**3GPP TSG RAN WG1 #108-e R1-** **220xxxx**

**e-Meeting, February 21th – March 3th, 2022**

**Agenda Item:** 7.1

**Source:** Moderator (Samsung)

**Title:** Summary of [108-e-NR-CRs-09]

**Document for:** Discussion and Decision

# Introduction

Based on Mr. Chair’s guidance, the corresponding editorial CRs are handled under in this email thread [108-e-NR-CRs-09].

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| **Issue#6, Issue#10, Issue#12**[R1-2201143](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_108-e/Docs/R1-2201143.zip) Correction on Type-2 HARQ-ACK codebook for Rel-15 ZTE[R1-2201383](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_108-e/Docs/R1-2201383.zip) Correction on Type-2 HARQ-ACK codebook for Rel-16 ZTE[R1-2201319](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_108-e/Docs/R1-2201319.zip) Draft CR on Type II CSI feedback CATT[R1-2201987](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_108-e/Docs/R1-2201987.zip) Correction on notation for power control Samsung [108-e-NR-CRs-09] Issue#6 (Correction on Type-2 HARQ-ACK codebook for Rel-15), Issue#10 (Draft CR on Type II CSI feedback), Issue#12 (Correction on notation for power control) by February 24 – Hyewon (Samsung)* For recommendation to the editors (in alignment CR).
* Relevant tdocs: R1-2201143, R1-2201383, R1-2201319, R1-2201987
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This document is to collect companies’ inputs and draw potential TP(s) as recommendations for the editors (no CRs) for the issue being agreeable in RAN1 group.

# Discussion

## Issue#6 (Rel-15/Rel-16): Correction on Type-2 HARQ-ACK codebook, ZTE [1][2]

### Background & Proposed TP for TS 38.213

Contribution [1] and [2] are related to TS 38.213 in Rel-15 and Rel-16 respectively, with the following reason for change and corresponding TP.

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| ***Reason for change:*** | Correct the notations $\tilde{o}\_{O^{ACK}-1}^{ACK}$,  and  in Clause 9.1.3.1 |
|  |  |
| ***Summary of change:*** | Change the incorrect notations $\tilde{o}\_{O^{ACK}-1}^{ACK}$ and  to  in Clause 9.1.3.1.Change the incorrect notation  to  in Clause 9.1.3.1.  |
|  |  |
| ***Consequences if not approved:*** | Inconsistent notations for HARQ-ACK information for Type-2 HARQ-ACK codebook.  |

**TP 1: {38.213: 9.1.3.1 Type-2 HARQ-ACK codebook in physical uplink control channel} for Rel-15**

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| < Unchanged part is omitted >9.1.3.1 Type-2 HARQ-ACK codebook in physical uplink control channel< Unchanged part is omitted >Denote by  the value of the counter DAI in DCI format 1\_0 or DCI format 1\_1 for scheduling on serving cell  in PDCCH monitoring occasion  according to Table 9.1.3-1. Denote by  the value of the total DAI in DCI format 1\_1 in PDCCH monitoring occasion  according to Table 9.1.3-1. The UE assumes a same value of total DAI in all DCI formats 1\_1 in PDCCH monitoring occasion .If the UE transmits HARQ-ACK information in a PUCCH in slot  and for any PUCCH format, the UE determines the , for a total number of  HARQ-ACK information bits, according to the following pseudo-code:< Unchanged part is omitted >if *harq-ACK-SpatialBundlingPUCCH* is not provided to the UE and the UE is configured by *maxNrofCodeWordsScheduledByDCI* with reception of two transport blocks for at least one configured DL BWP of a serving cell,elseend if for any Set  while if SPS PDSCH reception is activated for a UE and the UE is configured to receive SPS PDSCH in a slot  for serving cell , where  is the PDSCH-to-HARQ-feedback timing value for SPS PDSCH on serving cell = HARQ-ACK information bit associated with the SPS PDSCH receptionend if;end while< Unchanged part is omitted >If a UE - is provided *PDSCH-CodeBlockGroupTransmission* for  serving cells; and- is not provided *PDSCH-CodeBlockGroupTransmission*, for  serving cells where the UE determines the  according to the previous pseudo-code with the following modifications-  is used for the determination of a first HARQ-ACK sub-codebook for SPS PDSCH release, SPS PDSCH reception, and for TB-based PDSCH receptions scheduled by DCI formats 1\_0 on the  serving cells and by DCI formats 1\_0 and DCI formats 1\_1 on the  serving cells-  is replaced by  for the determination of a second HARQ-ACK sub-codebook corresponding to the  serving cells for CBG-based PDSCH receptions scheduled by DCI format 1\_1, and- Instead of generating one HARQ-ACK information bit per transport block for a serving cell from the  serving cells, the UE generates  HARQ-ACK information bits, where  is the maximum value of  across all  serving cells and  is the value of *maxNrofCodeWordsScheduledByDCI* for serving cell . If for a serving cell  it is , the UE generates NACK for the last  HARQ-ACK information bits for serving cell - The pseudo-code operation when *harq-ACK-SpatialBundlingPUCCH* is provided is not applicable- The counter DAI value and the total DAI value apply separately for each HARQ-ACK sub-codebook- The UE generates the HARQ-ACK codebook by appending the second HARQ-ACK sub-codebook to the first HARQ-ACK sub-codebook< Unchanged part is omitted > |

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

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| < Unchanged part is omitted >9.1.3.1 Type-2 HARQ-ACK codebook in physical uplink control channel< Unchanged part is omitted >if *harq-ACK-SpatialBundlingPUCCH* is not provided to the UE and the UE is configured by *maxNrofCodeWordsScheduledByDCI* with reception of two transport blocks for at least one configured DL BWP of a serving cell,$\_{}^{}=2⋅\left(4⋅j+V\_{temp2}\right)$ else$\_{}^{}=4⋅j+V\_{temp2}$ end if$\tilde{o}\_{i}^{ACK}=NACK$ for any $i\in \left\{0,1,\cdots ,\_{}^{}-1\right\}\V\_{s}$If a UE is configured to receive SPS PDSCH and the UE multiplexes HARQ-ACK information for one activated SPS PDSCH reception in the PUCCH in slot $n$, the UE generates one HARQ-ACK information bit associated with the SPS PDSCH reception and appends it to the $\_{}^{}$ HARQ-ACK information bits.If a UE is configured to receive SPS PDSCH and the UE multiplexes HARQ-ACK information for multiple activated SPS PDSCH receptions in the PUCCH in slot $n$, the UE generates the HARQ-ACK information as described in clause 9.1.2 and appends it to the $\_{}^{}$ HARQ-ACK information bits.< Unchanged part is omitted > |

### Companies’ input

Please kindly provide your views about the proposed TP of Issue#6 in the table below.

**Question 1-1: Do you agree the proposed TP of Issue#6 for Rel-15 and Rel-16?**

**Note: Once Rel-15 and Rel-16 TPs are agreed, the corresponding corrections for Rel-17 specifications will be recommended for the editors.**

* **If no, please provide the reasons and your suggestions, if any.**

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| --- | --- |
| Company |  Comment |
| Samsung | Agree |
| QC | We don’t agree with the TP especially for Rel-15. There is no other interpretation/ambiguity of current spec. Rel-15 has been deployed for a few years and it is stable. Unless a real issue observed in field due to this, otherwise we don’t see the need to adopt this CR.  |
| vivo | We support the change of “= HARQ-ACK information bit associated with the SPS PDSCH reception”. For the other change parts, we don’t see the necessary. But we are fine to change these together if most companies are fine. We think it should be editorial change. |
| ZTE | Agree@QC, please feel free, this is only editorial change and no impact on both gNB and UE implementation. The motivation is only to make the spec more accurate to read.@vivo, besides the change of “= HARQ-ACK information bit associated with the SPS PDSCH reception”, all of the changes are editorial correction. The motivation is only to make the spec more accurate to read.It is easy to accept these changes. |
|  |  |

## Issue#10 (Rel-15): Draft CR on Type II CSI feedback, CATT [3]

### Background & Proposed TP for TS 38.214

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| ***Reason for change:*** | For Type II CSI feedback, it is specified that the elements of $i\_{1,4,l}$, $i\_{2,1,l}$ (if reported) and $i\_{2,2,l}$ (if reported) are reported in the increasing order of their indices, $i=0,1,…, L-1$, where the element of the lowest index is mapped to the most significant bits and the element of the highest index is mapped to the least significant bits, in Clause 5.2.3 [TS 38.214]. There are 2L elements for $i\_{1,4,l}$, $i\_{2,1,l}$ and $i\_{2,2,l}$ according to the illustration in Caluse 5.2.2.2.3 [TS 38.214]. Hence, their indices *i* should be $0,1,…, 2L-1$. |
|  |  |
| ***Summary of change:*** | Corrected the index value of the elements of $i\_{1,4,l}$, $i\_{2,1,l}$ and $i\_{2,2,l}$. |
|  |  |
| ***Consequences if not approved:*** | The elements of $ i\_{1,4,l}$, $i\_{2,1,l}$(if reported) and $i\_{2,2,l}$ (if reported) with their indicesi= L,…,2L-1 are not reported. |

**TP 3: {38.214: 5.2.3 CSI reporting using PUSCH} for Rel-15**

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| ===================== Unchanged parts =====================5.2.3 CSI reporting using PUSCHA UE shall perform aperiodic CSI reporting using PUSCH on serving cell c upon successful decoding of a DCI format 0\_1 which triggers an aperiodic CSI trigger state.An aperiodic CSI report carried on the PUSCH supports wideband, and sub-band frequency granularities. An aperiodic CSI report carried on the PUSCH supports Type I and Type II CSI. A UE shall perform semi-persistent CSI reporting on the PUSCH upon successful decoding of a DCI format 0\_1 which activates a semi-persistent CSI trigger state. DCI format 0\_1 contains a CSI request field which indicates the semi-persistent CSI trigger state to activate or deactivate. Semi-persistent CSI reporting on the PUSCH supports Type I and Type II CSI with wideband, and sub-band frequency granularities. The PUSCH resources and MCS shall be allocated semi-persistently by an uplink DCI.CSI reporting on PUSCH can be multiplexed with uplink data on PUSCH except that semi-persistent CSI reporting on PUSCH activated by a DCI format is not expected to be multiplexed with uplink data on the PUSCH. CSI reporting on PUSCH can also be performed without any multiplexing with uplink data from the UE. Type I CSI feedback is supported for CSI Reporting on PUSCH. Type I wideband and sub-band CSI is supported for CSI Reporting on the PUSCH. Type II CSI is supported for CSI Reporting on the PUSCH.For Type I and Type II CSI feedback on PUSCH, a CSI report comprises of two parts. Part 1 has a fixed payload size and is used to identify the number of information bits in Part 2. Part 1 shall be transmitted in its entirety before Part 2. - For Type I CSI feedback, Part 1 contains RI (if reported), CRI (if reported), CQI for the first codeword (if reported). Part 2 contains PMI (if reported), LI (if reported) and contains the CQI for the second codeword (if reported) when RI is larger than 4. - For Type II CSI feedback, Part 1 contains RI (if reported), CQI, and an indication of the number of non-zero wideband amplitude coefficients per layer for the Type II CSI (see clause 5.2.2). The fields of Part 1 – RI (if reported), CQI, and the indication of the number of non-zero wideband amplitude coefficients for each layer – are separately encoded. Part 2 contains the PMI and LI (if reported) of the Type II CSI. The elements of $i\_{1,4,l}$, $i\_{2,1,l}$ (if reported) and $i\_{2,2,l}$ (if reported) are reported in the increasing order of their indices, $i=0,1,…, 2L-1$, where the element of the lowest index is mapped to the most significant bits and the element of the highest index is mapped to the least significant bits. Part 1 and 2 are separately encoded. A Type II CSI report that is carried on the PUSCH shall be computed independently from any Type II CSI report that is carried on the PUCCH formats 3 or 4 (see clause 5.2.4 and 5.2.2). ===================== Unchanged parts ===================== |

### Companies’ input

Please kindly provide your views about the proposed TP of Issue#10 in the table below.

**Question 2-1: Do you agree the proposed TP of Issue#10 for Rel-15?**

**Note: Once Rel-15 TP is agreed, the corresponding corrections for Rel-16 and Rel-17 specifications will be recommended for the editors.**

* **If no, please provide the reasons and your suggestions, if any.**

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| --- | --- |
| Company |  Comment |
| Samsung | Support the editorial correction.  |
| QC | Our position is to take the TP for R16 and beyond, but not for Rel-15. The change is too late for R15. Rel-15 has been deployed for a few years and it is stable. Unless a real issue observed in field due to this, otherwise we don’t see the need to adopt this CR for Rel-15. |
| vivo | The issue is also discussed in MIMO session for Rel-16. Almost all companies think it should be marked with ‘E’. For Rel-15, we are also fine with change and think it should be editorial change. Considering companies may have concern from implementation perspective, we can follow majority’s view. |
| Ericsson | Support the correction, it is an obvious typo/editorial.  |
|  |  |

## Issue#12 (Rel-15): Correction on notation for power control, Samsung [4]

### Background & Proposed TP for TS 38.213

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| --- | --- |
| ***Reason for change:*** | The specifications use the undefined $PL\_{c}$ in determining $∆P\_{rampup,b,f,c}$ for the initial PUSCH transmission power. If the change is agreed, a mirror CR for Rel-16/Rel-17 needs to also apply it for a term associated with 2-step RA. |
|  |  |
| ***Summary of change:*** | Change $PL\_{c}$ to $PL\_{b,f,c}(q\_{d})$ to align the notation for the pathloss used for $∆P\_{rampup,b,f,c}$ in determining initial power for a PUSCH transmission (and align with the notation used for $∆P\_{rampup,b,f,c}$ in determining initial power for a PUCCH transmission). |
|  |  |
| ***Consequences if not approved:*** | Incorrect/ambiguous specifications. |

**TP 4: {38.213: 7.1.1 UE behaviour and 7.2.1 UE behaviour} for Rel-15**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| << Unchanged text is omitted >>7.1.1 UE behaviour<< Unchanged text is omitted >>- If the UE receives a random access response message in response to a PRACH transmission on active UL BWP of carrier of serving cell as described in Clause 8- , where and- is a TPC command value indicated in the random access response grant of the random access response message corresponding to the PRACH transmission on active UL BWP of carrier in the serving cell , and - $\_{}\left[\left(\_{}\left(\_{}\left(^{}\_{}^{}\left(\right)\right)\_{}\_{}\left(\right)\_{}\_{}\_{}\left(\right)\_{}\right)\right)\_{}\right]$;  and $\_{}$ is provided by higher layers and corresponds to the total power ramp-up requested by higher layers from the first to the last random access preamble for carrier in the serving cell , is the bandwidth of the PUSCH resource assignment expressed in number of resource blocks for the first PUSCH transmission on active UL BWP of carrier of serving cell, and  is the power adjustment of first PUSCH transmission on active UL BWP of carrier of serving cell . **Table 7.1.1-1: Mapping of TPC Command Field in DCI format 0\_0, DCI format 0\_1, or DCI format 2\_2, with CRC scrambled by TPC-PUSCH-RNTI, or DCI format 2\_3, to absolute and accumulated values or values**

|  |  |  |
| --- | --- | --- |
| **TPC Command Field**  | **Accumulated  or  [dB]** | **Absolute  or  [dB]**  |
| 0 | -1 | -4 |
| 1 | 0 | -1 |
| 2 | 1 | 1 |
| 3 | 3 | 4 |

7.2 Physical uplink control channel<< Unchanged text is omitted >>- If a configuration of a value for a corresponding PUCCH power control adjustment state for active UL BWP of carrier of serving cell is provided by higher layers, -  If the UE is provided *PUCCH-SpatialRelationInfo*, the UE determines the value of from the value of based on a *pucch-SpatialRelationInfoId* value associated with the *p0-PUCCH-Id* value corresponding to and with the *closedLoopIndex* value corresponding to ; otherwise, - Else, - , where , and is the TPC command value indicated in a random access response grant corresponding to a PRACH transmission or is the TPC command value in a DCI format with CRC scrambled by C-RNTI or MCS-C-RNTI that the UE detects in a first PDCCH reception in a search space set provided by *recoverySearchSpaceId* if the PUCCH transmission is a first PUCCH transmission after 28 symbols from a last symbol of the first PDCCH reception, and, if the UE transmits PUCCH on active UL BWP of carrier of serving cell , $∆\_{}\left[\left(\_{}\left(\_{}\_{}\_{}\_{}\_{}\_{}\right)\right)\_{}\right]$; otherwise, $∆\_{}\left[\left(\_{}\left(\_{}\_{}\_{}\right)\right)\_{}\right]$ where $\_{}$ is provided by higher layers and corresponds to the total power ramp-up requested by higher layers from the first to the last preamble for active UL BWP of carrier of primary cell , and corresponds to PUCCH format 0 or PUCCH format 1**Table 7.2.1-1: Mapping of TPC Command Field in DCI format 1\_0 or DCI format 1\_1 or DCI format 2\_2 with CRC scrambled by TPC-PUCCH-RNTI to accumulated values**

|  |  |
| --- | --- |
| **TPC Command Field**  | **Accumulated  [dB]** |
| 0 | -1 |
| 1 | 0 |
| 2 | 1 |
| 3 | 3 |

<< Unchanged text is omitted >> |

### Companies’ input

Please kindly provide your views about the proposed TP of Issue#12 in the table below.

**Question 3-1: Do you agree the proposed TP of Issue#12 for Rel-15?**

**Note: Once Rel-15 TP is agreed, the corresponding corrections for Rel-16 and Rel-17 specifications will be recommended for the editors.**

* **If no, please provide the reasons and your suggestions, if any.**

|  |  |
| --- | --- |
| Company |  Comment |
| Samsung | We support this CR. |
| QC | We don’t agree with the TP especially for Rel-15. There is no other interpretation/ambiguity of current spec. Rel-15 has been deployed for a few years and it is stable. Unless a real issue observed in field due to this, otherwise we don’t see the need to adopt this CR. |
| vivo | The CR is not needed. We think it is not essential. According to the current spec, the pathloss reference RS for $∆P\_{rampup,b,f,c}$ calculation is unspecified, it can be determined based on UE implementation or same RS as for a corresponding PRACH). We prefer to clarify whether this is the common understanding rather than have the CR in the later time. |
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# Summary

TBD

# References

[1] R1-2201143, Correction on Type-2 HARQ-ACK codebook for Rel-15, ZTE

[2] R1-2201383, Correction on Type-2 HARQ-ACK codebook for Rel-16, ZTE

[3] R1-2201319, Draft CR on Type II CSI feedback, CATT

[4] R1-2201987, Correction on notation for power control, Samsung