**3GPP TSG RAN WG1 #106-e R1-210XXXX**

**e-Meeting, August 16th – 27th, 2021**

**Agenda item:** 7.1

**Source:** Moderator (CATT)

**Title:** Summary of [106-e-NR-7.1CRs-05]

**Document for:** Discussion and Decision

# Introduction

This document is created to facilitate the email discussion of “[106-e-NR-7.1CRs-05] Issue#10: Discussion on cancellation of semi-static transmission due to dynamic transmission”. This email thread is triggered by the following draft CR.

[R1-2106928](file:///D%3A%5C%5CDocuments%5C%5C3GPP%20documents%5C%5CRAN1%5C%5CTSGR1_106-e%5C%5CDocs%5C%5CR1-2106928.zip) Discussion on cancellation of semi-static transmission due to dynamic transmission CATT

# Company views

For operation on a single carrier in unpaired spectrum, for an overlapping case of a DL/UL semi-static transmission and an UL/DL dynamic transmission which collides with semi-static DL/UL symbol(s) or SSB/valid PRACH occasion,

* Understanding 1: both the dynamic transmission colliding with semi-static DL/UL symbol(s) or SSB/valid PRACH occasion and the semi-static transmission overlapping with the dynamic transmission are not transmitted / received;
* Understanding 2: semi-static transmission could be transmitted / received while dynamic transmission colliding with semi-static DL/UL symbol(s) or SSB/valid PRACH occasion is dropped.

More detailed elaboration of the case and the above understandings can be found in R1-2106928.

**Q1: Do you agree with understanding 1 or 2 above?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Understanding 1 or 2** | **Comment** |
| vivo | Understanding 1 | Current spec. reflects understanding 1.  |
| Huawei, HiSilicon | Und. 2 |  |
| Qualcomm | Not agree | Spec does not specify the order of the texts. Therefore, it is up to UE which order to process the relevant steps and hence up to UE whether to transmit/receive semi-static transmission. |
| OPPO |  | We agree with QC that it is up to UE implementation whether to process the semi-static UL/DL transmission. |
| Ericsson | Either is fine. | If possible, it would be good to clarify UE behavior when such configuration and scheduling occurs.  |
| ZTE | Understanding 2 | Understand 1 is not only inefficient due to the unnecessary dropping of the semi-static transmission, but would also imply that network should avoid configuring semi-static DL/UL transmission together with scheduling UL/DL dynamic transmission for typical cases. This would cause big restriction for network implementation especially when repetition is enabled for the dynamic transmission. Per our understanding, there should be no timeline issue for Understanding 2, as a UE should always know that dynamic UL/DL transmission is not allowed on semi-static DL/UL symbol(s) or SSB/valid PRACH occasion. Then, a UE could always prepare DL/UL reception/transmission on these symbols for semi-static signals.  |
| DOCOMO | Understanding 1 | Current spec says collision handling for 1) dynamic DL/UL transmission vs semi-static UL/DL transmission and 2) dynamic DL/UL transmission w/ repetitions vs semi-static UL/DL symbols are carried out independently if scheduling/triggering DCI for the dynamic DL/UL transmission is detected |
| Intel | Understanding 1 | Similar views as vivo, DCM that the collision handling for the two cases are specified independently in the specs and the UE behavior is defined in terms of the received higher layer configurations or L1 indications/triggers, and not expected to take into account any cancelations that may change one of the collision events. In this regard, although the order of processing the two collision events is not specified, UE should not determine Tx/Rx after any prior related cancelations, but based on the higher layer configuration and L1 indication themselves. Understanding 2 mandates the particular order (or alternatively, re-evaluation) of checking the two collision events, which would be a NBC change (current UE implementation may already decide to cancel the semi-static Tx/Rx upon reception of the dynamic trigger, regardless of whether the dynamic scheduling is also to be dropped due to some other collision).  |
| Sharp | Understanding 1 | Agree with vivo, DOCOMO and Intel. Current spec. reflects understanding 1.  |
| Samsung | Not agree | Since current specification doesn’t say one way or another explicitly (and even there is no RAN1 related conclusion/agreement), clarifying one way has potential NBC issue. |
| Spreadtrum | Up to UE implementation | Since these two different operations happen at same time, there are no clear statement of the order for thus problem, it can up to UE implementation for these cases.  |

**Q2: Do you think it necessary to clarify the intended UE behavior if there are different understandings among companies? If not, why?**

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| --- | --- | --- |
| **Company** | **Yes or No** | **Comment** |
| vivo | Not necessary for Rel-15 and Rel-16.Open for Rel-17 if there are different understandings among companies.  | If there are different understandings,* For Rel-15 and Rel-16, it may not be possible to have a unified UE behavior due to NBC concern.
* But we prefer have a clear UE behavior for future release.
 |
| Huawei, HiSilicon | OK to clarify. | If cannot be converged, our understanding is that for R15 the resulted effect would be up to UE implementation - similar issue as to RACH. For R16, a clarification would be preferred. |
| Qualcomm | No | It causes NBC issue. |
| OPPO | Not | It can be up to UE implementation. |
| Ericsson | If possible, **Yes**. |  |
| ZTE | Yes at least for the case that the dynamic transmission is scheduled with repetition | As commented above, at least in case that the dynamic transmission is scheduled with repetition, no clarification of intended UE behavior would cause big restrictions on network implementation.  |
| DOCOMO | OK to clarify for Rel-16 |  |
| Intel | Fine to clarify via a conclusion | To note, our understanding is that Understanding 1 is aligned with existing specs.  |
| Sharp | Not necessary | If there are different understandings, any alignment becomes NBC. |
| Samsung | Not necessary | It has NBC issue.  |
| Spreadtrum | No for Rel-15 |  |

# Initial summary

Based on the feedback in section 2, companies’ understanding of the current specification is summarized as follows.

For operation on a single carrier in unpaired spectrum, for an overlapping case of a DL/UL semi-static transmission and an UL/DL dynamic transmission which collides with semi-static DL/UL symbol(s) or SSB/valid PRACH occasion,

* Understanding 1: both the dynamic transmission colliding with semi-static DL/UL symbol(s) or SSB/valid PRACH occasion and the semi-static transmission overlapping with the dynamic transmission are not transmitted / received;
	+ Supported by: vivo, DOCOMO, Intel, Sharp
* Understanding 2: semi-static transmission could be transmitted / received while dynamic transmission colliding with semi-static DL/UL symbol(s) or SSB/valid PRACH occasion is dropped.
	+ Supported by: Huawei/HiSilicon, ZTE
* Not clear from the current specification
	+ Supported by: Qualcomm, OPPO, Samsung, Spreadtrum

It is clear that companies have different understandings on the current specification. On whether to clarify the intended UE behavior, companies’ views are as follows:

* Yes: vivo (for Rel-17), Huawei/HiSilicon, Ericsson, ZTE, DOCOMO (for Rel-16), Intel (Understanding 1),
* No: vivo (for Rel-15&Rel-16), Qualcomm, OPPO, Sharp, Samsung, Spreadtrum (for Rel-15)

For Rel-15, it seems that the only possible outcome is that the concerned case is up to UE implementation. The remaining question is that whether we can reach a conclusion on the intended UE behavior for Rel-16. To that end, companies’ views are invited for the following question.

**Q3: Do you object to clarify the UE behavior for Rel-16 according to understanding 1 or 2 in section 2?**

Please add you company name if you object to the understanding(s). It would also be appreciated if you can provide your reason in the table.

**Object to understanding 1:**

**Object to understanding 2: vivo, Intel, DOCOMO**

|  |  |
| --- | --- |
| **Company** | **Comment** |
| vivo | As other companies commented that the collision handling for the two cases are defined independently in the spec. Whether the semi-static transmission like SPS or CG can be performed or cancelled depends on whether it receives the L1 indication, it does not require UE to check whether the dynamically scheduled PUSCH is actually happens or not. Understanding 2 adds additional complexity at the UE side.  |
| OPPO | We do not think the conclusion is needed for Rel-16, which may unnecessarily introduce new UE behavior different from Rel-15. The same UE implementation as Rel-15 can be applied.  |
| Qualcomm | We do not think a clarification is necessary even for Rel-16. A UE may or may not transmit/receive semi-static transmission overlapped with a dropped dynamic reception/transmission. Either clarification (shall transmit/receive it, or shall drop it) causes behavior change for some UEs. Even with either clarification, the UE may or may not transmit/receive semi-static transmission overlapped with a dropped dynamic reception/transmission – it depends on whether the UE can correctly detect the scheduling DCI. Overall, there is no benefit of clarifying this. |
| Samsung | For Rel-16, we are okay with either way if RAN1 can make common understanding. |
| Intel | We would be fine to clarify the UE behavior for Rel-16 with a conclusion on Understanding 1. We share the views expressed by vivo on why Understanding 1 should be pursued.To Qualcomm, at least for Understanding 1, if the UE missed the scheduling DCI, then there is no issue to begin with. On the other hand, a common understanding based on Understanding 1 would be beneficial for the scenario at hand (when the UE detects the scheduling DCI).  |
| DOCOMO | We support to clarify UE behavior for Rel-16 with a conclusion on Understanding 1 and share the view with vivo/Intel. |
| Huawei, HiSilicon | We support a clarification on understanding#2 but could live with a conclusion that it is up to UE. |
| Apple  | For Rel-15, it seems the only possible conclusion is to leave for UE implementation. For Rel-16, we do not see reason to clarify with understanding 1. Instead, understanding 2 is preferrable to better utilize the radio resource e.g., either transmit CG-PUSCH or DL SPS, instead of no transmission and no reception. If we really make clarification, we should target to adopt a better design. Otherwise, we do not see reason why we clarify this, instead of leaving for UE implementation as in Rel-15 to avoid changing implementation at both gNB and UE as different understandings on current spec exist. In brief, if understanding 2 is not acceptable, we would prefer to conclude in chairman note with a unified solution, i.e., leaving for UE implementation for both Rel-15/16.  |
| ZTE | Still prefer Understanding 2. As Apple commented, if we have a chance to clarify, why don’t we choose the one with better design, which has no timeline issue as we commented. On the other hand, leave to UE implementation is the worst case for gNB. In this sense, we would not object to go with Understanding 1.  |
|  |  |

# Conclusion

To be added after the discussion.