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IMT cellular networks; Harmonised Standard for access to radio spectrum; Part 18: E-UTRA, UTRA and GSM/EDGE Multi-Standard Radio (MSR) Base Station (BS)

Reference

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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 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

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Foreword

This final draft Harmonised European Standard (EN) has been produced by ETSI Technical Committee Mobile Standards Group (MSG), and is now submitted for the Vote phase of the ETSI standards EN Approval Procedure.

For non-EU countries the present document may be used for regulatory (Type Approval) purposes.

The present document has been prepared under the Commission's standardisation request C(2015) 5376 final [i.6] 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 18 of a multi-part deliverable. Full details of the entire series can be found in part 1 [i.4].

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
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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.

Introduction

The present document is part of a set of standards developed by ETSI that are designed to fit in a modular structure to cover radio equipment within the scope of the Radio Equipment Directive [i.1]. The present document is produced following the guidance in ETSI EG 203 336 [i.2] as applicable.

1 Scope

The present document applies to the following equipment types:

- Multi-Standard Radio capable Base stations (E-UTRA, UTRA, GSM/EDGE, NB-IoT).

These radio equipment types are capable of operating in all or any part of the frequency bands given in table 1-1.

Table 1-1: Base station operating bands

Band designation and Band Category	Direction of transmission	MSR Base Station operating bands
1 (BC1)	Transmit	2 110 MHz to 2 170 MHz
	Receive	1 920 MHz to 1 980 MHz
3 (BC2)	Transmit	1 805 MHz to 1 880 MHz
	Receive	1 710 MHz to 1 785 MHz
7 (BC1) (note 3)	Transmit	2 620 MHz to 2 690 MHz
	Receive	2 500 MHz to 2 570 MHz
8 (BC2)	Transmit	925 MHz to 960 MHz
	Receive	880 MHz to 915 MHz
20 (BC1)	Transmit	791 MHz to 821 MHz
	Receive	832 MHz to 862 MHz
22 (BC1) (note 3)	Transmit	3 510 MHz to 3 590 MHz
	Receive	3 410 MHz to 3 490 MHz
28 (BC1) (note 4)	Transmit	758 MHz to 803 MHz
	Receive	703 MHz to 748 MHz
31 (BC1) (note 2)	Transmit	462,5 MHz to 467,5 MHz
	Receive	452,5 MHz to 457,5 MHz
32 (BC1) (notes 1, 3 and 5)	Transmit	1 452 MHz to 1 496 MHz
	Receive	N/A
33 (BC3)	Transmit and Receive	1 900 MHz to 1 920 MHz
34 (BC3)	Transmit and Receive	2 010 MHz to 2 025 MHz
38 (BC3)	Transmit and Receive	2 570 MHz to 2 620 MHz
40 (BC3)	Transmit and Receive	2 300 MHz to 2 400 MHz
42 (BC3)	Transmit and Receive	3 400 MHz to 3 600 MHz
43 (BC3)	Transmit and Receive	3 600 MHz to 3 800 MHz
65 (BC1) (note 2)	Transmit	2 110 MHz to 2 200 MHz
	Receive	1 920 MHz to 2 010 MHz
67 (BC1) (notes 1 and 2)	Transmit	738 MHz to 758 MHz
	Receive	N/A
68 (BC1) (note 2)	Transmit	753 MHz to 783 MHz
	Receive	698 MHz to 728 MHz
69 (BC1) (notes 1 and 2)	Transmit	2 570 MHz to 2 620 MHz
	Receive	N/A

NOTE 1: Restricted to E-UTRA operation when carrier aggregation is configured. The downlink operating band is paired with the uplink operating band (external) of the carrier aggregation configuration that is supporting the configured Pcell. Restricted to UTRA operation when dual band is configured (e.g. DB-DC-HSDPA or dual band 4C-HSDPA). The down link frequency(ies) of this band are paired with the uplink frequency(ies) of the other FDD band (external) of the dual band configuration.
NOTE 2: The band is for E-UTRA only.
NOTE 3: The band is for E-UTRA and UTRA only.
NOTE 4: The band is for E-UTRA and NB-IoT only.
NOTE 5: Radio equipment in band 32 is only allowed to operate between 1 452 MHz and 1 492 MHz.
NOTE 6: Radio equipment in band 28 is only allowed to operate between 758 MHz to 791 MHz for the transmitter and between 703 MHz to 736 MHz for the receiver.

NOTE 1: For BS capable of multi-band operation, the supported operating bands may belong to different Band Categories.

The present document covers conducted requirements for multi-RAT capable E-UTRA, UTRA and GSM/EDGE MSR Base Stations for 3GPP™ Release 9, 10, 11, 12 and 13. This includes the requirements for E UTRA Base Station operating bands and E-UTRA CA operating bands from 3GPP Release 14.

NOTE 2: The relationship between the present document and essential requirements of article 3.2 of Directive 2014/53/EU [i.1] is given in annex A.

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 https://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.

[1] ETSI TS 137 141 (V13.9.0) (01-2018): "Digital cellular telecommunications system (Phase 2+) (GSM); 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 13.9.0 Release 13)".

[2] ETSI TS 125 104 (V13.4.0) (04-2017): "Universal Mobile Telecommunications System (UMTS); Base Station (BS) radio transmission and reception (FDD) (3GPP TS 25.104 version 13.4.0 Release 13)".

[3] ETSI TS 125 105 (V13.2.0) (07-2017): "Universal Mobile Telecommunications System (UMTS); Base Station (BS) radio transmission and reception (TDD) (3GPP TS 25.105 version 13.2.0 Release 13)".

[4] ETSI TS 136 104 (V13.10.0) (01-2018): "LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); Base Station (BS) radio transmission and reception (3GPP TS 36.104 version 13.10.0 Release 13)".

[5] ETSI TS 145 005 (V13.4.0) (04-2017): "Digital cellular telecommunications system (Phase 2+) (GSM); GSM/EDGE Radio transmission and reception (3GPP TS 45.005 version 13.4.0 Release 13)".

[6] ETSI EN 301 908-3 (V13.1.0) (07-2018): "IMT cellular networks; Harmonised Standard for access to radio spectrum; Part 3: CDMA Direct Spread (UTRA FDD) Base Stations (BS)".

[7] ETSI EN 301 908-14 (V13.1.0) (07-2018): "IMT cellular networks; Harmonised Standard for access to radio spectrum; Part 14: Evolved Universal Terrestrial Radio Access (E-UTRA) Base Stations (BS)".

[8] Void.

[9] 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 Directive 2014/53/EU".

[10] ETSI TS 137 104 (V13.8.0) (01-2018): "Digital cellular telecommunications system (Phase 2+) (GSM); 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 13.8.0 Release 13)".

[11] ETSI TS 136 141 (V13.10.0) (01-2018): "LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); Base Station (BS) conformance testing (3GPP TS 36.141 version 13.10.0 Release 13)".

[12] ETSI TS 125 141 (V13.4.0) (10-2017): "Universal Mobile Telecommunications System (UMTS); Base Station (BS) conformance testing (FDD) (3GPP TS 25.141 version 13.4.0 Release 13)".

[13] ETSI TS 125 142 (V13.1.0) (08-2016): "Universal Mobile Telecommunications System (UMTS); Base Station (BS) conformance testing (TDD) (3GPP TS 25.142 version 13.1.0 Release 13)".

[14] ETSI TS 151 021 (V13.4.0) (08-2017): "Digital cellular telecommunications system (Phase 2+) (GSM); Base Station System (BSS) equipment specification; Radio aspects (3GPP TS 51.021 version 13.4.0 Release 13)".

2.2 Informative references

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

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

[i.1] Directive 2014/53/EU of the European parliament and of the council of 16 April 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment and repealing Directive 1999/5/EC.

[i.2] ETSI EG 203 336 (V1.1.1) (08-2015): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Guide for the selection of technical parameters for the production of Harmonised Standards covering article 3.1(b) and article 3.2 of Directive 2014/53/EU".

[i.3] ETSI TR 100 028 (all parts) (V1.4.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics".

[i.4] ETSI EN 301 908-1 (V11.1.1): "IMT cellular networks; Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU; Part 1: Introduction and common requirements".

[i.5] Recommendation ITU-R SM.329-12 (09-2012): "Unwanted emissions in the spurious domain".

[i.6] 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 following terms apply:

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

NOTE: The band categories for MSR BS are defined in clause 4.4 of ETSI TS 137 141 [1] and are listed in table 1-1.

Base Station class: wide area Base Station, medium range Base Station or local Area Base Station, as declared by the manufacturer

Base Station RF bandwidth: 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 4.2.1-2 to 4.2.1-5.

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

channel bandwidth: RF bandwidth supporting a single E-UTRA, UTRA or GSM/EDGE RF carrier

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

configured carrier power: target maximum power for a specific carrier for the operating mode set in the BS

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

inter RF bandwidth gap: frequency gap between two consecutive Base Station RF bandwidths that are placed within two supported operating bands

inter-band gap: frequency gap between two supported consecutive operating bands

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

local area Base Station: Base Stations characterized by requirements derived from picocell scenarios with a BS to UE minimum coupling loss equal to 45 dB

lower Base Station RF bandwidth edge: frequency of the lower edge of the Base Station RF bandwidth, 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 Base Station 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 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 clause 3.1 of ETSI TS 136 141 [11] and mean power for a UTRA carrier is defined in clause 3.1 of ETSI TS 125 141 [12]. In case of multiple carriers, the mean power is the sum of the mean power of all carriers.

measurement bandwidth: bandwidth in which an emission level is specified

medium range Base Station (BS): Base Stations characterized by requirements derived from micro cell scenarios with a BS to UE minimum coupling loss equal to 53 dB

MSR Base Station (BS): 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 receiver: receiver 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)

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)

NB-IoT guard band operation: operation of NB-IoT utilizing the unused resource block(s) within a E-UTRA carrier's guard-band

NB-IoT In-band operation: operation of NB-IoT utilizing the resource block(s) within a normal E-UTRA carrier

NB-IoT standalone operation: operation of NB-IoT utilizing its own spectrum, for example the spectrum currently being used by GERAN systems as a replacement of one or more GSM carriers, as well as scattered spectrum for potential IoT deployment

non-contiguous spectrum: spectrum consisting of two or more sub-blocks separated by sub-block gap(s)

operating band: frequency range in which E-UTRA, UTRA or GSM/EDGE operates (paired or unpaired), that is defined with a specific set of technical requirements

NOTE: The operating band(s) for a Base Station is declared by the manufacturer. Operating bands have designations according to table 1-1.

single-RAT operation: operation of a Base Station in an operating band with only one RAT configured in that operating band

sub-band: part of the uplink and downlink frequency range of the operating band

sub-block: contiguous allocated block of spectrum for use by the same Base Station

NOTE: There may be multiple instances of sub-blocks within a Base Station RF bandwidth.

sub-block bandwidth: bandwidth of one sub-block

sub-block gap: frequency gap between two consecutive sub-blocks within a Base Station RF bandwidth, where the RF requirements in the gap are based on co-existence for un-coordinated operation

superseding-band: band including the whole of the uplink and downlink frequency range of the operating band

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

total RF bandwidth: maximum sum of Base Station RF bandwidths in all supported operating bands

transmission bandwidth: bandwidth of an instantaneous E-UTRA transmission from a UE or BS, measured in Resource Block units

transmitter OFF period: time period during which the BS transmitter is not allowed to transmit

transmitter ON period: time period during which the BS transmitter is transmitting data and/or reference symbols, e.g. data subframes or DwPTS

transmitter transient period: time period during which the transmitter is changing from the OFF period to the ON period or vice versa

uplink operating band: part of the operating band designated for uplink

upper Base Station RF bandwidth edge: frequency of the upper edge of the Base Station RF bandwidth, used as a frequency reference point for transmitter and receiver requirements

upper sub-block edge: frequency at the upper edge of one sub-block

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

wide area Base Station: Base Stations characterized by requirements derived from macro cell scenarios with a BS to UE minimum coupling loss equal to 70 dB

NOTE: This Base Station class has the same requirements as the general purpose Base Station in the sixth release version of the present document, corresponding to 3GPP Release 8.

3.2 Symbols

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

BW_{RF}	Base Station RF bandwidth, where $BW_{RF} = F_{BW\ RF,\ high} - F_{BW\ RF,\ low}$
B_{RFBW}	Maximum Base Station RF bandwidth located at the bottom of the supported frequency range in the operating band
CA_X	CA for band X where X is the applicable E-UTRA operating band
f	Frequency
Δf	Separation between the Base Station RF bandwidth edge frequency and the nominal -3 dB point of the measuring filter closest to the carrier frequency
Δf_{max}	The largest value of Δf used for defining the requirement
F_C	Carrier centre frequency
F_{filter}	Filter centre frequency
f_offset	Separation between the Base Station RF bandwidth edge frequency and the centre of the measuring filter
f_offset_{max}	The maximum value of f_offset used for defining the requirement
$F_{block,high}$	Upper sub-block edge, where $F_{block,high} = F_{C,block,high} + F_{offset,\ RAT}$
$F_{block,low}$	Lower sub-block edge, where $F_{block,low} = F_{C,block,low} - F_{offset,\ RAT}$
$F_{BW\ RF,high}$	Upper Base Station RF bandwidth edge, where $F_{BW\ RF,high} = F_{C,high} + F_{offset,\ RAT}$
$F_{BW\ RF,low}$	Lower Base Station RF bandwidth edge, where $F_{BW\ RF,low} = F_{C,low} - F_{offset,\ RAT}$
$F_{C,block,\ high}$	Center frequency of the highest transmitted/received carrier in a sub-block
$F_{C,block,\ low}$	Center frequency of the lowest transmitted/received carrier in a sub-block
$F_{C,high}$	Center frequency of the highest transmitted/received carrier
$F_{C,low}$	Center frequency of the lowest transmitted/received carrier
$F_{offset,\ RAT}$	Frequency offset from the centre frequency of the *highest* transmitted/received carrier to the *upper* Base Station RF bandwidth edge, sub-block edge or inter-RF bandwidth edge, or from the centre frequency of the *lowest* transmitted/received carrier to the *lower* Base Station RF bandwidth edge, sub-block edge or inter-RF bandwidth edge for a specific RAT
F_{UL_low}	The lowest frequency of the uplink operating band
F_{UL_high}	The highest frequency of the uplink operating band
M_{RFBW}	Maximum Base Station RF bandwidth located in the middle of the supported frequency range in the operating band