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 PacketCable™ 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 the installer (DSAM-1500), through the trouble shooting needs of the service tech (DSAM-2500 through -3600), and to the advanced performance test needs of the network maintenance tech (DSAM-3600 and -6000)
- 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

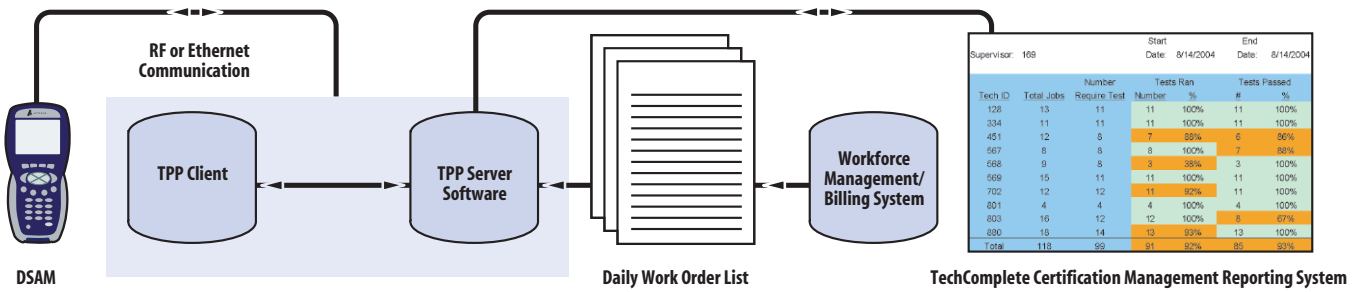
Simply being able to test complete digital and internet protocol (IP) services is not enough in today's market. You need test equipment that empowers your field work force, improving productivity, efficiency, and customer satisfaction. Customers demand the highest levels of service and support. Service 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 PacketCable 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-1500 technicians can certify homes are digital two-way ready during routine installations, assuring customer self-installations of high-speed data (HSD) to be more reliable, thereby reducing future service calls. Network maintenance technicians can use the DSAM-6000 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 radio frequency (RF) to a centrally located and security administrated server. This server can be accessed with a standard Web browser.

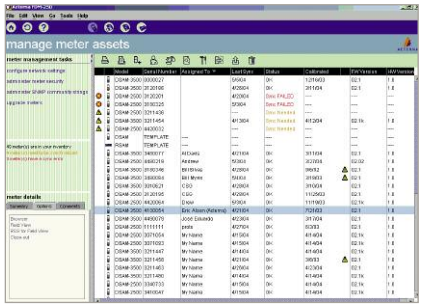
The DSAM's automated test capability can be custom configured and protected by an administrator to assure specific tests are conducted the same way by all technicians. Results of the test may be saved for further analysis and archiving on a personal computer (PC). Upgrading the meter can be as simple 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 the less skilled tech-nician. 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 work force 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 TPP's Remote DSAM feature.

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 DSAM's unique functions and available software.

Enhanced Management of Field Testing

With Tech Complete™ 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

Technicians can save 30 to 45 minutes of time every day with the DSAM's 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 the field technician. 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 TPP's unique synchronization process and structure 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 TPP's robust database and unique file structure 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-1500 provides the installation tech 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 two-way 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-2500 and -2600 and go further by troubleshooting DOCSIS connection and provisioning issues. With the DSAM-3500 or -3600, 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 the DSAM-2600, -3600, and -6000 models

Maintenance organizations now welcome the DSAM-6000. This model 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-6000 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.

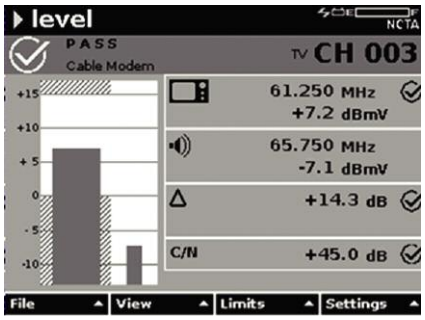
DSAM Detailed Feature Matrix

	Feature	Model			
		DSAM-1500	DSAM-2500/-2600	DSAM -3500/-3600	DSAM -6000
Secure Sync™	HTTPS communication to TPP server behind the firewall	X	X	X	X
Analog and Digital Carrier Level Verification *(C/N)* *24 Hour Auto Test*	Aural and visual levels	X	X	X	X
	Average 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
	Test point compensation	X	X	X	X
	One Key Video Autotest	X	X	X	X
	Hum [3]		X	X	X
	Downstream spectrum	Option	Option	X	X
Digital QAM Carrier Quality (64, 256)	Carrier Digital Quality Index™ (DQI) Score	Option	X	X	X
	QAM Sensitivity Setting	X	X	X	X
	AGC Stress Indicator	X	X	X	X
	dB Delta (Intermodulation Limit)	X	X	X	X
	Pre- and post-FEC BER (64, 128, 256)	X	X	X	X
	Constellation (64, 128, 256)	Option	Option	X	X
	Errored/severely errored seconds		X	X	X
	BER for Deep Interleave (128,4)		-2600 only	-3600 only	X
	QAM Ingress		-2600 only	-3600 only	X
Home Network Verification	IP tests via Ethernet jack			X	X
	Ingress Resistance Test (IRT)	X	X	X	X
	Fault Location using FDR feature in LST-1700 remote transmitter	X	X	X	X
Upstream Physical Verification	Upstream two-way connectivity and level test with margins (DOCSIS range results)	X	X	X	X
	Local upstream spectrum for ingress check	X	X	X	X
	Return QAM Generator (16 QAM upstream)	Option	Option	X	X
	Field View of headend upstream spectrum	Option	Option	Option	Option
DOCSIS/ EuroDocsis™ Cable Modem Service Verification over RF	DOCSIS downstream QAM performance (MER/EVM)	X	X	X	X
	Downstream pre- and post-FEC BER		X	X	X
	Dynamic DOCSIS range and registration		X	X	X
	Cable modem configuration file verification		X	X	X
	Internet access verification via Web access test		X	X	X
	Open Web browser [1]	Option	Option	Option	Option
	Cable modem and CPE MAC cloning		X	X	X
DOCSIS/ EuroDocsis IP Service Tests over RF	Roundtrip packet loss		X	X	X
	Specified US and DS packet loss		X	X	X
	Specified US and DS throughput		X	X	X
	Ping testing		X	X	X
	VoIPCheck DOCSIS VoIP verification		Option	Option	Option
	PacketCable VoIP testing [2]	Option	Option	Option	Option
PC Emulation over Ethernet	Web Access test using subscriber cable modem		X	X	X
	Open Web browser [1]	Option	Option	Option	Option
	View CM diagnostics page			X	X
RF Network Verification *Reverse Alignment*	Forward Sweepless Sweep			Option	X
	Reverse Alignment				X
	Forward (Downstream) Sweep				Option
	Reverse (Upstream) Sweep				Option
Other Available Options	Home Certification Testing	Option	Option	Option	Option
HFC Network Verification	Scheduled Autotest	X	X	X	X
	Proof Test	X	X	X	X

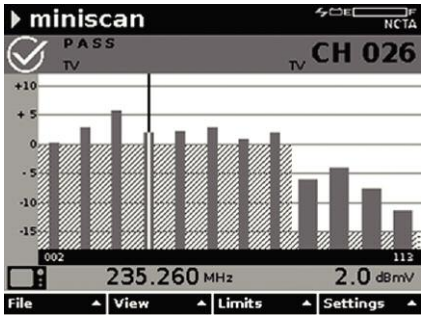
Notes:
(1) Function integrated with JDSU TPP Field Data Management Software, a client/server-based PC application software used to manage DSAM field meters and test data from a central location.
(2) VoIP available for North American PacketCable-based systems. Contact Local JDSU office for compatibility and availability for specific systems.
(3) C/N and Hum functional on all above models with new hardware as of v3.0 release.

Features

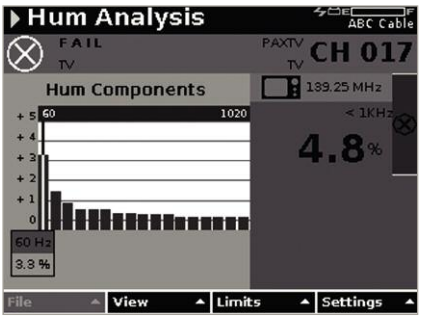
Refer to the DSAM Features Matrix on page 5 for feature inclusion on specific models.



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=4) on models 2600, 3600, and 6000. The DSAM can analyze downstream carriers to a full 1 GHz.

Miniscan and Full Scan Modes

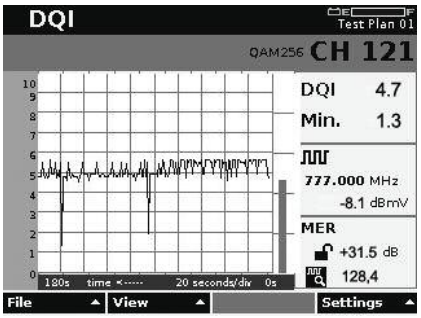
When measuring analog and digital as well as DOCSIS signals, technicians can see high- and low-frequency channels and verify how much level headroom remains when limits are activated. In miniscan mode, the DSAM can monitor up to 12 channels at a time. In full scan mode, the DSAM can monitor the entire 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

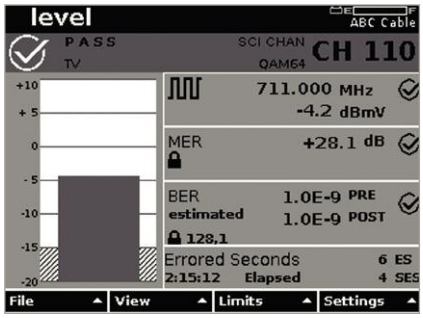
Tilt mode is used to check the forward tilt of the channel levels at the low and high ends of the frequency spectrum. The variances of the levels, which are displayed at the bottom of the DSAM screen, indicate distortion of the frequency spectrum. Based on these results, technicians know which equalizer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

Hum Analysis Mode

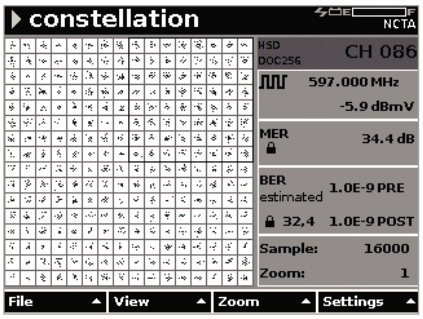
A hum measurement may be performed on a non-scrambled analog channel. The instrument is battery powered, thus the measurement is independent of ground loops and, therefore, is isolated from the line (mains). Severe hum is revealed on a TV as either single (60/50 Hz) or double (120/100 Hz) horizontal 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™ Mode

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. DQI also catches errors sometimes missed by BER and errored seconds measurements. It also displays a 90-second graphical history.

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

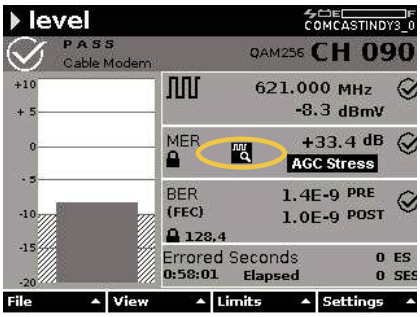
For troubleshooting connections that are suspected of intermittent bit errors, the technician can use the DSAM to capture errors that have occurred over a period of time. If an error has occurred during any second of elapsed time, the number in the errored seconds field increments by one. One error or 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. Deep interleave 256 QAM carriers require DSAM models 2600, 3600, or 6000 for measurement.

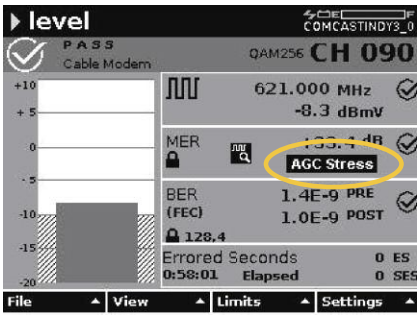
Constellation Mode

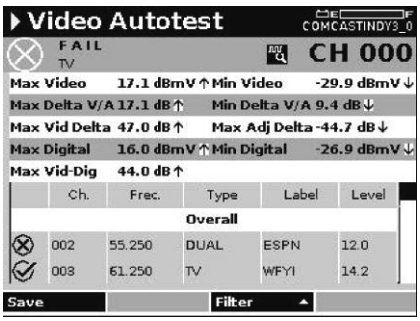
Various elements within a network can compromise digital video quality. The DSAM constellation mode displays patterns of data points on a graph. Technicians can then easily interpret, detect, and quickly diagnose the source of digital video problems.

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.







QAM Sensitivity Setting

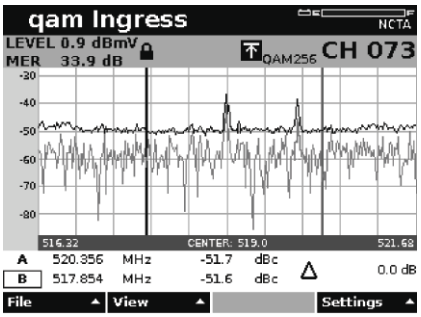
Not all CPE functions equally to the same standards and this is exactly why the QAM sensitivity setting was developed. It provides a new high-sensitivity digital setting to shows errors that occur on the customer's cable equipment, such as a set-top box, which will help technicians track CPE-reported 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

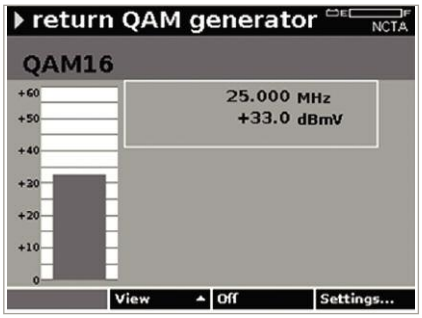
The AGC stress indicator provides notification of AGC problems on digital channels revealing the existence of rapidly varying AGC levels, which can cause CPE problems such as tiling, blocking, freezing, slow cable modem throughput, and/or packet loss. AGC separates problems to the network amplifiers 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)

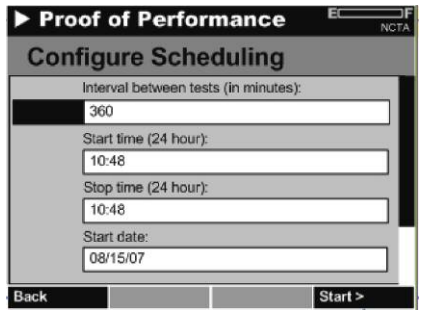
The db Delta compares carrier level values from the highest analog to the lowest digital levels to determine maximum differential in the network. This comparison provides an early indication of potential intermodulation distortion caused by largely different carrier levels overdriving a CPE's tuner, 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 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 eanables 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 constant scheduling offset (CSO) and cache transfer bus (CTB). An MER test will indicate that an issue exists, but with the patented JDSU QAM Ingress mode on DSAM models 2600, 3600, and 6000, the technician can inspect what is actually going on beneath the digital "haystack", while service remains in tact (Patent No. 6385237).

Return QAM Generator

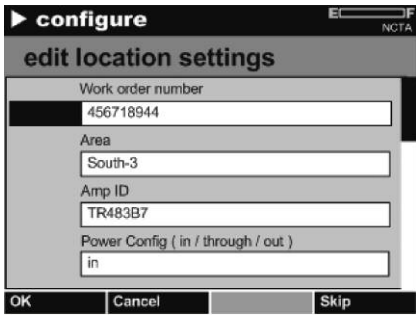
Standard on the DSAM-3500, -3600, and -6000, the Return QAM Generator is a mobile 16 QAM transmitter. The ability to transmit a QAM-16 modulated signal back to the headend is helpful for proving line capabilities for future data and voice channels and for troubleshooting return path issues in the network. A Continuous Wave (CW) mode may also be configured.

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.

The current focus is on the FCC 24-hour PoP test; however, tests may be scheduled in many ways to aid technicians in capturing intermittent events on the network. Tests results are automatically saved into a new user-labeled work folder.



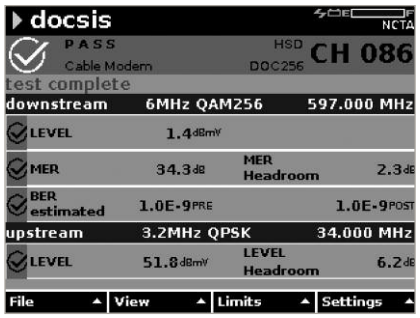
Location Files

Having a record of where test measurements where taken is important to field technicians. Location files provide such records and may be edited in the Configure mode or 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. Location files will be managed by a future TPP release.

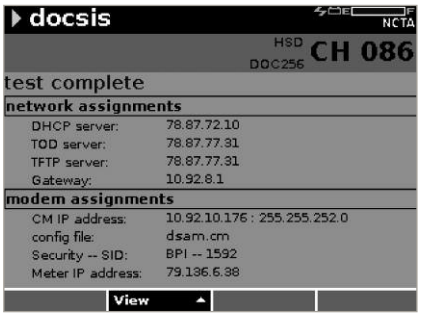
Comprehensive Analog and Digital Testing on the Forward Path

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.

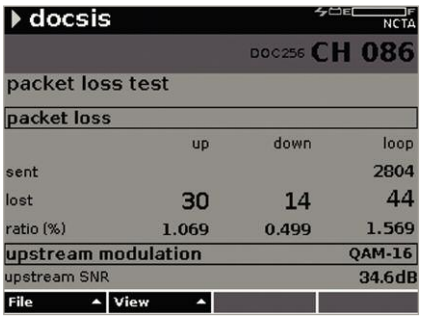
Also inherent within a given channel plan are autotest configurations for analog, digital, and DOCSIS services. Most configurations can be entered into the meter directly or through the JDSU TPP client/server application software. Accessed via a PC, TPP manages channel plans and measurement files for a collection of DSAM meters. Networks with a history of multiple owner-ships 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.



Using the range screen technicians are able to see what levels the DSAM's cable modem is reading and transmitting. This information allows technicians to see how close a customer's cable modem would be to failing.



DSAM models 2500 and higher provide complete network parameters for a DOCSIS registration, including configuration file served and service identifier number (SID). Network security configuration may also be accommodated within the meter's configuration.



A packet loss test shows how well the hybrid fiber-coax (HFC) transmits Real-Time Transport Protocol (RTP) data packets. Using TruPacket SNMP community strings the DSAM can view both the up and downstream packet losses separately as well as the signal-to-noise ratio the CMTS is receiving.

DOCSIS Service Testing

The DSAM has a built-in cable modem capable of performing quick and accurate DOCSIS RF and IP testing. This capability eliminates the need for a test modem to verify cable modem connectivity or a computer to test the customer premises equip-ment connection.

Range and Registration

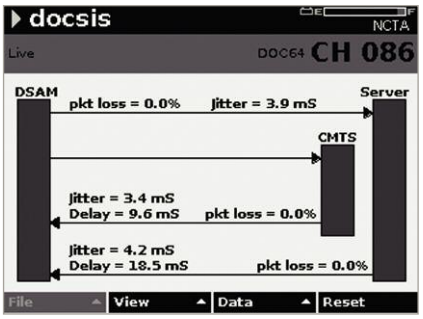
The DSAM can test range and register with the headend cable modem termination system (CMTS) to establish the required configuration parameters and obtain a valid IP address on the network. The DSAM's range and registration test verifies that a specific portion of the line can support high-speed data 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.

VoIP Testing

The DSAM offers two tiers of VoIP testing options and a range of VoIP troubleshooting tools. One VoIP test option enables the validation of services over a DOCSIS connection (VoIPCheck™ option). The other (TruVoice™ VoIP option) provides testing capabilities for networks that have deployed PacketCable™ VoIP.



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.

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.

TruVoice VoIP Option

The DSAM, with its built-in embedded multimedia terminal adapter(eMTA), can place calls as if they were from the CPE. This ability allows technicians to fully test the VoIP registration process and verify dial tones from the network. TruVoice™ VoIP Option enables the DSAM with eMTA to measure packet statistics (packet loss, delay, and jitter) and call quality (R-value and MOS) while on an active phone call, either placed or received. Listening to the call, the technician can listen for any noticeable problems and review the diagnostics displayed on the DSAM screen. Technicians can call any phone number on any system and measure call quality throughout the call's path to locate the problem source quickly and easily.

Forward and Return Path Testing and Maintenance

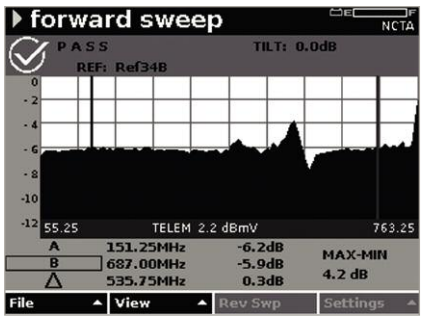
A cable plant is a two-way path of information that enables communication between equipment. As a vital link between the CPE and the CMTS, the return path must be aligned and kept free of ingress and noise. With more digital services on the forward path, limiting noise and ingress becomes even more important 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.

Applications

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

Sweepless Sweep® Mode

For fundamental alignment of the forward distribution network, the JDSU Sweepless Sweep mode provides an economical solution. 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 normalizes the display by saving a reference. The resultant display is a flat zero level trace. When the measurement point is moved to the output of the RF amplifier, any changes due to the amplifier will be displayed as a deviation (delta) from the reference display. The same reference is used as the technicians move down the cascade, thus providing an excellent tool to align succeeding amplifiers to compensate for the effects of each cable segment. The forward sweep option should be considered to isolate the effects of headend changes in levels, or to align portions of the spectrum where there are no active carriers to reference.



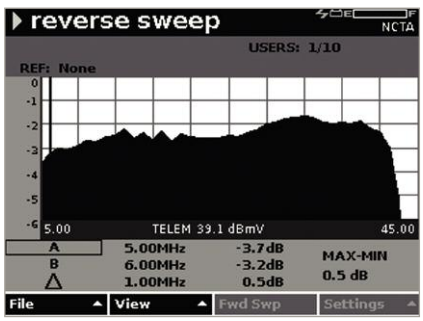
Forward sweep on the DSAM-6000 uses a unique referencing method to accurately reveal problems in the system without interfering with the analog or digital carriers.

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-6000 offers fast forward sweep capabilities, especially in systems with numerous digital channels. By referencing 64, 128, and 256 QAM signal types, the DSAM-6000 removes concerns about subscriber interference and prevents sweep carriers from being injected into the guard bands. Referencing active carriers, instead of transmitting sweep signals over active carriers, allows the DSAM-6000 to sweep without degrading service quality.

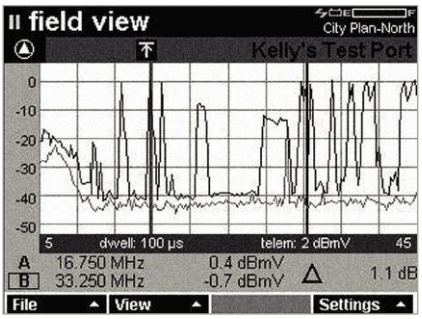
Where absent carriers exist, the SDA-5500 headend transceiver inserts a sweep point to fill vacant spectrum frequencies. To remove effects of headend level drift, this instrument monitors the levels and transmits new reference information with each sweep. If the signal levels change in the headend, the sweep response measurement remains unaffected.



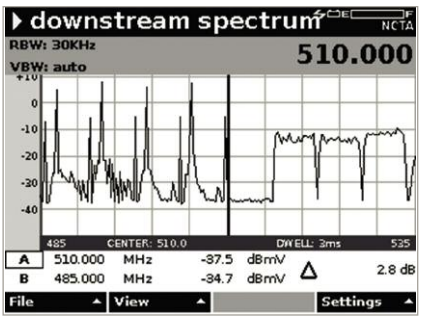
Tight reverse sweep points are set up in the sweep plan to better view the entire return path, which helps find mismatches or other problems as they head back to the headend or hub site.

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-6000 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.

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. By comparing local spectrum measurements to those from PathTrak, field technicians can 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.

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

Test & Measurement Regional Sales

NORTH AMERICA	LATIN AMERICA	ASIA PACIFIC	EMEA	www.jdsu.com/test
TOLL FREE: 1 866 228 3762 FAX: +1 301 353 9216	TEL: +1 954 688 5660 FAX: +1 954 345 4668	TEL: +852 2892 0990 FAX: +852 2892 0770	TEL: +49 7121 86 2222 FAX: +49 7121 86 1222	

10143252 506 0109 DSAMFAM.BR.CAB.TM.AE January 2009