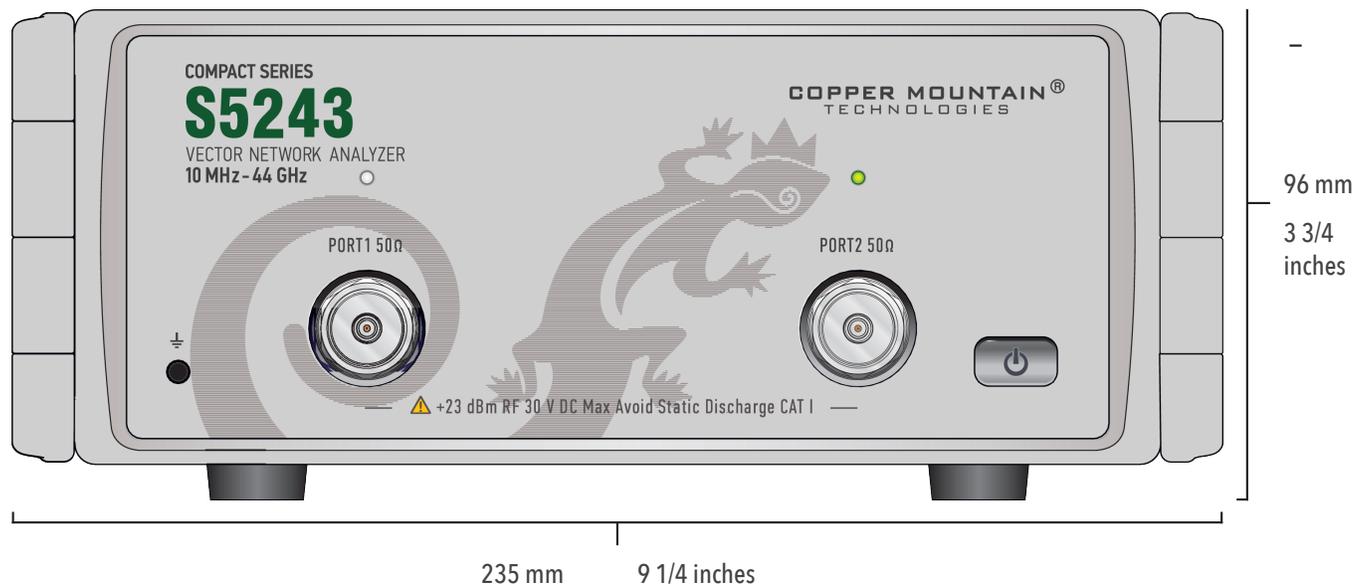


S5243 Extended Data Sheet



- **Frequency range:** 10 MHz - 44 GHz
- **Wide output power range:** -50 dBm to 0 dBm
- **Dynamic range:** 135 dB (10 Hz IF bandwidth) typ.
- **Measurement time per point:** 22 μ s per point, min typ.
- **16 logical channels with 16 traces** each max.
- **Automation programming** in Python, LabVIEW, 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

S5243 Specifications¹



Primary Specifications³

Impedance	50 Ohm
Test port connector	NMD 2.4 mm, male
Number of test ports	2
Frequency range	10 MHz to 44 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 27 GHz	133 dB (135 dB typ.)
27 GHz to 40 GHz	125 dB (128 dB typ.)
40 GHz to 44 GHz	115 dB (118 dB typ.)

Effective System Data

10 MHz to 27 GHz	
Directivity	42 dB
Source match	38 dB
Load match	42 dB
Reflection tracking	± 0.10 dB
Transmission tracking	± 0.10 dB
27 GHz to 44 GHz	
Directivity	40 dB
Source match	34 dB
Load match	40 dB
Reflection tracking	± 0.15 dB
Transmission tracking	± 0.10 dB

Measurement Accuracy

Accuracy of transmission measurements ⁴	Magnitude / Phase
10 MHz to 27 GHz	
0 dB to +10 dB	± 0.2 dB / $\pm 2^\circ$
-55 dB to 0 dB	± 0.1 dB / $\pm 1^\circ$
-75 dB to -55 dB	± 0.2 dB / $\pm 2^\circ$
-93 dB to -75 dB	± 1.0 dB / $\pm 6^\circ$
27 GHz to 40 GHz	
0 dB to +10 dB	± 0.2 dB / $\pm 2^\circ$
-45 dB to 0 dB	± 0.1 dB / $\pm 1^\circ$
-65 dB to -45 dB	± 0.2 dB / $\pm 2^\circ$
-85 dB to -65 dB	± 1.0 dB / $\pm 6^\circ$
40 GHz to 44 GHz	
0 dB to +10 dB	± 0.2 dB / $\pm 2^\circ$
-40 dB to 0 dB	± 0.1 dB / $\pm 1^\circ$
-60 dB to -40 dB	± 0.2 dB / $\pm 2^\circ$
-80 dB to -60 dB	± 1.0 dB / $\pm 6^\circ$
Accuracy of reflection measurements⁵	
10 MHz to 27 GHz	
-15 dB to 0 dB	± 0.5 dB / $\pm 5^\circ$
-25 dB to -15 dB	± 1.5 dB / $\pm 10^\circ$
-35 dB to -25 dB	± 5.5 dB / $\pm 30^\circ$
27 GHz to 44 GHz	
-15 dB to 0 dB	± 0.6 dB / $\pm 6^\circ$
-25 dB to -15 dB	± 2 dB / $\pm 12^\circ$
-35 dB to -25 dB	± 7.5 dB / $\pm 35^\circ$
Trace noise magnitude (IF bandwidth 3 kHz)	
10 MHz to 44 GHz	0.004 dB rms
Temperature dependence	
10 MHz to 9 GHz	0.02 dB/°C
9 GHz to 27 GHz	0.04 dB/°C
27 GHz to 44 GHz	0.04 dB/°C

Uncorrected System Performance

10 MHz to 27 GHz	
Directivity	10 dB
Source match	10 dB
Load match	10 dB
27 GHz to 44 GHz	
Directivity	8 dB
Source match	10 dB
Load match	10 dB

Test Port Output

Power range	
10 MHz to 40 GHz	-50 dBm to 0 dBm
40 GHz to 44 GHz	-50 dBm to -5 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 27 GHz	-143 dBm/Hz (-145 dBm/Hz typ.)
27 GHz to 40 GHz	-135 dBm/Hz (-138 dBm/Hz typ.)
40 GHz to 44 GHz	-130 dBm/Hz (-133 dBm/Hz typ.)
Damage level	
	+23 dBm
Damage DC voltage	
	30 V

Measurement Speed

Time per point	22 µs typ.
Port switchover time	7 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

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	1.5 GHz
RAM	1 GB
Interface	USB 2.0
Connector type	USB B
Power supply (Main Outlet)	110-240 V, 50/60 Hz
Power consumption (Main Outlet)	75 W

Factory Adjustment

Recommended factory adjustment interval	3 years
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Dimensions

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

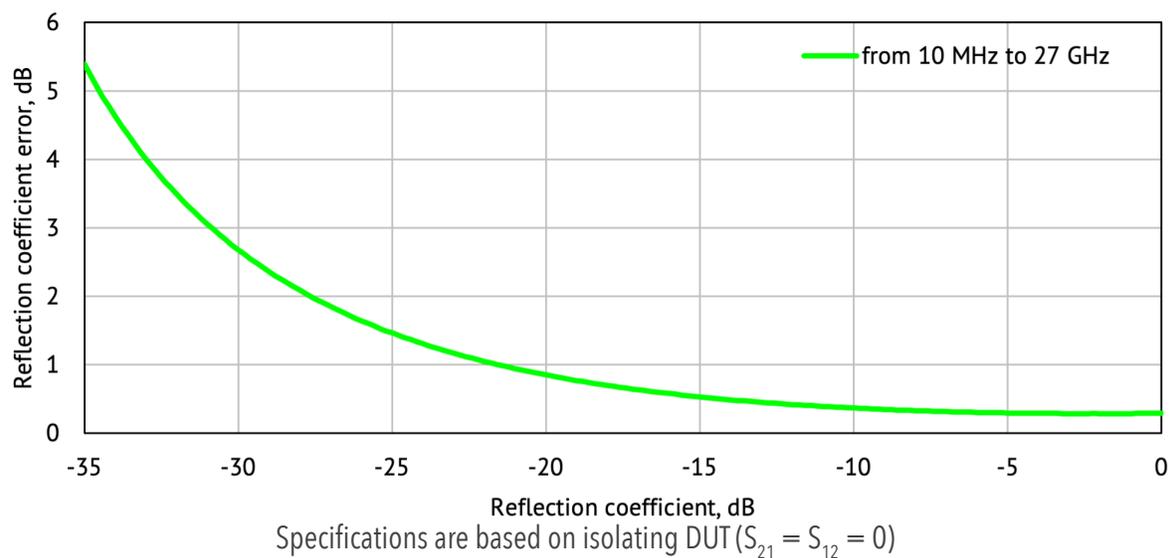
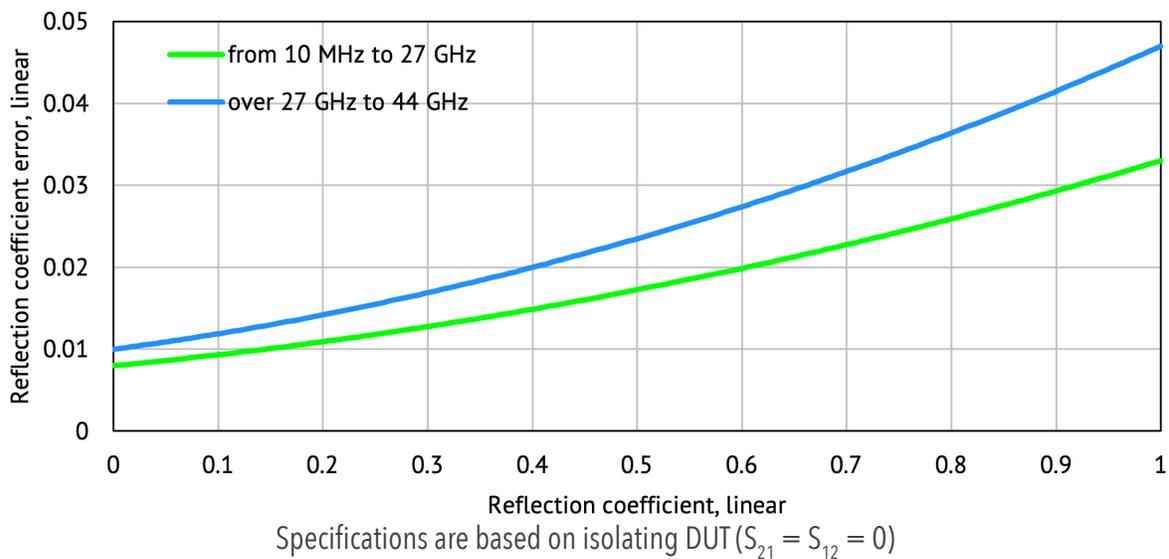
Environmental Specifications

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

[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 -10 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 entire frequency range, at output power of 0 dBm. ©Copper Mountain Technologies - www.coppermountaintech.com - Rev. 2022Q1

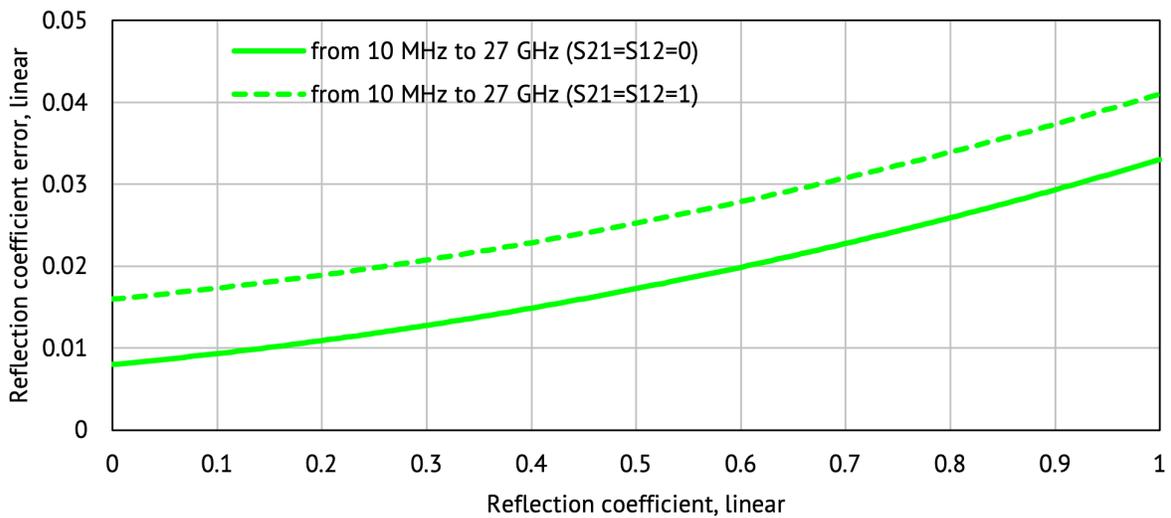
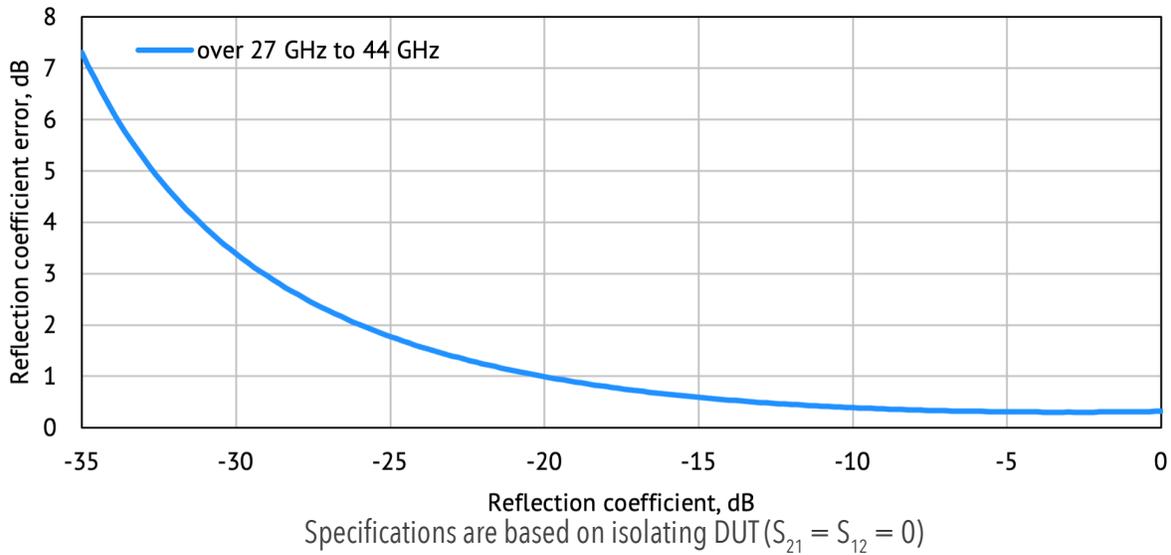
Reflection Accuracy Plots

Reflection Magnitude Errors



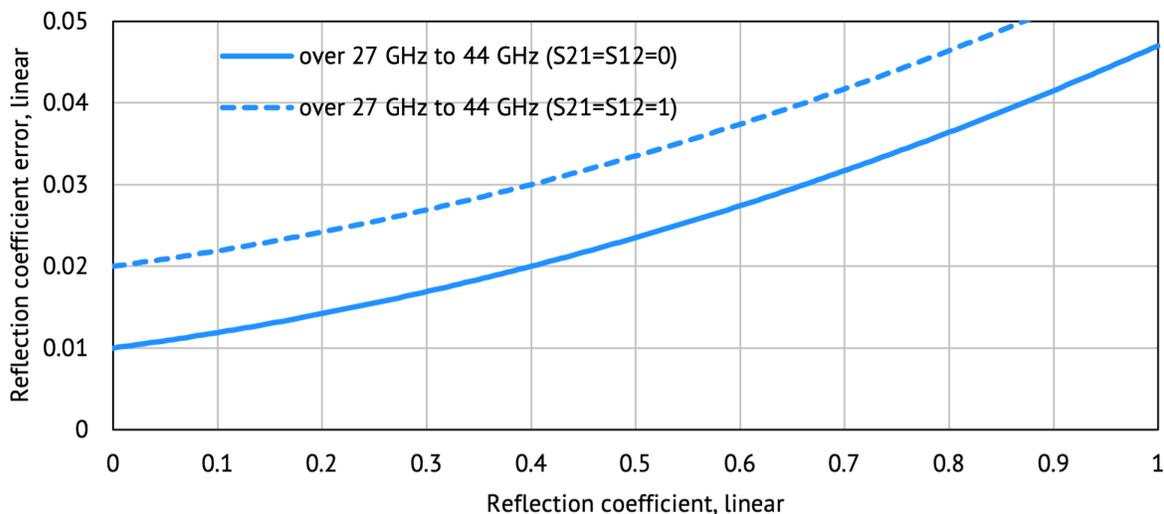
Reflection Accuracy Plots

Reflection Magnitude Errors

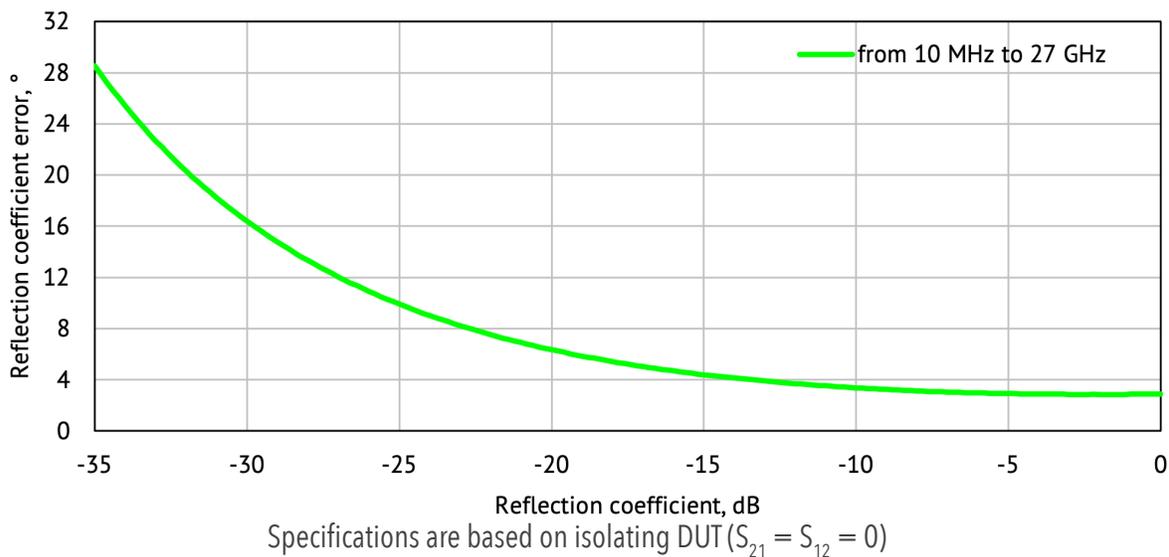


Reflection Accuracy Plots

Reflection Magnitude Errors

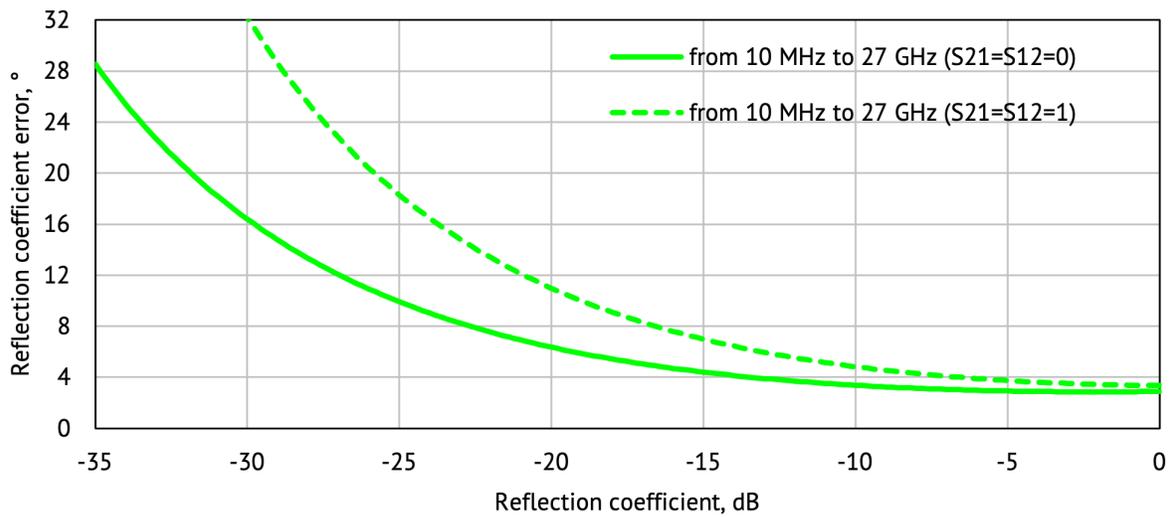
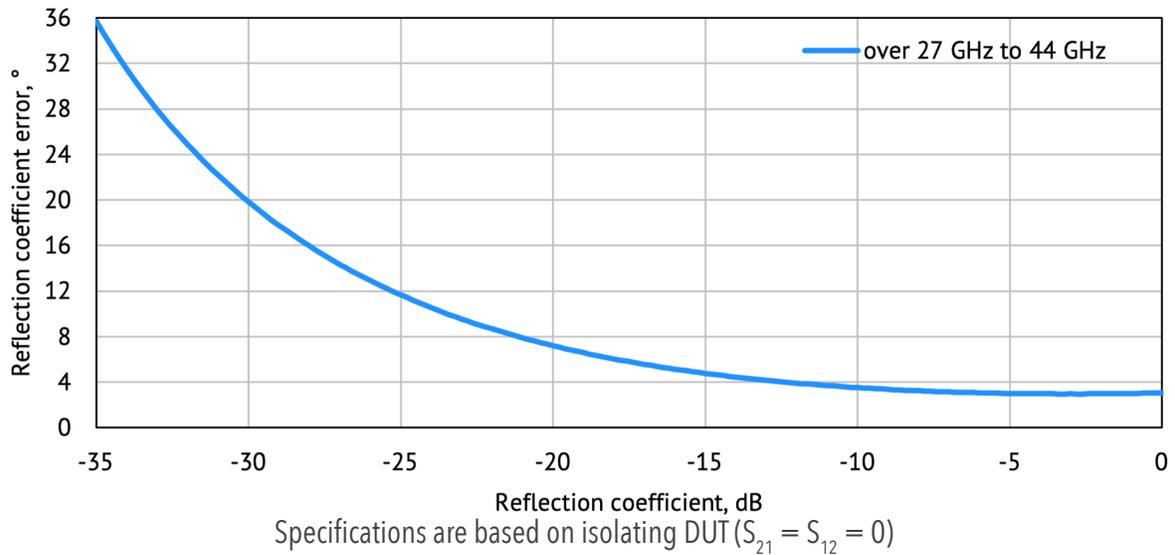


Reflection Phase Errors



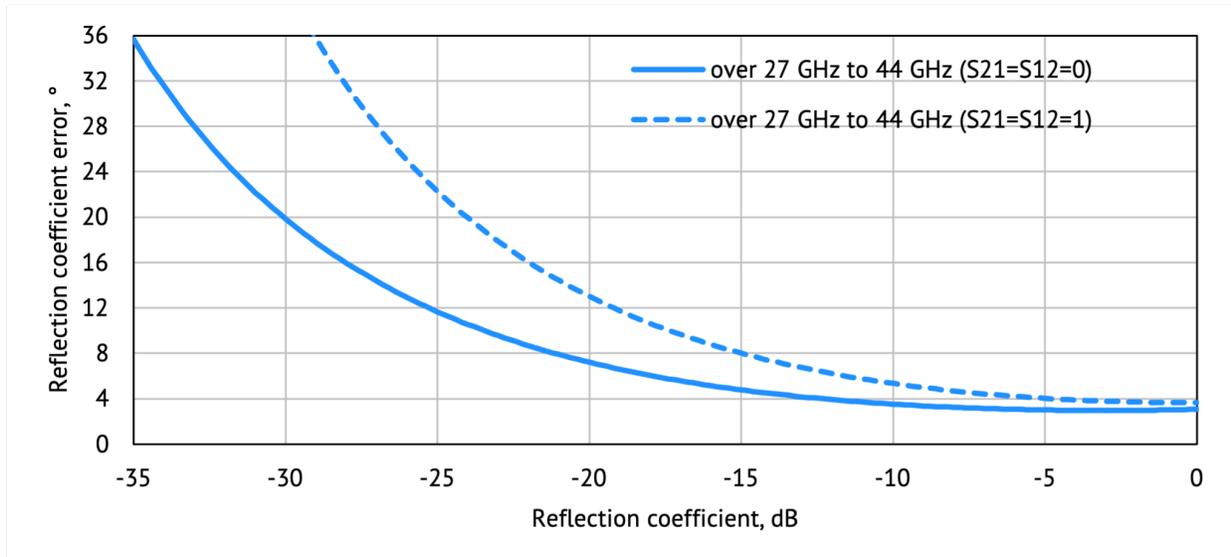
Reflection Accuracy Plots

Reflection Phase Errors



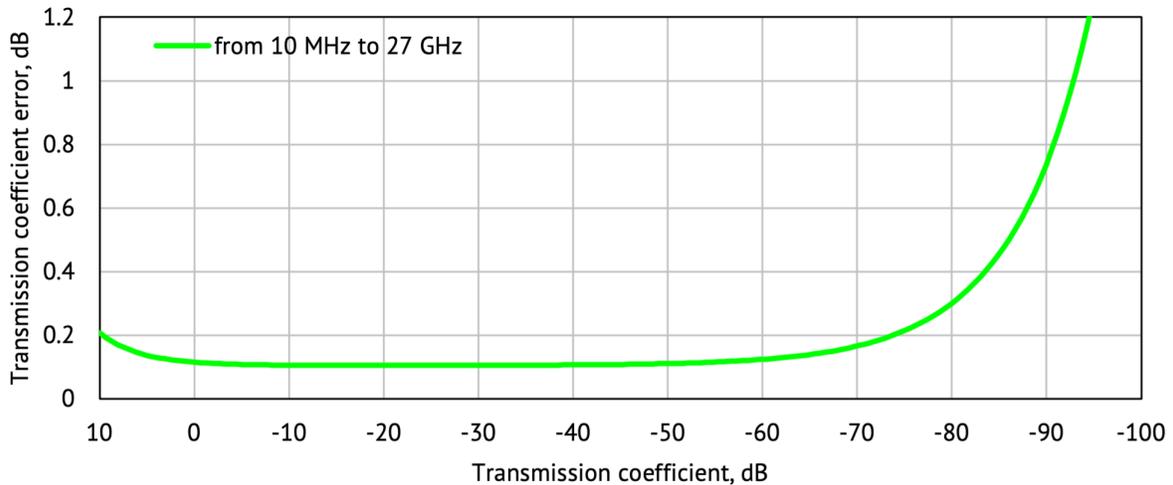
Reflection Accuracy Plots

Reflection Phase Errors

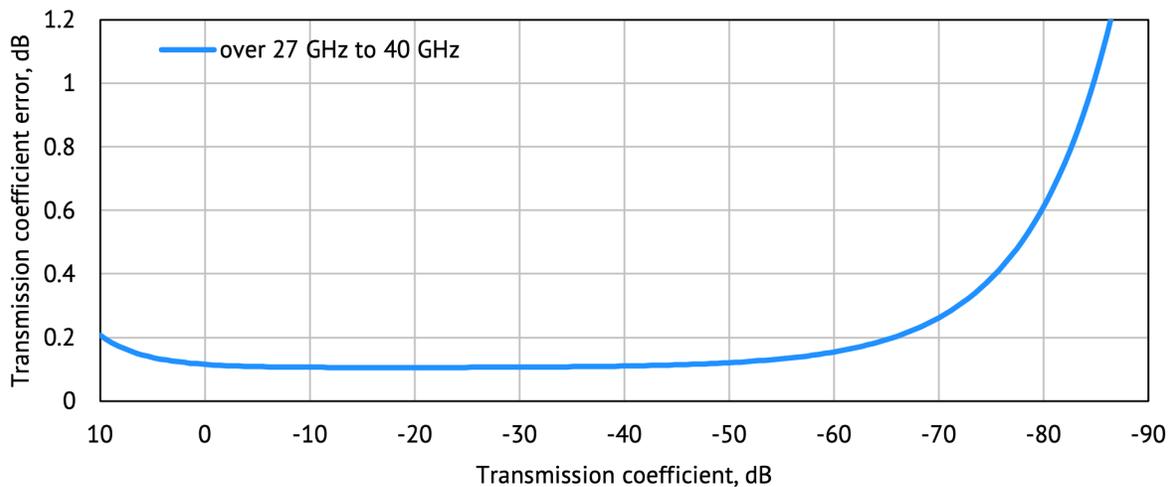


Transmission Accuracy Plots

Transmission Magnitude Errors



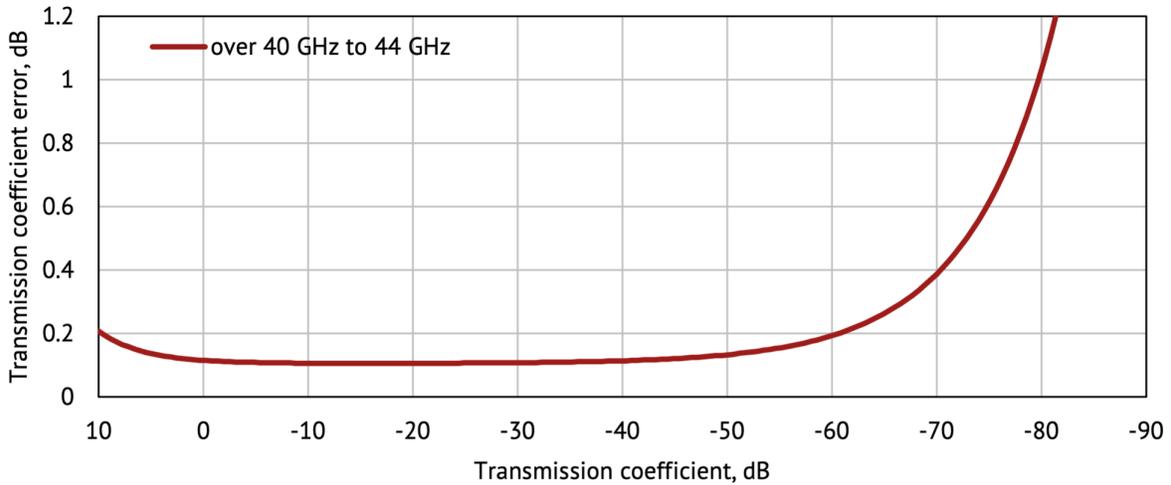
Specifications are based on matched DUT, and IF bandwidth of 10 Hz



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

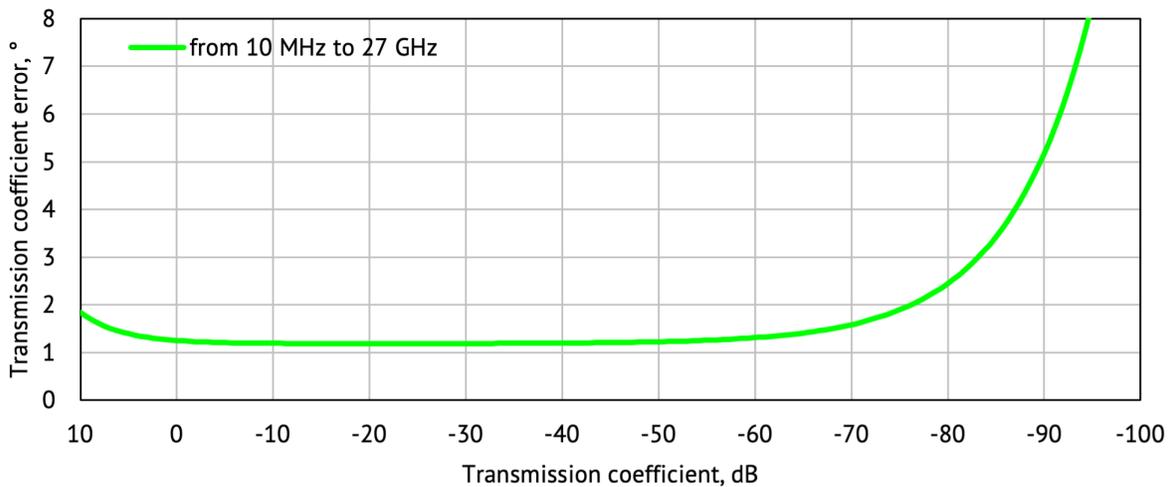
Transmission Accuracy Plots

Transmission Magnitude Errors



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

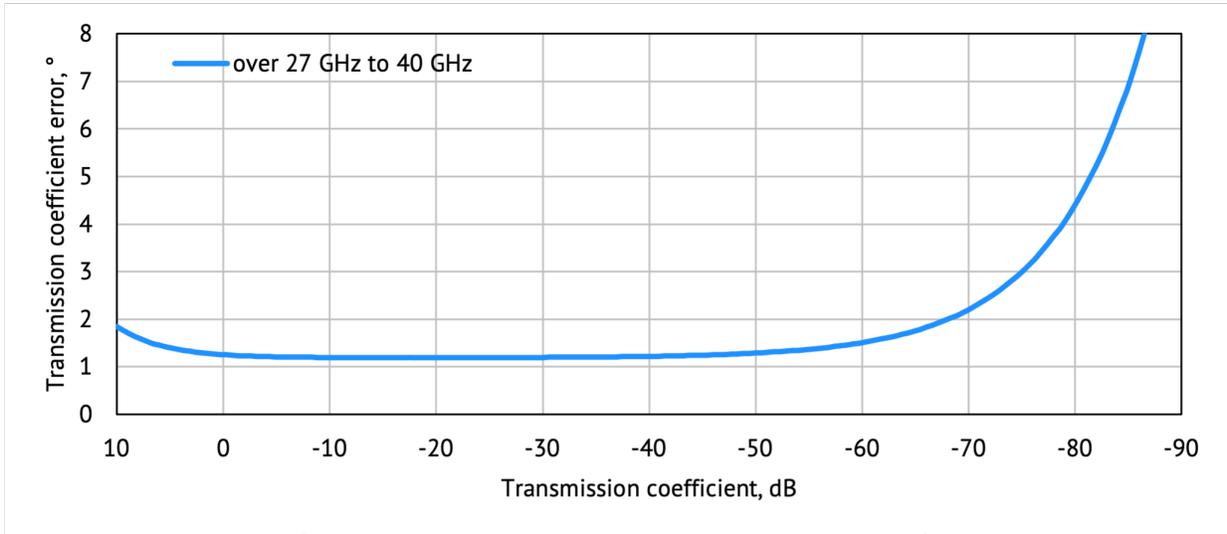
Transmission Phase Errors



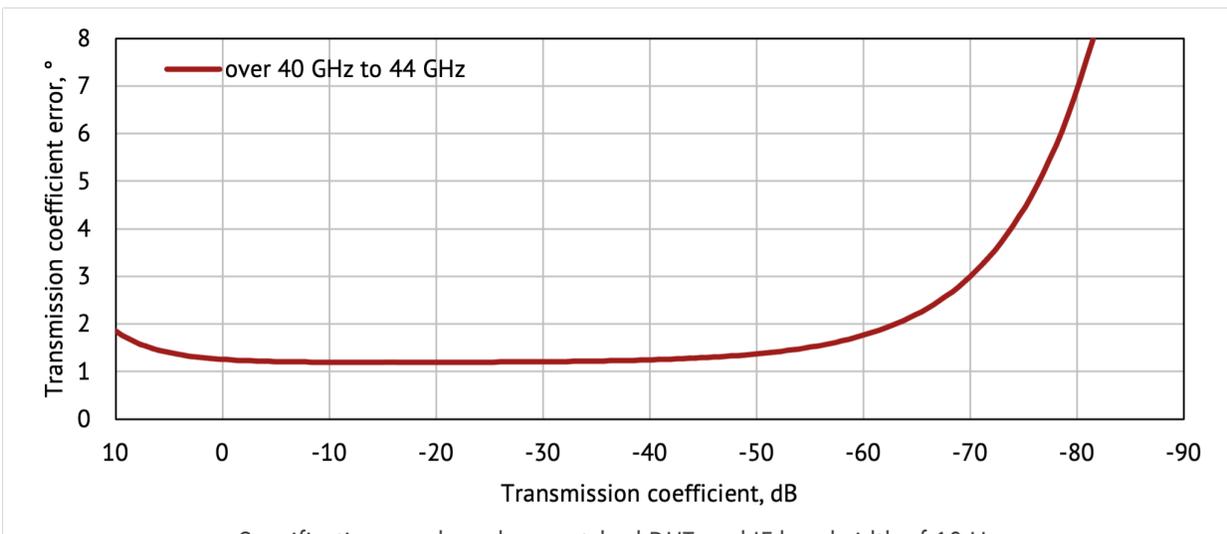
Specifications are based on matched DUT, and IF bandwidth of 10 Hz

Transmission Accuracy Plots

Transmission Phase Errors



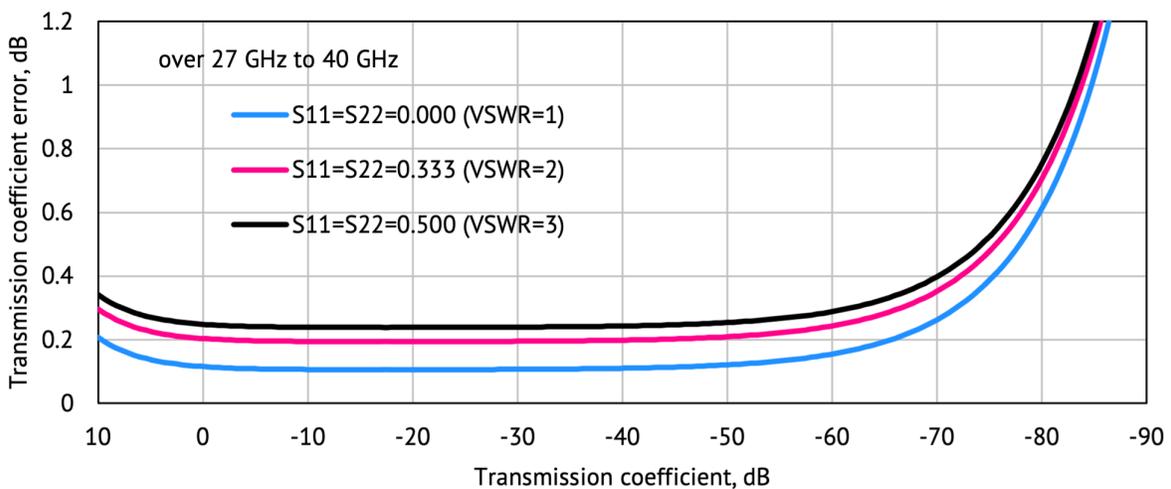
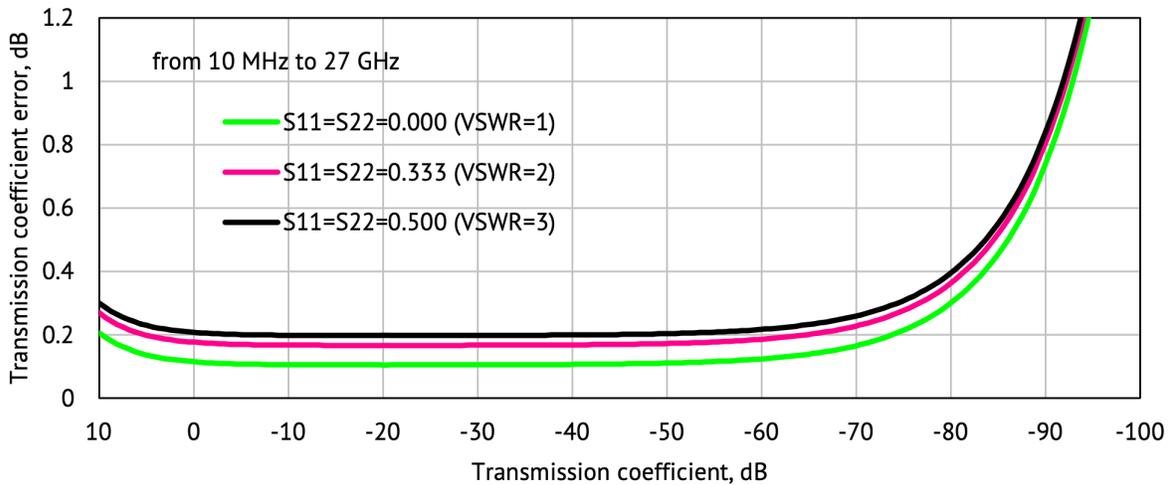
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Specifications are based on matched DUT, and IF bandwidth of 10 Hz

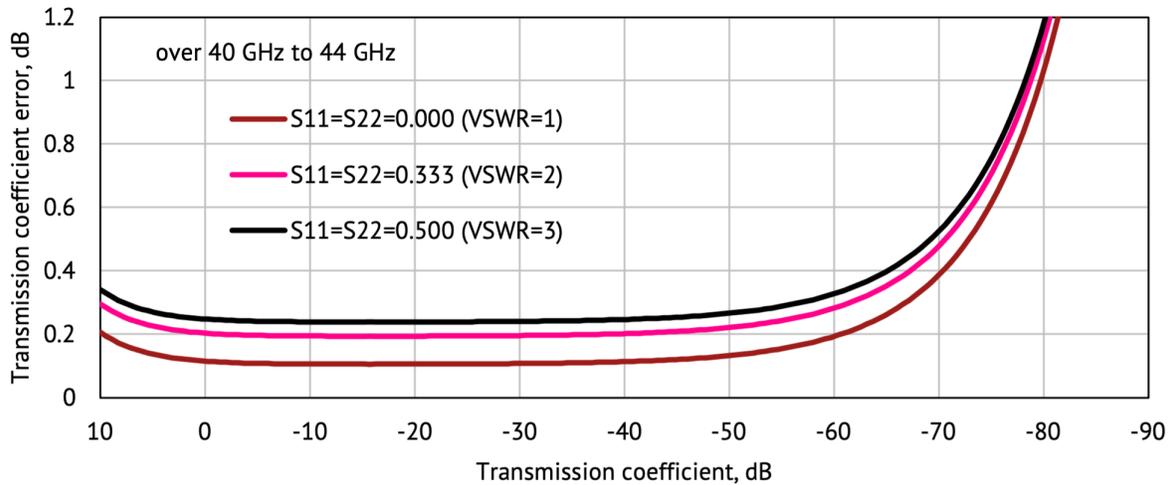
Transmission Accuracy Plots

Transmission magnitude errors for unmatched devices

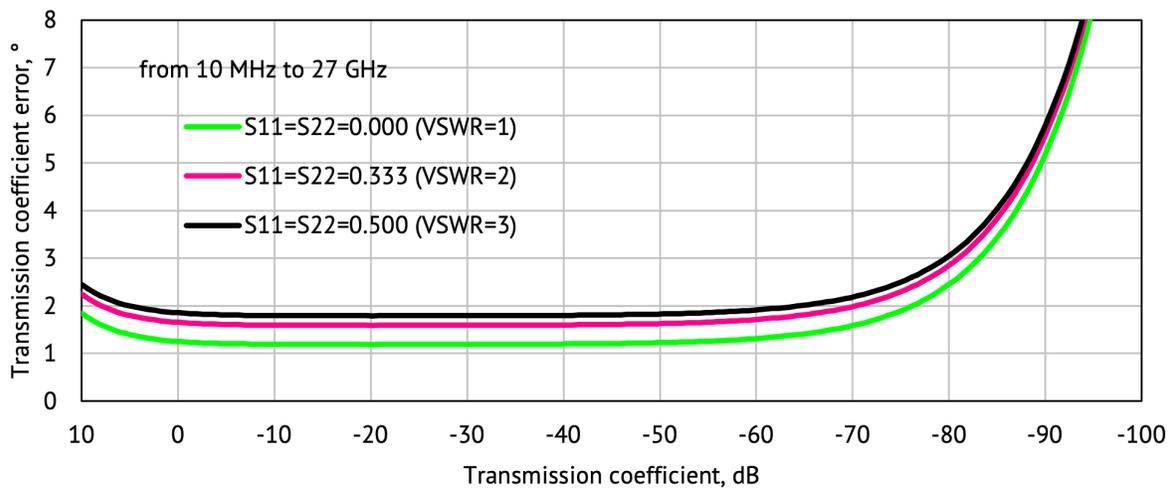


Transmission Accuracy Plots

Transmission magnitude errors for unmatched devices

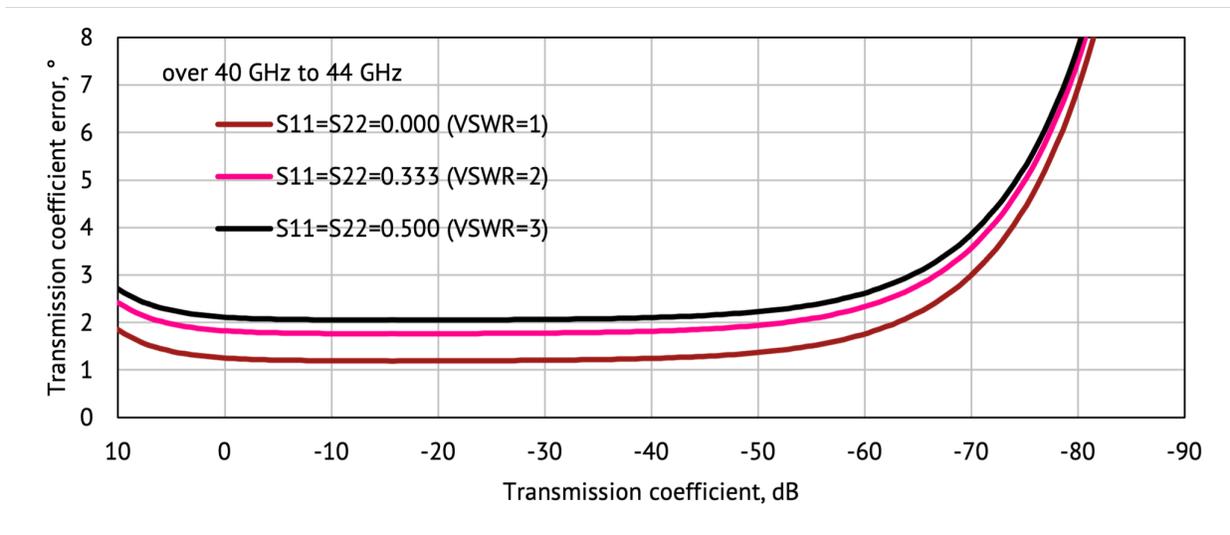
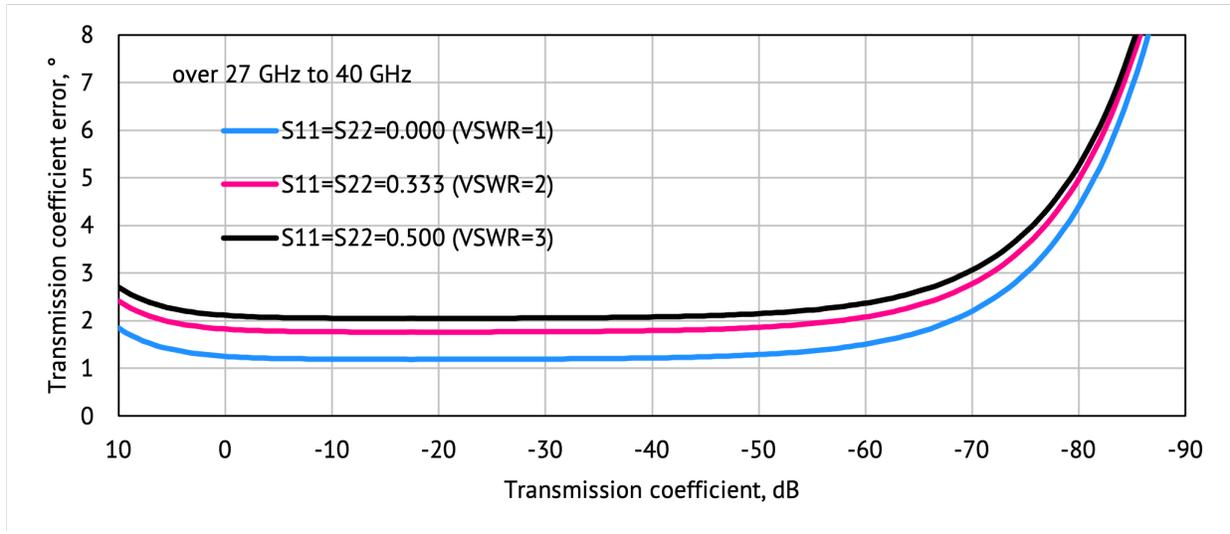


Transmission phase errors for unmatched devices



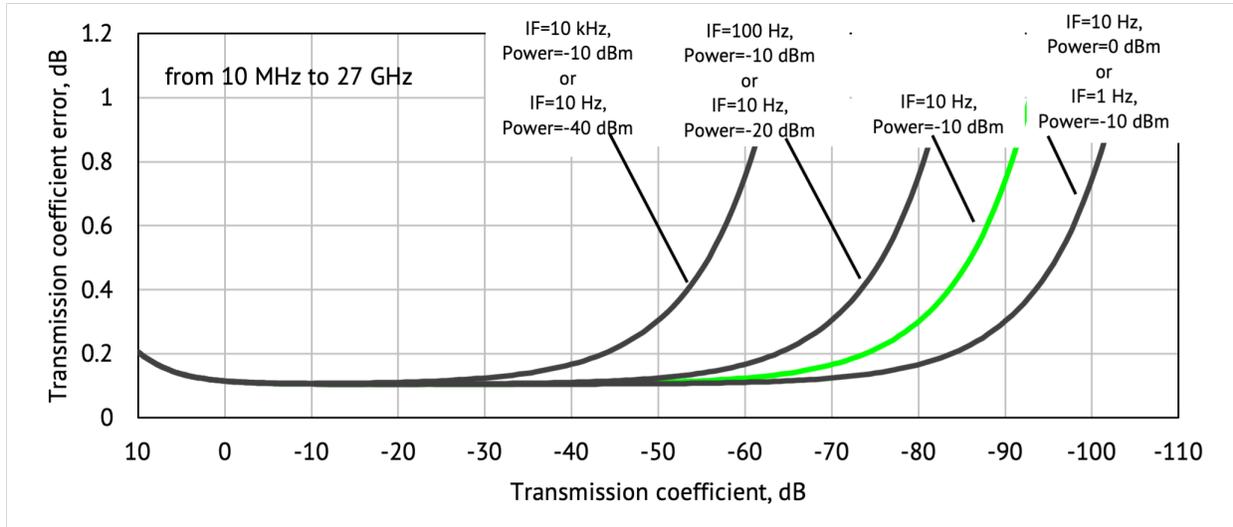
Transmission Accuracy Plots

Transmission phase errors for unmatched devices



Transmission Accuracy Plots

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.***



Compact Series S Models Overview

	S5045	S5065	S5085	S5180B	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 44 GHz	20 kHz to 3 GHz
Dynamic Range	130 dB, typ.	130 dB, typ.	130 dB, typ.	>130 dB, typ.	135 dB, typ.	123 dB, typ.
Port Impedance	50 Ohm	50 Ohm	50 Ohm	50 Ohm	50 Ohm	75 Ohm

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