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supporting a release-independent frequency band
(3GPP TS 36.307 version 14.6.0 Release 14)

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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 - NAF 742 C
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1 Scope

The present document specifies requirements for Rel-14 UEs supporting release independent features like:

- additional E-UTRA operating frequency bands on top of Rel-14 of TS 36.101 [2] and TS 36.133 [3];
- additional E-UTRA CA configurations (intra-band/inter-band) on top of Rel-14 of TS 36.101 [2] and TS 36.133 [3];
- additional operating bands and/or CA configurations for specific features (like UE category 0, M1, NB1);
- other release independent features (like 4Rx antenna port, high speed scenario, 8Rx antenna port).

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.
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[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 36.101: "Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) Radio Transmission and Reception".

NOTE: The considered release is given in the text of the present document that uses [2].

[3] 3GPP TS 36.133: "Evolved Universal Terrestrial Radio Access (E-UTRA); Requirements for Support of Radio Resource Management".

[4] 3GPP TS 36.306: "Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) radio access capabilities".

NOTE: The considered release is given in the text of the present document that uses [4].

[5] Void

3 Definitions 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].

release independent: applicable to some frozen releases, starting from a certain release Rel-M

NOTE 1: Normally, a feature is introduced only in the latest open release Rel-N and future releases are based on the previous one so that future releases inherit the requirements of this feature. Introducing a feature "in a release independent way from Rel-M onwards" (M<N) means it was decided by TSG RAN that this feature would be also beneficial in previous, already frozen releases starting with Rel-M until Rel-(N-1). In order to avoid touching TS 36.101 [2] or TS 36.133 [3] of these frozen releases, the corresponding requirements are captured in TS 36.307 via pointers to [2] or [3] of the release in which the feature was introduced.

NOTE 2: Release independent does not mean applicable to all releases.

3.2 Abbreviations

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

4Rx	4 UE receiver antenna ports
CA	Carrier Aggregation
CRS	Cell-specific Reference Signal
CSI	Channel State Indicator
FDD	Frequency Division Duplex
LAA	License-Assisted Access
RRC	Radio Resource Control
RRM	Radio Resource Management
SDR	Sustained Data Rate
TDD	Time Division Duplex
UE	User Equipment

3.3 Symbols

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

N	Release in which a feature is introduced into TS 36.101 [2] or TS 36.133 [3]
M	Release from which onwards (including release M) a feature is release independent

3A Release independent features

3A.0 General

TSG-RAN has agreed for certain features (see the following clauses) to introduce them in a "release independent way".

This means for each feature:

- it is "introduced" in a release N, i.e. TS 36.101 [2] and TS 36.133 [3] of release N define certain UE requirements for this feature; the feature is indicated in the tables of the following clauses;
- it is "release independent" starting from a release M (M<N); M for the given feature is provided in the tables of the following clauses;
- UEs supporting this feature have to fulfill additional requirements in release M or higher which are specified in one or more Annexes of TS 36.307 of release N; the applicable Annexes for a given feature are provided in the tables of the following clauses.

The applicable UE Categories are specified in TS 36.306 [4] according to the release to which the UE conforms.

3A.1 Additional E-UTRA operating bands

Requirements for a Rel-14 UE for additional E-UTRA operating bands compared to TS 36.101 Rel-14 [2] are introduced via this clause.

Table 3A.1-1: E-UTRA operating bands and UE power class

Feature	Duplex-mode	Release independent from	Requirements to be fulfilled (see TS 36.307 of the release in which the band was introduced)
Operating bands, band number <= 64, Power Class 3	FDD, TDD	Rel-8	Table B.2.1-1, Table B.4.1-1
Operating bands, band number > 64, Power Class 3	FDD, TDD	Rel-9	Table B.2.1-1, Table B.4.1-1
Operating bands, NS-value > 32	FDD, TDD	Rel-10	Table B.2.1-1, Table B.4.1-1
Asymmetric operating bands, Power Class 3	FDD	Rel-10	Table B.2.1-1, Table B.4.1-1
Operating bands, band number <= 64, Power Class 1	FDD	Rel-10	Table B.2.1-1, Table B.4.1-1
Operating bands, Power Class 2	TDD	Rel-10	Table B.2.1-1, Table B.4.1-1

For example, Band 19 was introduced in the Release 9 specifications. In order to implement a UE conforming to Release 8 but supporting Band 19, it is necessary for the UE to additionally conform to some parts of the Release 9 specifications (see corresponding Annexes of TS 36.307 Rel-9 which will point to the requirements in the Rel-9 of TS 36.101 [2] or TS 36.133 [3] to be fulfilled), such as the radio frequency and radio resource management requirements for the Band 19.

3A.2 Additional E-UTRA CA configurations

Requirements for a Rel-14 UE for additional E-UTRA CA configurations compared to TS 36.101 Rel-14 [2] are introduced via this clause.

Table 3A.2-1: Intra-band contiguous CA configurations and UE CA power class

Feature	DL/UL	CA BW Class	Duplex-mode	Release independent from	requirements to be fulfilled (see 36.307 of the REL in which the CA configuration and the power class were introduced)
Intra-band contiguous CA configurations, power class 3	DL	B	FDD	Rel-10	Table B.2.2-1, Table B.3.2-1, Table B.4.2-1
		C	FDD, TDD	Rel-10	Table B.2.2-1, Table B.3.2-1, Table B.4.2-1
		D	TDD	Rel-10	Table B.2.2-1, Table B.3.2-1, Table B.4.2-1
		E	TDD	Rel-11	Table B.2.2-1, Table B.3.2-1, Table B.4.2-1
		F	TDD	Rel-12	Table B.2.2-1, Table B.3.2-1, Table B.4.2-1
	UL	B	FDD	Rel-10	Table B.2.2-1, Table B.3.2-1, Table B.4.2-1
		C, D	FDD, TDD	Rel-10	Table B.2.2-1, Table B.3.2-1, Table B.4.2-1
Intra-band contiguous CA configurations, power class 2	UL	C	TDD	Rel-10	Table B.2.2-1, Table B.3.2-1, Table B.4.2-1
NOTE1: The duplex mode "FDD, TDD" refers to a CA configuration composed by only FDD bands or only TDD bands, respectively.					

Table 3A.2-2: Inter-band CAconfigurations

Feature	DL/UL	number of bands	number of CCs	CA BW Classes	Duplex-mode	Release independent from	requirements to be fulfilled (see 36.307 of the REL in which the CA configuration was introduced)
Inter-band CA configurations	DL	2	2-4	A, B, C	FDD, TDD	Rel-10	Table B.2.4-1, Table B.3.2-1, Table B.4.3-1 or Table B.4.4-1
			2-5	D, E	FDD, TDD	Rel-11	Table B.2.4-1, Table B.3.2-1, Table B.4.3-1 or Table B.4.4-1
			2-5	A, B, C, D, E	FDD and TDD	Rel-12	Table B.2.4-1, Table B.3.2-1, Table B.4.3-1 or Table B.4.4-1
		3	3	A	FDD, TDD	Rel-10	Table B.2.4-1, Table B.3.2-1, Table B.4.3-1 or Table B.4.4-1
			3-5	B, C, D	FDD, TDD	Rel-11	Table B.2.4-1, Table B.3.2-1, Table B.4.3-1 or Table B.4.4-1
			3	A	FDD and TDD	Rel-12	Table B.2.4-1, Table B.3.2-1, Table B.4.3-1 or Table B.4.4-1
		4	4-5	A, C	FDD, TDD	Rel-11	Table B.2.4-1, Table B.3.2-1, Table B.4.3-1 or Table B.4.4-1
			4-5		FDD and TDD	Rel-12	Table B.2.4-1, Table B.3.2-1, Table B.4.3-1 or Table B.4.4-1
		5	5	A	FDD, TDD	Rel-12	Table B.2.4-1, Table B.3.2-1, Table B.4.3-1 or Table B.4.4-1
			5		FDD and TDD	Rel-12	Table B.2.4-1, Table B.3.2-1, Table B.4.3-1 or Table B.4.4-1
	UL	2	2-4	A, C	FDD, TDD	Rel-11	Table B.2.4-1, Table B.3.2-1, Table B.4.3-1 or Table B.4.4-1
			2-3	A, C	FDD and TDD	Rel-12	Table B.2.4-1, Table B.3.2-1, Table B.4.3-1 or Table B.4.4-1

NOTE 1: The duplex mode "FDD, TDD" refers to a CA configuration composed by only FDD bands or only TDD bands, respectively. The duplex mode "FDD and TDD" refers to a CA configuration including both FDD and TDD bands.

NOTE 2: CA configurations involving downlink only operation in Band 46 are release independent from Rel-13 onwards (LAA was introduced in Rel-13). The 10 MHz channel bandwidth for Band 46 was introduced in TS 36.101 Rel-14 [2] and can be implemented in a release independent way from Rel-13.

For example, CA configuration CA_1A-19A was introduced in the Release 11 specifications. In order to implement a UE conforming to Release 10 but supporting the CA configuration CA_1A-19A, it is necessary for the UE to additionally conform to some parts of the Release 11 specifications (see corresponding Annexes of TS 36.307 Rel-11 which will point to the requirements in the Rel-11 of TS 36.101 [2] or TS 36.133 [3] to be fulfilled), such as the radio frequency and radio resource management requirements for the CA configuration CA_1A-19A.

Table 3A.2-3: Intra-band non-contiguous CA configurations

Feature	DL/UL	number of sub-blocks	number of CCs	CA BW Classes	Duplex-mode	Release independent from	requirements to be fulfilled (see 36.307 of the REL in which the CA configuration was introduced)
Intra-band non-contiguous CA configurations	DL	2	2-5	A, C, D	FDD, TDD	Rel-11	Table B.2.3-1, Table B.3.2-1, Table B.4.5-1
		3	3-5	A, C	FDD, TDD	Rel-11	Table B.2.3-1, Table B.3.2-1, Table B.4.5-1
	UL	2	2	A	FDD	Rel-11	Table B.2.3-1, Table B.3.2-1, Table B.4.5-1
NOTE 1: The duplex mode "FDD, TDD" refers to a CA configuration composed by only FDD bands or only TDD bands, respectively.							

3A.3 Additional operating bands and/or CA configurations for specific features

For a specific feature introduced in an earlier release, it may be decided in a later release to apply this specific feature in a release independent way for additional operating bands and/or CA configurations. For a Rel-14 UE corresponding requirements are then introduced via this clause.

Table 3A.3-1: Operating bands for specific features

Feature	Release independent from	Requirements to be fulfilled (see 36.307 of the REL when the feature was introduced)	Further information
Operating bands for UE category 0	Rel-12	Table B.2.9-1, Table B.3.5-1, Table B.4.10-1	Rel-14 WI LC_MTC_LTE_cat0_B25_B26-Core introduced RF, RRM, demodulation and CSI requirements for bands 25 and 26, see Table B.2.9-1, Table B.3.5-1, Table B.4.10-1
Operating bands for UE category M1	Rel-13	Table B.2.10-1, Table B.3.6-1, Table B.4.11-1	Rel-14 WI LTE_MTCe2_L1_cat1_B25_B40-Core introduced RF, RRM, demodulation and CSI requirements for bands 25 and 40, see Table B.2.10-1, Table B.3.6-1, Table B.4.11-1. Rel-15 WI LTE_bands_R15_M1_NB1-Core introduced RF, RRM, demodulation and CSI requirements for bands 14 and 71, see Table B.2.10-1, Table B.3.6-1, Table B.4.11-1.
Operating bands for UE category M2	Rel-14	Table B.2.11-1, Table B.4.11-1	Rel-15 WI LTE_bands_R15_M2_NB2-Core introduced RF and RRM requirements for bands 14 and 71, see Table B.2.11-1, Table B.4.11-1.
Operating bands for UE category NB1	Rel-13	Table B.2.8-1, Table B.3.7-1, Table B.4.9-1	Rel-14 WI NB_IOT_R14_bands introduced RF, RRM and demodulation requirements for bands 11, 21, 25, 31, 70, see Table B.2.8-1, Table B.3.7-1, Table B.4.9-1. Rel-15 WI LTE_bands_R15_M1_NB1-Core introduced RF and RRM for bands 4, 14 and 71 see Table B.2.8-1, Table B.4.9-1.
Operating bands for UE category NB2	Rel-14	Table B.2.12-1, Table 3.7-1, Table B.4.9-1	Rel-15 WI LTE_bands_R15_M2_NB2-Core introduced RF, RRM and demodulation requirements for bands 4, 14 and 71, see Table B.2.12-1, Table 3.7-1, Table B.4.9-1.

Table 3A.3-2: CA configurations for specific features

Feature	Release independent from	Requirements to be fulfilled (see 36.307 of the REL when the feature was introduced)	Further information
Operating bands for V2X communication with con-current operation	Rel-14	Table B.2.13-1, Table B.4.12-1	Rel-15 WI V2X new band combinations (V2X_5A-47A, V2X_20A-47A, V2X_34A-47A, V2X_28A-47A, V2X_71A-47A) introduced and should be satisfied for the RF and RRM requirements in Table B.2.13-1, Table B.4.12-1
Operating band for V2X communication with multi-carrier at Band 47	Rel-14	Table B.2.13-1, Table B.4.12-1	In Rel-15 WI for eV2X, introduce intra-band multi-carrier V2X_47C and V2X_47C1 and should be satisfied for the RF and RRM requirements in Table B.2.13-1, Table B.4.12-1

3A.4 Other release independent features

This clause covers requirements for a Rel-14 UE coming from all other release independent features that are not covered under clause 3A.1, 3A.2 and 3A.3, e.g. generic baseband requirements or requirements that are not band/CA configuration specific.

Table 3A.4-1: Additional requirements of other release independent features

Feature	Release independent from	Requirements to be fulfilled (see 36.307 of the REL when the feature was introduced)	Further information
RF and performance requirements for 4Rx UEs	Rel-10	Table C.1-1, Table C.2-1 for single carrier and Table C.1-2, Table C.2-2 for CA	REL-13 WI LTE_4Rx_AP_DL introduced: - single carrier RF requirements for bands 1, 2, 3, 7, 20, 39, 41, 42: see Table C.1-1 - CA RF requirements for CA_3A-42A and other 1UL CA configurations (see TS 36.101 REL-13 [2] Table 7.3.1A-0a NOTE 20): see Table C.1-2 - single carrier performance requirements for demodulation and CSI: see Table C.2-1 REL-14 WI LTE_4Rx_AP_DL_bands introduced: - single carrier RF requirements for band 35, 40: see Table C.1-1 - CA RF requirements for some further 1UL CA configurations (see TS 36.101 REL-14 [2]): see Table C.1-2 REL-14 WI LTE_4Rx_AP_DL_CA introduced: - CA RF requirements for some 2DL/2UL CA configurations (see TS 36.101 REL-14 [2]): see Table C.1-2 - CA performance requirements for demodulation/SDR and CSI: see Table C2-2 REL-15 WI LTE_4Rx_AP_DL_bands_R15 introduced: - single carrier RF requirements for band 4, 34, 43, 66: see Table C.1-1 - CA RF requirements for some further 1UL CA configurations (see TS 36.101 REL-15 [2]): see Table C.1-2
RF and performance requirements for 8Rx UEs	Rel-13	Table E.1-1for single carrier and Table E.1-2 for CA	REL-15 WI LTE_8Rx_AP_DL introduced: - single carrier RF requirements for band 41, 42,43: see Table E.1-1 - CA RF requirements for some further 1UL CA configurations (see TS 36.101 REL-15 [2]): see Table E.1-2
RRM and demodulation requirements for high speed scenario	Rel-13 (NOTE 1)	Table D.1-1, Table D.2-1	Rel-14 WI LTE_high_speed introduced band independent RRM and demodulation requirements. see Table D.1-1, Table D.2-1
NOTE 1: Rel-13 UEs supporting the high speed scenario are assumed to read the Rel-14 high speed scenario information, which is broadcast to all UEs.			

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Annex A (informative) : Frequency arrangement for overlapping operating bands

The following information is provided in order to assist a UE derive the DL EARFCN and UL EARFCN in a multi-band environment, in which multiple overlapping operating bands may be indicated in the fields *freqBandIndicator* and *multiBandInfoList* of SIB1.

The overlapping bands, independent of release, which may be indicated in a cell are shown in Table A-1 for applicable E-UTRA bands. The DL EARFCN and UL EARFCN are derived according to TS 36.101 Rel-14 [2].

Table A-1: Overlapping bands (multi-band environments) for each E-UTRA band

E-UTRA Operating Band	Overlapping E-UTRA operating bands	Duplex Mode
2	25	FDD
3	9	FDD
4	10, 66	FDD
5	18, 19, 26	FDD
9	3	FDD
10	4, 66	FDD
12	17	FDD
17	12	FDD
18	5, 26, 27	FDD
19	5, 26	FDD
25	2	FDD
26	5, 18, 19, 27	FDD
27	18, 26	FDD
33	39	TDD
38	41	TDD
39	33	TDD
41	38	TDD
66	4, 10	FDD

Annex B (normative): Common Requirements for bands or CA

B.1 Purpose of annex

The purpose of Annex B is to group the requirements that are common for several bands or CA configurations in this specification and use the common tables as references.

B.2 Common RRM requirements

B.2.1 Common RRM requirements for a release independent band

The requirements and test cases listed in Table B.2.1-1 are specified in TS 36.133 Rel-14 [3].

Table B.2.1-1: Common RRM requirements for a release independent band

Section / Clause	Description
4 Note 1	E-UTRAN RRC_IDLE state mobility
5	E-UTRAN RRC_CONNECTED state mobility
6 Note 2	RRC Connection Mobility Control
7 Note 3	Timing and signalling characteristics
8 Note 4	UE Measurements Procedures in RRC_CONNECTED State
9 Note 5	Measurements performance requirements for UE
A.4 Note 1	E-UTRAN RRC_IDLE state
A.5	E-UTRAN RRC CONNECTED Mode Mobility
A.6 Note 2	RRC Connection Control
A.7 Note 3	Timing and Signalling Characteristics
A.8 Note 4	UE Measurements Procedures
A.9 Note 5	Measurement Performance Requirements

NOTE 1: All requirements and the corresponding test cases shall apply, except:
- for supporting the corresponding band in Rel-9 and below: clause 4.3 (Minimization of Drive Tests).

NOTE 2: All requirements and the corresponding test cases shall apply, except:
- for supporting the corresponding band in Rel-8: clauses 6.3 (RRC Connection Release with Redirection), 6.4 (CSG Proximity Indication for E-UTRAN and UTRAN).

NOTE 3: All requirements and corresponding test cases shall apply, except those defined in sections 7.4 and 7.5.

NOTE 4: All requirements and corresponding test cases shall apply, except:
- for supporting the corresponding band in Rel-8: clauses 8.1.2.5 (E-UTRAN OTDOA Intra-Frequency RSTD Measurements), 8.1.2.6 (E-UTRAN Inter-Frequency OTDOA Measurements), 8.1.2.7 (E-UTRAN E-CID Measurements).

NOTE 5: All requirements and corresponding test cases shall apply, except:
- for supporting the corresponding band in Rel-8: clauses 9.1.9 (UE Rx–Tx time difference), 9.1.10 (Reference Signal Time Difference).
- for supporting the corresponding band in Rel-11 or below: the RSRP absolute accuracy requirement under normal conditions in table 9.1.2.1-1, 9.1.2.3-1, 9.1.2.5-1 and 9.1.3.1-1 when Io≤-70dBm is ±6dB.
- for supporting the corresponding band in Rel-11 or below: the interfrequency RSRP relative accuracy requirement under normal conditions in table 9.1.3.2-1 is ±6dB.

NOTE 6: In addition to the exceptions above, all requirements and test cases in this table shall apply, except those defined for:
- carrier aggregation;
- for supporting the corresponding band in Rel-9 or below: measurements under time-domain measurement resource restriction without CRS assistance information;
- for supporting the corresponding band in Rel-10 or below: measurements under time-domain measurement resource restriction with CRS assistance information;
- for supporting the corresponding band in Rel-11 or below: requirements introduced in Rel-12.

B.2.2 Common RRM requirements for an intra-band contiguous CA configuration

The requirements and test cases listed in Table B.2.2-1 are specified in TS 36.133 Rel-14 [3].

Table B.2.2-1: Common RRM requirements for a release independent single-band CA configuration

Section / Clause	Description
7.1	UE transmit timing
7.7	SCell Activation and Deactivation Delay for E-UTRA Carrier Aggregation
7.8	Interruptions with Carrier Aggregation
8.2	Capabilities for Support of Event Triggering and Reporting Criteria
8.3	Measurements for E-UTRA carrier aggregation
8.4	OTDOA RSTD Measurements for E-UTRAN carrier aggregation
9.1.11 Note 3	Carrier aggregation measurement accuracy
9.1.12	Reference Signal Time Difference (RSTD) Measurement Accuracy Requirements for Carrier Aggregation
A.7	Timing and Signalling Characteristics
A.8	UE Measurements Procedures
A.9 Note 3	Measurement Performance Requirements
NOTE 1: Only requirements and test cases defined for intra-band contiguous carrier aggregation shall apply. NOTE 2: In addition to the exceptions above, all requirements and test cases in this table shall apply, except: - for supporting the corresponding band in Rel-11 or below: requirements introduced in Rel-12. NOTE 3: - For supporting the corresponding band in Rel-11 or below: the RSRP absolute accuracy requirement under normal conditions in table 9.1.2.1-1, 9.1.2.3-1, 9.1.2.5-1 and 9.1.3.1-1 when Io≤-70dBm is ±6dB. - For supporting the corresponding band in Rel-11 or below: the interfrequency RSRP relative accuracy requirement under normal conditions in table 9.1.3.2-1 is ±6dB.	

B.2.3 Common RRM requirements for an intra-band non-contiguous CA with single uplink configuration

The requirements and test cases listed in Table B.2.3-1 are specified in TS 36.133 Rel-14 [3].

Table B.2.3-1: Common RRM requirements for a release independent single-band CA configuration

Section / Clause	Description
7.1	UE transmit timing
7.7	SCell Activation and Deactivation Delay for E-UTRA Carrier Aggregation
7.8	Interruptions with Carrier Aggregation
8.2	Capabilities for Support of Event Triggering and Reporting Criteria
8.3	Measurements for E-UTRA carrier aggregation
8.4	OTDOA RSTD Measurements for E-UTRAN carrier aggregation
9.1.11 Note 3	Carrier aggregation measurement accuracy
9.1.12	Reference Signal Time Difference (RSTD) Measurement Accuracy Requirements for Carrier Aggregation
A.7	Timing and Signalling Characteristics
A.8	UE Measurements Procedures
A.9 Note 3	Measurement Performance Requirements
NOTE 1: Only requirements and test cases defined for intra-band non-contiguous carrier aggregation with single uplink shall apply. NOTE 2: In addition to the exceptions above, all requirements and test cases in this table shall apply, except: - for supporting the corresponding band in Rel-11 or below: requirements introduced in Rel-12. NOTE 3: - For supporting the corresponding band in Rel-11 or below: the RSRP absolute accuracy requirement under normal conditions in table 9.1.2.1-1, 9.1.2.3-1, 9.1.2.5-1 and 9.1.3.1-1 when Io≤-70dBm is ±6dB - for supporting the corresponding band in Rel-11 or below: the interfrequency RSRP relative accuracy requirement under normal conditions in table 9.1.3.2-1 is ±6dB.	

B.2.4 Common RRM requirements for an inter-band CA with single uplink configuration

The requirements and test cases listed in Table B.2.4-1 are specified in TS 36.133 Rel-14 [3].

Table B.2.4-1: Common RRM requirements for a release independent band-combination CA configuration

Section / Clause	Description
7.1	UE transmit timing
7.7	SCell Activation and Deactivation Delay for E-UTRA Carrier Aggregation
7.8	Interruptions with Carrier Aggregation
8.2	Capabilities for Support of Event Triggering and Reporting Criteria
8.3	Measurements for E-UTRA carrier aggregation
8.4	OTDOA RSTD Measurements for E-UTRAN carrier aggregation
9.1.11 Note 3	Carrier aggregation measurement accuracy
9.1.12	Reference Signal Time Difference (RSTD) Measurement Accuracy Requirements for Carrier Aggregation
A.7	Timing and Signalling Characteristics
A.8	UE Measurements Procedures
A.9 Note 3	Measurement Performance Requirements
NOTE 1: Only requirements and test cases defined for inter-band with single uplink carrier aggregation shall apply. NOTE 2: In addition to the exceptions above, all requirements and test cases in this table shall apply, except: - for supporting the corresponding band in Rel-11 or below: requirements introduced in Rel-12. NOTE 3: - For supporting the corresponding band in Rel-11 or below: the RSRP absolute accuracy requirement under normal conditions in table 9.1.2.1-1, 9.1.2.3-1, 9.1.2.5-1 and 9.1.3.1-1 when Io≤-70dBm is ±6dB. - for supporting the corresponding band in Rel-11 or below: the interfrequency RSRP relative accuracy requirement under normal conditions in table 9.1.3.2-1 is ±6dB.	

B.2.5 Common RRM requirements for an inter-band CA with dual uplink configuration

The requirements and test cases listed in Table B.2.5-1 are specified in TS 36.133 Rel-14 [3].

Table B.2.5-1: Common RRM requirements for a release independent band-combination CA configuration with dual uplink

Section / Clause	Description
7.1	UE transmit timing
7.7	SCell Activation and Deactivation Delay for E-UTRA Carrier Aggregation
7.8	Interruptions with Carrier Aggregation
7.17	Maximum Transmission Timing Difference in Dual Connectivity
8.2	Capabilities for Support of Event Triggering and Reporting Criteria
8.3	Measurements for E-UTRA carrier aggregation
8.4	OTDOA RSTD Measurements for E-UTRAN carrier aggregation
9.1.11 Note 3	Carrier aggregation measurement accuracy
9.1.12	Reference Signal Time Difference (RSTD) Measurement Accuracy Requirements for Carrier Aggregation
A.7	Timing and Signalling Characteristics
A.8	UE Measurements Procedures
A.9 Note 3	Measurement Performance Requirements
NOTE 1: Only requirements and test cases defined for inter-band with dual uplink carrier aggregation shall apply. NOTE 2: In addition to the exceptions above, all requirements and test cases in this table shall apply, except: - for supporting the corresponding band in Rel-11 or below: requirements introduced in Rel-12. NOTE 3: - For supporting the corresponding band in Rel-11 or below: the RSRP absolute accuracy requirement under normal conditions in table 9.1.2.1-1, 9.1.2.3-1, 9.1.2.5-1 and 9.1.3.1-1 when Io≤-70dBm is ±6dB. - for supporting the corresponding band in Rel-11 or below: the interfrequency RSRP relative accuracy requirement under normal conditions in table 9.1.3.2-1 is ±6dB.	

B.2.6 Common RRM requirements for an intra-band non-contiguous CA with dual uplink configuration

The requirements and test cases listed in Table B.2.6-1 are specified in TS 36.133 Rel-14 [3].

Table B.2.6-1: Common RRM requirements for a release independent single-band CA configuration with dual uplink

Section / Clause	Description
7.1	UE transmit timing
7.7	SCell Activation and Deactivation Delay for E-UTRA Carrier Aggregation
7.8	Interruptions with Carrier Aggregation
7.17	Maximum Transmission Timing Difference in Dual Connectivity
8.2	Capabilities for Support of Event Triggering and Reporting Criteria
8.3	Measurements for E-UTRA carrier aggregation
8.4	OTDOA RSTD Measurements for E-UTRAN carrier aggregation
9.1.11 Note 3	Carrier aggregation measurement accuracy
9.1.12	Reference Signal Time Difference (RSTD) Measurement Accuracy Requirements for Carrier Aggregation
A.7	Timing and Signalling Characteristics
A.8	UE Measurements Procedures
A.9 Note 3	Measurement Performance Requirements
NOTE 1: Only requirements and test cases defined for intra-band non-contiguous carrier aggregation with dual uplinks shall apply. NOTE 2: In addition to the exceptions above, all requirements and test cases in this table shall apply, except: - for supporting the corresponding band in Rel-11 or below: requirements introduced in Rel-12. NOTE 3: - For supporting the corresponding band in Rel-11 or below: the RSRP absolute accuracy requirement under normal conditions in table 9.1.2.1-1, 9.1.2.3-1, 9.1.2.5-1 and 9.1.3.1-1 when Io≤-70dBm is ±6dB. - for supporting the corresponding band in Rel-11 or below: the interfrequency RSRP relative accuracy requirement under normal conditions in table 9.1.3.2-1 is ±6dB.	

B.2.7 Common RRM requirements for an inter-band CA with three uplink configuration

The requirements and test cases listed in Table B.2.7-1 are specified in TS 36.133 Rel-14 [3].

Table B.2.7-1: Common RRM requirements for a release independent band-combination CA configuration with three uplink

Section / Clause	Description
7.1	UE transmit timing
7.7	SCell Activation and Deactivation Delay for E-UTRA Carrier Aggregation
7.8	Interruptions with Carrier Aggregation
7.17	Maximum Transmission Timing Difference in Dual Connectivity
8.2	Capabilities for Support of Event Triggering and Reporting Criteria
8.3	Measurements for E-UTRA carrier aggregation
8.4	OTDOA RSTD Measurements for E-UTRAN carrier aggregation
9.1.11 Note 3	Carrier aggregation measurement accuracy
9.1.12	Reference Signal Time Difference (RSTD) Measurement Accuracy Requirements for Carrier Aggregation
NOTE 1: Only requirements defined for three uplink carrier aggregation shall apply. There are no test cases defined with a three uplink carrier aggregation configuration. NOTE 2: In addition to the exceptions above, all requirements and test cases in this table shall apply, except: - for supporting the corresponding band in Rel-11 or below: requirements introduced in Rel-12. NOTE 3: - For supporting the corresponding band in Rel-11 or below: the RSRP absolute accuracy requirement under normal conditions in table 9.1.2.1-1, 9.1.2.3-1, 9.1.2.5-1 and 9.1.3.1-1 when Io≤-70dBm is ±6dB. - for supporting the corresponding band in Rel-11 or below: the interfrequency RSRP relative accuracy requirement under normal conditions in table 9.1.3.2-1 is ±6dB.	

B.2.8 Common RRM requirements for operating bands for UE category NB1

The requirements and test cases listed in Table B.2.8-1 are specified in TS 36.133 Rel-14 [3].

Table B.2.8-1: Common RRM requirements for release independent operating bands for UE category NB1

Section / Clause	Description
4.6	Cell Selection and Reselection Requirements for UE category NB1
6.6	Random Access for UE category NB1
7.23	Radio Link Monitoring for category NB1 UE
8.14	Measurements for UE category NB1
9.1.22	Measurement accuracy for UE Category NB1
9.1.23	Power Headroom for UE category NB1
NOTE 1: Only requirements and test cases defined for UE category NB1 shall apply.	

B.2.9 Common RRM requirements for operating bands for UE category 0

The requirements and test cases listed in Table B.2.9-1 are specified in TS 36.133 Rel-14 [3].

Table B.2.9-1: Common RRM requirements for release independent operating bands for a UE category 0

Section / Clause	Description
7.11	Radio Link Monitoring for UE category 0
8.5	Measurements for UE category 0
9.1.13	Measurement accuracy for UE category 0

B.2.10 Common RRM requirements for operating bands for UE category M1

The requirements and test cases listed in Table B.2.10-1 are specified in TS 36.133 Rel-14 [3].

Table B.2.10-1: Common RRM requirements for release independent operating bands for a UE category M1

Section / Clause	Description
4.2.2.11	Measurement and evaluation requirements for UE in enhanced coverage
5.5	E-UTRAN Handover for cat.M1 UEs in CEModeA
5.6	E-UTRAN Handover for cat.M1 UEs in CEModeB
6.2.3	Requirements for cat.M1 UEs
6.7	RRC Re-establishment for cat.M1 UEs
7.19	Radio Link Monitoring for UE Category M1
7.24	UE transmit timing for category M1
8.13	Measurements for UE category M1
9.1.21	Measurement accuracy for UE category M1

B.3 Common UE performance requirements

B.3.1 Void

B.3.2 Common UE performance requirements and tests for different CA configurations and combination sets

The requirements and test cases listed in Table B.3.2-1 are specified in TS 36.101 Rel-14 [2].

Table B.3.2-1: Common UE performance requirements and tests for different CA configurations and combination sets

Section / Clause	Description
8.2.1.1.1	Single-antenna port performance (FDD)
8.2.2.1.1	Single-antenna port performance (TDD)
8.2.3.1.1	Single-antenna port performance (TDD-FDD CA)
8.2.1.3.1	Open-loop spatial multiplexing performance - Minimum Requirement 2 Tx Antenna Port (FDD)
8.2.2.3.1	Open-loop spatial multiplexing performance - Minimum Requirement 2 Tx Antenna Port (TDD)
8.2.3.3.1	Open-loop spatial multiplexing performance - Minimum Requirement 2 Tx Antenna Port (TDD-FDD CA)
8.2.1.3.1A	Open-loop spatial multiplexing performance - Soft buffer management test (FDD)
8.2.2.3.1A	Open-loop spatial multiplexing performance - Soft buffer management test (TDD)
8.2.3.3.1A	Open-loop spatial multiplexing performance - Soft buffer management test (TDD-FDD CA)
8.2.1.4.3	Closed-loop spatial multiplexing performance - Minimum Requirement Multi-Layer Spatial Multiplexing 4 Tx Antenna Port (FDD)
8.2.2.4.3	Closed-loop spatial multiplexing performance - Minimum Requirement Multi-Layer Spatial Multiplexing 4 Tx Antenna Port (TDD)
8.2.3.4.3	Closed-loop spatial multiplexing performance - Minimum Requirement Multi-Layer Spatial Multiplexing 4 Tx Antenna Port (TDD-FDD CA)
8.2.1.7	Carrier aggregation with power imbalance (FDD)
8.2.1.8	Intra-band non-contiguous carrier aggregation with timing offset (FDD)
8.2.2.7	Carrier aggregation with power imbalance (TDD)
8.7.1	Sustained downlink data rate provided by lower layers (FDD)
8.7.2	Sustained downlink data rate provided by lower layers (TDD)
8.7.5	Sustained downlink data rate provided by lower layers (TDD-FDD CA)
8.7.12.1	Sustained downlink data rate provided by lower layers (FDD CA in licensed bands)
8.7.12.2	Sustained downlink data rate provided by lower layers (TDD CA in licensed bands)
8.7.12.3	Sustained downlink data rate provided by lower layers (TDD-FDD CA in licensed bands)
9.6.1.1	Additional requirements for carrier aggregation - Periodic reporting on multiple cells (Cell Specific Reference symbols) (FDD)
9.6.1.2	Additional requirements for carrier aggregation - Periodic reporting on multiple cells (Cell Specific Reference symbols) (TDD)
9.6.1.3	Additional requirements for carrier aggregation - Periodic reporting on multiple cells (Cell Specific Reference symbols) (TDD-FDD CA)
NOTE 1: The applicability of requirements for different CA configurations and bandwidth combination sets is specified in Section 8.1.2.3 and 9.1.1.2. NOTE 2: The test coverage for different number of component carriers is defined in 8.1.2.4.	

B.3.3 Void

B.3.4 Void

B.3.5 Common UE performance requirements and tests for operating bands for UE category 0

The requirements and test cases listed in Table B.3.5-1 are specified in TS 36.101 Rel-14 [2].

Table B.3.5-1: Common UE performance requirements and tests for release independent operating bands for UE category 0

Section / Clause	Description
8.9	Demodulation (single receiver antenna)
9.7	CSI reporting (Single receiver antenna)

B.3.6 Common UE performance requirements and tests for operating bands for UE category M1

The requirements and test cases listed in Table B.3.6-1 are specified in TS 36.101 Rel-14 [2].

Table B.3.6-1: Common UE performance requirements and tests for release independent operating bands for UE category M1

Section / Clause	Description
8.11	Demodulation (UE supporting coverage enhancement)
9.8	CSI reporting (UE supporting coverage enhancement)

B.3.7 Common UE performance requirements and tests for operating bands for UE category NB1

The requirements and test cases listed in Table B.3.7-1 are specified in TS 36.101 Rel-14 [2].

Table B.3.7-1: Common UE performance requirements and tests for release independent operating bands for UE category NB1

Section / Clause	Description
8.12	Demodulation of Narrowband IoT

B.4 Common UE RF requirements

B.4.1 Common UE RF requirements for a release independent band

The requirements and test cases listed in Table B.4.1-1 are specified in TS 36.101 Rel-14 [2].

Table B.4.1-1: Common UE RF requirements for a release independent band

Section / Clause	Description
5.5	Operating bands
5.6	Channel bandwidth
5.7	Channel arrangement
6.2	Transmit power
6.3	Output power dynamics
6.5	Transmit signal quality
6.6	Output RF spectrum emissions
6.7	Transmit intermodulation
7.3	Reference sensitivity power level
7.4	Maximum input level
7.5	Adjacent Channel Selectivity (ACS)
7.6	Blocking characteristics
7.7	Spurious response
7.8	Intermodulation characteristics
7.9	RX spurious emissions

B.4.2 Common UE RF requirements for an intra-band contiguous CA configuration

The requirements and test cases listed in Table B.4.2-1 are specified in TS 36.101 Rel-14 [2].

Table B.4.2-1: Common UE RF requirements for a release independent intra-band contiguous CA configuration

Section / Clause	Description
5.5A	Operating bands for CA
5.6A	Channel bandwidths per operating band for CA
5.7.1A	Channel spacing for CA
5.7.2A	Channel raster for CA
5.7.4A	TX–RX frequency separation for CA
6.2.2A	UE maximum output power for CA
6.2.3A	UE maximum output power for modulation/channel bandwidth for CA
6.2.4A	UE maximum output power with additional requirements for CA
6.2.5A	Configured transmitted power for CA
6.3.2A	UE Minimum utput power for CA
6.3.3A	UE Trasnsmit OFF power for CA
6.3.4A	ON/OFF time mask for CA
6.3.5A	Power control for CA
6.5.1A	Frequency error for CA
6.5.2A	Transmit modulation quality for CA
6.6.1A	Occupied bandwidth for CA
6.6.2.1A	Spectrum emission mask for CA
6.6.2.2A	Additional Spectrum Emission mask for CA
6.6.2.3.2A	UTRA ACLR for CA
6.6.2.3.3A	E-UTRA ACLR for CA
6.6.3.1A	Minimum requirements for CA
6.6.3.2A	Spurious emission band UE co-existence for CA
6.6.3.3A	Additional spurious emissions for CA
6.7.1A	Minimum requirement for CA
7.3.1A	Reference sensitivity for CA
7.4.1A	Maximum input level for CA
7.5.1A	Adjacent Channel Selectivity (ACS) for CA
7.6.1.1A	In-band blocking for CA
7.6.2.1A	Out-of-band blocking for CA
7.6.3.1A	Narrow band blocking for CA
7.7.1A	Spurious response for CA
7.8.1A	Wideband intermodulation for CA
7.10.1A	Receiver response for CA

B.4.3 Common UE RF requirements for an single uplink inter-band CA configuration

The requirements and test cases listed in Table B.4.3-1 are specified in TS 36.101 Rel-14 [2].

Table B.4.3-1: Common UE RF requirements for a release independent inter-band CA configuration

Section / Clause	Description
5.5A	Operating bands for CA
5.6A.1	Channel bandwidths per operating band for CA
5.7.2A	Channel raster for CA
6.2.2A	UE maximum output power for CA
6.2.3A	UE maximum output power for modulation/channel bandwidth for CA
6.2.5	Configured transmitted power
7.3.1A	Reference sensitivity for CA
7.4.1A	Maximum input level for CA
7.5.1A	Adjacent Channel Selectivity (ACS) for CA
7.6.1.1A	In-band blocking for CA
7.6.2.1A	Out-of-band blocking for CA
7.6.3.1A	Narrow band blocking for CA
7.7.1A	Spurious response for CA
7.8.1A	Wideband intermodulation for CA

B.4.4 Common UE RF requirements for an inter-band CA configuration including an operating band without uplink band

The requirements and test cases listed in Table B.4.4-1 are specified in TS 36.101 Rel-14 [2].

Table B.4.4-1: Common UE RF requirements for a release independent inter-band CA configuration including an operating band without uplink band

Section / Clause	Description
5.5	Operating bands
5.5A	Operating bands for CA
5.6A.1	Channel bandwidths per operating band for CA
5.7	Channel arrangement
6.2.2A	UE maximum output power for CA
6.2.3A	UE maximum output power for modulation/channel bandwidth for CA
6.2.5	Configured transmitted power
7.3.1A	Reference sensitivity for CA
7.4.1A	Maximum input level for CA
7.5.1A	Adjacent Channel Selectivity (ACS) for CA
7.6.1.1A	In-band blocking for CA
7.6.2.1A	Out-of-band blocking for CA
7.6.3.1A	Narrow band blocking for CA
7.7.1A	Spurious response for CA
7.8.1A	Wideband intermodulation for CA

B.4.5 Common UE RF requirements for a single uplink intra-band non-contiguous CA configuration

The requirements and test cases listed in Table B.4.5-1 are specified in TS 36.101 Rel-14 [2].

Table B.4.5-1: Common UE RF requirements for a release independent single uplink intra-band non-contiguous CA configuration

Section / Clause	Description
5.5A	Operating bands for CA
5.6A1	Channel bandwidths per operating band for CA
5.7.2A	Channel raster for CA
6.2.2A	UE maximum output power for CA
6.2.3A	UE maximum output power for modulation/channel bandwidth for CA
7.3.1A	Reference sensitivity for CA
7.4.1A	Maximum input level for CA
7.5.1A	Adjacent Channel Selectivity (ACS) for CA
7.6.1.1A	In-band blocking for CA
7.6.2.1A	Out-of-band blocking for CA
7.6.3.1A	Narrow band blocking for CA
7.7.1A	Spurious response for CA
7.8.1A	Wideband intermodulation for CA

B.4.6 Common UE RF requirements for dual uplink inter-band CA configuration

The requirements and test cases listed in Table B.4.6-1 are specified in TS 36.101 Rel-14 [2].

Table B.4.6-1: Common UE RF requirements for a release independent dual uplink inter-band CA configuration

Section / Clause	Description
5.6A.1	Channel bandwidths per operating band for CA
6.2.2A	UE maximum output power for CA
6.2.5A	Configured transmitted Power for CA
6.3.2A	UE Minimum output power for CA
6.3.3A	UE Transmit OFF power for CA
6.3.4A	ON/OFF time mask for CA
6.3.5A	Power control for CA
6.5.1A	Frequency error for CA
6.5.2A	Transmit modulation quality for CA
6.6.1A	Occupied bandwidth for CA
6.6.2.1A	Spectrum emission mask for CA
6.6.2.3	Adjacent Channel Leakage Ratio
6.6.3.1A	Spurious Emission for CA
6.6.3.2A	Spurious emission band UE co-existence for CA
6.7.1A	Transmit intermodulation for CA
7.3.1A	Reference sensitivity for CA
7.6.2.1A	Out-of-band blocking for CA
7.7.1A	Spurious response for CA

B.4.7 Common UE RF requirements for dual uplink intra-band non-contiguous CA configuration

The requirements and test cases listed in Table B.4.7-1 are specified in TS 36.101 Rel-14 [2].

Table B.4.7-1: Common UE RF requirements for a release independent dual uplink intra-band non-contiguous CA configuration

Section / Clause	Description
5.6A.1	Channel bandwidths per operating band for CA
6.2.2A	UE maximum output power for CA
6.2.3A	UE Maximum Output power for modulation / channel bandwidth for CA
6.2.5A	Configured transmitted Power for CA
6.3.2A	UE Minimum output power for CA
6.3.3A	UE Transmit OFF power for CA
6.3.4A	ON/OFF time mask for CA
6.3.5A	Power control for CA
6.5.1A	Frequency error for CA
6.5.2A	Transmit modulation quality for CA
6.6.1A	Occupied bandwidth for CA
6.6.2.1A	Spectrum emission mask for CA
6.6.2.3	Adjacent Channel Leakage Ratio
6.6.3.1A	Spurious Emission for CA
6.6.3.2A	Spurious emission band UE co-existence for CA
7.3.1A	Reference sensitivity for CA
7.6.2.1A	Out-of-band blocking for CA
7.7.1A	Spurious response for CA

B.4.8 Common UE RF requirements for three uplink inter-band CA configuration

The requirements and test cases listed in Table B.4.8-1 are specified in TS 36.101 Rel-14 [2].

Table B.4.8-1: Common UE RF requirements for a release independent three uplink inter-band CA configuration

Section / Clause	Description
5.6A.1	Channel bandwidths per operating band for CA
6.2.2A	UE maximum output power for CA
6.2.5A	Configured transmitted Power for CA
6.3.2A	UE Minimum output power for CA
6.3.3A	UE Transmit OFF power for CA
6.3.4A	ON/OFF time mask for CA
6.3.5A	Power control for CA
6.5.1A	Frequency error for CA
6.5.2A	Transmit modulation quality for CA
6.6.1A	Occupied bandwidth for CA
6.6.2.1A	Spectrum emission mask for CA
6.6.2.3	Adjacent Channel Leakage Ratio
6.6.3.1A	Spurious Emission for CA
6.6.3.2A	Spurious emission band UE co-existence for CA
6.7.1A	Transmit intermodulation for CA
7.3.1A	Reference sensitivity for CA
7.6.2.1A	Out-of-band blocking for CA
7.7.1A	Spurious response for CA

B.4.9 Common UE RF requirements for operating bands for UE category NB1

The requirements and test cases listed in Table B.4.9-1 are specified in TS 36.101 Rel-14 [2].

Table B.4.9-1: Common UE RF requirements for release independent operating bands for UE category NB1

Section / Clause	Description
5.5F	Operating bands for category NB1
5.6F	Channel bandwidth for category NB1
5.7.1F	Channel spacing for category NB1
5.7.2F	Channel raster for category NB1
5.7.3F	Carrier frequency and EARFCN for category NB1
5.7.4F	TX–RX frequency separation for category NB1
6.2.2F	UE maximum output power for category NB1
6.2.3F	UE maximum output power for category NB1
6.2.5F	Configured transmitted Power for category NB1
6.3.2F	UE Minimum output power for category NB1
6.3.3F	Transmit OFF power for category NB1
6.3.4F	ON/OFF time mask for category NB1
6.3.5F	Power Control for category NB1
6.5.1F	Frequency error for UE category NB1
6.5.2F	Transmit modulation quality for Category NB1
6.6.1F	Occupied bandwidth for category NB1
6.6.2F	Out of band emission for category NB1
6.6.3F	Spurious emission for category NB1
6.7.1F	Transmission intermodulation for category NB1
7.3.1F	Reference sensitivity for UE category NB1
7.4.1F	Maximum input level for category NB1
7.5.1F	Adjacent channel selectivity for category NB1
7.6.1.1F	In-band blocking for category NB1
7.6.2.1F	Out-of-band blocking for category NB1
7.7.1F	Spurious response for category NB1
7.8.1F	Intermodulation characteristics for category NB1

B.4.10 Common UE RF requirements for operating bands for UE category 0

The requirements and test cases listed in Table B.4.10-1 are specified in TS 36.101 Rel-14 [2].

Table B.4.10-1: Common UE RF requirements for release independent operating bands for UE category 0

Section / Clause	Description
5.5E	Operating bands for UE category 0
7.3.1E	Minimum requirements (QPSK) for UE category 0

B.4.11 Common UE RF requirements for operating bands for UE category M1

The requirements and test cases listed in Table B.4.11-1 are specified in TS 36.101 Rel-14 [2].

Table B.4.11-1: Common UE RF requirements for release independent operating bands for UE category 0

Section / Clause	Description
5.5E	Operating bands for UE category 0 and UE category M1
6.2.2E	UE maximum output power for Category M1 UE
6.2.3E	UE maximum output power for modulation / channel bandwidth for category M1
6.2.4E	UE maximum output power with additional requirements for category M1 UE
6.3.5E	Power control for category M1
6.5.2E	Transmit modulation quality for category M1
7.3.1E	Minimum requirements (QPSK) for UE category 0 and M1
7.5	Adjacent Channel Selectivity (ACS)
7.6.1	In-band blocking
7.6.2	Out-of-band blocking
7.6.3	Narrow band blocking
7.8.1	Wide band intermodulation

Annex C (normative): Common Requirements for 4Rx

C.1 Common UE RF requirements

The requirements and test cases listed in Table C.1-1 are specified in TS 36.101 Rel-14 [2].

Table C.1-1: RF requirements for 4Rx for single band

Section / Clause	Description
7.3	Reference sensitivity power level
7.4	Maximum input level
7.5	Adjacent channel selectivity
7.6	Blocking characteristics
7.7	Spurious response
7.8	Intermodulation characteristics
7.9	Spurious emissions

The requirements and test cases listed in Table C.1-2 are specified in TS 36.101 Rel-14 [2].

Table C.1-2: RF requirements for 4Rx for CA

Section / Clause	Description
6.2.5A	Configured maximum output power
7.3.1A	Reference sensitivity for CA
7.4.1A	Maximum input level for CA
7.5.1A	Adjacent Channel Selectivity for CA
7.6.1.1A	In-band blocking for CA
7.6.2.1A	Out-of-band blocking for CA
7.6.3.1A	Narrow band blocking for CA
7.7.1A	Spurious response for CA
7.8.1A	Wideband intermodulation for CA

C.2 Common UE demodulation and CSI requirements

The requirements and test cases listed in Table C.2-1 are specified in TS 36.101 Rel-14 [2].

Table C.2-1: UE Demodulation and CSI requirements for 4Rx for single band

Section / Clause	Description
8.10.1 (NOTE)	PDSCH
8.10.2	PDCCH/PCFICH
8.10.3	PHICH
8.10.4	ePDCCH
9.9	CSI reporting for 4Rx UE

The requirements and test cases listed in Table C.2-2 are specified in TS 36.101 Rel-14 [2].

Table C.2-2: UE Demodulation and CSI requirements for 4Rx CA/DC

Section / Clause	Description
8.13	Demodulation of PDSCH CA
8.7.9	SDR of FDD CA (4 layer MIMO)
8.7.10	SDR of TDD CA (4 layer MIMO)
8.7.11	SDR of TDD-FDD CA (4 layer MIMO)
8.7.13	SDR of FDD DC (4 layer MIMO)
8.7.14	SDR of TDD DC (4 layer MIMO)
8.7.15	SDR of TDD-FDD DC (4 layer MIMO)
9.1.1.4.2	CSI CA tests for 4Rx UE

Annex D (normative): Common Requirements for performance enhancements for high speed scenario

D.1 Common RRM requirements for performance enhancements for high speed scenario

The requirements and test cases listed in Table D.1-1 are specified in TS 36.133 Rel-14 [3].

Table D.1-1: RRM requirements for performance enhancements for high speed scenario

Section / Clause	Description
4.2	Cell Re-selection
8.1.2.2	E-UTRAN intra frequency measurements in RRC connected state

D.2 Common UE demodulation requirements for performance enhancements for high speed scenario

The requirements and test cases listed in Table D.2-1 are specified in TS 36.101 Rel-14 [2].

Table D.2-1: UE Demodulation requirements for performance enhancements for high speed scenario

Section / Clause	Description
8.2.1.9	FDD PDSCH
8.2.2.9	TDD PDSCH

Annex E (normative): Common Requirements for 8Rx

E.1 Common UE RF requirements

The requirements and test cases listed in Table E.1-1 are specified in TS 36.101 [2].

Table E.1-1: RF requirements for 8Rx

Section / Clause	Description
7.3	Reference sensitivity power level

The requirements and test cases listed in Table E.1-2 are specified in TS 36.101 [2].

Table E.1-2: RF requirements for 8Rx for CA

Section / Clause	Description
7.3.1A	Reference sensitivity for CA

Annex F (informative): Change history

Table C.1: Change History

Date	Meeting	TDoc	CR	Rev	Cat	Subject/Comment	New version
11-2009	RP#46	RP-091141				TS36.307 V0.1.0 approved by RAN (Originally in R4-095022)	0.1.0
02-2010	R4#54	R4-100419				For release 9 version, replace sections 4 to 6 as 'Void' and add a new void section as section 7.	0.2.0
03-2010	RP#47	RP-100162				TS36.307 v1.0.0 for approval	1.0.0
03-2010	RP#47	RP-100162				Approved by RAN	9.0.0
09-2010	RP-49	RP-100927	2			CR LTE_TDD_2600_US spectrum band definition additions to TS 36.307 V900	9.1.0
						Correction of section numbering	9.1.1
12-2010	RP-50	RP-101356	008			Band 42 and 43 parameters for UMTS/LTE 3500 (TDD) for TS 36.307	9.2.0
12-2010	RP-50	RP-101361	005			Introduction of L-band in TS 36.307	9.2.0
12-2010	RP-50	RP-101344	016			CR creating the rel-10 of the 36.307 specification	9.3.0
12-2010	RP-50	RP-101356	012			Band 42 and 43 parameters for UMTS/LTE 3500 (TDD) for TS 36.307	9.3.0
12-2010	RP-50					Raised to Rel-10 with no technical change	10.0.0
01-2011						Correction to history table	10.0.1
06-2011	RP-52	RP-110804	015			Add Expanded 1900 MHz Band (Band 25) in 36.307	10.1.0
06-2011	RP-52	RP-110812	022			Add 2GHz S-Band (Band 23) in 36.307 (Rel 10)	10.1.0
09-2011	RP-53	RP-111255	025			Add Band 22 for LTE/UMTS 3500 (FDD) to TS 36.307	10.2.0
03-2012	RP-55	RP-120305	029			Introduction of Band 26/XXVI to TS 36.307	11.0.0
2012-06	RP-56	RP-120789	043			Introduction of CA_1A-19A to TS 36.307	11.1.0
2012-06	RP-56	RP-120793	049			Introduction of APAC700(FDD) into TS 36.307 Rel-11	11.1.0
2012-06	RP-56	RP-120793	053			Introduction of APAC700(TDD) into TS 36.307 Rel-11	11.1.0
2012-06	RP-56	RP-120791	057			Introduction of e850_LB (Band 27) to TS 36.307	11.1.0
2012-09	RP-57	RP-121335	059			Introduction of CA_1A-21A to TS 36.307	11.2.0
2012-09	RP-57	RP-121295	070r1			Relation between EARFCN for overlapping bands with multiple FBI indication	11.2.0
2012-09	RP-57	RP-121338	072			36.307 CR for LTE_CA_B7	11.2.0
2012-09	RP-57	RP-121337	073			TS 36.307 CR for CA_38	11.2.0
2012-09	RP-57	RP-121327	074			Introduction of CA_B7_B20 in 36.307	11.2.0
2012-09	RP-57	RP-121329	075			Introduction of CA band combination Band3 + Band5 to TS 36.307	11.2.0
2012-09	RP-57	RP-121331	076			Introduction of CA_3A-20A to TS 36.307	11.2.0
2012-09	RP-57	RP-121334	077			Add requirements for inter-band CA of B_1-18 in TS36.307	11.2.0
2012-09	RP-57	RP-121333	078			Introduction of CA_8_20 RF requirements into TS36.307	11.2.0
2012-09	RP-57	RP-121324	079			Introduction of CA_B3_B7 in 36.307	11.2.0
2012-12	RP-58	RP-121890	086			Introduction of CA_4A-5A into 36.307	11.3.0
2012-12	RP-58	RP-121889	088			Introduction of CA band combination Band4 + Band13 to TS 36.307 (Rel-11)	11.3.0
2012-12	RP-58	RP-121896	091			Introduction of Band 5 + Band 17 inter-band CA configuration into 36.307	11.3.0
2012-12	RP-58	RP-121884	092			Introduction of CA_3A-8A to TS 36.307	11.3.0
2012-12	RP-58	RP-121894	093			Introduction of CA_B5_B12 in 36.307	11.3.0
2012-12	RP-58	RP-121887	095			Introduction of CA_4-12 into TS 36.307 (Rel-11)	11.3.0
2012-12	RP-58	RP-121882	097			[Rel-11] Introduction of inter-band CA_11-18 into TS36.307	11.3.0
2012-12	RP-58	RP-121861	099			Release-independent implementation of carrier aggregation configuration CA_4-7	11.3.0
2012-12	RP-58	RP-121901	101			Introduction of Band 29	11.3.0
2012-12	RP-58	RP-121718	0102			Introduction of CA band combination Band2 + Band17 to TS 36.307 (Rel-11)	11.3.0
2012-12	RP-58	RP-121720	0104			Introduction of CA band combination Band4 + Band17 to TS 36.307 (Rel-11)	11.3.0
2013-06	RP-60	RP-130771	108			Introduction of CA 1+8 into TS36.307(Rel-12)	12.0.0
2013-06	RP-60	RP-130782	111			Introduction of LTE Advanced inter-band Carrier Aggregation of Band 3 and Band 28 to TS 36.307 Rel-12	12.0.0
2013-06	RP-60	RP-130785	114			Introduction of LTE Advanced inter-band Carrier Aggregation of Band 23 and Band 29 to TS 36.307 (Rel-12)	12.0.0
2013-06	RP-60	RP-130779	117			Introduction of LTE Advanced inter-band Carrier Aggregation of Band 3 and Band 26 to TS 36.307 (Rel-12)	12.0.0
2013-06	RP-60	RP-130777	120			Introduction of CA_3A-19A to TS 36.307	12.0.0
2013-06	RP-60	RP-130783	123			Introduction of CA_19A-21A to TS 36.307	12.0.0
2013-06	RP-60	RP-130775	131			Introduction of CA_2A-13A to TS 36.307	12.0.0
2013-06	RP-60	RP-130791	136			Introduction of Band 30	12.0.0
2013-06	RP-60	RP-130790	143			Introduction of LTE 450 into TS 36.307 R12	12.0.0
2013-06	RP-60	RP-130787	150			Introduction of CA_4A-4A into 36.307 Rel-12	12.0.0
09-2013	RP-61	RP-131300	153			36.307 CR for LTE_CA_C_B3 (Rel-12)	12.1.0
09-2013	RP-61	RP-131296	160			[Rel-12] Add requirements for CA_1A-26A into TS36.307	12.1.0
09-2013	RP-61	RP-131297	163			Introduction of CA_2A-4A to TS 36.307	12.1.0
09-2013	RP-61	RP-131298	167			Introduction of inter-band CA Band 2+5	12.1.0
12-2013	RP-62	RP-131965	173			Introduction of CA_23A-23A to TS 36.307	12.2.0
12-2013	RP-62	RP-131946	178			Introduction of CA band combination Band2 + Band12 to TS 36.307	12.2.0

12-2013	RP-62	RP-131954	181			Introduction of CA band combination Band12 + Band25 to TS 36.307	12.2.0
12-2013	RP-62	RP-131959	184			Introduction of LTE_CA_C_B27 to 36.307 (Rel-12)	12.2.0
12-2013	RP-62	RP-131957	192			Introduction of CA_23B to TS 36.307	12.2.0
12-2013	RP-62	RP-131961	194			Introduction of Intra-band non-contiguous CA in band 3 to TS 36.307	12.2.0
12-2013	RP-62	RP-131950	200			Introduction of CA band combination Band5 + Band25 to TS 36.307	12.2.0
12-2013	RP-62	RP-131967	201r1			Introducing 'General' clause with note referring to note in clause 4.4 in TS36.101, editorial corrections and modifications to Forward and Scope clauses	12.2.0
12-2013	RP-62	RP-131948	204			Introduction of CA band combination B5 + B7 to TS 36.307 R12	12.2.0
12-2013	RP-62	RP-131952	207			Introduction of CA band combination B7 + B28 to TS 36.307	12.2.0
12-2013	RP-62	RP-131967	211			Correction to release independent specification	12.2.0
12-2013	RP-62	RP-131925	216			UE performance requirements in release independent specification for CA	12.2.0
12-2013	RP-62	RP-131963	219			Introduction of CA_7A-7A to TS 36.307 Rel-12	12.2.0
03-2014	RP-63	RP-140371	235			Release independence of Band 14 HPUE	12.3.0
03-2014	RP-63	RP-140386	227			Introduction of CA band combination Band 3 and Band 27 to TS 36.307	12.3.0
03-2014	RP-63	RP-140389	245r1			Correction to release independent specification	12.3.0
03-2014	RP-63	RP-140388	210r1			Introduction of CA_39C to TS 36.307	12.3.0
03-2014	RP-63	RP-140387	197r1			Introduction of CA_39A-41A to TS 36.307	12.3.0
06-2014	RP-64	RP-140911	259			Introduction of CA band combination Band 1 and Band 5 to TS 36.307	12.4.0
06-2014	RP-64	RP-140918	300			Correction of Common RRM requirements for CA in release independent specification (Rel-12)	12.4.0
06-2014	RP-64	RP-140926	280r1			Introduction of Band 20+32 CA	12.4.0
06-2014	RP-64	RP-140931	265			Introduction of CA 1+11 to 36.307 (Rel-12)	12.4.0
06-2014	RP-64	RP-140933	275			Introduction of CA band combination Band 4 and Band 27 to TS 36.307	12.4.0
06-2014	RP-64	RP-140938	291			Introduction of CA_2A-2A to TS 36.307 Rel-12	12.4.0
06-2014	RP-64	RP-140940	319			Introduction of LTE_CA_NC_B42 into 36.307	12.4.0
06-2014	RP-64	RP-140942	253			Introduction of CA band combination Band 3 and Band 27 to TS 36.307	12.4.0
06-2014	RP-64	RP-140942	340			Introduction of CA band combination Band 1 and Band 20 to TS 36.307	12.4.0
06-2014	RP-64	RP-140943	347			Introduction of CA band combination CA_41D into TS 36.307 (Rel-12)	12.4.0
09-2014	RP-65	RP-141110	0388r1			[Rel-12] Introduction of inter-band CA_18-28 into TS36.307	12.5.0
09-2014	RP-65	RP-141200	0366r1			Introduction of CA_B1_B3_B19 into TS 36.307 (Rel-12)	12.5.0
09-2014	RP-65	RP-141205	0363r1			Introduction of CA_B1_B3 into TS 36.307 (Rel-12)	12.5.0
09-2014	RP-65	RP-141332	0429r1			Introduction of CA_1A-7A into 36.307 (Rel -12)	12.5.0
09-2014	RP-65	RP-141340	0376r1			Introduction of CA_B1_B5_B7 into TS 36.307 (Rel-12)	12.5.0
09-2014	RP-65	RP-141467	0432			Introduction of 3 DL CA for Band 1+7+20	12.5.0
09-2014	RP-65	RP-141527	415r1			CR for 36.307 on CA UE performance requirement in Rel-12	12.5.0
09-2014	RP-65	RP-141551	360			Introduction of CA 8+11 to 36.307 (Rel-12)	12.5.0
09-2014	RP-65	RP-141552	379			Introduction of CA_41A-42A to TS 36.307	12.5.0
09-2014	RP-65	RP-141553	381			Introduction of a new bandwidth combination set for CA_25A-25A into 36.307	12.5.0
09-2014	RP-65	RP-141554	418r1			Introduction of requirements for 2DL inter-band carrier aggregation (FDD) and 2DL fallback	12.5.0
09-2014	RP-65	RP-141554	421			Introduction of requirements for 3DL inter-band carrier aggregation including Band 30	12.5.0
09-2014	RP-65	RP-141555	384			Introduction of 3 Band Carrier Aggregation of Band 1,Band 3 and Band 5 to TS 36.307(Rel.12)	12.5.0
09-2014	RP-65	RP-141556	357r1			Introduction of 3 Band Carrier Aggregation (3DL/1UL) of Band 1, Band 3 and Band 8 to TS 36.307	12.5.0
09-2014	RP-65	RP-141558	402			Introduction of CA band combination Band 1, Band 3 and Band 20 to TS 36.307	12.5.0
09-2014	RP-65	RP-141560	352			Introduction of new CA_40C bandwidth combination set into 36.307	12.5.0
09-2014	RP-65	RP-141561	354			CR to 36.307 Rel-12: Introduction of CA_41C-41A and CA_41A-41C	12.5.0
12-2014	RP-66	RP-142142	440			UE RF requirements in the release independent spec	12.6.0
12-2014	RP-66	RP-142188	444			Revision of common RRM requirements for release independent specification	12.6.0
12-2014	RP-66	RP-142182	448			[Rel-12] Introduction of inter-band CA_1-28 into TS36.307	12.6.0
12-2014	RP-66	RP-142189	455			CR for TR 36.307: LTE_CA_B5_B13	12.6.0
12-2014	RP-66	RP-142190	458r2			Introduction of additional band combinations for 3DL inter-band CA	12.6.0
03-2015	RP-67	RP-150387	463			R4-73AH-0113: Correction of UE RF requirements for dual uplik to TS 36.307 Rel-12	12.7.0
03-2015	RP-67	RP-150392	468			CR for 36.307 on CA UE performance requirement in Rel-12	12.7.0
03-2015	RP-67	RP-150387	469			Further revision of RSRP requirement for 36.307 release 12	12.7.0
05-2015	RP-68	RP-151068	0511r1			Introduction of CA_3A-40A to TS 36.307 R13	13.0.0
05-2015	RP-68	RP-151070	0513r1			Introduction of CA_3A-40C to TS 36.307 R13	13.0.0

05-2015	RP-68	RP-150958	461r1			Introduction of dual uplink CA into 36.307	13.0.0
05-2015	RP-68	RP-150968	499r2			Release independence CR for 2DL inter-band CA Rel-13	13.0.0
05-2015	RP-68	RP-150972	503r1			Release independence CR for 3DL inter-band CA Rel-13	13.0.0
05-2015	RP-68	RP-150974	506r1			Release independence CR for 4DL inter-band CA Rel-13	13.0.0
05-2015	RP-68	RP-150975	509			Introduction of non-contiguous Carrier Aggregation (CA) in Band 42 for 3DL	13.0.0
05-2015	RP-68	RP-151006	514			Introduction of CA_42D to TS 36.307	13.0.0
09-2015	RP-69	RP-151501	0520r1			Introduction of finished 4DL inter-band CAs to TS 36.307	13.1.0
09-2015	RP-69	RP-151503	0526			[Rel-13] Introduction of dual uplink CA into 36.307	13.1.0
09-2015	RP-69	RP-151499	0538			Rel-13 3DL combinations	13.1.0
09-2015	RP-69	RP-151201	0543			Introduction of CA_7A-40A and CA_7A-40C to TS 36.307 R13	13.1.0
10-2015						Correction of the release in the cover page	13.1.1
12-2015	RP-70	RP-152158	0543a			Release independent requirements for CA_42E (Rel-13)	13.2.0
12-2015	RP-70	RP-152160	0549			Introduction of 4DL NC CA in band42 in 36.307	13.2.0
12-2015	RP-70	RP-152157	0561			Introducing B20 + B67 CA into TS 36.307	13.2.0
12-2015	RP-70	RP-152168	0562			Introduction of intra-band CA_8B to TS 36.307	13.2.0
12-2015	RP-70	RP-152171	0580			Introduction of Band 65	13.2.0
12-2015	RP-70	RP-152167	0589			Introduction of intra-band CA_5B to TS 36.307	13.2.0
12-2015	RP-70	RP-152169	0590			Introduction of intra-band NC CA_5A-5A to TS 36.307	13.2.0
12-2015	RP-70	RP-152166	0596			Introduction of 3DL/3UL Inter-band CA in TS36.307	13.2.0
12-2015	RP-70	RP-152163	0598			Introduction of 5DL/1UL CA combinations into TS 36.307 (Rel-13)	13.2.0
12-2015	RP-70	RP-152162	0604			Introduction of finished 4DL inter-band CAs to TS 36.307	13.2.0
12-2015	RP-70	RP-152173	0612			Introduction of 1447-1467MHz Band into 36.307	13.2.0
12-2015	RP-70	RP-152156	0616			Rel-13 2DL combinations	13.2.0
12-2015	RP-70	RP-152161	0620			Rel-13 3DL combinations	13.2.0
12-2015	RP-70	RP-152172	0628			Introduction of Band 66	13.2.0
12-2015	RP-70	RP-152159	0632			Introduction of intra-band non-contiguous CA in Band 41 for 4DL	13.2.0
12-2015	RP-70	RP-152165	0634			Introduction of 2 UL and 3 DL mixed inter/intra cases without MSD into 36.307 Rel-13	13.2.0
03/2016	RP-71	RP-160480	0655		B	Rel-13 3DL combinations	13.3.0
03/2016	RP-71	RP-160481	0642		B	Introduction of completed R13 4DL inter-band CA's to TS 36.307	13.3.0
03/2016	RP-71	RP-160482	0651		B	Introduction of 5DL/1UL CA combinations into TS 36.307 (Rel-13)	13.3.0
03/2016	RP-71	RP-160483	0647		B	Introduction of Band 68	13.3.0
06/2016	RP-72	RP-161142	0682	1	F	CR TS 36.307 REL-13	13.4.0
06/2016	RP-72	RP-161142	0691	1	F	Correction of RRM multiple uplink requirements and test cases in 36.307	13.4.0
09/2016	RP-73	RP-161628	0693		A	Release 13 36.307 CAT A CR to make Band 41 power class 2 release independent	13.5.0
09/2016	RP-73	RP-161613	0705		B	CR for 4Rx requirements for release independent in Rel-13	13.5.0
09/2016	RP-73	RP-161628	0692	1	F	Release 14 36.307 CR to make Band 41 power class 2 release independent	14.0.0
09/2016	RP-73	RP-161617	0703	1	B	Introduction of V2V operating bands in TS36.307 Rel-14	14.0.0
12/2016	RP-74	RP-162387	0707		A	Introduction of B46 DL 10 MHz release independent feature	14.1.0
12/2016	RP-74	RP-162398	0711	1	A	Addition of CA bandwidth Class F	14.1.0
12/2016	RP-74	RP-162459	0716	2	A	Correction to UE category applicability	14.1.0
12/2016	RP-74	RP-162390	0721	1	A	Addition of UE category 0 and M1 to release independence specification	14.1.0
12/2016	RP-74	RP-162407	0722	-	A	Introduction of new bands for NB-IoT in 36.307	14.1.0
03/2017	RP-75	RP-170559	0733	-	B	CR on 36.307 for V2X multi-carrier operation	14.2.0
06/2017	RP-76	RP-171291	0749	1	F	Cleanup of TS 36.307	14.3.0
09/2017	RP-77	RP-171943	4354		F	CR for adding NB-IoT performance requirements in 36.307 in Rel-14	14.4.0
09/2017	RP-77	RP-171953	4358		B	CR on TS36.307 in rel-14 for V2X release independents	14.4.0
09/2017	RP-77	RP-171973	4359		A	CR for adding overlapping band B66 in 36.307 in Rel-14	14.4.0
09/2017	RP-77	RP-172045	4361		B	Additional LTE bands for UE category M1 and/or NB1 in Rel-15	14.4.0
09/2017	RP-77	RP-172052	4363		B	Additional LTE bands for UE category M2 and/or NB2 in Rel-14	14.4.0
2018-03	RAN#79	RP-180288	4370		A	Addition of missing features for TS 36.307 REL-14	14.5.0
2018-03	RAN#79	RP-180276	4375		B	Introduction of 4UL CA into TS36.307	14.5.0
2018-06	RAN#80	RP-181116	4380		B	TS 36.307 Rel-14	14.6.0
2018-06	RAN#80	RP-181097	4388	1	A	TS 36.307 big CR for introduction new band support for 4Rx antenna ports R14	14.6.0
2018-06	RAN#80	RP-181087	4390	1	A	TS 36.307 big CR for introduction new band support for 8Rx antenna ports R14	14.6.0
2018-06	RAN#80	RP-181110	4393	1	F	CR for adding LAA SDR tests for release independent R14	14.6.0
2018-06	RAN#80	RP-181095	4399		B	Introduction of 3UL CA into TS36.307	14.6.0
2018-06	RAN#80	RP-181096	4401		B	CR on new V2X band combinations and eV2X feature in TS36.307 rel-14	14.6.0

History

Document history		
V14.2.0	April 2017	Publication
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