UNI-T®

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Data Sheet

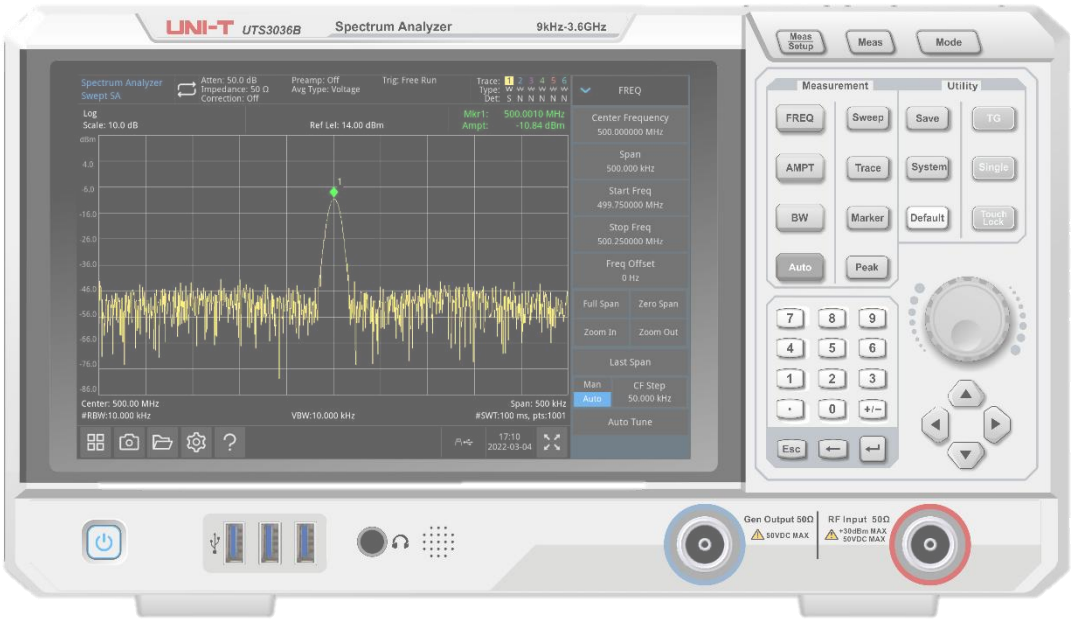
UTS3000B Series Spectrum Analyzer

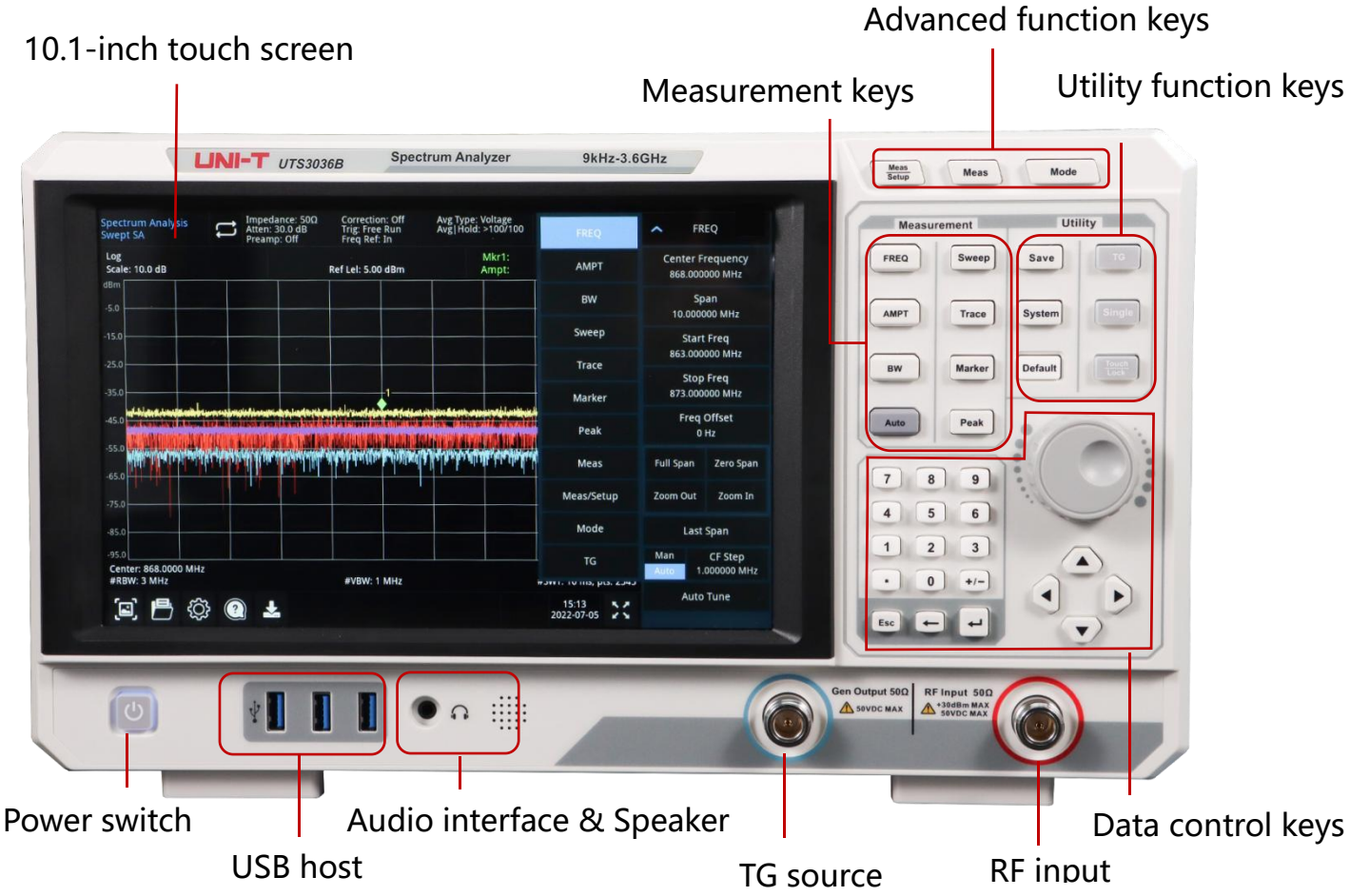
V 1.1

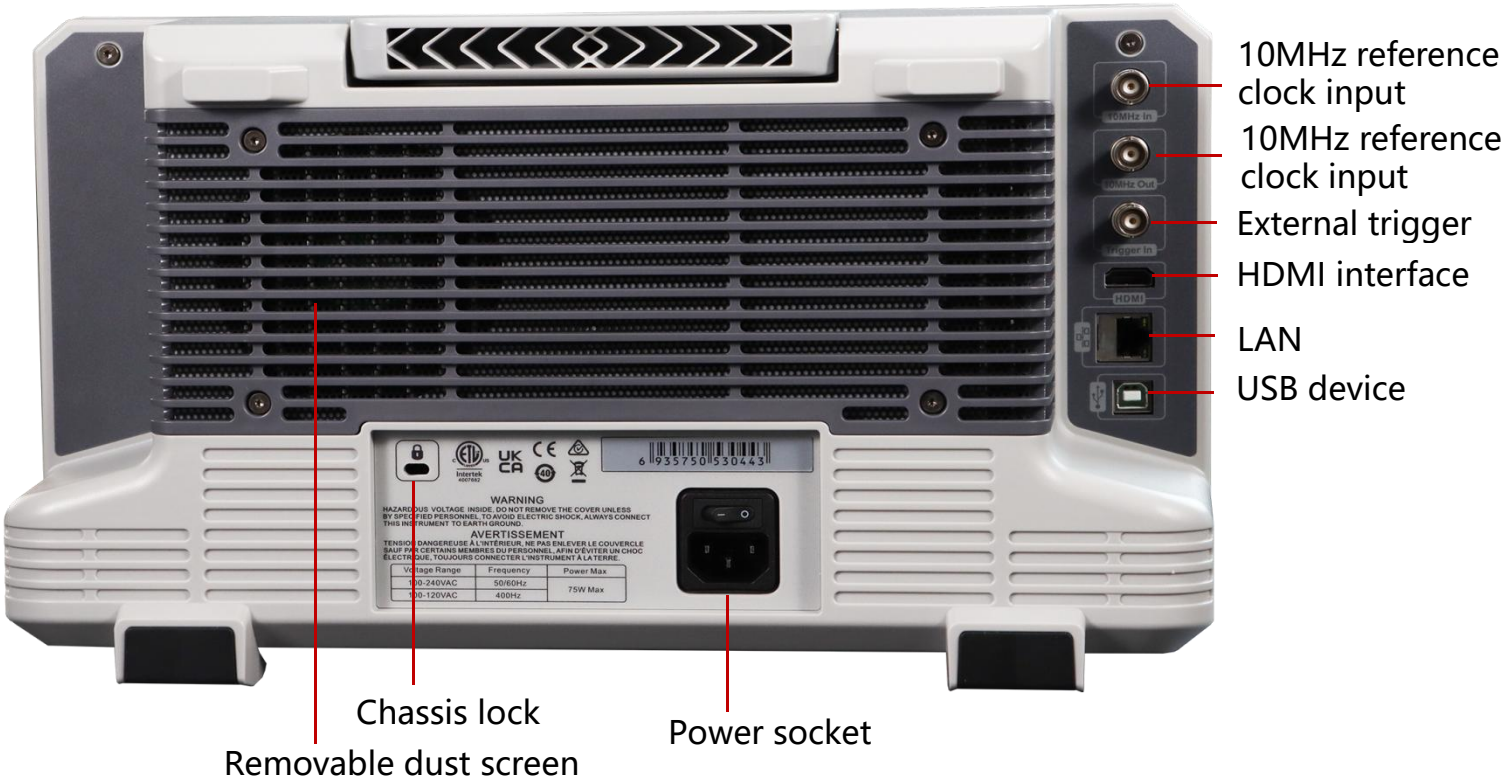
2024.06

Product Features

- Frequency measurement range:9 kHz~2.1 GHz,9 kHz~3.6 GHz,9 kHz~8.4 GHz
- Display average noise level can be as low as -161 dBm (typical value)
- Phase noise <-98 dBc/Hz (Offset 10 kHz, typical value)
- Full amplitude accuracy <0.7 dB
- Up to 40,001 scanning points
- Minimum resolution bandwidth (RBW) 1 Hz
- Advanced function one key measurement (optional)
- EMI Pre-compliance analysis function (optional)
- Support analog demodulation analysis (optional)
- Support tracking source output function (optional)
- 10.1-inch 1280 × 800 HD capacitive touch screen
- Provide USB/LAN interface, support SCPI protocol




10.1-inch touch screen
Advanced function keys
Measurement keys
Utility function keys
Power switch
USB host
Audio interface & Speaker
TG source
RF input
Data control keys

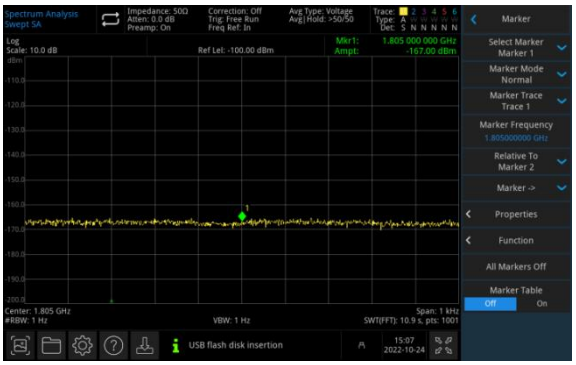

10MHz reference clock input
10MHz reference clock input
External trigger
HDMI interface
LAN
USB device
Chassis lock
Removable dust screen
Power socket

Multi touch HD screen for quick operation

10.1-inch multi-touch HD capacitive screen. Quick menu settings. Supports multiple gesture operations such as dragging, expanding, and zooming on the trace. Convenient human-computer interaction operation solves the problem of cumbersome and difficult operation to the greatest extent.

Excellent sensitivity to test weaker signals

The weak signal test is easily affected by the noise floor of the spectrum analyzer itself. UTS3000B series DANL as low as -161dBm, excellent sensitivity can effectively test weak signals.

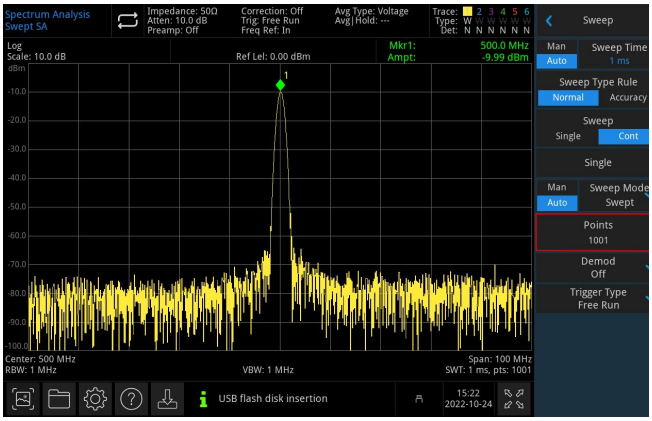


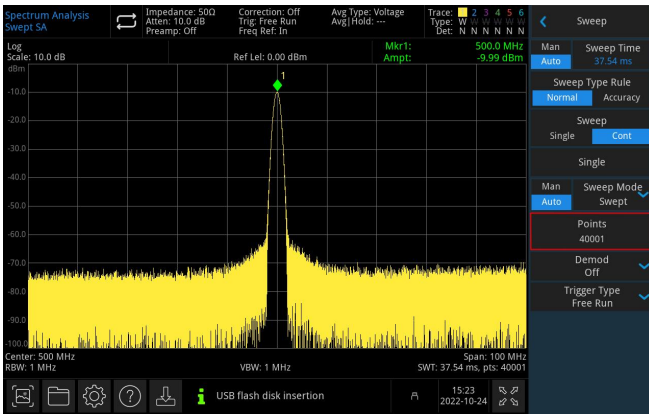
Removable dust mesh

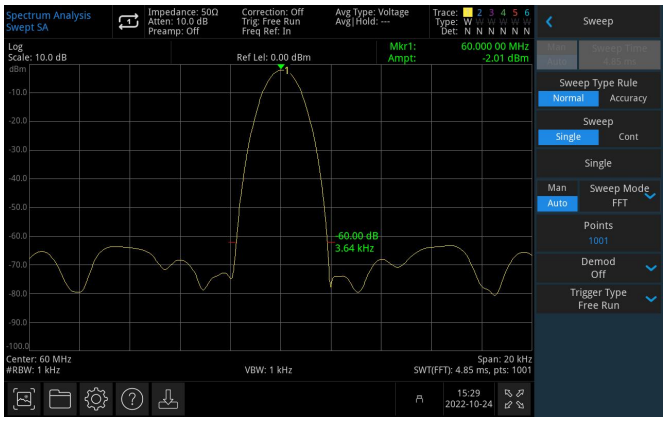
With a detachable dust filter, after the instrument is used for a period of time, the user can remove the dust from the air inlet. To ensure the reliability of the whole machine, it can avoid short-circuit, burn or fire caused by dust.

Scan 40,001 points

The UTS3000B series provides up to 40,001 sweep points, providing higher frequency resolution, making it easier to capture signals that are difficult to detect.





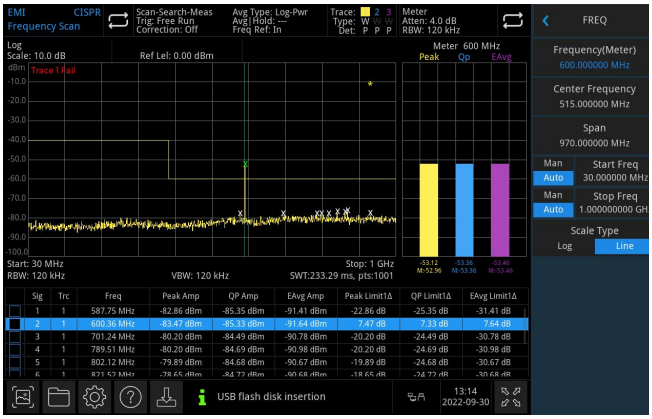


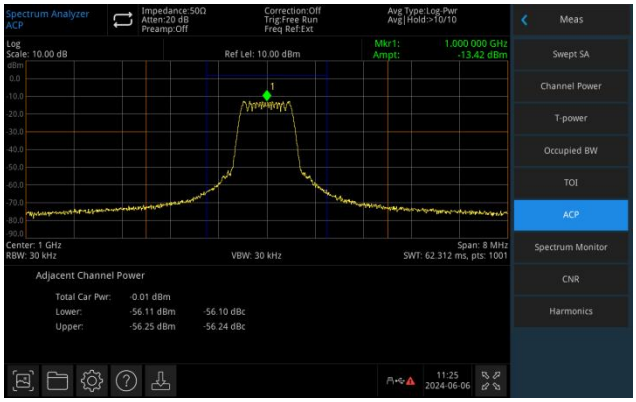
Excellent selectivity

It has stronger signal resolution capability of adjacent unequal amplitudes.

EMI pre-compliance (Optional)

UTS3000B series Optional components, together with near-field probes, help you find and improve EMI defects in advance. Thereby shortening the development cycle.



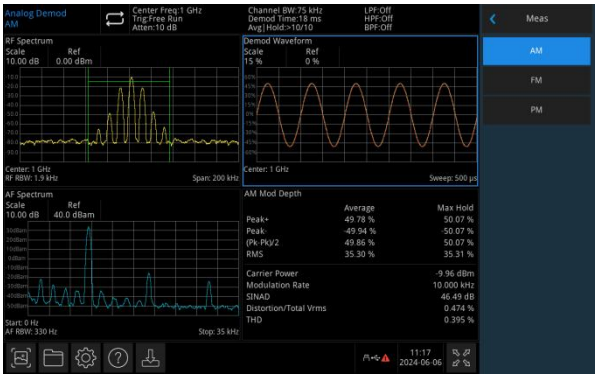


Advanced measurement (Optional) : Calculating ACPR(Adjacent Channel Power Ratio)

The advanced measurement mode provides the test items required by the transmitter test specification: Channel Power, T-power, Occupied BW, TOI, ACP, Spectrum Monitor, CNR, Harmonics.

Analog demodulation analysis (Optional)

Provides demodulation analysis of AM, FM, PM analog signals



Definitions and Conditions

"Specifications" describe the performance of the parameters covered by the product warranty in detail. Unless otherwise noted, these specifications apply to the temperature range of 20°C to 30°C.
"Typical" refers to additional product performance information that is not covered by the product warranty. When performance exceeds specifications, 80% of units can be demonstrated with a 95% confidence level over a temperature range of 20 °C to 30 °C. Typical performance does not include measurement uncertainty.
"Nominal Value" means expected performance, or describes product performance that is useful in product applications but not covered by the product warranty.

The analyzer can meet its specifications under the following conditions:
The instrument should in a calibration cycle and has warmed up for at least 30 minutes. If the analyzer is stored within the allowable storage temperature range but exceed the allowable operating temperature range, it must be placed within the allowable operating temperature range for at least two hours before starting the analyzer.

Product function and model comparison table

	UTS3021B	UTS3036B	UTS3084B	UTS3084T
Spectrum analysis	●	●	●	●
EMI	○	○	○	○
Analog demodulation	○	○	○	○
Advanced measurement	○	○	○	○
Tracking generator	○	○	×	●

Note: ● standard ○ option × Not Available

Frequency and Time Specifications

Frequency			
model	UTS3021B	UTS3036B	UTS3084B/T
frequency range	9 kHz to 2.1 GHz	9 kHz to 3.6 GHz	9 kHz to 8.4 GHz
resolution bandwidth	1 Hz		
10MHz internal frequency reference			
Frequency reference	10.000000 MHz		
Accuracy	±[(time since last adjustment x aging rate)+ temperature stability +calibration accuracy]		
Achievable initial calibration accuracy	<1 ppm		
Temperature stability	<1 ppm	5 to+45 ℃， Take 25 ℃ as reference	
Aging rate	0.5 ppm/ year, 3 ppm/20 years		
Frequency readout accuracy (start, stop, center, marker)			
Marker resolution	Span / (Sweep point - 1)		
Marker frequency uncertainty	± (marker frequency x frequency reference accuracy + 1 % x span + 10 % x RBW+marker resolution)		
Marker Mode	Normal,DeltaΔ,Fixed		
Marker function	Marker Noise, Band Power, Band Density, N dB, Counter		
Counter resolution	1 Hz		
Uncertainty of frequency counter	±[marker frequency x frequency reference accuracy+Counter resolution]		
Frequency span (FFT and swept mode)			
Sweep range	0Hz, 100 Hz to 2.1 GHz	0Hz, 100 Hz to 3.6 GHz	0Hz, 100 Hz to 8.4 GHz
Sweep accuracy	Swept	±[0.25%*Span+Span / (Points-1)]	
	FFT	±[0.10%*Span+Span / (Points-1)]	
Sweep time and triggering			
Sweep time	1 ms to 4,000 s(span ≠ 0) 1 μs to 4,000 s(span = 0)		
Sweep Type Rule	Accuracy, Normal		
Sweep Mode	Swept, FFT		
Sweep Rules	Single, Continuous		
Trigger Type	Free Run, External, Video		
External trigger input	TTL, Rising/Falling		
Resolution bandwidth (RBW)			
Range (-3dB bandwidth)	1 Hz to 3 MHz, 1-3-10 steps		
Selectivity (-60 dB/-3 dB)	<4.8: 1(nominal)	-60 dB: -3 dB	

Bandwidth accuracy (-3 dB)	< 5% (nominal)
Video bandwidth (VBW)	
Range	1 Hz to 3 MHz, 1-3-10 steps
Uncertainty of video bandwidth	< 5%

Amplitude Accuracy and Range

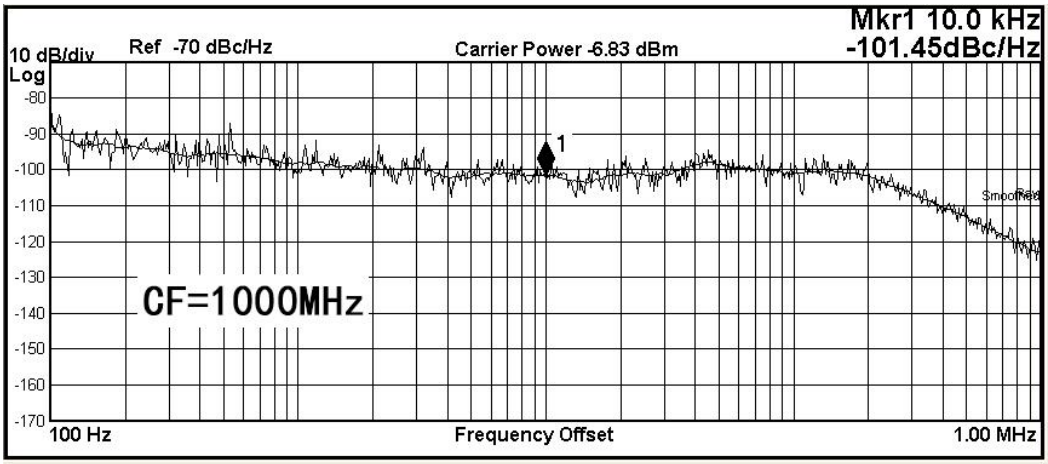
Amplitude range		
Range	10 MHz to maximum frequency	
Reference level	-100 dBm to+30 dBm, steps 1 dB	
Preamp	20 dB, Nominal, 9 kHz to 2.1 GHz (3.6 GHz, 8.4 GHz)	
Input attenuator range	0~51 dB, 1 dB Step	
Maximum safe input level		
DC volts	50 V DC	max
Maximum continuous wave RF power	≤+33 dBm	3 minutes, Input attenuation >20 dB
Display range		
Log scale	1 dB to 200 dB	
Linear scale	0 to Reference level	
Scale units	dBm, dBmV, dBμV, V, W	
Sweep (trace) point range	40,001	
Number of traces	6	
Detector	Sample, Peak, Negative, Normal, Average	
Trace Type	Clear/Write, Average, Max Hold, Min Hold	
Frequency response		
20℃ ~30℃， 30%~70% relative humidity， Input attenuation 20 dB， be relative to 50 MHz。		
Preamp Off	9 kHz to 3.6 GHz	±0.6 dB; ±0.3 dB, Typical
	3.6 GHz to 8.4 GHz	±0.8 dB; ±0.6 dB, Typical
Preamp On	100 kHz to 3.6 GHz	±1.0 dB; ±0.8 dB, Typical
	3.6 GHz to 8.4 GHz	±1.2 dB; ±1.0 dB, Typical
Error and precision		
Resolution bandwidth switching uncertainty	Relative to 10 kHz RBW logarithmic resolution ± 0.2 dB, linear resolution ± 0.01, Nominal	
Input attenuation switching uncertainty	20 ~ 30 ℃, fc=50 MHz, Preamp Off, Relative to 20 dB attenuation, Input attenuation 1~51 dB	
	±0.5 dB	

Absolute amplitude accuracy	20 ~ 30 ℃, fc=50 MHz, RBW=1 kHz, VBW=1 kHz, Peak detectors, Input attenuation 20 dB
	±0.4 dB, Input signal level -20 dBm, Preamp Off
	±0.5 dB, Input signal level -40 dBm, Preamp On
Total absolute amplitude accuracy	20 ~ 30 ℃, fc>100 kHz, Input signal level -50 dBm~0 dBm, RBW=1 kHz, VBW=1 kHz, Peak detectors, Input attenuation 20 dB, Preamp Off, 95% confidence
	±(0.4 dB+ Frequency response)
Input voltage standing wave ratio (VSWR)	<1.8 (Nominal)

Dynamic Range Specifications

1 dB gain compression			
	20~30 ℃, fc ≥ 50 MHz, Input attenuation 0 dB, Preamp off		
	>-5 dBm, Nominal		
Displayed average noise level (DANL)			
20 ~ 30 ℃, 0dB RF attenuation, RBW=1Hz, VBW=1Hz, sample detector, average > 50			
		UTS3036B/UTS3021B	UTS3084B/UTS3084T
Preamp off	100 kHz~500 kHz	-108dBm (Nominal)	-108 dBm (Nominal)
	500 kHz ~1 MHz	-120 dBm, -124 dBm (Typical)	-114 dBm, -118 dBm (Typical)
	1 MHz~10 MHz	-127 dBm, -130 dBm (Typical)	-124 dBm, -128 dBm (Typical)
	10 MHz~200 MHz	-142 dBm, -145 dBm (Typical)	-144 dBm, -148 dBm (Typical)
	200 MHz~1.5 GHz	-143 dBm, -146 dBm (Typical)	-143 dBm, -147 dBm (Typical)
	1.5 GHz~3.2 GHz	-140 dBm, -143 dBm (Typical)	-142 dBm, -144 dBm (Typical)
	3.2 GHz~4.5 GHz	-135 dBm, -140 dBm (Typical)	-139 dBm, -142 dBm (Typical)
	4.5 GHz~6.2 GHz	---	-134 dBm, -138 dBm (Typical)
	6.2 GHz~7.5 GHz	---	-138 dBm, -143 dBm (Typical)
	7.5 GHz~8.4 GHz	---	-139 dBm, -141 dBm (Typical)
Preamp on	100 kHz~500 kHz	-130 dBm (Nominal)	-130 dBm (Nominal)
	500 kHz ~1 MHz	-145 dBm, -150 dBm (Typical)	-135 dBm, -140 dBm (Typical)
	1 MHz~10 MHz	-155 dBm, -158 dBm (Typical)	-146 dBm, -152 dBm (Typical)
	10 MHz~200 MHz	-162 dBm, -164 dBm (Typical)	-162 dBm, -165 dBm (Typical))
	200 MHz~1.5 GHz	-161 dBm, -164 dBm (Typical)	-162 dBm, -164 dBm (Typical)
	1.5 GHz~3.2 GHz	-159 dBm, -161 dBm (Typical)	-160 dBm, -162 dBm (Typical)
	3.2 GHz~4.5 GHz	-155 dBm, -158 dBm (Typical)	-157 dBm, -160 dBm (Typical))
	4.5 GHz~6.2 GHz	---	-153 dBm, -156 dBm (Typical)

	6.2 GHz~7.5 GHz	---	-155 dBm, -157 dBm (Typical)
	7.5 GHz~8.4 GHz	---	-154 dBm, -156 dBm (Typical)
Spurious responses			
Second harmonic distortion (SHI)	20 ~ 30 ℃, Preamp off, Signal input-30 dBm, 0dB RF attenuation		
	fc≥50 MHz		-65 dBc/+35 dBm
Third-order intermodulation distortion (TOI)	20 ~ 30 ℃, Preamp off, Signal input-20 dBm, 0 dB RF attenuation, fc ≥ 50 MHz		
	+10 dBm; +13 dBm Nominal		
Input related spurious	20 ~ 30 ℃, Mixer level: -30 dBm		
	< -60 dBc		
Residual responses	20 ~ 30 ℃, Input port 50 Ω, RF attenuation 0 dB		
	< -90 dBm		
Phase noise			
20 ~ 30 ℃, fc=1 GHz, RBW=1 kHz, VBW=10 Hz, Sampling detection, Log avg, avg > 50			
Offset	UTS3036B/UTS3021B		UTS3084B/UTS3084T
10 kHz	-95 dBc/Hz, -98 dBc/Hz (Typical)		
100 kHz	-93 dBc/Hz, -98 dBc/Hz (Typical)		
1 MHz	-115 dBc/Hz, -116 dBc/Hz (Typical)		-110 dBc/Hz, -112 dBc/Hz (Typical)



Freq Offset	Trace1	Trace2	Trace3
100 Hz	-80.40 dBc/Hz	-84.70 dBc/Hz	---
1.00 kHz	-99.72 dBc/Hz	-97.88 dBc/Hz	---
10.0 kHz	-101.61 dBc/Hz	-101.45 dBc/Hz	---
100 kHz	-101.85 dBc/Hz	-100.88 dBc/Hz	---
1.00 MHz	-118.57 dBc/Hz	-122.65 dBc/Hz	---

Tracking Generator Specifications

Frequency			
Frequency range	10 MHz to 2.1 GHz	10 MHz to 3.6 GHz	100 kHz to 6 GHz
Counter resolution	10 Hz		
Output power level			
Range	-40 dBm to 0 dBm		
Resolution	0.5 dB		
Flatness output	be relative to 50 MHz		
	±3 dB		
Maximum safe reverse input level			
Average total power	30 dBm		
AC coupling	±50 V DC		

Analog Demodulation Analysis (Option)

Demodulation			
Frequency range	2 MHz to 2.1 GHz	2 MHz to 3.6 GHz	2 MHz to 8.4 GHz
Carrier power accuracy	±2 dB		
Input power	-30 dBm to +20 dBm		Automatic attenuation
Carrier power display resolution	0.01 dBm		
AM measurement			
Modulation rate	20 Hz to 100 kHz		
Accuracy	1 Hz (Nominal)		Modulation rate < 1 kHz
	< 0.1% Modulation rate (Nominal)		Modulation rate ≥ 1 kHz
Depth	5 to 95%		
Accuracy	±4% (Nominal)		
FM measurement			
Modulation rate	20 Hz to 100 kHz		
Accuracy	1 Hz (Nominal)		Modulation rate < 1 kHz
	< 0.1% Modulation rate (Nominal)		Modulation rate ≥ 1 kHz
Frequency offset	1 kHz to 400 kHz		
Accuracy	±4% (Nominal)		
PM measurement			
Modulation rate	20 Hz to 100 kHz		

Accuracy	1 Hz (Nominal)	Modulation rate < 1 kHz
	< 0.1% Modulation rate (Nominal)	Modulation rate ≥ 1 kHz
Phase deviation	0.2 to 6.28 rad	
Accuracy	±4% (Nominal)	

EMI (Option)

EMI Resolution bandwidth	
Resolution bandwidth (-6dB)	200 Hz, 9 kHz, 120 kHz, 1 MHz
Resolution bandwidth accuracy	<5%, (Nominal)
EMI detector	
EMI detector	Peak, Negative Peak, Quasi Peak, EMI Average, Average
EMI Main function	
Main function	EMI Standard:CISPR
	View: Scan table, Meter, Signal table
	Meter control
	Avg settings
	Limit: AS-NZS, BellCore, DEF-STAN, DO-160, EN, FCC, GB9254, MIL-461, VCCI and Custom
	Signal table settings
	Scan table settings
	Scan Sequence: Scan, Search, Scan-Search-Meas, Scan-Search, Search-Meas, Measure
	Sig Detector
	Output report

Advanced measurement kit

Power Measurement	
Channel Power	Channel power, Power spectral density
Adjacent Channel Power (ACP)	Main CH Power, Left channel power, Right channel power
Occupied Bandwidth	Occupied Bandwidth, Transmit Frequency Error
Time Domain Power	Zero Span Integrated Power
Carrier Noise Ratio(CNR)	C/N, Noise Power

Non-Linear Measurement	
Third-Order Intercept(TOI)	Measure the third-order products from two tones
Harmonic Measurement	Max Harmonic number 10
Spectrum Monitor Measurement	
Spectrogram	

Interface and display

Common interface	
RF Input	Type-N female, 50 Ω, nominal
Front panel trace source output	Type-N female, 50 Ω, nominal
10MHz Ext Ref In	10 MHz, >0 dBm, BNC female, 50 Ω, nominal
10 MHz out	10 MHz, -5 dBm~+10 dBm,BNC female, 50 Ω, nominal
External trigger input	TTL , BNC female
HDMI display	HDMI 1.4 Display interface
USB-Host	USB-A
USB-Device	USB-B
LAN	LAN(VXI11), 10/100/1,000 Base, RJ-45
Headphone Jack	3.5 mm (1/8 inch) miniature stereo audio jack
Display screen	
Display Type	10.1-inch capacitive multi-touch panel
Display resolution	1280×800, RGB Vertical pixel

General technical specifications

Specifications		
Supply voltage	100 to 240 VAC (Fluctuations±10%)	100 to 120 VAC (Fluctuations±10%)
Frequency	50/60 Hz	400 Hz
Environment		
Temperature range	operation: 0℃ ~ +40 ℃	
	Non operational: -20 ℃ ~ +70 ℃	
Cooling method	Fan forced cooling	
Humidity range	operation: Below +35 ℃ ≤90%relative humidity; Non operational: +35 ℃ ~ +40 ℃ ≤60%relative humidity	
Altitude	operation: Below 3,000 m; Non operational: Below 15,000 m	

Mechanical specifications		
Dimensions	378mm×218mm×120mm (Width x Height x Length)	
Net weight	4.55 kg	
Calibration cycle	The recommended calibration cycle is one year	
Regulatory standards		
EMC	Compliance with EMC directives(2014/30/EU), Conform to or better than IEC 61326-1:2021/EN61326-1:2021, IEC 61326-2-1:2021/EN61326-2-1:2021	
Conductive disturbance	CISPR 11/EN 55011	CLASS B group 1, 150kHz-30MHz
Radiation disturbance	CISPR 11/EN 55011	CLASS B group 1, 30MHz-1GHz
(ESD)Electrostatic discharge (ESD)	IEC 61000-4-2/EN 61000-4-2	4.0 kV (Contact), 8.0 kV (air)
Radio frequency electromagnetic field immunity	IEC 61000-4-3/EN 61000-4-3	0 V/m (80 MHz to 1 GHz); 3 V/m (1.4 GHz to 2 GHz); 1 V/m (2.0 GHz to 2.7GHz)
(EFT)Electrical fast transient burst (EFT)	IEC 61000-4-4/EN 61000-4-4	2 kV (AC input port)
Surge	IEC 61000-4-5/EN 61000-4-5	1 kV (Live line to zero line) 2 kV (Fire/zero line to ground)
Immunity to RF continuous conduction	IEC 61000-4-6/EN 61000-4-6	3 V, 0.15-80 MHz
Voltage dips and short interruptions	IEC 61000-4-11/EN 61000-4-11	Voltage dip: 0% UT during 1 cycle; 40% UT during 10/12 cycles; 70% UT during 25/30 cycles Short Interruption: 0% UT during 250/300 cycles
Safety regulations		
	EN 61010-1:2010+A1:2019 EN IEC61010-2-030:2021+A11:2021 BS EN61010-1:2010+A1:2019 BS EN IEC61010-2-030:2021+A11:2021 UL 61010-1:2012 Ed.3+ R:19 Jul2019 UL 61010-2-030:2018 Ed.2 CSA C22.2#61010-1:2012 Ed.3+U1; U2; A1 CSA C22.2#61010-2-030:2018 Ed.2	

Ordering information

	Description	Ordering No.
Models	Spectrum analyzer, 9 kHz to 2.1 GHz	UTS3021B
	Spectrum analyzer, 9 kHz to 3.6 GHz	UTS3036B
	Spectrum analyzer, 9 kHz to 8.4 GHz	UTS3084B
	Spectrum analyzer, 9 kHz to 8.4 GHz with built-in Tracking generator	UTS3084T
Standard accessories	Power cord ×1	
	USB cable x1	UT-D14
Recommended options & accessories		
Options	Advanced measurement kit	UTS3000-AMK
	EMI measurement option	UTS3000-EMI
	Analog demodulation analysis option	UTS3000-AMA
	Tracking generator options	UTS3021B-TG
		UTS3036B-TG
UT-CK01 accessories kit	SMAJ-NJ-0.7M DC-6G Cable x1	UT-W02-6GHz
	NJ-NJ-0.7M DC-6G Cable x1	UT-W01-6GHz
	Adapter SMA-N-KJ-T DC-6GHz x2	UT-C01-6GHz
	Adapter N-BNC-JK DC-4GHz x2	UT-C02-6GHz
	Antenna 2400MHz-2500MHz x2	UTS-T01
	Antenna 824-960MHz/1710-1990MHz x2	UTS-T02
UTS-EMI01 Near-field probes kit	50Ω-SMA-SMB Cable x1	UT-W03
	Adapter SMA-N-KJ-T DC-6 GHz x1	UT-C01
	Near field probe, frequency range 30 MHz-3 GHz, Detection range 10 cm x1	NFP-3G-P1
	Near field probe, frequency range30MHz-3GHz, Detection range 3 cm x1	NFP-3G-P2
	Near field probe, frequency range30MHz-2GHz, resolving power 5 mm x1	NFP-2G-P3
	Near field probe, frequency range30MHz-3GHz, resolving power 2 mm x1	NFP-3G-P4

Options ordering and installation

1. **Purchase options:** Based on your requirements, please purchase the specified function options from Uni-t Sales Personnel and provide the serial number of the instrument that needs the option installed.
2. **Receive certificate:** You will receive the license certificate based on the address provided in the order.
3. **Register and obtain license:** Visit the Uni-t official website license activation session for registration. Use the license key and instrument serial number provided in the certificate to obtain the option license code and license file.
4. **Install the option:** Download the option license file to the root directory of a USB storage device, and connect the USB storage device to the instrument. Once the USB storage device is recognized, the Option Install menu will be activated. Press this menu key to begin installing the option.

Limited Warranty and Liability

Uni-T guarantees that the Instrument product is free from any defect in material and workmanship within three years from the purchase date. This warranty does not apply to damages caused by accident, negligence, misuse, modification, contamination or improper handling. If you need warranty service within the warranty period, please contact your seller directly. Uni-T will not be responsible for any special, indirect, incidental or subsequent damage or loss caused by using this device. For the probes and accessories, the warranty period is one year. Visit instrument.uni-trend.com for full warranty information.

Learn more at: www.uni-trend.com

Register your product to confirm your ownership. You will also get product notifications, update alerts, exclusive offers and all the latest information you need to know.

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