/Anritsu Advancing beyond

Site Master™
Ultraportable Cable & Antenna Analyzer
Featuring Classic and Advanced Modes

S331P
150 kHz to 4.0 GHz or 6 GHz

Introduction

Anritsu introduces its ninth generation, compact handheld Cable & Antenna Analyzer for installation and maintenance of antenna systems. It is available in two frequency ranges starting from 150 kHz and up to 4 GHz or 6 GHz. The S331P is now also supported by the Field Master Pro™ MS2090A with Option 331.

Optimized for Field Use

- FlexCal™ Calibration
  - One Calibration for All Frequencies

- Impact, Dust, and Splash Resistant
- Smallest, Lightest, and Fastest Site Master™

Easy to Use

- Factory default calibration (1-Port ReadyCal) automatically applied to OSL measurements
- S331D-like Classic Mode
- S331E-like Advanced Mode
  - Additional Markers
  - Customizable Shortcuts
  - Full-screen View

- S331L-like Graphical User Interface and Functionality
- Integrated Help Function
- EZ Name Quick Matrix
- easyTest™
- Controlled and Powered by a Windows tablet or PC using standard USB 2.0 (not included) or the Field Master Pro MS2090A

Efficient Sweep Management

- Internal File Storage (limited only by space on PC or Tablet)
  - Sweeps, Setups, Screen Shots
- Line Sweep Tools (LST) Software
  - Edit Sweeps, Rename, Archive
  - Generate PDF or HTML Reports

- Fast Preview of Stored Sweeps
- Standard *.dat and *.csv File Formats
- Compatible with HHST
  - Widely Accepted by Operators

Test Port Connector
N(m)

Front   Back

Status LED

Micro USB Connector
With Latch

Not Used

Site Master™ S331P Cable & Antenna Analyzer Featuring USB Connectivity with a Windows PC or Tablet
Size: 52 mm x 148 mm x 36 mm (2 in x 5.8 in x 1.4 in), Lightweight: < 0.4 kg (< 0.9 lb)

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Definitions

All specifications and characteristics apply to Revision 3 instruments under the following conditions, unless otherwise stated:
- 23 °C ± 5 °C ambient temperature
- After 10 minutes of warm-up time, where the instrument has completely stabilized to the ambient temperature.
- Internal frequency reference is used.

Calibration   Instrument is within the recommended calibration cycle of 12 months. Cable and Antenna Analyzer measurements applicable after standard OSL calibration is performed using Anritsu calibration components.

Typical Performance   Typical specifications in parentheses () describe performance that will be met by a minimum of 80% of all products. They do not include guard bands and are not warranted.

Typical specifications that are not in parentheses are not tested and not warranted. They are generally representative of the nominal characteristic performance.

Uncertainty   A coverage factor of k = 2 is applied to the measurement uncertainties to facilitate comparison with other industry monitors.

All specifications subject to change without notice. For the most current data sheet, please visit the Anritsu web site: www.anritsu.com

📶 Cable and Antenna Analyzer

Measurements

Measurements	VSWR
	Return Loss
	Cable Loss (One Port)
	Distance-to-Fault (DTF) Return Loss
	Distance-to-Fault (DTF) VSWR
	Smith Chart 50 Ω/75 Ω (Advanced Mode Only)
	1-Port Phase (Advanced Mode Only)
	Transmission with External Sensor (Advanced Mode Only)

Setup Parameters–Classic Mode (PC Application)

Measurement Display	Single Display with independent markers
Frequency	Start Frequency (F1), Stop Frequency (F2)
DTF	Start Distance (D1), Stop Distance (D2), DTF Aid, Cable Loss, Propagation Velocity, Cable type
Windowing	Rectangular, Normal Side Lobe, Low Side Lobe, Minimum Side Lobe
Amplitude	Top, Bottom Auto Scale, Full Scale
Sweep	Data Points, Run/Hold, Single/Continuous, Trace
Data Points	130, 259, 517, 1033, 2065
Markers	Markers 1 to 6 (On/Off), Delta Markers 2 to 4 (Ref M1), Marker to Peak/Valley, Marker Table, Marker 5 (Peak/Valley between M1 & M2), Marker 6 (Peak/Valley between M3 & M4), Independent Markers for Frequency and Distance Measurements
Traces	Copy Trace To Memory, Trace Display, Trace Math [Trace - Memory, Trace + Memory, (Trace + Memory)/2]
Limit Line	On/Off, Edit Value, Limit Alarm, Pass/Fail On/Off, Limit Preset
Calibration	Factory default 1-Port ReadyCal (automatically applied to all measurements)
	User calibration (User Cal) overrides ReadyCal
	Start Calibration, Cal Info, User Cal (On/Off),
	Cal Method: OSL
	Cal Types: Standard, FlexCal™
Save/Recall	Setups, Measurements, Screen Shots

Setup Parameters–Advanced Mode (PC Application)

Measurement Display	Single/Dual Display with independent markers
Frequency	Start Frequency (F1), Stop Frequency (F2)
DTF	Start Distance (D1), Stop Distance (D2), Units m/ft, DTF Aid, Cable List, Cable Loss, Propagation Velocity
Windowing	Rectangular, Normal Side Lobe, Low Side Lobe, Minimum Side Lobe
Amplitude	Top, Bottom, Auto Scale, Full Scale
Sweep	Data Points, Run/Hold, Single/Continuous, RF Immunity (High/Low)
Data Points	130, 259, 517, 1033, 2065
Markers	Markers 1 to 8 (On/Off), Delta Markers 2 to 8 (Ref M1), Marker Tracking (On/Off), Marker to Peak/Valley, Marker Table, Marker 5 & 7 (Peak/Valley between M1 & M2), Marker 6 & 8 (Peak/Valley between M3 & M4), Independent Markers for Frequency and Distance Measurements
Traces	Copy Trace to Memory, Trace Display, Trace Math [Trace - Memory, Trace + Memory, (Trace + Memory)/2]
Limit Line	Active Limit (Upper/Lower), Limit State (On/Off), Move Active Limit, Edit Segments (42 upper and 42 lower segments maximum), Limit Alarm, Pass/Fail On/Off, Limit Preset
Calibration	Factory default 1-Port ReadyCal (automatically applied to all measurements except Transmission)
	User calibration (User Cal) overrides ReadyCal
	Start Calibration, Cal Info, User Cal (On/Off),
	Cal Methods: OSL, Transmission, OSL + Transmission
	Cal Types: Standard, FlexCal™
Save/Recall	Setups, Measurements, Screen Shots

Frequency

Frequency Ranges	150 kHz to 4 GHz (S331P-0704)
	150 kHz to 6 GHz (S331P-0706)
Frequency Accuracy	± 2.5 ppm @ 23 °C ± 3 °C
Frequency Resolution	1 kHz

Power

Output Power	–5 dBm, typical

Interference Immunity

	On Channel and On Frequency +17 dBm, typical

Measurement Speed

	500 µs/data point (timing dependent on external computer configuration)

📡 Cable and Antenna Analyzer (continued)

Return Loss

Measurement Range	0 to 60 dB
Resolution	0.01 dB

VSWR

Measurement Range	1 to 65
Resolution	0.01

Cable Loss

Measurement Range	0 to 30 dB
Resolution	0.01 dB

Distance-to-Fault

Vertical Range Return Loss	0 to 60 dB
Vertical Range VSWR	1 to 65
Fault Resolution (meters)	$(1.5 \times 10^8 \times vp)/\Delta F$ (vp = propagation velocity, ΔF is F2 – F1 in Hz)
Horizontal Range (meters)	0 to (Data Points – 1) x Fault Resolution, to maximum of 1500 meters (4921 ft)

1-Port Phase (Advanced Mode Only)

Measurement Display Range	–450 ° to +450 °
Resolution	0.01 °

Smith Chart (Advanced Mode Only)

Impedance	50 Ω, 75 Ω
Resolution	0.01

Transmission Ext Sensor (Advanced Mode Only)

Measurement Display Range	–100 dB to +100 dB
Resolution	0.01 dB

Measurement Accuracy (at 23 °C ± 3 °C)

Corrected Directivity	≥ 42 dB, OSL calibration (OSLN50A-8, OSLNF50A-8)

Return Loss Measurement Uncertainty (Standard OSL calibration. OSLNF50A-8 Precision Open/Short/Load calibration component.)

Reflection Magnitude Uncertainty
S331P standard OSL calibration using OSLNF50A Cal Kit

Reflection Phase Uncertainty
S331P standard OSL calibration using OSLNF50A Cal Kit
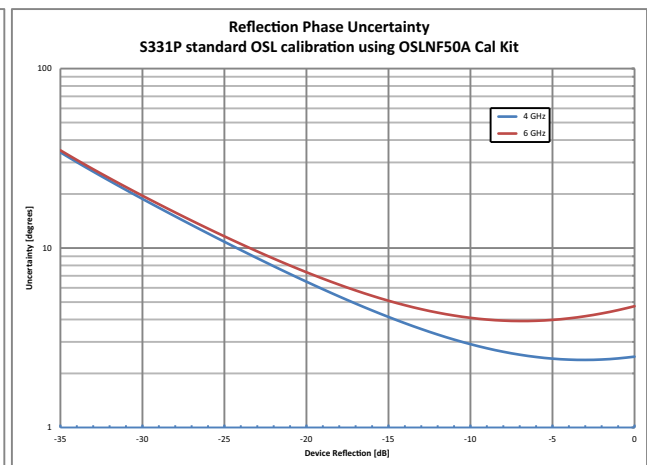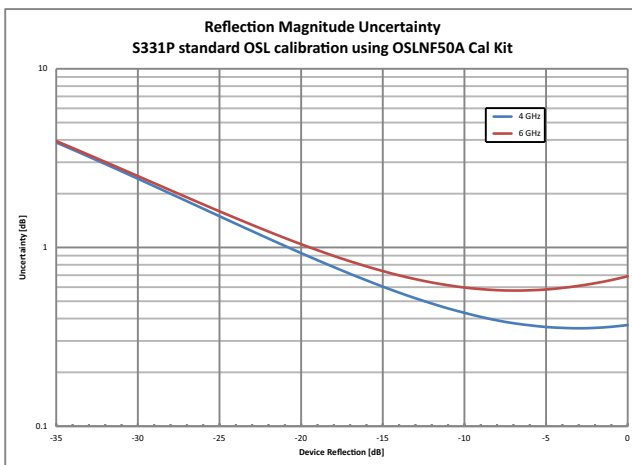
General Specifications

Setup Parameters (PC Application)

System Info	Status
System Setups	Language, Display/Audio
Language	English, French, German, Italian, Spanish, Russian, Portuguese, Japanese, Korean, Chinese
Display/Audio	Brightness, Color Schemes, Screen Shot Settings, Volume
Connectivity	USB
Diagnostics	Self Test
Preset	Preset, Reset
Reset	Factory Reset, Delete All User Files, Delete Custom Files, Master Reset
File	Save, Recall, File Management
Save	Measurement (*.dat, *.csv), Setup (*.stp), Screen Shot (*.png), System and Self Test Info (*.txt)
Recall	Recall, Create Folder, Copy, Paste, Delete
File Management	Rename, Create Folder, Copy, Paste, Delete
Navigation	Top, Bottom, Page Up, Page Down
Help Menu	System Info, FAQ, User Guide
Internal Trace/Setup Memory	> 1000 files for traces, setups, screen shots, or any combination (limited by PC/Tablet storage)
External Trace/Setup Memory	Limited only by size of USB Flash drive

Connectors

RF Port	Type N(m), 50 Ω, Maximum input +23 dBm maximum, ±50 VDC maximum
USB Port	USB 2.0 port for connecting to an external PC controller

Regulatory Compliance

European Union	EMC 2014/30/EU, EN 61326:2013, CISPR 11/EN 55011, IEC/EN 61000-4-2/3/4/5/6/8/11
	Low Voltage Directive 2014/35/EU
	Safety EN 61010-1:2010
	RoHS Directive 2011/65/EU applies to instruments with CE marking placed on the market after July 22, 2017
Australia and New Zealand	RCM AS/NZS 4417:2012
South Korea	KCC-REM-A21-0004

Environmental

	MIL-PRF-28800F Class 2
Operating Temperature Range	–10 ℃ to 55 ℃
Storage Temperature Range	–51 ℃ to 71 ℃
Maximum Relative Humidity	95 % RH at 30 ℃, non-condensing
Vibration, Sinusoidal	5 Hz to 55 Hz
Vibration, Random	10 Hz to 500 Hz
Half Sine Shock	30 g_n
Altitude	4600 meters, operating and non-operating

Size and Weight

Size	52 mm x 148 mm x 36 mm (2 in x 5.8 in x 1.4 in)
Weight	< 0.4 kg (< 0.9 lb), typical

Recommended External PC/Controller Configuration

One USB 2.0 (or higher) port
S331P software is compatible with Windows® 7, 8, 8.1, or 10; 32 or 64 bit operating systems.
Tested with tablets running Windows 10 and Intel Atom X5-Z8300 processor.

Or use with MS2090A with Option 331

🦉 Anritsu Tool Box and Line Sweep Tools (for your PC)

Line Sweep Tools (LST) is a free PC based program that increases productivity for people who deal with numerous Cable and Antenna traces every day. LST is the next generation of Anritsu's familiar Handheld Software Tools (HHST) and shares its uncomplicated user interface, giving a new face to the term "ease of use."

Cable Editor[1]	Instrument Cable Lists may be retrieved from the instrument, modified as required, and uploaded back into instrument.
Distance to Fault[2] (DTF)	Easily convert Return Loss or VSWR traces to Distance to Fault traces with one button press.
Measurement Calculator	Provides quick conversion between commonly used measurement units such as VSWR, RL, and others.
Signal Standard Editor[1]	Signal Standard Lists may be retrieved from the instrument, modified as required, and uploaded back into instrument.
Naming Grid	A naming grid function makes changing file names, trace titles, and trace subtitles from field values to those required by contract simple and quick. Once the naming grid is populated with user defined file name segments, a few simple button presses will then fill out the file, title, and sub-title names. Quickly applied to multiple traces, the naming grid can save time, increase efficiency and accuracy.
Presets	Presets make applying markers and a limit line to similar traces quick and easy. They only need to be set once, and recorded. After this, applying them to a similar trace requires only one button push. This speeds up trace processing and makes providing consistent marker and limit line settings easy.
Report Generator	The report generator creates a professional PDF or HTML based report. Reports may include GPS[3] location, power level[3], company logo[4], instrument and calibration status along with a display of all open traces. It also may contain additional information such as addresses and phone numbers.
Connection	File transfer.
Supported File Types	Input: *.dat, *.vna, *.mna, *.pim, *.tm
	Output: *.dat, *.vna, *.pim, *.tm, *.csv, *.bmp, *.jpg, *.png

📋 easyTest Tools (for your PC)

Instrument Mode

	Cable & Antenna Analyzer Mode

Commands

Display Image	Allows a custom on-screen image
Recall Setup	Places the instrument into a known state
Prompt	Displays instructional messages for the user
Save	Allows automatic or manual saving of traces

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1. Instrument type/model must match original
2. Only *.dat and *.vna file types supported
3. Model dependent
4. Optionally set by user

Ordering Information

	Model Number	Description
	S331P	Cable and Antenna Analyzer (required one frequency option)
	Frequency Options	
	S331P-0704	150 kHz to 4 GHz
	S331P-0706	150 kHz to 6 GHz

Calibration and Extended Warranty Options

Option	Description
S331P-ES510	Warranty Extension to 5 Years
S331P-ES513	Warranty Extension to 5 Years with Z540 Calibration
S331P-0098	Standard Calibration to ISO17025 and ANSI/NCSL Z540-1. Includes calibration certificate.
S331P-0099	Premium Calibration to ISO17025 and ANSI/NCSL Z540-1. Includes calibration certificate, test report, and uncertainty data.

Standard Accessories   (included with instrument)

Accessory	Description	Accessory	Description
	2000-1864-R Soft Carrying Case		2000-1687-R Torque Multiplier N(m)
	2000-2010-R USB-A to Micro-USB, 1.83 m (6 ft)		Standard Three-Year Warranty Certificate of Calibration and Conformance

USB Sensors   (for complete ordering information, see the respective data sheets of each sensor)

Accessory	Description	Accessory	Description
	MA24330A Microwave CW USB Power Sensor, 10 MHz to 33 GHz, +20 dBm		MA24108A Microwave USB Power Sensor, 10 MHz to 8 GHz, +20 dBm to –40 dBm
	MA24340A Microwave CW USB Power Sensor, 10 MHz to 40 GHz, +20 dBm		MA24118A Microwave USB Power Sensor, 10 MHz to 18 GHz, +20 dBm to –40 dBm
	MA24350A Microwave CW USB Power Sensor, 10 MHz to 50 GHz, +20 dBm		MA24126A Microwave USB Power Sensor, 10 MHz to 26 GHz, +20 dBm to –40 dBm
	MA24208A Microwave Universal USB Power Sensor, 10 MHz to 8 GHz, +20 dBm to –60 dBm		MA24105A Inline Dual Directional High Power Sensor, 350 MHz to 4 GHz, +3 dBm to +51.76 dBm
	MA24218A Microwave Universal USB Power Sensor, 10 MHz to 18 GHz, +20 dBm to –60 dBm		
	MA24106A High Accuracy RF Power Sensor, 50 MHz to 6 GHz, +23 dBm to –40 dBm		MA25100A RF Power Indicator
	SC8268 USB Transmission Sensor, K(m), 1 MHz to 40 GHz, +10 dBm to –50 dBm		

Optional Accessories

Backpack and Transit Case

Accessory	Description		Accessory	Description
	67135 Anritsu Backpack (for instrument and PC)			760-283 Transit Case, USB 1 Port VNA

Calibration Components, 50 Ω

Accessory	Description		Accessory	Description
	OSLN50A-8 High Performance Type N(m), DC to 8 GHz, 50 Ω			2000-1619-R Precision Open/Short/Load, 7/16 DIN(f), DC to 6.0 GHz 50 Ω
	OSLNF50A-8 High Performance Type N(f), DC to 8 GHz, 50 Ω			22N50 Open/Short, N(m), DC to 18 GHz, 50 Ω
	2000-1914-R Precision Open/Short/Load, 4.3-10(f), DC to 6 GHz, 50 Ω			22NF50 Open/Short, N(f), DC to 18 GHz, 50 Ω
	2000-1915-R Precision Open/Short/Load, 4.3-10(m), DC to 6 GHz, 50 Ω			SM/PL-1 Precision Load, N(m), 42 dB, 6.0 GHz
	2000-1618-R Precision Open/Short/Load, 7/16 DIN(m), DC to 6.0 GHz 50 Ω			SM/PLNF-1 Precision Load, N(f), 42 dB, 6.0 GHz

Calibration Components, 75 Ω

Accessory	Description	Accessory	Description
	22N75 Open/Short, N(m), DC to 3 GHz, 75 Ω		22NF75 Open/Short, N(f), DC to 3 GHz, 75 Ω
	26N75A Precision Termination, N(m), DC to 3 GHz, 75 Ω		26NF75A Precision Termination, N(f), DC to 3 GHz, 75 Ω
	12N50-75B Matching Pad, DC to 3 GHz, 50 Ω to 75 Ω		

Adapters

Accessory	Description	Accessory	Description
	510-91-R 7/16 DIN(f) to N(f), DC to 7.5 GHz, 50 Ω		1091-434-R Low PIM Adapter, 4.1-9.5(m) to 7/16 DIN(f), DC to 3.0 GHz, 50 Ω
	510-96-R 7/16 DIN(m) to 7/16 DIN(m), DC to 7.5 GHz, 50 Ω		1091-435-R Low PIM Adapter, 4.1-9.5(f) to N(m), DC to 3.0 GHz, 50 Ω
	510-97-R 7/16 DIN(f) to 7/16 DIN(f), DC to 7.5 GHz, 50 Ω		1091-436-R Low PIM Adapter, 4.3-10(f) to 7/16 DIN(f), DC to 6.0 GHz, 50 Ω
	1091-80-R SMA(m) to N(f), DC to 18 GHz, 50 Ω		1091-440-R Low PIM Adapter, 4.3-10(f) to 7/16 DIN(f), DC to 6.0 GHz, 50 Ω
	1091-81-R SMA(f) to N(f), DC to 18 GHz, 50 Ω		1091-441-R Low PIM Adapter, 4.3-10(m) to 7/16 DIN(f), DC to 6.0 GHz, 50 Ω
	1091-433-R Low PIM Adapter, 4.1-9.5(f) to 7/16 DIN(f), DC to 3.0GHz, 50 Ω		1091-443-R Low PIM Adapter, 4.3-10(m) to N(m), DC to 6.0 GHz, 50 Ω

Accessory	Description
1091-465-R	DC to 6 GHz, 4.3-10(f) to N(f), 50 Ω
1091-467-R	DC to 6 GHz, 4.3-10(m) to N(f), 50 Ω

Accessory	Description
1091-442-R	Low PIM Adapter, 4.3-10(f) to N(m), DC to 6.0 GHz, 50 Ω

Precision Adapters

Accessory	Description
	34NN50A N(m) to N(m), DC to 18 GHz, 50 Ω
	34NFNF50 N(f) to N(f), DC to 18 GHz, 50 Ω

Attenuators

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

USB Extender Kit   (for use with external 2-port cable loss/transmission sensors; requires Cat 5e extension cable, sold separately)

Accessory	Description
	2000-1900-R USB 2.0 Active 100 meter Extender (with Type A power cord for USA, Japan, North America, Central America and Caribbean)
	2000-1717-R USB 1.1 Passive 40 m Extender (Not compatible with sensors MA24208A, MA24218A, MA24330A, MA24340A, MA24350A; must use active extenders with these sensors).
	2000-1901-R USB 2.0 Active 100 meter Extender (with Type C power cord for use in Europe, India, South Korea, and many countries in Middle East and Africa)
	2100-28-R Cat 5e extension cable for use with USB Extender (22.5 m)
	2000-1902-R USB 2.0 Active 100 meter Extender (with Type I power cord for use in Australia, New Zealand, Argentina, and the South Pacific)
	2000-1903-R USB 2.0 Active 100 meter Extender (with Type G power cord for use in the UK, and several other countries in Asia, the Middle East, and Africa)

Reference Documents (Soft copies available at www.anritsu.com)

Part Number	Description
11410-00964	Site Master™ S331P Technical Data Sheet
10580-00426	Site Master™ S331P User Guide
11410-00674	Cable and Antenna Analysis Troubleshooting Guide

Training at Anritsu

Anritsu has designed courses to help you stay up to date with technologies important to your job. For available training courses, visit: www.anritsu.com/training

Anritsu Advancing beyond