TFN TD5

vector signal analyzer

2 Hz～18/26.5/40/44/50 GHz

PRODUCT PARAMETERS

Technical indicators It refers to the parameter performance included in the product warranty. Unless otherwise specified, these technical indicators are only valid within the temperature range of 20 ° C to 30 ° C. Unless otherwise specified, technical indicators include measurement uncertainty. Under the following conditions, the instrument can achieve its technical specifications:

- The instrument is within the calibration cycle
- If the instrument is stored in an environment that is within the allowable storage temperature range but exceeds the allowable working temperature range, it must be placed within the allowable working temperature range for at least two hours and preheated for 30 minutes before starting the instrument

95% value When the ambient temperature is between 20 ° C and 30 ° C, 95% (2 σ) The grasp is expected to reach the performance tolerance range. In addition to the statistical observation data of instrument samples, these values also include the uncertainty impact of external calibration references. But it is not guaranteed that all instruments can achieve these values. If there are significant changes in the statistical observation characteristics of production instruments, these values may be updated periodically.

Typical value It refers to other product performance information that is not within the product warranty range, and refers to a performance indicator that 80% of equipment units can demonstrate a 95% confidence level within the temperature range of 20 ° C to 30 ° C.

Nominal value It refers to the expected performance, or describes the product performance that is useful in product application but not included in the product warranty scope.

OVERVIEW

TD5 is a high-performance vector signal analyzer. Has excellent measurement dynamic range, analysis bandwidth, phase noise, amplitude accuracy, and testing speed; Having multiple testing functions such as high sensitivity spectrum analysis, vector signal analysis, real-time spectrum analysis, analog demodulation analysis, noise coefficient measurement, and phase noise measurement; It has optional testing functions and excellent hardware scalability. Its maximum analysis bandwidth can reach up to 1.2GHz, meeting the testing needs of 5G, radar civilian, etc.

- Frequency range: 9 kHz to 44 GHz (expandable to 2 Hz, 50 GHz)
- Analysis bandwidth: 40 MHz (scalable to 1.2 GHz)
- Real time analysis bandwidth: 40 MHz (scalable to 600 MHz)
- Phase noise: -125 dBc/Hz (carrier 1 GHz, offset 10 kHz)
- Supports universal spectrum analysis mode, vector signal analysis mode, real-time spectrum analysis mode, analog signal analysis mode, noise coefficient analysis mode, and phase noise analysis mode
- The instrument can be controlled through LAN, GPIB, and USB interfaces
- Remote control instructions are compatible with mainstream similar devices

PRODUCT PARAMETERS

WORKING MODE

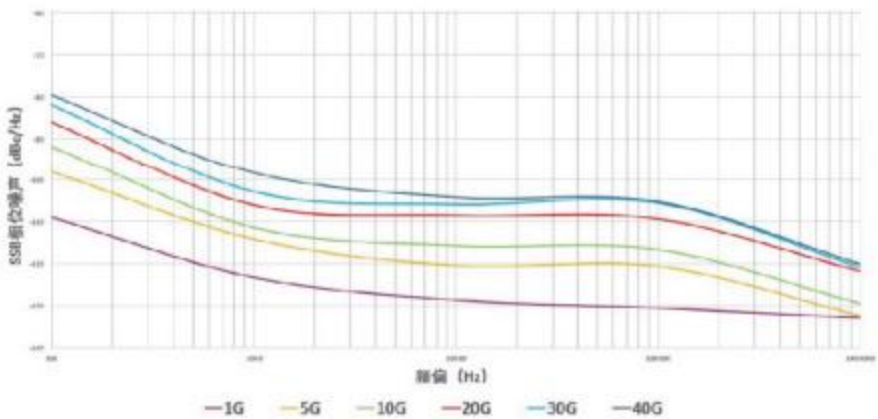
Universal Spectrum Analysis Mode
Vector signal analysis mode
Analog signal analysis mode
Real time spectrum analysis mode
Phase noise analysis mode
Noise coefficient analysis mode

FREQUENCY AND TIME TECHNICAL INDICATORS

Measurement frequency range	
Option F03	9 kHz ~ 3.8 GHz
Option F09	9 kHz ~ 9 GHz
Option F18	9 kHz ~ 18 GHz
Option F26	9 kHz ~ 26.5 GHz
Option F40	9 kHz ~ 40 GHz
Option F44	9 kHz ~ 44 GHz
Option F50	9 kHz ~ 50 GHz
Option FL2	Low frequency to 2 Hz

Internal frequency reference	
Reference frequency	10 MHz
Accuracy	± [(time X aging rate from last calibration)+temperature stability+calibration accuracy]
Aging rate	±0.1 ppm/年
Temperature stability	±0.1 ppm
Initial calibration accuracy	±0.1 ppm

Phase noise (input signal: 0dBm, carrier 1GHz)		
	Index	Typical value
Offset 100 Hz	−96.0 dBc/Hz	−101.0 dBc/Hz
Offset 1 kHz	−116.0 dBc/Hz	−118.0 dBc/Hz
Offset 10 kHz	−125.0 dBc/Hz	−126.0 dBc/Hz
Offset 100 kHz	−125.0 dBc/Hz	−127.0 dBc/Hz
Offset 1 MHz	−130.0 dBc/Hz	−131.0 dBc/Hz



AMPLITUDE ACCURACY AND RANGE TECHNICAL INDICATORS

Range of amplitude	
Range	Display average noise level (DANL)~+30 dBm
Reference level	−170 dBm ~ +30 dBm
Maximum safe input level	+30 dBm
Input attenuator range	0-72 dB in steps of 2 dB
Attenuation accuracy	± 0.5dB, attenuation<40 dB
	± 1.2dB, attenuation ≥ 40 dB
	± 3.0 dB, attenuation ≥ 60 dB

Electronic attenuator	
Frequency range	9 kHz ~ 3.8 GHz
Range of electronic attenuators	0~30 dB in steps of 1 dB

Display average noise level (DANL) (F50, B40, detection: sampling, trace average: logarithmic, number ≥ 100)

Frequency range	Index	Typical value
The preamplifier is disconnected		
10 MHz ~ 1 GHz	−152 dBm/Hz	−153 dBm/Hz
1 GHz ~ 2 GHz	−150 dBm/Hz	−151 dBm/Hz
2 GHz ~ 3 GHz	−148 dBm/Hz	−149 dBm/Hz
3 GHz ~ 3.8 GHz	−146 dBm/Hz	−147 dBm/Hz
3.8 GHz ~ 9 GHz	−145 dBm/Hz	−147 dBm/Hz
9 GHz ~ 18 GHz	−142 dBm/Hz	−143 dBm/Hz
18 GHz ~ 26.5 GHz	−137 dBm/Hz	−139 dBm/Hz
26.5 GHz ~ 40 GHz	−132 dBm/Hz	−134 dBm/Hz
40 GHz ~ 44 GHz	−130 dBm/Hz	−133 dBm/Hz
44 GHz ~ 50 GHz	−127 dBm/Hz	−129 dBm/Hz
Preamplifier on		
10 MHz ~ 2 GHz	−162 dBm/Hz	−164 dBm/Hz
2 GHz ~ 3 GHz	−161 dBm/Hz	−163 dBm/Hz
3 GHz ~ 3.8 GHz	−158 dBm/Hz	−160 dBm/Hz
3.8 GHz ~ 9 GHz	−156 dBm/Hz	−158 dBm/Hz
9 GHz ~ 18 GHz	−154 dBm/Hz	−155 dBm/Hz
18 GHz ~ 26.5 GHz	−152 dBm/Hz	−154 dBm/Hz
26.5 GHz ~ 40 GHz	−150 dBm/Hz	−152 dBm/Hz
40 GHz ~ 44 GHz	−148 dBm/Hz	−149 dBm/Hz
44 GHz ~ 50 GHz	−145 dBm/Hz	−146 dBm/Hz

Frequency response

Preamplifier disconnected (attenuation: 10 dB, frequency≥3.8 GH2: after performing preselector center tuning, 20℃~30 ° C)

9 kHz ~ 20 MHz	±0.7 dB
20 MHz ~ 2 GHz	±0.5 dB
2 GHz ~ 3.8 GHz	±0.7 dB
3.8 GHz ~ 10 GHz	±1.4 dB
10 GHz ~ 13.6 GHz	±1.5 dB
13.6 GHz ~ 18 GHz	±1.7 dB
18 GHz ~ 26.5 GHz	±2.2 dB
26.5 GHz ~ 35 GHz	±2.5 dB
35 GHz ~ 44 GHz	±2.8 dB
44 GHz ~ 50 GHz	±3.0 dB

Preamplifier on (attenuation: 10 dB, frequency ≥ 3.8 GHz: after performing preselector center tuning, 20 ° C~30 * C)

100 kHz ~ 2 GHz	±1.0 dB
2 GHz ~ 3.8 GHz	±1.1 dB
3.8 GHz ~ 10 GHz	±1.8 dB
10 GHz ~ 13.6 GHz	±2.2 dB
13.6 GHz ~ 18 GHz	±2.7 dB
18 GHz ~ 26.5 GHz	±3.0 dB
26.5 GHz ~ 35 GHz	±3.2 dB
35 GHz ~ 44 GHz	±3.5 dB
44 GHz ~ 50 GHz	±4.0 dB

Overall absolute amplitude accuracy (RBW: 30 kHz, input level: -10 dBm, 20 ° C~30 ° C)

	Index	Typical value
100MHz	±0.5 dB	±0.24 dB
All frequencies	± (0.5+frequency response) dB	± (0.24+frequency response) dB

Spurious response		
Remaining response (input to load)	≤ -100 dBm (nominal value, frequency:<9 GHz, attenuation: 0 dB)	
	Mixer level	**Response**
Mirror response	−10 dBm	−65 dBc
Intermediate frequency feedthrough	−10 dBm	−75 dBc
Local oscillator related spurious signals	−10 dBm	−60 dBc
First order RF (offset carrier: ≥ 10 MH2)		
First order RF (offset carrier: ≥ 10 MH2)	−10 dBm	−65 dBc
High order RF (offset carrier: ≥ 10 MHz)	−30 dBm	−65 dBc

Second harmonic distortion (SHD) (preamplifier: off, mixer level: -30 dBm)

10 MHz ~ 500 MHz	−60 dBc
500 MHz ~ 22 GHz	−70 dBc

Third order cutoff point (-20 dBm input, interval of 1 MHz, 0 dB attenuation, pre amplifier disconnected)

	Index	Typical value
20 MHz ~ 400 MHz	+9 dBm	+12 dBm
>400 MHz	+12 dBm	+14 dBm

1dB gain compression point (dual tone interval: 5x pre selected filter bandwidth, pre amplifier: off, attenuator: 0dB)

Frequency range	Maximum level of mixer
20 MHz ~ 100 MHz	-5 dBm
100 MHz ~ 1 GHz	⩾0 dBm
1 GHz ~ 3.8 GHz	⩾+2 dBm
3.8 GHz ~ 9 GHz	⩾+1 dBm
9 GHz ~ 44 GHz	⩾+3 dBm
44 GHz ~ 50 GHz	⩾+3 dBm

Input voltage standing wave ratio (VSWR) (pre amplifier off, reference level 0 dBm)

10 MHz ~ 10 GHz	≤ 1.5:1, nominal value
10 GHz ~ 26.5 GHz	≤ 1.8:1, nominal value
26.5 GHz ~ 50 GHz	≤ 2.0:1, nominal value

TECHNICAL INDICATORS OF GPSA UNIVERSAL SPECTRUM ANALYSIS MODE

Frequency reading accuracy (start, end, center, cursor)

± (Cursor frequency X: Frequency reference accuracy+0.5% X Sweep width+5% X RBW+10Hz+0.5X Horizontal resolution)

Among them: horizontal resolution=scan width/(scan point-1)

Frequency span

Range	0, 10 Hz~highest frequency
Resolving power	2 Hz
Accuracy	± (0.25% X scan width+horizontal resolution)

Scan time

Zero sweep width	1 μs ~ 6000 s
Sweep width ≥ 10 Hz	1 ms ~ 6000 s
trigger	
Trigger method	Free operation, power supply, RF burst, video, external, cycle
Trigger delay	
Zero sweep width	−150 ms ~ +500 ms
Non-zero sweep width	0 ~ 500 ms
resolving power	1 μs

Resolution bandwidth

Range (-3.01 dB bandwidth)	1 Hz~3 MHz (10% in steps), 4.5, 6, 8, 10.20 MHz
Accuracy (-3.01 dB)	± 5%, nominal value (measurement range: 1 Hz~3 MHz)
Selectivity (-60 dB/-3 dB)	4.6:1, nominal value (measurement range: 1 Hz~3 MHz)

Video bandwidth

Range (-3.01 dB bandwidth)	1 Hz~3 MHz (10% in steps), 4.5, 6, 8, 10.20 MHz

Spectrum display

Logarithmic scale	10 display cells, with steps of 0.1 dB to 20 dB per cell
Linear scale	10 display cells, 0 to reference level
X-scale	Linear, logarithmic
Scale units	dBm、dBmV、dBμV、dBmA、dBμA、V、W、A
Display points	1001
Scan points	101 ~ 10001
Number of traces	6
Detection mode	Positive peak, negative peak, conventional, sampling value, mean
Trace function	Clear write, maximum hold, minimum hold, average
Cursor count	12
Supported cursor functions	Conventional, differential, noise, bandwidth functions

TECHNICAL INDICATORS OF VSA VECTOR SIGNAL ANALYSIS MODE

Vector signal analysis

Display mode	Constellation diagram, spectrum diagram, vector diagram, EVM time domain,
Supported modulation types	
FSK	2FSK、4FSK、8FSK、16FSK、MSK
PSK	BPSK、QPSK、OQPSK、π/4DQPSK、8PSK
QAM	16、32、64、128、256、512、1024
ASK	2-ASK、APSK16、APSK32
Filter type	Rising cosine filter, root rising cosine filter, Gaussian filter, bypass
α	0.05~1.0; Step 0.01 (raised cosine or root raised cosine filter)
BT	0.05~100; Step 0.01 (Gaussian filter)

EVM typical value

Modulation type: QPSK; Symbol rate: 1MS/s; Center frequency: 1GHz; Filter: Root raised cosine, a=0.35; Input power: -10dBm; Reference level: 0dBm; Minimum symbol length of 200	⩽ 0.8%

Measurement result	Error vector amplitude, amplitude error, phase error, I/Q offset error, channel power	
Analyze bandwidth	Option B10	10 MHz (standard configuration)
	Option B25	25 MHz (Upgradable)
	Option B40	40 MHz (Upgradable)
	Option B85	85 MHz (requires hardware upgrade)
	Option B1H	160 MHz (requires hardware upgrade)
	Option B2H	200 MHZ (requires hardware upgrade)
	Option B6H	600 MHz (requires hardware upgrade)
	Option B12H	1200 MHz (requires hardware upgrade)
Storage depth	4GB	

TECHNICAL INDICATORS OF RTSA REAL-TIME SPECTRUM ANALYSIS MODE (UPGRADABLE)

Real-time analysis

Analyze bandwidth		Option B10	10 MHz (standard configuration)
		Option B25	25 MHz (Upgradable)
		Option B40	40 MHz (Upgradable)
		Option B85	85 MHz (requires hardware upgrade)
		Option B1H	160 MHz (requires hardware upgrade)
		Option B2H	200 MHz (requires hardware upgrade)
		Option B6H	600 MHz (requires hardware upgrade)
Real time trace detection method			Positive peak, negative peak, sampling, average value
Number of traces			6
Trace type			Clear write, maximum hold, minimum hold, view
Cursor count			12
Supported cursor functions			Conventional, differential, noise, bandwidth functions
Amplitude resolution			0.5 dB
Frequency points			821
Window type			Hanning window, Blackman window, rectangular window, flat top window, Caesar window, Gaussian window
Trigger			Freedom, power, RF burst, video, external, cycle, frequency template (FMT)
Resolution bandwidth	window	Analyze bandwidth	RBW1、RBW2、RBW3、RBW4、RBW5、RBW6
	Kaiqi	600 MHz	1.5 MHz ~ 47.0 MHz
		200 MHz	489 kHz ~ 15.7 MHz
		160 MHz	391 kHz ~ 12.6 MHz
		85 MHz	208 kHz ~ 6.7 MHz
		40 MHz	98 kHz ~ 3.2 MHz
		20 MHz	49 kHz ~ 1.6 MHz
Maximum Sample Rate			Analyze bandwidth x 1.25
100% POI minimum duration			<1 μs
FFT rate			1464843/5 (bandwidth: ≥ 85 MHZ)
SFDR			<−60 dBc
Display mode			Conventional, density plot, spectrogram, density+spectrum, power time (PvT), power time+spectrum, power time+spectrum

Density map display

Probability range	0~100% (0.0019% step)
Minimum frequency span	1 kHz
Afterglow time	0,30 ms~10 s (1 ms step)
Tone	Warm tone, cool tone, grayscale, radar
Minimum collection time	30 ms

Spectral chart display

Maximum display trace	10000
Color temperature dynamic range	256 dB
Minimum collection time	102.4 μs

PvT

Maximum frequency span	10/25/40/85/160/200/600 MHZ (determined based on installed options)
Detector	Positive peak, negative peak, sampling, average
Number of Cursors	12
Maximum time	40 s
Shortest time	202 μs
The shortest continuous detectable signal	0.8 ns (signal-to-noise ratio StM>60 dB)

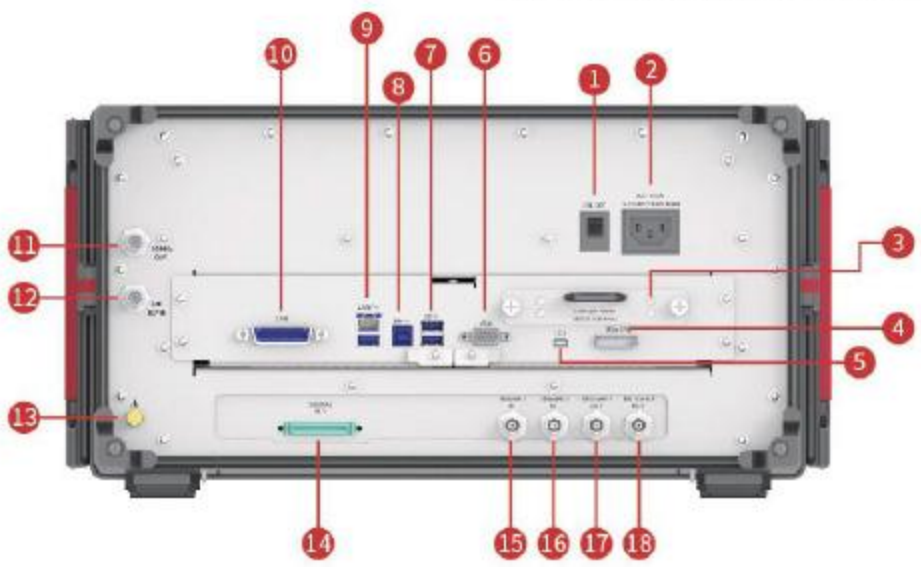
Frequency mask triggering

Available display modes	Density map, spectral map, conventional
Trigger resolution	0.5 dB
Trigger conditions	Enter, leave, internal, external, enter → leave, leave → enter

INPUT/OUTPUT

Front panel

Number	Name	Connector Type	Input/Output	Remarks
1	Chassis Ground	/	/	/
2	Power button	/	/	/
3	USB2.0	USB2.0 Type a	Input/Output	Standard USB 2.0 port, Type A, connected to peripherals such as mouse, keyboard, printer, DVD drive, or hard drive
4	RF connector	NMD 2.4 mm	Input	RF input port, 50n, male, maximum input power 1W, DC coupling: 0VDC
5	Function buttons	/	Input	Input for parameters
6	LCD display area	/	Input/Output	Adopting a 12.1-inch touch screen, supporting multiple gesture operations. Used to display measurement values, settings menu, and other information



Rear panel

Number	Name	Connector type	Input/Output	Remarks
1	Power switch	/	/	Input
2	Source	ATX	Input	220V ~ 250V;50Hz ~ 60Hz;600W Max
3	Removable disk drive	--	Output	Hard disk
4	PCIe X4	PCIe X4 output port	Output	Reserved for future use
5	DP video output	Mini Display Connector	Output	DP output
6	6 VGA video output	15 pin VGA connector	Output	Format: XGA analog RGB, used for external VGA display devices
7	USB3.0	USB3.0 A Type female head	Input/Output	Standard USB 3.0 port, Type A, connected to peripherals such as mouse, keyboard, printer, DVD drive, or hard drive
8	USB3.0	USB3.0 B Type female head	Input/Output	Standard USB 3.0 port, Type B, for remote control of analyzers
9	Network interface	RJ45 Network connector	Input/Output	Gigabit Ethernet, can be used for remote control of analyzers
	USB2.0	USB2.0 A Network connector	Input/Output	Standard USB 2.0 port, Type A, connected to external devices such as USB flash drives, mice, keyboards, DVD drives, or hard drives
10	GPIB	IEEE-488.2 Bus connector	Input/Output	Universal Interface Bus (GPIB, IEE 488.2) connection, can be used for remote control of analyzers
11	10 MHz output	BNC	Output	Output amplitude>0 dBm, frequency 10 MHz+ (10 MHz * frequency reference accuracy)
12	External reference input	BNC	Input	Input amplitude 0 to+10 dBm, input frequency 10 MHZ
13	Chassis Ground	--	--	--
14	Digital bus	MDR-50	Output	Real time digital interface, LVDS, can only serve as a data source and
15	Trigger 1 input	BNC	Input	Input level 0 to+5 VITTL)
16	Trigger 2 inputs	BNC	Input	Input level 0 to+5 V (TTL)
17	Trigger 1 output	BNC	Output	Output level 0 to+5 VITTL)
18	Trigger 2 output	BNC	Output	Output level 0 to+5 V (TTL)

GENERAL TECHNICAL INDICATORS

General technical indicators

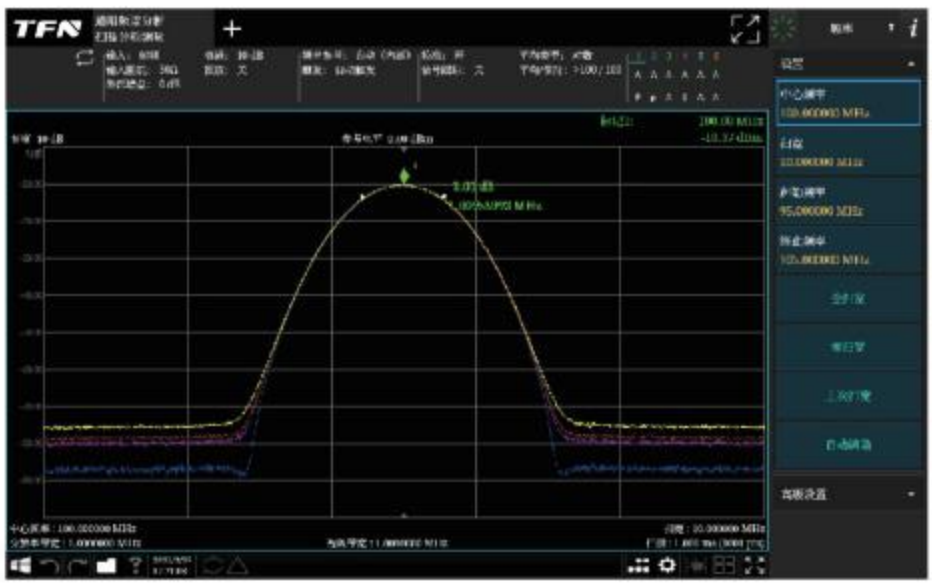
Working temperature	0°C ~ +50°C
Storage temperature	−40°C ~ +70°C
Source	Voltage: 220~250V, frequency: 50~60 Hz
Power dissipation	⩽450W
Heat dissipation method	Air cooling and heat dissipation
Data storage	⩾160GB
Display screen	12.1 inches, resolution 1280x800
Physical dimensions	426mm (width) x 22m (height) x 538mm (depth) (excluding foot pads and hand
Weight	≤ 35 kg (different options have different weights)

MAIN APPLICATIONS

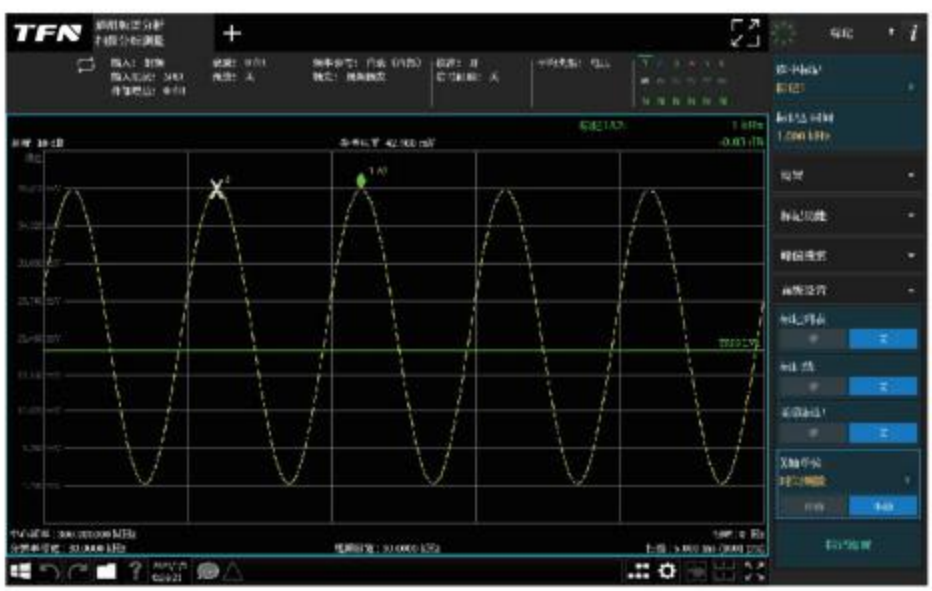
1. Universal spectrum analysis mode

Spectrum analysis mode is a conventional universal spectrum analysis measurement mode, which has two scanning types: scanning frequency and FFT. Through local oscillator scanning, the frequency, power and other parameters of the signal within the testing range are measured; It has signal peak search, marking functions, and various trace types and trace detection processing capabilities. The TFN TD5 supports a maximum operating frequency of 2Hz~50GHz, ensuring that it meets the testing needs of mainstream equipment and components in stages such as research and development design, production debugging, and factory inspection. Having excellent stability and consistency, providing assurance for the full lifecycle health management of equipment and components.

Scanning analysis



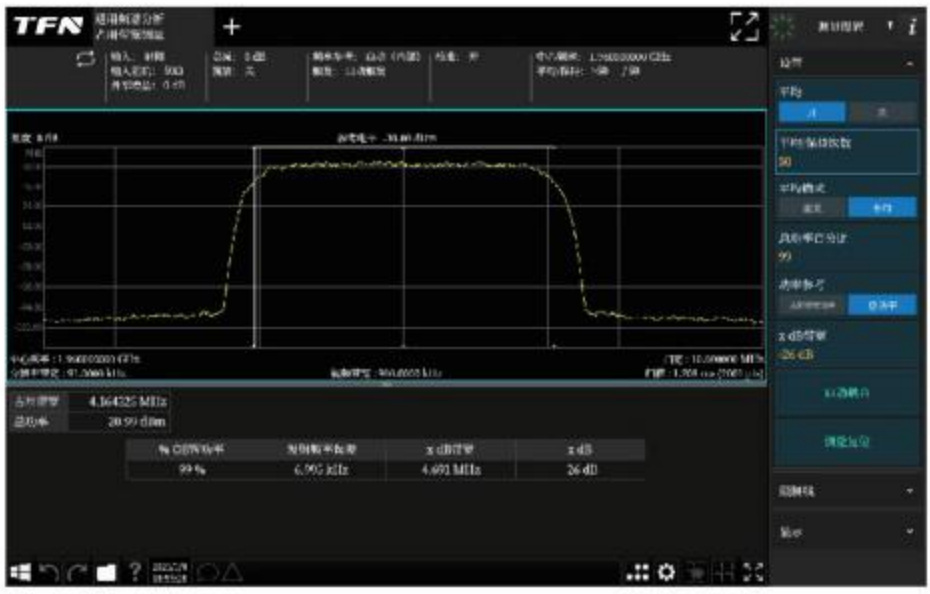
Time Domain



2. Rich testing functions

It has rich advanced measurement functions, including channel power measurement, occupied bandwidth measurement, adjacent channel power measurement, power CCDF statistical measurement, transmission power measurement, stray emission measurement, spectrum emission template measurement, third-order intermodulation measurement, and harmonic measurement.

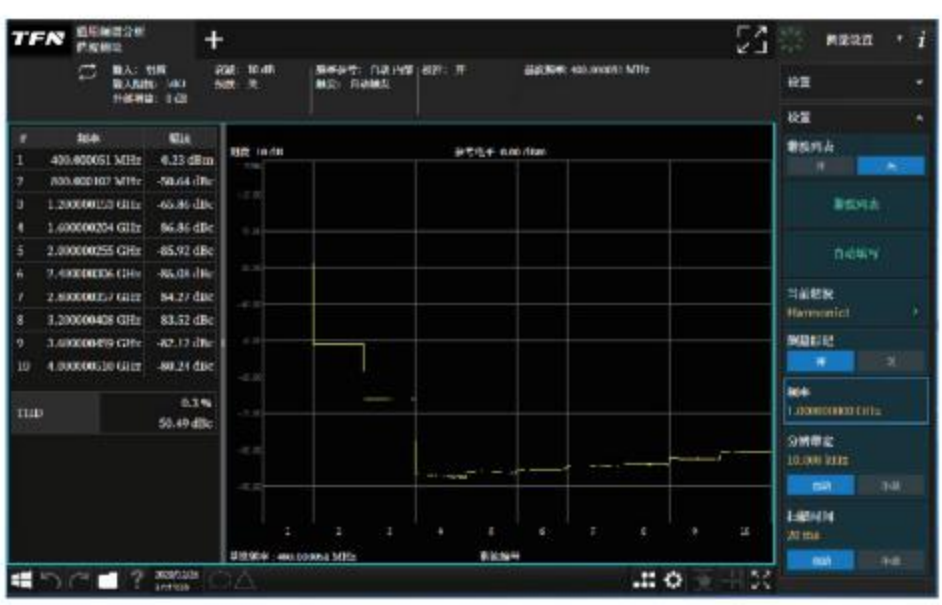
Bandwidth occupied



Adjacent channel power measurement

Third order intermodulation measurement

Harmonic measurement

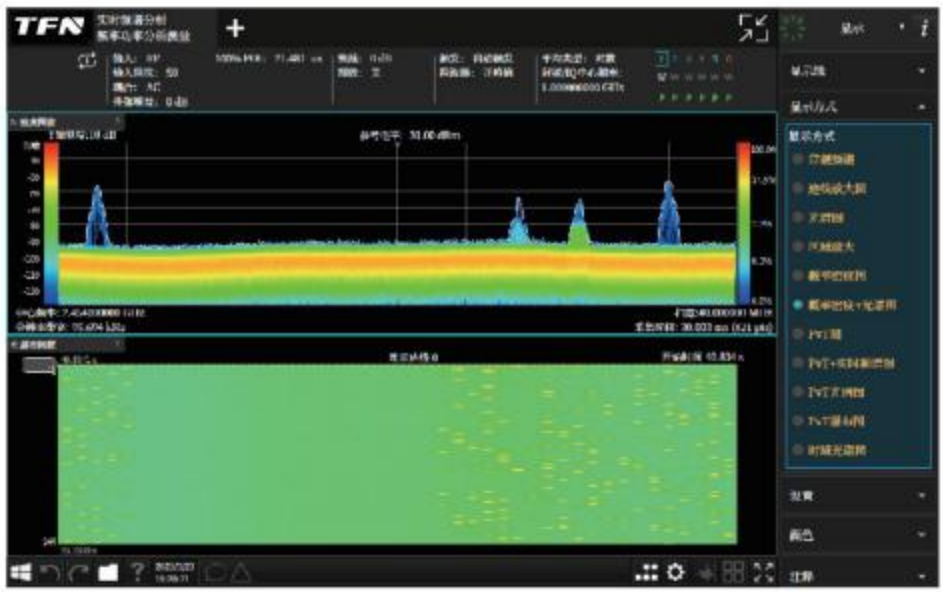


3. Real time spectrum analysis

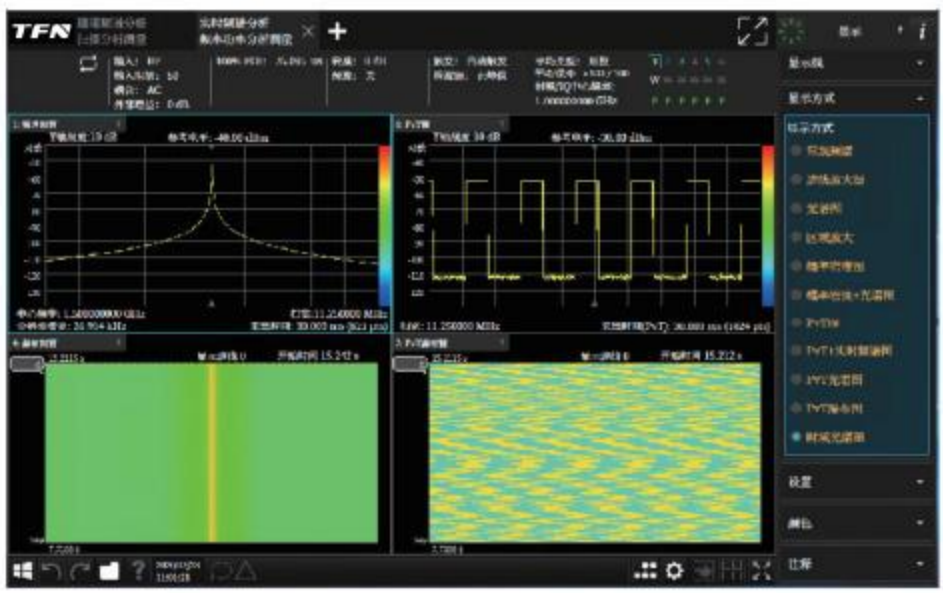
Real time Spectrum Analysis (RTSA) mode provides real-time signal analysis and seamless capture of transient signals. RTSA mainly tests various transient signals. In addition to traditional power spectrum test results, RTSA measures the characteristics of signals through probability density and frequency domain+time domain correlation methods. TFNTD5 has a frequency template triggering function, which can quickly construct templates and accurately locate and trigger signals that comply with template rules, thereby discovering transient signals within the monitoring range.

- Real time analysis bandwidth: 10 MHz/25 MHz/40 MHz/85 MHz/160 MHz/200 MHz/600 MHz
- Multiple display methods including probability density map, PvT spectrogram, PvT waterfall map, time-domain spectrogram, etc
- Minimum signal duration at 100% capture probability (POI): less than 1 us

Probability density+spectrogram



Time-domain spectrogram



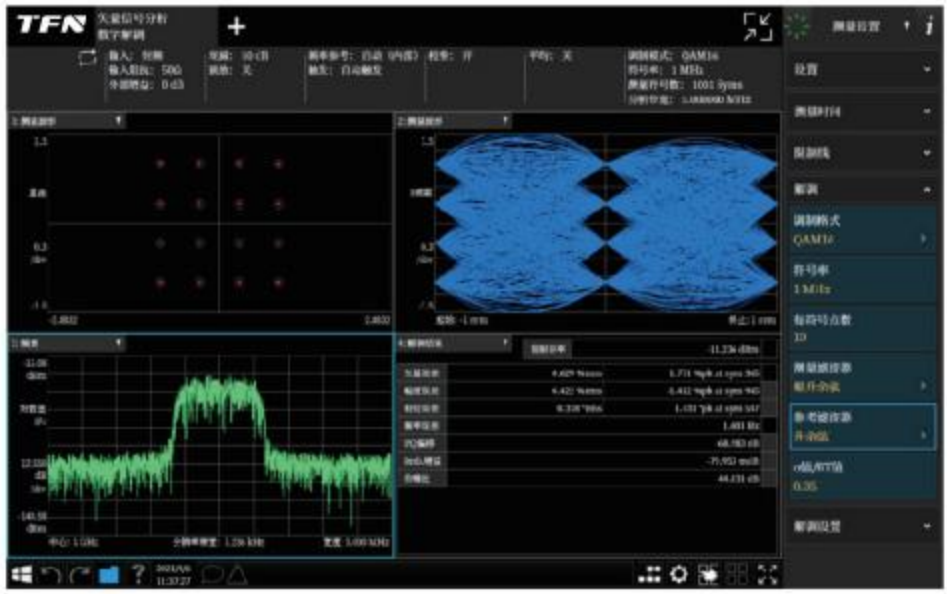
4. Vector signal analysis

Vector Signal Analysis (VSA) mainly completes the frequency domain, modulation domain, and code domain analysis of signals; At the same time, VSA provides fast and high-resolution spectrum measurement, advanced time-domain analysis functions, and is particularly suitable for characterizing modulated signals, such as pulse, instantaneous, or modulated signals in communication, video, broadcasting, radar, and software defined radio applications. Vector modulation analysis can provide flexible modulation analysis functions for various digital signal formats and standards. It can provide rich graphs such as IQ waveform, constellation diagram, eye diagram, spectrum diagram, etc. to analyze the characteristics of modulation signals, and can obtain modulation errors of signals through demodulation, helping to determine the causes of signal errors.

- Can demodulate and analyze various universal digital modulation signals such as PSK, FSK, QAM, etc
- Simultaneously display pre demodulation, post demodulation, demodulation error, and demodulation result, supporting multiple displays such as I _ Q, constellation diagram, I eye diagram, Q eye diagram, real part, imaginary part, etc

QPSK signal

16QAM signal



5. Analog signal analysis

Analog Demodulation Analysis (ASA) provides three measurement modes for measuring amplitude modulation, frequency modulation, or phase modulation signals. After demodulation, the spectrum and time-domain waveform of the demodulated signal can be displayed simultaneously. Based on the demodulated signal, measurements of modulation depth modulation deviation, modulation phase offset, carrier frequency error, signal-to-noise ratio, total harmonic distortion, carrier power, etc. of the modulated signal can be completed.

AM Demod

Frequency modulation demodulation

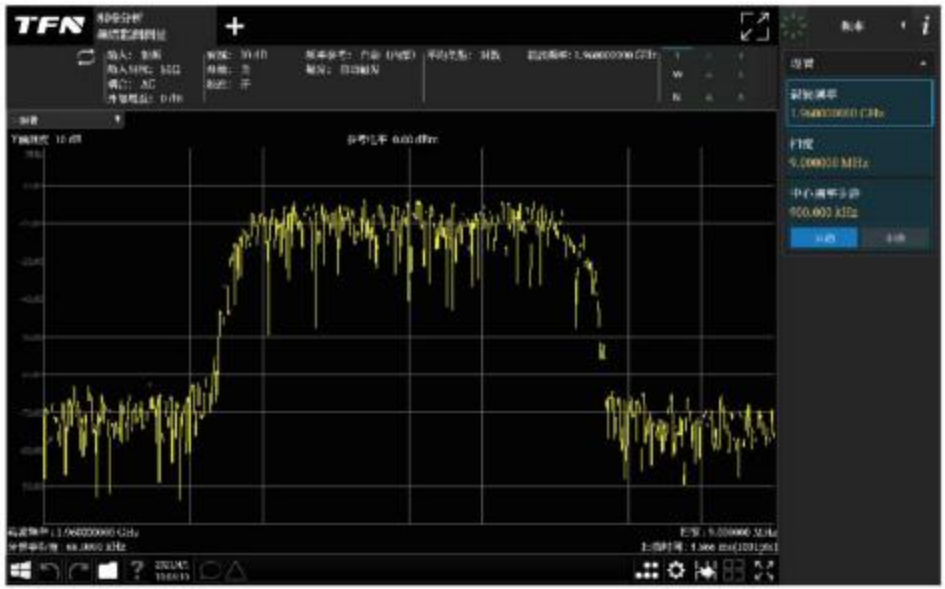
Phase modulation and demodulation

6. Phase noise measurement

Phase noise measurement is used to measure the phase noise within a specified offset frequency range of the measured signal. Provide one click automatic measurement to meet various phase noise measurement applications.

Probability density+spectrogram

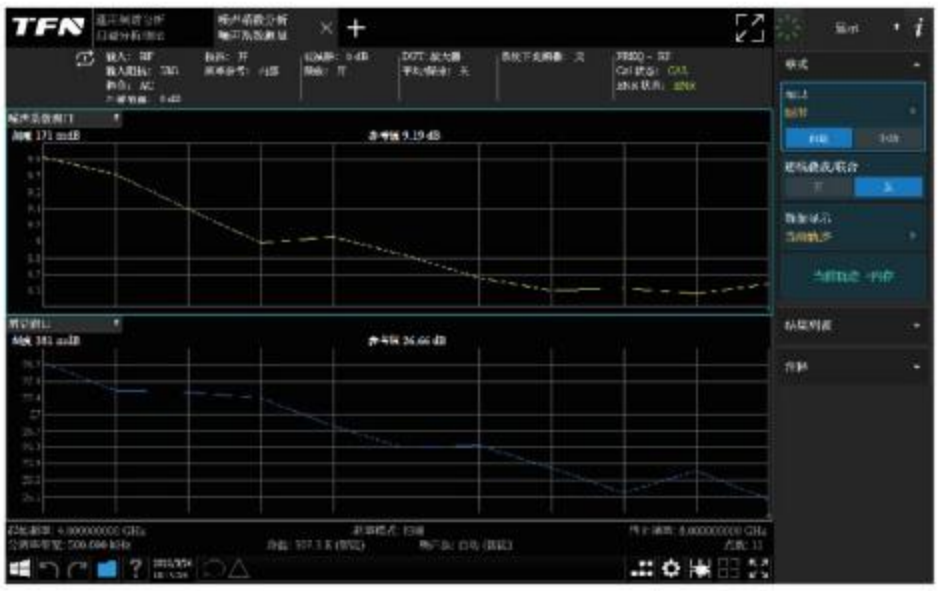
Time-domain spectrogram



7. Noise coefficient measurement

Noise coefficient is one of the key indicators of RF circuits, which determines the sensitivity of the receiver and affects the signal-to-noise ratio of analog communication systems and the bit error rate of digital communication systems. TFN TD5 uses the Y-factor method to measure the noise coefficient.

Noise coefficient measurement



Gain measurement

Trace stacking/combining

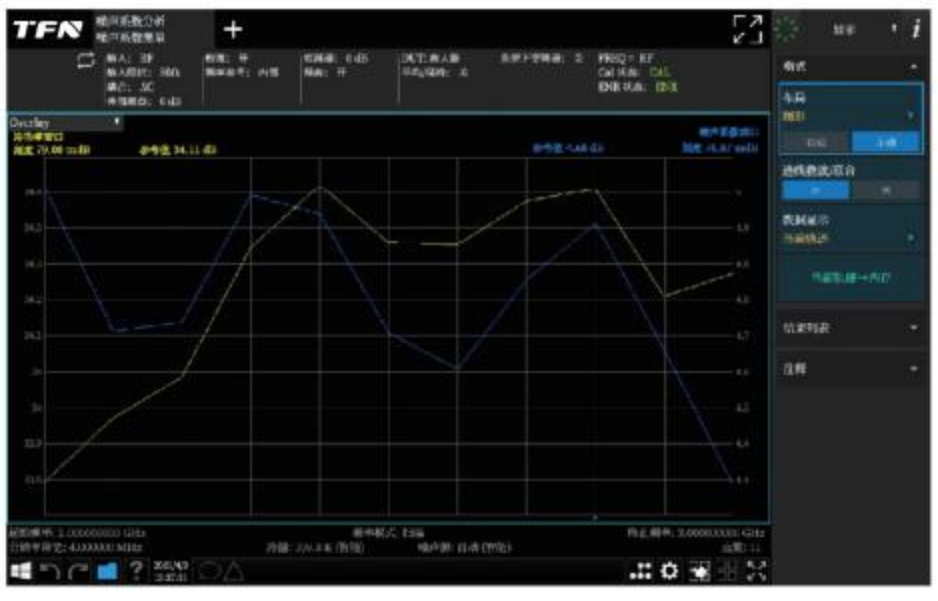


Table Window

CONFIGURATION AND ORDERING INFORMATION

Configuration and ordering information	Illustrate
TD5	Vector signal analyzer 2Hz~3.8/9/18/265/40/44/50GHz
Configurable options	
Frequency range options	
TD5-F03	9 kHz ~ 3.8 GHz (Standard configuration)
TD5-F09	9 kHz ~ 9 GHz
TD5-F18	9 kHz ~ 18 GHz
TD5-F26	9 kHz ~ 26.5 GHz
TD5-F40	9 kHz ~ 40 GHz
TD5-F44	9 kHz ~ 44 GHz
TD5-F50	9 kHz ~ 50 GHz
TD5-FL2	Low frequency to 2 Hz
Analyze bandwidth options	
TD5-B10	10 MHz (standard configuration)
TD5-B25	25 MHz (Upgradable)
TD5-B40	40 MHz (Upgradable)
TD5-B85	85 MHZ [requires hardware upgrade)
TD5-B1H	160 MHZ (requires hardware upgrade)
TD5-B2H	200 MHZ (requires hardware upgrade)
TD5-B6H	600 MHz (requires hardware upgrade)
TD5-B12H	1200 MHz requires hardware upgrade)
Preamplifier	
TD5-P03	100 kHz ~ 3.8 GHz
TD5-P09	100 kHz ~ 9 GHz
TD5-P18	100 kHz ~ 18 GHz
TD5-P26	100 kHz ~ 26.5 GHz
TD5-P40	100 kHz ~ 40 GHz
TD5-P44	100 kHz ~ 44 GHz
TD5-P50	100 kHz ~ 50 GHz
Electronic attenuator options	
TD5-EA3	9kHz~3.8 GHz, I dB step
YTF preselector bypass option	YTF preselector bypass option
TD5-YPB	YTF preselector bypass
Application software options	
TD5-GPSA	Universal frequency harmonic analysis software (standard configuration)
TD5-AMS	Advanced measurement kit
TD5-VSA	Vector signal analysis software
TD5-ASA	Analog signal analysis software
TD5-RTSA	Real time spectrum analysis software
TD5-PNM	Phase noise measurement software
TD5-NFM	Noise coefficient measurement software

Software Information

operating system	Windows 10 (64 bit)
control interface	GPIB, LAN、USB
SCPI instruction recording	SCPI instruction recording function: It can automatically record the corresponding SCPI instructions for user operations and generate remote control codes automatically

Analysis software	Category	Explain
Universal Spectrum Analysis Software (GPSA)	Scanning analysis measurement (SSA)	Scanning analysis measurement can support two analysis methods: local oscillator scanning and FFT scanning; Can support both frequency domain and time domain analysis functions
Advanced measurement kit	Channel Power Measurement (CHP)	Used to measure the effective power value and power spectral density of signals within a certain bandwidth
	Bandwidth occupancy measurement (OBW)	Used to measure the bandwidth of broadband signals
	Adjacent channel power measurement (ACP)	ACP is used to measure the interference or power of adjacent channels and evaluate the impact of adjacent channels on the main channel
	Power CCDF statistics Measurement (PS-CCDF)	Digital modulation signals have characteristics similar to noise, which can be measured by PS-CCDF to reflect the statistical characteristics of the modulation signal
	Transmission Power Measurement (TXP)	Measure the power of the RF channel and verify the accuracy of the average power of the transmitted carrier signal; Time domain testing function, displaying the envelope waveform of the measured signal
	Stray radiation measurement (SE)	Measure the stray power within the specified frequency band
	Spectral radiation mask measurement (SEM)	Measure the level of stray signals with up to 6 offset frequencies, and the measurement result is related to the carrier power
	Third order intermodulation measurement (TOI)	Measurement of third-order intermodulation interference in dual tone signals
	Harmonic Measurement (HMM)	Measure the harmonics of the fundamental wave and calculate the power of each harmonic and total harmonic distortion
Vector signal analysis software (VSA)	Digital Demodulation Measurement (DDM)	Supports digital modulation signal analysis capabilities for multiple (standard or user-defined) types, while displaying various modulation domain features of the measured signal
Analog signal analysis software (ASA)	Measurement of amplitude modulation and demodulation (AM)	Demodulation analysis of amplitude modulation signals
	Frequency modulation demodulation measurement (FM)	Demodulation analysis of frequency modulation signals
	Phase modulation demodulation measurement (PM)	Demodulation Analysis of Phase Modulation Signal
Real time spectrum analysis software (RTSA)	Conventional spectrum view	Display real-time traces
	Spectral view	Including windows: spectrum display window, waterfall plot window
	PvT View	Include window: PvT window
	PvT probability density view	Including window: Spectrum display window
	PvT+real-time spectrum view	Including windows: PvT window, spectrum window
	PvT spectral view	Including windows: PvT window, spectrum window, waterfall window
	PvT Waterfall View	Including windows: PvT window, waterfall chart window
	Time frequency spectral view	Including windows: spectrum window, PvT window, spectrum waterfall window, PvT waterfall window
Phase noise measurement software (PNM)	Spectral monitoring and measurement	Monitoring signal spectrum, waveform display similar to scanning spectrum analysis
	Phase noise measurement	Measurement of phase noise within a specified offset frequency range of a signal
Noise coefficient measurement software (NFM)	Graph	In the basic scanning frequency analysis measurement mode, the scanning method can support two analysis methods: local oscillator scanning and FFT scanning; Supports two analysis modes: frequency domain and time domain
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