Viavi Solutions™ Ethernet Testing

Key Benefits of Probe/Instrument Integration

Unique Test Capabilities

The following sections detail how various test applications benefit from the interoperability of QT-600 probes and T-BERD/MTS instruments.

Test Application	Description	Key Benefits
Asymmetric RFC 2544	Perform RFC 2544 tests with unidirectional upstream and downstream traffic.	Isolates faults to either the upstream or downstream direction on test failure.
Asymmetric Y.1564	Perform Y.1564 tests with unidirectional upstream and downstream traffic.	Isolates faults to either the upstream or downstream direction on test failure.
Automatic Test Probe IP Address Discovery	Automatically provide field technicians with the IP address of the appropriate QT-600 for service activation tests.	Eliminates technician confusion and coordination challenges through automation.
JMEP and T-BERD/MTS Interoperation	Perform service activation and troubleshooting tests between instruments and JMEP SFPs.	Significantly increases the number of test points to reduce travel and troubleshooting times.
VoIP Testing	Place live VoIP calls between instruments and QT-600 test probes to test connectivity and generate MOS scores.	Eliminates the need for coordination on extra equipment when testing VoIP.

Combining QT-600 test probes with portable T-BERD®/MTS instruments provides unique test capabilities that:

- Increase test automation
- Accelerate fault isolation
- Reduce coordination needs and idle time

Empower field technicians, network engineers, and NOC personnel with unmatched operational flexibility by deploying tightly-integrated portable test tools and carrier-grade, scalable Ethernet probes.

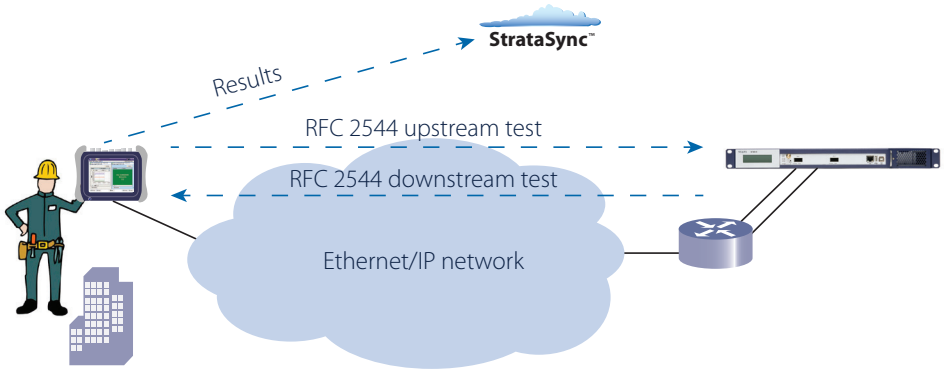
Asymmetric RFC 2544

The Problem

- Most RFC 2544 tests are performed with one endpoint generating traffic and the other endpoint placed in loopback. By all accounts, this is the fastest and easiest way to perform these tests.
- However, when a test fails, the technicians and engineers have no information on where packets are being dropped or where excessive delay variation is being introduced into the network.
- In addition, some service level agreements (SLAs) may specify different upstream and downstream committed information rates (CIR). In these cases, a loopback test cannot fully characterize the performance of the circuit because the direction with the higher CIR will not be fully stressed.

The Solution

- T-BERD/MTS portable instruments and QT-600 test probes perform RFC 2544 tests in asymmetric mode. This means that instead of simply generating traffic on one end and looping it back on the other, both endpoints generate traffic that the far end will receive and analyze. The complete results from both directions are then automatically consolidated into one test report—generated by either the QT-600 or the T-BERD/MTS.
- Asymmetric RFC 2544 tests provide network engineers and technicians with important information about the source of network impairments such as excessive frame loss or packet delay variation.
- These tests can also be used to fully test SLAs with different CIRs in upstream and downstream directions.



Feature	Description	Benefit
Independent upstream and downstream testing	The ability to generate and test traffic independently in both the upstream and downstream directions. Tests include throughput, latency, jitter, frame loss, and committed burst size (CBS).	Testing both directions (east-west and west-east) independently allows for sectionalization of problems associated with any SLA parameter.
Asymmetric throughput in upstream and downstream directions	Generate traffic at different rates in the upstream and downstream directions.	Allows for fully testing SLAs with different CIR in each direction such as 100 Mbps upstream and 200 Mbps downstream.
Bidirectional CBS tests	CBS tests generate bursts of traffic at line rate to ensure that network policer and buffer settings are configured properly. In asymmetric mode, bursts are generated in both upstream and downstream directions.	Testing CBS with just a loopback will only stress one of the two policers in the circuit (the near-end one) because bursts of traffic will spread out as they traverse a live network and not stress the policer on the far end.
Consolidated test report generation	Results from both the upstream and downstream directions are consolidated into a single test report generated by either the QT-600 or the T-BERD/MTS.	A single test report consolidates all measurements and pass/fail results in one place for easy reference.

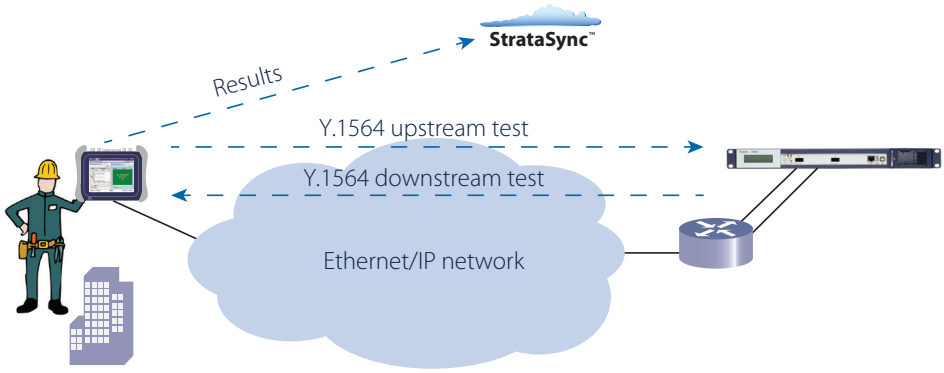
Asymmetric Y.1564

The Problem

- Y.1564 service activation tests are often run by generating traffic at one endpoint and looping it back at the far end. Similar to RFC 2544 tests, performing Y.1564 tests with the far end in loopback is a quick and easy way to activate services.
- When problems occur with CIR, EIR, FD, and FL, loopback tests are unable to sectionalize the cause.
- Policer tests and CBS only test the near-end policer and do not stress the far-end.
- SLAs with different bandwidth profiles in the upstream and downstream direction cannot be fully tested.

The Solution

- The QT-600 test probe and T-BERD/MTS instruments offer an asymmetric Y.1564 mode that generates traffic for one or multiple streams independently in both the upstream and downstream directions. The traffic is then analyzed by the far end and consolidated into a single test report for both directions—again generated by either the QT-600 or the T-BERD/MTS.
- Asymmetric Y.1564 tests can test each service independently in both upstream and downstream directions. This allows for easier sectionalizing of any SLA violations.
- In addition, asymmetric Y.1564 fully tests any services with different upstream and downstream profiles while stressing both near-end and far-end policers.



Feature	Description	Benefit
Independent upstream and downstream testing	The ability to generate and test traffic independently in both the upstream and downstream directions. Tests include: CIR, EIR, steps, policing, FD, FDV, and CBS.	Testing both directions (east-west and west-east) independently allows for sectionalization of problems associated with any SLA parameter.
Asymmetric throughput in upstream and downstream directions	Generate traffic at different rates in the upstream and downstream directions.	Allows for fully testing SLAs with different CIR in each direction such as 100 Mbps upstream and 200 Mbps downstream.
Bidirectional policing and CBS tests	CBS tests generate bursts of traffic at line rate to ensure that network policer and buffer settings are configured properly. In asymmetric mode, bursts are generated in both upstream and downstream.	Testing CBS with just a loopback will only stress one of the two policers in the circuit (the near-end one) because bursts of traffic will spread out as they traverse a live network and not stress the policer on the far end.
Consolidated test report generation	Results from both the upstream and downstream directions are consolidated into a single test report generated by either the QT-600 or the T-BERD/MTS.	A single test report consolidates all measurements and pass/fail results in one place for easy reference.

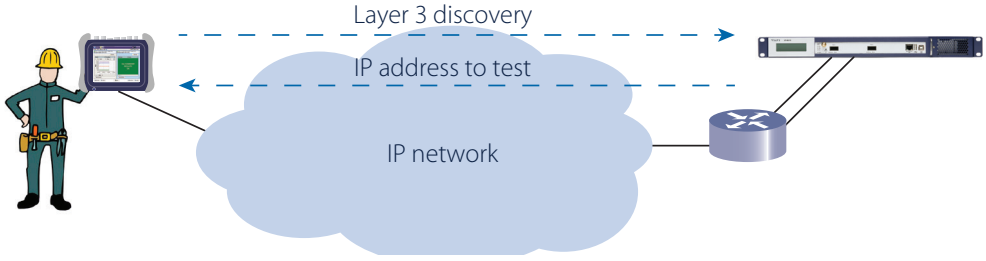
Automated Test Probe IP Address Discovery

The Problem

- Technicians in the field often have trouble identifying the IP address of the far-end test instrument or test probe. Even with automated discovery of all of the test probes in a subnet, there is often confusion about which IP address to pick.
- Sharing test probe IP addresses among multiple technicians often leads to contention for the same IP address and presents coordination problems and lost time.

The Solution

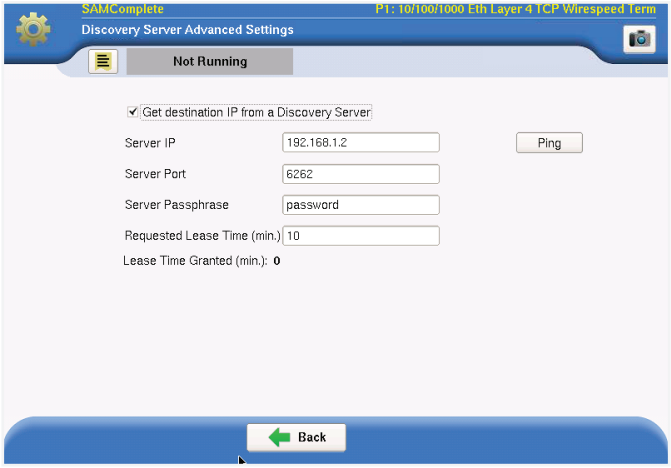
- QT-600 test probes deployed within the NetComplete® EtherAssure™ solution automatically tell the T-BERD/MTS instrument which far-end IP address to use and reserves that IP address for the duration of the test.



Feature	Description	Benefit
Automated IP address discovery	The EtherAssure server automatically configures the instrument with a destination IP address.	Eliminates the need for technicians to carry a list of test IP addresses. Reduces confusion on the very first test setup.
Test IP address allocation and lockout	The server centrally manages all available test IP addresses and allocates an IP address for each test.	Eliminates contention for IP test addresses among multiple technicians as well as any coordination issues.
Saved T-BERD/MTS test profiles	Pre-configures the server IP address, port, and password in a saved test profile that can be distributed to all test instruments and technicians via a USB memory stick or the StrataSync cloud server.	Technicians never need to worry about the details of the setup. All steps become automatic.

T-BERD/MTS Configuration

The setup screen for automatic test probe discovery can be initially configured and saved in a test profile. When the test profile is distributed to all portable test instruments via USB memory stick or StrataSync, the instrument will automatically configure the destination IP address without any technician involvement. Easily fall back to manual IP address configuration by unchecking the checkbox.



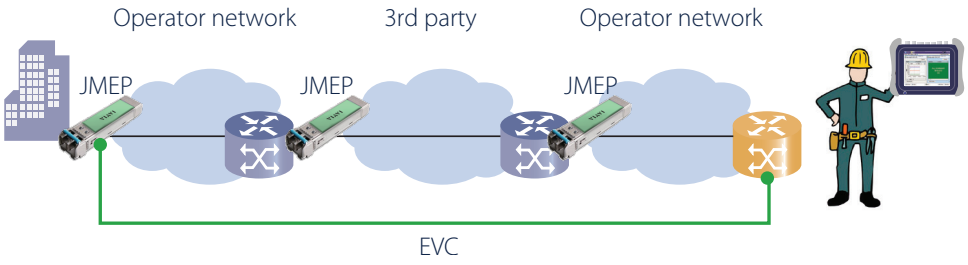
T-BERD and JMEP Interoperation

The Problem

- When end-to-end test results indicate poor network performance, the first step is to isolate the source of the problem by sectionalizing the network.
- A key challenge is to gain test access to the key portions of the network such as handoffs, where errors are likely to occur. This often requires multiple technicians with test equipment traveling to different locations, which are often far apart. Problems created are coordination challenges, time lost to travel, and idle resources.

The Solution

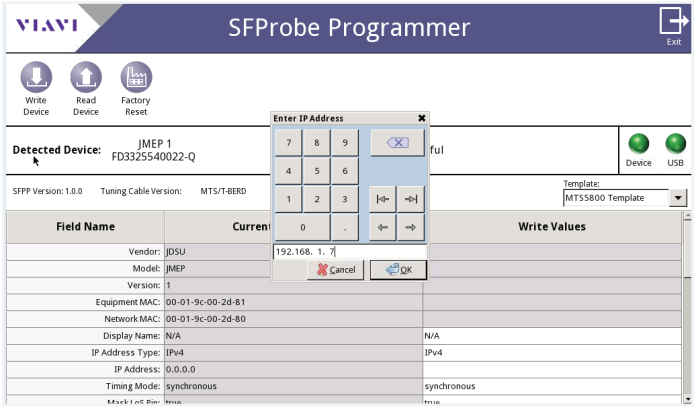
- Deploying JMEP SFProbes™ in key locations in the network significantly increases the number of locations with built=in test access. This means that a technician attempting to sectionalize a problem can immediately run tests to multiple locations without requiring another technician to travel there with a test instrument.



Feature	Description	Benefit
RFC 2544 test interoperation	Ability to test the entire Ethernet stream at the JMEP location.	Allows increased test access for full-stream testing.
Y.1564 and EVC loopback interoperation	Test individual services within the Ethernet stream at the JMEP location.	Lets a technician sectionalize performance issues on a particular service or set of services without impacting unrelated traffic.

T-BERD/MTS-5800 JMEP Programmer

Field technicians carrying T-BERD-5800 test instruments can easily program and deploy JMEP SFProbes with the JMEP programmer interface. They insert the JMEP into the SFP interface on the T-BERD/MTS-5800 and launch the SFProbe Programmer utility to configure MAC and IP addresses, display names, and EVC loopback parameters. Technicians then deploy the JMEP in the network to begin testing.



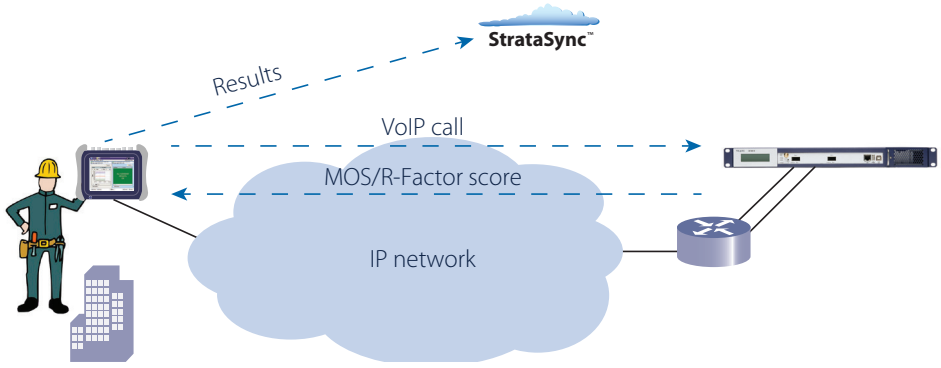
VoIP Testing

The Problem

- Often, the final step in deploying business services is to place live VoIP calls to test connectivity and to ensure high call quality.
- Many Ethernet/IP loopback devices do not natively handle VoIP, so operators need to deploy additional equipment or test instruments to place calls and score call quality.

The Solution

- To operationalize testing of VoIP call quality, T-BERD/MTS instruments can place VoIP calls to a QT-600 test probe. The VoIP calls are bidirectional and both the T-BERD portable and the QT-600 probe score the call on a MOS or R-Factor scale.
- At the completion of the call, MOS or R-Factor scores from both directions are combined so that a single test report can be generated.



Feature	Description	Benefit
Automated VoIP test	T-BERD/MTS instruments can place automated bidirectional test calls to a QT-600 probe.	Lets field technicians test call quality without requiring a second instrument, a dedicated POTS phone, or any additional equipment.
MOS or R-Factor call scoring with pass/fail threshold	Both test instruments score the call on either a MOS or R-Factor-quality scale. Preconfigured pass/fail thresholds allow for easy interpretation of results.	Easily readable results empower any field technician to perform VoIP testing out requiring additional training.
Single report generation	Results from both directions are compiled by the T-BERD/MTS portable. A single test report is then generated.	A single test report for a birth certificate on the VoIP service makes storing information about VoIP performance easy.
VoIP testing with background traffic	A VoIP test with background traffic simulates the network under real-life conditions.	Provides a more realistic view of what the user will experience when the circuit is commissioned.

Contact Us **+1 844 GO VIAVI**
(+1 844 468 4284)

To reach the Viavi office nearest you,
visit viavisolutions.com/contacts.

ethernettesting-pb-tfs-nse-ae
30175883 900 0514