

## Specifications

Instek GSP-9300BTG Specifications		
<b>Frequency</b>		
Range	9 kHz ~ 3 GHz	
Resolution	1 Hz	
Accuracy	$\pm(\text{period since last adjustment} \times \text{aging rate}) + \text{stability over temperature} + \text{supply voltage stability}$	
Aging Rate	Aging Rate $\pm 1$ ppm max	1 year after last adjustment
Frequency Stability Over Temperature	$\pm 0.025$ ppm	0 ~ 50 °C
<b>Frequency Readout Accuracy</b>		
Start, Stop, Center, Marker	$\pm(\text{marker frequency indication} \times \text{frequency reference accuracy} + 10\% \times \text{RBW} + \text{frequency resolution})$	
Trace Points	Max. 601 points, Min. 6 points	
<b>Marker Frequency Counter</b>		
Resolution	1 Hz, 10 Hz, 100 Hz, 1 kHz	
Accuracy	$\pm(\text{marker frequency indication} \times \text{frequency reference accuracy} + \text{counter resolution})$	RBW/Span $\geq 0.02$ ; Mkr level to DNL > 30 dB
<b>Frequency Span</b>		
Range	0 Hz (zero span), 100 Hz ~ 3 GHz	
Resolution	1 Hz	
Accuracy	$\pm$ frequency resolution	RBW : Auto
<b>Phase Noise</b>		
Offset from Carrier		Fc=1GHz;RBW=1kHz,VBW=10Hz;Average 40
10 kHz	< -88 dBc/Hz	Typical
100 kHz	< -95 dBc/Hz	Typical
1 MHz	< -113 dBc/Hz	Typical
<b>Resolution Bandwidth (RBW) Filter</b>		
Filter Bandwidth	1 Hz ~ 1 MHz in 1-3-10 sequence 200 Hz, 9 kHz, 120 kHz, 1MHz	-3dB bandwidth -6dB bandwidth
Accuracy	$\pm 8\%$ , RBW = 1MHz ; $\pm 5\%$ , RBW < 1MHz	Nominal
Shape Factor	< 4.5: 1	Normal Bandwidth ratio: -60dB:-3dB
<b>Video Bandwidth (VBW) Filter</b>		
Filter Bandwidth	1 Hz ~ 1 MHz in 1-3-10 sequence	-3dB bandwidth
<b>Amplitude</b>		
<b>Amplitude Range</b>		
Measurement Range	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
<b>Attenuator</b>		
Input Attenuator Range	0 ~ 50 dB, in 1 dB steps	Auto or manual setup
<b>Maximum Safe Input Level</b>		
Average Total Power	$\leq +33$ dBm	Input attenuator $\geq 10$ dB

<b>1 dB Gain Compression</b>		
<b>Total Power at 1st Mixer</b>	> 0 dBm	Typical ; Fc 50 MHz; preamp. off
<b>Total Power at the Preamp</b>	> -22 dBm	Typical ; Fc 50 MHz; preamp. on Mixer power level (dBm) = input power (dBm) - attenuation (dB)
<b>Displayed Average Noise Level (DANL)</b>		
<b>Preamp off</b>	0 dB attenuation; RF Input is terminated with a 50 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 dBm	Nominal
<b>100 kHz ~ 1 MHz</b>	< -90 dBm - 3 x (f/100 kHz) dB	Nominal
<b>1 MHz ~ 10 MHz</b>	< -122 dBm	Nominal
<b>2.7 ~ 3.25 GHz</b>	< -116 dBm	Nominal
<b>Preamp on</b>	0 dB attenuation; RF Input is terminated with a 50 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 dBm - 3 x (f/100 kHz) dB	Nominal
<b>1 MHz ~ 10 MHz</b>	< -142 dBm	Nominal
<b>10 MHz ~ 3.25 GHz</b>	< -142 dBm + 3 x (f/1 GHz) dB	Nominal
<b>Level Display Range</b>		
<b>Scales</b>	Log, Linear	
<b>Units</b>	dBm, dBmV, dBuV, V, W	
<b>Marker Level Readout</b>	0.01 dB	Log scale Linear Scale
<b>Level Display Modes</b>	Trace, Topographic, Spectrogram	Single/Split Windows
<b>Number of Traces Detector Trace Functions</b>	4 Positive-peak, negative-peak, sample, normal, RMS(not Video), Quasi-Peak(EMI), Average(EMI), Clear & Write, Max/Min Hold, View, Blank, Average	
<b>Absolute Amplitude Accuracy</b>		
<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>	$\pm 0.3$ dB	Ref level 0 dBm; 10 dB RF attenuation
<b>Preamp On</b>	$\pm 0.4$ dB	Ref level 0 dBm; -30 dB RF attenuation
<b>Frequency Response</b>		
<b>Preamp Off</b>	Attenuation : 10 dB; Reference: 160 MHz; 20 ~ 30°C	
<b>100 kHz ~ 2.0 GHz</b>	$\pm 0.5$ dB	
<b>2GHz ~ 3 GHz</b>	$\pm 0.7$ dB	
<b>Preamp On</b>	Attenuation: 0 dB; Reference: 160 MHz; 20 ~ 30°C	
<b>1 MHz ~ 2 GHz</b>	$\pm 0.6$ dB	
<b>2 GHz ~ 3 GHz</b>	$\pm 0.8$ dB	
<b>Attenuation Switching Uncertainty</b>		
<b>Attenuator Setting</b>	0 ~ 50 dB in 1 dB step	
<b>Uncertainty</b>	$\pm 0.25$ dB	Reference : 160 MHz, 10dB attenuation
<b>RBW Filter Switching Uncertainty</b>		
<b>1 Hz ~ 1 MHz</b>	$\pm 0.25$ dB	Reference : 10 kHz RBW
<b>Level Measurement Uncertainty</b>		
<b>Overall Amplitude Accuracy</b>	$\pm 1.5$ dB	20 ~ 30°C; frequency > 1 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
	$\pm 0.5$ dB	Typical
<b>Spurious Response</b>		

Spurious Response		
Second Harmonic Intercept		Preamp off; signal input -30dBm; 0 dB attenuation
	+35 dBm	Typical; 10 MHz < fc < 775 MHz
	+60 dBm	Typical; 775 MHz fc < 1.625 GHz
Third-order Intercept		Preamp off; signal input -30dBm; 0 dB attenuation
	> 1dBm	300 MHz ~ 3 GHz input -30dBm; 0 dB attenuation
Input Related Spurious	< -60 dBc	Input signal level -30 dBm, Att. Mode, Att = 0dB; 20 ~ 30°C
Residual Response (Inherent)	<-90 dBm	Input terminated; 0 dB attenuation; Preamp off
Sweep		
Sweep Time		
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	
RF Preamplifier		
Frequency Range	1 MHz ~ 3 GHz	
Gain	18 dB	Nominal (installed as standard)
Front Panel Input/Output		
RF Input		
Connector Type	N-type female	
Impedance	50 $\Omega$	Nominal
VSWR	< 1.6 :1	300 kHz ~ 3 GHz ; Input attenuator $\geq$ 10 dB
RF Input		
Connector Type	SMB male	With short-circuit protection
Voltage/Current	DC +7V/500 mA max	
USB Host		
Connector Type	A plug	Support Full/High/Low speed
Protocol	Version 2.0	
Micro SD Socket		
Protocol	SD 1.1	Up to 32GB capacity
Support Cards	Micro SD, Micro SDHC	
Rear Panel Input/Output		
Reference Output		
Connector Type	BNC female	Nominal
Output Frequency	10 MHz	
Output Amplitude	13.3V CMOS	
Output Impedance	50 $\Omega$	
Reference Input		
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>Alarm Output</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	For remote control only; supports USB TMC Supports Full/High/Low speed
Protocol	Version 2.0	
<b>IF Output</b>		
Connector Type	SMA female	
Impedance	50Ω	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>GPIO 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	With UN38.3 Certification
Voltage	DC 10.8 V	
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 °C ~ + 45 °C -20 °C ~ + 70 °C	Operating Storage
Dimensions & Weight	50(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 + GPIO + Battery)
<b>Tracking Generator</b>		
Frequency Range	100 kHz ~ 3 GHz	
Output Power	-50 dBm ~ 0 dBm in 0.5 dB steps	
Connector Type	N-type female	50Ω Nominal
Output VSWR	< 1.6 : 1 300 kHz ~ 3 GHz, source attenuation 12 dB	