**3GPP TSG-RAN WG2 Meeting #122 *R2-230xxxx***

**Incheon, Korea, 22 – 26 May 2023**

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| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
|  |
|  | **38.331** | **CR** | **4139** | **rev** | **1** | **Current version:** | **17.4.0** |  |
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| *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 | **x** | Core Network |  |

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| ***Title:***  | UE capability reporting for Rel-18 UL Tx switching enhancements |
|  |  |
| ***Source to WG:*** | Huawei, HiSilicon, NTT DOCOMO INC. |
| ***Source to TSG:*** |  |
|  |  |
| ***Work item code:*** | NR\_MC\_enh-Core  |  | ***Date:*** | 2023-05-22 |
|  |  |  |  |  |
| ***Category:*** | C |  | ***Release:*** | Rel-18 |
|  | *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-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)**Rel-19 (Release 19)* |
|  |  |
| ***Reason for change:*** | In Rel-18, dynamic UL Tx switching has been enhanced and the following agreements have been achieved for UE capability reporting.RAN2 #119e agreement:* As a baseline, RAN2 reuse Rel-16/17 UL Tx switching band combination list (i.e. *BandCombinationList-UplinkTxSwitch-r16*) for Rel-18 UL Tx switching capability reporting.

RAN2 #120 agreements:* R2 assumes For UE capability to report applicability of DL interruption for Rel-18 UL Tx switching, RAN2 reuses uplinkTxSwitching-DL-Interruption-r16 (no spec impact).
* R2 assumes to reuse the per band per BC capability, uplinkTxSwitching2T2T-PUSCH-TransCoherence-r17, on UL-MIMO coherence for the 2Tx-capable UL band(s) for Rel-18 UL Tx switching (fallback description FFS).

RAN2 #121 agreements:* For UE capability of switching options, introduce a per-band-pair UE capability to report supported switching options for Rel-18 UL Tx switching.
* For UE capability of 2-port UL transmission, RAN2 reuse the per-FS UL-MIMO UE capability (no spec change).

RAN2 #121bis-e agreements:* P5: RAN2 introduce a per-band-pair report of bands that can be transmitted while the other Tx chain is switching across that band pair. Absence of this field means there is interruption in all bands during the switching.
* In support of RAN4 agreement, RAN2 intend to introduce support for two per-band-pair UE capabilities, a length of a switching period, for 1Tx-2Tx switching (like Rel-16) and that for 2Tx-2Tx switching (like Rel-17).

RAN2 #122 agreements:* In Rel-18 UL Tx switching, the 3/4 FeatureSetUplink corresponding to the 3/4 UL bands are reported in one row for a given BC including 3/4 UL bands, and fallback and backward compatibility should be supported in the following way:
	+ - The UE needs to guarantee the FeatureSetUplinks reported for Rel-18 UL Tx switching are applicable to Rel-16/Rel-17 Tx switching (as the Rel-16/Rel-17 switching period is reported for that band pair and the same switching option of the band pair is supported for Rel-16/Rel-17 switching).
		- The UE can report FSC row for Rel-16/Rel-17 UL Tx switching explicitly if the Rel-16/Rel-17 switching period is reported for that band pair in case of different fallback.
* RAN2 confirm the intention that Rel-16 band pair list is reused to indicate Rel-18 per-band pair capability which is the same as in Rel-17.
* RAN2 to introduce a per-BC capability of Minimum separation time. The exact values of the capability is pending to RAN1.
* For Rel-18 UL Tx switching (1T-1T and/or 1T-2T and/or 2T-2T) across 3 or 4 bands the UE shall indicate the support of UL Tx switching (e.g. at least switchedUL) for ALL possible band pairs.
* Allow the UE to report switching period for a band pair in which the two bands do not support 2-layers UL MIMO.
* For Rel-18 UL Tx switching (1T-1T and/or 1T-2T and/or 2T-2T) across 3 or 4 bands the UE shall indicate the support of UL Tx switching (e.g. at least switchedUL) for ALL possible band pairs.
* Allow the UE to report switching period for a band pair in which the two bands do not support 2-layers UL MIMO.
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| ***Summary of change:*** | In 6.3.3,* Add *supportedBandCombinationList-UplinkTxSwitch-v18xy* in *RF-Parameters*,
* Add *supportedBandPairListNR-v18xy* in *BandCombinationList-UplinkTxSwitch-v18xy*.
* Add *uplinkTxSwitchingMinimumSeparationTime-r18* in *BandCombinationList-UplinkTxSwitch-v18xy*.
* Add *uplinkTxSwitchingOptionForBandPair-r18*, *uplinkTxSwitchingMaintainedULtrans-r18*, and *uplinkTxSwitchingPeriodForBandPair-r18* in *ULTxSwitchingBandPair-v18xy*.
* Add *uplinkTxSwitchingPeriodMoreBandsList* in *BandCombinationList-UplinkTxSwitch-v18xy*.

**Impact analysis**Impacted 5G architecture options:NR SA Impacted functionalityUL Tx switchingInter-operability:No inter-operablity issue. |
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| ***Consequences if not approved:*** | UE capablity reporting is not supported for the Rel-18 UL Tx switching enhancement. |
|  |  |
| ***Clauses affected:*** | 6.3.3 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  **x** |  |  Other core specifications  | TS 38.306 CR 0924 |
| ***affected:*** |  | **x** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **x** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

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| START OF CHANGES  |

### 6.3.3 UE capability information elements

– *BandCombinationList*

The IE *BandCombinationList* contains a list of NR CA, NR non-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-v15g0 ::= SEQUENCE (SIZE (1..maxBandComb)) OF BandCombination-v15g0

BandCombinationList-v1610 ::= SEQUENCE (SIZE (1..maxBandComb)) OF BandCombination-v1610

BandCombinationList-v1630 ::= SEQUENCE (SIZE (1..maxBandComb)) OF BandCombination-v1630

BandCombinationList-v1640 ::= SEQUENCE (SIZE (1..maxBandComb)) OF BandCombination-v1640

BandCombinationList-v1650 ::= SEQUENCE (SIZE (1..maxBandComb)) OF BandCombination-v1650

BandCombinationList-v1680 ::= SEQUENCE (SIZE (1..maxBandComb)) OF BandCombination-v1680

BandCombinationList-v1690 ::= SEQUENCE (SIZE (1..maxBandComb)) OF BandCombination-v1690

BandCombinationList-v16a0 ::= SEQUENCE (SIZE (1..maxBandComb)) OF BandCombination-v16a0

BandCombinationList-v1700 ::= SEQUENCE (SIZE (1..maxBandComb)) OF BandCombination-v1700

BandCombinationList-v1720 ::= SEQUENCE (SIZE (1..maxBandComb)) OF BandCombination-v1720

BandCombinationList-v1730 ::= SEQUENCE (SIZE (1..maxBandComb)) OF BandCombination-v1730

BandCombinationList-UplinkTxSwitch-r16 ::= SEQUENCE (SIZE (1..maxBandComb)) OF BandCombination-UplinkTxSwitch-r16

BandCombinationList-UplinkTxSwitch-v1630 ::= SEQUENCE (SIZE (1..maxBandComb)) OF BandCombination-UplinkTxSwitch-v1630

BandCombinationList-UplinkTxSwitch-v1640 ::= SEQUENCE (SIZE (1..maxBandComb)) OF BandCombination-UplinkTxSwitch-v1640

BandCombinationList-UplinkTxSwitch-v1650 ::= SEQUENCE (SIZE (1..maxBandComb)) OF BandCombination-UplinkTxSwitch-v1650

BandCombinationList-UplinkTxSwitch-v1670 ::= SEQUENCE (SIZE (1..maxBandComb)) OF BandCombination-UplinkTxSwitch-v1670

BandCombinationList-UplinkTxSwitch-v1690 ::= SEQUENCE (SIZE (1..maxBandComb)) OF BandCombination-UplinkTxSwitch-v1690

BandCombinationList-UplinkTxSwitch-v16a0 ::= SEQUENCE (SIZE (1..maxBandComb)) OF BandCombination-UplinkTxSwitch-v16a0

BandCombinationList-UplinkTxSwitch-v1700 ::= SEQUENCE (SIZE (1..maxBandComb)) OF BandCombination-UplinkTxSwitch-v1700

BandCombinationList-UplinkTxSwitch-v1720 ::= SEQUENCE (SIZE (1..maxBandComb)) OF BandCombination-UplinkTxSwitch-v1720

BandCombinationList-UplinkTxSwitch-v1730 ::= SEQUENCE (SIZE (1..maxBandComb)) OF BandCombination-UplinkTxSwitch-v1730

BandCombinationList-UplinkTxSwitch-v18xy ::= SEQUENCE (SIZE (1..maxBandComb)) OF BandCombination-UplinkTxSwitch-v18xy

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-v15g0::= SEQUENCE {

 ca-ParametersNR-v15g0 CA-ParametersNR-v15g0 OPTIONAL,

 ca-ParametersNRDC-v15g0 CA-ParametersNRDC-v15g0 OPTIONAL,

 mrdc-Parameters-v15g0 MRDC-Parameters-v15g0 OPTIONAL

}

BandCombination-v1610 ::= SEQUENCE {

 bandList-v1610 SEQUENCE (SIZE (1..maxSimultaneousBands)) OF BandParameters-v1610 OPTIONAL,

 ca-ParametersNR-v1610 CA-ParametersNR-v1610 OPTIONAL,

 ca-ParametersNRDC-v1610 CA-ParametersNRDC-v1610 OPTIONAL,

 powerClass-v1610 ENUMERATED {pc1dot5} OPTIONAL,

 powerClassNRPart-r16 ENUMERATED {pc1, pc2, pc3, pc5} OPTIONAL,

 featureSetCombinationDAPS-r16 FeatureSetCombinationId OPTIONAL,

 mrdc-Parameters-v1620 MRDC-Parameters-v1620 OPTIONAL

}

BandCombination-v1630 ::= SEQUENCE {

 ca-ParametersNR-v1630 CA-ParametersNR-v1630 OPTIONAL,

 ca-ParametersNRDC-v1630 CA-ParametersNRDC-v1630 OPTIONAL,

 mrdc-Parameters-v1630 MRDC-Parameters-v1630 OPTIONAL,

 supportedTxBandCombListPerBC-Sidelink-r16 BIT STRING (SIZE (1..maxBandComb)) OPTIONAL,

 supportedRxBandCombListPerBC-Sidelink-r16 BIT STRING (SIZE (1..maxBandComb)) OPTIONAL,

 scalingFactorTxSidelink-r16 SEQUENCE (SIZE (1..maxBandComb)) OF ScalingFactorSidelink-r16 OPTIONAL,

 scalingFactorRxSidelink-r16 SEQUENCE (SIZE (1..maxBandComb)) OF ScalingFactorSidelink-r16 OPTIONAL

}

BandCombination-v1640 ::= SEQUENCE {

 ca-ParametersNR-v1640 CA-ParametersNR-v1640 OPTIONAL,

 ca-ParametersNRDC-v1640 CA-ParametersNRDC-v1640 OPTIONAL

}

BandCombination-v1650 ::= SEQUENCE {

 ca-ParametersNRDC-v1650 CA-ParametersNRDC-v1650 OPTIONAL

}

BandCombination-v1680 ::= SEQUENCE {

 intrabandConcurrentOperationPowerClass-r16 SEQUENCE (SIZE (1..maxBandComb)) OF IntraBandPowerClass-r16 OPTIONAL

}

BandCombination-v1690 ::= SEQUENCE {

 ca-ParametersNR-v1690 CA-ParametersNR-v1690 OPTIONAL

}

BandCombination-v16a0 ::= SEQUENCE {

 ca-ParametersNR-v16a0 CA-ParametersNR-v16a0 OPTIONAL,

 ca-ParametersNRDC-v16a0 CA-ParametersNRDC-v16a0 OPTIONAL

}

BandCombination-v1700 ::= SEQUENCE {

 ca-ParametersNR-v1700 CA-ParametersNR-v1700 OPTIONAL,

 ca-ParametersNRDC-v1700 CA-ParametersNRDC-v1700 OPTIONAL,

 mrdc-Parameters-v1700 MRDC-Parameters-v1700 OPTIONAL,

 bandList-v1710 SEQUENCE (SIZE (1..maxSimultaneousBands)) OF BandParameters-v1710 OPTIONAL,

 supportedBandCombListPerBC-SL-RelayDiscovery-r17 BIT STRING (SIZE (1..maxBandComb)) OPTIONAL,

 supportedBandCombListPerBC-SL-NonRelayDiscovery-r17 BIT STRING (SIZE (1..maxBandComb)) OPTIONAL

}

BandCombination-v1720 ::= SEQUENCE {

 ca-ParametersNR-v1720 CA-ParametersNR-v1720 OPTIONAL,

 ca-ParametersNRDC-v1720 CA-ParametersNRDC-v1720 OPTIONAL

}

BandCombination-v1730 ::= SEQUENCE {

 ca-ParametersNR-v1730 CA-ParametersNR-v1730 OPTIONAL,

 ca-ParametersNRDC-v1730 CA-ParametersNRDC-v1730 OPTIONAL,

 bandList-v1730 SEQUENCE (SIZE (1..maxSimultaneousBands)) OF BandParameters-v1730 OPTIONAL

}

BandCombination-UplinkTxSwitch-r16 ::= SEQUENCE {

 bandCombination-r16 BandCombination,

 bandCombination-v1540 BandCombination-v1540 OPTIONAL,

 bandCombination-v1560 BandCombination-v1560 OPTIONAL,

 bandCombination-v1570 BandCombination-v1570 OPTIONAL,

 bandCombination-v1580 BandCombination-v1580 OPTIONAL,

 bandCombination-v1590 BandCombination-v1590 OPTIONAL,

 bandCombination-v1610 BandCombination-v1610 OPTIONAL,

 supportedBandPairListNR-r16 SEQUENCE (SIZE (1..maxULTxSwitchingBandPairs)) OF ULTxSwitchingBandPair-r16,

 uplinkTxSwitching-OptionSupport-r16 ENUMERATED {switchedUL, dualUL, both} OPTIONAL,

 uplinkTxSwitching-PowerBoosting-r16 ENUMERATED {supported} OPTIONAL,

 ...,

 [[

 -- R4 16-5 UL-MIMO coherence capability for dynamic Tx switching between 3CC 1Tx-2Tx switching

 uplinkTxSwitching-PUSCH-TransCoherence-r16 ENUMERATED {nonCoherent, fullCoherent} OPTIONAL

 ]]

}

BandCombination-UplinkTxSwitch-v1630 ::= SEQUENCE {

 bandCombination-v1630 BandCombination-v1630 OPTIONAL

}

BandCombination-UplinkTxSwitch-v1640 ::= SEQUENCE {

 bandCombination-v1640 BandCombination-v1640 OPTIONAL

}

BandCombination-UplinkTxSwitch-v1650 ::= SEQUENCE {

 bandCombination-v1650 BandCombination-v1650 OPTIONAL

}

BandCombination-UplinkTxSwitch-v1670 ::= SEQUENCE {

 bandCombination-v15g0 BandCombination-v15g0 OPTIONAL

}

BandCombination-UplinkTxSwitch-v1690 ::= SEQUENCE {

 bandCombination-v1690 BandCombination-v1690 OPTIONAL

}

BandCombination-UplinkTxSwitch-v16a0 ::= SEQUENCE {

 bandCombination-v16a0 BandCombination-v16a0 OPTIONAL

}

BandCombination-UplinkTxSwitch-v1700 ::= SEQUENCE {

 bandCombination-v1700 BandCombination-v1700 OPTIONAL,

 -- R4 16-1/16-2/16-3 Dynamic Tx switching between 2CC/3CC 2Tx-2Tx/1Tx-2Tx switching

 supportedBandPairListNR-v1700 SEQUENCE (SIZE (1..maxULTxSwitchingBandPairs)) OF ULTxSwitchingBandPair-v1700 OPTIONAL,

 -- R4 16-6: UL-MIMO coherence capability for dynamic Tx switching between 2Tx-2Tx switching

 uplinkTxSwitchingBandParametersList-v1700 SEQUENCE (SIZE (1.. maxSimultaneousBands)) OF UplinkTxSwitchingBandParameters-v1700 OPTIONAL

}

BandCombination-UplinkTxSwitch-v1720 ::= SEQUENCE {

 bandCombination-v1720 BandCombination-v1720 OPTIONAL,

 uplinkTxSwitching-OptionSupport2T2T-r17 ENUMERATED {switchedUL, dualUL, both} OPTIONAL

}

BandCombination-UplinkTxSwitch-v1730 ::= SEQUENCE {

 bandCombination-v1730 BandCombination-v1730 OPTIONAL

}

BandCombination-UplinkTxSwitch-v18xy ::= SEQUENCE {

 supportedBandPairListNR-v18xy SEQUENCE (SIZE (1..maxULTxSwitchingBandPairs)) OF ULTxSwitchingBandPair-v18xy OPTIONAL,

 uplinkTxSwitchingMinimumSeparationTime-r18 ENUMERATED {0us, 500us},

 uplinkTxSwitchingPeriodMoreBandsList-r18 SEQUENCE (SIZE (1..maxULTxSwitchingBandPairs)) OF UplinkTxSwitchingPeriodMoreBands OPTIONAL}

ULTxSwitchingBandPair-r16 ::= SEQUENCE {

 bandIndexUL1-r16 INTEGER(1..maxSimultaneousBands),

 bandIndexUL2-r16 INTEGER(1..maxSimultaneousBands),

 uplinkTxSwitchingPeriod-r16 ENUMERATED {n35us, n140us, n210us},

 uplinkTxSwitching-DL-Interruption-r16 BIT STRING (SIZE(1..maxSimultaneousBands)) OPTIONAL

}

ULTxSwitchingBandPair-v1700 ::= SEQUENCE {

 uplinkTxSwitchingPeriod2T2T-r17 ENUMERATED {n35us, n140us, n210us} OPTIONAL

}

ULTxSwitchingBandPair-v18xy ::=     SEQUENCE {

 uplinkTxSwitchingOptionForBandPair-r18 ENUMERATED {switchedUL, dualUL, both},

 uplinkTxSwitchingMaintainedULtrans-r18 BIT STRING (SIZE(1..maxSimultaneousBands-2)) OPTIONAL,

 uplinkTxSwitchingPeriodForBandPair-r18::=   SEQUENCE {

 switchingPeriodFor2T-r18 ENUMERATED {n35us, n140us, n210us} OPTIONAL,

 switchingPeriodFor1T-r18 ENUMERATED {n35us, n140us, n210us}

 }

}

UplinkTxSwitchingBandParameters-v1700 ::= SEQUENCE {

 bandIndex-r17 INTEGER(1..maxSimultaneousBands),

 uplinkTxSwitching2T2T-PUSCH-TransCoherence-r17 ENUMERATED {nonCoherent, fullCoherent} OPTIONAL

}

UplinkTxSwitchingPeriodDualUL-r18::=     CHOICE {

 uplinkTxSwitchingBetweenBandPairs-r18     SEQUENCE {

 bandPairIndex1-r18 INTEGER(1.. maxULTxSwitchingBandPairs),

 bandPairIndex2-r18 INTEGER(1.. maxULTxSwitchingBandPairs),

 switchingPeriod1T1Tto1T1T-r18 ENUMERATED {n35us, n140us, n210us}

 },

 uplinkTxSwitchingBetweenBandPairAndBand-r18 SEQUENCE {

 bandPairIndex-r18 INTEGER(1.. maxULTxSwitchingBandPairs),

 bandIndex-r18 INTEGER(1..maxSimultaneousBands),

 switchingPeriod1T1Tto2T-r18 ENUMERATED {n35us, n140us, n210us}

 }

}

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-v1610 ::= SEQUENCE {

 srs-TxSwitch-v1610 SEQUENCE {

 supportedSRS-TxPortSwitch-v1610 ENUMERATED {t1r1-t1r2, t1r1-t1r2-t1r4, t1r1-t1r2-t2r2-t2r4, t1r1-t1r2-t2r2-t1r4-t2r4,

 t1r1-t2r2, t1r1-t2r2-t4r4}

 } OPTIONAL

}

BandParameters-v1710 ::= SEQUENCE {

 -- R1 23-8-3 SRS Antenna switching for >4Rx

 srs-AntennaSwitchingBeyond4RX-r17 SEQUENCE {

 -- 1. Support of SRS antenna switching xTyR with y>4

 supportedSRS-TxPortSwitchBeyond4Rx-r17 BIT STRING (SIZE (11)),

 -- 2. Report the entry number of the first-listed band with UL in the band combination that affects this DL

 entryNumberAffectBeyond4Rx-r17 INTEGER (1..32) OPTIONAL,

 -- 3. Report the entry number of the first-listed band with UL in the band combination that switches together with this UL

 entryNumberSwitchBeyond4Rx-r17 INTEGER (1..32) OPTIONAL

 } OPTIONAL

}

BandParameters-v1730 ::= SEQUENCE {

 -- R1 39-3-2 Affected bands for inter-band CA during SRS carrier switching

 srs-SwitchingAffectedBandsListNR-r17 SEQUENCE (SIZE (1..maxSimultaneousBands)) OF SRS-SwitchingAffectedBandsNR-r17

}

ScalingFactorSidelink-r16 ::= ENUMERATED {f0p4, f0p75, f0p8, f1}

IntraBandPowerClass-r16 ::= ENUMERATED {pc2, pc3, spare6, spare5, spare4, spare3, spare2, spare1}

SRS-SwitchingAffectedBandsNR-r17 ::= BIT STRING (SIZE (1..maxSimultaneousBands))

-- TAG-BANDCOMBINATIONLIST-STOP

-- ASN1STOP

|  |
| --- |
| *BandCombination* field descriptions |
| ***BandCombinationList-v1540, BandCombinationList-v1550, BandCombinationList-v1560, BandCombinationList-v1570, BandCombinationList-v1580, BandCombinationList-v1590, BandCombinationList-v15g0, BandCombinationList-v1610*, *BandCombinationList-v1630*, *BandCombinationList-v1640*, *BandCombinationList-v1650, BandCombinationList-v1680, BandCombinationList-v1690, BandCombinationList-v16a0, BandCombinationList-v1700, BandCombinationList-v1720, BandCombinationList-v1730***The UE shall include the same number of entries, and listed in the same order, as in *BandCombinationList* (without suffix). If the field is included in *supportedBandCombinationListNEDC-Only-v1610*, the UE shall include the same number of entries, and listed in the same order, as in *BandCombinationList* of *supportedBandCombinationListNEDC-Only* (without suffix) field.If the field is included in *supportedBandCombinationListNEDC-Only-v15a0*, the UE shall include the same number of entries, and listed in the same order, as in *BandCombinationList* (without suffix) of *supportedBandCombinationListNEDC-Only* (without suffix) field. |
| ***BandCombinationList-UplinkTxSwitch-r16, BandCombinationList-UplinkTxSwitch-v1630, BandCombinationList-UplinkTxSwitch-v1640, BandCombinationList-UplinkTxSwitch-v1650, BandCombinationList-UplinkTxSwitch-v1690, BandCombinationList-UplinkTxSwitch-v16a0, BandCombinationList-UplinkTxSwitch-v1700, BandCombinationList-UplinkTxSwitch-v1720, BandCombinationList-UplinkTxSwitch-v1730, BandCombination-UplinkTxSwitch-v18xy***The UE shall include the same number of entries, and listed in the same order, as in *BandCombinationList-UplinkTxSwitch-r16*.For the field of *supportedBandCombinationList-UplinkTxSwitch-v1700*, if the UE does not support 2Tx-2Tx switching for a given band combination, the field of *supportedBandPairListNR-v1700* in the corresponding entry is absent. |
| ***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. |
| ***featureSetCombinationDAPS***If this field is present for a band combination, it reports the feature set combination supported for the band combination when any DAPS bearer is configured. |
| ***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. |
| ***supportedBandPairListNR-r16, supportedBandPairListNR-v1700, supportedBandPairListNR-v18xy***Indicates a list of band pair supporting UL Tx switching as defined in TS 38.101-1 [15] for a given band combination.A UE supporting 2Tx-2Tx switching should include both of *supportedBandPairListNR-r16* and *supportedBandPairListNR-v1700*. And the UE shall include the same number of entries listed in the same order as in *supportedBandPairListNR-r16*.If the UE does not support 2Tx-2Tx switching for a given band pair, the field of *uplinkTxSwitchingPeriod2T2T* in the corresponding entry is absent.A UE supporting R18 dynamic UL Tx switching (i.e. configured by *uplinkTxSwitchingMoreBands-r18*) as specified in TS 38.214 [19] and TS 38.101-1 [15], should indicate both of *supportedBandPairListNR-v18xy* and *supportedBandPairListNR-r16,* and indicate *supportedBandPairListNR-v1700* if the UE support 2Tx-2Tx switching on at least one band pair. The UE shall include all the possible band pair and list the entries in the same order in *supportedBandPairListNR-r16, supportedBandPairListNR-v1700*, as well as *supportedBandPairListNR-v18xy*. For a band pair supporting 2Tx-2Tx switching, the UE should include *switchingPeriodFor2T* in *ULTxSwitchingBandPair-v18xy* and *uplinkTxSwitchingPeriod2T2T* in *ULTxSwitchingBandPair-v1700*, as well as *uplinkTxSwitchingPeriod* in *ULTxSwitchingBandPair-r16*. For a band pair supporting 1Tx-2Tx switching or 1Tx-1Tx switching, the UE should include *switchingPeriodFor1T* in *ULTxSwitchingBandPair-v18xy* and *uplinkTxSwitchingPeriod* in *ULTxSwitchingBandPair-r16*. |
| ***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 |
| ***srs-TxSwitch***Indicates supported SRS antenna switch capability for the associated band. If the UE indicates support of *SRS-SwitchingTimeNR*, the UE is allowed to set this field for a band with associated *FeatureSetUplinkId* set to 0 for SRS carrier switching. |
| ***uplinkTxSwitchingBandParametersList-v1700***Indicates a list of per band per band combination capabilities for UL Tx switching. |

|  |
| --- |
| NEXT CHANGE |

– *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-v1610 BandCombinationList-v1610 OPTIONAL,

 supportedBandCombinationListSidelinkEUTRA-NR-r16 BandCombinationListSidelinkEUTRA-NR-r16 OPTIONAL,

 supportedBandCombinationList-UplinkTxSwitch-r16 BandCombinationList-UplinkTxSwitch-r16 OPTIONAL

 ]],

 [[

 supportedBandCombinationList-v1630 BandCombinationList-v1630 OPTIONAL,

 supportedBandCombinationListSidelinkEUTRA-NR-v1630 BandCombinationListSidelinkEUTRA-NR-v1630 OPTIONAL,

 supportedBandCombinationList-UplinkTxSwitch-v1630 BandCombinationList-UplinkTxSwitch-v1630 OPTIONAL

 ]],

 [[

 supportedBandCombinationList-v1640 BandCombinationList-v1640 OPTIONAL,

 supportedBandCombinationList-UplinkTxSwitch-v1640 BandCombinationList-UplinkTxSwitch-v1640 OPTIONAL

 ]],

 [[

 supportedBandCombinationList-v1650 BandCombinationList-v1650 OPTIONAL,

 supportedBandCombinationList-UplinkTxSwitch-v1650 BandCombinationList-UplinkTxSwitch-v1650 OPTIONAL

 ]],

 [[

 extendedBand-n77-r16 ENUMERATED {supported} OPTIONAL

 ]],

 [[

 supportedBandCombinationList-UplinkTxSwitch-v1670 BandCombinationList-UplinkTxSwitch-v1670 OPTIONAL

 ]],

 [[

 supportedBandCombinationList-v1680 BandCombinationList-v1680 OPTIONAL

 ]],

 [[

 supportedBandCombinationList-v1690 BandCombinationList-v1690 OPTIONAL,

 supportedBandCombinationList-UplinkTxSwitch-v1690 BandCombinationList-UplinkTxSwitch-v1690 OPTIONAL

 ]],

 [[

 supportedBandCombinationList-v1700 BandCombinationList-v1700 OPTIONAL,

 supportedBandCombinationList-UplinkTxSwitch-v1700 BandCombinationList-UplinkTxSwitch-v1700 OPTIONAL,

 supportedBandCombinationListSL-RelayDiscovery-r17 OCTET STRING OPTIONAL, -- Contains PC5 BandCombinationListSidelinkNR-r16

 supportedBandCombinationListSL-NonRelayDiscovery-r17 OCTET STRING OPTIONAL, -- Contains PC5 BandCombinationListSidelinkNR-r16

 supportedBandCombinationListSidelinkEUTRA-NR-v1710 BandCombinationListSidelinkEUTRA-NR-v1710 OPTIONAL,

 sidelinkRequested-r17 ENUMERATED {true} OPTIONAL,

 extendedBand-n77-2-r17 ENUMERATED {supported} OPTIONAL

 ]],

 [[

 supportedBandCombinationList-v1720 BandCombinationList-v1720 OPTIONAL,

 supportedBandCombinationList-UplinkTxSwitch-v1720 BandCombinationList-UplinkTxSwitch-v1720 OPTIONAL

 ]],

 [[

 supportedBandCombinationList-UplinkTxSwitch-v18xy BandCombinationList-UplinkTxSwitch-v18xy OPTIONAL

 ]]

}

RF-Parameters-v15g0 ::= SEQUENCE {

 supportedBandCombinationList-v15g0 BandCombinationList-v15g0 OPTIONAL

}

RF-Parameters-v16a0 ::= SEQUENCE {

 supportedBandCombinationList-v16a0 BandCombinationList-v16a0 OPTIONAL,

 supportedBandCombinationList-UplinkTxSwitch-v16a0 BandCombinationList-UplinkTxSwitch-v16a0 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

 ]],

 [[

 asymmetricBandwidthCombinationSet BIT STRING (SIZE (1..32)) OPTIONAL

 ]],

 [[

 -- R1 10: NR-unlicensed

 sharedSpectrumChAccessParamsPerBand-r16 SharedSpectrumChAccessParamsPerBand-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

 oneSlotPeriodicTRS-r16 ENUMERATED {supported} OPTIONAL,

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

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

 simulSRS-MIMO-TransWithinBand-r16 ENUMERATED {n2} 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-v1610 ENUMERATED {pc1dot5} OPTIONAL,

 condHandover-r16 ENUMERATED {supported} OPTIONAL,

 condHandoverFailure-r16 ENUMERATED {supported} OPTIONAL,

 condHandoverTwoTriggerEvents-r16 ENUMERATED {supported} OPTIONAL,

 condPSCellChange-r16 ENUMERATED {supported} OPTIONAL,

 condPSCellChangeTwoTriggerEvents-r16 ENUMERATED {supported} OPTIONAL,

 mpr-PowerBoost-FR2-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 11-9: Multiple active configured grant configurations for a BWP of a serving cell

 activeConfiguredGrant-r16 SEQUENCE {

 maxNumberConfigsPerBWP-r16 ENUMERATED {n1, n2, n4, n8, n12},

 maxNumberConfigsAllCC-r16 INTEGER (2..32)

 } OPTIONAL,

 -- R1 11-9a: Joint release in a DCI for two or more configured grant Type 2 configurations for a given BWP of a serving cell

 jointReleaseConfiguredGrantType2-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 12-2: Multiple SPS configurations

 sps-r16 SEQUENCE {

 maxNumberConfigsPerBWP-r16 INTEGER (1..8),

 maxNumberConfigsAllCC-r16 INTEGER (2..32)

 } OPTIONAL,

 -- R1 12-2a: Joint release in a DCI for two or more SPS configurations for a given BWP of a serving cell

 jointReleaseSPS-r16 ENUMERATED {supported} OPTIONAL,

 -- R1 13-19: Simultaneous positioning SRS and MIMO SRS transmission within a band across multiple CCs

 simulSRS-TransWithinBand-r16 ENUMERATED {n2} OPTIONAL,

 trs-AdditionalBandwidth-r16 ENUMERATED {trs-AddBW-Set1, trs-AddBW-Set2} OPTIONAL,

 handoverIntraF-IAB-r16 ENUMERATED {supported} OPTIONAL

 ]],

 [[

 -- R1 22-5a: Simultaneous transmission of SRS for antenna switching and SRS for CB/NCB /BM for intra-band UL CA

 -- R1 22-5c: Simultaneous transmission of SRS for antenna switching and SRS for antenna switching for intra-band UL CA

 simulTX-SRS-AntSwitchingIntraBandUL-CA-r16 SimulSRS-ForAntennaSwitching-r16 OPTIONAL,

 -- R1 10: NR-unlicensed

 sharedSpectrumChAccessParamsPerBand-v1630 SharedSpectrumChAccessParamsPerBand-v1630 OPTIONAL

 ]],

 [[

 handoverUTRA-FDD-r16 ENUMERATED {supported} OPTIONAL,

 -- R4 7-4: Report the shorter transient capability supported by the UE: 2, 4 or 7us

 enhancedUL-TransientPeriod-r16 ENUMERATED {us2, us4, us7} OPTIONAL,

 sharedSpectrumChAccessParamsPerBand-v1640 SharedSpectrumChAccessParamsPerBand-v1640 OPTIONAL

 ]],

 [[

 type1-PUSCH-RepetitionMultiSlots-v1650 ENUMERATED {supported} OPTIONAL,

 type2-PUSCH-RepetitionMultiSlots-v1650 ENUMERATED {supported} OPTIONAL,

 pusch-RepetitionMultiSlots-v1650 ENUMERATED {supported} OPTIONAL,

 configuredUL-GrantType1-v1650 ENUMERATED {supported} OPTIONAL,

 configuredUL-GrantType2-v1650 ENUMERATED {supported} OPTIONAL,

 sharedSpectrumChAccessParamsPerBand-v1650 SharedSpectrumChAccessParamsPerBand-v1650 OPTIONAL

 ]],

 [[

 enhancedSkipUplinkTxConfigured-v1660 ENUMERATED {supported} OPTIONAL,

 enhancedSkipUplinkTxDynamic-v1660 ENUMERATED {supported} OPTIONAL

 ]],

 [[

 maxUplinkDutyCycle-PC1dot5-MPE-FR1-r16 ENUMERATED {n10, n15, n20, n25, n30, n40, n50, n60, n70, n80, n90, n100} OPTIONAL,

 txDiversity-r16 ENUMERATED {supported} OPTIONAL

 ]],

 [[

 -- R1 36-1: Support of 1024QAM for PDSCH for FR1

 pdsch-1024QAM-FR1-r17 ENUMERATED {supported} OPTIONAL,

 -- R4 22-1 support of FR2 HST operation

 ue-PowerClass-v1700 ENUMERATED {pc5, pc6, pc7} OPTIONAL,

 -- R1 24: NR extension to 71GHz (FR2-2)

 fr2-2-AccessParamsPerBand-r17 FR2-2-AccessParamsPerBand-r17 OPTIONAL,

 rlm-Relaxation-r17 ENUMERATED {supported} OPTIONAL,

 bfd-Relaxation-r17 ENUMERATED {supported} OPTIONAL,

 cg-SDT-r17 ENUMERATED {supported} OPTIONAL,

 locationBasedCondHandover-r17 ENUMERATED {supported} OPTIONAL,

 timeBasedCondHandover-r17 ENUMERATED {supported} OPTIONAL,

 eventA4BasedCondHandover-r17 ENUMERATED {supported} OPTIONAL,

 mn-InitiatedCondPSCellChangeNRDC-r17 ENUMERATED {supported} OPTIONAL,

 sn-InitiatedCondPSCellChangeNRDC-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 29-3a: PDCCH skipping

 pdcch-SkippingWithoutSSSG-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 29-3b: 2 search space sets group switching

 sssg-Switching-1BitInd-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 29-3c: 3 search space sets group switching

 sssg-Switching-2BitInd-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 29-3d: 2 search space sets group switching with PDCCH skipping

 pdcch-SkippingWithSSSG-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 29-3e: Support Search space set group switching capability 2 for FR1

 searchSpaceSetGrp-switchCap2-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 26-1: Uplink Time and Frequency pre-compensation and timing relationship enhancements

 uplinkPreCompensation-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 26-4: UE reporting of information related to TA pre-compensation

 uplink-TA-Reporting-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 26-5: Increasing the number of HARQ processes

 max-HARQ-ProcessNumber-r17 ENUMERATED {u16d32, u32d16, u32d32} OPTIONAL,

 -- R1 26-6: Type-2 HARQ codebook enhancement

 type2-HARQ-Codebook-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 26-6a: Type-1 HARQ codebook enhancement

 type1-HARQ-Codebook-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 26-6b: Type-3 HARQ codebook enhancement

 type3-HARQ-Codebook-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 26-9: UE-specific K\_offset

 ue-specific-K-Offset-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 24-1f: Multiple PDSCH scheduling by single DCI for 120kHz in FR2-1

 multiPDSCH-SingleDCI-FR2-1-SCS-120kHz-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 24-1g: Multiple PUSCH scheduling by single DCI for 120kHz in FR2-1

 multiPUSCH-SingleDCI-FR2-1-SCS-120kHz-r17 ENUMERATED {supported} OPTIONAL,

 -- R4 14-4: Parallel PRS measurements in RRC\_INACTIVE state, FR1/FR2 diff

 parallelPRS-MeasRRC-Inactive-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 27-1-2: Support of UE-TxTEGs for UL TDOA

 nr-UE-TxTEG-ID-MaxSupport-r17 ENUMERATED {n1, n2, n3, n4, n6, n8} OPTIONAL,

 -- R1 27-17: PRS processing in RRC\_INACTIVE

 prs-ProcessingRRC-Inactive-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 27-3-2: DL PRS measurement outside MG and in a PRS processing window

 prs-ProcessingWindowType1A-r17 ENUMERATED {option1, option2, option3} OPTIONAL,

 prs-ProcessingWindowType1B-r17 ENUMERATED {option1, option2, option3} OPTIONAL,

 prs-ProcessingWindowType2-r17 ENUMERATED {option1, option2, option3} OPTIONAL,

 -- R1 27-15: Positioning SRS transmission in RRC\_INACTIVE state for initial UL BWP

 srs-AllPosResourcesRRC-Inactive-r17 SRS-AllPosResourcesRRC-Inactive-r17 OPTIONAL,

 -- R1 27-16: OLPC for positioning SRS in RRC\_INACTIVE state - gNB

 olpc-SRS-PosRRC-Inactive-r17 OLPC-SRS-Pos-r16 OPTIONAL,

 -- R1 27-19: Spatial relation for positioning SRS in RRC\_INACTIVE state - gNB

 spatialRelationsSRS-PosRRC-Inactive-r17 SpatialRelationsSRS-Pos-r16 OPTIONAL,

 -- R1 30-1: Increased maximum number of PUSCH Type A repetitions

 maxNumberPUSCH-TypeA-Repetition-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 30-2: PUSCH Type A repetitions based on available slots

 puschTypeA-RepetitionsAvailSlot-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 30-3: TB processing over multi-slot PUSCH

 tb-ProcessingMultiSlotPUSCH-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 30-3a: Repetition of TB processing over multi-slot PUSCH

 tb-ProcessingRepMultiSlotPUSCH-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 30-4: The maximum duration for DM-RS bundling

 maxDurationDMRS-Bundling-r17 SEQUENCE {

 fdd-r17 ENUMERATED {n4, n8, n16, n32} OPTIONAL,

 tdd-r17 ENUMERATED {n2, n4, n8, n16} OPTIONAL

 } OPTIONAL,

 -- R1 30-6: Repetition of PUSCH transmission scheduled by RAR UL grant and DCI format 0\_0 with CRC scrambled by TC-RNTI

 pusch-RepetitionCRC-r17 ENUMERATED {supported} OPTIONAL,

 sharedSpectrumChAccessParamsPerBand-v1710 SharedSpectrumChAccessParamsPerBand-v1710 OPTIONAL,

 -- R4 25-2: Parallel measurements on cells belonging to a different NGSO satellite than a serving satellite without scheduling restrictions

 -- on normal operations with the serving cell

 parallelMeasurementWithoutRestriction-r17 ENUMERATED {supported} OPTIONAL,

 -- R4 25-5: Parallel measurements on multiple NGSO satellites within a SMTC

 maxNumber-NGSO-SatellitesWithinOneSMTC-r17 ENUMERATED {n1, n2, n3, n4} OPTIONAL,

 -- R1 26-10: K1 range extension

 k1-RangeExtension-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 35-1: Aperiodic CSI-RS for tracking for fast SCell activation

 aperiodicCSI-RS-FastScellActivation-r17 SEQUENCE {

 maxNumberAperiodicCSI-RS-PerCC-r17 ENUMERATED {n8, n16, n32, n48, n64, n128, n255},

 maxNumberAperiodicCSI-RS-AcrossCCs-r17 ENUMERATED {n8, n16, n32, n64, n128, n256, n512, n1024}

 } OPTIONAL,

 -- R1 35-2: Aperiodic CSI-RS bandwidth for tracking for fast SCell activation for 10MHz UE channel bandwidth

 aperiodicCSI-RS-AdditionalBandwidth-r17 ENUMERATED {addBW-Set1, addBW-Set2} OPTIONAL,

 -- R1 28-1a: RRC-configured DL BWP without CD-SSB or NCD-SSB

 bwp-WithoutCD-SSB-OrNCD-SSB-RedCap-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 28-3: Half-duplex FDD operation type A for RedCap UE

 halfDuplexFDD-TypeA-RedCap-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 27-15b: Positioning SRS transmission in RRC\_INACTIVE state configured outside initial UL BWP

 posSRS-RRC-Inactive-OutsideInitialUL-BWP-r17 PosSRS-RRC-Inactive-OutsideInitialUL-BWP-r17 OPTIONAL,

 -- R4 15-3 UE support of CBW for 480kHz SCS

 channelBWs-DL-SCS-480kHz-FR2-2-r17 BIT STRING (SIZE (8)) OPTIONAL,

 channelBWs-UL-SCS-480kHz-FR2-2-r17 BIT STRING (SIZE (8)) OPTIONAL,

 -- R4 15-4 UE support of CBW for 960kHz SCS

 channelBWs-DL-SCS-960kHz-FR2-2-r17 BIT STRING (SIZE (8)) OPTIONAL,

 channelBWs-UL-SCS-960kHz-FR2-2-r17 BIT STRING (SIZE (8)) OPTIONAL,

 -- R4 17-1 UL gap for Tx power management

 ul-GapFR2-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 25-4: One-shot HARQ ACK feedback triggered by DCI format 1\_2

 oneShotHARQ-feedbackTriggeredByDCI-1-2-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 25-5: PHY priority handling for one-shot HARQ ACK feedback

 oneShotHARQ-feedbackPhy-Priority-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 25-6: Enhanced type 3 HARQ-ACK codebook feedback

 enhancedType3-HARQ-CodebookFeedback-r17 SEQUENCE {

 enhancedType3-HARQ-Codebooks-r17 ENUMERATED {n1, n2, n4, n8},

 maxNumberPUCCH-Transmissions-r17 ENUMERATED {n1, n2, n3, n4, n5, n6, n7}

 } OPTIONAL,

 -- R1 25-7: Triggered HARQ-ACK codebook re-transmission

 triggeredHARQ-CodebookRetx-r17 SEQUENCE {

 minHARQ-Retx-Offset-r17 ENUMERATED {n-7, n-5, n-3, n-1, n1},

 maxHARQ-Retx-Offset-r17 ENUMERATED {n4, n6, n8, n10, n12, n14, n16, n18, n20, n22, n24}

 } OPTIONAL

 ]],

 [[

 -- R4 22-2 support of one shot large UL timing adjustment

 ue-OneShotUL-TimingAdj-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 25-2: Repetitions for PUCCH format 0, and 2 over multiple slots with K = 2, 4, 8

 pucch-Repetition-F0-2-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 25-11a: 4-bits subband CQI for NTN and unlicensed

 cqi-4-BitsSubbandNTN-SharedSpectrumChAccess-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 25-16: HARQ-ACK with different priorities multiplexing on a PUCCH/PUSCH

 mux-HARQ-ACK-DiffPriorities-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 25-20a: Propagation delay compensation based on legacy TA procedure for NTN and unlicensed

 ta-BasedPDC-NTN-SharedSpectrumChAccess-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 33-2b: DCI-based enabling/disabling ACK/NACK-based feedback for dynamic scheduling for multicast

 ack-NACK-FeedbackForMulticastWithDCI-Enabler-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 33-2e: Multiple G-RNTIs for group-common PDSCHs

 maxNumberG-RNTI-r17 INTEGER (2..8) OPTIONAL,

 -- R1 33-2f: Dynamic multicast with DCI format 4\_2

 dynamicMulticastDCI-Format4-2-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 33-2i: Supported maximal modulation order for multicast PDSCH

 maxModulationOrderForMulticast-r17 CHOICE {

 fr1-r17 ENUMERATED {qam256, qam1024},

 fr2-r17 ENUMERATED {qam64, qam256}

 } OPTIONAL,

 -- R1 33-3-1: Dynamic Slot-level repetition for group-common PDSCH for TN and licensed

 dynamicSlotRepetitionMulticastTN-NonSharedSpectrumChAccess-r17 ENUMERATED {n8, n16} OPTIONAL,

 -- R1 33-3-1a: Dynamic Slot-level repetition for group-common PDSCH for NTN and unlicensed

 dynamicSlotRepetitionMulticastNTN-SharedSpectrumChAccess-r17 ENUMERATED {n8, n16} OPTIONAL,

 -- R1 33-4-1: DCI-based enabling/disabling NACK-only based feedback for dynamic scheduling for multicast

 nack-OnlyFeedbackForMulticastWithDCI-Enabler-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 33-5-1b: DCI-based enabling/disabling ACK/NACK-based feedback for dynamic scheduling for multicast

 ack-NACK-FeedbackForSPS-MulticastWithDCI-Enabler-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 33-5-1h: Multiple G-CS-RNTIs for SPS group-common PDSCHs

 maxNumberG-CS-RNTI-r17 INTEGER (2..8) OPTIONAL,

 -- R1 33-10: Support group-common PDSCH RE-level rate matching for multicast

 re-LevelRateMatchingForMulticast-r17 ENUMERATED {supported} OPTIONAL,

 -- R1 36-1a: Support of 1024QAM for PDSCH with maximum 2 MIMO layers for FR1

 pdsch-1024QAM-2MIMO-FR1-r17 ENUMERATED {supported} OPTIONAL,

 -- R4 14-3 PRS measurement without MG

 prs-MeasurementWithoutMG-r17 ENUMERATED {cpLength, quarterSymbol, halfSymbol, halfSlot} OPTIONAL,

 -- R4 25-7: The number of target LEO satellites the UE can monitor per carrier

 maxNumber-LEO-SatellitesPerCarrier-r17 INTEGER (3..4) OPTIONAL,

 -- R1 27-3-3 DL PRS Processing Capability outside MG - buffering capability

 prs-ProcessingCapabilityOutsideMGinPPW-r17 SEQUENCE (SIZE(1..3)) OF PRS-ProcessingCapabilityOutsideMGinPPWperType-r17 OPTIONAL,

 -- R1 27-15a: Positioning SRS transmission in RRC\_INACTIVE state for initial UL BWP with semi-persistent SRS

 srs-SemiPersistent-PosResourcesRRC-Inactive-r17 SEQUENCE {

 maxNumOfSemiPersistentSRSposResources-r17 ENUMERATED {n1, n2, n4, n8, n16, n32, n64},

 maxNumOfSemiPersistentSRSposResourcesPerSlot-r17 ENUMERATED {n1, n2, n3, n4, n5, n6, n8, n10, n12, n14}

 } OPTIONAL,

 -- R2: UE support of CBW for 120kHz SCS

 channelBWs-DL-SCS-120kHz-FR2-2-r17 BIT STRING (SIZE (8)) OPTIONAL,

 channelBWs-UL-SCS-120kHz-FR2-2-r17 BIT STRING (SIZE (8)) OPTIONAL

 ]]

}

-- TAG-RF-PARAMETERS-STOP

-- ASN1STOP

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| ***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]. |
| ***supportedBandCombinationListSidelinkEUTRA-NR***A list of band combinations that the UE supports for NR sidelink communication only, for joint NR sidelink communication and V2X sidelink communication, or for V2X sidelink communication only. The UE does not include this field if the UE capability is requested by E-UTRAN (see TS 36.331[10]) and the network request includes the field *eutra-nr-only*. |
| ***supportedBandCombinationListSL-NonRelayDiscovery***A list of band combinations that the UE supports for NR sidelink non-relay discovery. The encoding is defined in PC5 *BandCombinationListSidelinkNR-r16.* |
| ***supportedBandCombinationListSL-RelayDiscovery***A list of band combinations that the UE supports for NR sidelink relay discovery. The encoding is defined in PC5 *BandCombinationListSidelinkNR-r16.* |
| ***supportedBandCombinationList-UplinkTxSwitch***A list of band combinations that the UE supports dynamic uplink Tx switching for NR UL CA and SUL. 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]. |

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| END OF CHANGES |