Whether deploying cable modems, rolling out digital TV, or maintaining the analog spectrum, the SDA-4040D delivers precision “find and fix” measurement tools that will reduce critical test time when analyzing and qualifying broadband network performance. Priced for virtually any system budget, the SDA-4040D brings unmatched measurement performance to the network technician in a rugged “One Box” solution. And with a versatile upgrade program, the SDA-4040D can be updated as technician skill levels and system requirements expand.

Digital services testing is the centerpiece of the SDA-4040D platform. Detecting and eliminating return path noise is confronted with a fast spectrum analyzer (detects signals down to a 5µs duration), and the industry unique PathTrak Field View option. A Zero Span spectrum provides accurate, in-service power and carrier-to-noise measurements of cable modems. And the new QAM View digital analysis option adds forward path digital signal testing including constellation, pre/post FEC BER, MER, and exclusive QAM Ingress feature that reveals noise under an active carrier. Of course, analog signal measurements are addressed with standard features like RF level, fast-scan, tilt, in-service C/N and HUM, and FCC and CENELEC compliant auto testing.

WWG also offers comprehensive technical training programs to make sure that network field technicians become experts on the SDA-4040D. WWG training provides detailed instruction on the time saving and practical SDA-4040D applications related to the latest broadband technology.

Preparing the Network for Digital Services

OAM View Option Ensures Quality Forward Path Digital Services. For measurement and analysis of digital TV and forward modem signals, the new OAM 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 noise margin “cliff effect” parameter. An equalizer display shows equalizer stress and distance to fault.

In addition, an exclusive QAM ingress noise mode allows 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!

• Fast, Sensitive Spectrum Analyzer
• Full In-Service Proof-of-Performance Analyzer with Level, Carrier-to-Noise, HUM and Modulation Measurements
• Cable Modem Analysis Using Zero Span Mode Provides Accurate, In-service, Power and C/N Measurements
• QAM View Option Provides Complete Analysis of Digital TV and Forward Cable Modem Signals
  > Pre/Post FEC BER
  > MER
  > Constellation
  > Exclusive “Ingress Under the Carrier”
• PathTrak Field View Option Quickly Pinpoints Return Path Noise/Ingress
• Automated 24 Hour Proof-of-Performance According to FCC and CENELEC Standards
• Technical Training Programs
• International Language
• Rugged, Weather Resistant and Lightweight

Advanced Test Equipment Rentals
www.atecorp.com  800-404-ATEC (2832)
®
Established 1981

Wavetek Wandel Goltermann
Communications Test Solutions

▲ Constellation display with MER and prepost FEC BER.

▲ QAM ingress feature shows noise/ingress under an active carrier.
Measuring the Behavior of DOCSIS/DAVIC Compatible Cable Modem Signals in the Cable Plant. For ‘bursty’ digital signals, such as TDMA technologies used on cable modems for reverse services, the SDA-4040D uses the advanced Zero Span capabilities to make the measurement. Time domain displays of TDMA signals allow power measurement, D/U (desired/undesired measurements), and detection of packet collisions, all while the modem is in service. Technicians can measure the level of interference in the actual channel being used.

![Time domain view of ingress in the Zero Span mode captures elusive ingress.](image)

![Cable modem analysis using Zero Span mode provides accurate, in-service, power and C/N measurements.](image)

Fast-Update Spectrum Display for Detecting Ingress in the Field. The spectrum mode has the speed and versatility to effectively troubleshoot difficult system problems. A programmable dwell time allows the meter to stay on each frequency longer to catch more ingress. Peak hold mode captures and saves transient bursts (like evasive return path electrical noise). The SAM4040D detects signals as fast as 5µs, in both Zero Span and continuous modes. The pre-amp and low-pass filter on the SDA-4040D assures that ingress can be measured on devices with bi-directional testpoints or testpoint values of 30dB or more.

![PathTrak Field View option compares headend node spectrum with field test-point spectrum.](image)

PathTrak Field View Option. When your network is equipped with the PathTrak Performance Monitoring System, system technicians can benefit from the ultimate ingress fighting tool—the PathTrak Field View option for the SDA-4040D. With Field View, the SDA-4040D receives a return path headend spectrum broadcast from the PathTrak unit, and then 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 his current testpoint or at a different location. The comparative spectrum technique slashes noise/ingress troubleshooting time, since the technician can immediately verify whether corrective action performed in the field (local trace) results in improvement in the headend spectrum (remote trace).

Sweepless Sweep® Provides Non-Intrusive Frequency Response. The trade-marked Sweepless Sweep® passively provides frequency response information about a network by measuring active carriers. The SAM404D stores the levels of all active carriers at one reference point in the network, and then compares the relative levels to another point within the network, just like referenced sweep, but without the need for a transmitter!
Comprehensive Testing

The SDA-4040D provides an extensive set of signal analysis features designed for proving, and improving, network quality. All tests utilize a practical user interface, normally requiring only a one-button keystroke.

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

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 learning curve for a progressing technician is considerably shorter than alternative test equipment. This means urgent upgrade projects make the most efficient use of limited resources when SDA series products are used.

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 learning curve for a progressing technician is considerably shorter than alternative test equipment. This means urgent upgrade projects make the most efficient use of limited resources when SDA series products are used.

Analog Testing

• Non-Intrusive Sweepless Sweep®
• RF Level, Fast Scan, Tilt
• In-service Carrier to Noise, HUM, Depth of Mod.
• Fast Spectrum Display with CTB/CSO
• Auto Testing/24 Hour Testing (FCC & CENELEC Compliant)

Return Path Testing

• PathTrak Field View Option Pinpoints Return Path Noise
• Zero Span Spectrum Mode
• DOCSIS/DAVIC Compatible Cable Modem Analysis

Advanced Digital Testing

• DigiCheck™ Average Power
• QAM View Digital Analysis Option with MER, Pre/Post FEC BER, Constellation, and Exclusive Noise/Ingress Under the Carrier Measurement

WWG "One Box" Solutions

The SDA-4040D signal analysis meter delivers a “One-Box” solution to help deploy and maintain quality video and data services in the HFC network. With the same durability and measurement accuracy as its venerable SAM predecessor, the SDA-4040D is designed with the speed, spectrum and advanced QAM analysis to test both traditional analog video and the latest digital formats. The versatile combination of standard features and available options allow the meter to be customized, or upgraded to the SDA-5000, to meet virtually any system requirements.

Analog and Digital Signal Limits. Analog signal threshold limits have always been a technician’s favorite feature of WWG 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 (available July 2000).
Other SDA Materials Available:
The following WWG materials are available. Inside the U.S., please call toll-free at 800-622-5515 or 317-788-9357. For faster service, please visit our website at www.wwgsolutions.com.

- Wavelengths newsletter
- SDA-5000 Data Sheet
- PathTrak Field View Option “How It Works”
- App Note #1, Forward Sweep and Balance
- App Note #2, Reverse Sweep and Balance
- App Note #3, Return Path Troubleshooting
- SDA-5000 Sweep Training CD-ROM

**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 user simply uses markers to indicate the tilt channels that define the new limits.

![Tilt mode performs automatic tilt calculations between any 2 of 9 designated carriers.](image)

**In-service carrier-to-noise.**

**Hum Measurement: In-Service.** Measuring hum on a channel (non-scrambled) is as simple as pressing the “HUM” key. And since the instrument is battery powered, the measurement is independent of ground loops, therefore isolated from the line (mains). Hum reveals itself as either single (60 Hz) or double (120 Hz) horizontal bars across the video screen. The level of either can be measured.

![In-service HUM (PAL & NTSC compatible).](image)

**Modulation Measurement.** Includes 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.

![Depth of modulation.](image)

**Scan Measurement.** 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.

![Limit checks can be instantly viewed after identifying channel of interest with a marker in scan mode display.](image)

**Carrier-to-Noise Measurement: In-Service.** Carrier-to-noise measurement (on non-scrambled channel) is just as easy, and there is no need to remove modulation from the video carrier. No tunable preselector filter is needed.

![Depth of modulation.](image)
Extensive Automated Test Capability
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 anytime.

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 to 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. Automated test results can be printed directly to a serial printer or uploaded to a PC using StealthWare to store and include in custom reports.

Data Analysis with StealthWare. Any stored SDA measurement information can be uploaded to a PC using StealthWare, a Windows™ based data management package. Stored sweep, scan, or spectrum screens can be viewed on the PC and analyzed with marker movement and readout information just the same as on the actual unit. A sweep graph overlay function allows comparison of multiple RF response variations over time. StealthWare also allows the operator to build channel plans and edit site locations, which can be downloaded to multiple SDA instruments. Additionally, channel plans can be uploaded to the PC, modified in StealthWare, and then downloaded back to the SDA instrument.

Upgrading the SDA-4040D to SDA-5000.
Your test equipment investment is protected with the WWG upgrade program. As system requirements change, the SDA-4040D can be upgraded to the SDA-5000 for forward and reverse sweep capabilities at any of the WWG worldwide service centers. And if you own a model SAM-4040D, you can upgrade to the SDA-4040D with an in-the-field firmware change only!

Additional Customer Support
Wavetek Wandel Goltermann offers quality, cost-effective support programs that address all of your technical support needs. With over 20 fully equipped CATV accredited service centers world-wide, WWG provides local product maintenance, calibration and upgrades, along with technical training services.

CarePlanSM Customer Support Package
The WWG CarePlan is a proactive technical support program designed to safeguard your investment through its complete life-cycle. Key benefits of the CarePlan include:
- Cost-effective product maintenance support
- Annual calibration certification program
- Proactive hardware and software upgrades
- Technical support

Technology Training
WWG provides a comprehensive CATV technology training program designed to help you and your teams understand the changing needs of today’s advanced networks. Training seminars include:
- HFC Basics
- Understanding Digital
- Sweep and Balance Forward and Return
- Mastering the Forward Path
- Mastering the Return Path
- Sweep 101 “Bootcamp”
Model SDA-4040D Signal Analysis Meter:
Digital / Analog HFC Analyzer. Includes: Extended-life nickel metal hydride battery, universal charger/AC adapter, canvas carrying case and operators manual.

Options:
- SDA-OPT3A: PathTrak Field View Interoperation for model SDA-4040D (requires PathTrak HCU)
- SDA-OPT4A/B: QAM View digital analysis including 64/256 Constellation, MER, Pre/Post FEC BER, and exclusive QAM ingress under the carrier feature. Please specify OPT version 4A or 4B when ordering.
  - SDA-OPT4A: 64/256 QAM, DVB-C, ITU-T J.83 Annex A (8 MHz)
  - SDA-OPT4B: 64/256 QAM, DVS-031, ITU-T J.83 Annex B (6 MHz)
- SDA-OPT5: BNC connectors replace standard F type connectors
- StealthWare: Windows™ Compatible Data Management Software for all SDA, Stealth, MicroStealth, and CLI products.

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-CASE2: Replacement soft carrying case for all SDA instruments with QAM View option installed.
- SDA-NIMH: Spare extended life battery.
- SDA-NIMK: Extended life battery kit. Includes extended life battery, universal charger/AC adapter and soft carrying case (SDA-CASE1).

Specifications

**Frequency**
- Range: 5 to 1,000 MHz
- Accuracy: ± 10 ppm at 25°C; ± 10 ppm drift over temp.; ± 3 ppm/year aging

**Hum Measurement**
- In-service measurement. Carrier > 0 dBmV. Non-scrambled channels only
- Range: ≥ 52 dB
- Resolution: < 0.5 dB

**Depth of Modulation**
- Assumess 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%

**Tilt Measurement**
- Up to 9 pilot carriers or video channels with tilt and level measurements on the highest and lowest.
- Hi-Lo Δ Resolution: 0.1 dB

**Scan Mode**
- All video, audio, pilot carrier, and digital channel levels displayed.

**Carrier-to-Noise**
- In-service measurement. Non-scrambled channels only. No preselection required for 78 channels or less. Best dynamic range at +10dBmV or higher input.
- Range: ≥ 52 dB
- Resolution: < 0.5 dB
**Specifications**

**General**
- Display: 320x240 dot matrix LCD, selectable back light
- Dimensions: 15.2 x 27.9 x 8.9 cm (6"x11"x3.5")
- Weight: 2.3 kg (5.1 lbs)
- Temperature Range Operating: -20 to +47°C (-4 to 117°F)

**Power Sources**
- Battery: Extended-life replaceable nickel metal hydride, 12V/3.5Ah 4 hours cont. use on a single charge

**PathTrak Field View (OPT 3 required)**
- 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)

**Notes**
1) Typical Specifications
2) Relative to 25°C
3) @25°C and +20dBmV
4) Nominal level in 10 µs +/- 2 dB from nominal in 5 µs (>1 MHz VBW, 280 kHz RBW)
5) Nominal level in 10 µs +/- 2.5 dB from nominal in 5 µs (>1 MHz VBW, 280 kHz RBW)

**Sweepless Sweep® Mode**
- Frequency Range: 5-1000 MHz
- Display Span: user definable
- Display Scale/Range: 6 vertical divisions 1, 2, 5, or 10dB/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; 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

**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, 20, 10 & 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
- Spurious Free Dynamic Range: 60 dB
- Sensitivity Without Preamp: -40 dBmV 5 - 550 MHz
  - -35 dBmV 550 - 1000 MHz
- Sensitivity With Preamp: -50 dBmV 5 - 550 MHz
  - -45 dBmV 550 - 1000 MHz
- Max. Level With Preamp: +50 dBmV

**Zero-Span Mode**
- Video BW: >1MHz, 100 kHz, 10 kHz, 100 Hz
- Resolution BW: 2 MHz, 280 kHz, 30 kHz
- Measurement BW Compensation: programmable 1 kHz-99 MHz
- Pulse Measurement Accuracy: nominal level in 10 µs +/- 2 dB from nominal in 5 µs (>1 MHz VBW, 280 kHz RBW)
- Sweep Times: 100 µs to 20 s (1,2,5 settings)

**Intermodulation Distortion (CSO/CTB)**
- Range: ≥ 60 dB
- Resolution: 0.1 dB

**Data Storage**
- Files stored: Autotests, tilt, channel plans, scan and Sweepless Sweep. 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. Typical mix of files for 78-channel plan 8 channel plans, 16 sweep references 80 sweep traces; 40 scan files 20 spectrum displays; 20 autotests

**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

**Carrier to Noise Ratio**

<table>
<thead>
<tr>
<th>Video Carrier Level (dBmV)</th>
<th>Carrier to Noise Ratio (dB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>-10</td>
<td>0</td>
</tr>
<tr>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>20</td>
<td>30</td>
</tr>
<tr>
<td>30</td>
<td>40</td>
</tr>
<tr>
<td>40</td>
<td>50</td>
</tr>
<tr>
<td>50</td>
<td>60</td>
</tr>
<tr>
<td>Out of Measurement Range</td>
<td></td>
</tr>
</tbody>
</table>

**Spurious Free Dynamic Range**

<table>
<thead>
<tr>
<th>Video Signal Level (dBmV)</th>
<th>Spurious Free Dynamic Range (dB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>-40</td>
<td>60</td>
</tr>
<tr>
<td>-35</td>
<td>60</td>
</tr>
<tr>
<td>-50</td>
<td>60</td>
</tr>
<tr>
<td>-45</td>
<td>60</td>
</tr>
<tr>
<td>50</td>
<td>60</td>
</tr>
<tr>
<td>550</td>
<td>60</td>
</tr>
<tr>
<td>1000</td>
<td>60</td>
</tr>
<tr>
<td>Out of Measurement Range</td>
<td></td>
</tr>
</tbody>
</table>

**Zero Span Mode Resolution BW**

<table>
<thead>
<tr>
<th>Video Signal Level (dBmV)</th>
<th>Resolution BW (dB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>-10</td>
<td>2 MHz</td>
</tr>
<tr>
<td>0</td>
<td>280 kHz</td>
</tr>
<tr>
<td>10</td>
<td>30 kHz</td>
</tr>
<tr>
<td>20</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td></td>
</tr>
<tr>
<td>40</td>
<td></td>
</tr>
<tr>
<td>50</td>
<td></td>
</tr>
<tr>
<td>60</td>
<td></td>
</tr>
<tr>
<td>Out of Measurement Range</td>
<td></td>
</tr>
</tbody>
</table>

**Pulse Measurement Accuracy**

<table>
<thead>
<tr>
<th>Video Signal Level (dBmV)</th>
<th>Pulse Measurement Accuracy (dB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>-10</td>
<td>+/- 2 dB</td>
</tr>
<tr>
<td>0</td>
<td>+/- 2.5 dB</td>
</tr>
<tr>
<td>10</td>
<td>+/- 3 dB</td>
</tr>
<tr>
<td>20</td>
<td>+/- 3.5 dB</td>
</tr>
<tr>
<td>30</td>
<td>+/- 4 dB</td>
</tr>
<tr>
<td>40</td>
<td>+/- 4.5 dB</td>
</tr>
<tr>
<td>50</td>
<td>+/- 5 dB</td>
</tr>
<tr>
<td>60</td>
<td>+/- 5.5 dB</td>
</tr>
<tr>
<td>Out of Measurement Range</td>
<td></td>
</tr>
</tbody>
</table>

**Data Storage Files stored**
- Autotests, tilt, channel plans, scan and Sweepless Sweep. 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. Typical mix of files for 78-channel plan 8 channel plans, 16 sweep references 80 sweep traces; 40 scan files 20 spectrum displays; 20 autotests

**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
**QAM View Option (OPT 4)—PRELIMINARY**

The QAM Analyzer Option (QAM View) can be factory installed in any new or existing SDA-4040D instrument. The specifications and features are in addition to the standard measurement features of the SDA-4040D. When ordering, please specify OPT 4A for 8MHz, DVB-C, ITU-T J.83 Annex A, or OPT 4B for 6MHz, DVS-031, ITU-T J.83 Annex B.

**Modulation Type**

<table>
<thead>
<tr>
<th>Type</th>
<th>QAM View Option (OPT 4)</th>
</tr>
</thead>
</table>

**Measurable Input Range (Lock Range)**

<table>
<thead>
<tr>
<th>Range</th>
<th>dBmV (typical)</th>
</tr>
</thead>
<tbody>
<tr>
<td>64 QAM</td>
<td>-20 to +50 dBmV</td>
</tr>
<tr>
<td>256 QAM</td>
<td>-15 to +50 dBmV</td>
</tr>
</tbody>
</table>

**Frequency Tuning**

50 to 860 MHz (Digital QAM mode)

Resolution: 25 kHz

**MER (Modulation Error Ratio)**

<table>
<thead>
<tr>
<th>Mode</th>
<th>64 QAM/OPT 4A</th>
<th>64 QAM/OPT 4B</th>
<th>256 QAM/OPT 4A</th>
<th>256 QAM/OPT 4B</th>
</tr>
</thead>
<tbody>
<tr>
<td>64 QAM/OPT 4A</td>
<td>22-35 dB</td>
<td>21-35 dB</td>
<td>28-35 dB</td>
<td>28-35 dB</td>
</tr>
<tr>
<td>256 QAM/OPT 4A</td>
<td>30-35 dB</td>
<td>28-35 dB</td>
<td>30-35 dB</td>
<td>28-35 dB</td>
</tr>
</tbody>
</table>

**EVM (Error Vector Magnitude)**

<table>
<thead>
<tr>
<th>Mode</th>
<th>64 QAM/OPT 4A</th>
<th>64 QAM/OPT 4B</th>
<th>256 QAM/OPT 4A</th>
<th>256 QAM/OPT 4B</th>
</tr>
</thead>
<tbody>
<tr>
<td>64 QAM/OPT 4A</td>
<td>1.2% - 5.2%</td>
<td>1.2% - 5.2%</td>
<td>1.2% - 2.0%</td>
<td>1.2% - 2.5%</td>
</tr>
<tr>
<td>256 QAM/OPT 4A</td>
<td>1.1% - 2.5%</td>
<td>1.1% - 2.5%</td>
<td>1.1% - 2.0%</td>
<td>1.1% - 2.5%</td>
</tr>
</tbody>
</table>

**Accuracy**

64 QAM/OPT 4A and 4B: ± 0.4% (1.2% - 5.2%)

256 QAM/OPT 4A and 4B: ± 1.0% (2.1% - 5.2%)

**BER (Bit Error Rate)**

<table>
<thead>
<tr>
<th>Mode</th>
<th>Type</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>64 QAM Pre-FEC/OPTs 4A and 4B</td>
<td>10^-4 to 10^-9</td>
<td></td>
</tr>
<tr>
<td>64 QAM Post-FEC/OPTs 4A and 4B</td>
<td>10^-4 to 10^-9</td>
<td></td>
</tr>
<tr>
<td>256 QAM Pre-FEC/OPT 4A</td>
<td>10^-4 to 10^-6</td>
<td></td>
</tr>
<tr>
<td>256 QAM Post-FEC/OPT 4A</td>
<td>10^-4 to 10^-9</td>
<td></td>
</tr>
<tr>
<td>256 QAM Pre-FEC/OPT 4B</td>
<td>10^-4 to 10^-9</td>
<td></td>
</tr>
<tr>
<td>256 QAM Post-FEC/OPT 4B</td>
<td>10^-4 to 10^-9</td>
<td></td>
</tr>
</tbody>
</table>

**Measurable QAM Ingress**

-25 to -40 dBc

Accuracy: ± 1.5 dB

**Channel Bandwidth**

8 MHz (OPT 4A); 6 MHz (OPT 4B)

**Zero Span Spectrum**

(Standard Feature - See SDA-4040D specifications)

**Graphic Display**

Digital summary (including MER/EVM, Pre/Post FEC BER, Equalizer Stress, Carrier Offset, Symbol Rate) with limit/margin test results. IQ constellation with zoom. Adaptive Equalizer Display (8 feed forward/24 feedback), Frequency Response, Group Delay. Ingress/Noise Under the Carrier.

**Power Source**

Note: Option powered from SDA-4040D 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, 0.5A

Output: Charge 15V @ 750 ma

**Physical**

Dimensions (total SDA-4040D size after option installation): 15.2 x 26.7 x 10.8 cm

Weight: (total SDA-4040D weight after option installation) Approx. 3.5 kg (7.7 lbs)

Operating Temperature Range: -20 to 45°C (-4 to 113°F)

**For more detailed information about using the SDA-4040D, call for your free CATV “Find & Fix” Guide at 800-851-1202 or +1 317-788-9351.**