by incorporating a radio module, which may be assessed separated from the host.

configuration: operational conditions of the EUT and AE, consisting of the set of hardware elements selected to comprise the EUT and AE, mode of operation used to exercise the EUT and arrangement of the EUT and AE

DC distribution network: local supply network in the infrastructure of a site or building intended for use by one or more different types of equipment and providing power independent of the public mains network

NOTE: Connection to a remote local battery is not regarded as a DC distribution network, if such a link comprises only power supply for a single piece of equipment.

DC power port: port used to connect to a low voltage DC power generating system, energy storage or DC distribution network to power the equipment

exclusion band(s): frequency range(s) where during immunity test, the radio functionality is not required to meet the performance criteria defined for the specific test and where the emissions are not assessed

NOTE: Further information on exclusion bands can be found in Annex C.

function: operation carried out by an equipment

NOTE: Functions are related to basic technologies incorporated in the equipment such as radio reception, radio transmission, emitting light, conversion of physical dimensions to electrical signals.