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

e-Meeting, February 21st – March 3rd, 2022

**Agenda Item: 7.1**

**Source: Moderator (Sharp)**

**Title: Summary of email discussion [108-e-NR-CRs-08]: Corrections on mapping between the Time domain resource allocation field value of the RAR UL grant and a row index of an allocated table**

**Document for: Discussion** **and Decision**

# Introduction

This contribution provides the summary of the following email discussion in RAN1#108-e, which was triggered by the draft CR in [R1-2202184](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_108-e/Docs/R1-2202184.zip) [1] and issue 2 in [R1-2202114](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_108-e/Docs/R1-2202114.zip) [2].

[108-e-NR-CRs-08] Issue#19 Corrections on mapping between the Time domain resource allocation field value of the RAR UL grant and a row index of an allocated table by February 23 – Liqing (Sharp)

* Relevant tdocs: [R1-2202184](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_108-e/Docs/R1-2202184.zip), [R1-2202114](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_108-e/Docs/R1-2202114.zip) (focus on issue 2)

# Discussions

## Issue description

In clause 6.1.2.1 of TS38.214 as below, it is specified that the *Time domain resource assignment* field value *m* of the DCI is mapped to a row index *m* + 1to an allocated table.

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| **TS38.214 V15.15.0**  6.1.2.1 Resource allocation in time domain  When the UE is scheduled to transmit a transport block and no CSI report, or the UE is scheduled to transmit a transport block and a CSI report(s) on PUSCH by a DCI, the *Time domain resource assignment* field value *m* of the DCI provides a row index *m* + 1to an allocated table. The determination of the used resource allocation table is defined in clause 6.1.2.1.1. The indexed row defines the slot offset *K2*, the start and length indicator *SLIV*, or directly the start symbol *S* and the allocation length *L*, and the PUSCH mapping type to be applied in the PUSCH transmission. |

However, the current specification only specifies the mapping between the TDRA field value of a DCI and a row index of an allocated TDRA table. As pointed out in [1] and issue 2 in [2], neither 38.213 nor 38.214 specifies how a TDRA field value of a RAR UL grant is mapped to a row index of an allocated TDRA table.

## First Round

**Question 1: Please provide your views on whether you see** **the missing case in the current spec description, i.e. the current spec description does not specify how a TDRA field value of a RAR UL grant is mapped to a row index of an allocated TDRA table.**

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| **Company** | **Agree or not** | **Comments** |
| Ericsson | Yes |  |
| vivo | Yes |  |
| Samsung | Yes |  |
| LG | Yes |  |
| CATT | Yes |  |
| ZTE | Yes |  |
| Huawei, HiSilicon | Agree |  |
| Qualcomm | Yes |  |
| NTT DOCOMO | Yes |  |

**Question 2: Please provide your views on whether specification change is needed to solve the issue.**

* **If yes, whether** **the proposed change in** [**R1-2202184**](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_108-e/Docs/R1-2202184.zip) **[1] can be supported. Or any other suggested change?**
* **If no, please explain why.**

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| **Company** | **Spec change is needed or not** | **Comments** |
| Ericsson | Yes |  |
| vivo | Yes |  |
| Samsung | Yes | We have minor comment. Since RAR UL grant will not have CSI report, the correct change might be: 6.1.2.1 Resource allocation in time domain When the UE is scheduled to transmit a transport block and no CSI report by a DCI or a RAR UL grant, or the UE is scheduled to transmit a transport block and a CSI report(s) on PUSCH by a DCI |
| LG | Yes |  |
| CATT | Yes | We recognize that generally RAR UL grant should be treated the same as dynamic scheduling (DCI), but it is missed in several places in current 38.214. Another example is in TBS determination clause:   |  | | --- | | 6.1.4.2 Transport block size determination …  - the TBS is assumed to be as determined from the DCI transported in the latest PDCCH or a RAR UL grant for the same transport block using . If there is no PDCCH for the same transport block using , and if the initial PUSCH for the same transport block is transmitted with configured grant,  …  - the TBS is assumed to be as determined from the DCI transported in the latest PDCCH or a RAR UL grant for the same transport block using . If there is no PDCCH for the same transport block using , and if the initial PUSCH for the same transport block is transmitted with configured grant,  … |   To us, it is considerable to fix this part too. |
| Apple | OK |  |
| ZTE |  | For the first change, it is not needed as commented by Samsung.  Ok with the second change. |
| Huawei, HiSilicon | Yes | Additionally, case for MsgA PUSCH is also missing. |
| Qualcomm |  | We propose to discuss any change as Rel-16 CR. Rel-15 already works well. |
| NTT DOCOMO | Yes |  |

## Second Round

Based on companies’ comments during the first round discussion, the situation was summarized below.

* Regarding **Question 1**, 9 companies provided feedback. All the replied companies agree that there is a missing case in the current spec description, i.e. the current spec description does not specify how a TDRA field value of a RAR UL grant is mapped to a row index of an allocated TDRA table.
* Regarding **Question 2**, 8 out of 9 companies generally agreed with the proposed change in R1-2202184 [1]. In addition, several specific comments are summarized as below.
  + Samsung suggests moving RAR UL grant to the first branch of the ‘when’ condition given RAR UL grant will not have CSI report. ZTE is also fine with the suggestion. Moderator thinks it is a more precise correction.
  + For the comment from CATT, Moderator thinks the proposed change from CATT is related to implicit MCS for retransmission for PUSCH scheduled by RAR UL grant and would be beyond the scope of the email discussion. On the other hand, moderator recalls that, in RAN1#96bis, a similar issue raised in [R1-1904467](https://www.3gpp.org/ftp/tsg_ran/wg1_rL1/TSGR1_96b/Docs/R1-1904467.zip) had been discussed and not agreed. Therefore, moderator proposes to focus on the spec change to solve the missing case in Question 1.
  + Huawei and HiSilicon comment that MsgA PUSCH is also missing. Moderator agrees that the PUSCH scheduled by the *fallbackRAR* UL grant in addition to the RAR UL grant should be included for Rel-16 CR.
  + Qualcomm comments that Rel-15 already works well and proposes to discuss any change as Rel-16 CR. According to the email discussion, companies had discussed the missing case. The proposed spec change should be RAN1’s common understating and would not cause any NBC issue. Therefore, it should be no harm to have a spec change for Rel-15 to capture the missing case.

According to above discussion and summary in the first round, companies please check the following proposals and provide comments.

**Proposal #1: Adopt the following Text proposal for TS38.214 for Rel-15.**

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| 6.1.2.1 Resource allocation in time domain  When the UE is scheduled to transmit a transport block and no CSI report by a DCI or by a RAR UL grant, or the UE is scheduled to transmit a transport block and a CSI report(s) on PUSCH by a DCI, the *Time domain resource assignment* field value *m* of the DCI or the *Time domain resource allocation* field value *m* of the RAR UL grant provides a row index *m* + 1to an allocated table. The determination of the used resource allocation table is defined in clause 6.1.2.1.1. The indexed row defines the slot offset *K2*, the start and length indicator *SLIV*, or directly the start symbol *S* and the allocation length *L*, and the PUSCH mapping type to be applied in the PUSCH transmission. |

Please provide your views on the proposal #1.

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| **Company** | **Comments** |
| CATT | Agree in principle. We are fine with moderator’s assessment.  One minor comment. As we check the Rel-15 38.213 spec, the name of the time domain resource allocation field of RAR UL grant should be ‘PUSCH time resource allocation’.  Table 8.2-1: Random Access Response Grant Content field size   |  |  | | --- | --- | | RAR grant field | Number of bits | | Frequency hopping flag | 1 | | PUSCH frequency resource allocation | 14 | | PUSCH time resource allocation | 4 | | MCS | 4 | | TPC command for PUSCH | 3 | | CSI request | 1 |   Should we use the same name as 38.213 exactly in the CR, i.e. replacing ‘*Time domain resource allocation*’ by *‘PUSCH time resource allocation’*? |
| Spreadtrum | Prefer CATT’s version. |
| vivo | We are fine with the TP by replaying the ‘Time domain resource allocation’ by ‘PUSCH time resource allocation”. |
| Samsung | We prefer the TP with CATT’s modification. |
| Qualcomm | We still do not think Rel-15 CR is necessary. There has not been any issue in the field. We can improve clarity from Rel-16. |
| Ericsson | We are fine to align the Rel-15 38.214 with existing name in 38.213, i.e. apply the change proposed by CATT. |
| ZTE | OK with CATT’s revision. |
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**Proposal #2: Adopt the following Text proposal for TS38.214 for Rel-16.**

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| 6.1.2.1 Resource allocation in time domain  When the UE is scheduled to transmit a transport block and no CSI report by a DCI or by a RAR UL grant or a fallbackRAR UL grant, or the UE is scheduled to transmit a transport block and a CSI report(s) on PUSCH by a DCI, the '*Time domain resource assignment'* field value *m* of the DCI or the *Time domain resource allocation* field value *m* of the RAR UL grant or of the fallbackRAR UL grant provides a row index *m* + 1to an allocated table. The determination of the used resource allocation table is defined in Clause 6.1.2.1.1. The indexed row defines the slot offset *K2*, the start and length indicator *SLIV*, or directly the start symbol *S* and the allocation length *L*, the PUSCH mapping type, and the number of repetitions (if *numberOfRepetitions* is present in the resource allocation table) to be applied in the PUSCH transmission. |

Please provide your views on the proposal #2.

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| **Company** | **Comments** |
| CATT | Agree in principle. Similar minor comment as the same with Rel-15 one. |
| Spreadtrum | Prefer CATT’s version. |
| vivo | We are fine with the TP by replaying the ‘Time domain resource allocation’ by ‘PUSCH time resource allocation”. |
| Qualcomm | We are fine with the TP by replacing the ‘Time domain resource allocation’ by ‘PUSCH time resource allocation”. |
| Ericsson | We share same view with above companies. Another minor comment is to remove the “a” after the second “or” to improve the readability, i.e. “by a DCI or by a RAR UL grant or **~~a~~** fallbackRAR UL grant”. It keeps the same style as 6.1.2.2 as editor has captured for frequency domain resource allocation in 38.214. |
| ZTE | OK with CATT’s revision. |
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**Summary of Second Round**

Based on companies’ comments during the second round discussion, the situation was summarized below.

* Regarding the proposed text proposal for Rel-15, 6 companies (CATT, Spreadtrum, vivo, Samsung, Ericsson, ZTE) agreed with the proposed TP with adding CATT’s proposed correction, i.e. replacing ‘Time domain resource allocation’ by ‘PUSCH time resource allocation’. While 1 company (Qualcomm) did not think Rel-15 CR is necessary.
  + @Qualcomm. The proposed change for Rel-15 should be the common understanding and would not impact any UE and gNB’s current implementation. Rather than leave a specification hole in Rel-15, it seems better to fill in the spec hole in Rel-15.
* Regarding the proposed text proposal for Rel-16, 6 companies (CATT, Spreadtrum, vivo, Qualcomm, Ericsson, ZTE) agreed with the proposed TP with adding CATT’s proposed correction, i.e. replacing ‘Time domain resource allocation’ by ‘PUSCH time resource allocation’. 1 company (Ericsson) commented to remove “a” in “by a DCI or by a RAR UL grant or **~~a~~** fallbackRAR UL grant” to improve the readability, which can keep the same style as in the current specification in subclause 6.1.2.2. The correction from Ericsson seems reasonable and agreeable.

The TPs for updated Proposal#1 and updated Proposal #2 are updated based on the comments in the second round discussion.

Since we are behind the deadline for the email thread, if you have any comments, please directly provide your comments in the email thread. Then we can know the situation quickly.

**Updated Proposal #1: Adopt the following Text proposal for TS38.214 for Rel-15.**

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| 6.1.2.1 Resource allocation in time domain  When the UE is scheduled to transmit a transport block and no CSI report by a DCI or by a RAR UL grant, or the UE is scheduled to transmit a transport block and a CSI report(s) on PUSCH by a DCI, the *Time domain resource assignment* field value *m* of the DCI or the *PUSCH time resource allocation* field value *m* of the RAR UL grant provides a row index *m* + 1to an allocated table. The determination of the used resource allocation table is defined in clause 6.1.2.1.1. The indexed row defines the slot offset *K2*, the start and length indicator *SLIV*, or directly the start symbol *S* and the allocation length *L*, and the PUSCH mapping type to be applied in the PUSCH transmission. |

Please provide your views on the updated proposal #1.

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| **Company** | **Comments** |
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**Updated Proposal #2: Adopt the following Text proposal for TS38.214 for Rel-16.**

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| 6.1.2.1 Resource allocation in time domain  When the UE is scheduled to transmit a transport block and no CSI report by a DCI or by a RAR UL grant or fallbackRAR UL grant, or the UE is scheduled to transmit a transport block and a CSI report(s) on PUSCH by a DCI, the '*Time domain resource assignment'* field value *m* of the DCI or the *PUSCH Time resource allocation* field value *m* of the RAR UL grant or of the fallbackRAR UL grant provides a row index *m* + 1to an allocated table. The determination of the used resource allocation table is defined in Clause 6.1.2.1.1. The indexed row defines the slot offset *K2*, the start and length indicator *SLIV*, or directly the start symbol *S* and the allocation length *L*, the PUSCH mapping type, and the number of repetitions (if *numberOfRepetitions* is present in the resource allocation table) to be applied in the PUSCH transmission. |

Please provide your views on the updated proposal #2.

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# Conclusion

TBD.

# References

1. [R1-2202184](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_108-e/Docs/R1-2202184.zip) “Corrections on mapping between the *Time domain resource allocation* field value of the RAR UL grant and a row index of an allocated table”, RAN1#108e, Sharp.
2. [R1-2202114](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_108-e/Docs/R1-2202114.zip) “Correction on time-domain resource allocation for Msg.3 PUSCH scheduled by RAR UL grant”, RAN1#108e, Qualcomm Incorporated.