**3GPP T****SG-RAN WG2 #114 electronic R2-21xxxxx**

**Online, 19th – 27th May, 2021**

**Agenda item: 5.3 User Plane corrections**

**Source: NEC (Rapporteur)**

**Title: Report of [AT114-e][002][NR15] User Plane**

**Document for: Discussion and decision**

1. Introduction

This document is to report the result of the following email discussion in RAN2#114-e Meeting:

* [AT114-e][002][NR15] User Plane (NEC)

Scope: Treat R2-2105747, R2-2105748, R2-2106455, R2-2106456, R2-2105849, R2-2105850, R2-2106286, R2-2105746, R2-2105555, R2-2105556, R2-2105315, R2-2105316, R2-2106302, R2-2106319, R2-2105469, R2-2105470, R2-2105743, R2-2105761,

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

Intended outcome: Report and Agreed CRs.

Deadline: Schedule A

2. Contact Information

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| --- | --- |
| Company | Contact: Name (E-mail) |
| NEC (Rapporteur) | Wangda (wangda@labs.nec.cn) |
| Qualcomm | Linhai He (linhaihe@qti.qualcomm.com) |
| MediaTek | Guanyu Lin (guanyu.lin@mediatek.com) |
| ZTE | Fei Dong(dong.fei@zte.com.cn) |
| LG Electronics | SeungJune Yi (seungjune.yi@lge.com) |
| Nokia | Benoist Sébire (benoist.sebire@nokia.com) |
| vivo | Yitao Mo (yitao.mo@vivo.com) |
| OPPO | shicong@oppo.com |
| Lenovo | Joachim Löhr ([jlohr@lenovo.com](mailto:jlohr@lenovo.com)) |
| Ericsson | Mats Folke (mats.folke@ericsson.com) |

3. Phase 1 discussion

## 3.1 MAC behavior for suspended radio bearers

[1] [R2-2105747](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_114-e/Docs/R2-2105747.zip) Correction on MAC behavior for suspended radio bearers for Rel-15 Huawei, HiSilicon CR Rel-15 38.321 15.12.0 1107 - F NR\_newRAT-Core

[2] [R2-2105748](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_114-e/Docs/R2-2105748.zip) Correction on MAC behavior for suspended radio bearers for Rel-16 Huawei, HiSilicon CR Rel-16 38.321 16.4.0 1108 - F NR\_newRAT-Core

**Reason of change:** In LTE MAC spec, it says “The MAC entity shall not transmit data for a logical channel corresponding to a radio bearer that is suspended (the conditions for when a radio bearer is considered suspended are defined in TS 36.331 [8]).”. However, there is no such description in NR MAC spec, which makes the UE behavior for suspended radio bearers not clear.

Q1: Do you agree to add in NR MAC spec that MAC shall not transmit data for a logical channel corresponding to a radio bearer that is suspended?

|  |  |  |
| --- | --- | --- |
| Company | Yes/No | comments |
| Qualcomm | Yes | We are fine with the CRs. |
| MediaTek | Yes | We are fine to clarify UE behaviour as in LTE MAC spec. |
| ZTE | Yes | it’s ok to us to capture the clarification. |
| xiaomi | Yes | agree with MTK |
| LG | Comment | We are ok to clarify UE behaviour for suspended RBs. However, the text in LTE is incomplete and ambiguous.  Our assumption is that if an RB is suspended, all the SDAP/PDCP/RLC entities of the suspended RBs are suspended, i.e.  - not receive SDUs from upper layer  - not deliver SDUs to upper layer  - not receive PDUs from lower layer  - not submit PDUs to lower layer  Thus, if clarification is needed, we think it would be better to clarify for all the L2 entities. |
| Nokia | FFS | Agree with LGE. Also does that originate from field experience showing UEs transmitting data for suspended DRBs and if so in what context? |
| vivo | Yes | We are fine with the addition in the CRs. |
| OPPO | Yes |  |
| Lenovo | Yes |  |
| NEC | Comments | We have similar concern as LG. We are OK to clarify but it should be for all L2 entities. |
| Ericsson | No | We have not seen any problems in the field and wonder if this is a real problem or not. In general we have some sympathy for the comment from LG and agree that the terminology for suspended bearers/entities is not 100% precise. On the other hand we are not sure it is really beneficial to spend time to clean this up unless problems are seen in the field. |
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[3] [R2-2106455](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_114-e/Docs/R2-2106455.zip) Correction on BSR calculation for suspended radio bearers MediaTek CR Rel-15 38.321 15.12.0 1119 - F NR\_newRAT-Core

[4] [R2-2106456](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_114-e/Docs/R2-2106456.zip) Correction on BSR calculation for suspended radio bearers MediaTek CR Rel-16 38.321 16.4.0 1120 - A NR\_newRAT-Core

**Reason of change:** In LTE MAC spec, it is specified that “For the Buffer Status reporting procedure, the UE shall consider all radio bearers which are not suspended and may consider radio bearers which are suspended. “ However, there is no such description in NR MAC spec, which makes the UE behavior for suspended radio bearers not clear.

Rapporteur think it is common understanding that the UE shall consider all radio bearers which are not suspended for BSR, so the question is if the NR MAC entity may consider radio bearers which are suspended.

Q2: Do you agree that NR MAC may consider radio bearers which are suspended for BSR?

|  |  |  |
| --- | --- | --- |
| Company | Yes/No | comments |
| Qualcomm | Yes | We are fine with the CRs. |
| MediaTek | Yes | We are fine to clarify UE behaviour as in LTE MAC spec. |
| ZTE | Yes | We are fine with the CRs |
| Xiaomi | Yes | We are fine with the CR |
| LG | No | In NR, the MAC “shall” consider data volume in PDCP and RLC for BS calculation regardless of whether the RB is suspended or not. Otherwise, the unacknowledged PDCP SDUs will not be reflected in BSR during handover.  We think this is clear from the current specification, and CR is not needed. |
| Nokia | No | Agree with LGE. Introducing a “may” introduces uncertainty.  In general, and as exemplified by the discussion in 3.4, we ought to be careful between mixing DRBs suspended at handover/RLF and DRBs belonging to a suspended DRB entity when going to INACTIVE. |
| vivo | Yes | We agree that the legacy MAC principle of LTE can be reused for NR. |
| OPO | Yes |  |
| Lenovo | No | Agree with LG and Nokia. |
| NEC | comments | Currently MAC spec just refer to RLC and PDCP specs, which clarifies that the UE shall consider data volume as described without considering whether DRB is suspended or not.  If the proposed change is introduced, we should discuss and confirm the potential impact on the current behaviours |
| Ericsson | No | Agree with LG and Nokia. Furthermore, we have not seen any problems in the field related to this. |
|  |  |  |

## 3.2 Term of handover in handling of MAC CE

[5] [R2-2105849](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_114-e/Docs/R2-2105849.zip) Correction to 38.321 on the term of the handover in handling of MAC CE ZTE, Sanechips CR Rel-15 38.321 15.12.0 1110 - F NR\_newRAT-Core

[6] [R2-2105850](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_114-e/Docs/R2-2105850.zip) Correction to 38.321 on the term of the handover in handling of MAC CE ZTE, Sanechips CR Rel-16 38.321 16.4.0 1111 - F NR\_newRAT-Core

**Reason of changes:** Regrading the handover is only referring to the PCell change, UE behavior for handling the MAC CE will be restricted to only PCell change case, it will result in some unexpected UE behavior as shown below:

* 1: TCI states or some kind resources sets or semi-presistent CSI reporting configuration on SCG will not be deactivated when UE performing the PSCell change/addition.
* 2: TCI states or some kind resources sets or semi-presistent CSI reporting configuration on SCG should be deactivated when UE performing the PCell change.

Q3: Do you agree to change the term “handover” into ‘reconfiguration with sync’ in subclause Handling of MAC CEs as proposed in [5][6]?

|  |  |  |
| --- | --- | --- |
| Company | Yes/No | comments |
| Qualcomm | Yes | We agree with the reasons for change. In addition, we'd like to suggest companies to discuss whether to change "handover" in the RACH section to "RRC reconfig with sync" as well.  We understand that this issue was discussed in the past. But we think it is worth revisiting, because otherwise there can be issues during PSCell change/addition. |
| MediaTek | Open to discuss | Since we have new scenarios to consider (PSCell change/addition), we are fine to revisit the issue. |
| ZTE(Proponent) | Yes | Just confirm the concern from Qualcomm, the term ‘handover’ in the RACH section is only used for priotization parameter selection in Rel-15, and used for both msgA-Transmax for 2-step CFRA selection and priotization parameter selection in Rel-16. As shown below:  -------------- From 38.321 g40 -------------------------  <omit for short>  2> if the Random Access procedure was initiated for handover; and  2> if *rach-ConfigDedicated* is configured for the selected carrier:  3> if *msgA-TransMax* is configured in the *rach-ConfigDedicated*:  4> apply *msgA-TransMax* configured in the *rach-ConfigDedicated*.  2> else if *msgA-TransMax* is included in the *RACH-ConfigCommonTwoStepRA*:  3> apply *msgA-TransMax* included in the *RACH-ConfigCommonTwoStepRA*.  <omit for short>  2> else if the Random Access procedure was initiated for handover; and  2> if *rach-ConfigDedicated* is configured for the selected carrier; and  2> if *ra-PrioritizationTwoStep* is configured in the *rach-ConfigDedicated*:  3> set *PREAMBLE\_POWER\_RAMPING\_STEP* to the *powerRampingStepHighPriority* included in the *ra-PrioritizationTwoStep* in *rach-ConfigDedicated*;  3> if *scalingFactorBI* is configured in *ra-PrioritizationTwoStep* in the *rach-ConfigDedicated*:  4> set *SCALING\_FACTOR\_BI* to the *scalingFactorBI*.  -------------- From 38.321 g40 -------------------------  And we have achieved the agreements for both cases:  For prioritization parameter:  RAN2#101bis:  =>We need a specific powerRampingStep parameter for prioritized RACH at **HO**.  => The scaling factor used for prioritized Random Access procedure for HO is configured in the **HO** command, and is used for common RACH resource (CBRA).  For 2-step CFRA  In RAN plenary#85:  3.Contention-free 2 step RACH is only supported for the **handover** case.  it can be seen that the prioritized parameter selection and msgA-Transmax are used for only handover case (i.e not PSCell change/addition), therefore, there is no need for us to correct the term of handover in RACH subclause.  //  For the term of the handover applied in MAC CE operation subclause, it is not correct to restrict UE behavior only on PCell change case (i.e handover), so that’s why we suggest to correct it. |
| Xiaomi | Yes | we are ok with the change |
| LG | Yes |  |
| Nokia | Yes | The cover sheet should however say that it only impacts DC type of operation. A reference to RRC could also be useful. |
| vivo | Yes | Although this topic had been treated in RAN2#107bis with no achieved agreement, we are still supportive of this clarification since the change is truly intended meaning.  R2-1913311 Correction on handover terminology Ericsson CR Rel-15 38.321 15.7.0 0669 - F NR\_newRAT-Core  - Samsung think we don’t need to change and think the current text is deliberate. LG think we don’t need this change.  - Ericsson would like to align,  - Huawei think the change involves UE behaviour change   * Not Pursued |
| OPPO | Yes | We are ok on the change |
| Lenovo | Yes |  |
| NEC | Yes |  |
| Ericsson | No | We are not sure it is as simple to make the replacement as the proponent claims. These MAC CEs and their general function were in principle developed in RAN1. Thus we should ask them what is meant with "handover" and whether it applies to all cases of "reconfiguration with sync" or not.  Should the outcome be to agree to the CR we have the following comments on the cover sheet  - Update the title, it should not include the name of the specification.  - Improve the inter-op analysis, obviously the NW and the UE will have different information and make different assumptions, but what are the consequences of this?  - Clauses affected shall reflect the clauses affected.  And on the content  - Only include clauses where changes are made |
|  |  |  |

## 3.3 PDCCH monitoring for deactivated SCell

[7] [R2-2106286](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_114-e/Docs/R2-2106286.zip) Clarification on not monitoring PDCCH for SCell when the SCell is deactivated ZTE Corporation, Sanechips discussion Rel-15 NR\_newRAT-Core

In [7], clarification about PDCCH monitoring for deactivate SCell has been discussed, and point out there are two different understanding as below:

* Understanding 1: the UE expects that all detected PDCCHs sent by other active cells do not contain information for the deactivated cell.
* Understanding 2: the UE ignores information for the deactivated SCell if the detected PDCCHs sent by other active cells contain information for it, such as ap-CSI-RS or SFI.

[7] thinks understanding 2 is a correct understanding, and based on understanding 2, RAN2 needs to confirm the following proposals:

**Proposal 1：RAN2 confirm the PDCCH will be monitored if the monitor of such PDCCH is required by any serving cell.**

**Proposal 2: From RAN2 perspective, the information carried in DCI for an deactivated serving cell should be ignored by UE.**

Q4: Do you agree with the understanding 2 and the two proposals above?

|  |  |  |
| --- | --- | --- |
| Company | Yes/No | comments |
| Qualcomm | See comment | We are not sure what exactly Proposal 1 specifies, as it is not worded clearly to us. We are fine with Proposal 2. We don’t think any change to the current RAN2 specs are needed.  Our understanding of UE behavior for an deactivated SCell is that since scheduled and scheduling cells share the same search space, UE still monitors the search space on the scheduling cell but it does not expect any PDCCH message for the deactivated SCell (the scheduled one). Otherwise, that should be a network error and UE should ignore it. |
| MediaTek | See comment | We share same view with Qualcomm. We think understanding 2 and P2 are correct. Besides, we do not see RAN2 spec change needed. |
| ZTE(Proponents) | Yes | Regarding the comments from Qualcomm, The intention of the proposal 1 is to confirm even though the DCI may include the information from inactive serving cell, UE is supposed to monitor the DCI which is sent on the PDCCH from other activated serving cell  We also think the understanding 2 is the correct understanding. |
| Xiaomi | Yes | we share the same view as QC that no DCI for the deactivated SCell is expected. If it occurs, UE will ignore. |
| LG | Yes | We also think the understanding 2 is correct, and ok with proposal 1 and 2. |
| Nokia | - | Should be discussed in RAN1 |
| vivo | Yes with comments | Wo agree with understanding 2.  For P1, we agree with the intention. But we don’t think RAN2 needs to confirm it. Generally, we think the NW should not transmit any schedule info regarding the deactivated Scell. In this sense, the wording “such PDCCH is required” is a bit strange in our understanding. At the very least, no restrictions on PDCCH monitoring (on other activated cells) are set in the current specs. Thus, the UE behavior is quite clear even without confirming P1.  For P2, we are okay with it. And no spec change is required since it might be a common understanding and is quite straightforward. If necessary, we are okay to capture it in the Chairman's notes. |
| OPPO |  | We also think if the scell is deactivared, ue should not expect any PDCCH for this SCell. |
| Lenovo |  | Proposal 2 is the correct understanding. Proposal 1 is not clear to us. Not sure whether we need a CR though. |
| NEC | See comment | We are OK with the understanding 2 and P2. But for P1, we think it is not necessary, as UE needs to monitor the DCI which is sent on the PDCCH from other activated serving cell which may include the information for the deactivated cell, but the intention is actually for PDCCH monitoring for other cells within the same group of the deactivated Scell.  Additionally, we think no RAN2 spec change is needed for understanding 2 and P2. |
| Ericsson | - | We understand RAN1 is discussing this. No need to do the same work in RAN2. If RAN1 has any questions for RAN2 they can send an LS. |
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## 3.4 Suspended AM DRB in PDCP re-establishment

[8] [R2-2105746](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_114-e/Docs/R2-2105746.zip) Clarification on PDCP suspend and suspended DRB Huawei, HiSilicon discussion Rel-15 NR\_newRAT-Core

[9] [R2-2105315](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_114-e/Docs/R2-2105315.zip) Correction on suspended AM DRB in PDCP re-establishment NEC, LG Electronics CR Rel-15 38.323 15.7.0 0073 - F NR\_newRAT-Core

[10] [R2-2105316](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_114-e/Docs/R2-2105316.zip) Correction on suspended AM DRB in PDCP re-establishment NEC, LG Electronics CR Rel-16 38.323 16.3.0 0074 - A NR\_newRAT-Core

[11] [R2-2105555](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_114-e/Docs/R2-2105555.zip) RRC connection re-establishment Nokia, Ericsson, Nokia Shanghai Bell, Sequans Communications CR Rel-15 38.323 15.7.0 0075 - F NR\_newRAT-Core

[12] [R2-2105556](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_114-e/Docs/R2-2105556.zip) RRC connection re-establishment Nokia, Ericsson, Nokia Shanghai Bell, Sequans Communications CR Rel-16 38.323 16.3.0 0076 - A NR\_newRAT-Core

[13] [R2-2106302](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_114-e/Docs/R2-2106302.zip) Clarification on suspended AM DRB Samsung Electronics Polska CR Rel-15 38.323 15.7.0 0077 - F NR\_newRAT-Core

[14] [R2-2106319](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_114-e/Docs/R2-2106319.zip) Clarification on suspended AM DRB Samsung Electronics Polska CR Rel-16 38.323 16.3.0 0079 - A NR\_newRAT-Core

At RAN2 #113bis, there was some discussion on the use of “suspended DRB” in PDCP re-establishment to refer to “PDCP suspend”, which may mislead the readers wrongly go to the procedure for RRC Resume in case of first reconfiguration after RRC re-establishment. No conclusion was made and the CRs R2-2103302/R2-2103303 are postponed.

In this meeting, companies’ view can be divided into two groups:

* 1. Correction on the “suspended AM DRB” in PDCP spec is needed to avoid the confusion [9][10][11][12][13][14].
* 2. Capture in the chairman notes that “for suspended AM DRBs” in PDCP spec is referring to the case when PDCP suspend was performed before” [8].

Q5. Do you agree that correction is needed for “suspended AM DRBs” in NR PDCP spec?

|  |  |  |
| --- | --- | --- |
| Company | Yes/No | comments |
| Qualcomm | Yes |  |
| MediaTek | Yes |  |
| ZTE | Yes |  |
| Xiaomi | Maybe not | We notice that PDCP re-establishment is performed per PDCP entity, i.e. a DRB entity or a SRB entity. During RRC re-establishment, it clearly states that SRB1 PDCP entity is established. Then, when PDCP performs SRB1 reestablishment, UE will ignore the procedure for other RBs(e.g. SRB0/2, DRBs) in the PDCP reestablishement procedure. It means that UE will ignore the sentence “for suspended AM DRBs...” since it is for DRB, not for SRB1. Thus, there is no ambiguity. |
| LG | Yes |  |
| Nokia | Yes |  |
| vivo | No strong view | We can follow the majority view. |
| OPPO | Yes |  |
| Lenovo | Yes |  |
| NEC | Yes |  |
| Ericsson | Yes |  |

If correction in PDCP spec is needed, the following three options are proposed based on companies’ input:

* Option 1: Avoid using “suspended AM DRBs”, and instead use below to describe the case of “PDCP suspend”[9][10]
* for AM DRBs whose PDCP entities were suspended,
* for AM DRBs whose PDCP entities were not suspended,
* Option 2: Avoid using “suspended AM DRBs”, and instead use below to describe the case of “PDCP suspend” [11][12]
* for AM DRBs belonging to a PDCP entity which is suspended (see clause 5.1.4)…
* for AM DRBs belonging to a PDCP entity which is not suspended (see clause 5.1.4)…
* Option 3: To add a reference without modifying existing text [13][14]:
* for suspended AM DRBs according to clause 5.1.4…
* for AM DRBs which were not suspended according to clause 5.1.4….

Option 1 and option 2 are actually very similar. The main difference is either “were/was” or “are/is” is used. The rapporteur understand Option 1 considers PDCP suspend as a procedure which was performed before PDCP re-establishment, while Option 2 considers PDCP suspended/not suspended can be seen as a PDCP status when PDCP re-establishment is performed.

For Option 3, the rapporteur think if we are OK to correct the spec, it is better to avoid keeping the confusing wording “suspended DRB”.

Q6. If the answer to Q5 is “**Yes”**, which option do you support?

|  |  |  |
| --- | --- | --- |
| Company | Option 1/2/3? | comments |
| Qualcomm | Option 1 |  |
| MediaTek | Option 1 |  |
| ZTE | Option 1 |  |
| LG | Option 1 |  |
| Nokia | Option 2 | Regardless of the option taken, we strongly prefer the cover sheet from R2-2105555 & R2-2105556 to explain clearly what the issue is. |
| vivo | Option 1 | If a correction is needed, we prefer Option 1. |
| OPPO | Option 1 |  |
| Lenovo | Option 1 |  |
| NEC | Option 1 | About the cover page, once the changes to be done are confirmed, the descriptions of cover sheet can be discussed in phase 2. |
| Ericsson | Option 2 | Agree with comment from Nokia |
|  |  |  |

## 3.5 PDU session ID change

[15] [R2-2105469](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_114-e/Docs/R2-2105469.zip) Clarification on the change of PDU session ID Samsung CR Rel-15 38.331 15.13.0 2628 - F NR\_newRAT-Core R2-2103279

[16] [R2-2105470](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_114-e/Docs/R2-2105470.zip) Clarification on the change of PDU session ID Samsung CR Rel-16 38.331 16.4.1 2629 - A NR\_newRAT-Core

[17] [R2-2105743](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_114-e/Docs/R2-2105743.zip) On change of PDU session ID for an established DRB Huawei, HiSilicon discussion Rel-15 NR\_newRAT-Core

[18] [R2-2105761](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_114-e/Docs/R2-2105761.zip) Change of PDU Session ID Ericsson discussion Rel-15 NR\_newRAT-Core

This is one postponed issue at RAN2 #113bis-e.

At this meeting, all contributions [15] [16] [17] [18] think the PDU session ID cannot be changed after a DRB is established. [15] [16] think clarification in 38.331 is needed, while [17] [18] think there is no need to capture this in specification.

Q7. Do you agree that PDU session ID is not changed after a DRB is established?

|  |  |  |
| --- | --- | --- |
| Company | Yes/No | comments |
| Qualcomm | Yes |  |
| MediaTek | Yes |  |
| ZTE | Yes |  |
| Xiaomi | Yes |  |
| LG | Yes |  |
| Nokia | Yes |  |
| vivo | Yes |  |
| OPPO | Yes |  |
| Lenovo | Yes |  |
| NEC | Yes |  |
| Ericsson | Yes |  |
|  |  |  |

Q8. If the answer to Q7 is “**Yes”**, do you think there is a need to capture it in the NR RRC spec?

|  |  |  |
| --- | --- | --- |
| Company | Yes/No | comments |
| Qualcomm | neutral |  |
| MediaTek | Yes | We are fine to specify the restriction in the field description of pdu-Session to close the issue. |
| ZTE | No | There is no need to restrict the NW behavior in the specification, it can be confirmed on chairman notes. |
| Xiaomi | No | No need to capture it in the spec |
| LG | No | There may be other parameters that shall not be changed during the lifetime of the RB. Specifying restriction for a specific parameter will bring bunch of CRs in a future, which should be avoided. We think confirming in the chairman’s note is sufficient. |
| Nokia | No |  |
| vivo | No | The NW can guarantee this implementation since there is no valid use case for the PDU session ID change. |
| OPPO | Yes | We are open to capture for clarifaiction. |
| Lenovo | No |  |
| NEC | No | We are OK if majority companies think capturing in chairman note is sufficient |
| Ericsson | No |  |
|  |  |  |

4. Phase 2 discussion

TBD (based on phase 1 outcome)

1. Conclusion

TBD