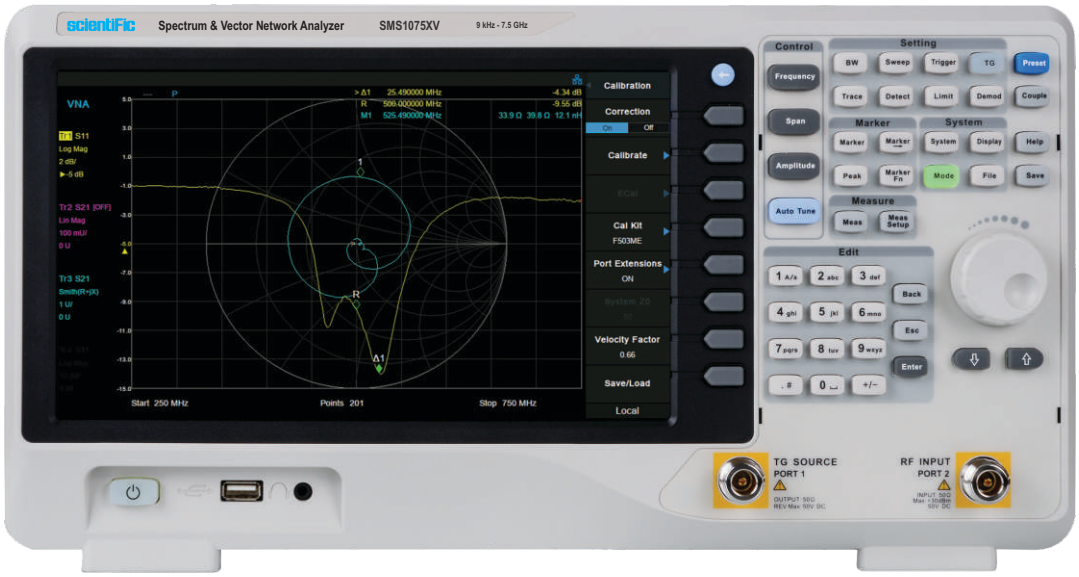
Spectrum & Vector Network Analyzer
SMS1000XV Series



Advance Features

- Spectrum Analyzer Frequency Range from 9 kHz up to 7.5 GHz
- Vector Network Analyzer Frequency Range from 100 kHz up to 7.5 GHz
- -165 dBm/Hz Displayed Average Noise Level (Typ.)
- -98 dBc/Hz.@10 kHz Offset Phase Noise (1 GHz, Typ.)
- Level Measurement Uncertainty < 0.7 dB (Typ.)
- 1 Hz Minimum Resolution Bandwidth (RBW)
- Preamplifier Standard
- Tracking Generator Standard
- Distance To Fault (Opt.)
- Analog and Digital Signal Modulation Analysis Mode (Opt.)
- EMI Filter and Quasi-Peak Detector Kit(Opt.)
- Advanced Measurement Kit (Opt.)
- 10.1 Inch Multi-Touch Screen , Mouse and Keyboard supported
- Web Browser Remote Control on PC and Mobile Terminals and File Operation

Technical Specifications	SMS1015XV	SMS1032XV	SMS1075XV
Spectrum Analyzer Frequency Range	9 kHz to 1.5 GHz	9 kHz to 3.2 GHz	9 kHz to 7.5 GHz
Vector Network Ananlyzer Frequency Range	10 MHz to 1.5 GHz	100 kHz to 3.2 GHz	100 kHz to 7.5 GHz
Resolution Bandwidth	1 Hz to 1 MHz	1 Hz to 1 MHz	1 Hz to 3 MHz
Displayed Average Noise Level	-156 dBm/Hz	-161 dBm/Hz	-165 dBm/Hz
SSB Phase Noise	< - 99 dBc/Hz	<- 98 dBc/Hz	<- 98 dBc/Hz
Total Amplitude Accuracy	< 1.2 dB	< 0.7 dB	< 0.7 dB
Tracking Generator	5 MHz to 1.5 GHz	100 kHz to 3.2 GHz	100 kHz to 7.5 GHz
VNA Measurement	Vector S11, Vector S21		
Distance to Fault	VNA Timing Domain Analysis Locator		
Touch Screen	Multi Touch, Mouse and Keyboard supported		
Advanced Measurement	CHP, ACPR, OBW, CNR, Harmonic, TOI, Monitor		
Reflection Measurement	VSWR, Measurement using Reflection Bridge		
EMI Test	EMI Filter and Quasi-Peak Detector, Log Scale and Limit Line		
Modulation Analysis	AM, FM, ASK, FSK, MSK, PSK, QAM		
Communication Interface	LAN, USB Device, USB Host (USB-GPIB)		
Remote Control Capability	SCPI/Labview/IVI based on USB-TMC/VXI-11/Socket/Telnet		
Remote Controller	NI-MAX, Web Browser, Easy Spectrum Software, File Explorer		

Technical Specifications			SMS1015XV	SMS1032XV	SMS1075XV
Spectrum Analyzer Mode					
Frequency and Time Characteristic					
Frequency					
Frequency Range			9 kHz to 1.5 GHz	9 kHz to 3.2 GHz	9 kHz to 7.5 GHz
Frequency Resolution			1 Hz		
Frequency Span					
Range			0 Hz, 100 Hz to Max Frequency		
Accuracy			± Span / (Number of display points - 1)		
Internal Reference Source					
Reference Frequency			10.000000 MHz		
Reference Frequency Accuracy / Uncertainity			± [(time since last adjustment x frequency aging rate) + temperature stability + initial calibration accuracy]		
Initial Calibration Accuracy			<1 ppm		
Temperature Stability			< 1 ppm/year, 0˚C to 50˚C		
Frequency Aging Rate			< 0.5 ppm/first year, 3.0 ppm/20 year		
Marker					
Marker Resolution			Span / (Number of display points -1)		
Marker Uncertainity			± [frequency Indication X Reference Frequency Uncertainity + 1% X Span + 10% X Resolution Bandwidth + Marker Resolution]		
Frequency Counter Resolution			0.01 Hz		0.1 Hz
Bandwidths					
Resolution Bandwidth (-3dB)			1 Hz to 1 MHz, in 1-3-10 sequence		1 Hz - 3 MHz
Resolution Filter Shape Factor			< 4.8 : 1 (60 dB : 3 dB), Gaussian-like		
RBW Uncertainty			< 5%		
Video Bandwidth (-3dB)			1 Hz to 3 MHz, in 1-3-10 sequene		1 Hz to 10 MHz
VBW Uncertainity			< 5%		
Sweep and Trigger					
Sweep Time			1 ms to 7500 s		
RBW		Sweep	30 Hz to 1 MHz	30 Hz to 1 MHz	3 kHz to 3 MHz
		FFT	1 Hz to 10 kHz	1 Hz to 10 kHz	1 Hz to 10 kHz
Sweep Type			Single, Continuous		
Trigger Source			Free, Video, External		
External Trigger			5 V TTL level, Rising edge / Falling edge		
Amplitude Accuracy and Range Specifications					
Amplitude and Level					
Measurement Range			DANL to + 10 dBm, 100 kHz to 1 MHz, Preamp off DANL to + 20 dBm, 1 MHz to 7.5 GHz, Preamp off		
Reference Level			- 200 dBm to + 30 dBm, 1 dB steps		
Preamplifier			20 dB (nom.)		
Input Attenuation			0 to 50 dB, 1 dB steps		
Maximum Input DC Voltage			± 50 VDC		
Maximum Average Power			30 dBm, 3 minutes, fc ≥ 10 MHz, att > 20 dBm, preamp off		
Maximum Damage Level			33 dBm, fc ≥ 10 MHz, att > 20 dBm, preamp off		
Level Display					
Logarithmic Level Axis			1 dB to 200 dB		
Linear Level Axis			0 to reference level		
Units of Level Axis			dBm, dBmV, dBµV, dBµA, Volt, Watt		
Number of Display Points			751		
Number of Traces			4		
Trace Detectors			Positive-peak, Negative-peak, Sample, Normal, Average (Voltage/RMS/Video), Quasi-peak		
Trace Functions			Clear write, Max Hold, Min Hold, View, Blank, Average, Math		
SSB Phase Noise					
Offset			20˚C to 30˚C, fc = 1 GHz, Normalized to 1 Hz		
10 kHz			-95 dBc/Hz, -99 dBc/Hz (typ.)	-95 dBc/Hz, -98 dBc/Hz (typ.)	-96 dBc/Hz, -98 dBc/Hz (typ.)
100 kHz			-96 dBc/Hz, -98 dBc/Hz (typ.)	-96 dBc/Hz, -97 dBc/Hz (typ.)	-95 dBc/Hz, -97 dBc/Hz (typ.)
1 MHz			-115 dBc/Hz, -120 dBc/Hz (typ.)	-115 dBc/Hz, -117 dBc/Hz (typ.)	-112 dBc/Hz, -114 dBc/Hz (typ.)
Displayed Average Noise (DADL)					
20˚C to 30˚C, att = 0 dB, RBW = 1 Hz, Sample detector, trace average > 50, TG off					
Preamp off	100 kHz to 1 MHz		-101 dBm, -107 dBm (typ.)	-107 dBm, -111 dBm (typ.)	-105 dBm, -109 dBm (typ.)
	1 MHz to 10 MHz		-124 dBm, -130 dBm (typ.)	-132 dBm, -136 dBm (typ.)	-122 dBm, -126 dBm (typ.)
	10 MHz to 200 MHz		-128 dBm, -134 dBm (typ.)	-137 dBm, -141 dBm (typ.)	-142 dBm, -146 dBm (typ.)
	200 MHz to 1.5 GHz		-121 dBm, -127 dBm (typ.)	-135 dBm, -139 dBm (typ.)	-142 dBm, -147 dBm (typ.)
	1.5 GHz to 3.2 GHz		-	-126 dBm, -132 dBm (typ.)	-140 dBm, -145 dBm (typ.)
	3.2 GHz to 5.0 GHz		-	-	-137 dBm, -143 dBm (typ.)
	5.0 GHz to 6.5 GHz		-	-	-136 dBm, -141 dBm (typ.)
	6.5 GHz to 7.5 GHz		-	-	-134 dBm, -139 dBm (typ.)

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Preamp on	100 kHz to 1 MHz	-120 dBm, -128 dBm (typ.)	-132 dBm, -137 dBm (typ.)	-133 dBm, -136 dBm (typ.)
	1 MHz to 10 MHz	-147 dBm, -152 dBm (typ.)	-148 dBm, -154 dBm (typ.)	-151 dBm, -154 dBm (typ.)
	10 MHz to 200 MHz	-150 dBm, -156 dBm (typ.)	-156 dBm, -161 dBm (typ.)	-161 dBm, -165 dBm (typ.)
	200 MHz to 1.5 GHz	-142 dBm, -148 dBm (typ.)	-155 dBm, -158 dBm (typ.)	-159 dBm, -163 dBm (typ.)
	1.5 GHz to 3.2 GHz	-	-145 dBm, -149 dBm (typ.)	-159 dBm, -162 dBm (typ.)
	3.2 GHz to 5.0 GHz	-	-	-157 dBm, -161 dBm (typ.)
	5.0 GHz to 6.5 GHz	-	-	-157 dBm, -160 dBm (typ.)
	6.5 GHz to 7.5 GHz	-	-	-155 dBm, -159 dBm (typ.)
Frequency Response				
		(20˚C to 30˚C to 70% relative humidity, att = 20 dB, relative to 50 MHz)		
Preamp off		± 0.8 dB, ± 0.4 dB (typ.)		
Preamp on		± 1.2 dB, ± 0.6 dB (typ.)		
Error and Accuracy				
Resolution Bandwidth Switching Uncertainity		± 0.2 dB nom. (Logarithmic Resolution, Relative to RBW = 10 kHz)		
Input Attenuation Switching Uncertainity		± 0.5 dB (20˚C to 30˚C, fc = 50 MHz, off, preamp off, relative to att = 20 dB)		
Absolute Amplitude Accuracy		(20˚C to 30˚C, fc = 50 MHz, RBW =VBW = 1 kHz, att = 20 dB, peak detector, 95% reliability)		
		Preamp off : ± 0.4 dB, input signal - 20 dBm		
		Preamp on : ±0.6dB,inputsignal-40dBm		
Total Amplitude Accuracy		(20˚C to 30˚C, fc > 100 kHz, input signal - 50 dBm to 0 dBm, att = 20 dB, RBW=VBW= 1 kHz, peak detector, preamp off, 95% reliability		
		± 1.2 dB	± 0.7 dB	± 0.7 dB
RF input VSWR		< 1.5 (nom.) (Att = 10 dB, fc ≥ 1 MHz)	-	< 1.5 (nom.) (Att = 20 dB, fc ≥ 1 MHz)
Distortion and Spurious Response				
Second Harmonic Distortion (SHI)		-65 dBC / +45 dBm (nom.) (20˚C to 30˚C, fc ≥ 50 MHz, mixer level - 20 dBm, att = 0 dB, preamp off		
Third Order Intercept (TOI)		(20˚C to 30˚C, fc ≥ 50 MHz, two - 20 dBm tones spaced by 100 kHz, att = 0 dB, preamp off		
		+ 10 dBm (type)	+ 10 dBm (type)	+ 14 dBm (type)
1 dB gain compression		(20˚C to 30˚C, fc ≥ 50 MHz, att = 0 dB, preamp off		
		> - 5 dBm (nom.)	> - 5 dBm (nom.)	> - 0 dBm (nom.)
Residual Respnonse		< - 90 dBm (20˚C to 30˚C, input terminated = 50 Ω, att = 0 dB)		
Input Related Spurious		< - 65 dBc (20˚C to 30˚C, mixer level = - 30 dBm)		
Tracking Generator				
Frequency Parameter				
Frequency Range		5 MHz to 1.5 GHz	100 kHz to 3.2 GHz	100 kHz to 7.5 GHz
Frequency Resolution		1 Hz, Zero Span		
RBW, Sweep Mode		100 Hz to 1 MHz	100 Hz to 1 MHz	3 kHz to 3 MHz
Power Parameter				
Output Level		-20 dBm to 0 dBm	-20 dBm to 0 dBm	-40 dBm to 0 dBm
Output Level Resolution		1 dB		
Output Flatness		± 3 dB (nom.)		
Normalization Trace		Ref A/B/C/D-> Ref trace		
VSWR		< 2 (nom)		
Connector and Impedance		N-type female, 50 Ω		
Average Safe Reverse Power		Total : 30 dBm, (1 W)		
Maximum Safe Reverse Level		Voltage : ± 50VDC		
Advanced Measurement Kit (Option SMS1000XV-AMK)				
Power Measurement				
CHP, Channel Power		Channel Power, Power Spectral Density		
ACPR, Adjacent Channel Power Ratio		Main CH Power, Left Channel Power, Right Channel Power		
OBW, Occupied Bandwidth		Occupied Bandwidth, Transmit Frequency Error		
T-Power, Time Domain Power		Zero Span Integrated Power		
CNR, Carrier Noise Ratio		C/N, Noise Power		
Non-Linear Measurement				
Harmonic Measurement		Max Harmonic Number 10		
TOI, Third Order Intercept		Measure the third order products from two tones		
Spectrum Monitor Measurement				
Spectrogram				
EMI Filter and Quasi-Peak Detector Kit (Option SMS1000XV-EMI)				
Measurement				
EMI Filter RBW (-6 dB)		200 Hz, 9 kHz, 120 kHz, 1 MHz (following CISPR 16-1-1)		
Detector		Peak, Average, RMS, Quasi-peak (following CISPR 16-1-1)		
QPD Dwell time		0 µs to 10 s		
EMI Receiver Software		Easy Spectrum EMI Pre-compliance test Software		
Frequency Axis		Linear, Logarithmic		

Technical Specifications		SMS1015XV	SMS1032XV	SMS1075XV
Vector Network Analyzer Mode				
Vector Network Analyzer				
Stimulus and Measurement				
Frequency Range		10 MHz to 1.5 GHz	100 kHz to 3.2 GHz	100 kHz to 7.5 GHz
Measurement		S11, S21		
IFBW		10 kHz		
Port 1 Stimulus Power		0 dBm (nom.)	-5 dBm (nom.)	0 dBm (nom.)
Format		Lin Mag, Log Mag, Phase, Group Delay, SWR Smith Chart (Lin/Phase, Log/Phase, Real/Imag, R+j*X, G+j*B) Polar Chart (Lin/Phase, Log/Phase, Real/Imag)		
Sweep Points		101 to 751, default 201		
Trace		4 Traces, Mem, Math, Hold, Overlay		
Marker		(6 + Ref) * 4 traces		
Calibration				
Directivity of Calibration		S11, Log mag, Average = 50, >50 MHz		
		> 40 dB		
Dynamic Range	100 kHz to 10 MHz	-	75 dB (typ.)	60 dB (typ.)
	10 MHz to 1.5 GHz	80 dB (typ.)	60 dB (typ.)	90 dB (typ.)
	1.5 GHz to 3.2 GHz	-	60 dB (typ.)	90 dB (typ.)
	3.2 GHz to 7.5 GHz	-	-	80 dB (typ.)
Trace Noise		10 kHz RBW, Log mag, Average = 50, > 10 MHz		
		0.1 dB		
Calibration		Short Respons		
		Open Response		
		Full 1-Port (OSL)		
		Response Through		
		Enhanced Response		
Mechanical Calibration Kit		F503ME, F603FE, 85032B\E, 85032F, User Cal Kit		
Port Extensions		Port 1, Port 2, Auto Open Port 1		
System Z0		50 Ω		
Velocity Factor		0.1 to 1		
Distance to Fault Mode				
Distance to Fault (Option SMS1000XV-DTF)				
Measurement				
Frequency Range		10 MHz to 1.5 GHz	100 kHz to 3.2 GHz	100 kHz to 7.5. GHz
Maximum Distance (Meters)		(76800 x Velocity Factor) / (Stop Freq - Start Freq. (MHz))		
Resolution (Meters)		(150 x Velocity Factor) / (Stop Freq - Start Freq (MHz))		
Windows		Rectangular, Hamming		
Calibration		Full 1-Port (OSL)		
Velocity Factor		0.1 to 1		
Modulation Analyzer Mode				
Common Parameter				
Frequency Range		2 MHz to 2.1 GHz	2 MHz to 3.2 GHz	2 MHz to 7.5 GHz
Carrier Power Accuracy		± 2 dB (nom.)		
Carrier Power Range		- 30 dBm to + 20 dBm (nom.)		
Digital Modulation Analysis (Option SMS1000XV-DMA)				
Modulation Type		ASK : 2 ASK FSK : 2, 4, 8, 16 level MSK : GMSK PSK : BPSK, QPSK, OQPSK, 8PSK DPSK : DBPSK, DQPSK, D8PSK, π/4-DQPSK, π/8-D8PSK QAM : 16, 32, 64, 128, 256		
Meas Length		16 to 4096		
Points/Symbol		4, 6, 8, 10, 12, 14, 16		
Symbol Rate		1 ksps to 2.5 Msps, Symbol Rate* Points/Symbol <=10 Msps		
Filter				
Meas/Ref Filter		Nyquist, Squrt Nyquist, Gauss, Half Sine, Rectangular		
Length		2 to 128		
Alpha/BT		Alpha 0.01 to 1, BT 0.01 to 10		
Trace				
Trace Data		IQ Meas Time, IQ Meas Spectrum, IQ Ref time, IQ Ref Spectrum Time, Spectrum Symbol Error Chart, Err Vector Time, Err Vector Spectrum IQ Mag Err, IQ Phase Err		
Layout		Single, Stacked 2, Grid 1*2, Grid 2*2		

Technical Specifications	SMS1015XV	SMS1032XV	SMS1075XV
Trace Formats	Log mag, Lin mag, Real, Imag I-Q, Constellation, I-eye, Q-eye, Wrap Phase, Unwrap Phase, Trellis Eye		
Symbol Error Chart			
PSK/DPSK/MSK/QAM	EVM (rms EVM, peak EVM), Magnitude error, Phase error, IQ offset, Carrier offset, SNR Quardrature error Gain Imbalance (not support for MSK)		
ASK	ASK Error, ASK depth, Carrier offset		
FSK	FSK Error, Magnitude error, FSK deviation, Carrier offset		
Analog Modulation Analysis (Option SMS1000XV-AMA)			
AM			
Modulation Rate Range	20 Hz to 100 kHz		
Accuracy	1 Hz (nom.)	Modulation Rate < 1 kHz	
	< 0.1% modulation rate (nom.)	Modulation Rate ≥ 1 kHz	
Modulation Depth Range	5% to 95%		
Accuracy	± 4% (nom)		
FM			
Modulation Rate Range	20 Hz to 200 kHz		
Accuracy	1 Hz (nom.)	Modulation Rate < 1 kHz	
	< 0.1% modulation rate (nom.)	Modulation Rate ≥ 1 kHz	
Frequency Deviation	1 kHz to 400 kHz		
Accuracy	±4% (nom.)		
Input and Output			
Front Pannel			
RF input, Port 2	N-type female, 50 Ω (nom.)		
TG Source, Port 1	N-type female, 50 Ω (nom.)		
USB Host	USB-A plug, Version 2.0		
Ear Phone Jack	3.5 mm		
Rear Panel			
USB device	USB-B plug, Version 2.0		
LAN	10/100 Base, RJ-45		
10 MHz reference output	10 MHz, >0 dBm, BNC-type female, 50 Ω (nom.)		
10 MHz reference intput	10 MHz, -5 to + 10 dBm, BNC-type female, 50 Ω (nom.)		
External Trigger Input	5V TTL level, BNC-type female, 10 kΩ		
Remote Control			
Communication Interface	LAN, USB Device, USB Host (USB-GPIB adaptor)		
Remote Control Capability	SCPI / Labview / IVI based on USB-TMC / VXI-11 / Socket / Telnet		
Remote Control	NI-MAX, Web Browser, Easy Spectrum Software, File Explorer		
General Specifications			
Input Power	AC voltage range : 100-240 V, 50/60 Hz or 100-120 V, 400 Hz		
Power consumption	35 W	35 W	70 W
Temperature & Humidity	Working Temperature : 0˚C to 30˚C, ≤ 95% Relative humidity		
	Storage Temperature : 30˚C to 50˚C, ≤ 75% Relative humidity		
Weight	Net : 4.30 Kg.	Net : 4.40 Kg.	Net : 4.70 Kg.
Dimmensions (W×H×D)	W : 393, H : 207, D : 116.5 mm		
Display	TFT LCD, 1024 X 600, 10.1 Inch multi touch screen		
Storage	Internal (Flash) 256 MB, external (USB storage device) 32 GByte		
Standard Accessories	Power Cord, USB Cable, CD		
Available Options	Description	Option No.	
	EMI Measurement Kit:	SMS1000XV-EMI	
	Advanced Measurement Kit	SMS1000XV-AMV	
	Distance to Fault	SMS1000XV-DTF	
	Digital Modulation: ASK, FSK, MSK, PSK, QAM	SMS1000XV-DMA	
	Analog Modulation: AM, FM	SMS1000XV-AMA	
	50 Ω N type Mechanical Calibration Kit: Open(M), Short(M), Match(M), Through Adapter(F-F)	F503ME	
	50 Ω 3.5mm/SMA type Mechanical Calibration Kit: Open(F), Short(F), Match(F), Through Adapter (F-F)	F603FE	
	300 kHz to 3 GHz Near Field Probe Kit: 3 H-probes (20/10/5 mm), 1 E-probe (5 mm)	SRF5030T	

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	Utility Kit: N(M)-SMA(M) cable (6 GHz), N(M)-N(M) cable (6 GHz), N(M)-BNC(F) adaptor x 2, N(M)-SMA(F) adaptor x 2, 10 dB 1 W attenuator	UKitSSA3X	
	N(M)-SMA(M) cable, 70cm, 6 Ghz	N-SMA-6L	
	N(M)-N(M) cable, 70cm, 6 GHz	N-N-6L	
	N(M)-BNC(M) cable, 70cm, 2 GHz	N-BNC-2L	
	USB-GPIB Adaptor	USB-GPIB	
Electromagnetic Compatibility			
EN 61326-1 : 2013 EN 61000-3-2 : 2014	Class A (The active input power of the EUT is less than 75 W. According to EN 61000-3-2, no limits are necessary.)		
EN 61000-3-3 : 2013	Plt: 0.65 Pst: 1.00, dmax: 4.00 %, dc: 3.00 %; dt Lim: 3.30 % dt>Lim: 500ms		
IEC 61000-4-2 : 2008	AD ± 8.0 kV, CD ± 4.0 kV		
IEC 61000-4-3 : 2006 + A1: 2007 + A2 : 2010	80 MHz to 1000 MHz : 10V/m, 1.4 GHz to 2.0 GHz : 3 V/m, 2.0 GHz to 2.7 GHz : 1V/m		
IEC 61000-4-4 : 2004 + A1: 2010	AC Line : ± 2.00 kV		
IEC 61000-4-5 : 2005	Line to Line: 1.0 kV, Line to Earth: 2.0 kV		
IEC 61000-4-6 : 2008	0.15-80 MHz : 3 V 1 KHz 80% AM		
IEC 61000-4-8 : 2009	30 A/m, 50/60 Hz		
IEC 61000-4-8 : 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			

Subject to change

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