
# GSP-830

## 3GHz Spectrum Analyzer

## FEATURES

- Low Noise Floor (-117dBm @1GHz, 3k RBW)
- Autoset Function
- Sequence Programming Functions
- ACPR, OCBW, Channel Power, N-dB Measurements
- Pass/Fail Test with Limit Line Editing
- 10 Markers with △Marker, Peak Functions
- Split Windows Allowed Separate Settings
- AC/DC/Battery Multi-Mode Power Opezation
- USB/RS232/GPIB(Optional) Interface
- Direct VGA Output
- 6.4" TFT Color LCD, Resolution: 640 x 480
- Compact Size, 330(W) x 170 (H) x 340 (D) mm
- Light Weight of 5.8kg Without Options
- Optional Tracking Generator & Preamplifier

GW INSTEK

Made to Measure

# Full-Fledged Functions for a Total Solution

GSP-830, with much elevation on the frequency domain technology, is positioned as an accurate and powerful tool for RF measurements in the industrial fields. The 3GHz Frequency Band and the low Noise Floor of -117dBm greatly expands the GSP-830 dynamic range to a level that meets most of the critical measurement requirements in various market sectors. The high speed signal processing of GSP-830 not only gives a very fast sweep rate of the spectrum but also plays the role as the engine for powerful measurement capabilities. The Auto Measurements of Channel Power, Bandwidth and Phase-Jitter related parameters of a RF system or device could be done with ease. The Split-Window enables the dual measurements with dual displays of a signal under two different setting environments. The A B C Traces provide three live measurement results, such as Clear & Write, Max Hold, and Average traces, of a signal in the same spectrum at the same time. The Go/NoGo function facilitates the fast measurements in the Manufacturing and Component Sourcing fields, whereas the Auto Sequence provides a mean to automatically run through a sequence of tests based on the various system settings of the user's test routines.

The remarkable USB features support the Image, Data & Setting storage through flash drive and the direct printout of screen image through a color printer. Being an USB Device, GSP-830 can be remotely controlled by PC through the USB OTG port on the rear panel. The 6.4" TFT LCD with 640 x 480 resolution enhances the effectiveness of GSP-830 powerful measurements due to its bright, colorful & high-resolution display. The Auto-Set function, 10Markers (with 5 pairs) measurement and Multi-Language Menu all together provide a very thoughtful user interface. The light-weight & compact design plus DC/Battery power operation give field service engineers the best portability benefit.

The optional 9k/120kHz RBW filters plus Average and Quasi-Peak Detections fulfill the demand for EMI Test compliances. The function of "Peak Table", listing the first ten peaks based on the ranking of either amplitude or frequency, provides EMI Engineers with a very convenient tool. With optional preamplifier GAP-801, GSP-830 becomes a very good EMI pre-tester to help electronic designers catch potentially critical signals prior to the product EMI certification test. With 3GHz Tracking Generator, GSP-830 well accommodates the applications for System & Component characteristic verifications. The optional ±1ppm stability and the optional AM/FM Demodulator extend the GSP-830 application support to the niche areas. The accessories, such as pre-amplifier, CATV test kit and RLB test kit, are all available as GSP-830 options to meet the requirements with various applications.

The free PC software of GSP-830, EagleShot, can be accessed and downloaded from GW Instek website. Through RS-232 or USB connection, EagleShot transfers the measurement data from GSP-830 to the PC. Users can print out the data in graphical format directly or save them 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.

## APPLICATION

## KEY FEATURES

GW Instek now extends its spectrum Analyzer product series to 3GHz up. As a new member, GSP-830 inherits the advanta ges of high performance, low cost, easy to use and light-weight portability of GWinstek products. Moreover, its fabulous low noise floor greatly increases the measurement range; advanced user interface brings you significant visual distinction; rich measurement functions make your work simple and easy. GSP-830 offers you the greatest performance-price value in the market.

### Wide Measurement Range

With GW Instek state-of-the-art design, GSP-830's outstanding noise floor level, -152dBm/Hz @600MHz, presents extreme sensitivity for picking up weak signals. Along with GAP-810 10dB-gain preamplifier, GSP-830 reaches the equivalent noise floor level as low as 162dBm/Hz, thus widely extend the measurement range.

### Automatic Measurement

GSP-830 can be an automatic test instrument without any external computer control. Users can define their own macros through a keypad on the front panel and store them into 10 Sequence sets. The sequence includes the steps of pause, so the running sequence could be stopped for measurement result observation then continue when necessary. Repeat or Single run modes can be selected based on the application requirements.

### Portable Power Operations

Equipped with two packs of Li-ion battery, GSP-830 could 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-size internal memory of GSP-830 helps store measured traces, setup information, limit lines and user-defined macros. 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.

### Advanced User Interface

The user-oriented interface design of GSP-830 gives you the pleasure of handling a complicated job with ease. A high-resolution 6.4" color TFT LCD provides high quality image display. Multiple traces with different colors, as defined by the user, facilitate the visual recognition of small disparities at a glance. Split window mode delivers the value for monitoring two different frequency bands on the same display at the same time. GSP-830 under this split-window mode acts like a product of two-spectrum-analyzers-in-one.

### Feature-Rich Interface

The front panel USB host connector supports the ubiquitous flash drive for various transactions, including setup info, trace data and display images. In addition, it also supports the direct screen printout for the printers with USB ports. The rear panel USB On-The-Go, or OTG, connector plays the dual roles of both host and slave. As a slave, it gives accessibility to the remote control from PC. The display image of GSP-830 could 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.

### Free PC Software for GSP-830/GSP-827

Through RS-232 or USB connection, EagleShot transfers the measurement data from GSP-830 to the PC. Users can print out the data in graphical format directly or save them 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 EagleShot PC software supports both GSP-830 and GSP-827 in various application fileds.

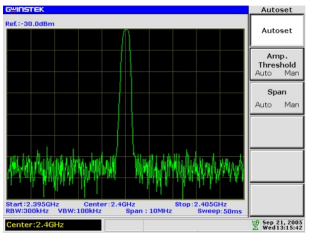
## PANEL INTRODUCTION


1. Main Functions
2. Measurement Keys
3. Control Keys
4. State Keys
5. Power Button
6. Arrow Key
7. Fly Wheel
8. Numeric Keypad
9. Autoset Function
10. Function Keys
11. 640 x 480 High Resolution LCD Display
12. R F Input
13. Tracking Generator Output
14. DC Output for Pre-Amplitier (GAP-801)
15. USB Host (type A)
16. Battery Pack Slot
17. Headphone Output
18. DC Input Jack
19. RS-232 Interface
20. USB(type mini-B)
21. VGA Output
22. GPIB Interface
23. External Trigger
24. REF Input
25. 10MHz REF Output

## FEATURES

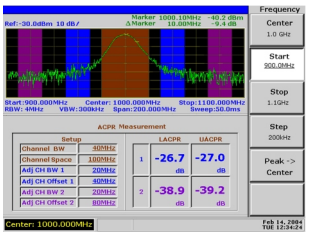
- Low Noise Floor(-117dBm@600MHz, 3k RBW)
- Autoset Function
- Sequence Programming Functions
- ACPR, OCBW, Channel Power, N-dB and Phase Noise Measurements
- Pass/Fail Test with Limit Line Editing
- 5 Markers with △ Marker
- 10 Peak Markers/Sorting Function
- Split Windows Allow Separate Settings
- AC/DC/Battery Multi-Mode Power Operation
- USB/RS-232C/GPIB(Optional) Interface
- Direct VGA Output
- 6.4" TFT Color LCD, Resolution: 640x480
- Compact Size,330(W)x170(H)x340(D)mm
- Light Weight of 6kg Without Options
- Optional Tracking Generator

## A. AUTO SET FUNCTIONS

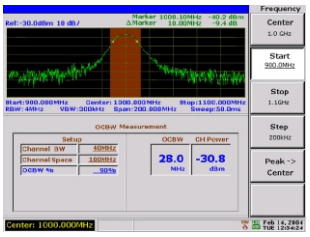




Going through special training and/or numerous panel operations is a common requirement to capture RF signals in a precise manner. Everything is changed now: GSP-830's internal Autoset function automatically captures RF signal and configures the optimal display setting in just one operation step. Of course for complex signals you can still manually adjust settings such as amplitude and frequency span. Using spectrum analyzer will never be a complicated matter again.

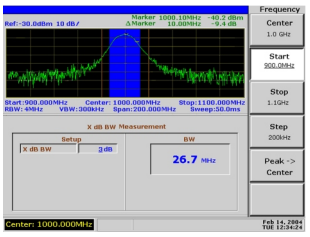
## B. POWER MEASUREMENT FUNCTION



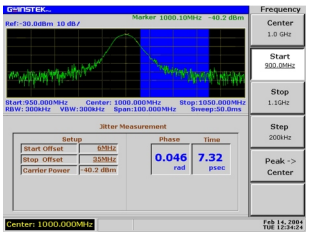
ACPR



OCBW



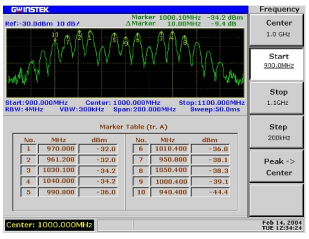
N-dB BW Measurement

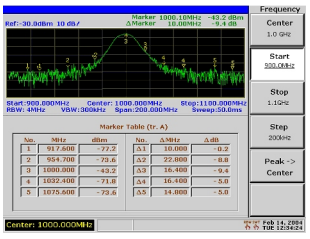


Jitter Measurement

GSP-830 provides various power measurement functions: ACPR, OCBW, Channel Power, Phase Jitter, and N-dB. Two adjacent channels as well as channels bands are shown at the same time with different color codes, letting you recognize the result at a glance. During power measurements, the display is split in half showing all parameters together with the waveform.

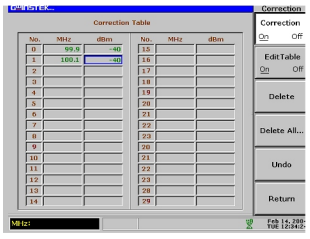
## C. MARKER FUNCTION





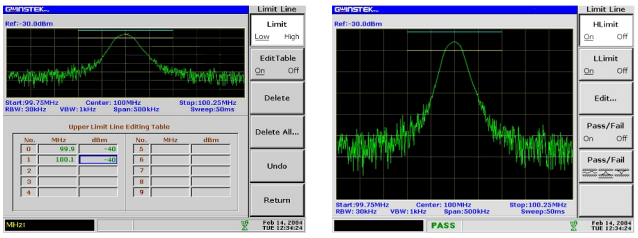
Using the 5 pairs of flexible and all-round markers in GSP-830, you can easily find and observe the signal peaks, track them, or measure the delta. The markers provide accurate status of any frequency in a table list, letting you grasp all signal aspects in a glance.

## D. CORRECTION TABLE FUNCTION



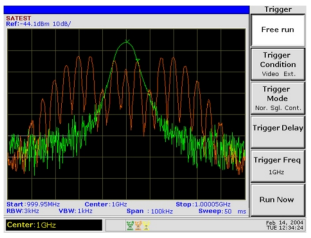
GSP-830 provides up to five sets of amplitude correction functionality for compensating antenna effect. Each correction set includes 30 amplitude adjustment points in independent frequencies, allowing adjustment of antenna effect over measurements.

## E. PASS/FAIL JUDGMENT



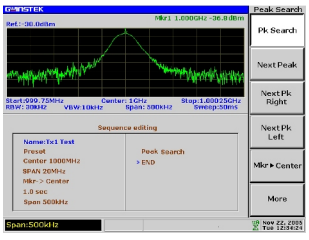
You can increase the production line efficiency by using the three types of GSP-830 Pass/Fail test setting (Hi, Lo, Curve) with high/low limit. GSP-830 swiftly and accurately determines whether the waveform is within the specified range or not. The display shows the low/high limit line shape in real time; the delta between the target shape is always clear.

## F. TRIGGER FUNCTION



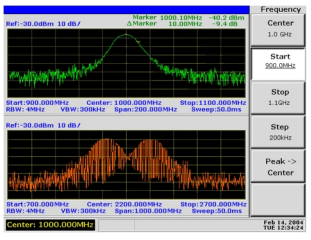
The configurable trigger feature adds a very flexible yet powerful triggering capability to GSP-830. You can select and set various trigger characteristics: source, mode, delay, frequency, etc.

## G. AUTO SEQUENCE MODE



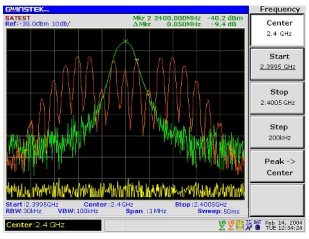
Automatic sequence feature offer a special functionality that frees you from complex programming; GSP-830 configures ATE test system by itself. After setting up sequence sets from the front panel, it will be very convenient to run different measurements in series (in a single key press) or to carry out the whole test sequences step by step.

## H. SPLIT WINDOWS DISPLAY IN LIVE MODE



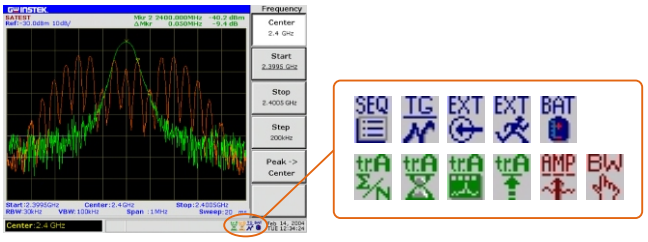
In the split window mode, you can measure two traces at the same time with different scale settings. More importantly, real-time display update is maintained under the split window mode. This feature is especially useful when measuring harmonics.

## I. THREE-TRACE INDEPENDENT DETECTION



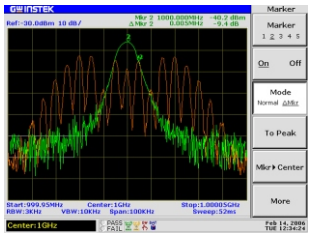
GSP-830 can display three traces at once, enhanced with various signal detection modes: peak, average, sample, etc. The other useful trace functions include trace math operations using the stored traces.

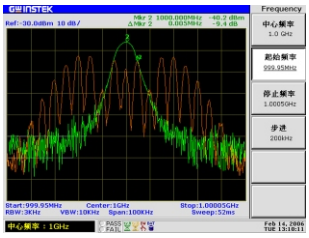
## J. STATUS INFORMATION PRESENTED BY ICONS




Breaking out of the traditional methodology, GSP-830 has adopted status icon to show the current instrument state in the display. The well-considered pictures help you grasp the current condition immediately. No need to worry about other functions or settings causing measurement errors.

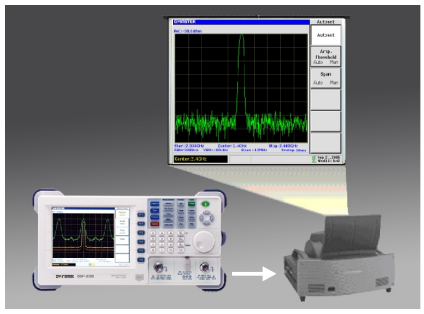
## K. MULTI-LANGUAGE OPERATION





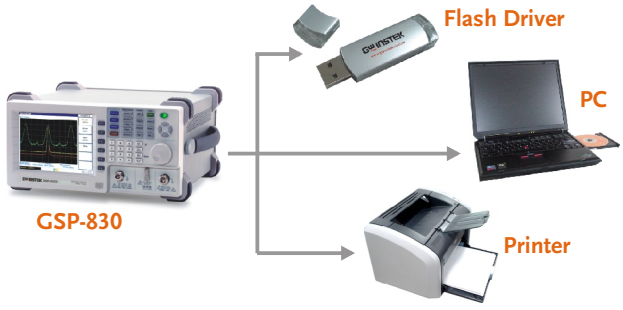
In order for you to operate the spectrum analyzer effectively, GSP-830 offers multi-language operation feature, which gives you the familiar environment and lets you dive into the RF measurement even at the first try.

## L. VGA OUTPUT



The VGA output terminal can be used for showing GSP-830 display content 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.

## M. USB INTERFACE INCLUDED IN THE STANDARD CONFIGURATION




GSP-830 provides multiple PC connections. In addition to the standard RS-232C and optional GPIB for ATE control, GSP-830 now includes the widely adopted USB Host for data transfer and display printout.
You can directly connect Flash drives to USB Host port to transfer measurement data, or an external printer to directly printout the display image. This feature improves the work efficiency and makes file transfer far more convenient.

## N. OPERATION TIME OF 3HOURS WITH THE BATTERY PACK

Li-Ion Battery Pack

Soft Carrying Case

Three types of power supplies are prepared for GSP-830: AC (100~240V), DC (+11~17V), and battery. Using the battery pack, you can operate GSP-830 for up to 3 hours without external power source. When using GSP-830 inside automobiles, the standard 12V supply provides not only the power source but also battery charging. These multiple power choices will definitely satisfy your mobile measurement needs.

## 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<br>-120 ± 1dBm~+20dBm, 15MHz ~600MHz, Ref. Level@-50dBm<br>-117 ± -1dBm~+20dBm, 600MHz~2.3GHz, Ref. Level@-50dBm<br>-115 ± 1dBm~+20dBm, 2.3GHz ~ 3GHz |
| | **Overload Protection** | +30dBm, 25VDC |
| | **Reference Level Range** | -110dBm ~ +20dBm |
| | **Accuracy** | ± 1dB @100MHz |
| | **Frequency Flatness** | ± 1dB |
| | **Display Range Linearity** | ± 1dB over 70dB |
| **DYNAMIC RANGE** | **Average Noise Floor** | -135dBm/Hz, 1MHz ~ 15MHz , Ref. Level≧-30dBm<br>-152 ± 1dBm/Hz, 15MHz ~ 600MHz, Ref. Level@-50dBm<br>-149 ± 1dBm/Hz, 600MHz ~ 2.3GHz, Ref. Level@-50dBm<br>-147 ± 1dBm/Hz, 2.3GHz ~ 3GHz |
| | **Third Inter-Modulation** | < -70dBc @-40dBm Input , Ref. Level@-30dBm |
| | **Harmonic Distortion** | < -60dBc RF Input < -40dBm, Ref. Level@-30dBm |
| | **Non-Harmonic Spurious** | < -110dBm @3kHz RBW |
| **GENERAL** | **Display** | 640 x 480 high resolution color TFT LCD |
| | **Internal Memory** | 10 Traces , 10 Setup info , 10 Limit lines , 5 Corrections , 10 Sequences |
| | **Markers** | 10 Markers for peaks; 5normal-delta marker pairs ; Functions: Delta , Peak , Marker Track |
| | **Trace Detection** | 3 traces with Peak, Maximum hold, Freeze, Average and Trace math |
| | **Power Measurement** | ACPR, OCBW, Channel power, N dB BW, and Phase jitter |
| | **Autoset Function** | Auto tuning the measurement result for observation |
| | **Sequence** | Automated test by uesr-defined macros without any remote control |
| **CONNECTORS** | **RF-Input** | Type: N female, 50Ω nominal ; RF input VSWR: <2 : 1 @ 0dBm Ref. Level |
| | **External Reference** | Type: BNC female, |
| | **Clock Input** | 1M, 1.544M, 2.048M, 5M, 10M, 10.24M, 13M, 15.36M, 15.4M, 19.2M |
| | **External Trigger Input** | Type: BNC female, accept +5-V TTL signal |
| | **Reference Clock Output** | Type: BNC female, 10MHz |
| | **DC Input** | Jack: 5.5mm, 12V |
| | **RS-232C** | Sub-D 9 pins female |
| | **USB Connector** | Front panel: type A receptacle ; Rear panel: type mini-B receptacle |
| | **DC Voltage Output Terminal** | Type: SMB male, outputs +9V/100mA max. |
| **POWER SOURCE** | AC 100 ~ 240V, 50/60Hz | |
| **ACCESSORIES** | Power cord x 1 , User manual x 1 | |
| **DIMENSIONS & WEIGHT** | 330(W) x 170(H) x 340(D) mm, Approx. 6kg | |

### OPTION LIST

| | |
|---|---|
| **Opt. 01 Tracking Generator** | Frequency Range 9kHz ~ 3GHz<br>Amplitude Range -50dBm ~ 0dBm<br>Amplitude Accuracy ±1dB@100MHz, 0dBm<br>Amplitude Flatness ±1dB@0dBm<br>Harmonics <-30dBc typical<br>Reverse Power +30dBm<br>Impedance Type: N female, 50Ω nominal<br>TG output VSWR < 2 : 1 |
| **Opt. 02 Battery pack** | 10.8V Li-Ion battery pack x 2 |
| **Opt. 03 ±1ppm Stability** | ±1ppm , 0 ~ 50°C, ±1ppm/yr |
| **Opt. 04 300Hz RBW** | RBW 300Hz, 3dB bandwidth<br>RBW accuracy : 20% |
| **Opt. 05 9kHz & 120kHz RBW(*)** | RBW selections : 9kHz and 120kHz, 6dB bandwidth<br>RBW accuracy : 15% |
| **Opt. 06 10kHz & 100kHz RBW(*)** | RBW selections : 10kHz and 100kHz, 3dB bandwidth<br>RBW accuracy : 15% |
| **Opt. 07 AM/FM Demodulator & 10kHz & 100kHz RBW(*)** | Demodulation : AM , FM<br>Output : internal speaker, 3.5mm stereo jack wired for mono operation<br>RBW selections : 10kHz and 100kHz, 3dB bandwidth<br>RBW accuracy : 15% |
| **Opt. 08 GPIB Interface** | IEEE 488 bus |

### OPTIONAL ACCESSORY

| | |
|---|---|
| **GSC-001 Soft Carrying Case** | Soft Carrying Case |
| **GKT-001 General Kit set** | ADP-002: adaptor, SMA(J/F) ~ N(P/M) x 2<br>ATN-100: 10dB attenuator, N(J) ~ N(P) x 1<br>GTL-303: RF cable assembly(SMA(P),RD316,600mm)x2<br>GSC-002: Kit box x 1 |
| **GKT-002 CATV Kit set** | ADP-001: adaptor, BNC(J/F) ~ N(P/M) x 2<br>ADP-101: adaptor,BNC(J/F)75Ω~BNC(P/M)50Ω x 2<br>GTL-304: RF cable assembly(RG223,N(P)-N(J),300mm)x2<br>GSC-003: Kit box x 1 |
| **GKT-003 RLB Kit set** | GAK-001: termination 50Ω, N(P) x 1<br>GAK-002: Cap with chain, N(P) x 1<br>GTL-302: RF cable assembly(RG223,N(P),300mm)x2<br>GSC-004: Kit box x 1 |
| **GTL-401 DC Power Cord** | DC power cord with DC Jack and lighter plug,Current 5A |
| **GAP-801 Pre-Amplifier** | GAP-801: Pre-amplifier with 10dB(typical) 9kHz ~ 6GHz |

**NOTE : 1. (*) Only one option can be selected among Opt. 05 to 07. 2. Opt. 01 & 03 to 07 are factory-installed.** **Specifications subject to change without notice.** SP-830GD0BH

| ORDERING INFORMATION | STANDARD ACCESSORIES | OPTION |
|---|---|---|
| GSP-830 3GHz Spectrum Analyzer | User Manual , Power Cord | Please see SPECIFICATIONS Page |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