GW INSTEK
Simply Reliable

ISO-9001 CERTIFIED MANUFACTURER
GOOD WILL INSTRUMENT CO., LTD.

GSP-9300 Spectrum Analyzer New Product Announcement

- **Frequency range: 9 kHz to 3 GHz**
- **3dB RBW range: 1Hz to 1MHz**
- **6dB EMI BW: 200Hz, 9kHz, 120kHz, 1MHz**
- **Sensitivity up to -152 dBm (1Hz)**
- **Sweep time up to 307 μ s**
- **Built-in EMC-pretest mode, 2FSK analysis, AM/FM/ASK/FSK demodulation and analysis, P1dB point measurement**
- **Remote control via LAN, USB, RS-232 & GPIB (optional)**

Product Introduction

GW Instek announces the release of light, compact, and high C/P ratio 3GHz GSP-9300 spectrum analyzer. The GSP-9300 frequency range stretches from 9 KHz to 3GHz and features many functions such as radio frequency and power measurement, 2FSK digital communications analysis, EMC pretest mode, and active component P1dB point measurement, etc. It can support the fast sweep speed up to 307 μ **s** . It is the ideal instrument for various application fields such as the basic operation of R&D, research and school lecture, engineering maintenance, and test for mass production. This light and compact spectrum analyzer is also suitable for automatic test systems and vehicle mounted operation.

GW Instek understands that high quality is a very important consideration for users who are selecting economical spectrum analyzers. GSP-9300 spectrum analyzer, with the built-in preamplifier and the highest sensitivity of -152dBm (1Hz), is capable of measuring very feeble signals. To obtain the accurate results, the low power measurement uncertainty of GSP-9300 is less than 1.5dB.

The built-in measurement functions of GSP-9300 spectrum analyzer include 2FSK digital communications analysis, AM/FM/ASK/FSK signal demodulation & analysis, EMC pretest mode, Harmonic Distortion, TOI, Channel Power, OCBW, ACPR, SEM, Phase Jitter, N-dB Bandwidth, Noise Marker, Frequency Counter, and Time Domain power measurement for burst signal, etc.

Tracking generator, an option for GSP-9300 spectrum analyzer, provides supplementary functions such as measuring the insertion loss of RF cable and identifying the frequency response of antenna, filter or amplifier. The P1dB measurement function supports power sweep and P1dB compression point of active component. It supports 6.2GHz power sensor PWS-06. Users, via the power meter mode, can conduct related measurement applications without using an independent power meter.

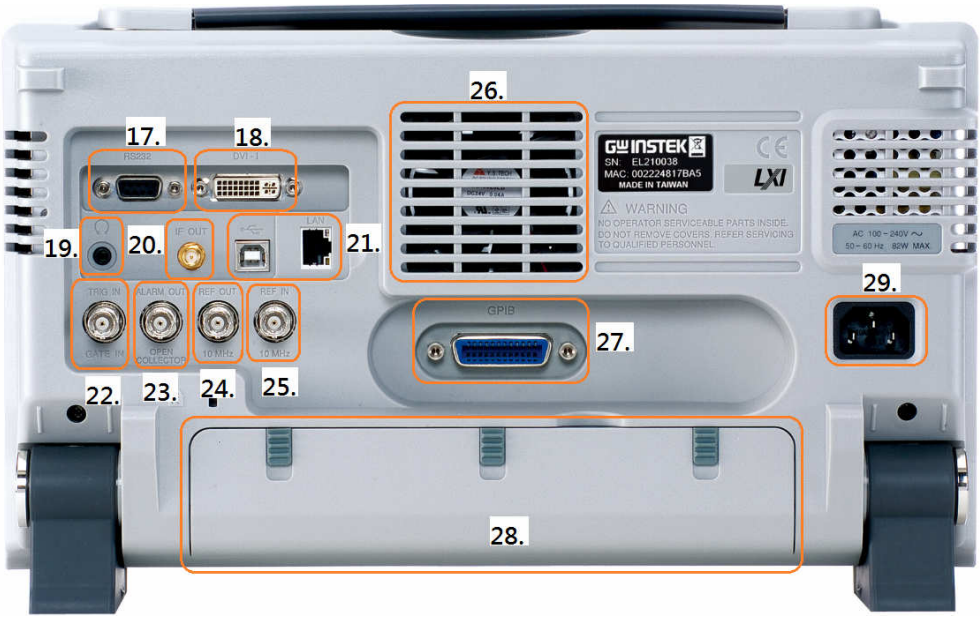
GSP-9300 spectrum analyzer is very user-friendly. All frequently used functions can be applied quickly through function keys and five languages (English, Russian, Traditional Chinese, Simplified Chinese and Japanese) are available for user interface.

Users can use the external software SpectrumShot for EMI test report management and assessment, remote control and waveform data recording for long periods of time. SpectrumShot can be applied to spectrum monitoring for detecting any abnormal radio signals. The software will send out e-mail to inform users if any abnormal situation occurs.

To summarize, GSP-9300 spectrum analyzer is a perfect, light, compact, and economical measurement instrument. With height of 210mm and width of 350mm, GSP-9300 is suitable for automatic test systems. It can be mounted on the 19 inches 6U rack. The light and compact design of GSP-9300 is ideal for vehicle mounted operation to carry out field strength measurement such as monitoring satellite communications signals.

GW INSTEK
Simply Reliable

Panel Introduction



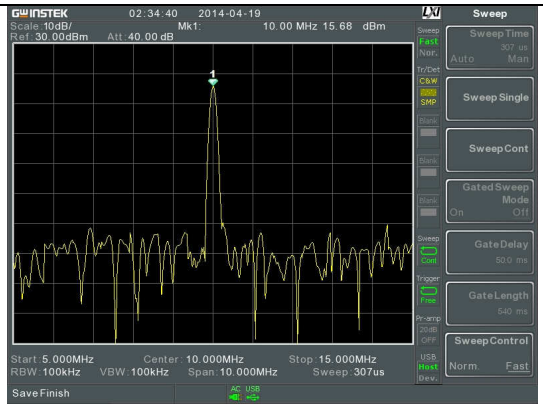
1. LCD Display	12. Enter, BK SP, Preset & Quick Save Keys	22. Trigger Input / Gate Input Port
2. Function Keys	13. Tracking Generator Output	23. Alarm Output / Open Collector
3. Main Keys	14. DC Power Supply	24. REF Output
4. Control Keys	15. RF Input Terminal	25. REF Input
5. Power Key	16. USB-A, Micro SD Port	26. Fan
6. File Keys	17. RS-232 Port	27. GPIB Port (optional)
7. Marker Keys	18. DVI-I Port	28. Battery Cover / Optional Battery Pack
8. Auxiliary Keys	19. Headphone Jack	29. Power Socket
9. Scroll Wheel	20. IF Output	
10. Arrow Keys	21. USB-B, LAN Port	
11. Numeric Keys		

GW INSTEK
Simply Reliable

Major Selling Points

Fast Sweep Mode

GSP-9300 supports the fast sweep mode with sweep speed up to 307 μs . Users can use the fast sweep mode to capture transient signals such as Tire-pressure monitoring system (TPMS), Bluetooth frequency hopping signals, tuned oscillator, and other interfering signals in ISM frequency band, etc.



2FSK Signal Analysis

2FSK modulation, for its features of low design cost and low electricity consumption, is widely used by RF communications applications with low power and low data transmission speed characteristics. Nowadays, 2FSK modulation technology has been applied in various products and systems such as consumer electronics, automotive electronics, RFID, auto reading electricity meter, and industrial control devices, etc.

2FSK signal analysis measures parameters including carrier power, FSK frequency deviation, carrier frequency, and carrier frequency offset. Users can set the criterion in frequency deviation and carrier offset for fast test result determination.

ASK/FSK Signal Demodulation & Analysis

RFID and optical communications systems often use Amplitude Shift Keying (ASK). Applications such as wireless telephone, paging systems, and RFID, etc. utilize Frequency Shift Keying (FSK).

ASK/FSK demodulation and analysis measures parameters including AM depth, frequency deviation, modulation rate, carrier power, carrier frequency offset, SINAD, symbol, and waveform. Users can set AM depth, frequency deviation, carrier power and carrier offset for Pass/Fail testing result.

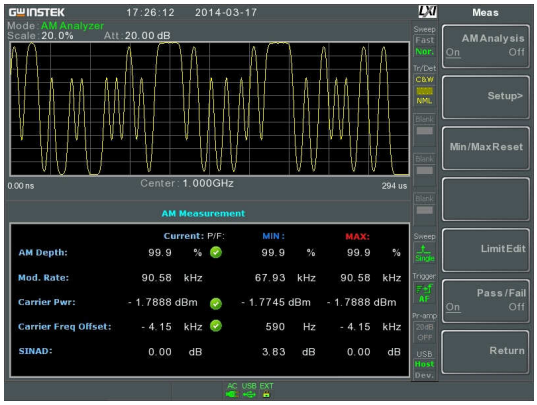
ASK Analyzer

FSK Analyzer

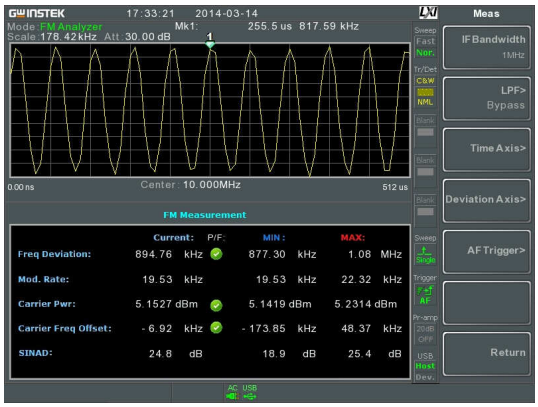
AM/FM Signal Demodulation & Analysis

AM/FM Signal Analysis measures parameters including AM depth, frequency deviation, modulation rate, carrier power, carrier frequency offset and SINAD. Users can set the criterion in AM depth, frequency deviation, carrier power and carrier offset for fast test result determination.

The GSP-9300 has a convenient AM/FM demodulation function to tune into AM or FM broadcast signals and listen to the demodulated baseband signals using the ear phone out socket.



AM Analyzer



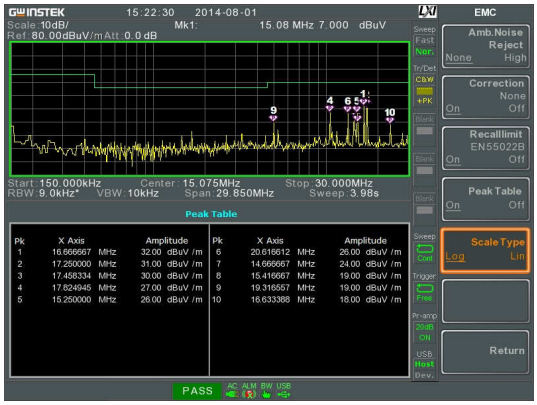
FM Analyzer

EMC Pretest Mode

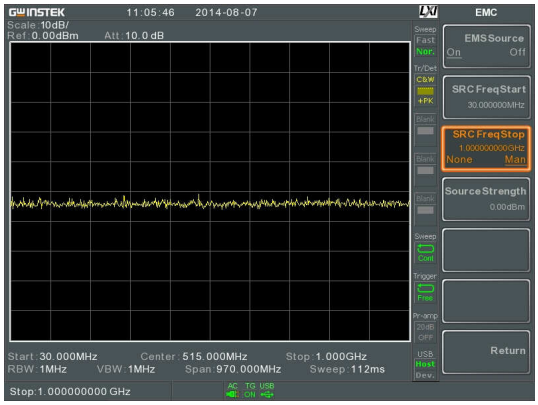
EMC pretest mode is ideal for electromagnetic compatibility (EMC) test which is the preliminary stage of electronics product development. Users can identify and resolve problems at the early phase to avoid product revision after it was finalized. Hence, product development cycle and cost will be greatly reduced which is beneficial to saving cost and time for product entering the verification stage.

GSP-9300 supports -6dB EMI filter with 200/9k/120k/1M Hz bandwidth and built-in low noise amplifier. Users can apply maximum peak detector and EMI filter to conduct pre-compliance testing for electronics products. Users can activate built-in amplifier to measure feeble electromagnetic interfering signals to -150dBm/Hz in 1GHz frequency band.

EMC pretest mode collocates with near field probe or antenna to carry out conduction and radiation electromagnetic interference (EMI) test. Additionally, near field probe and GSP-9300 tracking generator can be used to output 0dBm RF signals to test electromagnetic susceptibility (EMS) for electronics products.



EMI Pre-test Mode

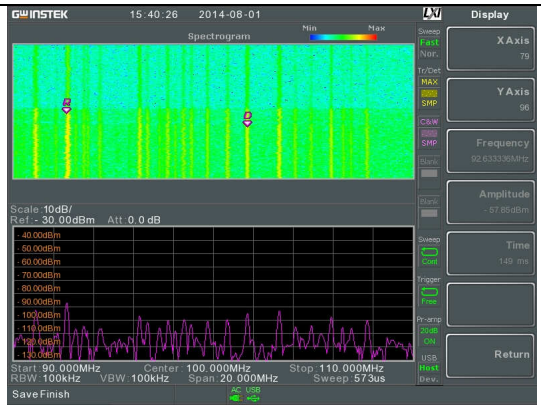


EMS Pre-test Mode

GW INSTEK
Simply Reliable

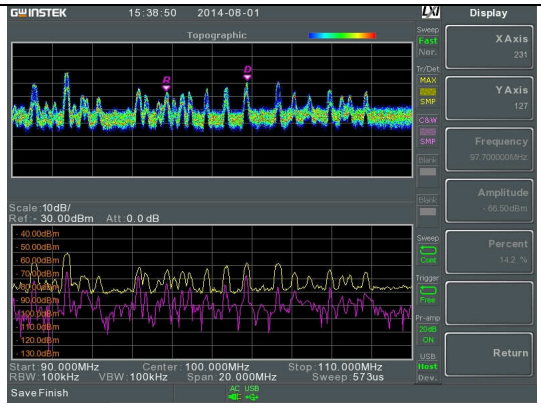
Spectrogram

Spectrogram can simultaneously display power, frequency, and time. Frequency and power variation according to time changes can also be tracked. Especially, the intermittently appeared signals can be identified. Users, by using Spectrogram, can analyze the stability of signal versus time or identify the intermittently appeared interference signals in the communications system. Users can use two markers to find out the relation of power to frequency and time.



Topographic

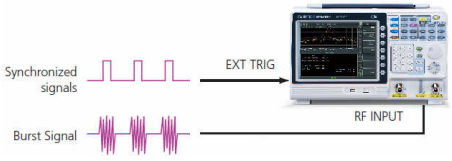
Topographic uses color shade to show the probability distribution of signal appearance. This function allows users to directly understand the process of signal variation according to time changes that is beneficial to observe intermittent feeble signals or electromagnetic interference signals. Users can use two makers to find out the relation of power to frequency and percentage.



Measurement Function Key Features

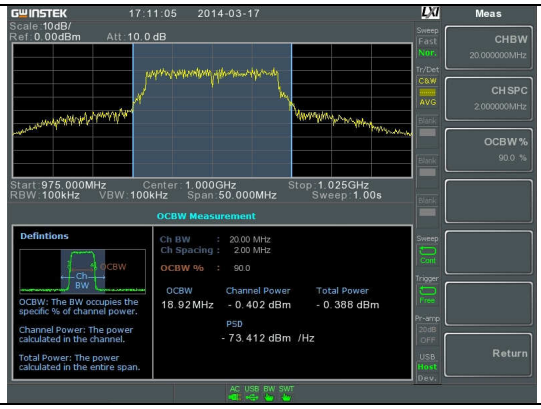
Gated Sweep

Radar or TDMA communications systems, via intermittently turning on/off output power, control transmission signals. In order to monitor the power spectrum during the transmission process, the Gated Sweep function can initiate measurement only when signals appear. This function is ideal for measuring burst signals such as GSM or WLAN (as shown in the example).



OCBW (Occupied Bandwidth)

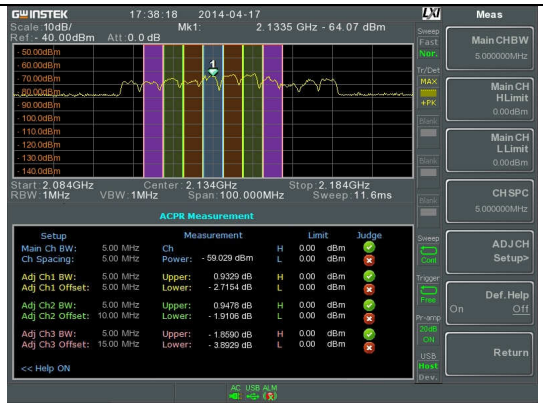
The OCBW measurement can simultaneously display OCBW, channel power and PSD. OCBW's unit is shown by percentage. A measurement area containing bandwidth will be shown when OCBW is in use.



GW INSTEK
Simply Reliable

ACPR (Adjacent Channel Power Ratio)

Telecommunications and broadcasting service carriers must reduce interference to the minimum. This interference is caused by power leakage to adjacent transmission channels. The ACPR measurement can examine the leakage status that is conducive to identifying interference source.



SEM (Spectrum Emission Mask)

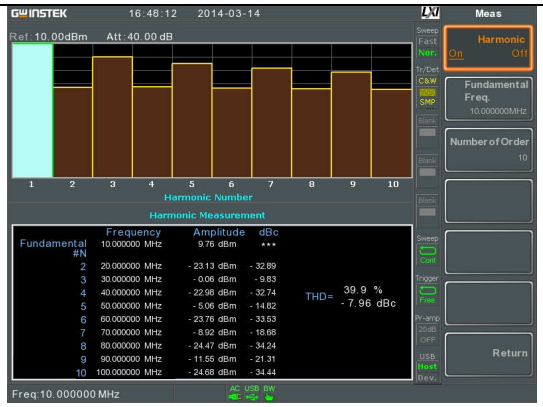
SEM measures out-of-channel emission which is defined by corresponding in-channel power. Users can set main channel's parameters, out-of-channel range, and limit line, etc. SEM supports the Pass/Fail test function and lists frequency range for surpassing each out-of-channel limit. An alarm signal will be triggered if any measurement results that are not matched with SEM. GSP-9300 has the built-in SEM settings of 3GPP, WLAN 802.11b/g/n, Wimax 802.16 and self-defined communications system

TOI (Third Order Intercept)

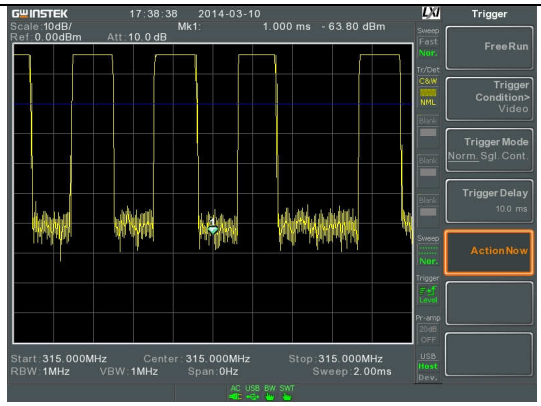
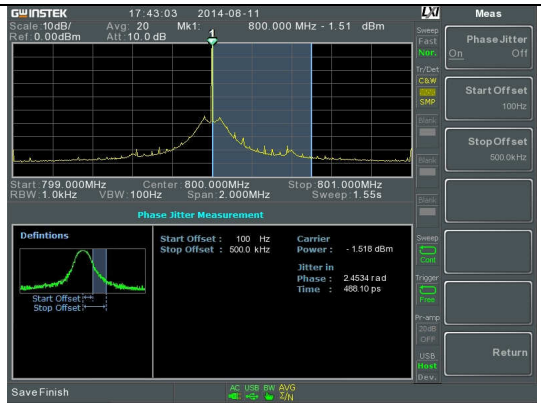
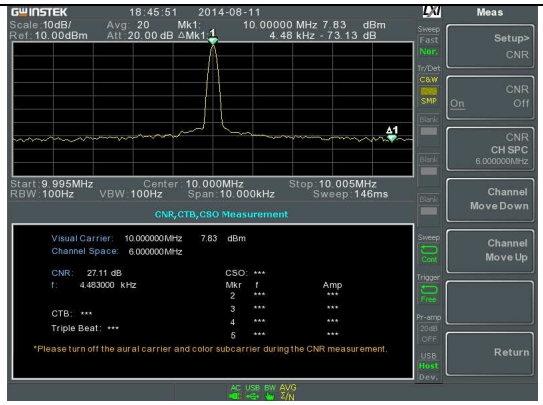
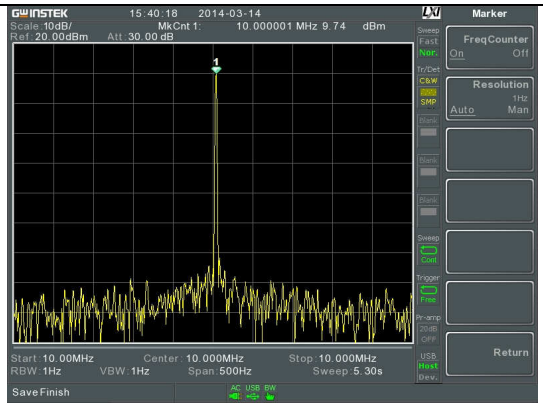
Users can measure the linearity of non-linear systems and components such as receiver, low-noise amplifier and mixer by TOI which automatically tests effective carrier and measures inter-modulation sidebands.

Harmonic

Harmonic can easily measure the amplitude of fundamental frequency and as high as ten orders of harmonic frequency. This function can also measure amplitude (dBc) which is the ratio of harmonic and corresponding fundamental carrier. Total harmonic distortion (THD) can also be calculated by this function.

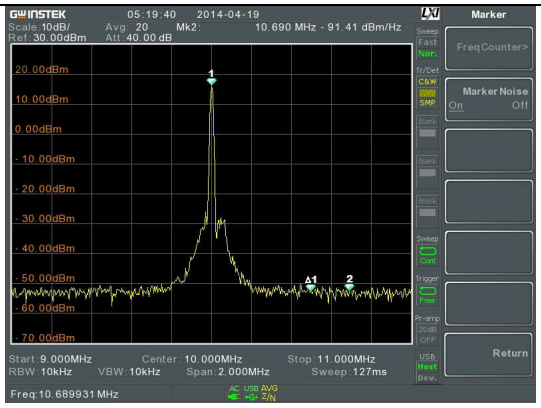


GW INSTEK
Simply Reliable

Time Domain Power Users can go to zero span setting and open marker to observe burst signals when measuring burst signal in time domain is required.	
Phase Jitter The Phase Jitter function can rapidly measure phase noise produced by RF signal source's and oscillator's carrier deviation. This function can directly convert signal jitter to phase (rad) and time (ns).	
CNR/CSO/CTB The built-in CNR/CSO/CTB functions of GSP-9300 are ideal for measuring performance of CATV amplifier and system.	
Frequency Counter The frequency counter function is used to make accurate frequency measurements up to 1Hz resolution.	

Marker Noise

The marker noise function calculates the average noise level over a bandwidth of 1Hz, referenced from the marker position.



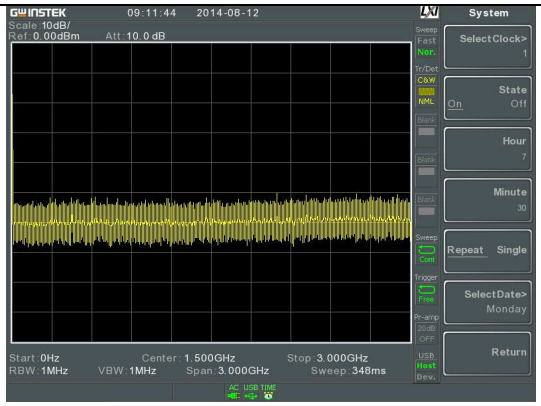
Production Line Key Features

Shorten Warm-Up Time

GSP-9300 utilizes the patented design of high efficient heat dissipation and feedback temperature control. After the instrument is turned on, the internal instrument can rapidly maintain a stable temperature so as to provide accurate amplitude measurement and deliver the frequency measurement with 0.025ppm frequency stability.

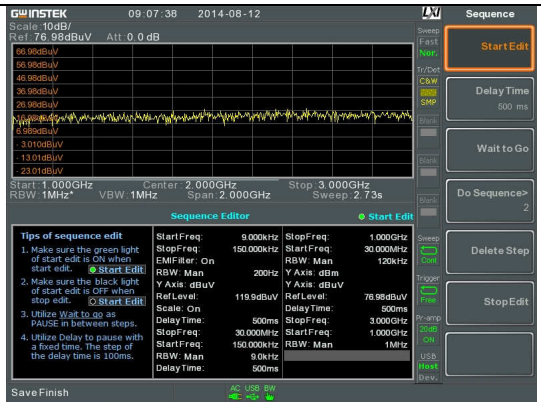
Wake-Up Clock

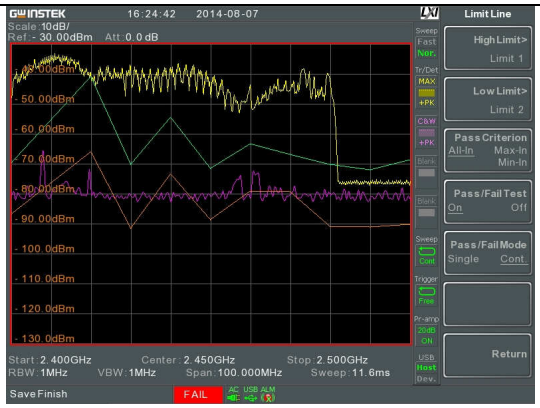
Users can set up automatic wake-up time for each day of the week. By so doing, the purpose of GSP-9300 pre wake-up can be achieved. Pre wake-up is ideal for the lower temperature environment to conduct tests in the preset time.



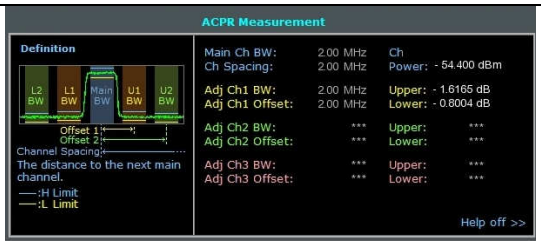
Sequence Function

The sequence function allows users to edit a sequence formulated by a series of steps directly from the instrument. Pause and delay can be inserted in the sequence to observe the test results. There are five sets of sequence for selection. Each sequence allows editing of 20 steps. Different sequence can be interactive and support each other. This function provides automatic editing without using the PC that is very convenient for assembly lines in which execute routine test procedures.



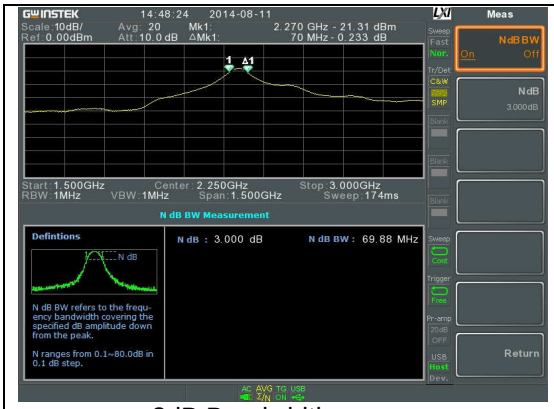
Limit Line Function The limit line function, based upon the preset criteria of passing the test, can be used to directly determine whether the DUT passes the test. Test result not only can be shown on the LCD screen, but also an alarm signal output indication which is done by connecting a speaker or light device with the BNC terminal on the rear panel to facilitate the maximum yield rate of the production line.	
Various Interface GSP-9300 provides instrument control interface including LAN, RS-232, USB, and GPIB (optional). IVI driver is also provided to support LabVIEW / CVI / LabWindows to meet the requirements of editing the automatic test software.	

User Friendly Design

Status Icons Status Icons show the interface status, power status, alarm status and etc of GSP-9300. Users can easily understand the setting status and test results of the instrument.	
Definition Help The built-in Definition Help function allows users to immediately understand the parameters of Channel Power, OCBW, ACPR, SEM, Phase Jitter, N-dB Bandwidth & P1dB items so as to save time on reading user manual.	

Options

Scalar Network Analysis The built-in tracking generator can swiftly and easily measure frequency response of cable loss, filter bandwidth, amplifier gain, mixer conversion loss, etc. The N-dB Bandwidth function measures 3dB bandwidth of Bandpass filter. SWR bridge should be connected with tracking generator to measure the return loss of antenna or filter.



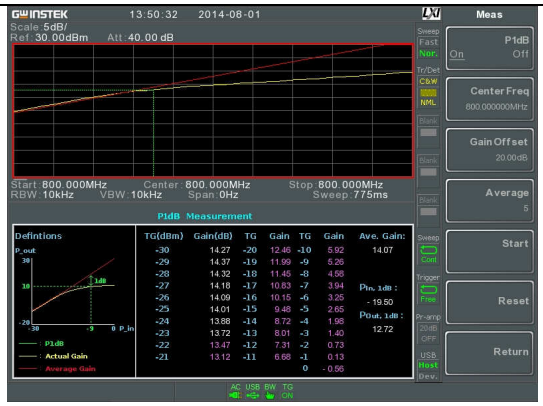
3dB Bandwidth

Return Loss

P1dB Point Measurement

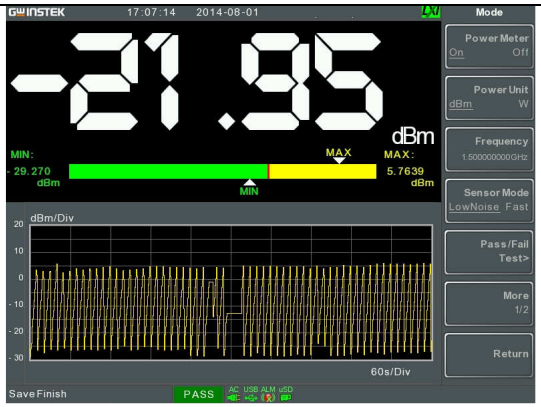
All active components have linear dynamic range for power output. Once output power reaches the maximum level, active component will enter the non-linear saturated area of P1dB point and cease amplifying signal intensity as well as produce harmonic distortion. It is very useful for P1dB point measurement in active components such as low noise amplifier, mixer and active filter.

The GSP-9300 tracking generator supports 50dB power sweep range; output power from 0dBm to -50dBm; frequency range from 100kHz to 3GHz.



Power Meter

GSP-9300 connecting with PWS-06 USB power sensor can be applied to execute high precision average power measurement for USB PnP. PWS-06 USB power sensor has the built-in zero function; therefore, calibration by an external signal source is unnecessary. GSP-9300 not only collects, displays, and stores the measurement results of power meter, but also provides the Pass/Fail function.



Battery Pack

Compact and light-weighted (4kg) GSP-9300 can be powered by battery making it suitable for outdoor operations. Optional GSP-9300 battery pack (opt.02) has a battery life of two hours. Optional soft carrying case (GSC-009) provides convenience and protection to the instrument. GSP-9300 is equipped with 8.4 inches 800x600 pixels LCD display which yields clearer display results for outdoor operations.

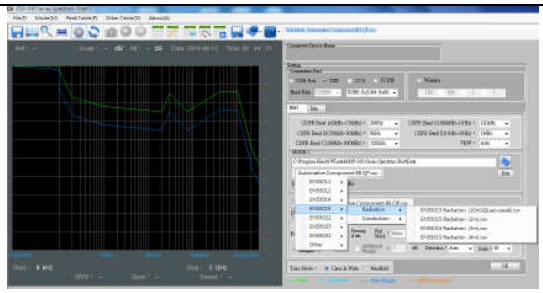
GW INSTEK
Simply Reliable

External PC Software & Driver Support

SpectrumShot Software

Users can use the external software SpectrumShot for EMI test report management and assessment, remote control and waveform data recording for long periods of time.

Under the EMI Pre-test Mode, users can select the required CISPR EMI regulation for conduction and radiation measurement.

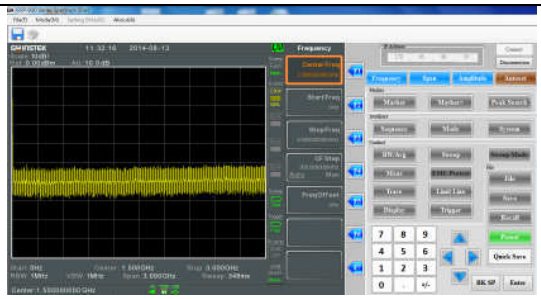


Under Get Trace mode, users can record the waveform data for long periods of time. It can be applied to spectrum monitoring for detecting any abnormal radio signals. The software will send out e-mail to inform users if any abnormal situation occurs.

Under the Remote Control mode, users can monitor wireless interference signals or observe signals for long periods of time.

IVI Driver

IVI Driver Supports LabView & LabWindows/CVI Programming. It is available on NI website.

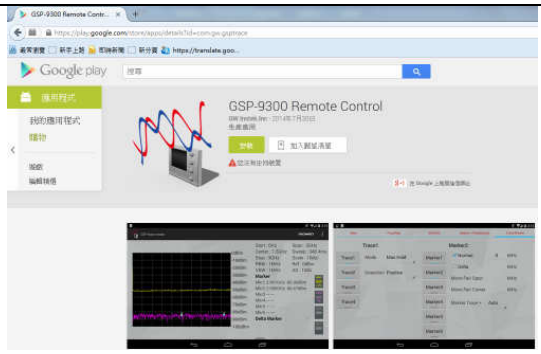


GSP-9300 Remote Control APP

Users can install the “GSP-9300 Remote Control” APP on an Android Smart Phone or Tablet.

To use the GSP-9300 as a server using a 3G modem, the user must first obtain a fixed IP address from a network provider.

For remote locations, using a 3G modem allows the user to remote control the GSP-9300 Spectrum Analyzer. It is available on Google Play Store.



Customers and Applications

Customers	Applications
· Consumer Electronics · Service and Maintenance · Universities, Schools · Military Customers · Automotive Electronics · Telecom Industry · Distributors for RF-Instruments · Instrument Rental Companies	· General Purpose Spectrum Analysis for the quick check of spectral characteristic · EMI pre-compliance testing · Analyze ASK, FSK, AM, FM signal characteristics · Satellite Monitoring in the Satellite Uplink Truck · Test systems that require a very compact instrument · Measure the frequency response of cable, attenuator, filter and amplifier · High precise power measurement with external power sensor

GW INSTEK
Simply Reliable

GSP-9300 vs. GSP-930

The following chart shows the comparison between the two products.

	GSP-9300	GSP-930
Boot-Up Time	52s	83s
Sweep Time	310us to 1000s	22ms to 1000s
-3dB Bandwidth RBW Filter	1 Hz to 1MHz in 1-3-10 sequence	10 Hz to 3 kHz in 1-3-10 sequence 10 kHz to 1 MHz, increment in 10% step
-6dB Bandwidth EMI Filter	200Hz, 9kHz, 120kHz, 1MHz	200Hz, 9kHz, 120kHz
Measurement Function	2FSK Analysis, ASK/FSK demodulation & Analysis, EMC pretest, P1dB point	No Support
Save Picture File Preview	Support	No Support
Network Interface	LXI 1.4 HiSLIP / 3G modem	LXI 1.3
ASK/FSK Demo Kit	Support	No Support
GUI Language	English, Russian, Traditional Chinese, Simplified Chinese & Japanese	English, Russian & Simplified Chinese

Competitors Information

Major competitors are Keysight N9320B and R&S FSC. The comparison chart is as follows:

	GW Instek GSP-9300	Keysight N9320B	R&S FSC
Frequency Range	9kHz to 3GHz	9kHz to 3GHz	9kHz to 3GHz
Freq Stability Aging Per Year	±2 ppm max.	±1 ppm max.	1 ppm
Over Temperature Freq Stability (0 to 50 ℃)	±0.025 ppm	±1 ppm	3 ppm
RBW	1Hz to 1MHz in 1-3-10 sequence	10Hz to 1MHz in 1-3 steps	10Hz to 3MHz in 1-3-10 steps
Phase Noise	-88dBc/Hz@1GHz, 10kHz offset	-90dBc/Hz@1GHz, 10kHz offset	-95dBc/Hz@500MHz, 30kHz offset
Displayed Average Noise Level (Attenuator 0 dB, RBW = 10 Hz, VBW = 10 Hz, Pre-amp OFF)	9 kHz to 100 kHz < -93 dBm, 100 kHz to 1 MHz < -90 dBm – 3 x (f/100 kHz) dB, 1 MHz to 10 MHz < -122 dBm, 10 MHz to 3 GHz < -122 dBm	9 to 100 kHz < -90 dBm, 100 kHz to 1 MHz < -90 dBm – 3 x (f/100 kHz) dB, 1 to 10 MHz < -124 dBm, 10 MHz to 3 GHz < -127 dBm	9 kHz to 100 kHz < –98 dBm, 100 kHz to 1 MHz < –105 dBm, 1 MHz to 10 MHz < –126 dBm, 10 MHz to 2 GHz < –131 dBm, 2 GHz to 3.0 GHz < –128 dBm,
Displayed Average Noise Level (Attenuator 0 dB, RBW = 10 Hz, VBW = 10 Hz, Pre-amp ON)	100 kHz to 1 MHz < -108 dBm - 3 x (f/100 kHz) dB, 1 MHz to 10 MHz < -142 dBm, 10 MHz to 3 GHz < -142 dBm + 3 x (f/1GHz) dB	100 kHz to 1 MHz < -108 dBm – 3 x (f/100 kHz) dB 1 to 10 MHz < -142 dBm 10 MHz to 3 GHz < -148 dBm + 3 x (f/1 GHz) dB	100 kHz to 1 MHz, < –123 dBm 1 MHz to 10 MHz, < –147 dBm 10 MHz to 1 GHz, < –151 dBm 1 GHz to 2 GHz, < –149 dBm 2 GHz to 3 GHz, < –145 dBm
Input Attenuator	0 to 50 dB, in 1 dB steps	0 to 70 dB, in 1 dB steps	0 to 40 dB, in 5 dB steps
Sweep Points	601	461	631
Sweep Time (Non-Zero Span)	310 us to 1000 s	20 ms to 1000 s	10 ms to 1000 s
Gated Sweep	Support, standard	No support	Support
Frequency Counter	Min. resolution 1Hz	Min. resolution 1Hz	Min. resolution 0.1Hz
Measurement Functions	SEM / ACPR / OCBW / Channel Power / Phase Jitter / AM,FM,ASK,FSK Demod Analyzer /TOI/Harmonic/ CNR/CSO/CTB/ N-dB Bandwidth /P1dB/Time domain Power	SEM/ACP/OCBW/Channel Power/ AM,FM,ASK,FSK Demod Analyzer (Option AMA, DMA)/ TOI	SEM/ACLR/ OCBW/ Channel Power/ TDMA Power /Harmonic/ AM modulation depth/
Trace	4 Traces	4 Traces	2 Traces
Display Modes	Spectrogram ,Topographic, Linear/ Log scale Spectrum	Only Spectrum mode	Only Spectrum mode
Display Screen	8.4 inchs LCD , resolution (800 x 600)	6.4 inch LCD, resolution (640 x 480)	5.7 inchs LCD resolution (640 x 480)
Interfaces	LXI,RS-232C,USB, DVI, MicroSD, GPIB(Opt)	LXI,USB, VGA, GPIB(Opt)	LXI,USB

Pre-amplifier	Built-in, standard	Option, Option PA3	R&S®FSC-B22 option
-6dB EMI Filter	Support, standard (200Hz, 9kHz, 120kHz, 1MHz)	Support, Option EMF (200Hz, 9kHz, 120kHz,1MHz)	No support
Power Meter	Support, power sensor option	Support, power sensor option	Support, power sensor option
Tracking Generator	Support, Option 01	Support, Option TG3	Support, Option
Spectrogram	Support, standard	No support	No support
Topographic	Support, standard	No support	No support
AM & FM Demodulation	Support, standard	Support, Option AMA	No support
ASK & FSK Demodulation	Support, standard	Support, Option DMA	No support
2FSK Analysis	Support, standard	Support, Option DMA	No support
Battery Operation	Option 02	No support	No support

Key Dates for Product Announcement

1. Global Market Announcement (October 24th, 2014)
2. Order Queue Open (October 24th, 2014)
3. Order Shipped to Subsidiaries and Distributors (November 7th, 2014)
4. Mass Quantity Order Fulfillment (November 14th, 2014)

Marketing Resource

1. Brochure
2. Datasheet
3. Catalog
4. Web Materials
5. Product Function Video introduction

Ordering Information

GSP-9300, 3GHz Spectrum Analyzer

Standard Accessories

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

Options

Option 01, Tracking Generator
Option 02, Battery Pack
Option 03, GPIB Interface

Optional Accessories

PWS-06, 6.2GHz USB Power Sensor
GSC-009, Soft Carrying Case
GRA-415, Rack Adapter Panel
ADB-002, DC Block BNC 50 Ohm 10MHz-2.2GHz
ADB-006, DC Block N-TYPE 50 Ohm 10MHz-6GHz
ADB-008, DC Block SMA 50 Ohm 0.1MHz-8GHz
ADP-001, BNC to N-TYPE Adaptor
ADP-002, SMA to N-TYPE Adaptor

GW INSTEK
Simply Reliable

Free Download

SpectrumShot PC Software for Windows System	(available on GW Instek website)
GSP-9300 Remote Control APP for Android System	(available on Google play)
IVI Driver Supports LabVIEW/LabWindows/CVI Programming	(available on NI website)

Service Policy

1. **One (1) year warranty.** GSP-9300 Spectrum Analyzer carries a standard warranty for 1 year.

2. **Service Support.** The service instructions in the Service Manual will help distributors repairing damage units promptly. The parts-swapping service support is provided by Good Will Instrument to facilitate the repair jobs done at the distributor's site.

3. **Marcom Material and Service Manual download through Website**. Good Will Instrument continues to provide after sales support through its website. The most updated version of service manual and Marcom material of GSP-9300 spectrum analyzer will be posted on the distributor zone of GW Instek's website at http://www.gwinstek.com

Specifications

The specifications apply when the GSP-9300 is powered on for at least 30 minutes to warm-up to a temperature of 20° C to 30° C, unless specified otherwise.

Frequency

Frequency			
	Range	9 kHz to 3 GHz	
	Resolution	1Hz	
Frequency Reference			
	Accuracy	±(period since last adjustment X aging rate) + stability over temperature + supply voltage stability	
	Aging Rate	±2 ppm max.	1 year after last adjustment
	Frequency Stability over Temperature	±0.025 ppm	0 to 50° C
	Supply Voltage Stability	±0.02 ppm	
Frequency Readout Accuracy			
	Start, Stop, Center, Marker	±(marker frequency indication X frequency reference accuracy + 10% x RBW + frequency resolution[1])	
	Trace points	Max. 601 points, Min. 6 points	
Marker Frequency Counter			
	Resolution	1 Hz, 10 Hz, 100 Hz, 1 kHz	
	Accuracy	±(marker frequency indication X frequency reference accuracy + counter resolution)	RBW/Span ≧0.02 ; Mkr level to DNL > 30 dB
Frequency Span			
	Range	0 Hz (zero span), 100 Hz to 3 GHz	
	Resolution	1 Hz	
	Accuracy	± frequency resolution[1]	RBW: Auto

Phase Noise			
	Offset from Carrier		Fc=1 GHz; RBW=1 kHz, VBW=10 Hz; Average≧ 40
	10 kHz	< -88 dBc/Hz	Typical[2]
	100 kHz	<-95 dBc/Hz	Typical
	1M Hz	<-113 dBc/Hz	Typical
Resolution Bandwidth (RBW) Filter			
	Filter Bandwidth	1 Hz to 1 MHz in 1-3-10 sequence	-3dB bandwidth
		200 Hz,9 kHz,120 kHz,1 MHz	-6dB bandwidth
	Accuracy	± 8%, RBW = 1 MHz	Nominal[3]
		± 5%, RBW < 1 MHz	Nominal
	Shape Factor	< 4.5 : 1	Normal Bandwidth Ratio: -60dB : -3dB
Video Bandwidth (VBW) Filter			
	Filter Bandwidth	1 Hz to 1 MHz in 1-3-10 sequence	-3dB bandwidth

[1] Frequency Resolution = Span / (Trace points - 1)

[2] Typical specifications in this datasheet mean that the performance can be exhibited in 80% of the units with a 95% confidence level over the temperature range 20 to 30° C. They are not covered by the product warranty.

[3] Nominal values indicate expected performance. They are not covered by the product warranty.

Amplitude

Amplitude Range			
	Measurement Range	100 kHz to 1 MHz	Displayed Average Noise Level (DANL) to 18 dBm
		1 MHz to 10 MHz	DANL to 21 dBm
		10 MHz to 3 GHz	DANL to 30 dBm
Attenuator			
	Input Attenuator Range	0 to 50 dB, in 1 dB step	Auto or manual setup
Maximum Safe Input Level			
	Average Total Power	≦ +33 dBm	Input attenuator ≧10 dB
	DC Voltage	± 50 V	
1 dB Gain Compression			
	Total Power at 1st Mixer	> 0 dBm	Typical; Fc ≧ 50 MHz; preamp. off
	Total Power at the Preamp	> - 22 dBm	Typical; Fc ≧ 50 MHz; preamp. on
		Mixer power level(dBm) = input power(dBm) – attenuation(dB)	
Displayed Average Noise Level (DANL)[4]			
	Preamp off	0 dB attenuation; RF Input is terminated with a 50Ω load. RBW 10 Hz; VBW 10 Hz; span 500 Hz; reference level = - 60 dBm; trace average≧ 40	
	9 kHz to 100 kHz	< -93 dBm	Nominal
	100 kHz to 1 MHz	< -90 dBm – 3 x (f/100 kHz) dB	
	1 MHz to 10 MHz	< -122 dBm	
	10 MHz to 3 GHz	< -122 dBm	
	Preamp off	0 dB attenuation; RF Input is terminated with a 50Ω load. RBW 10 Hz; VBW 10 Hz; span 500 Hz; reference level = - 60 dBm; trace average≧ 40	

	100 kHz to 1 MHz	< -108 dBm - 3 x (f/100 kHz) dB	Nominal
	1 MHz to 10 MHz	< -142 dBm	
	10 MHz to 3 GHz	< -142 dBm + 3 x (f/1 GHz) dB	
[4] DANL spec shall exclude the Spurious Response.			
Level Display Range			
	Scales	Log, Linear	
	Units	dBm, dBmV, dBuV, V, W	
	Marker Level Readout	0.01 dB	Log scale
		0.01 % of reference level	Linear scale
	Level Display Modes	Trace, Topographic, Spectrogram	Single / split Windows
	Numbers of Traces	4	
	Detector	Positive-peak, negative-peak, sample, normal, RMS (not Video)	Can be setup for each trace separately
	Trace Functions	Clear & Write, Max/Min Hold, View, Blank, Average	
Absolute Amplitude Accuracy			
	Absolute Point	Center = 160 MHz; RBW 10 kHz; VBW 1 kHz; span 100 kHz; log scale; 1 dB/div; peak detector; 20 to 30° C; signal input : 0 dBm	
	Preamp off	± 0.3 dB	Ref level 0 dBm ; 10 dB RF attenuation
	Preamp on	± 0.4 dB	Ref level -30 dBm ; 0 dB RF attenuation
Frequency Response			
	Preamp off	Attenuation: 10 dB; Reference: 160 MHz; 20 to 30° C	
	100 kHz to 2 GHz	± 0.5 dB	
	2 GHz to 3 GHz	± 0.7 dB	
	Preamp on	Attenuation: 0 dB; Reference: 160 MHz; 20 to 30° C	
	1 MHz to 2 GHz	± 0.6 dB	
	2 GHz to 3 GHz	± 0.8 dB	
Attenuation Switching Uncertainty			
	Attenuator setting	0 to 50 dB in 1 dB step	
	Uncertainty	± 0.15 dB	Reference : 160 MHz, 10 dB attenuation
RBW Filter Switching Uncertainty			
	1 Hz to 1 MHz	± 0.25 dB	Reference : 10 kHz RBW
Level Measurement Uncertainty			
	Overall Amplitude Accuracy	± 1.5 dB	20 to 30° C; frequency > 1 MHz; Signal input 0 to -50 dBm; Reference level 0 to -50 dBm; Input attenuation 10 dB; RBW 1 kHz; VBW 1 kHz; after cal; Preamp Off
		± 0.5 dB	Typical
Spurious Response			
	Second Harmonic Intercept		Preamp off; signal input -30 dBm; 0 dB attenuation
		+35 dBm	Typical; 10 MHz < fc < 775 MHz
		+60 dBm	Typical; 775 MHz ≦ fc < 1.5 GHz
	Third-order Intercept		Preamp off; signal input -30 dBm; 0 dB attenuation
		> 1 dBm	300 MHz to 3 GHz
	Input Related Spurious	< -60 dBc	Input signal level – 30 dBm, Att. Mode, Att.=0dB; 20 to 30° C

	Residual Response (inherent)	< - 90 dBm	Input terminated; 0 dB attenuation; Preamp off

Sweep

Sweep Time			
	Range	310 us to 1000 s	Span > 0 Hz
		50 us to 1000 s	Span = 0Hz; Min Resolution = 10 us
	Sweep Mode	Continuous ; Single	
	Trigger Source	Free run ; Video ; External	
	Trigger Slope	Positive or negative edge	

RF Preamplifier

	Frequency Range	1 MHz to 3 GHz	
	Gain	18 dB	Nominal
			(installed as standard)

Front Panel Input/Output

RF Input			
	Connector Type	N-type female	
	Impedance	50 ohm	Nominal
	VSWR	<1.6 : 1	300 kHz to 3 GHz; Attenuation ≧ 10 dB
Power for Option			
	Connector Type	SMB male	
	Voltage/Current	DC +7V/ 500 mA max	With short-circuit protection
USB Host			
	Connector Type	A plug	
	Protocol	Version 2.0	Supports Full/High/Low speed
MicroSD Socket			
	Protocol	SD 1.1	
	Supported Card	microSD, microSDHC	Up to 32GB capacity

Rear Panel Input/Output

Reference Output			
	Connector Type	BNC female	
	Output Frequency	10 MHz	Nominal
	Output Amplitude	3.3V CMOS	
	Output Impedance	50 ohm	
Reference Input			
	Connector Type	BNC female	
	Input Frequency	10 MHz	
	Input Amplitude	-5 dBm to +10 dBm	
	Frequency Lock Range	Within ± 5 ppm of the input reference frequency	
Alarm Output			
	Connector Type	BNC female	Open-collector
Trigger Input / Gated Sweep Input			
	Connector Type	BNC female	
	Input Amplitude	3.3V CMOS	
	Switch	Auto selection by function	
LAN TCP/IP Interface			
	Connector Type	RJ-45	
	Base	10Base-T; 100Base-Tx; Auto-MDIX	
USB Device			
	Connector Type	B plug	For remote control only; supports USB TMC
	Protocol	Version 2.0	

IF Output			
	Connector Type	SMA female	
	Impedance	50 ohm	Nominal
	IF Frequency	886 MHz	Nominal
	Output level	-25 dBm	10 dB attenuation; RF input: 0 dBm@ 1 GHz
Earphone Output			
	Connector Type	3.5mm stereo jack	Wired for mono operation
Video Output			
	Connector Type	DVI-I (integrated analog and digital), Single Link	Compatible with VGA or HDMI standard through adapter
RS232 Interface			
	Connector Type	D-sub 9-pin female	Tx,Rx,RTS,CTS
GPIB Interface (Optional)			
	Connector Type	IEEE-488 bus connector	
AC Power Input			
	Power Source	AC 100V to 240V, 50/60 Hz	Auto range selection
Battery Pack (Optional)			
	Battery pack	6 cells, Li-Ion rechargeable, 3S2P	With UN38.3 Certification
	Voltage	DC 10.8 V	
	Capacity	5200 mAh / 56 Wh	

General

	Internal Data storage	16 MB	Nominal
	Power Consumption	< 65 W	
	Warm-up Time	< 30 minutes	
	Temperature Range	+5 °C to +45 °C	Operating
		-20 °C to +70 °C	Storage
	Weight	4.5 kg (9.9 lb)	Inc. all options (Basic + TG + GPIB + Battery)
	Dimensions	210 x 350 x100 (mm)	Approximately
		8.3 x 13.8 x 3.9 (in)	

Tracking Generator[5] (Optional)

	Frequency Range	100 kHz to 3 GHz	
	Output Power	-50 dBm to 0 dBm in 0.5 dB steps	
	Absolute Accuracy	± 0.5 dB	@160 MHz, -10 dBm, Source attenuation 10 dB, 20 to 30 °C
	Output Flatness	Referenced to 160 MHz, -10 dBm	
		100 kHz to 2 GHz	± 1.5 dB
		2 GHz to 3 GHz	± 2 dB
	Output Level Switching Uncertainty	± 0.8 dB	Referenced to -10 dBm
	Harmonics	< -30 dBc	Typical, output level = -10 dBm
	Reverse Power	+30 dBm max.	
	Connector type	N-type female	
	Impedance	50 ohm	Nominal
	Output VSWR	< 1.6 : 1	300 kHz to 3 GHz, source attenuation ≧ 12 dB

[5] The minimum RBW filter is 10 kHz when the TG output is ON.

USB Power Sensor (Optional)

	Type	Average power sensor Model: PWS-06	
	Interface to Meter	USB cable to GSP9300 Front-Panel USB Host	
	Connector Type	N-type male, 50 ohm	Nominal
	Input VSWR	1.1 : 1 Typical	1.3 : 1 Max.
	Input Frequency	1 to 6200 MHz	
	Sensing Level	-32 to +20 dBm	
	Max. Input Damage Power	≦ 27 dBm	

	Power Measurement Uncertainty @ 25 ° C	-30 dBm to +5 dBm: 1 MHz to 3 GHz : ± 0.1 dB Typical 3 GHz to 6 GHz : ± 0.15 dB Typical +5 dBm to +12 dBm: 1 MHz to 3 GHz : ± 0.15 dB Typical 3 GHz to 6 GHz : ± 0.15 dB Typical +12 dBm to +20 dBm: 1 MHz to 3 GHz : ± 0.2 dB Typical 3 GHz to 6 GHz : ± 0.2 dB Typical	 ± 0.3 dB Max. ± 0.3 dB Max. ± 0.3 dB Max. ± 0.3 dB Max. ± 0.4 dB Max. ± 0.3 dB Max.
	Power Measurement Uncertainty @ 0 to 25 ° C	-30 dBm to +5 dBm: 1 MHz to 3 GHz : ± 0.25 dB 3 GHz to 6 GHz : ± 0.25 dB +5 dBm to +12 dBm: 1 MHz to 3 GHz : ± 0.2 dB 3 GHz to 6 GHz : ± 0.2 dB +12 dBm to +20 dBm: 1 MHz to 3 GHz : ± 0.35 dB 3 GHz to 6 GHz : ± 0.3 dB	 Typical Typical Typical Typical Typical Typical
	Linearity @ 25 ° C	±3%	
	Measurement Speed	100 ms for Low Noise Mode 30 ms for Fast Mode	Typical