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			PA19	

SBT Test Cases Analysis for MSMM

Abstract

This document is a specification to cover MSMM SBT test cases.

Intended readers are CI testers.

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1 Introduction

1.1 Revision History

Revision	Date	Prepared	Description
PA1	2016-04-07	epenchu	Drafted
PA2	2016-04-19	epenchu	Add more generic pre- and post-conditions Add traffic description and MO class in TC
PA3	2016-04-26	epenchu	Introduce CPRI LOS scenarios, actions and checkpoints TC1.001 to TC1.010
PA4	2016-05-06	eshenwe	Add overall purpose, assumptions

PA4	2016-05-06	epenchu	Add open issue 1, CT-10 CDC limitation Update test environment with required test tools and STP usage strategy Update each test case purpose with more category contents
PA5	2016-05-09	epenchu	Specify RiPort Status when introducing break
PA6	2016-05-11	epenchu	Introduce CT-10 sub-path break and CDC scenarios TC1.011 and TC1.012 to TC1.013
PA7	2016-05-16	epenchu	Introduce XMU03 Robustness, Test Group 2, TC2.001 to TC2.008
PA8	2016-05-18	epenchu	Add open issue 2, CT-10 redundant with COLI Add open issue 3 RiPortStatus for G2 and answer Correct Loss of SoCPRI alarm appearance >= 180s Correct RiPortStatus CONNECTED_TO_RU_NOT_TO_NEIGHBOR for G1 only Add open issue 4 XMU03 restart rank and answer Add XMU03 crash check, distinguish cold and warm restart
PA9	2016-06-01	epenchu	Add open issue 5 short disruption and answer Add open issue 6 tool limitation and answer Correct short disruption <= 400ms Clarify TC1.011 dual secondary link Add each test group reference or input Introduce SoCPRI feature legacy, Test Group 3, TC3.001 to TC3.008
PA10	2016-06-03	epenchu	Add open issue 7 RU restart rank Introduce DU RU restart, Test Group 4, TC4.001 to TC4.007
PA11	2016-06-08	epenchu	Modify purpose of TC3.001 to TC3.008 Add open issue 8 Correct single RU restart description
PA12	2016-06-16	epenchu	Add RU restart attention for TC4.004 and TC4.005 Add more clarification for DU cold and single RU restart Change open issue 8 regarding DU restart affect RU restart Other correction based on review comments
PA13	2016-06-22	epenchu	Remove CT-10 and related cases due to impact on SoCPRI
PA14	2016-07-05	epenchu	Remove RiLink availability status check for XMU03 restart
PA15	2016-08-12	epenchu	Add inconsistent behavior for G1 and G2 in TC3.004 and TC3.005
PA16	2016-08-31	epenchu	Add chapter 1.6 limitation Correct TC4.001 and open issue 8

PA17	2016-10-12	epenchu	Add short time glitch limitation in chapter 1.6
PA18	2016-12-06	epenchu	G2 introduce new status NODE_PRIORITY_COLLISION in TC3.004 and TC3.005, G1 will do same change too
PA19	2017-03-14	epenchu	Add limitation 4 for MSME configuration

1.2 Purpose

This document specifies test cases for SBT (Source Baseline Test) of MSMM (Multi Standard Mixed Mode). The test cases are based on the customer TRs and TGR input test cases which relevant to CPRI or MSMM robustness. The test scope is defined by MSMM Technical Reference Group team.

1.3 Assumptions

For short term goal we focused on MSMM System robustness when introducing LOS on the link(s), or at big CPRI delay changes, XMU03 Lock/Unlock/Restart and Sync over CPRI feature.

1.4 Open Issues

1. There is limitation that delay changes on CT-10 can only be setup when the CT-10 is on the link that connects the DU to the RU, that is, first link on a cascade chain. Delay changes are no possible on consequent links, due to RICR limitation?

   LOS could preferably be tested with coli commands instead of CT10, but changing the delays is not doable without CT10. TC1.011 need to be replaced by XMU03 coli? Only keep CDC between DU and Radio with CT-10?

   Latest decision is to remove both CT-10 and related cases TC1.011 to TC1.013

2. CT-10 break is more or less redundant with COLI command break, so it intends not to cover duplicated scenarios use CT-10? E.g. break primary link between DU and RU or all secondary links between XMU03 and Radio are similar like RiPort break on DU with COLI?

   LOS could preferably be tested with coli commands instead of CT10.

3. No “CONNECTED_TO_RU_NOT_TO_NEIGHBOR” RiPortStatus for G2?

   Currently, there is no “CONNECTED_TO_RU_NOT_TO_NEIGHBOR” RiPortStatus on G2 node; it’s only for G1 node. Equivalent for that RiPortStatus on G2 is “CPRI_LINK_NOT_AVAILABLE

4. G1/G2 MO restart action on XMU03 will only translate to warm restart?

Yes; and two restart rank warm (“restart”) and cold (“restart -c") on XMU03 with OSE remote shell command. So it’s better to test with remote shell command instead of MO action with different rank.

5. How to define CPRI link short disruption?

   With MR518 (WP5284) implement in L16B for both G1 and G2, a hidden cpriLinkFilterTime attribute with default value equal to 400ms has been created to remove “SKT filter”. Only link failures that last longer than the filter time are reported. 400ms was chosen since it is the biggest value that does not impact radio, baseband, ecp-link etc. The attribute can be set in range [0ms - 10000ms]. Before L16B, the behavior was, when link break is detected, the Link Stability alarm is raised. If that link break is longer than 100ms, Link Failure alarm will be raised.

6. Is there any test tool limitation to trigger glitches on CPRI link?

   COLI commands introduce a variable latency (even a few seconds!) so it might be impossible to test the filter for small values of cpriLinkFilterTime; CT-10's emulator has limited link break duration, controlled manually.

7. G1/G2 MO restart action on RU will only translate to one restart? If yes, then RU restart will test with MO action and remote shell command separately?

8. How DU restart to affect RU restart?

   See CPI description in section 7.7 “Locking and Restarts”. A refresh or cold restart of the DU or Baseband unit for node 2 causes traffic interruption to or node 1, unless any of the following conditions apply: (a) The radio unit is already running on the radio software specified in the current Upgrade Packages (UP) for node 2. (b) The radio unit is running on Pre-Installed Software (PIS) which is later than the radio software included in the UP for node 2, or the UP for node 2 does not contain any radio software for this radio unit.

   DU cold restart, RU will be ordered to restarted while its LMC version is not equal the version specified in the UCF file of the UP that the node is running on. DU warm and cold_w_test restart, RU will not be ordered to restart, unless RU is running on LMC revision lower than specified in UCF file of UP starting up on.

1.5 Decision Log

Date	Forum	Decision
2016-05-04	Meeting review	Reviewer: Hamid Ebrahimi, Maria Barrueco - Update overall purpose, assumptions and open issues - Update test environment with required test tools and STP usage strategy - Update each test case purpose with more category

		contents
2016-06-15	Meeting review	Reviewer: Hamid Ebrahimi, Maria Barrueco, Daniel Blomqvist - Update some grammatical description to be more clear - Update traffic check principle in pre and post check - Update DU restart affect mixed mode RU restart

1.6 Limitation

1. According to CPI 55/1553-LZA 701 6014/1, before activating the Node Group Synchronization functionality, lock all cells/TRXs on all nodes that are included in the node group. Then activate the functionality in priority order. That is, start with the Synchronization Provider with node priority = 1, followed by the others in falling priority order.

2. Regarding NGSM MO reconfiguration for G2, the MO should be locked before change.

3. Regarding short time CPRI glitch (<400ms), if link where glitch is introduced is not link that leads to the RU we can't guarantee cell enabled and no alarm raised. Also, it's not guaranteed that Riport status not switched.

DU --- * --- RU	guaranteed
DU --- --- XMU03 --- * --- RU	guaranteed
DU --- * --- RU(1) --- --- RU(2)	only cell 1 guaranteed
DU --- --- XMU03 --- * --- RU(1) --- --- RU(2)	only cell 1 guaranteed
DU --- * --- XMU03 --- --- RU	not guaranteed
> 400ms	not guaranteed

4. In case MSME configuration, WRAT can't handle BFN jump and causing a node warm restart when BFN jump is issued on G2 node.

2 Test Configuration

In the test execution phase, tests are performed on a test configuration testing the System Under Test (SUT) using a test environment.

The Test Configuration baseline is defined by the STP topology.

2.1 System Under Test

In general the RBS6000 is defined as the SUT. However, this may be extended to adjacent nodes if there is functional impact.

Most test cases in this specification are not dependent of any particular RBS type. If any specific capabilities are needed, it is stated under 'Environment' in the specific cases.

2.2 Test Environment

The test environment to be used is nodes adjacent to the RBS, i.e. RNC, CN, UE and test tools, i.e. CT-10, XMU03.

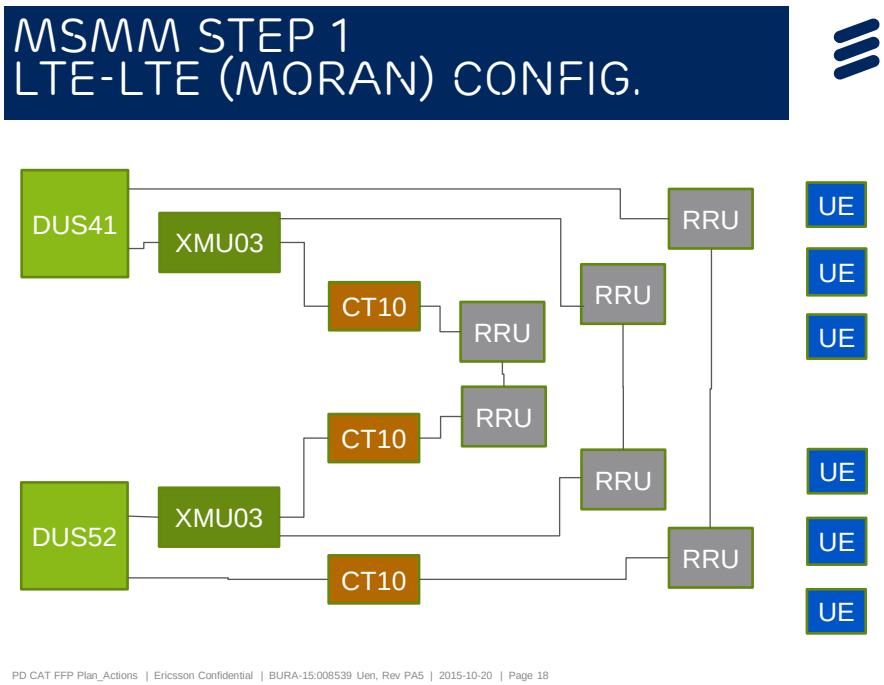
- The lab installation and network planning is described in **Error! Reference source not found.**
- Tools are described in RBS I&V test tool specification, TBD

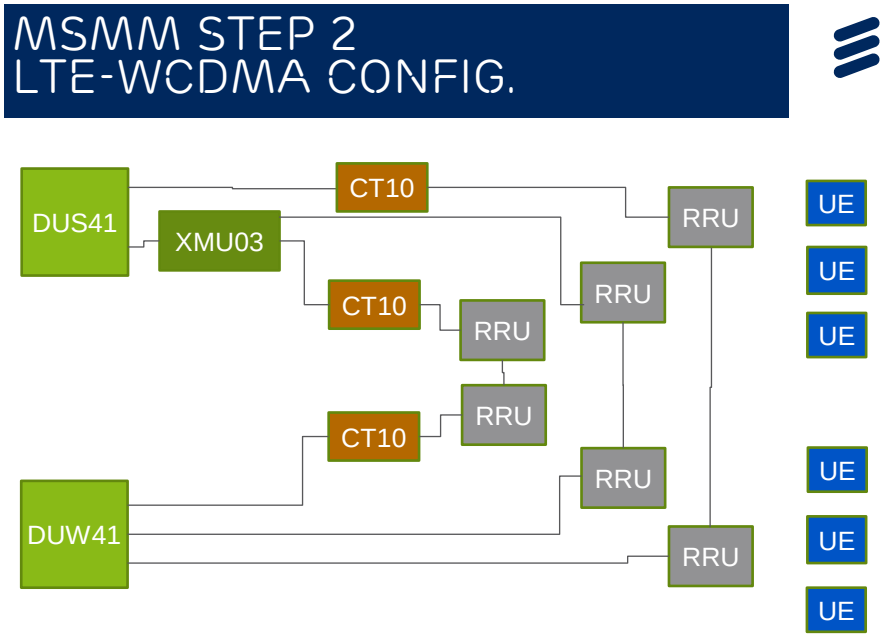
2.3 STP Topology

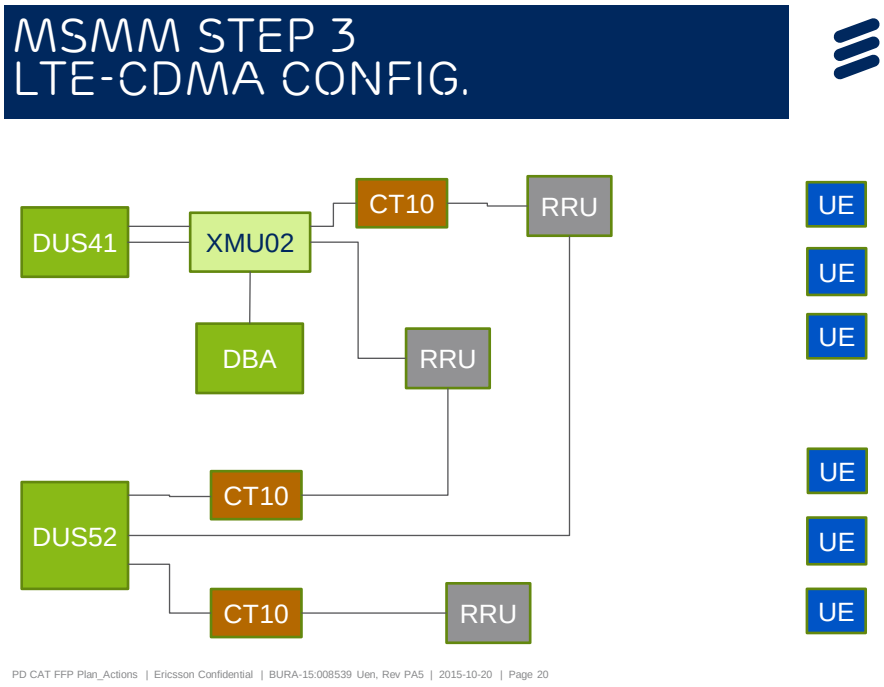
Three kinds of MSMM combination will be introduced, L+L, L+W and L+C.

Each type will have two kinds of configuration, depended on shared radio position in one radio chain between two RATs, i.e. cascaded radio for one RAT and single radio for the other RAT.

Each STP will have two mirrors, currently both of them are used for develop JCAT test cases, in the future, one for test cases execution, and the other for automation test cases development shared with XFT teams.







2.4 User Instruction

In accordance with the strategy, **Error! Reference source not found.** are the submitted test cases written on a high level where neither standard nor SW and HW implementation specific information is submitted. It is a prerequisite to fetch this information before test case execution.

It should be noted that the functional requirements describe “white box” sequences related to clients (DUs) and a server (RU) within an RBS, while the Use Cases are described on a RAN end user level. The test cases have not been selected with the purpose to verify a specific requirement or Use Case but will rather involve, to various extents a traceable part or parts of one or several requirements.

To reduce complexity in the challenging task of running high level multi standard test cases it is recommended to be prepared when entering the lab:

- A list of SPOCs should be available; who is contact for LTE questions, who can help out with Mobitec, why is the UP not available on the SMRS?
- The Test Configuration, i.e. SUT and Test Environment, is prepared according to the LTC before executing any test case.
- A tester in a multi standard environment is responsible to be familiar with all parts of test configuration management handling:
  - Test Configuration baseline handling (LTC)
  - SW management and delivery handling
  - TR and CR processes
  - Handling of DT, licenses and parameters
  - Network planning, lab configuration and HW management.

2.5 Trace Information

Information about handling of trace and error including decoding of the trace output is described in the tool specification, ref [1]

3 Specification Structure Information

3.1 Explanation of the Test Case Identity

Example: TC1.001

Format: TCg.zzz

g = Test Case group. In this case: 1

zzz = Test Case number. In this case: 001

Used tags and next free tag to be used should be stated in revision history. (E.g. Rev B: TC1.002 is removed, TC1.003 is added. Next free TC tag is TC1.004.)

4 Requirement Based Tests

4.1 Generic pre- and post-conditions

Description: High level checks and actions to be executed in addition to what is specified for each test case.

The steps described below should be validated, not with the main purpose to verify a specific requirement, but with the intention to secure the RBS product quality.

Call establishment should be performed and passed, if not explicitly stated in the test case, at the testers own judgement on a per Test Group basis. The general principle is that the expected non-affected traffic should not be disturbed or degraded during the action performed, and no degradation happened in post-check compared to pre-check.

Precondition: All nodes in the RBS 6000 are in service:
- RBS support system is in controlled mode
- List alarms
- No corrupt configuration data, e.g. MOs
- Sector, Carrier, XMU, RU and RiLink are enabled
- Nodes are synchronized (e.g. TIME_LOCKED)
- RiLink rate are as expected
- Cell setup
- Call establishment, see description above

Postcondition: All nodes in the RBS 6000 are in service:
- RBS support system is in controlled mode
- No new alarms issued
- No corrupt configuration data, e.g. MOs
- Sector, Carrier, XMU, RU and RiLink are enabled
- Nodes are synchronized (e.g. TIME_LOCKED)
- RiLink rate are as expected
- No unexpected errors in trace and error log
- Cell Setup
- Call establishment, see description above

4.2 Test Group 1: CPRI Robustness

Objective: The objective of this test group is to verify the MSMM use cases for CRRI robustness, including LOS (Lost of Signal), CDC (CPRI Delay Change) with SoCC (Sync over CPRI Connection) setup. Ref [2] [3]

Preparation: Planning of MSMM configuration is based on the STP topology specified in section 2.3, node group Sync over CPRI is established.

4.2.1 Normal Cases

4.2.1.1 TC1.001 CPRI LOS, SP, COLI, One by One, Not Active, Long Disruption

Tag: TC1.001

Purpose: Loss of one CPRI link NOT used for SoCPRI on SP for long disruption, the Link Failure alarm is issued on the client that lost connection. No impact on SoCC. Traffic at the other clients is unaffected.

Description: CPRI link break on the NOT active SoCC link for SP node, using coli command for long time disruption (above 30s but less than 5min).

Precondition: The RBSs are prepared with basic configuration, node identifiers and login credentials. The adjacent nodes (e.g. RNC, MME and OSS-RC) and network services (e.g. sync, IP Transport network, DNS, COMINF) are prepared with configuration data required for the new RBSs.

Sync over CPRI is established, more than one connected RiPort between SP and SR is configured. All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

Both single and mixed mode sectors are present for CDMA, WCDMA or LTE (G1/G2); they should be operational with traffic running.

Precondition as specified in Generic pre- and post-conditions does not give any unexpected result.

Action 1: Break one OK_NOT_ACTIVE SoCC link connected to SP not used for SoCPRI between SP and SR by COLI command on DU RiPort for 30s. (e.g. RiPort=A, G1->lhsh 000100 riportglitch 1 30000 txrx, G2-> rhdc ri_linkbreak ri0 both 30000)

Result 1: On SP, RiPortStatus (in MO class NodeGroupSyncMember) connected to the broken port becomes CPRI_LINK_NOT_AVAILABLE, others are OK_NOT_ACTIVE. On SR, RiPortStatus connected to the broken port becomes CONNECTED_TO_RU_NOT_TO_NEIGHBOR or CPRI_LINK_NOT_AVAILABLE.

On SP, RU and cell that are related to the broken link are DISABLED, and cell status is DEPENDENCY_FAILED while others are ENABLED, with availability status as NO_STATUS. No impact on SR.

No impact on SP/SR clock state (e.g. TIME_LOCKED). External sync reference is not active on SR.

Link Failure alarm is raised on broken link on SP, no alarms on SR.

Traffic related to the broken link is disturbed on SP, while others are not affected.

Action 2: COLI command expired, the broken link recovered.

Result 2: All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

All RUs and cells are ENABLED, with availability status as NO_STATUS.

Nodes are synchronized (e.g. TIME_LOCKED). External sync reference is not active on SR.

Link Failure alarm is ceased on broken link on SP.

Traffic related to the broken link on SP is restored.

Action 3: Repeat Action1 and Action2 on remained RiPorts.

Result 3: Same result like Result1 and Result 2.

Action 4: Repeat above Action 1-3 three times.

Result 4: Same result like Result 1-3.

Postcondition: The RBSs are operating as MSMM configuration based on the STP topology specified in section 2.3, with SoCC established.

Postcondition as specified in Generic pre- and post-conditions does not give any unexpected result.

4.2.1.2 TC1.002 CPRI LOS, SP, COLI, One by One, Active, Long Disruption

Tag: TC1.002

Purpose: Loss of the active SoCC link on SP for long disruption, the Link Failure alarm is issued on the client that lost connection. No impact on SoCC but switch from one RI port to another. Traffic at the other clients is unaffected.

Description: CPRI link break on the active SoCC link for SP node, using coli command for long time disruption (above 30s but less than 5min).

Precondition: The RBSs are prepared with basic configuration, node identifiers and login credentials. The adjacent nodes (e.g. RNC, MME and OSS-RC) and network services (e.g. sync, IP Transport network, DNS, COMINF) are prepared with configuration data required for the new RBSs.

Sync over CPRI is established, more than one connected RiPort between SP and SR is configured. All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

Both single and mixed mode sectors are present for CDMA, WCDMA or LTE (G1/G2); they should be operational with traffic running.

Precondition as specified in Generic pre- and post-conditions does not give any unexpected result.

Action 1: Break the active SoCC link connected to SP by COLI command on DU RiPort for 30s. (e.g. RiPort=A, G1->lhsh 000100 riportglitch 1 30000 txrx, G2-> rhdc ri_linkbreak ri0 both 30000)

Result 1: On SP, RiPortStatus (in MO class NodeGroupSyncMember) connected to the broken port becomes CPRI_LINK_NOT_AVAILABLE, others are OK_NOT_ACTIVE. On SR, RiPortStatus connected to the broken port becomes from OK_ACTIVE to CONNECTED_TO_RU_NOT_TO_NEIGHBOR or CPRI_LINK_NOT_AVAILABLE, next available port on SR switches to OK_ACTIVE.

On SP, RU and cell that are related to the broken link are DISABLED, and cell status is DEPENDENCY_FAILED while others are ENABLED, with availability status as NO_STATUS. No impact on SR.

No impact on SP/SR clock state (e.g. TIME_LOCKED). External sync reference is not active on SR.

Link Failure alarm is raised on broken link on SP, no alarms on SR.

Traffic related to the broken link is disturbed on SP, while others are not affected.

Action 2: COLI command expired, the broken link recovered.

Result 2: All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

All RUs and cells are ENABLED, with availability status as NO_STATUS.

Nodes are synchronized (e.g. TIME_LOCKED). External sync reference is not active on SR.

Link Failure alarm is ceased on broken link on SP.

Traffic related to the broken link on SP is restored.

Action 3: Repeat above Action 1-2 three times.

Result 3: Same result like Result 1-2.

Postcondition: The RBSs are operating as MSMM configuration based on the STP topology specified in section 2.3, with SoCC established.

Postcondition as specified in Generic pre- and post-conditions does not give any unexpected result.

4.2.1.3 TC1.003 CPRI LOS, SR, COLI, One by One, Not Active, Long Disruption

Tag: TC1.003

Purpose: Loss of one CPRI link NOT used for SoCPRI on SR for long disruption, the Link Failure alarm is issued on the client that lost connection. No impact on SoCC. Traffic at the other clients is unaffected.

Description: CPRI link break on the NOT active SoCC link for SR node, using coli command for long time disruption (above 30s but less than 5min).

Precondition: The RBSs are prepared with basic configuration, node identifiers and login credentials. The adjacent nodes (e.g. RNC, MME and OSS-RC) and network services (e.g. sync, IP Transport network, DNS, COMINF) are prepared with configuration data required for the new RBSs.

Sync over CPRI is established, more than one connected RiPort between SP and SR is configured. All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

Both single and mixed mode sectors are present for CDMA, WCDMA or LTE (G1/G2); they should be operational with traffic running.

Precondition as specified in Generic pre- and post-conditions does not give any unexpected result.

Action 1: Break one OK_NOT_ACTIVE SoCC link connected to SR not used for SoCPRI between SP and SR by COLI command on DU RiPort for 30s. (e.g. RiPort=A, G1->lhsh 000100 riportglitch 1 30000 txrx, G2-> rhdc ri_linkbreak ri0 both 30000)

Result 1: On SP, RiPortStatus (in MO class NodeGroupSyncMember) connected to the broken port becomes CPRI_LINK_NOT_AVAILABLE or CONNECTED_TO_RU_NOT_TO_NEIGHBOR, others are OK_NOT_ACTIVE. On SR, RiPortStatus connected to the broken port becomes CPRI_LINK_NOT_AVAILABLE.

On SR, RU and cell that are related to the broken link are DISABLED, and cell status is DEPENDENCY_FAILED while others are ENABLED, with availability status as NO_STATUS. No impact on SP.

No impact on SP/SR clock state (e.g. TIME_LOCKED). External sync reference is not active on SR.

Link Failure alarm is raised on broken link on SR, no alarms on SP.

Traffic related to the broken link is disturbed on SR, while others are not affected.

Action 2: COLI command expired, the broken link recovered.

Result 2: All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

All RUs and cells are ENABLED, with availability status as NO_STATUS.

Nodes are synchronized (e.g. TIME_LOCKED). External sync reference is not active on SR.

Link Failure alarm is ceased on broken link on SR.

Traffic related to the broken link on SR is restored.

Action 3: Repeat Action1 and Action2 on remained RiPorts.

Result 3: Same result like Result1 and Result 2.

Action 4: Repeat above Action 1-3 three times.

Result 4: Same result like Result 1-3.

Postcondition: The RBSs are operating as MSMM configuration based on the STP topology specified in section 2.3, with SoCC established.

Postcondition as specified in Generic pre- and post-conditions does not give any unexpected result.

4.2.1.4 TC1.004 CPRI LOS, SR, COLI, One by One, Active, Long Disruption

Tag: TC1.004

Purpose: Loss of the active SoCC link on SR for long disruption, the Link Failure alarm is issued on the client that lost connection. No impact on SoCC but switch from one RI port to another. Traffic at the other clients is unaffected.

Description: CPRI link break on the active SoCC link for SR node, using coli command for long time disruption (above 30s but less than 5min).

Precondition: The RBSs are prepared with basic configuration, node identifiers and login credentials. The adjacent nodes (e.g. RNC, MME and OSS-RC) and network services (e.g. sync, IP Transport network, DNS, COMINF) are prepared with configuration data required for the new RBSs.

Sync over CPRI is established, more than one connected RiPort between SP and SR is configured. All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

Both single and mixed mode sectors are present for CDMA, WCDMA or LTE (G1/G2); they should be operational with traffic running.

Precondition as specified in Generic pre- and post-conditions does not give any unexpected result.

Action 1: Break the active SoCC link connected to SR by COLI command on DU RiPort for 30s. (e.g. RiPort=A, G1->lhsh 000100 riportglitch 1 30000 txrx, G2-> rhdc ri_linkbreak ri0 both 30000)

Result 1: On SP, RiPortStatus (in MO class NodeGroupSyncMember) connected to the broken port becomes CPRI_LINK_NOT_AVAILABLE or CONNECTED_TO_RU_NOT_TO_NEIGHBOR, others are OK_NOT_ACTIVE. On SR, RiPortStatus connected to the broken port becomes from OK_ACTIVE to CPRI_LINK_NOT_AVAILABLE, next available port on SR switches to OK_ACTIVE.

On SR, RU and cell that are related to the broken link are DISABLED, and cell status is DEPENDENCY_FAILED while others are ENABLED, with availability status as NO_STATUS. No impact on SP.

No impact on SP/SR clock state (e.g. TIME_LOCKED). External sync reference is not active on SR.

Link Failure alarm is raised on broken link on SR, no alarms on SP.

Traffic related to the broken link is disturbed on SP, while others are not affected.

Action 2: COLI command expired, the broken link recovered.

Result 2: All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

All RUs and cells are ENABLED, with availability status as NO_STATUS.

Nodes are synchronized (e.g. TIME_LOCKED). External sync reference is not active on SR.

Link Failure alarm is ceased on broken link on SR.

Traffic related to the broken link on SR is restored.

Action 3: Repeat above Action 1-2 three times.

Result 3: Same result like Result 1-2.

Postcondition: The RBSs are operating as MSMM configuration based on the STP topology specified in section 2.3, with SoCC established.

Postcondition as specified in Generic pre- and post-conditions does not give any unexpected result.

4.2.1.5 TC1.005 CPRI LOS, SP, COLI, Simultaneous, Long Disruption

Tag: TC1.005

Purpose: Loss of all CPRI links on SP for long disruption, the Link Failure alarms are issued on the clients that lost connection. Loss of SoCPRI alarms are raised on both SP and SR (>=180s), holdover time NOT expired. Traffic at the other clients is unaffected.

Description: Break all CPRI links on SP node, using coli command for long time disruption (above 30s but less than 5min).

Precondition: The RBSs are prepared with basic configuration, node identifiers and login credentials. The adjacent nodes (e.g. RNC, MME and OSS-RC) and network services (e.g. sync, IP Transport network, DNS, COMINF) are prepared with configuration data required for the new RBSs.

Sync over CPRI is established, more than one connected RiPort between SP and SR is configured. All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

Both single and mixed mode sectors are present for CDMA, WCDMA or LTE (G1/G2); they should be operational with traffic running.

Precondition as specified in Generic pre- and post-conditions does not give any unexpected result.

Action 1: Break all CPRI links on SP node by COLI command on DU RiPort for 30s. (e.g. RiPort=A, G1->lhsh 000100 riportglitch 1 30000 txrx, G2-> rhdc ri_linkbreak ri0 both 30000)

Result 1: On SP, all RiPortStatus (in MO class NodeGroupSyncMember) become CPRI_LINK_NOT_AVAILABLE. On SR, all RiPortStatus become CONNECTED_TO_RU_NOT_TO_NEIGHBOR or CPRI_LINK_NOT_AVAILABLE.

On SP, all RU and cell are DISABLED, and cell status is DEPENDENCY_FAILED. No impact on SR.

No impact on SP clock state (e.g. TIME_LOCKED), SR transits from TIME_LOCKED to TIME_HOLDOVER clock state. External sync reference is not active on SR.

Link Failure alarms are only raised on broken links on SP.

Loss of SoCPRI alarms are raised on both SP and SR (>=180s).

Traffic related to the broken links is disturbed on SP, while others are not affected.

Action 2: COLI command expired, all broken links recovered.

Result 2: All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

All RUs and cells are ENABLED, with availability status as NO_STATUS.

Nodes are synchronized (e.g. TIME_LOCKED). External sync reference is not active on SR.

Link Failure alarms are ceased on broken links on SP.

Loss of SoCPRI alarms are ceased on both SP and SR.

Traffic related to the broken links on SP is restored.

Action 3: Repeat above Action 1-2 three times.

Result 3: Same result like Result 1-2.

Postcondition: The RBSs are operating as MSMM configuration based on the STP topology specified in section 2.3, with SoCC established.

Postcondition as specified in Generic pre- and post-conditions does not give any unexpected result.

4.2.1.6 TC1.006 CPRI LOS, SR, COLI, Simultaneous, Long Disruption

Tag: TC1.006

Purpose: Loss of all CPRI links on SR for long disruption, the Link Failure alarms are issued on the clients that lost connection. Loss of SoCPRI alarms are raised on both SP and SR (>=180s), holdover time NOT expired. Traffic at the other clients is unaffected.

Description: Break all CPRI links on SR node, using coli command for long time disruption (above 30s but less than 5min).

Precondition: The RBSs are prepared with basic configuration, node identifiers and login credentials. The adjacent nodes (e.g. RNC, MME and OSS-RC) and network services (e.g. sync, IP Transport network, DNS, COMINF) are prepared with configuration data required for the new RBSs.

Sync over CPRI is established, more than one connected RiPort between SP and SR is configured. All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

Both single and mixed mode sectors are present for CDMA, WCDMA or LTE (G1/G2); they should be operational with traffic running.

Precondition as specified in Generic pre- and post-conditions does not give any unexpected result.

Action 1: Break all CPRI links on SR node by COLI command on DU RiPort for 30s. (e.g. RiPort=A, G1->lhsh 000100 riportglitch 1 30000 txrx, G2-> rhdc ri_linkbreak ri0 both 30000)

Result 1: On SP, all RiPortStatus (in MO class NodeGroupSyncMember) become CPRI_LINK_NOT_AVAILABLE or CONNECTED_TO_RU_NOT_TO_NEIGHBOR. On SR, all RiPortStatus become CPRI_LINK_NOT_AVAILABLE.

On SR, all RU and cell are DISABLED, and cell status is DEPENDENCY_FAILED. No impact on SP.

No impact on SP clock state (e.g. TIME_LOCKED), SR transits from TIME_LOCKED to TIME_HOLDOVER clock state. External sync reference is not active on SR.

Link Failure alarms are only raised on broken links on SR.

Loss of SoCPRI alarms are raised on both SP and SR (>=180s).

Traffic related to the broken links is disturbed on SR, while others are not affected.

Action 2: COLI command expired, all broken links recovered.

Result 2: All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

All RUs and cells are ENABLED, with availability status as NO_STATUS.

Nodes are synchronized (e.g. TIME_LOCKED). External sync reference is not active on SR.

Link Failure alarms are ceased on broken links on SR.

Loss of SoCPRI alarms are ceased on both SP and SR.

Traffic related to the broken links on SR is restored.

Action 3: Repeat above Action 1-2 three times.

Result 3: Same result like Result 1-2.

Postcondition: The RBSs are operating as MSMM configuration based on the STP topology specified in section 2.3, with SoCC established.

Postcondition as specified in Generic pre- and post-conditions does not give any unexpected result.

4.2.1.7 TC1.007 CPRI LOS, SP, COLI, Simultaneous, Extend Long Disruption

Tag: TC1.007

Purpose: Loss of all CPRI links on SP for extend long disruption, the Link Failure alarms are issued on the clients that lost connection. Loss of SoCPRI alarms are raised on both SP and SR (>=180s), holdover time expired. Traffic at the other clients is unaffected.

Description: Break all CPRI links on SP node, using coli command for long time disruption (more than 5min).

Precondition: The RBSs are prepared with basic configuration, node identifiers and login credentials. The adjacent nodes (e.g. RNC, MME and OSS-RC) and network services (e.g. sync, IP Transport network, DNS, COMINF) are prepared with configuration data required for the new RBSs.

Sync over CPRI is established, more than one connected RiPort between SP and SR is configured. All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

Backup sync reference exists on SR.

Both single and mixed mode sectors are present for CDMA, WCDMA or LTE (G1/G2); they should be operational with traffic running.

Precondition as specified in Generic pre- and post-conditions does not give any unexpected result.

Action 1: Break all CPRI links on SP node by COLI command on DU RiPort for more than 300s. (e.g. RiPort=A, G1->lhsh 000100 riportglitch 1 350000 txrx, G2-> rhdc ri_linkbreak ri0 both 350000)

Result 1: On SP, all RiPortStatus (in MO class NodeGroupSyncMember) become CPRI_LINK_NOT_AVAILABLE. On SR, all RiPortStatus become CONNECTED_TO_RU_NOT_TO_NEIGHBOR or CPRI_LINK_NOT_AVAILABLE.

On SP, all RU and cell are DISABLED, and cell status is DEPENDENCY_FAILED. No impact on SR.

No impact on SP clock state (e.g. TIME_LOCKED), SR transits from TIME_LOCKED to TIME_HOLDOVER clock state. External sync reference is not active on SR.

Link Failure alarms are only raised on broken links on SP.

Loss of SoCPRI alarms are raised on both SP and SR (>=180s).

Traffic related to the broken links is disturbed on SP, while others are not affected.

Action 2: Wait 5 minutes for holdover to expire on SR.

Result 2: On SP, all RiPortStatus (in MO class NodeGroupSyncMember) become CPRI_LINK_NOT_AVAILABLE. On SR, all RiPortStatus become CONNECTED_TO_RU_NOT_TO_NEIGHBOR or CPRI_LINK_NOT_AVAILABLE.

On SP, all RU and cell are DISABLED, and cell status is DEPENDENCY_FAILED. No impact on SR.

No impact on SP clock state (e.g. TIME_LOCKED), SR transits from TIME_HOLDOVER to TIME_LOCKED clock state. External sync reference is active on SR, SR's local status transits from SYNC_RECEIVER_TIME_HOLDOVER to SYNC_PROVIDER.

Link Failure alarms are still present on SP.

Loss of SoCPRI alarms are still present on both SP and SR.

Traffic related to the broken links is still disturbed on SP, while others are not affected.

Action 3: COLI command expired, all broken links recovered.

Result 3: All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

All RUs and cells are ENABLED, with availability status as NO_STATUS.

Nodes are synchronized (e.g. TIME_LOCKED). External sync reference is not active on SR.

Link Failure alarms are ceased on broken links on SP.

Loss of SoCPRI alarms are ceased on both SP and SR.

Traffic related to the broken links on SP is restored.

Action 4: Repeat above Action 1-3 three times.

Result 4: Same result like Result 1-3.

Postcondition: The RBSs are operating as MSMM configuration based on the STP topology specified in section 2.3, with SoCC established.

Postcondition as specified in Generic pre- and post-conditions does not give any unexpected result.

4.2.1.8 TC1.008 CPRI LOS, SR, COLI, Simultaneous, Extend Long Disruption

Tag: TC1.008

Purpose: Loss of all CPRI links on SR for extend long disruption, the Link Failure alarms are issued on the clients that lost connection. Loss of SoCPRI alarms(>=180s) are raised on both SP and SR, holdover time expired. Traffic at the other clients is unaffected.

Description: Break all CPRI links on SR node, using coli command for long time disruption (more than 5min).

Precondition: The RBSs are prepared with basic configuration, node identifiers and login credentials. The adjacent nodes (e.g. RNC, MME and OSS-RC) and network services (e.g. sync, IP Transport network, DNS, COMINF) are prepared with configuration data required for the new RBSs.

Sync over CPRI is established, more than one connected RiPort between SP and SR is configured. All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

Backup sync reference exists on SR.

Both single and mixed mode sectors are present for CDMA, WCDMA or LTE (G1/G2); they should be operational with traffic running.

Precondition as specified in Generic pre- and post-conditions does not give any unexpected result.

Action 1: Break all CPRI links on SR node by COLI command on DU RiPort for more than 300s. (e.g. RiPort=A, G1->lhsh 000100 riportglitch 1 350000 txrx, G2-> rhdc ri_linkbreak ri0 both 350000)

Result 1: On SP, all RiPortStatus (in MO class NodeGroupSyncMember) become CPRI_LINK_NOT_AVAILABLE or CONNECTED_TO_RU_NOT_TO_NEIGHBOR. On SR, all RiPortStatus become CPRI_LINK_NOT_AVAILABLE.

On SR, all RU and cell are DISABLED, and cell status is DEPENDENCY_FAILED. No impact on SP.

No impact on SP clock state (e.g. TIME_LOCKED), SR transits from TIME_LOCKED to TIME_HOLDOVER clock state. External sync reference is not active on SR.

Link Failure alarms are only raised on broken links on SR.

Loss of SoCPRI alarms are raised on both SP and SR (>= 180s).

Traffic related to the broken links is disturbed on SR, while others are not affected.

Action 2: Wait 5 minutes for holdover to expire on SR.

Result 2: On SP, all RiPortStatus (in MO class NodeGroupSyncMember) become CPRI_LINK_NOT_AVAILABLE or CONNECTED_TO_RU_NOT_TO_NEIGHBOR. On SR, all RiPortStatus become CPRI_LINK_NOT_AVAILABLE.

On SR, all RU and cell are DISABLED, and cell status is DEPENDENCY_FAILED. No impact on SP.

No impact on SP clock state (e.g. TIME_LOCKED), SR transits from TIME_HOLDOVER to TIME_LOCKED clock state. External sync reference is active on SR, SR's local status transits from SYNC_RECEIVER_TIME_HOLDOVER to SYNC_PROVIDER.

Link Failure alarms are still present on SR.

Loss of SoCPRI alarms are still present on both SP and SR.

Traffic related to the broken links is still disturbed on SR, while others are not affected.

Action 3: COLI command expired, all broken links recovered.

Result 3: All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

All RUs and cells are ENABLED, with availability status as NO_STATUS.

Nodes are synchronized (e.g. TIME_LOCKED). External sync reference is not active on SR.

Link Failure alarms are ceased on broken links on SP.

Loss of SoCPRI alarms are ceased on both SP and SR.

Traffic related to the broken links on SP is restored.

Action 4: Repeat above Action 1-3 three times.

Result 4: Same result like Result 1-3.

Postcondition: The RBSs are operating as MSMM configuration based on the STP topology specified in section 2.3, with SoCC established.

Postcondition as specified in Generic pre- and post-conditions does not give any unexpected result.

4.2.1.9 TC1.009 CPRI LOS, SP, COLI, Simultaneous, Short Disruption

Tag: TC1.009

Purpose: Loss of all CPRI links on SP for short disruption, the Link Failure alarm is NOT issued on the client that lost connection. No impact on SoCC. Traffic at all clients is unaffected.

Description: Break all CPRI links on SP node, using coli command for short time disruption (less than 400ms).

Precondition: The RBSs are prepared with basic configuration, node identifiers and login credentials. The adjacent nodes (e.g. RNC, MME and OSS-RC) and network services (e.g. sync, IP Transport network, DNS, COMINF) are prepared with configuration data required for the new RBSs.

Sync over CPRI is established, more than one connected RiPort between SP and SR is configured. All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

Both single and mixed mode sectors are present for CDMA, WCDMA or LTE (G1/G2); they should be operational with traffic running.

Precondition as specified in Generic pre- and post-conditions does not give any unexpected result.

Action 1: Break all CPRI links on SP node by COLI command on DU RiPort for 400ms. (e.g. RiPort=A, G1->lhsh 000100 riportglitch 1 400 txrx, G2-> rhdc ri_linkbreak ri0 both 400).

Result 1: RiPortStatus (in MO NodeGroupSyncMember) on both SP and SR are not changed. All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

All RUs and cells are ENABLED, with availability status as NO_STATUS. (see limitation 3)

Nodes are synchronized (e.g. TIME_LOCKED). External sync reference is not active on SR.

No alarm is raised on both SP and SR.

Traffic is not affected on both SP and SR.

Action 2: Repeat above Action 1 three times.

Result 2: Same result like Result 1.

Postcondition: The RBSs are operating as MSMM configuration based on the STP topology specified in section 2.3, with SoCC established.

Postcondition as specified in Generic pre- and post-conditions does not give any unexpected result.

4.2.1.10 TC1.010 CPRI LOS, SR, COLI, Simultaneous, Short Disruption

Tag: TC1.010

Purpose: Loss of all CPRI links on SR for short disruption, the Link Failure alarm is NOT issued on the client that lost connection. No impact on SoCC. Traffic at all clients is unaffected.

Description: Break all CPRI links on SR node, using coli command for short time disruption (less than 400ms).

Precondition: The RBSs are prepared with basic configuration, node identifiers and login credentials. The adjacent nodes (e.g. RNC, MME and OSS-RC) and network services (e.g. sync, IP Transport network, DNS, COMINF) are prepared with configuration data required for the new RBSs.

Sync over CPRI is established, more than one connected RiPort between SP and SR is configured. All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

Both single and mixed mode sectors are present for CDMA, WCDMA or LTE (G1/G2); they should be operational with traffic running.

Precondition as specified in Generic pre- and post-conditions does not give any unexpected result.

Action 1: Break all CPRI links on SR node by COLI command on DU RiPort for 400ms. (e.g. RiPort=A, G1->lhsh 000100 riportglitch 1 400 txrx, G2-> rhdc ri_linkbreak ri0 both 400).

Result 1: RiPortStatus (in MO NodeGroupSyncMember) on both SP and SR are not changed. All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

All RUs and cells are ENABLED, with availability status as NO_STATUS. (see limitation 3)

Nodes are synchronized (e.g. TIME_LOCKED). External sync reference is not active on SR.

No alarm is raised on both SP and SR.

Traffic is not affected on both SP and SR.

Action 2: Repeat above Action 1 three times.

Result 2: Same result like Result 1.

Postcondition: The RBSs are operating as MSMM configuration based on the STP topology specified in section 2.3, with SoCC established.

Postcondition as specified in Generic pre- and post-conditions does not give any unexpected result.

~~4.2.1.11 TC1.011 CPRI LOS, CT-10, Dual Secondary Link between XMU03 and Radio, Long Disruption~~

~~**Tag:** TC1.011~~

~~**Purpose:** Loss of one Sub CPRI link between XMU03 and Radio when dual sub-paths existed for one SoCC link, the Link Failure alarm is issued on the client that lost connection. No impact on SoCC. Traffic at the other clients is unaffected.~~

~~**Description:** CPRI link break on the Sub CPRI link between XMU03 and Radio, using CT-10 to emulate Loss of Signal due to shutdown of laser (above 30s but less than 5min).~~

~~**Precondition:** The RBSs are prepared with basic configuration, node identifiers and login credentials. The adjacent nodes (e.g. RNC, MME and OSS-RC) and network services (e.g. sync, IP Transport network, DNS, COMINF) are prepared with configuration data required for the new RBSs.~~

- Sync over CPRI is established, more than one connected RiPort between SP and SR is configured. All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

- More than one secondary CPRI links existed between XMU03 and Radio for one logic SoCC link between DUs.

- Both single and mixed mode sectors are present for CDMA, WCDMA or LTE (G1/G2); they should be operational with traffic running.

- Precondition as specified in Generic pre- and post-conditions does not give any unexpected result.

Action 1: Break one Sub CPRI link between XMU03 and Radio by CT-10 command. (e.g. set_los_laser_emulator 1 0 to enable loss of signal emulation on the primary port)

Result 1: RiPortStatus (in MO NodeGroupSyncMember) on both SP and SR are not changed. All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

- RU and cell that are related to the broken link are DISABLED, and cell status is DEPENDENCY_FAILED while others are ENABLED, with availability status as NO_STATUS.

- No impact on SP/SR clock state (e.g. TIME_LOCKED). External sync reference is not active on SR.

- Link Failure alarm is raised on broken link on related DU.

- Traffic related to the broken link is disturbed on related DU, while others are not affected.

Action 2: Recover the Sub CPRI link between XMU03 and Radio by CT-10 command. (e.g. set_los_laser_emulator 0 0 to disable loss of signal on the primary port)

Result 2: All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

- All RUs and cells are ENABLED, with availability status as NO_STATUS.

- Nodes are synchronized (e.g. TIME_LOCKED). External sync reference is not active on SR.

- Link Failure alarm is ceased on broken link on related DU.

~~Traffic related to the broken link on related DU is restored.~~

~~**Action 3:** Repeat above Action 1-2 three times.~~

~~**Result 3:** Same result like Result 1-2.~~

~~**Postcondition:** The RBSs are operating as MSMM configuration based on the STP topology specified in section 2.3, with SoCC established.~~

~~Postcondition as specified in Generic pre- and post-conditions does not give any unexpected result.~~

~~4.2.1.12 TC1.012 CPRI CDC, CT-10, 15km/10km/78m/46m Delay, 10s Stable~~

~~**Tag:** TC1.012~~

~~**Purpose:** Change CPRI link delay between DU and Radio with different length, the system can be stable within the disturbance check time. No impact on SoCC and traffic.~~

~~**Description:** CPRI link delay change between DU and Radio, using CT-10 to emulate cable length. (15km/10km/78m/46m)~~

~~**Precondition:** The RBSs are prepared with basic configuration, node identifiers and login credentials. The adjacent nodes (e.g. RNC, MME and OSS-RC) and network services (e.g. sync, IP Transport network, DNS, COMINF) are prepared with configuration data required for the new RBSs.~~

~~Sync over CPRI is established, more than one connected RiPort between SP and SR is configured. All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.~~

~~Both single and mixed mode sectors are present for CDMA, WCDMA or LTE (G1/G2); they should be operational with traffic running.~~

~~Precondition as specified in Generic pre- and post-conditions does not give any unexpected result.~~

~~**Action 1:** Change one CPRI link delay between XMU03 and Radio by CT-10 command, wait 10s to stabilize the system. (e.g. set_cable_length_emulator –m 15000 0 to set a cable length of 15km on the primary port)~~

~~**Result 1:** RiPortStatus (in MO NodeGroupSyncMember) on both SP and SR are not changed. All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.~~

~~Related RiLink status is ENABLED, with availability status as NO_STATUS, link rate remain unchanged.~~

~~All RUs and cells are ENABLED, with availability status as NO_STATUS.~~

~~Nodes are synchronized (e.g. TIME_LOCKED). External sync reference is not active on SR.~~

~~No alarm is raised on both SP and SR.~~

~~Traffic is not affected on both SP and SR.~~

~~**Action 2:** Repeat Action1 with different length change.~~

~~**Result 2:** Same result like Result 1.~~

~~**Action 3:** Repeat above Action 1-2 three times.~~

~~**Result 3:** Same result like Result 1-2.~~

~~**Postcondition:** The RBSs are operating as MSMM configuration based on the STP topology specified in section 2.3, with SoCC established.~~

~~Postcondition as specified in Generic pre- and post-conditions does not give any unexpected result.~~

~~4.2.1.13 TC1.013 CPRI CDC, CT10, 16m Steps, 10s Stable~~

~~**Tag:** TC1.013~~

~~**Purpose:** Change CPRI link delay between DU and Radio with fixed steps, the system can be stable within the disturbance check time. No impact on SoCC and traffic.~~

~~**Description:** CPRI link delay change between DU and Radio, using CT-10 to emulate cable length. Steps of 16m with 1s interval, start with 0 and continue to 160m then down to 0 again.~~

~~**Precondition:** The RBSs are prepared with basic configuration, node identifiers and login credentials. The adjacent nodes (e.g. RNC, MME and OSS-RC) and network services (e.g. sync, IP Transport network, DNS, COMINF) are prepared with configuration data required for the new RBSs.~~

~~Sync over CPRI is established, more than one connected RiPort between SP and SR is configured. All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.~~

~~Both single and mixed mode sectors are present for CDMA, WCDMA or LTE (G1/G2); they should be operational with traffic running.~~

~~Precondition as specified in Generic pre- and post-conditions does not give any unexpected result.~~

~~**Action 1:** Change one CPRI link delay between XMU03 and Radio by CT-10 command, steps of 16m with 1s interval, start with 0 and continue to 160m then down to 0 again. Wait 10s to stabilize the system. (e.g. set_cable_length_emulator –m 15000 0 to set a cable length of 15km on the primary port)~~

~~**Result 1:** RiPortStatus (in MO NodeGroupSyncMember) on both SP and SR are not changed. All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.~~

~~Related RiLink status is ENABLED, with availability status as NO_STATUS, link rate remain unchanged.~~

~~All RUs and cells are ENABLED, with availability status as NO_STATUS.~~

~~Nodes are synchronized (e.g. TIME_LOCKED). External sync reference is not active on SR.~~

~~No alarm is raised on both SP and SR.~~

~~Traffic is not affected on both SP and SR.~~

~~**Action 2:** Repeat Action1 with different length change.~~

~~**Result 2:** Same result like Result 1.~~

~~**Action 3:** Repeat above Action 1-2 three times.~~

~~**Result 3:** Same result like Result 1-2.~~

~~**Postcondition:** The RBSs are operating as MSMM configuration based on the STP topology specified in section 2.3, with SoCC established.~~

~~Postcondition as specified in Generic pre- and post-conditions does not give any unexpected result.~~

4.3 Test Group 2: XMU03 Robustness

Objective: The objective of this test group is to verify the MSMM use cases for the XMU03 robustness, including Restart, Lock/Unlock with SoCC (Sync over CPRI Connection) setup. Ref [2]

Preparation: Planning of MSMM configuration is based on the STP topology specified in section 2.3, node group Sync over CPRI is established.

4.3.1 Normal Cases

4.3.1.1 TC2.001 XMU03 Restart, SP, Not Active

Tag: TC2.001

Purpose: Restart XMU03 connected to SP between DU and Radio, which the links pass through NOT used for active SoCC. No impact on SoCC. Traffic at the other links is unaffected.

Description: XMU03 restart on the NOT active SoCC link connected to SP node, using MO command.

Precondition: The RBSs are prepared with basic configuration, node identifiers and login credentials. The adjacent nodes (e.g. RNC, MME and OSS-RC) and network services (e.g. sync, IP Transport network, DNS, COMINF) are prepared with configuration data required for the new RBSs.

Sync over CPRI is established, more than one connected RiPort between SP and SR is configured. All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

Both single and mixed mode sectors are present for CDMA, WCDMA or LTE (G1/G2); they should be operational with traffic running.

Precondition as specified in Generic pre- and post-conditions does not give any unexpected result.

Action 1: Restart XMU03 connected to SP, which the links pass through NOT used for active SoCC, by MO command on DU. (e.g. lhsh BXP_5 restart -> warm, lhsh BXP_5 restart –c ->cold)

Result 1: On SP, RiPortStatus (in MO class NodeGroupSyncMember) connected to the XMU03 becomes CPRI_LINK_NOT_AVAILABLE, others are OK_NOT_ACTIVE. On SR, RiPortStatus related to the XMU03 becomes CONNECTED_TO_RU_NOT_TO_NEIGHBOR or CPRI_LINK_NOT_AVAILABLE.

~~On SP, RiLinks related to the XMU03 are DISABLED with availability status as OFF_LINE. No impact on SR.~~

On SP, RU and cell that are related to the XMU03 are DISABLED, and cell status is DEPENDENCY_FAILED while others are ENABLED, with availability status as NO_STATUS. No impact on SR.

No impact on SP/SR clock state (e.g. TIME_LOCKED). External sync reference is not active on SR.

No alarm raised on both SP and SR. (Link Failure alarm may appear for cold restart)

Traffic related to XMU03 is disturbed on SP, while others are not affected.

Action 2: The XMU03 recovered.

Result 2: All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

All RiLinks, RUs and cells are ENABLED, with availability status as NO_STATUS.

Nodes are synchronized (e.g. TIME_LOCKED). External sync reference is not active on SR.

No alarm raised on both SP and SR.

Traffic related to the XMU03 on SP is restored.

No crash happened on XMU03. (e.g. lhsh BXP_5 llog/pmd)

Action 3: Repeat above Action 1-2 with different rank three times.

Result 3: Same result like Result 1-2.

Postcondition: The RBSs are operating as MSMM configuration based on the STP topology specified in section 2.3, with SoCC established.

Postcondition as specified in Generic pre- and post-conditions does not give any unexpected result.

4.3.1.2 TC2.002 XMU03 Restart, SP, Active

Tag: TC2.002

Purpose: Restart XMU03 connected to SP between DU and Radio, which the links pass through used for active SoCC. No impact on SoCC but switch from one RI port to another. Traffic at the other links is unaffected.

Description: XMU03 restart on the active SoCC link connected to SP node, using MO command.

Precondition: The RBSs are prepared with basic configuration, node identifiers and login credentials. The adjacent nodes (e.g. RNC, MME and OSS-RC) and network services (e.g. sync, IP Transport network, DNS, COMINF) are prepared with configuration data required for the new RBSs.

Sync over CPRI is established, more than one connected RiPort between SP and SR is configured. All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

Both single and mixed mode sectors are present for CDMA, WCDMA or LTE (G1/G2); they should be operational with traffic running.

Precondition as specified in Generic pre- and post-conditions does not give any unexpected result.

Action 1: Restart XMU03 connected to SP, which the links pass through used for active SoCC, by MO command on DU. (e.g. lhsh BXP_5 restart -> warm, lhsh BXP_5 restart –c ->cold)

Result 1: On SP, RiPortStatus (in MO class NodeGroupSyncMember) connected to XMU03 becomes CPRI_LINK_NOT_AVAILABLE, others are OK_NOT_ACTIVE. On SR, RiPortStatus related to the XMU03 becomes from OK_ACTIVE to CONNECTED_TO_RU_NOT_TO_NEIGHBOR or CPRI_LINK_NOT_AVAILABLE, next available port on SR switches to OK_ACTIVE.

~~On SP, RiLinks related to the XMU03 are DISABLED with availability status as OFF_LINE. No impact on SR.~~

On SP, RU and cell that are related to the XMU03 are DISABLED, and cell status is DEPENDENCY_FAILED while others are ENABLED, with availability status as NO_STATUS. No impact on SR.

No impact on SP/SR clock state (e.g. TIME_LOCKED). External sync reference is not active on SR.

No alarm raised on both SP and SR. (Link Failure alarm may appear for cold restart)

Traffic related to XMU03 is disturbed on SP, while others are not affected.

Action 2: The XMU03 recovered.

Result 2: All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

All RiLinks, RUs and cells are ENABLED, with availability status as NO_STATUS.

Nodes are synchronized (e.g. TIME_LOCKED). External sync reference is not active on SR.

No alarm raised on both SP and SR.

Traffic related to the XMU03 on SP is restored.

No crash happened on XMU03. (e.g. lhsh BXP_5 llog/pmd)

Action 3: Repeat above Action 1-2 with different rank three times.

Result 3: Same result like Result 1-2.

Postcondition: The RBSs are operating as MSMM configuration based on the STP topology specified in section 2.3, with SoCC established.

Postcondition as specified in Generic pre- and post-conditions does not give any unexpected result.

4.3.1.3 TC2.003 XMU03 Restart, SR, Not Active

Tag: TC2.003

Purpose: Restart XMU03 connected to SR between DU and Radio, which the links pass through NOT used for active SoCC. No impact on SoCC. Traffic at the other links is unaffected.

Description: XMU03 restart on the NOT active SoCC link connected to SR node, using MO command.

Precondition: The RBSs are prepared with basic configuration, node identifiers and login credentials. The adjacent nodes (e.g. RNC, MME and OSS-RC) and network services (e.g. sync, IP Transport network, DNS, COMINF) are prepared with configuration data required for the new RBSs.

Sync over CPRI is established, more than one connected RiPort between SP and SR is configured. All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

Both single and mixed mode sectors are present for CDMA, WCDMA or LTE (G1/G2); they should be operational with traffic running.

Precondition as specified in Generic pre- and post-conditions does not give any unexpected result.

Action 1: Restart XMU03 connected to SR, which the links pass through NOT used for active SoCC, by MO command on DU. (e.g. lhsh BXP_5 restart -> warm, lhsh BXP_5 restart –c ->cold)

Result 1: On SP, RiPortStatus (in MO class NodeGroupSyncMember) related to the XMU03 becomes CPRI_LINK_NOT_AVAILABLE or CONNECTED_TO_RU_NOT_TO_NEIGHBOR, others are OK_NOT_ACTIVE. On SR, RiPortStatus connected to the XMU03 becomes CPRI_LINK_NOT_AVAILABLE.

~~On SR, RiLinks related to the XMU03 are DISABLED with availability status as OFF_LINE. No impact on SP.~~

On SR, RU and cell that are related to the XMU03 are DISABLED, and cell status is DEPENDENCY_FAILED while others are ENABLED, with availability status as NO_STATUS. No impact on SP.

No impact on SP/SR clock state (e.g. TIME_LOCKED). External sync reference is not active on SR.

No alarm raised on both SP and SR. (Link Failure alarm may appear for cold restart)

Traffic related to XMU03 is disturbed on SR, while others are not affected.

Action 2: The XMU03 recovered.

Result 2: All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

All RiLinks, RUs and cells are ENABLED, with availability status as NO_STATUS.

Nodes are synchronized (e.g. TIME_LOCKED). External sync reference is not active on SR.

No alarm raised on both SP and SR.

Traffic related to the XMU03 on SR is restored.

No crash happened on XMU03. (e.g. lhsh BXP_5 llog/pmd)

Action 3: Repeat above Action 1-2 with different rank three times.

Result 3: Same result like Result 1-2.

Postcondition: The RBSs are operating as MSMM configuration based on the STP topology specified in section 2.3, with SoCC established.

Postcondition as specified in Generic pre- and post-conditions does not give any unexpected result.

4.3.1.4 TC2.004 XMU03 Restart, SR, Active

Tag: TC2.004

Purpose: Restart XMU03 connected to SR between DU and Radio, which the links pass through used for active SoCC. No impact on SoCC but switch from one RI port to another. Traffic at the other links is unaffected.

Description: XMU03 restart on the active SoCC link connected to SR node, using MO command.

Precondition: The RBSs are prepared with basic configuration, node identifiers and login credentials. The adjacent nodes (e.g. RNC, MME and OSS-RC) and network services (e.g. sync, IP Transport network, DNS, COMINF) are prepared with configuration data required for the new RBSs.

Sync over CPRI is established, more than one connected RiPort between SP and SR is configured. All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

Both single and mixed mode sectors are present for CDMA, WCDMA or LTE (G1/G2); they should be operational with traffic running.

Precondition as specified in Generic pre- and post-conditions does not give any unexpected result.

Action 1: Restart XMU03 connected to SR, which the links pass through used for active SoCC, by MO command on DU. (e.g. lhsh BXP_5 restart -> warm, lhsh BXP_5 restart –c ->cold)

Result 1: On SP, RiPortStatus (in MO class NodeGroupSyncMember) related to XMU03 becomes CPRI_LINK_NOT_AVAILABLE or CONNECTED_TO_RU_NOT_TO_NEIGHBOR, others are OK_NOT_ACTIVE. On SR, RiPortStatus connected to the XMU03 becomes from OK_ACTIVE to CPRI_LINK_NOT_AVAILABLE, next available port on SR switches to OK_ACTIVE.

~~On SR, RiLinks related to the XMU03 are DISABLED with availability status as OFF_LINE. No impact on SP.~~

On SR, RU and cell that are related to the XMU03 are DISABLED, and cell status is DEPENDENCY_FAILED while others are ENABLED, with availability status as NO_STATUS. No impact on SP.

No impact on SP/SR clock state (e.g. TIME_LOCKED). External sync reference is not active on SR.

No alarm raised on both SP and SR. (Link Failure alarm may appear for cold restart)

Traffic related to XMU03 is disturbed on SR, while others are not affected.

Action 2: The XMU03 recovered.

Result 2: All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

All RiLinks, RUs and cells are ENABLED, with availability status as NO_STATUS.

Nodes are synchronized (e.g. TIME_LOCKED). External sync reference is not active on SR.

No alarm raised on both SP and SR.

Traffic related to the XMU03 on SR is restored.

No crash happened on XMU03. (e.g. lhsh BXP_5 llog/pmd)

Action 3: Repeat above Action 1-2 with different rank three times.

Result 3: Same result like Result 1-2.

Postcondition: The RBSs are operating as MSMM configuration based on the STP topology specified in section 2.3, with SoCC established.

Postcondition as specified in Generic pre- and post-conditions does not give any unexpected result.

4.3.1.5 TC2.005 XMU03 Lock/Unlock, SP, Not Active

Tag: TC2.005

Purpose: Lock/Unlock XMU03 connected to SP between DU and Radio, which the links pass through NOT used for active SoCC. No impact on SoCC. Traffic at the other links is unaffected.

Description: XMU03 Lock/Unlock on the NOT active SoCC link connected to SP node, using MO command.

Precondition: The RBSs are prepared with basic configuration, node identifiers and login credentials. The adjacent nodes (e.g. RNC, MME and OSS-RC) and network services (e.g. sync, IP Transport network, DNS, COMINF) are prepared with configuration data required for the new RBSs.

Sync over CPRI is established, more than one connected RiPort between SP and SR is configured. All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

Both single and mixed mode sectors are present for CDMA, WCDMA or LTE (G1/G2); they should be operational with traffic running.

Precondition as specified in Generic pre- and post-conditions does not give any unexpected result.

Action 1: Lock XMU03 connected to SP, which the links pass through NOT used for active SoCC, by MO command on DU. (e.g. G1-> bl AuxPlugInUnit=XMU03-1, G2-> bl FieldReplaceableUnit=2)

Result 1: All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

On SP, RiLinks related to the XMU03 are DISABLED with availability status as DEPENDENCY_LOCKED. No impact on SR.

On SP, RU and cell that are related to the XMU03 are DISABLED, and cell status is DEPENDENCY_LOCKED while others are ENABLED, with availability status as NO_STATUS. No impact on SR.

No impact on SP/SR clock state (e.g. TIME_LOCKED). External sync reference is not active on SR.

No alarm raised on both SP and SR.

Traffic related to XMU03 is disturbed on SP, while others are not affected.

Action 2: Unlock the XMU03.

Result 2: All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

All RiLinks, RUs and cells are ENABLED, with availability status as NO_STATUS.

Nodes are synchronized (e.g. TIME_LOCKED). External sync reference is not active on SR.

No alarm raised on both SP and SR.

Traffic related to the XMU03 on SP is restored.

Action 3: Repeat above Action 1-2 three times.

Result 3: Same result like Result 1-2.

Postcondition: The RBSs are operating as MSMM configuration based on the STP topology specified in section 2.3, with SoCC established.

Postcondition as specified in Generic pre- and post-conditions does not give any unexpected result.

4.3.1.6 TC2.006 XMU03 Lock/Unlock, SP, Active

Tag: TC2.006

Purpose: Lock/Unlock XMU03 connected to SP between DU and Radio, which the links pass through used for active SoCC. No impact on SoCC. Traffic at the other links is unaffected.

Description: XMU03 Lock/Unlock on the active SoCC link connected to SP node, using MO command.

Precondition: The RBSs are prepared with basic configuration, node identifiers and login credentials. The adjacent nodes (e.g. RNC, MME and OSS-RC) and network services (e.g. sync, IP Transport network, DNS, COMINF) are prepared with configuration data required for the new RBSs.

Sync over CPRI is established, more than one connected RiPort between SP and SR is configured. All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

Both single and mixed mode sectors are present for CDMA, WCDMA or LTE (G1/G2); they should be operational with traffic running.

Precondition as specified in Generic pre- and post-conditions does not give any unexpected result.

Action 1: Lock XMU03 connected to SP, which the links pass through used for active SoCC, by MO command on DU. (e.g. G1-> bl AuxPlugInUnit=XMU03-1, G2-> bl FieldReplaceableUnit=2)

Result 1: All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

On SP, RiLinks related to the XMU03 are DISABLED with availability status as DEPENDENCY_LOCKED. No impact on SR.

On SP, RU and cell that are related to the XMU03 are DISABLED, and cell status is DEPENDENCY_LOCKED while others are ENABLED, with availability status as NO_STATUS. No impact on SR.

No impact on SP/SR clock state (e.g. TIME_LOCKED). External sync reference is not active on SR.

No alarm raised on both SP and SR.

Traffic related to XMU03 is disturbed on SP, while others are not affected.

Action 2: Unlock The XMU03.

Result 2: All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

All RiLinks, RUs and cells are ENABLED, with availability status as NO_STATUS.

Nodes are synchronized (e.g. TIME_LOCKED). External sync reference is not active on SR.

No alarm raised on both SP and SR.

Traffic related to the XMU03 on SP is restored.

Action 3: Repeat above Action 1-2 three times.

Result 3: Same result like Result 1-2.

Postcondition: The RBSs are operating as MSMM configuration based on the STP topology specified in section 2.3, with SoCC established.

Postcondition as specified in Generic pre- and post-conditions does not give any unexpected result.

4.3.1.7 TC2.007 XMU03 Lock/Unlock, SR, Not Active

Tag: TC2.007

Purpose: Lock/Unlock XMU03 connected to SR between DU and Radio, which the links pass through NOT used for active SoCC. No impact on SoCC. Traffic at the other links is unaffected.

Description: XMU03 Lock/Unlock on the NOT active SoCC link connected to SR node, using MO command.

Precondition: The RBSs are prepared with basic configuration, node identifiers and login credentials. The adjacent nodes (e.g. RNC, MME and OSS-RC) and network services (e.g. sync, IP Transport network, DNS, COMINF) are prepared with configuration data required for the new RBSs.

Sync over CPRI is established, more than one connected RiPort between SP and SR is configured. All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

Both single and mixed mode sectors are present for CDMA, WCDMA or LTE (G1/G2); they should be operational with traffic running.

Precondition as specified in Generic pre- and post-conditions does not give any unexpected result.

Action 1: Lock XMU03 connected to SR, which the links pass through NOT used for active SoCC, by MO command on DU. (e.g. G1-> bl AuxPlugInUnit=XMU03-1, G2-> bl FieldReplaceableUnit=2)

Result 1: All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

On SR, RiLinks related to the XMU03 are DISABLED with availability status as DEPENDENCY_LOCKED. No impact on SP.

On SR, RU and cell that are related to the XMU03 are DISABLED, and cell status is DEPENDENCY_LOCKED while others are ENABLED, with availability status as NO_STATUS. No impact on SP.

No impact on SP/SR clock state (e.g. TIME_LOCKED). External sync reference is not active on SR.

No alarm raised on both SP and SR.

Traffic related to XMU03 is disturbed on SR, while others are not affected.

Action 2: Unlock The XMU03.

Result 2: All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

All RiLinks, RUs and cells are ENABLED, with availability status as NO_STATUS.

Nodes are synchronized (e.g. TIME_LOCKED). External sync reference is not active on SR.

No alarm raised on both SP and SR.

Traffic related to the XMU03 on SR is restored.

Action 3: Repeat above Action 1-2 three times.

Result 3: Same result like Result 1-2.

Postcondition: The RBSs are operating as MSMM configuration based on the STP topology specified in section 2.3, with SoCC established.

Postcondition as specified in Generic pre- and post-conditions does not give any unexpected result

4.3.1.8 TC2.008 XMU03 Lock/Unlock, SR, Active

Tag: TC2.008

Purpose: Lock/Unlock XMU03 connected to SR between DU and Radio, which the links pass through used for active SoCC. No impact on SoCC. Traffic at the other links is unaffected.

Description: XMU03 Lock/Unlock on the active SoCC link connected to SR node, using MO command.

Precondition: The RBSs are prepared with basic configuration, node identifiers and login credentials. The adjacent nodes (e.g. RNC, MME and OSS-RC) and network services (e.g. sync, IP Transport network, DNS, COMINF) are prepared with configuration data required for the new RBSs.

Sync over CPRI is established, more than one connected RiPort between SP and SR is configured. All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

Both single and mixed mode sectors are present for CDMA, WCDMA or LTE (G1/G2); they should be operational with traffic running.

Precondition as specified in Generic pre- and post-conditions does not give any unexpected result.

Action 1: Lock XMU03 connected to SR, which the links pass through used for active SoCC, by MO command on DU. (e.g. G1-> bl AuxPlugInUnit=XMU03-1, G2-> bl FieldReplaceableUnit=2)

Result 1: All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

On SR, RiLinks related to the XMU03 are DISABLED with availability status as DEPENDENCY_LOCKED. No impact on SP.

On SR, RU and cell that are related to the XMU03 are DISABLED, and cell status is DEPENDENCY_LOCKED while others are ENABLED, with availability status as NO_STATUS. No impact on SP.

No impact on SP/SR clock state (e.g. TIME_LOCKED). External sync reference is not active on SR.

No alarm raised on both SP and SR.

Traffic related to XMU03 is disturbed on SR, while others are not affected.

Action 2: Unlock the XMU03.

Result 2: All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

All RiLinks, RUs and cells are ENABLED, with availability status as NO_STATUS.

Nodes are synchronized (e.g. TIME_LOCKED). External sync reference is not active on SR.

No alarm raised on both SP and SR.

Traffic related to the XMU03 on SR is restored.

Action 3: Repeat above Action 1-2 three times.

Result 3: Same result like Result 1-2.

Postcondition: The RBSs are operating as MSMM configuration based on the STP topology specified in section 2.3, with SoCC established.

Postcondition as specified in Generic pre- and post-conditions does not give any unexpected result.

4.4 Test Group 3: SoCPRI Feature Legacy

Objective: The objective of this test group is to verify the MSMM use cases for SoCPRI feature legacy. Ref [2]

Preparation: Planning of MSMM configuration is based on the STP topology specified in section 2.3, node group Sync over CPRI is established.

4.4.1 Normal Cases

4.4.1.1 TC3.001 SoCPRI Legacy, Remove RI Port as Active SoCC on SP and SR

Tag: TC3.001

Purpose: To verify SoCPRI can switch from one RI port to another when active RI port is removed. No impact on traffic.

Description: Remove active RI ports being used for SoCC on both SP and SR from NGSM MO.

Precondition: The RBSs are prepared with basic configuration, node identifiers and login credentials. The adjacent nodes (e.g. RNC, MME and OSS-RC) and network services (e.g. sync, IP Transport network, DNS, COMINF) are prepared with configuration data required for the new RBSs.

Sync over CPRI is established, more than one connected RiPort between SP and SR is configured. All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

Both single and mixed mode sectors are present for CDMA, WCDMA or LTE (G1/G2); they should be operational with traffic running.

Precondition as specified in Generic pre- and post-conditions does not give any unexpected result.

Action 1: Remove active RI ports being used for SoCC on both SP and SR from NGSM MO by MO set command, not delete the ports. (e.g. G1-> set . syncRiPortCandidate duNumber=1,duRiport=6, G2-> set . syncRiPortCandidate Equipment=1,FieldReplaceableUnit=1,RiPort=F)

Result 1: On SP, all RiPortStatus (in MO class NodeGroupSyncMember) are OK_NOT_ACTIVE. On SR, one OK_NOT_ACTIVE port becomes OK_ACTIVE, others are OK_NOT_ACTIVE.

All RUs and cells are ENABLED, with availability status as NO_STATUS.

No impact on SP/SR clock state (e.g. TIME_LOCKED). External sync reference is not active on SR.

No alarm is raised on both SP and SR.

Traffic is not affected on both SP and SR.

Action 2: Return back RI ports on SP and SR that were previously removed from NGSM MO.

Result 2: All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

All RUs and cells are ENABLED, with availability status as NO_STATUS.

Nodes are synchronized (e.g. TIME_LOCKED). External sync reference is not active on SR.

No alarm is raised on both SP and SR.

Traffic is not affected on both SP and SR.

Action 3: Repeat above Action 1-2 three times.

Result 3: Same result like Result 1-2.

Postcondition: The RBSs are operating as MSMM configuration based on the STP topology specified in section 2.3, with SoCC established.

Postcondition as specified in Generic pre- and post-conditions does not give any unexpected result.

4.4.1.2 TC3.002 SoCPRI Legacy, SR Loss of SoCC and Holdover Expire, No Backup Ref Exist

Tag: TC3.002

Purpose: Loss of SoCC on SR, holdover time expire, no backup external sync reference exist. The Link Failure alarms are issued on the clients that lost connection. Loss of SoCPRI alarms are raised on both SP and SR (>=180s). Traffic at the other clients is unaffected. SR transits into FREQ_HOLDOVER.

Description: Break all CPRI links on SP node, using coli command for long time disruption (more than 5min) to make SR loss of SoCC.

Precondition: The RBSs are prepared with basic configuration, node identifiers and login credentials. The adjacent nodes (e.g. RNC, MME and OSS-RC) and network services (e.g. sync, IP Transport network, DNS, COMINF) are prepared with configuration data required for the new RBSs.

Sync over CPRI is established, more than one connected RiPort between SP and SR is configured. All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

Backup sync reference NOT exists on SR, or blocked.

Both single and mixed mode sectors are present for CDMA, WCDMA or LTE (G1/G2); they should be operational with traffic running.

Precondition as specified in Generic pre- and post-conditions does not give any unexpected result.

Action 1: Break all CPRI links on SP node by COLI command on DU RiPort for more than 300s. (e.g. RiPort=A, G1->lhsh 000100 riportglitch 1 350000 txrx, G2-> rhdc ri_linkbreak ri0 both 350000)

Result 1: On SP, all RiPortStatus (in MO class NodeGroupSyncMember) become CPRI_LINK_NOT_AVAILABLE. On SR, all RiPortStatus become CONNECTED_TO_RU_NOT_TO_NEIGHBOR or CPRI_LINK_NOT_AVAILABLE.

On SP, all RU and cell are DISABLED, and cell status is DEPENDENCY_FAILED. No impact on SR.

No impact on SP clock state (e.g. TIME_LOCKED), SR transits from TIME_LOCKED to TIME_HOLDOVER clock state. External sync reference is not active on SR.

Link Failure alarms are only raised on broken links on SP.

Loss of SoCPRI alarms are raised on both SP and SR (>=180s).

Traffic related to the broken links is disturbed on SP, while others are not affected.

Action 2: Wait 5 minutes for holdover to expire on SR.

Result 2: On SP, all RiPortStatus (in MO class NodeGroupSyncMember) become CPRI_LINK_NOT_AVAILABLE. On SR, all RiPortStatus become CONNECTED_TO_RU_NOT_TO_NEIGHBOR or CPRI_LINK_NOT_AVAILABLE.

On SP, all RU and cell are DISABLED, and cell status is DEPENDENCY_FAILED. No impact on SR.

No impact on SP clock state (e.g. TIME_LOCKED), SR transits from TIME_HOLDOVER to FREQ_HOLDOVER clock state. SR's local status transits from SYNC_RECEIVER_TIME_HOLDOVER to SYNC_PROVIDER or UNKNOWN.

Link Failure alarms are still present on SP.

Loss of SoCPRI alarms are still present on both SP and SR.

Traffic related to the broken links is still disturbed on SP, while others are not affected.

Action 3: COLI command expired, all broken links recovered.

Result 3: All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

All RUs and cells are ENABLED, with availability status as NO_STATUS.

Nodes are synchronized (e.g. TIME_LOCKED). External sync reference is not active on SR.

Link Failure alarms are ceased on broken links on SP.

Loss of SoCPRI alarms are ceased on both SP and SR.

Traffic related to the broken links on SP is restored.

Action 4: Repeat above Action 1-3 three times.

Result 4: Same result like Result 1-3.

Postcondition: The RBSs are operating as MSMM configuration based on the STP topology specified in section 2.3, with SoCC established.

Postcondition as specified in Generic pre- and post-conditions does not give any unexpected result.

4.4.1.3 TC3.003 SoCPRI Legacy, SP Loss of External Time Reference without Time Offset

Tag: TC3.003

Purpose: SP loss of external time reference, transit into TIME_HOLDOVER. No impact on SoCC. No impact on traffic.

Description: Remove all external sync reference from SP by block related MOs.

Precondition: The RBSs are prepared with basic configuration, node identifiers and login credentials. The adjacent nodes (e.g. RNC, MME and OSS-RC) and network services (e.g. sync, IP Transport network, DNS, COMINF) are prepared with configuration data required for the new RBSs.

Sync over CPRI is established, more than one connected RiPort between SP and SR is configured. All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

Both single and mixed mode sectors are present for CDMA, WCDMA or LTE (G1/G2); they should be operational with traffic running.

Precondition as specified in Generic pre- and post-conditions does not give any unexpected result.

Action 1: Remove all external sync reference from SP block related MOs. (previously GPS locked)

Result 1: RiPortStatus (in MO NodeGroupSyncMember) on both SP and SR are not changed. All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

All RUs and cells are ENABLED, with availability status as NO_STATUS.

No impact on SR clock state (e.g. TIME_LOCKED), SP transits from TIME_LOCKED to TIME_HOLDOVER clock state. External sync reference is not active on SR.

No alarm is raised on both SP and SR.

Traffic is not affected on both SP and SR.

Action 2: Return back external sync reference on SP that were previously blocked.

Result 2: All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

All RUs and cells are ENABLED, with availability status as NO_STATUS.

Nodes are synchronized (e.g. TIME_LOCKED). External sync reference is not active on SR.

No alarm is raised on both SP and SR.

Traffic is not affected on both SP and SR.

Action 3: Repeat above Action 1-2 three times.

Result 3: Same result like Result 1-2.

Postcondition: The RBSs are operating as MSMM configuration based on the STP topology specified in section 2.3, with SoCC established.

Postcondition as specified in Generic pre- and post-conditions does not give any unexpected result.

4.4.1.4 TC3.004 SoCPRI Legacy, NGSM Configuration Fault, Same Priority as SR

Tag: TC3.004

Purpose: To verify NGSM configuration fault alarm raised when two nodes have same node priority as SR. No impact on traffic.

Description: Set same node priority on SP like SR in NGSM MO.

Precondition: The RBSs are prepared with basic configuration, node identifiers and login credentials. The adjacent nodes (e.g. RNC, MME and OSS-RC) and network services (e.g. sync, IP Transport network, DNS, COMINF) are prepared with configuration data required for the new RBSs.

Sync over CPRI is established, more than one connected RiPort between SP and SR is configured. All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

Backup sync reference exists on SR.

Both single and mixed mode sectors are present for CDMA, WCDMA or LTE (G1/G2); they should be operational with traffic running.

Precondition as specified in Generic pre- and post-conditions does not give any unexpected result.

Action 1: Set syncNodePriority to 2 on SP in NGSM MO.

Result 1: All RiPorts are OK_NOT_ACTIVE on both SP and SR. (G2 introduce new status NODE_PRIORITY_COLLISION, G1 will too)

All RUs and cells are ENABLED, with availability status as NO_STATUS.

No impact on SP clock state (e.g. TIME_LOCKED). SR transits from TIME_LOCKED to TIME_HOLDOVER clock state. External sync reference is not active on SR. SP's local status transits from SYNC_PROVIDER to UNKNOWN.

NGSM configuration fault alarms are raised on both SP and SR.

Traffic is not affected on both SP and SR.

Action 2: Wait 5 minutes for holdover to expire on SR.

Result 2: All RiPorts are OK_NOT_ACTIVE on both SP and SR.

All RUs and cells are ENABLED, with availability status as NO_STATUS.

No impact on SP clock state (e.g. TIME_LOCKED), SR transits from TIME_HOLDOVER to TIME_LOCKED clock state. External sync reference is active on SR, SR's local status transits from SYNC_RECEIVER_TIME_HOLDOVER to UNKNOWN.

NGSM configuration fault alarms are still present on both SP and SR.

Traffic is not affected on both SP and SR.

Action 3: Set syncNodePriority back to 1 on SP.

Result 3: All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

All RUs and cells are ENABLED, with availability status as NO_STATUS.

Nodes are synchronized (e.g. TIME_LOCKED). External sync reference is not active on SR.

NGSM configuration fault alarms are ceased on both SP and SR.

Traffic is not affected on both SP and SR.

Action 4: Repeat above Action 1-3 three times.

Result 4: Same result like Result 1-3.

Postcondition: The RBSs are operating as MSMM configuration based on the STP topology specified in section 2.3, with SoCC established.

Postcondition as specified in Generic pre- and post-conditions does not give any unexpected result.

4.4.1.5 TC3.005 SoCPRI Legacy, NGSM Configuration Fault, Same Priority as SP

Tag: TC3.005

Purpose: To verify NGSM configuration fault alarm raised when two nodes have same node priority as SP. No impact on traffic.

Description: Set same node priority on SR like SP in NGSM MO.

Precondition: The RBSs are prepared with basic configuration, node identifiers and login credentials. The adjacent nodes (e.g. RNC, MME and OSS-RC) and network services (e.g. sync, IP Transport network, DNS, COMINF) are prepared with configuration data required for the new RBSs.

Sync over CPRI is established, more than one connected RiPort between SP and SR is configured. All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

Backup sync reference exists on SR.

Both single and mixed mode sectors are present for CDMA, WCDMA or LTE (G1/G2); they should be operational with traffic running.

Precondition as specified in Generic pre- and post-conditions does not give any unexpected result.

Action 1: Set syncNodePriority to 1 on SR in NGSM MO.

Result 1: All RiPorts are OK_NOT_ACTIVE on both SP and SR. (G2 introduce new status NODE_PRIORITY_COLLISION, G1 will too)

All RUs and cells are ENABLED, with availability status as NO_STATUS.

Nodes are synchronized (e.g. TIME_LOCKED). External sync reference is active on SR, SR's local status transits from SYNC_RECEIVER_TIME_LOCKED to UNKNOWN. SP's local status keep as SYNC_PROVIDER unchanged. But change to UNKNOWN in G2 currently!

NGSM configuration fault alarms are raised on both SP and SR.

Traffic is not affected on both SP and SR.

Action 2: Set syncNodePriority back to 2 on SR.

Result 2: All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

All RUs and cells are ENABLED, with availability status as NO_STATUS.

Nodes are synchronized (e.g. TIME_LOCKED). External sync reference is not active on SR.

NGSM configuration fault alarms are ceased on both SP and SR.

Traffic is not affected on both SP and SR.

Action 3: Repeat above Action 1-2 three times.

Result 3: Same result like Result 1-2.

Postcondition: The RBSs are operating as MSMM configuration based on the STP topology specified in section 2.3, with SoCC established.

Postcondition as specified in Generic pre- and post-conditions does not give any unexpected result.

4.4.1.6 TC3.006 SoCPRI Legacy, NGSM Configuration Fault, SoCC Only Configured in SR

Tag: TC3.006

Purpose: To verify the behaviour on nodes when only SR have SoCC configuration. No impact on traffic.

Description: Delete NGSM MO on SP.

Precondition: The RBSs are prepared with basic configuration, node identifiers and login credentials. The adjacent nodes (e.g. RNC, MME and OSS-RC) and network services (e.g. sync, IP Transport network, DNS, COMINF) are prepared with configuration data required for the new RBSs.

Sync over CPRI is established, more than one connected RiPort between SP and SR is configured. All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

Backup sync reference exists on SR.

Both single and mixed mode sectors are present for CDMA, WCDMA or LTE (G1/G2); they should be operational with traffic running.

Precondition as specified in Generic pre- and post-conditions does not give any unexpected result.

Action 1: Delete NGSM MO on SP.

Result 1: All RiPorts are NO_SYNC_COMMUNICATION on SR.

All RUs and cells are ENABLED, with availability status as NO_STATUS.

No impact on SP clock state (e.g. TIME_LOCKED), SR transits from TIME_LOCKED to TIME_HOLDOVER clock state. External sync reference is not active on SR.

Loss of SoCPRI alarm is only raised on SR (>=180s).

Traffic is not affected on both SP and SR.

Action 2: Wait 5 minutes for holdover to expire on SR.

Result 2: All RiPorts are NO_SYNC_COMMUNICATION on SR.

All RUs and cells are ENABLED, with availability status as NO_STATUS.

No impact on SP clock state (e.g. TIME_LOCKED), SR transits from TIME_HOLDOVER to TIME_LOCKED clock state. External sync reference is active on SR, SR's local status transits from SYNC_RECEIVER_TIME_HOLDOVER to SYNC_PROVIDER or UNKNOWN.

Loss of SoCPRI alarm is still present on SR.

Traffic is not affected on both SP and SR.

Action 3: Add NGSM MO back on SP.

Result 3: All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

All RUs and cells are ENABLED, with availability status as NO_STATUS.

Nodes are synchronized (e.g. TIME_LOCKED). External sync reference is not active on SR.

Loss of SoCPRI alarm is ceased on SR.

Traffic is not affected on both SP and SR.

Action 4: Repeat above Action 1-3 three times.

Result 4: Same result like Result 1-3.

Postcondition: The RBSs are operating as MSMM configuration based on the STP topology specified in section 2.3, with SoCC established.

Postcondition as specified in Generic pre- and post-conditions does not give any unexpected result.

4.4.1.7 TC3.007 SoCPRI Legacy, Change Node Group Roles of SP and SR

Tag: TC3.007

Purpose: To verify the behaviour on nodes when node groups are switched between SP and SR, so receiver becomes provider and vice versa. No impact on traffic.

Description: Change node priority to change node group roles of SP and SR.

Precondition: The RBSs are prepared with basic configuration, node identifiers and login credentials. The adjacent nodes (e.g. RNC, MME and OSS-RC) and network services (e.g. sync, IP Transport network, DNS, COMINF) are prepared with configuration data required for the new RBSs.

Sync over CPRI is established, more than one connected RiPort between SP and SR is configured. All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

Backup sync reference exists on SR.

Both single and mixed mode sectors are present for CDMA, WCDMA or LTE (G1/G2); they should be operational with traffic running.

Precondition as specified in Generic pre- and post-conditions does not give any unexpected result.

Action 1: Set syncNodePriority to 1 on SR and 2 on SP while NGSM MOs are administratively locked.

Result 1: Only one RiPort on SP (now as SR) is OK_ACTIVE, others are OK_NOT_ACTIVE. All RiPorts on SR (now as SP) are OK_NOT_ACTIVE.

All RUs and cells are ENABLED, with availability status as NO_STATUS.

Nodes are synchronized (e.g. TIME_LOCKED). SP (now as SR) deselect external reference and select NGSM, SR (now as SP) select external reference. SP's local status transits from SYNC_RECEIVER_TIME_LOCKED to SYNC_PROVIDER, SR's local status transits from SYNC_PROVIDER to SYNC_RECEIVER_TIME_LOCKED.

Traffic is not affected on both SP and SR.

Action 2: Revert the node group roles.

Result 2: All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

All RUs and cells are ENABLED, with availability status as NO_STATUS.

Nodes are synchronized (e.g. TIME_LOCKED). External sync reference is not active on SR.

Traffic is not affected on both SP and SR.

Action 3: Repeat above Action 1-2 three times.

Result 3: Same result like Result 1-2.

Postcondition: The RBSs are operating as MSMM configuration based on the STP topology specified in section 2.3, with SoCC established.

Postcondition as specified in Generic pre- and post-conditions does not give any unexpected result.

4.4.1.8 TC3.008 SoCPRI Legacy, Deactivation of SOCC

Tag: TC3.008

Purpose: to verify SoCPRI can be deactivated after lock or delete the NGSM MO. No impact on traffic.

Description: Lock/unlock and delete/create NGSM MO on both SP and SR.

Precondition: The RBSs are prepared with basic configuration, node identifiers and login credentials. The adjacent nodes (e.g. RNC, MME and OSS-RC) and network services (e.g. sync, IP Transport network, DNS, COMINF) are prepared with configuration data required for the new RBSs.

Sync over CPRI is established, more than one connected RiPort between SP and SR is configured. All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

Backup sync reference exists on SR.

Both single and mixed mode sectors are present for CDMA, WCDMA or LTE (G1/G2); they should be operational with traffic running.

Precondition as specified in Generic pre- and post-conditions does not give any unexpected result.

Results: During the actions, common results are:

All RUs and cells are ENABLED, with availability status as NO_STATUS.

No impact on SP clock state (e.g. TIME_LOCKED).

No alarm is raised on both SP and SR.

Traffic is not affected on both SP and SR

Action 1: Lock NGSM MO on SP.

Result 1: SR entered RNT_TIME_HOLDOVER state.

Action 2: Unlock NGSM MO on SP.

Result 2: SR entered RNT_TIME_LOCKED state.

Action 3: Lock NGSM MO on SR.

Result 3: SR entered expected LOCKED state with external ref.

Action 4: Unlock NGSM MO on SR.

Result 4: SR entered RNT_TIME_LOCKED state with NGSM.

Action 5: Delete NGSM MO on SP.

Result 5: SR entered RNT_TIME_HOLDOVER state.

Action 6: Create back NGSM MO on SP.

Result 6: SR entered RNT_TIME_LOCKED state.

Action 7: Delete NGSM MO on SR.

Result 7: SR entered expected LOCKED state with external ref.

Action 8: Create back NGSM MO on SR.

Result 8: SR entered RNT_TIME_LOCKED state with NGSM.

Action 9: Repeat above Action 1-9 three times.

Result 9: Same result like Result 1-9.

Postcondition: The RBSs are operating as MSMM configuration based on the STP topology specified in section 2.3, with SoCC established.

Postcondition as specified in Generic pre- and post-conditions does not give any unexpected result.

4.5 Test Group 4: DU RU Restart

Objective: The objective of this test group is to verify the MSMM use cases for DU and RU restart with SoCC (Sync over CPRI Connection) setup, Ref [2] and DU RU reacting with restart, Ref [4]

Preparation: Planning of MSMM configuration is based on the STP topology specified in section 2.3, node group Sync over CPRI is established.

4.5.1 Normal Cases

4.5.1.1 TC4.001 DU Restart, Rank Warm

Tag: TC4.001

Purpose: To verify no abnormal traffic disturbance and degradation during and after DU restart with rank warm. No impact on SoCC.

Description: Warm restart in DU with MO command “acc 0 maunalrestart” (G1) or “acc FieldReplaceableUnit=xxx restartUnit” (G2).

Precondition: The RBSs are prepared with basic configuration, node identifiers and login credentials. The adjacent nodes (e.g. RNC, MME and OSS-RC) and network services (e.g. sync, IP Transport network, DNS, COMINF) are prepared with configuration data required for the new RBSs.

Sync over CPRI is established, more than one connected RiPort between SP and SR is configured. All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

Both single and mixed mode sectors are present for CDMA, WCDMA or LTE (G1/G2); they should be operational with traffic running.

Precondition as specified in Generic pre- and post-conditions does not give any unexpected result.

Action 1: Do a warm restart on SP.

Result 1: On SR, all RUs and cells (not affected by SP restart described in open issue 8) are ENABLED, with availability status as NO_STATUS.

No traffic disturbance observed on SR (not affected by SP restart described in open issue 8) during restart and recovery of SP.

Action 2: Do a warm restart on SR.

Result 2: On SP, all RUs and cells (not affected by SR restart described in open issue 8) are ENABLED, with availability status as NO_STATUS.

No traffic disturbance observed on SP (not affected by SR restart described in open issue 8) during restart and recovery of SR.

Action 3: Repeat above Action 1-2 three times.

Result 3: All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

All RUs and cells are ENABLED, with availability status as NO_STATUS.

Nodes are synchronized (e.g. TIME_LOCKED). External sync reference is not active on SR.

No alarm raised on both SP and SR.

No RU restart happened on both SP and SR.

No DU/RU crash happened on both SP and SR.

Traffic is up and running without error or degradation.

Postcondition: The RBSs are operating as MSMM configuration based on the STP topology specified in section 2.3, with SoCC established.

Postcondition as specified in Generic pre- and post-conditions does not give any unexpected result.

4.5.1.2 TC4.002 DU Restart, Rank Cold

Tag: TC4.002

Purpose: To verify no abnormal traffic disturbance and degradation during and after DU restart with rank cold. No impact on SoCC.

Description: Cold restart in DU with MO command “acc 0 maunalrestart” (G1) or “acc FieldReplaceableUnit=xxx restartUnit” (G2).

Precondition: The RBSs are prepared with basic configuration, node identifiers and login credentials. The adjacent nodes (e.g. RNC, MME and OSS-RC) and network services (e.g. sync, IP Transport network, DNS, COMINF) are prepared with configuration data required for the new RBSs.

Sync over CPRI is established, more than one connected RiPort between SP and SR is configured. All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

Both single and mixed mode sectors are present for CDMA, WCDMA or LTE (G1/G2); they should be operational with traffic running.

Precondition as specified in Generic pre- and post-conditions does not give any unexpected result.

Action 1: Do a cold restart on SP.

Result 1: On SR, all RUs and cells (not affected by SP restart described in open issue 8) are ENABLED, with availability status as NO_STATUS.

No traffic disturbance observed on SR (not affected by SP restart described in open issue 8) during restart and recovery of SP.

Action 2: Do a cold restart on SR.

Result 2: On SP, all RUs and cells (not affected by SR restart described in open issue 8) are ENABLED, with availability status as NO_STATUS.

No traffic disturbance observed on SP (not affected by SR restart described in open issue 8) during restart and recovery of SR.

Action 3: Repeat above Action 1-2 three times.

Result 3: All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

All RUs and cells are ENABLED, with availability status as NO_STATUS.

Nodes are synchronized (e.g. TIME_LOCKED). External sync reference is not active on SR.

No alarm raised on both SP and SR.

No DU/RU crash happened on both SP and SR.

Traffic is up and running without error or degradation.

Postcondition: The RBSs are operating as MSMM configuration based on the STP topology specified in section 2.3, with SoCC established.

Postcondition as specified in Generic pre- and post-conditions does not give any unexpected result.

4.5.1.3 TC4.003 DU Restart, Rank Cold with Test

Tag: TC4.003

Purpose: To verify no abnormal traffic disturbance and degradation during and after DU restart with rank cold w test. No impact on SoCC.

Description: Cold w test restart in DU with MO command “acc 0 maunalrestart” (G1) or “acc FieldReplaceableUnit=xxx restartUnit” (G2).

Precondition: The RBSs are prepared with basic configuration, node identifiers and login credentials. The adjacent nodes (e.g. RNC, MME and OSS-RC) and network services (e.g. sync, IP Transport network, DNS, COMINF) are prepared with configuration data required for the new RBSs.

Sync over CPRI is established, more than one connected RiPort between SP and SR is configured. All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

Both single and mixed mode sectors are present for CDMA, WCDMA or LTE (G1/G2); they should be operational with traffic running.

Precondition as specified in Generic pre- and post-conditions does not give any unexpected result.

Action 1: Do a cold w test restart on SP.

Result 1: On SR, all RUs and cells (not affected by SP restart described in open issue 8) are ENABLED, with availability status as NO_STATUS.

No traffic disturbance observed on SR (not affected by SP restart described in open issue 8) during restart and recovery of SP.

Action 2: Do a cold w test restart on SR.

Result 2: On SP, all RUs and cells (not affected by SR restart described in open issue 8) are ENABLED, with availability status as NO_STATUS.

No traffic disturbance observed on SP (not affected by SR restart described in open issue 8) during restart and recovery of SR.

Action 3: Repeat above Action 1-2 three times.

Result 3: All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

All RUs and cells are ENABLED, with availability status as NO_STATUS.

Nodes are synchronized (e.g. TIME_LOCKED). External sync reference is not active on SR.

No alarm raised on both SP and SR.

No DU/RU crash happened on both SP and SR.

Traffic is up and running without error or degradation.

Postcondition: The RBSs are operating as MSMM configuration based on the STP topology specified in section 2.3, with SoCC established.

Postcondition as specified in Generic pre- and post-conditions does not give any unexpected result.

4.5.1.4 TC4.004 Multi RU Restart, acc

Tag: TC4.004

Purpose: To verify no abnormal traffic disturbance and degradation during and after multi RU restart. No impact on SoCC. Simultaneously restart all radio units belong to different DUs.

Description: Multi RU restart with MO command “acc AuxPlugInUnit=xxx restartUnit/ restartAuxUnit” (G1) or “acc FieldReplaceableUnit=xxx restartUnit” (G2).

Precondition: The RBSs are prepared with basic configuration, node identifiers and login credentials. The adjacent nodes (e.g. RNC, MME and OSS-RC) and network services (e.g. sync, IP Transport network, DNS, COMINF) are prepared with configuration data required for the new RBSs.

Sync over CPRI is established, more than one connected RiPort between SP and SR is configured. All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

Both single and mixed mode sectors are present for CDMA, WCDMA or LTE (G1/G2); they should be operational with traffic running.

Precondition as specified in Generic pre- and post-conditions does not give any unexpected result.

Action 1: Restart all RUs belong to SP. (RUs in cascaded chain should be restarted firstly to avoid lost contact)

Result 1: On SR, all RUs and cells (except the shared ones) are ENABLED, with availability status as NO_STATUS.

No traffic disturbance observed on SR (except the shared ones) during restart and recovery of SP.

Action 2: Restart all RUs belong to SR. (RUs in cascaded chain should be restarted firstly to avoid lost contact)

Result 2: On SP, all RUs and cells (except the shared ones) are ENABLED, with availability status as NO_STATUS.

No traffic disturbance observed on SP (except the shared ones) during restart and recovery of SR.

Action 3: Repeat above Action 1-2 three times.

Result 3: All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

All RUs and cells are ENABLED, with availability status as NO_STATUS.

Nodes are synchronized (e.g. TIME_LOCKED). External sync reference is not active on SR.

No alarm raised on both SP and SR.

No DU restart happened on both SP and SR.

No DU/RU crash happened on both SP and SR.

Traffic is up and running without error or degradation.

Postcondition: The RBSs are operating as MSMM configuration based on the STP topology specified in section 2.3, with SoCC established.

Postcondition as specified in Generic pre- and post-conditions does not give any unexpected result.

4.5.1.5 TC4.005 Multi RU Restart, lhsh

Tag: TC4.005

Purpose: To verify no abnormal traffic disturbance and degradation during and after multi RU restart. No impact on SoCC. Simultaneously restart all radio units belong to different DUs.

Description: Multi RU restart with remote shell command “lhsh BXP_x restart”.

Precondition: The RBSs are prepared with basic configuration, node identifiers and login credentials. The adjacent nodes (e.g. RNC, MME and OSS-RC) and network services (e.g. sync, IP Transport network, DNS, COMINF) are prepared with configuration data required for the new RBSs.

Sync over CPRI is established, more than one connected RiPort between SP and SR is configured. All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

Both single and mixed mode sectors are present for CDMA, WCDMA or LTE (G1/G2); they should be operational with traffic running.

Precondition as specified in Generic pre- and post-conditions does not give any unexpected result.

Action 1: Restart all RUs belong to SP. (RUs in cascaded chain should be restarted firstly to avoid lost contact)

Result 1: On SR, all RUs and cells (except the shared ones) are ENABLED, with availability status as NO_STATUS.

No traffic disturbance observed on SR (except the shared ones) during restart and recovery of SP.

Action 2: Restart all RUs belong to SR. (RUs in cascaded chain should be restarted firstly to avoid lost contact)

Result 2: On SP, all RUs and cells (except the shared ones) are ENABLED, with availability status as NO_STATUS.

No traffic disturbance observed on SP (except the shared ones) during restart and recovery of SR.

Action 3: Repeat above Action 1-2 three times.

Result 3: All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

All RUs and cells are ENABLED, with availability status as NO_STATUS.

Nodes are synchronized (e.g. TIME_LOCKED). External sync reference is not active on SR.

No alarm raised on both SP and SR.

No DU restart happened on both SP and SR.

No DU/RU crash happened on both SP and SR.

Traffic is up and running without error or degradation.

Postcondition: The RBSs are operating as MSMM configuration based on the STP topology specified in section 2.3, with SoCC established.

Postcondition as specified in Generic pre- and post-conditions does not give any unexpected result.

4.5.1.6 TC4.006 Single RU Restart, acc

Tag: TC4.006

Purpose: To verify no abnormal traffic disturbance and degradation during and after single RU restart. No impact on SoCC. Restart all radio units in one by one order.

Description: Single RU restart with MO command “acc AuxPlugInUnit=xxx restartUnit/ restartAuxUnit” (G1) or “acc FieldReplaceableUnit=xxx restartUnit” (G2).

Precondition: The RBSs are prepared with basic configuration, node identifiers and login credentials. The adjacent nodes (e.g. RNC, MME and OSS-RC) and network services (e.g. sync, IP Transport network, DNS, COMINF) are prepared with configuration data required for the new RBSs.

Sync over CPRI is established, more than one connected RiPort between SP and SR is configured. All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

Both single and mixed mode sectors are present for CDMA, WCDMA or LTE (G1/G2); they should be operational with traffic running.

Precondition as specified in Generic pre- and post-conditions does not give any unexpected result.

Action 1: Restart non-shared RUs belong to SP in one by one order.

Result 1: On SP, other RUs and cells are ENABLED, with availability status as NO_STATUS. On SR, all RUs and cells (except the shared one affected by SP restart) are ENABLED, with availability status as NO_STATUS.

No traffic disturbance observed on SP on other RUs and cells, and SR (except the shared one affected by SP restart) during restart and recovery of the RU in SP.

Action 2: Restart shared RUs belong to SP in one by one order.

Result 2: On SP, other RUs and cells are ENABLED, with availability status as NO_STATUS. On SR, all RUs and cells (except the shared one being restarted) are ENABLED, with availability status as NO_STATUS.

No traffic disturbance observed on SP without restart RU and SR (except the shared one being restarted) during restart and recovery of the RU in SP.

Action 3: Restart non-shared RUs belong to SR in one by one order.

Result 3: On SR, other RUs and cells are ENABLED, with availability status as NO_STATUS. On SP, all RUs and cells (except the shared one affected by SR restart) are ENABLED, with availability status as NO_STATUS.

No traffic disturbance observed on SR on other RUs and cells, and SP (except the shared one affected by SR restart) during restart and recovery of the RU in SR.

Action 4: Restart shared RUs belong to SR in one by one order.

Result 4: On SR, other RUs and cells are ENABLED, with availability status as NO_STATUS. On SP, all RUs and cells (except the shared one being restarted) are ENABLED, with availability status as NO_STATUS.

No traffic disturbance observed on SR without restart RU and SP (except the shared one being restarted) during restart and recovery of the RU in SR.

Action 5: Repeat above Action 1-4 three times.

Result 5: All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

All RUs and cells are ENABLED, with availability status as NO_STATUS.

Nodes are synchronized (e.g. TIME_LOCKED). External sync reference is not active on SR.

No alarm raised on both SP and SR.

No DU restart happened on both SP and SR.

No DU/RU crash happened on both SP and SR.

Traffic is up and running without error or degradation.

Postcondition: The RBSs are operating as MSMM configuration based on the STP topology specified in section 2.3, with SoCC established.

Postcondition as specified in Generic pre- and post-conditions does not give any unexpected result.

4.5.1.7 TC4.007 Single RU Restart, lhsh

Tag: TC4.007

Purpose: To verify no abnormal traffic disturbance and degradation during and after single RU restart. No impact on SoCC. Restart all radio units in one by one order.

Description: Single RU restart with remote shell command “lhsh BXP_x restart”.

Precondition: The RBSs are prepared with basic configuration, node identifiers and login credentials. The adjacent nodes (e.g. RNC, MME and OSS-RC) and network services (e.g. sync, IP Transport network, DNS, COMINF) are prepared with configuration data required for the new RBSs.

Sync over CPRI is established, more than one connected RiPort between SP and SR is configured. All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

Both single and mixed mode sectors are present for CDMA, WCDMA or LTE (G1/G2); they should be operational with traffic running.

Precondition as specified in Generic pre- and post-conditions does not give any unexpected result.

Action 1: Restart non-shared RUs belong to SP in one by one order.

Result 1: On SP, other RUs and cells are ENABLED, with availability status as NO_STATUS. On SR, all RUs and cells (except the shared one affected by SP restart) are ENABLED, with availability status as NO_STATUS.

No traffic disturbance observed on SP on other RUs and cells, and SR (except the shared one affected by SP restart) during restart and recovery of the RU in SP.

Action 2: Restart shared RUs belong to SP in one by one order.

Result 2: On SP, other RUs and cells are ENABLED, with availability status as NO_STATUS. On SR, all RUs and cells (except the shared one being restarted) are ENABLED, with availability status as NO_STATUS.

No traffic disturbance observed on SP without restart RU and SR (except the shared one being restarted) during restart and recovery of the RU in SP.

Action 3: Restart non-shared RUs belong to SR in one by one order.

Result 3: On SR, other RUs and cells are ENABLED, with availability status as NO_STATUS. On SP, all RUs and cells (except the shared one affected by SR restart) are ENABLED, with availability status as NO_STATUS.

No traffic disturbance observed on SR on other RUs and cells, and SP (except the shared one affected by SR restart) during restart and recovery of the RU in SR.

Action 4: Restart shared RUs belong to SR in one by one order.

Result 4: On SR, other RUs and cells are ENABLED, with availability status as NO_STATUS. On SP, all RUs and cells (except the shared one being restarted) are ENABLED, with availability status as NO_STATUS.

No traffic disturbance observed on SR without restart RU and SP (except the shared one being restarted) during restart and recovery of the RU in SR.

Action 5: Repeat above Action 1-4 three times.

Result 5: All RiPorts on SP are OK_NOT_ACTIVE. Only one RiPort on SR is OK_ACTIVE, others are OK_NOT_ACTIVE.

All RUs and cells are ENABLED, with availability status as NO_STATUS.

Nodes are synchronized (e.g. TIME_LOCKED). External sync reference is not active on SR.

No alarm raised on both SP and SR.

No DU restart happened on both SP and SR.

No DU/RU crash happened on both SP and SR.

Traffic is up and running without error or degradation.

Postcondition: The RBSs are operating as MSMM configuration based on the STP topology specified in section 2.3, with SoCC established.

Postcondition as specified in Generic pre- and post-conditions does not give any unexpected result.

5 Terminology

SBT	System Baseline Test
MSMM	Multi Standard Mixed Mode
SoCPRI	Synchronization over CPRI
SoCC	Synchronization over CPRI Connection
SP	Synchronization Provider
SR	Synchronization Receiver
CPRI	Common Public Radio Interface
LOS	Loss of Signal
CDC	Cable Delay Change
NGSM	Node Group Synchronization Member

6 References

[1] RBS I&V test tool specification, TBD

[2] LMR FV DTAR for RBS6000 Gen2, Synchronization Support for MSMM RBS, MR 25337 and Support for Legacy MSMM Radio Configurations, MR 38170 in 16A

[3] CPRI SBT TC Criteria

[4] Mixed Mode Radio