

# AV4051A/B/C/D/E-S Series Signal Spectrum Analyzers

3Hz~4GHz/9GHz/13.2GHz/18GHz/26.5GHz



## Product Overview

AV4051-S Series Signal /Spectrum Analyzers can give you incomparable spectrum testing services of high price-performance ratio. The analyzers have excellent dynamic range, phase noise, amplitude precision and testing speed, can supply ten testing functions in total including high-performance spectrum analysis, spectral power test modules conforming to relevant criteria etc. Capabilities of the analyzers can be greatly augmented. Multiple practical options are available like preamplifier, phase noise testing, random IF output and so on. AV4051 Series can be widely applied in signal and instrument tests relating to fields of aerospace, communication, EMC, radar detection, navigation, etc.

## Main Characteristics

- Incomparable price-performance ratio
- 5 frequency ranges for your choice, the maxim reaches 26.5GHz
- Excellent testing and receiving performances
- Overall spectrum analysis capabilities
- Practical function options
- Convenient operation characteristics

## Incomparable price-performance ratio

- Economy price effectively reduces your testing cost
- Give you outstanding performance and specifications which can only be provided by high end analyzers

## 5 frequency ranges for your choice, the maxim reaches 26.5GHz

- The maxim coaxial frequency range of 26.5GHz
- 5 frequency ranges available, you can choose based on budgets
- Can supply broadband preamplifiers matching frequency ranges of corresponding main instruments

## Excellent testing and receiving performances

- 1GHz testing sensitivity of  $-153\text{dBm/Hz}$ , configured with preamplifier, the typical value is  $-166\text{dBm/Hz}$
- 26.5GHz testing sensitivity of  $-141\text{dBm/Hz}$ , configured with preamplifier, the typical value is  $-160\text{dBm/Hz}$
- All digital IF design, fine scale fidelity and IF error



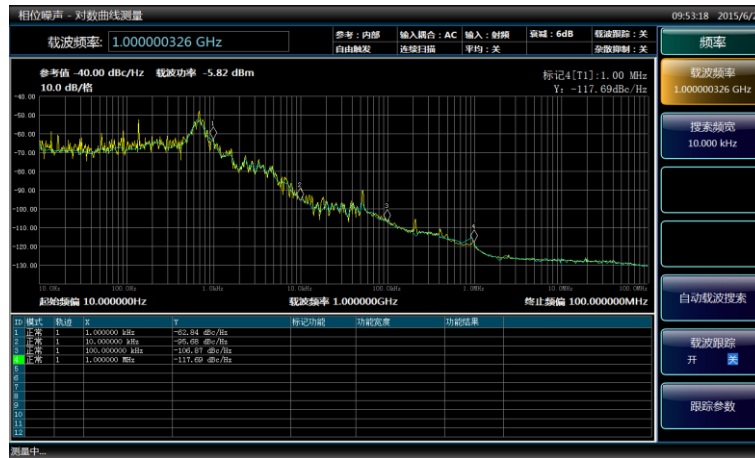
## Overall spectrum analysis

- Support sweep and FFT
- Fast sweep of zero bandwidth, the fastest sweep needs only 1us
- Precise frequency counting, the resolution can reach 0.001Hz
- Sweep points numbers can be arbitrarily selected among 101~30001
- 6 traces can be configured, with abundant marker operation functions
- 6 wave-detection modes, 3 average types.
- Support time gate measurement
- Test functions of occupied bandwidth, channel power, adjacent channel power test
- Test functions of power statistics, burst power, harmonic distortion, TOI, spurious emission etc.



### Practical extendable options

- Phase noise testing capability
- RF or full band preamplifiers
- 10MHz~160MHz random IF output, 1Hz frequency step, 4 auto gain control 1 levels



### Convenient operation

- Chinese/English are available
- Humanized auto tuning and auto scale
- One-click measurement
- 10.1 inch LCD, 1280\*800 screen resolution, display more clear measurement results
- Support USB, LAN, GPIB, monitor etc, for your convenience

## Typical applications

- RF performance assessment of electronic systems: as universal spectrum analyzers of multiple functions, AV4051-S Series Signal/Spectrum analyzers can be widely used in RF performance evaluation of electronic systems in fields like radar, communication and so on. They can provide high sensitivity, wide dynamic range, high precision and efficiency resolutions.
- Test and diagnosis of transmitter and receiver: AV4051-S Series can furnish comprehensive common diagnosis services for transmitter and receiver by the multiple functions of spectrum analysis, spectral power testing, and phase noise testing and so on.
- Can be directly used for the integration of complex test and diagnosis systems, and give you test results of spectrum characteristics and signal output.

## Technical specifications

Model	AV4051A-S/AV4051B-S/AV4051C-S/AV4051D-S/AV4051E-S
Frequency range	3Hz~4GHz/9GHz/13.2GHz/18GHz/26.5GHz
10MHz Precision frequency reference	Frequency accuracy: $\pm$ (last calibration time $\times$ aging rate + temp stability + calibration accuracy) Aging rate: $\pm 1 \times 10^{-7}/Y$ Temp stability: $\pm 1 \times 10^{-8}$ (20°C ~ 30°C) $\pm 5 \times 10^{-8}$ (0°C ~ 55°C) Calibration accuracy: $\pm 7 \times 10^{-8}$
Frequency readout accuracy	$\pm$ (Frequency readout $\times$ frequency reference accuracy + 0.1% frequency bandwidth + 5% resolution bandwidth + 2Hz + 0.5 horizontal resolution*) *: horizontal resolution = frequency bandwidth / (sweep points - 1)
Frequency counting accuracy	$\pm$ (frequency readout $\times$ frequency reference accuracy + 0.1Hz)
Frequency bandwidth	Range: 0Hz (zero frequency bandwidth), 10Hz~the maximum frequency range of this model Accuracy: $\pm$ (0.1% $\times$ frequency bandwidth + frequency bandwidth / (sweep points - 1))
Sweep time range	Frequency bandwidth $\geq$ 10Hz: 1ms~4000s Frequency bandwidth = 0Hz: 1 $\mu$ s~6000s
Resolution bandwidth	Range: 1Hz~3MHz (1, 2, 3, 5 stepping), 4, 5, 6, 8, 10MHz Conversion uncertainty: $\leq \pm 0.3$ dB
Video bandwidth	1Hz~3MHz (1, 2, 3, 5 stepping), 4, 5, 6, 8, 10MHz (rated value)

Trigger mode	Free, power source, video, external level (front panel), external level (rear panel), burst RF, timer																		
Detection mode	Normal, positive peak, negative peak, sampling, average, root mean square																		
Average modes	Video average, power average, level average																		
Sideband noise (central frequency 1GHz, 20°C ~ 30°C)	<table> <tr> <td>-92dBc/Hz</td> <td>100Hz</td> </tr> <tr> <td>-105dBc/Hz</td> <td>1kHz</td> </tr> <tr> <td>-118dBc/Hz</td> <td>10kHz</td> </tr> <tr> <td>-123dBc/Hz</td> <td>100kHz</td> </tr> </table>	-92dBc/Hz	100Hz	-105dBc/Hz	1kHz	-118dBc/Hz	10kHz	-123dBc/Hz	100kHz										
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Residual FM (central frequency 1GHz, resolution bandwidth 10Hz, video bandwidth 10 Hz)	<p><math>\leq(0.25 \text{ Hz} \times N) \text{ p-p}</math>, rated value within 20 ms N is frequency multiplication times of LO</p>																		
Displayed average noise level (the input end is connected to match load, sampling or average wave detection. The average type is logarithm, 0dB input attenuation, RF gain takes the sensitivity as the priority)	<table> <tr> <td>-153dBm/Hz</td> <td>10MHz~1GHz</td> </tr> <tr> <td>-151dBm/Hz</td> <td>1GHz~2GHz</td> </tr> <tr> <td>-150dBm/Hz</td> <td>2GHz~3GHz</td> </tr> <tr> <td>-148dBm/Hz</td> <td>3GHz~3.6GHz</td> </tr> <tr> <td>-145dBm/Hz</td> <td>3.6GHz~4GHz</td> </tr> <tr> <td>-148dBm/Hz</td> <td>4GHz~4.4GHz</td> </tr> <tr> <td>-150dBm/Hz</td> <td>4.4GHz~9GHz</td> </tr> <tr> <td>-146dBm/Hz</td> <td>9GHz~18GHz</td> </tr> <tr> <td>-141dBm/Hz</td> <td>18GHz~26.5GHz</td> </tr> </table>	-153dBm/Hz	10MHz~1GHz	-151dBm/Hz	1GHz~2GHz	-150dBm/Hz	2GHz~3GHz	-148dBm/Hz	3GHz~3.6GHz	-145dBm/Hz	3.6GHz~4GHz	-148dBm/Hz	4GHz~4.4GHz	-150dBm/Hz	4.4GHz~9GHz	-146dBm/Hz	9GHz~18GHz	-141dBm/Hz	18GHz~26.5GHz
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Frequency response & absolute amplitude accuracy (10dB attenuation, 20°C ~ 30°C)	<p>Frequency response:</p> <table> <tr> <td>&lt;±0.8dB</td> <td>3Hz~3.6GHz</td> </tr> <tr> <td>&lt; ±1.0dB</td> <td>3.6GHz~4GHz</td> </tr> <tr> <td>&lt; ±1.5dB</td> <td>4GHz~9GHz</td> </tr> <tr> <td>&lt; ±2.0dB</td> <td>9GHz~18GHz</td> </tr> <tr> <td>&lt; ±2.5dB</td> <td>18GHz~26.5GHz</td> </tr> </table> <p>Absolute amplitude accuracy 10 dB attenuation, 20°C ~ 30°C, 1 Hz ≤ resolution bandwidth ≤ 1 MHz, input signal -10 ~ -50 dBm):</p> <table> <tr> <td>±0.24dB</td> <td>500MHz</td> </tr> <tr> <td>± (0.24dB + frequency response)</td> <td>All frequencies</td> </tr> </table>	<±0.8dB	3Hz~3.6GHz	< ±1.0dB	3.6GHz~4GHz	< ±1.5dB	4GHz~9GHz	< ±2.0dB	9GHz~18GHz	< ±2.5dB	18GHz~26.5GHz	±0.24dB	500MHz	± (0.24dB + frequency response)	All frequencies				
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1dB gain compression (mixer level,	<table> <tr> <td>-3dBm</td> <td>20MHz~40MHz</td> </tr> <tr> <td>0dBm</td> <td>40MHz~200MHz</td> </tr> <tr> <td>+1dBm</td> <td>200MHz~4GHz</td> </tr> </table>	-3dBm	20MHz~40MHz	0dBm	40MHz~200MHz	+1dBm	200MHz~4GHz												
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dual-tone testing, resolution bandwidth of 5kHz, frequency interval of 3MHz, 20°C ~ 30°C)	- 1dBm      4GHz~9GHz 0dBm        9GHz~26.5GHz
Tri-order intermodulation distortion (TOI) (input 2 signals of -10dBm into the mixer for testing, frequency interval is 50kHz, 20°C~30°C)	< +12dBm      10MHz ~ 4GHz < +10dBm      4GHz ~ 9GHz < +12dBm      9GHz ~ 18GHz < +13dBm      18GHz ~ 26.5GHz
Residual response (the input end is connected to match load, 0dB attenuation)	-100dBm                      200kHz~9GHz -100dBm (rated value)      Other frequencies
Dimensions	W×H×D= 510mm×192mm×534mm (with handles, foot-pads, bottom feet) W×H×D= 426mm×177mm×460mm (without handles, foot-pads, bottom feet)
Weight	Approx. 25kg (different options, different weight)
Power	AC 220/240V: 50/60Hz
Power consumption	Standby is below 20W; Working is below 400W
Temp range	Working temp 0°C ~ +50°C ; Storage temp: -40°C ~ +70°C
Input connector	AV4051A-S/AV4051B-S /AV4051C-S /AV4051D-S: type N (F), impedance 50Ω AV4051E-S: 3.5mm (M), impedance 50Ω

- Order:
1. Rated value refers to the estimated performance, or the performance which is useful for the product beyond the quality guarantee scope.
  2. Typical value refers to other performance information when typical values stay beyond the quality guarantee scope. When performance surpasses technical specifications, 80% of samples will present 95% confidence within 20°C ~ 30°C temperature range. Typical performance excludes test uncertainty.

## Ordering information

- Main unit: AV4051A-S Spectrum analyzer 3Hz~4GHz  
           AV4051B-S Spectrum analyzer 3Hz~9GHz  
           AV4051C-S Spectrum analyzer 3Hz~13.2GHz  
           AV4051D-S Spectrum analyzer 3Hz~18GHz  
           AV4051E-S Spectrum analyzer 3Hz~26.5GHz

- Standard configurations:

No.	Name	Remarks
1	Power cord	Standard tri-core power cord
2	USB mouse	
3	User manual	
4	Programming manual	

- Options:

No.	Name	Functions
AV4051-H03	IF output	Output third IF signal, output frequency range is 10MHz ~ 160MHz, stepping resolution is 1Hz.
AV4051-H08	Wideband logarithm wave-detection output	To output the logarithm wave-detection signal which reflects the input signal level characteristics.
AV4051-H34-04 AV4051-H34-09 AV4051-H34-13 AV4051-H34-18 AV4051-H34-26	Low noise preamplifier	Can select low waveband preamplifier or full waveband preamplifier. When you select full waveband preamplifier, we provide above 4GHz frequency band noise optimization path. (Note: the no. of low waveband preamplifier is H34-04. The full waveband preamplifier should be selected according to the frequency upper limit of the main unit. For instance, the max. frequency of AV4051 E-S is 26.5GHz, then the full waveband preamplifier H34-26 should be selected).
AV4051-S04	Phase noise test	SSB phase noise curves and single-point phase noise test.
AV4051-H98	English options	English panels, English manuals, English operation interfaces and operation systems. Power: AC 100/115V : 50/60/400Hz ; AC 220/240V: 50/60Hz.

AV4051-H99	Aluminum transportation case	Highly-strengthened lightweight aluminum transportation case, with handles and rollers, convenient for transportation.
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**Foreign instruments can be substituted**

AV4051-S Series Signal/Spectrum Analyzers can substitute the following foreign instruments:

- Agilent N9020A Series Spectrum Analyzers, E4440 Series Spectrum Analyzers;
- R&S FSV Series Spectrum Analyzers, FSU Series Spectrum Analyzers;
- Anritsu MS2830 Series Spectrum Analyzers.