**3GPP TSG-RAN WG4 Meeting # 96-e R4-2012061**

**Electronic Meeting, 17 – 28 August., 2020**

**Agenda item:** 6.3

**Source:** Moderator (Nokia, Nokia Shanghai Bell)

**Title:** Email discussion summary for [96e][230] LTE feMob RRM

**Document for:** Information

# Introduction

*Briefly introduce background, the scope of this email discussion and provide some guidelines for email discussion if necessary.*

In RAN4#95e meeting, we have agreed all the core requirements for LTE mobility enhancement and the plan for performance requirements, the agreement and the plan were captured in the 2nd round email discussion summary R4-200993 and way forward R4-2009135. This email summary and way forward will be the input for this topic in RAN4#96e meeting.

According to the meeting agenda, we will have 2 topics for discussion:

* Core requirements
* Performance requirements

*List of candidate target of email discussion for 1st round and 2nd round*

* 1st round: Discuss the core requirements and the test cases for performance requirements. Get agreement on the core requirements, Get agreement on the test cases for performance requirements if possible.
* 2nd round: Get agreements on the remaining open issues after 1st round discussion. Get agreement on the CRs for performance requirements.

# Topic #1: Core requirements

*Main technical topic overview. The structure can be done based on sub-agenda basis.*

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2011127 | Huawei, Hisilicon | CR for correct Tinterrupt1 for async intra-frequency DAPS handover when the bandwidth of target cell is no larger than the bandwidth of source cell. |

## Open issues summary

*Before e-Meeting, moderators shall summarize list of open issues, candidate options and possible WF (if applicable) based on companies’ contributions.*

No open issues. Provide comments on CR directly in 1.3.2.

## Companies views’ collection for 1st round

### Open issues

No open issues. Provide comments on CRs directly.

### CRs/TPs comments collection

*Major close-to-finalize WIs and Rel-15 maintenance, comments collections can be arranged for TPs and CRs. For Rel-16 on-going WIs, suggest to focus on open issues discussion on 1st round.*

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| R4-2011127 | Ericsson : We don’t think additional 1ms time would be needed because the UE can time the switch to occur on a source cell slot boundary, and then regarding the target cell, this should be part of Tiu (RACH uncertainty) anyway |
| Intel: the change is fine. |
| Qualcomm: Proposed change is ok. |
|  | Huawei: to Ericsson, it is agreement in R4-2008585   * **Issue 1-1:** interruption requirements for **async** intra-frequency DAPS HO. * Agreement: one more slot of interruption is allowed compared to sync scenario   The CR is aligned with the agreements. |

## Summary for 1st round

### Open issues

*Moderator tries to summarize discussion status for 1st round, list all the identified open issues and tentative agreements or candidate options and suggestion for 2nd round i.e. WF assignment.*

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| --- | --- |
|  | **Status summary** |
| **Sub-topic#1** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |

*Recommendations on WF/LS assignment*

|  |  |  |
| --- | --- | --- |
|  | **WF/LS t-doc Title** | **Assigned Company,**  **WF or LS lead** |
| #1 |  |  |

### CRs/TPs

*Moderator tries to summarize discussion status for 1st round and provides recommendation on CRs/TPs Status update*

|  |  |
| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation** |
| XXX | *Based on 1st round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |
| R4-2011127 | Suggest to be agreeable |

## Discussion on 2nd round (if applicable)

## Summary on 2nd round (if applicable)

*Moderator tries to summarize discussion status for 2nd round and provided recommendation on CRs/TPs/WFs/LSs Status update suggestion*

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| --- | --- |
| **CR/TP/LS/WF number** | **T-doc Status update recommendation** |
| XXX | *Based on 2nd round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |

# Topic #2: Performance requirements

*Main technical topic overview. The structure can be done based on sub-agenda basis.*

## Companies’ contributions summary

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| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2011128 | Huawei, Hisilicon | **Proposal 1**: It is suggested that the DAPS handover tests consist of three successive time periods.   * The time duration T1 is the preparation period for the test. * During time duration T2, the handover delay Dhandover1 and the interruption time Tinterrupt1 for target cell addition need to be tested. * During time duration T3, the handover delay Dhandover2 and the interruption time Tinterrupt2 for source cell release need to be tested.   **Proposal 2**: The UE capable of synchronous DAPS handover needs to be tested in synchronous scenario.  **Proposal 3**: The UE capable of asynchronous DAPS handover needs to be tested in asynchronous scenario. |
| R4-2009885 | Qualcomm Incorporated | CR to introduce test cases for intra-frequency DAPS handover.   1. Adding LTE FDD-FDD intra-frequency DAPS HO test case (async) 2. Adding LTE TDD-TDD intra-frequency DAPS HO test case (sync) |
| R4-2011129 | Huawei, Hisilicon | CR to introduce test cases for inter-frequency DAPS handover.   * Intra-band Inter-frequency sync DAPS handover test for FDD-FDD * Intra-band Inter-frequency async DAPS handover test for FDD-FDD * Inter-band Inter-frequency sync DAPS handover test for FDD-FDD * Inter-band Inter-frequency async DAPS handover test for FDD-FDD |
| R4-2011432 | Nokia, Nokia Shanghai Bell | CR to introduce test cases for conditional handover.   * E-UTRAN FDD – FDD Intra-frequency conditional handover * E-UTRAN FDD – FDD Inter-frequency conditional handover |

## Open issues summary

*Before e-Meeting, moderators shall summarize list of open issues, candidate options and possible WF (if applicable) based on companies’ contributions.*

Based on the contributions, observations and proposals following list of sub-topics for further discussion and agreement have been identified:

1. Test setup for DAPS HO
2. Applicability rules for synchronous/asynchronous DAPS HO
3. whether CHO and inter-freq DAPS HO test cases should be defined only for FDD cases

### Sub-topic 2-1

*Sub-topic description:* Test setup for DAPS HO

*Open issues and candidate options before e-meeting:*

**Issue 2-1: Test setup for DAPS HO**

* Proposals
  + Option 1: DAPS handover tests consist of three successive time periods:
* The time duration T1 is the preparation period for the test.
* During time duration T2, the handover delay Dhandover1 and the interruption time Tinterrupt1 for target cell addition need to be tested.
* During time duration T3, the handover delay Dhandover2 and the interruption time Tinterrupt2 for source cell release need to be tested.
  + Option 2: DAPS handover tests consist of four successive time periods:
* The time duration T1: the UE may not have any timing information of cell 2.
* During time duration T2: The RRC message implying target cell add shall be sent to the UE during period T2, after the UE has reported Event A3.
* During period T3, UE is scheduled with PDSCH from cell 1 and cell 2 in alternative TTIs where cell 1 and cell 2 belong to the same TAG. E-UTRAN shall send another RRC message implying source cell release. The RRC message implying source cell release shall be sent to the UE during period T3, after the UE has successfully sent PRACH to cell 2.
* The start of the time duration T4 is defined as the end of the last TTI containing the RRC message implying source cell release.
  + Option 3: Align with the test setup rule in NR mobility enhancement WI.
* Recommended WF
  + Further discussion is needed for the test setup for DAPS HO test cases, suggest test setup for DAPS HO in LTE could be discussed together with the same topic in NR mobility enhancement WI.

### Sub-topic 2-2

*Sub-topic description:* Applicability rules for synchronous/asynchronous DAPS HO

*Open issues and candidate options before e-meeting:*

**Issue 2-2: Applicability rules for synchronous/asynchronous DAPS HO**

* Proposals
  + The UE capable of synchronous DAPS handover needs to be tested in synchronous scenario.
  + The UE capable of asynchronous DAPS handover needs to be tested in asynchronous scenario
* Recommended WF
  + Further discussion is needed for the applicability rules for synchronous/asynchronous DAPS HO test cases.

### Sub-topic 2-3

*Sub-topic description:* whether CHO and inter-freq DAPS HO test cases should be defined only for FDD cases

*Open issues and candidate options before e-meeting:*

**Issue 2-3:** whether CHO and inter-freq DAPS HO test cases should be defined only for FDD cases

Intra-frequency DAPS HO test cases are defined for both TDD and FDD, CHO and inter-frequency DAPS HO test cases are defined for FDD only.

* Recommended WF
  + Further discussion is needed whether CHO and inter-frequency DAPS HO test cases should be defined only for FDD cases.

## Companies views’ collection for 1st round

### Open issues

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| --- | --- |
| **Company** | **Comments** |
| XXX | Sub topic 2-1:  Sub topic 2-2:  Sub topic 2-3:  ….  Others: |
| Qualcomm | Issue 2-1: We think at least 4 intervals are needed as specified in our CR but we also agree that the test procedure can be aligned with NR test setup and same number of time intervals can be used.  Issue 2-2: In NR mobility email discussion [209], Ericsson provided an improved working of these proposals which we think can be re-used here.  Issue 2-3: We don’t see why tests should be defined for FDD only. At least in intra-frequency DAPS HO test cases, we specified sync test in TDD and async test in FDD. This improves coverage while avoiding increasing the number of tests. Perhaps the same principle can be used for CHO and inter-frequency DAPS HO. |
| Ericsson | Issue 2-1 : We have two comments for the test setup. Firstly, we think that prior to tester configuring DAPS handover the UE should send a measurement report for the target cell (blind DAPS HO would not be a typical scenario). The other thing we want clarification on is how the test equipment would know that the source cell has been released by the UE. There may be a need for guidance in this area in the test description for RAN5.  Issue 2-2 : For visibility I copy our comment from the NR thread  *Although the principle sounds OK by itself, we also need to remember that it is up to UE manufacturer which band they run tests on according to agreed principles. So there may be a UE which supports synchronous DAPS on some bands, and async DAPS on other bands. Then we are not really sure what this principle really means, and moreover the UE manufacturer may be able to select (or avoid) a certain kind of DAPS test just by declaring what band they have run the test on. We could perhaps agree to modified proposals such as*   * *The UE capable of asynchronous DAPS on any band handover need to be tested in asynchronous scenario.* * *The UE capable of synchronous DAPS on all bands handover need to be tested in synchronous scenario.*   Issue 2-3 : We think test cases should be defined for LTE FDD and LTE TDD so that they can be run on any band which the UE supports. It should be noted that in NR the test proposals use both NR FDD and NR TDD configurations. |
| Nokia | Issue 2-1: The test setup could be discussed together with the same topic in NR, same principle for test cases should be applied both for LTE and NR.  Issue 2-2: Agree with Ericsson and Qualcomm  Issue 2-3: We are fine to define test cases for both FDD and TDD. |
| Huawei | Issue 2-1. Compared with option 1, option 2 had one more time duration T2, during T2, UE firstly triggers A3 event and then reports measurement results. Option2 can be regarded as known cell handover, while option 1 is regarded as blind handover. We can’t say blind handover is not typical, as it also has corresponding test case in R15, see A.6.3.1.2 (Intra-frequency handover from FR1 to FR1; unknown target cell). T2 duration is long. In DAPS in order to reduce test time, we suggest to remove T2.  Also we know NR has ongoing discussion on the same topic, the conclusion of two WI shall be alligned.  Issue 2-2: we saw the comment from Ericsson, we have no strong opinion. LTE feomob can follow the agreement in NR RRM enhancement.  Issue 2-3: Tests for both FDD and TDD shall be defined. |
| Intel | Issue 2-1: suggest to align with NR test. In our view, the source cell release delay cannot be verified in neither option 1 and 2. Thus we proposed to introduce another time period T5 to verify the delay requirement.  Issue 2-2: same as we commented in NR mobility enhancement. Ericsson’s proposal looks good, with some minor update:  • The UE capable of asynchronous DAPS handover on any band need to be tested in asynchronous scenario.  • The UE capable of synchronous DAPS handover on all bands but not capable of asynchronous DAPS handover on any band need to be tested in synchronous scenario.  Issue 2-3: we support to cover both FDD and TDD. |

### CRs/TPs comments collection

*Major close to finalize WIs and Rel-15 maintenance, comments collections can be arranged for TPs and CRs. For Rel-16 on-going WIs, suggest to focus on open issues discussion on 1st round.*

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| **CR/TP number** | **Comments collection** |
| R4-2009885 | Ericsson : What happens if we have a UE that supports sync intrafrequency DAPS (no async) and also only supports FDD? By this approach it could not be tested. We should not confuse test effort (number of cases the vendor needs to run) with RAN4 effort (number of options/configurations that are defined for the tests). From a test definition point of view, we probably need to support all the options. Other comments are covered by issues 2-1 to 2-3. |
| Company B |
|  |
| R4-2011129 | Ericsson : Comments are coved by discussion of issues 2-1 to 2-3 |
| Company B |
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| R4-2011432 | Ericsson : Seems fairly well aligned with the approach we took for NR conditional handover tests |
| Company B |
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## Summary for 1st round

### Open issues

*Moderator tries to summarize discussion status for 1st round, list all the identified open issues and tentative agreements or candidate options and suggestion for 2nd round i.e. WF assignment.*

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|  | **Status summary** |
| **Sub-topic#2-1** | Issue 2-1: Test setup for DAPS HO  *Tentative agreements:* The test setup for LTE DAPS HO can be aligned with NR side.  *Candidate options:* Based on the companies’ comments, more discussion is needed with these options. Since the same discussion in NR side is ongoing. We can follow the conclusion in NR side.   * Option 1: three successive time periods * Option 2: four successive time periods * Option 3: five successive time periods   *Recommendations for 2nd round:* The test setup for DAPS handover will follow the conclusion in NR DAPS handover. |
| **Sub-topic#2-2** | Issue 2-2: Applicability rules for synchronous/asynchronous DAPS HO  *Tentative agreements:* The applicability rules for synchronous/asynchronous DAPS HO in LTE can follow the same principle in NR side.  *Candidate options:* Based on the companies’ comments, more discussion is needed with these options. Since the same discussion in NR side is ongoing. We can follow the conclusion in NR side.   * Option 1:   • The UE capable of asynchronous DAPS on any band handover need to be tested in asynchronous scenario.  • The UE capable of synchronous DAPS on all bands handover need to be tested in synchronous scenario.   * Option 2:   • The UE capable of asynchronous DAPS handover on any band need to be tested in asynchronous scenario.  • The UE capable of synchronous DAPS handover on all bands but not capable of asynchronous DAPS handover on any band need to be tested in synchronous scenario.  *Recommendations for 2nd round:* The applicability rules for synchronous/asynchronous DAPS HO in LTE can follow the same principle in NR side. |
| **Sub-topic#2-3** | Issue 2-3: whether CHO and inter-freq DAPS HO test cases should be defined only for FDD cases  *Tentative agreements:* All CHO and DAPS HO test cases should be defined for both TDD and FDD.  *Candidate options:*   * Option 1: CHO and inter-freq DAPS HO test cases should be defined for both TDD and FDD cases.   *Recommendations for 2nd round:* No further discussion is needed. |
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*Suggestion on WF/LS assignment*

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|  | **WF/LS t-doc Title** | **Assigned Company,**  **WF or LS lead** |
| #1 |  |  |

### CRs/TPs

*Moderator tries to summarize discussion status for 1st round and provided recommendation on CRs/TPs Status update suggestion*

|  |  |
| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation** |
| XXX | *Based on 1st round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |
| R4-2009885 | Suggest to be revised |
| R4-2011129 | Suggest to be revised |
| R4-2011432 | Suggest to be revised |

## Discussion on 2nd round (if applicable)

## Summary on 2nd round (if applicable)

*Moderator tries to summarize discussion status for 2nd round and provided recommendation on CRs/TPs/WFs/LSs Status update suggestion*

|  |  |
| --- | --- |
| **CR/TP/LS/WF number** | **T-doc Status update recommendation** |
| XXX | *Based on 2nd round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |