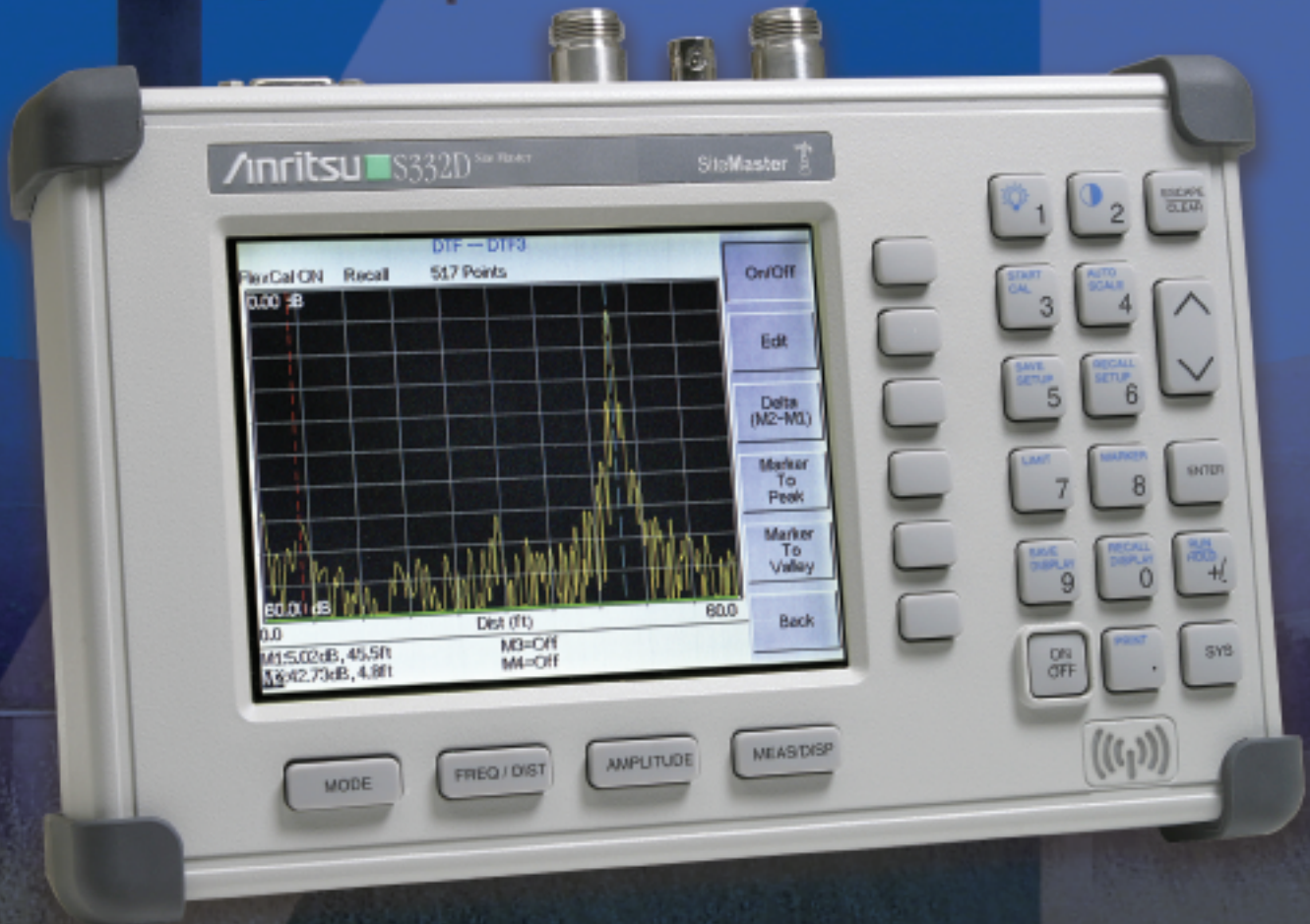



Anritsu

# 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 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 mis-positioned 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.

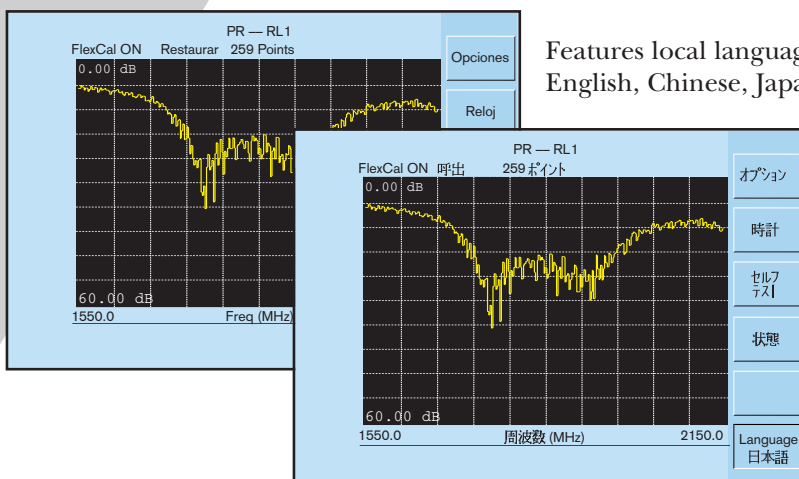


## Rugged and Reliable

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 LCD display makes test interpretation easy and quick. Displays are available in either monochrome or color (Option 3). 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.

# enna analyzer of wireless service providers,

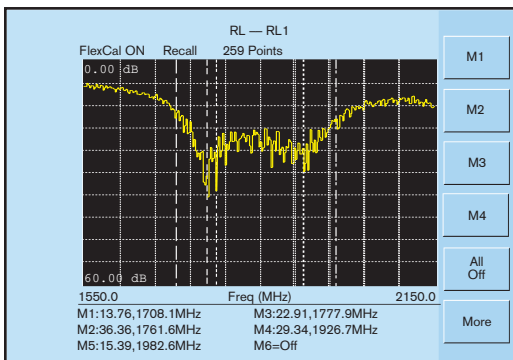
## FDR Technique

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 feedline and antenna systems at their proper operating frequency.

Deficient connectors, lightning arrestors, cables, jumpers, or antennas are replaced before call quality is compromised.

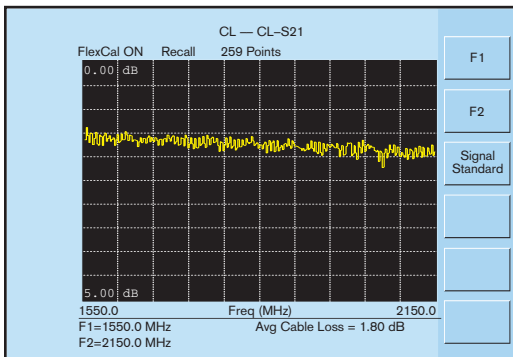
## Quick, Simple Measurements

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



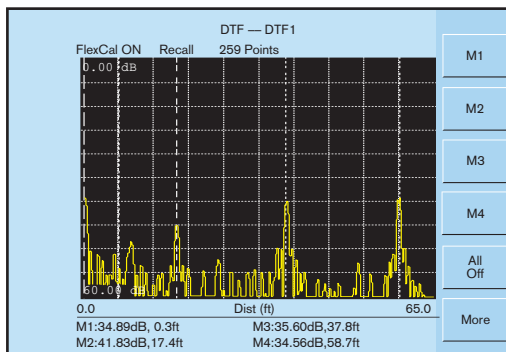
## Return Loss, SWR

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 feedline 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 can not tell the precise location of a fault within the feedline 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.

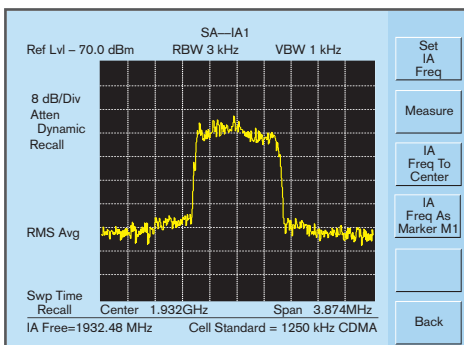
Distance-To-Fault pinpoints the location and reflection amplitude of transmission line components.

# 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.



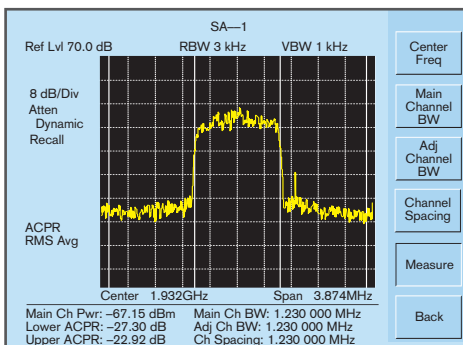
## Interference Analysis

The S332D can provide assistance in identifying signal types from cellular sites. If you are plagued by an unknown signal, you simply enter the frequency of the signal of interest as the “IA Frequency” and press “Measure.” The instrument looks at the bandwidth and skirt shape and, if the signal is of a known type, it gives the name of the air interface standard (e.g., 1250 kHz CDMA) and the measured bandwidth of the signal. If the signal isn’t a cellular signal, it simply gives the bandwidth.

## 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 allows 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) allows a technician to easily identify interfering signals.

**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 & Power Meter Port**

**External Trigger & External Reference In**

**Cable & Antenna Analyzer Port**

**T1/E1 Receive & Transmit Port**  
S331D Models with Option 50

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

**Rugged & 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.

**Large High Resolution Display**  
Standard VGA (640x480) or optional color monitor STN (640x480) display featuring contrast and variable back-lighting capability. Easy viewing under a variety of conditions.

**Function Keys**  
Four dedicated function keys simplify measurement tasks.

**Soft Keys**  
Intuitive soft key menu and user interface.

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

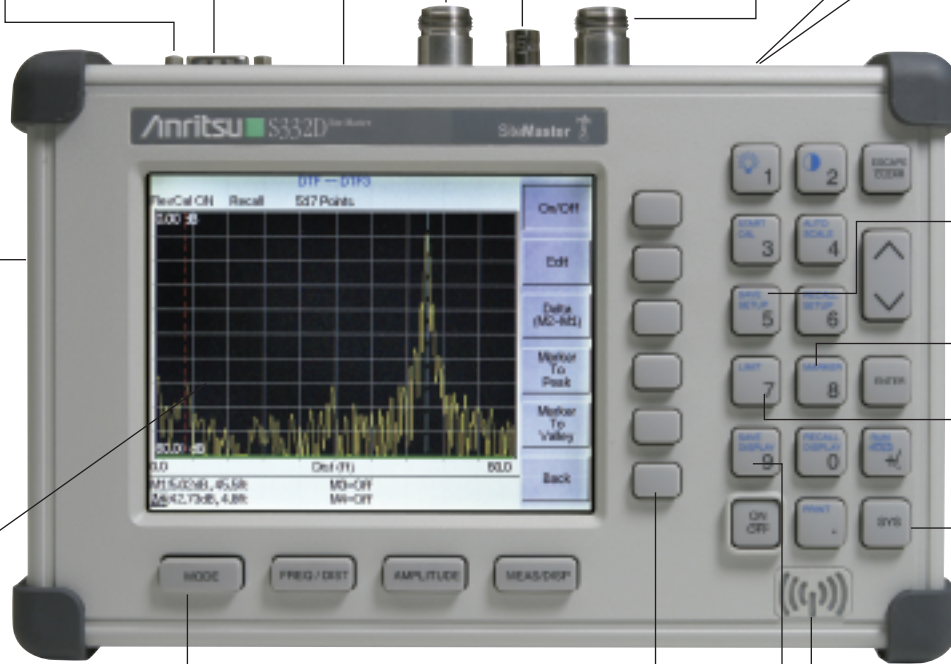
**Save & Recall Setup**  
Save setups for fast repeatable testing:  
S332D Models - 20  
S331D Models - 25

**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.

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

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



Site Master Options	S331D	S332D
Cable and Antenna Analyzer	✓	✓
Spectrum Analyzer		✓
AM/FM Demodulator		✓
Option 3 - Color LCD	✓	✓
Option 6 - Frequency Converter Interface		✓
Option 10 - Bias Tee		✓
Option 21 - Transmission Measurement		✓
Option 29 - Power Meter	✓	✓
Option 50 - T1/E1 Analyzer	✓	

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

# Handheld Software Tools™ Powerful PC-based Data Management and Analysis Software

A comprehensive data management and analysis software suite comes with every Site Master unit, providing users with a simple and easy method of managing, archiving, and analyzing system performance, trends, and the general health of monitored base stations. Handheld Software Tools also provides a professional report generator, for those times when recorded data must be communicated.

- Handheld Software Tools is Windows 95/98/NT4/2000/ME/XP compatible, and supports long alpha-numeric file names for descriptive data labeling
- Stores an unlimited number of data traces for comparison of historical performance measurements, easing the task of trend analysis
- Transfer data traces between the Site Master and the PC with a single menu selection
- Has the ability to convert Return Loss measurements to Distance-To-Fault measurements
- Handheld Software Tools has DTF and Smith Chart analysis capabilities

## Color Display (Option 3)

High resolution color STN display for crisp display/trace representation in indoor lighting conditions.

## Frequency Converter Control Module Interface (Option 6 on S332D only)

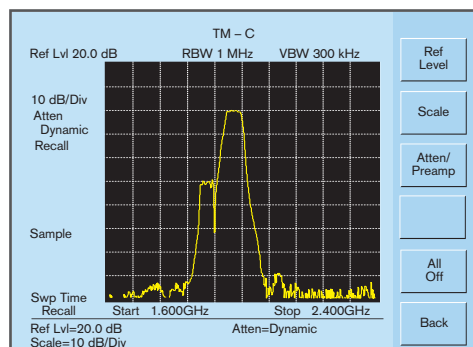
Connector providing internal control signals to drive the Anritsu Frequency Converter Module.

## Bias Tee (Option 10 on S332D only)

Built-in 18V power supply to bias tower mounted amplifier.

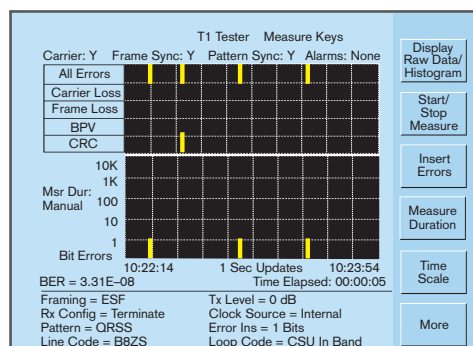
## Power Meter (Option 29)

The power meter performs accurate power measurements, and can display the measured power in dBm or Watts reducing coverage holes and interference.



## Transmission Measurement (Option 21 on S332D only)

An optional built-in 25 MHz to 3 GHz signal source provides the capability to measure loss, gain, or isolation of devices such as filters, cables, attenuators, amplifiers, and antennas.



## T1/E1 Analyzer (Option 50 on S331D only)

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 ( $V_{pp}$ ) of the signal and it can also be displayed as dBdsx.

# Specifications

All specifications apply when the unit is calibrated at ambient temperature after a five minute warm up. Typical values are given for reference, and are not guaranteed.

## Cable and Antenna Analyzer

Frequency Range: 25 MHz to 4.0 GHz

Frequency Accuracy:  $\leq \pm 75$  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:  $\leq 3.5$  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) =  $(1.5 \times 10^{-6}) \times (V_p)/DF$

Where  $V_p$  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:  $\pm 1$  ppm/yr

Accuracy:  $\pm 2$  ppm

Frequency Span: 10 Hz to 2.99 GHz in 1, 2, 5

step selections in auto mode, plus zero span

Sweep Time:  $\leq 1.1$  sec full span;

$\leq 50$   $\mu$ sec to 20 sec selectable in zero span

Resolution Bandwidth (-3 dB):

100 Hz to 1 MHz in 1-3 sequence  $\pm 5\%$  Accuracy

Video Bandwidth (-3 dB):

3 Hz to 1 MHz in 1-3 sequence  $\pm 5\%$  Accuracy typical

SSB Phase Noise (1 GHz) @ 30 kHz Offset:

$\leq -75$  dBc/Hz

Spurious Responses Input Related:  $\leq -45$  dBc

Spurious Residual Responses:

$\leq -90$  dBm,  $\geq 10$  MHz

$\leq -80$  dBm, <10 MHz

(10 kHz RBW, pre-amp on)

Amplitude:

Total Level Accuracy:

$\pm 1$  dB typical ( $\pm 1.5$  dBm max),  $\geq 10$  MHz to 3 GHz

$\pm 2$  dB typical, <10 MHz

for input signal levels  $\geq -60$  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:

$\leq -135$  dBm,  $\geq 10$  MHz (preamp on)

$\leq -115$  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, dB $\mu$ V, V, W

RF Input VSWR: (with  $\geq 20$  dB atten.), 1.5:1 typical,

(10 MHz to 2.4 GHz)

## Bias Tee (Option 10 S332D only)

Voltage: +18 Vdc

Current: 1A peak 150 ms, 300 mA max steady state

## Transmission Measurement (Option 21 S332D only)

Frequency Range: 25 MHz to 3 GHz

Frequency Resolution: 10 Hz

Output Power Level: -10 dBm typical

Output Impedance: 50 $\Omega$

## 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\*\*:  $\pm 1$  dB typical ( $\pm 1.5$  dBm max), >2 GHz to 3 GHz

$\pm 0.5$  dB typical ( $\pm 1$  dB max),  $\geq 10$  MHz to 2 GHz

$\pm 2$  dB typical, 3 MHz to <10 MHz

VSWR: 1.5:1 typical (Pin  $> -30$  dBm, 10 MHz to 2.4 GHz)

Maximum Power: +20 dBm (0.1W) without external attenuator

\*\* (Excludes Input VSWR)

## T1 Analyzer (Option 50 S331D only)

Line Coding: AMI, B8ZS

Framing Modes:

D4 (Superframe)

ESF (Extended Superframe)

Connection Configurations:

Terminate (100 $\Omega$ )

Bridge ( $\geq 1000\Omega$ )

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  $\pm 30$  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 ( $\leq 32$  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 ( $\pm 5\%$ )

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 (75 $\Omega$ , 120 $\Omega$ )

Bridge ( $\geq 1000\Omega$ )

Monitor (Connect via 20 dB pad in DSX)

Receiver Sensitivity: 0 to -43 dB

Clock Sources: External

Internal 2.048 MHz  $\pm 30$  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 ( $\leq 32$  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 ( $\pm 5\%$ )

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: VGA monochrome or VGA color LCD (Option 3) with adjustable backlight

Inputs and Outputs Ports:

RF Out: Type N, female, 50 $\Omega$

Maximum Input without Damage: +23 dBm,  $\pm 50$  VDC

RF In: Type N, female, 50 $\Omega$

Maximum Input without Damage: +43 dBm (peak),  $\pm 50$  VDC

Ext. Trig In: BNC, female (5V TTL) (S332D Models only)

Ext. Freq Ref In (2 to 20 MHz): Shared BNC, female, 50 $\Omega$ , (-15 dBm to +10 dBm) (S332D Models only)

T1/E1 (Receive & 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

# Ordering Information

## Basic Models

- S331D Cable and Antenna Analyzer (25 MHz to 4.0 GHz) with built-in DTF
- S332D Cable and Antenna Analyzer (25 MHz to 4.0 GHz), with built-in DTF, Spectrum Analyzer (100 kHz to 3.0 GHz)

## Standard Accessories Include

- User's Guide
- Soft Carrying Case
- AC-DC Adapter with Power Cord
- Automotive Cigarette Lighter/12 Volt DC Adapter
- One Year Warranty
- Handheld Software Tools CDROM
- Serial Interface Cable
- Rechargeable Battery, NiMH

## Options

- Option 3 Color LCD Display
- Option 6 Frequency Converter Control Module Interface (S332D only)
- Option 10 Bias Tee (S332D only)
- Option 21 Transmission Measurement (S332D only)
- Option 29 Power Meter (does not require external detector)
- Option 50 T1/E1 Analyzer (S331D only)

## 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
  
- 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
  
- 1030-86 Band Pass Filter, 806-869 MHz, 1.7 dB loss, N(m) to SMA(f), 50Ω
- 1030-87 Band Pass Filter, 902-960 MHz, 1.7 dB loss, N(m) to SMA(f), 50Ω
- 1030-88 Band Pass Filter, 1.85-1.99 GHz, 1.8 dB loss, N(m) to SMA(f), 50Ω
- 1030-89 Band Pass Filter, 2.4-2.5 GHz, 1.4 dB loss, N(m) to SMA(f), 50Ω
  
- 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
- 760-229 Transit Case
- 633-27 Rechargeable Battery, NiMH
- 2000-1029 Battery Charger, NiMH, w/ Universal Power Supply
- 40-163 AC/DC Adapter
- 806-62 Automotive Cigarette Lighter/12 Volts DC Adapter
- 800-441 Serial Interface Cable
- 2300-347 Software Tools
  
- 10580-00079 Site Master S331D/S332D User's Guide
- 10580-00100 Site Master S331D/S332D Programming Manual
- 10580-00101 Site Master S331D Maintenance Manual
- 10580-00102 Site Master S332D Maintenance Manual

## 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

## SALES CENTERS:

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