

YSA-P045

Handheld Real-Time Spectrum Analyzer | 9 kHz to 4.5 GHz

At a Glance

The YSA-P045 is a handheld real-time spectrum analyzer covering 9 kHz to 4.5 GHz. Its superheterodyne receiver uses up to 14 preselector filter bands and includes a full-band preamplifier. A 10.1-inch multi-touch display and 1.5 kg design support laboratory and field operation. Analysis bandwidth is 50 MHz as standard, with a 100 MHz hardware option. SASTudio4 provides spectrum analysis, IQ streaming, power detection and phase-noise measurements.



Key Features

Parameter / condition	YSA-P045
Frequency range	9 kHz to 4.5 GHz
Receiver architecture	High-performance superheterodyne; up to 14 preselector filter bands
Full-band preamplifier	Standard
1 GHz DANL	-168 dBm/Hz
1 GHz SSB phase noise, 10 kHz offset	< -110 dBc/Hz
1 GHz phase-noise measurement, 10 kHz offset	< -124 dBc/Hz
Analysis bandwidth	50 MHz standard; 100 MHz with Option 50
Sweep speed	Up to 1 THz/s at RBW = 250 kHz
Image rejection and IF rejection	> 90 dBc; > 95 dBc (typ.)
GNSS	Integrated; frequency calibration via GNSS
Remote control	SCPI protocol supported
Battery life	Up to 2.5 hours
Display	10.1-inch multi-touch screen
Weight	1.5 kg

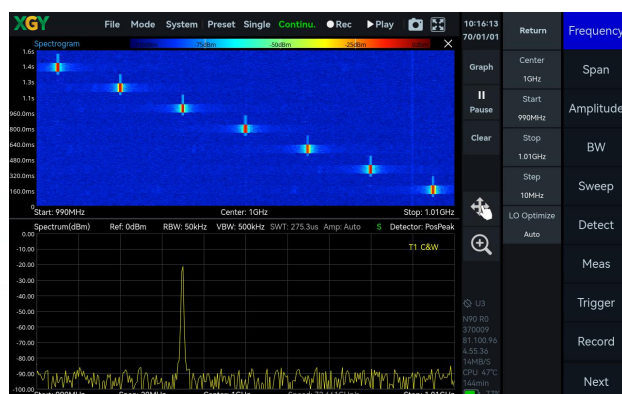
Integrated Measurement Suite

Channel Power, Occupied Bandwidth (OBW) and X dB Bandwidth are included as standard. Harmonic Analysis, AM/FM Demodulation and automated Phase Noise measurements are fully integrated for signal characterization.

SASudio4 operating modes include Standard Spectrum Analysis, IQ Streaming, Power Detection Analysis, Real-Time Spectrum Analysis, Phase Noise Measurement, Harmonic and Mapping. Basic Vector Modulation Analysis (Option 71), Pulse Analysis (Option 72) and EMI Pre-Compliance Measurement (Option 74) are optional.

Standard Spectrum Analysis

Provides spectrum sweep, channel power, OBW, ACPR, IM3 and SEM. Spectrum recording and playback are supported, together with signal tracking, a peak table and amplitude correction.



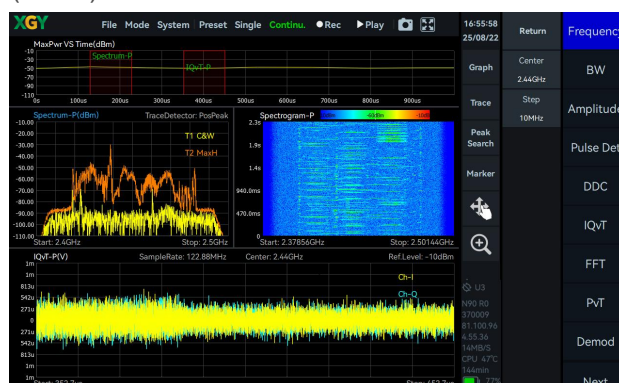
Power Detection Analysis

Detects and analyzes time-domain signals within the analysis bandwidth for in-band power-versus-time relationships, including pulse signal measurements.



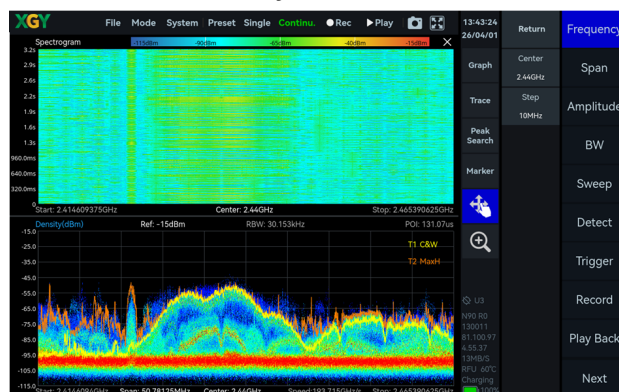
IQ Streaming

Supports 50 MHz analysis bandwidth, or 100 MHz with Option 50, with IQ acquisition through multiple trigger methods. Displays IQ time-domain waveforms, spectrum and spectrogram views, with AM/FM demodulation and digital down conversion (DDC).



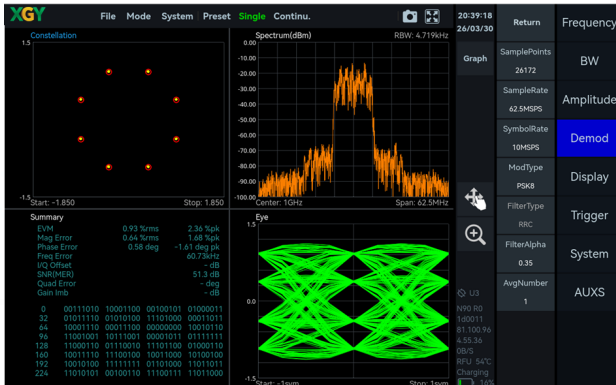
Real-Time Spectrum Analysis

A high-speed FPGA-based FFT engine provides strictly gapless and overlap-free FFT processing for real-time monitoring across the full analysis bandwidth.



Basic Vector Modulation Analysis (Option 71)

Supports 2ASK, 2FSK, 4FSK, GMSK, BPSK, QPSK, 8PSK, 16QAM, 64QAM, 128QAM and 256QAM signals. Additional modulation and rate details are listed in the specification tables.



Phase Noise Measurement

Supports frequency offsets from 1 Hz to 10 MHz for carrier phase-stability evaluation. Automatic carrier search locates the target carrier without manual adjustment.



Harmonic Analysis

Detects and measures up to 10 harmonic components, including harmonic peaks, harmonic channel power and total harmonic distortion.



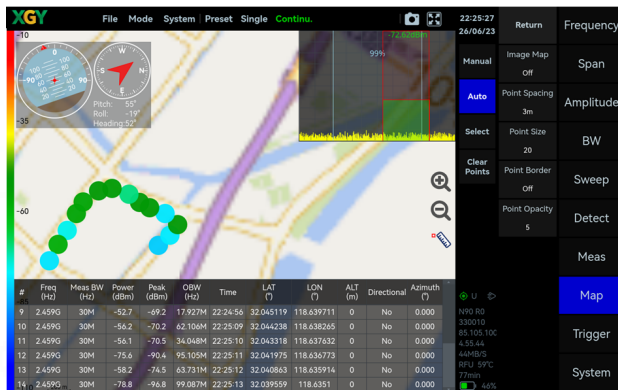
Pulse Analysis (Option 72)

Measures pulse widths from 64 ns at standard bandwidth, or from 32 ns with Option 50. Displays Top Level, Base Level, Top/Base, Droop, OverShoot, Ripple, Rise/Fall Time, Rise/Fall Edge, Width, PRI and Duty Cycle.



Mapping

Integrates GPS positioning data into heat maps and other visual charts, showing Channel Power, Occupied BW, Time, latitude/longitude, Altitude, Pixel Position and Azimuth within an area. Supports radio monitoring and interference analysis workflows.



EMI Pre-Compliance Measurement (Option 74)

Provides CISPR 16-1-1 compliant EMI measurement capabilities. Supports 6 dB EMI filters of 200 Hz, 9 kHz, 120 kHz and 1 MHz; Peak, Quasi-Peak, Average and RMS detectors; limit-line comparison, signal-list analysis and test-report export for radiated and conducted pre-compliance measurements.



Main Functions

Channel Power



Occupied Bandwidth (OBW)



Adjacent Channel Power Ratio (ACPR)



IM3



SEM



AM Demodulation



FM Demodulation



Multiple Unit Display



Antenna Factor



Amplitude Offset



Signal Track



Peak Table



Data Record and Playback



Tracking Generator (Option 60)



Frequency

Parameter / condition	YSA-P045
Frequency range	9 kHz to 4.5 GHz
Reference clock	Internal or external; manual correction of GNSS calibration available
Frequency accuracy	≤ 0.5 ppm; manual correction available
Aging stability	≤ 1 ppm/year
Temperature stability	≤ 1 ppm
Built-in GNSS 1PPS accuracy	± 100 ns

SSB Phase Noise

Parameter / condition	YSA-P045
Carrier 1 GHz — guaranteed / typical	
100 Hz offset	-85 / -88 dBc/Hz
1 kHz offset	-97 / -99 dBc/Hz
10 kHz offset	-110 / -112 dBc/Hz
100 kHz offset	-114 / -115 dBc/Hz
1 MHz offset	-131 / -132 dBc/Hz
Carrier 4.5 GHz — guaranteed / typical	
100 Hz offset	-78 / -81 dBc/Hz
1 kHz offset	-90 / -93 dBc/Hz
10 kHz offset	-103 / -106 dBc/Hz
100 kHz offset	-104 / -107 dBc/Hz
1 MHz offset	-119 / -122 dBc/Hz

Residual Response

Parameter / condition	YSA-P045
Reference level 0 dBm; RBW = 1 kHz; guaranteed / typical	
9 kHz to 100 MHz	-90 / -94 dBm
100 MHz to 4.5 GHz	-90 / -95 dBm
Reference level -50 dBm; RBW = 1 kHz; guaranteed / typical	
9 kHz to 100 MHz	-115 / -117 dBm
100 MHz to 4.5 GHz	-120 / -128 dBm

Rejection and Spurious Response

Parameter / condition	YSA-P045
Image rejection	> 90 dBc; > 95 dBc (typ.)
IF rejection	> 90 dBc; > 95 dBc (typ.)
Local-oscillator-related spurious	< -65 dBc; center frequency $\pm (N/M) \times 125$ MHz, N, M = 1, 2, 3, 4, 5...

IIP3 / IIP2

Parameter / condition	YSA-P045
Reference level 20 dBm; values are IIP3 / IIP2	
Carrier 1 GHz	42 / 80 dBm
Carrier 4.5 GHz	37 / 80 dBm
Reference level 0 dBm; values are IIP3 / IIP2	
Carrier 1 GHz	23 / 80 dBm
Carrier 4.5 GHz	22 / 80 dBm
Reference level -20 dBm; values are IIP3 / IIP2	
Carrier 1 GHz	3 / 60 dBm
Carrier 4.5 GHz	3 / 45 dBm

Amplitude

Parameter / condition	YSA-P045
Maximum input power (CW), 50 MHz to maximum frequency; preamplifier off	23 dBm
Maximum input power (CW), 9 kHz to 50 MHz or preamplifier on	10 dBm
Maximum DC voltage	± 10 VDC
Display range	DANL to 30 dBm
Amplitude accuracy, 20 °C to 30 °C; typical conditions	± 1.0 dB
Amplitude accuracy, full temperature range and all conditions	± 1.5 dB
IF in-band flatness, 50 MHz analysis bandwidth	< ± 1.5 dB
IF in-band flatness, 100 MHz analysis bandwidth	< ± 2.0 dB
Reference level	-70 dBm to +23 dBm
RF preamplifiers	Auto or manual
VSWR, 90 MHz to maximum frequency	< 2.0:1 nominal

Displayed Average Noise Level (DANL)

Parameter / condition	YSA-P045
Reference level -20 dBm; RBW = 1 kHz; guaranteed / typical	
9 kHz to 1 MHz	-131 / -134 dBm/Hz
1 MHz to 100 MHz	-151 / -154 dBm/Hz
100 MHz to 3.0 GHz	-141 / -144 dBm/Hz
3.0 GHz to 4.5 GHz	-142 / -145 dBm/Hz
Reference level -70 dBm; RBW = 1 kHz; guaranteed / typical	
9 kHz to 1 MHz	-141 / -144 dBm/Hz
1 MHz to 100 MHz	-163 / -166 dBm/Hz
100 MHz to 3.0 GHz	-165 / -168 dBm/Hz
3.0 GHz to 4.5 GHz	-165 / -168 dBm/Hz

Standard Spectrum Analysis

Parameter / condition	YSA-P045
Detectors	PosPeak, NegPeak, Sample, Average, RMS, RawFrames, MaxPower
RBW	0.1 Hz to 10 MHz
VBW	0.1 Hz to 10 MHz
Data charts	SASudio4 spectrum, spectrogram and historical trace
Measurements	Channel power, OBW, X dB bandwidth, adjacent channel power ratio, IM3

Sweep Speed

Spur Rejection = Bypass.

Parameter / condition	YSA-P045
RBW = 250 kHz; FPGA processing; B-Nuttall	≥ 1 THz/s
RBW = 25 kHz; FPGA processing; Kaiser	≥ 290 GHz/s
RBW = 1 kHz; CPU processing; B-Nuttall	≥ 2 GHz/s

IQ Recording

Parameter / condition	YSA-P045
Continuous recording bandwidth	Maximum 12.5 MHz
Burst recording bandwidth	Maximum 50 MHz standard; 100 MHz with Option 50
Built-in memory depth	128 Mbytes
IQ sample rate	Maximum 62.5 MSPS standard; 125 MSPS with Option 50
Decimation factors	1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024, 2048
External trigger response	Maximum frequency response: 500 times/s

Detection Analysis

Parameter / condition	YSA-P045
Minimum time resolution	16 ns standard; 8 ns with Option 50
Maximum analysis bandwidth	50 MHz standard; 100 MHz with Option 50
Detectors	PosPeak, NegPeak, Sample, Average, RMS, MaxPower

Real-Time Spectrum Analysis

Parameter / condition	YSA-P045
FFT implementation	FPGA FFT engine; frame compression and trace detection supported; no missing samples between FFT frames
FFT frame update-rate formula	$10^9 \text{ ns} / (N \times D \times \text{minimum time resolution})$
POI formula	$2 \times N \times D \times \text{minimum time resolution}$
FFT points, N	4096, 2048, 1024, 512, 256, 128, 64, 32
Decimation factor, D	1, 2, 4, 8...
N = 4096, D = 1; typical settings	
FFT refresh rate, standard	15,258 times/s
FFT refresh rate, Option 50	30,517 times/s
100% POI, standard	131.072 μs
100% POI, Option 50	65.536 μs
N = 32, D = 1; typical settings	
FFT refresh rate, standard	1,953,125 times/s
FFT refresh rate, Option 50	3,906,250 times/s
100% POI, standard	1.024 μs
100% POI, Option 50	0.512 μs
Analysis settings	
Maximum analysis bandwidth	50 MHz standard; 100 MHz with Option 50
Window functions	B-Nuttall, Flat-top, LowSideLobe, Rectangle, Kaiser
RBW settings	≥ 12 grades
Amplitude resolution	0.5 dB

General and Interfaces

Parameter / condition	YSA-P045
RF input	N (F), 50 Ω
RF output	N (F), 50 Ω
Power input	USB PD (65 W)
USB ports	USB 3.0 Type-C $\times$ 1; USB 2.0 Type-C $\times$ 1; USB 2.0 Type-A $\times$ 1
Ethernet	RJ45, 1000 Mbps
Video / audio	Micro HDMI $\times$ 1 (extended-display support); 3.5 mm headphone port $\times$ 1
External reference-clock input	MMCX (F), 10 MHz; amplitude $\geq$ 1.5 Vpp; impedance 330 Ω
Reference-clock output	MMCX (F), 100 MHz, 3.3 V CMOS; programmable on/off
External trigger input	MMCX (F), 3.3 V CMOS; high impedance
Trigger output	MMCX (F), 3.3 V CMOS
External antenna input	MMCX (F)
Analog IF output	MMCX (F); -25 dBm maximum output power; 50 Ω ; 312.5 MHz $\pm$ 50 MHz
Display	IPS LCD, 1280 $\times$ 800; 10.1-inch multi-touch screen
RAM / EMMC storage	4 GB / 32 GB
Power consumption	32 W (typ.)
Battery life	About 2.5 hours (typ.); external power-bank supply supported
Size (D $\times$ W $\times$ H)	260 $\times$ 185 $\times$ 46 mm
Weight	1.5 kg
Built-in GNSS 1PPS accuracy	$\pm$ 100 ns; external antenna only
Operating temperature (ambient)	0 to 50 $^{\circ}$ C
Storage temperature (ambient)	-20 to +70 $^{\circ}$ C
Operating relative humidity, ambient 0 to 40 $^{\circ}$ C	5 to 75%
Operating relative humidity, ambient > 40 $^{\circ}$ C	5 to 45%
Packaging and accessories	Protected YSA-P045 main unit $\times$ 1; power adapter $\times$ 1; power cord $\times$ 1; lanyard $\times$ 1

Phase Noise Measurement

Parameter / condition	YSA-P045
Minimum frequency offset	1 Hz
Maximum measurement frequency offset	10 MHz
Trace smoothing	Supported

Phase Noise Measurement — SSB Performance

Parameter / condition	YSA-P045
Carrier 1 GHz — guaranteed / typical	
100 Hz offset	-90 / -94 dBc/Hz
1 kHz offset	-113 / -117 dBc/Hz
10 kHz offset	-120 / -124 dBc/Hz
100 kHz offset	-126 / -129 dBc/Hz
1 MHz offset	-136 / -139 dBc/Hz
10 MHz offset	-140 / -143 dBc/Hz
Carrier 4.5 GHz — guaranteed / typical	
100 Hz offset	-80 / -83 dBc/Hz
1 kHz offset	-102 / -105 dBc/Hz
10 kHz offset	-112 / -115 dBc/Hz
100 kHz offset	-114 / -117 dBc/Hz
1 MHz offset	-125 / -128 dBc/Hz
10 MHz offset	-137 / -140 dBc/Hz

Pulse Detection (Option 72)

Parameter / condition	YSA-P045
Minimum pulse width	64 ns standard bandwidth; 32 ns with Option 50
Measurement parameters	Top Level, Base Level, Top/Base, Droop, OverShoot, Ripple, Rise Time, Rise Edge, Fall Time, Fall Edge, Width, PRI, Duty Cycle

AM Demodulation

Parameter / condition	YSA-P045
Measurement parameters	Modulation depth, carrier power, modulation rate, signal-to-noise ratio, RMS power, total harmonic distortion, etc.
Modulation-rate test range	20 Hz to 10 MHz
Modulation-rate accuracy, rate < 1 kHz	< 1 Hz
Modulation-rate accuracy, rate ≥ 1 kHz	< 0.1%
Modulation-depth test range and accuracy	5% to 95%; ± 5% (nominal)

FM Demodulation

Parameter / condition	YSA-P045
Measurement parameters	Modulation frequency offset, carrier power, modulation rate, SINAD, signal-to-noise ratio, RMS power, total harmonic distortion, etc.
Modulation-rate test range	20 Hz to 2 MHz
Modulation-rate accuracy, rate < 1 kHz	< 1 Hz
Modulation-rate accuracy, rate ≥ 1 kHz	< 0.1%
Frequency-offset test range and accuracy	1 kHz to 10 MHz; ± 6% (nominal)

Basic Vector Modulation Analysis (Option 71)

Parameter / condition	YSA-P045
ASK	2ASK
FSK	2FSK, 4FSK
MSK	GMSK
PSK	BPSK, QPSK, 8PSK
QAM	16QAM, 32QAM, 64QAM, 128QAM, 256QAM
Symbol length, 128QAM and 256QAM	4000
Symbol length, other modulation types	2000
Symbol rate	$(1/64 \text{ to } 1/4) \times \text{sample rate}; \leq 32.5 \text{ MSPS}$
Filter	Root raised cosine
Filter roll-off factor	0.01 to 0.99
Displays	Spectrum, constellation, eye diagrams, measurement results
Measurements	EVM, amplitude error, phase error, frequency error, signal-to-noise ratio, part of the bitstream

Tracking Generator (Option 60)

Parameter / condition	YSA-P045
Frequency range	1 MHz to 4.5 GHz
Modes	FixedPoint, FreqSweep, PowerSweep, Tracking Generator
Frequency resolution	10 Hz
Power resolution	0.25 dB
Power level	-20 dBm to 0 dBm
Power-level accuracy	$\pm 2 \text{ dB}$

EMI Pre-Compliance Measurement (Option 74)

Parameter / condition	YSA-P045
EMI filter, -6 dB bandwidth	200 Hz, 9 kHz, 120 kHz, 1 MHz
Detectors	Peak, Average, RMS, Quasi-Peak (CISPR 16-1-1 compliant)
Measurement-time setting range	0.1 s to 10 s
Limit-line standards	FCC Part 15, EN550xx, user defined
Report output	Signal list
Frequency axis	Linear and logarithmic

Specification Conditions

Parameter / condition	YSA-P045
Warm-up	Start up and warm up for 10 minutes
Ambient temperature	25 °C
Typical and nominal values	Not guaranteed; measurement uncertainty is not included
Specification changes	May vary with hardware and software versions without prior notice

Options

Parameter / condition	YSA-P045
Option 05	Internal high-precision GNSS; built-in hardware
Option 16	0 Hz start frequency; built-in hardware
Option 50	100 MHz analysis bandwidth; built-in hardware
Option 60	4.5 GHz tracking generator; built-in hardware
Option 71	Basic vector modulation analysis; software
Option 72	Pulse analysis; software
Option 74	EMI pre-compliance measurement; software
Option 80	4-year warranty; service option
Option 81	5-year warranty; service option

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