REV	REVISIONS	APPROVED	DATE
A0	Release for Production.	Zainal	28July06

NOTES:

1. Antenna Disc Material: 0.4mm thk Half Hard Brass.

2. Stem Material: 300 Series Stainless Steel Passivated.

3. ALL DIMENSIONS ARE RELATED TO DATUM -A- (PRIMARY), DATUM -B- (SECONDARY) AND DATUM -C- (TERTIARY).

4. GEOMETRIC DIMENSIONING & TOLERANCING SYMBOLOGY PER ANSI Y14.5M-1982.

5. ■ DENOTES CRITICAL DIMENSIONS. (To meet min Cp of 1.5 & min Cpk of 1.33 from min sample size of 30pcs by random pick)

6. FOR UNSPECIFIED DIMENSIONS, PLEASE REFER TO 3D CAD MODEL.

7. PART TO BE FREE FROM OIL, DIRT AND OTHER CONTAMINANTS.

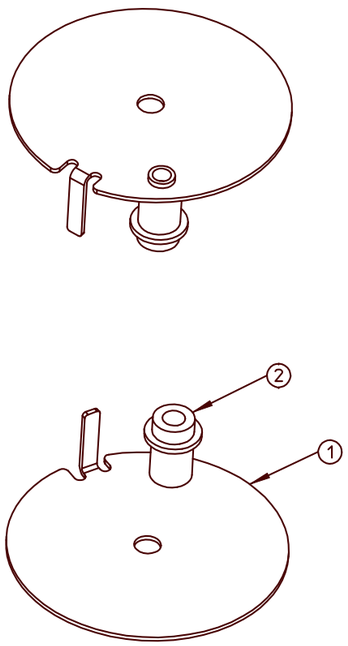
8. COSMETIC REQUIREMENT PER INTERMEC SPECIFICATION DOCUMENT 044856 APPENDIX C, CATEGORY II, CLASS B.

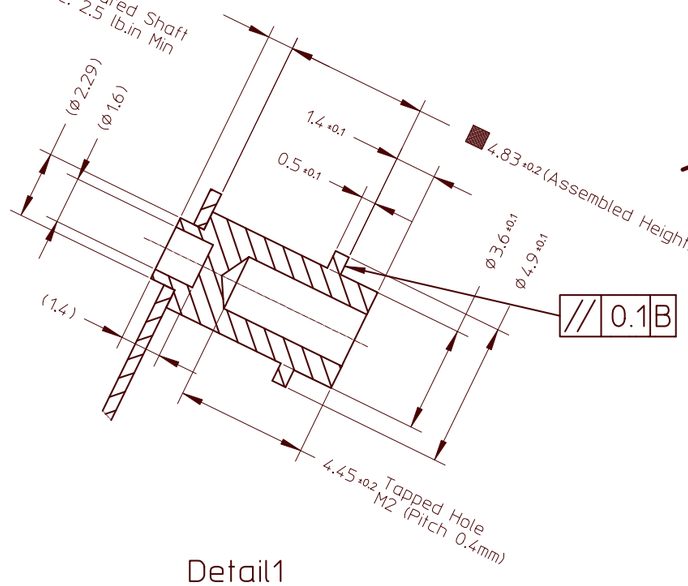
9. COUNTRY OF ORIGIN REQUIREMENTS SHALL CONFORM TO INTERMEC SPECIFICATION DOCUMENT 609030.

10. THIS PART OR ASSEMBLY MUST CONFORM TO DOCUMENT 631869 INTERMEC RESTRICTED SUBSTANCES COMPLIANCE REQUIREMENTS, MOST CURRENT VERSION.

11. FAI SUBMISSION SHALL CONFORM TO VENTURE DOCUMENT NO: IQC-VSOP-029. MOST CURRENT VERSION.

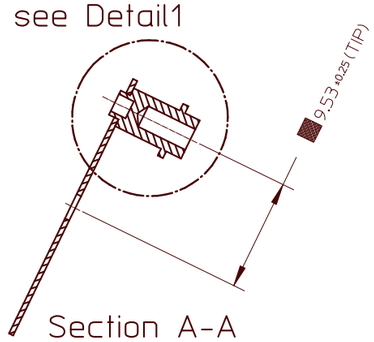
12. Electrical Specifications:
The Resonance Frequency for the Antenna shall be between 2250MHz and 2302.5MHz as measured on the Supplier's Production Test Fixture.
To be measured after filing process.



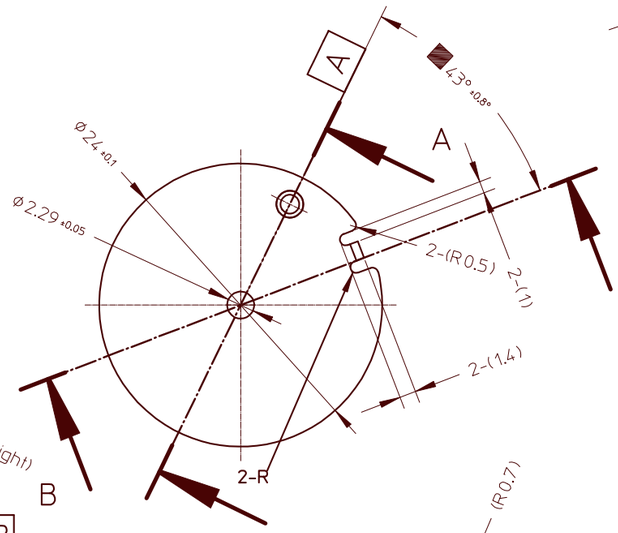


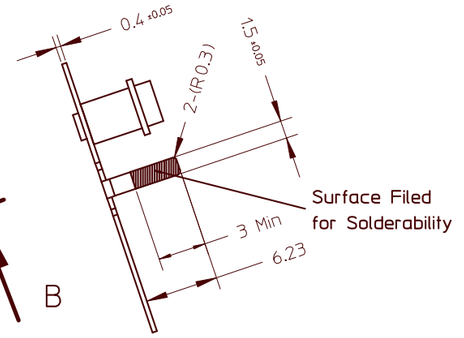
Detail1
Scale 5:1

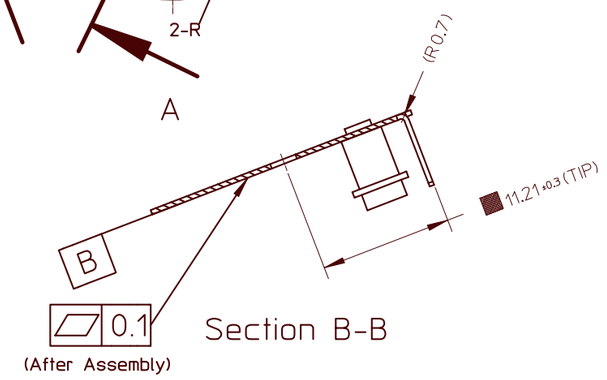
see Detail1



Section A-A







Section B-B

ITEM	QTY	PART/MAT'L DESCRIPTION	MAT'L PART NO.	MAT'L DRAWING NO.	MAT'L SPEC
2	1	Stem	Note 2	---	---
1	1	Antenna Disc	Note 1	---	---

UNLESS OTHERWISE SPECIFIED
-DIMENSIONS ARE IN MILLIMETRES
-THIRD ANGLE PROJECTION

DRAWN BY: CSTAY — DATE: 28July06
APPROVED: Zainal — DATE: 28July06
RELEASE TO PRODUCTION — DATE:

TITLE: **Assy-Antenna PIFA w/stem**

General Tolerance ±0.1mm

DO NOT SCALE THIS
METRIC
DRAWING

VENTURE

PART NUMBER: VE011-6012-A0
DRAWING NUMBER: A4-VE011-6012-A0
SCALE: 2:1
SHEET: 1 OF 1

Project Name	:	CV30	**Report No.**	:	CV30-06-ITM-EE-0012
Date	:	2 August 2006	**Prepared by**	:	Tan Huan Fong
Revision	:	1.0	**Approved by**	:	Koh Kia Sia

SUBJECT	:	Model B Antenna Measurement Report
OBJECTIVE	:	Detailed Antenna Measurement Data

1.0 INTRODUCTION

This documents shall provide a detailed measurement report for the 2.4GHz antenna hard-tool samples developed by Venture Electronics Solutions Pte Ltd for the Intermec PDA Model CV30. The antenna structure is provided by Intermec. The measurement data are measured with the latest hardware configuration as per Model B.

2.0 ANTENNA MEASUREMENT SUMMARY

Table 1 a summary of the data for both the Main and Aux Antenna based on the measurement done in a calibrated Satimo 3D Chamber.

S/N	Description	Specification	Main Antenna (Measured Data)	Aux Antenna (Measured Data)
1	Operating Frequency	2.4GHz ~ 2.485GHz	2.4GHz ~ 2.485GHz	2.4GHz ~ 2.485GHz
2	VSWR	2:1	See Figure 1	See Figure 2
3	Impedance	50 ohm	50 ohm	50 ohm
4	Efficiency	45% (min) across passband	See Figure 9	See Figure 10
5	Peak Gain	0dBi (min)	3.13dBi	1.82dBi
6	Average Gain	-3dBi (min)	-0.99dBi	-2.73dBi
7	Polarization	Linear	Linear	Linear
8	Input Power Limit	1W	1W	1W
9	Radiation Pattern	Omni-Directional	See Section 4.0	See Section 5.0

TABLE 1 Antenna Specifications

3.0 VSWR

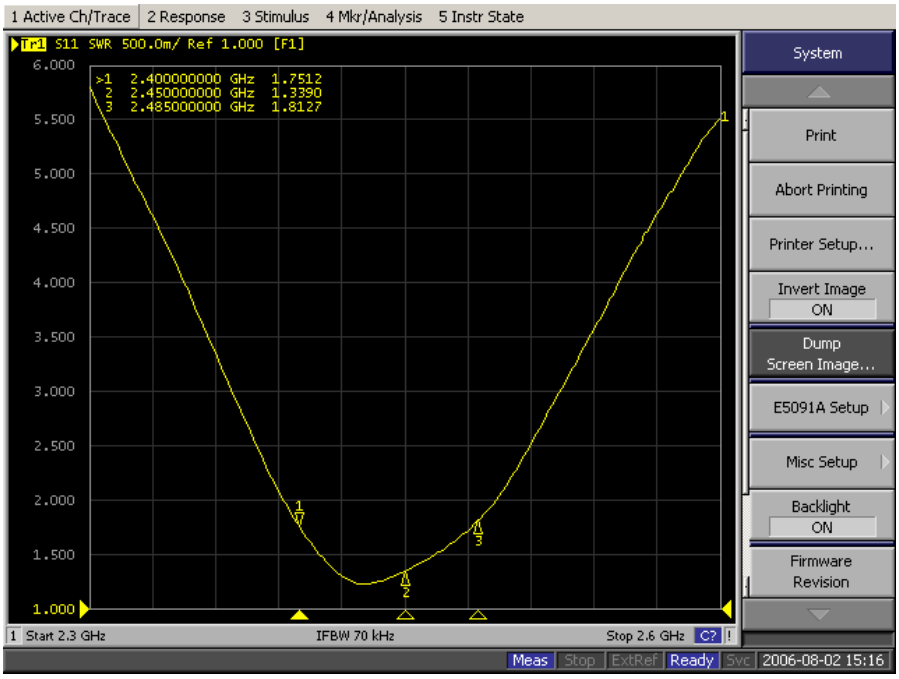


Figure 1 Main Antenna VSWR

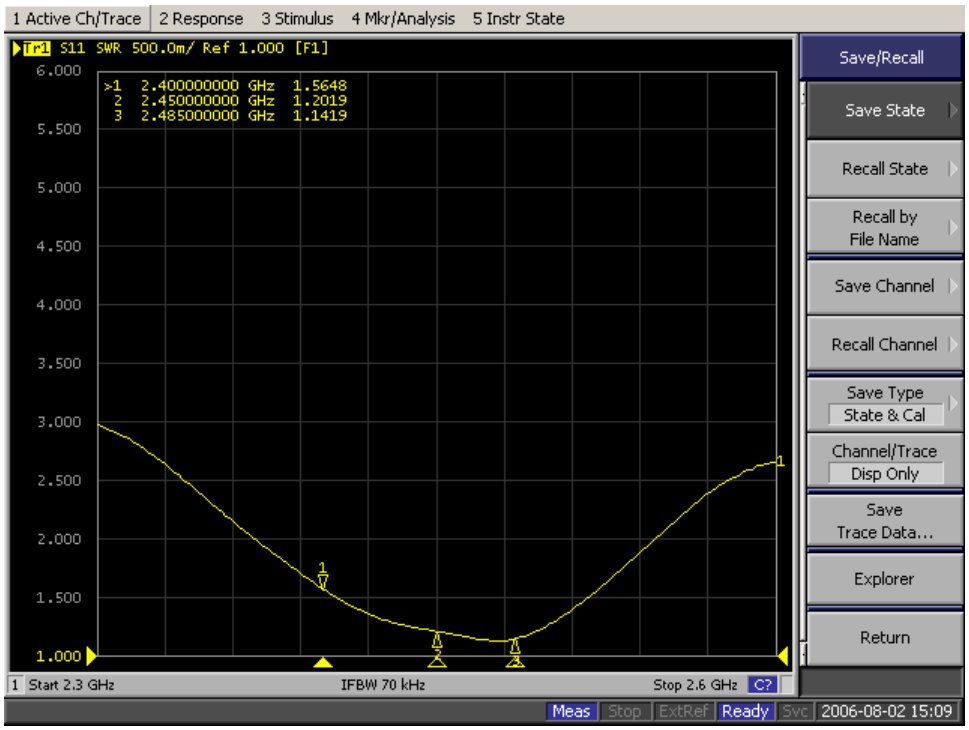
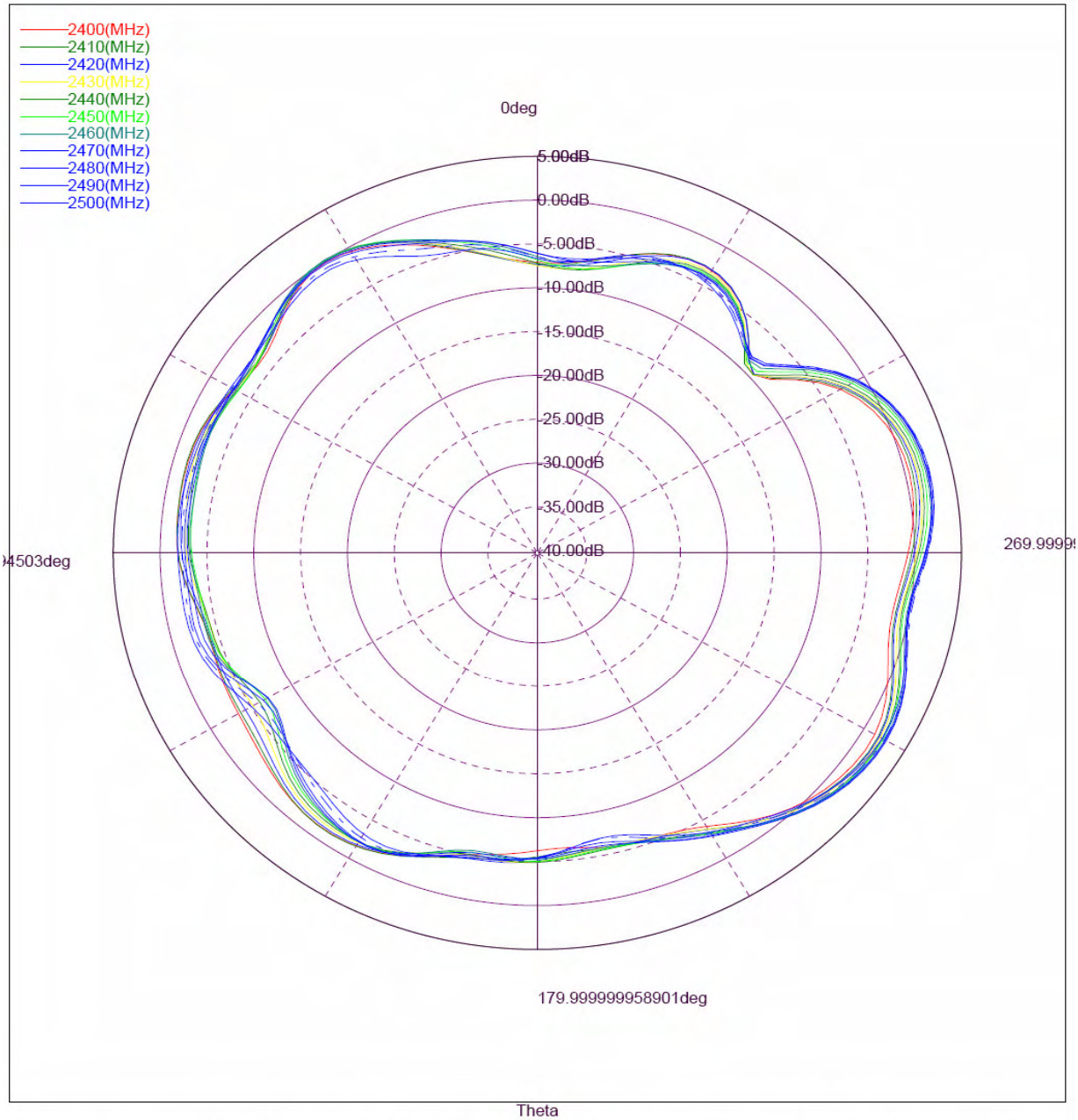


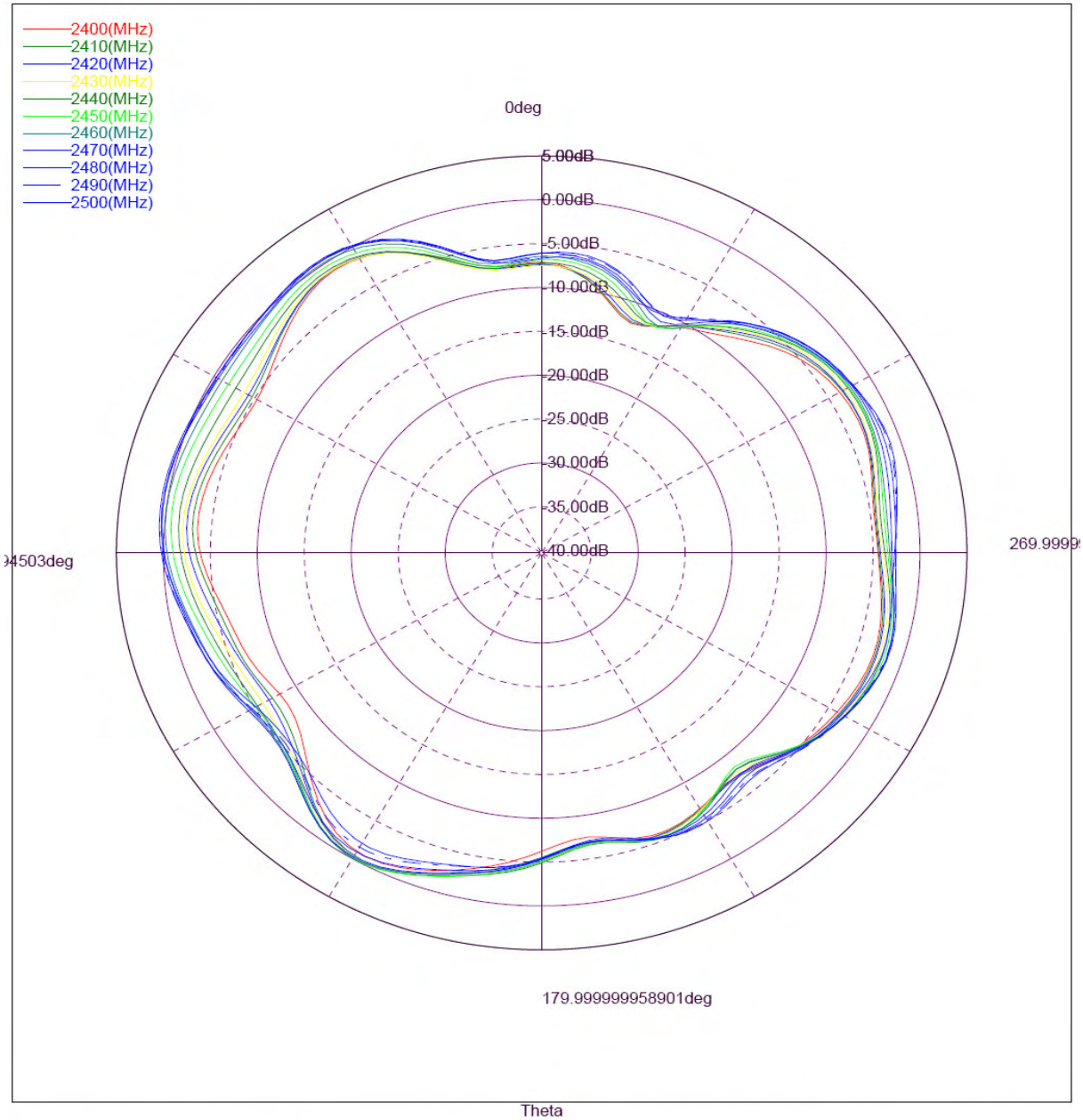
Figure 2 Aux Antenna VSWR

4.0 MAIN ANTENNA RADIATION PATTERN



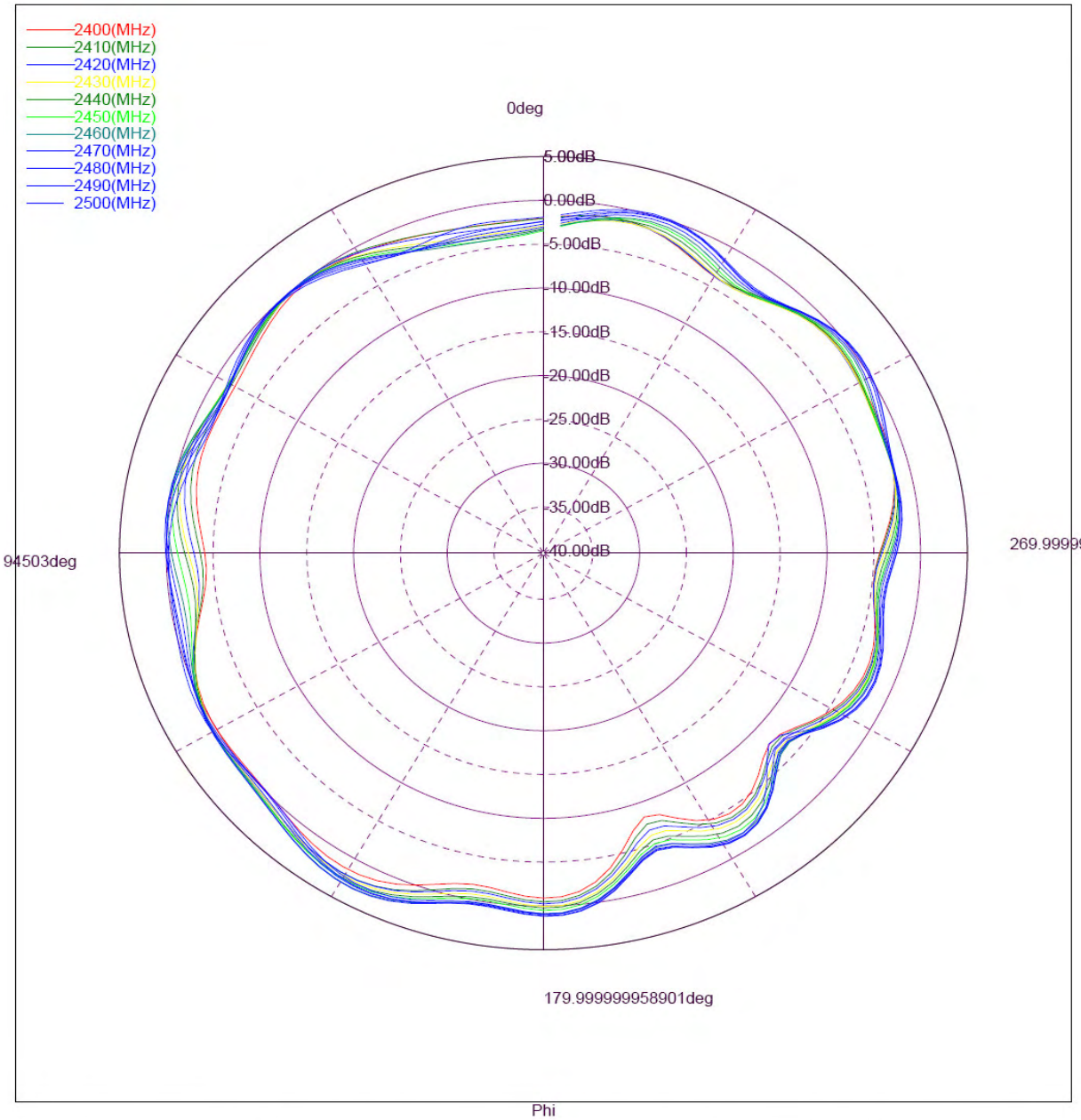
Layer	Max value	Position	Min value	Position	BeamWidth	Average
2400(MHz)	1.39 dB	-122.86 deg	-9.52 dB	-48.57 deg	38.09 deg	-2.69 dB
2410(MHz)	1.80 dB	-122.86 deg	-9.45 dB	-48.57 deg	37.37 deg	-2.50 dB
2420(MHz)	1.90 dB	-122.86 deg	-9.44 dB	-48.57 deg	37.55 deg	-2.52 dB
2430(MHz)	2.02 dB	-122.86 deg	-9.58 dB	-48.57 deg	77.45 deg	-2.61 dB
2440(MHz)	2.26 dB	-120.00 deg	-9.52 dB	-48.57 deg	40.11 deg	-2.58 dB
2450(MHz)	2.38 dB	-122.86 deg	-9.03 dB	-45.71 deg	78.31 deg	-2.52 dB
2460(MHz)	2.60 dB	-120.00 deg	-8.74 dB	-45.71 deg	77.98 deg	-2.41 dB
2470(MHz)	2.75 dB	-120.00 deg	-8.44 dB	-45.71 deg	77.74 deg	-2.30 dB
2480(MHz)	2.64 dB	-120.00 deg	-8.23 dB	-45.71 deg	78.13 deg	-2.25 dB
2490(MHz)	2.55 dB	-77.14 deg	-8.26 dB	-45.71 deg	77.60 deg	-2.34 dB
2500(MHz)	2.40 dB	-77.14 deg	-8.53 dB	-45.71 deg	77.28 deg	-2.46 dB

Figure 3 MAIN ANTENNA PHI=0



Layer	Max value	Position	Min value	Position	BeamWidth	Average
2400(MHz)	-0.90 dB	151.43 deg	-12.42 dB	-20.00 deg	31.93 deg	-4.98 dB
2410(MHz)	-0.37 dB	151.43 deg	-12.26 dB	-20.00 deg	31.31 deg	-4.65 dB
2420(MHz)	-0.30 dB	151.43 deg	-12.07 dB	-22.86 deg	33.00 deg	-4.46 dB
2430(MHz)	-0.30 dB	151.43 deg	-11.97 dB	-22.86 deg	33.86 deg	-4.26 dB
2440(MHz)	-0.06 dB	151.43 deg	-11.76 dB	-22.86 deg	33.50 deg	-3.91 dB
2450(MHz)	-0.07 dB	151.43 deg	-11.81 dB	-25.71 deg	33.69 deg	-3.61 dB
2460(MHz)	0.17 dB	37.14 deg	-11.65 dB	-25.71 deg	86.68 deg	-3.29 dB
2470(MHz)	0.47 dB	37.14 deg	-11.02 dB	-25.71 deg	87.89 deg	-3.03 dB
2480(MHz)	0.65 dB	80.00 deg	-10.31 dB	-25.71 deg	86.71 deg	-2.96 dB
2490(MHz)	0.58 dB	37.14 deg	-10.01 dB	-25.71 deg	87.25 deg	-3.06 dB
2500(MHz)	0.47 dB	34.29 deg	-10.23 dB	-22.86 deg	85.63 deg	-3.25 dB

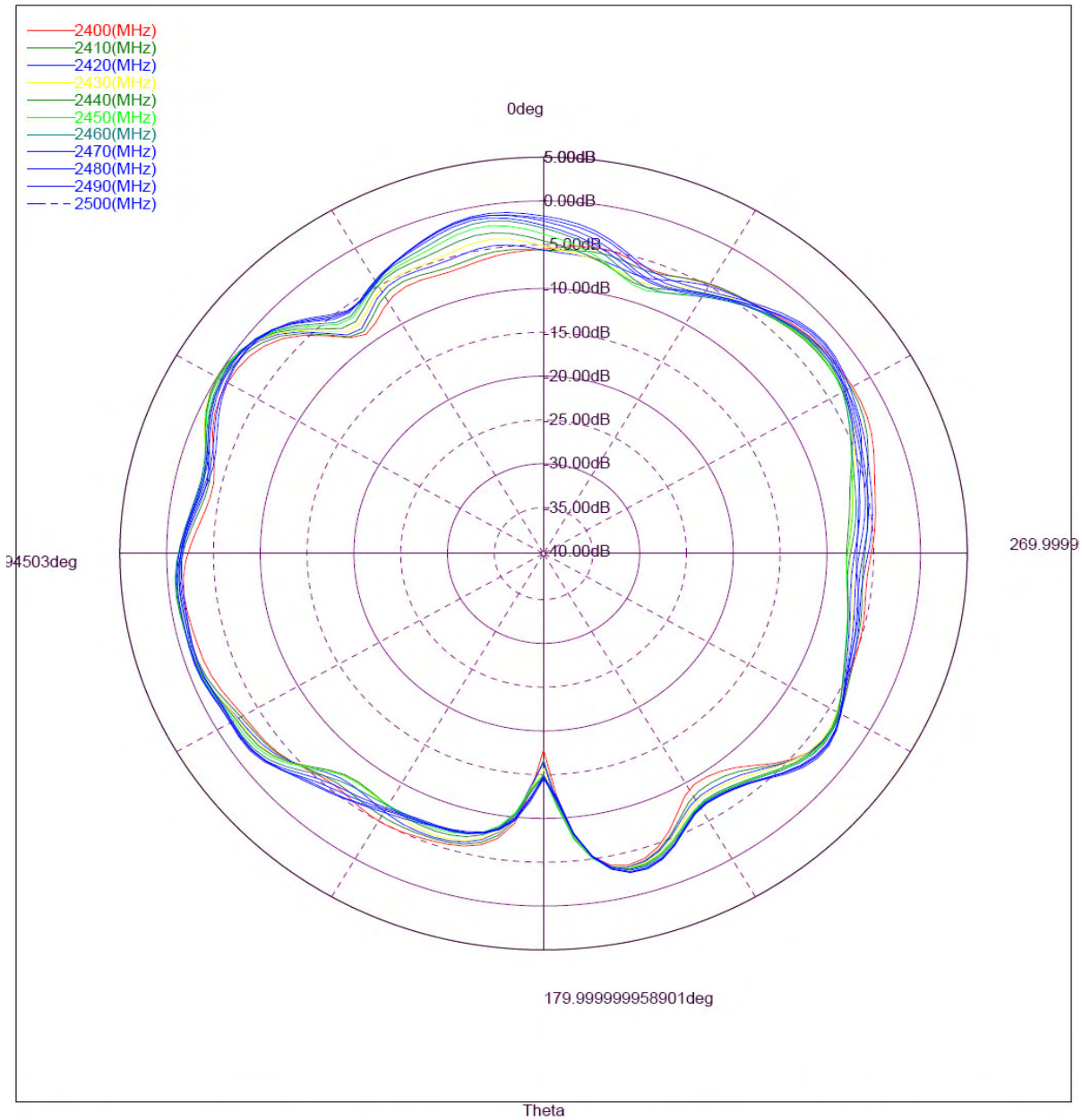
Figure 4 MAIN ANTENNA PHI=90



Layer	Max value	Position	Min value	Position	BeamWidth	Average
2400(MHz)	1.43 dB	149.06 deg	-8.29 dB	199.69 deg	61.27 deg	-2.14 dB
2410(MHz)	2.07 dB	149.06 deg	-7.42 dB	199.69 deg	58.82 deg	-1.85 dB
2420(MHz)	2.07 dB	149.06 deg	-7.02 dB	227.81 deg	60.61 deg	-1.77 dB
2430(MHz)	2.25 dB	151.87 deg	-6.63 dB	230.62 deg	76.95 deg	-1.71 dB
2440(MHz)	2.53 dB	151.87 deg	-6.42 dB	230.62 deg	75.36 deg	-1.54 dB
2450(MHz)	2.66 dB	151.87 deg	-6.31 dB	230.62 deg	76.10 deg	-1.39 dB
2460(MHz)	3.07 dB	151.87 deg	-6.27 dB	230.62 deg	73.32 deg	-1.18 dB
2470(MHz)	3.13 dB	151.87 deg	-6.39 dB	230.62 deg	74.29 deg	-1.05 dB
2480(MHz)	2.82 dB	151.87 deg	-6.50 dB	230.62 deg	80.64 deg	-0.99 dB
2490(MHz)	2.71 dB	151.87 deg	-6.88 dB	227.81 deg	85.08 deg	-1.00 dB
2500(MHz)	2.44 dB	151.87 deg	-7.80 dB	227.81 deg	106.95 deg	-1.06 dB

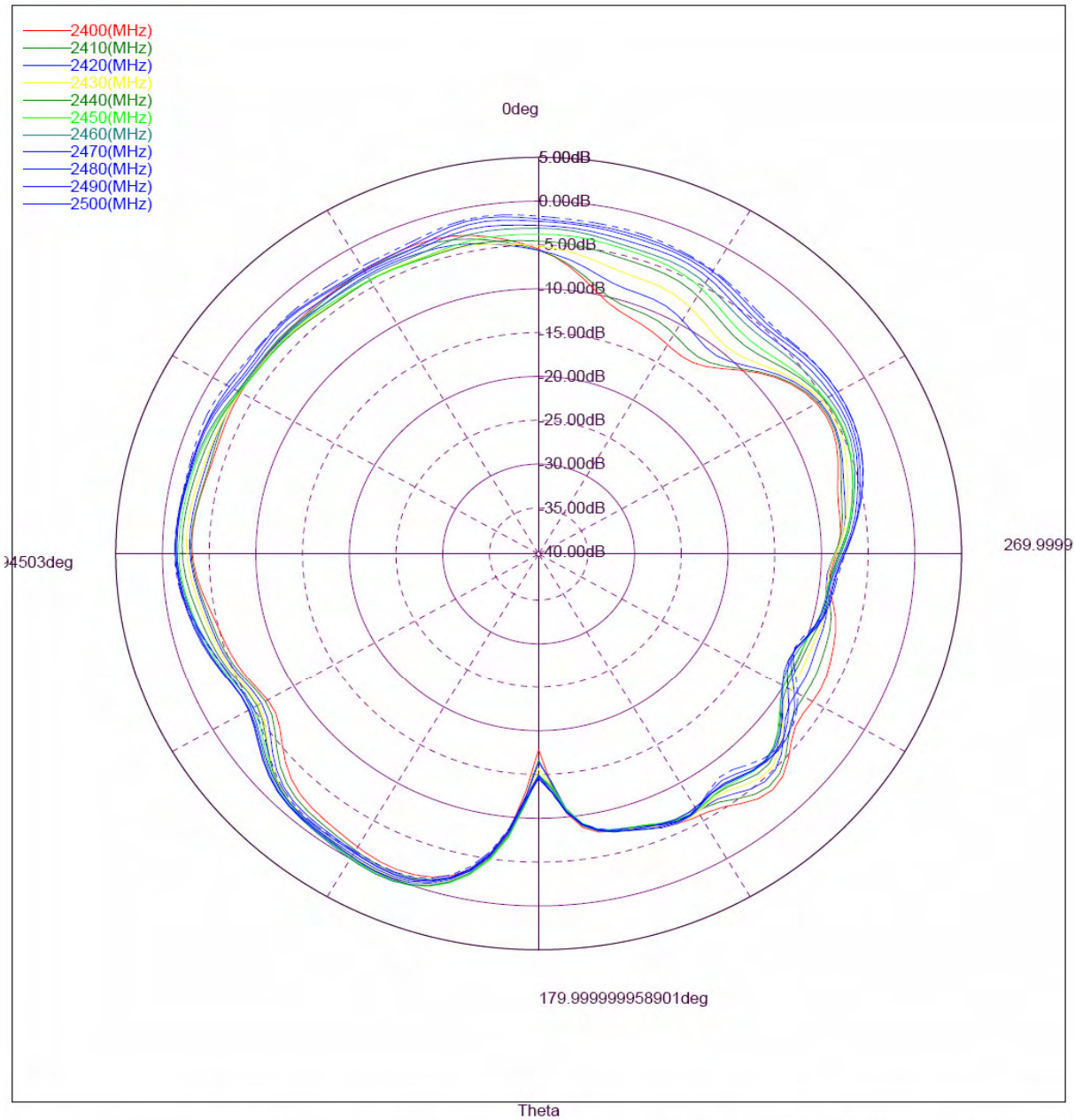
Figure 5 Main Antenna Theta=90

5.0 AUX ANTENNA RADIATION PATTERN



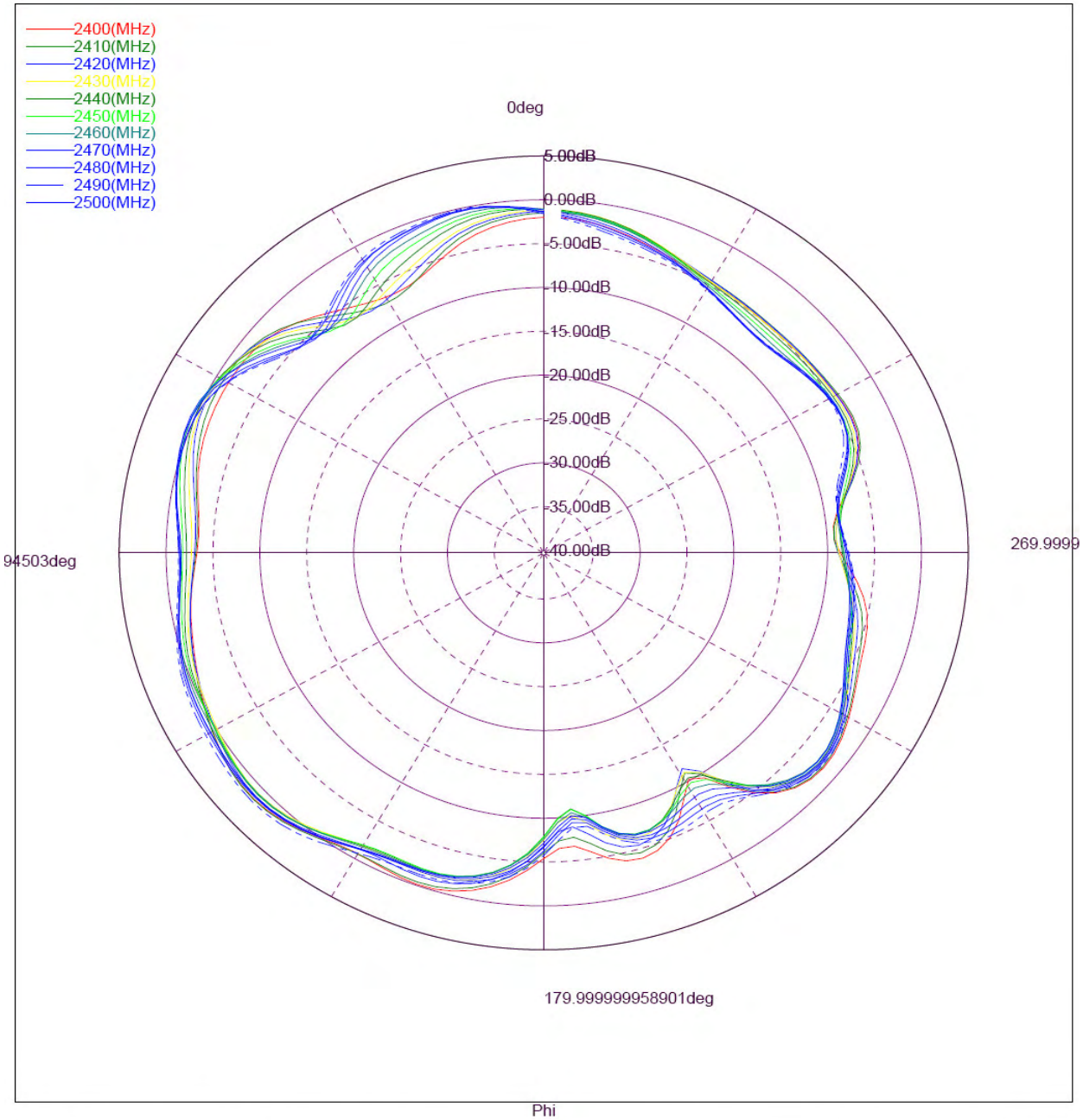
Layer	Max value	Position	Min value	Position	BeamWidth	Average
2400(MHz)	-1.27 dB	60.00 deg	-17.83 dB	-180.00 deg	84.55 deg	-4.62 dB
2410(MHz)	-0.66 dB	60.00 deg	-16.65 dB	-180.00 deg	80.73 deg	-4.53 dB
2420(MHz)	-0.21 dB	60.00 deg	-16.38 dB	-180.00 deg	28.20 deg	-4.55 dB
2430(MHz)	-0.06 dB	60.00 deg	-15.66 dB	-180.00 deg	30.00 deg	-4.59 dB
2440(MHz)	-0.05 dB	60.00 deg	-14.97 dB	-180.00 deg	80.77 deg	-4.53 dB
2450(MHz)	-0.19 dB	60.00 deg	-14.96 dB	-180.00 deg	83.26 deg	-4.43 dB
2460(MHz)	-0.38 dB	57.14 deg	-14.85 dB	-180.00 deg	85.95 deg	-4.27 dB
2470(MHz)	-0.45 dB	57.14 deg	-14.61 dB	-180.00 deg	87.90 deg	-4.07 dB
2480(MHz)	-0.58 dB	57.14 deg	-14.65 dB	-180.00 deg	89.77 deg	-3.94 dB
2490(MHz)	-0.88 dB	57.14 deg	-14.91 dB	-180.00 deg	92.35 deg	-3.90 dB
2500(MHz)	-0.95 dB	54.29 deg	-14.53 dB	-180.00 deg	94.12 deg	-3.80 dB

Figure 6 AUX ANTENNA PHI=0



Layer	Max value	Position	Min value	Position	BeamWidth	Average
2400(MHz)	-1.09 dB	157.14 deg	-17.83 dB	-180.00 deg	37.96 deg	-5.48 dB
2410(MHz)	-0.66 dB	157.14 deg	-16.65 dB	-180.00 deg	38.41 deg	-5.40 dB
2420(MHz)	-0.49 dB	157.14 deg	-16.38 dB	-180.00 deg	39.30 deg	-5.34 dB
2430(MHz)	-0.09 dB	157.14 deg	-15.66 dB	-180.00 deg	39.02 deg	-5.14 dB
2440(MHz)	0.14 dB	157.14 deg	-14.97 dB	-180.00 deg	38.65 deg	-4.87 dB
2450(MHz)	0.26 dB	157.14 deg	-14.96 dB	-180.00 deg	38.72 deg	-4.62 dB
2460(MHz)	0.29 dB	154.29 deg	-14.85 dB	-180.00 deg	39.44 deg	-4.36 dB
2470(MHz)	-0.01 dB	154.29 deg	-14.61 dB	-180.00 deg	41.17 deg	-4.13 dB
2480(MHz)	-0.23 dB	157.14 deg	-14.65 dB	-180.00 deg	42.26 deg	-3.94 dB
2490(MHz)	-0.45 dB	157.14 deg	-14.91 dB	-180.00 deg	41.89 deg	-3.85 dB
2500(MHz)	-0.76 dB	157.14 deg	-14.53 dB	-180.00 deg	41.41 deg	-3.79 dB

Figure 7 AUX ANTENNA PHI=90



Layer	Max value	Position	Min value	Position	BeamWidth	Average
2400(MHz)	1.49 dB	132.19 deg	-10.18 dB	210.94 deg	65.44 deg	-3.11 dB
2410(MHz)	1.55 dB	132.19 deg	-11.01 dB	210.94 deg	64.88 deg	-3.08 dB
2420(MHz)	1.13 dB	132.19 deg	-11.58 dB	210.94 deg	67.65 deg	-3.24 dB
2430(MHz)	0.70 dB	132.19 deg	-11.11 dB	210.94 deg	73.76 deg	-3.36 dB
2440(MHz)	0.84 dB	132.19 deg	-10.93 dB	185.62 deg	74.34 deg	-3.29 dB
2450(MHz)	0.77 dB	132.19 deg	-10.86 dB	185.62 deg	112.73 deg	-3.25 dB
2460(MHz)	0.77 dB	132.19 deg	-10.48 dB	185.62 deg	112.03 deg	-3.17 dB
2470(MHz)	1.18 dB	132.19 deg	-10.16 dB	185.62 deg	106.68 deg	-3.04 dB
2480(MHz)	1.20 dB	132.19 deg	-9.78 dB	185.62 deg	104.78 deg	-2.99 dB
2490(MHz)	1.30 dB	129.37 deg	-9.35 dB	185.62 deg	106.18 deg	-2.91 dB
2500(MHz)	1.82 dB	132.19 deg	-8.79 dB	185.62 deg	59.94 deg	-2.73 dB

Figure 8 AUX Antenna Theta=90

6.0 ANTENNA EFFICIENCY

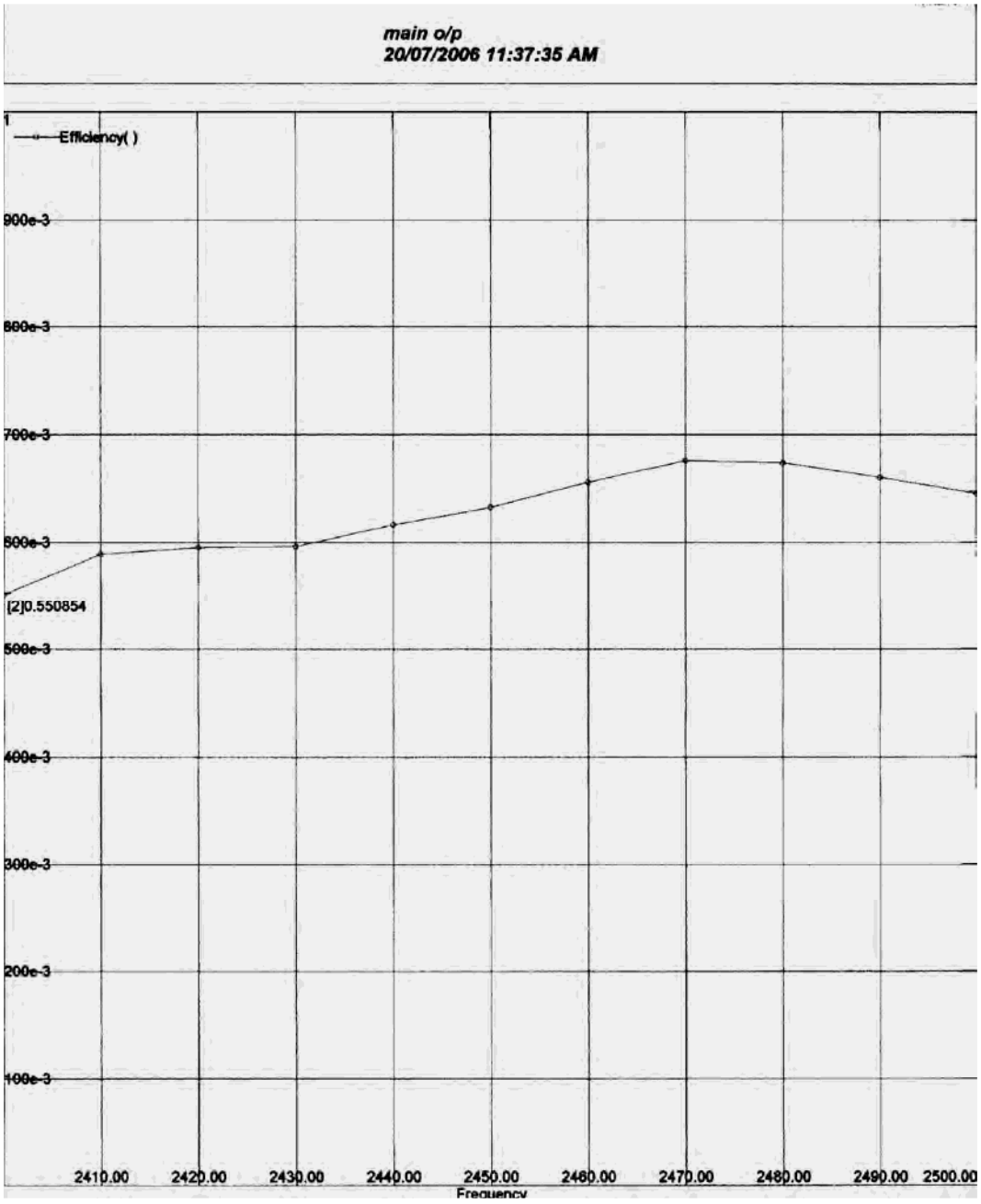


Figure 9 Efficiency of Main Antenna

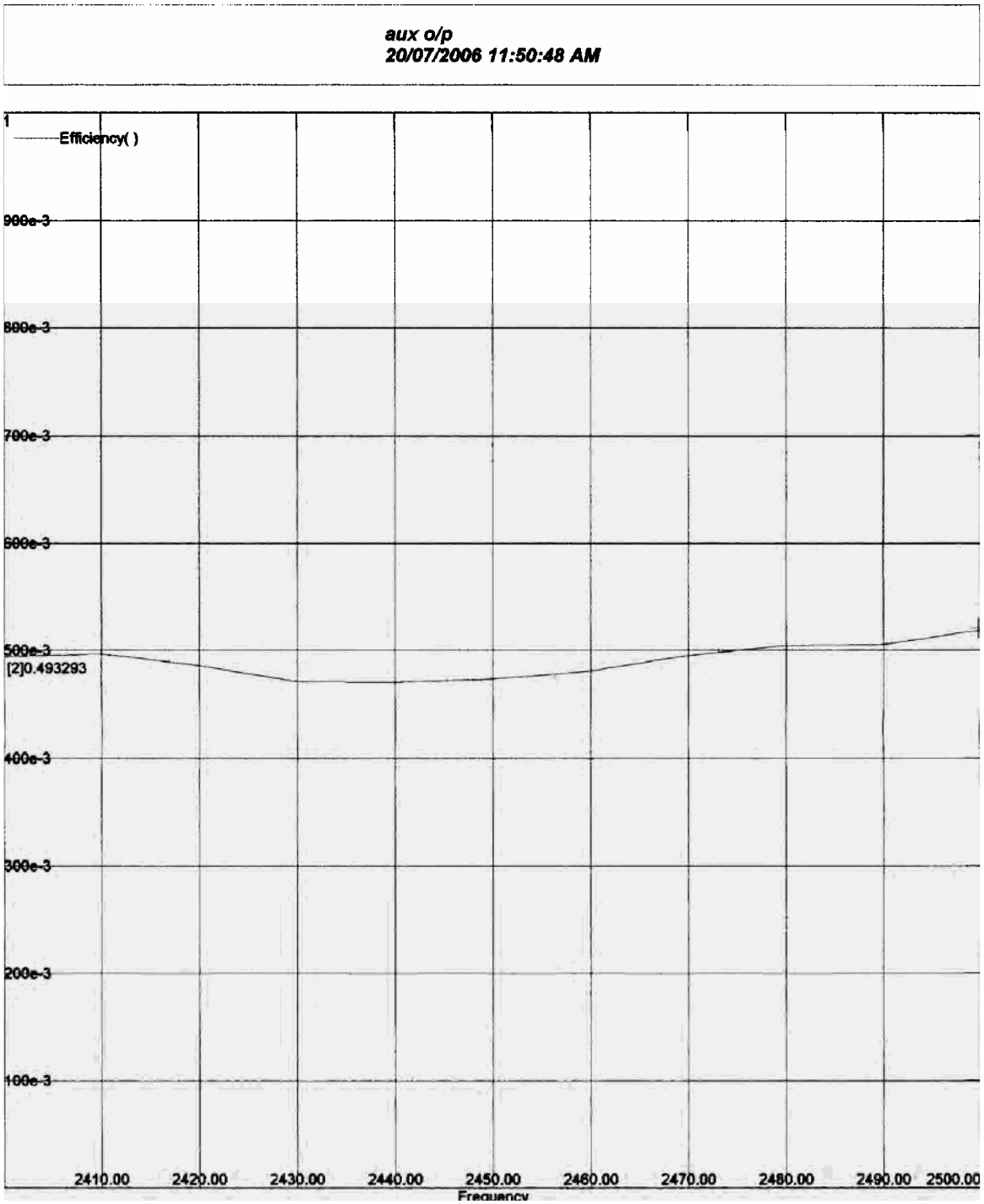


Figure 10 Efficiency of AUX Antenna

7.0 CONCLUSION

This document provides a detailed measurement report for the 2.4GHz Antenna developed for Intermec PDA Model CV30. All measurements are performed in a calibrated Satimo 3D Chamber in Perlos. All measurements are based on the latest Production Hard-tool Samples and CV30 Model B Production Unit.