**3GPP TSG-RAN WG2 Meeting#109bis electronic R2-200xxxx**

**20th - 30th April, 2020**

**Source: ZTE Corporation, Sanechips**

**Title: draft\_Report of offline [AT109bis-e][108][RACS] Stage 3 CRs (ZTE)**

**Agenda item:** **6.5.1**

**Document for:** **Discussion and Decision**

# Introduction

This is the report for the following offline discussion:

* **[AT109bis-e][108][RACS] Stage 3 CRs (ZTE)**

Scope: discuss the 36.331 and 38.331 CRs in [R2-2003290](file:///C:\\Data\\3GPP\\Extracts\\R2-2003290_38.331_(REL_16)_CR1553_Correction%20to%20transfer%20of%20UE%20capabilities%20at%20HO%20forRACS%20(38.331).docx" \o "C:Data3GPPExtractsR2-2003290_38.331_(REL_16)_CR1553_Correction to transfer of UE capabilities at HO forRACS (38.331).docx) and [R2-2003305](file:///C:\\Data\\3GPP\\Extracts\\R2-2003305.docx" \o "C:Data3GPPExtractsR2-2003305.docx) and the additional proposals in [R2-2002881](file:///C:\\Data\\3GPP\\Extracts\\R2-2002881.doc" \o "C:Data3GPPExtractsR2-2002881.doc) and [R2-2003471](file:///C:\\Data\\3GPP\\Extracts\\R2-2003471%20UE%20capability%20indication%20for%20segmentation.doc" \o "C:Data3GPPExtractsR2-2003471 UE capability indication for segmentation.doc)

Intended outcome: In-principle agreed 36.331 and 38.331 CRs

Deadline for companies' feedback: Thursday 2020-04-23 10:00 UTC

Deadline for rapporteur version for agreement: Friday 2020-04-24 10:00 UTC

# Stage 3 CRs

## **38.331 CR (R2-2003290)**

RAN2 understand that it is optional to include UE radio access capabilities in the *HandoverPreparationInformation* message when RACS is supported and UE Radio Capability ID is used and sent an LS from RAN2#109-e to SA2 [1] about that.

Based on the ASN.1, it is already optional, but there is a note specifying which UE capabilites shall be sent, so the note needs to be updated for the RACS case. The following changes are proposed [2].

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– *HandoverPreparationInformation*

This message is used to transfer the NR RRC information used by the target gNB during handover preparation or UE context retrieval, e.g. in case of resume or re-establishment, including UE capability information. This message is also used for transferring the information between the CU and DU.

\*\*\*\*\*\*\*\*\*omitted unchanged parts\*\*\*\*\*\*\*\*\*

NOTE 1: The following table indicates per source RAT whether RAT capabilities are included or not when UE Radio Capability ID as specified in 23.502 [X] is not used for the UE. If UE Radio Capability ID is used for the UE, all UE radio access capabilities are optional.

|  |  |  |  |
| --- | --- | --- | --- |
| **Source RAT** | **NR capabilites** | **E-UTRA capabilities** | **MR-DC capabilities** |
| NR | Included | May be included | May be included |
| E-UTRAN | Included | May be included | May be included |

NOTE 2: The following table indicates, in case of inter-RAT handover from E-UTRA, which additional IEs are included or not:

|  |  |  |  |
| --- | --- | --- | --- |
| **Source system** | **sourceConfig** | **rrm-Config** | **as-Context** |
| E-UTRA/EPC | Not included | May be included | Not included |
| E-UTRA/5GC | May be included, but only *radioBearerConfig* is included in the *RRCReconfiguration*. | May be included | Not included |

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**Q1) Do companies agree with the above change in TS38.331?**

|  |  |  |
| --- | --- | --- |
| **Company name** | **Yes/No** | **Comments** |
| Ericsson | Agree with intention. | After further consideration we think that a NOTE is not the most appropriate way to capture this. NOTEs are informative but this behavior described in the addition to the NOTE seem to talk about normative behavior.  The tables below the NOTE says that the capabilities are included (always). The NOTE however says that the capabilities are optionally included when the RACS ID is used.  Perhaps a better way would be something along the lines of the following:   |  |  |  |  | | --- | --- | --- | --- | | **Source RAT** | **NR capabilites** | **E-UTRA capabilities** | **MR-DC capabilities** | | NR | May be included if UE Radio Capability ID is ~~not~~ used for the UE. Included otherwise. | May be included | May be included | | E-UTRAN | May be included if UE Radio Capability ID is ~~not~~ used for the UE. Included otherwise. | May be included | May be included |   **Additional input 2020-04-22 10:20 CET:**   1. **Our suggested change**   I think we had a "not" to much above. See yellow highlight.   1. **Apple comment**   On the Apple-comment, we believe think that the "May be included" for E-UTRA and MR-DC already covers that these capabilities are optionally included. So far we have not seen a need to change these.   1. **To note or not to note**   Some people seem to indicate that we should capture it as a NOTE. However, here is an excerpt from 21.801: 6.5 Other informative elements6.5.1 Notes and examples integrated in the text Notes and examples integrated in the text of a 3GPP TS or 3GPP TR shall only be used for giving additional information intended to assist the understanding or use of the 3GPP TS or 3GPP TR. They shall not contain provisions to which it is necessary to conform in order to be able to claim compliance with a 3G TS.  The non-NOTE part for this states that the NR capabilities are included (full stop). Or in other words, the specification mandates them to be included. An informative NOTE cannot change this by saying the opposite thing, i.e. that they are not included (in some cases). Notes are informative and cannot contradict what the normative part of the specifications says.  We are, as said, fully supportive the intention of this change. Strictly, the approach with the NOTE is not actually capturing this change since the normative part of the spec still says that the capabilities are (unconditionally) included.  If our particular proposal above is not preferred by others, we are certainly open to find other approaches, as long as we adhere to the drafting rules. |
| Apple | Agree with intention | But we have a slightly different understanding compared to Ericsson. As per the 38.300 CR, R2-2001688, UE may include the ID to indicate its radio capabilities **for one or more RATs**.  *“If supported by the UE and the network, the UE may provide an ID in NAS signalling that represents its radio capabilities for one or more RATs in order to reduce signalling overhead. The ID may be assigned either by the manufacturer or by the serving PLMN. “*  So does the above proposal from Ericsson needs to include EUTRA and MR-DC capabilities as well ? |
| Samsung | Agree with intention | We don’t have strong view how it is captured.  Above change mainly indicates that UE ID may be sufficient based on SA2 response i.e. NR not mandatory to include the UE capability information in HandoverPreparationInformation.  Note that ASN.1 supports UE-CapabilityRAT-ContainerList with 0 entries, so it seems the proposed change is valid. |
| MediaTek | Agree with original proposal | Regarding Apple’s comment, we understand that E-UTRA and MR-DC capabilities are already indicated as optional (“May be included” in the table) and therefore no change is needed for these RATs.  We understand that Ericsson’s proposed change captures the same information as the original proposal; we find the single edit to the NOTE to be clearer and would slightly prefer to stick with this formulation. |
| Lenovo | Agree with the intention | Some minor corrections to the proposed note can be made: Spec reference for TS 23.502 is [43]. Furthermore, to be consistent “all UE radio access capabilities” can be replaced by “all RAT capabilities”. |
| Qualcomm Incorporated | Agree |  |
| Huawei | Agree | Slightly prefer that “all UE radio access capabilities” can be replaced by “all RAT capabilities” indicated by Lenovo. |
| CATT | Agree |  |
| ZTE | Agree | Also agree to capture it formally as suggested by Ericsson. |

## **36.331 CR (R2-2003305)**

Similarly, RAN2 understand that it is optional to include UE radio access capabilities in the *HandoverPreparationInformation* message when transferring EUTRA RRC information used by the target eNB or target ng-eNB if RACS is supported and UE Radio Capability ID is used. The following changes are proposed [3] to update the note about presence of the UE radio capabilities in *HandoverPreparationInformation* message.

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– *HandoverPreparationInformation*

This message is used to transfer the E-UTRA RRC information used by the target eNB or target ng-eNB during handover preparation or UE context retrieval, e.g. in case of resume or re-establishment, including UE capability information.

Direction: source eNB/ source RAN to target eNB or target ng-eNB

\*\*\*\*\*\*\*\*\*omitted unchanged parts\*\*\*\*\*\*\*\*\*

NOTE 1: The source typically sets the *ue-ConfigRelease* to the release corresponding with the current dedicated radio configuration. The source may however also consider the common radio resource configuration e.g. in case interoperability problems would appear if the UE temporary continues extensions of this part of the configuration in a target PCell not supporting them.

NOTE 2: The following table indicates per source RAT whether RAT capabilities are included or not when UE Radio Capability ID as specified in 23.502 [X] is not used for the UE. If UE Radio Capability ID is used for the UE, all UE radio access capabilities are optional for handover from E-UTRAN or NR.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Source RAT** | **E-UTRA capabilites** | **UTRA capabilities** | **GERAN capabilities** | **MR DC capabilities** | **NR capabilities** |
| UTRAN | Included | May be included, ignored by eNB if received | May be included | Excluded | Excluded |
| GERAN CS | Excluded | May be included, ignored by eNB if received | Included | Excluded | Excluded |
| GERAN PS | Excluded | May be included, ignored by eNB if received | Included | Excluded | Excluded |
| E-UTRAN | Included | May be included | May be included | May be included | May be included |
| NR | Included | Excluded | Excluded | May be included | May be included |

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**Q2) Do companies agree with the above change in TS36.331?**

|  |  |  |
| --- | --- | --- |
| **Company name** | **Yes/No** | **Comments** |
| Ericsson | Agree with intention. | See comment above. |
| Apple | Agree with intention. | See our comment above. |
| Samsung | Agree with intention. | See our comment above. |
| MediaTek | Agree with original proposal | See comment above. |
| Lenovo | Agree with intention | Some minor corrections to the proposed note can be made: Spec reference for TS 23.502 is [102]. Furthermore, to be consistent “all UE radio access capabilities” can be replaced by “all RAT capabilities”. |
| Qualcomm Incorporated | Agree |  |
| Huawei | Agree | See our comment above. |
| CATT | Agree |  |
| ZTE | Agree | See our comments above. |

# New proposals

## **Issue 1: Transmission of UE capability information message in SRB2 if segmented**

With the assumption that the segmented *UECapabilityInformation* message may block the transfer of other important SRB1 message e.g. measurement report, it has been proposed in [3] that UE capability information message should be transmitted in SRB1 if not segmented and in SRB2 if segmented to avoid the future blocking problem i.e. not transmitting the important UL message.

**Q3) Do companies agree that the UE capability information message should be transmitted in SRB2 if it is segmented to avoid future blocking problem?**

|  |  |  |
| --- | --- | --- |
| **Company name** | **Yes/No** | **Comments** |
| Ericsson | No | It is too late. |
| Apple | No | Agree it is late. Also, the unsegmented total message length should not be the criteria for SRB1 or SRB2 distinction. |
| Samsung | Yes | It is no harm to use SRB2 for ULDedicatedMessageSegment because it avoids the future problems without any additional burden in terms of procedure/ASN.1, so it can be easily updated with no impact if RAN2 agree.  In addition, we have other cases that UEInformationResponse where SRB2 is used for large size (logged measurements) |
| MediaTek | No | We consider that any potential blocking problem is not a big deal because (1) UE capability is not exchanged frequently, and (2) not much can be done while waiting for the UE capability anyway. |
| Lenovo | No | Upon request by network, we wonder why the transfer of UE capability information should have lower priority than other messages sent over SRB1. Furthermore, the amount of UE capability signaling and thus number of segments can be controlled by network by setting the filter criteria appropriately. |
| Qualcomm Incorporated | No | The critical scenario mentioned in the corresponding paper requires further discussion, which seems not desirable at this late stage. If we allow Measurement Report to go through and handover to take place, how does the handover procedure work; handover without the up to date UE capability? |
| Huawei | No | It is late and we don’t see critical issue. |
| CATT | No | We share MediaTek’s view. It is not so critical. |
| ZTE | No | Transmitting longer UE capabilities over SRB2 looks like a down prioritization of such message. We cannot understand why we down prioritize a message because of its size. |

## **Issue 2: Indicating UE’s support for segmentation**

With the understanding that knowing UE’s support for capability information segmentation might be helpful for the network to decide how to enquire the UE capabilities, it has been proposed in [5] that the UE should report the capability of supporting segmentation to the gNB/eNB before the gNB/eNB sends the *UECapabilityEnquiry* message.

**Q4) Do companies agree that UE should indicate support for segmentation to the network before network sends the *UECapabilityEnquiry* message?**

|  |  |  |
| --- | --- | --- |
| **Company name** | **Yes/No** | **Comments** |
| Ericsson | No | It is too late. |
| Apple | No | The proposal is reasonable, but is not necessarily required to make this feature work. |
| Samsung | No | We don’t have strong motivation to introduce this new indicator, i.e. it seems too much of an enhancement. |
| MediaTek | No | We see this as an optimisation. |
| Lenovo | No | This is a late enhancement. |
| Qualcomm Incorporated | Yes | The proposal indeed makes sense.  The form of UE Capability Enquiry that the network wants to apply, e.g. which RATs to request and what filters to use, can be different depending on whether the UE supports segmentation or not. The network aggressively assuming the UE support for UL segmentation can result in repeated UE Capability Enquiry procedures. |
| Huawei | Yes (our CR) | We have concerns it would have negative impacts on the legacy Rel-15 UEs if the NW cannot know the UE capability of supporting segmentation. The NW may set the filter inappropriately. |
| CATT | No | This is an optimization and it could not resolve the existing issue completely. The size of *UECapabilityInformation* message for each RAT is not fixed. The gNB/eNB can’t decide whether the *UECapabilityInformation* message should be segmented. Hence, it is unnecessary to introduce the indication to indicate whether UE supports for segmentation to the network. |
| ZTE | No strong view. | If the segmentation is supported by both NW and UE, then the UE should process the segmentation. Otherwise, it is up to UE implementation to reduce either the band combination of feature set of each band combination (it can be left to UE implementation or specified in specs with some guideline).  With this capability, the NW can determine whether to retrieve the capability by multiple capability enquire procedures with different filter. It maybe useful in some cases, even in most cases the frequency band supported by an operator is quite limited and the capability segmentation is not needed. |

# Conclusion

***To be added.***

# References

1. R2-2001891 LS on RACS and signaling of UE capabilities at handover(contact: Ericsson)
2. R2-2003290 Correction to transfer of UE capabilities at HO for RACS(38.331) ZTE Corporation, Ericsson,MediaTek Inc.,Sanechips
3. R2-2003305 Correction to transfer of UE capabilities at HO for RACS (36.331) MediaTek Inc., Ericsson, ZTE Corporation, Sanechips
4. R2-2002881 Transfer of segmented UECapabilityInformation by SRB2 Samsung
5. R2-2003471 UE capability indication for segmentation Huawei, HiSilicon