**3GPP TSG-RAN WG3 Meeting # 116-e *draft***

**Online, May 9th 2022 - May 19th 2022**

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.423** | **CR** | **0813** | **rev** | **1** | **Current version:** | **17.0.0** |  |
|  | | | | | | | | |
| *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 |  | Radio Access Network | **X** | Core Network |  |

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| ***Title:*** | XnAP corrections for NR-U | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Ericsson, Deutsche Telekom, Qualcomm Incorporated | | | | | | | | | |
| ***Source to TSG:*** | RAN3 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_ENDC\_SON\_MDT\_enh | | | | |  | ***Date:*** | | | 2022-05-16 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F** |  | | | | | ***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 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-15 (Release 15) Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | The name of *Channel occupancy time percentage* IE does not indicate that the IE is associated to DL.  The semantic description of *Channel occupancy time percentage* IE does not clearly indicate that the IE is associated to one NR-U Channel.  ASN.1 encoding for *Channel occupancy time percentage* IE is not aligned with tabular (0 value missing)  The semantic description for *NR-U ARFCN* IE can be clarified with relevant references. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | The *Channel occupancy time percentage* IE is renamed as *Channel occupancy time percentage DL*, and it is clarified that the IE is associated to one NR-U Channel. ASN.1 encoding is aligned to tabular (0 value added).  The semantic description for *NR-U ARFCN* IE is improved with references to tables in TS 38.101-1 containing allowed values for NR-U ARFCN.  Impact Analysis  The CR has limited impacts the previous version of the specification, with BC ASN.1 changes. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | The *Channel occupancy time percentage* and *NR-U ARFCN* IEs lack clarity. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 2, 9.1.3.21, 9.2.2.11 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | |  | | |
| ***affected:*** | |  | **X** | Test specifications | | | |  | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | |  | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

----------------------------------------------- Start of Changes ---------------------------------------------------------

# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

*(text unchanged skipped)*

[49] 3GPP TS 38.455: "NG-RAN; NR Positioning Protocol A (NRPPa)".

[50] 3GPP TS 29.571: "5G System; Common Data Types for Service Based Interfaces; Stage 3".

[51] 3GPP TS 37.213: "NR; Physical layer procedures for shared spectrum channel access".

[52] 3GPP TS 38.101-1: "NR; User Equipment (UE) radio transmission and reception; Part 1: Range 1 Standalone".

----------------------------------------------- Next Change ---------------------------------------------------------

#### 9.1.3.21 RESOURCE STATUS UPDATE

This message is sent by NG-RAN node2 to NG-RAN node1 to report the results of the requested measurements.

Direction: NG-RAN node2 → NG-RAN node1.

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| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M |  | 9.2.3.1 |  | YES | ignore |
| NG-RAN node1 Measurement ID | M |  | INTEGER (1..4095,...) | Allocated by NG-RAN node1 | YES | reject |
| NG-RAN node2 Measurement ID | M |  | INTEGER (1..4095,...) | Allocated by NG-RAN node2 | YES | reject |
| **Cell Measurement Result** |  | *1* |  |  | YES | ignore |
| **>Cell Measurement Result Item** |  | *1 .. < maxnoofCellsinNG-RANnode >* |  |  | YES | ignore |
| >>Cell ID | M |  | Global NG-RAN Cell Identity  9.2.2.27 |  | – |  |
| >>Radio Resource Status | O |  | 9.2.2.50 |  | – |  |
| >>TNL Capacity Indicator | O |  | 9.2.2.49 |  | – |  |
| >>Composite Available Capacity Group | O |  | 9.2.2.51 |  | – |  |
| >>Slice Available Capacity | O |  | 9.2.2.55 |  | – |  |
| >>Number of Active UEs | O |  | 9.2.2.62 |  | –- |  |
| >>RRC Connections | O |  | 9.2.2.56 |  | – |  |
| **>>NR-U Channel List** |  | *0..1* |  |  | YES | ignore |
| **>>>NR-U Channel Item** |  | *1..<maxnoofNR-UChannelIDs>* |  |  | – |  |
| >>>>NR-U Channel ID | M |  | INTEGER (1.. *maxnoofNR-UChannelIDs*, …) | The NR-U channel utilised in the last reporting period | – |  |
| >>>>Channel occupancy time percentage DL | M |  | INTEGER (0..100) | The percentage of time for which the channel resources have been utilised for DL traffic served by the corresponding NR-U Channel. Value 100 corresponds to the duration between consecutive reporting. | – |  |
| >>>>Energy Detection Threshold | M |  | INTEGER (-100..-50,…) | Average ED Threshold used for DL channel sensing. Value is in dBm. | – |  |

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| Range bound | Explanation |
| maxnoofCellsinNG-RANnode | Maximum no. cells that can be served by a NG-RAN node. Value is 16384. |
| maxnoofNR-UChannelIDs | Maximum no. NR-U channel IDs in a cell. Value is 4. |

----------------------------------------------- Next Change ---------------------------------------------------------

#### 9.2.2.11 Served Cell Information NR

This IE contains cell configuration information of an NR cell that a neighbouring NG-RAN node may need for the Xn AP interface.

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| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| NR-PCI | M |  | INTEGER (0..1007, …) | NR Physical Cell ID | – |  |
| NR CGI | M |  | 9.2.2.7 |  | – |  |
| TAC | M |  | 9.2.2.5 | Tracking Area Code | – |  |
| RANAC | O |  | RAN Area Code  9.2.2.6 |  | – |  |
| **Broadcast PLMNs** |  | *1..<maxnoofBPLMNs>* |  | Broadcast PLMNs in SIB1 associated to the NR Cell Identity in the *NR CGI* IE. | – |  |
| >PLMN Identity | M |  | 9.2.2.4 |  | – |  |
| CHOICE *NR-Mode-Info* | M |  |  |  | – |  |
| >*FDD* |  |  |  |  |  |  |
| >>**FDD Info** |  | *1* |  |  | – |  |
| >>>UL NR Frequency Info | M |  | NR Frequency Info  9.2.2.19 | This IE is ignored for NR operating bands for which uplink range of NREF is not defined in section 5.4.2.3 of TS 38.104 [24]. | – |  |
| >>>DL NR Frequency Info | M |  | NR Frequency Info  9.2.2.19 |  | – |  |
| >>>UL Transmission Bandwidth | M |  | NR Transmission Bandwidth  9.2.2.20 | This IE is ignored for NR operating bands for which uplink range of NREF is not defined in section 5.4.2.3 of TS 38.104 [24]. | – |  |
| >>>DL Transmission Bandwidth | M |  | NR Transmission Bandwidth  9.2.2.20 |  | – |  |
| >>>UL Carrier List | O |  | NR Carrier List  9.2.2.63 | If included, the *UL Transmission Bandwidth* IE shall be ignored. | YES | ignore |
| >>>DL Carrier List | O |  | NR Carrier List  9.2.2.63 | If included, the *DL Transmission Bandwidth* IE shall be ignored. | YES | ignore |
| >>>gNB-DU Cell Resource Configuration-FDD-UL | O |  | gNB-DU Cell Resource Configuration  9.2.2.95 | Contains FDD UL resource configuration of gNB-DU’s cell. Only applicable if the gNB-DU is an IAB-DU or an IAB-donor-DU. | YES | ignore |
| >>>gNB-DU Cell Resource Configuration-FDD-DL | O |  | gNB-DU Cell Resource Configuration  9.2.2.95 | Contains FDD UL resource configuration of gNB-DU’s cell. Only applicable if the gNB-DU is an IAB-DU or an IAB-donor-DU. | YES | ignore |
| >*TDD* |  |  |  |  |  |  |
| >>**TDD Info** |  | *1* |  |  | – |  |
| >>>Frequency Info | M |  | NR Frequency Info  9.2.2.19 |  | – |  |
| >>>Transmission Bandwidth | M |  | NR Transmission Bandwidth  9.2.2.20 |  | – |  |
| >>>Intended TDD DL-UL Configuration NR | O |  | 9.2.2.40 |  | YES | ignore |
| >>>TDD UL-DL Configuration Common NR | O |  | OCTET STRING | The *tdd-UL-DL-ConfigurationCommon* as defined in TS 38.331 [10] | YES | ignore |
| >>>Carrier List | O |  | NR Carrier List  9.2.2.63 | If included, the *Transmission Bandwidth* IE shall be ignored. | YES | ignore |
| >>>gNB-DU Cell Resource Configuration-TDD | O |  | gNB-DU Cell Resource Configuration  9.2.2.95 | Contains FDD UL resource configuration of gNB-DU’s cell. Only applicable if the gNB-DU is an IAB-DU or an IAB-donor-DU. | YES | ignore |
| Measurement Timing Configuration | M |  | OCTET STRING | Contains the *MeasurementTimingConfiguration* inter-node message for the served cell, as defined in TS 38.331 [10]. | – |  |
| Connectivity Support | M |  | 9.2.2.28 |  | – |  |
| **Broadcast PLMN Identity Info List NR** |  | *0..<maxnoofBPLMNs>* |  | This IE corresponds to the *PLMN-IdentityInfoList* IE and the *NPN-IdentityInfoList* IE (if available) in *SIB1* as specified in TS 38.331 [10]. All PLMN Identities and associated information contained in the *PLMN-IdentityInfoList* IE and NPN identities and associated information contained in the *NPN-IdentityInfoList* IE (if available) are included and provided in the same order as broadcast in SIB1.  NOTE: In case of NPN-only cell, the PLMN Identities and associated information contained in the *PLMN-IdentityInfoList* IE are not included. | YES | ignore |
| **>Broadcast PLMNs** |  | *1..<maxnoofBPLMNs>* |  | Broadcast PLMNs in SIB1 associated to the *NR Cell Identity* IE. | – |  |
| >>PLMN Identity | M |  | 9.2.2.4 |  | – |  |
| >TAC | M |  | 9.2.2.5 |  | – |  |
| >NR Cell Identity | M |  | BIT STRING (SIZE(36)) |  | – |  |
| >RANAC | O |  | RAN Area Code  9.2.2.6 |  | – |  |
| >Configured TAC Indication | O |  | 9.2.2.39a | NOTE: This IE is associated with the TAC in the *Broadcast PLMN Identity Info List NR* IE | YES | ignore |
| >NPN Broadcast Information | O |  | 9.2.2.71 | If this IE is included the content of the *Broadcast PLMNs* IE in the *Broadcast PLMN Identity Info List NR* IE is ignored. | YES | reject |
| Configured TAC Indication | O |  | 9.2.2.39a | NOTE: This IE is associated with the TAC on top-level of the *Served Cell Information NR* IE | YES | ignore |
| NPN Broadcast Information | O |  | 9.2.2.71 | If this IE is included the content of the *Broadcast PLMNs* IE in the top *Served Cell Information NR* IE is ignored. | YES | reject |
| SSB Positions In Burst | O |  | 9.2.2.64 |  | YES | ignore |
| NR Cell PRACH Configuration | O |  | OCTET STRING | Containing 9.3.1.139 NR Cell PRACH Configuration as of TS 38.473 [41]. | YES | ignore |
| CSI-RS Transmission Indication | O |  | ENUMERATED (activated, deactivated, ...) | This IE indicates the CSI-RS transmission status of the given cell.  If the *Additional Measurement Timing Configuration List* IE is present, this IE is ignored. | YES | ignore |
| SFN Offset | O |  | 9.2.2.75 |  | YES | Ignore |
| **Supported MBS FSA ID List** |  | *0..<maxnoofMBSFSAs>* |  | Shall contain all MBS Frequency Selection Area Identities associated with the NR CGI. | YES | ignore |
| >MBS Frequency Selection Area Identity | M |  | OCTET STRING(3) |  | – |  |
| **NR-U Channel Info List** |  | *0..1* |  |  | YES | ignore |
| **>NR-U Channel Info Item** |  | *1..<maxnoofNR-UChannelIDs>* |  |  | – |  |
| >>NR-U Channel ID | M |  | INTEGER (1.. maxnoofNR-UChannelIDs, …) | Index to uniquely identify the part of the NR-U Channel Bandwidth consisting of a contiguous set of resource blocks (RBs) on which a channel access procedure is performed in shared spectrum.  Value 1 represents the first part of the NR-U Channel Bandwidth on which a channel access procedure is performed. Value 2 represents the second part of the NR-U Channel Bandwidth on which a channel access procedure is performed, and so on. | – |  |
| >>NR ARFCN | M |  | INTEGER (0.. maxNRARFCN) | It represents the centre frequency of the NR-U Channel Bandwidth for NR bands restricted to operation with shared spectrum channel access, as defined in TS 37.213 [51]. Allowed values are specified in TS 38.101-1 [52] in Table 5.4.2.3-2, Table 5.4.2.3-3 and Table 5.4.2.3-4. | – |  |
| >>Bandwidth | M |  | ENUMERATED (10MHz, 20MHz, 40MHz, 60MHz, 80MHz, …) |  | – |  |
| **Additional Measurement Timing Configuration List** | O | *1 .. <maxnoofMTCItems>* |  |  | YES | Ignore |
| >Measurement Timing Configuration Index | M |  | INTEGER (0..16) | “0” refers to the configuration contained in the Measurement Timing Configuration IE.  Any value between “1” and “16” refers to a configuration within the *Additional Measurement Timing Configuration List* IE. | – |  |
| >**CSI- RS MTC Configuration List** | M | 1 .. <*maxnoofCSIRSconfigurations*> |  | This list explicitly expresses the CSI-RS configurations contained in the MTC | – |  |
| >>CSI-RS Index | M |  | INTEGER (0..95) | Index of CSI-RS as in MTC | – |  |
| >>CSI-RS Status | M |  | ENUMERATED (activated, deactivated, …) | This IE indicates the CSI-RS transmission status of the configuration. | – |  |
| >>**CSI-RS Neighbour List** | O | 1 .. <*maxnoofCSIRSneighbourCells*> |  | This list expresses the cells and CSI-RSs neighbouring the CSI-RS in the *CSI-RS Index* IE. | – |  |
| >>>NR CGI | M |  | 9.2.2.7 |  | – |  |
| >>>**CSI-RS MTC Neighbour List** | O | 1 .. < *maxnoofCSIRSneighbourCellsInMT*C> |  | This list expresses the CSI-RSs served by the NR CGI, which are neighbouring the CSI-RS of the served cell and contained in the MTC indicated by the neighbouring NR cell. | – |  |
| >>>>CSI-RS Index | M |  | INTEGER (0..95) |  | – |  |
| RedCap Broadcast Information | O |  | BIT STRING (SIZE(8)) | The presence of this IE indicates that the *intraFreqReselectionRedC*ap IE is broadcast in SIB1 of the corresponding cell, see TS 38.331 [10].  Each position in the bitmap indicates which RedCap UEs are allowed access, according to the setting of RedCap barring indicators in SIB1, see TS 38.331 [10].  First bit = 1Rx,  second bit = 2Rx,  other bits reserved for future use. Value '1' indicates 'access allowed'. Value '0' indicates 'access not allowed”. | YES | ignore |

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| Range bound | Explanation |
| maxnoofBPLMNs | Maximum no. of broadcast PLMNs by a cell. Value is 12. |
| maxnoofMBSFSAs | Maximum no. of MBS FSAs by one gNB. Value is 256. |
| maxnoofNR-UChannelIDs | Maximum no. NR-U channel IDs in a cell. Value is 4. |
| maxnoofMTCItems | Maximum no. of measurement timing configurations associated with the neighbour cell. Value is 16. |
| maxnoofCSIRSconfigurations | Maximum number of CSI RS configurations reported in the MTC. Value is 96 |
| maxnoofCSIRSneighbourCells | Maximum number of cells neighbouring a CSI-RS coverage area. Value is 16 |
| maxnoofCSIRSneighbourCellsInMTC | Maximum number of CSI-RS coverage areas neighbouring a specific CSI-RS coverage area. Value is 16 |

----------------------------------------------- Start of ASN.1 Changes ---------------------------------------------------------

NR-U-Channel-List ::= SEQUENCE (SIZE (1..maxnoofNR-UChannelIDs)) OF NR-U-Channel-Item

NR-U-Channel-Item ::= SEQUENCE {

nR-U-ChannelID NR-U-ChannelID,

channelOccupancyTimePercentageDL ChannelOccupancyTimePercentage,

energyDetectionThreshold EnergyDetectionThreshold,

iE-Extension ProtocolExtensionContainer { {NR-U-Channel-Item-ExtIEs} } OPTIONAL,

...

}

NR-U-Channel-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {

...

}

NR-U-ChannelID ::= INTEGER (1..maxnoofNR-UChannelIDs, ...)

ChannelOccupancyTimePercentage ::= INTEGER (0..100,...)  
EnergyDetectionThreshold ::= INTEGER (-100..-50, ...)

----------------------------------------------- End of Changes ---------------------------------------------------------