**3GPP TSG-RAN WG1 Meeting #118 R1-2407407**

**Maastricht, NL, August 19th – 23rd, 2024**

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| *CR-Form-v12.3* |
| **CHANGE REQUEST** |
|  |
|  | **38.213** | **CR** | **0658** | **rev** | **-** | **Current version:** | **18.3.0** |  |
|  |
| *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 | **X** | Radio Access Network | **X** | Core Network |  |

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|  |
| ***Title:***  | CR on FR2-NTN inclusion to TS 38.213 |
|  |  |
| ***Source to WG:*** | Moderator(vivo), Nokia, Ericsson |
| ***Source to TSG:*** | R1 |
|  |  |
| ***Work item code:*** | NR\_NTN\_enh-Core  |  | ***Date:*** | 2024-08-22 |
|  |  |  |  |  |
| ***Category:*** | F |  | ***Release:*** | Rel-18 |
|  | *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-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19) Rel-20 (Release 20)* |
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| ***Reason for change:*** | Frequency bands FR2-NTN are agreed, however, in TS 38.213, these frequency bands are not yet included for the procedure on determining physical downlink control channel assignment and Type0-PDCCH CSS sets in 38.213. |
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| ***Summary of change:*** | Update of UE procedure for determining physical downlink control channel assignment to include FR2-NTN.Update of UE procedure for monitoring Type0-PDCCH CSS sets to include FR2-NTN. |
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| ***Consequences if not approved:*** | NR over NTN in frequency bands defined by FR2-NTN is not complete. |
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| ***Clauses affected:*** | 10.1, 13 |
|  |  |
|  | **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:*** |  |

# 10 UE procedure for receiving control information

< Unchanged parts are omitted >

## 10.1 UE procedure for determining physical downlink control channel assignment

< Unchanged parts are omitted >

The UE may assume that the DM-RS antenna port associated with PDCCH receptions in the CORESET configured by *pdcch-ConfigSIB1* in *MIB*, the DM-RS antenna port associated with corresponding PDSCH receptions, and the corresponding SS/PBCH block are quasi co-located with respect to average gain, quasi co-location 'typeA' and 'typeD' properties, when applicable [6, TS 38.214], if the UE is not provided a TCI state indicating quasi co-location information of the DM-RS antenna port for PDCCH reception in the CORESET. The value for the DM-RS scrambling sequence initialization is the cell ID. For operation without shared spectrum channel access in FR1, FR2-1 and FR2-NTN, a SCS is provided by *subCarrierSpacingCommon* in *MIB*. For operation with shared spectrum channel access in FR1 and for operation in FR2-2, a SCS is same as the SCS of a corresponding SS/PBCH block.

< Unchanged parts are omitted >

# 13 UE procedure for monitoring Type0-PDCCH CSS sets

If during cell search a UE determines from *MIB* that a CORESET for Type0-PDCCH CSS set is present, as described in clause 4.1, the UE determines a number of consecutive resource blocks and a number of consecutive symbols for the CORESET of the Type0-PDCCH CSS set from *controlResourceSetZero* in *pdcch-ConfigSIB1*, as described in Tables 13-0 through 13-10, for operation without shared spectrum channel access in FR1, FR2-1 and FR2-NTN, or as described in Tables 13-1A and 13-4A for operation with shared spectrum channel access in FR1, or as described in Table 13-10A for FR2-2, and determines PDCCH monitoring occasions from *searchSpaceZero* in *pdcch-ConfigSIB1*, included in *MIB*, as described in Tables 13-11 through 13-15A. $SFN\_{c}$ and $n\_{c}$ are the SFN and slot index within a frame of the CORESET based on SCS of the CORESET and $SFN\_{SSB,i}$ and $n\_{SSB,i}$ are the SFN and slot index based on SCS of the CORESET, respectively, where the SS/PBCH block with index $i$ overlaps in time with system frame $SFN\_{SSB,i}$ and slot $n\_{SSB,i}$. The symbols of the CORESET associated with *pdcch-ConfigSIB1* in *MIB* or with *searchSpaceSIB1* in *PDCCH-ConfigCommon* have normal cyclic prefix. In Table 13-0, configurations with index 0 to 9 are applicable when an associated SS/PBCH block is located according to Table 5.4.3.3-2 in [8-1, TS 38.101-1], configurations with index 10 to 11 are applicable when an associated SS/PBCH block is located according to NOTE 12 of Table 5.4.3.3-1 in [8-1, TS 38.101-1], and non-interleaved CCE-to-REG mapping applies for configurations with index 6 to 9. In Table 13-1, the associated SS/PBCH block is not located according to NOTE 12 of Table 5.4.3.3-1 in [8-1, TS 38.101-1].

For operation with shared spectrum channel access in FR2-2 and for operation without shared spectrum channel access, a UE assumes that the offset in Tables 13-0 through 13-10A is defined with respect to the SCS of the CORESET for Type0-PDCCH CSS set from the smallest RB index of the CORESET for Type0-PDCCH CSS set to the smallest RB index of the common RB overlapping with the first RB of the corresponding SS/PBCH block, after puncturing if any [4, TS 38.211]. The SCS of the CORESET for Type0-PDCCH CSS set is provided by *subCarrierSpacingCommon* for FR1 , FR2-1 and FR2-NTN, and same as the SCS of the corresponding SS/PBCH block for FR2-2. In Tables 13-7, 13-8, and 13-10, $k\_{SSB}$ is defined in [4, TS 38.211].

< Unchanged parts are omitted >

Table 13-8: Set of resource blocks and slot symbols of CORESET for Type0-PDCCH search space set when {SS/PBCH block, PDCCH} SCS is {120, 120} kHz for FR2-1 and FR2-NTN

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Index | SS/PBCH block and CORESET multiplexing pattern  | Number of RBs $N\_{RB}^{CORESET}$ | Number of Symbols $N\_{symb}^{CORESET}$  | Offset (RBs)  |
| 0 | 1  | 24 | 2 | 0 |
| 1 | 1  | 24 | 2 | 4 |
| 2 | 1  | 48 | 1 | 14 |
| 3 | 1  | 48 | 2 | 14 |
| 4 | 3  | 24 | 2 | -20 if $k\_{SSB}=0$ -21 if $k\_{SSB}>0$ |
| 5 | 3  | 24 | 2 | 24 |
| 6 | 3  | 48 | 2 | -20 if $k\_{SSB}=0$ -21 if $k\_{SSB}>0$ |
| 7 | 3  | 48 | 2 | 48 |
| 8 | Reserved |
| 9 | Reserved |
| 10 | Reserved |
| 11 | Reserved |
| 12 | Reserved |
| 13 | Reserved |
| 14 | Reserved |
| 15 | Reserved |

< Unchanged parts are omitted >

Table 13-12: Parameters for PDCCH monitoring occasions for Type0-PDCCH CSS set - SS/PBCH block and CORESET multiplexing pattern 1 and FR2-1, or SS/PBCH block and CORESET multiplexing pattern 1 and FR2-NTN, or SS/PBCH block and CORESET multiplexing pattern 1 and {SS/PBCH block, PDCCH} SCS {120, 120} kHz in FR2-2

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Index | $$O$$ | Number of search space sets per slot | $$M$$ | **First symbol index** |
| 0 | 0 | 1 | 1 | 0 |
| 1 | 0 | 2 | 1/2 | {0, if $i$ is even}, {7, if $i$ is odd} |
| 2 | 2.5  | 1 | 1 | 0 |
| 3 | 2.5 | 2 | 1/2 | {0, if $i$ is even}, {7, if $i$ is odd} |
| 4 | 5 | 1 | 1 | 0 |
| 5 | 5 | 2 | 1/2 | {0, if $i$ is even}, {7, if $i$ is odd} |
| 6 | 0 | 2 | 1/2 |  {0, if $i$ is even}, {$N\_{symb}^{CORESET}$, if $i$ is odd} |
| 7 | 2.5 | 2 | 1/2 |  {0, if $i$ is even}, {$N\_{symb}^{CORESET}$, if $i$ is odd} |
| 8 | 5 | 2 | 1/2 |  {0, if $i$ is even}, {$N\_{symb}^{CORESET}$, if $i$ is odd} |
| 9 | 7.5 | 1 | 1 |  0 |
| 10 | 7.5 | 2 | 1/2 |  {0, if $i$ is even}, {7, if $i$ is odd} |
| 11 | 7.5 | 2 | 1/2 |  {0, if $i$ is even}, {$N\_{symb}^{CORESET}$, if $i$ is odd} |
| 12 | 0 | 1 | 2 | 0 |
| 13 | 5 | 1 | 2 | 0 |
| 14 | Reserved |
| 15 | Reserved |

< Unchanged parts are omitted >

If a UE detects a first SS/PBCH block and determines that a CORESET for Type0-PDCCH CSS set is not present, and for $24\leq k\_{SSB}\leq 29$ for FR1 or for $12\leq k\_{SSB}\leq 13$ for FR2, the UE may determine the nearest (in the corresponding frequency direction) global synchronization channel number (GSCN) of a second SS/PBCH block having a CORESET for an associated Type0-PDCCH CSS set as $N\_{GSCN}^{Reference}+N\_{GSCN}^{Size}⋅N\_{GSCN}^{Offset}$. $N\_{GSCN}^{Reference}$ is the GSCN of the first SS/PBCH block, $N\_{GSCN}^{Size}=1$ in FR1, FR2-1 and FR2-NTN, $N\_{GSCN}^{Size}=$ 3 in FR2-2, and $N\_{GSCN}^{Offset}$ is a GSCN offset provided by Table 13-16 for FR1 and Table 13-17 for FR2. If the UE detects the second SS/PBCH block and the second SS/PBCH block does not provide a CORESET for Type0-PDCCH CSS set, as described in clause 4.1, the UE may ignore the information related to GSCN of SS/PBCH block locations for performing cell search.