**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

|  |  |
| --- | --- |
| 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) |
| Huawei, HiSilicon | Chong Lou ([louchong@huawei.com](mailto:louchong@huawei.com)) |
| Samsung | Donggun Kim (s\_dg.kim@samsung.com) |
| Intel | Yujian Zhang (yujian.zhang@intel.com) |
| Apple | Pavan Nuggehalli (pnuggehalli@apple.com) |
| Sequans | Olivier Marco (omarco at sequans.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. |
| Huawei, HiSilicon | Yes | Regarding the concerns from LG, we are not sure if LTE text is “incomplete”. Our understanding is that the crucial issue for suspended RB is MAC entity should be “frozen”. For PDCP and RLC, when suspended RBs are resumed, PDCP and RLC will perform re-establishment, so there is no impact foreseen regarding whether PDCP and RLC should be “frozen” or not as long as MAC is “frozen”.  For MAC behavior, we think the “LTE text” is clear and sufficient for NR. We are open to discuss PDCP and RLC behaviors in Phase 2 discussion or next meeting if there is a interest.  Our intention is not to change any sensible UE implementation but to align with LTE text on “suspended RBs” for clarity. Otherwise, MAC behavior of “suspended RBs” is unclear from spec view, and it is also in line with the spirit of discussing the “suspended RBs” for PDCP spec. |
| Samsung | No | No strong view since it is obvious to not send data to the "suspended" bearer. We tend to agree with LG but it seems not essential because we have not seen any problem from this as Nokia and Ericsson mentioned. |
| Intel | Yes |  |
| Apple | Yes | We agree with others that data belonging to suspended bearers should not be transmitted. |
| Sequans | Yes | We are fine with the CR as it aligns with LTE.  Otherwise DRB suspension is actually completely undefined. |
| CATT | Yes |  |

**Observation:**

12 companies agree with the change. 2 companies think it is obvious and no need to capture unless there is any problems. 3 companies think if we clarify this, we may also need to clarify behavior of other L2 entities for suspended radio bearers. Proponent clarifies that there is no impact to PDCP and RLC as long as MAC is “frozen”, but open to discuss it.

Rapporteur think we can agree the change since majority companies are OK to capture it, although it may be obvious to few companies. And RAN2 can FFS if any clarification is needed for other L2 entities.

**Proposal 1: Changes proposed in R2-2105747 and R2-2105748 are agreed.**

[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. |
| Huawei, HiSilicon | Yes | Regarding the concerns from LG, we are not sure if LTE text is “incomplete”. Our understanding is that the crucial issue for suspended RB is MAC entity should be “frozen”, i.e. stop “transmitting” data from suspended RBs. For PDCP and RLC, when suspended RBs are resumed, PDCP and RLC will perform re-establishment, so there is no impact foreseen regarding whether PDCP and RLC should be “forzen” or not.  For MAC behavior, we think the “LTE text” is clear and sufficient for NR. We are open to discuss PDCP and RLC behaviors in Phase 2 discussion or next meeting if there is a interest. |
| Samsung | Yes | We agree that the behaviour is unclear, and can go with the CRs as they are. |
| Intel | Yes |  |
| Apple | No | We think it does not make much real difference, and it is not essential to specify such a change for Rel-15/16. |
| Sequans | Yes | It seems inefficient to signal data volume of suspended DRBs in the BSR. |
| CATT | No |  |

**Observation:**

10 companies agree with the CRs. 7 companies who don’t agree with or have some concern on CRs think the current behavior is that both suspend DRBs and non-suspended DRBs “shall” be counted into BSR calculation.

So rapporteur want companies to clarify in phase 2 what the current MAC behaviour is. If the current behavior is that UE always consider suspended radio bearers into BSR calculation, introducing a “may” is not aligned with the current behavior.

## 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 |
| Huawei, HiSilicon | See comments | This issue was discussed for several times. For RACH part, we agree with ZTE. For MAC CE part, as it involves quite a few WIs and also RAN1, not sure if we need to do some check one by one. |
| Samsung | Yes | We also agree with the reasons for change, and are fine with the proposed changes.  Regarding comments from Qualcomm, the term in RACH section is indeed only for the handover case (i.e. PCell change) according to the agreements in the past, so no need to update it. |
| Intel | Yes |  |
| Apple | Yes |  |
| Sequans | Yes |  |
| CATT | Yes |  |

**Observation**

14 companies agree with the changes. 1 company is open to discuss. 2 companies think the changes are RAN1 related, and need RAN1 to confirm. Some comments on the cover page are also provided.

Rapporteur see the clear majority, but also sees the concern on RAN1 related aspects. So rapporteur think the changes proposed in R2-2105849 and R2-2105850 can be agreed, and companies can check the RAN1 aspects with their RAN1 colleagues during phase 2.

**Proposal 2: Changes proposed in R2-2105849 and R2-2105850 are agreed and CRs are to be updated by taking into account the comments received.**

## 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. |
| Huawei, HiSilicon | See comment | For cross-carrier ap-CSI-RS report, it is transparent to RAN2. If RAN1 thinks it is not clear, then it should be triggered and discussed in RAN1, not RAN2. |
| Samsung | - | We have similar view to Qualcomm that no RAN2 specification changes would be needed. We also share the view that UE does not expect any PDCCH message for the deactivated SCell. |
| Intel | See comment | For proposal 1, our understanding is that UE just follows the RRC configuration regarding PDCH monitoring, and it is not clear to us whether Proposal 1 needs any specification change.  For proposal 2, our understanding is that it is mainly a RAN1 issue. |
| Apple | See comment | It is not clear why the network would send information about deactivated SCells in the first place, and what is the benefit, if any, accrued from “Understanding 2” |
| CATT |  | Agree above analysis, there is no need to clarify anything in RAN2 spec. |
|  |  |  |

**Observation**

Companies’ view are diverse.

Some companies agree with understanding 2 and the proposals. Some companies think proposal 1 is not clear, but ok with understanding 2 and P2. Some company think understanding 1 is correct. Some companies think this is RAN1 issue, should be discussed by RAN1.

As there is no consensus, and no RAN2 specification change is seen, rapporteur think no conclusion can be made for this topic.

**Proposal 3: There is no conclusion to R2-2106286.**

## 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 |  |
| Huawei, HiSilicon | Neutral | It was discussed for several times, so it should be clear to all what is the correct interpretation of this term in PDCP spec, we are okay to capture it into Chairman notes. But we don't have strong view and can follow majority view. |
| Samsung | Yes, but | We are also fine with 2. |
| Intel | Yes |  |
| Apple | Yes | We think that the spec. should be corrected and have a small preference for the wording in the NEC/LGE CRs (5315, 5316) |
| Sequans | Yes |  |
| CATT | Yes |  |

**Observation:**

14 companies agree. 1 company thinks maybe not. 2 companies are neutral.

Clear majority companies agree that correction is needed for “suspended AM DRBs” in NR PDCP spec.

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 |
| Huawei, HiSilicon | Option 1 |  |
| Samsung | Option 3 | We are fine to go for the majority view. |
| Intel | Option 1 | It is better to correct the terminology from “suspended DRB” to “suspended PDCP entity”. |
| Apple | Option 1 or 2 | Slightly prefer 1 |
| Sequans | Option 2 | Agree with Nokia |
| CATT | Option 1 or 2 | The options are both clear. |

**Observation:**

11 Companies prefer Option 1.

3 companies prefer Option 2.

1 company prefers Option 3, but can also go for the majority view.

1 company is OK for both Option 1 or Option 2

Rapporteur think we agree Option 1 as there is clear majority.

**Proposal 4: Correct “suspended AM DRBs” in NR PDCP spec as Option 1 which is proposed in R2-2105315 and R2-2105316.**

## 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 |  |
| Huawei, HiSilicon | Yes |  |
| Samsung | Yes |  |
| Intel | Yes |  |
| Apple | Yes |  |
| Sequans | Yes |  |
| CATT | Yes |  |

**Observation:**

All companies agree that PDU session ID is not changed after a DRB is established.

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 | Yes | We are also fine to specify the restriction in the field description of pdu-Session to close the issue. |
| 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 |  |
| Huawei, HiSilicon | No |  |
| Samsung | Yes | If the majority do not prefer this CR, then it would be good to capture the common understanding in the chairman note at least. |
| Intel | Yes | We prefer to capture it explicitly to avoid ambiguity. |
| Apple | Yes | It will be good to efinitively rule out unexpected behavior |
| Sequans | Yes |  |
| CATT | No |  |

**Observation:**

7 companies want to capture it explicitly. 9 companies think there is no need to capture in the spec, and confirming in chairman note is sufficient. 1 company is neutral.

No consensus on the need of spec change. As this is already the second meeting on this issue, the rapporteur suggest we capture it in the chairman note.

**Proposal 5: RAN2 confirm that PDU session ID is not changed after a DRB is established. No change to the specification.**

4. Phase 2 discussion

Based on companies’ input in phase 1, the following proposals are suggested by the rapporteur:

**Proposal 1: Changes proposed in R2-2105747 and R2-2105748 are agreed.**

**Proposal 2: Changes proposed in R2-2105849 and R2-2105850 are agreed and CRs are to be updated by taking into account the comments received.**

**Proposal 3: There is no conclusion to R2-2106286.**

**Proposal 4: Correct “suspended AM DRBs” in NR PDCP spec as Option 1 which is proposed in R2-2105315 and R2-2105316.**

**Proposal 5: RAN2 confirm that PDU session ID is not changed after a DRB is established. No change to the specification.**

Q9. If you have any comments on the above proposals, please provide them below:

|  |  |  |
| --- | --- | --- |
| Company | proposal | comments |
| Ericsson | P3 | Strictly speaking P3 should be rephrased to say that R2-2106286 is noted. |
| Ericsson | P1 | We think any decision on this issue should be made together with the question on BSR calculation below. Agreeing to one without the other is not beneficial and creates ambiguity. |
| ZTE | P3 | According to the comments from question, there are 16 companies join in the discussion:  9 companies think proposal 2 (i.e understanding 2) is the correct understanding.  4 companies think this is a RAN1 issue which shall be discussed in RAN1.  2 companies think understanding 1 is correct, it says that NW shall avoid including the deactivated SCell’s information into the DCI which is sent on the activated serving cell.  1 company only states that no specification change is needed, but not express their opinion on the understanding.  It can be seen that the majorities view from which the understanding 2 is correct, but some companies still concern that this is RAN1’s work not RAN2. However, this issue have been raised in RAN1 for almost three meetings, and no conclusion was achieved. According to RAN1 discussion, some companies think this shall be discussed in RAN2 not RAN1 since RAN2 specification have clearly specified the UE behavior on DCI monitoring. That’s why we have this contribution in RAN2 to confirm our understanding.  In addition, as far as I know, this issue is still pending in RAN1 for this meeting since there are limited participation in the email discussion of RAN1.So we suggest to put a FFS here for this issue in order to give each company time to make an alignment between RAN1 and RAN2. |
| LG | P1 | The proposed text makes more confusion in that the RLC entity of suspended RB may submit RLC PDUs to MAC entity, which is not correct. Thus, we don’t agree with the CR.  If companies want to clarify the behavior of the suspended RBs, following behavior needs to be specified in other L2 specifications.  - not receive SDUs from upper layer  - not deliver SDUs to upper layer  - not receive PDUs from lower layer  - not submit PDUs to lower layer  Then, there is no need to change the MAC specification. |
| LG | P3 | We agree with Ericsson that the status of R2-2106286 is “noted”. |
| vivo | P5 | A minor editorial comment that “confirm” should have been “confirms”. |

**P1:** 2 Companies comment. 1 company think decision on UL scheduling for suspended DRB should be made together with the question on BSR calculation. 1 company don’t agree with the CR, and think if we clarify behavior in other L2 entities, there is no need for the MAC CRs. As majority companies are fine with it, rapporteur suggest to keep P1, and we can have online discussion on this if there is still concern.

**P3:** 3 Companies comment. 2 company think P2 should be revised to R2-2106286 is noted, which is OK for the rapporteur; 1 company suggests to put a FFS for this issue. Rapporteur think since no other company share the same view, we can only agree that R2-2106286 is noted. If RAN1 need RAN2 to conclude anything further, LS can be sent to RAN2.

**P5:** 1 company think “confirm” should be “confirms”. RAN2 use both “confirm” and “confirms” in history, but it’s OK to change to “confirms”.

## 4.1 BSR calculation for suspended DRB

For the MAC behavior for BSR calculation, some companies think the current behavior is that both suspend DRBs and non-suspended DRBs “shall” be counted into BSR calculation, thus introducing a “may” will bring uncertainty. So rapporteur want to clarify what the current behavior is:

Q10. Do you think the current specification/behavior is that the UE “shall” consider suspended radio bearers into BSR calculation?

|  |  |  |
| --- | --- | --- |
| Company | Yes/No | comments |
| MediaTek | No | We think current UE behaviour is unclear because we may have two interreptations:   * Interrepation 1: No specificatoin on BSR calculation for suspended radio bearers means that there is no differentiated treatment between a unsuspended and a suspended radio bearer. So, it means UE “shall” consider suspended radio bearers into BSR calculation. * Interreptation 2: Since MAC shall not transmit traffic for a suspended radio bearer (as we agree in phase 1 discussion), it seems reasonable that UE **shall NOT** consider suspended radio bearers into BSR calculation. Otherwise, UE would report a BSR value more than the amount of data it can transmit.   Since both interreptations above make some sense, we think some clarification in the spec would be useful to remove the ambiguity. |
| Ericsson | Yes | The proposed CR states as reason for change that the current text is present in LTE MAC but not NR MAC. That is not a sufficient reason to change current NR functionality. The functionality of LTE MAC and NR MAC is different in several aspects.  There is nothing in the current NR specifications suggesting that suspended DRBs should be excluded from BSR functionality, hence we assume all DRBs regardless of being suspended or not are included. The proposed change is very much non-backwards compatible and we are not ready to agree to this change unless severe problems are shown. Having some UEs include data volume of suspended DRBs in BSR while others not is not beneficial for the scheduling efficiency.  In clause 6.1.3.1 it says  - Buffer Size: The Buffer Size field identifies the total amount of data available according to the data volume calculation procedure in TSs 38.322 [3] and 38.323 [4] across all logical channels of a logical channel group...  The data volume calculation in clause 5.5 in 38.322 does not distinguish between suspended and non-suspended DRBs.  The data volume calculation in clause 5.6 in 38.323 does not distinguish between suspended and non-suspended DRBs.  Lastly, MAC really does not operate on DRBs, MAC uses logical channels. Any functionality related to operation of suspended DRBs should not be specified in MAC. |
| ZTE | See comments  (It depends) | To our understanding, this issue is somewhat coupling with the first issue (i.e whether to capture ‘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]).’ in MAC spec.  If the correction from issue 1 is agreeable, it means that the MAC can be aware of the suspended RB and not compose and transmit any data from corresponding LCH. With this logic, it does make sense to capture how to calculate BSR when some RB being suspended as LTE specification. In addition, the correction does not break anything since ‘may’ is used in the sentence which means it is up to UE implementation to decide whether to take the suspended RB into account when calculating the BSR.  If the correction from issue 1 is not agreeable ,we think the understanding from Eric is correct. Nothing shall be captured in MAC for suspended RB |
| Huawei, HiSilicon | No | When performing RRC re-establishment, all the suspended DRBs will be resumed when receiving RRC reconfiguration, and then a new BSR will be triggered when initiating the RRC reconfiguration complete message. Therefore, we don't see a urgency and much benefit to indicate the “early” buffer status of suspended RBs at the stage of RRC re-establishment request.  According to the comments from Phase 1, we believe the ambiguity in NR MAC spec with respect to suspended RBs has already been there among companies and it is therefore necessary to clarify the MAC modelling of suspended RBs to some extend. Since we don't see any difference between LTE and NR, we would like to reuse the LTE principle and thus NBC risk can be avoided by leaving the BSR issue up to UE implementation. |
| LG | Yes | Note that there was similar disucssion in LTE Rel-8 (RAN2#64). The R2-086397 is the summary of the offline discussion, and the R2-086965 is the final agreed CR. The agreement at RAN2#64 is captured below.   |  | | --- | | Agreements:  Question 1:  - Will go for option 1, but with additional sentence in MAC: “MAC should not transmit data from RLC entities for suspended RB’s”  Question 2/3:  - We will leave it up to UE implementation whether to either include data available from suspended RB’s in a BSR report or not. |   Regarding BSR content, the reason for leaving it up to UE implementation is that it was difficult to converge; some companies think data volume of suspended RBs should be considered in BS calculation while others not. This was a compromise proposal.  However, in NR, the current specification does not say anything about suspended RBs in BS calculation and PDCP/RLC data volume calculation. Thus, it is obvious that PDCP/RLC data volume of all RBs shall be considered in BS calculation.  Even if MAC does not transmit the data of suspended RBs, the data volume should be informed to the network to indicate the amount of data stored in the buffer of suspended RBs, which is useful for the network to allocate UL grant after resumption, e.g. handover. |
| vivo | No | In our understanding, if a DRB is not resumed, then traffic data belonging to this DRB cannot be reached at the MAC layer or cannot be transmitted via the MAC layer. Then it seems there is no need for the MAC to be aware of the potential data volume. Anyway, we are okay with adding a clarification NOTE which is also used in LTE. |
| NEC | See comments | Regarding the current specifications, we have same understanding as Ericsson, i.e. MAC refers to RLC and PDCP, where no clear differentiation is specified for suspend..  As per information from LG, we can understand the LTE spec would need to solve divergent views among companies at that time. On the other hand, we are still wondering if the current NR spec have the said critical issue which needs to be fixed somehow. It might be good to confirm whether there is actual issue in the field? |
| Nokia | Yes | The point of the question is not to get one’s feeling about what could make sense or what should be considred as reasonable. The point is to look at the specification to determine what is specified. From that angle, there is no room for confusion : the BSR shall reflect what is buffered at PDCP regardless of whether the bearer is suspended or not. Changing that behaviour would be a non-backward compatible change.  Regarding the LTE history, we have the same understanding as LGE i.e. that the change was introduced by this CR:  <http://3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_64/Docs/R2-086965.zip>  Which was the result of this offline discussion:  <http://3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_64/Docs/R2-086397.zip> |
|  |  |  |

**Summary：**

3 companies think the current behavior is that the MAC “shall” consider suspended radio bearers for BSR, agreeing the CRs would mean NBC change. 3 companies don’t think so. 1 companies think it depends on if P1 is agreed. 1 company has some sympathy on the “shall”, but want to confirm if there is actual issue in the field.

Companies don’t have consistent understanding on current BSR calculation behavior for suspended radio bearers, so to progress more, rapporteur suggest to have online CB discussion on it.

## 4.2 Agreeable CRs

In this part, we would like to discuss if any text refining is needed for the agreeable CRs.

Q11. If P1 is agreeable, do you see any text in R2-2105747 [1] and R2-2105748 [2] need to be improved / corrected?

|  |  |  |
| --- | --- | --- |
| Company | Yes/No | comments |
| MeidaTek | No |  |
| ZTE | No |  |
| Huawei, HiSilicon | No |  |
| LG | Yes | As commented in Q9, the proposed text makes more confusion in that the RLC entity of suspended RB may submit RLC PDUs to MAC entity, which is not correct. |
| vivo | No |  |
| NEC | No |  |
|  |  |  |

**Summary：**

6 companies comments. 5 companies are fine with the current text of R2-2105747 and R2-2105748. 1 company think the correction is not correct.

As suggested in Q9, rapporteur propose to agree R2-2105747 and R2-2105748, and have online CB if needed.

During phase 1, one company provided comments on the cover sheet of R2-2105849 [5] and R2-2105850 [6]. Here, companies can provide further comments on the text of the CRs, and if any RAN1 related issues is seen.

Q12. If P2 is agreeable, do you see any text in R2-2105849 [5] and R2-2105850 [6] need to be improved / corrected, and do you see any RAN1 related issues of the CRs?

|  |  |  |
| --- | --- | --- |
| Company | Yes/No | comments |
| MediaTek | No |  |
| ZTE | No | We think the phase 1 comments from Eric on cover sheet does make sense to us, we will modify the cover sheet according to the suggestion from Eric. |
| Huawei, HiSilicon |  | As several companies commented in the Phase 1, this issue was discussed before. We may have concerns on the backward compatibility risk as it may impact existing functionalities. It would be safe to consult with RAN1 by checking if “handover” is the intention. |
| LG | No |  |
| vivo | No | These two CRs are agreeable to us. |
| NEC | Yes for the text | The comments from Ericsson on cover sheet during phase 1 make sense. |
| Nokia | Yes | The comments regarding the cover sheet need to be addressed. |

**Summary：**

3 companies agree with the comments on cover sheet form Ericsson during phase 1. 1 company thinks there is need to check RAN1 aspects later for safety. So rapporteur suggest that we can postpone R2-2105849 and R2-2105850 for companies to check RAN1 aspects after the meeting.

During phase 1 discussion, 3 companies strongly prefer the cover sheet from Option 2 CRs [11] [12] to explain clearly what the issue is. However, rapporteur think cover pages in Option1 CRs [9][10] reflect majority companies’ understanding better. As majority companies think the issue is one improper wording, not one serious mistake which will break lossless transmission.

For you convenience, the reason of change in [9][10] and [11][12] are copied below:

Reason of change in Option 1 CRs [9][10]:

|  |
| --- |
| As “suspended DRB” and “PDCP suspend” are different concepts, the term “suspended DRB” shouldn’t be use to refer to the case of “PDCP suspend” in PDCP spec. In PDCP re-establishment, due to the using of “for suspended AM DRBs”, the PDCP implementers may apply the behavior intended for RRC resume only for the case of RRC re-establishment as well, as according to TS38.331 all the DRBs are suspended when PDCP re-establishement configured.  To avoid this misleading, “AM DRBs whose PDCP entities were suspended” instead should be used in PDCP spec to discribe the case of PDCP suspend was performed before, and this is also to align with the wording used in RRC . |

Reason of change in Option 2 CRs [11][12]:

|  |
| --- |
| As a result of the agreed CR 025 [[link](http://3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_105/Docs/R2-1902780.zip)] the behaviour intended for RLF recovery is now bypassed.  Indeed RRC requires the DRBs to be suspended in case of RRC connection re-establishment (5.3.7.2 “suspend all RBs, except SRB0”), but the behaviour given for “suspended AM DRBs” in PDCP does not allow lossless RRC connection re-establishment. |

Companies who also have concerns and comments to the cover page of [9][10] can provide their comments below. Of course, your views on which one is better are welcome.

Q13. If P4 is agreeable, do you think any text needs to be improved/corrected for R2-2105315 [9] and R2-2105316 [10]?

|  |  |  |
| --- | --- | --- |
| Company | Yes/No | comments |
| MediaTek | No |  |
| ZTE | No |  |
| LG | No |  |
| vivo | No |  |
| NEC | No |  |
| Nokia | Yes | The cover sheet needs to be clearer to help implementers. Please use the one from R2-2105555 if possible, thank you. |

**Summary：**

5 companies are fine with R2-2105315 and R2-2105316. 1 company still want to use the cover sheet in R2-2105555.

Rapporteur suggest that we can try to merge the cover sheet of R2-2105315/R2-2105316 and R2-2105555.

Based on discussion above, the phase 2 proposals are suggested below. Please note I add one additional proposals on which CRs are not pursued (P7).

**Phase 2 proposals:**

**Proposal 1: R2-2105747 and R2-2105748 are agreed. (Require online CB)**

**Proposal 2: For R2-2106455 and R2-2106456, RAN2 needs further discussion on whether MAC “shall” or “may” consider suspended radio bearers for BSR. (Require online CB)**

**Proposal 3: R2-2105849 and R2-2105850 are postponed.**

**Proposal 4: R2-2106286 is noted.**

**Proposal 5: Changes in R2-2105315 and R2-2105316 are agreed, and try to merge the cover sheet from R2-2105555.**

**Proposal 6: RAN2 confirms that PDU session ID is not changed after a DRB is established. No change to the specification.**

**Proposal 7: R2-2105555, R2-2105556, R2-2106302, R2-2106319,** [**R2-2105469**](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_114-e/Docs/R2-2105469.zip) **and** [**R2-2105470**](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_114-e/Docs/R2-2105469.zip) **are not pursued.**

1. Final Conclusion

TBD