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Contents

Intellectual Property Rights	2
Legal Notice	2
Modal verbs terminology.....	2
Foreword.....	12
1 Scope	13
2 References	13
3 Definitions, symbols and abbreviations	14
3.1 Definitions	14
3.2 Symbols.....	18
3.3 Abbreviations	20
4 General	22
4.1 Relationship with other core specifications.....	22
4.2 Relationship between minimum requirements and test requirements	22
4.3 Conducted and radiated requirement reference points	22
4.3.1 <i>BS type 1-C</i>	22
4.3.2 <i>BS type 1-H</i>	23
4.3.3 <i>BS type 1-O</i> and <i>BS type 2-O</i>	24
4.4 Base station classes	24
4.5 Regional requirements.....	25
4.6 Applicability of requirements.....	26
4.7 Requirements for contiguous and <i>non-contiguous spectrum</i>	27
4.8 Requirements for BS capable of multi-band operation	27
4.9 OTA co-location with other base stations	29
5 <i>Operating bands</i> and channel arrangement.....	30
5.1 General	30
5.2 <i>Operating bands</i>	30
5.3 <i>BS channel bandwidth</i>	31
5.3.1 General.....	31
5.3.2 <i>Transmission bandwidth configuration</i>	32
5.3.3 Minimum guardband and <i>transmission bandwidth configuration</i>	32
5.3.4 RB alignment.....	34
5.3A <i>BS channel bandwidth</i> for CA.....	38
5.3A.1 <i>Transmission bandwidth configuration</i> for CA	38
5.3A.2 Minimum guardband and <i>transmission bandwidth configuration</i> for CA	38
5.4 Channel arrangement.....	40
5.4.1 Channel spacing.....	40
5.4.1.1 Channel spacing for adjacent NR carriers	40
5.4.1.2 Channel spacing for CA	40
5.4.2 Channel raster	41
5.4.2.1 NR-ARFCN and channel raster.....	41
5.4.2.2 Channel raster to resource element mapping.....	41
5.4.2.3 Channel raster entries for each <i>operating band</i>	42
5.4.3 Synchronization raster	43
5.4.3.1 Synchronization raster and numbering.....	43
5.4.3.2 Synchronization raster to synchronization block resource element mapping.....	44
5.4.3.3 Synchronization raster entries for each <i>operating band</i>	44
6 Conducted transmitter characteristics	46
6.1 General	46
6.2 Base station output power	46
6.2.1 General.....	46
6.2.2 Minimum requirement for <i>BS type 1-C</i>	47
6.2.3 Minimum requirement for <i>BS type 1-H</i>	47

6.2.4	Additional requirements (regional).....	47
6.3	Output power dynamics.....	47
6.3.1	General.....	47
6.3.2	RE power control dynamic range	47
6.3.2.1	General	47
6.3.2.2	Minimum requirement for <i>BS type 1-C</i> and <i>BS type 1-H</i>	47
6.3.3	Total power dynamic range	48
6.3.3.1	General	48
6.3.3.2	Minimum requirement for <i>BS type 1-C</i> and <i>BS type 1-H</i>	48
6.4	Transmit ON/OFF power	49
6.4.1	Transmitter OFF power	49
6.4.1.1	General	49
6.4.1.2	Minimum requirement for <i>BS type 1-C</i>	49
6.4.1.3	Minimum requirement for <i>BS type 1-H</i>	49
6.4.2	Transmitter transient period.....	49
6.4.2.1	General	49
6.4.2.2	Minimum requirement for <i>BS type 1-C</i> and <i>BS type 1-H</i>	50
6.4.2.3	Void.....	50
6.5	Transmitted signal quality	50
6.5.1	Frequency error.....	50
6.5.1.1	General	50
6.5.1.2	Minimum requirement for <i>BS type 1-C</i> and <i>BS type 1-H</i>	51
6.5.2	Modulation quality.....	51
6.5.2.1	General	51
6.5.2.2	Minimum Requirement for <i>BS type 1-C</i> and <i>BS type 1-H</i>	51
6.5.2.3	EVM frame structure for measurement.....	51
6.5.3	Time alignment error	51
6.5.3.1	General	51
6.5.3.2	Minimum requirement for <i>BS type 1-C</i> and <i>BS type 1-H</i>	52
6.6	Unwanted emissions.....	52
6.6.1	General.....	52
6.6.2	Occupied bandwidth	53
6.6.2.1	General	53
6.6.2.2	Minimum requirement for <i>BS type 1-C</i> and <i>BS type 1-H</i>	53
6.6.3	Adjacent Channel Leakage Power Ratio	53
6.6.3.1	General	53
6.6.3.2	Limits and <i>Basic limits</i>	53
6.6.3.3	Minimum requirement for <i>BS type 1-C</i>	56
6.6.3.4	Minimum requirement for <i>BS type 1-H</i>	57
6.6.4	Operating band unwanted emissions	57
6.6.4.1	General	57
6.6.4.2	<i>Basic limits</i>	59
6.6.4.2.1	<i>Basic limits</i> for Wide Area BS (Category A)	59
6.6.4.2.2	<i>Basic limits</i> for Wide Area BS (Category B).....	59
6.6.4.2.2.1	Category B requirements (Option 1).....	59
6.6.4.2.2.2	Category B requirements (Option 2).....	61
6.6.4.2.3	<i>Basic limits</i> for Medium Range BS (Category A and B).....	61
6.6.4.2.4	<i>Basic limits</i> for Local Area BS (Category A and B).....	62
6.6.4.2.5	<i>Basic limits</i> for additional requirements	62
6.6.4.2.5.1	Limits in FCC Title 47.....	62
6.6.4.2.5.2	Protection of DTT.....	62
6.6.4.3	Minimum requirements for <i>BS type 1-C</i>	63
6.6.4.4	Minimum requirements for <i>BS type 1-H</i>	63
6.6.5	Transmitter spurious emissions.....	63
6.6.5.1	General	63
6.6.5.2	<i>Basic limits</i>	64
6.6.5.2.1	General transmitter spurious emissions requirements	64
6.6.5.2.2	Protection of the BS receiver of own or different BS.....	64
6.6.5.2.3	Additional spurious emissions requirements	65
6.6.5.2.4	Co-location with other base stations.....	72
6.6.5.3	Minimum requirements for <i>BS type 1-C</i>	77
6.6.5.4	Minimum requirements for <i>BS type 1-H</i>	77

6.7	Transmitter intermodulation.....	77
6.7.1	General.....	77
6.7.2	Minimum requirements for <i>BS type 1-C</i>	78
6.7.2.1	Co-location minimum requirements.....	78
6.7.2.2	Additional requirements.....	78
6.7.3	Minimum requirements for <i>BS type 1-H</i>	79
6.7.3.1	Co-location minimum requirements.....	79
6.7.3.2	Intra-system minimum requirements.....	79
6.7.3.3	Additional requirements.....	80
7	Conducted receiver characteristics.....	81
7.1	General.....	81
7.2	Reference sensitivity level.....	81
7.2.1	General.....	81
7.2.2	Minimum requirements for <i>BS type 1-C</i> and <i>BS type 1-H</i>	82
7.3	Dynamic range.....	83
7.3.1	General.....	83
7.3.2	Minimum requirement for <i>BS type 1-C</i> and <i>BS type 1-H</i>	83
7.4	In-band selectivity and blocking.....	86
7.4.1	Adjacent Channel Selectivity (ACS).....	86
7.4.1.1	General.....	86
7.4.1.2	Minimum requirement for <i>BS type 1-C</i> and <i>BS type 1-H</i>	86
7.4.1.3	Void.....	88
7.4.1.4	Void.....	88
7.4.2	In-band blocking.....	88
7.4.2.1	General.....	88
7.4.2.2	Minimum requirement for <i>BS type 1-C</i> and <i>BS type 1-H</i>	88
7.4.2.3	Void.....	90
7.4.2.4	Void.....	90
7.5	Out-of-band blocking.....	90
7.5.1	General.....	90
7.5.2	Minimum requirement for <i>BS type 1-C</i> and <i>BS type 1-H</i>	90
7.5.3	Co-location minimum requirements for <i>BS type 1-C</i> and <i>BS type 1-H</i>	91
7.5.4	Void.....	92
7.6	Receiver spurious emissions.....	92
7.6.1	General.....	92
7.6.2	<i>Basic limits</i>	92
7.6.3	Minimum requirement for <i>BS type 1-C</i>	93
7.6.4	Minimum requirement for <i>BS type 1-H</i>	93
7.7	Receiver intermodulation.....	93
7.7.1	General.....	93
7.7.2	Minimum requirement for <i>BS type 1-C</i> and <i>BS type 1-H</i>	93
7.8	In-channel selectivity.....	98
7.8.1	General.....	98
7.8.2	Minimum requirement for <i>BS type 1-C</i> and <i>BS type 1-H</i>	98
8	Conducted performance requirements.....	101
8.1	General.....	101
8.1.1	Scope and definitions.....	101
8.1.2	Void.....	101
8.2	Performance requirements for PUSCH.....	101
8.2.1	Requirements for PUSCH with transform precoding disabled.....	101
8.2.1.1	General.....	101
8.2.1.2	Minimum requirements.....	102
8.2.2	Requirements for PUSCH with transform precoding enabled.....	109
8.2.2.1	General.....	109
8.2.2.2	Minimum requirements.....	110
8.2.3	Requirements for UCI multiplexed on PUSCH.....	111
8.2.3.1	General.....	111
8.2.3.2	Minimum requirements.....	112
8.3	Performance requirements for PUCCH.....	113
8.3.1	DTX to ACK probability.....	113

8.3.1.1	General	113
8.3.1.2	Minimum requirement	113
8.3.2	Performance requirements for PUCCH format 0	113
8.3.2.1	General	113
8.3.2.2	Minimum requirements	114
8.3.3	Performance requirements for PUCCH format 1	114
8.3.3.1	NACK to ACK requirements	114
8.3.3.1.1	General	114
8.3.3.1.2	Minimum requirements	115
8.3.3.2	ACK missed detection requirements	116
8.3.3.2.1	General	116
8.3.3.2.2	Minimum requirements	116
8.3.4	Performance requirements for PUCCH format 2	117
8.3.4.1	ACK missed detection requirements	117
8.3.4.1.1	General	117
8.3.4.1.2	Minimum requirements	117
8.3.4.2	UCI BLER performance requirements	117
8.3.4.2.1	General	117
8.3.4.2.2	Minimum requirements	118
8.3.5	Performance requirements for PUCCH format 3	118
8.3.5.1	General	118
8.3.5.2	Minimum requirements	119
8.3.6	Performance requirements for PUCCH format 4	120
8.3.6.1	General	120
8.3.6.2	Minimum requirement	121
8.3.7	Performance requirements for multi-slot PUCCH	121
8.3.7.1	General	121
8.3.7.2	Performance requirements for multi-slot PUCCH format 1	121
8.3.7.2.1	NACK to ACK requirements	121
8.3.7.2.1.1	General	121
8.3.7.2.1.2	Minimum requirements	122
8.3.7.2.2	ACK missed detection requirements	122
8.3.7.2.2.1	General	122
8.3.7.2.2.2	Minimum requirements	122
8.4	Performance requirements for PRACH	123
8.4.1	PRACH False alarm probability	123
8.4.1.1	General	123
8.4.1.2	Minimum requirement	123
8.4.2	PRACH detection requirements	123
8.4.2.1	General	123
8.4.2.2	Minimum requirements	123
9	Radiated transmitter characteristics	125
9.1	General	125
9.2	Radiated transmit power	125
9.2.1	General	125
9.2.2	Minimum requirement for <i>BS type 1-H</i> and <i>BS type 1-O</i>	125
9.2.3	Minimum requirement for <i>BS type 2-O</i>	126
9.3	OTA base station output power	126
9.3.1	General	126
9.3.2	Minimum requirement for <i>BS type 1-O</i>	126
9.3.3	Minimum requirement for <i>BS type 2-O</i>	127
9.3.4	Additional requirements (regional)	127
9.4	OTA output power dynamics	127
9.4.1	General	127
9.4.2	OTA RE power control dynamic range	127
9.4.2.1	General	127
9.4.2.2	Minimum requirement for <i>BS type 1-O</i>	127
9.4.3	OTA total power dynamic range	127
9.4.3.1	General	127
9.4.3.2	Minimum requirement for <i>BS type 1-O</i>	127
9.4.3.3	Minimum requirement for <i>BS type 2-O</i>	128

9.5	OTA transmit ON/OFF power.....	128
9.5.1	General.....	128
9.5.2	OTA transmitter OFF power.....	128
9.5.2.1	General.....	128
9.5.2.2	Minimum requirement for <i>BS type 1-O</i>	128
9.5.2.3	Minimum requirement for <i>BS type 2-O</i>	128
9.5.3	OTA transient period.....	128
9.5.3.1	General.....	128
9.5.3.2	Minimum requirement for <i>BS type 1-O</i>	129
9.5.3.3	Minimum requirement for <i>BS type 2-O</i>	129
9.6	OTA transmitted signal quality.....	129
9.6.1	OTA frequency error.....	129
9.6.1.1	General.....	129
9.6.1.2	Minimum requirement for <i>BS type 1-O</i>	129
9.6.1.3	Minimum requirement for <i>BS type 2-O</i>	129
9.6.2	OTA modulation quality.....	130
9.6.2.1	General.....	130
9.6.2.2	Minimum Requirement for <i>BS type 1-O</i>	130
9.6.2.3	Minimum Requirement for <i>BS type 2-O</i>	130
9.6.2.3.1	EVM frame structure for measurement.....	130
9.6.3	OTA time alignment error.....	130
9.6.3.1	General.....	130
9.6.3.2	Minimum requirement for <i>BS type 1-O</i>	130
9.6.3.3	Minimum requirement for <i>BS type 2-O</i>	131
9.7	OTA unwanted emissions.....	131
9.7.1	General.....	131
9.7.2	OTA occupied bandwidth.....	132
9.7.2.1	General.....	132
9.7.2.2	Minimum requirement for <i>BS type 1-O</i> and <i>BS type 2-O</i>	132
9.7.3	OTA Adjacent Channel Leakage Power Ratio (ACLR).....	132
9.7.3.1	General.....	132
9.7.3.2	Minimum requirement for <i>BS type 1-O</i>	132
9.7.3.3	Minimum requirement for <i>BS type 2-O</i>	132
9.7.4	OTA operating band unwanted emissions.....	134
9.7.4.1	General.....	134
9.7.4.2	Minimum requirement for <i>BS type 1-O</i>	134
9.7.4.2.1	Additional requirements.....	135
9.7.4.2.1.1	Protection of DTT.....	135
9.7.4.2.1.2	Limits in FCC Title 47.....	135
9.7.4.3	Minimum requirement for <i>BS type 2-O</i>	135
9.7.4.3.1	General.....	135
9.7.4.3.2	OTA operating band unwanted emission limits (Category A).....	136
9.7.4.3.3	OTA operating band unwanted emission limits (Category B).....	137
9.7.4.3.4	Additional OTA operating band unwanted emission requirements.....	137
9.7.4.3.4.1	Protection of Earth Exploration Satellite Service.....	137
9.7.5	OTA transmitter spurious emissions.....	138
9.7.5.1	General.....	138
9.7.5.2	Minimum requirement for <i>BS type 1-O</i>	138
9.7.5.2.1	General.....	138
9.7.5.2.2	General OTA transmitter spurious emissions requirements.....	138
9.7.5.2.3	Protection of the BS receiver of own or different BS.....	138
9.7.5.2.4	Additional spurious emissions requirements.....	138
9.7.5.2.5	Co-location with other base stations.....	139
9.7.5.3	Minimum requirement for <i>BS type 2-O</i>	139
9.7.5.3.1	General.....	139
9.7.5.3.2	General OTA transmitter spurious emissions requirements.....	139
9.7.5.3.2.1	General.....	139
9.7.5.3.2.2	OTA transmitter spurious emissions (Category A).....	139
9.7.5.3.2.3	OTA transmitter spurious emissions (Category B).....	140
9.7.5.3.3	Additional OTA transmitter spurious emissions requirements.....	140
9.7.5.3.3.1	Limits for protection of Earth Exploration Satellite Service.....	140
9.8	OTA transmitter intermodulation.....	141

9.8.1	General.....	141
9.8.2	Minimum requirement for <i>BS type 1-O</i>	141
10	Radiated receiver characteristics	142
10.1	General	142
10.2	OTA sensitivity	143
10.2.1	<i>BS type 1-H</i> and <i>BS type 1-O</i>	143
10.2.1.1	General	143
10.2.1.2	Minimum requirement	143
10.2.2	<i>BS type 2-O</i>	143
10.3	OTA reference sensitivity level.....	144
10.3.1	General.....	144
10.3.2	Minimum requirement for <i>BS type 1-O</i>	144
10.3.3	Minimum requirement for <i>BS type 2-O</i>	145
10.4	OTA dynamic range	146
10.4.1	General.....	146
10.4.2	Minimum requirement for <i>BS type 1-O</i>	146
10.5	OTA in-band selectivity and blocking.....	155
10.5.1	OTA adjacent channel selectivity	155
10.5.1.1	General	155
10.5.1.2	Minimum requirement for <i>BS type 1-O</i>	155
10.5.1.3	Minimum requirement for <i>BS type 2-O</i>	156
10.5.2	OTA in-band blocking	157
10.5.2.1	General	157
10.5.2.2	Minimum requirement for <i>BS type 1-O</i>	157
10.5.2.3	Minimum requirement for <i>BS type 2-O</i>	160
10.6	OTA out-of-band blocking	160
10.6.1	General.....	160
10.6.2	Minimum requirement for <i>BS type 1-O</i>	160
10.6.2.1	General minimum requirement	160
10.6.2.2	Co-location minimum requirement	161
10.6.3	Minimum requirement for <i>BS type 2-O</i>	162
10.6.3.1	General minimum requirement	162
10.7	OTA receiver spurious emissions.....	162
10.7.1	General.....	162
10.7.2	Minimum requirement for <i>BS type 1-O</i>	162
10.7.3	Minimum requirement for <i>BS type 2-O</i>	163
10.8	OTA receiver intermodulation	164
10.8.1	General.....	164
10.8.2	Minimum requirement for <i>BS type 1-O</i>	164
10.8.3	Minimum requirement for <i>BS type 2-O</i>	168
10.9	OTA in-channel selectivity.....	169
10.9.1	General.....	169
10.9.2	Minimum requirement for <i>BS type 1-O</i>	169
10.9.3	Minimum requirement for <i>BS type 2-O</i>	172
11	Radiated performance requirements.....	174
11.1	General	174
11.1.1	Scope and definitions.....	174
11.1.2	OTA demodulation branches	174
11.1.3	Void	175
11.2	Performance requirements for PUSCH	175
11.2.1	Requirements for <i>BS type 1-O</i>	175
11.2.1.1	Requirements for PUSCH with transform precoding disabled	175
11.2.1.2	Requirements for PUSCH with transform precoding enabled	175
11.2.1.3	Requirements for UCI multiplexed on PUSCH	175
11.2.2	Requirements for <i>BS type 2-O</i>	175
11.2.2.1	Requirements for PUSCH with transform precoding disabled	175
11.2.2.1.1	General	175
11.2.2.1.2	Minimum requirements	176
11.2.2.2	Requirements for PUSCH with transform precoding enabled	178
11.2.2.2.1	General	178

11.2.2.2.2	Minimum requirements	178
11.2.2.3	Requirements for UCI multiplexed on PUSCH	179
11.2.2.3.1	General	179
11.2.2.3.2	Minimum requirements	180
11.3	Performance requirements for PUCCH	181
11.3.1	Requirements for <i>BS type 1-O</i>	181
11.3.1.1	DTX to ACK probability	181
11.3.1.2	Performance requirements for PUCCH format 0	182
11.3.1.3	Performance requirements for PUCCH format 1	182
11.3.1.4	Performance requirements for PUCCH format 2	182
11.3.1.5	Performance requirements for PUCCH format 3	182
11.3.1.6	Performance requirements for PUCCH format 4	182
11.3.2	Requirements for <i>BS type 2-O</i>	182
11.3.2.1	DTX to ACK probability	182
11.3.2.2	Performance requirements for PUCCH format 0	182
11.3.2.2.1	General	182
11.3.2.2.2	Minimum requirements	183
11.3.2.3	Performance requirements for PUCCH format 1	183
11.3.2.3.1	NACK to ACK requirements	183
11.3.2.3.1.1	General	183
11.3.2.3.1.2	Minimum requirements	184
11.3.2.3.2	ACK missed detection requirements	184
11.3.2.3.2.1	General	184
11.3.2.3.2.2	Minimum requirements	184
11.3.2.4	Performance requirements for PUCCH format 2	185
11.3.2.4.1	ACK missed detection requirements	185
11.3.2.4.1.1	General	185
11.3.2.4.1.2	Minimum requirements	185
11.3.2.4.2	UCI BLER performance requirements	186
11.3.2.4.2.1	General	186
11.3.2.4.2.2	Minimum requirements	186
11.3.2.5	Performance requirements for PUCCH format 3	187
11.3.2.5.1	General	187
11.3.2.5.2	Minimum requirements	187
11.3.2.6	Performance requirements for PUCCH format 4	188
11.3.2.6.1	General	188
11.3.2.6.2	Minimum requirements	188
11.4	Performance requirements for PRACH	189
11.4.1	Requirements for <i>BS type 1-O</i>	189
11.4.1.1	PRACH False alarm probability	189
11.4.1.2	PRACH detection requirements	189
11.4.2	Requirements for <i>BS type 2-O</i>	189
11.4.2.1	PRACH False alarm probability	189
11.4.2.1.1	General	189
11.4.2.1.2	Minimum requirement	189
11.4.2.2	PRACH detection requirements	189
11.4.2.2.1	General	189
11.4.2.2.2	Minimum requirements	190
Annex A (normative): Reference measurement channels		191
A.1	Fixed Reference Channels for reference sensitivity level, ACS, in-band blocking, out-of-band blocking, receiver intermodulation and in-channel selectivity (QPSK, R=1/3)	191
A.2	Fixed Reference Channels for dynamic range (16QAM, R=2/3)	192
A.3	Fixed Reference Channels for performance requirements (QPSK, R=193/1024)	192
A.4	Fixed Reference Channels for performance requirements (16QAM, R=658/1024)	197
A.5	Fixed Reference Channels for performance requirements (64QAM, R=567/1024)	201
A.6	PRACH Test preambles	203

Annex B (normative):	Error Vector Magnitude (FR1)	204
B.1	Reference point for measurement.....	204
B.2	Basic unit of measurement	204
B.3	Modified signal under test.....	205
B.4	Estimation of frequency offset	205
B.5	Estimation of time offset	205
B.5.1	General	205
B.5.2	Window length	206
B.6	Estimation of TX chain amplitude and frequency response parameters	207
B.7	Averaged EVM	208
Annex C (normative):	Error Vector Magnitude (FR2)	210
C.1	Reference point for measurement.....	210
C.2	Basic unit of measurement	210
C.3	Modified signal under test.....	211
C.4	Estimation of frequency offset	211
C.5	Estimation of time offset	211
C.5.1	General	211
C.5.2	Window length	212
C.6	Estimation of TX chain amplitude and frequency response parameters	212
C.7	Averaged EVM	214
Annex D (normative):	Characteristics of the interfering signals	216
Annex E:	Void	217
Annex F (normative):	Relationship between EIRP based regulatory requirements and 3GPP requirements	218
F.1	General	218
F.2	Relationship between EIRP based regulatory requirements and conducted requirements.....	218
F.3	Relationship between EIRP based regulatory requirements and OTA requirements.....	219
Annex G (Normative):	Propagation conditions	220
G.1	Static propagation condition.....	220
G.2	Multi-path fading propagation conditions	220
G.2.1	Delay profiles	220
G.2.1.1	Delay profiles for FR1	221
G.2.1.2	Delay profiles for FR2	222
G.2.2	Combinations of channel model parameters	223
G.2.3	MIMO Channel Correlation Matrices	224
G.2.3.1	MIMO Correlation Matrices using Uniform Linear Array (ULA)	224
G.2.3.1.1	Definition of MIMO Correlation Matrices.....	224
G.2.3.1.2	MIMO Correlation Matrices at High, Medium and Low Level	228
G.2.3.2	Multi-Antenna channel models using cross polarized antennas	230
G.2.3.2.1	Definition of MIMO Correlation Matrices using cross polarized antennas	231
G.2.3.2.2	Spatial Correlation Matrices at UE and gNB sides	231
G.2.3.2.2.1	Spatial Correlation Matrices at UE side	231
G.2.3.2.2.2	Spatial Correlation Matrices at gNB side	232
G.2.3.2.3	MIMO Correlation Matrices using cross polarized antennas	232

Annex H (informative): **Change history**233
History242

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Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

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1 Scope

The present document establishes the minimum RF characteristics and minimum performance requirements of NR Base Station (BS).

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

- [1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".
- [2] ITU-R Recommendation SM.329: "Unwanted emissions in the spurious domain".
- [3] Recommendation ITU-R SM.328: "Spectra and bandwidth of emissions".
- [4] 3GPP TR 25.942: "RF system scenarios".
- [5] 3GPP TS 38.141-1: "NR; Base Station (BS) conformance testing; Part 1: Conducted conformance testing".
- [6] 3GPP TS 38.141-2: "NR; Base Station (BS) conformance testing; Part 2: Radiated conformance testing".
- [7] Recommendation ITU-R M.1545: "Measurement uncertainty as it applies to test limits for the terrestrial component of International Mobile Telecommunications-2000".
- [8] "Title 47 of the Code of Federal Regulations (CFR)", Federal Communications Commission.
- [9] 3GPP TS 38.211: "NR; Physical channels and modulation".
- [10] 3GPP TS 38.213: "NR; Physical layer procedures for control".
- [11] 3GPP TS 38.331: "NR; Radio Resource Control (RRC); Protocol specification".
- [12] ECC/DEC/(17)06: "The harmonised use of the frequency bands 1427-1452 MHz and 1492-1518 MHz for Mobile/Fixed Communications Networks Supplemental Downlink (MFCN SDL)".
- [13] 3GPP TS 36.104: "Evolved Universal Terrestrial Radio Access (E-UTRA); Base Station (BS) radio transmission and reception".
- [14] 3GPP TS 37.105: "Active Antenna System (AAS) Base Station (BS) transmission and reception".
- [15] 3GPP TS 38.212: "NR; Multiplexing and channel coding".
- [16] 3GPP TR 38.901: "Study on channel model for frequencies from 0.5 to 100 GHz".
- [17] 3GPP TS 38.101-1: "NR; User Equipment (UE) radio transmission and reception; Part 1: Range 1 Standalone".
- [18] 3GPP TS 38.101-2: "NR; User Equipment (UE) radio transmission and reception; Part 2: Range 2 Standalone".
- [19] ERC Recommendation 74-01, "Unwanted emissions in the spurious domain".

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in 3GPP TR 21.905 [1] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in 3GPP TR 21.905 [1].

Aggregated BS Channel Bandwidth: The RF bandwidth in which a Base Station transmits and receives multiple contiguously aggregated carriers. The *aggregated BS channel bandwidth* is measured in MHz.

antenna connector: connector at the conducted interface of the *BS type 1-C*

active transmitter unit: transmitter unit which is ON, and has the ability to send modulated data streams that are parallel and distinct to those sent from other transmitter units to a *BS type 1-C antenna connector*, or to one or more *BS type 1-H TAB connectors* at the *transceiver array boundary*

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 *BS channel bandwidth*.

Base Station RF Bandwidth edge: frequency of one of the edges of the *Base Station RF Bandwidth*.

basic limit: emissions limit relating to the power supplied by a single transmitter to a single antenna transmission line in ITU-R SM.329 [2] used for the formulation of unwanted emission requirements for FR1

beam: beam (of the antenna) is the main lobe of the radiation pattern of an *antenna array*

NOTE: For certain *BS antenna array*, there may be more than one *beam*.

beam centre direction: direction equal to the geometric centre of the half-power contour of the *beam*

beam direction pair: data set consisting of the *beam centre direction* and the related *beam peak direction*

beam peak direction: direction where the maximum EIRP is found

beamwidth: *beam* which has a half-power contour that is essentially elliptical, the half-power *beamwidths* in the two pattern cuts that respectively contain the major and minor axis of the ellipse

BS channel bandwidth: RF bandwidth supporting a single NR RF carrier with the transmission bandwidth configured in the uplink or downlink

NOTE 1: The *BS channel bandwidth* is measured in MHz and is used as a reference for transmitter and receiver RF requirements.

NOTE 2: It is possible for the BS to transmit to and/or receive from one or more UE bandwidth parts that are smaller than or equal to the *BS transmission bandwidth configuration*, in any part of the *BS transmission bandwidth configuration*.

BS transmission bandwidth configuration: set of resource blocks located within the *BS channel bandwidth* which may be used for transmitting or receiving by the BS

BS type 1-C: NR base station operating at FR1 with requirements set consisting only of conducted requirements defined at individual *antenna connectors*

BS type 1-H: NR base station operating at FR1 with a *requirement set* consisting of conducted requirements defined at individual *TAB connectors* and OTA requirements defined at RIB

BS type 1-O: NR base station operating at FR1 with a *requirement set* consisting only of OTA requirements defined at the RIB

BS type 2-O: NR base station operating at FR2 with a *requirement set* consisting only of OTA requirements defined at the RIB