SDA-5000 Series
Stealth Digital Analyzer

Key Features

- Offers unmatched measurement performance for digital video, data, and traditional analog services in a single instrument
- Increases the efficiency of service calls and reduces troubleshooting time
- Ensures HFC network integrity with the JDSU non-interfering forward and reverse sweep system compatible with today’s digital signals
- Enables easy preparation of networks for interactive services with a 5 to 1000-MHz, fast, sensitive spectrum analyzer
- Delivers comprehensive testing of forward and reverse digital services including optional QAM analysis
- Ensures full in-service proof-of-performance with automated tests
- Rugged, weather-resistant, and lightweight

In the world of high-growth subscriber services, engineers and technicians struggle with assignments as diverse as tracking down and fixing ingress, aligning optical nodes, and proof-of-performance. With competitive threats building, cable operators need easy and cost-effective solutions for efficient installation, qualification, maintenance and troubleshooting their HFC networks.

The JDSU SDA-5000 Series of Stealth Digital Analyzers provides a lightweight, weather resistant, rugged, and affordable single instrument with the versatility to test the latest digital services as well as the ideal device for maintaining the analog spectrum. The SDA Series provides seamless forward and return path testing as well as advanced digital testing. A host of invaluable extra options such as QAM analysis and PathTrak Field View are available, enabling the SDA Series to be customized for both the cable operator’s network technology level and budget.

The SDA builds on JDSU’s market leading RF sweep capabilities with numerous new features that ensure engineers can cope with the changing demands of today’s network.

Backward compatibility with earlier JDSU Stealth and StealthTrak Series products build on a company’s existing investment. Automated testing, new “Find and Fix” tools, and easy-to-use graphical user interfaces ensure training time is kept to a minimum. In addition, users familiar with a JDSU Stealth product can transfer their existing expertise to other SDA products without additional training.
Offers single-instrument testing of all services

JDSU SDA Series testers are capable of handling a broad spectrum of interactive testing needs including reverse sweep, multiple-user reverse testing, portable reverse testing, reverse path noise testing, quality forward path digital services with QAM View and in-service cable modem analysis. The SDA-5000 Series of Stealth Digital Analyzers includes the SDA-5000, SDA-5500, and SDA-5510, each of which provides a single-instrument “One Box” solution for engineers and technicians. The main features include:

**Analog testing**
- Non-interfering forward RF sweep
- RF level, fast scan, tilt
- In-service carrier-to-noise, hum, depth of modulation
- Fast spectrum display with CTB/CSO
- Automatic/24-hour testing (FCC and CENELEC compliant)

**Return path testing**
- Non-interfering reverse RF sweep
- PathTrak Field View option pinpoints return path noise
- Reverse Alignment mode prepares network for cable modem deployment
- Reverse noise feature shows accumulated noise/ingress seen at the headend
- Zero Span Spectrum mode
- DOCSIS/DAVIC compatible cable modem analysis

SDA instruments provide a comprehensive set of measurement tools that will follow the expansion of your cable network.
Advanced digital testing
- JDSU digiCheck average power
- QAM View digital analysis with modulation error ratio (MER), pre/post FEC BER, constellation, and exclusive noise/ingress under the carrier measurement

Sweep is the right solution
The majority of all transmission errors (including digital) are found by measuring the frequency response of the network. Every physical error in the network that influences the transmitted signals will be revealed in the sweep trace. This means the sweep results are independent of transmission methods and formats.

When maintaining and setting up the HFC network, the goal is to transmit all signals with the best noise specifications and the lowest intermodulation distortion. Sweep provides the most effective and efficient tool to show the effects and compromises of setting up the correct gain versus frequency.

Normalized sweep
To ensure that network specifications are maintained, starting from the headend to the subscriber, each section of the network has its own set of specifications. A normalized sweep divides the network into easily managed sections. Each of these network sections can be designated to an individual team or contractor and tested to its own specifications and quality standards.

The SDA Series uses a variation of JDSU’s original market-leading Stealth Sweep technology. Existing video carriers (analog, digital, or scrambled) are referenced when possible, eliminating any possibility of interference to the subscriber services. Where carriers are absent, the SDA-5500 transceiver at the headend transmits a sweep to fill vacant spectrum areas. To remove effects of headend level drift, the SDA-5500 transceiver monitors the levels and transmits new reference information with every sweep. This means that if the signal levels are changing in the headend, they will not affect the sweep response measurement. The SDA-5500 transceiver has all of the measurement capability of the SDA-5000 receiver enabling the technician to check headend levels.

The SDA Series also offers significantly faster forward sweep speed than earlier instruments, especially in systems that include many digital signals. They can reference 64/256 QAM signal types, removing the need to worry about subscriber interference, or injecting sweep carriers in the guard bands.

Reverse sweep
The SDA-5000 (with option 1 installed) enables simple and practical testing of the reverse path frequency response, regardless of the frequency (5 to 1000 MHz). It has a built-in reverse sweep transmitter, which means externally generated carriers are not required. Furthermore, the SDA-5500 transmitter and field receivers have frequency agile telemetry, enabling them to communicate on both the forward and reverse paths.
SDA Series instruments enable one person to perform forward and reverse path alignment simultaneously. The operator simply indicates which screen should be displayed – either the response from the headend to the testpoint, or the response from the testpoint to the headend. A reverse sweep can uncover mismatch problems, which reveal themselves as standing waves, or diplex filter roll-offs that can severely hamper the quality of services in the reverse band.

**Multiple-user reverse testing**

For intense reverse testing requirements, the rack mounted model SDA-5510 Headend Reverse Sweep Manager handles the reverse sweep job for up to 10 different technicians on the same cluster of nodes. Using the SDA-5510 in conjunction with the model SDA-5500 transceiver 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.

**Seeing headend/hub site accumulated ingress in the field**

The reverse noise feature of the SDA-5000 enables easy reverse path noise testing. The operator simply presses the “noise” softkey while reverse sweeping, and the display changes to a noise/ingress response indicating the noise level over the entire reverse path spectrum measured at the headend or hub site.

All SDA transmitters provide feedback to the field regarding the current condition of noise and ingress in the headend, even when noise or ingress is swamping the telemetry (Broadcast mode). A picture of the headend noise/ingress is sent out to the SDA receiver via a special forward telemetry carrier.

**QAM View ensures quality forward path digital services**

For measurement and analysis of digital TV and forward modem signals, the new digital QAM View option provides a full complement of digital quality measurements. Included is a 64/256 QAM constellation display with zoom, average digital power level, bit error rate (BER), 21 to 35-dB modulation error ratio (MER), and a noise margin “cliff effect” parameter. An equalizer display shows equalizer stress and distance to fault.

In addition, an exclusive Noise mode enables technicians to see ingress/noise under an active digital carrier. This tool is invaluable for detecting forward path ingress otherwise hidden by conventional spectrum views.

**In-service cable modem analyzer**

For bursty digital signals such as TDMA technologies used on cable modems for reverse services, the SDA-5000 offers two measurement choices. The first, a one-button cable modem analyzer test, shows carrier-to-noise measurements quickly. The second, an advanced zero span feature, uses a time domain display to allow power measurements while the modem is in service. Both modes are compatible with DOCSIS/EuroDOCSIS, CBR/switched circuit telephony, and proprietary cable modem standards.
Detecting ingress in the field
When detecting ingress in the field, first the operator looks at the ingress present at the field testpoint using the spectrum display on any of the receivers and then switches to reverse ingress/noise to see the ingress at the headend for comparison. This time-saving procedure helps in locating sources of ingress. An adjustable dwell time ensures that even intermittent ingress is detected. The preamp and lowpass filter also assures that even low-level ingress is seen. The preamp and lowpass filter on the SDA-5000 assures that ingress can be measured on devices with bidirectional testpoints or testpoint values of 30 dB or more.

PathTrak Field View option
When a network is equipped with the JDSU PathTrak Performance Monitoring System, system technicians can benefit from the ultimate tool to combat ingress – the PathTrak Field View option for the SDA-5000. With Field View, the SDA-5000 receives a return path headend spectrum broadcast from the PathTrak unit and compares it with a return path spectrum at any field testpoint. The side-by-side spectrum comparison instantly reveals to the technician whether the ingress source is originating at the technician’s current testpoint or at a different location. The comparative spectrum technique reduces noise/ingress troubleshooting time dramatically, since the technician can immediately verify whether corrective action performed in the field (local trace) results in improvement in the headend spectrum (remote trace).

Comprehensive testing
The SDA Series provides an extensive set of signal analysis features designed for proving and improving network quality. Its key capabilities include level measurement, analog and digital signal limits, tilt measurement, scan measurement, in-service carrier-to-noise measurement, hum measurement, modulation measurement, and local amplifier alignment with loopback tests.

Level measurement
The SDA instruments have a comprehensive single-channel level display with tuned channel, video frequency and level, audio frequency and level, and the difference between video and audio carrier levels.

Making accurate digital average power measurements is addressed with the digiCheck measurement function. The digiCheck feature is compatible with most non-bursty digital modulations in use today (that is, 16, 32, 64, 128, and 256 QAM, QPR, QPSK, VSB, and CAP16).

Analog and digital signal limits
Analog signal threshold limits have always been a technician’s favorite feature of JDSU instruments. Automatic limit checks provide a quick go/no-go status for audio and video levels. The SDA Series extends this capability with a dedicated digital limit set that can be applied exclusively to the forward digital carriers defined in a channel plan. By assigning separate analog and digital limits, test time is reduced, since no calculation is necessary to determine if analog and digital level relationships are within system specifications. Analog and digital limit capability is available in both the Scan and Autotest modes.
Tilt measurement
Tilt is the easiest and most efficient tool for balancing amplifiers. For cable plants requiring multiple tilt measurements, such as comparing today’s tilt measurement with a historical record and then making an additional measurement for a new wider channel plan, the technician simply uses markers to indicate the tilt channels that define the new limits with the SDA Series.

Intermodulation distortion
Intermodulation distortion (CSO/CTB) can be automatically measured using the CTB/CSO mode from the spectrum analyzer. CTB/CSO distortions produced by intermodulation of analog TV carriers can degrade the signal quality of QAM modulated signals used by digital video and cable modems.

Scan measurement
The SDA Series Scan mode provides a quick graphical view of the entire channel plan with bars representing the video level for each channel. Both video and audio may be displayed.

Carrier-to-noise measurement: in-service
Carrier-to-noise measurements (on a non-scrambled channel) is just as easy with the SDA Series and there is no need to remove modulation from the video carrier. No tunable preselector filter is needed.

Hum measurement: in-service
Measuring hum on a channel (non-scrambled) is as simple as pressing the “HUM” key with the versatile JDSU SDA Series. Since the instrument is battery powered, the measurement is independent of ground loops and is, therefore, isolated from the line (mains). Hum is revealed as either single (60 Hz) or double (120 Hz) horizontal bars across the video screen.

Modulation measurement
SDA Series modulation measurements include NTSC, PAL, and SECAM formats. Demodulation of the audio is done for both AM and FM. FM is used to hear audio distortion on the FM radio channels or the sound of the TV program. AM is used to recognize short-wave interference signals in the reverse band.

Local amplifier alignment w/loopback tests
The SDA Series’ loopback tests enable the technician to perform frequency response measurements of active or passive field devices. Either a CW or sweep signal may be generated from the SDA instrument and injected to the input of a device under test. The DUT output can then be measured by the SDA, providing valuable information such as gain, loss, roll-off, or frequency response. The CW loopback test is available on the SDA-5000 with option 1. The CW loopback and sweep loopback features are available on the SDA-5000 with option 2.
Provides the right solution for varying network needs

The SDA Series includes three models with multiple extra options ensuring that all testing needs, from portable in-the-field hub testing to rack-mounted, headend or hub requirements are catered to. The three models are also designed to interoperate with earlier JDSU Stealth models.

Field usage is covered by the SDA-5000. The SDA-5000 can be tailored with various options to meet the most demanding forward and reverse sweep needs.

Headend/hub usage is covered by the SDA-5500 and SDA-5510. The SDA-5500 provides forward sweep and single-user reverse sweep while the SDA-5510 provide multi-user reverse sweep. Full forward and reverse sweep alignment can be achieved by using the SDA-5510 in conjunction with the model SDA-5500 transceiver. The SDA-5510 can also be used alone in remote hub sites for dedicated reverse alignment applications.

For networks that do not provide a practical location to install a rack mounted SDA-5510, (that is, systems where reverse traffic is received by an ATM/SONET/SDH network rather than returning to the headend) the SDA-5000 with option 6 provides all the functionality of the SDA-5510, (Note: forward sweep capability is not included with SDA-5000 with option 6).

Stealth Sweep compatibility

The SDA Series is completely sweep compatible with Stealth 3SR, 3ST, 3HRV, and StealthTrak SSA-1000 Series instruments. The only requirement is that Firmware version 9.3 is installed in Stealth instruments, and Firmware version 2.0 installed in StealthTrak SSA-1000 instruments. To take full advantage of the faster forward sweep capability, all headend and field instruments must be SDA Series.

Upgrading from Stealth to SDA

The JDSU upgrade program is designed to protect customers’ investments in test equipment. Any model 3SR, 3ST, or 3HRV can be upgraded to the SDA Series at any of JDSU worldwide service centers, and customers who own a model SSA-1000 can upgrade to the SDA Series with an in-the-field Firmware change only.

Extensive automated test capability

The SDA Series offers a practical user interface, which normally only requires the push of a button to operate, and its built-in automation significantly reduces the cost of ownership to businesses.

Automated tests can be scheduled to perform either 24-hour FCC compliance tests, or initiated immediately to log performance at individual nodes, amplifiers, or other testpoints. A wide range of tests can be performed automatically, including signal levels, C/N, hum, and depth of modulation. The operator designates which tests to perform on which channels. Because these tests are non-intrusive, it is easy to test all parameters on all channels at any time.
After a test is performed, the results can be displayed on the SDA screen. A pass/fail indication on a variety of limits can be set for FCC/CENELEC or other government standards, or system preferences. Data taken during any automated test, or sequence of automated tests, can be viewed immediately with a pass/fail indication for each of the limits. Specific stored measurement results may be viewed on demand.

Data analysis with StealthWare
Test results can be printed directly to a serial printer or uploaded to a PC using JDSU StealthWare, a Microsoft® Windows®-based data management package, to store and include in custom reports. Stored sweep, scan, or spectrum screens can be viewed on the PC and analyzed with marker movement and readout information in just the same way as on the actual instrument. A sweep graph overlay function allows comparison of multiple RF response variations over time. Old sweep graphs may be downloaded back into the SDA instrument for realtime comparison.

Powerful and intuitive standardized graphical displays
All measurement results are presented to the user in clear, highly informative, summary displays. The graphics present the information the way the technician wants to see the results, with no further interpretation required. For example, testpoint compensation values are entered at the start of testing. Displays then calculate actual levels automatically, minimizing field errors.

Reduced training time
With SDA Series products, all levels of instruments are familiar to the technician, regardless of which is learned first, because the same user interface conventions are used across all product families. The time needed for a trainee technician to learn to use the instrument is considerably shorter than with alternative test equipment. This means urgent upgrade projects make the most efficient use of limited resources when SDA Series products are used.

JDSU Basic Service packages
To ensure the highest levels of support for SDA purchasers, JDSU offers the Basic Service for instrument package. Designed to provide the foundation for maximizing the features and usage of SDA equipment, JDSU’s Basic Service package offers the following degrees of service and support only JDSU can provide. This includes:

– An extended warranty of up to five years
– Annual calibration – fully traceable to meet NIST standards

These core services provide the foundation for a longer product life, help you realize greater meter functionality and maximize your JDSU investment. Ask your sales representative or call the JDSU Customer Care Center for more information.
Technology training
JDSU provides a comprehensive Cable Networks technology training program designed to help you and your teams understand the changing needs of today’s advanced networks.

Training seminars include:
- HFC basics
- Sweep and balance forward and return
- Sweep 101 “Bootcamp”

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Specifications

**10**

**Sweep resolution** 250 kHz maximum

**Tuning resolution** 10 kHz

**Resolution bandwidths** 30, 280 kHz and 2 MHz

**Accuracy** ±10 ppm at 25°C; ±10 ppm drift over temp (±3 ppm/year aging)

**Display resolution** 0.1 dB

**Log linearity** ±0.5 dB

**Flatness** ±0.5 dB

**Signal types** CW, single carrier, video (single or dual audio/NICAM), audio, digital

**Uncertainty for digital carrier** ±0.5 dB (digital types 16/32/64/256 QAM, QPR, QPSK, VSB, CAP-16, DVB/ACTS and TDMA using Zero Span Spectrum mode) at 280 kHz RBW

**Carrier-to-noise**

In-service measurement. Non-scrambled channels only. No preselection required for 78 channels or less. Best dynamic range at +10 dBmV or higher input.

**Range** ≥ 52 dB

**Resolution** < 0.5 dB

**Hum measurement**

In-service measurement. Carrier > 0 dBmV. Non-scrambled channels only.

**Range** 0 to 10%

**Resolution** < 0.2%

**Accuracy** ±0.7%

**Depth of modulation**

Assumes presence of white reference on any VITS line. Non-scrambled channels only. Audio demodulation of AM and FM carriers.

**Range** 80 to 100%

**Resolution** < 0.5% at 85%

**Audio demodulation**

AM and FM Carriers

**Tilt measurement**

Up to nine pilot carriers or video channels with tilt and level measurements on the highest and lowest.

**Hi-lo resolution** 0.1 dB

**Scan mode**

All video, audio, pilot carrier, and digital channel levels displayed.

**Sweep mode**

(SDA-5000 and 5500 only)

**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** ±0.5 dB, normalized (dependent on stability of referenced carriers)

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

**Channel plan templates** (user editable)

China-1; China-2; France; HDTV-NT; Ireland; Japan; Jerold; Jerald-HRC; Jerald-IRC; NCTA; NCTA-HRC; NCTA-SUB; NCTA-IRC; NTSC-Broadcast; OIRT-D/I; PL-B/G; PAL-UK

**Spectrum mode**

Spans 3, 5, 10, 20, and 50 MHz (0.3, 0.5, 1, 2, and 5 MHz/div)

**Sweep rates** ~1 second updates with spans of 50, 10, and 5 MHz. ~1.7 second updates with 3 MHz span

**Display scaling and range** 0.5, 1, 2, 5, and 10 dB/div 6 vertical divisions

**Dwell** programmable 0-25 ms

**Spectral free dynamic range** 60 dB

**Sensitivity without preamp**

−40 dBmV 5 to 550 MHz

−35 dBmV 550 to 1000 MHz

**Sensitivity with preamp**

−50 dBmV 5 to 550 MHz

−45 dBmV 550 to 1000 MHz

**Maximum level with preamp**

−50 dBmV

**Zero Span mode**

Video BW > 1 MHz, 100 kHz, 10 kHz, 100 Hz

**Resolution BW**

2 MHz, 280 kHz, 30 kHz

**Measurement BW**

1 kHz to 99 MHz

**Pulse measurement accuracy**

nominal level in 10 µs ±2 dB from nominal in 5 µs

(> 1 MHz BW, 280 kHz RBW)

**Sweep times**

100 µsec to 20 s (1, 2, 5 settings)

**Intermodulation distortion (CSO/CTB)**

Range (1)

≈ 60 dB

**Resolution** 0.1 dB

**Forward transmitter**

(SDA-5000 with option 2/SDA-5500 only)

**Frequency range** 5 to 1000 MHz

**Output level**

+20 to +50 dBmV adjustable in 2 dB increments

**Spectral purity**

Hars –30 dBc; Spurs –35 dBc

**Reverse transmitter**

(Requires SDA-5000 with option 1 or 2)

**Frequency range** 5 to 1000 MHz

**Output level**

+20 to +50 dBmV adjustable in 2 dB increments

**Spectral purity**

Hars –30 dBc; Spurs –35 dBc

**Telemetry**

**Frequency range** 5 to 1000 MHz

**Modulation**

FSK, 100 kHz deviation

**Spectrum required**

1.0 MHz vacant bandwidth

**Data storage**

Files stored: auto tests, tilt, channel plans, scan and forward sweep. Also reverse sweep and reverse amp alignment on SDA-5000 with option 1 and/or 2. Spectrum mode (regular with max hold and CSO/CTB). Allocated on demand. The storage capability is simultaneous — more of one file type can be “traded” for less of another. All files stored as database, not as screen picture. (Example: typical mix of files for 78-channel plan: 8 channel plans, 16 sweep references, 80 sweep traces, 40 scan files, 20 spectrum displays and 20 auto tests).
Specifications

Serial interface
RS232, Epson, IBM, Seiko, and Diconix Printers

Input configuration
Connector type 75Ω type F female (optional 75Ω type BNC female)
Maximum sustained voltage AC 100V DC 140V

General
Display 320 x 240 dot matrix LCD, selectable backlight (SDA-5000 only)
Dimensions 6 x 11 x 3.5 in (15.2 x 27.9 x 8.9 cm)
Weight 5.1 lb (2.3 kg) (with option 1 or 2, 5.5 lb (2.5 kg))
Temperature range operating –20 to +47°C (~4 to 117°F) (SDA-5500 and SDA-5510 only)
Dimensions 19 x 5.25 x 14 in (48.3 x 13.3 x 35.6 cm)
Weight 15 lb (6.8 kg)
Temperature range operating 0 to +50°C (32 to 120°F)

Power sources
Battery field extended-life replaceable, nickel metal hydride 12V/3.5A-hr, 4 hours continuous use on a single charge
AC line (SDA-5000) Charger input 100 to 250 VAC, 50 to 60 Hz, 0.5 A
Charger output aux out 16 V at 750 mA
Charge 15 V at 750 mA
AC line (SDA-5500) 100 to 265 VAC, 50 to 63 Hz ~100 VAC

PathTrak Field View (opt 3 required)
(SDA-5000 and SDA-5500 only)
Update rate 2x/second (remote trace)
~1x/second (local trace)
Display scaling 5/1/2/5/10/20 dB/div.
Selectable nodes 14 (selectable via PathTrak HCU)

QAM View option (opt 4)
The QAM View option can be factory installed in any new or existing SDA Series instrument. The specifications and features are in addition to the standard measurement features of the SDA Series. When ordering, please specify option 4a for 8 MHz, DVB-C, ITU-T J.83 annex A, or option 4b for 6 MHz, DVS-031, ITU-T J.83 annex B.
Modulation type 64/256 QAM, DVB-C, ITU-T J.83 annex A (option 4a)
64/256 QAM, DVS-031, ITU-T J.83 annex B (option 4b)
Channel bandwidth 8 MHz (option 4A); 6 MHz (option 4B)

Measurable input range (lock range)
64 QAM –20 to +50 dBmV (typical)
256 QAM –15 to +50 dBmV (typical)

Frequency tuning
50 to 860 MHz (Digital QAM mode)
Resolution
50 kHz
BER (bit error rate)
64 QAM Pre-FEC/options 4A and 4B 10^-4 to 10^-9
64 QAM Post-FEC/options 4A and 4B 10^-4 to 10^-9
256 QAM Pre-FEC/4A and 4B 10^-4 to 10^-9
256 QAM Post-FEC/4A and 4B 10^-4 to 10^-9

QAM level measurement
Signal types 64 QAM, 256 QAM
Range –20 to +45 dBmV
Accuracy ±1.0 dB
Flattness ±0.5 dB
Linearity ±1.0 dB
Temperature ±0.5 dB (typical)

Measureable QAM ingress
64 QAM –25 to –40 dBc
256 QAM –30 to –40 dBc

Accuracy ±3.0 dB

Graphic display
Digital summary (including MER/EVM, pre/post FEC BER, equalizer stress, carrier offset, symbol rate) with limit/margin test results, QAM level. IQ constellation with zoom. Adaptive equalizer display (in accordance with the ERT 290 standard), frequency response, group delay, ingress/noise under the carrier.

Power source
Note: option powered from SDA Series nickel metal hydride battery. Operating time is specified for continuous use in QAM View mode. Option includes high-output charger.
Charge time ~4 hours
Operating time 2.5 hours continuous use (typical)
Universal AC charger/adapter
Input 100-250 VAC, 50-60 Hz, 0.5 A
Output charge 15 V at 750 mA

Physical
(total SDA-5000 size with option 4)
Dimensions 6 x 10.5 x 4.25 in (15.2 x 26.7 x 10.8 cm)
Weight approx. 7.7 lb (3.5 kg)
Temperature range operating –4 to 113°F (~20 to 45°C)

Notes
(1) Typical specifications
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Specifications

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Optional accessories

| **SDA-CASE1** | Replacement soft carrying case for all SDA instruments without QAM View option installed. Compatible with standard and extended-life batteries |
| **SDA-QAM CASE** | Replacement soft carrying case for all SDA instruments with QAM View Option installed |
| **SDA-NIMH** | Spare extended-life battery |
| **SDA-NIMCA** | Universal charger/AC adapter for extended-life nickel metal hydride battery |
| **SDA-NIMK** | Extended-life battery kit. Includes extended-life battery, universal charger/AC adapter, and soft carrying case (SDA-CASE1) (For upgrading units without QAM View option) |
| **CBC-2** | In-vehicle charger for SDA NiMH extended life battery only utilizing standard 12V DC automotive accessory port |

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