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Requirements on User Equipments (UEs)
supporting a release-independent frequency band
(3GPP TS 38.307 version 15.3.0 Release 15)

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Contents

Foreword

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

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- z the third digit is incremented when editorial only changes have been incorporated in the document.

1 Scope

The present document specifies requirements for Rel-15 UEs supporting release independent features like:

- additional NR operating bands and power classes on top of Rel-15 of TS 38.101 [2-5] and TS 38.133 [6];

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 38.101-1: NR; User Equipment (UE) radio transmission and reception; Part 1: Range 1 Standalone

[3] 3GPP TS 38.101-2: NR; User Equipment (UE) radio transmission and reception; Part 2: Range 2 Standalone

[4] 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

[5] 3GPP TS 38.101-4: NR; User Equipment (UE) radio transmission and reception; Part 4: UE performance requirements

[6] 3GPP TS 38.133: NR; Requirements for support of radio resource management

[7] 3GPP TS 38.306: NR; User Equipment (UE) radio access capabilities

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].

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 38.101 [2-5] or TS 38.133 [6] of these frozen releases, the corresponding requirements are captured in TS 38.307 via pointers to [2-5] or [6] of the release in which the feature was introduced.

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

3.2 Symbols

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

N Release in which a feature is introduced into TS 38.101 [2-5] or TS 38.133 [6]
M Release from which onwards (including release M) a feature is release independent

3.3 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].

BW Bandwidth
CA Carrier Aggregation
CC Component carrier
DL Downlink
EN-DC Dual connectivity between E-UTRA and NR
FDD Frequency Division Duplex
FR1 Frequency range 1
FR2 Frequency range 2
NR New radio
REL Release
SUL Supplementary uplink
TDD Time Division Duplex
UE User Equipment
UL Uplink

4 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 38.101 [2-5] and TS 38.133 [6] 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 fulfil additional requirements in release M or higher which are specified in one or more Annexes of TS 38.307 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 38.306 [7] according to the release to which the UE conforms.

5 Release independent features for NR frequency range 1

5.1 Additional NR operating bands and UE power classes for NR frequency range 1

Requirements for a Rel-15 UE for additional NR operating bands and power classes compared to TS 38.101-1 of Rel-15 [2] are introduced via this clause.

Table 5.1-1: NR operating bands

Feature	Duplex-mode	Release independent from	Requirements to be fulfilled (see TS 38.307 of the release in which the band was introduced)
Operating bands	FDD, TDD, SUL	Rel-15	

Table 5.1-2: NR UE power class

Feature	Duplex-mode	Release independent from	Requirements to be fulfilled (see TS 38.307 of the release in which the band was introduced)
Power Class 2, 3	FDD, TDD, SUL	Rel-15	

5.2 Additional NR CA configurations for NR frequency range 1

5.2.1 Intraband CA

Requirements for a Rel-15 UE for additional NR intraband CA configurations within FR1 compared to TS 38.101-1 of Rel-15 [2] are introduced via this clause.

Table 5.2.1-1: NR intraband CA within FR1

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 was introduced)
Intra-band contiguous CA configurations within FR1	DL	C, D, E, F, G, H, I, J, K, L	TDD	Rel-15	
	UL	A	TDD	Rel-15	

5.2.2 Interband CA

Requirements for a Rel-15 UE for additional NR interband CA configurations within FR1 compared to TS 38.101-1 of Rel-15 [2] are introduced via this clause.

Table 5.2.2-1: NR interband CA within FR1

Feature	DL/UL	number of bands	number of CCs	CA BW Classes	Duplex-mode	Release independent from	requirements to be fulfilled (see 38.307 of the REL in which the CA configuration was introduced)
Inter-band CA configurations within NR FR1	DL	2	2	A	TDD, FDD and TDD	Rel-15	
	UL	2	2	A	TDD, FDD and TDD	Rel-15	

5.3 Additional NR SUL configurations for NR frequency range 1

Requirements for a Rel-15 UE for additional NR SUL configurations within FR1 compared to TS 38.101-1 of Rel-15 [2] are introduced via this clause.

Table 5.3-1: NR SUL within FR1

Feature	DL/UL	number of bands	number of CCs	CA BW Classes	Duplex-mode	Release independent from	requirements to be fulfilled (see 38.307 of the REL in which the SUL configuration was introduced)
Inter-band SUL configurations within NR FR1	DL	1	1	A	TDD	Rel-15	
	UL	2	2	A	TDD and SUL	Rel-15	

6 Release independent features for NR frequency range 2

6.1 Additional NR operating bands and UE power classes for NR frequency range 2

Requirements for a Rel-15 UE for additional NR operating bands and power classes compared to TS 38.101-2 of Rel-15 [3] are introduced via this clause.

Table 6.1-1: NR operating bands

Feature	Duplex-mode	Release independent from	Requirements to be fulfilled (see TS 38.307 of the release in which the band was introduced)
Operating bands	TDD	Rel-15	

Table 6.1-2: NR UE power class

Feature	Duplex-mode	Release independent from	Requirements to be fulfilled (see TS 38.307 of the release in which the band was introduced)
Power Class 1, 2, 3, 4	TDD	Rel-15	

6.2 Additional NR CA configurations for NR frequency range 2

6.2.1 Intraband CA

Requirements for a Rel-15 UE for additional NR intraband CA configurations within FR2 compared to TS 38.101-2 of Rel-15 [3] are introduced via this clause.

Table 6.2.1-1: NR intraband contiguous CA within FR2

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 was introduced)
Intra-band contiguous CA configurations within FR2	DL	B, C, D, E, F, G, H, I, J, K, L, M, O, P, Q	TDD	Rel-15	
	UL	B, D, E, F, G, H, I, J, K, L, M, O, P, Q	TDD	Rel-15	

Table 6.2.1-2: NR non-contiguous intraband CA within FR2

Feature	DL/UL	number of sub-blocks	maximum number of CCs within a sub-block	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 within FR2	DL	2	4	TDD	Rel-15	
		3	1	TDD	Rel-15	
		4	1	TDD	Rel-15	

7 Release independent features for NR interworking between NR frequency range 1 and NR frequency range 2

7.1 Additional NR interband CA configurations between frequency range 1 and frequency range 2

Requirements for a Rel-15 UE for additional NR interband CA configurations between FR1 and FR2 compared to TS 38.101-3 of Rel-15 [4] are introduced via this clause.

Table 7.1-1: NR interband CA between FR1 and FR2

Feature	DL/UL	number of bands	maximum number of CCs	CA BW Classes	Duplex-mode	Release independent from	requirements to be fulfilled (see 38.307 of the REL in which the CA configuration was introduced)
Inter-band CA configurations for NR interworking between FR1 and FR2	DL FR1	1	2	A, C	FDD, TDD	Rel-15	
	DL FR2	1	4	A, D, E, F	TDD	Rel-15	
	UL FR1	1	1	A	FDD, TDD	Rel-15	
	UL FR2	1	1	A	TDD	Rel-15	

7.2 Additional Inter-band NR-DC configurations between frequency range 1 and frequency range 2

Requirements for a Rel-15 UE for additional Inter-band NR-DC configurations between FR1 and FR2 compared to TS 38.101-3 of Rel-15 [4] are introduced via this clause.

Table 7.2-1: Inter-band NR-DC between FR1 and FR2

Feature	DL/UL	number of bands	maximum number of CCs	CA BW Classes	Duplex-mode	Release independent from	requirements to be fulfilled (see 38.307 of the REL in which the CA configuration was introduced)
Inter-band CA configurations for NR interworking between FR1 and FR2	DL FR1	1	2	A, C	TDD	Rel-15	
	DL FR2	1	8	A, D, E, F, G, H, I, J, K, L, M	TDD	Rel-15	
	UL FR1	1	1	A	TDD	Rel-15	
	UL FR2	1	1	A	TDD	Rel-15	

8 Release independent features for NR interworking between NR and E-UTRA

8.1 Additional EN-DC configurations

8.1.1 Intraband EN-DC

Requirements for a Rel-15 UE for additional EN-DC intraband configurations within FR1 compared to TS 38.101-3 of Rel-15 [4] are introduced via this clause.

Table 8.1.1-0: EN-DC intraband UE power class

Feature	Duplex-mode	Release independent from	Requirements to be fulfilled (see TS 38.307 of the release in which the band was introduced)
Intraband contiguous EN-DC power class 2	TDD	Rel-15	
Intraband contiguous EN-DC power class 3	FDD, TDD	Rel-15	
Intraband non-contiguous EN-DC power class 2	TDD	Rel-15	
Intraband non-contiguous EN-DC power class 3	FDD, TDD	Rel-15	

Table 8.1.1-1: EN-DC contiguous intraband configurations within FR1

Feature	DL/UL	maximum number of E-UTRA CCs	maximum number of NR CCs	Duplex-mode	Release independent from	requirements to be fulfilled (see 38.307 of the REL in which the CA configuration was introduced)
intraband contiguous EN-DC	DL	3	1	FDD, TDD	Rel-15	
	UL	1	1	FDD, TDD	Rel-15	

Table 8.1.1-2: EN-DC non-contiguous intraband configurations within FR1

Feature	DL/UL	maximum number of sub-blocks	maximum number of E-UTRA CCs	maximum number of NR CCs	Duplex-mode	Release independent from	requirements to be fulfilled (see 38.307 of the REL in which the CA configuration was introduced)
intraband non-contiguous EN-DC	DL	2	3	1	FDD, TDD	Rel-15	
	UL	2	1	1	FDD, TDD	Rel-15	

8.1.2 Interband EN-DC

8.1.2.1 Interband EN-DC within frequency range 1

Requirements for a Rel-15 UE for additional EN-DC interband configurations within FR1 compared to TS 38.101-3 of Rel-15 [4] are introduced via this clause.

Table 8.1.2.1-0: EN-DC interband UE power class

Feature	Duplex-mode	Release independent from	Requirements to be fulfilled (see TS 38.307 of the release in which the band was introduced)
Interband EN-DC Power Class 3	FDD, TDD	Rel-15	

Table 8.1.2.1-1: EN-DC interband configurations without SUL within FR1

Feature	DL/UL	maximum number of E-UTRA bands	maximum number of E-UTRA CCs	maximum number of NR bands	maximum number of NR CCs	Duplex-mode	Release independent from	requirements to be fulfilled (see 38.307 of the REL in which the CA configuration was introduced)
Interband EN-DC	DL	4	5	2	2	FDD, TDD, FDD and TDD	Rel-15	
	UL	1	2	1	1	FDD, TDD, FDD and TDD	Rel-15	

Table 8.1.2.1-2: EN-DC interband configurations with SUL within FR1

Feature	DL/UL	maximum number of E-UTRA bands	maximum number of E-UTRA CCs	maximum number of NR bands	maximum number of NR CCs	Duplex-mode	Release independent from	requirements to be fulfilled (see 38.307 of the REL in which the CA configuration was introduced)
Interband EN-DC	DL	2	3	1	1	FDD, TDD, FDD and TDD	Rel-15	
	UL	1	1	2	2	FDD, TDD, FDD and TDD, FDD and TDD and SUL	Rel-15	

8.1.2.2 Interband EN-DC including frequency range 2

Requirements for a Rel-15 UE for additional EN-DC interband configurations including FR2 compared to TS 38.101-3 of Rel-15 [4] are introduced via this clause.

Table 8.1.2.2-1: EN-DC interband configurations including FR2

Feature	DL/UL	number of E-UTRA bands	maximum number of E-UTRA CCs	number of NR bands	maximum number of NR CCs	Duplex-mode	Release independent from	requirements to be fulfilled (see 38.307 of the REL in which the CA configuration was introduced)
Interband EN-DC	DL	4	5	1	8	TDD, FDD and TDD	Rel-15	
	UL	1	2	1	8	TDD, FDD and TDD	Rel-15	

8.1.2.3 Interband EN-DC including frequency range 1 and frequency range 2

Requirements for a Rel-15 UE for additional EN-DC interband configurations including FR1 and FR2 compared to TS 38.101-3 of Rel-15 [4] are introduced via this clause.

Table 8.1.2.3-1: EN-DC interband configurations including FR1 and FR2

Feature	DL/UL	maximum number of E-UTRA bands	maximum number of E-UTRA CCs	maximum number of NR bands	maximum number of NR CCs	Duplex-mode	Release independent from	requirements to be fulfilled (see 38.307 of the REL in which the CA configuration was introduced)
Interband EN-DC	DL FR1	4	4	1	2	TDD, FDD	Rel-15	
	DL FR2			1	4	TDD	Rel-15	
	UL FR1	1	1	1	1	FDD, TDD	Rel-15	
	UL FR2			1	1	TDD,	Rel-15	

Annex A (informative): Change history

Change history							
Date	**Meeting**	**TDoc**	**CR**	**Rev**	**Cat**	**Subject/Comment**	**New version**
2017-09	RAN4#85	R4-1712166				Skeleton TS	0.0.1
2018-03	RAN4#86	R4-1802107				TS 38.307 v0.1.0	0.1.0
2018-06	RAN#80	RP-180988				v1.0.0 submitted for plenary approval	1.0.0
2018-06	RAN#80					Approved by plenary – Rel-15 spec under change control	15.0.0
2018-09	RAN#81	RP-181896	0001		F	CR for FR2 Power Classes in TS38.307	15.1.0
2018-12	RAN#82	RP-182362	0002	2	B	CR for TS 38.307	15.2.0
2019-06	RAN#84	RP-191237	0005		B	Addition of missing features for TS 38.307	15.3.0

History

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