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IMT cellular networks - Harmonised Standard for access to radio spectrum - Part 25: New Radio (NR) User Equipment (UE) Release 15

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**IMT cellular networks;
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The present document has been prepared under the Commission's standardisation request C(2015) 5376 final [i.9] 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].

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 Tables A-1 to A-3 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 25 of a multi-part deliverable. Full details of the entire series can be found in part 1 [i.12].

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Introduction

The present document is part of a set of standards developed by ETSI and is designed to fit in a modular structure to cover all radio and telecommunications terminal 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

1.0 General

The present document applies to the following radio equipment type:

- User Equipment for New Radio (NR).

Requirements throughout the present document are in many cases defined separately for different Frequency Ranges (FRs). The frequency ranges in which NR can operate according to this version of the present document are identified as described in Table 1-1.

Table 1-1: Definition of frequency ranges

Frequency range designation	Corresponding frequency range
FR1	450 MHz - 7 125 MHz
FR2	24 250 MHz - 52 600 MHz

1.1 Operating bands in FR1

This radio equipment type is capable of operating in all or any part of the frequency bands of FR1 given in tables from 1.1-1 through 1.1-5.

Table 1.1-1: NR operating bands in FR1

NR operating band	Uplink (UL) operating band UE transmit $F_{UL_low} - F_{UL_high}$	Downlink (DL) operating band UE receive $F_{DL_low} - F_{DL_high}$	Duplex Mode	Related EC/ECC Decision
n1	1 920 MHz - 1 980 MHz	2 110 MHz - 2 170 MHz	FDD	[i.19] and [i.20]
n3	1 710 MHz - 1 785 MHz	1 805 MHz - 1 880 MHz	FDD	[i.17] and [i.18]
n7	2 500 MHz - 2 570 MHz	2 620 MHz - 2 690 MHz	FDD	[i.23]
n8	880 MHz - 915 MHz	925 MHz - 960 MHz	FDD	[i.17] and [i.18]
n20	832 MHz - 862 MHz	791 MHz - 821 MHz	FDD	[i.6] and [i.7]
n28 (note 1)	703 MHz - 748 MHz	758 MHz - 803 MHz	FDD	[i.8] and [i.11]
n38	2 570 MHz - 2 620 MHz	2 570 MHz - 2 620 MHz	TDD	[i.22] and [i.23]
n40	2 300 MHz - 2 400 MHz	2 300 MHz - 2 400 MHz	TDD	[i.21]
n41 (note 2)	2 496 MHz - 2 690 MHz	2 496 MHz - 2 690 MHz	TDD	[i.22] and [i.23]
n50 (note 3)	1 432 MHz - 1 517 MHz	1 432 MHz - 1 517 MHz	TDD	[i.14], [i.15] and [i.16]
n51 (note 3)	1 427 MHz - 1 432 MHz	1 427 MHz - 1 432 MHz	TDD	[i.14] and [i.15]
n65 (note 6)	1 920 MHz - 2 010 MHz	2 110 MHz - 2 200 MHz	FDD	[i.19], [i.20] and [i.27]
n75	N/A	1 432 MHz - 1 517 MHz	SDL	[i.14], [i.15] and [i.16]
n76	N/A	1 427 MHz - 1 432 MHz	SDL	[i.14] and [i.15]
n77 (note 4)	3 300 MHz - 4 200 MHz	3 300 MHz - 4 200 MHz	TDD	[i.29] and [i.24]
n78 (note 5)	3 300 MHz - 3 800 MHz	3 300 MHz - 3 800 MHz	TDD	[i.29] and [i.24]
n80	1 710 MHz - 1 785 MHz	N/A	SUL	[i.17] and [i.18]
n81	880 MHz - 915 MHz	N/A	SUL	[i.17] and [i.18]
n82	832 MHz - 862 MHz	N/A	SUL	[i.6] and [i.7]
n83	703 MHz - 748 MHz	N/A	SUL	
n84	1 920 MHz - 1 980 MHz	N/A	SUL	[i.19] and [i.20]

NR operating band	Uplink (UL) operating band UE transmit $F_{UL_low} - F_{UL_high}$	Downlink (DL) operating band UE receive $F_{DL_low} - F_{DL_high}$	Duplex Mode	Related EC/ECC Decision
NOTE 1:	In Europe, according to [i.8] and [i.11], NR UE in Band n28 operates between 703 MHz and 736 MHz ($F_{UL_low} = 703$ MHz and $F_{UL_high} = 736$ MHz) for the transmitter and between 758 MHz and 791 MHz ($F_{DL_low} = 758$ MHz and $F_{DL_high} = 791$ MHz) for the receiver.			
NOTE 2:	In Europe, according to [i.22] and [i.23], NR UE in Band n41 operates between 2 500 MHz and 2 690 MHz ($F_{UL_low} = 2 500$ MHz and $F_{UL_high} = 2 690$ MHz).			
NOTE 3:	NR UE operation in Band 50 and Band n51 is restricted to downlink only.			
NOTE 4:	In Europe, according to [i.29] and [i.24], NR UE in Band 77 operates between 3 400 MHz and 4 200 MHz ($F_{UL_low} = 3 400$ MHz and $F_{UL_high} = 3 800$ MHz).			
NOTE 5:	In Europe, according to [i.29] and [i.24], NR UE in Band 78 operates between 3 400 MHz and 3 800 MHz ($F_{UL_low} = 3 400$ MHz and $F_{UL_high} = 3 800$ MHz).			
NOTE 6:	This band includes two frequency ranges that are harmonised in Europe:			
(a)	According to [i.19] and [i.20], radio equipment in band n65 operates between 2 110 MHz and 2 170 MHz for the transmitter ($F_{DL_low} = 2 110$ MHz and $F_{DL_high} = 2 170$ MHz), and between 1 920 MHz and 1 980 MHz for the receiver ($F_{UL_low} = 1 920$ MHz and $F_{UL_high} = 1 980$ MHz).			
(b)	Based on [i.27], radio equipment in band n65 operates between 2 170 MHz and 2 200 MHz for the transmitter ($F_{DL_low} = 2 170$ MHz and $F_{DL_high} = 2 200$ MHz) and between 1 980 MHz and 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.			

Table 1.1-2: Void

Table 1.1-3: Void

Table 1.1-4: Void

NR supplementary uplink is designed to operate in the operating band combination defined in Table 1.1-5, where all operating bands are within FR1.

Table 1.1-5: Operating band combination for SUL in FR1

NR Band combination for SUL	NR Band (Table 1.1-1)
SUL_n78-n80 (note 2)	n78, n80
SUL_n78-n81 (note 2)	n78, n81
SUL_n78-n82 (note 2)	n78, n82
SUL_n78-n83 (note 2)	n78, n83
SUL_n78-n84 (note 2)	n78, n84
NOTE 1: If a UE is configured with both NR UL and NR SUL carriers in a cell, the switching time between NR UL carrier and NR SUL carrier is 0us.	
NOTE 2: For UE supporting SUL band combination simultaneous Rx/Tx capability is mandatory.	

The requirements for FR1 in the present document apply to the combination of channel bandwidths, SCS and operating bands shown in Table 1.1-6. The channel bandwidths are specified for both the TX and RX paths.

Table 1.1-6: Channel Bandwidths for Each NR band in FR1

NR Band	NR Band / SCS / UE Channel bandwidth												
	SCS kHz	5 MHz	10 ^{1,2} MHz	15 ² MHz	20 ² MHz	25 ² MHz	30 MHz	40 MHz	50 MHz	60 MHz	80 MHz	90 ⁴ MHz	100 MHz
n1	15	Yes	Yes	Yes	Yes	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴				
	30		Yes	Yes	Yes	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴				
	60		Yes	Yes	Yes	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴				
n3	15	Yes	Yes	Yes	Yes	Yes	Yes						
	30		Yes	Yes	Yes	Yes	Yes						
	60		Yes	Yes	Yes	Yes	Yes						