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MOP-Excessive BER alarm clearance

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A: Introduction

This document outlines the systematic process involved in troubleshooting BER or Excessive BER alarm clearance.

B: Precheck

1. Check if impacted site node ping is available, if not align FE immediately.
2. If FE alignment required, he should be having required hardware.
3. FE should be having necessary software on his laptop, necessary node login tools.
4. Please check to have complete PCM path i.e. POP node to issue node.
5. Please get the VLAN information, local/Handover used LAN port information at issue node and POP node.
6. For TDM service, need to have used Local TDM port as well used KLM at POP node.
7. If partial outage is there from any node, and while rectification activity, other sites also can go down for time being, ensure to have proper approval for outage window for all dependent sites for working node.
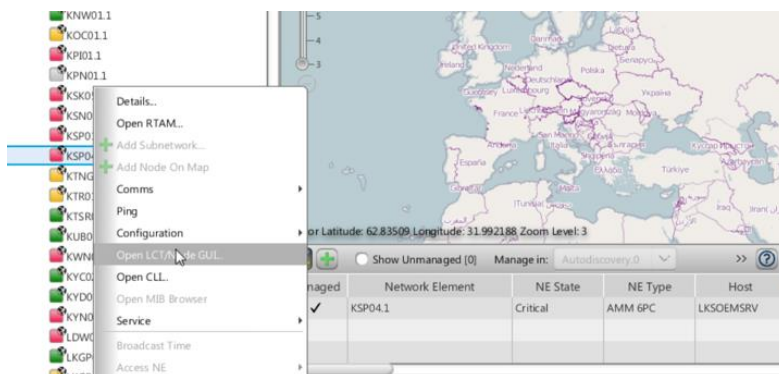
C: Procedure

Alarm Description: The BER calculated by the Forward Error Correction (FEC) for the received signal exceeds the BER alarm threshold. The incoming signal is so corrupt that the FEC is unable to correct the incoming traffic.

1. If node is managed, then open node using SO-EM GUI or directly from Mini-Link Craft using node IP.

   Login via SO-EM GUI

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Login via craft

Example Node having alarm

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2. Verify link RF Input level on the receiving radio is at-least 5 db above the threshold for BER 10^{-6} for the current configuration. See link budget calculation for the correct level.

- If the RF input power is not at least 5 dB above the threshold, go to Step 3.
- If the RF input power is at least 5 dB above the threshold, go to Step 13.

Expand Radio Links and click on link having alarm.
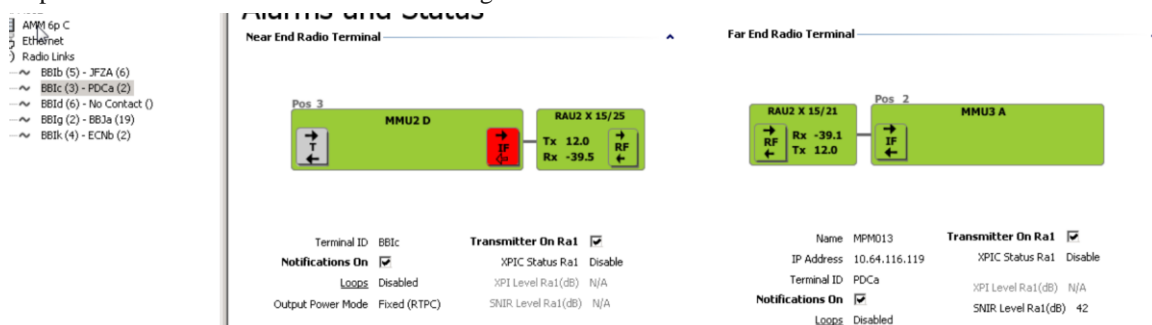
3. Perform an **RF** loop test on the near-end radio. Turn off the radio transmitter on the far-end during the test.

- If the RF input power is not about -50 dBm (± 10 dB) during the test, replace the radio on the near end.
- If the input power is about -50 dBm (± 10 dB) during the test, go to step 4.

Disabling Far-End Transmitter: Uncheck the Transmitter of far-end. (Ensure the visibility of near-end node is not dependent on far-end node, if it so align FE for radio loop testing. As well during loop all dependent services will go down so ensure to have proper approved downtime for the activity).
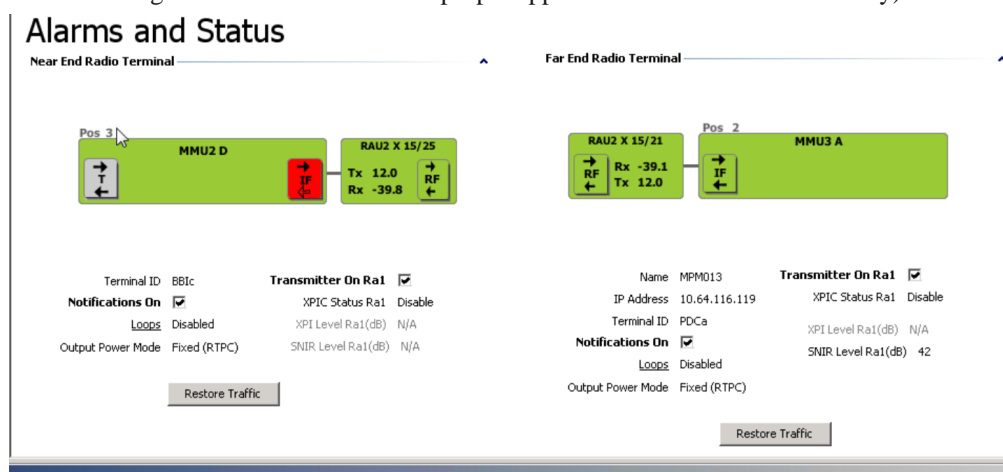
After unchecking the transmitter save the configuration

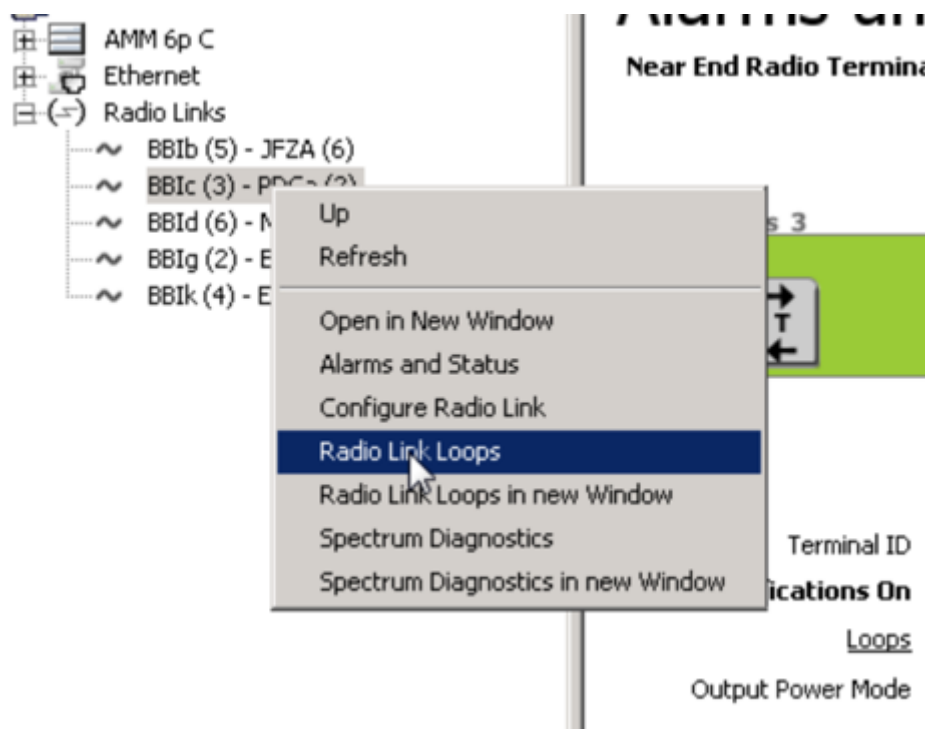| Confidentiality Class	External Confidentiality Label	Document Type		Page
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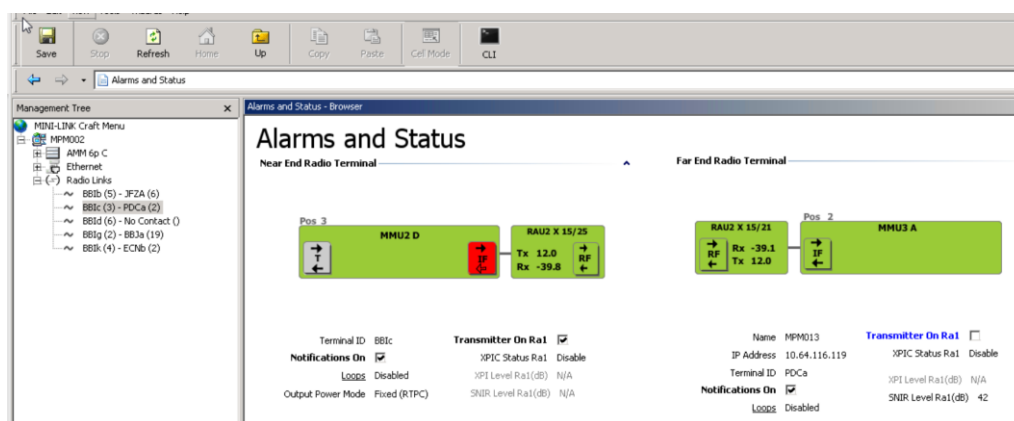
Now Select Radio Link Loops option as highlighter below for enabling loop on link

Now select RF loop as highlighted below and save to enable loop on radio link. RF will prompt as in Blue color when loop is enabled. (Ensure Auto Remove RL loops after 15 min is also checked so loop can auto removed if any visibility issue happens on node).

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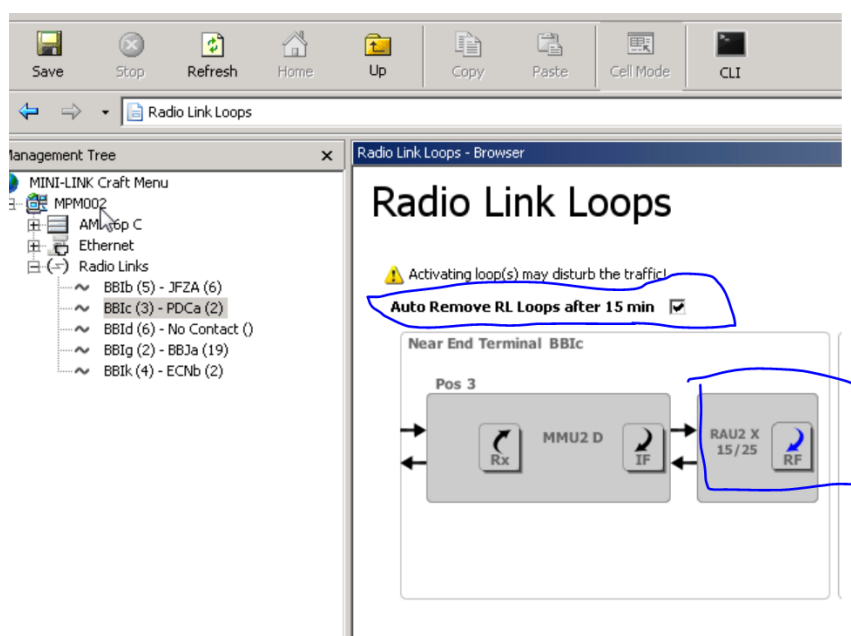
4. Check fading conditions and weather circumstances.

   - If link performance is not affected by propagation issues, go to Step 5.
   - If link performance is affected by propagation issues, consult the transmission design department on how to address the link budget.

5. Check the alarms and status of the far-end terminal.

   - If there are no alarms raised on the far-end terminal, go to Step 6.
   - If there are alarms raised on the far-end terminal, find the root causes of these alarms first, and take corrective actions according to the alarm description. If the BER alarm is still raised on the near-end terminal after clearing the alarms on the far-end terminal, go to Step 6.

6. Verify that the near-end terminal configuration matches the far-end terminal configuration.

   - If the configuration is not correct, reconfigure the near-end terminal and the far-end terminal according to the Site Installation Documentation (SID).
   - If the configuration is correct, go to Step 7.

7. Perform an RF loop test on the far-end radio. Turn off the radio transmitter on the near end during the test. Follow same process for loop testing as mentioned in Step 3.

   - If the RF input power is not about -50 dBm (± 10 dB) during the test, replace the radio on the far-end.
   - If the RF input power is about -50 dBm (± 10 dB) during the test, go to Step 8.

8. Check for possible obstacles interfering with the line of sight and check that the antennas are mounted at the correct height according to the link budget planning.
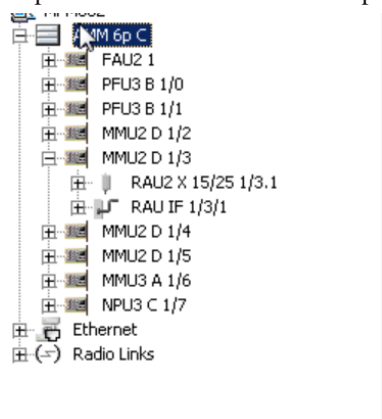
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- If there are obstacles or the antennas are not mounted at the correct height, consult the network design department to review the link budget planning.
- If there are no obstacles in the line of sight and the antennas are mounted at the correct height, go to Step 9.

9. Verify that the radios are correctly mounted on the antennas, that any flexible waveguides are not damaged, and that correct polarization is set on both sides of the hop.

   - If you find any problem, take corrective actions.
   - If you do not find any problems, go to Step 10.

10. Replace the antenna on the near end.

    - If the BER alarm is not cleared after the replacement, reinstall the initial antenna and go to Step 11.
    - If the BER alarm is cleared after the replacement. Check the service status.

11. Replace the antenna on the far-end. If alarm cleared check the service status. If still alarm not cleared go to Step 12.

12. Perform a cold restart of the MMU and the radio on the near end.
    - If the BER alarm is not cleared after the restart, go to Step 13.
    - If the BER alarm is cleared after the restart, monitor the hop for further BER alarms. If the alarm is raised again while the RF input level is higher than the threshold level for BER 10^{-6} for the current configuration, go to Step 13.

    For MMU or RAU Cold restart perform below step.
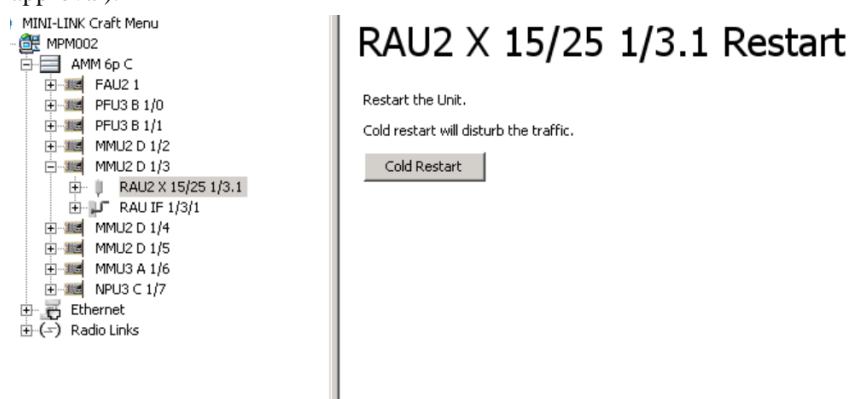
    Expand the node AMM and then particular slot card.

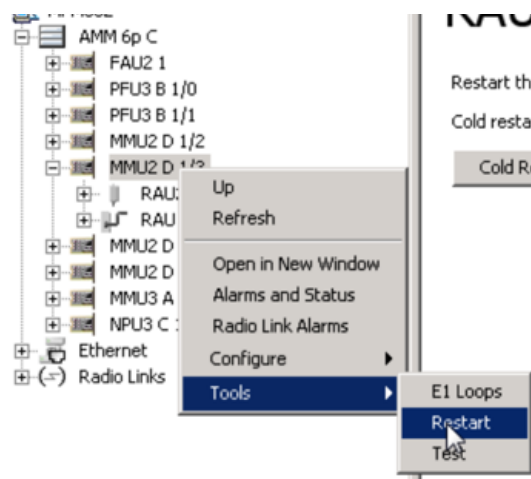
    Select RAU2 X ----Tools—Restart.

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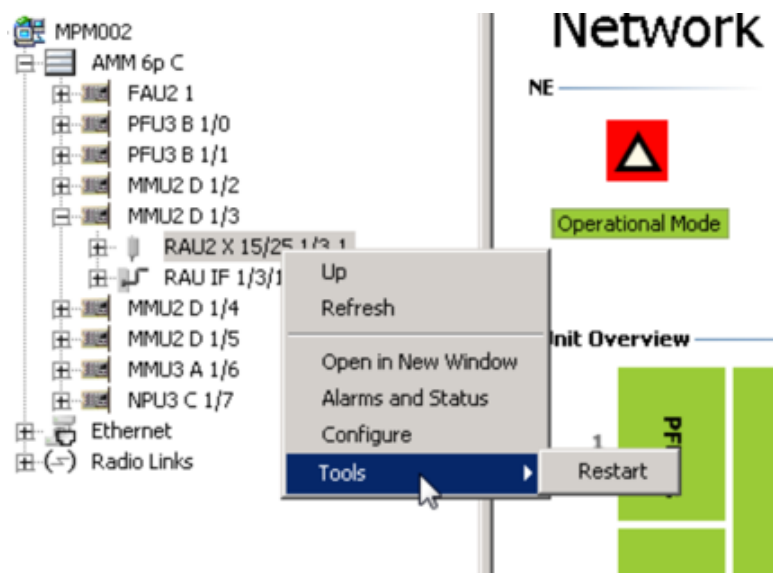
Now Click on Cold Restart (Cold restart is service impacting so need to be done with proper approval).
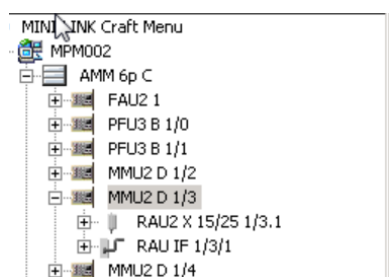

Now Select MMU card for MMU restart .

Now click on Cold-Restart to perform MMU restart.

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Now wait for few minutes (approx. 2-3 mins) till MMU/RAU cold restart completes.

13. Perform an **IF loop test** on the near-end **MMU**.

- If the BER alarm is not cleared during the test, replace the MMU on the near end.
- If the BER alarm is cleared during the test, go to Step 14.

For Performing IF loop Select Particular link click Radio Link Loops.
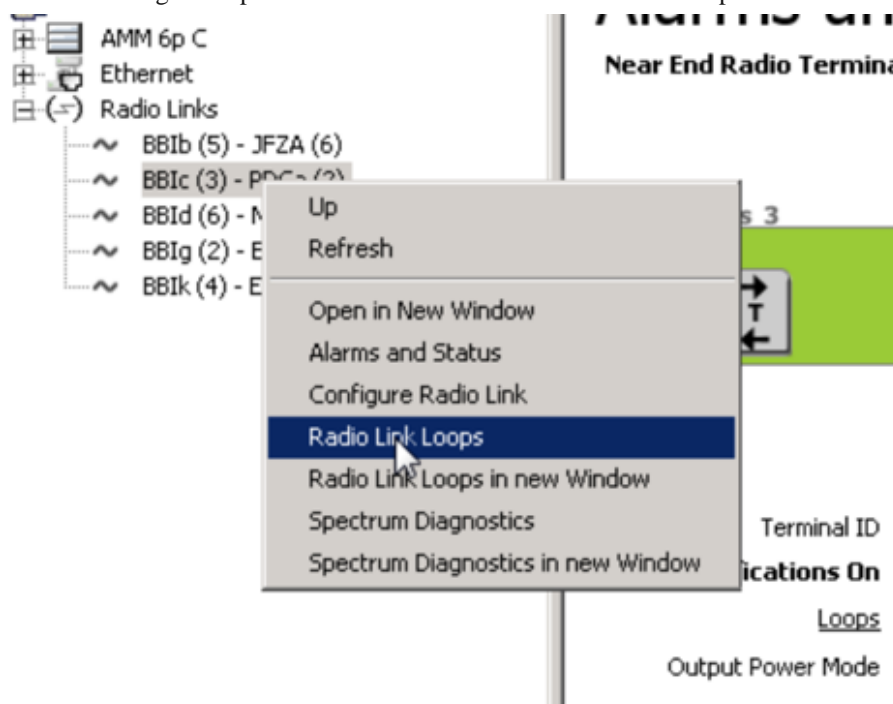
Now click on IF to enable IF loop on the link and save the configuration. Once enabled it will come in Blue color.

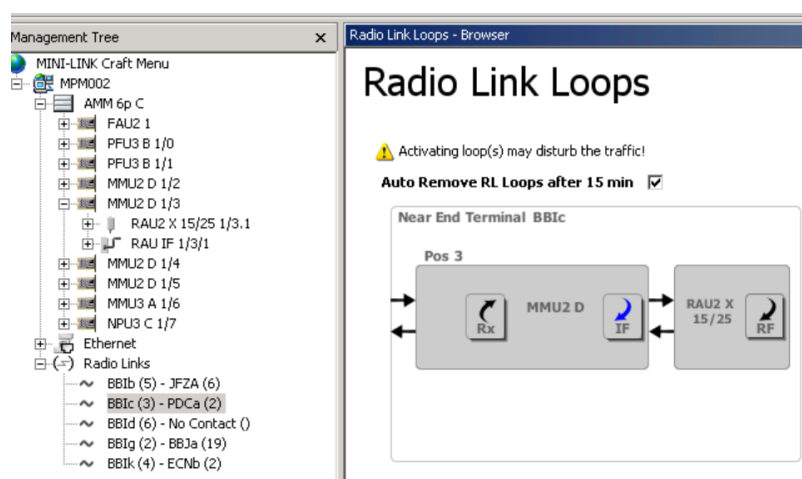| Confidentiality Class	External Confidentiality Label	Document Type			Page
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14. Check the radio cable for interference on the IF signal between the MMU and the radio on the far-end terminal with a Site-Master or a Spectrum Analyzer. Make sure that there is no interference in the frequency range of 0–400 MHz.

    - If there is no interference, go to Step 15.
    - If there is any interference, check the cables for damages and replace the cables if needed. Monitor the interfering source and remove it if possible or reroute the IF cables not to be disturbed by the interfering source.

15. Replace the radio cables and the connectors between the MMU and the radio on the far-end terminal.

Once alarm cleared check the service status and observed the link status for certain time-duration for link stability.

D: Post Check

1. Ensure no new alarm appeared on node.
2. All service should be restored after activity.
3. Ensure link stability is check for certain time-duration.

E: Fall Back Procedure

Since MOP is for alarm clearance for no Fall-Back Procedure.

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Please note that the method of procedure is prepared as the current scenario, available devices, and deployed software version. So activity steps and impact can vary depending upon the scenario.in that case we will further communicate.

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