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Part 2: Common Implementation Conformance Statement (ICS) proforma
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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
Association à but non lucratif enregistrée à la
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Contents

Foreword

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

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

Version x.y.z

where:

x the first digit:

1 presented to TSG for information;

2 presented to TSG for approval;

3 or greater indicates TSG approved document under change control.

y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.

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

The present document is part 2 of a multi-part deliverable covering the 5G System (5GS) User Equipment (UE) protocol conformance specification, as identified below:

- 3GPP TS 38.508-1 [11]: "5GS; User Equipment (UE) conformance specification; Part 1: Common test environment ".
- 3GPP TS 38.508-2: "**5GS; User Equipment (UE) conformance specification; Part 2: Common Implementation Conformance Statement (ICS) proforma**" (the present document).

1 Scope

The present document provides the Implementation Conformance Statement (ICS) proforma for 5G New Radio (NR) User Equipment (UE), in compliance with the relevant requirements.

Special conformance testing functions can be found in 3GPP TS 38.509 [12] and 3GPP TS 36.509 [14] and the common test environments are included in 3GPP TS 38.508-1 [11] and 3GPP TS 36.508 [13].

The present document is valid for UE implemented according to 3GPP Releases starting from Release 15 up to the Release indicated on the cover page of the present document.

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 38.523-1: "5GS; UE conformance specification; Part 1: Protocol conformance specification".

[3] 3GPP TS 38.523-2: “5GS; User Equipment (UE) conformance specification; Part 2: Applicability of protocol test cases”.

[4] 3GPP TS 38.523-3: “5GS; User Equipment (UE) conformance specification; Part 3: Protocol Test Suites”.

[5] 3GPP TS 38.521-1: “NR; User Equipment (UE) conformance specification; Radio transmission and reception; Part 1: Range 1 Standalone”.

[6] 3GPP TS 38.521-2: “NR; User Equipment (UE) conformance specification; Radio transmission and reception; Part 2: Range 2 Standalone”.

[7] 3GPP TS 38.521-3: “NR; User Equipment (UE) conformance specification; Radio transmission and reception; Part 3: Range 1 and Range 2 Interworking operation with other radios”.

[8] 3GPP TS 38.521-4: “NR; User Equipment conformance specification; Radio transmission and reception; Part 4: Performance”.

[9] 3GPP TS 38.522: “NR; User Equipment (UE) conformance specification; Applicability of radio transmission, radio reception and radio resource management test cases”.

[10] 3GPP TS 38.523: “NR; User Equipment (UE) conformance specification; Radio resource management”.

[11] 3GPP TS 38.508-1: "5GS; User Equipment (UE) conformance specification; Part 1: Common test environment".

[12] 3GPP TS 38.509: "5GS; Special conformance testing functions for UE".

[13] 3GPP TS 36.508: "Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access (E-UTRAN); Common Test Environments for User Equipment (UE) Conformance Testing".

[14] 3GPP TS 36.509: "Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Special conformance testing functions for User Equipment (UE)".

[15] 3GPP TS 34.229-2: "Internet Protocol (IP) multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP);User Equipment (UE) conformance specification; Part 2: Implementation Conformance Statement (ICS) specification".

[16] 3GPP TS 36.523-2: "Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access (E-UTRAN); User Equipment (UE) conformance specification; Part 2: Implementation Conformance Statement (ICS) proforma specification".

[17] 3GPP TS 38.306: “NR; User Equipment (UE) radio access capabilities”.

[18] ISO/IEC 9646-7: "Information technology - Open systems interconnection - Conformance testing methodology and framework - Part 7: Implementation Conformance Statements".

[19] 3GPP TS 38.307: “NR; User Equipments (UEs) supporting a release-independent frequency band”.

[20] 3GPP TS 37.340:"Evolved Universal Terrestrial Radio Access (E-UTRA) and NR; Multi-connectivity; Stage 2".

[21] 3GPP TS 38.300: "NR; NR and NG-RAN Overall Description; Stage 2".

[22] 3GPP TS 24.229: "IP multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); Stage 3"

[23] 3GPP TS 38.101-1: “NR; User Equipment (UE) radio transmission and reception; Part 1: Range 1 Standalone”

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in TR 21.905 [5] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in TR 21.905 [5].

Implementation Conformance Statement (ICS): statement made by the supplier of an implementation or system claimed to conform to a given specification, stating which capabilities have been implemented

ICS proforma: document, in the form of a questionnaire, which when completed for an implementation or system becomes an ICS

Implementation extra Information for Testing (IXIT): A statement made by a supplier or implementer of an UEUT which contains or references all of the information (in addition to that given in the ICS) related to the UEUT and its testing environment, which will enable the test laboratory to run an appropriate test suite against the UEUT

IXIT proforma: A document, in the form of a questionnaire, which when completed for an UEUT becomes an IXIT

Protocol Implementation Conformance Statement (PICS): An ICS for an implementation or system claimed to conform to a given protocol specification

Protocol Implementation extra Information for Testing (PIXIT): An IXIT related to testing for conformance to a given protocol specification

Static conformance review: A review of the extent to which the static conformance requirements are claimed to be supported by the UEUT, by comparing the answers in the ICS(s) with the static conformance requirements expressed in the relevant specification(s)

3.2 Symbols

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

<symbol> <Explanation>

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].

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

FFS	For Further Study
ICS	Implementation Conformance Statement
IXIT	Implementation extra Information for Testing
PICS	Protocol Implementation Conformance Statement
PIXIT	Protocol Implementation extra Information for Testing
SCS	System Conformance Statement
TC	Test Case
UEUT	User Equipment Under Test

Annex A (normative):ICS proforma for NR/5GS Generation User Equipment

Notwithstanding the provisions of the copyright clause related to the text of the present document, The Organizational Partners of 3GPP grant that users of the present document may freely reproduce the ICS proforma in this annex so that it can be used for its intended purposes and may further publish the completed ICS.

A.1 Guidance for completing the ICS proforma

A.1.1 Purposes and structure

The purpose of this ICS proforma is to provide a mechanism whereby a supplier of an implementation of the requirements defined in relevant specifications may provide information about the implementation in a standardised manner.

The ICS proforma is subdivided into clauses for the following categories of information:

- instructions for completing the ICS proforma;
- identification of the implementation;
- identification of the protocol;
- ICS proforma tables (for example: UE implementation types, Teleservices, etc).

A.1.2 Abbreviations and conventions

The ICS proforma contained in this annex is comprised of information in tabular form in accordance with the guidelines presented in ISO/IEC 9646-7 [18].

Item column

The item column contains a number which identifies the item in the table.

Item description column

The item description column describes in free text each respective item (e.g. parameters, timers, etc.). It implicitly means "is <item description> supported by the implementation?".

Reference column

The reference column gives reference to the relevant 3GPP core specifications.

Release column

The release column indicates the earliest release from which the capability or option is relevant.

Mnemonic column

The Mnemonic column contains mnemonic identifiers for each item.

Comments column

This column is left blank for particular use by the reader of the present document.

References to items

For each possible item answer (answer in the support column) within the ICS proforma there exists a unique reference, used, for example, in the conditional expressions. It is defined as the table identifier, followed by a solidus character "/", followed by the item number in the table. If there is more than one support column in a table, the columns shall be discriminated by letters (a, b, etc.), respectively.

A.1.3 Instructions for completing the ICS proforma

The supplier of the implementation may complete the ICS proforma in each of the spaces provided. More detailed instructions are given at the beginning of the different clauses of the ICS proforma.

A.2 Identification of the User Equipment

Identification of the User Equipment should be filled in so as to provide as much detail as possible regarding version numbers and configuration options.

The product supplier information and client information should both be filled in if they are different.

A person who can answer queries regarding information supplied in the ICS should be named as the contact person.

A.2.1 Date of the statement

.....

A.2.2 User Equipment Under Test (UEUT) identification

UEUT name:

.....

.....

Hardware configuration:

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.....

.....

Software configuration:

.....

.....

.....

A.2.3 Product supplier

Name:

.....

Address:

.....

.....

.....

Telephone number:

.....

Facsimile number:

.....

E-mail address:

.....

Additional information:

.....

.....

.....

A.2.4 Client

Name:

.....

Address:

.....

.....

.....

Telephone number:

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Facsimile number:

.....

E-mail address:

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Additional information:

.....

.....

.....

A.2.5 ICS contact person

Name:

.....

Telephone number:

.....

Facsimile number:

.....

E-mail address:

.....

Additional information:

.....

.....

A.3 Identification of the protocol

This ICS proforma applies to the 3GPP standards listed in the normative references clause of the present document.

A.4 ICS proforma tables

A.4.1 UE Implementation Types

Table A.4.1-1: UE Radio Technologies

Item	UE Radio Technologies	Ref.	Release	Mnemonic	Comments
1	NR FDD	38.101-1, 38.101-2	Rel-15	pc_nrFDD	
2	NR TDD	38.101-1, 38.101-2	Rel-15	pc_nrTDD	

Table A.4.1-2: UE general functionality

Item	UE Functionality	Ref.	Release	Mnemonic	Comments
1	Support of multiple NR FDD bands	38.101, 5.2	Rel-15	pc_nrFDD_MultiBand	
2	Support of multiple NR TDD bands	38.101, 5.2	Rel-15	pc_nrTDD_MultiBand	
3	NR SUL	38.101-1	Rel-15	pc_nrSUL	
4	NR SDL	38.101-1	Rel-15	pc_nrSDL	
5	Support of multiple NR SUL bands	38.101, 5.2	Rel-15	pc_nrSUL_MultiBand	
6	Support of multiple NR SDL bands	38.101, 5.2	Rel-15	pc_nrSDL_MultiBand	

Table A.4.1-3: RAN-CN Interface Options

Item	UE support of RAN-CN Interface Options	Ref.	Release	Mnemonic	Comments
1	NG-RAN NR	38.300	Rel-15	pc_NG_RAN_NR	Option 2
2	EN-DC	37.340	Rel-15	pc_EN_DC	Option 3
3	NE-DC	37.340	Rel-15	pc_NE_DC	Option 4
4	NG-RAN E-UTRA	38.300	Rel-15	pc_NG_RAN_EUTRA	Option 5
5	NGEN-DC	37.340	Rel-15	pc_NGEN_DC	Option 7

Table A.4.1-4: NSA DC UE Radio Technologies

Item	NSA UE Radio Technologies	Ref.	Release	Mnemonic	Comments
1	Intra-Band Contiguous EN-DC	38.101-3, 5.2B.2	Rel-15	pc_IntraBand_Contiguous_ENDC	
2	Intra-Band Non-Contiguous EN-DC	38.101-3, 5.2B.3	Rel-15	pc_IntraBand_Non_Contiguous_ENDC	
3	Inter-Band EN-DC within FR1	38.101-3, 5.2B.4	Rel-15	pc_InterBand_ENDC_WithinFR1	
4	Inter-Band EN-DC including FR2	38.101-3, 5.2B.5	Rel-15	pc_InterBand_ENDC_IncludingFR2	
5	Inter-band EN-DC including both FR1 and FR2	38.101-3, 5.2B.6	Rel-15	pc_InterBand_ENDC_IncludingFR1_FR2	
6	Inter-band NR-DC between FR1 and FR2	38.101-3, 5.2B.6	Rel-15	pc_InterBand_NRDC_BetweenFR1_FR2	

Table A.4.1-4A: SA CA UE Radio Technologies

Item	SA UE Radio Technologies	Ref.	Release	Mnemonic	Comments
1	Intra-Band Contiguous CA within FR1	38.101-1, 5.2A.1	Rel-15	pc_IntraBand_Contiguous_CA_WithinFR1	
2	Intra-Band Non-contiguous CA within FR1	38.101-1, 5.2A.1	Rel-15	pc_IntraBand_NonContiguous_CA_WithinFR1	
3	Intra-Band Contiguous CA within FR2	38.101-2, 5.2A.1	Rel-15	pc_IntraBand_Contiguous_CA_WithinFR2	
4	Intra-Band Non-contiguous CA within FR2	38.101-2, 5.2A.1	Rel-15	pc_IntraBand_NonContiguous_CA_WithinFR2	
5	Inter-Band CA within FR1	38.101-1, 5.2A.2	Rel-15	pc_InterBand_CA_WithinFR1	
6	Inter-Band CA within FR2	38.101-2, 5.2A.2	Rel-15	pc_InterBand_CA_WithinFR2	
7	Inter-band CA between FR1 and FR2	38.101-3, 5.2A.1	Rel-15	pc_InterBand_CA_BetweenFR1_FR2	

Table A.4.1-5: 5GS UE Core Technologies

Item	5GS UE Core Technologies	Ref.	Release	Mnemonic	Comments
1	UE Supports 5GS Core	24.501	Rel-15	pc_5GCN	
2	UE Supports 5GS core over non-3GPP Access Network	24.501, 4.7	Rel-15	pc_5GCN_N3AN	

A.4.2 UE Service Capabilities

A.4.2.1 3GPP Standardised UE Service Capabilities

A.4.2.1.1 Bearer Services

Table A.4.2.1.1-1: Definition of Bearer Services

Item	Definition of Bearer Services	Ref.	Release	Mnemonic	Comments
1	FFS				

A.4.3 Baseline Implementation Capabilities

Table A.4.3-1: Supported protocols

Item	Supported protocols	Ref.	Release	Mnemonic	Comments
1	5GS Mobility Management	24.501	Rel-15		
2	5GS Session Management	24.501	Rel-15		
3	Radio Resource Control	38.331	Rel-15		
4	Service Data Adaptation Protocol	37.324	Rel-15		
5	Packet Data Convergence Protocol	38.323	Rel-15		
6	Radio Link Control	38.322	Rel-15		
7	Medium Access Control	38.321	Rel-15		
8	Physical Layer	38.201	Rel-15		

Table A.4.3-2: Special Conformance Testing Functions

Item	Special Conformance Testing Functions	Ref.	Release	Mnemonic	Comments
1	UE test loop	38.509	Rel-15		

A.4.3.1 RF Baseline Implementation Capabilities

NOTE: The values indicated in column "Release" in tables A.4.3.1-1 and A.4.3.1-2 below are to be understood as the specifications release version in which a band was introduced and not as a mandate that a UE conforming to particular release shall support a particular band. For further guidance to release independent bands see TS 38.307 [19].

Table A.4.3.1-1: NR FDD FR1 RF Baseline Implementation Capabilities

Item	NR FDD RF Baseline Implementation Capabilities	Ref.	Release	Mnemonic	Comments
1	NR Frequency band: 1920-1980, 2110-2170 MHz	38.101-1, 5.2	Rel-15	pc_nrBand1_Supp	NR Band 1
2	NR Frequency band: 1850-1910, 1930-1990 MHz	38.101-1, 5.2	Rel-15	pc_nrBand2_Supp	NR Band 2
3	NR Frequency band: 1710-1785, 1805-1880 MHz	38.101-1, 5.2	Rel-15	pc_nrBand3_Supp	NR Band 3
4	NR Frequency band: 824-849, 869-894 MHz	38.101-1, 5.2	Rel-15	pc_nrBand5_Supp	NR Band 5
5	NR Frequency band: 2500-2570, 2620-2690 MHz	38.101-1, 5.2	Rel-15	pc_nrBand7_Supp	NR Band 7
6	NR Frequency band: 880-915, 925-960 MHz	38.101-1, 5.2	Rel-15	pc_nrBand8_Supp	NR Band 8
7	NR Frequency band: 832-862, 791-821 MHz	38.101-1, 5.2	Rel-15	pc_nrBand20_Supp	NR Band 20
8	NR Frequency band: 703-748, 758-803 MHz	38.101-1, 5.2	Rel-15	pc_nrBand28_Supp	NR Band 28
9	NR Frequency band: 1710-1780, 2110-2200 MHz	38.101-1, 5.2	Rel-15	pc_nrBand66_Supp	NR Band 66
10	NR Frequency band: 1695-1710, 1995-2020 MHz	38.101-1, 5.2	Rel-15	pc_nrBand70_Supp	NR Band 70
11	NR Frequency band: 663-698, 617-652 MHz	38.101-1, 5.2	Rel-15	pc_nrBand71_Supp	NR Band 71

Table A.4.3.1-2: NR TDD FR1 RF Baseline Implementation Capabilities

Item	NR TDD RF Baseline Implementation Capabilities	Ref.	Release	Mnemonic	Comments
1	NR Frequency band: 2570-2620 MHz	38.101-1, 5.2	Rel-15	pc_nrBand38_Supp	NR Band 38
2	NR Frequency band: 2496-2690 MHz	38.101-1, 5.2	Rel-15	pc_nrBand41_Supp	NR Band 41
3	NR Frequency band: 3300–4200 MHz	38.101-1, 5.2	Rel-15	pc_nrBand77_Supp	NR Band 77
4	NR Frequency band: 3300–3800 MHz	38.101-1, 5.2	Rel-15	pc_nrBand78_Supp	NR Band 78
5	NR Frequency band: 4400–5000 MHz	38.101-1, 5.2	Rel-15	pc_nrBand79_Supp	NR Band 79

Table A.4.3.1-3: NR FR2 TDD RF Baseline Implementation Capabilities

Item	NR TDD RF Baseline Implementation Capabilities	Ref.	Release	Mnemonic	Comments
1	NR Frequency band: 26500-29500 MHz	38.101-2, 5.2	Rel-15	pc_nrBand257_Supp	NR Band 257
2	NR Frequency band: 24250-27500 MHz	38.101-2, 5.2	Rel-15	pc_nrBand258_Supp	NR Band 258
3	NR Frequency band: 37000–40000 MHz	38.101-2, 5.2	Rel-15	pc_nrBand260_Supp	NR Band 260
4	NR Frequency band: 27500–28350 MHz	38.101-2, 5.2	Rel-15	pc_nrBand261_Supp	NR Band 261

Table A.4.3.1-4: NR PC2 RF Baseline Implementation Capabilities

Item	NR PC2 RF Baseline Implementation Capabilities	Ref.	Release	Mnemonic	Comments
1	NR Frequency band: 2496-2690 MHz	38.101-1, 6.2.1	Rel-15	pc_nrBand41_PC2_Supp	NR Band 41
2	NR Frequency band: 3300-4200 MHz	38.101-1, 6.2.1	Rel-15	pc_nrBand77_PC2_Supp	NR Band 77
3	NR Frequency band: 3300–3800 MHz	38.101-1, 6.2.1	Rel-15	pc_nrBand78_PC2_Supp	NR Band 78
4	NR Frequency band: 4400–5000 MHz	38.101-1, 6.2.1	Rel-15	pc_nrBand79_PC2_Supp	NR Band 79

Table A.4.3.1-5: NR SUL FR1 RF Baseline Implementation Capabilities

Item	NR SUL FR1 RF Baseline Implementation Capabilities	Ref.	Release	Mnemonic	Comments
1	NR Frequency band: 1710-1785	38.101-1, 5.2	Rel-15	pc_nrBand80_Supp	NR Band 80
2	NR Frequency band: 880-915	38.101-1, 5.2	Rel-15	pc_nrBand81_Supp	NR Band 81
3	NR Frequency band: 832-862	38.101-1, 5.2	Rel-15	pc_nrBand82_Supp	NR Band 82
4	NR Frequency band: 703-748	38.101-1, 5.2	Rel-15	pc_nrBand83_Supp	NR Band 83
5	NR Frequency band: 1920-1980	38.101-1, 5.2	Rel-15	pc_nrBand84_Supp	NR Band 84
6	NR Frequency band: 1710-1780	38.101-1, 5.2	Rel-15	pc_nrBand86_Supp	NR Band 86

A.4.3.2 Physical Layer Baseline Implementation Capabilities

Table A.4.3.2-1: UE Physical Layer Baseline Implementation Capabilities

Item	UE Physical Layer Baseline Implementation Capabilities	Ref.	Release	Mnemonic	M	If indicated "Yes" the feature shall be implemented and successfully tested for the corresponding release	Comments
1	Support PDSCH reception based on semi-persistent scheduling	38.306, 4.2.7	Rel-15	pc_downlinkSPS	No		
2	Support 256QAM for PDSCH for FR1	38.306, 4.2.7	Rel-15	pc_pdsch_256QAM_FR1	Yes		
3	Support 256QAM for PDSCH for FR2	38.306, 4.2.7	Rel-15	pc_pdsch_256QAM_FR2	No		
4	Support 256QAM for PUSCH for FR1	38.306, 4.2.7	Rel-15	pc_pusch_256QAM_FR1	No		
5	Support receiving PDSCH using PDSCH mapping type A with less than seven symbols	38.306, 4.2.7	Rel-15	pc_pdsch_MappingTypeA	Yes		
6	Support receiving PDSCH using PDSCH mapping type B	38.306, 4.2.7	Rel-15	pc_pdsch_MappingTypeB	Yes		
7	Support resource allocation Type 0 for PUSCH	38.306, 4.2.7	Rel-15	pc_ra_Type0_PUSCH	No		
8	Support scaling factor 0.75 is applied to the band in the max data rate calculation	38.306, 4.2.7	Rel-15	pc_scalingFactor0dot75			
9	Support handover using a contention free random access on PRACH resources that are associated with CSI-RS resources of the target cell	38.306, 4.2.7	Rel-15	pc_csi_RS_CFRA_ForHO	No		
10	Support Type 1 PUSCH transmissions with configured grant	38.306, 4.2.7	Rel-15	pc_configuredUL_GrantType1	No		
11	Support Type 2 PUSCH transmissions with configured grant	38.306, 4.2.7	Rel-15	pc_configuredUL_GrantType2	No		
12	Support PDSCH Reception when configured with higher layer parameter aggregationFactorDL > 1	38.306, 4.2.7	Rel-15	pc_pdsch_RepetitionMultiSlots	No		
13	Supports supplemental uplink with dynamic switch (DCI based selection of PUSCH carrier)	38.306, 4.2.7	Rel-15	pc_dynamicSwitch_SUL	FFS		
14	Supports more than one MIMO layers at the UE for PUSCH transmission with codebook precoding. UE indicating support of this feature shall also indicate support of PUSCH codebook coherency subset	38.306, 4.2.7	Rel-15	pc_nrMIMO_CB_PUSCH	No		Set to true if maxNumberMIMO-LayersCB-PUSCH has value other than 'oneLayer'
15	Supports more than one MIMO layers at the UE for PUSCH transmission using non-codebook precoding	38.306, 4.2.7	Rel-15	pc_nrMIMO_NonCB_PUSCH	No		Set to true if maxNumberMIMO-LayersNonCB-PUSCH has value other than 'oneLayer'
16	Support receiving PDSCH with interleaved VRB-to-PRB mapping	38.306, 4.2.7	Rel-15	pc_interleavingVRB_ToPRB_PDSCH	Yes		

17	Support dynamic EN-DC power sharing	38.306, 4.2.7	Rel-15	pc_dynamicPowerSharing	Yes		If the UE supports this capability it will dynamically share the power between NR and LTE if P_LTE + P_NR > Pcmax.
18	Supports up to 10 search spaces in a SCell per BWP	38.306, 4.2.7	Rel-15	pc_maxNumberSearchSpaces	No		
19	Supports spatial bundling of HARQ-ACK bits carried on PUCCH or PUSCH per PUCCH group. With spatial bundling, two HARQ-ACK bits for a DL MIMO data is bundled into a single bit by logical "AND" operation	38.306, 4.2.7	Rel-15	pc_spatialBundlingHARQ_ACK	Yes		
20	Support alternative additional DMRS position for co-existence with LTE CRS	38.306, 4.2.7.5	Rel-15	pc_additionalDMRS_DL_Alt	No		

A.4.3.2A NR CA Physical Layer Baseline Implementation Capabilities

A.4.3.2A.1 General NR CA capabilities

Table A.4.3.2A.1-1: Downlink NR CA capabilities (for one or more of the supported NR CA configurations in Tables A.4.3.2A.2.1-3, A.4.3.2A.2.2-3, A.4.3.2A.3.2-3 and A.4.3.2A.4-3)

Item	Bandwidth Class	Ref.	Comments
1	DL NR CA with 2 carriers	38.101-1, 5.3A 38.101-2, 5.3A 38.101-3, 5.3A	
2	DL NR CA with 3 carriers	38.101-1, 5.3A 38.101-2, 5.3A 38.101-3, 5.3A	
3	DL NR CA with 4 carriers	38.101-1, 5.3A 38.101-2, 5.3A 38.101-3, 5.3A	
4	DL NR CA with 5 carriers	38.101-1, 5.3A 38.101-2, 5.3A 38.101-3, 5.3A	
5	DL NR CA with 6 carriers	38.101-1, 5.3A 38.101-2, 5.3A 38.101-3, 5.3A	
6	DL NR CA with 7 carriers	38.101-1, 5.3A 38.101-2, 5.3A 38.101-3, 5.3A	
7	DL NR CA with 8 carriers	38.101-1, 5.3A 38.101-2, 5.3A 38.101-3, 5.3A	

Table A.4.3.2A.1-2: Uplink CA capabilities (for one or more of the supported NR CA configurations in Tables A.4.3.2A.2.1-3, A.4.3.2A.2.2-3, A.4.3.2A.3.2-3 and A.4.3.2A.4-3)

Item	Bandwidth Class	Ref.	Comments
1	UL NR CA with 2 carriers	38.101-1, 5.3A 38.101-2, 5.3A 38.101-3, 5.3A	

A.4.3.2A.2 NR CA Intra-band contiguous

A.4.3.2A.2.1 NR CA Intra-band contiguous with FR1

Table A.4.3.2A.2.1-1: Downlink Bandwidth Class capabilities for NR Intra-band contiguous CA with FR1 configurations (for one or more of the supported configurations in Table A.4.3.2A.2.1-3)

Item	Bandwidth Class	Ref.	Comments
1	DL NR FR1 Intra-band contiguous CA BW Class A	38.101-1, 5.3A.5	
2	DL NR FR1 Intra-band contiguous CA BW Class B	38.101-1, 5.3A.5	
3	DL NR FR1 Intra-band contiguous CA BW Class C	38.101-1, 5.3A.5	
4	DL NR FR1 Intra-band contiguous CA BW Class D	38.101-1, 5.3A.5	
5	DL NR FR1 Intra-band contiguous CA BW Class E	38.101-1, 5.3A.5	
6	DL NR FR1 Intra-band contiguous CA BW Class F	38.101-1, 5.3A.5	
7	DL NR FR1 Intra-band contiguous CA BW Class G	38.101-1, 5.3A.5	
8	DL NR FR1 Intra-band contiguous CA BW Class H	38.101-1, 5.3A.5	
9	DL NR FR1 Intra-band contiguous CA BW Class I	38.101-1, 5.3A.5	
10	DL NR FR1 Intra-band contiguous CA BW Class J	38.101-1, 5.3A.5	
11	DL NR FR1 Intra-band contiguous CA BW Class K	38.101-1, 5.3A.5	
12	DL NR FR1 Intra-band contiguous CA BW Class L	38.101-1, 5.3A.5	

Table A.4.3.2A.2.1-2: Uplink Bandwidth Class capabilities for NR Intra-band contiguous CA with FR1 configurations (for one or more of the supported configurations in Table A.4.3.2A.2.1-3)

Item	Bandwidth Class	Ref.	Comments
1	UL NR FR1 Intra-band contiguous CA BW Class A	38.101-1, 5.3A.5	
2	UL NR FR1 Intra-band contiguous CA BW Class B	38.101-1, 5.3A.5	
3	UL NR FR1 Intra-band contiguous CA BW Class C	38.101-1, 5.3A.5	
4	UL NR FR1 Intra-band contiguous CA BW Class D	38.101-1, 5.3A.5	
5	UL NR FR1 Intra-band contiguous CA BW Class E	38.101-1, 5.3A.5	
6	UL NR FR1 Intra-band contiguous CA BW Class F	38.101-1, 5.3A.5	
7	UL NR FR1 Intra-band contiguous CA BW Class G	38.101-1, 5.3A.5	
8	UL NR FR1 Intra-band contiguous CA BW Class H	38.101-1, 5.3A.5	
9	UL NR FR1 Intra-band contiguous CA BW Class I	38.101-1, 5.3A.5	
10	UL NR FR1 Intra-band contiguous CA BW Class J	38.101-1, 5.3A.5	
11	UL NR FR1 Intra-band contiguous CA BW Class K	38.101-1, 5.3A.5	
12	UL NR FR1 Intra-band contiguous CA BW Class L	38.101-1, 5.3A.5	

Table A.4.3.2A.2.1-3: Supported NR CA configurations for Intra-band contiguous CA with FR1

NR CA configuration / Item (Note 1)	Release	Supported	Supported CA Bandwidth Class(es) in UL (Note 2,5)	Supported Bandwidth Combination Set(s) (Note 3)
CA_n77C	Rel-15			
CA_n78C	Rel-15			
CA_n79C	Rel-15			
CA_n77D	Rel-15			
CA_n78D	Rel-15			
CA_n79D	Rel-15			
CA_n77E	Rel-15			
CA_n78E	Rel-15			
CA_n79E	Rel-15			

Note 1: Notation used for intra-band contiguous CA Bands is according to TS 38.101-1 [23] Table 5.5A.1-1, e.g. 'CA_n77C' indicates CA operation on NR band n77 with DL CA Bandwidth Class C.

Note 2: The UL CA capabilities as per Table A.4.3.2A.2.1-2 can be supported on a single or multiple CA Band(s). The UE supplier shall indicate all supported UL CA Bandwidth Class(es), in uplink of the supported CA Band(s), as per TS 38.101-1 [23] Table 5.5A.1-1. For this release of specification valid choices are 'N', 'XB' and 'XC', where X is the band. For example, for CA_1C, N would mean only DL CA, '1C' would mean both DL and UL CA.

Note 3: The UE supplier shall indicate the supported Bandwidth Combination Set(s) as per TS 38.101-1 [23] Table 5.5A.1-1.

Note 4: Reference to all items is 38.101-1, 5.5A.1 and 38.331, 6.3.4

Note 5: UL(Table A.4.3.2A.2.1-3) shall return all supported CA Configurations where at least one UL CA Bandwidth Class was declared in column "Supported CA Bandwidth Class(es) in UL".
UL_2CC(Table A.4.3.2A.2.1-3) shall return all supported CA Configurations where at least one 2 Carrier UL CA Bandwidth Class was declared in column "Supported CA Bandwidth Class(es) in UL".
UL_3CC(Table A.4.3.2A.2.1-3) shall return all supported CA Configurations where at least one 3 Carrier UL CA Bandwidth Class was declared.

A.4.3.2A.2.2 NR CA Intra-band contiguous with FR2

Table A.4.3.2A.2.2-1: Downlink Bandwidth Class capabilities for NR Intra-band contiguous CA with FR2 configurations (for one or more of the supported configurations in Table A.4.3.2A.2.2-3)

Item	Bandwidth Class	Ref.	Comments
1	DL NR FR2 Intra-band contiguous CA BW Class A	38.101-2, 5.3A.4	
2	DL NR FR2 Intra-band contiguous CA BW Class B	38.101-2, 5.3A.4	
3	DL NR FR2 Intra-band contiguous CA BW Class C	38.101-2, 5.3A.4	
4	DL NR FR2 Intra-band contiguous CA BW Class D	38.101-2, 5.3A.4	
5	DL NR FR2 Intra-band contiguous CA BW Class E	38.101-2, 5.3A.4	
6	DL NR FR2 Intra-band contiguous CA BW Class F	38.101-2, 5.3A.4	
7	DL NR FR2 Intra-band contiguous CA BW Class G	38.101-2, 5.3A.4	
8	DL NR FR2 Intra-band contiguous CA BW Class H	38.101-2, 5.3A.4	
9	DL NR FR2 Intra-band contiguous CA BW Class I	38.101-2, 5.3A.4	
10	DL NR FR2 Intra-band contiguous CA BW Class J	38.101-2, 5.3A.4	
11	DL NR FR2 Intra-band contiguous CA BW Class K	38.101-2, 5.3A.4	
12	DL NR FR2 Intra-band contiguous CA BW Class L	38.101-2, 5.3A.4	
13	DL NR FR2 Intra-band contiguous CA BW Class M	38.101-2, 5.3A.4	
14	DL NR FR2 Intra-band contiguous CA BW Class O	38.101-2, 5.3A.4	
15	DL NR FR2 Intra-band contiguous CA BW Class P	38.101-2, 5.3A.4	
16	DL NR FR2 Intra-band contiguous CA BW Class Q	38.101-2, 5.3A.4	

Table A.4.3.2A.2.2-2: Uplink Bandwidth Class capabilities for NR Intra-band contiguous CA with FR2 configurations (for one or more of the supported configurations in Table A.4.3.2A.2.2-3)

Item	Bandwidth Class	Ref.	Comments
1	UL NR FR1 Intra-band contiguous CA BW Class B	38.101-2, 5.3A.4	
2	UL NR FR1 Intra-band contiguous CA BW Class C	38.101-2, 5.3A.4	
3	UL NR FR1 Intra-band contiguous CA BW Class D	38.101-2, 5.3A.4	

Table A.4.3.2A.2.2-3: Supported NR CA configurations for Intra-band contiguous CA with FR2

FFS

A.4.3.2A.3 NR CA Intra-band non-contiguous

A.4.3.2A.3.1 NR CA Intra-band non-contiguous with FR1

Editor's note: There are no NR CA Intra-band non-contiguous configurations with FR1in Rel-15.

A.4.3.2A.3.2 NR CA Intra-band non-contiguous with FR2

Table A.4.3.2A.3.2-1: Downlink Bandwidth Class capabilities for NR Intra-band non-contiguous configurations CA with FR2 (for one or more of the supported configurations in Table A.4.3.2A.3.2-3)

Item	Bandwidth Class	Ref.	Comments
1	DL NR FR2 Intra-band non-contiguous CA BW Class Combination A-A	38.101-2, 5.3A.5	

Table A.4.3.2A.3.2-2: Uplink Bandwidth Class capabilities for NR Intra-band non-contiguous CA with FR2 configurations (for one or more of the supported configurations in Table A.4.3.2A.3.2-3)

Item	Bandwidth Class	Ref.	Comments
1	UL NR FR1 Intra-band non-contiguous CA BW Class Combination A-A	38.101-2, 5.3A.5	

Table A.4.3.2A.3.2-3: Supported configurations for NR Intra-band non-contiguous CA with FR2

FFS

A.4.3.2A.4 NR Inter-band CA

A.4.3.2A.4.1 NR Inter-band CA with FR1 (two bands)

Table A.4.3.2A.4.1-1: Downlink Bandwidth Class Combination capabilities for NR Inter-band CA configuration with FR1 and two bands (for one or more of the supported CA configurations in Table A.4.3.2A.4.1-3)

Item	Bandwidth Class	Ref.	Comments
1	DL NR FR1 Inter-band CA BW Class Combination A-A (two bands)	38.101-2, 5.3A.5	

Table A.4.3.2A.4.1-2: Uplink Bandwidth Class Combination capabilities for NR Inter-band CA with FR1 and two bands (for one or more of the supported CA configurations in Table A.4.3.2A.4.1-3)

Item	Bandwidth Class	Ref.	Comments
1	UL NR FR1 Inter-band CA BW Class Combination A-A (two bands)	38.101-2, 5.3A.5	

Table A.4.3.2A.4.1-3: Supported CA configurations for NR Inter-band CA with FR1 and two bands

FFS

A.4.3.2B NR DC Physical Layer Baseline Implementation Capabilities

A.4.3.2B.1 NR DC between FR1 and FR2

Table A.4.3.2B.1-1: Downlink NR DC Bandwidth Class Combination capabilities between FR1 and FR2 (for one or more of the supported DC configurations in Table A.4.3.2B.1-2)

Item	Bandwidth Class (FR1-FR2)	Ref.	Comments
1	DL NR DC FR1 and FR2 BW Class Combination A-A	38.101-1, 5.3A.5 38.101-2, 5.3A.4 38.101-3, 5.3A.1	
2	DL NR DC FR1 AND FR2 BW Class Combination A-D	38.101-1, 5.3A.5 38.101-2, 5.3A.4 38.101-3, 5.3A.1	
3	DL NR DC FR1 AND FR2 BW Class Combination A-E	38.101-1, 5.3A.5 38.101-2, 5.3A.4 38.101-3, 5.3A.1	
4	DL NR DC FR1 AND FR2 BW Class Combination A-F	38.101-1, 5.3A.5 38.101-2, 5.3A.4 38.101-3, 5.3A.1	
5	DL NR DC FR1 AND FR2 BW Class Combination A-G	38.101-1, 5.3A.5 38.101-2, 5.3A.4 38.101-3, 5.3A.1	
6	DL NR DC FR1 AND FR2 BW Class Combination A-H	38.101-1, 5.3A.5 38.101-2, 5.3A.4 38.101-3, 5.3A.1	
7	DL NR DC FR1 AND FR2 BW Class Combination A-I	38.101-1, 5.3A.5 38.101-2, 5.3A.4 38.101-3, 5.3A.1	
8	DL NR DC FR1 AND FR2 BW Class Combination A-J	38.101-1, 5.3A.5 38.101-2, 5.3A.4 38.101-3, 5.3A.1	
9	DL NR DC FR1 AND FR2 BW Class Combination A-K	38.101-1, 5.3A.5 38.101-2, 5.3A.4 38.101-3, 5.3A.1	
10	DL NR DC FR1 AND FR2 BW Class Combination A-L	38.101-1, 5.3A.5 38.101-2, 5.3A.4 38.101-3, 5.3A.1	
11	DL NR DC FR1 AND FR2 BW Class Combination A-M	38.101-1, 5.3A.5 38.101-2, 5.3A.4 38.101-3, 5.3A.1	
12	DL NR DC FR1 AND FR2 BW Class Combination C-A	38.101-1, 5.3A.5 38.101-2, 5.3A.4 38.101-3, 5.3A.1	
13	DL NR DC FR1 AND FR2 BW Class Combination C-D	38.101-1, 5.3A.5 38.101-2, 5.3A.4 38.101-3, 5.3A.1	
14	DL NR DC FR1 AND FR2 BW Class Combination C-E	38.101-1, 5.3A.5 38.101-2, 5.3A.4 38.101-3, 5.3A.1	
15	DL NR DC FR1 AND FR2 BW Class Combination C-F	38.101-1, 5.3A.5 38.101-2, 5.3A.4 38.101-3, 5.3A.1	

Table A.4.3.2B.1-2: Supported NR DC configurations between FR1 and FR2 (two bands)

FFS

A.4.3.2B.2 EN-DC Physical Layer Baseline Implementation Capabilities

A.4.3.2B.2.1 EN-DC Intra-band contiguous with NR FR1

Table A.4.3.2B.2.1-1: Bandwidth Class Combination capabilities for EN-DC Intra-band contiguous configurations with NR FR1 (for one or more of the supported configurations in Table A.4.3.2B.2.1-2)

Item	Bandwidth Class (E-UTRA/NR FR1)	Ref.	Comments
1	DL EN-DC Intra-band contiguous with NR FR1 BW Class Combination A/A	38.101-3, 5.3B	
2	DL EN-DC Intra-band contiguous with NR FR1 BW Class Combination C/A	38.101-3, 5.3B	
3	DL EN-DC Intra-band contiguous with NR FR1 BW Class Combination D/A	38.101-3, 5.3B	

Table A.4.3.2B.2.1-2: Supported EN-DC Intra-band contiguous configurations with NR FR1

FFS

A.4.3.2B.2.2 EN-DC Intra-band non-contiguous with FR1

Table A.4.3.2B.2.2-1: Bandwidth Class Combination capabilities for EN-DC Intra-band non-contiguous configurations with NR FR1 (for one or more of the supported configurations in Table A.4.3.2B.2.2-2)

Item	Bandwidth Class (E-UTRA/NR FR1)	Ref.	Comments
1	DL EN-DC Intra-band non-contiguous with NR FR1 BW Class Combination A/A	36.101, 5.6A 38.101-1, 5.3A.5	
2	DL EN-DC Intra-band non-contiguous with NR FR1 BW Class Combination C/A	36.101, 5.6A 38.101-1, 5.3A.5	
3	DL EN-DC Intra-band non-contiguous with NR FR1 BW Class Combination D/A	36.101, 5.6A 38.101-1, 5.3A.5	

Table A.4.3.2B.2.2-2: Supported EN-DC Intra-band non-contiguous configurations with NR FR1

FFS

A.4.3.2B.2.3 EN-DC Inter-band

A.4.3.2B.2.3.1 EN-DC Inter-band with FR1 (two bands)

Table A.4.3.2B.2.3.1-1: Bandwidth Class Combination capabilities for EN-DC Inter-band with NR FR1 and two bands (for one or more of the supported DC configurations in Table A.4.3.2B.2.3.1-2)

Item	Bandwidth Class (E-UTRA/NR FR1)	Ref.	Comments
1	EN-DC Inter-band with NR FR1 BW Class Combination A/A (two bands)	36.101, 5.6A 38.101-1, 5.3A.5	
2	EN-DC Inter-band with NR FR1 BW Class Combination A/C (two bands)	36.101, 5.6A 38.101-1, 5.3A.5	
3	EN-DC Inter-band with NR FR1 BW Class Combination A-A/A (two bands)	36.101, 5.6A 38.101-1, 5.3A.5	

Table A.4.3.2B.2.3.1-2: Supported EN-DC Intra-band non-contiguous configurations with NR FR1 (two bands)

FFS

A.4.3.2B.2.3.2 EN-DC Inter-band with FR1 (three bands)

Table A.4.3.2B.2.3.2-1: Bandwidth Class Combination capabilities for EN-DC Inter-band with NR FR1 and three bands (for one or more of the supported DC configurations in Table A.4.3.2B.2.3.2-2)

Item	Bandwidth Class (E-UTRA/NR FR1)	Ref.	Comments
1	EN-DC Inter-band with NR FR1 BW Class Combination A/C (three bands)	36.101, 5.6A 38.101-1, 5.3A.5	
2	EN-DC Inter-band with NR FR1 BW Class Combination C/A (three bands)	36.101, 5.6A 38.101-1, 5.3A.5	
3	EN-DC Inter-band with NR FR1 BW Class Combination A-A/A (three bands)	36.101, 5.6A 38.101-1, 5.3A.5	
4	EN-DC Inter-band with NR FR1 BW Class Combination A-A/C (three bands)	36.101, 5.6A 38.101-1, 5.3A.5	
5	EN-DC Inter-band with NR FR1 BW Class Combination A-C/A (three bands)	36.101, 5.6A 38.101-1, 5.3A.5	
6	EN-DC Inter-band with NR FR1 BW Class Combination A-D/A (three bands)	36.101, 5.6A 38.101-1, 5.3A.5	
7	EN-DC Inter-band with NR FR1 BW Class Combination A-E/A (three bands)	36.101, 5.6A 38.101-1, 5.3A.5	
8	EN-DC Inter-band with NR FR1 BW Class Combination A/nAA (three bands)	36.101, 5.6A 38.101-1, 5.3A.5	
9	EN-DC Inter-band with NR FR1 BW Class Combination A/A-A (three bands)	36.101, 5.6A 38.101-1, 5.3A.5	

Table A.4.3.2B.2.3.2-2: Supported EN-DC Intra-band non-contiguous configurations with NR FR1 (three bands)

FFS

A.4.3.2B.2.3.3 EN-DC Inter-band with FR1 (four bands)

Table A.4.3.2B.2.3.3-1: Bandwidth Class Combination capabilities for EN-DC Inter-band with NR FR1 and four bands (for one or more of the supported DC configurations in Table A.4.3.2B.2.3.3-2)

FFS

Table A.4.3.2B.2.3.3-2: Supported EN-DC Intra-band non-contiguous configurations with NR FR1 (four bands)

FFS

A.4.3.2B.2.3.4 EN-DC Inter-band with FR1 (five bands)

Table A.4.3.2B.2.3.4-1: Bandwidth Class Combination capabilities for EN-DC Inter-band with NR FR1 and five bands (for one or more of the supported DC configurations in Table A.4.3.2B.2.3.4-2)

FFS

Table A.4.3.2B.2.3.4-2: Supported EN-DC Intra-band non-contiguous configurations with NR FR1 (five bands)

FFS

A.4.3.2B.2.3.5 EN-DC Inter-band with FR1 (six bands)

Table A.4.3.2B.2.3.5-1: Bandwidth Class Combination capabilities for EN-DC Inter-band with NR FR1 and six bands (for one or more of the supported DC configurations in Table A.4.3.2B.2.3.5-2)

FFS

Table A.4.3.2B.2.3.5-2: Supported EN-DC Intra-band non-contiguous configurations with NR FR1 (six bands)

FFS

A.4.3.2B.2.3.6 EN-DC Inter-band with FR2 (two bands)

Table A.4.3.2B.2.3.6-1: Bandwidth Class Combination capabilities for EN-DC Inter-band with NR FR2 and two bands (for one or more of the supported DC configurations in Table A.4.3.2B.2.3.6-2)

FFS

Table A.4.3.2B.2.3.6-2: Supported EN-DC Intra-band non-contiguous configurations with NR FR2 (two bands)

FFS

A.4.3.2B.2.3.7 EN-DC Inter-band with FR2 or with both FR1 and FR2 (three bands)

Table A.4.3.2B.2.3.7-1: Bandwidth Class Combination capabilities for EN-DC Inter-band with NR FR2, or with both FR1 and FR2, and three bands (for one or more of the supported DC configurations in Table A.4.3.2B.2.3.7-2)

FFS

Table A.4.3.2B.2.3.7-2: Supported EN-DC Intra-band non-contiguous configurations with NR FR2, or with both FR1 and FR2 (three bands)

FFS

A.4.3.2B.2.3.8 EN-DC Inter-band with FR2 or with both FR1 and FR2 (four bands)

Table A.4.3.2B.2.3.8-1: Bandwidth Class Combination capabilities for EN-DC Inter-band with NR FR2, or with both FR1 and FR2, and four bands (for one or more of the supported DC configurations in Table A.4.3.2B.2.3.8-2)

FFS

Table A.4.3.2B.2.3.8-2: Supported EN-DC Intra-band non-contiguous configurations with NR FR2, or with both FR1 and FR2 (four bands)

FFS

A.4.3.2B.2.3.9 EN-DC Inter-band with FR2 or with both FR1 and FR2 (five bands)

Table A.4.3.2B.2.3.9-1: Bandwidth Class Combination capabilities for EN-DC Inter-band with NR FR2, or with both FR1 and FR2, and five bands (for one or more of the supported DC configurations in Table A.4.3.2B.2.3.9-2)

FFS

Table A.4.3.2B.2.3.9-2: Supported EN-DC Intra-band non-contiguous configurations with NR FR2, or with both FR1 and FR2 (five bands)

FFS

A.4.3.2B.2.3.10 EN-DC Inter-band with FR2 or with both FR1 and FR2 (six bands)

Table A.4.3.2B.2.3.10-1: Bandwidth Class Combination capabilities for EN-DC Inter-band with NR FR2, or with both FR1 and FR2, and six bands (for one or more of the supported DC configurations in Table A.4.3.2B.2.3.10-2)

FFS

Table A.4.3.2B.2.3.10-2: Supported EN-DC Intra-band non-contiguous configurations with NR FR2, or with both FR1 and FR2 (six bands)

FFS

A.4.3.3 PDCP Implementation Capabilities

Table A.4.3.3-1: UE PDCP Implementation Capabilities

Item	UE PDCP Implementation Capabilities	Ref.	Release	Mnemonic	M	If indicated "Yes" the feature shall be implemented and successfully tested for the corresponding release	Comments
1	Support 12 bit length of PDCP sequence number	38.306, 4.2.4	Rel-15	pc_shortSN	Yes		

A.4.3.4 RLC Implementation Capabilities

Table A.4.3.4-1: UE RLC Implementation Capabilities

Item	UE RLC Implementation Capabilities	Ref.	Release	Mnemonic	M	If indicated "Yes" the feature shall be implemented and successfully tested for the corresponding release	Comments
1	Support RLC AM with 12 bit length of RLC sequence number	38.306, 4.2.5	Rel-15	pc_am_WithShortSN	Yes		
2	Support RLC UM with 12 bit length of RLC sequence number	38.306, 4.2.5	Rel-15	pc_um_WIthLongSN	Yes		
3	Support RLC UM with 6 bit length of RLC sequence number	38.306, 4.2.5	Rel-15	pc_um_WithShortSN	Yes		

A.4.3.5 MAC Implementation Capabilities

Table A.4.3.5-1: UE MAC Implementation Capabilities

Item	UE MAC Implementation Capabilities	Ref.	Release	Mnemonic	M	If indicated "Yes" the feature shall be implemented and successfully tested for the corresponding release	Comments
1	Support long DRX cycle	38.306, 4.2.6	Rel-15	pc_longDRX_Cycle	Yes		
2	Support short DRX cycle	38.306, 4.2.6	Rel-15	pc_shortDRX_Cycle	Yes		
3	Support skipping of UL transmission for an uplink grant indicated on PDCCH if no data is available for transmission	38.306, 4.2.6	Rel-15	pc_skipUplinkTxDynamic	No		

A.4.3.6 Measurement Capabilities

Table A.4.3.6-1: UE Measurement Capabilities

Item	UE Measurement Capabilities	Ref.	Release	Mnemonic	M	If indicated "Yes" the feature shall be implemented and successfully tested for the corresponding release	Comments
1	Support NR measurements and events A triggered reporting	38.306, 4.2.9	Rel-15	pc_eventA_MeasAndReport	Yes		
2	Support two independent measurement gap configurations for FR1 and FR2	38.306, 4.2.9	Rel-15	pc_independentGapConfig	No		
3	Support NR intra-frequency and inter-frequency measurements and at least periodical reporting	38.306, 4.2.9	Rel-15	pc_intraAndInterF_MeasAndReport	Yes		
4	Support CSI-RSRP and CSI-RSRQ measurement as specified in TS38.215 [21], where CSI-RS resource is configured with an associated SS/PBCH	38.306, 4.2.9	Rel-15	pc_csi_RSRP_AndRSRQ_MeasWithSSB	No		
5	Support inter-RAT E-UTRA measurements and events B triggered reporting	38.306, 4.2.9	Rel-15	pc_eventB_MeasAndReport	Yes		
6	Support SS-SINR measurents	38.306, 4.2.9	Rel-15	pc_ss_SINR_Meas	No		

A.4.3.7 General Capabilities

Table A.4.3.7-1: UE General Capabilities

Item	UE General Capabilities	Ref.	Release	Mnemonic	M	If indicated "Yes" the feature shall be implemented and successfully tested for the corresponding release	Comments
1	Support UL transmission via either MCG path or SCG path for the split SRB as specified in TS 37.340[20]	38.306, 4.2.2	Rel-15	pc_splitSRB_WithOneUL_Path	No		
2	Support UL transmission via both MCG path and SCG path for the split DRB as specified in TS 37.340[20]	38.306, 4.2.2	Rel-15	pc_splitDRB_withUL_Both_MCG_SCG	Yes		
3	Support direct SRB between the SN and the UE as specified in TS 37.340[20]	38.306, 4.2.2	Rel-15	pc_srb3	Yes		
4	Support of reflective QoS	38.306, 4.2.2	Rel-15	pc_as_ReflectiveQoS	No		
5	Support of NAS reflective QoS	24.501, 6.2.5.1.4.1, 9.11.4.1	Rel-15	pc_nas_ReflectiveQoS	No		
6	Support of SMS over NAS	24.501, 5.5.1.2	Rel-15	pc_sms_over_NAS	No		
7	Support of CMAS message on NR	38.331, 5.2.2.2.2	Rel-15	pc_CMAS_NR	No		
8	Support of ETWS message on NR	38.331, 5.2.2.2.2	Rel-15	pc_ETWS_NR	No		
9	The UE supports additional UE-requested PDU establishment	24.501, 6.4.1.5	Rel-15	pc_Additional_PDU_establishment	No		pc_ExpectedNoOfPDUSessionsAtRegistration +1
10	The UE includes the SM PDU DN request container IE in the PDU PDU SESSION ESTABLISHMENT REQUEST message	24.501, 6.4.1.2	Rel-15	pc_SM_PDU_DN_RequestContainer	No		
11	Support of emergency services fallback	24.501, 9.11.3.5	Rel-15	pc_EmergencyService_fallback	No		

A.4.3.8 Mobility Capabilities

Table A.4.3.8-1: UE Mobility Capabilities

Item	UE Mobility Capabilities	Ref.	Release	Mnemonic	M	If indicated "Yes" the feature shall be implemented and successfully tested for the corresponding release	Comments
1	Support inter-RAT Handover to EUTRA connected to EPC	38.306, 4.2.9	Rel-15	pc_interRAT_EUTRA_Handover	Yes		
2	Support inter-frequency Handover from the corresponding duplex mode or from the corresponding frequency range.	38.306, 4.2.9	Rel-15	pc_handoverInterF	Yes		
3	Support Handover between FR1 and FR2	38.306, 4.2.9	Rel-15	pc_FR1toFR2_Handover	Yes		
4	Support Handover between FDD and TDD	38.306, 4.2.9	Rel-15	pc_FDDtoTDD_Handover	Yes		
5	Support inter-RAT Handover to E-UTRA connected to 5GC	38.306, 4.2.9	Rel-15	pc_interRAT_eLTE_Handover	Yes		

A.4.3.9 Additional capabilities for UE declared capability

Table A.4.3.9-1: UE declared capabilities

Item	UE declared capabilities	Ref.	Release	Mnemonic	Comments
1	Enhanced Type X Receiver for NR	38.101-4, 5	Rel-15	pc_nr_enh_typeX_receiver	Support for Enhanced Type X Receiver

Table A.4.3.9-2: UE declared multi-band peak EIRP relaxation factors for FR2 power class 3

Item	Supported FR2 bands set	Ref.	Release	peak EIRP relaxation factor per band, MB_p (dB) (Note 1)				Maximum sum of MB_p, $\sum MB_P$ (dB) (Note 2)	Comments
				n257	n258	n260	n261		
1	n257, n258	38.101-2, 6.2.1.3	Rel-15			N/A	N/A	1.3	
2	n257, n260				N/A		N/A	1.0	
3	n258, n260			N/A			N/A	1.0	
4	n258, n261			N/A		N/A		1.0	
5	n260, n261			N/A	N/A	N/A	N/A	0.0	No relaxation factor allowed
6	n257, n258, n260						N/A	1.7	
7	n257, n258, n261					N/A		1.7	
8	n257, n260, n261				N/A			0.5	
9	n258, n260, n261			N/A				1.5	
10	n257, n258, n260, n261							1.7	

Note 1: UE vendor to fill in the needed relaxation factor per band that is ≥0. One row to be filled in, the one matching the supported FR2 bands of the UE as declared in Table A.4.3.1-3.
Note 2: Max allowed sum of MB_p over all supported FR2 bands as defined in TS 38.521-2 clause 6.2.1.1.3.3

Table A.4.3.9-3: UE declared multi-band peak EIRP Spherical coverage relaxation factors for FR2 power class 3

Item	Supported FR2 bands set	Ref.	Release	EIRP Spherical coverage relaxation factor per band, MB_s (dB) (Note 1)				Maximum sum of MB_s, $\sum MB_s$ (dB) (Note 2)	Comments
				n257	n258	n260	n261		
1	n257, n258	38.101-2, 6.2.1.3	Rel-15			N/A	N/A	1.25	
2	n257, n260				N/A		N/A	0.75	Maximum 0.4 dB relaxation allowed for n260
3	n258, n260			N/A			N/A	0.75	Maximum 0.4 dB relaxation allowed for n260
4	n258, n261			N/A		N/A		1.25	
5	n260, n261			N/A	N/A			0.75	No relaxation allowed for n260
6	n257, n258, n260						N/A	1.75	Maximum 0.4 dB relaxation allowed for n260
7	n257, n258, n261					N/A		1.75	
8	n257, n260, n261				N/A			1.25	Maximum 0.4 dB relaxation allowed for n260
9	n258, n260, n261			N/A				1.25	Maximum 0.4 dB relaxation allowed for n260
10	n257, n258, n260, n261							1.75	Maximum 0.4 dB relaxation allowed for n260

Note 1: UE vendor to fill in the needed relaxation factor per band that is ≥0. One row to be filled in, the one matching the supported FR2 bands of the UE as declared in Table A.4.3.1-3

Note 2: Max allowed sum of MB_s over all supported FR2 bands as defined in TS 38.521-2 clause 6.2.1.1.3.3

A.4.4 Additional information

Table A.4.4-1: Additional information

Item	Additional information	Ref.	Release	Mnemonic	Comments
1	Support of ICMP or ICMP IPv6	RFC 792 OR RFC 4443, RFC 4884	NA	pc_IP_Ping	UE supports ICMP or ICMPv6 protocol to enable IP Ping Operation
2	Support of IMS	24.229, Annex U	Rel-15	pc_IMS_5GS	

Table A.4.4-2: Definition of UE implementation capabilities

Item	Definition of UE implementation capabilities	Ref.	Release	Mnemonic	Comments
1	UE-requested PDU session establishment for IMS after REGISTRATION	24.501	Rel-15	pc_PDU_IMS	Configured to initiate PDU session establishment for IMS after REGISTRATION.
2	UE-requested PDU session establishment for Internet after REGISTRATION	24.501	Rel-15	pc_PDU_Internet	Configured to initiate PDU session establishment for Internet after REGISTRATION.

Item	Definition of UE implementation capabilities	Ref.	Release	Mnemonic	Comments
3	Number of UE-requested PDU session establishments after REGISTRATION	24.501	Rel-15	pc_noOf_PDUs	Number of UE-requested PDU session establishments after REGISTRATION.

Annex B (informative): Change history

Change history							
Date	**Meeting**	**TDoc**	**CR**	**Rev**	**Cat**	**Subject/Comment**	**New version**
2017-12	RAN5#77	R5-176852	-	-	-	Introduction of TS 38.508-2	0.1.0
2018-04	RAN5#2-5G-NR Adhoc	R5-182069	-	-	-	Addition of several required PICS	0.2.1
2018-05	RAN5#79	R5-183271	-	-	-	Addition of Missing PICS	1.0.0
2018-06	RAN#80	RP-181208	-	-	-	put under revision control as v15.0.0 with small editorial changes	15.0.0
2018-09	RAN#81	R5-185161	0001	1	F	Addition of PICS	15.1.0
2018-12	RAN#82	R5-187040	0010	-	F	Addition of new band into RF baseline implementation capabilities	15.2.0
2018-12	RAN#82	R5-187777	0011	1	F	Addition of PICS	15.2.0
2019-03	RAN#83	R5-192365	0020	1	F	Introduction of Physical Layer Baseline Implementation Capabilities for NR CA, NR DC and EN-DC	15.3.0
2019-03	RAN#83	R5-192706	0019	1	F	Introduction of Non 3GPP Access over WLAN PICS	15.3.0
2019-03	RAN#83	R5-192746	0017	1	F	Addition of Capability for test cases	15.3.0
2019-03	RAN#83	R5-192747	0018	1	F	PICS Update	15.3.0
2019-03	RAN#83	R5-192748	0021	1	F	Add UE capability PDU	15.3.0
2019-06	RAN#84	R5-193576	0027	-	F	Update of Clause 2 References of 38.508-2	15.4.0
2019-06	RAN#84	R5-193577	0028	-	F	Introduction of Table A.4.3.2A.2.1-3 configuration for FR1 Intra-band contiguous CA	15.4.0
2019-06	RAN#84	R5-193756	0030	-	F	Addition of UE capability for mobility	15.4.0
2019-06	RAN#84	R5-195137	0036	1	F	Addition of ICS for FR2 Multiband Relaxation declaration	15.4.0
2019-06	RAN#84	R5-195331	0031	1	F	PICS update	15.4.0
2019-06	RAN#84	R5-195428	0035	2	F	Resubmission: Addition of optional UE capabilities for Demod	15.4.0

History

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V15.0.0	July 2018	Publication
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V15.2.0	April 2019	Publication
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