Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 50: Specific conditions for Cellular Communication Base Station (BS), repeater and ancillary equipment 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 covering the essential requirements of article 3.1(b) of Directive 2014/53/EU
Contents

Intellectual Property Rights .................................................................................................................. 5
Foreword .................................................................................................................................................. 5
Modal verbs terminology ....................................................................................................................... 6
1 Scope ................................................................................................................................................... 6
2 References ............................................................................................................................................ 7
  2.1 Normative references ..................................................................................................................... 7
  2.2 Informative references ................................................................................................................... 9
3 Definitions and abbreviations ............................................................................................................. 10
  3.1 Definitions ....................................................................................................................................... 10
  3.2 Abbreviations ................................................................................................................................ 12
4 Test conditions ................................................................................................................................. 13
  4.1 General ............................................................................................................................................ 13
  4.2 Arrangements for test signals ....................................................................................................... 14
    4.2.0 General ...................................................................................................................................... 14
    4.2.1 Multiple enclosure BS solution ................................................................................................. 15
    4.2.2 Arrangements for test signals at the input of transmitters ....................................................... 15
    4.2.3 Arrangements for test signals at the output of transmitters ................................................... 15
    4.2.4 Arrangements for test signals at the input of receivers ........................................................... 15
    4.2.5 Arrangements for test signals at the output of receivers ......................................................... 15
    4.2.6 Arrangements for test signals for repeaters ........................................................................... 15
  4.3 Exclusion bands ............................................................................................................................. 16
    4.3.1 Transmitter exclusion band ..................................................................................................... 16
    4.3.2 Receiver exclusion band .......................................................................................................... 16
  4.4 Narrow band responses of receivers ............................................................................................. 16
  4.5 Normal test modulation ................................................................................................................. 17
  4.6 Test configurations for MSR, MC and MB .................................................................................... 18
5 Performance assessment ..................................................................................................................... 19
  5.1 General ............................................................................................................................................ 19
  5.2 Equipment which can provide a continuous communication link ................................................ 19
    5.2.0 General ...................................................................................................................................... 19
    5.2.1 Assessment of BLER/Throughput/BER/FER in Downlink .................................................... 19
      5.2.1.0 General ............................................................................................................................. 19
      5.2.1.1 Assessment of BER using static layer 1 functions .............................................................. 20
      5.2.1.2 Assessment of BER using RXQUAL ............................................................................... 20
      5.2.2 Assessment of BLER/Throughput/BER/FER in Uplink ....................................................... 20
        5.2.2.0 General ........................................................................................................................... 20
        5.2.2.1 Assessment of BER using RXQUAL ............................................................................. 21
        5.2.2.2 Assessment of BER using reported BER ......................................................................... 21
        5.2.3 Assessment of RF gain variations of repeaters ................................................................... 21
    5.3 Equipment which does not provide a continuous communication link ........................................ 21
    5.4 Ancillary equipment .................................................................................................................... 21
    5.5 Equipment classification .............................................................................................................. 21
6 Performance criteria .......................................................................................................................... 22
  6.1 Performance criteria for continuous phenomena applied to Base Stations and Repeaters ............. 22
    6.1.1 Base Stations (BS) .................................................................................................................... 22
    6.1.2 Repeaters ................................................................................................................................. 23
    6.2 Performance criteria for transient phenomena for Base Station and Repeaters ........................ 24
      6.2.1 Base stations (BS) .................................................................................................................. 24
      6.2.2 Repeaters ............................................................................................................................... 24
    6.3 Performance criteria for ancillary equipment tested on a standalone basis ................................ 24
      6.3.0 General .................................................................................................................................. 24
      6.3.1 Performance criteria for continuous phenomena for ancillary equipment ........................ 24
6.3.2 Performance criteria for transient phenomena for ancillary equipment ........................................ 24
7 Applicability overview tables ............................................................................................................. 25
7.1 Emission .......................................................................................................................................... 25
7.1.1 General ........................................................................................................................................ 25
7.1.2 Special conditions ....................................................................................................................... 25
7.2 Immunity .......................................................................................................................................... 25
7.2.1 General ........................................................................................................................................ 25
7.2.2 Special conditions ....................................................................................................................... 26


Annex B (informative): Examples of base station radio equipment for digital cellular radio telecommunications systems within the scope of the present document ............................................................................................................ 29

B.0 General ........................................................................................................................................... 29
B.1 Base station equipment for IMT-2000 CDMA Direct Spread (UTRA) .............................................. 29
B.2 Base station equipment for Evolved Universal Terrestrial Radio Access (E-UTRA) ...................... 29
B.3 GSM base station, ancillary RF amplifiers, and GSM repeaters meeting Phase 2 and 2+ .............. 29
B.4 Other types of GSM base station, ancillary RF amplifiers, and GSM repeaters equipment ............ 30
B.5 Multi Standard Radio (MSR) Base station equipment ...................................................................... 30
B.6 OFDMA WMAN Base station equipment ......................................................................................... 30
B.7 OFDMA WMAN Base station equipment ......................................................................................... 30
B.8 CDMA 1x spread spectrum Base stations, repeaters and ancillary equipment ............................ 30

Annex C (informative): Bibliography ..................................................................................................... 32

Annex D (informative): Change history ................................................................................................. 33

History .................................................................................................................................................... 34
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Pursuant to the ETSI IPR Policy, no investigation, 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.

Foreword

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

The present document has been produced by ETSI in response to a mandate from the European Commission issued 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 98/34/EC [i.2] as amended by Directive 98/48/EC [i.8].


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

### National transposition dates

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<td>Date of withdrawal of any conflicting National Standard (dow):</td>
<td>30 November 2014</td>
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Introduction

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 has been produced to rationalize the current ETSI EN 301 489 series [i.9;9] of EMC standards by collating the EMC requirements for Digital Cellular Communication Base Station (BS), repeater and ancillary Equipment into a single standard, there are no technical changes to product EMC Test requirements. The present document has been produced to replace ETSI EN 301 489-8 [i.9] (GSM/EDGE), ETSI EN 301 489-23 [i.9] (WCDMA and LTE UTRA/E-UTRA), ETSI EN 301 489-26 [i.9] CDMA1x/CDMA 2000 1x and those parts of ETSI EN 301 489-4 [i.9] which pertain to WiMAX OFDMA WMAN BS and to incorporate IMT MSR and IMT Mobile WiMAX OFDMA WMAN.
The present document is part 50 of a multi-part deliverable. Full details of the entire series can be found in part [1].

### National transposition dates

| Date of adoption of this EN: | 23 January 2017 |
| Date of latest announcement of this EN (doa): | 30 April 2017 |
| Date of latest publication of new National Standard or endorsement of this EN (dop/e): | 31 October 2017 |
| Date of withdrawal of any conflicting National Standard (dow): | 31 October 2018 |

### 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.

### 1 Scope

The present document, together with EN 301 489-1 [1], covers the assessment of specifies technical characteristics and methods of measurements for the following equipment types:

1) Digital cellular base station equipment;
2) Repeaters;
3) Associated ancillary equipment in respect of ElectroMagnetic Compatibility (EMC).

Including individually and combinations of:

- UTRA, WCDMA (IMT-2000 CDMA Direct Spread (UTRA and W-CDMA, UMTS)
- E-UTRA, i.e. LTE;
- (IMT-2000 CDMA Multi-carrier and IMT advanced)
- GSM equipment meeting Phase 2. (IMT-2000 SC, Technology GSM/EDGE)
- MSR (IMT-2000 and Phase 2+ requirements, IMT advanced, combination of technologies above)
- IMT Multi-Standard Radio (MSR);
- IMT-OFDMA TDD WMAN (Mobile WiMAX) IMT-2000 OFDMA, OFDMA WMAN)
- CDMA (CDMA2000 - IMT MC, CDMA2000 1X)

Technical specifications related to the antenna port and emissions from the enclosure port of radio equipment (base station (BS), and 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.

Examples of base station equipment covered by the present document are given in annex A.

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.
The environmental classification and the emission and immunity requirements used in the present document are as stated in ETSI EN 301 489-1 [41], except for any special conditions included in the present document.

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

Technical specifications related to the antenna port of radio equipment and radiated emissions from the enclosure port of radio equipment and combinations of radio and associated ancillary equipment are given in the harmonised product standards ETSI EN 301 908-1 [28] or ETSI EN 301 502 [8] for the effective and efficient use of the radio spectrum.

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.


[7] ETSI TS 145 008 (V9.7Y12.4.0) (06/201101-2015): "Digital cellular telecommunications system (Phase 2+); Radio subsystem link control (3GPP TS 45.008 version 9.7.12.4.0 Release 9.12)".


[9] ETSI TS 151 021 (V9.6Y12.3.0) (06/201101-2015): "Digital cellular telecommunications system (Phase 2+); Base Station System (BSS) equipment specification; Radio aspects (3GPP TS 51.021 version 9.6.12.3.0 Release 9.12)".
[10] ETSI TS 100 607-1 (V8.3.0) (10/2001): "Digital cellular telecommunications system (Phase 2+); Mobile Station (MS) conformance specification; Part 1: Conformance specification (3GPP 11.10.1 version 8.3.0 Release 1999)".

[11] ETSI TS 137 104 (V9.5.12.8.0) (06/2011/07-2015): "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; E-UTRA, UTRA and GSM/EDGE; Multi-Standard Radio (MSR) Base Station (BS) radio transmission and reception (3GPP TS 37.104 version 9.5.12.8.0 Release 912)".

[12] ETSI TS 137 141 (V9.4.12.8.0) (06/2011/07-2015): "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; E-UTRA, UTRA and GSM/EDGE; Multi-Standard Radio (MSR) Base Station (BS) conformance testing (3GPP TS 37.141 version 9.4.12.8.0 Release 912)".


[17] ETSI EN 302 544-1 (V1.1.2) (01/2010): "Broadband Data Transmission Systems operating in the 2 500 MHz to 2 690 MHz frequency band; Part 1: TDD Base Stations; Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive".


[20] ETSI EN 301 449 (V1.1.1) (07/2006): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Harmonised 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".

[21] ETSI EN 302 426 (V1.1.1) (09/2006): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Harmonised 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".


ETSI
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.3] ETSI TS 125 104 (V9.7.0): "Universal Mobile Telecommunications System (UMTS); Base Station (BS) radio transmission and reception (FDD) (3GPP TS 25.104 version 9.7.0 Release 9)".

[i.4] ETSI TS 125 104 (V9.2.0): "Universal Mobile Telecommunications System (UMTS); Base Station (BS) radio transmission and reception (FDD) (3GPP TS 25.104 version 9.2.0 Release 9)".

[i.5] ETSI TS 125 106 (V9.2.0): "Universal Mobile Telecommunications System (UMTS); UTRA repeater radio transmission and reception (3GPP TS 25.106 version 9.2.0 Release 9)".

[i.6] ETSI TS 125 106 (V9.3.0): "Universal Mobile Telecommunications System (UMTS); UTRA repeater radio transmission and reception (3GPP TS 25.106 version 9.3.0 Release 9)".

[i.7] ETSI EN 300 774 (V1.2.1): "Broadband Wireless Access Systems (BWA) in the 3 400 MHz to 3 800 MHz frequency band; Base Stations; Harmonised EN covering the essential requirements of article 3.2 of the R&TTE Directive".
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 [11] and the following apply:

Abis interface: logical interface between a BTS and a BSC

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

CDMA 1x Spread Spectrum: term used to denote cdma2000 Spread Spectrum Systems and their evolution with wireless air interface standard for spread-spectrum technology with a spreading rate 1

CDMA-PAMR: term used to denote a PAMR Public Access Mobile Radio system, based on TIA/EIA-552-2000 [Error! Reference source not found.] 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.
**forward CDMA channel**: CDMA channel from a base station to mobile stations

**NOTE**: The forward CDMA channel contains one or more code channels that are transmitted on a CDMA frequency assignment using a particular pilot PN offset.

**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

**maximum throughput**: maximum achievable throughput for a reference measurement channel

**MB Base Station**: Multi-Band Base Station 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 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)

**necessary bandwidth**: As defined in ITU-R Recommendation ITU-R SM.329-11 [i.14].

**radio communications equipment**: telecommunications equipment which includes one or more transmitters and/or receivers and/or parts thereof for use in a fixed, mobile or portable application

**NOTE**: It can be operated with ancillary equipment but if so, is not dependent on it for basic functionality.

**Radio Configuration (RC)**: set of Forward Traffic Channel and Reverse Traffic Channel transmission formats that are characterized by physical layer parameters such as transmission rates, modulation characteristics, and spreading rate

**radio digital unit**: equipment which contains base band and functionality for controlling Radio unit

**NOTE**: See figures 1a and 1b.

**radio equipment**: equipment which contains Radio digital unit and Radio unit

**NOTE**: See figures 1a and 1b.

**radio unit**: equipment which contains transmitter and receiver

**NOTE**: See figures 1a and 1b.

**repeater**: device with two RF ports, both of which are intended to be connected to antennas, which is capable of receiving, amplifying and transmitting simultaneously in one direction a signal in a BSS transmit band and in the other direction a signal in the corresponding BSS receive band

**reverse CDMA channel**: CDMA channel from the mobile station to the base station

**NOTE**: From the base station's perspective, the Reverse CDMA Channel is the sum of all mobile station transmissions on a CDMA frequency assignment.

**RXQUAL**: measure of the received signal quality, which is generated by the base station for use as a criterion in the RF power control and handover processes

**NOTE**: The characteristics and requirements are specified in ETSI TS 145 008 [27], clause 8.2.

**throughput**: number of payload bits successfully received per second for a reference measurement channel in a specified reference condition
3.2 Abbreviations

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

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC</td>
<td>Alternating Current</td>
</tr>
<tr>
<td>ARFCN</td>
<td>Absolute Radio Frequency Channel Number</td>
</tr>
<tr>
<td>BER</td>
<td>Bit Error Ratio</td>
</tr>
<tr>
<td>BLER</td>
<td>Block Error Ratio</td>
</tr>
<tr>
<td>BS</td>
<td>Base Station</td>
</tr>
<tr>
<td>BSC</td>
<td>Base Station Controller</td>
</tr>
<tr>
<td>BSS</td>
<td>Base Station System</td>
</tr>
<tr>
<td>BTS</td>
<td>Base Transceiver Station</td>
</tr>
<tr>
<td>BW Channel</td>
<td>Channel bandwidth</td>
</tr>
<tr>
<td>CDMA</td>
<td>Code Division Multiple Access</td>
</tr>
<tr>
<td>CNC</td>
<td>Contiguous and Non-Contiguous operation</td>
</tr>
<tr>
<td>CRC</td>
<td>Cyclic Redundancy Check</td>
</tr>
<tr>
<td>CS</td>
<td>Capability Set</td>
</tr>
<tr>
<td>DC</td>
<td>Direct Current</td>
</tr>
<tr>
<td>DCS</td>
<td>Digital Cellular System</td>
</tr>
<tr>
<td>EARFCN</td>
<td>E-UTRA Absolute Radio Frequency Channel Number</td>
</tr>
<tr>
<td>EMC</td>
<td>ElectroMagnetic Compatibility</td>
</tr>
<tr>
<td>EPC</td>
<td>Evolved Packet Core</td>
</tr>
<tr>
<td>EUT</td>
<td>Equipment Under Test</td>
</tr>
<tr>
<td>E-UTRA</td>
<td>Evolved Universal Terrestrial Radio Access</td>
</tr>
<tr>
<td>FDD</td>
<td>Frequency Division Duplex</td>
</tr>
<tr>
<td>FER</td>
<td>Frame Error Rate</td>
</tr>
<tr>
<td>FRC</td>
<td>Fixed Reference Channel</td>
</tr>
<tr>
<td>GSM</td>
<td>Global System for Mobile communication</td>
</tr>
<tr>
<td>HW</td>
<td>Hardware</td>
</tr>
<tr>
<td>IF</td>
<td>Intermediate Frequency</td>
</tr>
<tr>
<td>IMT</td>
<td>International Mobile Telecommunications</td>
</tr>
<tr>
<td>IMT-2000</td>
<td>International Mobile Telecommunications 2000</td>
</tr>
<tr>
<td>IP</td>
<td>Internet Protocol</td>
</tr>
<tr>
<td>ISDN</td>
<td>Integrated Services Digital Network</td>
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</table>
4 Test conditions

4.1 General

For the purpose 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 base station equipment are specified in the present document.

4.1 General

The equipment shall be tested in the normal test environment defined in the appropriate conformance testing specification as specified below:

Base station:

- UTRA (FDD) base station ETSI TS 125 141 [22];
- UTRA (TDD) base station ETSI TS 125 142 [3];
- E-UTRA base station ETSI TS 136 141 [6];
- GSM/EDGE base station ETSI EN 301 502 [8];
- MSR base station ETSI TS 137 141 [12];
- Mobile WiMAXOFDMA WMAN TDD base station ETSI EN 301 908-20 [15];
- Mobile WiMAXOFDMA WMAN FDD base station ETSI EN 301 908-22 [16];
- CDMA Multi-Carrier base station TIA-97-E-1 [1818].

Repeater:

- UTRA repeater conformance testing specification ETSI TS 125 143 [4];
The test conditions shall be recorded in the test report.

For emission and immunity tests the test arrangements, etc., as specified in the present document, clauses 4.2 to 4.6, shall apply.

For an EUT which contains more than one BS, it is sufficient to perform tests relating to connectors of each representative type of port forming part of the EUT. For an MSR BS or other BS supporting more than one RAT, tests shall be performed relating to each port, but need not be repeated for each RAT that use the same port unless the test configuration in clause 4.6 calls for multi-RAT test configuration. For other BS supporting more than one RAT however (other than MSR BS), tests relating to the antenna port(s) shall always be performed for each supported RAT.

4.2 Arrangements for test signals

4.2.0 General

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

UTRA/E-UTRA/GSM-EDGE/MSR

The wanted RF signal nominal frequency shall be selected by setting the channel number according to the following:

- The Absolute Radio Frequency Channel Number (EARFCN) for E-UTRA carrier.
- The Absolute Radio Frequency Channel Number (UARFCN) for UTRA carrier.
- The Absolute Radio Frequency Channel Number (ARFCN) for GSM/EDGE carrier.

CDMA - Set the CDMA channel to an appropriate number.

Mobile WiMAX/OFDMA WMAN - The wanted signal(s) shall be (a) representative baseband input signal(s) corresponding to normal operation.

A communication link shall be set up with a suitable test system capable of evaluating the required performance criteria (hereafter called "the test system") at the radio interface and telecommunication port/ports (e.g. the S1/Iub/Abis interface).

The test system shall be located outside of the test environment.

When the EUT is required to be in the transmit/receive mode, the following conditions shall be met:

- The EUT shall be commanded to operate at maximum rated transmit power.
- Adequate measures shall be taken to avoid the effect of the unwanted signal on the measuring equipment.
- The wanted RF input signal level shall be set to a level where the performance is not limited by the receiver noise floor or strong signal effects:
  - For E-UTRA, the wanted signal can be set e.g. 15 dB above the reference sensitivity level as defined in ETSI TS 136 141 [6] to provide a stable communication link.
  - For UTRA FDD and TDD, the wanted signal can be set e.g. 15 dB above the reference sensitivity level as defined in ETSI TS 125 141 [2] or ETSI TS 125 142 [3] respectively, to provide a stable communication link.
  - For GSM/EDGE the wanted receiver input signal level shall be set to a nominal value of -47 dBm.

Mobile WiMAX

OFDMA WMAN

The input signal level shall be at a nominal value of 15 dB above the receiver input level for a Bit Error Ratio (BER) of $1 \times 10^{-5}$. 
CDMA

A communication link shall be set up with a suitable mobile station simulator (hereafter called "the test system") according to the Radio Configuration (RC) supported by the base station (see clause 1.3 in TIA-97-E-1 [18] using full data rate only).

4.2.1 Multiple enclosure BS solution

For a BS with multiple enclosures, the BS part with Radio digital unit and the Radio unit may be tested separately. Communication link shall be set up in the same way as if they are in single BS enclosure. The Radio Digital unit and the Radio unit shall communicate over an interface enabling establishment of a communication link.

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.

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.

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.

To provide a stable communication link, the wanted input signal level shall be set to a level to provide a stable communication link where the performance is not limited by the receiver noise floor or strong signal effects e.g. of 15 dB above the reference sensitivity level as defined in:

- UTRA TS 125 141 [2] (for FDD), ETSI TS 125 142 [3] (for TDD);
- E-UTRA ETSI TS 136 141 [6];
- CDMA TIA-97-E-1 [18];
   - Mobile WiMAX OFDMA WMAN for a Bit Error Ratio (BER) of $1 \times 10^{-5}$;
   - CDMA TIA-97 [18].

GSM/EDGE

The source of the wanted RF input signal shall be at a nominal value of -47 dBm.

CDMA

For immunity testing the wanted RF signal level at the input of the EUT shall be set to no more than 40 dB above the reference sensitivity level as defined in TIA-97-E-1 [18].

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.

4.2.6 Arrangements for test signals for repeaters

For immunity tests of repeaters, the wanted RF input signal shall be coupled to one antenna port at a level which will result, when measured, in the maximum rated RF output power per channel, as declared by the manufacturer. The test shall either be repeated with a wanted signal coupled to the other antenna port, or a single test shall be performed with the specified input signals being simultaneously coupled to both antenna ports.
4.3 Exclusion bands

4.3.1 Transmitter exclusion band

UTRA, E-UTRA, GSM/Edge, CDMA, Mobile WiMAX, OFDMA, WMAN and MSR - for testing of radiated immunity there shall be no transmitter exclusion band.

4.3.2 Receiver exclusion band

The BSS receiver exclusion band is the band of frequencies over which no tests of radiated immunity of a receiver are made.

Extends from the lower frequency of the Base Station receive band minus 20 MHz to the upper frequency of the Base Station receive band plus 20 MHz.

NOTE: The value of 20 MHz above is derived using the formula in clause 4.3.3.1 of ETSI EN 301 489-1 \([1]\) where the value of \(n\) is one.

For BS capable of multi-band operation, the total receiver exclusion band shall be the combination of the exclusion bands for each operating band supported by the BS.

The exclusion bands for the E-UTRA, UTRA, GSM/EDGE and MSR paired and unpaired can be calculated using the operating bands as set out in tables 4.4-2 and 4.4-3 in ETSI TS 137 113 \([27]\).

4.4 Narrow band responses of receivers

Responses on receivers or duplex transceivers occurring during the immunity test at discrete frequencies which are narrow band responses - spurious responses, are identified by the following method:

- **If** during an immunity test the quantity being monitored goes outside the specified tolerances (clause 6), it is necessary to establish whether the deviation is due to a narrow band response or to a wide band (EMC) phenomenon. Therefore, the test shall be repeated with the unwanted signal frequency first increased, and then decreased by an offset \(f_{\text{offset}}\) where:

  - for UTRA, \(f_{\text{offset}} = 10 \text{ MHz}\);
  - for E-UTRA, \(f_{\text{offset}} = 2 \times \text{BW}_{\text{Channel}}\) where \(\text{BW}_{\text{Channel}}\) is the channel bandwidth as defined in ETSI TS 136 104 \([5]\);
  - for GSM/EDGE, \(f_{\text{offset}} = 400 \text{ kHz}\);
  - for CDMA, \(f_{\text{offset}} = 10 \text{ MHz}, f_{\text{offset}} = 12.5 \text{ MHz}\);
  - for mobile WiMAX - for OFDMA, WMAN, \(f_{\text{offset}} = 2 \times \text{BW}_{\text{Channel}}\), where \(\text{BW}_{\text{Channel}}\) is the channel bandwidth;

- **If** the deviation disappears in either or both of the above offset cases, then the response is considered as a narrow band response.

- **If** the deviation does not disappear, 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 set to \(1.25 \times f_{\text{offset}}\).

- **If** the deviation does not disappear with the increased and/or decreased frequency, the phenomenon is considered wide band and therefore an EMC problem and the equipment fails the test.

Narrow band responses are disregarded.
For an MSR BS or other BS supporting more than one RAT, the method above shall be applied for each RAT supported. For BS capable of multi-band operation, all supported operating bands shall be considered for narrow band responses.

4.5 Normal test modulation

A communication link shall be set up with a suitable base station system test equipment.

**UTRA**

The normal test modulation should be a bearer with the characteristics of data rate shown in table 1.

If the test is not performed using one of these bearers, (for example none of them are supported by the BS), the characteristics of the bearer used shall be declared by the manufacturer and recorded in the test report.

### Table 1: Bearer information data rate

<table>
<thead>
<tr>
<th>Bearer Information</th>
<th>Data Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>12.2 kbit/s</td>
</tr>
<tr>
<td></td>
<td>64 kbit/s</td>
</tr>
<tr>
<td></td>
<td>144 kbit/s</td>
</tr>
<tr>
<td></td>
<td>384 kbit/s</td>
</tr>
</tbody>
</table>

**E-UTRA**

The normal test modulation should be a bearer with the characteristics of data rate shown in table 2.

If the test is not performed using one of these bearers, (for example none of them are supported by the BS), the characteristics of the bearer used shall be declared by the manufacturer and recorded in the test report.

### Table 2: Bearer information data rate

<table>
<thead>
<tr>
<th>E-UTRA Channel Bandwidth [MHz]</th>
<th>Bearer Information Data Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>FRC A1-3 in clause A.1 in ETSI TS 136 104 [5] (see note)</td>
</tr>
<tr>
<td>20</td>
<td>FRC A1-3 in clause A.1 in ETSI TS 136 104 [5] (see note)</td>
</tr>
</tbody>
</table>

**NOTE:** This is the information data rate of a single instance of the bearer mapped to 25 resource blocks. The performance criteria shall be met for each consecutive application of a single instance of the bearer mapped to disjoint frequency ranges with a width of 25 resource blocks each.

**GSM/EDGE**

The normal test modulation shall be delivered by a suitable mobile station or base station system test equipment (BSSTE).

**Mobile WiMAX**

**OFDMA WMAN**

A representative modulated RF signal corresponding to normal operation.

**CDMA**
A communication link shall be set up with a suitable base station system test equipment. The normal test modulation should be setup according to the Radio Configuration (RC) supported by the base station under test using full data rate only (see clause 1.3 in TIA-97-E-18 [18]).

### 4.6 MSR-BS test configurations for MSR, MC and MB

The present clause defines the test configurations for MSR, multi-carrier and multi-band Base Stations that shall be used for demonstrating conformance.

This is specified in table 3a for multi-RAT capable MSR Base Stations and in table 3b for single-RAT capable BS, and in table 3c for multi-band capable BS. For other BS supporting more than one RAT (other than MSR BS), table 3b applies separately for each RAT supported.

The Test configurations apply according to the declared RAT Capability Set (CS) of the MSR Base Station according to clause 4.7 of ETSI TS 137 141 [12] and the Band Category of the declared operating band (BC1, BC2 or BC3), as listed in the heading of each table.

For BS declared to be capable of contiguous operation only, the test configuration(s) in tables 3a and 3b denoted by a "C" shall be used for testing.

For BS declared to be capable of contiguous and non-contiguous operation and where the parameters in the manufacturer's declaration according to clause 4.7.2 of ETSI TS 137 141 [12] are identical for contiguous and non-contiguous operation, the test configurations denoted by "CNC" shall be used.

For BS declared to be capable of contiguous and non-contiguous operation and where the parameters in the manufacturer's declaration according to clause 4.7.2 of ETSI TS 137 141 [12] are not identical for contiguous and non-contiguous operation, the test configurations denoted by "C/NC" shall be used for testing.

The test configurations (TCx) are defined in ETSI TS 137 141 [12], clause 4.8.

#### Table 3a: Test configurations for single-band Multi-RAT capable MSR BS

<table>
<thead>
<tr>
<th>Capability Set</th>
<th>UTRA + E-UTRA (CS 3)</th>
<th>GSM + UTRA (CS 4)</th>
<th>GSM + E-UTRA (CS 5)</th>
<th>GSM + UTRA + E-UTRA (CS 6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BS test case</td>
<td>BC1</td>
<td>BC2</td>
<td>BC3</td>
<td>BC2</td>
</tr>
<tr>
<td></td>
<td>C: TC3a</td>
<td>C: TC3a</td>
<td>C: TC3b</td>
<td>C: TC2b</td>
</tr>
<tr>
<td></td>
<td>CNC: NTC3a</td>
<td>CNC: NTC3a</td>
<td>CNC: NTC4a</td>
<td>CNC: NTC4b</td>
</tr>
<tr>
<td></td>
<td>C/NC: TC3a and NTC3a</td>
<td>C/NC: TC3a and NTC3a</td>
<td>C/NC: TC4a and NTC4a</td>
<td>C/NC: TC4b and NTC4b</td>
</tr>
<tr>
<td>Emission tests</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Immunity tests</td>
<td>TC3a</td>
<td>TC3a</td>
<td>TC3b</td>
<td>TC4a</td>
</tr>
<tr>
<td>(see note)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NOTE: The test configuration identified for immunity tests are intended for transmitter tests in ETSI TS 137 141 [12], but are here applied both for BS transmitter and receiver.

#### Table 3b: Test configurations for single-band Single-RAT capable BS

<table>
<thead>
<tr>
<th>Capability Set</th>
<th>UTRA (MC) capable BS (CS1)</th>
<th>E-UTRA (MC) capable BS (CS2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BS test case</td>
<td>BC1</td>
<td>BC2</td>
</tr>
<tr>
<td></td>
<td>C: TC1a</td>
<td>C: TC1a</td>
</tr>
<tr>
<td></td>
<td>CNC: NTC1a</td>
<td>CNC: NTC1a</td>
</tr>
<tr>
<td></td>
<td>C/NC: TC1a and NTC1a</td>
<td>C/NC: TC1a and NTC1a</td>
</tr>
<tr>
<td>Emission tests</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Immunity tests</td>
<td>TC1a</td>
<td>TC1a</td>
</tr>
<tr>
<td>(see note)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NOTE: The test configuration identified for immunity tests are intended for transmitter tests in ETSI TS 137 141 [12], but are here applied both for BS transmitter and receiver.
Table 3c: Test configurations for multi-band capable BS (all Capability Sets)

<table>
<thead>
<tr>
<th>Capability Set</th>
<th>Multi-band testing</th>
</tr>
</thead>
<tbody>
<tr>
<td>BS test case</td>
<td>BC1/BC2</td>
</tr>
<tr>
<td>Emission tests</td>
<td>TC7b</td>
</tr>
<tr>
<td>Immunity tests</td>
<td>TC7a</td>
</tr>
</tbody>
</table>

NOTE: The test configuration identified for immunity tests are intended for transmitter tests in ETSI TS 137 141 [12], but are here applied both for BS transmitter and receiver.

For immunity tests:
- The communication link for the RAT(s) listed in the table shall be established according to clause 4.2.
- Tests for ports relating to the RAT(s) supported shall be performed according to clause 4.1.

5 Performance assessment

5.1 General

The provision of ETSI EN 301 489-1 [1], clause 5.1 shall apply with the following modifications:

- Additionally, additional information about the common and/or RAT-specific active RF components and other HW blocks for a communication link in MSR BS or other BS supporting more than one RAT shall be recorded in or annexed to the test report.

- Additional information about the common and/or band-specific active RF components and other HW blocks for a communication link in BS capable of multi-band operation shall be recorded in or annexed to the test report.

- A common communication link used by more than one RAT, shall be assessed on any one RAT.

- A communication link used by more than one RAT or more than one operating band, shall be assessed on all RATs and operating bands. Communication link(s) and/or radio performance parameters for the RATs and operating bands can during the test be assessed simultaneously or separately for each RAT and band, depending on the test environment capability.

- The information about the bandwidth of the IF amplifier immediately preceding the demodulator as set out in ETSI EN 301 489-1 [41], clause 5.1 is not applicable for radio equipment in the scope of the present document.

- A common communication link used by more than one RAT, shall be assessed on any one RAT.

5.2 Equipment which can provide a continuous communication link

5.2.0 General

The provision of ETSI EN 301 489-1 [1], clause 5.2 shall apply.

5.2.1 Assessment of BLER/Throughput/BER/FER in Downlink

5.2.1.0 General

The level of the signal supplied to the equipment should be within the range for which the assessment of BLER/Throughput/BER is not impaired. Power control shall be off during the immunity testing.
For UTRA (BLER)

In order to assess the BLER of the bearer used during the immunity tests, the output of the transmitter shall be connected to an equipment which meets the requirements for the BLER assessment of ETSI TS 125 101 [22] in case of FDD and ETSI TS 125 102 [23,24] in case of TDD.

For E-UTRA (Throughput)

The output of the transmitter shall be connected to an equipment which meet the requirements for the throughput assessment of ETSI TS 136 101 [24] for the bearer used in the immunity tests.

For GSM/EDGE (BER)

The BER at the output of the transmitter may be assessed using either of the techniques described below.

For OFDMA WMAN

The output of the transmitter shall be connected to equipment which meets the requirements for throughput assessment.

For CDMA (FER)

For immunity testing, the output of the transmitter shall be connected to a test system which meets the requirements for the FER assessment in accordance with TIA/EIA/IS-2000.2-1 [19] and TIA-97-E-1 [18]. The level of the signal supplied to the test system shall be attenuated such that it is within the range for which the assessment of FER is not impaired.

Mobile WiMAX

The output of the transmitter shall be connected to an equipment which meets the requirements for throughput assessment.

For GSM/EDGE (BER)

The BER at the output of the transmitter may be assessed using either of the techniques described below.

5.2.1.1 Assessment of BER using static layer 1 functions

The transmitter under test shall be operated according to the test case of ETSI TS 151 021 [9], clause 6.1.2. The bit sequence from the output of the transmitter shall be monitored by the test system according to the test case of ETSI TS 151 021 [9], clause 7.1.2, and the BER of the class 2 bits for TCH/FS assessed. The BER shall not exceed the values specified in clause 6.1 of the present document.

If the EUT does not support TCH/FS, the manufacturer shall declare the logical channel for which the performance shall be assessed, and the corresponding performance criteria.

5.2.1.2 Assessment of BER using RXQUAL

The output of the transmitter shall be connected to an equipment which meets the requirements of either ETSI TS 151-010-1, [26] or TS 100 607-1 [10] for the assessment of RXQUAL. The RXQUAL shall be monitored during the test. The RXQUAL shall not exceed the values specified in clause 6.1 of the present document.

NOTE: This equipment can be a GSM mobile station with suitable provision for the monitoring of RXQUAL.

5.2.2 Assessment of BLER/Throughput/BER/FER in Uplink

5.2.2.0 General

For UTRA (BLER)

The value of the BLER at the output of the receiver reported by the BS shall be monitored at the Iub interface by using a suitable test equipment.

For E-UTRA (Throughput)
The value of the throughput at the output of the receiver shall be monitored at S1 interface by using suitable test equipment.

**CDMA (FER)**

The value of the FER at the output of the receiver reported by the BS shall be monitored using a suitable test system.

**Mobile WiMAX**

For **GSM/EDGE (BER)**

The BER at the output of the receiver may be assessed using either of the techniques described below.

**For OFDMA WMAN**

The value of the throughput at the output of the receiver shall be monitored at the backhaul interface by using suitable test equipment.

For **CDMA (FER)**

The value of the FER at the output of the receiver reported by the BS shall be monitored using a suitable test system.

For **GSM/EDGE (BER)**

The BER at the output of the receiver may be assessed using either of the techniques described below.

5.2.2.1 **Assessment of BER using RXQUAL**

The value of the RXQUAL reported by the BTS or BSS shall be monitored using suitable test equipment.

5.2.2.2 **Assessment of BER using reported BER**

The BER of the class 2 bits at the output of the receiver shall be assessed using suitable test equipment.

If the EUT does not support TCH/FS, the manufacturer shall declare the logical channel for which the performance shall be assessed, and the corresponding performance criteria.

**NOTE:** This can be performed by a “test loopback” which uses the transmitter of the BTS to return the data which has been decoded by the receiver back to the test equipment which generated the bit sequence. For immunity tests of signal ports, the “test loopback” includes an external connection between signal ports.

5.2.3 **Assessment of RF gain variations of repeaters**

The parameter used for the performance assessment of a repeater is the RF gain within the operating frequency band.

5.3 **Equipment which does not provide a continuous communication link**

The provision of ETSI EN 301 489-1 [1], clause 5.3 shall apply.

5.4 **Ancillary equipment**

The provision of ETSI EN 301 489-1 [1], clause 5.4 shall apply.

5.5 **Equipment classification**

The provision of ETSI EN 301 489-1 [1], clause 5.5 shall apply.
6 Performance criteria

6.1 Performance criteria for continuous phenomena applied to Base Stations and Repeaters

6.1.1 Base Stations (BS)

For UTRA

The BLER calculation shall be based on evaluating the CRC on each transport block.

During immunity tests of the BS Uplink and Downlink paths the observed BLER shall be less than $1 \times 10^{-2}$ and the BS shall operate as intended. If the Uplink and Downlink paths are evaluated as one loop then the criteria is less than $2 \times 10^{-2}$.

After each test case the BS shall operate as intended with no loss of user control functions or stored data, the communications link shall be maintained.

For E-UTRA

The test should, where possible, be performed using a bearer with the characteristics of data rate and throughput defined in table 4. If the test is not performed using one of these bearers (for example, of none of them are supported by the BS), the characteristics of the bearer used shall be recorded in the test report.

The throughput in table 4 is stated relative to the maximum throughput of the FRC. The maximum throughput for an FRC is equal to the payload size $\times$ the number of uplink subframes per second.

The BS Uplink and Downlink paths shall each meet the performance criteria defined in table 4 during the test. If the Uplink and Downlink paths are evaluated as a one loop then the criteria is two times the throughput reduction shown in table 4. After each test case BS shall operate as intended with no loss of user control function, stored data and the communication link shall be maintained.

Table 4: BS Performance Criteria for continuous phenomena for BS

<table>
<thead>
<tr>
<th>E-UTRA Channel Bandwidth [MHz]</th>
<th>Bearer Information Data Rate</th>
<th>Performance Criteria (see notes 1 and 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.4</td>
<td>FRC A1-1 in clause A.1 in ETSI TS 136 104 [5]</td>
<td>Throughput &gt; 95 % No loss of service</td>
</tr>
<tr>
<td>3</td>
<td>FRC A1-2 in clause A.1 in ETSI TS 136 104 [5]</td>
<td>Throughput &gt; 95 % No loss of service</td>
</tr>
<tr>
<td>5</td>
<td>FRC A1-3 in clause A.1 in ETSI TS 136 104 [5]</td>
<td>Throughput &gt; 95 % No loss of service</td>
</tr>
<tr>
<td>10</td>
<td>FRC A1-3 in clause A.1 in ETSI TS 136 104 [5] (see note 3)</td>
<td>Throughput &gt; 95 % No loss of service</td>
</tr>
<tr>
<td>15</td>
<td>FRC A1-3 in clause A.1 in ETSI TS 136 104 [5] (see note 3)</td>
<td>Throughput &gt; 95 % No loss of service</td>
</tr>
<tr>
<td>20</td>
<td>FRC A1-3 in clause A.1 in ETSI TS 136 104 [5] (see note 3)</td>
<td>Throughput &gt; 95 % No loss of service</td>
</tr>
</tbody>
</table>

NOTE 1: The performance criteria, Throughput > 95 % / No loss of service, applies also if a bearer with another characteristics is used in the test.

NOTE 2: The performance criteria, Throughput > 90 % / No loss of service, applies instead if the Uplink and Downlink paths are evaluated as a one loop.

NOTE 3: This is the information data rate of a single instance of the bearer mapped to 25 resource blocks. The performance criteria shall be met for each consecutive application of a single instance of the bearer mapped to disjoint frequency ranges with a width of 25 resource blocks each.

After each test case the BS shall operate as intended with no loss of user control functions or stored data, the communications link shall be maintained.

For GSM/EDGE
Downlink

The BER of the downlink shall be assessed during the test according to one of the test methods of clause 5.2.1.

If the test method of clause 5.2.1.1 is used, the measured BER of the class 2 bits of TCH/FS shall not exceed 1.6 % during the test.

NOTE 1: This BER is the upper limit in ETSI TS 145 008 [7] for RXQUAL = 3.

If the test method of clause 5.2.1.2 is used, the value of RXQUAL shall not exceed 3 during the test.

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.

Uplink

The BER of the uplink shall be assessed during the test according to one of the test methods of clause 5.2.2.

If the test method of clause 5.2.2.1 is used, the value of RXQUAL shall not exceed 3 during the test.

If the test method of clause 5.2.2.2 is used, the measured BER of the class 2 bits of TCH/FS shall not exceed 1.6 % during the test.

NOTE 2: This BER is the upper limit in ETSI TS 145 008 [7] for RXQUAL = 3.

For a base station the RXQUAL of the uplink shall not exceed three (3) measured during the test sequence.

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.

CDMA

During the immunity test, the observed Frame Error Rate (FER) of the BS forward link and reverse link shall not exceed 1.0 % with 95 % confidence (see clause 6.8 in TIA-97-E-1 [18]), and the BS shall operate as intended. However, in the case of PAMR base stations the observed Frame Error Rate (FER) of the BS forward link and reverse link shall not exceed 2.0 % with 95 % confidence (see clause 6.8 in TIA-97-E-1 [18]), and the BS shall operate as intended.

Table 5: Mobile WiMAX OFDMA WMAN

<table>
<thead>
<tr>
<th>Mobile WiMAX OFDMA WMAN</th>
<th>Performance Criteria (see notes 1 and 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Channel Bandwidth [MHz]</td>
<td>Throughput &gt; 95 % / No loss of service</td>
</tr>
<tr>
<td>5</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>

NOTE 1: The performance criteria, Throughput > 95 % / No loss of service, applies also if a bearer with another characteristics is used in the test.

NOTE 2: The performance criteria, Throughput > 90 % / No loss of service, applies instead if the Uplink and Downlink paths are evaluated as a one loop.

After each test case, the BS shall operate as intended with no loss of user control function, or stored data, the communication link shall be maintained.

6.1.2 Repeaters

The RF gain of the EUT shall be measured throughout the period of exposure to the phenomenon. The RF gain measured during the test shall not deviate from the gain measured before the test by more than ±1 dB.

At the conclusion of the test the EUT shall operate as intended with no loss of user control functions or stored data.
6.2 Performance criteria for transient phenomena for Base Station and Repeaters

6.2.1 Base stations (BS)
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.

6.2.2 Repeaters
The RF gain of the EUT shall be measured before the test and after each exposure. At the conclusion of each exposure the gain of the EUT shall not have changed by more than ±1 dB. 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 gain of the EUT shall not have changed by more than ±1 dB.

6.3 Performance criteria for ancillary equipment tested on a stand-alone basis

6.3.0 General
The provision of ETSI EN 301 489-1 [1], clause 6.4 shall apply. In addition, the provisions of clauses 6.3.1 and 6.3.2 of the present document shall apply.

6.3.1 Performance criteria for continuous phenomena for ancillary equipment
The EUT shall continue to operate as intended during and after the test. No degradation of performance or loss of function is allowed below the performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible performance loss. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, either of these may be derived from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.

6.3.2 Performance criteria for transient phenomena for ancillary equipment
The EUT shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below the performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible performance loss. During the test, degradation of performance is however allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, either of these may be derived from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.
7   Applicability overview tables

7.1   Emission

7.1.1   General

ETSI EN 301 489-1 [1], table 1 contains the applicability of EMC emission measurements to the relevant ports of radio and/or associated ancillary equipment. These requirements cover the essential requirements defined in article 3.1(b) of Directive 2014/53/EU [1].

7.1.2   Special conditions

The following special conditions set out in table 6, relate to the emission test methods used in the ETSI EN 301 489-1 [1], clause clauses 1 and 8.

<table>
<thead>
<tr>
<th>Reference to clauses in ETSI EN 301 489-1 [1]</th>
<th>Special product-related conditions, additional to or modifying the test conditions in ETSI EN 301 489-1 [1], clause 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.2.3.1  Conducted emission DC power input/output ports</td>
<td>For this type of equipment the limits below apply: Limits for conducted emissions:</td>
</tr>
<tr>
<td>8.3.3.1  Limits</td>
<td>Frequency range</td>
</tr>
<tr>
<td>0.15 MHz to 0.5 MHz</td>
<td>79 dBµV</td>
</tr>
<tr>
<td>&gt; 0.5 MHz to 30 MHz</td>
<td>73 dBµV</td>
</tr>
</tbody>
</table>

NOTE 1: IMT cellular networks BS, the limits the test method in clause 4.2.3 of standard for ETSI EN 301 908-1 [28] shall apply.

NOTE 2: Base Stations that are only single-RAT GSM/EDGE capable, the limits and the test method in clauses 4.2.16 and 5.3.16 of ETSI EN 301 502 [8] shall apply.

7.2   Immunity

7.2.1   General

ETSI EN 301 489-1 [1], table 2 contains the applicability of EMC immunity measurements to the relevant ports of radio and/or associated ancillary equipment.

These requirements cover the essential requirements defined in article 3.1(b) of Directive 2014/53/EU [1].
7.2.2 Special conditions

The following special conditions set out in table 7 relate to the immunity test configurations set out in EN 301 489-1 [1], clause 9.1.

Table 7: Special conditions for EMC immunity measurements

<table>
<thead>
<tr>
<th>Reference to clauses in EN 301 489-1 [1]</th>
<th>Special product-related conditions, additional to or modifying the test configuration in EN 301 489-1 [1], clause 9.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.1 Test Configuration</td>
<td>- Immunity tests on the entire base station shall be performed by establishing communication links at the air interface (e.g. with the mobile simulator(s)) and the S1/lub/Abis interface (e.g. with an EPC/RNC/BSC simulator) and evaluating the throughput/BLER/BER (see figure 9.2.11).</td>
</tr>
<tr>
<td>E-UTRA, UTRA, GSM/EDGE, CDMA Test configuration</td>
<td>- Immunity tests shall be performed on both the Uplink and Downlink paths. The tests shall also include both the air interface and S1/lub/Abis interface. Throughput/BLER/BER evaluation may be carried out at either interface, where appropriate, and the measurements for the Uplink and Downlink paths may be carried out as a single path looped at either the air interface or S1/lub/Abis interface. In case of looping is used care have to be taken that the throughput/BLER/BER information does not change due to looping.</td>
</tr>
<tr>
<td></td>
<td>- Immunity tests on the MSR base station shall be performed by activating all supported RATs concurrently.</td>
</tr>
</tbody>
</table>

![Figure 2: Communication link set up for BS immunity measurement](chart)

9.2.2 Test method

- Radio frequency electromagnetic field (80 MHz to 6 000 MHz)

- Test level:
  - For the frequency range 80 MHz to 690 MHz, test level shall be 3 V/m
  - For the frequency range 690 MHz to 6 000 MHz test level shall be 10 V/m
Annex A (informative):
Relationship between the present document and the essential requirements of Directive 2014/53/EU

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.

Table A.1: Relationship between the present document and the essential requirements of Directive 2014/53/EU

<table>
<thead>
<tr>
<th>Harmonised Standard ETSI EN 301 489-50</th>
<th>Requirement</th>
<th>Reference: Clause No</th>
<th>U/C</th>
<th>Requirement Conditionality</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Enclosure port</td>
<td>7.1.2</td>
<td>U</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Enclosure of ancillary equipment measured on a stand-alone basis</td>
<td>8.2 of ETSI EN 301 489-1 [1]</td>
<td>U</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. DC power input/output ports</td>
<td>7.2.2</td>
<td>C Only where equipment has DC power input and/or output ports with a cable length greater than 3 m</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. AC mains power input/output ports</td>
<td>8.4 of ETSI EN 301 489-1 [1]</td>
<td>C Only where equipment has AC mains power input and/or output ports</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Harmonic current mission (AC mains input port)</td>
<td>8.5 of ETSI EN 301 489-1 [1]</td>
<td>C Only where equipment has AC mains power input ports</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Voltage fluctuations and flicker (AC mains input ports)</td>
<td>8.6 of ETSI EN 301 489-1 [1]</td>
<td>C Only where equipment has AC mains power input ports</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Wired network ports</td>
<td>8.7 of ETSI EN 301 489-1 [1]</td>
<td>C Only where equipment has wired network ports</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Radio frequency electromagnetic field (80 MHz to 6,000 MHz)</td>
<td>7.2.2</td>
<td>U</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Fast transients common mode</td>
<td>9.4 of ETSI EN 301 489-1 [1]</td>
<td>C Only where equipment has AC mains power input ports</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Radio frequency common mode</td>
<td>9.5 of ETSI EN 301 489-1 [1]</td>
<td>C Only where equipment has AC mains power input ports</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Voltage dips and interruptions</td>
<td>9.7 of ETSI EN 301 489-1 [1]</td>
<td>C Only where equipment has AC mains power input ports</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Surges, line to line and line to ground</td>
<td>9.8 of ETSI EN 301 489-1 [1]</td>
<td>C Only where equipment has AC mains power input ports and/or wired network ports</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Key to columns:

Requirement:

No A unique identifier for one row of the table which may be used to identify a requirement.

Description A textual reference to the requirement.

Clause Number Identification of clause(s) defining the requirement in the present document unless another document is referenced explicitly.
Requirement Conditionality:

U/C Indicates whether the requirement is unconditionally applicable (U) or is conditional upon the manufacturer's claimed functionality of the equipment (C).

Condition Explains the conditions when the requirement is or is not applicable for a requirement which is classified "conditional".

Presumption of conformity stays valid only as long as a reference to the present document is maintained in the list published in the Official Journal of the European Union. Users of the present document should consult frequently the latest list published in the Official Journal of the European Union.

Other Union legislation may be applicable to the product(s) falling within the scope of the present document.
Annex B (informative):
Examples of base station radio equipment for digital cellular radio telecommunications systems within the scope of the present document

B.0 General

The present document covers types of base station digital cellular radio telecommunications equipment as set out below.

AB.1 Base station equipment for IMT-2000 CDMA Direct Spread (UTRA)

The present document applies to 3rd Generation Partnership Project (UTRA) radio equipment intended for use in digital cellular mobile radio services. Definitions for base station equipment within the scope of the present document are found in the following functional radio specifications:

- ETSI TS 125 104 [i.3];
- ETSI TS 125 105 [i.4];
- ETSI TS 125 106 [i.5].

AB.2 Base station equipment for Evolved Universal Terrestrial Radio Access (E-UTRA)

The present document applies to 3rd Generation Partnership Project (UTRA) radio equipment intended for use in digital cellular mobile radio services. Definitions for base station equipment within the scope of the present document are found in the following functional radio specifications:

- E-UTRA base stations meeting the requirements of ETSI TS 136 104 [5], with conformance demonstrated by compliance to ETSI TS 136 141 [6].
- E-UTRA repeaters meeting the requirements of ETSI TS 136 106 [i.6], with conformance demonstrated by compliance to ETSI TS 136 143 [25].

AB.3 GSM base station, ancillary RF amplifiers, and GSM repeaters meeting Phase 2 and 2+

The present document applies to GSM base stations meeting Phase 2 and 2+ requirements of the GSM digital cellular telecommunications system, and operating in the P-GSM 900 MHz, E-GSM 900 MHz or DCS 1 800 MHz bands.
AB.4 Other types of GSM base station, ancillary RF amplifiers, and GSM repeaters equipment

The present document is also applicable to:

- equipment which operates in other frequency bands, provided that the performance requirements (other than operating frequency) are the same as the Phase 2 or 2+ GSM requirements;
- equipment which is designed to meet Phase 1 GSM requirements, provided that it also meets the Phase 2 or 2+ GSM requirements.

NOTE: This provision is particularly intended for equipment, which is designed to meet either the Phase 1 or the Phase 2 or 2+ GSM requirements by a change of software.

AB.5 Multi Standard Radio (MSR) Base station equipment

The present document applies to Multi-Standard Radio (MSR) base station equipment intended for use in digital cellular mobile radio services. Definitions for base station equipment within the scope of the present document are found in the following functional radio specification:

- the requirements of ETSI TS 137 104 [11], with conformance demonstrated by compliance to ETSI TS_137_141 [12].

AB.6 WiMAXOFDMA WMAN Base station equipment

The present document applies to Broadband Data Transmission System base station equipment. This equipment can be found in networks operating in a number of frequency bands subject to national licensing conditions. Examples of such frequency bands are 2 500 MHz to 2 690 MHz, 3 400 MHz to 3 600 MHz and 3 600 MHz to 3 800 MHz details of such equipment can be found in the following harmonized standard:

- ETSI EN 302 544-1 [17];
- EN 302 774 [1-7].

A.7 Mobile WiMAXB.7 OFDMA WMAN Base station equipment

The present document applies to Mobile WiMAX OFDMA WMAN base station equipment. Definitions of base station equipment within the scope of the present document are found in the following functional radio specifications:

- ETSI EN 301 908-20 [15];
- ETSI EN 301 908-22 [16].

AB.8 CDMA 1x spread spectrum Base stations, repeaters and ancillary equipment

The present document covers types of base stations and repeaters using CDMA 1x spread spectrum technology and associated ancillary equipment. Definitions of examples of base station equipment within the scope of the present document are found in the following functional radio specifications:
- CDMA-PAMR radio equipment operating in one or more of the band classes defined in TIA-97-IE-18 [18].
- ETSI EN 301 908-5 [13].
- ETSI EN 301 908-7 [14].
- ETSI EN 301 449 [20].
- ETSI EN 302 426 [21].
Annex BC (informative):
Bibliography

ETSI EN 301 526 (V1.1.1): "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".
Annex D (informative): Change history

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<td>First publication</td>
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<tr>
<td>2.1.1</td>
<td>New edition for RED: Updates for multi-band BS</td>
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# History

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<td>Public Enquiry</td>
<td>PE 20120804: 2012-04-06 to 2012-08-06</td>
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<td>December 2012</td>
<td>Vote</td>
<td>V 20130222: 2012-12-24 to 2013-02-23</td>
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<td>V2.1.0</td>
<td>June 2016</td>
<td>EN Approval Procedure</td>
<td>AP 20160830: 2016-06-01 to 2016-08-30</td>
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