**3GPP TSG-RAN WG2 Meeting #112 electronic R2-2011236**

**Electronic Meeting, Nov 2-13, 2020**

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| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
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|  | **38.331** | **CR** | **2275** | **rev** | **2** | **Current version:** | **16.2.0** |  |
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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:***  | On number for supported CORESETs |
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| ***Source to WG:*** | Ericsson |
| ***Source to TSG:*** | R2 |
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| ***Work item code:*** | NR\_newRAT-Core, NR\_eMIMO-Core |  | ***Date:*** | 2020-10-22 |
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| ***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 canbe found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)Rel-12 (Release 12)**Rel-13 (Release 13)Rel-14 (Release 14)Rel-15 (Release 15)Rel-16 (Release 16)* |
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| ***Reason for change:*** | Currently in 38.331 has limitation on the number of CORESETs in the configuration and in the UE capabilities, with a lower limitation in the configuration than the maximum value in the UE capabilities in maxNumberCORESET-r16 in multiDCI-MultiTRP-r16, which makes these values useless. |
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| ***Summary of change:*** | Update the field description of *ControlResourceSetId* and *controlResourceSetToAddModList, controlResourceSetToAddModList2.* The limitation on number of CORESETs to be configured is removed and reference to TS 38.213 is added, where limitations are correctly captured.**Impact analysis**.Impacted 5G architecture options:NR SA, NR-DC, NE-DC, EN-DCImpacted functionality:MIMOInter-operability:1. If the network is implemented according to the CR and the UE is not, the UE strictly following the field description may reject a supported configuration according to its capabilities..
2. If the UE is implemented according to the CR and the network is not, the network may configure less CORESETs that the UE is actually capable for and hence performance may be limited.
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| ***Consequences if not approved:*** | Number of CORESETs per BWP that can be configured is lower than the maximum number that can be signalled by the UE capability, unnecessarily limiting performance. |
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| ***Clauses affected:*** | 6.3.2 |
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|  | **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 ...  |
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| ***Other comments:*** |  |
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| ***This CR's revision history:*** |   |

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| The first of change |

#### – *ControlResourceSetId*

The *ControlResourceSetId* IE concerns a short identity, used to identify a control resource set within a serving cell. The *ControlResourceSetId* = 0 identifies the ControlResourceSet#0 configured via PBCH (*MIB*) and in *controlResourceSetZero* (*ServingCellConfigCommon*). The ID space is used across the BWPs of a Serving Cell.

– *PDCCH-Config*

The IE *PDCCH-Config* is used to configure UE specific PDCCH parameters such as control resource sets (CORESET), search spaces and additional parameters for acquiring the PDCCH. If this IE is used for the scheduled cell in case of cross carrier scheduling, the fields other than *searchSpacesToAddModList* and *searchSpacesToReleaseList* are absent. If the IE is used for a dormant BWP, the fields other than *controlResourceSetToAddModList* and *controlResourceSetToReleaseList* are absent.

***PDCCH-Config* information element**

-- ASN1START

-- TAG-PDCCH-CONFIG-START

PDCCH-Config ::= SEQUENCE {

 controlResourceSetToAddModList SEQUENCE(SIZE (1..3)) OF ControlResourceSet OPTIONAL, -- Need N

 controlResourceSetToReleaseList SEQUENCE(SIZE (1..3)) OF ControlResourceSetId OPTIONAL, -- Need N

 searchSpacesToAddModList SEQUENCE(SIZE (1..10)) OF SearchSpace OPTIONAL, -- Need N

 searchSpacesToReleaseList SEQUENCE(SIZE (1..10)) OF SearchSpaceId OPTIONAL, -- Need N

 downlinkPreemption SetupRelease { DownlinkPreemption } OPTIONAL, -- Need M

 tpc-PUSCH SetupRelease { PUSCH-TPC-CommandConfig } OPTIONAL, -- Need M

 tpc-PUCCH SetupRelease { PUCCH-TPC-CommandConfig } OPTIONAL, -- Need M

 tpc-SRS SetupRelease { SRS-TPC-CommandConfig} OPTIONAL, -- Need M

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 controlResourceSetToAddModList2-r16 SEQUENCE (SIZE (1..2)) OF ControlResourceSet OPTIONAL, -- Need N

 controlResourceSetToReleaseList-r16 SEQUENCE (SIZE (1..5)) OF ControlResourceSetId-r16 OPTIONAL, -- Need N

 searchSpacesToAddModListExt-r16 SEQUENCE(SIZE (1..10)) OF SearchSpaceExt-r16 OPTIONAL, -- Need N

 uplinkCancellation-r16 SetupRelease { UplinkCancellation-r16 } OPTIONAL, -- Need M

 monitoringCapabilityConfig-r16 ENUMERATED { r15monitoringcapability,r16monitoringcapability } OPTIONAL, -- Need M

 searchSpaceSwitchConfig-r16 SearchSpaceSwitchConfig-r16 OPTIONAL -- Need R

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}

SearchSpaceSwitchConfig-r16 ::= SEQUENCE {

 cellGroupsForSwitchList-r16 SEQUENCE(SIZE (1..4)) OF CellGroupForSwitch-r16 OPTIONAL, -- Need R

 searchSpaceSwitchDelay-r16 INTEGER (10..52) OPTIONAL -- Need R

}

CellGroupForSwitch-r16 ::= SEQUENCE(SIZE (1..16)) OF ServCellIndex

-- TAG-PDCCH-CONFIG-STOP

-- ASN1STOP

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| ***PDCCH-Config* field descriptions** |
| ***controlResourceSetToAddModList, controlResourceSetToAddModList2***List of UE specifically configured Control Resource Sets (CORESETs) to be used by the UE. The network restrictions on configuration of CORESETs per DL BWP are specified in TS 38.213 section 10.1 and TS 38.306.The UE shall consider entries in *controlResourceSetToAddModList* and in *controlResourceSetToAddModList2* as a single list, i.e. an entry created using *controlResourceSetToAddModList* can be modifed using *controlResourceSetToAddModList2* and vice-versa. In case network reconfigures control resource set with the same *ControlResourceSetId* as used for *commonControlResourceSet* configured via *PDCCH-ConfigCommon*, the configuration from *PDCCH-Config* always takes precedence and should not be updated by the UE based on *servingCellConfigCommon*. |
| ***controlResourceSetToReleaseList***List of UE specifically configured Control Resource Sets (CORESETs) to be released by the UE. This field only applies to CORESETs configured by *controlResourceSetToAddModList* and does not release the field *commonControlResourceSet* configured by *PDCCH-ConfigCommon*. |
| ***downlinkPreemption***Configuration of downlink preemption indications to be monitored in this cell (see TS 38.213 [13], clause 11.2). |
| ***monitoringCapabilityConfig***Configures either Rel-15 PDCCH monitoring capability or Rel-16 PDCCH monitoring capability for PDCCH monitoring on a serving cell. Value *r15monitoringcapablity* enables the Rel-15 monitoring capability, and value *r16monitoringcapablity* enables the Rel-16 PDCCH monitoring capability (see TS 38.213 [13], clause 10.1). |
| ***searchSpacesToAddModList, searchSpacesToAddModListExt***List of UE specifically configured Search Spaces. The network configures at most 10 Search Spaces per BWP per cell (including UE-specific and common Search Spaces). If the network includes searchSpaceToAddModListExt, it includes the same number of entries, and listed in the same order, as in searchSpacesToAddModList. |
| ***tpc-PUCCH***Enable and configure reception of group TPC commands for PUCCH. |
| ***tpc-PUSCH***Enable and configure reception of group TPC commands for PUSCH. |
| ***tpc-SRS***Enable and configure reception of group TPC commands for SRS. |
| ***uplinkCancellation***Configuration of uplink cancellation indications to be monitored in this cell (see TS 38.213 [13], clause 11.2A). |

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| ***SearchSpaceSwitchConfig* field descriptions** |
| ***cellGroupsForSwitchList***The list of serving cells which are bundled for the search space group switching purpose (see TS 38.213 [13], clause 10.4). A serving cell can belong to only one *CellGroupForSwitch*. The network configures the same list for all BWPs of serving cells in the same *CellGroupForSwitch.* |
| ***searchSpaceSwitchDelay***Indicates the value to be applied by a UE for Search Space Set Group switching; corresponds to the P value in TS 38.213 [13], clause 10.4. The network configures the same value for all BWPs of serving cells in the same *CellGroupForSwitch.* |

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| The end of change |