3GPP TSG-RAN WG2 Meeting #113 Electronic R2-21xxxxx

Online, 25 January – 05 February 2021

**Agenda item: 5.4.1.1**

**Source: Apple Inc**

**Title: DRAFT- Summary of [AT113-e][005][NR15] Connection Control II (Apple)**

**WID/SID: NR\_newRAT-Core**

**Document for: Discussion and Decision**

# 1 Introduction

This document is the report of the following email discussion:

* [AT113-e][005][NR15] Connection Control II (Apple)

Scope: Treat [R2-2100057](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113-e\Docs\R2-2100057.zip), [R2-2101462](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113-e\Docs\R2-2101462.zip), [R2-2101459](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113-e\Docs\R2-2101459.zip), [R2-2101166](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113-e\Docs\R2-2101166.zip), [R2-2100945](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113-e\Docs\R2-2100945.zip), [R2-2101019](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113-e\Docs\R2-2101019.zip), [R2-2101267](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113-e\Docs\R2-2101267.zip), [R2-2101268](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113-e\Docs\R2-2101268.zip), [R2-2100841](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113-e\Docs\R2-2100841.zip), [R2-2100756](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113-e\Docs\R2-2100756.zip), [R2-2100757](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113-e\Docs\R2-2100757.zip)

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

Intended outcome: Report and Agreed CRs.

Deadline: Schedule A

Deadline for providing comments and for rapporteur inputs:

* + - Initial deadline (for companies' feedback): 1st week Thu Jan 28, UTC 1200
    - Deadline for CR finalization: 2nd week Thu, UTC 1200

# 2 Contact Points

Respondents to the email discussion are kindly asked to fill in the following table.

|  |  |  |
| --- | --- | --- |
| Company | Name | Email Address |
| Apple (Rapporteur) | Naveen Palle | naveen\_palle@apple.com |
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| Nokia | Amaanat | amaanat.ali@nokia.com |
| Google | Frank Wu | frankwu@google.com |
| MediaTek | Felix Tsai | Chun-fan.tsai@mediatek.com |
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| OPPO | Jiangsheng Fan | fanjiangsheng@oppo.com |
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| Intel | Sudeep Palat | Sudeep.k.palat@intel.com |
| NEC | Hisashi Futaki | hisashi.futaki@ nec.com |
| vivo | Wenjuan Pu | wenjuan.pu@vivo.com |
| ZTE | Yu Liu | liu.yu3@zte.com.cn |
| Samsung | Soenghun Kim | Kimsh23@samsung.com |
| LG | SungHoon Jung | sunghoon.jung@lge.com |

# 3 BWP Switching related issues

For this discussion, we are going to use the below papers submitted for this meeting in order to address the RAN4 LS R2-2100057:

|  |
| --- |
| [R2-2100057](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113-e\Docs\R2-2100057.zip) LS on RRC based BWP switch for Scell (R4-2017040; contact: Apple) RAN4 LS in Rel-15 NR\_newRAT-Core To:RAN2  Moved from 5.1  [R2-2101462](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113-e\Docs\R2-2101462.zip) Discussion on RRC-based BWP switch Apple Inc discussion Rel-15 NR\_newRAT-Core  [R2-2101459](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113-e\Docs\R2-2101459.zip) [Draft] LS Reply on RRC based BWP switch Apple Inc LS out Rel-15 NR\_newRAT-Core To:RAN4  [R2-2101166](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113-e\Docs\R2-2101166.zip) Discussion on RRC based BWP switch for Pcell ZTE Corporation, Sanechips discussion  [R2-2100945](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113-e\Docs\R2-2100945.zip) Clarification on RRC based BWP switch for SCell Nokia, Nokia Shanghai Bell discussion Rel-15 NR\_newRAT-Core, LTE\_NR\_DC\_CA\_enh-Core  [R2-2101019](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113-e\Docs\R2-2101019.zip) RRC-based BWP switch for SpCell and SCells vivo discussion NR\_newRAT-Core |

3.1 Usage of *firstActiveDownlinkBWP-Id* and *firstActiveUplinkBWP-Id* for SpCell and SCell

The following is stated in the RAN4 LS where RAN2 is requested to confirm:

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| --- |
| *According to RAN4 understanding the firstActiveDownlinkBWP-Id or firstActiveUplinkBWP-Id defined in TS 38.331 can be changed only for SpCell and for SCell upon activation.* |

The text is a bit ambiguous for SCell in terms of how to interpret “upon activation” when viewed from a RRC reconfiguration message. It makes sense from Rel-16 perspective where the SCell can be activated with an RRC message. Based on the papers: [R2-2101166](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113-e\Docs\R2-2101166.zip), [R2-2101019](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113-e\Docs\R2-2101019.zip), [R2-2101462](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113-e\Docs\R2-2101462.zip) and [R2-2100945](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113-e\Docs\R2-2100945.zip) we can propose at least the below.

**Question 1**: *firstActiveDownlinkBWP-Id* and *firstActiveUplinkBWP-Id* can be changed for an SpCell in a reconfiguration message. And this results in a BWP switch. Do companies agree with this?

|  |  |  |
| --- | --- | --- |
| Answers to Question 1 | | |
| Company | Yes/No | Comments |
| Apple | Yes | This is the method of BWP switch for SpCell using RRC signalling. |
| Huawei, HiSilicon | Yes | To be precise, if the RRC configured *firstActiveDownlinkBWP-Id* and *firstActiveUplinkBWP-Id* are different from current active BWPs (dynamically switched by DCI), it would result in a BWP switch. |
| Nokia | Yes | Indeed, to be precise and be careful what BWP switching means:   * RRC-based BWP switching can **ONLY** be done for SpCells (as far as Rel-15 is concerned as it is only defined for SpCells) * RRC reconfiguration without modification of firstActiveDownlinkBWP-Id or firstActiveUplinkBWP-Id **NEVER** triggers BWP switching for SpCell |
| Google | Yes |  |
| MediaTek | Yes |  |
| Ericsson | Yes | Agree with Nokia’s comment |
| Qcom | Yes |  |
| OPPO | Yes |  |
| CATT | Yes | Agree with Huawei, and even though the firstActiveDownlinkBWP-Id/ firstActiveUplinkBWP-Id is not changed, if it is present, and if the current active BWP is different with the firstActiveDownlinkBWP-Id/ firstActiveUplinkBWP-Id,UE will perform BWP switch to make the active BWP to be the BWP indicated by efirstActiveDownlinkBWP-Id/ firstActiveUplinkBWP-Id |
| Intel | Yes | Support Nokia’s clarification. |
| NEC | Yes | Support Nokia’s clarification |
| vivo | Yes | It is obvious conclusion according to both RRC and MAC spec. |
| ZTE | Yes | For SpCell, it triggers a BWP switch when *firstActiveDownlinkBWP-Id* and/or *firstActiveUplinkBWP-Id* in *RRCReconfiguration* message is different from the UE’s current active BWP. |
| Samsung | Yes |  |
| LG | Yes | We share the understanding with other companies, and from the FD of firstActiveDownlinkBWP-Id, it is confirmed that BWP switch is triggered upon update of the field:  If configured for an SpCell, this field contains the ID of the DL BWP to be activated upon performing the RRC (re-)configuration. If the field is absent, the RRC (re-)configuration does not impose a BWP switch.  Also, we see no further restriction that prevents the field from being updated. The same applies to firstActiveUplinkBWP-Id |

There are differing views for SCell. We can start the discussion with the below:

**Question 2**: In Rel-15 *firstActiveDownlinkBWP-Id* and *firstActiveUplinkBWP-Id* can only be given/changed for an SCell in a reconfiguration message at the time of SCell addition. Do companies agree with this?

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| --- | --- | --- |
| Answers to Question 2 | | |
| Company | Yes/No | Comments |
| Apple | Yes |  |
| Huawei, HiSilicon | Yes | Note that according to R2-2100552, the condition to indicate these fields for SCell will be changed to “The field is mandatory present for an SCell upon addition, and absent for SCell in other cases, Need M.” |
| Nokia | Yes | Agree with Huawei. Also, in Rel-15 RRC-based BWP switching for SCell requires SCell deactivation and activation. |
| Google | Yes |  |
| MediaTek | Yes |  |
| Ericsson | Yes | Agree with Huawei and Nokia |
| Qcom | Yes | Not sure how configuring the FirstActiveBWP is relevant to RRC based BWP switch. |
| OPPO | Yes |  |
| CATT | Yes |  |
| Intel | Yes |  |
| NEC | Yes |  |
| vivo | yes |  |
| ZTE | Yes |  |
| Samsung | Yes |  |
| LG | Yes |  |

According to [R2-2100945](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113-e\Docs\R2-2100945.zip) the *firstActiveDownlinkBWP-Id* and *firstActiveUplinkBWP-Id* can be changed while the SCell is deactivated. But according to [R2-2101166](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113-e\Docs\R2-2101166.zip), [R2-2101019](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113-e\Docs\R2-2101019.zip), [R2-2101462](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113-e\Docs\R2-2101462.zip) this is not the case.

**Question 3**: In Rel-16 can ***firstActiveDownlinkBWP-Id* and *firstActiveUplinkBWP-Id*** be changed for an SCell in a reconfiguration message when the SCell is deactivated?

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| --- | --- | --- |
| Answers to Question 3 | | |
| Company | Yes/No | Comments |
| Apple | No | Per the need code of ***firstActiveDownlinkBWP-Id* and *firstActiveUplinkBWP-Id*** for SCell, this can only be given to the UE at the time of SCell addition. It can be given at the time of SCell modification. So it cannot be changed even in Rel-16 unless the SCell is being added. The UE does not consider this as a BWP switch if the SCell is released and added again (the UE considers this as a new SCell). |
| Huawei, HiSilicon | No | The condition to include the fields of firstActiveDownlinkBWP-Id and firstActiveUplinkBWP-Id is still “The field is mandatory present for an SCell upon addition, and absent for SCell in other cases, Need M.” |
| Nokia | Question is not precise | - RRC-based BWP switching for SCell is possible in Rel-16 but only for “deactivated state“ SCells (i.e. SCells need to be first deactivated, then modified and reactivated)  - Rel-16 allows switching the BWP via RRC using the direct SCell activation (which basically accomplishes the reconfiguration and reactivation) leading to the BWP switch |
| Google | No | The two fields can only be included for the SCell when the SCell is added. |
| MediaTek | No | The conditional code clearly saying that first active BWP could only be changed upon SCell addition. So, release and add of SCell is required to change the BWP ID.  In response to Nokia’s comment, we agree the direct SCell activation procedure in Rel-16. However, we won’t call it a RRC-based BWP switching procedure. It would be an activation procedure with corresponding RAN4 requirement. We understand that RAN4 is actually discuss whether the requirement for RRC-based SCell BWP switching is needed, so there is this LS. Direct SCell activation is different procedure and is not relevant to the concerned question. |
| Ericsson | No | Agree with Huawei |
| Qcom | No | Agree with MediaTek |
| OPPO | No | Agree Huawei and MediaTek |
| CATT | No |  |
| Intel | No with comment | Agree with Q3. Regarding SCell activation, we think that right upon SCell activation during reconfiguration sync, it results in BWP switching to first active BWP from the on-going active BWP. This may or may not be considered in RRC based BWP switching. As MediaTek said, if RAN4 defines a separate requirement, it would not be considered as RRC based BWP switching. In any case, there is no harm to provide further information. |
| NEC | No | For SCell, as Huawei commented, it is important to confirm the changes agreed in last meeting. |
| vivo | No | *- firstActiveXlinkBWP-Id* can only be configured at SCell addition, and cannot be changed later, regardless of the state of the SCell. |
| ZTE | No | Agree with Huawei, and disagree with ‘So, release and add of SCell is required to change the BWP ID’ mentioned by MediaTek. We think when the SCell is released and added again, any firstActiveDownlinkBWP-Id and firstActiveUplinkBWP-Id can be configured. |
| Samsung | No | We don’t think there is considerable use case for RRC-based SCell BWP switch. The most important thing would be having common understanding between companies. We are fine with “no” for this scenario. However, there seem still more cases we need to discuss to achieve common understanding, which can be further discussed based on contribution |
| LG | No | For a SCell, the two fields can be configured only upon addition, according to the Need code. So, update of any of these fields requires release and addition of the SCell. |

**Summary 1**: TBD.

**Proposal 1**: TBD.

3.2 BWP switch at RRCSetup/RRCResume

[R2-2101166](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113-e\Docs\R2-2101166.zip) makes the below observation. Do companies have objection to this?

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| --- |
| **Observation: Since the UE uses the initial BWP for sending MSG3 and receiving MSG4, reception of RRCSetup/RRCResume triggers a BWP switch procedure in case firstActiveDownlinkBWP-Id and/or firstActiveUplinkBWP-Id in the RRCSetup/RRCResume message indicates a dedicated BWP other than initial BWP.** |

**Question 4**: Do companies also view the above observation as valid?

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| --- | --- | --- | --- | --- | --- |
| Answers to Question 4 | | | | | |
| Company | | Yes/No | | Comments | |
| Apple | | Yes (with a note) | | This is applicable only to SpCell where the NW can modify the BWP config at the time of RRCResume and can also modify the firstActive for UL/DL and this is a BWP switch.  For SCells, there wont be a BWP switch. The UE starts with the firstActive BWP if the RRCResume indicates to activate the SCell in the RRC message. | |
| Huawei, HiSilicon | | Yes | | The observation should be only for PCell upon initial access. | |
| Nokia | | Yes | | Agree with Huawei | |
| Google | | Yes | |  | |
| MediaTek | | Yes with comment | | RRC Setup or RRC Resume could set the first activate BWP Id. But I am not sure we will call it RRC based BWP switch and it is not related to the question raised by RAN4. | |
| Ericsson | | Yes | |  | |
| Qcom | | Yes | | Yes for PCell | |
| OPPO | | Yes | | PCell only | |
| CATT | | Yes | | PCell only | |
| Intel | | yes | |  | |
| NEC | | Yes | | for PCell only | |
| vivo | | Yes | | BWP switch during RRCSetup/RRCResume is a valid case, and is not included in the RRC-based BWP switching requirement specified in RAN4. | |
| ZTE | | Yes | | PCell only | |
| Samsung | | Yes | |  | |
| LG | | Yes | | Agree with Huawei | |

**Question 5**: According to [R2-2101166](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113-e\Docs\R2-2101166.zip) *RRCResume/RRCSetup* might not be part of description in TS38.133 which uses *RRCReconfiguration* and so proposes to add this clarification by sending an LS. If Q1 is agreeable, do companies see the need to include this in the RAN2 reply LS?

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| --- | --- | --- |
| Answers to Question 5 | | |
| Company | Yes/No | Comments |
| Apple | Yes | We are ok to clarify. |
| Huawei, HiSilicon | Yes | Ok to clarify it. |
| Nokia | Yes | Okay as well |
| Google | Yes |  |
| MediaTek | Maybe | We understand that RRC Setup or Resume will anyway have different performance requirement in RAN4. So, it is actually not related to the question from RAN4. But we could of course tell RAN4 that NW could set first active BWP during Setup or Resume. |
| Ericsson | Yes |  |
| OPPO | Yes |  |
| CATT | Yes |  |
| Intel | Yes | We are ok to clarify. |
| NEC | Yes | fine to clarify |
| vivo | Yes | We can inform RAN4 about this identified case when replying the LS. |
| ZTE | Yes | proponent |
| Samsung | Yes |  |
| LG | Yes |  |

**Summary 2**: TBD.

**Proposal 2**: TBD.

3.3 Parameter change of an active BWP in SpCell and SCell

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| For the RAN4 question#1:  *Whether RRC reconfiguration can change any parameter of the already active BWP of an activated SCell or SpCell.* |

For the above, [R2-2101462](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113-e\Docs\R2-2101462.zip) discusses about what parameters can be changed for an active BWP for SpCell and SCell. [R2-2101462](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113-e\Docs\R2-2101462.zip) also brings up the point whether the common config of a UE dedicated BWP can be changed.

**Question 6**: Do companies agree that any parameter of **IE *BWP-DownlinkDedicated* and *BWP-UplinkDedicated*** in the UE dedicated BWPs (including *initialDownlinkBWP* and *initialUplinkBWP*) can be changed in a RRC reconfiguration message without resulting in a BWP switch?

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| --- | --- | --- | --- | --- | --- |
| Answers to Question 6 | | | | | |
| Company | | Yes/No | | Comments | |
| Apple | | Yes | | No BWP switch occurs in this case. | |
| Huawei, HiSilicon | | Yes | |  | |
| Nokia | | Yes | | Indeed, this is simple reconfiguration and never a BWP switch. | |
| Google | | Yes | |  | |
| MediaTek | | Yes | |  | |
| Ericsson | | Yes | |  | |
| Qcom | | Yes | |  | |
| OPPO | | Yes | |  | |
| CATT | | Yes | |  | |
| Intel | | Yes | |  | |
| NEC | | Yes | |  | |
| vivo | | yes | | For any BWP of an SpCell or SCell, the conditional presence of *bwp-Common* and *bwp-Dedicated* in *BWP-Uplink* and *bwp-Common* and *bwp-Dedicated* in *BWP-Downlink* are SetupOtherBWP, which is given below. Thus, we think RRC reconfiguration can change any parameter of the already active BWP for an SpCell or SCell in principle.   |  |  | | --- | --- | | *SetupOtherBWP* | The field is mandatory present upon configuration of a new DL BWP. The field is optionally present, Need M, otherwise. |   When comes to the child fields of these four fields, there are so many parameters defined, and whether RRC reconfiguration can change each of these parameter of the already active BWP should be based on the corresponding conditional presence specified in TS 38.331.  And we think change any parameter of an active BWP will not result in a BWP switch. | |
| ZTE | | Yes | |  | |
| Samsung | | Yes | | In specification point of view, it is allowed. Any ambiguity period due to the change shall be handled correctly by NW if it wish to change the parameter of activated SCell | |
| LG | | Yes | |  | |

**Question 7**: Do companies agree that any parameter of **IE *BWP-DownlinkCommon* or *BWP-UplinkCommon*** in the UE dedicated BWPs be changed in a RRC reconfiguration message for the same BWP?

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| --- | --- | --- |
| Answers to Question 7 | | |
| Company | Yes/No | Comments |
| Apple | No | While the ASN.1 construct allows this, we wonder how the UE should view/behave if the critical operating BWP parameters of common config (like the BW, PRB, SCS) changes for the same BWP! We think this should be atleast considered a BWP switch. But atleast for Rel-15/Rel-16, it’s safer for the NW to release and add the BWP again if the core common parameters are to be changed. As mentioned in our paper, TS38.331 mentions that common config of UE dedicaged BWPs are to be treated as cell-specific parmeters, and if they are to be changed, they would have to be changed for all the UEs using the “similar” BWP config. We think its rare for the NW to change the operating BWP config, and in such rare cases it’s better to release and add the changed BWP than changing the common config dynamically. For SCell, we anyway follow such logic. |
| Huawei, HiSilicon | Yes | We should inform RAN4 that current RRC allows reconfiguration of any parameters of a BWP, including common and dedicated parameters of the active BWP.  Whether to treat common configuration of a BWP differently, e.g. define different requirements, would be up to RAN4 discussion. |
| Nokia | Yes | ASN.1 wise, this is allowed. It would be up to RAN4 then to determine what constitutes additional requirements. |
| Google | Yes | This is allowed by the RRC ASN.1. |
| MediaTek | No | The ASN.1 itself allow this but we usually don’t change common configuration in this way. For SpCell, this could only be changed by reconfiguration with sync. For SCell, this could only be changed by release and add of SCell. |
| Ericsson | Yes | According to the current ASN.1, this is supported. |
| Qcom | No | Although it’s permissible by the ASN.1, it might not be practical to change some of these parameters. |
| OPPO | No | Agree Apple and MediaTek |
| CATT | No | Agree with MediaTek |
| Intel | See Comments | From ASN.1 point of view, any parameter could be changed unless it is indicated otherwise. However, as Apple commented, it is not desirable to change any parameters for active BWP. Therefore, it is expected that NW would avoid reconfiguring on-going active BWP parameter without deactivation or change active BWP. |
| vivo | Yes but | We understand the concern pointed out by Apple. Our understanding is network is possible to reconfigure any parameter of IE *BWP-DownlinkCommon* or *BWP-UplinkCommon* in RRC reconfiguration, while with the restriction that keep the alignment with corresponding parameters of other UEs. We can indicate the feasibility and this restriction to RAN4. |
| ZTE | Yes | There is no restriction in RRC. RRC ASN.1 allows reconfiguration of any parameters of a dedicated BWP. It is noted that the ***BWP-DownlinkCommon* or *BWP-UplinkCommon*** of the initial BWP can only be reconfigured by *ServingCellConfigCommonSIB* and *ServingCellConfigCommon.* |
| Samsung | Yes | We tend to agree 1) spec allow it and 2) NW should avoid it. Maybe we can covey this information in RAN4 LS. |
| LG | No | Though ASN.1 allows, changing parameters of common config is not practical. |

**Question 8**: If the answer to Q7 is yes, can the UE still view this as the same BWP or view it as a BWP switch?

|  |  |  |
| --- | --- | --- |
| Answers to Question 8 | | |
| Company | BWP switch? | Comments/views |
| Apple | Yes | As answered in Q7, we prefer to not have such scenario, but if this is indeed preferred in RAN2, we would like to view this as a BWP swtich. |
| Huawei, HiSilicon | No | How to treat this kind of reconfiguration would be up to RAN4, e.g. they may define different requirements.  From RAN2’s point of view, we should not treat this kind of reconfiguration as BWP switch. |
| Nokia | No | It is definitely not BWP switching if done for same BWP. RRC reconfiguration without modification of firstActiveDownlinkBWP-Id or firstActiveUplinkBWP-Id never triggers BWP switching for SpCell but may trigger BWP switch for SCell in Rel-16 (if RAN4 sees it so). |
| Google | Yes | It depends on what parameters are changed. If BWP parameters such as BW, PRB, SCS changes, the UE can view this as a BWP switch. |
| MediaTek | Yes | Same view as Apple. |
| Ericsson | No | If the parameters are changed for the same BWP, this is not a BWP switch. |
| Qcom | Yes | Same as Apple and Google |
| OPPO | Yes | Same as Apple and Google |
| Intel | Not sure | we can let RAN4 discuss based on our feedback on Q7. Since changing any parameters on the active BWP is not desirable, we are not sure if the specification specify UE behaviour. |
| vivo | Maybe | Actually, we don’t know why we have this question. According to the following RAN4 spec, the RRC based BWP switching delay can be applied to the case parameter change of its active BWP. Will anything go wrong if the change of theses parameters triggers a BWP switch? 8.6.3 RRC based BWP switch delay on a single CC *<…>*  For RRC-based BWP switch, after the UE receives RRC reconfiguration involving active BWP switching or parameter change of its active BWP, UE shall be able to receive PDSCH/PDCCH (for DL active BWP switch) or transmit PUSCH (for UL active BWP switch) on the new BWP on the serving cell on which BWP switch occurs on the first DL or UL slot right after a time duration of slots which begins from the beginning of DL slot n, where  DL slot n is the last slot containing the RRC command, and  is determined by the smaller SCS between the SCS before BWP switch and the SCS after BWP switch if the BWP switch involves changing of SCS.  is the length of the RRC procedure delay in ms as defined in clause 12 in TS 38.331 [2], and  is the time used by the UE to perform BWP switch.  *<…>* |
| ZTE | No | From RAN2 perspective, it should be considered as the same BWP. But we are fine to check with RAN4 whether any new requirement is needed for such case. |
| Samsung | No requirement | We don’t think we need to specify RAN4 requirements for all the corner cases. We can just note that Spec allow it but RAN2 thinks no requirement is needed for it. |
| LG | No | At least from RAN2 point of view, changing parameters of the same BWP is not considered as BWP switching. |

**Question 9**: If the answer to Q7 is no, any views on how the NW can change the common config? And if a spec change is needed.

|  |  |  |
| --- | --- | --- |
| Answers to Question 9 | | |
| Company | Comments/views |
| Apple | Our view is to release the BWP and add the BWP again. The UE would view this as a new BWP.  We are ok to capture this in chair’s notes and no spec change is needed. |
| Nokia | Network can change it via. reconfiguration. |
| MediaTek | The common configuration is “cell” specific. Usually this kind of parameter does not change frequently. So, we think that for SCell, this could be done by release and add of SCell. |
| Ericsson | Agree with Nokia and no spec change is needed. |
| OPPO | Agree Apple and MediaTek |
| CATT | Agree with MediaTek, if for SpCell, the reconfiguration with sync is needed, for SCell it can be done by release and add of the SCell |
| Intel | If agreeable, we would prefer to capture in the spec such that NW should avoid reconfiguration of parameters in the active BWP. Instead, NW would release and add BWP or switch to another BWP that is not needed to reconfigure. |
| ZTE | No change is needed in RAN2 unless we receive requirement from RAN4. |
| LG | Agree with MediaTek. |
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**Summary 3**: TBD.

**Proposal 3**: TBD.

[R2-2101462](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113-e\Docs\R2-2101462.zip) also discusses about releasing an active BWP via RRC message.

**Question 10**: Do companies agree that if the NW releases an active BWP for an SpCell, the NW should provide the ***firstActiveDownlinkBWP-Id* and *firstActiveUplinkBWP-Id*** for the SpCell to prevent the ambiguity for the UE to know which BWP to use?

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| Answers to Question 10 | | |
| Company | Yes/No | Comments |
| Apple | Yes | The firstActiveBWP (UL or DL) is optional for the NW to provide, and it is need ‘N’ (not ‘M), If the active BWP is released, the UE cannot be relied to remember the earlier provided first active BWP to switch to. Rather, the NW should provide the firstActiveBWP for the UE to use, in the same RRC message that releases the active BWP.  Infact, this would be means of BWP switching for 6-1 UEs (which can only be configured with one BWP). |
| Huawei, HiSilicon | No | It should be clarified first what is the case of “the NW releases an active BWP for an SpCell”.  If there are multiple BWPs configured, the network may switch the BWP dynamically using DCI. From RRC point of view, the network doesn’t need to know exactly which BWP is the active one and is scheduled by DCI, when it sends the RRC reconfiguration to release a BWP.  But of course during the reconfiguration ambiguous period (i.e. before receiving the reconfiguration complete message), the network should be careful and should not use the BWP to be released. This is only the network implementation, and no restriction is needed to mandate the network to do RRC-based BWP switch, i.e. to provide the firstActiveDownlinkBWP-Id and firstActiveUplinkBWP-Id. |
| Nokia | No | Agree with HW that the network can take care of this by implementation e.g. switch to another BWP and release appropriately. |
| Google |  | We don’t need to restrict the NW. The NW should ensure the UE can switch a BWP appropriately in any case. |
| MediaTek | Yes | We don’t understand why RRC want to release the current active BWP.  But if NW really does this, the approach from Apple is the most reasonable way to do. |
| Ericsson | No | First, we believe that it may not be common for the network to release a BWP but probably a common situation can be to configure and keep multiple BWPs and switching among them via DCI. Second, the aspect highlighted in this question can be handled by network implementation. |
| QCOM | Yes | Support Apple suggestion.  Comment for Huawei: DCI based BWP switch might not be supported by all UEs. |
| OPPO | Yes | Agree apple |
| CATT | No | Due to the BWP can be switched based on DCI, so the RRC doesn't know which BWP is the active BWP, so the RRC may release the current active BWP, and we agree the NW can avoid the active BWP to be released by NW implementation e.g.by BWP switch |
| Intel | No | It is reasonable to assume that NW will switch to another dedicated BWP before releasing the current active BWP with RRC reconfiguration. |
| NEC |  | we agree with Huawei that firstly the scenario should be clarified. Without adding new BWP, the network cannot release an current active BWP for an SpCell. Based on this assumption, we understand the scenario in question is BWP replacing (switching) via RRC in one message. In this case, the network should provide the first active DL/UL BWP ID for the SpCell. |
| vivo | No | Agree with HW and Nokia. |
| ZTE | No | We agree the ambiguity shall be avoid, but it can be left to NW implementation.  For the release of active BWP, we think a release/addition of BWP with the same BWP ID should be allowed in a single RRC reconfiguration message, in which case the firstActiveDownlinkBWP-Id and firstActiveUplinkBWP-Id is not required. |
| Samsung | No | We are not quite sure why NW release active BWP. For single BWP UE, there is no issue because there is no other BWP to be confused with. |
| LG | Yes/No | We do not think we need to change something to support releasing an active BWP. Network can switch an active BWP and then release the previously active one. But, it’s up to network implementation. |

**Question 11**: If the answer to Q10 is no, companies are requested to provide their view on which BWP should the UE use in this case?

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| Answers to Question 11 | | |
| Company | Comments |
| Huawei, HiSilicon | The UE can just follow the network scheduling and use the BWP indicated by DCI. |
| Nokia | Agree with HW |
| MediaTek | Question to HW, if the current active BWP is released, which BWP should the UE to receive DCI after processing the RRC reconfiguration?  [Huawei] my point was that the network by implementation should ensure that active BWP is not a released one after the UE processing/receiving the RRC reconfiguration. But if we put a restriction to the network like Question 10 says, we should be careful about the meaning of “the NW releases an active BWP for an SpCell”. As the active BWP can be dynamically changed by DCI, does the active BWP mean the BWP used for transmitting this RRC reconfiguration message? Can the network transmit on a BWP the RRC reconfiguration message which release the BWP, but immediately switch the UE to another BWP by DCI? |
| Ericsson | Agree with HW |
| CATT | Agree with HW |
| Intel | Agree with HW. NW will switch to another dedicated BWP before releasing the current active BWP with RRC reconfiguration. |
| vivo | Agree with HW |
| ZTE | see our reply in question 10. |
| Samsung | Agree with HW |
| LG | Nothing needs to be changed. |
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**Question 12**: If the answer to Q10 is yes, companies are requested to provide their view on if a spec change is needed?

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| Answers to Question 12 | | |
| Company | Comments ( for eg., on whether a spec change is needed or if it is already specified or if it can be captured in chair notes) |
| Apple | We are ok to capture this in chair’s notes if companies prefer no change in spec. |
| MediaTek | Capture in chair’s note is acceptable. We are actually open for SPEC clarification on releasing of current active BWP. |
| QCOM | Chair’s note is good, preferred to have it, clarified in the spec. |
| OPPO | Fine with chair’s notes |
| LG | Spec change is not needed. Fine with chair’s note. |
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**Question 13**: Can the NW release the active BWP of an SCell using an RRC message?

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| Answers to Question 13 | | |
| Company | Yes/No | Comments |
| Apple | No | Inline with our views earlier, if the active BWP is released, the UE should be given a firstActiveBWP to fallback to. But for SCell, the firstActiveBWP (DL/UL) can only be given at the time of SCell addition. So the NW would have to release and add the SCell in such a case |
| Huawei, HiSilicon | Yes/No | As clarified above, the BWP can be switched by DCI dynamically. From RRC point of view, any configured BWP can be released or reconfigured. But of course, the network scheduling should be careful and should not use the released BWP during the reconfiguration ambiguous period, and this can be handled by implementation. |
| Nokia | - | Agree with Huawei |
| MediaTek | No | Same view as Apple.  Do companies really expect no IOT issue to release current active BWP? |
| Ericsson |  | Agree with Huawei. Also, please note that what we are trying to solve here is a bad network implementation and usually is something we do not do in 3GPP. |
| QCOM | No | Since BWP switch is supported on SCell, so we expect network to release then add the SCell in this case. |
| OPPO | No | Agree with Apple |
| CATT |  | Agree with HW |
| Intel | No but | There is no explicit restriction in the specification. But, it should be reasonable assumption that the network should not release the current active BWP. Instead, NW can deactivate the concerned SCell or switch to another dedicated BWP before releasing the BWP. |
| NEC |  | not sure what this question really mean.. Similar to the question for SpCell, if this is intended to release current active BWP and add new BWP in one RRC message, then it is possible. But if this is intended to just release the current active BWP, then it is impossible and the network should achieve rather SCell release. |
| vivo | No | Agree with Huawei |
| ZTE | Yes | Release/addition of BWP with the same BWP ID should be allowed in a single RRC reconfiguration message, in which case the firstActiveDownlinkBWP-Id and firstActiveUplinkBWP-Id is not required. |
| Samsung | No | We don’t see any good motivation for NW to release current active BWP |
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| LG | No | Agree with Apple, and see our comment for Q10 |

**Question 14**: If the answer to Q13 is no, companies are requested to provide their view on if a spec change is needed?

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| Answers to Question 14 | | |
| Company | Comments ( for eg., on whether a spec change is needed or if it is already specified or if it can be captured in chair notes) |
| Apple | Capturing in Chair’s notes is ok for us if majority prefers. |
| MediaTek | Capture in chair’s note is acceptable. We are actually open for SPEC clarification on releasing of current active BWP. |
| QCOM | Chair’s note is good, preferred to have it, clarified in the spec. |
| OPPO | Agree above comments |
| Intel | If agreeable, we would prefer to capture in the spec such that NW should deactivate the concerned SCell or switch to another dedicated BWP before releasing the BWP. |
| Samsung | Chair note would be fine |
| LG | Spec change is not needed. Fine with chair’s note. |
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**Summary 4**: TBD.

**Proposal 4**: TBD.

3.4 BWP switch from parameter change of an active BWP in SpCell and SCell

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| For the RAN4 question#2:  *Whether this RRC reconfiguration without modification of firstActiveDownlinkBWP-Id or firstActiveUplinkBWP-Id for an activated SCell or SpCell can trigger a BWP switch.* |

**From the perspective of the rapporteur, the answer to this would be dependent on the inputs from the companies to Q1, Q2, Q3 and from Q13/14.**

The rapporteur intends to provide a summary based on this, but do request companies to provide their answer to the below question.

**Question 15**: Does the RRC reconfiguration without modification of firstActiveDownlinkBWP-Id or firstActiveUplinkBWP-Id for an activated SCell trigger a BWP switch?

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| Answers to Question 15 | | |
| Company | Yes/No | Comments |
| Apple | No | As provided earlier, we think that for an SCell a BWP swtich using RRC is through releasing and adding the SCell with a new BWP using firstActiveBWP DL/UL. |
| Huawei, HiSilicon | No | BWP can be switched by RRC by including firstActiveDownlinkBWP-Id or firstActiveUplinkBWP-Id, or by DCI. |
| Nokia | No |  |
| Google |  | It depends on what parameters are changed in the RRC reconfiguration message. If BWP parameters such as BW, PRB, SCS changes, the UE can view this as a BWP switch. |
| MediaTek |  | We suggest to clarify the aspect in previous questions and we could discuss how to reply RAN4 LS. |
| Ericsson | No |  |
| QCOM | No |  |
| OPPO | No |  |
| CATT | No |  |
| Intel | No | There is no such case. If it is referred to BW/PRB/SCS change as Google commented, RAN4 may not need to consider it as BWP switching based on the discussion so far. |
| NEC | No |  |
| vivo | No | *sCellState-r16* can only be configured upon SCell addition, reconfiguration with sync, and resuming an RRC connection, thus RRC-based reactivation of an activated SCell seems to be supported for reconfiguration with sync with SCell modification. However, since the Need code of firstActiveXlinkBWP-Id is need N, it maybe not feasible to trigger a BWP switch from current BWP to the active BWP via RRC-based reactivation of an activated SCell. |
| ZTE | No |  |
| Samsung | No |  |
| LG | No |  |

**Summary 5**: TBD.

**Proposal 5**: TBD.

# 4 Skip ACK upon *reconfigurationWithSync*

There are two sets of CRs related to this topic marked for this discussion, as shown below, however, the second one is a shadow CR.

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| [R2-2101267](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113-e\Docs\R2-2101267.zip) Clarification of Note for leaving source cell at reconfigurationWithSync Ericsson CR Rel-15 38.331 15.12.0 2394 - F NR\_newRAT-Core  [R2-2101268](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113-e\Docs\R2-2101268.zip) Clarification of Note for leaving source cell at reconfigurationWithSync Ericsson CR Rel-16 38.331 16.3.1 2395 - A NR\_newRAT-Core |

**Question 4.1**: Is the intent of the CRs in [R2-2101267](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113-e\Docs\R2-2101267.zip) and [R2-2101268](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113-e\Docs\R2-2101267.zip) agreeable?

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| Answers to Question 4.1 | | |
| Company | Yes/No | Comments (e.g. changes required to be acceptable, why the CR is or is not needed) |
| Apple | No, but no strong view | We think the current text is clear enough as this refers to the HARQ/ARQ for the RRC message that triggers the “handover”. The UE anyway does not associate/link the received RLC to which RRC message. |
| Huawei, HiSilicon | No | The current Note is clear for RRC messages. The handling of DRB depends on e.g. the indication of reestablishRLC, and no need to revise this Note. |
| Nokia | No | The proposed modifications actually change the UE behavior, if we consider the NOTE seriously and as something binding for the UE. Current wording states 'before' which does not imply anything directly if the UE actually confirms successful reception (it may do it later, after triggering the reconfiguration with sync, although not very likely to happen, as the UE abandons the source in the classical HO). The proposed change is saying directly: 'without' which is a sort of restriction for the UE and new behavior, even if most of the UE vendors understood this part of the specification in a similar way as proposed now.  Another change here is to replace 'this message' with 'DL transmissions', which broadens the scope and should result in the UE not ACKing any DL message, not only this HO command. Again, maybe in practical cases this will anyway be like that (and just HO command will be there for ACKing), but overall we think this changes UE behavior as per specs. Not sure if a NOTE is something we should be spending lots of time with.  Impact analysis and inter-operability claims there is no issue in case of mismatch between the UE and the NW, so maybe this is another reason (assuming the impact analysis is correct) why this CR is not needed? |
| Google | No | It becomes confusing to replace “this message” with “DL transmission”. Besides, this is just a note so we don’t see a need to clarify it. |
| MediaTek | No | The intention is fine and we also understand that the UE trigger handover ASAP without waiting to send the ACK in source cell. But the change of the NOTE make it even confusing. We think that it is not necessary. |
| QCOM | No | Current spec is clear with no ambiguity, in addition nothing is broken that needs to be fixed |
| CATT | No | Current spec has specified “The UE should perform the reconfiguration with sync as soon as possible following the reception of the RRC message triggering the reconfiguration with sync” so I think it is enough |
| Intel | No | We don’t think there is a risk of wrong implementation here that it needs an essential correction. |
| NEC | No | current Note is already clear |
| vivo | No | The correction is not essential but causes some confusion. |
| ZTE | No | We share the view with Huawei and we think nothing is really broken without the CR. |
| Samsung | No | We don’t see the additional clarity from the new text |
| LG | No | While the current wording is meant for the HO message, it is clear enough to say that HO should happen as soon as possible as the current text is formulated. The intention of the CR may be already implemented in the existing UE implementation. |
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**Summary 6**: TBD.

**Proposal 6**: TBD.

# 5 Local Release

There are one CR which proposes a change to 38.331 on adding more clarification on UE local release.

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| [R2-2100841](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113-e\Docs\R2-2100841.zip) Further Clarification on RRC Local Release vivo discussion |

**Question 5.1**: Is the intent of the proposal in [R2-2100841](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113-e\Docs\R2-2100841.zip) agreeable?

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| Answers to Question 5.1 | | |
| Company | Yes/No | Comments |
| Apple | Yes | We are ok to the proposed changes in the disc paper. |
| Huawei, HiSilicon | Yes | Ok with the clarification |
| Nokia | Yes |  |
| Google | Yes |  |
| MediaTek | No strong view | We think that the change is not essential but would be acceptable if majorities prefer to have it. |
| Ericsson | No strong view | We think this is not essential but we are also okay to have this clarification. |
| QCOM | Partially | The current text has some ambiguity, as in the suggested change:  Only in exceptional cases, as specified within this specification, TS 38.300 [2], TS 38.304 [20] or TS 24.501 [23], may the UE abort the RRC connection, i.e. move to RRC\_IDLE without notifying network.    We’re not sure what is the significance of “without notifying network”? since UE is already aborting connection, therefore no need for this.  We can agree on it, if wording was modified accordingly. |
| OPPO | Yes |  |
| CATT | No | Not essential |
| Intel | No strong view | It could be useful information but we don’t see it as essential correction. |
| NEC | Yes | we are fine to clarify as proposed, but not a strong opinion |
| vivo | Yes | Our understanding is that the proposed change is necessary to have a full picture of RRC connection release mechanism in NR which includes not only release initiated by the network but also release by the UE locally.  Regarding Qualcomm’s question, the following is our answer:  The text proposal is following the same wording as legacy, i.e. LTE spec TS 36.331.  Besides, the reason why LTE emphasizes the UE behavior without notifying network is to differentiate that from UMTS. In UMTS, UE may send SIGNALLING CONNECTION RELEASE INDICATION to network once aborting the RRC connection, but there is no such signalling connection release indication procedure in LTE.  However, since NR is inheriting from LTE, maybe there is no need of saying “without notifying network”. We are ok to follow majority views on removing this part of change. |
| ZTE | No Strong view | We are fine with the intention but not sure whether the CR is essential, considering everything is clear in stage 3 specification. |
| Samsung | Yes | Good to align NR with LTE wherever they are supposed to be |
| LG | Yes |  |

**Summary 7**: TBD.

**Proposal 7**: TBD.

# 6 RLC Mode in Split bearer

There are two sets of CRs related to this topic marked for this discussion, as shown below, however, the second one is a shadow CR.

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| [R2-2100756](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113-e\Docs\R2-2100756.zip) RLC Mode Restrictions Nokia, Ericsson (Rapporteur), Nokia Shanghai Bell CR Rel-15 38.331 15.12.0 2351 - F NR\_newRAT-Core  [R2-2100757](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113-e\Docs\R2-2100757.zip) RLC Mode Restrictions Nokia, Ericsson (Rapporteur), Nokia Shanghai Bell CR Rel-16 38.331 16.3.1 2352 - A NR\_newRAT-Core |

**Question 6.1**: Is the intent of the CRs in [R2-2100756](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113-e\Docs\R2-2100756.zip) and [R2-2100757](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113-e\Docs\R2-2100756.zip) agreeable?

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| Answers to Question 6.1 | | |
| Company | Yes/No | Comments (e.g. changes required to be acceptable, why the CR is or is not needed) |
| Apple | No | the proposed change in RRC spec “The RLC modes of all the RLC entities associated with the same PDCP entity shall be identical i.e. either UM or AM (see TS 38.323 [5]).” does not match the MAC text for the case “PDCP duplication used for split RB”....so the change are not entirely correct. Also, we do not think this change is necessary because MAC spec is clear |
| Huawei, HiSilicon | No | Not essential. No change is also good to us, given that PDCP spec already clarified the same thing. |
| Google |  | No strong view. We understand the PDCP spec describes something but the clarification is on the RRC configurations. |
| MediaTek | Yes |  |
| Nokia | Yes | [Proponent] |
| Ericsson | Yes | Proponent |
| QCOM | No | Agree with the intention  but instead we can refer to the PDCP spec about the allowed combination of RLC mode, rather mentioning in the RRC spec. |
| CATT | Yes |  |
| Intel | Yes | Agree with the CR. |
| NEC | Yes | we are fine to clarify this in RRC, but changes can be merged to Rapporteur misc CR |
| vivo | No | PDCP spec is clear enough, so there is no need to add such clarification in RRC. For network, such configuration is the common understanding. |
| ZTE | No | We are fine with the intention. However, since such restriction has already been captured in 38.323 section 4.2.1, the CR seems not needed (Otherwise, we may see lots of similar CRs in the future to capture restrictions in RRC). |
| Samsung | Yes | Agree with the intention but prefer to be in misc CR |
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| LG | No | The text in the PDCP specification is clear enough. Moreover, in Rel-17 MBS, there is a possibility that both PTP leg using RLC AM and PTM leg using RLC UM are mapped to the same PDCP entity, and if such configuration is introduced, another CR is needed to remove the added text. |

**Summary 8**: TBD.

**Proposal 8**: TBD.

# 7 PDCP re-establishment for SRB1 after RRC Reestablishment

Per request of RAN2 chair, this offline discussion has included the following discuss paper with intention to capture in chair’s notes.

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| [R2-2100369](file:///C:\Users\naveenpalle\spec\RAN2-113e\Docs\R2-2100369-Reest-SRB1.docx) PDCP re-establishment for SRB1 after RRC Reestablishment Intel Corporation, Ericsson discussion Rel-15 NR\_newRAT-Core |

**Question 7.1**: Do companies agree to the proposal to be captured in chair’s notes that:  
If SRB1 is included in the first RRCReconfiguration after re-establishment, the reestablishPDCP field ***is not set to true*** for SRB1.

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| Answers to Question 7.1 | | |
| Company | Yes/No | Comments (e.g. changes required to be acceptable, why the CR is or is not needed) |
| Apple | Yes |  |
| Huawei, HiSilicon | Yes | Ok to clarify this if there is a security concern. |
| CATT | Yes |  |
| MediaTek | Yes |  |
| Ericsson | Yes | Proponent |
| Intel | Yes | Proponent |
| NEC | Yes |  |
| vivo | Yes |  |
| ZTE | Yes | Proponent |
| Samsung | Yes |  |
| LG | Yes | Ok to capture it in chair’s note. |
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**Question 7.2**: Do companies agree to the proposal to be captured in chair’s notes that:  
If SRB1 is included in the first RRCReconfiguration after re-establishment, the reestablishRLC field is not set to *true* for SRB1.

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| Answers to Question 7.1 | | |
| Company | Yes/No | Comments (e.g. changes required to be acceptable, why the CR is or is not needed) |
| Apple | Yes |  |
| Huawei, HiSilicon | No | This proposal seems not to be based on security concern, and the problem is potential loss of messages. We think this can be handled by network implementation and a clarification is not needed. |
| CATT | Yes |  |
| MediaTek | Yes |  |
| Ericsson | Yes | Proponent |
| Intel | Yes | Proponent |
| NEC | Yes |  |
| vivo | Yes |  |
| ZTE | Yes | Proponent |
| Samsung | No | Actually we don’t see any security problem with re-establishing RLC in this case. Security key is not updated with this reconfiguration message. There will be no data stored in RLC buffer for SRB1. So resetting RLC entity virtually mean nothing happen. |
| LG | Yes | Ok to capture it in chair’s note. |
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**Summary 9**: TBD.

**Proposal 9**: TBD.

# 8 Conclusion

To be filled.