Value Series VNAs

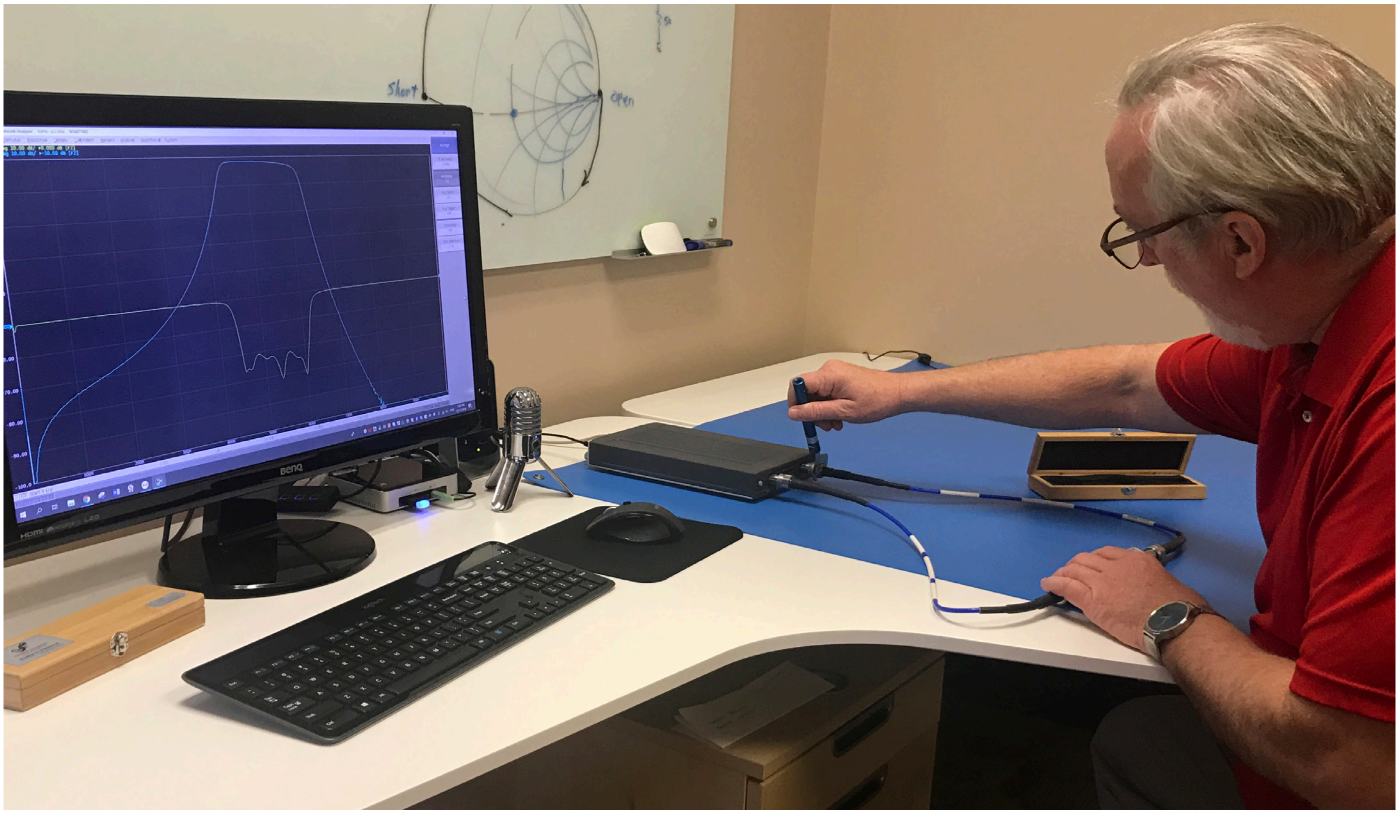
COPPER MOUNTAIN®
TECHNOLOGIES

V0402
VECTOR NETWORK ANALYZER 100 kHz - 4.5 GHz
V0602
VECTOR NETWORK ANALYZER 100 kHz - 6.5 GHz
V0902
VECTOR NETWORK ANALYZER 100 kHz - 9 GHz
COPPER MOUNTAIN TECHNOLOGIES
50 Ω PORT 1
+23 dBm RF 25 V DC Max Avoid Static Discharge CAT I

- **Frequency range**: 100 kHz - 9 GHz
- **Wide output power range**: -40 dBm to +10 dBm*
- **Dynamic range**: 130 dB (10 Hz IF bandwidth) typ.*
- **Measurement time per point**: 25 µs per point, min typ.*
- **16 logical channels with 16 traces** per channel.
- **Automation programming** in Python, LabVIEW, MATLAB, .NET, etc.
- Up to **500,001 measurement points***
- Multiple **precision calibration methods** and automatic calibration

**Depending on model*

Small Size, Basic Software Features



Value Series VNAs deliver metrology-grade performance in a more economical package that excludes a number of advanced features: Vector Mixer Calibration, TRL Calibration, Frequency Offset, Time Domain, and Gating. These Vector Network Analyzers are small, can be powered by battery, and are ideal for use in laboratory and production testing in a variety of applications including filter tuning, antenna test and characterization, amplifier testing, etc.

Copper Mountain Technologies' USB VNAs are next generation analyzers designed to meet the needs of 21st Century engineers. Our VNAs include an RF measurement module and software application which runs on a Windows PC, laptop, or tablet, connecting to the measurement hardware via USB interface.

This innovative approach delivers high measurement accuracy and enables users to take advantage of faster processors, newer computers and larger displays. USB VNAs have lower Total Cost of Ownership and fewer potential failure points. These instruments are smaller and lighter, can go almost anywhere, are very easy to share and eliminate the need for data purging or hard drive removal in secure environments.

The Whole Solution

Warranty, Service & Repairs

All our products come with a standard three-year warranty from date of shipment. During that time we will repair or replace any product malfunctioning due to defective parts or labor.

While we pride ourselves on quality of our instruments, should your VNA malfunction for any reason, we will gladly offer a loaner unit while we service yours. With our USB VNAs where all data is stored on your PC, a simple swap of the device assures uninterrupted workflow and little or no downtime.

Our Engineers are an Extension of Your Team

Our team of applications engineers, service technicians, and metrology scientists are here to help you with technical support, application-specific recommendations, annual performance testing, and troubleshooting or repair of your CMT instruments.

Our engineers will work with your team to augment your in-house capabilities. We can write custom applications and test software, develop test automation scripts and help with integrated RF system testing. We can design and provide an RF switching network specific to your requirements; electro-mechanical, solid-state, or PIN diode-based. If the S-parameter measurement fixture involves challenging conditions for repeatability and accuracy we can assist with measurement uncertainty analysis.

An extensive library of technical materials including application notes, tips on performing VNA measurements, sample automation scripts, and how-to videos are available on our website www.coppermountaintech.com and YouTube channel, CopperMountainTech.

Annual Calibration

Copper Mountain Technologies' Indianapolis and Cyprus calibration laboratories are accredited in accordance with the recognized international standard ISO/IEC 17025:2017 and meets the requirements of ANSI/NCSL Z540-1994-1. All reference standards and equipment in the laboratory are traceable to National Institute of Standards and Technology (NIST) or international equivalent.

Should you prefer to perform the annual testing yourself or use a third party, contact us for information or questions on performing these procedures. Additionally, the VNA Performance Test (VNAPT) software application is available for third party laboratories without restriction. Use of VNAPT to execute performance tests is optional, but the software is designed to automate and streamline VNA performance testing, including automatic generation of test reports. Please contact Copper Mountain Technologies or your local distributor for recommended calibration options.

> **"CMT devices are lightweight, compact and a necessary tool for technical sales or engineers on the go. The software interface allows users to test RF products with any standard computer system. This is a revolution and a relief in terms of space occupied in the lab, measurement reliability and dynamic range. CMT provides the highest level of timely and attentive customer care."**
>
> – Jessy Cavazos | *Industry Director, Frost & Sullivan*

FROST & SULLIVAN
2015 BEST PRACTICES AWARD
GLOBAL VECTOR NETWORK ANALYZER COMPETITIVE STRATEGY INNOVATION AND LEADERSHIP AWARD

FROST & SULLIVAN
2017 BEST PRACTICES AWARD
GLOBAL UNIVERSAL SERIAL BUS (USB) VECTOR NETWORK ANALYZER (VNA) PRODUCT LEADERSHIP AWARD

FROST & SULLIVAN
2020 BEST PRACTICES AWARD
GLOBAL VECTOR NETWORK ANALYZERS CUSTOMER VALUE LEADERSHIP AWARD

V0402 Specifications[1]

Primary Specifications[3]

Impedance	50 Ohm
Test port connector	type N, female
Number of test ports	2 −6
Frequency range	100 kHz to 4.5 GHz
Full frequency accuracy	±5·10
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 300 kHz
Dynamic range[2]	
100 kHz to 10 MHz	115 dB
10 MHz to 4.5 GHz	130 dB (135 dB typ.)

Effective System Data

100 kHz to 4.5 GHz	
Directivity	42 dB
Source match	38 dB
Load match	42 dB
Reflection tracking	±0.10 dB
Transmission tracking	
100 kHz to 10 MHz	±0.25 dB
10 MHz to 9 GHz	±0.14 dB

Test Port Output

Power range	
100 kHz to 4.5 GHz	-50 dBm to +5 dBm
Power accuracy	±1.5 dB
Power resolution	0.05 dB
Harmonic distortion[6]	-15 dBc
Non-harmonic spurious[6]	-20 dBc

Measurement Accuracy

Accuracy of transmission measurements	Magnitude / Phase
100 kHz to 10 MHz	
0 dB to +10 dB	±0.35 dB / ±3.5°
-35 dB to 0 dB	±0.25 dB / ±2.5°
-55 dB to -35 dB	±0.35 dB / ±3.5°
-75 dB to -55 dB	±1.2 dB / ±8.0°
10 MHz to 4.5 GHz	
0 dB to +10 dB	±0.25 dB / ±2.5°
-50 dB to 0 dB	±0.15 dB / ±1.5°
-70 dB to -50 dB	±0.25 dB / ±2.5°
-90 dB to -70 dB	±1.1 dB / ±7.5°
Accuracy of reflection measurements	Magnitude / Phase
-15 dB to 0 dB	±0.5 dB / ±4°
-25 dB to -15 dB	±1.5 dB / ±10°
-35 dB to -25 dB	±5.5 dB / ±30°
Trace noise magnitude (IF bandwidth 3 kHz)	
100 kHz to 10 MHz	0.005 dB rms
10 MHz to 4.5 GHz	0.002 dB rms
Temperature dependence	0.02 dB/°C

Uncorrected System Performance

100 kHz to 4.5 GHz	
Directivity	15 dB
Source match	15 dB
Load match	15 dB

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[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 over entire frequency range, at output power of 0 dBm.

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Test Port Input

Noise floor	
100 kHz to 10 MHz	-120 dBm/Hz
10 MHz to 4.5 GHz	-135 dBm/Hz
Damage level	+23 dBm
Damage DC voltage	25 V

Measurement Speed

Time per point	25 μs typ.
Port Switchover time	1 ms

Frequency Reference Input

Port	10 MHz Ref In/Out
External reference frequency	10 MHz
Input level	-1 dBm to 5 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 5 dBm
Connector type	BNC, female

Trigger Input

Port	Ext Trig In
Input level	
low threshold voltage	0.8 V
high threshold voltage	2.0 V
Input level range	0 V to +3.3 V
Pulse width	≥2 μs
Polarity	positive or negative
Input impedance	≥5 kOhm
Connector type	BNC, female

Trigger Output

Port	Ext Trig Out
Maximum output current	12 mA
Output level	
low threshold voltage	0.0 V
high threshold voltage	3.3 V
Polarity	positive or negative
Connector type	BNC, female

System & Power

Operating system (min requirements)	Windows 10 and above
CPU	4 core 2.0 GHz (x64 or arm64)
RAM	8 GB
Interface	USB 2.0
Connector type	Type C
Input power (VNA)	9 V DC to 15 V DC
Input power consumption (VNA)	26 W
Power supply (Main outlet)	110-240 V, 50/60 Hz
Power consumption (Main outlet)	30 W

Factory Adjustment

Recommended factory adjustment interval	3 Years

Dimensions

Length	297 mm
Width	160 mm
Height	44 mm
Weight	2.3 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	-50 °C to +70 °C (-58 °F to 158 °F)
Atmospheric pressure	70.0 kPa to 106.7 kPa

V0602 Specifications[1]

Primary Specifications[3]

Impedance	50 Ohm
Test port connector	type N, female
Number of test ports	2
Frequency range	100 kHz to 6.5 GHz
Full frequency accuracy	$\pm 5 \cdot 10^{-6}$
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 300 kHz
Dynamic range[2]	
100 kHz to 10 MHz	115 dB
10 MHz to 4.5 GHz	130 dB (135 dB typ.)
4.5 GHz to 6.5 GHz	125 dB (130 dB typ.)

Effective System Data

100 kHz to 6.5 GHz	
Directivity	42 dB
Source match	38 dB
Load match	42 dB
Reflection tracking	±0.10 dB
Transmission tracking	
100 kHz to 10 MHz	±0.25 dB
10 MHz to 6.5 GHz	±0.14 dB

Test Port Output

Power range	
100 kHz to 6.5 GHz	-50 dBm to +5 dBm
Power accuracy	±1.5 dB
Power resolution	0.05 dB
Harmonic distortion[6]	-15 dBc
Non-harmonic spurious[6]	-20 dBc

Measurement Accuracy

Accuracy of transmission measurements	Magnitude / Phase
100 kHz to 10 MHz	
0 dB to +10 dB	±0.35 dB / ±3.5°
-35 dB to 0 dB	±0.25 dB / ±2.5°
-55 dB to -35 dB	±0.35 dB / ±3.5°
-75 dB to -55 dB	±1.2 dB / ±8.0°
10 MHz to 4.5 GHz	
0 dB to +10 dB	±0.25 dB / ±2.5°
-50 dB to 0 dB	±0.15 dB / ±1.5°
-70 dB to -50 dB	±0.25 dB / ±2.5°
-90 dB to -70 dB	±1.1 dB / ±7.5°
4.5 MHz to 6.5 GHz	
0 dB to +10 dB	±0.25 dB / ±2.5°
-45 dB to 0 dB	±0.15 dB / ±1.5°
-65 dB to -45 dB	±0.25 dB / ±2.5°
-85 dB to -65 dB	±1.1 dB / ±7.5°
Accuracy of reflection measurements	Magnitude / Phase
-15 dB to 0 dB	±0.5 dB / ±4°
-25 dB to -15 dB	±1.5 dB / ±10°
-35 dB to -25 dB	±5.5 dB / ±30°
Trace noise magnitude (IF bandwidth 3 kHz)	
100 kHz to 10 MHz	0.005 dB rms
10 MHz to 4.5 GHz	0.002 dB rms
4.5 GHz to 6.5 GHz	0.004 dB rms
Temperature dependence	0.02 dB/°C

Uncorrected System Performance

100 kHz to 6.5 GHz	
Directivity	15 dB
Source match	15 dB
Load match	15 dB

[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 over entire frequency range, at output power of 0 dBm.

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Test Port Input

Noise floor	
100 kHz to 10 MHz	-120 dBm/Hz
10 MHz to 4.5 GHz	-135 dBm/Hz
4.5 GHz to 6.5 GHz	-130 dBm/Hz
Damage level	+23 dBm
Damage DC voltage	25 V

Measurement Speed

Time per point	25 µs typ.
Port Switchover time	1 ms

Frequency Reference Input

Port	10 MHz Ref In/Out
External reference frequency	10 MHz
Input level	-1 dBm to 5 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 5 dBm
Connector type	BNC, female

Trigger Input

Port	Ext Trig In
Input level	
low threshold voltage	0.8 V
high threshold voltage	2.0 V
Input level range	0 V to +3.3 V
Pulse width	≥2 µs
Polarity	positive or negative
Input impedance	≥5 kOhm
Connector type	BNC, female

Trigger Output

Port	Ext Trig Out
Maximum output current	12 mA
Output level	
low threshold voltage	0.0 V
high threshold voltage	3.3 V
Polarity	positive or negative
Connector type	BNC, female

System & Power

CPU	4 core 2.0 GHz (x64 or arm64)
RAM	8 GB
Interface	USB 2.0
Connector type	Type C
Input power (VNA)	9 V DC to 15 V DC
Input power consumption (VNA)	26 W
Power supply (Main outlet)	110-240 V, 50/60 Hz
Power consumption (Main outlet)	30 W

Factory Adjustment

Recommended factory adjustment interval	3 Years

Dimensions

Length	297 mm
Width	160 mm
Height	44 mm
Weight	2.3 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	-50 °C to +70 °C (-58 °F to 158 °F)
Atmospheric pressure	70.0 kPa to 106.7 kPa

V0902 Specifications[1]

Primary Specifications[3]

Impedance	50 Ohm
Test port connector	type N, female
Number of test ports	2 −6
Frequency range	100 kHz to 9 GHz
Full frequency accuracy	±5·10
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 300 kHz
Dynamic range[2]	
100 kHz to 10 MHz	115 dB
10 MHz to 4.5 GHz	130 dB (135 dB typ.)
4.5 GHz to 6.5 GHz	125 dB (130 dB typ.)
6.5 GHz to 9.0 GHz	123 dB (130 dB typ.)

Effective System Data

100 kHz to 9 GHz	
Directivity	42 dB
Source match	38 dB
Load match	42 dB
Reflection tracking	±0.10 dB
Transmission tracking	
100 kHz to 10 MHz	±0.25 dB
10 MHz to 9 GHz	±0.14 dB

Test Port Output

Power range	
100 kHz to 6.5 GHz	-50 dBm to +5 dBm
6.5 GHz to 9GHz	-50 dBm to +3 dBm
Power accuracy	±1.5 dB
Power resolution	0.05 dB
Harmonic distortion[6]	-15 dBc
Non-harmonic spurious[6]	-20 dBc

Measurement Accuracy

Accuracy of transmission measurements	Magnitude / Phase
100 kHz to 10 MHz	
0 dB to +10 dB	±0.35 dB / ±3.5°
-35 dB to 0 dB	±0.25 dB / ±2.5°
-55 dB to -35 dB	±0.35 dB / ±3.5°
-75 dB to -55 dB	±1.2 dB / ±8.0°
10 MHz to 4.5 GHz	
0 dB to +10 dB	±0.25 dB / ±2.5°
-50 dB to 0 dB	±0.15 dB / ±1.5°
-70 dB to -50 dB	±0.25 dB / ±2.5°
-90 dB to -70 dB	±1.1 dB / ±7.5°
4.5 MHz to 9 GHz	
0 dB to +10 dB	±0.25 dB / ±2.5°
-45 dB to 0 dB	±0.15 dB / ±1.5°
-65 dB to -45 dB	±0.25 dB / ±2.5°
-85 dB to -65 dB	±1.1 dB / ±7.5°
Accuracy of reflection measurements	Magnitude / Phase
-15 dB to 0 dB	±0.5 dB / ±4°
-25 dB to -15 dB	±1.5 dB / ±10°
-35 dB to -25 dB	±5.5 dB / ±30°
Trace noise magnitude (IF bandwidth 3 kHz)	
100 kHz to 10 MHz	0.005 dB rms
10 MHz to 4.5 GHz	0.002 dB rms
4.5 GHz to 9 GHz	0.004 dB rms
Temperature dependence	0.02 dB/°C

Uncorrected System Performance

100 kHz to 6.5 GHz	
Directivity	15 dB
Source match	15 dB
Load match	15 dB
6.5 GHz to 9 GHz	
Directivity	12 dB
Source match	12 dB
Load match	12 dB

[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 over entire frequency range, at output power of 0 dBm.

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Test Port Input

Noise floor	
100 kHz to 10 MHz	-120 dBm/Hz
10 MHz to 4.5 GHz	-135 dBm/Hz
4.5 GHz to 9 GHz	-130 dBm/Hz
Damage level	+23 dBm
Damage DC voltage	25 V

Measurement Speed

Time per point	25 µs typ.
Port Switchover time	1 ms

Frequency Reference Input

Port	10 MHz Ref In/Out
External reference frequency	10 MHz
Input level	-1 dBm to 5 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 5 dBm
Connector type	BNC, female

Trigger Input

Port	Ext Trig In
Input level	
low threshold voltage	0.8 V
high threshold voltage	2.0 V
Input level range	0 V to +3.3 V
Pulse width	≥2 µs
Polarity	positive or negative
Input impedance	≥5 kOhm
Connector type	BNC, female

Trigger Output

Port	Ext Trig Out
Maximum output current	12 mA
Output level	
low threshold voltage	0.0 V
high threshold voltage	3.3 V
Polarity	positive or negative
Connector type	BNC, female

System & Power

Operating system (min requirements)	Windows 10 and above
CPU	4 core 2.0 GHz (x64 or arm64)
RAM	8 GB
Interface	USB 2.0
Connector type	Type C
Input power (VNA)	9 V DC to 15 V DC
Input power consumption (VNA)	26 W
Power supply (Main outlet)	110-240 V, 50/60 Hz
Power consumption (Main outlet)	30 W

Factory Adjustment

Recommended factory adjustment interval	3 Years

Dimensions

Length	297 mm
Width	160 mm
Height	44 mm
Weight	2.3 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	-50 °C to +70 °C (-58 °F to 158 °F)
Atmospheric pressure	70.0 kPa to 106.7 kPa

M5180 Specifications[1]

Primary Specifications[3]

Impedance	50 Ohm
Test port connector	type N, female
Number of test ports	2
Frequency range	300 kHz to 18 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]	
300 kHz to 1 MHz	100 dB
1 MHz to 6.5 GHz	130 dB
6.5 GHz to 12 GHz	125 dB
12 GHz to 16 GHz	122 dB
16 GHz to 18 GHz	118 dB
Crosstalk[2a]	
300 kHz to 5 GHz	-
5 GHz to 7.5 GHz	-120 dB typ.
7.5 GHz to 8.5 GHz	-110 dB typ.
8.5 GHz to 15 GHz	-120 dB typ.
15 GHz to 18 GHz	-100 dB typ.

Effective System Data

300 kHz to 10 GHz	
Directivity	46 dB
Source match	40 dB
Load match	46 dB
Reflection tracking	±0.10 dB
Transmission tracking	±0.08 dB
10 GHz to 18 GHz	
Directivity	42 dB
Source match	38 dB
Load match	42 dB
Reflection tracking	±0.10 dB
Transmission tracking	±0.08 dB

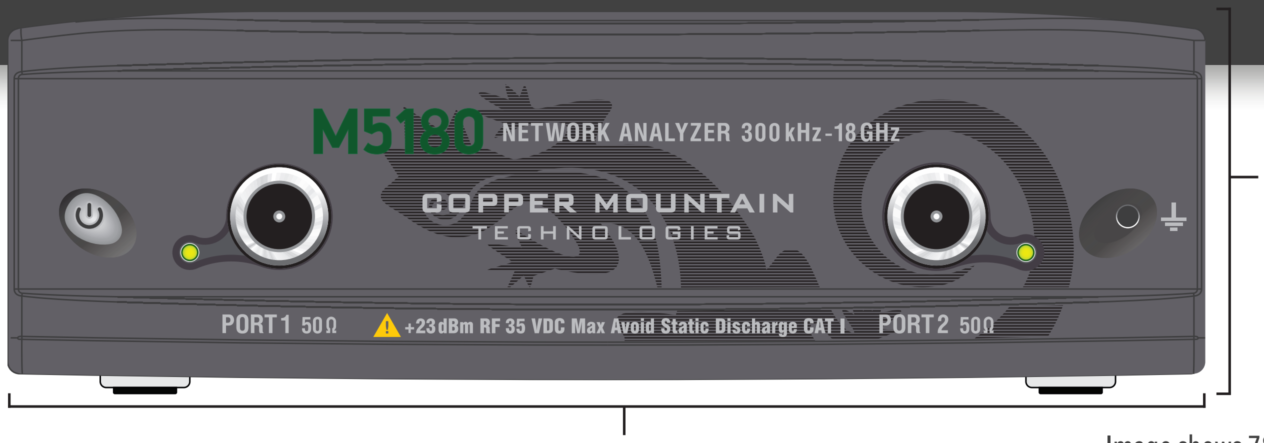
Uncorrected System Performance

300 kHz to 1 MHz	
Directivity	10 dB
Source match	8 dB
Load match	12 dB
1 MHz to 6.5 GHz	
Directivity	15 dB
Source match	12 dB
Load match	15 dB
6.5 GHz to 12 GHz	
Directivity	10 dB
Source match	8 dB
Load match	10 dB
12 GHz to 18 GHz	
Directivity	10 dB
Source match	8 dB
Load match	10 dB

Measurement Accuracy

Accuracy of transmission measurements[4]	Magnitude / Phase
300 kHz to 1 MHz	
0 dB to +10 dB	±0.2 dB / ±2°
-30 dB to 0 dB	±0.1 dB / ±1°
-50 dB to -30 dB	±0.2 dB / ±2°
-70 dB to -50 dB	±1.0 dB / ±6°
1 MHz to 6.5 GHz	
0 dB to +10 dB	±0.2 dB / ±2°
-60 dB to 0 dB	±0.1 dB / ±1°
-80 dB to -60 dB	±0.2 dB / ±2°
-100 dB to -80 dB	±1.0 dB / ±6°
6.5 GHz to 12 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°
12 GHz to 16 GHz	
0 dB to +10 dB	±0.2 dB / ±2°
-50 dB to 0 dB	±0.1 dB / ±1°
-70 dB to -50 dB	±0.2 dB / ±2°
-92 dB to -70 dB	±1.0 dB / ±6°
16 GHz to 18 GHz	
0 dB to +6 dB	±0.2 dB / ±2°
-50 dB to 0 dB	±0.1 dB / ±1°
-70 dB to -50 dB	±0.2 dB / ±2°
-92 dB to -70 dB	±1.0 dB / ±6°
Accuracy of reflection measurements[5]	Magnitude / Phase
300 kHz to 10 GHz	
-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°
10 GHz to 18 GHz	
-15 dB to 0 dB	±0.5 dB / ±4°
-25 dB to -15 dB	±1.5 dB / ±10°
-35 dB to -25 dB	±5.5 dB / ±30°
Trace noise magnitude (IF bandwidth 3 kHz)	
300 kHz to 1 MHz	0.010 dB rms
1 MHz to 6.5 GHz	0.002 dB rms
6.5 GHz to 12 GHz	0.003 dB rms
12 GHz to 18 GHz	0.004 dB rms
Temperature dependence	
300 kHz to 6.5 GHz	0.02 dB/°C
6.5 GHz to 18 GHz	0.04 dB/°C

[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. Dynamic range of the analyzer may be limited on the lower end by either crosstalk or noise floor. [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 entire frequency range, at output power of 0 dBm. © Copper Mountain Technologies - www.coppermountaintech.com - 2022Q1


M5180
NETWORK ANALYZER 300 kHz-18 GHz
COPPER MOUNTAIN
TECHNOLOGIES
PORT 1 50Ω
+23 dBm RF 35 VDC Max Avoid Static Discharge CAT I
PORT 2 50Ω

65 mm
2.5 inches

200 mm/7.9 inches

Image shows 78% scale

Test Port Output

Power range	
300 kHz to 16 GHz	-40 dBm to +10 dBm
16 GHz to 18 GHz	-40 dBm to +6 dBm
Power accuracy	±2 dB
Power resolution	0.05 dB
Harmonic distortion[6]	-15 dBc
Non-harmonic spurious[6]	
300 kHz to 16 GHz	-20 dBc
16 GHz to 18 GHz	-15 dBc

Test Port Input

Noise floor	
300 kHz to 1 MHz	-100 dBm/Hz
1 MHz to 6.5 GHz	-130 dBm/Hz
6.5 GHz to 12 GHz	-125 dBm/Hz
12 GHz to 18 GHz	-122 dBm/Hz
Damage level	+23 dBm
Damage DC voltage	35 V

Measurement Speed

Time per point	30 µs typ.
Port switchover time	0.2 ms

Frequency Reference Input

Port	10 MHz Ref In/Out
External reference frequency	10 MHz
Input level	-1 dBm to 5 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 5 dBm
Connector type	BNC, female

Factory Adjustment

Recommended factory adjustment interval	3 years

Trigger Input

Port	Ext Trig In
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 Out
Maximum output current	20 mA
Output level	
Low level voltage	0.0 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)	11 V DC to 15 V DC
Input power consumption (VNA)	35 W
Power supply (Main Outlet)	110-240 V, 50/60 Hz
Power consumption (Main Outlet)	40 W

Dimensions

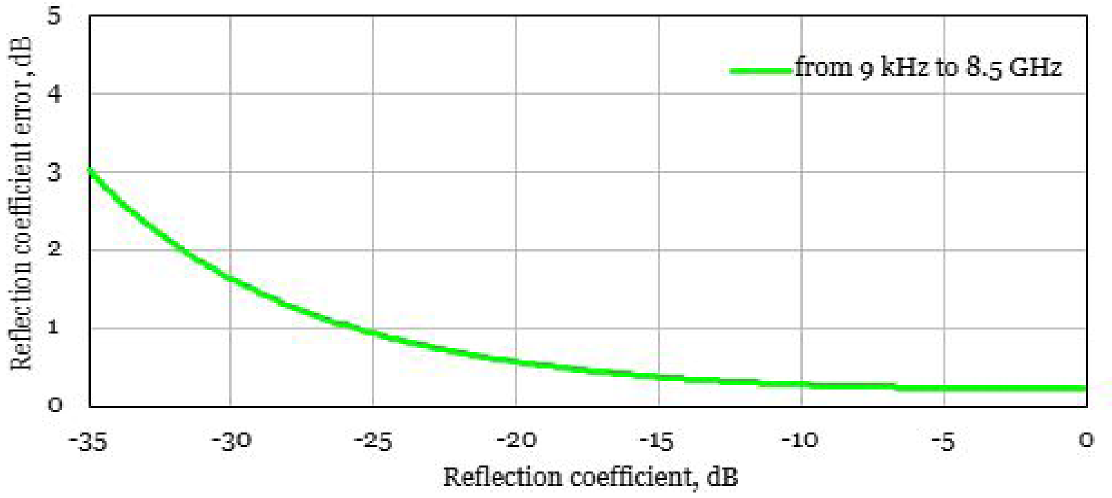
Length	370 mm
Width	210 mm
Height	75 mm
Weight	3.9 kg (137.5 oz)

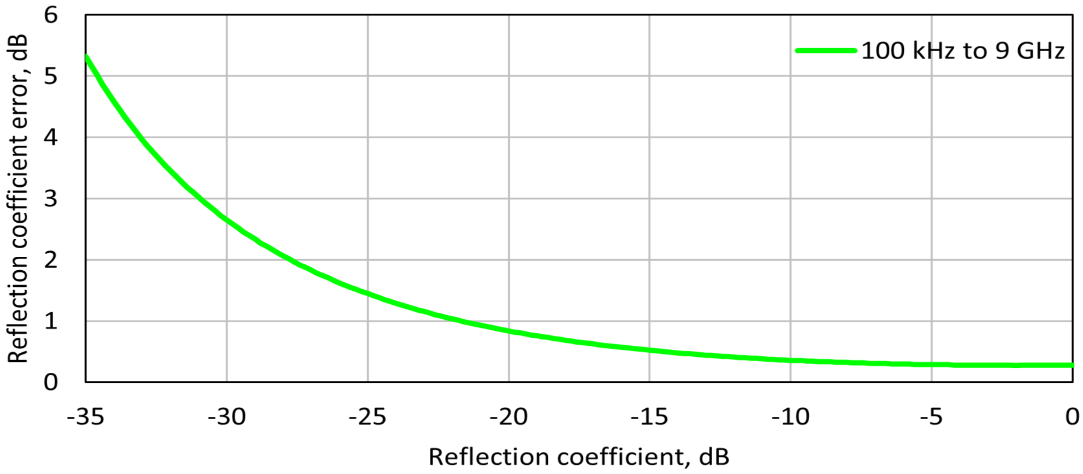
Environmental Specifications

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

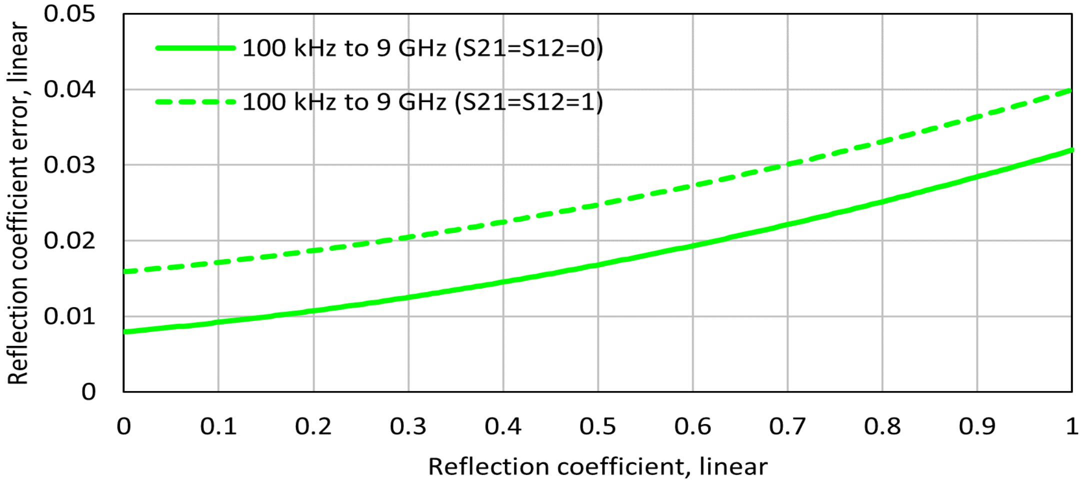
Reflection Accuracy Plots V0X02 Models

Reflection Magnitude Errors





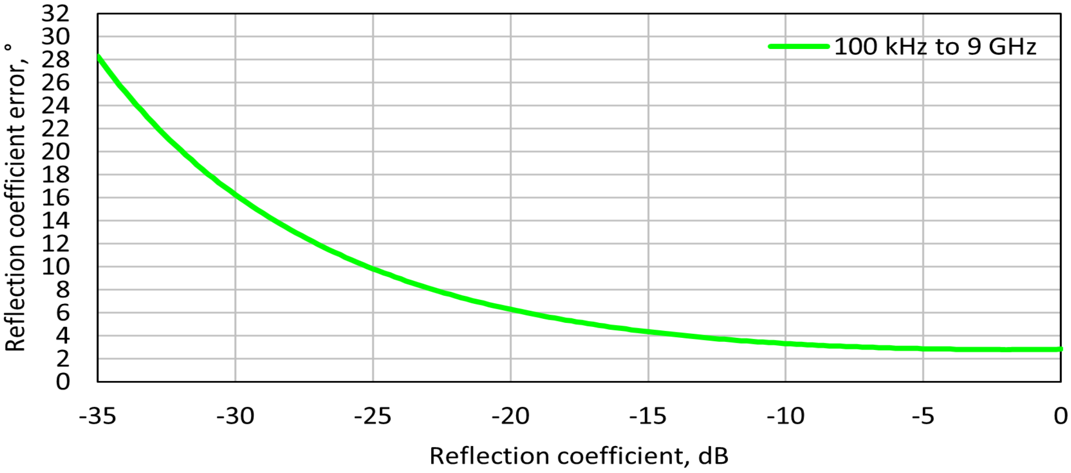
Specifications are based on isolating DUT ($S_{21} = S_{12} = 0$)



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

Reflection Accuracy Plots V0X02 Models

Reflection Phase Errors



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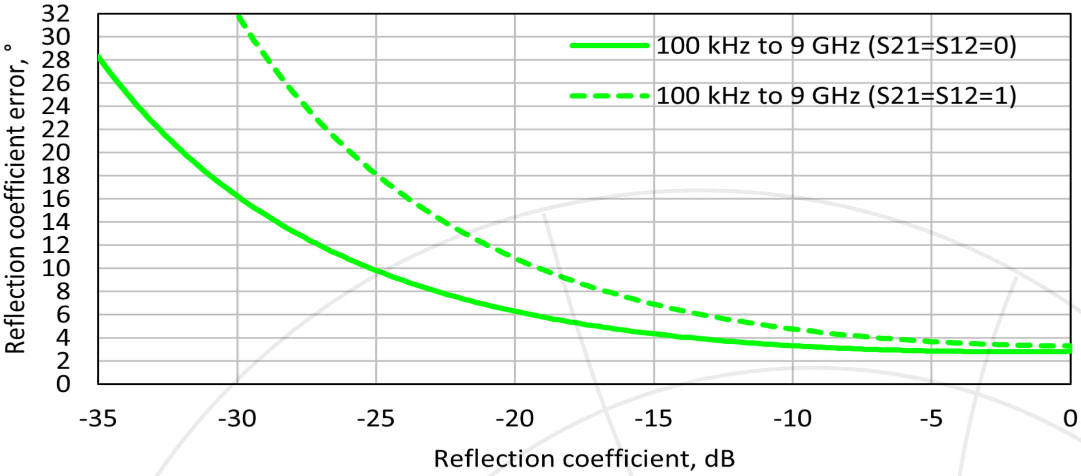
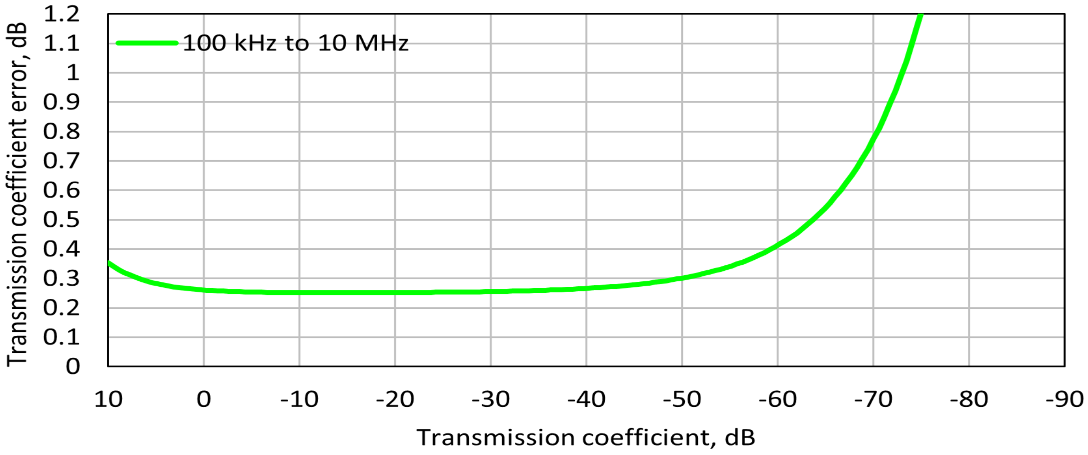
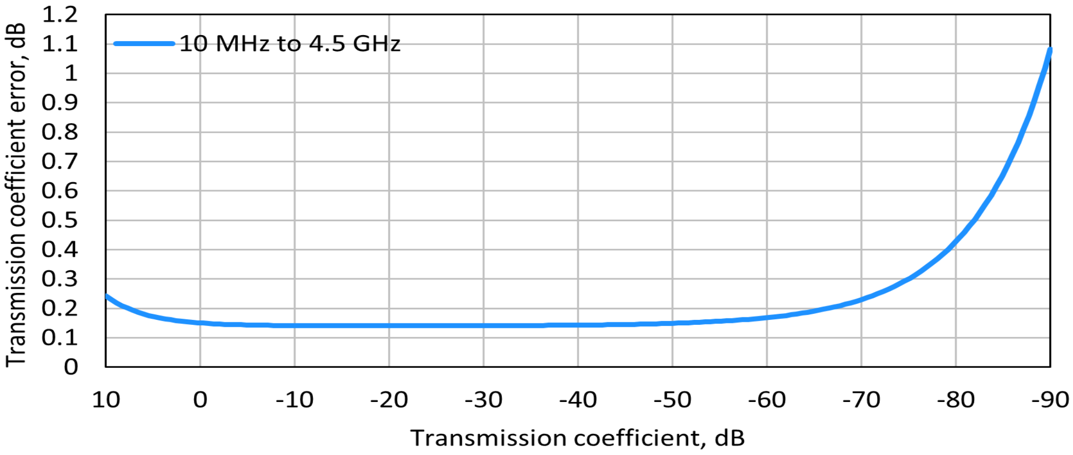
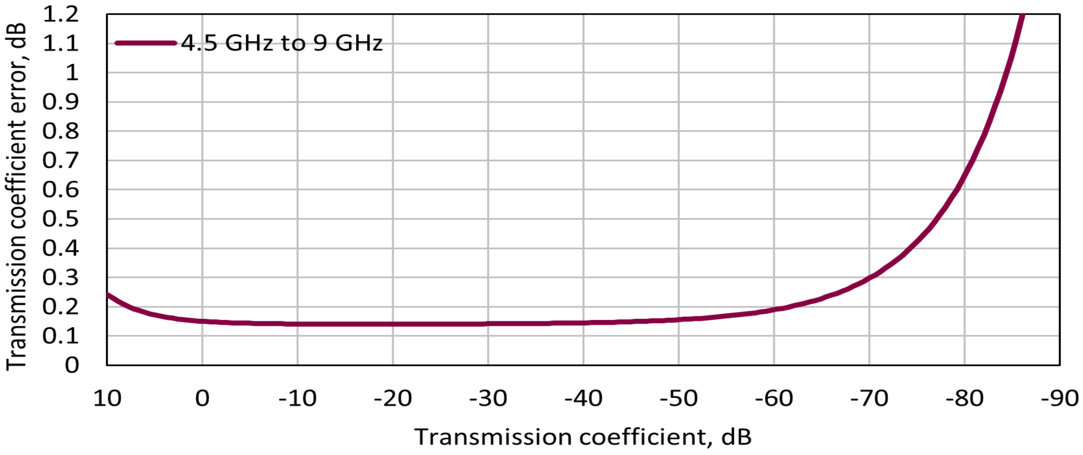


Transmission Accuracy Plots V0X02 Models

Transmission Magnitude Errors



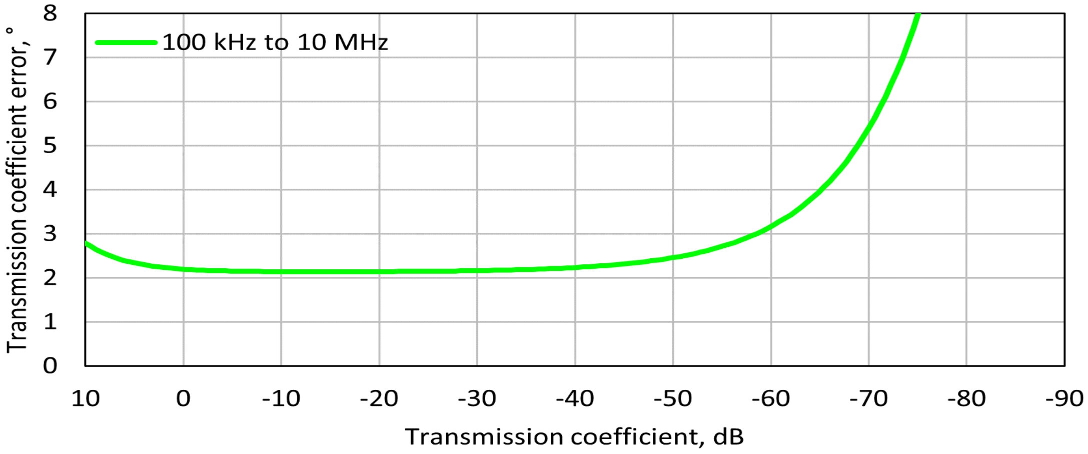


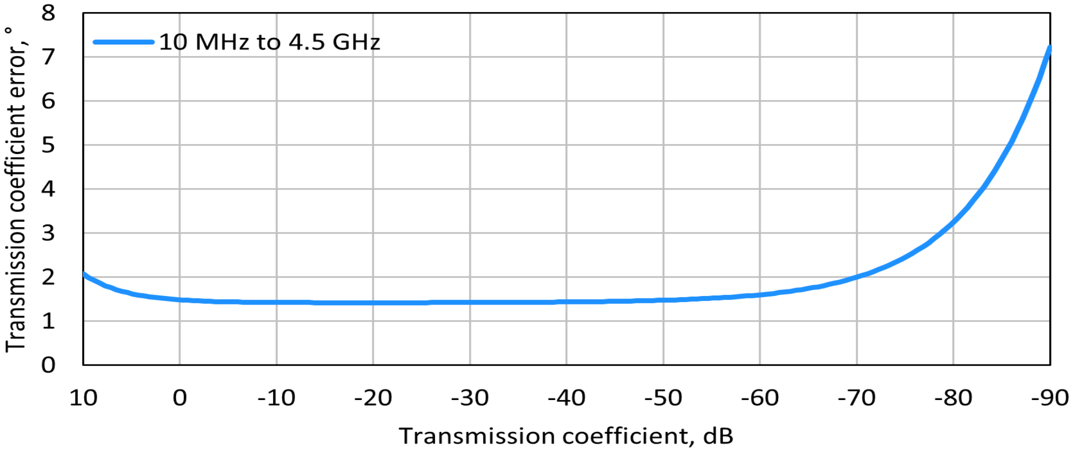


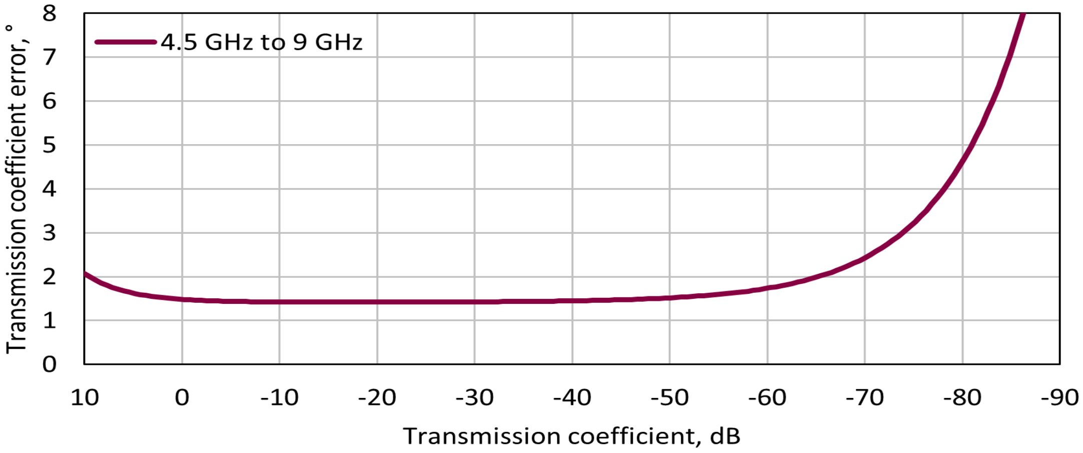
Specifications are based on matched DUT, and IF bandwidth of 10 Hz

Transmission Accuracy Plots V0X02 Models

Transmission Phase Errors



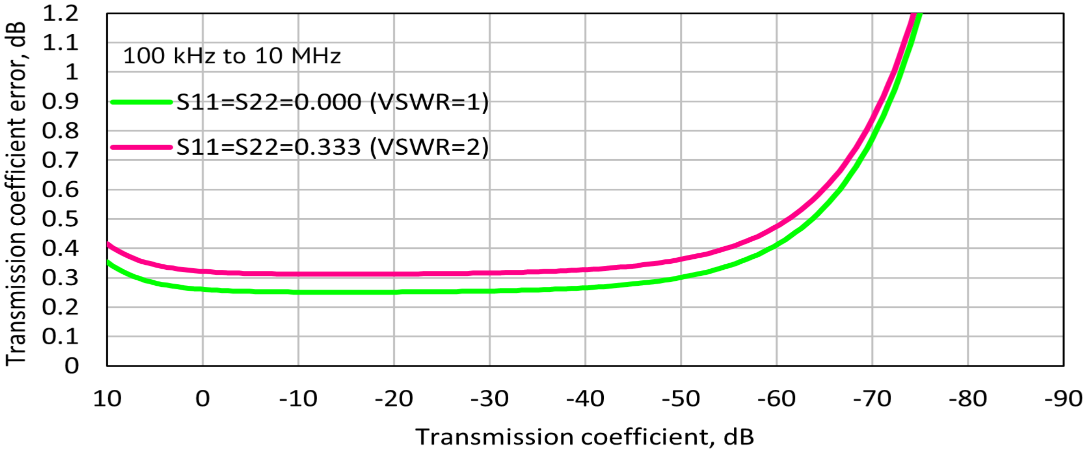


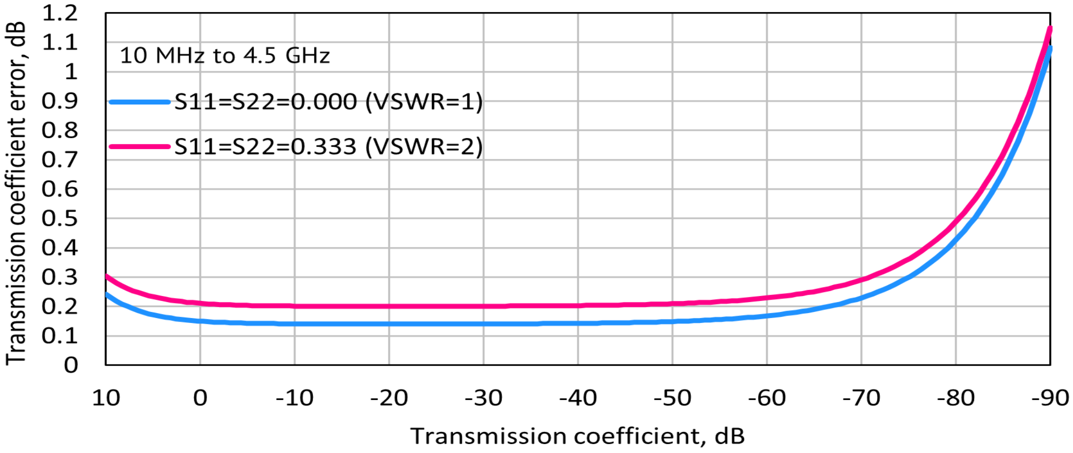


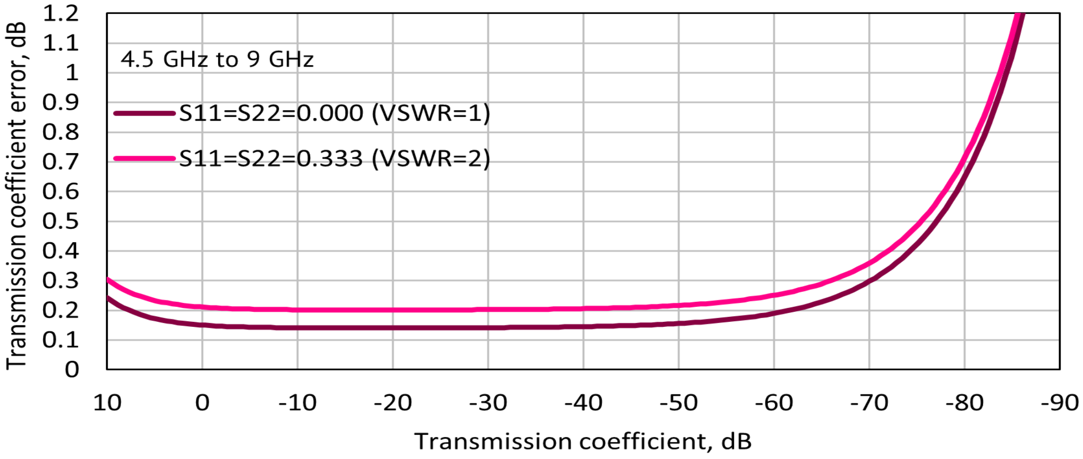
Specifications are based on matched DUT, and IF bandwidth of 10 Hz

Transmission Accuracy Plots V0X02 Models

Transmission Magnitude Errors for Unmatched Devices

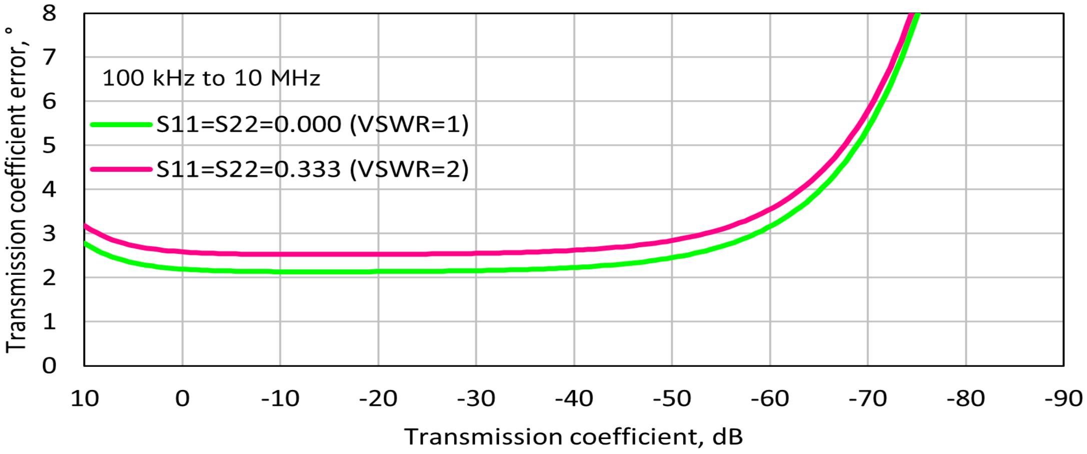


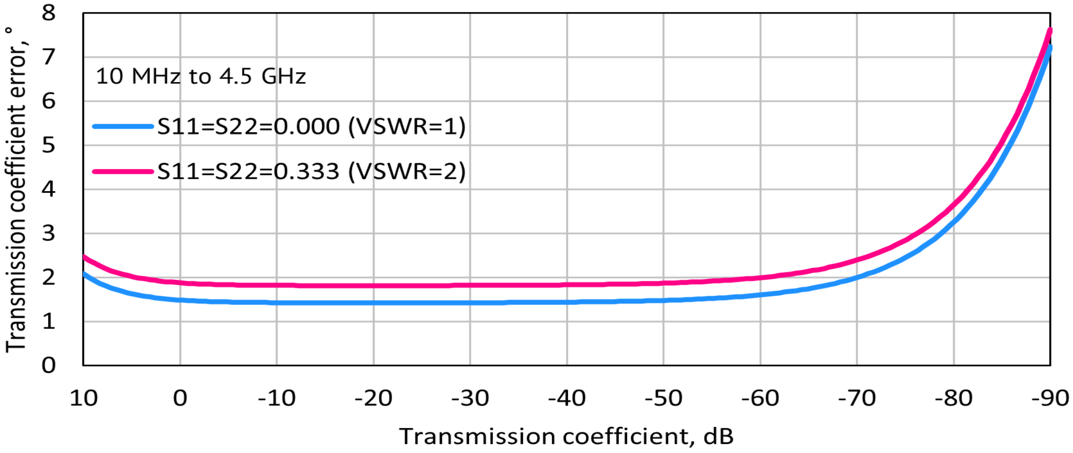


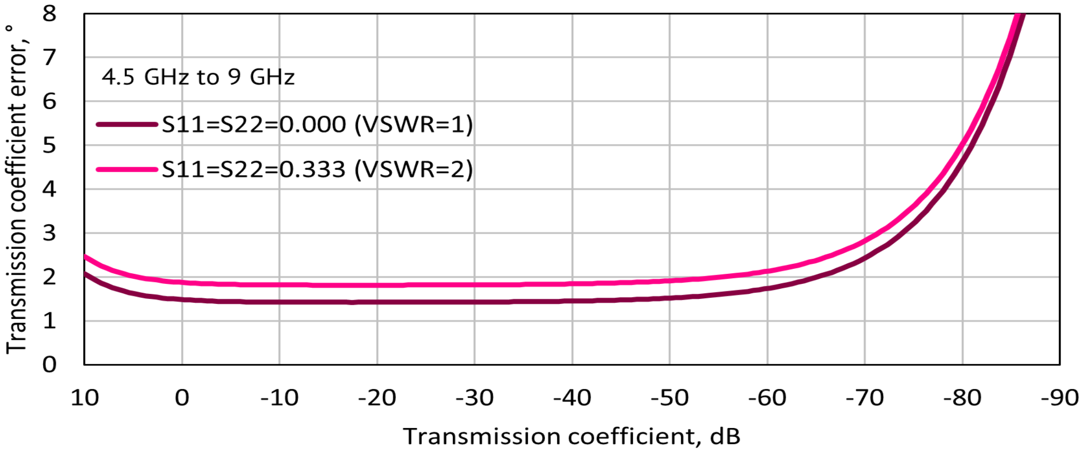


Transmission Accuracy Plots V0X02 Models

Transmission Phase Errors for Unmatched Devices

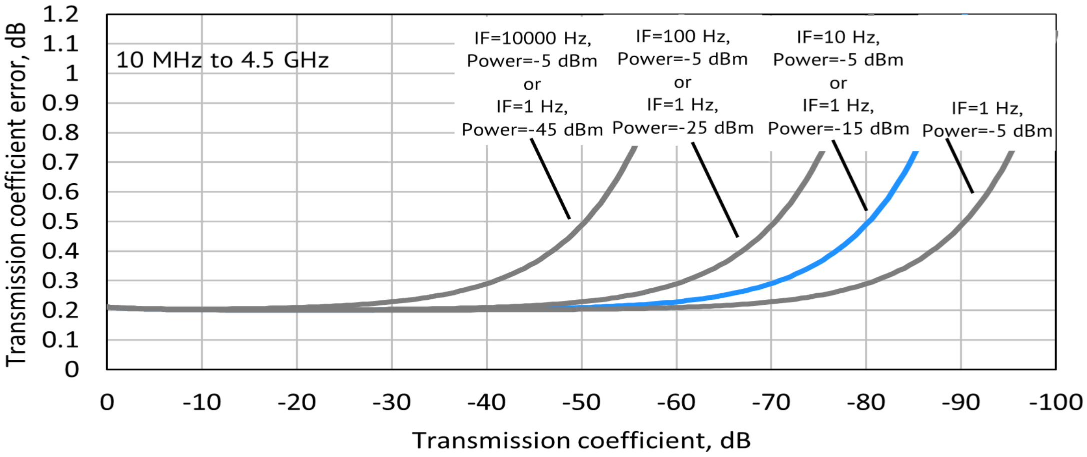






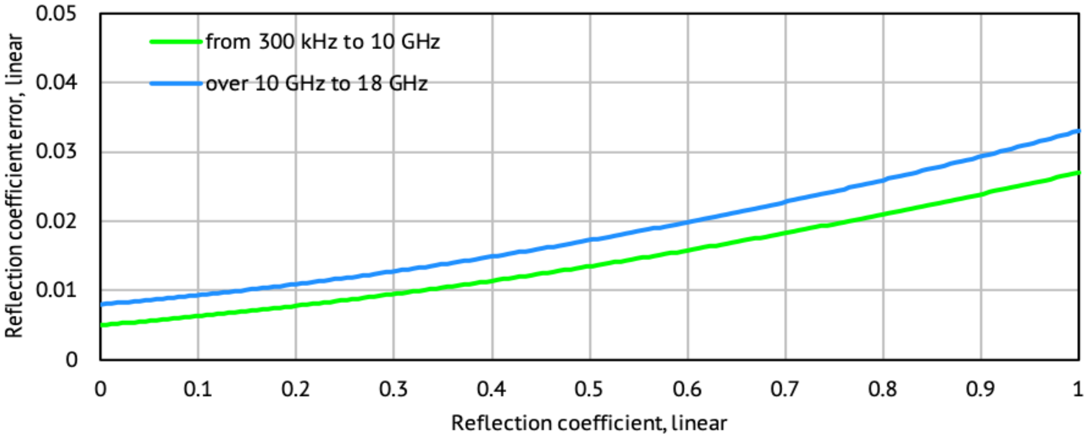
Transmission Accuracy Plots V0X02 Models

Transmission Errors for Matched Devices vs Output Power and IF Bandwidth

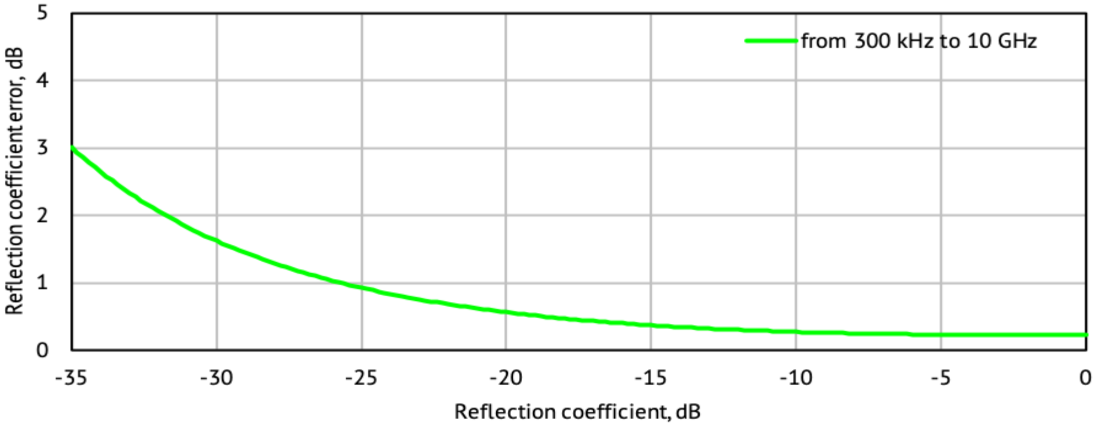


Reflection Accuracy Plots M5180

Reflection Magnitude Errors



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



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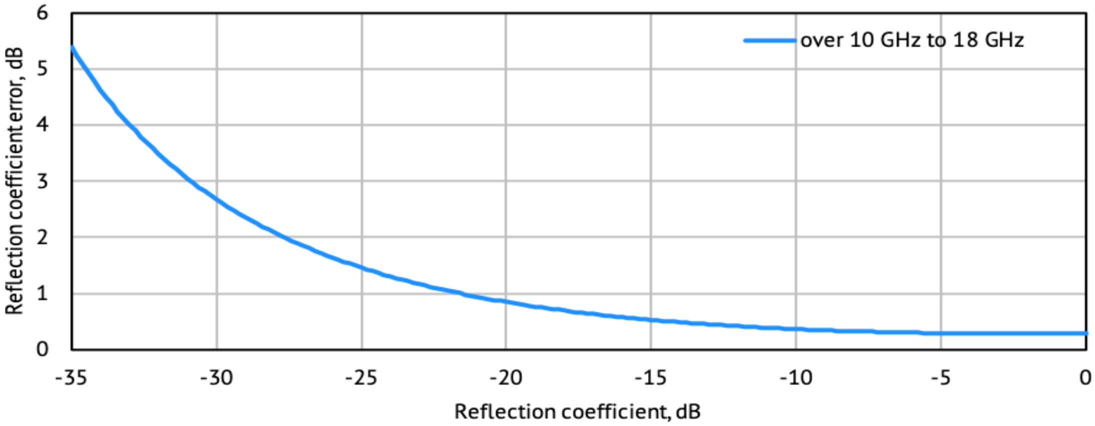
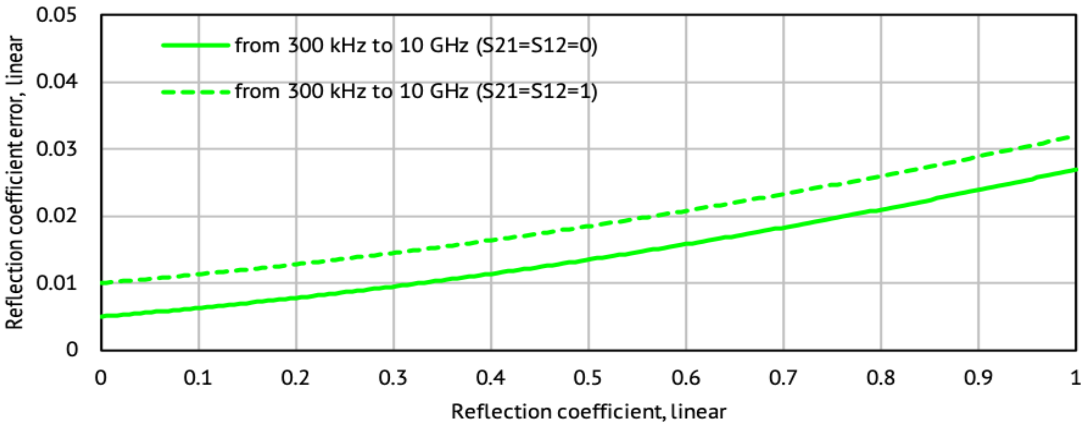


Specifications are based on isolating DUT ($S_{21} = S_{12} = 0$)

Reflection Accuracy Plots M5180

Reflection Magnitude Errors



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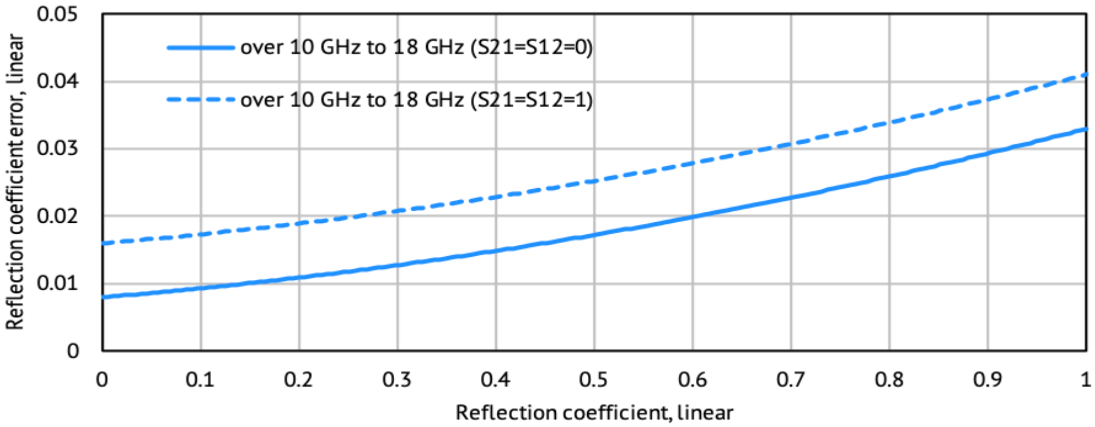
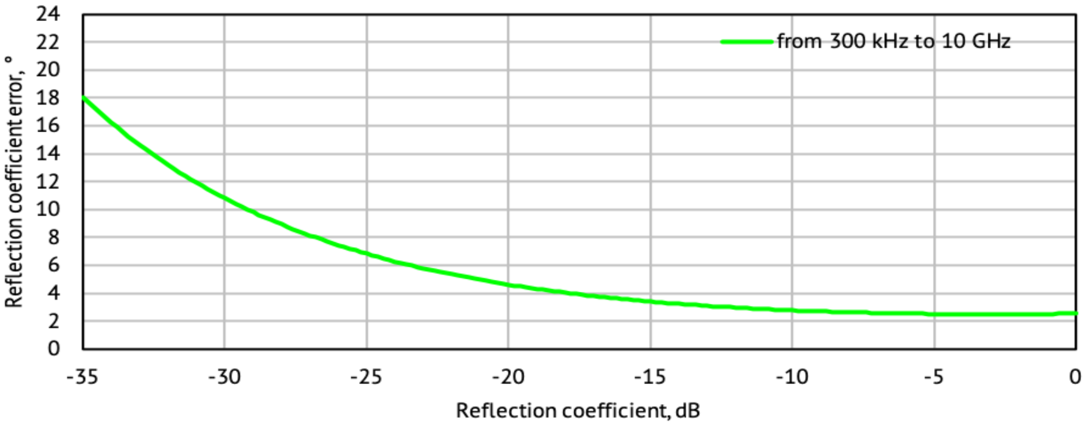


Reflection Phase Errors



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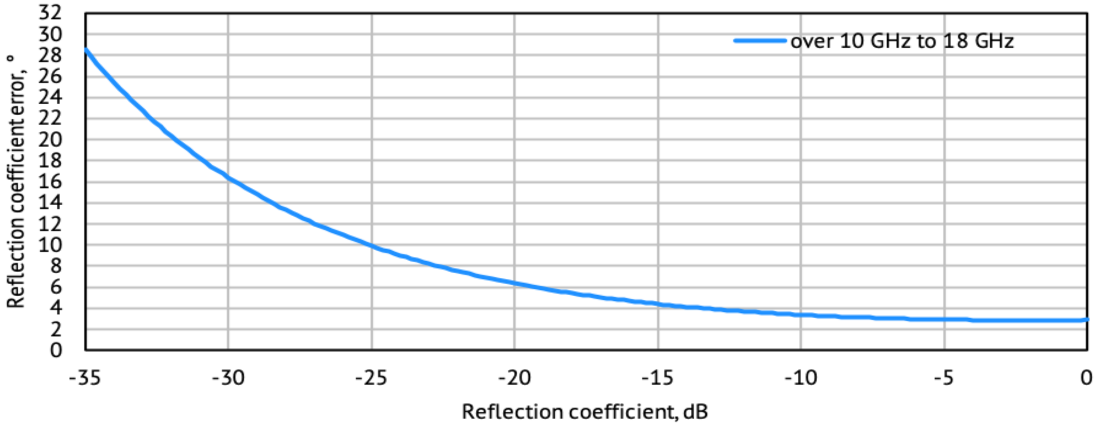
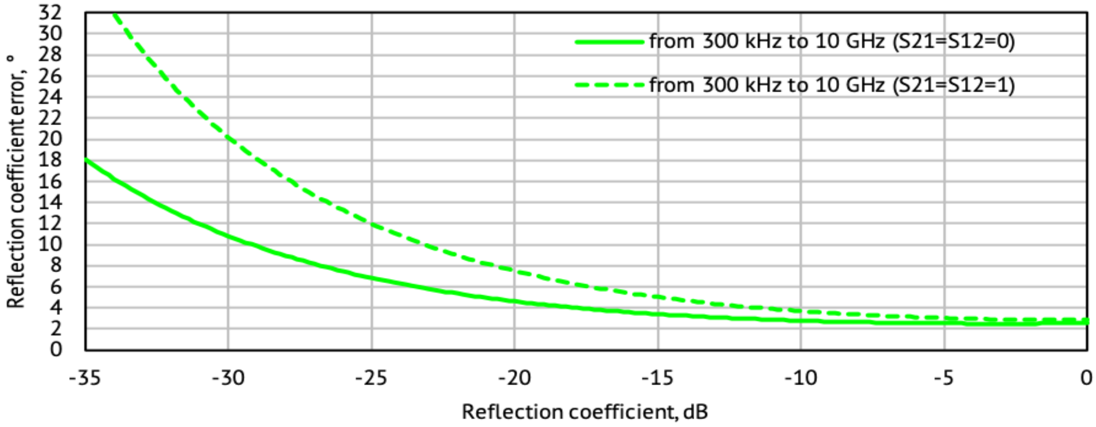
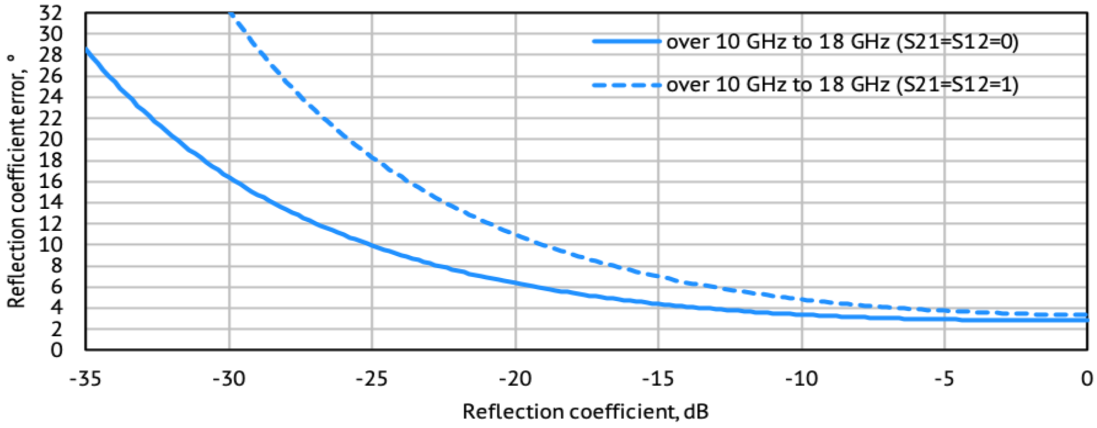
Reflection Accuracy Plots M5180

Reflection Phase Errors

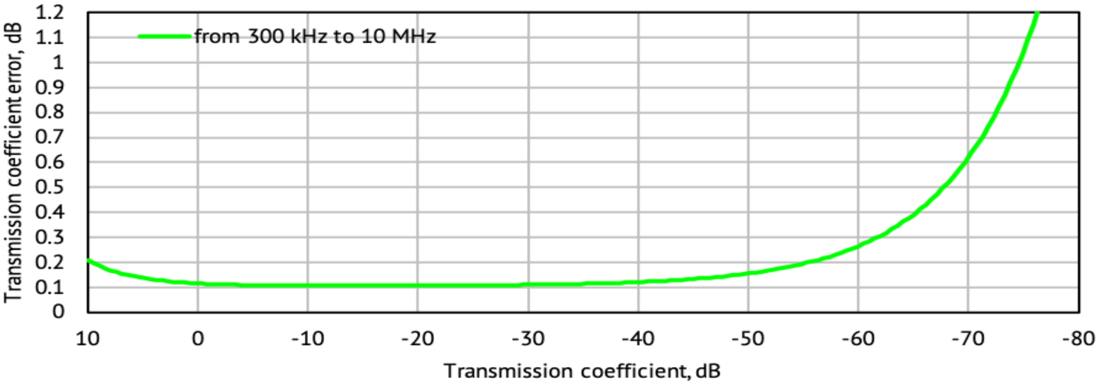




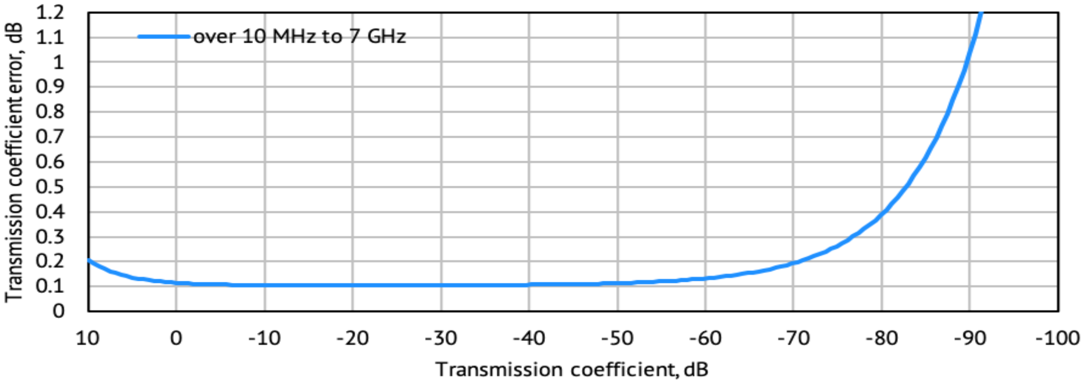


Transmission Accuracy Plots M5180

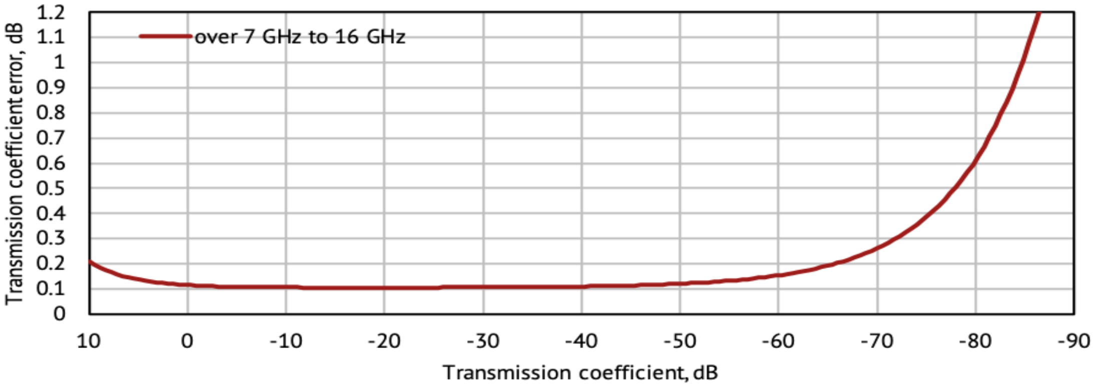
Transmission Magnitude Errors



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



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



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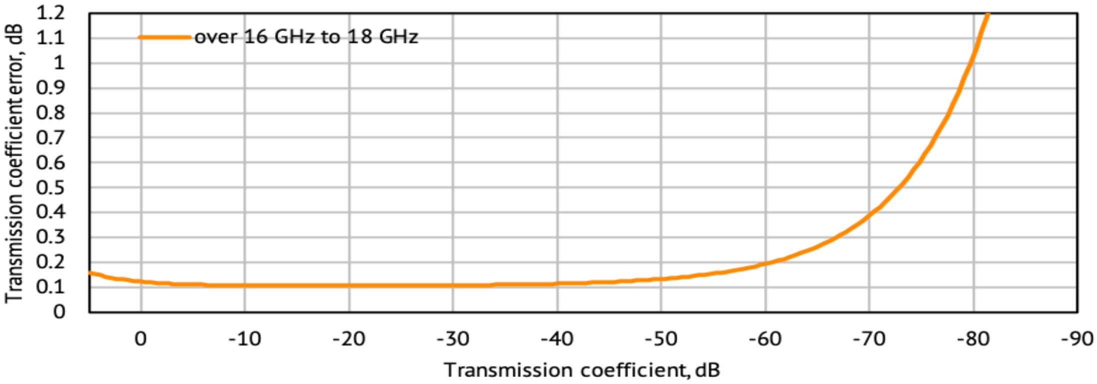
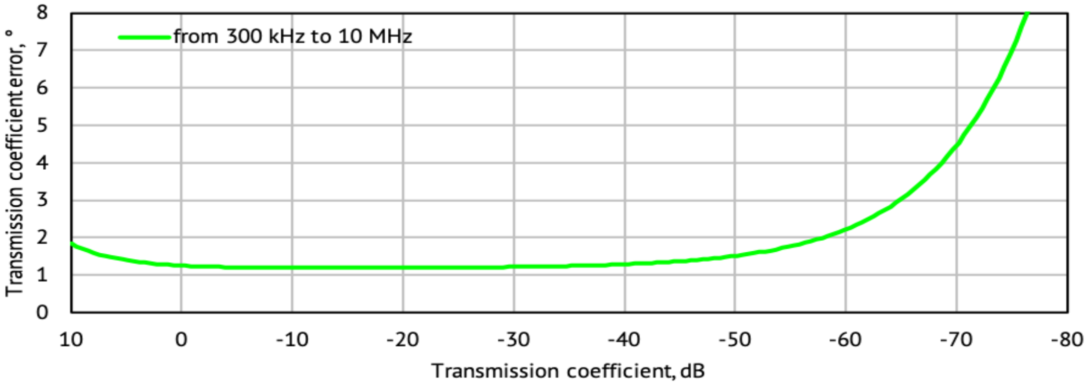
Transmission Accuracy Plots M5180

Transmission Magnitude Errors



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

Transmission Phase Errors



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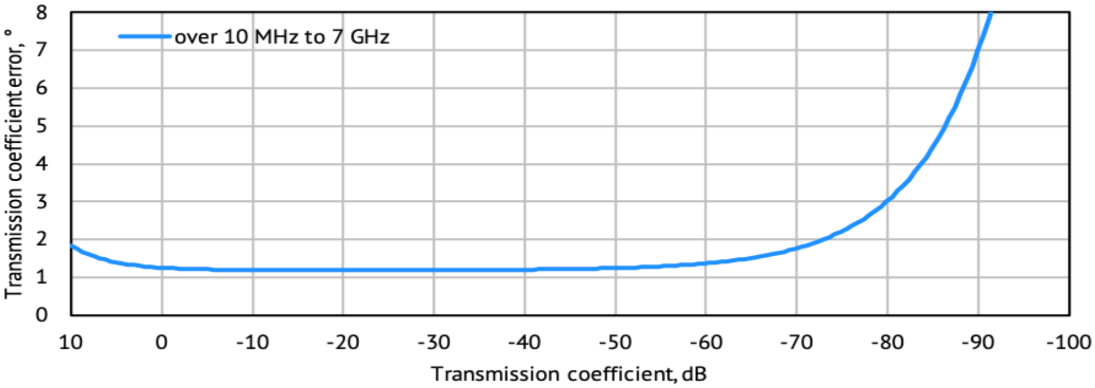
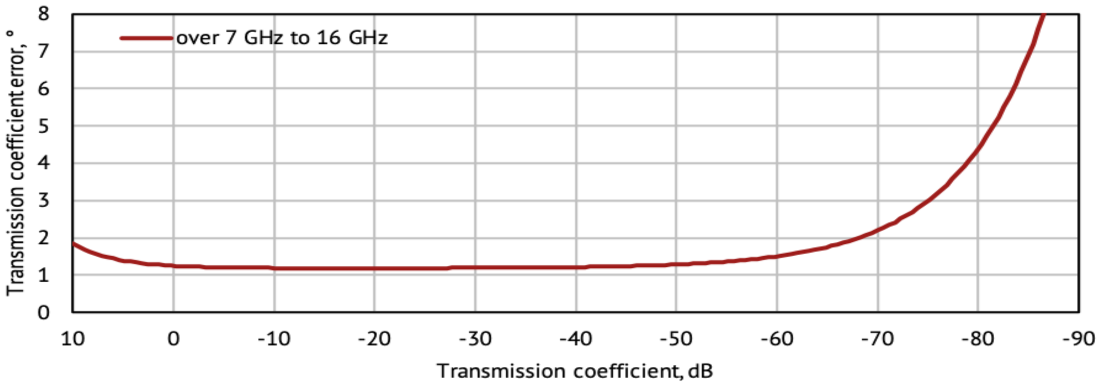


Specifications are based on matched DUT, and IF bandwidth of 10 Hz

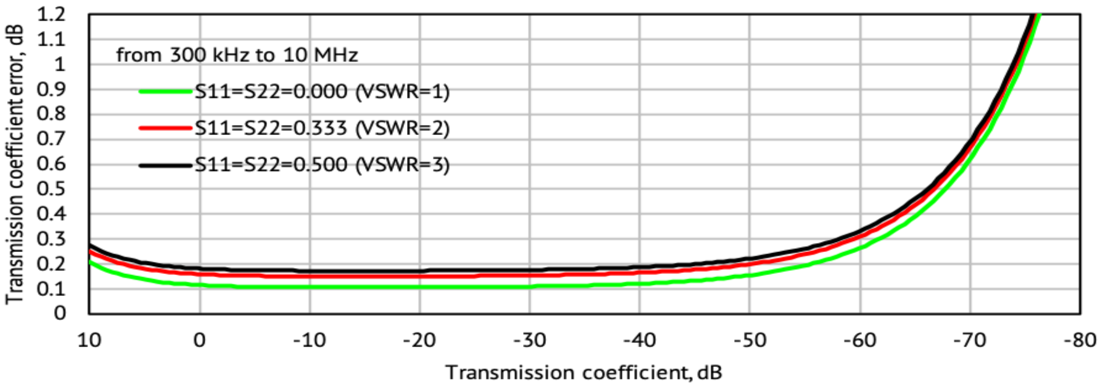
Transmission Accuracy Plots M5180

Transmission Phase Errors

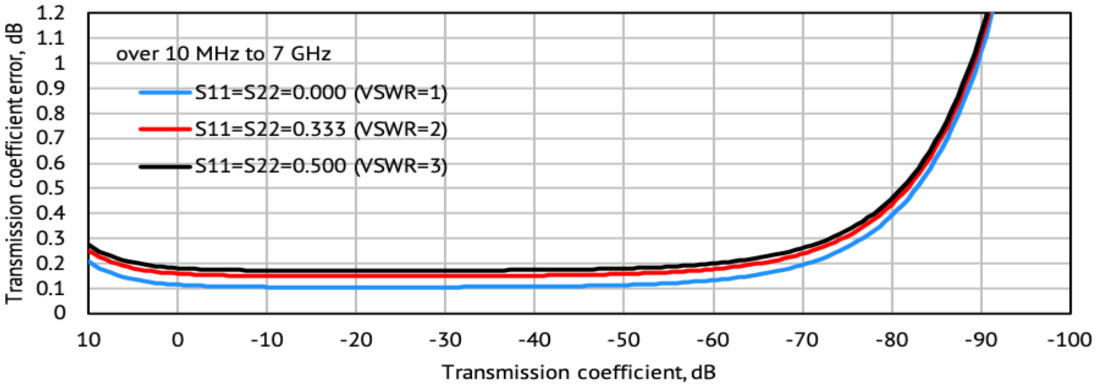


Specifications are based on matched DUT, and IF bandwidth of 10 Hz

Transmission Magnitude Errors for Unmatched Devices



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



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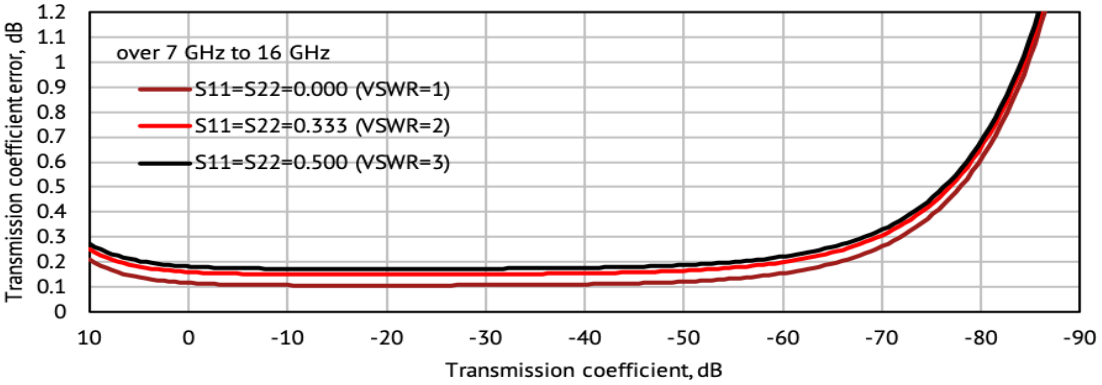
Transmission Accuracy Plots M5180

Transmission Magnitude Errors for Unmatched Devices



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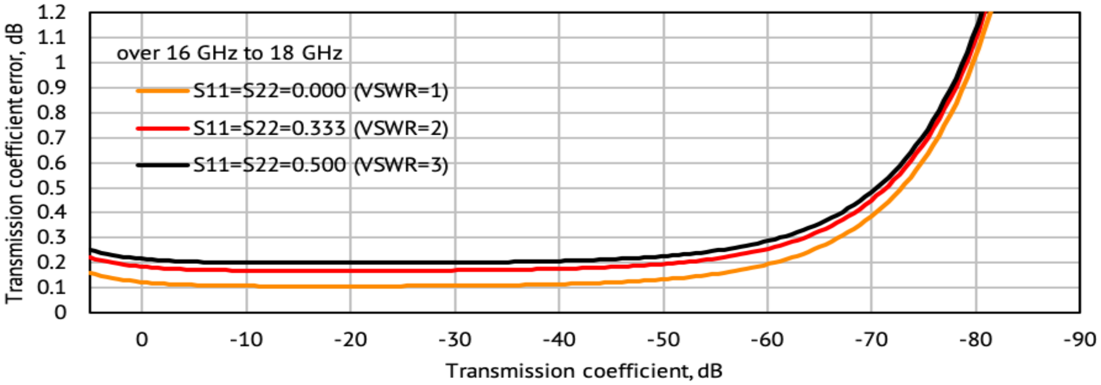

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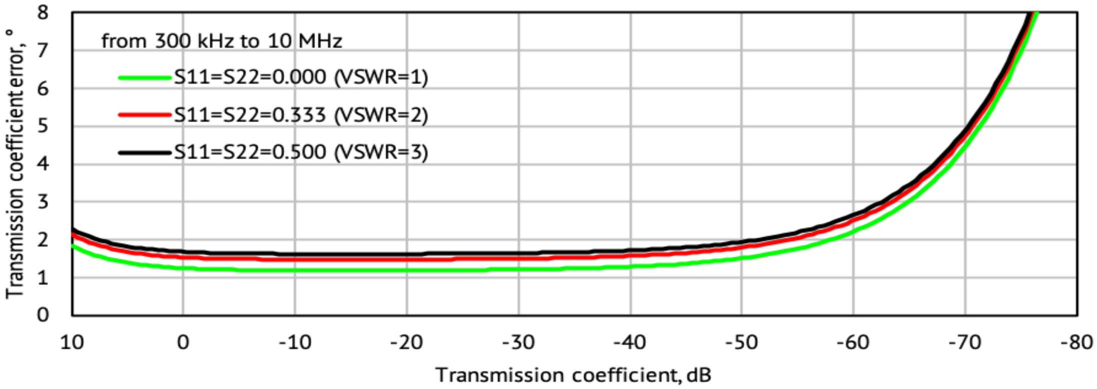
Transmission Phase Errors for Unmatched Devices



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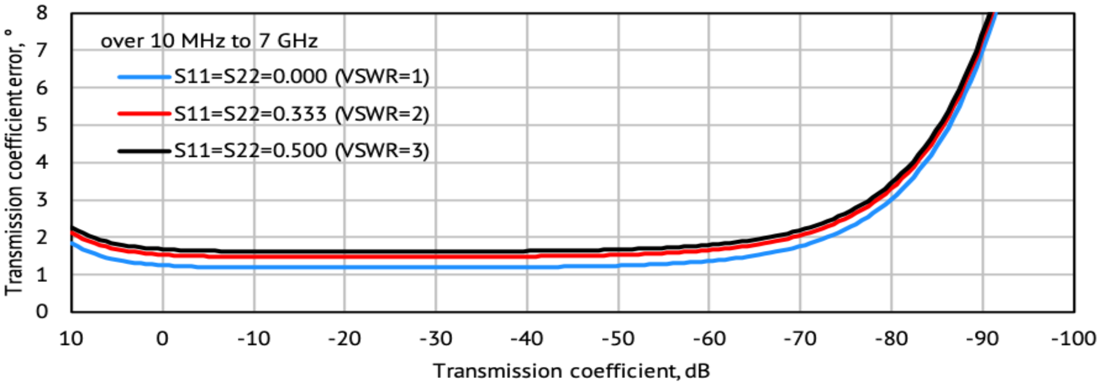
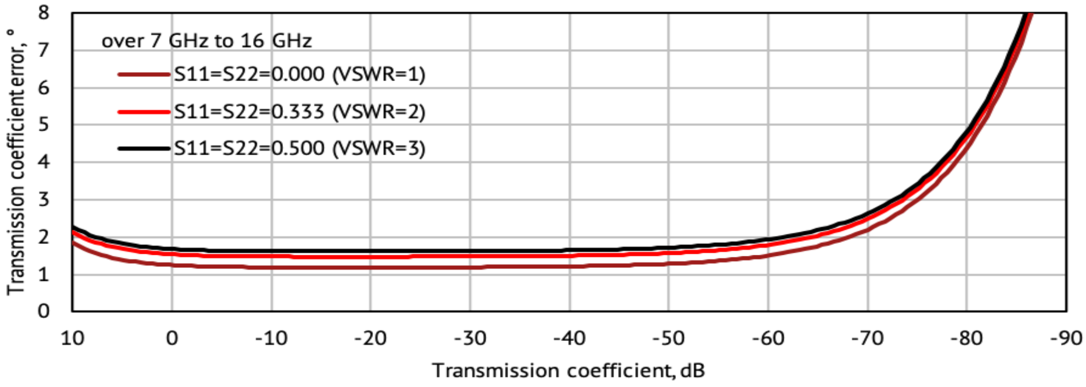
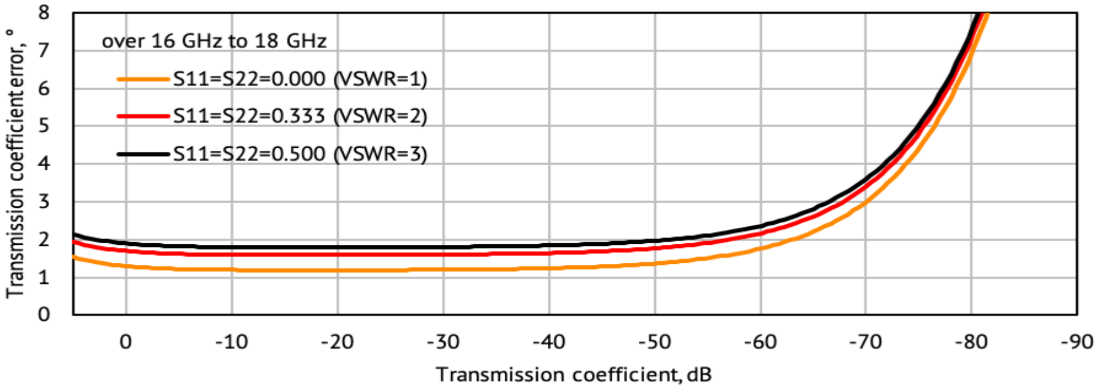
Transmission Accuracy Plots M5180

Transmission Phase Errors for Unmatched Devices

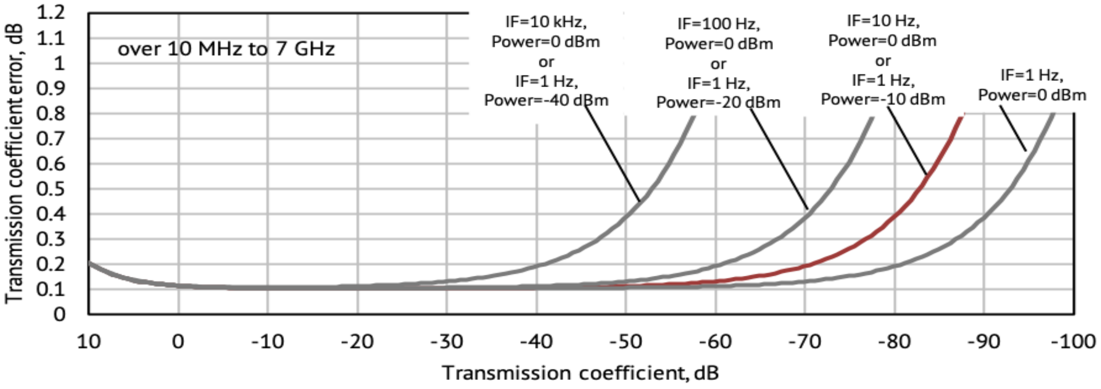






Transmission Accuracy Plots M5180

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 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.

FROST & SULLIVAN
2015 BEST PRACTICES AWARD
GLOBAL VECTOR NETWORK ANALYZER COMPETITIVE STRATEGY INNOVATION AND LEADERSHIP AWARD

FROST & SULLIVAN
2017 BEST PRACTICES AWARD
GLOBAL UNIVERSAL SERIAL BUS (USB) VECTOR NETWORK ANALYZER (VNA) PRODUCT LEADERSHIP AWARD

FROST & SULLIVAN
2020 BEST PRACTICES AWARD
GLOBAL VECTOR NETWORK ANALYZERS CUSTOMER VALUE LEADERSHIP AWARD

Value Series Models Overview

	V0402	V0602	V0902	M5180
Frequency Range	100 kHz to 4.5 GHz	100 kHz to 6.5 GHz	100 kHz to 9 GHz	300 kHz to 18 GHz
Dynamic Range	130 dB, typ.	130 dB, typ.	130 dB, typ.	135 dB, typ.

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