**3GPP TSG-RAN WG2** **Meeting #121 *Draft R2-2302201***

**Athens, Greece, 27 February - 3 March 2023**

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| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
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|  | **38.331** | **CR** | **3930** | **rev** | **-** | **Current version:** | **17.3.0** |  |
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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:***  | Correction on BWP for CSI-RS in TCI-State |
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| ***Source to WG:*** | Huawei, HiSilicon |
| ***Source to TSG:*** | RAN2 |
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| ***Work item code:*** | NR\_feMIMO-Core |  | ***Date:*** | 2023-03-02 |
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| ***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 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:*** | According to TS 38.214 clause 5.1.5:“When the *bwp-id* or *cell* for QCL-TypeA/D source RS in a QCL-Info of the TCI state is not configured, the UE assumes that QCL-TypeA/D source RS is configured in the CC/DL BWP where TCI state applies”.Absent BWP is useful when using the TCI state list from a different cell/BWP as it allows the cell/BWP to be the one where the TCI state is applied.However, in the TS 38.331 v17.3.0, the *bwp-Id* field in *QCL-Info* is mandatory present when the reference signal is CSI-RS. |
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| ***Summary of change:*** | 1) Change the presence condition to "optionally present" when the RS is CSI-RS and unified TCI state is used and capture the meaning of "absent" in the field description.2) Capture that when the RS is CSI-RS and unified TCI framework is used, either both cell and bwp-Id are present, or both cell and bwp-Id are absent.**Impacted 5G architecture options:**NR SA, (NG)EN-DC, NR-DC**Impacted functionality:**Rel-17 unified TCI framework**Inter-operability:** If the UE is implemented according to this CR while the network is not, there is no inter-operability issue.If the network is implemented according to this CR while the UE is not, the UE may regard an *RRCReconfiguration* message as invalid. |
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| ***Consequences if not approved:*** | When the Rel-17 TCI framework is used, the UE could consider an *RRCReconfiguration* message as invalid if bwp-Id is absent in QCL-Info while this is a valid configuration according to TS 38.214.  |
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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:*** |  |

#### – *TCI-State*

The IE *TCI-State* associates one or two DL reference signals with a corresponding quasi-colocation (QCL) type.

*TCI-State* information element

-- ASN1START

-- TAG-TCI-STATE-START

TCI-State ::= SEQUENCE {

 tci-StateId TCI-StateId,

 qcl-Type1 QCL-Info,

 qcl-Type2 QCL-Info OPTIONAL, -- Need R

 ...,

 [[

 additionalPCI-r17 AdditionalPCIIndex-r17 OPTIONAL, -- Need R

 pathlossReferenceRS-Id-r17 PathlossReferenceRS-Id-r17 OPTIONAL, -- Cond JointTCI1

 ul-powerControl-r17 Uplink-powerControlId-r17 OPTIONAL -- Cond JointTCI

 ]]

}

QCL-Info ::= SEQUENCE {

 cell ServCellIndex OPTIONAL, -- Need R

 bwp-Id BWP-Id OPTIONAL, -- Cond CSI-RS-Indicated

 referenceSignal CHOICE {

 csi-rs NZP-CSI-RS-ResourceId,

 ssb SSB-Index

 },

 qcl-Type ENUMERATED {typeA, typeB, typeC, typeD},

 ...

}

-- TAG-TCI-STATE-STOP

-- ASN1STOP

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| *QCL-Info* field descriptions |
| ***bwp-Id***The DL BWP which the RS is located in. If the field is absent, the RS is located in the BWP in which the *TCI-State* is applied by the UE. |
| ***cell***The UE's serving cell in which the *referenceSignal* is configured. If the field is absent, it applies to the serving cell in which the *TCI-State* is applied by the UE. The RS can be located on a serving cell other than the serving cell for which the *TCI-State* is applied by the UE only if the *qcl-Type* is configured as *typeC* or *typeD*. If the *referenceSignal* is set to *csi-rs* and *unifiedTCI-StateType* is configured, either both *cell* and *bwp-Id* are present or both *cell* and *bwp-Id* are absent. See TS 38.214 [19] clause 5.1.5. |
| ***referenceSignal***Reference signal with which quasi-collocation information is provided as specified in TS 38.214 [19] clause 5.1.5. |
| ***qcl-Type***QCL type as specified in TS 38.214 [19] clause 5.1.5. |

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| *TCI-State* field descriptions |
| ***additionalPCI***Indicates the physical cell IDs (PCI) of the SSBs when *referenceSignal* is configured as SSB for both QCL-Type1 and QCL-Type2. In case the c*ell* is present, the *additionalPCI* refers to a PCI value configured in the list configured using *additionalPCI-ToAddModList* in the serving cell indicated by the field c*ell*. Otherwise, it refers to a PCI value configured in a list *additionalPCI-ToAddModList* configured in the serving cell where the *TCI-State* is applied by the UE. When this field is present the *cell* for *qcl-Type1* and *qcl-Type2* is configured with same value, if present. |
| ***pathlossReferenceRS-Id***The ID of the reference signal (e.g. a CSI-RS or an SS block) used for PUSCH, PUCCH and SRS path loss estimation. |
| ***qcl-Type1, qcl-Type2***QCL information for the TCI state as specified in TS 38.214 [19] clause 5.1.5. |
| ***tci-StateId***ID number of the TCI state. |
| ***ul-PowerControl***Configures power control parameters for PUCCH, PUSCH and SRS for this TCI state. The field is present here only if *ul-powerControl* is not configured in any *BWP-Uplink-Dedicated* of this serving cell. |

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| Conditional Presence | Explanation |
| *CSI-RS-Indicated* | This field is mandatory present if *csi-rs* is included and *unifiedTCI-StateType* is not configured. This field is optionally present, Need R, if *csi-rs* is included and *unifiedTCI-StateType* is configured. Otherwise, it is absent Need R. |
| *JointTCI* | This field is optionally present, Need R,if this serving cell is configured with *unifiedTCI-StateType* set to '*joint*'. It is absent, Need R, otherwise. |
| *JointTCI1* | This field is mandatory present, if this serving cell is configured with unifiedTCI-StateType set to 'joint'. It is absent, Need R, otherwise. |