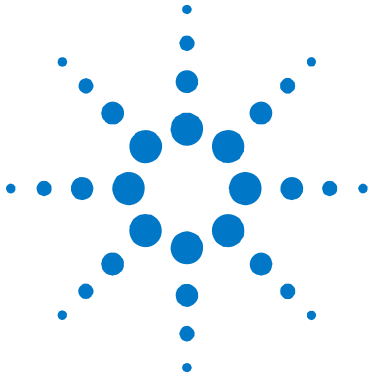

Agilent V2920A
Vector Signal Generator

Specifications

Agilent Technologies

Notices

Manual Part Number

V2920-90007

Edition

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Sales and Technical Support

To contact Agilent for sales and technical support, refer to the "support" links on the following Agilent web resources:

- www.agilent.com/find/V2920A(product-specific information and support)
- www.agilent.com/find/assist (worldwide contact information for repair and service)

Information on preventing damage to your Agilent equipment can be found at www.agilent.com/find/tips.

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Safety Notices

The following safety precautions should be

CAUTION

A **CAUTION** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a **CAUTION** notice until the indicated conditions are fully understood and met.

WARNING

A WARNING notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a WARNING notice until the indicated conditions are fully understood and met.

Specification notes

Specifications (warranted performance)

Specifications describe the instrument's warranted performance. All units are warranted to meet performance specifications under the following conditions:

- Ambient operating temperature of 18°C to 28°C, unless otherwise noted.
- After specified warm-up time of 30 minutes and self calibration at ambient temperature.

Note: All items are specifications unless otherwise noted.

Typical (mean plus three standard deviations)

"Typical" indicates performance that units will meet under the following conditions:

- Ambient operating temperature of 23°C, unless otherwise noted.
- After specified warm-up time of 30 minutes and self calibration at ambient temperature.
- This performance is not warranted.

Nominal (mean or expected value)

"Nominal" values indicate expected performance, or describe product performance that is useful in the application of the product, but is not covered by product warranty.

Basic modes of operation

CW (continuous waveform) Signal Generator mode: CW signal generator. Default mode.

Analog and Digital Signal Generator Personalities: general-purpose analog and digital modulation.

Vector Signal Generator Personalities: modulation quality source for GSM, GPRS, EDGE, GPS, cdma2000, and WCDMA mobile phone transmitter signals.

Frequency

Frequency parameters		Specification
Frequency range		V2920A-504: 10 MHz to 4.0 GHz
		V2920A-506: 10 MHz to 6.0 GHz[1]
Frequency input units		Hz, kHz, MHz, GHz
Frequency setting resolution		0.1 Hz
Frequency accuracy		Same as frequency reference + synthesizer resolution term[2]
Frequency switching time[3]	Via remote command after receipt of end-of-operation indicator (EOI)	≤ 2 ms (nominal) ≤ 1 ms (nominal) using Series V2900A Desktop Control Panel
	List or Swept Mode[4]	≤ 350 µs standard (300 µs typical) ≤ 750 µs V2920A-UPN

Frequency and amplitude switching time (standard or V2920A-UPN options)[5]				
Frequency Band	**Mode**	**From final value (dB)**	**Standard Time (µs)**	**V2920A-UPN Time (µs)**
10 MHz ≤ frequency ≤ 6000 MHz	Open loop	0.25	600	750
	Closed loop (fast)	0.25	750	750
	Sample and hold	0.25	900	900
(Band 1) 10 MHz ≤ frequency < 330 MHz	Open loop	0.20	450	750
	Closed loop (fast)	0.20	600	750
	Sample and hold	0.25	900	900
(Band 2) 330 MHz ≤ frequency < 3400 MHz	Open loop	0.20	450	750
	Closed loop (fast)	0.20	600	750
	Sample and hold	0.25	900	900
(Band 3) 3400 MHz ≤ frequency ≤ 6000 MHz	Open loop	0.25	550	750
	Closed loop (fast)	0.25	700	750
	Sample and hold	0.25	900	900

Internal frequency reference

Internal frequency reference parameters	Specification
Aging rate	≤ 1 ppm/year
Temperature stability	≤ 0.2 ppm[6]

Frequency reference output

Frequency reference parameters	Specification
Impedance	50 Ω (nominal), AC coupled
Ref output signal	10 MHz, +7 dBm ± 3 dB (nominal)

[1] Over range operation provided: 10 MHz to 6.9 GHz. Performance above 6.0 GHz is not specified.
[2] Synthesizer resolution term: ≤ 5 µHz.
[3] To within 0.1 ppm or 100 Hz of final value, whichever is greater. ALC on or off. Modulation on or off.
[4] Start and stop frequencies remain in the same Frequency band: Band 1 = 10 MHz to 330 MHz, Band 2 = 330 MHz to 3400 MHz, Band 3 = 3400 MHz to 6000 MHz. No change in programmed level.
[5] To within 0.1 ppm of final frequency value. List mode or sweep mode. Start and stop frequencies remain in the same Frequency band . If the start and stop frequencies cross frequency bands, use the 10 MHz to 6000 MHz row. Blank on tuning disabled.
[6] Total variation relative to 0ºC to 50ºC ambient temperature range.

External frequency reference input

External frequency reference parameters		Specification
Frequency lock range	Hardware lock mode[7]	10 MHz ±10 Hz (1ppm) input frequency lock range
	Variable input frequency mode	1 MHz to 60 MHz[8]
Amplitude		Lock range: -3 to +15 dBm[9]
Impedance		50 Ω (nominal)

List and step sweep modes

Parameter	Specification
Frequency step/sweep	Start, stop, number of points, dwell time
Amplitude step/sweep	Start, stop, number of points, dwell time
Dwell time min/max	0 sec to 999.9999 sec
Dwell time resolution	0.1 ms
Arbitrary List	List of frequency / amplitude/ dwell time sets
	Maximum number of sets = 1000

Spectral purity

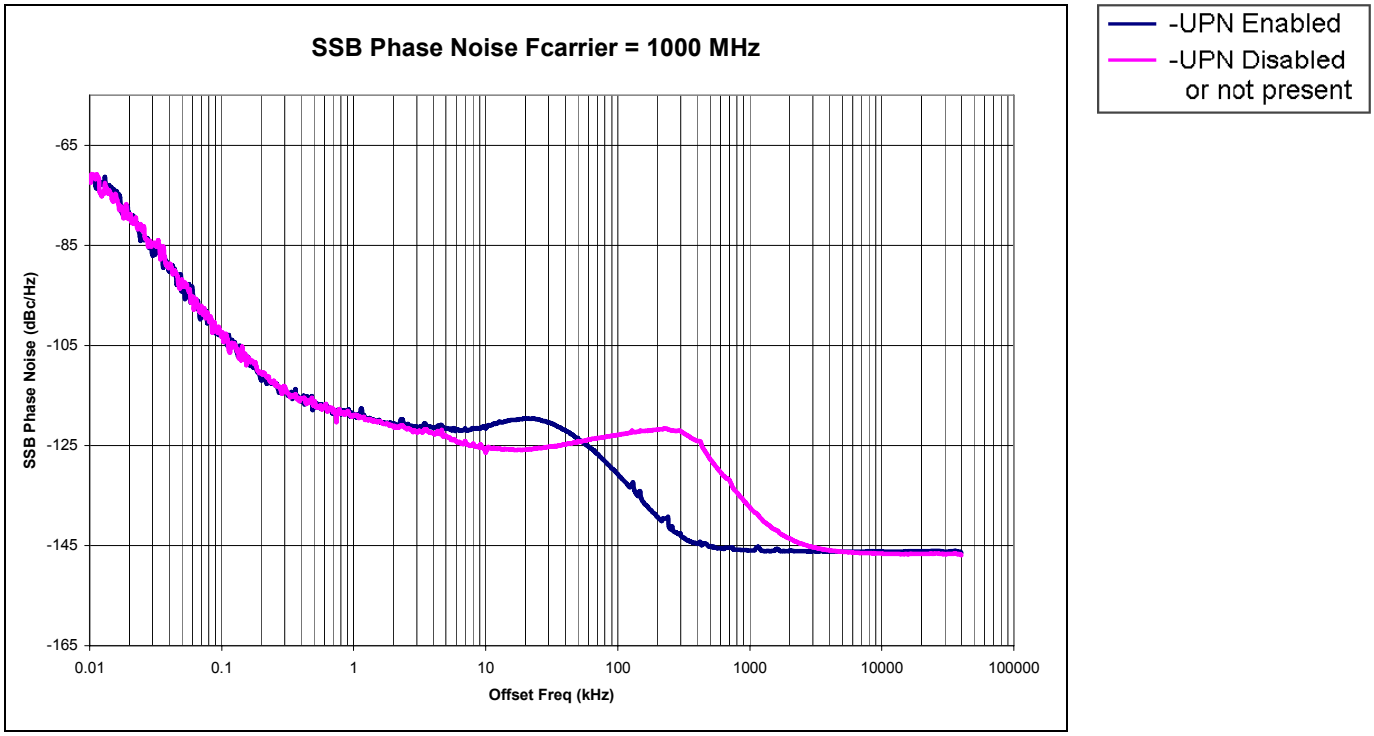
Spectral purity parameters			
Standard SSB phase noise; 300 kHz offset	**Carrier frequency (GHz)**	**Specification**	**Nominal**
	1	≤ -118 dBc/Hz	≤ -122 dBc/Hz
	2	≤ -112 dBc/Hz	≤ -117 dBc/Hz
	3	≤ -109 dBc/Hz	≤ -114 dBc/Hz
	4	≤ -106 dBc/Hz	≤ -110 dBc/Hz
	5.8	≤ -101 dBc/Hz	≤ -105 dBc/Hz
Harmonics and sub-harmonics[10]	**Fundamental frequency (Ff)**	**Harmonics specification (typical)**	**Sub-harmonics specification (typical)**
	20 MHz ≤ Ff < 120 MHz[11]	≤ -25 dBc	Not Applicable
	120 MHz ≤ Ff < 4.0 GHz	≤ -30 dBc	≤ -40 dBc
	4.0 GHz ≤ Ff ≤ 6.0 GHz	≤ -40 dBc	≤ -40 dBc
Non-harmonic spurious[12]	**Fundamental frequency (Ff)**	**Specification**	**Nominal**
	10 MHz ≤ Ff < 330 MHz	≤ -55 dBc	≤ -64 dBc
	330 MHz ≤ Ff < 1.0 GHz	≤ -55 dBc	≤ -64 dBc
	1.0 GHz ≤ Ff < 3.0 GHz	≤ -55 dBc	≤ -60 dBc
	3.0 GHz ≤ Ff < 4.0 GHz	≤ -55 dBc	≤ -58 dBc
	4.0 GHz ≤ Ff ≤ 6.0 GHz	≤ -50 dBc	≤ -55 dBc

[7] Factory preset setting
[8] On 10Hz boundaries Freq = 1 MHz + n * 10 Hz. Reference accuracy: ≤ ± 1 ppm. Sine or square wave inputs acceptable. Lock time may be up to 30 seconds.
[9] For optimum phase noise performance use hardware lock mode. Reference input power 0 to +10 dBm.
[10] Pout ≤ +4 dBm. Specifications apply to harmonic and sub-harmonic responses within the specified operating range of the instrument.
[11] Pout ≤ 0 dBm.
[12] Valid for responses offset from carrier >10 kHz, Pout = 0 dBm and modulation off, specifications apply to responses within the specified operating range of the instrument.

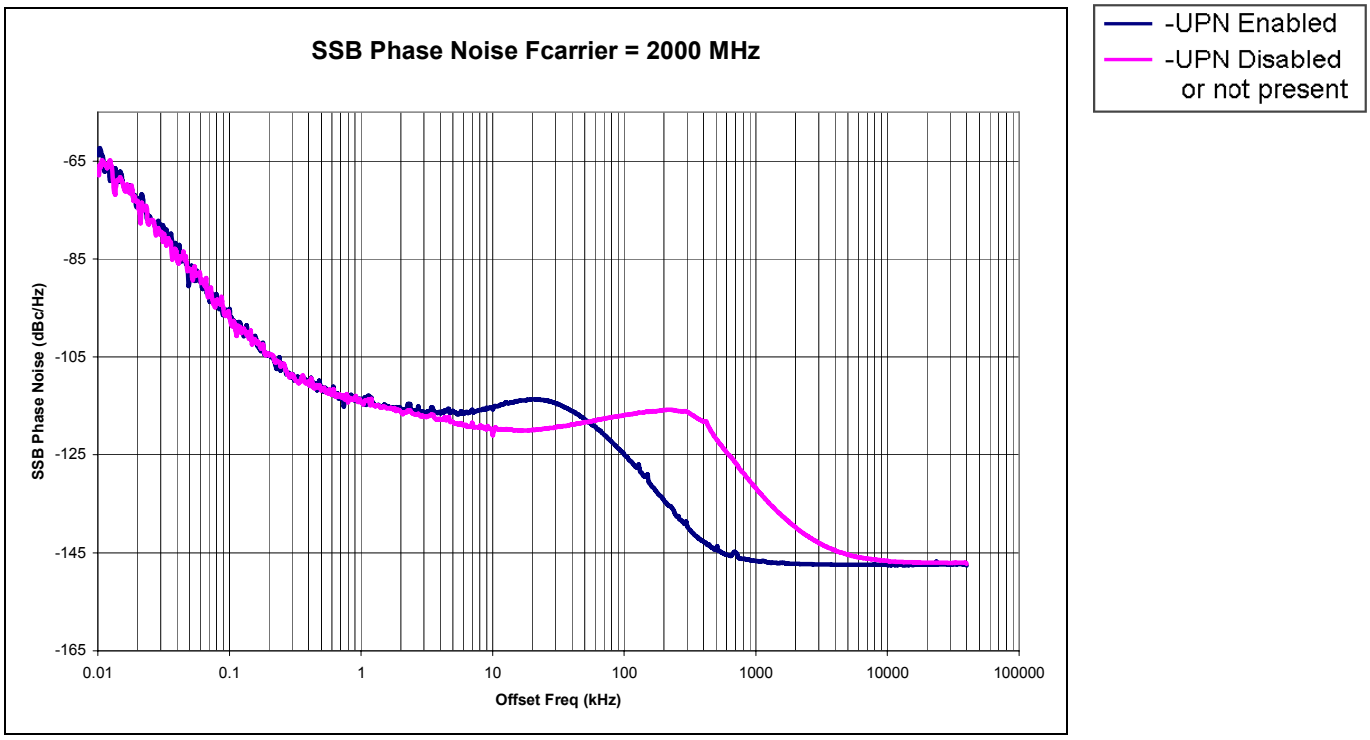
V2920A-UPN ultra low phase noise option

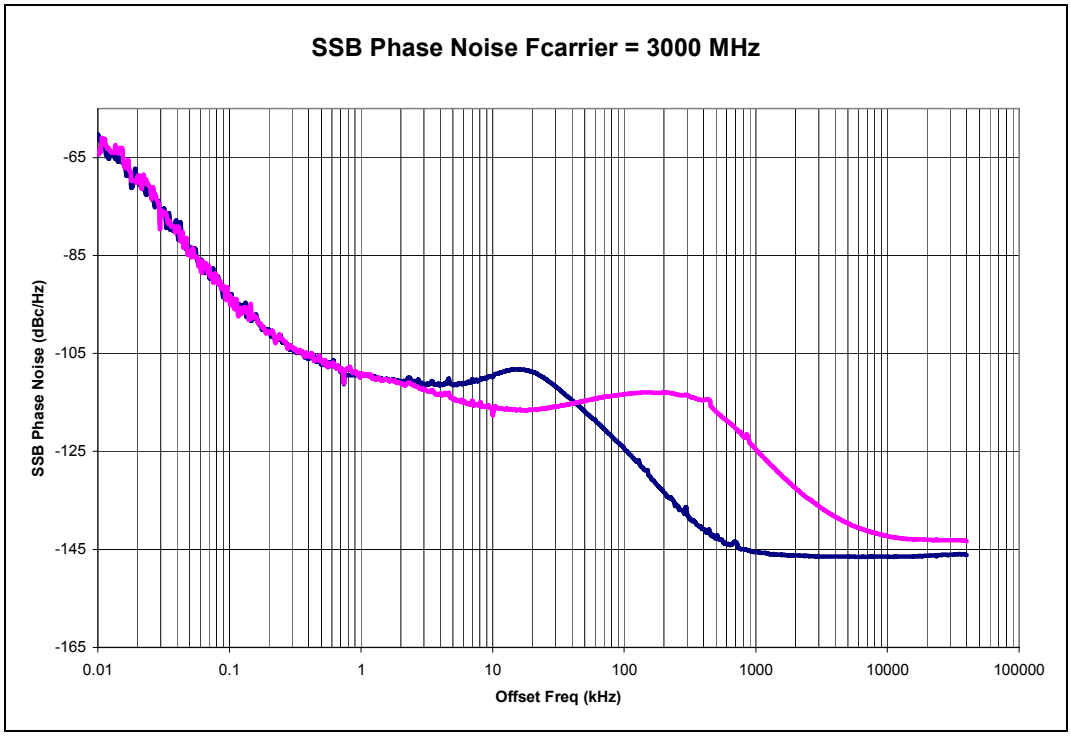
Ultra s				
	Carrier frequency	Specification (nominal) at offset frequency		
		100 kHz	300 kHz	1 MHz
SSB phase noise; dBc/Hz[13]	1.0 GHz	≤ -126 (-131)	≤ -138 (-143)	≤ -141 (-146)
	2.0 GHz	≤ -120 (-125)	≤ -135 (-139)	≤ -141 (-146)
	3.0 GHz	≤ -117 (-122)	≤ -133 (-137)	≤ -141 (-146)
	4.0 GHz	≤ -114 (-119)	≤ -129 (-133)	≤ -137 (-142)
	5.8 GHz	≤ -109 (-113)	≤ -125 (-129)	≤ -137 (-142)

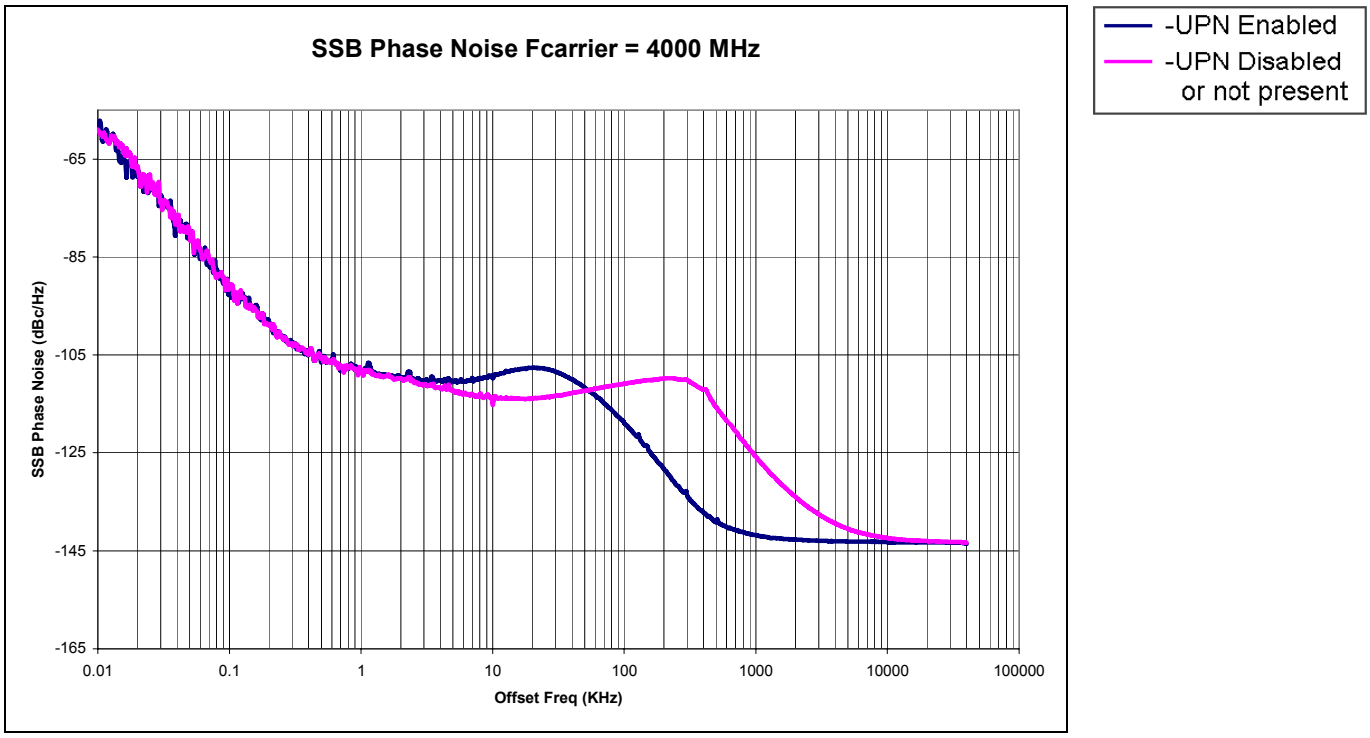
Phase noise for standard product vs. V2920A-UPN option

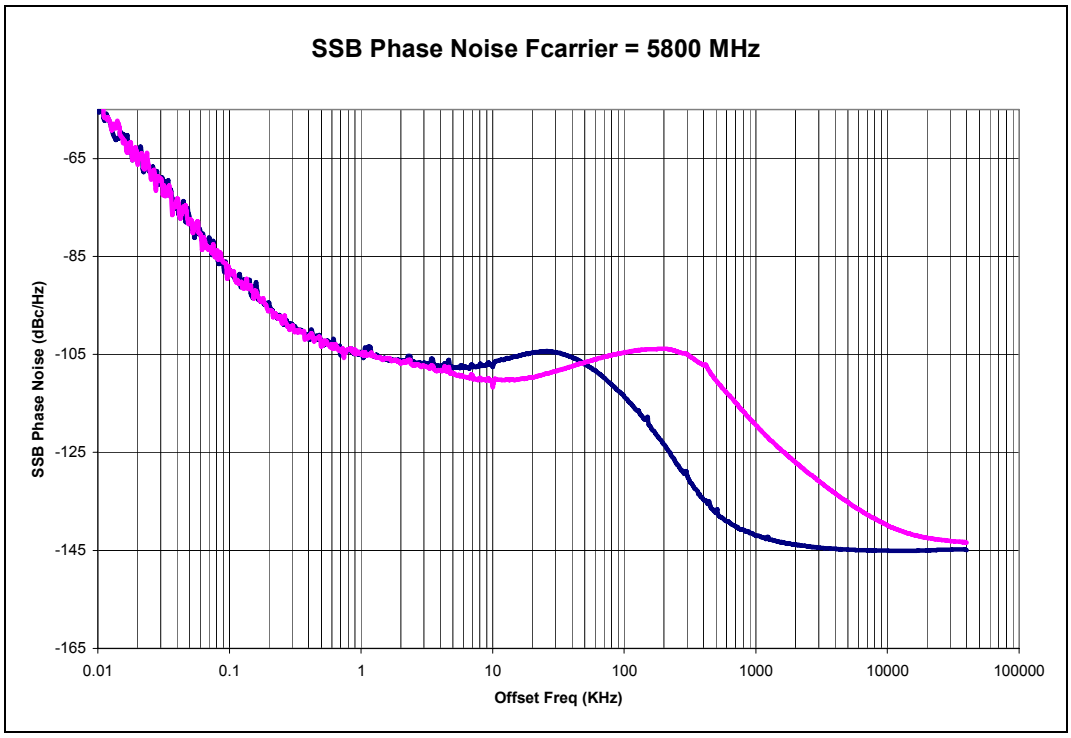


[13] RF output power set to 0 dBm.


SSB Phase Noise Fcarrier = 2000 MHz
-UPN Enabled
-UPN Disabled or not present
SSB Phase Noise (dBc/Hz)
-65
-85
-105
-125
-145
-165
0.01
0.1
1
10
100
1000
10000
100000
Offset Freq (kHz)


SSB Phase Noise Fcarrier = 3000 MHz
SSB Phase Noise (dBc/Hz)
-65
-85
-105
-125
-145
-165
0.01
0.1
1
10
100
1000
10000
100000
Offset Freq (kHz)


SSB Phase Noise Fcarrier = 4000 MHz
-UPN Enabled
-UPN Disabled or not present
SSB Phase Noise (dBc/Hz)
-65
-85
-105
-125
-145
-165
0.01
0.1
1
10
100
1000
10000
100000
Offset Freq (KHz)


SSB Phase Noise Fcarrier = 5800 MHz
SSB Phase Noise (dBc/Hz)
-65
-85
-105
-125
-145
-165
0.01
0.1
1
10
100
1000
10000
100000
Offset Freq (KHz)

Amplitude[14]

Amplitude parameters			
Amplitude level range (CW)	Specification		
	Carrier frequency	**Standard**	**V2920A-LAR**
	10 MHz to < 330 MHz	-110 to +10 dBm	-130 to +10 dBm
	330 MHz to < 3.0 GHz	-110 to +13 dBm	-130 to +13 dBm
	3.0 GHz to ≤ 6.0 GHz	-110 to +12 dBm	-130 to +12 dBm
Using built in waveforms			
Amplitude level range (GSM)		-110 to +6dBm	-130 to +6dBm
Amplitude level range (EDGE)		-110 to +6dBm	-130 to +6dBm
Amplitude level range (cdma2000)[15]		-110 to +3dBm	-130 to +3dBm
Amplitude level range (WCDMA)[16]		-110 to +4dBm	-130 to +4dBm
Amplitude setting resolution		0.01dB	
Amplitude input units		dBm	
Absolute amplitude level accuracy (CW); dB	**Amplitude level setting**	**Frequency (typical)**	
		10 MHz to < 330 MHz	**330 MHz to < 3.0 GHz**	**3.0 GHz to 4.0 GHz**	**4.0 GHz to 6.0 GHz**
	Maximum to > -75 dBm	≤ ± 0.6 (0.3)	≤ ± 0.6 (0.3)	≤ ± 0.7 (0.4)	≤ ± 0.7 (0.4)
	-75 dBm to ≥ -110 dBm	≤ ± 0.6 (0.3)	≤ ± 0.6 (0.3)	≤ ± 0.8 (0.4)	≤ ± 0.8 (0.4)
	V2920A-LAR				
	-110 dBm to > -120 dBm	≤ ± 0.6 (0.3)	≤ ± 1.0 (0.6)	≤ ± 1.5 (0.7)	≤ ± 1.5 (0.7)
	-120 to dBm ≥ -125 dBm	≤ ± (0.6)	≤ ± (0.6)	≤ (0.7)	≤ ± (0.7)
User flatness correction max number of points = 20 (points are amplitude correction & frequency pairs)					
Power change over temperature 0°C to 50°C (nominal)		0.02 dB/°C			
Relative amplitude accuracy - linearity[17] (nominal)		≤ ± 0.05 dB			
Amplitude repeatability[18] (nominal)		≤ ± 0.05 dB			
Output match – VSWR	**Carrier frequency; Fc**	**Specification**	**Typical**		
	10 MHz ≤ Fc ≤ 3.4 GHz	< 1.45:1	< 1.3:1		
	3.4 GHz < Fc ≤ 6.0 GHz	< 1.60:1	< 1.4:1		
Reverse power protection[19]		+35 dBm or 10 VDC			
Amplitude switching time		**Specification**			
	Via remote command – after receipt of end-of-operation indicator (EOI)	≤ 2 ms (nominal) ≤ 1 ms (nominal) using Series V2900A Desktop Control Panel			

[14] Specifications apply when ALC is in auto mode, unless otherwise stated.
[15] +3 dBm max for Pilot only. +0.5 dBm max for Forward 9 channel.
[16] +4 dBm max for CPICH only. -1.0 dBm max for Test Model 1 with 16 DPCH.
[17] Applies for changes in amplitude setting only. -110 dBm < Pout < Pmax, CW signal, ALC mode: Auto.
[18] -110 dBm < Pout < Pmax, CW signal, ALC mode: Auto.
[19] Up to 50 VDC with optional external DC block, Agilent part number, V2999A-DCB.

V2900A-101: Analog modulation personality[20]

Frequency modulation parameter		Specification
FM modulation frequency range		1 Hz to 100 kHz
FM modulation frequency setting resolution		1 Hz
FM deviation internal sine wave only		0 Hz to 1 MHz
FM distortion		< 1.5% (nominal)
Internal modulation waveform types		Sine, ramp up, ramp down and triangle waves
Amplitude modulation parameter		**Specification**
AM modulation frequency range		1 Hz to 100 kHz
AM modulation frequency setting resolution		1 Hz
AM modulation depth		0 to 100%
AM distortion[21]		< 1.5% (nominal)
Internal modulation waveform types		Sine, ramp up, ramp down and triangle waves
Phase (Φ) modulation parameter		**Specification**
Φ modulation frequency range		1 Hz to 100 kHz
Φ modulation frequency setting resolution		1 Hz
Φ deviation		0 to 100 radians
Φ distortion		< 1.5% (nominal)
Internal modulation waveform type		Sine wave only
Pulse modulation parameter		**Specification**
PM pulse repetition rate		1 Hz to 100 kHz
PM pulse repetition rate setting resolution		1 Hz
PM minimum pulse width[22]		1.2 µs (nominal)
PM rise/fall time (10% to 90%)[23]		< 600 ns (nominal)
PM on-off ratio[24]	**Pulse width**	**Nominal**
	< 5 µs	> 40 dB
	≥ 5 µs	> 100 dB
Two-tone parameters		**Specification**
Two-tone CW frequency separation settings		2 Hz to 2 MHz
Noise modulation parameters		**Specification**
Modulation bandwidth[25]		1 kHz to 2.5 MHz

[20] Frequency ranges and resolution can be multiplied by up to 40 times with V2920-Bxx license. For example, FM deviation can be extended to 40 MHz.
[21] Output power ≤ 0 dBm.
[22] Can be decreased by up to 40 times with V2920A-Bxx license.
[23] Can be decreased by up to 40 times with V2920A-Bxx license.
[24] Valid when Pulse Modulation is the only active modulation type. The higher on-off ratio is attained using Arb Blanking feature.
[25] 6 dB double sided. Can be increased up to 40 times with V2920A-Bxx license.

V2920A-BBA Baseband analog I-Q inputs and outputs option

Baseband analog inputs		**Specification (nominal)**
External IQ input 3dB bandwidth[26]		I channel: (DC-200 MHz) Q channel: (DC-200 MHz)
Input impedance (single-ended only)		50 Ω (nominal) , DC coupled, SMB (m) connector
Maximum input V (DC + AC peak)[27]		±3V peak damage level
Baseband analog outputs		**Specification (nominal)**
0.2 dB Bandwidth[28]		I channel: (DC-40 MHz); Q channel: (DC-40 MHz)
Output impedance (single ended only)		50 Ω (nominal), DC coupled, SMB (m) connector
Full scale output V (DC +AC peak)		±1.0 V peak
Maximum reverse input voltage (damage level)		±1.0 V
IQ offset (DC & quadrature adjustment)		±12.5% of full scale ±10°
IQ gain		0 to full scale
Accuracy[29]	Parameter	Specification (typical)
	Carrier suppression	≤ -60 (-65) dBc
	Image rejection	≤ -50 (-55) dBc

V2920A-Bxx: Arbitrary waveform generator

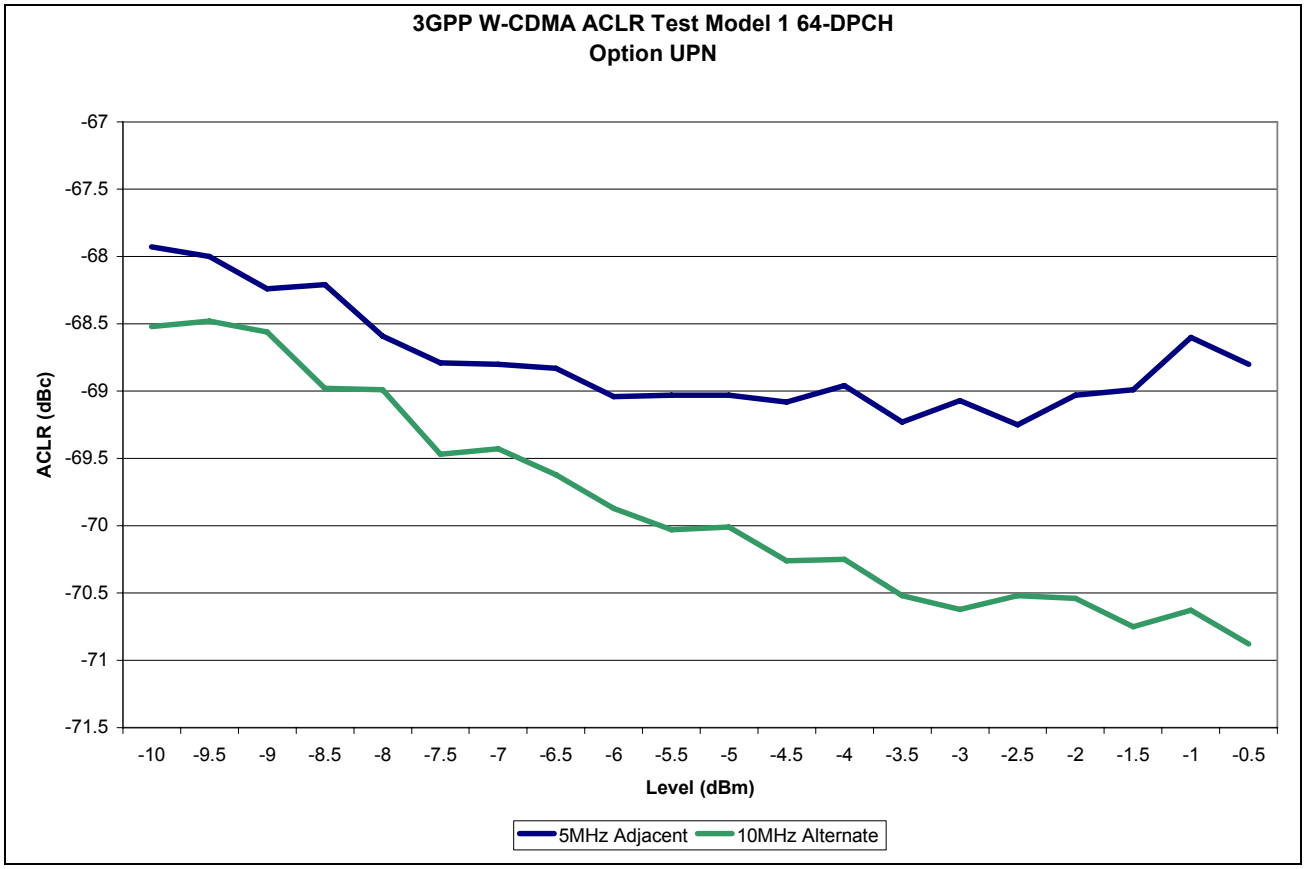
Parameter		**Specification**
Maximum modulation bandwidth for internal modulation generation	V2920A-B20	20 MHz (25 MSa/sec)
	V2920A-B40	40 MHz (50 MSa/sec)
	V2920A-B80	80 MHz (100 MSa/sec)
Waveform memory		100 megasamples
Minimum segment length		1000 samples
Maximum segment length		100 megasamples
Max number of segments in a sequence		400 segments
Non-volatile memory		2 GB

[26] 3 dB BW. With inputs applied directly to I/Q modulator. User needs to provide correction for I/Q AC and DC amplitude and phase skew and offsets.
[27] Maximum voltage includes Offsets and Signal for nominal input of 50 Ω. Optimal drive voltage is ± 0.8 V.
[28] Into 50 Ω impedance.
[29] At the V2920A output ports, 0.5V peak-to-peak output voltage.

V2900A-105: W-CDMA FDD uplink and downlink signal generator personality

W-CDMA parameter		Specification	
Frequency range		1800 MHz to 2200 MHz	
		Typical	**Nominal**
EVM RMS[30]		< 0.85%	< 0.75%
ACLR[31]	Adjacent	> 68 dBc	> 70 dBc
	Alternate	> 72 dBc	> 73 dBc
With V2920A-UPN			
ACLR[32]	Adjacent	> 68 dBc	> 70 dBc
	Alternate	> 73 dBc	> 73 dBc

ACLR vs. Output power nominal[33]



[30] Pout ≤ -10 dBm.
[31] CPICH only. Pout ≤ -1 dBm. Adjacent spacing 5 MHz offset. Alternate spacing 10 MHz offset.
[32] CPICH only. Pout ≤ -1 dBm. Adjacent spacing 5 MHz offset. Alternate spacing 10 MHz offset.
[33] Single carrier

V2900A-104: Cdma2000 and IS-95A forward link signal generation personality

CDMA2000 and cdmaOne parameter			
Frequency range		800 MHz to 900 MHz; 1800 MHz to 1900 MHz	
		Typical	**Nominal**
RHO[34]		> 0.9995	> 0.9999
ACPR[35]	Adjacent at 750 kHz	> 70 dBc	> 72 dBc
	Adjacent at 885 kHz	> 75 dBc	> 78 dBc
	Alternate at 1980 kHz	> 85 dBc	> 90 dBc
With V2920A-UPN			
ACPR[36]	Adjacent at 750 kHz	> 70 dBc	> 73 dBc
	Adjacent at 885 kHz	> 77 dBc	> 83 dBc
	Alternate at 1980 kHz	> 87 dBc	> 91 dBc

V2900A-103: GSM modulation personality

EDGE/GSM parameter			
Frequency Range		800 MHz to 900 MHz, 1800 MHz to 1900 MHz	
		Typical	**Nominal**
EVM for EDGE[37]		< 0.60% RMS	< 0.35% RMS
Phase Error for GSM[38]		< 0.25° RMS	< 0.15° RMS
ORFS for EDGE (nominal)		**Carrier Frequency; Fc**	
	Frequency Offset; kHz	**990 MHz Pout = +6 dBm**	**1955 MHz Pout = +6 dBm**
	200	-38 dBc	-38 dBc
	400	-69 dBc	-65 dBc
	600	-75 dBc	-72 dBc
	1200	-82 dBc	-80 dBc
	1800	-79 dBc	-79 dBc
ORFS for GSM (nominal)		**Carrier Frequency; Fc**	
	Frequency Offset; kHz	**990 MHz Pout = +6 dBm**	**1955 MHz Pout = +6 dBm**
	200	-36 dBc	-36 dBc
	400	-69 dBc	-65 dBc
	600	-77 dBc	-72 dBc
	1200	-83 dBc	-81 dBc
	1800	-81 dBc	-79 dBc

[34] Pilot only.
[35] Pilot only. Pout ≤ -4 dBm.
[36] Pilot only. Pout ≤ -4 dBm.
[37] Measured at Pout = 0 dBm.
[38] Measured at Pout = +4 dBm.

EDGE/GSM parameter			
With V2920A-UPN			
ORFS for EDGE (nominal)		**Carrier Frequency; Fc**	
	Frequency Offset; kHz	**990 MHz Pout = +6 dBm**	**1955 MHz Pout =+6 dBm**
	200	-38 dBc	-38 dBc
	400	-72 dBc	-72 dBc
	600	-80 dBc	-80 dBc
	1200	-83 dBc	-83 dBc
	1800	-80 dBc	-80 dBc
ORFS for GSM (nominal)		**Carrier Frequency; Fc**	
	Frequency Offset; kHz	**990 MHz Pout = +6 dBm**	**1955 MHz Pout =+6 dBm**
	200	-36 dBc	-36 dBc
	400	-71 dBc	-71 dBc
	600	-81 dBc	-81 dBc
	1200	-85 dBc	-85 dBc
	1800	-81 dBc	-81 dBc

V2900A-106: GPS signal generation personality

GPS parameter	Specification
Carrier frequency	200 MHz to 2.5 GHz Button provided to set carrier frequency to L1 (1575.42 MHz)
C/A code ID range	1 through 37, Default value = 1
Data pattern	Selectable: PN9 (default), PN15, all ones, all zeros, square 1-bit [0 1] and square 2-bit [0011] User-defined: Pattern from a file, length range of 1 to 37,504 bits Default pattern = PN9
Doppler shift range	-10 kHz to +10 kHz, default value = 0 Hz
EVM	3.5% (nominal)

V2900A-102: General purpose digital modulation generation personality

Common parameters		Common specifications
Symbol rate	Symbol rate resolution	1 Sps (symbols per second)
	Minimum symbol rate	500 Sps
	Maximum symbol rate	2 MSps for NRZ, Gaussian, and Wideband 25 MSps for RC and RRC
Filters	Filter types	NRZ, RC, RRC, Gaussian, and Wideband
Filter factor	RC, RRC Gaussian	Ratio is 0.2 to 1.0 Ratio is 0.2 to 3.0
Symbol format	Differential encoding	On/Off
Sequence format	Output inversion	On/Off
Data pattern	PRBS	PN5, PN9, PN11, PN15
	Count	Radix
	Alternating 0,1	1-16

Modulation format	Modulation type	Parameter	Specification
ASK	OOK (ASK2) ASK4 SASK2 SASK4	See *Common parameters* above	See *Common parameters* above
FSK	FSK2	Frequency separation resolution	1 Hz
		Frequency separation range	0 to 2 x symbol rate in Sps
PSK	BPSK QPSK QPSK-π/4 QPSK-3π/4 OQPSK 8PSK	See *Common parameters* above	See *Common parameters* above
QAM	QAM 16 QAM 32 QAM 64 QAM 128 QAM 256	See *Common Parameters* above	See *Common parameters* above

EVM nominal values for V2900A-102[39]

Format	Filter conditions	RMS EVM
QPSK	RRC, α=default (0.35)	≤ 1.5%
16QAM	RRC, α=default (0.35)	≤ 1.5%
FSK	Gaussian BT = 0.7	≤ 1.5%

[39] Characterized at 2.5 GHz and 6.0 GHz. Symbol rates from minimum to maximum. For best results at low symbol rates, use the V2920A external reference hardware lock mode.

Supplementary Nominal Values

V2900A-201: SignalMeister license for cdmaOne®, cdma2000®, and 1xEV-DV forward and reverse Links

			V2920A
RHO (ρ) [40]	cdma2000 forward link	800 MHz to 2025 MHz	≥ 0.9999
	cdma2000 reverse link	800 MHz to 2025 MHz	≥ 0.9998
ACPR [40, 41]	cdma2000 forward link	800 MHz to 900 MHz	Adjacent: < -78 dBc Alternate: < -90 dBc
		1800 MHz to 1900 MHz	Adjacent: < -74 dBc Alternate: < -88 dBc
		1900 MHz to 2025 MHz	Adjacent: < -73 dBc Alternate: < -87 dBc
	cdma2000 reverse link	800 MHz to 900 MHz	Adjacent: < -80 dBc Alternate: < -91 dBc
		1800 MHz to 1900 MHz	Adjacent: < -76 dBc Alternate: < -88 dBc
		1900 MHz to 2025 MHz	Adjacent: < -75 dBc Alternate: < -88 dBc

V2900A-202: SignalMeister™ license for W-CDMA FDD uplink and downlink

V2900A-203: SignalMeister license for W-CDMA HSPA

Frequency range: 1800 MHz to 2200 MHz

		V2920A
EVM [42]	W-CDMA downlink	≤ 0.4%
	W-CDMA uplink	≤ 0.4%
	HSUPA	≤ 0.4%
ACLR [43]	W-CDMA downlink	Adjacent: < -68 dBc Alternate: < -75 dBc
	W-CDMA uplink	Adjacent: < -66 dBc Alternate: < -76 dBc
	HSUPA	Adjacent: < -64 dBc Alternate: < -76 dBc

[40] RF amplitude setting: +3 dB (pilot only).
[41] RF amplitude setting: (V2920A): -1 dBm (pilot only). Adjacent spacing: 750 kHz offset. Alternate spacing: 1.98 MHz offset.
[42] RF amplitude setting: +3 dB (CPICH only).
[43] RF amplitude setting (V2920A): -3 dBm (CPICH only). Adjacent spacing: 5 MHz offset. Alternate spacing: 10 MHz offset.

V2900A-205: SignalMeister license for 802.11a, b, g, j WLAN signals

	Standard	Frequency band	V2920A
EVM [44, 45]	802.11a	5150 MHz to 5825 MHz	≤ -41 dB
	802.11b	2400 MHz to 2500 MHz	≤ -38 dB
	802.11g	2400 MHz to 2500 MHz	≤ -42 dB
	802.11j	4900 MHz to 5000 MHz	≤ -41 dB
ACP-adjacent[44, 45]	802.11a	5150 MHz to 5825 MHz	≤ -45 dBc
	802.11b	2400 MHz to 2500 MHz	≤ -36 dBc
	802.11g	2400 MHz to 2500 MHz	≤ -45 dBc
	802.11j	4900 MHz to 5000 MHz	≤ -55 dBc

V2900A-206 Signalmeister™ license for WLAN (802.11n)

Parameter	Signal Type (64 QAM)	Nominal EVM
Standard phase noise	20 MHz BW, 2.4 GHz	< -41 dB
	20 MHz BW, 3.5 GHz	< -41 dB
	40 MHz BW, 5.8 GHz	< -37 dB
V2920A-UPN	20 MHz BW, 2.4 GHz	< -48 dB
	20 MHz BW, 5.8 GHz	< -45 dB
	40 MHz BW, 5.8 GHz	< -43 dB

V2900A-208 Signalmeister™ license for WiMAX (802.16e)

WIMAX parameter 802.16e-2005 mobile WiMAX	Nominal
Carrier Frequency	Residual RCE [46]
2300 MHz to 2690 MHz	≤ -45 dB
3400 MHz to 3800 MHz	≤ -44 dB
4000 MHz to 4999 MHz	≤ -44 dB
5150 MHz to 5825 MHz	≤ -43 dB

[44] RF amplitude: -1 dBm (for V2920A EVM and ACP data).
[45] Signal characteristics: 802.11b: 11 Mbps, 50% duty cycle, Gaussian filter; 802.11a, g: 54 Mbps, 50% duty cycle, 20 MHz bandwidth, Bartlett filter; 802.11j: 27 Mbps, 90% duty cycle, 10 MHz, Bartlett filter.
[46] Signal nominal values: Pout: -2 dBm, DL subframe, 10 MHz bandwidth, 1024 subcarrier FFT, 1/8, 30-symbol guard period, PN9 data.

Trigger and synchronization inputs and outputs

Parameters	Events
Trigger modes	▪ Free run ▪ Trigger sweeps in sweep or list mode ▪ Trigger a sweep or list ▪ Trigger start of arb waveform
Arb sequence trigger modes	▪ Stepping only ▪ Start and step
Trigger sources	▪ SCPI or rear panel trigger ▪ Rising edge of external TTL input ▪ Falling edge of external TTL input
External trigger nominal values	▪ Minimum input pulse width required 50nsec (nominal) ▪ Trigger repeatability ±10 nsec
Trigger delay	0 sec to 1 sec
Sync output modes	Generate a sync pulse: ▪ Never (off) ▪ On arb waveform wrap ▪ At beginning of sweep, list or sequence ▪ At end of each step in sweep, list or sequence ▪ At end of dwell in sweep, list or sequence ▪ At end of sweep, list or sequence
Sync output polarity select	▪ Sync out is on rising edge ▪ Sync out is on falling edge
Sync output nominal values	3.3 V CMOS, SMV (m) Minimum pulse width 200 ns
Even second clock input	External even second clock 3.3V CMOS, SMB (m)
Even second clock output	External even second clock 3.3V CMOS, SMB (m)

General specifications

<table>
<tr><th>Parameter</th><th>Specification</th></tr>
<tr><td>IEC</td><td>This product is designed for use in INSTALLATION CATEGORY II and POLLUTION DEGREE 2, per IEC 61010-1 Second Edition.</td></tr>
<tr><td>EMC compliance</td><td>▪ Complies with European EMC Directive 2004/108/EC
▪ IEC/EN 61326-1 or IEC/EN 61326-2-1
▪ CISPR Pub 11 Group 1, class A
▪ AS/NZS CISPR 11
▪ ICES/NMB-001: This ISM device complies with Canadian ICES-001. (Cet appareil ISM est conforme a la norme NMB du Canada.)</td></tr>
<tr><td>Safety compliance</td><td>▪ Complies with European Low Voltage Directive 2006/95/EC
▪ IEC/EN 61010-1, 2nd Edition
▪ Canada: CSA 22.2 N0. 61010-1-04
▪ USA: UL Std No. 61010-1 (Second Edition)
▪ This instrument is in conformance with the German Regulation on Noise Declaration for Machines (Laermangabe nach der Maschinenlaermrerordnung - 3.GSGV Deutschland):
<table>
<tr><th>Acoustic noise emission</th><th>Geraeuschemission</th></tr>
<tr><td>LpA < 70 dB
Operator position
Normal position
Per ISO 7779</td><td>LpA < 70 dB
Am Arbeitsplatz
Normaler Betrieb
Nach DIN 45635 t.19</td></tr>
</table></td></tr>
<tr><td>Power requirements</td><td>100 VAC to 240 VAC; 50/60 Hz (automatically detected); 150 VA</td></tr>
<tr><td>Calibration</td><td>Annual calibration cycle in system</td></tr>
<tr><td>Environment
(for indoor use only)</td><td>▪ 18°C to 28°C specified operating, unless otherwise noted
▪ 0°C to 50°C operating range (+23°C is optimal)
▪ -25°C to 65°C storage (AC power off)
▪ Altitude: 2000 meters above sea level maximum specified operating
▪ Cooling forced air top, bottom and side intakes and rear exhaust. For proper cooling in a rack, use Agilent Technologies Inc. V2920A-1CM Rack Mount Kit</td></tr>
<tr><td>Digital inputs/outputs</td><td>4 bits, TTL-compatible</td></tr>
<tr><td>Interfaces</td><td>▪ IEEE-488.1 compliant. Supports IEEE-488.2 -common commands and status model topology
▪ LAN: 10/100BT Ethernet, RJ45, LXI Class C, no auto MDIX
▪ IVI-COM
▪ USB: USB full speed
o B-style connector (“FROM HOST”) is USB 2.0 compliant
o All A-style connectors are USB 1.1 compliant
▪ Supports Agilent V3500A in pass-through mode using USB
▪ RF out: Type N connector</td></tr>
<tr><td>Mechanical vibration and shock (type tested)</td><td>▪ Random Vibration: MIL-PRF-28800F CL3, 3 axes, 5-500 Hz, 2.09g RMS
▪ Sine-Sweep for resonances: 3 axes, 5-500 Hz, 0.5g
▪ Bench Handling: MIL-STD-810F, 4.5.7 Procedure VI</td></tr>
<tr><td>General mechanical information</td><td>▪ Height: 3U (133 mm) (5.25 in.)
▪ Width: half-rack (213 mm) (8.4 in.)
▪ Depth: 464 mm (18.25 in.)
▪ Weight: 9.3 kg (20.5 lb)</td></tr>
<tr><td>Warranty</td><td>1 year</td></tr>
<tr><td>Accessories supplied</td><td>▪ AC power cable
▪ Printed Quick Start Guide
▪ CD-ROM containing V2920A VSG system help, utility programs, and PDF files (also available on-line at www.agilent.com).
▪ On-board, context-sensitive help system</td></tr>
</table>