**3GPP TSG-RAN WG2 Meeting #118 Electronic *R2-2205387***

**Elbonia, 09 – 20 May 2022**

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| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **38.331** | **CR** | **XXXX** | **rev** |  | **Current version:** | **17.0.0** |  |
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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:*** | Corrections to searchSpaceSwitchTimer and pdcch-SkippingDurationList | | | | | | | | | |
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| ***Source to WG:*** | Nokia, Nokia Shanghai Bell | | | | | | | | | |
| ***Source to TSG:*** | R2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_UE\_pow\_sav\_enh-Core | | | | |  | ***Date:*** | | | 2022-04-25 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F** |  | | | | | ***Release:*** | | | 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) Rel-19 (Release 19)* | |
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| ***Reason for change:*** | | The PDCCH adaptation fields *searchSpaceSwitchTimer-r17* and *pdcch-SkippingDurationList-r17* use field definition of INTEGER (1..800), but only 166 values are possible at maximum, which means 10 bits are used when 8 bits would be sufficient.  Additionally, the values depend on the SCS as the field description states, but how each value maps to a signalled value is not clear int he field description. | | | | | | | | |
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| ***Summary of change:*** | | 1. Define IE SCS-SpecificDuration-r17 as INTEGER (1..166) to minimize signalling overhead 2. Clarify in field description how the values are mapped depending on used SCS for fields *searchSpaceSwitchTimer-r17* and *pdcch-SkippingDurationList-r17*. 3. For the field *searchSpaceSwitchDelay*, clarify that only values 40..52 are valid and scale according to SCS/120 for 120/480/960 kHz SCS. | | | | | | | | |
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| ***Consequences if not approved:*** | | The use of fields remains unclear and has unnecessary signalling overhead. | | | | | | | | |
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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 ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

*First Modified Subclause*

### 6.3.2 Radio resource control information elements

<UNNECESSARY PARTS OMITTED>

#### – *PDCCH-Config*

The IE *PDCCH-Config* is used to configure UE specific or MBS multicast 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 SCell 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. If this IE is used for MBS CFR, the field *downlinkPreemptiom,tpc-PUSCH, tpc-SRS, uplinkCancellation, monitoringCapabilityConfig,* and *searchSpaceSwitchConfig* 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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controlResourceSetToAddModListSizeExt-v1610 SEQUENCE (SIZE (1..2)) OF ControlResourceSet OPTIONAL, -- Need N

controlResourceSetToReleaseListSizeExt-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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sfnScheme-r17 ENUMERATED {sfnSchemeA,sfnSchemeB} OPTIONAL, -- Need R

searchSpacesToAddModListExt-v1700 SEQUENCE(SIZE (1..10)) OF SearchSpaceExt-v1700 OPTIONAL, -- Need N

monitoringCapabilityConfig-r17 ENUMERATED { r15monitoringcapability, r16monitoringcapability, r17monitoringcapability }

OPTIONAL, -- Need M

searchSpaceSwitchTimer-r17 SCS-SpecificDuration-r17 OPTIONAL, -- Need R

pdcch-SkippingDurationList-r17 SEQUENCE(SIZE (1..3)) OF SCS-SpecificDuration-r17 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

SCS-SpecificDuration-r17 ::= INTEGER (1..166)

-- TAG-PDCCH-CONFIG-STOP

-- ASN1STOP

Editor's NOTE: It is FFS whether SSSG switching or PDCCH skipping is only applicable when C-DRX is configured. Wait for further RAN1 clarification.

Editor's note: searchSpacesToAddModListExt2 may need to be added to PDCCH-ConfigCommon as well.

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| *PDCCH-Config* field descriptions |
| ***controlResourceSetToAddModList, controlResourceSetToAddModListSizeExt***  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 [13], clause 10.1 and TS 38.306 [26]. The UE shall consider entries in *controlResourceSetToAddModList* and in *controlResourceSetToAddModListSizeExt* as a single list, i.e. an entry created using *controlResourceSetToAddModList* can be modified using *controlResourceSetToAddModListSizeExt* (or deleted using *controlResourceSetToReleaseListSizeExt*) 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*. The network shall not use same *ControlResourceSetId* as used for *commonControlResourceSetExt* configured via *SIB20* in this field. |
| ***controlResourceSetToReleaseList, controlResourceSetToReleaseListSizeExt***  List of UE specifically configured Control Resource Sets (CORESETs) to be released by the UE. This field only applies to CORESETs configured by *controlResourceSetToAddModList* or *controlResourceSetToAddModListSizeExt* and does not release the field *commonControlResourceSet* configured by *PDCCH-ConfigCommon* and *commonControlResourceSetExt* configured by *SIB20*. |
| ***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). *r17monitoringcapability* enables the Rel-17 PDCCH multi-slot monitoring capability (see TS 38.213 [13], clause 10.1). For 480 and 960 kHz SCS, only value *r17monitoringcapability* is applicable. |
| ***pdcch-SkippingDurationList***  The UE can be configured to be indicated by DCI a value of X (i.e., skipping duration), in units of slots, among at most 3 multiple RRC configured values by scheduling DCIs indicating PDCCH schedules data. For the first 160 values in 1..160 range, the actual value = CEIL(field value \* SCS/120 kHz). For the last 6 values in 161..166 range, the field values correspond to (30, 40, 50, 60, 80, 100) slots and the actual value = SCS/15 \* (30, 40, 50, 60, 80, 100), i.e. 161 corresponds to 30 slots for 15kHz SCS, 2\*30 slots for 30kHz SCS, 4\*30 slots for 60kHz SCS, 8\*30 slots for 120kHz SCS, 32\*30 slots for 480kHz SCS and 64\*30 slots for 960kHz SCS, and so on.. |
| ***searchSpacesToAddModList, searchSpacesToAddModListExt***  List of UE specifically configured Search Spaces or MBS multicast 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 in each of them. |
| ***searchSpaceSwitchTimer***  Timer (in unit of slots) to control the UE behavior to switch from search space group X back to search space group 0, as specified in clause 10 of TS 38.213. A UE does not expect to be configured with Rel-16 SSSG switching parameters and Rel-17 SSSG switching parameters per cell simultaneously. For the first 160 values in 1..160 range, the actual value = CEIL(field value \* SCS/120 kHz). For the last 6 values in 161..166 range, the field values correspond to (30, 40, 50, 60, 80, 100) slots and the actual value = SCS/15 \* (30, 40, 50, 60, 80, 100), i.e. 161 corresponds to 30 slots for 15kHz SCS, 2\*30 slots for 30kHz SCS, 4\*30 slots for 60kHz SCS, 8\*30 slots for 120kHz SCS, 32\*30 slots for 480kHz SCS and 64\*30 slots for 960kHz SCS, and so on.. |
| ***sfnScheme***  This parameter is used to configure SFN scheme for PDCCH: scheme 1 (sfnSchemeA) or TRP-based pre-compensation (sfnSchemeB). The PDCCH-Config:s in all BWPs (except BWP#0) of a ServingCell should have the same configuration of SFN scheme. |
| ***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.*For 120/480/960 kHz SCS, only values 40,41, ... 52 are valid and the actual value = field value \* SCS/120 kHz i.e. field value 40 corresponds to 40 with 120 kHz SCS, 160 with 480 kHz SCS and 320 with 960 kHz SCS, and so on. |

*End of Changes*