



## **WIESON TECHNOLOGIES CO., LTD.**

### **WIESON 3D CHAMBER TEST REPORT**

Customer: **Versa Networks**

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Project Name: **2.4GHz BT Antenna**

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P/N: **JVPCB105936E**

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Antenna Type: **PCB Print Antenna**

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Version No. : **1**

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## Revision History

Revision	Date	Engineer	Description
01	2019/12/18	vicky	NEW RELEASE
02	2022/11/25	vicky	Add vendor info and model name

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## **I. ELECTRONIC CHARACTERISTICS**

Vendor: Versa Networks

Address: 2550 GREAT AMERICA WAY SUITE 350 SANTA CLARA,  
CA 95054

Model Name: JVPCB105936E

<b>Item</b>	<b>Specification</b>
<b>Operating Frequency(GHz)</b>	2.4-2.5
<b>Bandwidth</b>	100 MHz (Min.)
<b>Return Loss</b>	-6 dB (Max)
<b>Polarization</b>	Linear
<b>Azimuth Bandwidth</b>	Omni-directional
<b>Peak Gain</b>	0.55 dBi (Max)
<b>Impedance</b>	50Ω
<b>Material</b>	PCB Print Antenna
<b>Maximum Power</b>	1W
<b>V.S.W.R</b>	3 : 1
<b>Radiation</b>	Omni directional
<b>Efficiency</b>	>30%
<b>Operating Temperature</b>	-10~60°C
<b>Storage temp</b>	-10~70°C

## II. Summary :

This report to account for the measurement setup and result of the Antenna. The measurement setup includes s-parameter, pattern, and gain measurement.

The measured data for Antenna are presented and analysis.

## III. S-Parameter Measurement :

### A. Reflection coefficient :

(a) Instrument : Network Analyzer.

(b) Setup :

- (1) Calibrate the Network Analyzer by one port calibration using O.S.L. calibration kits.
- (2) Connect the antenna under test to the Network Analyzer.
- (3) Measure the  $S_{11}$ (reflection coefficient) shown in Fig. 1.
- (4) Generally, the  $S_{11}$  is less than  $-10\text{dB}$  to ensure the 90% power into antenna and only less than 10% power back to system.

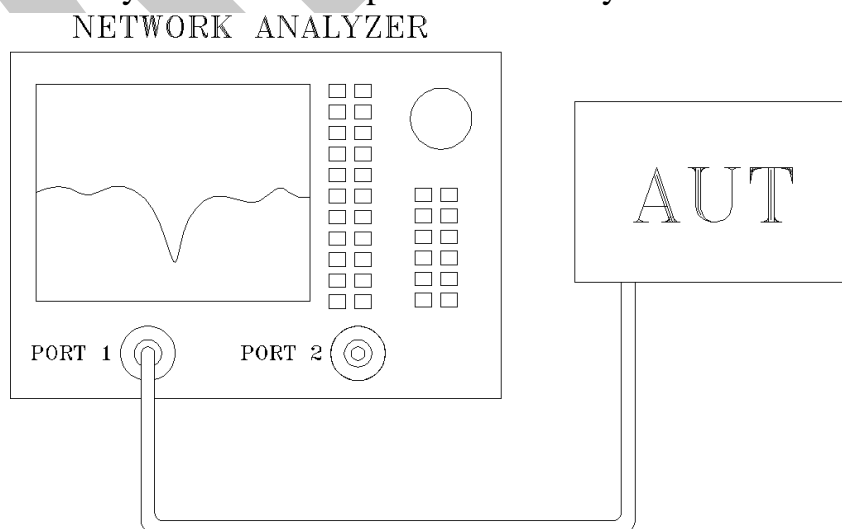


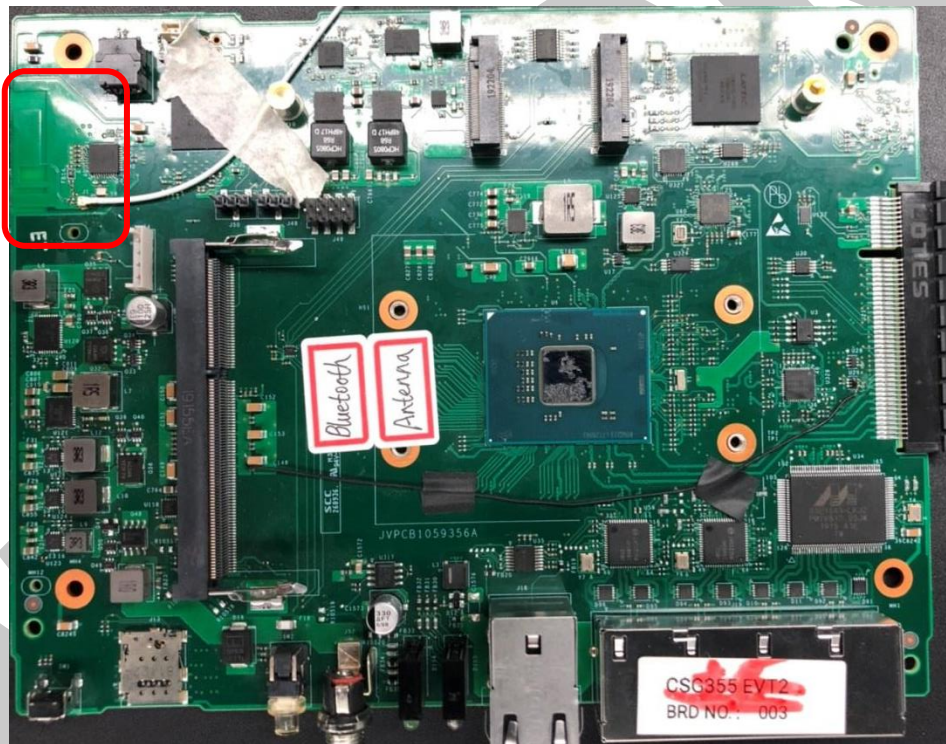
Fig.1 Antenna measured in Network Analyzer



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## IV. Antenna Photos :

2.4GHz BT Antenna

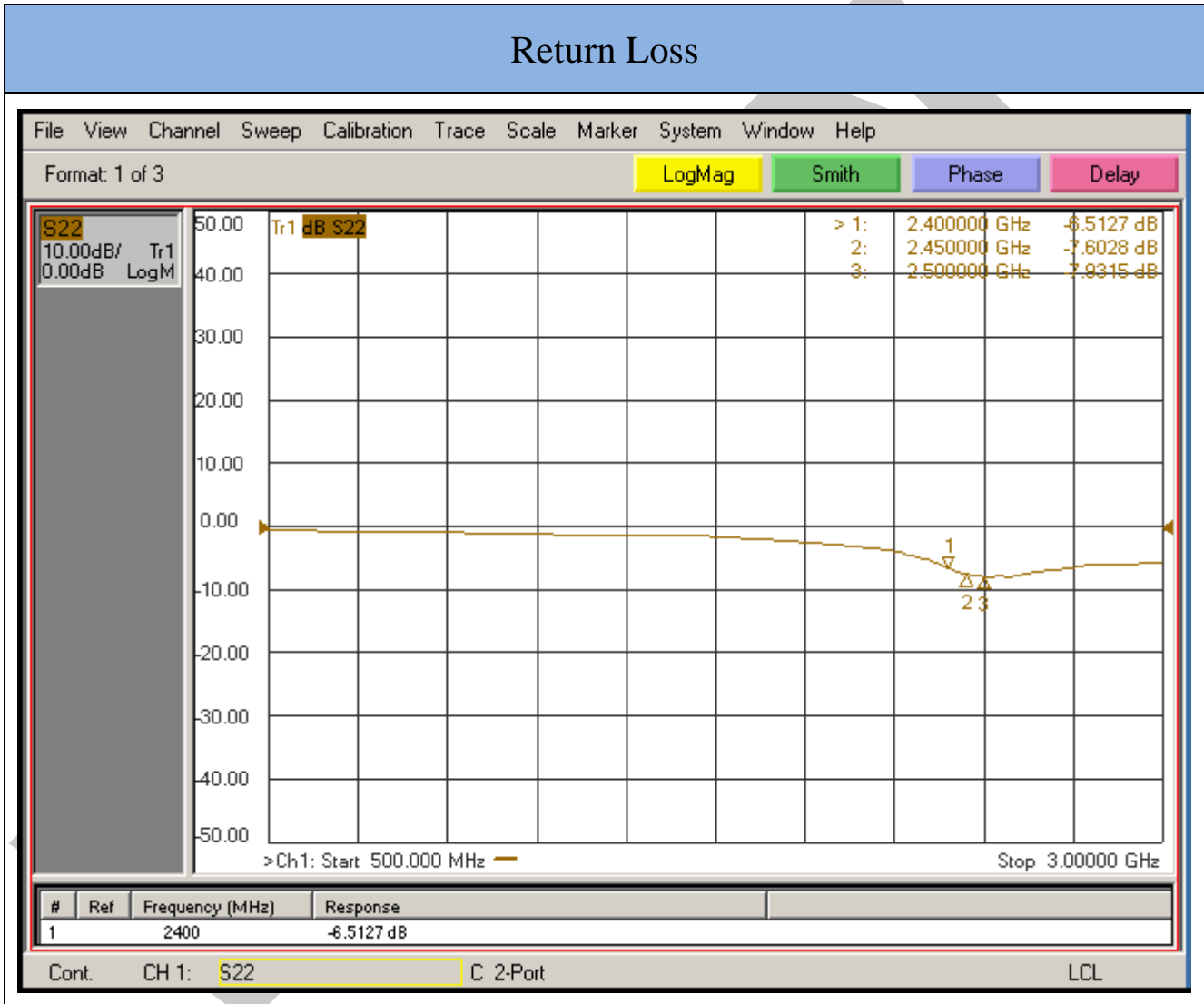




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## V. S-Parameter Measurement Result :

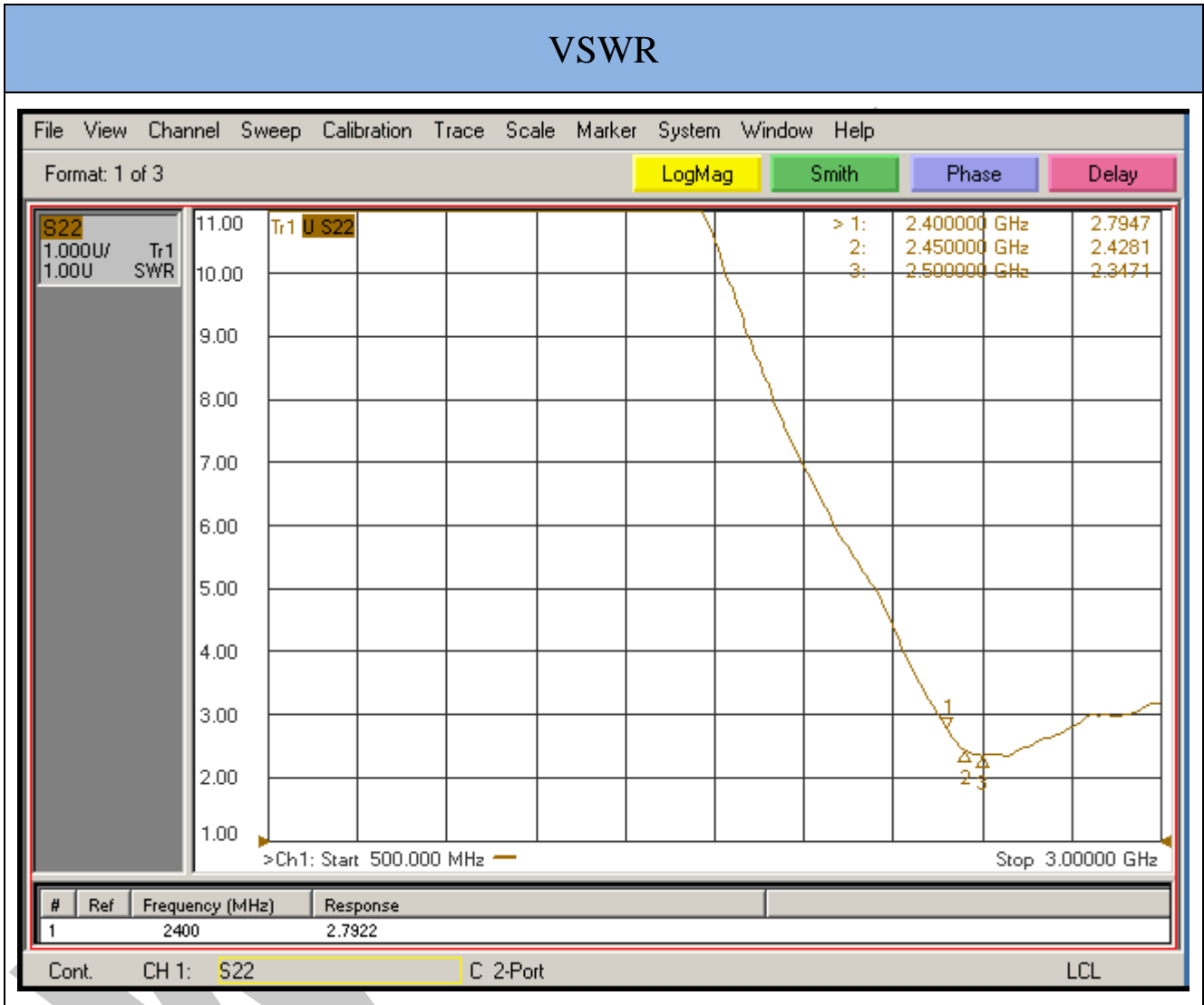
2.4GHz BT Antenna



Frequency	2400 MHz	2450 MHz	2500 MHz
dB	-6.51	-7.60	-7.93



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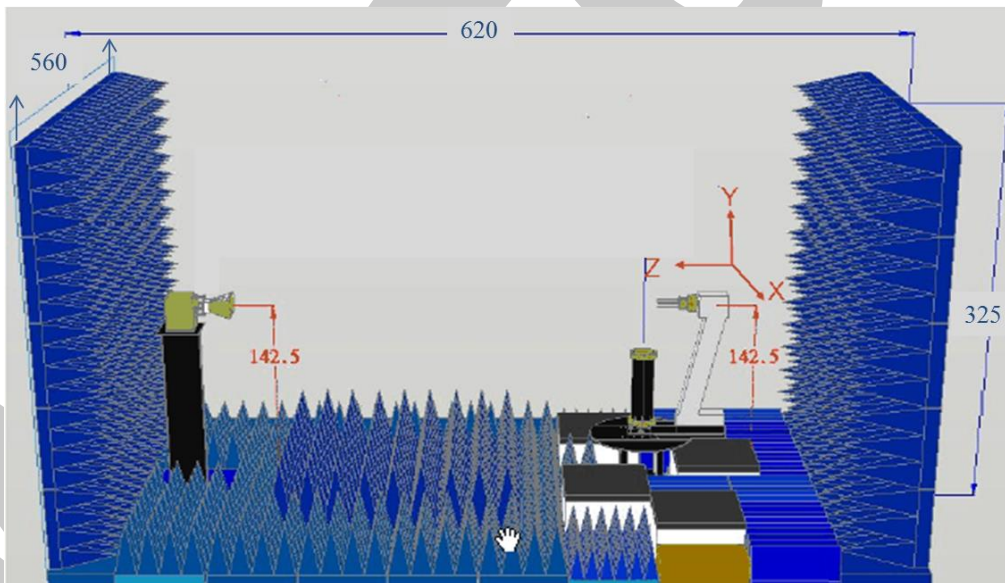
Frequency	2400 MHz	2450 MHz	2500 MHz
<b>VSWR</b>	<b>2.79</b>	<b>2.42</b>	<b>2.34</b>

## **VI. The Test Information Anechoic Chamber**

### **A. Scope**

This statement of work defines the requirements of a far-field antenna measurement range, which includes

- (1) One 560 cm (W) x 325 cm (H) x 620 cm (L) Antenna Measurement Anechoic Chamber, detailed requirements refer section B .
- (2) One Far-field Antenna Measurement System with spinning linear CP measurement capabilities, detailed requirement refer section E & F .
- (3) One broad-band transmitted antenna, detailed requirements refer section G .



### **B. Antenna Measurement Anechoic Chamber**

Fully anechoic chamber with dimension 560 cm in width, 325 cm in height and 620 cm in length. The quiet zone of this Chamber shall be greater than





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60 cm @ 400MHz~900MHz, 43 cm @2.4 GHz, 31 cm @5.8 GHz,. Contractor should be aware of this anechoic chamber is going to be used for performing far-field antenna measurement.

### C. Electrical specifications

Frequency Range: 400 MHz to 6 GHz,

Quiet zone size: >60 cm @ 400MHz~900MHz, >43 cm @2.4 GHz, >31 cm @5.8 GHz.

Quiet zone ripple: < +/- 1.5 dB @500(400)MHz~800MHz, < +/-0.75 dB @800MHz~1.5GHz, < +/- 0.5 dB @1.5GHz~6.0GHz

<b>Field Probing Frequency</b>	<b>Peak-to-Peak Amplitude Taper (Within specified Quiet Zone Area)</b>	<b>Quiet Zone Size (cm)</b>	<b>Compliant</b>
0.9 GHz	< 0.75 dB	60	Yes
1.575 GHz	< 0.5 dB	43	Yes
1.8 GHz	< 0.5 dB	43	Yes
2.4 GHz	< 0.5 dB	43	Yes
5.8 GHz	< 0.5 dB	31	Yes



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## D. Absorbers

We shall design and install proper absorbers on the inner walls of the chamber to guarantee the electrical specifications. However, the absorbers height shall be no less than 24" which enables the space in the chamber to be around 438 cm (W) x 203 cm (H) x 513 cm (L). All the absorber used shall meet NRL-8093 fire retardant regulations

## E. Far-field Antenna Measurement System

We shall supply all the hardware and software which are capable of characterizing antenna radiation patterns from 30 KHz to 6 GHz using the existed Agilent 5230A PNA-L or Agilent 8753ES Vector Network Analyzer. The system shall be able to automatically measure and plot single axis amplitude and phase antenna patterns in either Cartesian or polar formats.

## F. Far-field measurement software

The software consists of the control or data acquisition software and the data plotting software.

(1) The data acquisition software shall at least be capable of the following functions:

- \*measuring single frequency per cut - single axis (azimuth); system can automatically switch frequency at the end of a scan.
- \*measuring data in Uni-direction or bi-direction
- \*measuring data at least with azimuth 360 degrees. (+/- 180 degrees or 0-360 degrees)
- \*real time plot in Cartesian or polar format
- \*screen shows real time angle position



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- \*system automatically calculates S/N ratio level based on measured signal fluctuation
- \*function to set positioner zero position
- \*operator can set data taking velocity and data sampling interval
- \*entry to allow positioner offset to any angle

(2) The data plotting software shall at least be capable of the following functions:

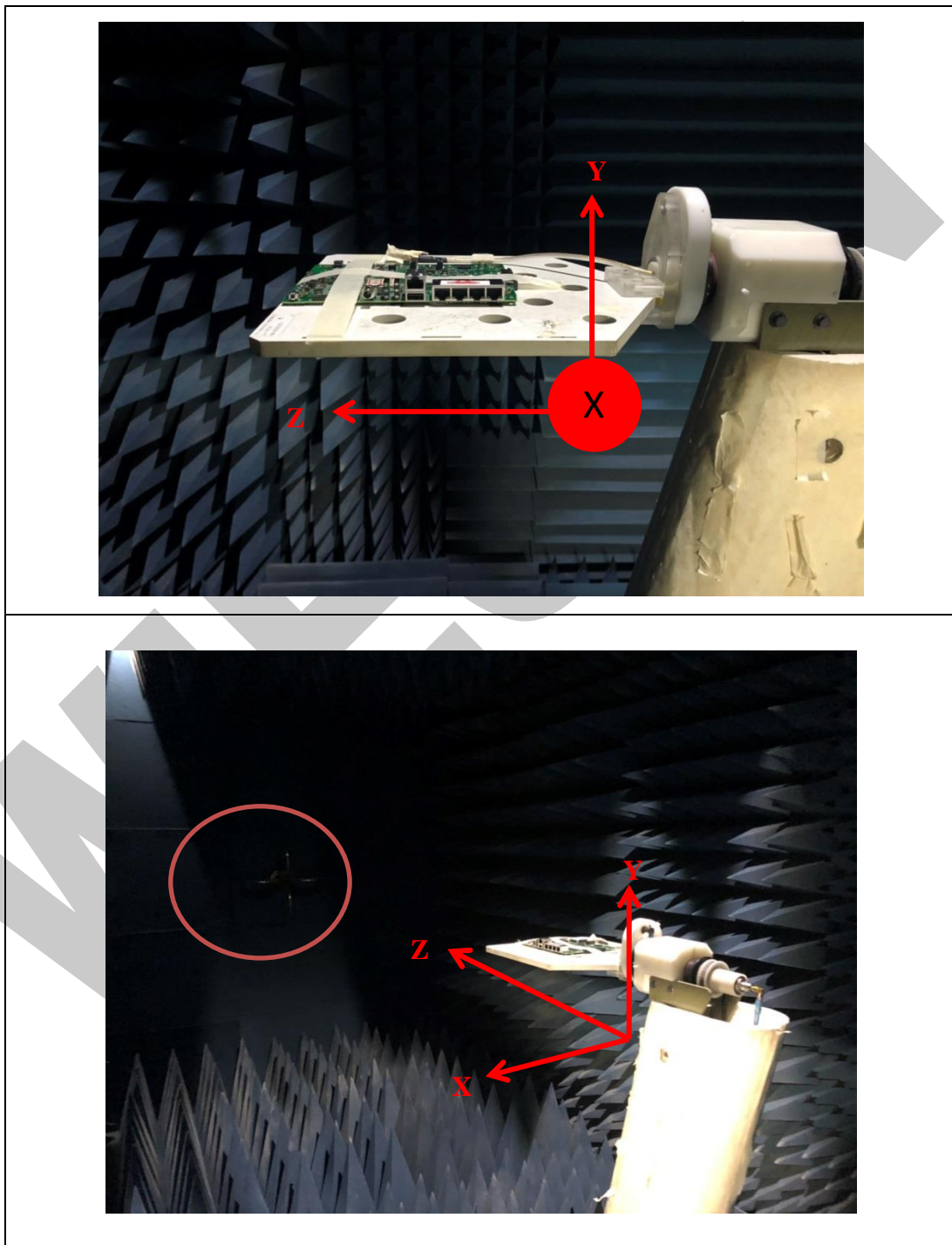
- \*Editing plot data
- \*plotting data in Cartesian, Polar or delimited ASCII output with header information
- \*plotting data in linear or dB scales
- \*normalizing data to peak (dB), standard gain reference (dBi), or no normalization
- \*overlying data, (drag and drop capability is preferable)
- \*outputting data to any Windows supported printers

### G. Broadband Transmitted antenna

We shall provide a linear-polarized broadband antenna with the specifications better than those listed hereafter in this article,

Frequency: 0.5-6 GHz, Gain: >12 dBi @10 GHz, VSWR:<2,0:1, Front to Back Ration > 20 dB

**VII. Antenna Measurement Photo**





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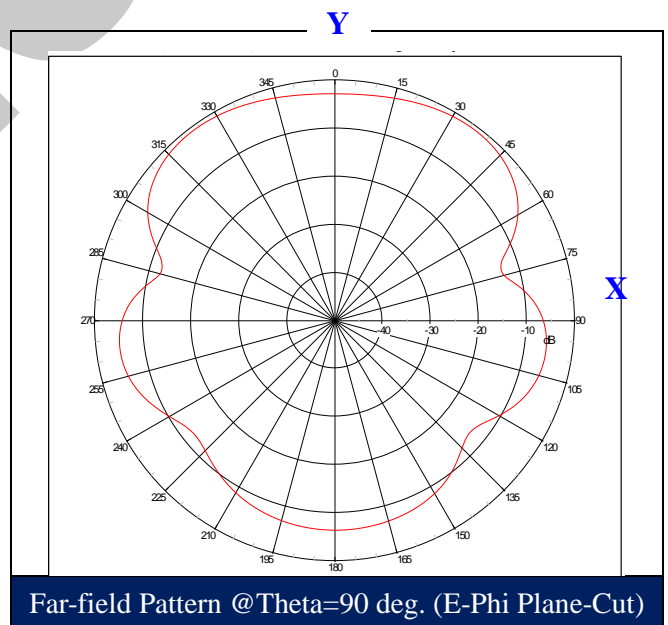
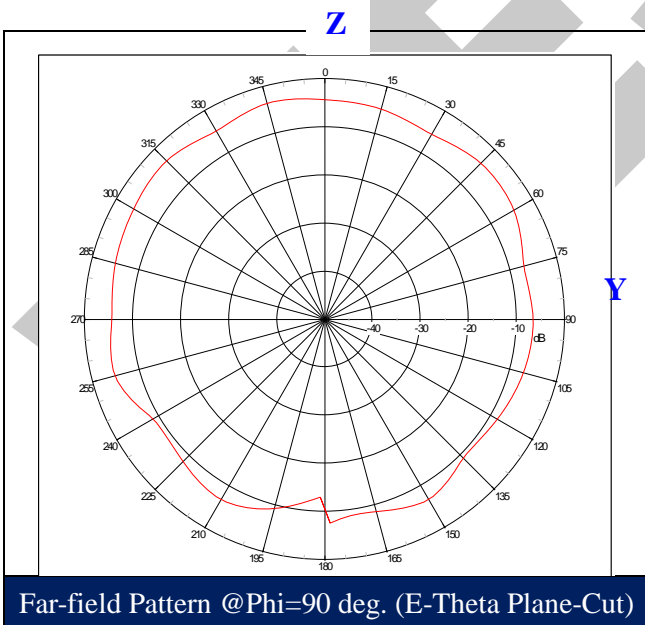
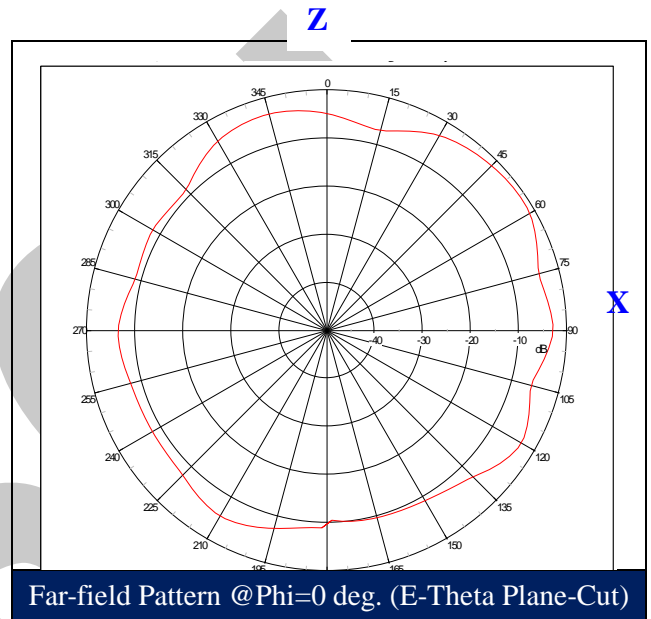
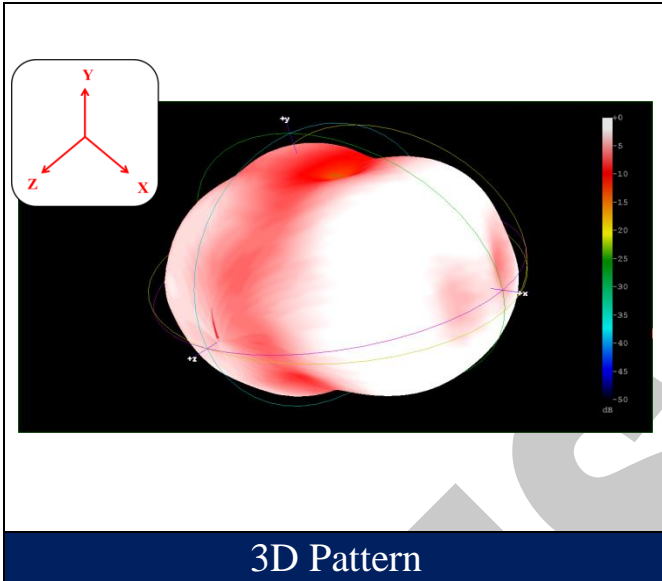
## VIII. Antenna Measurement Result

### 2.4GHz Antenna

Frequency (GHz)	Peak Gain (dBi)	3D Gain (dBi)	3D Radiation Efficiency(%)
2.4	-1.13	-5.25	30
2.45	0.41	-4.14	39
2.5	0.55	-4.27	37

## IX. 3D Radiation Pattern

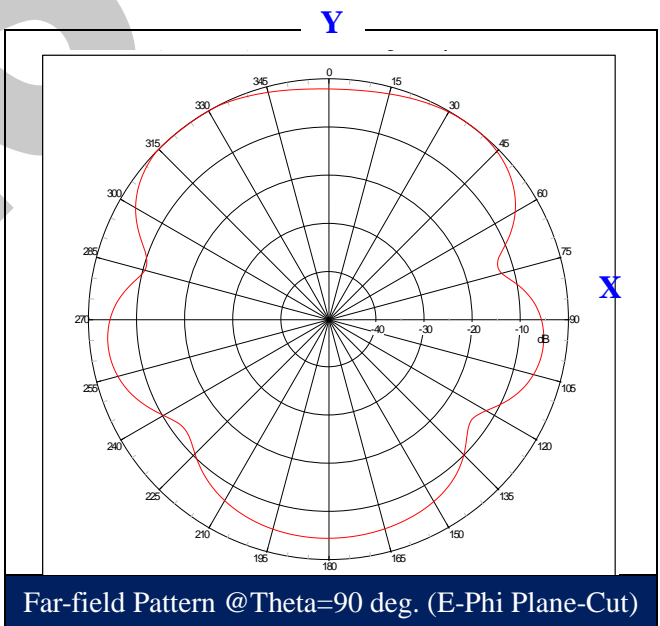
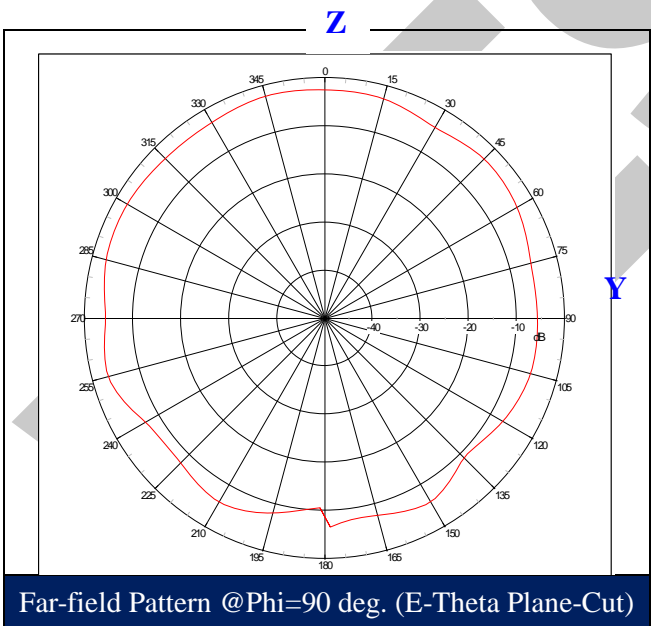
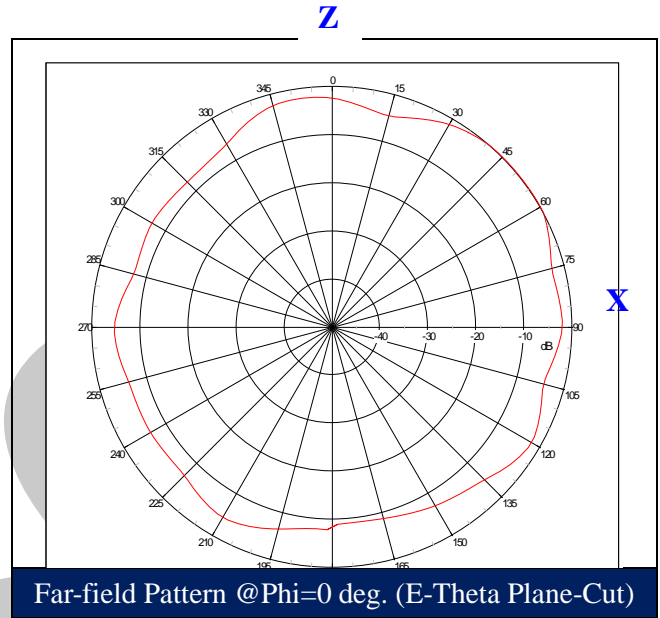
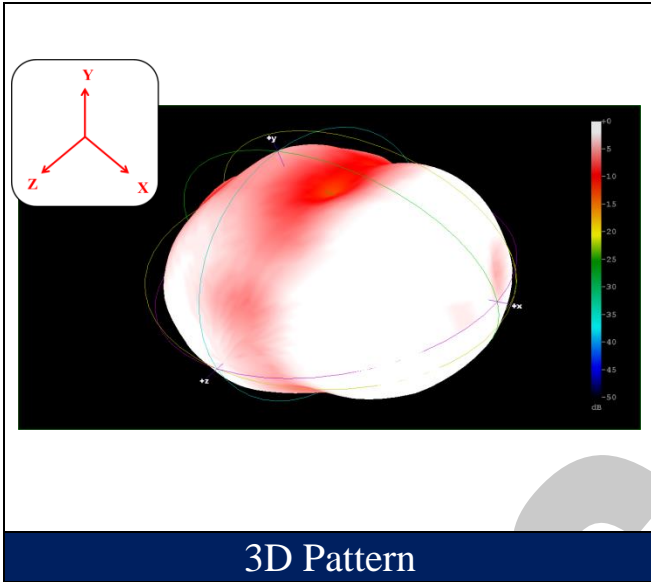
**2.4GHz**





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**2.45GHz**





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**2.5GHz**

