University Kit CMT804U Extended Data Sheet

COPPER MOUNTAIN® TECHNOLOGIES

Kit Includes:

- Vector Network Analyzer
- Mechanical Calibration Kit
- Filter/Diplexer
- Antenna
- Cables
- Adapters
- Torque Wrenches
- Class Curriculum

- **Complete S-parameters measurement solution** that backs RF theory with a robust **hands-on VNA experience** and sample labs for classes
- Exclusively offered to **educational institutions teaching RF**
- Practical approach to a variety of measurements that will prepare students for a **wide range of industry engineering jobs**
- CMT can assist with **creating labs** designed by applications engineers to walk students through common VNA measurements
- **Software is free** to download on an unlimited number of PCs
- Students can **perform measurement preparations and post-process results** on their own computers without the measurement module

CMT804U Specifications[1]

Primary Specifications

Impedance	50 Ohm
Test port connector	type N, female
Number of test ports	2
Frequency range	1 MHz to 8.0 GHz
Full frequency accuracy	$\pm 5 \cdot 10^{-6}$
Frequency resolution	1 Hz
Number of measurement points	2 to 10,001
Measurement bandwidths (with 1/1.5/2/3/5/7 steps)	1 Hz to 30 kHz
Dynamic range[2]	
1 MHz to 6 GHz	130 dB (135 dB typ.)
6 GHz to 8 GHz	125 dB (135 dB typ.)

Measurement Accuracy[3]

Accuracy of transmission measurements[4]	Magnitude / Phase
+5 dB to +15 dB	±0.2 dB / ±2°
-50 dB to +5 dB	±0.1 dB / ±1°
-70 dB to -50 dB	±0.2 dB / ±2°
-85 dB to -70 dB	±1.0 dB / ±6°
Accuracy of reflection measurements[5]	Magnitude / Phase
-15 dB to 0 dB	±0.4 dB / ±3°
-25 dB to -15 dB	±1.0 dB / ±6°
-35 dB to -25 dB	±3.0 dB / ±20°
Trace noise magnitude (IF bandwidth 3 kHz)	0.001 dB rms
Temperature dependence	0.02 dB/°C

Measurement Speed

Time per Point		100 µs typ.	
Port switchover time		10 ms	
Typical cycle time vs number of measurement points			
Frequency range	Number of points	Uncorrected	2-port calibration
1 MHz to 8 GHz	51	6.5 ms	32.4 ms
(IF bandwidth 30 kHz)	201	21.1 ms	61.7 ms
	401	40.5 ms	100.3 ms
	1601	157.7 ms	333.0 ms

Effective System Data

Directivity	46 dB
Source match	40 dB
Load match	46 dB
Reflection tracking	±0.10 dB
Transmission tracking	±0.08 dB

Uncorrected System Performance

Directivity	18 dB
Source match	18 dB
Load match	18 dB

Test Port Output

Power range	-60 dBm to +5 dBm
Power accuracy	±1.5 dB
Power resolution	0.05 dB
Harmonic distortion[6]	-25 dBc
Non-harmonic spurious[6]	-30 dBc

Test Port Input

Noise floor	-130 dBm/Hz
Damage level	+26 dBm
Damage DC voltage	35 V

[1] All specifications subject to change without notice. [2] The dynamic range is defined as the difference between the specified maximum power level and the specified noise floor. The specification applies at 10 Hz IF bandwidth. [3] Reflection and transmission measurement accuracy applies over the temperature range of (73 ± 9) °F or (23 ± 5) °C after 40 minutes of warming-up, with less than 1 °C deviation from the full two-port 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 IF bandwidth of 10 Hz. [5] Reflection specifications are based on an isolating DUT. [6] Specification applies at output power of 0 dBm.

CMT804U Specifications[1]

Frequency Reference Input

Port	10 MHz Ref In
External reference frequency	10 MHz
Input level	0 dBm to 4 dBm
Input impedance	50 Ohm
Connector type	BNC, female

Frequency Reference Output

Port	10 MHz Ref Out
Internal reference frequency	10 MHz
Output reference signal level at 50 Ohm impedance	1 dBm to 5 dBm
Connector type	BNC, female

Trigger Input

Port	Ext Trig
Input level	
Low threshold voltage	0.5 V
High threshold voltage	2.7 V
Input level range	+3 V to + 5 V
Pulse width	≥1 µs
Polarity	positive or negative
Input impedance	≥10 kOhm
Connector type	BNC, female

System & Power

Operating system	Windows 7 and above
CPU frequency	1.0 GHz
RAM	512 MB
Interface	USB 2.0
Connector type	USB B
Power supply	110-240 V, 50/60 Hz
Power consumption	40 W

Dimensions

Length	324 mm
Width	415 mm
Height	96 mm
Weight	7 kg (247 oz)

Factory Adjustment

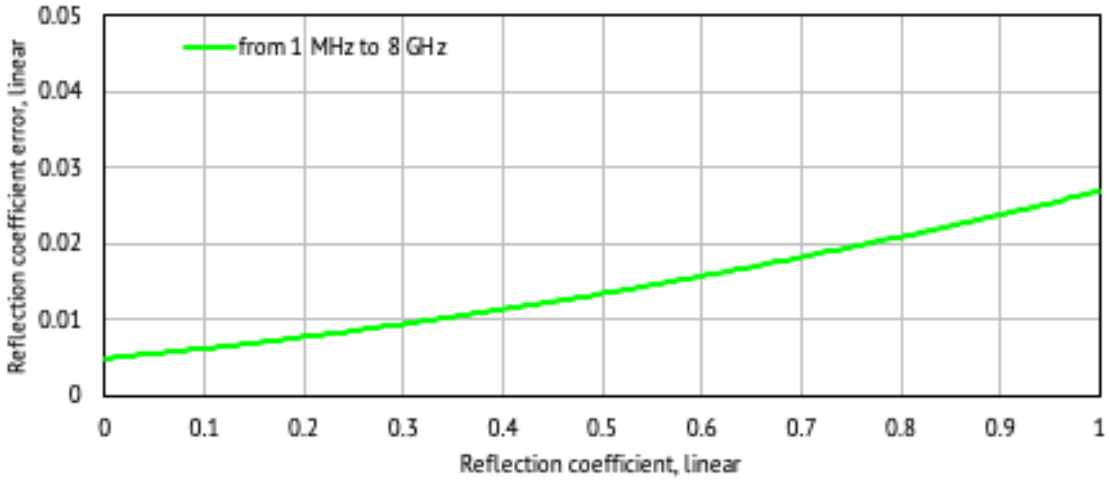
Recommended Factory Adjustment Interval	3 Years

Environmental Specifications

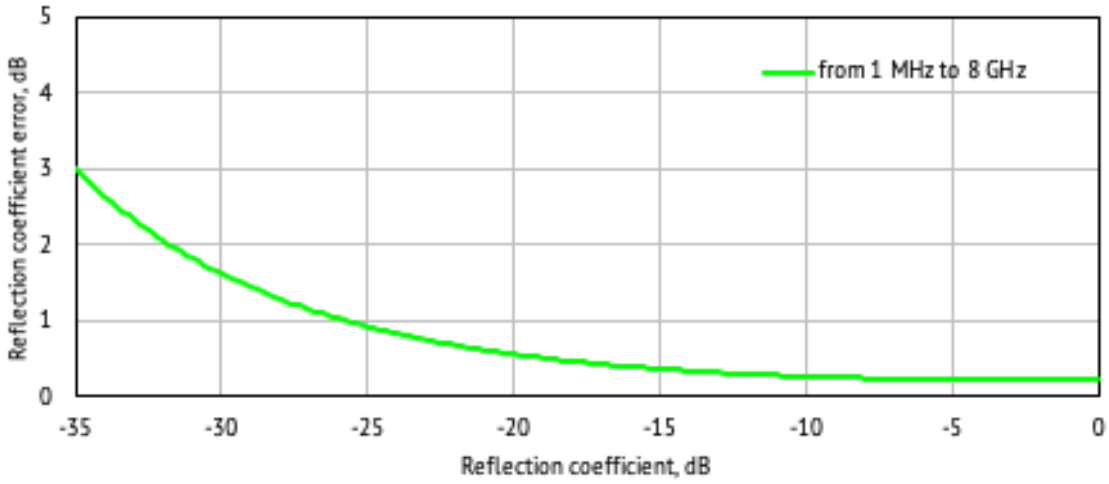
Operating temperature	+5 °C to +40 °C (41 °F to 104 °F)
Storage temperature	-50 °C to +70 °C (-58 °F to 158 °F)
Humidity	90 % at 25 °C (77 °F)
Atmospheric pressure	70.0 kPa to 106.7 kPa

Reflection Accuracy Plots

Reflection Magnitude Errors



Specifications are based on isolating DUT ($S_{21} = S_{12} = 0$)



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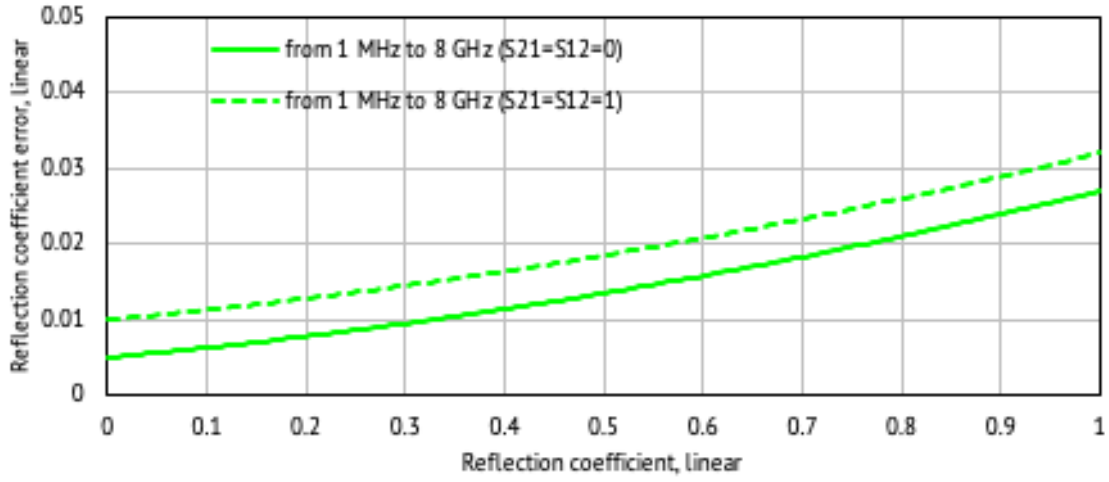
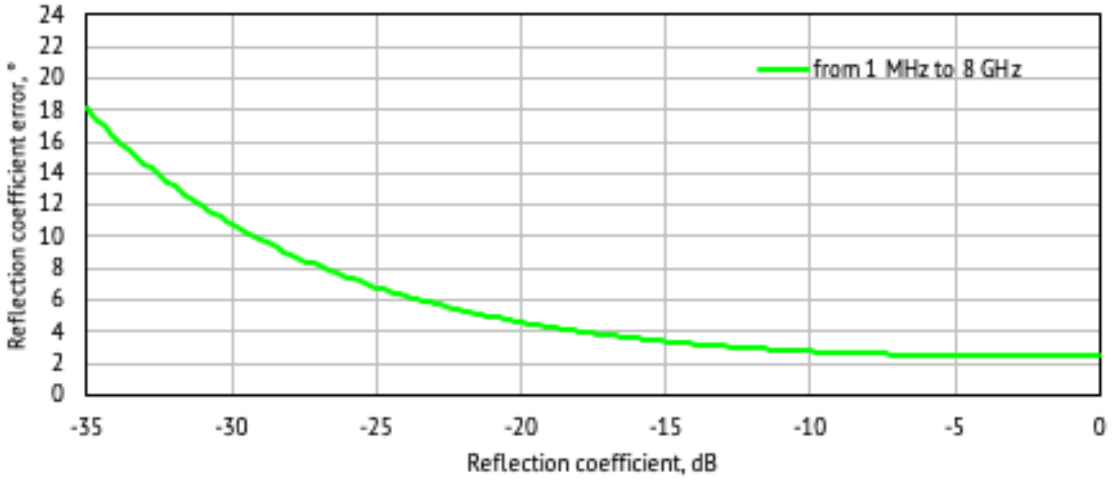


Reflection Accuracy Plots

Reflection Phase Errors



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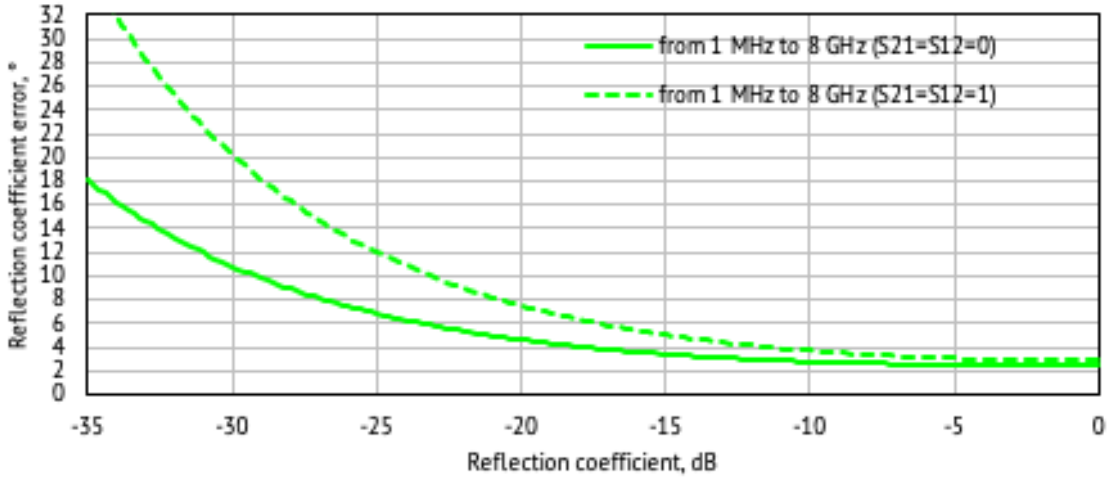
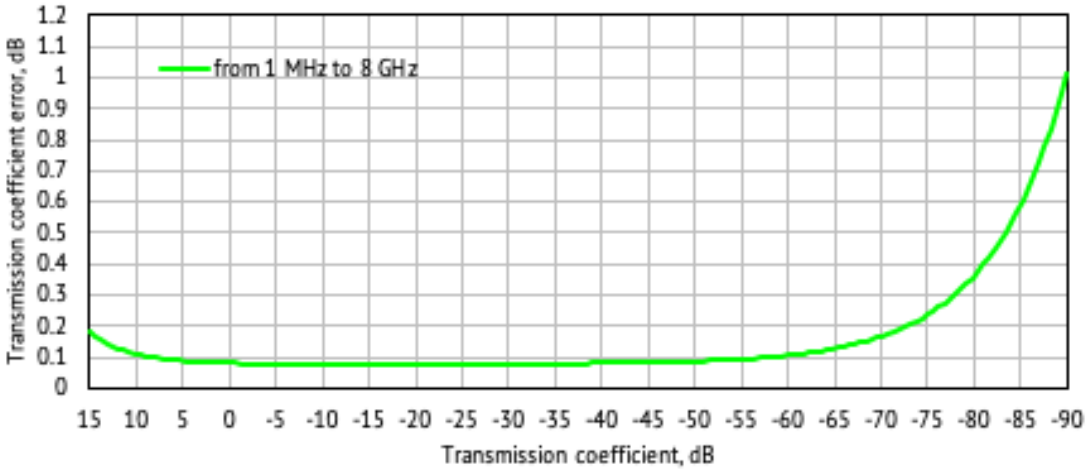


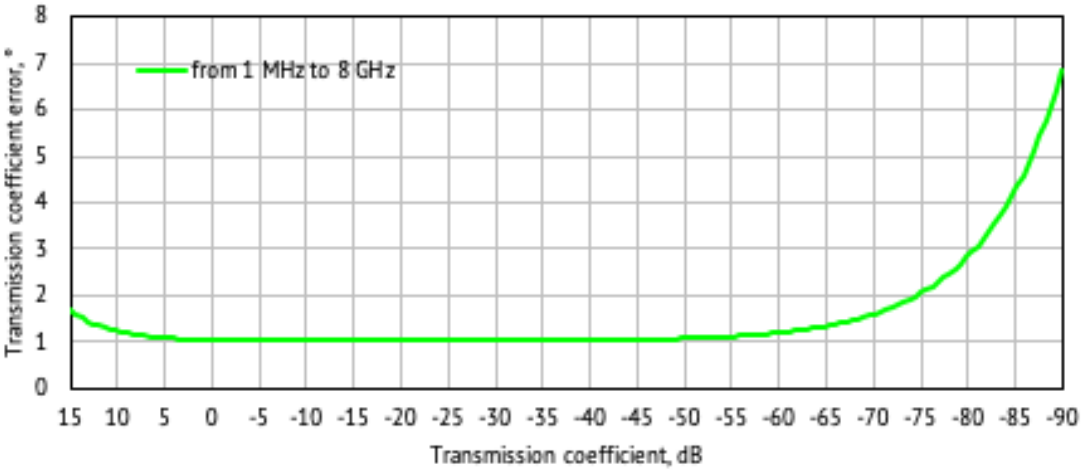
Transmission Accuracy Plots

Transmission Magnitude Errors



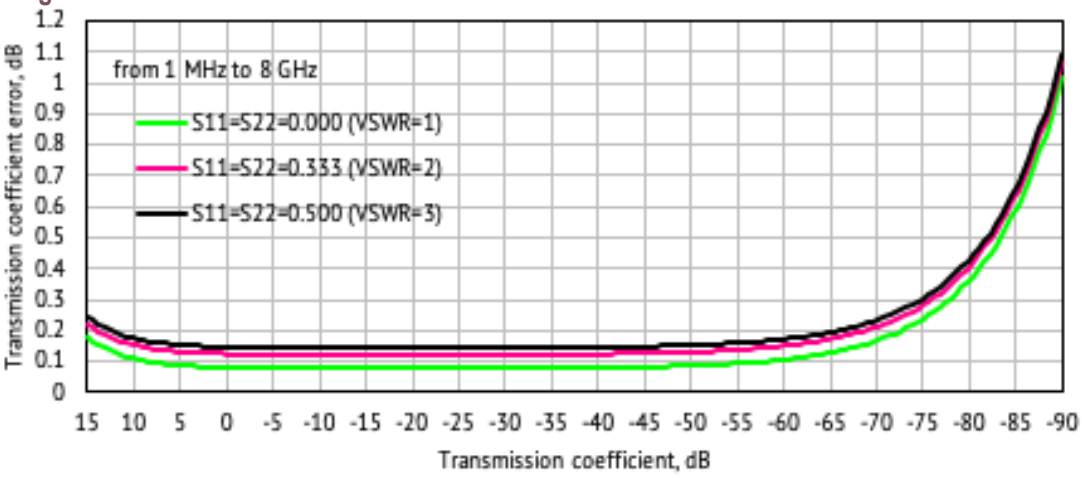
Specifications are based on matched DUT, and IF bandwidth of 10 Hz

Transmission Phase Errors



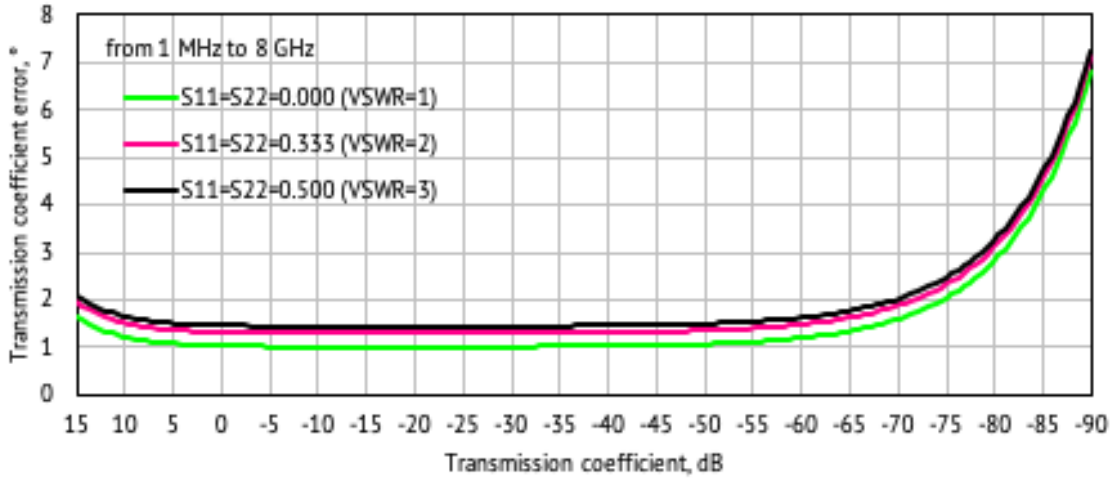
Specifications are based on matched DUT, and IF bandwidth of 10 Hz

Transmission Magnitude Errors for Unmatched Devices

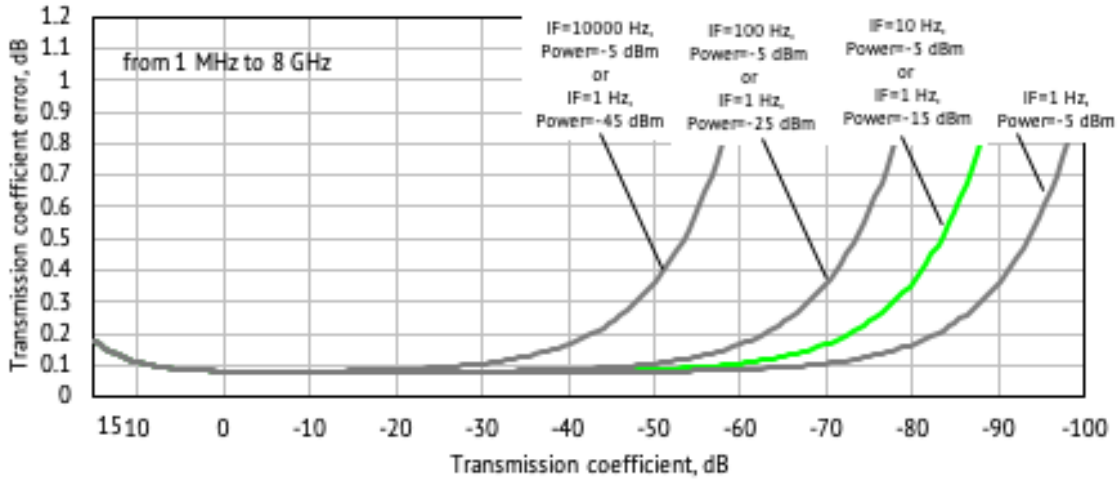


Transmission Accuracy Plots

Transmission Phase Errors for Unmatched Devices



Transmission Errors for Matched Devices vs. Output Power and IF Bandwidth



COPPER MOUNTAIN®
TECHNOLOGIES

Technology is supposed to move. It's supposed to change and update and progress. It's not meant to sit stagnant year after year simply because that's how things have always been done.

The engineers at Copper Mountain Technologies are creative problem solvers. They know the people using VNAs don't just need one giant machine in a lab. They know that VNAs are needed in the field, requiring portability and flexibility. Data needs to be quickly transfered, and a test setup needs to be easily automated and recalled for various applications. The engineers at Copper Mountain Technologies are rethinking the way VNAs are developed and used.

Copper Mountain Technologies' VNAs are designed to work with the Windows or Linux PC you already use via USB interface. After installing the test software, you have a top-quality VNA at a fraction of the cost of a traditional analyzer. The result is a faster, more effective test process that fits into the modern workspace. This is the creativity that makes Copper Mountain Technologies stand out above the crowd.

We're creative. We're problem solvers.

University Kit VNAs

	CMT304U	CMT804U	CMT808U
Frequency Range	1 MHz to 3.2 GHz	1 MHz to 8 GHz	1 MHz to 8 GHz
Number of Ports	2	2	4
Dynamic Range	130 dB, typ.	135 dB, typ.	130 dB, typ.

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