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Part 1: Range 1 Standalone
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ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - APE 7112B
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Contents

Intellectual Property Rights	2
Legal Notice	2
Modal verbs terminology.....	2
Foreword.....	11
1 Scope	12
2 References	12
3 Definitions, symbols and abbreviations	12
3.1 Definitions	12
3.2 Symbols.....	13
3.3 Abbreviations	15
4 General	16
4.1 Relationship between minimum requirements and test requirements	16
4.2 Applicability of minimum requirements	16
4.3 Specification suffix information.....	16
5 Operating bands and channel arrangement.....	17
5.1 General	17
5.2 Operating bands.....	17
5.2A Operating bands for CA	18
5.2A.1 Intra-band CA	18
5.2A.2 Inter-band CA	18
5.2A.2.1 Inter-band CA (two bands).....	19
5.2B Void.....	19
5.2C Operating band combination for SUL	19
5.3 UE channel bandwidth	20
5.3.1 General.....	20
5.3.2 Maximum transmission bandwidth configuration	20
5.3.3 Minimum guardband and transmission bandwidth configuration.....	21
5.3.4 RB alignment	22
5.3.5 UE channel bandwidth per operating band	22
5.3.6 Asymmetric channel bandwidths	24
5.3A UE channel bandwidth for CA	25
5.3A.1 General.....	25
5.3A.2 Maximum transmission bandwidth configuration for CA	25
5.3A.3 Minimum guardband and transmission bandwidth configuration for CA	25
5.3A.4 Void	27
5.3A.5 UE channel bandwidth per operating band for CA	27
5.4 Channel arrangement.....	27
5.4.1 Channel spacing.....	27
5.4.1.1 Channel spacing for adjacent NR carriers	27
5.4.2 Channel raster	28
5.4.2.1 NR-ARFCN and channel raster.....	28
5.4.2.2 Channel raster to resource element mapping.....	28
5.4.2.3 Channel raster entries for each operating band	29
5.4.3 Synchronization raster	30
5.4.3.1 Synchronization raster and numbering.....	30
5.4.3.2 Synchronization raster to synchronization block resource element mapping.....	30
5.4.3.3 Synchronization raster entries for each operating band.....	30
5.4.4 TX–RX frequency separation	31
5.4A Channel arrangement for CA.....	31
5.4A.1 Channel spacing for CA.....	31
5.4A.2 Channel raster for CA	32
5.4A.3 Synchronization raster for CA	32
5.4A.4 Tx-Rx frequency separation for CA.....	32

5.5	Void.....	32
5.5A	Configurations for CA.....	32
5.5A.1	Configurations for intra-band contiguous CA.....	32
5.5A.2	Void.....	34
5.5A.3	Configurations for inter-band CA.....	34
5.5A.3.1	Configurations for inter-band CA (two bands)	34
5.5B	Void.....	36
5.5C	Configurations for SUL.....	36
6	Transmitter characteristics	39
6.1	General	39
6.2	Transmitter power	39
6.2.1	UE maximum output power.....	39
6.2.2	UE maximum output power reduction.....	40
6.2.3	UE additional maximum output power reduction.....	41
6.2.3.1	General.....	41
6.2.3.2	A-MPR for NS_04.....	44
6.2.3.3	A-MPR for NS_10.....	45
6.2.3.4	A-MPR for NS_05 and NS_05U.....	46
6.2.3.5	A-MPR for NS_40.....	48
6.2.3.6	A-MPR for NS_43 and NS_43U.....	48
6.2.3.7	A-MPR for NS_03 and NS_03U.....	49
6.2.3.8	A-MPR for NS_37.....	49
6.2.3.9	A-MPR for NS_38.....	50
6.2.3.10	A-MPR for NS_39.....	50
6.2.3.11	A-MPR for NS_41.....	50
6.2.3.12	A-MPR for NS_42.....	51
6.2.3.13	A-MPR for NS_18.....	51
6.2.4	Configured transmitted power	52
6.2A	Transmitter power for CA	54
6.2A.1	UE maximum output power for CA.....	54
6.2A.1.1	Void.....	54
6.2A.1.2	Void.....	54
6.2A.1.3	UE maximum output power for Inter-band CA	54
6.2A.2	UE maximum output power reduction for CA.....	55
6.2A.2.1	Void.....	55
6.2A.2.2	Void.....	55
6.2A.2.3	UE maximum output power reduction for Inter-band CA	55
6.2A.3	UE additional maximum output power reduction for CA.....	55
6.2A.3.1.1	Void.....	55
6.2A.3.1.2	Void.....	55
6.2A.3.1.3	UE additional maximum output power reduction for Inter-band CA	55
6.2A.4	Configured output power for CA.....	56
6.2A.4.1	Configured transmitted power level.....	56
6.2A.4.1.1	Void.....	56
6.2A.4.1.2	Void.....	56
6.2A.4.1.3	Configured transmitted power for Inter-band CA	56
6.2A.4.2	$\Delta T_{IB,c}$ for CA	58
6.2A.4.2.1	Void.....	58
6.2A.4.2.2	Void.....	58
6.2A.4.2.3	$\Delta T_{IB,c}$ for Inter-band CA (two bands).....	58
6.2B	Void.....	59
6.2C	Transmitter power for SUL	59
6.2C.1	Configured transmitted power for SUL	59
6.2C.2	$\Delta T_{IB,c}$	59
6.2D	Transmitter power for UL MIMO	59
6.2D.1	UE maximum output power for UL MIMO.....	59
6.2D.2	UE maximum output power reduction for UL MIMO.....	60
6.2D.3	UE additional maximum output power reduction for UL MIMO.....	60
6.2D.4	Configured transmitted power for UL MIMO	60
6.3	Output power dynamics.....	61
6.3.1	Minimum output power	61

6.3.2	Transmit OFF power.....	62
6.3.3	Transmit ON/OFF time mask	62
6.3.3.1	General	62
6.3.3.2	General ON/OFF time mask	62
6.3.3.3	Transmit power time mask for slot and short or long subslot boundaries.....	63
6.3.3.4	PRACH time mask.....	63
6.3.3.5	Void.....	64
6.3.3.6	SRS time mask	64
6.3.3.7	PUSCH-PUCCH and PUSCH-SRS time masks	65
6.3.3.8	Transmit power time mask for consecutive slot or long subslot transmission and short subslot transmission boundaries	66
6.3.3.9	Transmit power time mask for consecutive short subslot transmissions boundaries	67
6.3.4	Power control.....	67
6.3.4.1	General	67
6.3.4.2	Absolute power tolerance.....	67
6.3.4.3	Relative power tolerance.....	68
6.3.4.4	Aggregate power tolerance.....	68
6.3A	Output power dynamics for CA	68
6.3A.1	Minimum output power for CA	68
6.3A.1.1	Void.....	68
6.3A.1.2	Void.....	68
6.3A.1.3	Minimum output power for inter-band CA	68
6.3A.2	Transmit OFF power for CA.....	69
6.3A.2.1	Void.....	69
6.3A.2.2	Void.....	69
6.3A.2.3	Transmit OFF power for inter-band CA.....	69
6.3A.3	Transmit ON/OFF time mask for CA	69
6.3A.3.1	Void.....	69
6.3A.3.2	Void.....	69
6.3A.3.3	Transmit ON/OFF time mask for inter-band CA	69
6.3A.4	Power control for CA.....	69
6.3A.4.1	Void.....	69
6.3A.4.2	Void.....	69
6.3A.4.3	Power control for inter-band CA.....	69
6.3D	Output power dynamics for UL MIMO	69
6.3D.1	Minimum output power for UL MIMO	69
6.3D.2	Transmit OFF power for UL MIMO.....	69
6.3D.3	Transmit ON/OFF time mask for UL MIMO	70
6.3D.4	Power control for UL MIMO.....	70
6.4	Transmit signal quality	70
6.4.1	Frequency error.....	70
6.4.2	Transmit modulation quality.....	70
6.4.2.0	General	70
6.4.2.1	Error Vector Magnitude	70
6.4.2.2	Carrier leakage	71
6.4.2.3	In-band emissions	71
6.4.2.4	EVM equalizer spectrum flatness	72
6.4.2.4.1	Requirements for Pi/2 BPSK modulation.....	73
6.4A	Transmit signal quality for CA.....	74
6.4A.1	Frequency error for CA.....	74
6.4A.1.1	Void.....	74
6.4A.1.2	Void.....	74
6.4A.1.3	Frequency error for inter-band CA.....	74
6.4A.2	Transmit modulation quality for CA.....	74
6.4A.2.1	Void.....	74
6.4A.2.2	Void.....	74
6.4A.2.3	Transmit modulation quality for inter-band CA.....	74
6.4D	Transmit signal quality for UL MIMO.....	75
6.4D.0	General.....	75
6.4D.1	Frequency error for UL MIMO.....	75
6.4D.2	Transmit modulation quality for UL MIMO.....	75
6.4D.2.0	General	75

6.4D.2.1	Error Vector Magnitude	75
6.4D.2.2	Carrier leakage	75
6.4D.2.3	In-band emissions	76
6.4D.2.4	EVM equalizer spectrum flatness for UL MIMO	76
6.4D.3	Time alignment error for UL MIMO	76
6.4D.4	Requirements for coherent UL MIMO	76
6.5	Output RF spectrum emissions.....	76
6.5.1	Occupied bandwidth	76
6.5.2	Out of band emission.....	77
6.5.2.1	General	77
6.5.2.2	Spectrum emission mask.....	77
6.5.2.3	Additional spectrum emission mask	78
6.5.2.3.1	Requirements for network signalling value "NS_35"	78
6.5.2.3.2	Requirements for network signalling value "NS_04"	78
6.5.2.3.3	Requirements for network signalling values "NS_03" and "NS_03U"	79
6.5.2.3.4	Requirements for network signalling value "NS_06"	79
6.5.2.3.5	Void.....	80
6.5.2.3.6	Void.....	80
6.5.2.3.7	Void.....	80
6.5.2.4	Adjacent channel leakage ratio	80
6.5.2.4.1	NR ACLR.....	80
6.5.2.4.2	UTRA ACLR	81
6.5.3	Spurious emissions	81
6.5.3.0	General	81
6.5.3.1	General spurious emissions	81
6.5.3.2	Spurious emissions for UE co-existence	82
6.5.3.3	Additional spurious emissions	87
6.5.3.3.1	Requirement for network signalling value "NS_04"	87
6.5.3.3.2	Requirement for network signalling value "NS_17"	87
6.5.3.3.3	Requirement for network signalling value "NS_18"	87
6.5.3.3.4	Requirement for network signalling values "NS_05" and "NS_05U"	87
6.5.3.3.5	Requirement for network signalling values "NS_43" and "NS_43U"	88
6.5.3.3.6	Requirement for network signalling value "NS_37"	88
6.5.3.3.7	Requirement for network signalling value "NS_38"	88
6.5.3.3.8	Requirement for network signalling value "NS_39"	88
6.5.3.3.9	Requirement for network signalling value "NS_40"	89
6.5.3.3.10	Requirement for network signalling value "NS_41"	89
6.5.3.3.11	Requirement for network signalling value "NS_42"	89
6.5.3.3.12	Void.....	90
6.5.3.3.13	Void.....	90
6.5.3.3.14	Void.....	90
6.5.3.3.15	Void.....	90
6.5.3.3.16	Requirement for network signalling value "NS_50"	90
6.5.4	Transmit intermodulation	90
6.5A	Output RF spectrum emissions for CA.....	90
6.5A.0	General.....	90
6.5A.1	Occupied bandwidth for CA	91
6.5A.1.1	Void.....	91
6.5A.1.2	Void.....	91
6.5A.1.3	Occupied bandwidth for Inter-band CA.....	91
6.5A.2	Out of band emission for CA.....	91
6.5A.2.1	General	91
6.5A.2.2	Spectrum emission mask.....	91
6.5A.2.2.1	Void.....	91
6.5A.2.2.2	Void.....	91
6.5A.2.2.3	Spectrum emission mask for Inter-band CA.....	91
6.5A.2.3	Additional spectrum emission mask	91
6.5A.2.3.1	Void.....	91
6.5A.2.3.2	Void.....	91
6.5A.2.3.3	Additional spectrum emission mask for Inter-band CA	91
6.5A.2.4	Adjacent channel leakage ratio	91
6.5A.2.4.1	NR ACLR.....	91

6.5A.2.4.1.1	Void	91
6.5A.2.4.1.2	Void	91
6.5A.2.4.1.3	NR ACLR for Inter-band CA	91
6.5A.2.4.2	UTRA ACLR	92
6.5A.2.4.2.1	Void	92
6.5A.2.4.2.2	Void	92
6.5A.2.4.2.3	UTRA ACLR for Inter-band CA	92
6.5A.3	Spurious emission for CA	92
6.5A.3.1	General spurious emissions	92
6.5A.3.2	Spurious emissions for UE co-existence	92
6.5A.3.2.1	Void	92
6.5A.3.2.2	Void	92
6.5A.3.2.3	Spurious emissions for UE co-existence for Inter-band CA	92
6.5A.4	Transmit intermodulation for CA	93
6.5A.4.1	Void	93
6.5A.4.2	Void	93
6.5A.4.3	Transmit intermodulation for Inter-band CA	93
6.5D	Output RF spectrum emissions for UL MIMO	93
6.5D.1	Occupied bandwidth for UL MIMO	93
6.5D.2	Out of band emission for UL MIMO	93
6.5D.3	Spurious emission for UL MIMO	93
6.5D.4	Transmit intermodulation for UL MIMO	94
7	Receiver characteristics	95
7.1	General	95
7.2	Diversity characteristics	95
7.3	Reference sensitivity	95
7.3.1	General	95
7.3.2	Reference sensitivity power level	95
7.3.3	$\Delta R_{IB,c}$	101
7.3A	Reference sensitivity for CA	101
7.3A.1	General	101
7.3A.2	Reference sensitivity power level for CA	101
7.3A.2.1	Reference sensitivity power level for Intra-band contiguous CA	101
7.3A.2.2	Void	101
7.3A.2.3	Reference sensitivity power level for Inter-band CA	101
7.3A.2.4	Void	102
7.3A.3	$\Delta R_{IB,c}$ for CA	103
7.3A.3.1	General	103
7.3A.3.2	$\Delta R_{IB,c}$ for Inter-band CA	103
7.3A.3.2.1	$\Delta R_{IB,c}$ for two bands	103
7.3A.3.2.2	Void	103
7.3A.4	Reference sensitivity exceptions due to UL harmonic interference for CA	103
7.3A.5	Reference sensitivity exceptions due to intermodulation interference due to 2UL CA	105
7.3A.6	Reference sensitivity exceptions due to cross band isolation for CA	106
7.3B	Void	107
7.3C	Reference sensitivity for SUL	107
7.3C.1	General	107
7.3C.2	Reference sensitivity power level for SUL	107
7.3C.3	$\Delta R_{IB,c}$ for SUL	108
7.3C.3.1	General	108
7.3C.3.2	SUL band combination	108
7.3C.3.2.1	$\Delta R_{IB,c}$ for two bands	109
7.3D	Reference sensitivity for UL MIMO	109
7.4	Maximum input level	109
7.4A	Maximum input level for CA	109
7.4A.1	Maximum input level for Intra-band contiguous CA	109
7.4A.2	Void	110
7.4A.3	Maximum input level for Inter-band CA	110
7.4D	Maximum input level for UL MIMO	110
7.5	Adjacent channel selectivity	110
7.5A	Adjacent channel selectivity for CA	113

7.5A.1	Adjacent channel selectivity for Intra-band contiguous CA	113
7.5A.2	Void	115
7.5A.3	Adjacent channel selectivity Inter-band CA	115
7.5D	Adjacent channel selectivity for UL MIMO.....	115
7.6	Blocking characteristics	115
7.6.1	General.....	115
7.6.2	In-band blocking.....	116
7.6.3	Out-of-band blocking.....	118
7.6.4	Narrow band blocking	121
7.6A	Blocking characteristics for CA	122
7.6A.1	General.....	122
7.6A.2	In-band blocking for CA.....	122
7.6A.2.1	In-band blocking for Intra-band contiguous CA.....	122
7.6A.2.2	Void.....	123
7.6A.2.3	In-band blocking for Inter-band CA.....	123
7.6A.3	Out-of-band blocking for CA.....	123
7.6A.3.1	Out-of-band blocking for Intra-band contiguous CA.....	123
7.6A.3.2	Void.....	124
7.6A.3.3	Out-of-band blocking for Inter-band CA	124
7.6A.4	Narrow band blocking for CA	125
7.6A.4.1	Narrow band blocking for Intra-band contiguous CA.....	125
7.6A.4.2	Void	126
7.6A.4.3	Narrow band blocking for Inter-band CA.....	126
7.6C	Blocking characteristics for SUL	126
7.6C.1	General.....	126
7.6C.2	In-band blocking for SUL.....	126
7.6C.3	Out-of-band blocking for SUL.....	126
7.6C.4	Narrow band blocking for SUL	127
7.6D	Blocking characteristics for UL MIMO	127
7.7	Spurious response.....	127
7.7A	Spurious response for CA.....	128
7.7A.1	Spurious response for Intra-band contiguous CA	128
7.7A.2	Void	128
7.7A.3	Spurious response for Inter-band CA.....	128
7.7D	Spurious response for UL MIMO.....	129
7.8	Intermodulation characteristics	129
7.8.1	General.....	129
7.8.2	Wide band Intermodulation	129
7.8A	Intermodulation characteristics for CA	130
7.8A.1	General.....	130
7.8A.2	Wide band intermodulation for CA	130
7.8A.2.1	Wide band intermodulation for Intra-band contiguous CA.....	130
7.8A.2.2	Void.....	131
7.8A.2.3	Wide band intermodulation for Inter-band CA	131
7.8D	Intermodulation characteristics for UL MIMO	131
7.9	Spurious emissions	132
7.9A	Spurious emissions for CA.....	132
7.9A.1	Void	132
7.9A.2	Void	132
7.9A.3	Spurious emissions for Inter-band CA.....	132

Annex A (normative): Measurement channels.....133

A.1	General	133
A.2	UL reference measurement channels	133
A.2.1	General	133
A.2.2	Reference measurement channels.....	134
A.2.2.1	DFT-s-OFDM Pi/2-BPSK	134
A.2.2.2	DFT-s-OFDM QPSK.....	135
A.2.2.3	DFT-s-OFDM 16QAM.....	136
A.2.2.4	DFT-s-OFDM 64QAM.....	137
A.2.2.5	DFT-s-OFDM 256QAM.....	138

A.2.2.6	CP-OFDM QPSK	139
A.2.2.7	CP-OFDM 16QAM	141
A.2.2.8	CP-OFDM 64QAM	144
A.2.2.9	CP-OFDM 256QAM	146
A.2.3	Reference measurement channels for TDD.....	148
A.2.3.1	DFT-s-OFDM Pi/2-BPSK	148
A.2.3.2	DFT-s-OFDM QPSK.....	148
A.2.3.3	DFT-s-OFDM 16QAM.....	148
A.2.3.4	DFT-s-OFDM 64QAM.....	148
A.2.3.5	DFT-s-OFDM 256QAM.....	148
A.2.3.6	CP-OFDM QPSK	149
A.2.3.7	CP-OFDM 16QAM	149
A.2.3.8	CP-OFDM 64QAM	149
A.2.3.9	CP-OFDM 256QAM	149
A.3	DL reference measurement channels	150
A.3.1	General	150
A.3.2	DL reference measurement channels for FDD	152
A.3.2.1	General.....	152
A.3.2.2	FRC for receiver requirements for QPSK.....	152
A.3.2.3	FRC for maximum input level for 64QAM	155
A.3.2.4	FRC for maximum input level for 256 QAM	158
A.3.3	DL reference measurement channels for TDD.....	161
A.3.3.1	General.....	161
A.3.3.2	FRC for receiver requirements for QPSK.....	161
A.3.3.3	FRC for maximum input level for 64QAM	165
A.3.3.4	FRC for maximum input level for 256 QAM	168
A.4	CSI reference measurement channels.....	171
A.5	OFDMA Channel Noise Generator (OCNG)	171
A.5.1	OCNG Patterns for FDD	171
A.5.1.1	OCNG FDD pattern 1: Generic OCNG FDD Pattern for all unused REs.....	171
A.5.2	OCNG Patterns for TDD.....	171
A.5.2.1	OCNG TDD pattern 1: Generic OCNG TDD Pattern for all unused REs	171
A.6	Void.....	171
Annex B (informative):	Void	172
Annex C (informative):	Downlink physical channels.....	173
C.1	General	173
C.2	Setup.....	173
C.3	Connection	173
C.3.1	Measurement of Receiver Characteristics	173
Annex D (normative):	Characteristics of the interfering signal	174
D.1	General	174
D.2	Interference signals.....	174
Annex E (normative):	Environmental conditions	176
E.1	General	176
E.2	Environmental	176
E.2.1	Temperature	176
E.2.2	Voltage	176
E.2.3	Vibration.....	176
Annex F (normative):	Transmit modulation.....	178
F.0	General	178

F.1	Measurement Point	178
F.2	Basic Error Vector Magnitude measurement	178
F.3	Basic in-band emissions measurement	179
F.4	Modified signal under test	179
F.5	Window length	181
F.5.1	Timing offset	181
F.5.2	Window length	181
F.5.3	Window length for normal CP	181
F.5.4	Window length for Extended CP	183
F.5.5	Window length for PRACH	183
F.6	Averaged EVM	184
F.7	Spectrum Flatness	185
F.8	185	
F.9	185	
F.10	EVM for UL MIMO	185
F10.1	General	185
F10.2	MIMO Equalization	187
F10.3	Layer processing	187
Annex G (normative):		189
G.0	General	189
G.1	Measurement Point	189
G.2	Relative Phase Error Measurement	190
G.2.1	Symbols and subcarriers used	190
G.2.2	CFO (carrier frequency offset) correction	190
G.2.3	Steps of the measurement method	190
Annex H (normative):		Modified MPR-Behavior
Annex H (normative):		192
H.1	Indication of modified MPR behavior	192
Annex I (informative):		Void
Annex I (informative):		193
Annex J (informative):		Void
Annex J (informative):		194
Annex K (informative):		Void
Annex K (informative):		195
Annex L (informative):		Change history
Annex L (informative):		196
History		209

Foreword

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

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1 Scope

The present document establishes the minimum RF requirements for NR User Equipment (UE) operating on frequency Range 1.

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] 3GPP TS 38.101-2: "NR; User Equipment (UE) radio transmission and reception; Part 2: Range 2 Standalone".
- [3] 3GPP TS 38.101-3: "NR; User Equipment (UE) radio transmission and reception; Part 3: Range 1 and Range 2 Interworking operation with other radios".
- [4] 3GPP TS 38.521-1: "NR; User Equipment (UE) conformance specification; Radio transmission and reception; Part 1: Range 1 Standalone".
- [5] Recommendation ITU-R M.1545: "Measurement uncertainty as it applies to test limits for the terrestrial component of International Mobile Telecommunications-2000".
- [6] 3GPP TS 38.211: "NR; Physical channels and modulation".
- [7] 3GPP TS 38.331: "Radio Resource Control (RRC) protocol specification".
- [8] 3GPP TS 38.213: "NR; Physical layer procedures for control".
- [9] ITU-R Recommendation SM.329-10, "Unwanted emissions in the spurious domain".
- [10] 3GPP TS 38.214: "NR; Physical layer procedures for data".

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 Channel Bandwidth: The RF bandwidth in which a UE transmits and receives multiple contiguously aggregated carriers.

Carrier aggregation: Aggregation of two or more component carriers in order to support wider transmission bandwidths.

Carrier aggregation band: A set of one or more operating bands across which multiple carriers are aggregated with a specific set of technical requirements.

Carrier aggregation bandwidth class: A class defined by the aggregated transmission bandwidth configuration and maximum number of component carriers supported by a UE.

Carrier aggregation configuration: A combination of CA operating band(s) and CA bandwidth class(es) supported by a UE.

Contiguous carriers: A set of 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 resource allocation: A resource allocation of consecutive resource blocks within one carrier or across contiguously aggregated carriers. The gap between contiguously aggregated carriers due to the nominal channel spacing is allowed.

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

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.

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.

Sub-block: This is one contiguous allocated block of spectrum for transmission and reception by the same UE. There may be multiple instances of sub-blocks within an RF bandwidth.

Sub-block bandwidth: The bandwidth of one sub-block.

Sub-block gap: A frequency gap between two consecutive sub-blocks within an RF bandwidth, where the RF requirements in the gap are based on co-existence for un-coordinated operation.

UE transmission bandwidth configuration: Set of resource blocks located within the UE channel bandwidth which may be used for transmitting or receiving by the UE.

Vehicular UE: A UE embedded in a vehicle, permanently connected to an embedded antenna system that radiates externally for NR operating bands.

NOTE: Vehicular UE does not refer to other UE form factors placed inside the vehicle.

3.2 Symbols

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

ΔF_{Global}	Granularity of the global frequency raster
ΔF_{Raster}	Band dependent channel raster granularity
Δf_{OOB}	Δ Frequency of Out Of Band emission
$\Delta F_{\text{TX-RX}}$	Δ Frequency of default TX-RX separation of the FDD <i>operating band</i>
$\Delta P_{\text{PowerClass}}$	Adjustment to maximum output power for a given power class
ΔR_{B}	The starting frequency offset between the allocated RB and the measured non-allocated RB
$\Delta R_{\text{IB},c}$	Allowed reference sensitivity relaxation due to support for inter-band CA operation, for serving cell c
$\Delta R_{\text{IB},4R}$	Reference sensitivity adjustment due to support for 4 antenna ports
Δ_{Shift}	Channel raster offset
ΔT_{C}	Allowed operating band edge transmission power relaxation
$\Delta T_{\text{C},c}$	Allowed operating band edge transmission power relaxation for serving cell c
$\Delta T_{\text{IB},c}$	Allowed maximum configured output power relaxation due to support for inter-band CA operation and due to support for SUL operations, for serving cell c
BW_{Channel}	Channel bandwidth
$BW_{\text{Channel,block}}$	Sub-block bandwidth, expressed in MHz. $BW_{\text{Channel,block}} = F_{\text{edge,block,high}} - F_{\text{edge,block,low}}$
$BW_{\text{Channel_CA}}$	Aggregated channel bandwidth, expressed in MHz
$BW_{\text{Channel,max}}$	Maximum channel bandwidth supported among all bands in a release
BW_{GB}	$\max(BW_{\text{GB,Channel}(k)})$
$BW_{\text{GB,Channel}(k)}$	Minimum guard band defined in clause 5.3A.1 of carrier k
BW_{DL}	Channel bandwidth for DL