**3GPP TSG-RAN WG3 Meeting #119 R3-230850**

**Athens, Greece, 27 February-3 March, 2023**

Agenda Item: 10.2.2

Source: CMCC, Lenovo (moderator)

Title: Summary of Offline Discussion on MRO

Document for: Approval

# Introduction

**CB: # 13\_SONMDT2\_MRO**

**- Discuss the open issues above**

**- For stage2 CR for inter-system HO for voice fallback, take** [**R3-230649**](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_119%5CDocs%5CR3-230649.zip) **as the starting point**

**- Capture agreements and open issues**

(CMCC, Lenovo - moderator)

Summary of offline disc R3-230850

Officially organized offline discussion

# For the Chairman’s Notes

Propose the following:

R3-20xxxa, R3-20xxxc merged

R3-20xxxc rev [in xxxg] – agreed

R3-20xxxd rev [in xxxh] – agreed

R3-20xxxe rev [in xxxi] – agreed

R3-20xxxf rev [in xxxj] – endorsed

Propose to capture the following:

**Agreement text…**

**Agreement text…**

**WA: carefully crafted text…**

Issue 1: no consensus

**Issue 2: issue is acknowledged; need to further check the impact on xxx. May be possible to address with a pure st2 change. To be continued…**

# Discussion

## MRO for CPAC

**Enhancements on SCGFailureInformation? E.g, the CPAC execution condition(s) fulfilled? Timer between the fulfill of the two events?**

During online discussion, enhancements of SCGFailureInformation message were discussed, but it was hard to be converged. Similar as MRO for CHO, considering at most two CPAC events can be configured for one CPAC candidate target PSCell, two companies raised that for CPAC at least the first fulfilled CPAC event and time duration between two fulfilled CPAC events are beneficial for MRO.

**Moderator proposes:** to make some progresses on the enhancements of SCGFailureInformation, **RAN3 agrees that at least the first fulfilled CPAC event and time duration between two fulfilled CPAC events are useful for MRO for CPAC, other enhancements can be further discussed if any. LS to RAN2 to confirm the two items seems needed**.

**Q1-A: Companies are invited to provide their views on whether agree to support that at least the first fulfilled CPAC event and time duration between two fulfilled CPAC events are useful for MRO for CPAC.**

|  |  |  |
| --- | --- | --- |
| Company | Yes/No | Comment |
| Huawei | Yes | To distinguish which (or both) of triggering events needs to be adjusted accordingly. |

**Q1-B: If companies agree with the enhancements in Q1-1, companies are invited to provide their views on whether an LS to RAN2 to confirm the enhancements is needed.**

|  |  |  |
| --- | --- | --- |
| Company | Yes/No | Comment |
| Huawei | Yes | To help progress it in RAN2. |

**Summary to offline discussion in the meeting room:**

## MRO for fast MCG recovery

**Case c/Case d/Case e/Case f would not be considered for MRO for fast MCG recovery failure?**

First, we discuss whether to consider Case c/Case d/Case e/Case f for MRO for fast MCG recovery failure:

* Case c: Fast recovery near failure case, i.e. UE receives the response message from MN via SN while T316 is running which almost expires but not yet.
* Case d: Failure case for CHO based recovery failure after fast MCG recovery failure.
* Case e: Subsequent failure after successful fast MCG recovery.
* Case f: dual failure case, i.e. MCG failure occur while at about the same time SCG is deactivated/suspended/de-configured.

During online discussion, CMCC and HW suggested Case c needs to be considered with description update. From moderator point of view, Case c is the case that the UE can receive the response message (e.g. RRC reconfiguration message for MCG change/modification) for MCG failure recovery while T316 is running, but the elapsed time of the T316 is near to be expired. If companies think the description is not clear enough, the updates are welcome. **Case c is open to be discussed in offline meeting.**

For Case d, moderator think it is a complex case with two successive failures, it is better to de-prioritize it.

For Case e, moderator think it is a legacy MRO case where failure happens after successful fast MCG recovery, there seems no spec impact.

For Case f, since the UE can not transmit the MCGFailureInformation message for recovery due to SCG failure/deactivation upon MCG failure, which needs to be avoided, majority proposes to consider it.

**Moderator proposes:** since we have discussed these cases for several meetings, we should try to de-prioritize some cases, it is suggested that **Case d/e would not be considered, and case f would be considered**.

**Q2-A: Companies are invited to provide their views on whether agree that case d/e would not be considered for MRO for fast MCG recovery failure.**

|  |  |  |
| --- | --- | --- |
| Company | Yes/No | Comment |
| Huawei | No | D+E is beneficial for the MRO algorithm. The resulting report from the failure event happens after a recovery situation so it should be possible for the MRO algorithm to distinguish this type of event from “normal” event when collecting statistics. |

**Q2-B: Companies are invited to provide their views on whether agree that case f would be considered for MRO for fast MCG recovery failure.**

|  |  |  |
| --- | --- | --- |
| Company | Yes/No | Comment |
| Huawei | Yes |  |

**Summary to offline discussion in the meeting room:**

**Additional information to be reported by UE?**

Then, we discuss whether/what we can agree about the information for fast MCG recovery. Based on companies’ documents, the information to be reported by UE can be summarized as following:

1. the failure type i.e. SCG failure/deactivation upon MCG failure
2. PSCell where SCG failure happened
3. an indication concerning that SCG was deactivated during fast MCG recovery resulting in T316 expiry
4. T316 elapsed time
5. SCG status while T316 is running, e.g. SCG deactivation/suspended/de-configured
6. SCG status e.g. PSCell change/PSCell addition/SCG deactivation/SCG RLF upon initiation failure of MCG recovery
7. SCG status at the time of Fast MCG Recovery attempt
8. SCG RLF failure type, e.g. synchReconfigFailureSCG, scg-ReconfigFailure, srb3-IntegrityFailure
9. RRM measurement results
10. time between MCG failure and SCG failure/deactivation

**Q2-C: Companies are invited to provide their views on which information above is needed from the UE?**

|  |  |
| --- | --- |
| Company | Comment |
| Huawei | a), b), c), f), g), h), j)a), f), g) are all intended to indicate the SCG status which makes UE fail to initiate MCG recovery attempt. |

If we can have conclusion on Q3-1, RAN3 should inform RAN2 about the information to be reported by the UE.

**Q2-D: Companies are invited to provide their views on whether an LS to inform RAN2 about the information to be reported by the UE is needed.**

|  |  |  |
| --- | --- | --- |
| Company | Yes/No | Comment |
| Huawei | Yes | Since RAN3 has analyzed, it is beneficial for RAN2 to take into account. |

**Summary to offline discussion in the meeting room:**

## MRO for inter-system handover for voice fallback

During the meeting, the following open issue in MRO for inter-system handover for voice fallback is identified for further discussion offline.

**Work on stage2 CR for inter-system handover for voice fallback with agreed cases.**

Regard to the MRO for inter-system handover for voice fallback cases already agreed in previous RAN3 meetings:

“*Consider Case 1-2 for MRO enhancements for inter-system inter-RAT handover for voice fallback:*

*- Case 1: after failure (HOF/RLF) of inter-system inter-RAT handover 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.*

*- Case 2: after failure (HOF) of inter-system inter-RAT handover from NR to E-UTRAN for voice fallback, none suitable E-UTRAN cell can be selected, the UE reverts back to the configuration of the source PCell and initiates RRC re-establishment procedure in NR.*”

Based on the online discussion, we agreed to capture the agreed cases in stage2 TP in TS 38.300.

From the TPs provided by companies, there are two options to draft a TP including case 1 and case 2.

* Option 1: adding the description of inter-system handover for voice fallback within the section 15.5.2.2.3 connection failure due to inter-system mobility in stage 2 in TS38.300.
* Option 2: adding the description of inter-system handover for voice fallback in a new section in stage 2 in TS 38.300

**Q3-A: Companies are invited to provide their views on which option to be selected.**

|  |  |
| --- | --- |
| Company | Comments for Option 1 or Option 2 |
| Huawei | Option 1 is supported. |

Moderator gives an example if Option 1 is selected as below:

15.5.2.2.3 Connection failure due to inter-system mobility

One of the functions of Mobility Robustness Optimization is to detect connection failures that occurred due to Too Early or Too Late inter-system handovers or inter-system handover for voice fallback. These problems are defined as follows:

- Inter-system/ Too Late Handover: an RLF occurs after the UE has stayed in a cell belonging to an NG-RAN node for a long period of time; the UE attempts to re-connect to a cell belonging to an E-UTRAN node.

- Inter-system/ Too Early Handover: an RLF occurs shortly after a successful handover from a cell belonging to an E-UTRAN node to a target cell belonging to an NG-RAN node; the UE attempts to re-connect to the source cell or to another cell belonging to an E-UTRAN node.

- Inter-system handover for voice fallback: A failure (HOF/RLF) occurs during the handover procedure from a cell belonging to an NG-RAN node to a cell belonging to an E-UTRAN node for voice fallback purpose, the UE attempts to re-connect to a cell belonging to an E-UTRAN node for the voice service; or a failure (HOF) occurs during the handover procedure from a cell belonging to an NG-RAN node to a cell belonging to an E-UTRAN node for voice fallback purpose, the UE reverts back to the configuration of the source PCell and attempts to re-connect to a cell belonging to a NG-RAN node.

**Summary to offline discussion in the meeting room:**

Regard to case 4 that after a successful inter-system inter-RAT handover from a first NG-RAN node to an E-UTRA node for voice fallback, the UE is handed over back to a second NG-RAN node from the E-UTRA node, the moderator thinks that case 4 should be considered for MRO for inter-system handover for voice fallback without stage3 impact. It is proposed that introducing a clear description in TS38.300 to indicate the inter-system handover for voice fallback cannot be counted in the statistics of inter-system ping-pong.

**Q3-B: Companies are invited to provide their views on whether agree to introduce a clear description in TS38.300 to indicate the inter-system handover for voice fallback cannot be counted in the statistics of inter-system ping-pong.**

|  |  |  |
| --- | --- | --- |
| Company | Yes/No | Comment |
| Huawei | Yes | A clarification of this MRO case is needed in order to avoid being misunderstood as ping-pong.  |

Moderator gives an example as below:

15.5.2.4 Inter-system Ping-pong

One of the functions of Mobility Robustness Optimization is to detect ping-pongs that occur in inter-system environment. The problem is defined as follows:

- A UE is handed over from a cell in a source system (e.g. 5GS) to a cell in a target system different from the source system (e.g. EPS), then within a predefined limited time the UE is handed over back to a cell in the source system, while the coverage of the source system was sufficient for the service used by the UE. The event may occur more than once.

The solution for the problem may consist of the following steps:

1) Statistics regarding inter-system ping-pong occurrences are collected by the responsible node;

2) Coverage verification is performed to check if the mobility to other system was inevitable.

The statistics regarding ping-pong occurrence may be based on evaluation of the *UE History Information* IE in the HANDOVER REQUIRED message. Inter-system handover triggered by voice fallback is not counted in the statistics of inter-system ping-pong. If the evaluation indicates a potential ping-pong case and the source NG\_RAN node of the 1st inter-system handover is different than the target NG-RAN node of the 2nd inter-system handover, the target NG-RAN node may use the HANDOVER REPORT message or the UPLINK RAN CONFIGURATION TRANSFER message to indicate the occurrence of potential ping-pong cases to the source NG-RAN node.

If NG-RAN coverage during the potential ping-pong event needs to be verified for the purpose of determining corrective measures, the Unnecessary HO to another system procedure may be used.

**Summary to offline discussion in the meeting room:**

# Conclusion, Recommendations [if needed]

If needed

# References