COPPER MOUNTAIN® TECHNOLOGIES
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TR0102 and TR0302 Vector Network Analyzer Specifications



Frequency range	
TR0102	200 kHz to 1.5 GHz
TR0302	200 kHz to 3.5 GHz
Software	CMT VNA, Windows & Linux, demo mode supported

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Hardware Specifications

TR0102 and TR0302

All specifications subject to change without notice.

Measurement Range

Impedance	50 Ohm
Test port connector	type N, female
Configuration	2-port, 1-path
Number of transmitter ports	1
Number of receiver ports	1
Frequency range	
TR0102	200 kHz to 1.5 GHz
TR0302	200 kHz to 3.5 GHz
Full frequency accuracy	$\pm 1 \cdot 10^{-6}$
Frequency resolution	1 Hz
Number of measurement points	2 to 200,001
Measurement bandwidths (with 1/1.5/2/3/5/7 steps)	1 Hz to 300 kHz
Dynamic range[2]	
200 kHz to 5 MHz	95 dB
5 MHz to 1.5 GHz	130 dB
1.5 GHz to 3.5 GHz	125 dB
Control	USB 2.0, Ethernet
Power over Ethernet	supported

[2] The dynamic range is defined as the difference between the specified maximum transmitter power level and the specified noise floor. The specification applies at 10 Hz IF bandwidth.

Measurement Accuracy[3]

Transmission measurements[4]	Magnitude / Phase ($S_{11} = S_{22} = 0$)	Magnitude / Phase ($S_{11} = S_{22} = 0.1$)
200 kHz to 5 MHz		
-35 dB to 10 dB	±0.35 dB / ±3.0°	±0.45 dB / ±3.5°
-55 dB to -35 dB	±1.2 dB / ±8.0°	±1.3 dB / ±9.0°
5 MHz to 1.5 GHz		
-70 dB to 10 dB	±0.35 dB / ±3.0°	±0.45 dB / ±3.5°
-90 dB to -70 dB	±1.2 dB / ±8.0°	±1.3 dB / ±9.0°
1.5 GHz to 3.5 GHz		
-65 dB to 10 dB	±0.35 dB / ±3.0°	±0.45 dB / ±3.5°
-85 dB to -65 dB	±1.2 dB / ±8.0°	±1.3 dB / ±9.0°
Reflection measurements[5]		Magnitude/Phase
-15 dB to 0 dB	N/A	±0.65 dB / ±5°
-25 dB to -15 dB	N/A	±1.6 dB / ±11°
-35 dB to -25 dB	N/A	±5.5 dB / ±30°
Trace noise magnitude	0.004 dB rms	
Temperature dependence	0.02 dB/°C	

[3] Reflection and transmission measurement accuracy applies over the temperature range of (73 ± 9) °F or (23 ± 5) °C after 60 minutes of warming-up, with less than 1 ° C deviation from the calibration temperature, at output power of -5 dBm. Frequency points have to be identical for measurement and calibration (no interpolation allowed).

[4] Transmission specifications are based on a matched DUT and DUT with S11=S22=0.1, IF bandwidth of 10 Hz.

[5] Reflection specifications are based on an isolating DUT.

Effective System Data

Directivity	42 dB
Source match	38 dB
Load match	22 dB
Reflection tracking	±0.20 dB
Transmission tracking	±0.25 dB

Uncorrected System Performance

Uncorrected parameters are the instrument parameters obtained without applying user or system corrections that are normally used to compensate for errors in reflection and transmission measurements. These are raw port parameters

Frequency range	200 kHz to 1.5 GHz	1.5 GHz to 3.5 GHz
Directivity	15 dB	15 dB
Source match	18 dB	15 dB
Load match	22 dB	22 dB

Port Parameters

Damage level	+23 dBm
Damage DC voltage	35 V

Transmitter Output

Output power	
Range	-55 dBm to +5 dBm
Accuracy	±1.5 dB
Resolution	0.05 dB
Harmonic distortion[6]	
200 kHz to 1.5 GHz	-30 dBc
1.5 GHz to 3.5 GHz	-25 dBc
Non-harmonic spurious[6]	-45 dBc

[6] Specification applies over full frequency range, at an output power of 0 dBm.

Receiver Input

Receiver max input power	+5 dBm
Noise floor[7]	
200 kHz to 5 MHz	-100 dBm/Hz
5 MHz to 1.5 GHz	-135 dBm/Hz
1.5 GHz to 3.5 GHz	-130 dBm/Hz

[7] Receiver noise floor specification includes crosstalk effect within the frequency range up to 5 MHz.

Trigger

Number of trigger ports	2
Communication mode	bidirectional (IN/OUT)
Port designation	Trig 1, Trig 2
Connector type	BNC, female
Trigger input	3.3 V nom. (5 V tolerant)
Input level	
Low threshold voltage	1.1 V
High threshold voltage	2.6 V
Input level range	0 V to +5 V
Pulse width	≥2 µs
Polarity	positive or negative
Input impedance	≥5 kOhm
Trigger output	
Maximum output current	10 mA
Output level	
Low level voltage	0.0 to 0.6 V
High level voltage	3.0 to 3.8 V
Polarity	positive or negative

Frequency reference

Port designation	REF IN/OUT
Connector type	BNC, female
Reference input	
External reference frequency	5 MHz, 10 MHz, 100 MHz
Input level	-3 dBm to 10 dBm
Input impedance	50 Ohm
Reference output	
Internal reference frequency	5 MHz, 10 MHz, 100 MHz
Output reference signal level at 50 Ohm	-3 dBm to 3 dBm

Measurement Speed

Time per point	35 µs typ.

System and Power

CMT VNA software:	
Operating system (min requirements)	Windows 10 (1809 version), Ubuntu 24.04
CPU	4 core 2.0 GHz (x64 or arm64)
RAM	8 GB
Interface	USB 2.0, Ethernet: 10/100BASE-TX
Connector type	
USB	Type C
Ethernet	RJ-45
Power over Ethernet	supported
Input power	
Voltage range	9 V DC to 15 V DC
Power consumption	18.5 W
Connector type	KPJX-4S-S

Dimensions

Dimensions	297 x 160 x 44 mm
Weight	2.0 kg (70.5 oz)

Environmental Specifications

Operating condition	
Temperature	+5 °C to +40 °C (41 °F to 104 °F)
Humidity	90 % at 25 °C (77 °F)
Storage	
Temperature	+0 °C to +40 °C (32 °F to 104 °F)
Humidity	80 % at 35 °C (95 °F)
Non-operating temperature[8]	-50 °C to +70 °C (-58 °F to 158 °F)
Atmospheric pressure	70.0 kPa to 106.7 kPa

[8] Non-operating temperature specifies the allowable environmental conditions for transporting the instrument. Storage conditions are listed separately in the table.