**3GPP TSG-RAN WG2 Meeting #114-eR2-210xxxx**

**Electronic, 19th - 27th May, 2021**

Agenda Item: 5.4.1.1

Source: Huawei, HiSilicon

**Title: Offline discussion: [AT114-e][004][NR15] Connection Control I (Huawei)**

Document for: Discussion and decision

# Introduction

This documents aims at gathering and summarizing companies views for the following offline discussion:

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| * [AT114-e][004][NR15] Connection Control I (Huawei)   Scope: Treat R2-2105769 if needed (on-line first), R2-2106329 (on-line first), R2-2106330 (on-line first), R2-2106304, R2-2106305, R2-2105582, R2-2105583, R2-2105584, R2-2105946, R2-2105947, R2-2105948, R2-2105949, R2-2105649, R2-2105650, R2-2106192, R2-2106193,  Phase 1, determine agreeable parts, Phase 2, for agreeable parts Work on CRs.  Intended outcome: Report and Agreed CRs.  Deadline: Schedule A |

For convenience Schedule A is copied below:

**Schedule A** (a schedule for main session for many offline dicussion):

A first round with **Deadline for comments Friday May 21 1000 UTC** to settle scope what is agreeable etc (phase 1).

A pre-final round with **Deadline for any functional and/or scope comments Wednesday May 26 1200 UTC.** At this point, non-agreeable parts shall be removed/excluded. (phase 2)

A final round (last 24h) for checking and smaller simplification / removal comments only including agreeable parts, with Deadline **EOM** (at this point all outcome documents need to be available in inbox with tdoc numbers).

Additional check-points etc if needed are defined by the Rapporteur. Offline discussion rapporteur must notify chairman / session chair if on-line comeback discussion is needed, if discussion doesn’t converge etc.

The discussion covers the following documents from AI 5.4.1.1 Connection control:

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| R2-2105769 | Summary of [Post113bis-e][060][NR15] RLC bearer handling with Full Configuration | Ericsson, Mediatek Inc. | discussion |
| R2-2106329 | Clarification on RLC bearer handling in full configuration | MediaTek Inc., Qualcomm Incorporated, Ericsson, Nokia, Nokia Shanghai Bell, Vivo, Huawei, HiSilicon, ZTE Corporation, Apple | CR |
| R2-2106330 | Clarification on RLC bearer handling in full Configuration | MediaTek Inc., Qualcomm Incorporated, Ericsson, Nokia, Nokia Shanghai Bell, Vivo, Huawei, HiSilicon, ZTE Corporation, Apple | CR |
| R2-2106304 | RLC re-establishment upon full configuration | Huawei, HiSilicon | CR |
| R2-2106305 | RLC re-establishment upon full configuration | Huawei, HiSilicon | CR |
| R2-2105582 | Discussion on abortion of resume procedure | Huawei, HiSilicon | discussion |
| R2-2105583 | Clarification on the abortion of RRC connection resume | Huawei, HiSilicon | CR |
| R2-2105584 | Clarification on the abortion of RRC connection resume | Huawei, HiSilicon | CR |
| R2-2105946 | Abortion of RRC connection resume procedure by upper layers | Ericsson | CR |
| R2-2105947 | Abortion of RRC connection resume procedure by upper layers | Ericsson | CR |
| R2-2105948 | Abortion of RRC connection resume procedure by upper layers | Ericsson | CR |
| R2-2105949 | Abortion of RRC connection resume procedure by upper layers | Ericsson | CR |
| R2-2105649 | Clarification for an ongoing establishment and resume procedure | Ericsson | CR |
| R2-2105650 | Clarification for an ongoing establishment and resume procedure | Ericsson | CR |
| R2-2106192 | Clarification of initiation of RRC resume procedure | Huawei, HiSilicon | CR |
| R2-2106193 | Clarification of initiation of RRC resume procedure | Huawei, HiSilicon | CR |

# Company contact details

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| Apple | yuqin\_chen@apple.com |

# Discussion

## 3.1 RLC bearer handling upon full configuration

There are two different sets of CRs proposed for this topic:

1. R2-2106329 and R2-2106330 includes the correcitons towards full configuration procedure in section 5.3.5.11.
2. R2-2106304 and R2-2106305 make a clarification in the field description of *reestablishRLC*.

This topic was discussed during the first online session during RAN2#114 meeting and in general there was consensus that clarifications are beneficial/needed. At the time of preparing this document, the chairman notes from the session are not yet available, but it seems the the changes proposed in both sets of CRs are (almost) aligned with the conclusions. Companies are invited to provide any comments to the CRs that still need to be considered after the online discussion that took place already.

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| **Company** | **Comments for the CRs** |
| **Qcom** | R2-2106329   * **We co-signed the CR, so obviously we support the change** * **During the online discussion, some companies mentioned that there is no need to support both approaches to reestablish the RLC entity for the SRB … would it be possible to explain the motive behind this request, having both approaches provide more flexibility to the network.**   R2-2106304   * **The RLC is reestablished when FullConfig flag is set (implicitly), so this clarification is a given.** * **🡪 we will go with majority regarding this clarification.** |
| **Ericsson (Tony)** | R2-2106329   * **We support the CR (proponent). Regarding the comment raised by Intel on clarify that the RLC is established before applying the default configuration, that is also fine for us.** * **Regarding the comment from QC, we did not want to restric the approach on how to reestablish the RLC to only one, but the discussion was about clarify that the network “does not” set the *reestablishRLC* field to *true.* How to establish the RLC entity, is up to the network which option to chose.**   R2-2106304   * **We think that is already clear from the agreements we took when the network set the *reestablishRLC* to *true* and we see no need to clarify this. If we go to have this change, then it would make sense to have a similar clarification also for SRB1.** * **We prefer to not have this change as it is not essential.** |
| Intel | R2-2106329  Agree in principle with the CR intention.  We are also OK to have both options for using *srb-ToAddModList* and rlc-*BearerToAddModList* if that helps network implementations.  We propose to explicitly capture that RLC entity is stablished.  Something like:  1> for each *srb-Identity* value included in the *srb-ToAddModList*(SRB reconfiguration):    2> establish an RLC entity for the corresponding SRB;    2> apply the default SRB configuration defined in 9.2.1 for the corresponding SRB;    This is similar to what we have in 5.3.5.5.4 on the UE behaviour for the option 2 when rlc-BearerToAddModList is provided:  3>  establish an RLC entity in accordance with the default configuration defined in 9.2 for the corresponding SRB;  R2-2106304  We are OK in principle with this but if we go with this, we have to cover all scenarios of SRBs and Resume. |
| MediaTek | R2-2106329   * Support (proponent). * Regarding to the suggestion proposed by Intel (i.e. to clarify that the RLC is established before applying the default configuration), we are also fine with this. If no objection, we could update the CR accordingly.   R2-2106304   * No strong view. The intention is correct but seems not eseential. We could follow the majroty. |
| LG | R2-2106329  We are ok with this CR, with including Intel’s suggestion.  R2-2106304  We think this CR is not needed. |
| Nokia | R2-2106329  Intel suggestion is good for us too, it makes sense to clarify that RLC bearer is to be added here. Usage of the same phrase seems good “establish an RLC entity in accordance with the default configuration defined in 9.2 for the corresponding SRB”  R2-2106304  Agree that the change proposed is not essential and we could live without it. |
| vivo | R2-2106329   * Support(proponent).   R2-2106304   * Current agreement “RAN2 confirms that during NR full configuration, the network does not set the reestablishRLC to true in case of the first reconfiguration after reestablishment and RRC resume. “ seems to be enough for understanding the network’s behavior. * If we really need this explicit clarification, SRB1 should also be clarified. |
| CATT | R2-2106329  We accpect the changes if majority supports. We are fine with Intel’s suggestion.  R2-2106304  We are ok with the change |
| ZTE(LiuJing) | R2-2106329   * Support (proponent), and we are fine with the suggestion from Intel.   R2-2106304   * Same comment as Intel, if majority want to have this clarification, then we need to capture all cases, e.g. SRB1, RRCResume, RRC reestablishment. |
| Samsung | R2-2106329   * We support the change and the suggestion from Intel seems fine.   R2-2106304   * We prefer to not have this change as it is not essential. |
| Apple | R2-2106329   * Support (proponent). * Regarding Intel’s comment, we are fine with caputing the “establish RLC” procedure explicitly.   R2-2106304  Generally we are fine. Companies’ comments should be taken into account. |

## 3.2 Abortion of RRC connection resume procedure

This topic was discussed during RAN2#113bis-e meeting and there was a willingness to clarify the handling of timers and UE behaviour upon abortion of RRC connection resume by upper layers, similarly as this is handled for RRC connection setup procedure. However, the issue was postponed with the following conclusions:

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| [R2-2104267](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113bis-e\Docs\R2-2104267.zip) Clarification on the abortion of RRC connection establishment Huawei, HiSilicon CR Rel-15 38.331 15.13.0 2566 - F NR\_newRAT-Core  - [006] Rapporteur: Some issues should be further discussed, e.g. whether the UE should stay in RRC INACTIVE (e.g. from NAS perspective) and what happens in case the UE still receives RRCSetup or RRCResume after aborting the procedure.   * [006] Postponed   [R2-2104268](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113bis-e\Docs\R2-2104268.zip) Clarification on the abortion of RRC connection establishment Huawei, HiSilicon CR Rel-16 38.331 16.4.1 2567 - A NR\_newRAT-Core   * [006] Postponed |

For this meeting, there are two different approaches proposed by companies in their papers/CRs:

1. The UE should stay in RRC INACTIVE state upon abortion of RRC connection resume (R2-2105946, R2-2105947, R2-2105948, R2-2105949)
2. The UE should move to RRC IDLE state upon abortion of RRC connection resume (R2-2105582, R2-2105583, R2-2105584)

The second approach is more aligned with the proposal which was discussed during RAN2#113bis-e meeting. However, in R2-2105582 it is indicated that this approach may lead to RRC state mismatch happening between the UE and the network as the network will remove the UE context after not receiving the reponse for RRCResume message. Hence, a proposal is brought up that UE should rather move to RRC IDLE state upon abortion of RRC connection resume by upper layers. Companies are then requested to express their view on which approach should be applied to solve this issue.

**Question 2.1: What should be the UE behaviour upon abortion of RRC connection resume by upper layers:**

1. **The UE stays in RRC INACTIVE state (e.g. according to R2-2105946).**
2. **The UE moves to RRC IDLE state (e.g. according to R2-2105583).**

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| **Company** | **Preferred approach** | **Comments (any immediate comments on the CRs for the preferred option are welcome as well)** |
| **Qcom** |  | **First we need to figure out the network behavior, when the resume procedure is interrupted/aborted and whether the network will preserve or clear the UE context.** |
| Intel | None | Neither of the approaches seems essential correction for Rel-15.  Unlike Connection establishment which is always triggered by NAS and includes a NAS message, Resume procedure is initiated by RRC Resume Request and does not have to contain a NAS message. Hence even if the NAS aborts the procedure, the AS can still continue with the Resume procedure. The only consequence seems to be that the UE will stay connected for a while until network releases the connection due to inactivity. Since this is a corner case,  Further, this kind of issues can still be addressed by implementation options in a UE without this CR.  As pointed out in R2-2105583, there is a possibility of state mismatch if the UE aborts the procedure at certain phases of the procedure. Going to IDLE for this can have more negative impact than not doing anything. |
| MediaTek | moves to RRC IDLE | We understand that NAS abort during RRC Resume is rare situation and thus no solution is also fine to us. If we need to specify something, simply go to IDLE to avoid state mistach is preferred. This does not have too much performance impact as it is anyway unlikely scenario. |
| LG | Stays in RRC INACTIVE | We think it would be better to align the UE behaviour for RRC establishment case and RRC resume case. |
| Nokia | None | Both the use cases are corner cases as Intel rightly explained and there is no urgent need to really fix this. Given this is non-essential we suggest not to do anything unless there is a real field issue due to this. |
| vivo |  | Firstly, agree with QC, we need to confirm the network behavior. When the resume procedure is interrupted/aborted, whether the network will preserve or clear the UE context.  Secondly, no matter which approach we choose, the T319 description in Section 7 of TS 38.331 and TS 36.331 also needs to be clarified. |
| CATT | None | No matter the UE stays in inactive or idle, there is no issue when the UE trigger the connection establishment or resumption procedure again. Even though the UE stays in inactive however the NW release the UE context when the RRC resumption is not completed. When the UE sends an RRC resume request to NW, the NW can response the UE an RRC setup message to fall back the UE. |
| Ericsson (Håkan) | Idle/None | Although we submitted R2-2105946, we agree it is probably better UE enter Idle.  We can also agree with Intel and others that this can be regarded as corner case, and no CR is needed.  We agree with comment by Vivo that Timer tables need to be fixed. In case RAN2 agrees to have no CR to introduce new section for Abort of resume procedure by NAS, the text in Timer tables can be removed in 3x:331 Rapp/Misc CRs  Upon reception of *RRCResume,* *RRCSetup, RRCRelease, RRCRelease* with *suspendConfig* or *RRCReject* message, cell re-selection ~~and upon abortion of connection establishment by upper layers~~. |
| ZTE | None | There are two scenarios:  Scenario 1: The UE sends *RRCResumeRequest*, but the NW does not receive the message,and in this time the UE RRC receives abortion of connection establishment from NAS. For this scenario, it is reasonable that the UE stays in RRC\_INACTIVE and abort the procedure.  Scenario 2: The UE sends *RRCResumeRequest*, and the NW receives the message successfully,but the UE does not receive *RRCResume*,and in this time the UE RRC receives abortion of connection establishment from NAS. For this scenario, it is reasonable that the UE enter to RRC\_IDLE, because the NW will release the UE context when the internal timer expires(i.e.not receiving *RRCResumeComplete*).  Anyway it seems that no matter the UE stays in inactive or idle, there is no issue, because the NW can success to process the subsequent action. |
| Samsung | moves to RRC IDLE (R16 only if agreed) | We share same view with others that the concerned scenario is a corner case so we can live without these changes. If anything needs to be specified, we think it makes more sense to enter RRC\_IDLE state but we prefer to have it from Rel-16. |
| Apple | Nothing or 2 (move to idle) | Indeed this is a corner case and without doing anything, UE just stays in connected state for a while which is not a big deal.  We also agree with vivo that the table for T319 should be updated. |
| Huawei, HiSilicon | Approach 2 (move to Idle) | We acknowledge the abortion of connection establishment/resume should not happen very often. Nevertheless it may happen and it would be good to capture the UE behaviour. In our understanding the UE will not continue resume procedure in this case and it does not really depend on AS layer only, but also on NAS which is the layer to indicate the abortion. We would like to note that the discussion started during the last meeting from clarifying that T319 should be stopped and we think this is a proper UE behaviour. This is also how it is handled in LTE, but there both connection establishment and resumption are controlled by a single timer (T300). In that sense, removing the abortion case from T319 description would not really be correct. It would also have some consequences, i.e. since the UE does not continue resume procedure and the timer is not stopped, it would lead to T319 expiry and triggering actions in 5.3.13.5, i.e. UE considers there was a connection resume failure, stores failure related information for reporting to the network and goes to RRC IDLE anyway after all. Then going to RRC IDLE without treating this as failure would be more appropriate it seems. |

Previously, the topic was discussed for NR only, but there are CRs submitted to solve this issue for LTE as well. Putting aside the chosen approach, do companies agree that the issue should be addressed for both LTE and NR.

**Question 2.2: Do you agree to address this issue for both LTE (36.331) and NR specifications (38.331)?**

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| **Company** | **Yes/No** | **Comments** |
| **Qcom** | **Yes** | **It makes sense to align the UE/network behavior for LTE and NR.** |
| Intel | No | Please see comments above. |
| MediaTek | Yes | Prefer to align the behavior. |
| LG | Yes |  |
| Intel | No | Please see comments above. |
| vivo | Yes | It is reasonable to align. |
| Ericsson (Håkan) | Yes | Should be aligned. Either CR to both NR and LTE, or no CR at all. See above |
| ZTE | Yes |  |
| Samsung | Yes | If needed, we prefer to align the behavior from Rel-16. |
| Apple | Yes |  |

## 3.3 Ongoing establishment and resume procedure

This topic was discussed during RAN2#113bis-e meeting and the final conclusions as minuted in [1] are:

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| RRC Resume  [R2-2102715](http://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_113bis-e/Docs/R2-2102715.zip) Corrections to initiation upon reception of RAN paging and T380 Expiry Samsung Electronics Co., Ltd CR Rel-15 38.331 15.13.0 2476 - F NR\_newRAT-Core  - [006] Rap: Not pursued, no spec change required  - [006] Late comment: Ericsson – think we shall consider a Note, keep open for next meeting. Rap: OK to keep open for checking.   * [006] Not pursued * [006] The UE should not start the 2nd RRC resumption procedure when there is a RRC resumption procedure ongoing |

Hence, the intention was to allow further discussion on whether/how to capture the agreement in the specifications. There are two proposals submitted on this issue to this meeting:

1. CRs in R2-2106192 and R2-2106193 cover only RRC connection resume procedure, which was discussed during the last meeting, and propose to add the following sentence in section 5.3.13.2: “The UE does not initiate the procedure again when there is already a RRC resume procedure ongoing.”
2. CRs in R2-2105649 and R2-2105650 propose to cover both RRC connection establishment and RRC connection resume procedures by adding the following sentences:
   1. In section 5.3.3.2: “The UE shall not initiate an RRC connection establishment procedure when T300 is running.”
   2. In section 5.3.13.2: “The UE shall not initiate an RRC connection resume procedure when T319 is running.”

Companies are requested to indicate whether they support clarifying this issue and according to which CRs.

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| **Company** | **Preferred approach** | **Comments (any immediate comments on the CRs for the preferred option are welcome as well)** |
| **QCom** | **Approach-2 (**R2-2105649) | **Approach-2 seems more aligned with the spec language (procedural wise). In addition it includes th e “resume” case as well.** |
| Intel | None | Firstly, this is a corner case. We don’t see a risk of wrong implementation here and it causing interoperability problems. It doesn’t seem essential to have normative UE requirements for these unless there is a real issue in the field. Similar issues existed in LTE for connection establishment without such clarifications?  If there is support to do such a change, we prefer approach 1 to cover both scenarios as it descriptive without normative UE requirement. |
| MediaTek | None | Similar view as Intel. There is no real issue in the field. Note that for LTE connection establishment, there is no issue since Rel-8. Common understanding from Chairman note in last meeting is enough, we don’t see the need to have this kind of CR. |
| Ericsson | Approach 2 (proponent) | This issue has not been observed in the field, which does not necessarily mean that it does not happen. This issue was brought up by at least one UE vendor that thought this was correct UE behavior. Perhaps this issues it not causing inter-operability problems, but it does generate unnecessary signalling in the network, and reserve unnecessary resources in the gNB. For these reasons we think it should be corrected.  In case this is clarified, we think it should be clarified for both setup and resume.  @ZTE: in the official chairman notes in [R2-2104701](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2//TSGR2_114-e/Docs/R2-2104701.zip) the "no spec change required" based on our comments during offline.  @Samsung: in our view the UE shall also not trigger a second connection establishment procedure, and we think it is not a good idea to capture that in NAS specification. This should at minimum be captured in the chairman notes. |
| LG | None | Agree with Intel that this is corner case and no issues have been identified in the field. Moreover, in R17 SDT, it is currently under discussion whether to trigger a new (legacy) RRC resume procedure while a (SDT) RRC resume procedure is on-going. If any of the CR is agreed, the text may need to be changed later in R17 depending on the outcome of R17 SDT. |
| Nokia | None | Agree with MTK, Intel. This can be captured to Chair notes only “The UE should not start the 2nd RRC resumption procedure when there is a RRC resumption procedure ongoing” |
| vivo | None | Firstly, current agreement “The UE should not start the 2nd RRC resumption procedure when there is a RRC resumption procedure ongoing.”seems to be enough for understanding the UE’s behavior.  Secondly, according to previous email discussion, this is not a big issue(i.e., even though UE sends the second RRC resume request), because the network implementation can handle it. |
| CATT | None | Agree with MTK, for LTE since R8 there is no issue on RRC establishment. |
| ZTE | None | We think no spec change is required according to the consensus from the last meeting:  ‘The UE should not start the 2nd RRC resumption procedure when there is a RRC resumption procedure ongoing (no spec change required)’ |
| Samsung | None | We think the minutes captured in the last meeting seems enough and do not see a strong need to specify it in our specifications.  Regarding the RRC connection establishment procedure, we think it is not valid as upper layers always know whether there is on-going RRC connection establishment procedure or not.  If we decide to have CR, approach 1 is simpler. |
| Apple | None | Capturing the common understanding in chairman notes is sufficient. |

# Conclusions

TBD

# References

1. R2-2104701 RAN2#113bis-e Meeting Report MCC report