SIGLENT TECHNOLOGIES

Every Bench. Every Engineer. Every Day.

SIGLENT®

Any Signal. Anytime. Anywhere.

SHA850A

Handheld Spectrum Analyzer

Frequency range：9 kHz ~ 7.5 GHz

Why should you choose SHA850A?
Multifunction Handheld Spectrum Analyzer

01

Capture any signal with precision and confidence

Measurement accuracy comparable to performance benchtop instruments.

02

Conduct proficient testing in complex environments

Lightweight, portable, durable, specially designed for field operation.

03

Utilize portable analyzer functions

Cable and antenna analyzer (CAT)
Vector network analyzer (VNA)
Spectrum analyzer (SA)

04

Provide budget flexibility

Select the current required features and easily upgrade in the future to advance with changing measurement requirements.

Traditional measurement technology of SIGLENT
Innovation brought by SHA850A

Cable and antenna analyzer

DTF and SWR measurement

Vector network analyzer

Dynamic range up to 114 dB

Spectrum analyzer

± 0.7 dB Total amplitude accuracy

2023.05

2022.09 SSA5000A Spectrum Analyzer

2020.04 SSA3000X-R Real-time Spectrum Analyzer

2019.09 SVA1000X Spectrum & Vector Network Analyzer

2019.09 SSA3000X Plus Spectrum Analyzer

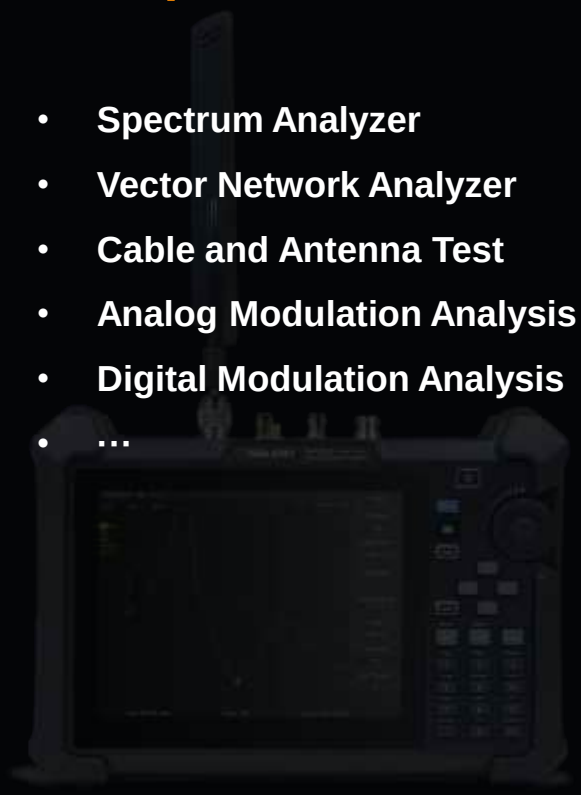
SIGLENT®

Outstanding Characteristics

- Wide Dynamic Range
- Ultra-low phase noise
- Source
- Preamplifier
- …

Multiple Functions

- Spectrum Analyzer
- Vector Network Analyzer
- Cable and Antenna Test
- Analog Modulation Analysis
- Digital Modulation Analysis
- …



Subtle Design

- Small size
- Fully functional
- Rich communication interface
- Intuitive operation interface
- …

Contents

Specification

Model	SHA851A	SHA852A
Spectrum Analyzer	9 kHz ~ 3.6 GHz	9 kHz ~ 7.5 GHz
Vector Network Analyzer (SHA850-VNA)	100 kHz ~ 3.6 GHz	100 kHz ~ 7.5 GHz
Cable and Antenna Test	100 kHz ~ 3.6 GHz	100 kHz ~ 7.5 GHz
Source	100 kHz ~ 3.6/7.5 GHz (option SHA850-SOR)	
Preamplifier	25 dB, standard	
Displayed Average Noise Level	-165 dBm (typ.), Preamp on, best, 20 °C to 30 °C	
SSB Phase Noise	-104 dBc/Hz (typ.) @ fc = 1 GHz, Offset 100 kHz	
Dynamic Range	114 dB	
Advanced Measurement Kit	CHP, Channel Power; ACPR, Adjacent Channel Power Ratio; OBW, Occupied Bandwidth; T-Power, Time Domain Power; CNR, Carrier Noise Ratio; Harmonic measurement; TOI, Third-Order Intercept; Spectrogram(option SHA850-AMK)	
Analog Modulation Analysis	AM, FM, PM (option SHA850-AMA)	
Digital Modulation Analysis	ASK: 2ASK; FSK: 2FSK, 4FSK, 8FSK, 16FSK;MSK: GMSK;PSK: BPSK, QPSK, OQPSK, 8PSK; DPSK: DBPSK, DQPSK, D8PSK, π/4 -DQPSK, π/8 -D8PSK; QAM: 16, 32, 64, 128, 256(option SHA850-DMA)	
Dimensions	310 mm × 215 mm × 78.5 mm (W×H×D)	
Operating time	4h	

Features and Benefits
make operation more fluent.

01

4.8 "touch screen

- ✓ Simple UI interface
- ✓ Easy to use

02

Abundant communication interfaces

- ✓ Support mouse and remote web page control
- ✓ More connection and control modes

03

Low phase noise -104 dBc/Hz

- ✓ Provides excellent signal quality
- ✓ Excellent phase performance

04

Sources

- ✓ Option SHA850-SOR
- ✓ Transmission response of filter
- ✓ Cable insertion loss

05

High performance RF components

- ✓ Improve accuracy and stability of the measurement results
- ✓ Less trace noise

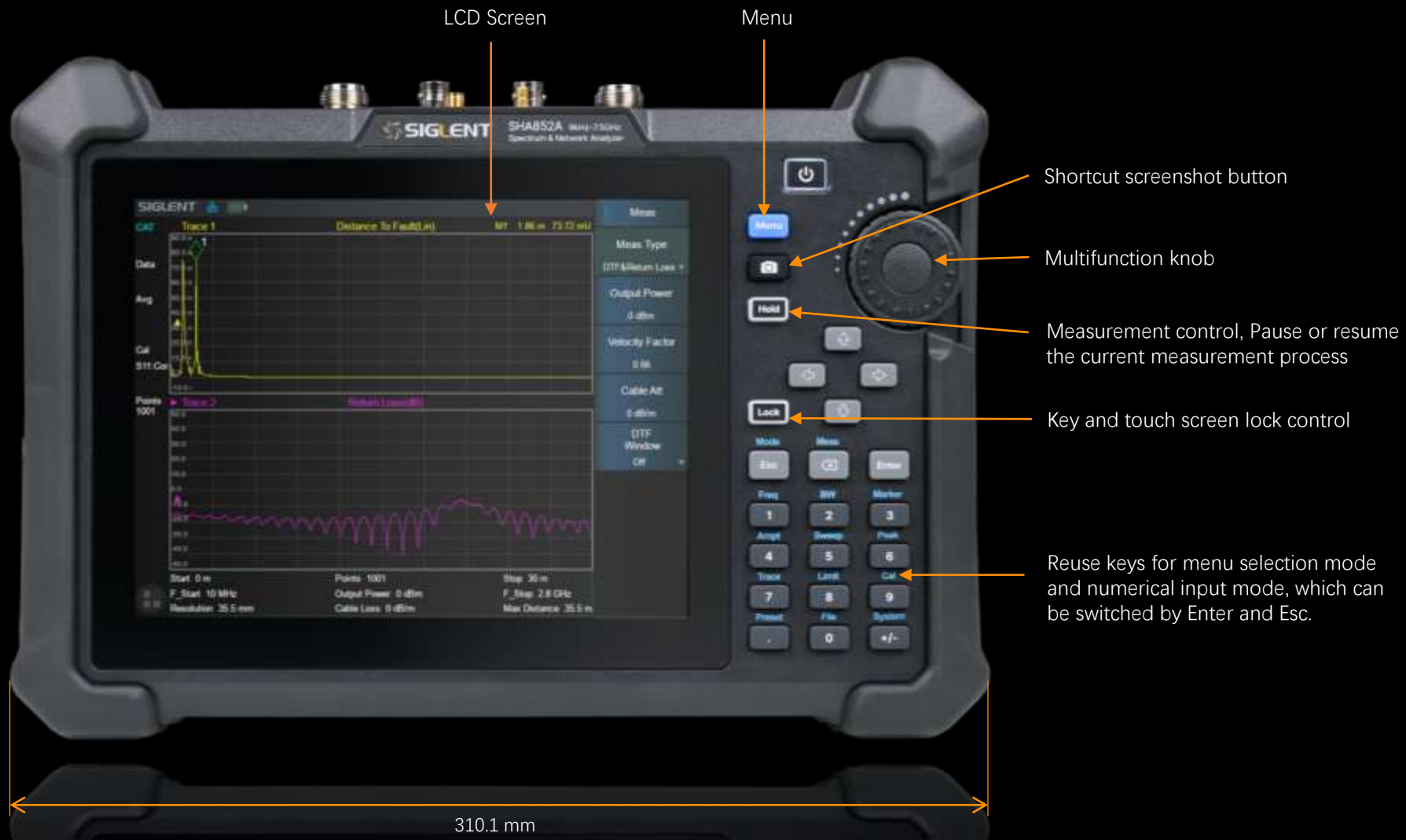
06

VNA

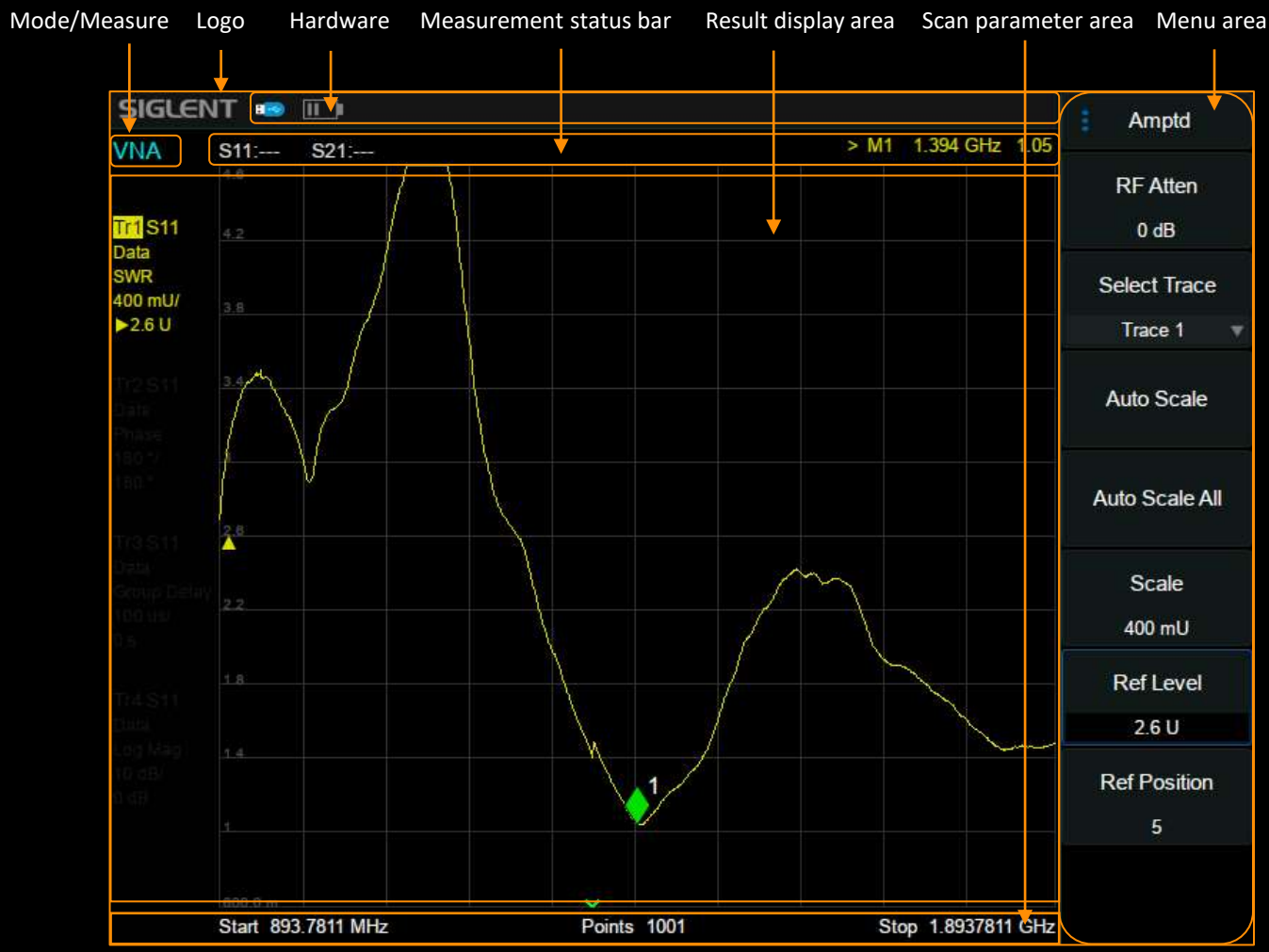
- ✓ Option SHA850-VNA
- ✓ Amplitude and phase parameters

High dynamic range 114 dB	✓ It can be applied to test scenes that require high dynamic range, such as measuring the passband and out-of-band suppression performance of filters at the same time, and measuring narrow-band devices with high suppression, such as cavity filters.
Ecal	✓ Shorten the calibration time and reduce the number of connections in the test, while providing higher measurement consistency, less human error and higher accuracy.
Advanced measurement kit	✓ A variety of intelligent measurement functions are integrated into a portable instrument powered by battery, which can easily complete the measurement task.
GPS option	✓ Provide geographical location labels for measurement, and geographical data such as longitude, latitude and altitude can be displayed on the screen and saved in data files.
Bias Out	✓ Power supply for external offset connectors, probes and active devices saves time and improves measurement accuracy.

Front Panel

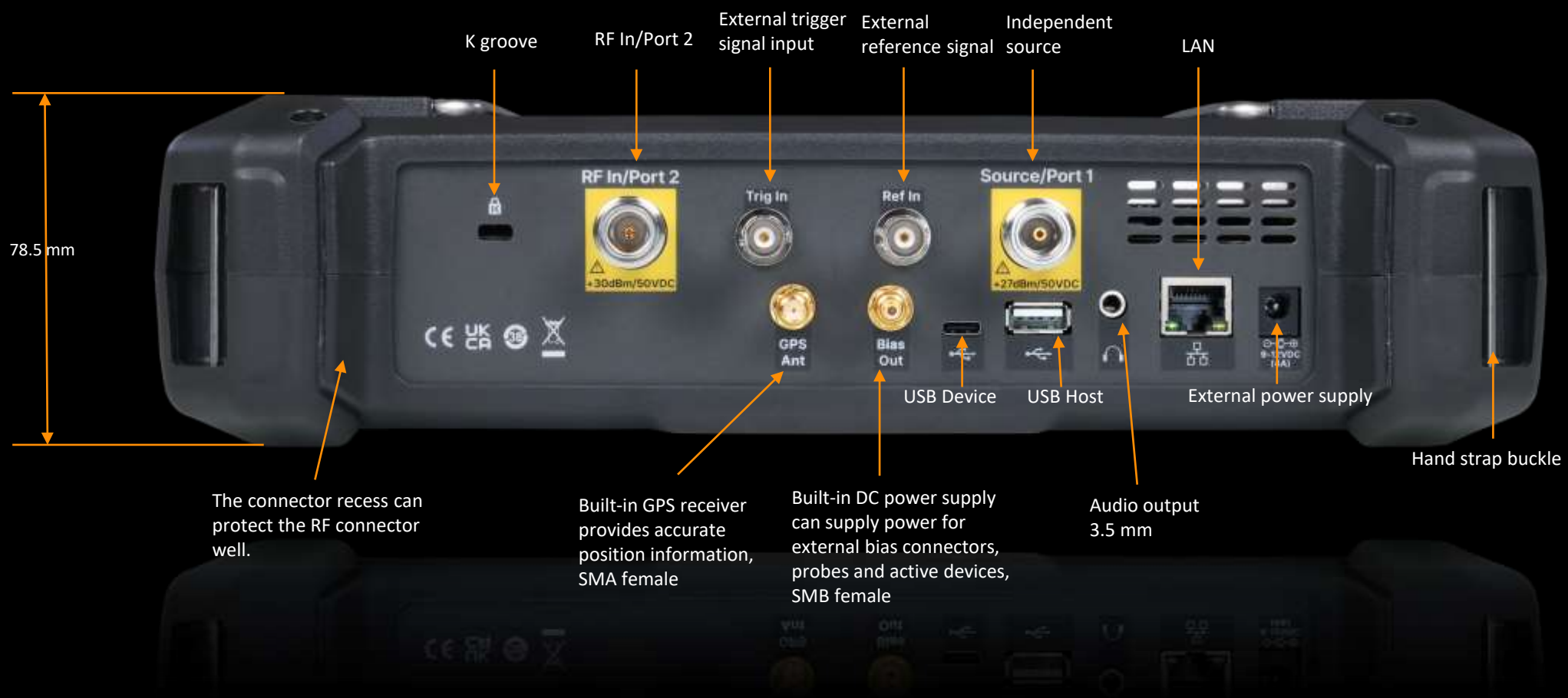

LCD Screen
Menu
Shortcut screenshot button
Multifunction knob
Measurement control, Pause or resume the current measurement process
Key and touch screen lock control
Reuse keys for menu selection mode and numerical input mode, which can be switched by Enter and Esc.
310.1 mm

User Interface



Left

Rear Panel

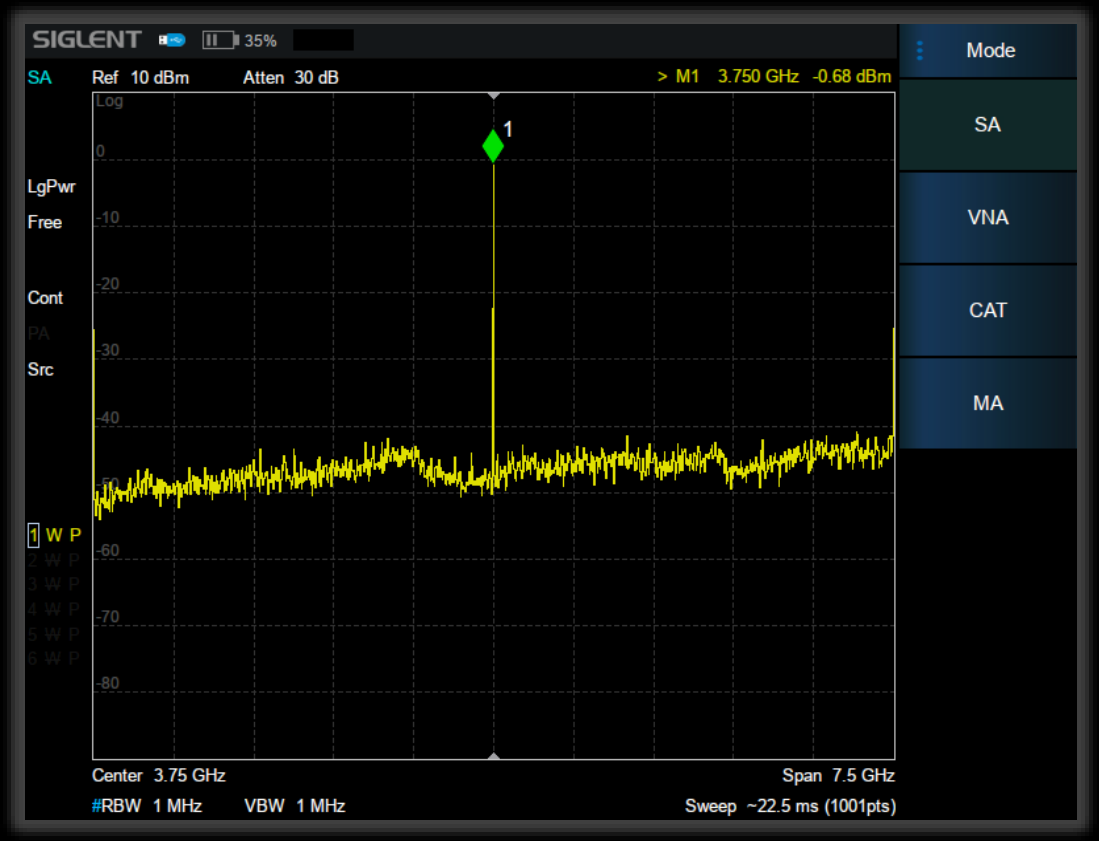

K groove
RF In/Port 2
External trigger signal input
External reference signal
Independent source
LAN
78.5 mm
RF In/Port 2
+30dBm/50VDC
Trig In
Ref In
Source/Port 1
+27dBm/50VDC
GPS Ant
Bias Out
USB Device
USB Host
External power supply
Hand strap buckle
The connector recess can protect the RF connector well.
Built-in GPS receiver provides accurate position information, SMA female
Built-in DC power supply can supply power for external bias connectors, probes and active devices, SMB female
Audio output 3.5 mm

Contents

Design Features

Any signal. Anytime. Anywhere.

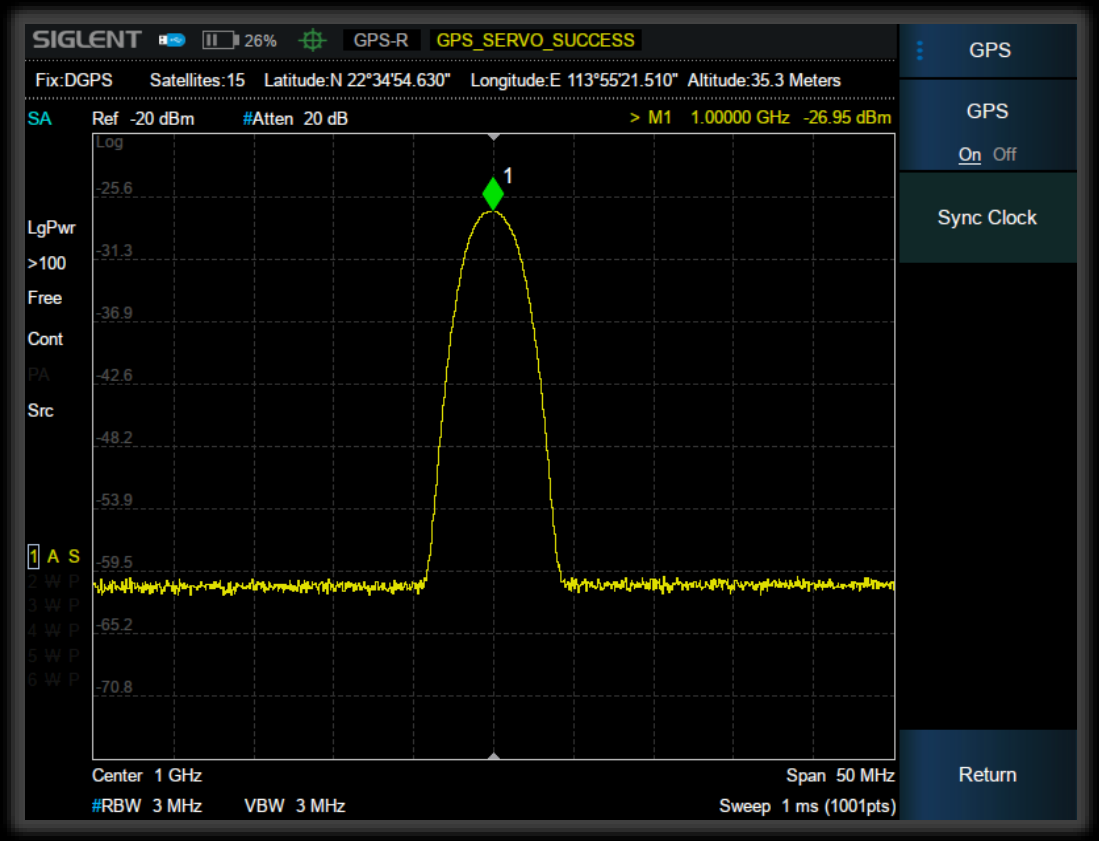
- 8.4 inch multi-touch screen
- Quickly adjust waveform
- Easily activate features and settings
- Improve operation efficiency
- Support network remote control
- …



GPS

Any signal. Anytime. Anywhere.

- Area for "GPS display information“
- Area for "GPS satellite lock icon“
- GPS display information:
  - Fix: Invalid / Estimated: Unknown system /
    GNSS: global navigation satellite system /
    DGPS: differential global positioning system
  - Satellite: number of Satellites
  - Latitude
  - Longitude
  - Altitude



*Requires GPS Antenna and GPS Receiver Option. GPS Logging Option for saving data.

Low DANL

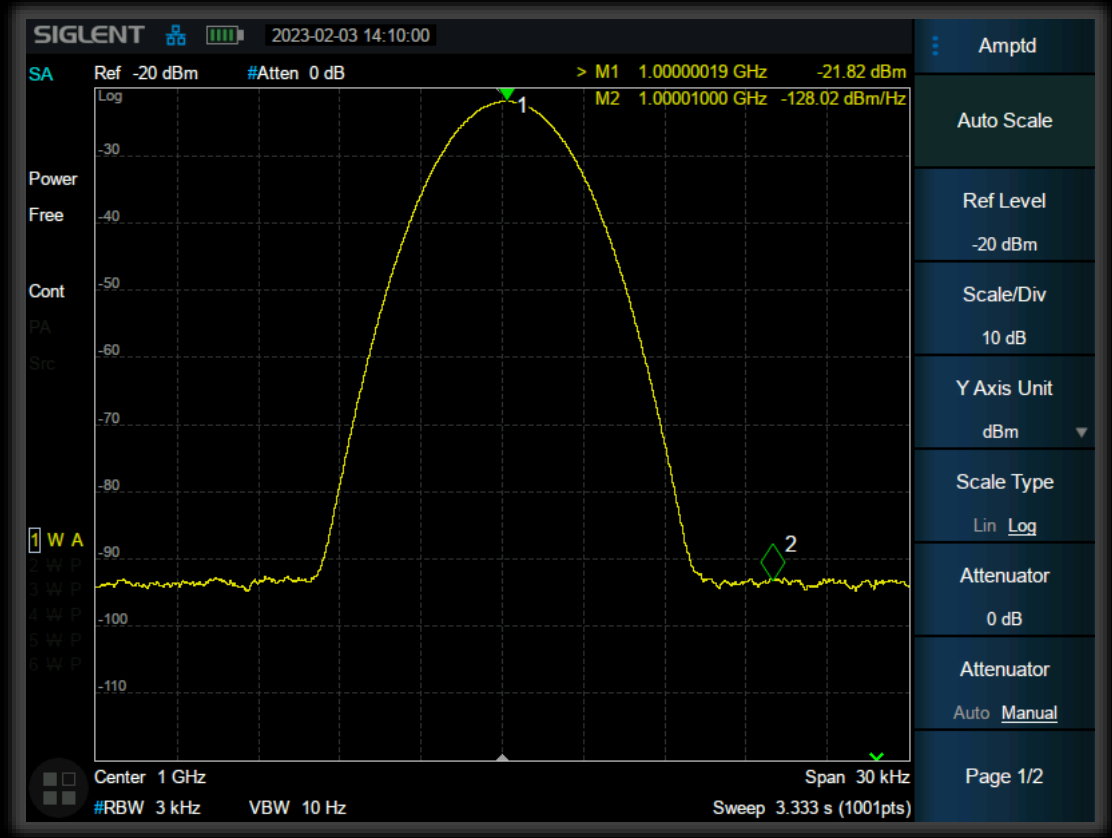
Any signal. Anytime. Anywhere.

- -165 dBm/Hz
- Low noise
- High performance RF design
- Provide standard built-in preamplifier
- Improving weak signal monitoring with high sensitivity

Low Phase Noise

Any signal. Anytime. Anywhere.

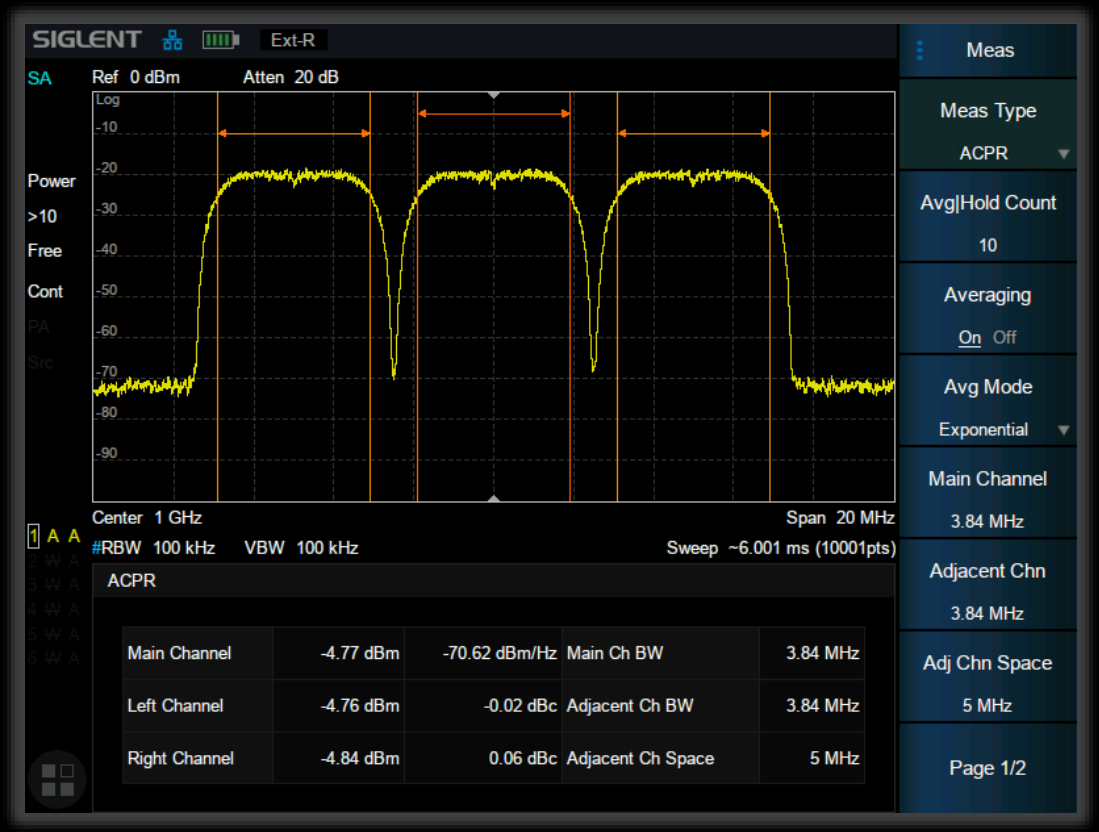
- -104 dBc/Hz
- A measurement parameter of the frequency stability of the oscillator
- An important index for evaluating spectrum analyzers – SHA800A has better performance than SSA3000X-R series



ACPR

Any signal. Anytime. Anywhere.

- Common measurement characteristic for channel-based communication protocols.
- It can describe the out-of-band spectrum distortion characteristics of signal caused by nonlinear distortion of power amplifier



*Requires AMK (Advanced Measurement Kit) Option

Harmonic Analysis

Any signal. Anytime. Anywhere.

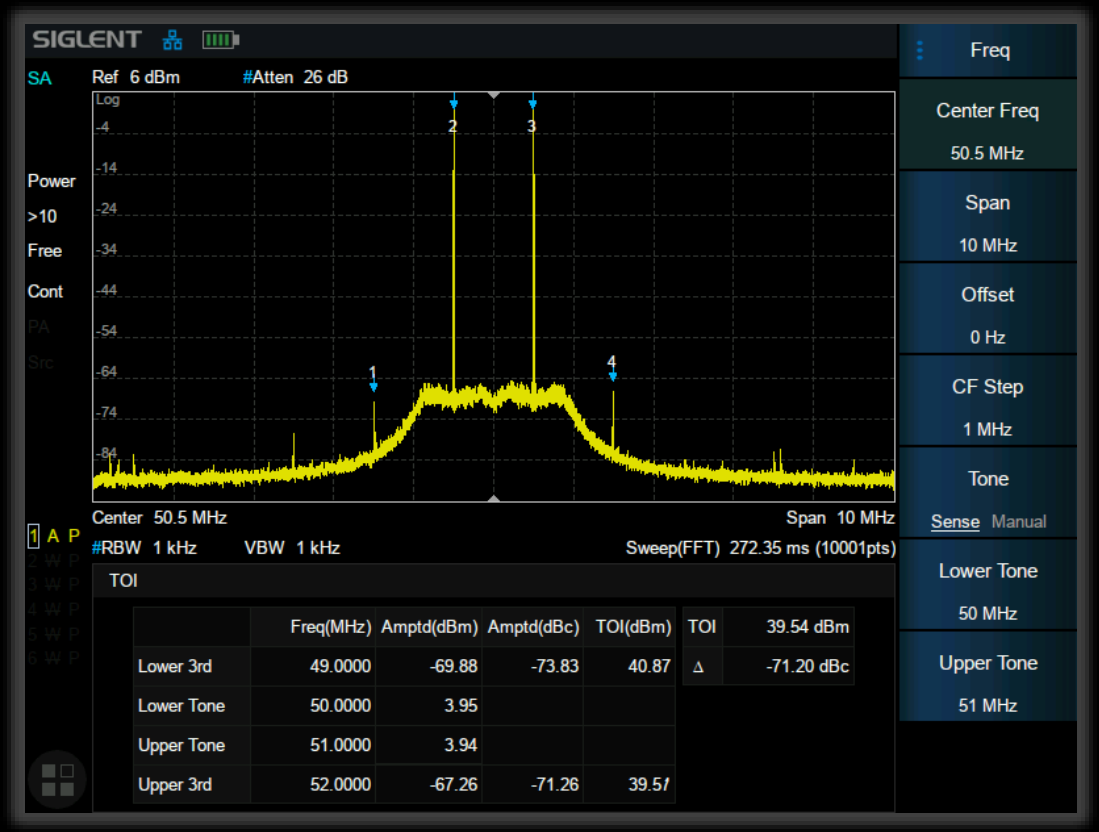
- Measure the harmonic power and total harmonic distortion of carrier signal
- The maximum measurable harmonic is the 10th harmonic
- The fundamental amplitude of the carrier signal should be greater than -50 dBm

*Requires AMK (Advanced Measurement Kit) Option

TOI

Any signal. Anytime. Anywhere.

- IP3: Third-order Intercept Point
- An important index to measure linearity or distortion of amplifiers, mixers, and receivers



*Requires AMK (Advanced Measurement Kit) Option

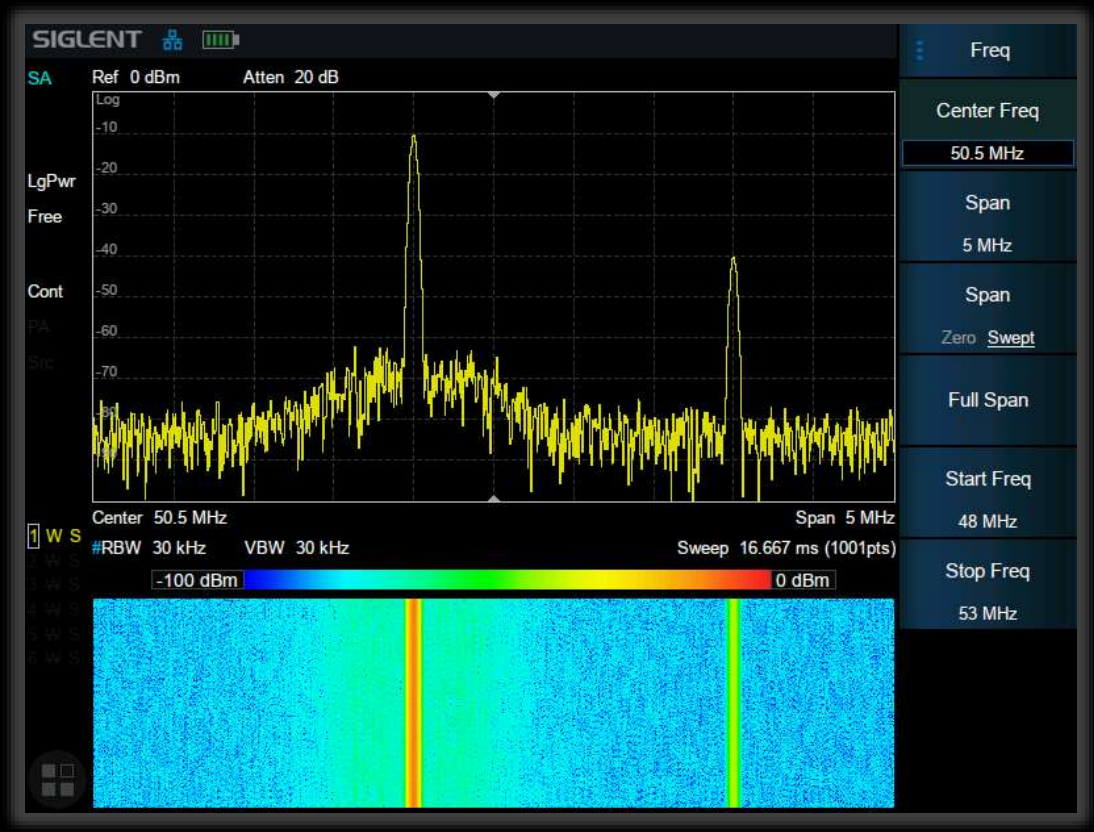
Spectrum Monitor

Any signal. Anytime. Anywhere.

- Color represents spectral energy
- The X axis is frequency
- The Y axis is time
- Also called Spectrogram or Waterfall Chart

- By detecting the non-continuous and frequency hopping signals

- We can observe the change of the signal over a longer period of time

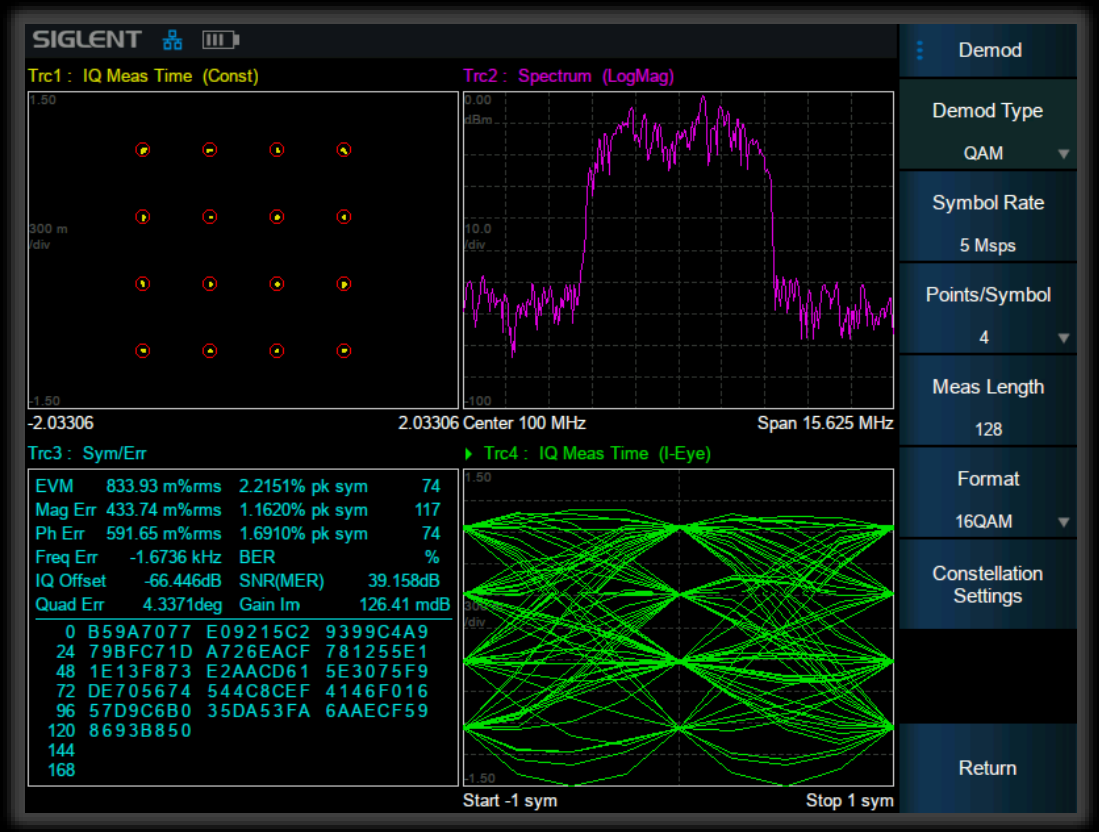


*Requires AMK (Advanced Measurement Kit) Option

Signal Modulation Analysis

Any signal. Anytime. Anywhere.

- Analog signal: AM/FM/PM (AMA Option)
- Digital signal: ASK/FSK/PSK/QAM (DMA Option)
- EVM (Error Vector Magnitude) Calculation
- Transmission quality factors
- Visualization modes include eye-diagrams and constellations
- Extends troubleshooting to complex signals and systems

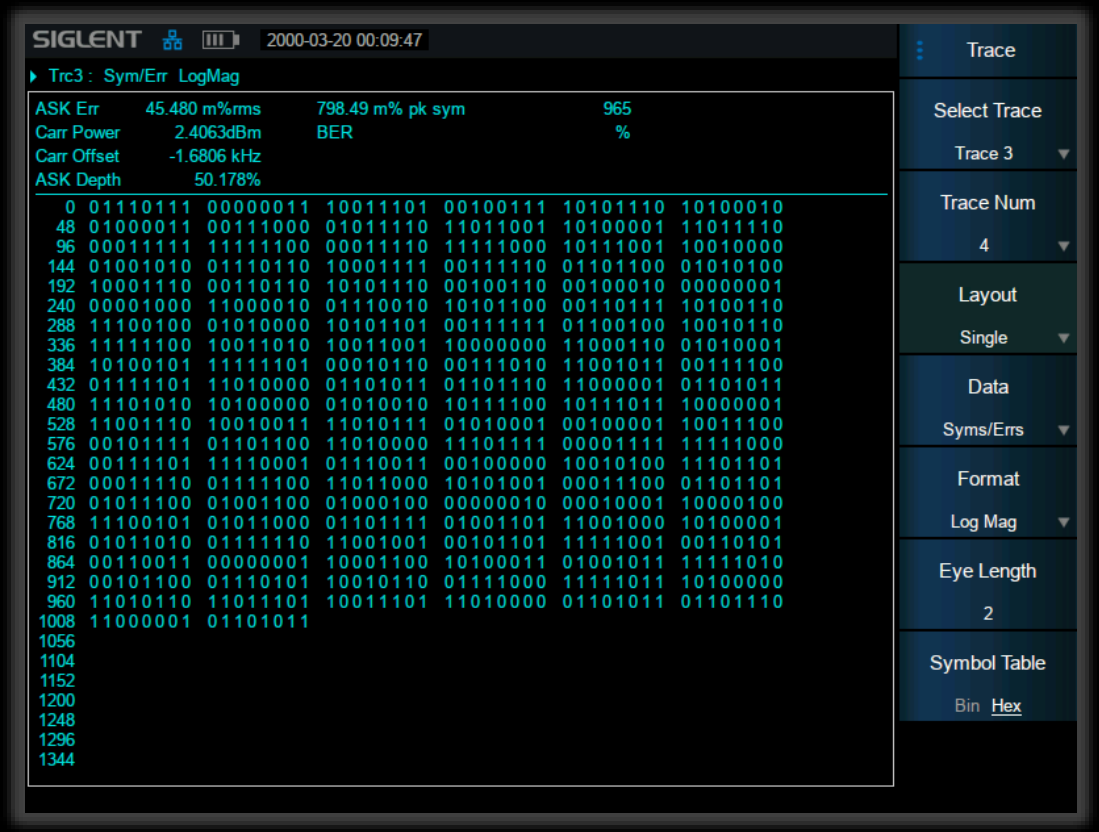


*Requires AMA / DMA Option

Digital Modulation Analysis

Any signal. Anytime. Anywhere.

- Display in binary or hexadecimal
- Compare captured data to known data to calculate BER (Bit Error Rate)

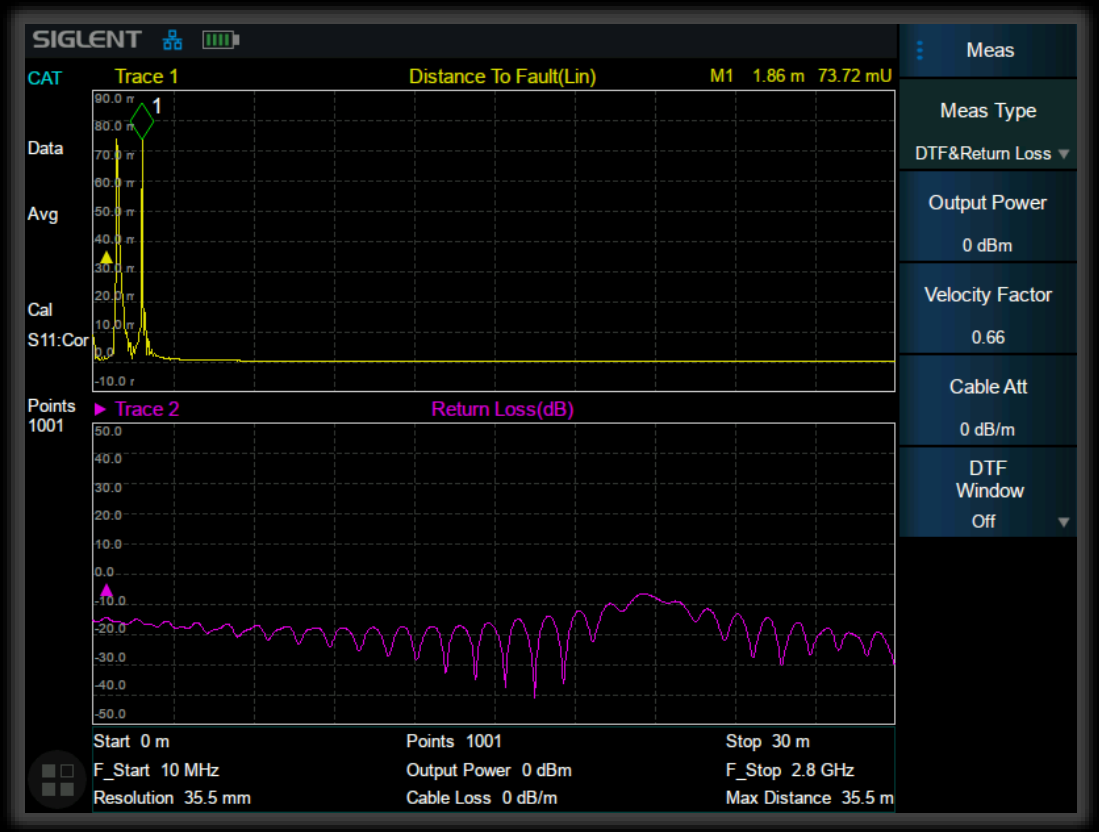


*Requires DMA Option

DTF

Any signal. Anytime. Anywhere.

- Detecting Cable Quality
- Service Maintenance
- Performance Verification
- Fault Analysis

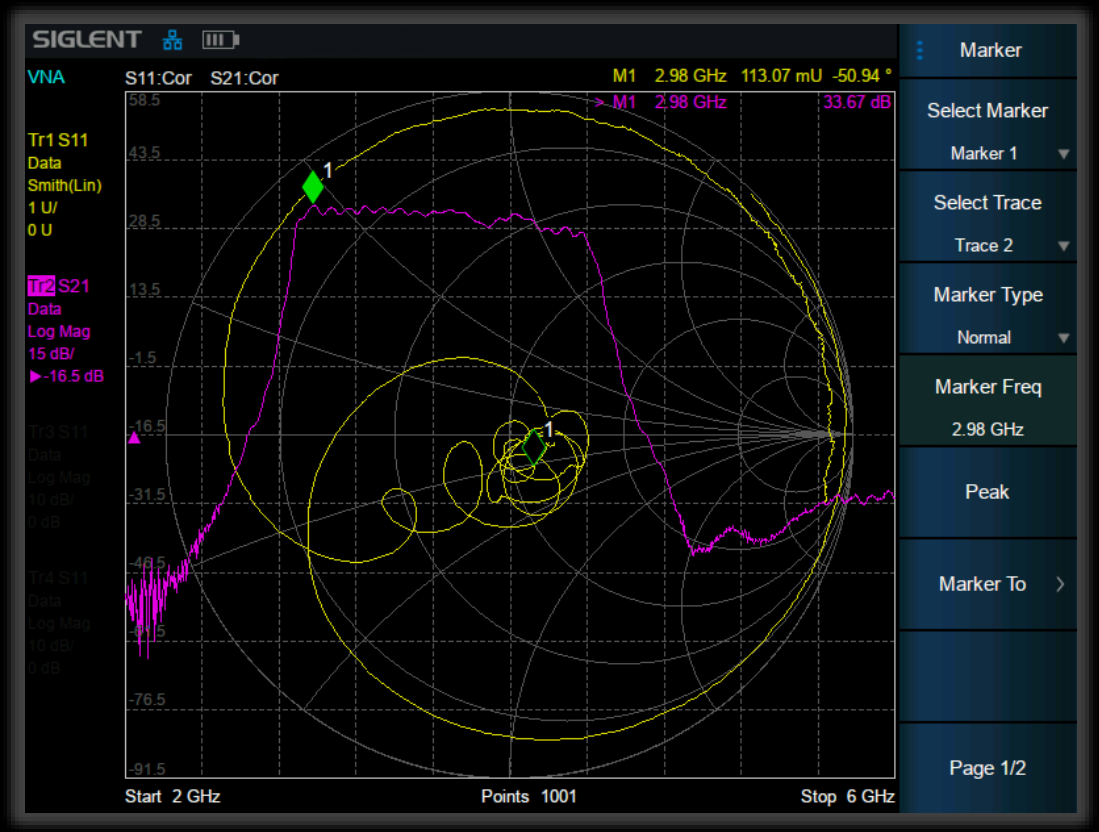


*Standard in CAT mode

VNA

Any signal. Anytime. Anywhere.

- Easily measure S11 and S21
- 10001 maximum measuring points
- The display contents include:
  - Phase
  - Group Delay
  - Polar Chart
  - Smith Chart
  - …
- Simultaneous S11 and S21 display provides simple and intuitive impedance measurements



*Requires VNA Option

SWR

Any signal. Anytime. Anywhere.

- An index indicating the matching degree between antenna and base station
- Ideal VSWR = 1. The greater the VSWR, the greater the reflection and therefore, the worse worse the match

*Available in VNA mode Option

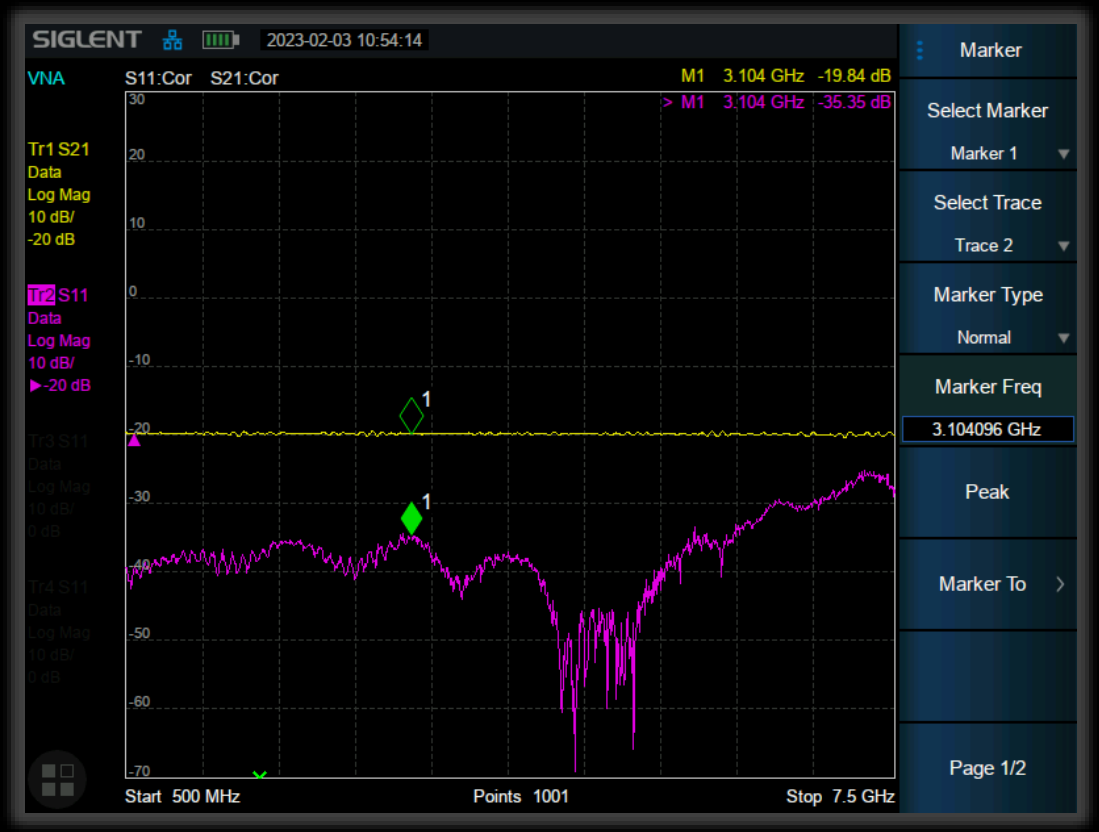
Insertion Loss/Return Loss

Any signal. Anytime. Anywhere.

- Insertion loss can represent the loss of jumper cable, feeder cable, duplexer, etc.
- Or the gain of tower top amplifier

- Return loss (RL) is an important parameter for measuring and verifying cable and antenna systems

- The measurement results can reflect the power transmission efficiency of the system



*Requires VNA Option

Port Extension

Any signal. Anytime. Anywhere.

- Eliminates the error of test fixture
- The reference plane can be extended to the specified measurement plane so that more accurate testing can be carried out

*Requires VNA Option

Ecal

Any signal. Anytime. Anywhere.

- Supports user calibration kit
- Shortens the calibration time
- Reduces the number of connections
- Provides higher measurement consistency
- Reduces human error and improves accuracy

*Requires VNA Option

Contents

Market and Application

Any signal. Anytime. Anywhere.

Communication Engineering

- Comparative measurement of received signal power
- Fast location of interference signals
- Installation and maintenance of base station
- Cable and antenna measurement
- Wireless equipment field test
- Field strength coverage measurement
- Telecom drive test operation and maintenance

Failure Analysis in the field

- Characterize RF devices
- Characterize electronic components including
- Resistors, Capacitors, Inductors…
- Filters, Cables, Mixers, Connectors…
- Antennas, Amplifiers, Attenuators…

Device parameter Verification

- Measure the characteristics of amplifiers, mixers, filters and other devices in the field
- Test the performance, bandwidth, intermodulation distortion and many other indicators

Site Installation & Troubleshooting

- Site survey
- Radio link installation
- Site acceptance
- Design and assembly troubleshooting

Telecom drive test operation and maintenance
Installation and maintenance of cellular systems

- Fault diagnosis and maintenance to ensure the continuity of communication.
- Most microwave link equipment problems are related to cables, antennas and connectors.
- If the performance of the feeder is degraded, it may lead to problems such as
  - Reduced coverage
  - Link failure
  - Decreased sensitivity of the receiver path

Radio Monitoring Management

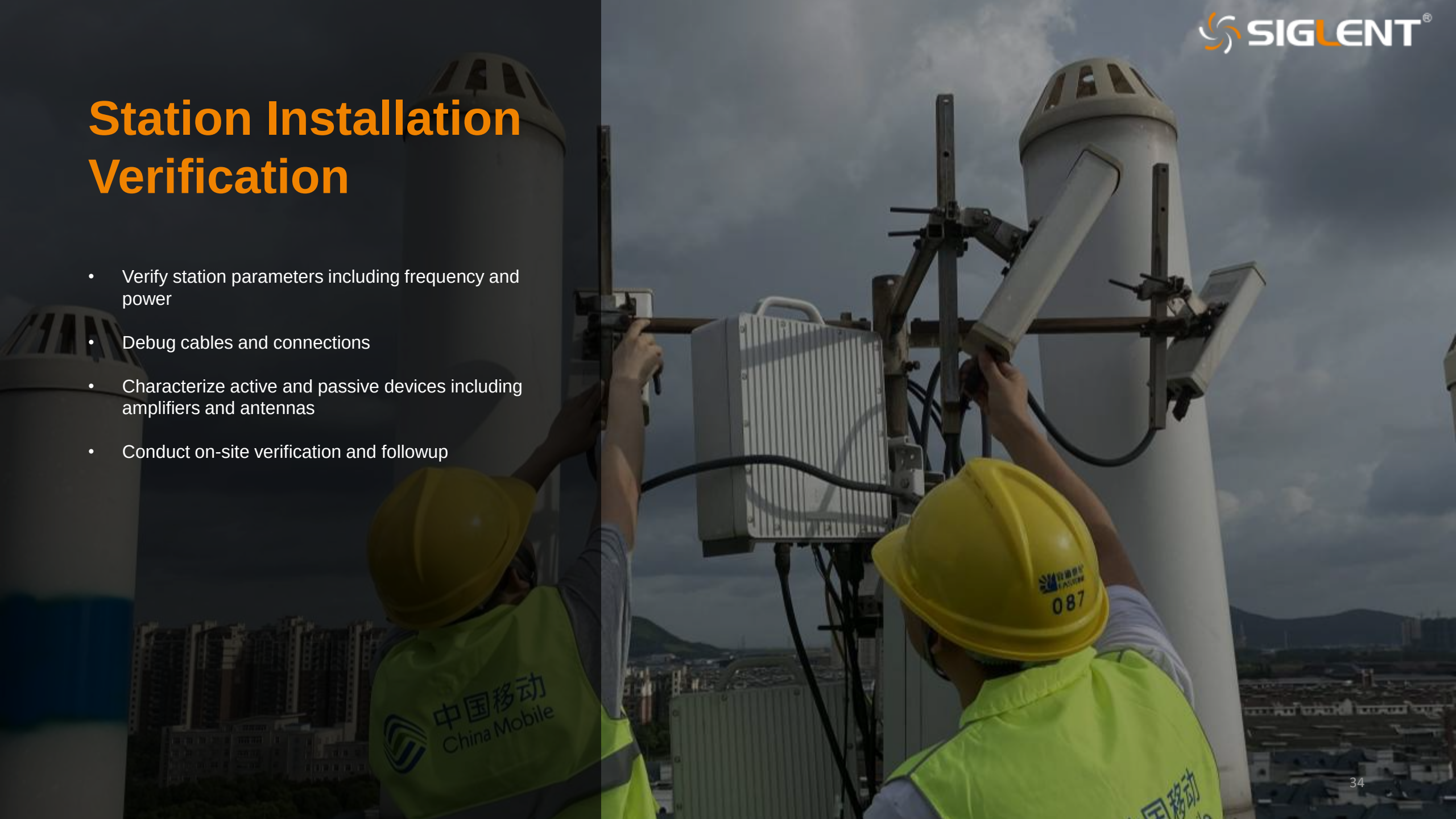
In applications such as communication and commercial microwave backhaul

- Hardware installation and maintenance
- Detecting the quality of wireless signals
- Periodically detect unexpected signals
- Signal monitoring

- Example
- Detecting low-level signals or neighboring small interference signals under strong signal conditions requires high dynamic range.
- While the latter requires excellent phase noise performance.

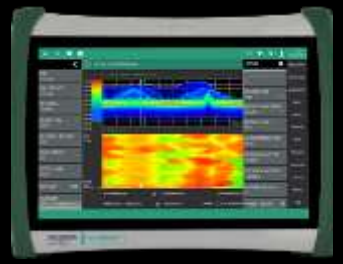
Station Installation Verification

- Verify station parameters including frequency and power
- Debug cables and connections
- Characterize active and passive devices including amplifiers and antennas
- Conduct on-site verification and followup



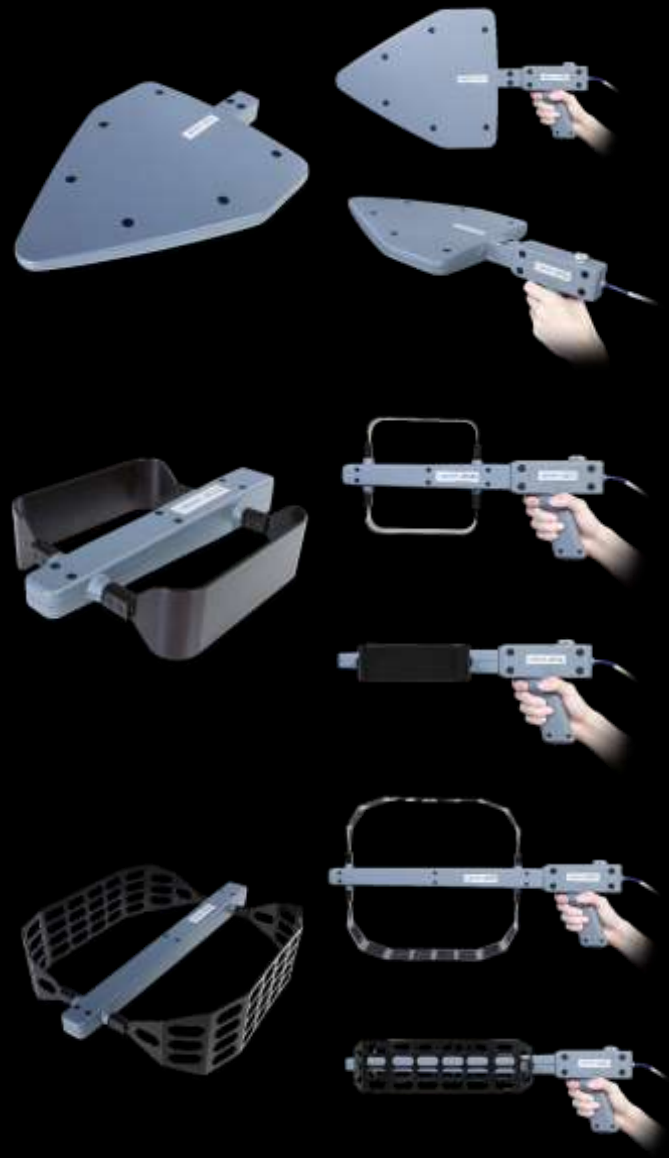
Contents

Model	SIGLENT SHA850A	KEYSIGHT N9913/4A	R&S ZPH	Anritsu MS2034/5B
Appearance				
Spectrum Analyzer	9 kHz ~ 3.6/7.5 GHz	5 kHz ~ 4 GHz/6.5 GHz(option 233)	5 kHz ~ 3 GHz/4 GHz(option ZPH-B4)	9 kHz ~ 4/6 GHz
Vector Network Analyzer	100 kHz ~ 3.6/7.5 GHz (option SHA850-VNA)	30 kHz to 4/6.5 GHz (N9914A-V5K) (N9914A-210; N9914A-211)	2 MHz to 3 GHz/4 GHz (option ZPH-B4)	500 kHz ~ 4/6 GHz
Cable and Antenna Analyzer	100 kHz ~ 3.6/7.5 GHz	30 kHz to 4/6.5 GHz (N9914A-V5K: 5kHz start frequency)	2 MHz to 3 GHz/4 GHz (option ZPH-B4)	500 kHz ~ 4/6 GHz
DANL	-165 dBm/Hz	-155 dBm/Hz	-163 dBm/Hz	-162 dBm
SSB Phase Noise	fc = 1 GH, offset 10 kHz -104 dBc/Hz (typ.)	fc = 1 GH, offset 10 kHz -111 dBc/Hz(typ.)	fc = 500 MHz, offset 30 kHz -95 dBc/Hz(typ.)	fc = 1 GH, offset 10 kHz –110 dBc/Hz(typ.)
Dynamic Range (typ.)	114 dB	100 dB	> 90 dB	100 dB
Analog Modulation Analysis	AM/FM/PM (option SHA850-AMA)	AM/FM (Option 355)	AM/FM (option ZPH-K7)	AM/FM/PM (Option 509)
Digital Modulation Analysis	ASK/FSK/MSK/PSK/DPSK/QAM (option SHA850-DMA)	none	none	none
Measurement range	DANL to +10 dBm, 100 kHz ~ 1 MHz DANL to +20 dBm, 1 MHz ~ 7.5 GHz	DANL to +20 dBm	DANL to +30 dBm	DANL to +26 dBm (≥ 50 MHz) DANL to 0 dBm (< 50 MHz)
Preamplifier	25 dB (nom.), standard	+20 dB (Option 235)	option	standard
Source	100 kHz ~ 3.6/7.5 GHz (option SHA850-SOR)	30 kHz to 4/6.5 GHz	100 kHz ~ 4 GHz	unspecified
Dimensions	310.1 x 215 x 78.5 mm	292 x 188 x 72 mm	294 x 202 x 76 mm	273 x 199 x 91 mm
Operating time	4 hours	3.5 hours	6.5 ~ 9 hours	3.6 hours

Model	SIGLENT SHA850A	KEYSIGHT N9912A	R&S FPH	Anritsu MS2080A
Appearance				
Spectrum Analyzer	9 kHz ~ 3.6/7.5 GHz	N9912AU-230: 100 kHz to 4 GHz N9912AU-231: 100 kHz to 6 GHz	5 kHz to 2 GHz(model .02) 5 kHz to 6 GHz(model .06)	9 kHz ~ 4 GHz (Option 704)
Vector Network Analyzer	100 kHz ~ 3.6/7.5 GHz (option SHA850-VNA)	Option 104:2 MHz to 4 GHz Option 106:2 MHz to 6 GHz (S11 – Option 303; S21 – Option 110 and 303)	none	none
Cable and Antenna Analyzer	100 kHz ~ 3.6/7.5 GHz	Option 104: 2 MHz to 4 GHz Option 106: 2 MHz to 6 GHz	none	150 kHz to 4 GHz (S331P-0704) 150 kHz to 6 GHz (S331P-0706)
DANL	-165 dBm/Hz	-148 dBm/Hz	-163 dBm/Hz	-167 dBm
SSB Phase Noise	fc = 1 GH, offset 10 kHz -104 dBc/Hz (typ.)	fc = 1 GH, offset 10 kHz -88 dBc/Hz(typ.)	fc = 500 MHz, offset 30 kHz -95 dBc/Hz(typ.)	fc = 1 GH, offset 10 kHz –94 dBc/Hz(typ.)
Dynamic Range (typ.)	114 dB	unspecified	none	>105 dB Typical
Analog Modulation Analysis	AM/FM/PM (option SHA850-AMA)	AM/FM (Option 230 or 231)	AM/FM (option FPH-K7)	AM/FM (Option 24)
Digital Modulation Analysis	ASK/FSK/MSK/PSK/DPSK/QAM (option SHA850-DMA)	none	ASK/FSK (option FPH-K7)	none
Measurement range	DANL to +10 dBm, 100 kHz ~ 1 MHz DANL to +20 dBm, 1 MHz ~ 7.5 GHz	DANL to +20 dBm	DANL to +30 dBm	DANL to +30 dBm
Preamplifier	25 dB (nom.), standard	+22 dB (Option 235)	option	standard
Source	100 kHz ~ 3.6/7.5 GHz (option SHA850-SOR)	N9912AU-230: 2 MHz to 4 GHz N9912AU-231: 2 MHz to 6 GHz	100 kHz to MAX frequency	unspecified
Dimensions	310.1 x 215 x 78.5 mm	292 x 188 x 72 mm	294 x 202 x 76 mm	290 x 212 x 96 mm
Operating time	4 hours	4 hours (typical)	8 h(model .02) / 7 h(model .06)	3 h with Internal 6 h with Accessory Power Pack

S5000 Directional Antenna Set

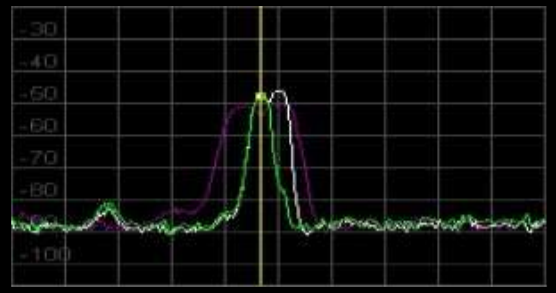
Model	ANT-DA13 (S5001-LP)	ANT-DA12 (S5001-UHF)	ANT-DA11 (S5001-VHF)
Frequency Range	500MHz-8GHz	200MHz – 500MHz	10MHz – 200MHz
Appearance			
Antenna Gain	10dB (typ.)		
SWR	< 1:1.9 (typ.)		
Direction Of Polarization	horizontal, vertical		
RF Interface	50Ω/N type, female		
Handle Radio Frequency Wire	1.5m /N type, male		
Handle Amplifier Gain	12dB @1GHz, more than 50 hours		
Dimensions	470 x 400 x 240mm		
Rough Weight	4.8kg (including packing box)		
Net Weight	0.45kg (including handle 0.96kg)	0.32kg (including handle 0.83kg)	0.50kg (including handle 1.01kg)



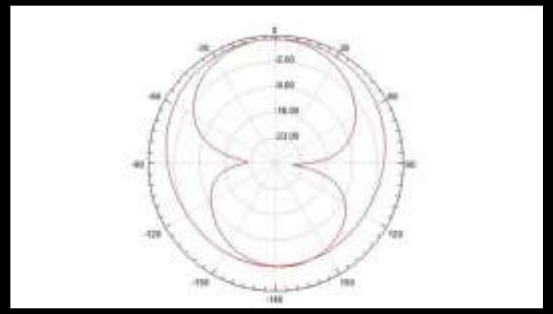
Pattern and application diagram

3GHz pattern

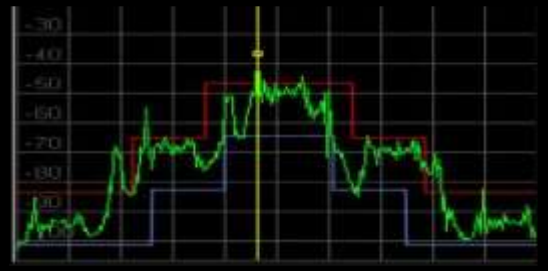
Spectrum live view and reference record tracking



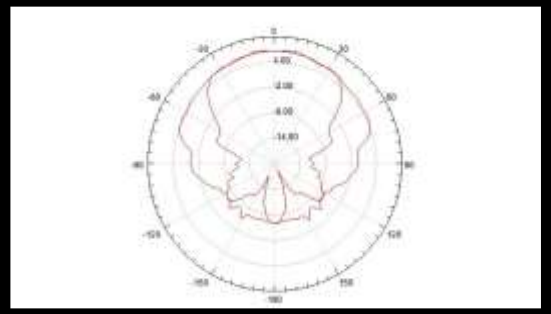
400MHz pattern



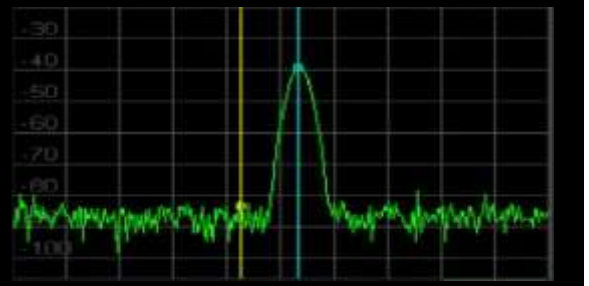
Spectrum limit test



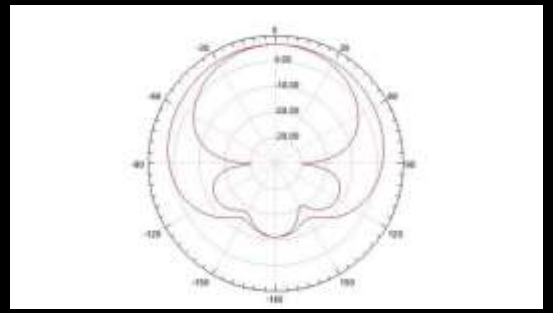
6GHz pattern



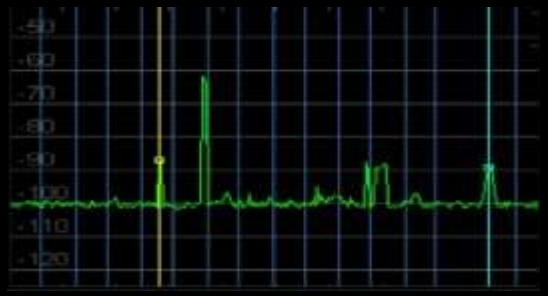
Accurate intermediate frequency analysis and measurement of spectrum frequency



800MHz pattern



Spectrum frequency scanning measurement



Pricing & Availability

Type	Model Name	Description	Price	Availability
Product Code	SHA851A	Spectrum & Vector Network Analyzer, 9 kHz~3.6 GHz	$4,860	4-6 weeks
	SHA852A	Spectrum & Vector Network Analyzer, 9 kHz~7.5 GHz	$7,650	4-6 weeks
Options	SHA850-F2	SHA851A to SHA852A	$4,022	Stock
	SHA850-SOR	Source	$297	Stock
	SHA850-VNA	Vector Network Analysis	$1,019	Stock
	SHA850-AMK	Advanced Measurement Kit	$400	Stock
	SHA850-AMA	Analog Modulation Analysis	$338	Stock
	SHA850-DMA	Digital Modulation Analysis	$606	Stock
	SHA850-BIAS	DC Bias Out	$132	Stock
	SHA850-GPS	GPS Receiver	$173	Stock
	SHA850-GPSM	GPS Logging(need GPS Receiver)	$173	Stock
Antenna Accessories	ANT-GPS1	GPS Antenna with male SMA connector	$20	4-6 weeks
	ANT-DA1	Contains amplifier handle and 3 antennas: 10-200 MHz, 200-500 MHz, and 500 MHz-8 GHz	$7,614	4-6 weeks
	ANT-DA11	Contains amplifier handle and 10MHz ~ 200MHz antenna	$3,080	4-6 weeks
	ANT-DA12	Contains amplifier handle and 200MHz ~ 500MHz antenna	$3,065	4-6 weeks
	ANT-DA13	Contains amplifier handle and 500MHz ~ 8GHz antenna	$3,673	4-6 weeks

General Accessories

Product	Description	Order Number
General Accessories	Rechargeable lithium battery	SHA800-BAT
	AC-DC adapter	SHA800-AP
	Portable bag	SHA800-BG
	GPS antenna, SMA(M), 100cm	ANT-GPS1
	S5000 Directional Antenna Set: S5001-VHF(10 MHz~200 MHz), S5001-UHF(200 MHz~500 MHz), S5001-LP(500 MHz~8 GHz), Preamp(10 dB, 9 kHz~8 GHz)	ANT-DA1
	Near field probe kit：300 kHz~3 GHz, H-field probes(20 mm,10 mm,5 mm), E-field probe(5 mm)	SRF5030T
	Utility Kit: N(M)-SMA(M) cable(6 GHz), N(M)-N(M) cable(6 GHz), N(M)-BNC(F) adaptor x2, N(M)-SMA(F) adaptor x2，10 dB 1W attenuator	UKitSSA3X
	N(M)-BNC(M) cable, DC~2 GHz, 700 mm	N-BNC-2L
	N(M)-SMA(M) cable, DC~6 GHz, 700 mm	N-SMA-6L
	N(M)-N(M) cable, DC~6 GHz, 700 mm	N-N-6L
	N(M)-N(M) cable ,DC~18 GHz，1000 mm	N-N-18L
	N(M)-SMA(M) cable ,DC~18 GHz，1000 mm	N-SMA-18L
	SMA(M)-SMA(M) cable ,DC~18 GHz，1000 mm	SMA-SMA-18L

VNA Calibration Kit Selection

Model	Max Frequency	Most Popular Calibration Kit	Alternate Cal Kit for reverse gender	Complete Kit for both genders
SHA851A	3.6 GHz	F503ME	F503FE	F504TS
SHA852A	7.5 GHz	F504MS	F504FS	F504TS

Calibration Kit Model	Max Frequency	Calibration Kit Connectors	Calibration Kit Gender
F503FE	4.5 GHz	N Type (F)	Female
F503ME	4.5 GHz	N Type (M)	Male
F603FE	4.5 GHz	3.5 mm	Female
F603ME	4.5 GHz	3.5 mm	Male
F504FS	9 GHz	N Type (F)	Female
F504MS	9 GHz	N Type (M)	Male
F504TS	9 GHz	N Type (M & F)	Male & Female w/ Wrench
F604FS	9 GHz	3.5 mm	Female
F604MS	9 GHz	3.5 mm	Male
F604TS	9 GHz	3.5 mm	Male & Female w/ Wrench
Y504FS	9 GHz	N Type (F)	Female
Y504MS	9 GHz	N Type (M)	Male

F503ME

F504TS

Thank You

Every Bench. Every Engineer. Every Day.

Headquarters

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