3GPP TSG-RAN WG2 #114-e Tdoc R2-21xxxxx

Electronic meeting, 19th - 27th May 2021

Agenda Item: 6.1.3.5

Source: Ericsson

Title: Summary of [AT114-e][019][NR16] BAP (Ericsson)

Document for: Discussion, Decision

# Introduction

This paper addresses the following email discussion:

* [AT114-e][019][NR16] BAP (Ericsson)

 Scope: Treat R2-2105357, R2-2105875, R2-2106027, R2-2106028, R2-2106218, R2-2106219

 Phase 1, determine agreeable parts, Phase 2, for agreeable parts Work on CRs.

 Intended outcome: Report and Agreed CRs.

 Deadline: Schedule A

[R2-2105357](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_114-e%5CDocs%5CR2-2105357.zip) Corrections on BAP Control PDU operations vivo CR Rel-16 38.340 16.4.0 0016 - F NR\_IAB-Core

[R2-2105875](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_114-e%5CDocs%5CR2-2105875.zip) Handling of erroneous data at BAP layer Samsung Electronics GmbH CR Rel-16 38.340 16.4.0 0017 - F NR\_IAB-Core

[R2-2106027](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_114-e%5CDocs%5CR2-2106027.zip) Corrections to the handling of unknown, unforeseen, and erroneous protocol data Ericsson, AT&T CR Rel-16 38.340 16.4.0 0018 - F NR\_IAB-Core

[R2-2106028](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_114-e%5CDocs%5CR2-2106028.zip) Handling of Unknown and Reserved Values in the BAP Header Ericsson, AT&T discussion NR\_IAB-Core

[R2-2106218](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_114-e%5CDocs%5CR2-2106218.zip) Correction on BAP handling for the hybrid release IAB deployment Huawei (Rapporteur), HiSilicon CR Rel-16 38.340 16.4.0 0019 - F NR\_IAB-Core

[R2-2106219](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_114-e%5CDocs%5CR2-2106219.zip) Discussion on extension principles for mixed deployment of IAB node in different releases Huawei, HiSilicon discussion Rel-16 NR\_IAB-Core

Deadline for comments is Friday May 21 1000 UTC

# Summary of AI 6.1.3.5 - BAP

## [R2-2105357](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_114-e/Docs/R2-2105357.zip) - [Corrections on BAP Control PDU operations](https://ericsson.sharepoint.com/R2-2105357.zip)

The CR includes the following change proposals:

1. Add indication of detected BH RLF recovery failure to upper layers in Section 4.3.1
2. Clarifications to the flow control feedbacks:
	1. “Construct a BAP Control PDU for flow control feedback per ingress BH RLC channel, if configured by RRC”
	2. construct a BAP Control PDU for flow control feedback per BAP routing ID as configured in downstream, if configured by RRC, in accordance with clause 6.2.3;
3. Add action for the receiving part of the IAB-MT to inform the collocated IAB-DU to construct a BAP Control PDU for BH RLF indication, in case the IAB-node has no alternative path available to IAB-donor-CU

Rapporteur´s view: Related to the change 3 above, Rapporteur observes that according to TS 38.300 (Section 9.2.7), the BH RLF indication is triggered in case the RRC reestablishment procedure fails. So it is not clear why the BAP layer of the IAB-MT should inform the collocated IAB-DU, given that the reestablishment procedure is handled at RRC layer.

* **Q1: Which of the above changes in** [**R2-2105357**](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_114-e/Docs/R2-2105357.zip) **are agreeable?**

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| **Company** | **Changes (1/2/3)** | **Detailed Comments** |
| Samsung | 1 and 2 (but 2 may need rewording) | Same as Rapporteur, we are not ok with change no. 3, although we have a different understanding to the Rapporteur. We think the procedure described in this change is correct, but it is an internal matter of the IAB node and not something that should be captured in the BAP spec.  |
| LG | none | For the 1st change, however, we are ok if a majority company wants to change it. For the 2nd change, it is already clear in 38.300, i.e., “In downstream direction” and “for an ingress BH RLC channel”.For the 3rd change, we agree with rapporteur and the 3rd change is not needed. |
| Nokia, Nokia Shanghai Bell | 1 with changes | C1: Intention is correct but the proposed wording now sounds like BAP is responsible for declaring recovery failure. We’d suggest e.g. "relaying of received indication of BH RLF recovery failure".We think C2 is clear from Stage-2.For C3 we agree with rapporteur. |
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## Handling of Unknown and Reserved Values in the BAP Header

In this section the following contributions are discussed:

* [R2-2105875](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_114-e%5CDocs%5CR2-2105875.zip) Handling of erroneous data at BAP layer Samsung Electronics GmbH CR Rel-16 38.340 16.4.0 0017 - F NR\_IAB-Core
* [R2-2106027](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_114-e%5CDocs%5CR2-2106027.zip) Corrections to the handling of unknown, unforeseen, and erroneous protocol data Ericsson, AT&T CR Rel-16 38.340 16.4.0 0018 - F NR\_IAB-Core
* [R2-2106028](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_114-e%5CDocs%5CR2-2106028.zip) Handling of Unknown and Reserved Values in the BAP Header Ericsson, AT&T discussion NR\_IAB-Core
* [R2-2106218](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_114-e%5CDocs%5CR2-2106218.zip) Correction on BAP handling for the hybrid release IAB deployment Huawei (Rapporteur), HiSilicon CR Rel-16 38.340 16.4.0 0019 - F NR\_IAB-Core
* [R2-2106219](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_114-e%5CDocs%5CR2-2106219.zip) Discussion on extension principles for mixed deployment of IAB node in different releases Huawei, HiSilicon discussion Rel-16 NR\_IAB-Core

Related to this topic, the following agreements were reached in RAN2#113-e:



The papers above are concerned with the fact that the current way of handling the unkown and reserved values in the BAP header might not be future-proof. In fact, according to the current BAP specification, the IAB node discards a received BAP PDU if that contains reserved or invalid values. Hence, if for example RAN2 decides in a future release to enhance the BAP header to support new features, and if a BAP PDU with such enhanced BAP header is received by any Rel.16 IAB node, such BAP PDU would be discarded, because the new BAP header will be interpreted by the Rel.16 IAB node as containing reserved or invalid values. This would obviously make the coexistence between Rel.16 IAB nodes and IAB nodes of future releases difficult.

The CRs [R2-2105875](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_114-e%5CDocs%5CR2-2105875.zip), [R2-2106027](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_114-e%5CDocs%5CR2-2106027.zip), [R2-2106218](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_114-e%5CDocs%5CR2-2106218.zip) (and related contributions [R2-2106027](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_114-e%5CDocs%5CR2-2106027.zip), [R2-2106219](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_114-e%5CDocs%5CR2-2106219.zip)), propose to address this problem in Rel.16 BAP specification.

However, before discussing the Rel.16 CRs, companies are asked to provide their views on whether this issue should be fixed in Rel.16 BAP specification or not.

* **Q2: Do you believe that is beneficial to address in Rel.16 BAP specification the issue described in contributions R2-2105875, R2-2106027, R2-2106028, R2-2106218, R2-2106219?**

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| **Company** | **Yes/No** | **Detailed Comments** |
| Samsung | Yes | We are one of the proponents. We do believe the mixed-release node scenario is an important one and that we should ensure that a Rel-16 node does not discard a packet which can be routed correctly, even if its contents (apart from the routing ID) may be unintelligible to the node in question. |
| LG | Maybe | We think that there is no restriction to deploy an “old” Rel-16 IAB node as the next hop for a new Rel-17 IAB node and it could be a valid scenario.  |
| Nokia, Nokia Shanghai Bell | No | We think there is nothing to fix.The Rel-16 spec already implements this, unknown/reserved values cannot co-exist with Destination and Path fields in a BAP header:- Only BAP Data PDU has Destination and Path fields;- "Reserved bits shall be ignored by the receiver"So reserved bits can be used in the future releases, legacy nodes will ignore them but not the PDU. This can be found from 6.3.5 of BAP specification (parameter description of the R bit, “Reserved bits shall be ignored by the receiver”). |
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If the answer to Q2 is **“Yes”**, companies are asked to provide their views on which CR, among the following submitted CRs, should be used as baseline:

1. [R2-2105875](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_114-e%5CDocs%5CR2-2105875.zip) Handling of erroneous data at BAP layer Samsung Electronics GmbH CR Rel-16 38.340 16.4.0 0017 - F NR\_IAB-Core
2. [R2-2106027](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_114-e%5CDocs%5CR2-2106027.zip) Corrections to the handling of unknown, unforeseen, and erroneous protocol data Ericsson, AT&T CR Rel-16 38.340 16.4.0 0018 - F NR\_IAB-Core
3. [R2-2106218](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_114-e%5CDocs%5CR2-2106218.zip) Correction on BAP handling for the hybrid release IAB deployment Huawei (Rapporteur), HiSilicon CR Rel-16 38.340 16.4.0 0019 - F NR\_IAB-Core

Rapporteur notes that while the intention of [R2-2105875](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_114-e%5CDocs%5CR2-2105875.zip) and [R2-2106027](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_114-e%5CDocs%5CR2-2106027.zip) seems similar, i.e. both of them propose changes to the procedural text, the CR in [R2-2106218](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_114-e%5CDocs%5CR2-2106218.zip) proposes to add two notes (based on three different assumptions described in [R2-2106219](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_114-e%5CDocs%5CR2-2106219.zip)) which should explain the handling of a BAP PDU with a future release BAP header.

* **Q3: In case the answer to Q2 is “Yes”, which of the above submitted CRs should be used as baseline?**
	+ **If there is the need, companies are also invited to provide their views on possible changes to those submitted CRs.**

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| **Company** | **Baseline CR** | **Detailed Comments** |
| Samsung | R2-2105875 | We prefer the approach of CRs in R2-2105875 and R2-2106027. We have concerns about the approach taken in the third CR (R2-2106218):1. It appears to be specifying (albeit in the form of a NOTE) network behaviour: ‘BAP Data PDU… allowed to be destined to a Release 16 IAB node, only if…’ – it is better in our view to specify the node behaviour, rather than recommend (specify?) network behaviour.
2. BAP Control PDUs with invalid data are not discarded.

This second issue also holds true for the CR in R2-2106027, which not only does not discard the BAP Control PDUs with invalid data, but actually attempts to forward them. We therefore propose to go with the CR in R2-2105875.[We would like to note that the first change in R2-2106218 (to clause 4.2.2) is valid in our view, and worth considering.] |
| LG | R2-2105875 | Given that D/C field, R bits, DESTINATION address, and PATH id fields are only included in the header of a BAP data PDU, even though an “old” Rel-16 IAB node is the next hop for a new Rel-17 IAB node, we think that BAP data PDU may have no issue with reserved/invalid value in the header if DESTINATION or PATH ID is not extended. The IAB node would also check a reserved/invalid value in the BAP control PDU. However, we are not sure whether Ericsson and Huawei’s CR can cover the BAP control PDU properly. |
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In case the answer to Q2 is **“No”**, discussion papers [R2-2106028](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_114-e%5CDocs%5CR2-2106028.zip) (see proposal P2a) and [R2-2106219](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_114-e%5CDocs%5CR2-2106219.zip) (see proposal P2) also propose a possible way forward to address this issue in future releases. In particular, it is proposed that the CU should ensure in a future release that a Rel.16 IAB node can receive a BAP PDU with a Rel-16 BAP header from an IAB node of a future release.

Rapporteur would like to note that even if this approach would avoid packet discarding at the Rel.16 IAB node, it would not allow a “new” IAB node to use a new feature if that affects the BAP header, and if there is an “old” Rel.16 IAB along the routing path which will receive such BAP header. Hence, this might be a limiting factor from a configuration/deployment perspective.

* **Q4: In case the answer to Q2 is “No”, do you agree with the proposals P2a in** [**R2-2106028**](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_114-e%5CDocs%5CR2-2106028.zip) **and P2 in** [**R2-2106219**](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_114-e%5CDocs%5CR2-2106219.zip)**, i.e. in a future release, the CU ensures that a Rel.16 IAB node can receive a BAP PDU with a Rel-16 BAP header from an IAB node of a future release.**

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| **Company** | **Yes/No** | **Detailed Comments** |
| Nokia, Nokia Shanghai Bell | No | The specification is clear as it stands and reserved bits are already ignored by the current specification. |
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# Conclusion

To be updated

# References

1. [R2-2105357](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_114-e%5CDocs%5CR2-2105357.zip) Corrections on BAP Control PDU operations vivo CR Rel-16 38.340 16.4.0 0016 - F NR\_IAB-Core
2. [R2-2105875](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_114-e%5CDocs%5CR2-2105875.zip) Handling of erroneous data at BAP layer Samsung Electronics GmbH CR Rel-16 38.340 16.4.0 0017 - F NR\_IAB-Core
3. [R2-2106027](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_114-e%5CDocs%5CR2-2106027.zip) Corrections to the handling of unknown, unforeseen, and erroneous protocol data Ericsson, AT&T CR Rel-16 38.340 16.4.0 0018 - F NR\_IAB-Core
4. [R2-2106028](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_114-e%5CDocs%5CR2-2106028.zip) Handling of Unknown and Reserved Values in the BAP Header Ericsson, AT&T discussion NR\_IAB-Core
5. [R2-2106218](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_114-e%5CDocs%5CR2-2106218.zip) Correction on BAP handling for the hybrid release IAB deployment Huawei (Rapporteur), HiSilicon CR Rel-16 38.340 16.4.0 0019 - F NR\_IAB-Core
6. [R2-2106219](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_114-e%5CDocs%5CR2-2106219.zip) Discussion on extension principles for mixed deployment of IAB node in different releases Huawei, HiSilicon discussion Rel-16 NR\_IAB-Core