



AEL Crystals Limited

Specification

Customer:

Part Name: AEL-A04 LTCC Antenna

Part Number A2450M000000S007

Technical Spec. LA5220P2450-A04



Specification List

Product: A04 LTCC Antenna
AEL A2450M000000S007

Item		Page
1.	Introduction	3
2.	Dimensions	3
3.	Evaluation Board	3
4.	Electrical Characteristics	4
5.	Characteristic Curve	4
6.	Environmental Test	5
7.	Reflow Soldering Standard Condition	6
8.	Test Report	6~17

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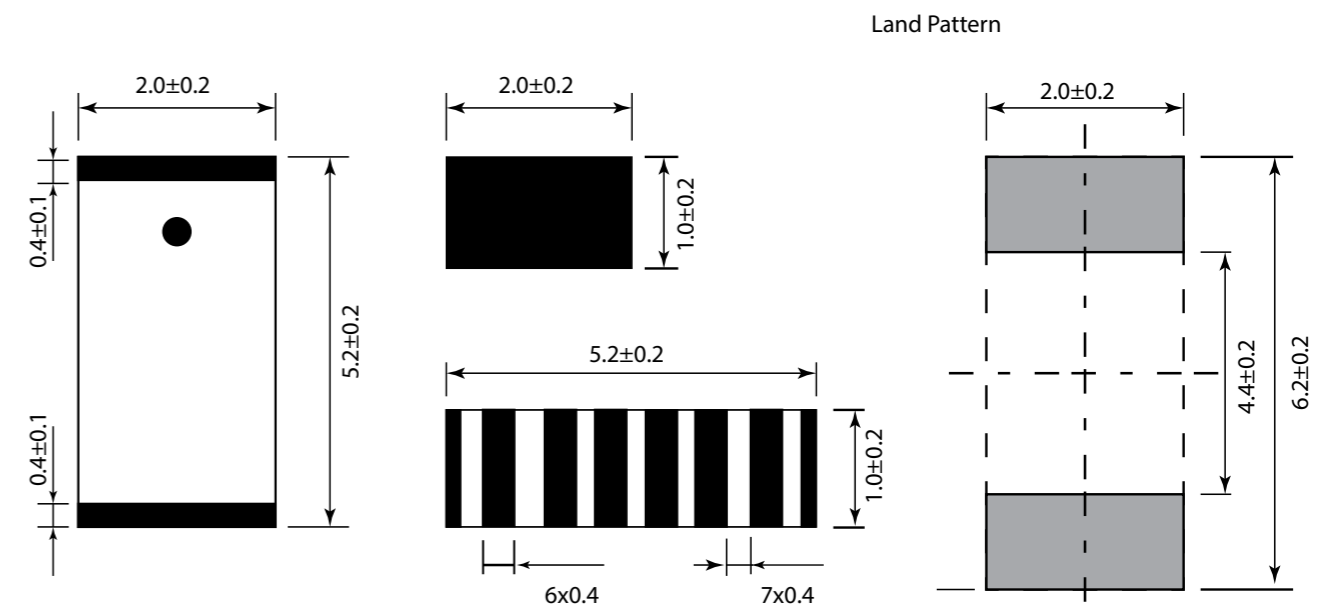
Type of Product

A04 LTCC Chip Antenna

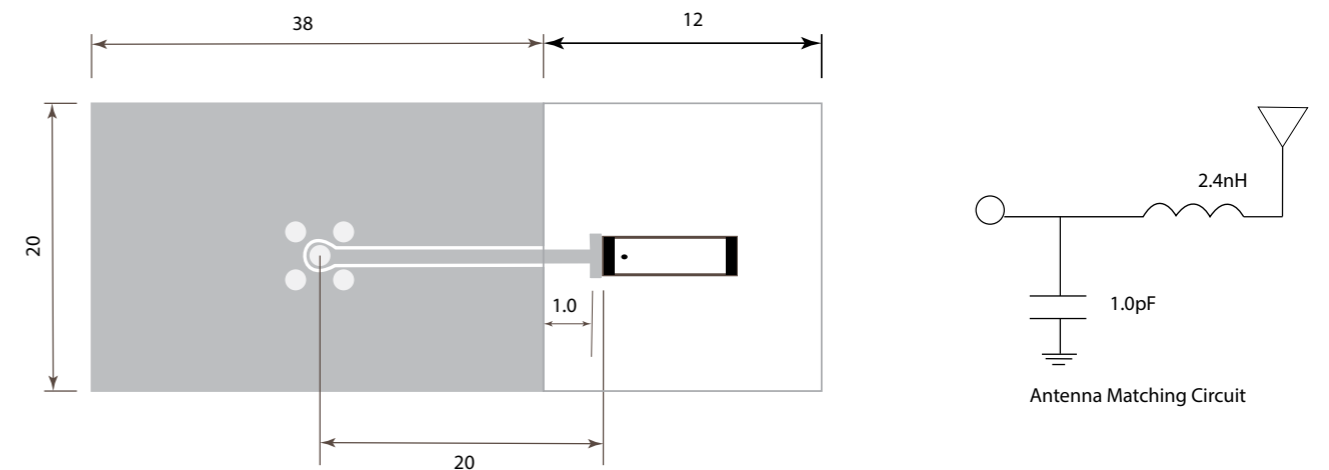
1. Introduction

“Weison” microwave multi-layer chip ceramic antenna GPL series, are designed to be used in WLAN, Bluetooth, multi-band mobile phone antenna, GPS, and other similar applications. Compact size and SMD Chip design make it ideally suited to portable applications.

2. Dimensions



3. Evaluation Board

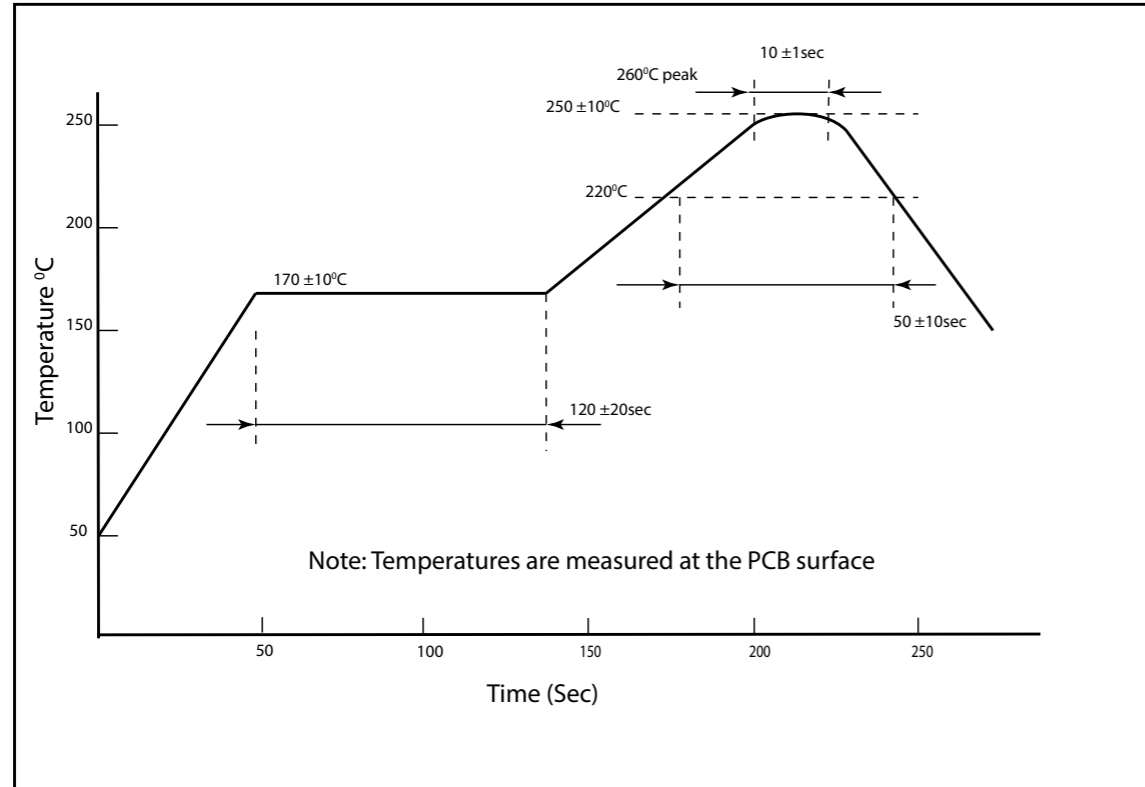




4. Electrical Characteristics

Item	Specification
Centre Frequency	2450 MHz \pm 25 MHz
Bandwidth	>100 MHz
Gain	1.5 dBi max.
VSWR	2.0 max.
Polarization	Linear
Azimuth Beam Width	Omni-directional
Impedance	50 Ω

4. Solder Characteristics



5. Environmental Conditions

Item	Condition
Reference Temperature	25 ^{0C}
Relative Humidity Range	55-75% RH
Operating Temperature Range	-40 ^{0C} to +85 ^{0C}
Storage Temperature Range	-40 ^{0C} to +85 ^{0C}



6. Test Report

1. S-Parameter

Summary:

This report to account for the measurement setup and result of LTCC Chip antenna.

- (1) The measurement setup includes reflection coefficient, pattern, and gain measurement.
- (2) The measured data for LTCC Chip antenna are presented and analysis.

I. Measurement Coefficient Measurement

A. Reflection Coefficient Measurement

- (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 S11(reflection coefficient) shown in Fig. 1.
- (4) Generally, the S11 is less than -10dB to ensure the 90% power into antenna and only less than 10% power back to system.

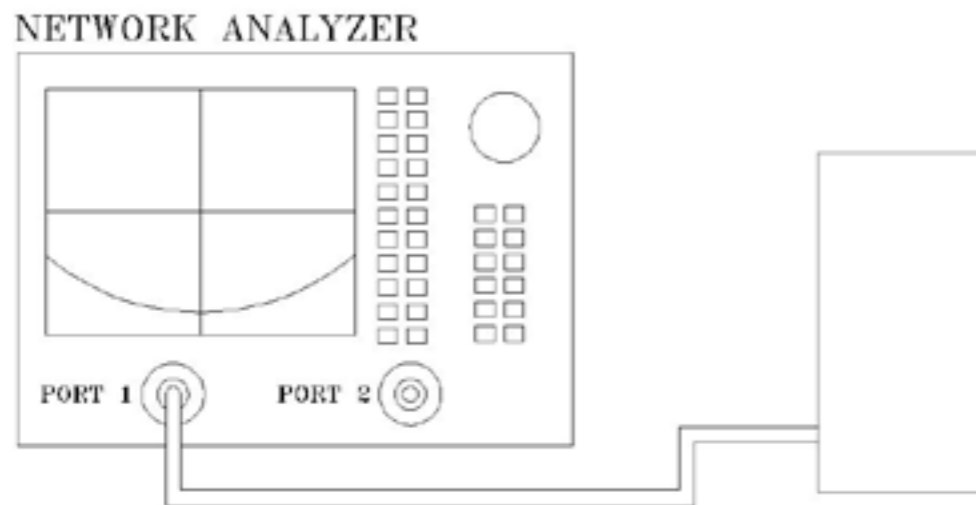


Fig. 1 LTCC chip antenna measured in Network Analyser



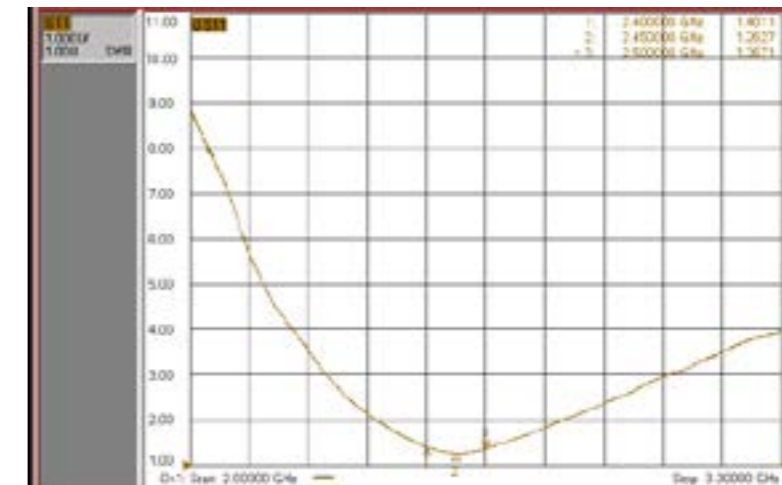
II Test Value

A. VSWR

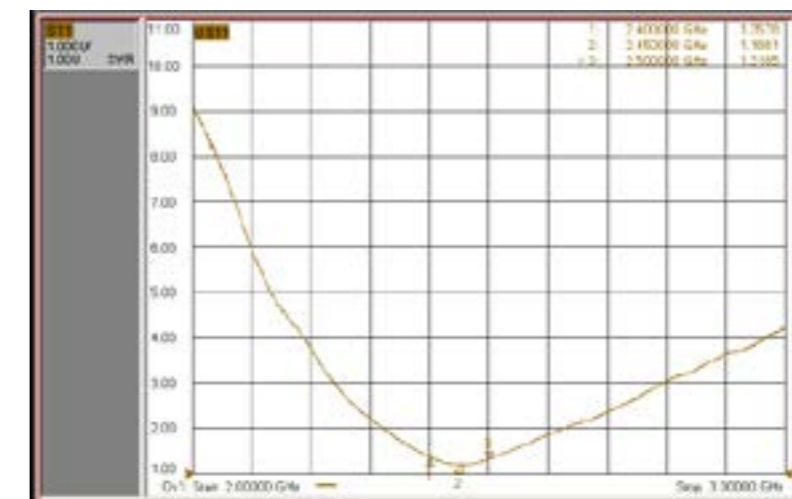
II. Test Value :

A. VSWR

Sample \ Frequency	2.40GHz	2.45GHz	2.50GHz
1	1.4011	1.2627	1.3671
2	1.3578	1.1881	1.3185



SAMPLE-1

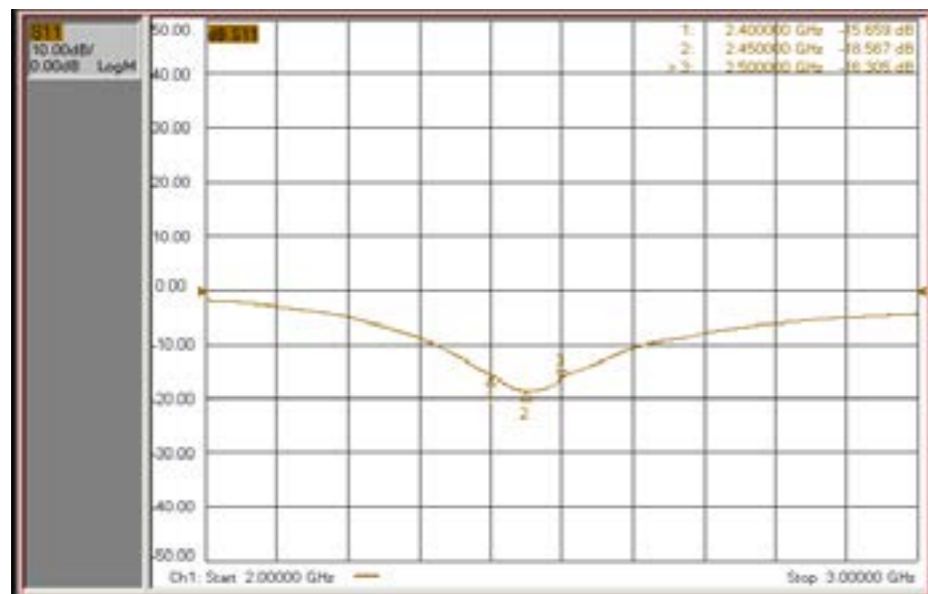


SAMPLE-2

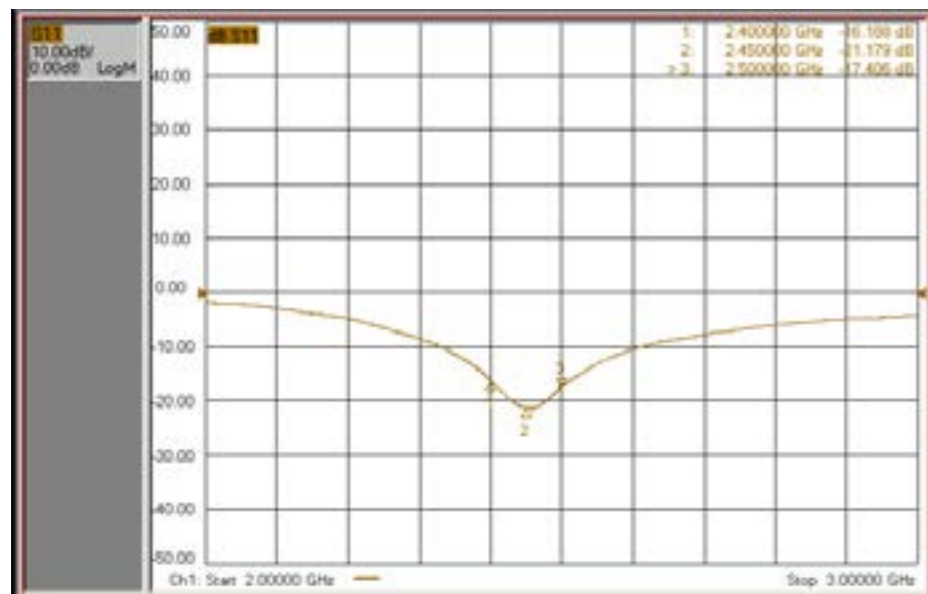


B. RETURN LOSS

Sample	Frequency	2.40GHz	2.45GHz	2.50GHz
1		-15.659	-18.567	-16.305
2		-16.188	-21.179	-17.406



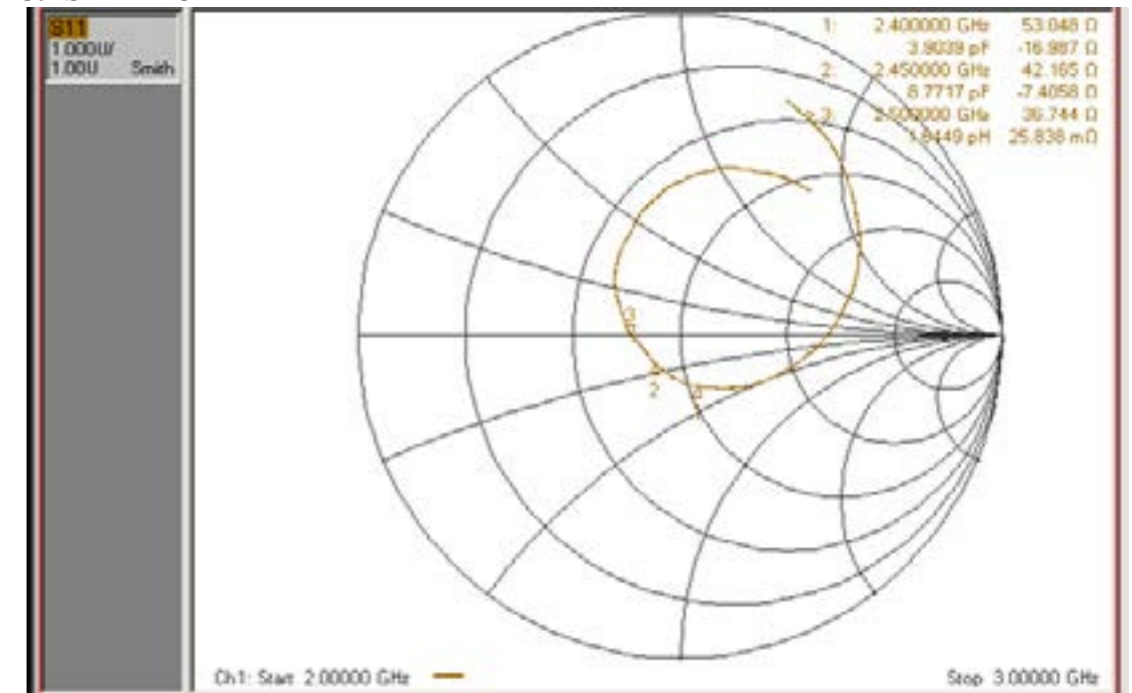
SAMPLE-1



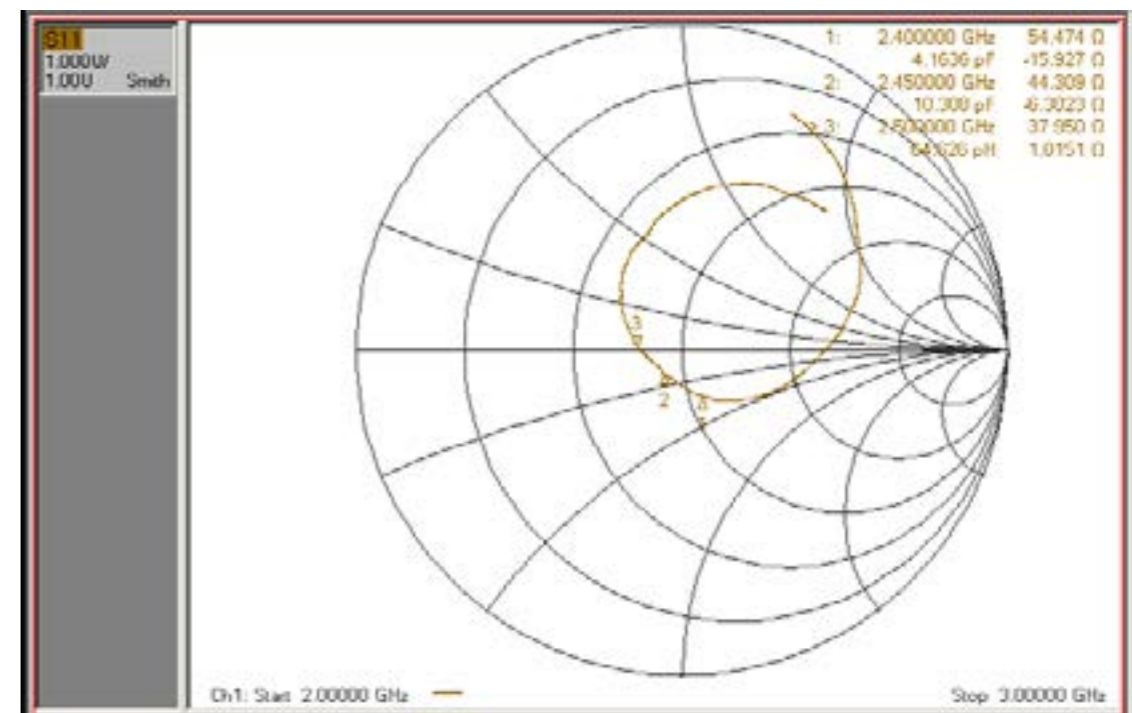
SAMPLE-2



C. SMITH CHART



SAMPLE-1



SAMPLE-2



2. 2D PATTERN

I. Measurement

(a) **Instruments** : anechoic chamber, network analyzer, standard gain antenna.

(b) **chamber description** :

- (1) The anechoic chamber is a far-field measurement system with size of 3.25M*2.84M*6.4M. The quiet zone region is 44cm*44cm*44cm at frequency range of 2.4GHz in the center of the rotator.

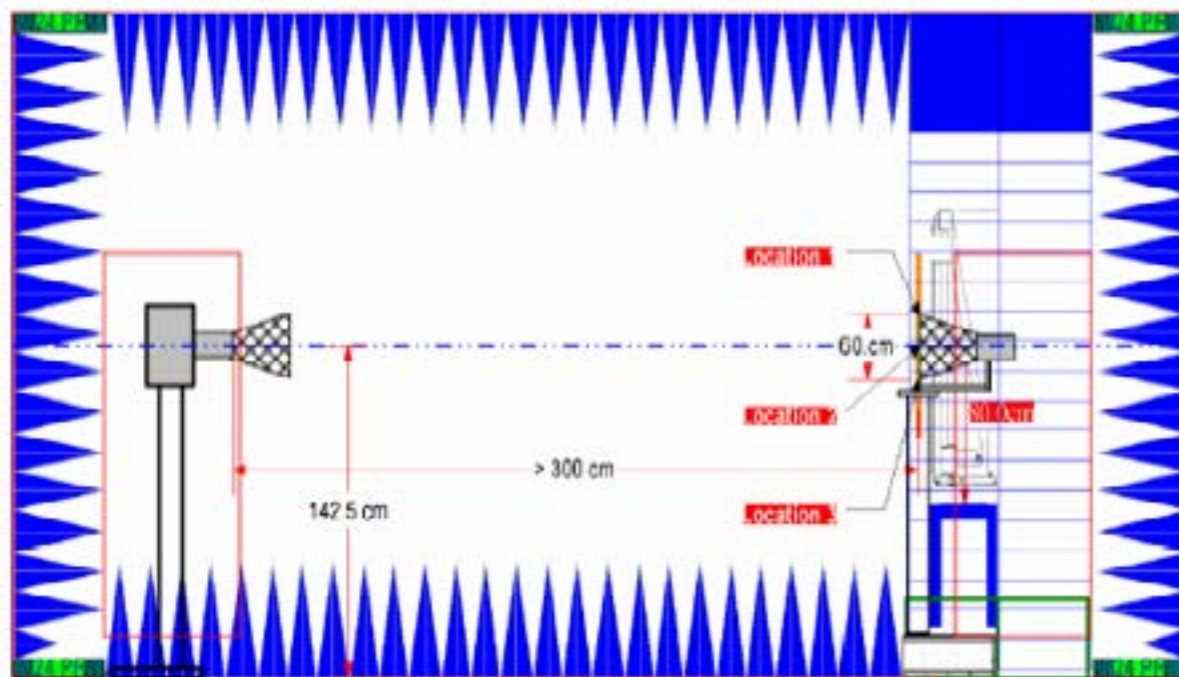


Fig. 2 The interior components of the anechoic.

- (2) Fig. 2. shows the interior components of the anechoic chamber. The antenna standard antenna as probe and antenna under test is 3M. The antenna under test is fixed on a step rotator. We can control the rotating angle for accurate or rough measurement.
- (3) While we measure the radiation patterns by rotating AUT with 360 degrees and repeat again by replacing the AUT with the standard gain antenna under test, we compare both data and using a formula to obtain the

$$G_{AUT} = G_{stand} + P_{AUT} - P_{stand}$$

G_{AUT} : Gain of AUT

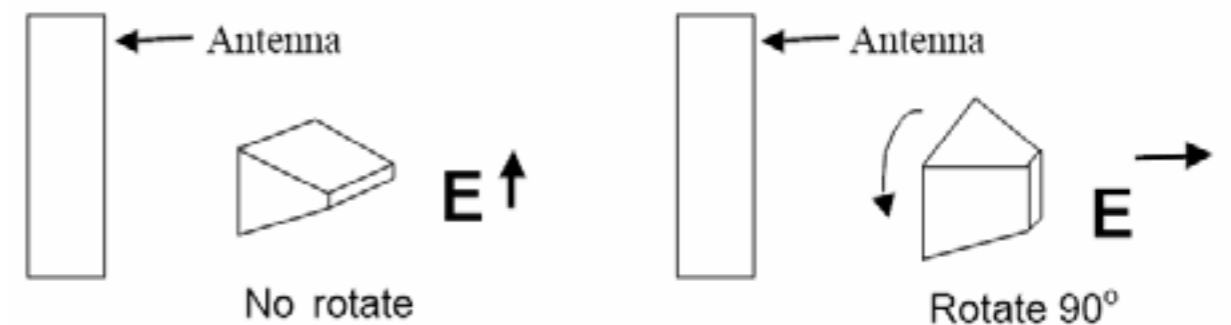
G_{stand} : Gain of Standard Gain Antenna

P_{AUT} : Measured Power of AUT

P_{stand} : Measured Power of Standard Gain Antenna



- (3) Gain of AUT. The standard gain antenna is a gain horn(SG-430 1.7GHz ~ 2.6GHz).
- (4) The planes defined in the Fig. 4 which we want to measure are H(X-Y) , E1(X-Z) and E2(Y-Z) planes. The vertical or horizontal polarization's power is measured by rotating the antenna probe to 0 degree or to 90 degree shown in Fig. 3, respectively. While we combine both vertical and horizontal power, we obtain total power.
- (5) From the total power in three basic planes(H, and E), we can analyze the performance of the antenna is good or not.



(a) Antenna Probe at 0 degree as a vertical polarization.

(b) Antenna Probe at 90 degree as a horizontal polarization.

Fig. 3. The definition of vertical and horizontal polarization.

(c) Plane definition :

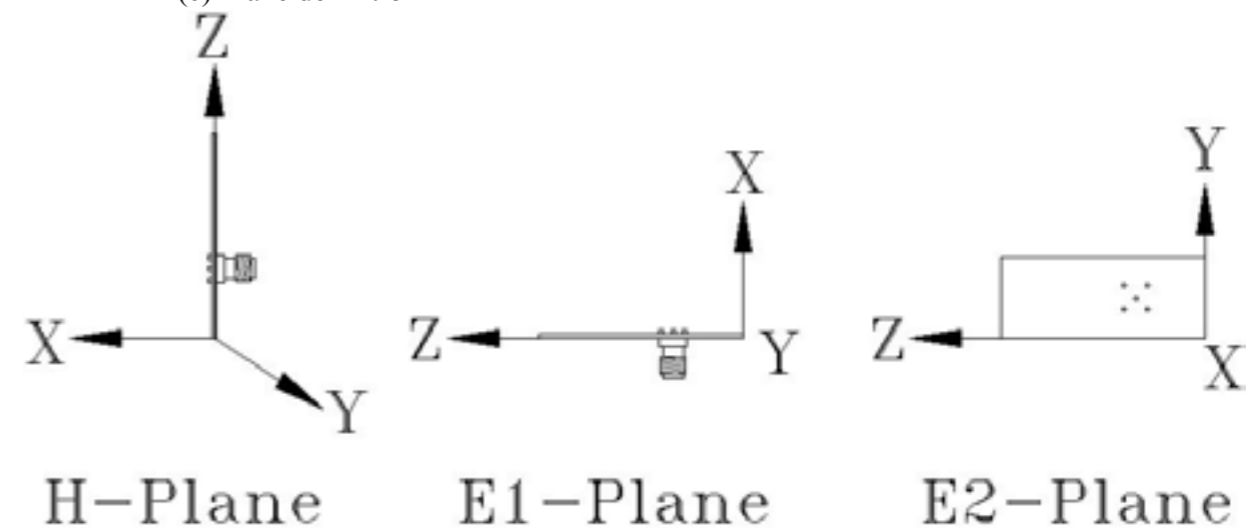


Fig. 4. The plane definition : H-Plane , E1-Plane and E2-Plane.



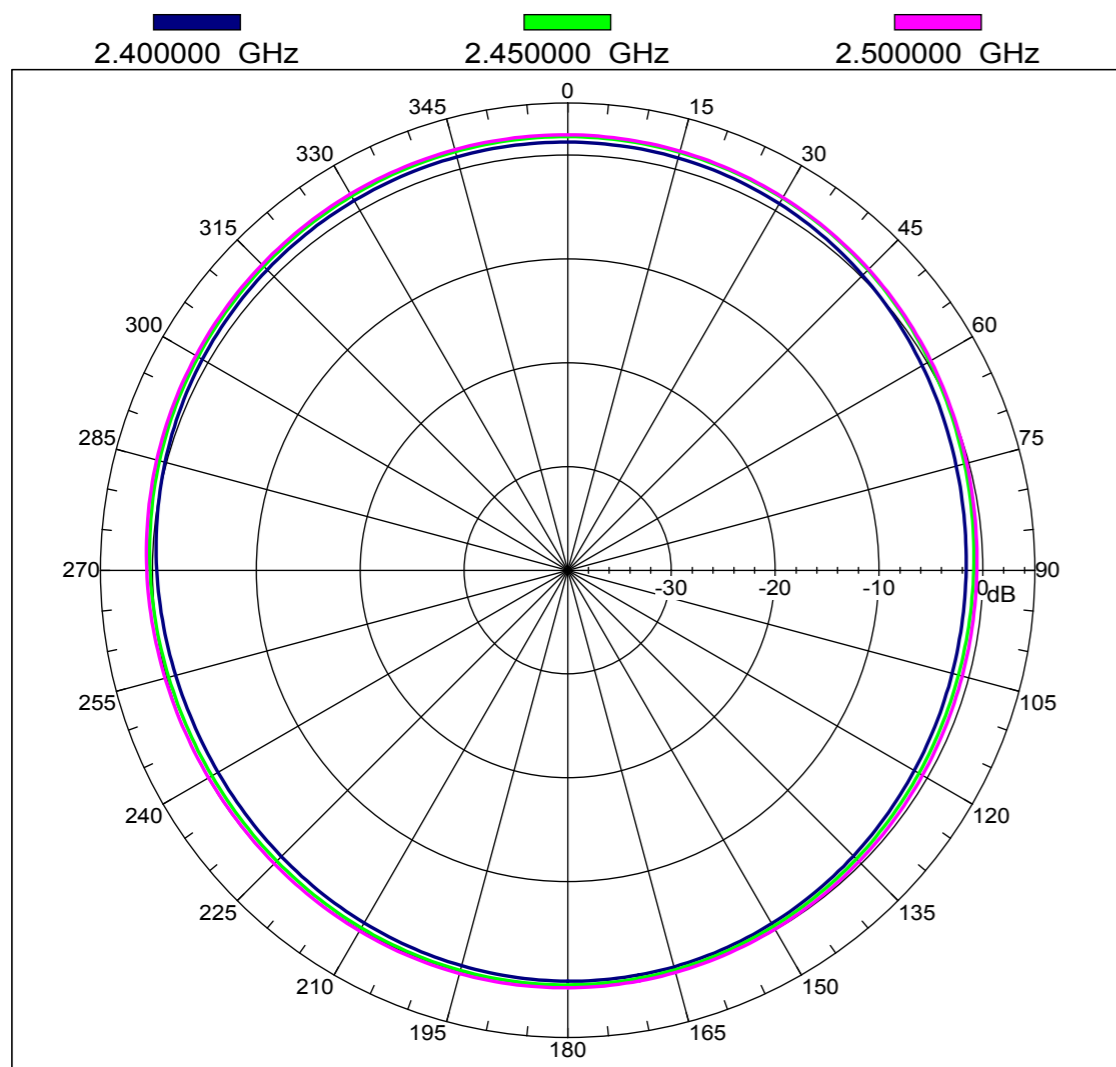
II. Test Value :

A. Sample-1

(1) H-Plane

Frequency	2.40GHz	2.45GHz	2.50GHz
Gain (dBi)			
Peak	1.23878	1.76309	1.94786
Avg.	0.236	0.324	0.583

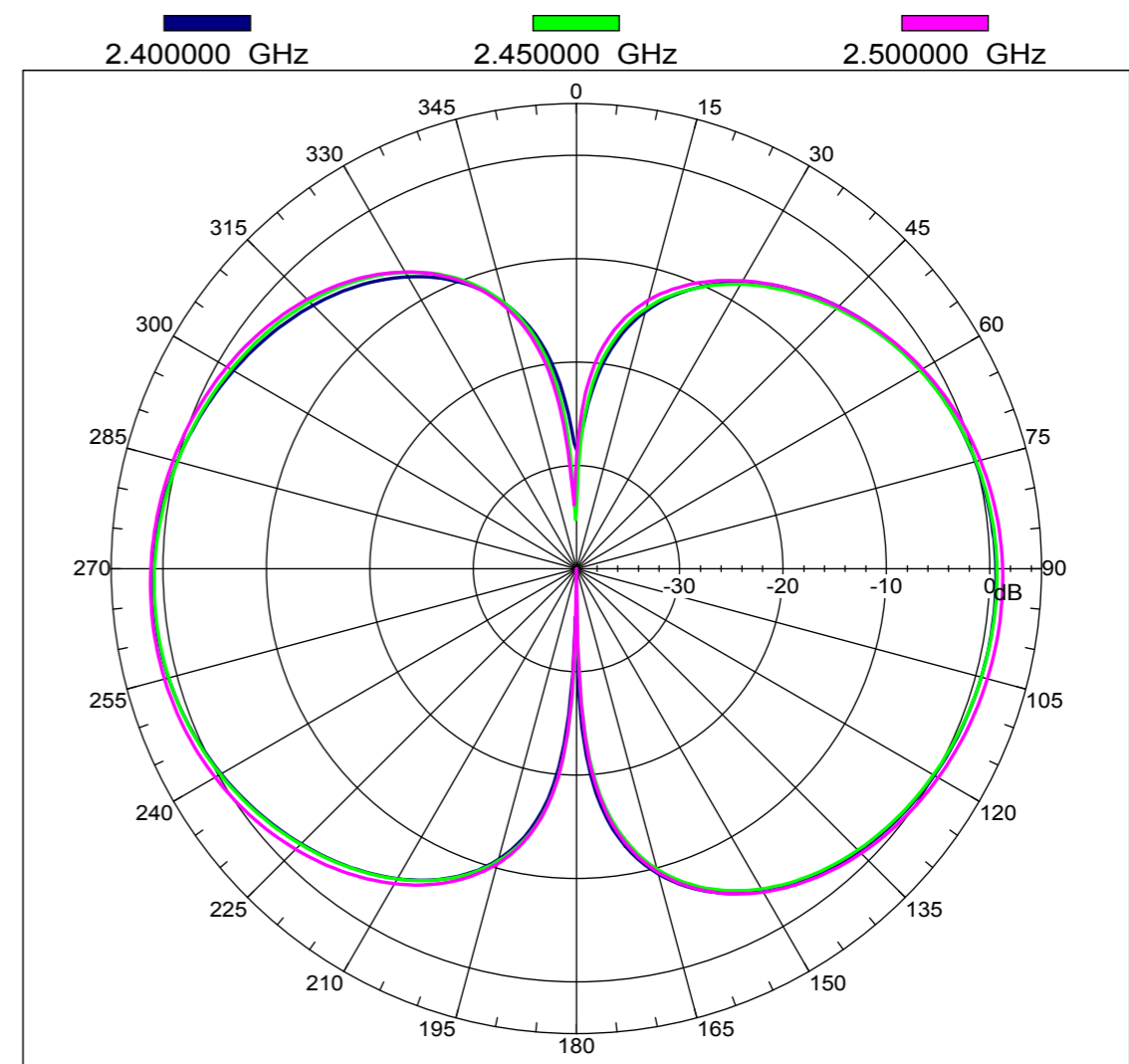
Far-field amplitude of A04 LTCC Chip Antenna H-Plane.nsi



(2) E1-Plane

Frequency	2.40GHz	2.45GHz	2.50GHz
Gain (dBi)			
Peak	1.02541	0.93877	1.31626
Avg.	-3.539	-3.537	-3.104

Far-field amplitude of A04 LTCC Chip Antenna E1-Plane.nsi

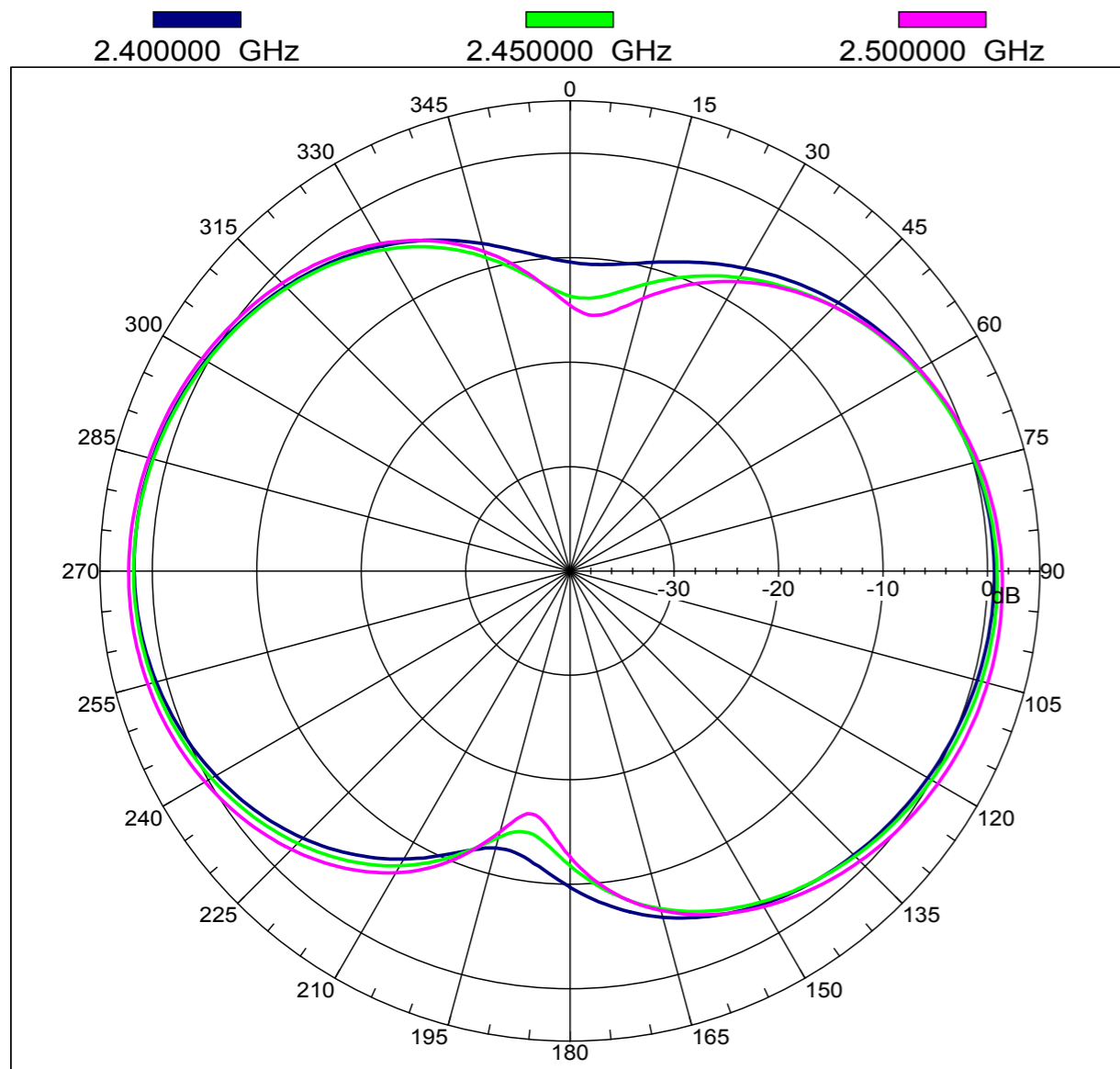




(3) E2-Plane

Frequency	2.40GHz	2.45GHz	2.50GHz
Gain (dBi)			
Peak	1.73482	1.77531	2.2492
Avg.	-2.653	-2.772	-2.345

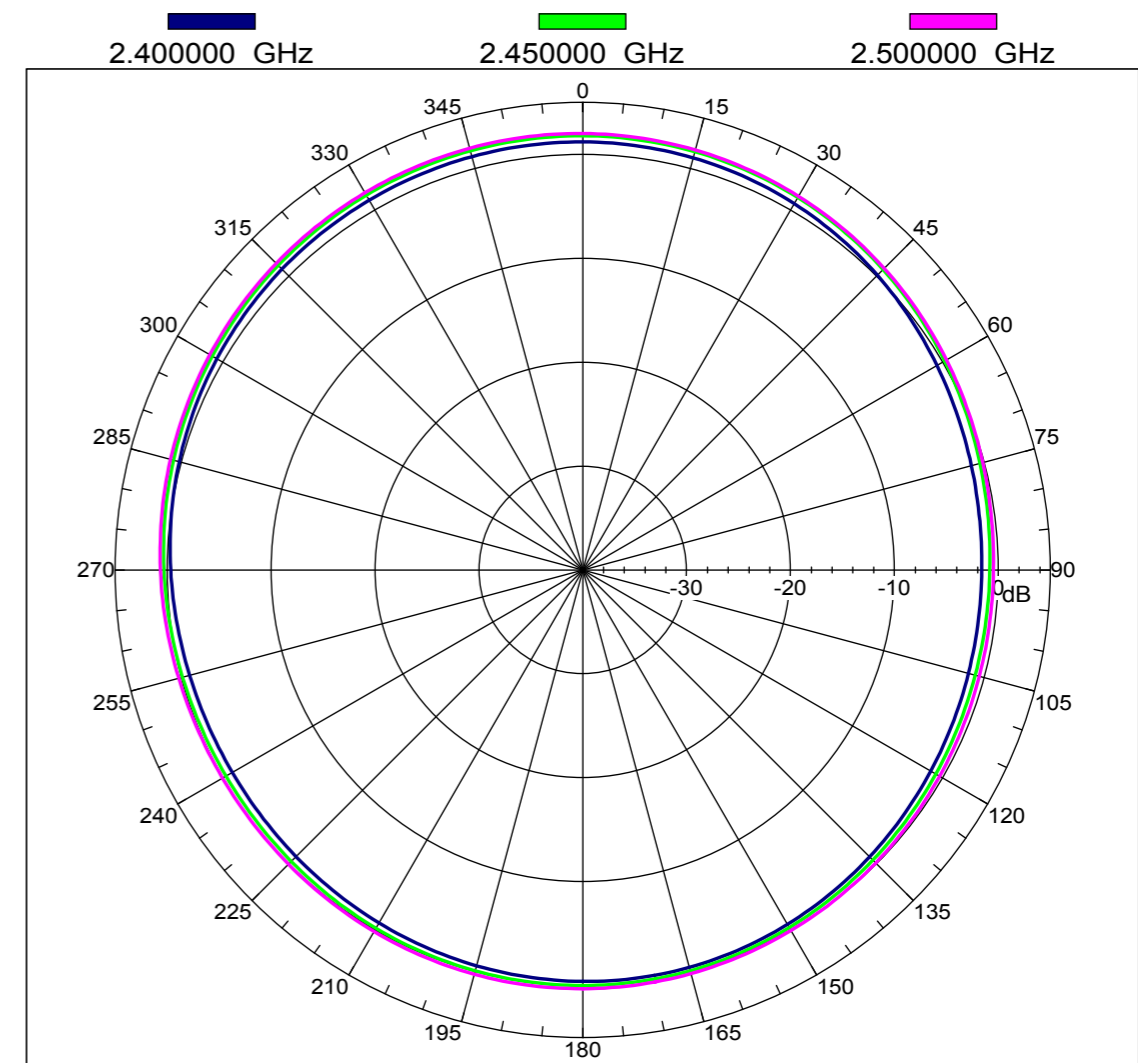
Far-field amplitude of A04 LTCC Chip Antenna E2-Plane.nsi



B. Sample-2
(1) H-Plane

Frequency	2.40GHz	2.45GHz	2.50GHz
Gain (dBi)			
Peak	1.18998	1.77512	2.01254
Avg.	-0.219	0.380	0.677

Far-field amplitude of A04 LTCC Chip Antenna H-Plane.nsi

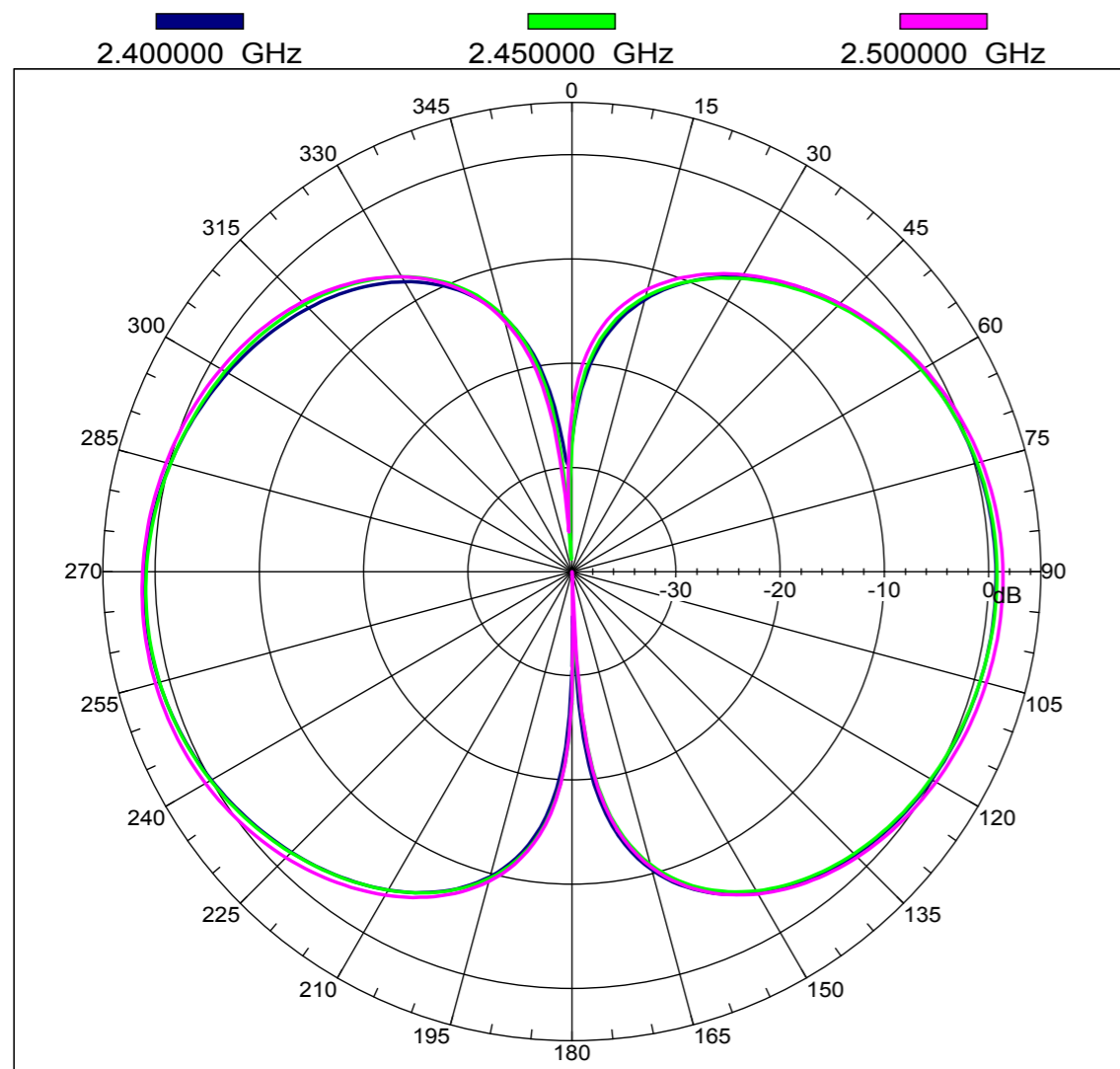




(2) E1-Plane

Frequency Gain (dBi)	2.40GHz	2.45GHz	2.50GHz
Peak	1.10138	1.023	1.40474
Avg.	-3.465	-3.454	-3.013

Far-field amplitude of A04 LTCC Chip Antenna E1-Plane.nsi



(3) E2-Plane

Frequency Gain (dBi)	2.40GHz	2.45GHz	2.50GHz
Peak	1.80321	1.87149	2.3496
Avg.	-2.612	-2.703	-2.275

Far-field amplitude of A04 LTCC Chip Antenna E2-Plane.nsi

