

# Data Sheet

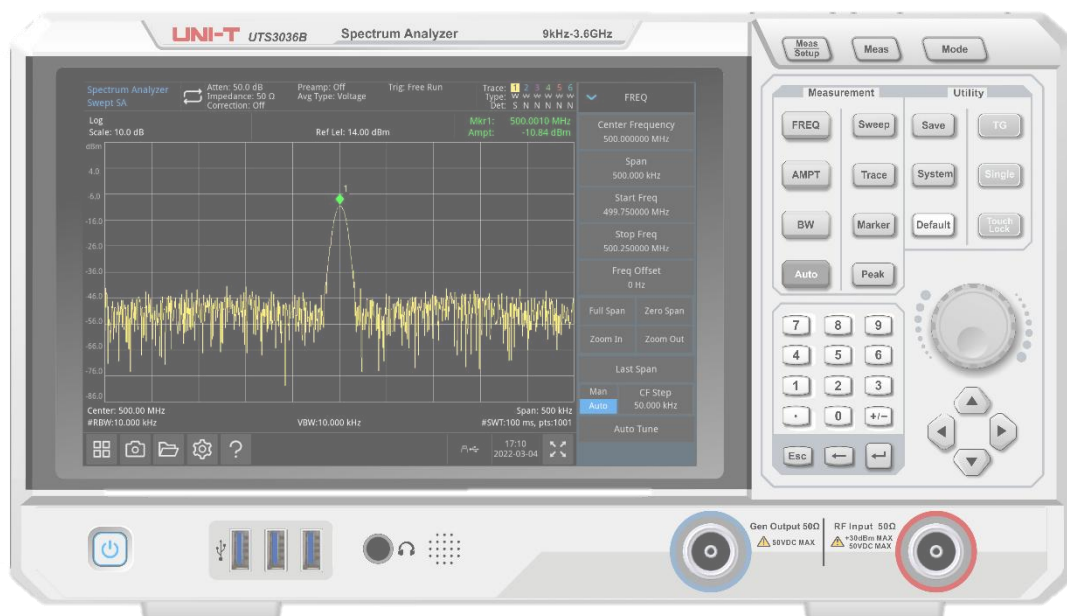
## UTS3000B Series Spectrum Analyzer

REV 05

2024.02

## 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 40001 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)
- Vector Signal Analysis (optional)
- Support tracking source output function (optional)
- 10.1 inch 1280 × 800 HD capacitive touch screen
- Provide USB/LAN interface, support SCPI protocol

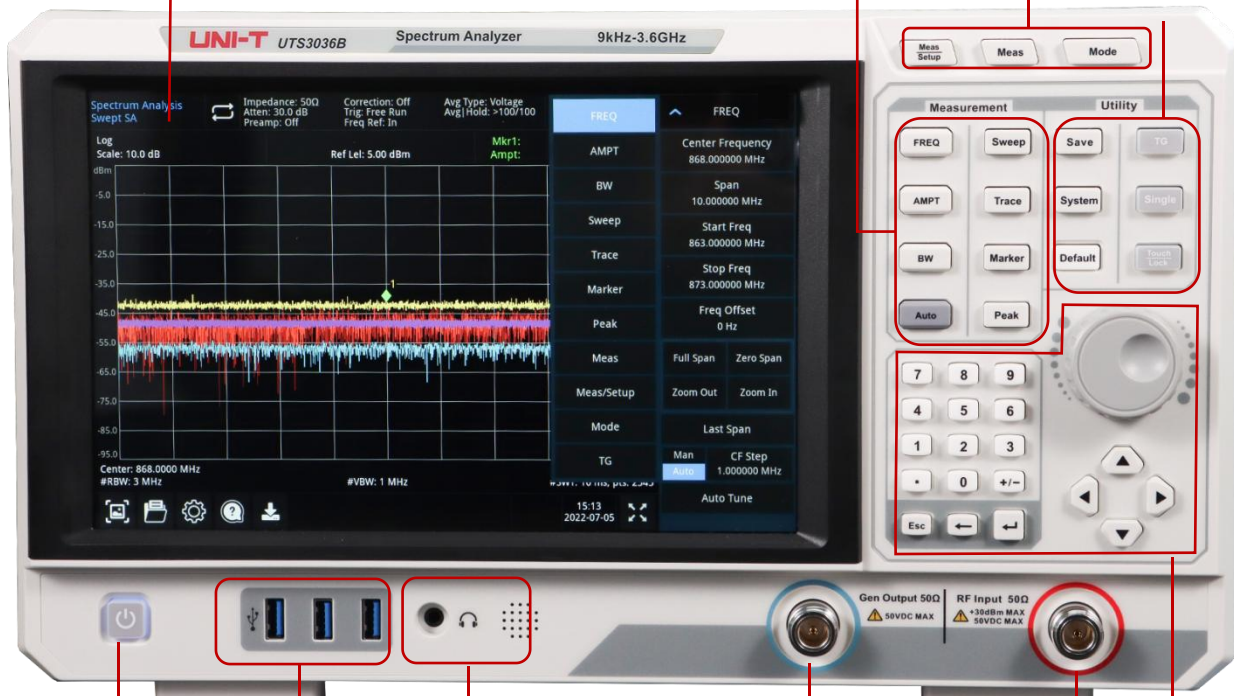


10.1 inch touch screen

Advanced function keys

Measurement keys

Function keys Utility



Power switch

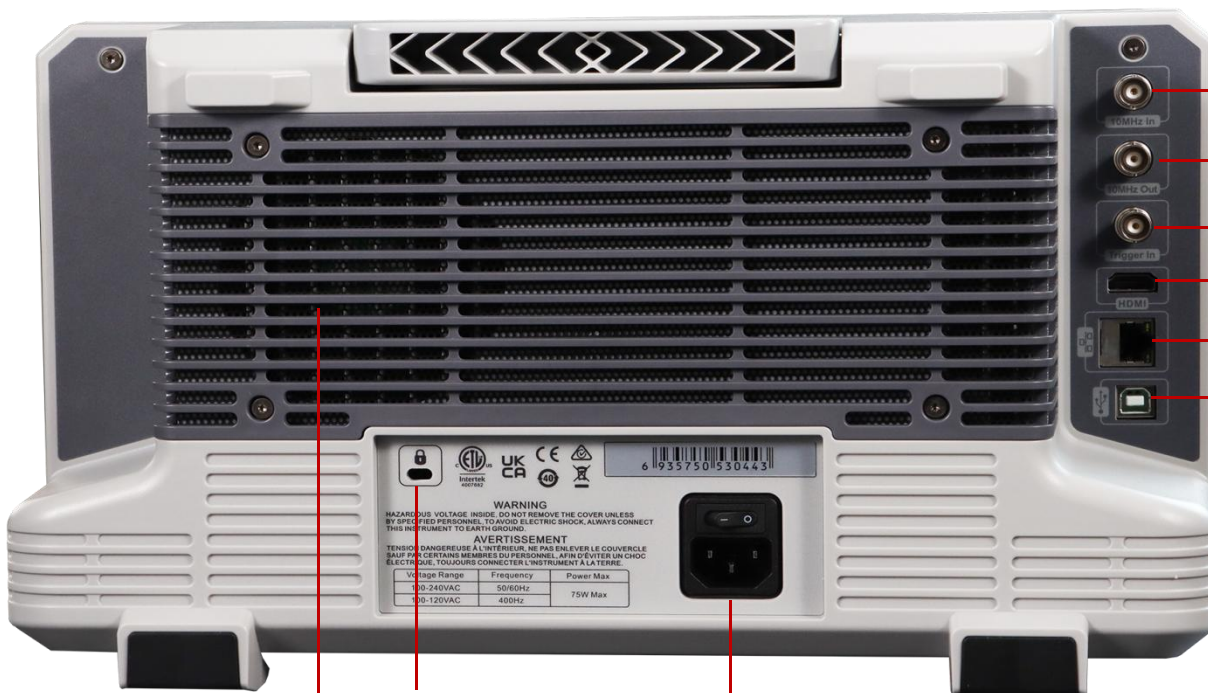
USB host

Audio interface & Speaker

TG source

RF input

Data control keys



10MHz reference clock input

10MHz reference clock output

External trigger

HDMI interface

LAN

USB device

Chassis lock

Power socket

Removable dust screen

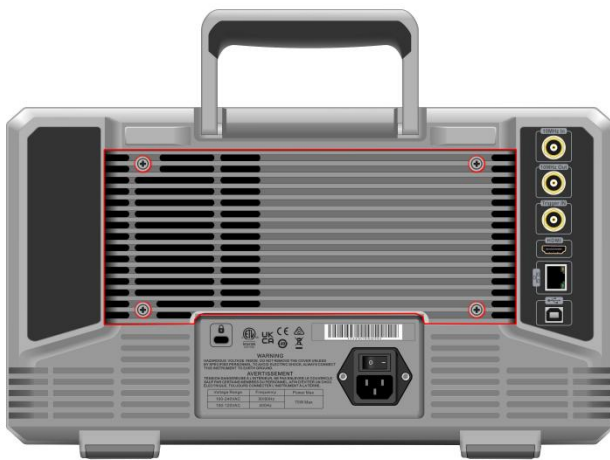
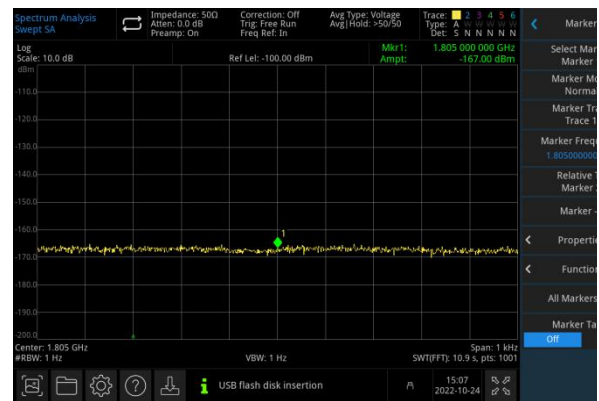


## Multi touch HD screen for quick operation

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  $-161\text{dBm}$ , excellent sensitivity can effectively test weak signals.



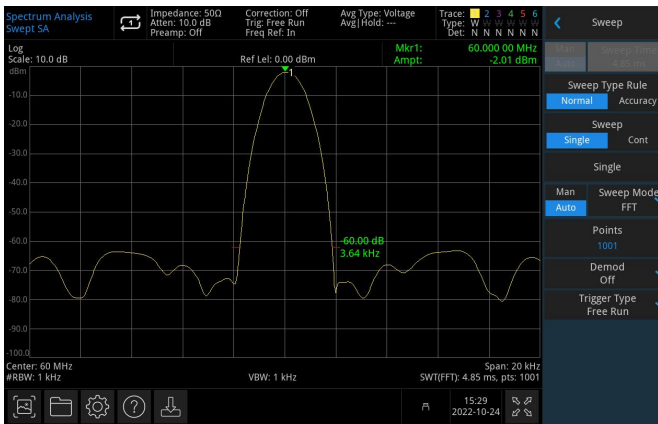
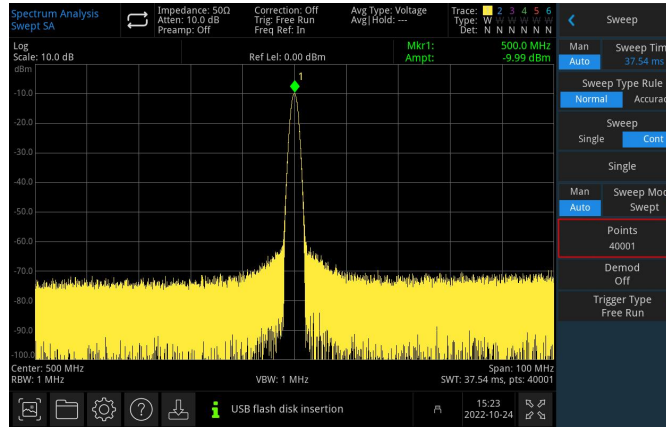
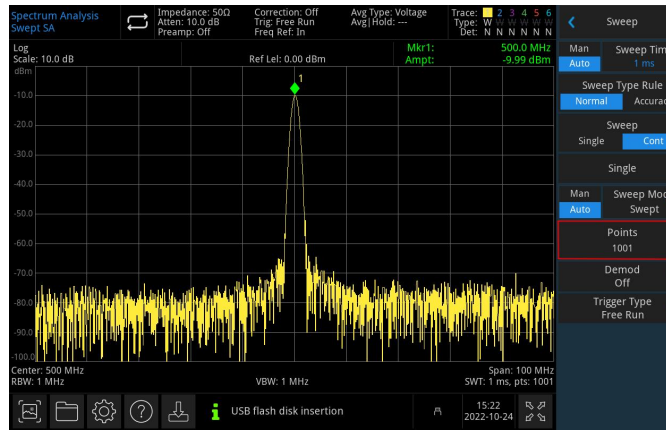
## Removable dust mesh

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 40001 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.

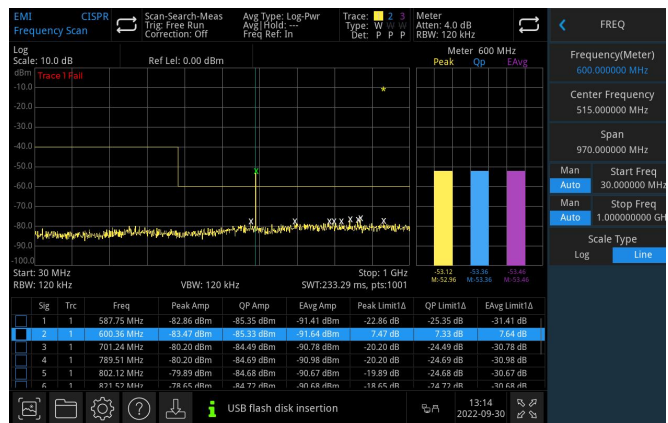


## Excellent selectivity

It has stronger signal resolution capability of adjacent unequal amplitudes.

## EMI pre-compliance

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



## 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	●	●	●	●
Vector Signal Analysis	○	○	○	○
EMI	○	○	○	○
Analog demodulation	○	○	○	○
Advanced measurement	○	○	○	○
Tracking generator	○	○		●

Note: ● standard ○ option

## 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	$\pm[(\text{time since last adjustment} \times \text{aging rate}) + \text{temperature stability} + \text{calibration accuracy}]$		
Achievable initial calibration accuracy	<1 ppm		
Temperature stability	<1 ppm	5 to +45 °C, Take 25 °C 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	$\pm(\text{marker frequency} \times \text{frequency reference accuracy} + 1\% \times \text{span} + 10\% \times \text{RBW} + \text{marker resolution})$		
Marker Mode	Normal, Delta $\Delta$ , Fixed		
Marker function	Marker Noise, Band Power, Band Density, N dB, Counter		
Counter resolution	1 Hz		
Uncertainty of frequency counter	$\pm[\text{marker frequency} \times \text{frequency reference accuracy} + \text{Counter resolution}]$		
Frequency span (FFT and swept mode)			
Sweep range	0Hz, 100Hz to 2.1GHz	0Hz, 100Hz to 3.6GHz	0Hz, 100Hz to 8.4GHz
Sweep accuracy	Swept	$\pm[0.25\% \times \text{Span} + \text{Span} / (\text{Points}-1)]$	
	FFT	$\pm[0.10\% \times \text{Span} + \text{Span} / (\text{Points}-1)]$	
Sweep time and triggering			
Sweep time	1 ms to 4000 s (span $\neq$ 0)		
	1 $\mu$ s to 4000 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 (-3dB)	< 5% (nominal)	
<b>Video bandwidth (VBW)</b>		
Range	1 Hz to 3 MHz, 1-3-10 steps	
Uncertainty of video bandwidth	< 5%	

## Amplitude Accuracy and Range

<b>Amplitude range</b>		
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	
<b>Maximum safe input level</b>		
DC volts	50 V DC	max
Maximum continuous wave RF power	≤+33 dBm	3 minutes, Input attenuation >20 dB
<b>Display range</b>		
Log scale	1 dB to 200 dB	
Linear scale	0 to Reference level	
Scale units	dBm, dBmV, dBμV, V, W	
Sweep (trace) point range	40001	
Number of traces	6	
Detector	Sample, Peak, Negative, Normal, Average	
Trace Type	Clear/Write, Average, Max Hold, Min Hold	
<b>Frequency response</b>		
20 °C ~30 °C, 30%~70% relative humidity, Input attenuation 20 dB, be relative to 50MHz.		
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
<b>Error and precision</b>		
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 °C, fc=50 MHz, Preamp Off, Relative to 20 dB attenuation, Input attenuation 1~51 dB	



	±0.5 dB
Absolute amplitude accuracy	20 ~ 30 °C, $f_c=50$ MHz, RBW=1 kHz, VBW=1 kHz, Peak detectors, Input attenuation 20 dB ±0.4 dB, Input signal level -20 dBm, Preamp Off
Total absolute amplitude accuracy	±0.5 dB, Input signal level -40 dBm, Preamp On 20 ~ 30 °C, $f_c>100$ 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 °C,  $f_c \geq 50$  MHz, Input attenuation 0 dB, Preamp off  
>-5 dBm, Nominal

### Displayed average noise level (DANL)

20 ~ 30 °C, 0dB RF attenuation, RBW=1Hz, VBW=1Hz, sample detector, average > 50

	UTS3036B/UTS3021B	UTS3084B/UTS3084T	
Preamp off	100 kHz~500 kHz	-108dBm (Nominal)	-108dBm (Nominal)
	500 kHz ~1 MHz	-120dBm, -124dBm (Typical)	-114dBm, -118dBm (Typical)
	1 MHz~10 MHz	-127dBm, -130dBm (Typical)	-124dBm, -128dBm (Typical)
	10 MHz~200 MHz	-142dBm, -145dBm (Typical)	-144dBm, -148dBm (Typical)
	200 MHz~1.5 GHz	-143dBm, -146dBm (Typical)	-143dBm, -147dBm (Typical)
	1.5 GHz~3.2 GHz	-140dBm, -143dBm (Typical)	-142dBm, -144dBm (Typical)
	3.2 GHz~4.5 GHz	-135dBm, -140dBm (Typical)	-139dBm, -142dBm (Typical)
	4.5 GHz~6.2 GHz	---	-134dBm, -138dBm (Typical)
	6.2 GHz~7.5 GHz	---	-138dBm, -143dBm (Typical)
	7.5 GHz~8.4 GHz	---	-139dBm, -141dBm (Typical)
Preamp on	100 kHz~500 kHz	-130dBm (Nominal)	-130dBm (Nominal)
	500 kHz ~1 MHz	-145dBm, -150dBm (Typical)	-135dBm, -140dBm (Typical)
	1 MHz~10 MHz	-155dBm, -158dBm (Typical)	-146dBm, -152dBm (Typical)
	10 MHz~200 MHz	-162dBm, -164dBm (Typical)	-162dBm, -165dBm (Typical)
	200 MHz~1.5 GHz	-161dBm, -164dBm (Typical)	-162dBm, -164dBm (Typical)
	1.5 GHz~3.2 GHz	-159dBm, -161dBm (Typical)	-160dBm, -162dBm (Typical)
	3.2 GHz~4.5 GHz	-155dBm, -158dBm (Typical)	-157dBm, -160dBm (Typical)

4.5 GHz~6.2 GHz	---	-153dBm, -156dBm (Typical)
6.2 GHz~7.5 GHz	---	-155dBm, -157dBm (Typical)
7.5 GHz~8.4 GHz	---	-154dBm, -156dBm (Typical)

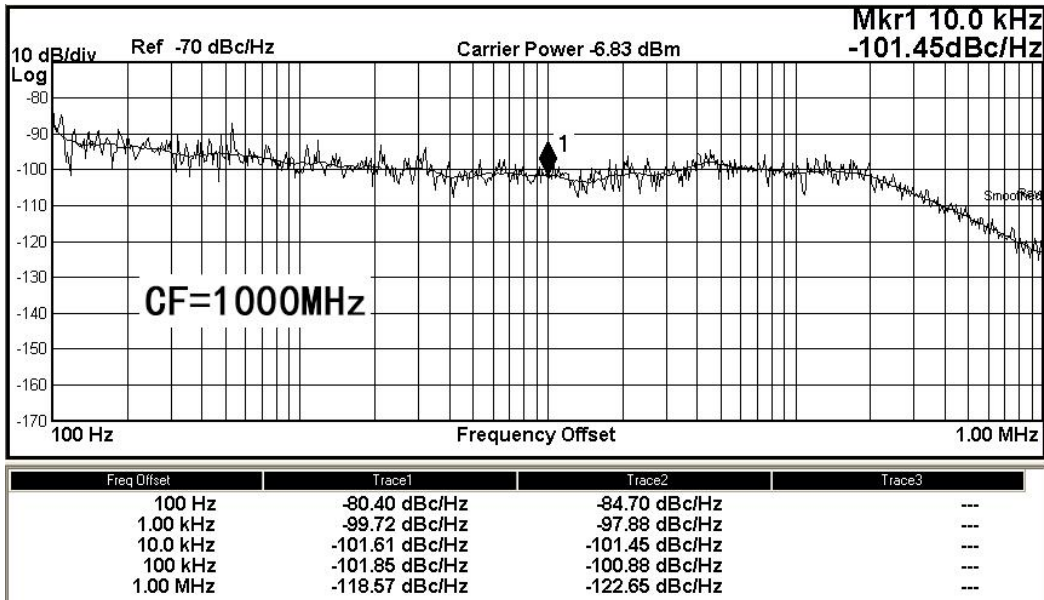
**Spurious responses**

Second harmonic distortion(SH1)	20 ~ 30 °C, Preamp off, Signal input-30dBm, 0dB RF attenuation	
	fc>50MHz	-65dBc/+35dBm
Third-order intermodulation distortion(TOI)	20 ~ 30 °C, Preamp off, Signal input-20 dBm, 0 dB RF attenuation, fc ≥ 50 MHz	
	+10 dBm; +13 dBm Nominal	
Input related spurious	20 ~ 30 °C, Mixer level: -30 dBm	
	< -60 dBc	
Residual responses	20 ~ 30 °C, Input port 50 Ω, RF attenuation 0 dB	
	< -90dBm	

**Phase noise**

20 ~ 30 °C, fc=1 GHz, RBW=1 kHz, VBW=10 Hz, Sampling detection, Log avg, avg > 50

Offset	UTS3036B/UTS3021B	UTS3084B/UTS3084T
10 kHz	-95dBc/Hz, -98dBc/Hz(Typical)	
100 kHz	-93dBc/Hz, -98dBc/Hz(Typical)	
1 MHz	-115dBc/Hz, -116dBc/Hz(Typical)	-110dBc/Hz, -112dBc/Hz(Typical)



## TG 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	
depth	5 to 95%		
accuracy	±4% (Nominal)		
FM measurement			
Modulation rate	20 Hz to 100 kHz		
accuracy	1 Hz (Nominal)	Modulation rate < 1 kHz	
frequency offset	1 kHz to 400 kHz		
accuracy	±4% (Nominal)		

## Vector Signal Analysis (Option)

Measurement Function	
Modulation type	ASK (2 ASK)
	FSK: 2 FSK, 4 FSK, 8 FSK, 16 FSK
	MSK (GMSK)
	PSK: BPSK, QPSK, OQPSK, 8PSK
	DPSK: DBPSK, DQPSK, D8PSK, $\pi/4$ - DQPSK, $\pi/8$ - D8PSK
	QAM: 16, 32, 64, 128, 256
Length of measure symbol	16 to 4096
Number of sign points/oversampling rate	4, 6, 8, 10, 12, 14, 16
Symbol rate	1 ksps to 2.5 Msps, Number of symbol points * symbol rate $\leq$ 10 Msps
Holdoff	500 ms
Wave Filter	
Filter type	Rising cosine/Nyquist, root rising cosine/root Nyquist, Gaussian, half sine, rectangular
Filter length	2 to 128
Alpha/BT	Alpha 0.01 to 1, BT 0.01 to 10
Display	
Data	IQ measurement time domain, IQ measurement frequency domain
	IQ reference time domain
	Symbol error statistical table, error vector time domain, error vector frequency domain
	Time domain, frequency domain, IQ amplitude error, IQ phase error
Window layout	1, 2, 3, 4
Format	Logarithmic amplitude, Linear amplitude, Real part, Imaginary part
	IQ diagram, Constellation diagram, I-eye diagram, Q-eye diagram Phase diagram, Phase unwrapping diagram, Phase Tree
Statistical Table of Symbol Error	
PSK/DPSK/MSK/QAM	EVM (rms EVM, peak EVM), Magnitude error
	Phase error, IQ offset, Carrier offset, SNR Quadrature error Gain imbalance ( not support for MSK )
ASK	ASK Error, ASK depth, Carrier offset
FSK	FSK Error, Magnitude error, FSK deviation, Carrier offset

## 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

## Interface and display

Common interface	
RF Input	Type-N female, 50 $\Omega$ , nominal
Front panel trace source output	Type-N female, 50 $\Omega$ , nominal
10MHz Ext Ref In	10 MHz, >0 dBm, 50 $\Omega$ , BNC female, 50 $\Omega$ , nominal
10 MHz out	10 MHz, -5 dBm~+10 dBm, 50 $\Omega$ , BNC female, 50 $\Omega$ , 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), 10/100/1000 Base, RJ-45
Display screen	

Display Type	10.1 inch capacitive multi-touch panel
Display resolution	1280×800, RGB Vertical pixel

## Advanced measurement kit

Power Measurement	
Channel power	Channel power, Power spectral density
ACP, Adjacent channel power	Main CH Power, Left channel power, Right channel power
Occupied Bandwidth	Occupied Bandwidth, Transmit Frequency Error
Time Domain Power	Zero Span Integrated Power
CNR, Carrier Noise Ratio	C/N, Noise Power
Non-Linear Measurement	
TOI, Third-Order Intercept	Measure the third-order products from two tones
Harmonic measurement	Max Harmonic number 10
Spectrum Monitor Measurement	
Spectrogram	

## 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 °C ~ +40 °C	
	Non operational: -20 °C ~ +70 °C	
Cooling method	Fan forced cooling	
Humidity range	operation: Below +35 °C ≤90% relative humidity;	
	Non operational: +35 °C ~ +40 °C ≤60% relative humidity	
Altitude	operation: Below 3000 m; Non operational: Below 15000 m	
Mechanical specifications		
Dimensions	378mm×218mm×120mm (Width x Height x Length)	
Net weight	4.55 kg	
Calibration cycle	The recommended calibration circle 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 x1		
	USB cable x1	UT-D14	
<b>Recommended options &amp; accessories</b>			
Options	Advanced measurement kit	UTS3000-AMK	
	EMI measurement option	UTS3000-EMI	
	Analog demodulation analysis option	UTS3000-AMA	
	Vector signal analysis option	UTS3000-VSA	
	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 range 30MHz-3GHz, Detection range 3 cm x1	NFP-3G-P2	
	Near field probe, frequency range 30MHz-2GHz, resolving power 5 mm x1	NFP-2G-P3	
	Near field probe, frequency range 30MHz-3GHz, resolving power 2 mm x1	NFP-3G-P4	

## Warranty Service

UNI-T Technical Support Hotline: 400-876-7822

If the spectrum analyzer is under warranty or is covered by a maintenance contract, it will be repaired under the terms of warranty as below. If the analyzer is no longer under warranty, UNI-T will notify you of the cost of repair after examining the analyzer.

UNI-T UTS3000B series spectrum analyzers provide 3- years warranty for mainframes and 1-year warranty for accessories as standard.

The above warranty applies to all UNI-TREND test measurement instrument products procured through the UNI-TREND authorized distributors. Product purchased from outside the UNI-TREND instruments network will be serviced by the selling agents and not UNI-TREND TECHNOLOGY. Please Go to UNI-T official website ->instruments->support->Where to buy to find the authorized test and measurement instrument distributors.

Learn more at: [www.uni-trend.com](http://www.uni-trend.com)

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