DSAM Digital Services Analysis Meter

JDSU

Designed for your business

- **All-in-one tester incorporating state-of-the-art DSP and DOCSIS® technologies to test cable modem service, digital video, analog video, and VoIP (optional)**
- **Addresses the demands of IP testing with TruPacket™ suite of IP tests, both over RF and Ethernet interfaces**
- **Rugged, lightweight design can withstand rain, cold, heat, hits, drops, and other accidental mishaps**
- **Wide range of configurations available to cover the fundamental needs of installers or fulfillment technicians (DSAM-2000), through the troubleshooting needs of service technicians (DSAM-2300 or DSAM-3300), and to the advanced performance testing needs of the network maintenance technicians (DSAM-3300 and -6300)**
- **Optional PC software platform provides advanced tool to manage test activities, maintain an accurate inventory of DSAM meters, and baseline performance of network and technician/contractor performance**

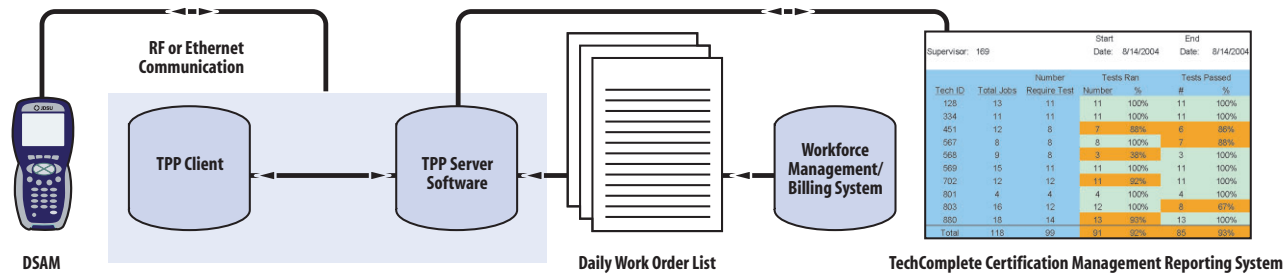
Simply being able to test complete digital and internet protocol (IP) services is not enough in today's market. You need test equipment that empowers your field workforce, improving productivity, efficiency, and customer satisfaction. Customers demand the highest levels of service and support. Service providers must deploy services quicker and ensure quality installations the first time, every time.

The digital services analysis meter (DSAM) incorporates state-of-the-art digital signal processing (DSP) and data-over-cable service interface specification (DOCSIS®) technologies to test cable modem services, digital video, analog video, and VoIP. With just one meter you can test virtually all of your services. There is no need for multiple meters or to change test equipment—even with voice over IP (VoIP) services.

With the DSAM-2000 technicians can certify homes are cable modem ready during routine installations, assuring customer self-installations of high-speed data (HSD) to be more reliable, thereby reducing future service calls. Service technicians can use the DSAM-3300 to troubleshoot, find, and fix network and service problems. Network maintenance and sweep technicians can use the DSAM-6300 to perform both forward and reverse sweep performance tests as well as support troubled installation jobs with advanced digital and DOCSIS capabilities on the same meter. Test results can be archived at the test site over the DOCSIS connection to a centrally located and security administrated server. This server can be accessed with a standard Web browser.

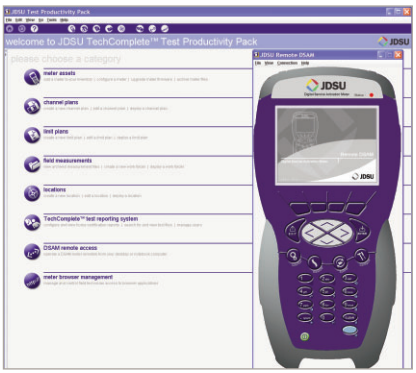
The automated test capability of the DSAM can be custom configured and protected by administrators to assure specific tests are conducted the same way by all technicians. Results of the test may be saved for further analysis and archiving on a personal computer (PC). Upgrading the meter can be as simple as downloading a file from the Web. Designed for use in conditions that your field workforce will encounter, the DSAM meters are rugged, reliable, and ready to use by even less skilled technicians. Reduce repeat calls by finding and fixing the problems the first time. Whether the problem is at the home or in the network, the DSAM can perform the tests needed to help identify and correct the problem, thus eliminating the need for future calls.

TechComplete Home Certification Testing Solution



Typical workforce management process

Solutions that improve your bottom line



TPP software lets supervisors easily configure, update, and upgrade DSAM meters in the field. It also enables more knowledgeable techs to remotely control a DSAM in the field with the Remote DSAM feature of the TPP.

Synchronization of test files from the field and updated channel plans from test administration can be performed with optional Field Data Management (FDM) software over Ethernet or DOCSIS RF.

Advanced Productivity Functions

Achieve large productivity gains and make the jobs of managers and technicians easier and more efficient with the unique functions of the DSAM and available software.

Enhanced Management of Field Testing

With TechComplete™ Test Productivity Pack (TPP), a next-generation PC software platform, field service supervisors and managers have an advanced tool to manage testing activities, maintain an accurate inventory of DSAMs, and baseline performance of network and technician/contractor performance. It even provides the ability to tie into back office systems with third-party vendor applications.

Remote RF Synchronization

The DSAM can save technicians 30 to 45 minutes of time every day with its unique Remote RF Synchronization function. This feature allows technicians to synchronize data both ways with the TPP central server software over the RF plant via a DOCSIS channel. Channel plans and pass/fail limit plans for the DSAM can be configured and stored in the TPP software program.

With just one push of the synchronize function on the meter, all channel plans, limit plans, and test data are synchronized with the TPP server with little effort by field technicians. Technicians do not need to physically go to a single PC to synchronize their meters. Alternatively, any local area network (LAN) connection on the network can be used when the Ethernet jack on the DSAM is selected for the synchronization process. The DSAM makes it practical for a large number of technicians to effectively upload test results at the end of the day, every day, or even after every job.

Meter Asset Manager

Monitor meters at a glance with the Meter Asset Manager function of the TPP software. Quickly determine:

– How many and what version of meters they have in inventory
– Which meters in the field have the correct test setups and firmware
– Which technicians routinely synchronize their data with the TPP server (and which ones do not!)

TPP software provides a simplified way to configure test setups for your DSAM meters. When channel lineups are changed, supervisors can ensure all instruments are updated with the new channel plan quickly and ensure the correct autotest is used with the latest limit plan.

Solutions that improve your bottom line

Improved Reporting

The unique synchronization process and structure of the TPP also serves as a central repository for managing all of the valuable test data gathered in the field. Traditionally underutilized because of its difficulty to retrieve and store, test data, including sweep files, is easily maintained and retrieved. Retrieval is accomplished with the synch process from the instruments or by access with a standard browser to the Web interface of the TPP database. The robust database and unique file structure of the TPP maintains all the test data in a single database that can be easily mined for value-added reports.

Rugged and Reliable

JDSU understands work environments and the need for rugged test equipment. The DSAM is built to withstand a 4-foot drop on all sides, and it can withstand 75-mph, wind-driven rain at up to 4 inches of rain over a 1-hour period. What does this mean? Technicians love to use the DSAM. With its lightweight design and ergonomic body, technicians prefer to use the DSAM to other meters. Easy to understand and learn using an onboard help system, technicians can quickly use the DSAM with minimal training.

Designed for your technicians

The DSAM family of meters is scaled to provide just the right collection of test tools needed for technicians to do their jobs. The DSAM-2000 provides installation technicians with a basic service level management (SLM) that has both analog and digital capabilities. Analog video and audio levels as well as carrier-to-noise (C/N) measurements are included, as well as digital average power level, modulation error rate (MER), and pre- and post-FEC (forward error correction) bit error rate (BER) for digital quadrature amplitude modulation (QAM) carriers. DOCSIS connectivity can be confirmed with a simple range and registration test that includes upstream transmit level margin. Measurements may be configured into an autotest plan, which requires just two button pushes for the technician to perform the same pass/fail test, the same way, at any location, using the latest channel plan and autotest administered to all meters by the TPP server.

Service organizations can perform the same measurements with the DSAM-2300 and go further by troubleshooting DOCSIS connection and provisioning issues. With the DSAM-3300, Ethernet testing is included as well as full downstream spectrum mode and a constellation view of QAM carriers. FEC BER and errored seconds and severely errored seconds measurements are made on deep interleave 256 QAM carriers with all DSAM-2000, -2300, -3300, and -6300 models.

Maintenance organizations now welcome the DSAM-6300, which combines all the DSAM functions with the forward and return path Stealth Sweep™ technology (Patent No. 5585842) used in the JDSU Stealth Digital Analyzer (SDA) products.

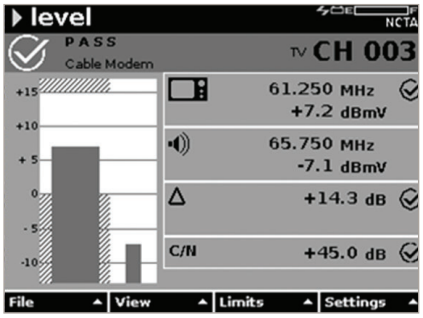
Because it uses the powerful Stealth Sweep technology, the DSAM-6300 can be used with existing SDA rack-mounted sweep gear, SDA-5500, and SDA-5510 located at headend and hub sites. Additionally, the DSAM-6000 meters can sweep side by side with SDA-5000 meters. Major network modifications are not required.

DSAM Detailed Feature Matrix

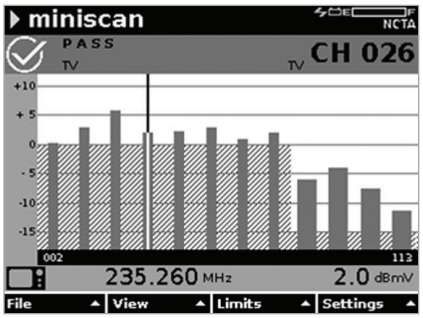
	Feature	DSAM-2000	DSAM-2300	DSAM-3300	DSAM-6300
Analog and Digital Carrier Level Verification	Analog video and audio power levels	X	X	X	X
	Digital power level	X	X	X	X
	Tilt (1 to 12 channels)	X	X	X	X
	Mini-scan (1 to 12 channels)	X	X	X	X
	Full-scan (1 to 999 channels)	X	X	X	X
	Analog carrier-to-noise	X	X	X	X
	Hum	X	X	X	X
	SmartScan™	Option	Option	X	X
	Spectrum Analyzer with Auto Pre-Amp	Option	Option	X	X
Digital Carrier Quality (QAM Carriers)	MER/EVM measurements	X	X	X	X
	Pre- and post-FEC BER (64, 128, 256)	X	X	X	X
	BER for Deep Interleave (128,4 or 128,5)	X	X	X	X
	Constellation (64, 128, 256)	Option	Option	X	X
	Digital Quality Index™ (DQI)	Option	X	X	X
	AGC Stress	Option	X	X	X
	Errored/severely errored seconds	Option	X	X	X
	QAM Ingress	HW Option	HW Option	HW Option	SW Option
Upstream Physical Verification	Return Loopback (requires QAM Ingress Option)	Option	Option	Option	X
	Local upstream spectrum for ingress check	X	X	X	X
	Return QAM Generator	Option	Option	X	X
	Spectrum Analyzer w/Auto Pre-Amp	Option	Option	X	X
	Field View of the PathTrak Return Spectrum	Option	Option	Option	Option
DOCSIS®/ EuroDocsis™ Testing	DOCSIS 2.0/1.1/1.0 testing 1 Downstream x 1 Upstream	X	X	X	X
	DOCSIS 3.0 Bonded Carrier testing 8 Downstream x 4 Upstream	SW Option	SW Option	SW Option	SW Option
	Downstream MER/EVM, Pre- and Post-FEC BER	X	X	X	X
	Dynamic DOCSIS Range and Registration	X	X	X	X
	Cable modem configuration file verification	X	X	X	X
	Upstream channel selection	X	X	X	X
	Upstream transmit level and headroom	X	X	X	X
	Cable modem and CPE MAC cloning	X	X	X	X
	CableLabs® issued certificates	X	X	X	X
DOCSIS/ EuroDocsis Service Tests	Packet Loss	X	X	X	X
	Throughput - Upstream and Downstream (Up to DOCSIS 3.0 rates)	Option	X	X	X
	Ping	Option	X	X	X
	VoIPCheck - Voice over IP testing (MOS, Packet Loss, Jitter, Delay)	Option	Option	Option	Option
Basic Ethernet Testing	Throughput - (DOCSIS 2.0 rates)	Option	Option	X	X
	Packet Loss	Option	Option	X	X
	Ping	Option	Option	X	X
	View CM diagnostics page	X	X	X	X
Gigabit Ethernet Testing	Throughput - (DOCSIS 3.0 rates)	Option	Option	Option	Option
	Packet Loss	Option	Option	Option	Option
	Ping	Option	Option	Option	Option
	Gig-E testing - DOCSIS 3.0 Support up to 400 Mb/s down	Option	Option	Option	Option
RF Network Verification	Forward Sweepless Sweep™	Option	Option	Option	X
	Reverse Alignment				X
	Forward (Downstream) Sweep				Option
	Reverse (Upstream) Sweep				Option
	Return Loopback (requires QAM Ingress Option)	Option	Option	Option	X
HFC Network Verification	Scheduled Autotest	X	X	X	X
	Proof Test	X	X	X	X
Home Network Verification	IP Tests via 10/100/1000 Ethernet jack	Option	Option	X	X
	Ingress Resistance Test (IRT)	X	X	X	X
	Fault Location using FDR feature in LST-1700 remote transmitter	X	X	X	X
	Test Point Compensation	X	X	X	X
Autotest	Home Certification	Option	Option	Option	Option
	Video Autotest	X	X	X	X
	Cable Modem Autotest	X	X	X	X
	Combination Autotest (Video and Cable Modem)	X	X	X	X
	Proof of Performance (Scheduled autotest)	X	X	X	X
	Web Browser	Option	Option	Option	Option
Miscellaneous	RF or Ethernet synchronization with TPP	X	X	X	X
	Secure Sync™ - RF Synchronization through firewalls	X	X	X	X

Features

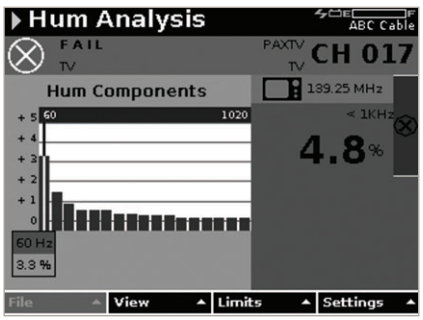
Refer to the DSAM Features Matrix on page 5 for feature inclusion on specific models.



Level mode on an analog channel displays video and audio signal levels and their delta value. Carrier-to-Noise (C/N) ratio is also displayed.



Miniscan measures signal strength of up to 12 channels simultaneously.



Undesired electrical interference can appear on a video channel as one or two horizontal bars on the TV. A hum measurement reveals if any electrical interference is present on the tested channel.

Signal Level Meter

The DSAM family supports traditional SLM test functions for analog video and audio levels as well as the extremely accurate JDSU digiCheck™ digital power level measurements. Furthermore, the ability to measure carrier-to-noise on analog carriers comes standard. Also included are MER and pre- and post-FEC BER as well as errored seconds/severely errored seconds on 64/256 QAM digital video and DOCSIS carriers. These tests allow allowing technicians to validate that digital services are received and have adequate margin and quality specifications. This includes deep interleave modulation (j=128, i=5) on all new DSAM models 2000, 2300, 3300, and 6300. The DSAM can analyze downstream carriers to a full 1 GHz.

Miniscan and Full Scan Modes

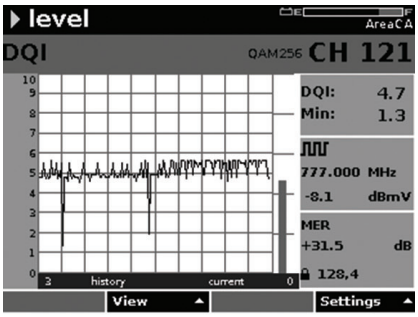
When measuring analog and digital as well as DOCSIS signals, technicians can see high- and low-frequency channels and verify how much level headroom remains when limits are activated. In miniscan mode, the DSAM can monitor up to 12 channels at a time. In full scan mode, the DSAM can monitor the entire channel plan, up to 999 channels. The results of both scans are displayed either as an easy-to-see bar graph or in an informative table.

Tilt Mode

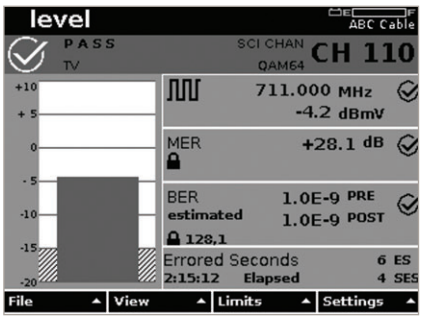
Tilt mode is used to check the forward tilt of the channel levels at the low and high ends of the frequency spectrum. The variances of the levels, which are displayed at the bottom of the DSAM screen, indicate distortion of the frequency spectrum. Based on these results, technicians know which equalizer pad to select that will provide optimum flatness at the end of the line.

Hum Analysis Mode

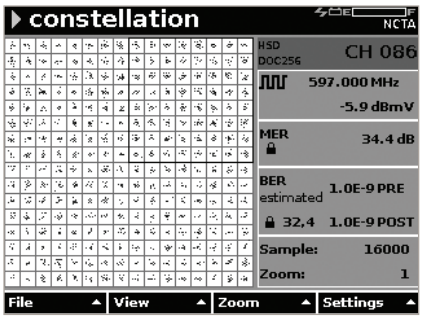
A hum measurement may be performed on a non-scrambled analog channel. The instrument is battery powered, thus the measurement is independent of ground loops and, therefore, is isolated from the line (mains). Severe hum is revealed on a TV as either single (60/50 Hz) or double (120/100 Hz) horizontal bars across the video screen. The hum display indicates the composite level of all frequency components below 1000 Hz as well as the fundamental hum frequency. The lower levels of adjacent frequencies as well as the fundamental are displayed across a frequency graph. This display is valuable in determining the source of hum generation by displaying a telltale signature of the hum generating source (patent pending).



DQI will display intermittent, short duration impairments missed by MER and BER as well as steady state issues typically captured by MER and BER.



The Level mode on a digital channel measures the signal level and MER, and tracks the channel's BER and errored seconds.



A Constellation graph shows impairments on the network with patterns in the display. By identifying the pattern, technicians can determine the probable cause of the impairment.

Digital Quality Index™

DQI is an indicator of the overall health of a QAM stream. This measurement does a great job tracking intermittent problems and is unique only to JDSU. It is represented by an easy to understand Index rating from 1 to 10, with 10 being the highest quality. The advanced algorithm of the DQI provides the sensitivity needed to quickly and easily catch and isolate problems in the RF domain that are affecting HDTV and HSD services. DQI also catches errors sometimes missed by traditional measurements. It also displays a 90-second graphical history making it easy to identify intermittent problems.

Bit Error Rate Measurement

BER helps to quickly detect impulse changes in the system by revealing when information is lost or corrupted at the bit layer. The DSAM measures BER by tracking the number of errored bits that are seen before FEC, known as pre-BER, and the number of bits that cannot be fixed by FEC, known as post-BER.

Errored Seconds and Severely Errored Seconds Measurement

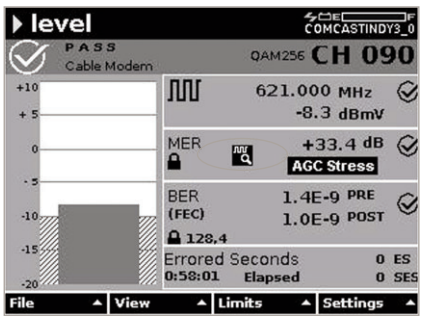
For troubleshooting connections that are suspected of intermittent bit errors, technicians can use the DSAM to capture errors that have occurred over a period of time. If an error has occurred during any second of elapsed time, the number in the errored seconds field increments by one. One error or multiple errors in the same second is counted as one errored second. If more than 1 bit in 1 million received bits has errors occurring in the same second, the severely errored second register increments by one. The errored seconds fields are conveniently included in the standard digital level display.

Constellation Mode

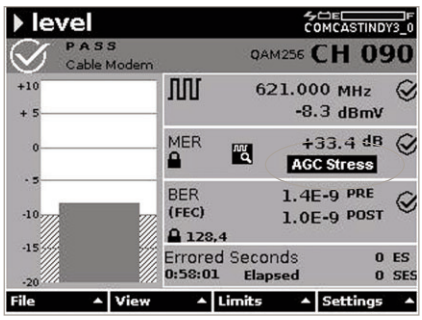
Various elements within a network can compromise digital video quality. The DSAM constellation mode displays patterns of data points on a graph. Technicians can then easily interpret, detect, and quickly diagnose the source of digital video problems.

Modulation Error Ratio Measurement

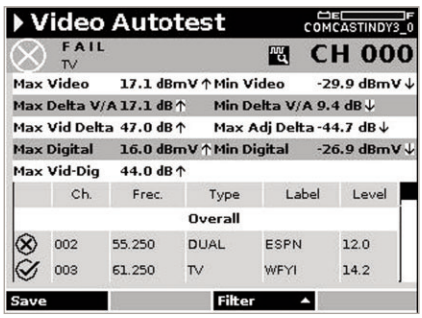
MER is the earliest indication of transmission quality degradation resulting from noise, ingress, and composite distortions. An expression of signal-to-noise (S/N) ratio plus all other non-transient distortion signals, MER also shows phase and amplitude distortions that may have been passed from the headend. MER is the best overall quality measurement that can be performed on a digital QAM carrier. JDSU has perfected this valuable measurement by optimizing both custom hardware and proprietary software algorithms (Patent Nos. 6061393, 6233274, 6278730, and 6385237). The result is accurate readings that far exceed those reported from customer premises equipment such as digital settops.



Toggle the QAM measurements of the DSAM between Sensitive and Normal Mode to help analyze the true quality of the carriers or to behave more like the CPE.



An AGC stress icon appears on the screen when the AGC circuitry of an amplifier acts up and may potentially cause problems with the digital carriers.



The dB Delta Limit illuminates when excessive differences occur between carriers that may overdrive the CPE tuner and cause service issues.

QAM Sensitivity Setting

Not all CPE functions equally to the same standards and this is exactly why the QAM sensitivity setting was developed. It provides a new high-sensitivity digital setting to shows errors that occur on the customer's cable equipment, such as a set-top box, which will help technicians track CPE-reported MER/BER issues in the network. The DSAM has a normal mode to determine the standard RF network performance. The DSAM will also have a normal mode which determines the standard RF network performance. The high-sensitivity setting turns off various digital processing technologies that correct various impairments found on the network, thus revealing distribution issues normally corrected. The configuration setting is global across all measurement modes that display MER and/or BER, including DOCSIS mode.

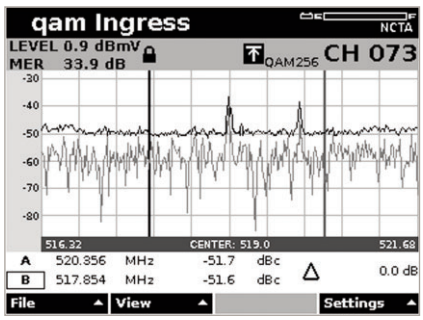
Automatic Gain Control (AGC) Stress Indicator

The AGC stress indicator provides notification of AGC problems on digital channels revealing the existence of rapidly varying AGC levels, which can cause CPE problems such as tiling, blocking, freezing, slow cable modem throughput, and/or packet loss. AGC separates problems to the network amplifiers from problems at the home. The AGC stress indicator is viewable in the Digital Level AutoTest and it will be present in the overall results section.

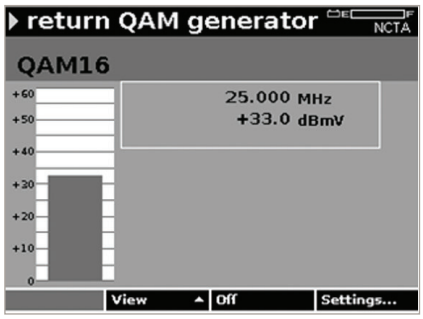
dB Delta (Intermodulation Limit)

The db Delta compares carrier level values from the highest analog to the lowest digital levels to determine maximum differential in the network. This comparison provides an early indication of potential intermodulation distortion caused by largely different carrier levels overdriving a CPE's tuner, which may result in tiling, blocking, or packet loss to the CPE. Root causes may be excessive tilt and/or cable loss or excessive power on a given channel. This calculation is integrated into the Video AutoTest and Home Certification results display.

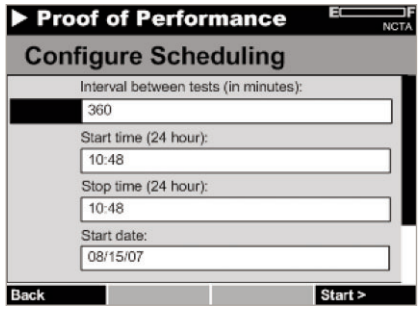
The DSAM can also counteract dB Delta situations and still provide accurate measurements. Set the DSAM for normal, medium, or high dB Delta conditions as needed to minimize overdriving and allow proper measurements.



The QAM Ingress test allows the technician to see the underlying activity of a live digital carrier, which is usually not viewable due to the presence of the "haystack".



The Return QAM Generator enables operators to test and prove upstream network performance.



QAM Ingress Mode

Detecting the presence of ingress within the digital tier of carriers on the downstream path is nearly impossible without turning off the service. The tightly spaced QAM carriers hide any visual presence of unwanted forward ingress such as composite second order (CSO) and composite triple beat (CTB). An MER test will indicate that an issue exists, but with the patented JDSU QAM Ingress mode, the technician can inspect what is actually going on beneath the digital "haystack", while service remains in tact (Patent No. 6385237). The hardware and/or software option available for QAM ingress can be ordered for DSAM models 2000, 2300, 3300, and 6300.

Return QAM Generator

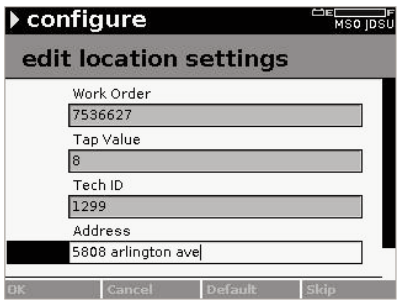
Standard on the DSAM-3300 and -6300, the Return QAM Generator is a mobile 16 and 64 QAM transmitter. The ability to transmit a QAM-16 or -64 modulated signal back to the headend is helpful for proving line capabilities for future data and voice channels and for troubleshooting return path issues in the network. This option can be used with the PathTrak™ RPM-3000 to identify network problems and distortions.

AutoTest Measurements

The DSAM provides a one-button autotest measurement that lets technicians quickly and automatically check combinations of key analog, digital, and/or DOCSIS network parameters. AutoTest may be configured with key autotest measurements including pre- and post-FEC BER, C/N, adjacent channel, hum, dB Delta (intermodulation limit), AGC stress indicator, and the FCC 24-hour Proof of Performance (PoP) AutoTest.

All but adjacent channel information and hum is user enabled per channel. Hum is enabled per channel in TPP software and adjacent channel information is calculated on all tests. AutoTests may also be scheduled over time. Each channel plan requires its own autotest configuration.

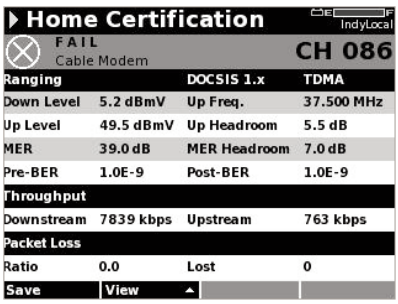
Scheduled tests default to the 6 hour FCC PoP interval, but the interval can be changed to fit the technicians needs. Scheduled tests at regular intervals (e.g. 15 minutes) can be used to identify disturbances that change based on time of day. Tests results are automatically saved into a new user-labeled work folder.



Critical information can be attached to each file to simplify sorting of reports using custom location templates

Location Files

Having a record of where test measurements were taken is important to field technicians. Location files provide the ability to attach critical information to saved files for easy sorting and reporting. The fields are input when prompted during the measurement file save process. Information such as work order number, area, amp ID, and power configuration can be appended. A single location file per meter will be applied to all saved measurement files. The location categories can be custom edited and deployed using the TPP software.

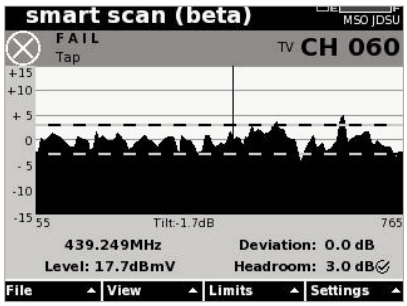


Home Certification option can provide consistent test methods for all technicians to help improve overall service quality

Comprehensive Analog and Digital Testing on the Forward Path

The DSAM architecture incorporates analog and digital testing into a single user interface. This interface allows technicians to select a specific channel or a scan of channels without having to differentiate between analog or digital video, DOCSIS high-speed data, or voice. The active channel plan functions as a meter configuration file as well as a channel lineup. An extensive selection of configuration elements establishes the type of tests that can be performed on a particular channel for each channel in the plan.

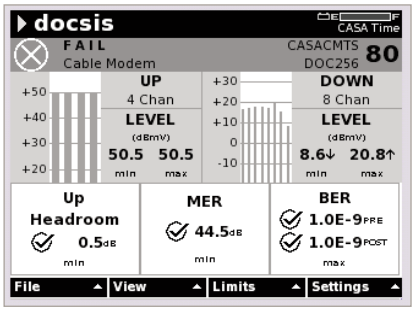
Also inherent within a given channel plan are autotest configurations for analog, digital, and DOCSIS services. Most configurations can be entered into the meter directly or through the JDSU TPP client/server application software. Accessed via a PC, TPP manages channel plans and measurement files for a collection of DSAM meters. Networks with a history of multiple ownerships and diverse hardware architectures are not a problem for the DSAM. Supervisors can create multiple channel plans for a specified group of meters or one channel plan for the whole network. The channel plans can be deployed with plan parameters locked when needed. Specific plans are easily selected from Configure mode or, in many cases, directly from within Measurement mode. After selecting an active plan, technicians can check the top of the measurement screen to confirm that it is the correct plan. The channel plan name is included in saved measurement files for reference. Using the channel plan to configure an autotest, multiple tests can be run quickly, with only two button presses.



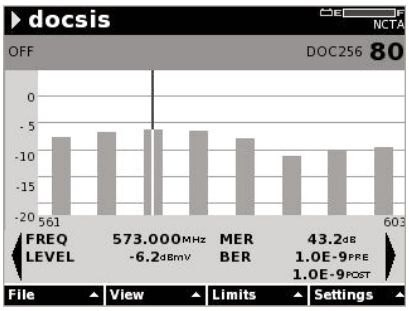
SmartScan provides a simple view to help locate RF issues between the tap and CPE.

SmartScan™

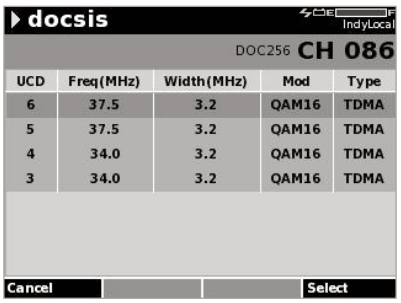
Identifying RF and frequency response issues at the tap can often be difficult for service or fulfillment technicians due to the large differences in acceptable tilt and varying design power levels. SmartScan helps technicians find issues at the tap by providing a simple normalized view that identifies peak-to-valley and tilt issues. The patent pending technology of the SmartScan provides a simple graphical view that helps eliminate technician interpretation and highlights RF response issues by automatically calculating and compensating for tilt and varying channel types. New SmartScan peak-to-valley and tilt limits are added on top of the existing power level limits to aid technicians in identifying and escalating problems from the tap or drop. SmartScan is presently a trial feature that will be optional and may not be available on all models.



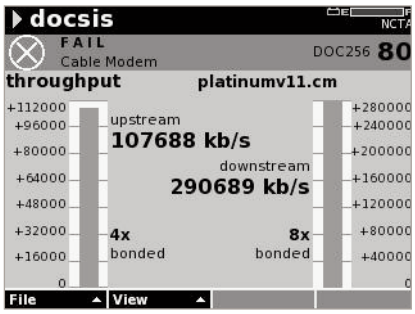
DOCSIS 3.0 summary screen highlights overall performance and identifies worst performance across 8 downstreams and 4 upstreams.



DOCSIS 3.0 graphical views provide details on individual bonded channels.



To help troubleshoot problems when multiple upstream carriers are present, the user can select a which upstream channel the DSAM should use.



DOCSIS 3.0 throughput testing validates bonded performance of up to 8 downstreams and 4 upstreams.

DOCSIS Service Testing

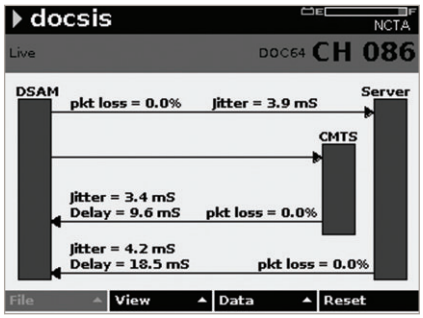
The DSAM has a built-in DOCSIS 3.0-ready cable modem capable of performing quick and accurate DOCSIS RF and IP testing. Technicians can use the DSAM to test existing DOCSIS 1.X and 2.0 system performance. With the DOCSIS 3.0 option, the DSAM can test a full DOCSIS 3.0 "gold" system complete with 8 bonded downstreams and 4 bonded upstreams.

Range and Registration

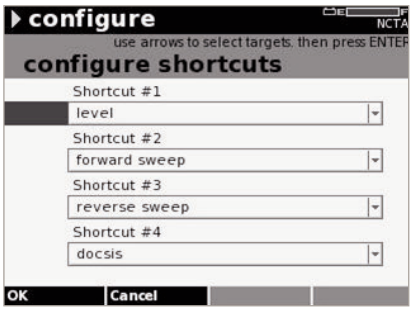
The DSAM can test range and register with the headend cable modem termination system (CMTS) to establish the required configuration parameters and obtain a valid IP address on the network. The DSAM's range and registration test verifies that a specific portion of the line can support high-speed data transmission. Range test results show how much margin remains before communications in both the up and downstreams will become disabled. Registration test results validate that the CMTS is distributing correct configuration files and IP addresses.

DOCSIS IP Test

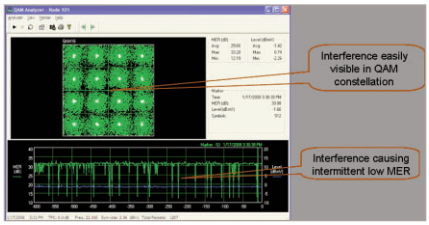
The DSAM performs IP tests, including packet loss, throughput, and ping, over the DOCSIS layer. The displayed results indicate problems that need to be located and fixed and those that should be reported as headend or IP troubles.



VoIPCheck is a voice quality verification test that runs over the DSAM's cable modem DOCSIS connection. It allows for segmentation between HFC and IP issues by showing which side of the CMTS data impairments are present.



The DSAM shortcuts can be custom configured to access the technicians most used functions.



PathTrak with RPM-3000 can be used in conjunction with the DSAM to improve upstream carrier health

VoIPCheck Option

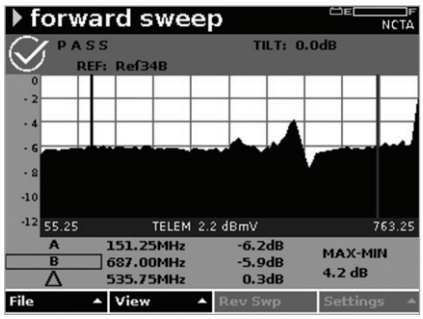
With VoIPCheck, the DSAM can test VoIP services independent of the VoIP specification being used. VoIPCheck can segment RF issues from IP issues, helping to eliminate organizational finger pointing. Packet statistics, including packet loss, jitter, and delay, as well as call-quality results such as R-value and mean opinion score (MOS), are displayed on the screen. With its in-depth results analysis capability, the DSAM can determine the source of call-quality problems, expediting the troubleshooting process.

Forward and Return Path Testing and Maintenance

A cable plant is a two-way path of information that enables communication between equipment. As a vital link between the CPE and the CMTS, the return path must be aligned and kept free of ingress and noise. With more digital services on the forward path, limiting noise and ingress becomes even more important because their effects may not be noticed until service has significantly degraded. The DSAM-6000 has an option to include the exclusive JDSU Stealth Sweep technology to test and maintain both the downstream forward path and upstream return path. This technology was first introduced to the market with the popular 3ST/3SR and SDA meters. Now the DSAM includes the same patented technology (Patent Nos. 5585842, 5867206, 6160991, 6278485, and 6961370). Its ability to sweep, along with conducting signal level and quality measurements, ingress testing, verifying forward path signals, and testing the level of ingress and noise, provide the optimal approach to maintaining both the return and forward path.

Sweepless Sweep® Mode

The JDSU Sweepless Sweep mode provides an economical solution for service technicians to check forward path alignment and identify frequency response issues. This mode scans the entire forward spectrum, displaying all levels across all frequencies (as defined by meter configuration). Technicians can adjust the reception of the node amplifier with this scan and then normalize the display by saving a reference. The resultant display is a flat zero level trace. Moving the measurement point to the output of the RF amplifier displays any changes due to the amplifier as a deviation (delta) from the reference display. The same reference is used as technicians move down the cascade, thus providing a simple tool to align succeeding amplifiers and compensating for the effects of each cable segment. The Forward Sweep Option should be considered to isolate the effects of headend changes in levels and to provide a more accurate and continually referenced sweep. Sweepless Sweep is also useful to align portions of the spectrum where there are no active carriers to reference or insert.



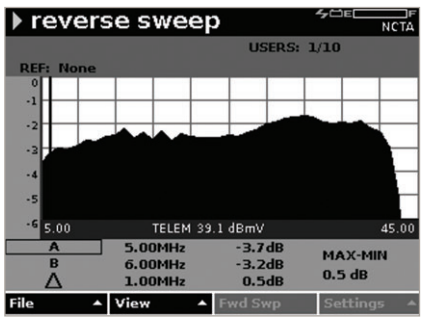
Forward sweep on the DSAM-6000 uses a unique referencing method to accurately reveal problems in the system without interfering with the analog or digital carriers.

Forward Sweep Option

During a forward sweep, existing video carriers (analog, digital, or scrambled) are continuously referenced at the headend or hub site source, eliminating any possibility of interference to the subscriber services.

The DSAM-6300 offers fast forward sweep capabilities, especially in systems with numerous digital channels. By referencing the active QAM signal types at the headend with the SDA-5500, the DSAM-6300 field unit removes concerns about subscriber interference and prevents sweep carriers from being injected into the carrier. Referencing active carriers, instead of transmitting sweep signals over active carriers, allows the DSAM-6000 to sweep without degrading service quality. Continuously referenced sweep provides a more stable and accurate measurement by minimizing the effects of headend level drift.

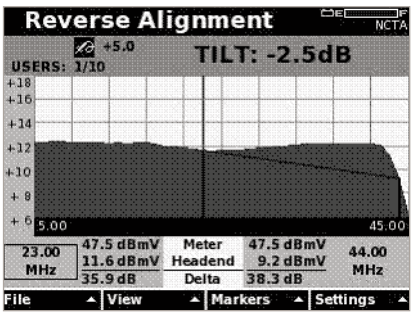
Where absent carriers exist, the SDA-5500 headend transceiver inserts a sweep point to fill vacant spectrum frequencies. This is extremely useful for construction and plant extensions up to 1 GHz.

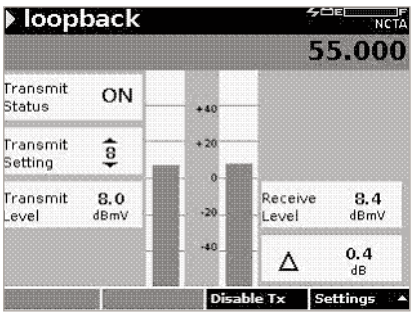


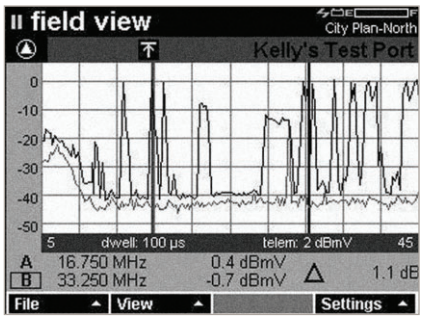
Forward sweep on the DSAM-6300 uses a unique referencing method to accurately reveal problems in the system without interfering with the analog or digital carriers.

Reverse Sweep Option

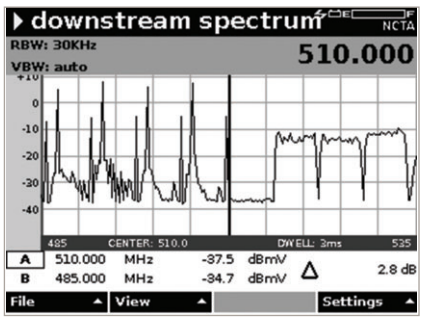
The return path can be problematic for two-way communications. It should be tended to as often or more than the forward path, and impairments promptly fixed. One of the best procedures to preserving a clean return path is with an active reverse sweep maintenance plan. The DSAM-6300 has a built-in reverse sweep transmitter, removing the need for externally generated carriers. A reverse sweep can uncover mismatch problems revealed as standing waves or diplex filter roll-offs that can severely hamper the quality of services in the reverse band.







The optional FieldView capability greatly improves the success rate and efficiency in determining ingress on the return path. Field technicians can view the return spectrum as received by the JDSU PathTrak Return Path Monitoring System and they can compare both the remote spectrum and the local spectrum view on the technician's meter.



Use the Downstream Spectrum to quickly look for missing video, audio, or digital channels. Visually check obvious impairments in the downstream or adjust center frequency, resolution bandwidth, and dwell time to look for ingress leaking back into the network.

Return Alignment

Return alignment provides sweep and maintenance technicians with a simple one-man solution to see the actual received levels at the SDA-5500 or SDA-5510. This capability is useful for validating the fiber node return alignment or gain as well as determining overall system loss.

Return Loopback

Return loopback provides technicians with a quick closed loop system that transmits a signal out the transmit port and receives and measures the level on the input port. Technicians can use this capability to check and pre-set the gain on a return amplifier or to validate the loss or performance of a passive device.

Headend Sweep Equipment

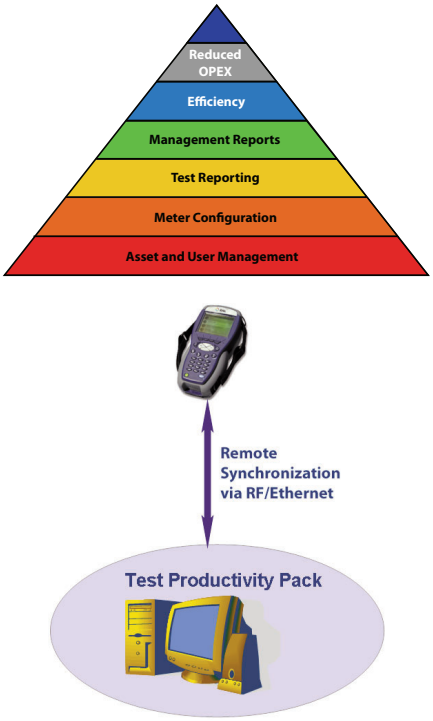
With the DSAM-6000, one person can perform forward (downstream) and reverse (upstream) path alignment simultaneously. For reverse testing with more than one field technician, the rack-mounted Model SDA-5510 Headend Reverse Sweep Manager can perform reverse sweep on the same cluster of nodes for up to 10 different technicians. The SDA-5500 transceiver used in conjunction with the SDA-5510 receiver provides a full forward and reverse sweep alignment solution. The SDA-5510 can also stand alone in remote hub sites for dedicated reverse alignment applications.

FieldView™ Option

FieldView provides the communication between JDSU PathTrak return path monitoring systems and field meters such as the DSAM. A JDSU HSM-1000 sends return spectrum measurements from PathTrak to the field meter, where the results are displayed on the DSAM's screen. Comparing local spectrum measurements to those from PathTrak helps field technicians quickly resolve return path ingress problems (Patent No. 6425132).

Enhanced Downstream Spectrum

Technicians must be able to view network behavior and troubleshoot whether channels have shifted, have missing carriers, or are experiencing in-channel frequency response problems. Because most technicians do not require a fully featured and expensive spectrum analyzer, the DSAM, with its enhanced downstream spectrum, provides technicians with an "everyday" spectrum analyzer. It lets users choose between two resolution bandwidths (RBW) settings, 330 kHz or 30 kHz, and modify the amount of time spent measuring each frequency step or dwell time of the analyzer, between 1 and 25 milliseconds. It also allows the user to see 4 MHz to 1 GHz, in 10 or 50 MHz steps, without switching test modes. Furthermore, if viewing the return path frequencies, technicians can turn on the internal low pass filter to eliminate noise caused by the higher frequencies, providing a clearer view upstream.



The Test Productivity Pack software promotes and provides consistent testing, flexible reporting, asset management, and improved efficiency.

TechComplete™ TPP

TechComplete TPP software contains the essential tools needed to efficiently process trouble tickets and manage test meter inventory and staff. A central database stores consolidated test data, limit plans, and channel plans, ensuring that the correct data is accessed and the right tests are performed. The client server architecture makes it easy for field technicians to access the data remotely, review it, and use it in the field as reference for troubleshooting. Even sweep results can be uploaded for later review to track the health of the network. Roadblocks to ensuring quality of service, such as accessing incorrect channel plans and limit plans, are eliminated, which significantly decreases the number of call backs and unnecessary truck rolls. Additionally, meters can be synchronized any time they are connected to the RF plant or an active Ethernet connection.

TechComplete also helps managers communicate with their field staff. Test results can be immediately reviewed and experienced technicians at the hub can coach less-experienced field staff remotely, enabling more effective use of time and resources.

JDSU Service Packages

To ensure the highest levels of support for DSAM purchasers, JDSU offers service packages designed to provide the foundation for maximizing the features and usage of DSAM equipment. Packages include the following:

- Extended warranty of up to 5 years
- Annual calibration, fully traceable to meet NIST standards
- Service ValuePaks that combine calibration and extended warranty into one economical package when accompanied with initial product purchase

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