**3GPP TSG RAN WG1 #116bis** **R1-240xxxx**

Changsha, China, April 15th – 19th, 2024

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| *CR-Form-v12.2* |
| **DRAFT CHANGE REQUEST** |
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|  | **38.213** | **CR** |  | **rev** |  | **Current version:** | **18.2.0** |  |
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| *For* [***HELP***](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:***  | Rel-18 editorial corrections for TS 38.213 |
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| ***Source to WG:*** | Samsung |
| ***Source to TSG:*** | R1 |
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| ***Work item code:*** | NR\_cov\_enh2-Core, NR\_SL\_enh2-Core, NR\_mob\_enh2-Core, NR\_NTN\_enh-Core |  | ***Date:*** | 2024-04-23 |
|  |  |  |  |  |
| ***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-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19)* |
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| ***Reason for change:*** | 1. Clarify total power ramp-up for PRACH preamble by referring to TS 38.321 in Clause 7.1.1.
2. Missing reference to Clause 22.1 for DM-RS antenna port quasi co-location with SS-PPCH block for PDCCH receptions in CORESET 0. In Clause 10.1.
3. Editorial correction in Clause 16.1.
4. Missing description for RB set selection for PSFCH transmission when a UE does not support multi-channel access for PSFCH transmission in multiple RB sets in Clause 16.2.4.2.
5. Misaligned parameter names with TS 38.331 v18.1.0 in Clauses 8.1, 21, and 22.2.
6. Introduce NTN operation for frequency bands defined by FR2-NTN.
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| ***Summary of change:*** | 1. Remove “from the first to the last random access preamble” and add reference to TS 38.321 in Clause 7.1.1.
2. Add reference to Clause 22.1 for DM-RS antenna port quasi co-location with SS-PPCH block for PDCCH receptions in CORESET 0 in Clause 10.1.
3. Editorial correction in Clause 16.1.
4. Add description for RB set selection for PSFCH transmission when a UE does not support multi-channel access for PSFCH transmission in multiple RB sets in Clause 16.2.4.2.
5. Align parameter names with TS 38.331 v18.1.0 in Clauses 8.1, 21, and 22.2.
6. Update references, abbreviations, and UE procedures for cell search and for reporting control information to include definition of FR2-NTN.
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| ***Consequences if not approved:*** | Ambiguous/incorrect/incomplete specifications. |
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| ***Clauses affected:*** | 2, 3.3, 4.1, 7.1.1, 8.1, 9, 10.1, 16.1, 16.2.4.2, 21, 22.2 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  |  |  Other core specifications  | TS/TR ... CR ... |
| ***affected:*** |  |  |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  |  |  O&M Specifications | TS/TR ... CR ...  |
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| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

\*\*\* Unchanged text is omitted \*\*\*

# 2 References

\*\*\* Unchanged text is omitted \*\*\*

 [8-3] 3GPP TS 38.101-3: "NR; User Equipment (UE) radio transmission and reception; Part 3: Range 1 and Range 2 Interworking operation with other radios"

[8-4] 3GPP TS 38.101-4: "NR; User Equipment (UE) radio transmission and reception; Part 4: Performance requirements"

[8-5] 3GPP TS 38.101-5: " User Equipment (UE) radio transmission and reception; Part 5: Satellite access Radio Frequency (RF) and performance requirements NR"

[9] 3GPP TS 38.104: "NR; Base Station (BS) radio transmission and reception"

[10] 3GPP TS 38.133: "NR; Requirements for support of radio resource management"

\*\*\* Unchanged text is omitted \*\*\*

## 3.3 Abbreviations

\*\*\* Unchanged text is omitted \*\*\*

FR1 Frequency Range 1

FR2 Frequency Range 2

FR2-NTN Frequency Range 2 for non-terrestrial networks [8-5]

G-CS-RNTI Group Configured Scheduling RNTI

G-RNTI Group RNTI

\*\*\* Unchanged text is omitted \*\*\*

## 4.1 Cell search

\*\*\* Unchanged text is omitted \*\*\*

- Case D - 120 kHz SCS: the first symbols of the candidate SS/PBCH blocks have indexes $\left\{4,8,16,20\right\}+28⋅n$. For carrier frequencies within FR2 and FR2-NTN, $n=0, 1, 2, 3, 5, 6, 7, 8, 10, 11, 12, 13, 15, 16, 17, 18$.

- Case E - 240 kHz SCS: the first symbols of the candidate SS/PBCH blocks have indexes $\left\{8,12,16,20,32,36,40,44\right\}+56⋅n$. For carrier frequencies within FR2-1 and FR2-NTN, $n=0, 1, 2, 3, 5, 6, 7, 8$.

- Case F – 480 kHz SCS: the first symbols of the candidate SS/PBCH blocks have indexes $\left\{2, 9\right\}+14⋅n$. For carrier frequencies within FR2-2, $n=0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31.$

\*\*\* Unchanged text is omitted \*\*\*

### 7.1.1 UE behaviour

\*\*\* Unchanged text is omitted \*\*\*

If the UE transmits a PUSCH associated with the first RS resource index $q\_{d}$, the UE applies the first $P\_{O\\_UE\\_PUSCH,b,f,c}\left(j\right)$ value, the first $α\_{b,f,c}\left(j\right)$ value, and $f\_{b,f,c}\left(i,l\right)$ for determining $P\_{PUSCH,b,f,c}(i,j,q\_{d},l)$. If the UE transmits a PUSCH associated with the second RS resource index $q\_{d}$, the UE applies the second $P\_{O\\_UE\\_PUSCH,b,f,c}\left(j\right)$ value, the second $α\_{b,f,c}\left(j\right)$ value, and $f\_{b,f,c}\left(i,l\right)$ or $f\_{b,f,c}\left(i,0\right)$ if *twoPUSCH-PC-AdjustmentStates* is provided or not provided, respectively, for determining $P\_{PUSCH,b,f,c}(i,j,q\_{d},l)$.

- If the UE receives a random access response message in response to a PRACH transmission or a MsgA transmission on active UL BWP $b$ of carrier $f$ of serving cell $c$ as described in clause 8

- $f\_{b,f,c}\left(0,l\right)=∆P\_{rampup,b,f,c}+δ\_{msg2,b,f,c}$, where $l=0$ and

- $δ\_{msg2,b,f,c}$ is a TPC command value indicated in a random access response grant of the random access response message corresponding to a PRACH transmission according to Type-1 random access procedure, or in a random access response grant of the random access response message corresponding to a MsgA transmission according to Type-2 random access procedure with RAR message(s) for fallbackRAR, on active UL BWP $b$ of carrier $f$ of serving cell $c$, and

-  and $∆P\_{rampup\\_requested,b,f,c}$ is provided by higher layers and corresponds to the total power ramp-up requested by higher layers [11, TS 38.321] for carrier $f$ in the serving cell $c$, $M\_{RB,b,f,c}^{PUSCH}(0)$ is the bandwidth of the PUSCH resource assignment expressed in number of resource blocks for the first PUSCH transmission on active UL BWP$ b$ of carrier $f$ of serving cell $c$, and $∆\_{TF,b,f,c}\left(0\right)$ is the power adjustment of first PUSCH transmission on active UL BWP $b$ of carrier $f$ of serving cell $c$.

- If the UE transmits the PUSCH in PUSCH transmission occasion $i$ on active UL BWP $b$ of carrier $f$ of serving cell $c$ as described in clause 8.1A, $f\_{b,f,c}(0,l)=ΔP\_{rampup,b,f,c}$, where

- $l=0$, and

-  and $ΔP\_{rampup\\_requested,b,f,c}$ is provided by higher layers and corresponds to the total power ramp-up requested by higher layers, $M\_{RB,b,f,c}^{PUSCH}(i)$ is the bandwidth of the PUSCH resource assignment expressed in number of resource blocks, and $Δ\_{TF,b,f,c}(i)$ is the power adjustment of the PUSCH transmission in PUSCH transmission occasion $i$.

\*\*\* Unchanged text is omitted \*\*\*

## 8.1 Random access preamble

\*\*\* Unchanged text is omitted \*\*\*

For single cell operation or for operation with contiguous carrier aggregation in a same frequency band or for operation with non-contiguous carrier aggregation in a same frequency band if the UE is not provided with *intraBandNC-PRACH-simulTx-r17*, a UE

- does not transmit PRACH and PUSCH/PUCCH/SRS in a same slot with respect to the smallest SCS configuration between the SCS configuration for the UL BWP with the PRACH and the SCS configuration for the UL BWP with the PUSCH/PUCCH/SRS transmissions

- does not transmit PRACH and PUSCH/PUCCH/SRS when a first or last symbol of a PRACH transmission in a first slot is separated by less than $N$ symbols from the last or first symbol, respectively, of a PUSCH/PUCCH/SRS transmission in a second slot; for a PRACH transmission with $N\_{preamble}^{rep}>1$ preamble repetitions, this applies to each preamble repetition

- for a PRACH transmission with $N\_{preamble}^{rep}>1$ preamble repetitions, if the UE does not indicate *prach-Repetition*, the UE does not transmit a first repetition of the PRACH and a second repetition of the PRACH when a first or last symbol of the first repetition of the PRACH in a first slot is separated by less than $N$ symbols from the last or first symbol, respectively, of the second repetition of the PRACH in a second slot; otherwise, the UE transmits the first repetition of the PRACH and the second repetition of the PRACH

where $N=2$ for $μ=0$ or $μ=$1, $N=4$ for $μ=2$ or $μ=3$, $N=16$ for $μ=5$, $N=32$ for $μ=6$, and $μ$ is the smallest SCS configuration between the SCS configuration for the UL BWP with the PRACH and the SCS configuration for the UL BWP with the PUSCH/PUCCH/SRS transmissions. For a PUSCH transmission with repetition Type B, this applies to each actual repetition for PUSCH transmission [6, TS 38.214].

\*\*\* Unchanged text is omitted \*\*\*

# 9 UE procedure for reporting control information

\*\*\* Unchanged text is omitted \*\*\*

For the remaining of this clause, if a UE is provided $K\_{cell,offset}$ by *cellSpecificKoffset* or $K\_{UE,offset}$ by a MAC CE command, reference to a slot $n+k$ for a PUCCH transmission or PUSCH transmission corresponds to a slot $n+k+2^{μ-μ\_{K\_{offset}}}∙K\_{offset}$ for the PUSCH or the PUCCH transmission, and reference to a slot $n\_{U}-K\_{1,k}$ corresponds to slot $n\_{U}-K\_{1,k}-2^{μ-μ\_{K\_{offset}}}∙K\_{offset}$, where $μ$ is the SCS configuration for the PUCCH transmission or PUSCH transmission, $K\_{offset}$ is defined in clause 4.2, and $μ\_{K\_{offset}}=0$ in FR1 and in FR2-NTN. If *cellSpecificKoffset* or if the MAC CE command is not provided, $K\_{cell,offset}=0$ or $K\_{UE,offset}=0$, respectively. If the PUCCH or PUSCH transmission is scheduled by a DCI format, or if SRS transmission is triggered by a DCI format, the value of $K\_{UE,offset}$ is the one that is applicable at the slot overlapping with the last symbol of the PDCCH reception providing the DCI format. If the PUCCH transmission or the PUSCH transmission is scheduled by a DCI format with CRC scrambled by TC-RNTI, $K\_{UE,offset}=0$. If the UE is provided a $K\_{UE,offset}$ value by a MAC CE command, the UE applies the MAC CE command in the first slot that is after slot $k+3N\_{slot}^{subframe,μ}$ where $k$ is the slot where the UE would transmit a PUCCH with HARQ-ACK information for the PDSCH providing the MAC CE command, $μ$ is the SCS configuration for the PUCCH transmission that is determined in the slot when the MAC CE command is applied.

\*\*\* Unchanged text is omitted \*\*\*

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

\*\*\* Unchanged text is omitted \*\*\*

For a CORESET with index 0,

- if the UE is provided *TCI-State* and *followUnifiedTCI-State* for the CORESET, the UE assumes that a DM-RS antenna port for PDCCH receptions in the CORESET and a DM-RS antenna port for PDSCH receptions scheduled by DCI formats provided by PDCCH receptions in the CORESET are quasi co-located with the reference signals provided by the indicated *TCI-State* [6, TS 38.214]

- else if the UE is provided *dl-OrJointTCI-StateList* and is indicated a first *TCI-State* and a second *TCI-State*, and *apply-IndicatedTCIState* for the CORESET

- if the CORESET is associated with a Type 0/0A/2-PDCCH CSS set that has search space set index 0

- if *apply-IndicatedTCIState* = 'first', the UE assumes that a DM-RS antenna port for PDCCH receptions in the CORESET is quasi co-located with the reference signals provided by the first *TCI-State*,

- if *apply-IndicatedTCIState* = 'second', the UE assumes that a DM-RS antenna port for PDCCH receptions in the CORESET is quasi co-located with the reference signals provided by the second *TCI-State*,

- if *apply-IndicatedTCIState* = 'none', the UE assumes that a DM-RS antenna port for PDCCH receptions in the CORESET is quasi co-located with the one or more DL RS configured by a TCI state, where the TCI state is indicated by a MAC CE activation command for the CORESET, if any

- else

- if *apply-IndicatedTCIState* = 'first', the UE assumes that a DM-RS antenna port for PDCCH receptions in the CORESET is quasi co-located with the reference signals provided by the first *TCI-State*,

- if *apply-IndicatedTCIState* = 'second', the UE assumes that a DM-RS antenna port for PDCCH receptions in the CORESET is quasi co-located with the reference signals provided by the second *TCI-State*,

- if *apply-IndicatedTCIState* = 'both', the UE assumes that a DM-RS antenna port for PDCCH receptions in the CORESET is quasi co-located with the reference signals provided by the first and the second *TCI-State,*

- if *apply-IndicatedTCIState* = 'none', the UE assumes that a DM-RS antenna port for PDCCH receptions in the CORESET is quasi co-located with the one or more DL RS configured by a TCI state, where the TCI state is indicated by a MAC CE activation command for the CORESET.

- else, the UE assumes that a DM-RS antenna port for PDCCH receptions in the CORESET is quasi co-located with

- the one or more DL RS configured by a TCI state, where the TCI state is indicated by a MAC CE activation command for the CORESET, if any, or

- a SS/PBCH block the UE identified during a most recent random access procedure not initiated by a PDCCH order that triggers a contention-free random access procedure, if no MAC CE activation command indicating a TCI state for the CORESET is received after the most recent random access procedure, or a SS/PBCH block the UE identified during a most recent configured grant PUSCH transmission as described in clauses 19 or 22.1.

\*\*\* Unchanged text is omitted \*\*\*

16.1 Synchronization procedures

\*\*\* Unchanged text is omitted \*\*\*

The UE assumes that a S-PSS symbol, a S-SSS symbol, and a PSBCH symbol have a same transmission power. The UE assumes a same numerology of the S-SS/PSBCH block as for a SL BWP of the S-SS/PSBCH block reception, and that a bandwidth of the S-SS/PSBCH block is within a bandwidth of the SL BWP. The UE assumes the subcarrier with index 0 in the S-SS/PSBCH block is aligned with a subcarrier with index 0 in an RB of the SL BWP.

\*\*\* Unchanged text is omitted \*\*\*

#### 16.2.4.2 Simultaneous PSFCH transmission/reception

\*\*\* Unchanged text is omitted \*\*\*

For operation with shared spectrum channel access, if a UE does not support PSFCH transmission in non-contiguous RB sets, the UE selects for PSFCH transmission any contiguous RB set(s) that include PSFCH with the smallest priority value among the PSFCHs with HARQ-ACK information. If none of the $N\_{sch,Tx,PSFCH}$ PSFCHs and none of the $N\_{sch,Rx,PSFCH}$ PSFCHs provide HARQ-ACK information, the UE selects for PSFCH transmission any contiguous RB sets that include PSFCH with the smallest priority value.

For operation with shared spectrum channel access, if a UE does not support multi-channel access for PSFCH transmission in multiple RB sets, the UE selects for PSFCH transmission a single RB set that includes PSFCH with the smallest priority value among the PSFCHs with HARQ-ACK information. If none of the $N\_{sch,Tx,PSFCH}$ PSFCHs and none of the $N\_{sch,Rx,PSFCH}$ PSFCHs provide HARQ-ACK information, the UE selects for PSFCH transmission a single RB set that include PSFCH with the smallest priority value.

If a UE indicates a capability to receive $N\_{Rx,PSFCH}$ PSFCHs in a PSFCH reception occasion [18, TS 38.306], the UE first receives PSFCHs with HARQ-ACK information, if any, and subsequently receives PSFCHs with conflict information, if any.

\*\*\* Unchanged text is omitted \*\*\*

# 21 L1/L2-triggered mobility procedures

A UE can be indicated, by *LTM-Config*, candidate cells and SS/PBCH blocks per candidate cell for the UE to obtain synchronization and measure corresponding L1-RSRPs [10, TS 38.133]. A Candidate Cell TCI States Activation/Deactivation MAC CE can activate TCI states, provided by *CandidateTCI-State* or/and *CandidateTCI-UL-State*, associated with SS/PBCH blocks or TRS of corresponding candidate cells [11, TS 38.321]. If the Candidate Cell TCI States Activation/Deactivation MAC CE activates TCI states, an LTM Cell Switch Command MAC CE can indicate a TCI state from the activated TCI states; otherwise, the LTM Cell Switch Command MAC CE can activate and indicate a TCI state, provided by *CandidateTCI-State* or/and *CandidateTCI-UL-State*. After reception of the LTM Cell Switch Command MAC CE, activated TCI states that are not indicated by the MAC CE are deactivated. The UE is provided configurations by *ltm-CSI-ReportConfigToAddModList* for reporting L1-RSRP measurements [6, TS 38.214] that include a number of candidate cells and a number of SS/PBCH blocks per candidate cell from the number of candidate cells.

If *ltm-UE-MeasuredTA-ID* of a candidate cell and *ltm-ServingCellUE-MeasuredTA-ID* of the serving cell are provided to a UE and have same value, the UE estimates based on the UE implementation a timing advance to apply from a first transmission on the candidate cell that is after the reception of a cell switch command for the candidate cell when the condition defined in clause 5.18.35 of [11, TS 38.321] is satisfied.

A UE can be provided configurations, by *EarlyUl-SyncConfig*, for PRACH transmission parameters for each of the candidate cells. The UE can be triggered a PRACH transmission on a candidate cell by a PDCCH order that the UE receives on a serving cell and includes an indication of the candidate cell for the PRACH transmission [4, TS 38.212]. If the serving cell and the candidate cell operate in a same frequency range and the UE would have transmissions that overlap in time, or when a gap between a first or last symbol of a PRACH transmission to the candidate cell is less than 𝑁 symbols from a last or first symbol, respectively, of an UL transmission to the serving cell, where $N$ is defined in Clause 8.1, the UE

- drops the transmissions on the serving cell when the UE does not support transmissions that overlap in time or are separated by less than the gap on the serving cell and the candidate cell

- prioritizes power allocation to the PRACH transmission on the candidate cell in clause 7.5 when the UE supports transmissions that overlap in time or are separated by less than the gap, and a total UE transmit power in the frequency range would exceed $\hat{P}\_{CMAX}$

The UE transmits the PRACH on the candidate cell as described in Clause 8.1 with a power determined as described in Clause 7.4.

A UE can be provided by a LTM Cell Switch Command MAC CE in a PDSCH reception on the serving cell [11, TS 38.321] a *CandidateTCI-State* and/or *CandidateTCI-UL-State* in *ltm-DL-OrJointTCI-StateToAddModList* and/or *ltm-UL-TCI-StateToAddModList* indicating a unified TCI state [6, TS 38.214] for applicable receptions or transmissions on a candidate cell from the number of candidate cells. The UE may assume that DM-RS antenna ports for PDCCH receptions and for PDSCH receptions are quasi co-located with the SS/PBCH block or the TRS in the TCI state with respect to quasi co-location 'typeA' and 'typeD' properties, when applicable. The UE does not expect to be indicated quasi co-location 'typeA' properties when a SS/PBCH block is configured as a source RS of the TCI state. The UE applies the *CandidateTCI-State* and/or *CandidateTCI-UL-State,* if indicated by the MAC CE, no later than $T\_{LTM-RRC-processing}+T\_{LTM-processing}+T\_{first-RS}+T\_{RS-proc}+3 msec$ after the last symbol of a PUCCH or PUSCH with HARQ-ACK information for the PDSCH providing the MAC CE, where $T\_{LTM-RRC-processing}$, $T\_{LTM-processing}$, $T\_{first-RS}$and $T\_{RS-proc}$ are defined in [10, TS 38.133]*.* For RACH-based LTM cell switch [19, TS 38.300], the UE applies the *CandidateTCI-State* for receptions on the candidate cell, and applies a spatial domain filter corresponding to the *CandidateTCI-State* or the *CandidateTCI-UL-State* for transmissions on the candidate cell, that are after the completion of the random access procedure associated with the PRACH transmission on the candidate cell and before a new TCI state is indicated for the candidate cell. For RACH-less LTM cell switch [19, TS 38.300], the UE applies the *CandidateTCI-State* for receptions on the candidate cell and applies a spatial domain filter corresponding to the *CandidateTCI-State* or the *CandidateTCI-UL-State* for transmissions on the candidate cell before a new TCI state is indicated for the candidate cell.

\*\*\* Unchanged text is omitted \*\*\*

## 22.2 Dynamic-grant PUSCH transmission

If *ssb-Index* is provided in *RACH-LessHO,* the UE may assume that the DM-RS antenna port associated with the PDCCH receptions for scheduling initial PUSCH transmission and the SS/PBCH block indicated by *ssb-Index* are quasi co-located with respect to average gain and quasi co-location 'typeA' or 'typeD' properties.