



**CONFIDENTIAL**

825 CORPORATE WOODS PKWY  
VERNON HILLS, IL 60061-3148  
TEL 847 478-5600  
FAX 847 478-5735

**T&M ANTENNAS**

## **Electrical Performance Report**

**Compaq Raptor  
(IEEE 802.11 2.4GHz, 5.4GHz)**

**August 19th, 2002**



## 1 Overview

The following report summarizes the electrical results of the proposed by Amphenol T&M Antennas dual band embedded diversity antenna set for Compaq's Tablet PC. Both antennas are dual band designs (2.4GHz/5GHz) based on a single printed circuit board. PVT tablet prototype was used as a test fixture.

## 2 Testing

The data was obtained with antennas installed into PV unit. PV plastic supports were used for antenna mounting. Both cables were routed as close as possible to the routing instructions provided by LGE. Main antenna cable was secured with tape to the keypad PCB; auxiliary antenna cable was secured with tape to the back side of the motherboard.

### 2.1 VSWR Measurement

#### 2.1.1 Test Setup

The VSWR measurements ( $S_{11}$ ) were performed using an Hewlett Packard 8753D Network Analyzer and the previously described test fixture. A ferrite-loaded coaxial cable was used to mitigate surface currents on the outside of the cabling. The testing was performed with antennas installed in the tablet.

#### 2.1.2 Test Results

Tables 2 summarizes the VSWR measurements at the edges of the both frequency bands. The VSWR plots are shown in Appendix A.

Table 2 – VSWR performance summary				
Antenna	2400	2500	5150	5850
Main	3.12	3.34	1.72	1.30
Aux	3.27	3.36	2.31	1.83

### 2.2 Gain Measurement

#### 2.1.2 Test Setup

The gain of the antenna was measured in the Amphenol T&M Antennas anechoic chamber. The chamber provides less than -30 dB reflectivity from 800 MHz through 6 GHz. The measurement results are calibrated using a leaky wave horn standard.



**CONFIDENTIAL**

825 CORPORATE WOODS PKWY  
VERNON HILLS, IL 60061-3148  
TEL 847 478-5600  
FAX 847 478-5735

**T&M ANTENNAS**

### 2.1.3 Radiation Performance Summary

The following table contains a summary of the radiation properties for both antennas. Radiation patterns, gain and efficiency plots are shown in Appendix B.

Table 3 – Radiation Performance Summary						
Freq MHz	Main			Aux		
	Efficiency	Major Lobe Peak Gain (dBi)	Average Gain in Azimuth Plane (dBi)	Efficiency	Major Lobe Peak Gain (dBi)	Average Gain in Azimuth Plane (dBi)
2400	0.35	1.11	-4.31	0.22	0.2	-6.57
2420	0.37	1.39	-4.14	0.24	0.72	-6.07
2450	0.34	1.1	-4.45	0.23	0.51	-6.28
2480	0.32	1.03	-4.73	0.22	0.22	-6.59
2500	0.31	0.83	-5.06	0.2	-0.16	-7
5150	0.4	4.95	-3.04	0.46	4.42	-4.05
5250	0.46	5.06	-2.91	0.52	5.3	-3.51
5350	0.47	4.97	-3.06	0.47	5.23	-3.75
5450	0.48	6.19	-3	0.47	4.7	-3.35
5550	0.44	5.64	-3.84	0.47	4.89	-3.28
5650	0.39	5.05	-4.17	0.5	5.37	-2.81
5750	0.44	6.32	-3.12	0.54	6.04	-2.52
5850	0.43	6.33	-2.4	0.53	5.66	-2.57



**CONFIDENTIAL**

825 CORPORATE WOODS PKWY  
VERNON HILLS, IL 60061-3148  
TEL 847 478-5600  
FAX 847 478-5735

**T&M ANTENNAS**

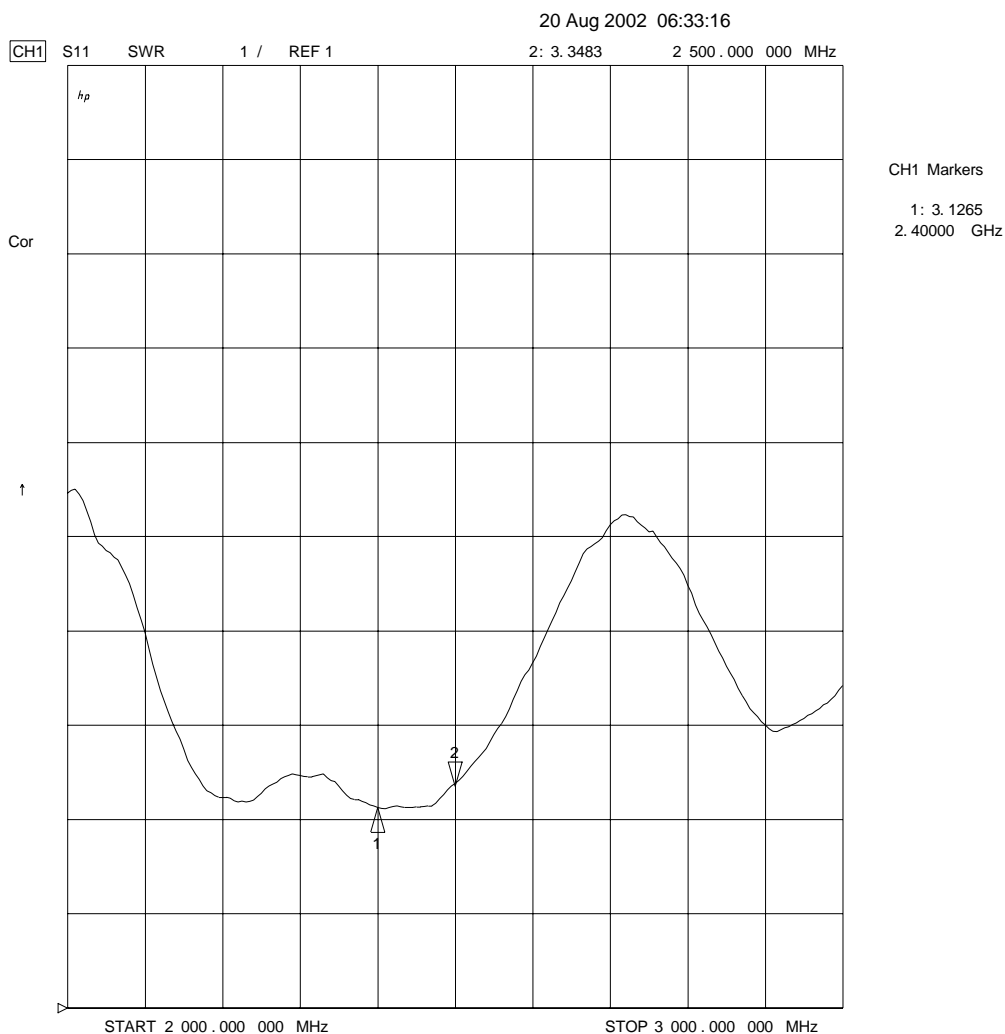
## **Appendix A – VSWR Plots**



CONFIDENTIAL

825 CORPORATE WOODS PKWY  
VERNON HILLS, IL 60061-3148  
TEL 847 478-5600  
FAX 847 478-5735

**T&M ANTENNAS**



### Main Antenna, 2.4GHz Band

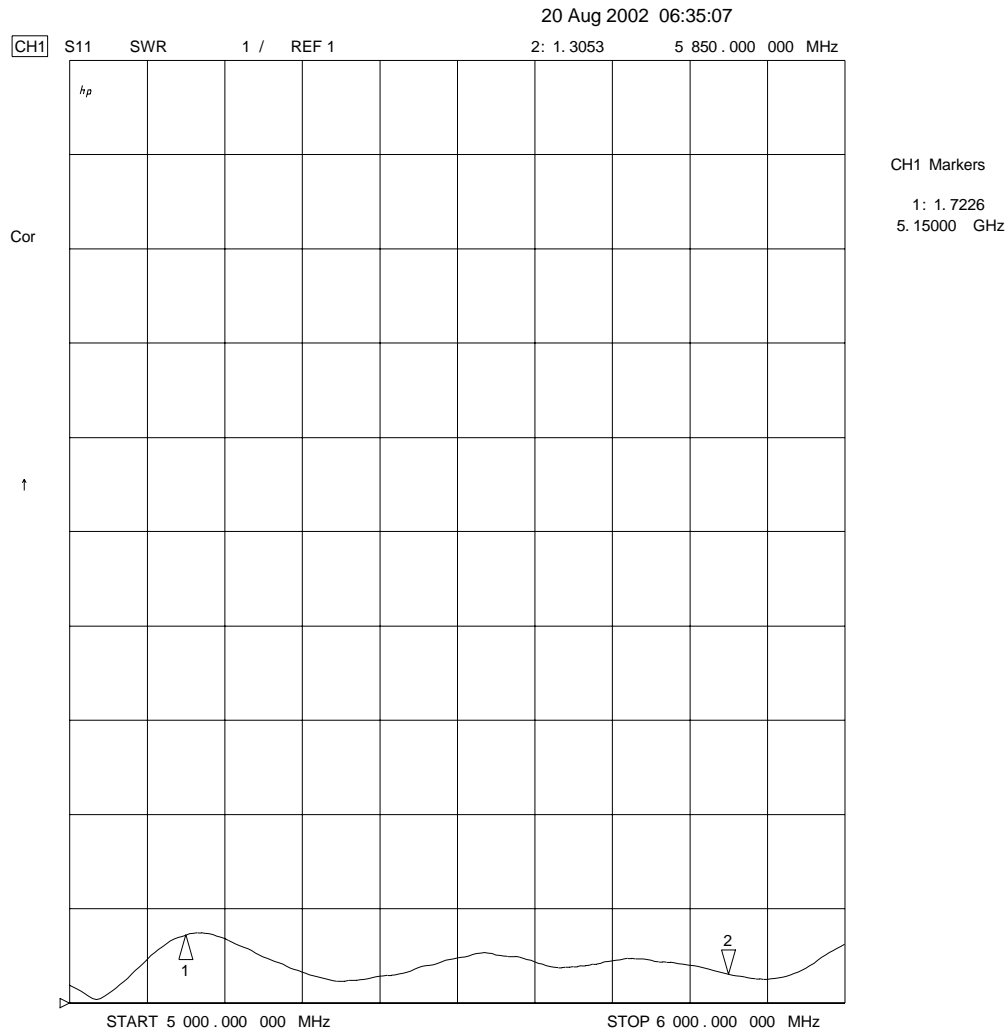
Amphenol T&M Antennas is in possession of proprietary information provided in this presentation and this proprietary information shall be kept in strict confidence and not disclosed to any person or firm without the prior written consent of Amphenol T&M Antennas.



CONFIDENTIAL

825 CORPORATE WOODS PKWY  
VERNON HILLS, IL 60061-3148  
TEL 847 478-5600  
FAX 847 478-5735

**T&M ANTENNAS**



## Main Antenna, 5GHz Band

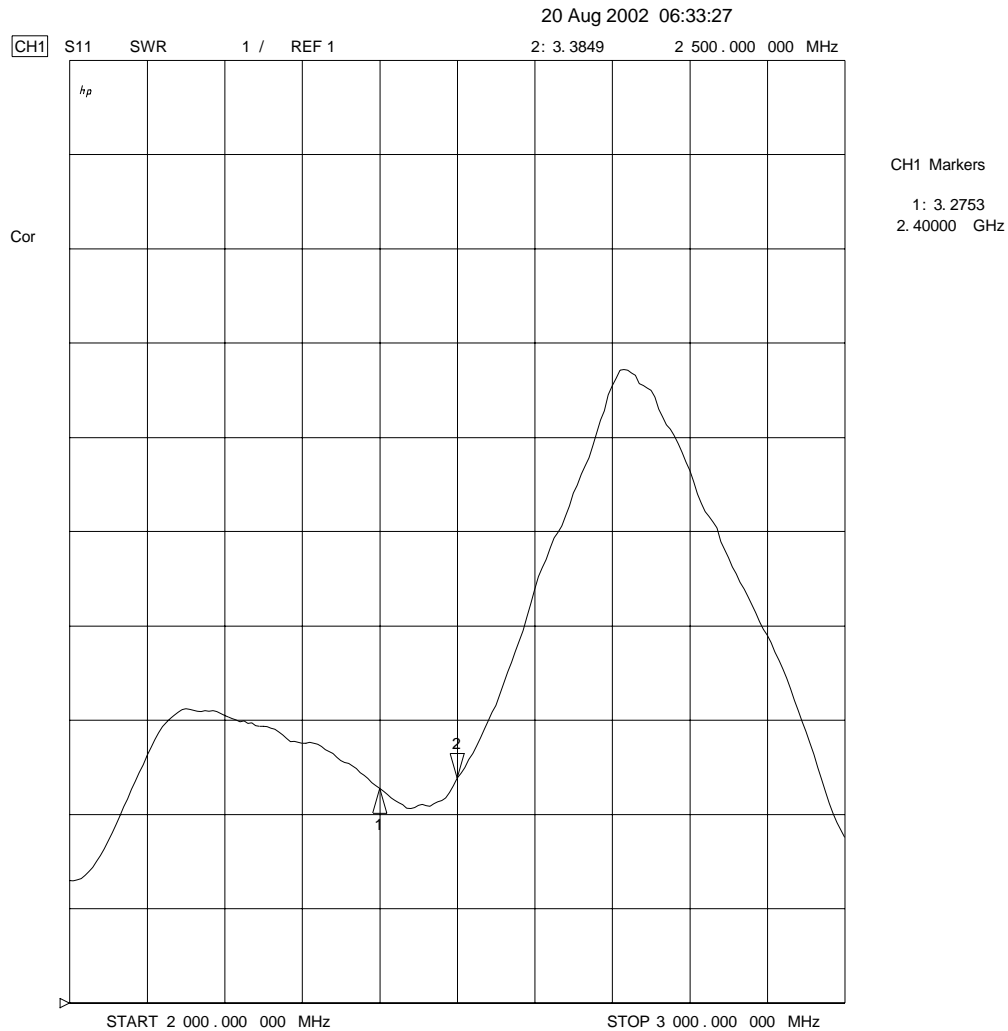
Amphenol T&M Antennas is in possession of proprietary information provided in this presentation and this proprietary information shall be kept in strict confidence and not disclosed to any person or firm without the prior written consent of Amphenol T&M Antennas.



CONFIDENTIAL

825 CORPORATE WOODS PKWY  
VERNON HILLS, IL 60061-3148  
TEL 847 478-5600  
FAX 847 478-5735

**T&M ANTENNAS**



### Aux Antenna, 2.4GHz Band

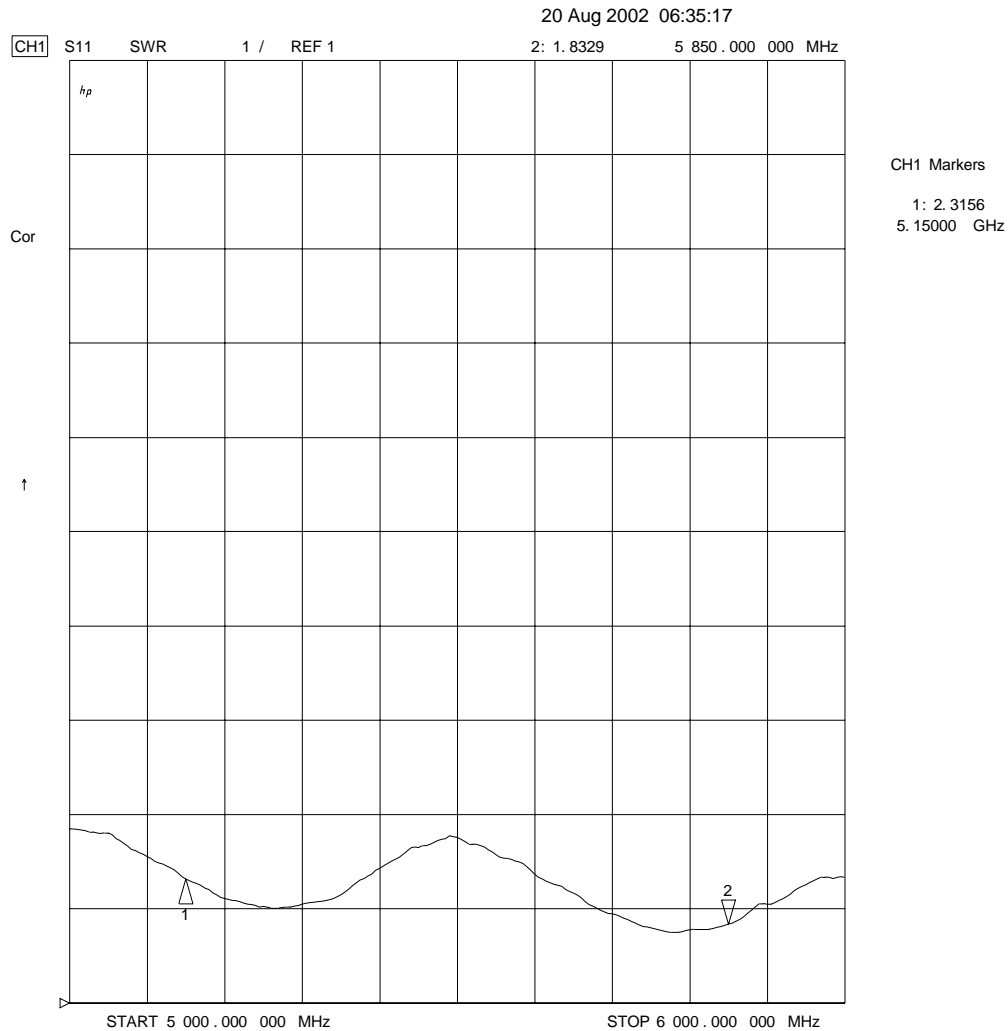
Amphenol T&M Antennas is in possession of proprietary information provided in this presentation and this proprietary information shall be kept in strict confidence and not disclosed to any person or firm without the prior written consent of Amphenol T&M Antennas.



CONFIDENTIAL

825 CORPORATE WOODS PKWY  
VERNON HILLS, IL 60061-3148  
TEL 847 478-5600  
FAX 847 478-5735

**T&M ANTENNAS**



### Aux Antenna, 5GHz Band

Amphenol T&M Antennas is in possession of proprietary information provided in this presentation and this proprietary information shall be kept in strict confidence and not disclosed to any person or firm without the prior written consent of Amphenol T&M Antennas.



**CONFIDENTIAL**

825 CORPORATE WOODS PKWY  
VERNON HILLS, IL 60061-3148  
TEL 847 478-5600  
FAX 847 478-5735

**T&M ANTENNAS**

## **Appendix B – Gain, Efficiency and Pattern Plots**



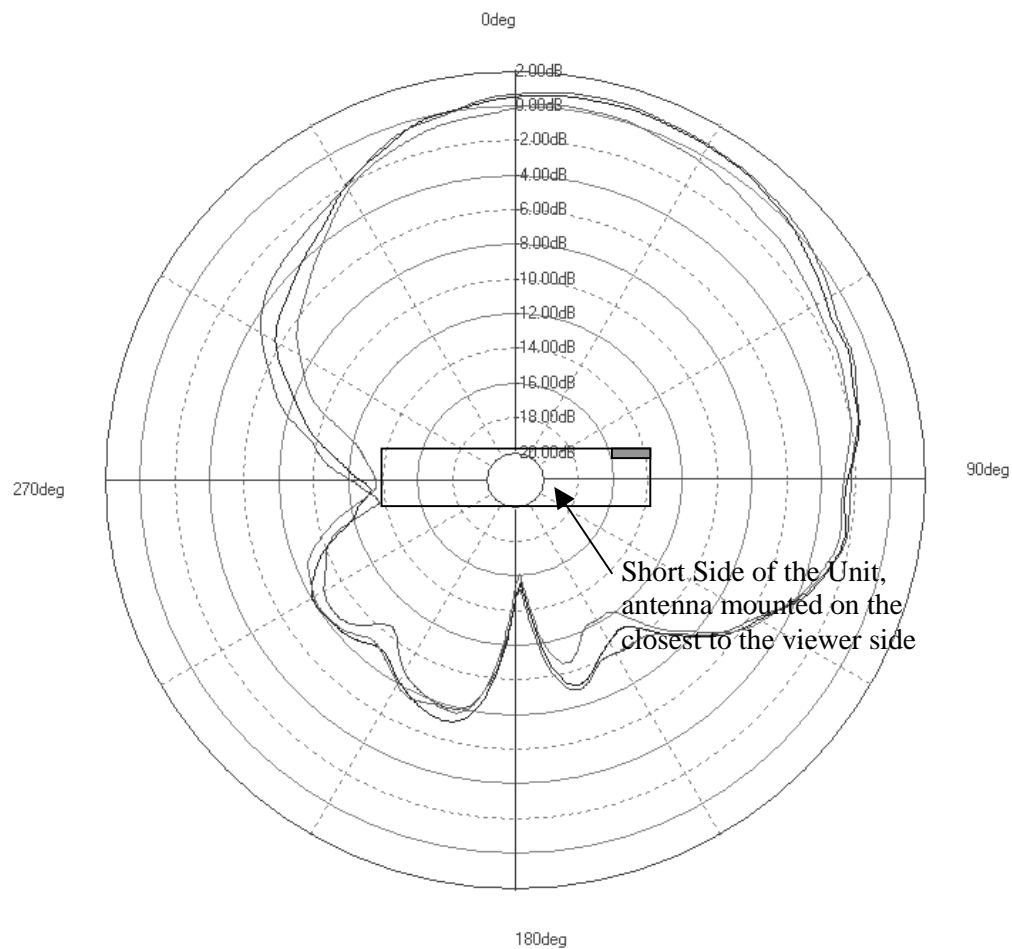
CONFIDENTIAL

825 CORPORATE WOODS PKWY  
VERNON HILLS, IL 60061-3148  
TEL 847 478-5600  
FAX 847 478-5735

**T&M ANTENNAS**

Legend

— 2400(MHz)  
— 2449.999872(MHz)  
— 2500(MHz)



Azimuth Cut, Main, 2.4GHz Band (dBi)



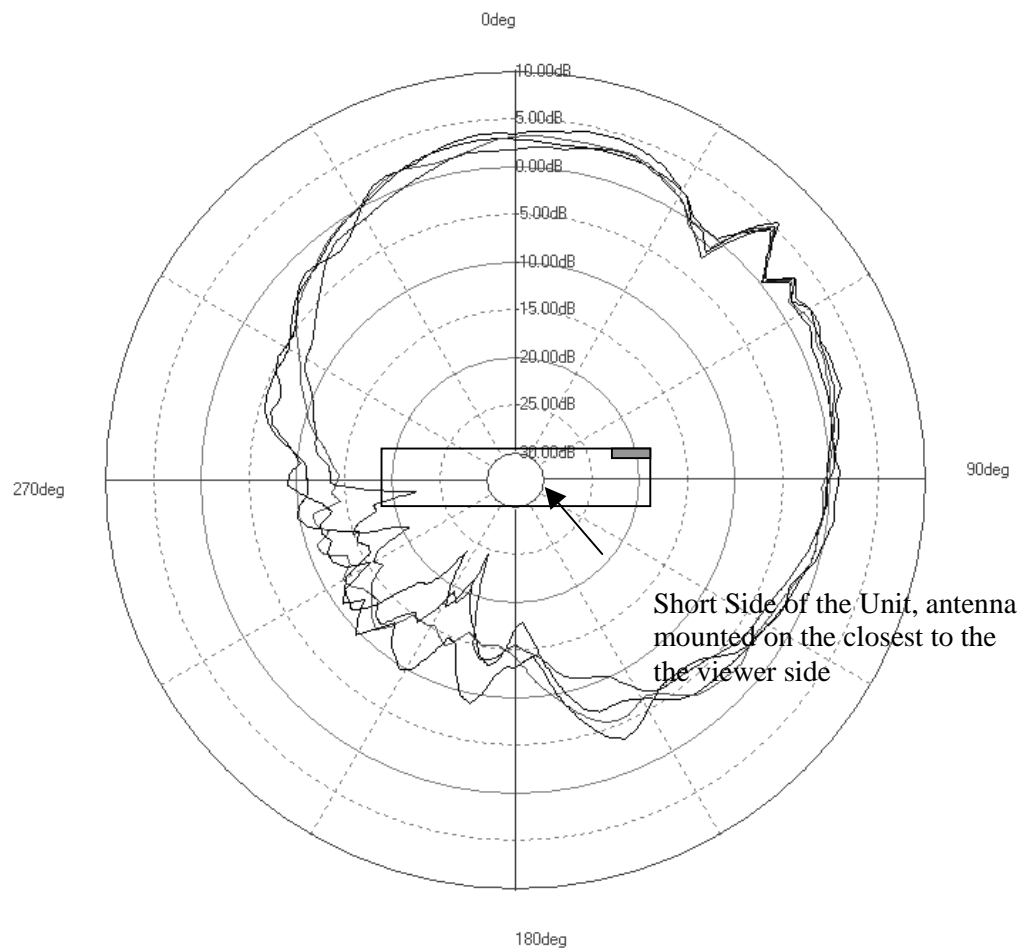
CONFIDENTIAL

825 CORPORATE WOODS PKWY  
VERNON HILLS, IL 60061-3148  
TEL 847 478-5600  
FAX 847 478-5735

**T&M ANTENNAS**

Legend

- 5150.000128(MHz)
- 5350.000128(MHz)
- 5550.000128(MHz)
- 5849.999872(MHz)



Azimuth Cut, Main, 5GHz Band (dBi)



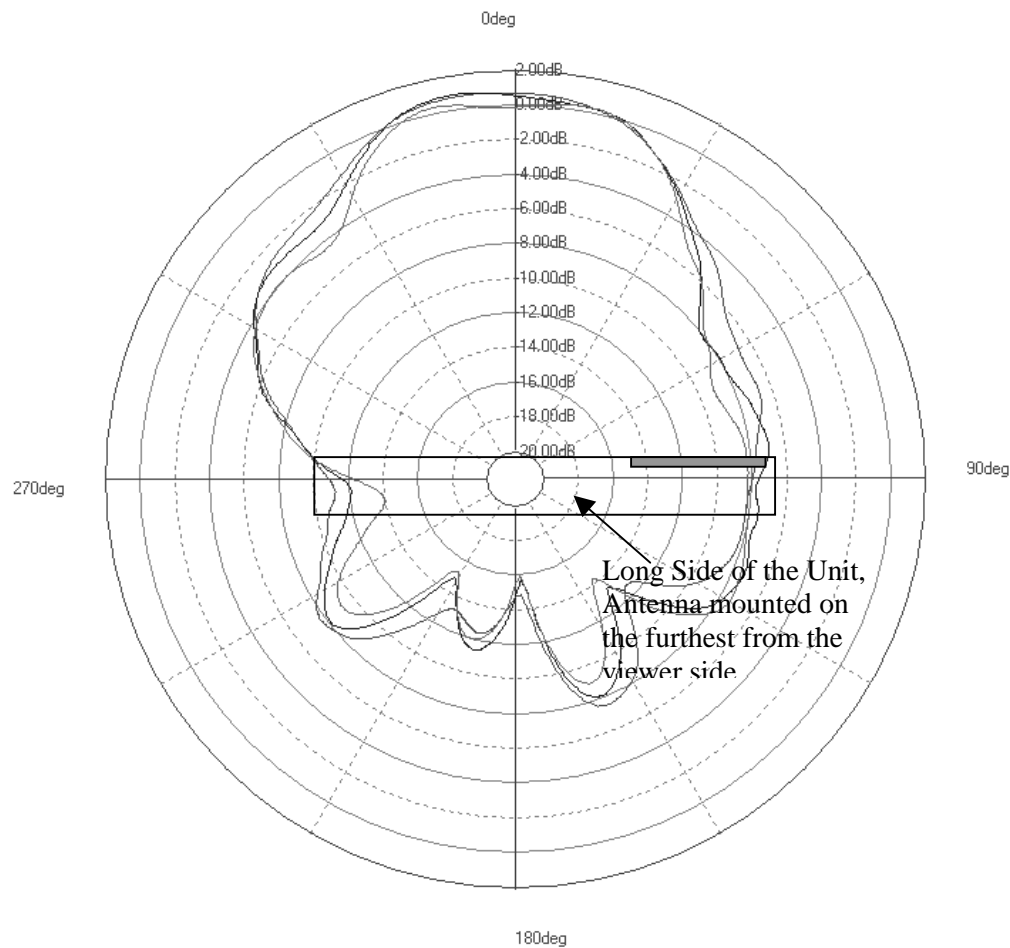
CONFIDENTIAL

825 CORPORATE WOODS PKWY  
VERNON HILLS, IL 60061-3148  
TEL 847 478-5600  
FAX 847 478-5735

**T&M ANTENNAS**

Legend

— 2400(MHz)  
— 2449.999872(MHz)  
— 2500(MHz)



Elevation Phi0, Main, 2.4GHz Band (dBi)



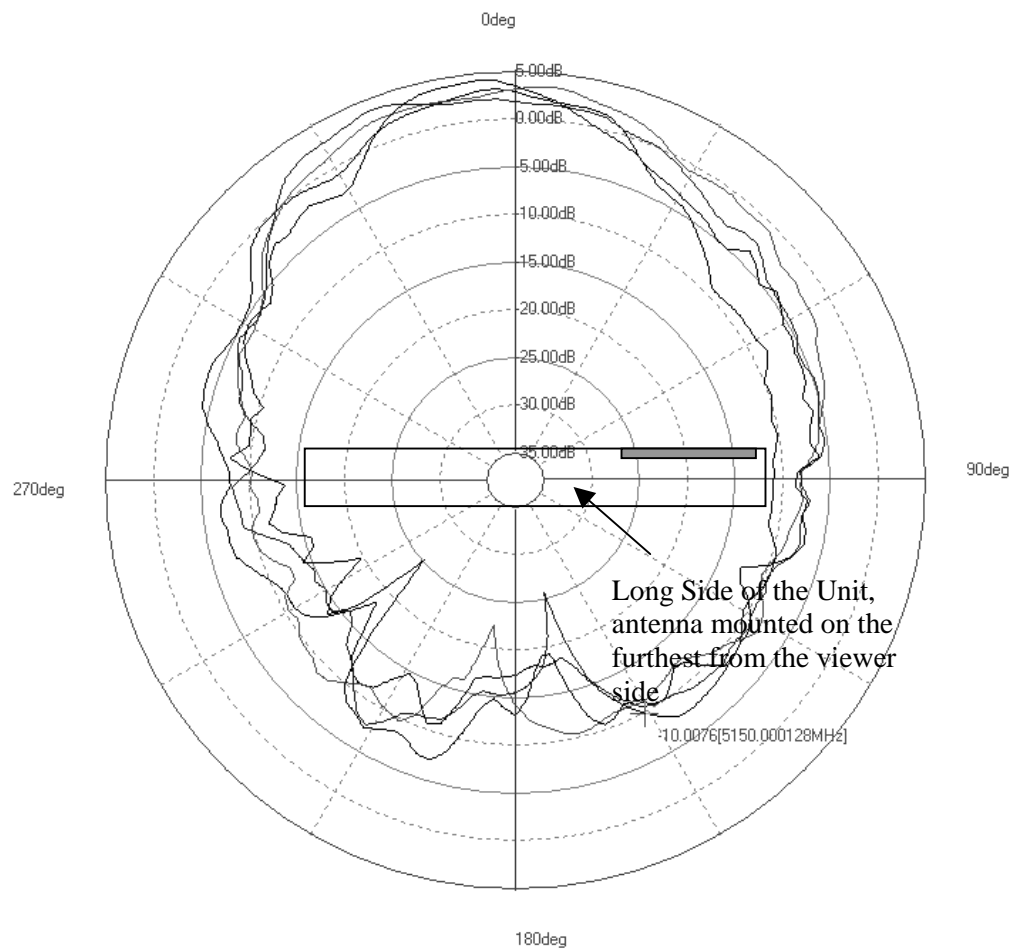
CONFIDENTIAL

825 CORPORATE WOODS PKWY  
VERNON HILLS, IL 60061-3148  
TEL 847 478-5600  
FAX 847 478-5735

**T&M ANTENNAS**

Legend

- 5150.000128(MHz)
- 5350.000128(MHz)
- 5550.000128(MHz)
- 5849.999872(MHz)



Elevation Phi0, Main, 5GHz Band (dBi)

Amphenol T&M Antennas is in possession of proprietary information provided in this presentation and this proprietary information shall be kept in strict confidence and not disclosed to any person or firm without the prior written consent of Amphenol T&M Antennas.



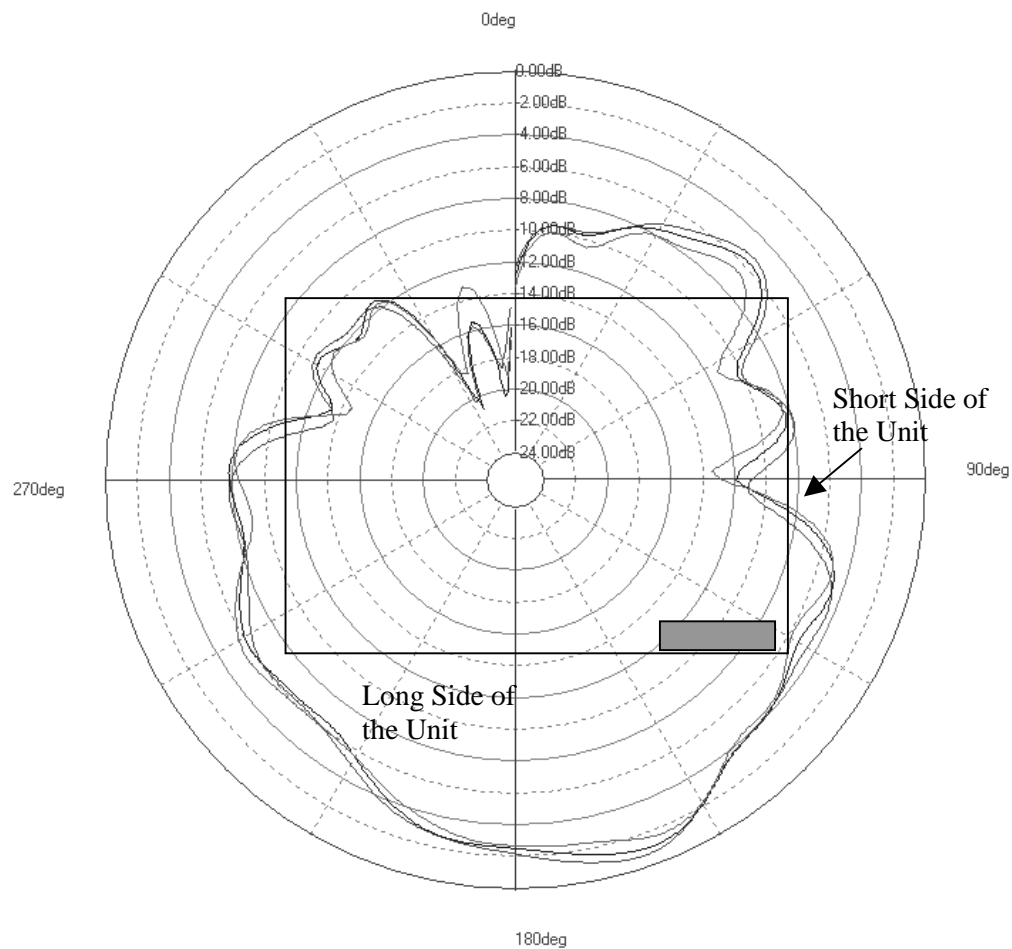
**CONFIDENTIAL**

825 CORPORATE WOODS PKWY  
VERNON HILLS, IL 60061-3148  
TEL 847 478-5600  
FAX 847 478-5735

**T&M ANTENNAS**

Legend

— 2400(MHz)  
— 2449.999872(MHz)  
— 2500(MHz)



Elevation Phi90, Main, 2.4GHz Band (dBi)

Amphenol T&M Antennas is in possession of proprietary information provided in this presentation and this proprietary information shall be kept in strict confidence and not disclosed to any person or firm without the prior written consent of Amphenol T&M Antennas.



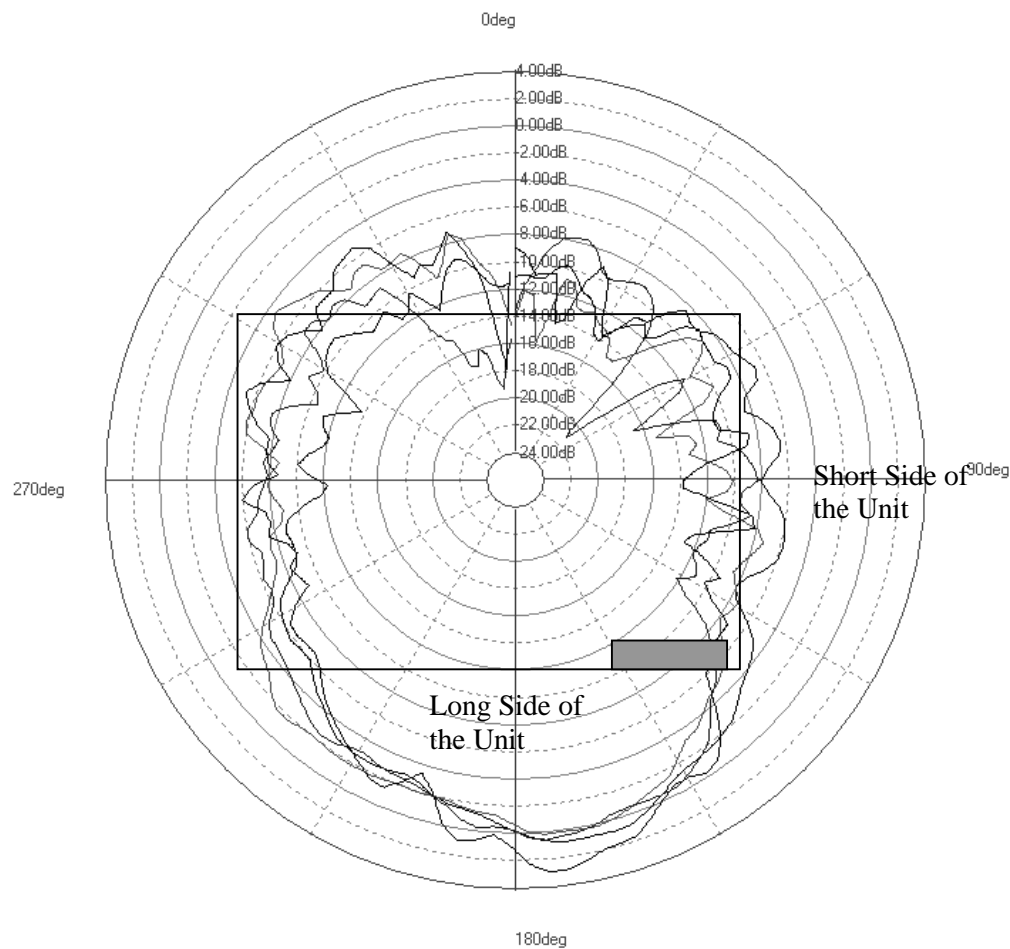
CONFIDENTIAL

825 CORPORATE WOODS PKWY  
VERNON HILLS, IL 60061-3148  
TEL 847 478-5600  
FAX 847 478-5735

**T&M ANTENNAS**

Legend

- 5150.000128(MHz)
- 5350.000128(MHz)
- 5550.000128(MHz)
- 5849.999872(MHz)



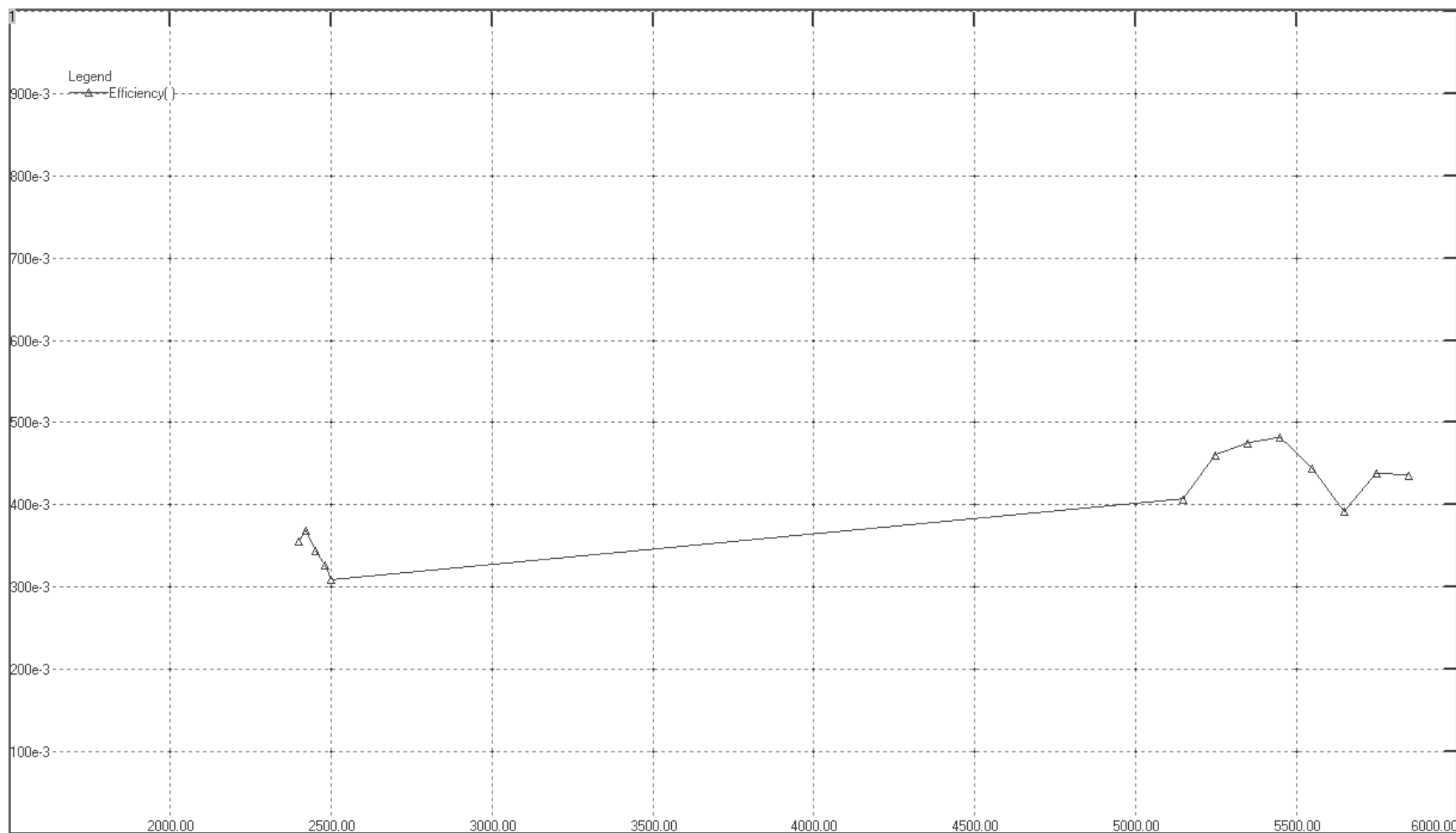
Elevation Phi90, Main, 5GHz Band (dBi)



CONFIDENTIAL

825 CORPORATE WOODS PKWY  
VERNON HILLS, IL 60061-3148  
TEL 847 478-5600  
FAX 847 478-5735

**T&M ANTENNAS**



Efficiency, Main

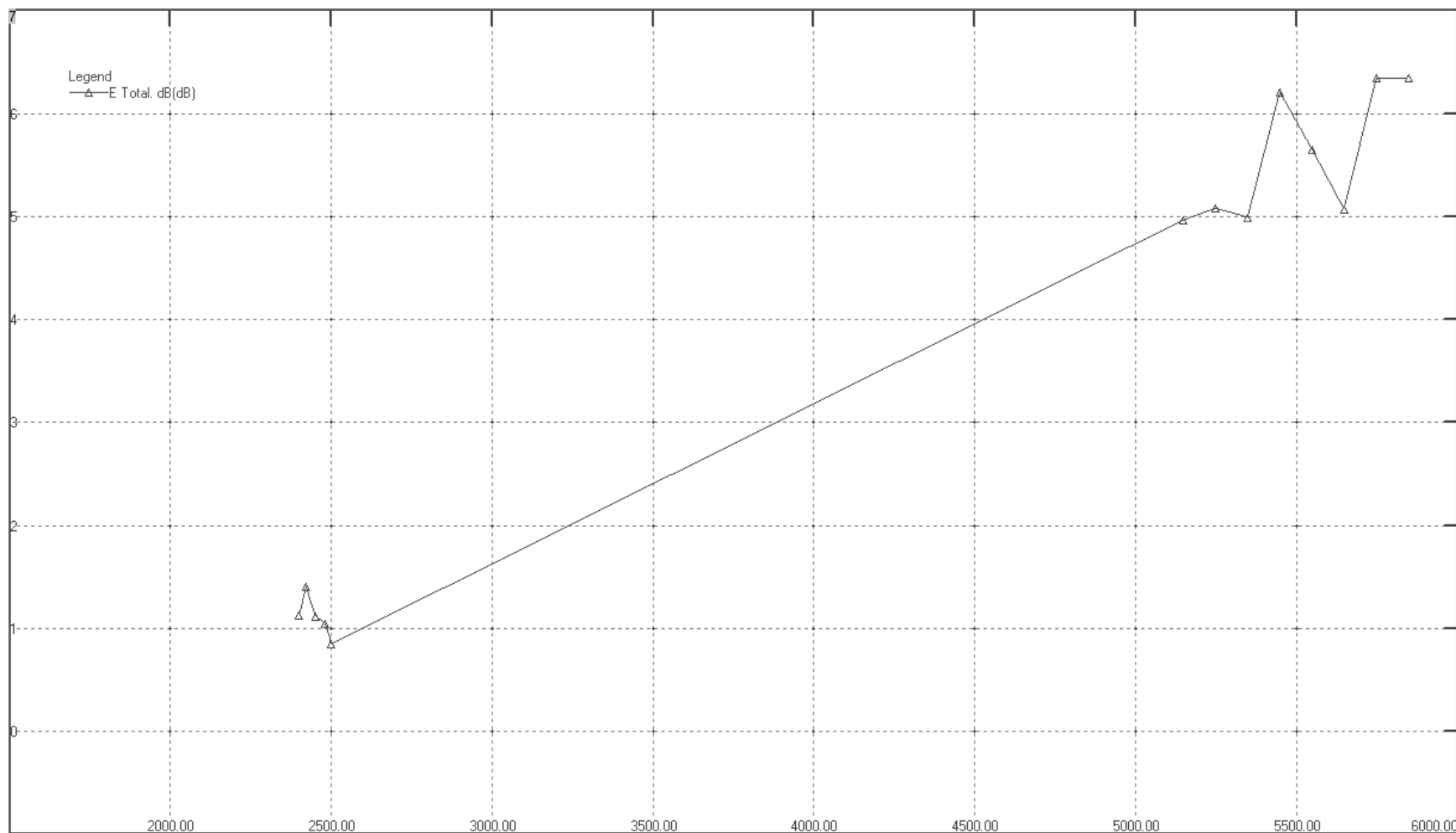
Amphenol T&M Antennas is in possession of proprietary information provided in this presentation and this proprietary information shall be kept in strict confidence and not disclosed to any person or firm without the prior written consent of Amphenol T&M Antennas.



CONFIDENTIAL

825 CORPORATE WOODS PKWY  
VERNON HILLS, IL 60061-3148  
TEL 847 478-5600  
FAX 847 478-5735

**T&M ANTENNAS**



Major Lobe Peak Gain, Main (dBi)

Amphenol T&M Antennas is in possession of proprietary information provided in this presentation and this proprietary information shall be kept in strict confidence and not disclosed to any person or firm without the prior written consent of Amphenol T&M Antennas.



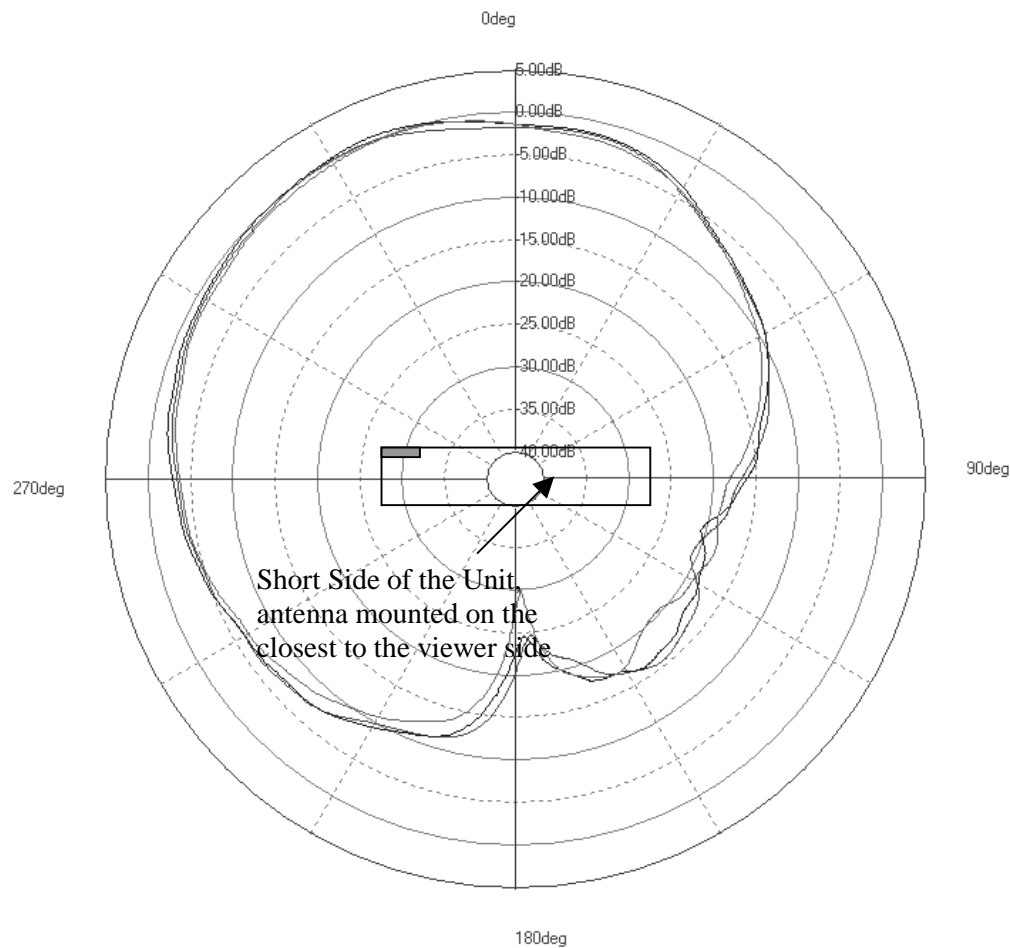
CONFIDENTIAL

825 CORPORATE WOODS PKWY  
VERNON HILLS, IL 60061-3148  
TEL 847 478-5600  
FAX 847 478-5735

**T&M ANTENNAS**

Legend

— 2400(MHz)  
— 2449.999872(MHz)  
— 2500(MHz)



Azimuth Cut, Auxiliary, 2.4GHz Band (dBi)



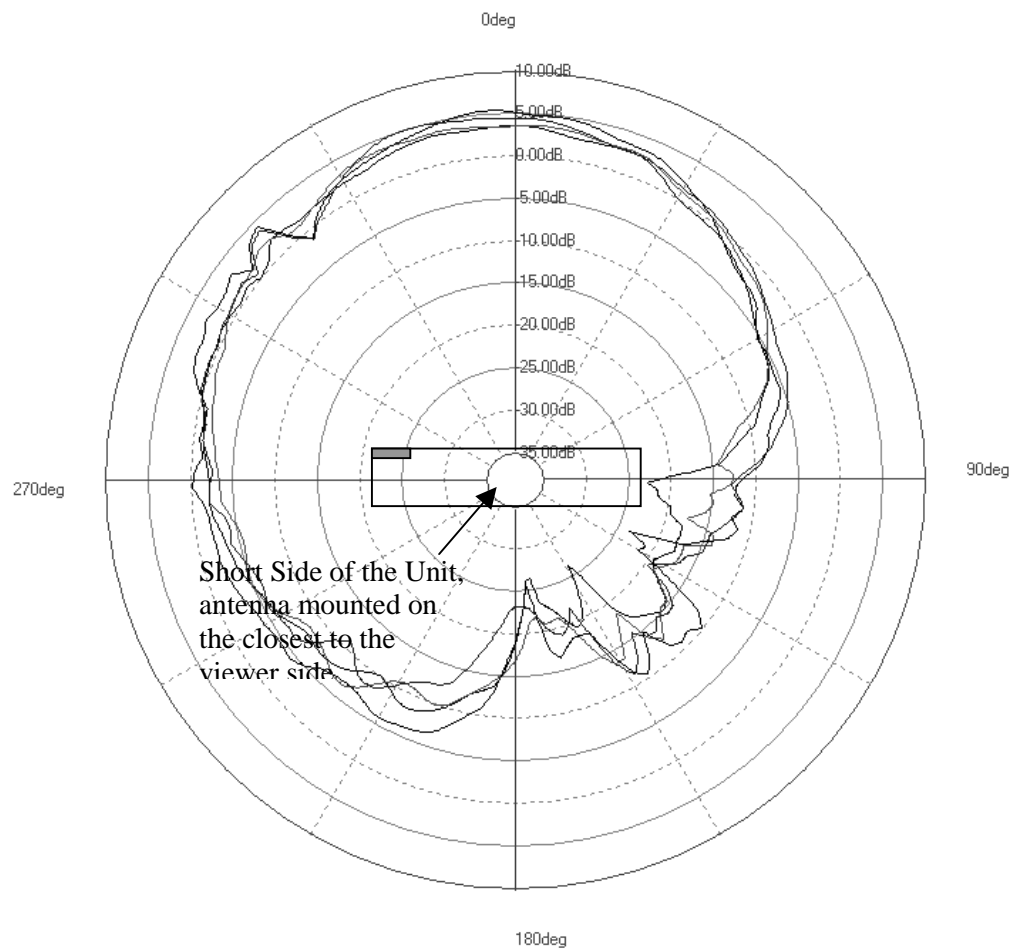
CONFIDENTIAL

825 CORPORATE WOODS PKWY  
VERNON HILLS, IL 60061-3148  
TEL 847 478-5600  
FAX 847 478-5735

**T&M ANTENNAS**

Legend

- 5150.000128(MHz)
- 5350.000128(MHz)
- 5550.000128(MHz)
- 5849.999872(MHz)



Azimuth Cut, Auxiliary, 5GHz Band (dBi)



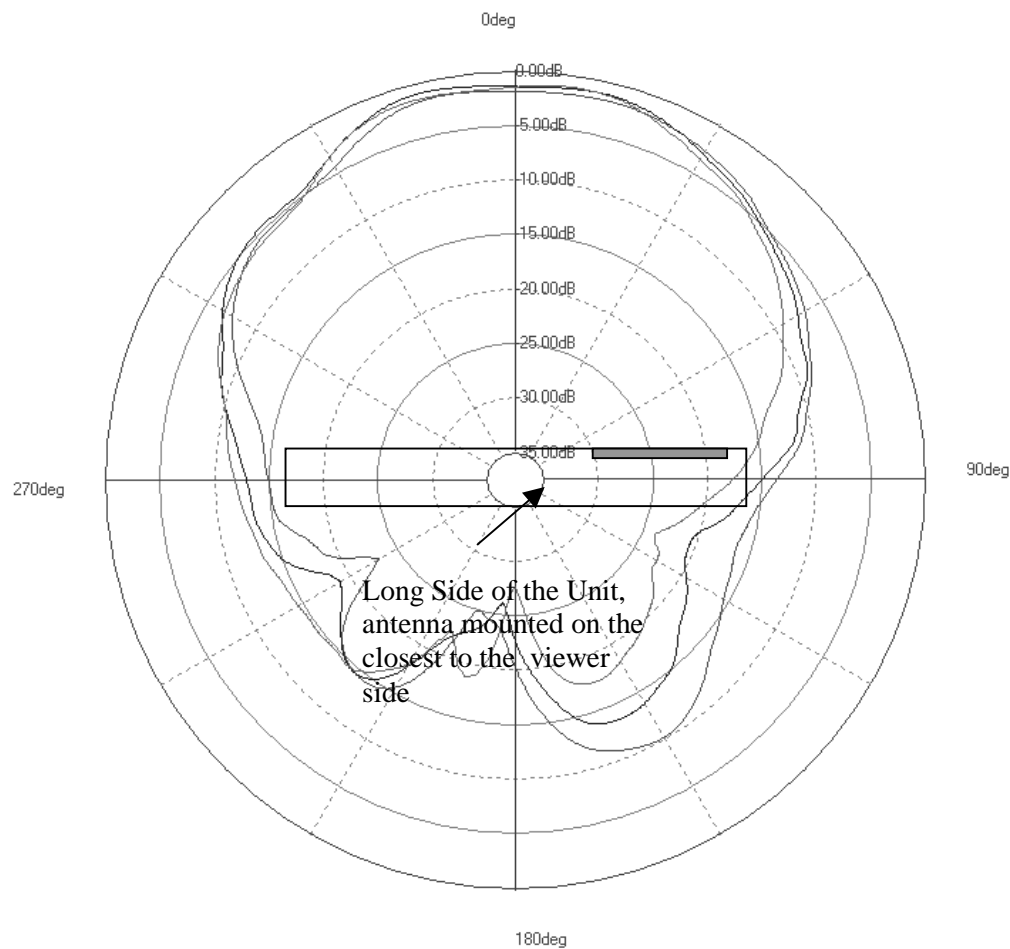
CONFIDENTIAL

825 CORPORATE WOODS PKWY  
VERNON HILLS, IL 60061-3148  
TEL 847 478-5600  
FAX 847 478-5735

**T&M ANTENNAS**

Legend

— 2400(MHz)  
— 2449.999872(MHz)  
— 2500(MHz)



Elevation Phi0, Auxiliary, 2.4GHz Band (dBi)



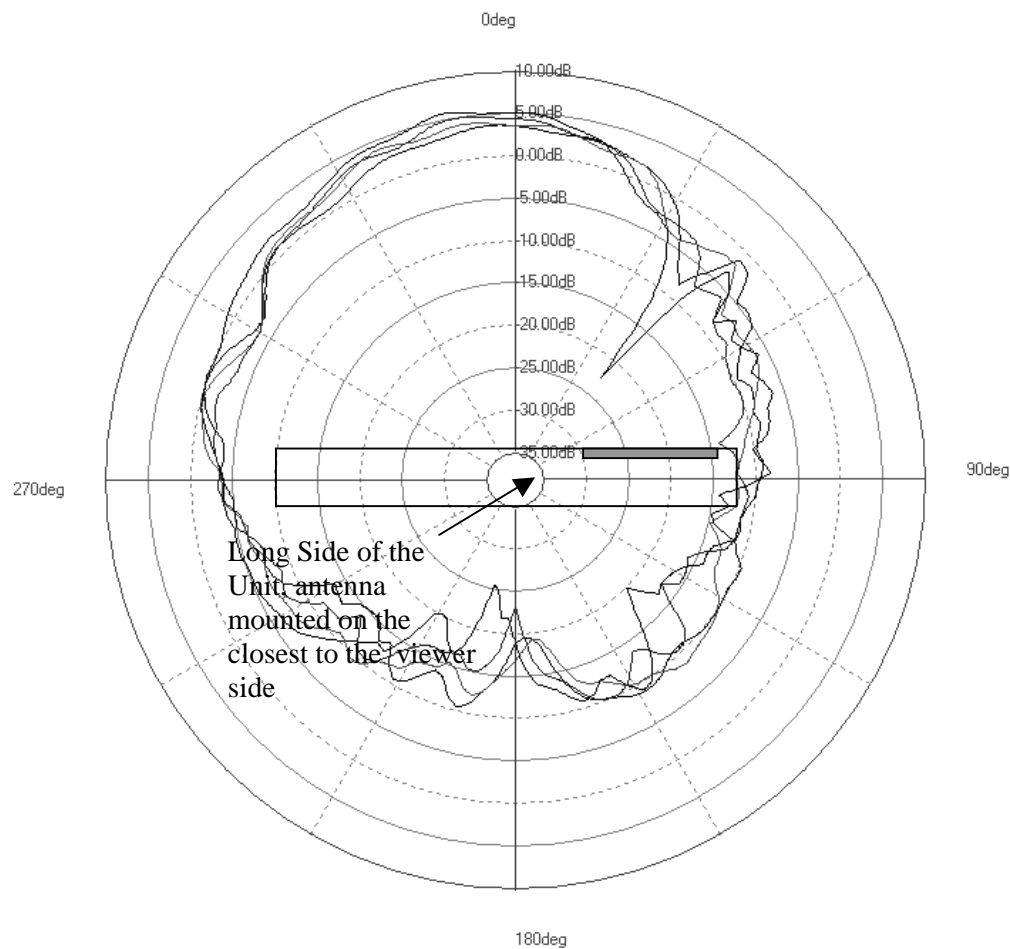
CONFIDENTIAL

825 CORPORATE WOODS PKWY  
VERNON HILLS, IL 60061-3148  
TEL 847 478-5600  
FAX 847 478-5735

**T&M ANTENNAS**

Legend

— 5150.000128(MHz)  
— 5350.000128(MHz)  
— 5550.000128(MHz)  
— 5849.999872(MHz)



Elevation Phi0, Auxiliary, 5GHz Band (dBi)

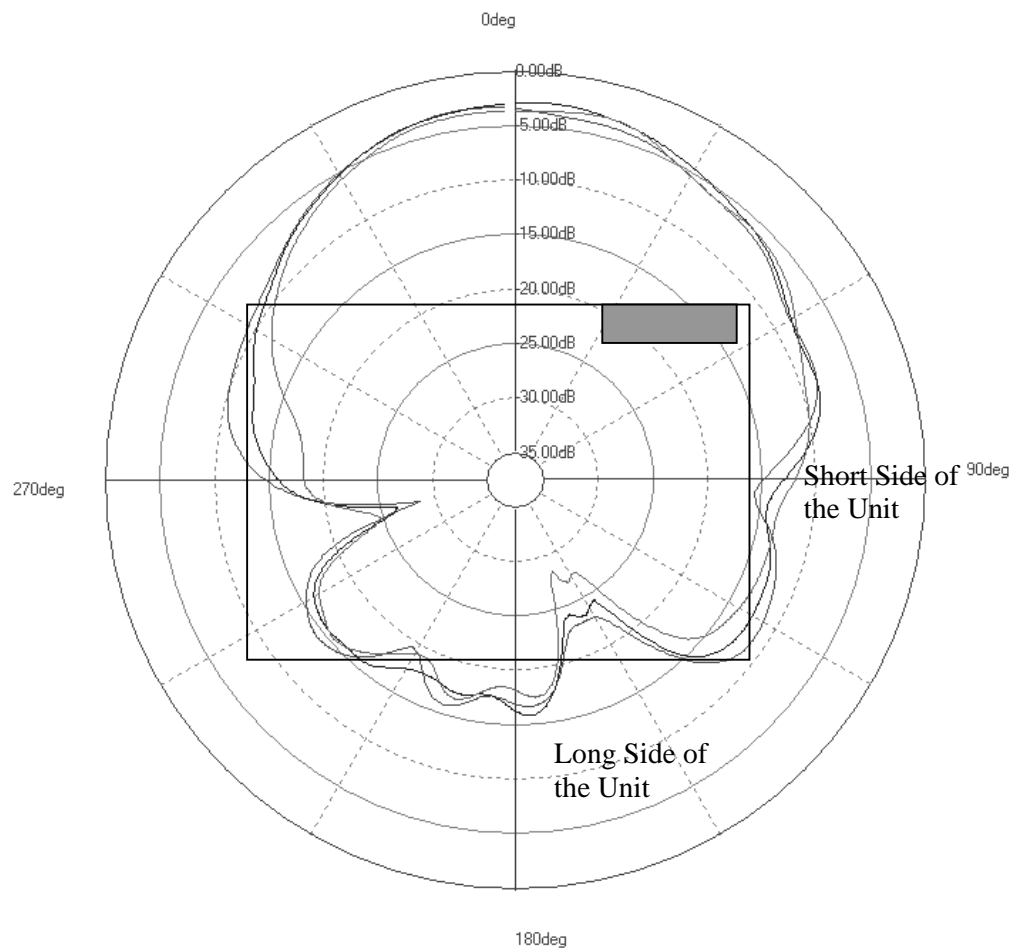


**CONFIDENTIAL**

825 CORPORATE WOODS PKWY  
VERNON HILLS, IL 60061-3148  
TEL 847 478-5600  
FAX 847 478-5735

**T&M ANTENNAS**

Legend  
— 2400(MHz)  
— 2449.999872(MHz)  
— 2500(MHz)



Elevation Phi90, Auxiliary, 2.4GHz Band (dBi)

Amphenol T&M Antennas is in possession of proprietary information provided in this presentation and this proprietary information shall be kept in strict confidence and not disclosed to any person or firm without the prior written consent of Amphenol T&M Antennas.



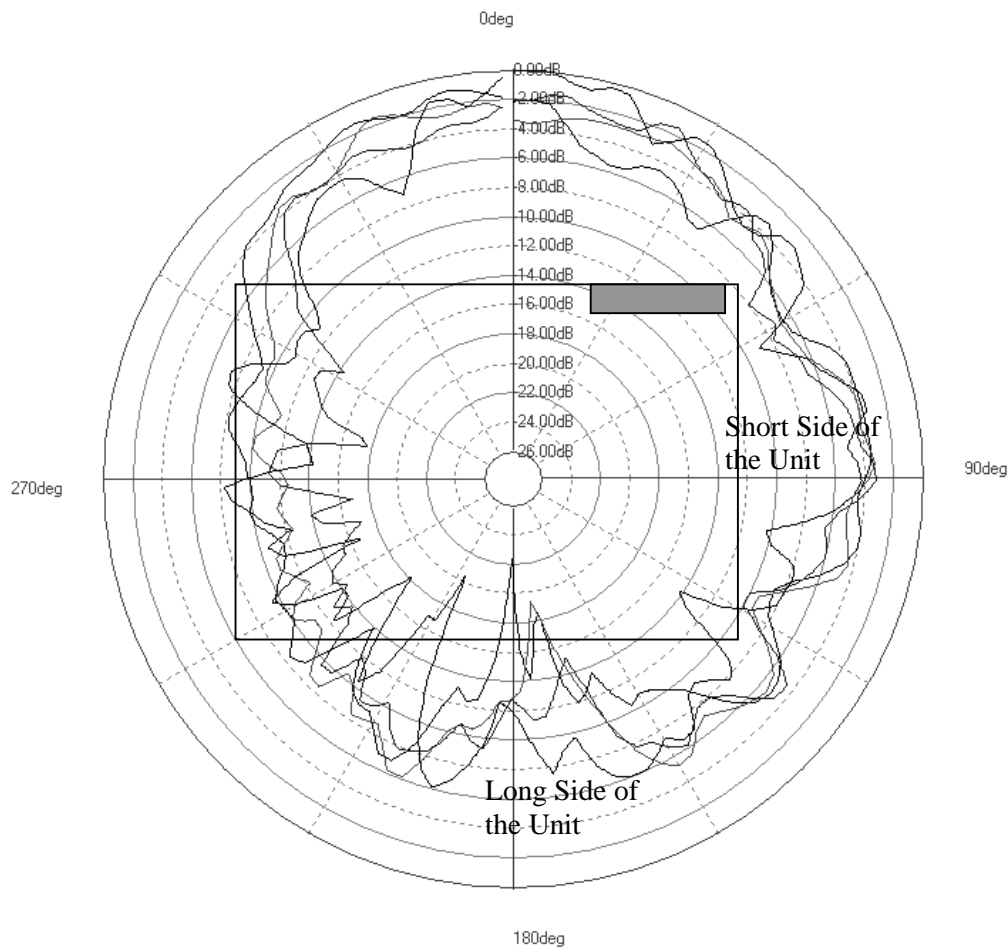
**CONFIDENTIAL**

825 CORPORATE WOODS PKWY  
VERNON HILLS, IL 60061-3148  
TEL 847 478-5600  
FAX 847 478-5735

**T&M ANTENNAS**

Legend

— 5150.000128(MHz)  
— 5350.000128(MHz)  
— 5550.000128(MHz)  
— 5849.999872(MHz)



Elevation Phi90, Auxiliary, 5GHz Band (dBi)

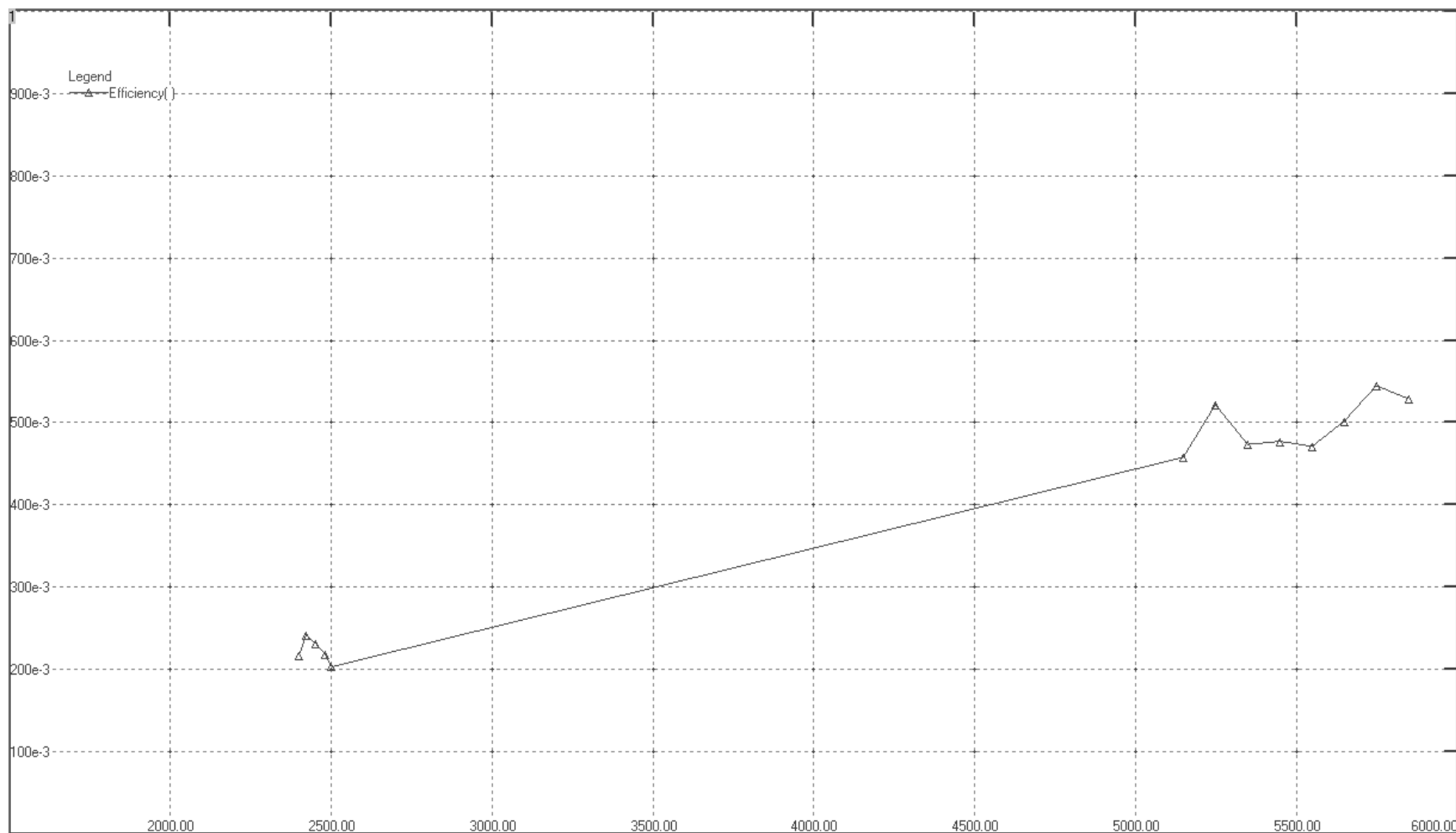
Amphenol T&M Antennas is in possession of proprietary information provided in this presentation and this proprietary information shall be kept in strict confidence and not disclosed to any person or firm without the prior written consent of Amphenol T&M Antennas.



CONFIDENTIAL

825 CORPORATE WOODS PKWY  
VERNON HILLS, IL 60061-3148  
TEL 847 478-5600  
FAX 847 478-5735

**T&M ANTENNAS**



Efficiency, Auxiliary

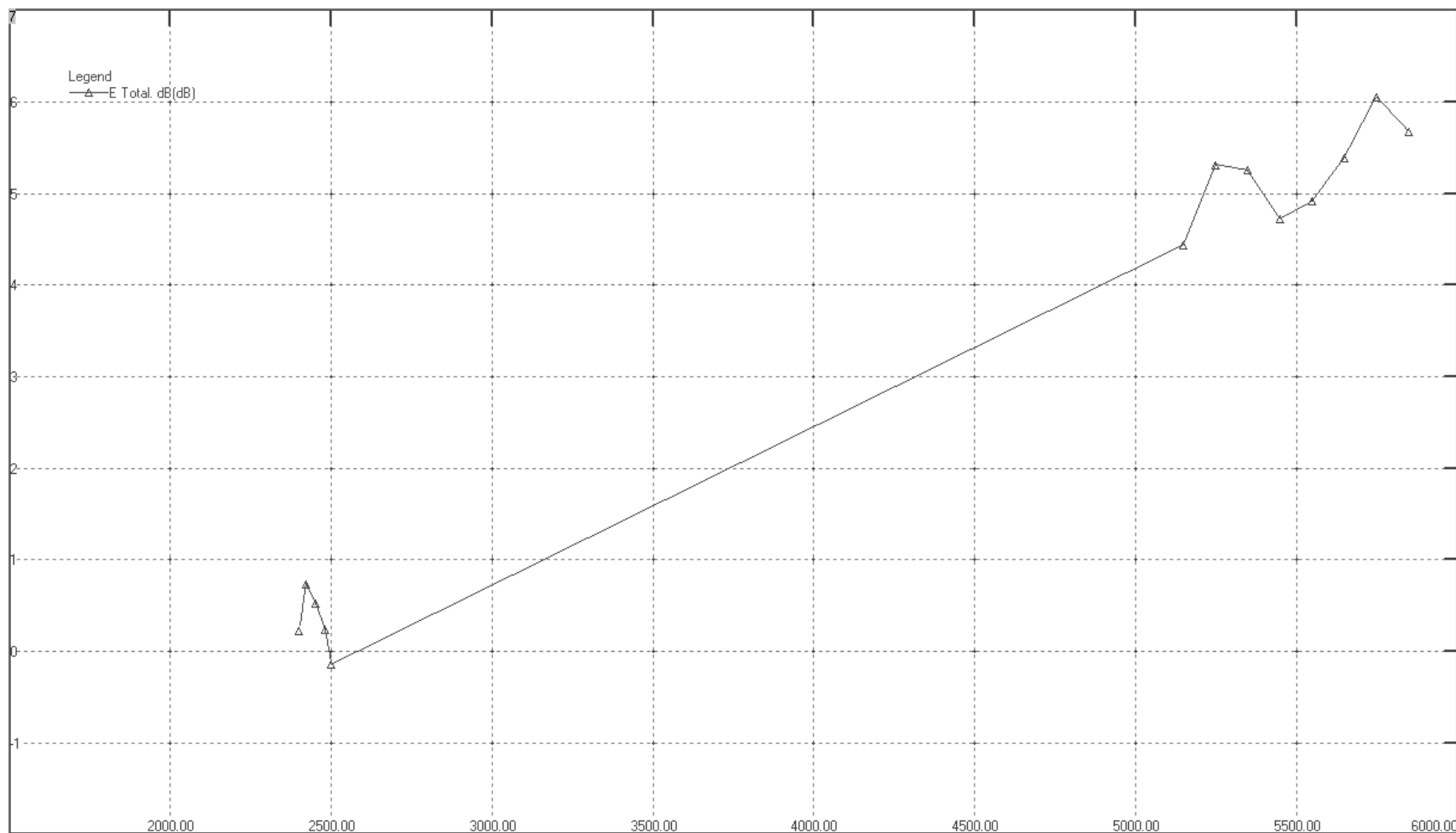
Amphenol T&M Antennas is in possession of proprietary information provided in this presentation and this proprietary information shall be kept in strict confidence and not disclosed to any person or firm without the prior written consent of Amphenol T&M Antennas.



CONFIDENTIAL

825 CORPORATE WOODS PKWY  
VERNON HILLS, IL 60061-3148  
TEL 847 478-5600  
FAX 847 478-5735

**T&M ANTENNAS**



Major Lobe Peak Gain, Auxiliary (dBi)

Amphenol T&M Antennas is in possession of proprietary information provided in this presentation and this proprietary information shall be kept in strict confidence and not disclosed to any person or firm without the prior written consent of Amphenol T&M Antennas.