**3GPP TSG RAN WG1 #103-e R1-20xxxxx**

**e-Meeting, October 26th – November 13th, 2020**

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

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

**Title: Feature Lead Summary of [103-e-NR-IAB-01] Corrections for DCI Format 2\_5 monitoring**

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

# Introduction

This contribution provides a summary of the following email discussion:

[103-e-NR-IAB-01] Corrections for DCI Format 2\_5 monitoring – Thomas (AT&T)

-       Harmonize proposals in R1-2008328, R1-2008409, R1-2008742 to approve a single CR for 38.213.

-       Discussion and decision by 10/29, TPs by 11/4

# Corrections for DCI Format 2\_5 monitoring

**Source**: R1-2008328, R1-2008409, R1-2008742

**Background:** It is currently not captured in 38.213 that an IAB-MT monitors PDCCH candidates in Type-3-PDCCH CSS (all cell types) and USS sets for DCI formats with CRC scrambled by AI-RNTI in addition to the candidates/formats already captured in Section 10.1 of 38.213. This was previously discussed in RAN1#102-e but no CR was approved. Three different proposals are put forward in contributions (R1-2008328, R1-2008409, R1-2008742) so there is a need for discussion during the meeting to harmonize and approve a single CR.

**Alt 1 (R1-2008328):**

# 14 Integrated access-backhaul operation

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

If a PDCCH monitoring periodicity for DCI format 2\_5is smaller than a duration of an availability combination of soft symbols over a number of slots that the IAB-MT obtains at a PDCCH monitoring occasion for DCI format 2\_5 by a corresponding AI index field value, and the IAB-MT detects more than one DCI formats 2\_5 indicating an availability combination of soft symbols in a slot, the IAB-MT expects that each of the more than one DCI formats 2\_5 indicates a same value for the availability combination of the soft symbols in the slot. An IAB-MT monitors PDCCH candidates in a Type3-PDCCH CSS set configured by *SearchSpace* in *PDCCH-Config* with *searchSpaceType* = *common* and a USS set configured by *SearchSpace* in *PDCCH-Config* with *searchSpaceType* = *ue-Specific* for DCI formats with CRC scrambled by AI-RNTI.

**Alt 2 (R1-2008409)**

10.1   UE procedure for determining physical downlink control channel assignment

A set of PDCCH candidates for a UE to monitor is defined in terms of PDCCH search space sets. A search space set can be a CSS set or a USS set. A UE monitors PDCCH candidates in one or more of the following search spaces sets

-     a Type0-PDCCH CSS set configured by *pdcch-ConfigSIB1* in *MIB* or by *searchSpaceSIB1* in *PDCCH-ConfigCommon* or by *searchSpaceZero* in *PDCCH-ConfigCommon* for a DCI format with CRC scrambled by a SI-RNTI on the primary cell of the MCG

-     a Type0A-PDCCH CSS set configured by *searchSpaceOtherSystemInformation* in *PDCCH-ConfigCommon* for a DCI format with CRC scrambled by a SI-RNTI on the primary cell of the MCG

-     a Type1-PDCCH CSS set configured by *ra-SearchSpace* in *PDCCH-ConfigCommon* for a DCI format with CRC scrambled by a RA-RNTI, a MsgB-RNTI, or a TC-RNTI on the primary cell

-     a Type2-PDCCH CSS set configured by *pagingSearchSpace* in *PDCCH-ConfigCommon* for a DCI format with CRC scrambled by a P-RNTI on the primary cell of the MCG

-     a Type3-PDCCH CSS set configured by *SearchSpace* in *PDCCH-Config* with *searchSpaceType* = *common* for DCI formats with CRC scrambled by INT-RNTI, SFI-RNTI, TPC-PUSCH-RNTI, TPC-PUCCH-RNTI, TPC-SRS-RNTI, CI-RNTI, PS-RNTI, or AI-RNTI and, only for the primary cell, C-RNTI, MCS-C-RNTI, or CS-RNTI(s), and

-     a USS set configured by *SearchSpace* in *PDCCH-Config* with *searchSpaceType* = *ue-Specific* for DCI formats with CRC scrambled by C-RNTI, MCS-C-RNTI, SP-CSI-RNTI, CS-RNTI(s), SL-RNTI, SL-CS-RNTI, SL-L-CS-RNTI, or AI-RNTI.

--------------- Unchanged parts omitted -------------

**Alt 3 (R1-2008742):**

**14 Integrated access-backhaul operation**

<text omitted>

If a PDCCH monitoring periodicity for DCI format 2\_5is smaller than a duration of an availability combination of soft symbols over a number of slots that the IAB-MT obtains at a PDCCH monitoring occasion for DCI format 2\_5 by a corresponding AI index field value, and the IAB-MT detects more than one DCI formats 2\_5 indicating an availability combination of soft symbols in a slot, the IAB-MT expects that each of the more than one DCI formats 2\_5 indicates a same value for the availability combination of the soft symbols in the slot.

The IAB-MT monitors PDCCH candidates in one or more search space sets as described in Clause 10.1, and additionally monitors PDCCH candidates for a DCI format 2\_5 with CRC scrambled by AI-RNTI in one or both of the following search spaces sets

- a Type3-PDCCH CSS set configured by *SearchSpace* in *PDCCH-Config* with *searchSpaceType* = *common*

- a USS set configured by *SearchSpace* in *PDCCH-Config* with *searchSpaceType* = *ue-Specific*.

<text omitted>

**FL Observation 2.1:** All three alternative candidate TPs make the necessary changes, but while Alt 2 has the smallest spec impact, it makes the change in a section outside of Section 14, which goes against the principle of keeping all IAB-specific functionality self-contained in a single section of 38.213. Alt 1 and Alt 3 are almost identical, but Alt 1 is slightly more concise and only references monitoring for 2\_5 which is the context of the paragraph where the text is added. So the FL has a slight preference for Alt 1, but discussion is welcome on the alternatives and any changes which may be needed to capture the issue correctly in a single CR.

**FL Proposal 2.1:** **Take Alt 1 (R1-2008328) as the starting point for the 38.213 CR to address necessary** **corrections for DCI Format 2\_5 monitoring.**

**Discussion:**

|  |  |  |
| --- | --- | --- |
| **Company** | **Do you agree with FL Proposal 2.1?** | **Comments** |
| Ericsson | Slight preference to Alt. 3. | Both Alt. 1 and Alt. 3 are acceptable. We have a preference to Alt. 3 since it refers to 10.1 and lists the two search spaces in bullet form making it a bit clearer. |
| Qualcomm | Slight preference for Alt. 3. | Same view as Ericsson. Both Alt. 1 and Alt 3 are agreeable, however Alt. is in our view a clearer version. |
| Huawei | Yes | Both Alt.1 and Alt.3 are okay. Similar to the moderator, we have a slight preference to Alt.1 since it is more concise. The reference to section 10.1 is not necessary since it is already stated at the beginning of section 14.  “Throughout this specification, unless otherwise noted, statements using the term "UE" in clauses 4 through 13 are equally applicable to the IAB-MT of an IAB node.” |
| LG | Have preference on Alt. 2 | Since Alt2 has the smallest spec. impact (as commented by FL), our first preference is Alt 2. However, if LG is the only supporter for Alt2, we can live with Alt 1 or 3. Among them, we have preference on Alt 3. |
| Samsung |  | We are fine with Alt. 1. Also, we can go with Alt. 3 by a slight modification. Taking into account the following is already included in the beginning of section 14 “Throughout this specification, unless otherwise noted, statements using the term "UE" in clauses 4 through 13 are equally applicable to the IAB-MT of an IAB node.”, we can remove duplicated wording in Alt.3 little bit as follows:  The IAB-MT ~~monitors PDCCH candidates in one or more search space sets as described in Clause 10.1, and additionally~~ monitors PDCCH candidates for a DCI format 2\_5 with CRC scrambled by AI-RNTI in one or both of the following search spaces sets  - a Type3-PDCCH CSS set configured by *SearchSpace* in *PDCCH-Config* with *searchSpaceType* = *common*  - a USS set configured by *SearchSpace* in *PDCCH-Config* with *searchSpaceType* = *ue-Specific*. |
| Nokia | Slight preference for Alt. 3 | Agree with Ericsson and Qualcomm that either Alt. 1 or Alt. 3 are agreeable, but have a slight preference towards Alt. 3 |
| ZTE, Sanechips | Partially agree | Agree to add the related text under section 14 since DCI format 2-5 is only applicable for IAB-MTs. But we think it is better to add the text at the end of the following paragraph:  “  If an IAB-node is provided an AvailabilityIndicator, the IAB-node is provided an AI-RNTI by *ai-RNTI* and a payload size of a DCI format 2\_5 by *dci-PayloadSize-AI*. The IAB-node is also provided a search space set configuration, by *SearchSpace*, for monitoring PDCCH. An IAB-MT monitors PDCCH...  ” |
| vivo | Alt. 1 or alt. 3 | Prefer to capture the statement in IAB section. Both 1 and 3 are acceptable for us. |
| Intel | Slight preference for Alt.3 | Agree with Ericsson/Qualcomm/Nokia that either Alt. 1 or Alt. 3 are agreeable, but have a slight preference towards Alt. 3 |
|  |  |  |
|  |  |  |

**FL Proposal 2.2:** **Adopt Alt 4. for the 38.213 CR to address necessary** **corrections for DCI Format 2\_5 monitoring:**

**Alt. 4 (FL proposed harmonization of Alt. 1 & Alt. 3):**

# 14 Integrated access-backhaul operation

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

If a PDCCH monitoring periodicity for DCI format 2\_5is smaller than a duration of an availability combination of soft symbols over a number of slots that the IAB-MT obtains at a PDCCH monitoring occasion for DCI format 2\_5 by a corresponding AI index field value, and the IAB-MT detects more than one DCI formats 2\_5 indicating an availability combination of soft symbols in a slot, the IAB-MT expects that each of the more than one DCI formats 2\_5 indicates a same value for the availability combination of the soft symbols in the slot. An IAB-MT monitors PDCCH candidates for a DCI format 2\_5 with CRC scrambled by AI-RNTI in one or both of the following:

- a Type3-PDCCH CSS set configured by *SearchSpace* in *PDCCH-Config* with *searchSpaceType* = *common*

- a USS set configured by *SearchSpace* in *PDCCH-Config* with *searchSpaceType* = *ue-Specific*.

**Discussion:**

|  |  |  |
| --- | --- | --- |
| **Company** | **Do you agree with FL Proposal 2.2?** | **Comments** |
| LG | Agree | We also ok with adding “search space sets” in the end of the main sentence. |

**FL Proposal 2.4:** **Adopt the following TP for the 38.213 CR to address necessary** **corrections for DCI Format 2\_5 monitoring:**

# 14 Integrated access-backhaul operation

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

If a PDCCH monitoring periodicity for DCI format 2\_5is smaller than a duration of an availability combination of soft symbols over a number of slots that the IAB-MT obtains at a PDCCH monitoring occasion for DCI format 2\_5 by a corresponding AI index field value, and the IAB-MT detects more than one DCI formats 2\_5 indicating an availability combination of soft symbols in a slot, the IAB-MT expects that each of the more than one DCI formats 2\_5 indicates a same value for the availability combination of the soft symbols in the slot. An IAB-MT monitors PDCCH candidates for a DCI format 2\_5 with CRC scrambled by AI-RNTI in one or both of the following search space sets:

- a Type3-PDCCH CSS set configured by *SearchSpace* in *PDCCH-Config* with *searchSpaceType* = *common*

- a USS set configured by *SearchSpace* in *PDCCH-Config* with *searchSpaceType* = *ue-Specific*.

# Summary

TBD