WT-328E

无线连接测试仪器

Wireless Connectivity Tester

Technical Specifications

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General Technical Specifications

Analyzer			
Parameter	**Ports**	**Value**	
Input frequency range	RF A1 to B4	400 MHz to 7300 MHz	
IF bandwidth	RF A1 to B4	180 MHz	
Input power range	RF A1 to B4	+30 dBm peak (+25 dBm average)	
Input power accuracy	RF A1 to B4	Specification:	± 0.5 dB (+25 dBm to -40 dBm)
		Typical:	± 0.3 dB (+25 dBm to -40 dBm)
Input return loss	RF A1 to B4	> 13 dB	
Spurious (signal applied)	RF A1 to B4	< -70 dBc (CW, for signal levels greater than -10 dBm)	
Spectral flatness	RF A1 to B4	Specification:	⩽ ± 0.75 dB (± 80 MHz)
		Typical:	± 0.5 dB (± 80 MHz)
Inherent spurious floor (no signal)	RF A1 to B4	⩽ -95 dBm（100 KHz RBW）	
Quantization		14 bits	
Noise figure		⩽ 26 dB at minimum input attenuation	
Integrated phase noise		⩽ 0.3 degrees (100 Hz to 1 MHz) 0.2 degrees (100 Hz to 1 MHz) typical	
Signal to noise ratio		⩾ 55 dB 100 KHz RBW	
Sampling data rate		30, 60, 120, 240 MHz	
Waveform capture duration		at 30 MHz sampling data rate	160 ms
		at 60 MHz sampling data rate	80 ms
		at 120 MHz sampling data rate	40 ms
		at 240 MHz sampling data rate	20 ms
RF Generator			
Parameter	**Ports**	**Value**	
Output frequency range	RF A1 to B4	400 MHz to 7300 MHz	
IF bandwidth	RF A1 to B4	180 MHz	
Output power range (CW)	RF A1 to B4	+5 dBm to -100 dBm(400 MHz to 6500MHz) 0 dBm to -100 dBm(6500 MHz to 7300MHz)	
Output power accuracy	RF A1 to B4	Specification:	± 0.75 dB (+5 dBm to -90 dBm，400 MHz to 6500MHz) ± 1.50 dB (-90 dBm to -100 dBm，400 MHz to 6500MHz) ± 0.75 dB (0 dBm to -90 dBm，6500 MHz to 7300MHz) ± 1.50 dB (-90 dBm to -100 dBm，6500 MHz to 7300MHz)
		Typical:	± 0.5 dB (+5 dBm to -90 dBm，400 MHz to 6500MHz) ± 1.0 dB (-90 dBm to -100 dBm，400 MHz to 6500MHz) ± 0.5 dB (0 dBm to -90 dBm，6500 MHz to 7300MHz) ± 1.0 dB (-90 dBm to -100 dBm，6500 MHz to 7300MHz)
Output return loss	RF A1 to B4	>13 dB	
Spurious (in channel)	RF A1 to B4	Specification:	⩽ -40 dBc (160 MHz, >-55 dBm) (CW)
		Typical:	⩽ -50 dBc (160 MHz, >-55 dBm) (CW)
Spectral flatness	RF A1 to B4	Specification:	⩽ ± 0.75 dB (± 80 MHz)
		Typical:	± 0.5 dB (± 80 MHz)
Quantization		16 bits	
Integrated phase noise		⩽ 0.3 degrees (100 Hz to 1 MHz) 0.2 degrees (100 Hz to 1 MHz) typical	
Signal to noise ratio		Specification:	⩾ 60 dB (100 KHz RBW), power level -10 dBm
		Typical:	⩾ 70 dB (100 KHz RBW), power level -10 dBm
Carrier leakage		⩽ -40 dBc	
Gap power		⩽ -90 dBm/100 KHz	
Sampling data rate		30, 60, 120, 240 MHz	
Waveform playback duration		at 30 MHz sampling data rate	160 ms
		at 60 MHz sampling data rate	80 ms
		at 120 MHz sampling data rate	40 ms
		at 240 MHz sampling data rate	20 ms

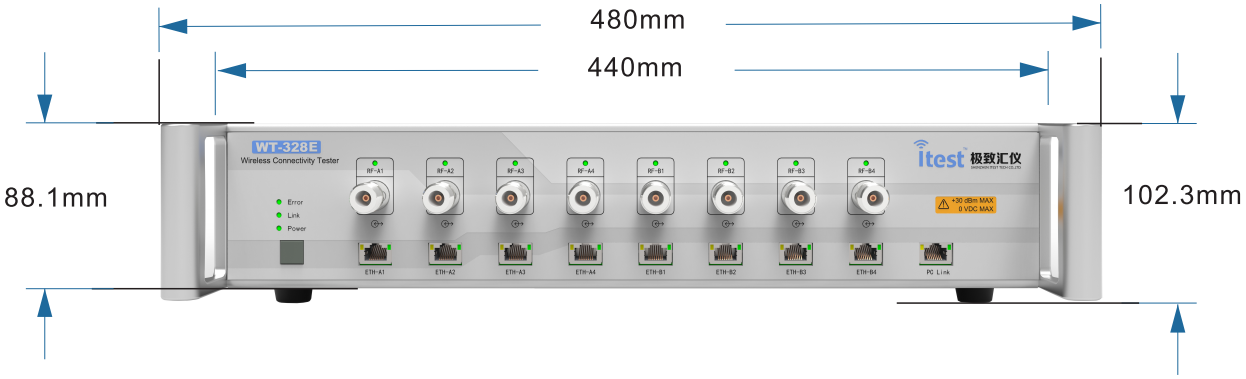
RF Analyzer–Signal Trigger		
Parameter	**Range**	
Absolute minimum value	Wideband RF	-40 dBm
Absolute maximum value	Limited by the maximum input power	
Trigger relative threshold	-10 dBmax to -40 dBmax	
Level accuracy	< ± 1 dB	
Port Isolation		
Measurement	**Description**	
Port to port isolation	> 110 dB typical	
VSA channel switching time	≤ 100 ms	
VSG channel switching time	≤ 100 ms	
Timebase		
Measurement	**Description**	
Oscillator type	OCXO	
Frequency	10 MHz	
Initial accuracy (25°C, after 60 minute warm-up)	< ± 0.05 ppm	
Maximum aging	< ± 0.1 ppm per year	
Temperature stability	< ± 0.01 ppm, referenced to 25°C	
Warm-up time (to within ±0.1 ppm at 25°C)	< 5 minutes	
MIMO System Performance		
Measurement	**Range**	
VSA capture trigger accuracy	≤ ± 50 ns	
VSG start trigger accuracy	≤ ± 50 ns	
General and Environmental		
Dimensions	Unit with Handle: 480 mm W x 570 mm D x 102.3 mm H Unit without Handle:440 mm W x 504 mm D x 88.1 mm H	
Net weight	14 kg	
Power requirements	110 VAC to 240 VAC, 50 Hz to 60Hz	
Power consumption	<150 W (maximum), <15W (standby)	
Operating temperature	+10°C to +55°C	
Storage temperature	-20°C to +70°C	
Specification validity temperature	+20°C to +30°C	
Operating humidity	15% to 95% relative humidity, non-condensing	
EMC	EN 61326, FCC PART 15B	
Safety	EN 61010-1, IEC 61010-1	
Mechanical vibration	IEC 60068, IEC 61010	
Mechanical shock	ASTM D3332-99, Method B	
Recommended calibration cycle	24 months	
Warranty	12 months hardware 12 months software updates	
Recommended PC	Intel Core i5 2.5 GHz with 4 GB of RAM or better	

Measurement Specifications

Wireless LAN (802.11a/b/g/n/p/ac/ax) Measurement Specifications			
Measurement	**Description**	**Performance**	
EVM	EVM averaged over payload based on standard requirements(typical) Note: - Measured at 6895 MHz - Power in/out at -10 dBm - Averaged over 20 packets - 802.11ax waveform, MCS 11	Residual VSA EVM (full packet channel estimation):	⩽ -50 dB for 80 M ⩽ -47 dB for 160 M
		Residual VSG EVM: (full packet channel estimation):	⩽ -52 dB for 80 M ⩽ -49 dB for 160 M
Peak power	Peak power over all symbols (dBm)	VSA power accuracy: ± 0.5 dB (+20 dBm to -45 dBm)	
RMS power	All: average power of complete data capture (dBm)		
	No gap: average power over all symbols after removal of any gap between packets (dBm)		
I/Q amplitude error	I/Q amplitude imbalance (%) and approximate contribution to EVM (dB)	Residual VSA I/Q imbalance:	⩽ 1% (+20 dBm to -30 dBm)
		Residual VSG I/Q imbalance:	⩽ 1% (-5 dBm to -95 dBm)
I/Q phase error	I/Q phase imbalance (degrees) and approximate contribution to EVM (dB)	Residual VSA I/Q imbalance:	⩽ 0.5 degree (+20 dBm to -30 dBm)
		Residual VSG I/Q imbalance:	⩽ 0.5 degree (-5 dBm to -95 dBm)
Frequency error	Carrier frequency error (kHz)	VSA measurement error:	⩽ ± 0.2 ppm calibrated
RMS phase noise	Integrated phase noise (degrees)	VSA integrated phase noise:	< 0.3 degrees (100 Hz to 1 MHz)
Spectral mask	Transmit spectrum mask	Spectral mask view: ± 90 MHz	
Spectral flatness	Reflects variation of signal energy as a function of OFDM subcarrier number OFDM signals only	VSA flatness over 160 MHz BW: ± 0.75 dB	
CCDF (complementary cumulative distribution function)	Probability of peak signal power being greater than a given power level versus peak-to-average power ratio (dB)		
Power on ramp	Power-on time from 10% to 90%		
Power down ramp	Power-off time from 90% to 10%		
Eye diagram	I and Q channels versus time (802.11b/g DSSS signals only)		
Raw capture data	I and Q signals versus time		
General waveform analysis	DC offset, RMS level, minimum/ maximum amplitude, peak-to-peak amplitude, RMS I- and Q-channel levels		
CW frequency analysis	Frequency of CW tone		
Bluetooth® (1.0, 2.0, 2.1, 3.0) Measurement Specifications			
Measurement	**Description**	**Performance**	
TX output power	Transmit DUT output power (dBm)	VSA power accuracy:	± 0.5 dB (+20 dBm to -45 dBm)
TX output spectrum	Transmit DUT power spectral density		
20 dB bandwidth	Bandwidth between the ± 20 dB down points of the modulation waveform	VSA frequency accuracy:	⩽ ± 0.2 ppm calibrated
In-band emissions (Adjacent channel)	Spurious emission measured at ± 5 MHz of DUT TX frequency only	VSA spurious:	< -70 dBc (100 KHz RBW) (CW)
Modulation characteristics	Average and peak frequency deviation (Hz)	(For EVM better than -25 dB) VSA measurement error: ⩽ ± 0.2 ppm calibrated	
Carrier frequency tolerance	Carrier frequency offset (Hz)		
Carrier frequency drift	Carrier frequency change over the Bluetooth burst (Hz)		
Relative transmit power (EDR)	Average power of complete data capture (dBm)	VSA power accuracy:	± 0.5 dB (+20 dBm to -45 dBm)
Carrier frequency stability (EDR)	Frequency drift over the Bluetooth EDR burst duration (Hz)		
Receive sensitivity	Receive sensitivity test. Includes Dirty Packets.	VSG power accuracy:	± 0.75 dB (+5 dBm to -90 dBm) ± 1.50 dB (-90 dBm to -100 dBm)
Maximum input signal level	Assuming single-ended BER measurement		
RMS EVM (EDR)	RMS EVM for Bluetooth EDR	Residual VSA EVM: ⩽ -35 dB (+20 dBm to -30 dBm) Residual VSG EVM: ⩽ -35 dB (-10 dBm to -70 dBm)	
Peak EVM (EDR)	Peak EVM for Bluetooth EDR		

Bluetooth (4.0, 4.1, 4.2) Measurement Specifications			
Measurement	**Description**	**Performance**	
Output power at NOC		VSA power accuracy:	± 0.5 dB (+20 dBm to -45 dBm)
Output power at EOC			
In-band emissions at NOC	Spurious emission measured at ± 5 MHz of DUT TX frequency only	VSA spurious: < -70 dBc (100 KHz RBW) (CW)	
In-band emissions at EOC			
Modulation characteristics	Average and peak frequency deviation (Hz)		
Carrier frequency offset and drift at NOC	Carrier frequency offset (Hz) and change over the Bluetooth burst (Hz)	VSA frequency accuracy: ⩽ ± 0.2 ppm calibrated	
Carrier frequency offset and drift at EOC			
Receiver sensitivity at NOC	Receive sensitivity test using user-generated waveforms	VSG power accuracy:	± 0.75 dB (+5 dBm to -90 dBm) ± 1.50 dB (-90 dBm to -100 dBm)
Receiver sensitivity at EOC			
C/I and receiver selectivity performance		VSG Spurious (in channel): ⩽ -40 dBc (160 MHz, >-55 dBm) (CW)	
Blocking performance			
Intermodulation performance			
Maximum input signal level	Assuming single-ended BER measurement	VSG maximum output power:	0 dBm to -100 dBm CW

Bluetooth 5 Measurement Specifications			
Measurement	**Description**	**Performance**	
In-band emissions	Spurious emission measured at ± 5 MHz of DUT TX frequency only. Tested at 1 Mbps, 2 Mbps	VSA spurious: < -70 dBc (100 KHz RBW) (CW)	
Modulation characteristics	Average and peak frequency deviation (Hz). Tested at 1 Mbps, 2 Mbps, 125 kbps	VSA frequency accuracy: ⩽ ± 0.2 ppm calibrated	
Carrier frequency offset and drift	Carrier frequency offset (Hz) and change over the Bluetooth burst (Hz). Tested at 1 Mbps, 2 Mbps, 125 kbps		
Stable Modulation Characteristics	Tested at 1 Mbps, 2 Mbps		
Receiver sensitivity	Receive sensitivity test using user-generated waveforms. Tested at 1 Mbps, 2 Mbps, 125 kbps	VSG power accuracy:	± 0.75 dB (+5 dBm to -90 dBm) ± 1.50 dB (-90 dBm to -100 dBm)
Receiver sensitivity – Stable Modulation Index	Tested at 1 Mbps, 2 Mbps, 500 kbps, 125 kbps		
Maximum input signal level	Assuming single-ended BER measurement. Tested at 1 Mbps, 2 Mbps	VSG maximum output power:	0 dBm to -100 dBm CW
Maximum Input signal level – Stable Modulation Index	Tested at 1 Mbps, 2 Mbps	VSG maximum output power:	0 dBm to -100 dBm CW
C/I and receiver selectivity performance	Tested at 1 Mbps, 2 Mbps, 500 kbps, 125 kbps	VSG Spurious (in channel): ⩽ -40 dBc (160 MHz, >-55 dBm) (CW)	
Blocking performance	Tested at 1 Mbps, 2 Mbps		
Intermodulation performance	Tested at 1 Mbps, 2 Mbps		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Wireless Connectivity Tester
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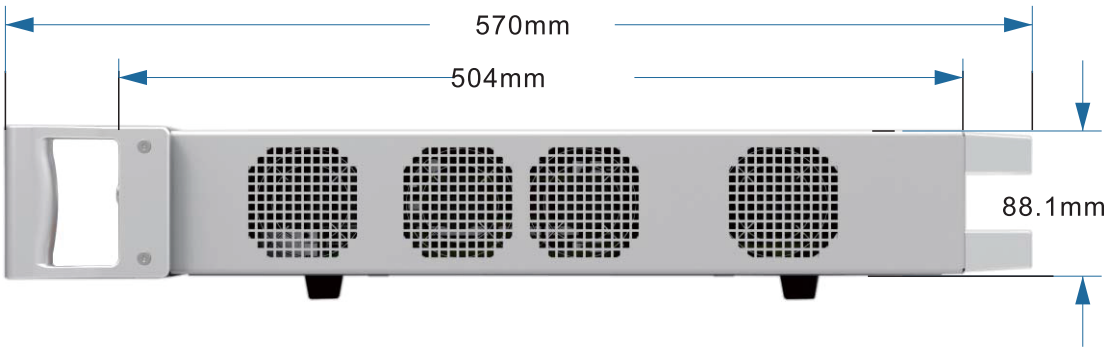
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TRIG 3
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HDMI

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