**3GPP TSG RAN WG2 Meeting #110-e draft R2-2005817**

**Electronic meeting, June 01 - 12, 2020**

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| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
|  |
|  | **38.331** | **CR** | **1665** | **rev** | **1** | **Current version:** | **16.0.0** |  |
|  |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* |
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| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network |  | Core Network |  |

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| ***Title:***  | Release-16 UE capabilities based on RAN1, RAN4 feature lists and RAN2 |
|  |  |
| ***Source to WG:*** | Intel Corporation, NTT DOCOMO, INC. |
| ***Source to TSG:*** | R2 |
|  |  |
| ***Work item code:*** | NR\_UE\_pow\_sav, NR\_IAB-Core, NR\_eMIMO-Core, NR\_IIOT-Core, NR\_2step\_RACH-Core, 5G\_V2X\_NRSL-Core, NR\_Mob\_enh-Core, NR\_pos-Core, NR\_unlic-Core, LTE\_NR\_DC\_CA\_enh-Core, NR\_SON\_MDT-Core, NR\_CLI\_RIM, NG\_RAN\_PRN-Core, TEI16, NR\_L1enh\_URLLC-Core |  | ***Date:*** | 2020-06-25 |
|  |  |  |  |  |
| ***Category:*** | B |  | ***Release:*** | Rel-16 |
|  | *Use one of the following categories:****F*** *(correction)****A*** *(mirror corresponding to a change in an earlier release)****B*** *(addition of feature),* ***C*** *(functional modification of feature)****D*** *(editorial modification)*Detailed explanations of the above categories canbe found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)Rel-12 (Release 12)**Rel-13 (Release 13)Rel-14 (Release 14)Rel-15 (Release 15)Rel-16 (Release 16)* |
|  |  |
| ***Reason for change:*** | Capture the Release-16 UE capabilities based on the RAN1 UE feature list (R1-2005097) and RAN4 UE feature list (R4-2009174) and the below endorsed CRs for other capabilities.All the entries that are not concluded from both RAN1 and RAN4 feature lists are not considered as part of this CR.List of changes * R1-2005097 RAN1 UE feature list
* R4-2009174 RAN4 UE feature list
* R2-2005857 UE capabilities for Rel-16 Power Saving WI
* R2-2006000 UE capabilities for Rel-16 CLI (RAN1/RAN4)
* R2-2005786 UE capabilities for RAN1 feature list NR\_Mob\_enh
* R2-2005762 UE capabilities for RAN2 feature list NR\_Mob\_enh
* R2-2005885 UE capabilities for RAN1 feature list NR\_pos\_Core
* R2-2006296 UE capabilities for RAN2 feature list NR\_IAB\_Core
* R2-2006409 UE capabilities for RAN2 feature list NR\_IAB\_Core
* R2-2005807 UE capabilities for RAN2 feature list NG\_RAN\_PRN
* R2-2006293 UE capabilities for RAN2 feature list NR\_IIOT\_Core
* R2-2006360 Intraband EN\_DC power class expansion for 29 dBm
* R2-2006263 Introduction of UE capabilities for inter-frequency measurement without gap
* R2-2006290 Introduction of mandatory gap patterns in Rel-16
* R2-2004583 UE capability for single entry PHR with P bit
* R2-2006327 Introduction of signalling for high-speed train scenarios
* R2-2006110 Introduction of NeedForGap capability for NR measurement
* R2-2006366 Introduction of RAN2 UE capabilities for eDCCA
* R2-2006053 Introduction of NR eURLLC capabilities
* R2-2005973 Introduction of NR RAN2 V2X capabilities
* R2-2005953 Introduction of NR RAN1/RAN4 V2X capabilities
* R2-2005870 RAN2 UE capabilities for NR Shared Spectrum
* R2-2006340 UE capabilities for NR MDT and SON
* R2-2005900 Introduction of capability for on-demand SIB(s) procedure in CONNECTED
* R2-2006203 Extension of CSI-RS capabilities per codebook type
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|  |  |
| ***Summary of change:*** | New Release-16 capabilities from RAN1/RAN2/RAN4 are added based on the above list. |
|  |  |
| ***Consequences if not approved:*** | RAN1, RAN2 and RAN4 related UE capabilities will not be captured in specifcations |
|  |  |
| ***Clauses affected:*** | 5.8.3, 6.3.3, 6.4, 6.6.1 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** | **Y** |  |  Other core specifications  | TS/TR .38.306, CR ...  |
| ***affected:*** |  | **X** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

*Start of changes*

### 5.8.3 Sidelink UE information for NR sidelink communication

#### 5.8.3.1 General



Figure 5.8.3.1-1: Sidelink UE information for NR sidelink communication

The purpose of this procedure is to inform the network that the UE is interested or no longer interested to receive NR sidelink communication, as well as to request assignment or release of transmission resource for NR sidelink communication and to report parameters related to NR sidelink communication.

#### 5.8.3.2 Initiation

A UE capable of NR sidelink communication that is in RRC\_CONNECTED may initiate the procedure to indicate it is (interested in) receiving NR sidelink communication in several cases including upon successful connection establishment or resuming, upon change of interest, or upon change to a PCell providing *SIB12* including *sl-ConfigCommonNR*. A UE capable of NR sidelink communication may initiate the procedure to request assignment of dedicated resources for NR sidelink communication transmission.

Upon initiating this procedure, the UE shall:

1> if *SIB12* including *sl-ConfigCommonNR* is provided by the PCell:

2> ensure having a valid version of *SIB12* for the PCell;

2> if configured by upper layers to receive NR sidelink communication on the frequency included in *sl-FreqInfoList* in *SIB12* of the PCell:

3> if the UE did not transmit a *SidelinkUEInformationNR* message since last entering RRC\_CONNECTED state; or

3> if since the last time the UE transmitted a *SidelinkUEInformationNR* message the UE connected to a PCell not providing *SIB12* including *sl-ConfigCommonNR*; or

3> if the last transmission of the *SidelinkUEInformationNR* message did not include *sl-RxInterestedFreqList*; or if the frequency configured by upper layers to receive NR sidelink communication on has changed since the last transmission of the *SidelinkUEInformationNR* message:

4> initiate transmission of the *SidelinkUEInformationNR* message to indicate the NR sidelink communication reception frequency of interest in accordance with 5.8.3.3;

2> else:

3> if the last transmission of the *SidelinkUEInformationNR* message included *sl-RxInterestedFreqList*:

4> initiate transmission of the *SidelinkUEInformationNR* message to indicate it is no longer interested in NR sidelink communication reception in accordance with 5.8.3.3;

2> if configured by upper layers to transmit NR sidelink communication on the frequency included in *sl-FreqInfoList* in *SIB12* of the PCell:

3> if the UE did not transmit a *SidelinkUEInformationNR* message since last entering RRC\_CONNECTED state; or

3> if since the last time the UE transmitted a *SidelinkUEInformationNR* message the UE connected to a PCell not providing *SIB12* including *sl-ConfigCommonNR*; or

3> if the last transmission of the *SidelinkUEInformationNR* message did not include *sl-TxResourceReqList*; or if the information carried by the *sl-TxResourceReqList* has changed since the last transmission of the *SidelinkUEInformationNR* message:

4> initiate transmission of the *SidelinkUEInformationNR* message to indicate the NR sidelink communication transmission resources required by the UE in accordance with 5.8.3.3;

2> else:

3> if the last transmission of the *SidelinkUEInformationNR* message included *sl-TxResourceReqList*:

4> initiate transmission of the *SidelinkUEInformationNR* message to indicate it no longer requires NR sidelink communication transmission resources in accordance with 5.8.3.3.

#### 5.8.3.3 Actions related to transmission of *SidelinkUEInformationNR* message

The UE shall set the contents of the *SidelinkUEInformationNR* message as follows:

1> if the UE initiates the procedure to indicate it is (no more) interested to receive NR sidelink communication or to request (configuration/ release) of NR sidelink communication transmission resources (i.e. UE includes all concerned information, irrespective of what triggered the procedure):

2> if *SIB12* including *sl-ConfigCommonNR* is provided by the PCell:

3> if configured by upper layers to receive NR sidelink communication:

4> include *sl-RxInterestedFreqList* and set it to the frequency for NR sidelink communication reception;

3> if configured by upper layers to transmit NR sidelink communication:

4> include *sl-TxResourceReqList* and set its fields (if needed) as follows for each destination for which it requests network to assign NR sidelink communication resource:

5> set *sl-DestinationIdentiy* to the destination identity configured by upper layer for NR sidelink communication transmission;

5> set *sl-CastType* to the cast type of the associated destination identity configured by the upper layer for the NR sidelink communication transmission;

5> set *sl-RLC-ModeIndication* to include the RLC mode(s) and optionally QoS profile(s) of the sidelink QoS flow(s) of the associated RLC mode(s), if the associated bi-directional sidelink DRB has been established due to the configurationby *RRCReconfigurationSidelink*;

5> set *sl-Failure* as *rlf* for the associated destination for the NR sidelink communication transmission, if the sidelink RLF is detected;

5> set *sl-Failure* as *configFailure* for the associated destination for the NR sidelink communication transmission, if *RRCReconfigurationFailureSidelink* is received as sidelink RRC reconfiguration failure;

5> set *sl-QoS-InfoList* to include QoS profile(s) of the sidelink QoS flow(s) of the associated destination configured by the upper layer for the NR sidelink communication transmission;

5> set *sl-InterestedFreqList* to indicate the frequency for NR sidelink communication transmission;

5> set *sl-TypeTxSyncList* to the current synchronization reference type used on the associated *sl-InterestedFreqList* for NR sidelink communication transmission.

5> set *sl-CapabilityInformationSidelink* to include *UECapabilityInformationSidelink* message, if any, received from peer UE.

1> The UE shall submit the *SidelinkUEInformationNR* message to lower layers for transmission.

*Next Change*

#### 5.8.9.2 Sidelink UE capability transfer

#### 5.8.9.2.1 General

This clause describes how the UE compiles and transfers its sidelink UE capability information for unicast to the initiating UE.



Figure 5.8.9.2.1-1: Sidelink UE capability transfer

#### 5.8.9.2.2 Initiation

The UE may initiate the sidelink UE capability transfer procedure upon indication from upper layer when it needs (additional) UE radio access capability information.

#### 5.8.9.2.3 Actions related to transmission of the *UECapabilityEnquirySidelink* by the UE

The initiating UE shall set the contents of *UECapabilityEnquirySidelink* message as follows:

1> include in UE radio access capabilities for sidelink within *ueCapabilityInformationSidelink*;

NOTE: It is up to initiating UE to decide whether *ueCapabilityInformationSidelink* should be included.

1> set *frequencyBandListFilterSidelink* to include frequency bands for which the peer UE is requested to provide supported bands and band combinations;

1> submit the *UECapabilityEnquirySidelink* message to lower layers for transmission.

#### 5.8.9.2.4 Actions related to reception of the *UECapabilityEnquirySidelink* by the UE

The peer UE shall set the contents of *UECapabilityInformationSidelink* message as follows:

1> include in UE radio access capabilities for sidelink within *ueCapabilityInformationSidelink*;

1> compile a list of "candidate band combinations" only consisting of bands included in *frequencyBandListFilter*, and prioritized in the order of *frequencyBandListFilterSidelink* (i.e. first include band combinations containing the first-listed band, then include remaining band combinations containing the second-listed band, and so on).

1> Include into *supportedBandCombinationListSidelink* as many band combinations as possible from the list of "candidate band combinations", starting from the first entry;

1> submit the *UECapabilityInformationSidelink* message to lower layers for transmission.

*Next Change*

– *SidelinkUEInformationNR*

The *SidelinkUEinformationNR* message is used for the indication of NR sidelink UE information to the network.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to Network

***SidelinkUEInformationNR* message**

-- ASN1START

-- TAG-SIDELINKUEINFORMATIONNR-START

SidelinkUEInformationNR-r16::= SEQUENCE {

 criticalExtensions CHOICE {

 sidelinkUEInformationNR-r16 SidelinkUEInformationNR-r16-IEs,

 criticalExtensionsFuture SEQUENCE {}

 }

}

SidelinkUEInformationNR-r16-IEs ::= SEQUENCE {

 sl-RxInterestedFreqList-r16 SL-InterestedFreqList-r16 OPTIONAL,

 sl-TxResourceReqList-r16 SL-TxResourceReqList-r16 OPTIONAL,

 lateNonCriticalExtension OCTET STRING OPTIONAL,

 nonCriticalExtension SEQUENCE {} OPTIONAL

}

SL-InterestedFreqList-r16 ::= SEQUENCE (SIZE (1..maxNrofFreqSL-r16)) OF INTEGER (1..maxNrofFreqSL-r16)

SL-TxResourceReqList-r16 ::= SEQUENCE (SIZE (1..maxNrofSL-Dest-r16)) OF SL-TxResourceReq-r16

SL-TxResourceReq-r16 ::= SEQUENCE {

 sl-DestinationIdentity-r16 SL-DestinationIdentity-r16,

 sl-CastType-r16 ENUMERATED {broadcast, groupcast, unicast, spare1},

 sl-RLC-ModeIndicationList-r16 SEQUENCE (SIZE (1.. maxNrofSLRB-r16)) OF SL-RLC-ModeIndication-r16 OPTIONAL,

 sl-QoS-InfoList-r16 SEQUENCE (SIZE (1..maxNrofSL-QFIsPerDest-r16)) OF SL-QoS-Info-r16 OPTIONAL,

 sl-Failure-r16 ENUMERATED {rlf, configFailure, spare2, spare1} OPTIONAL,

 sl-TypeTxSyncList-r16 SEQUENCE (SIZE (1..maxNrofFreqSL-r16)) OF SL-TypeTxSync-r16 OPTIONAL,

 sl-TxInterestedFreqList-r16 SEQUENCE (SIZE (1..maxNrofFreqSL-r16)) OF INTEGER (1..maxNrofFreqSL-r16) OPTIONAL,

 sl-CapabilityInformationSidelink-r16 OCTET STRING OPTIONAL

}

SL-QoS-Info-r16 ::= SEQUENCE {

 sl-QoS-FlowIdentity-r16 SL-QoS-FlowIdentity-r16,

 sl-QoS-Profile-r16 SL-QoS-Profile-r16 OPTIONAL

}

SL-RLC-ModeIndication-r16 ::= SEQUENCE {

 sl-AM-Mode-r16 SEQUENCE {

 sl-AM-Mode-r16 ENUMERATED {true},

 sl-AM-QoS-InfoList-r16 SEQUENCE (SIZE (1..maxNrofSL-QFIsPerDest-r16)) OF SL-QoS-Info-r16

 } OPTIONAL,

 sl-UM-Mode-r16 SEQUENCE {

 sl-UM-Mode-r16 ENUMERATED {true},

 sl-UM-QoS-InfoList-r16 SEQUENCE (SIZE (1..maxNrofSL-QFIsPerDest-r16)) OF SL-QoS-Info-r16

 } OPTIONAL

}

-- TAG-SIDELINKUEINFORMATIONNR-STOP

-- ASN1STOP

| ***SidelinkUEinformationNR* field descriptions** |
| --- |
| ***sl-RxInterestedFreqList***Indicates the index of frequency on which the UE is interested to receive NR sidelink communication. The value 1 corresponds to the frequency of first entry in *sl-FreqInfoList* broadcast in *SIB12*, the value 2 corresponds to the frequency of second entry in *sl-FreqInfoList* broadcast in *SIB12* and so on. In this release, only value 1 can be included in the interested frequency list.  |
| ***sl-TxResourceReq***Paramters to request the transmisison resouces for NR sidelink communication to the network in the Sidelink UE Information report. |

| ***SL-TxResourceReq* field descriptions** |
| --- |
| ***sl-CapabilityInformationSidelink***Includes the *UECapabilityInformationSidelink* message (which can be also included in *ueCapabilityInformationSidelink-r16* in *UECapabilityEnquirySidelink* from peer UE) received from the peer UE. |
| ***sl-CastType***Indicates the cast type for the correponding destination for which to request the resource. |
| ***sl-DestinationIdentity***Indicates the destination for which the TX resource request and allocation from the network are concerned. |
| ***sl-Failure***Indicates the sidelink RLF (value *rlf*) for the associated destination, when the sidelink RLF is detected. Indicates the sidelink AS configuration failure (value *configFailure*) for the associated destination, in case PC5-RRC AS configuration failure by receiving *RRCReconfigurationFailureSidelink*. |
| ***sl-QoS-InfoList***Includes the QoS profile of the sidelink QoS flow as specified in TS 23.287 [55] |
| ***sl-QoS-FlowIdentity***This identity uniquely identifies one sidelink QoS flow between the UE and the network in the scope of UE, which is unique for different destination and cast type. |
| ***sl-RLC-ModeIndication***This field indicates the RLC mode and optionally the related QoS profiles for the sidelink radio bearer, which has not been configured by the network and is initiated by another UE in unicast. The RLC mode for one sidelink radio bearer is aligned between UE and NW by the sl-QoS-FlowIdentity. |
| ***sl-TxInterestedFreqList***Each entry of this field indicates the index of frequency on which the UE is interested to transmit NR sidelink communication. The value 1 corresponds to the frequency of first entry in *sl-FreqInfoList* broadcast in *SIB12*, the value 2 corresponds to the frequency of second entry in *sl-FreqInfoList broadcast* in *SIB12* and so on. In this release, only value 1 can be included in the interested frequency list. In this relase, only one entry can be included in the list. |
| ***sl-TypeTxSyncList***A list of synchronization reference used by the UE. The UE shall include the same number of entries, listed in the same order, as in *sl-TxInterestedFreqList*, i.e. one for each carrier freqeuncy included in *sl-TxInterestedFreqList*. |

*Next change*

### 6.3.3 UE capability information elements

#### – *AccessStratumRelease*

The IE *AccessStratumRelease* indicates the release supported by the UE.

*AccessStratumRelease* information element

-- ASN1START

-- TAG-ACCESSSTRATUMRELEASE-START

AccessStratumRelease ::= ENUMERATED {

 rel15, spare7, spare6, spare5, spare4, spare3, spare2, spare1, ... }

-- TAG-ACCESSSTRATUMRELEASE-STOP

-- ASN1STOP

#### – *BandCombinationList*

The IE *BandCombinationList* contains a list of NR CA and/or MR-DC band combinations (also including DL only or UL only band).

*BandCombinationList* information element

-- ASN1START

-- TAG-BANDCOMBINATIONLIST-START

BandCombinationList ::= SEQUENCE (SIZE (1..maxBandComb)) OF BandCombination

BandCombinationList-v1540 ::= SEQUENCE (SIZE (1..maxBandComb)) OF BandCombination-v1540

BandCombinationList-v1550 ::= SEQUENCE (SIZE (1..maxBandComb)) OF BandCombination-v1550

BandCombinationList-v1560 ::= SEQUENCE (SIZE (1..maxBandComb)) OF BandCombination-v1560

BandCombinationList-v1570 ::= SEQUENCE (SIZE (1..maxBandComb)) OF BandCombination-v1570

BandCombinationList-v1580 ::= SEQUENCE (SIZE (1..maxBandComb)) OF BandCombination-v1580

BandCombinationList-v1590 ::= SEQUENCE (SIZE (1..maxBandComb)) OF BandCombination-v1590

BandCombinationList-v16xy ::= SEQUENCE (SIZE (1..maxBandComb)) OF BandCombination-v16xy

BandCombination ::= SEQUENCE {

 bandList SEQUENCE (SIZE (1..maxSimultaneousBands)) OF BandParameters,

 featureSetCombination FeatureSetCombinationId,

 ca-ParametersEUTRA CA-ParametersEUTRA OPTIONAL,

 ca-ParametersNR CA-ParametersNR OPTIONAL,

 mrdc-Parameters MRDC-Parameters OPTIONAL,

 supportedBandwidthCombinationSet BIT STRING (SIZE (1..32)) OPTIONAL,

 powerClass-v1530 ENUMERATED {pc2} OPTIONAL

}

BandCombination-v1540::= SEQUENCE {

 bandList-v1540 SEQUENCE (SIZE (1..maxSimultaneousBands)) OF BandParameters-v1540,

 ca-ParametersNR-v1540 CA-ParametersNR-v1540 OPTIONAL

}

BandCombination-v1550 ::= SEQUENCE {

 ca-ParametersNR-v1550 CA-ParametersNR-v1550

}

BandCombination-v1560::= SEQUENCE {

 ne-DC-BC ENUMERATED {supported} OPTIONAL,

 ca-ParametersNRDC CA-ParametersNRDC OPTIONAL,

 ca-ParametersEUTRA-v1560 CA-ParametersEUTRA-v1560 OPTIONAL,

 ca-ParametersNR-v1560 CA-ParametersNR-v1560 OPTIONAL

}

BandCombination-v1570 ::= SEQUENCE {

 ca-ParametersEUTRA-v1570 CA-ParametersEUTRA-v1570

}

BandCombination-v1580 ::= SEQUENCE {

 mrdc-Parameters-v1580 MRDC-Parameters-v1580

}

BandCombination-v1590::= SEQUENCE {

 supportedBandwidthCombinationSetIntraENDC BIT STRING (SIZE (1..32)) OPTIONAL,

 mrdc-Parameters-v1590 MRDC-Parameters-v1590

}

BandCombination-v16xy ::= SEQUENCE {

 bandList-v16xy SEQUENCE (SIZE (1..maxSimultaneousBands)) OF BandParameters-v16xy OPTIONAL,

 ca-ParametersNR-v16xy CA-ParametersNR-v16xy OPTIONAL,

 ca-ParametersNRDC-v16xy CA-ParametersNRDC-v16xy OPTIONAL,

 powerClass-v16xy ENUMERATED {pc1dot5} OPTIONAL

}

BandParameters ::= CHOICE {

 eutra SEQUENCE {

 bandEUTRA FreqBandIndicatorEUTRA,

 ca-BandwidthClassDL-EUTRA CA-BandwidthClassEUTRA OPTIONAL,

 ca-BandwidthClassUL-EUTRA CA-BandwidthClassEUTRA OPTIONAL

 },

 nr SEQUENCE {

 bandNR FreqBandIndicatorNR,

 ca-BandwidthClassDL-NR CA-BandwidthClassNR OPTIONAL,

 ca-BandwidthClassUL-NR CA-BandwidthClassNR OPTIONAL

 }

}

BandParameters-v1540 ::= SEQUENCE {

 srs-CarrierSwitch CHOICE {

 nr SEQUENCE {

 srs-SwitchingTimesListNR SEQUENCE (SIZE (1..maxSimultaneousBands)) OF SRS-SwitchingTimeNR

 },

 eutra SEQUENCE {

 srs-SwitchingTimesListEUTRA SEQUENCE (SIZE (1..maxSimultaneousBands)) OF SRS-SwitchingTimeEUTRA

 }

 } OPTIONAL,

 srs-TxSwitch SEQUENCE {

 supportedSRS-TxPortSwitch ENUMERATED {t1r2, t1r4, t2r4, t1r4-t2r4, t1r1, t2r2, t4r4, notSupported},

 txSwitchImpactToRx INTEGER (1..32) OPTIONAL,

 txSwitchWithAnotherBand INTEGER (1..32) OPTIONAL

 } OPTIONAL

}

BandParameters-v16xy ::= SEQUENCE {

 srs-TxSwitch-v16xy SEQUENCE {

 supportedSRS-TxPortSwitch-v16xy ENUMERATED {t1r1-t1r2, t1r1-t1r2-t1r4, t1r1-t1r2-t2r2-t2r4, t1r1-t1r2-t2r2-t1r4-t2r4, t1r1-t2r2, t1r1-t2r2-t4r4}

 } OPTIONAL,

 intraFreqDAPS-Parameters-r16 SEQUENCE {

 intraFreqDiffSCS-DAPS-r16 ENUMERATED {supported} OPTIONAL,

 intraFreqDAPS-r16 ENUMERATED {supported} OPTIONAL,

 intraFreqAsyncDAPS-r16 ENUMERATED {supported} OPTIONAL,

 intraFreqMultiUL-TransmissionDAPS-r16 ENUMERATED {supported} OPTIONAL,

 intraFreqTwoTAGs-DAPS-r16 ENUMERATED {supported} OPTIONAL,

 intraFreqSemiStaticPowerSharingDAPS-Mode1-r16 ENUMERATED {supported} OPTIONAL,

 intraFreqSemiStaticPowerSharingDAPS-Mode2-r16 ENUMERATED {supported} OPTIONAL,

 intraFreqDynamicPowersharingDAPS-r16 ENUMERATED {short, long} OPTIONAL

 }

}

-- TAG-BANDCOMBINATIONLIST-STOP

-- ASN1STOP

|  |
| --- |
| *BandCombination* field descriptions |
| ***BandCombinationList-v1540, BandCombinationList-v1550, BandCombinationList-v1560, BandCombinationList-v1570, BandCombinationList-v1580, BandCombinationList-v1590, BandCombinationList-r16***The UE shall include the same number of entries, and listed in the same order, as in *BandCombinationList* (without suffix). |
| ***ca-ParametersNRDC***If the field is included for a band combination in the NR capability container, the field indicates support of NR-DC. Otherwise, the field is absent. |
| ***ne-DC-BC***If the field is included for a band combination in the MR-DC capability container, the field indicates support of NE-DC. Otherwise, the field is absent. |
| ***srs-SwitchingTimesListNR***Indicates, for a particular pair of NR bands, the RF retuning time when switching between a NR carrier corresponding to this band entry and another (PUSCH-less) NR carrier corresponding to the band entry in the order indicated below:- For the first NR band, the UE shall include the same number of entries for NR bands as in *bandList*, i.e. first entry corresponds to first NR band in *bandList* and so on,- For the second NR band, the UE shall include one entry less, i.e. first entry corresponds to the second NR band in *bandList* and so on- And so on |
| ***srs-SwitchingTimesListEUTRA***Indicates, for a particular pair of E-UTRA bands, the RF retuning time when switching between an E-UTRA carrier corresponding to this band entry and another (PUSCH-less) E-UTRA carrier corresponding to the band entry in the order indicated below:- For the first E-UTRA band, the UE shall include the same number of entries for E-UTRA bands as in *bandList,* i.e. first entry corresponds to first E-UTRA band in *bandList* and so on,- For the second E-UTRA band, the UE shall include one entry less, i.e. first entry corresponds to the second E-UTRA band in *bandList* and so on - And so on |

#### – *CA-BandwidthClassEUTRA*

The IE *CA-BandwidthClassEUTRA* indicates the E-UTRA CA bandwidth class as defined in TS 36.101 [22], table 5.6A-1.

*CA-BandwidthClassEUTRA* information element

-- ASN1START

-- TAG-CA-BANDWIDTHCLASSEUTRA-START

CA-BandwidthClassEUTRA ::= ENUMERATED {a, b, c, d, e, f, ...}

-- TAG-CA-BANDWIDTHCLASSEUTRA-STOP

-- ASN1STOP

#### – *CA-BandwidthClassNR*

The IE *CA-BandwidthClassNR* indicates the NR CA bandwidth class as defined in TS 38.101-1 [15], table 5.3A.5-1 and TS 38.101-2 [39], table 5.3A.4-1.

*CA-BandwidthClassNR* information element

-- ASN1START

-- TAG-CA-BANDWIDTHCLASSNR-START

CA-BandwidthClassNR ::= ENUMERATED {a, b, c, d, e, f, g, h, i, j, k, l, m, n, o, p, q, ...}

-- TAG-CA-BANDWIDTHCLASSNR-STOP

-- ASN1STOP

#### – *CA-ParametersEUTRA*

The IE *CA-ParametersEUTRA* contains the E-UTRA part of band combination parameters for a given MR-DC band combination.

NOTE: If additional E-UTRA band combination parameters are defined in TS 36.331 [10], which are supported for MR-DC, they will be defined here as well.

*CA-ParametersEUTRA* information element

-- ASN1START

-- TAG-CA-PARAMETERSEUTRA-START

CA-ParametersEUTRA ::= SEQUENCE {

 multipleTimingAdvance ENUMERATED {supported} OPTIONAL,

 simultaneousRx-Tx ENUMERATED {supported} OPTIONAL,

 supportedNAICS-2CRS-AP BIT STRING (SIZE (1..8)) OPTIONAL,

 additionalRx-Tx-PerformanceReq ENUMERATED {supported} OPTIONAL,

 ue-CA-PowerClass-N ENUMERATED {class2} OPTIONAL,

 supportedBandwidthCombinationSetEUTRA-v1530 BIT STRING (SIZE (1..32)) OPTIONAL,

 ...

}

CA-ParametersEUTRA-v1560 ::= SEQUENCE {

 fd-MIMO-TotalWeightedLayers INTEGER (2..128) OPTIONAL

}

CA-ParametersEUTRA-v1570 ::= SEQUENCE {

 dl-1024QAM-TotalWeightedLayers INTEGER (0..10) OPTIONAL

}

-- TAG-CA-PARAMETERSEUTRA-STOP

-- ASN1STOP

#### – *CA-ParametersNR*

The IE *CA-ParametersNR* contains carrier aggregation related capabilities that are defined per band combination.

*CA-ParametersNR* information element

-- ASN1START

-- TAG-CA-PARAMETERSNR-START

CA-ParametersNR ::= SEQUENCE {

 dummy ENUMERATED {supported} OPTIONAL,

 parallelTxSRS-PUCCH-PUSCH ENUMERATED {supported} OPTIONAL,

 parallelTxPRACH-SRS-PUCCH-PUSCH ENUMERATED {supported} OPTIONAL,

 simultaneousRxTxInterBandCA ENUMERATED {supported} OPTIONAL,

 simultaneousRxTxSUL ENUMERATED {supported} OPTIONAL,

 diffNumerologyAcrossPUCCH-Group ENUMERATED {supported} OPTIONAL,

 diffNumerologyWithinPUCCH-GroupSmallerSCS ENUMERATED {supported} OPTIONAL,

 supportedNumberTAG ENUMERATED {n2, n3, n4} OPTIONAL,

 ...

}

CA-ParametersNR-v1540 ::= SEQUENCE {

 simultaneousSRS-AssocCSI-RS-AllCC INTEGER (5..32) OPTIONAL,

 csi-RS-IM-ReceptionForFeedbackPerBandComb SEQUENCE {

 maxNumberSimultaneousNZP-CSI-RS-ActBWP-AllCC INTEGER (1..64) OPTIONAL,

 totalNumberPortsSimultaneousNZP-CSI-RS-ActBWP-AllCC INTEGER (2..256) OPTIONAL

 } OPTIONAL,

 simultaneousCSI-ReportsAllCC INTEGER (5..32) OPTIONAL,

 dualPA-Architecture ENUMERATED {supported} OPTIONAL

}

CA-ParametersNR-v1550 ::= SEQUENCE {

 dummy ENUMERATED {supported} OPTIONAL

}

CA-ParametersNR-v1560 ::= SEQUENCE {

 diffNumerologyWithinPUCCH-GroupLargerSCS ENUMERATED {supported} OPTIONAL

}

CA-ParametersNR-v16xy ::= SEQUENCE {

 -- R1 9-3: Parallel MsgA and SRS/PUCCH/PUSCH transmissions across CCs in inter-band CA

 parallelTxMsgA-SRS-PUCCH-PUSCH-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 9-4: MsgA operation in a band combination including SUL

 msgA-SUL-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 10-9c: Joint search space group switching across multiple cells

 jointSearchSpaceGroupSwitchingAcrossCells-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 14-5: Half-duplex UE behaviour in TDD CA for same SCS

 half-DuplexTDD-CA-SameSCS-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 18-4 SCell dormancy within active time

 scellDormancyWithinActiveTime-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 18-4a SCell dormancy outside active time

 scellDormancyOutsideActiveTime-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 18-6: Cross-carrier A-CSI RS triggering with different SCS

 crossCarrierA-CSI-trigDiffSCS-r16 ENUMERATED {higherA-CSI-SCS,lowerA-CSI-SCS,both} OPTIONAL,

 -- R1 18-6a Default QCL assumption for cross-carrier A-CSI-RS triggering

 defaultQCL-CrossCarrierA-CSI-Trig-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 18-7: CA with non-aligned frame boundaries for inter-band CA

 interCA-NonAlignedFrame-r16 ENUMERATED {supported} OPTIONAL,

 simul-SRS-Trans-InterBandCA-r16 INTEGER (1..2) OPTIONAL,

 daps-Parameters-r16 SEQUENCE {

 asyncDAPS-r16 ENUMERATED {supported} OPTIONAL,

 interFreqDAPS-r16 ENUMERATED {supported} OPTIONAL,

 interFreqDiffSCS-DAPS-r16 ENUMERATED {supported} OPTIONAL,

 multiUL-TransmissionDAPS-r16 ENUMERATED {supported} OPTIONAL,

 semiStaticPowerSharingDAPS-Mode1-r16 ENUMERATED {supported} OPTIONAL,

 semiStaticPowerSharingDAPS-Mode2-r16 ENUMERATED {supported} OPTIONAL,

 dynamicPowersharingDAPS-r16 ENUMERATED {short, long} OPTIONAL,

 ul-TransCancellationDAPS-r16 ENUMERATED {supported} OPTIONAL

 } OPTIONAL,

 codebookParametersPerBC-r16 CodebookParameters-v16xy OPTIONAL

}

-- TAG-CA-PARAMETERSNR-STOP

-- ASN1STOP

#### – *CA-ParametersNRDC*

The IE *CA-ParametersNRDC* contains dual connectivity related capabilities that are defined per band combination.

*CA-ParametersNRDC* information element

-- ASN1START

-- TAG-CA-PARAMETERS-NRDC-START

CA-ParametersNRDC ::= SEQUENCE {

 ca-ParametersNR-ForDC CA-ParametersNR OPTIONAL,

 ca-ParametersNR-ForDC-v1540 CA-ParametersNR-v1540 OPTIONAL,

 ca-ParametersNR-ForDC-v1550 CA-ParametersNR-v1550 OPTIONAL,

 ca-ParametersNR-ForDC-v1560 CA-ParametersNR-v1560 OPTIONAL,

 featureSetCombinationDC FeatureSetCombinationId OPTIONAL

}

CA-ParametersNRDC-v16xy ::= SEQUENCE {

 -- R1 18-1: Semi-static power sharing mode1 between MCG and SCG cells of same FR for NR dual connectivity

 intraFR-NR-DC-PwrSharingMode1-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 18-1a: Semi-static power sharing mode 2 between MCG and SCG cells of same FR for NR dual connectivity

 intraFR-NR-DC-PwrSharingMode2-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 18-1b: Dynamic power sharing between MCG and SCG cells of same FR for NR dual connectivity

 intraFR-NR-DC-DynamicPwrSharing-r16 ENUMERATED {short, long} OPTIONAL

}

-- TAG-CA-PARAMETERS-NRDC-STOP

-- ASN1STOP

|  |
| --- |
| *CA-ParametersNRDC* field descriptions |
| ***ca-ParametersNR-forDC (with and without suffix)***If this field is present for a band combination, it reports the UE capabilities when NR-DC is configured with the band combination. If no version of this field (i.e., with and without suffix) is present for a band combination, the *ca-ParametersNR* field versions (with and without suffix) in *BandCombination* are applicable to the UE configured with NR-DC for the band combination. |
| ***featureSetCombinationDC***If this field is present for a band combination, it reports the feature set combination supported for the band combination when NR-DC is configured. If this field is absent for a band combination, the *featureSetCombination* in *BandCombination* (without suffix) is applicable to the UE configured with NR-DC for the band combination. |

#### – *CodebookParameters*

The IE *CodebookParameters* is used to convey codebook related parameters.

*CodebookParameters* information element

-- ASN1START

-- TAG-CODEBOOKPARAMETERS-START

CodebookParameters ::= SEQUENCE {

 type1 SEQUENCE {

 singlePanel SEQUENCE {

 supportedCSI-RS-ResourceList SEQUENCE (SIZE (1.. maxNrofCSI-RS-Resources)) OF SupportedCSI-RS-Resource,

 modes ENUMERATED {mode1, mode1andMode2},

 maxNumberCSI-RS-PerResourceSet INTEGER (1..8)

 },

 multiPanel SEQUENCE {

 supportedCSI-RS-ResourceList SEQUENCE (SIZE (1.. maxNrofCSI-RS-Resources)) OF SupportedCSI-RS-Resource,

 modes ENUMERATED {mode1, mode2, both},

 nrofPanels ENUMERATED {n2, n4},

 maxNumberCSI-RS-PerResourceSet INTEGER (1..8)

 } OPTIONAL

 },

 type2 SEQUENCE {

 supportedCSI-RS-ResourceList SEQUENCE (SIZE (1.. maxNrofCSI-RS-Resources)) OF SupportedCSI-RS-Resource,

 parameterLx INTEGER (2..4),

 amplitudeScalingType ENUMERATED {wideband, widebandAndSubband},

 amplitudeSubsetRestriction ENUMERATED {supported} OPTIONAL

 } OPTIONAL,

 type2-PortSelection SEQUENCE {

 supportedCSI-RS-ResourceList SEQUENCE (SIZE (1.. maxNrofCSI-RS-Resources)) OF SupportedCSI-RS-Resource,

 parameterLx INTEGER (2..4),

 amplitudeScalingType ENUMERATED {wideband, widebandAndSubband}

 } OPTIONAL

}

CodebookParameters-v16xy ::= SEQUENCE {

 supportedCSI-RS-ResourceListAlt-r16 SEQUENCE {

 type1-SinglePanel-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-Resources)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16) OPTIONAL,

 type1-MultiPanel-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-Resources)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16) OPTIONAL,

 type2-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-Resources)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16) OPTIONAL,

 type2-PortSelection-r16 SEQUENCE (SIZE (1..maxNrofCSI-RS-Resources)) OF INTEGER (0..maxNrofCSI-RS-ResourcesAlt-1-r16) OPTIONAL

 } OPTIONAL

}

CodebookVariantsList-r16 ::= SEQUENCE (SIZE (1..maxNrofCSI-RS-ResourcesAlt-r16)) OF SupportedCSI-RS-Resource

SupportedCSI-RS-Resource ::= SEQUENCE {

 maxNumberTxPortsPerResource ENUMERATED {p2, p4, p8, p12, p16, p24, p32},

 maxNumberResourcesPerBand INTEGER (1..64),

 totalNumberTxPortsPerBand INTEGER (2..256)

}

-- TAG-CODEBOOKPARAMETERS-STOP

-- ASN1STOP

|  |
| --- |
| *CodebookParameters* field descriptions |
| ***supportedCSI-RS-ResourceListAlt***This field indicates the alternative list of *SupportedCSI-RS-Resource* supported for each codebook type. The supported CSI-RS resource is indicated by an integer value which pinpoints *SupportedCSI-RS-Resource* defined in *CodebookVariantsList*. The value 0 corresponds to the first entry of *CodebookVariantsList*. The value 1 corresponds to the second entry of *CodebookVariantsList*, and so on. For each codebook type, the field shall be included in both *codebookParametersPerBC* and *codebookParametersPerBand*. |

#### – *FeatureSetCombination*

The IE *FeatureSetCombination* is a two-dimensional matrix of *FeatureSet* entries.

Each *FeatureSetsPerBand* contains a list of feature sets applicable to the carrier(s) of one band entry of the associated band combination. Across the associated bands, the UE shall support the combination of *FeatureSets* at the same position in the *FeatureSetsPerBand*. All *FeatureSetsPerBand* in one *FeatureSetCombination* must have the same number of entries.

The number of *FeatureSetsPerBand* in the *FeatureSetCombination* must be equal to the number of band entries in an associated band combination. The first *FeatureSetPerBand* applies to the first band entry of the band combination, and so on.

Each *FeatureSet* contains either a pair of NR or E-UTRA feature set IDs for UL and DL.

In case of NR, the actual feature sets for UL and DL are defined in the *FeatureSets* IE and referred to from here by their ID, i.e., their position in the *featureSetsUplink* / *featureSetsDownlink* list in the FeatureSet IE.

In case of E-UTRA, the feature sets referred to from this list are defined in TS 36.331 [10] and conveyed as part of the *UE-EUTRA-Capability* container.

The *FeatureSetUplink* and *FeatureSetDownlink* referred to from the *FeatureSet* comprise, among other information, a set of *FeatureSetUplinkPerCC-Id:s* and *FeatureSetDownlinkPerCC-Id:s*. The number of these per-CC IDs determines the number of carriers that the UE is able to aggregate contiguously in frequency domain in the corresponding band. The number of carriers supported by the UE is also restricted by the bandwidth class indicated in the associated *BandCombination*, if present.

In feature set combinations the UE shall exclude entries for fallback combinations with same capabilities, since the network may anyway assume that the UE supports those.

NOTE 1: The UE may advertise fallback band-combinations in which it supports additional functionality explicitly in two ways: Either by setting FeatureSet IDs to zero (inter-band and intra-band non-contiguous fallback) and by reducing the number of FeatureSet-PerCC Ids in a Feature Set (intra-band contiguous fallback). Or by separate *BandCombination* entries with associated *FeatureSetCombinations*.

NOTE 2: The UE may advertise a *FeatureSetCombination* containing only fallback band combinations. That means, in a *FeatureSetCombination,* each group of *FeatureSets* across the bands may contain at least one pair of *FeatureSetUplinkId* and *FeatureSetDownlinkId* which is set to 0/0.

NOTE 3: The Network configures serving cell(s) and BWP(s) configuration to comply with capabilities derived from the combination of FeatureSets at the same position in the FeatureSetsPerBand, regardless of activated/deactivated serving cell(s) and BWP(s).

*FeatureSetCombination* information element

-- ASN1START

-- TAG-FEATURESETCOMBINATION-START

FeatureSetCombination ::= SEQUENCE (SIZE (1..maxSimultaneousBands)) OF FeatureSetsPerBand

FeatureSetsPerBand ::= SEQUENCE (SIZE (1..maxFeatureSetsPerBand)) OF FeatureSet

FeatureSet ::= CHOICE {

 eutra SEQUENCE {

 downlinkSetEUTRA FeatureSetEUTRA-DownlinkId,

 uplinkSetEUTRA FeatureSetEUTRA-UplinkId

 },

 nr SEQUENCE {

 downlinkSetNR FeatureSetDownlinkId,

 uplinkSetNR FeatureSetUplinkId

 }

}

-- TAG-FEATURESETCOMBINATION-STOP

-- ASN1STOP

#### – *FeatureSetCombinationId*

The IE *FeatureSetCombinationId* identifies a *FeatureSetCombination*. The *FeatureSetCombinationId* of a *FeatureSetCombination* is the position of the *FeatureSetCombination* in the featureSetCombinations list (in *UE-NR-Capability* or *UE-MRDC-Capability*). The *FeatureSetCombinationId* = 0 refers to the first entry in the *featureSetCombinations* list (in *UE-NR-Capability* or *UE-MRDC-Capability*).

NOTE: The *FeatureSetCombinationId* = 1024 is not used due to the maximum entry number of *featureSetCombinations*.

*FeatureSetCombinationId* information element

-- ASN1START

-- TAG-FEATURESETCOMBINATIONID-START

FeatureSetCombinationId ::= INTEGER (0.. maxFeatureSetCombinations)

-- TAG-FEATURESETCOMBINATIONID-STOP

-- ASN1STOP

#### – *FeatureSetDownlink*

The IE *FeatureSetDownlink* indicates a set of features that the UE supports on the carriers corresponding to one band entry in a band combination.

*FeatureSetDownlink* information element

-- ASN1START

-- TAG-FEATURESETDOWNLINK-START

FeatureSetDownlink ::= SEQUENCE {

 featureSetListPerDownlinkCC SEQUENCE (SIZE (1..maxNrofServingCells)) OF FeatureSetDownlinkPerCC-Id,

 intraBandFreqSeparationDL FreqSeparationClass OPTIONAL,

 scalingFactor ENUMERATED {f0p4, f0p75, f0p8} OPTIONAL,

 crossCarrierScheduling-OtherSCS ENUMERATED {supported} OPTIONAL,

 scellWithoutSSB ENUMERATED {supported} OPTIONAL,

 csi-RS-MeasSCellWithoutSSB ENUMERATED {supported} OPTIONAL,

 dummy1 ENUMERATED {supported} OPTIONAL,

 type1-3-CSS ENUMERATED {supported} OPTIONAL,

 pdcch-MonitoringAnyOccasions ENUMERATED {withoutDCI-Gap, withDCI-Gap} OPTIONAL,

 dummy2 ENUMERATED {supported} OPTIONAL,

 ue-SpecificUL-DL-Assignment ENUMERATED {supported} OPTIONAL,

 searchSpaceSharingCA-DL ENUMERATED {supported} OPTIONAL,

 timeDurationForQCL SEQUENCE {

 scs-60kHz ENUMERATED {s7, s14, s28} OPTIONAL,

 scs-120kHz ENUMERATED {s14, s28} OPTIONAL

 } OPTIONAL,

 pdsch-ProcessingType1-DifferentTB-PerSlot SEQUENCE {

 scs-15kHz ENUMERATED {upto2, upto4, upto7} OPTIONAL,

 scs-30kHz ENUMERATED {upto2, upto4, upto7} OPTIONAL,

 scs-60kHz ENUMERATED {upto2, upto4, upto7} OPTIONAL,

 scs-120kHz ENUMERATED {upto2, upto4, upto7} OPTIONAL

 } OPTIONAL,

 dummy3 DummyA OPTIONAL,

 dummy4 SEQUENCE (SIZE (1.. maxNrofCodebooks)) OF DummyB OPTIONAL,

 dummy5 SEQUENCE (SIZE (1.. maxNrofCodebooks)) OF DummyC OPTIONAL,

 dummy6 SEQUENCE (SIZE (1.. maxNrofCodebooks)) OF DummyD OPTIONAL,

 dummy7 SEQUENCE (SIZE (1.. maxNrofCodebooks)) OF DummyE OPTIONAL

}

FeatureSetDownlink-v1540 ::= SEQUENCE {

 oneFL-DMRS-TwoAdditionalDMRS-DL ENUMERATED {supported} OPTIONAL,

 additionalDMRS-DL-Alt ENUMERATED {supported} OPTIONAL,

 twoFL-DMRS-TwoAdditionalDMRS-DL ENUMERATED {supported} OPTIONAL,

 oneFL-DMRS-ThreeAdditionalDMRS-DL ENUMERATED {supported} OPTIONAL,

 pdcch-MonitoringAnyOccasionsWithSpanGap SEQUENCE {

 scs-15kHz ENUMERATED {set1, set2, set3} OPTIONAL,

 scs-30kHz ENUMERATED {set1, set2, set3} OPTIONAL,

 scs-60kHz ENUMERATED {set1, set2, set3} OPTIONAL,

 scs-120kHz ENUMERATED {set1, set2, set3} OPTIONAL

 } OPTIONAL,

 pdsch-SeparationWithGap ENUMERATED {supported} OPTIONAL,

 pdsch-ProcessingType2 SEQUENCE {

 scs-15kHz ProcessingParameters OPTIONAL,

 scs-30kHz ProcessingParameters OPTIONAL,

 scs-60kHz ProcessingParameters OPTIONAL

 } OPTIONAL,

 pdsch-ProcessingType2-Limited SEQUENCE {

 differentTB-PerSlot-SCS-30kHz ENUMERATED {upto1, upto2, upto4, upto7}

 } OPTIONAL,

 dl-MCS-TableAlt-DynamicIndication ENUMERATED {supported} OPTIONAL

}

FeatureSetDownlink-v16xy ::= SEQUENCE {

 -- R1 22-4e/4f/4g/4h: CBG based reception for DL with unicast PDSCH(s) per slot per CC with UE processing time Capability 1

 cbgPDSCH-ProcessingType1-DifferentTB-PerSlot SEQUENCE {

 scs-15kHz ENUMERATED {one-pdsch, upto2, upto4, upto7} OPTIONAL,

 scs-30kHz ENUMERATED {one-pdsch, upto2, upto4, upto7} OPTIONAL,

 scs-60kHz ENUMERATED {one-pdsch, upto2, upto4, upto7} OPTIONAL,

 scs-120kHz ENUMERATED {one-pdsch, upto2, upto4, upto7} OPTIONAL

 } OPTIONAL,

 -- R1 22-3e/3f/3g/3h: CBG based reception for DL with unicast PDSCH(s) per slot per CC with UE processing time Capability 2

 cbgPDSCH-ProcessingType2-DifferentTB-PerSlot SEQUENCE {

 scs-15kHz ENUMERATED {one-pdsch, upto2, upto4, upto7} OPTIONAL,

 scs-30kHz ENUMERATED {one-pdsch, upto2, upto4, upto7} OPTIONAL,

 scs-60kHz ENUMERATED {one-pdsch, upto2, upto4, upto7} OPTIONAL,

 scs-120kHz ENUMERATED {one-pdsch, upto2, upto4, upto7} OPTIONAL

 } OPTIONAL

}

DummyA ::= SEQUENCE {

 maxNumberNZP-CSI-RS-PerCC INTEGER (1..32),

 maxNumberPortsAcrossNZP-CSI-RS-PerCC ENUMERATED {p2, p4, p8, p12, p16, p24, p32, p40, p48, p56, p64, p72, p80,

 p88, p96, p104, p112, p120, p128, p136, p144, p152, p160, p168,

 p176, p184, p192, p200, p208, p216, p224, p232, p240, p248, p256},

 maxNumberCS-IM-PerCC ENUMERATED {n1, n2, n4, n8, n16, n32},

 maxNumberSimultaneousCSI-RS-ActBWP-AllCC ENUMERATED {n5, n6, n7, n8, n9, n10, n12, n14, n16, n18, n20, n22, n24, n26,

 n28, n30, n32, n34, n36, n38, n40, n42, n44, n46, n48, n50, n52,

 n54, n56, n58, n60, n62, n64},

 totalNumberPortsSimultaneousCSI-RS-ActBWP-AllCC ENUMERATED {p8, p12, p16, p24, p32, p40, p48, p56, p64, p72, p80,

 p88, p96, p104, p112, p120, p128, p136, p144, p152, p160, p168,

 p176, p184, p192, p200, p208, p216, p224, p232, p240, p248, p256}

}

DummyB ::= SEQUENCE {

 maxNumberTxPortsPerResource ENUMERATED {p2, p4, p8, p12, p16, p24, p32},

 maxNumberResources INTEGER (1..64),

 totalNumberTxPorts INTEGER (2..256),

 supportedCodebookMode ENUMERATED {mode1, mode1AndMode2},

 maxNumberCSI-RS-PerResourceSet INTEGER (1..8)

}

DummyC ::= SEQUENCE {

 maxNumberTxPortsPerResource ENUMERATED {p8, p16, p32},

 maxNumberResources INTEGER (1..64),

 totalNumberTxPorts INTEGER (2..256),

 supportedCodebookMode ENUMERATED {mode1, mode2, both},

 supportedNumberPanels ENUMERATED {n2, n4},

 maxNumberCSI-RS-PerResourceSet INTEGER (1..8)

}

DummyD ::= SEQUENCE {

 maxNumberTxPortsPerResource ENUMERATED {p4, p8, p12, p16, p24, p32},

 maxNumberResources INTEGER (1..64),

 totalNumberTxPorts INTEGER (2..256),

 parameterLx INTEGER (2..4),

 amplitudeScalingType ENUMERATED {wideband, widebandAndSubband},

 amplitudeSubsetRestriction ENUMERATED {supported} OPTIONAL,

 maxNumberCSI-RS-PerResourceSet INTEGER (1..8)

}

DummyE ::= SEQUENCE {

 maxNumberTxPortsPerResource ENUMERATED {p4, p8, p12, p16, p24, p32},

 maxNumberResources INTEGER (1..64),

 totalNumberTxPorts INTEGER (2..256),

 parameterLx INTEGER (2..4),

 amplitudeScalingType ENUMERATED {wideband, widebandAndSubband},

 maxNumberCSI-RS-PerResourceSet INTEGER (1..8)

}

-- TAG-FEATURESETDOWNLINK-STOP

-- ASN1STOP

|  |
| --- |
| *FeatureSetDownlink* field descriptions |
| ***crossCarrierScheduling-OtherSCS***The UE shall set this field to the same value as *crossCarrierScheduling-OtherSCS* in the associated *FeatureSetUplink* (if present). |
| ***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). The UE shall hence include at least as many *FeatureSetDownlinkPerCC-Id* in this list as the number of carriers it supports according to the *ca-BandwidthClassDL*, except if indicating additional functionality by reducing the number of *FeatureSetDownlinkPerCC-Id* in the feature set (see NOTE 1 in *FeatureSetCombination* IE description). 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. |

#### – *FeatureSetDownlinkId*

The IE *FeatureSetDownlinkId* identifies a downlink feature set. The *FeatureSetDownlinkId* of a *FeatureSetDownlink* is the index position of the *FeatureSetDownlink* in the *featureSetsDownlink* list in the *FeatureSets* IE. The first element in that list is referred to by *FeatureSetDownlinkId* = 1. The *FeatureSetDownlinkId=0* is not used by an actual *FeatureSetDownlink* but means that the UE does not support a carrier in this band of a band combination.

*FeatureSetDownlinkId* information element

-- ASN1START

-- TAG-FEATURESETDOWNLINKID-START

FeatureSetDownlinkId ::= INTEGER (0..maxDownlinkFeatureSets)

-- TAG-FEATURESETDOWNLINKID-STOP

-- ASN1STOP

#### – *FeatureSetDownlinkPerCC*

The IE *FeatureSetDownlinkPerCC* indicates a set of features that the UE supports on the corresponding carrier of one band entry of a band combination.

*FeatureSetDownlinkPerCC* information element

-- ASN1START

-- TAG-FEATURESETDOWNLINKPERCC-START

FeatureSetDownlinkPerCC ::= SEQUENCE {

 supportedSubcarrierSpacingDL SubcarrierSpacing,

 supportedBandwidthDL SupportedBandwidth,

 channelBW-90mhz ENUMERATED {supported} OPTIONAL,

 maxNumberMIMO-LayersPDSCH MIMO-LayersDL OPTIONAL,

 supportedModulationOrderDL ModulationOrder OPTIONAL

}

-- TAG-FEATURESETDOWNLINKPERCC-STOP

-- ASN1STOP

#### – *FeatureSetDownlinkPerCC-Id*

The IE *FeatureSetDownlinkPerCC-Id* identifies a set of features applicable to one carrier of a feature set. The *FeatureSetDownlinkPerCC-Id* of a *FeatureSetDownlinkPerCC* is the index position of the *FeatureSetDownlinkPerCC* in the *featureSetsDownlinkPerCC*. The first element in the list is referred to by *FeatureSetDownlinkPerCC-Id* = 1, and so on.

*FeatureSetDownlinkPerCC-Id* information element

-- ASN1START

-- TAG-FEATURESETDOWNLINKPERCC-ID-START

FeatureSetDownlinkPerCC-Id ::= INTEGER (1..maxPerCC-FeatureSets)

-- TAG-FEATURESETDOWNLINKPERCC-ID-STOP

-- ASN1STOP

#### – *FeatureSetEUTRA-DownlinkId*

The IE *FeatureSetEUTRA-DownlinkId* identifies a downlink feature set in E-UTRA list (see TS 36.331 [10]. The first element in that list is referred to by *FeatureSetEUTRA-DownlinkId* = 1. The *FeatureSetEUTRA-DownlinkId=0* is used when the UE does not support a carrier in this band of a band combination.

*FeatureSetEUTRA-DownlinkId* information element

-- ASN1START

-- TAG-FEATURESETEUTRADOWNLINKID-START

FeatureSetEUTRA-DownlinkId ::= INTEGER (0..maxEUTRA-DL-FeatureSets)

-- TAG-FEATURESETEUTRADOWNLINKID-STOP

-- ASN1STOP

#### – *FeatureSetEUTRA-UplinkId*

The IE *FeatureSetEUTRA-UplinkId* identifies an uplink feature set in E-UTRA list (see TS 36.331 [10]. The first element in that list is referred to by *FeatureSetEUTRA-UplinkId* = 1. The *FeatureSetEUTRA-UplinkId* *=0* is used when the UE does not support a carrier in this band of a band combination.

*FeatureSetEUTRA-UplinkId* information element

-- ASN1START

-- TAG-FEATURESETEUTRAUPLINKID-START

FeatureSetEUTRA-UplinkId ::= INTEGER (0..maxEUTRA-UL-FeatureSets)

-- TAG-FEATURESETEUTRAUPLINKID-STOP

-- ASN1STOP

#### – *FeatureSets*

The IE *FeatureSets* is used to provide pools of downlink and uplink features sets. 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 for that band combination.

The entries in the lists in this IE are identified by their index position. For example, the *FeatureSetUplinkPerCC-Id* = 4 identifies the 4th element in the *featureSetsUplinkPerCC* list.

NOTE: When feature sets (per CC) IEs require extension in future versions of the specification, new versions of the *FeatureSetDownlink*, *FeatureSetUplink*, *FeatureSets*, *FeatureSetDownlinkPerCC* and/or *FeatureSetUplinkPerCC* will be created and instantiated in corresponding new lists in the *FeatureSets* IE. For example, if new capability bits are to be added to the *FeatureSetDownlink*, they will instead be defined in a new *FeatureSetDownlink-rxy* which will be instantiated in a new *featureSetDownlinkList-rxy* list. If a UE indicates in a *FeatureSetCombination* that it supports the *FeatureSetDownlink* with ID #5, it implies that it supports both the features in *FeatureSetDownlink* #5 and *FeatureSetDownlink-rxy* #5 (if present). The number of entries in the new list(s) shall be the same as in the original list(s).

*FeatureSets* information element

-- ASN1START

-- TAG-FEATURESETS-START

FeatureSets ::= SEQUENCE {

 featureSetsDownlink SEQUENCE (SIZE (1..maxDownlinkFeatureSets)) OF FeatureSetDownlink OPTIONAL,

 featureSetsDownlinkPerCC SEQUENCE (SIZE (1..maxPerCC-FeatureSets)) OF FeatureSetDownlinkPerCC OPTIONAL,

 featureSetsUplink SEQUENCE (SIZE (1..maxUplinkFeatureSets)) OF FeatureSetUplink OPTIONAL,

 featureSetsUplinkPerCC SEQUENCE (SIZE (1..maxPerCC-FeatureSets)) OF FeatureSetUplinkPerCC OPTIONAL,

 ...,

 [[

 featureSetsDownlink-v1540 SEQUENCE (SIZE (1..maxDownlinkFeatureSets)) OF FeatureSetDownlink-v1540 OPTIONAL,

 featureSetsUplink-v1540 SEQUENCE (SIZE (1..maxUplinkFeatureSets)) OF FeatureSetUplink-v1540 OPTIONAL,

 featureSetsUplinkPerCC-v1540 SEQUENCE (SIZE (1..maxPerCC-FeatureSets)) OF FeatureSetUplinkPerCC-v1540 OPTIONAL

 ]],

 [[

 featureSetsDownlink-v16xy SEQUENCE (SIZE (1..maxDownlinkFeatureSets)) OF FeatureSetDownlink-v16xy OPTIONAL,

 featureSetsUplink-v16xy SEQUENCE (SIZE (1..maxUplinkFeatureSets)) OF FeatureSetUplink-v16xy OPTIONAL

 ]]

}

-- TAG-FEATURESETS-STOP

-- ASN1STOP

#### – *FeatureSetUplink*

The IE *FeatureSetUplink* is used to indicate the features that the UE supports on the carriers corresponding to one band entry in a band combination.

*FeatureSetUplink* information element

-- ASN1START

-- TAG-FEATURESETUPLINK-START

FeatureSetUplink ::= SEQUENCE {

 featureSetListPerUplinkCC SEQUENCE (SIZE (1.. maxNrofServingCells)) OF FeatureSetUplinkPerCC-Id,

 scalingFactor ENUMERATED {f0p4, f0p75, f0p8} OPTIONAL,

 crossCarrierScheduling-OtherSCS ENUMERATED {supported} OPTIONAL,

 intraBandFreqSeparationUL FreqSeparationClass OPTIONAL,

 searchSpaceSharingCA-UL ENUMERATED {supported} OPTIONAL,

 dummy1 DummyI  OPTIONAL,

 supportedSRS-Resources SRS-Resources OPTIONAL,

 twoPUCCH-Group ENUMERATED {supported} OPTIONAL,

 dynamicSwitchSUL ENUMERATED {supported} OPTIONAL,

 simultaneousTxSUL-NonSUL ENUMERATED {supported} OPTIONAL,

 pusch-ProcessingType1-DifferentTB-PerSlot SEQUENCE {

 scs-15kHz ENUMERATED {upto2, upto4, upto7} OPTIONAL,

 scs-30kHz ENUMERATED {upto2, upto4, upto7} OPTIONAL,

 scs-60kHz ENUMERATED {upto2, upto4, upto7} OPTIONAL,

 scs-120kHz ENUMERATED {upto2, upto4, upto7} OPTIONAL

 } OPTIONAL,

 dummy2 DummyF OPTIONAL

}

FeatureSetUplink-v1540 ::= SEQUENCE {

 zeroSlotOffsetAperiodicSRS ENUMERATED {supported} OPTIONAL,

 pa-PhaseDiscontinuityImpacts ENUMERATED {supported} OPTIONAL,

 pusch-SeparationWithGap ENUMERATED {supported} OPTIONAL,

 pusch-ProcessingType2 SEQUENCE {

 scs-15kHz ProcessingParameters OPTIONAL,

 scs-30kHz ProcessingParameters OPTIONAL,

 scs-60kHz ProcessingParameters OPTIONAL

 } OPTIONAL,

 ul-MCS-TableAlt-DynamicIndication ENUMERATED {supported} OPTIONAL

}

FeatureSetUplink-v16xy ::= SEQUENCE {

 -- R1 11-5: PUsCH repetition Type B

 pusch-RepetitionTypeB-r16 SEQUENCE {

 maxNumberPUSCH-Tx-r16 ENUMERATED {n2, n3, n4, n7, n8, n12},

 hoppingScheme-r16 ENUMERATED {interSlotHopping, interRepetitionHopping, both}

 } OPTIONAL,

 -- R1 11-7: UL cancelation scheme for self-carrier

 ul-CancellationSelfCarrier-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 11-7a: UL cancelation scheme for cross-carrier

 ul-CancellationCrossCarrier-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 16-5c: The maximum number of SRS resources in one SRS resource set with usage set to ‘codebook’ for Mode 2

 ul-FullPwrMode2-MaxSRS-ResInSet ENUMERATED {n1, n2, n4} OPTIONAL,

 -- R1 22-4a/4b/4c/4d: CBG based transmission for UL with unicast PUSCH(s) per slot per CC with UE processing time Capability 1

 cbgPUSCH-ProcessingType1-DifferentTB-PerSlot SEQUENCE {

 scs-15kHz ENUMERATED {one-pusch, upto2, upto4, upto7} OPTIONAL,

 scs-30kHz ENUMERATED {one-pusch, upto2, upto4, upto7} OPTIONAL,

 scs-60kHz ENUMERATED {one-pusch, upto2, upto4, upto7} OPTIONAL,

 scs-120kHz ENUMERATED {one-pusch, upto2, upto4, upto7} OPTIONAL

 } OPTIONAL,

 -- R1 22-3a/3b/3c/3d: CBG based transmission for UL with unicast PUSCH(s) per slot per CC with UE processing time Capability 2

 cbgPUSCH-ProcessingType2-DifferentTB-PerSlot SEQUENCE {

 scs-15kHz ENUMERATED {one-pusch, upto2, upto4, upto7} OPTIONAL,

 scs-30kHz ENUMERATED {one-pusch, upto2, upto4, upto7} OPTIONAL,

 scs-60kHz ENUMERATED {one-pusch, upto2, upto4, upto7} OPTIONAL,

 scs-120kHz ENUMERATED {one-pusch, upto2, upto4, upto7} OPTIONAL

 } OPTIONAL,

 supportedSRS-PosResources-r16 SRS-AllPosResources-r16 OPTIONAL

}

SRS-AllPosResources-r16 ::= SEQUENCE {

 srs-PosResources-r16 SRS-PosResources-r16,

 srs-PosResourceAP-r16 SRS-PosResourceAP-r16 OPTIONAL,

 srs-PosResourceSP-r16 SRS-PosResourceSP-r16 OPTIONAL

}

SRS-PosResources-r16 ::= SEQUENCE {

 maxNumberSRS-PosResourceSetPerBWP-r16 ENUMERATED {n1, n2, n4, n8, n12, n16},

 maxNumberSRS-PosResourcesPerBWP-r16 ENUMERATED {n1, n2, n4, n8, n16, n32, n64},

 maxNumberSRS-ResourcesPerBWP-PerSlot-r16 ENUMERATED {n1, n2, n3, n4, n5, n6, n8, n10, n12, n14},

 maxNumberPeriodicSRS-PosResourcesPerBWP-r16 ENUMERATED {n1, n2, n4, n8, n16, n32, n64},

 maxNumberPeriodicSRS-PosResourcesPerBWP-PerSlot-r16 ENUMERATED {n1, n2, n3, n4, n5, n6, n8, n10, n12, n14}

}

SRS-PosResourceAP-r16 ::= SEQUENCE {

 maxNumberAP-SRS-PosResourcesPerBWP-r16 ENUMERATED {n1, n2, n4, n8, n16, n32, n64},

 maxNumberAP-SRS-PosResourcesPerBWP-PerSlot-r16 ENUMERATED (n1, n2, n3, n4, n5, n6, n8, n10, n12, n14)

}

SRS-PosResourceSP-r16 ::= SEQUENCE {

 maxNumberSP-SRS-PosResourcesPerBWP-r16 ENUMERATED {n1, n2, n4, n8, n16, n32, n64},

 maxNumberSP-SRS-PosResourcesPerBWP-PerSlot-r16 ENUMERATED (n1, n2, n3, n4, n5, n6, n8, n10, n12, n14)

}

SRS-Resources ::= SEQUENCE {

 maxNumberAperiodicSRS-PerBWP ENUMERATED {n1, n2, n4, n8, n16},

 maxNumberAperiodicSRS-PerBWP-PerSlot INTEGER (1..6),

 maxNumberPeriodicSRS-PerBWP ENUMERATED {n1, n2, n4, n8, n16},

 maxNumberPeriodicSRS-PerBWP-PerSlot INTEGER (1..6),

 maxNumberSemiPersistentSRS-PerBWP ENUMERATED {n1, n2, n4, n8, n16},

 maxNumberSemiPersistentSRS-PerBWP-PerSlot INTEGER (1..6),

 maxNumberSRS-Ports-PerResource ENUMERATED {n1, n2, n4}

}

DummyF ::= SEQUENCE {

 maxNumberPeriodicCSI-ReportPerBWP INTEGER (1..4),

 maxNumberAperiodicCSI-ReportPerBWP INTEGER (1..4),

 maxNumberSemiPersistentCSI-ReportPerBWP INTEGER (0..4),

 simultaneousCSI-ReportsAllCC INTEGER (5..32)

}

-- TAG-FEATURESETUPLINK-STOP

-- ASN1STOP

|  |
| --- |
| *FeatureSetUplink* field descriptions |
| ***crossCarrierScheduling-OtherSCS***The UE shall set this field to the same value as *crossCarrierScheduling-OtherSCS* in the associated *FeatureSetDownlink* (if present). |
| ***featureSetListPerUplinkCC***Indicates which features the UE supports on the individual UL carriers of the feature set (and hence of a band entry that refers to the feature set). The UE shall hence include at least as many *FeatureSetUplinkPerCC-Id* in this list as the number of carriers it supports according to the *ca-BandwidthClassUL*, except if indicating additional functionality by reducing the number of *FeatureSetUplinkPerCC-Id* in the feature set (see NOTE 1 in *FeatureSetCombination* IE description). 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. |

#### – *FeatureSetUplinkId*

The IE *FeatureSetUplinkId* identifies an uplink feature set. The *FeatureSetUplinkId* of a *FeatureSetUplink* is the index position of the *FeatureSetUplink* in the *featureSetsUplink* list in the *FeatureSets* IE. The first element in the list is referred to by *FeatureSetUplinkId* = 1, and so on. The *FeatureSetUplinkId =0* is not used by an actual *FeatureSetUplink* but means that the UE does not support a carrier in this band of a band combination.

*FeatureSetUplinkId* information element

-- ASN1START

-- TAG-FEATURESETUPLINKID-START

FeatureSetUplinkId ::= INTEGER (0..maxUplinkFeatureSets)

-- TAG-FEATURESETUPLINKID-STOP

-- ASN1STOP

#### – *FeatureSetUplinkPerCC*

The IE *FeatureSetUplinkPerCC* indicates a set of features that the UE supports on the corresponding carrier of one band entry of a band combination.

*FeatureSetUplinkPerCC* information element

-- ASN1START

-- TAG-FEATURESETUPLINKPERCC-START

FeatureSetUplinkPerCC ::= SEQUENCE {

 supportedSubcarrierSpacingUL SubcarrierSpacing,

 supportedBandwidthUL SupportedBandwidth,

 channelBW-90mhz ENUMERATED {supported} OPTIONAL,

 mimo-CB-PUSCH SEQUENCE {

 maxNumberMIMO-LayersCB-PUSCH MIMO-LayersUL OPTIONAL,

 maxNumberSRS-ResourcePerSet INTEGER (1..2)

 } OPTIONAL,

 maxNumberMIMO-LayersNonCB-PUSCH MIMO-LayersUL OPTIONAL,

 supportedModulationOrderUL ModulationOrder OPTIONAL

}

FeatureSetUplinkPerCC-v1540 ::= SEQUENCE {

 mimo-NonCB-PUSCH SEQUENCE {

 maxNumberSRS-ResourcePerSet INTEGER (1..4),

 maxNumberSimultaneousSRS-ResourceTx INTEGER (1..4)

 } OPTIONAL

}

-- TAG-FEATURESETUPLINKPERCC-STOP

-- ASN1STOP

#### – *FeatureSetUplinkPerCC-Id*

The IE *FeatureSetUplinkPerCC-Id* identifies a set of features applicable to one carrier of a feature set. The *FeatureSetUplinkPerCC-Id* of a *FeatureSetUplinkPerCC* is the index position of the *FeatureSetUplinkPerCC* in the *featureSetsUplinkPerCC*. The first element in the list is referred to by *FeatureSetUplinkPerCC-Id* = 1, and so on.

*FeatureSetUplinkPerCC-Id* information element

-- ASN1START

-- TAG-FEATURESETUPLINKPERCC-ID-START

FeatureSetUplinkPerCC-Id ::= INTEGER (1..maxPerCC-FeatureSets)

-- TAG-FEATURESETUPLINKPERCC-ID-STOP

-- ASN1STOP

#### – *FreqBandIndicatorEUTRA*

-- ASN1START

-- TAG-FREQBANDINDICATOREUTRA-START

FreqBandIndicatorEUTRA ::= INTEGER (1..maxBandsEUTRA)

-- TAG-FREQBANDINDICATOREUTRA-STOP

-- ASN1STOP

#### – *FreqBandList*

The IE *FreqBandList* is used by the network to request NR CA and/or MR-DC band combinations for specific NR and/or E-UTRA frequency bands and/or up to a specific number of carriers and/or up to specific aggregated bandwidth. This is also used to request feature sets (for NR) and feature set combinations (for NR and MR-DC).

*FreqBandList* information element

-- ASN1START

-- TAG-FREQBANDLIST-START

FreqBandList ::= SEQUENCE (SIZE (1..maxBandsMRDC)) OF FreqBandInformation

FreqBandInformation ::= CHOICE {

 bandInformationEUTRA FreqBandInformationEUTRA,

 bandInformationNR FreqBandInformationNR

}

FreqBandInformationEUTRA ::= SEQUENCE {

 bandEUTRA FreqBandIndicatorEUTRA,

 ca-BandwidthClassDL-EUTRA CA-BandwidthClassEUTRA OPTIONAL, -- Need N

 ca-BandwidthClassUL-EUTRA CA-BandwidthClassEUTRA OPTIONAL -- Need N

}

FreqBandInformationNR ::= SEQUENCE {

 bandNR FreqBandIndicatorNR,

 maxBandwidthRequestedDL AggregatedBandwidth OPTIONAL, -- Need N

 maxBandwidthRequestedUL AggregatedBandwidth OPTIONAL, -- Need N

 maxCarriersRequestedDL INTEGER (1..maxNrofServingCells) OPTIONAL, -- Need N

 maxCarriersRequestedUL INTEGER (1..maxNrofServingCells) OPTIONAL -- Need N

}

AggregatedBandwidth ::= ENUMERATED {mhz50, mhz100, mhz150, mhz200, mhz250, mhz300, mhz350,

 mhz400, mhz450, mhz500, mhz550, mhz600, mhz650, mhz700, mhz750, mhz800}

-- TAG-FREQBANDLIST-STOP

-- ASN1STOP

#### – *FreqSeparationClass*

The IE *FreqSeparationClas*s is used for an intra-band non-contiguous CA band combination to indicate frequency separation between lower edge of lowest CC and upper edge of highest CC in a frequency band.

*FreqSeparationClass* information element

-- ASN1START

-- TAG-FREQSEPARATIONCLASS-START

FreqSeparationClass ::= ENUMERATED {c1, c2, c3, ...}

-- TAG-FREQSEPARATIONCLASS-STOP

-- ASN1STOP

– *HighSpeedParameters*

The IE *HighSpeedParameters* is used to convey capabilities related to high speed scenarios.

***HighSpeedParameters* information element**

-- ASN1START

-- TAG-HIGHSPEEDPARAMETERS-START

HighSpeedParameters-r16 ::= SEQUENCE {

 measurementEnhancement-r16 ENUMERATED {supported} OPTIONAL,

 demodulationEnhancement-r16 ENUMERATED {supported} OPTIONAL

}

-- TAG-HIGHSPEEDPARAMETERS-STOP

-- ASN1STOP

#### – *IMS-Parameters*

The IE *IMS-Parameters* is used to convery capabilities related to IMS.

*IMS-Parameters* information element

-- ASN1START

-- TAG-IMS-PARAMETERS-START

IMS-Parameters ::= SEQUENCE {

 ims-ParametersCommon IMS-ParametersCommon OPTIONAL,

 ims-ParametersFRX-Diff IMS-ParametersFRX-Diff OPTIONAL,

 ...

}

IMS-ParametersCommon ::= SEQUENCE {

 voiceOverEUTRA-5GC ENUMERATED {supported} OPTIONAL,

 ...,

 [[

 voiceOverSCG-BearerEUTRA-5GC ENUMERATED {supported} OPTIONAL

 ]],

 [[

 voiceFallbackIndicationEPS-r16 ENUMERATED {supported} OPTIONAL

 ]]

}

IMS-ParametersFRX-Diff ::= SEQUENCE {

 voiceOverNR ENUMERATED {supported} OPTIONAL,

 ...

}

-- TAG-IMS-PARAMETERS-STOP

-- ASN1STOP

#### – *InterRAT-Parameters*

The IE *InterRAT-Parameters* is used convey UE capabilities related to the other RATs.

*InterRAT-Parameters* information element

-- ASN1START

-- TAG-INTERRAT-PARAMETERS-START

InterRAT-Parameters ::= SEQUENCE {

 eutra EUTRA-Parameters OPTIONAL,

 ...,

 [[

 utra-FDD-r16 UTRA-FDD-Parameters-r16 OPTIONAL

 ]]

}

EUTRA-Parameters ::= SEQUENCE {

 supportedBandListEUTRA SEQUENCE (SIZE (1..maxBandsEUTRA)) OF FreqBandIndicatorEUTRA,

 eutra-ParametersCommon EUTRA-ParametersCommon OPTIONAL,

 eutra-ParametersXDD-Diff EUTRA-ParametersXDD-Diff OPTIONAL,

 ...

}

EUTRA-ParametersCommon ::= SEQUENCE {

 mfbi-EUTRA ENUMERATED {supported} OPTIONAL,

 modifiedMPR-BehaviorEUTRA BIT STRING (SIZE (32)) OPTIONAL,

 multiNS-Pmax-EUTRA ENUMERATED {supported} OPTIONAL,

 rs-SINR-MeasEUTRA ENUMERATED {supported} OPTIONAL,

 ...,

 [[

 ne-DC ENUMERATED {supported} OPTIONAL

 ]],

 [[

 nr-HO-ToEN-DC-r16 ENUMERATED {supported} OPTIONAL

 ]]

}

EUTRA-ParametersXDD-Diff ::= SEQUENCE {

 rsrqMeasWidebandEUTRA ENUMERATED {supported} OPTIONAL,

 ...

}

UTRA-FDD-Parameters-r16 ::= SEQUENCE {

 supportedBandListUTRA-FDD-r16 SEQUENCE (SIZE (1..maxBandsUTRA-FDD-r16)) OF SupportedBandUTRA-FDD-r16,

 ...

}

SupportedBandUTRA-FDD-r16 ::= ENUMERATED {

 bandI, bandII, bandIII, bandIV, bandV, bandVI,

 bandVII, bandVIII, bandIX, bandX, bandXI,

 bandXII, bandXIII, bandXIV, bandXV, bandXVI,

 bandXVII, bandXVIII, bandXIX, bandXX,

 bandXXI, bandXXII, bandXXIII, bandXXIV,

 bandXXV, bandXXVI, bandXXVII, bandXXVIII,

 bandXXIX, bandXXX, bandXXXI, bandXXXII}

-- TAG-INTERRAT-PARAMETERS-STOP

-- ASN1STOP

#### – *MAC-Parameters*

The IE *MAC-Parameters* is used to convey capabilities related to MAC.

*MAC-Parameters* information element

-- ASN1START

-- TAG-MAC-PARAMETERS-START

MAC-Parameters ::= SEQUENCE {

 mac-ParametersCommon MAC-ParametersCommon OPTIONAL,

 mac-ParametersXDD-Diff MAC-ParametersXDD-Diff OPTIONAL

}

MAC-Parameters-v16xy ::- SEQUENCE {

 mac-ParametersFRX-Diff-r16 MAC-ParametersFRX-Diff-r16 OPTIONAL

}

MAC-ParametersCommon ::= SEQUENCE {

 lcp-Restriction ENUMERATED {supported} OPTIONAL,

 dummy ENUMERATED {supported} OPTIONAL,

 lch-ToSCellRestriction ENUMERATED {supported} OPTIONAL,

 ...,

 [[

 recommendedBitRate ENUMERATED {supported} OPTIONAL,

 recommendedBitRateQuery ENUMERATED {supported} OPTIONAL

 ]],

 [[

 recommendedBitRateMultiplier-r16 ENUMERATED {supported} OPTIONAL,

 lcid-ExtensionIAB-r16 ENUMERATED {supported} OPTIONAL,

 preEmptiveBSR-r16 ENUMERATED {supported} OPTIONAL,

 autonomousTransmission-r16 ENUMERATED {supported} OPTIONAL,

 lch-PriorityBasedPrioritization-r16 ENUMERATED {supported} OPTIONAL,

 lch-ToConfiguredGrantMapping-r16 ENUMERATED {supported} OPTIONAL,

 lch-ToGrantPriorityRestriction-r16 ENUMERATED {supported} OPTIONAL,

 singlePHR-P-r16 ENUMERATED {supported} OPTIONAL,

 ul-LBT-FailureDetectionRecovery-r16 ENUMERATED {supported} OPTIONAL

 ]]

}

MAC-ParametersFRX-Diff-r16 ::= SEQUENCE {

 directMCG-SCellActivation-r16 ENUMERATED {supported} OPTIONAL,

 directMCG-SCellActivationResume-r16 ENUMERATED {supported} OPTIONAL,

 directSCG-SCellActivation-r16 ENUMERATED {supported} OPTIONAL,

 directSCG-SCellActivationResume-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 19-1: DRX Adaptation

 drx-Adaptation-r16 SEQUENCE {

 licensedBand-r16 MinTimeGap-r16 OPTIONAL,

 unlicensedBand-r16 MinTimeGap-r16 OPTIONAL

 } OPTIONAL,

 ...

}

MAC-ParametersXDD-Diff ::= SEQUENCE {

 skipUplinkTxDynamic ENUMERATED {supported} OPTIONAL,

 logicalChannelSR-DelayTimer ENUMERATED {supported} OPTIONAL,

 longDRX-Cycle ENUMERATED {supported} OPTIONAL,

 shortDRX-Cycle ENUMERATED {supported} OPTIONAL,

 multipleSR-Configurations ENUMERATED {supported} OPTIONAL,

 multipleConfiguredGrants ENUMERATED {supported} OPTIONAL,

 ...

}

MinTimeGap-r16 ::= SEQUENCE {

 scs-15kHz-r16 ENUMERATED {sl1, sl3} OPTIONAL,

 scs-30kHz-r16 ENUMERATED {sl1, sl6} OPTIONAL,

 scs-60kHz-r16 ENUMERATED {sl1, sl12} OPTIONAL,

 scs-120kHz-r16 ENUMERATED {sl2, sl24} OPTIONAL

}

-- TAG-MAC-PARAMETERS-STOP

-- ASN1STOP

#### – *MeasAndMobParameters*

The IE *MeasAndMobParameters* is used to convey UE capabilities related to measurements for radio resource management (RRM), radio link monitoring (RLM) and mobility (e.g. handover).

*MeasAndMobParameters* information element

-- ASN1START

-- TAG-MEASANDMOBPARAMETERS-START

MeasAndMobParameters ::= SEQUENCE {

 measAndMobParametersCommon MeasAndMobParametersCommon OPTIONAL,

 measAndMobParametersXDD-Diff MeasAndMobParametersXDD-Diff OPTIONAL,

 measAndMobParametersFRX-Diff MeasAndMobParametersFRX-Diff OPTIONAL

}

MeasAndMobParametersCommon ::= SEQUENCE {

 supportedGapPattern BIT STRING (SIZE (22)) OPTIONAL,

 ssb-RLM ENUMERATED {supported} OPTIONAL,

 ssb-AndCSI-RS-RLM ENUMERATED {supported} OPTIONAL,

 ...,

 [[

 eventB-MeasAndReport ENUMERATED {supported} OPTIONAL,

 handoverFDD-TDD ENUMERATED {supported} OPTIONAL,

 eutra-CGI-Reporting ENUMERATED {supported} OPTIONAL,

 nr-CGI-Reporting ENUMERATED {supported} OPTIONAL

 ]],

 [[

 independentGapConfig ENUMERATED {supported} OPTIONAL,

 periodicEUTRA-MeasAndReport ENUMERATED {supported} OPTIONAL,

 handoverFR1-FR2 ENUMERATED {supported} OPTIONAL,

 maxNumberCSI-RS-RRM-RS-SINR ENUMERATED {n4, n8, n16, n32, n64, n96} OPTIONAL

 ]],

 [[

 nr-CGI-Reporting-ENDC ENUMERATED {supported} OPTIONAL

 ]] ,

 [[

 condHandoverParametersCommon-r16 SEQUENCE {

 condHandoverFDD-TDD-r16 ENUMERATED {supported} OPTIONAL,

 condHandoverFR1-FR2-r16 ENUMERATED {supported} OPTIONAL

 } OPTIONAL,

 nr-NeedForGap-Reporting-r16 ENUMERATED {supported} OPTIONAL,

 supportedGapPattern-NRonly-r16 BIT STRING (SIZE (10)) OPTIONAL,

 supportedGapPattern-NRonly-NEDC-r16 ENUMERATED {supported} OPTIONAL,

 maxNumberCLI-RSSI-r16 ENUMERATED {n8, n16, n32, n64} OPTIONAL,

 maxNumberCLI-SRS-RSRP-r16 ENUMERATED {n4, n8, n16, n32} OPTIONAL,

 maxNumberPerSlotCLI-SRS-RSRP-r16 ENUMERATED {n2, n4, n8} OPTIONAL,

 mfbi-IAB-r16 ENUMERATED {supported} OPTIONAL,

 multipleNS-And-Pmax-IAB-r16 ENUMERATED {supported} OPTIONAL,

 nr-CGI-Reporting-NPN-r16 ENUMERATED {supported} OPTIONAL,

 idleInactiveEUTRA-MeasReport-r16 ENUMERATED {supported} OPTIONAL,

 idleInactive-ValidityArea-r16 ENUMERATED {supported} OPTIONAL

 ]]

}

MeasAndMobParametersXDD-Diff ::= SEQUENCE {

 intraAndInterF-MeasAndReport ENUMERATED {supported} OPTIONAL,

 eventA-MeasAndReport ENUMERATED {supported} OPTIONAL,

 ...,

 [[

 handoverInterF ENUMERATED {supported} OPTIONAL,

 handoverLTE-EPC ENUMERATED {supported} OPTIONAL,

 handoverLTE-5GC ENUMERATED {supported} OPTIONAL

 ]],

 [[

 sftd-MeasNR-Neigh ENUMERATED {supported} OPTIONAL,

 sftd-MeasNR-Neigh-DRX ENUMERATED {supported} OPTIONAL

 ]],

 [[

 condHandoverParametersXDD-Diff-r16 SEQUENCE {

 condHandover-r16 ENUMERATED {supported} OPTIONAL,

 condHandoverFailure-r16 ENUMERATED {supported} OPTIONAL,

 condHandoverTwoTriggerEvents-r16 ENUMERATED {supported} OPTIONAL

 } OPTIONAL,

 pcellT312-r16 ENUMERATED {supported} OPTIONAL,

 handoverIntraF-IAB-r16 ENUMERATED {supported} OPTIONAL,

 eutra-AutonomousGaps-r16 ENUMERATED {supported} OPTIONAL,

 eutra-AutonomousGapsNEDC-r16 ENUMERATED {supported} OPTIONAL,

 eutra-AutonomousGapsNRDC-r16 ENUMERATED {supported} OPTIONAL,

 nr-AutonomousGaps-r16 ENUMERATED {supported} OPTIONAL,

 nr-AutonomousGapsENDC-r16 ENUMERATED {supported} OPTIONAL,

 nr-AutonomousGapsNEDC-r16 ENUMERATED {supported} OPTIONAL,

 nr-AutonomousGapsNRDC-r16 ENUMERATED {supported} OPTIONAL,

 handoverUTRA-FDD-r16 ENUMERATED {supported} OPTIONAL

 ]]

}

MeasAndMobParametersFRX-Diff ::= SEQUENCE {

 ss-SINR-Meas ENUMERATED {supported} OPTIONAL,

 csi-RSRP-AndRSRQ-MeasWithSSB ENUMERATED {supported} OPTIONAL,

 csi-RSRP-AndRSRQ-MeasWithoutSSB ENUMERATED {supported} OPTIONAL,

 csi-SINR-Meas ENUMERATED {supported} OPTIONAL,

 csi-RS-RLM ENUMERATED {supported} OPTIONAL,

 ...,

 [[

 handoverInterF ENUMERATED {supported} OPTIONAL,

 handoverLTE-EPC ENUMERATED {supported} OPTIONAL,

 handoverLTE-5GC ENUMERATED {supported} OPTIONAL

 ]],

 [[

 maxNumberResource-CSI-RS-RLM ENUMERATED {n2, n4, n6, n8} OPTIONAL

 ]],

 [[

 simultaneousRxDataSSB-DiffNumerology ENUMERATED {supported} OPTIONAL

 ]],

 [[

 nr-AutonomousGaps-r16 ENUMERATED {supported} OPTIONAL,

 nr-AutonomousGaps-ENDC-r16 ENUMERATED {supported} OPTIONAL,

 handoverUTRA-FDD-r16 ENUMERATED {supported} OPTIONAL,

 cli-RSSI-Meas-r16 ENUMERATED {supported} OPTIONAL,

 cli-SRS-RSRP-Meas-r16 ENUMERATED {supported} OPTIONAL,

 condHandoverParametersFRX-Diff-r16 SEQUENCE {

 condHandover-r16 ENUMERATED {supported} OPTIONAL,

 condHandoverFailure-r16 ENUMERATED {supported} OPTIONAL,

 condHandoverTwoTriggerEvents-r16 ENUMERATED {supported} OPTIONAL

 } OPTIONAL,

 pcellT312-r16 ENUMERATED {supported} OPTIONAL,

 interFrequencyMeas-Nogap-r16 ENUMERATED {supported} OPTIONAL,

 simultaneousRxDataSSB-DiffNumerology-Inter-r16 ENUMERATED {supported} OPTIONAL,

 handoverIntraF-IAB-r16 ENUMERATED {supported} OPTIONAL,

 idleInactiveNR-MeasReport-r16 ENUMERATED {supported} OPTIONAL

 ]]

}

-- TAG-MEASANDMOBPARAMETERS-STOP

-- ASN1STOP

#### – *MeasAndMobParametersMRDC*

The IE *MeasAndMobParametersMRDC* is used to convey capability parameters related to RRM measurements and RRC mobility.

*MeasAndMobParametersMRDC* information element

-- ASN1START

-- TAG-MEASANDMOBPARAMETERSMRDC-START

MeasAndMobParametersMRDC ::= SEQUENCE {

 measAndMobParametersMRDC-Common MeasAndMobParametersMRDC-Common OPTIONAL,

 measAndMobParametersMRDC-XDD-Diff MeasAndMobParametersMRDC-XDD-Diff OPTIONAL,

 measAndMobParametersMRDC-FRX-Diff MeasAndMobParametersMRDC-FRX-Diff OPTIONAL

}

MeasAndMobParametersMRDC-v1560 ::= SEQUENCE {

 measAndMobParametersMRDC-XDD-Diff-v1560 MeasAndMobParametersMRDC-XDD-Diff-v1560 OPTIONAL

}

MeasAndMobParametersMRDC-v16xy ::= SEQUENCE {

 measAndMobParametersMRDC-Common-v16xy MeasAndMobParametersMRDC-Common-v16xy OPTIONAL,

 measAndMobParametersMRDC-XDD-Diff-v16xy MeasAndMobParametersMRDC-XDD-Diff-v16xy OPTIONAL,

 measAndMobParametersMRDC-FRX-Diff-v16xy MeasAndMobParametersMRDC-FRX-Diff-v16xy OPTIONAL

}

MeasAndMobParametersMRDC-Common ::= SEQUENCE {

 independentGapConfig ENUMERATED {supported} OPTIONAL

}

MeasAndMobParametersMRDC-Common-v16xy ::= SEQUENCE {

 condPSCellChangeParametersCommon-r16 SEQUENCE {

 condPSCellChangeFDD-TDD-r16 ENUMERATED {supported} OPTIONAL,

 condPSCellChangeFR1-FR2-r16 ENUMERATED {supported} OPTIONAL

 } OPTIONAL

}

MeasAndMobParametersMRDC-XDD-Diff ::= SEQUENCE {

 sftd-MeasPSCell ENUMERATED {supported} OPTIONAL,

 sftd-MeasNR-Cell ENUMERATED {supported} OPTIONAL

}

MeasAndMobParametersMRDC-XDD-Diff-v1560 ::= SEQUENCE {

 sftd-MeasPSCell-NEDC ENUMERATED {supported} OPTIONAL

}

MeasAndMobParametersMRDC-XDD-Diff-v16xy ::= SEQUENCE {

 condPSCellChangeParametersXDD-Diff-r16 SEQUENCE {

 condPSCellChange-r16 ENUMERATED {supported} OPTIONAL,

 condPSCellChangeTwoTriggerEvents-r16 ENUMERATED {supported} OPTIONAL

 } OPTIONAL,

 pscellT312-r16 ENUMERATED {supported} OPTIONAL

}

MeasAndMobParametersMRDC-FRX-Diff ::= SEQUENCE {

 simultaneousRxDataSSB-DiffNumerology ENUMERATED {supported} OPTIONAL

}

MeasAndMobParametersMRDC-FRX-Diff-v16xy ::= SEQUENCE {

 condPSCellChangeParametersFRX-Diff-r16 SEQUENCE {

 condPSCellChange-r16 ENUMERATED {supported} OPTIONAL,

 condPSCellChangeTwoTriggerEvents-r16 ENUMERATED {supported} OPTIONAL

 } OPTIONAL,

 pscellT312-r16 ENUMERATED {supported} OPTIONAL

}

-- TAG-MEASANDMOBPARAMETERSMRDC-STOP

-- ASN1STOP

#### – *MIMO-Layers*

The IE *MIMO-Layers* is used to convey the number of supported MIMO layers.

*MIMO-Layers* information element

-- ASN1START

-- TAG-MIMO-LAYERS-START

MIMO-LayersDL ::= ENUMERATED {twoLayers, fourLayers, eightLayers}

MIMO-LayersUL ::= ENUMERATED {oneLayer, twoLayers, fourLayers}

-- TAG-MIMO-LAYERS-STOP

-- ASN1STOP

#### – *MIMO-ParametersPerBand*

The IE *MIMO-ParametersPerBand* is used to convey MIMO related parameters specific for a certain band (not per feature set or band combination).

*MIMO-ParametersPerBand* information element

-- ASN1START

-- TAG-MIMO-PARAMETERSPERBAND-START

MIMO-ParametersPerBand ::= SEQUENCE {

 tci-StatePDSCH SEQUENCE {

 maxNumberConfiguredTCIstatesPerCC ENUMERATED {n4, n8, n16, n32, n64, n128} OPTIONAL,

 maxNumberActiveTCI-PerBWP ENUMERATED {n1, n2, n4, n8} OPTIONAL

 } OPTIONAL,

 additionalActiveTCI-StatePDCCH ENUMERATED {supported} OPTIONAL,

 pusch-TransCoherence ENUMERATED {nonCoherent, partialCoherent, fullCoherent} OPTIONAL,

 beamCorrespondenceWithoutUL-BeamSweeping ENUMERATED {supported} OPTIONAL,

 periodicBeamReport ENUMERATED {supported} OPTIONAL,

 aperiodicBeamReport ENUMERATED {supported} OPTIONAL,

 sp-BeamReportPUCCH ENUMERATED {supported} OPTIONAL,

 sp-BeamReportPUSCH ENUMERATED {supported} OPTIONAL,

 dummy1 DummyG OPTIONAL,

 maxNumberRxBeam INTEGER (2..8) OPTIONAL,

 maxNumberRxTxBeamSwitchDL SEQUENCE {

 scs-15kHz ENUMERATED {n4, n7, n14} OPTIONAL,

 scs-30kHz ENUMERATED {n4, n7, n14} OPTIONAL,

 scs-60kHz ENUMERATED {n4, n7, n14} OPTIONAL,

 scs-120kHz ENUMERATED {n4, n7, n14} OPTIONAL,

 scs-240kHz ENUMERATED {n4, n7, n14} OPTIONAL

 } OPTIONAL,

 maxNumberNonGroupBeamReporting ENUMERATED {n1, n2, n4} OPTIONAL,

 groupBeamReporting ENUMERATED {supported} OPTIONAL,

 uplinkBeamManagement SEQUENCE {

 maxNumberSRS-ResourcePerSet-BM ENUMERATED {n2, n4, n8, n16},

 maxNumberSRS-ResourceSet INTEGER (1..8)

 } OPTIONAL,

 maxNumberCSI-RS-BFD INTEGER (1..64) OPTIONAL,

 maxNumberSSB-BFD INTEGER (1..64) OPTIONAL,

 maxNumberCSI-RS-SSB-CBD INTEGER (1..256) OPTIONAL,

 dummy2 ENUMERATED {supported} OPTIONAL,

 twoPortsPTRS-UL ENUMERATED {supported} OPTIONAL,

 dummy5 SRS-Resources OPTIONAL,

 dummy3 INTEGER (1..4) OPTIONAL,

 beamReportTiming SEQUENCE {

 scs-15kHz ENUMERATED {sym2, sym4, sym8} OPTIONAL,

 scs-30kHz ENUMERATED {sym4, sym8, sym14, sym28} OPTIONAL,

 scs-60kHz ENUMERATED {sym8, sym14, sym28} OPTIONAL,

 scs-120kHz ENUMERATED {sym14, sym28, sym56} OPTIONAL

 } OPTIONAL,

 ptrs-DensityRecommendationSetDL SEQUENCE {

 scs-15kHz PTRS-DensityRecommendationDL OPTIONAL,

 scs-30kHz PTRS-DensityRecommendationDL OPTIONAL,

 scs-60kHz PTRS-DensityRecommendationDL OPTIONAL,

 scs-120kHz PTRS-DensityRecommendationDL OPTIONAL

 } OPTIONAL,

 ptrs-DensityRecommendationSetUL SEQUENCE {

 scs-15kHz PTRS-DensityRecommendationUL OPTIONAL,

 scs-30kHz PTRS-DensityRecommendationUL OPTIONAL,

 scs-60kHz PTRS-DensityRecommendationUL OPTIONAL,

 scs-120kHz PTRS-DensityRecommendationUL OPTIONAL

 } OPTIONAL,

 dummy4 DummyH OPTIONAL,

 aperiodicTRS ENUMERATED {supported} OPTIONAL,

 ...,

 [[

 dummy6 ENUMERATED {true} OPTIONAL,

 beamManagementSSB-CSI-RS BeamManagementSSB-CSI-RS OPTIONAL,

 beamSwitchTiming SEQUENCE {

 scs-60kHz ENUMERATED {sym14, sym28, sym48, sym224, sym336} OPTIONAL,

 scs-120kHz ENUMERATED {sym14, sym28, sym48, sym224, sym336} OPTIONAL

 } OPTIONAL,

 codebookParameters CodebookParameters OPTIONAL,

 csi-RS-IM-ReceptionForFeedback CSI-RS-IM-ReceptionForFeedback OPTIONAL,

 csi-RS-ProcFrameworkForSRS CSI-RS-ProcFrameworkForSRS OPTIONAL,

 csi-ReportFramework CSI-ReportFramework OPTIONAL,

 csi-RS-ForTracking CSI-RS-ForTracking OPTIONAL,

 srs-AssocCSI-RS SEQUENCE (SIZE (1.. maxNrofCSI-RS-Resources)) OF SupportedCSI-RS-Resource OPTIONAL,

 spatialRelations SpatialRelations OPTIONAL

 ]],

 [[

 -- R1 16-2b-0: Support of default QCL assumption with two TCI states

 defaultQCL-TwoTCI-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 16-7: Extension of the maximum number of configured aperiodic CSI report settings for all codebook types

 ~~extMaxAP-CSI-ReportSupport-r16 ENUMERATED {supported} OPTIONAL,~~

 codebookParametersPerBand-r16 CodebookParameters-v16xy OPTIONAL

 ]]

}

DummyG ::= SEQUENCE {

 maxNumberSSB-CSI-RS-ResourceOneTx ENUMERATED {n8, n16, n32, n64},

 maxNumberSSB-CSI-RS-ResourceTwoTx ENUMERATED {n0, n4, n8, n16, n32, n64},

 supportedCSI-RS-Density ENUMERATED {one, three, oneAndThree}

}

BeamManagementSSB-CSI-RS ::= SEQUENCE {

 maxNumberSSB-CSI-RS-ResourceOneTx ENUMERATED {n0, n8, n16, n32, n64},

 maxNumberCSI-RS-Resource ENUMERATED {n0, n4, n8, n16, n32, n64},

 maxNumberCSI-RS-ResourceTwoTx ENUMERATED {n0, n4, n8, n16, n32, n64},

 supportedCSI-RS-Density ENUMERATED {one, three, oneAndThree} OPTIONAL,

 maxNumberAperiodicCSI-RS-Resource ENUMERATED {n0, n1, n4, n8, n16, n32, n64}

}

DummyH ::= SEQUENCE {

 burstLength INTEGER (1..2),

 maxSimultaneousResourceSetsPerCC INTEGER (1..8),

 maxConfiguredResourceSetsPerCC INTEGER (1..64),

 maxConfiguredResourceSetsAllCC INTEGER (1..128)

}

CSI-RS-ForTracking ::= SEQUENCE {

 maxBurstLength INTEGER (1..2),

 maxSimultaneousResourceSetsPerCC INTEGER (1..8),

 maxConfiguredResourceSetsPerCC INTEGER (1..64),

 maxConfiguredResourceSetsAllCC INTEGER (1..256)

}

CSI-RS-IM-ReceptionForFeedback ::= SEQUENCE {

 maxConfigNumberNZP-CSI-RS-PerCC INTEGER (1..64),

 maxConfigNumberPortsAcrossNZP-CSI-RS-PerCC INTEGER (2..256),

 maxConfigNumberCSI-IM-PerCC ENUMERATED {n1, n2, n4, n8, n16, n32},

 maxNumberSimultaneousNZP-CSI-RS-PerCC INTEGER (1..64),

 totalNumberPortsSimultaneousNZP-CSI-RS-PerCC INTEGER (2..256)

}

CSI-RS-ProcFrameworkForSRS ::= SEQUENCE {

 maxNumberPeriodicSRS-AssocCSI-RS-PerBWP INTEGER (1..4),

 maxNumberAperiodicSRS-AssocCSI-RS-PerBWP INTEGER (1..4),

 maxNumberSP-SRS-AssocCSI-RS-PerBWP INTEGER (0..4),

 simultaneousSRS-AssocCSI-RS-PerCC INTEGER (1..8)

}

CSI-ReportFramework ::= SEQUENCE {

 maxNumberPeriodicCSI-PerBWP-ForCSI-Report INTEGER (1..4),

 maxNumberAperiodicCSI-PerBWP-ForCSI-Report INTEGER (1..4),

 maxNumberSemiPersistentCSI-PerBWP-ForCSI-Report INTEGER (0..4),

 maxNumberPeriodicCSI-PerBWP-ForBeamReport INTEGER (1..4),

 maxNumberAperiodicCSI-PerBWP-ForBeamReport INTEGER (1..4),

 maxNumberAperiodicCSI-triggeringStatePerCC ENUMERATED {n3, n7, n15, n31, n63, n128},

 maxNumberSemiPersistentCSI-PerBWP-ForBeamReport INTEGER (0..4),

 simultaneousCSI-ReportsPerCC INTEGER (1..8)

}

PTRS-DensityRecommendationDL ::= SEQUENCE {

 frequencyDensity1 INTEGER (1..276),

 frequencyDensity2 INTEGER (1..276),

 timeDensity1 INTEGER (0..29),

 timeDensity2 INTEGER (0..29),

 timeDensity3 INTEGER (0..29)

}

PTRS-DensityRecommendationUL ::= SEQUENCE {

 frequencyDensity1 INTEGER (1..276),

 frequencyDensity2 INTEGER (1..276),

 timeDensity1 INTEGER (0..29),

 timeDensity2 INTEGER (0..29),

 timeDensity3 INTEGER (0..29),

 sampleDensity1 INTEGER (1..276),

 sampleDensity2 INTEGER (1..276),

 sampleDensity3 INTEGER (1..276),

 sampleDensity4 INTEGER (1..276),

 sampleDensity5 INTEGER (1..276)

}

SpatialRelations ::= SEQUENCE {

 maxNumberConfiguredSpatialRelations ENUMERATED {n4, n8, n16, n32, n64, n96},

 maxNumberActiveSpatialRelations ENUMERATED {n1, n2, n4, n8, n14},

 additionalActiveSpatialRelationPUCCH ENUMERATED {supported} OPTIONAL,

 maxNumberDL-RS-QCL-TypeD ENUMERATED {n1, n2, n4, n8, n14}

}

DummyI ::= SEQUENCE {

 supportedSRS-TxPortSwitch ENUMERATED {t1r2, t1r4, t2r4, t1r4-t2r4, tr-equal},

 txSwitchImpactToRx ENUMERATED {true} OPTIONAL

}

-- TAG-MIMO-PARAMETERSPERBAND-STOP

-- ASN1STOP

|  |
| --- |
| *MIMO-ParametersPerBand field description* |
| ***csi-RS-IM-ReceptionForFeedback/ csi-RS-ProcFrameworkForSRS/ csi-ReportFramework***CSI related capabilities which the UE supports on each of the carriers operated on this band. For mixed FR1-FR2 band combinations these values may be further limited by the corresponding fields in *Phy-ParametersFRX-Diff*. |

#### – *ModulationOrder*

The IE *ModulationOrder* is used to convey the maximum supported modulation order.

*ModulationOrder* information element

-- ASN1START

-- TAG-MODULATIONORDER-START

ModulationOrder ::= ENUMERATED {bpsk-halfpi, bpsk, qpsk, qam16, qam64, qam256}

-- TAG-MODULATIONORDER-STOP

-- ASN1STOP

#### – *MRDC-Parameters*

The IE *MRDC-Parameters* contains the band combination parameters specific to MR-DC for a given MR-DC band combination.

*MRDC-Parameters* information element

-- ASN1START

-- TAG-MRDC-PARAMETERS-START

MRDC-Parameters ::= SEQUENCE {

 singleUL-Transmission ENUMERATED {supported} OPTIONAL,

 dynamicPowerSharingENDC ENUMERATED {supported} OPTIONAL,

 tdm-Pattern ENUMERATED {supported} OPTIONAL,

 ul-SharingEUTRA-NR ENUMERATED {tdm, fdm, both} OPTIONAL,

 ul-SwitchingTimeEUTRA-NR ENUMERATED {type1, type2} OPTIONAL,

 simultaneousRxTxInterBandENDC ENUMERATED {supported} OPTIONAL,

 asyncIntraBandENDC ENUMERATED {supported} OPTIONAL,

 ...,

 [[

 dualPA-Architecture ENUMERATED {supported} OPTIONAL,

 intraBandENDC-Support ENUMERATED {non-contiguous, both} OPTIONAL,

 ul-TimingAlignmentEUTRA-NR ENUMERATED {required} OPTIONAL

 ]],

 [[

 maxUplinkDutyCycle-interBandENDC-TDD-PC2-r16 SEQUENCE{

 eutra-TDD-Config0-r16 ENUMERATED {n20, n40, n50, n60, n70, n80, n90, n100} OPTIONAL,

 eutra-TDD-Config1-r16 ENUMERATED {n20, n40, n50, n60, n70, n80, n90, n100} OPTIONAL,

 eutra-TDD-Config2-r16 ENUMERATED {n20, n40, n50, n60, n70, n80, n90, n100} OPTIONAL,

 eutra-TDD-Config3-r16 ENUMERATED {n20, n40, n50, n60, n70, n80, n90, n100} OPTIONAL,

 eutra-TDD-Config4-r16 ENUMERATED {n20, n40, n50, n60, n70, n80, n90, n100} OPTIONAL,

 eutra-TDD-Config5-r16 ENUMERATED {n20, n40, n50, n60, n70, n80, n90, n100} OPTIONAL,

 eutra-TDD-Config6-r16 ENUMERATED {n20, n40, n50, n60, n70, n80, n90, n100} OPTIONAL

 } OPTIONAL,

 ~~-- R4 2-20: support co-located scenario only for inter-band EN-DC~~

 ~~interBandCoLocOnlySupportENDC-r16 ENUMERATED {type1, type2} OPTIONAL~~

 ]]

}

MRDC-Parameters-v1580 ::= SEQUENCE {

 dynamicPowerSharingNEDC ENUMERATED {supported} OPTIONAL

}

MRDC-Parameters-v1590 ::= SEQUENCE {

 interBandContiguousMRDC ENUMERATED {supported} OPTIONAL

}

-- TAG-MRDC-PARAMETERS-STOP

-- ASN1STOP

#### – *NRDC-Parameters*

The IE *NRDC-Parameters* contains parameters specific to NR-DC, i.e., which are not applicable to NR SA.

*NRDC-Parameters* information element

-- ASN1START

-- TAG-NRDC-PARAMETERS-START

NRDC-Parameters ::= SEQUENCE {

 measAndMobParametersNRDC MeasAndMobParametersMRDC OPTIONAL,

 generalParametersNRDC GeneralParametersMRDC-XDD-Diff OPTIONAL,

 fdd-Add-UE-NRDC-Capabilities UE-MRDC-CapabilityAddXDD-Mode OPTIONAL,

 tdd-Add-UE-NRDC-Capabilities UE-MRDC-CapabilityAddXDD-Mode OPTIONAL,

 fr1-Add-UE-NRDC-Capabilities UE-MRDC-CapabilityAddFRX-Mode OPTIONAL,

 fr2-Add-UE-NRDC-Capabilities UE-MRDC-CapabilityAddFRX-Mode OPTIONAL,

 lateNonCriticalExtension OCTET STRING OPTIONAL,

 dummy SEQUENCE {} OPTIONAL

}

NRDC-Parameters-v1570 ::= SEQUENCE {

 sfn-SyncNRDC ENUMERATED {supported} OPTIONAL

}

NRDC-Parameters-v16xy ::= SEQUENCE {

 measAndMobParametersNRDC-v16xy MeasAndMobParametersMRDC-v16xy OPTIONAL

}

-- TAG-NRDC-PARAMETERS-STOP

-- ASN1STOP

#### – *OLPC-SRS-Pos*

The IE *OLPC-SRS-Pos* is used to convey OLPC SRS positioning related parameters specific for a certain band.

*OLPC-SRS-Pos* information element

-- ASN1START

-- TAG-OLPC-SRS-POS-START

OLPC-SRS-Pos-r16 ::= SEQUENCE {

 olpc-SRS-PosBasedOnPRS-Serving-r16 ENUMERATED {supported} OPTIONAL,

 olpc-SRS-PosBasedOnSSB-Neigh-r16 ENUMERATED {supported} OPTIONAL,

 olpc-SRS-PosBasedOnPRS-Neigh-r16 ENUMERATED {supported} OPTIONAL,

 maxNumberPathLossEstimatePerServing-r16 NUMERATED {n1, n4, n8, n16} OPTIONAL

}

--TAG-OLPC-SRS-POS-STOP

-- ASN1STOP

#### – *PDCP-Parameters*

The IE *PDCP-Parameters* is used to convey capabilities related to PDCP.

*PDCP-Parameters* information element

-- ASN1START

-- TAG-PDCP-PARAMETERS-START

PDCP-Parameters ::= SEQUENCE {

 supportedROHC-Profiles SEQUENCE {

 profile0x0000 BOOLEAN,

 profile0x0001 BOOLEAN,

 profile0x0002 BOOLEAN,

 profile0x0003 BOOLEAN,

 profile0x0004 BOOLEAN,

 profile0x0006 BOOLEAN,

 profile0x0101 BOOLEAN,

 profile0x0102 BOOLEAN,

 profile0x0103 BOOLEAN,

 profile0x0104 BOOLEAN

 },

 maxNumberROHC-ContextSessions ENUMERATED {cs2, cs4, cs8, cs12, cs16, cs24, cs32, cs48, cs64,

 cs128, cs256, cs512, cs1024, cs16384, spare2, spare1},

 uplinkOnlyROHC-Profiles ENUMERATED {supported} OPTIONAL,

 continueROHC-Context ENUMERATED {supported} OPTIONAL,

 outOfOrderDelivery ENUMERATED {supported} OPTIONAL,

 shortSN ENUMERATED {supported} OPTIONAL,

 pdcp-DuplicationSRB ENUMERATED {supported} OPTIONAL,

 pdcp-DuplicationMCG-OrSCG-DRB ENUMERATED {supported} OPTIONAL,

 ...,

 [[

 drb-IAB-r16 ENUMERATED {supported} OPTIONAL,

 non-DRB-IAB-r16 ENUMERATED {supported} OPTIONAL,

 extendedDiscardTimer-r16 ENUMERATED {supported} OPTIONAL,

 continueEHC-Context-r16 ENUMERATED {supported} OPTIONAL,

 ehc-r16 ENUMERATED {supported} OPTIONAL,

 maxNumberEHC-Contexts-r16 ENUMERATED {2, 4, 8, 16, 32, 64, 128, 256, 512, 1024, 2048, 4096, 8192, 16384, 32768, 65536} OPTIONAL,

 jointEHC-ROHC-Config-r16 ENUMERATED {supported} OPTIONAL,

 pdcp-DuplicationMoreThanTwoRLC-r16 ENUMERATED {supported} OPTIONAL

 ]]

}

-- TAG-PDCP-PARAMETERS-STOP

-- ASN1STOP

#### – *PDCP-ParametersMRDC*

The IE *PDCP-ParametersMRDC* is used to convey PDCP related capabilities for MR-DC.

*PDCP-ParametersMRDC* information element

-- ASN1START

-- TAG-PDCP-PARAMETERSMRDC-START

PDCP-ParametersMRDC ::= SEQUENCE {

 pdcp-DuplicationSplitSRB ENUMERATED {supported} OPTIONAL,

 pdcp-DuplicationSplitDRB ENUMERATED {supported} OPTIONAL

}

-- TAG-PDCP-PARAMETERSMRDC-STOP

-- ASN1STOP

#### – *Phy-Parameters*

The IE *Phy-Parameters* is used to convey the physical layer capabilities.

*Phy-Parameters* information element

-- ASN1START

-- TAG-PHY-PARAMETERS-START

Phy-Parameters ::= SEQUENCE {

 phy-ParametersCommon Phy-ParametersCommon OPTIONAL,

 phy-ParametersXDD-Diff Phy-ParametersXDD-Diff OPTIONAL,

 phy-ParametersFRX-Diff Phy-ParametersFRX-Diff OPTIONAL,

 phy-ParametersFR1 Phy-ParametersFR1 OPTIONAL,

 phy-ParametersFR2 Phy-ParametersFR2 OPTIONAL

}

Phy-ParametersCommon ::= SEQUENCE {

 csi-RS-CFRA-ForHO ENUMERATED {supported} OPTIONAL,

 dynamicPRB-BundlingDL ENUMERATED {supported} OPTIONAL,

 sp-CSI-ReportPUCCH ENUMERATED {supported} OPTIONAL,

 sp-CSI-ReportPUSCH ENUMERATED {supported} OPTIONAL,

 nzp-CSI-RS-IntefMgmt ENUMERATED {supported} OPTIONAL,

 type2-SP-CSI-Feedback-LongPUCCH ENUMERATED {supported} OPTIONAL,

 precoderGranularityCORESET ENUMERATED {supported} OPTIONAL,

 dynamicHARQ-ACK-Codebook ENUMERATED {supported} OPTIONAL,

 semiStaticHARQ-ACK-Codebook ENUMERATED {supported} OPTIONAL,

 spatialBundlingHARQ-ACK ENUMERATED {supported} OPTIONAL,

 dynamicBetaOffsetInd-HARQ-ACK-CSI ENUMERATED {supported} OPTIONAL,

 pucch-Repetition-F1-3-4 ENUMERATED {supported} OPTIONAL,

 ra-Type0-PUSCH ENUMERATED {supported} OPTIONAL,

 dynamicSwitchRA-Type0-1-PDSCH ENUMERATED {supported} OPTIONAL,

 dynamicSwitchRA-Type0-1-PUSCH ENUMERATED {supported} OPTIONAL,

 pdsch-MappingTypeA ENUMERATED {supported} OPTIONAL,

 pdsch-MappingTypeB ENUMERATED {supported} OPTIONAL,

 interleavingVRB-ToPRB-PDSCH ENUMERATED {supported} OPTIONAL,

 interSlotFreqHopping-PUSCH ENUMERATED {supported} OPTIONAL,

 type1-PUSCH-RepetitionMultiSlots ENUMERATED {supported} OPTIONAL,

 type2-PUSCH-RepetitionMultiSlots ENUMERATED {supported} OPTIONAL,

 pusch-RepetitionMultiSlots ENUMERATED {supported} OPTIONAL,

 pdsch-RepetitionMultiSlots ENUMERATED {supported} OPTIONAL,

 downlinkSPS ENUMERATED {supported} OPTIONAL,

 configuredUL-GrantType1 ENUMERATED {supported} OPTIONAL,

 configuredUL-GrantType2 ENUMERATED {supported} OPTIONAL,

 pre-EmptIndication-DL ENUMERATED {supported} OPTIONAL,

 cbg-TransIndication-DL ENUMERATED {supported} OPTIONAL,

 cbg-TransIndication-UL ENUMERATED {supported} OPTIONAL,

 cbg-FlushIndication-DL ENUMERATED {supported} OPTIONAL,

 dynamicHARQ-ACK-CodeB-CBG-Retx-DL ENUMERATED {supported} OPTIONAL,

 rateMatchingResrcSetSemi-Static ENUMERATED {supported} OPTIONAL,

 rateMatchingResrcSetDynamic ENUMERATED {supported} OPTIONAL,

 bwp-SwitchingDelay ENUMERATED {type1, type2} OPTIONAL,

 ...,

 [[

 dummy ENUMERATED {supported} OPTIONAL

 ]],

 [[

 maxNumberSearchSpaces ENUMERATED {n10} OPTIONAL,

 rateMatchingCtrlResrcSetDynamic ENUMERATED {supported} OPTIONAL,

 maxLayersMIMO-Indication ENUMERATED {supported} OPTIONAL

 ]] ,

 [[

 -- R1 9-1: Basic channel structure and procedure of 2-step RACH

 twoStepRACH-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 11-1: Monitoring DCI format 1\_2 and DCI format 0\_2

 dci-Format1-2And0-2-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 11-1a: Monitoring both DCI format 0\_1/1\_1 and DCI format 0\_2/1\_2 in the same search space

 monitoringDCI-SameSearchSpace-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 11-10: Type 2 configured grant release by DCI format 0\_1

 type2-CG-ReleaseDCI-0-1-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 11-11: Type 2 configured grant release by DCI format 0\_2

 type2-CG-ReleaseDCI-0-2-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 12-3: SPS release by DCI format 1\_1

 sps-ReleaseDCI-1-1-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 12-3a: SPS release by DCI format 1\_2

 sps-ReleaseDCI-1-2-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 14-8: CSI trigger states containing non-active BWP

 csi-TriggerStateNon-ActiveBWP-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 20-2: Support up to 4 SMTCs configured for an IAB node MT per frequency location, including IAB-specific SMTC window periodicities

 seperateSMTC-InterIAB-Support-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 20-3: Support RACH configuration separately from the RACH configuration for UE access, including new IAB-specific offset and scaling factors

 seperateRACH-IAB-Support-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 20-5a: Support semi-static configuration/indication of UL-Flexible-DL slot formats for IAB-MT resources

 ul-flexibleDL-SlotFormatSemiStatic-IAB-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 20-5b: Support dynamic indication of UL-Flexible-DL slot formats for IAB-MT resources

 ul-flexibleDL-SlotFormatDynamics-IAB-r16 ENUMERATED {supported} OPTIONAL,

 dft-S-OFDM-WaveformUL-IAB-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 20-6: Support DCI Format 2\_5 based indication of soft resource availability to an IAB node

 dci-25-AI-RNTI-Support-IAB-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 20-7: Support T\_delta reception.

 t-DeltaReceptionSupport-IAB-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 20-8: Support of Desired guard symbol reporting and provided guard symbok reception.

 guardSymbolReportReception-IAB-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 18-8 HARQ-ACK codebook type and spatial bundling per PUCCH group

 harqACK-CB-SpatialBundlingPUCCH-Group-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 19-2: Cross Slot Scheduling

 crossSlotScheduling-r16 SEQUENCE {

 licensedBand-r16 ENUMERATED {supported} OPTIONAL,

 unlicensedBand-r16 ENUMERATED {supported} OPTIONAL

 } OPTIONAL,

 maxNumberSRS-PosPathLossEstimateAllServingCells-r16 ENUMERATED {n1, n4, n8, n16} OPTIONAL,

 maxNumberSRS-PosSpatialRelationsAllServingCells-r16 ENUMERATED {n0, n1, n2, n4, n8, n16} OPTIONAL,

 extendedCG-Periodicities-r16 ENUMERATED {supported} OPTIONAL,

 extendedSPS-Periodicities-r16 ENUMERATED {supported} OPTIONAL,

 codebookVariantsList-r16 CodebookVariantsList-r16 OPTIONAL

 ]]

}

Phy-ParametersXDD-Diff ::= SEQUENCE {

 dynamicSFI ENUMERATED {supported} OPTIONAL,

 twoPUCCH-F0-2-ConsecSymbols ENUMERATED {supported} OPTIONAL,

 twoDifferentTPC-Loop-PUSCH ENUMERATED {supported} OPTIONAL,

 twoDifferentTPC-Loop-PUCCH ENUMERATED {supported} OPTIONAL,

 ...,

 [[

 dl-SchedulingOffset-PDSCH-TypeA ENUMERATED {supported} OPTIONAL,

 dl-SchedulingOffset-PDSCH-TypeB ENUMERATED {supported} OPTIONAL,

 ul-SchedulingOffset ENUMERATED {supported} OPTIONAL

 ]]

}

Phy-ParametersFRX-Diff ::= SEQUENCE {

 dynamicSFI ENUMERATED {supported} OPTIONAL,

 dummy1 BIT STRING (SIZE (2)) OPTIONAL,

 twoFL-DMRS BIT STRING (SIZE (2)) OPTIONAL,

 dummy2 BIT STRING (SIZE (2)) OPTIONAL,

 dummy3 BIT STRING (SIZE (2)) OPTIONAL,

 supportedDMRS-TypeDL ENUMERATED {type1, type1And2} OPTIONAL,

 supportedDMRS-TypeUL ENUMERATED {type1, type1And2} OPTIONAL,

 semiOpenLoopCSI ENUMERATED {supported} OPTIONAL,

 csi-ReportWithoutPMI ENUMERATED {supported} OPTIONAL,

 csi-ReportWithoutCQI ENUMERATED {supported} OPTIONAL,

 onePortsPTRS BIT STRING (SIZE (2)) OPTIONAL,

 twoPUCCH-F0-2-ConsecSymbols ENUMERATED {supported} OPTIONAL,

 pucch-F2-WithFH ENUMERATED {supported} OPTIONAL,

 pucch-F3-WithFH ENUMERATED {supported} OPTIONAL,

 pucch-F4-WithFH ENUMERATED {supported} OPTIONAL,

 pucch-F0-2WithoutFH ENUMERATED {notSupported} OPTIONAL,

 pucch-F1-3-4WithoutFH ENUMERATED {notSupported} OPTIONAL,

 mux-SR-HARQ-ACK-CSI-PUCCH-MultiPerSlot ENUMERATED {supported} OPTIONAL,

 uci-CodeBlockSegmentation ENUMERATED {supported} OPTIONAL,

 onePUCCH-LongAndShortFormat ENUMERATED {supported} OPTIONAL,

 twoPUCCH-AnyOthersInSlot ENUMERATED {supported} OPTIONAL,

 intraSlotFreqHopping-PUSCH ENUMERATED {supported} OPTIONAL,

 pusch-LBRM ENUMERATED {supported} OPTIONAL,

 pdcch-BlindDetectionCA INTEGER (4..16) OPTIONAL,

 tpc-PUSCH-RNTI ENUMERATED {supported} OPTIONAL,

 tpc-PUCCH-RNTI ENUMERATED {supported} OPTIONAL,

 tpc-SRS-RNTI ENUMERATED {supported} OPTIONAL,

 absoluteTPC-Command ENUMERATED {supported} OPTIONAL,

 twoDifferentTPC-Loop-PUSCH ENUMERATED {supported} OPTIONAL,

 twoDifferentTPC-Loop-PUCCH ENUMERATED {supported} OPTIONAL,

 pusch-HalfPi-BPSK ENUMERATED {supported} OPTIONAL,

 pucch-F3-4-HalfPi-BPSK ENUMERATED {supported} OPTIONAL,

 almostContiguousCP-OFDM-UL ENUMERATED {supported} OPTIONAL,

 sp-CSI-RS ENUMERATED {supported} OPTIONAL,

 sp-CSI-IM ENUMERATED {supported} OPTIONAL,

 tdd-MultiDL-UL-SwitchPerSlot ENUMERATED {supported} OPTIONAL,

 multipleCORESET ENUMERATED {supported} OPTIONAL,

 ...,

 [[

 csi-RS-IM-ReceptionForFeedback CSI-RS-IM-ReceptionForFeedback OPTIONAL,

 csi-RS-ProcFrameworkForSRS CSI-RS-ProcFrameworkForSRS OPTIONAL,

 csi-ReportFramework CSI-ReportFramework OPTIONAL,

 mux-SR-HARQ-ACK-CSI-PUCCH-OncePerSlot SEQUENCE {

 sameSymbol ENUMERATED {supported} OPTIONAL,

 diffSymbol ENUMERATED {supported} OPTIONAL

 } OPTIONAL,

 mux-SR-HARQ-ACK-PUCCH ENUMERATED {supported} OPTIONAL,

 mux-MultipleGroupCtrlCH-Overlap ENUMERATED {supported} OPTIONAL,

 dl-SchedulingOffset-PDSCH-TypeA ENUMERATED {supported} OPTIONAL,

 dl-SchedulingOffset-PDSCH-TypeB ENUMERATED {supported} OPTIONAL,

 ul-SchedulingOffset ENUMERATED {supported} OPTIONAL,

 dl-64QAM-MCS-TableAlt ENUMERATED {supported} OPTIONAL,

 ul-64QAM-MCS-TableAlt ENUMERATED {supported} OPTIONAL,

 cqi-TableAlt ENUMERATED {supported} OPTIONAL,

 oneFL-DMRS-TwoAdditionalDMRS-UL ENUMERATED {supported} OPTIONAL,

 twoFL-DMRS-TwoAdditionalDMRS-UL ENUMERATED {supported} OPTIONAL,

 oneFL-DMRS-ThreeAdditionalDMRS-UL ENUMERATED {supported} OPTIONAL

 ]],

 [[

 pdcch-BlindDetectionNRDC SEQUENCE {

 pdcch-BlindDetectionMCG-UE INTEGER (1..15),

 pdcch-BlindDetectionSCG-UE INTEGER (1..15)

 } OPTIONAL,

 mux-HARQ-ACK-PUSCH-DiffSymbol ENUMERATED {supported} OPTIONAL

 ]],

 [[

 -- R1 11-1b: Type 1 HARQ-ACK codebook support for relative TDRA for DL

 type1-HARQ-ACK-Codebook-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 11-8: Enhanced UL power control scheme

 enhancedPowerControl-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 16-1b-1: TCI state activation across multiple CCs

 simultaneousTCI-ActMultipleCC-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 16-1b-2: Spatial relation update across multiple CCs

 simultaneousSpatialRelationMultipleCC-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 16-1c: Support of default spatial relation and pathloss reference RS for dedicated-PUCCH/SRS and PUSCH

 defaultSpatialRelationPathlossRS-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 16-1d: Support of spatial relation update for AP-SRS via MAC CE

 spatialRelationUpdateAP-SRS-r16 ENUMERATED {supported} OPTIONAL,

 cli-RSSI-FDM-DL-r16 ENUMERATED {supported} OPTIONAL,

 cli-SRS-RSRP-FDM-DL-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 19-3: Maximum MIMO Layer Adaptation

 maxLayersMIMO-Adaptation-r16 ENUMERATED {supported} OPTIONAL,

 ]]

}

Phy-ParametersFR1 ::= SEQUENCE {

 pdcch-MonitoringSingleOccasion ENUMERATED {supported} OPTIONAL,

 scs-60kHz ENUMERATED {supported} OPTIONAL,

 pdsch-256QAM-FR1 ENUMERATED {supported} OPTIONAL,

 pdsch-RE-MappingFR1-PerSymbol ENUMERATED {n10, n20} OPTIONAL,

 ...,

 [[

 pdsch-RE-MappingFR1-PerSlot ENUMERATED {n16, n32, n48, n64, n80, n96, n112, n128,

 n144, n160, n176, n192, n208, n224, n240, n256} OPTIONAL

 ]]

}

Phy-ParametersFR2 ::= SEQUENCE {

 dummy ENUMERATED {supported} OPTIONAL,

 pdsch-RE-MappingFR2-PerSymbol ENUMERATED {n6, n20} OPTIONAL,

 ...,

 [[

 pCell-FR2 ENUMERATED {supported} OPTIONAL,

 pdsch-RE-MappingFR2-PerSlot ENUMERATED {n16, n32, n48, n64, n80, n96, n112, n128,

 n144, n160, n176, n192, n208, n224, n240, n256} OPTIONAL

 ]]

}

-- TAG-PHY-PARAMETERS-STOP

-- ASN1STOP

|  |
| --- |
| *Phy-ParametersFRX-Diff field description* |
| ***csi-RS-IM-ReceptionForFeedback/ csi-RS-ProcFrameworkForSRS/ csi-ReportFramework***These fields are optionally present in *fr1-fr2-Add-UE-NR-Capabilities* in *UE-NR-Capability*. For a band combination comprised of FR1 and FR2 bands, these parameters, if present, limit the corresponding parameters in *MIMO-ParametersPerBand*. |

#### – *Phy-ParametersMRDC*

The IE *Phy-ParametersMRDC* is used to convey physical layer capabilities for MR-DC.

*Phy-ParametersMRDC* information element

-- ASN1START

-- TAG-PHY-PARAMETERSMRDC-START

Phy-ParametersMRDC ::= SEQUENCE {

 naics-Capability-List SEQUENCE (SIZE (1..maxNrofNAICS-Entries)) OF NAICS-Capability-Entry OPTIONAL,

 ...

}

NAICS-Capability-Entry ::= SEQUENCE {

 numberOfNAICS-CapableCC INTEGER(1..5),

 numberOfAggregatedPRB ENUMERATED {n50, n75, n100, n125, n150, n175, n200, n225,

 n250, n275, n300, n350, n400, n450, n500, spare},

 ...

}

-- TAG-PHY-PARAMETERSMRDC-STOP

-- ASN1STOP

|  |
| --- |
| *PHY-ParametersMRDC* field descriptions |
| ***naics-Capability-List***Indicates that UE in MR-DC supports NAICS as defined in TS 36.331 [10]. |

#### – *ProcessingParameters*

The IE *ProcessingParameters* is used to indicate PDSCH/PUSCH processing capabilities supported by the UE.

*ProcessingParameters* information element

-- ASN1START

-- TAG-PROCESSINGPARAMETERS-START

ProcessingParameters ::= SEQUENCE {

 fallback ENUMERATED {sc, cap1-only},

 differentTB-PerSlot SEQUENCE {

 upto1 NumberOfCarriers OPTIONAL,

 upto2 NumberOfCarriers OPTIONAL,

 upto4 NumberOfCarriers OPTIONAL,

 upto7 NumberOfCarriers OPTIONAL

 } OPTIONAL

}

NumberOfCarriers ::= INTEGER (1..16)

-- TAG-PROCESSINGPARAMETERS-STOP

-- ASN1STOP

#### *– PowSav-Parameters*

The IE *PowSav-Parameters* is used to convey the capabilities supported by the UE for the power saving preferences.

*PowSav-Parameters* information element

-- ASN1START

-- TAG-POWSAV-PARAMETERS-START

PowSav-Parameters-r16 ::= SEQUENCE {

 powSav-ParametersCommon-r16 PowSav-ParametersCommon-r16 OPTIONAL,

 powSav-ParametersFRX-Diff-r16 PowSav-ParametersFRX-Diff-r16 OPTIONAL,

 ...

}

PowSav-ParametersCommon-r16 ::= SEQUENCE {

 drx-Preference-r16 ENUMERATED {supported} OPTIONAL,

 maxCC-Preference-r16 ENUMERATED {supported} OPTIONAL,

 releasePreference-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 19-4a: UE assistance information

 minSchedulingOffsetPreference-r16   ENUMERATED {supported}                                             OPTIONAL,

 ...

}

PowSav-ParametersFRX-Diff-r16 ::= SEQUENCE {

 maxBW-Preference-r16 ENUMERATED {supported} OPTIONAL,

 maxMIMO-LayerPreference-r16 ENUMERATED {supported} OPTIONAL,

 ...

}

-- TAG-POWSAV-PARAMETERS-STOP

-- ASN1STOP

#### – *RAT-Type*

The IE *RAT-Type* is used to indicate the radio access technology (RAT), including NR, of the requested/transferred UE capabilities.

*RAT-Type* information element

-- ASN1START

-- TAG-RAT-TYPE-START

RAT-Type ::= ENUMERATED {nr, eutra-nr, eutra, utra-fdd-v16xy, ...}

-- TAG-RAT-TYPE-STOP

-- ASN1STOP

#### – *RF-Parameters*

The IE *RF-Parameters* is used to convey RF-related capabilities for NR operation.

*RF-Parameters* information element

-- ASN1START

-- TAG-RF-PARAMETERS-START

RF-Parameters ::= SEQUENCE {

 supportedBandListNR SEQUENCE (SIZE (1..maxBands)) OF BandNR,

 supportedBandCombinationList BandCombinationList OPTIONAL,

 appliedFreqBandListFilter FreqBandList OPTIONAL,

 ...,

 [[

 supportedBandCombinationList-v1540 BandCombinationList-v1540 OPTIONAL,

 srs-SwitchingTimeRequested ENUMERATED {true} OPTIONAL

 ]],

 [[

 supportedBandCombinationList-v1550 BandCombinationList-v1550 OPTIONAL

 ]],

 [[

 supportedBandCombinationList-v1560 BandCombinationList-v1560 OPTIONAL

 ]],

 [[

 supportedBandCombinationList-v16xy BandCombinationList-v16xy OPTIONAL,

 ]]

}

BandNR ::= SEQUENCE {

 bandNR FreqBandIndicatorNR,

 modifiedMPR-Behaviour BIT STRING (SIZE (8)) OPTIONAL,

 mimo-ParametersPerBand MIMO-ParametersPerBand OPTIONAL,

 extendedCP ENUMERATED {supported} OPTIONAL,

 multipleTCI ENUMERATED {supported} OPTIONAL,

 bwp-WithoutRestriction ENUMERATED {supported} OPTIONAL,

 bwp-SameNumerology ENUMERATED {upto2, upto4} OPTIONAL,

 bwp-DiffNumerology ENUMERATED {upto4} OPTIONAL,

 crossCarrierScheduling-SameSCS ENUMERATED {supported} OPTIONAL,

 pdsch-256QAM-FR2 ENUMERATED {supported} OPTIONAL,

 pusch-256QAM ENUMERATED {supported} OPTIONAL,

 ue-PowerClass ENUMERATED {pc1, pc2, pc3, pc4} OPTIONAL,

 rateMatchingLTE-CRS ENUMERATED {supported} OPTIONAL,

 channelBWs-DL CHOICE {

 fr1 SEQUENCE {

 scs-15kHz BIT STRING (SIZE (10)) OPTIONAL,

 scs-30kHz BIT STRING (SIZE (10)) OPTIONAL,

 scs-60kHz BIT STRING (SIZE (10)) OPTIONAL

 },

 fr2 SEQUENCE {

 scs-60kHz BIT STRING (SIZE (3)) OPTIONAL,

 scs-120kHz BIT STRING (SIZE (3)) OPTIONAL

 }

 } OPTIONAL,

 channelBWs-UL CHOICE {

 fr1 SEQUENCE {

 scs-15kHz BIT STRING (SIZE (10)) OPTIONAL,

 scs-30kHz BIT STRING (SIZE (10)) OPTIONAL,

 scs-60kHz BIT STRING (SIZE (10)) OPTIONAL

 },

 fr2 SEQUENCE {

 scs-60kHz BIT STRING (SIZE (3)) OPTIONAL,

 scs-120kHz BIT STRING (SIZE (3)) OPTIONAL

 }

 } OPTIONAL,

 ...,

 [[

 maxUplinkDutyCycle-PC2-FR1 ENUMERATED {n60, n70, n80, n90, n100} OPTIONAL

 ]],

 [[

 pucch-SpatialRelInfoMAC-CE ENUMERATED {supported} OPTIONAL,

 powerBoosting-pi2BPSK ENUMERATED {supported} OPTIONAL

 ]],

 [[

 maxUplinkDutyCycle-FR2 ENUMERATED {n15, n20, n25, n30, n40, n50, n60, n70, n80, n90, n100} OPTIONAL

 ]],

 [[

 channelBWs-DL-v1590 CHOICE {

 fr1 SEQUENCE {

 scs-15kHz BIT STRING (SIZE (16)) OPTIONAL,

 scs-30kHz BIT STRING (SIZE (16)) OPTIONAL,

 scs-60kHz BIT STRING (SIZE (16)) OPTIONAL

 },

 fr2 SEQUENCE {

 scs-60kHz BIT STRING (SIZE (8)) OPTIONAL,

 scs-120kHz BIT STRING (SIZE (8)) OPTIONAL

 }

 } OPTIONAL,

 channelBWs-UL-v1590 CHOICE {

 fr1 SEQUENCE {

 scs-15kHz BIT STRING (SIZE (16)) OPTIONAL,

 scs-30kHz BIT STRING (SIZE (16)) OPTIONAL,

 scs-60kHz BIT STRING (SIZE (16)) OPTIONAL

 },

 fr2 SEQUENCE {

 scs-60kHz BIT STRING (SIZE (8)) OPTIONAL,

 scs-120kHz BIT STRING (SIZE (8)) OPTIONAL

 }

 } OPTIONAL

 ]],

 [[

 -- R1 10: NR-unlicensed

 unlicensedParametersPerBand-r16 UnlicensedParametersPerBand-r16 OPTIONAL,

 -- R1 11-7b: Independent cancellation of the overlapping PUSCHs in an intra-band UL CA

 cancelOverlappingPUSCH-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 14-1: Multiple LTE-CRS rate matching patterns

 multipleRateMatchingEUTRA-CRS-r16 SEQUENCE {

 maxNumberPatterns-r16 INTEGER (2..6),

 maxNumberNon-OverlapPatterns-r16 INTEGER (1..3)

 } OPTIONAL,

 -- R1 14-1a: Two LTE-CRS overlapping rate matching patterns within a part of NR carrier using 15 kHz overlapping with a LTE carrier

 overlapRateMatchingEUTRA-CRS-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 14-2: PDSCH Type B mapping of length 9 and 10 OFDM symbols

 pdsch-MappingTypeB-Alt-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 14-3: One slot periodic TRS configuration for FR1

 oneShotPeriodicTRS-r16 ENUMERATED {supported} OPTIONAL,

 olpc-SRS-Pos-r16 OLPC-SRS-Pos-r16 OPTIONAL,

 spatialRelationsSRS-Pos-r16 SpatialRelationsSRS-Pos-r16 OPTIONAL,

 simul-SRS-Trans-IntraBandCA-r16 INTEGER (1..2) OPTIONAL,

 channelBW-DL-IAB-r16 CHOICE {

 fr1-100mhz SEQUENCE {

 scs-15kHz ENUMERATED {supported} OPTIONAL,

 scs-30kHz ENUMERATED {supported} OPTIONAL,

 scs-60kHz ENUMERATED {supported} OPTIONAL

 },

 fr2-200mhz SEQUENCE {

 scs-60kHz ENUMERATED {supported} OPTIONAL,

 scs-120kHz ENUMERATED {supported} OPTIONAL

 }

 } OPTIONAL,

 channelBW-UL-IAB-r16 CHOICE {

 fr1-100mhz SEQUENCE {

 scs-15kHz ENUMERATED {supported} OPTIONAL,

 scs-30kHz ENUMERATED {supported} OPTIONAL,

 scs-60kHz ENUMERATED {supported} OPTIONAL

 },

 fr2-200mhz SEQUENCE {

 scs-60kHz ENUMERATED {supported} OPTIONAL,

 scs-120kHz ENUMERATED {supported} OPTIONAL

 }

 } OPTIONAL,

 rasterShift7dot5-IAB-r16 ENUMERATED {supported} OPTIONAL,

 ue-PowerClass-v16xy ENUMERATED {pc1dot5} OPTIONAL

 ]]

}

-- TAG-RF-PARAMETERS-STOP

-- ASN1STOP

|  |
| --- |
| *RF-Parameters* field descriptions |
| ***appliedFreqBandListFilter***In this field the UE 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*. The UE does not include this field if the UE capability is requested by E-UTRAN and the network request includes the field *eutra-nr-only* [10]. |
| ***supportedBandCombinationList***A list of band combinations that the UE supports for NR (and NR-DC, if requested). The *FeatureSetCombinationId*:s in this list refer to the *FeatureSetCombination* entries in the *featureSetCombinations* list in the *UE-NR-Capability* IE. The UE does not include this field if the UE capability is requested by E-UTRAN and the network request includes the field *eutra-nr-only* [10]. |

#### – *RF-ParametersMRDC*

The IE *RF-ParametersMRDC* is used to convey RF related capabilities for MR-DC.

*RF-ParametersMRDC* information element

-- ASN1START

-- TAG-RF-PARAMETERSMRDC-START

RF-ParametersMRDC ::= SEQUENCE {

 supportedBandCombinationList BandCombinationList OPTIONAL,

 appliedFreqBandListFilter FreqBandList OPTIONAL,

 ...,

 [[

 srs-SwitchingTimeRequested ENUMERATED {true} OPTIONAL,

 supportedBandCombinationList-v1540 BandCombinationList-v1540 OPTIONAL

 ]],

 [[

 supportedBandCombinationList-v1550 BandCombinationList-v1550 OPTIONAL

 ]],

 [[

 supportedBandCombinationList-v1560 BandCombinationList-v1560 OPTIONAL,

 supportedBandCombinationListNEDC-Only BandCombinationList OPTIONAL

 ]],

 [[

 supportedBandCombinationList-v1570 BandCombinationList-v1570 OPTIONAL

 ]],

 [[

 supportedBandCombinationList-v1580 BandCombinationList-v1580 OPTIONAL

 ]],

 [[

 supportedBandCombinationList-v1590 BandCombinationList-v1590 OPTIONAL

 ]],

 [[

 supportedBandCombinationList-v16xy BandCombinationList-v16xy OPTIONAL

 ]]

}

-- TAG-RF-PARAMETERSMRDC-STOP

-- ASN1STOP

|  |
| --- |
| *RF-ParametersMRDC* field descriptions |
| ***appliedFreqBandListFilter***In this field the UE 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*. |
| ***supportedBandCombinationList***A list of band combinations that the UE supports for (NG)EN-DC and/or NE-DC. The *FeatureSetCombinationId*:s in this list refer to the *FeatureSetCombination* entries in the *featureSetCombinations* list in the *UE-MRDC-Capability* IE. |
| ***supportedBandCombinationListNEDC-Only***A list of band combinations that the UE supports only for NE-DC. The *FeatureSetCombinationId*:s in this list refer to the *FeatureSetCombination* entries in the *featureSetCombinations* list in the *UE-MRDC-Capability* IE. |

#### – *RLC-Parameters*

The IE *RLC-Parameters* is used to convey capabilities related to RLC.

*RLC-Parameters* information element

-- ASN1START

-- TAG-RLC-PARAMETERS-START

RLC-Parameters ::= SEQUENCE {

 am-WithShortSN ENUMERATED {supported} OPTIONAL,

 um-WithShortSN ENUMERATED {supported} OPTIONAL,

 um-WithLongSN ENUMERATED {supported} OPTIONAL,

 ...,

 [[

 extendedT-PollRetransmit-r16 ENUMERATED {supported} OPTIONAL,

 extendedT-StatusProhibit-r16 ENUMERATED {supported} OPTIONAL

 ]]

}

}

-- TAG-RLC-PARAMETERS-STOP

-- ASN1STOP

#### – *SDAP-Parameters*

The IE *SDAP-Parameters* is used to convey capabilities related to SDAP.

*SDAP-Parameters* information element

-- ASN1START

-- TAG-SDAP-PARAMETERS-START

SDAP-Parameters ::= SEQUENCE {

 as-ReflectiveQoS ENUMERATED {true} OPTIONAL,

 ...,

 [[

 sdap-QOS-IAB-r16 ENUMERATED {supported} OPTIONAL,

 sdapHeaderIAB-r16 ENUMERATED {supported} OPTIONAL

 ]]

}

-- TAG-SDAP-PARAMETERS-STOP

-- ASN1STOP

– *SidelinkParameters*

The IE *SidelinkParameters* is used to convey capabilities related to NR and E-UTRA sidelink communications.

***SidelinkParameters information element***

-- ASN1START

-- TAG-SIDELINKPARAMETERS-START

SidelinkParameters-r16 ::= SEQUENCE {

 sidelinkParametersNR-r16 SidelinkParametersNR-r16 OPTIONAL,

 sidelinkParametersEUTRA-r16 SidelinkParametersEUTRA-r16 OPTIONAL

}

SidelinkParametersNR-r16 ::= SEQUENCE {

 rlc-ParametersSidelink-r16 RLC-ParametersSidelink-r16 OPTIONAL,

 mac-ParametersSidelink-r16 MAC-ParametersSidelink-r16 OPTIONAL,

 fdd-Add-UE-Sidelink-Capabilities-r16 UE-SidelinkCapabilityAddXDD-Mode-r16 OPTIONAL,

tdd-Add-UE-Sidelink-Capabilities-r16 UE-SidelinkCapabilityAddXDD-Mode-r16 OPTIONAL,

 nonCriticalExtension SEQUENCE {} OPTIONAL

}

SidelinkParametersEUTRA-r16 ::= SEQUENCE {

 sl-ParametersEUTRA1-r16 OCTET STRING OPTIONAL,

 sl-ParametersEUTRA2-r16 OCTET STRING OPTIONAL,

 sl-ParametersEUTRA3-r16 OCTET STRING OPTIONAL,

 supportedBandListSidelinkEUTRA-r16 SEQUENCE (SIZE (1..maxBandsEUTRA)) OF BandSidelinkEUTRA-r16 OPTIONAL,

 ...

}

RLC-ParametersSidelink-r16 ::= SEQUENCE {

 am-WithLongSN-Sidelink-r16 ENUMERATED {supported} OPTIONAL,

 um-WithLongSN-Sidelink-r16 ENUMERATED {supported} OPTIONAL,

 ...

}

MAC-ParametersSidelink-r16 ::= SEQUENCE {

 mac-ParametersSidelinkCommon-r16 MAC-ParametersSidelinkCommon-r16 OPTIONAL,

 mac-ParametersSidelinkXDD-Diff-r16 MAC-ParametersSidelinkXDD-Diff-r16 OPTIONAL,

 ...

}

UE-SidelinkCapabilityAddXDD-Mode-r16 ::= SEQUENCE {

 mac-ParametersSidelinkXDD-Diff-r16 MAC-ParametersSidelinkXDD-Diff-r16 OPTIONAL

}

MAC-ParametersSidelinkCommon-r16 ::= SEQUENCE {

 lcp-RestrictionSidelink-r16 ENUMERATED {supported} OPTIONAL,

 multipleConfiguredGrantsSidelink-r16 ENUMERATED {supported} OPTIONAL,

 ...

}

MAC-ParametersSidelinkXDD-Diff-r16 ::= SEQUENCE {

 multipleSR-ConfigurationsSidelink-r16 ENUMERATED {supported} OPTIONAL,

 logicalChannelSR-DelayTimerSidelink-r16 ENUMERATED {supported} OPTIONAL,

 ...

}

BandSidelinkEUTRA-r16 ::= SEQUENCE {

 freqBandSidelinkEUTRA-r16 FreqBandIndicatorEUTRA,

 -- R1 15-7: Transmitting LTE sidelink mode 3 scheduled by NR Uu

 gnb-ScheduledMode3SidelinkEUTRA-r16 SEQUENCE {

 gnb-ScheduledMode3DelaySidelinkEUTRA-r16 ENUMERATED {ms0, ms0dot25, ms0dot5, ms0dot625, ms0dot75, ms1,

 ms1dot25, ms1dot5, ms1dot75, ms2, ms2dot5, ms3, ms4,

 ms5, ms6, ms8, ms10, ms20}

 } OPTIONAL,

 -- R1 15-9: Transmitting LTE sidelink mode 4 configured by NR Uu

 gnb-ScheduledMode4SidelinkEUTRA-r16 ENUMERATED {supported} OPTIONAL,

}

-- TAG-SIDELINKPARAMETERS-STOP

-- ASN1STOP

|  |
| --- |
| *SidelinkParametersEUTRA* field descriptions |
| ***sl-ParametersEUTRA1, sl-ParametersEUTRA2, sl-ParametersEUTRA3***This field includes IE of *SL-Parameters-v1430* (where *v2x-eNB-Scheduled-r14* and *V2X-SupportedBandCombination-r14* shall not be included), *SL-Parameters-v1530* (where *V2X-SupportedBandCombination-r1530* shall not be included) and *SL-Parameters-v1540* respectively defined in 36.331 [10]. It is used for reporting the per-UE capability for V2X sidelink communication. |

#### – *SON-Parameters*

The IE *SON-Parameters* contains SON related parameters.

*SON-Parameters* information element

-- ASN1START

-- TAG-SON-PARAMETERS-START

SON-Parameters-r16 ::= SEQUENCE {

rach-Report-r16 ENUMERATED {true} OPTIONAL,

 ...

}

-- TAG-SON-PARAMETERS-STOP

-- ASN1STOP

#### – *SpatialRelationsSRS-Pos*

The IE *SpatialRelationsSRS-Pos* is used to convey spatial relation for SRS for positioning related parameters.

*SpatialRelationsSRS-Pos* information element

-- ASN1START

-- TAG-SPATIALRELATIONSSRS-POS-START

SpatialRelationsSRS-Pos-r16 ::= SEQUENCE {

 spatialRelation-SRS-PosBasedOnSSB-Serving-r16 ENUMERATED {supported} OPTIONAL,

 spatialRelation-SRS-PosBasedOnCSI-RS-Serving-r16 ENUMERATED {supported} OPTIONAL,

 spatialRelation-SRS-PosBasedOnPRS-Serving-r16 ENUMERATED {supported} OPTIONAL,

 spatialRelation-SRS-PosBasedOnSRS-r16 ENUMERATED {supported} OPTIONAL,

 spatialRelation-SRS-PosBasedOnSSB-Neigh-r16 ENUMERATED {supported} OPTIONAL,

 spatialRelation-SRS-PosBasedOnPRS-Neigh-r16 ENUMERATED {supported} OPTIONAL

}

--TAG-SPATIALRELATIONSSRS-POS-STOP

-- ASN1STOP

#### – *SRS-SwitchingTimeNR*

The IE *SRS-SwitchingTimeNR* is used to indicate the SRS carrier switching time supported by the UE for one NR band pair.

*SRS-SwitchingTimeNR information element*

-- ASN1START

-- TAG-SRS-SWITCHINGTIMENR-START

SRS-SwitchingTimeNR ::= SEQUENCE {

 switchingTimeDL ENUMERATED {n0us, n30us, n100us, n140us, n200us, n300us, n500us, n900us} OPTIONAL,

 switchingTimeUL ENUMERATED {n0us, n30us, n100us, n140us, n200us, n300us, n500us, n900us} OPTIONAL

}

-- TAG-SRS-SWITCHINGTIMENR-STOP

-- ASN1STOP

#### – *SRS-SwitchingTimeEUTRA*

The IE *SRS-SwitchingTimeEUTRA* is used to indicate the SRS carrier switching time supported by the UE for one E-UTRA band pair.

*SRS-SwitchingTimeEUTRA information element*

-- ASN1START

-- TAG-SRS-SWITCHINGTIMEEUTRA-START

SRS-SwitchingTimeEUTRA ::= SEQUENCE {

 switchingTimeDL ENUMERATED {n0, n0dot5, n1, n1dot5, n2, n2dot5, n3, n3dot5, n4, n4dot5, n5, n5dot5, n6, n6dot5, n7}

 OPTIONAL,

 switchingTimeUL ENUMERATED {n0, n0dot5, n1, n1dot5, n2, n2dot5, n3, n3dot5, n4, n4dot5, n5, n5dot5, n6, n6dot5, n7}

 OPTIONAL

}

-- TAG-SRS-SWITCHINGTIMEEUTRA-STOP

-- ASN1STOP

#### – *SupportedBandwidth*

The IE *SupportedBandwidth* is used to indicate the maximum channel bandwidth supported by the UE on one carrier of a band of a band combination.

*SupportedBandwidth* information element

-- ASN1START

-- TAG-SUPPORTEDBANDWIDTH-START

SupportedBandwidth ::= CHOICE {

 fr1 ENUMERATED {mhz5, mhz10, mhz15, mhz20, mhz25, mhz30, mhz40, mhz50, mhz60, mhz80, mhz100},

 fr2 ENUMERATED {mhz50, mhz100, mhz200, mhz400}

}

-- TAG-SUPPORTEDBANDWIDTH-STOP

-- ASN1STOP

#### – *UE-BasedPerfMeas-Parameters*

The IE *UE-BasedPerfMeas-Parameters* contains UE-based performance measurement parameters.

*UE-BasedPerfMeas-Parameters* information element

-- ASN1START

-- TAG-UE-BASEDPERFMEAS-PARAMETERS-START

UE-BasedPerfMeas-Parameters-r16 ::= SEQUENCE {

barometerMeasReport-r16 ENUMERATED {true} OPTIONAL,

immMeasBT-r16 ENUMERATED {true} OPTIONAL,

immMeasWLAN-r16 ENUMERATED {true} OPTIONAL,

loggedMeasBT-r16 ENUMERATED {true} OPTIONAL,

loggedMeasurements-r16 ENUMERATED {true} OPTIONAL,

loggedMeasWLAN-r16 ENUMERATED {true} OPTIONAL,

orientationMeasReport-r16 ENUMERATED {true} OPTIONAL,

speedMeasReport-r16 ENUMERATED {true} OPTIONAL,

gnss-Location-r16 ENUMERATED {true} OPTIONAL,

ulPDCP-Delay-r16 ENUMERATED {true} OPTIONAL,

 ...

}

-- TAG-UE-BASEDPERFMEAS-PARAMETERS-STOP

-- ASN1STOP

#### – *UE-CapabilityRAT-ContainerList*

The IE *UE-CapabilityRAT-ContainerList* contains a list of radio access technology specific capability containers.

*UE-CapabilityRAT-ContainerList* information element

-- ASN1START

-- TAG-UE-CAPABILITYRAT-CONTAINERLIST-START

UE-CapabilityRAT-ContainerList ::= SEQUENCE (SIZE (0..maxRAT-CapabilityContainers)) OF UE-CapabilityRAT-Container

UE-CapabilityRAT-Container ::= SEQUENCE {

 rat-Type RAT-Type,

 ue-CapabilityRAT-Container OCTET STRING

}

-- TAG-UE-CAPABILITYRAT-CONTAINERLIST-STOP

-- ASN1STOP

|  |
| --- |
| *UE-CapabilityRAT-ContainerList* field descriptions |
| ***ue-CapabilityRAT-Container***Container for the UE capabilities of the indicated RAT. The encoding is defined in the specification of each RAT:For *rat-Type* set to *nr*: the encoding of UE capabilities is defined in *UE-NR-Capability*.For *rat-Type* set to *eutra-nr*: the encoding of UE capabilities is defined in *UE-MRDC-Capability*.For *rat-Type* set to *eutra*: the encoding of UE capabilities is defined in *UE-EUTRA-Capability* specified in TS 36.331 [10].For *rat-Type* set to *utra-fdd*: the octet string contains the INTER RAT HANDOVER INFO message defined in TS 25.331 [45]. |

#### – *UE-CapabilityRAT-RequestList*

The IE *UE-CapabilityRAT-RequestList* is used to request UE capabilities for one or more RATs from the UE.

*UE-CapabilityRAT-RequestList* information element

-- ASN1START

-- TAG-UE-CAPABILITYRAT-REQUESTLIST-START

UE-CapabilityRAT-RequestList ::= SEQUENCE (SIZE (1..maxRAT-CapabilityContainers)) OF UE-CapabilityRAT-Request

UE-CapabilityRAT-Request ::= SEQUENCE {

 rat-Type RAT-Type,

 capabilityRequestFilter OCTET STRING OPTIONAL, -- Need N

 ...

}

-- TAG-UE-CAPABILITYRAT-REQUESTLIST-STOP

-- ASN1STOP

|  |
| --- |
| *UE-CapabilityRAT-Request* field descriptions |
| ***capabilityRequestFilter***Information by which the network requests the UE to filter the UE capabilities.For *rat-Type* set to *nr* or *eutra-nr*: the encoding of the *capabilityRequestFilter* is defined in *UE-CapabilityRequestFilterNR*.For *rat-Type* set to *eutra*: the encoding of the *capabilityRequestFilter* is defined by *UECapabilityEnquiry* message defined in TS36.331 [10], in which *RAT-Type* in *UE-CapabilityRequest* includes only '*eutra'*. |
| ***rat-Type***The RAT type for which the NW requests UE capabilities. |

#### – *UE-CapabilityRequestFilterCommon*

The IE *UE-CapabilityRequestFilterCommon* is used to request filtered UE capabilities. The filter is common for all capability containers that are requested.

*UE-CapabilityRequestFilterCommon* information element

-- ASN1START

-- TAG-UE-CAPABILITYREQUESTFILTERCOMMON-START

UE-CapabilityRequestFilterCommon ::= SEQUENCE {

 mrdc-Request SEQUENCE {

 omitEN-DC ENUMERATED {true} OPTIONAL, -- Need N

 includeNR-DC ENUMERATED {true} OPTIONAL, -- Need N

 includeNE-DC ENUMERATED {true} OPTIONAL -- Need N

 } OPTIONAL, -- Need N

 ...,

 [[

 codebookTypeRequest-r16 SEQUENCE {

 type1-SinglePanel-r16 ENUMERATED {true} OPTIONAL, -- Need N

 type1-MultiPanel-r16 ENUMERATED {true} OPTIONAL, -- Need N

 type2-r16 ENUMERATED {true} OPTIONAL, -- Need N

 type2-PortSelection-r16 ENUMERATED {true} OPTIONAL -- Need N

 } OPTIONAL -- Need N

 ]]

}

-- TAG-UE-CAPABILITYREQUESTFILTERCOMMON-STOP

-- ASN1STOP

|  |
| --- |
| *UE-CapabilityRequestFilterCommon field descriptions* |
| ***codebookTypeRequest***Only if this field is present, the UE includes *SupportedCSI-RS-Resource* supported for the codebook type(s) requested within this field (i.e. type I single/multi-panel, type II and type II port selection) into *codebookVariantsList*, *codebookParametersPerBand* and *codebookParametersPerBC*. If this field is present and none of the codebook types is requested within this field (i.e. empty field), the UE includes *SupportedCSI-RS-Resource* supported for all codebook types into *codebookVariantsList*, *codebookParametersPerBand* and *codebookParametersPerBC*. |
| ***includeNE-DC***Only if this field is present, the UE supporting NE-DC shall indicate support for NE-DC in band combinations and include feature set combinations which are applicable to NE-DC. Band combinations supporting both NE-DC and (NG)EN-DC shall be included in *supportedBandCombinationList*, band combinations supporting only NE-DC shall be included in *supportedBandCombinationListNEDC-Only*. |
| ***includeNR-DC***Only if this field is present, the UE supporting NR-DC shall indicate support for NR-DC in band combinations and include feature set combinations which are applicable to NR-DC. |
| ***omitEN-DC***Only if this field is present, the UE shall omit band combinations and feature set combinations which are only applicable to (NG)EN-DC. |

#### – *UE-CapabilityRequestFilterNR*

The IE *UE-CapabilityRequestFilterNR* is used to request filtered UE capabilities.

*UE-CapabilityRequestFilterNR* information element

-- ASN1START

-- TAG-UE-CAPABILITYREQUESTFILTERNR-START

UE-CapabilityRequestFilterNR ::= SEQUENCE {

 frequencyBandListFilter FreqBandList OPTIONAL, -- Need N

 nonCriticalExtension UE-CapabilityRequestFilterNR-v1540 OPTIONAL

}

UE-CapabilityRequestFilterNR-v1540 ::= SEQUENCE {

 srs-SwitchingTimeRequest ENUMERATED {true} OPTIONAL, -- Need N

 nonCriticalExtension SEQUENCE {} OPTIONAL

}

-- TAG-UE-CAPABILITYREQUESTFILTERNR-STOP

-- ASN1STOP

#### – *UE-MRDC-Capability*

The IE *UE-MRDC-Capability* is used to convey the UE Radio Access Capability Parameters for MR-DC, see TS 38.306 [26].

*UE-MRDC-Capability* information element

-- ASN1START

-- TAG-UE-MRDC-CAPABILITY-START

UE-MRDC-Capability ::= SEQUENCE {

 measAndMobParametersMRDC MeasAndMobParametersMRDC OPTIONAL,

 phy-ParametersMRDC-v1530 Phy-ParametersMRDC OPTIONAL,

 rf-ParametersMRDC RF-ParametersMRDC,

 generalParametersMRDC GeneralParametersMRDC-XDD-Diff OPTIONAL,

 fdd-Add-UE-MRDC-Capabilities UE-MRDC-CapabilityAddXDD-Mode OPTIONAL,

 tdd-Add-UE-MRDC-Capabilities UE-MRDC-CapabilityAddXDD-Mode OPTIONAL,

 fr1-Add-UE-MRDC-Capabilities UE-MRDC-CapabilityAddFRX-Mode OPTIONAL,

 fr2-Add-UE-MRDC-Capabilities UE-MRDC-CapabilityAddFRX-Mode OPTIONAL,

 featureSetCombinations SEQUENCE (SIZE (1..maxFeatureSetCombinations)) OF FeatureSetCombination OPTIONAL,

 pdcp-ParametersMRDC-v1530 PDCP-ParametersMRDC OPTIONAL,

 lateNonCriticalExtension OCTET STRING OPTIONAL,

 nonCriticalExtension UE-MRDC-Capability-v1560 OPTIONAL

}

UE-MRDC-Capability-v1560 ::= SEQUENCE {

 receivedFilters OCTET STRING (CONTAINING UECapabilityEnquiry-v1560-IEs) OPTIONAL,

 measAndMobParametersMRDC-v1560 MeasAndMobParametersMRDC-v1560 OPTIONAL,

 fdd-Add-UE-MRDC-Capabilities-v1560 UE-MRDC-CapabilityAddXDD-Mode-v1560 OPTIONAL,

 tdd-Add-UE-MRDC-Capabilities-v1560 UE-MRDC-CapabilityAddXDD-Mode-v1560 OPTIONAL,

 nonCriticalExtension UE-MRDC-Capability-v16xy OPTIONAL

}

UE-MRDC-Capability-v16xy ::= SEQUENCE {

 measAndMobParametersMRDC-v16xy MeasAndMobParametersMRDC-v16xy OPTIONAL,

 generalParametersMRDC-v16xy GeneralParametersMRDC-v16xy OPTIONAL, pdcp-ParametersMRDC-v16xy PDCP-ParametersMRDC-v16xy OPTIONAL,

 measAndMobParametersMRDC-v16xy MeasAndMobParametersMRDC-v16xy OPTIONAL,

 nonCriticalExtension SEQUENCE {} OPTIONAL

}

UE-MRDC-CapabilityAddXDD-Mode ::= SEQUENCE {

 measAndMobParametersMRDC-XDD-Diff MeasAndMobParametersMRDC-XDD-Diff OPTIONAL,

 generalParametersMRDC-XDD-Diff GeneralParametersMRDC-XDD-Diff OPTIONAL

}

UE-MRDC-CapabilityAddXDD-Mode-v1560 ::= SEQUENCE {

 measAndMobParametersMRDC-XDD-Diff-v1560 MeasAndMobParametersMRDC-XDD-Diff-v1560 OPTIONAL

}

UE-MRDC-CapabilityAddFRX-Mode ::= SEQUENCE {

 measAndMobParametersMRDC-FRX-Diff MeasAndMobParametersMRDC-FRX-Diff

}

GeneralParametersMRDC-XDD-Diff ::= SEQUENCE {

 splitSRB-WithOneUL-Path ENUMERATED {supported}  OPTIONAL,

 splitDRB-withUL-Both-MCG-SCG ENUMERATED {supported} OPTIONAL,

 srb3 ENUMERATED {supported} OPTIONAL,

 v2x-EUTRA ENUMERATED {supported} OPTIONAL,

 ...

}

GeneralParametersMRDC-v16xy ::= SEQUENCE {

 f1c-OverEUTRA-r16                ENUMERATED {supported} OPTIONAL

}

PDCP-ParametersMRDC-v16xy ::= SEQUENCE {

 scg-DRB-NR-IAB-r16                ENUMERATED {supported} OPTIONAL

}

MeasAndMobParametersMRDC-v16xy ::= SEQUENCE {

 interNR-MeasEUTRA-IAB-r16           ENUMERATED {supported} OPTIONAL

}

-- TAG-UE-MRDC-CAPABILITY-STOP

-- ASN1STOP

|  |
| --- |
| *UE-MRDC-Capability* field descriptions |
| ***featureSetCombinations***A list of *FeatureSetCombination*:s for *supportedBandCombinationList* and *supportedBandCombinationListNEDC-Only* in *UE-MRDC-Capability*. The *FeatureSetDownlink*:s and *FeatureSetUplink*:s referred to from these *FeatureSetCombination*:s are defined in the *featureSets* list in *UE-NR-Capability*. |

#### – *UE-NR-Capability*

The IE *UE-NR-Capability* is used to convey the NR UE Radio Access Capability Parameters, see TS 38.306 [26].

*UE-NR-Capability* information element

-- ASN1START

-- TAG-UE-NR-CAPABILITY-START

UE-NR-Capability ::= SEQUENCE {

 accessStratumRelease AccessStratumRelease,

 pdcp-Parameters PDCP-Parameters,

 rlc-Parameters RLC-Parameters OPTIONAL,

 mac-Parameters MAC-Parameters OPTIONAL,

 phy-Parameters Phy-Parameters,

 rf-Parameters RF-Parameters,

 measAndMobParameters MeasAndMobParameters OPTIONAL,

 fdd-Add-UE-NR-Capabilities UE-NR-CapabilityAddXDD-Mode OPTIONAL,

 tdd-Add-UE-NR-Capabilities UE-NR-CapabilityAddXDD-Mode OPTIONAL,

 fr1-Add-UE-NR-Capabilities UE-NR-CapabilityAddFRX-Mode OPTIONAL,

 fr2-Add-UE-NR-Capabilities UE-NR-CapabilityAddFRX-Mode OPTIONAL,

 featureSets FeatureSets OPTIONAL,

 featureSetCombinations SEQUENCE (SIZE (1..maxFeatureSetCombinations)) OF FeatureSetCombination OPTIONAL,

 lateNonCriticalExtension OCTET STRING OPTIONAL,

 nonCriticalExtension UE-NR-Capability-v1530 OPTIONAL

}

UE-NR-Capability-v1530 ::= SEQUENCE {

 fdd-Add-UE-NR-Capabilities-v1530 UE-NR-CapabilityAddXDD-Mode-v1530 OPTIONAL,

 tdd-Add-UE-NR-Capabilities-v1530 UE-NR-CapabilityAddXDD-Mode-v1530 OPTIONAL,

 dummy ENUMERATED {supported} OPTIONAL,

 interRAT-Parameters InterRAT-Parameters OPTIONAL,

 inactiveState ENUMERATED {supported} OPTIONAL,

 delayBudgetReporting ENUMERATED {supported} OPTIONAL,

 nonCriticalExtension UE-NR-Capability-v1540 OPTIONAL

}

UE-NR-Capability-v1540 ::= SEQUENCE {

 sdap-Parameters SDAP-Parameters OPTIONAL,

 overheatingInd ENUMERATED {supported} OPTIONAL,

 ims-Parameters IMS-Parameters OPTIONAL,

 fr1-Add-UE-NR-Capabilities-v1540 UE-NR-CapabilityAddFRX-Mode-v1540 OPTIONAL,

 fr2-Add-UE-NR-Capabilities-v1540 UE-NR-CapabilityAddFRX-Mode-v1540 OPTIONAL,

 fr1-fr2-Add-UE-NR-Capabilities UE-NR-CapabilityAddFRX-Mode OPTIONAL,

 nonCriticalExtension UE-NR-Capability-v1550 OPTIONAL

}

UE-NR-Capability-v1550 ::= SEQUENCE {

 reducedCP-Latency ENUMERATED {supported} OPTIONAL,

 nonCriticalExtension UE-NR-Capability-v1560 OPTIONAL

}

UE-NR-Capability-v1560 ::= SEQUENCE {

 nrdc-Parameters NRDC-Parameters OPTIONAL,

 receivedFilters OCTET STRING (CONTAINING UECapabilityEnquiry-v1560-IEs) OPTIONAL,

 nonCriticalExtension UE-NR-Capability-v1570 OPTIONAL

}

UE-NR-Capability-v1570 ::= SEQUENCE {

 nrdc-Parameters-v1570 NRDC-Parameters-v1570 OPTIONAL,

 nonCriticalExtension UE-NR-Capability-v16xy OPTIONAL

}

UE-NR-Capability-v16xy ::= SEQUENCE {

 inDeviceCoexInd-r16 ENUMERATED {supported} OPTIONAL,

 dl-DedicatedMessageSegmentation-r16 ENUMERATED {supported} OPTIONAL,

 nrdc-Parameters-v16xy NRDC-Parameters-v16xy OPTIONAL,

 powSav-Parameters-r16 PowSav-Parameters-r16 OPTIONAL,

 fr1-Add-UE-NR-Capabilities-v16xy UE-NR-CapabilityAddFRX-Mode-v16xy OPTIONAL,

 fr2-Add-UE-NR-Capabilities-v16xy UE-NR-CapabilityAddFRX-Mode-v16xy OPTIONAL,

 bh-RLF-Indication-r16 ENUMERATED {supported} OPTIONAL,

 directSN-AdditionFirstRRC-IAB-r16 ENUMERATED {supported} OPTIONAL,

 bap-Parameters-r16 BAP-Parameters-r16 OPTIONAL,

 referenceTimeProvision-r16 ENUMERATED {supported} OPTIONAL,

 sidelinkParameters-r16 SidelinkParameters-r16 OPTIONAL,

 highSpeedParameters-r16 HighSpeedParameters-r16 OPTIONAL,

 mac-Parameters-v16xy MAC-Parameters-v16xy OPTIONAL,

 mcgRLF-RecoveryViaSCG-r16 ENUMERATED {supported} OPTIONAL,

 resumeWithStoredMCG-SCells-r16 ENUMERATED {supported} OPTIONAL,

 resumeWithStoredSCG-r16 ENUMERATED {supported} OPTIONAL,

 resumeWithSCG-Config-r16 ENUMERATED {supported} OPTIONAL,

 ue-BasedPerfMeas-Parameters-r16 UE-BasedPerfMeas-Parameters-r16 OPTIONAL,

 son-Parameters-r16 SON-Parameters-r16 OPTIONAL,

 onDemandSIB-Connected-r16 ENUMERATED {supported} OPTIONAL,

 nonCriticalExtension SEQUENCE {} OPTIONAL

}

UE-NR-CapabilityAddXDD-Mode ::= SEQUENCE {

 phy-ParametersXDD-Diff Phy-ParametersXDD-Diff OPTIONAL,

 mac-ParametersXDD-Diff MAC-ParametersXDD-Diff OPTIONAL,

 measAndMobParametersXDD-Diff MeasAndMobParametersXDD-Diff OPTIONAL

}

UE-NR-CapabilityAddXDD-Mode-v1530 ::= SEQUENCE {

 eutra-ParametersXDD-Diff EUTRA-ParametersXDD-Diff

}

UE-NR-CapabilityAddFRX-Mode ::= SEQUENCE {

 phy-ParametersFRX-Diff Phy-ParametersFRX-Diff OPTIONAL,

 measAndMobParametersFRX-Diff MeasAndMobParametersFRX-Diff OPTIONAL

}

UE-NR-CapabilityAddFRX-Mode-v1540 ::= SEQUENCE {

 ims-ParametersFRX-Diff IMS-ParametersFRX-Diff OPTIONAL

}

UE-NR-CapabilityAddFRX-Mode-v16xy ::= SEQUENCE {

 powSav-ParametersFRX-Diff-r16 PowSav-ParametersFRX-Diff-r16 OPTIONAL,

 mac-ParametersFRX-Diff-r16 MAC-ParametersFRX-Diff-r16 OPTIONAL

}

BAP-Parameters-r16 ::= SEQUENCE {

 flowControlBH-RLC-ChannelBased-r16 ENUMERATED {supported} OPTIONAL,

 flowControlRouting-ID-Based-r16 ENUMERATED {supported} OPTIONAL

}

-- TAG-UE-NR-CAPABILITY-STOP

-- ASN1STOP

|  |
| --- |
| *UE-NR-Capability* field descriptions |
| ***featureSetCombinations***A list of *FeatureSetCombination:s* for *supportedBandCombinationList* in *UE-NR-Capability*. The *FeatureSetDownlink:s* and *FeatureSetUplink:s* referred to from these *FeatureSetCombination:s* are defined in the *featureSets* list in *UE-NR-Capability*. |
|  |

#### – *UnlicensedParametersPerBand*

The IE *UnlicensedParametersPerBand* is used to convey unlicensed operation related parameters specific for a certain unlicensed band (not per feature set or band combination).

*UnlicensedParametersPerBand* information element

-- ASN1START

-- TAG-UNLICENSEDPARAMETERSPERBAND-START

UnlicensedParametersPerBand-r16 ::= SEQUENCE {

 -- R1 10-2g: SSB-based BFD/CBD for dynamic channel access mode

 ssb-BFD-CBD-dynamicChannelAccess-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 10-2h: SSB-based BFD/CBD for semi-static channel access mode

 ssb-BFD-CBD-semi-staticChannelAccess-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 10-2i: CSI-RS-based BFD/CBD for NR-U

 csi-RS-BFD-CBD-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 10-10: RSSI and channel occupancy measurement and reporting

 rssi-ChannelOccupancyReporting-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 10-11:SRS starting position at any OFDM symbol in a slot

 srs-StartAnyOFDM-Symbol-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 10-20: Support search space set configuration with freqMonitorLocation-r16

 searchSpaceFreqMonitorLocation-r16 INTEGER (1..5) OPTIONAL,

 -- R1 10-20a: Support coreset configuration with rb-Offset

 coreset-RB-Offset-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 10-23:CGI reading on unlicensed cell for ANR functionality

 cgi-Acquisition-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 10-25: Enable configured UL transmissions when DCI 2\_0 is configured but not detected

 configuredUL-Tx-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 10-8: Type B PDSCH length {3, 5, 6, 8, 9, 10, 11, 12, 13} without DMRS shift due to CRS collision

 typeB-PDSCH-length-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 10-9: Search space set group switching with explicit DCI 2\_0 bit field trigger or with implicit PDCCH decoding with DCI 2\_0 monitoring

 searchSpaceSetGroupSwitchingwithDCI-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 10-9b: Search space set group switching with implicit PDCCH decoding without DCI 2\_0 monitoring FFS:per band or per UE

 searchSpaceSetGroupSwitchingwithoutDCI-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 10-9d: Support Search space set group switching capability 2

 searchSpaceSetGroupSwitchingcapability2-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 10-14: Non-numerical PDSCH to HARQ-ACK timing

 non-numericalPDSCH-HARQ-timing-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 10-15: Enhanced dynamic HARQ codebook

 enhancedDynamicHARQ-codebook-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 10-16: One-shot HARQ ACK feedback

 oneShotHARQ-feedback-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 10-17: Multi-PUSCH UL grant

 multiPUSCH-UL-grant-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 10-26: CSI-RS based RLM for NR-U

 csi-RS-RLM-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 10-26a: CSI-RS based RRM for NR-U

 csi-RS-RRM-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 10-3: PRB interlace mapping for PUSCH

 pusch-PRB-interlace-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 10-3a: PRB interlace mapping for PUCCH

 pucch-F0-F1-PRB-Interlace-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 10-12: OCC for PRB interlace mapping for PF2 and PF3

 occ-PRB-PF2-PF3-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 10-13a: Extended CP range of more than one symbol for CG-PUSCH

 extCP-rangeCG-PUSCH-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 10-18: Configured grant with retransmission in CG resources

 configuredGrantWithReTx-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 10-24: CG-UCI multiplexing with HARQ ACK

 mux-CG-UCI-HARQ-ACK-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 10-28: Configured grant with Rel-16 enhanced resource configuration

 cg-resourceConfig-r16 ENUMERATED {supported} OPTIONAL,

}

-- TAG-UNLICENSEDPARAMETERSPERBAND-STOP

-- ASN1STOP

<< skip unrelated part >>

## 6.4 RRC multiplicity and type constraint values

### – Multiplicity and type constraint definitions

-- ASN1START

-- TAG-MULTIPLICITY-AND-TYPE-CONSTRAINT-DEFINITIONS-START

ffsValue INTEGER ::= 65536 -- Placehold for all FFS values, to be removed

maxNrofFFS-r16 INTEGER ::= 65536 -- Maximum number of FFS

maxAI-DCI-PayloadSize-r16 INTEGER ::= 128 --Maximum size of the DCI payload scrambled with ai-RNTI

maxAI-DCI-PayloadSize-r16-1 INTEGER ::= 127 --Maximum size of the DCI payload scrambled with ai-RNTI minus 1

maxBandComb INTEGER ::= 65536 -- Maximum number of DL band combinations

maxBandsUTRA-FDD-r16 INTEGER ::= 64 -- Maximum number of bands listed in UTRA-FDD UE caps

maxBT-IdReport-r16 INTEGER ::= 32 -- Maximum number of Bluetooth IDs to report

maxBT-Name-r16 INTEGER ::= 4 -- Maximum number of Bluetooth name

maxCBR-Config-r16 INTEGER ::= 8 -- Maximum number of CBR range configurations for sidelink communication

 -- congestion control

maxCBR-Config-1-r16 INTEGER ::= 7

maxCBR-Level-r16 INTEGER ::= 16 -- Maximum nuber of CBR levels

maxCBR-Level-1-r16 INTEGER ::= 15

maxCellBlack INTEGER ::= 16 -- Maximum number of NR blacklisted cell ranges in SIB3, SIB4

maxCellHistory-r16 INTEGER ::= 16 -- Maximum number of visited cells reported

maxCellInter INTEGER ::= 16 -- Maximum number of inter-Freq cells listed in SIB4

maxCellIntra INTEGER ::= 16 -- Maximum number of intra-Freq cells listed in SIB3

maxCellMeasEUTRA INTEGER ::= 32 -- Maximum number of cells in E-UTRAN

maxCellMeasIdle-r16 INTEGER ::= 65535 -- Maximum number of cells per carrier for idle/inactive measurements is FFS

maxCellMeasUTRA-FDD-r16 INTEGER ::= 32 -- Maximum number of cells in FDD UTRAN

maxCellWhite INTEGER ::= 16 -- Maximum number of NR whitelisted cell ranges in SIB3, SIB4

maxEARFCN INTEGER ::= 262143 -- Maximum value of E-UTRA carrier frequency

maxEUTRA-CellBlack INTEGER ::= 16 -- Maximum number of E-UTRA blacklisted physical cell identity ranges

 -- in SIB5

maxEUTRA-NS-Pmax INTEGER ::= 8 -- Maximum number of NS and P-Max values per band

maxLogMeasReport-r16 INTEGER ::= 520 -- Maximum number of entries for logged measurements

maxMultiBands INTEGER ::= 8 -- Maximum number of additional frequency bands that a cell belongs to

maxNARFCN INTEGER ::= 3279165 -- Maximum value of NR carrier frequency

maxNR-NS-Pmax INTEGER ::= 8 -- Maximum number of NS and P-Max values per band

maxFreqIdle-r16 INTEGER ::= 8 -- Maximum number of carrier frequencies for idle/inactive measurements

maxNrofServingCells INTEGER ::= 32 -- Max number of serving cells (SpCells + SCells)

maxNrofServingCells-1 INTEGER ::= 31 -- Max number of serving cells (SpCell + SCells) per cell group

maxNrofAggregatedCellsPerCellGroup INTEGER ::= 16

maxNrofDUCells-r16 INTEGER ::= 512 -- Max number of cells configured on the collocated IAB-DU

maxNrofAssociatedDUCellsPerMT-r16 INTEGER ::= 65535 -- FFS

maxNrofAvailabilityCombinationsPerSet-r16 INTEGER ::= 512 -- Max number of AvailabilityCombinationId used in the DCI format 2\_5

maxNrofAvailabilityCombinationsPerSet-r16-1 INTEGER ::= 511 -- Max number of AvailabilityCombinationId used in the DCI format 2\_5 minus 1

maxNrofSCells INTEGER ::= 31 -- Max number of secondary serving cells per cell group

maxNrofCellMeas INTEGER ::= 32 -- Maximum number of entries in each of the cell lists in a measurement

 -- object

maxNrofCG-SL-r16 INTEGER ::= 8 -- Max number of configured sidelink grant

maxNrofSS-BlocksToAverage INTEGER ::= 16 -- Max number for the (max) number of SS blocks to average to determine cell

 -- measurement

maxNrofCondCells-r16 INTEGER ::= 8 -- Max number of conditional candidate SpCells

maxNrofCSI-RS-ResourcesToAverage INTEGER ::= 16 -- Max number for the (max) number of CSI-RS to average to determine cell

 -- measurement

maxNrofDL-Allocations INTEGER ::= 16 -- Maximum number of PDSCH time domain resource allocations

maxNrofSR-ConfigPerCellGroup INTEGER ::= 8 -- Maximum number of SR configurations per cell group

maxLCG-ID INTEGER ::= 7 -- Maximum value of LCG ID

maxLC-ID INTEGER ::= 32 -- Maximum value of Logical Channel ID

maxLC-ID-Iab-r16 INTEGER ::= ffsValue -- Maximum value of BH Logical Channel ID extension

maxLTE-CRS-Patterns-r16 INTEGER ::= 3 -- Maximum number of additional LTE CRS rate matching patterns

maxNrofTAGs INTEGER ::= 4 -- Maximum number of Timing Advance Groups

maxNrofTAGs-1 INTEGER ::= 3 -- Maximum number of Timing Advance Groups minus 1

maxNrofBWPs INTEGER ::= 4 -- Maximum number of BWPs per serving cell

maxNrofCombIDC INTEGER ::= 128 -- Maximum number of reported MR-DC combinations for IDC

maxNrofSymbols-1 INTEGER ::= 13 -- Maximum index identifying a symbol within a slot (14 symbols, indexed

 -- from 0..13)

maxNrofSlots INTEGER ::= 320 -- Maximum number of slots in a 10 ms period

maxNrofSlots-1 INTEGER ::= 319 -- Maximum number of slots in a 10 ms period minus 1

maxNrofPhysicalResourceBlocks INTEGER ::= 275 -- Maximum number of PRBs

maxNrofPhysicalResourceBlocks-1 INTEGER ::= 274 -- Maximum number of PRBs minus 1

maxNrofPhysicalResourceBlocksPlus1 INTEGER ::= 276 -- Maximum number of PRBs plus 1

maxNrofControlResourceSets-1 INTEGER ::= 11 -- Max number of CoReSets configurable on a serving cell minus 1

maxNrofControlResourceSets-1-r16 INTEGER ::= 15 -- Max number of CoReSets configurable on a serving cell extended in minus 1

maxNrofCoresetPools-r16 INTEGER ::= 2 -- Maximum number of CORESET pools

maxCoReSetDuration INTEGER ::= 3 -- Max number of OFDM symbols in a control resource set

maxNrofSearchSpaces-1 INTEGER ::= 39 -- Max number of Search Spaces minus 1

maxSFI-DCI-PayloadSize INTEGER ::= 128 -- Max number payload of a DCI scrambled with SFI-RNTI

maxSFI-DCI-PayloadSize-1 INTEGER ::= 127 -- Max number payload of a DCI scrambled with SFI-RNTI minus 1

maxINT-DCI-PayloadSize INTEGER ::= 126 -- Max number payload of a DCI scrambled with INT-RNTI

maxINT-DCI-PayloadSize-1 INTEGER ::= 125 -- Max number payload of a DCI scrambled with INT-RNTI minus 1

maxNrofRateMatchPatterns INTEGER ::= 4 -- Max number of rate matching patterns that may be configured

maxNrofRateMatchPatterns-1 INTEGER ::= 3 -- Max number of rate matching patterns that may be configured minus 1

maxNrofRateMatchPatternsPerGroup INTEGER ::= 8 -- Max number of rate matching patterns that may be configured in one group

maxNrofCSI-ReportConfigurations INTEGER ::= 48 -- Maximum number of report configurations

maxNrofCSI-ReportConfigurations-1 INTEGER ::= 47 -- Maximum number of report configurations minus 1

maxNrofCSI-ResourceConfigurations INTEGER ::= 112 -- Maximum number of resource configurations

maxNrofCSI-ResourceConfigurations-1 INTEGER ::= 111 -- Maximum number of resource configurations minus 1

maxNrofAP-CSI-RS-ResourcesPerSet INTEGER ::= 16

maxNrOfCSI-AperiodicTriggers INTEGER ::= 128 -- Maximum number of triggers for aperiodic CSI reporting

maxNrofReportConfigPerAperiodicTrigger INTEGER ::= 16 -- Maximum number of report configurations per trigger state for aperiodic

 -- reporting

maxNrofNZP-CSI-RS-Resources INTEGER ::= 192 -- Maximum number of Non-Zero-Power (NZP) CSI-RS resources

maxNrofNZP-CSI-RS-Resources-1 INTEGER ::= 191 -- Maximum number of Non-Zero-Power (NZP) CSI-RS resources minus 1

maxNrofNZP-CSI-RS-ResourcesPerSet INTEGER ::= 64 -- Maximum number of NZP CSI-RS resources per resource set

maxNrofNZP-CSI-RS-ResourceSets INTEGER ::= 64 -- Maximum number of NZP CSI-RS resources per cell

maxNrofNZP-CSI-RS-ResourceSets-1 INTEGER ::= 63 -- Maximum number of NZP CSI-RS resources per cell minus 1

maxNrofNZP-CSI-RS-ResourceSetsPerConfig INTEGER ::= 16 -- Maximum number of resource sets per resource configuration

maxNrofNZP-CSI-RS-ResourcesPerConfig INTEGER ::= 128 -- Maximum number of resources per resource configuration

maxNrofZP-CSI-RS-Resources INTEGER ::= 32 -- Maximum number of Zero-Power (ZP) CSI-RS resources

maxNrofZP-CSI-RS-Resources-1 INTEGER ::= 31 -- Maximum number of Zero-Power (ZP) CSI-RS resources minus 1

maxNrofZP-CSI-RS-ResourceSets-1 INTEGER ::= 15

maxNrofZP-CSI-RS-ResourcesPerSet INTEGER ::= 16

maxNrofZP-CSI-RS-ResourceSets INTEGER ::= 16

maxNrofCSI-IM-Resources INTEGER ::= 32 -- Maximum number of CSI-IM resources. See CSI-IM-ResourceMax in 38.214.

maxNrofCSI-IM-Resources-1 INTEGER ::= 31 -- Maximum number of CSI-IM resources minus 1. See CSI-IM-ResourceMax

 -- in 38.214.

maxNrofCSI-IM-ResourcesPerSet INTEGER ::= 8 -- Maximum number of CSI-IM resources per set. See CSI-IM-ResourcePerSetMax

 -- in 38.214

maxNrofCSI-IM-ResourceSets INTEGER ::= 64 -- Maximum number of NZP CSI-IM resources per cell

maxNrofCSI-IM-ResourceSets-1 INTEGER ::= 63 -- Maximum number of NZP CSI-IM resources per cell minus 1

maxNrofCSI-IM-ResourceSetsPerConfig INTEGER ::= 16 -- Maximum number of CSI IM resource sets per resource configuration

maxNrofCSI-SSB-ResourcePerSet INTEGER ::= 64 -- Maximum number of SSB resources in a resource set

maxNrofCSI-SSB-ResourceSets INTEGER ::= 64 -- Maximum number of CSI SSB resource sets per cell

maxNrofCSI-SSB-ResourceSets-1 INTEGER ::= 63 -- Maximum number of CSI SSB resource sets per cell minus 1

maxNrofCSI-SSB-ResourceSetsPerConfig INTEGER ::= 1 -- Maximum number of CSI SSB resource sets per resource configuration

maxNrofFailureDetectionResources INTEGER ::= 10 -- Maximum number of failure detection resources

maxNrofFailureDetectionResources-1 INTEGER ::= 9 -- Maximum number of failure detection resources minus 1

maxNrofFreqSL-r16 INTEGER ::= 8 -- Maximum number of carrier frequncy for for NR sidelink communication

maxNrofSL-BWPs-r16 INTEGER ::= 4 -- Maximum number of BWP for for NR sidelink communication

maxFreqSL-EUTRA-r16 INTEGER ::= 8 -- Maximum number of EUTRA anchor carrier frequncy for NR sidelink

 -- communication

maxNrofSL-MeasId-r16 INTEGER ::= 84 -- Maximum number of sidelink measurement identity (RSRP)

maxNrofSL-ObjectId-r16 INTEGER ::= 64 -- Maximum number of sidelink measurement objects (RSRP)

maxNrofSL-ReportConfigId-r16 INTEGER ::= 64 -- Maximum number of sidelink measurement reporting configuration(RSRP)

maxNrofSL-PoolToMeasureEUTRA-r16 INTEGER ::= 8 -- Maximum number of resoure pool for V2X sidelink measurement to measure

 -- for each measurement object (for CBR)

maxNrofSL-PoolToMeasureNR-r16 INTEGER ::= 8 -- Maximum number of resoure pool for NR sidelink measurement to measure for

 -- each measurement object (for CBR)

maxFreqSL-NR-r16 INTEGER ::= 8 -- Maximum number of NR anchor carrier frequncy for NR sidelink

 -- communication

maxNrofSL-QFIs-r16 INTEGER ::= 2048 -- Maximum number of QoS flow for NR sidelink communication per UE

maxNrofSL-QFIsPerDest-r16 INTEGER ::= 64 -- Maximum number of QoS flow per destination for NR sidelink communication

maxNrofObjectId INTEGER ::= 64 -- Maximum number of measurement objects

maxNrofPageRec INTEGER ::= 32 -- Maximum number of page records

maxNrofPCI-Ranges INTEGER ::= 8 -- Maximum number of PCI ranges

maxPLMN INTEGER ::= 12 -- Maximum number of PLMNs broadcast and reported by UE at establisghment

maxNrofCSI-RS-ResourcesRRM INTEGER ::= 96 -- Maximum number of CSI-RS resources for an RRM measurement object

maxNrofCSI-RS-ResourcesRRM-1 INTEGER ::= 95 -- Maximum number of CSI-RS resources for an RRM measurement object minus 1

maxNrofMeasId INTEGER ::= 64 -- Maximum number of configured measurements

maxNrofQuantityConfig INTEGER ::= 2 -- Maximum number of quantity configurations

maxNrofCSI-RS-CellsRRM INTEGER ::= 96 -- Maximum number of cells with CSI-RS resources for an RRM measurement

 -- object

maxNrofSL-Dest-r16 INTEGER ::= 32 -- Maximum number of destination for NR sidelink communication

maxNrofSL-Dest-1-r16 INTEGER ::= 31 -- Highest index of destination for NR sidelink communication

maxNrofSLRB-r16 INTEGER ::= 512 -- Maximum number of radio bearer for NR sidelink communication per UE

maxSL-LCID-r16 INTEGER ::= 512 -- Maximum number of RLC bearer for NR sidelink communication per UE

maxSL-SyncConfig-r16 INTEGER ::= 16 -- Maximum number of sidelink Sync configurations

maxNrofRXPool-r16 INTEGER ::= 16 -- Maximum number of Rx resource poolfor NR sidelink communication

maxNrofTXPool-r16 INTEGER ::= 8 -- Maximum number of Tx resourcepoolfor NR sidelink communication

maxNrofPoolID-r16 INTEGER ::= 16 -- Maximum index of resource pool for NR sidelink communication

maxNrofSRS-PathlossReferenceRS-r16-1 INTEGER ::= ffsValue --

maxNrofSRS-ResourceSets INTEGER ::= 16 -- Maximum number of SRS resource sets in a BWP.

maxNrofSRS-ResourceSets-1 INTEGER ::= 15 -- Maximum number of SRS resource sets in a BWP minus 1.

maxNrofSRS-PosResourceSets-r16 INTEGER ::= 16 -- Maximum number of SRS Positioning resource sets in a BWP.

maxNrofSRS-PosResourceSets-1-r16 INTEGER ::= 15 -- Maximum number of SRS Positioning resource sets in a BWP minus 1.

maxNrofSRS-Resources INTEGER ::= 64 -- Maximum number of SRS resources.

maxNrofSRS-Resources-1 INTEGER ::= 63 -- Maximum number of SRS resources in an SRS resource set minus 1.

maxNrofSRS-PosResources-r16 INTEGER ::= 64 -- Maximum number of SRS Positioning resources.

maxNrofSRS-PosResources-1-r16 INTEGER ::= 63 -- Maximum number of SRS Positioning resources in an SRS Positioning

 -- resource set minus 1.

maxNrofSRS-ResourcesPerSet INTEGER ::= 16 -- Maximum number of SRS resources in an SRS resource set

maxNrofSRS-TriggerStates-1 INTEGER ::= 3 -- Maximum number of SRS trigger states minus 1, i.e., the largest code

 -- point.

maxNrofSRS-TriggerStates-2 INTEGER ::= 2 -- Maximum number of SRS trigger states minus 2.

maxRAT-CapabilityContainers INTEGER ::= 8 -- Maximum number of interworking RAT containers (incl NR and MRDC)

maxSimultaneousBands INTEGER ::= 32 -- Maximum number of simultaneously aggregated bands

maxNrofSlotFormatCombinationsPerSet INTEGER ::= 512 -- Maximum number of Slot Format Combinations in a SF-Set.

maxNrofSlotFormatCombinationsPerSet-1 INTEGER ::= 511 -- Maximum number of Slot Format Combinations in a SF-Set minus 1.

maxNrofTrafficPattern-r16 INTEGER ::= 8 -- Maximum number of Traffic Pattern for NR sidelink communication.

maxNrofPUCCH-Resources INTEGER ::= 128

maxNrofPUCCH-Resources-1 INTEGER ::= 127

maxNrofPUCCH-ResourceSets INTEGER ::= 4 -- Maximum number of PUCCH Resource Sets

maxNrofPUCCH-ResourceSets-1 INTEGER ::= 3 -- Maximum number of PUCCH Resource Sets minus 1.

maxNrofPUCCH-ResourcesPerSet INTEGER ::= 32 -- Maximum number of PUCCH Resources per PUCCH-ResourceSet

maxNrofPUCCH-P0-PerSet INTEGER ::= 8 -- Maximum number of P0-pucch present in a p0-pucch set

maxNrofPUCCH-PathlossReferenceRSs INTEGER ::= 4 -- Maximum number of RSs used as pathloss reference for PUCCH power control.

maxNrofPUCCH-PathlossReferenceRSs-1 INTEGER ::= 3 -- Maximum number of RSs used as pathloss reference for PUCCH power

 -- control minus 1.

maxNrofPUCCH-PathlossReferenceRSs-r16 INTEGER ::= 64 -- Maximum number of RSs used as pathloss reference for PUCCH power control

 -- extended.

maxNrofPUCCH-PathlossReferenceRSs-1-r16 INTEGER ::= 63 -- Maximum number of RSs used as pathloss reference for PUCCH power control

 -- minus 1 extended.

maxNrofPUCCH-ResourceGroups-r16 INTEGER ::= 4 -- Maximum number of PUCCH resources groups.

maxNrofPUCCH-ResourcesPerGroup-r16 INTEGER ::= ffsValue -- Maximum number of PUCCH resources in a PUCCH group.

maxNrofPUCCH-ResourcesPerGroup-1-r16 INTEGER ::= ffsValue -- Maximum number of PUCCH resources in a PUCCH group minus 1.

maxNrofServingCells-r16 INTEGER ::= ffsValue -- Maximum number of serving cells in simultaneousTCI-UpdateList.

maxNrofP0-PUSCH-AlphaSets INTEGER ::= 30 -- Maximum number of P0-pusch-alpha-sets (see 38,213, clause 7.1)

maxNrofP0-PUSCH-AlphaSets-1 INTEGER ::= 29 -- Maximum number of P0-pusch-alpha-sets minus 1 (see 38,213, clause 7.1)

maxNrofPUSCH-PathlossReferenceRSs INTEGER ::= 4 -- Maximum number of RSs used as pathloss reference for PUSCH power control.

maxNrofPUSCH-PathlossReferenceRSs-1 INTEGER ::= 3 -- Maximum number of RSs used as pathloss reference for PUSCH power

 -- control minus 1.

maxNrofPUSCH-PathlossReferenceRSs-r16 INTEGER ::= 64 -- Maximum number of RSs used as pathloss reference for PUSCH power control

 -- extended

maxNrofPUSCH-PathlossReferenceRSs-1-r16 INTEGER ::= 63 -- Maximum number of RSs used as pathloss reference for PUSCH power control

 -- minus 1

maxNrofNAICS-Entries INTEGER ::= 8 -- Maximum number of supported NAICS capability set

maxBands INTEGER ::= 1024 -- Maximum number of supported bands in UE capability.

maxBandsMRDC INTEGER ::= 1280

maxBandsEUTRA INTEGER ::= 256

maxCellReport INTEGER ::= 8

maxDRB INTEGER ::= 29 -- Maximum number of DRBs (that can be added in DRB-ToAddModLIst).

maxFreq INTEGER ::= 8 -- Max number of frequencies.

maxFreqIDC-r16 INTEGER ::= 128 -- Max number of frequencies for IDC indication.

maxCombIDC-r16 INTEGER ::= 128 -- Max number of reported UL CA for IDC indication.

maxFreqIDC-MRDC INTEGER ::= 32 -- Maximum number of candidate NR frequencies for MR-DC IDC indication

maxNrofCandidateBeams INTEGER ::= 16 -- Max number of PRACH-ResourceDedicatedBFR that in BFR config.

maxNrofCandidateBeams-r16 INTEGER ::= 64 -- Max number of candidate beam resources in BFR config.

maxNrofCandidateBeamsExt-r16 INTEGER ::= 9999 -- FFS

maxNrofPCIsPerSMTC INTEGER ::= 64 -- Maximun number of PCIs per SMTC.

maxNrofQFIs INTEGER ::= 64

maxNrofResourceAvailabilityPerCombination-r16 INTEGER ::= 64 -- FFS

maxNrOfSemiPersistentPUSCH-Triggers INTEGER ::= 64 -- Maximum number of triggers for semi persistent reporting on PUSCH

maxNrofSR-Resources INTEGER ::= 8 -- Maximum number of SR resources per BWP in a cell.

maxNrofSlotFormatsPerCombination INTEGER ::= 256

maxNrofSpatialRelationInfos INTEGER ::= 8

maxNrofSpatialRelationInfos-r16 INTEGER ::= 64

maxNrofIndexesToReport INTEGER ::= 32

maxNrofIndexesToReport2 INTEGER ::= 64

maxNrofSSBs-r16 INTEGER ::= 64 -- Maximum number of SSB resources in a resource set.

maxNrofSSBs-1 INTEGER ::= 63 -- Maximum number of SSB resources in a resource set minus 1.

maxNrofS-NSSAI INTEGER ::= 8 -- Maximum number of S-NSSAI.

maxNrofTCI-StatesPDCCH INTEGER ::= 64

maxNrofTCI-States INTEGER ::= 128 -- Maximum number of TCI states.

maxNrofTCI-States-1 INTEGER ::= 127 -- Maximum number of TCI states minus 1.

maxNrofUL-Allocations INTEGER ::= 16 -- Maximum number of PUSCH time domain resource allocations.

maxQFI INTEGER ::= 63

maxRA-CSIRS-Resources INTEGER ::= 96

maxRA-OccasionsPerCSIRS INTEGER ::= 64 -- Maximum number of RA occasions for one CSI-RS

maxRA-Occasions-1 INTEGER ::= 511 -- Maximum number of RA occasions in the system

maxRA-SSB-Resources INTEGER ::= 64

maxSCSs INTEGER ::= 5

maxSecondaryCellGroups INTEGER ::= 3

maxNrofServingCellsEUTRA INTEGER ::= 32

maxMBSFN-Allocations INTEGER ::= 8

maxNrofMultiBands INTEGER ::= 8

maxCellSFTD INTEGER ::= 3 -- Maximum number of cells for SFTD reporting

maxReportConfigId INTEGER ::= 64

maxNrofCodebooks INTEGER ::= 16 -- Maximum number of codebooks suppoted by the UE

maxNrofCSI-RS-Resources INTEGER ::= 7 -- Maximum number of codebook resources supported by the UE

maxNrofCSI-RS-ResourcesAlt-r16 INTEGER ::= 512 -- Maximum number of alternative codebook resources supported by the UE

maxNrofCSI-RS-ResourcesAlt-1-r16 INTEGER ::= 511 -- Maximum number of alternative codebook resources supported by the UE minus 1

maxNrofSRI-PUSCH-Mappings INTEGER ::= 16

maxNrofSRI-PUSCH-Mappings-1 INTEGER ::= 15

maxSIB INTEGER::= 32 -- Maximum number of SIBs

maxSI-Message INTEGER::= 32 -- Maximum number of SI messages

maxPO-perPF INTEGER ::= 4 -- Maximum number of paging occasion per paging frame

maxAccessCat-1 INTEGER ::= 63 -- Maximum number of Access Categories minus 1

maxBarringInfoSet INTEGER ::= 8 -- Maximum number of Access Categories

maxCellEUTRA INTEGER ::= 8 -- Maximum number of E-UTRA cells in SIB list

maxEUTRA-Carrier INTEGER ::= 8 -- Maximum number of E-UTRA carriers in SIB list

maxPLMNIdentities INTEGER ::= 8 -- Maximum number of PLMN identites in RAN area configurations

maxDownlinkFeatureSets INTEGER ::= 1024 -- (for NR DL) Total number of FeatureSets (size of the pool)

maxUplinkFeatureSets INTEGER ::= 1024 -- (for NR UL) Total number of FeatureSets (size of the pool)

maxEUTRA-DL-FeatureSets INTEGER ::= 256 -- (for E-UTRA) Total number of FeatureSets (size of the pool)

maxEUTRA-UL-FeatureSets INTEGER ::= 256 -- (for E-UTRA) Total number of FeatureSets (size of the pool)

maxFeatureSetsPerBand INTEGER ::= 128 -- (for NR) The number of feature sets associated with one band.

maxPerCC-FeatureSets INTEGER ::= 1024 -- (for NR) Total number of CC-specific FeatureSets (size of the pool)

maxFeatureSetCombinations INTEGER ::= 1024 -- (for MR-DC/NR)Total number of Feature set combinations (size of the

 -- pool)

maxInterRAT-RSTD-Freq INTEGER ::= 3

maxHRNN-Len-r16 INTEGER ::= ffsValue -- Maximum length of HRNNs, value is FFS

maxNPN-r16 INTEGER ::= 12 -- Maximum number of NPNs broadcast and reported by UE at establishment

maxNrOfMinSchedulingOffsetValues-r16 INTEGER ::= 2 -- Maximum number of min. scheduling offset (K0/K2) configurations

maxK0-SchedulingOffset-r16 INTEGER ::= 16 -- Maximum number of slots configured as min. scheduling offset (K0)

maxK2-SchedulingOffset-r16 INTEGER ::= 16 -- Maximum number of slots configured as min. scheduling offset (K2)

maxDCI-2-6-Size-r16 INTEGER ::= 140 -- Maximum size of DCI format 2-6

maxDCI-2-6-Size-1-r16 INTEGER ::= 139 -- Maximum DCI format 2-6 size minus 1

maxNrofUL-Allocations-r16 INTEGER ::= 64 -- Maximum number of PUSCH time domain resource allocations

maxNrofP0-PUSCH-Set-r16 INTEGER ::= 2 -- Maximum number of P0 PUSCH set(s)

maxCI-DCI-PayloadSize-r16 INTEGER ::= 126 -- Maximum number of the DCI size for CI

maxCI-DCI-PayloadSize-r16-1 INTEGER ::= 125 -- Maximum number of the DCI size for CI minus 1

maxWLAN-Id-Report-r16 INTEGER ::= 32 -- Maximum number of WLAN IDs to report

maxWLAN-Name-r16 INTEGER ::= 4 -- Maximum number of WLAN name

maxRAReport-r16 INTEGER ::= 8 -- Maximum number of RA procedures information to be included in the

 -- RA report

maxTxConfig-r16 INTEGER ::= 64

maxTxConfig-1-r16 INTEGER ::= 63

maxPSSCH-TxConfig-r16 INTEGER ::= 16 -- Maximum number of PSSCH TX configurations

maxNrofCLI-RSSI-Resources-r16 INTEGER ::= 64 -- Maximum number of CLI-RSSI resources for UE

maxNrofCLI-RSSI-Resources-r16-1 INTEGER ::= 63 -- Maximum number of CLI-RSSI resources for UE minus 1

maxNrofSRS-Resources-r16 INTEGER ::= 32 -- Maximum number of SRS resources for CLI measurement for UE

maxCLI-Report-r16 INTEGER ::= 8

maxNrofConfiguredGrantConfig-r16 INTEGER ::= 12 -- Maximum number of configured grant configurations per BWP

maxNrofConfiguredGrantConfig-r16-1 INTEGER ::= 11 -- Maximum number of configured grant configurations per BWP minus 1

maxNrofConfiguredGrantConfigMAC-r16 INTEGER ::= 32 -- Maximum number of configured grant configurations per MAC entity

maxNrofConfiguredGrantConfigMAC-r16-1 INTEGER ::= 31 -- Maximum number of configured grant configurations per MAC entity minus 1

maxNrofSPS-Config-r16 INTEGER ::= 8 -- Maximum number of SPS configurations per BWP

maxNrofSPS-Config-r16-1 INTEGER ::= 7 -- Maximum number of SPS configurations per BWP minus 1

maxNrofDormancyGroups INTEGER ::= 5 --

maxNrofPUCCH-ResourceGroups-1-r16 INTEGER ::= 3 --

maxNrofServingCellsTCI-r16 INTEGER ::= ffsValue --

-- TAG-MULTIPLICITY-AND-TYPE-CONSTRAINT-DEFINITIONS-STOP

-- ASN1STOP

### – End of NR-RRC-Definitions

-- ASN1START

END

-- ASN1STOP

*Next Change*

6.6.1 General message structure

– *PC5-RRC-Definitions*

This ASN.1 segment is the start of the PC5 RRC PDU definitions.

-- ASN1START

-- TAG-PC5-RRC-DEFINITIONS-START

PC5-RRC-Definitions DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

IMPORTS

 RRC-TransactionIdentifier,

 SN-FieldLengthAM,

 SN-FieldLengthUM,

 LogicalChannelIdentity,

 maxNrofSLRB-r16,

 maxNrofSL-QFIs-r16,

 maxNrofSL-QFIsPerDest-r16,

 RSRP-Range,

 SL-MeasConfig-r16,

 SL-MeasId-r16,

 FreqBandList

FROM NR-RRC-Definitions;

-- TAG-PC5-RRC-DEFINITIONS-STOP

-- ASN1STOP

*Next Change*

– *UECapabilityEnquirySidelink*

The *UECapabilityEnquirySidelink* message is used to request UE sidelink capabilities. It is only applied to unicast of NR sidelink communication.

Signalling radio bearer: Sidelink SRB for PC5-RRC

RLC-SAP: AM

Logical channel: SCCH

Direction: UE to UE

***UECapabilityEnquirySidelink* information element**

-- ASN1START

-- TAG-UECAPABILITYENQUIRYSIDELINK-START

UECapabilityEnquirySidelink ::= SEQUENCE {

 rrc-TransactionIdentifier-r16 RRC-TransactionIdentifier,

 criticalExtensions CHOICE {

 ueCapabilityEnquirySidelink-r16 UECapabilityEnquirySidelink-IEs-r16,

 criticalExtensionsFuture SEQUENCE {}

 }

}

UECapabilityEnquirySidelink-IEs-r16 ::= SEQUENCE {

 ueCapabilityRequestFilterSidelink-r16 UE-CapabilityRequestFilterSidelink OPTIONAL, -- Need N

 ueCapabilityInformationSidelink-r16 OCTET STRING OPTIONAL,

 lateNonCriticalExtension OCTET STRING OPTIONAL,

 nonCriticalExtension SEQUENCE{} OPTIONAL

}

-- TAG-UECAPABILITYENQUIRYSIDELINK-STOP

-- ASN1STOP

|  |
| --- |
| ***UECapabilityEnquirySidelink*-IEs field descriptions** |
| ***ueCapabilityInformationSidelink***This filed indicates the *UECapabilityInformationSidelink* message to provide the UE sidelink capability, which can be optionally sent together with *UECapabilityEnquirySidelink*. |

– *UE-CapabilityRequestFilterSidelink*

The IE *UE-CapabilityRequestFilterSidelink* is used to request filtered UE capabilities.

***UE-CapabilityRequestFilterSidelink* information element**

-- ASN1START

-- TAG-UE-CAPABILITYREQUESTFILTERSIDELINK-START

UE-CapabilityRequestFilterSidelink ::= SEQUENCE {

 frequencyBandListFilterSidelink FreqBandList OPTIONAL, -- Need N

 nonCriticalExtension SEQUENCE {} OPTIONAL

}

-- TAG-UE-CAPABILITYREQUESTFILTERSIDELINK-STOP

-- ASN1STOP

– *UECapabilityInformationSidelink*

The IE *UECapabilityInformationSidelink* message is used to transfer UE radio access capabilities. It is only applied to unicast of NR sidelink communication.

Signalling radio bearer: Sidelink SRB for PC5-RRC

RLC-SAP: AM

Logical channel: SCCH

Direction: UE to UE

***UECapabilityInformationSidelink* information element**

-- ASN1START

-- TAG-UECAPABILITYINFORMATIONSIDELINK-START

UECapabilityInformationSidelink ::= SEQUENCE {

 rrc-TransactionIdentifier-r16 RRC-TransactionIdentifier,

 criticalExtensions CHOICE {

 ueCapabilityInformationSidelink-r16 UECapabilityInformationSidelink-IEs-r16,

 criticalExtensionsFuture SEQUENCE {}

 }

}

UECapabilityInformationSidelink-IEs-r16 ::= SEQUENCE {

 accessStratumReleaseSidelink-r16 AccessStratumReleaseSidelink-r16,

 pdcp-ParametersSidelink-r16 PDCP-ParametersSidelink-r16 OPTIONAL,

 rlc-ParametersSidelink-r16 RLC-ParametersSidelink-r16 OPTIONAL,

 lateNonCriticalExtension OCTET STRING OPTIONAL,

 nonCriticalExtension SEQUENCE{} OPTIONAL

}

AccessStratumReleaseSidelink-r16 ::= ENUMERATED {

 rel16, spare7, spare6, spare5, spare4, spare3, spare2, spare1, ... }

PDCP-ParametersSidelink-r16 ::= SEQUENCE {

 outOfOrderDeliverySidelink-r16 ENUMERATED {supported} OPTIONAL,

 ...

}

RLC-ParametersSidelink-r16 ::= SEQUENCE {

 am-WithLongSN-Sidelink-r16 ENUMERATED {supported} OPTIONAL,

 um-WithLongSN-Sidelink-r16 ENUMERATED {supported} OPTIONAL,

 ...

}

-- TAG-UECAPABILITYINFORMATIONSIDELINK-STOP

-- ASN1STOP

End of changes