GSP-830 3GHz Spectrum Analyzer
# New Product Announcement

GOOD WILL INSTRUMENT is announcing to the global market the 3GHz Spectrum Analyzer, GSP-830, which inherits high performance, easy to use, light-weight portability and affordable price of GW Instek Spectrum Analyzer product line. With state-of-the-art design, GSP-830's outstanding low noise floor level, -152dBm/Hz (-162dBm/Hz with GAP-801 preamplifier), presents extreme sensitivity for picking up weak signals. Through Auto Sequence mode, professionals can define their own macros into 10 sets of routine sequence, while additional Pause, Repeat and Single Run functions help edit an ATE-like operation program for various applications. Further advanced features, like Autoset, Split Window, Power Measurements, Pass/Fail Templates, and AC/DC/Battery operations, make GSP-830 an ideal solution for RF spectrum analysis. The GSP-830 optional features, including 3GHz Tracking Generator, 300Hz, 10k/100k and 9k/120k additional RBW, and Battery Packs for DC/Battery Power Operation, well extend the product application range to various fields.

The vast and advanced interfaces, USB host/device, RS-232, VGA, and GPIB (optional), make remote control, remote monitoring, screen printout, and data transmission extremely easy. EagleShot, a free PC software, has been developed to facilitate the tasks of data transmission, data analysis, and test result documentation and printout. The EagleShot software, along with GSP-830, is available to all customers for free, downloadable from GW Website.

GSP-830 Description

GSP-830, 3GHz Spectrum Analyzer
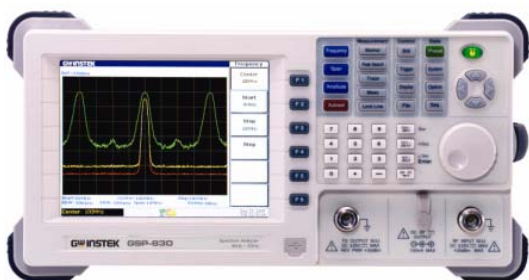
Key Features

■ -152dBm/Hz Display Average Noise Level (DANL) without Pre-amp.	■ 3GHz Tracking Generator(Optional)
■ Autoset Function	■ ±1PPM Stability(Optional)
■ Sequence Programming	■ 300Hz, 9kHz, 120kHz RBW(Optional)
■ ACPR, OCBW, Channel Power, Phase Jitter, N-dB measurement	■ AM/FM Demodulator(Optional)
■ Pass/Fail Test with Limit Line Editing	■ USB/RS-232/GPIB(Optional) Interface
■ 10 Markers with Marker, Peak Functions	■ Direct VGA Output
■ Split Windows Allow Separate Settings	■ Multi-Language Operation
■ AC/DC/Battery Multi-Mode Power Operation	■ Free PC Software
	■ 6.4" TFT Color LCD, Resolution: 640 x 480
	■ Compact Size, 330(W) x170(H) x 340 (D)mm
	■ Light Weight of 6kg Without options

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Key Features

Very Low Noise Level

With GW Instek state-of-the-art design, GSP-830's outstanding low noise floor level, -152dBm/Hz at 1GHz, performs extreme sensitivity for picking up weak signals. Along with GAP-801, a 10dB-gain preamplifier, GSP-830 reaches the equivalent noise floor level as low as 162dBm/Hz, thus widely extends the measurement range.

Autoset Function

Going through a specific training and numerous trials of panel operations are common processes to get used to a product utilization. Everything is changed now: GSP-830's Autoset function automatically captures RF signal and configures the optimal display setting just in one step. For complex signals, you can still manually adjust the settings, such as amplitude and frequency span, to get the appropriate display. Using spectrum analyzer is no more a complicated experience with GSP-830 Autoset function.


Auto Sequence Mode

Automatic Sequence feature offers a special functionality that frees you from complex programming; you can configure ATE test programs over GSP-830 without going through software programming processes. After editting the auto sequence sets as you need through GSP-830 front panel and screen, you can easily run different measurements in series (by a single key press) or to carry out the whole test sequences step by step.
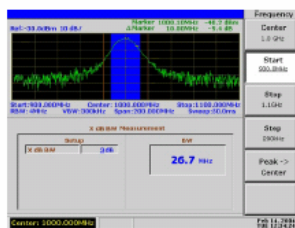
Power Measurements

GSP-830 provides various power measurement functions: ACPR, OCBW, and Channel Power, Phase Jitter, and N-dB bandwidth measurements. Two adjacent channels as well as channel bands are shown at the same time with different color codes enabling users to recognize the test result at a glance. Under power measurement mode, the screen display splits into two parts with upper part to show the waveform and lower part to show the parameters of test result.
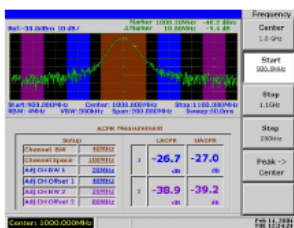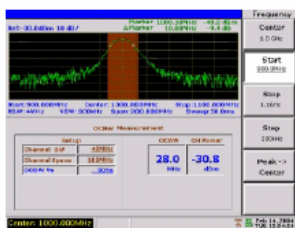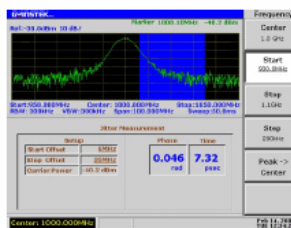

ACPR   OCBW   N-dB BW Measurement   Jitter Measurement

Pass/Fail Judgment
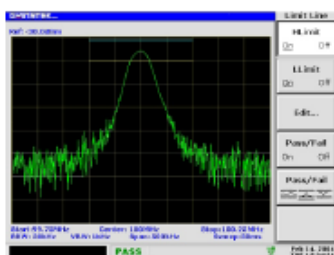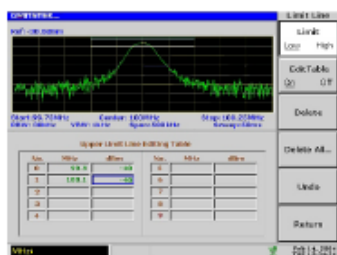
The Pass/Fail judgment function provides convenience for quick inspections over repetitive measurements. This function is especially helpful to the efficiency and the productivity of the production line. After the setting of high/low limits to create Pass/Fail templates, GSP-830 swiftly and accurately determines whether the waveform of the input signal is within the specified range or not, and indicate the Pass or Fail test result.

Marker function
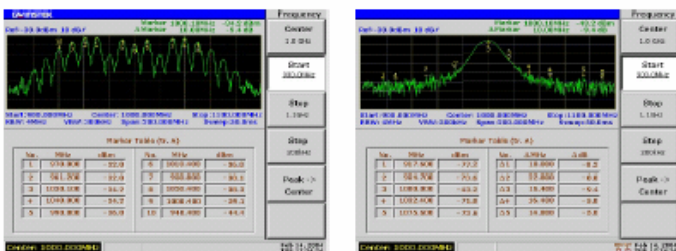
Using the 5 pairs of flexible and all-around markers under the Marker mode of GSP-830, you can easily find and observe the signal peaks and track them or measure the delta readings between defined pairs. A table list provides a real-time update of the frequency and power information of all markers, letting you grasp the signal details in a glance.

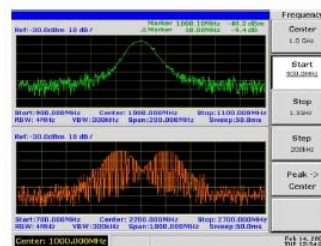## Split Windows Display in Live Mode

The Split-Window enables the dual measurements with dual displays of a signal under two different setting environments. Most important of all, the real-time display update is maintained under the split window mode. This feature is especially useful when measuring harmonics.

3 Hours DC Operation & Field Service Adaptation

Battery power operation

Equipped with two packs of Li-ion battery, GSP-830 is able to maintain its normal operation for more than 3 hours. The DC operation mode also allows GSP-830 to be powered by a 12-Volt power supply or the power of cigar-lighter inside the automobile. The large internal memory size of GSP-830 makes the mass storage of measured traces, setup information, limit lines and user-defined macros possible. Along with the USB feature to adopt the popular flash drive for mass storage, GSP-830 is a convenient tool for the service engineers. With only 6kg light weight and compact size, GSP-830 well fits into outdoor applications.

Feature-rich Interface

The USB host port in the front panel supports the ubiquitous flash drive for various transactions, including setup info, trace data and display images. The rear panel USB On-The-Go, port plays the slave role. As a slave, it gives accessibility to the remote control from PC. The display image of GSP-830 can be sent directly to the external monitors through a VGA port on the rear panel. This gives convenience for the remote monitoring at EMI test sites or the circumstances needing presentation or group discussion.

USB Host/ Device & VGA Output

GSP-830 provides multiple PC connections. In addition to the standard RS-232 and optional GPIB for ATE control, GSP-830 includes the widely adopted USB Host for data transfer. Professionals can directly plug in Flash drives to USB Host port to transfer measurement data. This feature improves the work efficiency and makes file transfer far more convenient.
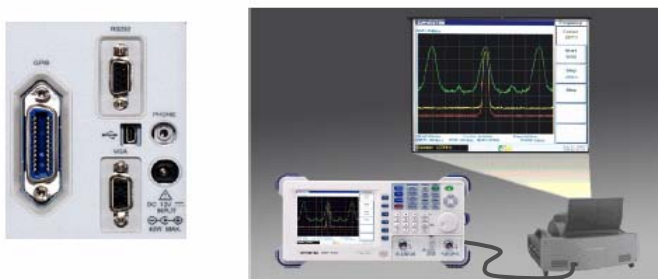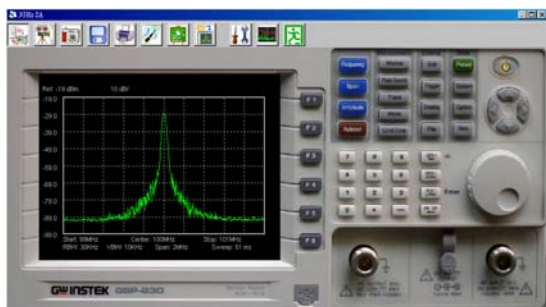

The VGA output terminal can be used for showing GSP-830 display contents on an external device, such as projector screen or VGA monitor. It offers a huge benefit in a large amount of applications such as education and remote monitoring.

Free PC Software for GSP-830

Through RS-232 or USB connection, EagleShot software transfers the measurement data from GSP-830 to the PC. Users can print out the data in graphical format directly or save it into text file for further data analysis. With

EagleShot software, the Limit Line setting on the PC could be done either through capturing the setting from GSP-830 or through the Limit Line editing by the user at the PC end. For marking and reading the measured signals on the PC screen, users can place markers to the peaks of their interest on the display, as easily as they do on GSP-830. The new version of EagleShot PC software supports GSP-830 in various application fields. Besides, it is also compatible for GSP-827.

GSP-830 Product Position

The GSP-830 product position could be seen from the following four aspects:

1. Price Position
The list price of GSP-830 is set at less than FOBS$5,500 for the basic unit without any options. This attractive price makes GSP-830 the price leader among all the 3GHz spectrum analyzer available in market.

2. Application Position
GSP-830 focuses more on the industrial market covering manufacturing and service, whereas GSP-827 is dedicated in penetrating the educational market with a lower price. Please refer to the section "**Target Markets and Associated Features**" for details.

3. Competitor Position
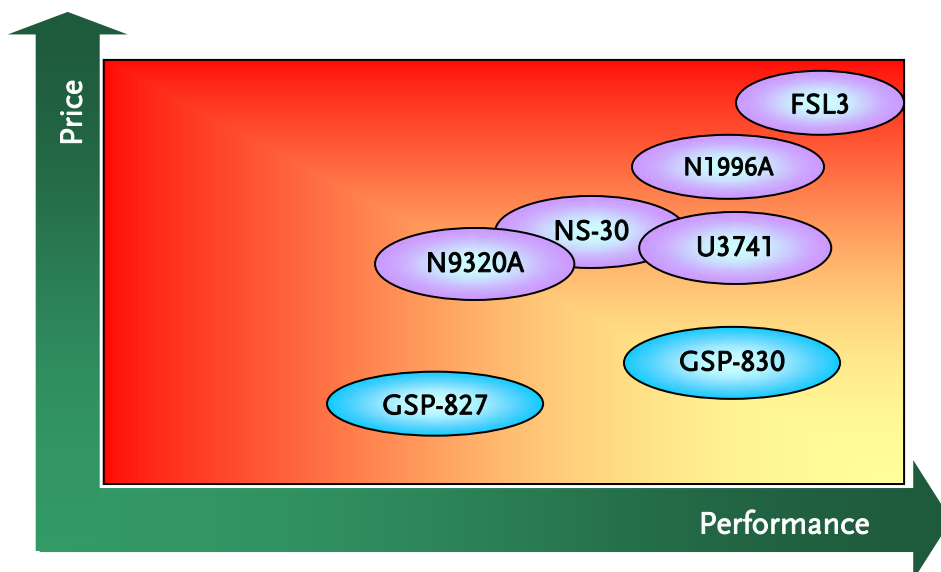
From the chart above you will easily see that GSP-830 locates in the leading position of performance/price value, which greatly differentiates GSP-830 from all other competitors. Besides price advantage, GSP-830 stays at the level of moderate performance, which adequately covers most of the applications in the manufacturing and the service markets, whereas most of the competitors stand within a crowded range of high price. Because of the affordable price, GSP-830 also accommodates the budget pressure in the educational market if the choice of better performance and a bit higher price than GSP-827 is considered.

4. Flagship of GW Product Line
GW Instek has been developing Spectrum Analyzer technology for many years, starting from GSP-810 to GSP-827 and now to GSP-830. With fantastic outlook design, brilliant features, and complete measurement functions, GSP-830 will greatly enhance the expertise and establish a notable stand as a professional instrument manufacturer for GW Instek in the global market. We expect the elevated brand image through GSP-830 announcement will bring benefit not just to GW Instek but to its partners as well.

Feature Comparisons & Competition

In the key specs area, from frequency range to sweep time, GSP-830 shows almost the same performances as all other competitors do. The remarkable characteristic of low display average noise level, or DANL, of GSP-830, differentiates itself from other competitors with a highest sensitivity. A Spectrum Analyzer with low noise level can easily pick up or detect weak signals without an additional preamplifier. This significantly saves cost and time for the users needing high sensitivity measurements.

In the industrial market, lots of applications are achieved by the communication between computers and instruments via various types of interface. GSP-830 is equipped with almost all the commonly used interfaces, including USB, GPIB, and RS-232 but except LAN interface.

For the rest of specs areas, including I/O, options, and measurement functions, GSP-830 stays at the same performance level with its competitors. Most remarkable of all, GSP-830 has a unique Sequence function, which allows users to edit their own test sequences through the panel. With Sequence function, sequential and repetitive measurements can be done automatically without any remote controls from a PC.
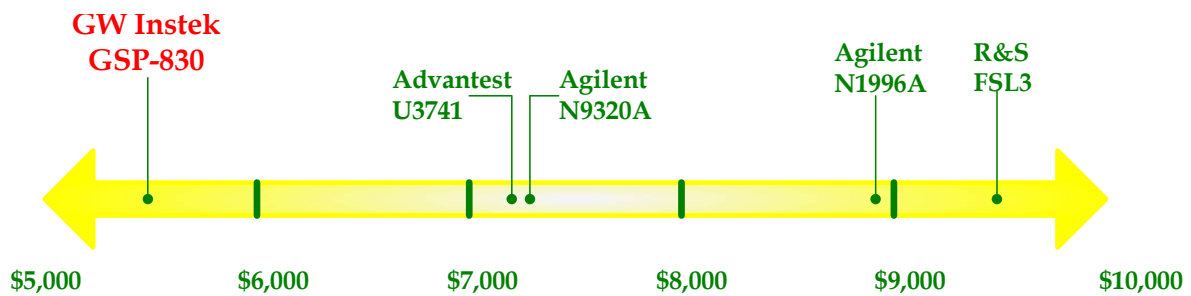
With high performance, great flexibility and a price less than $5,500, GSP-830 is the only choice for a high performance-price ratio product in the market. The chart above states the price positioning among the spectrum analyzers mentioned above. All the prices are for the basic units, without tracking generator or other options.

The following table provides the information of key feature comparisons among GSP-830 and its competitors. From the price and performance viewpoints, Rohde & Schwarz FSL3, Agilent N1996A and N9320A, and Advantest U3741 are considered the major competitors of GSP-830. This table also includes the internal comparison between GSP-827 and GSP-830.

		GW Instek GSP-830	GW Instek GSP-827	Agilent N1996A	Agilent N9320A	Advantest U3741	R&S FSL3
Key Specs	Freq: Up to 3GHz	●		●	●	●	●
	Color Display	●		●	●	●	●
	Phase Noise<-90dBc/Hz, 10KHz (1)						●
	DANL<-150dBm/Hz	●					
	RBW in 1-3 steps (2)			●	●	●	●
	Frequency Response =1 dB (overall freq. band)	●		●	●	●	●
	Sweep time < 10ms (Span>0)				●		●
Interfaces	USB Interface	●		●	●	●	●
	GPIB Interface	●	●			●	●
	LAN Interface (3)			●		●	●
	RS232 Interface	●	●				
I/O	External Ref. Input	●	●	●	●	●	●
	External Trigger Input	●	●	●	●	●	●
	VGA Output	●					
	Ref. Clock Output	●	●	●	●	●	●
	USB Drive Connector	●		●	●	●	●
Options	Tracking Generator	●	●	●	●	●	●
	Preamplifier	●	●	●	●	●	●
	Battery Operation	●	●	●		●	●
Key Measurement Functions	Autoset (Autotune)	●		●			
	ACPR (ACLR)	●	●	●	●	●	●
	OCBW	●	●	●	●	●	●
	Auto Sequence	●					
	Pass/Fail Test	●	●	●	●	●	●
	Multi Language	●			●		
	Dual Windows for Alternate Sweep	●					
	Support USB Memory Stick	●		●	●	●	●
	User-Defined Amp. Correction Table	●					
$	Price < $5500 (w/o opt.)	●	●				

Note:

(1) The phase noise is mainly for measuring signal of high purity, like oscillator output signal or signal generators. But even for signal generators, -90dBc/Hz is not good enough. It has to be better than –105 ~ –110dBc/Hz at least. That is why it is not so critical for all of this range of products.

(2) The RBW number is basically not a significant factor to the overall performance of a Spectrum Analyzer. The key is how narrow the bandwidth can go. GSP-830 equipped with 3k, 30k, 300k and 4MHz RBW filters, adequately accommodates most of the manufacturing and service applications. Besides standard features if more RBWs are required, the 300Hz, 10k and 100kHz filters can be added as options for the product., The configuration of optional RBWs of GSP-830 provides a flexible and economic solution based on the consideration of cost and applications.

(3) The LAN port on the instrument is getting popular; however, the practicability and the application popularity remain under a long-term observation. GSP-830 doesn't have a LAN port in order to save the cost for most of the users who don't need it. Actually GPIB is still the most commonly-used interface in manufacturing field.

Target Markets and Associated Features

GSP-830 is designed to meet the application demands of **Manufacturing, Service,** and **Education** markets. Without the requirement of very critical phase noise performance, which reflects to a high price, **R&D** is also a potential market for GSP-830 with budget advantage. The following table introduces the associated features of the GSP-830 in related markets:

	GPIB/RS232/USB	Ultra Low DANL	Multi Meas. Functions	Sequence	Pass/Fail	Split Windows	Battery Operation	Multi Language	VGA Output	User Defined Correction Table
Manufacturing	●	●	●	●	●	●		●	●	●
Service	●	●	●		●	●	●	●	●	●
Education		●	●	●				●	●	
R & D		●	●				●			●

1. Manufacturing

Various remote control interfaces, GPIB/RS-232/USB, are the musts for the industrial applications. The measurement functions, like Power Measurement, Sequence function and Pass/Fail test, etc., facilitate the mass productions and the final quality inspections. The manufacturing market that GSP-830 covers containing the manufacturers of the GPS handsets, RFID tags or readers, CATV tuners, RF components, antennas, LNBs, remote controllers, wireless computer peripherals, wireless LAN cards, etc.

2. Service

Equipped with battery power, GSP-830 is capable of doing outdoor services and measurements. The power monitoring of base-stations and the field strength measurement of antennas are typical applications for GSP-830. For indoor services, like EMI pretest and handset maintenance, utilizing Pass/Fail test function, Auto Sequence function and EagleShot software of GSP-830, the user can make his job done pretty much easier.

3. Education

Instructors can utilize the VGA output to project the real-time image for educational purpose. The GSP-830 also provides the USB storage abilities for the data/images accesses to and from the system. Students can switch the languages shown on the displayed menu, which improves the usage and the convenience greatly.

Market Strategy

1. Focus on the competition against major competitors mentioned in the previous sections: Aglient N1996A and N9320A, Advantest U3741, and R&S FSL3. Emphasize the following advantages that GSP-830 surpasses:

   A. Lower Price, at least 20% lower market price than that of Agilent, Advantest and R&S's counterparts.

   B. Lower DANL, equivalent to –150dBm/Hz, and other valued features of Auto Sequence, USB Host and Device support, Color TFT LCD Display, Battery Power Operation and Free PC Software EagleShot.

2. Complementary product sales for different markets:

   Focus on the promotion of GSP-830 instead of GSP-827. GSP-830, with a little higher price, is a better choice than GSP-827 from all aspects. However, for the highly price-sensitive accounts or tenders, it is a good strategy using GSP-827 to secure the orders.

3. All GW Instek's distribution partners in the global market are requested to start promotion activities for new GSP-830 from mid-June, 2007. **The e-files of the GSP-830 Marcom material, including advertisement artwork, data sheet, brochure and NPI presentation material, will be posted on GW Instek's Website for download. The**

adequate amount of hardcopy of Marcom material will be sent to all GW's distributors before end of June, 2007.

4. The demo units will be available for shipment starting beginning of June. The demonstrations to enhance the strengths of the GSP-830 will be a very effective way to ramp up the new product sales in the market.

5. The mass quantity orders will be shipped starting beginning of July. The plan is to deliver distributors' orders within 1 month after receipt of order, so the end users' orders could be fulfilled promptly starting from August.

Existing GW Products Replacement

The GSP-830 is estimated to replace 80% of the GSP-827 sales in the global market.

Key Dates for Product Announcement

1. Order queue open (mid-May)
2. Distributor Announcement (End of May)
3. Global Market Announcement (Beginning of June)
4. Market Promotion Activities (June through December 07')
5. Demo Units Shipped to Distributors (Beginning of June)
6. Mass quantity order fulfillment (Beginning of July)

Service Policy

GSP-830 carries **1-year** warranty. The exception is for the Battery Pack, which carries a 3-months warranty. All the necessary technical supports and service procedures can be found in the GSP-830 Service Manual. Please refer to it for details when necessary. The GSP-830 service issues are generally categorized into the following six grades:

1. **Software Update**

   When the new functions are added or the old functions are upgraded to GSP-830, GW Instek will release new version software for distributors to do software update on the products being used in the field. This can be done either through the direct download of a USB memory stick, or through of a PC (RS-232) plus a tool program to do the update. GW Instek will provide all necessary technical resources, including procedures, codes, and tool program to help distributors complete this job.

   GSP-830 does NOT need to be re-calibrated after any software update.

2. **Calibration through Front Panel**

   When the amplitude tolerance of a GSP-830 unit is found to be out of its published specification, a simple calibration procedure can be executed easily through panel operation to compensate the amplitude error of this product. In this procedure, only a well-calibrated signal generator with at least 15MHz and -30dBm output is necessary.

3. **Board-Level Service and Calibration Data Reload**

   When the functions or the specs of a GSP-830 cannot get back to normal by executing Software Update and Front Panel calibration, or the malfunction is obviously seen as a result of component failure, this unit needs to be fixed by board-swapping. GW Instek will provide distributors with printed circuit boards and new calibration data for doing repair service. Service technicians need to reload the new calibration data on the unit through a PC via RS-232 after the board swapping is done. In this grade of service, GW Instek will provide the boards, the calibration data, and the tool program.

4. **Miscellaneous issues**

Other service issues, such as the replacement of LCD panel or clock battery, can be resolved with ease by following the procedures indicated in the Service Manual or by contacting GW Instek Service Center for further technical consultations.

5. **Option Installation**

Most of the options of GSP-830 have to be installed in the factory before it is shipped out, except Opt.02 Battery Packs, Opt.03 1ppm Stability Time base, and Opt. 08 GPIB Interface that are field installable.

6. **Return-repair**

The Service Manual of GSP-830 contains all the necessary information to help distributors provide repair service locally. Should there be any specific service issue that can not be resolved by following the instructions in the Service Manual; the distributor needs to contact GW Instek Service Center for further technical assistance. Once the product can't be fixed at the distributor site, GW Instek Service Center will make the arrangements together with the distributor to return the failure product to the factory for repair.

Should you have any questions on the GSP-830 announcement, please don't hesitate to contact us.

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Specifications

Frequency	Frequency Range	9kHz ~3GHz
	Aging Rate	± 10ppm, 0-50°C, 5ppm/yr
	Span Range	2kHz ~ 3GHz in 1-2-5 sequence, full span, zero span
	Phase Noise	-80dBc/Hz @1GHz 20kHz Offset typical
	Sweep time range	50ms ~ 25.6s
Resolution Bandwidth	RBW Range	3kHz, 30kHz, 300kHz, 4MHz
	RBW Accuracy	15%
	Video Bandwidth Range	10Hz ~ 1MHz in 1-3 steps
Amplitude	Measurement Range	-103dBm~+20dBm, 1MHz~15MHz, Ref. Level≥-30dBm; -117dBm~+20dBm, 15MHz~1000MHz, Ref. Level≥-110dBm; -114dBm~+20dBm, 1000MHz~3000MHz, Ref. Level≥-110dBm (Span=50KHz, RBW=3KHz)
	Overload protection	Max. +30dBm, 25VDC
	Reference Level Range	-110 ~ +20dBm
	Accuracy	±1dB @100MHz
	Frequency Flatness	±1dB
	Display Range Linearity	±1dB over 70dB
Dynamic Range	Average Noise Floor	<-135±1dBm/Hz, 1MHz ~ 15MHz, Ref. Level≥-30dBm; <-149dBm/Hz, typical -152dBm/Hz. 15MHz~1000MHz, Ref. Level≥-110dBm; <-146dBm/Hz, typical -149dBm/Hz, 1000MHz~3000MHz, Ref. Level≥-110dBm;
	Third Inter-modulation	<-70dBc, RF Input @-40dBm, Ref. level@-30dBm
	Harmonic Distortion	<-60dBc, RF Input <-40dBm, Ref. level@-30dBm
	Non-harmonic Spurious	<-93dBm, 1MHz~15MHz, Ref. level≥-30dBm; <-107dBm, 15MHz~1000MHz, Ref. level≥-110dBm; <-104dBm, 1000MHz~3000MHz, Ref. level≥-110dBm; (Span=50KHz, RBW=3KHz)
General	Display	640 x 480 high resolution TFT color LCD
	Split Windows	Active Window: Upper, Lower, or Alternate (two simultaneously sweeping windows)
	Markers	10 Markers for peaks; 5 Normal-delta marker pairs Function: Delta, To Peak, To Minimum, Peak track, Peak Table, Peak Sort
	Trace Detection	3 Trace with Peak, Maximum hold, Freeze, Average, Trace math
	Power measurement	ACPR, OCBW, Channel power, N dB and Phase jitter
	Autoset function	Auto tuning the measurement result for observation
	Trigger	Conditions: Video, External (Positive-going +5V-TTL ext. signal) Modes: Normal, Single, Continuous
	Sequence	Automated test by user-defined macros without any remote controller. 10 sequential macro sets and 10 macros per each set. Variable Delays and Wait-to-Go facilitate automated measurement. Do-Sequence links and nests different sequence sets.
Connectors	RF-Input	Type: N female, 50Ω nominal RF input VSWR: <2:1 @0dBm Ref. level
	External reference clock input	Type: BNC female, 1MHZ, 1.544MHz, 2.048MHz, 5MHz, 10MHz, 10.24MHz, 13MHz, 15.36MHz, 15.4MHz, 19.2MHz

	Reference clock output	Type: BNC female, 10MHz
	DC input (DC power operation)	Jack: 5.5mm, 12V
	DC Output (for pre-amplifier GAP-801)	Type: SMA male, output +9V/ 100mA max.
Interface	RS-232C	Sub-D 9 pins female
	USB connector	USB Host/Device fully speed supported Front panel: Type A receptacle for USB flash drives. Real panel: Type mini-B receptacle for PC remote control.
	VGA Output	Sub-D 15 pins female
	GPIB(Option)	Fully programmable with IEEE 488.2 compliance
Accessories	Power cord x1, Instruction manual x1, USB cable (Type A plug to Type mini-B plug) x1	
Power Source	AC 100~240V, 50/60Hz	
Dimensions & Weight	330W x 170H x 340D (mm), Approx. 6kg	

Option		
Opt. 01	Tracking Generator	■ Frequency Range: 9k~3GHz ■ Amplitude Range: -50dBm~0dBm ■ Amplitude Accuracy: ±1dB@100MHz, 0dBm ■ Amplitude Flatness: ±1dB@0dBm ■ Harmonics: <-30dBc typical ■ Reverse Power: +30dBm ■ Impedance: Type: N female, 50Ω nominal ■ RF output VSWR: < 2:1
Opt. 02	Battery pack	■ 11.1V Li-Ion battery pack *2
Opt. 03	± 1ppm Stability	■ ±1ppm, 0~50 °C , ±1ppm/yr
Opt. 04	300Hz RBW	■ RBW 300Hz, Accuracy: 20%
Opt. 05	9kHz & 120kHz RBW	■ RBW 9kHz & 120kHz, 6dB BW, Accuracy: 15%
Opt. 06	10kHz & 100kHz RBW	■ RBW 10kHz & 100kHz, 3dB BW, Accuracy: 15%
Opt. 07	Demodulator (*)	■ Demodulation: AM/ FM ■ Output: Internal speaker, 3.5mm stereo jack wired for mono operation ■ RBW 10kHz & 100kHz, 3dB BW, Accuracy: 15%
Opt. 08	GPIB Interface	■ IEEE 488 bus

Specifications are subject to change without notice.

Ordering Information

GSP-830   3GHz Spectrum analyzer

Standard Accessories

Instruction manual, Power cord, USB Cable (Type A plug to Type mini-B plug)

Option

Opt. 01: Tracking generator
Opt. 02: Battery pack x2
Opt. 03: ±1ppm stability
Opt. 04: 300Hz RBW
Opt. 05: 9kHz & 120kHz RBW
Opt. 06: 10kHz & 100kHz RBW
Opt. 07: AM/FM Demodulator and 10kHz & 100kHz RBW
Opt. 08: GPIB Interface

Note:
Only one option can be selected among Opt. 05, 06 and 07.
Opt. 01 & 03 to 07 are factory-installed.

Optional Accessories

ADP-001 BNC(J/F) ~ N(P/M)		ADP-002 SMA(J/F) ~ N(P/M)		ADP-101 BNC(J/F)75Ω ~ BNC(P/M)50Ω	
ATN-100 10dB attenuator N(J/F) ~ N(P/M)		GAK-001 Termination 50Ω N(P/M)		GAK-002 Cap with chain N(P/M)	
ATA-001 BNC antenna					
GTL-301 RG223, N(P/M) 1000mm		GTL-302 RG223, N(P/M) 300mm		GTL-303 RD316, SMA(P/J) 600mm	
GTL-304 RG223, N(P/M)~N(J/F) 300mm					

GKT-001	General kit set	■ ADP-002: adapter, SMA(J/F)-N(P/M) x2 ■ ATN-001:10dB attenuator, N(J)-N(P) x1 ■ GTL-303: RF cable assembly(SMA(P), RD316, 600mm) x2 ■ GSC-002: Kit box x1
GKT-002	CATV kit set	■ ADP-001: adapter, BNC(J/F)-N(P/M) x2 ■ ADP-101: BNC(P/M)50Ω to BNC(J/F)75Ω adapter x2 ■ GTL-304: RF cable assembly(N(P)-N(J), RG223, 300mm) x2 ■ GSC-003: Kit box x1
GKT-003	RLB kit set	■ GAK-001: Termination, 50Ω, N(P) x1 ■ GAK-002: Cap with chain, N(P) x1 ■ GTL-302: RF cable assembly(N(P), RG223, 300mm) x2 ■ GSC-004: Kit box x1
GKT-006	EMI probe set	■ ADP-01: adapter, BNC(J/F)-N(P/M) x1 ■ ADP-02: adapter, SMA(J/F)-N(P/M) x1 ■ ANT-01: 6cm Loop, H-Field Probe x1 ■ ANT-02: 3cm Loop, H-Field Probe x1 ■ ANT-03: 6mm Loop, H-Field Probe x1 ■ PR-03: Touch Passive Probe, <3GHz x1 ■ Test Lead: RF cable assembly BNC(P/M)-BNC(P/M) x1 ■ Test Lead: RF cable assembly SMA(P/M)-SMA(P/M) x1

GAP-801	Preamplifier	■ Preamplifier with 10dB(Typical， 9kHz ~ 6GHz

RLB-001	Return Loss Bridge	■ Frequency Range: 10MHz to 1GHz ■ Directivity: 10MHz to 100MHz: >48dB 100MHz to 1000MHz: >38dB ■ Insertion Loss: Source to Load: <10dB Load to Coupler: <6dB ■ Source Return Loss: >7dB Load Return Loss: >11dB Coupler Return Loss: >17dB ■ Characteristic Impedance: 50 Ohm ■ Connector: N Type Source and Load: Female Coupler: Male ■ Dimension: 88 x 54 x 32 (mm) ■ Weight: 230 g

GSC-001	Soft Carrying Case	■ Available to accommodate the field applications.

GTL-401	DC power line	■ DC plug to lighter, 5A

GRA-404	Rack Adapter Panel	■ For GSP-827/830, Rack Mounting (19", 4U)