PX SERIES
PRODUCT MANUAL

HANDHELD/BENCHTOP REAL-TIME SPECTRUM ANALYZER

PXN-400 SERIES
40 GHz

V1.5 25/09/01

PXN-400
SERIES OVERVIEW

Key facts

Measure wide, measure smart

1.5 kg lightweight, 10.1-inch multi touchscreen

Frequency range: 9 kHz to 40 GHz

1 GHz DANL: -159 dBm/Hz

1 GHz phase noise: -107 dBc/Hz@10 kHz

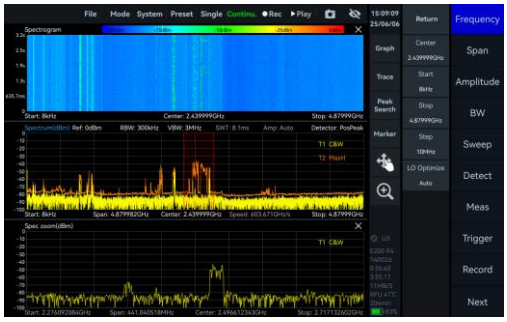
Analysis Bandwidth: up to 100 MHz

Channel power, phase noise and more

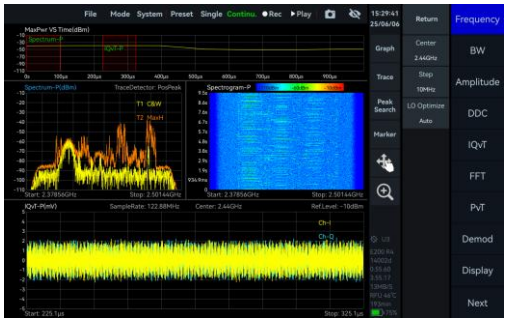
3 hours operation time, external power bank supported

Applications

Standard spectrum sweep



IQ streaming and analysis



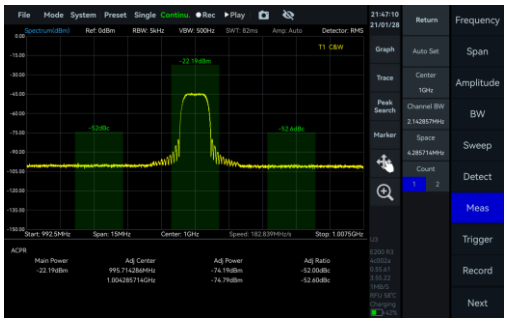
Power vs time measurement

Real-time analysis

PX Series

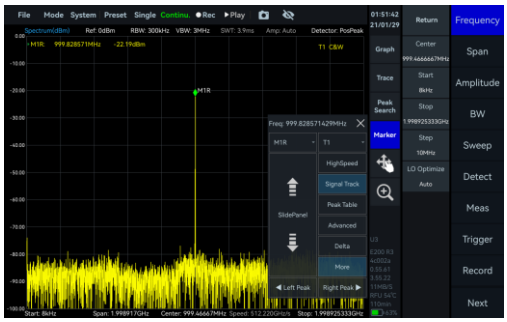
Applications

Channel power/ACPR



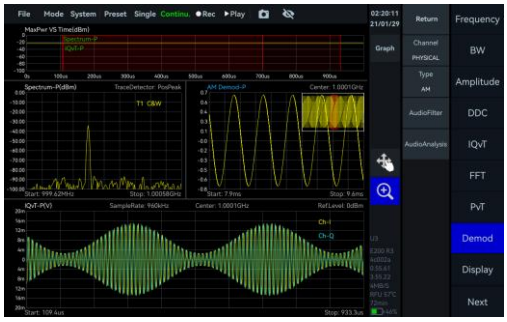
Phase noise

Frequency tracking

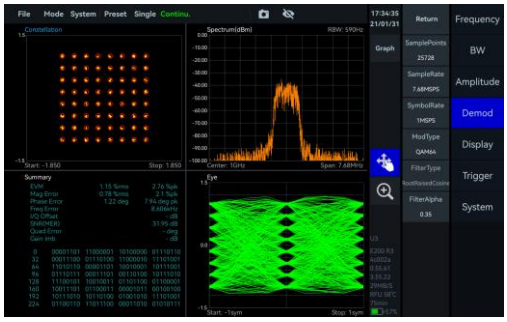


Pulse signal measure

AM/FM demodulation



Basic digital demodulation



Specifications*

FREQUENCY

Frequency range	PXN-400	-
	9 kHz - 40 GHz	-
Reference clock	Internal or external	
Frequency accuracy	OCXO (std.)	<1 ppm, manual correction is available
	OCXO (opt01)	<1 ppm, manual correction is available
Aging and temperature stability	OCXO (std.)	<1 ppm/year, <1 ppm
	OCXO (opt01)	<1 ppm/year, <0.15 ppm

SPECTRUM PURITY

SSB phase noise (dBc/Hz)

	PXN-400		-	
Carrier frequency	1 GHz	40 GHz	-	-
1 kHz	-99	-78.4	-	-
10 kHz	-107.5	-85.7	-	-
100 kHz	-107.7	-85.1	-	-
1 MHz	-122.7	-100.8	-	-

Residual response (dBm)
Spur reject = bypass
RBW = 1 kHz
PosPeak detector

	PXN-400		-	
Reference level (R.L.)	0 dBm	-50 dBm	-	-
9 kHz - 10 GHz	-72	-103	-	-
10 GHz - 20 GHz	-91	-115	-	-
20 GHz - 40 GHz	-85	-105	-	-

Image rejection **Spur reject = standard**	PXN-400	-
90 MHz - 33 GHz	>90 dBc (typ.)	-
33 GHz - 40 GHz	>58 dBc(typ.)	-

IF rejection	>90 dBc; 8.2GHz - 21.75GHz: >68 dBc
Local oscillator related spurious	<-65 dBc Center frequency ± (N/M) * 125 MHz, N, M = 1, 2, 3, 4, 5...

IIP3/IIP2 (dBm)

	PXN-400		-	
Carrier frequency	1 GHz	40 GHz	-	-
R.L. = 20 dBm	40.3/75.5	31.7/88.6	-	-
R.L. = 0 dBm	27.4/45.3	10.3/86.1	-	-
R.L. = -20 dBm	8.7/25.2	4.8/66.6	-	-

AMPLITUDE

Max. input power (CW)	23 dBm	50 MHz - 40 GHz and the preamplifier is off
	10 dBm	9 kHz - 50 MHz or preamplifier is on
Max. DC voltage	±10 VDC	
Display range	DANL - 20 dBm (typ.)	
Amplitude accuracy	9 kHz - 9.5 GHz	±2.0 dB
	9.5 GHz - 40 GHz	±3.0 dB
IF in-band flatness	±2.0 dB	
Reference level (R.L.)	-50 dBm - 20 dBm (typ.)	
RF preamplifiers	Automatically turn on or forcibly turn off	
VSWR		
90 MHz - 16 GHz	<2.0:1	
16 GHz - 40 GHz	<3.0:1	

Display average noise level (DANL) (dBm/Hz), RBW=1 kHz

	PXN-400		-	
Reference level	-20 dBm	-50 dBm	-	-
9 kHz - 1 MHz	-136.0	-145.8	-	-
1 MHz - 88 MHz	-153.7	-158.0	-	-
88 MHz - 9.0 GHz	-154.1	-159.9	-	-
9.0 GHz - 19 GHz	-156.8	-161.5	-	-
19 GHz - 40 GHz	-145.2	-149.3	-	-

STANDARD SPECTRUM ANALYSIS

Detector	PosPeak, NegPeak, Sample, Average, RMS, MaxPower
RBW	1 Hz - 10 MHz
VBW	1 Hz - 10 MHz
Data chart	SAStudio4 software provides spectrum, waterfall chart, and historical trace
Measurements	Channel power, OBW, XdB bandwidth, Adjacent channel power ratio, IM3

Sweep speed	PXN-400	-
RBW ≥ 1 MHz FPGA **Spur reject = bypass**	about 1.1 THz/s	-
RBW = 250 kHz FPGA **Spur reject = standard**	about 597.2 GHz/s	-
RBW = 50 kHz FPGA **Spur reject = bypass**	about 221.5 GHz/s	-
RBW = 1 kHz CPU **Spur reject = bypass**	about 2.9 GHz/s	-

IQ RECORDING

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

DETECTION ANAYLSY

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 ns/(N * D * 8 ns); POI = N * D * 8 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/s	16.384 us
N = 32, D = 1	3,906,250 times/s	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	USB PD (65 W)
USB port	USB3.0 Type-C * 1, USB2.0 Type-C * 1, USB2.0 Type-A * 1
Video and audio interfaces	Micro HDMI * 1 (support for extended display), 3.5mm headphone port * 1
RF input	2.4 mm (M), Input impedance 50 Ω
External reference clock input	MMCX (F), amplitude ≥ 1.5 Vpp, input impedance is about 330 Ω
Reference clock output	Integrated in MUXIO, 3.3 V CMOS, programmable on/off
External trigger input	MMXC (F), 3.3 V CMOS, input: high impedance
External trigger output	MMXC (F), 3.3 V CMOS
Analog IF output	MMCX (F), maximum output power - 25 dBm, output impedance 50 Ω Supporting 307.2 MHz ± 50 MHz
External antenna input	MMCX (F)
Display	IPS LCD 1280 * 800, 10.1-inch multi-touch screen
RAM and EMMC storage	4 GB/32 GB
Power consumption	25 W (typ.)
Size (D * W * H)	260 * 179 * 46 mm

Weight	1.5 kg	
GNSS synchronization	Internal GNSS (external antenna support only)	± 100 ns
Operating temperature (ambient)	0 - 50 °C	
Storage temperature (ambient)	-20 - 70 °C	
Operating Relative Humidity	0 -40 °C	5 – 75%
	>40 °C	5 – 45%
Packaging and accessories	Spectrum analyzer with protective shell * 1, power adapter * 1, power cable * 1, lanyard*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) Standard 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

(5) Sweep speed and display average noise level test conditions: MCU:0.55.57,FPGA:0.55.22,API:0.55.61

OPTIONS

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

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