

## GSP-9300B

NEW



## PRACTICAL, AFFORDABLE AND NEVER CARELESS!

GSP-9300B is a 3GHz spectrum analyzer to meet basic RF measurement requirements. It provides the frequency stability of 0.025ppm; the aging rate of 1ppm/year; a built-in preamplifier; the base noise of -149dBm/Hz, and more than 20 measurement applications, including AM/FM modulation signal analysis, signal channel analysis, and CATV parameter test. While collocating with TG option, GSP-9300B can conduct frequency response or power linearity tests for components.

For monitoring signals, GSP-9300B provides Topographic display mode, which is capable of distinguishing continuous or random signals by using color temperature. Spectrogram mode provides a time axis on spectrum display that allows users to observe signal variations based upon the reference of time. Split window mode allows different parameter settings for each display window. Additionally, GSP-9300B also provides user-friendly user interfaces such as display mode, help, multi-languages, and fast data logging, etc. Interfaces and software include USB/RS-232/LXI/MicroSD/GPIB (option)/DVI output and dedicated PC software IVI Driver.

GSP-9300B, with its unique features, including auto wake-Up, sequence function, and limit line testing, is specially designed to meet the requirements of production lines. The patent design of heat conduction allows GSP-9300B to substantially reduce the warm-up time so as to expedite production processes. Options include tracking generator, carrying bag, battery module, EMI antenna set and rack accessories. The compact design of GSP-9300B satisfies either field testing or the integration of automatic testing systems.

To sum up, GSP-9300B is a stable, light and all-purpose test equipment, which is the most ideal choice for the educational market, production line, and general signal monitoring applications, etc. Most important, the pricing of GSP-9300B is beyond your imagination and it is the number one choice for users with budget considerations.

### Frequency Stability : 0.025ppm

Wireless communications applications are nowadays ubiquitous. Signals in the limited spectrum are getting very crowded. Therefore, the demands of signal efficiency and frequency stability are higher and stricter. To meet high precision measurement requirements, GSP-9300B provides the frequency stability of 0.025ppm and the aging rate of 1ppm/year, which only appear in high-end T&M equipment.

### Built-in Preamplifier

Engineers often face the challenge of measuring small RF signals during product development stage. GSP-9300B's built-in preamplifier provides the base noise of -149dBm. When collocating with the built-in EMI filter and the dedicated EMI near field probe, GSP-9300B can conduct EMI tests and debugging.

### More Than 20 Measurement Applications

GSP-9300B provides rich signal processing functions, including AM/FM modulation signal analysis, signal channel analysis, and CATV parameter test, characteristic test on signal stability, and frequency response or power linearity tests for components to substantially bring up the measurement convenience. Most competitors in the same class only offer a few test functions, and the standard built-in functions of GSP-9300B are options for competitors.

## FEATURES

- Frequency Range : 9kHz ~ 3 GHz
- 0.025ppm Frequency Stability and 1ppm Aging Rate
- Built-in Preamplifier, 50dB Attenuator, and Sequence Function
- RBW : 1Hz ~ 1MHz
- Sensitivity : -149dBm/Hz (@PreAmp on)
- Built-in AM/FM Demodulation & Analysis
- Built-in P1dB point, Harmonic, Channel Power, N-dB Bandwidth, OCBW, ACPR, SEM, TOI, CNR, CTB, CSO, Noise Marker, Frequency Counter, Time Domain Power, Gated Sweep
- Built-in Spectrogram, Topographic and Dual-View Display Modes
- Remote Control Interface : LAN, USB, RS-232
- Options : Tracking Generator, GPIB Interface

## APPLICATIONS

- For the Quick Check and Analysis of Spectral Characteristic
- Analyze AM, FM Signal Characteristics
- Monitor Satellite Uplink Signals From Satellite Uplink Truck
- Test Systems That Require a Very Compact Instrument
- Measure The Frequency Response of Cable, Attenuator, Filter and Amplifier

# SPECIFICATIONS

## FREQUENCY

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<b>Range</b>	9 kHz ~ 3 GHz	
<b>Resolution</b>	1 Hz	

### FREQUENCY REFERENCE

<b>Accuracy</b>	$\pm(\text{period since last adjustment} \times \text{aging rate}) + \text{stability over temperature} + \text{supply voltage stability}$	
<b>Aging Rate</b>	$\pm 1 \text{ ppm max.}$	1 year after last adjustment
<b>Frequency Stability Over Temperature</b>	$\pm 0.025 \text{ ppm}$	0 ~ 50 °C
<b>Supply Voltage Stability</b>	$\pm 0.02 \text{ ppm}$	

### FREQUENCY READOUT ACCURACY

<b>Start, Stop, Center, Marker</b>	$\pm(\text{marker frequency indication} \times \text{frequency reference accuracy} + 10\% \times \text{RBW} + \text{frequency resolution})$	
<b>Trace Points</b>	Max. 601 points, Min. 6 points	

### MARKER FREQUENCY COUNTER

<b>Resolution</b>	1 Hz, 10 Hz, 100 Hz, 1 kHz	
<b>Accuracy</b>	$\pm(\text{marker frequency indication} \times \text{frequency reference accuracy} + \text{counter resolution})$	RBW/Span $\geq 0.02$ ; Mkr level to DNL $>30$ dB

### FREQUENCY SPAN

<b>Range</b>	0 Hz (zero span), 100 Hz ~ 3 GHz	
<b>Resolution</b>	1 Hz	
<b>Accuracy</b>	$\pm$ frequency resolution	RBW : Auto

### PHASE NOISE

<b>Offset from Carrier</b>		Fc=1GHz;RBW=1kHz,VBW=10Hz;Average $\geq 40$
<b>10 kHz</b>	$< -88 \text{ dBc/Hz}$	Typical
<b>100 kHz</b>	$< -95 \text{ dBc/Hz}$	Typical
<b>1 MHz</b>	$< -113 \text{ dBc/Hz}$	Typical

### RESOLUTION BANDWIDTH (RBW) FILTER

<b>Filter Bandwidth</b>	1 Hz ~ 1 MHz in 1-3-10 sequence 200 Hz, 9 kHz, 120 kHz, 1MHz	-3dB bandwidth
<b>Accuracy</b>	$\pm 8\%$ , RBW = 1MHz ; $\pm 5\%$ , RBW < 1MHz	-6dB bandwidth
<b>Shape Factor</b>	$< 4.5 : 1$	Nominal
		Normal Bandwidth ratio: -60dB:-3dB

### VIDEO BANDWIDTH (VBW) FILTER

<b>Filter Bandwidth</b>	1 Hz ~ 1 MHz in 1-3-10 sequence	-3dB bandwidth
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### AMPLITUDE

#### AMPLITUDE RANGE

<b>Measurement Range</b>	100 kHz ~ 1 MHz 1 MHz ~ 10 MHz 10 MHz ~ 3 GHz	Displayed Average Noise Level (DANL) to 18 dBm DANL to 21 dBm DANL to 30 dBm
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#### ATTENUATOR

<b>Input Attenuator Range</b>	0 ~ 50 dB, in 1 dB steps	Auto or manual setup
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#### MAXIMUM SAFE INPUT LEVEL

<b>Average Total Power</b>	$\leq +33 \text{ dBm}$	Input attenuator $\geq 10 \text{ dB}$
<b>DC Voltage</b>	$\pm 50 \text{ V}$	

#### 1 dB GAIN COMPRESSION

<b>Total Power at 1st Mixer</b>	$> 0 \text{ dBm}$	Typical ; Fc $\geq 50 \text{ MHz}$ ; preamp. off
<b>Total Power at the Preamp</b>	$> -22 \text{ dBm}$	Typical ; Fc $\geq 50 \text{ MHz}$ ; preamp. on Mixer power level (dBm) = input power (dBm) – attenuation (dB)

#### DISPLAYED AVERAGE NOISE LEVEL (DANL)

<b>Preamp off</b>	0 dB attenuation; RF Input is terminated with a 50 $\Omega$ load. RBW 10 Hz; VBW 10 Hz; span 500 Hz; reference level = - 60 dBm; trace average $\geq 40$	
<b>9 kHz~100 kHz</b>	$< -93 \text{ dBm}$	Nominal
<b>100 kHz~1 MHz</b>	$< -90 \text{ dBm} - 3 \times (f/100 \text{ kHz}) \text{ dB}$	Nominal
<b>1 MHz~10 MHz</b>	$< -122 \text{ dBm}$	Nominal
<b>2.7 ~ 3.25 GHz</b>	$< -116 \text{ dBm}$	Nominal
<b>Preamp on</b>	0 dB attenuation; RF Input is terminated with a 50 $\Omega$ load. RBW 10 Hz; VBW 10 Hz; span 500 Hz; reference level = - 60 dBm; trace average $\geq 40$	
<b>100 kHz~1 MHz</b>	$< -108 \text{ dBm} - 3 \times (f/100 \text{ kHz}) \text{ dB}$	Nominal
<b>1 MHz~10 MHz</b>	$< -142 \text{ dBm}$	Nominal
<b>10 MHz~3.25 GHz</b>	$< -142 \text{ dBm} + 3 \times (f/1 \text{ GHz}) \text{ dB}$	Nominal

#### LEVEL DISPLAY RANGE

<b>Scales</b>	Log, Linear	
<b>Units</b>	dBm, dBmV, dBuV, V, W	
<b>Marker Level Readout</b>	0.01 dB	Log scale
<b>Level Display Modes</b>	0.01 % of reference level	Linear scale
<b>Number of Traces</b>	Trace, Topographic, Spectrogram	Single/Split Windows
<b>Detector</b>	4	
<b>Trace Functions</b>	Positive-peak,negative-peak,sample,normal,RMS(not Video), Quasi-Peak(EMI),Average(EMI),Clear & Write,Max/Min Hold, View, Blank, Average	

#### ABSOLUTE AMPLITUDE ACCURACY

<b>Absolute Point</b>	Center=160 MHz ; RBW 10 kHz; VBW 1 kHz; span 100 kHz; log scale; 1 dB/div; peak detector; 23°C $\pm 1$ °C; Signal at Reference Level	
<b>Preamp Off</b>	$\pm 0.3 \text{ dB}$	Ref level 0 dBm; 10 dB RF attenuation
<b>Preamp On</b>	$\pm 0.4 \text{ dB}$	Ref level 0 dBm; -30 dB RF attenuation

#### FREQUENCY RESPONSE

<b>Preamp Off</b>	Attenuation : 10 dB; Reference: 160 MHz; 20 ~ 30°C	
<b>100 kHz ~ 2.0 GHz</b>	$\pm 0.5 \text{ dB}$	
<b>2GHz ~ 3 GHz</b>	$\pm 0.7 \text{ dB}$	
<b>Preamp On</b>	Attenuation: 0 dB; Reference: 160 MHz; 20 ~ 30°C	
<b>1 MHz ~ 2 GHz</b>	$\pm 0.6 \text{ dB}$	
<b>2 GHz ~ 3 GHz</b>	$\pm 0.8 \text{ dB}$	

#### ATTENUATION SWITCHING UNCERTAINTY

<b>Attenuator Setting</b>	0 ~ 50 dB in 1 dB step	
<b>Uncertainty</b>	$\pm 0.25 \text{ dB}$	Reference : 160 MHz, 10dB attenuation

#### RBW FILTER SWITCHING UNCERTAINTY

<b>1 Hz ~ 1 MHz</b>	$\pm 0.25 \text{ dB}$	Reference : 10 kHz RBW
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#### LEVEL MEASUREMENT UNCERTAINTY

<b>Overall Amplitude Accuracy</b>	$\pm 1.5 \text{ dB}$	20 ~ 30°C; frequency $> 1 \text{ MHz}$ ; Signal input 0 ~ -50 dBm; Reference level 0 ~ -50 dBm; Input attenuation 10 dB; RBW 1 kHz; VBW 1 kHz; after cal; Preamp Off
	$\pm 0.5 \text{ dB}$	Typical

#### SPURIOUS RESPONSE

<b>Second Harmonic Intercept</b>	+35 dBm +60 dBm	Preamp off; signal input -30dBm; 0 dB attenuation Typical; 10 MHz $< f_c < 775 \text{ MHz}$ Typical; 775 MHz $\leq f_c < 1.625 \text{ GHz}$
<b>Third-order Intercept</b>		Preamp off; signal input -30dBm; 0 dB attenuation 300 MHz ~ 3 GHz
<b>Input Related Spurious Residual Response (Inherent)</b>	$> 1 \text{ dBm}$ $< -60 \text{ dBc}$ $< -90 \text{ dBm}$	Input signal level -30 dBm, Att. Mode, Att = 0dB; 20 ~ 30°C Input terminated; 0 dB attenuation; Preamp off

## SPECIFICATIONS

<b>SWEEP</b>		
<b>SWEEP TIME</b>		
Range	204 $\mu$ s ~ 1000 s 50 $\mu$ s ~ 1000 s	Span > 0 Hz Span = 0 Hz; Min resolution = 10 $\mu$ s
Sweep Mode	Continuous; Single	
Trigger Source	Free run; Video; External	
Trigger Slope	Positive or negative edge	
<b>RF PREAMPLIFIER</b>		
Frequency Range	1 MHz ~ 3 GHz	
Gain	18 dB	Nominal (installed as standard)
<b>FRONT PANEL INPUT/OUTPUT</b>		
<b>RF INPUT</b>		
Connector Type	N-type female	
Impedance	50 $\Omega$	Nominal
VSWR	<1.6:1	300 kHz ~ 3 GHz; Input attenuator $\geq$ 10 dB
<b>POWER FOR OPTION</b>		
Connector Type	SMB male	
Voltage/Current	DC +7V/500 mA max	With short-circuit protection
<b>USB HOST</b>		
Connector Type	A plug	
Protocol	Version 2.0	Support Full/High/Low speed
<b>MICRO SD SOCKET</b>		
Protocol	SD 1.1	
Support Cards	Micro SD, Micro SDHC	Up to 32GB capacity
<b>REAR PANEL INPUT/OUTPUT</b>		
<b>REFERENCE OUTPUT</b>		
Connector Type	BNC female	
Output Frequency	10 MHz	Nominal
Output Amplitude	3.3V CMOS	
Output Impedance	50 $\Omega$	
<b>REFERENCE INPUT</b>		
Connector Type	BNC female	
Input Reference Frequency	10 MHz	
Input Amplitude	-5 dBm ~ +10 dBm	
Frequency Lock Range	Within $\pm$ 5 ppm of the input reference frequency	
<b>ALARM OUTPUT</b>		
Connector Type	BNC female	Open-collector
<b>TRIGGER INPUT/GATED SWEEP INPUT</b>		
Connector Type	BNC female	
Input Amplitude	3.3V CMOS	
Switch	Auto selection by function	
<b>LAN TCP/IP INTERFACE</b>		
Connector Type	RJ-45	
Base	10Base-T; 100Base-Tx; Auto-MDIX	
<b>USB DEVICE</b>		
Connector Type	B plug	
Protocol	Version 2.0	For remote control only; supports USB TMC Supports Full/High/Low speed
<b>IF OUTPUT</b>		
Connector Type	SMA female	
Impedance	50 $\Omega$	Nominal
IF Frequency	886 MHz	Nominal
Output Level	-25 dBm	10 dB attenuation; RF input : 0 dBm @ 1 GHz
<b>EARPHONE OUTPUT</b>		
Connector Type	3.5mm stereo jack, wired for mono operation	
<b>VIDEO OUTPUT</b>		
Connector Type	DVI-I (integrated analog and digital), Single Link. Compatible with VGA or HDMI standard through adapter	
<b>RS-232C INTERFACE</b>		
Connector Type	D-sub 9-pin female	Tx, Rx, RTS, CTS
<b>GPIB INTERFACE (OPTIONAL)</b>		
Connector Type	IEEE-488 bus connector	
<b>AC POWER INPUT</b>		
Power Source	AC 100 V ~ 240 V, 50/60 Hz	Auto range selection
<b>BATTERY PACK (OPTIONAL)</b>		
Battery Pack	6 cells, Li-Ion rechargeable, 3S2P	
Voltage	DC 10.8 V	With UN38.3 Certification
Capacity	5200 mAh/56Wh	
<b>GENERAL</b>		
Internal Data Storage	16 MB nominal	
Power Consumption	< 65 W	
Warm-up Time	< 30 minutes	
Temperature Range	+5 $^{\circ}$ C ~ + 45 $^{\circ}$ C -20 $^{\circ}$ C ~ + 70 $^{\circ}$ C	Operating Storage
Dimensions & Weight	350(W) x 210(H) x 100(D) mm, Approx. 4.5kg 13.8(W) x 8.3(H) x 3.9(D) inch, Approx. 9.9lb	Inc. all options (Basic + TG + GPIB + Battery)
<b>TRACKING GENERATOR (OPTIONAL)</b>		
Frequency Range	100 kHz ~ 3 GHz	
Output Power	-50 dBm ~ 0 dBm in 0.5 dB steps	
Connector Type	N-type female	50 $\Omega$ Nominal
Output VSWR	< 1.6 : 1	300 kHz ~ 3 GHz, source attenuation $\geq$ 12 dB

Note : The specifications apply when the GSP-9300B is powered on for at least 30 minutes to warm-up to a temperature of 20  $^{\circ}$ C to 30  $^{\circ}$ C, unless specified otherwise.

Specifications subject to change without notice. GSP-9300BGD1DH

### ORDERING INFORMATION

**GSP-9300B** 3 GHz Spectrum Analyzer

**EMC Pretest Solution :** **GKT-008** EMI Near Field Probe Set  
**GLN-5040A** Line Impedance Stabilization Network  
**GIT-5060** Isolation transformer  
**GPL-5010** Transient Limiter

#### ACCESSORIES :

Power Cord, Certificate of Calibration, CD-ROM (with Quick Start Guide, User Manual, Programming Manual, SpectrumShot Software, SpectrumShot Guide & IVI Driver)

### OPTIONS

**Opt.01** Tracking Generator  
**Opt.02** Battery Pack

**Opt.03** GPIB Interface

### OPTIONAL ACCESSORIES

**GSC-009** Soft Carrying Case  
**GRA-415** Rack Adapter Panel

### FREE DOWNLOAD

SpectrumShot PC Software for Windows System (available on GW Instek website)  
IVI Driver Supports LabVIEW/LabWindows/CVI Programming (available on NI website)

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