Product Brochure

Anritsu

Site Master™ S331D/S332D

Cable and Antenna Analyzer, 2 MHz to 6 GHz
Spectrum Analyzer, 100 kHz to 3 GHz

Site Master™ is the Preferred Cable and Antenna Analyzer of Wireless Service Providers, Contractors, and Installers.

Cost Savings and Quality Improvement

Wireless market competition requires operators to reduce per site maintenance expense. Site Master's Frequency Domain Reflectometry (FDR) techniques break away from the traditional fix-after-failure maintenance process by finding small, hard to identify problems before major failures occur.

Sixty to eighty percent of a typical cell site's problems are caused by problematic cables, connectors and antennas. When cables or antennas are contaminated with moisture, damaged, or mispositioned during storms, Site Master identifies the problem quickly. Antenna degradation reduces the cell coverage pattern and can cause dropped calls. Site Master can pinpoint the antenna problem from ground level in a few seconds making climbing the antenna tower unnecessary.

A poorly installed weather seal will corrode connectors and, if undetected, will eventually damage an expensive coaxial cable. Site Master has the sensitivity to identify the connector problem before the cable is damaged. Distance-To-Fault provides the clearest indication of troubled areas.

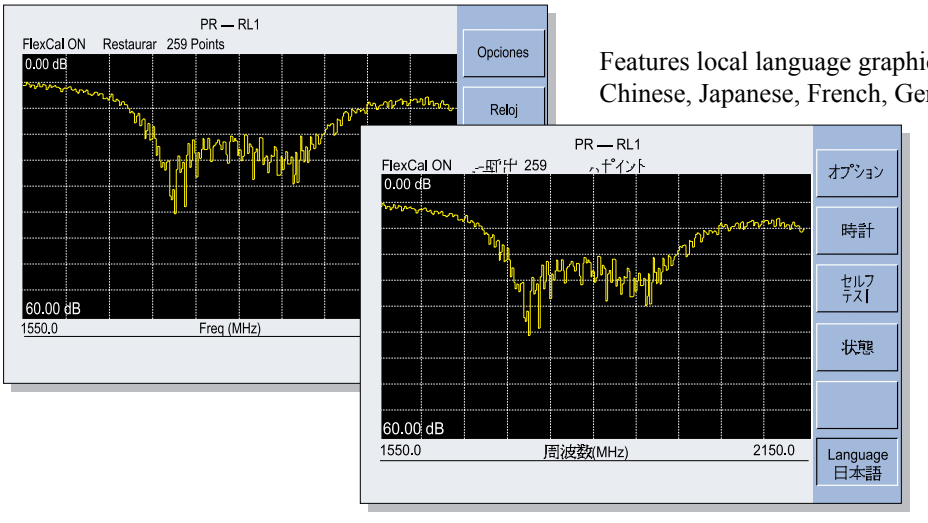
Site Master Revolutionizes Cable and Antenna Sweeping in the Wireless Industry.

Rugged and Reliable

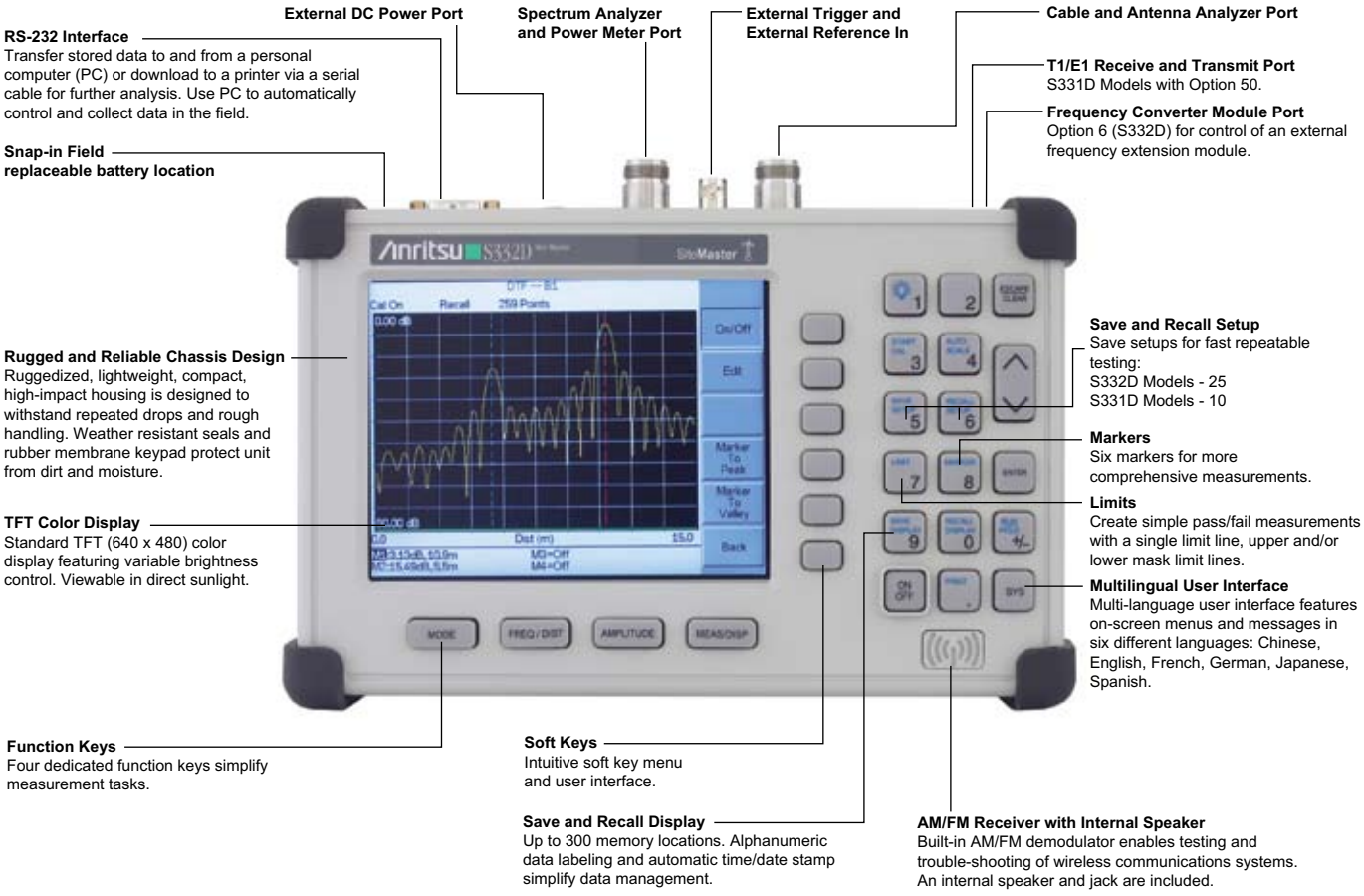
Because the Site Master was designed specifically for field environments, it can easily withstand the day-to-day punishment of field use. The analyzer is almost impervious to the bumps and bangs typically encountered by portable field-equipment.

Easy-to-Use

Site Master operation is straightforward; measurements are obtained through a menu-driven user interface that is easy to use and requires little training. The large, and high-resolution TFT color display makes test interpretation easy and quick. A full range of markers enable the user to make accurate measurements. Limit lines simplify measurements allowing users to create quick and simple pass/fail tests.



Features local language graphical user interface support in English, Chinese, Japanese, French, German, and Spanish.



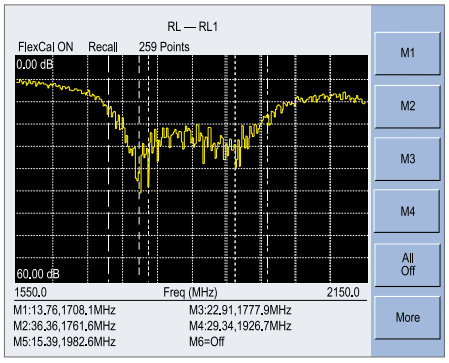
Function	Benefits
Cable and Antenna Analyzer (S331D/S332D)	Characterize antenna system and pinpoint location of faults
Spectrum Analyzer (S332D)	Easily locate, identify and record various signals with high accuracy
AM/FM Demodulator (S332D)	Built-in demodulator for AM, narrow band FM, wide band FM, and SSB allows technician to listen to and identify interfering signals
Standard TFT Color Display (S331D/S332D)	Display is viewable in direct sunlight
Power Monitor (S331D/S332D)	Performs accurate broadband power measurements using an external detector
High Accuracy Power Meter (S331D/S332D)	Performs accurate RMS power measurements for both CW and modulated signals
Power Meter (S331D/S332D)	Performs accurate power measurements up to 3 GHz without the need of an external detector
Frequency Converter Interface (S332D)	Make measurement from 4.7 GHz to 6 GHz using an external detector
2 MHz and 6 GHz Frequency Extensions (S331D/S332D)	Extend the lower and upper frequency ranges of the cable and antenna analyzer to 2 MHz and 6 GHz for optimum frequency coverage
Built-in +12 V to +24 V variable Bias Tee (S332D)	No need to use external power to bias an amplifier
Transmission Measurement (S332D)	Perform a 2-port measurement and measure the insertion gain, loss, and isolation of Tower Mounted Amplifiers, filters, attenuators, and antennas
Interference Analyzer (S332D)	Identify and locate interfering signals that cause dropped calls and coverage problems. Intermittent problems can be identified using spectrograms
Channel Scanner (S332D)	Measure frequency, bandwidth and power of multiple transmitted signals
CW Signal Generator (S332D)	CW source to test low noise amplifiers, repeaters, and BTS receivers
GPS Receiver (S331D/S332D)	Provides location (latitude, longitude, altitude) and UTC time information
T1/E1 Analyzer (S331D)	Simplifies the task of determining if the source of problems is on the wireline or the wireless side

FDR Technique

Frequency Domain Reflectometry, (FDR), and Time Domain Reflectometry, (TDR), have similar acronyms, and both techniques are used to test transmission lines. But, that's where the similarities end. TDRs are not sensitive to RF problems: the TDR stimulus is a DC pulse, not RF. Thus, TDRs are unable to detect system faults that often lead to system failures. Additionally, FDR techniques save costly, time-consuming trouble shooting efforts by testing cable feed-line and antenna systems at their proper operating frequency. Deficient connectors, lightning arrestors, cables, jumpers, or antennas are replaced before call quality is compromised.

Quick, Simple Measurements

Site Master performs various RF measurements aimed at simplifying cable feedline and antenna analysis: Return Loss, SWR, Cable Loss and Distance-to-Fault (DTF). A single key selection on the main menu activates the desired measurement mode.

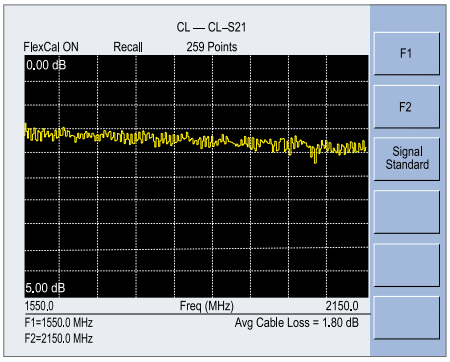


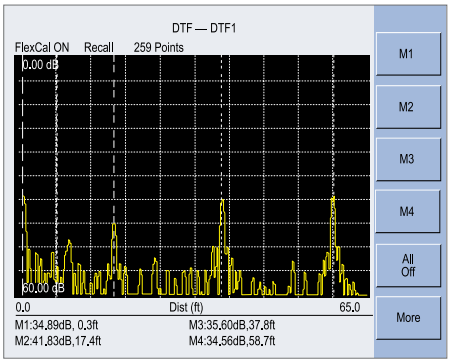
Return Loss, SWR

Return Loss and SWR "system" measurements ensure conformance to system performance engineering specifications. Measurement easily toggles between either one of the two modes and can be performed without climbing the tower.

Cable Loss

Cable Loss measurements measure the level of insertion loss within the cable feed-line system. Insertion loss can be verified prior to deployment, when you have access to both ends of the cable, or on installed cables without access to the opposite end. Site Master automatically calculates and displays the average cable loss so there is no more guess work or a need to perform calculations in the field.





Distance-to-Fault

Although a Return Loss test can tell users the magnitude of signal reflections, it cannot tell the precise location of a fault within the feed-line system. Distance-To-Fault measurements provide the clearest indication of trouble areas as it tells us both the magnitude of signal reflection and the location of the signal anomaly.

Distance-To-Fault measurement capability is built into all Site Master models as a standard feature. Return Loss (SWR) measurement data is processed using Fast Fourier Transform and the resulting data indicates Return Loss (SWR) versus distance. Distance-to-Fault measurements indicating Return Loss or SWR versus time is available with Handheld Software Tools™.

New Options Provide Cable and Antenna Analysis Coverage from 2 MHz to 6 GHz

2 MHz Frequency Extension (Option 2, S331D/S332D)

The standard Site Master spans 25 MHz to 4000 MHz. Option 2 extends the lower frequency range of the cable and antenna analyzer to 2 MHz.

6 GHz Frequency Extension (Option 16, S331D/S332D)

Option 16 extends the standard 25 MHz to 4000 MHz frequency range of the cable and antenna analyzer to 25 MHz to 6000 MHz. Option 16 used in conjunction with option 2 provides continuous coverage of the cable and antenna analyzer from 2 MHz to 6 GHz.

OSL Calibration

Open-Short-Load (OSL) calibration is standard for the S331D and S332D. All errors from source match, directivity and frequency response are mathematically removed allowing for accurate vector corrected Return Loss, Cable Loss, VSWR, and DTF measurements. Directivity is usually the main contributor to measurement uncertainty, and corrected directivity of 42 dB or better is common using Anritsu's precision components.

FlexCal™

The Site Master FlexCal™ broadband calibration feature is an OSL-based calibration method. It offers field technicians a simple and convenient way to troubleshoot and identify faulty antenna system components, because it eliminates the need for multiple instrument calibrations and calibration setups. Field technicians can now perform a broadband calibration and change the frequency range after calibration without having to recalibrate the instrument. A zoom-in/zoom-out capability is available in Return Loss, Cable Loss or VSWR mode. Because the resolution and maximum distance are dependent on the frequency range, field technicians can even change the frequency range in DTF mode to produce the desired fault resolution and horizontal range needed for the measurement, without performing additional calibrations.

InstaCal™ Calibration

The InstaCal Calibration module is available in the S331D and S332D and users can cut the time required to calibrate the Site Master by as much as 50 percent. With InstaCal, users are only required to connect the InstaCal calibration module once and the calibration process will be done automatically. Directivity specification for the InstaCal module is 38 dB for the entire frequency range allowing the user to make fast and accurate measurements.

RF Immunity

In today's wireless environment it is very common that there will be other RF activity present when making a measurement. In order to make accurate measurements in hostile RF environments, the receiver has to be able to reject the unwanted signals. Special dithering techniques are applied to the Site Master when making a measurement, and the Site Master can reject signals up to +17 dBm ensuring accurate measurements in RF rich environments.

Optical Distance-To-Fault

The ODTF-1 accessory module can be used with Anritsu's handheld cable & antenna analyzers to make high resolution Optical DTF (Distance-To-Fault) measurements.

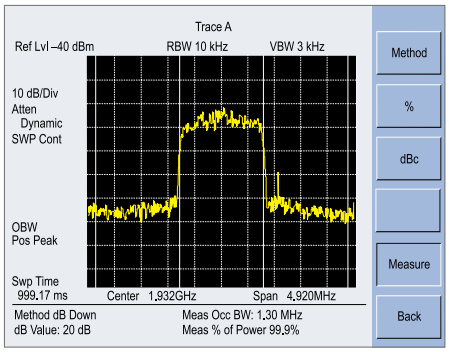
The combination of the Site Master and ODTF-1 module provides users with an efficient solution for characterizing both RF and Fiber Optic systems such as Remote Radio Head configured BTS systems.

Spectrum Analysis – Anywhere, Anytime (S332D)

The Site Master S332D integrated Spectrum Analysis capability provides the "ultimate" in measurement flexibility for field environments and applications requiring mobility. With the S332D you can locate, identify, record and solve communication systems problems quickly and easily, and with incredible accuracy – making it a perfect solution for conducting field measurements in the 100 kHz to 3 GHz frequency range.

Smart Measurements

The S332D has dedicated routines for measurements of field strength, channel power, occupied bandwidth, Adjacent Channel Power Ratio (ACPR), Carrier-to-Interference, and interference analysis. These are increasingly critical measurements for today's wireless communication systems. The simple interface for these complex measurements significantly reduces test time and increases analyzer usability.



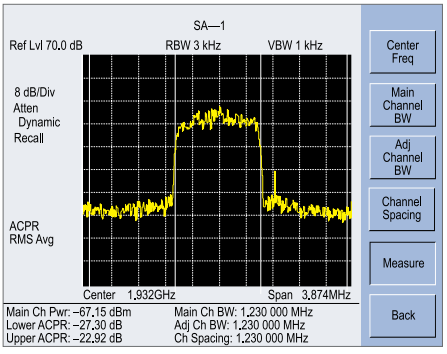
Occupied Bandwidth

This measurement calculates the bandwidth containing the total integrated power occupied in a given signal bandwidth. There are two different methods of calculation depending on the technique used to modulate the carrier. The user can specify percent of power or the "x" dB down point, where "x" can be from 1 dB to 120 dB below the carrier.

Adjacent Channel Power Ratio

A common transmitter measurement is that of adjacent channel leakage power. This is the ratio of the amount of leakage power in an adjacent channel to the total transmitted power in the main channel. This measurement is used to replace the traditional two-tone intermodulation distortion (IMD) test for system non-linear behavior.

The result of an ACPR measurement can be expressed either as a power ratio or a power density. In order to calculate the upper and lower adjacent channel values, the S332D allow the adjustment of four parameters to meet specific measurement needs: main channel center frequency, measurement channel bandwidth, adjacent channel bandwidth and channel spacing.



AM/FM/SSB Demodulator

A built-in demodulator for AM, narrowband FM, wideband FM and single sideband (selectable USB and LSB) allow a technician to easily identify interfering signals.

Frequency Converter Control Module

6 GHz Frequency Extension

The FCN4760 is a block down converter for the 4.7 to 6.0 GHz frequency range. It is designed to work with an Anritsu Site Master S332D equipped with Option 6.

This converter is primarily intended for field use by fixed wireless engineers who are responsible for the design, deployment and optimization of 802.11a networks. It is also used to conduct interference analysis measurements to determine the level of interference and locate the sources of interference.

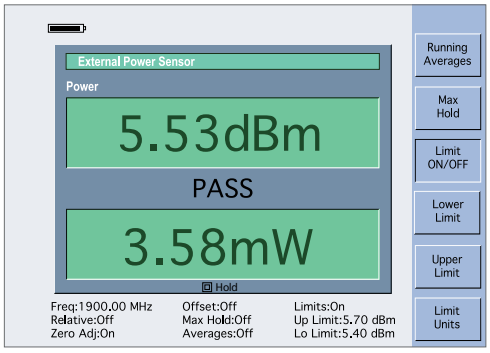
Frequency Converter Control Module Interface (Option 6, S332D)

Connector providing internal control signals to work with the FCN4760, a block down converter designed for the 4.7 to 6 GHz frequency ranges.

Power Monitor (Option 5, S331D/S332D)

Use Anritsu's 560 and 5400 series detector to measure broadband power. They are an excellent solution to measure an 18 GHz microwave link carrying the Base Station T1/E1 link. The detectors use precision high return loss detectors with excellent impedance match designed to minimize mismatch uncertainty (See uncertainty curves on page 11). Measurement range is from –50 to +16 dBm and the display range is from –80 to +80 dBm. There are several detectors available designed for different frequency ranges.

S332D Site Master with
560-7N50B Detector

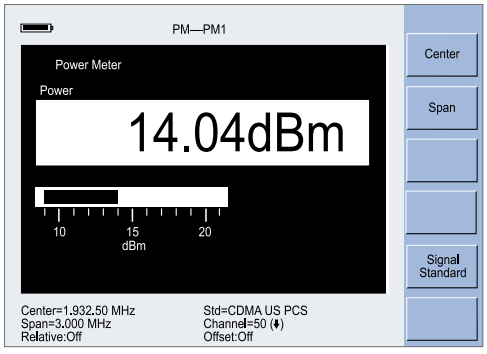


High Accuracy Power Meter (Option 19, S331D/S332D)

PSN50 High Accuracy
Power Sensor

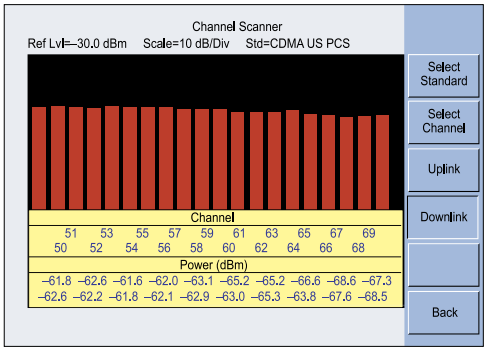
Anritsu's High Accuracy Power Meter option enables users to make high accuracy RMS measurements, perfect for both CW and digitally modulated signals such as CDMA/EV-DO, GSM/EDGE, and WCDMA/HSDPA. This option requires sensor PSN50 or MA24104A. The PSN50 sensor provides high accuracy measurements from 50 MHz to 6 GHz with a dynamic range from –30 to +20 dBm. The MA24104A is an Inline High Power Sensor with a frequency range from 600 MHz to 4 GHz and can measure signals as high as 150 W. Both of the sensors are equipped with an RS-232 interface for fast and easy connection to the Site Master.

MA24104A
Inline High Power Sensor



Power Meter (Option 29, S331D/S332D)

The power meter tool performs accurate transmitter power meter measurements from 3 MHz to 3 GHz reducing coverage holes and interference. The Spectrum Analyzer is used to measure the channel power and results can be displayed in dBm or Watts. No external detector is required.



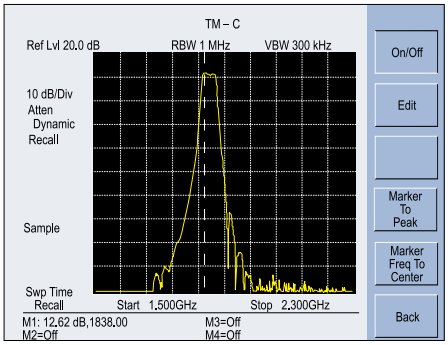
Channel Scanner (Option 27, S332D)

The Channel Scanner option measures the power of multiple transmitted signals, and is very useful for measuring the channel power of AMPS, iDEN, GSM, CDMA/EV-DO, and TDMA networks.

Site Master Options (Continued)

Built-in Bias Tee (Option 10A, S332D)

Built-in power supply can be turned on as needed to place +12 to +24V (variable in 1V steps) on the center conductor of the RF In port. It is designed to deliver 6W steady state.



Transmission Measurement (Option 21, S332D)

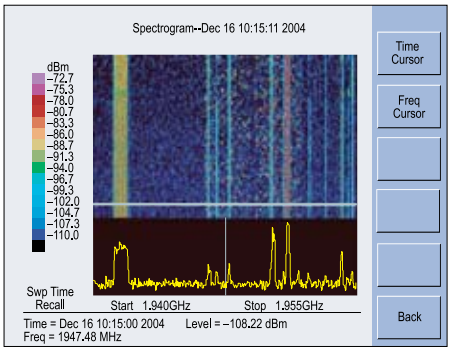
Built-in signal source from 25 MHz to 3 GHz provides the capability to make 2-port measurements and measure gain, loss, or isolation of devices such as filters, cables, attenuators, amplifiers, and antennas.

Interference Analyzer (Option 25, S332D)

The interference analyzer option displays interference in four different ways: Spectrogram, RSSI, Signal Strength, Signal ID.

Spectrogram

The Site Master Spectrogram is a three dimensional display of frequency, power and time of the spectrum activity to identify intermittent interference and track signal levels over time. The Site Master can save a history up to three days.

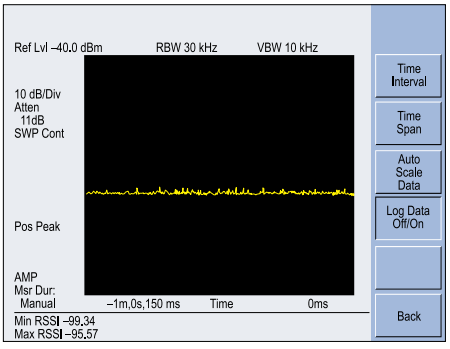


RSSI

RSSI measurement is useful to observe the signal strength of a single frequency over time. The data can be collected for up to seven days.

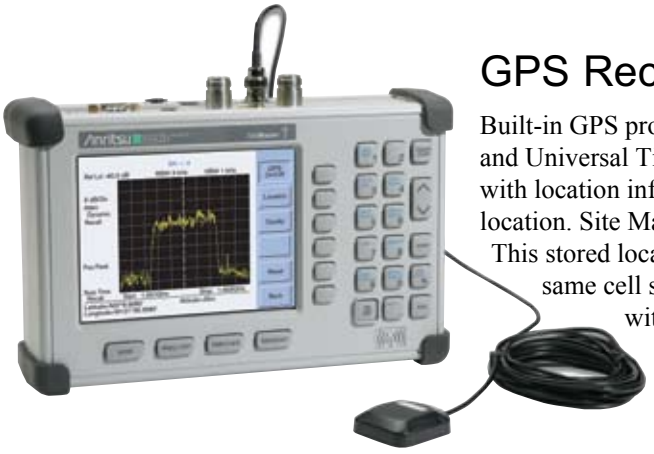
Locating an Interfering Signal

Connect a directional antenna to the Site Master and locate the interfering source by measuring the strength of the interfering signal. Signal strength is indicated as an audible beep.



CW Signal (Option 28, S332D)

Provides a CW signal from –6 dBm to –80 dBm in 1 dB step from 25 MHz to 2 GHz. The attenuator connected to the RF port can be varied from 0 to 90 dB in 1 dB steps and the splitter divides the signal into two signals: One is fed into the device under test and one is fed into the Spectrum Analyzer Receiver port. The display shows the output power and the frequency. The CW Signal mode and the Power Monitor mode can be operated simultaneously in units with both options installed providing the user with the flexibility to send out and monitor a signal at the same time.

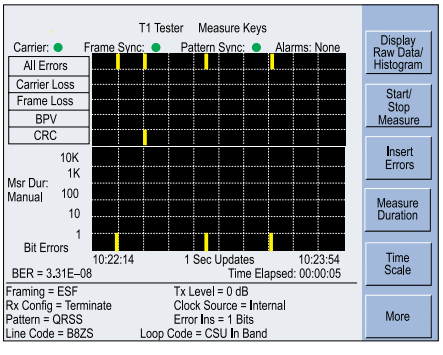


GPS Receiver (Option 31, S331D/S332D)

Built-in GPS provides location information (latitude, longitude, and altitude) and Universal Time (UT) information. Site Master can stamp each trace with location information to check if the measurements are taken at the right location. Site Master stores the GPS location information until the unit is turned off. This stored location information can be used to stamp traces taken indoors at the same cell site location. The GPS option is offered with a magnet mount antenna with a 15-foot (~ 5m) cable to mount on the car or other useful surface.

T1/E1 Analyzer (Option 50, S331D)

Site Master built-in T1/E1 Analyzer performs T1/E1 functional tests, simplifying the task of determining if the source of the problem is on the wireline or the wireless side. Site Master can display the T1/E1 data in histogram form and collect the data for up to two days. Site Master can also measure the voltage (Vpp) of the signal and it can also be displayed as dBdsx.



Master Software Tools™

Master Software Tools provides the user with comprehensive data management and post processing tools which augment the capabilities of the Site Master. This software provides a simple and easy way to manage, archive, analyze, print measurement reports, customize your cable list, antenna list, signal standards list and keep your Site Master up to date with the latest instrument firmware. Master Software Tools (MST) is a Windows program which is included with every Site Master instrument. For the most current version of Master Software Tools, please visit www.us.anritsu.com.

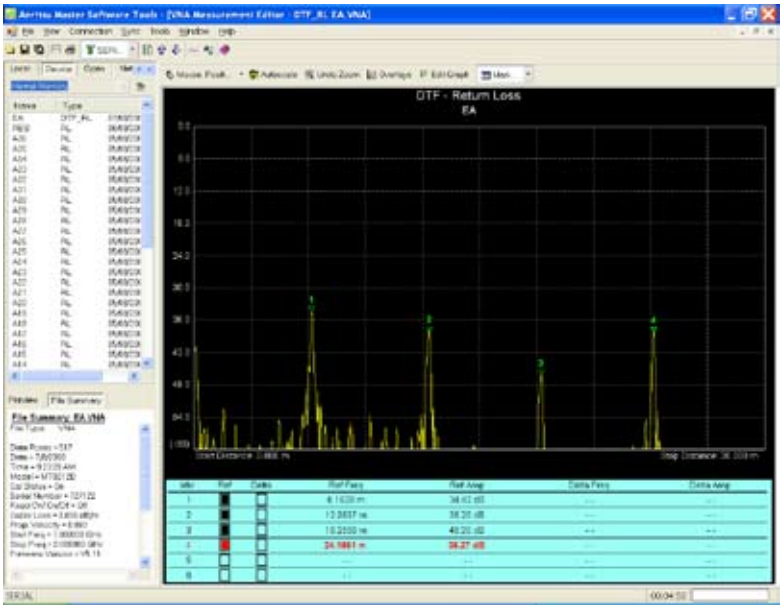


Figure 1, DTF trace transferred to MST

- Up to 300 Site Master trace memory locations can be downloaded with a single menu selection
- Build historical records with an unlimited number of traces in one document
- Intelligent Trace Renaming features allow you to rename hundreds of traces in minutes instead of hours.
- Edit and create custom signal standards and cable lists
- Create custom reports
- View Spectrogram displays in 3D
- Copy markers and limit lines from one trace to all the traces in a specific folder with easy to use group edit functions
- Use the Product Update feature to make sure you always use the latest instrument firmware.

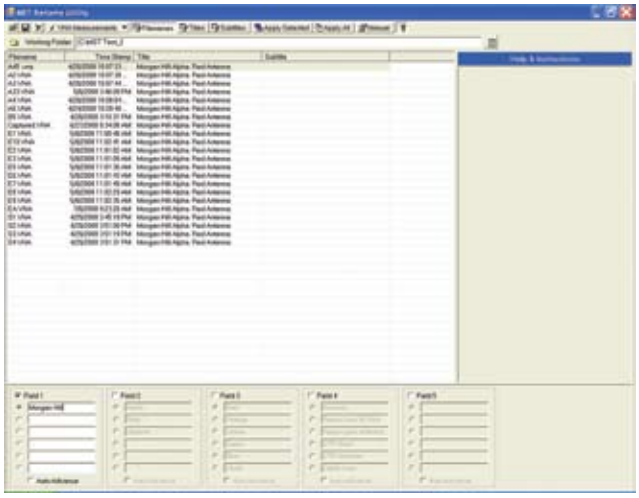


Figure 2, Update file names with the Trace Rename utility

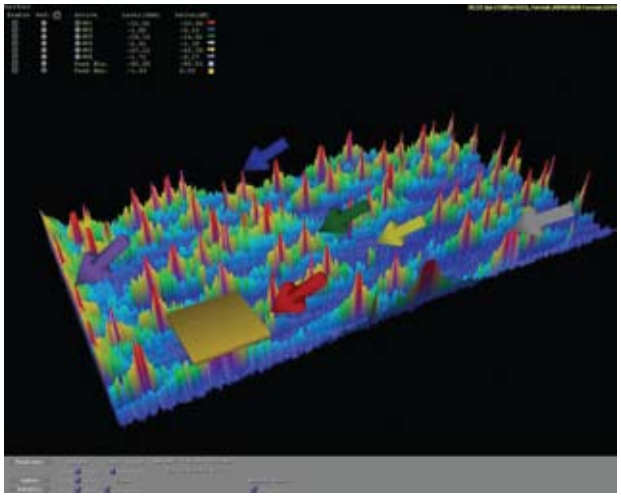


Figure 3, View Spectrogram displays in 3D

Specifications

Cable and Antenna Analyzer (S331D/S332D)

Frequency Range: 25 MHz to 4.0 GHz
Frequency Accuracy: ≤ ±50 ppm @ +25 °C
Frequency Resolution: 1 kHz (CW On)
100 kHz (CW Off)
Output Power: 0 dBm typical
Immunity to Interfering Signals: On-channel: +17 dBm
On-frequency: –5 dBm
Measurement Speed: ≤ 2.5 msec / data point (CW ON)
Number of Data Points: 130, 259, 517
Return Loss: Range: 0.00 to 60.00 dB
Resolution: 0.01 dB
VSWR: Range: 1.00 to 65.00
Resolution: 0.01
Cable Loss: Range: 0.00 to 30.00 dB
Resolution: 0.01 dB
Measurement Accuracy: > 42 dB corrected directivity after calibration
Distance-to-Fault:
Vertical Range: Return Loss: 0.00 to 60.00 dB
VSWR 1.00 to 65.00
Horizontal Range: 0 to (# of data pts –1) x Resolution to a maximum of 1497m (4912 ft), # of data pts = 130, 259 or 517
Horizontal Resolution (Rectangular Windowing): Resolution (meter) = $(1.5 \times 10^8) \times (Vp)/DF$ Where Vp is the cable's relative propagation velocity and where DF is the stop frequency minus the start frequency (in Hz).

Spectrum Analyzer (S332D)

Frequency:

Frequency Range: 100 kHz to 3.0 GHz (tunable to 9 kHz)
Frequency Reference
(Internal Timebase) Aging: ± 1 ppm/yr
Accuracy: ± 2 ppm
Frequency Span: 10 Hz to 2.99 GHz in 1, 2, and 5 step selections in auto mode, plus zero span
Sweep Time: ≤ 1.1 sec full span
≤ 50 µsec to 20 sec selectable in zero span
Resolution Bandwidth (–3 dB): 100 Hz to 1 MHz in 1-3 sequence
± 5% Accuracy
Video Bandwidth (–3 dB): 3 Hz to 1 MHz in 1-3 sequence
± 5% Accuracy typical
SSB Phase Noise (1 GHz) @ 30 kHz Offset: ≤ –75 dBc/Hz
Spurious Responses Input Related: ≤ –45 dBc
Spurious Residual Responses: –90 dBm, ≥ 10 MHz
–80 dBm, <10 MHz
(10 kHz RBW, pre-amp on)

Amplitude:

Total Level Accuracy: ± 1 dB typical (±1.5 dBm max), ≤ 10 MHz to 3 GHz
± 2 dB typical, <10 MHz for input signal levels ≥ –60 dBm, excludes input VSWR mismatch
Measurement Range: +20 dBm to –135 dBm
Input Attenuator Range: 0 to 51 dB, selected manually or automatically coupled to the reference level. Resolution in 1 dB steps
Displayed Average Noise Level: ≤ –135 dBm, ≥10 MHz (preamp on)
≤ –115 dBm, <10 MHz (preamp on) for input terminated, 0 dB attenuation, RMS detection, 100 Hz RBW
Dynamic Range: > 65 dB, typical
Display Range: 1 to 15 dB/division, in 1 dB steps, 10 divisions displayed
Scale Units: dBm, dBV, dBmV, dBmV, V, W
RF Input VSWR: (with ≥ 20 dB atten.), 1.5:1 typical, (10 MHz to 2.4 GHz)

2 MHz Frequency Extension (Option 2 S331D/S332D)

Cable and antenna frequency range: 2 MHz to 4000 MHz
(All other specs remain the same as standard S33xD)

6 GHz Frequency Extension (Option 16 S331D/S332D)

Cable and antenna frequency range: 25 MHz to 6000 MHz
(All other specs remain the same as standard S33xD)

Power Monitor (Option 5 S331D/S332D)

Display Range: –80 to +80 dBm (10 pW to 100 kW
Measurement Range: –50 to +16 dBm (10 nW to 40 mW)
Offset Range: 0 to +60 dB
Resolution: 0.1 dB, 0.1W
Accuracy: ± 1 dB

Bias Tee (Option 10A S332D)

Voltage: +12V to +24V (variable in 1V steps)
Power: 6 W steady state
Current: 6 W/Voltage (V)

High Accuracy Power Meter (Option 19)

Compatible Sensors: PSN50 and MA24104A
PSN50 High Accuracy Power Sensor
Frequency Range: 50 MHz to 6 GHz
Measurement Range: –30 to +20 dBm
Linearity: ± 0.13 dB
Input Connector: Type N, male, 50 Ω
Complete Technical Datasheet: p/n 11410-00423
MA24104A Inline High Power Sensor
Frequency Range: 600 MHz to 4 GHz
Measurement Range: +3 dBm to +51.76 dBm (2 mW to 150 W)
Linearity: ± 0.13 dB
Input Connector: Type N, female, 50 Ω
Complete Technical Datasheet: p/n 11410-00483

Transmission Measurement (Option 21 S332D)

Frequency Range: 25 MHz to 3.0 GHz
Frequency Resolution: 10 Hz
Output Power Level: –10 dBm typical
Dynamic Range: 80 dB, 25 MHz to 2 GHz
60 dB, > 2 GHz to 3 GHz
Output Impedence: 50 Ω

Channel Scanner (Option 27 S332D)

Frequency Range: 100 kHz to 3.0 GHz
Frequency Accuracy: ± 10 Hz + Time base error, 99% confidence level
Measurement Range: +20 dBm to –100 dBm
Channel Power: ± 1 dB typical (± 1.5 dB max)
Adjacent Channel Power Accuracy: ± 0.75 dBc

Power Meter (Option 29 S331D/S332D)

Frequency Range: 3 MHz to 3.0 GHz
Measurement Range: –80 dBm to +20 dBm (+80 dBm with 60 dB external attenuator)
Display Range: –80 dBm to +80 dBm
Offset Range: 0 to +60 dB
Accuracy***: ± 1 dB typical (± 1.5 dBm max), > 2 GHz to 3 GHz
± 2 dB typical, 3 MHz to < 10 MHz
VSWR: 1.5:1 typical (P_{in} >–30 dBm, 10 MHz to 2.4 GHz)
Maximum Power: +20 dBm (0.1W) without external attenuator
***(Excludes Input VSWR)

GPS (Option 31 S331D/S332D)

GPS Location Indicator
Latitude, Longitude, and Altitude on Display
Latitude, Longitude, and Altitude with trace storage

T1 Analyzer (Option 50 S331D)

Line Coding: AMI, B8ZS
Framing Modes: D4 (Superframe)
ESF (Extended Superframe)
Connection Configurations: Terminate (100 Ω)
Bridge (≥ 1000 Ω)
Monitor (Connect via 20 dB pad in DSX)
Receiver Sensitivity: 0 to –36 dBdsx
Transmit Level: 0 dB, –7.5 dB, and –15 dB
Clock Sources: External
Internal 1.544 MHz ± 30 ppm
Pulse Shapes: Conform to ANSI T1.403
Pattern Generation and Detection: PRBS: 2-9, 2-11, 2-15, 2-20, 2-23
Inverted and non-inverted, QRSS, 1-in-8 (1-in-7), 2-in-8, 3-in-24, All ones, All zeros, T1-Daly, User defined (≤ 32 bits)
Circuit Status Reports: Carrier present, Frame ID and Sync, Pattern ID and Sync
Alarm Detection: AIS (Blue Alarm), RAI (Yellow Alarm)
Error Detection: Frame Bits, Bit, BER, BPV, CRC, Error Sec
Error Insertion: Bit, BPV, Framing Bits, RAI, AIS
Loopback Modes: Self loop, CSU, NIU, User defined, In-band or Data Link
Level Measurements: Vp-p (± 5%)
Data Log: Continuous, up to 48 hrs.

E1 Analyzer (Option 50 S331D)

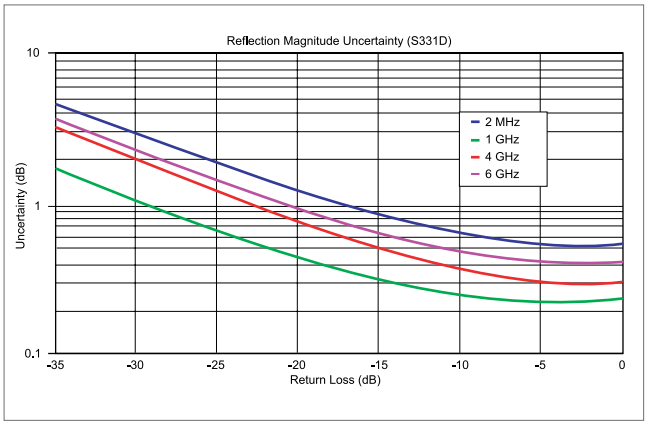
Line Coding: AMI, HDB3
Framing Modes: PCM30, PCM30CRC, PCM31, PCM31CRC
Connection Configurations: Terminate (75 Ω, 120 Ω)
Bridge (≥ 1000 Ω)
Monitor (Connect via 20 dB pad in DSX)
Receiver Sensitivity: 0 to –43 dB
Transmit Level: 0 dB, –7.5 dB, and –15 dB
Clock Sources: External
Internal 2.048 MHz ± 30 ppm
Pulse Shapes: Conform to ITU G.703
Pattern Generation and Detection: PRBS: 2-9, 2-11, 2-15, 2-20, 2-23
Inverted and non-inverted, QRSS, 1-in-8 (1-in-7), 2-in-8, 3-in-24, All ones, All zeros, T1-Daly, User defined (≤ 32 bits)
Circuit Status Reports: Carrier present, Frame ID and Sync, Pattern ID and Sync
Alarm Detection: AIS, RAI, MMF
Error Detection: Frame Bits, Bit, BER, BPV, CRC, E-Bits, Error Sec
Error Insertion: Bit, BPV, Framing Bits, RAI, AIS
Loopback Modes: Self loopback
Level Measurements: Vp-p (± 5%)
Data Log: Continuous, up to 48 hrs.

General

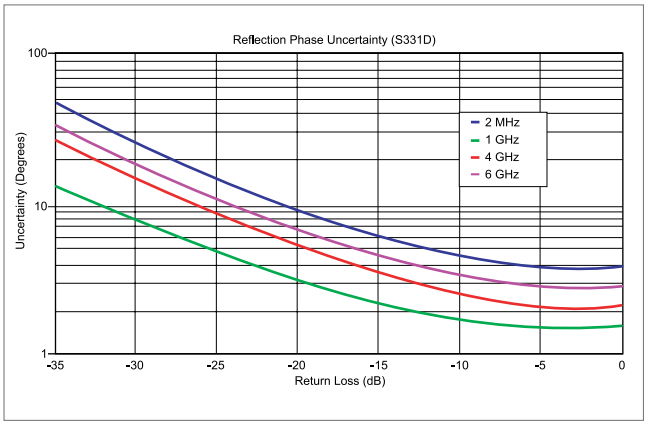
Language Support: Chinese, English, French, German, Japanese, Spanish
Internal Trace Memory: 300 traces
Setup Configuration: S332D - 25, S331D - 10
Display: TFT color LCD with adjustable backlight
Inputs and Outputs Ports:
RF Out: Type N, female, 50 Ω
Maximum Input without Damage: +23 dBm, ±50 VDC
RF In: Type N, female, 50 Ω
Maximum Input without Damage: +43 dBm (peak), ±50 VDC
Ext. Trig In: BNC, female (5V TTL) (S332D Models only)
Ext. Freq Ref In (2 to 20 MHz): Shared BNC, female, 50 Ω, (–15 dBm to +10 dBm) (S332D Models only)
T1/E1 (Receive and Transmit): Bantam Jack (S331D Models with Option 50 only)
Serial Interface: RS-232 9 pin D-sub, three wire serial
Electromagnetic Compatibility:
Meets European Community requirements for CE marking
Safety: Conforms to EN 61010-1 for Class 1 portable equipment
Temperature:
Operating: –10 °C to 55 °C, humidity 85% or less
Non-operating: –51 °C to +71 °C (Recommend the battery be stored separately between 0 °C and +40 °C for any prolonged non-operating storage period.)
Environmental: MIL-PRF-28800F Class 2
Power Supply:
External DC Input: +12.5 to +15 volt dc, 3A max
Internal NiMH battery: 10.8 volts, 1800 mAH
Dimensions:
Size (w x h x d): 254 mm x 178 mm x 61 mm (10.0 in x 7.0 in x 2.4 in)
Weight: < 2.28 kg (< 5 lbs) includes battery

Specifications (Continued)

The following graphs provide measurement uncertainty accuracy at 23° ±3° C after vector error correction for the standard N connector types. The errors are worst-case contributions of residual directivity, source match, frequency response, network analyzer dynamic range, and connector repeatability. In preparing these graphs, Fixed CW is ON. Calibration components 22N50 and 28N50-2 are used.

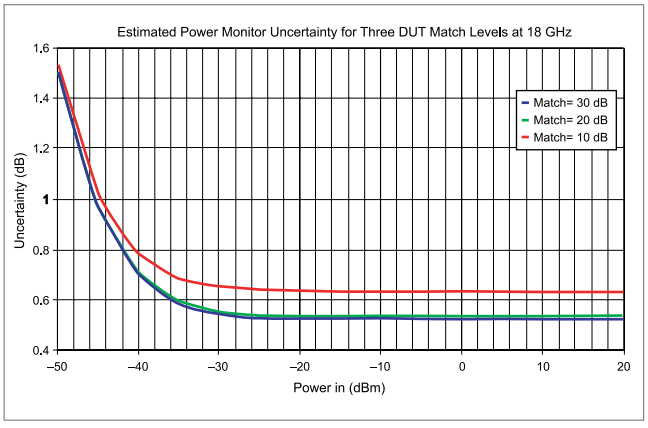


Reflection Magnitude Uncertainty

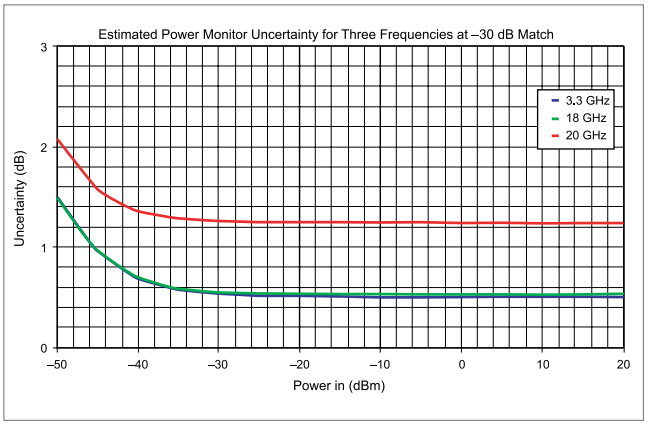


Reflection Phase Uncertainty

Using the 560-7N50B detector, the following curves show estimated power monitor uncertainties for various DUT match.



Estimated Power Monitor Uncertainty for Three DUT Match Levels at 18 GHz



Estimated Power Monitor Uncertainty for Three Frequencies at –30 dB Match

Power Monitor - Detectors

Model	Frequency Range	Impedance	Return Loss	Input Connector	Frequency Response
5400-71N50	0.001 to 3 GHz	50 Ω	26 dB	N(m)	±0.2 dB, <1 GHz ±0.3 dB, <3 GHz
5400-71N75	0.001 to 3 GHz	75 Ω	26 dB, <2 GHz 20 dB, <3 GHz	N(m)	±0.2 dB, <1 GHz ±0.5 dB, <3 GHz
560-7N50B	0.01 to 20 GHz	50 Ω	15 dB, <0.04 GHz 22 dB, <8 GHz 17 dB, <18 GHz 14 dB, <20 GHz	N(m)	±0.5 dB, <18 GHz ±1.25 dB, <20 GHz
560-7S50B	0.01 to 20 GHz	50 Ω	15 dB, <0.04 GHz 22 dB, <8 GHz 17 dB, <18 GHz 14 dB, <20 GHz	WSMA(m)	±0.5 dB, <18 GHz ±1.25 dB, <20 GHz
560-7K50	0.01 to 40 GHz	50 Ω	12 dB, <0.04 GHz 22 dB, <8 GHz 17 dB, <18 GHz 15 dB, <26.5 GHz 14 dB, <32 GHz 13 dB, <40 GHz	K(m)	±0.5 dB, <18 GHz ±1.25 dB, <26.5 GHz ±2.2 dB, <32 GHz ±2.5 dB, <40 GHz
560-7VA50	0.01 to 50 GHz	50 Ω	12 dB, <0.04 GHz 19 dB, <20 GHz 15 dB, <40 GHz 10 dB, <50 GHz	V(m)	±0.8 dB, <20 GHz ±2.5 dB, <40 GHz ±3.0 dB, <50 GHz

Ordering Information

Basic Models

S331D	Cable and Antenna Analyzer (25 MHz to 4.0 GHz)
S332D	Cable and Antenna Analyzer (25 MHz to 4.0 GHz), Spectrum Analyzer (100 kHz to 3.0 GHz)

Options

Option 2	2 MHz frequency extension (S331D/S332D)
Option 5	Power Monitor - requires external detector (S331D/S332D)
Option 6	Frequency Converter Control Module Interface - can not be ordered with Option 5 (S332D)
Option 10A	+12 to +24V Variable (1V steps) Bias Tee (S332D)
Option 16	6 GHz frequency extension, Cable & Antenna Analyzer (S331D/S332D)
Option 19	High Accuracy Power Meter (S331D/S332D) (sensor not included)
Option 21	Transmission Measurement (S332D)
Option 25	Interference Analyzer - requires color display and requires directional antenna (S332D)
Option 27	Channel Scanner (S332D)
Option 28	CW Signal Generator - requires CW Signal Generator Kit (S332D)
Option 29	Power Meter - does not require external detector (S331D/S332D)
Option 31	GPS Receiver for location information. Includes GPS antenna (S331D/S332D)
Option 50	T1/E1 Analyzer - can not be ordered with Option 5 (S331D)

Standard Accessories

65717	Soft Carrying Case
633-27	Rechargeable Battery, Ni-MH
40-168-R	AC–DC Adapter
806-141	Automotive Cigarette Lighter 12 Volt DC Adapter
2300-347	Handheld Software Tools CDROM
800-441	Serial Interface Cable (null modem type)
551-1691-R	USB to RS-232 Adapter Cable
10580-00079	S331D/S332D Site Master User's Guide
	One-Year Warranty

Calibration Components

ICN50B	InstaCal™ Calibration Module, 2 MHz to 6.0 GHz, N(m), 50 Ω
OSLN50-1	Precision Open/Short/Load, DC to 6 GHz, 42 dB, 50 Ω, N(m)
OSLNF50-1	Precision Open/Short/Load, DC to 6 GHz, 42 dB, 50 Ω, N(f)
22N50	Open/Short, DC to 18 GHz, N(m), 50 Ω
SM/PL-1	Precision Load, DC to 6 GHz, 42 dB, N(m), 50 Ω
22NF50	Open/Short, DC to 18 GHz, N(f), 50 Ω
SM/PLNF-1	Precision Load, DC to 6 GHz, 42 dB, N(f), 50 Ω
2000-767	Precision Open/Short/Load, DC to 4 GHz, 7/16 DIN(m), 50 Ω
2000-768	Precision Open/Short/Load, DC to 4 GHz, 7/16 DIN(f), 50 Ω
22N75	Open/Short, DC to 3 GHz, N(m) 75 Ω
26N75A	Precision Termination, DC to 3 GHz, N(m) 75 Ω
22NF75	Open/Short, DC to 3 GHz, N(f) 75 Ω
26NF75A	Precision Termination, DC to 3 GHz, N(f) 75 Ω
12N50-75B	Matching Pad, DC to 3 GHz, 50 Ω to 75 Ω

Precision Adapters

34NN50A	Precision Adapter, N(m)-N(m), DC to 18 GHz, 50 Ω
34NFNF50	Precision Adapter, N(f)-N(f), DC to 18 GHz, 50 Ω

Adapters

1091-26	Adapter, N(m)-SMA(m), DC to 18 GHz, 50 Ω
1091-27	Adapter, N(m)-SMA(f), DC to 18 GHz, 50 Ω
1091-80-R	Adapter, N(f)-SMA(m), DC to 18 GHz, 50 Ω
1091-81-R	Adapter, N(f)-SMA(f), DC to 18 GHz, 50 Ω
1091-172	Adapter, N(m)-BNC(f), DC to 1.3 GHz, 50 Ω
510-90	Adapter, 7/16 DIN(f)-N(m), DC to 7.5 GHz, 50 Ω
510-91	Adapter, 7/16 DIN(f)-N(f), DC to 7.5 GHz, 50 Ω
510-92	Adapter, 7/16 DIN(m)-N(m), DC to 7.5 GHz, 50 Ω
510-93	Adapter, 7/16 DIN(m)-N(f), DC to 7.5 GHz, 50 Ω
510-96	Adapter, 7/16 DIN(m)-7/16 DIN(m), DC to 7.5 GHz, 50 Ω
510-97	Adapter, 7/16 DIN(f)-7/16 DIN(f), DC to 7.5 GHz, 50 Ω

Adapters w/ Reinforced Grip

1091-379-R	Adapter w/ Reinforced Grip, 7/16 DIN(f)-7/16 DIN(f), DC to 6 GHz, 50 Ω

Test Port Cables

3-806-151	Cable, 0.46 m, N(m)-N(m), 4 GHz, 50 Ω
806-186-R	Cable, 0.91 m, N(m)-N(f), 4 GHz, 50 Ω
806-187-R	Cable, 0.91 m, N(m)-N(m), 4 GHz, 50 Ω

Test Port Cable Armored

15NN50-1.5C	Test Port Cable Armored, 1.5 meters, N(m)-N(m), 6 GHz, 50 Ω
15NN50-3.0C	Test Port Cable Armored, 3.0 meters, N(m)-N(m), 6 GHz, 50 Ω
15NN50-5.0C	Test Port Cable Armored, 5.0 meters, N(m)-N(m), 6 GHz, 50 Ω
15NNF50-1.5C	Test Port Cable Armored, 1.5 meters, N(m)-N(f), 6 GHz, 50 Ω
15NNF50-3.0C	Test Port Cable Armored, 3.0 meters, N(m)-N(f), 6 GHz, 50 Ω
15NNF50-5.0C	Test Port Cable Armored, 5.0 meters, N(m)-N(f), 6 GHz, 50 Ω

Test Port Cables, Armored w/ Reinforced Grip

15RNFN50-1.5-R	Test Port Cable Armored w/Reinforced Grip 1.5 m, N(f)-N(m), 6 GHz, 50 Ω
15RDFN50-1.5-R	Test Port Cable Armored w/Reinforced Grip 1.5 m, D(f)-N(m), 6 GHz, 50 Ω
15RDFN50-3.0-R	Test Port Cable Armored w/Reinforced Grip 3.0 m, D(f)-N(m), 6 GHz, 50 Ω
15RDN50-1.5-R	Test Port Cable Armored w/Reinforced Grip 1.5 m, D(m)-N(m), 6 GHz, 50 Ω
15RDN50-3.0-R	Test Port Cable Armored w/Reinforced Grip 3.0 m, D(m)-N(m), 6 GHz, 50 Ω

Antennas

2000-1200	Portable Antenna, SMA (m), 806-866 MHz, 50 Ω
2000-1473	Portable Antenna, SMA (m), 870-960 MHz, 50 Ω
2000-1035	Portable Antenna, SMA (m), 896-941 MHz, 50 Ω
2000-1030	Portable Antenna, SMA(m), 1.71 to 1.88 GHz, 50 Ω
2000-1474	Portable Antenna, SMA(m), 1.71 to 1.88 GHz, 50 Ω
2000-1031	Portable Antenna, SMA(m), 1.85 to 1.99 GHz, 50 Ω
2000-1475	Portable Antenna, SMA(m), 1.92 to 1.98 and 2.11 to 2.17 GHz, 50 Ω
2000-1032	Portable Antenna, SMA(m), 2.4 to 2.4835 GHz, 50 Ω
2000-1361	Portable Antenna, SMA(m), 5.725 to 5.825 GHz, 50 Ω
61532	Antenna Kit: 2000–1030, 2000–1031, 2000–1032, 2000-1035, 2000–1200, and 2000–1361
2000-1410	Magnet Mount GPS Antenna with 15-foot cable

Directional Antennas

2000-1411-R	Portable Yagi Antenna, N(f), 822 to 900 MHz, 10 dBd
2000-1412-R	Portable Yagi Antenna, N(f), 885 to 975 MHz, 10 dBd
2000-1413-R	Portable Yagi Antenna, N(f), 1710 to 1880 MHz, 10 dBd
2000-1414-R	Portable Yagi Antenna, N(f), 1850 to 1990 MHz, 9.3 dBd
2000-1416-R	Portable Yagi Antenna, N(f), 1920 to 2170 MHz, 12 dBd
2000-1415-R	Portable Yagi Antenna, N(f), 2400 to 2500 MHz, 12 dBd

Filters

1030-114-R	Filter, Bandpass, 806 to 869 MHz, N(m)-SMA(f), 50 Ω
1030-109-R	Filter, Bandpass, 824 to 849 MHz N(m)-SMA(f), 50 Ω
1030-110-R	Filter, Bandpass, 880 to 915 MHz, N(m)-SMA(f), 50 Ω
1030-105-R	Filter, Bandpass, 890 to 915 MHz, N(m)-N(f), 50 Ω
1030-111-R	Filter, Bandpass, 1850 to 1910 MHz, N(m)-SMA(f), 50 Ω
1030-106-R	Filter, Bandpass, 1710 to 1790 MHz, N(m)-N(f), 50 Ω
1030-107-R	Filter, Bandpass, 1910 to 1990 MHz, N(m)-N(f), 50 Ω
1030-112-R	Filter, Bandpass, 2400 to 2484 MHz, N(m)-SMA(f), 50 Ω

Ordering Information (Continued)

Attenuators

3-1010-119	Attenuator, 10 dB, 2 W, DC to 6 GHz
3-1010-122	Attenuator, 20 dB, 5 W, DC to 12.4 GHz, N(m)-N(f)
42N50-20	Attenuator, 20 dB, 5 W, DC to 18 GHz, N(m)-N(f)
3-1010-123	Attenuator, 30 dB, 50 W, DC to 8.5 GHz, N(m)-N(f)
42N50A-30	Attenuator, 30 dB, 50 W, DC to 18 GHz, N(m)-N(f)
1010-127-R	Attenuator, 30 dB, 150 W, DC to 3 GHz, N(m)-N(f)
3-1010-124	Attenuator, 40 dB, 100 W, DC to 8.5 GHz, N(m)-N(f), Uni-directional
1010-121	Attenuator, 40 dB, 100 W, DC to 18 GHz, N(m)-N(f)
1010-128-R	Attenuator, 40 dB, 150 W, DC to 3 GHz, N(m)-N(f)

Miscellaneous Accessories

633-27	Rechargeable Battery, Ni-MH
806-141	Automotive Cigarette Lighter/12 Volt DC Adapter
40-168-R	AC/DC Adapter
2000-1029	Battery Charger, NiMH, w/ Universal Power Supply
551-1691-R	USB to RS-232 Adapter Cable
800-441	Serial Interface Cable
70-28	Headset
65717	Soft Carrying Case
67135	Site Master Backpack
760-243-R	Transit Case
1N50C	Limiter, N(m) to N(f), 50 W, 10 MHz to 18 GHz
FCN4760	Frequency Converter, 4.7 GHz to 6 GHz
ODTF-1	Optical DTF Module, 1550 nm, Single Mode
61534	CW Signal Generator Kit with variable step attenuator
65701	3 GHz Offset Cal Kit consisting of one each: 3-1010-119, 10 dB Attenuator, DC to 6 GHz, 2 W, 3-806-151, 4 GHz Cable, 18" (46 cm)
806-16	Bantam Plug to Bantam Plug
806-116	Bantam Plug to BNC
806-117	Bantam "Y" Plug to RJ48
2300-347	Handheld Software Tools CDROM

Power Monitor Detectors

5400-71N50	Detector, .001 to 3 GHz, N(m), 50 Ω
5400-71N75	Detector, .001 to 3 GHz, N(m), 75 Ω
560-7N50B	Detector, 10 MHz to 20 GHz, N(m), 50 Ω
560-7S50B	Detector, 10 MHz to 20 GHz, WSMA(m), 50 Ω
560-7K50	Detector, 10 MHz to 40 GHz, K(m), 50 Ω
560-7VA50	Detector, 10 MHz to 50 GHz, V(m), 50 Ω

Power Monitor Extender Cables

800-109	7.6 m (25 ft)
800-111	30.5 m (100 ft)

High Accuracy Power Meter Accessories

PSN50	High Accuracy Power Sensor, 50 MHz to 6 GHz
MA24104A	Inline High Power Sensor, 600 MHz to 4 GHz
40-168-R	AC-DC Adapter
800-441	Serial Interface Cable
3-1010-122	Attenuator, 20 dB, 5 W, DC to 12.4 GHz, N(m)-N(f)
1010-127-R	Attenuator, 30 dB, 150 W, DC to 3 GHz, N(m)-N(f)
3-1010-123	Attenuator, 30 dB, 50 W, DC to 8.5 GHz, N(m)-N(f)
3-1010-124	Attenuator, 40 dB, 100 W, DC to 8.5 GHz, N(m)-N(f), Uni-directional
1010-128-R	Attenuator, 40 dB, 150 W, DC to 3 GHz, N(m)-N(f)
65701	3 GHz Offset Cal Kit consisting of one each: 3-1010-119, 10 dB Attenuator, DC to 6 GHz, 2 W, 3-806-151, 4 GHz Cable, 18" (46 cm)

Product Literature

10580-00079	S331D/S332D Site Master User's Guide
10580-00100	S331D/S332D Site Master Programming Guide

15RNFN50-1.5-R
Test Port Cable Armored with Reinforced Grip

1091-379-R
Adapter with Reinforced Grip

ICN50B
InstaCal™ Calibration Module

67135
SiteMaster Backpack

ODTF-1
Optical DTF Module, 1550 nm

1010-128-R
40 dB, 150 W, Attenuator

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