**3GPP TSG-RAN WG2 Meeting #111 Electronic R2-2008089**

**Electronic, August 17th - 28th, 2020**

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| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **38.331** | **CR** | **1910** | **rev** | **2** | **Current version:** | **16.1.0** |  |
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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:*** | Support of flexible TRS bandwidth sizes | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Huawei, HiSilicon, Ericsson, Vodafone, Nokia, Nokia Shanghai Bell | | | | | | | | | |
| ***Source to TSG:*** | R2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | TEI16 | | | | |  | ***Date:*** | | | 2020-08-06 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F** |  | | | | | ***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 can be 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)* | |
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| ***Reason for change:*** | | In recent meetings, RAN1 discussed the flexibility to operate NR with a number of RBs not corresponding to a nominal channel bandwidth in a spectrum block of 10MHz.  In RAN88e, the following proposals which require RAN2 works were endorsed in [RP-201333] after email discussion:   * *Task RAN1 (cc: RAN2) to define TRS bandwidth sizes of 28, 32, 36, 40, 44, 48 RBs.*   + *All TRS configured for a given BWP with the newly defined TRS bandwidth sizes for a UE span the same set of RBs.*   + *All allocated PDSCH RBs are confined within the bandwidth spanned by TRS + up to 3RBs beyond either/both of the highest RB and lowest RB of the TRS.*   + *Only supported for 10MHz UE channel bandwidth, 52 RB BWP size, and 15kHz SCS, in FDD bands.*   + *Note: No new performance requirement on UE is introduced here.* * *A “per-band” UE capability is to be defined for this optional UE feature, that indicates per band support for one of:*    + *“All newly defined TRS bandwidth sizes”*   + *“All newly defined TRS bandwidth sizes except 28 RB size”*   + *Introduce from Release 16 as part of TEI16* | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Introduce the signalling on the TRS capability for 10MHz UE channel bandwidth, 52 RB BWP size, and 15kHz SCS, in FDD bands.  **Impact analysis**  Impacted 5G architecture options:  (NG)EN-DC, NR SA, NE-DC, NR-DC  Impacted functionality:  TRS  Inter-operability:  1. If the network is implemented according to the CR and the UE is not, there is no compatiblity issues.  2. If the UE is implemented according to the CR and the network is not, there is no compatiblity issues. | | | | | | | | |
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| ***Consequences if not approved:*** | | Only TRS with 52 RBs bandwidth can be configured for 10MHz UE channel bandwidth, 52 RB BWP size, and 15kHz SCS, in FDD bands. | | | | | | | | |
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| ***Clauses affected:*** | | 6.3.3 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | | **X** |  | Other core specifications | | | | 38.306 CR#0391 | | |
| ***affected:*** | |  | **X** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
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| ***This CR's revision history:*** | |  | | | | | | | | |

----------------------------------- [Change Start] -----------------------------------

– *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,

supportedBandCombinationListSidelink-r16 BandCombinationListSidelink-r16 OPTIONAL,

supportedBandCombinationList-UplinkTxSwitch-r16 BandCombinationList-UplinkTxSwitch-r16 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

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-v1610 ENUMERATED {pc1dot5} OPTIONAL

]],

[[

trs-AdditionalBandwidth-r16 ENUMERATED {trs-AddBW-Set1, trs-AddBW-Set2} 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]. |
| ***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]. |

----------------------------------- [Change End] -----------------------------------