MEILHAUS ELECTRONIC

Product Datasheet - Technical Specifications

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Vector Network Analyzer Specifications
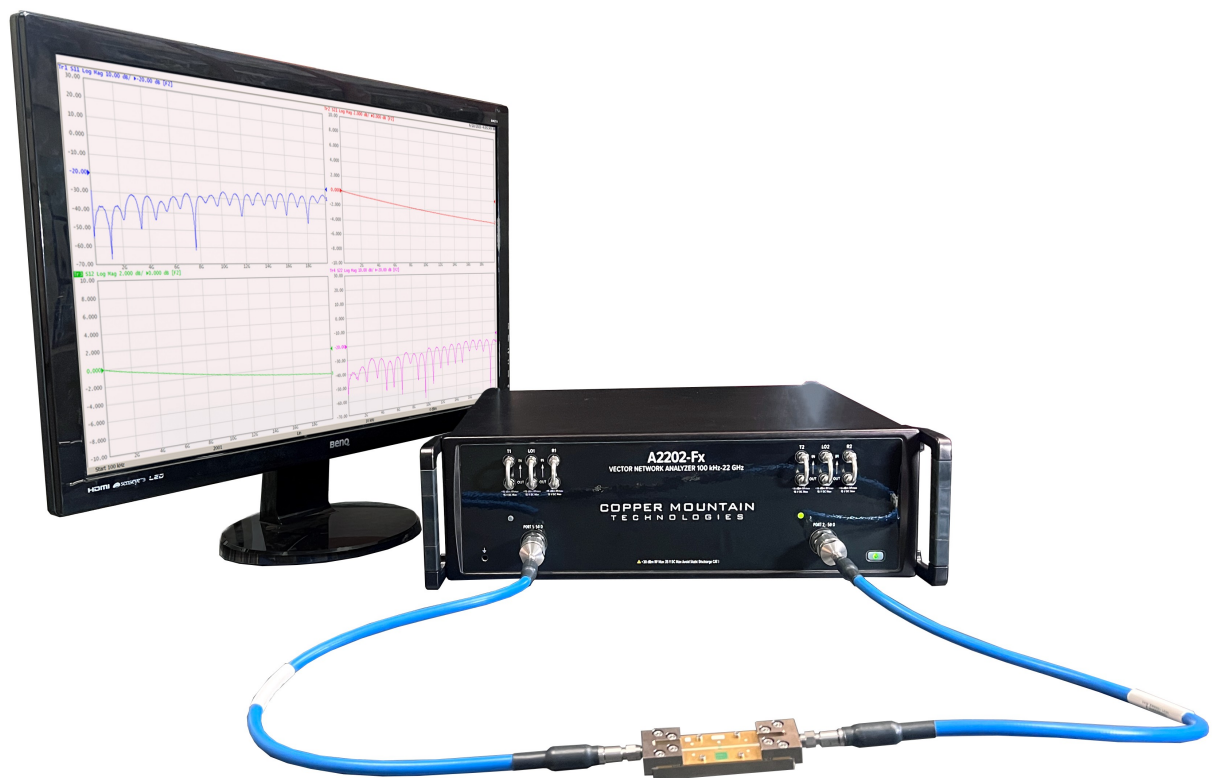
Advanced Series

Preliminary Specifications - Subject to Change

Advanced Series

The following pages contain the hardware specifications for the Advanced Series Vector Network Analyzers:

- A2202
- A2202-D
- A2202-Fx
- A2202-DFx

Preliminary Specification[1]

[1] All specifications subject to change without notice.

Measurement Range

Impedance	50 Ohm
Test port connector	NMD 3.5 mm, male
Number of test ports	2
Frequency extender compatible	CobaltFx (2 ports)*
Frequency range	100 kHz to 22 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]	
100 kHz to 1 MHz	110 dB
1 MHz to 22 GHz	130 dB (135 dB typ.)

[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.

* A2202-Fx and A2202-DFx only

Measurement Accuracy[3]

Accuracy of transmission measurements[4]	Magnitude / Phase
100 kHz to 1 MHz	
-40 dB to 0 dB	±0.2 dB / ±2°
-60 dB to -40 dB	±0.3 dB / ±3°
-80 dB to -60 dB	±1.1 dB / ±7°
1 MHz to 22 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°
Accuracy of reflection measurements[5]	Magnitude / Phase
100 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 22 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)	
100 kHz to 1 MHz	0.020 dB rms
1 MHz to 22 GHz	0.001 dB rms
Temperature dependence	0.02 dB/°C (0.01 dB/°C typ.)

[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 1 Hz.

[5] Reflection specifications are based on an isolating DUT.

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Effective System Data

100 kHz to 1 MHz	
Directivity	46 dB
Source match	40 dB
Load match	46 dB
Reflection tracking	±0.05 dB
Transmission tracking	±0.20 dB
1 MHz to 10 GHz	
Directivity	46 dB
Source match	40 dB
Load match	46 dB
Reflection tracking	±0.05 dB
Transmission tracking	±0.05 dB
10 GHz to 22 GHz	
Directivity	42 dB
Source match	38 dB
Load match	42 dB
Reflection tracking	±0.10 dB
Transmission tracking	±0.05 dB

Uncorrected System Performance

100 kHz to 1 MHz	
Directivity	5 dB
Source match	10 dB
Load match	10 dB
1 MHz to 10 GHz	
Directivity	15 dB
Source match	10 dB
Load match	10 dB
10 GHz to 22 GHz	
Directivity	15 dB
Source match	10 dB
Load match	10 dB

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Test Port Output

Power range	
100 kHz to 18 GHz	-60 dBm to +15 dBm
18 GHz to 22 GHz	-60 dBm to +10 dBm
Power accuracy	±1.5 dB
Power resolution	0.05 dB
Harmonic distortion[6]	-30 dBc
Non-harmonic spurious[6]	-30 dBc

[6] Specification applies over frequency range from 1 MHz to 20 GHz, at output power of -5 dBm.

Test Port Input

Noise floor	
100 kHz to 1 MHz	-110 dBm/Hz
1 MHz to 22 GHz	-133 dBm/Hz
Damage level	+30 dBm
Damage DC voltage	35 V

Measurement Speed

Time per point	12 µs typ.	
Point Switchover Time	0.2 ms typ.	
Typical cycle time vs number of measurement points[7]		
Number of points (IF bandwidth 1 MHz)		
51	Uncorrected (1-port)	2-port calibration
	2.3 ms	4.4 ms
201	Uncorrected (1-port)	2-port calibration
	4.2 ms	8.2 ms
401	Uncorrected (1-port)	2-port calibration
	6.5 ms	12.8 ms
1601	Uncorrected (1-port)	2-port calibration
	20.5 ms	40.8 ms

[7] Display update: OFF

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 and 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	100-253 V, 50/60 Hz
Power consumption	145 W

Calibration

Recommended factory adjustment interval	3 years

Dimensions

Length	470 mm
Width	440 mm
Height	140 mm
Weight	14 kg (494 oz)

Environment

Operating temperature	+5 °C to +40 °C (41 °F to 104 °F)
Non-operating 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

Vector Network Analyzer Specifications

Reflection Accuracy Plots

Reflection Magnitude Errors
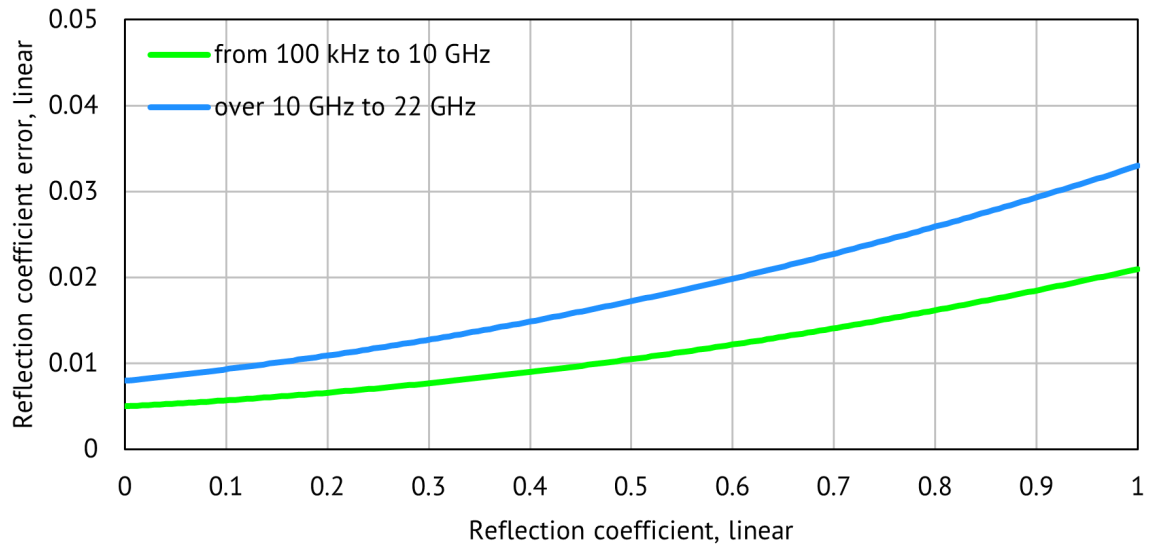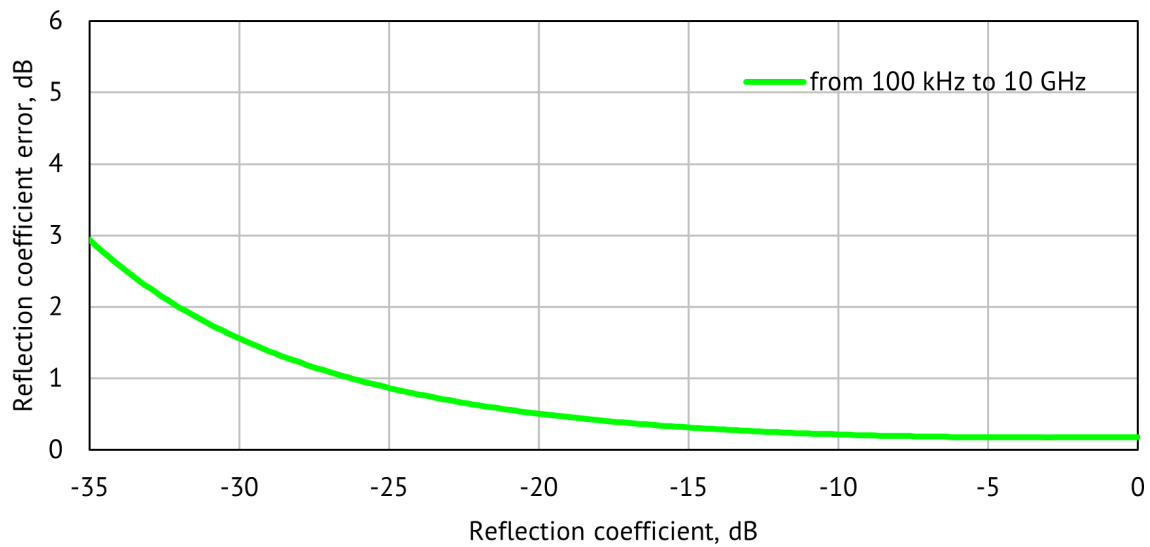
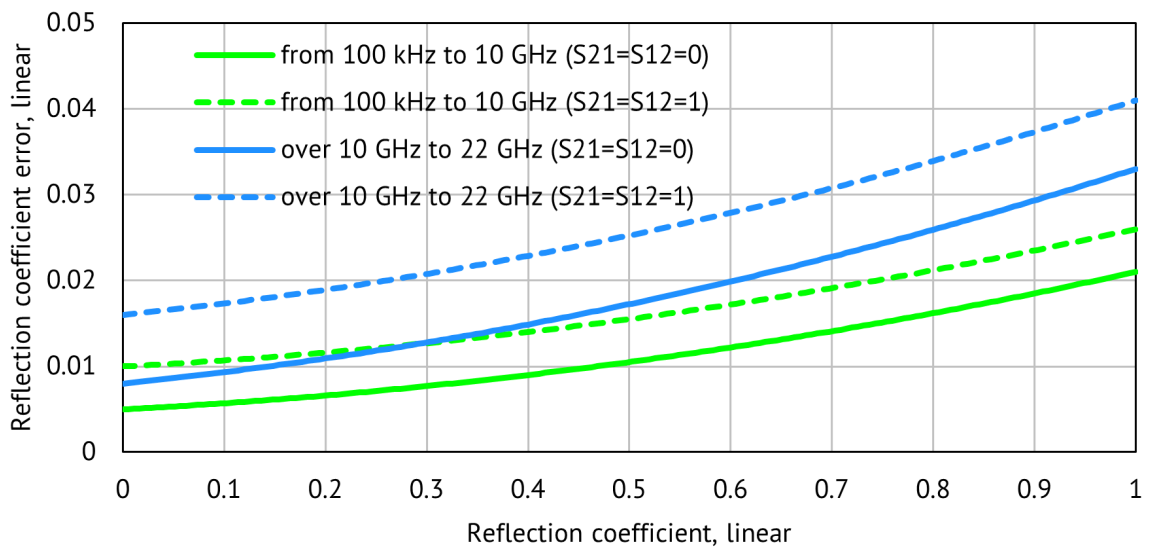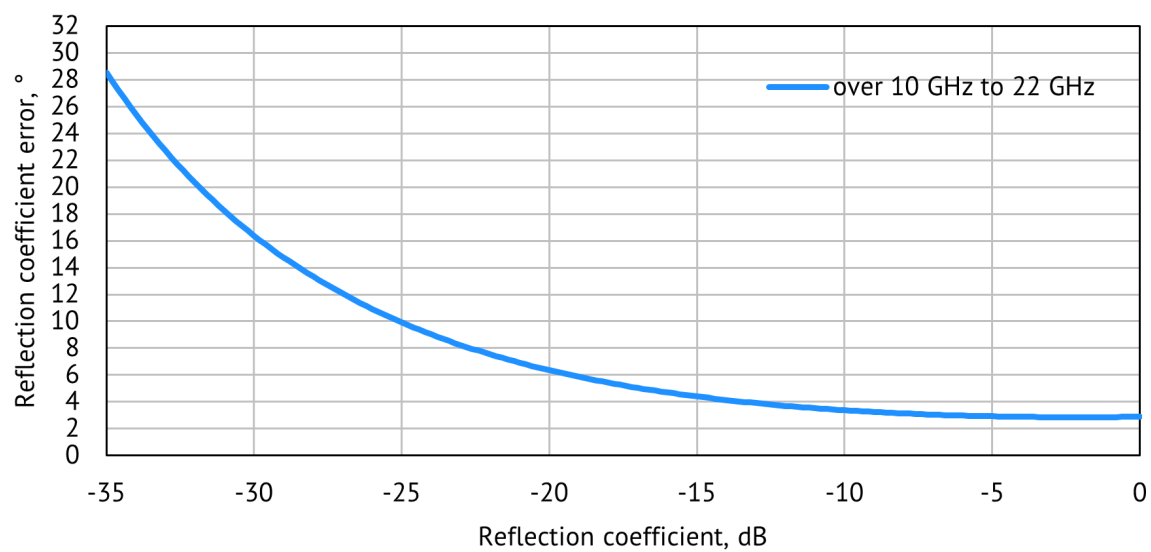**Specifications are based on isolating DUT (S21 = S12 = 0)**

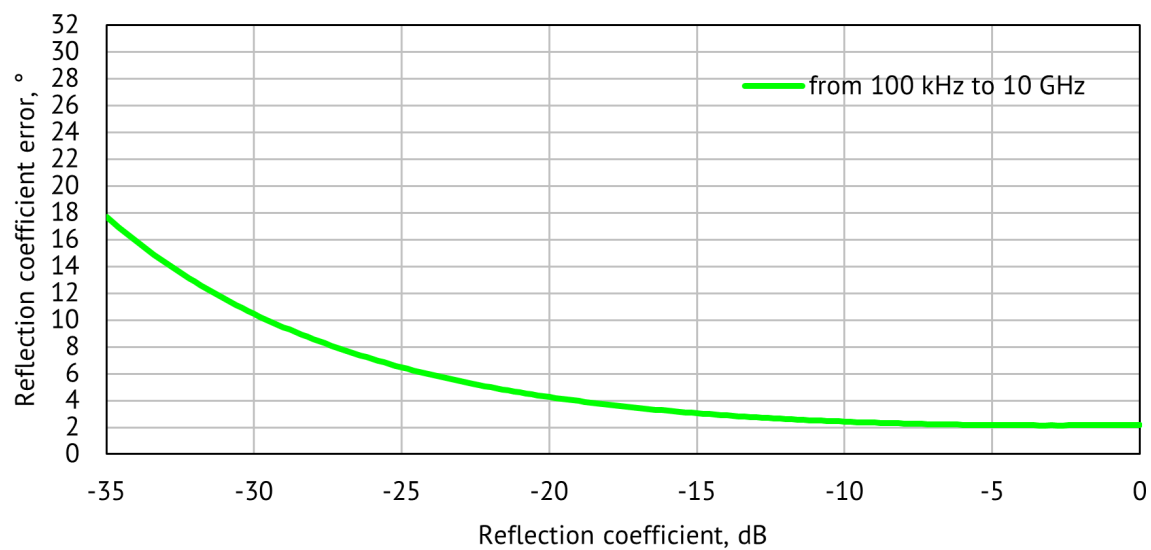**Specifications are based on isolating DUT (S21 = S12 = 0)**

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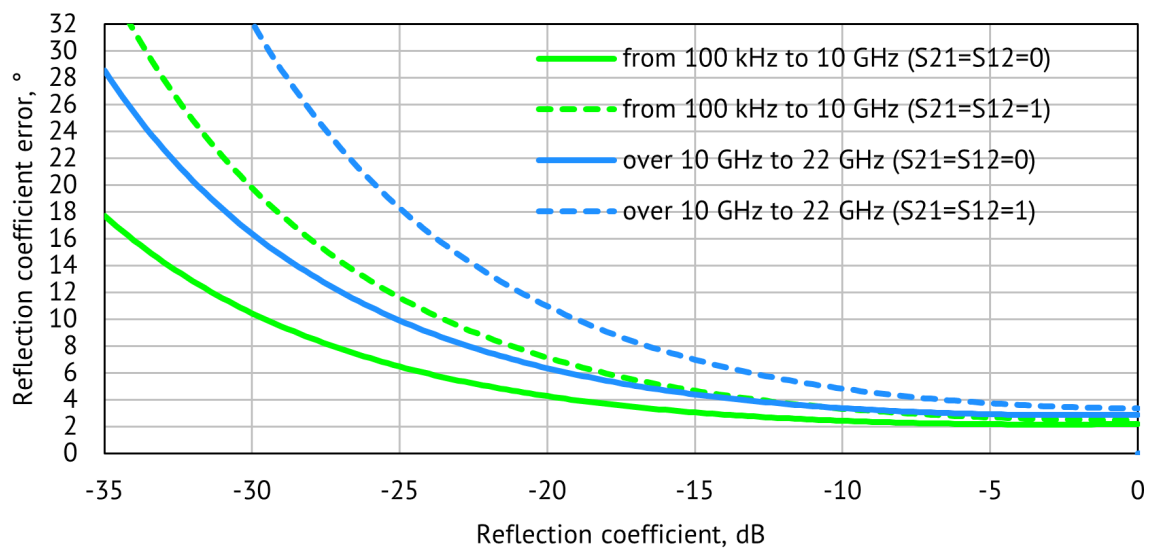Specifications are based on isolating DUT (S21 = S12 = 0)

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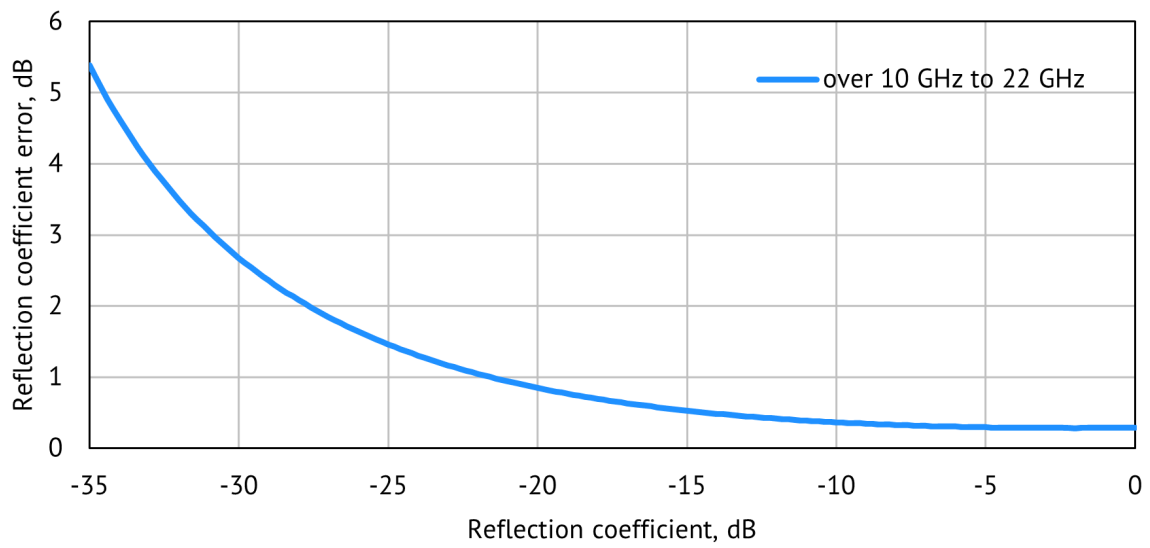
Reflection Phase Errors

Specifications are based on isolating DUT (S21 = S12 = 0)
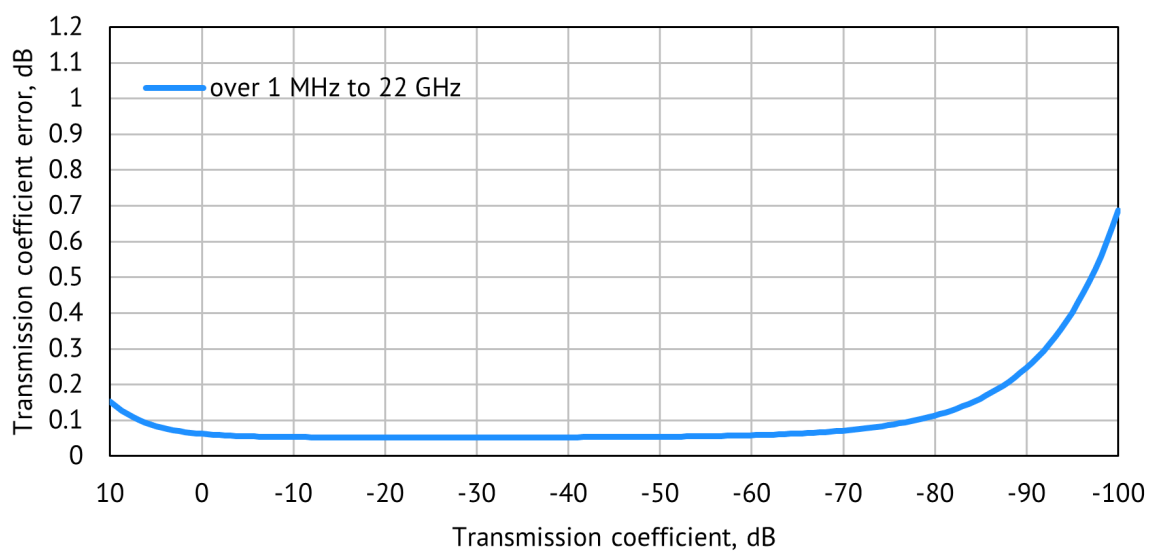
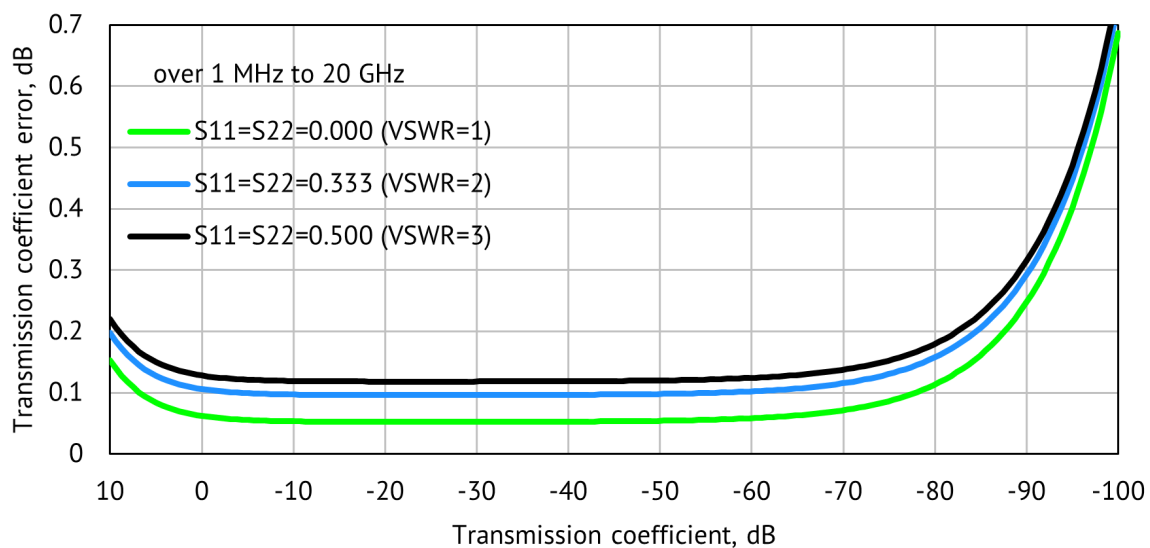Vector Network Analyzer Specifications

Transmission Accuracy Plots
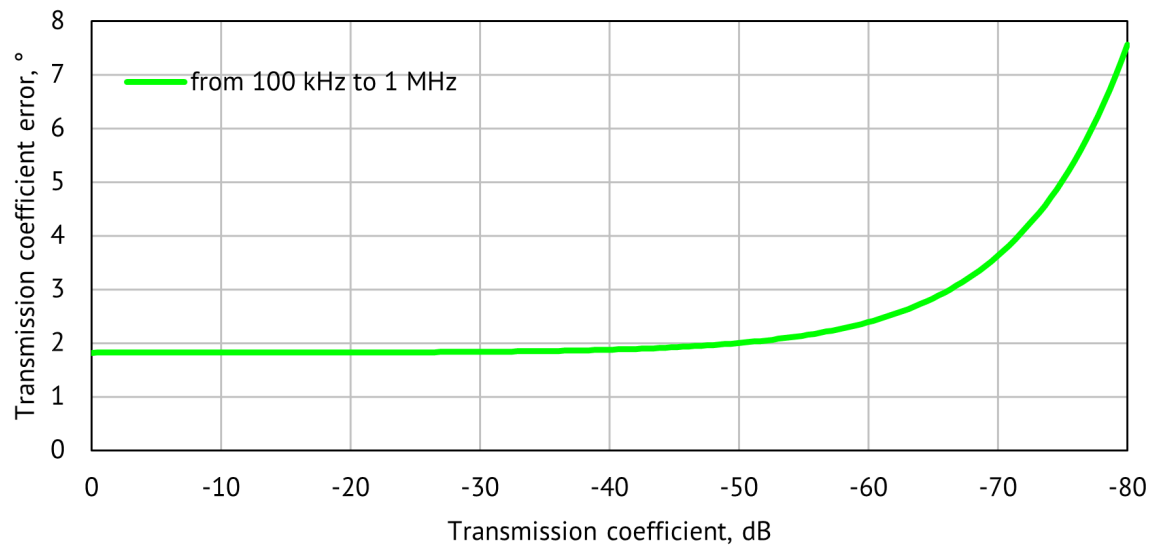
Transmission Magnitude Errors
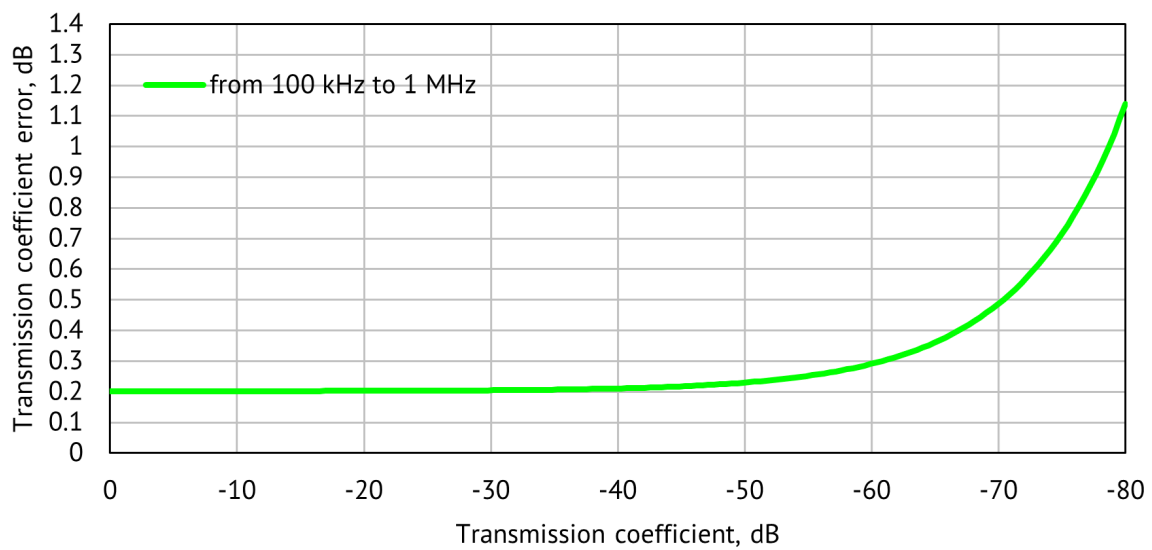
Specifications are based on matched DUT, and IF bandwidth of 1 Hz
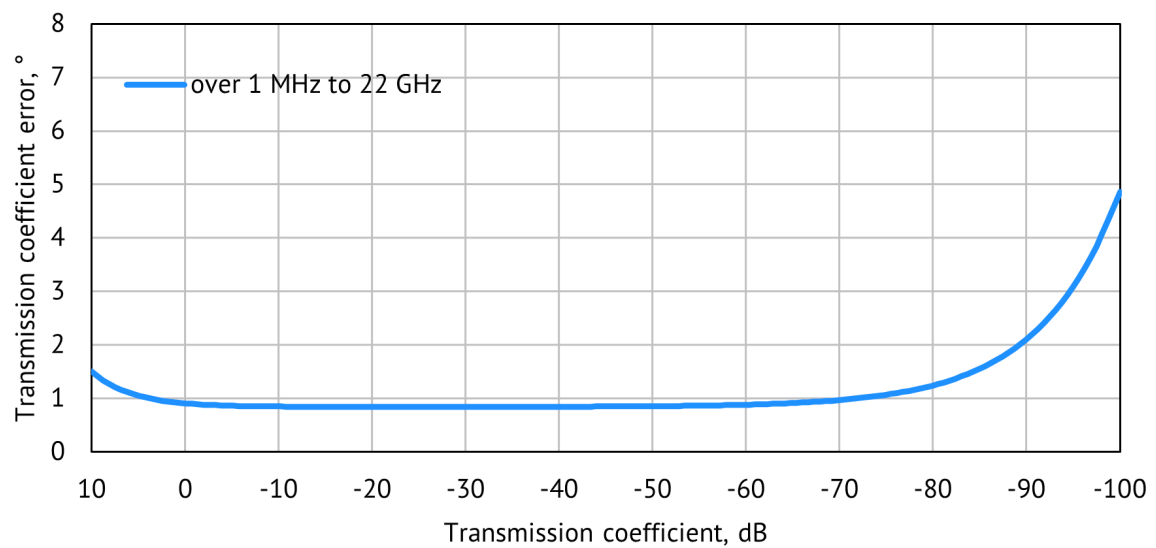
Specifications are based on matched DUT, and IF bandwidth of 1 Hz
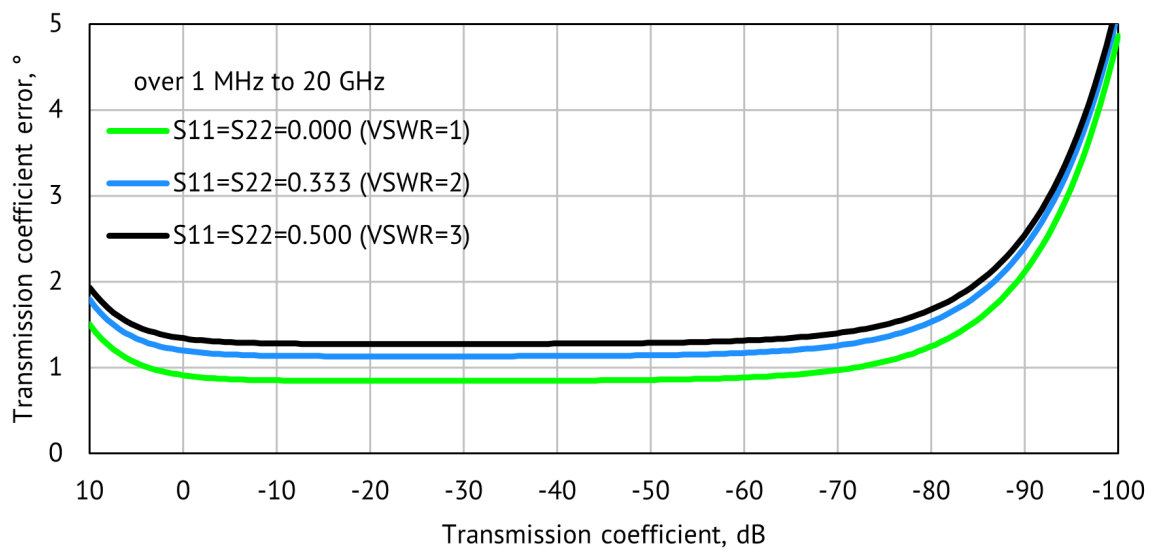
Transmission Phase Errors

Specifications are based on matched DUT, and IF bandwidth of 1 Hz

Specifications are based on matched DUT, and IF bandwidth of 1 Hz

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Vector Network Analyzer Specifications

over 1 MHz to 20 GHz

S11=S22=0.000 (VSWR=1)
S11=S22=0.333 (VSWR=2)
S11=S22=0.500 (VSWR=3)

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

Transmission Errors for Matched Devices vs Output Power and IF Bandwidth

IF=10000 Hz,
Power=0 dBm
or
IF=1 Hz,
Power=-40 dBm

IF=100 Hz,
Power=0 dBm
or
IF=1 Hz,
Power=-20 dBm

IF=10 Hz,
Power=0 dBm
or
IF=1 Hz,
Power=-10 dBm

IF=1 Hz,
Power=0 dBm

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