**3GPP TSG RAN WG1 #102-e R1-20xxxxx**

**e-Meeting, August 17th – 28th, 2020**

**Agenda Item:** **7.2.3**

**Source: Moderator (AT&T)**

**Title: Summary of [102-e-NR-IAB-01]**

**Document for:** **Discussion/Approval**

# Introduction

This contribution provides a summary of the following email discussion:

[102-e-NR-IAB-01] Clarify starting slot within DCI 2\_5 indication – Thomas (AT&T)

* Discussion and agreements by 8/19, TPs by 8/21.

# Starting slot within DCI 2\_5 indication

**Source**: R1-2005316

**Background:** The current TS 38.213 states the following:

*An AI index field value in a DCI format 2\_5 indicates to an IAB-node DU a soft symbol availability in each slot for a number of slots starting from a slot where the IAB-node detects the DCI format 2\_5.*

The specification text “from **a** slot” does not specifically mention whether the slot is defined based on the DU or MT resource configuration/timing and configured SCS for the AI index file value in DCI Format 2\_5. If the SCS is different for the IAB-DU and IAB-MT, different slots may be identified for that reference slot as shown by Figures 1 and 2 below by R1-2005316:



Figure 1: SCS configured by *availabilityCombinations* is higher than MT SCS for DCI format 2\_5



Figure 2: SCS configured by *availabilityCombinations* is lower than MT SCS for DCI format 2\_5

Given the soft resources are only defined for slots within the resource configuration of an IAB-DU, it seems straightforward that the starting slot is relative to the IAB-DU, however since DCI Format 2\_5 is received by an IAB-MT, there appears to be a need to define the starting slot also relative to the slot where the IAB-MT detected DCI Format 2\_5.

The first goal should be to clarify the common understanding and then whether any specification update is needed.

**FL Conclusion 1: Clarify the common understanding as the following:**

**An AI index field value in a DCI format 2\_5 indicates to an IAB-node DU a soft symbol availability in each slot for a number of slots starting from the earliest slot of the IAB-DU which overlaps in time with the slot of the IAB-MT where the IAB node detects the DCI format 2\_5.**

**Discussion:**

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| **Company** | **Do you agree with FL Conclusion 1? Is an update to 38.213 needed?** | **Comments** |
| ZTE, Sanechips | Agree. The update to 38.213 is needed. | As mentioned by FL, the “starting” behavior happens to DU slot and the “DCI 2\_5 detection” happens in MT slot. The mapping connection between the two types of slots has to be built, especially for the case where DU and MT have different numerologies. |
| Qualcomm | Agree that there is a problem and that an update to 38.213 is needed.  We also agree with the intent of the conclusion but some refinement may be needed. | Agree with ZTE. Moreover, given that the IAB-DU has two different timings for Tx and Rx there is still some potential ambiguity with the identification of the “earliest slot of the IAB-DU which overlaps in time with the slot of the IAB-MT where the IAB node detects the DCI format 2\_5”. Since the IAB-DU Rx timing is not precisely known at the parent, the reference should probably be the IAB-DU Tx timing. |
| Ericsson | Agree there is a problem, but more discussion may be needed to find a solution. | The problem may be a bit more complex than what is presented in ZTE’s figure. A DU slot overlapping with an MT slot may both start and end earlier than the MT slot. In that case, there is a problem of causality. To capture that case in a desirable way, we propose a small addition to the above formulation: “**starting from the earliest slot of the IAB-DU which overlaps in time with the slot of the IAB-MT where the IAB node detects the DCI format 2\_5 and does not start before the slot of the IAB-MT.**” |
| Nokia | Agree an update is needed | This may not be a critical issue now as whatever we do here does not fully solve the problem.  RAN1 discussed processing timeline of soft resource availability for some extent in Rel-16.  However, RAN1 understood that the implementation could handle such processing delays (MT receiving DCI 2\_5 and DU using the soft resource). Therefore, even though we define that the earliest slot that DU can use the soft resource, that will not be known to the parent and be able to use the resource efficiently until child DU start using it. In summary, as we have not defined processing delay for the IAB DU to prepare a schedule the first slot, there seems a waste of concurrent resources.  Anyways, we are fine with clarifying the spec text to reflect the wording refer DU slot. |
| Intel | Agree there is a problem, but more discussion and text refinement needed | We have some concern on the FL description of “the earliest slot of the IAB-DU which overlaps in time …. where the IAB node detects the DCI format 2\_5”.  In Figure 2 shows above, does this description means the first red rectangle, which is even before the IAB MT detects DCI 2\_5?  We propose “starting from the earliest slot of the IAB-DU that after the IAB-MT slot that carries the DCI format 2\_5”. |
| LG | Agree, further discussion is needed. | We agree there might be some ambiguity on starting symbol especially for the case where DU and MT have different numerology. As Qualcomm and Ericsson pointed out, there are still some ambiguities on statement of “… overlaps in time with the slot of the IAB-MT… ” to be further clarified.  Regarding update of specification, our preference is making a conclusion as a RAN1’s common understanding based on the discussion and leaving specification as it is. |
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# Summary

TBD