3GPP TSG-RAN WG2 #117-e Tdoc R2-220XXXX

Electronic meeting, Feb 21st – Mar 3rd, 2022

Agenda Item: 8.12.2.2.1

Source: Apple Inc.

Title: Email discussion report for [AT117-e][114][RedCap] Inter-RAT HO (Apple)

Document for: Discussion, Decision

# 1 Introduction

Following the online meeting the below offline is triggered. This document intends to collect companies feedback and attempt at a (set of) proposal(s) related to the interRAT handover for RedCap UEs.

* [AT117-e][114][RedCap] inter-RAT HO (Apple)

Scope: Discuss inter-RAT HO from LTE to NR aspects

Intended outcome: Summary of the offline discussion with e.g.:

* + - List of proposals for agreement (if any)
    - List of proposals that require online discussions
    - List of proposals that should not be pursued (if any)

Deadline (for companies' feedback): Tuesday 2022-03-01 1200 UTC

Deadline (for rapporteur's summary in R2-2203564): Tuesday 2022-03-01 1800 UTC

Proposals marked "for agreement" in R2-2203564 not challenged until Wednesday 2022-03-02 1000 UTC will be declared as agreed via email by the session chair (for the rest the discussion might continue offline).

Contact information

|  |  |
| --- | --- |
| Company | Contact person - [email@address.com](mailto:email@address.com) |
| Apple | Naveen Palle – naveen.palle@apple.com |
| Huawei, HiSilicon | Yulong (shiyulong5@huawei.com) |
| Samsung | Jaehyuk Jang (jack.jang@samsung.com) |
| OPPO | Haitao Li (lihaitao@oppo.com) |
| CATT | Xiangdong Zhang ([zhangxiangdong@catt.cn](mailto:zhangxiangdong@catt.cn)) |
| Futurewei | Yunsong Yang (yyang1@futurewei.com) |
| Intel | Yi.guo@intel.com |
| InterDigital | Keiichi Kubota ([keiichi.kubota@interdigital](mailto:keiichi.kubota@interdigital).com) |
| vivo | Chenli(Chenli5g@vivo.com) |
| Sequans | Noam Cayron (noam.cayron@sequans.com) |
| Ericsson | Tuomas Tirronen (@ericsson.com) |
| BT | Salva Diaz (salva.diazsendra@bt.com) |
| Nokia | Jussi Koskinen (jussi-pekka.koskinen@nokia.com) |

# 2 Discussion

There are three contributions related to the below FFS from the last meeting.

Agreements online:

1. For the LTE to NR handover, in case the target NR cell is a legacy cell, the RedCap UE should trigger RRC re-establishment procedure. FFS any specification impact or purely leave to implementation

[1] [R2-2203712](file:///C:\Data\3GPP\Extracts\R2-2203712%20Inter-RAT%20mobility%20from%20LTE%20to%20NR_v1.doc) Inter-RAT mobility from LTE to NR Huawei, HiSilicon, BT Plc, CATT, Sequans discussion Rel-17 NR\_redcap-Core

[2] [R2-2202530](file:///C:\Data\3GPP\Extracts\R2-2202530_lte-handover-redcap.docx) On the EUTRA handover to NR for RedCap Ues Apple discussion Rel-17 NR\_redcap-Core

[3] [R2-2202654](file:///C:\Data\3GPP\Extracts\R2-2202654%20On%20inter-RAT%20handover%20for%20RedCap%20UEs.docx) On inter-RAT handover for RedCap Ues ZTE Corporation, Sanechips discussion Rel-17 NR\_redcap-Core

[4] R2-2203355 Handover from E-UTRA from legacy eNB to legacy gNB Ericsson

[5] R2-2202316 Discussion on remaining issues on RRC aspects for RedCap vivo

### 2.1 Spec support or UE implementation

Two papers [2] [3] suggest for UE implementation based approach, while [3] also proposes a complete solution (instead of re-establishment) with an approach related to UE capability of RedCap. [1] proposes two options where both of these have impact to specification.

**Q 2.1.1** Do companies prefer an approach that is purely UE implementation based for this inter-RAT issue or do companies prefer a change to standards to address this?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Company** | **UE implementation is enough** | **Network implementation is enough (R2-2203355)** | **At least some specification impact is needed** | **Any additional comments?** |
| Qualcomm | Yes |  | No | Option 1 from R2-2203712 is not needed, because UE itself is capable of determining whether the target cell supports RedCap or not.  We can consider adding the Note proposed in R2-2203712 (but replace “should” by “may”), if all companies support it.  For issues described in R2-2202654, we believe they can be handled by network implementation. |
| Huawei, HiSilicon | No |  | Yes | Agree with QC that option 2 in R2-2203712 with NOTE is needed. |
| Samsung | Yes |  | No | Even the NOTE would not be needed as that would be the consequence. |
| OPPO | Yes |  | No | Same view as Samsung. |
| CATT | No |  | Yes | The option 2 in R2-2203712 with NOTE is needed. |
| Futurewei | No |  | Yes | Same view as CATT. |
| Intel | No | Yes | No | We prefer network implementation based approach mentioned by R2-2203355 (without specification impact). |
| Apple | Yes |  | No |  |
| InterDigital | Yes |  | No | This is a special case. If a targe cell is not supported by the UE, then the UE won’t be able to move there naturally. We don’t specify any UE behaviour for every single case of unsupported cell. |
| vivo | No | No | Yes | In our understanding, the agreement quoted by the rapporteur already implies a new trigger of RRC Re-establishment should be introduced. |
| Sequans | No | No | Yes | The quoted agreement itself implies that we should at the very least implement option 2 in R2-2203712, but as normative text; without it the UE may access in the “fallback” manner already rejected by RAN2.  We would have preferred one of the other solutions, but it is clear there is not enough support for them.  NW implementation solutions presented are only partial or very light on details. |
| Ericsson | No | Yes | No | UE based solution cannot alone resolve the issue of starting HO towards non-supporting cell to start with, and does not prevent consecutive and systematic HO attempts towards non-supporting cell.  To us it is clear the UE should, in any case, initiate RRC re-establishment when there is no support for the UE in the cell, but this is not a new behaviour and we don’t think any changes in the specs are needed. |
| BT | No |  | Yes | It is quite likelihood that first RedCap UEs are compliant with non-RedCap cells. In this scenario, UE implementation is not enough.  Option 2: if “should” is changed by “can” as suggested by QC, the result is that it won’t be possible to have a predictable delay in areas or frequencies with non-RedCap cells. |
| Nokia | Yes | No | No | If a target cell configuration is not supported by the UE the UE will perform re-establishment procedure. Nothing new needs to be specified. |

**Summary – Q 2.1.1**

TBD

Based on the observations above, the rapporteur proposes the following:

1. ???

**Q 2.1.2** If you answer to Q2.1.1 is that some specification impact is needed, pls provide your views on each of the below.

**Option 1 from** [**R2-2203712**](file:///C:\Data\3GPP\Extracts\R2-2203712%20Inter-RAT%20mobility%20from%20LTE%20to%20NR_v1.doc)**:** **The target NR cell, supporting RedCap and allowing the access of this RedCap UE, adds a new indication in the HO command sent to the RedCap UE. The RedCap UE should trigger RRC re-establishment if the indication is absent.**

**Option 2 from** [**R2-2203712**](file:///C:\Data\3GPP\Extracts\R2-2203712%20Inter-RAT%20mobility%20from%20LTE%20to%20NR_v1.doc)**: Add a NOTE in the spec that The UE should trigger RRC re-establishment if the target NR cell does not support RedCap, by considering the configuration (e.g. *intraFreqReselectionRedCap-r17*) in SIB1 of the target cell.**

**Proposal 2 from** [**R2-2202654**](file:///C:\Data\3GPP\Extracts\R2-2202654%20On%20inter-RAT%20handover%20for%20RedCap%20UEs.docx)**: RAN2 should discuss and specify a complete solution solving the inter-RAT handover issue, only triggering RRC re-establishment is insufficient.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Company** | **Option [1] from**  [R2-2203712](file:///C:\Data\3GPP\Extracts\R2-2203712%20Inter-RAT%20mobility%20from%20LTE%20to%20NR_v1.doc) | **Option [2] from**  [R2-2203712](file:///C:\Data\3GPP\Extracts\R2-2203712%20Inter-RAT%20mobility%20from%20LTE%20to%20NR_v1.doc) | **Proposal 2 from**  [R2-2202654](file:///C:\Data\3GPP\Extracts\R2-2202654%20On%20inter-RAT%20handover%20for%20RedCap%20UEs.docx) | **Any additional comments?** |
| Huawei, HiSilicon | Fine, but it requires more spec impact.  Sure, the benefit is clear on shorter interruption, compared with option 2. | Preferred.  This is just to capture the agreement. | Intention is good. But it requires more discussion with approach 2. | The main case to be addressed is “legacy eNB without upgrade HO to legacy gNB” |
| CATT |  | Preferred  Considering the low probability of the target scenario, and the left time of Rel-17, we think this option can be an acceptable compromise of signaling overhead and specification work. |  |  |
| Futurewei |  | Same view as CATT. |  |  |
| vivo | Not preferred, acceptable if majority prefer this. | Preferred | disagree | We should avoid big impact to spec at this late stage of Rel-17.  Option 1 from  [R2-2203712](file:///C:\Data\3GPP\Extracts\R2-2203712%20Inter-RAT%20mobility%20from%20LTE%20to%20NR_v1.doc) has more impacts than Option 2 form [R2-2203712](file:///C:\Data\3GPP\Extracts\R2-2203712%20Inter-RAT%20mobility%20from%20LTE%20to%20NR_v1.doc).  For Proposal 2 from  [R2-2202654](file:///C:\Data\3GPP\Extracts\R2-2202654%20On%20inter-RAT%20handover%20for%20RedCap%20UEs.docx), it is not clear to us what the complete solution is. Hence, there is a risk to select this solution given limited time left. |
| Sequans | Preferred.  Rather minimal spec impact with speed and power saving upsides of not having to read SIB1. | Acceptable,  if majority agrees, but should be normative.  Most minimal spec impact. | Fine.  Probably best solution in principle, but no chance to have it agreed as it has the most spec impact of all solutions. |  |
| Ericsson |  | If anything is really needed, this is acceptable to us |  |  |
| BT | Preferred to reduce the interruption time | Preferred to reduce complexity but a predictable behavior is needed when the network is engineered and the KPIs are evaluated. Hence “should” needs to be kept for obvious reasons. To ensure a predictable behavior, “should” will be replaced by “have to” or “must” but we can compromise. |  | BT can accept either option 1 or option 2 of R2-2203712 |
| Nokia |  | If something is agreed to be specified then some note like this is acceptable to us. However no need to specify that SIB1 with certain *intraFreqReselectionRedCap-r17* triggers re-establishment. In some cases UE can determine from the HO command whether RedCap is supported e.g. based on the BW. |  |  |

**Summary – Q 2.1.2**

TBD

Based on the observations above, the rapporteur proposes the following:

1. ???

# 3 Conclusion

Based on the discussion above the following proposals have been made:

[Proposal 1 ???](#_Toc96429434)

[Proposal 2 ???](#_Toc96429435)

[Proposal 3 ???](#_Toc96429436)

# References

[1] [R2-2203712](file:///C:\Data\3GPP\Extracts\R2-2203712%20Inter-RAT%20mobility%20from%20LTE%20to%20NR_v1.doc) Inter-RAT mobility from LTE to NR Huawei, HiSilicon, BT Plc, CATT, Sequans discussion Rel-17 NR\_redcap-Core

[2] [R2-2202530](file:///C:\Data\3GPP\Extracts\R2-2202530_lte-handover-redcap.docx) On the EUTRA handover to NR for RedCap UEs Apple discussion Rel-17 NR\_redcap-Core

[3] [R2-2202654](file:///C:\Data\3GPP\Extracts\R2-2202654%20On%20inter-RAT%20handover%20for%20RedCap%20UEs.docx) On inter-RAT handover for RedCap UEs ZTE Corporation, Sanechips discussion Rel-17 NR\_redcap-Core

[4] [R2-2202316](file:///C:\\Data\\3GPP\\Extracts\\R2-2202316_Discussion%20on%20remaining%20issues%20on%20RRC%20aspects%20for%20RedCap.doc" \o "C:Data3GPPExtractsR2-2202316_Discussion on remaining issues on RRC aspects for RedCap.doc) Discussion on remaining issues on RRC aspects for RedCap vivo, Guangdong Genius discussion Rel-17 NR\_redcap-Core