



**IMT cellular networks;
Harmonised Standard for access to radio spectrum;
Part 18: NR, E-UTRA, UTRA and GSM/EDGE
Multi-Standard Radio (MSR) Base Station (BS)
Release 17**

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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 Standardisation Request deliverable Approval Procedure.

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

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

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II

1 Scope

The present document specifies technical characteristics and methods of measurements for the following equipment:

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

NOTE: UTRA TDD is not included in Release 17 of ETSI EN 301 908.

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	Supported RATs and Band Numbers					Direction of transmission	MSR Base Station operating bands (MHz)	Relevant EC/ECC decision
	NR	E-UTRA	NB-IoT	UTRA	GSM/EDGE			
1 (BC1)	n1	1	X	I	-	Transmit	2 110 to 2 170	[i.19] and [i.20].
						Receive	1 920 to 1 980	
3 (BC2)	n3	3	X	III	DCS 1800	Transmit	1 805 to 1 880	[i.17] and [i.18]
						Receive	1 710 to 1 785	
7 (BC1)	n7	7	X	VII	-	Transmit	2 620 to 2 690	[i.21] and [i.22]
						Receive	2 500 to 2 570	
8 (BC2)	n8	8	X	VIII	E-GSM	Transmit	925 to 960	[i.17] and [i.22]
						Receive	880 to 915	
20 (BC1)	n20	20	X	XX	-	Transmit	791 to 821	[i.12] and [i.13]
						Receive	832 to 862	
22 (BC1)	-	22	-	XXII	-	Transmit	3 510 to 3 590	[i.7] and [i.24]
						Receive	3 410 to 3 490	
28 (BC1) (note 1)	n28	28	X	-	-	Transmit	758 to 803	[i.9] and [i.10]
						Receive	703 to 748	
31 (BC1)	n31	31	X	-	-	Transmit	462,5 to 467,5	[i.26]
						Receive	452,5 to 457,5	
32 (BC1) (notes 5 and 6)	-	32	-	XXXII	-	Transmit	1 452 to 1 496	[i.14], [i.15] and [i.16]
						Receive	N/A	
38 (BC3)	n38	38	-	-	-	Transmit and Receive	2 570 to 2 620	[i.22] and [i.23]
40 (BC3)	n40	40	-	-	-	Transmit and Receive	2 300 to 2 400	[i.21]
41 (BC3) (note 2)	n41	41	X	-	-	Transmit and Receive	2 496 to 2 690	[i.22] and [i.23]
42 (BC3)	-	42	X	-	-	Transmit and Receive	3 400 to 3 600	[i.7] and [i.24]
43 (BC3)	-	43	X	-	-	Transmit and Receive	3 600 to 3 800	[i.7] and [i.24]
50 (BC3) (note 5)	n50	50	-	-	-	Transmit and Receive	1 432 to 1 517	[i.15]
51 (BC3) (note 5)	n51	51	-	-	-	Transmit and Receive	1 427 to 1 432	[i.15]
65 (BC1) (note 7)	n65	65	X	-	-	Transmit	2 110 to 2 200	[i.19], [i.20] and [i.25]
						Receive	1 920 to 2 010	
67 (BC1) (note 5)	n67	67	-	-	-	Transmit	738 to 758	[i.9] and [i.10]
						Receive	N/A	
68 (BC1)	-	68	-	-	-	Transmit	753 to 783	[i.9] and [i.10]
						Receive	698 to 728	
69 (BC1) (note 5)	-	69	-	-	-	Transmit	2 570 to 2 620	[i.22] and [i.23]
						Receive	N/A	
72 (BC1)	n72	72	X	-	-	Transmit	461 to 466	[i.26]
						Receive	451 to 456	
75 (BC1) (note 5)	n75	75	-	-	-	Transmit	1 432 to 1 517	[i.14], [i.15] and [i.16]
						Receive	N/A	

Band designation and Band Category	Supported RATs and Band Numbers					Direction of transmission	MSR Base Station operating bands (MHz)	Relevant EC/ECC decision
	NR	E-UTRA	NB-IoT	UTRA	GSM/EDGE			
76 (BC1) (note 5)	n76	76	-	-	-	Transmit	1 427 to 1 432	[i.15] and [i.16]
						Receive	N/A	
77 (BC3) (note 3)	n77	-	-	-	-	Transmit and Receive	3 300 to 4 200	[i.7] and [i.24]
78 (BC3) (note 4)	n78	-	-	-	-	Transmit and Receive	3 300 to 3 800	[i.7]and [i.24]
87 (BC1)	-	87	X	-	-	Transmit	420 to 425	[i.26]
						Receive	410 to 415	
88 (BC1)	-	88	X	-	-	Transmit	422 to 427	[i.26]
						Receive	412 to 417	
NOTE 1: In Europe according to [i.9], radio equipment in band 28 operates between 758 MHz and 791 MHz for the transmitter ($F_{DL_low} = 758$ MHz and $F_{DL_high} = 791$ MHz) and between 703 MHz and 736 MHz for the receiver ($F_{UL_low} = 703$ MHz and $F_{UL_high} = 736$ MHz).								
NOTE 2: In Europe according to [i.22] and [i.23], radio equipment in band 41 operates between 2 570 MHz and 2 620 MHz ($F_{DL_low} = 2 570$ MHz and $F_{DL_high} = 2 620$ MHz).								
NOTE 3: In Europe according to [i.7] and [i.24], radio equipment in band 77 operates between 3 400 MHz and 3 800 MHz ($F_{DL_low} = 3 400$ MHz and $F_{DL_high} = 3 800$ MHz).								
NOTE 4: In Europe according to [i.7]and [i.24], radio equipment in band 78 operates between 3 400 MHz and 3 800 MHz ($F_{DL_low} = 3 400$ MHz and $F_{DL_high} = 3 800$ MHz).								
NOTE 5: Restricted to NR and/or 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 6: 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 7: This band includes two frequency ranges that are harmonised in Europe:								
(a) According to [i.19] and [i.20], radio equipment in band 65 operates between 2 110 MHz to 2 170 MHz for the transmitter ($F_{DL_low} = 2 110$ MHz and $F_{DL_high} = 2 170$ MHz), and between 1 920 MHz to 1 980 MHz for the receiver ($F_{UL_low} = 1 920$ MHz and $F_{UL_high} = 1 980$ MHz).								
(b) Based on [i.25], radio equipment in band 65 operates between 2 170 MHz to 2 200 MHz for the transmitter ($F_{DL_low} = 2 170$ MHz and $F_{DL_high} = 2 200$ MHz) and between 1 980 MHz to 2 010 MHz for the receiver ($F_{UL_low} = 1 980$ MHz and $F_{UL_high} = 2 010$ MHz) as the Complementary Ground Component (CGC) of a Mobile-satellite service by reference to the present document.								

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

The present document covers requirements for multi-RAT capable NR, E-UTRA, UTRA and GSM/EDGE MSR Base Stations for 3GPP™ Release 9, 10, 11, 12, 13, 14, 15, 16 and 17. This includes the requirements for MSR operating bands from 3GPP Release 18.

The RF requirements in the present document do not apply for multi-band operation supporting bands for both FDD and TDD.

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

2 References

2.1 Normative 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.

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 \(V17.14.0\) \(08-2024\)](#): "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); LTE; 5G; NR, E-UTRA, UTRA and GSM/EDGE; Multi-Standard Radio (MSR) Base Station (BS) conformance testing (3GPP TS 37.141 version 17. 14.0 Release 17)".
- [2] [ETSI TS 125 104 \(V17.0.1\) \(09-2024\)](#): "Universal Mobile Telecommunications System (UMTS); Base Station (BS) radio transmission and reception (FDD) (3GPP TS 25.104 version 17.0.1 Release 17)".
- [3] Void.
- [4] [ETSI TS 136 104 \(V17.12.0\) \(05-2024\)](#): "LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); Base Station (BS) radio transmission and reception (3GPP TS 36.104 version 17.12.0 Release 17)".
- [5] [ETSI TS 145 005 \(V17.0.0\) \(05-2022\)](#): "Digital cellular telecommunications system (Phase 2+) (GSM); GSM/EDGE Radio transmission and reception (3GPP TS 45.005 version 17.0.0 Release 17)".
- [6] [ETSI EN 301 908-3 \(V15.1.1\) \(05-2024\)](#): "IMT cellular networks; Harmonised Standard for access to radio spectrum; Part 3: CDMA Direct Spread (UTRA FDD) Base Stations (BS) Release 15".
- [7] [ETSI EN 301 908-14 \(V17.1.0\) \(11-2024\)](#): "IMT cellular networks; Harmonised Standard for access to radio spectrum; Part 14: Evolved Universal Terrestrial Radio Access (E-UTRA) Base Stations (BS) Release 17".
- [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 \(V17.13.0\) \(08-2024\)](#): "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); LTE; 5G; NR, E-UTRA, UTRA and GSM/EDGE; Multi-Standard Radio (MSR) Base Station (BS) radio transmission and reception (3GPP TS 37.104 version 17.13.0 Release 17)".
- [11] [ETSI TS 136 141 \(V17.12.0\) \(05-2024\)](#): "LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); Base Station (BS) conformance testing (3GPP TS 36.141 version 17.12.0 Release 17)".
- [12] [ETSI TS 125 141 \(V17.0.0\) \(04-2022\)](#): "Universal Mobile Telecommunications System (UMTS); Base Station (BS) conformance testing (FDD) (3GPP TS 25.141 version 17.0.0 Release 17)".
- [13] Void.

- [14] [ETSI TS 151 021 \(V17.0.0\) \(05-2022\)](#): "Digital cellular telecommunications system (Phase 2+) (GSM); Base Station System (BSS) equipment specification; Radio aspects (3GPP TS 51.021 version 17.0.0 Release 17)".
- [15] [ETSI TS 138 141-1 \(V17.14.0\) \(08-2024\)](#): "5G; NR; Base Station (BS) conformance testing Part 1: Conducted conformance testing (3GPP TS 38.141-1 version 17.14.0 Release 17)".
- [16] [ETSI TS 138 104 \(V17.14.0\) \(08-2024\)](#): "5G; NR; Base Station (BS) radio transmission and reception (3GPP TS 38.104 version 17.14.0 Release 17)".
- [17] Void.

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 (V1.2.1) (05-2020): "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) (12-2001): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics".
- [i.4] [ETSI EN 301 908-1 \(V15.2.1\) \(01-2023\)](#): "IMT cellular networks; Harmonised Standard for access to radio spectrum; Part 1: Introduction and common requirements; Release 15".
- [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.
- [i.7] [Commission Implementing Decision \(EU\) 2019/235](#) of 24 January 2019 on amending Decision 2008/411/EC as regards an update of relevant technical conditions applicable to the 3 400-3 800 MHz frequency band.
- [i.8] ETSI TS 103 807 (V1.1.1) (10-2021): "Mobile Standards Group (MSG); IMT Cellular Networks Base Stations (BS) Additional Regulatory Requirements".
- [i.9] [ECC Decision \(15\)01](#): "Harmonised technical conditions for mobile/fixed communications networks (MFCN) in the band 694-790 MHz including a paired frequency arrangement (Frequency Division Duplex 2x30 MHz) and an optional unpaired frequency arrangement (Supplemental Downlink)", approved 06 March 2015.
- [i.10] [Commission Implementing Decision \(EU\) 2016/687](#) of 28 April 2016 on the harmonisation of the 694-790 MHz frequency band for terrestrial systems capable of providing wireless broadband electronic communications services and for flexible national use in the Union.
- [i.11] Void.

- [i.12] [ECC Decision \(09\)03](#): "Harmonised conditions for mobile/fixed communications networks (MFCN) operating in the band 790 - 862 MHz", 30 October 2009.
- [i.13] [Commission Decision 2010/267/EU](#) of 6 May 2010 on harmonised technical conditions of use in the 790-862 MHz frequency band for terrestrial systems capable of providing electronic communications services in the European Union.
- [i.14] [ECC Decision \(13\)03](#): "The harmonised use of the frequency band 1 452-1 492 MHz for Mobile/Fixed Communications Networks Supplemental Downlink (MFCN SDL)", approved 8 November 2013, amended 2 March 2018.
- [i.15] [ECC Decision 17\(06\)](#): "The harmonised use of the frequency bands 1 427-1 452 MHz and 1492-1518 MHz for Mobile/Fixed Communications Networks Supplemental Downlink (MFCN SDL)", approved 17 November 2017, corrected 2 March 2018.
- [i.16] [Commission Implementing Decision \(EU\) 2018/661](#) of 26 April 2018 amending Implementing Decision (EU) 2015/750 on the harmonisation of the 1452-1492 MHz frequency band for terrestrial systems capable of providing electronic communications services in the Union as regards its extension in the harmonised 1427-1452 MHz and 1492-1517 MHz frequency bands.
- [i.17] [Commission Implementing Decision 2011/251/EU](#) amending Decision 2009/766/EC on the harmonisation of the 900 MHz and 1800 MHz frequency bands for terrestrial systems capable of providing pan-European electronic communications services in the Community.
- [i.18] [ECC Decision \(06\)13](#): "Harmonised technical conditions for mobile/fixed communications networks (MFCN) including terrestrial IMT systems, other than GSM and EC-GSM IoT, in the bands 880-915/925-960 MHz and 1710-1785/1805-1880 MHz", approved 01 December 2006, amended 4 March 2022.
- [i.19] [ECC Decision \(06\)01](#): "The harmonised utilisation of the bands 1920-1980 MHz and 2110-2170 MHz for mobile/fixed communications networks (MFCN) including terrestrial IMT systems", approved 24 March 2006, amended 8 March 2019.
- [i.20] [Commission Implementing Decision \(EU\) 2020/667](#) of 6 May 2020 amending Decision 2012/688/EU as regards an update of relevant technical conditions applicable to the frequency bands 1 920-1 980 MHz and 2 110-2 170 MHz.
- [i.21] [ECC Decision 14\(02\)](#): "Harmonised technical and regulatory conditions for the use of the band 2 300-2 400 MHz for Mobile/Fixed Communications Networks (MFCN)", approved 27 June 2014, amended 10 March 2023.
- [i.22] [ECC Decision 05\(05\)](#): "Harmonised utilization of spectrum for Mobile/Fixed Communications Networks (MFCN) operating within the band 2 500-2 690 MHz", Approved 18 March 2005, Amended 05 July 2019, corrected 4 March 2022.
- [i.23] [Commission Implementing Decision \(EU\) 2020/636](#) of 8 May 2020 amending Decision 2008/477/EC as regards an update of relevant technical conditions applicable to the 2 500-2 690 MHz frequency band.
- [i.24] [ECC Decision 11\(06\)](#): "Harmonised frequency arrangements and least restrictive technical conditions (LRTC) for mobile/fixed communications networks (MFCN) operating in the band 3400-3800 MHz", Approved 09 December 2011, amended 26 October 2018.
- [i.25] [ECC Decision 06\(09\)](#): "Designation of the bands 1980-2010 MHz and 2170-2200 MHz for use by systems in the Mobile-Satellite Service including those supplemented by a Complementary Ground Component (CGC)", Approved 01 December 2006, amended 05 September 2007.
- [i.26] [ECC Decision \(19\)02](#): "Land mobile systems in the frequency ranges 68-87.5 MHz, 146-174 MHz, 406.1-410 MHz, 410-430 MHz, 440-450 MHz and 450-470 MHz", approved 8 March 2019.
- [i.27] ETSI TR 103 877 (V1.1.1): "Task Force for European Standards for IMT-2000 (MSG); Technical Parameter selection in ETSI EN 301 908 Base Station (BS) Harmonised Standards".

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 NR, E-UTRA, UTRA or GSM/EDGE physical channels

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

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

NOTE: The term channel bandwidth is referred to as BS channel bandwidth in the NR specifications, since for NR the BS and UE may operate with differing bandwidths.

carrier power: power at the antenna connector in the channel bandwidth of the carrier averaged over at least one subframe for NR or 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 NR, 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-band gap: frequency gap between two supported consecutive operating bands

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

intra-band contiguous carrier aggregation: contiguous NR or 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.