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**LTE;
Evolved Universal Terrestrial Radio Access (E-UTRA);
Requirements on User Equipments (UEs)
supporting a release-independent frequency band
(3GPP TS 36.307 version 11.17.0 Release 11)**



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Foreword

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1 Scope

The present document specifies requirements on UEs supporting a frequency band and inter-band/intra-band CA configurations that are independent of release. The present document also defines requirements for 4RX antenna port requirements that are independent of release.

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 36.101 (Release 11): "Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) Radio Transmission and Reception".
- [3] 3GPP TS 36.133 (Release 11): "Evolved Universal Terrestrial Radio Access (E-UTRA); Requirements for Support of Radio Resource Management".
- [4] 3GPP TS 36.101 (Release 10): "Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) Radio Transmission and Reception".
- [5] 3GPP TS 36.101 (Release 12): "Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) Radio Transmission and Reception".

3 Definitions and Abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in [1] apply.

3.2 Abbreviations

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

3A General

3A.1 Operating bands and CA

TSG-RAN has agreed that the standardisation of new features listed in Tables 3A.1-1, 3A.1-2, 3A-3 and, 3A.1-4 are independent of a release. UE conforming earlier release than when the feature was introduced into the specifications shall comply with RRM-, demodulation- and RF-requirements as specified in the Annex-B2, Annex-B3 and, Annex-B4 of TS 36.307 in the release that the feature was introduced. The applicable UE Categories are specified in TS 36.306 according to the release to which the UE conforms.

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

Feature	Duplex-mode	Release independent from
Operating bands, band number <= 64, Power Class 3	FDD, TDD	8
Operating bands, band number > 64, Power Class 3	FDD, TDD	9
Asymmetric operating bands, Power Class 3	FDD	10
Operating bands, band number <= 64, Power Class 1	FDD	10

Table 3A.1-2: Intra-band contiguous CA

CA feature	DL/UL	CA BW Class	Duplex-mode	Release independent from
Intra-band contiguous CA	DL	B	FDD	10
		C	FDD, TDD	10
		D	TDD	10
			TDD	11
	E	TDD	11	
	UL	B	FDD	10
		C	FDD, TDD	10

Table 3A.1-3: Inter-band CA

CAfeature	DL/UL	number of bands	CA BW Classes	Duplex-mode	Release independent from
Inter-band CA	DL	2	A, B, C	FDD, TDD	10
			A, B, C, D	FDD, TDD	11
		3	A	FDD, TDD	10
			A, B, C	FDD, TDD	11
			4	A, C	FDD, TDD
	UL	2	A, C	FDD, TDD	11

Table 3A.1-4: Intra-band non-contiguous CA

CA type	DL/UL	number of sub-blocks	CA BW Classes	Duplex-mode	Release independent from
Intra-band non-contiguous CA	Downlink	2	A, C, D	FDD, TDD	11
	Uplink	2	A	FDD	11

For example, Band 19 is contained 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, such as the radio frequency and radio resource management requirements for the Band 19.

For another example on carrier aggregations, CA configuration CA_1A-19A is contained 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, such as the radio frequency and radio resource management requirements for the CA configuration CA_1A-19A.

All frequency bands are fully specified in this release of the specifications. The present document does not contain any requirements for UEs supporting frequency bands independent of release.

NOTE: See NOTE in clause 4.4 in [2].

3A.2 Other features

Features other than frequency bands and CA configurations can also be implemented independent of release, as listed in Tables 3A.2-1.

4 Rx compliant Rel-10 UE that supports 4 Rx reception and declares compliance to 4 Rx requirements shall comply with RF requirements, UE demodulation and CSI requirements as specified in the Annex-C.1 and Annex-C.2 of TS 36.307 in the release that the feature was introduced.

Table 3A.2-1: Other feature

Feature	Release independent from
4RX	10

4 – 292 Void

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 [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	FDD
5	18, 19, 26	FDD
9	3	FDD
10	4	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

Annex B (normative): Common Requirements

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 band independent of release

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

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

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
<p>NOTE 1: All requirements and the corresponding test cases shall apply, except:</p> <ul style="list-style-type: none"> - for supporting the corresponding band in Rel-9 and below: clause 4.3 (Minimization of Drive Tests). <p>NOTE 2: All requirements and the corresponding test cases shall apply, except:</p> <ul style="list-style-type: none"> - 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). <p>NOTE 3: All requirements and corresponding test cases shall apply, except those defined in sections 7.4 and 7.5.</p> <p>NOTE 4: All requirements and corresponding test cases shall apply, except:</p> <ul style="list-style-type: none"> - 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). <p>NOTE 5: All requirements and corresponding test cases shall apply, except:</p> <ul style="list-style-type: none"> - for supporting the corresponding band in Rel-8: clauses 9.1.9 (UE Rx-Tx time difference), 9.1.10 (Reference Signal Time Difference). <p>NOTE 6: All requirements and test cases in this table shall apply, except those defined for: carrier aggregation; measurements under time-domain measurement resource restriction with or without CRS assistance information, in addition to the exceptions listed above.</p>	

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 [3].

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

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	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	Measurement Performance Requirements
NOTE:	Only requirements and test cases defined for intra-band contiguous carrier aggregation shall apply.

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

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

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

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	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	Measurement Performance Requirements
NOTE:	Only requirements and test cases defined for intra-band non-contiguous carrier aggregation shall apply.

Editor's note: references to this section are to be revisited when intra-band non-contiguous CA requirements are finalized in TS 36.101.

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

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

Table B.2.4-1: Common RRM requirements for a 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	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	Measurement Performance Requirements
NOTE: Only requirements and test cases defined for inter-band carrier aggregation shall apply.	

B.3 Common UE performance requirements

B.3.1 Void

Table B.3.1-1: 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 [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)
8.2.1.3.1	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)
8.2.1.3.1A	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)
8.2.1.4.3	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)
8.2.1.7	Carrier aggregation with power imbalance (FDD)
8.2.2.7	Carrier aggregation with power imbalance (TDD)
8.2.1.8	Intra-band non-contiguous carrier aggregation with timing offset (FDD)
8.7.1	Sustained downlink data rate provided by lower layers (FDD)
8.7.2	Sustained downlink data rate provided by lower layers (TDD)
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)
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 in [2].
Note 2:	The test coverage for different number of component carriers is defined in 8.1.2.4 in [5].

B.3.3 Void

Table B.3.3-1: Void

B.3.4 Void

B.4 Common UE RF requirements

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

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

Table B.4.1-1: Common UE RF requirements for a band independent of releaseSection / 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 (NOTE)	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
NOTE: Requirements in section 6.5.2.2.1 and 6.5.2.3.1 as specified in [4] apply	

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 [2].

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

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 inter-band CA configuration

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

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

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 [2].

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

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 an intra-band non-contiguous CA configuration

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

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

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

Annex C (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
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06/2016	RP-72	RP-161140	680	1	F	CR TS 36.307 REL-11	11.16.0
09/2016	RP-73	RP-161628	695		A	Release 11 36.307 CAT A CR to make Band 41 power class 2 release independent The CRs was not implemented because it was not based on the latest version of the spec.	11.17.0
09/2016	RP-73	RP-161633	701		F	Correction of REL-11 TS 36.307 references	11.17.0

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