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IMT cellular networks;
Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU;
Part 14: Evolved Universal Terrestrial Radio Access (E-UTRA) Base Stations (BS)

Reference

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Foreword

This Harmonised European Standard (EN) has been produced by ETSI Technical Committee Mobile Standards Group (MSG).

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.1] 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.2].

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The present document is part 14 of a multi-part deliverable. Full details of the entire series can be found in part 1 [i.7].

National transposition dates	
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Modal verbs terminology

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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.2]. The present document is produced following the guidance in ETSI EG 203 336 [i.3] as applicable.

1 Scope

The present document applies to the following radio equipment types:

1) Base Station for Evolved Universal Terrestrial Radio Access (E-UTRA).

This radio equipment type is capable of operating in all or any part of the operating bands given in table 1-1.

Table 1-1: E-UTRA Base Station operating bands

E-UTRA band	Direction of transmission	E-UTRA Base Station operating bands
1	Transmit	2 110 MHz to 2 170 MHz
	Receive	1 920 MHz to 1 980 MHz
3	Transmit	1 805 MHz to 1 880 MHz
	Receive	1 710 MHz to 1 785 MHz
7	Transmit	2 620 MHz to 2 690 MHz
	Receive	2 500 MHz to 2 570 MHz
8	Transmit	925 MHz to 960 MHz
	Receive	880 MHz to 915 MHz
20	Transmit	791 MHz to 821 MHz
	Receive	832 MHz to 862 MHz
22	Transmit	3 510 MHz to 3 590 MHz
	Receive	3 410 MHz to 3 490 MHz
28	Transmit	758 MHz to 803 MHz
	Receive	703 MHz to 748 MHz
32 (note 1) (note 2)	Transmit	1 452 MHz to 1 496 MHz
	Receive	N/A
33	Transmit and Receive	1 900 MHz to 1 920 MHz
34	Transmit and Receive	2 010 MHz to 2 025 MHz
38	Transmit and Receive	2 570 MHz to 2 620 MHz
40	Transmit and Receive	2 300 MHz to 2 400 MHz
42	Transmit and Receive	3 400 MHz to 3 600 MHz
43	Transmit and Receive	3 600 MHz to 3 800 MHz
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.		
NOTE 2: Radio equipment in band 32 is only allowed to operate between 1 452 MHz and 1 492 MHz.		

The present document covers requirements for E-UTRA Base Stations for 3GPP Release 8, 9, 10 and 11. This includes the requirements for E-UTRA Base Station operating bands and E-UTRA CA operating bands from 3GPP Release 12.

The present document covers the essential requirements of article 3.2 of Directive 2014/53/EU [i.2] under the conditions identified 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/.

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The following referenced documents are necessary for the application of the present document.

[1] ETSI TS 136 141 (V11.14.0) (01-2016): "LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); Base Station (BS) conformance testing (3GPP TS 36.141 version 11.14.0 Release 11)".

[2] ETSI TS 125 104 (V11.12.0) (01-2016): "Universal Mobile Telecommunications System (UMTS); Base Station (BS) radio transmission and reception (FDD) (3GPP TS 25.104 version 11.12.0 Release 11)".

[3] ETSI TS 125 105 (V11.9.0) (01-2016): "Universal Mobile Telecommunications System (UMTS); Base Station (BS) radio transmission and reception (TDD) (3GPP TS 25.105 version 11.9.0 Release 11)".

[4] ETSI TS 136 104 (V11.14.0) (01-2016): "LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); Base Station (BS) radio transmission and reception (3GPP TS 36.104 version 11.14.0 Release 11)".

[5] ETSI TS 125 141 (V11.12.0) (01-2016): "Universal Mobile Telecommunications System (UMTS); Base Station (BS) conformance testing (FDD) (3GPP TS 25.141 version 11.12.0 Release 11)".

[6] ETSI TS 136 211 (V11.6.0) (10-2014): "LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); Physical channels and modulation (3GPP TS 36.211 version 11.6.0 Release 11)".

[7] ETSI EN 301 908-18 (V11.1.2) (04-2017): "IMT cellular networks; Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU; Part 18: E-UTRA, UTRA and GSM/EDGE Multi-Standard Radio (MSR) Base Station (BS)".

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.

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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] 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.

[i.2] 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.3] 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.4] Recommendation ITU-R SM.329-12 (09-2012): "Unwanted emissions in the spurious domain".

[i.5] 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.6] ETSI TS 136 104 (V12.10.0) (01-2016): "LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); Base Station (BS) radio transmission and reception (3GPP TS 36.104 version 12.10.0 Release 12)".

[i.7] 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.8] ETSI TS 136 214 (V11.1.0) (02-2013): "LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); Physical layer; Measurements (3GPP TS 36.214 version 11.1.0 Release 11)".

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

Aggregated Channel Bandwidth: RF bandwidth in which a Base Station transmits and receives multiple contiguously aggregated carriers

NOTE: The Aggregated Channel Bandwidth is measured in MHz.

Base Station class: Wide Area Base Station, Medium Range Base Station, Local Area Base Station or Home Base Station, as declared by the manufacturer

Base Station RF Bandwidth: RF bandwidth in which a Base Station transmits and/or receives single or multiple carrier(s) 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

NOTE: Base Station RF Bandwidth edges are separated by the Base Station RF Bandwidth

carrier: modulated waveform conveying the E-UTRA or UTRA (WCDMA) physical channels

carrier aggregation: aggregation of two or more component carriers in order to support wider transmission bandwidths

carrier aggregation band: set of one or more operating bands across which multiple 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 4.2.1-3 to 4.2.1-4.

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.

channel edge: lowest or highest frequency of the E-UTRA carrier

NOTE: Channel edges are separated by the channel bandwidth.

contiguous carriers: 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

contiguous spectrum: spectrum consisting of a contiguous block of spectrum with no sub-block gaps

downlink operating band: part of the operating band designated for downlink (BS transmit)

Downlink Reference Symbol (DL RS) power: resource element power of Downlink Reference Symbol

Home Base Station: Base Stations characterized by requirements derived from femtocell scenarios

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 component carriers in different operating bands

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

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

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

intra-band non-contiguous carrier aggregation: non-contiguous 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 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

maximum output power: mean power level per carrier of the Base Station measured at the antenna connector in 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

mean power: when applied to E-UTRA transmission, power measured in the channel bandwidth of the carrier where the period of measurement is at least one subframe (1 ms), unless otherwise stated

Medium Range Base Station: Base Stations characterized by requirements derived from micro cell scenarios with a BS to UE minimum coupling loss equal to 53 dB

multi-band Base Station: 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)

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 non-overlapping 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 non-overlapping operating band than the other carrier(s)

multi-carrier transmission configuration: set of one or more contiguous carriers that a BS is able to transmit simultaneously according to the manufacturer's specification

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

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

NOTE: The operating band(s) for an E-UTRA BS is declared by the manufacturer according to the designations in table 1-1. Operating bands for E-UTRA are designated with Arabic numerals, while the corresponding operating bands for UTRA are designated with Roman numerals.

output power: mean power of one carrier of the Base Station, delivered to a load with resistance equal to the nominal load impedance of the transmitter

rated output power: rated output power of the Base Station is the mean power level per carrier that the manufacturer has declared to be available at the antenna connector

rated total output power: mean power level that the manufacturer has declared to be available at the antenna connector

resource block: physical resource consisting of a number of symbols in the time domain and a number of consecutive subcarriers spanning 180 kHz in the frequency domain

sub-block: one contiguous allocated block of spectrum for transmission and reception by the same Base Station

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

sub-block bandwidth: bandwidth of one sub-block

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

synchronized operation: operation of TDD in two different systems, where no simultaneous uplink and downlink occur

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 transmission from a UE or BS, measured in resource block units

transmission bandwidth configuration: highest transmission bandwidth allowed for uplink or downlink in a given channel bandwidth, 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, i.e. 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

unsynchronized operation: operation of TDD in two different systems, where the conditions for synchronized operation are not met

uplink operating band: part of the operating band designated for uplink (BS receive)

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 3GPP Release 8.

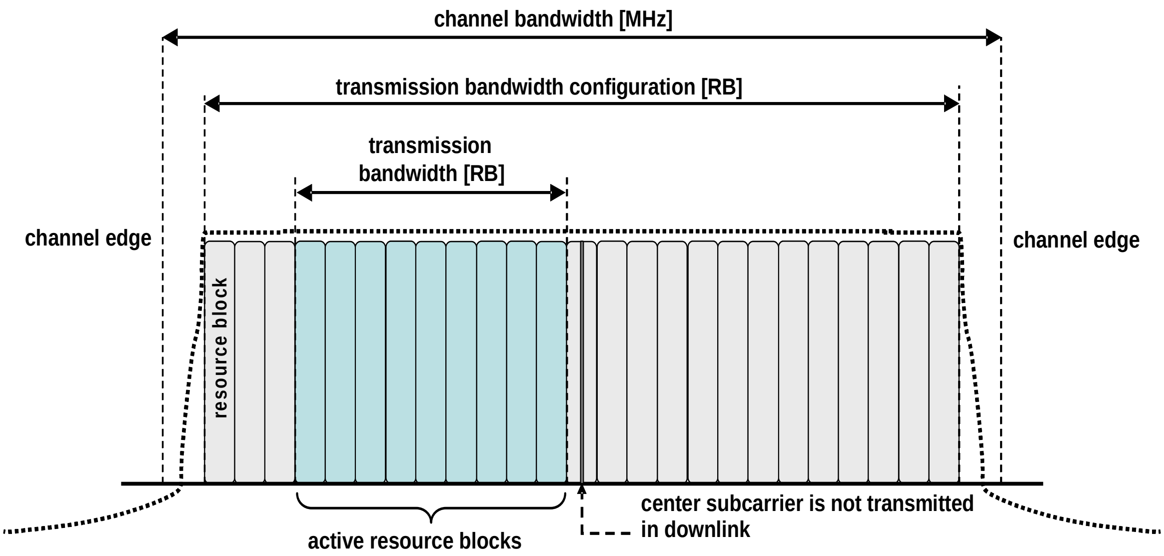

Figure 3.1-1: Channel bandwidth and transmission bandwidth configuration for one E-UTRA carrier

Figure 3.1-2 illustrates the Aggregated Channel Bandwidth for intra-band contiguous carrier aggregation.

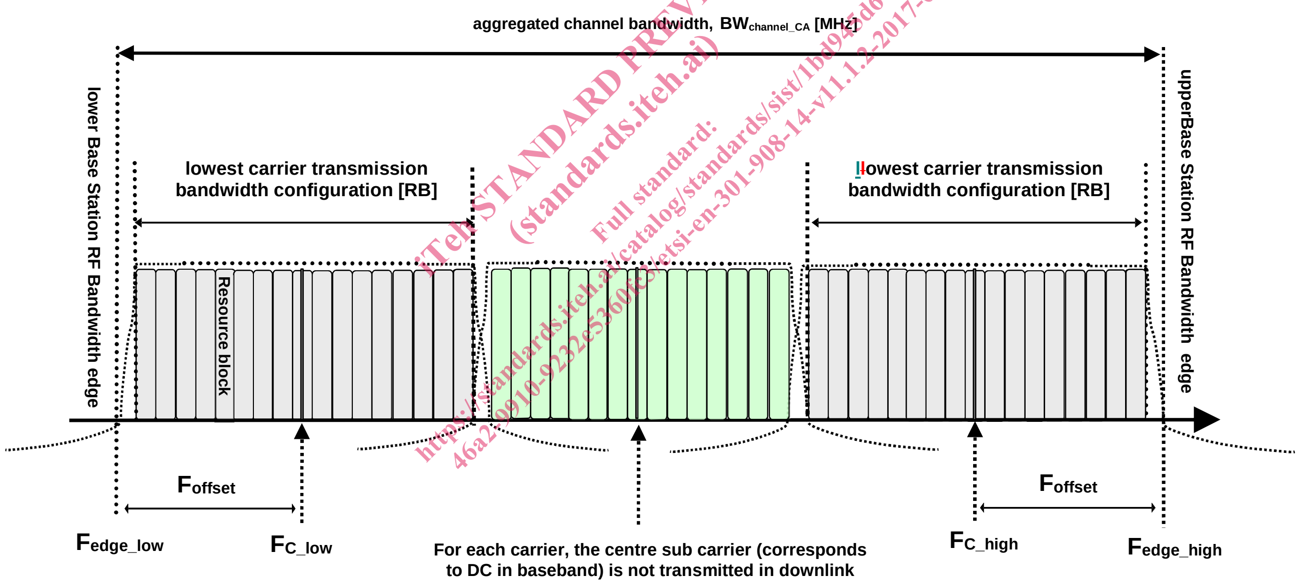

Figure 3.1-2: Aggregated Channel Bandwidth for intra-band carrier aggregation

The lower edge of the Aggregated Channel Bandwidth ($BW_{Channel\_CA}$) is defined as $F_{edge\_low} = F_{C\_low} - F_{offset}$. The upper edge of the Aggregated Channel Bandwidth is defined as $F_{edge\_high} = F_{C\_low} + F_{offset}$. The Aggregated Channel Bandwidth, $BW_{Channel\_CA}$, is defined as follows:

$$BW_{Channel\_CA} = F_{edge\_high} - F_{edge\_low} \text{ [MHz]}$$

Figure 3.1-3 illustrates the sub-block bandwidth for a BS operating in non-contiguous spectrum.