ETSI TS 138 306 V15.4.0 (2019-04)

5G;
NR;
User Equipment (UE) radio access capabilities
(3GPP TS 38.306 version 15.4.0 Release 15)

Reference
RTS/TSGR-0238306vf40

Keywords
5G

ETSI

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

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

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

Intellectual Property Rights

Essential patents

IPRs essential or potentially essential to normative deliverables may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: *"Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards"*, which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (https://ipr.etsi.org/).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Trademarks

The present document may include trademarks and/or tradenames which are asserted and/or registered by their owners. ETSI claims no ownership of these except for any which are indicated as being the property of ETSI, and conveys no right to use or reproduce any trademark and/or tradename. Mention of those trademarks in the present document does not constitute an endorsement by ETSI of products, services or organizations associated with those trademarks.

Foreword

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

The present document may refer to technical specifications or reports using their 3GPP identities, UMTS identities or GSM identities. These should be interpreted as being references to the corresponding ETSI deliverables.

The cross reference between GSM, UMTS, 3GPP and ETSI identities can be found under http://webapp.etsi.org/key/queryform.asp.

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the ETSI Drafting Rules (Verbal forms for the expression of provisions).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

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.

1 Scope

The present document defines the NR UE Radio Access Capability Parameters.

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 38.133: "NR; Requirements for support of radio resource management".

[6] 3GPP TS 38.211: "NR; Physical channels and modulation".

[7] 3GPP TS 37.340: "Evolved Universal Terrestrial Radio Access (E-UTRA) and NR Multi-connectivity".

[8] 3GPP TS 38.321: "NR; Medium Access Control (MAC) protocol specification".

[9] 3GPP TS 38.331: "NR; Radio Resource Control (RRC) protocol specification".

[10] 3GPP TS 38.212: "NR; Multiplexing and channel coding".

[11] 3GPP TS 38.213: "NR; Physical layer procedures for control".

[12] 3GPP TS 38.214: "NR; Physical layer procedures for data".

[13] 3GPP TS 38.215: "NR; Physical layer measurements".

[14] 3GPP TS 36.101: "Evolved Universal Terrestrial Radio Access (E-UTRA) radio transmission and reception".

[15] 3GPP TS 36.306: "Evolved Universal Terrestrial Radio Access (E-UTRA) User Equipment (UE) radio access capabilities".

[16] 3GPP TS 38.323: "NR; Packet Data Convergence Protocol (PDCP) specification".

[17] 3GPP TS 36.331: "Evolved Universal Terrestrial Radio Access (E-UTRA) Radio Resource Control (RRC); Protocol Specification".

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].

Fallback band combination: A band combination that would result from another band combination by releasing at least one SCell or uplink configuration of SCell. An intra-band non-contiguous band combination is not considered to be a fallback band combination of an intra-band contiguous band combination.

Fallback per band feature set: A feature set per band that has same or lower values than the reported values from the reported feature set per band for a given band.

Fallback per CC feature set: A feature set per CC that has lower value of UE supported MIMO layers and BW while keeping the numerology and other parameters the same from the reported feature set per CC for a given carrier per band.

3.2 Symbols

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

MaxDLDataRate: Maximum DL data rate
MaxDLDataRate_MN: Maximum DL data rate in the MN
MaxDLDataRate_SN: Maximum DL data rate in the SN
MaxULDataRate: Maximum UL data rate

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].

BC Band Combination
DL Downlink
FS Feature Set
FSPC Feature Set Per Component-carrier
MAC Medium Access Control
MCG Master Cell Group
MN Master Node
MR-DC Multi-RAT Dual Connectivity
PDCP Packet Data Convergence Protocol
RLC Radio Link Control
RTT Round Trip Time
SCG Secondary Cell Group
SDAP Service Data Adaptation Protocol
SN Secondary Node
UL Uplink

4 UE radio access capability parameters

4.1 Supported max data rate

4.1.1 General

The DL and UL max data rate supported by the UE is calculated by band or band combinations supported by the UE. A UE supporting MR-DC shall support the calculated DL and UL max data rate defined in 4.1.2.

4.1.2 Supported max data rate

For NR, the approximate data rate for a given number of aggregated carriers in a band or band combination is computed as follows.

$$\text{data rate (in Mbps)} = 10^{-6} \cdot \sum_{j=1}^{J} \left(v_{Layers}^{(j)} \cdot Q_m^{(j)} \cdot f^{(j)} \cdot R_{\max} \cdot \frac{N_{PRB}^{BW(j),\mu} \cdot 12}{T_s^{\mu}} \cdot \left(1 - OH^{(j)}\right) \right)$$

wherein

J is the number of aggregated component carriers in a band or band combination
R_{max} = 948/1024
For the j-th CC,

$v_{Layers}^{(j)}$ is the maximum number of supported layers given by higher layer parameter *maxNumberMIMO-LayersPDSCH* for downlink and maximum of higher layer parameters *maxNumberMIMO-LayersCB-PUSCH* and *maxNumberMIMO-LayersNonCB-PUSCH* for uplink.

$Q_m^{(j)}$ is the maximum supported modulation order given by higher layer parameter *supportedModulationOrderDL* for downlink and higher layer parameter *supportedModulationOrderUL* for uplink.

$f^{(j)}$ is the scaling factor given by higher layer parameter *scalingFactor* and can take the values 1, 0.8, 0.75, and 0.4.

μ is the numerology (as defined in TS 38.211 [6])

T_s^{μ} is the average OFDM symbol duration in a subframe for numerology μ, i.e. $T_s^{\mu} = \frac{10^{-3}}{14 \cdot 2^{\mu}}$. Note that normal cyclic prefix is assumed.

$N_{PRB}^{BW(j),\mu}$ is the maximum RB allocation in bandwidth $BW^{(j)}$ with numerology μ, as defined in 5.3 TS 38.101-1 [2] and 5.3 TS 38.101-2 [3], where $BW^{(j)}$ is the UE supported maximum bandwidth in the given band or band combination.

$OH^{(j)}$ is the overhead and takes the following values

0.14, for frequency range FR1 for DL
0.18, for frequency range FR2 for DL
0.08, for frequency range FR1 for UL
0.10, for frequency range FR2 for UL

NOTE: Only one of the UL or SUL carriers (the one with the higher data rate) is counted for a cell operating SUL.

The approximate maximum data rate can be computed as the maximum of the approximate data rates computed using the above formula for each of the supported band or band combinations.

For EUTRA in case of MR-DC, the approximate data rate for a given number of aggregated carriers in a band or band combination is computed as follows.

$$\text{Data rate (in Mbps)} = 10^{-3} \cdot \sum_{j=1}^{J} TBS_j$$

wherein

J is the number of aggregated EUTRA component carriers in MR-DC band combination

TBS_j is the total maximum number of DL-SCH transport block bits received within a 1ms TTI for j-th CC, as derived from TS36.213 [22] based on the UE supported maximum MIMO layers for the j-th carrier, and based on the modulation order and number of PRBs based on the bandwidth of the j-th carrier.

The approximate maximum data rate can be computed as the maximum of the approximate data rates computed using the above formula for each of the supported band or band combinations.

For MR-DC, the approximate maximum data rate is computed as the sum of the approximate maximum data rates from NR and EUTRA.

4.1.3 Void

4.1.4 Total layer 2 buffer size

The total layer 2 buffer size is defined as the sum of the number of bytes that the UE is capable of storing in the RLC transmission windows and RLC reception and reordering windows and also in PDCP reordering windows for all radio bearers.

The required total layer 2 buffer size in MR-DC and NR-DC is the maximum value of the calculated values based on the following equations:

- *MaxULDataRate_MN * RLCRTT_MN + MaxULDataRate_SN * RLCRTT_SN + MaxDLDataRate_SN * RLCRTT_SN + MaxDLDataRate_MN * (RLCRTT_SN + X2/Xn delay + Queuing in SN*)

- *MaxULDataRate_MN * RLCRTT_MN + MaxULDataRate_SN * RLCRTT_SN + MaxDLDataRate_MN * RLCRTT_MN + MaxDLDataRate_SN * (RLCRTT_MN + X2/Xn delay + Queuing in MN*)

Otherwise it is calculated by *MaxDLDataRate * RLC RTT + MaxULDataRate * RLC RTT*.

NOTE: Additional L2 buffer required for preprocessing of data is not taken into account in above formula.

The required total layer 2 buffer size is determined as the maximum total layer 2 buffer size of all the calculated ones for each band combination and the applicable Feature Set combination in the supported MR-DC or NR band combinations. The RLC RTT for NR cell group corresponds to the smallest SCS numerology supported in the band combination and the applicable Feature Set combination.

wherein

X2/Xn delay + Queuing in SN = 25ms if SCG is NR, and 55ms if SCG is EUTRA

X2/Xn delay + Queuing in MN = 25ms if MCG is NR, and 55ms if MCG is EUTRA

RLC RTT for EUTRA cell group = 75ms

RLC RTT for NR cell group is defined in Table 4.1.4-1

Table 4.1.4-1: RLC RTT for NR cell group per SCS

SCS (KHz)	RLC RTT (ms)
15KHz	50
30KHz	40
60KHz	30
120KHz	20

4.2 UE Capability Parameters

4.2.1 Introduction

The UE may support different functionalities between FDD and TDD, and/or between FR1 and FR2. The UE shall indicate the UE capabilities as follows.

1> set all fields of UE-NR/MRDC-Capability except fdd-Add-UE-NR/MRDC-Capabilities, tdd-Add-UE-NR/MRDC-Capabilities, fr1-Add-UE-NR/MRDC-Capabilities and fr2-Add-UE-NR/MRDC-Capabilities, to include the values applicable for all duplex mode(s) and frequency range(s) that the UE supports;

1> if UE supports both FDD and TDD and if (some of) the UE capability fields have a different value for FDD and TDD

2> if for FDD, the UE supports additional functionality compared to what is indicated by the previous fields of UE-NR/MRDC-Capability:

3> include field fdd-Add-UE-NR/MRDC-Capabilities and set it to include fields reflecting the additional functionality applicable for FDD;

2> if for TDD, the UE supports additional functionality compared to what is indicated by the previous fields of UE-NR/MRDC-Capability:

3> include field tdd-Add-UE-NR/MRDC-Capabilities and set it to include fields reflecting the additional functionality applicable for TDD;

1> if UE supports both FR1 and FR2 and if (some of) the UE capability fields have a different value for FR1 and FR2:

2> if for FR1, the UE supports additional functionality compared to what is indicated by the previous fields of UE-NR/MRDC-Capability:

3> include field fr1-Add-UE-NR/MRDC-Capabilities and set it to include fields reflecting the additional functionality applicable for FR1;

2> if for FR2, the UE supports additional functionality compared to what is indicated by the previous fields of UE-NR/MRDC-Capability:

3> include field fr2-Add-UE-NR/MRDC-Capabilities and set it to include fields reflecting the additional functionality applicable for FR2;

4.2.2 General parameters

Definitions for parameters	Per	M	FDD-TDD DIFF	FR1-FR2 DIFF
delayBudgetReporting Indicates whether the UE supports delay budget reporting as specified in TS 38.331 [9].	UE	No	No	No
inactiveState Indicates whether the UE supports RRC_inactive as specified in TS 38.331 [9].	UE	Yes	No	No
overheatingInd Indicates whether the UE supports overheating assistance information.	UE	No	No	No
splitSRB-WithOneUL-Path Indicates whether the UE supports UL transmission via either MCG path or SCG path for the split SRB as specified in TS 37.340 [7].	UE	No	Yes	No
splitDRB-withUL-Both-MCG-SCG Indicates whether the UE supports UL transmission via both MCG path and SCG path for the split DRB as specified in TS 37.340 [7].	UE	Yes	Yes	No
srb3 Indicates whether the UE supports direct SRB between the SN and the UE as specified in TS 37.340 [7].	UE	Yes	Yes	No
v2x-EUTRA Indicates whether the UE supports EUTRA V2X according to *UE-EUTRA-Capability* as defined in [x], independent of the configured EN-DC band combination.	UE	No	No	No

4.2.3 SDAP Parameters

Definitions for parameters	Per	M	FDD-TDD DIFF
as-ReflectiveQoS Indicates whether the UE supports reflective QoS.	UE	No	No

4.2.4 PDCP Parameters

Definitions for parameters	Per	M	FDD-TDD DIFF
continueROHC-Context Defines whether the UE supports ROHC context continuation operation where the UE does not reset the current ROHC context upon handover.	UE	No	No
maxNumberROHC-ContextSessions Defines the maximum number of header compression context sessions supported by the UE, excluding context sessions that leave all headers uncompressed.	UE	No	No
outOfOrderDelivery Indicates whether UE supports Out of order delivery of data to upper layers by PDCP.	UE	No	No
pdcp-DuplicationMCG-OrSCG-DRB Indicates whether the UE supports CA-based PDCP duplication over MCG or SCG DRB as specified in TS 38.323 [16].	UE	No	No
pdcp-DuplicationSplitDRB Indicates whether the UE supports PDCP duplication over split DRB as specified in TS 38.323 [16].	UE	No	No
pdcp-DuplicationSplitSRB Indicates whether the UE supports PDCP duplication over split SRB1/2 as specified in TS 38.323 [16].	UE	No	No
pdcp-DuplicationSRB Indicates whether the UE supports CA-based PDCP duplication over SRB1/2 and/or, if EN-DC is supported, SRB3 as specified in TS 38.323 [16].	UE	No	No
shortSN Indicates whether the UE supports 12 bit length of PDCP sequence number.	UE	Yes	No
supportedROHC-Profiles Defines which ROHC profiles from the list below are supported by the UE: - 0x0000 ROHC No compression (RFC 5795) - 0x0001 ROHC RTP/UDP/IP (RFC 3095, RFC 4815) - 0x0002 ROHC UDP/IP (RFC 3095, RFC 4815) - 0x0003 ROHC ESP/IP (RFC 3095, RFC 4815) - 0x0004 ROHC IP (RFC 3843, RFC 4815) - 0x0006 ROHC TCP/IP (RFC 6846) - 0x0101 ROHC RTP/UDP/IP (RFC 5225) - 0x0102 ROHC UDP/IP (RFC 5225) - 0x0103 ROHC ESP/IP (RFC 5225) - 0x0104 ROHC IP (RFC 5225) A UE that supports one or more of the listed ROHC profiles shall support ROHC profile 0x0000 ROHC uncompressed (RFC 5795).	UE	No	No
uplinkOnlyROHC-Profiles Indicates which ROHC profile(s) from the list below are supported in uplink-only ROHC operation by the UE. - 0x0006 ROHC TCP (RFC [6846]) A UE that supports uplink-only ROHC profile(s) shall support ROHC profile 0x0000 ROHC uncompressed (RFC 5795).	UE	No	No

4.2.5 RLC parameters

Definitions for parameters	Per	M	FDD-TDD DIFF
am-WithShortSN Indicates whether the UE supports AM DRB with 12 bit length of RLC sequence number.	UE	Yes	No
um-WIthLongSN Indicates whether the UE supports UM DRB with 12 bit length of RLC sequence number.	UE	Yes	No
um-WithShortSN Indicates whether the UE supports UM DRB with 6 bit length of RLC sequence number.	UE	Yes	No

4.2.6 MAC parameters

Definitions for parameters	Per	M	FDD-TDD DIFF	FR1-FR2 DIFF
lch-ToSCellRestriction Indicates whether the UE supports restricting data transmission from a given LCH to a configured (sub-) set of serving cells (see allowedServingCells in LogicalChannelConfig). A UE supporting pdcp-Duplication (see PDCP-Config) shall also support lch-ToSCellRestriction.	UE	No	No	No
lcp-Restriction Indicates whether UE supports the selection of logical channels for each UL grant based on RRC configured restriction.	UE	No	No	No
logicalChannelSR-DelayTimer Indicates whether the UE supports the logicalChannelSR-DelayTimer as specified in TS 38.321 [8].	UE	No	Yes	No
longDRX-Cycle Indicates whether UE supports long DRX cycle as specified in TS 38.321 [8].	UE	Yes	Yes	No
multipleConfiguredGrants Indicates whether UE supports more than one configured grant configurations (including both Type 1 and Type 2) in a cell group. For each cell, the UE supports at most one configured grant per BWP and the maximum number of configured grant configurations per cell group is 2. If absent, for each configured cell group, the UE only supports one configured grant configuration on one serving cell.	UE	No	Yes	No
multipleSR-Configurations Indicates whether the UE supports TS 38.321 [8] SR configurations per cell group.	UE	No	Yes	No
recommendedBitRate Indicates whether the UE supports the bit rate recommendation message from the gNB to the UE as specified in TS 38.321 [8].	UE	No	No	No
recommendedBitRateQuery Indicates whether the UE supports the bit rate recommendation query message from the UE to the gNB as specified in TS 38.321 [8]. This field is only applicable if the UE supports recommendedBitRate.	UE	No	No	No
shortDRX-Cycle Indicates whether UE supports short DRX cycle as specified in TS 38.321 [8].	UE	Yes	Yes	No
skipUplinkTxDynamic Indicates whether the UE supports skipping of UL transmission for an uplink grant indicated on PDCCH if no data is available for transmission as specified in TS 38.321 [8].	UE	No	Yes	No

4.2.7 Physical layer parameters

4.2.7.1 *BandCombinationList* parameters

Definitions for parameters	Per	M	FDD-TDD DIFF	FR1-FR2 DIFF
bandEUTRA Defines supported EUTRA frequency band by NR frequency band number, as specified in TS 36.101.	Band	Yes	No	No
bandNR Defines supported NR frequency band by NR frequency band number, as specified in TS 38.101-1 [2] and TS 38.101-2 [3].	Band	Yes	No	No
ca-BandwidthClassDL-EUTRA Defines for DL, the class defined by the aggregated transmission bandwidth configuration and maximum number of component carriers supported by the UE, as specified in TS 36.101.	Band	No	No	No
ca-BandwidthClassDL-NR Defines for DL, the class defined by the aggregated transmission bandwidth configuration and maximum number of component carriers supported by the UE, as specified in TS 38.101-1 [2] and TS 38.101-2 [3].	Band	No	No	No
ca-BandwidthClassUL-EUTRA Defines for UL, the class defined by the aggregated transmission bandwidth configuration and maximum number of component carriers supported by the UE, as specified in TS 36.101.	Band	No	No	No
ca-BandwidthClassUL-NR Defines for UL, the class defined by the aggregated transmission bandwidth configuration and maximum number of component carriers supported by the UE, as specified in TS 38.101-1 [2] and TS 38.101-2 [3].	Band	No	No	No
ca-ParametersEUTRA Contains the EUTRA part of band combination parameters for a given EN-DC band combination.	BC	No	No	No
ca-ParametersNR Contains the NR band combination parameters for a given EN-DC and/or NR CA band combination.	BC	No	No	No
featureSetCombination Indicates the feature set that the UE supports on the NR CA and/or MR-DC band combination by FeatureSetCombinationId. It is mandatory for the UE supporting NR CA and/or MR-DC.	BC	Yes /No	No	No
mrdc-Parameters Contains the band combination parameters for a given EN-DC band combination.	BC	No	No	No
srs-SwitchingTimeNR Indicates the interruption time on DL/UL reception within a NR band pair during the RF retuning for switching between a carrier on one band and another (PUSCH-less) carrier on the other band to transmit SRS. *switchingTimeDL/ switchingTimeUL :* n0 represents 0 us, n30us represents 30us, and so on. *switchingTimeDL/ switchingTimeDL* is mandatory present if switching between the NR band pair is supported, otherwise the field is absent.	Paired bands per BC	No	No	No
srs-SwitchingTimeEUTRA indicates the interruption time on DL/UL reception within a EUTRA band pair during the RF retuning for switching between a carrier on one band and another (PUSCH-less) carrier on the other band to transmit SRS. *switchingTimeDL/ switchingTimeUL:* n0 represents 0 OFDM symbols, n0dot5 represents 0.5 OFDM symbols, n1 represents 1 OFDM symbol and so on. *switchingTimeDL/ switchingTimeUL* is mandatory present if switching between the EUTRA band pair is supported, otherwise the field is absent.	Paired bands per BC	No	No	No

SRS-TxSwitch-v15xy Defines whether UE supports SRS antenna port switching as defined in clause 6.2.1.2 of TS 38.214 [12]. The capability signalling comprises of the following parameters: - *supportedSRS-TxPortSwitch* indicates SRS Tx port switching pattern supported by the UE. The indicated UE antenna switching capability of 'xTyR' corresponds to a UE, capable of SRS transmission on 'x' antenna ports over total of 'y' antennas, where 'y' corresponds to all or subset of UE receive antennas; - *txSwitchImpactToRx* indicates the entry number of the first-listed band with UL in the band combination that affects this DL; - *txSwitchWithAnotherBand* indicates the entry number of the first-listed band with UL in the band combination that switches together with this UL. For *txSwitchImpactToRx* and *txSwitchWithAnotherBand*, value 1 means first entry, value 2 means second entry and so on. All DL and UL that switch together indicate the same entry number. The UE is restricted not to include fallback band combinations for the purpose of indicating different SRS antenna switching capabilities.	BC	Tbd	No	No
supportedBandwidthCombinationSet Defines the supported bandwidth combination for the band combination set as defined in the TS 38.101-1 [2], TS 38.101-2 [3] and TS 38.101-3 [4]. Field encoded as a bit map, where bit N is set to "1" if UE support Bandwidth Combination Set N for this band combination as defined in the TS 38.101-1 [2], TS 38.101-2 [3] and TS 38.101-3 [4]. The leading / leftmost bit (bit 0) corresponds to the Bandwidth Combination Set 0, the next bit corresponds to the Bandwidth Combination Set 1 and so on.	BC	Tbd	No	No

4.2.7.2 *BandNR parameters*

Definitions for parameters	Per	M	FDD-TDD DIFF	FR1-FR2 DIFF
additionalActiveTCI-StatePDCCH Indicates whether the UE supports one additional active TCI-State for control in addition to the supported number of active TCI-States for PDSCH. The UE can include this field only if *maxNumberConfiguredTCIstatesPerCC* in *tci-StatePDSCH* is set to 1. Otherwise, the UE does not include this field.	Band	Yes	No	No
aperiodicBeamReport Indicates whether the UE supports aperiodic 'CRI/RSRP' or 'SSBRI/RSRP' reporting on PUSCH. For FR2, it is mandatory.	Band	Yes /No	No	No
aperiodicTRS Indicates whether the UE supports DCI triggering aperiodic TRS associated with periodic TRS.	Band	No	No	No
bandNR Defines supported NR frequency band by NR frequency band number, as specified in TS 38.101-1 [2] and TS 38.101-2 [3].	Band	Yes	No	No
beamCorrespondence Indicates whether UE supports beam correspondence as defined in <TBD RAN4 >.	Band	Tbd	No	No
beamCorrespondenceCA Indicates whether UE configured with CA supports the same beam correspondence across all CCs as defined in <TBD RAN4 >.	Band	Tbd	No	No
beamManagementSSB-CSI-RS Defines support of SS/PBCH and CSI-RS based RSRP measurements. The capability comprises signalling of - *maxNumberSSB-CSI-RS-ResourceOneTx* indicates maximum total number of one port NZP CSI-RS resources and SS/PBCH blocks that are supported by the UE for 'CRI/RSRP' and 'SSBRI/RSRP' reporting within a slot and across all serving cells. Support of n8 is mandatory for at least for >6Ghz bands. - *maxNumberCSI-RS-Resource* indicates maximum total number of NZP-CSI-RS resources that are supported by the UE for 'CRI/RSRP' or 'SSBRI/RSRP' reporting within a slot and across all serving cells. It is mandated to report at least n8 for FR1. - *maxNumberCSI-RS-ResourceTwoTx* indicates maximum total number of two ports NZP CSI-RS resources that are supported by the UE for 'CRI/RSRP' or 'SSBRI/RSRP' reporting within a slot and across all serving cells. - *supportedCSI-RS-Density* indicates density of one RE per PRB for one port NZP CSI-RS resource for RSRP reporting, if supported. At least density of CSI-RS = 3 or both 1 and 3 is mandatory. - *maxNumberAperiodicCSI-RS-Resource* indicates maximum number of aperiodic CSI-RS resources across all CCs. For FR1 and FR2, the UE is mandated to report at least n4.	Band	Yes	No	No
beamReportTiming Indicates the number of OFDM symbols between the last symbol of SSB/CSI-RS and the first symbol of the transmission channel containing beam report. The UE includes this field for each supported sub-carrier spacing.	Band	Yes	No	No
beamSwitchTiming Indicates the minimum number of OFDM symbols between the DCI triggering of aperiodic CSI-RS and aperiodic CSI-RS transmission. The number of OFDM symbols is measured from the last symbol containing the indication to the first symbol of CSI-RS. The UE includes this field for each supported sub-carrier spacing.	Band	No	No	FR2 only
bwp-DiffNumerology Indicates whether the UE supports BWP adaptation up to 4 BWPs with the different numerologies, via DCI and timer. For the UE capable of this feature, the bandwidth of a UE-specific RRC configured BWP includes the bandwidth of the CORESET#0 (if CORESET#0 is present) and SSB for PCell and PSCell (if configured). For SCell(s), the bandwidth of the UE-specific RRC configured BWP includes SSB, if there is SSB on SCell(s).	Band	No	No	No

bwp-SameNumerology Defines type A/B BWP adaptation (up to 2/4 BWPs) with the same numerology, via DCI and timer. For the UE capable of this feature, the bandwidth of a UE-specific RRC configured BWP includes the bandwidth of the CORESET#0 (if CORESET#0 is present) and SSB for PCell and PSCell (if configured). For SCell(s), the bandwidth of the UE-specific RRC configured BWP includes SSB, if there is SSB on SCell(s).	Band	No	No	No
bwp-WithoutRestriction Indicates support of BWP operation without bandwidth restriction. The Bandwidth restriction in terms of BWP for PCell and PSCell means that the bandwidth of a UE-specific RRC configured BWP may not include the bandwidth of initial DL BWP and SSB. For SCell(s), it means that the bandwidth of BWP may not include SSB.	Band	No	No	No
channelBWs-DL Indicates for each subcarrier spacing whether the UE supports channel bandwidths lower than the maximum channel bandwidth as defined in TS 38.101-1 [2] and TS 38.101-2 [3]. If this parameter is not included, the UE supports all channel bandwidths. For FR1, the bits starting from the leading / leftmost bit indicate 5, 10, 15, 20, 25, 30, 40, 50, 60 and 80MHz. For FR2, the bits starting from the leading / leftmost bit indicate 50, 100 and 200MHz.	Band	Yes	No	No
channelBWs-UL Indicates for each subcarrier spacing whether the UE supports channel bandwidths lower than the maximum channel bandwidth as defined in TS 38.101-1 [2] and TS 38.101-2 [3]. If this parameter is not included, the UE supports all channel bandwidths. For FR1, the bits starting from the leading / leftmost bit indicate 5, 10, 15, 20, 25, 30, 40, 50, 60 and 80MHz. For FR2, the bits starting from the leading / leftmost bit indicate 50, 100 and 200MHz.	Band	Yes	No	No

codebookParameters Indicates the codebooks and the corresponding parameters supported by the UE. Parameters for type I single panel codebook (type1 singlePanel) supported by the UE: - *supportedCSI-RS-ResourceList*; - *modes* indicates supported codebook modes (mode 1, both mode 1 and mode 2); - *maxNumberCSI-RS-PerResourceSet* indicates the maximum number of CSI-RS resource in a resource set. Parameters for type I multi-panel codebook (type1 multiPanel) supported by the UE: - *supportedCSI-RS-ResourceList*; - *modes* indicates supported codebook modes (mode 1, mode 2, or both mode 1 and mode 2); - *maxNumberCSI-RS-PerResourceSet* indicates the maximum number of CSI-RS resource in a resource set; - *nrofPanels* indicates supported number of panels. Parameters for type II codebook (type2) supported by the UE: - *supportedCSI-RS-ResourceList*; - *parameterLx* indicates the parameter "Lx" in codebook generation where x is an index of Tx ports indicated by *maxNumberTxPortsPerResource*; - *amplitudeScalingType* indicates the amplitude scaling type supported by the UE (wideband or both wideband and sub-band); - *amplitudeSubsetRestriction* indicates whether amplitude subset restriction is supported for the UE. Parameters for type II codebook with port selection (type2-PortSelection) supported by the UE: - *supportedCSI-RS-ResourceList*; - *parameterLx* indicates the parameter "Lx" in codebook generation where x is an index of Tx ports indicated by *maxNumberTxPortsPerResource*; - *amplitudeScalingType* indicates the amplitude scaling type supported by the UE (wideband or both wideband and sub-band). Parameters for the calculation of the precoder for SRS transmission based on channel measurements using associated NZP CSI-RS resource (srs-AssocCSI-RS) as described in clause 6.1.1.2 of TS 38.214 [12]. UE supporting this feature shall also indicate support of non-codebook based PUSCH transmission. - *supportedCSI-RS-ResourceList*. *supportedCSI-RS-ResourceList* includes list of the following parameters: - *maxNumberTxPortsPerResource* indicates the maximum number of Tx ports in a resource across all CCs simultaneously; - *maxNumberResourcesPerBand* indicates the maximum number of resources across all CCs within a band simultaneously; - *totalNumberTxPortsPerBand* indicates the total number of Tx ports across all CCs within a band simultaneously.	Band	Tbd	No	No
crossCarrierSchedulingDL-SameSCS Indicates whether the UE supports cross carrier scheduling for the same numerology in DL carrier aggregation with carrier indicator field (CIF).	Band	No	Yes	No
crossCarrierSchedulingUL-SameSCS Indicates whether the UE supports cross carrier scheduling for the same numerology in UL carrier aggregation with carrier indicator field (CIF).	Band	No	Yes	No

csi-ReportFramework Indicates whether the UE supports CSI report framework. This capability signalling comprises the following parameters: - *maxNumberPeriodicCSI-PerBWP- ForCSI-Report* indicates the maximum number of periodic CSI report setting per BWP for CSI report; - *maxNumberPeriodicCSI-PerBWP-ForBeamReport* indicates the maximum number of periodic CSI report setting per BWP for beam report. The CSI report in *maxNumberPeriodicCSI-PerBWP-ForBeamReport* includes the beam report and CSI report; - *maxNumberAperiodicCSI-PerBWP-ForCSI-Report* indicates the maximum number of aperiodic CSI report setting per BWP for CSI report; - *maxNumberAperiodicCSI-PerBWP-ForBeamReport* indicates the maximum number of aperiodic CSI report setting per BWP for beam report; - *maxNumberAperidicCSI-triggeringStatePerCC* indicates the maximum nuber of aperiodic CSI triggering states in *CSI-AperiodicTriggerStateList* per cc; - *maxNumberSemiPersistentCSI-PerBWP-ForCSI-Report* indicates the maximum number of semi-persistent CSI report setting per BWP for CSI report; - *maxNumberSemiPersistentCSI-PerBWP-ForBeamReport* indicates the maximum number of semi-persistent CSI report setting per BWP for beam report; - *simultaneousCSI-ReportsPerCC* indicates the number of CSI report(s) which the UE can simultaneously process in a CC. The CSI report comprises periodic, semi-persistent and aperiodic CSI and any latency classes and codebook types;	Band or UE	Yes	No	No
csi-RS-ForTracking Indicates support of CSI-RS for tracking (i.e. TRS). This capability signalling comprises the following parameters: - *maxBurstLength* indicates the TRS burst length. Value 1 indicates 1 slot and value 2 indicates both of 1 slot and 2 slots. In this release UE is mandated to report value 2; - *maxSimultaneousResourceSetsPerCC* indicates the maximum number of TRS resource sets per CC which the UE can track simultaneously; - *maxConfiguredResourceSetsPerCC* indicates the maximum number of TRS resource sets configured to UE per CC. It is mandated to report at least 8 for FR1 and [8 or 16 or 32] for FR2; - *maxConfiguredResourceSetsAllCC* indicates the maximum number of TRS resource sets configured to UE across CCs.	Band	Yes	No	No
csi-RS-IM-ReceptionForFeedback Indicates support of CSI-RS and CSI-IM reception for CSI feedback. This capability signalling comprises the following parameters: - *maxConfigNumberNZP-CSI-RS-PerCC* indicates the maximum number of configured NZP-CSI-RS resources per CC; - *maxConfigNumberPortsAcrossNZP-CSI-RS-PerCC* indicates the maximum number of ports across all configured NZP-CSI-RS resources per CC; - *maxConfigNumberCSI-IM-PerCC* indicates the maximum number of configured CSI-IM resources per CC; - *maxNumberSimultaneousNZP-CSI-RS-PerCC* indicates the maximum number of simultanesous CSI-RS-resources per CC; - *totalNumberPortsSimultaneousNZP-CSI-RS-PerCC* indicates the total number of CSI-RS ports in simultaneous CSI-RS resources per CC.	Band or UE	Yes	No	No

csi-RS-ProcFrameworkForSRS Indicates support of CSI-RS processing framework for SRS. This capability signalling comprises the following parameters: - *maxNumberPeriodicSRS-AssocCSI-RS-PerBWP* indicates the maximum number of periodic SRS resources associated with CSI-RS per BWP; - *maxNumberAperiodicSRS-AssocCSI-RS-PerBWP* indicates the maximum number of aperiodic SRS resources associated with CSI-RS per BWP; - *maxNumberSP-SRS-AssocCSI-RS-PerBWP* indicates the maximum number of semi-persistent SRS resources associated with CSI-RS per BWP; - *simultaneousSRS-AssocCSI-RS-PerCC* indicates the number of SRS resources that the UE can process simultaneously in a CC, including periodic, aperiodic and semi-persistent SRS.	Band or UE	No	No	No
extendedCP Indicates whether the UE supports 60 kHz subcarrier spacing with extended CP length for reception of PDCCH, and PDSCH, and transmission of PUCCH, PUSCH, and SRS.	Band	No	No	No
groupBeamReporting Indicates whether UE supports RSRP reporting for the group of two reference signals.	Band	No	No	No
maxNumberActiveTCI-PerBWP Defines maximum number of TCI states for PDSCH reception that can be activated for the UE using MAC Control Element from the set of RRC configured TCI states as defined in TS 38.214 [12] clause 5.1.5.	Band	Tbd	No	No
maxNumberConfiguredTCIstatesPerCC Defines maximum number of TCI states that can be configured for the UE using RRC signalling. This value shall not be lower than the maximum number of TCI states supported by the UE for MAC Control Element activation.	Band	Tbd	No	No
maxNumberCSI-RS-BFD Indicates maximal number of CSI-RS resources across all CCs for UE to monitor PDCCH quality. In this release, the maximum value supported by the UE is upto 16.	Band	Tbd	No	No
maxNumberCSI-RS-SSB-CBD Defines maximal number of different CSI-RS [and/or SSB] resources across all CCs for new beam identifications. In this release, the maximum value supported by the UE is upto 128.	Band	Tbd	No	No
maxNumberNonGroupBeamReporting Defines support of non-group based RSRP reporting using N_max RSRP values reported.	Band	Yes	No	No
maxNumberRxBeam Defines whether UE supports receive beamforming switching using NZP CSI-RS resource. UE shall indicate a single value for the preferred number of NZP CSI-RS resource repetitions per CSI-RS resource set. Support of Rx beam switching is mandatory for FR2.	Band	Yes /No	No	No
maxNumberRxTxBeamSwitchDL Defines the number of Tx and Rx beam changes UE can perform within a slot across all configured serving cells. UE shall report one value per each subcarrier spacing supported by the UE. In this release, the number of Tx and Rx beam changes for scs-15kHz and scs-30kHz are not included.	Band	No	No	FR2 only
maxNumberSSB-BFD Defines maximal number of different SSBs across all CCs for UE to monitor PDCCH quality. In this release, the maximum value supported by the UE is upto 16.	Band	Tbd	No	No
maxUplinkDutyCycle-PC2-FR1 Indicates the maximum percentage of uplink symbols can be scheduled within a certain evaluation period so as to ensure compliance with applicable electromagnetic energy absorption requirements provided by regulatory bodies. This field is only applicable for FR1 power class 2 UE as specified in TS38.101. If the field is absent, 50% shall be applied. Value n60 corresponds to 60%, value n70 corresponds to 70% and so on.	Band	Tbd	No	FR1 only
modifiedMPR-Behaviour Indicates whether UE supports UE maximum output power modified by MPR defined in TS 38.101-1 [2] and TS 38.101-2 [3].	Band	No	No	No

multipleTCI Indicates whether UE supports more than one TCI state configurations per CORESET. UE is only required to track one active TCI state per CORESET. UE is required to support minimum between 64 and number of configured TCI states indicated by *tci-StatePDSCH*.	Band	Yes	No	No
pdsch-256QAM-FR2 Indicates whether the UE supports 256QAM for PDSCH for FR2.	Band	No	No	FR2 only
periodicBeamReport Indicates whether UE supports periodic 'CRI/RSRP' or 'SSBRI/RSRP' reporting using PUCCH formats 2, 3 and 4 in one slot. For FR2, it is mandatory.	Band	Yes /No	No	No
powerBoosting-pi2BPSK Indicates whether UE supports power boosting for pi/2 BPSK, which is applicable to power class 3 in TDD bands n40, n77, n78 and n79 with duty cycle less than 40%.	Band	No	TDD only	FR1 only
ptrs-DensityRecommendationSetDL For each supported sub-carrier spacing, indicates preferred threshold sets for determining DL PTRS density. It is mandated for FR2. For each supported sub-carrier spacing, this field comprises: - two values of *frequencyDensity*; - three values of *timeDensity*.	Band	Yes /No	No	No
ptrs-DensityRecommendationSetUL For each supported sub-carrier spacing, indicates preferred threshold sets for determining UL PTRS density. For each supported sub-carrier spacing, this field comprises: - two values of *frequencyDensity*; - three values of *timeDensity*; - five values of *sampleDensity*.	Band	No	No	No
pucch-SpatialRelInfoMAC-CE Indicates whether the UE supports indication of PUCCH-spatialrelationinfo by a MAC CE per PUCCH resource. It is mandatory for FR2 and optional for FR1.	Band	Yes /No	No	Yes
pusch-256QAM Indicates whether the UE supports 256QAM for PUSCH.	Band	No	No	No
pusch-TransCoherence Defines support of the uplink codebook subset by the UE for UL precoding for PUSCH transmission as described in clause 6.1.1.1 of TS 38.214 [12]. UE indicated support of partial coherent codebook subset shall also support non-coherent codebook subset. UE indicated support of full coherent codebook subset shall also support partial and non-coherent codebook subset.	Band	No	No	No
rateMatchingLTE-CRS Indicates whether the UE supports receiving PDSCH with resource mapping that excludes the REs determined by the higher layer configuration LTE-carrier configuring common RS, as specified in TS 38.214 [12].	Band	Yes	No	No
spatialRelations Indicates whether the UE supports spatial relations. The capability signalling comprises the following parameters. - *maxNumberConfiguredSpatialRelations* indicates the maximum number of configures spatial relations per CC for PUCCH and SRS; - *maxNumberActiveSpatialRelations* indicates the maximum number of active spatial relations with regarding to PUCCH and SRS for PUSCH, per BWP per CC; - *additionalActiveSpatialRelationPUCCH* indicates support of one additional active spatial relations for PUCCH, which is mandatory; - *maxNumberDL-RS-QCL-TypeD* indicates the maximum number of downlink RS resources used for QCL type D in the active TCI states and active spatial relation information.	Band	No	No	No
sp-BeamReportPUCCH Indicates support of semi-persistent 'CRI/RSRP' or 'SSBRI/RSRP' reporting using PUCCH formats 2, 3 and 4 in one slot.	Band	No	No	No
sp-BeamReportPUSCH Indicates support of semi-persistent 'CRI/RSRP' or 'SSBRI/RSRP' reporting on PUSCH.	Band	No	No	No

srs-AssocCSI-RS Parameters for the calculation of the precoder for SRS transmission based on channel measurements using associated NZP CSI-RS resource (srs-AssocCSI-RS) as described in clause 6.1.1.2 of TS 38.214 [12]. UE supporting this feature shall also indicate support of non-codebook based PUSCH transmission. - *supportedCSI-RS-ResourceList*. *supportedCSI-RS-ResourceList* includes list of the following parameters: - *maxNumberTxPortsPerResourcePerBand* indicates the maximum number of Tx ports in a resource across all CCs within a band simultaneously; - *maxNumberResourcesPerBand* indicates the maximum number of resources across all CCs within a band simultaneously; - *totalNumberTxPortsPerBand* indicates the total number of Tx ports across all CCs within a band simultaneously.	Band	No	No	No
srs-TxSwitch Defines whether UE supports SRS antenna port switching as defined in clause 6.2.1.2 of TS 38.214 [12].	Band or FS	Tbd	No	No
supportedSRS-Resources Defines support of SRS resources. The capability signalling comprising indication of: - Supported maximum number of aperiodic SRS resources that can be configured for the UE per each BWP - Supported maximum number of aperiodic SRS resources per slot in the BWP - Supported maximum number of periodic SRS resources per BWP - Supported maximum number of periodic SRS resources per slot in the BWP - Supported maximum number of semi-persistent SRS resources that can be configured for the UE per each BWP - Supported maximum number of semi-persistent SRS resources per slot in the BWP - Supported maximum number of SRS antenna port per each SRS resource	Band or FS	Yes	No	No
tci-StatePDSCH Defines support of TCI-States for PDSCH. The capability signalling comprises the following parameters: - *maxNumberConfiguredTCIstatesPerCC* indicates the maximum number of configured TCI-states per CC for PDSCH. For FR2, the UE is mandated to set the value to 64; - *maxNumberActiveTCI-PerBWP* indicates the maximum number of activated TCI-states per BWP per CC, including control and data. If a UE reports X active TCI state(s), it is not expected that more than X active QCL type D assumption(s) for any PDSCH and any CORESETs for a given BWP of a serving cell become active for the UE. For FR1, the UE is mandated to set these values to the maximum nuber of allowed SSBs in the supported band.	Band	Yes	No	No
twoPortsPTRS-UL Defines whether UE supports PT-RS with 2 antenna ports for UL transmission.	Band	No	No	No
ue-PowerClass If the UE supports the different power class than the default power class (see TS 36.101 [14]), the UE shall report the supported power class in this field.	Band	Yes	No	No
uplinkBeamManagement Defines support of beam management for UL. The capability include indication of the - Maximum number of SRS resources per SRS resource set supported by the UE. - Maximum number of SRS resource sets supported by the UE.	Band	Tbd	No	No

4.2.7.3 *CA-ParametersEUTRA*

Definitions for parameters	Per	M	FDD-TDD DIFF	FR1-FR2 DIFF
additionalRx-Tx-PerformanceReq *additionalRx-Tx-PerformanceReq* defined in 4.3.5.22, TS 36.306 [15].	BC	No	No	No
multipleTimingAdvance *multipleTimingAdvance* defined in 4.3.5.3, TS 36.306 [15].	BC	No	No	No
simultaneousRx-Tx *simultaneousRx-Tx* defined in 4.3.5.4, TS 36.306 [15].	BC	No	No	No
supportedBandwidthCombinationSetEUTRA Indicates the set of supported bandwidth combinations for the LTE part for inter-band EN-DC. The first (left-most) bit in the bitmap corresponds to the BWCS#1 and so on. If the bit is set to 1, the UE supports the corresponding BWCS.	BC	Tbd	No	No
supportedNAICS-2CRS-AP *supportedNAICS-2CRS-AP* defined in 4.3.5.8, TS 36.306 [15].	BC	No	No	No
ue-CA-PowerClass-N *ue-CA-PowerClass-N* defined in 4.3.5.1.3, TS 36.306 [15].	BC	No	No	No

4.2.7.4 *CA-ParametersNR*

Definitions for parameters	Per	M	FDD-TDD DIFF	FR1-FR2 DIFF
CSI-RS-IM-ReceptionForFeedbackPerBandComb Indicates support of CSI-RS and CSI-IM reception for CSI feedback. This capability signalling comprises the following parameters: - *maxNumberSimultaneousNZP-CSI-RS-ActBWP-AllCC* indicates the maximum number of simultaneous CSI-RS resources in active BWPs across all CCs. This parameter limits the total number of NZP-CSI-RS resources that the NW may configure across all CCs (irrespective of the associated codebook type). The network applies this limit in addition to the limits signalled in *MIMO-ParametersPerBand-> maxNumberSimultaneousNZP-CSI-RS-PerCC* and in *Phy-ParametersFRX-Diff-> maxNumberSimultaneousNZP-CSI-RS-PerCC*; - *totalNumberPortsSimultaneousNZP-CSI-RS-ActBWP-AllCC* indicates the total number of CSI-RS ports in simultaneous CSI-RS resources in active BWPs across all CCs. This parameter limits the total number of ports that the NW may configure across all NZP-CSI-RS resources across all CCs (irrespective of the associated codebook type). The network applies this limit in addition to the limits signalled in *MIMO-ParametersPerBand-> totalNumberPortsSimultaneousNZP-CSI-RS-PerCC* and in *Phy-ParametersFRX-Diff-> totalNumberPortsSimultaneousNZP-CSI-RS-PerCC*.	BC	Yes	No	No
diffNumerologyAcrossPUCCH-Group Indicates whether different numerology across two NR PUCCH groups for data and control channel at a given time in NR CA and EN-DC is supported by the UE.	BC	No	No	No
diffNumerologyWithinPUCCH-Group Indicates whether UE supports different numerology across carriers within a PUCCH group and a same numerology between DL and UL per carrier for data/control channel at a given time in NR CA and EN-DC. In case of NR CA and EN-DC with one NR PUCCH group, the UE supports different numerologies across NR carriers within the same NR PUCCH group up to two different numerologies within the same NR PUCCH group for data and control channel at a given time. In case of NR CA with two NR PUCCH groups, the UE supports different numerologies across NR carriers up to two different numerologies within the same NR PUCCH group, wherein NR PUCCH is sent on the carrier with smaller SCS for data and control channel at a given time. In case of EN-DC with two NR PUCCH groups, the UE supports different numerologies across NR carriers up to two different numerologies within an NR PUCCH group in FR1, wherein NR PUCCH is sent on the carrier with smaller SCS, and same numerology across NR carriers within another NR PUCCH group in FR2 for data and control channel at a given time.	BC	No	No	No
dualpA-Architecture For band combinations with single-band with UL CA, this field indicates the support of dual PA. If absent in such band combinations, the UE supports single PA for all the ULs. For other band combinations, this field is not applicable.	BC	No	No	No
multipleTimingAdvances Indicates whether multiple timing advances are supported by the UE. For NR CA band combination, if the band combination comprised of more than one band entry (i.e., inter-band or intra-band non-contiguous band combination), the field indicates that different timing advances on different band entries are supported. For EN-DC band combination, this field is not presented and it is mandatory for the UE supporting EN-DC band combination. In this release, up to two timing advances are supported for EN-DC band combination or NR CA band combination. For NR CA, it is mandatory with IOT bit for inter-band NR CA, otherwise optional. For EN-DC, it is mandatory without IOT bit.	BC	Yes /No	No	No
parallelTxSRS-PUCCH-PUSCH Indicates whether the UE supports parallel transmission of SRS and PUCCH/ PUSCH across CCs in an inter-band CA band combination.	BC	No	No	No
parallelTxPRACH-SRS-PUCCH-PUSCH Indicates whether the UE supports parallel transmission of PRACH and SRS/PUCCH/PUSCH across CCs in an inter-band CA band combination.	BC	No	No	No

simultaneousCSI-ReportsAllCC Indicates whether the UE supports CSI report framework and the number of CSI report(s) which the UE can simultaneously process across all CCs. The CSI report comprises periodic, semi-persistent and aperiodic CSI and any latency classes and codebook types. The CSI report in *simultaneousCSI-ReportsAllCC* includes the beam report and CSI report. This parameter may further limit *simultaneousCSI-ReportsPerCC* in *MIMO-ParametersPerBand* and *Phy-ParametersFRX-Diff* for each band in a given band combination.	BC	Yes	No	No
simultaneousRxTxInterBandCA Indicates whether the UE supports simultaneous transmission and reception in TDD-TDD and TDD-FDD inter-band NR CA. It is mandatory for certain TDD-FDD and TDD-TDD band combinations defined in TS 38.101-1 [2], TS 38.101-2 [3] and TS 38.101-3 [4].	BC	Yes /No	No	No
simultaneousRxTxSUL Indicates whether the UE supports simultaneous reception and transmission for a NR band combination including SUL. Mandatory/Optional support depends on band combination and captured in TS 38.101-1 [2].	BC	Yes /No	No	No
simultaneousSRS-AssocCSI-RS-AllCC Indicates support of CSI-RS processing framework for SRS and the number of SRS resources that the UE can process simultaneously across all CCs, including periodic, aperiodic and semi-persistent SRS. This parameter may further limit *simultaneousSRS-AssocCSI-RS-PerCC* in *MIMO-ParametersPerBand* and *Phy-ParametersFRX-Diff* for each band in a given band combination.	BC	No	No	No
supportedNumberTAG Defines the number of timing advance groups are supported by the UE. It is applied to NR-NR CA and EN-DC. For EN-DC, it indicates number of TAGs only for NR CG. The number of TAGs for the LTE MCG is signalled by existing LTE TAG capability signalling.	BC	Tbd	No	No

4.2.7.5 *FeatureSetDownlink* parameters

Definitions for parameters	Per	M	FDD-TDD DIFF	FR1-FR2 DIFF
additionalDMRS-DL-Alt Indicates whether the UE supports the alternative additional DMRS position for co-existence with LTE CRS.	FS	No	No	No
crossCarrierSchedulingDL-OtherSCS Indicates whether the UE supports cross carrier scheduling for the different numerologies in DL carrier aggregation with carrier indicator field (CIF).	FS	No	Yes	No
csi-RS-MeasSCellWithoutSSB Defines whether the UE can perform CSI-RSRP and CSI-RSRQ measurement as specified in TS 38.215 [13], where CSI-RS resource is configured for a cell that does not transmit SS/PBCH block. A UE that supports this feature shall also support scellWithoutSSB.	FS	No	No	No
dl-MCS-TableAlt-DynamicIndication Indicates whether the UE supports dynamic indication of MCS table for PDSCH.	FS	No	No	No
featureSetListPerDownlinkCC Indicates which features the UE supports on the individual DL carriers of the feature set (and hence of a band entry that refer to the feature set) by FeatureSetDownlinkPerCC-Id. The UE shall hence include as many FeatureSetDownlinkPerCC-Id in this list as the number of carriers it supports according to the ca-bandwidthClassDL. The order of the elements in this list is not relevant, i.e., the network may configure any of the carriers in accordance with any of the FeatureSetDownlinkPerCC-Id in this list. A fallback per CC feature set resulting from the reported feature set per DL CC is not signalled but the UE shall support it.	FS	Tbd	No	No
intraBandFreqSeparationDL Indicates DL frequency separation class the UE supports, which indicates frequency separation between lower edge of lowest CC and upper edge of highest CC in a frequency band, for intra-band non-contiguous CA. It is mandatory to report for UE to support non-continuous CA in FR2.	FS	[Yes/No]	No	No
oneFL-DMRS-ThreeAdditionalDMRS-DL Defines whether the UE supports DM-RS pattern for DL transmission with 1 symbol front-loaded DM-RS with three additional DM-RS symbols.	FS	No	No	Yes
oneFL-DMRS-TwoAdditionalDMRS-DL Defines support of DM-RS pattern for DL transmission with 1 symbol front-loaded DM-RS with 2 additional DM-RS symbols and more than 1 antenna ports.	FS	Yes	No	Yes
pdcch-MonitoringAnyOccasions Defines the supported PDCCH search space monitoring occasions. withoutDCI-gap indicates whether the UE supports PDCCH search space monitoring occasions in any symbol of the slot for Type 1-PDCCH common search space configured by dedicated RRC signaling, for a Type 3-PDCCH common search space, or for a UE-specific search space with the capability of supporting at least 44, 36, 22, and 20 blind decodes in a slot for 15 kHz, 30 kHz, 60kHz, and 120 kHz subcarrier spacing values respectively. withDCI-gap indicates whether the UE supports PDCCH search space monitoring occasions in any symbol of the slot with minimum time separation between two consecutive transmissions of PDCCH scrambled with C-RNTI or CS-RNTI for Type 1-PDCCH common search space configured by dedicated RRC signaling, for a Type 3-PDCCH common search space, or for a UE-specific search space, with the capability of supporting at least 44, 36, 22, and 20 blind decodes in a slot for 15 kHz, 30 kHz, 60kHz, and 120 kHz subcarrier spacing values respectively. *withSpanGap* indicates whether the UE supports PDCCH search space monitoring occasions in any symbol of the slot with minimum time separation between two consecutive transmissions of PDCCH with span up to two OFDM symbols for two OFDM symbols or span up to three OFDM symbols for four and seven OFDM symbols.	FS	No	No	No
pdcch-MonitoringAnyOccasionsWithSpanGap Indicates whether the UE supports PDCCH search space monitoring occasions in any symbol of the slot with minimum time separation between two consecutive transmissions of PDCCH with span up to two OFDM symbols for two OFDM symbols or span up to three OFDM symbols for four and seven OFDM symbols. Value set1 indicates the supported value set (X,Y) is (7,3), value set2 indicates the supported value set (X,Y) is (4,3) and (7,3) and value set 3 indicates the supported value set (X,Y) is (2,2), (4,3) and (7,3).	FS	No	No	No

pdsch-ProcessingType1-DifferentTB-PerSlot Defines whether the UE capable of processing time capability 1 supports reception of up to two, four or seven PDSCHs for different transport blocks with PDSCH scrambled using C-RNTI, TC-RNTI, or CS-RNTI within the same slot. Note PDSCH(s) for Msg.4 is included.	FS	No	No	No
pdsch-ProcessingType2 Indicates whether the UE supports PDSCH processing capability 2. This capability signalling comprises the following parameters for each sub-carrier spacing supported by the UE. - *numberOfCarriers* indicates the number of carriers for which the UE is capable of PDSCH processing capability 2; - *differentTB-PerSlot* indicates the number of different TBs per slot.	FS	No	No	FR1 only
pdsch-ProcessingType2-Limited Indicates whether the UE supports PDSCH processing capability 2 with scheduling limitation for SCS 30kHz. This capability signalling comprises the following parameter. - *differentTB-PerSlot-SCS-30kHz* indicates the number of different TBs per slot. The UE supports this limited processing capability 2 only if: 1) One carrier is configured in the band, independent of the number of carriers configured in the other bands; 2) The maximum bandwidth of PDSCH is 136 PRBs; 3) N1 based on Table 5.3-2 of TS 38.214 [12] for SCS 30 kHz.	FS	No	No	FR1 only
pdsch-SeparationWithGap Indicates whether the UE supports separation of two unicast PDSCHs with a gap, applicable to Sub-carrier spacings of 30 KHz and 60 KHz only. For any two consecutive slots n and n+1, if there are more than 1 unicast PDSCH in either slot, the minimum time separation between starting time of any two unicast PDSCHs within the duration of these slots is 4 OFDM symbol for 30kHz and 7 OFDM symbol for 60kHz.	FS	No	No	No
scalingFactor Indicates the scaling factor to be applied to the band in the max data rate calculation as defined in 4.1.2. Value f0p4 indicates the scaling factor 0.4, f0p75 indicates 0.75, and so on. If absent, the scaling factor 1 is applied to the band in the max data rate calculation.	FS	Tbd	No	No
scellWithoutSSB Defines whether the UE supports configuration of SCell that does not transmit SS/PBCH block. This is conditionally mandatory with capability signalling for intra-band CA but not supported for inter-band CA.	FS	Yes /No	No	No
searchSpaceSharingCA-DL Defines whether the UE supports DL PDCCH search space sharing for carrier aggregation operation.	FS	No	No	No
timeDurationForQCL Defines minimum number of OFDM symbols required by the UE to perform PDCCH reception and applying spatial QCL information received in DCI for PDSCH processing as described in TS 38.214 [12] clause 5.1.5, i.e. Threshold-Sched-Offset. UE shall indicate one value of the minimum number of OFDM symbols per each subcarrier spacing of 60kHz and 120kHz.	FS	Yes	No	FR2 only
twoFL-DMRS-TwoAdditionalDMRS-DL Defines whether the UE supports DM-RS pattern for DL transmission with 2 symbols front-loaded DM-RS with one additional 2 symbols DM-RS.	FS	Yes	No	Yes
type1-3-CSS Defines whether the UE is able to receive PDCCH in a Type1-PDCCH common search space configured by dedicated RRC signaling, or in a Type3-PDCCH common search space or in a UE-specific search space, with an associated CORESET duration of 3 symbols in FR2.	FS	Yes	No	No
ue-SpecificUL-DL-Assignment Indicates whether the UE supports dynamic determination of UL and DL link direction and slot format based on Layer 1 scheduling DCI and higher layer configured parameter UL-DL-configuration-dedicated as specified in TS 38.213 [11].	FS	No	No	No

4.2.7.6 *FeatureSetDownlinkPerCC* parameters

Definitions for parameters	Per	M	FDD-TDD DIFF	FR1-FR2 DIFF
channelBW-90mhz Indicates whether the UE supports the channel bandwidth of 90 MHz.	FSPC	No	No	No
maxNumberMIMO-LayersPDSCH Defines the maximum number of spatial multiplexing layer(s) supported by the UE for DL reception. For single CC standalone NR, it is mandatory with capability signaling to support at least 4 MIMO layers in the bands where 4Rx is specified as mandatory for the given UE and at least 2 MIMO layers in FR2.	FSPC	Tbd	No	No
supportedBandwidthDL Indicates maximum DL channel bandwidth supported for a given SCS that UE supports within a single CC, which is defined in Table 5.3.5-1 in TS 38.101-1 [2] for FR1 and Table 5.3.5-1 in TS 38.101-2 [3] for FR2. For FR1, all the bandwidths listed in TS38.101-1 v15.0.0 Table 5.3.5-1 for each band shall be mandatory with a single CC. For FR2, the set of mandatory CBW is 50, 100, 200 MHz. When this field is included in a band combination with a signle band entry and a single CC entry (i.e. non-CA band combination), the UE shall indicate the maximum channel bandwith for the band according to TS 38.101-1 [2] and TS 38.101-2 [3].	FSPC	Tbd	No	Tbd
supportedModulationOrderDL Indicates the maximum supported modulation order to be applied for downlink in the carrier in the max data rate calculation as defined in 4.1.2. The network may use a modulation order on this serving cell which is higher than the value indicated in this field as long as UE supports the modulation of higher value for downlink.	FSPC	Tbd	No	Tbd
supportedSubCarrierSpacingDL Defines the supported sub-carrier spacing for DL by the UE indicating the UE supports simultaneous reception with same or different numerologies in CA. Note the UE shall support all mandated sub-carrier spacing for FR1/FR2. Same numerology for intra-band NR CA including both continuous and non-continuous is mandatory with capability in both FR1 and FR2. Two mixed numerologies between FR1 band(s) and FR2 band(s) in DL are mandatory with capability if UE supports inter-band NR CA including both FR1 band(s) and FR2 band(s). Optional for other cases.	FSPC	Yes /No	No	No

4.2.7.7 *FeatureSetUplink* parameters

Definitions for parameters	Per	M	FDD-TDD DIFF	FR1-FR2 DIFF
scalingFactor Indicates the scaling factor to be applied to the band in the max data rate calculation as defined in 4.1.2. Value f0p4 indicates the scaling factor 0.4, f0p75 indicates 0.75, and so on. If absent, the scaling factor 1 is applied to the band in the max data rate calculation.	FS	Tbd	No	No
crossCarrierSchedulingUL-OtherSCS Indicates whether the UE supports cross carrier scheduling for the different numerologies in UL carrier aggregation with carrier indicator field (CIF).	FS	No	Yes	No
dynamicSwitchSUL Indicates whether the UE supports supplemental uplink with dynamic switch (DCI based selection of PUSCH carrier).	FS	Tbd	No	No
featureSetListPerUplinkCC Indicates which features the UE supports on the individual UL carriers of the feature set (and hence of a band entry that refer to the feature set) by FeatureSetUplinkPerCC-Id. The UE shall hence include as many FeatureSetUplinkPerCC-Id in this list as the number of carriers it supports according to the ca-bandwidthClassUL. The order of the elements in this list is not relevant, i.e., the network may configure any of the carriers in accordance with any of the FeatureSetUplinkPerCC-Id in this list. A fallback per CC feature set resulting from the reported feature set per UL CC is not signalled but the UE shall support it.	FS	Tbd	No	No
intraBandFreqSeparationUL Indicates UL frequency separation class the UE supports, which indicates frequency separation between lower edge of lowest CC and upper edge of highest CC in a frequency band, for intra-band non-contiguous CA. It is mandatory to report for UE to support non-continuous CA in FR2.	FS	[Yes/No]	No	No
pa-PhaseDiscontinuityImpacts Indicates incapability motivated by impacts of PA phase discontinuity with overlapping transmissions with non-aligned starting or ending times or hop boundaries across carriers for intra-band EN-DC, intra-band CA and FDM based ULSUP.	FS	No	No	No
pusch-ProcessingType1-DifferentTB-PerSlot Indicates whether the UE capable of processing time capability 1 supports transmission of up to two, four or seven PUSCHs for different transport blocks within the same slot.	FS	No	No	No
pusch-ProcessingType2 Indicates whether the UE supports PUSCH processing capability 2. This capability signalling comprises the following parameters for each sub-carrier spacing supported by the UE. - *numberOfCarriers* indicates the number of carriers for which the UE is capable of PUSCH processing capability 2; - *differentTB-PerSlot* indicates the number of different TBs per slot.	FS	No	No	FR1 only
pusch-SeparationWithGap Indicates whether the UE supports separation of two unicast PUSCHs with a gap, applicable to Sub-carrier spacings of 15 KHz, 30 KHz and 60 KHz only. For any two consecutive slots n and n+1, if there are more than 1 unicast PUSCH in either slot, the minimum time separation between starting time of any two unicast PUSCHs within the duration of these slots is 2 OFDM symbols for 15kHz, 4 OFDM symbols for 30kHz and 7 OFDM symbols for 60kHz.	FS	No	No	No
searchSpaceSharingCA-UL Defines whether the UE supports UL PDCCH search space sharing for carrier aggregation operation.	FS	No	No	No
srs-TxSwitch Defines whether UE supports SRS antenna port switching as defined in clause 6.2.1.2 of TS 38.214 [12].	Band or FS	Tbd	No	No

supportedSRS-Resources Defines support of SRS resources. The capability signalling comprising indication of: - Supported maximum number of aperiodic SRS resources that can be configured for the UE per each BWP - Supported maximum number of aperiodic SRS resources per slot in the BWP - Supported maximum number of periodic SRS resources per BWP - Supported maximum number of periodic SRS resources per slot in the BWP - Supported maximum number of semi-persistent SRS resources that can be configured for the UE per each BWP - Supported maximum number of semi-persistent SRS resources per slot in the BWP - Supported maximum number of SRS antenna port per each SRS resource	Band or FS	Tbd	No	No
twoPUCCH-Group Indicates whether two PUCCH group in CA with a same numerology across CCs for data and control channel [at a given time] is supported by the UE. For NR CA, two PUCCH group is supported with the same numerology across NR carriers for data and control channel at a given time. For EN-DC, two PUCCH group is supported with the same numerology across NR carriers for data and control channel at a given time, wherein an NR PUCCH group is configured in FR1 and another NR PUCCH group is configured in FR2.	FS	No	No	No
ul-MCS-TableAlt-DynamicIndication Indicates whether the UE supports dynamic indication of MCS table using new RNTI for PUSCH.	FS	Tbd	No	No
zeroSlotOffsetAperiodicSRS Indicates whether the UE supports 0 slot offset between aperiodic SRS triggering and transmission, for SRS for CB PUSCH and antenna switching on FR1.	FS	No	No	No

4.2.7.8 *FeatureSetUplinkPerCC* parameters

Definitions for parameters	Per	M	FDD-TDD DIFF	FR1-FR2 DIFF
channelBW-90mhz Indicates whether the UE supports the channel bandwidth of 90 MHz.	FSPC	No	No	No
maxNumberMIMO-LayersCB-PUSCH Defines supported maximum number of 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. This feature is not supported for SUL.	FSPC	No	No	No
maxNumberMIMO-LayersNonCB-PUSCH Defines supported maximum number of MIMO layers at the UE for PUSCH transmission using non-codebook precoding. This feature is not supported for SUL.	FSPC	No	No	No
maxNumberSimultaneousSRS-ResourceTx Defines the maximum number of simultaneous transmitted SRS resources at one symbol for non-codebook based transmission to the UE. This feature is not supported for SUL.	FSPC	No	No	No
maxNumberSRS-ResourcePerSet Defines the maximum number of SRS resources per SRS resource set configured for codebook or non-codebook based transmission to the UE. This feature is not supported for SUL.	FSPC	No	No	No
simultaneousTxSUL-NonSUL Indicates whether the UE supports simultaneous transmission of SRS on an SUL/non-SUL carrier and PUSCH/PUCCH/SRS/PRACH on the other UL carrier in the same cell.	FSPC	No	No	No
supportedBandwidthUL Indicates maximum UL channel bandwidth supported for a given SCS that UE supports within a single CC, which is defined in Table 5.3.5-1 in TS38.101-1 [2] for FR1 and Table 5.3.5-1 in TS 38.101-2 [3] for FR2. For FR1, all the bandwidths listed in TS38.101-1 v15.0.0 Table 5.3.5-1 for each band shall be mandatory with a single CC. For FR2, the set of mandatory CBW is 50, 100, 200 MHz. When this field is included in a band combination with a single band entry and a single CC entry (i.e. non-CA band combination), the UE shall indicate the maximum channel bandwidth for the band according to TS 38.101-1 [2] and TS 38.101-2 [3].	FSPC	Tbd	No	Tbd
supportedModulationOrderUL Indicates the maximum supported modulation order to be applied for uplink in the carrier in the max data rate calculation as defined in 4.1.2. The network may use a modulation order on this serving cell which is higher than the value indicated in this field as long as UE supports the modulation of higher value for uplink.	FSPC	Tbd	No	Tbd
supportedSubCarrierSpacingUL Defines the supported sub-carrier spacing for UL by the UE, indicating the UE supports simultaneous transmission with same or different numerogies in CA, or indicating the UE supports different numerologies on NR UL and SUL within one cell. Note the UE shall support all mandated sub-carrier spacing for FR1/FR2. Same numerology for intra-band NR CA including both continuous and non-continuous is mandatory with capability in both FR1 and FR2. Two mixed numerologies between FR1 band(s) and FR2 band(s) in UL are mandatory with capability if UE supports inter-band NR CA including both FR1 band(s) and FR2 band(s). Optional for other cases.	FSPC	Yes /No	No	No

4.2.7.9 *MRDC-Parameters*

Definitions for parameters	Per	M	FDD-TDD DIFF	FR1-FR2 DIFF
asyncIntraBandENDC Indicates whether the UE supports asynchronous FDD-FDD intra-band EUTRA-NR EN-DC with MRTD and MTTD as specified in [x]. If it is not supported for FDD-FDD intra-band EUTRA-NR EN-DC, the UE supports only synchronous FDD-FDD intra-band EUTRA-NR EN-DC.	BC	No	No	FR1 only
dualpA-Architecture For intra-band band combinations, this field indicates the support of dual PA. If absent in such band combinations, the UE supports single PA for all the ULs. For other band combinations, this field is not applicable.	BC	No	No	No
dynamicPowerSharing Indicates whether the UE supports dynamic EN-DC power sharing or not. If the UE supports this capability it will dynamically share the power between NR and LTE if P_LTE + P_NR > Pcmax.	BC	Yes	No	Tbd
intraBandENDC-Support Indicates whether the UE supports intra-band EN-DC with only non-contiguous spectrum, or with both contiguous and non-contiguous spectrum for the EN-DC combination. Intra-band contiguous and intra-band non-contiguous spectrum refer to the frequency spacing between the adjacent LTE and NR carriers in EN-DC. If the UE does not include this field for a EN-DC combination with the same LTE and NR band number, for the LTE and NR band with the same number in the EN-DC combination, the UE supports as a contiguous spectrum.	BC	No	No	No
simultaneousRxTxInterBandENDC Indicates whether the UE supports simultaneous transmission and reception in TDD-TDD and TDD-FDD inter-band EN-DC. It is mandatory for certain TDD-FDD and TDD-TDD band combinations defined in TS 38.101-3 [4].	BC	Yes /No	No	No
singleUL-Transmission Indicates that the UE does not support simultaneous UL transmissions as defined in TS 38.101-3 [4]. The UE may only set this bit for certain band combinations defined in TS 38.101-3 [4]. If set for a particular band combination, the bit applies to all fallback band combinations of this band combination that are defined in TS 38.101-3 [4] as being allowed to set the bit and does not apply to any other fallback band combinations defined in TS 38.101-3 [4].	BC	Tbd	No	No
tdm-Pattern Indicates whether the UE supports the *tdm-Pattern* for *single UL-transmission* associated functionality. Support is conditionally mandatory for UEs that do not support dynamic power sharing and for UEs that indicate single UL for any BC, and optional otherwise.	BC	Yes /No	Yes	Tbd
ul-SharingEUTRA-NR Indicates whether the UE supports EN-DC with EUTRA-NR coexistence in UL sharing via TDM only, FDM only, or both TDM and FDM from UE perspective.	BC	No	No	No
ul-SwitchingTimeEUTRA-NR Indicates support of switching type between LTE UL and NR UL for EN-DC with LTE-NR coexistence in UL sharing from UE perspective. Type1 indicates UE supports switching within less than 0 us and type2 indicates UE supports switching within less than 20us. It is mandatory to report switching time type 1 or type 2 if UE supports LTE and NR UL Transmission in the shared carrier via TDM only or LTE and NR UL transmission in the shared carrier via FDM or TDM.	BC	[Yes]	No	No
ul-TimingAlignmentEUTRA-NR Indicates whether to apply the same UL timing between NR and LTE for dynamic power sharing capable UE operating in intra-band contiguous synchronous EN-DC. If this field is absent, UE should be able to operate with a timing difference up to applicable MTTD requirements when operating in a synchronous intra-band contiguous EN-DC network.	BC	No	No	No

4.2.7.10 *Phy-Parameters*

Definitions for parameters	Per	M	FDD-TDD DIFF	FR1-FR2 DIFF
absoluteTPC-Command Indicates whether the UE supports absolute TPC command mode.	UE	No	No	Yes
almostContiguousCP-OFDM-UL Indicates whether the UE supports almost contiguous UL CP-OFDM transmissions.	UE	No	No	FR1 only
bwp-SwitchingDelay Defines whether the UE supports BWP switching delay within type1 or type2 specified in TS 38.xxx. It is mandatory to report type 1 or type 2.	UE	[Yes]	No	No
cbg-FlushIndication-DL Indicates whether the UE supports CBG-based (re)transmission for DL using CBG flushing out information (CBGFI) as specified in TS 38.214 [12].	UE	No	No	No
cbg-TransIndication-DL Indicates whether the UE supports CBG-based (re)transmission for DL using CBG transmission information (CBGTI) as specified in TS 38.214 [12].	UE	No	No	No
cbg-TransIndication-UL Indicates whether the UE supports CBG-based (re)transmission for UL using CBG transmission information (CBGTI) as specified in TS 38.214 [12].	UE	No	No	No
configuredUL-GrantType1 Indicates whether the UE supports Type 1 PUSCH transmissions with configured grant as specified in TS 38.214 [12] with UL-TWG-repK value of one.	UE	No	No	No
configuredUL-GrantType2 Indicates whether the UE supports Type 2 PUSCH transmissions with configured grant as specified in TS 38.214 [12] with UL-TWG-repK value of one.	UE	No	No	No
cqi-TableAlt Indicates whether UE supports the CQI table with target BLER of 10^-5.	UE	No	No	Yes
csi-ReportFramework See *csi-ReportFramework* in 4.2.7.2. For a band combination comprised of FR1 and FR2 bands, this parameter, if present, limits the corresponding parameter in *MIMO-ParametersPerBand*.	Band or UE	Yes	No	No
csi-ReportWithoutCQI Indicates whether UE supports CSI reporting with report quantity set to 'CRI/RI/i1' as defined in clause 5.2.1.4 of TS 38.214 [12].	UE	No	No	Yes
csi-ReportWithoutPMI Indicates whether UE supports CSI reporting with report quantity set to 'CRI/RI/CQI' as defined in clause 5.2.1.4 of TS 38.214 [12].	UE	Tbd	No	Yes
csi-RS-CFRA-ForHO Indicates whether the UE can perform handover using a contention free random access on PRACH resources that are associated with CSI-RS resources of the target cell.	UE	No	No	No
csi-RS-IM-ReceptionForFeedback See *csi-RS-IM-ReceptionForFeedback* in 4.2.7.2. For a band combination comprised of FR1 and FR2 bands, this parameter, if present, limits the corresponding parameter in *MIMO-ParametersPerBand*.	Band or UE	Yes	No	No
csi-RS-ProcFrameworkForSRS See *csi-RS-ProcFrameworkForSRS* in 4.2.7.2. For a band combination comprised of FR1 and FR2 bands, this parameter, if present, limits the corresponding parameter in *MIMO-ParametersPerBand*.	Band or UE	No	No	No
dl-64QAM-MCS-TableAlt Indicates whether the UE supports the alternative 64QAM MCS table for PDSCH.	UE	No	No	Yes
dl-SchedulingOffset-PDSCH-TypeA Indicates whether the UE supports DL scheduling slot offset (K0) greater than 0 for PDSCH mapping type A.	UE	Yes	Yes	Yes
dl-SchedulingOffset-PDSCH-TypeB Indicates whether the UE supports DL scheduling slot offset (K0) greater than 0 for PDSCH mapping type B.	UE	Yes	Yes	Yes
downlinkSPS Indicates whether the UE supports PDSCH reception based on semi-persistent scheduling.	UE	No	No	No
dynamicBetaOffsetInd-HARQ-ACK-CSI Indicates whether the UE supports indicating beta-offset (UCI repetition factor onto PUSCH) for HARQ-ACK and/or SR via DCI among the RRC configured beta-offsets.	UE	No	No	No
dynamicHARQ-ACK-Codebook Indicates whether the UE supports HARQ-ACK codebook dynamically constructed by DCI(s).	UE	Yes	No	No

dynamicHARQ-ACK-CodeB-CBG-Retx-DL Indicates whether the UE supports HARQ-ACK codebook size for CBG-based (re)transmission based on the DAI-based solution as specified in TS 38.213 [11].	UE	No	No	No
dynamicPRB-BundlingDL Indicates whether UE supports DCI-based indication of the PRG size for PDSCH reception.	UE	No	No	No
dynamicSFI Indicates whether the UE supports monitoring for DCI format 2_0 and determination of slot formats via DCI format 2_0.	UE	No	Yes	Yes
dynamicSwitchRA-Type0-1-PDSCH Indicates whether the UE supports dynamic switching between resource allocation Types 0 and 1 for PDSCH as specified in TS 38.212 [10].	UE	No	No	No
dynamicSwitchRA-Type0-1-PUSCH Indicates whether the UE supports dynamic switching between resource allocation Types 0 and 1 for PUSCH as specified in TS 38.212 [10].	UE	No	No	No
freqHoppingPUCCH-F0-2 Indicates whether the UE supports transmission of a PUCCH format 0 or 2 without frequency hopping.	UE	Yes	No	Yes
freqHoppingPUCCH-F1-3-4 Indicates whether the UE supports transmission of a PUCCH format 1, 3 or 4 without frequency hopping.	UE	Yes	No	Yes
interleavingVRB-ToPRB-PDSCH Indicates whether the UE supports receiving PDSCH with interleaved VRB-to-PRB mapping as specified in TS 38.211 [6].	UE	Yes	No	No
interSlotFreqHopping-PUSCH Indicates whether the UE supports inter-slot frequency hopping for PUSCH transmissions.	UE	No	No	No
intraSlotFreqHopping-PUSCH Indicates whether the UE supports intra-slot frequency hopping for PUSCH transmission, except for PUSCH scheduled by PDCCH in the Type1-PDCCH common search space before RRC connection establishment.	UE	Yes	No	Yes
maxLayersMIMO-Indication Indicates whether the UE supports the network configuration of *maxMIMO-Layers* as specified in TS 38.331 [9].	UE	Yes	No	No
maxNumberSearchSpaces Indicates whether the UE supports up to 10 search spaces in a SCell per BWP.	UE	No	No	No
multipleCORESET Indicates whether the UE supports configuration of more than one PDCCH CORESET per BWP in addition to the CORESET with CORESET-ID 0 in the BWP. It is mandatory with capability signaling for FR2 and optional for FR1.	UE	Yes /No	No	No
mux-MultipleGroupCtrlCH-Overlap Indicates whether the UE supports more than one group of overlapping PUCCHs and PUSCHs per slot per cell group for control multiplexing.	UE	No	No	Yes
mux-SR-HARQ-ACK-CSI-PUCCH Indicates whether the UE supports multiplexing SR, HARQ-ACK and CSI on a PUCCH or piggybacking on a PUSCH once per slot when SR, HARQ-ACK and CSI are supposed to be sent with the same or different starting symbol in a slot.	UE	No	No	Yes
mux-SR-HARQ-ACK-CSI-PUCCH-DiffSymbol Indicates whether the UE supports multiplexing SR, HARQ-ACK and CSI on a PUCCH or piggybacking on a PUSCH once per slot, when SR, HARQ-ACK and CSI are supposed to be sent with different starting symbols in a slot.	UE	No	No	Yes
mux-SR-HARQ-ACK-CSI-PUCCH-SameSymbol Indicates whether the UE supports multiplexing SR, HARQ-ACK and CSI on a PUCCH or piggybacking on a PUSCH more than once per slot, when SR, HARQ-ACK and CSI are supposed to be sent with the same starting symbol in a slot.	UE	Yes	No	Yes
mux-SR-HARQ-ACK-PUCCH Indicates whether the UE supports multiplexing SR and HARQ-ACK on a PUCCH or piggybacking on a PUSCH once per slot, when SR and HARQ-ACK are supposed to be sent with different starting symbols in a slot.	UE	No	No	Yes
nzp-CSI-RS-IntefMgmt Indicates whether the UE supports interference measurements using NZP CSI-RS.	UE	No	No	No
oneFL-DMRS-ThreeAdditionalDMRS-UL Defines whether the UE supports DM-RS pattern for UL transmission with 1 symbol front-loaded DM-RS with three additional DM-RS symbols.	UE	No	No	Yes
oneFL-DMRS-TwoAdditionalDMRS-UL Defines support of DM-RS pattern for UL transmission with 1 symbol front-loaded DM-RS with 2 additional DM-RS symbols and more than 1 antenna ports.	UE	Yes	No	Yes

onePortsPTRS Defines whether UE supports PT-RS with 1 antenna port in DL reception and/or UL transmission. It is mandatory with UE capability signalling for FR2 and optional for FR1. The left most in the bitmap corresponds to DL reception and the right most bit in the bitmap corresponds to UL transmission.	UE	Yes /No	No	Yes
onePUCCH-LongAndShortFormat Indicates whether the UE supports transmission of one long PUCCH format and one short PUCCH format in TDM in the same slot.	UE	No	No	Yes
pCell-FR2 Indicates whether the UE supports PCell operation on FR2.	UE	Yes	No	No
pdcch-MonitoringSingleOccasion Indicates whether the UE supports receiving PDCCH scrambled with C-RNTI or CS-RNTI in a search space configured to be monitored within a single span of any three contiguous OFDM symbols in a slot with the capability of supporting at least 44 blind decodes in a slot for 15 kHz subcarrier spacing.	UE	No	No	FR1 only
pdcch-BlindDetectionCA Indicates PDCCH blind decoding capabilities supported by the UE for CA with more than 4 CCs as specified in TS 38.213 [11]. The field value is from 4 to 16.	UE	Tbd	No	Yes
pdsch-256QAM-FR1 Indicates whether the UE supports 256QAM for PDSCH for FR1.	UE	Yes	No	Yes
pdsch-MappingTypeA Indicates whether the UE supports receiving PDSCH using PDSCH mapping type A with less than seven symbols.	UE	Yes	No	No
pdsch-MappingTypeB Indicates whether the UE supports receiving PDSCH using PDSCH mapping type B.	UE	Yes	No	No
pdsch-RepetitionMultiSlots Indicates whether the UE supports receiving PDSCH scheduled by DCI format 1_0 or 1_1 when configured with higher layer parameter aggregationFactorDL > 1.	UE	No	No	Tbd
pdsch-RE-MappingFR1-PerSymbol/pdsch-RE-MappingFR1-PerSlot Indicates the maximum number of PDSCH Resource Element (RE) mapping supported for FR1, per symbol per CC and per slot per CC respectively. Value n6 means 6 RE mapping patterns and n10 means 10 RE mapping patterns, and so on.	UE	Yes	No	FR1 only
pdsch-RE-MappingFR2-PerSymbol/pdsch-RE-MappingFR2-PerSlot Indicates the maximum number of PDSCH Resource Element (RE) mapping supported for FR2, per symbol per CC and per slot per CC respectively. Value n6 means 6 RE mapping patterns and n10 means 10 RE mapping patterns, and so on.	UE	Yes	No	FR2 only
precoderGranularityCORESET Indicates whether the UE supports receiving PDCCH in CORESETs configured with CORESET-precoder-granularity equal to the size of the CORESET in the frequency domain as specified in TS 38.211 [6].	UE	No	No	No
pre-EmptIndication-DL Indicates whether the UE supports interrupted transmission indication for PDSCH reception based on reception of DCI format 2_1 as defined in TS 38.213 [11].	UE	No	No	No
pucch-F2-WithFH Indicates whether the UE supports transmission of a PUCCH format 2 (2 OFDM symbols in total) with frequency hopping in a slot.	UE	Yes	No	Yes
pucch-F3-WithFH Indicates whether the UE supports transmission of a PUCCH format 3 (4~14 OFDM symbols in total) with frequency hopping in a slot.	UE	Yes	No	Yes
pucch-F3-4-HalfPi-BPSK Indicates whether the UE supports pi/2-BPSK for PUCCH format 3/4. It is optional for FR1 and mandatory with capability signalling for FR2.	UE	Yes /No	No	Yes
pucch-F4-WithFH Indicates whether the UE supports transmission of a PUCCH format 4 (4~14 OFDM symbols in total) with frequency hopping in a slot.	UE	Yes	No	Yes
pusch-RepetitionMultiSlots Indicates whether the UE supports transmitting PUSCH scheduled by DCI format 0_0 or 0_1 when configured with higher layer parameter aggregationFactorIUL > 1.	UE	Yes	No	No
pucch-Repetition-F1-3-4 Indicates whether the UE supports transmission of a PUCCH format 1 or 3 or 4 over multiple slots with the repetition factor 2, 4 or 8.	UE	Yes	No	No
pusch-HalfPi-BPSK Indicates whether the UE supports pi/2-BPSK for PUSCH. It is optional for FR1 and mandatory with capability signalling for FR2.	UE	Yes /No	No	Yes

pusch-LBRM Indicates whether the UE supports limited buffer rate matching in UL as specified in TS 38.212 [10].	UE	No	No	Yes
ra-Type0-PUSCH Indicates whether the UE supports resource allocation Type 0 for PUSCH as specified in TS 38.214 [12].	UE	No	No	No
rateMatchingCtrlResrcSetDynamic Indicates whether the UE supports dynamic rate matching for DL control resource set.	UE	Tbd	No	No
rateMatchingResrcSetDynamic Indicates whether the UE supports receiving PDSCH with resource mapping that excludes the REs corresponding to resource sets configured with RB-symbol level granularity based on dynamic indication in the scheduling DCI as specified in TS 38.214 [12].	UE	No	No	No
rateMatchingResrcSetSemi-Static Indicates whether the UE supports receiving PDSCH with resource mapping that excludes the REs corresponding to resource sets configured with RB-symbol level granularity following the semi-static configuration as specified in TS 38.214 [12].	UE	Yes	No	No
scs-60kHz Indicates whether the UE supports 60kHz subcarrier spacing for data channel in FR1.	UE	No	No	FR1 only
semiOpenLoopCSI Indicates whether UE supports CSI reporting with report quantity set to 'CRI/RI/i1' as defined in clause 5.2.1.4 of TS 38.214 [12].	UE	No	No	Yes
semiStaticHARQ-ACK-Codebook Indicates whether the UE supports HARQ-ACK codebook constructed by semi-static configuration.	UE	Yes	No	No
spatialBundlingHARQ-ACK Indicates whether the UE 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.	UE	Yes	No	No
sp-CSI-IM Indicates whether the UE supports semi-persistent CSI-IM.	UE	No	No	Yes
sp-CSI-ReportPUCCH Indicates whether UE supports semi-persistent CSI reporting using PUCCH formats 2, 3 and 4.	UE	No	No	No
sp-CSI-ReportPUSCH Indicates whether UE supports semi-persistent CSI reporting using PUSCH.	UE	No	No	No
sp-CSI-RS Indicates whether the UE supports semi-persistent CSI-RS.	UE	Yes	No	Yes
supportedDMRS-TypeDL Defines supported DM-RS configuration types at the UE for DL reception. Type 1 is mandatory with capability signaling. Type 2 is optional.	UE	Yes /No	No	Yes
supportedDMRS-TypeUL Defines supported DM-RS configuration types at the UE for UL transmission. At least support of type1 is mandatory. Support both type 1 and type 2 are mandatory with capability signalling.	UE	Yes	No	Yes
tdd-MultiDL-UL-SwitchPerSlot Indicates whether the UE supports more than one switch points in a slot for actual DL/UL transmission(s).	UE	No	TDD only	Yes
tpc-PUCCH-RNTI Indicates whether the UE supports group DCI message based on TPC-PUCCH-RNTI for TPC commands for PUCCH.	UE	No	No	Yes
tpc-PUSCH-RNTI Indicates whether the UE supports group DCI message based on TPC-PUSCH-RNTI for TPC commands for PUSCH.	UE	No	No	Yes
tpc-SRS-RNTI Indicates whether the UE supports group DCI message based on TPC-SRS-RNTI for TPC commands for SRS.	UE	No	No	Yes
twoDifferentTPC-Loop-PUCCH Indicates whether the UE supports two different TPC loops for PUCCH closed loop power control.	UE	Yes	Yes	Yes
twoDifferentTPC-Loop-PUSCH Indicates whether the UE supports two different TPC loops for PUSCH closed loop power control.	UE	Yes	Yes	Yes

twoFL-DMRS Defines whether the UE supports DM-RS pattern for DL reception and/or UL transmission with 2 symbols front-loaded DM-RS without additional DM-RS symbols. The left most in the bitmap corresponds to DL reception and the right most bit in the bitmap corresponds to UL transmission.	UE	Yes	No	Yes
twoFL-DMRS-TwoAdditionalDMRS-UL Defines whether the UE supports DM-RS pattern for UL transmission with 2 symbols front-loaded DM-RS with one additional 2 symbols DM-RS.	UE	Yes	No	Yes
twoPUCCH-AnyOthersInSlot Indicates whether the UE supports transmission of two PUCCH formats in TDM in the same slot, which are not covered by *twoPUCCH-F0-2-ConsecSymbols* and *onePUCCH-LongAndShortFormat*.	UE	No	No	Yes
twoPUCCH-F0-2-ConsecSymbols Indicates whether the UE supports transmission of two PUCCHs of format 0 or 2 in consecutive symbols in a slot.	UE	No	Yes	Yes
type1-PUSCH-RepetitionMultiSlots Indicates whether the UE supports Type 1 PUSCH transmissions with configured grant as specified in TS 38.214 [12] with UL-TWG-repK value equal to 2, 4, or 8 with a single repetition of the transport block within each slot, and redundancy version pattern as indicated by UL-TWG-RV-rep. A UE supporting this feature shall also support Type 1 PUSCH transmissions with configured grant as specified in TS 38.214 [12] with UL-TWG-repK value of one.	UE	No	No	No
type2-PUSCH-RepetitionMultiSlots Indicates whether the UE supports Type 1 PUSCH transmissions with configured grant as specified in TS 38.214 [12] with UL-TWG-repK value equal to 2, 4, or 8 with a single repetition of the transport block within each slot, and redundancy version pattern as indicated by UL-TWG-RV-rep. A UE supporting this feature shall also support Type 2 PUSCH transmissions with configured grant as specified in TS 38.214 [12] with UL-TWG-repK value of one.	UE	No	No	No
type2-SP-CSI-Feedback-LongPUCCH Indicates whether UE supports Type II CSI semi-persistent CSI reporting over PUCCH Formats 3 and 4 as defined in clause 5.2.4 of TS 38.214 [12].	UE	No	No	No
uci-CodeBlockSegmentation Indicates whether the UE supports segmenting UCI into multiple code blocks depending on the payload size.	UE	Yes	No	Yes
ul-64QAM-MCS-TableAlt Indicates whether the UE supports the alternative 64QAM MCS table for PUSCH with and without transform precoding respectively.	UE	No	No	Yes
ul-SchedulingOffset Indicates whether the UE supports UL scheduling slot offset (K2) greater than 12.	UE	Yes	Yes	Yes

4.2.7.11 Other PHY parameters

Definitions for parameters	Per	M	FDD-TDD DIFF	FR1-FR2 DIFF
appliedFreqBandListFilter Mirrors the *FreqBandList* that the NW provided in the capability enquiry, if any. The UE filtered the band combinations in the *supportedBandCombinationList* in accordance with this *appliedFreqBandListFilter*.	UE	No	No	No
downlinkSetEUTRA Indicates the features that the UE supports on the DL carriers corresponding to one EUTRA band entry in a band combination by FeatureSetEUTRA-DownlinkId. The FeatureSetEUTRA-DownlinkId = 0 means that the UE does not support a EUTRA DL carrier in this band of a band combination.	Band	Tbd	No	No
downlinkSetNR Indicates the features that the UE supports on the DL carriers corresponding to one NR band entry in a band combination by FeatureSetDownlinkId. The FeatureSetDownlinkId = 0 means that the UE does not support a DL carrier in this band of a band combination. A fallback per band feature set resulting from the reported DL feature set that has fallback per CC feature set is not signalled but the UE shall support it.	Band	Tbd	No	No
featureSetCombinations Pools of feature sets that the UE supports on the NR CA or MR-DC band combinations.	UE	Tbd	No	No
featureSets Pools of downlink and uplink features sets as well as a pool of FeatureSetCombination elements. A FeatureSetCombination refers to the IDs of the feature set(s) that the UE supports in that FeatureSetCombination. The BandCombination entries in the BandCombinationList then indicate the ID of the FeatureSetCombination that the UE supports fot that band combination.	UE	Tbd	No	No
naics-Capability-List Indicates that UE in MR-DC supports NAICS as defined in defined in TS 36.331 [17].	UE	No	No	No
supportedBandCombinationList Defines the supported CA and/or MR-DC band combinations by the UE. For each band combination the UE identifies the associated feature set combination by featureSetCombinations index referring to featureSetCombination. A fallback band combination resulting from the reported CA and MR-DC band combination is not signalled but the UE shall support it. For intra-band non-contiguous CA band combinations, the UE only includes one band combination, and exclude the others for which the presence of uplink CA bandwidth class in the band combination entry is different. One band combination entry can also indicate support of any other possible permutations in the presence of uplink CA bandwidth class where a paired downlink CA bandwidth class is the same or where the number of UL CCs is smaller than the one of paired DL CCs expressed by the CA bandwidth class, as specified in TS 36.306 [15]. For these band combinations not included in the capability, the supported feature set is the same as the ones for the band combination included in the UE capability.	UE	Yes	No	No
supportedBandListNR Includes the supported NR bands as defined in TS 38.101-1 [2] and TS 38.101-2 [3].	UE	Yes	No	No
uplinkSetEUTRA Indicates the features that the UE supports on the UL carriers corresponding to one EUTRA band entry in a band combination by FeatureSetEUTRA-UplinkId. The FeatureSetUplinkId = 0 means that the UE does not support a UL carrier in this band of a band combination.	Band	Tbd	No	No
uplinkSetNR Indicates the features that the UE supports on the UL carriers corresponding to one NR band entry in a band combination by FeatureSetUplinkId. The FeatureSetUplinkId = 0 means that the UE does not support a UL carrier in this band of a band combination. A fallback per band feature set resulting from the reported UL feature set that has fallback per CC feature set is not signalled but the UE shall support it.	Band	Tbd	No	No

4.2.8 Void

4.2.9 *MeasAndMobParameters*

Definitions for parameters	Per	M	FDD-TDD DIFF	FR1-FR2 DIFF
csi-RS-RLM Indicates whether the UE can perform radio link monitoring procedure based on measurement of CSI-RS as specified in TS 38.213 [11] and TS 38.133 [5]. This parameter needs FR1 and FR2 differentiation. If the UE supports this feature, the UE needs to report *maxNumberResource-CSI-RS-RLM*.	UE	Yes	No	Yes
csi-RSRP-AndRSRQ-MeasWithSSB Indicates whether the UE can perform CSI-RSRP and CSI-RSRQ measurement as specified in TS 38.215 [13], where CSI-RS resource is configured with an associated SS/PBCH. This parameter needs FR1 and FR2 differentiation. If the UE supports this feature, the UE needs to report *maxNumberCSI-RS-RRM-RS-SINR*.	UE	No	No	Yes
csi-RSRP-AndRSRQ-MeasWithoutSSB Indicates whether the UE can perform CSI-RSRP and CSI-RSRQ measurement as specified in TS 38.215 [13], where CSI-RS resource is configured for a cell that transmits SS/PBCH block and without an associated SS/PBCH block. This parameter needs FR1 and FR2 differentiation. If the UE supports this feature, the UE needs to report *maxNumberCSI-RS-RRM-RS-SINR*.	UE	No	No	Yes
csi-SINR-Meas Indicates whether the UE can perform CSI-SINR measurements based on configured CSI-RS resources as specified in TS 38.215 [13]. This parameter needs FR1 and FR2 differentiation. If the UE supports this feature, the UE needs to report *maxNumberCSI-RS-RRM-RS-SINR*.	UE	No	No	Yes
eutra-CGI-Reporting Defines whether the UE supports acquisition of relevant information from a neighbouring E-UTRA cell by reading the SI of the neighbouring cell and reporting the acquired information to the network as specified in TS 38.331 [9].	UE	Yes	No	No
eventA-MeasAndReport Indicates whether the UE supports NR measurements and events A triggered reporting as specified in TS 38.331 [9].	UE	Yes	Yes	No
eventB-MeasAndReport Indicates whether the UE supports EUTRA measurement and event B triggered reporting as specified in TS 38.331 [9]. It is mandated if the UE supports EUTRA.	UE	Yes	No	No
handover-eLTE Indicates whether the UE supports HO to EUTRA connected to 5GC. It is mandated if the UE supports EUTRA connected to 5GC.	UE	Yes	Yes	Yes
handoverFDD-TDD Indicates whether the UE supports HO between FDD and TDD. It is mandated if the UE supports both FDD and TDD.	UE	Yes	No	No
handoverFR1-FR2 Indicates whether the UE supports HO between FR1 and FR2. Support is mandatory for the UE supporting both FR1 and FR2.	UE	Yes	No	No
handoverInterF Indicates whether the UE supports inter-frequency HO. It indicates the support for inter-frequency HO from the corresponding duplex mode if this capability is included in *fdd-Add-UE-NR-Capabilities* or *tdd-Add-UE-NR-Capabilities*. It indicates the support for of inter-frequency HO from the corresponding frequency range if this capability is included in *fr1-Add-UE-NR-Capabilities* or *fr2-Add-UE-NR-Capabilities*.	UE	Yes	Yes	Yes
handoverLTE Indicates whether the UE supports HO to EUTRA connected to EPC. It is mandated if the UE supports EUTRA connected to EPC.	UE	Yes	Yes	Yes
independentGapConfig This field indicates whether the UE supports two independent measurement gap configurations for FR1 and FR2 specified in TS 38.133 [5]. The field also indicates whether the UE supports the FR2 inter-RAT measurement without gaps when EN-DC is not configured.	UE	No	Yes	No
intraAndInterF-MeasAndReport Indicates whether the UE supports NR intra-frequency and inter-frequency measurements and at least periodical reporting.	UE	Yes	Yes	No

Definitions for parameters	Per	M	FDD-TDD DIFF	FR1-FR2 DIFF
periodicEUTRA-MeasAndReport Indicates whether the UE supports periodic EUTRA measurement and reporting. It is mandatory if the UE supports EUTRA, otherwise optional.	UE	Yes /No	No	No
maxNumberCSI-RS-RRM-RS-SINR Defines the maximum number of CSI-RS resources for RRM and RS-SINR measurement across all measurement frequencies per slot.	UE	Tbd	No	No
maxNumberResource-CSI-RS-RLM Defines the maximum number of CSI-RS resources within a slot per spCell for CSI-RS based RLM.	UE	Tbd	No	Yes
nr-CGI-Reporting Defines whether the UE supports acquisition of relevant information from a neighbouring intra-frequency or inter-frequency NR cell by reading the SI of the neighbouring cell and reporting the acquired information to the network as specified in TS 38.331 [9].	UE	Yes	No	No
simultaneousRxDataSSB-DiffNumerology Indicates whether the UE supports concurrent intra-frequency measurement on serving cell or neighbouring cell and PDCCH or PDSCH reception from the serving cell with a different numerology.	UE	No	Yes	Yes
sftd-MeasPSCell Indicates whether the UE supports SFTD measurements between the Pcell and a configured PSCell.	UE	No	Yes	No
sftd-MeasNR-Cell Indicates whether the SFTD measurement with and without measurement gapsbetween the Pcell and the NR cells is supported by the UE which is capable of EN-DC when EN-DC is not configured. The SFTD measurement without gaps can be used when the UE supports at least one EN-DC band combination consisting of the set of the current E-UTRA serving frequencies and the NR frequency where SFTD measurement is configured.	UE	No	Yes	No
ssb-RLM Indicates whether the UE can perform radio link monitoring procedure based on measurement of SS/PBCH block as specified in TS 38.213 [11] and TS 38.133 [5].	UE	Yes	No	No
ssb-AndCSI-RS-RLM Indicates whether the UE can perform radio link monitoring procedure based on measurement of SS/PBCH block and CSI-RS as specified in TS 38.213 [11] and TS 38.133 [5]. If the UE supports this feature, the UE needs to report *maxNumberResource-CSI-RS-RLM*.	UE	Tbd	No	No
ss-SINR-Meas Indicates whether the UE can perform SS-SINR measurement as specified in TS 38.215 [13]. This parameter needs FR1 and FR2 differentiation.	UE	No	No	Yes
supportedGapPattern Indicates measurement gap pattern(s) optionally supported by the UE. The leading / leftmost bit (bit 0) corresponds to the gap pattern 2, the next bit corresponds to the gap pattern 3, as specified in TS 38.133 [5] and so on.	UE	No	No	No

4.2.10 Inter-RAT parameters

Definitions for parameters	Per	M	FDD-TDD DIFF
mfbi-EUTRA Indicates whether the UE supports the mechanisms defined for cells broadcasting multi band information i.e. comprehending *multiBandInfoList* defined in TS 36.331 [17].	UE	Yes	No
modifiedMRP-BehaviorEUTRA *modifiedMPR-Behavior* in 4.3.5.10, TS 36.306 [15].	UE	No	No
multiNS-Pmax-EUTRA *multiNS-Pmax* defined in 4.3.5.16, TS 36.306 [15].	UE	No	No
rs-SINR-MeasEUTRA *rs-SINR-Meas* in 4.3.6.13, TS 36.306 [15].	UE	No	No
rsrqMeasWidebandEUTRA *rsrqMeasWideband* in 4.3.6.2, TS 36.306 [15]	UE	No	Yes

4.2.10.1 Void

4.2.10.2 Void

4.2.11 Void

4.2.12 Void

4.2.13 IMS Parameters

Definitions for parameters	Per	M	FDD-TDD DIFF	FR1-FR2 DIFF
voiceOverEUTRA-5GC Indicates whether the UE supports IMS voice over E-UTRA via 5GC.	UE	No	No	No
voiceOverNR Indicates whether the UE supports IMS voice over NR. It is mandated to the IMS voice capable UE in NR otherwise optional.	UE	No	No	Yes

4.2.14 RRC buffer size

The RRC buffer size is defined as the maximum overall RRC configuration size that the UE is required to store. The RRC buffer size is 45Kbytes.

5 Optional features without UE radio access capability parameters

6 Conditionally mandatory features

Features	Condition
Skipping UL configured grant if no data to transmit.	Configured grant type ½ is supported.
multipleTimingAdvances	EN-DC is supported.
tdm-pattern	*dynamicPowerSharing* is not supported or single UL for any band combination is indicated.

7 Capability coordination in MR-DC operation

In MR-DC operation, only two nodes (one EUTRA eNB and one NR gNB) need to be considered in the EUTRA/NR capability coordination. For capabilities for which coordination is needed, it is up to the MN to make the decision on how to resolve the dependency between MN and SN configurations. The MN provides the resulting UE capabilities usable for SCG configuration to the SN. The SN is allowed to initiate the re-negotiation of capability. For capabilities for which no coordination is needed, the SN specific capabilities are just forwarded by the MN to the SN. For feature set combination, MN determines its own feature set combination to be used in MN side based on *supportedBandCombination* in MRDC container then determines the allowed feature set combination list in SN side and indicates them to SN via *SCG-ConfigInfo*. SN may request to MN different feature set combination to be used in SN side via *SCG-Config*.

8 UE Capability Constraints

The following table lists constraints indicating the minimum UE capabilities that the UE shall support.

Parameter	Description	Value
#DRBs	The number of DRBs that a UE shall support.	16 without duplication 8 per MAC entity with duplication.
#minCellperMeasObjectNR	The minimum number of neighbour cells (excluding black list cells) that a UE shall be able to store associated with a MeasObjectNR.	32
#minBlackCellRangesperMeasObjectNR	The minimum number of blacklist cell PCI ranges that a UE shall be able to store associated with a MeasObjectNR.	8
#minCellperMeasObjectEUTRA	The minimum number of neighbour cells that a UE shall be able to store associated with a MeasObjectEUTRA.	32
#minCellTotal	The minimum number of neighbour cells (excluding black list cells) that UE shall be able to store in total from all measurement objects configured.	256 with counting CSI-RS and SSB as 2.
#cell for CGI reporting	the limit regarding the cells NR can configure includes the cell for which the UE is requested to report CGI.	(# minCellperMeasObjectRAT - 1), where RAT represents NR and EUTRA.

Annex A (informative): Change history

Change history							
Date	**Meeting**	**TDoc**	**CR**	**Rev**	**Cat**	**Subject/Comment**	**New version**
06/2017	RAN2#98	R2-1704810				First version	0.0.1
06/2017	RAN2#NR2	R2-1707386					0.0.2
08/2017	RAN2#99	R2-1708750					0.0.3
12/2017	RAN2#100	R2-1712587					0.0.4
12/2017	RAN2#100	R2-1714141					0.0.5
12/2017	RAN2#100	R2-1714271					0.1.0
12/2017	RP-78	RP-172521				Submitted to RAN#78 for approval	1.0.0
12/2017	RP-78					Upgraded to Rel-15	15.0.0
03/2018	RP-79	RP-180440	0003	3	F	Updates on UE capabilities	15.1.0
06/2018	RP-80	RP-181216	0009	2	B	Introduce ANR in NR	15.2.0
	RP-80	RP-181216	0012	1	F	Miscellaneous corrections	15.2.0
	RP-80	RP-181216	0013	-	B	Delay budget report and MAC CE adaptation for NR for TS 38.306	15.2.0
09/2018	RP-81	RP-181940	0008	4	F	Correction on total layer2 buffer size	15.3.0
	RP-81	RP-181942	0024	1	F	Introduction of UE capability constraints	15.3.0
	RP-81	RP-181942	0030	-	F	38.306 corrections and cleanup	15.3.0
12/2018	RP-82	RP-182651	0016	4	F	Clarification for Interruption-based and gap-based SFTD measurement	15.4.0
	RP-82	RP-182653	0033	1	F	Timer based BWP switching	15.4.0
	RP-82	RP-182652	0035	2	F	Additional UE capabilities for NR standalone	15.4.0
	RP-82	RP-182651	0037	1	F	Clarification to UE capability of independentGapConfig for inter-RAT NR measurement not yet configured with EN-DC	15.4.0
	RP-82	RP-182661	0038	2	F	Update of L2 capability parameters	15.4.0
	RP-82	RP-182660	0047	2	F	Clarification on physical layer parameters of UE capability	15.4.0
	RP-82	RP-182666	0050	3	F	Introduce RRC buffer size in NR	15.4.0
	RP-82	RP-182664	0051	2	F	Clarification of multipleConfiguredGrants	15.4.0
	RP-82	RP-182664	0052	2	F	CR to 38.306 for PDCP CA duplication for SRB	15.4.0
	RP-82	RP-182661	0054	1	F	UE capability handling for FDD/TDD and FR1/FR2	15.4.0
	RP-82	RP-182663	0057	1	F	Clarify for per CC UL/DL modulation order capabilities	15.4.0
	RP-82	RP-182664	0058	1	F	Inter-frequency handover capability	15.4.0
	RP-82	RP-182665	0060	3	F	UE capability on PA architecture	15.4.0
	RP-82	RP-182661	0062	1	F	CR on signaling contiguous and non-contiguous EN-DC capability	15.4.0
	RP-82	RP-182813	0063	6	F	Update of UE capabilities	15.4.0
	RP-82	RP-182662	0065	2	F	Introduction of SRS switching capability	15.4.0
	RP-82	RP-182667	0068	2	B	CR on introduction of UE overheating support in NR SA scenario	15.4.0
	RP-82	RP-182664	0071	-	F	Introduction of SRS switching capability	15.4.0

History

Document history		
V15.2.0	September 2018	Publication
V15.3.0	October 2018	Publication
V15.4.0	April 2019	Publication