**3GPP TSG-RAN WG2 Meeting #109e-bis R2-20xxxxx**

**Electronic meeting, April 20 – April 30**

**Agenda item:** 6.1.6

**Source:** Qualcomm Incorporated (Rapporteur)

**Title:** [AT109bis-e][022][IAB] RLF Handling (Qualcomm)

**Document for:** Discussion

# Introduction

This document handles offline email discussion:

* [AT109bis-e][022][IAB] RLF Handling (Qualcomm)

Scope: Treat RLF handling to close open issues and make correction if applicable, [R2-2003813](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_109bis-e\Docs\R2-2003813.zip), and [R2-2003726](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_109bis-e\Docs\R2-2003726.zip)

Expected outcome: Decisions taken in this email discussion shall be taken into account in the other email discussions on CRs: RRC, possibly BAP, Possibly Idle Mode TS.

Deadline: April 24 0700 UTC

Since the report from [Post109e#36][IAB] RLF Handling Open Issues was not handled during the webinar session, this conclusion section will include the proposals from that session. These proposals (in short) were:

**Proposal 1-1: IAB-DU behavior after RLF declaration is left up to implementation. IAB-DU should be able to send RLF notification when RLF recovery fails.**

**Proposal 1-2: Fast MCG link recovery is supported for NRDC and ENDC.**

This offline discussion aims to address further issues that have not been properly resolved during the post-109e email discussion or that have been identified in contributions to R2#109e-bis. It will *not* address topics which were properly addressed in post-109e email discussion and did not result in any proposals. It will not discuss support for Rel-15/16 features.

**We should aim for functional freeze in this meeting since it is the second-to-last of the WI. The timeframe of this offline is very short. Therefore, we can only move forward with proposals that get broad support.**

# Discussion

2.1 SCGFailureInformation report includes a new failure type

This issue was raised by two companies during the discussion in the post-109e email discussion.

**Proposal 2-1: SCGFailureInformation report includes “reception of RLF recovery failure” as new type.**

**Q: Do you agree with proposal 2.1?**

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| Company | Agree with proposal | Comment |
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2.2 Reestablishment at former parent node

The IAB-node should *not* attempt reestablishment at its former parent node for some time after receiving BH RLF notification. This was proposed by R2-2003302 and R2-2003314.

We need to agree if anything should be captured:

**Proposal 2-2: Specification captures that the parent node, which sent BH RLF notification, should not be considered for reestablishment for some time.**

**Q: Do you agree with proposal 2.2?**

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| Company | Agree with proposal | Comment |
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It needs to be decided if the time frame is up to implementation or configurable.

**Option a: Time frame is up to implementation**

**Option b: Time frame is configurable.**

**Q: Which option do you prefer?**

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| --- | --- | --- |
| Company | Preferred option (a, b) | Comment |
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2.3 Support of other types of RLF indication

Types 1/2/3 RLF indications were established in an email discussion during last year. They were further proposed in post-109e email discussion as well as in R2-2002855, R2-2002991, R2-2003302, and R2-2003314. These types of RLF indication can help avoiding that the IAB-node tries to re-establish at its own descendant nodes.

Getting agreement on such a complex issue at this late stage of the WI is a rather adventurous undertaking. There are lots of different options to be considered. We will try to explore the space.

Type-1/2 indication allows fast propagation of RLF problems throughout the subtree. Here is how this would work:

If a single-connected IAB-node has determined BH RLF or received a BH RLF indication (which is different from the RLF notification sent after recovery failure) from its parent node, it sends an RLF indication to its child node, removes the “IAB-supported” indicator in SIB1 and blocks IAB-MT access.

This already contains a lot of material, but there is little benefit in breaking it further down.

**Proposal 3-1: If a single-connected IAB-node has determined BH RLF or received a BH RLF indication (which is different from the RLF notification sent after recovery failure) from its parent node, it sends an RLF indication to its child node, removes the “IAB-supported” indicator in SIB1 and blocks IAB-MT access.**

**Q: Do you agree with proposal 3.1? Any variation?**

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| Company | Agree with proposal | Comment |
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If the “MT-access blocking” state was triggered by local RLF, it can be reversed upon recovery. Otherwise, it can be reversed after expiration of a (configurable) timer or upon reception of a type-3 indication.

**Option 1: The IAB-node reinstates “IAB-supported” indicator in SIB1 and readmits IAB-MT access attempts upon RLF recovery or after some time.**

**Option 2: The IAB-node reinstates “IAB-supported” indicator in SIB1 and readmits IAB-MT access attempts upon RLF recovery or after reception of a type-3 indication.**

**Q: Which option do you prefer?**

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| Company | Option preferred | Comment |
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In case of Option 1, the time frame might be based on implementation or based on a configurable timer:

**Option 1.1: Time frame up to implementation**

**Option 1.2: Time frame configurable**

**Q: In case of option 1, which sub-option do you prefer?**

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| Company | Option preferred | Comment |
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In case of option 2: If multiple BH links in a chain have link quality issues their RLF indicators and radio-link recovery (RLR) indicators may overlap in time and create a state of uncertainty among the descendant nodes. To avoid such a situation, the BH RLF indicator and BH RLR indicator should contain, e.g., the node’s BAP address to avoid such conflicting information.

**Q: In case of option 2, should the BAP address (or another identifier) be included in the RLR indication?**

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| --- | --- | --- |
| Company | BAP address in included in RLF/RLR indication (yes/no) | Comment |
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Dual-connected IAB-nodes with RLF on one of the BH links might be able to use the other link for backhauling. If the dual-connected IAB-node receives a RLF indicator from the parent node, however, it does not know if the failed link resides on a subset of paths or on all paths. In prior case, it should make itself available to allow access by orphaned IAB-nodes, in the latter it shouldn’t.

Options considered might be:

**Option A:** Dual-connected nodes do not send RLF and RLR indications.

**Option B:** Dual-connected nodes do send RLF and RLR indications.

**Option C:** ...

**Q: How should dual-connected nodes behave?**

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| Company | Option (A, B, C…) | Comment |
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**Q: Anything forgotten?**

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| Company | Comment |
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2.4 Include BAP address into MCG or SCG failure report

This was proposed by R2-2002855. It provides the CU with more detailed information on where the RLF occurred.

**Proposal 4-1: The IAB-MT includes its BAP address in the MCG and SCG failure report.**

**Q: Do you agree with proposal 4-1?**

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| Company | Agree with proposal | Comment |
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2.5 Max timer for MCG recovery

This proposal by R2-2003099 is conditional on Proposal 2, i.e. support for MCG recovery. The max time value for T316 for MCG recovery presently is 2000ms. For IAB-nodes, a longer timer might be advantageous since the BH can still operate on the SCG link.

**Proposal 5-1: The max-time of T316 for MCG recovery can be configured to larger values than 2sec for IAB-MT.**

**Q: Do you agree with proposal 5-1?**

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| Company | Agree with proposal | Comment: Please include the max time value for MT |
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* 1. RLF indication in SIB1 for UEs

R2-2003314 proposes to have SIB1 send an RLF indicator to allow UEs to perform reestablishment. This, of course, would only be applicable to Rel-16+ UEs.

**Q: Do you agree with proposal 6-1?**

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| --- | --- | --- |
| Company | Agree with proposal | Comment |
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# Conclusion

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