**3GPP TSG-RAN WG1 Meeting #114 *R1-23xxxxx***

**Toulouse, France, August 21 – 25, 2023**

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| --- |
| *CR-Form-v12.2* |
| **Draft CHANGE REQUEST** |
|  |
|  | **38.212** | **CR** |  | **rev** | **-** | **Current version:** | **17.5.0** |  |
|  |
| *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:***  | Introduction of Rel-18 network energy saving for NR |
|  |  |
| ***Source to WG:*** | Huawei |
| ***Source to TSG:*** |  |
|  |  |
| ***Work item code:*** | Netw\_Energy\_NR-Core |  | ***Date:*** | 2023-09-01 |
|  |  |  |  |  |
| ***Category:*** | **B** |  | ***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)* |
|  |  |
| ***Reason for change:*** | Inclusion of Rel-18 network energy saving for NR. |
|  |  |
| ***Summary of change:*** | Support of Rel-18 network energy saving for NR: 1. Section 6.3.1.1.2 & 6.3.2.1.2: Capture agreements on CSI reporting for sub-configurations.
2. Section 7.3.1 & 7.3.1.3.10: Capture agreements on the new DCI format for activation/deactivation of cell DTX and DRX configuration.
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|  |  |
| ***Consequences if not approved:*** | Rel-18 network energy saving for NR will be incomplete. |
|  |  |
| ***Clauses affected:*** | 6.3.1.1.2, 6.3.2.1.2, 7.3.1, 7.3.1.3.10 (new) |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** | **X** |  |  Other core specifications  | TS 38.213, TS 38.214 |
| ***affected:*** |  | **X** |  Test specifications |  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications |  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

##### 6.3.1.1.2 CSI only

If *cqi-BitsPerSubband* is configured, this Clause 6.3.1.1.2 applies by taking Subband CQI as Subband differential CQI and replacing the corresponding number of bits 2 by 4.

If *csi-ReportSubConfig* is configured, for a corresponding CSI sub-report, the bitwidth of a CSI field of the CSI sub-report is determined following the procedure in this clause 6.3.1.1.2 by taking configurations in *CSI-ReportSubConfig* when applicable. If *csi-ReportSubConfig* configures a list of CSI-RS resource IDs, for the determination of the bitwdith of a CRI field, the value of is the number of CSI-RS resources configured in the corresponding *csi-ReportSubConfig*.

The bitwidth for PMI of *codebookType=typeI-SinglePanel* with 2 CSI-RS ports is 2 for Rank=1 and 1 for Rank=2, according to Clause 5.2.2.2.1 in [6, TS 38.214].

The bitwidth for PMI of *codebookType=typeI-SinglePanel* with more than 2 CSI-RS ports is provided in Tables 6.3.1.1.2-1, where the values of ****and **** are given by Clause 5.2.2.2.1 in [6, TS 38.214].

Table 6.3.1.1.2-1: PMI of *codebookType=typeI-SinglePanel*

|  |  |  |
| --- | --- | --- |
|  | Information field  for wideband PMI | Information field  for wideband PMIor per subband PMI |
| (,) |  |  |
| *codebookMode*=1 | *codebookMode*=2 | *codebookMode*=1 | *codebookMode*=2 |
| Rank = 1 with >2 CSI-RS ports,  | (,) | (,) | N/A | 2 | 4 |
| Rank = 1 with >2 CSI-RS ports,  | (,) | (, 0) | N/A | 2 | 4 |
| Rank=2 with 4 CSI-RS ports,  |  (,) | (, 0) | 1 | 1 | 3 |
| Rank=2 with >4 CSI-RS ports,  |  (,) | (,) | 2 | 1 | 3 |
| Rank=2 with >4 CSI-RS ports,  | (,) | (, 0) | 2 | 1 | 3 |
| Rank=3 or 4, with 4 CSI-RS ports |  (,) | 0 | 1 |
| Rank=3 or 4, with 8 or 12 CSI-RS ports |  (,) | 2 | 1 |
| Rank=3 or 4 , with >=16 CSI-RS ports |  (, ) | 2 | 1 |
| Rank=5 or 6 |  (,) | N/A | 1 |
| Rank=7 or 8,  |  (, ) | N/A | 1 |
| Rank=7 or 8,  |  (,) | N/A | 1 |
| Rank=7 or 8, with  or or  |  (,) | N/A | 1 |

The bitwidth for PMI of *codebookType=* *typeI-MultiPanel* is provided in Tables 6.3.1.1.2-2, where the values of and **** are given by Clause 5.2.2.2.2 in [6, TS 38.214].

Table 6.3.1.1.2-2: PMI of *codebookType=* *typeI-MultiPanel*

|  |  |  |
| --- | --- | --- |
|  | Information fields for wideband | Information fields  for wideband or per subband |
| (,) |  |  |  |  |  |  |  |  |
| Rank=1 with *codebookMode=1* |  (,) | N/A | 2 | N/A | N/A | 2 | N/A | N/A | N/A |
| Rank=1 with *codebookMode=1* |  (,) | N/A | 2 | 2 | 2 | 2 | N/A | N/A | N/A |
| Rank=2 with , *codebookMode=1* |  (,) | 1 | 2 | N/A | N/A | 1 | N/A | N/A | N/A |
| Rank=3 or 4 with , *codebookMode=1* |  (,) | 0 | 2 | N/A | N/A | 1 | N/A | N/A | N/A |
| Rank=2 or 3 or 4 with , *codebookMode=1* |  (,) | 2 | 2 | N/A | N/A | 1 | N/A | N/A | N/A |
| Rank=2 with , *codebookMode=1* |  (,) | 1 | 2 | 2 | 2 | 1 | N/A | N/A | N/A |
| Rank=3 or 4 with , *codebookMode=1* |  (,) | 0 | 2 | 2 | 2 | 1 | N/A | N/A | N/A |
| Rank=2 or 3 or 4 with , *codebookMode=1* |  (,) | 2 | 2 | 2 | 2 | 1 | N/A | N/A | N/A |
| Rank=1 with *codebookMode=2* |  (,) | N/A | 2 | 2 | N/A | N/A | 2 | 1 | 1 |
| Rank=2 with , *codebookMode=2* |  (,) | 1 | 2 | 2 | N/A | N/A | 1 | 1 | 1 |
| Rank=3 or 4 with , *codebookMode=2* |  (,) | 0 | 2 | 2 | N/A | N/A | 1 | 1 | 1 |
| Rank=2 or 3 or 4 with , *codebookMode=2* |  (,) | 2 | 2 | 2 | N/A | N/A | 1 | 1 | 1 |

The bitwidth for PMI with 1 CSI-RS port is 0.

The bitwidth for RI/LI/CQI/CRI of *codebookType=typeI-SinglePanel* or *reportQuantity* set to 'cri-RI-CQI' is provided in Tables 6.3.1.1.2-3.

Table 6.3.1.1.2-3: RI, LI, CQI, and CRI of *codebookType=typeI-SinglePanel*, or *reportQuantity* set to 'cri-RI-CQI'

|  |  |
| --- | --- |
| **Field** | **Bitwidth** |
| **1 antenna port** | **2 antenna ports** | **4 antenna ports** | **>4 antenna ports** |
| **Rank1~4** | **Rank5~8** |
| Rank Indicator when *codebookType=typeI-SinglePanel* | 0 |  |  |  |  |
| Rank Indicator when *reportQuantity* set to 'cri-RI-CQI' | 0 | 1 | 2 | 3 | 3 |
| Layer Indicator | 0 |  |  |  |  |
| Wide-band CQI for the first TB | 4 | 4 | 4 | 4 | 4 |
| Wideband CQI for the second TB | 0 | 0 | 0 | 0 | 4 |
| Subband differential CQI for the first TB | 2 | 2 | 2 | 2 | 2 |
| Subband differential CQI for the second TB | 0 | 0 | 0 | 0 | 2 |
| CRI |  |  |  |  |  |

 in Table 6.3.1.1.2-3 is the number of allowed rank indicator values according to Clause 5.2.2.2.1 [6, TS 38.214].  is the value of the rank. The value of  is the number of CSI-RS resources in the corresponding resource set. The values of the rank indicator field are mapped to allowed rank indicator values with increasing order, where '0' is mapped to the smallest allowed rank indicator value. For higher layer parameter *reportQuantity* set to 'cri-RI-CQI', the values of the rank indicator field are mapped to rank indicator values with increasing order, where '0' is mapped to rank-1.

Table 6.3.1.1.2-3A: RI, LI, CQI, and CRI associated with one CSI-RS resource pair and *csi-ReportMode= Mode 1* or *Mode 2*

|  |  |
| --- | --- |
| **Field** | **Bitwidth** |
| **1 antenna port per Resource** | **>1 antenna ports per Resource** |
| Rank Combination Indicator | 0 |  |
| The first Layer Indicator | 0 |  |
| The second Layer Indicator | 0 |  |
| Wide-band CQI for the first TB | 4 | 4 |
| Subband differential CQI for the first TB | 2 | 2 |
| CRI if *csi-ReportMode= Mode 1*  |  |  |
| CRI if *csi-ReportMode= Mode 2* |  |  |

Table 6.3.1.1.2-3B: RI, LI, CQI, and CRI associated with one CSI-RS resource *and csi-ReportMode= Mode 1 or Mode 2*

|  |  |
| --- | --- |
| **Field** | **Bitwidth** |
| **1 antenna port** | **2 antenna ports** | **4 antenna ports** | **>4 antenna ports** |
| **Rank1~4** | **Rank5~8** |
| Rank Indicator | 0 |  |  |  |  |
|  Layer Indicator | 0 |  |  |  |  |
| Wide-band CQI for the first TB | 4 | 4 | 4 | 4 | 4 |
| Wideband CQI for the second TB | 0 | 0 | 0 | 0 | 4 |
| Subband differential CQI for the first TB | 2 | 2 | 2 | 2 | 2 |
| Subband differential CQI for the second TB | 0 | 0 | 0 | 0 | 2 |
| CRI if *csi-ReportMode= Mode 1* and *numberOfSingleTRP-CSI-Mode1 = 1* |  |  |  |  |  |
| CRI if *csi-ReportMode= Mode 1* and *numberOfSingleTRP-CSI-Mode1 = 2* |  for the first CRI; for the second CRI |  for the first CRI; for the second CRI |  for the first CRI; for the second CRI |  for the first CRI; for the second CRI |  for the first CRI; for the second CRI |
| CRI if *csi-ReportMode= Mode 2* |  |  |  |  |  |

 in Table 6.3.1.1.2-3A is the number of allowed rank combination indicator values associated with one CSI-RS resource pair according to Clause 5.2.2.2.1X [6, TS 38.214]. The values of the rank combination indicator field are mapped to allowed rank combinations in the following order: {1,1}, {1,2}, {2,1},{2,2}, where '0' is mapped to {1,1}. and are the values of the first and the second rank associated with two CSI-RS resources of the CSI-RS resource pair respectively.

 in Table 6.3.1.1.2-3B is the number of allowed rank indicator values associated with one CSI-RS resource according to Clause 5.2.2.2.1X [6, TS 38.214]. *v* is the value of the rank associated with the CSI-RS resource. The values of the rank indicator field are mapped to allowed rank indicator values with increasing order, where '0' is mapped to the smallest allowed rank indicator value.

The value of *N* in Table 6.3.1.1.2-3A and Table 6.3.1.1.2-3B is the number of CSI-RS resource pairs configured within a CSI-RS resource set. The values of M1 and M2 in Table 6.3.1.1.2-3A and Table 6.3.1.1.2-3B are given by

- If *sharedCMR* = "Enabled", *M*1 = *K*1 and *M*2 = *K*2

- If *sharedCMR* is absent and *N* = 1, *M*1 = *K*1 - 1 and *M*2 = *K*2 – 1

- If *sharedCMR* is absent and *N* = 2,

*- M*1 = *K*1 - 2 and *M*2 = *K*2 – 2, if the two resource pairs do not share any CSI-RS resource

*- M*1 = *K*1 - 1 and *M*2 = *K*2 – 2, if the two resource pairs share the same CSI-RS resource from the first CSI-RS resource group

*- M*1 = *K*1 - 2 and *M*2 = *K*2 – 1, if the two resource pairs share the same CSI-RS resource from the second CSI-RS resource group

where the values of *K*1 and *K*2 are the numbers of CSI-RS resources in the first and second CSI-RS resource groups within the CSI-RS resource set respectively.

The bitwidth for RI/LI/CQI/CRI of *codebookType= typeI-MultiPanel* is provided in Table 6.3.1.1.2-4.

Table 6.3.1.1.2-4: RI, LI, CQI, and CRI of *codebookType=typeI-MultiPanel*

|  |  |
| --- | --- |
| Field | Bitwidth |
| Rank Indicator |  |
| Layer Indicator |  |
| Wide-band CQI | 4 |
| Subband differential CQI | 2 |
| CRI |  |

where  is the number of allowed rank indicator values according to Clause 5.2.2.2.2 [6, TS 38.214],  is the value of the rank, and  is the number of CSI-RS resources in the corresponding resource set. The values of the rank indicator field are mapped to allowed rank indicator values with increasing order, where '0' is mapped to the smallest allowed rank indicator value.

The bitwidth for RI/LI/CQI of *codebookType= typeII* or *codebookType=typeII-PortSelection* is provided in Table 6.3.1.1.2-5.

Table 6.3.1.1.2-5: RI, LI, and CQI of *codebookType=typeII or typeII-PortSelection*

|  |  |
| --- | --- |
| Field | Bitwidth |
| Rank Indicator |  |
| Layer Indicator |  |
| Wide-band CQI | 4 |
| Subband differential CQI | 2 |
| Indicator of the number of non-zero wideband amplitude coefficients  for layer   |  |

where  is the number of allowed rank indicator values according to Clauses 5.2.2.2.3 and 5.2.2.2.4 [6, TS 38.214] and  is the value of the rank. The values of the rank indicator field are mapped to allowed rank indicator values with increasing order, where '0' is mapped to the smallest allowed rank indicator value.

The bitwidth for CRI, SSBRI, RSRP, differential RSRP, and CapabilityIndex are provided in Table 6.3.1.1.2-6.

Table 6.3.1.1.2-6: CRI, SSBRI, RSRP, and CapabilityIndex

|  |  |
| --- | --- |
| Field | Bitwidth |
| CRI |  |
| SSBRI |  |
| RSRP | 7 |
| Differential RSRP | 4 |
| CapabilityIndex | 2 |

where  is the number of CSI-RS resources in the corresponding resource set, and  is the configured number of SS/PBCH blocks in the corresponding resource set for reporting 'ssb-Index-RSRP'.

The bitwidth for CRI, SSBRI, SINR, differential SINR, and CapabilityIndex are provided in Table 6.3.1.1.2-6A.

Table 6.3.1.1.2-6A: CRI, SSBRI, SINR, and CapabilityIndex

|  |  |
| --- | --- |
| **Field** | **Bitwidth** |
| CRI |  |
| SSBRI |  |
| SINR | 7 |
| Differential SINR | 4 |
| CapabilityIndex | 2 |

where is the number of CSI-RS resources in the corresponding resource set, and is the configured number of SS/PBCH blocks in the corresponding resource set for reporting 'ssb-Index-SINR'.

If *csi-ReportSubConfig* is configured, for a corresponding CSI sub-report, the mapping order of CSI fields of one CSI sub-report is determined following the procedure in this clause 6.3.1.1.2, by replacing CSI report #n in the following tables with CSI sub-report #n.

Table 6.3.1.1.2-7: Mapping order of CSI fields of one CSI report, *pmi-FormatIndicator=widebandPMI* and *cqi-FormatIndicator=widebandCQI* or *reportQuantity* set to 'cri-RI-CQI' and *cqi-FormatIndicator=widebandCQI*

|  |  |
| --- | --- |
| CSI report number | CSI fields |
| CSI report #n | CRI as in Tables 6.3.1.1.2-3/4, if reported |
| Rank Indicator as in Tables 6.3.1.1.2-3/4, if reported |
| Layer Indicator as in Tables 6.3.1.1.2-3/4, if reported |
| Zero padding bits , if needed |
| PMI wideband information fields , from left to right as in Tables 6.3.1.1.2-1/2, if reported |
| PMI wideband information fields , from left to right as in Tables 6.3.1.1.2-1/2, or codebook index for 2 antenna ports according to Clause 5.2.2.2.1 in [6, TS38.214], if reported |
| Wideband CQI for the first TB as in Tables 6.3.1.1.2-3/4, if reported  |
| Wideband CQI for the second TB as in Tables 6.3.1.1.2-3/4, if reported |

The number of zero padding bits  in Table 6.3.1.1.2-7 is 0 for 1 CSI-RS port and  for more than 1 CSI-RS port, where

-  and  is the set of rank values  that are allowed to be reported;

- , where  is the reported rank;

- For 2 CSI-RS ports, ;

- For more than 2 CSI-RS ports, ;

- if PMI is reported,  and ; otherwise, ;

- if PMI  is reported,  is obtained according to Tables 6.3.1.1.2-1/2; otherwise, ;

- if PMI  is reported,  is obtained according to Tables 6.3.1.1.2-1/2; otherwise, ;

- if CQI is reported,  is obtained according to Tables 6.3.1.1.2-3/4; otherwise, ;

- if LI is reported,  is obtained according to Tables 6.3.1.1.2-3/4; otherwise, .

Table 6.3.1.1.2-7A: Mapping order of CSI fields of one CSI report, *pmi-FormatIndicator=widebandPMI*, *cqi-FormatIndicator=widebandCQI, csi-ReportMode= Mode 1* and *numberOfSingleTRP-CSI-Mode1=0*

|  |  |
| --- | --- |
| CSI report number | CSI fields |
| CSI report #n | CRI as in Tables 6.3.1.1.2-3A, if reported |
| Rank Combination Indicator as in Tables 6.3.1.1.2-3A, if reported |
| Two Layer Indicators as in Table 6.3.1.1.2-3A, where the first Layer Indicator and the second Layer Indicator are associated with the first resource and the second resource within the resource pair respectively and if reported; |
| Zero padding bits , if needed |
| PMI wideband information fields *X1*, from left to right as in Tables 6.3.1.1.2-1 associated with the first resource within the CSI-RS resource pair, if reported |
| PMI wideband information fields *X2*, from left to right as in Tables 6.3.1.1.2-1, or codebook index for 2 antenna ports according to Clause 5.2.2.2.1 in [6, TS38.214] associated with the first CSI-RS resource within the CSI-RS resource pair, if reported |
| PMI wideband information fields *X1*, from left to right as in Tables 6.3.1.1.2-1 associated with the second resource within the CSI-RS resource pair, if reported |
| PMI wideband information fields *X2*, from left to right as in Tables 6.3.1.1.2-1, or codebook index for 2 antenna ports according to Clause 5.2.2.2.1 in [6, TS38.214] associated with the second CSI-RS resource within the CSI-RS resource pair, if reported |
| Wideband CQI for the first TB as in Tables 6.3.1.1.2-3A, if reported |

The number of zero padding bits in Table 6.3.1.1.2-7A is 0 for 1 CSI-RS port and for more than 1 CSI-RS port, where

- and is the set of rank combination values of that are allowed to be reported;

- where R is the reported rank combination;

- For 2 CSI-RS ports, ;

- For more than 2 CSI-RS ports, ;

- if PMI is reported, and ; otherwise,;

- if PMI is reported, and are obtained according to Tables 6.3.1.1.2-1; otherwise, ;

- if PMI is reported, and are obtained according to Tables 6.3.1.1.2-1; otherwise, ;

- if CQI is reported, is obtained according to Tables 6.3.1.1.2-3A; otherwise,;

- if LI is reported, and are obtained according to Tables 6.3.1.1.2-3A; otherwise , .

Table 6.3.1.1.2-8: Mapping order of CSI fields of one report for CRI/RSRP or SSBRI/RSRP or CRI/RSRP/CapabilityIndex or SSBRI/RSRP/CapabilityIndex reporting, or mapping order of CSI fields of one report for inter-cell SSBRI/RSRP reporting

|  |  |
| --- | --- |
| CSI report number | CSI fields |
| CSI report #n | CRI or SSBRI #1 as in Table 6.3.1.1.2-6, if reported |
| CRI or SSBRI #2 as in Table 6.3.1.1.2-6, if reported |
| CRI or SSBRI #3 as in Table 6.3.1.1.2-6, if reported |
| CRI or SSBRI #4 as in Table 6.3.1.1.2-6, if reported |
| RSRP #1 as in Table 6.3.1.1.2-6, if reported |
| Differential RSRP #2 as in Table 6.3.1.1.2-6, if reported |
| Differential RSRP #3 as in Table 6.3.1.1.2-6, if reported |
| Differential RSRP #4 as in Table 6.3.1.1.2-6, if reported |
| CapabilityIndex #1 as in Table 6.3.1.1.2-6, if reported |
| CapabilityIndex #2 as in Table 6.3.1.1.2-6, if reported |
| CapabilityIndex #3 as in Table 6.3.1.1.2-6, if reported |
| CapabilityIndex #4 as in Table 6.3.1.1.2-6, if reported |

Table 6.3.1.1.2-8A: Mapping order of CSI fields of one report for CRI/SINR or SSBRI/SINR or CRI/SINR/CapabilityIndex or SSBRI/SINR/CapabilityIndex reporting

|  |  |
| --- | --- |
| CSI report number | CSI fields |
| CSI report #n | CRI or SSBRI #1 as in Table 6.3.1.1.2-6A, if reported |
| CRI or SSBRI #2 as in Table 6.3.1.1.2-6A, if reported |
| CRI or SSBRI #3 as in Table 6.3.1.1.2-6A, if reported |
| CRI or SSBRI #4 as in Table 6.3.1.1.2-6A, if reported |
| SINR #1 as in Table 6.3.1.1.2-6A, if reported |
| Differential SINR #2 as in Table 6.3.1.1.2-6A, if reported |
| Differential SINR #3 as in Table 6.3.1.1.2-6A, if reported |
| Differential SINR #4 as in Table 6.3.1.1.2-6A, if reported |
| CapabilityIndex #1 as in Table 6.3.1.1.2-6, if reported |
| CapabilityIndex #2 as in Table 6.3.1.1.2-6, if reported |
| CapabilityIndex #3 as in Table 6.3.1.1.2-6, if reported |
| CapabilityIndex #4 as in Table 6.3.1.1.2-6, if reported |

Table 6.3.1.1.2-8B: Mapping order of CSI fields of one report for group-based CRI/RSRP or SSBRI/RSRP reporting

|  |  |
| --- | --- |
| **CSI report number** | **CSI fields** |
| CSI report #n | Resource set indicator |
| CRI or SSBRI #1 of 1st resource group as in Table 6.3.1.1.2-6, if reported |
| CRI or SSBRI #2 of 1st resource group as in Table 6.3.1.1.2-6, if reported |
| CRI or SSBRI #1 of 2nd resource group as in Table 6.3.1.1.2-6, if reported |
| CRI or SSBRI #2 of 2nd resource group as in Table 6.3.1.1.2-6, if reported |
| CRI or SSBRI #1 of 3rd resource group as in Table 6.3.1.1.2-6, if reported |
| CRI or SSBRI #2 of 3rd resource group as in Table 6.3.1.1.2-6, if reported |
| CRI or SSBRI #1 of 4th resource group as in Table 6.3.1.1.2-6, if reported |
| CRI or SSBRI #2 of 4th resource group as in Table 6.3.1.1.2-6, if reported |
| RSRP of CRI or SSBRI #1 of 1st resource group as in Table 6.3.1.1.2-6 |
| Differential RSRP of CRI or SSBRI #2 of 1st resource group as in Table 6.3.1.1.2-6 |
| Differential RSRP of CRI or SSBRI #1 of 2nd resource group as in Table 6.3.1.1.2-6, if reported |
| Differential RSRP of CRI or SSBRI #2 of 2nd resource group as in Table 6.3.1.1.2-6, if reported |
| Differential RSRP of CRI or SSBRI #1 of 3rd resource group as in Table 6.3.1.1.2-6, if reported |
| Differential RSRP of CRI or SSBRI #2 of 3rd resource group as in Table 6.3.1.1.2-6, if reported |
| Differential RSRP of CRI or SSBRI #1 of 4th resource group as in Table 6.3.1.1.2-6, if reported |
| Differential RSRP of CRI or SSBRI #2 of 4th resource group as in Table 6.3.1.1.2-6, if reported |

where the 1-bit resource set indicator, with value of 0 or 1, indicates the 1st or the 2nd channel measurement resource set respectively, from which CRI or SSBRI #1 of 1st resource group is reported from; and all remaining resource groups, if reported, follow the same mapping order as the 1st resource group where CRI or SSBRI #1 of all remaining resource groups is reported from the indicated channel measurement resource set. For all reported resource groups, CRI or SSBRI #1 and CRI or SSBRI #2 are reported from different channel measurement resource sets.

Table 6.3.1.1.2-9: Mapping order of CSI fields of one CSI report, CSI part 1, *pmi-FormatIndicator=* *subbandPMI* or *cqi-FormatIndicator=subbandCQI*

|  |  |
| --- | --- |
| CSI report number | CSI fields |
| CSI report #nCSI part 1 | CRI as in Tables 6.3.1.1.2-3/4, if reported |
| Rank Indicator as in Tables 6.3.1.1.2-3/4/5, if reported |
| Wideband CQI for the first TB as in Tables 6.3.1.1.2-3/4/5, if reported |
| Subband differential CQI for the first TB with increasing order of subband number as in Tables 6.3.1.1.2-3/4/5, if reported |
| Indicator of the number of non-zero wideband amplitude coefficients for layer 0 as in Table 6.3.1.1.2-5, if reported |
| Indicator of the number of non-zero wideband amplitude coefficients for layer 1 as in Table 6.3.1.1.2-5 (if the rank according to the reported RI is equal to one, this field is set to all zeros), if 2-layer PMI reporting is allowed according to the rank restriction in Clauses 5.2.2.2.3 and 5.2.2.2.4 [6, TS 38.214] and if reported |
| Note: Subbands for given CSI report *n* indicated by the higher layer parameter *csi-ReportingBand* with value set to '1' are numbered continuously in the increasing order with the lowest subband of *csi-ReportingBand* with value set to '1' as subband 0. |

Table 6.3.1.1.2-9A: Mapping order of CSI fields of one CSI report, CSI part 1, *csi-ReportMode= Mode 1*

|  |  |
| --- | --- |
| CSI report number | CSI fields |
| CSI report #nCSI part 1 | CRI as in Tables 6.3.1.1.2-3A, if associated with one CSI-RS resource pair and if reported |
| Rank Combination Indicator as in Tables 6.3.1.1.2-3A, if reported |
| Wideband CQI for the first TB as in Tables 6.3.1.1.2-3A, if reported |
| Subband differential CQI for the first TB with increasing order of subband number as in Tables 6.3.1.1.2-3A, if reported |
| CRI as in Tables 6.3.1.1.2-3B, if associated with one CSI-RS resource, *numberOfSingleTRP-CSI-Mode1 = 1* and if reported;First CRI as in Tables 6.3.1.1.2-3B, if associated with one CSI-RS resource, *numberOfSingleTRP-CSI-Mode1 = 2* and if reported |
| Rank Indicator associated with CRI as in Tables 6.3.1.1.2-3B, if *numberOfSingleTRP-CSI-Mode1 =* 1 and if reported;Rank Indicator associated with the first CRI as in Tables 6.3.1.1.2-3B, if *numberOfSingleTRP-CSI-Mode1 =* 2 and if reported |
| Wideband CQI associated with CRI for the first TB as in Tables 6.3.1.1.2-3B, if *numberOfSingleTRP-CSI-Mode1 =* 1 and if reported;Wideband CQI associated with the first CRI for the first TB as in Tables 6.3.1.1.2-3B, if *numberOfSingleTRP-CSI-Mode1 = 2* and if reported |
| Subband differential CQI associated with CRI for the first TB with increasing order of subband number as in Tables 6.3.1.1.2-3B, if *numberOfSingleTRP-CSI-Mode1 =* 1 if reported;Subband differential CQI associated with the first CRI for the first TB with increasing order of subband number as in Tables 6.3.1.1.2-3B, if *numberOfSingleTRP-CSI-Mode1 =* 2 and if reported |
| Second CRI as in Tables 6.3.1.1.2-3B, if associated with one CSI-RS resource, *numberOfSingleTRP-CSI-Mode1 =* 2 and if reported |
| Rank Indicator associated with the second CRI as in Tables 6.3.1.1.2-3B, if *numberOfSingleTRP-CSI-Mode1 =* 2 and if reported |
| Wideband CQI associated with the second CRI for the first TB as in Tables 6.3.1.1.2-3B, if *numberOfSingleTRP-CSI-Mode1 =* 2 and if reported |
| Subband differential CQI associated with the second CRI for the first TB with increasing order of subband number as in Tables 6.3.1.1.2-3B, if *numberOfSingleTRP-CSI-Mode1 =* 2 and if reported |
| Note: Subbands for given CSI report *n* indicated by the higher layer parameter *csi-ReportingBand* with value set to '1' are numbered continuously in the increasing order with the lowest subband of *csi-ReportingBand* with value set to '1' as subband 0. |

Table 6.3.1.1.2-9B: Mapping order of CSI fields of one CSI report, CSI part 1, *csi-ReportMode= Mode 2*

|  |  |
| --- | --- |
| CSI report number | CSI fields |
| CSI report #nCSI part 1 | CRI as in Tables 6.3.1.1.2-3A, if associated with one CSI-RS resource pair and if reported;CRI as in Tables 6.3.1.1.2-3B, if associated with one CSI-RS resource and if reported |
| Rank Combination Indicator as in Tables 6.3.1.1.2-3A, if associated with one CSI-RS resource pair and if reported;Rank Indicator as in Tables 6.3.1.1.2-3B, if associated with one CSI-RS resource and if reported;Zero padding bits , if needed |
| Wideband CQI for the first TB as in Tables 6.3.1.1.2-3A, if associated with one CSI-RS resource pair and if reported;Wideband CQI for the first TB as in Tables 6.3.1.1.2-3B, if associated with one CSI-RS resource and if reported |
| Subband differential CQI for the first TB with increasing order of subband number as in Tables 6.3.1.1.2-3A, if associated with one CSI-RS resource pair and if reported;Subband differential CQI for the first TB with increasing order of subband number as in Tables 6.3.1.1.2-3B, if associated with one CSI-RS resource and if reported |
| Note: Subbands for given CSI report *n* indicated by the higher layer parameter *csi-ReportingBand* with value set to '1' are numbered continuously in the increasing order with the lowest subband of *csi-ReportingBand* with value set to '1' as subband 0. |

The number of zero padding bits in Table 6.3.1.1.2-9B is 0 for 1 CSI-RS port and for more than 1 CSI-RS port, where

- . is the set of rank and rank combination values *r* that are allowed to be reported. is obtained according to Tables 6.3.1.1.2-3A/3B for rank combination indicator and rank indicator respectively.

- is obtained according to Tables 6.3.1.1.2-3A for rank combination indicator and *R* is the reported rank combination.

- is obtained according to Tables 6.3.1.1.2-3B for rank indicator and *R* is the reported rank.

Table 6.3.1.1.2-10: Mapping order of CSI fields of one CSI report, CSI part 2 wideband, *pmi-FormatIndicator=* *subbandPMI* or *cqi-FormatIndicator=subbandCQI*

|  |  |
| --- | --- |
| CSI report number | CSI fields |
| CSI report #nCSI part 2 wideband | Wideband CQI for the second TB as in Tables 6.3.1.1.2-3/4/5, if present and reported |
| Layer Indicator as in Tables 6.3.1.1.2-3/4/5, if reported |
| PMI wideband information fields , from left to right as in Tables 6.3.1.1.2-1/2, if reported |
| PMI wideband information fields , from left to right as in Tables 6.3.1.1.2-1/2, or codebook index for 2 antenna ports according to Clause 5.2.2.2.1 in [6, TS38.214], if *pmi-FormatIndicator=* *widebandPMI* and if reported |

Table 6.3.1.1.2-10A: Mapping order of CSI fields of one CSI report, CSI part 2 wideband, *csi-ReportMode= Mode 1*

|  |  |
| --- | --- |
| CSI report number | CSI fields |
| CSI report #nCSI part 2 wideband | Two Layer Indicators as in Table 6.3.1.1.2-3A, where the first Layer Indicator and the second Layer Indicator are associated with the first resource and the second resource within the resource pair respectively and if reported; |
| PMI wideband information fields , from left to right as in Tables 6.3.1.1.2-1 associated with the first resource within the CSI-RS resource pair, if reported  |
| PMI wideband information fields , from left to right as in Tables 6.3.1.1.2-1, or codebook index for 2 antenna ports according to Clause 5.2.2.2.1 in [6, TS38.214] associated with the first CSI-RS resource within the CSI-RS resource pair, if *pmi-FormatIndicator=* *widebandPMI* and if reported  |
| PMI wideband information fields , from left to right as in Tables 6.3.1.1.2-1 associated with the second resource within the CSI-RS resource pair, if reported  |
| PMI wideband information fields , from left to right as in Tables 6.3.1.1.2-1, or codebook index for 2 antenna ports according to Clause 5.2.2.2.1 in [6, TS38.214] associated with the second CSI-RS resource within the CSI-RS resource pair, if *pmi-FormatIndicator=* *widebandPMI* and if reported  |
| Wideband CQI for the second TB as in Tables 6.3.1.1.2-3B, if associated with CRI in CSI part 1, *numberOfSingleTRP-CSI-Mode1 =* 1 and if reported;Wideband CQI for the second TB as in Tables 6.3.1.1.2-3B, if associated with the first CRI in CSI part 1, *numberOfSingleTRP-CSI-Mode1 =* 2 and if reported |
| Layer Indicator as in Table 6.3.1.1.2-3B, if associated with CRI in CSI part 1, *numberOfSingleTRP-CSI-Mode1 =* 1 and if reported;Layer Indicator as in Table 6.3.1.1.2-3B, if associated with the first CRI in CSI part 1, *numberOfSingleTRP-CSI-Mode1 =* 2 and if reported |
| PMI wideband information fields , from left to right as in Tables 6.3.1.1.2-1, if associated with CRI in CSI part 1, *numberOfSingleTRP-CSI-Mode1 =* 1 and if reported;PMI wideband information fields , from left to right as in Tables 6.3.1.1.2-1, if associated with the first CRI in CSI part 1, *numberOfSingleTRP-CSI-Mode1 =* 2 and if reported |
| PMI wideband information fields , from left to right as in Tables 6.3.1.1.2-1, or codebook index for 2 antenna ports according to Clause 5.2.2.2.1 in [6, TS38.214], if associated with CRI in CSI part 1, *pmi-FormatIndicator=* *widebandPMI*, *numberOfSingleTRP-CSI-Mode1 =* 1 and if reported;PMI wideband information fields , from left to right as in Tables 6.3.1.1.2-1, or codebook index for 2 antenna ports according to Clause 5.2.2.2.1 in [6, TS38.214], if associated with the first CRI in CSI part 1, *pmi-FormatIndicator=* *widebandPMI,* *numberOfSingleTRP-CSI-Mode1 =* 2 and if reported |
| Wideband CQI for the second TB as in Tables 6.3.1.1.2-3B, if associated with the second CRI in CSI part 1, *numberOfSingleTRP-CSI-Mode1 =* 2 and if reported |
| Layer Indicator as in Table 6.3.1.1.2-3B, if associated with the second CRI in CSI part 1, *numberOfSingleTRP-CSI-Mode1 =* 2 and if reported |
| PMI wideband information fields , from left to right as in Tables 6.3.1.1.2-1, if associated with the second CRI in CSI part 1, *numberOfSingleTRP-CSI-Mode1 =* 2 and if reported |
| PMI wideband information fields , from left to right as in Tables 6.3.1.1.2-1, or codebook index for 2 antenna ports according to Clause 5.2.2.2.1 in [6, TS38.214], if associated with the second CRI in CSI part 1, *pmi-FormatIndicator=* *widebandPMI*, *numberOfSingleTRP-CSI-Mode1 =* 2 and if reported |

Table 6.3.1.1.2-10B: Mapping order of CSI fields of one CSI report, CSI part 2 wideband, *csi-ReportMode= Mode 2*

|  |  |
| --- | --- |
| CSI report number | CSI fields |
| CSI report #nCSI part 2 wideband | Wideband CQI for the second TB as in Tables 6.3.1.1.2-3B, if reported part 1 is associated with one CSI-RS resource and if reported  |
| Two Layer Indicators as in Table 6.3.1.1.2-3A, if reported part 1 is associated with one CSI-RS resource pair, where the first Layer Indicator and the second Layer Indicator are associated with the first resource and the second resource within the resource pair respectively and if reported;Layer Indicator as in Table 6.3.1.1.2-3B, if reported part 1 is associated with one CSI-RS resource and if reported |
| PMI wideband information fields , from left to right as in Tables 6.3.1.1.2-1 associated with the first resource within the CSI-RS resource pair, if reported part 1 is associated with one CSI-RS resource pair and if reported |
| PMI wideband information fields , from left to right as in Tables 6.3.1.1.2-1, or codebook index for 2 antenna ports according to Clause 5.2.2.2.1 in [6, TS38.214] associated with the first CSI-RS resource within the CSI-RS resource pair, if *pmi-FormatIndicator=* *widebandPMI* and reported part 1 is associated with one CSI-RS resource pair and if reported |
| PMI wideband information fields , from left to right as in Tables 6.3.1.1.2-1 associated with the second CSI-RS resource within the CSI-RS resource pair, if reported part 1 is associated with one CSI-RS resource pair and if reported  |
| PMI wideband information fields , from left to right as in Tables 6.3.1.1.2-1, or codebook index for 2 antenna ports according to Clause 5.2.2.2.1 in [6, TS38.214] associated with the second CSI-RS resource within the CSI-RS resource pair, if *pmi-FormatIndicator=* *widebandPMI* and reported part 1 is associated with one CSI-RS resource pair and if reported |
| PMI wideband information fields , from left to right as in Tables 6.3.1.1.2-1, if reported part 1 is associated with one CSI-RS resource and if reported |
| PMI wideband information fields , from left to right as in Tables 6.3.1.1.2-1, or codebook index for 2 antenna ports according to Clause 5.2.2.2.1 in [6, TS38.214], if *pmi-FormatIndicator=* *widebandPMI* and reported part 1 is associated with one CSI-RS resource and if reported |

Table 6.3.1.1.2-11: Mapping order of CSI fields of one CSI report, CSI part 2 subband, *pmi-FormatIndicator=* *subbandPMI* or *cqi-FormatIndicator=subbandCQI*

|  |  |
| --- | --- |
| CSI report #nPart 2 subband | Subband differential CQI for the second TB of all even subbands with increasing order of subband number, as in Tables 6.3.1.1.2-3/4/5, if *cqi-FormatIndicator=subbandCQI* and if reported |
| PMI subband information fields  of all even subbands with increasing order of subband number, from left to right as in Tables 6.3.1.1.2-1/2, or codebook index for 2 antenna ports according to Clause 5.2.2.2.1 in [6, TS38.214] of all even subbands with increasing order of subband number, if *pmi-FormatIndicator=* *subbandPMI* and if reported |
| Subband differential CQI for the second TB of all odd subbands with increasing order of subband number, as in Tables 6.3.1.1.2-3/4/5, if *cqi-FormatIndicator=subbandCQI* and if reported |
| PMI subband information fields  of all odd subbands with increasing order of subband number, from left to right as in Tables 6.3.1.1.2-1/2, or codebook index for 2 antenna ports according to Clause 5.2.2.2.1 in [6, TS38.214] of all odd subbands with increasing order of subband number, if *pmi-FormatIndicator=* *subbandPMI* and if reported |

Note: Subbands for given CSI report *n* indicated by the higher layer parameter *csi-ReportingBand* with value set to '1' are numbered continuously in the increasing order with the lowest subband of *csi-ReportingBand* with value set to '1' as subband 0.

Table 6.3.1.1.2-11A: Mapping order of CSI fields of one CSI report, CSI part 2 subband, *csi-ReportMode= Mode 1*

|  |  |
| --- | --- |
| CSI report #nPart 2 subband | PMI subband information fields  of all even subbands with increasing order of subband number, from left to right as in Tables 6.3.1.1.2-1, or codebook index for 2 antenna ports associated with the first resource within the CSI-RS resource pair, according to Clause 5.2.2.2.1 in [6, TS38.214] of all even subbands with increasing order of subband number, if *pmi-FormatIndicator=* *subbandPMI* and if reported |
| PMI subband information fields  of all even subbands with increasing order of subband number, from left to right as in Tables 6.3.1.1.2-1, or codebook index for 2 antenna ports associated with the second resource within the CSI-RS resource pair, according to Clause 5.2.2.2.1 in [6, TS38.214] of all even subbands with increasing order of subband number, if *pmi-FormatIndicator=* *subbandPMI* and if reported |
| Subband differential CQI for the second TB of all even subbands with increasing order of subband number associated with CRI in CSI part 1, as in Tables 6.3.1.1.2-3B, if *cqi-FormatIndicator=subbandCQI*, *numberOfSingleTRP-CSI-Mode1 =* 1 and if reported;Subband differential CQI for the second TB of all even subbands with increasing order of subband number associated with the first CRI in CSI part 1, as in Tables 6.3.1.1.2-3B, if *cqi-FormatIndicator=subbandCQI*, *numberOfSingleTRP-CSI-Mode1 =* 2 and if reported |
| PMI subband information fields  of all even subbands with increasing order of subband number, from left to right as in Tables 6.3.1.1.2-1, or codebook index for 2 antenna ports associated with CRI in CSI part 1 according to Clause 5.2.2.2.1 in [6, TS38.214] of all even subbands with increasing order of subband number, if *pmi-FormatIndicator=* *subbandPMI*, *numberOfSingleTRP-CSI-Mode1 =* 1 and if reported;PMI subband information fields  of all even subbands with increasing order of subband number, from left to right as in Tables 6.3.1.1.2-1, or codebook index for 2 antenna ports associated with the first CRI in CSI part 1 according to Clause 5.2.2.2.1 in [6, TS38.214] of all even subbands with increasing order of subband number, if *pmi-FormatIndicator=* *subbandPMI*, *numberOfSingleTRP-CSI-Mode1 =* 2 and if reported |
| Subband differential CQI for the second TB of all even subbands with increasing order of subband number associated with the second CRI in CSI part 1, as in Tables 6.3.1.1.2-3B, if *cqi-FormatIndicator=subbandCQI*, *numberOfSingleTRP-CSI-Mode1 =* 2 and if reported |
| PMI subband information fields  of all even subbands with increasing order of subband number, from left to right as in Tables 6.3.1.1.2-1, or codebook index for 2 antenna ports associated with the second CRI in CSI part 1 according to Clause 5.2.2.2.1 in [6, TS38.214] of all even subbands with increasing order of subband number, if *pmi-FormatIndicator=* *subbandPMI*, *numberOfSingleTRP-CSI-Mode1 =* 2 and if reported |
| PMI subband information fields  of all odd subbands with increasing order of subband number, from left to right as in Tables 6.3.1.1.2-1, or codebook index for 2 antenna ports associated with the first resource within the CSI-RS resource pair, according to Clause 5.2.2.2.1 in [6, TS38.214] of all odd subbands with increasing order of subband number, if *pmi-FormatIndicator=* *subbandPMI* and if reported |
| PMI subband information fields  of all odd subbands with increasing order of subband number, from left to right as in Tables 6.3.1.1.2-1, or codebook index for 2 antenna ports associated with the second resource within the CSI-RS resource pair, according to Clause 5.2.2.2.1 in [6, TS38.214] of all odd subbands with increasing order of subband number, if *pmi-FormatIndicator=* *subbandPMI* and if reported |
| Subband differential CQI for the second TB of all odd subbands with increasing order of subband number associated with CRI in CSI part 1, as in Tables 6.3.1.1.2-3B, if *cqi-FormatIndicator=subbandCQI*, *numberOfSingleTRP-CSI-Mode1 =* 1 and if reported;Subband differential CQI for the second TB of all odd subbands with increasing order of subband number associated with the first CRI in CSI part 1, as in Tables 6.3.1.1.2-3B, if *cqi-FormatIndicator=subbandCQI*, *numberOfSingleTRP-CSI-Mode1 =* 2 and if reported |
| PMI subband information fields  of all odd subbands with increasing order of subband number, from left to right as in Tables 6.3.1.1.2-1, or codebook index for 2 antenna ports associated with CRI in CSI part 1 according to Clause 5.2.2.2.1 in [6, TS38.214] of all odd subbands with increasing order of subband number, if *pmi-FormatIndicator=* *subbandPMI*, *numberOfSingleTRP-CSI-Mode1 =* 1 and if reported;PMI subband information fields  of all odd subbands with increasing order of subband number, from left to right as in Tables 6.3.1.1.2-1, or codebook index for 2 antenna ports associated with the first CRI in CSI part 1 according to Clause 5.2.2.2.1 in [6, TS38.214] of all odd subbands with increasing order of subband number, if *pmi-FormatIndicator=* *subbandPMI*, *numberOfSingleTRP-CSI-Mode1 =* 2 and if reported |
| Subband differential CQI for the second TB of all odd subbands with increasing order of subband number associated with the second CRI in CSI part 1, as in Tables 6.3.1.1.2-3B, if *cqi-FormatIndicator=subbandCQI*, *numberOfSingleTRP-CSI-Mode1 =* 2 and if reported |
| PMI subband information fields  of all odd subbands with increasing order of subband number, from left to right as in Tables 6.3.1.1.2-1, or codebook index for 2 antenna ports associated with the second CRI in CSI part 1 according to Clause 5.2.2.2.1 in [6, TS38.214] of all odd subbands with increasing order of subband number, if *pmi-FormatIndicator=* *subbandPMI*, *numberOfSingleTRP-CSI-Mode1 =* 2 and if reported |

Table 6.3.1.1.2-11B: Mapping order of CSI fields of one CSI report, CSI part 2 subband, *csi-ReportMode= Mode 2*

|  |  |
| --- | --- |
| CSI report #nPart 2 subband | PMI subband information fields  of all even subbands with increasing order of subband number, from left to right as in Tables 6.3.1.1.2-1, or codebook index for 2 antenna ports associated with the first resource within the CSI-RS resource pair, according to Clause 5.2.2.2.1 in [6, TS38.214] of all even subbands with increasing order of subband number, if *pmi-FormatIndicator=* *subbandPMI* and reported part 1 is associated with one CSI-RS resource pair and if reported |
| PMI subband information fields  of all even subbands with increasing order of subband number, from left to right as in Tables 6.3.1.1.2-1, or codebook index for 2 antenna ports associated with the second resource within the CSI-RS resource pair, according to Clause 5.2.2.2.1 in [6, TS38.214] of all even subbands with increasing order of subband number, if *pmi-FormatIndicator=* *subbandPMI* and reported part 1 is associated with one CSI-RS resource pair and if reported |
| PMI subband information fields  of all odd subbands with increasing order of subband number, from left to right as in Tables 6.3.1.1.2-1, or codebook index for 2 antenna ports associated with the first resource within the CSI-RS resource pair, according to Clause 5.2.2.2.1 in [6, TS38.214] of all odd subbands with increasing order of subband number, if *pmi-FormatIndicator=* *subbandPMI* and reported part 1 is associated with one CSI-RS resource pair and if reported |
| PMI subband information fields  of all odd subbands with increasing order of subband number, from left to right as in Tables 6.3.1.1.2-1, or codebook index for 2 antenna ports associated with the second resource within the CSI-RS resource pair, according to Clause 5.2.2.2.1 in [6, TS38.214] of all odd subbands with increasing order of subband number, if *pmi-FormatIndicator=* *subbandPMI* and reported part 1 is associated with one CSI-RS resource pair and if reported |
| Subband differential CQI for the second TB of all even subbands with increasing order of subband number associated with one CSI-RS resource, as in Tables 6.3.1.1.2-3B, if *cqi-FormatIndicator=subbandCQI* and reported part 1 is associated with one CSI-RS resource and if reported |
| PMI subband information fields  of all even subbands with increasing order of subband number, from left to right as in Tables 6.3.1.1.2-1, or codebook index for 2 antenna ports associated with one CSI-RS resource according to Clause 5.2.2.2.1 in [6, TS38.214] of all even subbands with increasing order of subband number, if *pmi-FormatIndicator=* *subbandPMI* and reported part 1 is associated with one CSI-RS resource and if reported |
| Subband differential CQI for the second TB of all odd subbands with increasing order of subband number associated with one CSI-RS resource, as in Tables 6.3.1.1.2-3B, if *cqi-FormatIndicator=subbandCQI* and reported part 1 is associated with one CSI-RS resource and if reported |
| PMI subband information fields  of all odd subbands with increasing order of subband number, from left to right as in Tables 6.3.1.1.2-1/2, or codebook index for 2 antenna ports associated with one CSI-RS resource according to Clause 5.2.2.2.1 in [6, TS38.214] of all odd subbands with increasing order of subband number, if *pmi-FormatIndicator=* *subbandPMI* and reported part 1 is associated with one CSI-RS resource and if reported |

If none of the CSI reports for transmission on a PUCCH is of two parts, the CSI fields of all CSI reports, in the order from upper part to lower part in Table 6.3.1.1.2-12, are mapped to the UCI bit sequence  starting with . The most significant bit of each field is mapped to the lowest order information bit for that field, e.g. the most significant bit of the first field is mapped to.

Table 6.3.1.1.2-12: Mapping order of CSI reports to UCI bit sequence , without two-part CSI report(s)

|  |  |
| --- | --- |
| UCI bit sequence | CSI report number |
|  | CSI report #1as in Table 6.3.1.1.2-7/7A/8/8B |
| CSI report #2as in Table 6.3.1.1.2-7/7A/8/8B |
| … |
| CSI report #nas in Table 6.3.1.1.2-7/7A/8/8B |
| Note: For a CSI report #i containing CSI sub-reports, where i=1,2,…,n, all CSI sub-reports within the CSI report #i are mapped to the corresponding part of UCI bit sequence of CSI report #i, from upper part to lower part in increasing order of CSI sub-report number. CSI sub-report #1, CSI sub-report #2, …, CSI sub-report #n correspond to the CSI sub-reports in increasing order of *CSI-ReportSubConfigID*. |

If at least one of the CSI reports for transmission on a PUCCH is of two parts, two UCI bit sequences are generated,  and . The CSI fields of all CSI reports, in the order from upper part to lower part in Table 6.3.1.1.2-13, are mapped to the UCI bit sequence  starting with . The most significant bit of each field is mapped to the lowest order information bit for that field, e.g. the most significant bit of the first field is mapped to. The CSI fields of all CSI reports, in the order from upper part to lower part in Table 6.3.1.1.2-14, are mapped to the UCI bit sequence  starting with . The most significant bit of each field is mapped to the lowest order information bit for that field, e.g. the most significant bit of the first field is mapped to . If the length of UCI bit sequence  is less than 3 bits, zeros shall be appended to the UCI bit sequence until its length equals 3.

Table 6.3.1.1.2-13: Mapping order of CSI reports to UCI bit sequence ,
with two-part CSI report(s)

|  |  |
| --- | --- |
| UCI bit sequence | CSI report number |
|  | CSI report #1 if CSI report #1 is not of two parts, orCSI report #1, CSI part 1, if CSI report #1 is of two parts,as in Table 6.3.1.1.2-7/7A/8/8B/9/9A/9B |
| CSI report #2 if CSI report #2 is not of two parts, orCSI report #2, CSI part 1, if CSI report #2 is of two parts,as in Table 6.3.1.1.2-7/7A/8/8B/9/9A/9B |
| … |
| CSI report #n if CSI report #n is not of two parts, orCSI report #n, CSI part 1, if CSI report #n is of two parts,as in Table 6.3.1.1.2-7/7A/8/8B/9/9A/9B |
| Note: For a CSI report #i containing CSI sub-reports, where i=1,2,…,n, all CSI sub-reports, either a CSI sub-report without two-part, or CSI part 1 of a CSI sub-report with two-part CSI, are mapped to the corresponding part of UCI bit sequence of CSI report #i, from upper part to lower part in increasing order of CSI sub-report number. CSI sub-report #1, CSI sub-report #2, …, CSI sub-report #n correspond to the CSI sub-reports in increasing order of *CSI-ReportSubConfigID*. |

where CSI report #1, CSI report #2, …, CSI report #n in Table 6.3.1.1.2-13 correspond to the CSI reports in increasing order of CSI report priority values according to Clause 5.2.5 of [6, TS38.214].

Table 6.3.1.1.2-14: Mapping order of CSI reports to UCI bit sequence ,
with two-part CSI report(s)

|  |  |
| --- | --- |
| UCI bit sequence | CSI report number |
|  | CSI report #1, CSI part 2 wideband, as in Table 6.3.1.1.2-10/10A/10Bif CSI part 2 exists for CSI report #1 |
| CSI report #2, CSI part 2 wideband, as in Table 6.3.1.1.2-10/10A/10Bif CSI part 2 exists for CSI report #2 |
| … |
| CSI report #n, CSI part 2 wideband, as in Table 6.3.1.1.2-10/10A/10Bif CSI part 2 exists for CSI report #n |
| CSI report #1, CSI part 2 subband, as in Table 6.3.1.1.2-11/11A/11Bif CSI part 2 exists for CSI report #1 |
| CSI report #2, CSI part 2 subband, as in Table 6.3.1.1.2-11/11A/11Bif CSI part 2 exists for CSI report #2 |
| … |
| CSI report #n, CSI part 2 subband, as in Table 6.3.1.1.2-11/11A/11Bif CSI part 2 exists for CSI report #n |
| Note: For a CSI report #i containing CSI sub-reports, where i=1,2,…,n,* all the CSI part 2 widebands of CSI sub-reports are mapped to the corresponding part of UCI bit sequence of CSI report #i, from upper part to lower part in increasing order of CSI sub-report number;
* after the mapping of all the CSI part 2 widebands of CSI sub-reports, all the CSI part 2 subbands of CSI sub-reports are mapped to the corresponding part of UCI bit sequence of CSI report #i, from upper part to lower part in increasing order of CSI sub-report number.
* CSI sub-report #1, CSI sub-report #2, …, CSI sub-report #n correspond to the CSI sub-reports in increasing order of *CSI-ReportSubConfigID*.
 |

where CSI report #1, CSI report #2, …, CSI report #n in Table 6.3.1.1.2-14 correspond to the CSI reports in increasing order of CSI report priority values according to Clause 5.2.5 of [6, TS38.214].

< Unchanged parts are omitted >

##### 6.3.2.1.2 CSI

If *cqi-BitsPerSubband* is configured, this Clause 6.3.2.1.2 applies by taking Subband CQI as Subband differential CQI and replacing the corresponding number of bits 2 by 4.

If *csi-ReportSubConfig* is configured, for a corresponding CSI sub-report, the bitwidth of a CSI field of the CSI sub-report is determined following the procedure in this clause 6.3.2.1.2 by taking configurations in *CSI-ReportSubConfig* when applicable. If *csi-ReportSubConfig* configures a list of CSI-RS resource IDs, for the determination of the bitwdith of a CRI field, the value of is the number of CSI-RS resources configured in the corresponding *csi-ReportSubConfig*.

The bitwidth for PMI of *codebookType=typeI-SinglePanel* and *codebookType=typeI-MultiPanel* is specified in Clause 6.3.1.1.2.

The bitwidth for RI/LI/CQI/CRI of *codebookType=typeI-SinglePanel* and *codebookType=typeI-MultiPanel* is specified in Clause 6.3.1.1.2.

The bitwidth for PMI of *codebookType=typeII* is provided in Tables 6.3.2.1.2-1, where the values of , , , , , , and  are given by Clause 5.2.2.2.3 in [6, TS 38.214].

Table 6.3.2.1.2-1: PMI of *codebookType=* *typeII*

|  |  |  |
| --- | --- | --- |
|  | Information fields  for wideband PMI | Information fields  for wideband PMI or per subband PMI |
|  |  |  |  |  |  |  |  |  |  |
| Rank=1SBAmp off |  |  |  |  | N/A | N/A |  | N/A | N/A | N/A |
| Rank=2SBAmp off |  |  |  |  |  |  |  |  | N/A | N/A |
| Rank=1SBAmp on |  |  |  |  | N/A | N/A |  | N/A |  | N/A |
| Rank=2SBAmp on |  |  |  |  |  |  |  |  |  |  |

The bitwidth for PMI of *codebookType=typeII-r16* is provided in Tables 6.3.2.1.2-1A, where the values of , , , , , and are given by Clause 5.2.2.2.5 in [6, TS 38.214].

Table 6.3.2.1.2-1A: PMI of *codebookType=* *typeII-r16*

|  |  |
| --- | --- |
|  | Information fields  |
|  |  |  |  |  |  |
| Rank=1 |  |  |  | N/A | N/A | N/A |
| Rank=2 |  |  |  |  | N/A | N/A |
| Rank=3 |  |  |  |  |  | N/A |
| Rank=4 |  |  |  |  |  |  |
| Rank=1 |  |  |  | N/A | N/A | N/A |
| Rank=2 |  |  |  |  | N/A | N/A |
| Rank=3 |  |  |  |  |  | N/A |
| Rank=4 |  |  |  |  |  |  |
|  | Information fields  |
|  |  |  |  |  |  |  |  |  |  |  |  |
| Rank=1 | 4 | N/A | N/A | N/A | N/A |  | N/A | N/A | N/A |  |  |  |
| Rank=2 | 4 | 4 | N/A | N/A | N/A |  |  | N/A | N/A |  |  |  |
| Rank=3 | 4 | 4 | 4 | N/A | N/A |  |  |  | N/A |  |  |  |
| Rank=4 | 4 | 4 | 4 | 4 | N/A |  |  |  |  |  |  |  |
| Rank=1 | 4 | N/A | N/A | N/A |  |  | N/A | N/A | N/A |  |  |  |
| Rank=2 | 4 | 4 | N/A | N/A |  |  |  | N/A | N/A |  |  |  |
| Rank=3 | 4 | 4 | 4 | N/A |  |  |  |  | N/A |  |  |  |
| Rank=4 | 4 | 4 | 4 | 4 |  |  |  |  |  |  |  |  |

Note: the bitwidth for , and shown in Table 6.3.2.1.2-1A is the total bitwidth of , and up to Rank = , respectively, and the corresponding per layer bitwidths are , , and 4, (i.e., 1, 3, and 4 bits for each respective indicator elements , , and , respectively), where as defined in Clause 5.2.2.2.5 in [6, TS 38.214] is the number of nonzero coefficients for layer such that .

The bitwidth for PMI of *codebookType= typeII-PortSelection* is provided in Tables 6.3.2.1.2-2, where the values of , , , , , , and  are given by Clause 5.2.2.2.4 in [6, TS 38.214].

Table 6.3.2.1.2-2: PMI of *codebookType=* *typeII-PortSelection*

|  |  |  |
| --- | --- | --- |
|  | Information fields  for wideband PMI | Information fields  for wideband PMI or per subband PMI |
|  |  |  |  |  |  |  |  |  |
| Rank=1SBAmp off |  |  |  | N/A | N/A |  | N/A | N/A | N/A |
| Rank=2SBAmp off |  |  |  |  |  |  |  | N/A | N/A |
| Rank=1SBAmp on |  |  |  | N/A | N/A |  | N/A |  | N/A |
| Rank=2SBAmp on |  |  |  |  |  |  |  |  |  |

The bitwidth for PMI of *codebookType=typeII-PortSelection-r16* is provided in Tables 6.3.2.1.2-2A, where the values of ,, , , , and are given by Clause 5.2.2.2.6 in [6, TS 38.214].

Table 6.3.2.1.2-2A: PMI of *codebookType=* *typeII-PortSelection-r16*

|  |  |
| --- | --- |
|  | Information fields  |
|  |  |  |  |  |
| Rank=1 |  |  | N/A | N/A | N/A |
| Rank=2 |  |  |  | N/A | N/A |
| Rank=3 |  |  |  |  | N/A |
| Rank=4 |  |  |  |  |  |
| Rank=1 |  |  | N/A | N/A | N/A |
| Rank=2 |  |  |  | N/A | N/A |
| Rank=3 |  |  |  |  | N/A |
| Rank=4 |  |  |  |  |  |
|  | Information fields  |
|  |  |  |  |  |  |  |  |  |  |  |  |
| Rank=1 | 4 | N/A | N/A | N/A | N/A |  | N/A | N/A | N/A |  |  |  |
| Rank=2 | 4 | 4 | N/A | N/A | N/A |  |  | N/A | N/A |  |  |  |
| Rank=3 | 4 | 4 | 4 | N/A | N/A |  |  |  | N/A |  |  |  |
| Rank=4 | 4 | 4 | 4 | 4 | N/A |  |  |  |  |  |  |  |
| Rank=1 | 4 | N/A | N/A | N/A |  |  | N/A | N/A | N/A |  |  |  |
| Rank=2 | 4 | 4 | N/A | N/A |  |  |  | N/A | N/A |  |  |  |
| Rank=3 | 4 | 4 | 4 | N/A |  |  |  |  | N/A |  |  |  |
| Rank=4 | 4 | 4 | 4 | 4 |  |  |  |  |  |  |  |  |

Note: the bitwidth for , and shown in Table 6.3.2.1.2-2A is the total bitwidth of , and up to Rank = , respectively, and the corresponding per layer bitwidths are , , and 4, (i.e., 1, 3, and 4 bits for each respective indicator elements , , and , respectively), where as defined in Clause 5.2.2.2.5 in [6, TS 38.214] is the number of nonzero coefficients for layer such that .

The bitwidth for PMI of *codebookType=typeII-PortSelection-r17* is provided in Tables 6.3.2.1.2-2B, where the values of ,, , , and are given by Clause 5.2.2.2.7 in [6, TS 38.214].

Table 6.3.2.1.2-2B: PMI of *codebookType=* *typeII-PortSelection-r17*

|  |  |
| --- | --- |
|  | Information fields  |
|  |  |  |  |  |  |
| Rank=1 |  |  if *N > M=2*, N/A otherwise  |  | N/A | N/A | N/A |
| Rank=2 |  |  if *N > M=2*, N/A otherwise  |  |  | N/A | N/A |
| Rank=3 |  |  if *N > M=2*, N/A otherwise  |  |  |  | N/A |
| Rank=4 |  |  if *N > M=2*, N/A otherwise  |  |  |  |  |
|  | Information fields  |
|  |  |  |  |  |  |  |
| Rank=1 | 4 | N/A | N/A | N/A |  |  | N/A if ; otherwise |
| Rank=2 | 4 | 4 | N/A | N/A |  |  | N/A if ; otherwise |
| Rank=3 | 4 | 4 | 4 | N/A |  |  |  |
| Rank=4 | 4 | 4 | 4 | 4 |  |  |  |

Note: the bitwidth for , and shown in Table 6.3.2.1.2-2B is the total bitwidth of , and up to Rank = , respectively, and the corresponding per layer bitwidths are , , and 4, (i.e., 1, 3, and 4 bits for each respective indicator elements , , and , respectively), where as defined in Clause 5.2.2.2.7 in [6, TS 38.214] is the number of nonzero coefficients for layer such that .

If *csi-ReportSubConfig* is configured, for a corresponding CSI sub-report, the mapping order of CSI fields of one CSI sub-report is determined following the procedure in this clause 6.3.2.1.2, by replacing CSI report #n in the following tables with CSI sub-report #n.

For CSI on PUSCH, two UCI bit sequences are generated,  and . The CSI fields of all CSI reports, in the order from upper part to lower part in Table 6.3.2.1.2-6, are mapped to the UCI bit sequence  starting with . The CSI fields of all CSI reports, in the order from upper part to lower part in Table 6.3.2.1.2-7, are mapped to the UCI bit sequence  starting with .

The mapping order of CSI fields of one report for CRI/RSRP or SSBRI/RSRP or CRI/RSRP/CapabilityIndex or SSBRI/RSRP/CapabilityIndex reporting is provided in Table 6.3.1.1.2-8. The mapping order of CSI fields of one report for inter-cell SSBRI/RSRP reporting is provided in Table 6.3.1.1.2-8. The mapping order of CSI fields of one report for CRI/SINR or SSBRI/SINR or CRI/SINR/CapabilityIndex or SSBRI/SINR/CapabilityIndex reporting is provided in Table 6.3.1.1.2-8A. The mapping order of CSI fields of one report for group-based CRI/RSRP or SSBRI/RSRP reporting is provided in Table 6.3.1.1.2-8B. The procedure in clause 6.3.2 described for CSI part 1 is also applicable for one report for CRI/RSRP, SSBRI/RSRP, CRI/SINR, or SSBRI/SINR reporting.

Table 6.3.2.1.2-3: Mapping order of CSI fields of one CSI report, CSI part 1

|  |  |
| --- | --- |
| CSI report number | CSI fields |
| CSI report #nCSI part 1 | CRI as in Tables 6.3.1.1.2-3/4/6, if reported |
| Rank Indicator as in Tables 6.3.1.1.2-3/4/5 or 6.3.2.1.2-8/9, if reported |
| Wideband CQI for the first TB as in Tables 6.3.1.1.2-3/4/5 or 6.3.2.1.2-8/9, if reported |
| Subband differential CQI for the first TB with increasing order of subband number as in Tables 6.3.1.1.2-3/4/5 or 6.3.2.1.2-8/9, if reported |
| Indicator of the number of non-zero wideband amplitude coefficients for layer 0 as in Table 6.3.1.1.2-5, if reported |
| Indicator of the number of non-zero wideband amplitude coefficients for layer 1 as in Table 6.3.1.1.2-5 (if the rank according to the reported RI is equal to one, this field is set to all zeros), if 2-layer PMI reporting is allowed according to the rank restriction in Clauses 5.2.2.2.3 and 5.2.2.2.4 [6, TS 38.214] and if reported |
| Indicator of the total number of non-zero coefficients summed across all layers as in Table 6.3.2.1.2-8/9, if reported |
| Note: Subbands for given CSI report *n* indicated by the higher layer parameter *csi-ReportingBand* are numbered continuously in the increasing order with the lowest subband of *csi-ReportingBand* as subband 0. |

Table 6.3.2.1.2-3A: Mapping order of CSI fields of one CSI report, CSI part 1, *csi-ReportMode= Mode 1*

|  |  |
| --- | --- |
| CSI report number | CSI fields |
| CSI report #nCSI part 1 | CRI as in Tables 6.3.1.1.2-3A, if associated with one CSI-RS resource pair and if reported |
| Rank Combination Indicator as in Tables 6.3.1.1.2-3A, if reported |
| Wideband CQI for the first TB as in Tables 6.3.1.1.2-3A, if reported |
| Subband differential CQI for the first TB with increasing order of subband number as in Tables 6.3.1.1.2-3A, if reported |
| CRI as in Tables 6.3.1.1.2-3B, if associated with one CSI-RS resource, *numberOfSingleTRP-CSI-Mode1 = 1* and if reported;First CRI as in Tables 6.3.1.1.2-3B, if associated with one CSI-RS resource, *numberOfSingleTRP-CSI-Mode1 = 2* and if reported |
| Rank Indicator associated with CRI as in Tables 6.3.1.1.2-3B, if *numberOfSingleTRP-CSI-Mode1 =* 1 and if reported;Rank Indicator associated with the first CRI as in Tables 6.3.1.1.2-3B, if *numberOfSingleTRP-CSI-Mode1 =* 2 and if reported |
| Wideband CQI associated with CRI for the first TB as in Tables 6.3.1.1.2-3B, if *numberOfSingleTRP-CSI-Mode1 =* 1 and if reported;Wideband CQI associated with the first CRI for the first TB as in Tables 6.3.1.1.2-3B, if *numberOfSingleTRP-CSI-Mode1 = 2* and if reported |
| Subband differential CQI associated with CRI for the first TB with increasing order of subband number as in Tables 6.3.1.1.2-3B, if *numberOfSingleTRP-CSI-Mode1 =* 1 if reported;Subband differential CQI associated with the first CRI for the first TB with increasing order of subband number as in Tables 6.3.1.1.2-3B, if *numberOfSingleTRP-CSI-Mode1 =* 2 and if reported |
| Second CRI as in Tables 6.3.1.1.2-3B, if associated with one CSI-RS resource, *numberOfSingleTRP-CSI-Mode1 =* 2 and if reported |
| Rank Indicator associated with the second CRI as in Tables 6.3.1.1.2-3B, if *numberOfSingleTRP-CSI-Mode1 =* 2 and if reported |
| Wideband CQI associated with the second CRI for the first TB as in Tables 6.3.1.1.2-3B, if *numberOfSingleTRP-CSI-Mode1 =* 2 and if reported |
| Subband differential CQI associated with the second CRI for the first TB with increasing order of subband number as in Tables 6.3.1.1.2-3B, if *numberOfSingleTRP-CSI-Mode1 =* 2 and if reported |
| Note: Subbands for given CSI report *n* indicated by the higher layer parameter *csi-ReportingBand* are numbered continuously in the increasing order with the lowest subband of *csi-ReportingBand* as subband 0. |

Table 6.3.2.1.2-3B: Mapping order of CSI fields of one CSI report, CSI part 1, *csi-ReportMode= Mode 2*

|  |  |
| --- | --- |
| CSI report number | CSI fields |
| CSI report #nCSI part 1 | CRI as in Tables 6.3.1.1.2-3A, if associated with one CSI-RS resource pair and if reported;CRI as in Tables 6.3.1.1.2-3B, if associated with one CSI-RS resource and if reported |
| Rank Combination Indicator as in Tables 6.3.1.1.2-3A, if associated with one CSI-RS resource pair and if reported;Rank Indicator as in Tables 6.3.1.1.2-3B, if associated with one CSI-RS resource and if reported;Zero padding bits , if needed |
| Wideband CQI for the first TB as in Tables 6.3.1.1.2-3A, if associated with one CSI-RS resource pair and if reported;Wideband CQI for the first TB as in Tables 6.3.1.1.2-3B, if associated with one CSI-RS resource and if reported |
| Subband differential CQI for the first TB with increasing order of subband number as in Tables 6.3.1.1.2-3A, if associated with one CSI-RS resource pair and if reported;Subband differential CQI for the first TB with increasing order of subband number as in Tables 6.3.1.1.2-3B, if associated with one CSI-RS resource and if reported |
| Note: Subbands for given CSI report *n* indicated by the higher layer parameter *csi-ReportingBand* are numbered continuously in the increasing order with the lowest subband of *csi-ReportingBand* as subband 0. |

The number of zero padding bits in Table 6.3.1.1.2-9B is 0 for 1 CSI-RS port and for more than 1 CSI-RS port, where

- . is the set of rank and rank combination values *r* that are allowed to be reported. is obtained according to Tables 6.3.1.1.2-3A/3B for rank combination indicator and rank indicator respectively.

- is obtained according to Tables 6.3.1.1.2-3A for rank combination indicator and *R* is the reported rank combination

- is obtained according to Tables 6.3.1.1.2-3B for rank indicator and *R* is the reported rank

Table 6.3.2.1.2-4: Mapping order of CSI fields of one CSI report, CSI part 2 wideband

|  |  |
| --- | --- |
| CSI report number | CSI fields |
| CSI report #nCSI part 2 wideband | Wideband CQI for the second TB as in Tables 6.3.1.1.2-3/4/5, if present and reported |
| Layer Indicator as in Tables 6.3.1.1.2-3/4/5, if reported |
| PMI wideband information fields , from left to right as in Tables 6.3.1.1.2-1/2 or 6.3.2.1.2-1/2, if reported |
| PMI wideband information fields , from left to right as in Tables 6.3.1.1.2-1/2 or 6.3.2.1.2-1/2, or codebook index for 2 antenna ports according to Clause 5.2.2.2.1 in [6, TS38.214], if *pmi-FormatIndicator=* *widebandPMI* and if reported |

Table 6.3.2.1.2-4A: Mapping order of CSI fields of one CSI report, CSI part 2 wideband, *csi-ReportMode= Mode 1*

|  |  |
| --- | --- |
| CSI report number | CSI fields |
| CSI report #nCSI part 2 wideband | Two Layer Indicators as in Table 6.3.1.1.2-3A, where the first Layer Indicator and the second Layer Indicator are associated with the first resource and the second resource within the resource pair respectively and if reported; |
| PMI wideband information fields , from left to right as in Tables 6.3.1.1.2-1 associated with the first resource within the CSI-RS resource pair, if reported  |
| PMI wideband information fields , from left to right as in Tables 6.3.1.1.2-1, or codebook index for 2 antenna ports according to Clause 5.2.2.2.1 in [6, TS38.214] associated with the first CSI-RS resource within the CSI-RS resource pair, if *pmi-FormatIndicator=* *widebandPMI* and if reported  |
| PMI wideband information fields , from left to right as in Tables 6.3.1.1.2-1 associated with the second resource within the CSI-RS resource pair, if reported  |
| PMI wideband information fields , from left to right as in Tables 6.3.1.1.2-1, or codebook index for 2 antenna ports according to Clause 5.2.2.2.1 in [6, TS38.214] associated with the second CSI-RS resource within the CSI-RS resource pair, if *pmi-FormatIndicator=* *widebandPMI* and if reported  |
| Wideband CQI for the second TB as in Tables 6.3.1.1.2-3B, if associated with CRI in CSI part 1, *numberOfSingleTRP-CSI-Mode1 =* 1 and if reported;Wideband CQI for the second TB as in Tables 6.3.1.1.2-3B, if associated with the first CRI in CSI part 1, *numberOfSingleTRP-CSI-Mode1 =* 2 and if reported |
| Layer Indicator as in Table 6.3.1.1.2-3B, if associated with CRI in CSI part 1, *numberOfSingleTRP-CSI-Mode1 =* 1 and if reported;Layer Indicator as in Table 6.3.1.1.2-3B, if associated with the first CRI in CSI part 1, *numberOfSingleTRP-CSI-Mode1 =* 2 and if reported |
| PMI wideband information fields , from left to right as in Tables 6.3.1.1.2-1, if associated with CRI in CSI part 1, *numberOfSingleTRP-CSI-Mode1 =* 1 and if reported;PMI wideband information fields , from left to right as in Tables 6.3.1.1.2-1, if associated with the first CRI in CSI part 1, *numberOfSingleTRP-CSI-Mode1 =* 2 and if reported |
| PMI wideband information fields , from left to right as in Tables 6.3.1.1.2-1, or codebook index for 2 antenna ports according to Clause 5.2.2.2.1 in [6, TS38.214], if associated with CRI in CSI part 1, *pmi-FormatIndicator=* *widebandPMI*, *numberOfSingleTRP-CSI-Mode1 =* 1 and if reported;PMI wideband information fields , from left to right as in Tables 6.3.1.1.2-1, or codebook index for 2 antenna ports according to Clause 5.2.2.2.1 in [6, TS38.214], if associated with the first CRI in CSI part 1, *pmi-FormatIndicator=* *widebandPMI,* *numberOfSingleTRP-CSI-Mode1 =* 2 and if reported |
| Wideband CQI for the second TB as in Tables 6.3.1.1.2-3B, if associated with the second CRI in CSI part 1, *numberOfSingleTRP-CSI-Mode1 =* 2 and if reported |
| Layer Indicator as in Table 6.3.1.1.2-3B, if associated with the second CRI in CSI part 1, *numberOfSingleTRP-CSI-Mode1 =* 2 and if reported |
| PMI wideband information fields , from left to right as in Tables 6.3.1.1.2-1, if associated with the second CRI in CSI part 1, *numberOfSingleTRP-CSI-Mode1 =* 2 and if reported |
| PMI wideband information fields , from left to right as in Tables 6.3.1.1.2-1, or codebook index for 2 antenna ports according to Clause 5.2.2.2.1 in [6, TS38.214], if associated with the second CRI in CSI part 1, *pmi-FormatIndicator=* *widebandPMI*, *numberOfSingleTRP-CSI-Mode1 =* 2 and if reported |

Table 6.3.2.1.2-4B: Mapping order of CSI fields of one CSI report, CSI part 2 wideband, *csi-ReportMode= Mode 2*

|  |  |
| --- | --- |
| CSI report number | CSI fields |
| CSI report #nCSI part 2 wideband | Wideband CQI for the second TB as in Tables 6.3.1.1.2-3B, if reported part 1 is associated with one CSI-RS resource and if reported |
| Two Layer Indicators as in Table 6.3.1.1.2-3A, if reported part 1 is associated with one CSI-RS resource pair, where the first Layer Indicator and the second Layer Indicator are associated with the first resource and the second resource within the resource pair respectively and if reported;Layer Indicator as in Table 6.3.1.1.2-3B, if reported part 1 is associated with one CSI-RS resource and if reported |
| PMI wideband information fields , from left to right as in Tables 6.3.1.1.2-1 associated with the first resource within the CSI-RS resource pair, if reported part 1 is associated with one CSI-RS resource pair and if reported  |
| PMI wideband information fields , from left to right as in Tables 6.3.1.1.2-1, or codebook index for 2 antenna ports according to Clause 5.2.2.2.1 in [6, TS38.214] associated with the first CSI-RS resource within the CSI-RS resource pair, if *pmi-FormatIndicator=* *widebandPMI* and reported part 1 is associated with one CSI-RS resource pair and if reported  |
| PMI wideband information fields , from left to right as in Tables 6.3.1.1.2-1 associated with the second CSI-RS resource within the CSI-RS resource pair, if reported part 1 is associated with one CSI-RS resource pair and if reported  |
| PMI wideband information fields , from left to right as in Tables 6.3.1.1.2-1, or codebook index for 2 antenna ports according to Clause 5.2.2.2.1 in [6, TS38.214] associated with the second CSI-RS resource within the CSI-RS resource pair, if *pmi-FormatIndicator=* *widebandPMI* and reported part 1 is associated with one CSI-RS resource pair and if reported |
| PMI wideband information fields , from left to right as in Tables 6.3.1.1.2-1, if reported part 1 is associated with one CSI-RS resource and if reported |
| PMI wideband information fields , from left to right as in Tables 6.3.1.1.2-1, or codebook index for 2 antenna ports according to Clause 5.2.2.2.1 in [6, TS38.214], if *pmi-FormatIndicator=* *widebandPMI* and reported part 1 is associated with one CSI-RS resource and if reported |

Table 6.3.2.1.2-5: Mapping order of CSI fields of one CSI report, CSI part 2 subband

|  |  |
| --- | --- |
| CSI report #nPart 2 subband | Subband differential CQI for the second TB of all even subbands with increasing order of subband number, as in Tables 6.3.1.1.2-3/4/5, if *cqi-FormatIndicator=subbandCQI* and if reported |
| PMI subband information fields  of all even subbands with increasing order of subband number, from left to right as in Tables 6.3.1.1.2-1/2 or 6.3.2.1.2-1/2, or codebook index for 2 antenna ports according to Clause 5.2.2.2.1 in [6, TS38.214] of all even subbands with increasing order of subband number, if *pmi-FormatIndicator=* *subbandPMI* and if reported |
| Subband differential CQI for the second TB of all odd subbands with increasing order of subband number, as in Tables 6.3.1.1.2-3/4/5, if *cqi-FormatIndicator=subbandCQI* and if reported |
| PMI subband information fields  of all odd subbands with increasing order of subband number, from left to right as in Tables 6.3.1.1.2-1/2 or 6.3.2.1.2-1/2, or codebook index for 2 antenna ports according to Clause 5.2.2.2.1 in [6, TS38.214] of all odd subbands with increasing order of subband number, if *pmi-FormatIndicator=* *subbandPMI* and if reported |

Note: Subbands for given CSI report *n* indicated by the higher layer parameter *csi-ReportingBand* are numbered continuously in the increasing order with the lowest subband of *csi-ReportingBand* as subband 0.

Table 6.3.2.1.2-5A: Mapping order of CSI fields of one CSI report, CSI part 2 of *codebookType=typeII-r16 or typeII-PortSelection-r16*

|  |  |
| --- | --- |
| CSI report number | CSI fields |
| CSI report #nCSI part 2, group 0 | PMI fields , from left to right as in Tables 6.3.2.1.2-1A/2A, if reported |
| CSI report #nCSI part 2, group 1 | The following PMI fields , from left to right, as in Tables 6.3.2.1.2-1A/2A:, , and highest priority bits of highest priority bits of and highest priority bits of, in decreasing order of priority based on the corresponding function defined in clause 5.2.3 of TS38.214, if reported |
| CSI report #nCSI part 2, group 2 | The following PMI fields , from left to right, as in Tables 6.3.2.1.2-1A/2A lowest priority bits of lowest priority bits of and lowest priority bits of , in decreasing order of priority based on the corresponding function defined in clause 5.2.3 of TS38.214, if reported |

Table 6.3.2.1.2-5B: Mapping order of CSI fields of one CSI report, CSI part 2 of *codebookType=typeII-PortSelection-r17*

|  |  |
| --- | --- |
| CSI report number | CSI fields |
| CSI report #nCSI part 2, group 0 | PMI fields , from left to right as in Tables 6.3.2.1.2-2B, if reported |
| CSI report #nCSI part 2, group 1 | The following PMI fields , from left to right, as in Tables 6.3.2.1.2-2B: highest priority bits of highest priority bits of and highest priority bits of, in decreasing order of priority based on the corresponding function defined in clause 5.2.3 of TS38.214, if reported |
| CSI report #nCSI part 2, group 2 | The following PMI fields , from left to right, as in Tables 6.3.2.1.2-2B lowest priority bits of lowest priority bits of and lowest priority bits of , in decreasing order of priority based on the corresponding function defined in clause 5.2.3 of TS38.214, if reported |

Table 6.3.2.1.2-5C: Mapping order of CSI fields of one CSI report, CSI part 2 subband, *ReportMode= Mode 1*

|  |  |
| --- | --- |
| CSI report #nPart 2 subband | PMI subband information fields  of all even subbands with increasing order of subband number, from left to right as in Tables 6.3.1.1.2-1, or codebook index for 2 antenna ports associated with the first resource within the CSI-RS resource pair, according to Clause 5.2.2.2.1 in [6, TS38.214] of all even subbands with increasing order of subband number, if *pmi-FormatIndicator=* *subbandPMI* and if reported |
| PMI subband information fields  of all even subbands with increasing order of subband number, from left to right as in Tables 6.3.1.1.2-1, or codebook index for 2 antenna ports associated with the second resource within the CSI-RS resource pair, according to Clause 5.2.2.2.1 in [6, TS38.214] of all even subbands with increasing order of subband number, if *pmi-FormatIndicator=* *subbandPMI* and if reported |
| Subband differential CQI for the second TB of all even subbands with increasing order of subband number associated with CRI in CSI part 1, as in Tables 6.3.1.1.2-3B, if *cqi-FormatIndicator=subbandCQI*, *numberOfSingleTRP-CSI-Mode1 =* 1 and if reported;Subband differential CQI for the second TB of all even subbands with increasing order of subband number associated with the first CRI in CSI part 1, as in Tables 6.3.1.1.2-3B, if *cqi-FormatIndicator=subbandCQI*, *numberOfSingleTRP-CSI-Mode1 =* 2 and if reported |
| PMI subband information fields  of all even subbands with increasing order of subband number, from left to right as in Tables 6.3.1.1.2-1, or codebook index for 2 antenna ports associated with CRI in CSI part 1 according to Clause 5.2.2.2.1 in [6, TS38.214] of all even subbands with increasing order of subband number, if *pmi-FormatIndicator=* *subbandPMI*, *numberOfSingleTRP-CSI-Mode1 =* 1 and if reported;PMI subband information fields  of all even subbands with increasing order of subband number, from left to right as in Tables 6.3.1.1.2-1, or codebook index for 2 antenna ports associated with the first CRI in CSI part 1 according to Clause 5.2.2.2.1 in [6, TS38.214] of all even subbands with increasing order of subband number, if *pmi-FormatIndicator=* *subbandPMI*, *numberOfSingleTRP-CSI-Mode1 =* 2 and if reported |
| Subband differential CQI for the second TB of all even subbands with increasing order of subband number associated with the second CRI in CSI part 1, as in Tables 6.3.1.1.2-3B, if *cqi-FormatIndicator=subbandCQI*, *numberOfSingleTRP-CSI-Mode1 =* 2 and if reported |
| PMI subband information fields  of all even subbands with increasing order of subband number, from left to right as in Tables 6.3.1.1.2-1, or codebook index for 2 antenna ports associated with the second CRI in CSI part 1 according to Clause 5.2.2.2.1 in [6, TS38.214] of all even subbands with increasing order of subband number, if *pmi-FormatIndicator=* *subbandPMI*, *numberOfSingleTRP-CSI-Mode1 =* 2 and if reported |
| PMI subband information fields  of all odd subbands with increasing order of subband number, from left to right as in Tables 6.3.1.1.2-1, or codebook index for 2 antenna ports associated with the first resource within the CSI-RS resource pair, according to Clause 5.2.2.2.1 in [6, TS38.214] of all odd subbands with increasing order of subband number, if *pmi-FormatIndicator=* *subbandPMI* and if reported |
| PMI subband information fields  of all odd subbands with increasing order of subband number, from left to right as in Tables 6.3.1.1.2-1, or codebook index for 2 antenna ports associated with the second resource within the CSI-RS resource pair, according to Clause 5.2.2.2.1 in [6, TS38.214] of all odd subbands with increasing order of subband number, if *pmi-FormatIndicator=* *subbandPMI* and if reported |
| Subband differential CQI for the second TB of all odd subbands with increasing order of subband number associated with CRI in CSI part 1, as in Tables 6.3.1.1.2-3B, if *cqi-FormatIndicator=subbandCQI*, *numberOfSingleTRP-CSI-Mode1 =* 1 and if reported;Subband differential CQI for the second TB of all odd subbands with increasing order of subband number associated with the first CRI in CSI part 1, as in Tables 6.3.1.1.2-3B, if *cqi-FormatIndicator=subbandCQI*, *numberOfSingleTRP-CSI-Mode1 =* 2 and if reported |
| PMI subband information fields  of all odd subbands with increasing order of subband number, from left to right as in Tables 6.3.1.1.2-1, or codebook index for 2 antenna ports associated with CRI in CSI part 1 according to Clause 5.2.2.2.1 in [6, TS38.214] of all odd subbands with increasing order of subband number, if *pmi-FormatIndicator=* *subbandPMI*, *numberOfSingleTRP-CSI-Mode1 =* 1 and if reported;PMI subband information fields  of all odd subbands with increasing order of subband number, from left to right as in Tables 6.3.1.1.2-1, or codebook index for 2 antenna ports associated with the first CRI in CSI part 1 according to Clause 5.2.2.2.1 in [6, TS38.214] of all odd subbands with increasing order of subband number, if *pmi-FormatIndicator=* *subbandPMI*, *numberOfSingleTRP-CSI-Mode1 =* 2 and if reported |
| Subband differential CQI for the second TB of all odd subbands with increasing order of subband number associated with the second CRI in CSI part 1, as in Tables 6.3.1.1.2-3B, if *cqi-FormatIndicator=subbandCQI*, *numberOfSingleTRP-CSI-Mode1 =* 2 and if reported |
| PMI subband information fields  of all odd subbands with increasing order of subband number, from left to right as in Tables 6.3.1.1.2-1, or codebook index for 2 antenna ports associated with the second CRI in CSI part 1 according to Clause 5.2.2.2.1 in [6, TS38.214] of all odd subbands with increasing order of subband number, if *pmi-FormatIndicator=* *subbandPMI*, *numberOfSingleTRP-CSI-Mode1 =* 2 and if reported |

Table 6.3.2.1.2-5D: Mapping order of CSI fields of one CSI report, CSI part 2 subband, *ReportMode= Mode 2*

|  |  |
| --- | --- |
| CSI report #nPart 2 subband | PMI subband information fields  of all even subbands with increasing order of subband number, from left to right as in Tables 6.3.1.1.2-1, or codebook index for 2 antenna ports associated with the first resource within the CSI-RS resource pair, according to Clause 5.2.2.2.1 in [6, TS38.214] of all even subbands with increasing order of subband number, if *pmi-FormatIndicator=* *subbandPMI* and reported part 1 is associated with one CSI-RS resource pair and if reported |
| PMI subband information fields  of all even subbands with increasing order of subband number, from left to right as in Tables 6.3.1.1.2-1, or codebook index for 2 antenna ports associated with the second resource within the CSI-RS resource pair, according to Clause 5.2.2.2.1 in [6, TS38.214] of all even subbands with increasing order of subband number, if *pmi-FormatIndicator=* *subbandPMI* and reported part 1 is associated with one CSI-RS resource pair and if reported |
| PMI subband information fields  of all odd subbands with increasing order of subband number, from left to right as in Tables 6.3.1.1.2-1, or codebook index for 2 antenna ports associated with the first resource within the CSI-RS resource pair, according to Clause 5.2.2.2.1 in [6, TS38.214] of all odd subbands with increasing order of subband number, if *pmi-FormatIndicator=* *subbandPMI* and reported part 1 is associated with one CSI-RS resource pair and if reported |
| PMI subband information fields  of all odd subbands with increasing order of subband number, from left to right as in Tables 6.3.1.1.2-1, or codebook index for 2 antenna ports associated with the second resource within the CSI-RS resource pair, according to Clause 5.2.2.2.1 in [6, TS38.214] of all odd subbands with increasing order of subband number, if *pmi-FormatIndicator=* *subbandPMI* and reported part 1 is associated with one CSI-RS resource pair and if reported |
| Subband differential CQI for the second TB of all even subbands with increasing order of subband number associated with one CSI-RS resource, as in Tables 6.3.1.1.2-3B, if *cqi-FormatIndicator=subbandCQI* and reported part 1 is associated with one CSI-RS resource and if reported |
| PMI subband information fields  of all even subbands with increasing order of subband number, from left to right as in Tables 6.3.1.1.2-1, or codebook index for 2 antenna ports associated with one CSI-RS resource according to Clause 5.2.2.2.1 in [6, TS38.214] of all even subbands with increasing order of subband number, if *pmi-FormatIndicator=* *subbandPMI* and reported part 1 is associated with one CSI-RS resource and if reported |
| Subband differential CQI for the second TB of all odd subbands with increasing order of subband number associated with one CSI-RS resource, as in Tables 6.3.1.1.2-3B, if *cqi-FormatIndicator=subbandCQI* and reported part 1 is associated with one CSI-RS resource and if reported |
| PMI subband information fields  of all odd subbands with increasing order of subband number, from left to right as in Tables 6.3.1.1.2-1/2, or codebook index for 2 antenna ports associated with one CSI-RS resource according to Clause 5.2.2.2.1 in [6, TS38.214] of all odd subbands with increasing order of subband number, if *pmi-FormatIndicator=* *subbandPMI* and reported part 1 is associated with one CSI-RS resource and if reported |

Table 6.3.2.1.2-6: Mapping order of CSI reports to UCI bit sequence ,
with two-part CSI report(s)

|  |  |
| --- | --- |
| UCI bit sequence | CSI report number |
|  | CSI part 1 of CSI report #1 as in Table 6.3.2.1.2-3/3A/3B or Table 6.3.1.1.2-8/8A/8B |
| CSI part 1 of CSI report #2 as in Table 6.3.2.1.2-3/3A/3B or Table 6.3.1.1.2-8/8A/8B |
| … |
| CSI part 1 of CSI report #n as in Table 6.3.2.1.2-3/3A/3B or Table 6.3.1.1.2-8/8A/8B |
| Note: For a CSI report #i containing CSI sub-reports, where i=1,2,…,n, CSI part 1 of all CSI sub-reports are mapped to the corresponding part of UCI bit sequence of CSI report #i, from upper part to lower part in increasing order of CSI sub-report number. CSI sub-report #1, CSI sub-report #2, …, CSI sub-report #n correspond to the CSI sub-reports in increasing order of *CSI-ReportSubConfigID*. |

where CSI report #1, CSI report #2, …, CSI report #n in Table 6.3.2.1.2-6 correspond to the CSI reports in increasing order of CSI report priority values according to Clause 5.2.5 of [6, TS38.214].

Table 6.3.2.1.2-7: Mapping order of CSI reports to UCI bit sequence ,
with two-part CSI report(s)

|  |  |
| --- | --- |
| UCI bit sequence | CSI report number |
|  | CSI report #1, CSI part 2 wideband, as in Table 6.3.2.1.2-4/4A/4B,or CSI part 2 with group 0, as in Table 6.3.2.1.2-5A/5B,if CSI part 2 exists for CSI report #1 |
| CSI report #2, CSI part 2 wideband, as in Table 6.3.2.1.2-4/4A/4B,or CSI part 2 with group 0, as in Table 6.3.2.1.2-5A/5B,if CSI part 2 exists for CSI report #2 |
| … |
| CSI report #n, CSI part 2 wideband, as in Table 6.3.2.1.2-4/4A/4B,or CSI part 2 with group 0, as in Table 6.3.2.1.2-5A/5B,if CSI part 2 exists for CSI report #n |
| CSI report #1, CSI part 2 subband, as in Table 6.3.2.1.2-5/5C/5D,or CSI part 2 with group 1 and 2, as in Table 6.3.2.1.2-5A/5B,if CSI part 2 exists for CSI report #1 |
| CSI report #2, CSI part 2 subband, as in Table 6.3.2.1.2-5/5C/5D,or CSI part 2 with group 1 and 2, as in Table 6.3.2.1.2-5A/5B,if CSI part 2 exists for CSI report #2 |
| … |
| CSI report #n, CSI part 2 subband, as in Table 6.3.2.1.2-5/5C/5D,or CSI part 2 with group 1 and 2, as in Table 6.3.2.1.2-5A/5B,if CSI part 2 exists for CSI report #n |
| Note: For a CSI report #i containing CSI sub-reports, where i=1,2,…,n,* CSI part 2 wideband of all CSI sub-reports are mapped to the corresponding part of UCI bit sequence of CSI report #i, from upper part to lower part in increasing order of CSI sub-report number;
* after the mapping of CSI part 2 wideband of all CSI sub-reports, CSI part 2 subband of all CSI sub-reports are mapped to the corresponding part of UCI bit sequence of CSI report #i, from upper part to lower part in increasing order of CSI sub-report number.
* CSI sub-report #1, CSI sub-report #2, …, CSI sub-report #n correspond to the CSI sub-reports in increasing order of *CSI-ReportSubConfigID*.
 |

where CSI report #1, CSI report #2, …, CSI report #n in Table 6.3.2.1.2-7 correspond to the CSI reports in increasing order of CSI report priority values according to Clause 5.2.5 of [6, TS38.214].

The bitwidth for RI/CQI of *codebookType= typeII-r16* or *codebookType=typeII-PortSelection-r16* is provided in Table 6.3.2.1.2-8.

Table 6.3.2.1.2-8: RI and CQI of *codebookType=typeII-r16 or typeII-PortSelection-r16*

|  |  |
| --- | --- |
| Field | Bitwidth |
| Rank Indicator |  |
| Wide-band CQI | 4 |
| Subband differential CQI | 2 |
| Indicator of the total number of non-zero coefficients summed across all layers  |  if max allowed rank is 1; otherwise |

where is the number of allowed rank indicator values according to Clauses 5.2.2.2.5 and 5.2.2.2.6 [6, TS 38.214],, where , , , and are given by Clause 5.2.2.2.5 and 5.2.2.2.6 in [6, TS 38.214]. The values of the rank indicator field are mapped to allowed rank indicator values with increasing order, where '0' is mapped to the smallest allowed rank indicator value. The values of the indicator field are mapped to the allowed values of , according to Clauses 5.2.2.2.5 and 5.2.2.2.6 [6, TS 38.214], with increasing order, where '0' is mapped to .

The bitwidth for RI/CQI of codebookType=typeII-PortSelection-r17 is provided in Table 6.3.2.1.2-9.

Table 6.3.2.1.2-9: RI and CQI of *codebookType=typeII-PortSelection-r17*

|  |  |
| --- | --- |
| Field | Bitwidth |
| Rank Indicator |  |
| Wide-band CQI | 4 |
| Subband differential CQI | 2 |
| Indicator of the total number of non-zero coefficients summed across all layers  |  if max allowed rank is 1; otherwise |

where is the number of allowed rank indicator values according to Clauses 5.2.2.2.7 [6, TS 38.214],, where , , and are given by Clause 5.2.2.2.7 in [6, TS 38.214]. The values of the rank indicator field are mapped to allowed rank indicator values with increasing order, where '0' is mapped to the smallest allowed rank indicator value. The values of the indicator field are mapped to the allowed values of , according to Clauses 5.2.2.2.7 [6, TS 38.214], with increasing order, where '0' is mapped to .

< Unchanged parts are omitted >

### 7.3.1 DCI formats

The DCI formats defined in table 7.3.1-1 are supported.

Table 7.3.1-1: DCI formats

|  |  |
| --- | --- |
| **DCI format** | **Usage** |
| 0\_0 | Scheduling of PUSCH in one cell |
| 0\_1 | Scheduling of one or multiple PUSCH in one cell, or indicating downlink feedback information for configured grant PUSCH (CG-DFI) |
| 0\_2 | Scheduling of PUSCH in one cell |
| 1\_0 | Scheduling of PDSCH in one cell |
| 1\_1 | Scheduling of one or multiple PDSCH in one cell, and/or triggering one shot HARQ-ACK codebook feedback |
| 1\_2 | Scheduling of PDSCH in one cell |
| 2\_0 | Notifying a group of UEs of the slot format, available RB sets, COT duration and search space set group switching |
| 2\_1 | Notifying a group of UEs of the PRB(s) and OFDM symbol(s) where UE may assume no transmission is intended for the UE |
| 2\_2 | Transmission of TPC commands for PUCCH and PUSCH |
| 2\_3 | Transmission of a group of TPC commands for SRS transmissions by one or more UEs |
| 2\_4 | Notifying a group of UEs of the PRB(s) and OFDM symbol(s) where UE cancels the corresponding UL transmission from the UE |
| 2\_5 | Notifying the availability of soft resources as defined in Clause 9.3.1 of [10, TS 38.473] |
| 2\_6 | Notifying the power saving information outside DRX Active Time for one or more UEs |
| 2\_7 | Notifying paging early indication and TRS availability indication for one or more UEs. |
| 2\_9 | Activating or de-activating the cell DTX/DRX configuration of one or multiple serving cells for one or more UEs. |
| 3\_0 | Scheduling of NR sidelink in one cell |
| 3\_1 | Scheduling of LTE sidelink in one cell |
| 4\_0 | Schedulng of PDSCH with CRC scrambled by MCCH-RNTI/G-RNTI for broadcast |
| 4\_1 | Schedulng of PDSCH with CRC scrambled by G-RNTI/G-CS-RNTI for multicast |
| 4\_2 | Schedulng of PDSCH with CRC scrambled by G-RNTI/G-CS-RNTI for multicast |

The fields defined in the DCI formats below are mapped to the information bits  to  as follows.

Each field is mapped in the order in which it appears in the description, including the zero-padding bit(s), if any, with the first field mapped to the lowest order information bit  and each successive field mapped to higher order information bits. The most significant bit of each field is mapped to the lowest order information bit for that field, e.g. the most significant bit of the first field is mapped to .

If the number of information bits in a DCI format is less than 12 bits, zeros shall be appended to the DCI format until the payload size equals 12.

The size of each DCI format is determined by the configuration of the corresponding active bandwidth part of the scheduled cell and shall be adjusted as described in clause 7.3.1.0 if necessary.

If a UE is configured with *pdsch-HARQ-ACK-CodebookList-r16*, *pdsch-HARQ-ACK-Codebook* is replaced by the relevant entry in *pdsch-HARQ-ACK-CodebookList-r16* in this clause.

If a UE is configured with *pdsch-HARQ-ACK-CodebookListMulticast-r17*, *pdsch-HARQ-ACK-Codebook* is replaced by the relevant entry in *pdsch-HARQ-ACK-CodebookListMulticast-r17* in this clause.

< Unchanged parts are omitted >

##### 7.3.1.3.10 Format 2\_9

DCI format 2\_9 is used for activating or de-activating the cell DTX/DRX configuration of one or multiple serving cells for one or more UEs.

The following information is transmitted by means of the DCI format 2\_9 with CRC scrambled by NES-RNTI:

- block number 1, block number 2,…, block number *N*

 where the starting position of a block is determined by the parameter *positionInDCI-cellDTRX* provided by higher layers for the UE configured with the block.

If the UE is configured with higher layer parameter *nes-RNTI*, one or more blocks are configured for the UE by higher layers, with the following field defined for the block:

- Cell DTX/DRX indication – 2 bits if higher layer parameter *cellDTXconfig* and *cellDRXconfig* are both configured for a serving cell, with the MSB corresponding to cell DTX configuration and the LSB corresponding to cell DRX configuration; otherwise 1 bit when either *cellDTXconfig* or *cellDRXconfig* is configured for a serving cell.

The size of DCI format 2\_9 is indicated by the higher layer parameter *sizeDCI-2-9*. The number of information bits in format 2\_9 shall be equal to or less than the payload size of format 2\_9. If the number of information bits in format 2\_9 is less than the size of format 2\_9, the remaining bits are reserved.