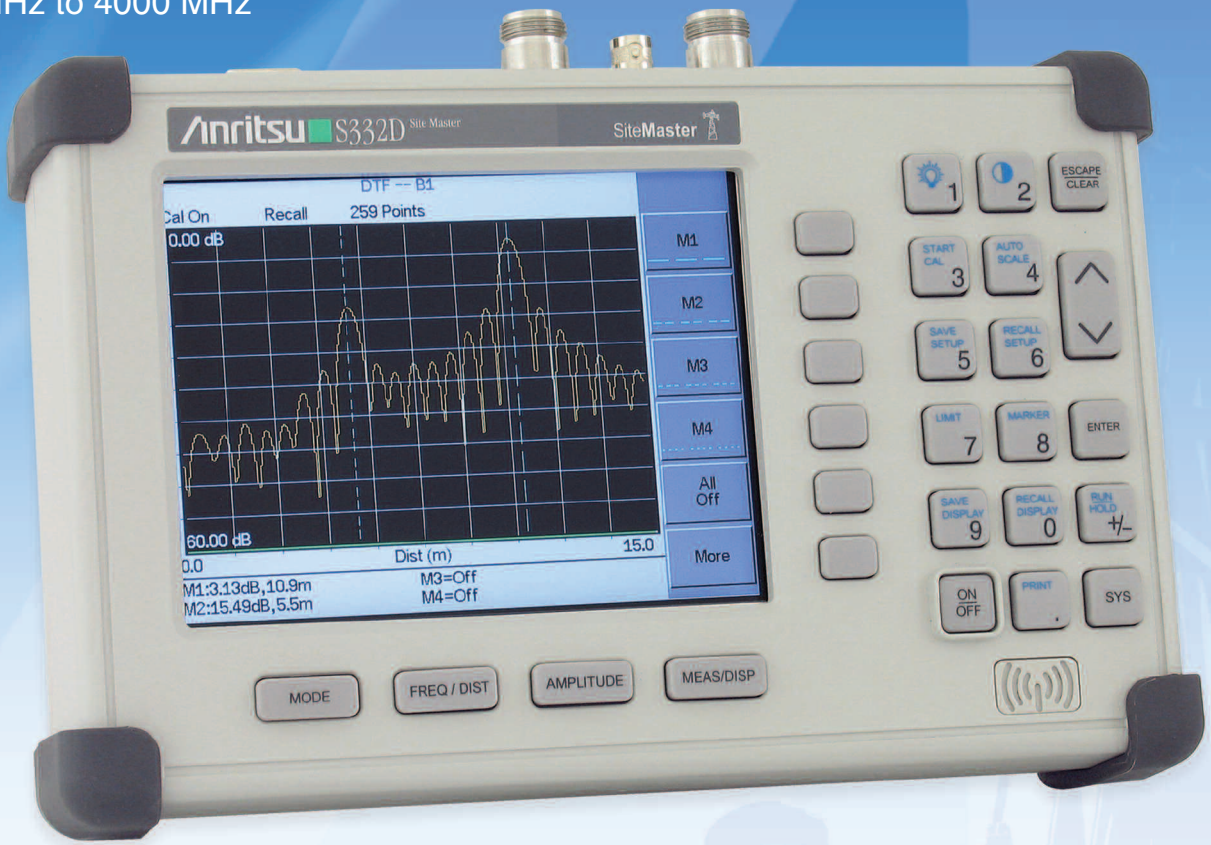
Anritsu

Site Master™
S331D/S332D

Cable and Antenna Analyzer
25 MHz to 4000 MHz



SiteMaster The World's Leading Cable and Antenna System Analyzer

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.

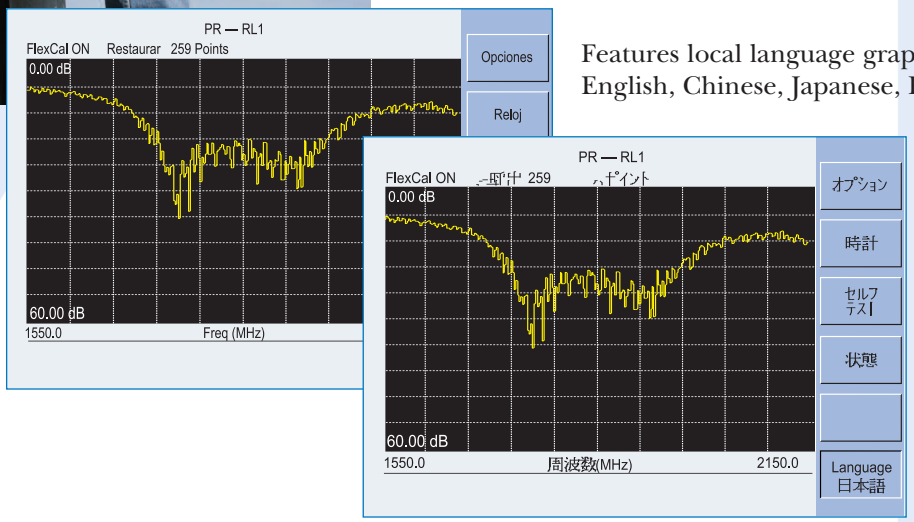
Site Master Revolutionizes Cable and Antenna Sweeping in the Wireless Industry.

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.

RS-232 Interface
Transfer stored data to and from a personal computer (PC) or download to a printer via a serial cable for further analysis. Use PC to automatically control and collect data in the field.

Snap-in Field replaceable battery location

External DC Power Port

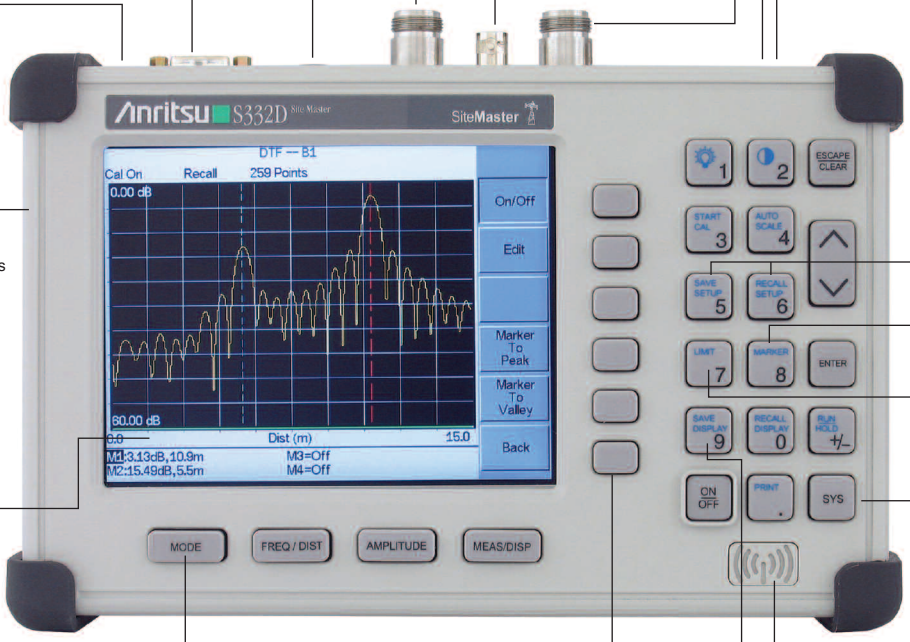
Spectrum Analyzer and Power Meter Port

External Trigger and External Reference In

Cable and Antenna Analyzer Port

T1/E1 Receive and Transmit Port
S331D Models with Option 50.

Frequency Converter Module Port
Option 6 (S332D) for control of an external frequency extension module.



Rugged and Reliable Chassis Design
Ruggedized, lightweight, compact, high-impact housing is designed to withstand repeated drops and rough handling. Weather resistant seals and rubber membrane keypad protect unit from dirt and moisture.

Save and Recall Setup
Save setups for fast repeatable testing:
S332D Models - 20
S331D Models - 25

Markers
Six markers for more comprehensive measurements.

Limits
Create simple pass/fail measurements with a single limit line, upper and/or lower mask limit lines.

TFT Color Display
Standard TFT (640 x 480) color display featuring variable brightness control.
Viewable in direct sunlight.

Multilingual User Interface
Multi-language user interface features on-screen menus and messages in six different languages: Chinese, English, French, German, Japanese, Spanish.

Function Keys
Four dedicated function keys simplify measurement tasks.

Soft Keys
Intuitive soft key menu and user interface.

Save and Recall Display
Up to 200 memory locations. Alphanumeric data labeling and automatic time/date stamp simplify data management.

AM/FM Receiver with Internal Speaker
Built-in AM/FM demodulator enables testing and trouble-shooting of wireless communications systems. An internal speaker and jack are included.

Function	Benefits
Cable and Antenna Analyzer (331D/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
Frequency Converter Interface (S332D)	Make measurement from 4.7 to 6 GHz using an external detector
Built-in Bias Tee (S332D)	No need to use external power to bias an amplifier
Transmission Measurement (S332D)	Identify and locate interfering signals that cause dropped calls and coverage problems. Intermittent problems can be identified using spectrograms
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
Power Meter (S331D/S332D)	Performs accurate power measurements up to 3 GHz without the need of an external detector
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

Cable and Antenna Analysis – Increase System Uptime

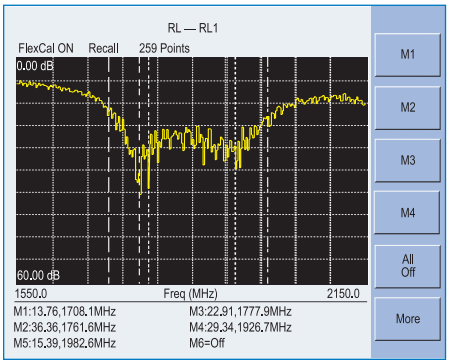
FDR Technique

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.

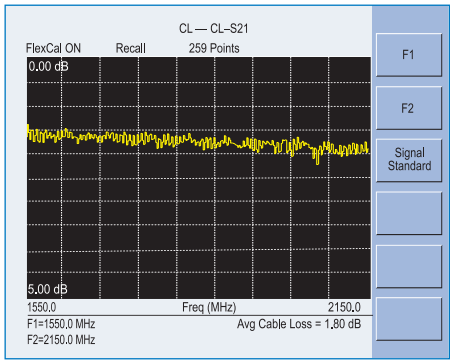


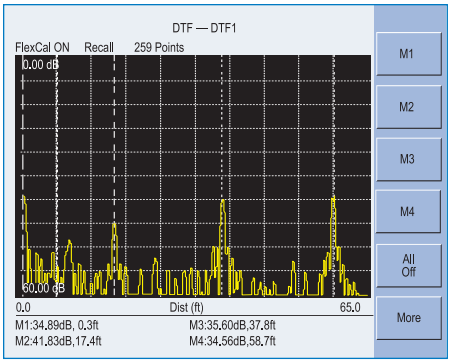
Return Loss, SWR

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™.

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 from 25 MHz to 4 GHz 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 for 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

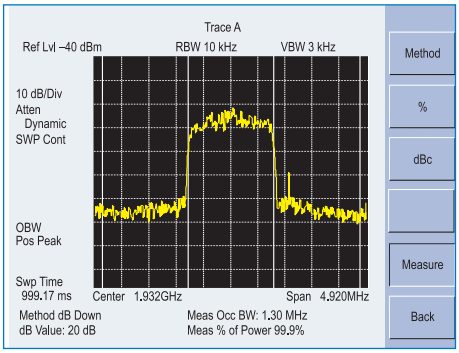
In today's wireless environment it is very common that there will be other RF activity present when making a measurement. In order to make accurate measurements in hostile RF environments, the receiver has to be able to reject the unwanted signals. Special dithering techniques are applied to the Site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

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.

One Button Measurements

The S332D has dedicated routines for one-button 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.



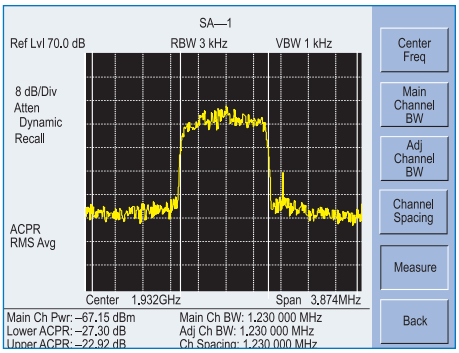
Occupied Bandwidth

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. When an air interface standard is specified in the S332D, all these values are automatically set to the normal values for that standard.



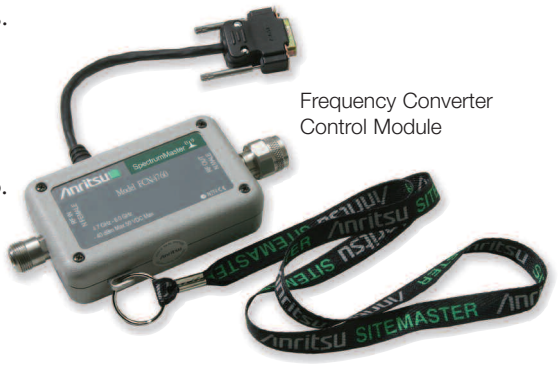
AM/FM/SSB Demodulator

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.

6 GHz Measurements

The FCN4760 is a block down converter for the 4.7 to 6.0 GHz frequency range. Is 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

Site Master Options

Power Monitor (Option 5, S331D and S332D)

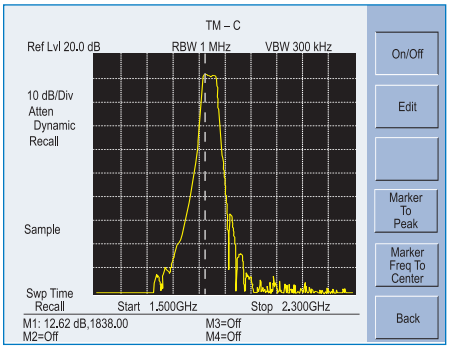
Use Anritsu's 560 and 5400 series detector to measure broadband power. They are an excellent solution to measure an 18 GHz microwave link carrying the Base Station T1/E1 link. The detectors use precision high return loss detectors with excellent impedance match designed to minimize mismatch uncertainty (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.

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 (see page 6).

Built-in Bias Tee (Option 10, S332D)

Built-in power supply can be turned on as needed to place 18 Vdc on the center conductor of the RF In port. It is designed to deliver 300 mA steady state and up to 1A peak for 200 ms.



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.

Calibration is a normal thru calibration. Padding the output with 20 dB will ensure linearity for active measurements and minimize source match errors resulting in very accurate measurements.

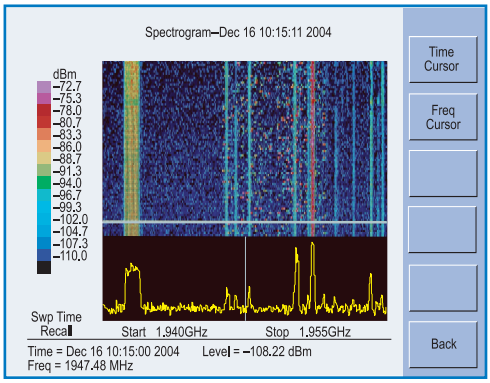
Interference Analyzer (Option 25, S332D)

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

The 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 (three days). RSSI is useful to observe the signal strength at a single frequency over time (seven days).

Signal Strength measurements can be made with a directional antenna to locate the interferer by measuring the strength of the interfering signal, which will be indicated by an audible beep.

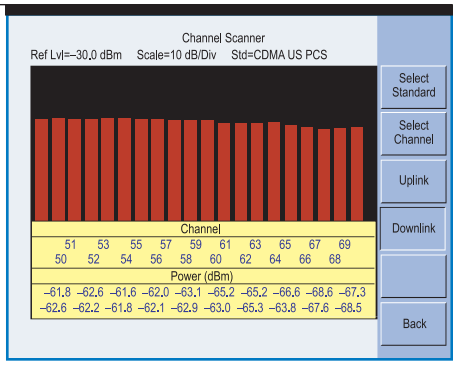
Signal ID can provide assistance in identifying signal types from cellular/PCS sites.



Site Master Options

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, and TDMA networks.

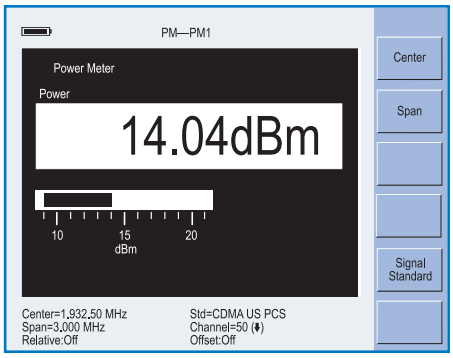


CW Signal (Option 28, S332D)

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.

Power Meter (Option 29, S331D and S332D)

The power meter tool performs accurate transmitter power meter measurements from 4.5 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.

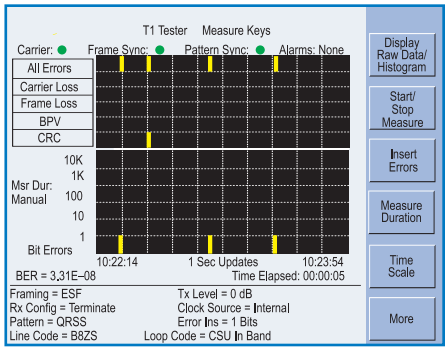


GPS Receiver (Option 31, S331D and S332D)

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.

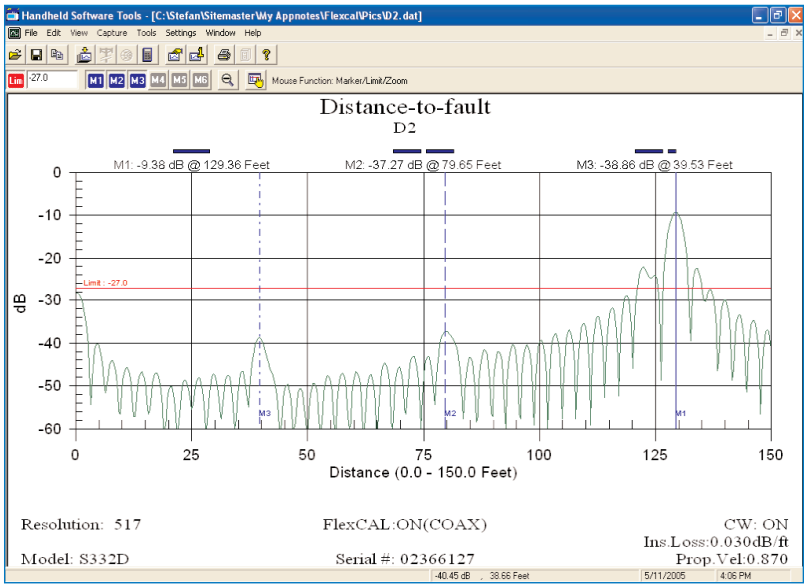
T1/E1 Analyzer (Option 50, S331D)

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.



Handheld Software Tools™

Although Site Master features built-in analytical and reporting functions, users can also download measurement data to a PC for additional analysis or report generation. Site Master's user friendly Software Tools is a Windows® program designed specifically for cable and antenna analysis and will run on any computer with Windows 95/98/NT4/2000/ME/XP Test data can be analyzed and compared to historical performance.



- Up to 200 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.
- Familiar Windows 95/98/NT4/2000/ME/XP interface simplifies data analysis and report generation.
- Intelligent drag and drop automatically converts traces to a common scale and speeds fault identification.
- Supports long file names for easy measurement data identification.

Specifications

Cable and Antenna Analyzer

Frequency Range: 25 MHz to 4.0 GHz
Frequency Accuracy: ≤±75 ppm @ +25°C
Frequency Resolution: 100 kHz
Output Power: <0 dBm (–10 dBm nominal)
Immunity to Interfering Signals: On-channel: +17 dBm
On-frequency: –5 dBm
Measurement Speed: ≤3.5 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 1197m (3929 ft),
# of data pts = 130, 259 or 517

Horizontal Resolution (Rectangular Windowing):
Resolution (meter) = (1.5 x 108) x (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, dBµV, dBmV, V, W
RF Input VSWR: (with ≥20 dB atten.), 1.5:1 typical, (10 MHz to 2.4 GHz)

Power Monitor (Option 5)

Detector Range: 1A peak 150 ms, 300 mA max steady state
Offset Range: –50 to +20 dBm, 10 nW to 100nW
Display Range: –80 to 80 dBm
Resolution: 0.1 dB, 0.1 xW
Measurement Accuracy: ±1 dB maximum for >–40 dBm and <18 GHz

Bias Tee (Option 10 S332D only)

Voltage: +18 Vdc
Current: 1A peak 200 ms, 300 mA max steady state

Transmission Measurement (Option 21 S332D only)

Frequency Range: 25 MHz to 3.0 GHz
Frequency Resolution: 10 Hz
Output Power Level: –10 dBm typical
Output Impedence: 50Ω

Channel Scanner (Option 27)

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)

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
±0.5 dB typical (±1 dB max), ≥10 MHz to 2 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)

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

T1 Analyzer (Option 50 S331D Only)

Line Coding: AMI, B8ZS
Framing Modes: D4 (Superframe)
ESF (Extended Superframe)
Connection Configurations: Terminate (100Ω)
Bridge (≥1000Ω)
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 only)

Line Coding: AMI, HDB3
Framing Modes: PCM30, PCM30CRC, PCM31, PCM31CRC
Connection Configurations: Terminate (75Ω, 120Ω)
Bridge (≥1000Ω)
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: 200 traces
Setup Configuration: S332D - 20, S331D - 25
Display: TFT color LCD with adjustable backlight
Inputs and Outputs Ports:

RF Out: Type N, female, 50Ω
Maximum Input without Damage: +23 dBm, ±50 VDC
RF In: Type N, female, 50Ω
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, 50Ω, (–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:

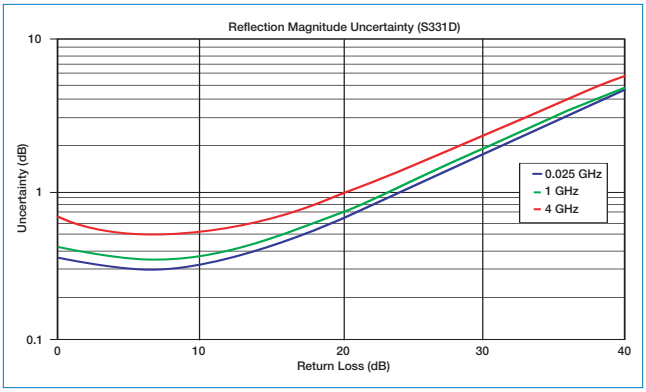
Operating: –10°C to 55°C, humidity 85% or less
Non-operating: –51°C to +71°C (Recommend the battery be stored separately between 0°C and +40°C for any prolonged non-operating storage period.)

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:

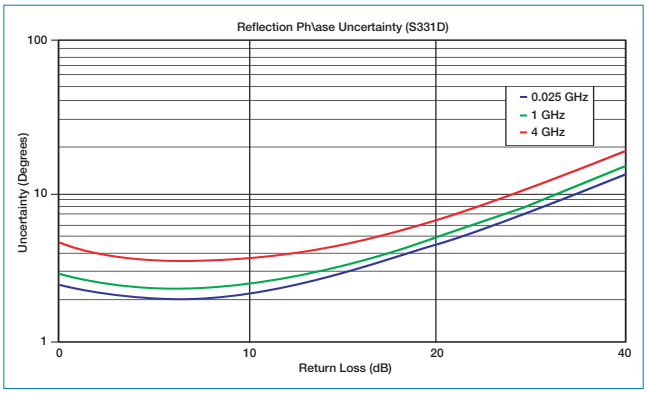
Size (w x h x d): 25.4 cm x 17.8 cm x 6.1 cm (10.0 in x 7.0 in x 2.4 in)
Weight: <2.28 kg (<5 lbs) includes battery

Specifications (Continued)

The following graphs provide measurement uncertainty accuracy at 23°±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.

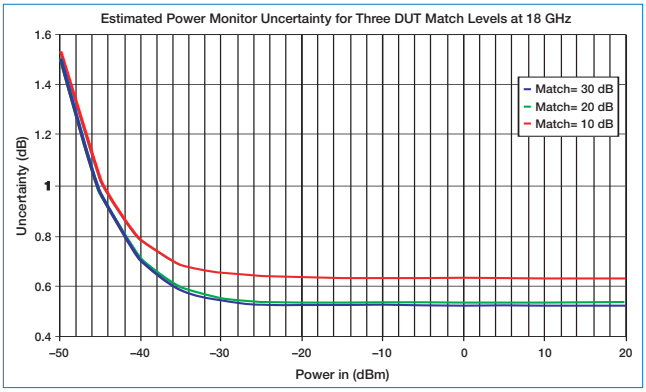


Reflection Magnitude Uncertainty

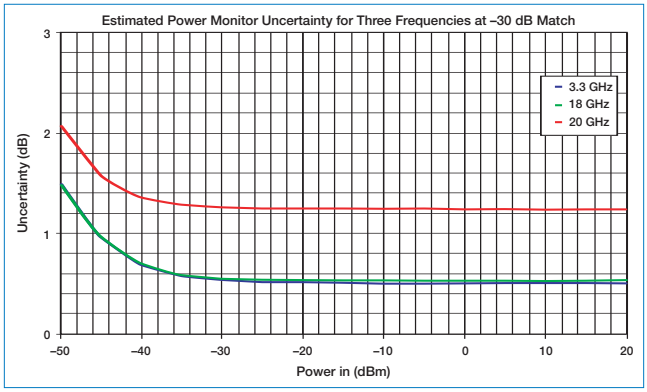


Reflection Phase Uncertainty

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	50Ω	26 dB	N(m)	±0.2 dB, <1 GHz ±0.3 dB, <3 GHz
5400-71N75	0.001 to 3 GHz	75Ω	26 dB, <2 GHz 20 dB, <3 GHz	N(m)	±0.2 dB, <1 GHz ±0.5 dB, <3 GHz
560-7A50	0.01 to 18 GHz	50Ω	15 dB, <0.04 GHz 22 dB, <8 GHz 17 dB, <18 GHz	GPC-7	±0.5 dB, <18 GHz
560-7N50B	0.01 to 20 GHz	50Ω	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	50Ω	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
560-7S50-2	0.01 to 26.5 GHz	50Ω	15 dB, <0.04 GHz 22 dB, <8 GHz 17 dB, <18 GHz 14 dB, <26.5 GHz	WSMA(m)	±0.5 dB, <18 GHz ±1.25 dB, <26.5 GHz
560-7K50	0.01 to 40 GHz	50Ω	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	50Ω	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

Base Model	Description
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	Description
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 10	Bias Tee (S332D)
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 (S332)
Option 29	Power Meter - does not require external detector (S331D/S332D)
Option 31	GPS - requires GPS antenna (S331D/S332D)
Option 50	T1/E1 Analyzer - can not be ordered with Option 5 (S331D)

Standard Accessories Include:	
10580-00079	S331D/S332D Site Master User's Guide
2300-347	Anritsu Handheld Software Tools CDROM
48258	Soft Carrying Case
633-27	Rechargeable Battery, NiMH
40-168	AC-DC Adapter with Power Cord
806-62	Automotive Cigarette Lighter/12 Volt DC Adapter
806-441	Serial Interface Cable
	One Year Warranty

Optional Accessories	
FCN4760	Frequency Converter, 4.7 to 6.0 GHz
1N50C	Limiter, N(m) to N(f), 50Ω, 10 MHz to 18 GHz
42N50-20	Attenuator, 20 dB, 5 watt, DC to 18 GHz, N(m)-N(f)
42N50A-30	Attenuator, 30 dB, 50 watt, DC to 18 GHz, N(m)-N(f)
ICN50 InstaCal™	Calibration Module, 2 MHz to 4.0 GHz, N(m), 50Ω
22N50	Open/Short, DC to 18 GHz, N(m), 50Ω
22NF50	Open/Short, DC to 18 GHz, N(f), 50Ω
SM/PL	Precision Load, DC to 4 GHz, 42 dB, N(m), 50Ω
SM/PLNF	Precision Load, DC to 4 GHz, 42 dB, N(f), 50Ω
OSLN50LF	Precision Open/Short/Load, DC to 4 GHz, 42 dB, 50Ω, N(m)
OSLNF50LF	Precision Open/Short/Load, DC to 4 GHz, 42 dB, 50Ω, N(f)
2000-767	Precision Open/Short/Load, DC to 4 GHz, 7/16 DIN(m), 50Ω
2000-768	Precision Open/Short/Load, DC to 4 GHz, 7/16 DIN(f), 50Ω
15NN50-1.5C	Test Port Cable Armored, 1.5 meters, N(m)-N(m), 6 GHz, 50Ω
15NN50-3.0C	Test Port Cable Armored, 3.0 meters, N(m)-N(m), 6 GHz, 50Ω
15NN50-5.0C	Test Port Cable Armored, 5.0 meters, N(m)-N(m), 6 GHz, 50Ω
15NNF50-1.5C	Test Port Cable Armored, 1.5 meters, N(m)-N(f), 6 GHz, 50Ω
15NNF50-3.0C	Test Port Cable Armored, 3.0 meters, N(m)-N(f), 6 GHz, 50Ω
15NNF50-5.0C	Test Port Cable Armored, 5.0 meters, N(m)-N(f), 6 GHz, 50Ω
15ND50-1.5C	Test Port Cable Armored, 1.5 meters, N(m)-7/16 DIN(m), 6 GHz, 50Ω
15NDF50-1.5C	Test Port Cable Armored, 1.5 meters, N(m)-7/16 DIN(f),6 GHz, 50Ω
34NN50A	Precision Adapter, N(m)-N(m), DC to 18 GHz, 50Ω
34NFNF50	Precision Adapter, N(f)-N(f), DC to 18 GHz, 50Ω
1091-26	Adapter, N(m)-SMA(m), DC to 18 GHz, 50Ω
1091-27	Adapter, N(m)-SMA(f), DC to 18 GHz, 50Ω
1091-80	Adapter, N(f)-SMA(m), DC to 18 GHz, 50Ω
1091-81	Adapter, N(f)-SMA(f), DC to 18 GHz, 50Ω
1091-172	Adapter, N(m)-BNC(f), DC to 1.3 GHz, 50Ω
510-90	Adapter, 7/16 DIN(f)-N(m), DC to 7.5 GHz, 50Ω
510-91	Adapter, 7/16 DIN(f)-N(f), DC to 7.5 GHz, 50Ω
510-92	Adapter, 7/16 DIN(m)-N(m), DC to 7.5 GHz, 50Ω
510-93	Adapter, 7/16 DIN(m)-N(f), DC to 7.5 GHz, 50Ω
510-96	Adapter, 7/16 DIN(m)-7/16 DIN(m), DC to 7.5 GHz, 50Ω
510-97	Adapter, 7/16 DIN(f)-7/16 DIN(f), DC to 7.5 GHz, 50Ω

61532 Antenna Kit:	
2000-1030	Portable Antenna, SMA(m), 1.71 to 1.88 GHz, 50Ω
2000-1031	Portable Antenna, SMA(m), 1.85 to 1.99 GHz, 50Ω
2000-1032	Portable Antenna, SMA(m), 2.4 to 2.5 GHz, 50Ω
2000-1200	Portable Antenna, SMA(m), 806-869 MHz, 50Ω
2000-1035	Portable Antenna, SMA(m), 896-941 MHz, 50Ω
2000-1361	Portable Antenna, SMA(m), 5.725-5.825 MHz, 50Ω
2000-1411	Portable YAGI Antenna, N(f), 822-900 MHz, 10 dBd
2000-1412	Portable YAGI Antenna, N(f), 885-975 MHz, 10 dBd
2000-1413	Portable YAGI Antenna, N(f), 1.71-1.88 GHz, 10 dBd
2000-1414	Portable YAGI Antenna, N(f), 1.85-1.99 GHz, 9.3 dBd
2000-1415	Portable YAGI Antenna, N(f), 2.4-2.5 GHz, 12 dBd
2000-1416	Portable YAGI Antenna, N(f), 1.92-2.23 GHz, 12 dBd
1030-109	Band Pass Filter, 824-849 MHz, 1.7 dB loss, N(m) to SMA(f), 50Ω
1030-110	Band Pass Filter, 880-915 MHz, 1.7 dB loss, N(m) to SMA(f), 50Ω
1030-111	Band Pass Filter, 1.85-1.91 GHz, 1.8 dB loss, N(m) to SMA(f), 50Ω
1030-112	Band Pass Filter, 2.40-2.58 GHz, 1.4 dB loss, N(m) to SMA(f), 50Ω
2000-1410	Magnet Mount GPS Antenna with 15 ft. cable
61534	CW Signal Generator Kit with variable step attenuator
806-16	Bantam Plug to Bantam Plug
806-116	Bantam Plug to BNC
806-117	Bantam "Y" Plug to RJ48
551-1691	USB to RS-232 adapter cable
48258	Soft Carrying Case
760-235	Transit Case
633-27	Rechargeable Battery, NiMH
2000-1029	Battery Charger, NiMH, w/ Universal Power Supply
40-168	AC/DC Adapter
806-62	Automotive Cigarette Lighter/12 Volts DC Adapter
800-441	Serial Interface Cable
2300-347	Software Tools

Printers	
2000-1214	HP DeskJet Printer, Model 450: Includes printer cable, 2000-1216 black print cartridge and U.S. power cord. Also includes 2000-753 serial-to-parallel Centronics converter cable and 1091-310 Centronics-to DB25 adapter. Rechargeable battery is optional and is not included.
2000-753	Null Modem Serial-to-Parallel Centronics Converter Cable
1091-310	Adapter 36-pin Centronics female-to-DB25 female
2000-1216	Black Print Cartridge
2000-663	Power Cable (Europe) for DeskJet Printer
2000-664	Power Cable (Australia) for DeskJet Printer
2000-667	Power Cable (S. Africa) for DeskJet Printer
2000-1217	Rechargeable Battery for DeskJet Printer, Model 450
2000-1218	Power Cable (U.K.) for DeskJet Printer

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