



**IMT cellular networks;
Harmonised Standard for access to radio spectrum;
Part 3: CDMA Direct Spread (UTRA FDD) Base Stations (BS)**

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Foreword

This draft Harmonised European Standard (EN) has been produced by ETSI Technical Committee Mobile Standards Group (MSG), and is now submitted for the combined Public Enquiry and 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 Commission's standardisation request C(2015) 5376 [i.1] final 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].

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 3 of a multi-part deliverable. Full details of the entire series can be found in part 1 [i.5].

Proposed national transposition dates	
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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.

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1 Scope

The present document applies to the following equipment types:

- 1) Stations for IMT 2000 CDMA Direct Spread (UTRA FDD).

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

Table 1-1: UTRA FDD Base Station operating bands

UTRA FDD band	Direction of transmission	UTRA FDD Base Station operating bands
I	Transmit	2 110 MHz to 2 170 MHz
	Receive	1 920 MHz to 1 980 MHz
III	Transmit	1 805 MHz to 1 880 MHz
	Receive	1 710 MHz to 1 785 MHz
VII	Transmit	2 620 MHz to 2 690 MHz
	Receive	2 500 MHz to 2 570 MHz
VIII	Transmit	925 MHz to 960 MHz
	Receive	880 MHz to 915 MHz
XX	Transmit	791 MHz to 821 MHz
	Receive	832 MHz to 862 MHz
XXII	Transmit	3 510 MHz to 3 590 MHz
	Receive	3 410 MHz to 3 490 MHz
XXXII (see notes 1 and 2)	Transmit	1 452 MHz to 1 496 MHz
	Receive	-
NOTE 1: The down link frequenc(ies) of this band are paired with the uplink frequenc(ies) of the other FDD band (external) of the dual band configuration.		
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 UTRA FDD Base Stations for 3GPP Releases 99, 4, 5, 6, 7, 8, 9, 10, 11, 12 and 13. This includes the requirements for BS operating bands from 3GPP Release 14.

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

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

- [1] ETSI TS 125 141 (V13.3.0) (08-2016): "Universal Mobile Telecommunications System (UMTS); Base Station (BS) conformance testing (FDD) (3GPP TS 25.141 version 13.3.0 Release 13)".
- [2] ETSI TS 145 004 (V13.4.0) (01-2017): "Digital cellular telecommunications system (Phase 2+) (GSM); GSM/ EDGE Modulation (3GPP TS 45.004 version 13.4.0 Release 13)".
- [3] 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)".

- [4] ETSI EN 301 908-18 (V13.0.1) (11-2017): "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)".

2.2 Informative references

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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] Void.
- [i.5] ETSI EN 301 908-1: "IMT cellular networks; Harmonized EN covering the essential requirements of article 3.2 of the Directive 2014/53/EU; Part 1: Introduction and common requirements".
- [i.6] ETSI TR 100 028 (all parts): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics".
- [i.7] ETSI TS 136 104 (V13.8.0) (07-2017): "LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); Base Station (BS) radio transmission and reception (3GPP TS 36.104 version 13.8.0 Release 13)".
- [i.8] Void.
- [i.9] Recommendation ITU-R SM.329-12 (09-2012): "Unwanted emissions in the spurious domain".
- [i.10] Recommendation ITU-T O.153 (10-1992): "Basic parameters for the measurement of error performance at bit rates below the primary rate".

3 Definitions, symbols and abbreviations

3.1 Definitions

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

ancillary equipment: equipment (apparatus) used in connection with a Base Station

NOTE: This is considered as an ancillary equipment (apparatus) if:

- the equipment is intended for use in conjunction with a Base Station to provide additional operational and/or control features to the radio equipment, (e.g. to extend control to another position or location);

- the equipment cannot be used on a standalone basis to provide user functions independently of a BS; and
- the BS to which it is connected, is capable of providing some intended operation such as transmitting and/or receiving without the ancillary equipment (i.e. it is not a sub-unit of the main equipment essential to the main equipment basic functions).

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

BS RF Bandwidth: RF bandwidth in which a Base Station transmits and/or receives single or multiple carriers simultaneously within each supported operating band

NOTE: In single carrier operation the channel bandwidth is equal to BS RF Bandwidth.

BS RF Bandwidth edge: frequency of one of the edges of the BS RF Bandwidth

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

channel bandwidth: RF bandwidth supporting a single UTRA RF carrier

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

chip rate: rate of "chips" (modulated symbols after spreading) per second

NOTE: The UTRA FDD chip rate is 3,84 Mchip/s.

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 (BS transmit)

environmental profile: range of environmental conditions under which equipment, within the scope of the present document, is required to comply with the provisions of the present document

home Base Station: base station characterized by requirements derived from femtocell scenarios

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

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

Local Area Base Station: base station 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 BS RF Bandwidth: maximum RF bandwidth supported by a BS within each supported operating band

maximum output power per carrier: 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

mean power: power (transmitted or received) in a bandwidth of at least $(1 + \alpha)$ times the chip rate of the radio access mod, when applied to a WCDMA-modulated signal

NOTE 1: The period of measurement is at least one timeslot unless otherwise stated.

NOTE 2: $\alpha = 0,22$ is the roll-off factor of the WCDMA signal.

Medium Range Base Station: base station characterized by requirements derived from microcell scenarios with a BS to UE minimum coupling loss equal to 53 dB

MIMO mode: downlink MIMO configuration with two transmit antennas

MIMO mode with four transmit antennas: downlink MIMO configuration with four transmit antennas

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 operating band (which is not a sub-band or superseding-band of another supported 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 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)

multi-carrier transmission configuration: set of one or more contiguous or non-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 that is defined with a specific set of technical requirements, in which UTRA FDD operates

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

RRC filtered mean power: mean power as measured through a root raised cosine filter with roll-off factor α and a bandwidth equal to the chip rate of the radio access mode

NOTE: The RRC filtered mean power of a perfectly modulated WCDMA signal is 0,246 dB lower than the mean power of the same signal.

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

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

NOTE: There may be multiple instances of sub-blocks within a BS RF Bandwidth.

sub-block bandwidth: RF bandwidth of one sub-block

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

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

Total RF Bandwidth: maximum sum of BS RF Bandwidths in all supported operating bands

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

upper sub-block edge: frequency at the higher 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 Station 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 Releases 99, 4 and 5.

3.2 Symbols

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

α	Roll-off factor
Δf	Frequency offset of the measurement filter -3 dB point, as defined in clause 4.2.2.2
Δf_{\max}	The largest value of Δf used for defining the requirement
B	Appropriate frequency in the Bottom of the operating band of the BS
B_{RFBW}	Maximum BS RF Bandwidth located at the bottom of the supported frequency range in each operating band
BW_{\max}	Maximum Radio Bandwidth
BW_{tot}	Total RF Bandwidth
CPICH \hat{E}_c	Common Pilot Channel code power (on the adjacent channel)
E_b	Average energy per information bit
E_c	Total energy per PN chip
F_{filter}	Filter centre frequency
F_{high}	The highest BS transmit frequency of the downlink operating band
F_{low}	The lowest BS transmit frequency of the downlink operating band
F_{uw}	Frequency offset of unwanted signal
I_{oh}	Total received power density excluding own Home BS signal
f	Frequency
F_{offset}	Frequency offset from the centre frequency of the <i>highest</i> transmitted/received carrier to the <i>upper</i> BS RF Bandwidth edge, sub-block edge, or Inter RF Bandwidth edge, from the centre frequency of the <i>lowest</i> transmitted/received carrier to the <i>lower</i> BS RF Bandwidth edge, sub-block edge or Inter RF Bandwidth edge.
NOTE:	F_{offset} for UTRA FDD is 2,5 MHz.
$F_{\text{DL_low}}$	The lowest frequency of the downlink operating band
$F_{\text{DL_high}}$	The highest frequency of the downlink operating band
$F_{\text{DL_Offset}}$	The offset parameter used to calculate the UARFCN
$F_{\text{UL_low}}$	The lowest frequency of the uplink operating band
$F_{\text{UL_high}}$	The highest frequency of the uplink operating band
$F_{\text{UL_Offset}}$	The offset parameter used to calculate the UARFCN
M	Appropriate frequency in the Middle of the operating band of the BS
M_{RFBW}	Maximum BS RF Bandwidth located in the middle of the supported frequency range in each operating band
$P_{\text{EM,N}}$	Declared emission level for channel N
$P_{\text{EM,B32,ind}}$	Declared emission level in Band 32, ind=a, b, c, d, e
$P_{\text{max,c}}$	Maximum output power (per carrier)
$P_{\text{rated,c}}$	Rated output power (per carrier)
$P_{\text{rated,t}}$	Rated total output power
P_{out}	Output power
P_{REFSENS}	Reference sensitivity power level
Rx	Receiver
T	Appropriate frequency in the Top of the operating band of the BS
T_{RFBW}	Maximum BS RF Bandwidth located at the top of the supported frequency range in each operating band
Tx	Transmitter
W_{gap}	Sub-block gap or Inter RF Bandwidth gap size

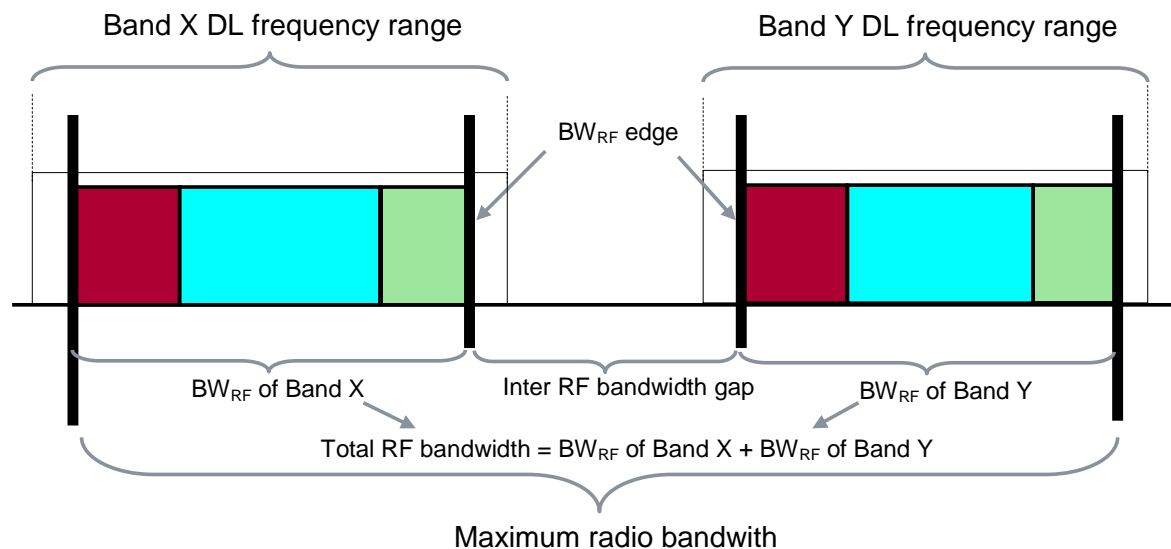


Figure 3.2-1: Illustration of Maximum Radio Bandwidth BW_{\max} and Total RF Bandwidth for Multi-band Base Station BW_{tot}

3.3 Abbreviations

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

ACLR	Adjacent Channel Leakage power Ratio
ACS	Adjacent Channel Selectivity
AWGN	Additive White Gaussian Noise
BER	Bit Error Ratio
BS	Base Station
BTS	Base Transceiver Station
CACLR	Cumulative ACLR
CDMA	Code Division Multiple Access
CEPT	Conférence Européenne des administrations des Postes et des Télécommunications
CPICH	Common Pilot Channel
CW	Continuous Wave
DC	Direct Current
DL	Down Link (forward link)
DPCH	Dedicated Physical Channel
DTT	Digital Terrestrial Television
DUT	Device Under Test
EC	European Commission
ECC	Electronic Communications Committee
EFTA	European Foreign Trade Association
EUT	Equipment Under Test
FDD	Frequency Division Duplexing
GMSK	Gaussian Minimum Shift Keying
GSM	Global System for Mobile communications
HSDPA	High Speed Downlink Packet Access
IMT	International Mobile Telecommunications
MIMO	Multiple Input Multiple Output
MS	Mobile Station
MSR	Multi-Standard Radio
NC	Non-Contiguous
PN	Pseudo Noise
RAT	Radio Access Technology
RF	Radio Frequency