

VA080

WR-8 variable attenuator



MicroHarmonics

Superior mm-Wave Components

The voltage variable attenuator is controlled using an analog DC signal applied to either the SMA port or the solder pin connectors.



Control

Voltage Control Range	0–10 V
Max Control Current	85 mA
Control Circuit Connector	SMA Solder Pin
Step Size	Analog
Directional	Yes

Mechanical

Flange	WR-8 IEEE 1785.2
Weight	1.3 Oz 36 g
Mechanical Dimensions	Page 5

Environmental

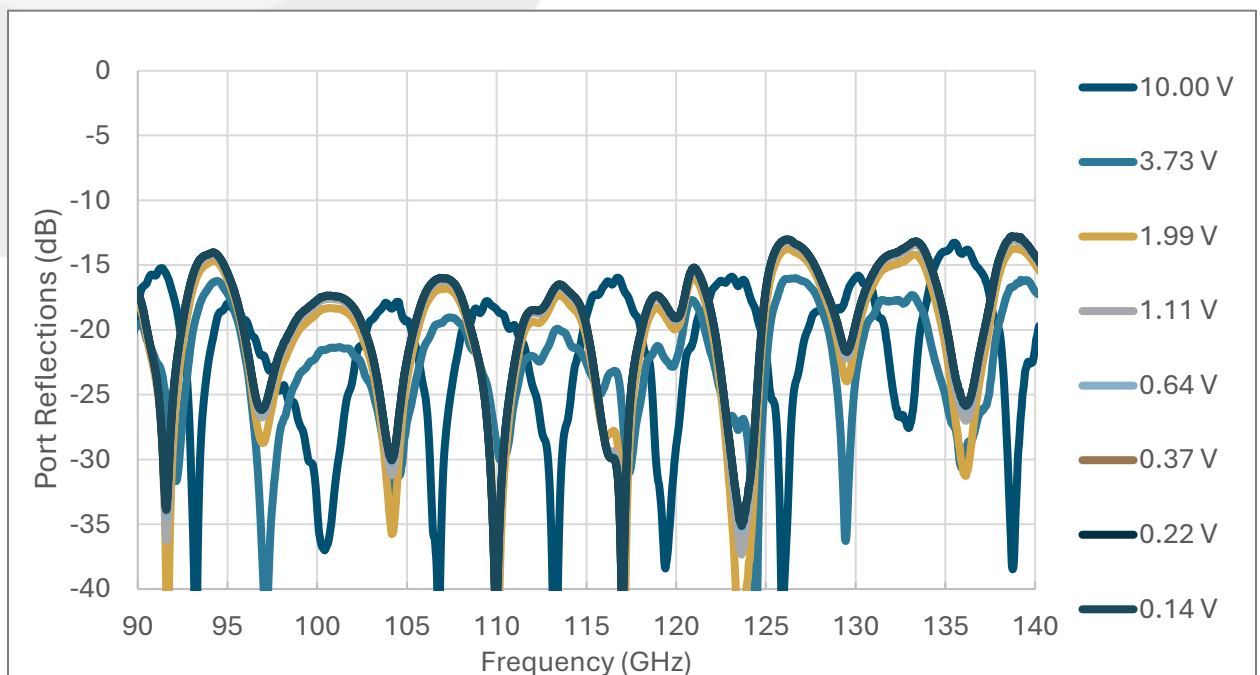
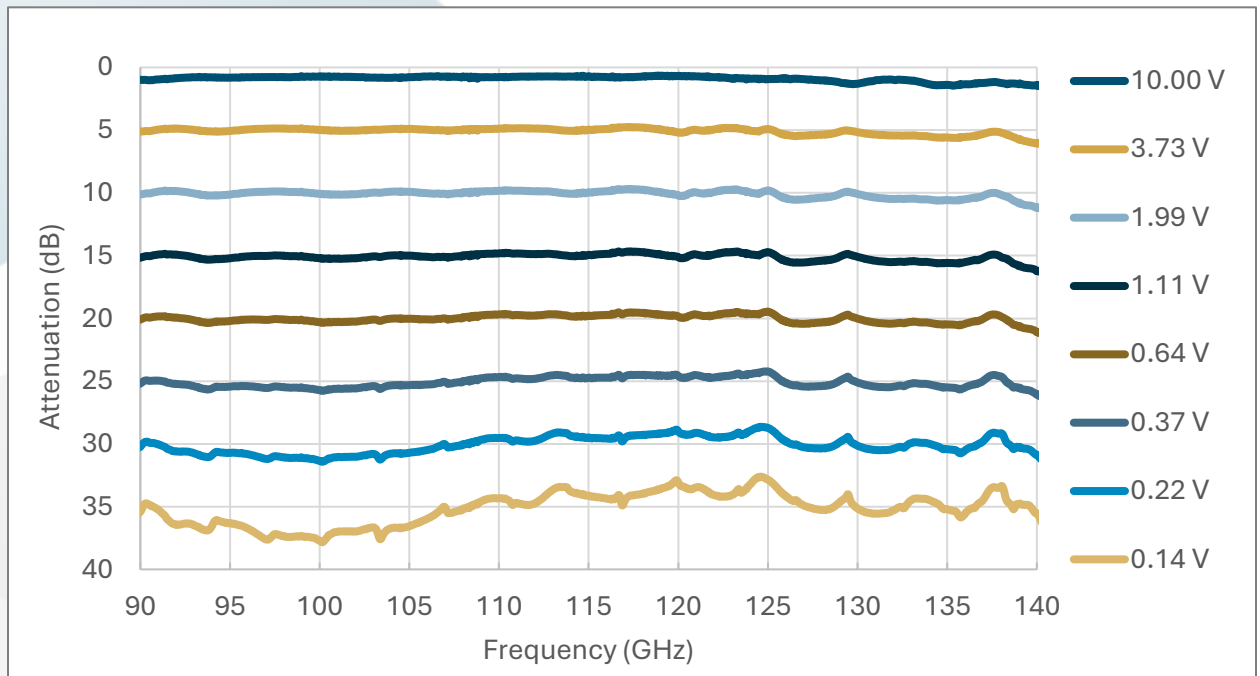
Specification Temp	22 °C
Operation Temp	-40 to +85 °C
ESD Sensitivity	None

Electrical

Frequency	min–max	90–140 GHz
Dynamic Range	mix	0–30 dB
Insertion Loss	max	2.0 dB
Insertion Loss	avg	0.8 dB
Return Loss	typ min	14 dB
VSWR	typ max	1.5:1
Power Limit	max	34 dBm 2.4 W
Rise and fall time	max	2 ms
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Attenuation and Return Loss Example Data

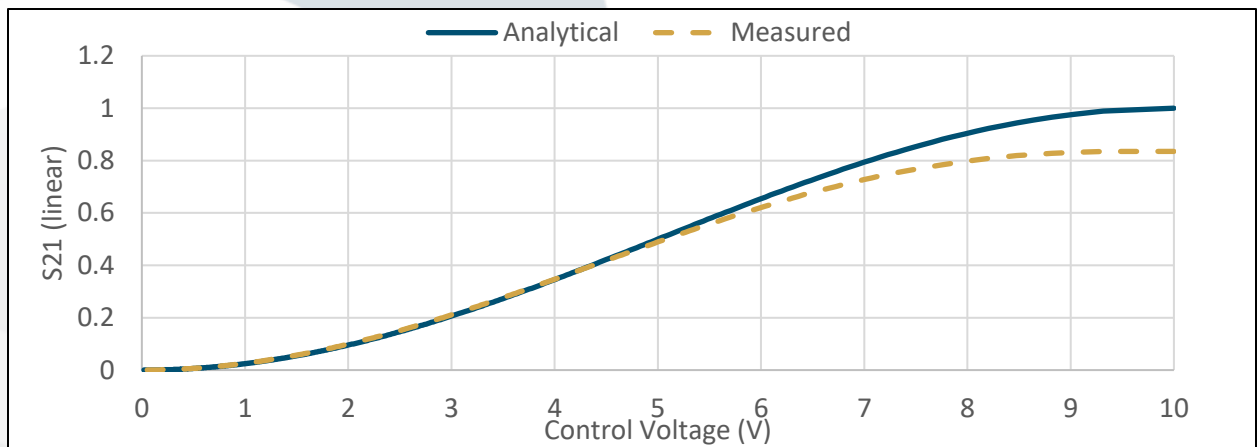




Control Voltage Vs. Attenuation

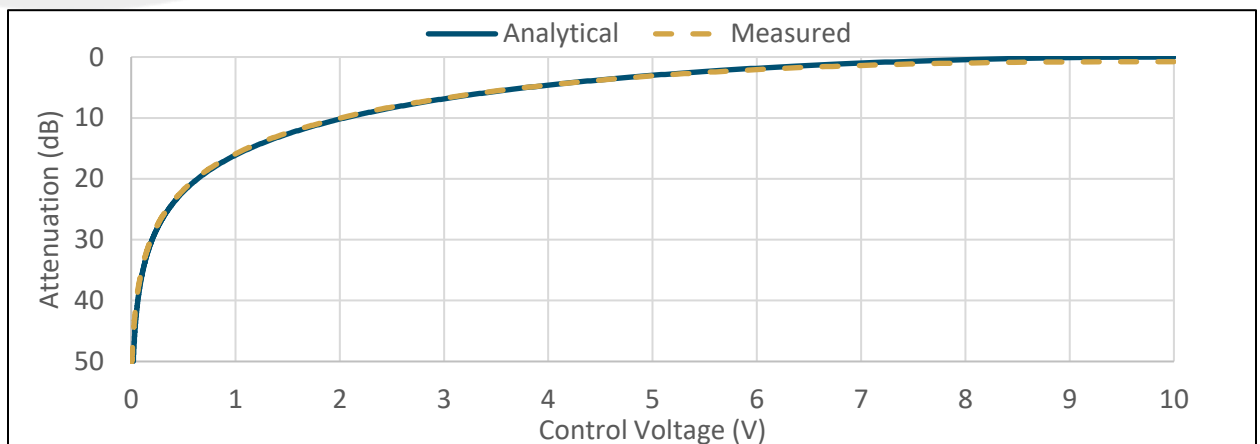
The relationship between the control voltage and linear gain (S_{21}) is described by the equation below where V is the control voltage. V_{max} is the maximum control voltage (10V) which yields nominally 0 dB gain (i.e., insertion loss). The discrepancy between the analytical and measured curves is because the analytical relationship assumes no loss.

$$S_{21} = \sin^2\left(\frac{\pi}{2} \frac{V}{V_{max}}\right)$$



The more intuitive way to visualize the relationship is in decibel form (instead of linear) and showing attenuation (instead of gain). This representation is below.

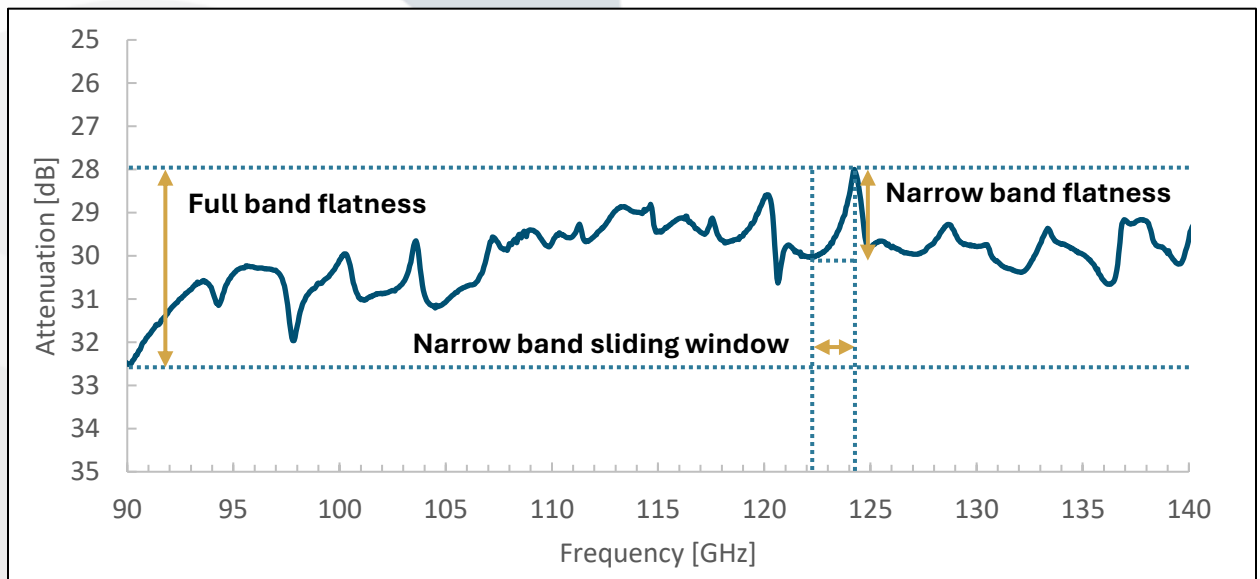
$$\alpha = 20 \log\left(\csc\left(\frac{\pi}{2} \frac{V}{V_{max}}\right)\right)$$





Full Band and Narrow Band Flatness

Flatness specifications vary by the attenuation level and are shown in the table below. Two types of flatness are specified. (1) Full band flatness is the maximum allowable variation across the whole frequency band. (2) Narrow band flatness is the maximum allowable variation for any arbitrary 2 GHz bandwidth within the frequency band. Please visit our documents page for application notes providing detailed definitions of the flatness specification.



Flatness Specifications

@ Attenuation [dB]	Full Band [$\pm$ dB, max]	Narrow Band [$\pm$ dB, max]
0	0.5	0.5
10	1.0	0.6
20	1.5	0.8
25	2.5	1.1
30	4.0	2.0

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