

Ethernet Mobile Backhaul Solutions

A Guide for Ethernet Mobile Backhaul Testing and Service Assurance



Mobile service providers and backhaul providers face numerous challenges associated with the migration from Time Division Multiplexing (TDM) or Plesiochronous Digital Hierarchy (PDH) mobile backhaul to Ethernet mobile backhaul. This migration is universally required but its complexity requires a familiarity with Ethernet and its standards, related test requirements, and planning requirements in tandem with the flexibility to incorporate new services and applications as they are introduced into the marketplace.

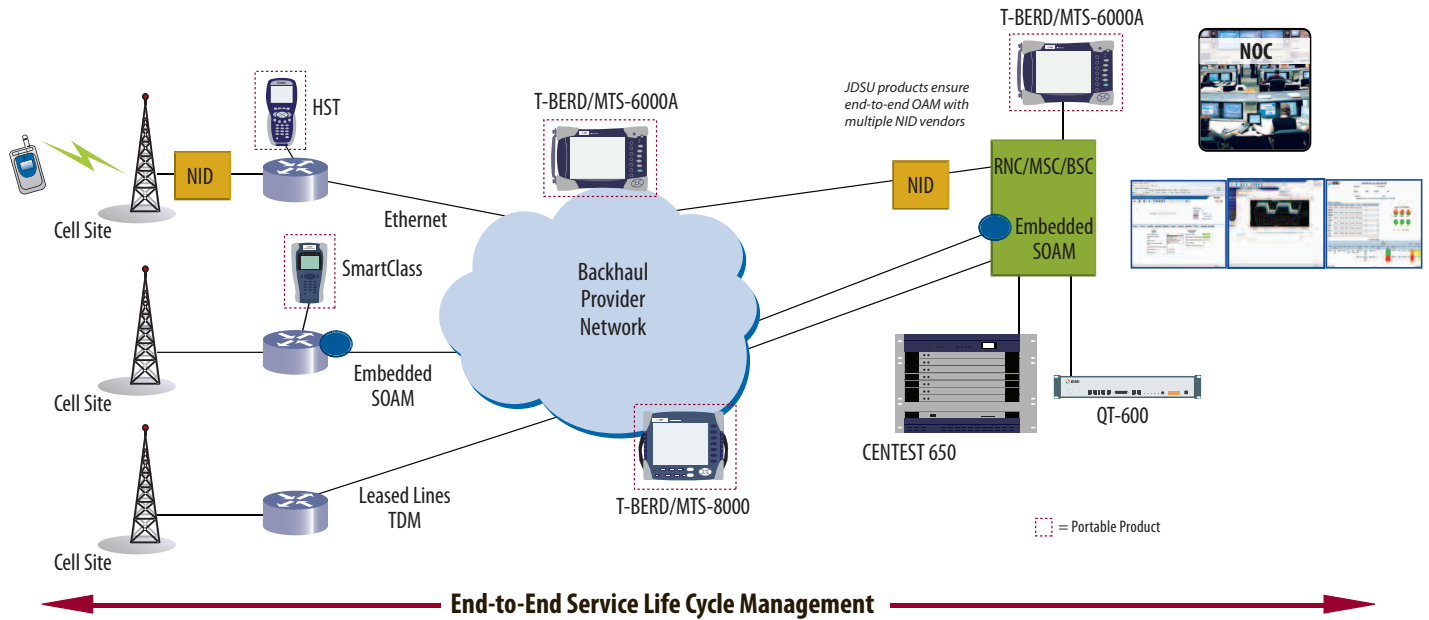
At the same time, the industry is demanding more from technicians and Network Operations Center (NOC) personnel than ever before to address a totally new, imminent, and accelerated installation and maintenance requirement. The challenge is multifaceted: learn a new technology, deploy quickly, achieve revenue goals and maintain service level agreements (SLAs)—or risk expensive rebates—all while operating with a relatively small workforce whose knowledge may be based on outdated technology.

The JDSU Ethernet Mobile Backhaul Solution, a suite of instruments, systems, software and services, addresses these challenges, providing an integrated, end-to-end approach to test products and services—and bring them to market quickly, cost-effectively, and in compliance with SLAs. JDSU offers customers worldwide the confidence to successfully build, deploy, and manage Ethernet Backhaul networks in all network layers from legacy TDM or PDH, a key requirement for the smooth transition to next-generation Long-Term Evolution (LTE). JDSU technical knowledge, innovation leadership, and experience in TDM/PDH, Carrier Ethernet, and LTE test and measurement is unmatched in the marketplace.

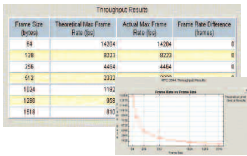
No test and measurement partner understands customers and shares the risk (of new markets and innovation) like JDSU. This selection guide provides an overview of the test solutions and services that JDSU can provide as your partner in deploying Ethernet mobile backhaul networks.



JDSU offers a complete suite of instruments, systems, and software to address testing and service assurance challenges associated with deploying Ethernet Mobile Backhaul networks



1. Service Installation Testing



Portables and System (w/ Probes) Approach:

- Perform end-to-end RFC 2544 services test to verify key SLA/KPI parameters (throughput, frame loss, delay, jitter)
- Perform Multiple Streams Test to Ensure Proper Prioritization of Traffic Through the Network
- Perform J-Proof Test to Ensure Backhaul Transparency of the Management Traffic
- Run Capture/Decode to Ensure Separation of Traffic Across Hand-off Boundaries
- Quick test from probe to portable/NID or NE loopback verifying SLA/KPI parameters using RFC 2544; traffic transparency and correct traffic prioritization
- Release technician to perform centralized long term Burn-in test to NID or NE loopback using RFC 2544 or multi-stream testing
- Service SLA report generated by OSS and stored as baseline

System NetAnalyst, QT-600, Centest 650

Portables T-BERD/MTS-8000, T-BERD/MTS-6000A, SmartClass, HST-3000

2. Service Performance & SLA Monitoring

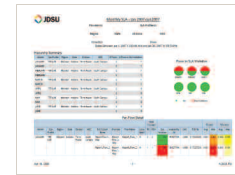


System (w/ NIDs or NEs) Approach:

- Set threshold values KPIs—availability, offered, accepted and delivered throughput; frame delay, frame delay variation and frame loss
- Collect OAM data from NIDs and/or NEs that support Y.1731 PM—calculate KPIs as defined by SLA agreements
- Continuous monitoring/generating hourly/daily/weekly & monthly reports
- Continuous monitoring and visibility of VLANs traffic patterns (Top N) Netmon/near real-time throughput, KPI and SLA information

System NetOptimize

3. Service Test & Troubleshooting



System Approach with Probes:

- Perform end-to-end one-way traffic generation focusing on VLANs, frame size, SLA values to determine if problem is directional and in which direction
- Utilize capture/decode to analyze real traffic, validate NE provisioning, or in conjunction with RFC 2544 testing
- Sectionalize and verify connectivity with Ethernet OAM LBM/LBR messages
- Run the J-Proof test again to see if there are any configuration changes or not; use J-Proof Test to build specific management frames for verification and troubleshooting
- Centralized sectionalization and verification of connectivity with LBM/LTR messages
- RFC 2544, multi-stream, traffic generation, packet capture, analysis and decode

System NetAnalyst, QT-600, Centest 650

Portables T-BERD/MTS-8000, T-BERD/MTS-6000A, SmartClass, HST-3000

JDSU offers a comprehensive suite of instruments, systems, and software covering the entire Ethernet mobile backhaul network element and service deployment life cycle.

Service Installation Testing, Service Test and Troubleshooting, and Service Performance/SLA Monitoring

Portable Field Test Solutions

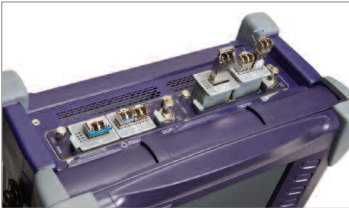


T-BERD®/MTS-8000

The next-generation, modular, and cost-effective JDSU T-BERD/MTS-8000 platform solution with its innovative design combines traditional synchronous optical network/synchronous digital hierarchy (SONET/SDH) and Ethernet/Internet Protocol (IP) testing—all in a single test module. The T-BERD/MTS-8000 provides physical layer test modules, including optical time domain reflectometer (OTDR), polarization mode dispersion (PMD), and chromatic dispersion (CD). It also provides service-layer test modules, such as 10 Gigabit Ethernet (GigE) and SONET/SDH, to test various fiber networks (FTTx) as well as coarse (CWDM) and dense wavelength division multiplexing (DWDM) networks.

T-BERD/MTS-8000 Dual Module Carrier (DMC)

The JDSU Dual Module Carrier (DMC) for the T-BERD®/MTS-8000 platform is the industry's only portable test solution offering concurrent capture/decode and TCP WireSpeed testing on two 10 GigE ports, including up to eight concurrent DSx/PDH tests for rapid equipment provisioning. A complete 10M to 10 GigE, DS1/E1 to OC-192/STM-64, OTN, PDH, Next Generation SONET/SDH and Fibre Channel test solution, the DMC is capable of simultaneous troubleshooting both sides of a circuit—using one tester—saving both time and money, and achieving operation efficiencies. Using a single DMC, technicians can easily determine and troubleshoot traffic problems from both directions using a single test solution, translating to significant time and cost savings. The DMC is also able to run four concurrent tests, creating other operational efficiencies. This is particularly valuable in Mobile Telephone Switching Office (MTSO) test applications where multiple circuits at a time can be tested. Technicians can share a test set for installation and troubleshooting in a central office and MSPP installation can be expedited by verifying multiple ports concurrently.



T-BERD/MTS-6000

The JDSU T-BERD/MTS-6000A is designed for all phases of the fiber and Ethernet/IP-based network life cycle. It provides field service technicians with the highest levels of performance and upgradeability on the market, providing over 40 different modules supporting a wide range of applications. The versatility of the T-BERD/MTS-6000A allows technicians to standardize using one type of test equipment and then introduce new testing capabilities in the field without incurring additional training and device costs.





T-BERD/MTS-6000A Multi-Services Application Module (MSAM)

One rugged, handheld JDSU Multi-Services Application Module (MSAM) provides the most compact 10-GigE multifunction tester in the industry used for the installation and maintenance of Carrier-grade services. It supports applications ranging from verifying Ethernet and IP SLAs (including VPLS/MPLS) to verifying provider backbone transport/optical amplifier module (PBT/OAM) functionality for true Carrier Ethernet SLAs. It also supports application-centric testing (focused on TCP/UDP) in the presence of background test streams (patent pending). Technicians can also add testing capability with pluggable physical interface modules (PIMs) to create a variety of field-configurable optical/electrical test combinations.



HST-3000 Ethernet Module

The JDSU HST-3000 Handheld Services Tester is a modular, portable, and rugged instrument that tests multiple technologies (including xDSL, copper, T1/E1, fiber, and Ethernet) in both Metro and Access networks. The Ethernet module supports physical layer testing (cable diagnostics), service quality verification (RFC 2544 at Layers 2 to 4 and class of service [CoS]), and application performance analysis (voice over IP [VoIP] and IP video). The HST-3000, equipped with the Ethernet module and the mainframe's VoIP and IP video options, addresses the broad requirements for 7-layer testing (including IPv6) in a rugged, modular platform perfect for field use.



SmartClass™ Handheld Point Solutions

A cost-effective, rugged, and portable test instrument designed for field technicians who install Ethernet, E1, and IP services, the JDSU SmartClass provides a complete range of test capabilities. SmartClass Ethernet includes support for cable diagnostics to RFC 2544 (including Asymmetrical RFC 2544), multiple streams support, and MPLS enabling service providers to successfully verify Carrier Ethernet SLAs at installation.

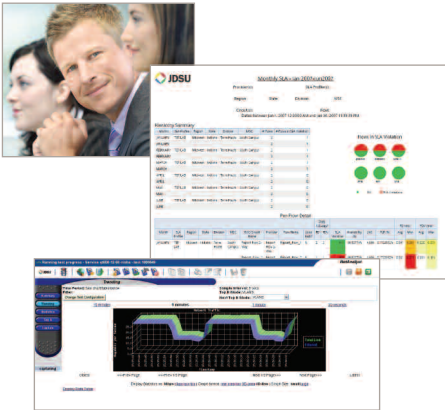


SmartClass Optical Channel Checkers

The new SmartClass OCC-50 series is ideal for CWDM or DWDM testing before turn-up and for first-level maintenance. Allowing optical channel verification by providing wavelength and power level measurements according to the ITU-T grids, the SmartClass OCC-55 is the ideal tool for technicians to carry when dealing with CWDM transmission systems. For DWDM transmission, the SmartClass OCC-56C (C-Band) and SmartClass OCC-56L (L-Band) provide the best Tier-1 solution.

Service Installation Testing, Service Test and Troubleshooting, and Service Performance/SLA Monitoring

Centralized Systems



NetComplete® Service Assurance for Mobile Backhaul

The NetComplete Mobile Backhaul Solution helps service providers deploy Ethernet with confidence by automating circuit turn-up testing assuring SLA adherence prior to handoff, by performing rapid fault isolation and troubleshooting of service affecting issues, and with continuous SLA conformance reporting through proactive service and network monitoring.

The NetComplete Mobile Backhaul Solution includes industry-leading operation support system (OSS) software NetAnalyst™ and NetOptimize®, the QT-600 Ethernet probe, and support for third-party network interface devices (NIDs).



QT-600 Ethernet Probe

A carrier-grade Ethernet probe, the QT-600 validates Ethernet services are turned up in compliance with SLAs optimizing long-term burn-in testing from a centralized location. The QT-600 troubleshoots and sectionalizes the issues using ping, traceroute, 802.1ag and RFC 2544 standard testing. In conjunction with troubleshooting capabilities, the QT-600 can passively monitor network traffic, performs top N analysis, and captures traffic applying sophisticated filters/triggers to drill down into the data for further analysis.



CT-650 CENTEST® Wideband Test Unit

The JDSU CT-650 CENTEST Wideband Test Unit is a centralized turn-up and maintenance testing system that tests services and facilities (DS0, DS1, and DS3 service rates) throughout the entire network from the network control center (NCC). The CENTEST 650 offers the ability to lower maintenance costs, improve responsiveness to customers, and enable more efficient network troubleshooting.

JDSU Global Services and Solutions



Business Consulting

Solutions for today's network operational and engineering challenges

Through the JDSU Operational Process Re-engineering (OPR) and Network Planning and Optimization (NPO) consulting practices, we deploy operations and network experts to help organizations improve network operation efficiency, shorten time to deployment for new services, minimize network downtime and mean time to repair (MTTR), and maximize the return on investment (ROI) of network assets.



Network Qualification and Fiber Characterization Service

Complete qualification of advanced optical networks

JDSU offers the most extensive network qualification expertise in the industry to help organizations verify fiber plant infrastructure for high-speed networks, perform staging tests for new DWDM, reconfigurable optical add-drop multiplexer (ROADM), and 40G configurations, and for qualifying end-to-end services, including burn-in testing. Whether increasing the speed or density of traffic on an existing network or verifying the quality of a fiber installation prior to deployment, the information provided in this comprehensive report allows for proper planning of network deployments and satisfies the most stringent network acceptance requirements.



JDSU Certified Equipment

The ACE Program provides a reliable source for used equipment

The JDSU ACE Program allows for the purchase of used JDSU equipment while providing the same confidence as when purchasing new equipment. The ACE Program provides guaranteed products that meet original JDSU product specifications.



Product Support Services

Extended Warranty

Extended warranty allows for control of unplanned maintenance and repair costs. Instruments under extended warranties are covered under the same industry-leading warranty that protects every new JDSU product.

Calibration

JDSU offers International Organization for Standardization (ISO)-certified on-site or return-to-factory calibration for JDSU and non-JDSU instruments, thus providing a one-stop solution for all calibration and calibration management needs.

Repair

JDSU together with its strategic partners offer repair and repair management services for test equipment and general instrumentation products used to support networks resulting in a single supplier providing all test instrument repair needs and assurance that all of the services provided will conform to JDSU quality and accountability standards.

Asset Management

JDSU asset management software and on-site solutions will increase the efficiency of your equipment and staff.

Test & Measurement Regional Sales

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