



SLOVENSKI STANDARD
oSIST prEN 301 489-50 V2.2.2:2021
01-februar-2021

Standard elektromagnetne združljivosti (EMC) za radijsko opremo in storitve - 50. del: Posebni pogoji za ponavljalniško (repetitorsko) in pomožno opremo celičnih komunikacijskih baznih postaj (BS) - Harmonizirani standard za elektromagnetno združljivost

ElectroMagnetic Compatibility (EMC) standard for radio equipment and services - Part 50: Specific conditions for Cellular Communication Base Station (BS), repeater and ancillary equipment - Harmonised Standard for ElectroMagnetic Compatibility

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Ta slovenski standard je istoveten z: ETSI EN 301 489-50 V2.2.2 (2020-12)

ICS:

33.060.01	Radijske komunikacije na splošno	Radiocommunications in general
33.100.01	Elektromagnetna združljivost na splošno	Electromagnetic compatibility in general

oSIST prEN 301 489-50 V2.2.2:2021 **en**

Draft ETSI EN 301 489-50 V2.2.2 (2020-12)



**ElectroMagnetic Compatibility (EMC)
standard for radio equipment and services;
Part 50: Specific conditions for Cellular Communication
Base Station (BS), repeater and ancillary equipment;
Harmonised Standard for ElectroMagnetic Compatibility**

<https://standards.iteh.ai/catalog/standards/sist/1b07ef8a-edc5-4f49-be7a-1c171208e326/sist-en-301-489-50-v2-3-1-2021>

Reference

REN/ERM-EMC-407

Keywords5G, EMC, GSM, harmonised standard, LTE,
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Foreword

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

The present document has been prepared under the Commission's standardisation request C(2015) 5376 final [i.15] to provide one voluntary means of conforming to the essential requirements of Directive 2014/53/EU on the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment and repealing Directive 1999/5/EC [i.1].

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

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):	18 months after doa

Modal verbs terminology

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1 Scope

The present document specifies technical characteristics and methods of measurements in respect of ElectroMagnetic Compatibility (EMC) for the following equipment types:

- 1) digital cellular base station equipment, including BS with antenna ports and BS without antenna ports;
- 2) repeaters;
- 3) associated ancillary equipment.

Including individual and combinations of technologies listed in table 1.

Table 1: Cellular Mobile Communication Technologies

Technology (Air technology)	Technology Generation	Standard SET	ETSI Standard
GSM (GSM/EDGE)	2G/3G	IMT-2000 SC (single carrier)	ETSI EN 301 502 [8] ETSI TS 137 104 [21] ETSI TS 137 141 [12]
CDMA 2000	3G	CDMA2000 (IMT-MC multi carrier)	ETSI EN 301 526 [i.2] ETSI EN 301 908-5 [i.7] ETSI EN 301 908-7 [i.8] ETSI EN 301 449 [i.11] ETSI EN 302 426 [i.12]
UMTS (UTRA, W-CDMA)	3G	IMT-2000 Direct Spread	ETSI TS 125 104 [i.3] ETSI TS 125 105 [i.4] ETSI TS 125 106 [i.5]
LTE (see note 1) (E-UTRA)	4G	IMT-advanced	ETSI TS 136 104 [5] ETSI TS 136 141[6] ETSI TS 136 106 [i.6] ETSI TS 136 143 [25]
LTE (see note 1) (E-UTRA), AAS	4G	IMT-advanced	ETSI TS 136 104 [5] ETSI TS 137 114 [31] ETSI TS 137 145-1 [13] ETSI TS 137 145-2 [14]
MSR (see note 2) AAS	4G	IMT-advanced	ETSI TS 137 104 [21] ETSI TS 137 141 [12] ETSI TS 137 114 [31] ETSI TS 137 145-1 [13] ETSI TS 137 145-2 [14]
WMAN (OFDMA)	3G	IMT-2000 OFDMA	ETSI EN 301 908-22 [16]
NR OTA	5G	IMT-advanced	ETSI TS 138 104 [20] ETSI TS 138 141-1 [10] ETSI TS 138 141-2 [17]
Standalone NB-IoT	4G	IMT-2000	ETSI TS 136 104 [5]

NOTE 1: Including LAA, inband NB-IoT or guard band NB-IoT.
NOTE 2: Combination of technologies GSM, W-CDMA, LTE and NR.

Technical specifications related to the antenna port and emissions from the enclosure port of Base Station (BS), combinations of radio and associated ancillary equipment or repeaters are not included in the present document. Such technical specifications are found in the relevant product standards for the effective use of the radio spectrum.

The environmental classification and the emission and immunity requirements used in the present document are as stated in ETSI EN 301 489-1 [1], except for any special conditions included in the present document.

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

2 References

2.1 Normative references

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

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- [1] ETSI EN 301 489-1 (V2.2.3) (11-2019): "ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonised Standard for ElectroMagnetic Compatibility".
- [2] ETSI TS 125 141 (V15.4.0) (04-2019): "Universal Mobile Telecommunications System (UMTS); Base Station (BS) conformance testing (FDD) (3GPP TS 25.141 version 15.4.0 Release 15)".
- [3] ETSI TS 125 142 (V15.0.1) (07-2018): "Universal Mobile Telecommunications System (UMTS); Base Station (BS) conformance testing (TDD) (3GPP TS 25.142 version 15.0.1 Release 15)".
- [4] ETSI TS 125 143 (V15.0.0) (07-2018): "Universal Mobile Telecommunications System (UMTS); UTRA repeater conformance testing (3GPP TS 25.143 version 15.0.0 Release 15)".
- [5] ETSI TS 136 104 (V15.8.0) (10-2019): "LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); Base Station (BS) radio transmission and reception (3GPP TS 36.104 version 15.8.0 Release 15)".
- [6] ETSI TS 136 141 (V15.8.0) (10-2019): "LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); Base Station (BS) conformance testing (3GPP TS 36.141 version 15.8.0 Release 15)".
- [7] ETSI TS 145 008 (V15.6.0) (04-2020): "Digital cellular telecommunications system (Phase 2+) (GSM); GSM/EDGE Radio subsystem link control (3GPP TS 45.008 version 15.6.0 Release 15)".
- [8] ETSI EN 301 502 (V12.5.2) (03-2017): "Global System for Mobile communications (GSM); Base Station (BS) equipment; Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU".
- [9] ETSI TS 151 021 (V15.3.0) (04-2020): "Digital cellular telecommunications system (Phase 2+) (GSM); Base Station System (BSS) equipment specification; Radio aspects (3GPP TS 51.021 version 15.3.0 Release 15)".
- [10] ETSI TS 138 141-1 (V15.5.0) (04-2020): "5G; NR; Base Station (BS) conformance testing Part 1: Conducted conformance testing (3GPP TS 38.141-1 version 15.5.0 Release 15)".
- [11] ETSI TS 138 101-4 (V15.5.0) (04-2020): "5G; NR; User Equipment (UE) radio transmission and reception; Part 4: Performance requirements (3GPP TS 38.101-4 version 15.5.0 Release 15)".
- [12] ETSI TS 137 141 (V15.10.0) (04-2020): "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); LTE; 5G; NR, E-UTRA, UTRA and GSM/EDGE; Multi-Standard Radio (MSR) Base Station (BS) conformance testing (3GPP TS 37.141 version 15.10.0 Release 15)".
- [13] ETSI TS 137 145-1 (V15.6.0) (01-2020): "Universal Mobile Telecommunications System (UMTS); LTE; Active Antenna System (AAS) Base Station (BS) conformance testing; Part 1: conducted conformance testing (3GPP TS 37.145-1 version 15.6.0 Release 15)".

- [14] ETSI TS 137 145-2 (V15.6.0) (01-2020): "Universal Mobile Telecommunications System (UMTS); LTE; Active Antenna System (AAS) Base Station (BS) conformance testing; Part 2: radiated conformance testing (3GPP TS 37.145-2 version 15.6.0 Release 15)".
- [15] ETSI EN 301 908-20 (V6.3.1) (05-2016): "IMT cellular networks; Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU; Part 20: OFDMA TDD WMAN (Mobile WiMAX™) TDD Base Stations (BS)".
- [16] ETSI EN 301 908-22 (V6.1.1) (07-2016): "IMT cellular networks; Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU; Part 22: OFDMA TDD WMAN (Mobile WiMAX™) FDD Base Stations (BS)".
- [17] ETSI TS 138 141-2 (V15.5.0) (04-2020): "5G; NR; Base Station (BS) conformance testing; Part 2: Radiated conformance testing (3GPP TS 38.141-2 version 15.5.0 Release 15)".
- [18] TIA-97 (2014): "Recommended Minimum Performance Standard for cdma2000 Spread Spectrum Base Stations".
- [19] TIA-2000 Series, Revision F (2014): "Introduction to CDMA2000 spread spectrum systems **Includes TIA-2000.1 (2013), TIA-2000.2 (2014), TIA-2000.3 (2014), TIA-2000.4 (2014), and TIA-2000.5 **".
- [20] ETSI TS 138 104 (V15.9.0) (04-2020): "5G; NR; Base Station (BS) radio transmission and reception (3GPP TS 38.104 version 15.9.0 Release 15)".
- [21] ETSI TS 137 104 (V15.10.0) (04-2020): "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); LTE; 5G; NR, E-UTRA, UTRA and GSM/EDGE; Multi-Standard Radio (MSR) Base Station (BS) radio transmission and reception (3GPP TS 37.104 version 15.10.0 Release 15)".
- [22] ETSI TS 125 101 (V15.3.0) (05-2019): "Universal Mobile Telecommunications System (UMTS); User Equipment (UE) radio transmission and reception (FDD) (3GPP TS 25.101 version 15.3.0 Release 15)".
- [23] ETSI TS 125 102 (V15.0.0) (10-2018): "Universal Mobile Telecommunications System (UMTS); User Equipment (UE) radio transmission and reception (TDD) (3GPP TS 25.102 version 15.0.0 Release 15)".
- [24] ETSI TS 136 101 (V15.10.0) (04-2020): "LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) radio transmission and reception (3GPP TS 36.101 version 15.10.0 Release 15)".
- [25] ETSI TS 136 143 (V15.0.0) (09-2018): "LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); FDD repeater conformance testing (3GPP TS 36.143 version 15.0.0 Release 15)".
- [26] ETSI TS 151 010-1 (V13.8.0) (07-2019): "Digital cellular telecommunications system (Phase 2+) (GSM); Mobile Station (MS) conformance specification; Part 1: Conformance specification (3GPP TS 51.010-1 version 13.8.0 Release 13)".
- [27] ETSI TS 137 105 (V15.8.0) (01-2020): "Universal Mobile Telecommunications System (UMTS); LTE; Active Antenna System (AAS) Base Station (BS) transmission and reception (3GPP TS 37.105 version 15.8.0 Release 15)".
- [28] Void.
- [29] Void.
- [30] ETSI TS 137 113 (V15.8.0) (01-2020): "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); LTE; NR, E-UTRA, UTRA and GSM/EDGE; Multi-Standard Radio (MSR) Base Station (BS) Electromagnetic Compatibility (EMC) (3GPP TS 37.113 version 15.8.0 Release 15)".
- [31] ETSI TS 137 114 (V15.8.0) (04-2020): "Universal Mobile Telecommunications System (UMTS); LTE; Active Antenna System (AAS) Base Station (BS) Electromagnetic Compatibility (EMC) (3GPP TS 37.114 version 15.8.0 Release 15)".

2.2 Informative references

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- [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] ETSI EN 301 526 (V1.1.1) (07-2006): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Harmonized EN for CDMA spread spectrum mobile stations operating in the 450 MHz cellular band (CDMA 450) and 410, 450 and 870 MHz PAMR bands (CDMA-PAMR) covering essential requirements of article 3.2 of the R&TTE Directive".
- [i.3] ETSI TS 125 104 (V15.5.0) (04-2019): "Universal Mobile Telecommunications System (UMTS); Base Station (BS) radio transmission and reception (FDD) (3GPP TS 25.104 version 15.5.0 Release 15)".
- [i.4] ETSI TS 125 105 (V15.0.0) (07-2018): "Universal Mobile Telecommunications System (UMTS); Base Station (BS) radio transmission and reception (TDD) (3GPP TS 25.105 version 15.0.0 Release 15)".
- [i.5] ETSI TS 125 106 (V15.0.0) (07-2018): "Universal Mobile Telecommunications System (UMTS); UTRA repeater radio transmission and reception (3GPP TS 25.106 version 15.0.0 Release 15)".
- [i.6] ETSI TS 136 106 (V15.0.0) (09-2018): "LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); FDD repeater radio transmission and reception (3GPP TS 36.106 version 15.0.0 Release 15)".
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- [i.7] ETSI EN 301 908-5 (V5.2.1) (09-2011): "IMT cellular networks; Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive; Part 5: CDMA Multi-Carrier (cdma2000) Base Stations (BS)".
- [i.8] ETSI EN 301 908-7 (V4.2.1) (03-2010): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Base Stations (BS), Repeaters and User Equipment (UE) for IMT-2000 Third-Generation cellular networks; Part 7: Harmonized EN for IMT-2000, CDMA TDD (UTRA TDD and E-UTRA TDD) (BS) covering the essential requirements of article 3.2 of the R&TTE Directive".
- [i.9] Void.
- [i.10] Void.
- [i.11] ETSI EN 301 449 (V1.1.1) (07-2006): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Harmonized EN for CDMA spread spectrum base stations operating in the 450 MHz cellular band (CDMA 450) and 410, 450 and 870 MHz PAMR bands (CDMA-PAMR) covering essential requirements of article 3.2 of the R&TTE Directive".
- [i.12] ETSI EN 302 426 (V1.1.1) (09-2006): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Harmonized EN for CDMA spread spectrum Repeaters operating in the 450 MHz cellular band (CDMA450) and the 410 MHz, 450 MHz and 870 MHz PAMR bands (CDMA-PAMR) covering essential requirements of article 3.2 of the R&TTE Directive".
- [i.13] Void.
- [i.14] Void.

- [i.15] Commission Implementing Decision C(2015) 5376 final of 4.8.2015 on a standardisation request to the European Committee for Electrotechnical Standardisation and to the European Telecommunications Standards Institute as regards radio equipment in support of Directive 2014/53/EU of the European Parliament and of the Council.

3 Definition of terms, symbols and abbreviations

3.1 Terms

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

active antenna system base station: base station system which combines an antenna array with a transceiver unit array and a radio distribution network

antenna array: group of radiating elements characterized by the geometry and the properties of the array elements

base station: radio equipment intended for operation at a fixed location which is not defined as portable equipment

base station type 1-C: base station operating at FR1 with requirements set consisting only of conducted requirements defined at individual antenna port

base station type 1-H: base station operating at FR1 with a requirement set consisting of conducted requirements defined at individual TAB connectors and OTA requirements defined at RIB

NOTE: BS type 1-H is treated as a BS type 1-C in EMC assessment. See figure 1b.

base station type 1-O: base station operating at FR1 with a requirement set consisting only of OTA requirements defined at the RIB

base station type 2-O: base station operating at FR2 with a requirement set consisting only of OTA requirements defined at the RIB

bearer: information transmission path of defined characteristics for transfer of user data or predefined test data

CDMA-PAMR: Public Access Mobile Radio system based on TIA-2000 [19] Spreading Rate 1 specifications

channel bandwidth: RF bandwidth supporting a single E-UTRA RF carrier with the transmission bandwidth configured in the uplink or downlink of a cell

NOTE: The channel bandwidth is measured in MHz and is used as a reference for transmitter and receiver RF requirements.

downlink: unidirectional radio link for the transmission of signals from a UTRAN access point to a UE

International Mobile Telecommunications-2000 (IMT-2000): third generation mobile systems which provide access, by means of one or more radio links, to a wide range of telecommunications services supported by the fixed telecommunication networks (e.g. PSTN, ISDN or IP), and to other services which are specific to mobile users

License Assisted Access (LAA): License Assisted Access LTE based base station operating in unlicensed frequency spectrum

maximum throughput: maximum achievable throughput for a reference measurement channel

MB Base Station: base station which is characterized by the ability of its transmitter and/or receiver to process two or more carriers in common active RF components simultaneously, where at least one carrier is configured at a different non-overlapping operating band than the other carrier(s)

MSR Base Station: base station which is characterized by the ability of its receiver and transmitter to process two or more carriers in common active RF components simultaneously in a declared RF bandwidth, where at least one carrier is of a different RAT than the other carrier(s)