3GPP TSG-RAN WG3 #117bis-e R3-225900

Online, October 10 - 18, 2022

Agenda Item: 9.2.3

Source: Qualcomm (Moderator)

Title: CB: # 7\_R17IAB

Document for: Discussion

# Introduction

This paper captures the following CB discussion:

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| **CB: # 7\_R17IAB****- Check the details of variant corrections****- Approve the CRs if agreeable**(Qualcomm - moderator)Summary of offline disc [R3-225900](Inbox%5CR3-225900.zip) |

The CB has the following phases:

**Phase I：Converge on open issues. Deadline is Friday, October 14, 2022, 12:00 UTC.**

**Phase II：If needed.**

The following contributions are included in this CB:

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| [R3-225306](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_117bis-e%5CDocs%5CR3-225306.zip) | Reply LS on RB set configuration for IAB (RAN1) | LS in |
| [R3-225349](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_117bis-e%5CDocs%5CR3-225349.zip) | (CR TS 38.473) Correction to NR Carrier List (Ericsson) | CR1036r, TS 38.473 v17.2.0, Rel-17, Cat. F |
| [R3-225356](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_117bis-e%5CDocs%5CR3-225356.zip) | (CR to TS 38.300) Correction for definition of IAB-topology (Qualcomm Inc.) | draftCR |
| [R3-225433](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_117bis-e%5CDocs%5CR3-225433.zip) | Correction to procedure of topology redundancy (Fujitsu) | CR0257r, TS 38.401 v17.2.0, Rel-17, Cat. F |
| [R3-225443](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_117bis-e%5CDocs%5CR3-225443.zip) | Correction to TS 38.473 on RB Set Configuration (ZTE) | CR1042r, TS 38.473 v17.2.0, Rel-17, Cat. F |
| [R3-225650](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_117bis-e%5CDocs%5CR3-225650.zip) | Correction to TS 38.423 on RRC transfer (ZTE) | CR0916r, TS 38.423 v17.2.0, Rel-17, Cat. F |
| [R3-225678](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_117bis-e%5CDocs%5CR3-225678.zip) | Correction on Resource configuration for IAB (Huawei, Lenovo, Ericsson, Nokia, Nokia Shanghai Bell) | CR0917r, TS 38.423 v17.2.0, Rel-17, Cat. F |
| [R3-225679](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_117bis-e%5CDocs%5CR3-225679.zip) | Correction on Resource configuration for IAB (Huawei, Lenovo, Nokia, Nokia Shanghai Bell) | CR1061r, TS 38.473 v17.2.0, Rel-17, Cat. F |
| [R3-225825](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_117bis-e%5CDocs%5CR3-225825.zip) | Discussion on the RB Set Configuration for IAB (ZTE) | discussion |

# For the Chairman’s Notes

**[To be updated].**

# Discussion - Phase I

## 3.1 R3-225306 – Reply LS on RB set configuration for IAB

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| [R3-225306](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_117bis-e%5CDocs%5CR3-225306.zip) | Reply LS on RB set configuration for IAB (RAN1) | LS in |

The Reply LS addresses two separate questions.

Reply to question 1:

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| *Regarding the first question, RAN1 would like to provide following answer:****Question 1: Whether the RB set needs to be configurable to the IAB-donor-DU?******Answer:*** *No. From RAN1 point of view, the RB set configuration is not applicable to IAB-donor-DU* |

R3-225678 addresses this issue, and this discussion is handled in Section 3.2.

Reply to question 2:

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| *Regarding the second question, there are diverged views on whether the previous RAN1 agreement referred in the RAN3 LS has already been captured due to the understanding of the agreement. RAN1 would like to provide following answer to the second question:****Question 2: Whether the current F1AP signalling about RB set size is clear enough. If not, which kind of clarification should be added?******Answer:***  *RAN1 was not available to converge on a response. Existing RAN1 agreements with reference to F1AP signalling about RB set size is unchanged.* |

There is no explicit action associated with this reply. R3-225443/R3-225825 discuss the Semantics Description of the same IE for other reasons. This discussion is handled in Section 3.4. Any follow up by RAN3 related to this IE can therefore be captured in the same section.

**Proposal 1: Reply LS in R3-225306 to be noted.**

**Q1: Do you agree with Proposal 1?**

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| **Company** | **Yes/No** | **Comments** |
| Qualcomm | Yes |  |
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## 3.2 R3-225678 – CR to TS 38.423 on Resource Configuration

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| [R3-225678](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_117bis-e%5CDocs%5CR3-225678.zip) | Correction on Resource configuration for IAB (Huawei, Lenovo, Ericsson, Nokia, Nokia Shanghai Bell) | CR0917r, TS 38.423 v17.2.0, Rel-17, Cat. F |

This CR addresses the first issue of RAN1’s Reply LS in R3-225303:

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| ***Reason for change:*** | * In section 9.1.4.6 and 9.1.4.7, the explanation of maxnoofServedCellsIAB is “Maximum number of cells served by an IAB-DU or an IAB-donor-DU. Value is 512”, but the maxnoofServedCellsIAB is used to indicate the maximum number of cells served by the boundary IAB-node in this table. Considering that the boundary node will only be an IAB-node, then the “IAB-donor-DU” should be removed from the explanation.
* In section 9.2.2.85, the IAB TNL Address request IE can also used to indicate the request of IP address removal, because it contains the optional IE “IAB TNL Address To Remove List”, so the IP address removal should also be mentioned in the description.
* Based on the reply LS (R3-225306), RAN1 provides response that the RB set configuration is not applicable to the IAB-donor-DU. Therefore, in section 9.2.2.97, the “IAB-donor-DU” should be removed from the description for the RB set Configuration.
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| ***Summary of change:*** | 1. In section 9.1.4.6 and 9.1.4.7, remove the “IAB-donor-DU” from the explanation of maxnoofServedCellsIAB.
2. In section 9.2.2.85, add content about the IP address removal in the description of the IAB TNL Address request IE.
3. In section 9.2.2.97, remove the “IAB-donor-DU” from the description about the RB set configuration IE and the range bound table.

**Impact analysis**Impact assessment towards the previous version of the specification (same release): This CR has isolated impact with the previous version of the specification (same release).This CR has no impact under functional point of view. The impact can be considered isolated because the change affects only the IAB related procedure.The changes are backward compatible. |

**Q2: Do you agree with this CR? Comments?**

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| **Company** | **Yes/No** | **Comments** |
| Qualcomm | Yes | This CR properly reflects RAN1’s reply the RAN3’s question 1. |
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## 3.3 R3-225349 – CR to TS 38473 on NR Carrier List

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| [R3-225349](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_117bis-e%5CDocs%5CR3-225349.zip) | (CR TS 38.473) Correction to NR Carrier List (Ericsson) | CR1036r, TS 38.473 v17.2.0, Rel-17, Cat. F |

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| ***Reason for change:*** | * At the RAN3#117-e meeting there was no consensus on the understanding of the number of carriers a DU cell can support. This arose from the incorrect description of *NR Carrier List* IE.
* According to TS 38.104 v17.6.0, an NR cell can support a single SCS per BS channel bandwith (see fig 5.3.1-1) or mupltiple SCSs per BS channel bandwidth (see fig 5.3.3-2) where “*multiple numerologies are multiplexed in the same symbol*”.
* The NR carrier List IE wrongly denotes numerologies as carriers leading to confusion.
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| ***Summary of change:*** | Modified the *NR Carrer List* IE to align with TS 38.104. |

**Q3: Do you agree with this CR? Comments?**

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| **Company** | **Yes/No** | **Comments** |
| Qualcomm | Yes |  |
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## 3.4 R3-225443/5825 – CR to TS 38.473/Discussion on RB Set configuration

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| [R3-225443](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_117bis-e%5CDocs%5CR3-225443.zip) | Correction to TS 38.473 on RB Set Configuration (ZTE) | CR1042r, TS 38.473 v17.2.0, Rel-17, Cat. F |
| [R3-225825](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_117bis-e%5CDocs%5CR3-225825.zip) | Discussion on the RB Set Configuration for IAB (ZTE) | discussion |

The train of thoughts provided in the discussion paper is also contained in Reason for Change in the CR:

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| ***Reason for change:*** | In current specification, the description of Number of RB Sets IE in RB Set Configuration is “Number of configured RB sets. The RB sets are contiguous and non-overlapping. The start RB index of the first RB set is the lowest index of RB of the IAB-DU cell.”. However, the meaning of “the lowest index of RB of the IAB-DU cell” is not clear and would lead to misunderstanding. Based on the discussion during RAN3#117e meeting, using the current description of Number of RB Sets IE, there are at least two options to determine the start RB position of the first RB set for RB set configuration:* Option 1: the start RB of the first RB set is aligned with the reference resource block (Common RB 0) of the carriers of IAB-DU cell. And the lowest subcarrier of common RB 0 is known as Point A, which is indicated by *NR ARFCN* in *NR Frequency Info* IE in section 9.3.1.17 in TS38.473.
* Option 2: the start RB of the first RB set is aligned with lowest RB of the carrier with the reference SCS indicated by the *Subcarrier Spacing* IE in the *RB set configuration* IE.

In our view, option 1 cannot work in some cases, especially when the configured value of *Offset to Carrier* is large. In some cases, if the configured value of *Offset to Carrier* is large, the configured RB sets may only cover the frequency between Point A and the lowest usable subcarrier of the IAB-DU cell, which means RB sets of the IAB-DU cell cannot be configured, as analyzed in the contribution R3-225825.In option 2, the RB set configuration can work in all the cases and is more flexible. So option 2 is preferred, i.e. “the lowest index of RB of the IAB-DU cell” should be the lowest index of RB of the carrier with the reference SCS indicated in the Subcarrier Spacing IE for the IAB-DU cell. And the description of the Number of RB Sets IE needs to be updated. |
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| ***Summary of change:*** | Clarify that “the lowest index of RB of the IAB-DU cell” in the description of *Number of RB Sets* IE should be the lowest index of RB of the carrier with the reference SCS indicated in the *Subcarrier Spacing* IE.**Impact analysis**Impact assessment towards the previous version of the specification (same release): This CR has isolated impact with the previous version of the specification (same release).This CR has impact under functional point of view. The impact can be considered isolated because the change affects only the IAB related procedure. |

**Q4: Do you agree with this CR? Comments?**

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| **Company** | **Yes/No** | **Comments** |
| Qualcomm | See comment | We agree on the spirit of the. We are not certain the solution proposed is the best way to go, in particular, since a CC can support multiple numerologies. We therefore propose to change the Semantic Description in the following manner:*“Number of configured RB sets. The RB sets are contiguous and non-overlapping.**The start RB index of the first RB set is the lowest index of RB of the IAB-DU cell for the subcarrier spacing indication in this RB Set Configuration IE.”* |
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## 3.5 R3-225356 – CR to TS 38300 on IAB Topology

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| [R3-225356](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_117bis-e%5CDocs%5CR3-225356.zip) | (CR to TS 38.300) Correction for definition of IAB-topology (Qualcomm Inc.) | draftCR |

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| ***Reason for change:*** | TS 38.300 defines the IAB topology as “The unison of all IAB-nodes and IAB-donor-DUs that are interconnected via BH links and terminate F1 and/or RRC at the same IAB-donor-CU.”This definition makes sense when the boundary node is dual-connected. In case the boundary node is single connected (e.g., after partial migration), it will only belong to the IAB topology of the non-F1-terminating IAB-donor, and as a consequence, the descendent nodes are not part of any IAB topology:* The descendent nodes are not part of the ***F1-terminating*** IAB-donor’s topology since they do not have BH links with IAB-nodes and/or IAB-donor-DUs of that topology.
* The descendent nodes are not part of the ***non-F1-terminating*** IAB-donor’s topology since they do not have RRC and/or F1 connectivity with the non-F1-terminating IAB-donor.
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| ***Summary of change:*** | The defintion of the IAB-topology is changed so that the topology assignment of the single connected boundary node is matched to that of the dual-connected boundary node. This means that both single-connected and dual-connected boundary nodes belong to both IAB topologies. Also, the descendent nodes should belong to the IAB topology of the F1-terminating IAB-donor for both cases, i.e., the single-connected or the dual-connected boundary node.The IAB topology definition is changed to:“The unison of all IAB-nodes and IAB-donor-DUs whose F1 and/or RRC connections are terminated at the same IAB-donor-CU.” |
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| ***Consequences if not approved:*** | All Rel-17 IAB stage-3 configurations that explicitly refer to the “non-F1-terminating IAB-donor’s topology” remain undefined for descendent nodes of single-connected boundary nodes. |

**Q5: Do you agree with this CR? Comments?**

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| **Company** | **Yes/No** | **Comments** |
| Qualcomm | Yes |  |
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## 3.6 R3-225433 – CR to TS 38.401 on Topology Redundancy

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| [R3-225433](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_117bis-e%5CDocs%5CR3-225433.zip) | Correction to procedure of topology redundancy (Fujitsu) | CR0257r, TS 38.401 v17.2.0, Rel-17, Cat. F |

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| ***Reason for change:*** | In procedure for inter-donor redundancy of the boundary node, the RRC reconfiguration for BAP address and TNL address(es) generated by the non-F1-terminating IAB-donor-CU is delivered to the second parent IAB-DU and forwarded to the dual-connecting IAB-MT. There is no problem when the non-F1-terminating IAB-donor-CU is SN of the dual-connecting IAB-MT and SRB3 is configured, or the non-F1-terminating IAB-donor-CU is MN of the dual-connecting IAB-MT. However, in case the non-F1-terminating IAB-donor-CU is SN and SRB3 is not established, RRC reconfiguration cannot be sent to the dual-connecting IAB-MT according to present procedure. SN initiated SN modification procedure when SRB3 is not used, as described in TS 37.340 clause 10.3.2, should be performed for delivering the RRC reconfiguration in that case. |
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| ***Summary of change:*** | * For delivering the RRC reconfiguration with BAP address and TNL address(es) pertaining to the topology of non-F1-terminating donor-CU to the dual-connecting IAB-MT, the alternative of SN initiated SN modification procedure is added to support the case that SN is the non-F1-terminating IAB-donor-CU and SRB3 is not used.
* Combine step 3 to step 6 and the new alternative to a new step.
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| ***Consequences if not approved:*** | The RRC reconfiguration cannot be sent to the dual-connecting IAB-MT when the non-F1-terminating IAB-donor-CU is SN of the dual-connecting IAB-MT and SRB3 is not configured. |

**Q6: Do you agree with this CR? Comments?**

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| **Company** | **Yes/No** | **Comments** |
| Qualcomm | No | The present version is fine. It refers to the exchange of RRC messages between the non-F1-terminating CU and the IAB-MT. For this message exchange, any available mechanism can be used. This may be SRB3 or SRB1, if applicable. If the non-F1-terminating CU is the SN and there is no SRB3, the SN can use the SN Modification procedure as defined in 37.340. This is already explained in 37.340:*The SN Modification procedure may be initiated either by the MN or by the SN and be used to modify the current user plane resource configuration (e.g. related to PDU session, QoS flow or DRB) or to modify other properties of the UE context within the same SN. It may also be used to transfer an RRC message from the SN to the UE via the MN and the response from the UE via MN to the SN (e.g. when SRB3 is not used).*There is no need to replicate this explanation in the St2 description of inter-donor topology redundancy procedure. |
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## 3.7 R3-225650 – CR to TS 38.423 on RRC Transfer

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| [R3-225650](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_117bis-e%5CDocs%5CR3-225650.zip) | Correction to TS 38.423 on RRC transfer (ZTE) | CR0916r, TS 38.423 v17.2.0, Rel-17, Cat. F |

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| ***Reason for change:*** | According to TS 37.340, the RRC transfer procedure is used for providing NR IAB other information from the IAB-MT to the SN when the IAB-donor is in the SN. However, transfer of IAB other information message via the RRC transfer procedure is not supported in current TS 38.423.  |
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| ***Summary of change:*** | Add the transfer of IAB other information message via the RRC transfer procedure. **Impact analysis**Impact assessment towards the previous version of the specification (same release): This CR has isolated impact with the previous version of the specification (same release).This CR has impact under functional point of view. The impact can be considered isolated because the change affects only the IAB related procedure. |
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| ***Consequences if not approved:*** | Transfer of IAB other information message via the RRC transfer procedure is not supported. |

**Q6: Do you agree with this CR? Comments?**

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| **Company** | **Yes/No** | **Comments** |
| Qualcomm | See comment | We agree with the spirit of the CR. However, we propose the following changes:For section: “8.3.9.1 General”, typo change: *“the NR RRC message container with the IAB other information.”*For section: “9.1.2.20 RRC TRANSFER”, change:*“For NGEN-DC and NR-DC, includes the UL-DCCH-Message as defined in subclause 6.2.1 of TS 38.331 [10] containing the MeasurementReport message or the RRCReconfigurationComplete message or the FailureInformation message or the UEAssistanceInformation message. For NR-DC, includes the UL-DCCH-Message as defined in subclause 6.2.1 of TS 38.331 [10] containing the IABOtherInformation message.”**For NE-DC, includes the UL-DCCH-Message as defined in subclause 6.2.1 of TS 36.331 [14] containing the MeasurementReport message.*Note that IAB is not defined for NGEN-DC. |
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## 3.8 R3-225679 – CR to TS 38473 on Resource Configuration

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| [R3-225679](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_117bis-e%5CDocs%5CR3-225679.zip) | Correction on Resource configuration for IAB (Huawei, Lenovo, Nokia, Nokia Shanghai Bell) | CR1061r, TS 38.473 v17.2.0, Rel-17, Cat. F |
| ***Reason for change:*** | * In section 9.2.9.3, the “*IAB-DU Cell Resource Configuration-Mode-Info*” IE is included in several parent IEs, i.e. *Activated Cells To Be Updated List Item*, *Child-Node Cells List Item*, *Neighbour-Node Cells List Item*. However, in the table, the content of “*IAB-DU Cell Resource Configuration-Mode-Info*” in the *Activated Cells To Be Updated List Item* which can be either FDD info or TDD info, is different from the same IE included in the *Child-Node Cells List Item* and *Neighbour-Node Cells List Item*”. The differences are listed below.
* For the *FDD Info*, the following 6 optional IEs are absent in the “*IAB-DU Cell Resource Configuration-Mode-Info*” contained in the *Activated Cells To Be Updated List Item* when compared to the other two places: UL Frequency Info, UL Transmission Bandwidth, UL NR Carrier List, DL Frequency Info, DL Transmission Bandwidth, DL NR Carrier List.
* For the TDD Info, the following 3 optional IEs are absent in the “*IAB-DU Cell Resource Configuration-Mode-Info*” contained in the *Activated Cells To Be Updated List Item* when compared to the other two places: NR Frequency Info, Transmission Bandwidth, UL NR Carrier List.

In the ASN.1 part, the above mentioned optional IEs are all included for the “*IAB-DU Cell Resource Configuration-Mode-Info*” contained in the *Activated Cells To Be Updated List Item.* But actually, these optional IEs are not need to be introduced for the *Activated Cells To Be Updated List Item,* because they has been included in the *Served Cell Information* IE, which can be confifggured to the IAB-DU via some existing F1 interface management procedures, e.g. F1 Setup, gNB-DU Configuration Update, gNB-CU confifuration update, etc. |
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| ***Summary of change:*** | 1. In section 9.2.9.3, Add the following IEs for the “*IAB-DU Cell Resource Configuration-Mode-Info*” contained in the *Activated Cells To Be Updated List Item*, and add description that these new added optional IEs will not be used in this release.
* For the *FDD Info*, add the following 6 IEs: UL Frequency Info, UL Transmission Bandwidth, UL NR Carrier List, DL Frequency Info, DL Transmission Bandwidth, DL NR Carrier List.
* For the TDD Info, add the following 6 IEs: NR Frequency Info, Transmission Bandwidth, UL NR Carrier List.

**Impact analysis**Impact assessment towards the previous version of the specification (same release): This CR has isolated impact with the previous version of the specification (same release).This CR has no impact under functional point of view. The impact can be considered isolated because the change affects only the IAB related procedure.The changes are backward compatible. |
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| ***Consequences if not approved:*** | The *Activated Cells To Be Updated List Item* in table is not aligned with ASN.1. |

**Q8: Do you agree with this CR? Comments?**

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| **Company** | **Yes/No** | **Comments** |
| Qualcomm | No | The CR aims to fix an inconsistency between IE description and ASN.1.The IE description is presently correct, the ASN.1 is not, i.e., it contains too more variables than necessary. Instead of fixing ASN.1, the CR proposes to add the additional variables also to the IE description, and add “This IE is not used in this release.” in the semantic description.This is an awful hack. Why do we want to define IEs which will never be used? We should change ASN.1 instead. If this is impossible, we should at least make the Semantic Description a little more palatable, e.g., such as “This IE can be included for information purposes”. |
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# Discussion - Phase II

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