**3GPP TSG RAN WG1 Meeting #104b-e R1-210xxxx**

**e-Meeting, April 12th–20th, 2021**

**Source: Moderator (ZTE)**

**Title: Summary on [104b-e-NR-7.1CRs-09]**

**Agenda item: 7.1**

**Document for:** **Discussion/Decision**

# Introduction

In RAN1#104b-e, based on Mr Chairman’s guidance, the editorial corrections (Issue#4 [1], Issue#7 [2], Issue#13 [3], Issue#19 [4], Issue#22 [5, 6], Issue#29 [7]) is handled under this single email discussion. The outcome of the email discussion will be captured in Chairman Notes as recommendations for the editors (no CRs).

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| --- |
| [104b-e-NR-7.1CRs-09] Issue#4, Issue#7, Issue#13, Issue#19, Issue#22, Issue#29 (for Rel-16 only) – Bo (ZTE) by April 14 |

This summary is trying to collect/summarize companies’ input and draw potential TP(s) as recommendations for the editors (no CRs), according to companies’ input.

# Discussion

## Issue#4: Draft CR on PUCCH power control [1]

### Background introduction

|  |  |
| --- | --- |
| ***Reason for change:*** | For the PUCCH power control adjustment state, the TPC command is included in a DCI format 1\_0 or DCI format 1\_1 or in a DCI format 2\_2 with CRC scrambled by TPC-PUCCH-RNTI described in 38.212. The DCI format 2\_2 with TPC command can’t be a LTE DCI format described in 36.212.  |
|  |  |
| ***Summary of change:*** | Correct the specification with defintion of DCI format 2\_2 from 36.212 to 38.212.  |
|  |  |
| ***Consequences if not approved:*** | Incorrect reference in TS 38.213. |

### Companies’ input

Based on [1], the following TP is proposed **for Rel-15**.

***TP 1:*** *{38.213: 7.2.1 UE behaviour}*

|  |
| --- |
| 7.2.1 UE behaviour<Unchaged parts>- For the PUCCH power control adjustment state  for active UL BWP  of carrier  of primary cell  and PUCCH transmission occasion -  is a TPC command value and is included in a DCI format 1\_0 or DCI format 1\_1 for active UL BWP  of carrier  of the primary cell  that the UE detects for PUCCH transmission occasion  or is jointly coded with other TPC commands in a DCI format 2\_2 with CRC scrambled by TPC-PUCCH-RNTI [5, TS 38.212], as described in Clause 11.3-  if the UE is provided *twoPUCCH-PC-AdjustmentStates* and *PUCCH-SpatialRelationInfo* and  if the UE is not provided *twoPUCCH-PC-AdjustmentStates* or *PUCCH-SpatialRelationInfo*- If the UE obtains a TPC command value from a DCI format 1\_0 or a DCI format 1\_1 and if the UE is provided *PUCCH-SpatialRelationInfo*, the UE obtains a mapping, by an index provided by *p0-PUCCH-Id*, between a set of *pucch-SpatialRelationInfoId* values and a set of values for *closedLoopIndex* that provide the  value(s). If the UE receives an activation command indicating a value of *pucch-SpatialRelationInfoId*, the UE determines the value *closedLoopIndex* that provides the value of  through the link to a corresponding *p0-PUCCH-Id* index - If the UE obtains one TPC command from a DCI format 2\_2 with CRC scrambled by a TPC-PUCCH-RNTI, the  value is provided by the closed loop indicator field in DCI format 2\_2 |

Please provide company’s views about TP 1 in the table below.

|  |  |
| --- | --- |
| Company | Comment |
| Moderator | Regarding Rel-16 shadow TP/CR, TP1 seems fine. |
| vivo | Fine. |
| QC | We are fine with the CR |
| Samsung | Support |
| Huawei, HiSilicon | Fine with the TP 1. |
| DOCOMO | We support TP1 for both Rel.15/16 |
| CATT | Fine with TP1. |
| OPPO | Support |
| Ericsson | Support moderator proposal |

## Issue#7: Corrections to TS 38.213 [2]

### Background introduction

|  |  |
| --- | --- |
| ***Reason for change:*** | 1. There is a typo in the subscript of HARQ-ACK sequence in clause 9.1.2.1.
2. According to clause 11.3, a UE can be provided an index for a location in DCI format 2\_2 of a first bit for a TPC command field for the SpCell for EN-DC operation. SpCell includes both PCell and Pscell, but it is not correct to include Pcell which is using LTE for EN-DC operation. Actually, for all DC operations including EN-DC, NE-DC and NR-DC, Pcell can be replaced by Pscell accroding to the descriptions at the beginning of Clause 11 when necessary.
 |
|  |  |
| ***Summary of change:*** | 1. Correct the subscription of HARQ-ACK sequence in clause 9.1.2.1.
2. Remove the description of ‘or the SpCell for EN-DC operation’ for group TPC command for PUCCH in DCI format 2\_2.
 |
|  |  |
| ***Consequences if not approved:*** | Unclear UE behavior for HARQ-ACK codebook generation and group TPC command for PUCCH in DCI format 2\_2 for EN-DC. |

### Companies’ input

Based on [2], the following two TPs are proposed **for Rel-15**.

***TP 2:*** *{38.213: 9.1.2.1 Type-1 HARQ-ACK codebook in physical uplink control channel}*

|  |
| --- |
| 9.1.2.1 Type-1 HARQ-ACK codebook in physical uplink control channel< Unchanged part is omitted >A UE determines  HARQ-ACK information bits, for a total number of  HARQ-ACK information bits, of a HARQ-ACK codebook for transmission in a PUCCH according to the following pseudo-code. In the following pseudo-code, if the UE does not receive a transport block or a CBG, due to the UE not detecting a corresponding DCI format 1\_0 or DCI format 1\_1, the UE generates a NACK value for the transport block or the CBG. The cardinality of the set  defines a total number  of occasions for PDSCH reception or SPS PDSCH release for serving cell  corresponding to the HARQ-ACK information bits. |

***TP 3:*** *{38.213: 11.3 Group TPC commands for PUCCH/PUSCH}*

|  |
| --- |
| 11.3 Group TPC commands for PUCCH/PUSCHFor PUCCH transmission on a serving cell, a UE can be provided- a TPC-PUCCH-RNTI for a DCI format 2\_2 by *tpc-PUCCH-RNTI*- a field in DCI format 2\_2 is a TPC command of 2 bits mapping to  values as described in Clause 7.2.1- an index for a location in DCI format 2\_2 of a first bit for a TPC command field for the Pcell, or for a carrier of the Pcell by *tpc-IndexPCell*- an index for a location in DCI format 2\_2 of a first bit for a TPC command field for the PUCCH-Scell or for a carrier for the PUCCH-Scell by *tpc-IndexPUCCH-Scell*- a mapping for the PUCCH power control adjustment state , by a corresponding {0, 1} value of a closed loop index field that is appended to the TPC command field in DCI format 2\_2 if the UE indicates a capability to support two PUCCH power control adjustment states by *twoDifferentTPC-Loop-PUCCH*, and if the UE is configured for two PUCCH power control adjustment states by *twoPUCCH-PC-AdjustmentStates* |

Please provide company’s views about TP 2 and TP 3 in the table below.

|  |  |
| --- | --- |
| Company | Comment |
| Moderator | Regarding Rel-16 shadow TP/CR, TP 2 and TP3 also seem fine. |
| Vivo | Fine. |
| QC | We are fine with TP 2 and TP 3.  |
| Samsung | Support |
| Huawei, HiSilicon | Fine with TP 2 and TP 3 |
| CATT | Support TP2 and TP3. |
| OPPO | Support |
| Ericsson | Support moderator proposal |

## Issue#13: Draft CR on PDSCH default TCI state[3]

### Background introduction

|  |  |
| --- | --- |
| ***Reason for change:*** | Based on the current 38.214, if none of configured TCI states for the serving cell of scheduled PDSCH contains 'QCL-TypeD', the UE shall obtain the other QCL assumptions from the **indicated TCI states** for its scheduled PDSCH irrespective of the time offset between the reception of the DL DCI and the corresponding PDSCH.However, only one TCI state can be indicated by DCI. The wording ‘states’ should be changed to ‘state’. |
|  |  |
| ***Summary of change:*** | Change ‘indicated TCI states’ to ‘indicated TCI state’. |
|  |  |
| ***Consequences if not approved:*** | The specification will be incorrect since only one TCI state can be indicated.  |

### Companies’ input

Based on [3], the following TP is proposed **for Rel-15**.

***TP 4:*** *{38.214: 5.1.5 Antenna ports quasi co-location}*

|  |
| --- |
| 5.1.5 Antenna ports quasi co-locationFor both the cases when *tci-PresentInDCI* is set to 'enabled' and *tci-PresentInDCI* is not configured in RRC connected mode, if the offset between the reception of the DL DCI and the corresponding PDSCH is less than the threshold *timeDurationForQCL*, the UE may assume that the DM-RS ports of PDSCH of a serving cell are quasi co-located with the RS(s) with respect to the QCL parameter(s) used for PDCCH quasi co-location indication of the CORESET associated with a monitored search space with the lowest *controlResourceSetId* in the latest slot in which one or more CORESETs within the active BWP of the serving cell are monitored by the UE. In this case, if the 'QCL-TypeD' of the PDSCH DM-RS is different from that of the PDCCH DM-RS with which they overlap in at least one symbol, the UE is expected to prioritize the reception of PDCCH associated with that CORESET. This also applies to the intra-band CA case (when PDSCH and the CORESET are in different component carriers). If none of configured TCI states for the serving cell of scheduled PDSCH contains 'QCL-TypeD', the UE shall obtain the other QCL assumptions from the indicated TCI state for its scheduled PDSCH irrespective of the time offset between the reception of the DL DCI and the corresponding PDSCH. |

Please provide company’s views about TP 4 in the table below.

|  |  |
| --- | --- |
| Company | Comment |
| Moderator | Regarding Rel-16 shadow TP/CR, it seems that we need to consider more than one TCI state to be indicated in sDCI-mTRP, and consequently it seems better that ‘indicated TCI states’ is replaced by ‘indicated TCI state(s)’ for Rel-16.  |
| vivo | Not needed. |
| QC | The original TP will need to change Rel-15 spec and then change it back to “states” in Rel-16, which seems unnecessary. The moderator’s proposal ‘indicated TCI state(s)’ is acceptable to us.  |
| Samsung | Support both TP4 and moderator’s proposal for shadow CR (‘indicated TCI state(s)’) for Rel-16. |
| Huawei, HiSilicon | Fine with TP 4 and the moderator’s proposal for Rel-16. |
| DOCOMO | We agree that only single TCI state can be indicated in Rel.15. However, one or multiple TCI state(s) can be indicated in Single DCI based Multi TRP in Rel.16. Thus, we support the TP4 for Rel.15 and we also support moderator’s proposal of ‘indicated TCI state(s)’for Rel.16. |
| CATT | Fine with TP4 and moderator’s proposal for Rel-16. |
| OPPO | Support |
| Ericsson | Support moderator proposal |

## Issue#19: Draft CR on prioritization between SRS and PUCCH [4]

### Background introduction

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Reason for change:*** | <This tdoc is a re-submission of R1-2100616.>The text in TS38.214 “For PUCCH and SRS on the same carrier, a UE shall not transmit SRS when semi-persistent and periodic SRS are configured in the same symbol(s) with PUCCH carrying only CSI report(s), or only L1-RSRP report(s).” is intended to capture the prioritization rule when PUCCH and semi-persistent SRS are overlapped or when PUCCH and periodic SRS are overlapped according to the agreement made in RAN1#90bis captured below. The current text can be misread such that the specified prioritization rule is applied only when PUCCH, periodic SRS and semi-persistent SRS are all overlapped. Note that the subsequent sentence in the same paragraph of the specification uses an expression of ‘when semi-persistent or periodic SRS is configured’

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Agreement @RAN1#90bis:*** In the case of collision of SRS and short PUCCH carrying only CSI report/beam failure recover request, support the prioritization rules in the table below:
	+ The channel listed in the entries below are prioritized

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Aperiodic SRS** | **Semi-persistent SRS** | **periodic SRS** |
| sPUCCH with aperiodic CSI report only | No rule\*\* | sPUCCH | sPUCCH |
| sPUCCH with semi persistent CSI report only | SRS | sPUCCH | sPUCCH |
| sPUCCH with periodic CSI report only | SRS | sPUCCH | sPUCCH |
| sPUCCH with beam failure recover request\* | sPUCCH | sPUCCH | sPUCCH |

* In case SRS is dropped, dropping can be partial in time domain, i.e., only those OFDM symbols that collide with short PUCCH

\*If short PUCCH is supported for beam failure recovery request and collision between short PUCCH with beam failure recovery request and aperiodic/semi persistent/periodic SRS occurs, prioritize short PUCCH\*\* UE can assume that this collision will not occur |

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|  |  |
| ***Summary of change:*** | Change ‘semi-persistent and periodic SRS are configured’ into ‘semi-persistent or periodic SRS is configured’ |
|  |  |
| ***Consequences if not approved:*** | The sentence could be misread such that the specified prioritization rule is applied when PUCCH, periodic SRS and semi-persistent SRS are all overlapped |

### Companies’ input

Based on [4], the following TP is proposed **for Rel-15**.

***TP 5:*** *{38.214: 6.2.1 UE sounding procedure}*

|  |
| --- |
| 6.2.1 UE sounding procedure**---- Unchanged text are omitted ----**The UE is not expected to be configured with different time domain ehaviour for SRS resources in the same SRS resource set. The UE is also not expected to be configured with different time domain ehaviour between SRS resource and associated SRS resources set.The SRS request field [5, TS38.212] in DCI format 0\_1, 1\_1 indicates the triggered SRS resource set given in Table 7.3.1.1.2-24 of [5, TS 38.212]. The 2-bit SRS request field [5, TS38.212] in DCI format 2\_3 indicates the triggered SRS resource set given in Clause 7.3 of [5, TS 38.212] if the UE is configured with higher layer parameter *srs-TPC-PDCCH-Group* set to ‘typeB’, or indicates the SRS transmission on a set of serving cells configured by higher layers if the UE is configured with higher layer parameter *srs-TPC-PDCCH-Group* set to ‘typeA’.For PUCCH and SRS on the same carrier, a UE shall not transmit SRS when semi-persistent or periodic SRS is configured in the same symbol(s) with PUCCH carrying only CSI report(s), or only L1-RSRP report(s). A UE shall not transmit SRS when semi-persistent or periodic SRS is configured or aperiodic SRS is triggered to be transmitted in the same symbol(s) with PUCCH carrying HARQ-ACK and/or SR. In the case that SRS is not transmitted due to overlap with PUCCH, only the SRS symbol(s) that overlap with PUCCH symbol(s) are dropped. PUCCH shall not be transmitted when aperiodic SRS is triggered to be transmitted to overlap in the same symbol with PUCCH carrying semi-persistent/periodic CSI report(s) or semi-persistent/periodic L1-RSRP report(s) only.  |

Please provide company’s views about TP 5 in the table below.

|  |  |
| --- | --- |
| Company | Comment |
| Moderator | Regarding Rel-16 shadow TP/CR, TP 5 also seems fine. |
| Vivo | Not needed.“is” should be “are”. |
| QC | We are fine with this CR. |
| Samsung | This is the editorial change. TP 5 seems fine.  |
| LG | @Vivo, ‘when semi-persistent and periodic SRS are configured in the same symbol(s) with PUCCH’ would mean that ‘when a semi-persistent SRS, a periodic SRS and a PUCCH are all in the same symbol(s)’ from grammar perspective although the intention was that ‘when a semi-persistent SRS and a PUCCH are in the same symbol(s) or when a periodic SRS and a PUCCH are in the same symbol(s)’. This TP is to fix this error, which we think that this is important to avoid potential mis-understanding of current specification especially for those who working outside 3GPP. Please also note that the next sentence uses ‘….**or**… **is**’ for the same situation (blue highlighted part and yellow highlighted part should be a same condition except for the UCI type delivered by the PUCCH)For PUCCH and SRS on the same carrier, a UE shall not transmit SRS when semi-persistent **and** periodic SRS **are** configured in the same symbol(s) with PUCCH carrying only CSI report(s), or only L1-RSRP report(s). A UE shall not transmit SRS when semi-persistent **or** periodic SRS **is** configured or aperiodic SRS is triggered to be transmitted in the same symbol(s) with PUCCH carrying HARQ-ACK and/or SR. |
| Huawei, HiSilicon | Fine with TP 5. |
| DOCOMO | We support TP5 both for Rel.15/16 |
| CATT | Fine with TP5. |
| OPPO | Support |
| Ericsson | Support moderator proposal |

## Issue#22: Correction on UL DAI for Type-2 HARQ-ACK codebook [5, 6]

### Background introduction

For Rel-15 [5]:

|  |  |
| --- | --- |
| ***Reason for change:*** | Correct the notation  to . |
|  |  |
| ***Summary of change:*** |  is changed to  |
|  |  |
| ***Consequences if not approved:*** | Inconsistent notation for UL total DAI.  |

For Rel-16 [6]

|  |  |
| --- | --- |
| ***Reason for change:*** | 1. Correct the notation to .
2. The DAI value in Table 9.1.3-2 is for UL total DAI. should be changed to .
 |
|  |  |
| ***Summary of change:*** |  is changed to ,and is changed to . |
|  |  |
| ***Consequences if not approved:*** | Inconsistent notation for UL total DAI.  |

### Companies’ input

Based on [5], the following TP is proposed **for Rel-15**.

***TP 6:*** *{38.213: 9.1.3.2 Type-2 HARQ-ACK codebook in physical uplink shared channel}*

|  |
| --- |
| 9.1.3.2 Type-2 HARQ-ACK codebook in physical uplink shared channelIf a UE would multiplex HARQ-ACK information in a PUSCH transmission that is not scheduled by a DCI format or is scheduled by DCI format 0\_0, then- if the UE has not received any PDCCH within the monitoring occasions for DCI format 1\_0 or DCI format 1\_1 for scheduling PDSCH receptions or SPS PDSCH release on any serving cell  and the UE does not have HARQ-ACK information in response to a SPS PDSCH reception to multiplex in the PUSCH, as described in Clause 9.1.3.1, the UE does not multiplex HARQ-ACK information in the PUSCH transmission;- else, the UE generates the HARQ-ACK codebook as described in Clause 9.1.3.1, except that *harq-ACK-SpatialBundlingPUCCH* is replaced by *harq-ACK-SpatialBundlingPUSCH*.If a UE multiplexes HARQ-ACK information in a PUSCH transmission that is scheduled by DCI format 0\_1, the UE generates the HARQ-ACK codebook as described in Clause 9.1.3.1, with the following modifications:- For the pseudo-code for the HARQ-ACK codebook generation in Clause 9.1.3.1, after the completion of the  and  loops, the UE sets  where  is the value of the DAI field in DCI format 0\_1 according to Table 9.1.3-2- For the case of first and second HARQ-ACK sub-codebooks, DCI format 0\_1 includes a first DAI field corresponding to the first HARQ-ACK sub-codebook and a second DAI field corresponding to the second HARQ-ACK sub-codebook*- harq-ACK-SpatialBundlingPUCCH* is replaced by *harq-ACK-SpatialBundlingPUSCH*. |

Based on [6], the following two TPs are proposed **for Rel-16**.

***TP 7:*** *{38.213: 9.1.3.1 Type-2 HARQ-ACK codebook in physical uplink control channel}*

|  |
| --- |
| 9.1.3.1 Type-2 HARQ-ACK codebook in physical uplink control channel**---- Unchanged text are omitted ----**if UE does not set and  end ifif end if |

***TP 8:*** *{38.213: 9.1.3.2 Type-2 HARQ-ACK codebook in physical uplink shared channel}*

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 9.1.3.2 Type-2 HARQ-ACK codebook in physical uplink shared channelIf a UE multiplexes HARQ-ACK information in a PUSCH transmission that is scheduled by a DCI format that includes a DAI field, the UE generates the HARQ-ACK codebook as described in Clause 9.1.3.1, with the following modifications:- For the pseudo-code for the HARQ-ACK codebook generation in Clause 9.1.3.1, after the completion of the and loops, the UE sets where is the value of the DAI field according to Table 9.1.3-2- For the case of first and second HARQ-ACK sub-codebooks, the DCI format includes a first DAI field corresponding to the first HARQ-ACK sub-codebook and a second DAI field corresponding to the second HARQ-ACK sub-codebook*- harq-ACK-SpatialBundlingPUCCH* is replaced by *harq-ACK-SpatialBundlingPUSCH*.If a UE is not provided *PDSCH-CodeBlockGroupTransmission* and the UE is scheduled for a PUSCH transmission by DCI format that includes a DAI field with value and the UE has not received any PDCCH within the monitoring occasions for PDCCH with DCI format scheduling PDSCH receptions or SPS PDSCH release or indicating SCell dormancy on any serving cell and the UE does not have HARQ-ACK information in response to a SPS PDSCH reception to multiplex in the PUSCH, as described in Clause 9.1.3.1, the UE does not multiplex HARQ-ACK information in the PUSCH transmission. If a UE is provided *PDSCH-CodeBlockGroupTransmission* and the UE is scheduled for a PUSCH transmission by DCI format that includes a DAI field with first value or with second value and the UE has not received any PDCCH within the monitoring occasions for PDCCH with DCI format scheduling PDSCH receptions or SPS PDSCH release, or DCI format 1\_1 indicating SCell dormancy, on any serving cell and the UE does not have HARQ-ACK information in response to a SPS PDSCH reception to multiplex in the PUSCH, as described in Clause 9.1.3.1, the UE does not multiplex HARQ-ACK information for the first sub-codebook or for the second sub-codebook, respectively, in the PUSCH transmission.Table 9.1.3-2: Value of DAI

|  |  |  |
| --- | --- | --- |
| DAIMSB, LSB |   | Number of {serving cell, PDCCH monitoring occasion}-pair(s) in which PDSCH transmission(s) associated with PDCCH or PDCCH indicating SPS PDSCH release or DCI format 1\_1 indicating SCell dormancy is present, denoted as and  |
| 0,0 | 1 |  |
| 0,1 | 2 |  |
| 1,0 | 3 |  |
| 1,1 | 4 |  |

 |

Please provide company’s views about TP 6, TP 7 and TP 8 in the table below.

|  |  |
| --- | --- |
| Company | Comment |
| vivo | Supportive. |
| QC | For TP 6, we acknowledge it is a typo. But we don’t see a change is mandatory because it causes no confusion. But if majority are fine, we don’t object the TP.For TP 7, same view as for TP 6. For TP8, the change in the table which change DL to UL is necessary. For the other change, we have the same view as for TP 6. |
| Samsung | This issue is the notation alignment. We are fine with TP 6, TP 7 and TP 8.  |
| Huawei, HiSilicon | Fine with TP 6, TP 7 and TP 8 even though most of the notation changes except the last one in TP 8 do not cause misinterpretation.  |
| DOCOMO | We support TP6/7/8 |
| CATT | Fine with the TPs. |
| OPPO | Support |
| Ericsson | Support TP6, TP7, TP8 to algin the notations properly. |

## Issue#29: Correction on PUSCH frequency hopping in 38.214 [7]

### Background introduction

|  |  |
| --- | --- |
| ***Reason for change:*** | In Rel-16, the frequency offset for PUSCH frequency hopping is described as follows*For a PUSCH scheduled by RAR UL grant, fallbackRAR UL grant, or by DCI format 0\_0 with CRC scrambled by TC-RNTI, frequency offsets are obtained as described in clause 8.3 of [6, TS 38.213]. For a PUSCH scheduled by DCI format 0\_0/0\_1 or a PUSCH based on a Type2 configured UL grant activated by DCI format 0\_0/0\_1 and for resource allocation type 1, frequency offsets are configured by higher layer parameter frequencyHoppingOffsetLists in pusch-Config.*The case of “PUSCH scheduled by DCI format 0\_0” as described in the second senence also covers the case of “PUSCH scheduled by DCI format 0\_0 scambled by TC-RNTI” in the first sentence. Therefore, it is not clear which frequency offsets are used for PUSCH scheduled by DCI format 0\_0 with CRC scrambled by TC-RNTI. Note that in Rel-15, there is an “Otherwise” at the beginning of the second sentence. *For a PUSCH scheduled by RAR UL grant or by DCI format 0\_0 with CRC scrambled by TC-RNTI, frequency offsets are obtained as described in clause 8.3 of [6, TS 38.213]. Otherwise, for a PUSCH scheduled by DCI format 0\_0/0\_1 or a PUSCH based on a Type2 configured UL grant and for resource allocation type 1, frequency offsets are configured by higher layer parameter frequencyHoppingOffsetLists in pusch-Config:*Besides the above, a square bracket is missing in the reference for TS 38.213 when the freqeuncy offset for MsgA PUSCH is descibed. |
|  |  |
| ***Summary of change:*** | Clarify the frequency offset for PUSCH scheduled by DCI format 0\_0 with CRC scrambled by TC-RNTI.Add a square bracket to the reference for TS 38.213. |
|  |  |
| ***Consequences if not approved:*** | It is not clear which frequency offsets are used for PUSCH scheduled by DCI format 0\_0 with CRC scrambled by TC-RNTI when PUSCH frequency hopping is enabled. |

### Companies’ input

Based on [7], the following TP is proposed **for Rel-16 only**.

***TP 9:*** *{38.214: 6.3.1 Frequency hopping for PUSCH repetition Type A}*

|  |
| --- |
| 6.3.1 Frequency hopping for PUSCH repetition Type A**<Unchanged parts are omitted>**For a PUSCH scheduled by RAR UL grant, fallbackRAR UL grant, or by DCI format 0\_0 with CRC scrambled by TC-RNTI, frequency offsets are obtained as described in clause 8.3 of [6, TS 38.213]. Otherwise, for a PUSCH scheduled by DCI format 0\_0/0\_1 or a PUSCH based on a Type2 configured UL grant activated by DCI format 0\_0/0\_1 and for resource allocation type 1, frequency offsets are configured by higher layer parameter *frequencyHoppingOffsetLists* in *pusch-Config*. For a PUSCH scheduled by DCI format 0\_2 or a PUSCH based on a Type2 configured UL grant activated by DCI format 0\_2 and for resource allocation type 1, frequency offsets are configured by higher layer parameter *frequencyHoppingOffsetListsDCI-0-2* in *pusch-Config*.- When the size of the active BWP is less than 50 PRBs, one of two higher layer configured offsets is indicated in the UL grant.- When the size of the active BWP is equal to or greater than 50 PRBs, one of four higher layer configured offsets is indicated in the UL grant.For PUSCH based on a Type1 configured UL grant the frequency offset is provided by the higher layer parameter *frequencyHoppingOffset* in *rrc-ConfiguredUplinkGrant*. For a MsgA PUSCH the frequency offset is provided by the higher layer parameter as described in [6, TS 38.213]. |

Please provide company’s views about TP 9 in the table below.

|  |  |
| --- | --- |
| Company | Comment |
| vivo | Supportive. |
| QC | We don’t see the change is necessary. But we can accept it if majority companies want it. |
| Samsung | Editorial CR, we are generally fine with CR. |
| Huawei, HiSilicon | Fine with TP 9. |
| DOCOMO | We support TP9 |
| CATT | Fine with TP9. |
| OPPO | Support |
| Ericsson | Support to adopt the TP as editorial change. |

# Summary

The following potential TP is updated based on the companies’ input. We have the following observation:

* Regarding Issue#4, all companies are fine with corresponding TP for Rel-15 and moderator’s suggestion on shadow CR/TP for Rel-16.
* Regarding Issue#7, all companies are fine with corresponding TP for Rel-15 and moderator’s suggestion on shadow CR/TP for Rel-16.
* Regarding Issue#13, one company has concerns but can be flexible after email discussion. So, hopefully, we can go with majority views. The TP 4 is proposed for Rel.15, and replacing ‘indicated TCI states’ by ‘indicated TCI state(s)’ for Rel.16 is proposed for Rel-16.
* Regarding Issue#19, one company has concerns but can be flexible after email discussion. So, the corresponding TP is proposed for Rel-15 and Rel-16.
* Regarding Issue#22, it seems that all companies can live the the Rel-15 TP and Rel-16 TP from [5] and [6] as well.
* Regarding Issue#29, it seems that all companies can live with the corresponding TP also.

Based on the above observation, we have the following TPs accordingly.

**Issue #4**

***TP 1-1:*** *{38.213: 7.2.1 UE behaviour} for Rel-15*

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| 7.2.1 UE behaviour**<Unchanged parts are omitted>**- For the PUCCH power control adjustment state  for active UL BWP  of carrier  of primary cell  and PUCCH transmission occasion -  is a TPC command value and is included in a DCI format 1\_0 or DCI format 1\_1 for active UL BWP  of carrier  of the primary cell  that the UE detects for PUCCH transmission occasion  or is jointly coded with other TPC commands in a DCI format 2\_2 with CRC scrambled by TPC-PUCCH-RNTI [5, TS 38.212], as described in Clause 11.3-  if the UE is provided *twoPUCCH-PC-AdjustmentStates* and *PUCCH-SpatialRelationInfo* and  if the UE is not provided *twoPUCCH-PC-AdjustmentStates* or *PUCCH-SpatialRelationInfo*- If the UE obtains a TPC command value from a DCI format 1\_0 or a DCI format 1\_1 and if the UE is provided *PUCCH-SpatialRelationInfo*, the UE obtains a mapping, by an index provided by *p0-PUCCH-Id*, between a set of *pucch-SpatialRelationInfoId* values and a set of values for *closedLoopIndex* that provide the  value(s). If the UE receives an activation command indicating a value of *pucch-SpatialRelationInfoId*, the UE determines the value *closedLoopIndex* that provides the value of  through the link to a corresponding *p0-PUCCH-Id* index - If the UE obtains one TPC command from a DCI format 2\_2 with CRC scrambled by a TPC-PUCCH-RNTI, the  value is provided by the closed loop indicator field in DCI format 2\_2 |

***TP 1-2:*** *{38.213: 7.2.1 UE behaviour} for Rel-16*

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| - For the PUCCH power control adjustment state  for active UL BWP  of carrier  of primary cell  and PUCCH transmission occasion -  is a TPC command value included in a DCI format scheduling a PDSCH reception for active UL BWP  of carrier  of the primary cell  that the UE detects for PUCCH transmission occasion , or is jointly coded with other TPC commands in a DCI format 2\_2 with CRC scrambled by TPC-PUCCH-RNTI [5, TS38.212], as described in Clause 11.3-  if the UE is provided *twoPUCCH-PC-AdjustmentStates* and *PUCCH-SpatialRelationInfo* and  if the UE is not provided *twoPUCCH-PC-AdjustmentStates* or *PUCCH-SpatialRelationInfo*- If the UE obtains a TPC command value from a DCI format scheduling a PDSCH reception and if the UE is provided *PUCCH-SpatialRelationInfo*, the UE obtains a mapping, by an index provided by *p0-PUCCH-Id*, between a set of *pucch-SpatialRelationInfoId* values and a set of values for *closedLoopIndex* that provide the  value(s). If the UE receives an activation command indicating a value of *pucch-SpatialRelationInfoId*, the UE determines the value *closedLoopIndex* that provides the value of  through the link to a corresponding *p0-PUCCH-Id* index  |

**Issue #7**

***TP 2-1:*** *{38.213: 9.1.2.1 Type-1 HARQ-ACK codebook in physical uplink control channel} for Rel-15*

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| 9.1.2.1 Type-1 HARQ-ACK codebook in physical uplink control channel< Unchanged part is omitted >A UE determines  HARQ-ACK information bits, for a total number of  HARQ-ACK information bits, of a HARQ-ACK codebook for transmission in a PUCCH according to the following pseudo-code. In the following pseudo-code, if the UE does not receive a transport block or a CBG, due to the UE not detecting a corresponding DCI format 1\_0 or DCI format 1\_1, the UE generates a NACK value for the transport block or the CBG. The cardinality of the set  defines a total number  of occasions for PDSCH reception or SPS PDSCH release for serving cell  corresponding to the HARQ-ACK information bits. |

***TP 2-2:*** *{38.213: 9.1.2.1 Type-1 HARQ-ACK codebook in physical uplink control channel} for Rel-16*

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| 9.1.2.1 Type-1 HARQ-ACK codebook in physical uplink control channel< Unchanged part is omitted >A UE determines  HARQ-ACK information bits, for a total number of  HARQ-ACK information bits, of a HARQ-ACK codebook for transmission in a PUCCH according to the following pseudo-code. In the following pseudo-code, if the UE does not receive a transport block or a CBG, due to the UE not detecting a corresponding DCI format, the UE generates a NACK value for the transport block or the CBG. The cardinality of the set  defines a total number  of occasions for PDSCH reception or SPS PDSCH release for serving cell  corresponding to the HARQ-ACK information bits. |

***TP 3-1:*** *{38.213: 11.3 Group TPC commands for PUCCH/PUSCH} for Rel-15*

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| 11.3 Group TPC commands for PUCCH/PUSCHFor PUCCH transmission on a serving cell, a UE can be provided- a TPC-PUCCH-RNTI for a DCI format 2\_2 by *tpc-PUCCH-RNTI*- a field in DCI format 2\_2 is a TPC command of 2 bits mapping to  values as described in Clause 7.2.1- an index for a location in DCI format 2\_2 of a first bit for a TPC command field for the Pcell, or for a carrier of the Pcell by *tpc-IndexPCell*- an index for a location in DCI format 2\_2 of a first bit for a TPC command field for the PUCCH-Scell or for a carrier for the PUCCH-Scell by *tpc-IndexPUCCH-Scell*- a mapping for the PUCCH power control adjustment state , by a corresponding {0, 1} value of a closed loop index field that is appended to the TPC command field in DCI format 2\_2 if the UE indicates a capability to support two PUCCH power control adjustment states by *twoDifferentTPC-Loop-PUCCH*, and if the UE is configured for two PUCCH power control adjustment states by *twoPUCCH-PC-AdjustmentStates* |

***TP 3-2:*** *{38.213: 11.3 Group TPC commands for PUCCH/PUSCH} for Rel-16*

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| 11.3 Group TPC commands for PUCCH/PUSCHFor PUCCH transmission on a serving cell, a UE can be provided- a TPC-PUCCH-RNTI for a DCI format 2\_2 by *tpc-PUCCH-RNTI*- a field in DCI format 2\_2 is a TPC command of 2 bits mapping to  values as described in Clause 7.2.1- an index for a location in DCI format 2\_2 of a first bit for a TPC command field for the PCell, or for a carrier of the PCell by *tpc-IndexPCell*- an index for a location in DCI format 2\_2 of a first bit for a TPC command field for the PUCCH-SCell or for a carrier for the PUCCH-SCell by *tpc-IndexPUCCH-Scell*- a mapping for the PUCCH power control adjustment state , by a corresponding {0, 1} value of a closed loop index field that is appended to the TPC command field in DCI format 2\_2 if the UE indicates a capability to support two PUCCH power control adjustment states by *twoDifferentTPC-Loop-PUCCH*, and if the UE is configured for two PUCCH power control adjustment states by *twoPUCCH-PC-AdjustmentStates* |

**Issue #13**

***TP 4-1:*** *{38.214: 5.1.5 Antenna ports quasi co-location} for Rel-15*

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| 5.1.5 Antenna ports quasi co-location< Unchanged part is omitted >For both the cases when *tci-PresentInDCI* is set to 'enabled' and *tci-PresentInDCI* is not configured in RRC connected mode, if the offset between the reception of the DL DCI and the corresponding PDSCH is less than the threshold *timeDurationForQCL*, the UE may assume that the DM-RS ports of PDSCH of a serving cell are quasi co-located with the RS(s) with respect to the QCL parameter(s) used for PDCCH quasi co-location indication of the CORESET associated with a monitored search space with the lowest *controlResourceSetId* in the latest slot in which one or more CORESETs within the active BWP of the serving cell are monitored by the UE. In this case, if the 'QCL-TypeD' of the PDSCH DM-RS is different from that of the PDCCH DM-RS with which they overlap in at least one symbol, the UE is expected to prioritize the reception of PDCCH associated with that CORESET. This also applies to the intra-band CA case (when PDSCH and the CORESET are in different component carriers). If none of configured TCI states for the serving cell of scheduled PDSCH contains 'QCL-TypeD', the UE shall obtain the other QCL assumptions from the indicated TCI state for its scheduled PDSCH irrespective of the time offset between the reception of the DL DCI and the corresponding PDSCH. |

***TP 4-2:*** *{38.214: 5.1.5 Antenna ports quasi co-location} for Rel-16*

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| 5.1.5 Antenna ports quasi co-location< Unchanged part is omitted >- If a UE is configured with *enableTwoDefaultTCI-States*, and at least one TCI codepoint indicates two TCI states, the UE may assume that the DM-RS ports of PDSCH or PDSCH transmission occasions of a serving cell are quasi co-located with the RS(s) with respect to the QCL parameter(s) associated with the TCI states corresponding to the lowest codepoint among the TCI codepoints containing two different TCI states. When the UE is configured by higher layer parameter *repetitionScheme* set to 'tdmSchemeA' or is configured with higher layer parameter *repetitionNumber*, the mapping of the TCI states to PDSCH transmission occasions is determined according to clause 5.1.2.1 by replacing the indicated TCI states with the TCI states corresponding to the lowest codepoint among the TCI codepoints containing two different TCI states based on the activated TCI states in the slot with the first PDSCH transmission occasion. In this case, if the 'QCL-TypeD' in both of the TCI states corresponding to the lowest codepoint among the TCI codepoints containing two different TCI states is different from that of the PDCCH DM-RS with which they overlap in at least one symbol, the UE is expected to prioritize the reception of PDCCH associated with that CORESET. This also applies to the intra-band CA case (when PDSCH and the CORESET are in different component carriers)- In all cases above, if none of configured TCI states for the serving cell of scheduled PDSCH is configured with *qcl-Type* set to 'typeD', the UE shall obtain the other QCL assumptions from the indicated TCI state(s) for its scheduled PDSCH irrespective of the time offset between the reception of the DL DCI and the corresponding PDSCH. |

**Issue #19**

***TP 5-1:*** *{38.214: 6.2.1 UE sounding procedure} for Rel-15*

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| 6.2.1 UE sounding procedure**---- Unchanged text are omitted ----**The SRS request field [5, TS38.212] in DCI format 0\_1, 1\_1 indicates the triggered SRS resource set given in Table 7.3.1.1.2-24 of [5, TS 38.212]. The 2-bit SRS request field [5, TS38.212] in DCI format 2\_3 indicates the triggered SRS resource set given in Clause 7.3 of [5, TS 38.212] if the UE is configured with higher layer parameter *srs-TPC-PDCCH-Group* set to ‘typeB’, or indicates the SRS transmission on a set of serving cells configured by higher layers if the UE is configured with higher layer parameter *srs-TPC-PDCCH-Group* set to ‘typeA’.For PUCCH and SRS on the same carrier, a UE shall not transmit SRS when semi-persistent or periodic SRS is configured in the same symbol(s) with PUCCH carrying only CSI report(s), or only L1-RSRP report(s). A UE shall not transmit SRS when semi-persistent or periodic SRS is configured or aperiodic SRS is triggered to be transmitted in the same symbol(s) with PUCCH carrying HARQ-ACK and/or SR. In the case that SRS is not transmitted due to overlap with PUCCH, only the SRS symbol(s) that overlap with PUCCH symbol(s) are dropped. PUCCH shall not be transmitted when aperiodic SRS is triggered to be transmitted to overlap in the same symbol with PUCCH carrying semi-persistent/periodic CSI report(s) or semi-persistent/periodic L1-RSRP report(s) only.  |

***TP 5-2:*** *{38.214: 6.2.1 UE sounding procedure} for Rel-16*

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| 6.2.1 UE sounding procedure**---- Unchanged text are omitted ----**The SRS request field [5, TS38.212] in DCI format 0\_1, 1\_1, 0\_2 (if SRS request field is present), 1\_2 (if SRS request field is present) indicates the triggered SRS resource set given in Table 7.3.1.1.2-24 of [5, TS 38.212]. The 2-bit SRS request field [5, TS38.212] in DCI format 2\_3 indicates the triggered SRS resource set given in Clause 7.3 of [5, TS 38.212] if the UE is configured with higher layer parameter *srs-TPC-PDCCH-Group* set to 'typeB', or indicates the SRS transmission on a set of serving cells configured by higher layers if the UE is configured with higher layer parameter *srs-TPC-PDCCH-Group* set to 'typeA'.For PUCCH and SRS on the same carrier, a UE shall not transmit SRS when semi-persistent or periodic SRS is configured in the same symbol(s) with PUCCH carrying only CSI report(s), or only L1-RSRP report(s), or only L1-SINR report(s). A UE shall not transmit SRS when semi-persistent or periodic SRS is configured or aperiodic SRS is triggered to be transmitted in the same symbol(s) with PUCCH carrying HARQ-ACK, link recovery request (as defined in clause 9.2.4 of [6, 38.213]) and/or SR. In the case that SRS is not transmitted due to overlap with PUCCH, only the SRS symbol(s) that overlap with PUCCH symbol(s) are dropped. PUCCH shall not be transmitted when aperiodic SRS is triggered to be transmitted to overlap in the same symbol with PUCCH carrying semi-persistent/periodic CSI report(s) or semi-persistent/periodic L1-RSRP report(s) only, or only L1-SINR report(s).  |

**Issue #22**

***TP 6:*** *{38.213: 9.1.3.2 Type-2 HARQ-ACK codebook in physical uplink shared channel} for Rel-15*

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| 9.1.3.2 Type-2 HARQ-ACK codebook in physical uplink shared channelIf a UE would multiplex HARQ-ACK information in a PUSCH transmission that is not scheduled by a DCI format or is scheduled by DCI format 0\_0, then- if the UE has not received any PDCCH within the monitoring occasions for DCI format 1\_0 or DCI format 1\_1 for scheduling PDSCH receptions or SPS PDSCH release on any serving cell  and the UE does not have HARQ-ACK information in response to a SPS PDSCH reception to multiplex in the PUSCH, as described in Clause 9.1.3.1, the UE does not multiplex HARQ-ACK information in the PUSCH transmission;- else, the UE generates the HARQ-ACK codebook as described in Clause 9.1.3.1, except that *harq-ACK-SpatialBundlingPUCCH* is replaced by *harq-ACK-SpatialBundlingPUSCH*.If a UE multiplexes HARQ-ACK information in a PUSCH transmission that is scheduled by DCI format 0\_1, the UE generates the HARQ-ACK codebook as described in Clause 9.1.3.1, with the following modifications:- For the pseudo-code for the HARQ-ACK codebook generation in Clause 9.1.3.1, after the completion of the  and  loops, the UE sets  where  is the value of the DAI field in DCI format 0\_1 according to Table 9.1.3-2- For the case of first and second HARQ-ACK sub-codebooks, DCI format 0\_1 includes a first DAI field corresponding to the first HARQ-ACK sub-codebook and a second DAI field corresponding to the second HARQ-ACK sub-codebook*- harq-ACK-SpatialBundlingPUCCH* is replaced by *harq-ACK-SpatialBundlingPUSCH*. |

***TP 7:*** *{38.213: 9.1.3.1 Type-2 HARQ-ACK codebook in physical uplink control channel} for Rel-16*

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| 9.1.3.1 Type-2 HARQ-ACK codebook in physical uplink control channel**---- Unchanged text are omitted ----**if UE does not set and  end ifif end if |

***TP 8:*** *{38.213: 9.1.3.2 Type-2 HARQ-ACK codebook in physical uplink shared channel} for Rel-16*

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 9.1.3.2 Type-2 HARQ-ACK codebook in physical uplink shared channelIf a UE multiplexes HARQ-ACK information in a PUSCH transmission that is scheduled by a DCI format that includes a DAI field, the UE generates the HARQ-ACK codebook as described in Clause 9.1.3.1, with the following modifications:- For the pseudo-code for the HARQ-ACK codebook generation in Clause 9.1.3.1, after the completion of the and loops, the UE sets where is the value of the DAI field according to Table 9.1.3-2- For the case of first and second HARQ-ACK sub-codebooks, the DCI format includes a first DAI field corresponding to the first HARQ-ACK sub-codebook and a second DAI field corresponding to the second HARQ-ACK sub-codebook*- harq-ACK-SpatialBundlingPUCCH* is replaced by *harq-ACK-SpatialBundlingPUSCH*.If a UE is not provided *PDSCH-CodeBlockGroupTransmission* and the UE is scheduled for a PUSCH transmission by DCI format that includes a DAI field with value and the UE has not received any PDCCH within the monitoring occasions for PDCCH with DCI format scheduling PDSCH receptions or SPS PDSCH release or indicating SCell dormancy on any serving cell and the UE does not have HARQ-ACK information in response to a SPS PDSCH reception to multiplex in the PUSCH, as described in Clause 9.1.3.1, the UE does not multiplex HARQ-ACK information in the PUSCH transmission. If a UE is provided *PDSCH-CodeBlockGroupTransmission* and the UE is scheduled for a PUSCH transmission by DCI format that includes a DAI field with first value or with second value and the UE has not received any PDCCH within the monitoring occasions for PDCCH with DCI format scheduling PDSCH receptions or SPS PDSCH release, or DCI format 1\_1 indicating SCell dormancy, on any serving cell and the UE does not have HARQ-ACK information in response to a SPS PDSCH reception to multiplex in the PUSCH, as described in Clause 9.1.3.1, the UE does not multiplex HARQ-ACK information for the first sub-codebook or for the second sub-codebook, respectively, in the PUSCH transmission.Table 9.1.3-2: Value of DAI

|  |  |  |
| --- | --- | --- |
| DAIMSB, LSB |   | Number of {serving cell, PDCCH monitoring occasion}-pair(s) in which PDSCH transmission(s) associated with PDCCH or PDCCH indicating SPS PDSCH release or DCI format 1\_1 indicating SCell dormancy is present, denoted as and  |
| 0,0 | 1 |  |
| 0,1 | 2 |  |
| 1,0 | 3 |  |
| 1,1 | 4 |  |

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***TP 9:*** *{38.214: 6.3.1 Frequency hopping for PUSCH repetition Type A} for Rel-16*

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| 6.3.1 Frequency hopping for PUSCH repetition Type A**<Unchanged parts are omitted>**For a PUSCH scheduled by RAR UL grant, fallbackRAR UL grant, or by DCI format 0\_0 with CRC scrambled by TC-RNTI, frequency offsets are obtained as described in clause 8.3 of [6, TS 38.213]. Otherwise, for a PUSCH scheduled by DCI format 0\_0/0\_1 or a PUSCH based on a Type2 configured UL grant activated by DCI format 0\_0/0\_1 and for resource allocation type 1, frequency offsets are configured by higher layer parameter *frequencyHoppingOffsetLists* in *pusch-Config*. For a PUSCH scheduled by DCI format 0\_2 or a PUSCH based on a Type2 configured UL grant activated by DCI format 0\_2 and for resource allocation type 1, frequency offsets are configured by higher layer parameter *frequencyHoppingOffsetListsDCI-0-2* in *pusch-Config*.- When the size of the active BWP is less than 50 PRBs, one of two higher layer configured offsets is indicated in the UL grant.- When the size of the active BWP is equal to or greater than 50 PRBs, one of four higher layer configured offsets is indicated in the UL grant.For PUSCH based on a Type1 configured UL grant the frequency offset is provided by the higher layer parameter *frequencyHoppingOffset* in *rrc-ConfiguredUplinkGrant*. For a MsgA PUSCH the frequency offset is provided by the higher layer parameter as described in [6, TS 38.213]. |

# Reference

[1] R1-2102430, Draft CR on PUCCH power control, OPPO

[2] R1-2102581, Corrections to TS 38.213, CATT

[3] R1-2102953, Draft CR on PDSCH default TCI state, ZTE

[4] R1-2103503, Draft CR on prioritization between SRS and PUCCH, LG Electronics

[5] R1-2102481, Correction on UL DAI for Type-2 HARQ-ACK codebook, ZTE

[6] R1-2102482, Correction on UL DAI for Type-2 HARQ-ACK codebook, ZTE

[7] R1-2103743, Correction on PUSCH frequency hopping in 38.214, Huawei, HiSilicon