3GPP TSG-RAN WG2 Meeting #122 R2-230xxxx

Incheon, South Korea, 22– 26 May 2023

**Agenda item: 7.9.13**

**Source: Nokia (Rapporteur)**

**Title: Summary for 7.9.13 MRO for inter-system handover for voice fallback (Nokia)**

**WID/SID: NR\_ENDC\_SON\_MDT\_enh2-Core - Release 18**

**Document for: Discussion and Decision**

# 1 Introduction

This document is the summary for agenda item for 7.9.13 (MRO for inter-system handover for voice fallback report). This document considers the following input papers:

[R2-2305483](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2305483.zip) Further Consideration on Inter-system Handover for Voice Fallback CATT

[R2-2305703](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2305703.zip) MRO for inter-system handover for voice fallback Lenovo

[R2-2305722](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2305722.zip) MRO for inter-system handover for voice fallback Samsung R&D Institute India

[R2-2305778](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2305778.zip) Further consideration on voice fallback CMCC

[R2-2305987](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2305987.zip) Mobility Robustness Optimization – all topics Ericsson
Only proposals in Section 2 (proposal 1-7) are considered as the rest of the paper is for other AIs

[R2-2306042](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2306042.zip) Data collection for MRO for inter-system handover for voice fallback Qualcomm Incorporated

[R2-2306245](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2306245.zip) Consideration on MRO for inter-system handover for voice fallback ZTE Corporation, Sanechips

[R2-2306291](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2306291.zip) Discussion on MRO for inter-system handover for voice fallback Huawei, HiSilicon

[R2-2306455](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2306455.zip) Discussion on inter-system HO for voice fallback NTT DOCOMO, INC.

# 2 Discussion

## 2.0 Agreements from previous RAN2 meetings

In previous RAN2 meetings, the following agreements were made for MRO for inter-system handover for voice fallback:

RAN2#119 agreements:

1 RAN2 to include an indication regarding voice fallback in the RLF report.

 FFS: implicit or explicit flag and other details.

2 RAN2 discuss the following scenarios:

 Suitable EUTRA cell found after MobilityFromNR failure

 No suitable EUTRA cell found after MobilityFromNR failure

RAN2#119bis agreements:

1 An explicit indication is included in RLF-report when mobility from NR fails and the corresponding MobilityFromNRCommand includes voiceFallbackIndication

2 The below content is included in RLF-report when reestablishment procedure is initiated due to mobility From NR failure.

 a. reestablishmentCellID

RAN2#121bis Agreements

1 RAN2 to support the scenario of “after RLF occurs shortly after successful HO from NR to E-UTRAN for voice fallback, a suitable E-UTRA cell is selected, and the UE tries RRC connection setup procedure for the voice service in the E-UTRA cell, which is agreed in RAN3”.

2 FFS: Introduce an indication for the scenario of RLF after successful voice fallback HO in the LTE RLF report regarding voice fallback.

3 UE logs the agreed indication regarding voice fallback in the NR RLF report.

4 FFS: RAN2 agree to differentiate an acceptable E-UTRA cell from a suitable E-UTRA cell in the RLF report in case of voiceFallback HOF. FFS explicit or implicit indications.

## 2.1 Indications for scenarios

There are the following proposals in this area:

[R2-2305483](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2305483.zip) Further Consideration on Inter-system Handover for Voice Fallback CATT

Proposal 1: RAN2 to include an indication regarding voice fallback in the LTE RLF report for the scenario of RLF occurs shortly after successful HO from NR to E-UTRAN for voice fallback.

[R2-2305703](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2305703.zip) MRO for inter-system handover for voice fallback Lenovo

Proposal 1: For the case that a suitable E-UTRAN cell is selected after HOF of inter-system inter-RAT handover from NR to E-UTRAN for voice fallback, the UE may send a NR RLF report including an indication concerning that the last failed inter-system inter-RAT HO was triggered due to voice fallback to a NG-RAN node in which the UE is back to.

Proposal 2: For the case that a suitable E-UTRAN cell is selected after a RLF occurs shortly after a successful inter-system inter-RAT handover from NR to E-UTRAN for voice fallback, the UE may send the LTE RLF report which is enhanced to include an indication concerning that the last failed inter-system inter-RAT HO was triggered due to voice fallback to the re-connected E-UTRAN node.

[R2-2305722](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2305722.zip) MRO for inter-system handover for voice fallback Samsung R&D Institute India

Proposal 2: A new type is included for lastHO-Type-r17 to indicate voice fallback.

Observation 3: Network can understand the UE has selected a suitable E-UTRA cell through the presence of the explicit flag for indicating voice fallback and the absence of re-establishmentCellID.

Proposal 3: No additional indication is needed to handle the identified scenarios.

[R2-2305778](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2305778.zip) Further consideration on voice fallback CMCC

Proposal 1: RAN2 discuss the scenario that RLF occurs after successful voice fallback HO.

Proposal 2: Introduce one indication for the scenario of RLF after successful voice fallback HO in the LTE RLF report regarding voice fallback.

[R2-2305987](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2305987.zip) Mobility Robustness Optimization – all topics Ericsson

Proposal 1: RAN2 to agree extend the existing voiceFallback indication to differentiate the emergency calls fallback failure from normal HOs. FFS the details.

Proposal 4: UE logs the explicit indication for voice fallback handover in the LTE RLF report for RLF after successful voice fallback HOs.

[R2-2306245](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2306245.zip) Consideration on MRO for inter-system handover for voice fallback ZTE Corporation, Sanechips

Proposal 1: Introduce a new one-bit indicate in NR RLF-report to indicae that mobility from NR failure is triggered due to voice fallback.

Proposal 4: Include explicit indication in LTE RLF report to indicate whether the successful HO prior to the RLF is initiated for voice fallback.

[R2-2306291](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2306291.zip) Discussion on MRO for inter-system handover for voice fallback Huawei, HiSilicon

Proposal 1: RAN2 consider that the UE logs the indication of voice fallback in LTE RLF report, which is similar to that in NR RLF report, in order to support case 1b (RLF in E-UTRA cell after successful voice fallback).

Proposal 1: If case 1b is confirmed by RAN2, the indication of voice fallback should be introduced to the LTE RLF report.

**Rapporteur’s summary:**

There are a number of proposals to indicate in the LTE RLF report that the RLF occurs shortly after successful HO from NR to E-UTRAN for voice fallback ([R2-2305483](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2305483.zip), [R2-2305703](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2305703.zip) [R2-2305722](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2305722.zip), [R2-2305778](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2305778.zip), [R2-2305987](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2305987.zip), [R2-2306245](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2306245.zip), [R2-2306291](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2306291.zip)). Rapporteur’s understanding is that this can be agreed as companies agree in this. As most of the proposals also includes the use of separate indication flag for this purpose, a proposal on the introduction of a new flag may also be agreed.

There are two proposals to indicate in the NR RLF report the last failed inter-system inter-RAT HO was triggered due to voice fallback ([R2-2305703](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2305703.zip), [R2-2306245](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2306245.zip)). There is a proposal to introduce an indication to differentiate the emergency calls fallback failure from normal HOs ([R2-2305987](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2305987.zip)). Rapporteur’s view is that it should be discussed whether these indications are needed.

Proposals for agreement:

**Proposal 1.1: Indicate in the LTE RLF report that an RLF occurs shortly after successful HO from NR to E-UTRAN for voice fallback.**

**Proposal 1.2: Introduce a new indication in the LTE RLF report for the case an RLF occurs shortly after successful HO from NR to E-UTRAN for voice fallback.**

Proposals for discussion (if time permits):

**Proposal 1.3: RAN2 discuss whether an indicate in the NR RLF report is needed that the last failed inter-system inter-RAT HO was triggered due to voice fallback.**

**Proposal 1.4: RAN2 discuss whether there is need to enable the differentiation of the emergency calls fallback failure from normal HOs.**

## 2.2 Differentiation between acceptable and suitable cells

There are the following proposals in this area

[R2-2305483](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2305483.zip) Further Consideration on Inter-system Handover for Voice Fallback CATT

Proposal 2: RAN2 agree to differentiate an acceptable E-UTRA cell from a suitable E-UTRA cell in the RLF report in case of voiceFallback HOF.

Proposal 3: Introduce an indicator of “acceptable E-UTRA cell is found for ongoing emergency call” in the RLF report besides the voice fallback indication.

Proposal 4: RAN2 discuss whether to report the suitable EUTRA cell ID selected by the UE in parallel with the legacy field of the NR reestablishmentCellId after MobilityFromNR failure for voice fallback.

[R2-2305722](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2305722.zip) MRO for inter-system handover for voice fallback Samsung R&D Institute India

Proposal 1: No additional information is needed to differentiate an acceptable E-UTRA cell from a suitable E-UTRA cell in the RLF report in case of voiceFallback HOF.

[R2-2305778](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2305778.zip) Further consideration on voice fallback CMCC

Proposal 3: Introduce one indication to indicate that an acceptable E-UTRA cell rather than a suitable cell is selected in case of voice Fallback HOF.

[R2-2305987](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2305987.zip) Mobility Robustness Optimization – all topics Ericsson

Proposal 2 : RAN2 agree to differentiate an acceptable cell from a suitable cell in the RLF report in case of mobility from NR failure.

Proposal 3 : If the reconnectCell ID is EUTRA, the UE to include a flag indicating whether the reconnect cell ID was a suitable cell or acceptable cell during cell selection procedure.

[R2-2306042](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2306042.zip) Data collection for MRO for inter-system handover for voice fallback Qualcomm Incorporated

Proposal 1: For the emergency service fallback, UE does not log acceptable cell information in the RLF report as reconnectCellId when "HoF failure happens, no suitable EUTRA cell is found, and UE selects an acceptable cell for an emergency call".

Proposal 2: When mobility from NR procedure is performed for emergency service fallback, the UE reports the following information in the RLF report:

• If a suitable EUTRA cell is found after HOF, UE includes EUTRA cell ID as reconnectCellId.

• If a suitable EUTRA cell is not found after HOF and UE selects an acceptable cell for emergency service, UE does not log reconnectCellId and reestablishmentCellId.

• If both suitable and acceptable EUTRA cells are not found after HOF, UE logs the reestablishmentCellId.

[R2-2306245](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2306245.zip) Consideration on MRO for inter-system handover for voice fallback ZTE Corporation, Sanechips

Proposal 2: The differentiation between non suitable EUTRA cell and suitable EUTRA cell found can be done by agreed fields ( reestablishmentCellId and explicit indication) and existing field (i.e., noSuitableCellFound) in RLF report, no new fields is needed.

Proposal 3: RAN2 doesn’t consider enhancements to differentiate an acceptable E-UTRA cell from a suitable E-UTRA cell in the RLF report in case of voiceFallback HOF unless true gain is identified.

[R2-2306291](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2306291.zip) Discussion on MRO for inter-system handover for voice fallback Huawei, HiSilicon

Proposal 2: Introduce the indication of whether the reconnected E-UTRA cell is acceptable E-UTRA cell or not.

[R2-2306455](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2306455.zip) Discussion on inter-system HO for voice fallback NTT DOCOMO, INC.

Proposal 1: RAN2 to agree introduce an explicit indication show whether suitable E-UTRA cell found in RLF report.

**Rapporteur’s summary:** 5 companies propose to introduce a new indication in the RLF report that indicates that information in the RLF report belongs an acceptable cell. 2 companies’ view is that this indication is not needed as it can be deduced by the network based on existing parameters. 1 company’s view is that this new indication is not needed as the UE does not collect information about acceptable cells.

Rapporteur’s understanding is that companies agree if the RLF report includes information about acceptable cells then it is beneficial for the network to know that this information belongs to an acceptable cell. As there is a disagreement on this issue, the rapporteur proposes a step-by-step approach for the discussion on this topic:

**Proposal 2: RAN2 further discuss and decide**

**1) whether the UE stores acceptable cell information in the RLF report;**

**2) if the answer for a) is YES, then whether**

**a) the network can deduce that the information in the RLF report belongs an acceptable cell based on other information elements in the RLF report; or**

**b) a new indication is needed in the RLF report that information in the RLF report belongs an acceptable cell.**

## 2.3 Other proposals

There are the following proposals that are not listed in the previous sections

[R2-2305987](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2305987.zip) Mobility Robustness Optimization – all topics Ericsson

Proposal 5: RAN2 consider the scenario that upon transition to connected state from IDLE and immediate HO to LTE network due to voice fallback, the UE may not have L3 measurements available to report in the RLF report.

Proposal 6 : UE includes the available early measurements in the RLF report after experiencing voice fallback HOF.

Proposal 7 : UE includes time spent in the source cell in the RLF report upon voiceFallback HOF.

[R2-2306042](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2306042.zip) Data collection for MRO for inter-system handover for voice fallback Qualcomm Incorporated

Proposal 3: When mobility from NR procedure is performed for voice fallback, the UE reports the following information in the RLF report:

• If a suitable EUTRA cell is found after HOF, UE includes EUTRA cell ID as reconnectCellId.

• If both suitable and acceptable EUTRA cells are not found after HOF, UE logs the reestablishmentCellId.

[R2-2306245](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_122/Docs/R2-2306245.zip) Consideration on MRO for inter-system handover for voice fallback ZTE Corporation, Sanechips

Proposal 5: New capability is introduced to indicate whether UE supports logging RLF-report when mobility from NR fails and the corresponding MobilityFromNRCommand includes voiceFallback indication.

**Rapporteur’s summary:** These proposals require RAN2 discussion and could be discussed if time permits.

**Proposal 3a: RAN2 discuss Proposal 5 of R2-2305987: RAN2 consider the scenario that upon transition to connected state from IDLE and immediate HO to LTE network due to voice fallback, the UE may not have L3 measurements available to report in the RLF report.**

**Proposal 3b: RAN2 discuss Proposal 6 of R2-2305987: UE includes the available early measurements in the RLF report after experiencing voice fallback HOF.**

**Proposal 3c: RAN2 discuss Proposal 7 of R2-2305987: UE includes time spent in the source cell in the RLF report upon voiceFallback HOF.**

**Proposal 3d: RAN2 discuss Proposal 3 of R2-2306042: When mobility from NR procedure is performed for voice fallback, the UE reports the following information in the RLF report:**

**• If a suitable EUTRA cell is found after HOF, UE includes EUTRA cell ID as reconnectCellId.**

**• If both suitable and acceptable EUTRA cells are not found after HOF, UE logs the reestablishmentCellId.**

**Proposal 3e: RAN2 discuss Proposal 5 of R2-2306245: New capability is introduced to indicate whether UE supports logging RLF-report when mobility from NR fails and the corresponding MobilityFromNRCommand includes voiceFallback indication.**

# 3 Conclusion

The following proposals are to be agreed:

**Proposal 1.1: Indicate in the LTE RLF report that an RLF occurs shortly after successful HO from NR to E-UTRAN for voice fallback.**

**Proposal 1.2: Introduce a new indication in the LTE RLF report for the case an RLF occurs shortly after successful HO from NR to E-UTRAN for voice fallback.**

The following proposal is to be discussed:

**Proposal 2: RAN2 further discuss and decide**

**1) whether the UE stores acceptable cell information in the RLF report;**

**2) if the answer for a) is YES, then whether**

**a) the network can deduce that the information in the RLF report belongs an acceptable cell based on other information elements in the RLF report; or**

**b) a new indication is needed in the RLF report that information in the RLF report belongs an acceptable cell.**

The following proposals are to be discussed if time permits:

**Proposal 1.3: RAN2 discuss whether an indicate in the NR RLF report is needed that the last failed inter-system inter-RAT HO was triggered due to voice fallback.**

**Proposal 1.4: RAN2 discuss whether there is need to enable the differentiation of the emergency calls fallback failure from normal HOs.**

**Proposal 3a: RAN2 discuss Proposal 5 of R2-2305987: RAN2 consider the scenario that upon transition to connected state from IDLE and immediate HO to LTE network due to voice fallback, the UE may not have L3 measurements available to report in the RLF report.**

**Proposal 3b: RAN2 discuss Proposal 6 of R2-2305987: UE includes the available early measurements in the RLF report after experiencing voice fallback HOF.**

**Proposal 3c: RAN2 discuss Proposal 7 of R2-2305987: UE includes time spent in the source cell in the RLF report upon voiceFallback HOF.**

**Proposal 3d: RAN2 discuss Proposal 3 of R2-2306042: When mobility from NR procedure is performed for voice fallback, the UE reports the following information in the RLF report:**

**• If a suitable EUTRA cell is found after HOF, UE includes EUTRA cell ID as reconnectCellId.**

**• If both suitable and acceptable EUTRA cells are not found after HOF, UE logs the reestablishmentCellId.**

**Proposal 3e: RAN2 discuss Proposal 5 of R2-2306245: New capability is introduced to indicate whether UE supports logging RLF-report when mobility from NR fails and the corresponding MobilityFromNRCommand includes voiceFallback indication.**