

Veryx ATTEST™ ERPS

APPLICATION NOTE



INTRODUCTION

Veryx ATTEST™ Comprehensive Automated Test Solution (CATS) ERPS provides mobile backhaul network equipment manufacturers an easy and efficient solution for verification of Ethernet ring protection switching (ERPS) implementation in accordance with ITU-T G.8032/Y.1344. Veryx ATTEST ERPS is designed for conformance, functional and performance verification of Ethernet ring protection switching functionality in Mobile backhaul networks.

This application note provides example scenarios to verify the performance measurements in mobile backhaul networks using ATTEST ERPS.

ATTEST ERPS Test suite is used to calculate the convergence time of the DUT, when it detects/clears a local signal failure on its ring link in various scenarios under wire speed data traffic. ATTEST ERPS supports the CCM interval from 3.33ms to 1s for protection switching.

TESTING WITH VERYX ATTEST ERPS

TEST SETUP

The following is the test setup referenced in the three test scenarios discussed in this application note:

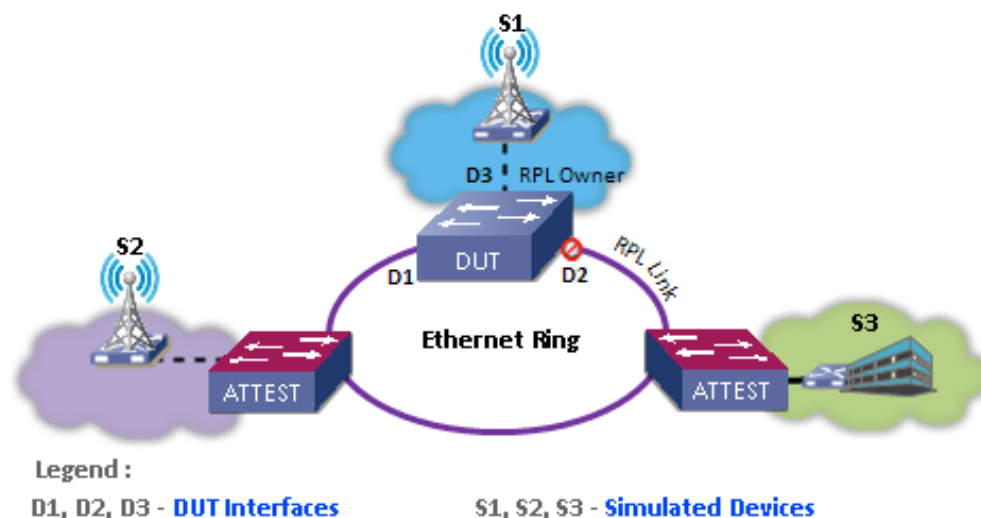


Figure 1 ATTEST ERPS Test setup for Performance measurement

SCENARIO 1 (RPLO-FT_001):

TEST PURPOSE

To calculate the fail over time when the DUT (RPL owner) detects a local signal failure on its non RPL port.

On selecting the test case (**Figure 2**) and initiating the execution process, ATTEST ERPS performs the steps as given in the test steps below:

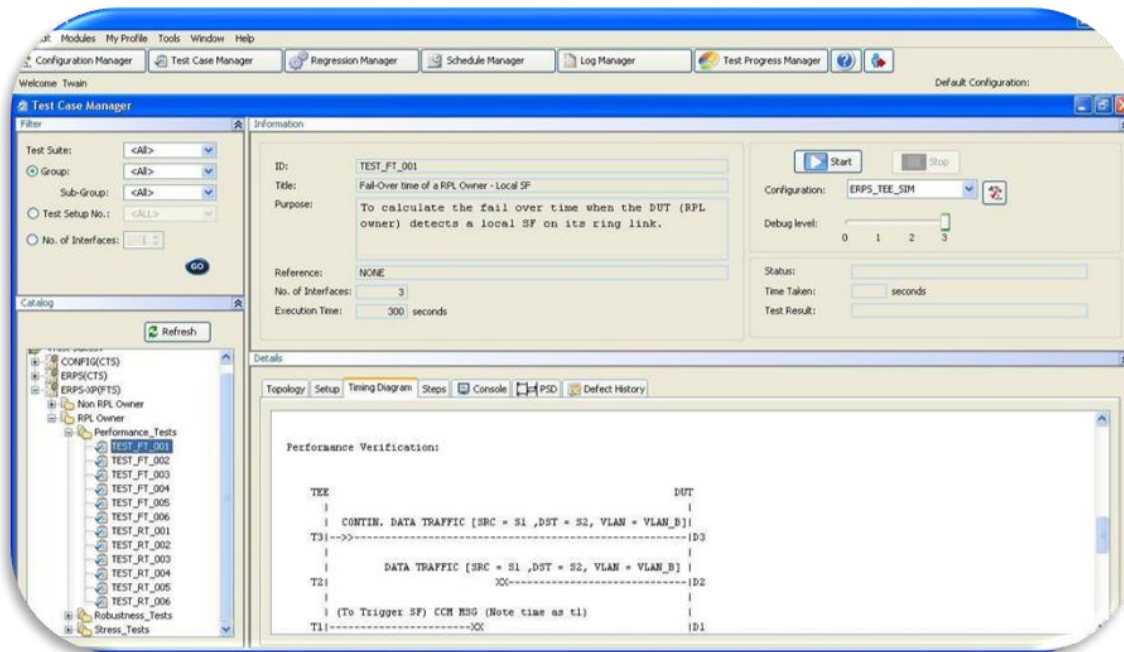


Figure 2- ATTEST ERPS Test case view with selected test case

TEST STEPS

Step 1: Device configuration

1. Create and enable Control VLAN A and Protected VLAN B
2. Enable ERP Ring for the chosen MEL level with ports D1 and D2 as ring ports and configure the port D2 as RPL Port.
3. Enable CCM for MEG ID A at chosen MEL level and configured down MEPs 700 and 800 on ports D1 and D2 respectively.

Step 2: ATTEST emulates non RPL Ring Nodes and MEPs (100 and 200) on ports D1 and D2 respectively.

Step 3: ATTEST generates wire speed VLAN tagged traffic (VID = VLAN B) on port D3 and verifies that DUT forwards it on the non RPL port D1 and does not forward it on blocked RPL port D2.

Step 4: ATTEST stops sending CCM messages from MEP ID 100 to simulate the local signal fail condition on port D1.

Step 5: ATTEST verifies that DUT unblocks its RPL port and starts forwarding the received VLAN data from S1 on its RPL port and does not forward it on recently failed port.

Step 6: ATTEST calculates the convergence time (fail over time).

TEST RESULT LOG REVIEW

At the end of the test execution, the result of the test case is as shown in (Figure 3)

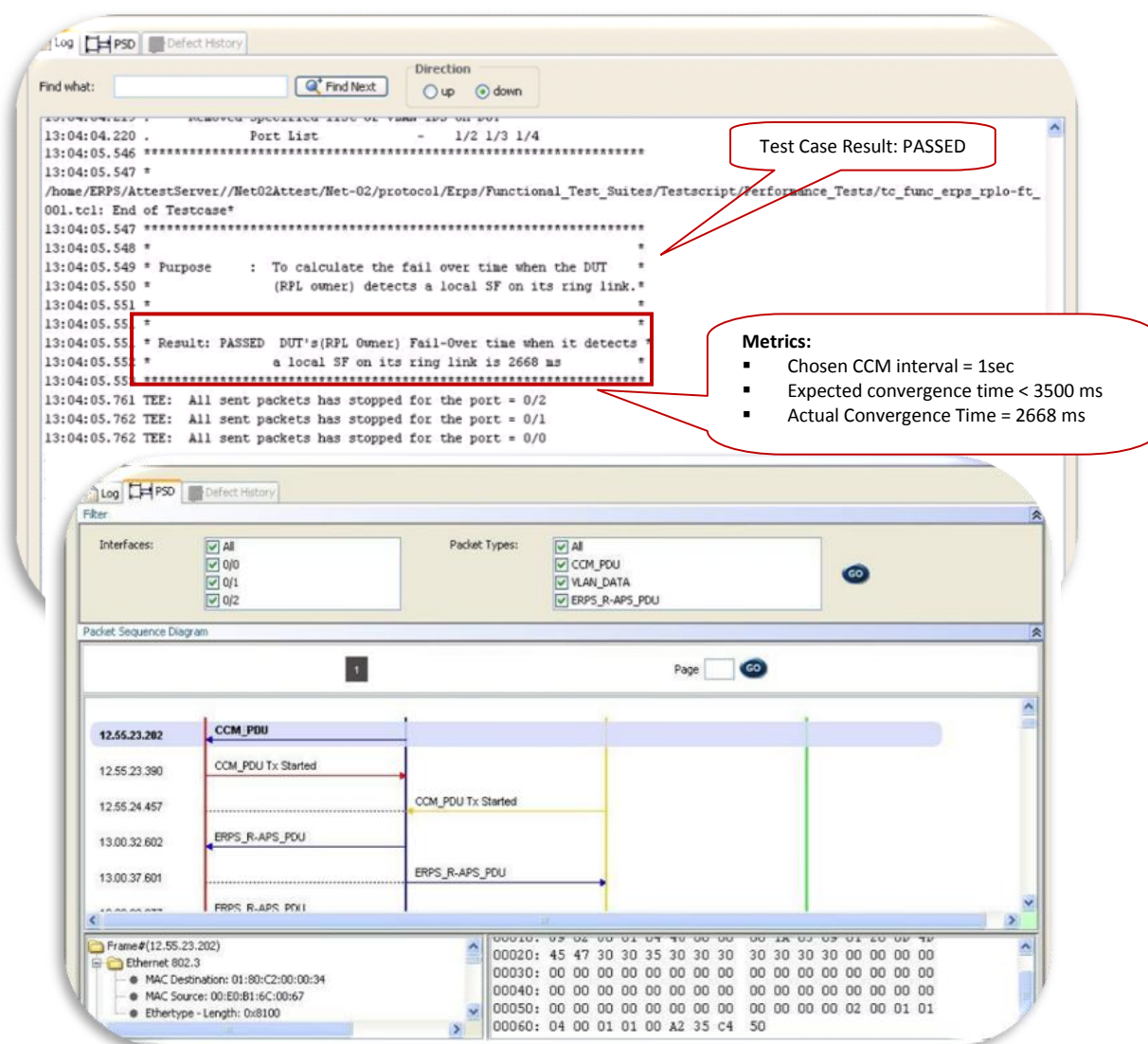


Figure 3- ATTEST ERPS Result log and Packet Sequence Display for the test case

TEST OBSERVATIONS

In this test scenario, the expected convergence time should be less than 3500 ms for the chosen CCM interval of 1000 ms. The calculated fail over time when the RPL owner detected a local signal failure was 2668ms which was well within the expected convergence time of 3500ms and hence the DUT has PASSED the test.

SCENARIO 2(RPLO-RT_001):

TEST PURPOSE

To calculate the recovery time when the DUT (RPL owner) recovers from its ring link local signal failure.

On selecting the test case (**Figure 4**) and initiating the execution process, ATTEST ERPS performs the steps as given in the test steps below:

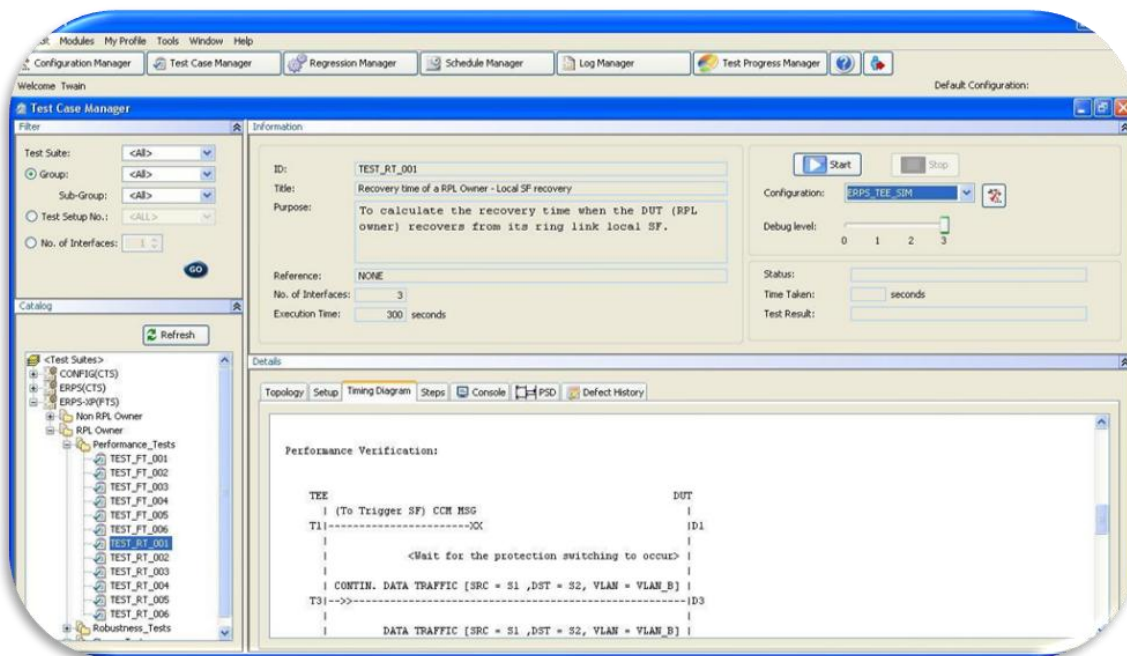


Figure 4- ATTEST ERPS Test case view with selected test case

TEST STEPS

Step 1: Device configuration

1. Create and enable Control VLAN A and Protected VLAN B
2. Enable ERP Ring for the chosen MEL level with ports D1 and D2 as ring ports and configure the port D2 as RPL Port.
3. Enable CCM for MEG ID A at chosen MEL level and configured down MEPs 700 and 800 on ports D1 and D2 respectively.

Step 2: ATTEST emulates non RPL Ring Nodes and MEPs (100 and 200) on ports D1 and D2 respectively.

Step 3: ATTEST stops sending CCM messages from MEP ID 100 to simulate the local signal fail condition on port D1.

Step 4: ATTEST generates wire speed VLAN tagged traffic (VID = VLAN B) from source S1 on port D3

Step 5: ATTEST verifies that DUT unblocks its RPL port and starts forwarding the received VLAN data from S1 on its RPL port and does not forward it on recently failed port.

Step 6: ATTEST starts sending CCM messages from MEP ID 100 on port D1.

Step 7: ATTEST verifies that DUT blocks its RPL port after expiry of WTR timer and starts forwarding the received VLAN data from S1 on the recently recovered port and does not forward it on RPL port.

Step 8: ATTEST calculates the convergence time (Recovery time).

TEST RESULT LOG REVIEW

At the end of the test, the result of the test case is as shown in (Figure 5)

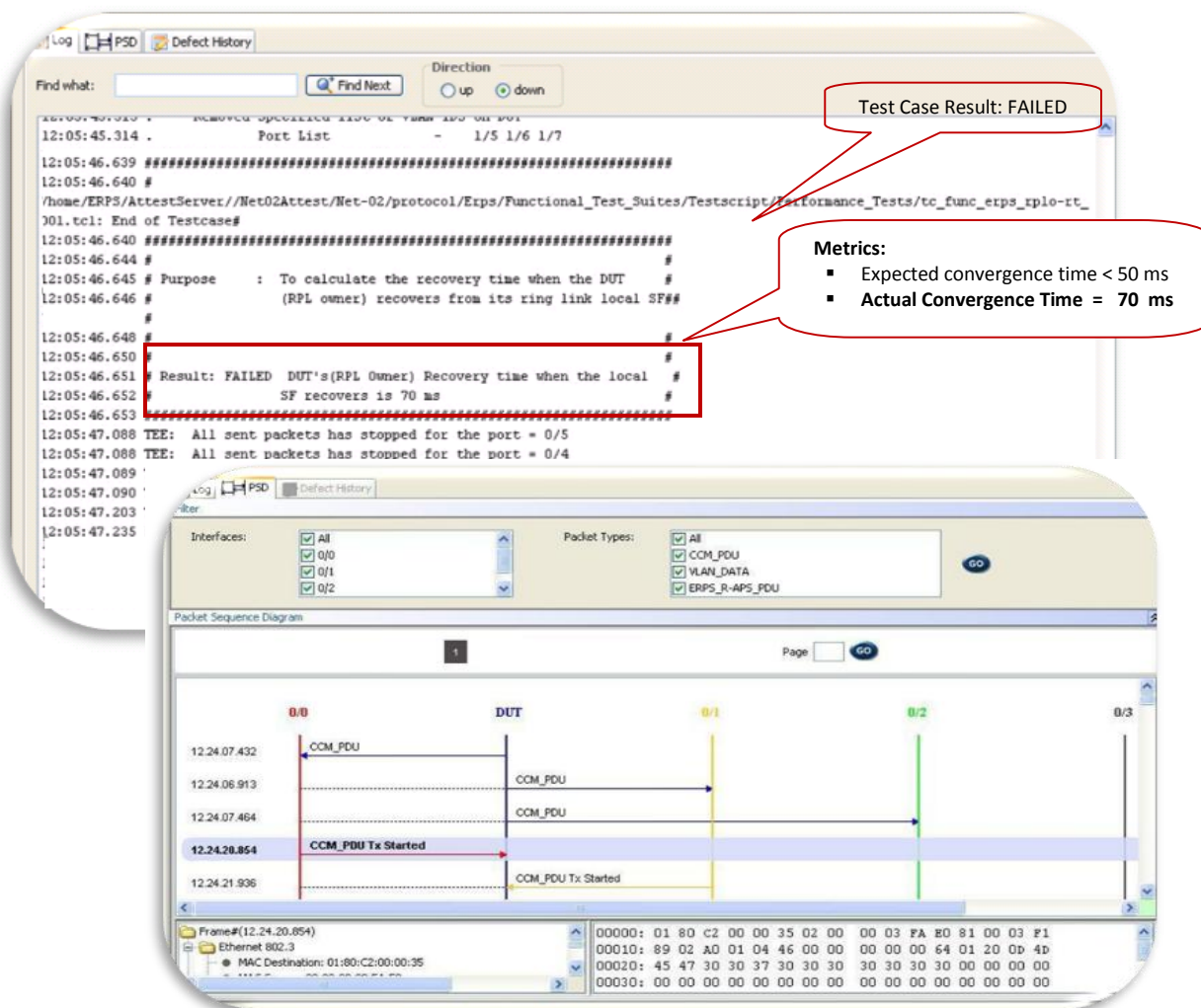


Figure 5- ATTEST ERPS Result log and Packet Sequence Display for the test case

TEST OBSERVATIONS

In this test scenario, the expected convergence time should be less than 50 ms. The recovery time determined by ATTEST ERPS when the RPL owner cleared a local failure was 70 ms, which exceeds the expected convergence time. Hence DUT has FAILED the test.

SCENARIO 3(RPLO-STRS_001):

TEST PURPOSE

To calculate the traffic loss under the fully populated Forwarding Data Base (FDB) when the DUT (RPL owner) detects a local signal failure on its ring link.

On selecting the test case (**Figure 6**) and initiating the execution process, ATTEST ERPS performs the steps as given in the test steps below:

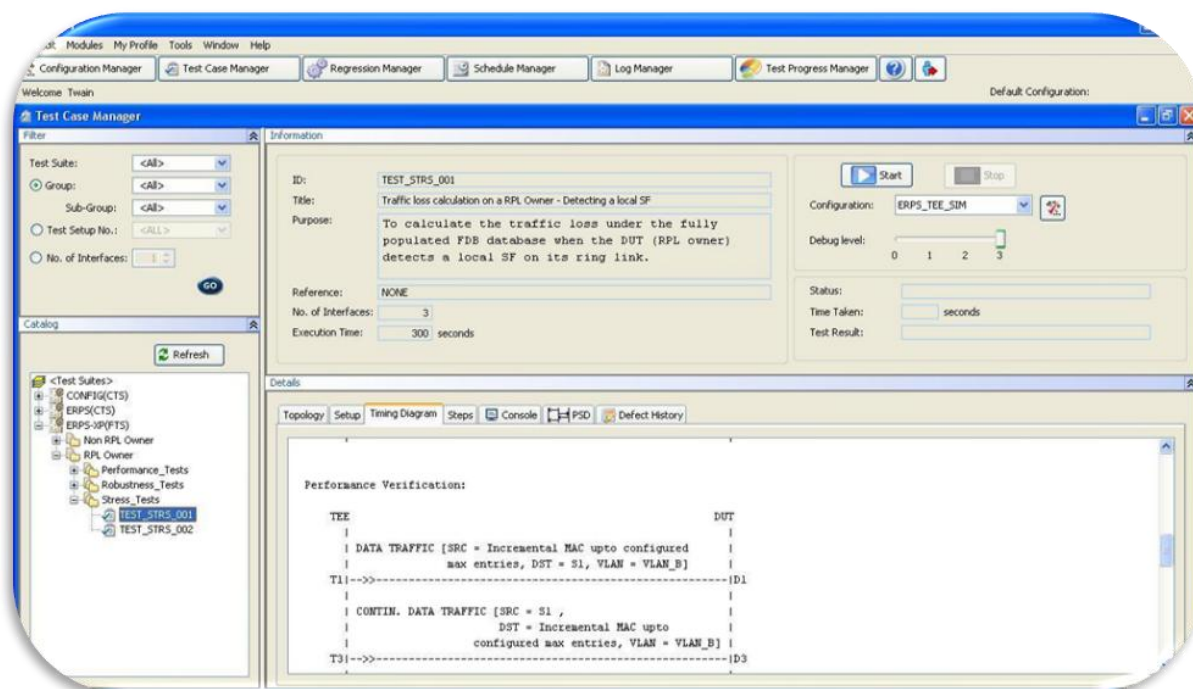


Figure 6 - ATTEST ERPS Test case view with selected test case

TEST STEPS

Step 1: Device configuration

1. Create and enable Control VLAN A and Protected VLAN B
2. Enable ERP Ring for the chosen MEL level with ports D1 and D2 as ring ports and configure the port D2 as RPL Port.
3. Enable CCM for MEG ID A at chosen MEL level and configured down MEPs 700 and 800 on ports D1 and D2 respectively.

Step 2: ATTEST emulates non RPL Ring Nodes and MEPs (100 and 200) on ports D1 and D2 respectively.

Step 3: ATTEST generates VLAN-tagged data traffic on port D1 with incremental source MAC address (up to DUTs Filtering database maximum entries) DST=S1 and VID=VLAN B to fully populates the FDB table.

Step 4: ATTEST generates continuous wire speed VLAN-tagged traffic (VID = VLAN B) from Station S1 with incremental Destination MAC address on port D3

Step 5: ATTEST verifies that DUT forwards it on the non RPL port D1 and does not forward it on blocked RPL port D2.

Step 6: ATTEST stops sending CCM messages from MEP ID 100 to simulate the local signal fail condition on port D1.

Step 7: ATTEST verifies that DUT unblocks its RPL port. It starts forwarding the received VLAN data from S1 on its RPL port but does not forward it on recently failed port.

Step 8: ATTEST calculates the traffic loss.

At the end of the test execution, the result of the test case is as shown in (**Figure 7**).

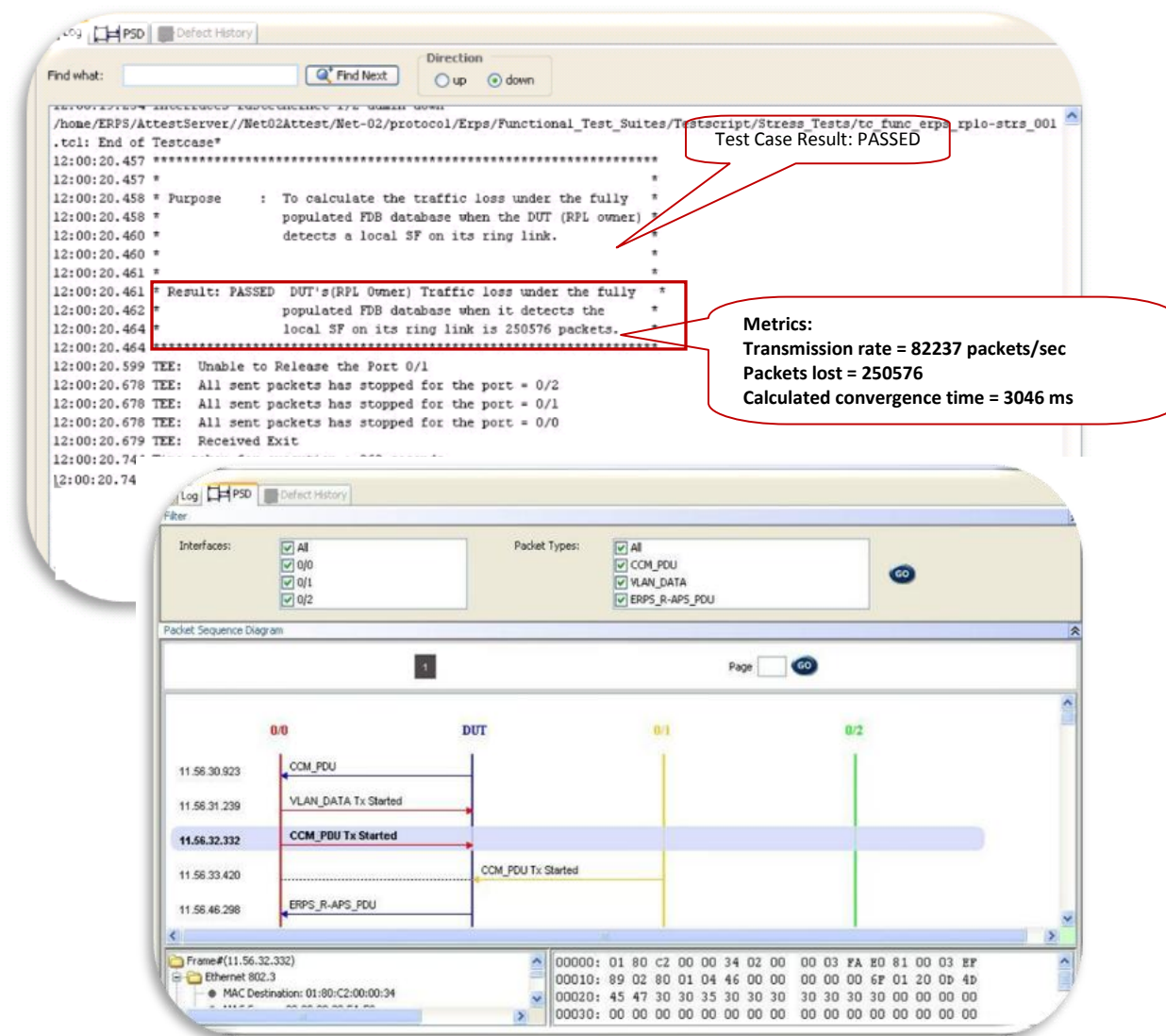


Figure 7 - ATTEST ERPS Result log and PSD for the test case

TEST OBSERVATIONS

In this test scenario, the expected convergence time should be less than 3500 ms for the chosen CCM interval of 1000 ms. The calculated traffic loss here was 250576 packets and ATTEST ERPS determined the convergence time to be 3046 ms. This is well within the expected convergence time and hence the DUT has PASSED the test.



CONCLUSION

Veryx ATTEST ERPS provides an easy and efficient solution for verification of G.8032/Y.1344 implementation in mobile backhaul equipment. Veryx ATTEST ERPS relies on the ATTEST Framework-- a powerful test framework that requires minimal time for set-up and enables easy analysis of test results.

ABOUT VERYX TECHNOLOGIES

Veryx Technologies (formerly Net-O₂ Technologies) provides innovative Verification and Measurement Solutions for the global communications industry. Veryx ATTEST solutions verify networking equipment being used for Access, Carrier Ethernet, Industrial, Data Center, Edge, Enterprise and Security. Leading manufacturers of network devices rely on ATTEST range of products for testing a wide variety of applications.

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