**3GPP TSG RAN WG1 #112 R1-2301960**

**Athens, Greece, February 27th – March 3rd, 2023**

**Agenda item:** 8.1

**Source:** Moderator (ZTE)

**Title:** Moderator Summary #0 for Maintenance on Rel-17 Multi-Beam

**Document for:** Discussion and Decision

## Introduction

The following in Section 2 and Section 3 is assigned for discussion on maintenance on normal and editorial issues of Rel-17 Multi-Beam. Please provide your comments in corresponding sections.

## Summary of normal issues

### Issue 1-1 SRS closed loop (R1-2300190, R1-2300191, R1-2300415, R1-2300416)

Last meeting, the following was agreed, and then, during last online session, some companies still need some more time to further review/discuss whether the corresponding CR should be captured in spec or not.

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| **Agreement*** If *srs-PowerControlAdjustmentStates* is set to '*separateClosedLoop*' in a SRS resource set, the SRS is associated with a separate close loop;
* Otherwise, *closedLoopIndex-r17* for SRS in a joint/UL-TCI state is to indicate a SRS close loop tied with PUSCH
	+ Note: In such case, candidate values of 'i0' and 'i1' in *closedLoopIndex -r17* for SRS refers to first and second close loop tied with PUSCH
* FFS: Whether specification change is required
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FYI, per Mr. Chair guidance in last online session in RAN1#111, if companies are NOT convinced that the following agreement has been well included in current spec, by default, the corresponding CR based on the agreement should be captured.

During this meeting, several contributions are provided to clarify the necessity of capturing the above agreements in [R1-2300190, R1-2300191, R1-2300415, R1-2300416]. Regarding draft CR, per Mod’s perspective, vivo and ZTE’s versions are the same, but the former (as follows from vivo) seems to use the wording from already agreement exactly.

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| **TS 38.213 Section 7 Uplink power control**In the remaining of this clause, if a UE is provided *TCIState* in *dl-OrJoint-TCIStateList* or *UL-TCIstate* and for an indicated *TCIState* or *UL-TCIstate* as described in [6, TS 38.214] - in clauses 7.1.1, 7.2.1, and 7.3.1, the RS index $q\_{d}$ for obtaining the downlink pathloss estimate for PUSCH, PUCCH, and SRS transmission is provided by *PL-RS* associated with or included in the indicated *TCIState* or *UL-TCIstate* except for SRS transmission that is not provided *followUnifiedTCIstateSRS*- in clause 7.1.1, if *p0AlphaSetforPUSCH* is provided, the values of $P\_{O\\_UE\\_PUSCH,b,f,c}\left(j\right)$, $α\_{b,f,c}\left(j\right)$, and the PUSCH power control adjustment state $l$ are provided by *p0AlphaSetforPUSCH* associated with the indicated *TCIState* or *UL-TCIstate*- in clause 7.2.1, if *p0AlphaSetforPUCCH* is provided, the values of $P\_{O\\_PUCCH,b,f,c}\left(q\_{u}\right)$ and the PUCCH power control adjustment state $l$ are provided by *p0AlphaSetforPUCCH* associated with the indicated *TCIState* or *UL-TCIstate*- in clause 7.3.1, if *p0AlphaSetforSRS* is provided, - if *followUnifiedTCIstateSRS* is provided for a SRS resource set, the values of $P\_{O\\_SRS,b,f,c}\left(q\_{s}\right)$, $α\_{SRS,b,f,c}\left(q\_{s}\right)$, and SRS power control adjustment state $l$ if *srs-PowerControlAdjustmentStates* is not set to ‘*separateClosedLoop*’, are provided by *p0AlphaSetforSRS* associated with the indicated *TCIState* or *UL-TCIState*- else, if *followUnifiedTCIstateSRS* is not provided for a SRS resource set and for a SRS resource from the SRS resource set, the values of $P\_{O\\_SRS,b,f,c}\left(q\_{s}\right)$, $α\_{SRS,b,f,c}\left(q\_{s}\right)$, and SRS power control adjustment state $l$ if *srs-PowerControlAdjustmentStates* is not set to ‘*separateClosedLoop*’, are provided by *p0AlphaSetforSRS* associated with *TCIState* or *UL-TCIState* of an SRS resource with lowest *SRS-ResourceId* in the SRS resource set and a RS index $q\_{d}$ for obtaining a pathloss estimate for the SRS transmission is provided by PL-RS associated with or included in the *TCIState* or *UL-TCIState* of an SRS resource with lowest *SRS-ResourceId* in the SRS resource set |

Please provide company’s view in the table below.

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| Company | Comment |
| Mod\_V00 | FL note: After reviewing the companies’ input, the controversial part is relevant to the case of SRS’s closed loop being tied with PUSCH: there are two available parameters (both should be mandatorily configured) of determining the index of tied closed loop power control for SRS, that is srs-PowerControlAdjustmentStates and closedLoopIndex-r17, resulting of ambiguities for interpreting the applied closed loop power control.Please provide your views for this issue (to be captured or not), and then, if agreed to capture above, do you have any further views on the draft CR from vivo. |
| QC | To our understanding, the CR is not needed. We think the spec has no ambiguity. The rule for the case when '*separateClosedLoop*' is set is described in other places. Also, the agreement already serves as conclusion, so no implementation misalignment. -  if the UE is not configured for PUSCH transmissions on active UL BWP $b$ of carrier $f$ of serving cell $c$, or if *srs-PowerControlAdjustmentStates* indicates separate power control adjustment states between SRS transmissions and PUSCH transmissions, and if *tpc-Accumulation* is not provided, where  |
| Google | We are open to endorse a CR to avoid potential ambiguity in spec. |
| Ericsson | We agree with Qualcomm: there is no ambiguity. |
| OPPO | The spec seems to have some ambiguity since the case of “otherwise” is not described in the spec. The text referred by QC only describe the case when “powercontroladjustmentstate” is set to “separate”. |
| Docomo | We are fine with the CR. |
| LG | Agree with Qualcomm’s comment |
| vivo | We think the CR is needed.To our reading, in current specification described in the Clause 7 of TS38.213, the behavior described in the paragraphs in the beginning “In the remaining of this clause, if a UE is provided *TCIState* in *dl-OrJoint-TCIStateList* or *UL-TCIstate* and for an indicated *TCIState* or *UL-TCIstate* as described in [6, TS 38.214] …” has highest priority. That is, once *dl-OrJoint-TCIStateList* or *ul-TCI-StateList* is provided, SRS closed loop power control parameter should be provided always by *p0AlphaSetforSRS* associated with the indicated TCI-State or TCI-UL-State, or TCI-State or TCI-UL-State of an SRS resource with lowest SRS-ResourceId in the SRS resource set, no matter *srs-PowerControlAdjustmentStates* indicates separate power control adjustment states between SRS transmissions and PUSCH transmissions set or not.Some companies expressed this understanding in previous meetings so we draw the conclusion to align the understanding among companies in the last meeting. Therefore, the CR is essential to avoid the misunderstanding. |
| Intel | Ok to clarify and avoid ambiguity |
| Samsung | This CR is not needed. Agree with Qualcomm. There is no spec ambiguity. The description in clause 7, describes how the values “$P\_{O\\_SRS,b,f,c}\left(q\_{s}\right)$, $α\_{SRS,b,f,c}\left(q\_{s}\right)$, and SRS power control adjustment state $l$” are determined. How and whether, these values are used is determined in the corresponding section for each channel and signal. In case of SRS, as described in 7.3.1, “power control adjustment state $l$” applies in case of joint SRS/PUSCH power control adjustment states and not separate power control adjustment states. |
| Huawei, HiSilicon | In our view, spec is clear as is. |
| Lenovo | We are fine to discuss. |
| ZTE | We think a CR is needed to avoid potential ambiguities for the configuration of SRS power control. In the current spec, there are two power control mechanisms in parallel that can determine the configuration of the SRS CLPC tied with PUSCH, namely *srs-PowerControlAdjustmentStates* and *closedLoopIndex-r17*. Therefore, the recent agreement made in the last meeting should be captured for clarification that *closedLoopIndex-r17* in the joint/UL-TCI state has higher priority for the configuration of the SRS CLPC tied with PUSCH (i.e., ‘otherwise’ in the agreement).Besides, apart from vivo’s version, we still suggest to consider ZTE’s version “except for the case that *srs-PowerControlAdjustmentStates* is set to *‘separateClosedLoop’* ” to clarify that the SRS CLPC is determined by *closedLoopIndex-r17* in the following two cases:Case A: *srs-PowerControlAdjustmentStates* is not provided, and Case B: *srs-PowerControlAdjustmentStates* is provided and set to ‘sameAsFci2’. |
| Mod\_V16 | **FL’s observation-1:** Support/fine-to-discuss: 7; Not-support: 5;**FL’s observation-2:** * Companies identify the following in the spec can represent the agreement well,

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| -  if the UE is not configured for PUSCH transmissions on active UL BWP $b$ of carrier $f$ of serving cell $c$, or if *srs-PowerControlAdjustmentStates* indicates separate power control adjustment states between SRS transmissions and PUSCH transmissions, and if *tpc-Accumulation* is not provided, where |

* But proponents clarify the above only describes the case when “*powercontroladjustmentstate*” is set to “separate” and we still face the two power control mechanisms in parallel that can determine the configuration of the SRS CLPC tied with PUSCH, namely ***srs-PowerControlAdjustmentStates*** and ***closedLoopIndex-r17***.

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| **Agreement*** If *srs-PowerControlAdjustmentStates* is set to '*separateClosedLoop*' in a SRS resource set, the SRS is associated with a separate close loop;
* Otherwise, *closedLoopIndex-r17* for SRS in a joint/UL-TCI state is to indicate a SRS close loop tied with PUSCH
	+ Note: In such case, candidate values of 'i0' and 'i1' in *closedLoopIndex -r17* for SRS refers to first and second close loop tied with PUSCH

FFS: Whether specification change is requiredsrs-PowerControlAdjustmentStates ENUMERATED { sameAsFci2, separateClosedLoop} OPTIONAL, -- Need SIndicates whether hsrs,c(i) = fc(i,1) or hsrs,c(i) = fc(i,2) (if twoPUSCH-PC-AdjustmentStates are configured) or separate close loop is configured for SRS. This parameter is applicable only for Uls on which UE also transmits PUSCH. If absent or release, the UE applies the value sameAs-Fci1 (see TS 38.213 [13], clause 7.3). |

The recommended CR:

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| **TS 38.213 Section 7 Uplink power control**In the remaining of this clause, if a UE is provided *TCIState* in *dl-OrJoint-TCIStateList* or *UL-TCIstate* and for an indicated *TCIState* or *UL-TCIstate* as described in [6, TS 38.214] **< Unchanged parts are omitted >**- in clause 7.3.1, if *p0AlphaSetforSRS* is provided, - if *followUnifiedTCIstateSRS* is provided for a SRS resource set, the values of $P\_{O\\_SRS,b,f,c}\left(q\_{s}\right)$, $α\_{SRS,b,f,c}\left(q\_{s}\right)$, and SRS power control adjustment state $l$ if *srs-PowerControlAdjustmentStates* is not set to ‘*separateClosedLoop*’, are provided by *p0AlphaSetforSRS* associated with the indicated *TCIState* or *UL-TCIState*- else, if *followUnifiedTCIstateSRS* is not provided for a SRS resource set and for a SRS resource from the SRS resource set, the values of $P\_{O\\_SRS,b,f,c}\left(q\_{s}\right)$, $α\_{SRS,b,f,c}\left(q\_{s}\right)$, and SRS power control adjustment state $l$ if *srs-PowerControlAdjustmentStates* is not set to ‘*separateClosedLoop*’, are provided by *p0AlphaSetforSRS* associated with *TCIState* or *UL-TCIState* of an SRS resource with lowest *SRS-ResourceId* in the SRS resource set and a RS index $q\_{d}$ for obtaining a pathloss estimate for the SRS transmission is provided by PL-RS associated with or included in the *TCIState* or *UL-TCIState* of an SRS resource with lowest *SRS-ResourceId* in the SRS resource set |

**FL’s recommendation: To treat above in first-day online session.**  |

### Issue 1-2 Default Beam Application Time (R1-2300388)

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| ***Reason for change:*** | Currently it is defined that the action delay for DCI based beam indication is configured by beamAppTime-r17. However, the beamAppTime-r17 is optional in 38.331 as follows. Then when the beamAppTime-r17 is not configured, the action time for DCI based beam indication could be unclear.beamAppTime-r17 ENUMERATED {n1, n2, n4, n7, n14, n28, n42, n56, n70, n84, n98, n112, n224, n336, spare2, spare1} OPTIONAL, -- Need R |
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| ***Summary of change:*** | Define the default behavior that when beamAppTime is not configured, the UE assumes the beamAppTime is 0. |
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| ***Consequences if not approved:*** | Action time for DCI based beam indication is unclear when the beamAppTime is not configured.  |

Due to above, the following draft CR is provided in R1-2300388:

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**5.1.5 Antenna ports quasi co-location**

<unrelated part omitted>

When a UE configured with *dl-OrJoint-TCIStateList* would transmit a PUCCH with HARQ-ACK information or a PUSCH with HARQ-ACK information corresponding to the DCI carrying the TCI State indication and without DL assignment, or corresponding to the PDSCH scheduled by the DCI carrying the TCI State indication, and if the indicated TCI State is different from the previously indicated one, the indicatedTCI-State and/or *TCI-UL-State* should be applied starting from the first slot that is at least $ beamAppTime$ symbols after the last symbol of the PUCCH or the PUSCH. If the *beamAppTime* is not provided, the UE shall expect the *beamAppTime* should be 0. The first slot and the $ beamAppTime$ symbols are both determined on the active BWP with the smallest SCS among the BWP(s) from the CCs applying the indicated *TCI-State* or *TCI-UL-State* that are active at the end of the PUCCH or the PUSCH carrying the HARQ-ACK information.

<unrelated part omitted>

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Please provide company’s view in the table below.

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| Company | Comment |
| Mod\_V00 | FL note: Above may be handled via providing an appropriate RRC configuration parameter by gNB, and then the CR’s essentiality should be justified. Please provide your views for this issue, and then do you have any further views on the draft CR, if identifying the essentiality from your side. |
| QC | Not critical. To our understanding, gNB needs to configure the application time based on UE capability anyway. |
| Google | It is true that there will be no critical issue to the gNB’s implementation, since gNB can anyway select to configure this RRC parameter. But this could cause the potential issue to the UE implementation, since UE has to get ready for all possible configurations including the case of “not configured”. From the UE implementation and the quality of spec point of view, we usually define the default value for an optional field. Therefore, we suggest we discuss this CR. |
| Ericsson | Not needed. If there is no behaviour specified for an optional RRC parameter, the UE is free to do whatever it likes, including rejecting the RRC configuration. |
| OPPO | We do not think that is needed. Furthermore, beamApplication time can not be zero since the gNB takes time to process the beam indication ACK. |
| Docomo | We are fine. |
| MediaTek | The use case if unclear, and NW needs to configure the parameter based on UE capability anyway. |
| LG | Agree with FL’s assessment that can be addressed with the corresponding RRC configuration. |
| Spreadtrum | We think the beam application time should be configured by gNB based on UE capability. This default behavior, i.e. the beam application time is not provided, may cause the UE cannot compete beam switching in time and the beams at gNB and UE are not aligned. |
| vivo | Not critical. We share similar view with QC that gNB should configure the application time based on UE capability anyway. |
| Intel | Agree with Ericsson. Also BAT should not be 0.  |
| Samsung | CR not needed. This is not a critical issue. |
| Huawei, HiSilicon | This CR is not needed. BAT is configured based on UE capability. If not configured, UE can apply the new beam whenever it wants. In any case, BAT cannot be zero.  |
| Lenovo | We also understand that the gNB should configure this parameter based on UE capability. |
| ZTE | Considering that the configuration of beamAppTime-r17 is optional, we are fine to define a default behavior for the case that beamAppTime is not configured. However, we prefer to set a default beamAppTime to a typical value (such as n4 or n7) as gNB takes time for HARQ-ACK reception and processing, then network may skip this parameter setting for overhead reduction to some extent. 0 seems not a valid value, or at least not a typical value, since it is not adopted as one of the candidates from RRC configuration. |
| Mod\_V16 | **FL’s observation-1:** Support/fine-to-discuss: 2; Not-support: 13;**FL’s observation-2:** Based on above inputs, it seems that majority companies does NOT identify the essentiality of the issue raised by the following CR:* R1-2300388 Draft CR on Default Beam Application Time Google
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### Issue 1-3 HARQ-ACK for beam application timing in unified TCI (R1-2300390, R1-2301468)

For DCI based TCI indication, the following is defined in 38.214.

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| When the UE would transmit a PUCCH with HARQ-ACK information or a PUSCH with HARQ-ACK information corresponding to the DCI carrying the TCI State indication and without DL assignment, or corresponding to the PDSCH scheduled by the DCI carrying the TCI State indication, and if the indicated TCI State is different from the previously indicated one, the indicated *DLorJointTCIState* or *UL-TCIstate* should be applied starting from the first slot that is at least $ beamAppTime$ symbols after the last symbol of the PUCCH or the PUSCH. The first slot and the $ beamAppTime$ symbols are both determined on the active BWP with the smallest SCS among the active BWP(s) of the carrier(s) applying the beam indication. |

According to some discussion in RAN1 #111, there were two different interpretations on the highlighted words “HARQ-ACK information”:

* **Interpretation 1: “HARQ-ACK information” indicates ACK only**
* **Interpretation 2: “HARQ-ACK information” indicates ACK and NACK**

Hence, based on the input from R1-2300390 and R1-2301468, the following is proposed for concluding this issue.

**Proposal for conclusion:**

* + ***“HARQ-ACK” for beam application timing only means positive HARQ-ACK information (i.e. ACK) in clause 5.1.5 in TS38.214.***

Please provide company’s view in the table below.

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| Company | Comment |
| Mod\_V00 | FL note: Above seems to be reasonable, and concluding that is beneficial for avoiding ambiguities while implementing the unified TCI framework in gNB and UE sides.  |
| QC | Fine for the conclusion to align implementation |
| Google | Support. Since different companies had different understanding based on the discussion in last meeting, it is necessary to have a conclusion at least. |
| Ericsson | We do not think this is needed. The natural solution is that if the UE receives a beam indication, it shall apply it. The intent of the proposal is to eliminate the risk for misalignment – but that can still happen if the ACK is lost, so we do not see why we should delay the beam switch to handle a subset of the error cases.[Mod\_V16]: Please review Google’s reply. Thank you. |
| Google2 | @Ericsson, there are two places defining “HARQ-ACK information” in spec, one is for DCI based beam indication and the other is for MAC CE based beam indication. There should be only one interpretation of “HARQ-ACK information”, right? If the “HARQ-ACK information” includes both ACK/NACK, how could MAC CE based beam indication work?  |
| OPPO | Support. That is a essential conclusion to clarify the rel17 beam application behavior.  |
| Docomo | Support. We should have the common understanding between companies to avoid beam miss understanding. Interpretation 2 does not work in semi-static HARQ codebook, because UE sends NACK even if UE miss-detects beam indication DCI.Another solution (Interpretation1 for semi-static HARQ codebook and Interpretation2 for dynamic HARQ codebook) was already discussed in previous meeting, but it was not agreed. |
| MediaTek | In 5.1.5 of TS38.214, there are two paragraphs including “HARQ-ACK information”, one for Rel-15/16/17 MAC-CE TCI activation and another for Rel-17 unified TCI indication. Our understanding to “HARQ-ACK information” is Interpretation 2 (including both ACK and NACK) since Rel-15.We are fine to have CR to change from “HARQ-ACK” to “ACK” in the paragraph for Rel-17 unified TCI indication. However, the proposed conclusion will even make confusion not only to Rel-17 unified TCI framework but also Rel-15/16 behavior.[Mod\_V16]: Personally speaking, I sympathize with you that the above issue may be also relevant to Rel-15/16 behavior (not only TCI/spatial relation, but also the whole spec). Based on other companies’ reply (from Google and DCM), what we can do for the most is to clarify that for Rel-17 unified TCI for now.  |
| LG | Fine with the conclusion |
| Spreadtrum | Fine with the conclusion. |
| vivo | Fine with the proposed conclusion. |
| Intel | OK with conclusion |
| Samsung | In our understanding, HARQ-ACK information means ACK or NACK. It doesn’t mean ACK only. Interpreting HARQ-ACK as ACK only, has implications on other parts of the spec. Therefore, we don’t agree with the conclusion.Having said that, we are fine to discuss if the spec should be updated by replacing “HARQ-ACK information” with “ACK” or “positive acknowledgement” to avoid misalignment if UE sends DTX as NACK. However, this would introduce new functionality to spec.[Mod\_V16]: Fully agree that your suggestion would introduce new functionality to the spec. But, based on current situation, could you please re-consider above proposed conclusion? Highly appreciated. |
| Huawei, HiSilicon | OK to discuss and try to make a conclusion.  |
| Lenovo | Fine to have a conclusion. |
| ZTE | Agree with the conclusion. |
| Mod\_V16 | **FL’s observation-1:** Support/fine-to-discuss: 13; Not-support: 2;**FL’s observation-2:** The issue has been discussed for quite long term, and, hopefully, companies can compromise to the following conclusion (thanks for Yuki’s effort).**Proposal for conclusion:*** + ***“HARQ-ACK” for beam application timing only means positive HARQ-ACK information (i.e. ACK) in clause 5.1.5 in TS38.214.***

Otherwise, we have to reject the following CRs.* R1-2300390 Clarification on HARQ ACK for Unified TCI Indication Google
* R1-2301468 Discussion on HARQ-ACK for beam application timing in unified TCI NTT DOCOMO, INC.
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| Docomo | Based on offline discussion with MediaTek, we suggest the following update.**Proposal for conclusion:*** + ***“HARQ-ACK” for DCI based beam application timing for unified TCI only means positive HARQ-ACK information (i.e. ACK) in clause 5.1.5 in TS38.214.***
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### Issue 1-4 UL power control for SRS resource set for noncodebook (R1-2300521)

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| ***Reason for change:*** | When separate TCI framework is configured, only CSI-RS for beam management which only has 1 or 2 ports, SSB with single ports or SRS for beam management can be configured in the TCI state for the UE to determine the UL beam, with which the UE cannot obtain the full DL channel matrix to calculate the proper precoder for SRS transmission. In other words, the associated NZP CSI-RS may have more than 2 ports for the UE to obtain the full DL channel matrix, should be configured for the SRS resource set for non-codebook at least when separate TCI framework is configured. And in that case, the SRS shall not be configured with TCI state or be indicated to follow the indicated unified TCI state according to Rel-15 principle. In summary, when an SRS resource set is configured with an associated NZP CSI-RS, how to determine the power control parameters including PL-RS, P0, alpha, closed loop index should be specified  |
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| ***Summary of change:*** | 1. Add the UE behavior to obtain the power control parameters for SRS resource set configured with associated NZP CSI-RS.
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| ***Consequences if not approved:*** | The UE does not know how to determine the power control related parameters when the SRS resource for non-codebook is configured with associated NZP CSI-RS. |

Due to above, the following draft CR is provided in R1-2300521:

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**7 UL power control**

**< Unchanged parts are omitted >**

- in clause 7.3.1, if *p0AlphaSetforSRS* is provided,

- if the higher layer parameter *usage* in *SRS-ResourceSet* set to 'nonCodebook' and a higher layer parameter *associatedCSI-RS* is configured in *SRS-ResourceSet,* thevalues of $P\_{O\\_SRS,b,f,c}\left(q\_{s}\right)$, $α\_{SRS,b,f,c}\left(q\_{s}\right)$, and SRS power control adjustment state $l$ are provided by *p0AlphaSetforSRS* associated with the indicated *TCI-State* or *TCI-UL-State*

- else, if *followUnifiedTCIstateSRS* is provided for a SRS resource set, the values of $P\_{O\\_SRS,b,f,c}\left(q\_{s}\right)$, $α\_{SRS,b,f,c}\left(q\_{s}\right)$, and SRS power control adjustment state $l$ are provided by *p0AlphaSetforSRS* associated with the indicated *TCI-State* or *TCI-UL-State*

- else, if *followUnifiedTCIstateSRS* is not provided for a SRS resource set and for a SRS resource from the SRS resource set, the values of $P\_{O\\_SRS,b,f,c}\left(q\_{s}\right)$, $α\_{SRS,b,f,c}\left(q\_{s}\right)$, and SRS power control adjustment state $l$ are provided by *p0AlphaSetforSRS* associated with *TCI-State* or *TCI-UL-State* of an SRS resource with lowest *SRS-ResourceId* in the SRS resource set and a RS index $q\_{d}$ for obtaining a pathloss estimate for the SRS transmission is provided by *pathlossReferenceRS-Id-r17* associated with or included in the *TCI-State* or *TCI-UL-State* of an SRS resource with lowest *SRS-ResourceId* in the SRS resource set

**< Unchanged parts are omitted >**

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Please provide company’s view in the table below

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| Company | Comment |
| Mod\_V00 | FL note: The key issue is relevant to whether, as a RAN1 common understanding, the configuration of associated CSI-RS for non-codebook SRS should be considered as in the scope of unified TCI framework. If yes, and also the case of associated CSI-RS is applied to FR2, we may have to justify whether the unified TCI state can not apply to the corresponding SRS transmission, and clarify the corresponding UL power control. |
| QC | Not critical. This can be solved by gNB implementation. To our understanding, gNB can configure SRS for NCB to follow indicated TCI if there is associated CSI-RS.  |
| Google | It is better to preclude the concurrent configuration of unified TCI indication and associated CSI-RS for SRS for NCB, which is the same as the principle in Rel-15. |
| Ericsson | Not supportive. The CR seems to introduce new functionality: *followUnifiedTCIstateSRS* has no impact for NCB.  |
| OPPO | The CR might not be needed. But Discussion and conclusion on configuring associated CSI-RS resource to SRS resource set of NCB is needed. |
| Docomo | We are fine. |
| LG | In this case, it needs to make a conclusion that the configuration of associated CSI-RS is not expected on SRS resource set of NCB when unified TCI is operated as similar to Rel-15 principle |
| Spreadtrum | Ok to discuss and clarify the power control determination in case that the associated CSI-RS is configured. |
| vivo | Unnecessary change. Associated CSI-RS and unified TCI state cannot be configured simultaneously for NCB-based SRS resource set as in Rel-15 where associated CSI-RS and spatial relation cannot be configured simultaneously. So, power control parameter configured in SRS resource set can be used as in legacy procedure. |
| Intel | Agree with Ericsson, not needed |
| Samsung | CR not needed. Agree with Ericsson that followUnifiedTCIStateSRS has no impact on NCB.  |
| Huawei, HiSilicon | Not needed. Agree with QC and Ericsson.  |
| Lenovo | Firstly, we think we should have a conclusion on whether *followUnifiedTCIstateSRS* can be configured for a SRS resource set for NCB is configured with associated NZP CSI RS, which is the principle in Rel-15.Secondly, if the answer of the first question is NO, i.e., the *followUnifiedTCIstateSRS* and *associatedCSI-RS* cannot be concurrently configured, then the following issue will be valid to support non-codebook based PUSCH in with unified TCI framework.*when separate TCI framework is configured, only CSI-RS for beam management which only has 1 or 2 ports, SSB with single ports or SRS for beam management can be configured in the TCI state for the UE to determine the UL beam, with which the UE cannot obtain the full DL channel matrix to calculate the proper precoder for SRS transmission, In other words, the associated NZP CSI-RS, which can have more than 2 ports for the UE to obtain the full DL channel matrix, should be configured for the SRS resource set for non-codebook at least when separate TCI framework is configured.*Therefore, we think this CR is needed. |
| ZTE | No need to discuss this issue. To our understanding, for a NCB SRS resource set, no matter whether it is configured with *associatedCSI-RS* or not, the parameter *followUnifiedTCIstateSRS* can be provided or not, then the spec is clear on how to obtain PC parameters according to the presence of *followUnifiedTCIstateSRS*.  |
| Mod\_V16 | **FL’s observation-1:** Support/fine-to-discuss: 9; Not-support: 4;**FL’s observation-2:** It seems that majority companies does NOT identify the essentiality of the issue raised by the following CR. But, I tend to agree with Lenovo that companies’ views on how to handle NCB SRS are diverged:* R1-2300521 Draft CR on the power control for SRS resource set for noncodebook Lenovo
 |

### Issue 1-5 Beam Failure Recovery related to unified TCI state framework (R1-2301229)

|  |  |
| --- | --- |
| ***Reason for change:*** | In RAN1#107-e, it was agreed only for intra-cell beam management to support Rel-16 SCell BFR, but the spec doesn’t limit the scope of SCell BFR to intra cell beam management.**Agreement**On Rel-17 unified TCI framework, **for intra-cell beam management**, after X symbols from the UE receives the BFRR from NW, the UE assumes the same QCL parameter as the ones associated with the index q new for all PDSCH /PDCCH receptions in a CC, as well as other signals/channels configured to sharing the same indicated Rel-17 TCI state as PDSCH /PDCCH reception.* **The above applies to** Rel-15 SpCell BFR , Rel-16 CBRA based SpCell BFR , and **Rel-16 SCell BFR**
* Note: q new is a candidate beam identified by the UE in set q1. q1 is the set of candidate beams

Clarify that For SCell BFR, PDCCHs are monitored on the SCell(s). |
|  |  |
| ***Summary of change:*** | Add phrase “if SSB -MTC-AdditionalPCI is not provided” to limit the scope of SCell BFR to intra-cell beam management.Add phrase “on the SCell (s) indicated by the MAC CE” to indicate that PDCCHs monitoring is on the SCell |
|  |  |
| ***Consequences if not approved:*** | Spec is not aligned with RAN1 agreements. Spec is ambiguos for the monitoring of PDCCHes in case of SCell BFR. |

Due to above, the following draft CR is provided in R1-2301229:

---------------------------------------------------------------------------------------------

**6 Link recovery procedures**

If a UE is provided *dl-OrJoint-TCIStateList* or *TCI-UL-State* indicating a unified TCI state, after 28 symbols from a last symbol of a PDCCH reception with a DCI format scheduling a PUSCH transmission with a same HARQ process number as for the transmission of the first PUSCH and having a toggled NDI field value, the UE

- if SSB -MTC-AdditionalPCI is not provided, monitors PDCCH in all CORESETs, on the SCell (s) indicated by the MAC CE, and receives PDSCH and aperiodic CSI-RS resource in a CSI-RS resource set using the same antenna port quasi co-location parameters as the ones associated with the corresponding index $q\_{new}$, if any

- transmits PUSCH, PUCCH and SRS that uses a same spatial domain filter with same indicated TCI state as for the PUSCH and PUCCH, using a same spatial domain filter as the one corresponding to $q\_{new}$, if any, and using the following parameters for determination of a corresponding power as described in clauses 7.1.1, 7.2.1, and 7.3.1

- the RS index $q\_{d}=q\_{new}$ for obtaining the downlink pathloss estimate

< Unchanged parts are omitted >

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Please provide company’s view in the table below.

|  |  |
| --- | --- |
| Company | Comment |
| Mod\_V00 | FL note: The update seems necessary to capture the recent agreement for BFR in unified TCI framework. |
| QC | Fine to discuss |
| Google | OK to discuss |
| Ericsson | Do not support. This would break the specification – the behavior when *SSB -MTC-AdditionalPCI* is provided would become unclear. In practice, there is no problem. |
| Docomo | Agree with Ericsson. |
| LG | Fine to discuss but the draft CR is unclear as Ericsson mentioned above.  |
| Spreadtrum | Ok to discuss. |
| vivo | Fine to discuss |
| Intel  | Ok to discuss |
| Samsung | Agree with FL. |
| Huawei, HiSiliocn | OK to discuss |
| Lenovo | OK to discuss |
| ZTE | Agree to discuss. |
| Mod\_V16 | **FL’s observation-1:** Support/fine-to-discuss: 10; Not-support: 2;**FL’s observation-2:** Let’s have some further offline discussion about above issues. @proponents, please try to solve the concerns/unclear parts from E///, DCM and LG.  |
|  |  |
|  |  |

### Issue 1-6 Beam application time for cross carrier beam application (R1-2301230)

|  |  |
| --- | --- |
| ***Reason for change:*** | In case of cross carrier beam indication, the carrier providing the beam indication can be different from the carrier(s) to which the beam indication applies. The beam application time is determined based on the smallest SCS among the active BWP(s) of the carrier(s) applying the beam indication and the active BWP of the carrier providing the beam indication. The spec seems to imply that SCS of carrier indicating the TCI state is not considered when the beam application time is determined. |
|  |  |
| ***Summary of change:*** | Add the phrase “and the active BWP of the carrier providing the beam indication”, to clarify that the SCS of the carrier providing the beam indication is also considered when determining the beam application time |
|  |  |
| ***Consequences if not approved:*** | Ambiguity in how the beam application time is determine in case of cross carrier scheduling/beam indication. |

Due to above, the following draft CR is provided in R1-2301230:

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**5.1.5 Antenna ports quasi co-location**

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

When a UE configured with *dl-OrJoint-TCIStateList* would transmit a PUCCH with HARQ-ACK information or a PUSCH with HARQ-ACK information corresponding to the DCI carrying the TCI State indication and without DL assignment, or corresponding to the PDSCH scheduled by the DCI carrying the TCI State indication, and if the indicated TCI State is different from the previously indicated one, the indicatedTCI-State and/or *TCI-UL-State* should be applied starting from the first slot that is at least $ beamAppTime$ symbols after the last symbol of the PUCCH or the PUSCH. The first slot and the $ beamAppTime$ symbols are both determined on the active BWP with the smallest SCS among the BWP(s) from the CCs applying the indicated *TCI-State* or *TCI-UL-State* and the active BWP of the carrier providing the beam indication that are active at the end of the PUCCH or the PUSCH carrying the HARQ-ACK information.

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Please provide company’s view in the table below.

|  |  |
| --- | --- |
| Company | Comment |
| Mod\_V00 | FL note: If my understanding is correct, based on already agreements, the first slot and BAT is not relevant to “the active BWP of the carrier providing the beam indication”. If so, the above CR may NOT be needed. **Agreement (RAN1#106b)**On Rel-17 DCI-based beam indication, regarding application time of the beam indication for CA, the first slot and the Y symbols are both determined on the carrier with the smallest SCS among the carrier(s) applying the beam indication. * For Rel-17 MAC-CE based beam indication (when only a single TCI codepoint is activated) and activation, it follows the Rel-16 application timeline of MAC-CE activation
	+ How to capture this in the specifications is up to the editors
 |
| QC | Agree with FL. No need the CR |
| Google | We think previous agreement and CRs have already been captured correctly. The proposed change looks unnecessary. |
| Ericsson | Agree with FL. This would introduce new behavior. |
| Docomo | Agree with FL. |
| MediaTek | Some view with FL. This CR is not aligned with RAN1 agreement. |
| LG | Agree with FL’s assessment |
| Spreadtrum | Agree with FL note. |
| vivo | Agree with FL. The CR is not needed. |
| Intel | Agree with FL, not needed |
| Samsung | We would like to point out the fact that in case of cross-carrier scheduling, the SCS spacing of the PDCCH is considered when determining the start of a PDSCH (on another carrier). It seems natural to consider this also in case of cross carrier beam indication (which I don’t think was taken into account when the above agreement, mentioned by the FL, was made). This is the corresponding text in clause 5.5 of TS 38.214:If the μPDCCH < μPDSCH, the UE is expected to receive the scheduled PDSCH, if the first symbol in the PDSCH allocation, including the DM-RS, as defined by the slot offset K0 and the start and length indicator SLIV of the scheduling DCI starts no earlier than the first symbol of the slot of the PDSCH reception starting at least Npdsch PDCCHsymbols after the end of the PDCCH scheduling the PDSCH, not taking into account the effect of receive timing difference between the scheduling cell and the scheduled cellHaving said that, if companies still think that we don’t need to consider the SCS of carrier that carries the beam indication in case of cross-carrier beam indication, it would be good to capture the following to avoid any confusion:In case of cross-carrier beam indication, only the sub-carrier spacing of the carrier(s) to which the indicated TCI state is applied is considered when determining the $beamAppTime$. |
| Huawei, HiSilicon | Agree with FL |
| Lenovo | Agree with FL |
| ZTE | Agree with FL.  |
| Mod\_V16 | **FL’s observation-1:** Support/fine-to-discuss: 1; Not-support: 12;**FL’s observation-2:** It seems that majority companies does NOT identify the essentiality of the issue raised by the following CR. * R1-2301230 Beam application time for cross carrier beam application Samsung
 |
|  |  |

### Issue 1-7 Multi-slot PDSCH/PUSCH repetition in unified TCI (R1-2301469)

In AI 8.2.5 in RAN1#109e, it was pointed out that the existing text of PDSCH repetition for indicated TCI state is not applied to Rel.17 unified TCI state, because the previous sentence is only applied to Rel.15 TCI state [1].

|  |
| --- |
| 5.1.5 Antenna ports quasi co-location[…]The UE may assume that the DM-RS ports of PDSCH of a serving cell are quasi co-located with the RS(s) in the TCI state with respect to the QCL type parameter(s) given by the indicated TCI state if the time offset between the reception of the DL DCI and the corresponding PDSCH is equal to or greater than a threshold *timeDurationForQCL*, where the threshold is based on reported UE capability [13, TS 38.306]. For a single slot PDSCH, the indicated TCI state(s) should be based on the activated TCI states in the slot with the scheduled PDSCH. For a multi-slot PDSCH or the UE is configured with higher layer parameter [*pdsch-TimeDomainAllocationListForMultiPDSCH-r17*], the indicated TCI state(s) should be based on the activated TCI states in the first slot with the scheduled PDSCH(s), and UE shall expect the activated TCI states are the same across the slots with the scheduled PDSCH(s). |

In AI 8.2.5 in RAN1#111, the following conclusion was made based on the common understanding that the above text is only applicable to Rel.15/16 TCI framework. Hence, the above text is not applied to Rel.17 unified TCI framework.

|  |
| --- |
| **Conclusion**For Rel-17 unified TCI framework, the applied TCI states can be updated using unified TCI framework within the span of multi-PDSCH/PUSCH.* No additional specification support is needed.
 |

For multi slot PDSCH/PUSCH repetition in Rel.17 unified TCI framework, based on the current specification, the following beam application timing (BAT) is strictly applied, because there is no exception for multi-slot PDSCH/PUSCH repetition.

|  |
| --- |
| 5.1.5 Antenna ports quasi co-location[…]When a UE configured with *dl-OrJoint-TCIStateList* would transmit a PUCCH with HARQ-ACK information or a PUSCH with HARQ-ACK information corresponding to the DCI carrying the TCI State indication and without DL assignment, or corresponding to the PDSCH scheduled by the DCI carrying the TCI State indication, and if the indicated TCI State is different from the previously indicated one, the indicatedTCI-State and/or *TCI-UL-State* should be applied starting from the first slot that is at least $beamAppTime$ symbols after the last symbol of the PUCCH or the PUSCH. The first slot and the $beamAppTime$ symbols are both determined on the active BWP with the smallest SCS among the BWP(s) from the CCs applying the indicated *TCI-State* or *TCI-UL-State* that are active at the end of the PUCCH or the PUSCH carrying the HARQ-ACK information.  |

In order to avoid potential beam miss-understanding for multi-slot PDSCH/PUSCH repetition between UEs and gNB, we propose to conclude as the following.

**Proposal for conclusion:**

* + ***For multi-slot PDSCH/PUSCH repetition, if DLorJointTCIState or UL-TCI-State is configured, the indicated joint/DL/UL TCI state on each slot is applied to the scheduled PDSCH/PUSCH on each slot.***

Please provide company’s view in the table below.

|  |  |
| --- | --- |
| Company | Comment |
| Mod\_V00 | FL note: Above analysis from R1-2301469 seems to reflect the current situation exactly. Then, the above proposed conclusion may be needed for avoiding some misunderstanding for unified TCI state indication. |
| QC | The conclusion is unnecessary, although we agree with it. It is essentially repeating the pink part of the spec. In addition, we think the CR mixed up two different issues. To our understanding, the yellow part says the indicated TCI codepoint should be based on the activated TCI codepoint in the 1st slot. But the indicated TCI codepoint can change in the middle of the multiple slots, e.g. gNB can send DCI to indicate TCI codepoint #4 instead of #1 in the middle, but their definitions should be based on those in the 1st slot. On the other hand, the pink part says a different thing, i.e. the indicated TCI codepoint will take effect after the BAT. So we think the spec is clear without ambiguity. The CR is essentially repeating the pink part of the spec.  |
| Google | In our view, if everyone shares the same view, we should change spec instead of making a conclusion. Current spec is somehow different from the conclusion, especially for PUSCH part. In addition, how about PUCCH? |
| Ericsson | We agree with Qualcomm – the specification does not make an exception for multi-slot, so the pink part always applies. |
| Docomo | In RAN1#111, we realized different companies had different understanding on this issue. So, we believe clear conclusion is needed to avoid spec. ambiguity. When we first read the spec., we were not sure the proposed conclusion is correct, because yellow part and pink part are contradicting each other. We worry some companies may implement based on incorrect understanding. |
| MediaTek | Rel-17 timeline for applying unified TCI state is quite clear in current specification. No need to make the conclusion since it is already captured/described in current specification. |
| LG | Similar understanding with Qualcomm |
| Spreadtrum | OK to clarify the understanding on the current spec. We think the BAT definition in current spec is suitable for this issue, i.e. the indicated unified TCI state is applied after BAT regardless of single slot or multi-slot channel transmission. |
| vivo | This conclusion and potential CR is needed. Previous conclusion is for multi-PDSCH/PUSCH, while this conclusion is for multi-slot PDSCH and PUSCH repetition.Please note that “PUSCH repetition” is more precise because PUSCH repetition includes both Type A and type B that can be cross multiple slots. So is inter-slot PUCCH repetition. Currently, PDCCH repetition is within a single slot.Propose the updated conclusion as follows:* + ***For multi-slot PDSCH and PUSCH/PUCCH repetition, if DLorJointTCIState or UL-TCI-State is configured, the indicated joint/DL/UL TCI state on each slot is applied to the scheduled PDSCH/PUSCH/PUCCH occasion(s) on each slot.***
 |
| Intel  | Tend to agree with QC, not needed. |
| Samsung | We think that the spec is clear. But we are fine to have a conclusion to avoid any potential misunderstanding.  |
| Huawei, HiSilicon | The conclusion is not required.  |
| Lenovo | We share similar understanding with QC, this CR is not needed. |
| ZTE | We are fine to have a clear conclusion to align understanding across companies. |
| Mod\_V16 | **FL’s observation-1:** Support/fine-to-discuss: 4; Not-support: 9;**FL’s observation-2:** It seems that majority companies does NOT identify the essentiality of the issue raised by the following CR. * R1-2301469 Discussion on multi-slot PDSCH/PUSCH repetition in unified TCI NTT DOCOMO, INC.
 |

### Issue 1-8 Application time of TCI indication (R1-2301722)

|  |  |
| --- | --- |
| ***Reason for change:*** | It is ambiguos for UE and NW to determine the exact beam application time when the PUCCH or PUSCH with HARQ-ACK information for TCI indication is transmitted with multiple repetitions*.* |
|  |  |
| ***Summary of change:*** | Clarify when the PUCCH or PUSCH with HARQ-ACK information for TCI indication is transmitted with multiple repetitions, the indicated *TCI-State* and/or *TCI-UL-State* should be applied starting from the first slot that is at least $beamAppTime$ symbols after the last symbol of the last repetition of the PUCCH or PUSCH.  |
|  |  |
| ***Consequences if not approved:*** | The beam application time may not be aligned between UE and BS when the PUCCH or PUSCH with HARQ-ACK information for TCI indication is transmitted with multiple repetitions. And the misaligned beam may lead to packet loss and even beam failure. |

Due to above, the following draft CR is provided in R1-2301722:

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**5.1.5 Antenna ports quasi co-location**

< Unchanged parts are omitted >

When a UE configured with *dl-OrJoint-TCIStateList* would transmit a PUCCH with HARQ-ACK information or a PUSCH with HARQ-ACK information corresponding to the DCI carrying the TCI State indication and without DL assignment, or corresponding to the PDSCH scheduled by the DCI carrying the TCI State indication, and if the indicated TCI State is different from the previously indicated one, the indicatedTCI-State and/or *TCI-UL-State* should be applied starting from the first slot that is at least $beamAppTime$ symbols after the last symbol of the PUCCH or the PUSCH. When a UE configured with *dl-OrJoint-TCIStateList* would transmit a PUCCH with HARQ-ACK information with repetitions or a PUSCH with HARQ-ACK information with repetitions corresponding to the DCI carrying the TCI State indication and without DL assignment, or corresponding to the PDSCH scheduled by the DCI carrying the TCI State indication, and if the indicated TCI State is different from the previously indicated one, the indicatedTCI-State and/or *TCI-UL-State* should be applied starting from the first slot that is at least $beamAppTime$ symbols after the last symbol of the last repetition of the PUCCH or the PUSCH.The first slot and the $beamAppTime$ symbols are both determined on the active BWP with the smallest SCS among the BWP(s) from the CCs applying the indicated *TCI-State* or *TCI-UL-State* that are active at the end of the PUCCH or the PUSCH carrying the HARQ-ACK information.

< Unchanged parts are omitted >

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Please provide company’s view in the table below.

|  |  |
| --- | --- |
| Company | Comment |
| Mod\_V00 | FL note: The update seems unnecessary if being based on the last repetition for HARQ-ACK is a common understanding and also reflected by ‘the last symbol of the PUSCH or PUSCH’ as captured in the spec. |
| QC | Fine to discuss |
| Google | OK to discuss. We think the wording needs more discussion. |
| Ericsson | Agree with the FL. “Last symbol” means “last symbol”, also for PUCCH or PUSCH with repetition. |
| OPPO | Seems no ambiguity.  |
| Docomo | Agree with FL. Spec. looks no ambiguity. |
| MediaTek | Same view with FL. No ambiguity in current spec. |
| LG | Agree with FL’s assessment |
| Spreadtrum | Agree with FL. |
| vivo | Agree with FL’s assessment |
| Intel | Agree with FL that “last symbol” should imply last symbol of last repetition.  |
| Samsung | CR not needed. Agree with FL and Ericsson. Last symbol means last symbol of the channel carrying the HARQ-ACK information including all repetitions! |
| Huawei, HiSilicon | We think it is necessary to clarify the “last symbol” for this issue. Specially because there are several other occasions in the spec that a similar clarification is made. Explicitly clarifying the “last symbol” in some instances while assuming that “last symbol” means “last symbol of last Tx occasion” in other instances causes ambiguity and confusion in the spec. One example follows:

|  |
| --- |
| 38.214 Clause 6.1.7- The end of an actual TDW is- The last symbol of the last PUSCH transmission in a slot for PUSCH transmission of PUSCH repetition type A scheduled by DCI format 0\_1 or 0\_2, or PUSCH repetition Type A with a configured grant, or PUSCH repetition type B or TB processing over multiple slots within the nominal TDW, if the actual TDW reaches the end of the last PUSCH transmission within the nominal TDW. |

 |
| Lenovo | Agree with FL’s assessment |
| ZTE | Agree with FL’s assessment. |
| Mod\_V16 | **FL’s observation-1:** Support/fine-to-discuss: 2; Not-support: 11;**FL’s observation-2:** It seems that majority companies does NOT identify the essentiality of the issue raised by the following CR. * R1-2301722 Correction on application time of TCI indication Huawei, HiSilicon
 |

## Summary of editorial (E) issues

Companies are to share their inputs on the editorial CR for the following issues herein.

### Issue 2-1

* R1-2300197 Draft 38.213 CR on parameter name alignment for unified TCI framework (Spreadtrum Communications)
* R1-2300198 Draft 38.214 CR on name alignment for TCI state parameter (Spreadtrum Communications)

Table 1 Companies’ inputs

|  |  |
| --- | --- |
| Company | Comment |
| Mod\_V00 | Above seems fine except that *dl-OrJoint-TCIStateList* should be replaced by ‘*dl-OrJointTCI-StateList*’ as mentioned in Issue 2-2.Please provide your views as follows. |
| QC | Fine for both |
| Google | Support |
| Ericsson | Fine for the first CR. In our view, the changes in the second CR are too small: there is no risk for any misunderstanding. We would prefer to avoid CRs with such small changes in the future. But maybe we could get some guidance from the chair?[Mod\_V16]: Sure. Please raise your comment during online. |
| Docomo | Support. |
| MediaTek | Okay to both |
| LG | Fine |
| Spreadtrum | Support |
| vivo | Support |
| Samsung | OK |
| Huawei, HiSilicon | Support |
| Lenovo | Support |
| ZTE | Support |
| Mod\_V16 | **FL’s recommendation:** @Spreadtrum, please update your contribution based on the above suggestion (*dl-OrJoint-TCIStateList* should be replaced by ‘*dl-OrJointTCI-StateList*’), and then we can quick review your update in the next round. |
| Spreadtrum | Follow the recommendation from FL, we have updated our two CRs R1-2301982 and R1-2301983 to inbox. |

### Issue 2-2

* R1-2300255 Parameter alignment for unified TCI state for 38.213 OPPO
* R1-2300256 Parameter alignment for unified TCI state for 38.214 OPPO

Table 2 Companies’ inputs

|  |  |
| --- | --- |
| Company | Comment |
| Mod\_V00 | Above editorial CRs seem fine. Please provide your views as follows. |
| QC | Fine for both |
| Google | Support |
| Ericsson | In our view, the changes in the CRs are too small: there is no risk for any misunderstanding. We would prefer to avoid CRs with such small changes in the future. But maybe we could get some guidance from the chair? |
| OPPO | Support.  |
| Docomo | Support. |
| MediaTek | OK |
| LG | Fine |
| Spreadtrum | Support |
| vivo | Support |
| Samsung | OK |
| Huawei, HiSilicon | Support |
| Lenovo | Support |
| ZTE | Support |
| Mod\_V16 | **FL’s recommendation-1:** To endorse the following as in alignment CR in TS 38.213.* R1-2300255 Parameter alignment for unified TCI state for 38.213 OPPO

**FL’s recommendation-2:** To endorse the following as in alignment CR in TS 38.214.* R1-2300256 Parameter alignment for unified TCI state for 38.214 OPPO
 |

### Issue 2-3

* R1-2300389 Draft CR on ACK for MAC CE based Unified TCI Indication Google

Table 3 Companies’ inputs

|  |  |
| --- | --- |
| Company | Comment |
| Mod\_V00 | Above editorial CR seem fine. Please provide your views as follows. |
| QC | Fine for the CR |
| Google | Support |
| Ericsson | This would affect also the legacy TCI framework, right? Do not support. |
| Google2 | @Ericsson, this is a Rel-17 CR. Another possible way is to define a totally new paragraph as follows, but do we really need such kind of overhead in spec?If a UE receives a higher layer configuration of *dl-OrJoint-TCIStateList* or *ul-TCI-StateList,* when the UE would transmit a PUCCH or a PUSCH with HARQ-ACK information in slot *n* corresponding to the PDSCH carrying the activation command, the indicated mapping between TCI states and codepoints of the DCI field *'Transmission Configuration Indication'* should be applied starting from the first slot that is after slot$ n+3N\_{slot}^{subframe,µ}+\frac{2^{μ}}{2^{μ\_{K\_{mac}}}}∙k\_{mac}$ where ** is the SCS configuration for the PUCCH or PUSCH and $μ\_{K\_{mac}} $is the subcarrier spacing configuration for $k\_{mac}$ with a value of 0 for frequency range 1, and $k\_{mac}$ is provided by *K-Mac* or $k\_{mac}=0$ if *K-Mac* is not provided. If *tci-PresentInDCI* is set to 'enabled' or *tci-PresentDCI-1-2* is configured for the CORESET scheduling the PDSCH, and the time offset between the reception of the DL DCI and the corresponding PDSCH is equal to or greater than *timeDurationForQCL* if applicable, after a UE receives an initial higher layer configuration of TCI states and before reception of the activation command, the UE may assume that the DM-RS ports of PDSCH of a serving cell are quasi co-located with the SS/PBCH block determined in the initial access procedure with respect to *qcl-Type* set to 'typeA', and when applicable, also with respect to *qcl-Type* set to 'typeD'.  |
| OPPO | Support |
| Docomo | Support.  |
| LG | Fine for the CR since the operation is for Rel-17 with higher layer configuration on Rel-17 TCI state list as Google captured. |
| vivo | Support |
| Intel  | OK |
| Samsung | Don’t support. Why define new behavior for Rel-17 different from that of Rel-15/16. The text says “UE **would** transmit a PUCCH”, this doesn’t have to be an actual PUCCH transmission, if PUCCH overlaps PUSCH and HARQ-ACK is multiplexed on PUSCH, the time of the original PUCCH would be considered for determining when the TCI state becomes effective. The spec is fine and there is no need to update. |
| Huawei, HiSilicon | Support |
| Lenovo | Support |
| ZTE | Support |
| Mod\_V16 | **FL’s observation-1:** Support/fine-to-discuss: 10; Not-support: 2;**FL’s observation-2:** Technically speaking, it seems quite clear. Then, we can try to handle above during online session. R1-2300389 Draft CR on ACK for MAC CE based Unified TCI Indication Google----------------------------------------------------------5.1.5 Antenna ports quasi co-location< Unchanged parts are omitted >When the UE would transmit a PUCCH or a PUSCH with HARQ-ACK information in slot *n* corresponding to the PDSCH carrying the activation command, the indicated mapping between TCI states and codepoints of the DCI field *'Transmission Configuration Indication'* should be applied starting from the first slot that is after slot$ n+3N\_{slot}^{subframe,µ}+\frac{2^{μ}}{2^{μ\_{K\_{mac}}}}∙k\_{mac}$ where ** is the SCS configuration for the PUCCH or PUSCH and $μ\_{K\_{mac}} $is the subcarrier spacing configuration for $k\_{mac}$ with a value of 0 for frequency range 1, and $k\_{mac}$ is provided by *K-Mac* or $k\_{mac}=0$ if *K-Mac* is not provided. If *tci-PresentInDCI* is set to 'enabled' or *tci-PresentDCI-1-2* is configured for the CORESET scheduling the PDSCH, and the time offset between the reception of the DL DCI and the corresponding PDSCH is equal to or greater than *timeDurationForQCL* if applicable, after a UE receives an initial higher layer configuration of TCI states and before reception of the activation command, the UE may assume that the DM-RS ports of PDSCH of a serving cell are quasi co-located with the SS/PBCH block determined in the initial access procedure with respect to *qcl-Type* set to 'typeA', and when applicable, also with respect to *qcl-Type* set to 'typeD'. < Unchanged parts are omitted >---------------------------------------------------------- |

### Issue 2-4

* R1-2300417 Draft alignment CR on RRC parameters vivo, Nokia
* R1-2300627 Editorial corrections on beam reporting in uplink panel selection CATT
* R1-2301465 Correction on reportQuantity ASUSTeK
* R1-2301662 Draft CR aligning parameter names related to CSI report procedure Ericsson

Table 4 Companies’ inputs

|  |  |
| --- | --- |
| Company | Comment |
| Mod\_V00 | After reviewing the above inputs, please find the following merge version: **5.2.1 Channel state information framework**The procedures on aperiodic CSI reporting described in this clause assume that the CSI reporting is triggered by DCI format 0\_1, but they equally apply to CSI reporting triggered by DCI format 0\_2, by applying the higher layer parameter *reportTriggerSizeDCI-0-2* instead of *reportTriggerSize*.The time and frequency resources that can be used by the UE to report CSI are controlled by the gNB. CSI may consist of Channel Quality Indicator (CQI), precoding matrix indicator (PMI), CSI-RS resource indicator (CRI), SS/PBCH Block Resource indicator (SSBRI), layer indicator (LI), rank indicator (RI), L1-RSRP, L1-SINR or CapabilityIndex.For CQI, PMI, CRI, SSBRI, LI, RI, L1-RSRP, L1-SINR, Capability~~[Set]~~Index a UE is configured by higher layers with N≥1 *CSI-ReportConfig* Reporting Settings, M≥1 *CSI-ResourceConfig* Resource Settings, and one or two list(s) of trigger states (given by the higher layer parameters *CSI-AperiodicTriggerStateList* and *CSI-SemiPersistentOnPUSCH-TriggerStateList*). Each trigger state in *CSI-AperiodicTriggerStateList* contains a list of associated *CSI-ReportConfigs* indicating the Resource Set IDs for channel and optionally for interference. Each trigger state in *CSI-SemiPersistentOnPUSCH-TriggerStateList* contains one associated *CSI-ReportConfig*.< Unchanged parts are omitted >**5.2.1.4 Reporting configurations**< Unchanged parts are omitted >A CSI Reporting Setting is said to have a wideband frequency-granularity if - *reportQuantity* is set to ‘cri-RI-PMI-CQI’, or ‘cri-RI-LI-PMI-CQI’, *cqi-FormatIndicator* is set to ‘widebandCQI’ and *pmi-FormatIndicator* is set to ‘widebandPMI’, or- *reportQuantity* is set to ‘cri-RI-PMI-CQI’, *codebookType* is set to ‘typeII-PortSelection-r17’ with $M=1$ and *cqi-FormatIndicator* is set to ‘widebandCQI’, or- *reportQuantity* is set to ‘cri-RI-i1’ or- *reportQuantity* is set to ‘cri-RI-CQI’ or ‘cri-RI-i1-CQI’ and *cqi-FormatIndicator* is set to ‘widebandCQI’, or- *reportQuantity* is set to ‘cri-RSRP’ or ‘ssb-Index-RSRP’ or ‘cri-SINR’, or ‘ssb-Index-SINR’ or ‘cri-RSRP-~~Capability~~Index’ or ‘ssb-Index-RSRP-~~Capability~~Index’ or ‘cri-SINR-~~Capability~~Index’, or ‘ssb-Index-SINR-~~Capability~~Index’, where ‘cri-RSRP-Index’, ‘ssb-Index-RSRP-Index’, ‘cri-SINR-Index’, ‘ssb-Index-SINR-Index’ are CapabilityIndex related quantities.< Unchanged parts are omitted >**5.2.2.5 CSI reference resource definition**< Unchanged parts are omitted >When DRX is configured, the UE reports a CSI report only if receiving at least one CSI-RS transmission occasion for channel measurement and CSI-RS and/or CSI-IM occasion for interference measurement in DRX Active Time no later than CSI reference resource and drops the report otherwise. When DRX is configured and the CSI-RS Resource Set for channel measurement corresponding to a CSI report is configured with two Resource Groups and $N$ Resource Pairs, as described in clause 5.2.1.4.1, the UE reports a CSI report only if receiving at least one CSI-RS transmission occasion for each CSI-RS resource in a Resource Pair within the same DRX Active Time no later than CSI reference resource and drops the report otherwise. When the UE is configured to monitor DCI format 2\_6 and if the UE configured by higher layer parameter *ps-TransmitOtherPeriodicCSI* to report CSI with the higher layer parameter *reportConfigType* set to ‘periodic’ and *reportQuantity* set to quantities other than ‘cri-RSRP’, ‘ssb-Index-RSRP’, ‘cri-RSRP- Index’, and ‘ssb-Index-RSRP- Index ‘ when *drx-onDurationTimer* is not started, the UE shall report CSI during the time duration indicated by *drx-onDurationTimer* in *DRX-Config* also outside active time according to the procedure described in Clause 5.2.1.4 if receiving at least one CSI-RS transmission occasion for channel measurement and CSI-RS and/or CSI-IM occasion for interference measurement during the time duration indicated by drx-onDurationTimer in *DRX-Config* outside DRX active time or in DRX Active Time no later than CSI reference resource and drops the report otherwise. When the UE is configured to monitor DCI format 2\_6 and if the UE configured by higher layer parameter *ps-TransmitPeriodicL1-RSRP* to report L1-RSRP with the higher layer parameter *reportConfigType* set to ‘periodic’ and *reportQuantity* set to ‘cri-RSRP’, ‘ssb-Index-RSRP’, ‘cri-RSRP- Index’, or ‘ssb-Index-RSRP- Index’ when *drx-onDurationTimer* is not started, the UE shall report L1-RSRP during the time duration indicated by *drx-onDurationTimer* in *DRX-Config* also outside active time according to the procedure described in clause 5.2.1.4 and when reportQuantity set to ‘cri-RSRP’ or *‘*cri-RSRP-~~Capability[Set]~~*Index*’ if receiving at least one CSI-RS transmission occasion for channel measurement during the time duration indicated by drx-onDurationTimer in *DRX-Config* outside DRX active time or in DRX Active Time no later than CSI reference resource and drops the report otherwise.< Unchanged parts are omitted >Please provide your views as follows. |
| QC | Fine for the merged version |
| Google | Support |
| Ericsson | Note that the same content is in R1-2301662. We are OK with the content, but this “are CapabilityIndex related quantities.” Seems unnecessary. Note that the paragraph only defines what wideband frequency granularity means.[Mod\_V16]: Please review the comments from Samsung, and the updated version. |
| OPPO | Support FL’s proposal of merged version |
| Docomo | Support. |
| LG | Fine |
| Spreadtrum | Support |
| vivo | Fine with the merged version |
| Intel  | OK with FL’s version |
| Samsung | First (5.2.1) and third (5.2.2.5): OK.Second (5.2.1.4): Three comments: Comment 1: OK, but this may add to confusion at least for two highlighted ones since it reads as ‘ssb-Index-RSRP-Index’ and ‘ssb-Index-SINR-Index’. The confusion can be due to “index” appearing twice. For ex: I can nterpret ‘ssb-Index-RSRP-Index’ as any one of the following:* 2 quantities: ssb-Index and RSRP-Index
* 3 quantities: ssb-Index, RSRP, and Index
* 4 quantities: ssb, Index, RSRP, and Index

The correct interpretation is 2nd one (3 quantities). We see no harm in keeping the word “Capability” since it can help avoid the confusion. But, if other companies don’t find it confusing, we can be OK with it.Comment 2: the last part of the text is needed, since it links the Index to CapabilityIndex mentioned in 5.2.1. We can perhaps clarify a bit, as shown in green below, since these quantities include CapabilityIndex in addition to CRI/SSBRI, RSRP/SINR.*reportQuantity* is set to ‘cri-RSRP’ or ‘ssb-Index-RSRP’ or ‘cri-SINR’, or ‘ssb-Index-SINR’ or ‘cri-RSRP-~~Capability~~Index’ or ‘ssb-Index-RSRP-~~Capability~~Index’ or ‘cri-SINR-~~Capability~~Index’, or ‘ssb-Index-SINR-~~Capability~~Index’, where quantities ‘cri-RSRP-Index’, ‘ssb-Index-RSRP-Index’, ‘cri-SINR-Index’, ‘ssb-Index-SINR-Index’ ~~are~~ include CapabilityIndex ~~related quantities~~.[Mod\_V16]: Thanks for good suggestion.Comment 3: we also need a CR (as shown in red below) for the following two tables from TS 38.212.* … for reporting ssb-Index-RSRP or ssb-Index-RSRP-Index”
* … for reporting ssb-Index-RSRP or ssb-Index-SINR-Index”

cid:image002.jpg@01D9489C.11D30380[Mod\_V16]: Thank you. Then let’s try to handle the above potential issue later. |
| Huawei, HiSilicon | Support |
| Lenovo | Support |
| ZTE | Support the merged version from FL. |
| Mod\_V16 | **FL’s recommendation:** Based on above input, we have the following update. Then, for potential CRs for TS 38.212, we can handle that later. To endorse the following as in alignment CR in TS 38.214.**5.2.1 Channel state information framework**The procedures on aperiodic CSI reporting described in this clause assume that the CSI reporting is triggered by DCI format 0\_1, but they equally apply to CSI reporting triggered by DCI format 0\_2, by applying the higher layer parameter *reportTriggerSizeDCI-0-2* instead of *reportTriggerSize*.The time and frequency resources that can be used by the UE to report CSI are controlled by the gNB. CSI may consist of Channel Quality Indicator (CQI), precoding matrix indicator (PMI), CSI-RS resource indicator (CRI), SS/PBCH Block Resource indicator (SSBRI), layer indicator (LI), rank indicator (RI), L1-RSRP, L1-SINR or CapabilityIndex.For CQI, PMI, CRI, SSBRI, LI, RI, L1-RSRP, L1-SINR, Capability~~[Set]~~Index a UE is configured by higher layers with N≥1 *CSI-ReportConfig* Reporting Settings, M≥1 *CSI-ResourceConfig* Resource Settings, and one or two list(s) of trigger states (given by the higher layer parameters *CSI-AperiodicTriggerStateList* and *CSI-SemiPersistentOnPUSCH-TriggerStateList*). Each trigger state in *CSI-AperiodicTriggerStateList* contains a list of associated *CSI-ReportConfigs* indicating the Resource Set IDs for channel and optionally for interference. Each trigger state in *CSI-SemiPersistentOnPUSCH-TriggerStateList* contains one associated *CSI-ReportConfig*.< Unchanged parts are omitted >**5.2.1.4 Reporting configurations**< Unchanged parts are omitted >A CSI Reporting Setting is said to have a wideband frequency-granularity if - *reportQuantity* is set to ‘cri-RI-PMI-CQI’, or ‘cri-RI-LI-PMI-CQI’, *cqi-FormatIndicator* is set to ‘widebandCQI’ and *pmi-FormatIndicator* is set to ‘widebandPMI’, or- *reportQuantity* is set to ‘cri-RI-PMI-CQI’, *codebookType* is set to ‘typeII-PortSelection-r17’ with $M=1$ and *cqi-FormatIndicator* is set to ‘widebandCQI’, or- *reportQuantity* is set to ‘cri-RI-i1’ or- *reportQuantity* is set to ‘cri-RI-CQI’ or ‘cri-RI-i1-CQI’ and *cqi-FormatIndicator* is set to ‘widebandCQI’, or- *reportQuantity* is set to ‘cri-RSRP’ or ‘ssb-Index-RSRP’ or ‘cri-SINR’, or ‘ssb-Index-SINR’ or ‘cri-RSRP-~~Capability~~Index’ or ‘ssb-Index-RSRP-~~Capability~~Index’ or ‘cri-SINR-~~Capability~~Index’, or ‘ssb-Index-SINR-~~Capability~~Index’, where quantities ‘cri-RSRP-Index’, ‘ssb-Index-RSRP-Index’, ‘cri-SINR-Index’, ‘ssb-Index-SINR-Index’ include CapabilityIndex.< Unchanged parts are omitted >**5.2.2.5 CSI reference resource definition**< Unchanged parts are omitted >When DRX is configured, the UE reports a CSI report only if receiving at least one CSI-RS transmission occasion for channel measurement and CSI-RS and/or CSI-IM occasion for interference measurement in DRX Active Time no later than CSI reference resource and drops the report otherwise. When DRX is configured and the CSI-RS Resource Set for channel measurement corresponding to a CSI report is configured with two Resource Groups and $N$ Resource Pairs, as described in clause 5.2.1.4.1, the UE reports a CSI report only if receiving at least one CSI-RS transmission occasion for each CSI-RS resource in a Resource Pair within the same DRX Active Time no later than CSI reference resource and drops the report otherwise. When the UE is configured to monitor DCI format 2\_6 and if the UE configured by higher layer parameter *ps-TransmitOtherPeriodicCSI* to report CSI with the higher layer parameter *reportConfigType* set to ‘periodic’ and *reportQuantity* set to quantities other than ‘cri-RSRP’, ‘ssb-Index-RSRP’, ‘cri-RSRP- Index’, and ‘ssb-Index-RSRP- Index ‘ when *drx-onDurationTimer* is not started, the UE shall report CSI during the time duration indicated by *drx-onDurationTimer* in *DRX-Config* also outside active time according to the procedure described in Clause 5.2.1.4 if receiving at least one CSI-RS transmission occasion for channel measurement and CSI-RS and/or CSI-IM occasion for interference measurement during the time duration indicated by drx-onDurationTimer in *DRX-Config* outside DRX active time or in DRX Active Time no later than CSI reference resource and drops the report otherwise. When the UE is configured to monitor DCI format 2\_6 and if the UE configured by higher layer parameter *ps-TransmitPeriodicL1-RSRP* to report L1-RSRP with the higher layer parameter *reportConfigType* set to ‘periodic’ and *reportQuantity* set to ‘cri-RSRP’, ‘ssb-Index-RSRP’, ‘cri-RSRP- Index’, or ‘ssb-Index-RSRP- Index’ when *drx-onDurationTimer* is not started, the UE shall report L1-RSRP during the time duration indicated by *drx-onDurationTimer* in *DRX-Config* also outside active time according to the procedure described in clause 5.2.1.4 and when reportQuantity set to ‘cri-RSRP’ or *‘*cri-RSRP-~~Capability[Set]~~*Index*’ if receiving at least one CSI-RS transmission occasion for channel measurement during the time duration indicated by drx-onDurationTimer in *DRX-Config* outside DRX active time or in DRX Active Time no later than CSI reference resource and drops the report otherwise.< Unchanged parts are omitted > |

## Conclusion

# References

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| --- | --- | --- | --- |
| 1 | [**R1-2300190**](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_112/Docs/R1-2300190.zip) | Discussion on SRS closed loop power control shared with PUSCH | ZTE |
| 2 | [**R1-2300191**](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_112/Docs/R1-2300191.zip) | Draft CR on SRS closed loop power control shared with PUSCH in TS 38.213 | ZTE |
| 3 | [**R1-2300197**](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_112/Docs/R1-2300197.zip) | Draft 38.213 CR on parameter name alignment for unified TCI framework | Spreadtrum Communications |
| 4 | [**R1-2300198**](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_112/Docs/R1-2300198.zip) | Draft 38.214 CR on name alignment for TCI state parameter | Spreadtrum Communications |
| 5 | [**R1-2300255**](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_112/Docs/R1-2300255.zip) | Parameter alignment for unified TCI state for 38.213 | OPPO |
| 6 | [**R1-2300256**](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_112/Docs/R1-2300256.zip) | Parameter alignment for unified TCI state for 38.214 | OPPO |
| 7 | [**R1-2300388**](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_112/Docs/R1-2300388.zip) | Draft CR on Default Beam Application Time | Google |
| 8 | [**R1-2300389**](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_112/Docs/R1-2300389.zip) | Draft CR on ACK for MAC CE based Unified TCI Indication | Google |
| 9 | [**R1-2300390**](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_112/Docs/R1-2300390.zip) | Clarification on HARQ ACK for Unified TCI Indication | Google |
| 10 | [**R1-2300415**](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_112/Docs/R1-2300415.zip) | Discussion on the SRS closed loop power control under unified TCI framework | vivo |
| 11 | [**R1-2300416**](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_112/Docs/R1-2300416.zip) | Draft CR on the SRS closed loop power control under unified TCI framework | vivo |
| 12 | [**R1-2300417**](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_112/Docs/R1-2300417.zip) | Draft alignment CR on RRC parameters | vivo, Nokia |
| 13 | [**R1-2300521**](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_112/Docs/R1-2300521.zip) | Draft CR on the power control for SRS resource set for noncodebook | Lenovo |
| 14 | [**R1-2300627**](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_112/Docs/R1-2300627.zip) | Editorial corrections on beam reporting in uplink panel selection | CATT |
| 15 | [**R1-2301229**](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_112/Docs/R1-2301229.zip) | Corrections for Beam Failure Recover related to unified TCI state framework | Samsung |
| 16 | [**R1-2301230**](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_112/Docs/R1-2301230.zip) | Beam application time for cross carrier beam application | Samsung |
| 17 | [**R1-2301465**](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_112/Docs/R1-2301465.zip) | Correction on reportQuantity | ASUSTeK |
| 18 | [**R1-2301468**](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_112/Docs/R1-2301468.zip) | Discussion on HARQ-ACK for beam application timing in unified TCI | NTT DOCOMO, INC. |
| 19 | [**R1-2301469**](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_112/Docs/R1-2301469.zip) | Discussion on multi-slot PDSCH/PUSCH repetition in unified TCI | NTT DOCOMO, INC. |
| 20 | [**R1-2301722**](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_112/Docs/R1-2301722.zip) | Correction on application time of TCI indication | Huawei, HiSilicon |
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