Anritsu Advancing beyond

Microwave Site Master™

Cable & Antenna Analyzer with Optional VNA and VVM Modes

S820E

1 MHz to 8 GHz, 14 GHz, 20 GHz, 30 GHz, 40 GHz



Introduction

Anritsu is proud to introduce the world's most advanced Site Master. With microwave frequency coverage up to 40 GHz, the new S820E completely redefines the standards for portable handheld analyzers, setting another new industry benchmark for performance and accuracy. The new S820E is the culmination of over 50 years of microwave development, utilizing the very latest technologies to deliver accuracy and performance previously reserved only for benchtop instruments. Based on a true 4 channel receiver design, the S820E offers true VNA performance in a portable package. Optional VNA Mode provides fully reversing S-parameter measurements anywhere, anytime. Optional Vector Voltmeter Mode (VVM) with standard A/B and B/A ratio may be used as drop-in replacement for legacy VVM products.

Cable and Antenna Analyzer Highlights

- 1-Port Measurements: RL, VSWR, Cable Loss, DTF, Phase, Smith Chart
- 2-Port Measurements: Transmission, Cable Loss
- Display: Single or Dual Measurement Touchscreen
- Calibration: Coaxial (OSL, TOSL), Waveguide (SSL, SSLT)
- Dynamic Range: 110 dB (20 MHz to 40 GHz)
- Frequency Resolution: 1 Hz (1 MHz to 40 GHz)
- Sweep Speed: 550 µs/data point
- Calibration Temperature Window: ±10 °C
- Full Temperature Calibration Kits: –10 °C to +55 °C

Vector Network Analyzer Highlights

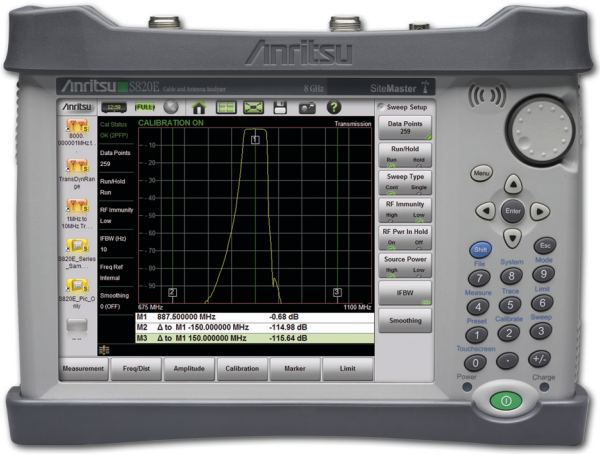
- Fully Reversing Error Corrected Measurements
- Measure All Four S-Parameters Simultaneously
- Flexible Trace Display Layout: 1, 2, 3, or 4, and Overlay on top
- Calibration Interpolation and Through Update
- Independent Markers and Limits Per Trace
- Fast Sweeps (<600 µs/pt) Even in 5 kHz IFBW
- Arbitrary Data Point Setting
- Port Reference Plane Extension (Distance/Loss)

Vector Voltmeter Highlights

- A/B & B/A Ratio Measurement Standard
- Reflection/Transmission Measurement Standard
- Reference Auto-tune reduces or eliminates need for common 10 MHz reference (for A/B & B/A Ratio measurement only)
- Vector Error Correction for Absolute Measurement (Reflection/Transmission only)
- 4 Flexible Data Display Formats
- Table Display allows 12 Measurements and 1 Reference, Simultaneously

Capabilities and Functional Highlights

- Benchtop VNA Performance
- Intuitive GUI + Classic Mode
- 2-Port Measurements Standard
- 2-Port Cable Loss
- Std High Accuracy Power Meter (Requires external USB sensor)
- USB Transmission Sensors up to 40 GHz
- Ethernet/USB Connectivity
- USB Peripheral Support
- Touchscreen Popup Keyboard
- easyTest™ Automated Scripts
- Embedded Help (FAQ and User Guide)



Microwave Site Master™ S820E Cable and Antenna Analyzer Featuring 8.4 in Daylight Viewable Touchscreen
Compact Size: 273 mm x 199 mm x 91 mm (10.7 in x 7.8 in x 3.6 in), Lightweight: 3.0 kg (6.6 lb)

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Definitions

All specifications and characteristics apply to Revision 2 instruments under the following conditions, unless otherwise stated:

Warm-Up Time — After 10 minutes of warm-up time, where the instrument is left in the ON state.

Reference Signal — When using internal reference signal.

Typical Performance — Typical specifications that are not in parenthesis are not tested and not warranted. They are generally representative of characteristic performance.

Typical specifications in parenthesis () represent the mean value of measured units and do not include any guard-bands or uncertainties. They are not warranted.

Uncertainty — A coverage factor of x1 is applied to the measurement uncertainties to facilitate comparison with other industry handheld analyzers.

Calibration Cycle — Calibration is within the recommended 12 month period (residual specifications also require calibration kit calibration cycle adherence.)

All specifications subject to change without notice. For the most current data sheet, please visit the Anritsu [redacted]

Cable and Antenna Analyzer

Measurements

1-Port Measurements	Return Loss Distance-to-Fault (DTF) Return Loss Cable Loss VSWR Distance-to-Fault (DTF) VSWR Smith Chart 50 Ω/75 Ω (Advanced Mode Only) Phase (Advanced Mode Only)
2-Port Measurements	Transmission (Advanced Mode Only) Transmission with External Sensor (Advanced Mode Only) Cable Loss (2-Port) with External Sensor (Classic Mode Only)

Setup Parameters Classic Mode

Measurement Display	Single Display with independent markers
Frequency	F1/F2
DTF	D1/D2, Units m/ft, DTF Aid, Cable List, Cable Loss, Propagation Velocity
Windowing	Rectangular, Nominal Side Lobe, Low Side Lobe, Minimum Side Lobe
Amplitude	Top, Bottom Auto Scale, Full Scale, Scale Preset
Sweep	Data Points (130, 259, 517, 1033, 2065), Run/Hold, Sweep Type (Single/Continuous), RF Immunity (High/Low), RF Power in Hold (On/Off), Smoothing, Sweep Averaging (1 to 1000), Trace
Marker	Markers 1 to 6 (On/Off), Delta Makers 2 to 4 (Ref Mk1), Marker to Peak/Valley, Marker Table, Marker 5 (Peak/Valley between M1 and M2), Marker 6 (Peak/Valley between M3 and M4)
Trace	Copy Trace To Memory, Trace Display, Trace Math
Limit	On/Off, Edit Value, Limit Alarm (On/ Off), Pass/Fail (On/Off), Limit Preset
Calibration	Start Calibration, Calibration Info, Calibration Correction (On/ Off)
Calibration Setup	Coax, Waveguide
Save/Recall/File Management[1]	Measurement (.dat), Setups (.stp), Screen Shots (.png), Text (.txt), CSV (.csv)

Setup Parameters Advanced Mode

Measurement Display	Single/Dual Display with independent markers
Frequency	Start Frequency (F1), Stop Frequency (F2)
Distance	Start Distance (D1), Stop Distance (D2), Units (meters/feet), DTF Aid
DTF Setup	DTF Line Type (Coax/Waveguide), Cable List, Cable Loss, Propagation Velocity, Windowing (Rectangular, Nominal Side Lobe, Low Side Lobe, Minimum Side Lobe)
Amplitude	Top, Bottom, Auto Scale, Full Scale, Scale Preset
Sweep	Data Points (130, 259, 517, 1033, 2065), Run/Hold, Sweep Type (Single/Continuous), RF Immunity (High/Low), RF Power in Hold (On/Off), Source Power (High/Low), IFBW (10 Hz, 100 Hz, 1 kHz, 100 kHz), Smoothing, Sweep Averaging (1 to 1000)
Markers	Markers 1 to 8 (On/Off), Delta Makers 2 to 8 (Ref Mk1), Marker to Peak/Valley, Marker Tracking (On/Off), Marker Table, Marker 5 and 7 (Peak/Valley between M1 and M2), Marker 6 and 8 (Peak/Valley between M3 and M4)
Trace	Copy Trace to Memory, Trace Display, Trace Math
Limit	Active Limit (Upper/Lower), Limit State (Off, Single, Segmented), Move Active Limit, Edit Segments (42 upper and 42 lower segments maximum), Limit Alarm (On/Off), Pass/Fail (On/Off), Limit Preset
Calibration	Start Calibration, Thru Update, Calibration Info, Calibration Correction (On/Off)
Save/Recall/File Management[1]	Measurement (.dat), Setups (.stp), Screen Shots (.png), Text (.txt), CSV (.csv)

Frequency

Frequency Range	1 MHz to 8 GHz, 14 GHz, 20 GHz, 30 GHz, 40 GHz (frequency option dependent)
Frequency Accuracy	±1.0 ppm at 23 °C
Stability	±1.0 ppm from –10 °C to +55 °C, typical
Aging	±1.0 ppm/yr, typical
Frequency Resolution	1 Hz

IFBW

Advanced Mode Only	10 Hz, 100 Hz, 1 kHz, 100 kHz

Output Power

1 MHz to 8 GHz	+5 dBm, typical (High); –20 dBm, typical (Low)
>8 GHz to 40 GHz	–3 dBm, typical (High); –20 dBm, typical (Low)

RF Immunity[2]

+17 dBm, typical

1. Text (.txt) and CSV (.csv) files cannot be recalled to the instrument.
2. +13 dBm for interfering signals landing in-band.

Cable and Antenna Analyzer (continued)

Measurement Speed[1]

Reflection/Transmission Measurements	≤ 550 µs/data point, RF immunity low, typical
Transmission Ext. Sensor (2-port Cable Loss)	Determined by USB sensor and may vary with model used, not specified.

Dynamic Range[2,3] (High Power, 10 Hz IFBW, 10 averages Port 1 to Port 2)

1 MHz to 10 MHz	≥ 85 dB (105 dB, typical)
>10 MHz to 8 GHz	≥ 100 dB (115 dB, typical)
>8 GHz to 40 GHz	≥ 100 dB (110 dB, typical)

Receiver Compression Port 1 or Port 2 (0.1 dB compression)

1 MHz to 40 GHz	+5 dBm, typical

High Level Noise[4] (High Power, 100 Hz IFBW, 20 MHz to 40 GHz)

Magnitude	±0.006 dB (±0.001 dB, typical) rms
Phase	±0.090° (±0.060°, typical)

Temperature Stability (10 MHz to 40 GHz, ratio measurement, ports shorted)

Magnitude	±0.02 dB/°C, typical
Phase	±0.3 degrees/°C, typical

Smoothing

Range	0 % to 20 %

System Impedance

Port 1 or Port 2	50 Ω standard, 75 Ω with 50 Ω to 75 Ω adapter

Return Loss

Measurement Display Range	0 dB to 1000 dB
Resolution	0.01 dB

VSWR

Measurement Display Range	1 to 1000
Resolution	0.01

Cable Loss

Measurement Display Range	0 dB to 500 dB
Resolution	0.01 dB

Distance-to-Fault

Vertical Range Return Loss	0 dB to 1000 dB
Vertical Range VSWR	1 to 1000
Fault Resolution (meters)	$(1.5 \times 10^8 \times vp)/\Delta F$ (vp = propagation velocity constant, ΔF is F2–F1 in Hz)
Horizontal Range (meters)	0 to (Data Points – 1) x Fault Resolution, to a maximum of 1500 m (4921 ft)

1-Port Phase

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

Smith Chart

Impedance	50 Ω, 75 Ω
Resolution	0.01

Cable Loss 2-Port (Classic Mode Only)

Measurement Display Range	–1000 dB to +1000 dB
Resolution	0.01 dB

Transmission (Advanced Mode Only)

Measurement Display Range	–1000 dB to +1000 dB
Resolution	0.01 dB

Transmission Ext Sensor (Advanced Mode Only)

Measurement Display Range	–1000 dB to +1000 dB
Resolution	0.01 dB

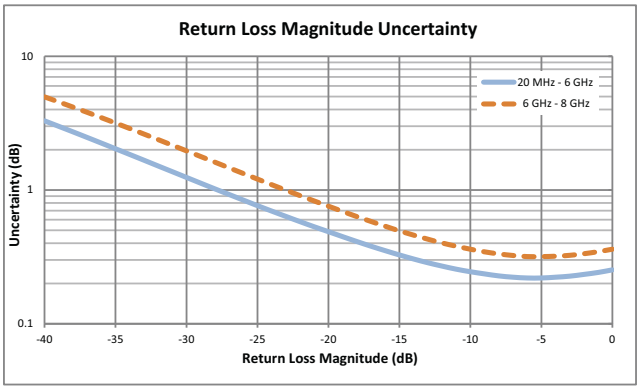
1. 100 kHz IFBW, typical.
2. Dynamic range is defined as the difference between output power and receiver noise floor.
3. Decrease specification by 5 dB between 8 GHz and 14 GHz. Crosstalk may reduce dynamic range up to 20 dB (typical) at lower IF bandwidths (≤ 10 kHz) when measuring highly reflective DUT's from 4 GHz to 8 GHz. Reflection measurements are not affected.
4. High Level Noise below 20 MHz is increased by a factor of 5.0. High Level Noise (Phase only) above 20 GHz is increased by a factor of 1.5.

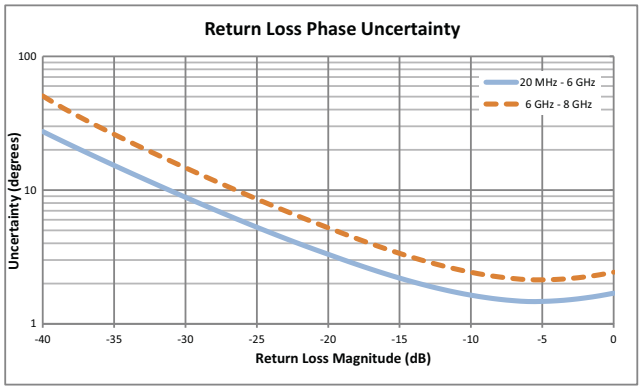
Cable and Antenna Analyzer (continued)

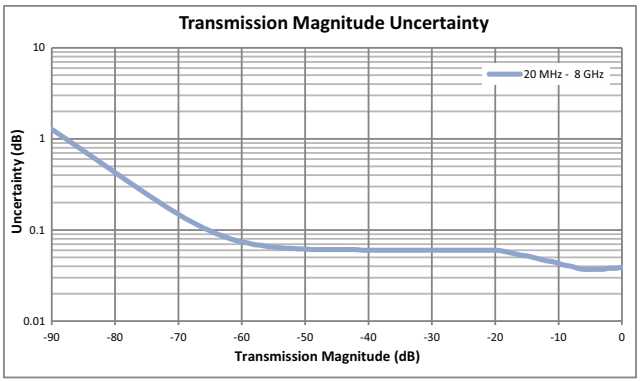
Measurement Accuracy[1] (OSLN50A-8 or OSLNF50A-8, TOSLN50A-8 or TOSLNF50A-8)

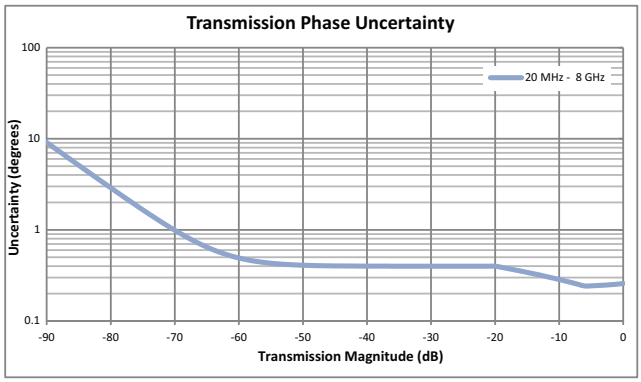
Frequency Range	Directivity (dB)	Source Match (dB)	Load Match (dB)	Reflection Tracking (dB)	Transmission Tracking (dB)
1 MHz to 6 GHz	≥ 42	≥ 33	≥ 42	±0.08	±0.06
> 6 GHz to 8 GHz	≥ 37	≥ 33	≥ 37	±0.08	±0.06

Corrected Measurement Uncertainty (Transmission from Port 1 to Port 2)









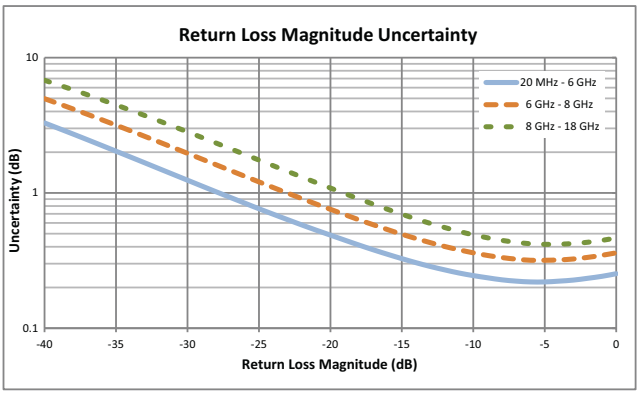
1. Full 2-Port calibration with isolation, Default Power, 10 Hz IFBW, No averaging, 10 minute warm-up. OSLN50A-8, OSLNF50A-8, TOSLN50A-8, or TOSLNF50A-8 calibration kit. Load match specification applicable directly at corrected port only. De-rate by approximately 8 dB if using a 3670 series test port cable. Reflection and Transmission Tracking are typical.

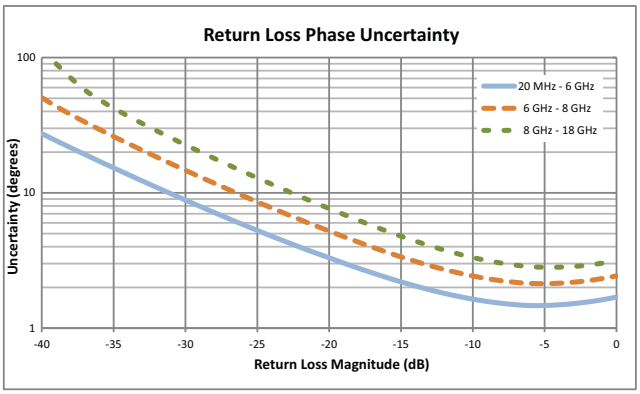
Cable and Antenna Analyzer (continued)

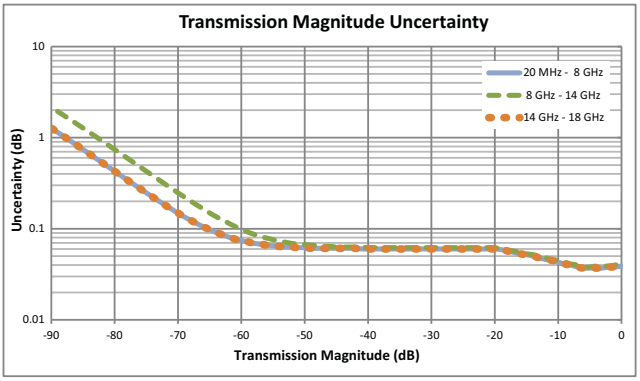
Measurement Accuracy[1] (OSLN50A-18 or OSLNF50A-18, TOSLN50A-18 or TOSLNF50A-18)

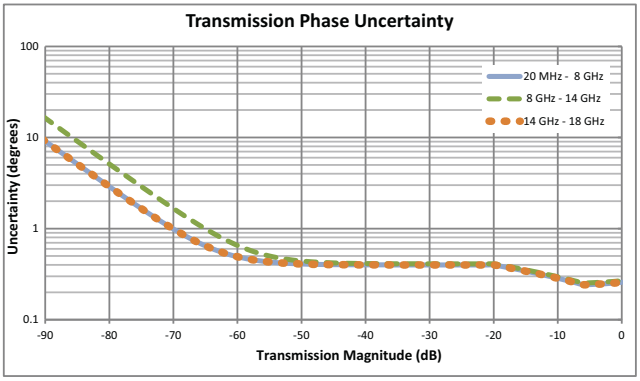
Frequency Range	Directivity (dB)	Source Match (dB)	Load Match (dB)	Reflection Tracking (dB)	Transmission Tracking (dB)
1 MHz to 6 GHz	≥ 42	≥ 33	≥ 42	±0.08	±0.06
> 6 GHz to 9 GHz	≥ 37	≥ 33	≥ 37	±0.08	±0.06
> 9 GHz to 18 GHz	≥ 33	≥ 26	≥ 33	±0.04	±0.03

Corrected Measurement Uncertainty (Transmission from Port 1 to Port 2)









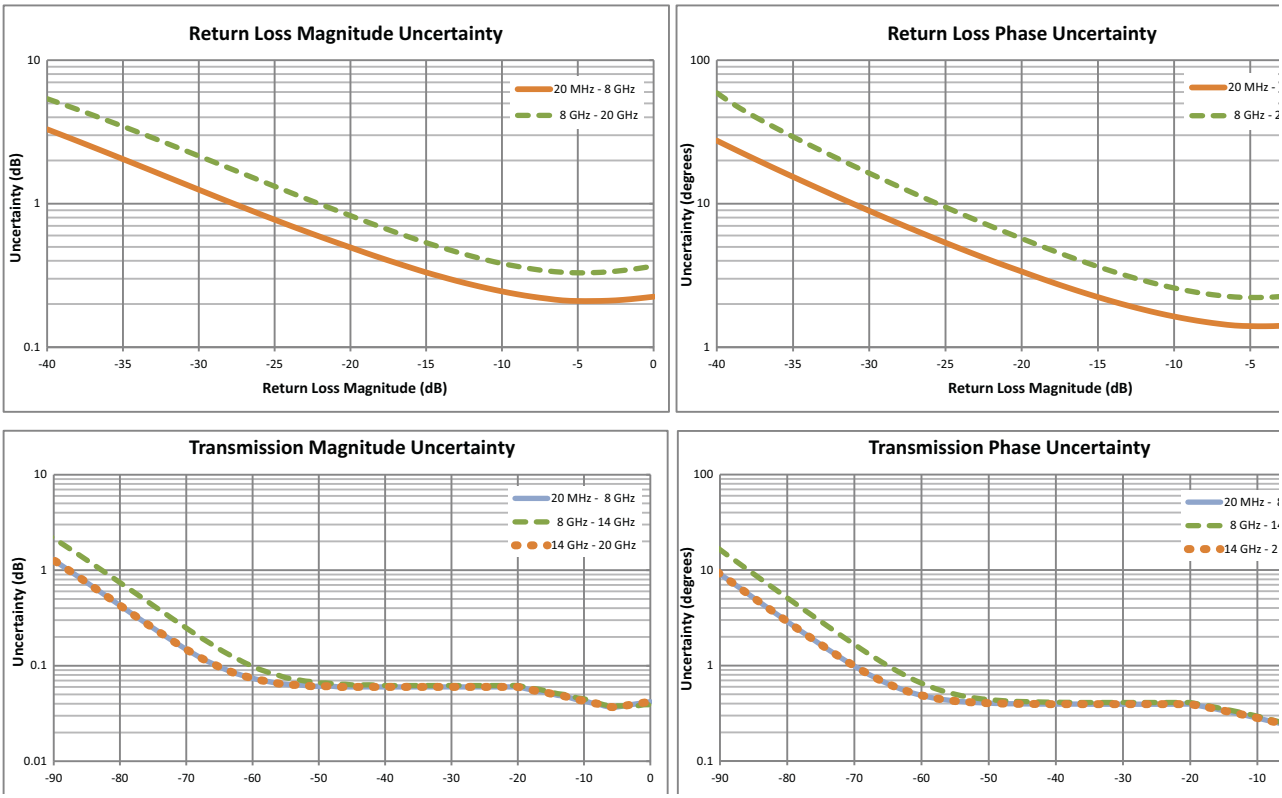
1. Full 2-Port calibration with isolation, Default Power, 10 Hz IFBW, No averaging, 10 minute warm-up. OSLN50A-18, OSLNF50A-18, TOSLN50A-18, or TOSLNF50A-18 calibration kit. Load match specification applicable directly at corrected port only. De-rate by approximately 8 dB if using a 3670 series test port cable. Reflection and Transmission Tracking are typical.

Cable and Antenna Analyzer (continued)

Measurement Accuracy[1] (TOSLK50A-20 or TOSLKF50A-20)

Frequency Range	Directivity (dB)	Source Match (dB)	Load Match (dB)	Reflection Tracking (dB)	Transmission Tracking (dB)
1 MHz to 10 GHz	≥ 42	≥ 33	≥ 42	±0.08	±0.06
> 10 GHz to 20 GHz	≥ 36	≥ 26	≥ 36	±0.04	±0.03

Corrected Measurement Uncertainty (Transmission from Port 1 to Port 2)



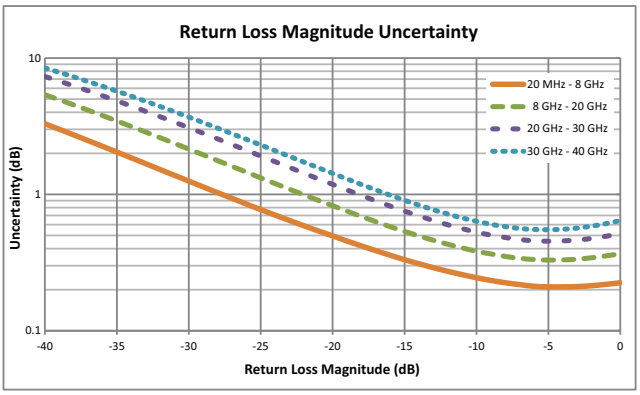
1. Full 2-Port calibration with isolation, Default Power, 10 Hz IFBW, No averaging, 10 minute warm-up. TOSLK50A-20 or TOSLKF50A-20 calibration kit. Load match specification applicable directly at corrected port only. De-rate by approximately 8 dB if using a 3670 series test port cable. Reflection and Transmission Tracking are typical.

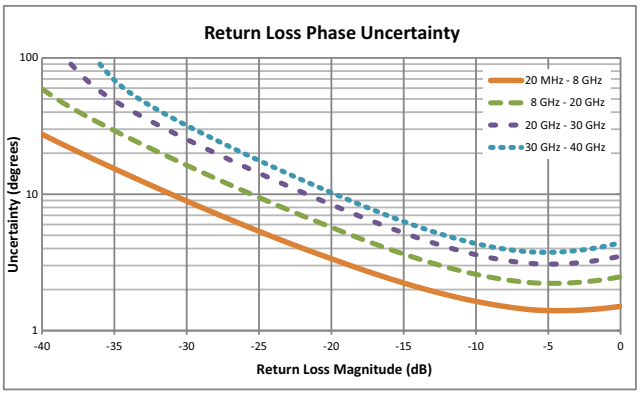
Cable and Antenna Analyzer (continued)

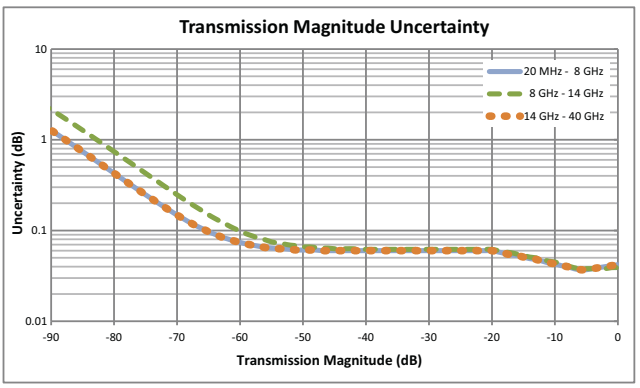
Measurement Accuracy[1] (TOSLK50A-40 or TOSLKF50A-40)

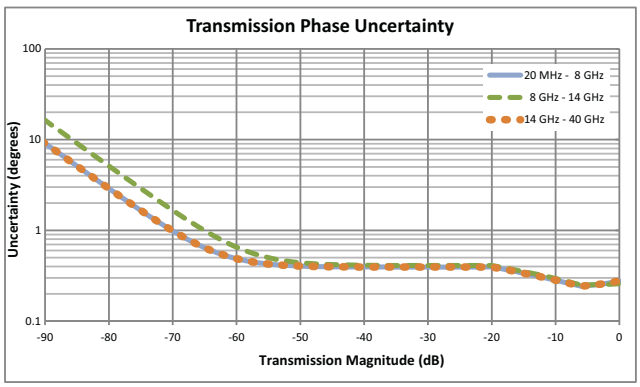
Frequency Range	Directivity (dB)	Source Match (dB)	Load Match (dB)	Reflection Tracking (dB)	Transmission Tracking (dB)
1 MHz to 10 GHz	≥ 42	≥ 33	≥ 42	±0.08	±0.06
> 10 GHz to 20 GHz	≥ 36	≥ 26	≥ 36	±0.04	±0.03
> 20 GHz to 30 GHz	≥ 32	≥ 22	≥ 32	±0.04	±0.03
> 30 GHz to 40 GHz	≥ 30	≥ 20	≥ 30	±0.04	±0.03

Corrected Measurement Uncertainty (Transmission from Port 1 to Port 2)





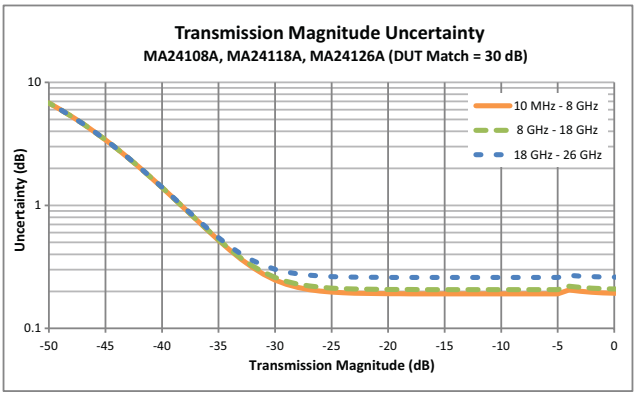


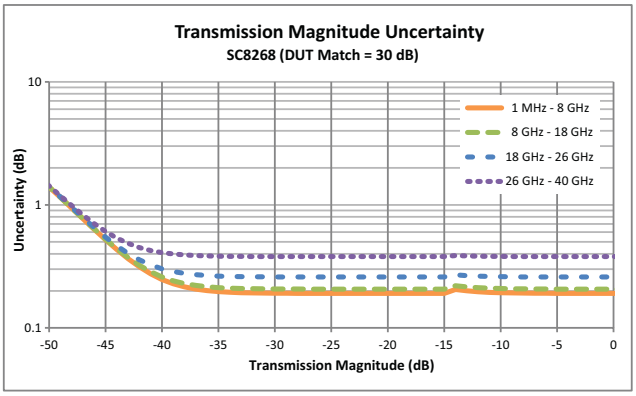


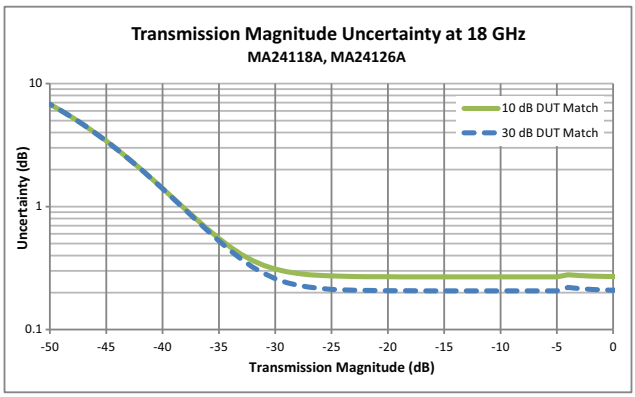
1. Full 2-Port calibration with isolation, Default Power, 10 Hz IFBW, No averaging, 10 minute warm-up. TOSLK50A-40 or TOSLKF50A-40 calibration kit. Load match specification applicable directly at corrected port only. De-rate by approximately 8 dB if using a 3670 series test port cable. Reflection and Transmission Tracking are typical.

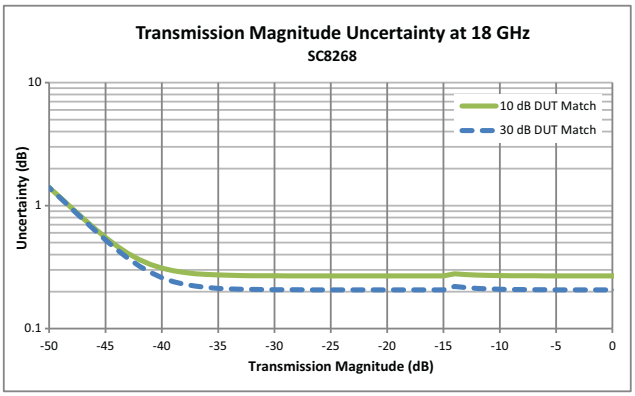
Cable and Antenna Analyzer (continued)

External Sensor Transmission Measurement Accuracy[1] (Corrected Transmission Uncertainty, Magnitude Only)









1. Sensor Transmission Calibration from Port 1 to Sensor, default power, 10 Hz bandwidth. SC8268 specifications are typical.



High Accuracy Power Meter (requires external USB Power Sensor)

Amplitude	Maximum, Minimum, Offset, Relative On/Off, Units, Auto Scale				
Average	# of Running Averages, Max Hold				
Zero/Cal	Zero On/Off, Cal Factor (Center Frequency, Signal Standard)				
Limits	Limit On/Off, Limit Upper/Lower				
Power Sensor Model	MA24105A	MA24106A	MA24108A/18A/26A	MA24208A/18A	MA24330A/40A/50A
Description	Inline High Power Sensor	High Accuracy RF Power Sensor	Microwave USB Power Sensor	Microwave Universal USB Power Sensor	Microwave CW USB Power Sensor
Frequency Range	350 MHz to 4 GHz	50 MHz to 6 GHz	10 MHz to 8/18/26 GHz	10 MHz to 8/18 GHz	10 MHz to 33/40/50 GHz
Connector	Type N(f), 50 Ω	Type N(m), 50 Ω	Type N(m), 50 Ω (8/18 GHz) Type K(m), 50 Ω (26 GHz)	Type N(m), 50 Ω	Type K(m), 50 Ω (33/40 GHz) Type V(m), 50 Ω (50 GHz)
Dynamic Range	+3 dBm to +51.76 dBm (2 mW to 150 W)	–40 dBm to +23 dBm (0.1 µW to 200 mW)	–40 dBm to +20 dBm (0.1 µW to 100 mW)	–60 dBm to +20 dBm (1 nW to 100 mW)	–70 dBm to +20 dBm (0.1 nW to 100 mW)
Measurand	True-RMS	True-RMS	True-RMS, Slot Power, Burst Average Power	True-RMS, Slot Power, Burst Average Power	Average Power
Measurement Uncertainty	± 0.17 dB[a]	± 0.16 dB[b]	± 0.18 dB[c]	± 0.17 dB[d]	± 0.17 dB[e]
Data sheet (for complete specifications)	11410-00621	11410-00424	11410-00504	11410-00841	11410-00906

Notes:

a. Expanded uncertainty with K=2 for power measurements of a CW signal greater than +20 dBm with a matched load. Measurement results referenced to the input side of the sensor.
b. Total RSS measurement uncertainty (0 °C to 50 °C) for power measurements of a CW signal greater than –20 dBm with zero mismatch errors.
c. Expanded uncertainty with K=2 for power measurements of a CW signal greater than –20 dBm with zero mismatch errors.
d. Power uncertainty expressed with two sigma confidence level for CW measurement after zero operation. Includes calibration factor and linearity over temperature uncertainties, but not the effects of mismatch, zero set and drift, or noise.
e. Includes linearity over temperature uncertainties, but not the effects of calibration factor, mismatch, zero set and drift, and noise.

Vector Network Analyzer (Option 440)

Setup Parameters

Active Trace	Tr1, Tr2, Tr3, Tr4
Measurement (S Parameter)	S_{11}, S_{21}, S_{12}, S_{22}
Graph Types	Log Magnitude, SWR, Phase, Unwrapped Phase, Real, Imaginary, Group Delay, Smith Chart (Impedance), Inverted Smith Chart (Admittance), Log Mag/2 (1-Port Cable Loss), Real Impedance, Imaginary Impedance
Domain	Frequency Domain, Distance Domain
Number of Traces	1, 2, 3, 4
Trace Format	Single, Dual, Tri, Quad. When used with Number of Traces, overlays are possible including a Single Format with Four trace overlays.
Smoothing	Smoothing 0 % to 20 % Independent Trace based.
Group Delay Aperture	Aperture 0.25 % to 20 % Aperture Defined as the frequency span over which the phase change is computed at a given frequency point. The aperture can be changed without recalibration.
Group Delay Range	< 180° of phase change within the aperture
Frequency	Start Frequency (F1), Stop Frequency (F2)
Distance	Start Distance (D1), Stop Distance (D2)
Distance Units	Meters (m), Feet (ft)
DTF Aid	Provides detailed DTF resolution information based on current instrument settings. Also provides helpful tips to optimize results.
DTF Setup	DUT Line Type (Coax/WG), Cable List, Cable Loss, Propagation Velocity, Windowing
Windowing	Rectangular, Nominal Side Lobe, Low Side Lobe, Minimum Side Lobe
Amplitude	Resolution Per Division, Reference Value, Reference Line, Autoscale, Scale Preset
Calibration	Start Calibration, Thru Update, Cal Info, Interpolation (On/Off), Cal Correction (On/Off)
Cal Type	Full 2-Port, Full S_{11}, Full S_{22}, Full S_{11} & S_{22}, One-Path Two-Port (S_{11},S_{21}), One-Path Two-Port (S_{22},S_{12}), Response S_{11}, Response S_{22}, Response S_{11} & S_{22}, Response S_{21}, Response S_{12}, Response S_{21} & S_{12}
Cal Line	Coax, Waveguide
Cal Method	Short-Open-Load-Through (SOLT), Offset-Short (SSLT)
Calibration Standards' Coefficients	Coax: K-Connector, N-Connector, 7/16, SMA, TNC, and four User defined
	Waveguide: WG11A, WG12, WG13, WG14, WG15, WG16, WG17, WG18, WG20, WG22, and four User Defined
Marker	Markers 1 to 8 (On/Off), Delta Makers 2 to 8 (Ref Mk1), Marker to Peak/Valley, Marker Tracking (On/Off),4 Marker Table, Marker 5 and 7 (Peak/Valley between M1 and M2), Marker 6 and 8 (Peak/Valley between M3 and M4)
Limit	Active Limit (Upper/Lower), Limit State (On/Off, Single, Segmented), Move Active Limit, Edit Segments (42 upper and 42 lower segments maximum), Limit Alarm (On/Off), Pass/Fail (On/Off), Limit Preset
Test Limits	Pass/Fail for Upper, Pass/Fail for Lower, Limit Audible Alarm
Save[1]	Measurement (.svna), Setup (.stp), Screen Shot (.png), S2P-Real/Imaginary (.s2p), S2P-Linear Mag/Phase (.s2p), S2P-Log Mag/Phase (.s2p), Text (.txt), CSV (.csv)
Recall[2]	Measurement (.svna), Setup (.stp), Screen Shot (.png)
File Management	Rename, Create Folder, Copy, Paste, Delete
Navigation (File Management)	Top, Bottom, Page Up, Page Down
Frequency Sweep Type	Linear Continuous, Linear Single Sweep
Data Points	Data Points 2 to 4001 (arbitrary setting)
Data Averaging	Sweep-by-Sweep, 1 to 1000
IF Bandwidth (Hz)	10, 20, 50, 100, 200, 500, 1k, 2k, 5k, 10k, 20k, 50k, 100k
Reference Plane	Reference Plane The reference planes of a calibration (or other normalization) can be changed by entering a line length or time, and loss. Assumes flat magnitude, linear phase, and constant impedance.
Auto Reference Plane Extension	Instead of manually entering a line length, this feature automatically adjusts phase shift from the current calibration (or other normalization) to compensate for external cables (or test fixtures). Assumes no loss (user can manually enter loss if known), flat magnitude, linear phase, and constant impedance.
Trace Memory	A separate memory for each trace can be used to store measurement data for later display. The trace data can be saved and recalled.
Trace Math	Complex trace math operations of subtraction, addition, multiplication, or division are provided.
Dispersion Compensation	Waveguide correction that improves accuracy of distance-to-fault data by automatically compensating for different wavelengths propagating at different speeds.
Impedance Conversion	Support for 50 Ω and 75 Ω Smith Charts are provided.
Timebase Reference	Internal (default), External 10 MHz (Auto-sense, BNC female, Max +10 dBm)
Ethernet Configuration	DHCP or Manual (Static) IP configuration, 10/100 Base-T, RJ45 jack
Languages	English, French, German, Italian, Spanish, Russian, Portuguese, Japanese, Korean, Chinese

Frequency

Frequency Range	1 MH MHz to 8/14/20/30/40 GHz (Frequency option dependent)
Frequency Accuracy	±1.0 ppm at 23 °C
Stability	±1.0 ppm from –10 °C to +55 °C, typical
Aging	±1.0 ppm/yr, typical
Frequency Resolution	1 Hz

Output Power

1 MHz to 8 GHz	+5 dBm, typical (High); –20 dBm, typical (Low)
>8 GHz to 40 GHz	–3 dBm, typical (High); –20 dBm, typical (Low)

1. SVNA (.svna) and S2P (.s2p) file formats are available in VNA Mode only.
2. SVNA (.svna) file format recall is available in VNA Mode only.

Vector Network Analyzer (Option 440) (continued)

RF Immunity [1]

RF Immunity High	+17 dBm nominal

Measurement Speed [2]

≤ 550 µs/pt (S_{11} and S_{21}, 1001 points, 100 kHz IFBW, RF immunity low, typical)

Dynamic Range [3, 4]

(High Power, 10 Hz IFBW, 10 averages Port 1 to Port 2)

1 MHz to 10 MHz	≥ 85 dB (105 dB, typical)
> 10 MHz to 8 GHz	≥ 100 dB (115 dB, typical)
> 8 GHz to 40 GHz	≥ 100 dB (110 dB, typical)

Receiver Compression Port 1 or Port 2

(0.1 dB compression)

1 MHz to 40 GHz	+5 dBm, typical

High Level Noise [5]

(High Power, 100 Hz IFBW, 20 MHz to 40 GHz)

Magnitude	±0.006 dB (±0.001 dB, typical) rms
Phase	±0.090° (±0.060°, typical)

Temperature Stability

(Typical, 10 MHz to 40 GHz, ratio measurement, ports shorted)

Magnitude	±0.02 dB/°C
Phase	±0.3 degrees/°C

Log Mag

Resolution Per Division	0.01 to 100 dB
Reference Value	±1000 dB
Reference Line	0 to 10

Log Mag/2

Resolution Per Division	0.01 to 100 dB
Reference Value	±1000 dB
Reference Line	0 to 10

SWR

Resolution Per Division	0.01 to 100
Reference Value	1 to 1000
Reference Line	0 to 10

Phase

Resolution Per Division	0.01° to 90°
Reference Value	±1000°
Reference Line	0 to 10

Unwrapped Phase

Resolution Per Division	0.01 degrees to 10^{13} degrees
Reference Value	$\pm 10^{13}$ degrees
Reference Line	0 to 10

Real/Imaginary

Resolution Per Division	0.01 to 260
Reference Value	±10000
Reference Line	0 to 10

Real/Imaginary Impedance

Resolution Per Division	0.01 Ω to 100,000 Ω
Reference Value	±100,000 Ω
Reference Line	0 to 10

Group Delay

Resolution Per Division	1 fs to 100 s
Reference Value	±100 s
Reference Line	0 to 10

Smith Chart/Inv Smith Chart

Reference Impedance	50 Ω, 75 Ω

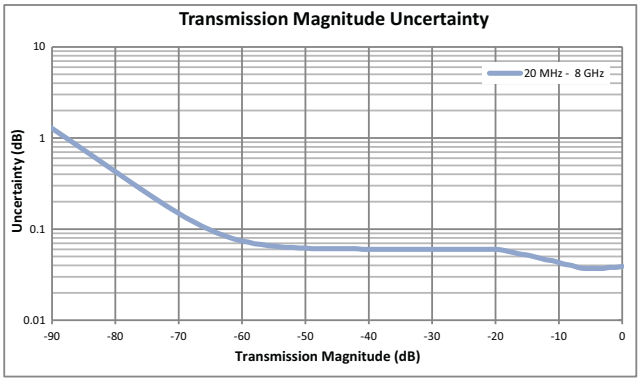
1. +13 dBm for interfering signals landing in-band.
2. Single trace display, frequency domain. Excludes Group Delay, Smith, or Admittance graph types. Excludes Active Smoothing, Markers, and/or Limits.
3. Dynamic range is defined as the difference between output power and receiver noise floor.
4. Decrease specification by 5 dB between 8 GHz and 14 GHz. Crosstalk may reduce dynamic range up to 20 dB (typical) at lower IF bandwidths (≤ 10 kHz) when measuring highly reflective DUT's from 4 GHz to 8 GHz. Reflection measurements are not affected.
5. High Level Noise below 20 MHz is increased by a factor of 5.0. High Level Noise (Phase only) above 20 GHz is increased by a factor of 1.5.

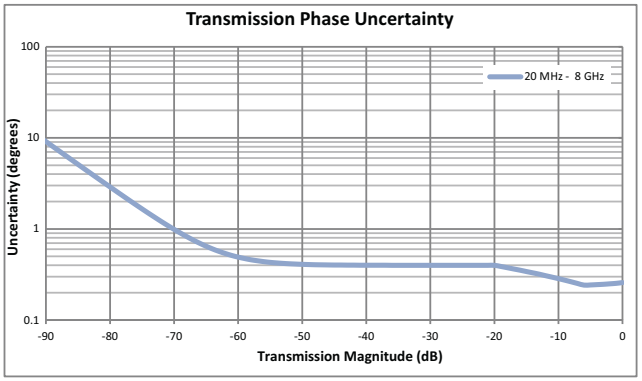
Vector Network Analyzer (Option 440) (continued)

Measurement Accuracy[1] (OSLN50A-8 or OSLNF50A-8, TOSLN50A-8 or TOSLNF50A-8)

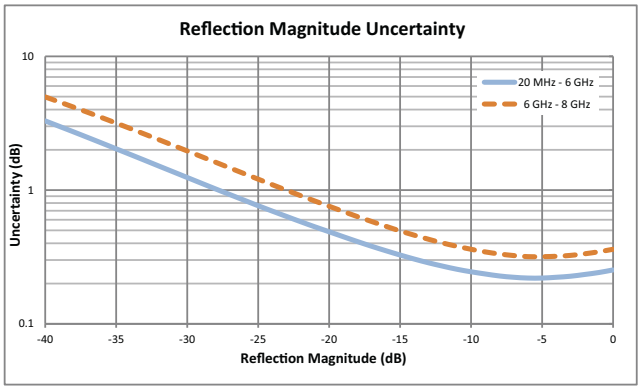
Frequency Range	Directivity (dB)	Source Match (dB)	Load Match (dB)	Reflection Tracking (dB)	Transmission Tracking (dB)
1 MHz to 6 GHz	≥ 42	≥ 33	≥ 42	±0.08	±0.06
> 6 GHz to 8 GHz	≥ 37	≥ 33	≥ 37	±0.08	±0.06

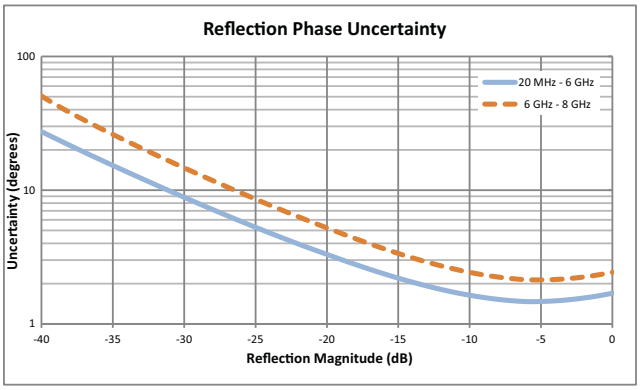
Transmission Uncertainty (S_{21}, S_{12}) ($S_{11} = S_{22} = 0$)





Reflection Uncertainty (S_{11}, S_{22}) ($S_{21} = S_{12} = 0$)





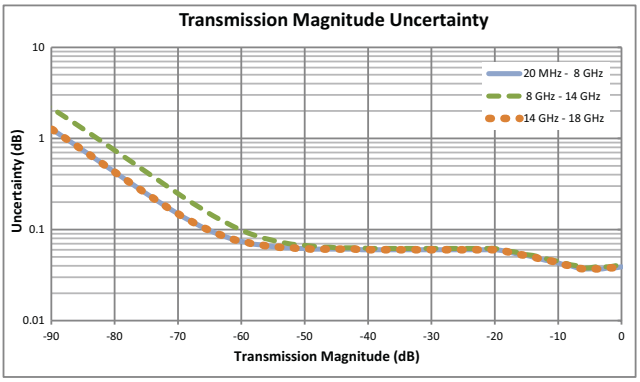
1. Full 2-Port calibration with isolation, Default Power, 10 Hz IFBW, No averaging, 10 minute warm-up. OSLN50A-8, OSLNF50A-8, TOSLN50A-8, or TOSLNF50A-8 calibration kit. Load match specification applicable directly at corrected port only. De-rate by approximately 8 dB if using a 3670 series test port cable. Reflection and Transmission Tracking are typical.

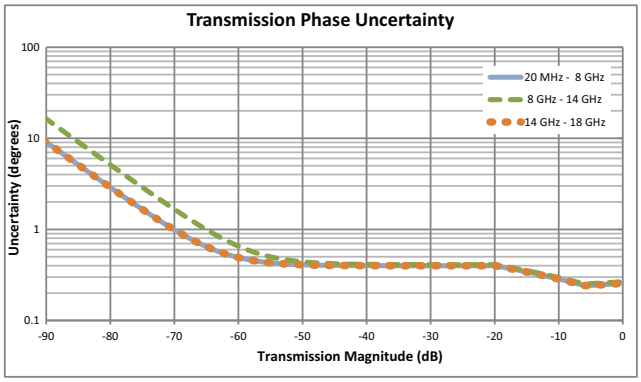
Vector Network Analyzer (Option 440) (continued)

Measurement Accuracy[1] (OSLN50A-18 or OSLNF50A-18, TOSLN50A-18 or TOSLNF50A-18)

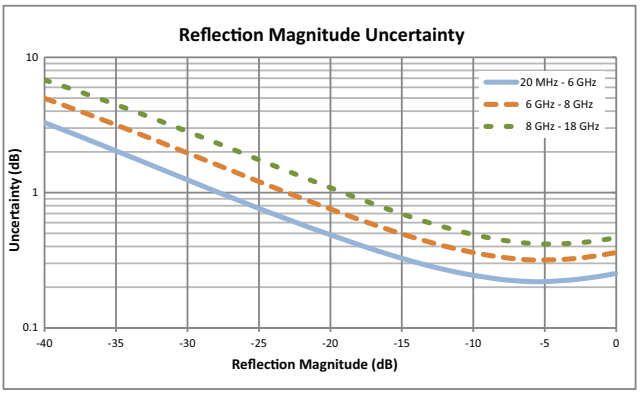
Frequency Range	Directivity (dB)	Source Match (dB)	Load Match (dB)	Reflection Tracking (dB)	Transmission Tracking (dB)
1 MHz to 6 GHz	≥ 42	≥ 33	≥ 42	±0.08	±0.06
> 6 GHz to 9 GHz	≥ 37	≥ 33	≥ 37	±0.08	±0.06
> 9 GHz to 18 GHz	≥ 33	≥ 26	≥ 33	±0.04	±0.03

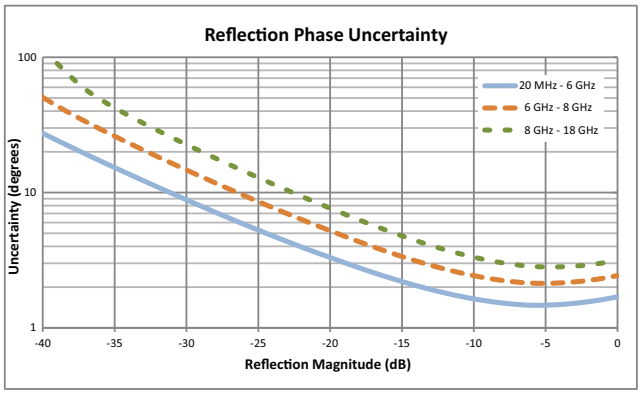
Transmission Uncertainty (S_{21}, S_{12}) ($S_{11} = S_{22} = 0$)





Reflection Uncertainty (S_{11}, S_{22}) ($S_{21} = S_{12} = 0$)





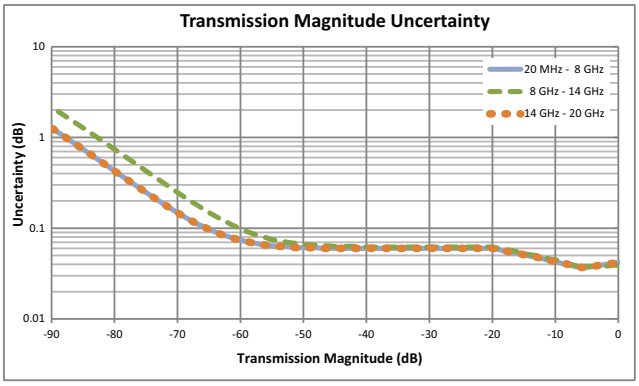
1. Full 2-Port calibration with isolation, Default Power, 10 Hz IFBW, No averaging, 10 minute warm-up. OSLN50A-18, OSLNF50A-18, TOSLN50A-18, or TOSLNF50A-18 calibration kit. Load match specification applicable directly at corrected port only. De-rate by approximately 8 dB if using a 3670 series test port cable. Reflection and Transmission Tracking are typical.

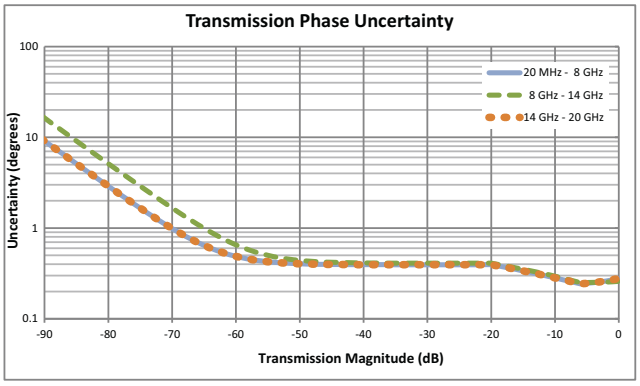
Vector Network Analyzer (Option 440) (continued)

Measurement Accuracy[1] (TOSLK50A-20 or TOSLKF50A-20)

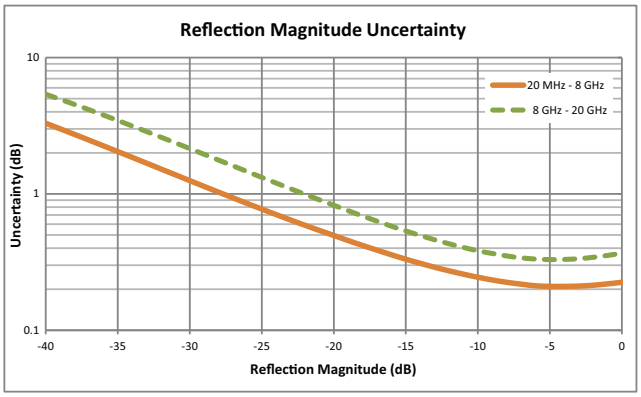
Frequency Range	Directivity (dB)	Source Match (dB)	Load Match (dB)	Reflection Tracking (dB)	Transmission Tracking (dB)
1 MHz to 10 GHz	≥ 42	≥ 33	≥ 42	±0.08	±0.06
> 10 GHz to 20 GHz	≥ 36	≥ 26	≥ 36	±0.04	±0.03

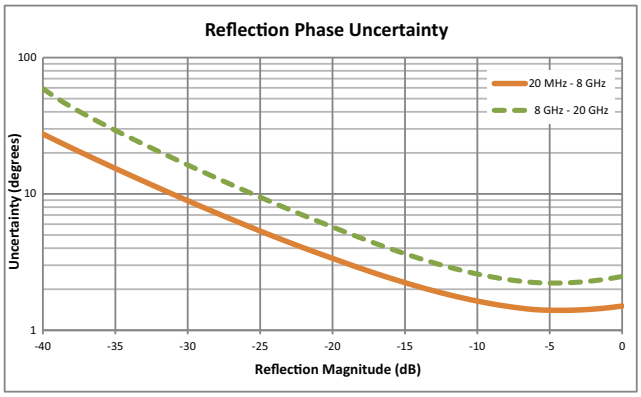
Transmission Uncertainty (S_{21}, S_{12}) ($S_{11} = S_{22} = 0$)





Reflection Uncertainty (S_{11}, S_{22}) ($S_{21} = S_{12} = 0$)





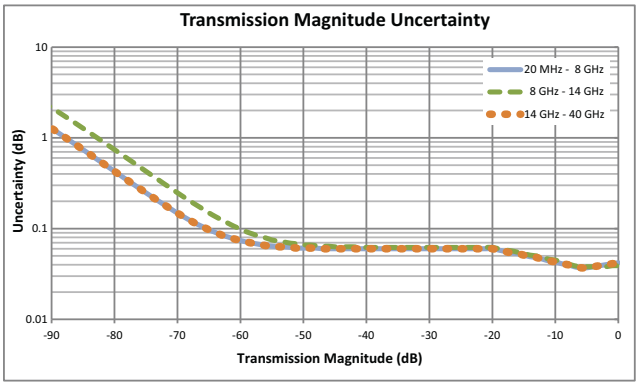
1. Full 2-Port calibration with isolation, Default Power, 10 Hz IFBW, No averaging, 10 minute warm-up. TOSLK50A-20 or TOSLKF50A-20 calibration kit. Load match specification applicable directly at corrected port only. De-rate by approximately 8 dB if using a 3670 series test port cable. Reflection and Transmission Tracking are typical.

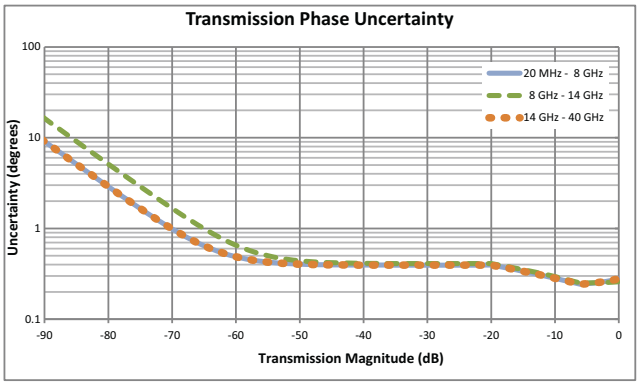
Vector Network Analyzer (Option 440) (continued)

Measurement Accuracy[1] (TOSLK50A-40 or TOSLKF50A-40)

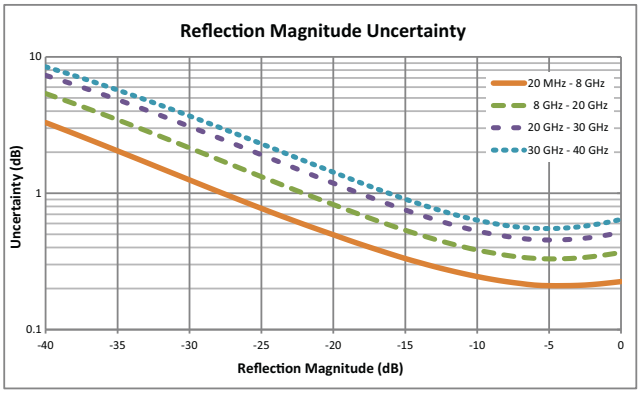
Frequency Range	Directivity (dB)	Source Match (dB)	Load Match (dB)	Reflection Tracking (dB)	Transmission Tracking (dB)
1 MHz to 10 GHz	≥ 42	≥ 33	≥ 42	±0.08	±0.06
> 10 GHz to 20 GHz	≥ 36	≥ 26	≥ 36	±0.04	±0.03
> 20 GHz to 30 GHz	≥ 32	≥ 22	≥ 32	±0.04	±0.03
> 30 GHz to 40 GHz	≥ 30	≥ 20	≥ 30	±0.04	±0.03

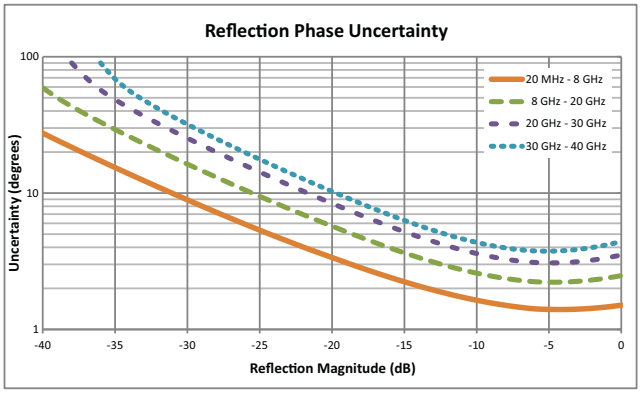
Transmission Uncertainty (S_{21}, S_{12}) ($S_{11} = S_{22} = 0$)





Reflection Uncertainty (S_{11}, S_{22}) ($S_{21} = S_{12} = 0$)





1. Full 2-Port calibration with isolation, Default Power, 10 Hz IFBW, No averaging, 10 minute warm-up. TOSLK50A-40 or TOSLKF50A-40 calibration kit. Load match specification applicable directly at corrected port only. De-rate by approximately 8 dB if using a 3670 series test port cable. Reflection and Transmission Tracking are typical.

Vector Voltmeter (Option 441)

Setup Parameters (Measurement)

Reflection	1-port Reflection (best for cable trimming, stub tuning, magnitude and phase matching of low loss DUTs)
Transmission	2-port Transmission (best magnitude and phase matching of splitters, high loss DUTs, glide slope, etc.)
Ratio A/B	Magnitude & Phase Ratio of A & B receivers. Port 1 = A, Port 2 = B. Requires external CW source
Ratio B/A	Magnitude & Phase Ratio of A & B receivers. Port 1 = A, Port 2 = B. Requires external CW source
Measurement Format	LogMag/Phase, LinMag/Phase, SWR, Impedance
Display Format	Single, Table (table holds up to 12 measurements plus reference)
Save Reference	Normalize response (Measurements become relative to saved reference)
Clear Reference	Clears normalized response (Measurements are no longer relative to saved reference)
Clear Table	Clears all values in table

Setup Parameters (Frequency)[1]

Measurement Frequency	Set CW Frequency, 1 MHz (minimum)

Setup Parameters (Amplitude)

Resolution	1 or 2 Decimal Display Resolution
Reference Impedance	50 Ω or 75 Ω (Impedance Measurement Format only)

Setup Parameters (Calibration)

Start Calibration	Measure, Cal Setup
Thru Update	Updates Thru parameters of active calibration and maintains OSL calibration parameters
Cal Info	Display current calibration status, including temperature
Cal Correction	On/Off

Setup Parameters (Sweep)

Run/Hold	Hold stops measurement and freezes display data
RF Pwr In Hold	On/Off
Source Power	High/Low
IFBW	10 Hz, 100 Hz (default), 1 kHz, 100 kHz
Sweep Averaging	Range 1 to 1000 rolling average

Setup Parameters (File)

Save	Measurement (.vvm), Setup (.stp), Screen Shot (.png), Text (.txt), CSV (.csv)
Recall	Measurement (.vvm), Setup (.stp), Screen Shot (.png)
File Management	Rename, Create Folder, Copy, Paste, Delete
Navigation (File management)	Top, Bottom, Page Up, Page Down

Setup Parameters (System)

Timebase Reference	Internal (default), External 10 MHz (Auto-sense, BNC female, Max +10 dBm)
Ethernet Configuration	DHCP or Manual (Static) IP configuration, 10/100 Base-T, RJ45 connector
Languages	English, French, German, Italian, Spanish, Russian, Portuguese, Japanese, Korean, Chinese

1. Reference receiver (A or B) will Auto-tune approximately ±100 kHz to lock onto external CW signal during A/B & B/A Ratio measurement.

Vector Voltmeter (Option 441) (continued)

Frequency

Frequency Range	1 MHz to 8/14/20/30/40 GHz (frequency option dependent)
Frequency Accuracy	±1.0 ppm at 23 °C
Stability	±1.0 ppm from –10 °C to +55 °C, typical
Aging	±1.0 ppm/yr, typical
Frequency Resolution	1 Hz

Output Power[1]

1 MHz to 8 GHz	+5 dBm, typical (High); –20 dBm, typical (Low)
>8 GHz to 40 GHz	–3 dBm, typical (High); –20 dBm, typical (Low)

Reflection/Transmission Uncertainty

1 MHz to 40 GHz	See the uncertainty curves in the Cable and Antenna Analyzer section. Applicable only when a vector error correction (calibration) is performed and active. Uncalibrated reflection/transmission uncertainty is not specified.

Receiver Compression[2] Port 1 or Port 2 (0.1 dB compression)

1 MHz to 40 GHz	+5 dBm, typical

Reference Level Input Range[2] (A/B and B/A)

1 MHz to 40 GHz	+5 dBm to –60 dBm (auto ranging), typical

Ratio Accuracy[3] (A/B and B/A)

1 MHz to 1 GHz	≤ ±0.2 dB typical (Relative to stored reference, DUT loss <10 dB)
>1 GHz to 20 GHz	≤ ±0.5 dB typical (Relative to stored reference, DUT loss <10 dB)
>20 GHz to 40 GHz	≤ ±1.0 dB typical (Relative to stored reference, DUT loss <10 dB)

Measurement Format

LogMag/Phase

Resolution	1 or 2 decimal places
Magnitude Display	dB
Phase Display Range	±180°

LinMag/Phase

Resolution	1 or 2 decimal places
Magnitude Display	Linear
Phase Display Range	±180°

SWR

Resolution	1 or 2 decimal places
Display	Linear SWR

Impedance

Resolution	1 or 2 decimal places
Display	Real and Imaginary (complex impedance) Ω

1. Not applicable in A/B or B/A Ratio Measurement.
2. Recommend ≤ +3 dBm for A/B or B/A Ratio Measurement.
3. Reference signal level 0 to –20 dBm at input port.



General Specifications

Setup Parameters[1]

System Info	Status, Battery
System Setups	Date/Time, Language, Display/Audio, Option Configuration
Date/Time	Day, Month, Year, Time
Language	English, French, German, Italian, Spanish, Russian, Portuguese, Japanese, Korean, Chinese
Display/Audio	Brightness, Color Schemes, Screen Shot Settings, Volume
Option Configuration	Enable Options Using Key and Enable Options Using File
Connectivity	GPS (Clear Data, Sync System Time), Ethernet Configuration (DHCP/Static)
Diagnostics	Self Test
Preset	Preset, Reset
Reset	Factory Reset, Delete All User or Custom Files, Master Reset, Update Firmware
File	Save, Recall, File Management
File Management	Rename, Create Folder, Copy, Paste, Delete, Navigation
Save	Measurement (*.dat, *.vipi), Setup (*.stp), Screen Shot and VIP Image (*.png), Text (*.txt), CSV (*.csv)
Recall	Measurement (*.dat, *.vipi), Setup (*.stp), Screen Shot and VIP Image (*.png)
Navigation	Top, Bottom, Page Up, Page Down
Internal Trace/Setup Memory	>2000 files, files may be traces, setups, screen shots, or any combination
External Trace/Setup Memory	Limited only by size of USB Flash drive

Connectors

Port 1 (models up to 14 GHz)	Type N, female, 50 Ω, Maximum Input +23 dBm, ±50 VDC
Port 2 (models up to 14 GHz)	Type N, female, 50 Ω, Maximum Input +23 dBm, ±50 VDC
Port 1 (models > 14 GHz)	Type Ruggedized K, male, 50 Ω, Maximum Input +23 dBm, ±50 VDC
Port 2 (models > 14 GHz)	Type Ruggedized K, male, 50 Ω, Maximum Input +23 dBm, ±50 VDC
External Reference In	Type BNC female, 50 Ω, 10 MHz, Maximum +10 dBm
External Trigger In	Type BNC female, 50 Ω, 3.3 V or 5 V TTL triggers on positive edge. Maximum +5 VDC
Headset Jack	3.5 mm mini-jack
External Power	5.5 mm barrel connector, +11 VDC to +14 VDC, ≤ 4.0 A
USB Interface (2)	Type A, Connect USB Flash Drive, GPS Module, Power Sensor, other
USB Interface	5-pin Mini-B, Connect to PC for data transfer and/or control
Ethernet	RJ-45, Category 5, 10/100 MB/s. Connect to PC for data transfer and/or control

Display

Type	High Resolution Resistive Touchscreen
Size	8.4 in daylight viewable color LCD
Resolution	800 x 600
Pixel Defects	No more than five defective pixels (99.9989% good pixels)

Battery

Type	Li-Ion
Battery Operation	5.0 hr, typical

Regulatory Compliance

European Union	EMC 2014/30/EU, EN 61326-1:2013, 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 + 2015/863
United Kingdom	EMC SI 2016/1091; BS EN 55011 & BS 61000-4-2/3/4/5/6/8/11 Consumer Protection (Safety) SI 2016/1101; BS EN 61010-1:2010 Environmental Protection SI 2012/3032;2011/65/EU & 2015/863
Australia and New Zealand	RCM AS/NZS 4417:2012
South Korea	KCC-REM-A21+-0004
Canada	ICES-1(A)/NMB-1(A)

Environmental

MIL-PRF-28800F Class 2

Operating Temperature Range	–10 °C to 55 °C
Storage Temperature Range	–51 °C to 71 °C
Maximum Relative Humidity	95 % RH at 30 °C, 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
Explosive Atmosphere	MIL-PRF-28800F Section 4.5.6.3 MIL-STD-810G, Method 511.5, Procedure 1

Size and Weight

Size	273 mm x 199 mm x 91 mm (10.7 in x 7.8 in x 3.6 in)
Weight	3.0 kg (6.6 lb), including battery

Warranty

Duration	Standard three-year warranty (one-year warranty on battery)

1. Applies to standard instruments only. Refer to specific option pages for detailed setup parameters for installed options.

Line Sweep Tools™ (for your PC)

Features 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."

Trace Capture

Browse to Instrument	View and copy traces from the test equipment to your PC using Windows Explorer
Open Legacy Files	Open DAT files captured with Handheld Software Tools v6.61
Open Current Files	Open VNA or DAT files
Capture Plots To	The Line Sweep Tools screen, DAT files, Database, or JPEG

Traces

Trace Types	Return Loss, VSWR, DTF-RL, DTF-VSWR, Cable Loss, Smith Chart, and PIM
File Formats	DAT, PIM, TM, MNA, VNA, CSV, PNG, BMP, JPG, HTML, Data Base, and PDF

Database

Create Database	Allows to select a directory to create the database
Import from Database	Opens all files in the database as measurement plots
Save Plot to Database	Saves the measurement plots to the database
Save All Plots to Database	Saves all the measurement plots in LST workplace to database

Report Generation

Report Generator	Includes GPS location along with measurements
Report Format	Create reports in HTML or PDF format
Report Setup	Report Title, Company, Prepared for, Location, Date and Time, Filename, Company logo (optionally set by user), Logo align (Left, Right), Prepared by, Approved by
Trace Page Setup	1-Portrait, 1-Landscape, 2-Portrait, 4-Portrait
Image Resolution	Low, Normal, High

Trace Validation

Presets	Seven presets allow "one click" setting of up to 12 markers and one limit line
Marker Controls	12 regular Markers, Marker Style (Default, Advanced), Type (Reference, Delta), Delta, Valley, Between, Distance, Frequency entry, Comment
Delta Markers	12 Delta markers
Limit Line	Enable and drag or value entry. Also works with presets
Next Trace Button	Next Trace and Previous Trace arrow keys allow quick switching between traces

Tools

Cable Editor	Allows creation of custom cable parameters (instrument type/model must match original)
Waveguide Editor	Allows creation of custom waveguide parameters (instrument type/model must match original)
Distance to Fault	Converts a Return Loss trace to a Distance to Fault trace (only *.dat and *.vna file types supported)
Measurement Calculator	Converts Real, Imaginary, Magnitude, Phase, RL, VSWR, Rho, and Transmit power
Signal Standard Editor	Creates new band and channel tables (instrument type/model must match original)
Naming Grid	36 user definable phrases for creation of file names, trace titles, and trace subtitles

Connectivity

Connections	Ethernet, Serial Port (COM1/3), and USB memory device

easyTest Tools™ (for your PC)

Instrument Mode	Cable & Antenna Analyzer Mode
Commands	
Display Image	Allows putting a custom image on the instrument screen
Recall Setup	Places the instrument into a known state
Prompt	Displays instructional messages on the instrument screen
Save	Allows automatic or manual saving of traces

Programmable Remote Control

Functionality	Instrument functionality is available via remote programming. See the S820E Programming Manual for details.
Programming Language	Standard Commands for Programmable Instruments (SCPI)
Interfaces	USB, LAN

Ordering Information (standard configuration)



Part Number	Description
S820E	Microwave Site Master (Requires one Frequency Option 708, 714, 720, 730, or 740) Three Year Warranty (One year on battery)

Frequency Options (select one frequency option only)

Option Number	Description
S820E-0708	1 MHz to 8 GHz, type N(f) ports
S820E-0714	1 MHz to 14 GHz, type N(f) ports
S820E-0720	1 MHz to 20 GHz, type Ruggedized K(m) ports (compatible with 3.5 mm and SMA connectors)
S820E-0730	1 MHz to 30 GHz, type Ruggedized K(m) ports (compatible with 3.5 mm and SMA connectors)
S820E-0740	1 MHz to 40 GHz, type Ruggedized K(m) ports (compatible with 3.5 mm and SMA connectors)

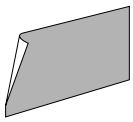
Instrument Options



Option Number	Description
S820E-0440	Vector Network Analyzer (VNA)
S820E-0441	Vector Voltmeter (VVM)
S820E-0097	Accredited Calibration to ISO17025 and ANSI/NCSL Z540-1. Includes calibration certificate.
S820E-0098	Standard Calibration to ISO17025 and ANSI/NCSL Z540-1. Includes calibration certificate.
S820E-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
	2000-1654-R Soft Carrying Case
	2000-1691-R Stylus with Coiled Tether
	633-75 Rechargeable Li-Ion Battery, 7500 mAh
	40-187-R AC-DC Adapter with power cable (country dependent)
	71693-R Ruggedized K(f) to N(f), 2 pcs (included only with S820E-0720)

Accessory	Description
	2000-1371-R Ethernet Cable, 2.13 m (7 ft)
	3-2000-1498 USB A/5-pin mini-B Cable, 10 ft
	806-141-R Automotive Power Adapter, 12 VDC, 60 W
	Certificate of Calibration and Conformance
	2000-1797-R Screen Protector Film (one factory installed, one spare)

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

Accessory	Description
	MA24330A Microwave CW USB Power Sensor, 10 MHz to 33 GHz, +20 dBm
	MA24340A Microwave CW USB Power Sensor, 10 MHz to 40 GHz, +20 dBm
	MA24350A Microwave CW USB Power Sensor, 10 MHz to 50 GHz, +20 dBm
	MA24208A Microwave Universal USB Power Sensor, 10 MHz to 8 GHz, +20 dBm to –60 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
	SC8268[a] USB Transmission Sensor, K(m), 1 MHz to 40 GHz, +10 dBm to –50 dBm

Accessory	Description
	MA24108A Microwave USB Power Sensor, 10 MHz to 8 GHz, +20 dBm to –40 dBm
	MA24118A Microwave USB Power Sensor, 10 MHz to 18 GHz, +20 dBm to –40 dBm
	MA24126A Microwave USB Power Sensor, 10 MHz to 26 GHz, +20 dBm to –40 dBm
	MA24105A Inline Dual Directional High Power Sensor, 350 MHz to 4 GHz, +3 dBm to +51.76 dBm
	MA25100A RF Power Indicator

a. Compatible with scalar transmission measurements only.

Optional Accessories

Miscellaneous Accessories

Accessory	Description
	2000-1374-R External Dual Charger for Li-Ion Batteries
	67135 Anritsu Backpack (for Handheld Instrument and PC)
	760-286-R Compact Transit Case with Wheels and Handle 55.6 cm x 35.5 cm x 22.9 cm (21.89" x 13.98" x 9.01")

Accessory	Description
	2000-1723-R High Performance USB Mag-Mount GPS Antenna/Receiver
	760-243-R Large Transit Case with Wheels and Handle 56 cm x 45.5 cm x 26.5 cm (22.07" x 17.92" x 10.42")

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 Single Port 2.0 USB 100 meter Cat 5e Range Extender (with Type A power cord for USA, Japan, North America, Central America and Caribbean. Can be used in other countries with user supplied power socket adaptor)
	2100-28-R Cat 5e extension cable for use with USB Extender (22.5 m)

Accessory	Description
	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).

Optional Accessories (continued)

Full Temperature Coaxial Calibration Kits

–10 °C to +55 °C, K Type is compatible with 3.5 mm and SMA connectors see individual data sheets on www.anritsu.com)

Accessory	Description
	OSLN50A-8 High Performance Type N(m), DC to 8 GHz, 50 Ω
	OSLN50A-18 High Performance Type N(m), DC to 18 GHz, 50 Ω
	TOSLN50A-8 High Performance with Through Type N(m), DC to 8 GHz, 50 Ω
	TOSLN50A-18 High Performance with Through Type N(m), DC to 18 GHz, 50 Ω
	TOSLK50A-20 High Performance with Through Type K(m), DC to 20 GHz, 50 Ω
	TOSLK50A-40 High Performance with Through Type K(m), DC to 40 GHz, 50 Ω

Accessory	Description
	OSLNF50A-8 High Performance Type N(f), DC to 8 GHz, 50 Ω
	OSLNF50A-18 High Performance Type N(f), DC to 18 GHz, 50 Ω
	TOSLNF50A-8 High Performance with Through Type N(f), DC to 8 GHz, 50 Ω
	TOSLNF50A-18 High Performance with Through Type N(f), DC to 18 GHz, 50 Ω
	TOSLKF50A-20 High Performance with Through Type K(f), DC to 20 GHz, 50 Ω
	TOSLKF50A-40 High Performance with Through Type K(f), DC to 40 GHz, 50 Ω

Coaxial Calibration Components, N Type 50 Ω, K Type 50 Ω

(K Type is compatible with 3.5 mm and SMA connectors)

Accessory	Description
	22N50 Open/Short, N(m), DC to 18 GHz, 50 Ω
	28N50-2 Precision Load, N(m), DC to 8 GHz, 50 Ω
	22K50 Precision Open/Short, K(m), DC to 40 GHz, 50 Ω
	28K50 Precision Load, K(m), DC to 40 GHz, 50 Ω

Accessory	Description
	22NF50 Open/Short, N(f), DC to 18 GHz, 50 Ω
	28NF50-2 Precision Load, N(f), DC to 18 GHz, 50 Ω
	22KF50 Precision Open/Short, K(f), DC to 40 GHz, 50 Ω
	28KF50 Precision Load, K(f), DC to 40 GHz, 50 Ω

Coaxial Calibration Components, Other 50 Ω, 75 Ω

Accessory	Description
	22N75 Open/Short, N(m), DC to 3 GHz, 75 Ω
	2000-1619-R Precision Open/Short/Load, 7/16 DIN(f), DC to 6.0 GHz, 50 Ω
	2000-1914-R Precision Open/Short/Load, 4.3-10(f), DC to 6 GHz, 50 Ω

Accessory	Description
	22NF75 Open/Short, N(f), DC to 3 GHz, 75 Ω
	2000-1618-R Precision Open/Short/Load, 7/16 DIN(m), DC to 6.0 GHz, 50 Ω
	2000-1915-R Precision Open/Short/Load, 4.3-10(m), DC to 6 GHz, 50 Ω

Optional Accessories (continued)

Waveguide Calibration Components, Rectangular Type 50 Ω

Frequency Range (GHz)	1/8 Offset (US)	3/8 Offset (US)	Termination (US)	Coax to Waveguide Adapter (US)	Compatible Flanges
3.95 to 5.85	23UA187-R	24UA187-R	26UA187-R	35UA187N-R, N(m)	CPR187F-R, CPR187G-R, UG-1352/U-R, UG-1353/U-R, UG-1728/U-R, UG-1729/U-R, UG-148/U-R, UG-149A/U-R
5.85 to 8.20	23UA137-R	24UA137-R	26UA137-R	35UA137N-R, N(m)	CPR137F-R, CPR137G-R, UG-1356/U-R, UG-1357/U-R, UG-1732/U-R, UG-1733/U-R, UG-343B/U-R, UG-344/U-R, UG-440B/U-R, UG-441/U-R
7.05 to 10.00	23UA112-R	24UA112-R	26UA112-R	35UA112N-R, N(m)	CPR112F-R, CPR112G-R, UG-1358/U-R, UG-1359/U-R, UG-1734/U-R, UG-1735/U-R, UG-52B/U-R, UG-51/U-R, UG-137B/U-R, UG-138/U-R
8.20 to 12.40	23UA90-R	24UA90-R	26UA90-R	35UA90N-R, N(m)	CPR90F-R, CPR90G-R, UG-1360/U-R, UG-1361/U-R, UG-1736/U-R, UG-1737/U-R, UG-40B/U-R, UG-39/U-R, UG-135/U-R, UG-136B/U-R
12.40 to 18.00	23UA62-R	24UA62-R	26UA62-R	35UA62N-R, N(m)	UG-541A/U-R, UG-419/U-R, UG-1665/U-R, UG1666/U-R
17.00 to 26.50	23UA42-R	24UA42-R	26UA42-R	35UA42K-R. K(m)	UG-596A/U-R, UG-595/U-R, UG-597/U-R, UG-598A/U-R
26.50 to 40.00	23UA28-R	24UA28-R	26UA28-R	35UA28K-R K(m)	UG-599/U-R

Phase-Stable Test Port Cables (Armored and Flexible)

Accessory	Description
	14KFKF50-0.6 0.6 m (24in), DC to 40 GHz, K(f) to K(f), 50 Ω
	14KFK50-0.6 1.0 m (39in), DC to 40 GHz, K(f) to K(m), 50 Ω
	14KFKF50-1.0 1.0 m (39in), DC to 40 GHz, K(f) to K(f), 50 Ω
	14KFK50-1.0 1.0 m (39in), DC to 40 GHz, K(f) to K(m), 50 Ω
	14RKFKF50-0.6 0.6 m (24in), DC to 40 GHz, Ruggedized K(f) to K(f), 50 Ω
	14RKFKF50-1.0 1.0 m (39in), DC to 40 GHz, Ruggedized K(f) to K(f), 50 Ω
	15NN50-1.0B 1.0 m (39in), DC to 18 GHz, N(m) to N(m), 50 Ω
	15N43M50-1.5C 1.5 m, DC to 6 GHz, N(m) to 4.3-10(m)
	15N43F50-1.5C 1.5 m, DC to 6 GHz, N(m) to 4.3-10(f)

Accessory	Description
	15NNF50-1.0B 1.0 m (39in), DC to 18 GHz, N(m) to N(f), 50 Ω
	15LL50-1.0A 1.0 m (39in), DC to 20 GHz, 3.5 mm(m) to 3.5 mm(m), 50 Ω
	15LLF50-1.0A 1.0 m (39in), DC to 20 GHz, 3.5 mm(m) to 3.5 mm(f), 50 Ω
	15KK50-1.0A 1.0 m (39in), DC to 26.5 GHz, K(m) to K(m), 50 Ω
	14RKFK50-0.6 0.6 m (24in), DC to 40 GHz, Ruggedized K(f) to K(m), 50 Ω
	14RKFK50-1.0 1.0 m (39in), DC to 40 GHz, Ruggedized K(f) to K(m), 50 Ω
	15KKF50-1.0A 1.0 m (39in), DC to 26.5 GHz, K(m) to K(f), 50 Ω
	15N43M50-3.0C 3.0 m, DC to 6 GHz, N(m) to 4.3-10(m)
	15N43F50-3.0C 3.0 m, DC to 6 GHz, N(m) to 4.3-10(f)

Phase-Stable 18 GHz and 70 GHz Semi-Rigid Cables (Armored)

Accessory	Description
	3670K50A-1 0.3 m (12 in), DC to 40 GHz, K(f) to K(m), 50 Ω
	3670K50A-2 0.6 m (24 in), DC to 40 GHz, K(f) to K(m), 50Ω
	3670NN50-1 0.3 m (12 in), DC to 18 GHz, N(m) to N(m), 50 Ω
	3670NN50-2 0.6 m (24 in), DC to 18 GHz, N(m) to N(m), 50 Ω

Accessory	Description
	3670N50-1 0.3 m (12 in), DC to 18 GHz, N(f) to N(m), 50 Ω
	3670N50-2 0.6 m (24 in), DC to 18 GHz, N(f) to N(m), 50 Ω

Optional Accessories (continued)

Adapters

Accessory	Description
	1091-26-R SMA(m) to N(m), DC to 18 GHz, 50 Ω
	1091-27-R SMA(f) to N(m), DC to 18 GHz, 50 Ω
	1091-80-R SMA(m) to N(f), DC to 18 GHz, 50 Ω
	1091-81-R SMA(f) to N(f), DC to 18 GHz, 50 Ω
	1091-172-R BNC(f) to N(m), DC to 1.3 GHz, 50 Ω
	1091-315-R DC to 18 GHz, TNC(m) to N(f), 50 Ω
	1091-323-R DC to 18 GHz, TNC(m) to TNC(f), 50 Ω
	1091-325-R DC to 18 GHz, TNC(m) to N(m), 50 Ω
	1091-467-R DC to 6 GHz, 4.3-10(m) to N(f), 50 Ω
	1091-465-R DC to 6 GHz, 4.3-10(f) to N(f), 50 Ω

Accessory	Description
	510-102-R N(m) to N(m), DC to 11 GHz, 50 Ω, 90 degrees right angle
	510-90-R 7/16 DIN(f) to N(m), DC to 7.5 GHz, 50 Ω
	510-91-R 7/16 DIN(f) to N(f), DC to 7.5 GHz, 50 Ω
	510-92-R 7/16 DIN(m) to N(m), DC to 7.5 GHz, 50 Ω
	510-93-R 7/16 DIN(m) to N(f), DC to 7.5 GHz, 50 Ω
	510-96-R 7/16 DIN(m) to 7/16 DIN (m), DC to 7.5 GHz, 50 Ω
	510-97-R 7/16 DIN(f) to 7/16 DIN (f), DC to 7.5 GHz, 50 Ω
	71693-R DC to 18 GHz, Ruggedized adapter, K(f) - N(f), 50 Ω
	1091-324-R DC to 18 GHz, TNC(f) to N(m), 50 Ω

Precision Adapters

Accessory	Description
	34NN50A N(m) to N(m), DC to 18 GHz, 50 Ω
	K220B DC to 40 GHz, K(m) to K(m), 50 Ω
	K224B DC to 40 GHz, K(m) to K(f), 50 Ω
	34NFNF50 N(f) to N(f), DC to 18 GHz, 50 Ω
	K222B DC to 40 GHz, K(f) to K(f), 50 Ω
	34VFKF50A V(f) to V(f), DC to 18 GHz, 50 Ω

Attenuators N Type (up to 18 GHz)

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

Attenuators K Type (up to 40 GHz)

Accessory	Description
	41KB-3 Precision, K(m) to K(f), 3 dB, DC to 26.5 GHz, 50 Ω
	41KB-6 Precision, K(m) to K(f), 6 dB, DC to 26.5 GHz, 50 Ω
	41KB-10 Precision, K(m) to K(f), 10 dB, DC to 26.5 GHz, 50 Ω
	41KB-20 Precision, K(m) to K(f), 20 dB, DC to 26.5 GHz, 50 Ω

Accessory	Description
	41KC-3 Precision, K(m) to K(f), 3 dB, DC to 40 GHz, 50 Ω
	41KC-6 Precision, K(m) to K(f), 6 dB, DC to 40 GHz, 50 Ω
	41KC-10 Precision, K(m) to K(f), 10 dB, DC to 40 GHz, 50 Ω
	41KC-20 Precision, K(m) to K(f), 20 dB, DC to 40 GHz, 50 Ω

Related Manuals (available at www.anritsu.com)

Part Number	Description
10100-00065	Product Information, Compliance, and Safety
10580-00343	Site Master User Guide
10580-00344	Site Master Programming Manual

