3GPP TSG-RAN WG2 Meeting #121-bis electronic \_R2-23xxx

April 17th - 26th, 2023

Agenda Item: 6.1.3.3

Source: Huawei, HiSilicon

**Title:** **Summary of [AT121bis-e][013][NR17] IAB Corrections**

Document for: Discussion and Decision

# Introduction

This paper aims at capturing the summary of the offline discussion.

* **[AT121bis-e][013][NR17] IAB Corrections (Huawei)**

 Scope: Treat R2-2303204 (online first – offline continuation if anything remains to be treated), R2-2303205 (after online), R2-2303479, R2-2303003, R2-2303480, R2-2304097
Ph1: Determine agreeable parts and on-line CB points if any. Ph2: For agreeable parts, if any, reflect these in agreeable CRs.

 Intended outcome: Report, If applicable: In-Principle-Agreed CRs

 Deadline: Schedule 1

A **first round** with **Deadline W1 Thursday April 21th 1200 UTC** to settle scope what is agreeable etc

A Final round with **Final deadline W2 Wednesday April 26th 1000 UTC (EOM)** to settle details / agree CRs etc.

**Contact information**

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| **Company** | **Name (Email)** |
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# Discussion

**2.1 MAC CR R2-2303003**

Following changes are proposed in R2-2303003:

Change 1: Clarify that the time resources applied for restricted/recommended beam indication and DL TX power adjustment MAC CEs are indicated via RRC and MAC CE.

Change 2. Clarify that the Desired DL TX Power Adjustment MAC CE is used by an IAB-node to indicate to its parent node requirements for the DL TX power adjustment.

Change 3. Clarify that time resources where these (required) DL TX power adjustment apply are indicated via RRC and MAC CE.

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| 5.18.26 Restricted and recommended beam indication for IABChild IAB-DU Restricted Beam Indication MAC CE is used by an IAB-node to indicate to its child node spatial and frequency resources where simultaneous transmission/reception from the IAB-MT and transmission from the IAB-DU cells is restricted. IAB-MT Recommended Beam Indication MAC CE is used by an IAB-node to indicate to its parent node recommendations for such a restriction. Time resources where these restrictions/recommendations apply are indicated via RRC and MAC CE.Upon reception of a Child IAB-DU Restricted Beam Indication MAC CE the IAB-node shall:- apply the configuration signalled in the MAC CE to the time slots indicated in *IAB-ResourceConfig* (as specified in TS 38.331 [5]) which contains *iab-ResourceConfigID* parameter which matches the Resource Configuration ID field of the MAC CE.The MAC entity may:1> if an IAB-MT Recommended Beam Indication query has not been triggered:2> trigger an IAB-MT Recommended Beam Indication query for this Serving Cell.If the MAC entity has UL resources allocated for new transmission the MAC entity shall:1> for each IAB-MT Recommended Beam Indication query that has been triggered and not cancelled:2> if the allocated UL resources can accommodate a IAB-MT Recommended Beam Indication MAC CE plus its subheader as a result of LCP as defined in clause 5.4.3.1:3> instruct the Multiplexing and Assembly procedure to generate the IAB-MT Recommended Beam Indication MAC CE;3> cancel this IAB-MT Recommended Beam Indication query.5.18.27 DL TX power adjustment for IABDL TX Power Adjustment MAC CE is used by an IAB-node to indicate to its child node spatial and frequency resources where the DL TX power adjustment contained in the MAC CE applies. Desired DL TX Power Adjustment MAC CE is used by an IAB-node to indicate to its parent node requirements for the DL TX power adjustment. Time resources where these (required) DL TX power adjustment apply are indicated via RRC and MAC CE.Upon reception of a DL TX Power Adjustment MAC CE the IAB-node shall:- apply the configuration signalled in the MAC CE to the time slots indicated in *IAB-ResourceConfig* (as specified in TS 38.331 [5]) which contains *iab-ResourceConfigID* parameter which matches the Resource Configuration ID field of the MAC CE.The MAC entity may:1> if a Desired DL TX Power Adjustment query has not been triggered:2> trigger a Desired DL TX Power Adjustment query for this Serving Cell.If the MAC entity has UL resources allocated for new transmission the MAC entity shall:1> for each Desired DL TX Power Adjustment query that has been triggered and not cancelled:2> if the allocated UL resources can accommodate a Desired DL TX Power Adjustment MAC CE plus its subheader as a result of LCP as defined in clause 5.4.3.1:3> instruct the Multiplexing and Assembly procedure to generate the Desired DL TX Power Adjustment MAC CE;3> cancel this Desired DL TX Power Adjustment query. |

**Question 1: Do you think any change 1/2/3 in** **R2-2303003 is agreeable?**

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| **Companies** | **Yes or No?**(which change ) | **Comments** |
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**2.2 MAC CR R2-2303480**

Following changes are proposed in R2-2303480:

Some query cancellations in MAC reset are missing for eIAB in clause 5.12, which should be added to capture the query-cancelling behaviors, as also captured for other triggered queries in current specification MAC reset:

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| 5.12 MAC ResetIf a reset of the MAC entity is requested by upper layers or the reset of the MAC entity is triggered due to SCG deactivation as defined in clause 5.29, the MAC entity shall:<omit…>1> if the MAC reset is not due to SCG deactivation:1> cancel, if any, triggered Scheduling Request procedure;1> cancel, if any, triggered Buffer Status Reporting procedure;1> cancel, if any, triggered Power Headroom Reporting procedure;1> cancel, if any, triggered consistent LBT failure;1> cancel, if any, triggered BFR;1> cancel, if any, triggered Sidelink Buffer Status Reporting procedure;1> cancel, if any, triggered Pre-emptive Buffer Status Reporting procedure;1> cancel, if any, triggered Timing Advance Reporting procedure;1> cancel, if any, triggered Recommended bit rate query procedure;1> cancel, if any, triggered Configured uplink grant confirmation;1> cancel, if any, triggered configured sidelink grant confirmation;1> cancel, if any, triggered Desired Guard Symbol query;1> cancel, if any, triggered Positioning Measurement Gap Activation/Deactivation Request procedure;1> cancel, if any, triggered SDT procedure;1> cancel, if any, triggered IAB-MT Recommended Beam Indication query;1> cancel, if any, triggered Desired DL TX Power Adjustment query;1> cancel, if any, triggered Desired IAB-MT PSD range query;1> cancel, if any, triggered Case-6 Timing Request query;1> flush the soft buffers for all DL HARQ processes, except for the DL HARQ process being used for MBS broadcast;1> for each DL HARQ process, except for the DL HARQ process being used for MBS broadcast, consider the next received transmission for a TB as the very first transmission;1> release, if any, Temporary C-RNTI;1> if upper layers indicate SCG deactivation and *bfd-and-RLM* with value *true* is not configured; or1> if the MAC reset is not due to SCG deactivation:2> reset all *BFI\_COUNTER*s;1> reset all *LBT\_COUNTERs*. |

**Question 2: Do you think the change in** **R2-2303480 is agreeable?**

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| **Companies** | **Yes or No?** | **Comments** |
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**2.3 MAC CR R2-2304097**

Following changes are proposed in R2-2304097:

In section 5.18.26, 5.18.27, Clarified that the recommendations and restrictions refer to “time” resources and not “frequency” resources.

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| 5.18.26 Restricted and recommended beam indication for IABChild IAB-DU Restricted Beam Indication MAC CE is used by an IAB-node to indicate to its child node spatial and time resources where simultaneous transmission/reception from the IAB-MT and transmission from the IAB-DU cells is restricted. IAB-MT Recommended Beam Indication MAC CE is used by an IAB-node to indicate to its parent node recommendations for such a restriction. Time resources where these restrictions/recommendations apply are indicated via RRC.Upon reception of a Child IAB-DU Restricted Beam Indication MAC CE the IAB-node shall:- apply the configuration signalled in the MAC CE to the time slots indicated in *IAB-ResourceConfig* (as specified in TS 38.331 [5]) which contains *iab-ResourceConfigID* parameter which matches the Resource Configuration ID field of the MAC CE.The MAC entity may:1> if an IAB-MT Recommended Beam Indication query has not been triggered:2> trigger an IAB-MT Recommended Beam Indication query for this Serving Cell.If the MAC entity has UL resources allocated for new transmission the MAC entity shall:1> for each IAB-MT Recommended Beam Indication query that has been triggered and not cancelled:2> if the allocated UL resources can accommodate a IAB-MT Recommended Beam Indication MAC CE plus its subheader as a result of LCP as defined in clause 5.4.3.1:3> instruct the Multiplexing and Assembly procedure to generate the IAB-MT Recommended Beam Indication MAC CE;3> cancel this IAB-MT Recommended Beam Indication query.5.18.27 DL TX power adjustment for IABDL TX Power Adjustment MAC CE is used by an IAB-node to indicate to its child node spatial and time resources where the DL TX power adjustment contained in the MAC CE applies. Desired DL TX Power Adjustment MAC CE is used by an IAB-node to indicate to its parent node recommendations for such a restriction. Time resources where these restrictions/recommendations apply are indicated via RRC.Upon reception of a DL TX Power Adjustment MAC CE the IAB-node shall:- apply the configuration signalled in the MAC CE to the time slots indicated in *IAB-ResourceConfig* (as specified in TS 38.331 [5]) which contains *iab-ResourceConfigID* parameter which matches the Resource Configuration ID field of the MAC CE.The MAC entity may:1> if a Desired DL TX Power Adjustment query has not been triggered:2> trigger a Desired DL TX Power Adjustment query for this Serving Cell.If the MAC entity has UL resources allocated for new transmission the MAC entity shall:1> for each Desired DL TX Power Adjustment query that has been triggered and not cancelled:2> if the allocated UL resources can accommodate a Desired DL TX Power Adjustment MAC CE plus its subheader as a result of LCP as defined in clause 5.4.3.1:3> instruct the Multiplexing and Assembly procedure to generate the Desired DL TX Power Adjustment MAC CE;3> cancel this Desired DL TX Power Adjustment query. |

**Question 3: Do you think the change in** **R2-2304097 is agreeable?**

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| **Companies** | **Yes or No?** | **Comments** |
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**2.4 UE capability CR in R2-2303479**

Following changes are proposed in R2-2303479:

Change 1: The type2 “BH RLF detection indication” introduced in Rel-17 doesn’t have any RRC procedure impacts, which only impacts BAP layer. Therefore it’s inappropriate to list TS 38.331 as a specification source for IE bh-RLF-DetectionRecovery-Indication-r17.

For clarification, for Type4, the child node receiving a BH RLF indication from parent node will take it as radio link failure indication. And the indication will be triggered when RRC reestablishment has failed, captured in RRC. However, for Type2, the child node receiving a BAP control PDU for BH RLF detection indication from parent node will consider the BH link as not available, only captured in BAP sepc, and may trigger the rerouting procedure while the RRC connection is still maintained.

In summary, there is no type2 BH RLF detection indication related description in RRC spec.

Change 2: According to TS 38.321, BSR MAC CEs and Pre-emptive BSR MAC CEs are defined separately. A UE supporting extended-LCG would also supports extended BSR and extended pre-emptive BSR formats equally. Therefore, to be comprehensive, the extended pre-emptive BSR should be listed and noted as independent supported feature for a UE (if preEmptiveBSR-r16 is supported). Otherwise, the UE capability about Extended Pre-emptive BSR formats cannot be reported/indicated in the capability signaling to NW.

Change 3: Typo in *updated-T-DeltaRangeRecption-r17* in 4.2.15.7.2 and field description of *bapHeaderRewriting-Routing-r17* in 4.2.15.5

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| 4.2.15.2 General Parameters

| **Definitions for parameters** | **Per** | **M** | **FDD-TDD****DIFF** | **FR1-FR2****DIFF** |
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| ***bh-RLF-DetectionRecovery-Indication-r17***Indicates whether the IAB-MT supports BH RLF detection indication and BH RLF recovery indication handling as specified in TS 38.340 [23] | IAB-MT | No | No | No |
| ***bh-RLF-Indication-r16***Indicates whether the IAB-MT supports BH RLF indication handling as specified in TS 38.331 [9] and in TS 38.340 [23] | IAB-MT | No | No | No |
| ***directSN-AdditionFirstRRC-IAB-r16***Indicates whether the IAB-MT supports direct SN addition in the first RRC connection reconfiguration after RRC connection establishment. | IAB-MT | No | No | No |

4.2.15.5 BAP Parameters

| **Definitions for parameters** | **Per** | **M** | **FDD-TDD****DIFF** | **FR1-FR2****DIFF** |
| --- | --- | --- | --- | --- |
| ***bapHeaderRewriting-Rerouting-r17***Indicates whether the IAB-MT supports BAP header rewriting for inter-donor-DU re-routing, as specified in TS 38.340 [23] and TS 38.300 [28]. IAB-donor-DUs can belong to the same or different IAB-donor CUs. | IAB-MT | No | No | No |
| ***bapHeaderRewriting-Routing-r17***Indicates whether the IAB-MT supports BAP header rewriting for inter-donor CU partial migration, inter-donor-CU RLF recovery and inter-donor-CU topology redundancy, as specified in TS 38.340 [23] and TS38.300 [28]. | IAB-MT | No | No | No |
| ***flowControlBH-RLC-ChannelBased-r16***Indicates whether the IAB-MT supports flow control procedures and flow control feedback per backhaul RLC channel, as specified in TS 38.340 [23]. | IAB-MT | No | No | No |
| ***flowControlRouting-ID-Based-r16***Indicates whether the IAB-MT supports flow control procedures and flow control feedback per Routing ID, as specified in TS 38.340 [23]. | IAB-MT | No | No | No |

4.2.15.6 MAC Parameters

| **Definitions for parameters** | **Per** | **M** | **FDD-TDD****DIFF** | **FR1-FR2****DIFF** |
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| ***lcg-ExtensionIAB-r17***Indicates whether the IAB-MT supports extended logical channel group as specified in TS 38.321 [8]. A UE supporting this feature shall also support Extended Buffer Status Report formats and Extended Pre-emptive BSR formats (if *preEmptiveBSR-r16* is supported). | IAB-MT | No | No | No |
| ***lcid-ExtensionIAB-r16***Indicates whether the IAB-MT supports extended Logical Channel ID space using two-octet eLCID, as specified in TS 38.321 [8]. | IAB-MT | No | No | No |
| ***preEmptiveBSR-r16***Indicates whether the IAB-MT supports Pre-emptive BSR as specified in TS 38.321 [8]. | IAB-MT | No | No | No |

4.2.15.7.2 Phy-Parameters

| **Definitions for parameters** | **Per** | **M** | **FDD-TDD****DIFF** | **FR1-FR2****DIFF** |
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| ***case6-TimingAlignmentReception-IAB-r17***Indicates whether the IAB-MT supports case 6 timing alignment reception and signalling to the parent-node that case 6 timing mode is required for simultaneous transmission as specified in TS 38.213 [11]. | IAB-MT | No | No | No |
| ***case7-TimingAlignmentReception-IAB-r17***Indicates whether the IAB-MT supports case 7 timing offset indication reception and case 7 timing at parent-node indication reception as specified in TS 38.213 [11]. | IAB-MT | No | No | No |
| ***dft-S-OFDM-WaveformUL-IAB-r16***Indicates whether the IAB-MT supports DFT-S-OFDM waveform for UL and transform precoding for single-layer PUSCH. | IAB-MT | No | No | No |
| ***dci-25-AI-RNTI-Support-IAB-r16***Indicates the support of monitoring DCI Format 2\_5 scrambled by AI-RNTI for indication of soft resource availability to an IAB node as specified in TS 38.212 [10]. | IAB-MT | No | No | No |
| ***directionalCollisionDC-IAB-r17***Indicates the support for directional collision handling between MCG and SCG cell(s) of the dual parent nodes for simultaneous operation in inter-donor and/or intra-donor DC operation. | IAB-MT | No | No | No |
| ***dl-tx-PowerAdjustment-IAB-r17***Indicates the support of desired DL Tx power adjustment reporting and DL Tx power adjustment reception. | IAB-MT | No | No | No |
| ***desired-ul-tx-PowerAdjustment-r17***Indicates the support of Desired IAB-MT PSD range reporting. | IAB-MT | No | No | No |
| ***fdm-SoftResourceAvailability-DynamicIndication-r17***Indicates the support of monitoring DCI Format 2\_5 scrambled by AI-RNTI for indication of FDM soft resource availability to an IAB-node. | IAB-MT | No | No | No |
| ***guardSymbolReportReception-IAB-r16***Indicates the support of DesiredGuardSymbols reporting and ProvidedGuardSymbols reception as specified in TS 38.213 [11]. | IAB-MT | No | No | No |
| ***guardSymbolReportReception-IAB-r17***Indicates the support of extended DesiredGuardSymbols reporting and ProvidedGuardSymbols reception to new switching scenarios case#6 and case#7 as specified in TS38.213 [11].UE indicating support of this feature shall also indicate support of one or more of *case6-TimingAlignmentReception-IAB-r17* and *case7-TimingAlignmentReception-IAB-r17*.NOTE: If an IAB node does not support a certain timing mode (Case 6, Case 7), the reported/provided values shall be ignored. | IAB-MT | No | No | No |
| ***pdsch-MappingTypeA***Indicates whether the IAB-MT supports receiving PDSCH using PDSCH mapping type A with less than seven symbols. | IAB-MT | No | No | No |
| ***pucch-F2-WithFH***Indicates whether the IAB-MT supports transmission of a PUCCH format 2 (2 OFDM symbols in total) with frequency hopping in a slot. | IAB-MT | No | No | Yes |
| ***pucch-F3-WithFH***Indicates whether the IAB-MT supports transmission of a PUCCH format 3 (4~14 OFDM symbols in total) with frequency hopping in a slot. | IAB-MT | No | No | Yes |
| ***restricted-IAB-DU-BeamReception-r17***Indicates the support of restricted IAB-DU beam reception. | IAB-MT | No | No | No |
| ***recommended-IAB-MT-BeamTransmission-r17***Indicates the support of recommended IAB-MT beam transmission for DL and UL beam. | IAB-MT | No | No | No |
| ***separateSMTC-InterIAB-Support-r16***Indicates the support of up to 4 SMTCs configurations per frequency location, including IAB-specific SMTC window periodicities. | IAB-MT | No | No | No |
| ***separateRACH-IAB-Support-r16***Indicates the support of separate RACH configurations including new IAB-specific offset and scaling factors. | IAB-MT | No | No | No |
| ***t-DeltaReceptionSupport-IAB-r16***Indicates the support of T\_delta reception for case 1 OTA timing alignment as specified in TS 38.213 [11]. | IAB-MT | No | No | No |
| ***ul-flexibleDL-SlotFormatSemiStatic-IAB-r16***Indicates the support of semi-static configuration/indication of UL-Flexible-DL slot formats for IAB-MT resources. | IAB-MT | No | No | No |
| ***ul-flexibleDL-SlotFormatDynamics-IAB-r16***Indicates the support of dynamic indication of UL-Flexible-DL slot formats for IAB-MT resources. | IAB-MT | No | No | No |
| ***updated-T-DeltaRangeReception-r17***Indicates the support of updated T\_Delta range reception.UE indicating support of this feature shall also support *case6-TimingAlignmentReception-IAB-r17*. | IAB-MT | No | No | No |

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**Question 1: Do you think any change 1/2/3 in R2-2303479 is agreeable?**

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| **Companies** | **Yes or No?**(which change ) | **Comments** |
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**2.5 Stage 2 IAB resource management**

TBD if anything left, pending on the Tuesday online session conclusion.

R2-2303204 Report from email discussion [Post121][042][NR17] Stage 2 description for IAB beam management and power control (Lenovo) Lenovo

R2-2303205 Introduction of stage 2 description for IAB resource management Lenovo, Ericsson

# Conclusion and proposals

Based on the above summary, following proposals are given.

**TBD.**

# Reference

1. R2-2303204 Report from email discussion [Post121][042][NR17] Stage 2 description for IAB beam management and power control (Lenovo) Lenovo
2. R2-2303205 Introduction of stage 2 description for IAB resource management Lenovo, Ericsson
3. R2-2303479 Corrections on the eIAB related capabilities Huawei, HiSilicon
4. R2-2303003 Correction to TS 38.321 on IAB beam management and DL Tx power adjustment ZTE, Sanechips
5. R2-2303480 Correction to MAC reset for eIAB Huawei, HiSilicon
6. R2-2304097 Correction to restricted resources for eIAB Ericsson