



ABSTRACT

Parsec's Phoenix is a paddle screw on Wi-Fi external antenna designed to be mounted directly to a standard reverse polarity SMA connector. The Phoenix works on both the 2.4GHz and 5 GHz Wi-Fi bands with high efficiency. Available in both black and white. Detailed product information and options are available under NDA.

PHOENIX ANTENNA TEST RESULTS

PTAPNWG-AW

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Product Details

Product Description

Parsec’s Phoenix PTAPNWG-AW is a paddle screw on Wi-Fi external antenna designed to be mounted directly to a standard reverse polarity SMA connector. The PTAPNWG-AW works on both the 2.4 GHz and 5 GHz Wi-Fi bands with high efficiency. Available in both black and white.

Detailed product information and options are available under NDA. Patent pending.

Mechanical Details

Dimensions	8.16-inch length x 1.10-inch width x 0.60-inch thickness
Mounting	Directly screws onto a RPSMA female connector

Environmental Details

Operating Temperature	-40°C to 85°C
Ingress Protection	indoor

Product Dimensions

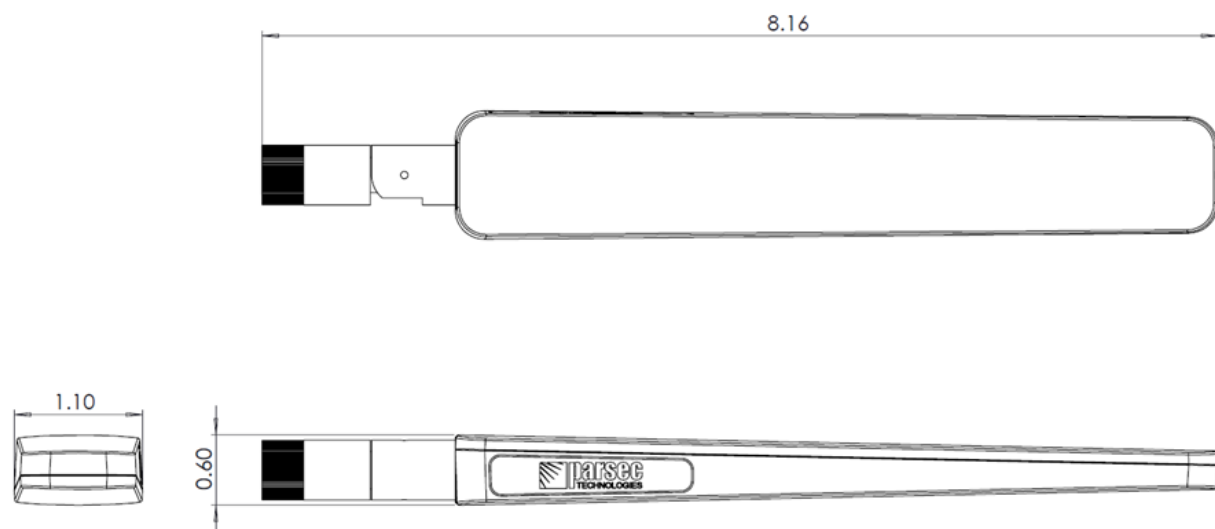


Figure 1: Product Dimensions

PARSEC PHOENIX WI-FI ANTENNA TEST RESULTS

Parsec Phoenix PTAPNWG-AW Dual Band Wi-Fi Antenna Peak Gain

The Parsec Phoenix PTAPNWG-AW dual band Wi-Fi antenna peak gain is determined from the peak gain for the PCB and radome in the ANSYS simulation combined with the measured loss for the cable and connector assembly connected to the antenna. The net peak gain is vs. frequency is shown in the table below.

Frequency (GHz)	ANSYS Gain (dBi)	Cable Loss (dB)	Net Gain (dBi)
2.40	2.68	-0.27	2.41
2.44	2.86	-0.41	2.45
2.48	2.82	-0.14	2.68
5.15	6.06	-1.37	4.70
5.20	6.00	-1.28	4.72
5.25	5.84	-1.23	4.61
5.30	5.62	-1.25	4.37
5.35	5.35	-1.11	4.24
5.40	5.08	-1.08	4.01
5.47	4.73	-0.91	3.82
5.60	4.01	-0.82	3.19
5.73	4.61	-0.76	3.86
5.80	4.71	-0.73	3.97
5.85	4.36	-0.84	3.52

Table 1: Frequency vs ANSYS Gain vs Cable Loss vs Net Gain

The frequencies in the table include the upper and lower band edge frequencies for the U-NII bands plus a frequency in the middle of each band.

The radiation pattern for the Parsec Phoenix PTAPNWG-AW dual band Wi-Fi antenna is omnidirectional with highest gain perpendicular to the length of the antenna. The azimuth and elevation radiation patterns are shown on the following pages.

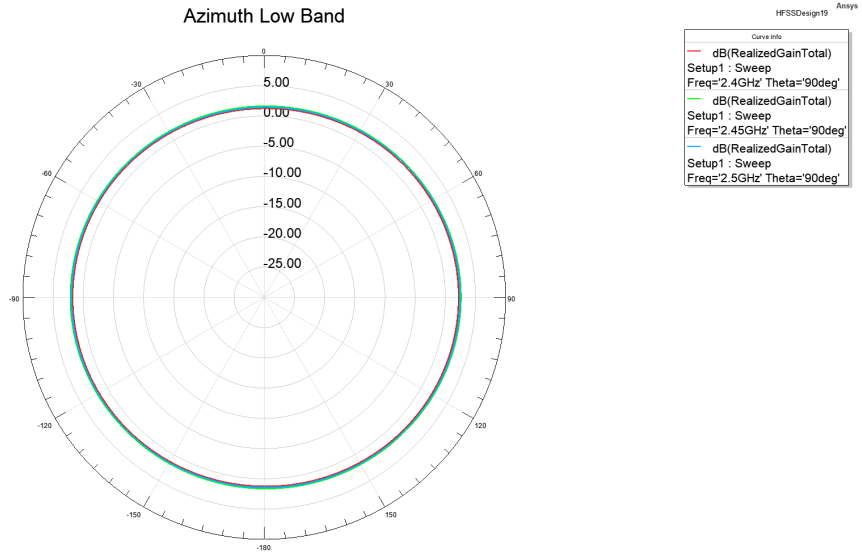


Figure 2: Azimuth, 2.4 GHz

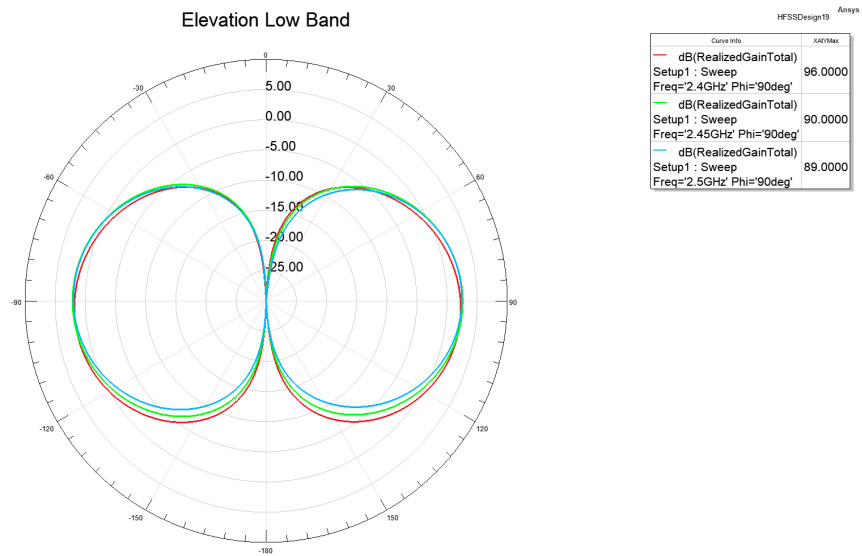


Figure 3: Elevation, 2.4 GHz

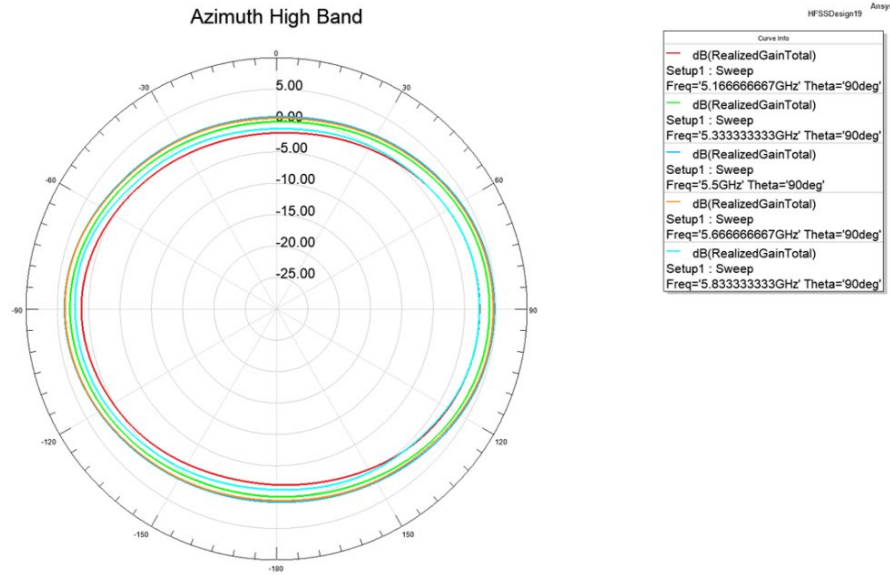


Figure 4: Azimuth, 5 GHz

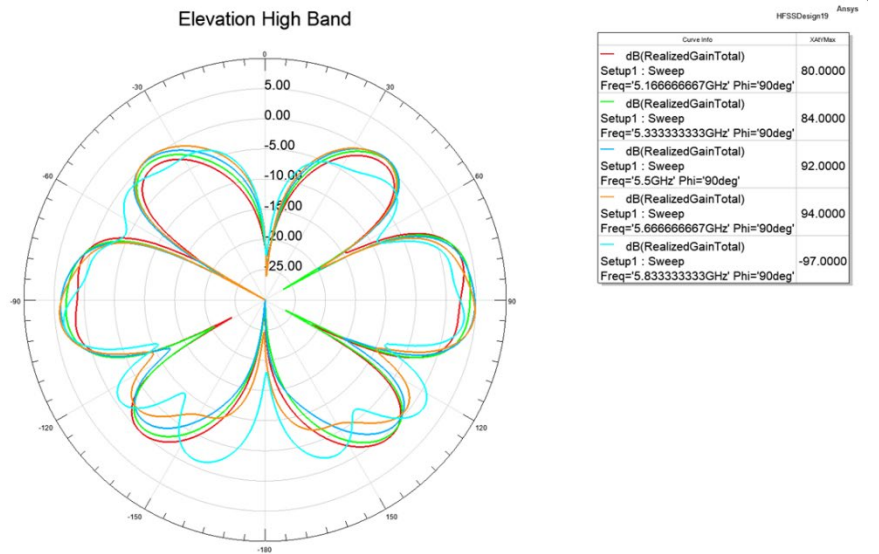


Figure 5: Elevation, 5 GHz

ANSYS Simulation Setup Details

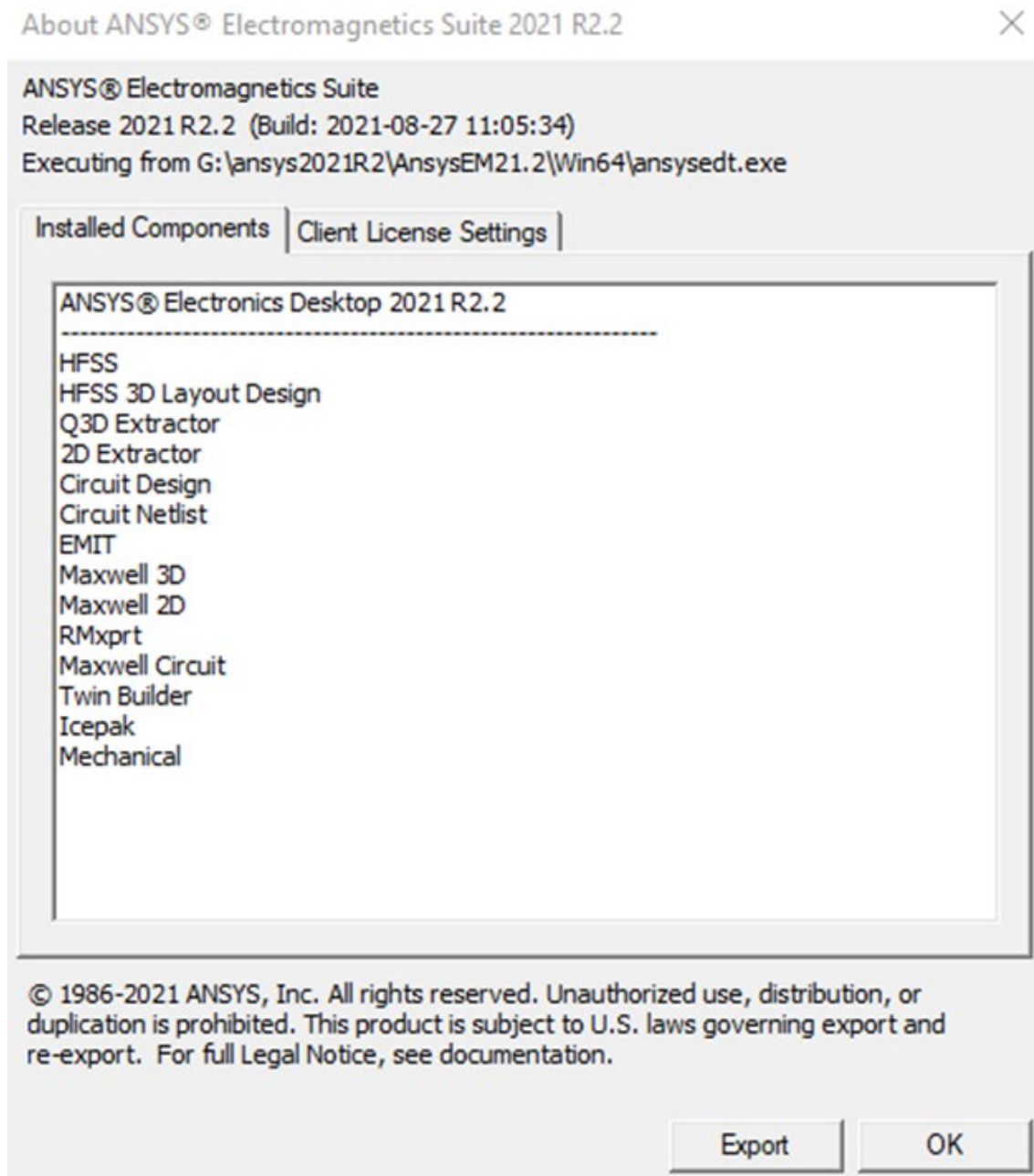


Figure 6: ANSYS Software details.

Driven Solution Setup

General | Options | Advanced | Expression Cache | Derivatives | Defaults

Setup Name:

Enabled Solve Ports Only

Adaptive Solutions

Solution Frequency: Single Multi-Frequencies Broadband

	Frequency	Unit	Max. Delta
	2.5	GHz	0.02
	6	GHz	0.02

Maximum Number of Passes:

Figure 7: Driven Solution Setup: General

Driven Solution Setup

General | Options | Advanced | Expression Cache | Derivatives | Defaults

Initial Mesh Options

Do Lambda Refinement

Lambda Target: Use Default Value

Use Free Space Lambda

Adaptive Options

Maximum Refinement Per Pass: %

Maximum Refinement:

Minimum Number of Passes:

Minimum Converged Passes:

Solution Options

Order of Basis Functions:

Direct Solver

Iterative Solver

Relative Residual:

Domain Decomposition

Relative Residual:

Enhanced low frequency accuracy

Figure 8: Driven Solution Setup: Options

Driven Solution Setup

General | Options | **Advanced** | Expression Cache | Derivatives | Defaults

Mesh Options

Import Mesh Setup Link...

Set Components for Mesh Fusion...

Port Options

Maximum Delta Zo: %

Use Radiation Boundary On Ports

Set Triangles for Wave Port

Minimum:

Maximum:

Fields

Save Fields Object/Face List

Save radiated fields only

Far Field Observation Domain

Edit Far Field Setup

Use Defaults

Figure 9: Driven Solution Setup: Advanced

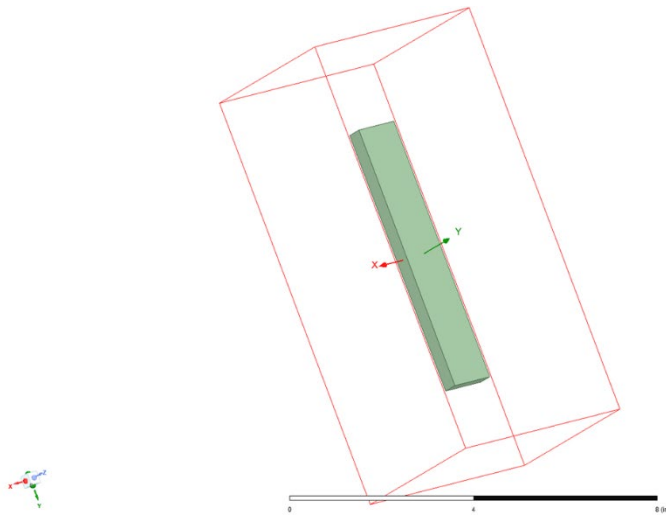
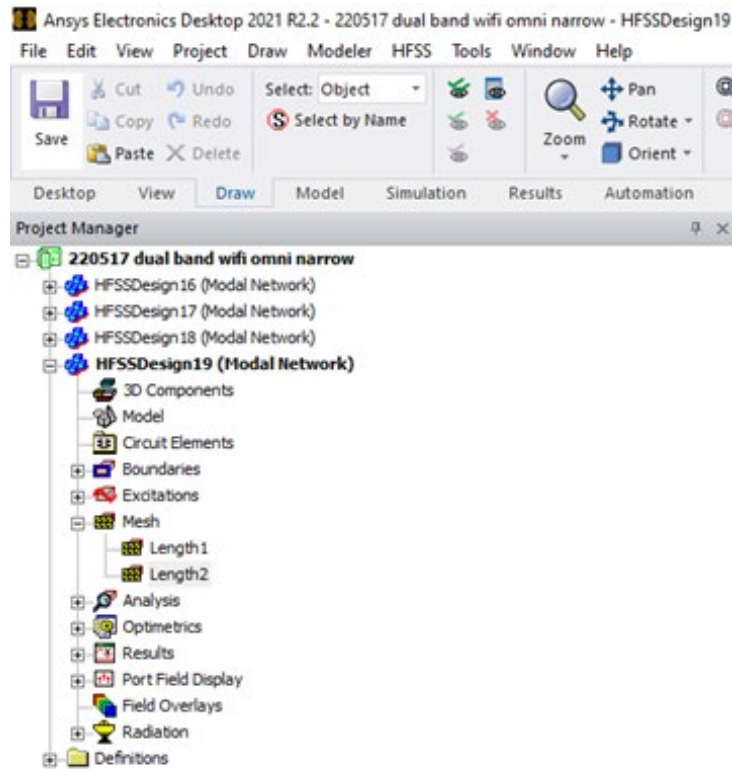
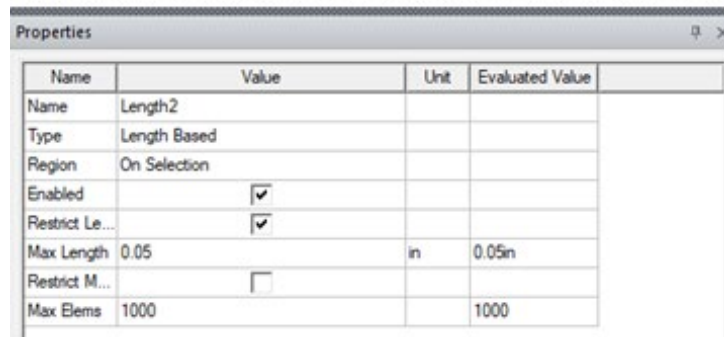


Figure 10: Origin and X, Y, Z planes setup of the model

The screenshot shows the Design Tree on the left and the Properties panel on the right. The Design Tree is expanded to show the 'Length1' mesh property under the 'Mesh' folder. The Properties panel displays the following settings:

Name	Value	Unit	Evaluated Value
Name	Length1		
Type	Length Based		
Region	On Selection		
Enabled	<input checked="" type="checkbox"/>		
Restrict Le...	<input checked="" type="checkbox"/>		
Max Length	0.05	in	0.05in
Restrict M...	<input type="checkbox"/>		
Max Elms	1000		1000

Figure 11: Length 1 mesh properties

The Properties dialog box for the Length2 mesh is shown. It contains the following table of properties:

Name	Value	Unit	Evaluated Value
Name	Length2		
Type	Length Based		
Region	On Selection		
Enabled	<input checked="" type="checkbox"/>		
Restrict Le...	<input checked="" type="checkbox"/>		
Max Length	0.05	in	0.05in
Restrict M...	<input type="checkbox"/>		
Max Elms	1000		1000

Figure 12: Length 2 mesh properties

Network Analyzer Measurement

The Hewlett Packard 8753 E network analyzer shown below was used to make return loss measurements for the assembled Parsec Phoenix PTAPNWx dual band Wi-Fi antenna. It was also used to measure the insertion loss of the cable and connector knuckle assembly at the base of the antenna separate from the antenna.

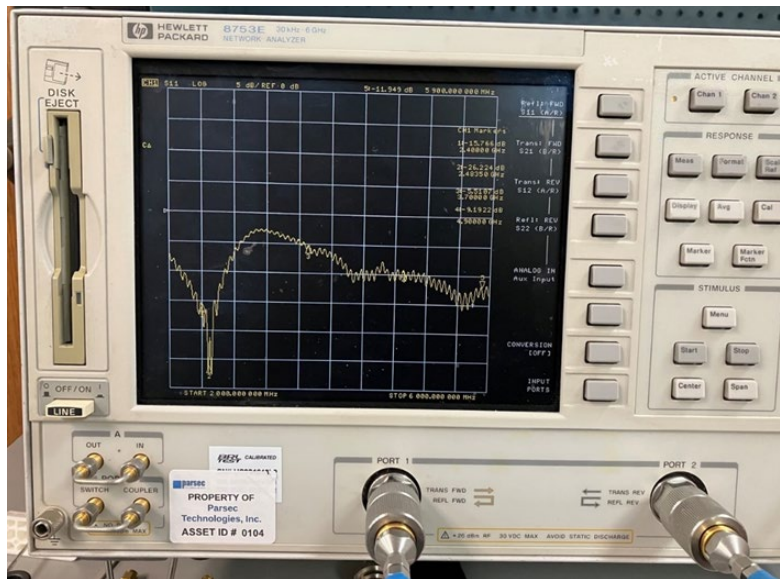


Figure 13: Hewlett Packard 8753 E network analyzer

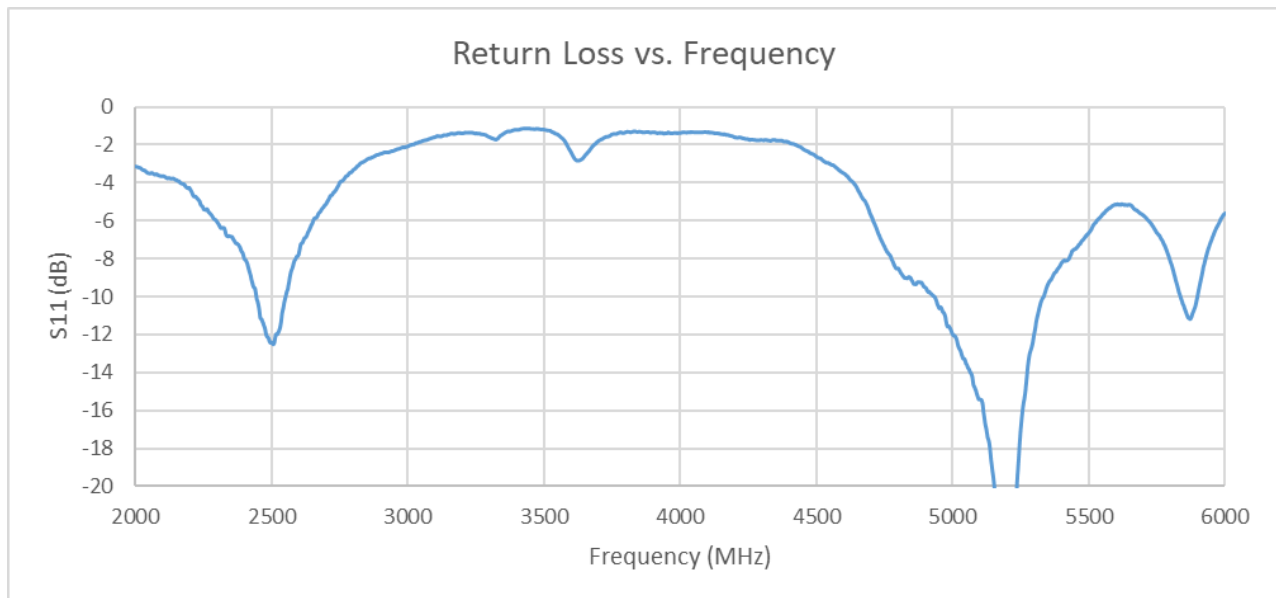


Figure 14: Return Loss vs Frequency Plot

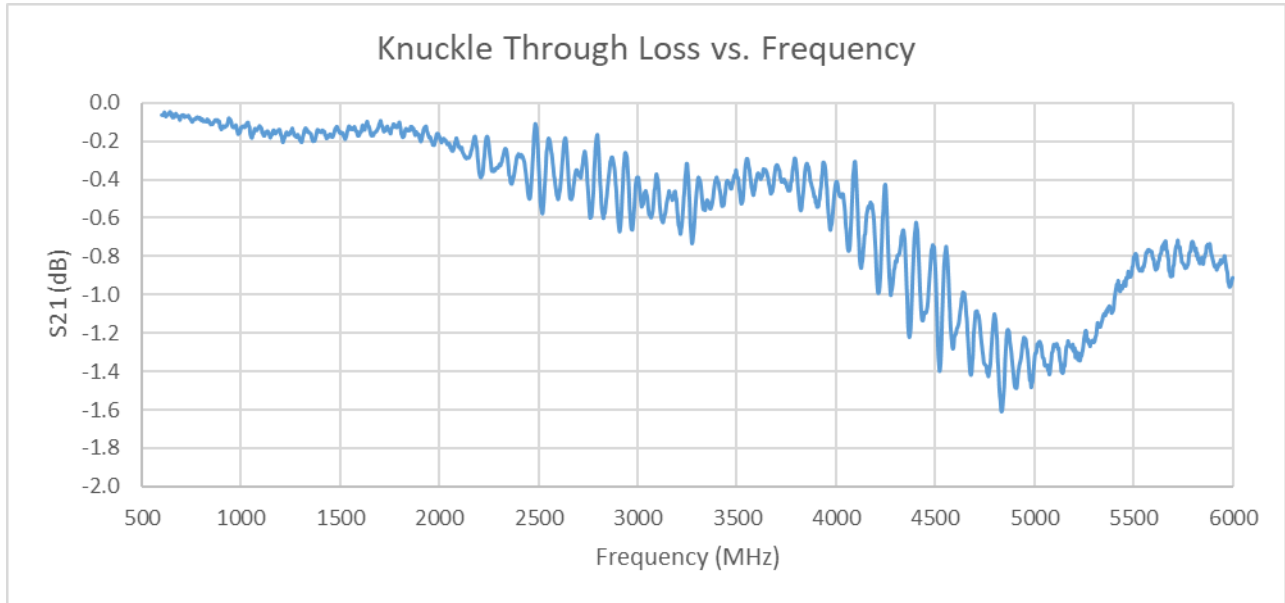


Figure 15: Knuckle Through Loss vs Frequency



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