**3GPP TSG-3 Meeting # *0982***

**5 January - 05 February 2021**

Agenda Item: 30

Source: Ericsson (moderator)

Title: Summary of Offline Discussion on Rel-17 positioning RAN2 LS

Document for: Discussion

# Introduction

**CB: # 19\_Basket\_Rel-17Pos**

**- Reply to RAN2 raising the detected issues and proposing a review considering the updated NG-AP and F1-AP interface delay values?**

**- If no agreement on the NG-AP latency values, liaising RAN2 mentioning that there is no consensus on the RAN3 interfaces latency (any aspect based on them should not be agreed for the WI)?**

(E/// - moderator)

Summary of offline disc [R3-210982](file:///C%3A%5CUsers%5Ccmcc%5CDesktop%5CInbox%5CR3-210982.zip)

# For the Chairman’s Notes

Propose the following:

//To be updated

# Introduction

In last e-meeting, RAN3 received a LS from RAN2 that was featuring values of RAN2’s on-going evaluation of Rel-17 SI on positioning end-to-end latency [1].

RAN3 has discussed the NG-AP values but without reaching a consensus. The chairman’s minutes report to RAN3#90-e [2] mentions the following:

* LS from RAN2 on latency of NR positioning protocols (R3-207042)
	+ RAN3 in cc (no actions)
	+ Received late during meeting
	+ No TUs in RAN3 for Rel-17 Positioning SI
* Huawei and Ericsson disagree with the content of this incoming LS as they believe the included results contradict the results in TR 36.932
* No consensus on a reply LS
* RAN3 unable to provide feedback if this SI concludes at the next meeting

As mentioned above, RAN3 was unable to provide feedback to RAN2, but the SI is still on-going in RAN2 with the SI’s last e-meeting starting today.

The RAN3 Rapporteur of the Rel-17 positioning WI proposed in [3] to resolve the issue raised from last time, because if left in this state, this topic may pose a risk toward the WI, where RAN3 will be working on topics involving potential aspects, which RAN3 had no consensus on during the SI discussion.

Hence the need of some sort of proper closure to RAN3’s discussion and official communication to RAN2.

# Discussion

## Review of RAN3 interfaces latency

1) Companies are invited to comment whether they consider that the latency values related to RAN3 interfaces described in the initial LS from RAN2 [1] are agreeable.

|  |  |  |
| --- | --- | --- |
| Company | Yes/No | Comment |
| Ericsson | NO | RAN2 focused only on Uu optimizations. NG-AP interface delay can also reach the 0 ms as explained in [3].F1-AP latency should also be taken into account |
| CATT | Yes, but | The latency values provided in the RAN2 LS should be ok. And agree with Ericsson that F1-AP latency should also be considered. |
| Nokia | Yes, but | The latency values in the RAN2 LS are OK. The intention of the table is to capture a baseline (i.e. without enhancements or optimizations), rather than trying to capture the most optimal or the most pessimistic values.From the discussion at RAN3#110e, it seemed that the 0ms minimum value for TUE-gNB is what triggered this current discussion about whether e.g. NGAP interface delay should also show 0ms. However, in our understanding the 0ms for TUE-gNB was introduced because a very small delay may occur over Uu even under normal scenarios and RAN2 did not want to capture sub-millisecond values in the table – so value 0ms was agreed to be used as an approximation. This is different than the NGAP case where 0ms would occur only in special deployment scenarios. |
| Huawei | No | The values provided by RAN2 are min and max, as seen in [3].RAN2 did not consider RAN3 min correctly.RAN2 ignored some 3GPP statement like TR 36.932.RAN2 provided 0ms over Uu without clarification, which is physically difficult to understand. Even if we would admit that reflecting an approximation, this approximation should reflect particular radio conditions. The low latency which motivate this discussion addresses dedicated use cases which require potentially address dedicated deployment and not overall needs …  |
| ZTE | Yes, but | The latency values provided in RAN2 LS might be OK, but we can remind RAN2 to reconsider these interface latency.F1-AP latency should also be taken into account. |
| Qualcomm | Yes but | Ack all of the above arguments, particularly Nokia’s. However:RAN2 has just agreed to “stick to values endorsed in last RAN2 meeting although some companies in RAN3 have different view, considering RAN3 is unable to provide feedback before the completion of the SI. This does not preclude future changes to the values when RAN3 provide input (e.g. in WI phase).”In that sense, there does not seem to be much to pursue. Yes, some values could be lower in specific deployments, and this seems already understood in RAN2. |
| CMCC | Yes but | Similar view as Nokia and Qualcomm. |

## Reply LS to RAN2

2) Can a consensus be reached on the RAN3 interfaces latency values: NG-AP and F1-AP

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| --- | --- | --- |
| Company | Yes/No | Comment |
| Ericsson | Yes, but | We acknowledge that discussing latency values is a difficult topic in RAN3. But as explained in [3], the lower bound of TgNB-AMF can effectively reach the 0 ms, considering current specified architecture and/or implementation scenarios. |
| CATT | See Comment | Agree with Ericsson that we should also consider the CU-DU latency.But on the lower bound of TgNB-AMF TAMF-LMF TgNB-DU-gNB-CU, etc, how can it reach 0 ms? Co-located scenarios?As in the In TS 36.932, the latency for ideal backhaul is described as below:A categorization of ideal backhaul based on operator inputs is listed in Table 6.1-2:Table 6.1-2: Categorization of ideal backhaul

|  |  |  |  |
| --- | --- | --- | --- |
| Backhaul Technology | Latency (One way) | Throughput | Priority (1 is the highest) |
| Fiber Access 4 (NOTE 1) | less than 2.5 us (NOTE2) | Up to 10Gbps | 1 |

NOTE 1: This can be applied between the eNB and the remote radio head.NOTE 2: propagation delay in the fiber/cable is not included.From the Note, we see currently only the latency between the eNB and the remote radio head could be treated as ideal backhaul. This could be treated as the internal latency of a gNB, not inter nodes latency. But for the signalling propagation delays between Nodes, whether it could reach the ideal value need to be cautious.And for the processing latencies, I do not understand how TgNBProc-NRPPa TAMFProc could reach 0ms. |
| Nokia | Yes, but | It is common knowledge that interface latencies depend on e.g. backhaul technology and distance, so it seems safe to assume that RAN2 considered this. Nevertheless, if companies believe that it would be beneficial to remind RAN2 of this, we could send a reply LS with qualitative statements such as:- signaling propagation delay between gNB and AMF may be shorter or longer than the 3-10ms range- one or more latency components may not be present in certain special deployments (e.g. TgNB-AMF could be negligible if gNB and AMF are co-located)- gNB split architecture adds F1AP processing latency and CU-DU signaling propagation delayThen, RAN2 can decide whether/how to take it into account in the TR (e.g. by modifying the values in the table, or adding notes to the table, or adding clarifying text, etc). |
| Huawei |  | Well the latency is first a problem of distance … The current architecture do not restrict any deployment! We should then clarify to RAN2 that better value can be achieved also in network side …It the LS was sent to RAN3, this is to allow RAN3 to provide such comment …  |
| ZTE |  | Agree that F1-AP latency values should be considered. We can remind RAN2 to consider the latency for ideal backhaul listed in TS36.932. |
| Qualcomm |  | We don’t see that an LS is needed (see above), but if most companies prefer, we can send an LS with considerations as mentioned by Nokia and/or others.  |
| CMCC |  | We don’t think an LS is needed. Anyway, the latency is a range which depends on the deployment and distance between gNB and AMF. And in our real deployment, the latency is even larger than 10ms, considering in 5G centralized AMF will be largely used, there the distance between ANF and gNB will be even 1000km far. |

3) In case no consensus can be reached on the RAN3 interfaces delay - neither on the initial RAN2 values, nor on the proposed reviewed ones, - rapporteur proposes to send a LS to RAN2, mentioning that there is no consensus on the RAN3 interfaces latency and that any aspect based on them should not be agreed for the WI. Current LS draft proposed in [4]

|  |  |
| --- | --- |
| Company | Comment |
| Ericsson | This is reasonable |
| CATT | Reasonable, pending to the output of RAN3 discussion. |
| Nokia | The “no consensus” is only about the proposal to directly edit RAN2’s latency table. Our understanding is that the table represents a baseline that reflects the consensus of many companies after lengthy discussion. RAN3 can certainly indicate reasons why latency values can be outside the baseline range, but then leave it to RAN2 how they would like to take it into account. |
| Huawei | Same view as Ericsson. The 3GPP rules are based on the consensus and the Term of Reference.  |
| ZTE | Reasonable |
| Qualcomm | There seems to be little point in trying to reach consensus on “RAN3 interfaces delay”. But repeating above, we can indicate issues in RAN3 domain that lead to considerable variation of latency (including use of F1, specialized deployments etc). |
| CMCC | The only no consensus is about the latency range. But it does not mean the table in RAN2 which represents the typical value cannot be used for further recommendation. |

# Conclusion, Recommendations [if needed]

Arguments from companies are acknowledged. It is proposed to send a LS reply to RAN2 asking them to take note of the following RAN3 remarks:

* There can be network latency variations depending on the deployment distance between gNB and AMF and the backhaul type. For the ideal backhaul, the example of latency in TR 36.932 shows that the latency is less than 2.5 us;
* gNB split architecture adds F1AP processing latency and CU-DU signaling propagation delay;
* One or more network latency components may not be present in certain specific deployments (e.g. CU-DU split, TgNB-AMF could be negligible if gNB and AMF are co-located).

# References

1. R3-207042, LS from RAN2 on latency of NR positioning protocols
2. RP-202129, “Status Report of RAN3#110-e”, RAN3 chairman
3. R3-210653, Discussion on the latency analysis in the on-going RAN2 Positioning SI, Ericsson, Huawei
4. R3-210654, Reply LS on Latency of NR Positioning Protocols, Ericsson