

Product Datasheet - Technical Specifications



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4042 Series Spectrum Analyzer

(9kHz to 9GHz/20GHz)



Ceyear Technologies Co., Ltd.

Product Overview

The Ceyear 4042 series spectrum analyzer is a new basic spectrum analyzer launched by Ceyear, which covers the frequency measurement range of 9kHz~20GHz. The 4042 series spectrum analyzer adopts portable structure, weighs less than 6.5kg, and has multiple advantages such as wide operating band, excellent performance indicators, fast sweep, multiple testing functions, portability and easy operation.

The 4042 series spectrum analyzer has such measurement function modes as real-time spectrum, interference analyzer, AM/FM/PM analyzer, channel scanner, field strength, power meter, peak-power meter, IQ analyzer, phase noise meter, vector signal analyzer, as well as such intelligent measurement functions as channel power, OBW, ACPR, emission mask, C/N, harmonics and spur emissions, and supports such digital interfaces as LAN, USB and HDMI. The 12.1-inch multi-touch capacitive touch screen adopted by 4042 brings better interactive experience, and the product can be applied to the research and development and testing process of industrial electronic products, as well as many fields such as communication testing, satellite communication, microwave communication, scientific research and teaching.

Main features

- **Frequency measurement range**

9kHz~9GHz/20GHz, standard full-band preamplifier

- **RF performance specifications**

DANL: -163dBm/Hz (10MHz~2GHz, preamplifier ON, Typical)

SSB Phase Noise: $\leq -113\text{dBc/Hz}$ @100kHz offset @1GHz carrier (Typical)

$\leq -108\text{dBc/Hz}$ @100kHz offset @10GHz carrier (Typical)

TOI: +16dBm @900MHz (Typical)

Absolute Amplitude Accuracy: $\pm 1.0\text{dB}$ (Typical)

- **Fast Sweep Speed**

Sweep time <33ms (span 20GHz, resolution bandwidth 3MHz)

Sweep time <4s (span 1GHz, resolution bandwidth 1kHz, Fast FFT sweep mode)

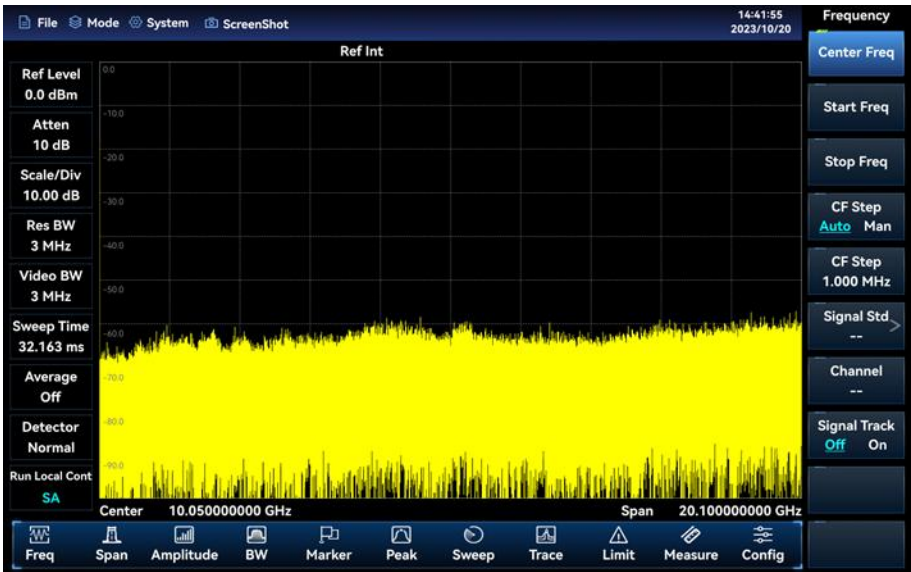
- **Multiple measurement function modes**

Spectrum analysis, real-time spectrum (maximum BW 40MHz), interference analyzer (spectrogram, RSSI), AM/FM/PM analyzer, channel scanner, field strength, power meter, peak-power meter, IQ analyzer, EMI analyzer, phase noise meter, vector signal analyzer, time gate, etc.

- **Multiple intelligent measurement functions**
Channel power, OBW, ACPR, emission mask, C/N, harmonics and spur emissions,Tune Listen,multi-ACPR,IP3,CCDF, etc.
- **Various auxiliary test interfaces and digital interfaces**
10MHz reference input and output, zero span IF output, LAN, USB, HDMI, etc
- **Convenient and quick user operation experience**
12.1-inch capacitive touch screen, supporting multi-touch, with 6 independent markers, supporting signal tracking and peak tracking, with 3 display traces, 6 detection methods (standard, positive peak, negative peak, sampling, mean, root mean square), and supporting HDMI output
- **Support a variety of external options and accessories**
such as USB CW power probe, USB peak power probe, EMI near field probe, etc.

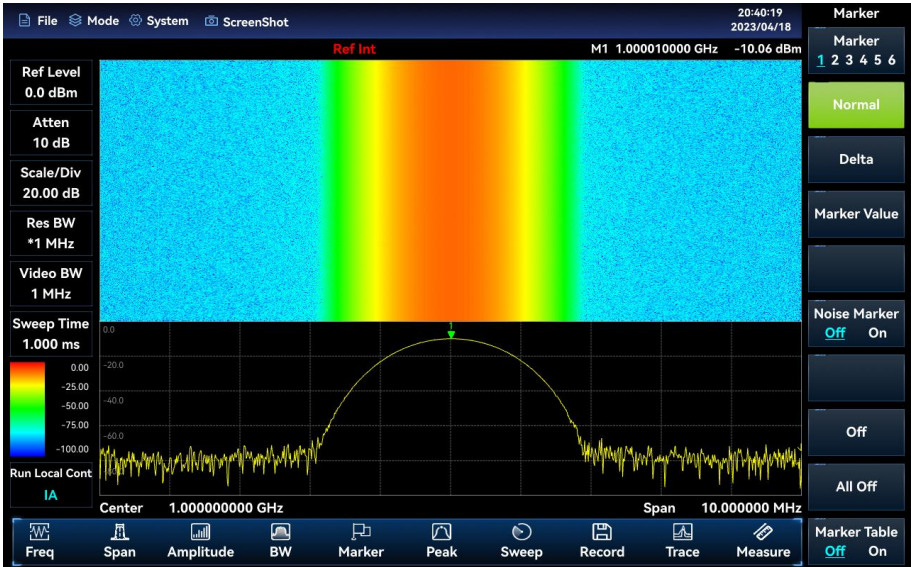
Rich measurement function modes and options

- **Spectrum Analyzer Mode**
The 4042 series spectrum analyzer has such test functions as Channel power, OBW, ACPR, emission mask, C/N, harmonics and spur emissions,Tune Listen,multi-ACPR,IP3,CCDF, supports noise marker and frequency counter functions, and can display 3 tracks at the same time, with different detection methods including Normal, peak, negative peak, sample, Average and RMS, supporting signal tracking and peak tracking functions.



● **Interference Analyzer (option)**

The interference analyzer option has spectrum , spectrogram and RSSI measurement. Spectrogram uses the frequency-amplitude-time three-dimensional display mode, which can conveniently observe periodic or intermittent signals. The different colors displayed in the waterfall plot reflect the strength of signal amplitude. RSSI (received signal strength indicator) is mainly used to measure the intensity change of a point frequency signal in a period of time. Both Spectrogram and RSSI measurement support the automatic storage of signals.



● **Channel Scanner (option)**

The channel scanner measurement mode offers signal power measurement for multiple channels. The signal power is displayed in the form of bar graph or list, and the signal power of 20 channels can be measured at most. According to the channel setting method, it is divided into three measurement methods: channel scanner, frequency scanner, and list scanner. The bandwidth and number of channels can be set in all of the three measurement methods.



● **AM/FM/PM Analyzer (option)**

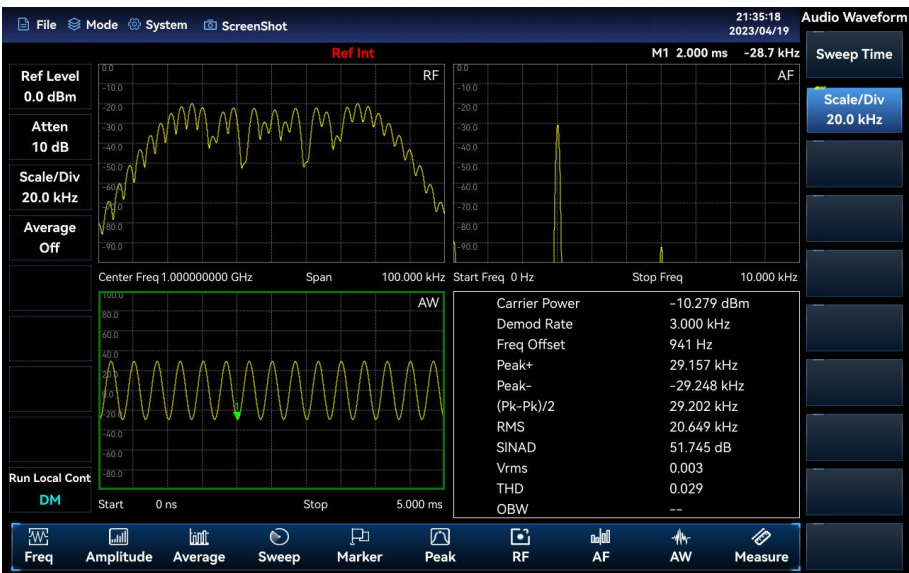
AM/FM/PM Analyzer measurement mode provides the display of AM, FM and PM signal spectrum and the analysis of related parameters. The main spectrum and related parameters are measured as follows:

RF spectrum: similar to the spectrum analysis mode, displaying the spectrum of the modulated signal and measuring the occupied bandwidth.

Audio spectrum: showing the spectrum of the demodulated audio signal.

Audio waveform: showing the waveform of the demodulated audio signal in the time domain.

Show all: measuring and analyzing parameters of the modulated signal including carrier power, modulation rate, carrier frequency offset, modulation depth (AM), modulation frequency offset (FM), modulation phase offset (PM), signal-to-noise ratio, modulation distortion and total harmonic distortion.



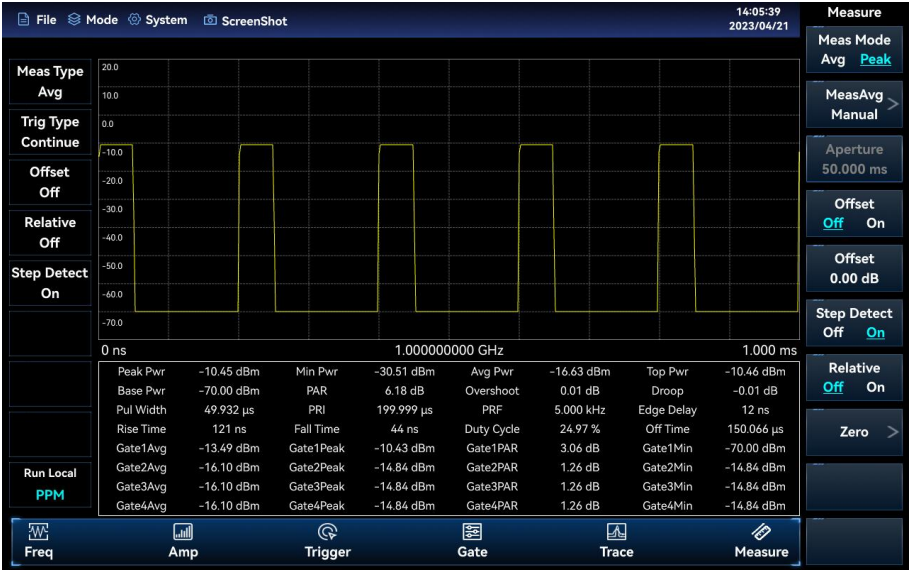
● **Power Meter (option)**

With the external USB power sensor of the Ceyear 87230/87231/84232/87233 series, the USB power measurement function can be used to measure CW signal power of up to 40GHz.



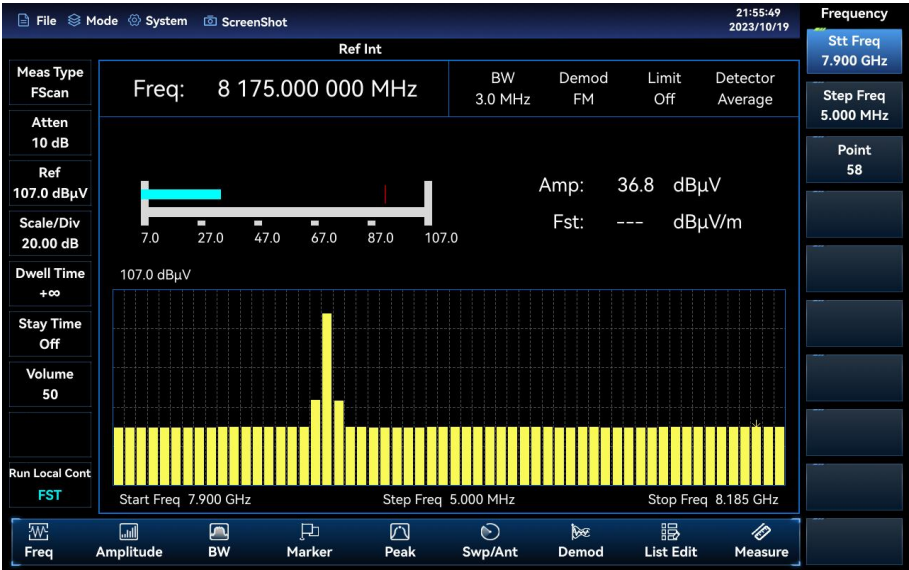
● **Peak-Power Meter(option)**

By connecting to the Ceyear 87234D/E/F/L USB peak sensor via the USB interface, this function can be used to test RF/microwave signals up to 67GHz, enabling pulse power measurement in a large dynamic range.



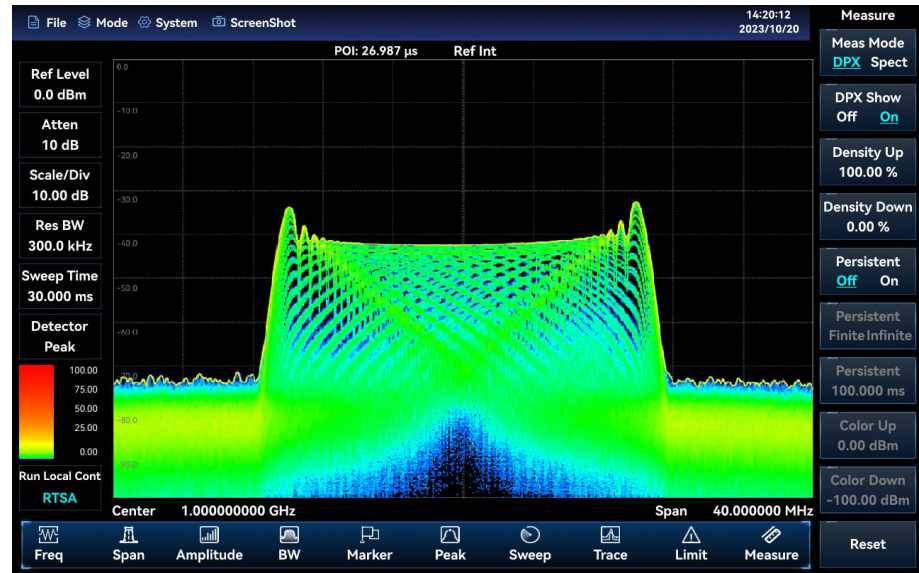
● **Field Strength (option)**

Field strength measurement can be divided into three modes: PScan, FScan and MScan. Whereas, the PScan measurement can be used to observe the frequency offset, amplitude value and field strength value of the current point by setting the point frequency rate. The FScan measurement By setting the initial frequency, step frequency and sweep points, the amplitude and field strength changes in a frequency range can be observed. The MScan measurements can be used to observe amplitude values and field strength values at list frequency points by calling a pre-edited or saved list.



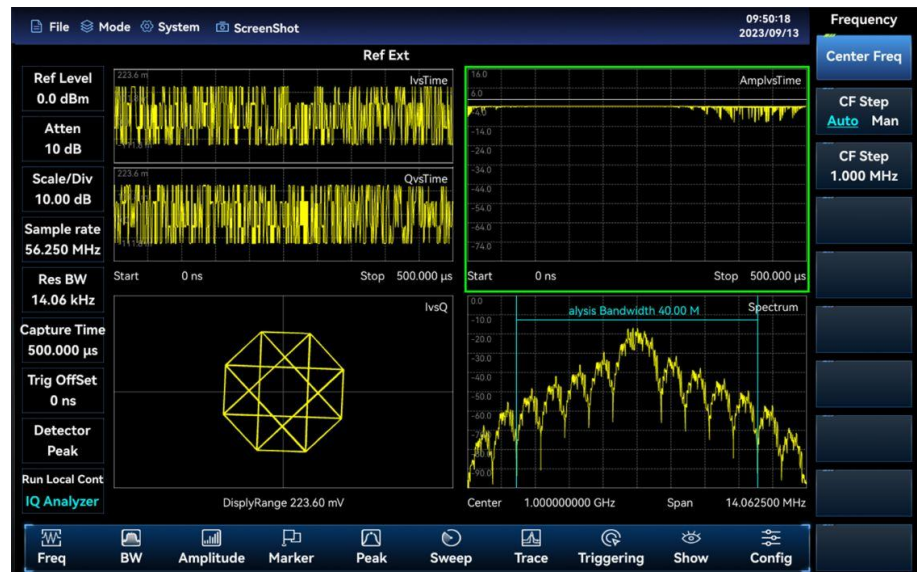
- **40MHz Real-time Spectrum AnalyZer (option)**

The real-time spectrum analyzer is mainly used for the capture and analysis of transient time-varying signals and burst signals. The real-time analysis bandwidth is up to 40MHz, which can realize the digital afterglow and waterfall plot measurement function of transient signals.



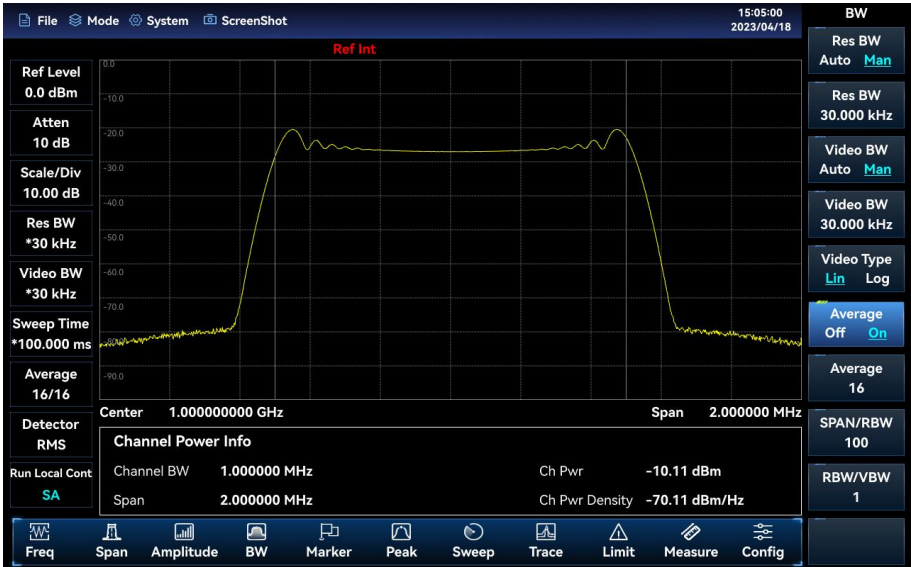
- **IQ Analyzer (option)**

The IQ analyzer option supports the capture and display of IQ data as well as graphical display interfaces such as IQvs time, amplitude vs time, spectrogram and I vs Q.

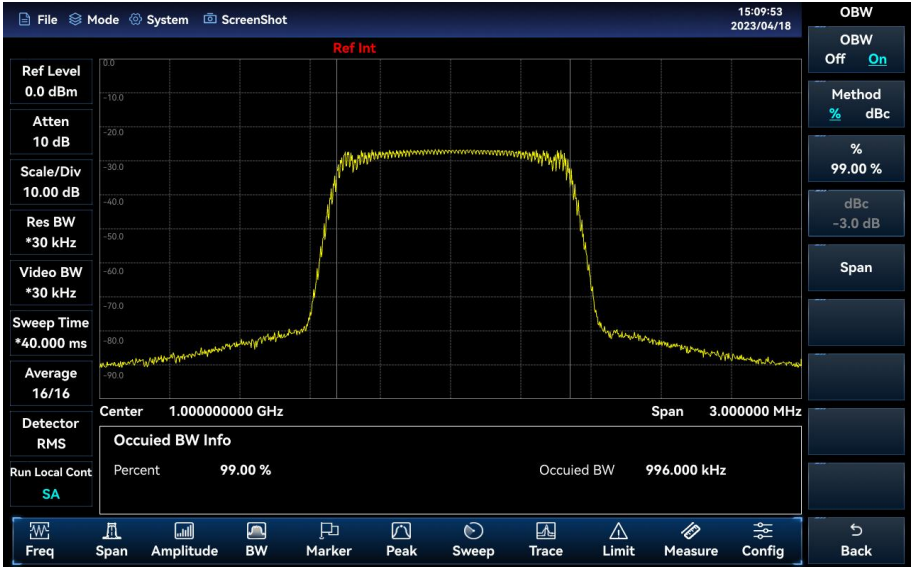


Comprehensive intelligent measurement functions

● Channel Power



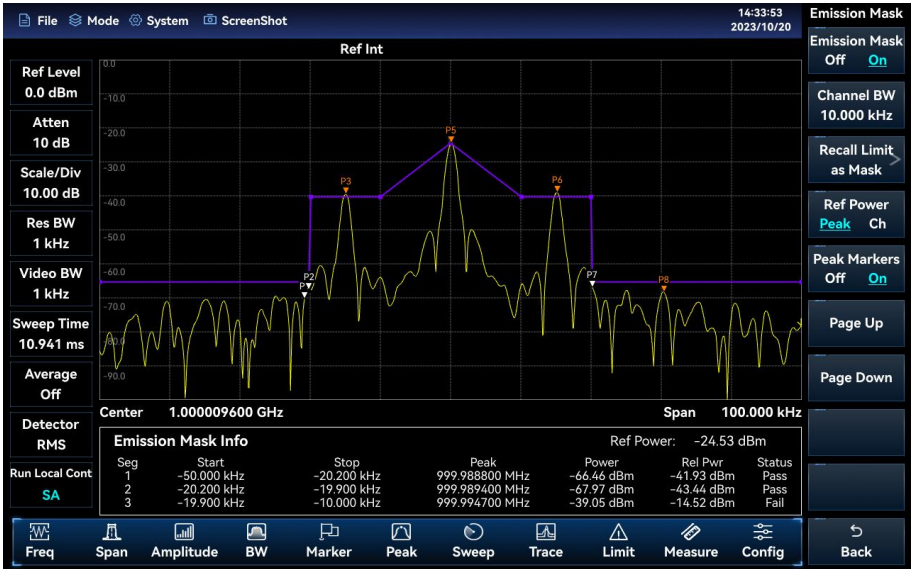
● OBW



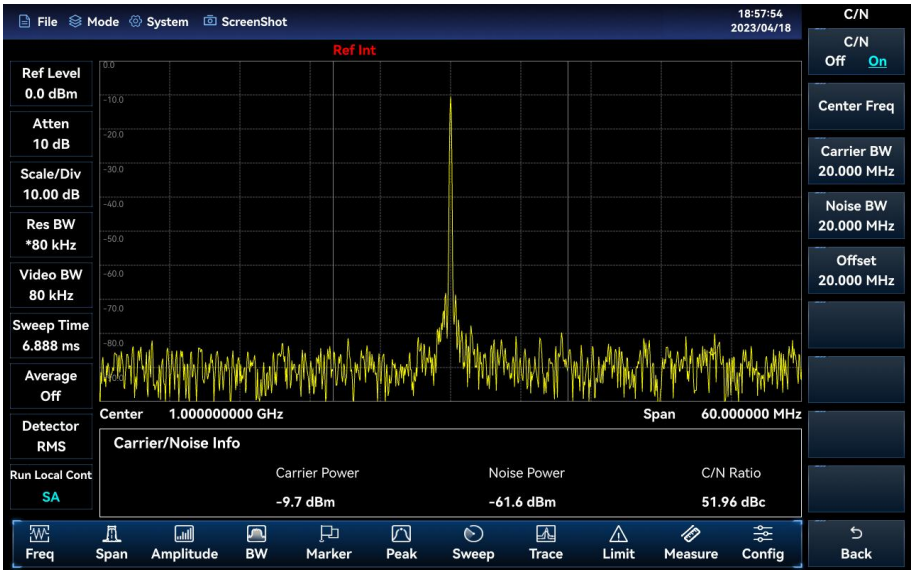
● ACPR



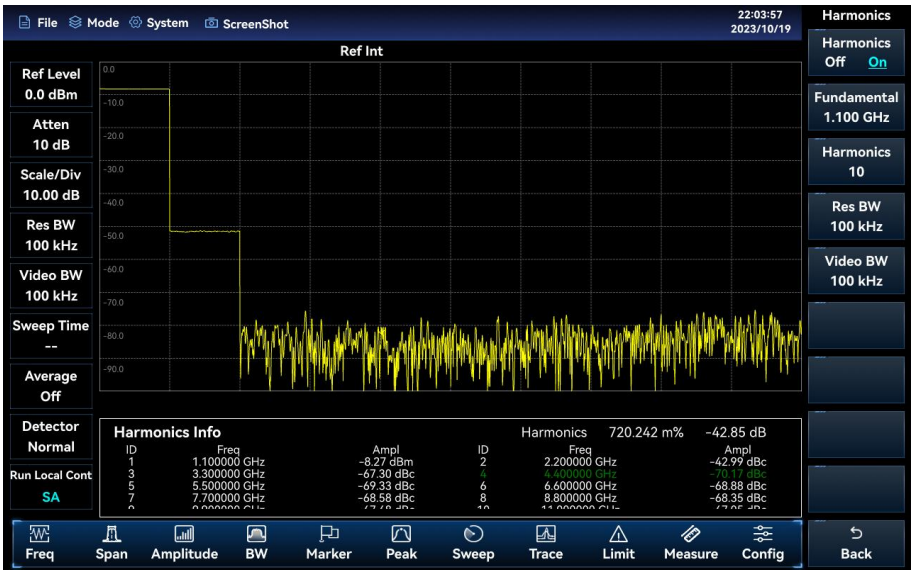
Emission Mask



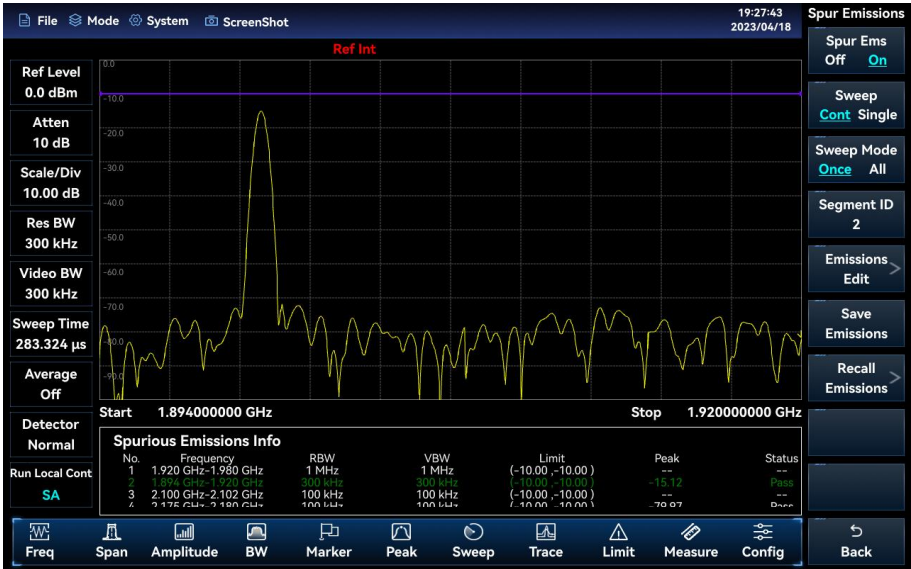
Carrier-to-Noise Ratio



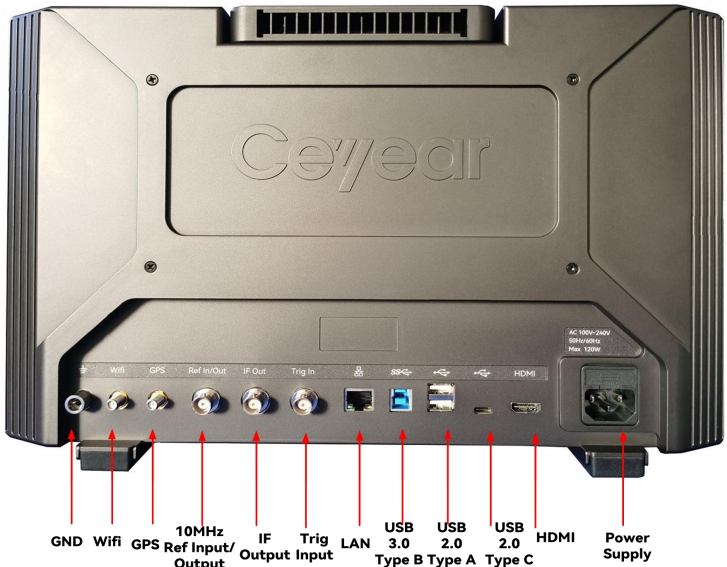
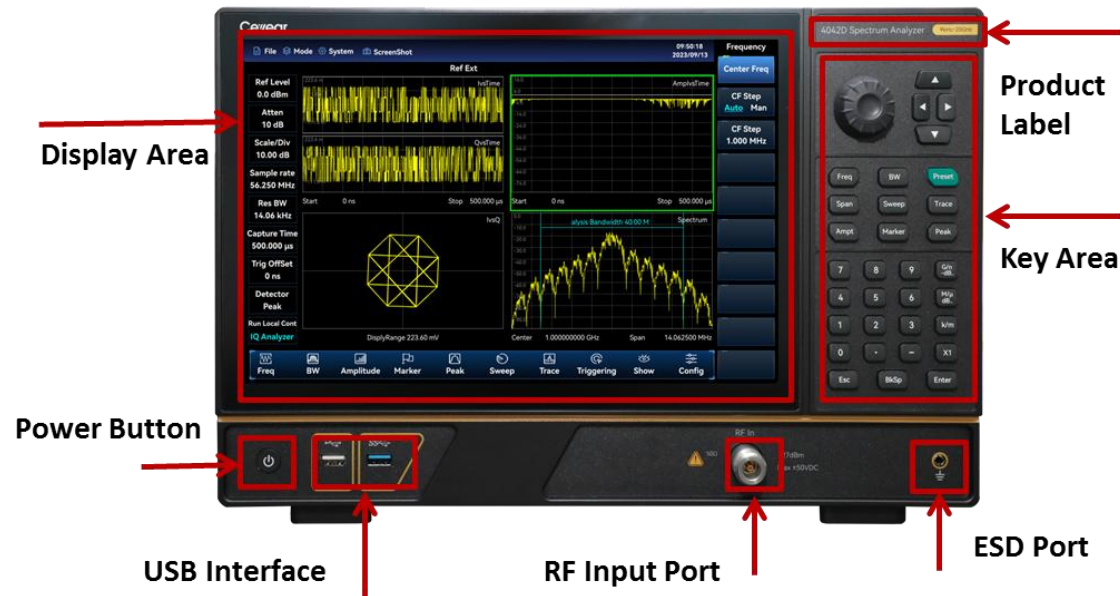
Harmonics



● Spur Emissions



● Overall RF and Auxiliary Interfaces



Technical Secification

Model	4042B/D
Frequency range:	4042B: 9kHz~9GHz 4042D: 9kHz~20GHz
Frequency reference	Nominal frequency: 10MHz Aging rate: $\pm 5 \times 10^{-7}$ /year Initial frequency accuracy: $\pm 3 \times 10^{-7}$ Temperature stability: $\pm 1 \times 10^{-7}$ (0°C ~ +50°C, relative to 25°C±10°C) Frequency reference error:±(to last calibration date × aging rate + temperature stability + calibration accuracy) Note: By default, the time until the last calibration is 1 year. This indicator is guaranteed by the crystal oscillator manufacturer.
Sweep Time	Range: 1μs-6000s (zero span) Accuracy: $\pm 1.0\%$ (zero span)
Frequency Readout Accuracy	±(frequency reading × frequency reference error + 1% × span + 10% × resolution bandwidth)
Span	Range: 0Hz (zero sweep width), 10Hz - upper limit of frequency range Accuracy: $\pm 1.0\%$
RBW	Bandwidth range: 1Hz~20MHz (1-2-3-5-8 steps)
VBW	Bandwidth range: 1Hz~20MHz (1-2-3-5-8 steps)
SSB Phase Noise (Carrier 1GHz, +15°C~+35°C)	$\leq -108\text{dBc/Hz}@10\text{kHz}$, $\leq -110\text{dBc/Hz}@100\text{kHz}$ $\leq -118\text{dBc/Hz}@1\text{MHz}$, $\leq -129\text{dBc/Hz}@10\text{MHz}$
Displayed Average Noise Level (50Ω load connected at input, 0dB input attenuation, average detector, RBW normalized to 1Hz, +15°C~+35°C)	Preamplifier ON: $\leq -161\text{dBm}(2\text{MHz}\sim 2.4\text{GHz})$, $\leq -160\text{dBm}(2.4\text{GHz}\sim 6\text{GHz})$, $\leq -159\text{dBm}(6\text{GHz}\sim 9\text{GHz})$, $\leq -158\text{dBm}(9\text{GHz}\sim 14\text{GHz})$, $\leq -156\text{dBm}(14\text{GHz}\sim 20\text{GHz})$ Preamplifier OFF $\leq -142\text{dBm}(2\text{MHz}\sim 2.4\text{GHz})$, $\leq -141\text{dBm}(2.4\text{GHz}\sim 6\text{GHz})$, $\leq -140\text{dBm}(6\text{GHz}\sim 9\text{GHz})$, $\leq -138\text{dBm}(9\text{GHz}\sim 14\text{GHz})$, $\leq -138\text{dBm}(14\text{GHz}\sim 20\text{GHz})$
Second Harmonic Distortion (Attenuation 0dB, -30 dBm input, preamplifier OFF)	$\leq -70\text{dBc}(50\text{MHz}\sim 10\text{GHz})$
TOI (-15 dBm dual tone signal, 100 kHz spacing, 0dB attenuation, preamplifier OFF)	$\geq +13\text{ dBm}(50\text{MHz} \sim 20\text{GHz})$
Image, Multiple and Out-of-band responses (-10dBm mixer level)	$< -65\text{dBc}(10\text{MHz}\sim 7.5\text{GHz})$, $< -60\text{dBc}(7.5\text{GHz}\sim 10.5\text{GHz})$, $< -65\text{dBc}(10.5\text{GHz}\sim 20\text{GHz})$

Residual response (50 Ω load connected to input port, 0 dB input attenuation)	Preamplifier ON: ≤-110dBm (10MHz~3GHz), ≤-105dBm (3GHz~9GHz) ≤-103dBm (9GHz~12GHz), ≤-100dBm (12GHz~20GHz) Preamplifier OFF: ≤-90dBm (10MHz~20GHz)
Absolute Amplitude Accuracy (Frequency 10MHz~20GHz, attenuation 10dB, 0 dBm~-50 dBm, preamplifier OFF, RBW 1kHz, other parameters automatic)	±1.30 dB (working temperature: +15°C~+35°C)
Input Attenuator	Attenuation range 0dB-30dB, 2dB step
Maximum Input Level	+27dBm CW (input) frequency ≥50 MHz, attenuation ≥ 10dB , preamplifier OFF)
Reference Level	Range: -150 dBm ~ +30 dBm, min step 1dB Conversion error: ±0.50dB (reference level 0 dBm~-60 dBm)
Detector Type	Normal, PosP, NegP, Smp, Avg, Rms.
Dimensions	377mm (W) ×250mm (H) ×119.5mm (D) (the padding block is closed, without protrusions such as handles, rotary pulse generators and adapters)
Weight	≤6.5kg
Working Temperature:	0°C~+50°C
Storage Temperature	-40°C~+70°C
Electromagnetic Compatibility	Complies with relevant requirements of 3.9.1 in GJB 3947A-2009
Power Supply	100~120VAC, 50~60Hz; or 200~240VAC, 50~60Hz
Power Consumption	≤55W
Test Interface	RF input: N-type female connector
Other Interfaces	10MHz reference input/output: BNC female External trigger input interface: BNC female GPS antenna interface: SMA female (option, reserved) IF output interface output: BNC female (option) Wi-Fi antenna interface: SMA female (option, reserved)
Communication and Auxiliary Interfaces	Front panel: 1 USB3.0 A-type interface, 1 USB2.0 A-type interface Rear panel: 2 USB2.0 A-type interfaces, 1 USB3.0 B-type interface (reserved) 1 USB 2.0 C-type interface, LAN interface: standard RJ-45 type 1 HDMI interface

Ordering Information

- Main Unit:

4042B spectrum analyzer (9kHz-9GHz)

4042D spectrum analyzer (9kHz-20GHz)

● Option:

No.	Option No.	Description	Function
1	4042-001	English options	English signs, English configuration software, English quick start guide.
2	4042-S01	Power Meter	It provides power measurement function, which can be used with an external USB CW power sensor87230/87231/87232/87233.
3	4042-S02	Peak-Power Meter	It provides peak power measurement, which can be used with the 87234D/E/F/L USB peak/average power meter.
4	4042-S03	Interference Analyzer	It provides waterfall plot, RSSI measurement and other functions.
5	4042-S04	Channel Scanner	It can measure the signal power of multiple channels.
6	4042-S05	Field Strength	It can be used to measure the radiation strength of the electric field of the device under test.
7	4042-S08	AM/FM/PM Analyzer	It can realize the analysis and measurement of AM, FM and PM modulation signals.
8	4042-S09	Zero Span IF Output	It outputs analog IF signal at zero span.
9	4042-S10	Time Gated	It is used for testing the time division interference signal.
10	4042-S12	40MHz Real-Time Spectrum Analyzer	It provides 40MHz BW real-time spectrum analysis.
11	4042-S13	List Sweep	It enables continuous sweeping measurement of multiple frequency bands.
12	4042-S14	IQ Analyzer	Storage and display of IQ data.
13	4042-S18	Phase Noise Meter	SSB phase noise curves and single-point phase noise meter.
14	4042-S20	Vector Signal Analyzer	It provides flexible demodulation functions of multiple single-carrier digital modulation singnals.
15	4042-H01	GPS/BeiDou Function	GPS or BeiDou positioning function through an external antenna.
16	4042-H02	Wi-Fi Communication	Wireless data transfer communication with external devices
17	4042-H03	4042 Safety Case	Safety transport case.
18	4042-H04	Shelf Kit	Standard 19-inch shelf kit for device integration testing.
19	4025-H36	PBS1 Near-field Probe	The highest working frequency is 9GHz, including one electric field probe and magnetic field probes of 6mm, 12mm, 25mm and 50mm, one each, and the interface type is SMB(m).
20	87230	USB CW Power Sensor	Frequency range: 9kHz ~ 6GHz,

No.	Option No.	Description	Function
			interface type N(m).
21	87231	USB CW Power Sensor	Frequency range: 10kHz ~ 18GHz, interface type N(m).
22	87232	USB CW Power Sensor	Frequency range: 50kHz ~ 26.5GHz, interface type 3.5mm(m).
23	87233	USB CW Power Sensor	Frequency range: 50MHz ~ 40GHz, interface type 2.4mm(m).
24	87234D	USB Peak/Average Power Sensor	Frequency range: 50MHz ~ 18GHz, interface type N(m).
25	87234E	USB Peak/Average Power Sensor	Frequency range: 50MHz ~ 26.5GHz, interface type 3.5mm(m).
26	87234F	USB Peak/Average Power Sensor	Frequency range: 50MHz ~ 40GHz, interface type 2.4mm(m).
27	87234L	USB Peak/Average Power Sensor	Frequency range: 500MHz ~ 67GHz, interface type 1.85mm(m).
28	4042B-JL	Metrological Service	It provides metrological calibration services and metrological reports.
29	4042D-JL	Metrological Service	It provides metrological calibration services and metrological reports.
30	4042B-EWT1	Extension of Warranty for One Year	
31	4042D-EWT1	Extension of Warranty for One Year	