Compact VNA - S5243

Extended Specifications

COPPER MOUNTAIN® TECHNOLOGIES

- **Frequency range:** 10 MHz - 43.5 GHz
- **Wide output power adjustment range:** -50 dBm to 0 dBm
- **Dynamic range:** 140 dB (10 Hz IF bandwidth) typ.
- **Measurement time per point:** 15 µs per point, min typ.
- Up to **16 logical channels with 16 traces** each max
- **Automation programming** in LabView, Python, MATLAB, .NET, etc.
- **Time domain and gating** conversion included
- **Frequency offset mode**, including vector mixer calibration measurements
- Up to **500,001 measurement points**
- Multiple **precision calibration** methods and automatic calibration

EXTEND YOUR REACH™

Specifications[1]

Measurement Range

Impedance	50 Ohm
Test port connector	NMD 2.4 mm, male
Number of test ports	2
Frequency range	10 MHz to 43.5 GHz
Full frequency accuracy	$\pm 2 \cdot 10^{-6}$
Frequency resolution	1 Hz
Number of measurement points	2 to 500,001
Measurement bandwidths (with 1/1.5/2/3/5/7 steps)	1 Hz to 2 MHz
Dynamic range[2]	
10 MHz to 8 GHz	135 dB (140 dB typ.)
8 GHz to 43.5 GHz	125 dB (130 dB typ.)

[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. [2a] Uncorrected crosstalk is defined at maximum specified output power level. Crosstalk may limit the dynamic range of the analyzer at low IF bandwidth.

Specifications[1]

Measurement Accuracy[3]

Accuracy of transmission measurements[4]	Magnitude / Phase
10 MHz to 8 GHz	
0 dB to +10 dB	±0.2 dB / ±2°
-55 dB to 0 dB	±0.1 dB / ±1°
-75 dB to -55 dB	±0.2 dB / ±2°
-95 dB to -75 dB	±1.0 dB / ±6°
8 GHz to 43.5 GHz	
0 dB to +10 dB	±0.2 dB / ±2°
-45 dB to 0 dB	±0.1 dB / ±1°
-65 dB to -45 dB	±0.2 dB / ±2°
-85 dB to -65 dB	±1.0 dB / ±6°
Accuracy of reflection measurements[5]	Magnitude / Phase
10 MHz to 26.5 GHz	
-15 dB to 0 dB	±0.5 dB / ±5°
-25 dB to -15 dB	±1.5 dB / ±10°
-35 dB to -25 dB	±5.5 dB / ±30°
26.5 GHz to 43.5 GHz	
-15 dB to 0 dB	±0.6 dB / ±6°
-25 dB to -15 dB	±2 dB / ±12°
-35 dB to -25 dB	±7.5 dB / ±35°
Trace noise magnitude (IF bandwidth 3 kHz)	
10 MHz to 43.5 GHz	0.004 dB rms
Temperature dependence	
10 MHz to 6 GHz	0.02 dB/°C
6 GHz to 43.5 GHz	0.04 dB/°C

Effective System Data

10 MHz to 26.5 GHz	
Directivity	42 dB
Source match	34 dB
Load match	42 dB
Reflection tracking	±0.15 dB
Transmission tracking	±0.08 dB
26.5 GHz to 43.5 GHz	
Directivity	40 dB
Source match	32 dB
Load match	40 dB
Reflection tracking	±0.20 dB
Transmission tracking	±0.10 dB

Uncorrected System Performance

10 MHz to 43.5 GHz	
Directivity	10 dB
Source match	10 dB
Load match	10 dB

[1] All specifications subject to change without notice. [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 0dBm. 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.

Specifications[1]

Test Port Output

Power range	-50 dBm to 0 dBm
Power accuracy	±1.5 dB
Power resolution	0.05 dB
Harmonic distortion[6]	-10 dBc
Non-harmonic spurious[6]	-10 dBc

Test Port Input

Noise floor	
10 MHz to 8 GHz	145 dBm/Hz (150 dBm/Hz typ.)
8 GHz to 43.5 GHz	135 dBm/Hz (140 dBm/Hz typ.)
Damage level	+23 dBm
Damage DC voltage	15 V

Measurement Speed

Time per point	15 µs typ.
Port switchover time	0.2 ms

Frequency Reference Input

Port	10 MHz Ref In
External reference frequency	10 MHz
Input level	-2 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	0 dBm to 2 dBm
Connector type	BNC, female

Trigger Input

Port	Ext Trig In
Input level	
Low threshold voltage	0.8 V
High threshold voltage	2.7 V
Input level range	0 V to + 5 V
Pulse width	≥2 µs
Polarity	positive or negative
Input impedance	≥10 kOhm
Connector type	BNC, female

[1] All specifications subject to change without notice. [6] Specification applies over frequency range from 300 kHz to upper frequency limit, at output power of 0 dBm.

Specifications[1]

Trigger Output

Port	Ext Trig Out
Maximum output current	20 mA
Output level	
Low level voltage	0.4 V
High level voltage	3.0 V
Polarity	positive or negative
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	45 W

Calibration

Recommended factory adjustment interval	3 years

Dimensions

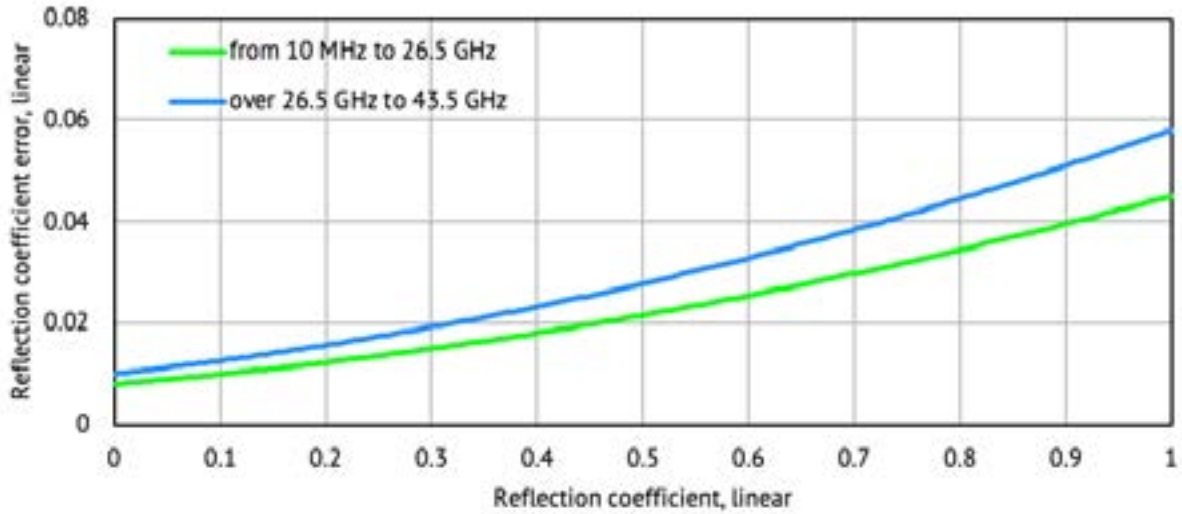
Length	425 mm
Width	235 mm
Height	96 mm
Weight	5 kg (176.4 oz)

Environmental Specifications

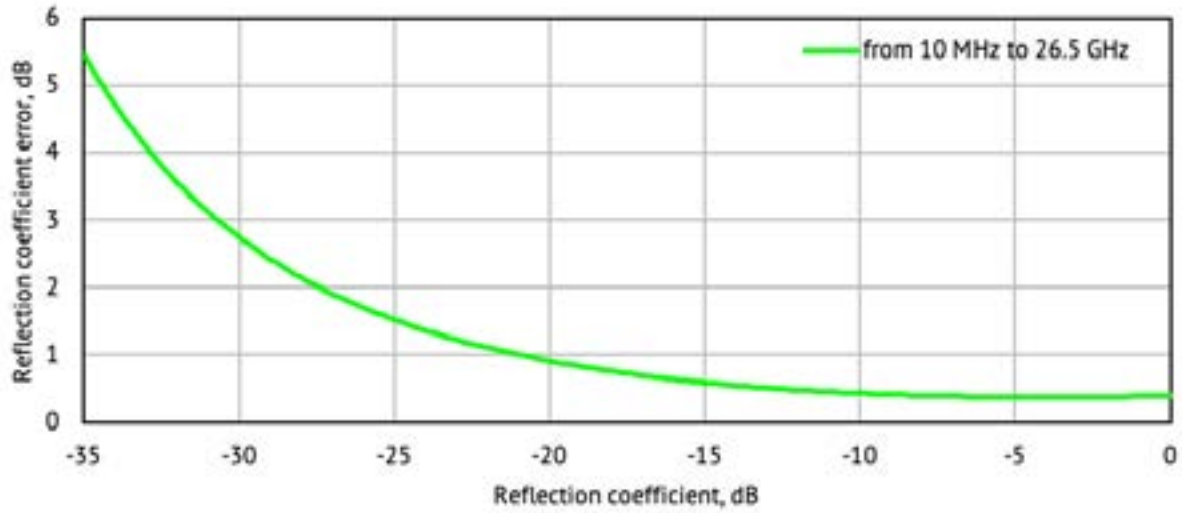
Operating temperature	+5 °C to +40 °C (41 °F to 104 °F)
Storage temperature	-50 °C to +70 °C (-58 °F to 158 °F)
Humidity	90 % at 25 °C (77 °F)
Atmospheric pressure	70.0 kPa to 106.7 kPa

Reflection Accuracy Plots

Reflection Magnitude Errors



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



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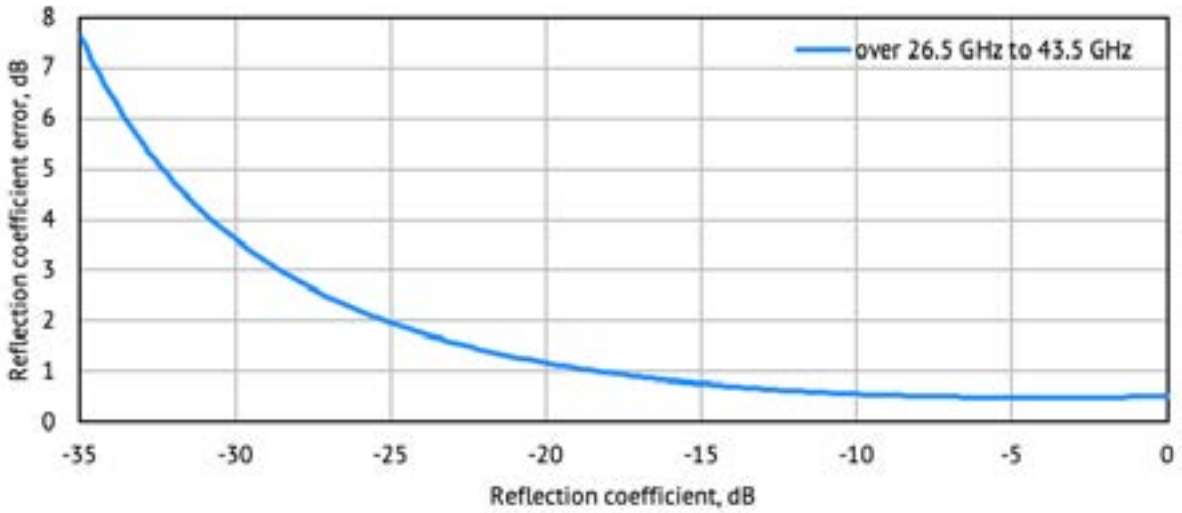

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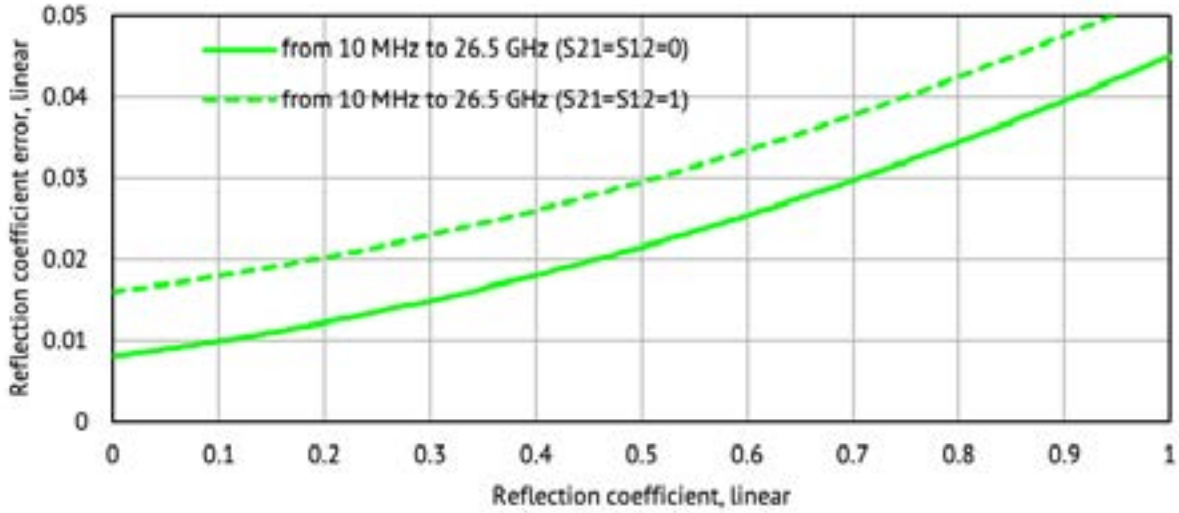
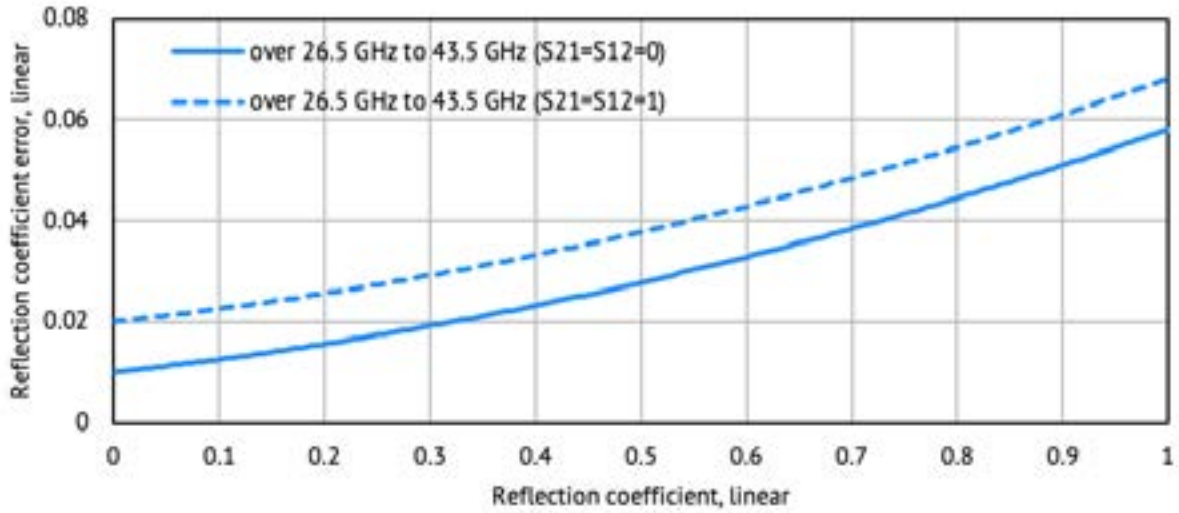
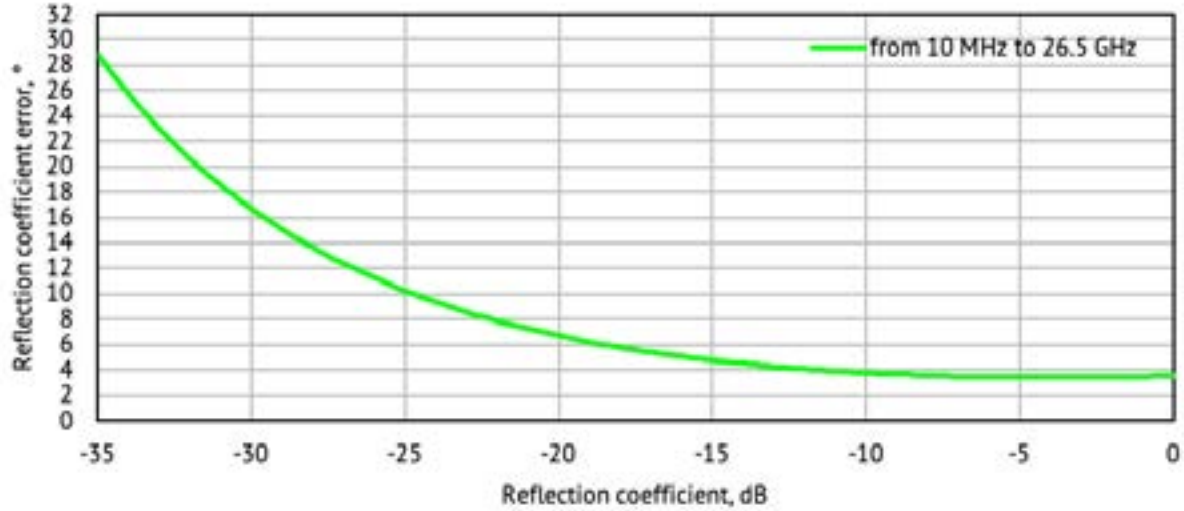
Reflection Accuracy Plots

Reflection Magnitude Errors





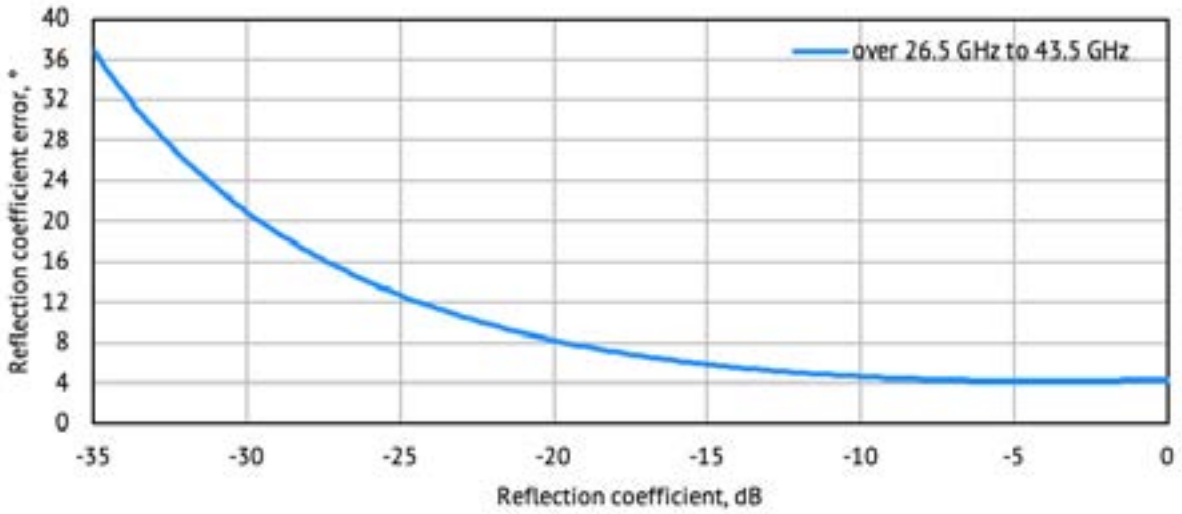
Reflection Phase Errors



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

Reflection/Transmission Accuracy Plots

Reflection Phase Errors



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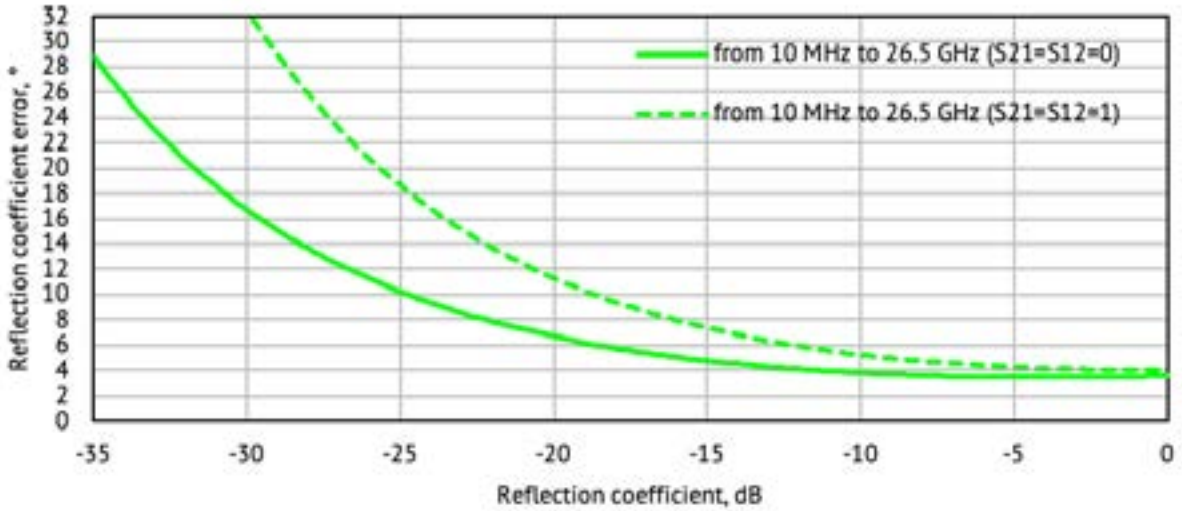
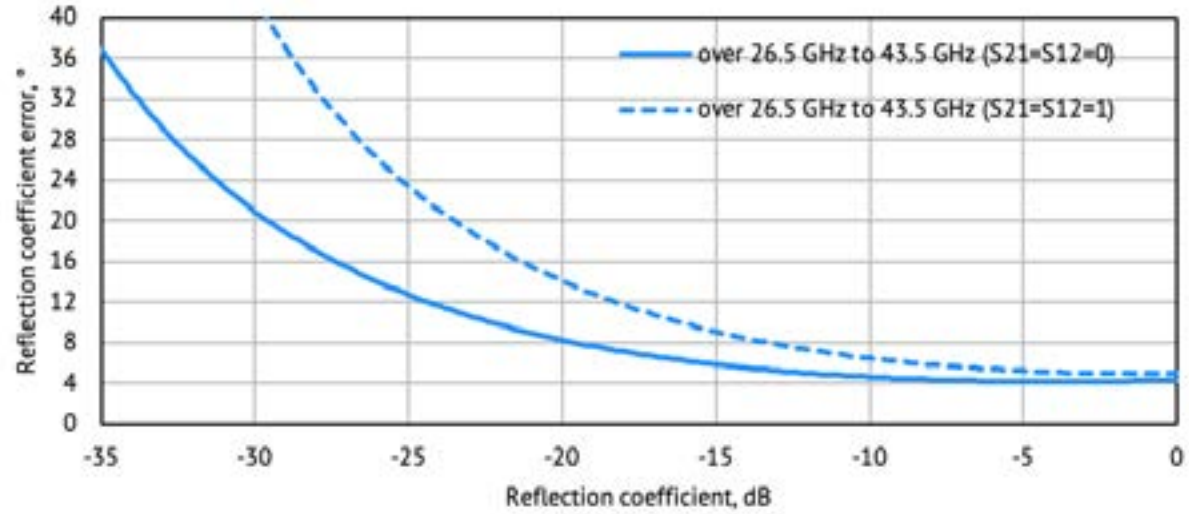
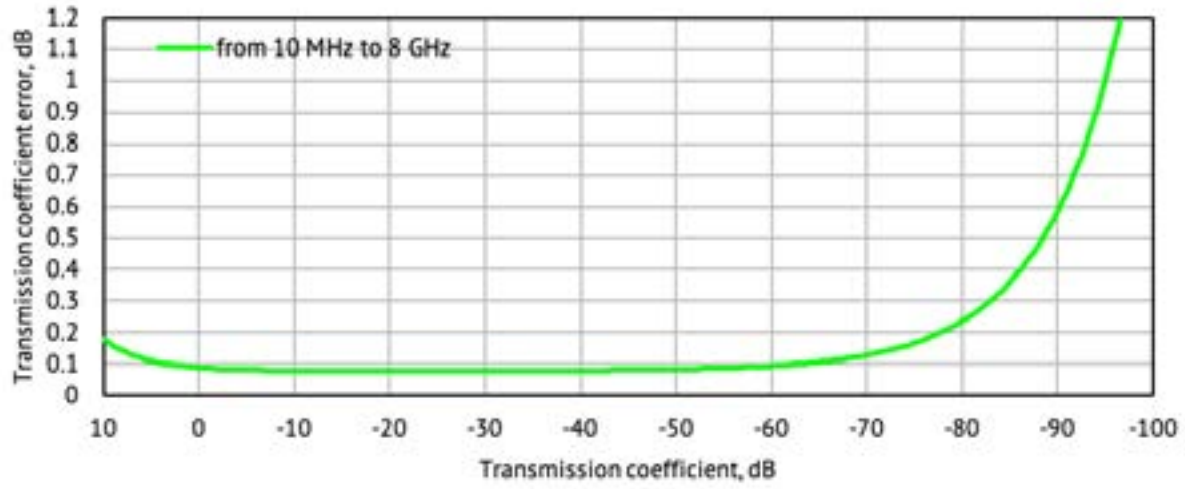




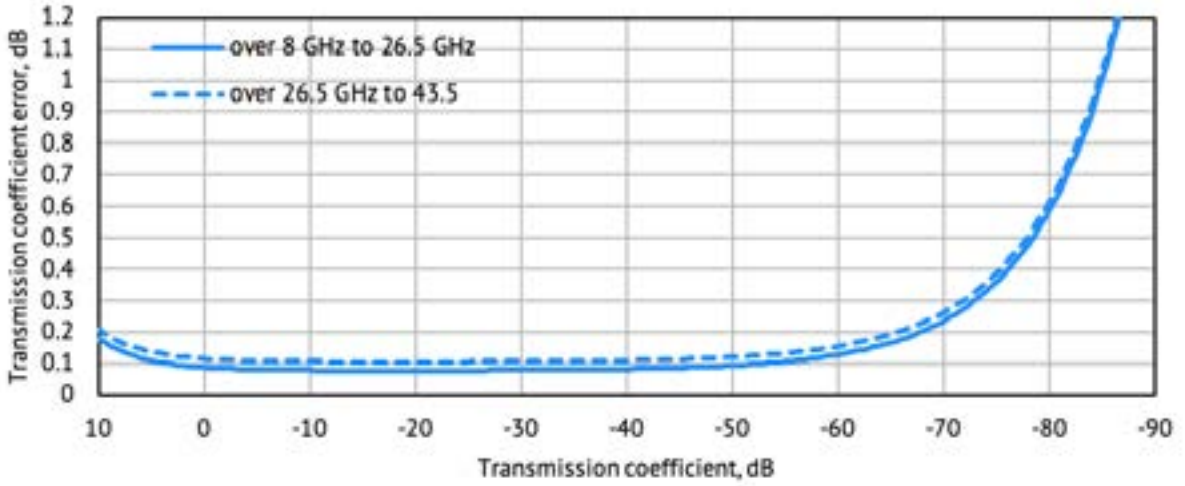
Specifications are based on matched DUT, and IF bandwidth of 10 Hz

Transmission Accuracy Plots

Transmission Magnitude Errors

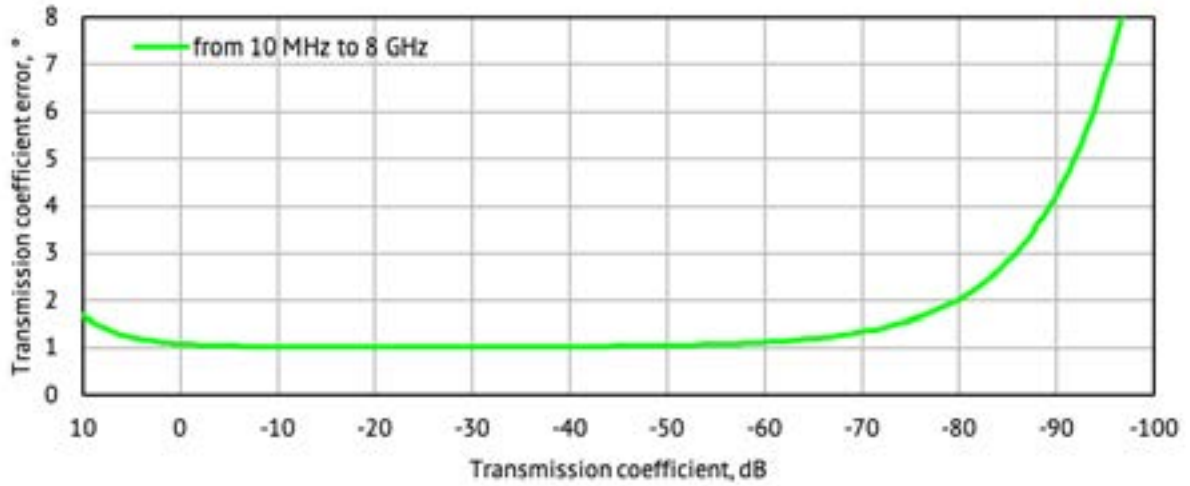


Specifications are based on matched DUT, and IF bandwidth of 10 Hz



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

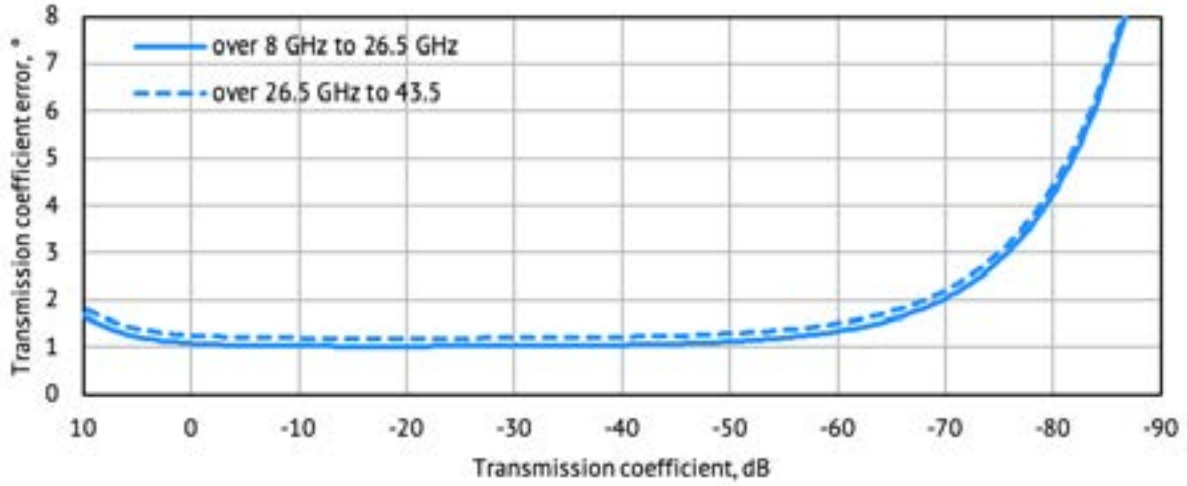
Transmission Phase Errors



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

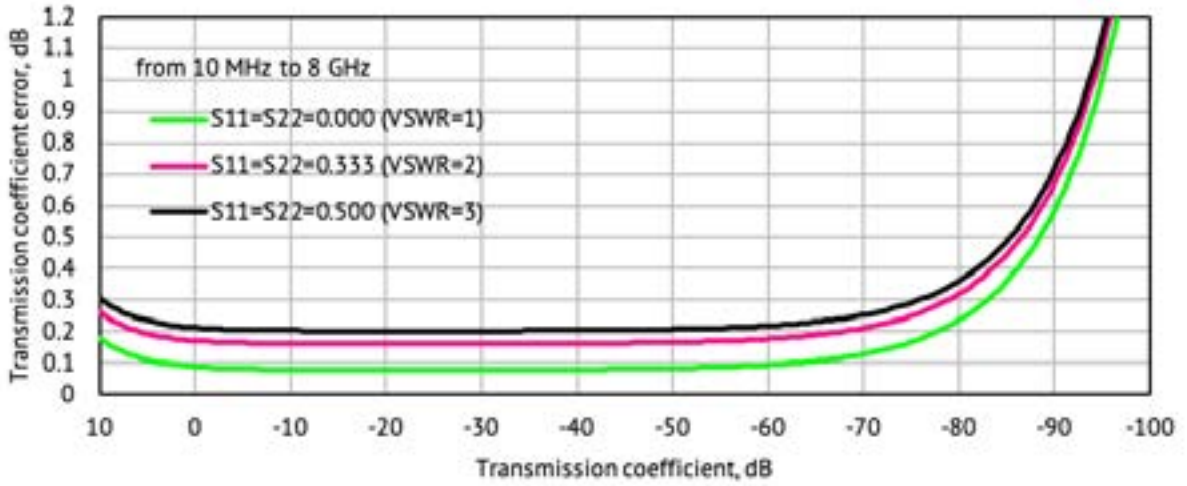
Transmission Accuracy Plots

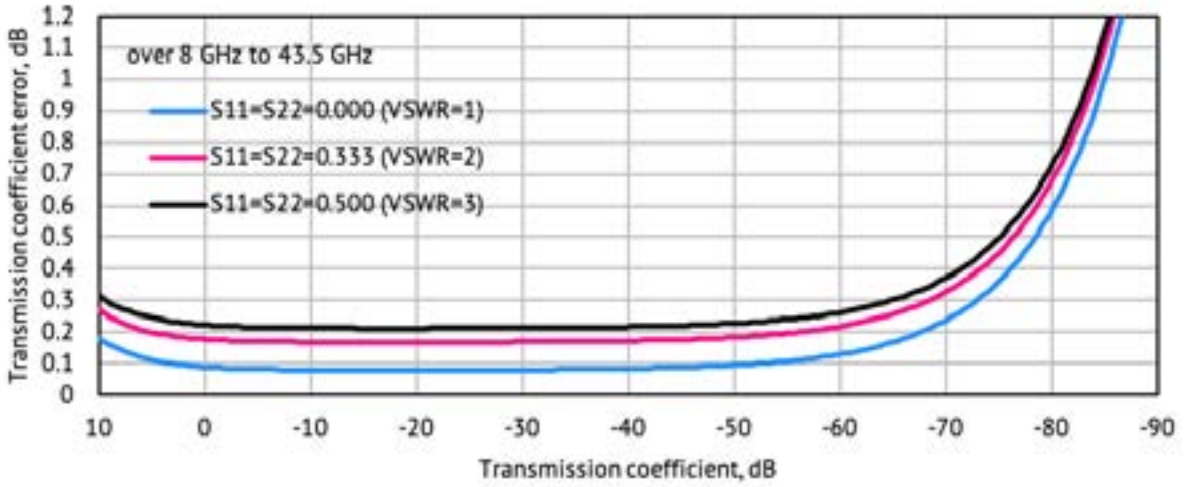
Transmission Phase Errors



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

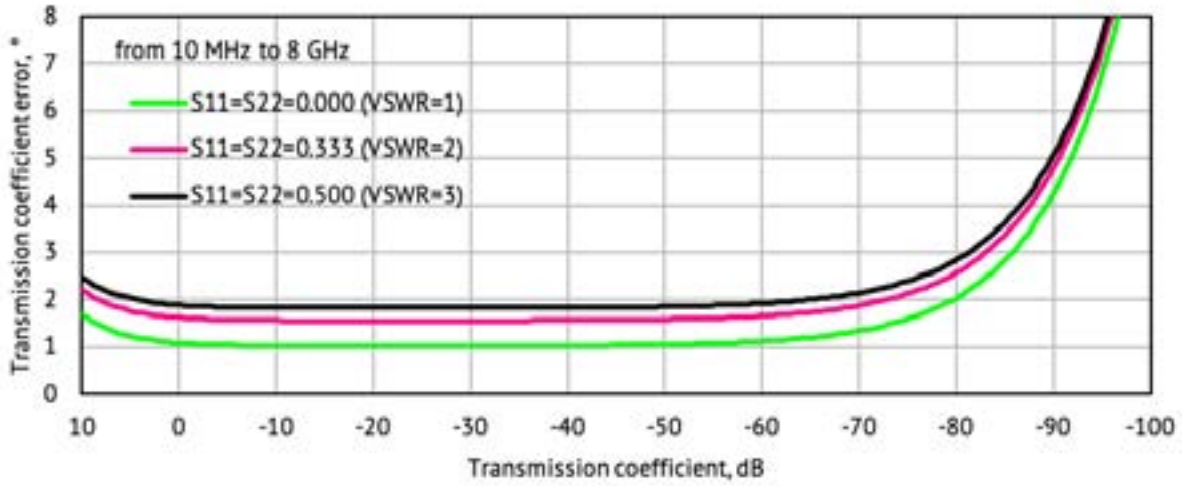
Transmission magnitude errors for unmatched devices

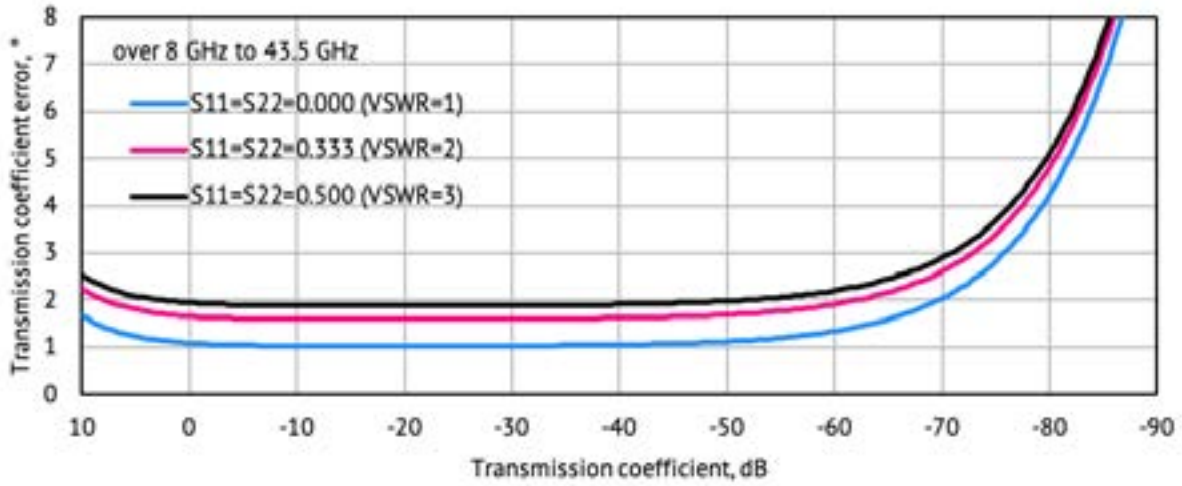




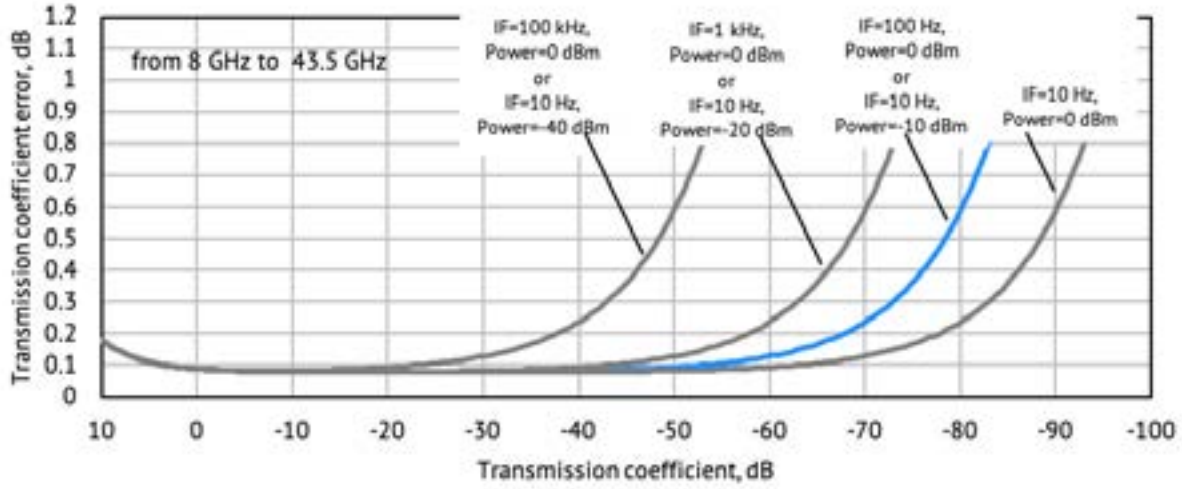
Transmission Accuracy Plots

Transmission Phase Errors for Unmatched Devices





Transmission errors for matched devices vs output power and IF bandwidth



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 transferred, 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.

	S5045	S5065	S5085	S5180	S5243	S7530
Frequency Range	9 kHz to 4.5 GHz	9 kHz to 6.5 GHz	9 kHz to 8.5 GHz	100 kHz to 18 GHz	10 Mhz to 43.5 GHz	20 kHz to 3 GHz
Dynamic Range	130 dB, typ.	130 dB, typ.	130 dB, typ.	135 dB, typ.	140 dB, typ.	123 dB, typ.
Port Impedance	50 Ohm	50 Ohm	50 Ohm	50 Ohm	50 Ohm	75 Ohm

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