**3GPP TSG-RAN WG3 Meeting #117-e R3-225073**

**E-Meeting, 15th – 24th Aug 2022**

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| --- |
| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
|  |
|  | **36.423** | **CR** | **1713** | **rev** |  **2** | **Current version:** | **17.1.0** |  |
|  |
| *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 |  | Radio Access Network | **x** | Core Network |  |

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| --- |
|  |
| ***Title:***  | CR for TS36.423 on Extending NR Operation to 71GHz |
|  |  |
| ***Source to WG:*** | China Telecom,Ericsson |
| ***Source to TSG:*** | RAN3 |
|  |  |
| ***Work item code:*** | NR\_ext\_to\_71GHz-Core |  | ***Date:*** | 2022-08-15 |
|  |  |  |  |  |
| ***Category:*** | **B** |  | ***Release:*** | Rel-17 |
|  | *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 order to support extending NR operation to 71GHz, new subcarrier spacings and transmission bandwidth configuration NRB for FR2-2 had been specified in Rel-17. In TS36.423, the configuration of one NR cell comprises of subcarrier spacings and Transmission bandwidth. Therefore, the new subcarrier spacings configuration and Transmission bandwidth need to be introduced in X2AP to indicate one NR cell in FR2-2. |
|  |  |
| ***Summary of change:*** | * Add SCS 480kHz and 960kHz in NR Transmission Bandwidth and NR Carrier List
* Add more values in transmission bandwidth configuration NRB

Impact assessment towards the previous version of the specification (same release):This CR has an isolated impact towards the previous version of the specification (same release). |
|  |  |
| ***Consequences if not approved:*** | One cell in FR2-2 could not be supported in EN-DC. |
|  |  |
| ***Clauses affected:*** | 9.2.114,9.2.168,9.3.5 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  | TS/TR ... 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:*** | V1: update cover sheetV2: Use the latest CR format |

////////////////////////////////////////////////////////////////////////start of change ////////////////////////////////////////////////////////////////////////

### 9.2.114 NR Transmission Bandwidth

The *NR Transmission Bandwidth* IE is used to indicate the UL or DL transmission bandwidth.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| NR SCS | M |  | ENUMERATED (scs15, scs30, scs60, scs120, …, scs 480, scs 960) | The values scs15, scs30, scs60 , scs120, scs 480,and scs 960 corresponds to the sub carrier spacing in TS 38.104 [37]. |
| NR NRB | M |  | ENUMERATED (nrb11, nrb18, nrb24, nrb25, nrb31, nrb32, nrb38, nrb51, nrb52, nrb65, nrb66, nrb78, nrb79, nrb93, nrb106, nrb107, nrb121, nrb132, nrb133, nrb135, nrb160, nrb162, nrb189, nrb216, nrb217, nrb245, nrb264, nrb270, nrb273, ...,nrb33, nrb62, nrb124, nrb148, nrb248) | This IE is used to indicate the UL or DL transmission bandwidth expressed in units of resource blocks "NRB" (TS 38.104 [37]). The values nrb11, nrb18, etc. correspond to the number of resource blocks "NRB" 11, 18, etc. |

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### 9.2.168 NR Carrier List

This IE indicates the SCS-specific carriers per TDD, per DL, per UL or per SUL of an NR cell.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| **NR Carrier Item** |  | *1..<maxnoofNRSCSs>* |  |  |
| >NR SCS | M |  | ENUMERATED (scs15, scs30, scs60, scs120, …, scs 480, scs 960) | SCS for the corresponding carrier. |
| >Offset to Carrier | M |  | INTEGER (0.. 2199, ...) | Offset in frequency domain between Point A (lowest subcarrier of common RB 0) and the lowest usable subcarrier on this carrier in number of PRBs (using the *NR SCS* IE defined for this carrier). The maximum value corresponds to 275×8−1. See TS 38.211 [42], clause 4.4.2. |
| >Carrier Bandwidth | M |  | INTEGER (1.. maxnoofNRPhysicalResourceBlocks, ...) | Width of this carrier in number of PRBs (using the *NR SCS* IE defined for this carrier). See TS 38.211 [42], clause 4.4.2. |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoofNRSCSs | Maximum no. of SCS-specific carriers per TDD, per DL, per UL or per SUL of an NR cell. Value is 5. |
| maxnoofNRPhysicalResourceBlocks | Maximum no. of Physical Resource Blocks of an NR Cell. Value is 275. |

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### 9.3.5 Information Element definitions

-- ASN1START

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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-- Information Element Definitions

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-- N

NBIoT-UL-DL-AlignmentOffset ::= ENUMERATED {

 khz-7dot5,

 khz0,

 khz7dot5,

 ...

}

NBIoT-RLF-Report-Container ::= OCTET STRING

Neighbour-Information ::= SEQUENCE (SIZE (0..maxnoofNeighbours)) OF SEQUENCE {

 eCGI ECGI,

 pCI PCI,

 eARFCN EARFCN,

 iE-Extensions ProtocolExtensionContainer { {Neighbour-Information-ExtIEs} } OPTIONAL,

 ...

}

Neighbour-Information-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

 { ID id-NeighbourTAC CRITICALITY ignore EXTENSION TAC PRESENCE optional}|

 { ID id-eARFCNExtension CRITICALITY reject EXTENSION EARFCNExtension PRESENCE optional},

 ...

}

NextHopChainingCount ::= INTEGER (0..7)

NewDRBIDrequest::= ENUMERATED {true, ...}

Number-of-Antennaports ::= ENUMERATED {

 an1,

 an2,

 an4,

 ...

}

NRCapacityValue ::= SEQUENCE {

 capacityValue INTEGER (0..100),

 ssbAreaCapacityValue-List SSBAreaCapacityValue-List OPTIONAL,

 iE-Extensions ProtocolExtensionContainer { { NRCapacityValue-ExtIEs} } OPTIONAL,

 ...

}

NRCapacityValue-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

 ...

}

NRCarrierList ::= SEQUENCE (SIZE(1..maxnoofNRSCSs)) OF NRCarrierItem

NRCarrierItem ::= SEQUENCE {

 carrierSCS NRSCS,

 offsetToCarrier INTEGER (0..2199, ...),

 carrierBandwidth INTEGER (0..maxnoofNRPhysicalResourceBlocks, ...),

 iE-Extension ProtocolExtensionContainer { {NRCarrierItem-ExtIEs} } OPTIONAL,

 ...

}

NRCarrierItem-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

 ...

}

NRCellCapacityClassValue ::= INTEGER (1..100, ...)

NRCellPRACHConfig ::= OCTET STRING

NRCompositeAvailableCapacityGroup ::= SEQUENCE {

 compositeAvailableCapacityDL NRCompositeAvailableCapacity,

 compositeAvailableCapacityUL NRCompositeAvailableCapacity,

 iE-Extensions ProtocolExtensionContainer { {NRCompositeAvailableCapacityGroup-ExtIEs} } OPTIONAL,

 ...

}

NRCompositeAvailableCapacityGroup-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

 ...

}

NRCompositeAvailableCapacity ::= SEQUENCE {

 cellCapacityClassValue NRCellCapacityClassValue OPTIONAL,

 capacityValue NRCapacityValue,

 iE-Extensions ProtocolExtensionContainer { {NRCompositeAvailableCapacity-ExtIEs} } OPTIONAL,

 ...

}

NRCompositeAvailableCapacity-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

 ...

}

NRFreqInfo ::= SEQUENCE{

 nRARFCN INTEGER (0.. 3279165),

 freqBandListNr SEQUENCE (SIZE(1..maxnoofNrCellBands)) OF FreqBandNrItem,

 sULInformation SULInformation OPTIONAL,

 iE-Extensions ProtocolExtensionContainer { {NRFreqInfo-ExtIEs} } OPTIONAL,

 ...

}

NRFreqInfo-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

 { ID id-FrequencyShift7p5khz CRITICALITY ignore EXTENSION FrequencyShift7p5khz PRESENCE optional},

 ...

}

NRCellIdentifier ::= BIT STRING (SIZE (36))

NRCGI ::= SEQUENCE {

 pLMN-Identity PLMN-Identity,

 nRcellIdentifier NRCellIdentifier,

 iE-Extensions ProtocolExtensionContainer { {NRCGI-ExtIEs} } OPTIONAL,

 ...

}

NRCGI-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

 ...

}

NRRACHReportContainer ::= OCTET STRING

NRRACHReportInformation ::= SEQUENCE (SIZE(1.. maxnoofRACHReports)) OF NRRACHReportList-Item

NRRACHReportList-Item ::= SEQUENCE {

 nRRACHReport NRRACHReportContainer,

 uEAssitantIdentifier SgNB-UE-X2AP-ID OPTIONAL,

 iE-Extensions ProtocolExtensionContainer { { NRRACHReportList-Item-ExtIEs} } OPTIONAL,

 ...

}

NRRACHReportList-Item-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

 ...

}

NRNeighbour-Information ::= SEQUENCE (SIZE (1.. maxofNRNeighbours))OF SEQUENCE {

 nrpCI NRPCI,

 nrCellID NRCGI,

 fiveGS-TAC FiveGS-TAC OPTIONAL,

 configured-TAC TAC OPTIONAL,

 measurementTimingConfiguration OCTET STRING,

 nRNeighbourModeInfo CHOICE {

 fdd FDD-InfoNeighbourServedNRCell-Information,

 tdd TDD-InfoNeighbourServedNRCell-Information,

 ...

 },

 iE-Extensions ProtocolExtensionContainer { {NRNeighbour-Information-ExtIEs} } OPTIONAL,

 ...

}

NRNeighbour-Information-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

 {ID id-CSI-RSTransmissionIndication CRITICALITY ignore EXTENSION CSI-RSTransmissionIndication PRESENCE optional}|

 {ID id-SSB-PositionsInBurst CRITICALITY ignore EXTENSION SSB-PositionsInBurst PRESENCE optional}|

 {ID id-NRCellPRACHConfig CRITICALITY ignore EXTENSION NRCellPRACHConfig PRESENCE optional}|

 {ID id-Additional-Measurement-Timing-Configuration-List CRITICALITY ignore EXTENSION Additional-Measurement-Timing-Configuration-List PRESENCE optional },

 ...

}

NPRACHConfiguration::= SEQUENCE {

 fdd-or-tdd CHOICE {

 fdd NPRACHConfiguration-FDD,

 tdd NPRACHConfiguration-TDD,

 ...

 }, iE-Extensions ProtocolExtensionContainer { { NPRACHConfiguration-ExtIEs} } OPTIONAL,

...

}

NPRACHConfiguration-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

 ...

}

NPRACHConfiguration-FDD::= SEQUENCE {

 nprach-CP-length NPRACH-CP-Length,

 anchorCarrier-NPRACHConfig OCTET STRING,

 anchorCarrier-EDT-NPRACHConfig OCTET STRING OPTIONAL,

 anchorCarrier-Format2-NPRACHConfig OCTET STRING OPTIONAL,

 anchorCarrier-Format2-EDT-NPRACHConfig OCTET STRING OPTIONAL,

 non-anchorCarrier-NPRACHConfig OCTET STRING OPTIONAL,

 non-anchorCarrier-Format2-NPRACHConfig OCTET STRING OPTIONAL,

 iE-Extensions ProtocolExtensionContainer { { NPRACHConfiguration-FDD-ExtIEs} } OPTIONAL,

...

}

NPRACHConfiguration-FDD-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

 ...

}

NPRACHConfiguration-TDD::= SEQUENCE {

 nprach-preambleFormat NPRACH-preambleFormat,

 anchorCarrier-NPRACHConfigTDD OCTET STRING,

 non-anchorCarrierFequencyConfiglist Non-AnchorCarrierFrequencylist OPTIONAL,

 non-anchorCarrier-NPRACHConfigTDD OCTET STRING OPTIONAL,

 iE-Extensions ProtocolExtensionContainer { { NPRACHConfiguration-TDD-ExtIEs} } OPTIONAL,

...

}

NPRACHConfiguration-TDD-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

 ...

}

NPRACH-CP-Length::= ENUMERATED {

 us66dot7,

 us266dot7,

 ...

}

NPRACH-preambleFormat::= ENUMERATED {fmt0,fmt1,fmt2,fmt0a,fmt1a,...}

Non-AnchorCarrierFrequencylist ::= SEQUENCE (SIZE(1..maxnoofNonAnchorCarrierFreqConfig)) OF

 SEQUENCE {

 non-anchorCarrioerFrquency OCTET STRING,

 iE-Extensions ProtocolExtensionContainer { { Non-AnchorCarrierFrequencylist-ExtIEs} } OPTIONAL,

 ...

 }

Non-AnchorCarrierFrequencylist-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

 ...

}

NRPCI ::= INTEGER (0..1007)

NRrestrictioninEPSasSecondaryRAT ::= ENUMERATED {

 nRrestrictedinEPSasSecondaryRAT,

 ...

}

MeasurementResultforNRCellsPossiblyAggregated ::= SEQUENCE (SIZE(1.. maxnoofReportedNRCellsPossiblyAggregated)) OF MeasurementResultforNRCellsPossiblyAggregated-Item

MeasurementResultforNRCellsPossiblyAggregated-Item ::= SEQUENCE {

 cellID NRCGI,

 nrCompositeAvailableCapacityGroup NRCompositeAvailableCapacityGroup OPTIONAL,

 iE-Extension ProtocolExtensionContainer { { MeasurementResultforNRCellsPossiblyAggregated-Item-ExtIEs} } OPTIONAL,

 ...

}

MeasurementResultforNRCellsPossiblyAggregated-Item-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

 ...

}

NRRadioResourceStatus ::= SEQUENCE {

 ssbAreaRadioResourceStatus-List SSBAreaRadioResourceStatus-List,

 iE-Extensions ProtocolExtensionContainer { {NRRadioResourceStatus-ExtIEs} } OPTIONAL,

 ...

}

NRRadioResourceStatus-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

 { ID id-MIMOPRBusageInformation CRITICALITY ignore EXTENSION MIMOPRBusageInformation PRESENCE optional },

 ...

}

MIMOPRBusageInformation ::= SEQUENCE {

dl-GBR-PRB-usage-for-MIMO DL-GBR-PRB-usage-for-MIMO,

 ul-GBR-PRB-usage-for-MIMO UL-GBR-PRB-usage-for-MIMO,

 dl-non-GBR-PRB-usage-for-MIMO DL-non-GBR-PRB-usage-for-MIMO,

 ul-non-GBR-PRB-usage-for-MIMO UL-non-GBR-PRB-usage-for-MIMO,

 dl-Total-PRB-usage-for-MIMO DL-Total-PRB-usage-for-MIMO,

 ul-Total-PRB-usage-for-MIMO UL-Total-PRB-usage-for-MIMO,

 iE-Extensions ProtocolExtensionContainer { { MIMOPRBusageInformation-ExtIEs} } OPTIONAL,

 ...

}

MIMOPRBusageInformation-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

 ...

}

NRrestrictionin5GS ::= ENUMERATED {

 nRrestrictedin5GS,

 ...

}

NRencryptionAlgorithms ::= BIT STRING (SIZE (16,...))

NRintegrityProtectionAlgorithms ::= BIT STRING (SIZE (16,...))

NR-TxBW ::= SEQUENCE {

 nRSCS NRSCS,

 nRNRB NRNRB,

 iE-Extensions ProtocolExtensionContainer { {NR-TxBW-ExtIEs} } OPTIONAL,

 ...

}

NR-TxBW-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

 ...

}

NRNRB ::= ENUMERATED { nrb11, nrb18, nrb24, nrb25, nrb31, nrb32, nrb38, nrb51, nrb52, nrb65, nrb66, nrb78, nrb79, nrb93, nrb106, nrb107, nrb121, nrb132, nrb133, nrb135, nrb160, nrb162, nrb189, nrb216, nrb217, nrb245, nrb264, nrb270, nrb273, ..., nrb33, nrb62, nrb124, nrb148, nrb248}

NRSCS ::= ENUMERATED { scs15, scs30, scs60, scs120, ..., scs480,scs960}

NRS-NSSS-PowerOffset ::= ENUMERATED { minusThree, zero, three, ...}

////////////////////////////////////////////////////////////////////////end of change////////////////////////////////////////////////////////////////////////