

An Analysis: Optimization of E Shape Antenna and Default Antenna

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ABSTRACT

In this research paper to proposes the optimization of E-shape antenna for bandwidth enhancement. The antenna is designed to wide bandwidth. E Shape Antenna and Default antennas are mostly used because of their many advantages, such as the low profile, lightweight, and conformity with different types of parameters.

Keywords: E-Shape, Antenna, parameter, Slot, Length, Width, Radius.

1. INTRODUCTION

The E-shaped patch Microstrip antenna would be modeled, and figure.2 showed the model created in a soft HFSS with using of Matlab 7.8. The E-shape Microstrip patch antenna has been designed with over all parameters W (mm) x L (mm).The designing of E-shaped Microstrip patch antenna, the resonant frequency = 2.57 GHz S11 parameter of E shape optimized antenna and we get maximum BW of 1.85 GHz. Figure 5.2 shows the VSWR i.e. 1.07 dB at 2.57 GHz and 1.98 dB at 1.45 GHz and Figure 3 Shows the Peak Gain of 2.7 dB. S11 parameter comparison of Optimized and default antenna. Figure 6 and Figure 7 Shows the VSWR and Peak Gain of Optimized and default antenna.

2. Optimized Antenna

Finally we get optimized antenna after doing parametric studies on: The slot length (Ls), width (Ws), position (Ps), the substrate height (h), the position of excitation point (Xf, Yf) and Probe radius (Pr).

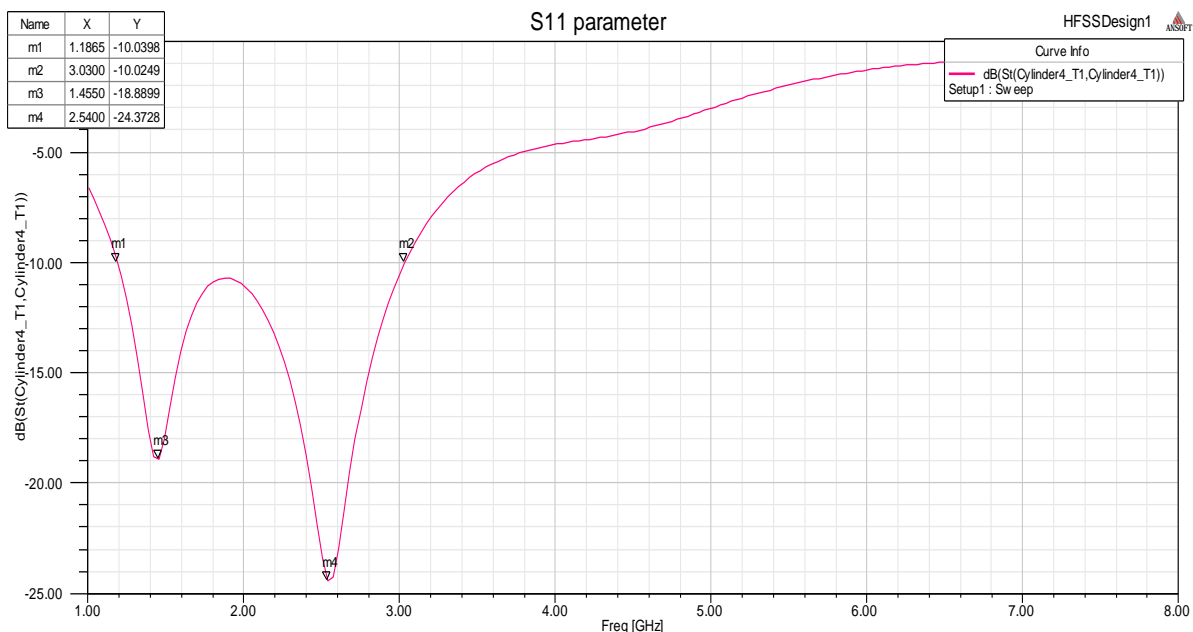


Figure 1: S11 parameter of E Shape Optimized antenna

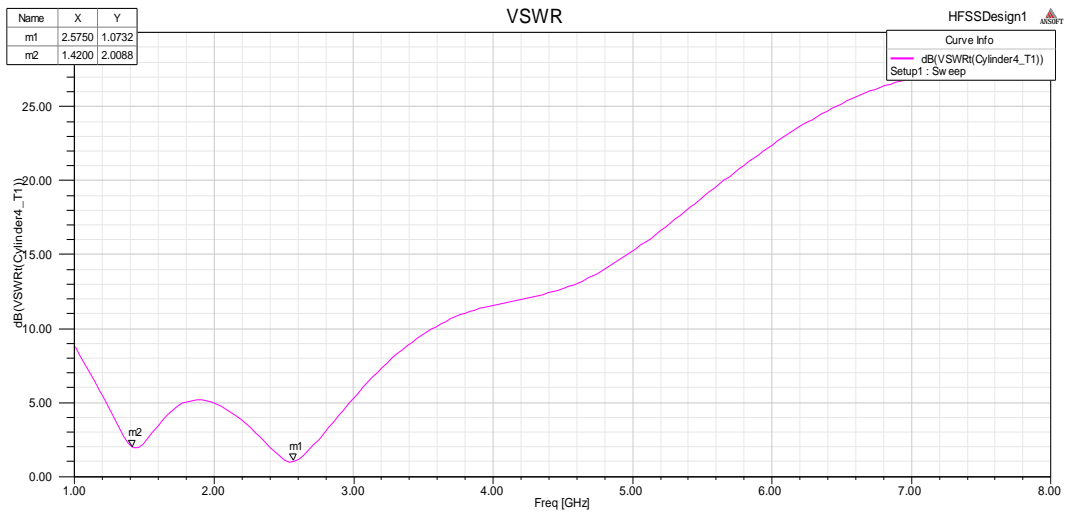


Figure 2: VSWR of E Shape Optimized antenna

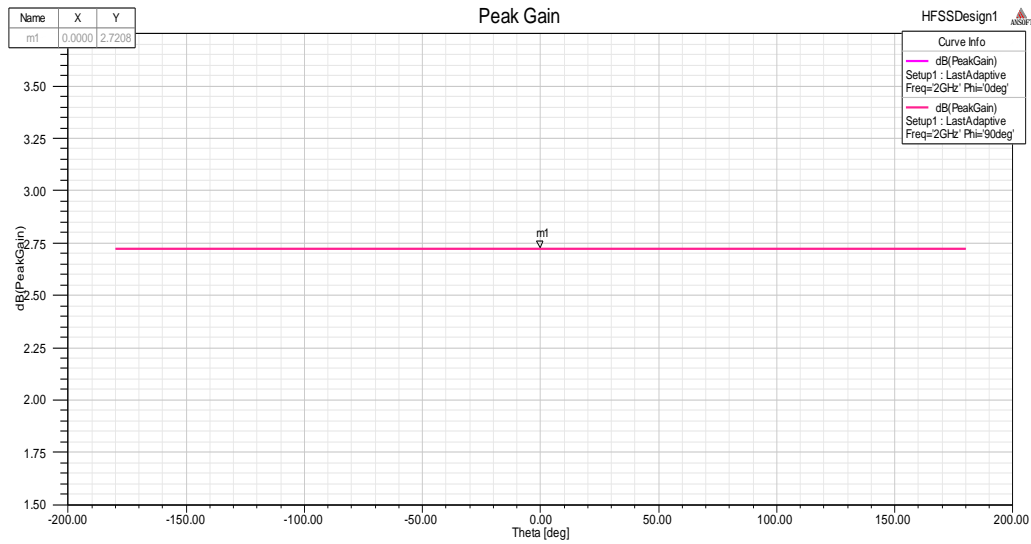


Figure 3: Peak Gain of E Shape Optimized antenna

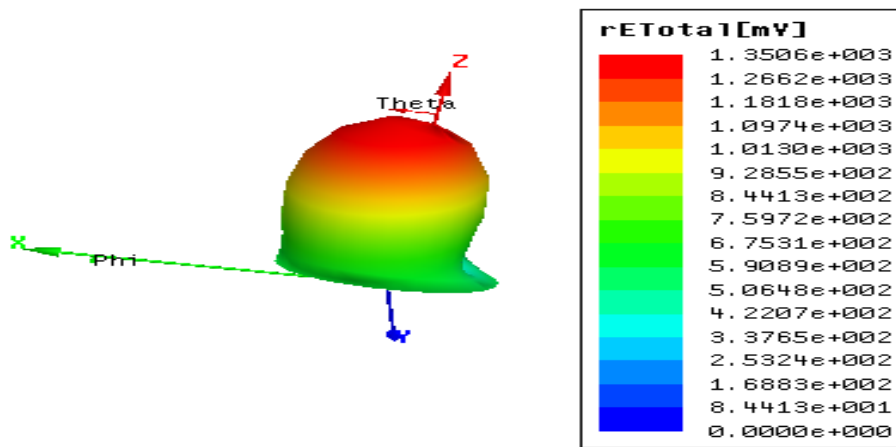


Figure 4: 3-D polar plot of E Shape Optimized antenna

Figure 1 Shows the S11 parameter of E shape optimized antenna and we get maximum BW of 1.85 GHz. Figure 2 shows the VSWR i.e. 1.07 dB at 2.57 GHz and 1.98 dB at 1.45 GHz and Figure 3 Shows the Peak Gain of 2.7 dB

3. Comparison between Optimized and default antenna:

Figure 5 Shows the S11 parameter comparison of Optimized and default antenna. Figure 6 and Figure 7 Shows the VSWR and Peak Gain of Optimized and default antenna. Optimized antenna has 150% greater BW than default antenna.

$$f_2 = \text{Max Frequency}$$

$$f_1 = \text{Min Frequency}$$

$$BW = \frac{f_2 - f_1}{f_c} * 100$$

$$f_c = \frac{f_2 - f_1}{2} + f_1$$

a. Optimized Antenna:

$F_{\max} = 3.03 \text{ GHz}$ $F_{\min} = 1.18 \text{ GHz}$
 $f_c = 2.105 \text{ GHz}$
 Bandwidth = 87.88%
 Bandwidth = 1.85 GHz

b. Default antenna:

$F_{\max} = 2.90 \text{ GHz}$
 $F_{\min} = 2.16 \text{ GHz}$
 $f_c = 2.53 \text{ GHz}$
 Bandwidth = 29.24%
 Bandwidth = 0.74 GHz

Table 1: Comparison between Optimized and default antenna

Pink Graph = Optimized antenna	Black Graph = Default antenna
$F_{\max} = 3.03 \text{ GHz}$ $F_{\min} = 1.18 \text{ GHz}$ Bandwidth = 1.85 GHz	$F_{\max} = 2.90 \text{ GHz}$ $F_{\min} = 2.16 \text{ GHz}$ Bandwidth = 0.74 GHz
VSWR = 1.07 dB at 2.57 GHz and 1.98 dB at 1.45 GHz	VSWR = .68 dB
Peak Gain = 2.7 dB	Gain = 1.58 dB

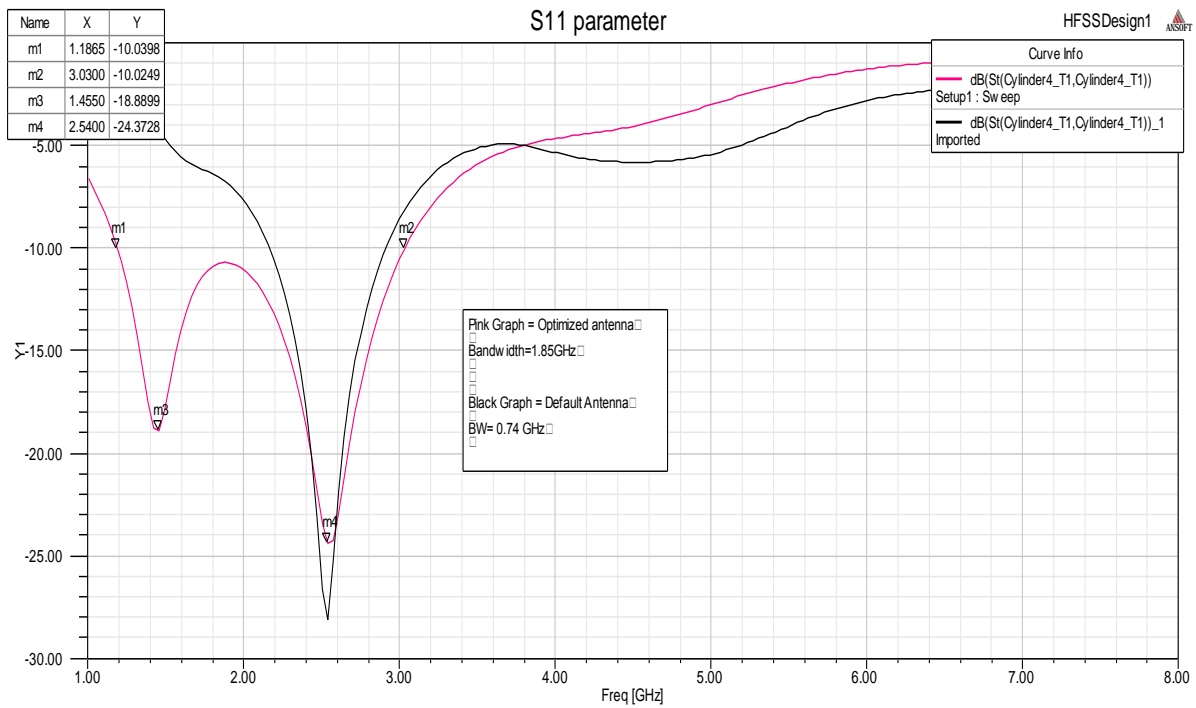


Figure 5: S11 parameter of Optimized and default antenna

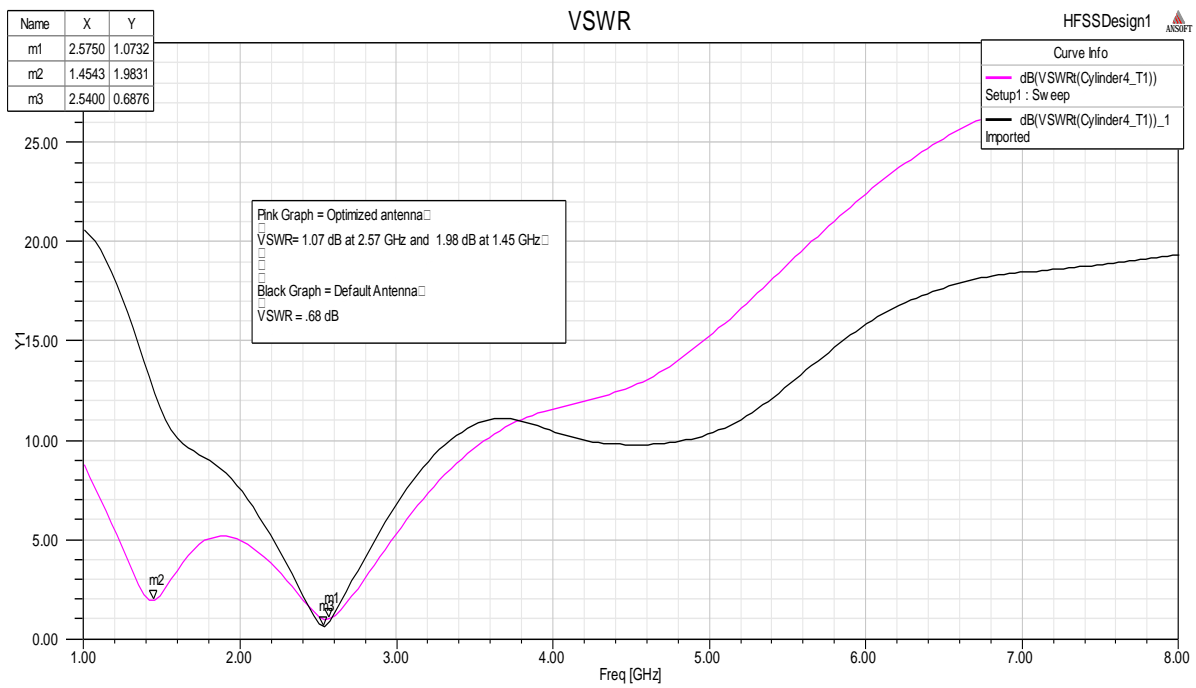


Figure 6: VSWR of Optimized and default antenna

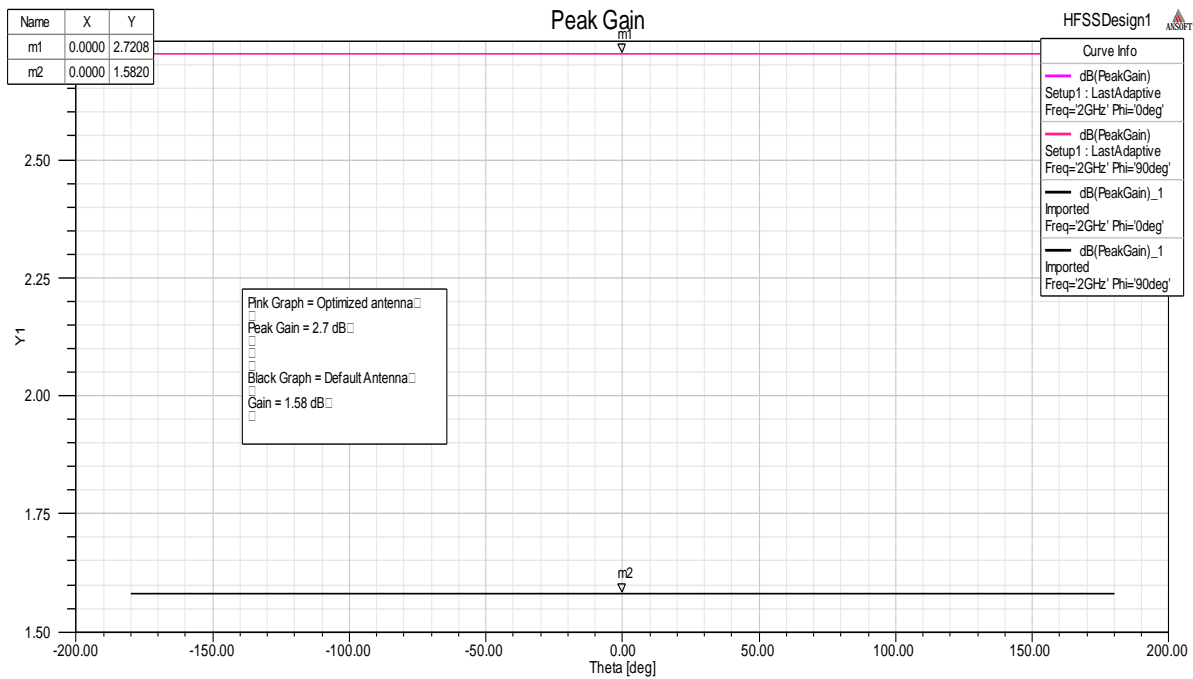


Figure 7: Gain of Optimized and default antenna

Thus we have compare return lose, VSWR and gain between default and optimized antenna and we found better result in optimized antenna.

4. References

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