**3GPP TSG-RAN WG2 Meeting #116-bis-e R2-22xxxxx**

**E-meeting, January 17 – 25, 2022**

**Agenda item:** 8.4.1

**Source:** Qualcomm Incorporated (Rapporteur)

**Title:** [Post116bis-e][079][eIAB] Open Issues (Qualcomm)

**Document for:** Discussion

# 1 Introduction

This document captures:

* [Post116bis-e][079][eIAB] Open Issues (Qualcomm)

Scope: Determine if Company input by Pre117-e discussions shall be used, and how many / which Pre-discussions shall be done. Capture Open Issues not captured in the CR email discussions and suggest how to treat. [After finalization, Merge open issues from other discussions into a WI OI list (OI for which company input is invited in some way shall be listed in the WI-list).

Intended outcome: Open Issues list, and organization of Pre117-e Company input discussions for the WI.

Deadline: Short.

The deadline is Friday Jan 28 0800 UTC.

# Discussion

All issues identified in the other Post116bis-e discussions need to be addressed and are not separately captured here.

## Update of ST2

We need to update ST2 38300 and 37400. This discussion should include latest agreements as well as RAN3’s BL CR on 38.300 in R3-221230. Further, all editor notes need to be addressed.

**This could be done via email discussion.**

**Q1: Are there other aspects related to ST2 TSs to be considered? Do you agree that email discussion is sufficient?**

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| **Company** | **Comment** |
| Samsung | Agree that email discussion is sufficient. |
| Intel | Agree |
| Apple | Agree |
| ZTE | Agree |
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## MAC

Please provide comments related to MAC in the MAC-related thread.

The rapporteur noticed that the following MAC CE requested by RAN1 in R2-2200095 still needs to be handled:

*“Signaling from an IAB-node/IAB-donor to a child node indicating beams of an the child IAB-DU in the direction of which simultaneous operation is restricted.”*

**This could be done via email discussion.**

**Q2: Any comments on the MAC CE related to RAN1 agreement above? Do you agree that email discussion would be sufficient?**

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| **Company** | **Comment** |
| Samsung | Please note that there is a dedicated (short) MAC discussion which focuses on update to CR but also on collecting open issues (as acknowledged by the rapporteur above). This present discussion [079] should then collate those issues as well.  But in general we agree that the only open issues to do with MAC are new MAC CE(s) requested by RAN1, and this could be handled via an email discussion. There is no need for separate contributions to the meeting on this matter.  One additional outstanding issue is padding BSR but this is minor and could also be handled via a single email discussion dedicated to open MAC issues. |
| Intel | Agree with Samsung. |
| Apple | There are indeed multiple MAC CEs that still need to be added, power adjustment, PSD range, recommended beam indication, restricted beam indication, also, there are still some FFS in RAN1. Fine to do this via email. |
| Huawei, HiSilicon | For the rest MAC CEs, the problem is RAN1 will complete the information by the end of next meeting. So, probably, we need a post email to discussion and add those MAC CEs. I expect those MAC CEs are not able to be discussed by AT-117 offline. |
| ZTE | It was agreed in RAN2#116bis-e meeting that RAN2 should focus on 2 new timing modes (Case-6 timing and Case-7 timing) for Desired guard symbols and Provided guard symbols, as well as on the Case-7 timing offset (deprioritizing work on other MAC CEs until further input from RAN1/RAN4 is received).  However, we would like to discuss the Child IAB-DU Restricted Beam Indication MAC CE earlier considering that there is no leftover work/FFS issue on this MAC CE in RAN1/4. So we prefer that RAN2 could start the discussion on this MAC CE based on RAN1’s LS now. And we think the email discussion would not be sufficient. |
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## BAP

Please provide comments related to BAP in the BAP-related thread.

We need to further address the FFS from the agreement of this meeting:

* Referring to previous agreement “*Will have rewriting mapping configuration(s) Old routing ID to New routing ID that limits the possible rewriting (for all cases of re-writing)*”: It is FFS whether for upstream there would be a configuration optimization such that the “New Routing ID” is the same for all entries (a.k.a. default routing ID)

The following options for the optimization of rewriting mappings for UL inter-donor-DU re-routing have been proposed in prior meetings/discussions:

**Option a:** No optimization, i.e.,inter-donor-DU re-routing uses configurations of (Ingress BAP routing ID, Egress BAP routing ID)-pairs. For this option, we need to resolve the ambiguity between re-routing and inter-topology routing for a boundary node as discussed during [AT116bis-e][049][eIAB].

**Option b:** Rewriting mapping for inter-donor-DU re-routing is based on a default egress BAP routing ID(s) configured for each parent link.

**Option c:** Rewriting mapping for inter-donor-DU re-routing is based on the BAP routing IDs included in the routing entries configured for each parent.

**Option d:** Others.

**This could be done via email discussion.**

**Q3: Any comments on this topic? Do you agree that email discussion would be sufficient?**

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| **Company** | **Comment** |
| Samsung | Just to reiterate our view that using the default routing ID does not violate any previous agreement and that our answer to the ‘FFS’ is yes. Perhaps this topic should be driven by company contributions? We’d be very happy to hear other views. |
| Intel | Agree. |
| Apple | Agree. |
| Huawei, HiSilicon | We can assume a as the baseline. The issue is: if we can only conclude this in next meeting, there is no time left for RAN3 to design the signalling in next meeting. Or, do we expect RAN3 to make the decision? The point is option a in BAP does not preclude RAN3 optimization on signalling (e.g. able to configure the default.)  Maybe proponent should clarify the coordination between RAN2 and RAN3. |
| ZTE | In our view, option c is the most simplest way. However, if option a is preferred if option c is not acceptable. In our view, option b could be implemented by configuring the same new routing ID for all entries. For option a, the issue of how could CU2 determine the egress routing IDs needs to be further discussed as below:  Issues 1: Is the mapping between ingress routing ID and egress routing ID based on QoS info of the upcoming rerouted packets? If yes, CU1 needs to send such QoS info to CU2 in advance considering that the rerouting is mainly triggered by RLF. The signaling and the timing of sending the Qos info needs to discuss as well (perhaps more RAN3 work).  Issue 2: If the egress routing ID is not configured per QoS, how CU2 determines the mapping between ingress routing ID and egress routing ID needs to be discussed as well. |
| Nokia | **Open issue:** How to handle re-routed packets in the boundary node, i.e., BAP PDUs that have been re-routed earlier based on BAP address only and the BAP address points to non-F1-terminating topology or inter-donor-DU re-routing is required.  - these BAP PDUs require header rewriting; with the above agreement, there are two alternatives:  1) header rewriting configuration of the boundary node shall include all ingress Routing IDs that possibly could reach the boundary node => makes header rewriting configuration much more complex than routing configuration  2) BAP PDUs re-routed based on BAP address only are discarded by the boundary node if no entry in the header rewriting configuration  We have been promoting an alternative where the re-routing should be based on the BAP address only (as in Rel16), which would simplify the header rewriting configuration significantly.  We will provide a Stage 3 text proposal. |
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## RLF indication

The rapporteur believes that we have exhausted this topic. The type-2/3 RLF indications were supposed to provide performance optimization during BH RLF recovery. This performance optimization is already small since BH RLF recovery is expected to be a rare *and* short event.

So far, the only purpose of this indication we agreed to capture on ST2 was local UL re-routing. This, obviously, only applies if the child node is dual connected. We further watered this down by not making it mandatory even if available. We could not agree to propagate this type-2 indication, which means that it cannot benefit any dual-connected descendent node further down the tree. We further could not agree to capture any other purposes of the type-2 indication in the spec.

The remaining open issues only relate to corner cases and further optimizations, e.g., partial re-routing, adding information on the type-2 indication, etc. The rapporteur does not believe that any further discussion would lead to convergence on the remaining matters or would add benefit to an already critically slimmed down feature.

For these reasons, we can stop ST2 discussions on type-2/3 RLF indication. Remaining issues can be included in St3 discussions (BAP and RRC).

**Q4: Any comments on this topic?**

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| **Company** | **Comment** |
| Samsung | OK to stop ST2 discussions but do not agree all the remaining issues are ‘corner cases’. However we are ok to discuss them in BAP and RRC discussions, so long as this does not mean we have excluded certain specific outstanding issues. Alternatively, the rapporteur could please share a list of such proposed exclusions, and we could then discuss this list? Otherwise the proposal seems a bit vague to us. |
| Intel | Agree. |
| Apple | Company views on this topic are quite diverse and still a bit far from being aligned. We are fine to start including topics in stage-3 that are concluded, but for the rest, it would be good to continue the discussion. The RLF discussion is not yet summarized for open issues and may only come a bit later. |
| Huawei, HiSilicon | We are fine to STOP ST2, if it means no propagation and no more information included in type2 indication. |
| ZTE | Currently there’s no conclusion on whether Type-2 is propagated further and whether any routing information is included in the type 2 indication triggered by dual-connected node yet. As stated by the rapporteur, the only purpose of this indication we agreed to capture on ST2 was local UL re-routing for dual-connected node. In our view, the above two issues are key points for this feature. So we cannot agree to stop st2 discussion on type 2/3 RLF indication at this stage. And we agree that stage 3 discussions in BAP and RRC could get started now. |
| Nokia | Propagation of type-2/3 indications was not ruled out but remains an open issue.  On this agreement:   * [048] Execution of local re-routing of all affected traffic among re-routable traffic upon BH RLF is not mandatory for a node capable of local re-routing. This can be revisited if there is a severe issue.   We believe this actually deviates from Rel.16 and should therefore be revoked. The agreement was justified by this BAP note, which was interpreted to mean that all local re-routing is optional in Rel.16:  *NOTE: Data buffering on the transmitting part of the BAP entity, e.g., until RLC-AM entity has received an acknowledgement, is up to implementation. In case of BH RLF, the transmitting part of the BAP entity may reroute the BAP Data PDUs, which has not been acknowledged by lower layer before the BH RLF, to an alternative path in accordance with clause 5.2.1.3.*  However, we think the purpose of this note and especially the highlighted text is that the BAP entity is allowed to retransmit (and reroute) previously transmitted but non-ACKed PDUs upon BH RLF. Local re-routing itself is specified in BAP section 5.2.1.3 and there is nothing optional about that:  - *else if there is an entry in the BH Routing Configuration whose BAP address matches the DESTINATION field, whose BAP path identity is the same as the PATH field, and whose egress link corresponding to the Next Hop BAP Address is available:*  *- select the egress link corresponding to the Next Hop BAP Address of the entry;*  *NOTE 1: An egress link is not considered to be available if the link is in BH RLF.*  *NOTE 2: ...*  *- else if there is at least one entry in the BH Routing Configuration whose BAP address matches the DESTINATION field, and whose egress link corresponding to the Next Hop BAP Address is available:*  *- select an entry from the BH Routing Configuration whose BAP address is the same as the DESTINATION field, and whose egress link corresponding to the Next Hop BAP Address is available;*  *- select the egress link corresponding to the Next Hop BAP Address of the entry selected above;*  Further, lack of conclusion on how the identified FFS work imply lack of functional (stage 2) understanding. Thus, we support to continue and address the open issues identified in the R2-2201937.  In particular, we find the following are open points that were not concluded and need to be resolved:  **Open point:** whether Type-2 is propagated further for single connection scenarios  **Open point:** whether Type-2 indication triggered by a dual-connected node includes a routing information. |
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## RAN3 efforts

RAN3 agreed to proceed with solution 1 for latency reduction of intra-donor topology adaptation. RAN3 informed RAN2 about this solution in LS in R2-2106948. RAN2 replied with potential concerns in LS in R2-2109108.

Related to solution 1, RAN3 further agreed in this meeting:

**CHO combined with solution#1 is not addressed by RAN3 unless requested by RAN2.**

RAN2 should discuss RAN2-related aspects of RAN3’s solution 1.

**This could be done via email discussion.**

**Q5: Any comments on this topic? Other RAN3 topics to be discussed in RAN2? Do you agree that email discussion would be sufficient?**

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| **Company** | **Comment** |
| Samsung | Agree that email discussion is sufficient. |
| Intel | For solution 1, RAN3 has also agreed following agreements:  **WA: Upon migration/HO failure case, the buffered RRC message is still transferred to child node.**  **Agree to confirm solution 1: An IAB-DU buffers an RRC message for a child IAB-MT based on an indication in the F1AP message carrying this RRC message.**  From RAN2 point of view, there’s still open issues on how to handle the received RRC messages upon migration failure. This is because, except bap-config, the received RRC messages would carry other RRC configurations. It is important for RAN2 to discuss how to handle such messages if partial information is expired.  Since RAN2 didn’t have enough time to discuss this topic during previous meetings, we think this topic should be discussed based on company’s contribution to have a clearer view on how the solution is solved in RAN2. |
| Huawei, HiSilicon | This depends on how many companies supporting “CHO plus sol.1”.  In RAN3 discussion, there is only extremely minority companies supporting this.  So, we don’t need on email on this, unless we received quite a lot of proponent contributions. Also, please note there is no RAN3 feasible solution on table.  **RAN3 believes the CHO combined with solution#1 is not feasible.** |
| ZTE | In the RAN2 reply LS R2-2109108, it was captured that “RAN2 observes that trigger conditions for both Solution 1 (to forward withheld RRCReconfiguration) and Solution 2 (to send the L1/L2 indication) require further discussion. Interaction of CHO with both solutions may also need further discussion. The case of IAB-node migration failure needs to be discussed for solution 1, and the impacts for solution 2 are provided above.”. So the issues mentioned in the reply LS related to solution 1 needs to be discussed in RAN2. |
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## Other issues

Please indicate if there are any other issues which need discussion and have not been captured above, e.g., related to:

* CP-UP separation
* UE capabilities
* Topology adaptation
* Others

**Q6: Any aspects missed? Do you believe that these aspects can be discussed via email discussion?**

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| **Company** | **Comment** |
| Samsung | We think the list above captures well the key overarching topics. Is the proposal to have a single email discussion for all of them? Perhaps we could use company contributions instead, but agree on a specific list of topics first? |
| Intel | As captured in Chair’s Note, following aspects of UE capabilities need to be discussed and solved:   * FFS UE capability for Rel-17 intra-donor DU local-rerouting and inter-donor DU re-routing. * FFS whether need to differentiate the capability between “inter-donor CU partial migration” and “inter-donor CU routing for topology redundancy” * FFS the feature group for BAP header rewriting based inter-donor CU routing * FFS the feature group for local rerouting |
| Apple | Agree with Samsung. |
| Huawei, HiSilicon | “Topology adaptation” is not clear.  There seems no left for CP-UP separation, which can be done by RRC running CR discussion. |
| ZTE | For inter-donor-redundancy, the issue of how to handle the IP addresses allocated by non-F1-terminating donor needs to be discussed. Specifically, when boundary IAB-MT receives the RRC message including the IP addresses allocated by non-F1-terminating donor, it may replace the old IP addresses with the new IP addresses. However, the F1-U tunnel to be migrated and F1-U tunnel not to be migrated may share the same IAB-DU IP address. As a result, the IAB-DU IP address of the F1-U tunnel not to be migrated would be replaced wrongly. RAN2 needs to discuss how to handle this issue. |
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# 3 Summary

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