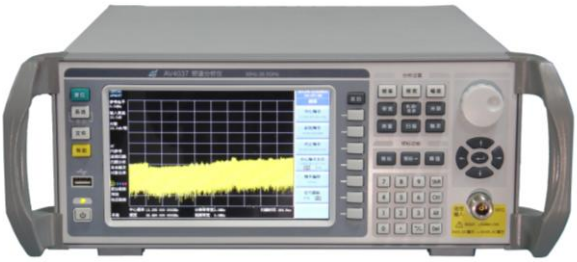
AV4037/A/B/C/D/M/MA/MB/MC/MD Spectrum Analyzer

（30Hz～3GHz/6GHz/13.2GHz/18GHz/26.5GHz）
（9kHz～3GHz/6GHz/13.2GHz/18GHz/26.5GHz）



Product Overview

AV4037 Series Spectrum Analyzers attach great importance to optimization of performance and cost. The two product lines contain 10 models to meet demands of medium-to-high and economy market. The design is cutting-edge and mature, and the comprehensive performance is excellent. The flexibility and convenience can give you a wonderful usage experience. Fast tests can be accomplished by auto testing and auto calibration. Stable performance ensures terrific test data repeatability. SCPI order set and VISA and IVI drive libraries bring you highly efficient program development.

The analyzers are designed in series to meet your diversified needs by adding and deleting options. Chinese/English operation interfaces and 7 inch high brightness color micro anti-reflection LCD provide high resolution and wide angle of view to adapt to environments in various lights. The standard 3U portable cabinets make the analyzers solid in structure and light in weight. AV4037 analyzers are mainly used for electronic product development, on-line testing of production lines, composition of auto testing systems etc.

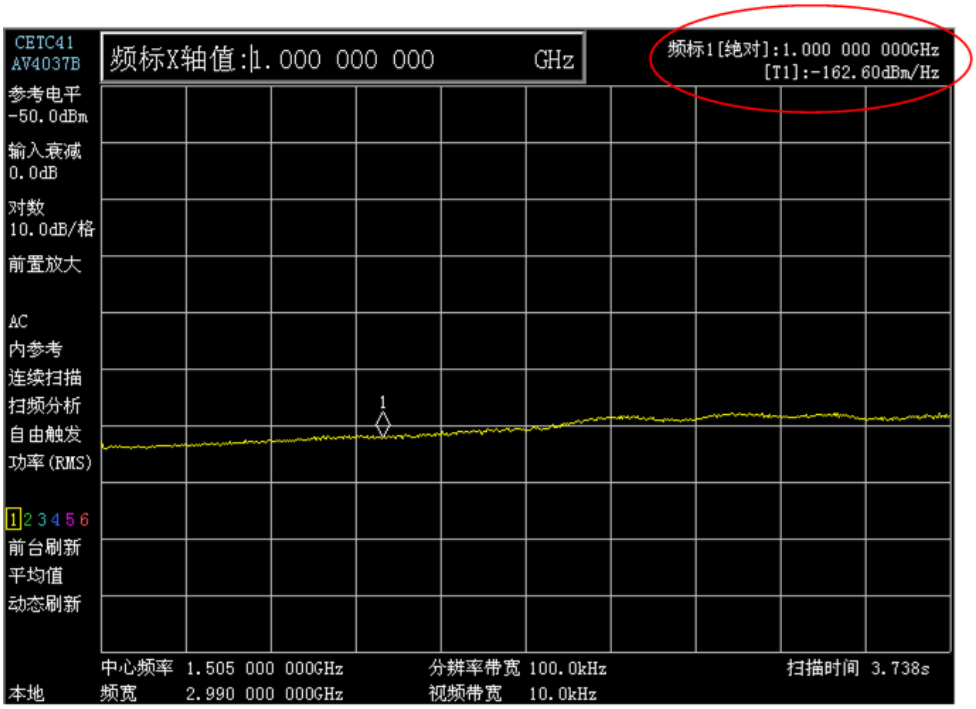
Main characteristics

- Wide frequency range, the lowest reaches 30Hz and the highest is up to 26.5GHz.
- Big dynamic range, 0dBm at 1dB gain compression, TOI（tri-order intercept point）+10dBm，DANL（display average noise level）is better than -160dBm（preamplifier is embedded as an option, typical value at 1GHz）.
- Excellent phase noise, -110dBc/Hz at frequency offset of 10kHz（low noise option, typical value）.
- Wide range of sweep time, non-zero frequency bandwidth is 1ms～2000s, 0 frequency bandwidth is 1us～4000s.
- Fast testing speed, testing ratio is as high as 90 times/sec.

- All digital IF, high spectrum resolution, the min. resolution bandwidth reaches 1Hz（FFT analysis option）.
- Auto calibration, strong circumstance adaptability.
- Two spectrum analysis modes, SF and FFT, can optimize testing speed and dynamic range flexibly.
- Resolution bandwidth takes 1-2-3-5 stepping, can generate the best coordination of frequency bandwidth and resolution bandwidth，and optimize spectrum resolution.
- Multiple video detection types are available, including normal, positive peak, negative peak, sampling, average value etc. Users are able to select flexibly when they test different types of signals to obtain fast testing results.
- As many as 6 traces are displayed to support simultaneous tests of multiple traces in diversified video detection modes. Can supply 12 scalars at most with flexible reading modes, support scale cross-trace identification.
- Embedded computer and multi-task operation system, convenient for storage, print and data sharing of testing results.
- 7”high brightness color micro anti-reflection LCD with high resolution and wide view angle. It is capable of clear display even under bright sunshine.
- Easy menu operation and comprehensive parameter settings. Support tests with external mouse, keyboard and VGA.
- 3 USB2.0 interfaces. Support movable storage devices and plug-play peripheral devices.
- Support 10M/100M self-adaptive network interconnection.
- Support GPIB, LAN programmable control, the instruction set conforms to SCPI 1999.0. Qualified VISA and IVI drive libraries, which passed strict examinations, are available for users to construct their own automatic testing systems.

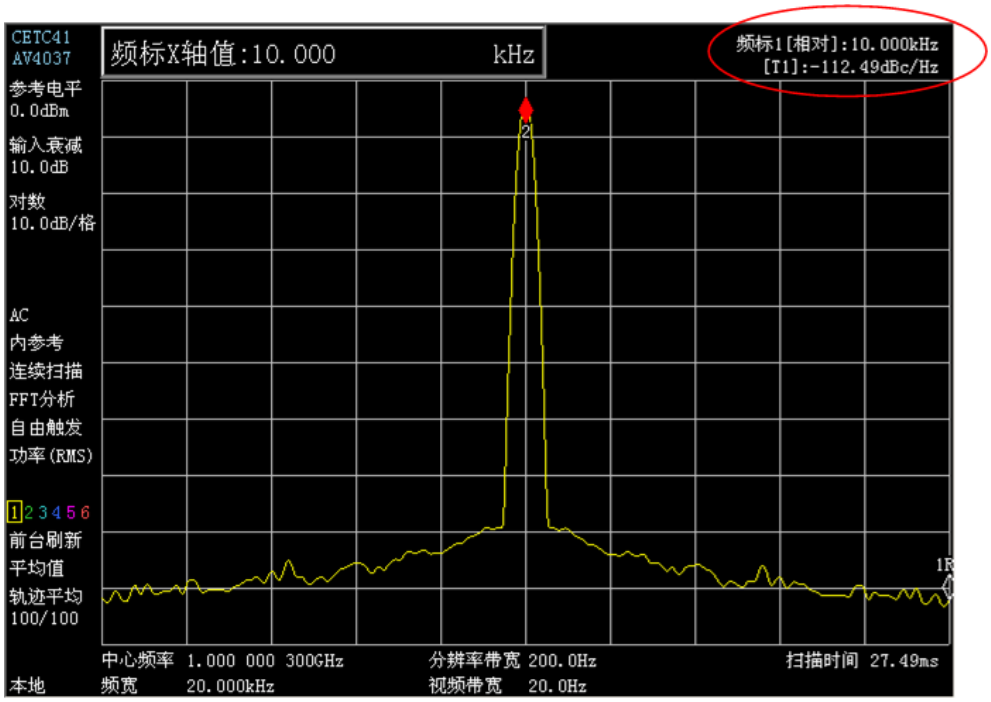
Extremely-low display average noise level

Enable the built-in preamplifier, the displayed average noise level (DANL) is as low as -160dBm/Hz（at 1GHz, typical value）.



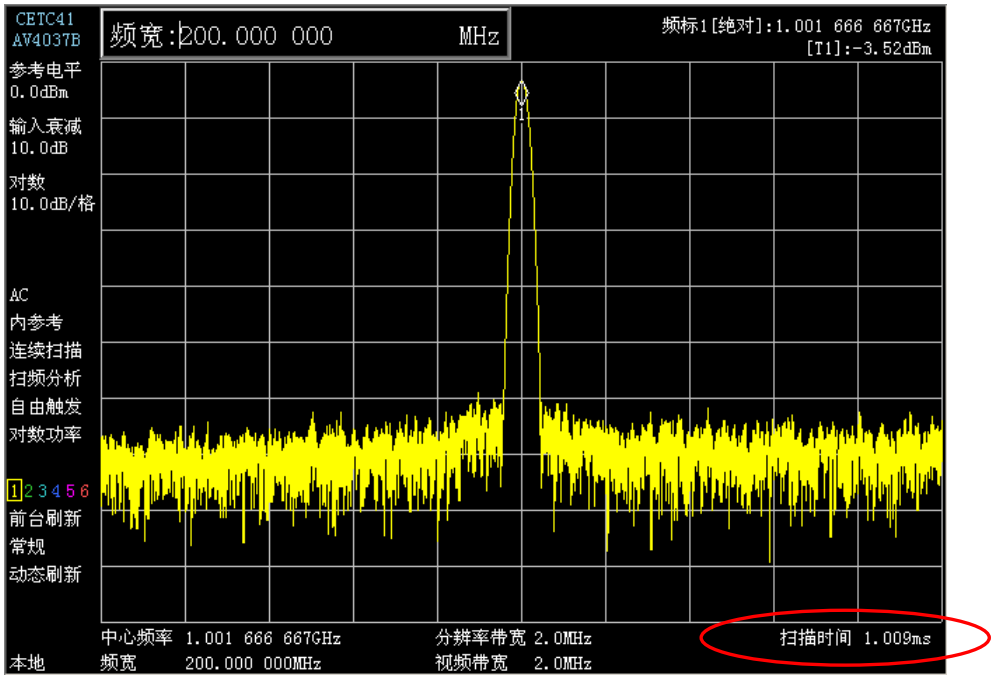
Excellent phase noise performance

This analyzer enjoys the best phase noise performance compared with other medium-grade spectrum analyzers made in China. The noise sideband reaches -110dBc/Hz (typical value) at 1GHz carrier and 10kHz frequency offset.



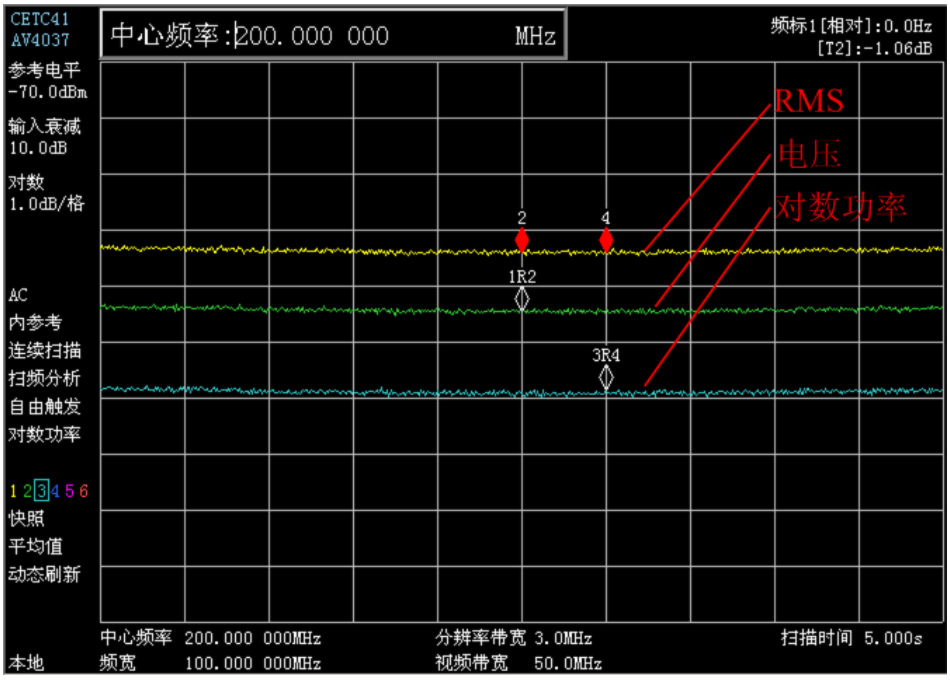
Super-fast measurement speed

The analyzer is equipped with the fastest testing speed compared with other medium-grade spectrum analyzers made in China. Sweep time of non-zero frequency bandwidth is as low as 1ms, the highest testing speed can reach 90 times per sec.



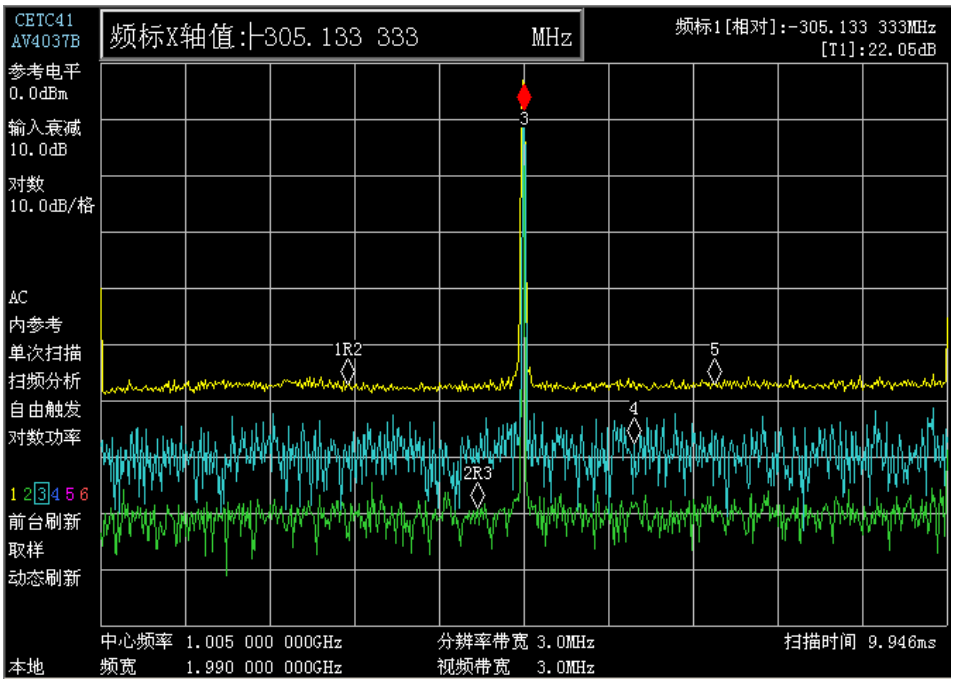
Multiple average value detection modes

Three average value detection modes are available: power (RMS), voltage and logarithm power. Users can select proper detection modes according to characteristics of signals to be tested to quickly acquire accurate average data.



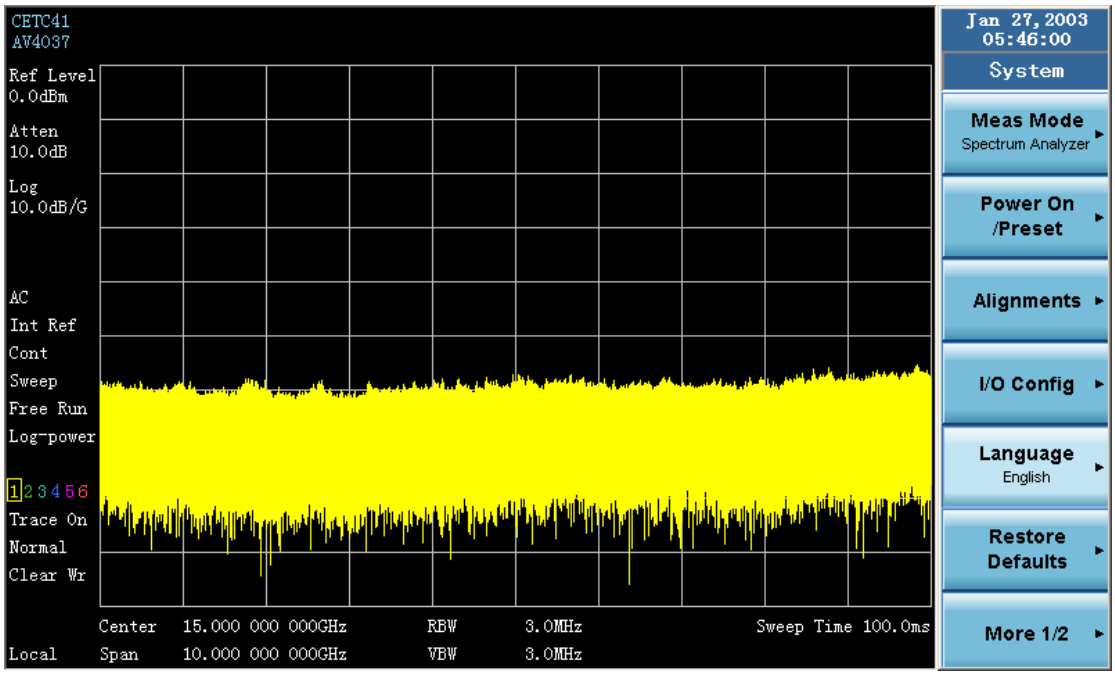
Multi-trace synchronous test and flexible scalar reading

The analyzer can give you as many as 6 traces and 12 frequency scalars. Users can activate multiple traces at the same time and select diversified video detection modes for synchronous signal tests. The flexible scalar functions are able to simultaneously activate many scalars in multiple traces and support mutual-reference between cross-trace scalars, so as to carry out relative parameters measurement.



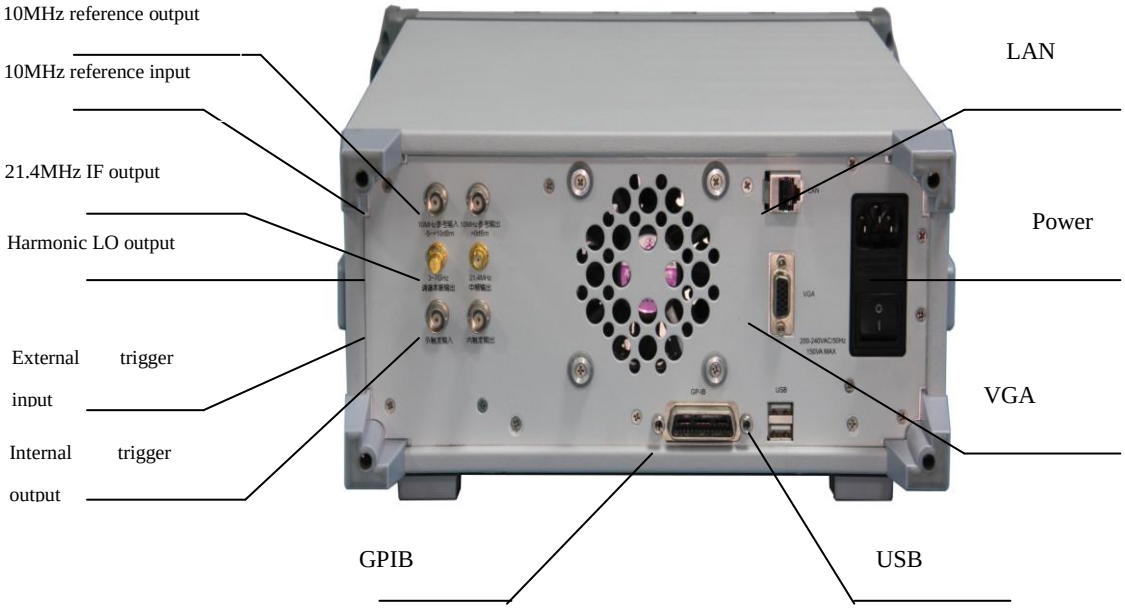
Chinese/English operation interfaces, wide-screen color LCD

Chinese/English operation interfaces are available. Users can choose menus based on different intentions. 7 inch high-brightness color micro anti-reflection LCD can give you clear images of parameter settings. Track graphs are exquisite. Users can get clear sight even under sunshine.



Powerful interactive interfaces

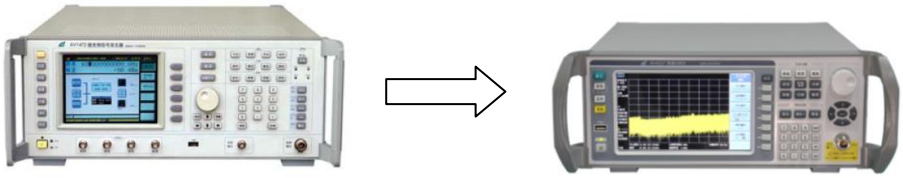
Besides fundamental time-base and trigger interfaces, the analyzer also gives you USB, GPIB and LAN interfaces for data and file transmission, copy, as well as programmable interconnection applications. VGA interface provides video information synchronized with the LCD, easy for monitoring or demonstration.



Typical applications

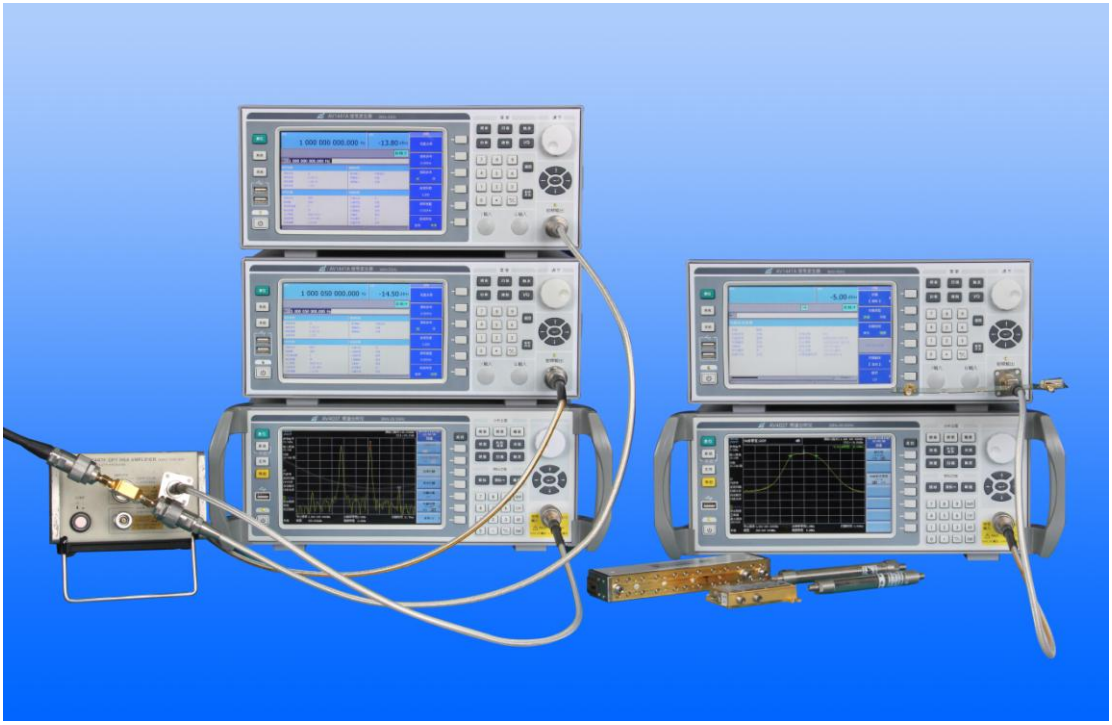
All kinds of transmitters and oscillator source tests

AV4037 Series analyzers can be used for development, production, debugging and tests of LO and signal generators of various transmitters as well as oscillators. The following specification tests are available, frequency, power, spurious, harmonic distortion, phase noise, modulation etc.



Components and modules performance test

Besides routine spectrum analysis and test, when an AV4037 analyzer is used together with one synthesized signal generator, they can build a scalar network testing system of wide dynamic range which can measure transmission parameters of components and modules, like filters, amplifiers, cables, connectors, including gain, insertion loss, frequency response, bandwidth, harmonic distortion etc. Reflection parameter can be measured when it works together with a bridge. When the analyzer works together with two synthesized signal generators, they are capable of gain compression, tri-order inter-modulation distortion and other parameter tests of active or non-linear parts, like amplifiers, mixers and so on.



Production line tests of electronic products and maintenance, examination and repair of peripheral devices

Market position of AV4037 Series analzyers is medium-to-high grade. With the characteristics of fast test speed, high precision and flexible reading, they are highly suitable for on-line tests for production lines. Meanwhile, the analyzers realize perfect combination of performance and structure. One the one hand, the size, weight and power consumpiton are reduced, and on the other, high performance specifications are maintained. Hence, they are ideal for filed tests, especially the occassions needs field breakdown diagnosis and repair.

Build auto testing system

AV4037 has the great capability of interconnectivity. The program instruction set conforms to SCPI 1999.0. We provide VISA and IVI drive libraries which have been tested strictly and meet relevant requirements. Auto testing systems can be built by users easily.

Technical specifications

Technical specifications on frequency and time	
Frequency range	AV4037 Series: AV4037A 30 Hz ～ 3 GHz AV4037B 30 Hz ～ 6 GHz AV4037C 30 Hz ～ 13.2 GHz AV4037D 30 Hz ～ 18 GHz AV4037 30 Hz ～ 26.5 GHz AV4037M Series: AV4037MA 9 kHz ～ 3 GHz AV4037MB 9 kHz ～ 6 GHz AV4037MC 9 kHz ～ 13.2 GHz AV4037MD 9 kHz ～ 18 GHz AV4037M 9 kHz ～ 26.5 GHz
10MHz frequency reference	AV4037 Series standard configuration: AV4037M Series precision frequency reference options: Aging rate： ±0.05ppm/year（30 days after continuous power-on） Temp stability degree：±0.05ppm（0℃～+50℃，compared to +25℃） AV4037M Series standard configuration: Aging rate： ±1ppm/year（30 days after continuous power-on） Temp stability degree:±1ppm（0℃～+50℃， compared to+25℃）
Frequency readout accuracy	±（frequency reading× frequency reference error＋（0.5％＋1/（sweep point−1））frequency bandwidth＋5％ resolution bandwidth＋10Hz）
Frequency counting accuracy and counting resolution	Counting accuracy： ±（frequency reading× frequency reference error＋frequency counting resolution＋residue FM） Counting resolution：1Hz to10kHz are open for choice, 10 times stepping is optional
Sweep bandwidth	Range： AV4037A, AV4037MA 0Hz，100Hz～3 GHz AV4037B, AV4037MB 0Hz，100Hz～6 GHz AV4037C, AV4037MC 0Hz，100Hz～13.2 GHz AV4037D, AV4037MD 0Hz，100Hz～18 GHz AV4037, AV4037M 0Hz，100Hz～26.5 GHz Accuracy：±（0.5%＋2/（sweep point-1））×frequency bandwidth
Sweep time	Range： 1us～4000s（frequency bandwidth ＝ 0Hz） 1ms～2000s（frequency bandwidth ≥ 100Hz） Accuracy： ±1%（frequency bandwidth=0 Hz，sweep analysis）
Trigger mode	Free, single, video, external
Resolution bandwidth	Range： AV4037 Series 1Hz～5MHz，1－2－3－5 stepping AV4037M Series 10Hz～5MHz，1－2－3－5 stepping Accuracy： ±5％（1Hz~3MHz）； ±20％（5MHz） Transmission error： ±0.5dB
Video bandwidth	Range:1Hz～5MHz, 1－2－3－5 stepping, 50MHz

Technical specifications on amplitude precision and range	
Reference level range	-150dBm～+30dBm Min. 0.01 dB stepping（the stepping is 1% of the range currently displayed）
Reference level uncertainty	±0.3dB （10dB input attenuation, 0～-80dBm reference level shift）
Display scale fidelity	±0.5dB （-10dBm ≥ level of input mixer signal ≥ -90dBm）
Frequency response（10dB input attenuation, 20～30℃）	AV4037A, B, MA, MB（the preamplifier is off） 10MHz～3GHz ±0.8dB 3GHz～6GHz ±1.0dB AV4037A, B, MA, MB（the preamplifier is on） 10MHz～3GHz ±1.2dB 3GHz～6GHz ±1.5dB AV4037, C, D, M, MC, MD 10MHz～3.1GHz ±1.5dB 3.1GHz～6.5GHz ±2.0dB 6.5GHz～18GHz ±2.5dB 18GHz～26.5GHz ±4.0dB
Absolute amplitude measurement accuracy（50MHz，-25dBm）	±0.3dB
Input attenuator	Range： AV4037A, B, MA, MB 0～40dB，1dB stepping AV4037, C, D, M, MC, MD 0～70dB，10dB stepping Shift uncertainty（50MHz，take 10dB input attenuation for reference）： AV4037A, B, MA, MB ±0.5dB AV4037, C, D, M, MC, MD ±（0.1dB+0.01dB×Attenuator setup）
RF input VSWR (input attenuation≥10dB）	AV4037A, B, MA, MB 50MHz～4.8GHz ≤1.5：1 4.8GHz～6GHz ≤1.8：1 AV4037, C, D, M, MC, MD 50MHz～6.5GHz ≤1.5：1 6.5GHz～13.2GHz ≤1.8：1 13.2GHz～26.5GHz ≤2.0：1
Max. secure input level	CW power +30dBm（1W）（≥10dB input attenuation） DC voltage 0Vdc（DC coupler），±50Vdc（AC coupler）
Display scale	Logarithm scale：0.1, 0.2, 0.5dB/per space and 1～20dB/ per space，1dB stepping，10 spaces in total Linear scale： 10 spaces Amplitude unit：dBm, dBmV , dBuV, Volts, Watts

Detection mode	Regular, positive peak, negative peak, average value, sampling
Frequency range of the preamplifier	AV4037A, MA 100kHz～3GHz AV4037B, MB 100kHz～6GHz AV4037, C, D, M, MC, MD don't have built-in preamplifiers as options

Technical specifications on dynamic range	
1dB gain compression point（dual-tone method test, mixer total RF input signal power）	AV4037A, B, MA, MB 50MHz～6GHz >0dBm（the preamplifier is off） >-15dBm（the present amplifier is on） AV4037, C, D, M, MC, MD 50MHz～6.5GHz > 0dBm 6.5GHz～13.2GHz >-3dBm 13.2GHz～26.5GHz >-5dBm
Display average noise level（input end connects matching load，0dB input attenuation，sampling detection）	AV4037A, B（1Hz RBW，1Hz VBW, the present amplifier is off） 100kHz～1MHz <-130dBm 1MHz～10MHz <-142dBm 10MHz～3GHz <-135dBm 3GHz～6GHz <-133dBm AV4037A, B（1Hz RBW，1Hz VBW，the present amplifier is on） 100kHz～1MHz <-145dBm 1MHz～10MHz <-155dBm 10MHz～3GHz <-151dBm 3GHz～6GHz <-150dBm AV4037MA, MB（10Hz RBW，1Hz VBW，the present amplifier is off） 100kHz～1MHz <-120dBm 1MHz～10MHz <-132dBm 10MHz～3GHz <-125dBm 3GHz～6GHz <-123dBm AV4037MA, MB（10Hz RBW，1Hz VBW，the present amplifier is on） 100kHz～1MHz <-135dBm 1MHz～10MHz <-145dBm 10MHz～3GHz <-141dBm 3GHz～6GHz <-140dBm AV4037, C, D（1Hz RBW，1Hz VBW） 1MHz～10MHz <-142dBm 10MHz～3.1GHz <-140dBm 3.1GHz～6.5GHz <-142dBm 6.5GHz～13.2GHz <-135dBm 13.2GHz～18GHz <-132dBm 18GHz～26.5GHz <-130dBm AV4037M, MC, MD（10Hz RBW，1Hz VBW） 1MHz～10MHz <-132dBm 10MHz～3.1GHz <-130dBm 3.1GHz～6.5GHz <-132dBm

	6.5GHz～13.2GHz <-125dBm 13.2GHz～18GHz <-122dBm 18GHz～26.5GHz <-120dBm

Technical specifications on dynamic range	
Two harmonic distortion（single-tone signal input，20～30℃）	AV4037A, B, MA, MB 10MHz～200MHz <-65dBc（input mixer level -30dBm） 200MHz～1.5GHz <-80dBc（input mixer level -30dBm） 1.5GHz～3GHz <-70dBc（input mixer level -10dBm） AV4037, C, D, M, MC, MD 10MHz～1.55GHz <-70dBc（input mixer level -30dBm） 1.55GHz～3.1GHz <-80dBc（input mixer level -10dBm） ＞3.1GHz <-100dBc（input mixer level -10dBm）
Tri-order inter-modulation distortion（frequency interval≥50kHz dual-tone single input，mixer level -30dBm，20～30℃）	AV4037A, B, MA, MB 100MHz～3GHz <-80dBc 3GHz～6GHz <-80dBc AV4037, C, D, M, MC, MD 100MHz～3.1GHz <-80dBc 3.1GHz～6.5GHz <-80dBc 6.5GHz～13.2GHz <-74dBc 13.2GHz～26.5GHz <-74dBc
Input relevant spurious response（single-tone signal input，mixer level-10dBm）	In-band response（offset carrier>30kHz）: <-60dBc Out-band response：<-80dBc
Residual response（RF input match, 0dB input attenuation）	AV4037A, B, MA, MB Preamplifier is off < -90dBm Preamplifier is on < -105dBm （Exceptional frequency：2.9572GHz, 3.6GHz, 4.1572GHz, 6GHz） AV4037, C, D, M, MC, MD< -90dBm
Noise sideband（central frequency 1GHz）	AV4037 Series standard configuration: AV4037M Series low phase noise options: Frequency offset＞1kHz ≤-90dBc/Hz Frequency offset＞10kHz ≤-105dBc/Hz Frequency offset＞100kHz ≤-110dBc/Hz AV4037M Series standard configuration Frequency offset＞10kHz ≤-90dBc/Hz Frequency offset＞30kHz ≤-100dBc/Hz Frequency offset＞100kHz ≤-110dBc/Hz

Residual FM	AV4037 Series （10Hz resolution bandwidth, 10Hz video bandwidth, 20ms peak value） ≤ 2Hz×N （N is times of mixing harmonic） AV4037M Series（1kHz resolution bandwidth, 1kHz video bandwidth, 100ms peak value） ≤ 100Hz×N （N is times of mixing harmonic）

Common technical specifications	
Power requirements	50Hz single-phase AC, rating voltage is 220V Permissible range of steady voltage：rating value ±10% Permissible range of steady frequency：rating value ±5%
Power consumption	AV4037A, B, MA, MB <100W AV4037, C, D, M, MC, MD <150W
Temp range	Working temp：0℃～+50℃ Storage temp：-40℃～+70℃
Safety	Conforms to Item 3.10 of GJB 3947A-2009
EM compatibility	Conforms to Item 3.9 of GJB 3947A-2009
Size （W×H×D）	Without handles, feet and side belt： 320 mm×133 mm×400 mm Without handles, feet and side belt： 393 mm×144 mm×465 mm
Weight	AV4037A, B, MA, MB approx.11.5 kg AV4037, C, D, M, MC, MD approx. 12 .5kg
Input connector	Type N（F），impedance 50Ω

Ordering information

Main instrument：

AV4037A Spectrum Analyzer	30Hz ～ 3GHz
AV4037B Spectrum Analyzer	30Hz ～ 6GHz
AV4037C Spectrum Analyzer	30Hz ～ 13.2GHz
AV4037D Spectrum Analyzer	30Hz ～ 18GHz
AV4037 Spectrum Analyzer	30Hz ～ 26.5GHz
AV4037MA Spectrum Analyzer	9kHz ～ 3GHz
AV4037MB Spectrum Analyzer	9kHz ～ 6GHz
AV4037MC Spectrum Analyzer	9kHz ～ 13.2GHz
AV4037MD Spectrum Analyzer	9kHz ～ 18GHz
AV4037M Spectrum Analyzer	9kHz ～ 26.5GHz

Standard configuration:

No.	Name	Remarks
1	Power cord	Standard 10A tri-core power cord
2	User Manual	Operation guide
3	Programming Manual	Programming design guide
4	Certificate	Outgoing certificate includes model number, serial number, date of issue etc.

Options:

Model No.	Name	Remarks
AV4037-S01	FFT analysis option	Support FFT analysis, 1Hz min. resolution bandwidth can be achieved.
AV4037-H01	Low noise option	Optimize LO near-end phase noise and residual FM performance.
AV4037-H02	Precise frequency reference option	Provide high stability frequency reference signals for the instrument, frequency measurement data precision can be improved to a higher grade.
AV4037-H03	Built-in preamplifier option	Significantly improve receiving channel noise factor of the whole instrument. Amplitude measurement sensitivity can be enhanced by approx 15dB.

Option selection table:

AV4037 Series					
Model of main instrument	Frequency range	FFT analysis option	Low phase noise option	Precision frequency reference option	Built-in present amplifier option
AV4037A	30 Hz ～3 GHz	Standard	Standard	Standard	Standard
AV4037B	30 Hz ～6 GHz	Standard	Standard	Standard	Standard
AV4037C	30 Hz ～13.2 GHz	Standard	Standard	Standard	N/A
AV4037D	30 Hz ～18 GHz	Standard	Standard	Standard	N/A
AV4037	30 Hz ～26.5 GHz	Standard	Standard	Standard	N/A
AV4037M Series					
Model of main instrument	Frequency range	FFT analysis option	Low phase noise option	Precision frequency reference option	Built-in preamplifier option
AV4037MA	9 kHz ～3 GHz	Optional	Optional	Optional	Optional
AV4037MB	9 kHz ～6 GHz	Optional	Optional	Optional	Optional

AV4037MC	9 kHz ～13.2 GHz	Optional	Optional	Optional	N/A
AV4037MD	9 kHz ～18 GHz	Optional	Optional	Optional	N/A
AV4037M	9 kHz ～26.5 GHz	Optional	Optional	Optional	N/A