XSA1000P Series Spectrum Analyzer Specifications

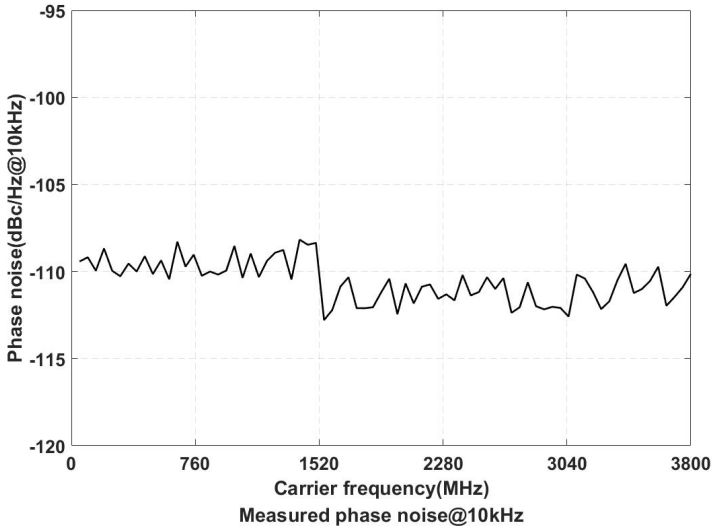
This chapter lists the technical specifications and general technical specifications of the spectrum analyzer. Unless otherwise stated, the technical specifications apply to the following conditions:

- The instrument has been preheated for 30 minutes before use.
- The instrument is in the calibration cycle and has been self-calibrated.

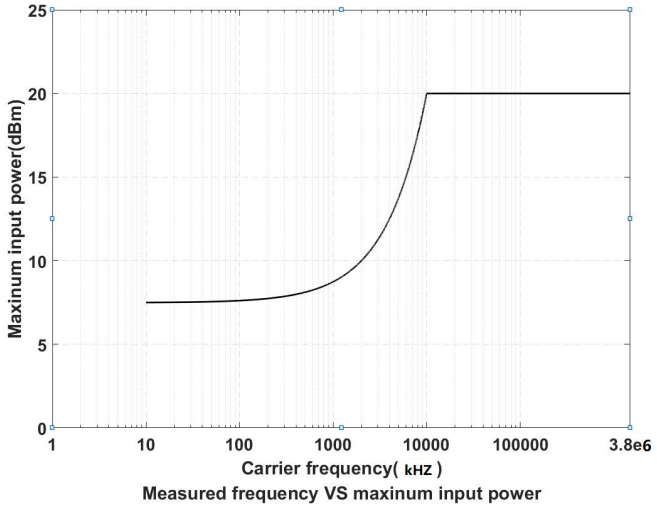
"Typical" and "nominal" for this product are defined as follows

- Typical: Refers to the performance of the product under certain conditions.
- Nominal: Refers to the approximate value under product application process.

Frequency		
Frequency Range	XSA1015P(-LF)	9.000 kHz to 1.500000000 GHz -LF model: 10 Hz to 1.500000000 GHz
	XSA1032P(-LF)	9.000 kHz to 3.200000000 GHz -LF model: 10 Hz to 3.200000000 GHz
	XSA1036P(-LF)	9.000 kHz to 3.600000000 GHz -LF model: 10 Hz to 3.600000000 GHz
	XSA1075P(-LF)	9.000 kHz to 7.500000000 GHz -LF model: 10 Hz to 7.500000000 GHz
Frequency Resolution	1 Hz	
Internal Reference Frequency		
Reference Frequency	10 MHz	
Reference Frequency Accuracy	±[(days since last calibrate × freq aging rate) + temperature stability + initial accuracy]	
Initial calibration accuracy	<1 ppm	
Temperature stability	0℃ to 50℃, reference to 25℃ < 0.5 ppm	
Aging rate	<1 ppm/year	
Frequency Readout Accuracy		
Marker frequency resolution	span / (number of sweep points - 1)	
Marker frequency uncertainty	±(frequency indication × reference frequency accuracy + 1% × span + 10% × resolution bandwidth + marker frequency resolution)	
Frequency Counter		
Resolution	1 Hz, 10 Hz, 100 Hz, 1 kHz	
Uncertainty	±(frequency indication × reference frequency accuracy + counter resolution)	
Frequency Span		
Range	0 Hz, 100 Hz to maximum frequency of instrument	
Uncertainty	± span / (number of sweep points - 1)	
SSB Phase Noise (20℃ to 30℃,fc=1 GHz)		
Carrier Offset	10 kHz	< -106 dBc/Hz (typical)
	100 kHz	< -104 dBc/Hz (typical)
	1 MHz	< -115dBc/Hz (typical)



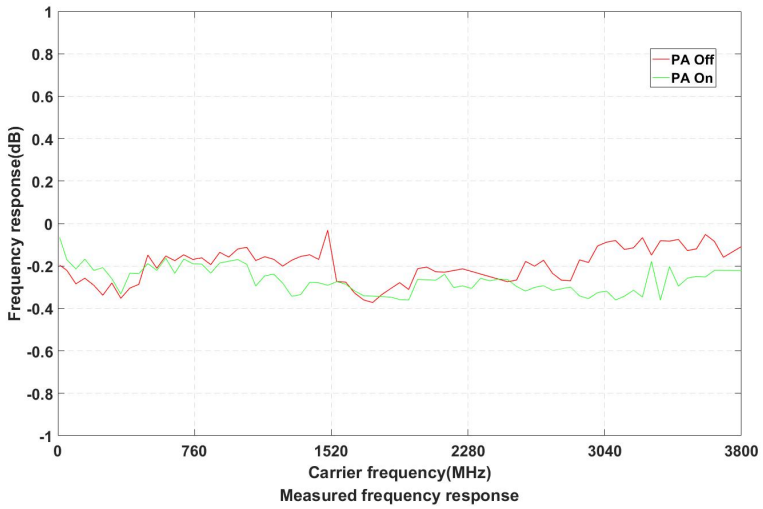
Residual FM (20℃ to 30℃, RBW = VBW = 1 kHz)		
Residual FM	< 50 Hz (nominal)	
Bandwidth		
Resolution Bandwidth(-3dB)	1 Hz to 1 MHz (1-3-5-10 steps by sequence)	
RBW accuracy	< 5%, typical	
Resolution Filter Shape Factor (60 dB : 3 dB)	< 5 typical	
Video Bandwidth (-3 dB)	10 Hz to 3 MHz(1-3-5-10 steps by sequence)	
Resolution bandwidth (-6 dB)	200 Hz, 9 kHz, 120 kHz, 1 MHz	
Amplitude		
Amplitude measurement range	XSA1015P (-LF)	DANL to +10 dBm, 100 kHz to 10MHz, Preamp Off -LF model: DANL to +10 dBm, 10 Hz to 10MHz, Preamp Off DANL to +20 dBm, 10 MHz to 1.5 GHz, Preamp Off
	XSA1032P (-LF)	DANL to +10 dBm, 100 kHz to 10MHz, Preamp Off -LF model: DANL to +10 dBm, 10 Hz to 10MHz, Preamp Off DANL to +20 dBm, 10 MHz to 3.2 GHz, Preamp Off
	XSA1036P (-LF)	DANL to +10 dBm, 100 kHz to 10MHz, Preamp Off -LF model: DANL to +10 dBm, 10 Hz to 10MHz, Preamp Off DANL to +20 dBm, 10 MHz to 3.6 GHz, Preamp Off
	XSA1075P (-LF)	DANL to +10 dBm, 100 kHz to 10MHz, Preamp Off -LF model: DANL to +10 dBm, 10 Hz to 10MHz, Preamp Off DANL to +20 dBm, 10 MHz to 7.5 GHz, Preamp Off
Max Input Level		
Input DC Voltage	0 V	
Continuous power	Attenuator =40dB +20dBm（100 mW）	
Max. damage level	+30 dBm（1 W）	



Measured frequency VS maxinum input power

Display Average Noise Level (attenuation = 0 dB, RBW = VBW = 100 Hz, sample detector, trace average ≥ 50, 20℃ to 30℃, input impendence = 50 Ω)			
Preamp Off	XSA1015P(-LF)	9 kHz to 1 MHz -LF model:10 Hz to 1MHz	-95 dBm (Typical), <-88 dBm -LF model: 10Hz to 2kHz: -110 dBm(Typical), <-100 dBm 2kHz to 1MHz: -140 dBm(Typical), <-130 dBm
		1 MHz to 500 MHz	-140 dBm (Typical), <-130dBm
		500 MHz to 1.5 GHz	-138 dBm (Typical), <-128dBm
	XSA1032P(-LF)	9 kHz to 1 MHz -LF model:10 Hz to 1MHz	-95 dBm (Typical), <-88 dBm -LF model: 10Hz to 2kHz: -110 dBm(Typical), <-100 dBm 2kHz to 1MHz: -140 dBm(Typical), <-130 dBm
		1 MHz to 500 MHz	-140 dBm (Typical), <-130dBm
		500 MHz to 3.2 GHz	-138 dBm (Typical), <-128dBm
	XSA1036P(-LF)	9 kHz to 1 MHz -LF model:10 Hz to 1MHz	-95 dBm (Typical), <-88 dBm -LF model: 10Hz to 2kHz: -110 dBm(Typical), <-100 dBm 2kHz to 1MHz: -140 dBm(Typical), <-130 dBm
		1 MHz to 500 MHz	-140 dBm (Typical), <-130dBm
		500 MHz to 3.6 GHz	-138 dBm (Typical), <-128dBm
	XSA1075P(-LF)	9 kHz to 1 MHz -LF model:10 Hz to 1MHz	-95 dBm (Typical), <-88 dBm -LF model: 10Hz to 2kHz: -110 dBm(Typical), <-100 dBm 2kHz to 1MHz: -140 dBm(Typical), <-130 dBm
		1 MHz to 500 MHz	-140 dBm (Typical), <-130dBm
		500 MHz to 3.6 GHz	-138 dBm (Typical), <-128dBm
		3.6 GHz to 6 GHz	-134 dBm (Typical), <-124dBm
		6 GHz to 7.5 GHz	-129 dBm (Typical), <-119dBm
Preamp On	XSA1015P(-LF)	100 kHz to 1 MHz -LF model:10 Hz to 1MHz	-135 dBm (Typical), <-128 dBm -LF model: -150 dBm (Typical),

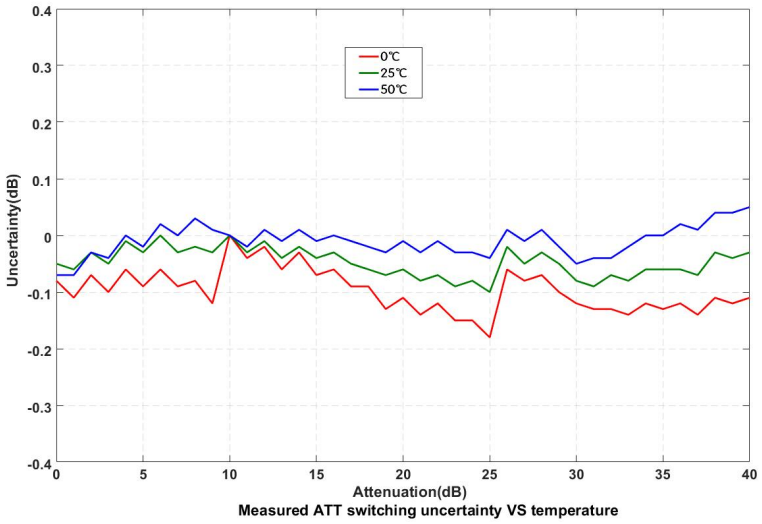
			<-140dBm
		1 MHz to 500 MHz	-160 dBm (Typical), <-150 dBm
		500 MHz to 1.5 GHz	-158 dBm (Typical), <-148 dBm
	XSA1032P(-LF)	100 kHz to 1 MHz -LF model:10 Hz to 1MHz	-135 dBm (Typical), <-128 dBm -LF model: -150 dBm (Typical), <-140dBm
		1 MHz to 500 MHz	-160 dBm (Typical), <-150 dBm
		500 MHz to 3.2 GHz	-158 dBm (Typical), <-148 dBm
	XSA1036P(-LF)	100 kHz to 1 MHz -LF model:10 Hz to 1MHz	-135 dBm (Typical), <-128 dBm -LF model: -150 dBm (Typical), <-140dBm
		1 MHz to 500 MHz	-160 dBm (Typical), <-150 dBm
		500 MHz to 3.6 GHz	-158 dBm (Typical), <-148 dBm
	XSA1075P(-LF)	100 kHz to 1 MHz -LF model:10 Hz to 1MHz	-135 dBm (Typical), <-128 dBm -LF model: -150 dBm (Typical), <-140dBm
		1 MHz to 500 MHz	-160 dBm (Typical), <-150 dBm
		500 MHz to 3.6 GHz	-158 dBm (Typical), <-148 dBm
		3.6 GHz to 6 GHz	-154 dBm (Typical), <-144 dBm
		6 GHz to 7.5 GHz	-149 dBm (Typical), <-139 dBm
Level Display			
Logarithmic level axis		0.01 dB to 1000 dB	
Linear level axis		0 to reference level	
Number of display points		801	
Number of traces		8	
Trace detectors		positive-peak, negative-peak, normal, sample, RMS, voltage average	
		quasi-peak	
Trace functions		clear write, max hold, min hold, average, view, blank, trace math	
Units of level axis		dBm, dBμW, dBμA, dBmV, dBμV, W, V	
Frequency response (20℃ to 30℃, input attenuation=10 dB, reference frequency=50 MHz)			
Preamp Off (f_C≥9kHz)(-LFmodel: f_C≥10Hz)		±0.7 dB	
Preamp On (f_C≥50 MHz)		±1.0 dB	



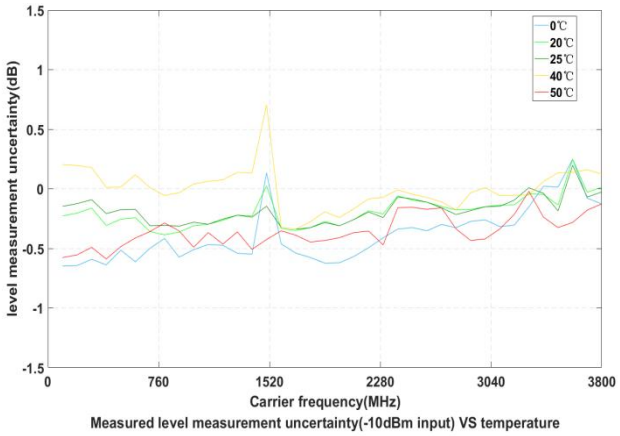
Measured frequency response

Input Attenuation Switching Uncertainty	
Setting range	0 dB to 40 dB, in 1 dB step

Switching uncertainty		fc = 50 MHz, relative to 10 dB, 20℃ to 30℃	
		<0.5 dB	



Absolute Amplitude Uncertainty			
Uncertainty		fc = 50 MHz, peak detector, preamplifier off, attenuation = 10 dB, input signal level = -10dBm, 20℃ to 30℃	
		<0.4 dB	
RBW Switching Uncertainty			
Uncertainty		relative to 10 kHz RBW	
		<0.1 dB	
Reference Level			
Range		-80 dBm to +30 dBm, in 1 dB step	
Resolution	log scale	0.01 dB	
	linear scale	4 digits	
Preamplifier input signal range 0 dBm to -50 dBm			
Gain	XSA1015P(-LF)	100 kHz to 1.5 GHz -LF model:10 Hz to 1.5 GHz	20 dB (nominal)
	XSA1032P(-LF)	100 kHz to 3.2 GHz -LF model:10 Hz to 3.2 GHz	
	XSA1036P(-LF)	100 kHz to 3.6 GHz -LF model:10 Hz to 3.6 GHz	
	XSA1075P(-LF)	100 kHz to 7.5 GHz -LF model:10 Hz to 7.5 GHz	
Level Measurement Uncertainty (95% confidence level, S/N > 20 dB, RBW = VBW = 1 kHz, preamplifier off, attenuation = 10 dB, -50 dBm < input level ≤ 0 dBm, fc > 10 MHz, 20℃ to 30℃)			
Level Measurement Uncertainty		< 0.7 dB	

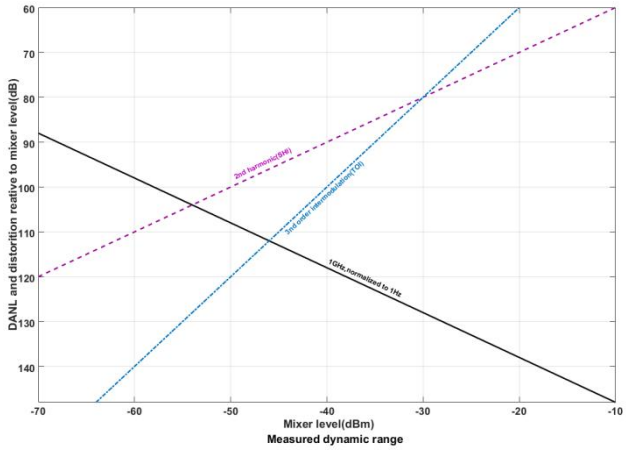


RF Input VSWR (attenuation ≥ 10 dB)			
VSWR	XSA1015P(-LF)	300 kHz to 1.5 GHz	＜1.8 (nominal)
	XSA1032P(-LF)	300 kHz to 3.2 GHz	
	XSA1036P(-LF)	300 kHz to 3.6 GHz	
	XSA1075P(-LF)	300 kHz to 7.5 GHz	



Distortion	
Second harmonic distortion	fc ≥ 50 MHz, Preamp off, signal input -20 dBm, attenuation = 10 dB
	> +45 dBc
Third-order intermodulation	fc ≥ 50 MHz, two -20 dBm tones at input mixer spaced by 200 kHz, attenuation = 0 dB
	> +14 dBm

1 dB Gain Compression	
1dB compression of input mixer (P1dB)	fc ≥ 50 MHz, 0 dB RF attenuation
	>-2 dBm, nominal



Spurious Response		
Residual response	connect 50 Ω load at input port, 0 dB input attenuation, 20℃ to 30℃	
	<-90 dBm, typical	
Intermediate frequency	< -60 dBc	
System related sidebands	referenced to local oscillators, referenced to A/D conversion, referenced to subharmonic of first LO, referenced to harmonic of first LO	
	< -60 dBc	
Input related spurious	-30 dBm signal at input mixer	
	< -60 dBc	
Sweep		
Sweep Time	Span≥10 Hz	10 ms to 3000 s
	Zero Span	33.33 us to 3000 s
Sweep time uncertainty	span ≥ 100 Hz: 5% (nominal) zero span (sweep time setting value > 1 ms): 5% (nominal)	
Sweep Mode	Continuous, Single	
Trigger		
Trigger source	free run, video, external	
External trigger level	5 V TTL level	
Tracking Generator (Option)		
Tracking Generator Output		
Frequency Range	XSA1015P(-LF)	100 kHz to 1.5 GHz
	XSA1032P(-LF)	100 kHz to 3.2 GHz
	XSA1036P(-LF)	100 kHz to 3.6 GHz
	XSA1075P(-LF)	100 kHz to 7.5 GHz
Output power level range	-40 dBm to 0 dBm	
Output power level resolution	1 dB	
Output flatness	relative to 50 MHz ±3 dB(nominal)	
Tracking generator spurious	Harmonic spurious	-20 dBc (Tracking generator output power = -10 dBm)
	Non-harmonic spurious	-20 dBc(Tracking generator output power = -10 dBm)
Tracking generator to input terminal isolation	-60 dB (Tracking generator output power = 0 dBm)	

Input/Output	
RF Input	
Impedance	50 Ω, typical
Connector	N Type Female
Tracking generator output	
Impedance	50 Ω, typical
Connector	N Type Female
Internal reference	
Frequency	10 MHz

Output level	+3 dBm to +10 dBm, +8 dBm (typical)
Impedance	50 Ω, typical
Connector	BNC female
External reference	
Frequency	10 MHz ± 5 ppm
Output level	0 dBm to + 10 dBm
Impedance	50 Ω, typical
Connector	BNC female
External Trigger Input	
Impedance	1 kΩ typical
Connector	BNC female
Audio interface	
Impedance	30 Ω, typical
Connector	3.5 mm
USB Host	
Connector	A Plug
Protocol	USB version 2.0
USB Device	
Connector	B Plug
Protocol	version 2.0
HDMI	
Connector	A Plug
Protocol	version 1.4
LAN	
10/100Base，RJ-45	
Display	
Type	TFT LCD
Resolution	1024*768
Size	10.4 inches
Color	65536
Mass Memory	
Mass memory	Flash disk (internal storage 256 MByte), USB storage device (not supplied)
Power Supply	
Input voltage range, AC	100 V to 240 V
AC supply frequency	50 Hz to 60 Hz
Power consumption	28 W (nominal)
Temperature	
Operating Temperature Range	0 ℃ to 50 ℃
Storage Temperature Range	-20 ℃ to 70 ℃
Humidity	
0℃ to 30℃	≤ 95% relative humidity
30℃ to 40℃	≤ 75% relative humidity
Altitude	
Operating height	up to 3,000m
Appearance	
Dimensions	421 mm (Width)×221 mm (Height)×115 mm (Depth)

Weight	Approx. 5.0 kg (without package)
Calibration interval time	
Calibration interval is recommended	18 months

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V1.0.2