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5G;
NR, E-UTRA, UTRA and GSM/EDGE;
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Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

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1. Scope

The present document specifies the Radio Frequency (RF) test methods and conformance requirements for E-UTRA, UTRA, GSM/EDGE and NB-IoT Multi-Standard Radio (MSR) Base Station (BS). These have been derived from, and are consistent with the E-UTRA, UTRA, GSM/EDGE and NB-IoT MSR BS specification defined in [2].

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

- [1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".
- [2] 3GPP TS 37.104: "E-UTRA, UTRA and GSM/EDGE; Multi-Standard Radio (MSR) Base Station (BS) radio transmission and reception".
- [3] 3GPP TS 25.104: "Base Station (BS) radio transmission and reception (FDD) ".
- [4] 3GPP TS 25.105: "Base Station (BS) radio transmission and reception (TDD) ".
- [5] 3GPP TS 36.104: "Evolved Universal Terrestrial Radio Access (E-UTRA); Base Station (BS) radio transmission and reception" 141 V13.15.0 (2021-04)
<https://standards.iteh.ai/catalog/standards/sist/c78b59cc-bd4e-4615-b6ff-2021-04>
- [6] 3GPP TS 45.005: "Radio transmission and reception"-2021-04
- [7] ITU-R Recommendation M.1545, "Measurement uncertainty as it applies to test limits for the terrestrial component of International Mobile Telecommunications-2000".
- [8] "Title 47 of the Code of Federal Regulations (CFR)", Federal Communications Commission.
- [9] 3GPP TS 36.141: "Evolved Universal Terrestrial Radio Access (E-UTRA); Base Station (BS) conformance testing".
- [10] 3GPP TS 25.141: "Base Station (BS) conformance testing (FDD) ".
- [11] 3GPP TS 51.021: "Base Station System (BSS) equipment specification; Radio aspects".
- [12] 3GPP TS 25.142: "Base Station (BS) conformance testing (TDD) ".
- [13] Recommendation ITU-R SM.329-10, "Unwanted emissions in the spurious domain".
- [14] 3GPP TR 25.942: "Radio Frequency (RF) system scenarios".
- [15] ITU-R recommendation SM.328: "Spectra and bandwidth of emissions".
- [16] IEC 60721: "Classification of environmental conditions".
- [17] IEC 60721-3-3: "Classification of environmental conditions - Part 3-3: Classification of groups of environmental parameters and their severities - Stationary use at weather protected locations".
- [18] IEC 60721-3-4: "Classification of environmental conditions - Part 3: Classification of groups of environmental parameters and their severities - Section 4: Stationary use at non-weather protected locations".

- [19] ETSI EN 300 019-1-3, *European Standard (Telecommunications series)*, "Environmental Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment; Part 1-3: Classification of environmental conditions; Stationary use at weather protected locations"
- [20] ETSI EN 300 019-1-4, *European Standard (Telecommunications series)*, "Environmental Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment; Part 1-4: Classification of environmental conditions; Stationary use at non-weather protected locations".
- [21] IEC 60068-2-1 (2007): "Environmental testing - Part 2: Tests. Tests A: Cold".
- [22] IEC 60068-2-2 (2007): "Environmental testing - Part 2: Tests. Tests B: Dry heat".
- [23] IEC 60068-2-6 (2007): "Environmental testing - Part 2: Tests - Test Fc: Vibration (sinusoidal)".
- [24] CEPT ECC Decision (13)03, "The harmonised use of the frequency band 1452-1492 MHz for Mobile/Fixed Communications Networks Supplemental Downlink (MFCN SDL)".

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in TR 21.905 [1] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in TR 21.905 [1].

Band category: group of operating bands for which the same MSR scenarios apply.

Base Station RF Bandwidth: RF bandwidth in which a base station transmits and/or receives single or multiple carrier(s) and/or RATs simultaneously within a supported operating band.

NOTE: In single carrier operation, the Base Station RF Bandwidth is equal to the channel bandwidth.

Base Station RF Bandwidth edge: frequency of one of the edges of the Base Station RF Bandwidth.

Carrier: modulated waveform conveying the E-UTRA, UTRA or GSM/EDGE physical channels.

Carrier aggregation: aggregation of two or more E-UTRA component carriers in order to support wider transmission bandwidths.

Carrier aggregation band: set of one or more operating bands across which multiple E-UTRA carriers are aggregated with a specific set of technical requirements.

NOTE: Carrier aggregation band(s) for an E-UTRA BS is declared by the manufacturer according to the designations in Tables 5.5-2 to 5.5-4 of TS 36.104 [5].

Channel bandwidth: RF bandwidth supporting a single E-UTRA, UTRA or GSM/EDGE 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.

Contiguous carriers: set of two or more carriers configured in a spectrum block where there are no RF requirements based on co-existence for un-coordinated operation within the spectrum block.

Carrier power: power at the antenna connector in the channel bandwidth of the carrier averaged over at least one subframe for E-UTRA, at least one slot for UTRA and the useful part of the burst for GSM/EDGE.

Contiguous spectrum: spectrum consisting of a contiguous block of spectrum with no sub-block gap(s).

Downlink operating band: part of the operating band designated for downlink.

Highest Carrier: carrier with the highest carrier centre frequency transmitted/received in the specified operating band(s).

Inter RF Bandwidth gap: frequency gap between two consecutive Base Station RF Bandwidths that are placed within two supported operating bands.

Inter-band carrier aggregation: carrier aggregation of E-UTRA component carriers in different operating bands.

NOTE: Carriers aggregated in each band can be contiguous or non-contiguous.

Inter-band gap: The frequency gap between two supported consecutive operating bands.

Intra-band contiguous carrier aggregation: contiguous E-UTRA carriers aggregated in the same operating band.

Intra-band non-contiguous carrier aggregation: non-contiguous E-UTRA carriers aggregated in the same operating band.

Lowest Carrier: carrier with the lowest carrier centre frequency transmitted/received in the specified operating band(s).

Lower Base Station RF Bandwidth edge: frequency of the lower Base Station RF Bandwidth edge, used as a frequency reference point for transmitter and receiver requirements.

Lower sub-block edge: frequency at the lower edge of one sub-block.

NOTE: It is used as a frequency reference point for both transmitter and receiver requirements.

Maximum Base Station RF Bandwidth: maximum RF bandwidth supported by a BS within each supported operating band.

NOTE: The maximum Base Station RF Bandwidth for BS configured for contiguous and non-contiguous operation within each supported operating band is declared separately.

Maximum carrier output power: carrier power available at the antenna connector for a specified reference condition.

Maximum Radio Bandwidth: maximum frequency difference between the upper edge of the highest used carrier and the lower edge of the lowest used carrier.

Maximum RAT output power: sum of the power of all carriers of the same RAT available at the antenna connector for a specified reference condition.

Maximum throughput: maximum achievable throughput for a reference measurement channel.

Maximum total output power: sum of the power of all carriers available at the antenna connector for a specified reference condition.

MB-MSR Base Station: MSR 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 operating band (which is not a sub-band or superseding-band of another supported operating band) than the other carrier(s).

Mean power: power measured in the bandwidth and period of measurement applicable for each RAT

NOTE: Mean power for an E-UTRA carrier is defined in TS 36.141 [9] and mean power for a UTRA carrier is defined in TS 25.141 [10]. In case of multiple carriers, the mean power is the sum of the mean power of all carriers.

Measurement bandwidth: RF bandwidth in which an emission level is specified.

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 Base Station RF Bandwidth, where at least one carrier is of a different RAT than the other carrier(s).

Multi-band transmitter: transmitter characterized by the ability to process two or more carriers in common active RF components simultaneously, where at least one carrier is configured at a different operating band (which is not a sub-band or superseding-band of another supported operating band) than the other carrier(s).