

ETSI EN 301 489-50 V2.4.1 (2025-09)



**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**

[ETSI EN 301 489-50 V2.4.0 \(2025-06\)](https://standards.iteh.ai/catalog/standards/etsi/712c220b-3549-445b-a685-98db123b1498/etsi-en-301-489-50-v2-4-0-2025-06)

<https://standards.iteh.ai/catalog/standards/etsi/712c220b-3549-445b-a685-98db123b1498/etsi-en-301-489-50-v2-4-0-2025-06>

Reference

REN/ERM-EMC-410

Keywords

5G, EMC, GSM, harmonised standard, LTE, MSR,
NR, OFDMA, WCDMA, WMAN

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 - APE 7112B
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° w061004871

Important notice

The present document can be downloaded from the
[ETSI Search & Browse Standards](#) application.

The present document may be made available in electronic versions and/or in print. The content of any electronic and/or print versions of the present document shall not be modified without the prior written authorization of ETSI. In case of any existing or perceived difference in contents between such versions and/or in print, the prevailing version of an ETSI deliverable is the one made publicly available in PDF format on [ETSI deliver](#) repository.

Users should be aware that the present document may be revised or have its status changed,
this information is available in the [Milestones listing](#).

If you find errors in the present document, please send your comments to
the relevant service listed under [Committee Support Staff](#).

If you find a security vulnerability in the present document, please report it through our
[Coordinated Vulnerability Disclosure \(CVD\)](#) program.

Notice of disclaimer & limitation of liability

The information provided in the present deliverable is directed solely to professionals who have the appropriate degree of experience to understand and interpret its content in accordance with generally accepted engineering or other professional standard and applicable regulations.

No recommendation as to products and services or vendors is made or should be implied.
In no event shall ETSI be held liable for loss of profits or any other incidental or consequential damages.

Any software contained in this deliverable is provided "AS IS" with no warranties, express or implied, including but not limited to, the warranties of merchantability, fitness for a particular purpose and non-infringement of intellectual property rights and ETSI shall not be held liable in any event for any damages whatsoever (including, without limitation, damages for loss of profits, business interruption, loss of information, or any other pecuniary loss) arising out of or related to the use of or inability to use the software.

Copyright Notification

No part may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm except as authorized by written permission of ETSI.

The content of the PDF version shall not be modified without the written authorization of ETSI.

The copyright and the foregoing restriction extend to reproduction in all media.

© ETSI 2025.
All rights reserved.

Contents

Intellectual Property Rights	5
Foreword.....	5
Modal verbs terminology.....	6
1 Scope	7
2 References	8
2.1 Normative references	8
2.2 Informative references.....	10
3 Definition of terms, symbols and abbreviations.....	11
3.1 Terms.....	11
3.2 Symbols.....	15
3.3 Abbreviations	15
4 Test conditions	16
4.1 General	16
4.2 Arrangements for establishing a communication link	16
4.2.0 Specification of Channel Number.....	16
4.2.1 Arrangements for test signals at the input of transmitters.....	17
4.2.2 Arrangements for test signals at the output of transmitters.....	17
4.2.3 Arrangements for test signals at the input of receivers	17
4.2.4 Arrangements for test signals at the output of receivers	18
4.2.5 Arrangements for test signals for repeaters.....	18
4.3 Exclusion bands.....	18
4.3.0 General.....	18
4.3.1 Transmitter exclusion band.....	19
4.3.2 Receiver exclusion band	19
4.3.2.0 General	19
4.3.3 Multi-band BS	20
4.4 Narrow band responses of receivers.....	20
4.5 Void.....	21
4.6 Test configurations	21
4.6.0 General.....	21
4.6.1 Emission	21
4.6.2 Immunity	22
5 Performance assessment.....	23
5.0 General	23
5.1 UTRA.....	23
5.1.1 BLER on DL.....	23
5.1.2 BLER on UL.....	23
5.2 E-UTRA, E-UTRA with LAA, in-band or guard band NB-IoT, Standalone NB-IoT.....	23
5.2.1 Throughput on DL	23
5.2.2 Throughput on UL	24
5.3 OFDMA WMAN	24
5.3.1 Throughput on DL	24
5.3.2 Throughput on UL	24
5.4 NR, NR with in-band NB-IoT	24
5.4.1 Throughput on DL	24
5.4.2 Throughput on UL	24
5.5 GSM/EDGE	24
5.5.1 BER on DL	24
5.5.1.0 General	24
5.5.1.1 Assessment of BER using static layer 1 functions	24
5.5.1.2 Assessment of BER using RXQUAL.....	25
5.5.2 BER on UL	25
5.5.2.0 General	25
5.5.2.1 Assessment of BER using reported BER	25

5.5.2.2	Assessment of BER using RXQUAL.....	25
5.6	CDMA.....	25
5.6.1	FER on DL.....	25
5.6.2	FER on UL.....	25
5.7	Assessment of RF gain variations of repeaters.....	25
5.8	Ancillary equipment.....	25
5.9	Void.....	25
6	Performance criteria.....	26
6.1	Performance criteria for continuous phenomena.....	26
6.1.0	General.....	26
6.1.1	Base Stations.....	26
6.1.1.1	UTRA.....	26
6.1.1.2	E-UTRA, E-UTRA with LAA, in-band or guard band NB-IoT	26
6.1.1.3	Standalone NB-IoT	27
6.1.1.4	GSM/EDGE	28
6.1.1.5	CDMA.....	28
6.1.1.6	NR, NR with in-band NB-IoT.....	29
6.1.2	Repeater.....	31
6.2	Performance criteria for transient phenomena.....	31
6.2.0	General.....	31
6.2.1	Repeater.....	31
7	Requirements.....	31
7.1	Emission.....	31
7.1.1	General.....	31
7.1.2	Special conditions.....	32
7.2	Immunity.....	32
7.2.1	General.....	32
7.2.2	Special conditions.....	33
Annex A (informative):	Relationship between the present document and the essential requirements of Directive 2014/53/EU	34
Annex B (informative):	Why testing on cables shorter than 3 m in length is not required.....	36
B.1	Background	36
B.2	Emission requirements	36
B.3	Immunity requirements	36
B.3.1	Common rationale	36
B.3.2	For EN 61000-4-6 tests	36
B.3.3	For EN 61000-4-4 tests	37
B.4	Interactive aspects in EMC Tests	37
B.4.1	Introduction	37
B.4.2	For EN 61000-4-6 tests	37
B.4.3	For EN 61000-4-4 tests	39
B.5	Conclusion.....	39
Annex C (informative):	Change history	40
History		41

Intellectual Property Rights

Essential patents

IPRs essential or potentially essential to normative deliverables may have been declared to ETSI. The declarations pertaining to these essential IPRs, if any, are publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: *"Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards"*, which is available from the ETSI Secretariat. Latest updates are available on the [ETSI IPR online database](https://standards.itec.ai).

Pursuant to the ETSI Directives including the ETSI IPR Policy, no investigation regarding the essentiality of IPRs, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Trademarks

The present document may include trademarks and/or tradenames which are asserted and/or registered by their owners. ETSI claims no ownership of these except for any which are indicated as being the property of ETSI, and conveys no right to use or reproduce any trademark and/or tradename. Mention of those trademarks in the present document does not constitute an endorsement by ETSI of products, services or organizations associated with those trademarks.

DECT™, **PLUGTESTS™**, **UMTS™** and the ETSI logo are trademarks of ETSI registered for the benefit of its Members. **3GPP™**, **LTE™** and **5G™** logo are trademarks of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners. **oneM2M™** logo is a trademark of ETSI registered for the benefit of its Members and of the oneM2M Partners. **GSM®** and the GSM logo are trademarks registered and owned by the GSM Association.

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.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.

The present document is part 50 of a multi-part deliverable. Full details of the entire series can be found in part 1 [1].

National transposition dates	
Date of adoption of this EN:	3 September 2025
Date of latest announcement of this EN (doa):	31 December 2025
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	30 June 2026
Date of withdrawal of any conflicting National Standard (dow):	30 June 2027

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).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

iTeh Standards
(<https://standards.iteh.ai>)
Document Preview

[ETSI EN 301 489-50 V2.4.0 \(2025-06\)](#)

<https://standards.iteh.ai/catalog/standards/etsi/712c220b-3549-445b-a685-98db123b1498/etsi-en-301-489-50-v2-4-0-2025-06>