**3GPP T****SG-RAN WG2 Meeting #117-electronic R2-220xxxx**

**Online, February 21st - March 3rd, 2022**

**Agenda item: 6.1.3**

**Source: vivo**

**Title: Report of [AT117-e][030][NR16] User-plane Related Corrections**

**Document for: Discussion and Decision**

# 1 Introduction

This contribution is aimed at reporting the discussion and results of the following email discussion:

* [AT117-e][030][NR16] User-plane Related Corrections (vivo)

Scope: Treat R2-2202524, R2-2202110, R2-2202326 (RRC CR), R2-2203484, R2-2203131.

Ph1 Determine agreeable parts. P2 agree CRs for agreeable parts.

Intended outcome: Report, Agreed CRs.

Deadline: Schedule 1

The discussion scope is to gather companies’ views on the contributions [2]-[5]. Companies are invited to provide their views by February 24th (Thursday), 2022, 12:00 UTC for phase-1 discussion.

# 2 Participants

To facilitate this offline discussion amongst the delegates, would you please fill in your name and email address in the table below.

|  |  |
| --- | --- |
| Delegate name | E-mail address |
| Yitao Mo (Stephen) | yitao.mo@vivo.com |
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# 3 Discussion

## 3.1 UL skipping (MAC aspect)

In contribution [2], it is proposed that a procedure level alignment should be introduced to make the branches of both enhanced and legacy UL skipping symmetric (i.e. the two branches for enhanced UL skipping in Rel-16 and legacy UL skipping in Rel-15 should follow a common method of description.). More specifically, the following changes are proposed,

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| **TS 38.321 clause 5.4.3.1.3:**  The MAC entity shall:  1> if the MAC entity is configured with *enhancedSkipUplinkTxDynamic* with value *true* and the grant indicated to the HARQ entity was addressed to a C-RNTI, or if the MAC entity is configured with *enhancedSkipUplinkTxConfigured* with value *true* and the grant indicated to the HARQ entity is a configured uplink grant:  2> if there is no UCI to be multiplexed on this PUSCH transmission as specified in TS 38.213 [6]; and  2> if there is no aperiodic CSI requested for this PUSCH transmission as specified in TS 38.212 [9]; and  2> if the MAC PDU includes zero MAC SDUs; and  2> if the MAC PDU includes only the periodic BSR and there is no data available for any LCG, or the MAC PDU includes only the padding BSR:  3> not generate a MAC PDU for the HARQ entity.  1> else if the MAC entity is configured with *skipUplinkTxDynamic* with value *true* and the grant indicated to the HARQ entity was addressed to a C-RNTI, or the grant indicated to the HARQ entity is a configured uplink grant:  2> if there is no aperiodic CSI requested for this PUSCH transmission as specified in TS 38.212 [9]; and  2> if the MAC PDU includes zero MAC SDUs; and  2> if the MAC PDU includes only the periodic BSR and there is no data available for any LCG, or the MAC PDU includes only the padding BSR:  3> not generate a MAC PDU for the HARQ entity. |

**Q1: Do companies agree with the intention of CR R2-2202524?**

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| --- | --- | --- |
| **Company** | **Yes/No/Comments** | **Detailed comments** |
| Samsung | No strong view | No strong view. The category D CR is not essential but can be merged into other CR? |
| CATT | No | This CR doesn’t fix any critical issue in UE behavior. So it is not needed. |
| vivo | Comments | It is more like editorial correction, rather than essential correction. Anyway, we can follow the majority view. |
| Huawei, HiSilicon | Not essential | We prefer to keep the R15 branch as it is given no functional change |
| Nokia | No need | Cat D CR without behavioral change thus not needed. Same TP was discussed at the time when this was added (RAN2 #113e, R2-2102458) and went with current wording. |
| OPPO | No need | It is just an editorial modification and we prefer to keep the R15 branch. |
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**Summary:**

## 3.2 UL skipping (RRC aspect)

In the LS R2-2202110 [1], it is indicated that RAN1 cannot confirm RAN2’s WA on LCH based priority has higher priority than UL skipping, and would like to inform RAN2 that RAN1 has concluded that when lch-basedPrioritization is configured, Rel-16 UL skipping cannot be enabled in Rel-16. RAN1 expects RAN2 to capture the above configuration restriction in TS 38.331.

Therefore, the correction RRC CR R2-2202326 [3] clarifies that the network does not configure *lch-BasedPrioritization* with *enhancedSkipUplinkTxDynamic* simultaneously nor *lch-BasedPrioritization* with e*nhancedSkipUplinkTxConfigured* simultaneously, as follows,

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| **TS 38.331 sub-clause 6.3.2 *MAC-CellGroupConfig***  ***lch-BasedPrioritization***  If this field is present, the corresponding MAC entity of the UE is configured with prioritization between overlapping grants and between scheduling request and overlapping grants based on LCH priority, see TS 38.321 [3]. The network does not configure *lch-BasedPrioritization* with *enhancedSkipUplinkTxDynamic* simultaneously nor *lch-BasedPrioritization* with *enhancedSkipUplinkTxConfigured* simultaneously. |

**Q2: Do companies agree with the intention of CR R2-2202326?**

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| **Company** | **Yes/No/Comments** | **Detailed comments** |
| Samsung | Yes | We agree that the RAN1 conclusion should be captured. |
| CATT | Yes | RAN1 agreement needs to be captured in RRC as a configuration restriction. |
| vivo | Yes | We agree with the RAN1 suggestion (i.e. capturing the configuration limitation in RRC spec) and are fine with the text proposal. |
| Huawei, HiSilicon | Yes | Fine with us |
| Nokia | Yes |  |
| OPPO | Yes |  |
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**Summary:**

## 3.3 DRX with bundling

According to the current MAC spec, *drx-HARQ-RTT-TimerUL* is started in the first symbol after the end of the first transmission (within a bundle) and *drx-RetransmissionTimerUL* is consequently started when *drx-HARQ-RTT-TimerUL* expires. With this, the gNB can configure the UE to monitor for cancellation indication for early termination of repetitions, which saves some energy for not always transmitting all repetitions but costs some extra energy to monitor for the cancellation indications until a repetition is successful.

In contribution [4], it considers that, for services where the UE energy consumption and coverage performance are of higher importance than the delay (like voice in normal operation), all repetitions are most likely needed. This means that the energy savings by using cancellation indication is much less as most of the time the link adaptation has selected the correct number of repetitions. Based on this, to save UE energy, it is proposed that the *drx-HARQ-RTT-TimerUL* shall be started after the end of the last transmission (within a bundle). The detailed proposal is listed as follows,

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| **Proposal 1: Introduce a new UE capability to allow a new optional RRC parameter to enable the start of the *drx-HARQ-RTT-TimerUL* after the end of the last transmission (within a bundle) instead of after the end of the first transmission (within a bundle).** |

**Q3: Do companies agree with the proposal 1 given in R2-2203484?**

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| --- | --- | --- |
| **Company** | **Yes/No/Comments** | **Detailed comments** |
| Samsung | No | - This proposal is an optimization for infrequent case (high repetition factor and very short DRX Retransmission Timer, so we think it’s not an essential correction. Also note that, in most cases, when PDCCH for new transmission is received, *drx-InactivityTimer* is restarted and all retransmissions will occur while *drx-InactivityTimer* is running, so the proposal seems to optimize the infrequent case.  - Considering practically used value of the Retransmission Timer, e.g. sl6-sl16, UE can most likely have a change for retransmission.  - It has been almost two years since Rel-16 stage-3 is frozen. This late-stage change is not desirable. |
| CATT | No | This is a non-critical optimization. |
| vivo | Comments | We share a similar with Samsung and CATT that the proposal is a further optimization, instead of essential correction for Rel-16 spec. In this sense, we think it might be better to postpone this discussion in Rel-16 and move this to TEI 17 session. |
| Huawei, HiSilicon | Agree with the intention | We share the intention of this proposal, which is similar to what CE topic discussed for CR timer in support of Msg3 repetition. |
| Nokia | Yes |  |
| OPPO | No | Similar view as Samsung |
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**Summary:**

If this proposal 1 is agreeable, to avoid NBC change, some backwards compatible modifications on TS 321/331/306 are needed. So, the following questions are whether the proposed text proposals in the appendix of [4] are agreeable or not.

**Q4: If companies agree with the Proposal 1, do you agree with the TP given in R2-2203484?**

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| --- | --- | --- | --- | --- |
| **Company** | **For 321 TP**  **Yes/**  **No/**  **Comments** | **For 331 TP**  **Yes/**  **No/**  **Comments** | **For 306 TP**  **Yes/**  **No/**  **Comments** | **Detailed comments** |
| Nokia | Yes | Yes | Yes |  |
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**Summary:**

## 3.4 Joint EHC and RoHC

In the RAN2#116 e-meeting, there was an offline discussion on joint EHC and RoHC for the case when EHC and RoHC are joint configured for a DRB and where “Type” field is not present (“Length” is used instead) in the Ethernet header. Unfortunately, no agreement was achieved. Hence, it might be beneficial to have common understandings in RAN2 to align the behavior in such a case.

In contribution [5], it is proposed that the most robust and clean solution would be always bypass RoHC for the Ethernet packet when “Type” field is not present for both EHC compressor and decompressor. The corresponding proposals are listed as follows,

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| **Proposal 1: RAN2 recommends both EHC compressor and decompressor to bypass RoHC for the Ethernet packet where “Type” field is not present, when joint EHC and RoHC is configured for a DRB.**  **Proposal 2: To capture above into the chair notes.** |

**Q5: Do companies agree with the Proposal 1 and/or Proposal 2 given above?**

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| --- | --- | --- | --- |
| **Company** | **For P1**  **Yes/**  **No/**  **Comments** | **For P2**  **Yes/**  **No/**  **Comments** | **Detailed comments** |
| Samsung | Yes | Yes | We are fine to capture it in the chair notes or 38.323. |
| CATT | No | No | The case when Type field is absent is marginal. And it can be solved by NW implementation that gNB does not configure joint EHC and ROHC for such (rare) traffic types. |
| vivo | No | No | We are wondering whether the mentioned case really exists. In our understanding, as per TS 24.501, optional header compression of IP data and Ethernet data can only be applied to PDU sessions with IP PDU session type and Ethernet PDU session type. Further, the Ethernet PDU session type can only be supported only if EtherType is defined. In this sense, if the type is absent, we assume there would be no available Ethernet PDU session. Consequently, EHC protocol cannot be used. It means the mentioned case doesn’t exist at all. If we would like to resolve this issue, sending an LS to CT1 checking whether this case is valid or not is required. 6.2.2 PDU session types The following PDU Session types are supported:  a) IPv4;  b) IPv6;  c) IPv4v6;  d) Ethernet (EtherType as defined in IEEE Std 802.3 [31A]); and  e) Unstructured. |
| Huawei, HiSilicon | Yes but | Yes but | We are also not sure if this case is rare, but if this is the case, we believe bypass ROHC would be the simpliest solution for implementation. Regarding the CT1 spec as indicated by vivo, we are not sure if d) Ethernet (EtherType as dfined in IEEE Std 802.3 [31A]) means EtherType field should be always present. As discussed in the previous e-meeting, there might be the case that there will be LLC/SNAP fields following the Ethernet header indicating the EtherType. But we are not sure if this is true for all Ethernet packets in the market. |
| OPPO | No | No | We understand that in most cases Type field is present since Ethernet II is widely used in the market. On the other hand, if the Type/Length field is represented as Length, we think that the packet type can also be aware by further checking e.g. LLC/SNAP field, as we mentioned in the previous e-meeting. With this further information, the PDCP can know whether to bypass RoHC.  Our understanding of the current text of "If a PDCP SDU including non-IP Ethernet packet is received from upper layers, the EHC compressor shall bypass the ROHC compressor" is that the EHC (de)compressor can identify the packet type no matter "Type" or "Length" field applies, although the details on how to identify the packet type are not captured. Thus, we do not expect anything more to be reflected in the spec or chair notes. |
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**Summary:**

# 4 Conclusion

The contribution is summarized with proposals as follows,

*Phase 1:*

# 5 Reference

1. R2-2202110, Reply LS on UL skipping with LCH prioritization (R1-2112862; contact: vivo).
2. R2-2202524, Procedure level alignment of UL skipping, Apple.
3. R2-2202326, Correction on UL skipping with LCH Prioritization in Rel-16, vivo.
4. R2-2203484, Correction to DRX operation with bundling controlled in the DCI, Ericsson, Nokia, T-Mobile USA, Verizon, Docomo.
5. R2-2203131, Joint EHC and RoHC when Type is not present in Ethernet header, Huawei, HiSilicon.