



SN0904 Vector Network Analyzer Specifications



Frequency range	300 kHz to 9 GHz
Software	S4VNA

Preliminary Specifications - Subject to Change

Hardware Specifications

SN0904

Measurement Range¹

Impedance	50 Ohm
Test port connector	type N, female
Number of test ports	4
Frequency range	300 kHz to 9 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	
300 kHz to 5 MHz	110 dB (125 dB typ.)
5 MHz to 6 GHz	135 dB (140 dB typ.)
6 GHz to 9 GHz	122 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.

Measurement Accuracy^[3]

Accuracy of transmission measurements ⁴	Magnitude/Phase
300 kHz to 5 MHz	
0 dB to +10 dB	± 0.25 dB / $\pm 2.5^\circ$
-30 dB to 0 dB	± 0.15 dB / $\pm 1.5^\circ$
-50 dB to -30 dB	± 0.25 dB / $\pm 2.5^\circ$
-70 dB to -50 dB	± 1.1 dB / $\pm 7.5^\circ$
5 MHz to 6 GHz	
0 dB to +10 dB	± 0.25 dB / $\pm 2.5^\circ$
-55 dB to 0 dB	± 0.15 dB / $\pm 1.5^\circ$
-75 dB to -55 dB	± 0.25 dB / $\pm 2.5^\circ$
-95 dB to -75 dB	± 1.1 dB / $\pm 7.5^\circ$
6 GHz to 9 GHz	
0 dB to +10 dB	± 0.25 dB / $\pm 2.5^\circ$
-50 dB to 0 dB	± 0.15 dB / $\pm 1.5^\circ$
-70 dB to -50 dB	± 0.25 dB / $\pm 2.5^\circ$
-90 dB to -70 dB	± 1.1 dB / $\pm 7.5^\circ$
Accuracy of reflection measurements ⁵	Magnitude/Phase
-15 dB to 0 dB	± 0.5 dB / $\pm 4^\circ$
-25 dB to -15 dB	± 1.5 dB / $\pm 10^\circ$
-35 dB to -25 dB	± 5.5 dB / $\pm 30^\circ$
Trace noise magnitude (IF bandwidth 3 kHz)	
300 kHz to 6 GHz	0.002 dB rms
6 GHz to 9 GHz	0.004 dB rms
Temperature dependence	
300 kHz to 6 GHz	0.02 dB/°C
6 GHz to 9 GHz	0.04 dB/°C

[3] Reflection and transmission measurement accuracy applies over the temperature range of $(73 \pm 9)^\circ\text{F}$ or $(23 \pm 5)^\circ\text{C}$ after 30 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 specification are based on a matched DUT, and IF bandwidth of 10 Hz.

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

Effective System Data

Directivity	42 dB
Source match	38 dB
Load match	42 dB
Reflection tracking	±0.10 dB
Transmission tracking	±0.14 dB

Uncorrected System Performance

300 kHz to 6 GHz	
Directivity	15 dB
Source match	15 dB
Load match	15 dB
6 GHz to 9 GHz	
Directivity	10 dB
Source match	15 dB
Load match	15 dB

Test Port Output

Power range	
300 kHz to 6 GHz	-45 dBm to +10 dBm
6 GHz to 9 GHz	-45 dBm to +2 dBm
Power accuracy	±1.5 dB
Power resolution	0.05 dB
Harmonic distortion⁶	
300 kHz to 1 GHz	-8 dBc
1 GHz to 9 GHz	-15 dBc
Non-harmonic spurious⁶	-15 dBc (-22 dBc typ.)

[6] Specification applies over the entire frequency range, at output power of 0 dBm.

Test Port Input

Noise floor	
300 kHz to 5 MHz	-110 dBm/Hz
5 MHz to 6 GHz	-135 dBm/Hz
6 GHz to 9 GHz	-130 dBm/Hz
Damage level	+23 dBm
Damage DC voltage	25 V

Measurement Speed

Time per point	24 μ s typ.
Port switchover time	200 μ s

Frequency Reference Input

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

Frequency Reference Output

Port	Ref OUT 10 MHz
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 In
Input level	
Low threshold voltage	1.1 V
High threshold voltage	2.6 V
Input level range	0 V to +5 V
Pulse width	≥2 μs
Polarity	positive or negative
Input impedance	≥2 kOhm
Connector type	BNC, female

Trigger Output

Port	Ext Trig Out
Maximum output current	20 mA
Output level	
Low level voltage	0.0 to 0.6 V
High level voltage	3.0 to 3.8 V
Polarity	positive or negative
Connector type	BNC, female

System & Power

Operating system	Windows 10 and above
CPU	4 core 2.0 GHz (x64)
RAM	4 GB
Interface	USB 2.0
Connector type	Type C
Power supply	110-240 V, 50/60 Hz
Power consumption	32 W

Calibration

Recommended factory adjustment interval	3 Years
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Dimensions

Length	439 mm
Width	362 mm
Height	90 mm
Weight	6.5 kg

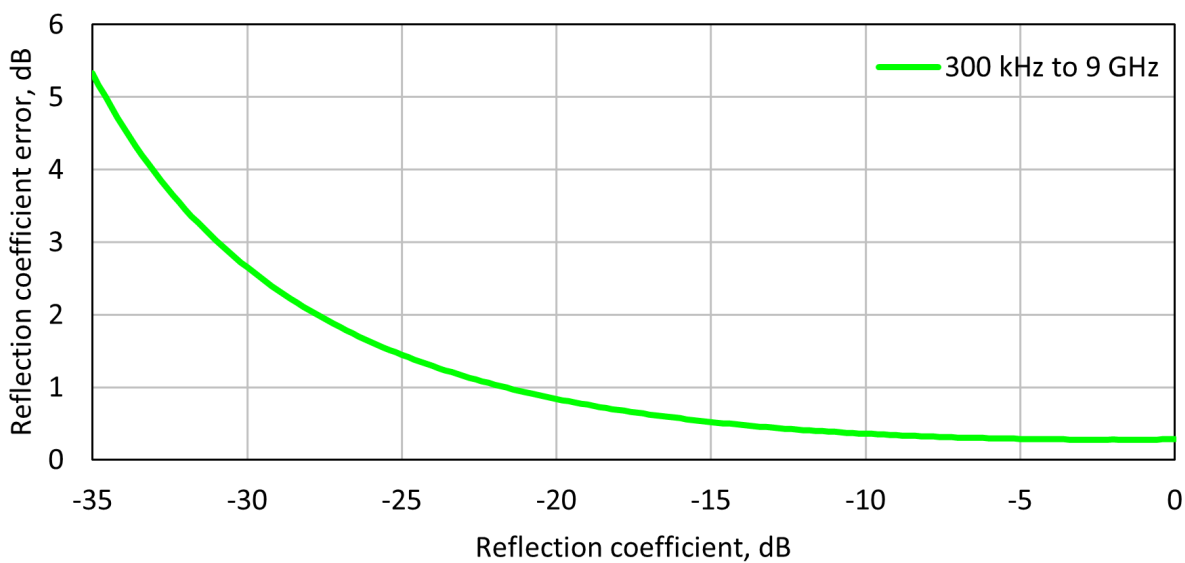
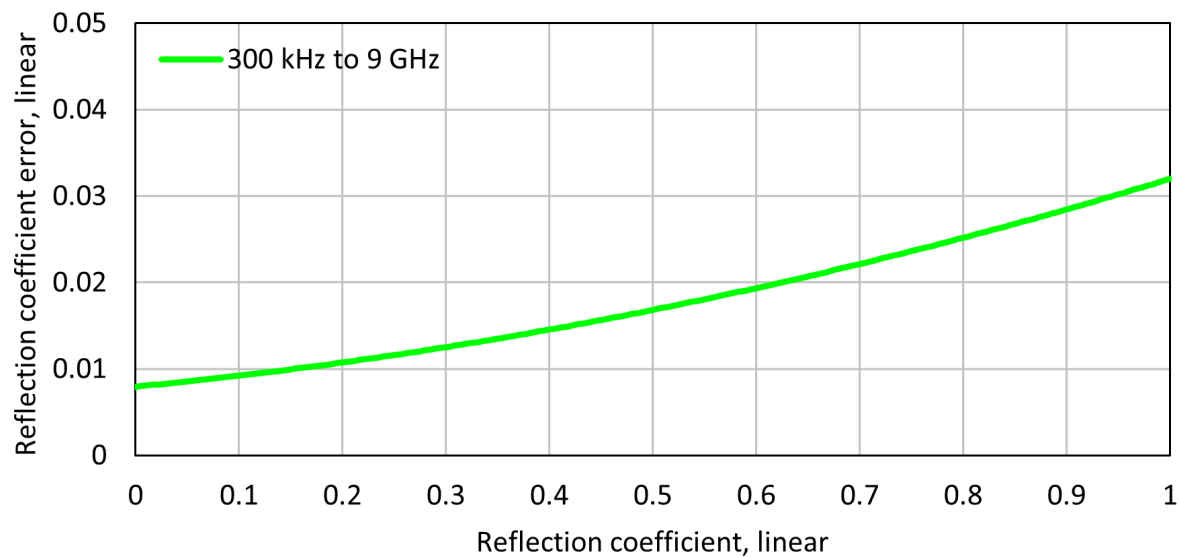
Environmental Specifications

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 temperature⁸	-50 °C to +70 °C (-58 °F to 158 °F)
Atmospheric pressure	70.0 kPa to 106.7 kPa

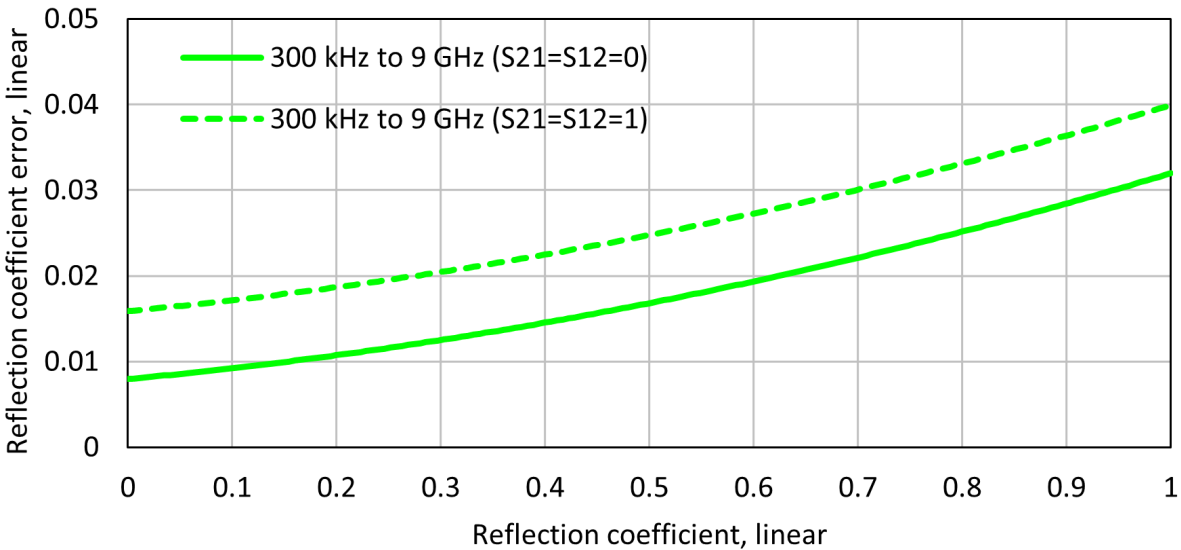
[8] Non-operating temperature specifies the allowable environmental conditions for transporting the instrument. Storage conditions are listed separately.

Reflection Accuracy Plots

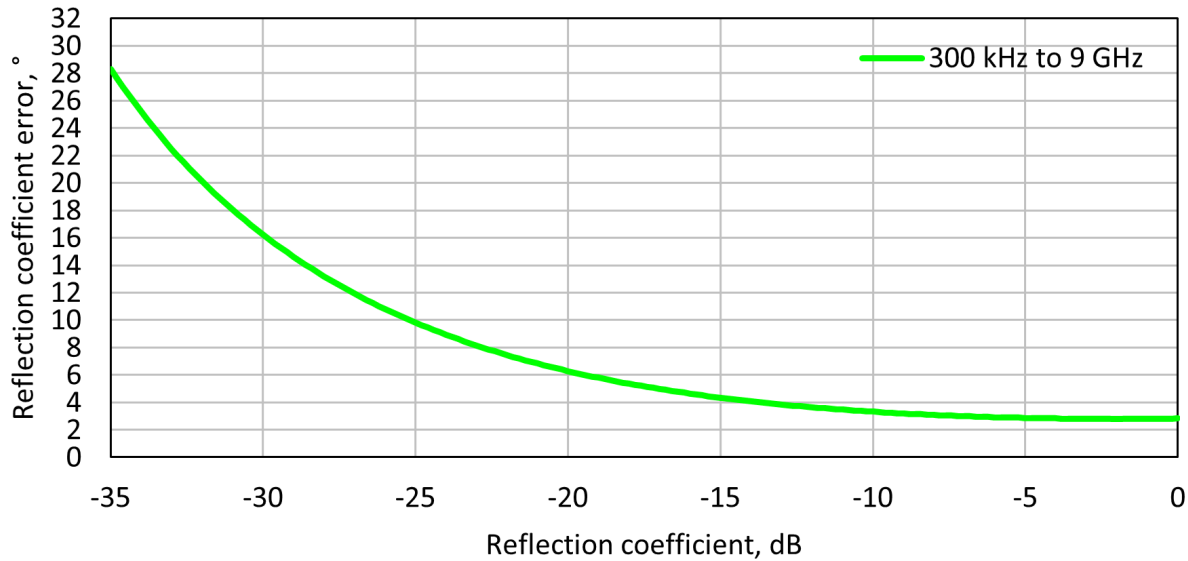
Reflection Magnitude Errors



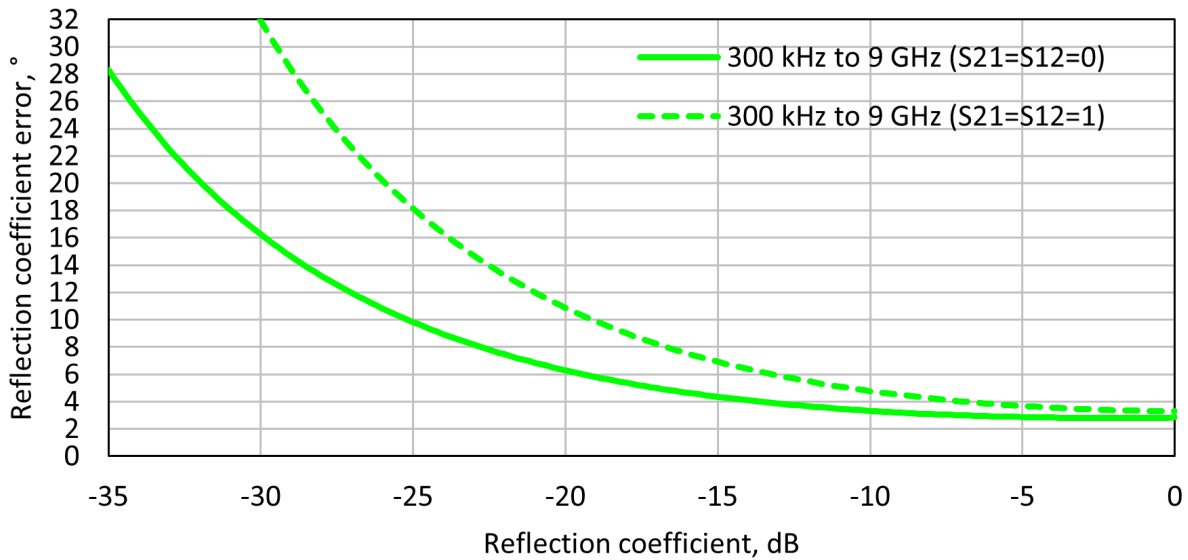
Specifications are based on an isolating DUT ($S_{21} = S_{12} = 0$)



Reflection Phase Errors

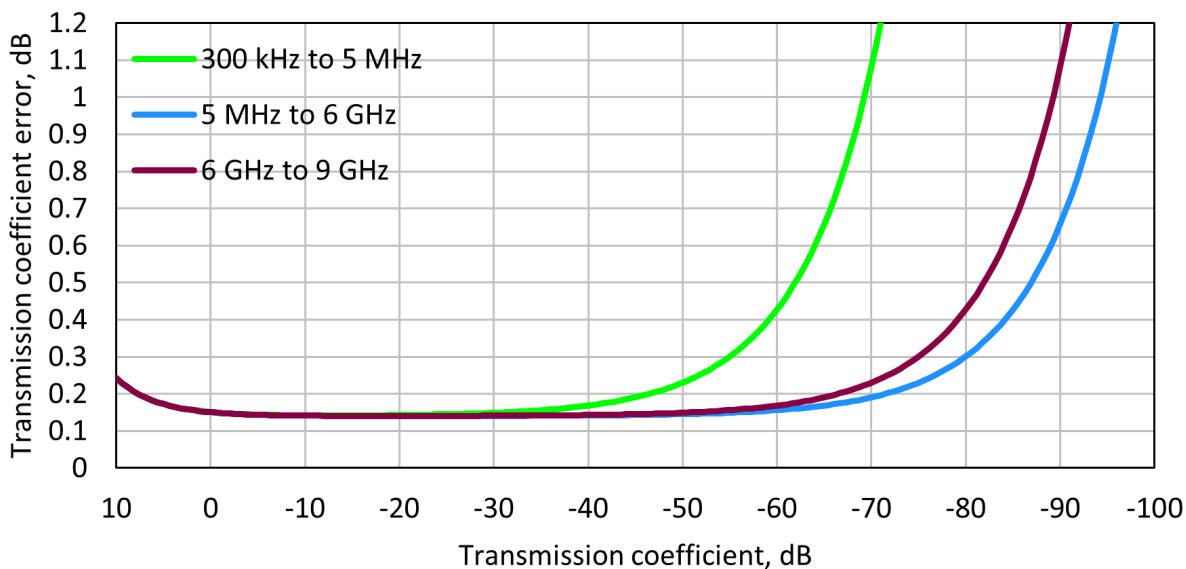


Specifications are based on an isolating DUT ($S_{21} = S_{12} = 0$)



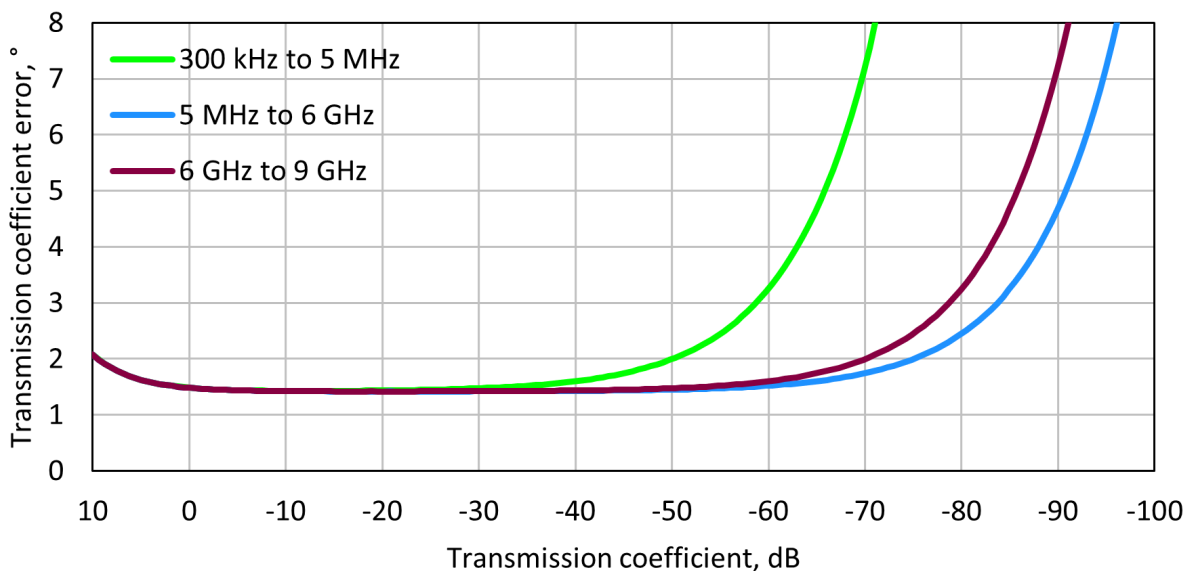
Transmission Accuracy Plots

Transmission Magnitude Errors



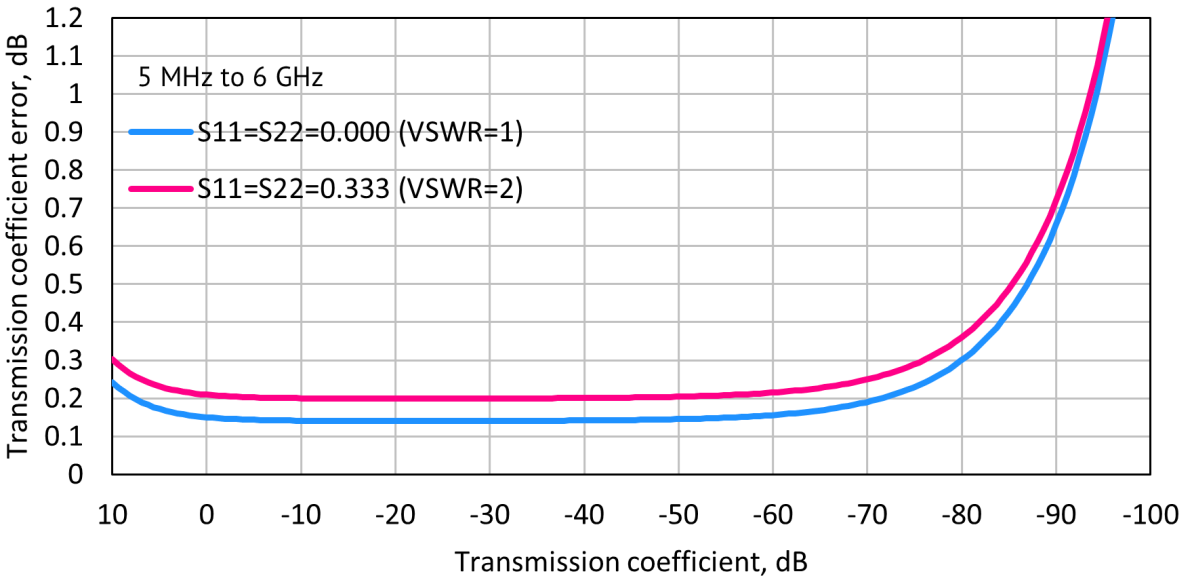
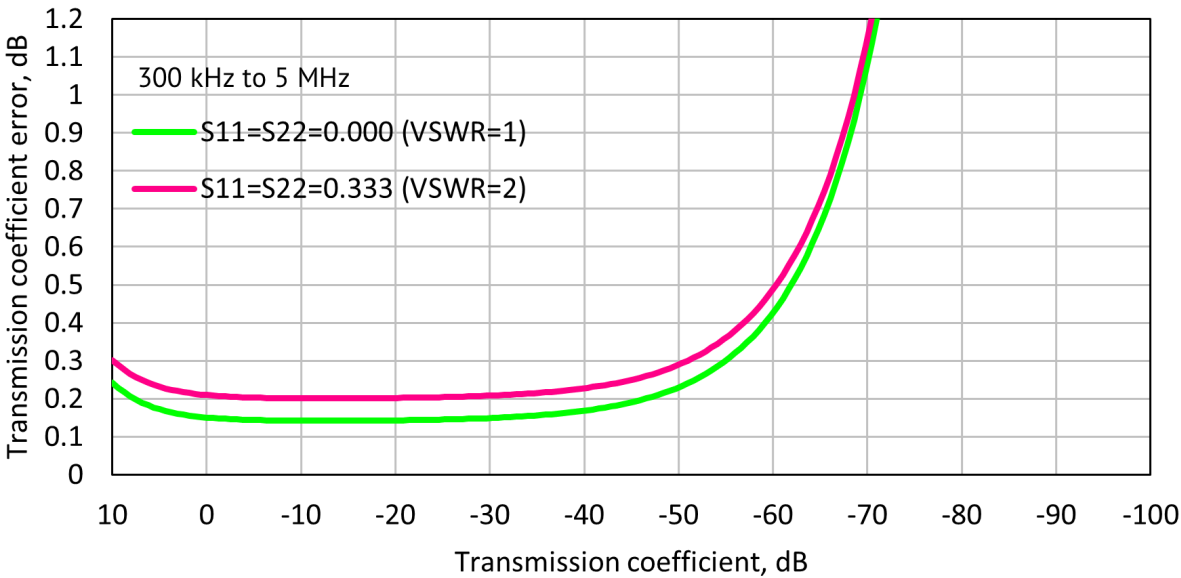
Specifications are based on a matched DUT, and IF bandwidth of 10 Hz

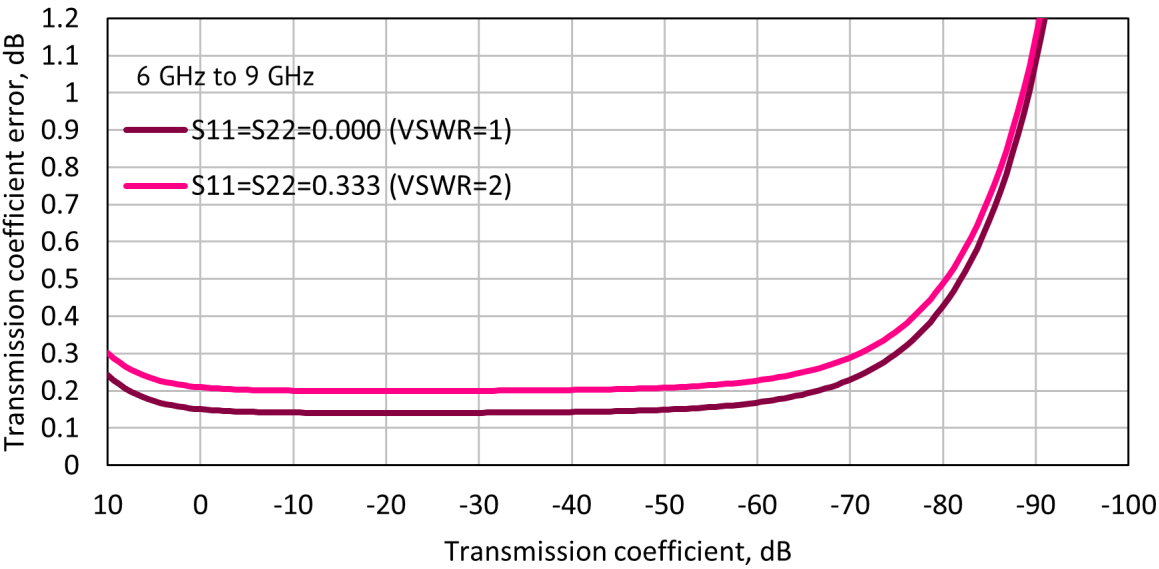
Transmission Phase Errors



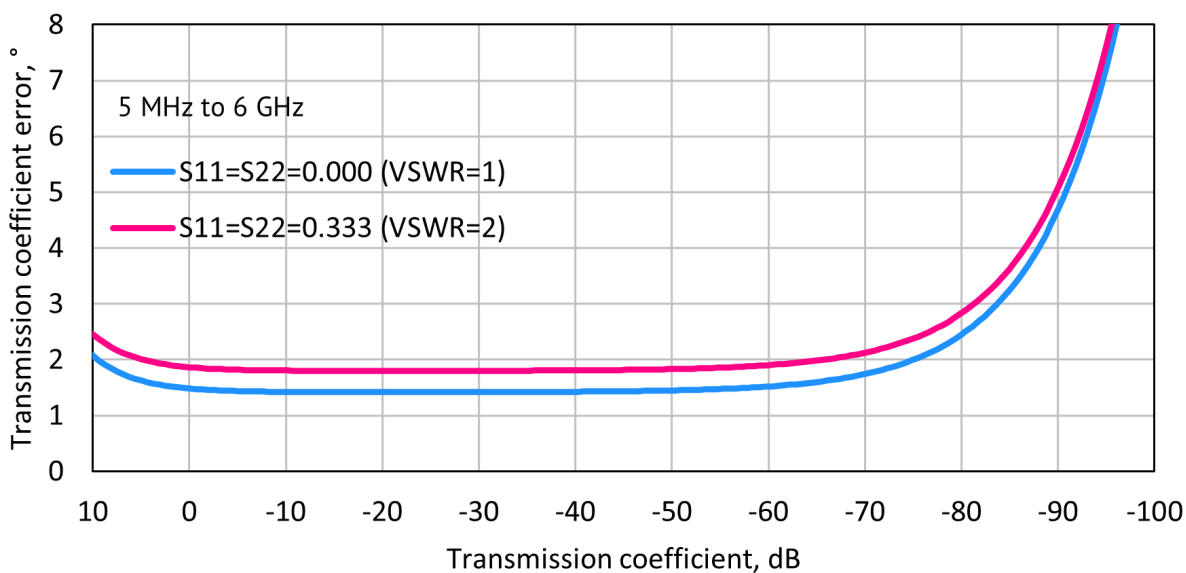
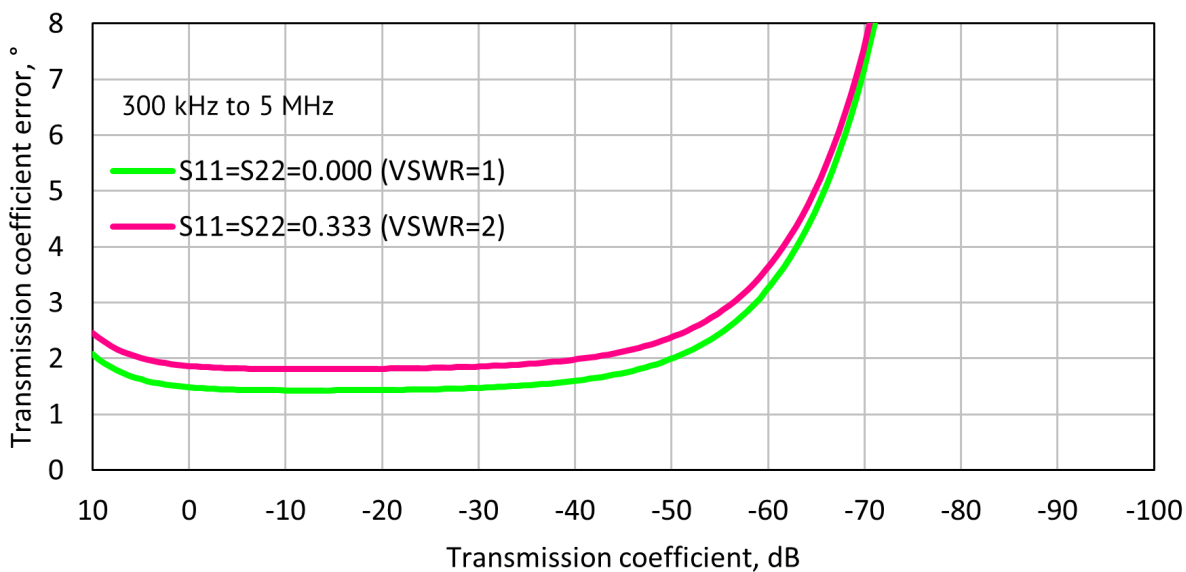
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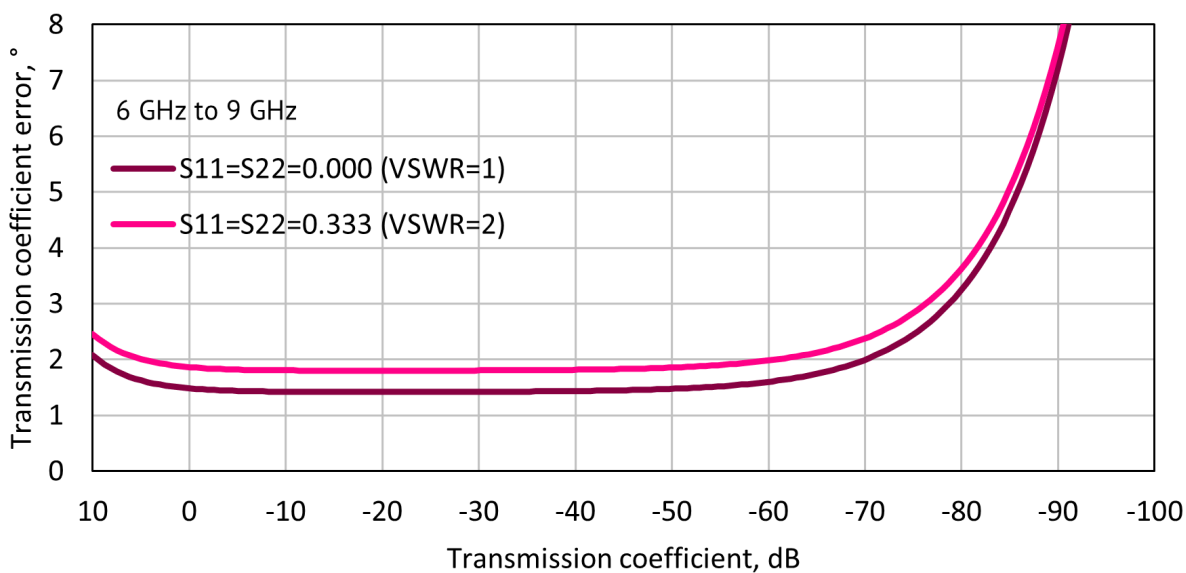
Transmission Magnitude Errors for Unmatched Devices





Transmission Phase Errors for Unmatched Devices





Transmission Errors for Matched Devices vs Output Power and IF Bandwidth

