

# HANDHELD REAL-TIME SPECTRUM ANALYZER

PXE SERIES  
9.5/20 GHz

## Key facts

Portable makes possible

1.5 kg lightweight, 10.1-inch multi touchscreen

Frequency range: 9 kHz to 9.5/20 GHz

1 GHz DANL:  $-168$  dBm/Hz

1 GHz phase noise:  $-100$  dBc/Hz@10 kHz

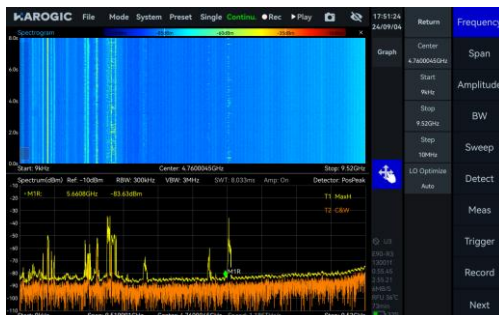
Analysis Bandwidth: up to 100 MHz

Channel power, phase noise and more

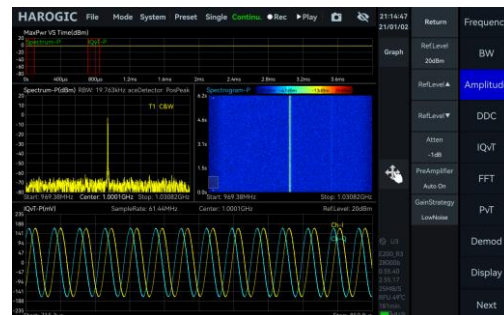
3 hours operation time, external power bank supported

## Applications

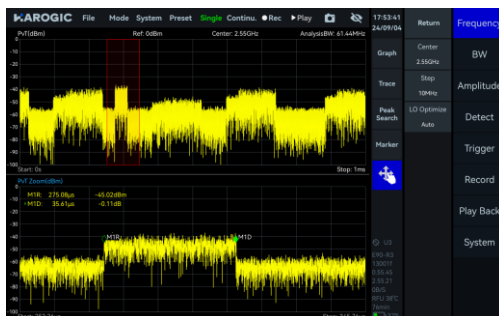
### Standard spectrum sweep



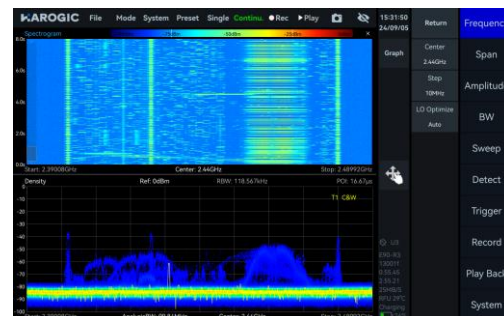
### IQ streaming and analysis



### Power vs time measurement

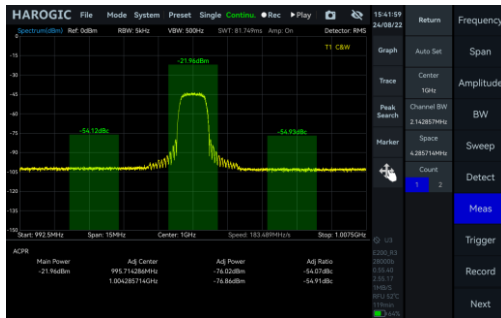


### Real-time analysis



## Applications

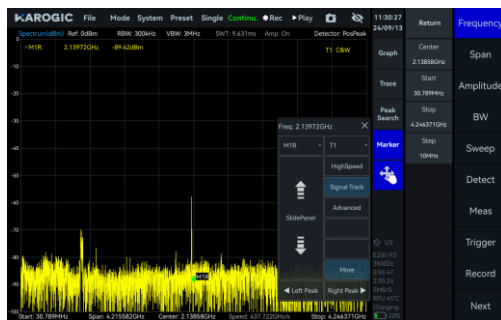
### Channel power/ACPR



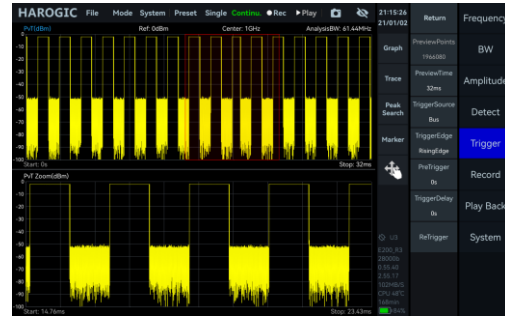
### Phase noise



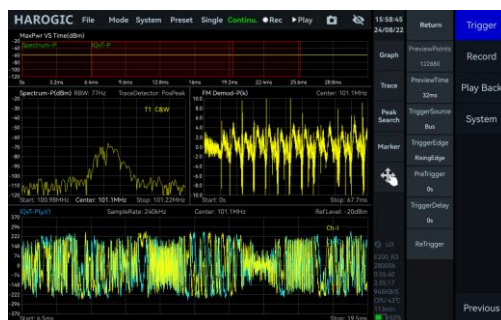
### Frequency tracking



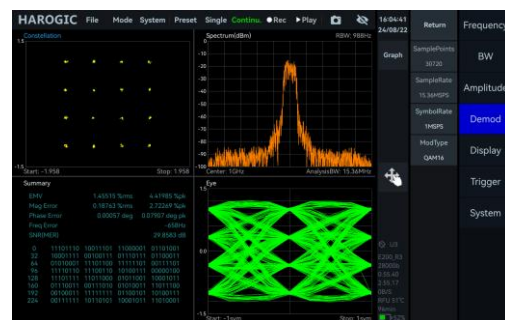
### Pulse signal measure



### AM/FM demodulation



### Basic digital demodulation (Beta)



## Specifications\*

### FREQUENCY

Frequency range	PXE-90	PXE-200
		9 kHz-9.5 GHz
Reference clock	Internal or external	
Frequency accuracy	TCXO (std.)	<1 ppm, manual correction is available
	OCXO (opt01)	<1 ppm, manual correction is available
Aging and temperature stability	TCXO (std.)	<1 ppm/year, <1 ppm
	OCXO (opt01)	<1 ppm/year, <0.15 ppm

### SPECTRUM PURITY

#### SSB phase noise (dBc/Hz)

	PXE-90		PXE-200	
	1 GHz	9.5 GHz	1 GHz	20 GHz
Carrier frequency	1 GHz	9.5 GHz	1 GHz	20 GHz
1 kHz	-95.2	-91.5	-91.2	-80.6
10 kHz	-101.6	-98.5	-99.7	-90.6
100 kHz	-100.6	-99.7	-101.1	-96.2
1 MHz	-120.9	-116.2	-121.6	-111.5

#### Residual response (dBm)

spur reject = bypass

RBW =1 kHz

PosPeak detector

Reference level (R.L.)	PXE-90		PXE-200	
	0 dBm	-50 dBm	0 dBm	-50 dBm
9 kHz-1 GHz	-83	-120	-90	-120
1 GHz-3 GHz	-83	-120	-80	-120
3 GHz-9.5/20 GHz	-90	-130	-90	-120

#### Image rejection

	PXE-90	PXE-200
9 kHz-3 GHz	> 90 dBc (typ.)	> 90 dBc (typ.)
3 GHz-9.5 GHz	> 90 dBc(typ.) for spur reject = enhanced; > 60 dBc (typ.) for spur reject = bypass	> 90 dBc (typ.)

9.5 GHz-20 GHz	-	> 90 dBc(typ.) for spur reject = enhanced; > 60 dBc (typ.) for spur reject = bypass
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IF rejection	> 90 dBc (typ.) for spur reject = enhanced; > 80 dBc (typ.) for spur reject = bypass
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Local oscillator related spurious	<-65 dBc Center frequency $\pm (N/M)*100$ MHz, N,M = 1,2,3,4,5...
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IIP3 / IIP2 (dBm)	PXE-90		PXE-200	
	1 GHz	9.5 GHz	1 GHz	20 GHz
Carrier frequency	1 GHz	9.5 GHz	1 GHz	20 GHz
R.L. = 20 dBm	46.1 / 83.2	40.5 / 92.8	45.5 / 82.6	35.3 / 93.6
R.L. = 0 dBm	26.7 / 85.0	19.2 / 90.3	25.5 / 81.1	21.0 / 89.0
R.L. = -20 dBm	10.5 / 82.2	2.0 / 49.3	7.9 / 81.5	-4.5 / 55.3

## AMPLITUDE

Max. input power (CW)	23 dBm 10 dBm	90 MHz-9.5/20 GHz and the preamplifier is off 9 kHz-90 MHz or preamplifier is on
Max. DC voltage	$\pm 10$ VDC	
Display range	DANL-23 dBm	
Amplitude accuracy	9 kHz-9.5 GHz 9.5 GHz-20 GHz	$\pm 2.0$ dB $\pm 3.0$ dB
IF in-band flatness	$\pm 2.0$ dB	
Reference level (R.L.)	-50 dBm-23 dBm	
RF preamplifiers	automatically turn on or forcibly turn off	
VSWR	<2.0:1	
90 MHz to Max.Freq.		

Display average noise level  
(DANL) (dBm/Hz)  
RBW=10 kHz

Reference level	PXE-90		PXE-200	
	-20 dBm	-50 dBm	-20 dBm	-50 dBm
9 kHz	-136.9	-142.4	-141.2	-152.3

100 kHz - 90 MHz	-146.3	-150.9	-152.2	-160.2
90 MHz - 3.0 GHz	-145.7	-165.1	-147.2	-165.3
3.0 GHz - 9.5 GHz	-148.9	-157.4	-139.1	-157.1
9.5 GHz - 20 GHz	-	-	-138.2	-159.5

## STANDARD SPECTRUM ANALYSIS

<b>Detector</b>	PosPeak, NegPeak, Sample, Average, RMS, MaxPower
<b>RBW</b>	1 Hz-10 MHz
<b>VBW</b>	1 Hz-10 MHz
<b>Data chart</b>	SASudio4 software provides spectrum, waterfall chart, and historical trace
<b>Measurements</b>	Channel power, OBW, X dB bandwidth, Adjacent channel power ratio, IM3

Sweep speed	PXE-90	PXE-200
RBW ≥ 1 MHz FPGA spur reject = bypass	about 830 GHz/s	about 890 GHz/s
RBW = 250 kHz FPGA spur reject = standard	about 570 GHz/s	about 590 GHz/s
RBW = 30 kHz FPGA spur reject = bypass	about 150 GHz/s	about 150 GHz/s
RBW = 1 kHz CPU spur reject = bypass	about 2.8 GHz/s	about 2.7 GHz/s

## IQ RECORDING

<b>Burst recording bandwidth</b>	Maximum: 100 MHz The built-in memory depth is 128 Mbytes
<b>Continuous recording bandwidth</b>	Maximum: 25 MHz Limited by the bandwidth of USB interface and hard disk. The storage depth is limited by the hard disk capacity
<b>IQ sample rate</b>	125MSPS, decimate factor: 1,2,4,8,32,64,128,256,512,1024,2048,4096 supported (FPGA)
<b>External trigger response</b>	Maximum response frequency 500 times/sec

## DETECTION ANALYSIS/ZERO SPAN

Lowest time resolution	8 ns
Max. analysis bandwidth	100 MHz
Detector	PosPeak, NegPeak, Sample, Average, RMS, MaxPower

## REAL TIME SPECTRUM ANALYSIS

FFT analysis	FFT engine is implemented in FPGA. Frame compression and trace detection are supported. No missing samples between FFT frames		
	FFT frame update rate= $10^9 \text{ ns}/(N * D * 8 \text{ ns})$ ; POI = $N * D * 8 \text{ ns}$ N for FFT points (2048,1024,512,256,128,64,32) D for decimate factor (1, 2, 4, 8...)		
	Typical settings	FFT refresh rate	POI
	N = 2048, D = 1	61,035 times/sec	16.384 us
	N = 32, D = 1	3,906,250 times/sec	0.256 us
Max. analysis bandwidth	100 MHz		
Window function	B-Nuttall, Flat-top, LowSideLobe		
RBW	14.73 MHz-3.59 kHz (Flat-top) 7.81 MHz-1.90 kHz (B-Nuttall) 13 grades for each window type		
Amplitude resolution	0.75 dB		

## GENERAL

Input and output	
Power supply	USB PD (20 V)
Data interface	USB3.0 Type-C * 1, USB2.0 Type-C * 1, USB2.0 Type-A * 1
Video and audio interface	Micro HDMI * 1 (support for extended display), 3.5mm headphone port * 1
RF input	N (F), Input impedance 50 $\Omega$
Reference input	MMCX (F), amplitude $\geq 1.5 \text{ Vpp}$ , input impedance is about 300 $\Omega$
Reference output	Integrated in MUXIO, 3.3 V CMOS, programmable on/off
External trigger input	Integrated in MUXIO, 3.3 V CMOS, input: high impedance
External trigger output	Integrated in MUXIO, 3.3 V CMOS
Analog IF output	MMCX (F), maximum output power – 25 dBm, output impedance 50 $\Omega$ supported, 307.2 MHz $\pm$ 50 MHz

<b>Display</b>	IPS LCD 1280×800, 10.1-inch multi-touch screen	
<b>EMMC storage</b>	16 GB	
<b>Power consumption</b>	Typical 25 W	
<b>Size (D * W * H) and weight</b>	260 mm×180 mm×50 mm and about 1.5 kg	
<b>GNSS synchronization</b>	GNSS (only support external antenna)	+/- 100 ns
<b>Operating temperature (ambient)</b>	0-50 °C	
<b>Storage temperature (ambient)</b>	-20-70°C	
<b>Packaging and accessories</b>	spectrum analyzer with protective shell * 1, power adapter * 1, power cable * 1, calibration certificate*1	

\*Specification applies under the following conditions:

- (1) Start up and warm up for 10 minutes
- (2) Ambient temperature 25 °C (core temperature 50 °C)
- (3) Stand spectrum analysis mode-spurious rejection enhance on.
- (4) Necessary heat dissipation is provided to ensure the ambient and core temperature within the rated range at the same time



## OPTIONS

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Code		
01	Built-in OCXO reference clock	built-in hardware
34	External omnidirectional antenna, 400-8000MHz, Gain<2dBi	accessory
71	Basic digital modulation analysis	software
72	Pulse signal measurement	software

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