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Agenda Item: 6.13.3

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Title: Pre-meeting summary of 6.13.3 (Ericsson)

**WI code(s): NR\_ENDC\_SON\_MDT\_enh1-Core**

Document for: Discussion, Decision

# Introduction

This summary includes the proposals collected from the papers submitted to RAN WG2 meeting#119 agenda item 8.13.2.

# Summary

## Corrections on MHI

In the following we highlight the changes requested by the following CRs.

[R2-2207945](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_119-e/Docs/R2-2207945.zip)[Discussion on logging of PSCell information in MHI](%5CR2-2207945.zip) - Huawei, HiSilicon

[R2-2208167](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_119-e/Docs/R2-2208167.zip) [PSCell information storing in Mobility History Information [E120, E121, E122]](%5CR2-2208167.zip) - Ericsson, Qualcomm, CMCC, CATT

[R2-2208236](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_119-e/Docs/R2-2208236.zip) [Correction on MHI setting upon UEInformationRequest](%5CR2-2208236.zip) Nokia, Nokia Shanghai Bell

[R2-2208166](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_119-e/Docs/R2-2208166.zip)[Correction to time with no PSCell in mobility history information reporting](%5CR2-2208166.zip) Ericsson

**Problem to resolve:** The main issue concerning MHI is how to implement the nested structure of the MHI including and associating the PSCell MHI to the relevant PCell MHI. This issue stems the fact that in legacy MHI (Rel 16 MHI) the PCell information will be added as a new entry to the visitedCellInfoList upon change of the cell while the PSCell changes (and their history) occurs prior to the PCell change. This means the PSCell related history information i.e., visitedPSCellInfo needs to be logged somewhere until the PCell entry in the visitedPCellInfoList is created.

**Solutions:** Two main solutions are discussed by Ericsson, Qualcomm, CMCC and CATT [[R2-2208167](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_119-e/Docs/R2-2208167.zip)] and Huawei [[R2-2207945](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_119-e/Docs/R2-2207945.zip)] to resolve the existing issue while Nokia in [[R2-2208236](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_119-e/Docs/R2-2208236.zip)] proposed to remove the procedural text concerning the collection of PSCell MHI from UEInformationRepsponse procedure. Provided that, we think to resolve the existing issue one of the following solutions should be adopted by RAN2.

1. Logging the PSCell history information in a variable (*visitedPSCellInfoList*) while the UE is connected to the current PCell and plugging the content to the *visitedPSCellInfoListReport* inside the PCell entry (in the *visitedCellInfoList*) that is created upon change of the PCell [ [R2-2208167](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_119-e/Docs/R2-2208167.zip)]. This approach follows the legacy MHI however needs to create a variable at UE to keep the PSCell MHI.
2. If the UE is in Dc scenario create the PCell entry in the *visitedCellInfoList* upon entering a PCell to enable logging and associating the PSCell history information directly to the PCell. If the UE is not in DC scenario, follow the legacy behaviour i.e., add the PCell entry upon exist from the PCell. [[R2-2207945](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_119-e/Docs/R2-2207945.zip)]. This solution requires changes in the legacy UE MHI behaviour.

Having these solutions, Rel 17 rapporteur would like to propose the following:

**Proposal 1: RAN2 discuss and choose one of the following solutions for logging the PSCell MHI.**

1. **Logging the PSCell history information in a variable (*visitedPSCellInfoList*) while the UE is connected to the current PCell and plugging the content to the *visitedPSCellInfoListReport* inside the PCell MHI when the PCell entry is created upon change of the PCell**
2. **Creating the PCell entry in the *visitedCellInfoList* upon entering a PCell to enable logging and associating the PSCell history information directly to the PCell entry.**

If Solution 1 in proposal 1 is chosen a clarification on deletion of the oldest PSCell entry may be needed i.e., whether to delete the oldest PSCell entry from the *visitedCellInfoList* or from the *visitedPSCellInfoList*. The UE need to deletes the oldest PSCell entry from *visitedPSCellInfoList* is no PSCell info is logged in the main variable i.e., *visitedCellInfoList* yet.

**Proposal 2: If Solution 1 in Proposal 1 is agreed, RAN2 agree to clarify deletion of the oldest PSCell entry from MHI i.e., the UE shall delete the oldest entry from *visitedPSCellInfoList* if there is no PSCell entry in the *visitedCellInfoList*, otherwise the UE deletes the oldest PSCell entry from *visitedCellInfoList*.**

**Same clarification is needed for MHI reporting in the UE information Response procedure.**

In addition, given the current implementation, the procedural text does not log the time with no PSCell for all different scenarios. In [[**R2-2208166**](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_119-e/Docs/R2-2208166.zip)] it has been discussed that if the UE changes state between idle/inactive and connected state in the same PCell, while not being connected to any PSCell, the current procedural text will not implement the agreement: “The UE includes the time spent with no PSCell in the MHI, when connected to a certain PCell.” from RAN2#117e. An example is shown in the following in which the UE logs time with no PSCell only for the scenarios in which the UE released or failed in having PSCell. Therefore, for scenarios where the UE changed RRC state not having any PSCell, before the PCell change is missing.

3> if the UE supports PSCell mobility history information and if the UE was not configured with a PSCell at the time of change of PCell in RRC\_CONNECTED:

4> include an entry in *visitedPSCellInfoList* after removing the oldest entry, if necessary, according to the following;

5> set the field *timeSpent* of the entry as the time without PSCell according to the following:

6> if the UE experienced a PSCell release or secondary cell radio link failure since entering the previous PCell in RRC\_CONNECTED:

7> include the time spent with no PSCell since last PSCell release or secondary cell radio link failure since entering the previous PCell in RRC\_CONNECTED;

The CR [[**R2-2208166**](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_119-e/Docs/R2-2208166.zip)] proposes the following solution:

3> if the UE supports PSCell mobility history information and if the UE was not configured with a PSCell at the time of change of PCell in RRC\_CONNECTED:

4> include an entry in *visitedPSCellInfoList* after removing the oldest entry, if necessary, according to the following;

5> set the field *timeSpent* of the entry as the time without PSCell according to the following:

6> if the UE experienced a PSCell release or secondary cell radio link failure since entering the previous PCell in RRC\_CONNECTED:

7> include the time spent with no PSCell since last PSCell release or secondary cell radio link failure since entering the previous PCell in RRC\_CONNECTED;

6> else:

7> include the time spent with no PSCell since entering the previous PCell in RRC\_CONNECTED;

Therefore, rapporteur proposes the following:

**Proposal 3: RAN2 agree on the correction to log the time without PSCell for the following scenario:**

* **UE logs the time spent without PSCell since entering to the RRC\_Connected state (as of now the spec only covers time without PSCell for the cases that UE release or fails in PSCell)**

## Correction on MRO

In [[R2-2208168](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_119-e/Docs/R2-2208168.zip)] Ericsson pointed out that problematic scenarios, e.g., when the UE experiences an RLF in the CHO recovery cell (after a CHO failure), the UE includes in the RLF-Report the *previousPCell ID*, the *timeConnFailure*, and the *lastHO-Type*. This may lead to erroneous network interpretations, since from the RLF-Report the network may believe that the last executed HO was successful (whereas being in connected mode was just the result of a successful CHO recovery after a CHO execution failure), and it may tune wrongly the CHO parameters, especially if the value of timeConnFailure and *previousPCell ID* misleads the network on a “too early HO”.

Rapporteur believes the correction is needed as the UE experiencing two consecutive failures wrongly set the values in the RLF report. Hence the following is proposed.

**Proposal 4: RAN2 to discuss the following options:**

* **When the UE experiences an RLF in the CHO recovery cell, the UE does not include in the RLF-Report, the previousPCellID, the timeConnFailure, and the lastHO-Type.**
* **When the UE experiences an RLF in the CHO recovery cell, the UE includes in the RLF-Report along with the previousPCellID, the timeConnFailure, and the lastHO-Type, also an indication indicating that the failed cell was a cell selected while the T311 timer was running.**

In another scenario discussed in [[R2-2208168](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_119-e/Docs/R2-2208168.zip)] when the UE experience an RLF after a successful CHO and yet another RLF after re-establishment procedure (without CHO recovery). In such scenario the UE again logs **previousPCellID, the timeConnFailure, and the lastHO-Type** with wrong values. Therefore, rapporteur proposes the following.

**Proposal 5: Clarify that the UE includes in the RLF-Report the HO parameters (i.e. nrPreviousCell, lastHO-Type, timeConnFailure) associated to the last executed RRCReconfiguration message including the reconfigurationWithSync that was received while connected to the actual previous PCell.**

Concerning SHR, CATT in [[R2-2207473](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_119-e/Docs/R2-2207473.zip)] proposed to remove the SHR configuration received from both source and target RAN nodes as following:

1> release *successHO-Config*.

However, rapporteur’s understanding is that allowing the UE to keep the SHR configuration received from the target RAN node enables the network (the target RAN node) to configure the UE with SHR configuration for the next handovers. This reduces the signalling overhead between UE and the RAN node. In other word if the UE keeps the SHR configuration of the target RAN node, the target RAN node can configure the next SHR configuration at the same HO command. Therefore, rapporteur would like to propose

**Proposal 6: RAN2 agree that the UE deletes the SHR configuration configured by the source PCell and the T304 threshold if included in successHO-Config by the target PCell.**

On the same issue Nokia in [[R2-2208235](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_119-e/Docs/R2-2208235.zip)] has proposed the following correction

1> release *successHO-Config* configured by the source PCell.

Arguing that the expression ‘before executing the last reconfiguration with sync’ intentionally refers to the configuration point by the source PCell before HO, but introduce ambiguity in terms of the UE action. It can be misintrepreted as the instruction to delete the configuration by the UE before the actual HO is executed, leaving the UE without possibility to determine the SHR content.

Rapporteur agrees with theargument as it can be mis-interpreted hence propose the following.

**Proposal 7: RAN2 agree to remove the expression “***before executing the last reconfiguration with sync***” from the SHR procedure as pointed in** [[R2-2208235](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_119-e/Docs/R2-2208235.zip)]**.**

CATT in [[R2-2207474](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_119-e/Docs/R2-2207474.zip)] discusses that the *measResultListNR-r16* is reused in RLF report in case of RLF happened with configuration of conditional handover and conditional handover failure, and *measResultListNR-r17* is introduced in SHR for successful handover. Therefore, the field description of the *measResultListNR* should be corrected to cover the above implementation. Rapporteur agrees with the changes and propose the following:

**Proposal 8: RAN2 agree to change the filed description of *measResultListNR* to reflect that the *measResultListNR-r17* is only usedin SHR, as proposed in [**[R2-2207474](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_119-e/Docs/R2-2207474.zip)**].**

CATT in [[R2-2207474](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_119-e/Docs/R2-2207474.zip)] and Huawei in [[R2-2207947](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_119-e/Docs/R2-2207947.zip)] proposed that the following changes on the procedural text concerning the setting of the first and second events of the CHO configurations.

Proposed change by CATT:

4> if the first entry of *choConfig* corresponds to a fulfilled execution condition at the moment of the detected failure; or

4> if the second entry of *choConfig*, if available, corresponds to a fulfilled execution condition at the moment of the detected failure:

And the proposed change by Huawei:

4> if the first entry of *choConfig* corresponds to a fulfilled execution condition at the moment of conditional reconfiguration execution; or

4> if the second entry of *choConfig*, if available, corresponds to a fulfilled execution condition at the moment of conditional reconfiguration execution:

Rapporteur believes the proposed changes by CATT is more acceptable, hence proposes

**Proposal 9: RAN2 agree to change the** *conditional reconfiguration execution, or radio link failure* **to** *the detected failure* **in the procedural text on setting the first and second event of CHO triggering conditions in RLF report.**

Huawei in [[R2-2207946](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_119-e/Docs/R2-2207946.zip)] discusses that the stage 2 description of the successful handover report is missing in 38.300. Similarly, CATT and ZTE in [[R2-2207472](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_119-e/Docs/R2-2207472.zip)] and [[R2-2208539](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_119-e/Docs/R2-2208539.zip)] proposes stage 2 description addition for 2-step RA report, SgNB RA report and PSCell MHI report. Therefore, rapporteur propose the following

 **Proposal 10: RAN2 agree to add stage 2 description for the following features as part of 38.300.**

**Successful handover report,**

**2 step RA report,**

**SgNB RA report,**

**PSCell MHI report.**

In [[R2-2207947](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_119-e/Docs/R2-2207947.zip)] the following changes are requested.

1. The field onDemandSISuccess is changed from BOOLEAN to Enumerated {true}, so the procedural text and the field description are updated correspondlingly
2. For cell(s) in the field choCandidateCellList, the tracking area code is removed because the RLF report will not be routed to any CHO candidated cell.
3. For RLF case, the PCI and freq info are introduced in case that the CGI is unavailable for cell(s) in the field choCandidateCellList.

Rapporteur believes the requested changes are acceptable, hence proposes the following:

**Proposal 11: RAN2 agree to the following changes:**

1. **The field onDemandSISuccess is changed from BOOLEAN to Enumerated {true}, so the procedural text and the field description are updated correspondlingly**
2. **For cell(s) in the field choCandidateCellList, the tracking area code is removed because the RLF report will not be routed to any CHO candidated cell.**
3. **For RLF case, the PCI and freq info are introduced in case that the CGI is unavailable for cell(s) in the field choCandidateCellList.**

# Conclusion

**MHI**

**Proposal 1: RAN2 discuss and choose one of the following solutions for logging the PSCell MHI.**

1. **Logging the PSCell history information in a variable (*visitedPSCellInfoList*) while the UE is connected to the current PCell and plugging the content to the *visitedPSCellInfoListReport* inside the PCell MHI when the PCell entry is created upon change of the PCell**
2. **Creating the PCell entry in the *visitedCellInfoList* upon entering a PCell to enable logging and associating the PSCell history information directly to the PCell entry.**

**Proposal 2: If Solution 1 in Proposal 1 is agreed, RAN2 agree to clarify deletion of the oldest PSCell entry from MHI i.e., the UE shall delete the oldest entry from *visitedPSCellInfoList* if there is no PSCell entry in the *visitedCellInfoList*, otherwise the UE deletes the oldest PSCell entry from *visitedCellInfoList*.**

**Same clarification is needed for MHI reporting in the UE information Response procedure.**

**Proposal 3: RAN2 agree on the correction to log the time without PSCell since entering to the RRC\_Connected state (as of now the spec only covers time without PSCell for the cases that UE release or fails in PSCell)**

**MRO and RACH**

**Proposal 4: RAN2 to discuss the following options:**

* **When the UE experiences an RLF in the CHO recovery cell, the UE does not include in the RLF-Report, the previousPCellID, the timeConnFailure, and the lastHO-Type.**
* **When the UE experiences an RLF in the CHO recovery cell, the UE includes in the RLF-Report along with the previousPCellID, the timeConnFailure, and the lastHO-Type, also an indication indicating that the failed cell was a cell selected while the T311 timer was running.**

**Proposal 5: Clarify that the UE includes in the RLF-Report the HO parameters (i.e. nrPreviousCell, lastHO-Type, timeConnFailure) associated to the last executed RRCReconfiguration message including the reconfigurationWithSync that was received while connected to the actual previous PCell.**

**Proposal 6: RAN2 agree that the UE deletes the SHR configuration configured by the source PCell and the T304 threshold if included in successHO-Config by the target PCell.**

**Proposal 7: RAN2 agree to remove the expression “***before executing the last reconfiguration with sync***” from the SHR procedure as pointed in** [[R2-2208235](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_119-e/Docs/R2-2208235.zip)]**.**

**Proposal 8: RAN2 agree to change the filed description of *measResultListNR* to reflect that the *measResultListNR-r17* is only usedin SHR, as proposed in [**[R2-2207474](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_119-e/Docs/R2-2207474.zip)**].**

**Proposal 9: RAN2 agree to change the** *conditional reconfiguration execution, or radio link failure* **to** *the detected failure* **in the procedural text on setting the first and second event of CHO triggering conditions in RLF report.**

**Proposal 10: RAN2 agree to add stage 2 description for the following features as part of 38.300.**

**Successful handover report (RAN2 waits for progress in RAN3),**

**2 step RA report,**

**SgNB RA report,**

**PSCell MHI report.**

**Proposal 11: RAN2 agree to the following changes:**

1. **The field onDemandSISuccess is changed from BOOLEAN to Enumerated {true}, so the procedural text and the field description are updated correspondlingly**
2. **For cell(s) in the field choCandidateCellList, the tracking area code is removed because the RLF report will not be routed to any CHO candidated cell.**
3. **For RLF case, the PCI and freq info are introduced in case that the CGI is unavailable for cell(s) in the field choCandidateCellList.**