3GPP TSG-RAN WG3 #117bis-e R3-226004

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Title: WF on the MRO scenarios

Document for: Discussion

# Introduction

This paper tries to capture the scenarios for MRO according to CB: # SONMDT2\_MRO [1].

# Scenarios for MRO for CPAC

## 2.1 Potential scenarios for MRO for CPA

Too Late CPA Execution: an RLF occurs in MCG, or PCell handover happens before any CPA execution condition is satisfied.

Too Early CPA Execution: UE receives CPA configuration and CPA execution condition is satisfied, CPA execution fails or an SCG failure occurs shortly after a successful CPA execution; no suitable PSCell is found based on the measurements reported from the UE.

CPA Execution to wrong PSCell: UE receives CPA configuration and CPA execution condition is satisfied, CPA execution fails or an SCG failure occurs shortly after a successful CPA execution; a suitable PSCell different with target PSCell is found based on the measurements reported from the UE.

**Conclusion in RAN3#117bis-e:**

**- Too Late CPA Execution will not be considered.**

**- CPA Execution to wrong PSCell will be considered.**

* **FFS on Too Early CPA Execution.**

## 2.2 Potential scenarios for MRO for CPC

Too Late CPC Execution: UE receives CPC configuration, while a SCG failure occurs before CPC execution condition is satisfied; a suitable PSCell different with source PSCell is found based on the measurements reported for the UE.

Too Early CPC Execution: UE receives CPC configuration and CPC execution condition is satisfied, CPC execution fails or an SCG failure occurs shortly after a successful CPC execution; source PSCell is still the suitable PSCell based on the measurements reported from the UE.

CPC Execution to wrong PSCell: UE receives CPC configuration and CPC execution condition is satisfied, CPC execution fails or an SCG failure occurs shortly after a successful CPC execution; a suitable PSCell different with source PSCell or target PSCell is found based on the measurements reported from the UE.

**Conclusion in RAN3#117bis-e:**

**- Too Late CPC Execution, Too Early CPC Execution and CPC Execution to wrong PSCell will be considered.**

## 2.3 Potential mixed scenarios

* Case i: mixed scenarios of legacy PA and CPA, i.e. UE receives CPA configuration, a legacy PSCell addition is performed but fails, or a legacy PSCell addition is performed and succeeds but an SCG failure occurs shortly after the successful legacy PSCell addition.
* Case ii: mixed scenarios of legacy PC and CPC, i.e. UE receives CPC configuration, a legacy PSCell change is performed but fails, or a legacy PSCell change is performed and succeeds but an SCG failure occurs shortly after the successful legacy PSCell change.
* Case iii: MCG RLF or handover failure or CHO execution failure before CPA/CPC execution.
* Case iv: CHO-CPC coexistence scenarios with low priority.

**Conclusion in RAN3#117bis-e:**

**- Case i/ii/iii/iv will be deprioritized.**

# Scenarios for Fast MCG Failure Recovery

* Case a: SCG fails or is deactivated when the UE attempts MCG recovery (i.e. a SCG failure/deactivation while T316 is running after MCG failure).
* Case b: the signalling delay is longer than the time the UE waits for the response (T316 expired).
* Sub-Case b1: T316 runs out on the UE side while the SN is trying to deliver the MN message, in this case the maximum number of retransmissions at the SN side has not been reached.
* Sub-Case b2: The SN reaches the maximum number of retransmissions while T316 has not expired on the UE side. In this case the SN can not make any further attempts to deliver the MN message but the UE will continue to wait for it for the remainder of the T316 time.
* 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.

**Conclusion until RAN3#117e:**

* **Case a: SCG fails or is deactivated when the UE attempts MCG recovery (i.e. a SCG failure/deactivation while T316 is running after MCG failure).**
* **Case b: the signalling delay is longer than the time the UE waits for the response (T316 expired).**
* **other problems are not precluded if legacy MRO mechanism cannot cope with it.**

**Conclusion in RAN3#117bis-e:**

**- FFS on Sub-Case b1/Sub-Case b2/Case c-f.**

# Scenarios for MRO for MR-DC SCG failure

* SCG failure in EN-DC, NGEN-DC and NE-DC scenarios
* dual failure case (i.e. both MCG failure and SCG failure occur)

**Conclusion until RAN3#117e:**

* **support MRO for SCG failure in EN-DC, NGEN-DC and NE-DC scenarios.**

**Conclusion in RAN3#117bis-e:**

**- dual failure case (i.e. both MCG failure and SCG failure occur) will be deprioritized.**

# Scenarios for MRO for inter-system handover for voice fallback

The potential scenarios for MRO enhancements for inter-system handover for voice fallback are summarized as following:

- 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.

- Case 3: an RLF occurs shortly in target E-UTRAN cell after a successful inter-system inter-RAT handover from NR to E-UTRAN for voice fallback, the UE connects to another E-UTRAN cell. (note: it can been categorized to Case 1)

- Case 4: 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.

- Case 5: the UE successfully performs inter-system inter-RAT handover from NR to E-UTRAN for voice fallback, but the handover is about to failure.

Besides above Case1-5, redirection for inter-system voice fallback was also discussed, i.e. the NG-RAN node releases the UE into RRC\_IDLE state with some redirected E-UTRA carrier information, the UE performs cell selection, and may find a suitable E-UTRA cell to establish RRC connection or not.

**Conclusion until RAN3#117e:**

**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.**

**Conclusion in RAN3#117bis-e:**

**- Case 5 will be deprioritized.**

**- MRO enhancements for redirection for voice fallback will be deprioritized.**

**- FFS on Case 4.**

# References

1. R3-225908, Summary of SONMDT2\_MRO, Lenovo