XSA3000-R Series Spectrum Analyzer Technical 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.

Characteristics	Descriptions				
Model	**XSA3036-R**	**XSA3060-R**	**XSA3080-R**	**XSA3140-R**	**XSA3200-R**
Frequency Range	9 kHz~3.6 GHz	9 kHz~6.0 GHz	9kHz~8.0GHz	9 kHz~14.0GHz	9 kHz~20.0GHz
Frequency Resolution	1 Hz~5 MHz	1 Hz~5 MHz	1 Hz~5 MHz	1 Hz~5 MHz	1 Hz~5 MHz
Display average noise level	-165 dBm/Hz	-165 dBm/Hz	-165 dBm/Hz	-165 dBm/Hz	-165 dBm/Hz
SSB Phase Noise	<-106 dBc/Hz	<-106 dBc/Hz	<-106 dBc/Hz	<-100 dBc/Hz	<-100 dBc/Hz
Third-order intercept (TOI)	+14 dbm	+14 dbm	+14 dbm	+14 dbm	+14 dbm
Amplitude Accuracy	< 0.7 dB	< 0.7 dB	< 0.7 dB	< 0.7 dB	< 0.7 dB
Tracking generator	100kHz-3.6GHz	100kHz-6.0GHz	100kHz-8.0GHz	--	--
Real-time bandwidth analysis	100MHz				
Real-time analysis of spurious-free dynamic	60 dB				

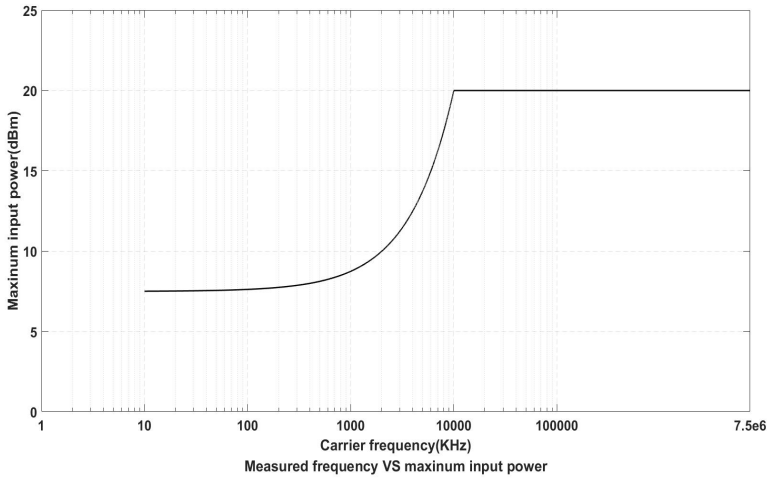
range		
100% POI Minimum Signal Duration	6.25 μs	
Real-time spectrum view	Probability Density Spectrum, Waterfall Plot, 3D Spectrum, Time-Power Spectrum	
Vector Network Analysis	Vector S11, Vector S21	--
Network Analysis Dynamic Range	90 dB	--
Cable Fault Location	Cable Fault Location	--
Touch Control	Multitouch, supports mouse and keyboard	
Advanced Measurement Functions	CHP,ACPR,OBW,CNR,Harmonic,Monitor,CCDF,SEM,TOI	
Modulation Analysis	AM,FM,PM	
Communication Port	LAN,USB Device,USB Host	
Remote Control Capability	SCPI/Labview/IVI based on USB-TMC/VXI-11/Socket/Telnet	
Remote Control	NI-MAX,Web Browser,Spectrum Vision software	

Spectrum Analyzer Mode

Characteristics	**Descriptions**				
Model	**XSA3036-R**	**XSA3060-R**	**XSA3080-R**	**XSA3140-R**	**XSA3200-R**
Frequency					
Frequency range	9 kHz~3.6 GHz	9 kHz~6.0 GHz	9 kHz~8.0 GHz	9 kHz~14.0GHz	9 kHz~20GHz

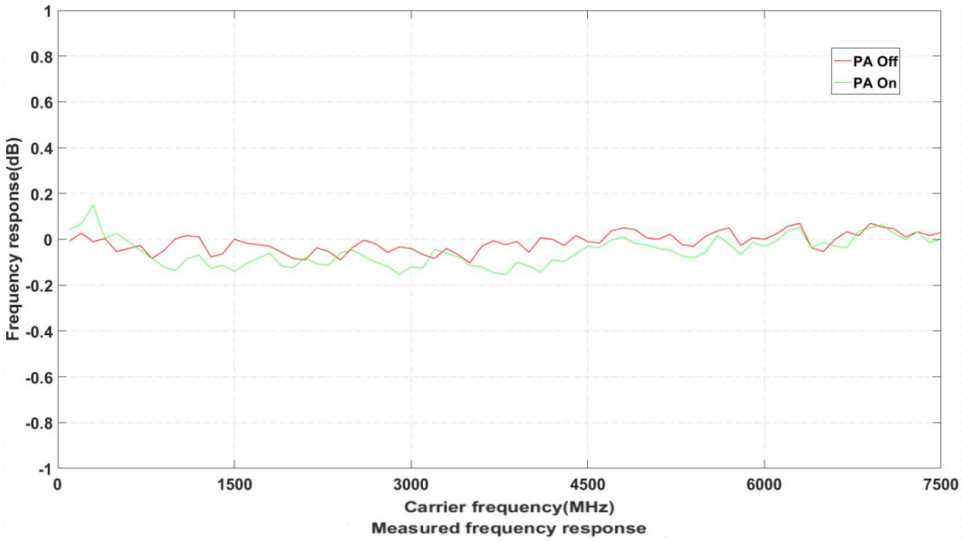
Frequency resolution	1Hz
Span	
Span range	0 Hz, 100 Hz to the maximum frequency of the instrument
Span accuracy	± Span / (span points - 1)
Internal Reference Source	
Reference Frequency	10.000000 MHz
Reference Frequency Accuracy	± [(Time since last adjustment × Frequency aging rate) + Temperature stability + Initial accuracy]
Initial Accuracy	<1 ppm
Temperature Stability	<1 ppm,0℃~50℃
Frequency Aging Rate	<0.5 ppm / first year, 3.0 ppm / 20 year
Marker	
Frequency Resolution	Span /(Screen resolution -1)
Frequency Uncertainty	± [Marker reading × Reference frequency accuracy + 1% × Sweep width + 0.5 × Cursor frequency resolution + 1 Hz]
Type	Normal, Delta, Stable
Function	Noise Marker, N dB Bandwidth, Frequency counter
Frequency Counter Resolution	1 Hz
Frequency Counter Uncertainty	±[Marker frequency reading × Reference frequency accuracy + Frequency counter resolution]
Bandwidth	
RBW Resolution (-3dB)	1 Hz ~ 5 MHz, step by 1-3-5-10
Discrimination Filter Shape Factor	< 5:1(60 dB:3 dB) (nom.)
RBW Uncertainty	< 5% (nom.)

Video Bandwidth (-3dB)	10 Hz~5 MHz, step by 1-3-5-10
Sweep and Trigger	
Sweep Time	29.688 us to 3000 s
Sweep Mode: RBW-Sweep	30 kHz ~ 5 MHz
Sweep Mode: RBW-FFT	1 Hz ~ 10 kHz
Sweep Rules	Continuous/Single
Trigger Source	Free, Video, External
External Trigger Setting	Level (5V TTL), Rising / Falling
Amplitude and Level	
Amplitude Measurement Range	DANL to +10 dBm, 100 kHz~1 MHz, preamp off DANL to +20 dBm, 1 MHz~7.5 GHz, preamp off
Reference Level	-120 dBm to +30 dBm, Step by 0.1 dB
Preamplifier	20 dB (nom.)
Input Attenuation	0 ~ 40 dB, Step by 1 dB
Maximum Input DC Voltage	+/- 50 VDC
Maximum Continuous Wave Radio Frequency Power	+20dBm(100mV)

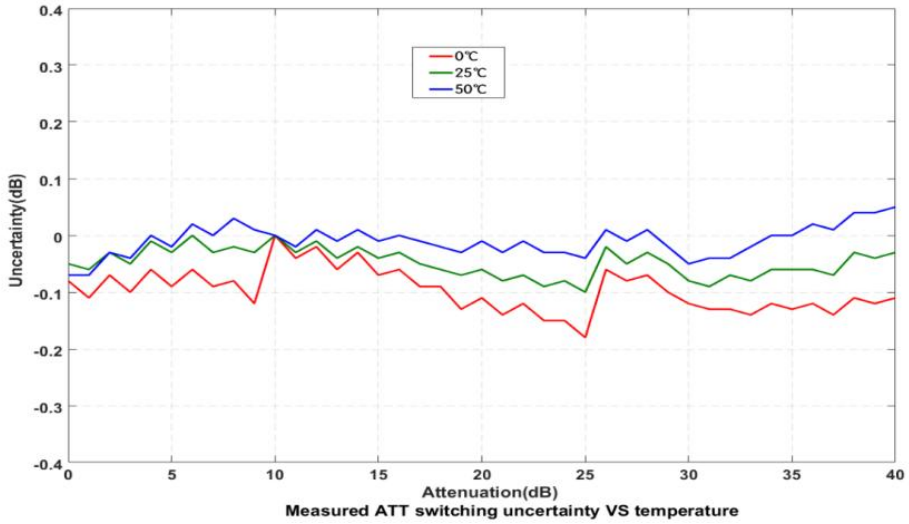


Level Display Range		
Display Log Scale	0.01 dB to 1000 dB	
Display Linear Scale	0% to 100% (Reference level)	
Level Coordinate Unit	dBm, dBmV, dBμV, dBμA, Volt, Watt, dBμW	
Screen Resolution	801	
Trace number	5	
Trace Detector Mode	Positive Peak, Negative Peak, Sample, Normal, Average, RMS, Quasi-Peak	
Trace Function	Clear Write, Max. Hold, Min. Hold, View, Close, Average	
Phase Noise		
Offset	20 °C to 30 °C,fc = 1 GHz,Normalized to 1 Hz	
10 kHz	-106 dBc/Hz (typ.)	-100 dBc/Hz (typ.)
100 kHz	-104 dBc/Hz (typ.)	-100 dBc/Hz (typ.)
1 MHz	-115 dBc/Hz (typ.)	-108 dBc/Hz (typ.)
Displayed Average Noise Level (DANL) at 20℃～30℃, with 0 dB input attenuation, sample detection, trace averaging >50 times, normalized to 1 Hz, and tracking generator off.		
Preamplifier off		
100 kHz ~ 1 MHz	-95 dBm (typ.),<-88dBm	

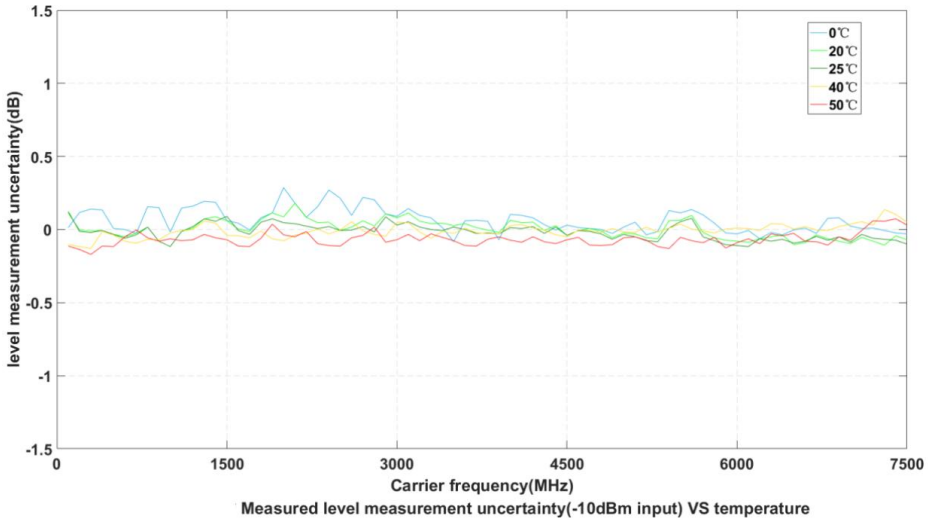
1 MHz~ 500 MHz	-140 dBm (typ.),<-130dBm				
500MHz~ 3.6GHz	-138dBm (typ.),<-128dBm				
3.6 GHz~ 6.0 GHz		-134dBm (typ.),<-124dBm			
6 GHz~8GHz			-129dBm (typ.),<-119dBm		
8GHz~14GHz				-134 dBm (typ.), <-124 dBm	
14GHz~ 20GHz					-132dBm(typ.), <-122 dBm
Preamplifier on					
100 kHz ~ 1 MHz	-135 dBm (typ.),<-128dBm				
1 MHz~ 500 MHz	-160 dBm (typ.),<-150dBm				
500MHz~ 3.6GHz	-158dBm (typ.),<-148dBm				
3.6 GHz~ 6.0 GHz		-154dBm (typ.),<-144dBm			
6 GHz~8GHz			-149dBm (typ.),<-139dBm		
8GHz~14GHz				-154 dBm (typ.), <-144 dBm	
14GHz~ 20GHz					-152 dBm(typ.), <-142dBm
Frequency response: 20℃～30℃, 30%～70% relative humidity, input attenuation 20 dB, reference frequency 50 MHz					
Preamplifier off	<0.7dB				
Preamplifier on	<1.0dB				



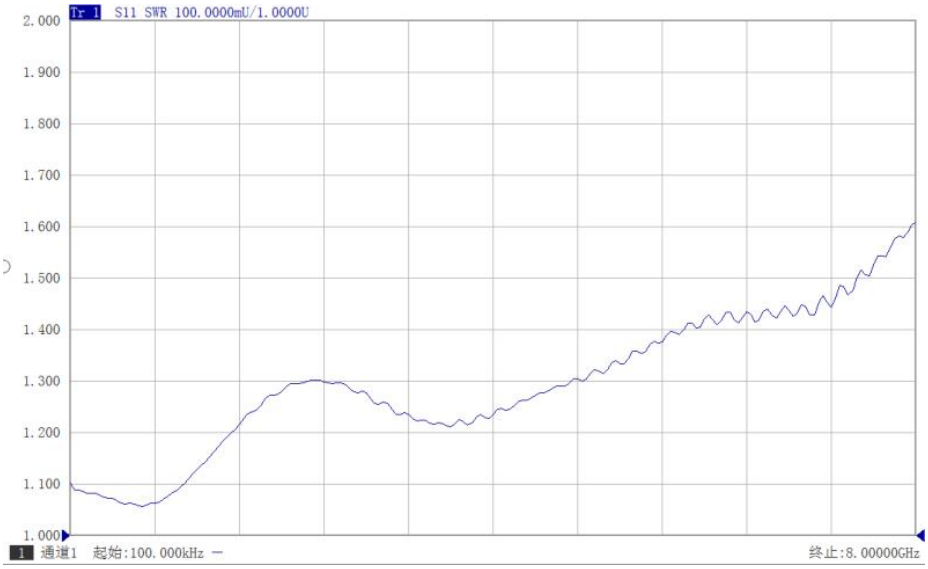
Error and Accuracy	
Resolution Bandwidth Switching Error	Logarithmic resolution, relative to 10 kHz RBW ±0.2 dB (nom.)
Input Attenuation Error	20℃~30℃, reference frequency 50 MHz, preamplifier off, relative to 20 dB attenuation, input attenuation 0~40 dB ±0.5 dB



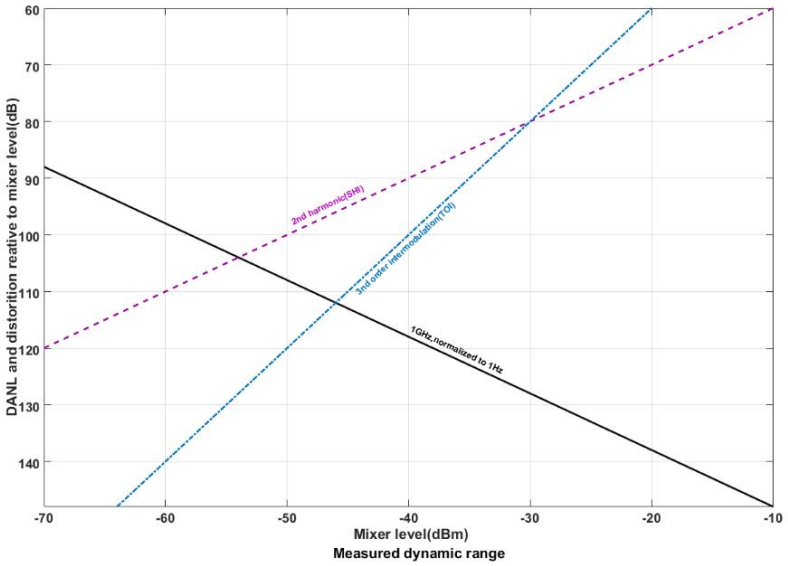
Absolute Magnitude Accuracy	20℃~30℃, fc=50 MHz, RBW=1 kHz, VBW=1 kHz, peak detection, input attenuation 20 dB, 95% confidence level ±0.4 dB, input signal level -20dBm, preamplifier off ±0.5 dB, input signal level -40dBm, preamplifier on
Full Range Accuracy	20℃~30℃, fc > 100 kHz, input signal level -50 dBm~0 dBm, RBW=1 kHz, VBW=1kHz, peak detection, input attenuation 20 dB, preamplifier off, 95% confidence level ±0.7 dB



Voltage Standing Wave Ratio (VSWR)	Input attenuation ≥10 dB, fc ≥ 1 MHz <1.8 (nom.)	Input attenuation ≥10 dB, fc ≥ 1 MHz <2.0 (nom.)



Distortion and Spurious Response	
Second Harmonic Distortion (SHD)	20℃~30℃, fc≥50 MHz, Input mono level -20 dBm, input attenuation 0 dB, preamplifier off -65 dBc / +45 dBm, (nom.)
Third-Order Intercept Point (TOI)	20℃~30℃, fc≥50 MHz, Input Dual-tone Level -20 dBm, frequency interval 100 kHz, input attenuation 0 dB, preamplifier off +14 dBm, (typ.)
1 dB Gain Compression	20℃~30℃, fc≥50MHz, input attenuation 0 dB,preamplifier off >0 dBm (nom.)



Residual response	20℃~30℃, input port is terminated with a 50Ω load, input attenuation 0 dB <-90 dBm			
Input-related clutter	20℃~30℃, mixer level -30 dBm <-65 dBc			
Tracking Generator				
Frequency Indicator				
Frequency range	100 kHz ~3.6GHz	100 kHz ~ 6.0 GHz	100 kHz ~ 8 GHz	--
Frequency resolution	1 Hz, Zero Span			--
RBW, only span mode	300 Hz ~ 5 MHz			--
Power Indicator				
Output power range	-40 dBm ~ 0 dBm			--
Output resolution	1 dB			--
Output Flatness	±3 dB (nom.)			--
Joint and Impedance	N-Type Female, 50Ω			--
Average Reverse Safe Power	Average power: 30 dBm(1 W)			--
Maximum Reverse Safe Voltage Level	±50 VDC			--

Advanced Measurement Kit	
Power Measurement	
Channel Power	Channel Power, Power Integral Density
ACPR	Main Channel Power, Left Adjacent Channel Power/Power Ratio, Right Adjacent Channel Power/Power Ratio
Bandwidth consumption	Power consumption
Time-Domain Power	Zero Sweep Time Integrated Power
Power Statistics	Statistical power probability
Phase Noise	Auto Tune, Frequency Offset Fixed
Spectrum Emission Mask	Built-in template, custom template, maximum 5 channels
Transmit Power	Peak trigger, Threshold limit
Spurious Emission Measurement	Amplitude limit, 5 Ranges, 10 Spurious signals
Nonlinear Measurement	
Third-Order Intermodulation Analysis	Based on dual-tone peak search
Harmonic Analysis	Maximum Harmonic 10

EMI Measurement Mode

Measurement Function	
Measurement View	Frequency scan, Meter, Signal List
Pre-compliance Sequence	Scan, Search, Meas
EMI Filter RBW (-6 dB)	200 Hz, 9 kHz, 120 kHz, 1 MHz
RBW Uncertainty	<5% (nom.)
Detector	Peak, RMS, Quasi-peak
Dwell time	1 ms ~ 1 s
RBW/Steps	0.1, 0.3, 0.5, 1, 2, 3

Limit and Trace	3
Limit Standards	EN550xx, GB9254, FCC Part15, User defined
Attenuator	0-40 dB
Frequency scale	Logarithmic

Real-Time Spectrum Analyzer Mode

Frequency and Time	
Real-Time Bandwidth	100 MHz
100% POI Minimum Signal Duration	Full Span, Kaiser Window, Frequency Mask Triggering at full amplitude accuracy 6.25 µs
Measurement view	Density: 33 ms ~ 1 s 3D+Spectrogram: 33 ms ~ 1 s Spectrogram: 100 us ~ 1 s PvT+Spectrum: 100 us ~ 1 s
Points	800
Span min	5 kHz
Max Sample rate	128MHz
FFT Frequency/s	166666 (100 MHz analysis bandwidth)
Marker	8
Window	Kaiser(Default), Hanning, Flattop, Gaussian, Blackman-Harris, Rectangular
RBW	Any SPAN, six RBW for every window (only one for Rectangular), default min RBW. Typical RBW for Kaiser: Span RBW Min RBW Max 100MHz 251.076kHz 8.285484MHz 50MHz 125.538kHz 4.142742MHz 20MHz 50.215kHz 1.657096MHz 10MHz 25.107kHz 828.548kHz 1MHz 2.51kHz 82.85kHz 100kHz 251Hz 8.285kHz
Spectrogram /PvT Maximum stored	50 000 (Loop store)
Amplitude Accuracy and Range	
Trace	3

Detector	+Peak, -Peak, Sample, Average						
Spectrum Density Display	0~100% (resolution 0.1%)						
Dynamic range for Spectrogram	200 dB						
Amplitude	Flatness: < 0.5dB Resolution: 0.01 dB Dynamic range: < 60 dB						
Trigger	Free Run, PvT, External						
Frequency Mask Trigger (FMT)	Source: Traces Type: Greater Than, Less Than, Outside Mask, Inside Mask, Frequency module trigger						
Color Display	Warm (Default)						
Different RBW and span, 100% POI (μs)	Analysis RBW RBW1 RBW2 RBW3 RBW4 RBW5 RBW6 100MHz 14 10 8 7 6.50 6.25 40MHz 26 16 11 8.5 7.25 6.62 20MHz 46 26 16 11 8.5 7.25 10MHz 86 46 26 16 11 8.5						
Different window length for RBW	Length/Type	1024	512	256	128	64	32
	Kaiser(Beta=12)	398.2849	198.9478	99.2793	49.4450	24.5279	12.0693
	Hanning	533.4785	266.4785	132.9785	66.2285	32.8535	16.1660
	Flattop	212.2447	106.0182	52.9050	26.3483	13.0700	6.4309
	Gaussian(alpha= 3.5)	404.8707	202.2399	100.9244	50.2666	24.9376	12.2729
	Blackman-Harris	399.2401	199.4250	99.5174	49.5636	24.5868	12.0983
	Rectangular	801	--	--	--	--	--

Modulation Analyzer Mode

Characteristics	**Descriptions**				
Model	**XSA3036-R**	**XSA3060-R**	**XSA3080-R**	**XSA3140-R**	**XSA3200-R**
General Parameters					
Carrier Frequency	10kHz~ 3.6GHz	10 kHz ~ 6.0 GHz	10 kHz ~ 8.0GHz	10 kHz~ 14.0GHz	10 kHz~ 20.0GHz
Carrier Power Accuracy	±2 dB (nom.)				
Carrier Power Range	-30 dBm ~ +20 dBm (nom.)				
Analog Modulation Analysis					
AM					

Modulation rate range	20 Hz ~ 100 kHz
Accuracy	1 Hz (nom.), modulation rate < 1 kHz < 0.1% modulation rate (nom.), modulation rate ≥ 1 kHz
Modulation depth range	5% ~ 95%
Accuracy	±4% (nom.)
FM	
Modulation rate range	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	
Modulation rate range	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.)

Vector Network Analysis Mode

Characteristics	**Description**		
Model	**XSA3036-R**	**XSA3060-R**	**XSA3080-R**
Stimulation and Measurement			
Frequency range	100 kHz ~ 3.6 GHz	100 kHz ~ 6.0 GHz	100 kHz ~ 8 GHz
Measurement Parameter	S11,S21		
IF Bandwidth	300Hz,500Hz,1kHz,3kHz,5kHz,10 kHz		
Port1 output power	-40~0 dBm (nom.)		
Display	Reflection/Transmission Coefficient, Return/Insertion Loss, Phase, Group Delay, Logarithmic Amplitude, Fault Location, Linear Amplitude, Real Part, Imaginary Part, Voltage Standing Wave Ratio (VSWR), Smith Chart (Linear/Phase, Log/Phase, Real/Imaginary, Resistance/Reactance, Conductance/Susceptance), Polar Plot (Linear/Phase, Log/Phase, Real/Imaginary)		
Points	201~10001, 201(Default)		

Trace function		Maximum 32 traces, Trace average, Maximum hold, Minimum hold, Trace memory		
Marker		Maximum 16 markers per trace		
Directionality after S11 calibration		Logarithmic Amplitude Average Frequency 50, 10MHz, > 50 dB		
S21 Dynamic range (IFBW=10kHz, Logarithmic ,Amplitude Average Frequency 50)	100kHz~ 10 MHz	70 dB (typ.)	70 dB (typ.)	70 dB (typ.)
	10 MHz ~ 3.6GHz	80 dB (typ.)	80 dB (typ.)	80 dB (typ.)
	3.6GHz ~ 6.0GHz		90 dB (typ.)	90 dB (typ.)
	6.0GHz ~ 8 GHz			90 dB (typ.)
Transmission Line Noise		10 kHz RBW, output power 0dB, Log mag, Average=20, >10MHz		
			Amplitude (dB)	Phase (deg)
		100kHz~3.05GHz	0.005	0.1
		3.05GHz~8.0GHz	0.005	0.3
Open-Loop Trace Noise		10 kHz RBW, output power 0dB, Log mag, Average=20, >10MHz		
			Amplitude (dB)	Phase (deg)
		100kHz~3.05GHz	0.04	0.3
		3.05GHz~8.0GHz	0.03	0.1
Calibration item		Full 1-Port Calibration Through Response Calibration		
Calibration Mechanisms		Built-in calibration parameters, user-defined calibration standards, adjustable phase/delay offset		
Socket Extension		1 Port Manual, 2 Ports Manual, 1 Port Automatic Open Circuit		
System Impedance		50Ω		
Velocity coefficient		0.01~1		

Cable and Antenna Measurement Mode

Characteristics	**Description**		
Model	**XSA3036-R**	**XSA3060-R**	**XSA3080-R**
Measurement Function			
Frequency range	100 kHz ~ 3.6GHz	100 kHz ~ 6.0 GHz	100 kHz ~ 8.0GHz

Maximum Distance Resolution (meters)	1.5e12*Velocity Factor/Sweep Width
Minimum Distance Resolution (meters)	1.5e8*Velocity Factor/Sweep Width
Windowing Form	Rectangular, Hamming
Calibration	Full 1-Port Calibration (OSL)
Velocity coefficient	0.01~1

Inputs and Outputs

Front Panel	
RF input	50Ω, N-type female
TG Source	50Ω, N-type female
USB Host	50Ω, N-type female
Audio modulation output	50Ω, N-type female
Rear Panel	
USB Device	USB-B 2.0
LAN	LAN（VXI11）, 10/100 Base, RJ-45
External trigger input	1 kΩ, 5V TTL , BNC-type female
10M reference output	10 MHz, >0 dBm, 50Ω, BNC-type female
10M reference input	10 MHz, -5 dBm~+10 dBm, 50Ω, BNC-type female
Remote Control	
Remote Control Capability	LAN, USB-TMC, USB Serial port

General Specification

Structure	
Dimensions	393 mm x 207 mm x 116.5 mm (W*H*D)
Weight	Net: 4.70 kg (10.0 lb); Shipping: 5.50 kg
Display	TFT LCD, 1024x600, 10.18 inch capacitive multi-touch screen
Storage	Internal (Flash) 3.3 GByte, External (U storage device) 32 GByte
Working Environment	
Power Supply	AC Voltage range: 100 V~240 V, 50/60Hz; 100~120V, 400Hz

Consumption	48 W
Temperature	Working temperature: 0℃~50℃ Storage temperature: -20℃~70℃
Humidity	0℃~30℃, ≤95% Relative humidity 30℃~50℃, ≤75% Relative humidity
Altitude	Operating: 3000 meters (10000 feet)
Electromagnetic Compatibility	
EN 61326-1: 2013 /EN 61000-3-2: 2014	Class A
EN61000-3-3: 2013	Plt : 0.65 Pst : 1.00, dmax : 4.00 %, dc : 3.00 %, dtLim: 3.30 % dt>Lim: 500ms
IEC61000-4-2: 2008	AD ±8.0kV, CD ±4.0kV
IEC61000-4-3: 2006 +A1: 2007 + A2: 2010	80MHz to 1000MHz: 10V/m; 1.4GHz to 2.0GHz:3V/m; 2.0GHz to 2.7GHz:1V/m
IEC61000-4-4: 2004 +A1:2010	AC Line:±2.00kV
IEC61000-4-5: 2005	Line to Line: 1.0kV, Line to Earth: 2.0kV
IEC61000-4-6: 2008	0.15-80MHz:3V 1KHz 80% AM
IEC61000-4-8: 2009	30A/m, 50/60Hz
IEC61000-4-11: 2004	Voltage Dips:0%/0.5P;40%/10P;70%/25P; Short Interruptions Test Level%UT:0%/250P
Safety	IEC 61010-1:2010/EN 61010-1:2010 CAN/CSA-C22.2 No.61010-1:2012 CAN/CSA-C22.2 No.61010-2-30:2012 UL 61010-1:2012 UL 61010-2-30:2012
RoHS	2011/65/EU

Interval Period of Adjustment:

One year is recommended for the calibration interval period.

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V1.1.1