4052 Series Signal/Spectrum Analyzer

F.E.S. Co., Ltd.
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Product Overview

Ceyear 4052 series signal/spectrum analyzer is a new mid-range series of signal analyzers launched by Ceyear Technologies. The signal/spectrum analyzer has excellent test dynamic range, phase noise, amplitude accuracy and measurement speed, and has rich test functions such as spectrum analysis, I/Q analysis, real-time spectrum analysis, transient analysis, vector signal analysis, pulse analysis, and audio analysis functions.

As a multifunctional general-purpose signal and spectrum analyzer, Ceyear 4052 has good expansion capability and can build a test system or carry out secondary development through a variety of digital and analog output interfaces. With the perfect match of superior performance and flexible applications, it can meet your testing needs for rapid production of signals and equipment in wireless communications, automotive electronics, low-orbit satellites, Internet of Things, aerospace and defense and other fields.

Main Features

- **Coaxial frequency coverage: 2Hz to 50GHz**
- **Maximum 1.2GHz analysis bandwidth, optional bandwidth from 10MHz to 1.2GHz**
- **Excellent phase noise performance: -122dBc/Hz at 1GHz carrier @10kHz offset**
- **10 Gigabit network interface**
- **Full bandwidth of real-time recording and playback**
- **Powerful mobile communication, satellite signal analysis function**

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First-class Spectrum Performance and Characteristics

Ceyear 4052 has excellent test dynamic range, phase noise, amplitude accuracy and fast test speed.

Ultra-wide Frequency Coverage

The measurement frequency range ranges from 2Hz to 50GHz, with 8 optional frequency band configurations, meeting the test requirements from low frequency to millimeter wave requirements.

Outstanding DANL Specification

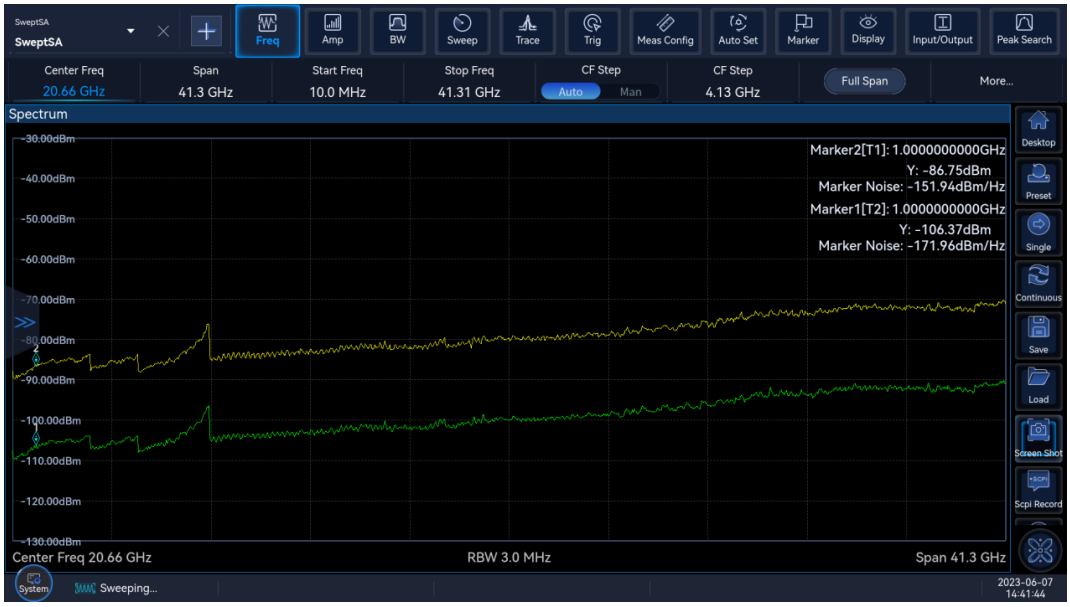
The displayed average noise level at 1GHz is -154dBm/Hz, it can reach -165dBm/Hz after configuring the preamplifier, and it can reach -172dBm/Hz after the noise cancellation function is turned on.

Excellent Phase Noise Performance

With excellent phase noise performance, it can meet the extreme requirements of users in communication signal measurement. Under the condition of 1GHz carrier and 10kHz frequency offset, the phase noise is better than -122dBc/Hz.

High Precision Amplitude Measurement Error

With excellent amplitude measurement accuracy, the signal amplitude measurement accuracy in the frequency band below 8GHz is better than ±0.5dB.



DANL Specification with Pre-amplifier ON or OFF

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1.2GHz Analysis Bandwidth

Ceyear 4052 has an instantaneous analysis bandwidth of 1.2GHz, and provides 6 options from 10MHz (standard) to 1.2GHz (optional) to meet the application requirements of different test scenarios.

Multiple Analysis Bandwidth Configuration Options

Provide a total of 6 bandwidth configuration options of 10MHz/40MHz/200MHz/400MHz/600MHz/1.2GHz to meet flexible configuration in different test application scenarios such as 5G NR, and WLAN.

Superior Spurious Free Dynamic Range

The spurious-free dynamic range under the 200MHz analysis bandwidth is -75dBc, and the spurious-free dynamic range under the 1.2GHz analysis bandwidth is -65dBc.

1.2GHz Analysis Bandwidth Measurement

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Comprehensive wireless communication protocol analysis capabilities

The mobile communication protocol analysis option of Ceyear 4052 can quickly and intuitively test the signal characteristics of various wireless communication standards such as 5G NR, LTE, NB-IoT, WCDMA, and GSM.

5G NR Signal Analysis

The 5G NR measurement function can perform in-band demodulation analysis of 5G NR uplink and downlink signals of 3GPP Rel 15 and Rel 16 versions, supports FDD and TDD duplex modes, supports QPSK to 256QAM modulation formats, supports Test Model and custom Parameter setting, support to provide measurement results such as error vector magnitude (EVM), frequency error and power of different channels and signals, with constellation diagram, error summary table, resource allocation and other display maps.

LTE, NB-IoT, WCDMA, GSM Signal Analysis

With Ceyear's dedicated protocol analysis software, in-band modulation analysis can be performed on LTE, LTE-Advanced, NB-IoT, WCDMA, GSM, EDGE communication signals, providing a variety of measurement results such as EVM, constellation diagram, and frequency error.

Analysis of Out-of-Band Characteristics of Wireless Communication Signals

In terms of out-of-band measurement, it can provide a wide range of standard and limit line one-key setting capabilities, and efficiently perform adjacent channel leakage ratio (ACLR), spectrum emission mask (SEM) and other measurements.

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5G NR Signal Analysis Measurement

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Powerful Real-time Spectrum Analysis Function

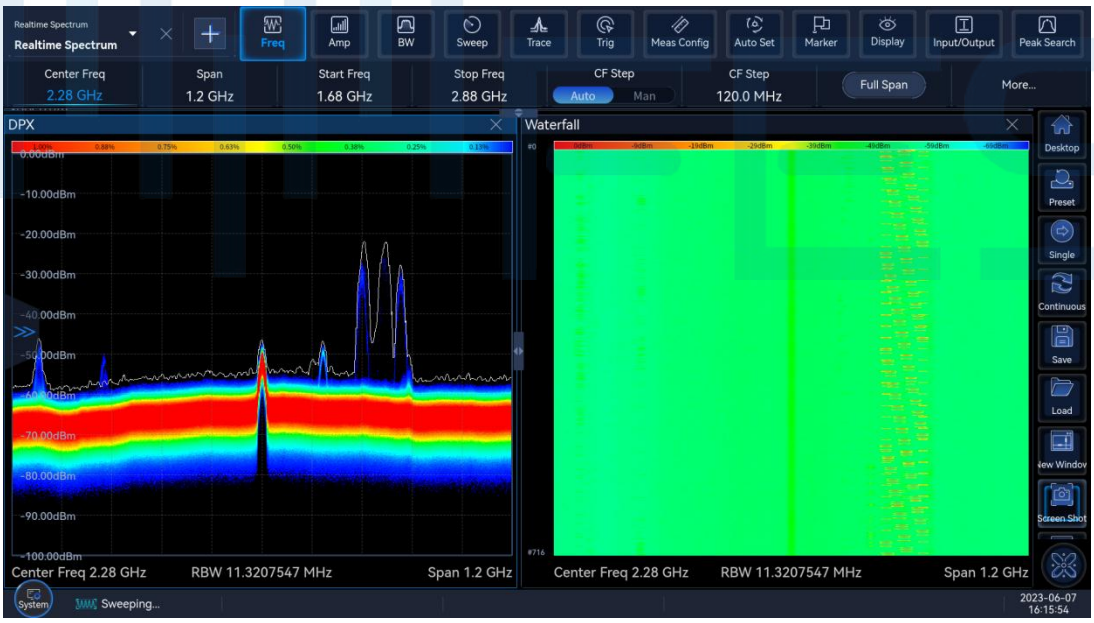
The real-time spectrum analysis function is an excellent test tool for time-varying signals such as bursty, agile, and frequency-hopping signals.

Burst Signal Capture

The real-time spectrum analysis function supports the discovery of transient and burst interference signals, the triggering and interception of transient signal data, and the time-domain and frequency-domain analysis of transient signal events.

Powerful High-bandwidth Real-time Processing Performance

The real-time analysis bandwidth is up to 400MHz, the 100% frequency domain intercepted signal duration is less than 0.6us, the time domain intercepted signal duration is less than 2ns, and the spectrum processing speed is as high as 1950000 times/second.



Real-time Spectrum Analysis Measurement

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Full bandwidth data real-time recording and playback

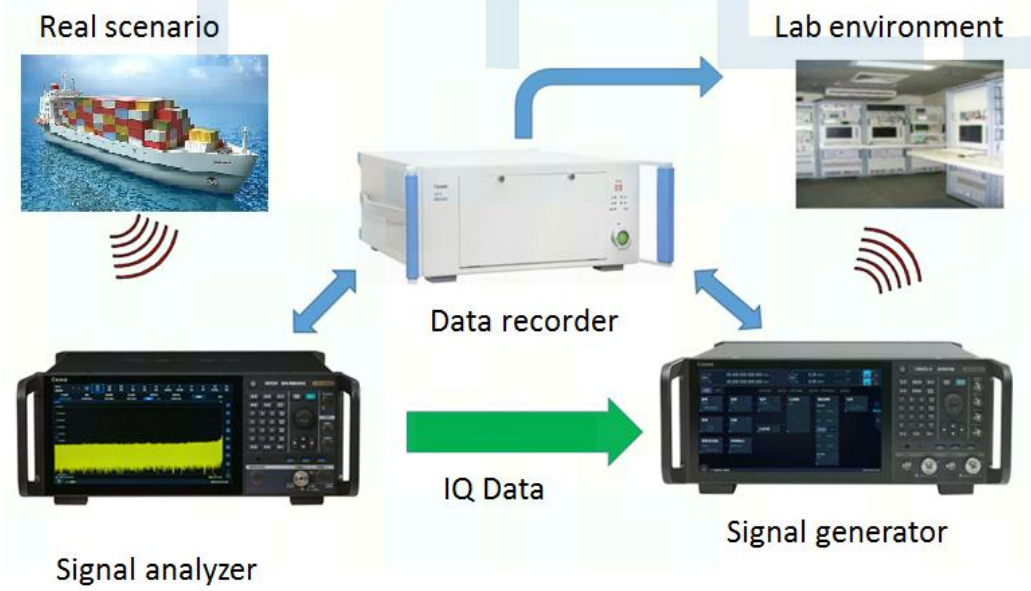
Real-time analysis of complex electromagnetic environments is extremely difficult. Long-term seamless recording of surrounding electromagnetic signals such as battlefields and positions and laboratory analysis are urgent needs of national defense users.

Superior RF Performance

As a signal and spectrum analyzer with excellent performance, as the receiving front end of RF acquisition and recording, it has large dynamic range, low distortion and high sensitivity. Combined with the powerful analysis function of Ceyear 4052, it can also provide functions such as search, analysis and playback of complex signals.

Record and Playback

The recording signal bandwidth is up to 1200MHz, with the function of starting and stopping the acquisition, and the real-time preview analysis of the spectrum analysis mode.



Data record and playback solution

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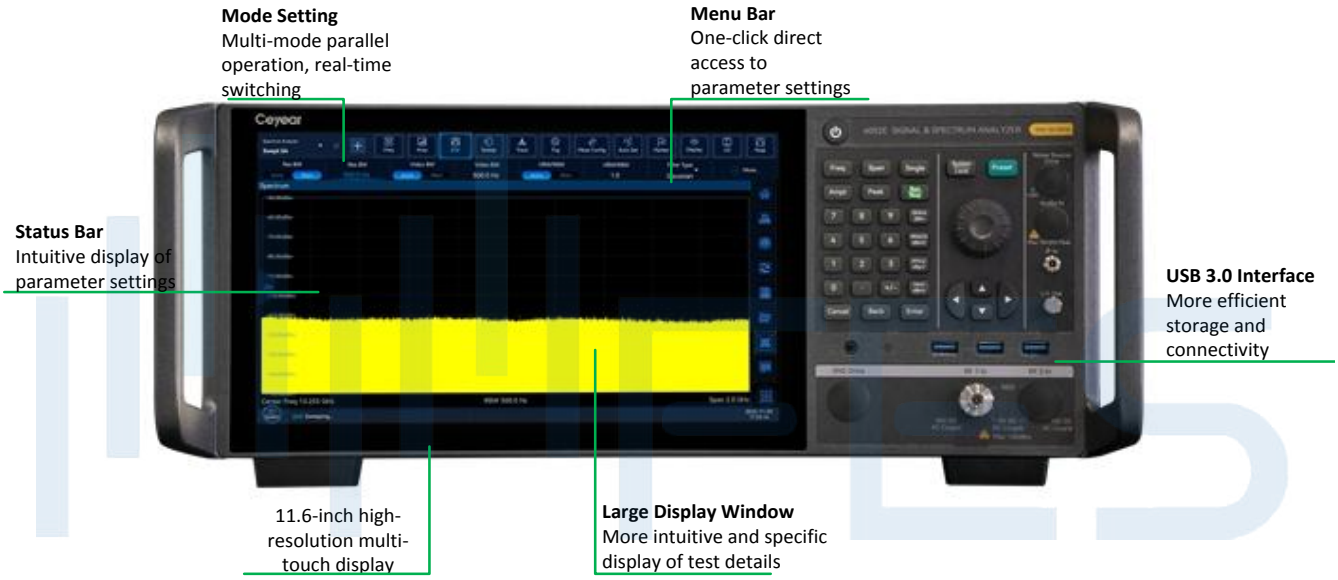
Advanced user interface, new interactive experience

Ceyear 4052 adopts an 11.6-inch touch screen, and the test details are displayed more comprehensively and intuitively. The parameter setting menu is concise, one-key direct parameter setting. Parallel operation and display of multiple measurement modes, convenient and efficient mode switching.



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Forward-looking Interface Configuration

Ceyear 4052 faces potential applications in the future, and is forward-lookingly configured with 10 Gigabit network control interfaces, optical fiber interfaces with 1.2GHz bandwidth and other interfaces to meet various digital transformation challenges.

10 Gigabit Network Control Interface

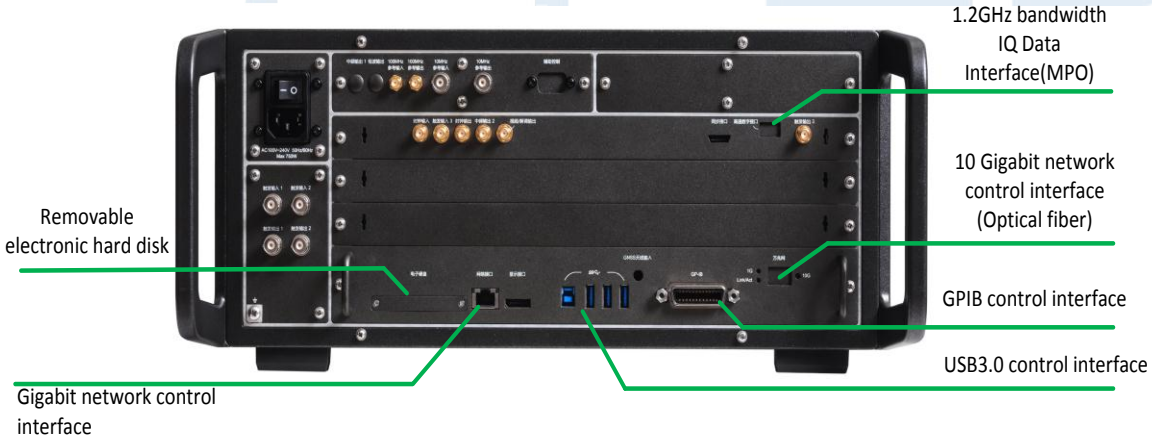
Configure 10 Gigabit network interface to provide you with higher bandwidth, faster speed and more stable data transmission.

4TB built-in Electronic Hard Drive

Built-in 4TB electronic hard disk (optional) provides convenience for mass data storage during measurement.

1.2GHz Bandwidth Fiber Interface

Equipped with 1.2GHz ultra-wideband digital interface, it can realize real-time broadband data acquisition and output with 1.2GHz bandwidth.



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Technical Specification

Frequency range	**Model**	**DC coupled**	**AC coupled**
	4052A	2Hz to 4GHz	10MHz to 4GHz
	4052B	2Hz to 9GHz	10MHz to 8GHz
	4052C	2Hz to 13.2GHz	10MHz to 13.6GHz
	4052D	2Hz to 18GHz	10MHz to 18GHz
	4052E	2Hz to 26.5GHz	10MHz to 26.5GHz
	4052F	2Hz to 40GHz	10MHz to 40GHz
	4052G	2Hz to 45GHz	10MHz to 45GHz
	4052H	2Hz to 50GHz	10MHz to 50GHz
10 MHz Precise frequency reference	Frequency accuracy: ± (last calibration date × aging rate + temperature stability + calibration accuracy) Aging rate: $\pm 5 \times 10^{-10}$/day Temperature stability: $\pm 1.5\times10^{-8}$(20°C ~ 30°C) $\pm 5\times10^{-8}$(0°C ~ 50°C) Calibration accuracy: $\pm 4\times10^{-8}$		
Frequency readout accuracy	± (frequency readout × frequency reference accuracy+0.1% frequency band+5% resolution bandwidth+2Hz+0.5 horizontal resolution*) *: horizontal resolution = span/ (sweep points − 1)		
Frequency counting accuracy	± (frequency readout × frequency reference accuracy+0.1Hz)		

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Span	Range: 0Hz (zero frequency span),10Hz to the highest frequency of the model Accuracy: ± (0.1%× Frequency span+ Frequency span/ (sweep points-1))
Sweep time range	Frequency span ≥10Hz: 1ms to 16000s Frequency span =0Hz: 1us to 16000s
Resolution bandwidth	Range: 0.1Hz to 20MHz (1,2,3,5 steps) Conversion uncertainty: ±0.10dB 1Hz to 1 MHz (1,2,3,5 steps) ±0.30dB 5MHz to 20 MHz (1,2,3,5 steps)
Analysis bandwidth	Standard: 10MHz Option H38-40: 40MHz Option H38-200: 200MHz Option H38-400: 400MHz Option H38-600: 600MHz Option H38-1200: 1.2GHz
Video bandwidth	1Hz to 20MHz (1,2,3,5 steps)
Trigger source	Free, Line, video, external level1, external level2, burst RF, timer
Trace detector	Normal, positive peak, negative peak, sample, video average, power average, voltage average

SSB phase noise (1GHz carrier,20°C ~ 30°C)	**Frequency offset**	**Spectfication**	**Typical**
	100Hz	-95dBc/Hz	-102dBc/Hz
	1kHz	-112dBc/Hz	-115dBc/Hz
	10kHz	-122dBc/Hz	-125dBc/Hz
	100kHz	-122dBc/Hz	-124dBc/Hz
	1MHz	-135dBc/Hz	/
Residual FM	≤(0.25 Hz x N) p-p, (10Hz resolution bandwidth, 10Hz video bandwidth, the rated value within 20ms. N is the number of frequency multiple times of LO)		

Displayed average noise level (the input end is connected to match load, sample or average wave detection, the average type is logarithm, 0dBinput attenuation, RF gain takes the DANL as the priority, 20°C ~ 30°C)

4052A/B With preamplifier(OFF)

Frequency range	Specification	Typical
10MHz≤f≤1GHz	-151dBm	-154dBm
1GHz < f≤2GHz	-149dBm	-154dBm
2GHz < f≤3GHz	-147dBm	-151dBm
3GHz< f≤4GHz	-144dBm	-148dBm
4GHz < f≤6GHz	-147dBm	-150dBm
6GHz < f≤8GHz	-145dBm	-149dBm

4052A/B With preamplifier(ON)

Frequency range	Specification	Typical (H34A-XX)	TypicaL (H34-XX)
10MHz≤f≤50MHz	-156dBm	-160dBm	-160dBm
50MHz<f≤4GHz	-161dBm	-164dBm	-164dBm
4GHz<f≤6GHz	-161dBm	-164dBm	-165dBm
6GHz<f≤8GHz	-157dBm	-160dBm	-163dBm

4052C/D/E/F/G/H With preamplifier(OFF)

Frequency range	Specification	Typical
10MHz≤f≤1GHz	-149dBm	-153dBm
1GHz<f≤2GHz	-147dBm	-152dBm
2GHz<f≤3GHz	-146dBm	-149dBm
3GHz<f≤4GHz	-141dBm	-146dBm
4GHz<f≤6GHz	-142dBm	-147dBm

6GHz<f≤8GHz	-139dBm	-143dBm
8GHz<f≤18GHz	-145dBm	-148dBm
18GHz<f≤26.5GHz	-141dBm	-144dBm
26.5GHz<f≤40GHz	-135dBm	-140dBm
40GHz<f≤45GHz	-134dBm	-139dBm
45GHz<f≤50GHz	-130dBm	-136dBm

4052C/D/E/F/G/H With preamplifier(ON)

Frequency range	**Specification**	**Typical (4052-H34-XX)**
10MHz≤f≤50MHz	-156dBm	-160dBm
50MHz<f≤4GHz	-161dBm	-164dBm
4GHz<f≤6GHz	-161dBm	-165dBm
6GHz<f≤8GHz	-157dBm	-163dBm
8GHz<f≤18GHz	-157dBm	-160dBm
18GHz<f≤26.5GHz	-154dBm	-158dBm
26.5GHz<f≤40GHz	-151dBm	-157dBm
40GHz<f≤50GHz	-148dBm	-154dBm

Frequency response & absolute amplitude accuracy (10dB attenuation, 20°C ~ 30°C)

With preamplifier(OFF)

Frequency range	Specification	Typical
10MHz≤f≤4GHz	±0.40dB	±0.24dB
4GHz < f≤8GHz	±0.70dB	±0.40dB
8GHz < f≤18GHz	±2.00dB	±0.90dB
18GHz < f≤26.5GHz	±2.50dB	±1.20dB
26.5GHz < f≤40GHz	±2.80dB	±1.80dB
40GHz < f≤50GHz	±3.00dB	±2.00dB

With preamplifier(ON)

Frequency range	Specification	Typical
10MHz≤f≤4GHz	±1.00dB	±0.50dB
4GHz < f≤8GHz	±1.50dB	±0.70dB
8GHz < f≤18GHz	±2.50dB	±1.20dB
18GHz < f≤40GHz	±3.00dB	±2.00dB
40GHz < f≤50GHz	±3.50dB	±2.20dB

Absolute amplitude accuracy (10 dB attenuation, 20°C ~ 30°C, 1 Hz ≤resolution bandwidth≤ 1 MHz, input signal -10 to -50 dBm):

±0.24dB 500MHz

± (0.24dB+frequency response)

all frequency except 500MHz frequency point

1dB gain compression (mixer level, dual-tone

Frequency range	Specification	Typical

test, resolution bandwidth is 5kHz, 3MHz frequency interval, 20°C ~ 30°C)	10MH≤f < 100MHz	0dBm	+8dBm
	100MHz≤f < 1GHz	0dBm	+5dBm
	1GHz≤f < 8GHz	+5dBm	+12dBm
	8GHz≤f ≤50GHz	+5dBm	+8dBm

TOI distortion (input mixer 2 -10dBm signal test, frequency interval is 50kHz, 20°C ~ 30°C)	**Frequency range**	**Specification**	**Typical**
	10MHz ≤f ≤200MHz	+12dBm	+17dBm
	200MHz < f ≤4GHz	+17dBm	+19dBm
	4GHz < f ≤8GHz	+16dBm	+20dBm
	8GHz < f ≤50GHz	+16dBm	+18dBm

Residual response (the input end is connected to match load, 0dB attenuation)	-90dBm	200kHz to 8GHz

IQ Data	Memory depth (IQ length): Analysis bandwidth≤40MHz: 500M IQ samples IQ bits length: 32 bits I, 32 bits Q Analysis bandwidth>40MHz: 1000M IQ samples IQ bits length: 32 bit I,32 bit Q
Dimensions	W (mm)×H (mm)×D (mm): (475±4)mm × (193±4)mm × (560±4)mm (excluding handle, foot-pad, bottom feet)

	(426±4)mm × (177±4)mm × (450±4)mm (without handle, foot-pad, bottom feet)
Weight	About 25kg (different configuration have different weights)
Power supply	Standard: AC 110~240V,50~60Hz
Power consumption	Maximum 300W(Standard), 450W(with H38/H41 Option)
Temperature range	Operating temperature:0℃ ~ +50℃ Storage temperature:-40℃ ~ +70℃

Notes:

1. Rated values refer to the estimated performance, or the performance which is useful for the product beyond the warrant range.
2. Typical value refers to other performance information beyond the product guarantee range; when the performance is over the technical index, 80% of the samples will present 95% confidence within 20℃ ~ 30℃ temperature range; typical performance excludes test uncertainty.

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Ording Information

- Mainframe:

Model	Description	Frequency range
4052A	Signal/Spetrum Analyzer	2Hz to 4GHz
4052B	Signal/Spetrum Analyzer	2Hz to 8GHz
4052C	Signal/Spetrum Analyzer	2Hz to 13.6GHz
4052D	Signal/Spetrum Analyzer	2Hz to 18GHz
4052E	Signal/Spetrum Analyzer	2Hz to 26.5GHz
4052F	Signal/Spetrum Analyzer	2Hz to 40GHz
4052G	Signal/Spetrum Analyzer	2Hz to 45GHz
4052H	Signal/Spetrum Analyzer	2Hz to 50GHz

- Option:

No.	Description	Functions
4052-H02	Auxiliary High IF output	Output second IF signal, the frequency is 425MHz,750MHz
4052-H08	Wideband Log detection signal output	Output a logarithmic detection signal reflecting the level characteristics of the input signal
4052-H11	10 Gigabit Ethernet Control and Data Interface	Fibre-based 10 Gigabit Ethernet interface with 10 Gbit/s transmission rate for fast remote control and fast IQ data transfer. Requires configuration of 4052-H17-E.
4052-H12C	Wideband Digital Interface (WDI)	It can output broadband IQ acquisition data in real time via optical fibre, and supports IQ data output with a maximum bandwidth of 400MHz. Together with the large-capacity data logger (4712C data logger), real-time large-capacity recording of IQ data can be realised. (Note: 4052-H12C is optional when the analysis bandwidth is ≤ 400MHz).
4052-H12E	Wideband Digital Interface (WDI)	Wideband IQ acquisition data can be output via optical fibre in real time, supporting IQ data output with a maximum bandwidth of 1.2GHz. Together with the large-capacity data logger (4712E data logger), real-time

		large-capacity recording of IQ data can be realised. (Note: 4052-H12E is optional when 600MHz ≤ analysis bandwidth≤1.2GHz).
4052-H22C-4T	4712C Data Logger	Interconnected with a signal/spectrum analyser equipped with the 4052-H12C wideband digital interface, real-time high-capacity recording of signal data with a maximum analysis bandwidth of 400MHz can be achieved, and detailed specifications and parameters of the recorder are shown in the 4712 series data logger information.
4052-H22C-8T	4712C Data Logger	
4052-H22C-16T	4712C Data Logger	
4052-H22C-32T	4712C Data Logger	
4052-H22E-8T	4712E Data Logger	Interconnected with a signal/spectrum analyser equipped with the 4052-H12E wideband digital interface, real-time high-capacity recording of signal data up to a maximum analysis bandwidth of 1.2 GHz can be achieved, the detailed specifications of the recorder parameters see the 4712 series data logger information.
4052-H22E-16T	4712E Data Logger	
4052-H22E-32T	4712E Data Logger	
4052-H22E-64T	4712E Data Logger	
4052-H17-E	Enhanced processor(CPU)	Update to I7 series processor
4052-H19-2T	Local memory expansion	Supports up to 2TB storage memory (electronic hard disk)
4052-H19-4T	Local memory expansion	Supports up to 4TB storage memory (electronic hard disk)
4052-H33-08	Electronic attenuator	Frequency range: 9kHz to 8GHz,attenuation range: 30dB,in 0.5dB steps
4052-H34-04	Low-noise preamplifier	The preamplifier is selected according to the frequency upper limit of the signal analyzer Example: 4052A frequency upper limit is 4GHz,Pre-amplifier need to select option H34-04
4052-H34-08	Low-noise preamplifier	The preamplifier is selected according to the frequency upper limit of the signal analyzer Example: 4052B frequency upper limit is 8GHz,Pre-amplifier need to select option H34-08
4052-H34-13	Low-noise preamplifier	The preamplifier is selected according to the frequency upper limit of the signal analyzer. Example: 4052C frequency upper limit is 13.6GHz,Pre-amplifier need to select option H34-13.
4052-H34-18	Low-noise preamplifier	The preamplifier is selected according to the frequency

		upper limit of the signal analyzer. Example: 4052D frequency upper limit is 18GHz,Pre-amplifier need to select option H34-18.
4052-H34-26	Low-noise preamplifier	The preamplifier is selected according to the frequency upper limit of the signal analyzer. Example:4052E frequency upper limit is 26.5GHz,Pre-amplifier need to select option H34-26.
4052-H34-40	Low-noise preamplifier	The preamplifier is selected according to the frequency upper limit of the signal analyzer. Example: 4052F frequency upper limit is 40GHz,Pre-amplifier need to select option H34-40.
4052-H34-45	Low-noise preamplifier	The preamplifier is selected according to the frequency upper limit of the signal analyzer. Example: 4052G frequency upper limit is 45GHz,Pre-amplifier need to select option H34-45.
4052-H34-50	Low-noise preamplifier	The preamplifier is selected according to the frequency upper limit of the signal analyzer. Example: 4052H frequency upper limit is 50GHz,Pre-amplifier need to select option H34-50.
4052-H34A-04	Low-noise preamplifier	Only 4052A mainframe can be configured, and 4052-H34-04 is not optional at the same time.
4052-H34A-08	Low-noise preamplifier	Only 4052B mainframe can be configured, and 4052-H34-08 is not optional at the same time.
4052-H36	Pre-selector Bypass	The tracking pre-selector in the bypass receiving channel.
4052-H38-40	40MHz Analysis bandwidth	Support 10Hz to 40MHz Analysis bandwidth
4052-H38-200	200MHz Analysis bandwidth	Support10Hz to 200MHz Analysis bandwidth
4052-H38-400	400MHz Analysis bandwidth	Support10Hz to 400MHz Analysis bandwidth
4052-H38-600	600MHz Analysis bandwidth	Support10Hz to 600MHz Analysis bandwidth
4052-H38-1200	1.2GHz Analysis bandwidth	Support10Hz to 1.2GHz Analysis bandwidth
4052-H39	Audio analyzer	Audio signal parameters test, distortion test and waveform analysis
4052-H40	External frequency extender	To extend the frequency range using external frequency mixing method. This option provides LO output and IF

		input, as well as signal recognition ability. (Notes: this option can be selected when the main unit is not 4052A and 4052B: the extended frequency range depends on the selected extension modules; the frequency extension module needs to buy additionally)
4052-H41-10	Real-time spectrum analysis	This option provides digital phosphor spectrum and seamless waterfall, including frequency template trigger, which can support real-time spectrum analysis of 10MHz bandwidth.
4052-H41-40	Real-time spectrum analysis	Provides up to 40MHz bandwidth digital fluorescence spectrum and seamless waterfall plot functionality, including frequency template triggering, broadband real-time spectrum analysis. (Requires the optional H38 option as well. (This option is available when configuring H38-40, H38-200, H38-400, H38-600, H38-1200).
4052-H41-200	Real-time spectrum analysis	Provides up to 40MHz bandwidth digital fluorescence spectrum and seamless waterfall plot functionality, including frequency template triggering, broadband real-time spectrum analysis. (Requires the optional H38 option as well. (This option is available when configuring, H38-200, H38-400, H38-600, H38-1200).
4052-H41-400	Real-time spectrum analysis	Provides up to 40MHz bandwidth digital fluorescence spectrum and seamless waterfall plot functionality, including frequency template triggering, broadband real-time spectrum analysis. (Requires the optional H38 option as well. (This option is available when configuring, H38-400, H38-600, H38-1200).
4052-H48	Noise figure analysis	Provide noise source drive and noise figure measurement function. 4052N/P only support maximum 67GHz noise figure measurement.(note: the option need to select low-noise pre-amplifier option and corresponding 1660X noise source to finish the noise figure measurement. This Option and H39 audio analysis cannot be selected simultaneously)
4052-H96	User manual (paper publication)	Provide a detailed user manual in hard copy
4052-H97	Mounting rack	handles and accessories for 4052 mounting on standard racks
4052-H98	English Option	English panel, English manual, English operation interface and English operating system

4052-H99-1	Aluminum transportation case	High-strength lightweight aluminum transportation case, with handle and roller, convenient for transportation
4052-H99-2	Plastic safety rod pulley packing case	High strength plastic safety tie rod with wheel packing box, with handle and roller, easy to transport.
4052-S01	Absolute Power Measurement	The RF signal power is measured with high precision by means of an external USB power sensor. (The corresponding 8723X series power sensor is required.)
4052-S02	Noise power ratio Measurement	Provide noise power ratio parameters measurement
4052-S04	Phase noise measurement	SSB phase noise curves and single-point phase noise measurement
4052-S05	EMC Pre-Compliance	Provide EMC pre-compliance measurement function
4052-S09	Analog Demodulation Option	The modulation characteristics and distortion characteristics of AM, FM and ΦM signals are analyzed
4052-S10	Transient analyzer	To realize the measurement & analysis of transient parameters, spectrum, and time-varying characteristics of signals, support playback of the recorded data.
4052-S10H	Frequency hopping signal analysis	Provides automatic measurement of frequency hopping signal residence time, switching time, frequency and error characteristics. (S10 option required).
4052-S10F	FMCW Signal Analysis	Provides automatic measurement of FMCW signal slope, deviation, power and other characteristics. (S10 option required)
4052-S12	Vector Signal Analyzer	This option provides flexible demodulation functions of multiple single-carrier digital modulation signals. It can provide vector charts, constellation diagrams, eye diagrams, spectrum diagrams, etc., to analyze the characteristics of the modulation signal. The modulation error of the signal can be obtained by demodulation, which helps to judge the cause of the signal error.
4052-S12B	BER Test Function	Support BER test based on known data imported from files; support BER test based on known data recorded by users; support BER test based on PRBS; provide BER result output. (Need to match S12 option at the same time)
4052-S12M	Multi-modulation Analysis Function	Support demodulation analysis of signals complying with DVB-S2/X standards; provide display windows for constellation diagrams, symbol tables, etc.; provide modulation quality analysis results such as EVM and origin offset. (S12 option is required at the same time)

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4052-S13	Pulse signal analyzer	Automatic measurement on time, level and modulation parameters of pulse waveform and statistical analysis of pulse sequence
4052-S14	OFDM Signal Analysis Function	Supports custom OFDM signal modulation analysis; supports multi-parameter custom configurations such as lead, lead-frequency, CP, subcarrier, number of symbols, etc.; has view windows such as capture storage, power spectral density, constellation diagram, and result summary table.
4052-S16	Multicarrier group delay measurement	Provides absolute and relative group delay measurement capability for wideband signals
4052-S40	WLAN 802.11a/b/g measurement	Broadband wireless local area network protocol physical layer test (802.11a/ b/g), covering radio frequency, modulation analysis, and modulation quality testing.
4052-S40N	WLAN 802.11n measurement	Broadband wireless local area network protocol physical layer test (802.11n), covering radio frequency, modulation analysis, and modulation quality testing.
4052-S40AC	WLAN 802.11ac measurement	Broadband wireless local area network protocol physical layer test (802.11ac), covering radio frequency, modulation analysis, and modulation quality testing.
4052-S40AX	WLAN 802.11ax measurement	Broadband wireless local area network protocol physical layer test (802.11ax), covering radio frequency, modulation analysis, and modulation quality testing.
4052-S40BE	WLAN 802.11be Signal Analysis	Broadband WLAN protocol physical layer testing (802.11be), covering RF, modulation analysis, modulation quality testing. (Requires concurrent S40 option)
4052-S41D	LTE/LTE-A TDD Downlink Signal Analysis	Support downlink signal modulation analysis; support TDD each subframe configuration type modulation analysis; support custom parameter configuration modulation analysis; support downlink E-TM template modulation analysis; support EVM, switching power, frequency error, power and other parameter measurements; provide view outputs such as capture storage, power spectral density, constellation diagram, result summary table, EVM Vs. carrier and so on.。
4052-S41U	LTE/LTE-A TDD Uplink Signal Analysis	Support uplink signal modulation analysis; support custom parameter configuration modulation analysis; support EVM, frequency error, power and other parameter measurements; provide view outputs such as capture

		storage, power spectral density, constellation diagram, result summary table, EVM Vs. carrier, and so on.
4052-S42D	LTE/LTE-A FDD Downlink Signal Analysis	Support downlink signal modulation analysis; support custom parameter configuration modulation analysis; support downlink E-TM template modulation analysis; support EVM, frequency error, power and other parameter measurements; provide view outputs such as Capture Storage, Power Spectral Density, Constellation Diagram, Result Summary Table, EVM Vs. Carrier, and so on.
4052-S42U	LTE/LTE-A FDD Uplink Signal Analysis	Support uplink signal modulation analysis; support custom parameter configuration modulation analysis; support EVM, frequency error, power and other parameter measurements; provide view outputs such as capture storage, power spectral density, constellation diagram, result summary table, EVM Vs. carrier, and so on.
4052-S46D	5G NR Downlink signal measurement	Support 5G NR DOWNlink signal demodulation, EVM, spectrum flatness, time alignment error; Support ACP, spectrum emission template, transmit on/off, CCDF and other power measurement; Support multiple bandwidth and multiple TM.
4052-S46U	5G NR Uplink signal measurement	Support 5G NR UPlink signal demodulation, EVM, spectrum flatness, time alignment error; Support ACP, spectrum emission template, transmit on/off, CCDF and other power measurement; Support multiple bandwidth and multiple TM.
4052A-JL	Professional calibration services	Provide metrological calibration services and provide metrological reports
4052B-JL	Professional calibration services	Provide metrological calibration services and provide metrological reports
4052C-JL	Professional calibration services	Provide metrological calibration services and provide metrological reports
4052D-JL	Professional calibration services	Provide metrological calibration services and provide metrological reports
4052E-JL	Professional calibration services	Provide metrological calibration services and provide metrological reports
4052F-JL	Professional calibration services	Provide metrological calibration services and provide metrological reports
4052G-JL	Professional calibration services	Provide metrological calibration services and provide metrological reports

4052H-JL	Professional calibration services	Provide metrological calibration services and provide metrological reports
4052A-EWT1	Extended warranty for 1 year	Beyond the warranty period, the warranty is extended for 1 year, and the two-year extended warranty is optional for 2 items, and so on
4052B-EWT1	Extended warranty for 1 year	Beyond the warranty period, the warranty is extended for 1 year, and the two-year extended warranty is optional for 2 items, and so on
4052C-EWT1	Extended warranty for 1 year	Beyond the warranty period, the warranty is extended for 1 year, and the two-year extended warranty is optional for 2 items, and so on
4052D-EWT1	Extended warranty for 1 year	Beyond the warranty period, the warranty is extended for 1 year, and the two-year extended warranty is optional for 2 items, and so on
4052E-EWT1	Extended warranty for 1 year	Beyond the warranty period, the warranty is extended for 1 year, and the two-year extended warranty is optional for 2 items, and so on
4052F-EWT1	Extended warranty for 1 year	Beyond the warranty period, the warranty is extended for 1 year, and the two-year extended warranty is optional for 2 items, and so on
4052G-EWT1	Extended warranty for 1 year	Beyond the warranty period, the warranty is extended for 1 year, and the two-year extended warranty is optional for 2 items, and so on
4052H-EWT1	Extended warranty for 1 year	Beyond the warranty period, the warranty is extended for 1 year, and the two-year extended warranty is optional for 2 items, and so on

- **USB Power Sensor Option(Requires 4052-S01 option):**

Model	Frequency Range
87230 USB CW Power Sensor	9kHz ~ 6GHz Power Sensor
87231 USB CW Power Sensor	10MHz ~ 18GHz Power Sensor
87232 USB CW Power Sensor	50MHz ~ 26.5GHz Power Sensor
87233 USB CW Power Sensor	50MHz ~ 40GHz Power Sensor
87235C USB Average Power Sensor	10MHz ~ 8GHz Power Sensor
87235D USB Average Power Sensor	10MHz ~ 18GHz Power Sensor
87235F USB Average Power Sensor	10MHz ~ 33GHz Power Sensor
87235FA USB Average Power Sensor	10MHz ~ 40GHz Power Sensor
87235H USB Average Power Sensor	10MHz ~ 50GHz Power Sensor

- **Spectrum Analyzer Extender Option(Requires 4052-H40 option):**

Model	Frequency Range
82407NA Spectrum Analyzer Extender	50GHz ~ 75GHz
82407NC Spectrum Analyzer Extender	60GHz ~ 90GHz
82407PA Spectrum Analyzer Extender	75GHz ~ 110GHz
82407QA Spectrum Analyzer Extender	90GHz ~ 140GHz
82407QB Spectrum Analyzer Extender	110GHz ~ 170GHz
82407RA Spectrum Analyzer Extender	140GHz ~ 220GHz
82407SA Spectrum Analyzer Extender	170GHz ~ 260GHz
82407S Spectrum Analyzer Extender	220GHz ~ 325GHz
82407TA Spectrum Analyzer Extender	260GHz ~ 400GHz
82407R Spectrum Analyzer Extender	325GHz ~ 500GHz
82407U Spectrum Analyzer Extender	500GHz ~ 750GHz

- **Noise Source Option(Requires 4052-H48 and 4052-H43 option):**

Model	Frequency Range
16603DB Noise Source	10MHz ~ 18GHz
16603EB Noise Source	10MHz ~ 26.5GHz
16603FB Noise Source	10MHz ~ 40GHz
16603HB Noise Source	10MHz ~ 50GHz
16604DB Smart Noise Source	10MHz ~ 18GHz
16604EB Smart Noise Source	10MHz ~ 26.5GHz
16604FB Smart Noise Source	10MHz ~ 40GHz
16604HB Smart Noise Source	10MHz ~ 50GHz

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