SHA860A Handheld Signal Analyzer

SIGLENT®

Data Sheet

EN02C



SIGLENT TECHNOLOGIES CO., LTD.

Feature and Benefits

- Frequency Range: 9 kHz~3.6 GHz /7.5 GHz/14 GHz /20 GHz /26.5 GHz, Usable to 5 kHz

  Displayed Average Noise Level (DANL): -165 dBm/Hz

  SSB Phase Noise: -104 dBc/Hz @1 GHz, 10 kHz offset

  Analysis Bandwidth: 40 MHz, upgradeable to 110 MHz
- 5G NR OTA Measurement, multi-PCI and multi-beam analysis
- LTE FDD and TDD OTA Measurement, multi-PCI analysis
- General Demodulation, including AM/FM/PM and ASK/FSK/PSK/APSK/MSK/QAM
- Real-Time Spectrum Analysis, 3.51 μs minimum signal duration with100% POI in 110 MHz BW
- IQ Data Acquisition in 110 MHz BW
- Channel Power, Occupied Bandwidth, Adjacent Channel Power, SHI and TOI etc.
- Trace Recording/Playback, Audio Tune & Listening
- Pulse Profile Measurements
- GNSS location, Indoor and Outdoor Map for Coverage Mapping and Interference Analysis
- Field Strength (EMF) Measurements and EMI Measurements
- USB Power Sensor Measurements
- Independent Source up to 26.5 GHz
- Vector Network Analyzer, 1-Path 2-Ports S11 and S21 Network Analysis

  Frequency Range, 100kHz~26.5 GHz, Usable to 30 kHz

  S11 Directionality 40 dB, S21 Dynamic Range 114 dB under 7.5 GHz
- Cable and Antenna Analysis, Distance-to-Fault and Time Domain Analysis
- TTA Measurement, bias out 10~32V DC
- Chargeable Battery working time 2.5 hours, 3.2 kg net weight
- 8.4 Inch Multi-Touch Screen, mouse and keyboard supported

Design Feature

5G NR OTA Measurement



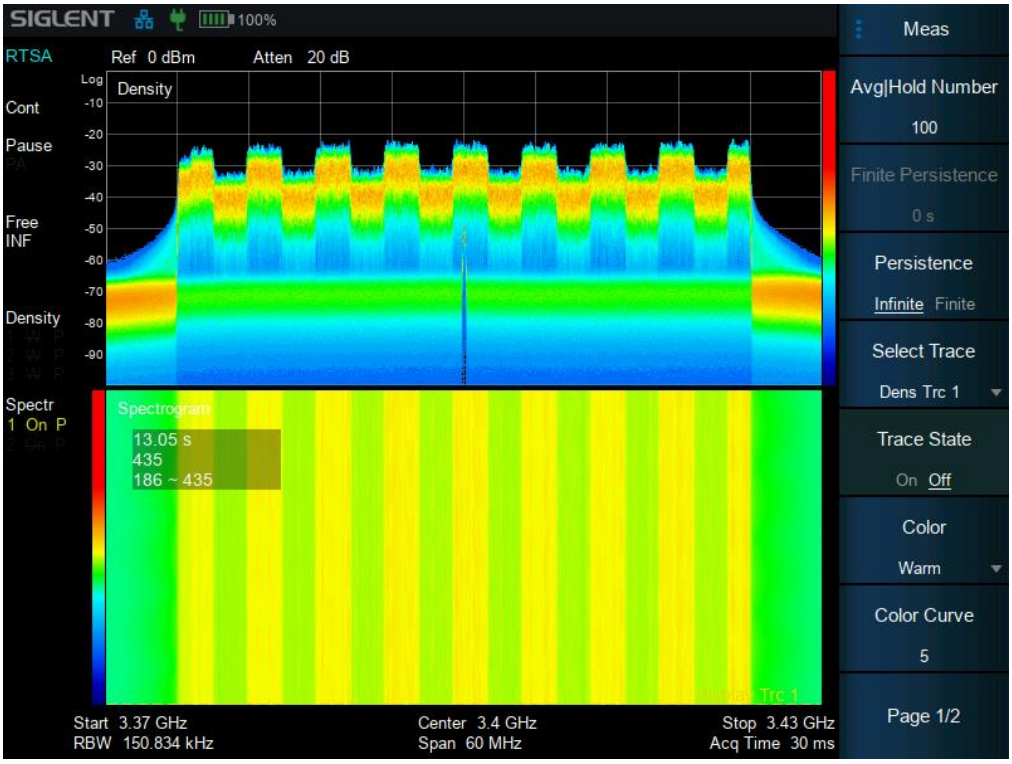
5G NR multi-PCI and multi-beam analysis



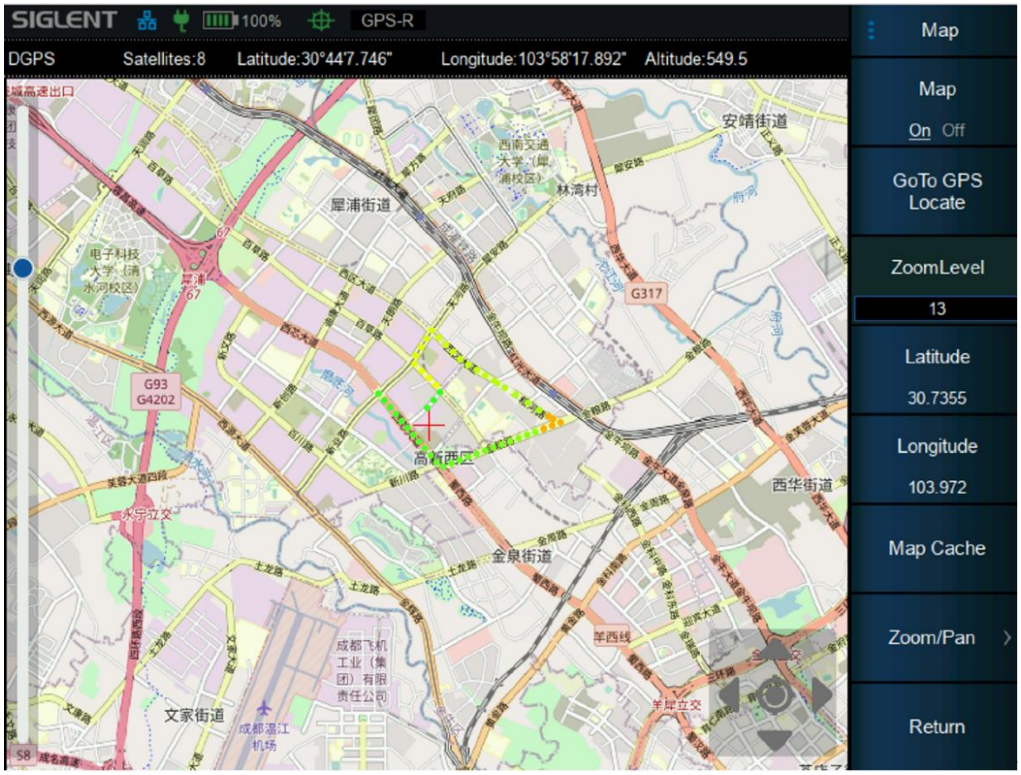
5G NR Constellation



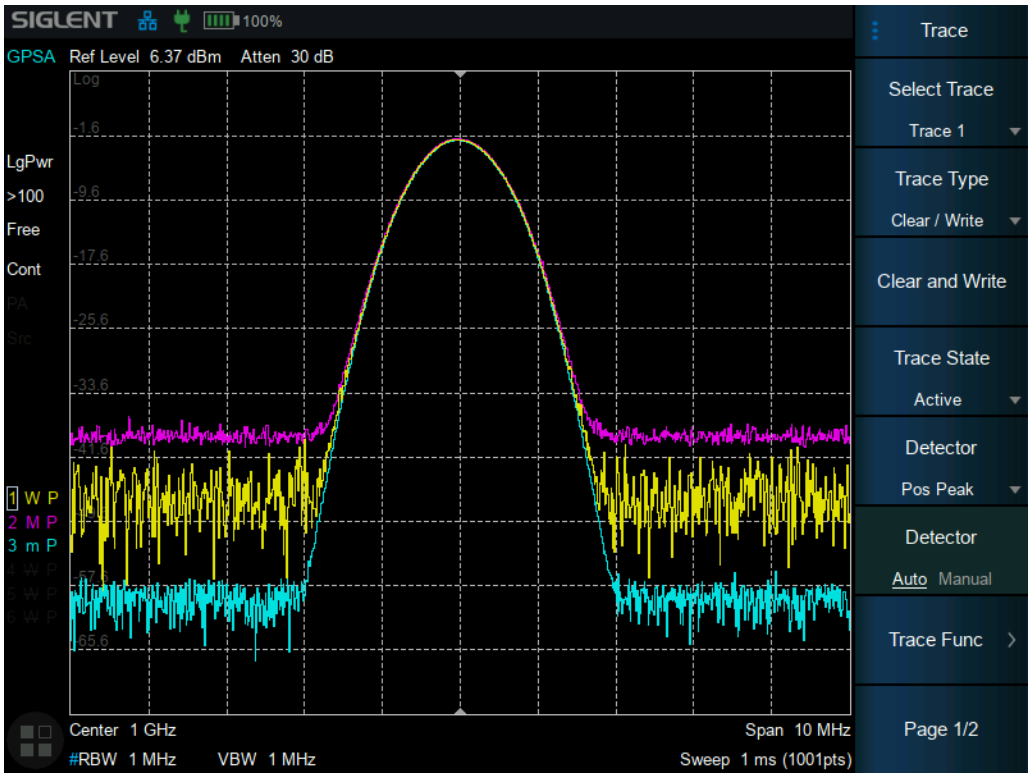
Real-Time Spectrum Analysis



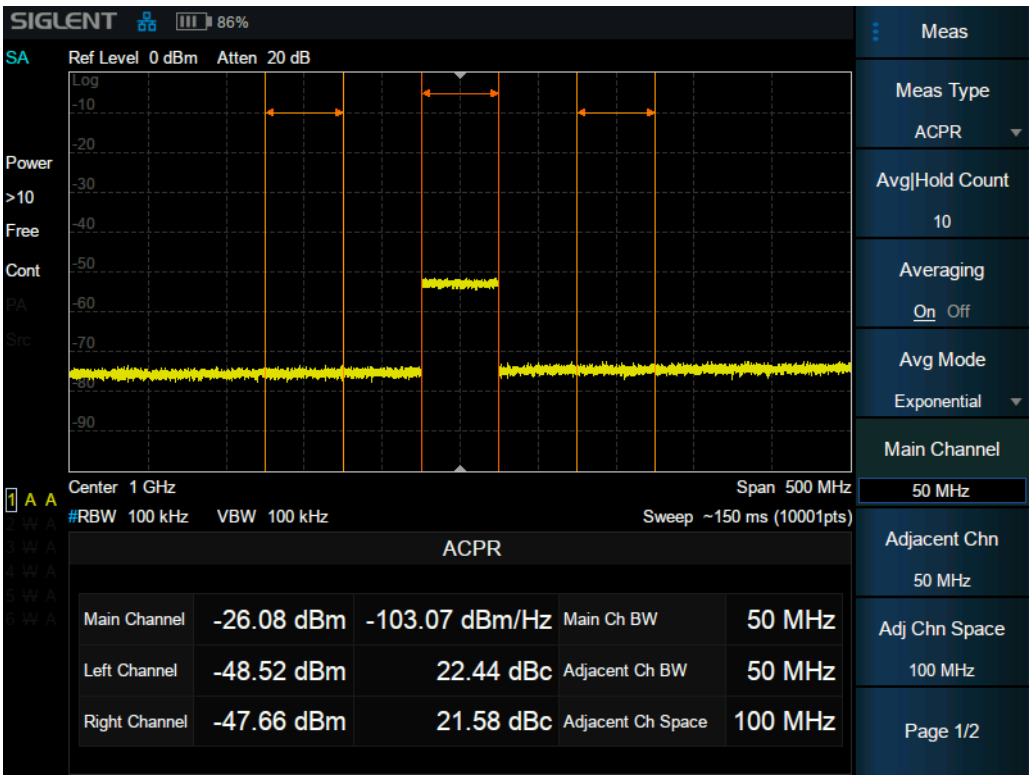
Indoor and Outdoor mapping, GPS logging



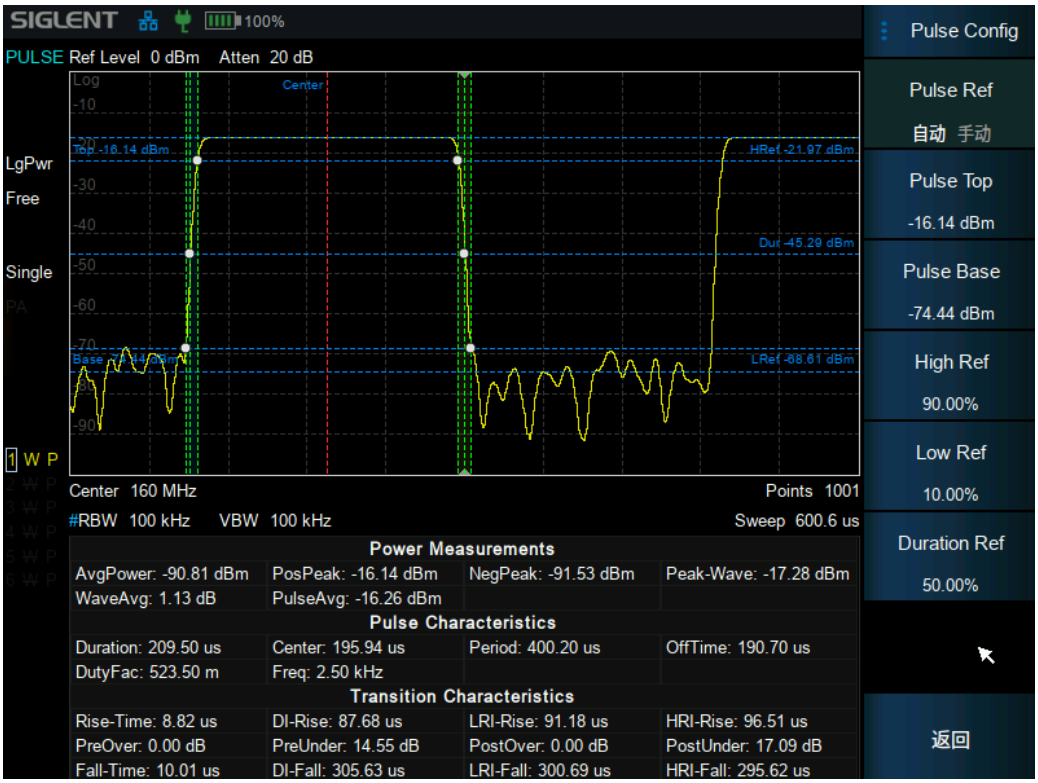
8.4 inch multi-touch screen and full keyboard control



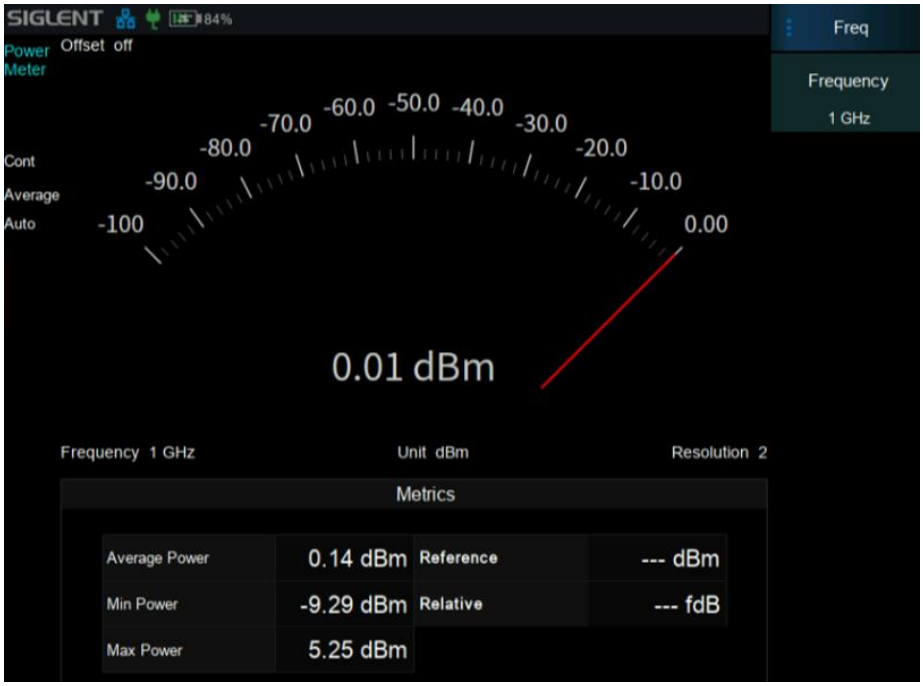
Channel Power and ACPR measurement



Pulse Profile Measurements



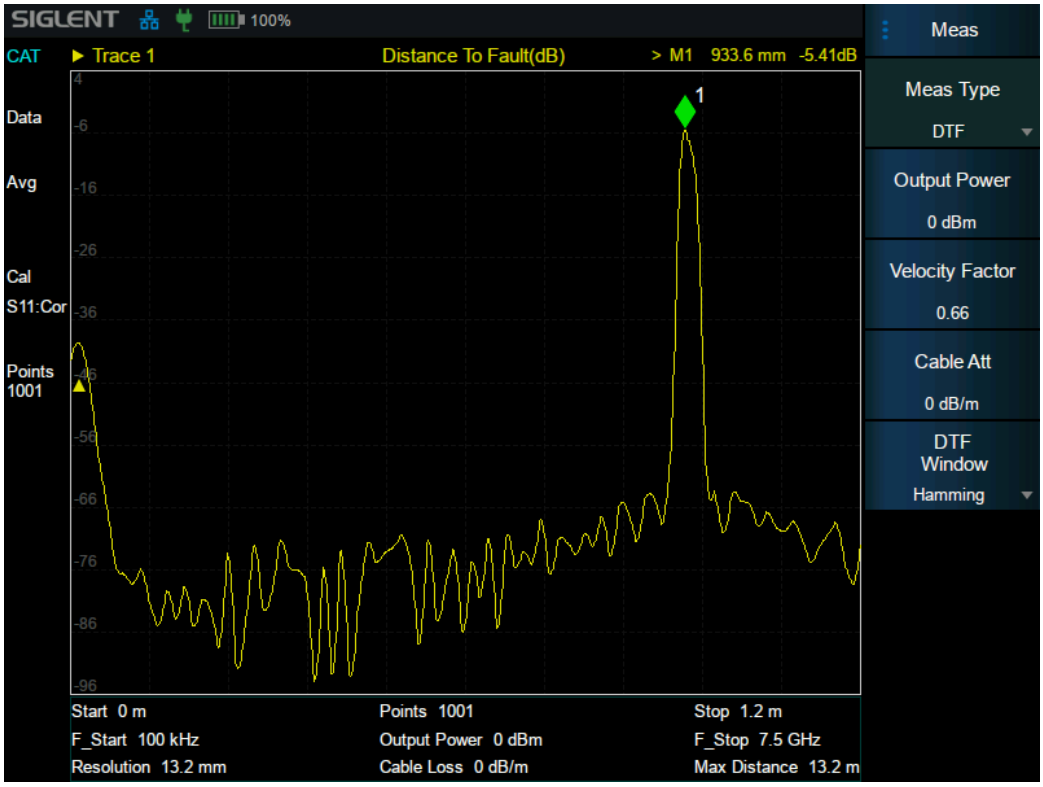
Power Meter



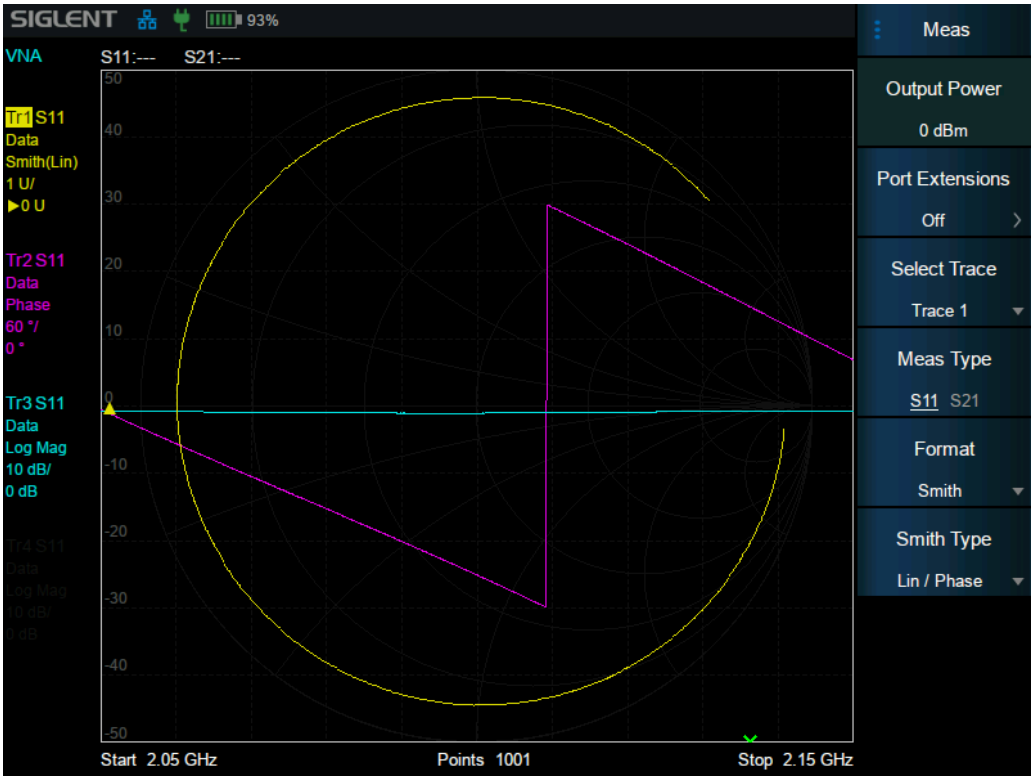
Interference analysis with directional antenna



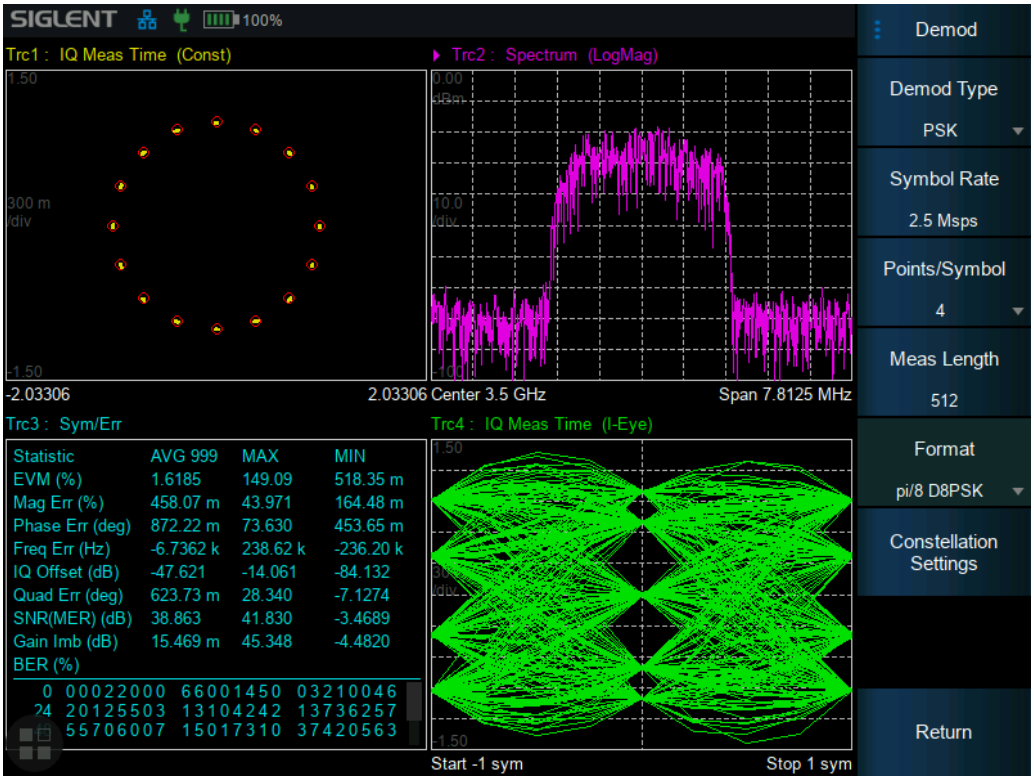
Cable and Antenna Test based on Timing Domain Analysis



Vector Network Analysis S11 and S21 measurement



AM/FM/PM analog demodulation, and ASK/FSK/PSK/MSK/QAM digital demodulation analysis



Accessories

Utility Kit



EMI Near Field Probe Kit



50Ω Calibration Kit



GPS Antenna



Portable Bag



Directional Antenna Kit



Definitions

Specifications are valid under the following conditions: the instrument is within the calibration period, operates over the 23 ℃ ± 5 ℃ temperature range, and has been powered on and warmed up for at least 20 minutes. The specifications include the measurement uncertainty, unless otherwise noted.

Specification (spec)

Specifications are warranted performance to meet published specifications when operating at room temperature (approximately 23 ℃), unless otherwise noted.

Typical

Describes additional product performance information not covered by the product warranty. It is performance beyond specifications that 80% of the units exhibit with a 90% confidence level over the temperature range 23 ℃ ± 5 ℃, unless otherwise noted. Typical performance is not warranted and does not include measurement uncertainty.

Nominal

A general, descriptive term or design parameter. It is not tested, and not covered by the product warranty. The product must be within its calibration cycle.

Spectrum Analyzer

Frequency and Time Characteristic

Frequency		
Frequency range	SHA861A	SHA862A
	9 kHz~3.6 GHz (5 kHz usable)	9 kHz~7.5 GHz (5 kHz usable)
	SHA863A	SHA864A
	9 kHz~14 GHz (5 kHz usable)	9 kHz~20 GHz (5 kHz usable)
	SHA865A	
	9 kHz~26.5 GHz (5 kHz usable)	
Frequency resolution	1 Hz	

Frequency Span	
Range	0 Hz, 100 Hz to Max Frequency
Accuracy	± Span/ (number of sweep points-1)

Internal Reference Source	
Reference frequency	10.000000 MHz
Reference frequency accuracy / uncertainty	±[(time since last adjustment × frequency aging rate) + temperature stability + initial calibration accuracy]
Initial calibration accuracy	<1 ppm
Temperature stability	<1 ppm, 0℃~50℃
Frequency aging rate	<0.5 ppm/first year, 3.0 ppm/20 年
GPS Receiver (SHA860-GPS)	
Accuracy synced to GPS	±0.01 ppm
Accuracy un-synced to GPS	±0.4 ppm

Marker	
Marker resolution	Span/ (number of sweep points-1)
Marker uncertainty	± [frequency indication × reference frequency uncertainty + 1% × span + ½ * marker resolution + 1 Hz]
Marker type	Normal, Delta, Fixed, Relative to, Marker Table
Marker functions	Noise marker, N dB BW, Frequency Counter
Frequency counter resolution	0.1 Hz
Frequency counter uncertainty	± [frequency indication × reference frequency uncertainty +Frequency counter resolution]

Bandwidth	
Resolution Bandwidth (-3dB)	1 Hz ~ 10 MHz, 1-3-10 sequence
Resolution filter shape factor	< 4.8 : 1 (60 dB:3 dB) , Quasi-Gaussian
RBW uncertainty	< 5%
Video bandwidth (-3dB)	1 Hz ~ 10 MHz, 1-3-10 sequence
VBW uncertainty	< 5%

Sweep and Trigger			
Sweep time		1 ms to 5000 s	1 ms to 7500 s
RBW in sweep mode	Sweep	3 kHz ~ 10 MHz	
	FFT	1 Hz ~ 10 kHz	
Sweep points		201~10001	
Sweep rule		Single, Continuous	
Trigger source		Free run, Video, External, Periodic	
External trigger		5V TTL level, Rising edge/Falling edge	

Amplitude Accuracy and Range Specifications

Amplitude and Level	
Measurement range	DANL to +10 dBm, 100 kHz ~ 1 MHz, Preamp off DANL to +20 dBm, 1 MHz ~ 7.5 GHz, Preamp off DANL to +20 dBm, 7.5 GHz ~ 26.5 GHz, Preamp off
Reference level	-200 dBm to +30 dBm
Preamplifier	25 dB(nom.), SHA861A, SHA862A 20 dB(nom.), SHA863A, SHA864A, SHA865A
Input attenuator range	0 ~ 50 dB, in 1 dB steps, SHA861A, SHA862A 0 ~ 50 dB, in 2 dB steps, SHA863A, SHA864A, SHA865A
Maximum input DC voltage	+/- 50 VDC
Maximum input average CW power	30 dBm, SHA861A, SHA862A 20 dBm, SHA863A, SHA864A, SHA865A fc≥10 MHz, >20 dB attenuation, preamp off, in 3 minutes

Level Display Range	
Logarithmic level axis	1 dB to 200 dB, 10 divisions
Linear level axis	0% to 100% (reference level)
Units of level axis	dBm, dBmV, dBμV, dBμA, Volt, Watt
Number of traces	6
Trace detectors	Positive-peak, Negative-peak, Sample, Normal, Average(Voltage/RMS/Video)
Trace functions	Clear write, Max Hold, Min Hold, View, Blank, Average, Math

Field Strength Measurement	
Antenna factor	4
Units	dBm/m2, dBw/m2, dBV/m, dBmV/m, dBpV/m, V/m, W/m2, W/cm2, A/m

Displayed Average Noise Level (DANL)			
20 °C to 30 °C, 0 dB attenuation, sample detector, trace average > 50, normalized to 1 Hz RBW, Source off			
		SHA861A	SHA862A
Preamp off	100 kHz ~1 MHz	-125 dBm, -136 dBm (typ.)	-125 dBm, -136 dBm (typ.)
	1 MHz~600 MHz	-140 dBm, -147 dBm (typ.)	-140 dBm, -147 dBm (typ.)
	600 MHz~1.8 GHz	-139 dBm, -145 dBm (typ.)	-139 dBm, -145 dBm (typ.)
	1.8 GHz~3.2 GHz	-134 dBm, -140 dBm (typ.)	-134 dBm, -140 dBm (typ.)
	3.2 GHz~3.65 GHz	-136 dBm, -143 dBm (typ.)	-136 dBm, -143 dBm (typ.)
	3.65 GHz~4.1 GHz		-136 dBm, -143 dBm (typ.)
	4.1 GHz~5.0 GHz		-135 dBm, -141 dBm (typ.)
	5.0 GHz~5.85 GHz		-135 dBm, -141 dBm (typ.)
	5.85 GHz~6.7 GHz		-134 dBm, -140 dBm (typ.)
	6.7 GHz~7.5 GHz		-132 dBm, -138 dBm (typ.)
Preamp on	100 kHz ~1 MHz	-125 dBm, -137 dBm (typ.)	-125 dBm, -137 dBm (typ.)
	1 MHz~600 MHz	-156 dBm, -163 dBm (typ.)	-156 dBm, -163 dBm (typ.)
	600 MHz~1.8 GHz	-159 dBm, -165 dBm (typ.)	-159 dBm, -165 dBm (typ.)
	1.8 GHz~3.2 GHz	-157 dBm, -163 dBm (typ.)	-157 dBm, -163 dBm (typ.)
	3.2 GHz~3.65 GHz	-157 dBm, -163 dBm (typ.)	-157 dBm, -163 dBm (typ.)
	3.65 GHz~4.1 GHz		-157 dBm, -163 dBm (typ.)
	4.1 GHz~5.0 GHz		-156 dBm, -162 dBm (typ.)
	5.0 GHz~5.85 GHz		-156 dBm, -162 dBm (typ.)
	5.85 GHz~6.7 GHz		-155 dBm, -161 dBm (typ.)
	6.7 GHz~7.5 GHz		-153 dBm, -159 dBm (typ.)

		SHA863A	SHA864A
Preamp off	100 kHz ~1 MHz	-125 dBm, -136 dBm (typ.)	-125 dBm, -136 dBm (typ.)
	1 MHz~600 MHz	-138 dBm, -144 dBm (typ.)	-138 dBm, -144 dBm (typ.)
	600 MHz~1.8 GHz	-138 dBm, -144 dBm (typ.)	-138 dBm, -144 dBm (typ.)
	1.8 GHz~3.2 GHz	-135 dBm, -141 dBm (typ.)	-135 dBm, -141 dBm (typ.)
	3.2 GHz~4.1 GHz	-135 dBm, -141 dBm (typ.)	-135 dBm, -141 dBm (typ.)
	4.1 GHz~5.0 GHz	-134 dBm, -139 dBm (typ.)	-134 dBm, -139 dBm (typ.)
	5.0 GHz~5.85 GHz	-133 dBm, -138 dBm (typ.)	-133 dBm, -138 dBm (typ.)
	5.85 GHz~6.7 GHz	-132 dBm, -136 dBm (typ.)	-132 dBm, -136 dBm (typ.)

	6.7 GHz~7.5 GHz	-133 dBm, -138 dBm (typ.)	-133 dBm, -138 dBm (typ.)
	7.5 GHz~9.3 GHz	-132 dBm, -136 dBm (typ.)	-132 dBm, -136 dBm (typ.)
	9.3 GHz~12 GHz	-133 dBm, -137 dBm (typ.)	-133 dBm, -137 dBm (typ.)
	12 GHz~14 GHz	-134 dBm, -139 dBm (typ.)	-134 dBm, -139 dBm (typ.)
	14 GHz~15.3 GHz		-134 dBm, -139 dBm (typ.)
	15.3 GHz~20 GHz		-134 dBm, -140 dBm (typ.)
Preamp on	100 kHz ~1 MHz	-125 dBm, -137 dBm (typ.)	-125 dBm, -137 dBm (typ.)
	1 MHz~600 MHz	-157 dBm, -163 dBm (typ.)	-157 dBm, -163 dBm (typ.)
	600 MHz~1.8 GHz	-157 dBm, -163 dBm (typ.)	-157 dBm, -163 dBm (typ.)
	1.8 GHz~3.2 GHz	-155 dBm, -161 dBm (typ.)	-155 dBm, -161 dBm (typ.)
	3.2 GHz~4.1 GHz	-154 dBm, -159 dBm (typ.)	-154 dBm, -159 dBm (typ.)
	4.1 GHz~5.0 GHz	-154 dBm, -159 dBm (typ.)	-154 dBm, -159 dBm (typ.)
	5.0 GHz~5.85 GHz	-153 dBm, -157 dBm (typ.)	-153 dBm, -157 dBm (typ.)
	5.85 GHz~6.7 GHz	-152 dBm, -156 dBm (typ.)	-152 dBm, -156 dBm (typ.)
	6.7 GHz~7.5 GHz	-154 dBm, -159 dBm (typ.)	-154 dBm, -159 dBm (typ.)
	7.5 GHz~9.3 GHz	-153 dBm, -157 dBm (typ.)	-153 dBm, -157 dBm (typ.)
	9.3 GHz~12 GHz	-153 dBm, -157 dBm (typ.)	-153 dBm, -157 dBm (typ.)
	12 GHz~14 GHz	-153 dBm, -158 dBm (typ.)	-153 dBm, -158 dBm (typ.)
	14 GHz~15.3 GHz		-153 dBm, -158 dBm (typ.)
	15.3 GHz~20 GHz		-153 dBm, -158 dBm (typ.)

		SHA865A
Preamp off	100 kHz ~1 MHz	-125 dBm, -136 dBm (typ.)
	1 MHz~600 MHz	-138 dBm, -144 dBm (typ.)
	600 MHz~1.8 GHz	-138 dBm, -144 dBm (typ.)
	1.8 GHz~3.2 GHz	-135 dBm, -141 dBm (typ.)
	3.2 GHz~4.1 GHz	-135 dBm, -141 dBm (typ.)
	4.1 GHz~5.0 GHz	-134 dBm, -139 dBm (typ.)
	5.0 GHz~5.85 GHz	-133 dBm, -138 dBm (typ.)
	5.85 GHz~6.7 GHz	-132 dBm, -136 dBm (typ.)
	6.7 GHz~7.5 GHz	-133 dBm, -138 dBm (typ.)
	7.5 GHz~9.3 GHz	-132 dBm, -136 dBm (typ.)
	9.3 GHz~12 GHz	-133 dBm, -137 dBm (typ.)
	12 GHz~14 GHz	-134 dBm, -139 dBm (typ.)

	14 GHz~15.3 GHz	-134 dBm, -139 dBm (typ.)
	15.3 GHz~20 GHz	-134 dBm, -140 dBm (typ.)
	20 GHz~22.6 GHz	-133 dBm, -139 dBm (typ.)
	22.6 GHz~26.5 GHz	-128 dBm, -134 dBm (typ.)
Preamp on	100 kHz ~1 MHz	-125 dBm, -137 dBm (typ.)
	1 MHz~600 MHz	-157 dBm, -163 dBm (typ.)
	600 MHz~1.8 GHz	-157 dBm, -163 dBm (typ.)
	1.8 GHz~3.2 GHz	-155 dBm, -161 dBm (typ.)
	3.2 GHz~4.1 GHz	-154 dBm, -159 dBm (typ.)
	4.1 GHz~5.0 GHz	-154 dBm, -159 dBm (typ.)
	5.0 GHz~5.85 GHz	-153 dBm, -157 dBm (typ.)
	5.85 GHz~6.7 GHz	-152 dBm, -156 dBm (typ.)
	6.7 GHz~7.5 GHz	-154 dBm, -159 dBm (typ.)
	7.5 GHz~9.3 GHz	-153 dBm, -157 dBm (typ.)
	9.3 GHz~12 GHz	-153 dBm, -157 dBm (typ.)
	12 GHz~14 GHz	-153 dBm, -158 dBm (typ.)
	14 GHz~15.3 GHz	-153 dBm, -158 dBm (typ.)
	15.3 GHz~20 GHz	-152 dBm, -158 dBm (typ.)
	20 GHz~22.6 GHz	-150 dBm, -156 dBm (typ.)
	22.6 GHz~26.5 GHz	-146 dBm, -152 dBm (typ.)

SSB Phase Noise	
Offset	20 ℃ to 30 ℃, fc = 1 GHz, Normalized to 1 Hz
10 kHz	-100 dBc/Hz, -104 dBc/Hz (typ.)
100 kHz	-100 dBc/Hz, -104 dBc/Hz (typ.)
1 MHz	-114 dBc/Hz, -117 dBc/Hz (typ.)

Frequency Response			
20℃~30℃, 30%~70% relative humidity, 20 dB attenuation, relative to 50 MHz			
		SHA861A	SHA862A
Preamp off	1 MHz~1.8 GHz	±0.8 dB, ±0.4 dB (typ.)	±0.8 dB, ±0.4 dB (typ.)
	1.8 GHz~3.65 GHz	±0.8 dB, ±0.4 dB (typ.)	±0.8 dB, ±0.4 dB (typ.)
	3.65 GHz~7.5 GHz		±0.8 dB, ±0.4 dB (typ.)
Preamp on	1 MHz~1.8 GHz	±1.2 dB, ±0.6 dB (typ.)	±1.2 dB, ±0.6 dB (typ.)
	1.8 GHz~3.65 GHz	±1.2 dB, ±0.6 dB (typ.)	±1.2 dB, ±0.6 dB (typ.)
	3.65 GHz~7.5 GHz		±1.2 dB, ±0.6 dB (typ.)
		SHA863A	SHA864A
Preamp off	1 MHz~1.8 GHz	±1.0 dB, ±0.6 dB (typ.)	±1.0 dB, ±0.6 dB (typ.)
	1.8 GHz~3.65 GHz	±1.0 dB, ±0.6 dB (typ.)	±1.0 dB, ±0.6 dB (typ.)
	3.65 GHz~7.5 GHz	±1.0 dB, ±0.6 dB (typ.)	±1.0 dB, ±0.6 dB (typ.)
	7.5 GHz~14 GHz	±1.2 dB, ±0.8 dB (typ.)	±1.2 dB, ±0.8 dB (typ.)
	14 GHz~20 GHz		±1.5 dB, ±1.0 dB (typ.)
Preamp on	1 MHz~1.8 GHz	±1.5 dB, ±1.0 dB (typ.)	±1.5 dB, ±1.0 dB (typ.)
	1.8 GHz~3.65 GHz	±1.5 dB, ±1.0 dB (typ.)	±1.5 dB, ±1.0 dB (typ.)
	3.65 GHz~7.5 GHz	±1.5 dB, ±1.0 dB (typ.)	±1.5 dB, ±1.0 dB (typ.)
	7.5 GHz~14 GHz	±1.8 dB, ±1.2 dB (typ.)	±1.8 dB, ±1.2 dB (typ.)
	14 GHz~20 GHz		±2.0 dB, ±1.5 dB (typ.)
		SHA865A	
Preamp off	1 MHz~1.8 GHz	±1.0 dB, ±0.6 dB (typ.)	
	1.8 GHz~3.65 GHz	±1.0 dB, ±0.6 dB (typ.)	
	3.65 GHz~7.5 GHz	±1.0 dB, ±0.6 dB (typ.)	
	7.5 GHz~14 GHz	±1.2 dB, ±0.8 dB (typ.)	
	14 GHz~20 GHz	±1.5 dB, ±1.0 dB (typ.)	
	20 GHz~22.6 GHz	±1.5 dB, ±1.0 dB (typ.)	
	22.6 GHz~26.5 GHz	±2.0 dB, ±1.5 dB (typ.)	
Preamp on	1 MHz~1.8 GHz	±1.5 dB, ±1.0 dB (typ.)	
	1.8 GHz~3.65 GHz	±1.5 dB, ±1.0 dB (typ.)	
	3.65 GHz~7.5 GHz	±1.5 dB, ±1.0 dB (typ.)	

	7.5 GHz~14 GHz	±1.8 dB, ±1.2 dB (typ.)
	14 GHz~20 GHz	±2.0 dB, ±1.5 dB (typ.)
	20 GHz~22.6 GHz	±2.0 dB, ±1.5 dB (typ.)
	22.6 GHz~26.5 GHz	±2.5 dB, ±2.0 dB (typ.)

Error and Accuracy			
Resolution bandwidth switching uncertainty	Logarithmic resolution, relative to RBW = 10 kHz		
	±0.2 dB (nom.)		
Input attenuation switching uncertainty	20℃~30℃, fc = 50 MHz, preamp off, relative to 20 dB attenuation, 0~50 dB attenuation		
		SHA861A, SHA862A	SHA863A, SHA864A, SHA865A
	50MHz	±0.5 dB	±0.5 dB
	10 MHz~3.65 GHz	±0.5 dB (nom.)	±0.7 dB (nom.)
	3.65 GHz~7.5 GHz	±0.5 dB (nom.)	±0.7 dB (nom.)
	7.5 GHz~14 GHz		±1.0 dB (nom.)
	14 GHz~26.5 GHz		±1.0 dB (nom.)
Absolute amplitude accuracy	20℃~30℃, fc=50 MHz, RBW=1 kHz, VBW=1 kHz, peak detector , 20 dB attenuation, 95% confidence level		
		SHA861A, SHA862A	SHA863A, SHA864A, SHA865A
	Input signal -20 dBm, Preamp off	±0.4 dB	±0.6 dB
	Input signal -40 dBm, Preamp on	±0.5 dB	±0.7 dB
RF input VSWR	10 dB attenuation, fc≥1 MHz		
	1 MHz~3.65 GHz	1.7 (nom.)	
	3.65 GHz~7.5 GHz	1.7 (nom.)	
	7.5 GHz~14 GHz	1.9 (nom.)	
	14 GHz~22.6 GHz	1.9 (nom.)	
	22.6 GHz~26.5 GHz	2.1 (nom.)	

Distortion and Spurious Responses			
Second harmonic distortion (SHI)	20℃~30℃, fc≥50 MHz, input signal -20 dBm, 0 dB attenuation, preamp off		
		SHA861A, SHA862A	SHA863A, SHA864A, SHA865A
	50 MHz~3.2 GHz	-65 dBc / +45 dBm (nom.)	-65 dBc / +45 dBm (nom.)
	3.2 GHz~3.75 GHz	-80 dBc / +60 dBm (nom.)	-65 dBc / +45 dBm (nom.)
	3.75 GHz~7 GHz		-65 dBc / +45 dBm (nom.)
	7 GHz~13.25 GHz		-65 dBc / +45 dBm (nom.)
Third-order intercept (TOI)	20℃~30℃, fc≥50 MHz,-20 dBm two tones spaced by 100 kHz, 0 dB attenuation, preamp off		
		SHA861A, SHA862A	SHA863A, SHA864A, SHA865A
		+9.5 dBm (typ.)	+11 dBm (typ.)
1 dB gain compression	20℃~30℃, fc≥50MHz, two tones frequency interval ≥10MHz, RBW<1kHz, 0 dB attenuation, preamp off		
	>8 dBm (nom.), SHA861A, SHA862A >5 dBm (nom.), SHA863A, SHA864A, SHA865A		
Residual response	20℃~30℃, input terminated to 50 Ω, 0 dB attenuation		
	<-90 dBm		
Input related spurious	20℃~30℃, mixer level = -30 dBm		
	<-65 dBc		

Source SHA860-SOR

Frequency		
Frequency Range	SHA861A	SHA862A
	100 kHz~3.6 GHz (30 kHz usable)	100 kHz~7.5 GHz (30 kHz usable)
	SHA863A	SHA864A
	100 kHz~14 GHz (30 kHz usable)	100 kHz~20 GHz (30 kHz usable)
	SHA865A	
	100 kHz~26.5 GHz (30 kHz usable)	
Frequency resolution	1 Hz	
Source Type	CW	

Power	
Output power level	-40 dBm ~ 0 dBm (typ.)
Output resolution	1 dB
Output flatness	±2 dB (nom.)
Normalization Trace	Ref A/B/C/D-> Ref trace

VSWR	< 2 (nom.), SHA861A, SHA862A < 2.2 (nom.), SHA863A, SHA864A, SHA865A
Connector	N-type female, 50Ω, SHA861A, SHA862A 2.92mm male, 50Ω, SHA863A, SHA864A, SHA865A
Average safe reverse power	27 dBm (0.5 W), SHA861A, SHA862A 20 dBm (0.1 W), SHA863A, SHA864A, SHA865A fc≥10 MHz, within 3min
Maximum safe reverse level	±50 V_{DC}

Advanced Measurement Kit SHA860-AMK

Power Measurement	
Channel Power(CHP)	Channel Power, Power Spectral Density
Adjacent Channel Power Ratio(ACPR)	Main channel Power, Left channel power, Right channel power
Occupied Bandwidth (OBW)	Occupied Bandwidth, Transmit Frequency Error
Time Domain Power (T-Power)	Zero Span Integrated Power
Carrier Noise Ratio (CNR)	Carrier Power, Noise Power

Non-Linear Measurement	
Third-Order Intercept	Measure the third-order products based on two tones
Harmonics	Max Harmonic number 10

Spectrum Monitor Measurement
Spectrogram

5G NR OTA Measurement (SHA860-NR)

General Measurement	
Frequency Setup	Center Frequency, Phase Compensation (Auto/Manual), SSB Offset, Band Configuration (Manual, Global All or selectable Band #), Absolute Radio Frequency Channel Number (ARFCN), Global Synchronization Raster Channel (GSCN)
Measurement Setup	Subcarrier Spacing(15 kHz, 30 kHz), SSB Case(Case A, Case B, Case C), Channel Bandwidth (5 MHz~30 MHz,in steps of 5 MHz； 30 MHz~100 MHz,in steps of10 MHz)
Auto SSB Detect	Searches 3GPP defined GSCN raster
Sweep	Single/Continuous
Amplitude	Attenuator (0 dB ~ 50 dB), Preamplifier (On/Off)

5G NR Single PCI	
Single-Beam Measurements	Synchronization and Demodulation Indication, Physical Cell ID (PCI), Sector ID, Cell Group, Frequency Error, Time Offset (μs), SS-RSRP (dBm), SS-RSRQ (dB), SS-SINR (dB), SS-RSSI (dB), Block Measurements (PSS, SSS, PBCH, PBCH-DMRS) Average EVM, Peak EVM (@subcarrier/symbol), Power (dBm)
Multi-Beam Measurements	Synchronization and Demodulation Indication, Physical Cell ID (PCI), Sector ID, Cell Group, Frequency Error, Time Offset (μs), Histogram of SS-RSRP, SS-RSRP (dBm), SS-RSRQ (dB), SS-SINR (dB), SS-RSSI (dB)
Views	Multi-Beam (up to 8), Single Beam
Cell ID Configuration	Auto/Manual (0~1008)
RSRP Accuracy	± 1.0 dB typica
Residual EVM (rms)	2.0% typica below 7.5G
Frequency Error	< ± 10 Hz + time base error, typical (FR1, Channel BW ≤ 50 MHz) < ± 20 Hz + time base error, typical (FR1, Channel BW > 50 MHz)

5G NR Multiple PCI	
Measurements	Multiple PCI, Beam Index, GSCN, SS-RSRP (dBm), SS-RSRQ (dB), SS-SINR (dB), SS-RSSI (dB), SS-EVM (%)， Time Offset (ms)
View	Multi PCI Beam Scanner (up to 64 beams), Table
Sort By	PCI, GSCN, RSRP, RSRQ, SINR, EVM, Time Offset
Sort Order	Ascending/Descending Order

5G NR Constellation	
PCI Summary	Synchronization and Demodulation Indication, Physical Cell ID (PCI), Sector ID, Cell Group, Frequency Error, Time Offset (μs),
Measurements	Diagram of Constellation, Beam ID, PBCH-DMRS Power, PSS Power, SSS Power, RMS EVM, Peak EVM
Configuration	Modulation (QPSK, BPSK, Auto Setting), Data Select (PBCH, DMRS, PSS, SSS, ALL), Reference Points (ON/OFF)

LTE OTA Measurement (SHA860-LTE)

General Measurement	
Channel Bandwidth	1.4, 3, 5, 10, 15, 20 MHz
Sweep	Single/Continuous
MIMO Antenna Setup	Antenna (Auto/0/1/2/3)

LTE Single PCI	
Measurement	Physical Cell ID, Sector ID, Cell Group, Frequency Error, Time Offset, Cyclic Prefix
Signal Power Measurements	Physical Broadcast Channel (PBCH), Sync Signal (PSS/SSS), Reference Signal (CRS)
Error Vector Magnitude Measurements	Physical Broadcast Channel EVM (PBCH), Sync Signal EVM (PSS/SSS), Reference Signal EVM (CRS)
Demodulation Summary View	PCI, Sector ID, Cell Group, Sync Status, Frequency Error, Time Offset, Power (PSS/SSS/CRS/PBCH), EVM (PSS/SSS/CRS/PBCH), Average EVM, Peak EVM
Time Alignment Error view	PCI, Sector ID, Cell Group, Frequency Error, Time Offset, Cyclic Prefix, Sync Status, TAE between Antennas, Power (PSS/SSS/CRS/PBCH), EVM (PSS/SSS/CRS/PBCH), Average EVM, Peak EVM
Configuration	Antenna(Auto/0/1/2/3), Cyclic Prefix(Auto/Normal/Extend), Duplex Type(FDD/TDD), UL/DL Config(TDD Only)

LTE Multiple PCI	
Measurement	Multiple Physical Cell IDs, PSS/SSS Signal Power, RSRP, RSRQ, SINR, EVM, Peak EVM, Frequency Error (Hz and PPM), Dominance (dB)
Graph Displays	PCI, SINR, RSRP, RSRQ, SSS Power, RMS EVM, Peak EVM, Frequency Error(HZ or PPM), Dominance (dB)
Configuration	Antenna(Auto/0/1/2/3), Cyclic Prefix(Auto/Normal/Extend), Duplex Type(FDD/TDD), UL/DL Config(TDD Only)

LTE Constellation	
Measurement	PCI, Sector ID, Cell Group, Frequency Error, Time Offset, Cyclic Prefix, Sync Status, Constellation (PBCH/CRS/PSS/SSS)
Power Measurement	CRS Power, PSS Power, SSS power, RMS EVM, Peak EVM
Configuration	Antenna(Auto/0/1/2/3), Cyclic Prefix(Auto/Normal/Extend), Duplex Type(FDD/TDD), UL/DL Config(TDD Only), Data Select (PBCH/CRS/PSS/SSS), Modulation (QPSK), Reference (On/Off)

Outdoor/Indoor Map (SHA860-MAP)

General Measurement	
Type	Indoor Map: PNG, JPEG
	Outdoor Map: Google Tile (Download from EasyMap)
Layer	Indoor Map: None
	Outdoor Map: Tile layer 1-19
Data	Indoor Map: kdata recorder and playback
	Outdoor Map: kml recorder and playback

GPSA Measurement
Channel Power

5G NR Measurement	
PCI Summary	PCI, Sector, Group
	Frequency error: Hz, ppm
	Time offset: ms
RSRP	dBm
RSRQ	dB
SINR	dB
Channel Summary	PBCH、PBCH-DMRS、PSS、SSS
	EVM, Peak EVM
	Subcarrier and symbol
	Power: dBm

Real-Time Spectrum Analysis (SHA860-RTA)

Frequency and Time			
Real-Time Analysis Bandwidth	40 MHz		
	110 MHz (Option SHA860-B1A)		
100% POI Minimum Signal Duration	Full Span, Kaiser Window, Frequency Mask Triggering at full amplitude accuracy		
	3.51 µs		
Display mode and Acquisition time	Density on	30 ms~40 s	
	Density off	100 µs~40 s	
Minimum Analysis Bandwidth	500 Hz		
Maximum Sample rate	140.98 MHz		
FFT per second	300 000 (110 MHz analysis bandwidth)		
Marker number	8		
Window function	Kaiser (Default) 、Hanning、Flattop、Gaussian、Blackman-Harris、Rectangular		
Resolution Bandwidth (RBW)	Six RBWs are available for every window function (only one for Rectangular) at any span. Default is min RBW. Some typical cases are listed as below when we choose Kaiser.		
	Span	Min RBW	Max RBW
	110 MHz	276.88 kHz	9.1369 MHz
	40 MHz	100.68 kHz	3.3225 MHz
	20 MHz	50.34 kHz	1.6612 MHz
	10 MHz	25.17 kHz	830.62 kHz
	1 MHz	2.52 kHz	83.06 kHz
	100 kHz	251.71 Hz	8.31 kHz
Spectrogram / PvT Maximum stored	125 000 (Loop store)		

Amplitude and Dynamic Range		
Trace number	3	
Detector type	+Peak、-Peak、Sample、Average	
Spectrum Density Display	0~100% (resolution 0.1%)	
Dynamic range for Spectrogram	200 dB	
Amplitude	Flatness	< 1.0 dB (nom.)
	Resolution	0.01 dB
	SFDR	> 60 dB, (typ.)
Trigger	Free Run、PvT、External	
Frequency Mask Trigger (FMT)	Source	Traces
	Type	Greater Than、Less Than、Outside Mask、Inside Mask
	Actions	Stop、Beep
Colour Mode	Warm (Default), Cold, Gray	

100% POI Minimum Signal Duration (μs) at Different RBW and Span						
Span	RBW1	RBW2	RBW3	RBW4	RBW5	RBW6
110 MHz	10.54	6.91	5.10	4.19	3.74	3.51
40 MHz	23.26	13.27	8.28	5.78	4.53	3.91
20 MHz	43.23	23.26	13.27	8.28	5.78	4.53
10 MHz	83.18	43.23	23.26	13.27	8.28	5.78
1 MHz	803.28	403.78	203.03	103.16	53.22	28.25

RBW factor at different window function and its length						
Type\Length	1024	512	256	128	64	32
Kaiser (Beta=12)	397.2904	198.4511	99.0314	49.3216	24.4666	12.0391
Hann	532.1465	265.8132	132.6465	66.0632	32.7715	16.1257
Flattop	211.7147	105.7535	52.7729	26.2825	13.0374	6.4148
Gaussian (alpha=3.5)	403.8598	201.7349	100.6724	50.1411	24.8753	12.2422
Blackman-Harris	398.2432	198.9270	99.2689	49.4399	24.5254	12.0681
Rectangular	799	399.5	199.75	99.875	49.9375	24.9688

Pulse Profile Analysis (SHA860-PU)

Measurement	
Points	201~10001, default is 1001
Trace Function	Clear/Write, Max Hold, Min Hold, Average
Trace Number	6
Detector type	Positive Peak, Negative Peak, Sample, Average, Normal
Power Measurement	Trace Average (average of all the points in the trace), Peak Power, Wave Average (average of all the points within all complete periods in the trace), Trace Average-Wave Average, Pulse Average
Pulse Characteristic	Pulse Duration, Pulse Center, Pulse Period, Pulse Off Time (Positive Pulse Only), Duty Factor, Rise Time, Fall Time, Pre-Trans-Overshoot, Pre-Trans-Undershoot, Post-Trans-Overshoot, Post-Trans-Undershoot

IQ Data Acquisition (SHA860-IQA)

Measurement	
Sweep Mode	Single、Continuous
Acquisition Setup	Acq Time、Sample Rate、Save(.txt)、Storage Device (Internal/USB)
Max Sample Rate	300 MHz
Max Signal BW	110 MHz
Bit Resolution	16-bit
Data Sample Size	I=Q=2 Byte
Storage Depth	1 GB
Max Sample Length	250 MB (1GB/4Byte)
Sample Time Length	Sample Length / Sample Rate

Analog Modulation Analysis (SHA860-AMA)

General		
Carrier Frequency Range	SHA861A	SHA862A
	2 MHz~3.6 GHz	2 MHz~7.5 GHz
	SHA863A	SHA864A
	2 MHz~14 GHz	2 MHz~20 GHz
	SHA865A	
	2 MHz~26.5 GHz	
Carrier Power Accuracy	±2 dB (nom.)	
Carrier Power Range	-30 dBm ~ +20 dBm (nom.)	

AM (Amplitude Modulation)		
Modulation Rate	20 Hz~100 kHz	
Accuracy	1 Hz (nom.)	Modulation rate < 1 kHz
	< 0.1% modulation rate (nom.)	Modulation rate ≥ 1 kHz
Modulation Depth	5%~95%	
Accuracy	±4% (nom.)	

FM (Frequency Modulation)		
Modulation Rate	20 Hz~100 kHz	
Accuracy	1 Hz (nom.)	Modulation rate < 1 kHz
	< 0.1% modulation rate (nom.)	Modulation rate ≥ 1 kHz
Frequency Deviation	1 kHz~400 kHz	
Accuracy	±4% (nom.)	

PM (Phase Modulation)		
Modulation Rate	50 Hz~50 kHz	
Accuracy	1 Hz (nom.)	Modulation rate < 1 kHz
	< 0.1% modulation rate (nom.)	Modulation rate ≥ 1 kHz
Phase Deviation	0.2~100 rad	
Accuracy	±4% (nom.)	

Digital Modulation Analysis (SHA860-DMA)

General		
Carrier Frequency Range	SHA861A	SHA862A
	2 MHz~3.6 GHz	2 MHz~7.5 GHz
	SHA863A	SHA864A
	2 MHz~14 GHz	2 MHz~20 GHz
	SHA865A	
	2 MHz~26.5 GHz	
Carrier Power Accuracy	±2 dB (nom.)	
Carrier Power Range	-30 dBm ~ +20 dBm (nom.)	

Measurement	
Modulation Type	ASK: 2ASK, FSK: 2FSK, 4FSK, 8FSK, 16FSK, MSK: GMSK, PSK: BPSK, QPSK, OQPSK, 8PSK, APSK: 16APSK, 32APSK, DPSK: DBPSK, DQPSK, D8PSK, $\pi/4$ -DQPSK, $\pi/8$ -D8PSK, QAM: 16, 32, 64, 128, 256
Meas Length	16 to 4096
Points/Symbol	4, 6, 8, 10, 12, 14, 16
Trigger Holdoff	500 ms
Burst and Search	Burst power sync, Symbol lookup, BERT

Filter	
Filter Type	Nyquist, Squrt Nyquist, Gauss, Half Sine, Rectang
Filter Length	2 to 128
Alpha/BT	Alpha 0.01~1, BT 0.01~10

Display	
Trace Data	IQ Meas Time, IQ Meas Spectrum, IQ Ref Time, IQ Ref Spectrum, Symbol Error Chart, Err Vector Time, Err Vector Spectrum, Time, Spectrum, IQ Mag Err, IQ Phase Err
Trace Formats	Log mag, Lin mag, Real, Imag, I-Q, Constellation, I-eye, Q-eye, Wrap Phase, Unwrap Phase, Trellis eye

Symbol Error Chart	
PSK/DPSK/MSK/QAM	EVM (rms EVM, peak EVM), Magnitude error, Phase error, IQ offset, Carrier offset, SNR Quadrature error, Gain imbalance (not support for MSK)
ASK	ASK Error, ASK depth, carrier offset
FSK	FSK Error, Magnitude error, FSK deviation, carrier offset

EMI Measurement (SHA860-EMI)

Measurement	
View	Frequency scan, Meter, Signal list
Pre-compliance Sequence	Scan, Search, Meas
EMI filter RBW (-6dB)	200 Hz, 9 kHz, 120 kHz, 1 MHz
RBW Uncertainty	< 5% (nom.)
Detector	Peak, Average, RMS, Quasi-peak (following CISPR 16-1-1)
Dwell Time	0 us ~ 10 s
RBW/Steps	0.1, 0.3, 0.5, 1, 2, 3
Corrections	4
Trace and Limit	3
Limit Standards	EN550xx, GB9254, FCC Part15, User defined
Attenuator	0 ~ 50 dB
Output Report	Signal List
Frequency scale	Linear, Logarithmic

Power Meter Measurement (SHA860-PM)

Measurement	
Function	External USB Power Sensor
Setup Parameters	Frequency
Supported Power Sensors	Keysight
	U2000, U2020X, U2040X, U2050X, U2060X, U8480
	N1911/1912A N1913/1914 A/B
	Rohde & Schwarz
	R&S®NRPxxS/SN/SN-V
	R&S®NRPxxP
	R&S®NRPxxA/AN
	R&S®NRPxxT/TN/TWG/TWGN
	R&S®NRQ6
	R&S®NRPxE

Cable and Antenna Test (SHA860-CAT)

General		
Frequency Range	SHA861A	SHA862A
	100 kHz~3.6 GHz (30 kHz usable)	100 kHz~7.5 GHz (30 kHz usable)
	SHA863A	SHA864A
	100 kHz~14 GHz (30 kHz usable)	100 kHz~20 GHz (30 kHz usable)
	SHA865A	
	100 kHz~26.5 GHz (30 kHz usable)	
Sweep Points	101~10001, default is 1001	
Port1 Stimulus Power	-40 dBm ~ 0 dBm (nom.)	
Max Distance (meters)	(Sweep Points - 1) x Velocity Factor x Light of Speed (m/s) / (2* (Stop Frequency - Start Frequency (Hz)))	
Min Distance Resolution (meters)	Maximum Distance / Sweep Points	
Calibration	Open Response, Short Response, Response Through, Full 1-Port (OSL)	
Velocity Factor	0.1~1	
Cable Loss	-10 dB/m ~ 100 dB/m	

Measurement	
Trace	Mem, Math, Hold, Overlay
Type	DTF, Return Loss, VSWR, Cable Loss(1-Port), Insertion Loss(2-Port), TDR, DTF & TDR, DTF & Return Loss, TDR & Return Loss
Distance to Fault (DTF)	Locate problems or faults in a length of cable or transmission line
	Format: Log Mag(dB), VSWR, Lin Mag Distance Unit: Meters, Feet Window Type: Rectangular, Hamming
Time Domain Reflectometry (TDR)	Locate problems and identify the type of problem in a length of cable or transmission line
	Format: Impedance(ohm), linear rho Distance Unit: as DTF Stimulus Type: Impulse, Step Frequency Type: Low-pass Window Type: Kaiser Kaiser β: 0~13 Time Gate Type: Band Pass, Notch Time Gate Shape: Normal, Maximum, Wide, Minimum Time Gate Range: Start Distance ~ Stop Distance
Cable Loss(1-Port)	Measure the accumulated losses throughout the length of the cable
Insertion Loss(2-Port)	Measure the loss through a DUT or cable over a specified frequency range

Vector Network Analyzer (SHA860-VNA)

Stimulus and Measurement		
Frequency Range	SHA861A	SHA862A
	100 kHz~3.6 GHz (30 kHz usable)	100 kHz~7.5 GHz (30 kHz usable)
	SHA863A	SHA864A
	100 kHz~14 GHz (30 kHz usable)	100 kHz~20 GHz (30 kHz usable)
	SHA865A	
	100 kHz~26.5 GHz (30 kHz usable)	
Measurement Parameter	S11, S21	
IFBW	100 Hz, 300 Hz, 1 kHz, 3 kHz, 10 kHz	
Port1 Stimulus Power	-40 dBm ~ 0 dBm (nom.)	
Format	Lin Mag, Log Mag, Phase, Group Delay, SWR Smith Chart (Lin/Phase, Log/Phase, Real/Imag, R+j*X, G+j*B), Polar Chart (Lin/Phase, Log/Phase, Real/Imag)	
Sweep Points	101~10001, default is 1001	
Trace	4 traces, Mem, Math, Hold, Overlay	
Marker	(6+Ref)* 4 traces	

Calibration	
Calibration Type	Short Response
	Open Response
	Full 1-Port (OSL)
	Through Response
	Enhanced Response
Port Extensions	Port 1, Port 2, Auto Open Port 1
System Impedance (Default)	50 Ω
Velocity Factor	0.1~1

Directivity	
Directivity after Calibration	F504MS, Log mag, Average=100, >50MHz
	> 40 dB (nom.)
	F606MS, Log mag, Average=100, >50MHz
	>40 dB (nom.) <7.5 GHz >30 dB (nom.) 7.5 GHz~14 GHz >20 dB (nom.) 14 GHz~26.5 GHz

Dynamic Range			
Dynamic Range	S21, IFBW=10 kHz, Port1 level=0 dBm, Log Mag, Average=100		
		SHA861A	SHA862A
	100 kHz~1 MHz	100 dB, 108 dB (typ.)	100 dB, 108 dB (typ.)
	1 MHz~1.5 GHz	108 dB, 114 dB (typ.)	108 dB, 114 dB (typ.)
	1.5 GHz~3.6 GHz	106 dB, 112 dB (typ.)	106 dB, 112 dB (typ.)
	3.6 GHz~6.5 GHz		102 dB, 109 dB (typ.)
	6.5 GHz~7.5 GHz		100 dB, 107 dB (typ.)
		SHA863A	SHA864A
	100 kHz~1 MHz	100 dB, 108 dB (typ.)	100 dB, 108 dB (typ.)
	1 MHz~1.5 GHz	108 dB, 114 dB (typ.)	108 dB, 114 dB (typ.)
	1.5 GHz~3.6 GHz	106 dB, 112 dB (typ.)	106 dB, 112 dB (typ.)
	3.6 GHz~5.85 GHz	102 dB, 109 dB (typ.)	102 dB, 109 dB (typ.)
	5.85 GHz~7.5 GHz	98 dB, 104 dB (typ.)	98 dB, 104 dB (typ.)
	7.5 GHz~14 GHz	98 dB, 104 dB (typ.)	98 dB, 104 dB (typ.)
	14 GHz~20 GHz		98 dB, 104 dB (typ.)
		SHA865A	
	100 kHz~1 MHz	100 dB, 108 dB (typ.)	
	1 MHz~1.5 GHz	108 dB, 114 dB (typ.)	
	1.5 GHz~3.6 GHz	106 dB, 112 dB (typ.)	
	3.6 GHz~5.85 GHz	102 dB, 109 dB (typ.)	
	5.85 GHz~7.5 GHz	98 dB, 104 dB (typ.)	
	7.5 GHz~14 GHz	98 dB, 104 dB (typ.)	
	14 GHz~22.6 GHz	98 dB, 104 dB (typ.)	
	22.6 GHz~26.5 GHz	90 dB (nom.)	

Reflection trace noise			
Reflection Trace noise (IFBW=10 kHz, max output power)	Frequency	Amplitude (dB rms)	Phase (deg rms)
	SHA861A, SHA862A		
	100 kHz~3.5 GHz	0.02 (nom.)	0.3 (nom.)
	3.5 GHz~7.5 GHz	0.03 (nom.)	0.5 (nom.)
	SHA863A, SHA864A, SHA865A		
	100 kHz~3.5 GHz	0.02 (nom.)	0.3 (nom.)
	3.5 GHz~7.5 GHz	0.03 (nom.)	0.5 (nom.)
	7.5 GHz~14 GHz	0.07 (nom.)	0.8 (nom.)
	14 GHz~22.6 GHz	0.15 (nom.)	1.6 (nom.)
	22.6 GHz~26.5 GHz	0.25 (nom.)	1.8 (nom.)

Transmission trace Noise			
Transmission Trace Noise (IFBW=10 kHz, max output power)	Frequency	Amplitude (dB rms)	Phase (deg rms)
	SHA861A, SHA862A		
	100 kHz~3.5 GHz	0.015 (nom.)	0.18 (nom.)
	3.5 GHz~7.5 GHz	0.015 (nom.)	0.4 (nom.)
	SHA863A, SHA864A, SHA865A		
	100 kHz~3.5 GHz	0.015 (nom.)	0.18 (nom.)
	3.5 GHz~7.5 GHz	0.015 (nom.)	0.4 (nom.)
	7.5 GHz~14 GHz	0.015 (nom.)	0.6 (nom.)
	14 GHz~22.6 GHz	0.015 (nom.)	0.8 (nom.)
	22.6 GHz~26.5 GHz	0.015 (nom.)	1.0 (nom.)

Inputs and Outputs

Front Panel	
RF input, Port 2	N-type female, 50 Ω, SHA861A, SHA862A 2.92mm male, 50 Ω, SHA863A, SHA864A, SHA865A
Source, Port 1	N-type female, 50 Ω, SHA861A, SHA862A 2.92mm male, 50 Ω, SHA863A, SHA864A, SHA865A
USB Host	USB-A 2.0
Ear Phone Jack	3.5 mm
USB Device	USB-C 2.0
LAN	LAN (VXI-11), 10/100 Base, RJ-45
GPS Receiver (SHA860-GPS)	SMA(F), 50 Ω, 3.3 V, Location, Sync, Timing
Bias Out (SHA860-BIAS)	SMB(F), 12 V-32 V, 0.1 V step
External Trigger Input	BNC-type female, 1 kΩ, 5V TTL
10 M Reference Input	BNC-type female, 50 Ω, 10 MHz, -5 dBm~+10 dBm (nom.)

Remote Control	
Communication Interface	LAN, USB-TMC, GPIB (SIGLENT USB-GPIB adaptor)
Remote Control Capability	SCPI / Labview / IVI based on USB-TMC / VXI-11 / GPIB / Socket / Telnet NI-MAX Web Browser (HTML 5 Supported)

General Specification

Structure	
Dimensions	310 mm x 215 mm x 78.5 mm (W×H×D)
Weight	Net: 3.20 kg (7.0 lb), SHA861A, SHA862A Net: 3.50 kg (7.7 lb), SHA863A, SHA864A, SHA865A
Display	TFT LCD, 800x600, 8.4 inch multi-touch screen
Storage	Internal (Flash) 3.2 GByte, external (USB storage device) 32 GByte

Working Environment	
Source	AC voltage range: 100 V~240 V, 50/60 Hz； 100~120 V, 400 Hz
Power consumption	25 W (typ.), SHA861A, SHA862A 30 W (typ.), SHA863A, SHA864A, SHA865A
Temperature	Operating temperature: 0℃~50℃, Operating temperature while charging: 0℃~40℃, Storage temperature: -20℃~70℃
Humidity	0℃~30℃, ≤95% Relative humidity 30℃~50℃, ≤75% Relative humidity
Altitude	less than 3 km (10000 feet)

Electromagnetic Compatibility	
EN 61326-1: 2013 / EN 61000-3-2: 2014	Class A
EN 61000-3-3: 2013	Plt : 0.65 Pst : 1.00, dmax : 4.00 %, dc : 3.00 %, dtLim: 3.30 % dt>Lim: 500ms

Safety
CAN/CSA-C22.2 No. 61010-1:2012/A1:2018-11
CAN/CSA-C22.2 No. 61010-2-030:2018
UL 61010-1:2012/R:2018-11
UL 61010-2-030:2018

RoHS
2011/65/EU

Ordering Information

Product	Description	Order Number
Product Code	Spectrum Analyzer 9 kHz~3.6 GHz, BW 40 MHz	SHA861A
	Spectrum Analyzer 9 kHz~7.5 GHz, BW 40 MHz	SHA862A
	Spectrum Analyzer 9 kHz~14 GHz, BW 40 MHz	SHA863A
	Spectrum Analyzer 9 kHz~20 GHz, BW 40 MHz	SHA864A
	Spectrum Analyzer 9 kHz~26.5 GHz, BW 40 MHz	SHA865A
Standard Accessories	Quick Start, AC-DC adapter, Rechargeable lithium battery, Power cord, Portable bag	
Options	SHA861A upgrade to SHA862A	SHA860-F2
	SHA863A upgrade to SHA864A	SHA860-F4
	SHA864A upgrade to SHA865A	SHA860-F5
	Analysis Bandwidth 110MHz	SHA860-B1A
	Real-Time Spectrum Analysis	SHA860-RTA
	IQ Data Acquisition	SHA860-IQA
	5G NR OTA Measurement	SHA860-NR
	LTE TDD/FDD OTA Measurement	SHA860-LTE
	Advanced Measurement Kit	SHA860-AMK
	EMI Measurement	SHA860-EMI
	Pulse Profile Analysis	SHA860-PU
	Power Meter	SHA860-PM
	Analog Modulation Analysis	SHA860-AMA
	Digital Modulation Analysis	SHA860-DMA
	Source	SHA860-SOR
	Cable and Antenna Test	SHA860-CAT
	Vector Network Analysis	SHA860-VNA
	Bias Out	SHA860-BIAS
	GPS Receiver	SHA860-GPS
	Outdoor/Indoor Map	SHA860-MAP
	Outdoor/Indoor Map Tile Download PC Software	EasyMap
General Accessories	Rechargeable lithium battery, 10.8 V, 74 Wh	10V8_BAT
	AC-DC adapter, 12 V, 4 A	12V_AP_4A
	Portable bag	BAG-H2
	Near field probe kit: 300 kHz~3 GHz Three H-field probes (20 mm, 10 mm, 5 mm), One E-field probe (5 mm)	SRF5030T
	Directional Antenna Suit: SHA861A, SHA862A Three Directional Antennas (10 MHz~200 MHz, 200 MHz~500 MHz, 500 MHz~8 GHz), Handler with preamplifier (10 dB, 9 kHz~8 GHz)	ANT-DA1

	Directional Antenna Suit: SHA863A, SHA864A, SHA865A One Directional Antennas (8 GHz~26.5 GHz), Handler with preamplifier (10 dB, 8 GHz~26.5 GHz)	ANT-DA2
	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
	GPS antenna, SMA(M), 1000 mm	ANT-GPS1
	2.92mm(F)-2.92mm(F) coaxial connector, DC~40 GHz	2.92F-2.92F-40A
	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
	SMA(M)-SMA(M) cable, DC~26.5 GHz, 1000 mm	SMA-SMA-26L
	SMA(F)-SMA(M) cable, DC~26.5 GHz, 1000 mm	SMAF-SMA-26L
CAT&VNA Accessories	Integrated N type Calibration Kit, Male, DC~9 GHz,50 Ω	Y504MS
	Integrated N type Calibration Kit, Female, DC~9 GHz,50 Ω	Y504FS
	Integrated 3.5mm type Calibration Kit, Male, DC~26.5 GHz, 50 Ω	Y606MS
	Integrated 3.5mm type Calibration Kit, Female, DC~26.5 GHz, 50 Ω	Y606FS
	N type Standard Calibration Kit, Male & Female, DC~9 GHz, 50 Ω	F504TS
	3.5mm type Standard Calibration Kit, Male & Female, DC~9 GHz, 50 Ω	F604TS
	N type Economic Calibration Kit, Male, DC~4.5 GHz, 50 Ω	F503ME
	N type Economic Calibration Kit, Female, DC~4.5 GHz, 50 Ω	F503FE
	3.5mm type Economic Calibration Kit, Male, DC~4.5 GHz, 50 Ω	F603ME
	3.5mm type Economic Calibration Kit, Female, DC~4.5 GHz, 50 Ω	F603FE
	N type Standard Calibration Kit, Male, DC~9 GHz, 50 Ω	F504MS
	N type Standard Calibration Kit, Female, DC~9 GHz, 50 Ω	F504FS
	3.5mm type Standard Calibration Kit, Male, DC~9 GHz, 50 Ω	F604MS
	3.5mm type Standard Calibration Kit, Female, DC~9 GHz, 50 Ω	F604FS
	3.5mm type Standard Calibration Kit, Male, DC~26.5GHz, 50 Ω	F606MS
	3.5mm type Standard Calibration Kit, Female, DC~26.5GHz, 50 Ω	F606FS

About SIGLENT

SIGLENT is an international high-tech company, concentrating on R&D, sales, production and services of electronic test & measurement instruments.

SIGLENT first began developing digital oscilloscopes independently in 2002. After more than a decade of continuous development, SIGLENT has extended its product line to include digital oscilloscopes, isolated handheld oscilloscopes, spectrum analyzers, function/arbitrary waveform generators, RF/MW signal generators, vector network analyzers, digital multimeters, DC power supplies, electronic loads and other general purpose test instrumentation. Since its first oscilloscope was launched in 2005, SIGLENT has become the fastest growing manufacturer of digital oscilloscopes. We firmly believe that today SIGLENT is the best value in electronic test & measurement.

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