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DSAM-6300

Digital Service Analysis Meter



Key Benefits

- Improve workforce efficiency by letting technicians perform complete maintenance and quality-verification tests on the spot— one person with one instrument— including sweep, digital video, analog video, DOCSIS®, VoIP tests, and more
- Streamline operations by managing and displaying sweep files via the web and by immediately synchronizing data over DOCSIS RF
- Minimize capital expenses—sweep is compatible with existing JDSU Stealth Sweep™ Systems, assuring non-interfering forward- and reverse-sweep operations
- Improve technician competency with the Digital Quality Index™ (DQI), an easy-to-understand, real-time indicator that shows up to 90 seconds of digital quality history
- Stand up to rain, cold, heat, bumps, drops, and other accidental mishaps with a rugged, lightweight design

Applications

- Non-invasive forward and reverse sweeping
- Comprehensive digital and analog video testing
- Full DOCSIS 3.0 performance testing: up to 8 downstream by 4 upstream bonded carriers
- Legacy testing – DOCSIS 1.X and 2.0
- QAM-carrier signal quality analysis and troubleshooting
- Return-path ingress troubleshooting
- Service-quality verification

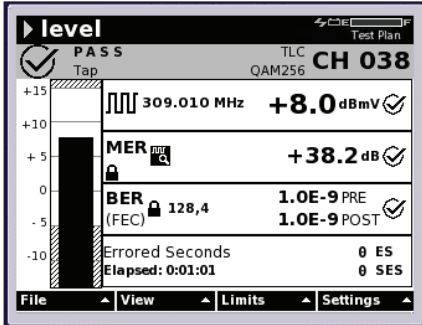
To achieve service-differentiating quality and reliability, network maintenance requires careful and consistent attention. While the broadband frequency response test in both the forward path (downstream) and the return path (upstream) is a core requirement of any cable network maintenance plan, maintaining cable networks requires more than sweep. The DSAM-6300 (Digital Services Analysis Meter) combines best-in-class video, audio, and data test functions with the extremely popular SDA sweep system's downstream forward path and upstream return path sweep functions in a rugged, multi-technology handheld that performs in the harshest environments.

Because it uses powerful Stealth Sweep technology, the DSAM-6300 works with existing Stealth Digital Analyzer (SDA) rack-mounted sweep gear (SDA-5500 and SDA-5510) located at headend and hub sites. Additionally, DSAM-6300 meters can sweep side-by-side with SDA-5000 meters. Therefore, major test infrastructure modifications are not required when DSAM-6300s are added to a department's meter pool.

Features

Signal Level Meter

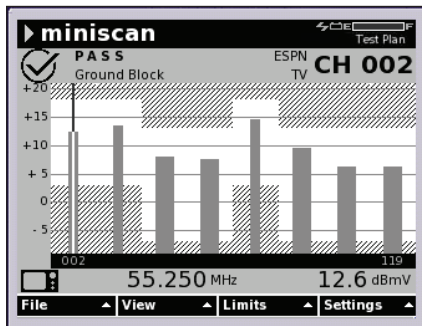
The DSAM-6300 features extremely accurate JDSU digiCheck™ digital power level measurements in addition to traditional Signal Level Measurement (SLM) test functions for analog video and audio levels. In addition to the standard analog carrier-to-noise (C/N) measurement, a quadrature amplitude modulation (QAM) ingress option enables viewing noise and ingress within the QAM signal spectrum. The DSAM-6300 can measure downstream carriers to a full 1 GHz and analyze 64, 128, and 256 QAM including deep interleave (i=128, j=4) modulation. Also included are modulation error ratio (MER) and pre- and post-FEC bit error rate (BER), margin, and quality specifications.



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

Miniscan and Full Scan Modes

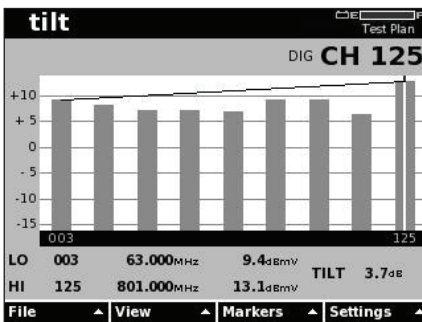
When measuring analog and digital signals, technicians can see high- and low-frequency channels and verify how much level headroom remains when limits are activated. In miniscan mode, the DSAM monitors up to 12 channels at a time and in full scan mode it monitors the entire channel plan—up to 999 channels.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



Miniscan measures signal strength of up to 12 channels simultaneously.

Tilt Mode

Part of the sweep procedure, tilt mode checks forward low- and high-frequency channel level tilt. Level variances display at the bottom of the DSAM-6300 screen, and a sampling of carrier levels throughout the spectrum provides a rough indication of frequency-response variation. Based on these results, technicians can choose an equalizer pad that will provide optimum flatness at the end of the line.



Tilt mode checks forward low- and high-frequency channel level tilt.

MER, BER, and Errored Seconds

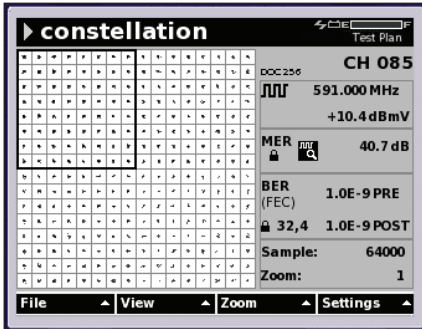
When the DSAM 6300 is tuned to a QAM signal in the level mode, it simultaneously measures MER, BER, and errored and severely errored seconds.

MER is an indicator of transmission quality degradation resulting from noise, ingress, and composite distortions. An expression of signal-to-noise 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 an 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. The result is accurate readings that far exceed those reported from customer-premises equipment such as digital set tops.

BER quickly detects impulse noise in the system by revealing when information is lost or corrupted at the bit layer. The DSAM-6300 measures BER by tracking the number of errored bits (pre-FEC) and the number of bits that cannot be fixed by forward error correction (FEC) (post-BER).

The errored seconds measurement is for troubleshooting connections with intermittent bit errors occurring over a period of time. If an error has occurred during any second of elapsed time, the errored second field increments by one. One error or multiple errors in the same second is counted as one errored second. If there is more than 1 in 1 million bit errors occurring in the same second, the severely errored second register increments by one. The errored seconds fields are conveniently included in the digital level display.

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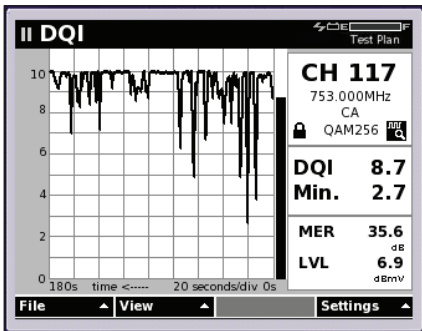
A constellation graph shows impairments on the network with patterns in the display. By identifying the pattern, technicians can figure out the probable cause of the impairment.

Constellation Mode

Various elements in a network can compromise video quality. The DSAM-6300 constellation mode displays patterns of data points on a graph for easy interpretation, letting technicians detect and quickly diagnose sources of digital video problems.

Digital Quality Index (DQI) Mode

DQI is an indicator of the overall health of a QAM stream. This JDSU exclusive measurement is extremely effective in tracking intermittent problems. QAM signal health 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. To help troubleshoot intermittent issues, the index is plotted on a 90-second graphical history display.



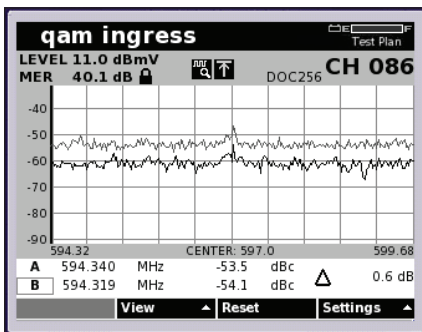
DQI displays intermittent, short-duration impairments that MER and BER miss as well as steady-state issues that MER and BER typically capture.

QAM Ingress Mode

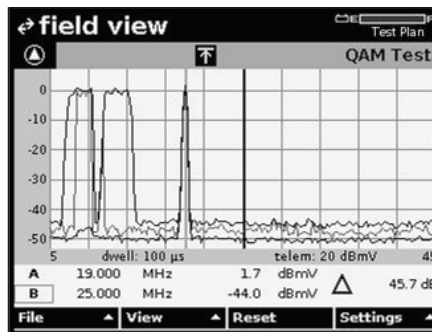
Traditionally, detecting the presence of ingress within downstream digital signal spectrum is nearly impossible without turning off the service. The tightly spaced QAM carriers hide any visual presence of ingress or intermodulation distortions. An MER test will indicate that an issue exists, but with the DSAM-6300 and the patented QAM Ingress mode, technicians can inspect what is actually going on beneath the digital “haystack” without interrupting service.

FieldView™ Option

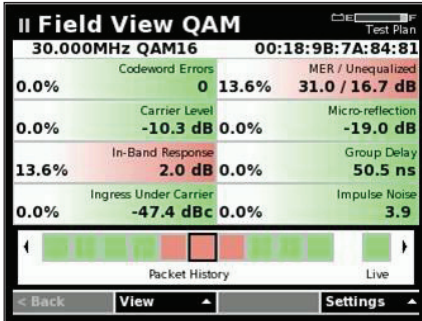
Field View provides the communication between JDSU PathTrak™ return-path monitoring systems and field meters such as the DSAM-6300. A JDSU HSM-1000 sends spectrum measurements from PathTrak to the field meter, where the results are displayed on the DSAM screen. By comparing local spectrum measurements to those from PathTrak, field technicians can quickly resolve return-path ingress problems.



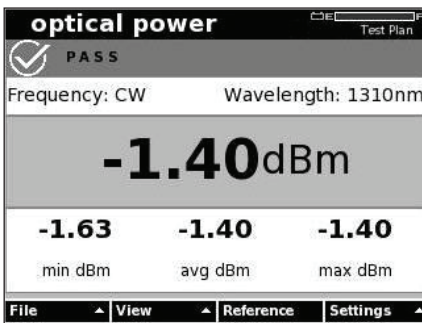
The QAM Ingress test lets technicians see spectrum underneath a live digital carrier which is usually not viewable due to the presence of the “haystack.”



The optional Field View capability greatly improves the success rate and efficiency in locating return-path ingress. Field technicians can view the return spectrum that the JDSU PathTrak Return Path Monitoring System receives. Both the remote spectrum and the local spectrum view can be compared on the meter.



The Field View QAM dashboard shows a variety of measurements for the represented carrier, and results that are outside of user-designated limits are indicated by color. From the dashboard, technicians can select a measurement parameter to view more closely and switch directly to a full-screen display of that measurement.



The optical power measurement option enables connecting a USB power meter (JDSU MP60A or MP80A) for verifying or troubleshooting node light levels.

Field View QAM™ Option

The unique Field View QAM option lets technicians see upstream impairments that are invisible to spectrum analyzers and sweep tools. Observing a clean spectrum with traditional spectrum-analysis tools may indicate a pristine return path; however, the overall node health reported by the cable modem termination system (CMTS) and other reporting tools can show a low health score, even after teams of technicians have been working on the node cleaning up noise issues for several weeks. With Field View QAM, technicians can quickly identify micro-reflections, in-band frequency response, and group-delay issues. Armed with the DSAM in conjunction with MACTrak™ technology in PathTrak, technicians can easily verify the overall health of return-path carriers.

WiFi Option

The WiFi option enables a USB WiFi adapter to verify WiFi network strength and connectivity, or to communicate test data to JDSU TechComplete™ Test Productivity Pack (TPP).

Optical Power Meter Option

The optical power meter option enables connecting a USB power meter (JDSU MP-60 or MP-80) for verifying or troubleshooting node light levels.

SmartID™

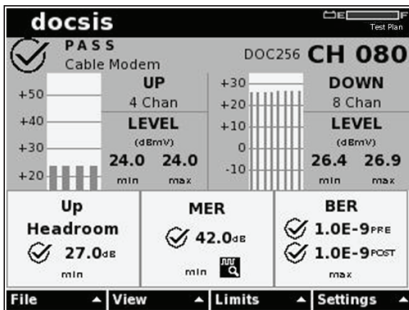
Innovative advanced JDSU coax probes enable extremely quick, comprehensive home network qualification, eliminating repeat truck rolls and making troubleshooting less costly and more effective.

Applications

Comprehensive Forward Path Analog and Digital Testing

With analog and digital testing combined in a single user interface, technicians can select any specific channel or a scan of channels without having to differentiate between analog or digital video, 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. Channel plans also include Autotest configurations for analog, digital, and DOCSIS services. Configurations are entered either directly into the meter or through the JDSU TPP client/server application software that manages channel plans and measurement files for a collection of DSAM meters. Configurations can also be conveniently cloned from meter to meter.

Networks with a history of multiple ownership transitions and/or diverse hardware architectures are not a problem for the DSAM-6300. 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 the ability to edit plan parameters locked when needed. Specific plans are easily selected from Configure mode, or in many cases, directly from within a measurement mode. After selecting an active plan, technicians can check the top of the measurement screen to confirm that it is using the correct plan. The channel plan name is included with any saved measurement file for reference. Because Autotests are configured within a channel plan, multiple tests can be run in a short period of time with only two button presses.



Summary view quickly identifies overall performance.

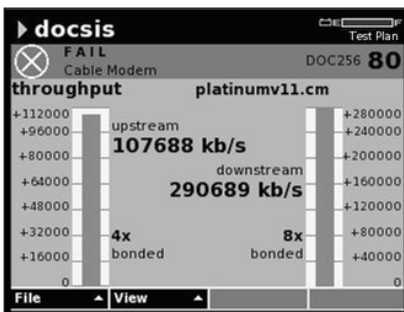
Return- and Forward-Path Testing and Maintenance

The cable plant is a two-way communication path. As a vital link between customer premises equipment (CPE) and the CMTS, the return path must be aligned and kept free of ingress and noise. With digital services, limiting noise and ingress becomes even more important as service degradation moves quickly from tiling or bit errors to catastrophic failure.

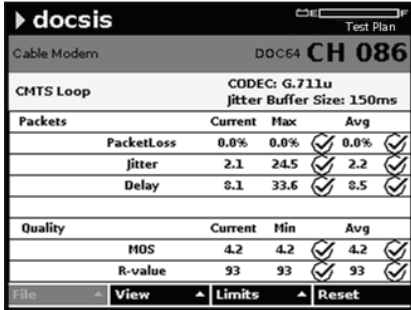
The DSAM-6300 is designed to test and maintain both forward and return paths. With its ability to sweep, conduct signal level and quality measurements, as well as analyze ingress and noise, it provides the optimal approach to maintaining a hybrid fiber/coax (HFC) network.

DOCSIS Service Testing

As service providers face increasing competition, it is important to maintain a competitive lead in data service throughput. The ability to offer higher data rates is a differentiating advantage and improves a provider's position as a preferred residential or business data service operator. This advantage, along with the more-effective use of valuable return-path spectrum, motivates service providers to migrate to DOCSIS 3.0 or to put this migration in their plans. To bolster the service provider's reputation, it is very important that new service offerings are of high quality and reliability, and testing during installation and for system maintenance and troubleshooting is essential. The DSAM DOCSIS 3.0 option lets technicians quickly and efficiently test bonded channel performance, signal levels, MER (including headroom), BER, and throughput to full range—eight downstream by four upstream channels. Other IP-related tests include packet loss and ping. The DSAM-6300 has a built-in cable modem capable of performing quick and accurate DOCSIS 3.0 RF and IP testing, eliminating the need for a test modem to verify cable modem connectivity or a computer to test the CPE connection.

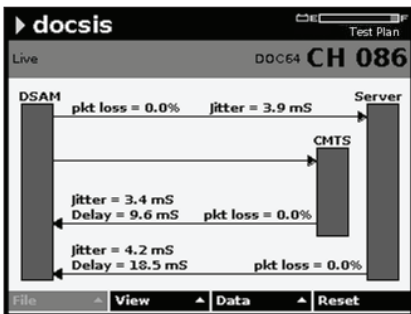


Test throughput to full DOCSIS 3.0 range.



Voice over IP (VoIP) Testing

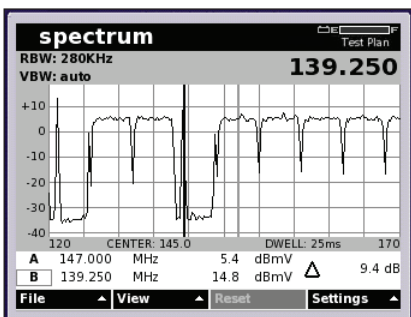
The DSAM-6300 VoIPCheck option enables service validation over a DOCSIS connection. With VoIPCheck, the DSAM-6300 can test VoIP services independently of the VoIP specification being used. VoIPCheck can segment RF issues from IP issues, helping to eliminate organizational finger pointing. The DSAM-6300 measures packet statistics, including packet loss, jitter, and delay, as well as call-quality results such as R-value and MOS. With its in-depth results analysis capability, the DSAM-6300 can determine the source of call-quality problems, expediting the troubleshooting process.



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

Enhanced Downstream Spectrum

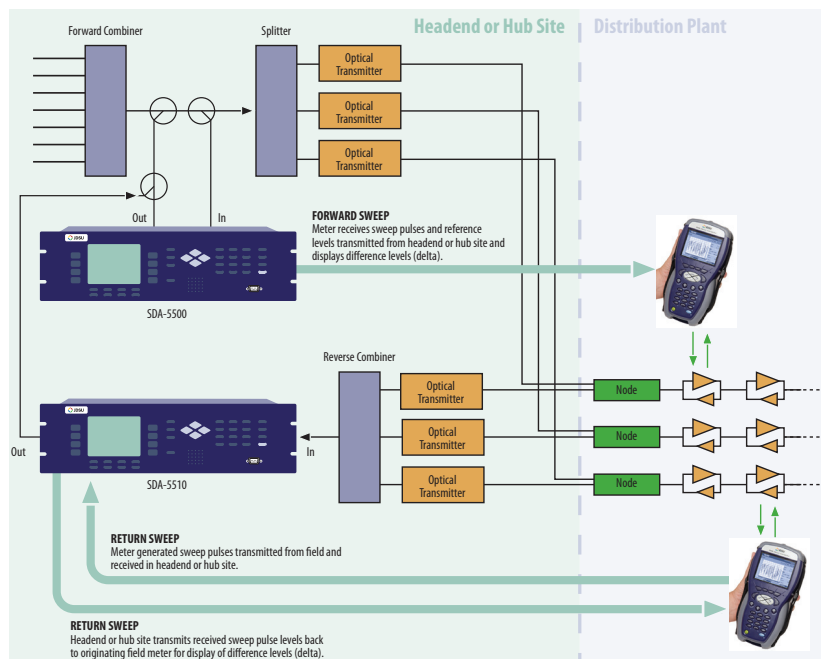
Technicians must be able to see how the network is behaving and troubleshoot spectrum-related problems. Most technicians do not require a fully featured and expensive spectrum analyzer, and the DSAM's enhanced downstream spectrum mode equips them with an "everyday" spectrum analyzer. It lets users choose between two resolution bandwidth (RBW) settings, 330 kHz or 30 kHz, and modify the amount of time spent measuring each frequency step, or dwell time of the analyzer, to a setting from 1 to 25 milliseconds. It also lets users see from 4 MHz to 1 GHz in 10 or 50 MHz spans. Furthermore, if viewing return-path frequencies, technicians can activate an internal low-pass filter to eliminate intermodulation distortion caused by relatively high-level higher frequencies on the meter input, providing a cleaner upstream view.

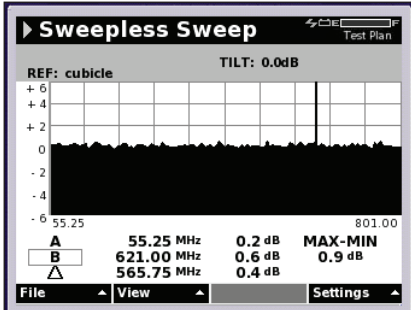


The DSAM's enhanced downstream spectrum mode equips technicians with an "everyday" spectrum analyzer.

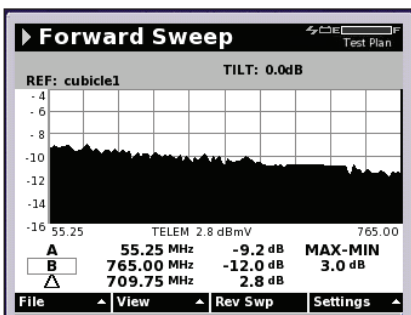
Sweep

Service quality depends on transmitting signals with the highest carrier-to-composite noise and the lowest intermodulation distortion. The majority of all transmission errors can be detected by measuring the frequency response of the network. A sweep trace reveals every physical error in the network that influences transmitted signals. Also, since sweep results are independent of transmission methods and formats, it is the most effective and efficient method for technicians to set up the right gain versus frequency.

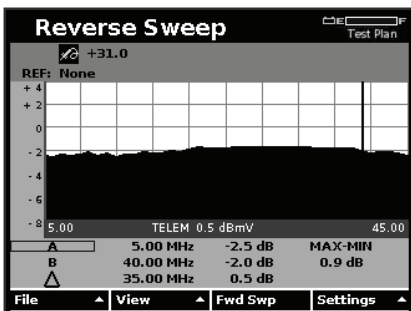




Sweepless Sweep provides a quick method to check cable system integrity using active channels to sweep the forward path. Sweep points do not need to be added and no forward-path headend gear is required.



Forward sweep uses a unique referencing method to accurately reveal any problems in the system without interfering with any of the analog or digital carriers.



Tight reverse sweep points in the sweep plan display the entire return path with better resolution and help to find mismatches or other problems in the upstream transmission path.

Sweepless Sweep® Mode

For fundamental forward-distribution network alignment, the 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 normalize 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 show as deviations (deltas) from the reference display. Because the cable network is designed on the unity gain principle, the same reference is used as technicians test downstream amplifiers to compensate for the effects of each cable segment. To isolate the effects of headend changes in levels, or to align portions of the spectrum where there are no active carriers to reference, the forward sweep option should be considered.

Forward Sweep Option

The Forward Sweep option continuously references existing carriers to ensure an accurate measurement result. The DSAM-6300 offers a fast forward sweep especially in systems with numerous digital channels. By referencing 64, 128, and 256 QAM signal types, the DSAM-6300 removes any worries about subscriber interference because there is no need to inject sweep carriers in the guard bands. Referencing active carriers, instead of transmitting sweep signals over active carriers, lets the DSAM-6300 sweep without degrading service quality.

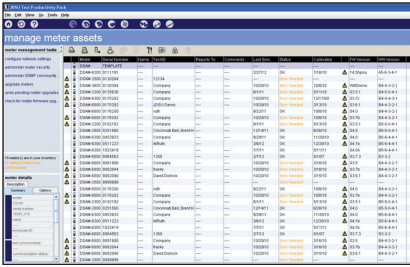
The SDA-5500 headend transceiver inserts sweep points in unoccupied spectrum to test frequency response. To remove the effects of headend level drift, the instrument monitors levels and transmits new reference information with every sweep. This means that if signal levels change in the headend, they will not affect the sweep response measurement.

Reverse Sweep Option

Because the return path can be problematic, it should be tended to at least as often as the forward path; and, any impairments should promptly be fixed. One of the best procedures for preserving a clean return path is to establish an active reverse-sweep maintenance plan. A reverse sweep can uncover mismatch problems, revealed as standing waves, or diplex filter roll-offs that can severely degrade the quality of services carried in the reverse band. The DSAM-6300 built-in reverse sweep transmitter eliminates the need for a separate, cumbersome carrier generator.

Headend Sweep Equipment

With the DSAM-6300, one person can perform forward- and reverse-path alignment simultaneously. For reverse testing with more than one field technician, the rack-mounted 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.



The TechComplete Test Productivity Pack lets supervisors easily configure, update, and upgrade DSAMs in the field.

TechComplete Test Productivity Pack (TPP)

TechComplete TPP software includes the essential tools to efficiently process trouble tickets and manage meter inventory and staff. It consolidates and stores test data, limit plans, and channel plans in a central database, ensuring that technicians perform the right tests with the proper configuration. The client-server architecture makes it easy for field technicians to access the data remotely, review it, and use it in the field as a troubleshooting reference. Even sweep results can be uploaded for later review to track the health of the network. TPP eliminates roadblocks to ensuring quality of service, such as accessing incorrect channel and limit plans, significantly decreasing the number of call backs and unnecessary truck rolls. Additionally, meters can be synchronized any time they are connected to the RF plant, an active Ethernet connection, or WiFi hotspot.

TechComplete also helps managers communicate with their field staff. Test results can be reviewed and experienced technicians at the hub can coach less-experienced field staff with the remote DSAM feature for more effective use of time and resources.

Upgrade DSAM Instruments to the DSAM-6300

DSAM models 2000, 2300, and 3300 can be upgraded to the DSAM-6300 maintenance technician meter. All meters to be upgraded to the DSAM-6300 may be sent back to the factory for hardware upgrades or upgraded on site by authorized JDSU service personnel.

JDSU PLUS™

JDSU PLUS provides a proven set of services solutions that help communications network operators meet the demands of competition, convergence, and complexity. JDSU PLUS leverages test and measurement expertise and leadership to help service providers deploy high-quality, profitable, next-generation telecommunications services.

Comprehensive PLUS deployment and support services ensure commissioning, availability, functionality, and understanding of the entire JDSU portfolio, including:

- hardware support plans
- factory and on-site calibration
- express loaner equipment
- technical assistance
- managed inventory
- installation and commissioning services
- software upgrade services and maintenance
- product training.

PLUS support plans streamline repair, calibration, and loaner processes, making support costs predictable and cost-effective while greatly alleviating administrative burdens. JDSU support plans provide reassurance that your hardware investment is well protected and that your equipment is available, functional, and up to date.



JDSU understands that your support needs vary and will work with you to find the right hardware service support plan for your needs. Our Gold, Silver, or Bronze support plans provide various levels of support for repairs, calibration, express loaner, advanced replacement, technical assistance, and product training.

JDSU maintains service centers of excellence throughout the world to rapidly and effectively service equipment for our global customer base. These centers can process thousands of pieces of equipment each month for a variety of sophisticated test equipment and instruments. This core competency that JDSU offers in conjunction with our nationwide partners ensures coverage of your entire installed base of test equipment and provides you with the highest quality of service. Tailor your support plan with one of the following plans.

PLUS Gold

- Product repairs (fault or no fault) including updates of all proprietary engineering changes
- Priority service for all transactions
- Basic or premium technical assistance center benefits
- Basic product training
- Express loaner equipment
- Basic and/or advanced custom training

PLUS Silver

- Product repairs including updates of all proprietary engineering changes
- Product calibrations
- Priority service for all transactions
- Basic technical assistance center benefits
- Basic product training

PLUS Bronze

- Product repairs, including updates of all proprietary engineering changes
- Priority service for all transactions
- Basic product training
- Basic technical assistance center benefits

Why JDSU?

JDSU has a long history of integrating the high-level functions and advanced technology necessary for maintaining cable networks with scalable hardware and software platforms. Coupling the innovative SAM with award-winning, patented Stealth Sweep technology, JDSU delivers sweep-meter solutions unequalled in performing advanced tests and measurements. These capabilities were integrated into the SDA-5000 series of products, earning its current industry-lead position.

JDSU introduced the DSAM when DOCSIS standards pushed the industry to adopt a common technology for delivering flawless high-speed data and IP services. This award-winning, landmark meter integrated well-known JDSU SAM functions with a DOCSIS cable modem element and a PC-based management and file system.

*Applicable Patents: MER – 6,061,393;
6,233,274; 6,278,730 and 6,385,237.
Field View QAM - 6,425,132*

DSAM-6300 Summary Feature Matrix

Applications	Features	Included or Optional
Analog and Digital Carrier Level Verification	Analog video and audio power levels	✓
	Digital power level	✓
	Tilt (1 to 12 channels)	✓
	Mini-scan (1 to 12 channels)	✓
	Full-scan (1 to 999 channels)	✓
	Analog carrier-to-noise	✓
	Hum	✓
	SmartScan™	✓
	Spectrum Analyzer with Auto Pre-Amp	✓
	MER/EVM measurements	✓
Digital Carrier Quality (QAM Carriers)	Pre- and post-FEC BER (64, 128, 256)	✓
	BER for Deep Interleave (128,4 or 128,5)	✓
	Constellation (64, 128, 256)	✓
	Digital Quality Index (DQI)	✓
	AGC Stress	✓
	Errored/severely errored seconds	✓
	QAM Ingress	Opt
Upstream Physical Verification	Return Loopback	✓
	Local upstream spectrum for ingress check	✓
	Return QAM Generator	✓
	Spectrum Analyzer w/Auto Pre-Amp	✓
	Field View of the PathTrak Return Spectrum	Opt
DOCSIS/ EuroDocs™ Testing	Field View QAM of PathTrak MACTrack	Opt
	DOCSIS 2.0/1.1/1.0 testing 1 Downstream x 1 Upstream	✓
	DOCSIS 3.0 Bonded Carrier testing 8 Downstream x 4 Upstream	Opt
	Downstream MER/EVM, Pre- and Post-FEC BER	✓
	Dynamic DOCSIS Range and Registration	✓
	Cable modem configuration file verification	✓
	Upstream channel selection	✓
	Upstream transmit level and headroom	✓
	Cable modem and CPE MAC cloning	✓
	CableLabs® issued certificates	✓
DOCSIS/EuroDocs Service Tests	IPv6 Compatibility - cable modem	✓
	Dual MAC / BPI+ Certificates	✓
	Packet Loss	✓
	Throughput - Upstream and Downstream (Up to DOCSIS 3.0 rates)	✓
Ethernet Testing	Ping	✓
	VoIPCheck - Voice over IP testing (MOS, Packet Loss, Jitter, Delay)	Opt
	Throughput - (DOCSIS 2.0 rates)	✓
	Packet Loss	✓
	Ping	✓
RF Network Verification	View CM diagnostics page	✓
	Gig-E Option Throughput - (DOCSIS 3.0 rates) up to 400 Mbps down	Opt
	Forward Sweepless Sweep	✓
	Reverse Alignment	✓
	Forward (Downstream) Sweep	Opt
HFC Network Verification	Reverse (Upstream) Sweep	Opt
	Return Loopback	✓
Home Network Verification	Scheduled Autotest	✓
	Proof Test	✓
	IP Tests via 10/100/1000 Ethernet jack	✓
	Ingress Resistance Test (IRT)	✓
	Fault Location using FDR feature in LST-1700 remote transmitter	✓
	Test Point Compensation	✓
	SmartID Advanced Coax Probe support	✓
Autotest	WiFi Support (USB)	Opt
	Home Certification	Opt
	Video Autotest	✓
	Cable Modem Autotest	✓
	Combination Autotest (Video and Cable Modem)	✓
	Proof of Performance (Scheduled autotest)	✓
	Web Browser	Opt
Miscellaneous	RF, WiFi or Ethernet synchronization with TPP	✓
	Secure Sync™ - RF Synchronization through firewalls	✓
	Optical Power Meter Support (USB) MP-60A and MP-80A	✓

Specifications

Frequency

Range	4 to 1,000 MHz
Accuracy	±10 ppm at 77°F (25°C)
Tuning resolution	Analog 10 KHz, Digital 50 KHz
Channel bandwidth:	Models ending in A, 8 MHz; Models ending in B, 6 MHz

Level Measurement, Analog

Signal types	CW, video and audio (NTSC, PAL, and SECAM)
Range ¹	-40 to +60 dBmV
Resolution	0.1 dB
Resolution bandwidth	280 KHz
Accuracy ²	±1.5 dB typical @ 25°C
Carrier-to-Noise	Input ≥ 6 dBmV 30 to 45 dB ±2 dB 45 to 48 dB ±3 dB

Level Measurement, Digital

Modulation types	QPR, QPSK, QAM (DVB/ACTS)
Range ¹	-40 to +60 dBmV Resolution 0.1 dB
Accuracy ²	±2.0 dB typical @ 25°C

Two-Way Ranging Test

DOCSIS based	DOCSIS 1.0, 1.1, 2.0, and 3.0
Upstream transmit range and diplexer crossover	(DOCSIS modes only) Models ending in A, 5 to 65 MHz 65/96 MHz (min. downstream DOCSIS center freq. 100 MHz) Models ending in B, 5 to 42 MHz 42/88 MHz (min. downstream DOCSIS center freq. 91 MHz)
Upstream modulation	QPSK and 8, 16, 32, and 64 QAM as instructed by CMTS
Transmitter output	At 25°C, maximum 55 dBmV with 16 and 64 QAM and 58 dBmV with QPSK, (typical)

Downstream QAM Demodulation

Modulation type	64, 128, and 256 QAM, ITU-T J.83 Annex A, B or C (selectable)
Input range (lock range) ³	-15 to +50 dBmV from 55 to 1000 MHz
BER ⁴	Pre- and Post-FEC 10 ⁻⁴ to 10 ⁻⁹
MER ⁵	Range 64 QAM: 21 to 35 dB Accuracy ±2 dB (typical) Range 128/256 QAM: 28 to 35 dB Accuracy ±2 dB (typical)
EVM ⁵	Range 64 QAM: 1.2% to 5.8% Accuracy ±0.5% (1.2% to 2.0%) ±1.0% (2.1% to 4.0%) ±1.4% (4.1% to 5.8%) Range 128/256 QAM: 1.1% to 2.4% Accuracy ±0.6%
Symbol rate	Annex A, 5.057 to 6.952 Msps (64/128/256 QAM) Annex B, 5.057 Msps (64 QAM) and 5.361 Msps (256 QAM) Annex C, 5.274 Msps (64 QAM) and 5.361 Msps (256 QAM)

Note: 128 QAM not defined for Annex B ITU-T J.83

Test Point Compensation (User editable)

Forward path TPC	Max 100 dB Total Forward external loss (dB): 0 to 50 Forward probe loss (dB): 0 to 50
Reverse path TPC	Max 55 dB Total Reverse internal loss (dB): 0 to 55 Reverse external loss (dB): 0 to 55 Reverse probe loss (dB): 0 to 55
Reverse telemetry level (dBmV)	0 to 55
Reverse sweep insertion level (dBmV)	0 to 55

Interfaces

RF	75 ohm, F81 or BNC option Max. sustained voltage 100 VAC, 140 VDC
RS232	Via optional direct cable
USB	JDSU DSAM options only

Standards Compliance

Shock and vibration IEC 60068	Drop IEC 61010
Handle stress IEC 61010	Water resistance MIL-STD-810E
Safety – emissions EN 55022	Safety – immunity EN 61000

Upstream Spectrum (Ingress Scan)

Frequency range	Models ending in A, 4 to 65 MHz Models ending in B, 4 to 45 MHz
Sweep rate	Less than 2 seconds; Display scaling 5 and 10 dB/division; 6 vertical divisions
Resolution bandwidth	280 kHz
Range ¹	-40 to 60 dBmV (typical)

Downstream Spectrum (Forward Scan)

Frequency range	4 to 1000 MHz
Sweep rate	Less than 2.5 seconds; Display 5 and 10 dB/division; 6 vertical divisions
Resolution bandwidth	30 or 330 kHz
Dwell	1 ms to 25 ms
Span	50MHz or 10MHz zoom
Range ¹	4 to 100MHz, (typical)

Sweep Specifications

Forward Sweep

Requires SDA-5500 (SDA Compatible mode)

Reverse Sweep

Requires SDA-5500 (Single Reverse) or SDA-5510 (Multiple Reverse) (SDA Compatible mode)

Sweep Modes

Frequency range	5 to 1000 MHz
Display span	user definable
Display scale/range	6 vertical divisions 1, 2, 5, or 10 dB/division
Sweep pulse occupied bandwidth	30 kHz
Stability	±0.5dB, normalized (dependent on stability of referenced carriers)

Sweep rate ~1 second (78 channels, including scrambled and digital signal types)

Channel plan templates (user editable on SDA Headend gear)
China-1; China-2; France; HDTP-NL; Ireland; Japan; Jerold; Jerold-HRC; Jerold-IRC; NCTA; NCTA-HRC; NCTA-SUB; NCTA-IRC; NTSC-broadcast; OIRT-D/K; PL-B/G; PAL-UK

Constellation

Modulation type	64, 128 and 256 QAM
Zoom capability	Yes

Return QAM Generator

Frequency range	Models ending in B: 5 to 55 MHz Models ending in A: 5 to 65 MHz
Signal level range	8 to 58 dBmV
Signal modulation	CW or 16 or 64 QAM
Symbol rates (Mps)	1.28, 2.56, 5.12

Cable Modem Diagnostic Page

IP address ⁶	192.168.100.1
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General

Display	320 x 240, grayscale, Selectable back light
Language support	(user interface and help system) English in all models No-charge second language option of Spanish, French, German, Hungarian, Japanese, Polish, or Chinese
Dimensions	4.75 x 9.75 x 3.25 in (12 x 25 x 8.25 cm)
Weight	3 lb 4 oz (1.5 kg)
Storage and operating temperature range	0 to 120°F; -20 to +50°C
Power	Hi-capacity Li-ion removable pack, standard 7 hours (typical)
Charge time	10 hours (typical)
Power supply input	90-264 VAC, 47-63 Hz

Notes:

1. Total integrated power, detectable range
2. Accuracy for levels between -20 to 55 dBmV Additional uncertainty ±0.5 dB across -20°C to 50°C Additional uncertainty ±1.0 dB from 4 MHz to 15 MHz
3. Total integrated power, At 64 QAM
4. Supports up to (I, J) = (128, 4) interleave for ITU-T J.83 Annex B
5. Accuracy and behavior from 100 MHz to 1000 MHz for levels between -5 to 50 dBmV (typical)
6. IP address is specified in the DOCSIS 1.1 and 2.0 operations support system interface (OSSI) specifications

Ordering Information
Sweep Tech Package

DSAM-6300 with DOCSIS 3.0 w/42 MHz diplexer includes DQI, SmartScan, Return Loopback, Return Alignment, and Sweepless Sweep (standard). Package includes Forward Sweep, Reverse Sweep, QAM Ingress, browser, and VoIP Check (DSAM-D3SWPPKG-42, or DSAM-D3SWPPKG-65, with the last two digits in the part number indicate diplex filter frequency.)

JDSU recommends that you work with your sales contact to customize the DSAM for your needs. Packages have been created for convenience and savings that simplify the ordering process and bundle multiple popular features. Additional options are available to add to the pre-configured packages. These packages have factory-configured hardware which may not be substituted or modified.

Note: The diplexer is used to block downstream carriers when performing measurements on the return path. JDSU recommends ordering the version that matches the system's existing return path.

Mainframe

Part Number	Description	Notes/Ordering Information
DSAM-6300	Sweep technician DOCSIS, Sweep and Signal Level Meter	DOCSIS 3.0 hardware ready; must order DSAM-D3-SWOPT to enable 3.0 mode and bonded carrier testing

DOCSIS 3.0 & Return Path Diplexer (Choose only one—mutually exclusive)

DSAM-D3DIPLEX-42	42 MHz DOCSIS 3.0 Diplexer	Must choose one diplex frequency to match return path
DSAM-D3DIPLEX-65	65 MHz DOCSIS 3.0 Diplexer	Must choose one diplex frequency to match return path
DSAM-D3DIPLEX-85	85 MHz DOCSIS 3.0 Diplexer	Must choose one diplex frequency to match return path

Options

DSAM-D3-SWOPT	DOCSIS 3.0 bonded testing	Meters ordered without this option will operate only as DOCSIS 2.0
DSAM-D3GIGE-OPT	Gigabit Ethernet Option (10/100/1000T)— Enables Gig-E port with Throughput beyond DOCSIS 3.0 speeds	
1019-00-1491	Integrated Web Browser	
1019-00-1556	VoIP Check	
1019-00-1495	Field View w/ return signal generator	
1019-00-1499	Field View w/o return signal generator	
1019-00-1513	Home Certification	
DSAM-QAM-INGRESS	QAM Ingress Software Option	
1019-00-1567	Forward Sweep	
1019-00-1563	Reverse Sweep	
1019-00-1455	Substitute 75-Ohm BNC Connector	
DSAM-FVQAM	DSAM Field View QAM Option	
DSAM-QINGLOOP-OPT	QAM Ingress and Return Loopback package	
DSAM-WIFI-PKG	DSAM WiFi Software Option and Compatible USB WiFi Adapter	
MP-60A	USB Optical Power Meter with Accessories	
MP-80A MP-80 -	USB Optical Power Meter - High Power, with Accessories	
SMARTID_1PC	SmartID qty 1 - Additional or Replacement Probe	
SMARTID_2PCS_STARTERKIT	SmartID 2 Pack and Starter Kit	
SMARTID_3PCS_STARTERKIT	SmartID 3 Pack and Starter Kit	
SMARTID_4PCS_STARTERKIT	SmartID 4 Pack and Starter Kit	
SMARTID_5PCS_STARTERKIT	SmartID 5 Pack and Starter Kit	
SMARTID_6PCS_STARTERKIT	SmartID 6 Pack and Starter Kit	
SMARTID_ACC_KIT	SmartID Accessory Kit - SmartID carrying case and USB cable	
SMARTID-USBCABLE	SmartID to DSAM USB Cable	
DSAMWE6300	Extended Hardware Warranty 1 year DSAM-6300	

Headend Instruments

SDA-5500	Headend sweep transceiver: provides forward sweep and single-user reverse sweep 1010-00-0470; Includes: line cord, channel plan transfer cable, and operator's manual
SDA-5510	Headend reverse sweep manager: receives reverse sweep from up to 10 DSAMs 1010-00-0472; Includes: line cord, channel plan transfer cable, and operator's manual

Test & Measurement Regional Sales

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