# SC7540 Extended Data Sheet

- **Frequency range:** 100 kHz - 4 GHz

- **Wide output power range:** -50 dBm to +10 dBm

- **Dynamic range:** 137 dB (10 Hz IF bandwidth) typ.

- **Measurement time per point:** 24 µs per point, min typ.

- **16 logical channels with 16 traces** each max.

- **Automation programming** in Python, LabVIEW, MATLAB, .NET, etc.

- 75 Ohm VNA

- **Time domain and gating** conversion included

- **Frequency offset mode**, including vector mixer calibration measurements

- Up to **200,001 measurement points**

- Multiple **precision calibration** methods and automatic calibration

SC7540 Specifications[1]

160 mm

44 mm

Image shows actual size
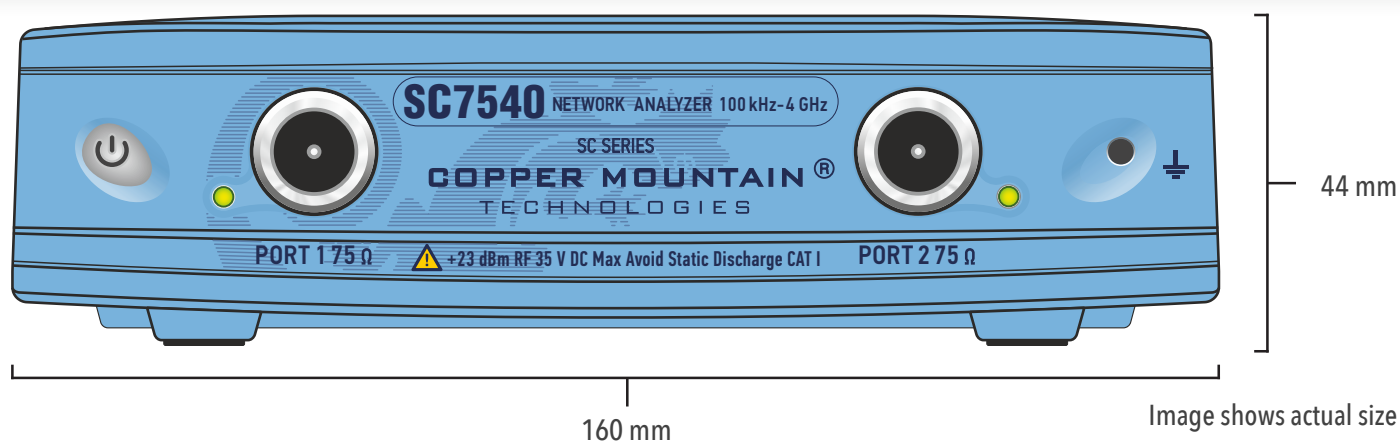
Primary Specifications

Impedance	75 Ohm
Test port connector	type N, female
Number of test ports	2
Frequency range	100 kHz to 4 GHz
Full frequency accuracy	$\pm 5 \cdot 10^{-6}$
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]	
100 kHz to 1 MHz	75 dB (100 dB typ.)
1 MHz to 4 GHz	132 dB (137 dB typ.)

Effective System Data

100 kHz to 4 GHz	
Directivity	46 dB
Source match	40 dB
Load match	46 dB
Reflection tracking	±0.10 dB
Transmission tracking	±0.14 dB

Uncorrected System Performance

100 kHz to 1 MHz	
Directivity	12 dB
Source match	15 dB
Load match	15 dB
1 MHz to 4 GHz	
Directivity	15 dB
Source match	15 dB
Load match	15 dB

Measurement Accuracy

Accuracy of transmission measurements[4]	Magnitude / Phase
100 kHz to 1 MHz	
-15 dB to +10 dB	±0.2 dB / ±2°
-35 dB to -15 dB	±1.0 dB / ±6°
1 MHz to 4 GHz	
0 dB to +10 dB	±0.2 dB / ±2°
-55 dB to 0 dB	±0.15 dB / ±1.5°
-75 dB to -55 dB	±0.2 dB / ±2°
-95 dB to -75 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)	
100 kHz to 300 kHz	0.050 dB rms
300 kHz to 4 GHz	0.002 dB rms
Temperature dependence	0.02 dB/°C

Test Port Output

Power range	-50 dBm to +10 dBm
Power accuracy	±1.0 dB
Power resolution	0.05 dB
Harmonic distortion[6]	-20 dBc
Non-harmonic spurious[6]	-30 dBc

Test Port Input

Noise floor	
100 kHz to 1 MHz	-75 dBm/Hz
1 MHz to 4 GHz	-132 dBm/Hz
Damage level	+23 dBm
Damage DC voltage	35 V

Measurement Speed

Time per point	24 µs typ.
Port switchover time	0.2 ms

SC7540 Specifications[1]

Frequency Reference Input

Port	10 MHz Ref In/Out
External reference frequency	10 MHz
Input level	-3 dBm to 3 dBm
Input impedance	50 Ohm
Connector type	BNC, female

Frequency Reference Output

Port	10 MHz Ref In/Out
Internal reference frequency	10 MHz
Output reference signal level at 50 Ohm impedance	-1 dBm to 3 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		0 V to + 5 V
Pulse width		≥2 µs
Polarity		positive or negative
Input impedance		≥10 kOhm
Connector type		BNC, female

Trigger Output

Port		Ext Trig
Maximum output current		20 mA
Output level		
	Low level voltage	0.5 V
	High level voltage	3.5 V
Polarity		positive or negative
Connector type		BNC, female

System & Power

Operating system	Windows 7 and above
CPU frequency	1.5 GHz
RAM	1 GB
Interface	USB 2.0
Connector type	USB B
Input power (VNA)	9 V DC to 15 V DC
Input power consumption (VNA)	10 W
Power supply (Main Outlet)	110-240 V, 50/60 Hz
Power consumption (Main Outlet)	12 W

Factory Adjustment

Recommended factory adjustment interval	3 years

Dimensions

Length	297 mm
Width	160 mm
Height	44 mm
Weight	1.7 kg (60 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

Effective System Data

| 100 kHz to 1 MHz	
Directivity	0.005
Source match	0.010
Load match	0.005
Reflection tracking	0.012
Transmission tracking	0.016
Isolation (max noise level)	$1.8 \cdot 10^{-3}$
Compression	$1.15 \cdot 10^{-3}$
1 MHz to 4 GHz	
Directivity	0.005
Source match	0.010
Load match	0.005
Reflection tracking	0.012
Transmission tracking	0.016
Isolation (max noise level)	$2.5 \cdot 10^{-6}$
Compression	$1.15 \cdot 10^{-3}$

[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 0 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 over frequency range from 300 kHz to upper frequency limit, at output power of 0 dBm. © Copper Mountain Technologies - www.coppermountaintech.com - Rev. 2025Q2

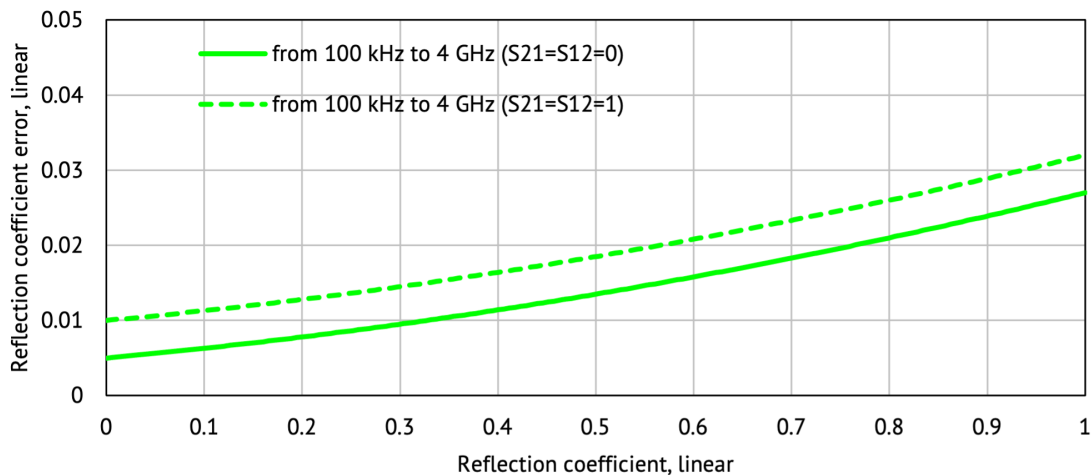# Reflection Accuracy Plots

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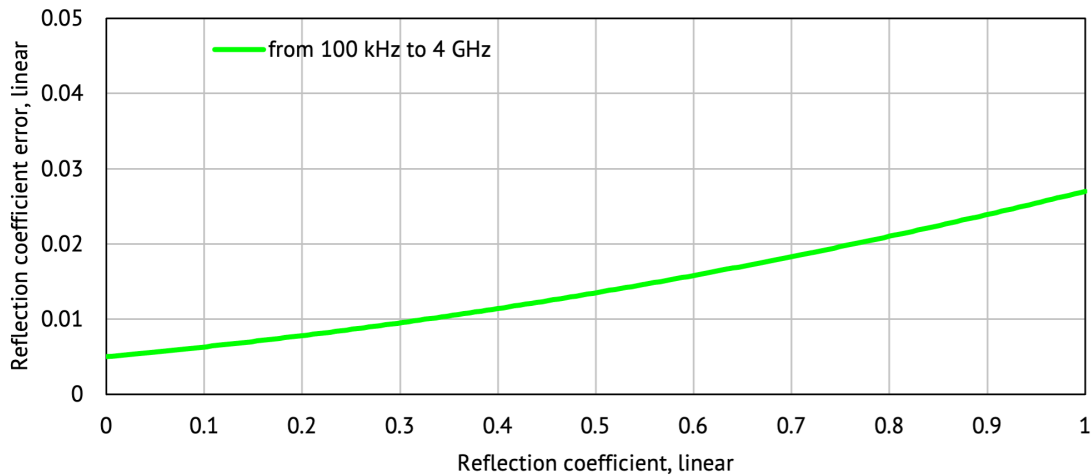
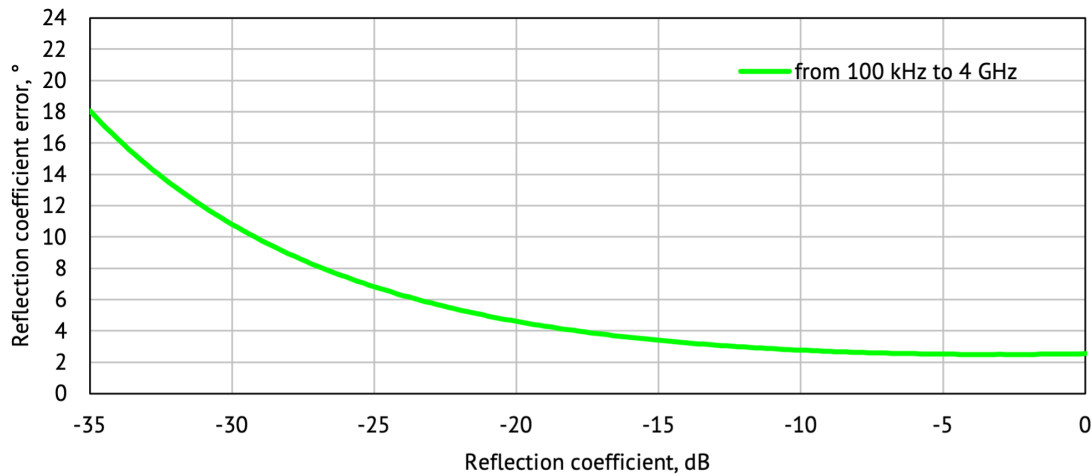Specifications are based on isolating DUT ($S_{21} = S_{12} = 0$)
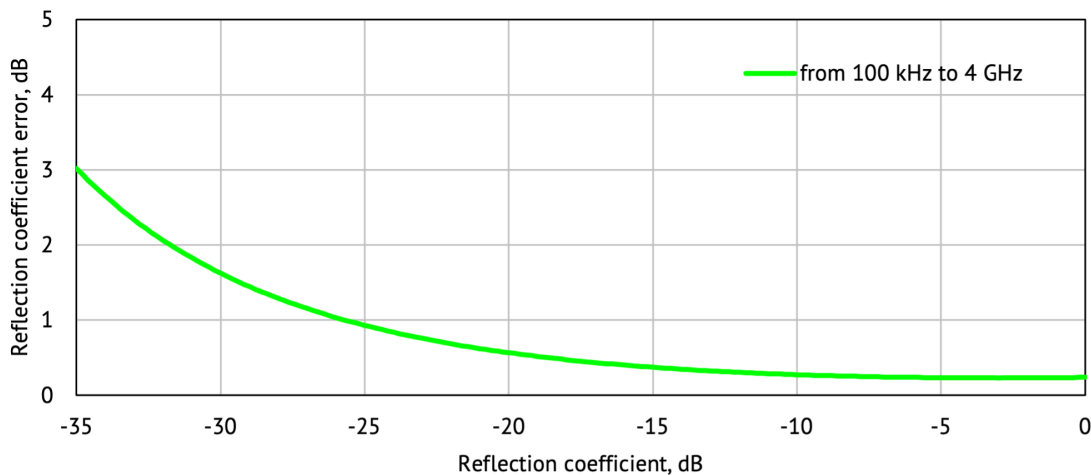
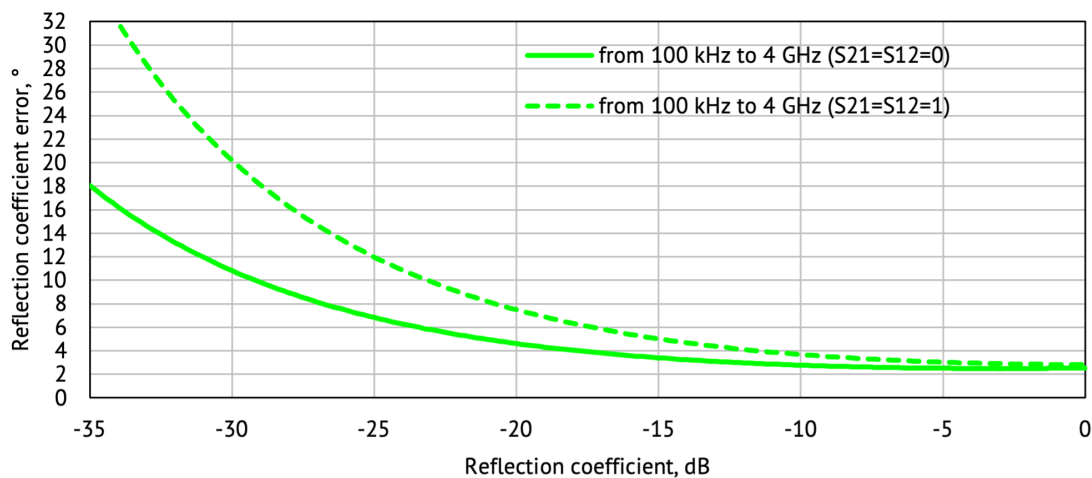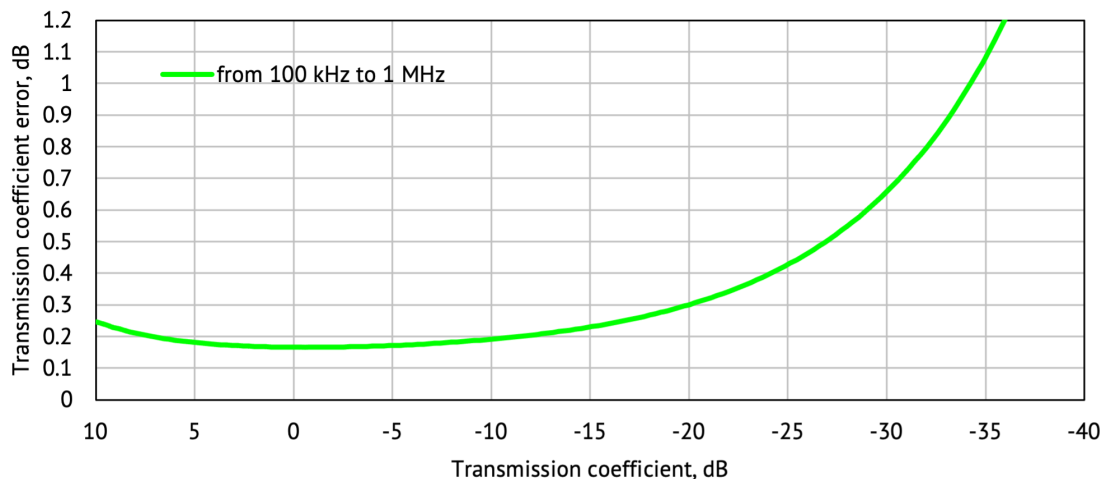Specifications are based on isolating DUT ($S_{21} = S_{12} = 0$)

Reflection Phase Errors

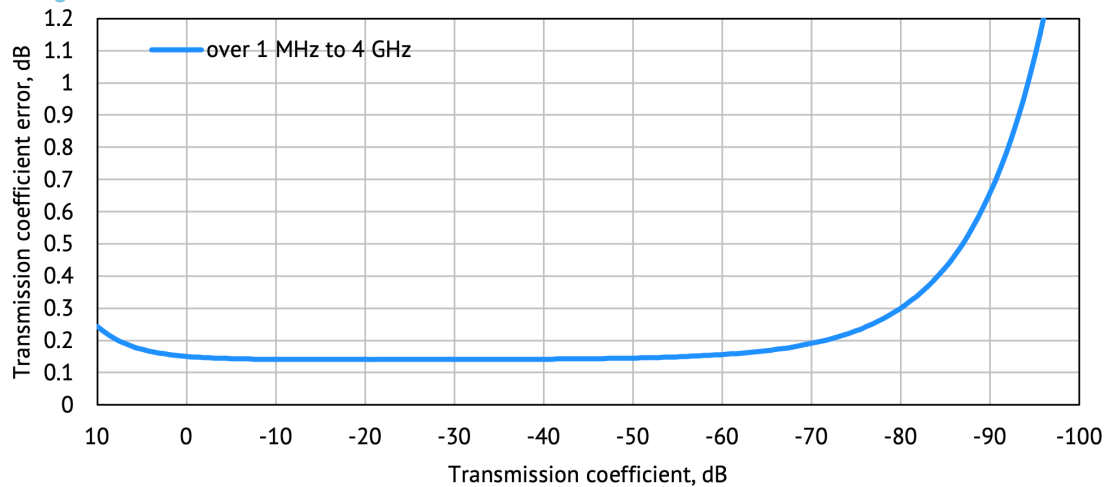Specifications are based on isolating DUT ($S_{21} = S_{12} = 0$)

Transmission Magnitude Errors

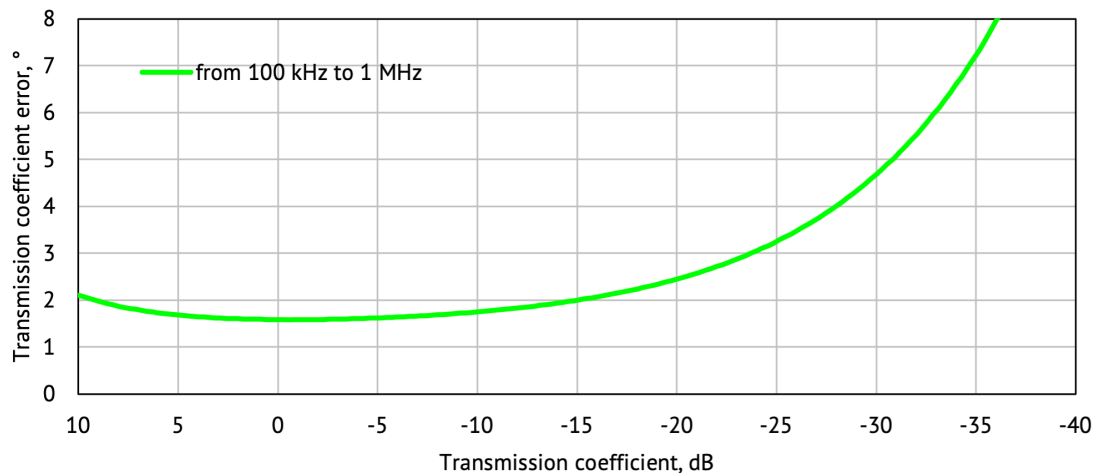Specifications are based on matched DUT, and IF bandwidth of 10 Hz

Transmission Accuracy Plots
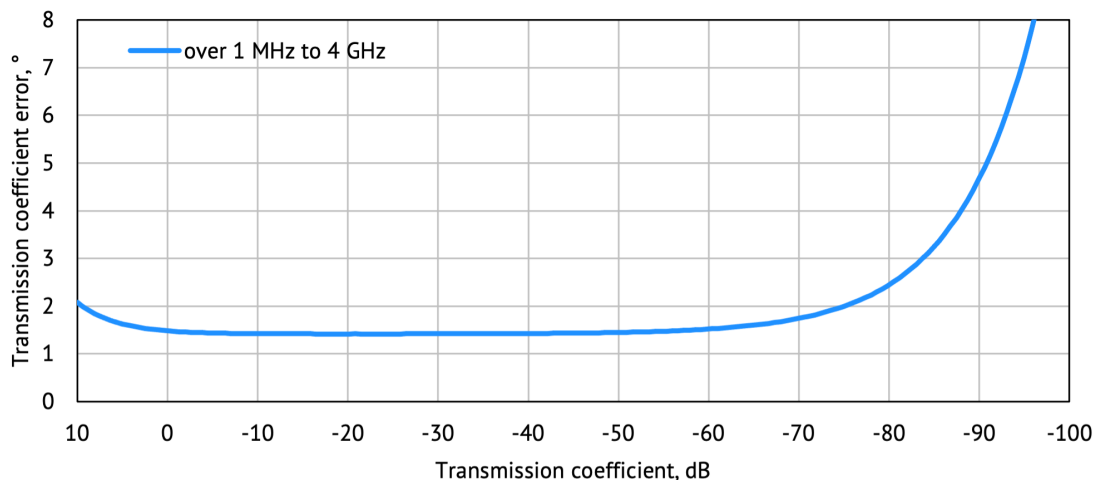
Transmission Magnitude Errors

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

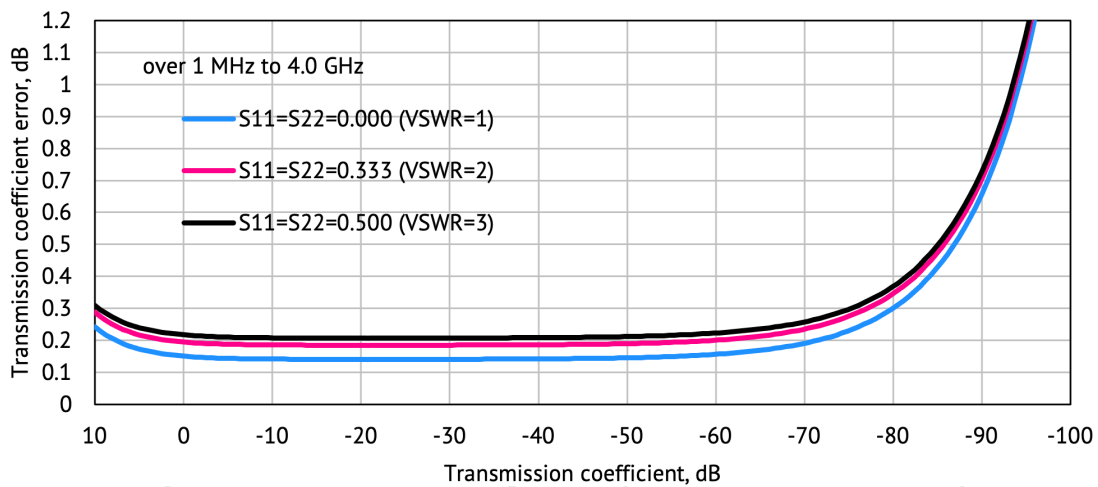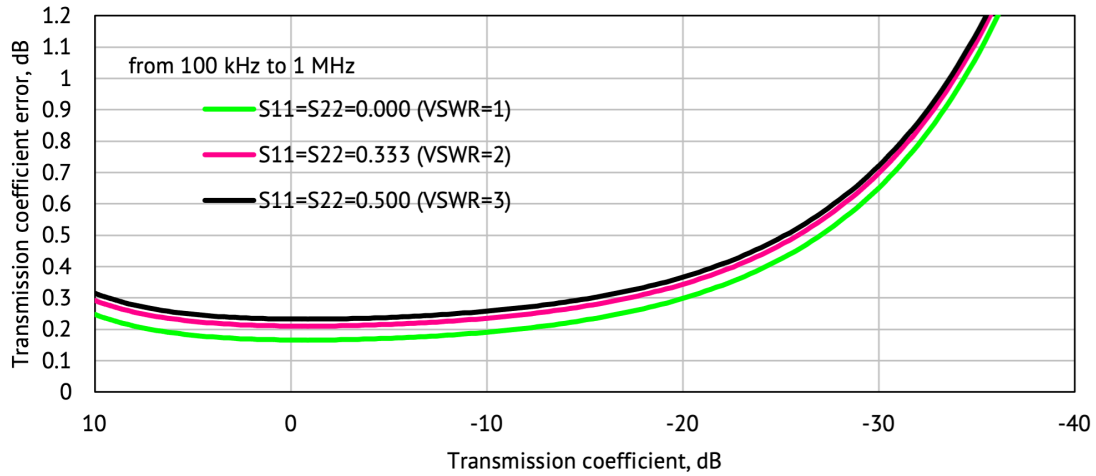**Transmission Phase Errors**

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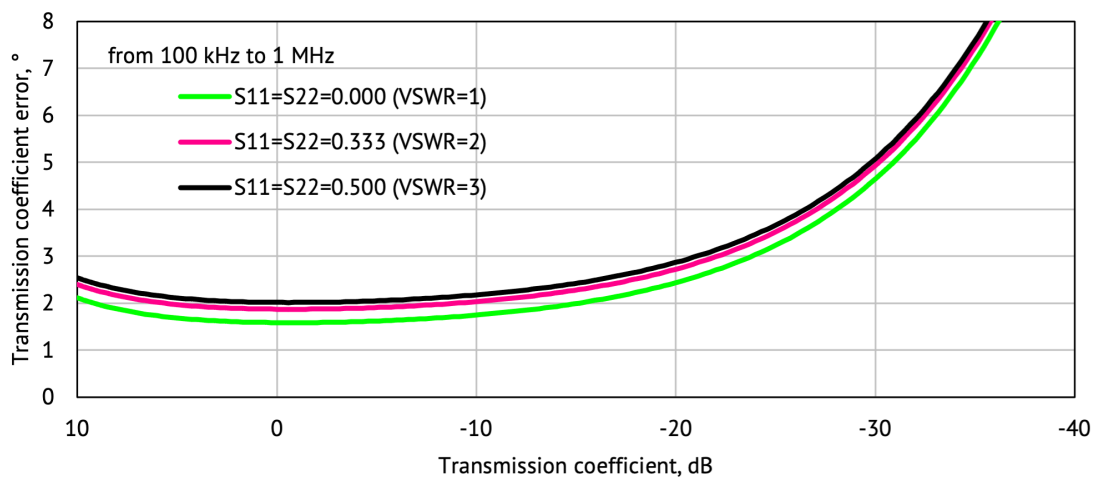

Specifications are based on matched DUT, and IF bandwidth of 10 Hz

Transmission Accuracy Plots
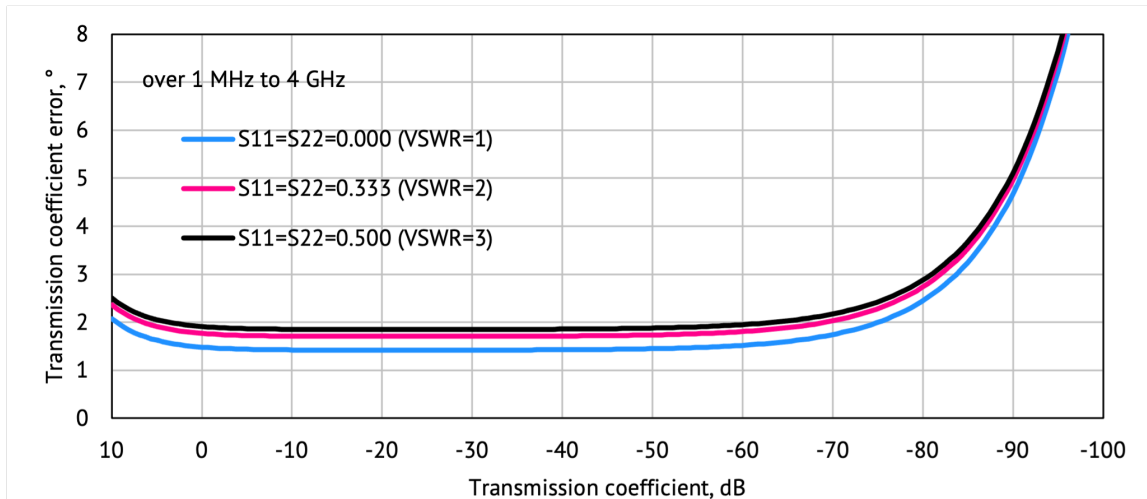
Transmission Magnitude Errors for Unmatched Devices

from 100 kHz to 1 MHz
- S11=S22=0.000 (VSWR=1)
- S11=S22=0.333 (VSWR=2)
- S11=S22=0.500 (VSWR=3)

Transmission coefficient error, dB vs Transmission coefficient, dB

over 1 MHz to 4.0 GHz
- S11=S22=0.000 (VSWR=1)
- S11=S22=0.333 (VSWR=2)
- S11=S22=0.500 (VSWR=3)

Transmission coefficient error, dB vs Transmission coefficient, dB

Transmission Phase Errors for Unmatched Devices

from 100 kHz to 1 MHz
- S11=S22=0.000 (VSWR=1)
- S11=S22=0.333 (VSWR=2)
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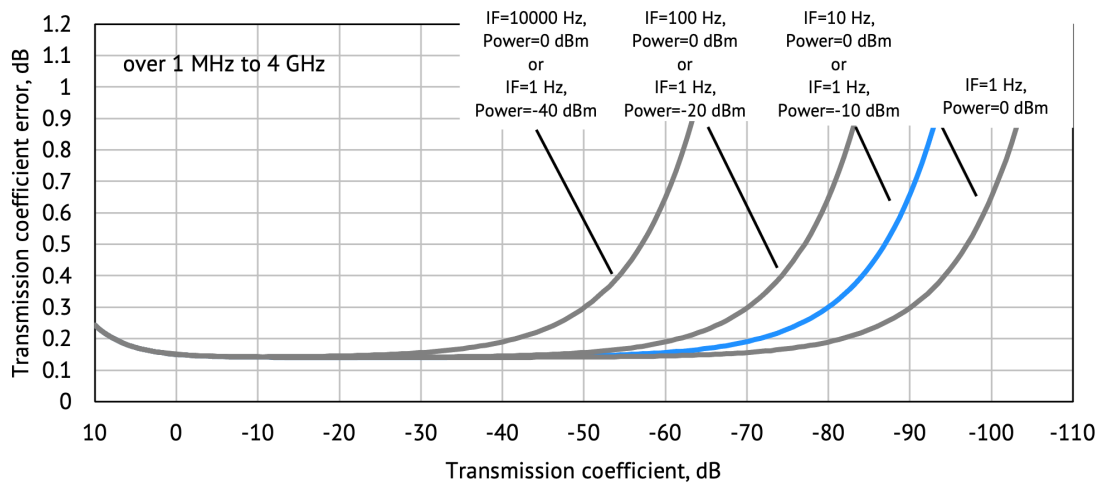Transmission coefficient error, ° vs Transmission coefficient, dB

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 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.

Compact Series S Models Overview

	SC5065	SC5090	SC7540
Frequency Range	300 kHz to 6.5 GHz	300 kHz to 9 GHz	100 kHz to 4 GHz
Dynamic Range	140 dB, typ.	140 dB, typ.	137 dB, typ.
S-parameters	S11, S21, S12, S22	S11, S21, S12, S22	S11, S21, S12, S22

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