規格承認書

Specification for Approval

客　戶：
Customer

品　名：　A04 LTCC ANTENNA
Part name

料　號：　GPL52P245000-00
Part No.

客戶承認印　CUSTOMER APPROVED BY		
APPROVAL	CHIEF	SUPERVISOR
Approval No.		
Model		
Part No.		

CHIEF	SALES	R&D	DESIGN
Jeff	James	GWP	Hui
Date: 2009.11.13		Date: 2009.11.13	

驊 原 科 技 股 份 有 限 公 司

WIESON INTERNATIONAL CO., LTD.

WIESON INTERNATIONAL CO., LTD.	SPECIFICATION LIST	TYPE OF PRODUCT
		LTCC Antenna

INDEX

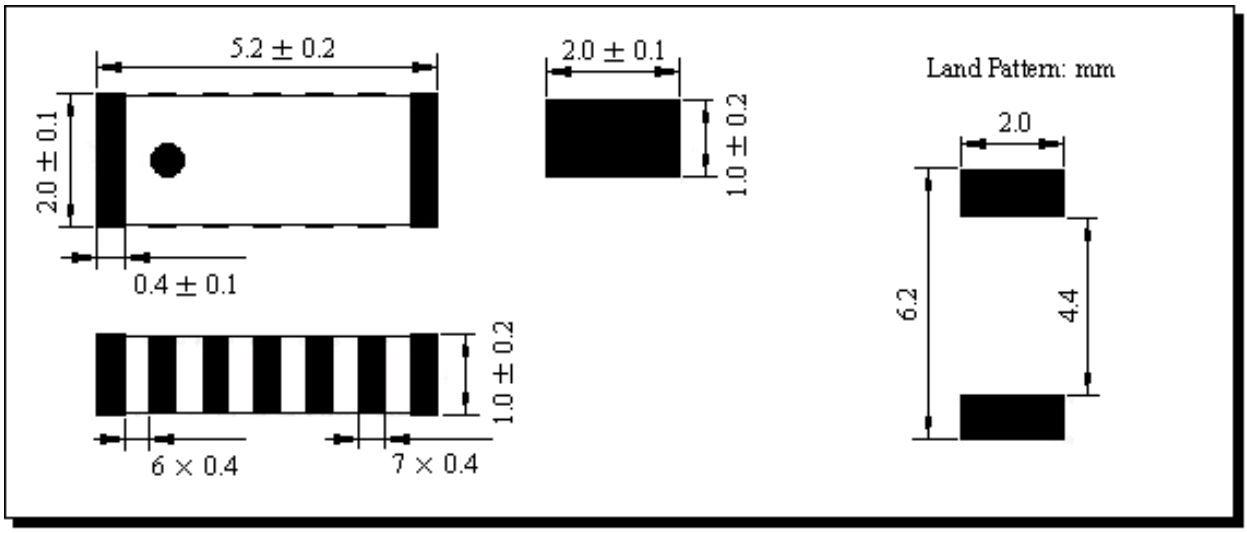
				Approvals	
Rev	Date	Description	Edited by	Prepared	Hui
01	2009.11.13	NEW RELEASE	Hui	Checked	GWP
				Approved	Jeff
				Issued No	1.0
				Sheet	**2 OF 23**

一. 概述 Introduction

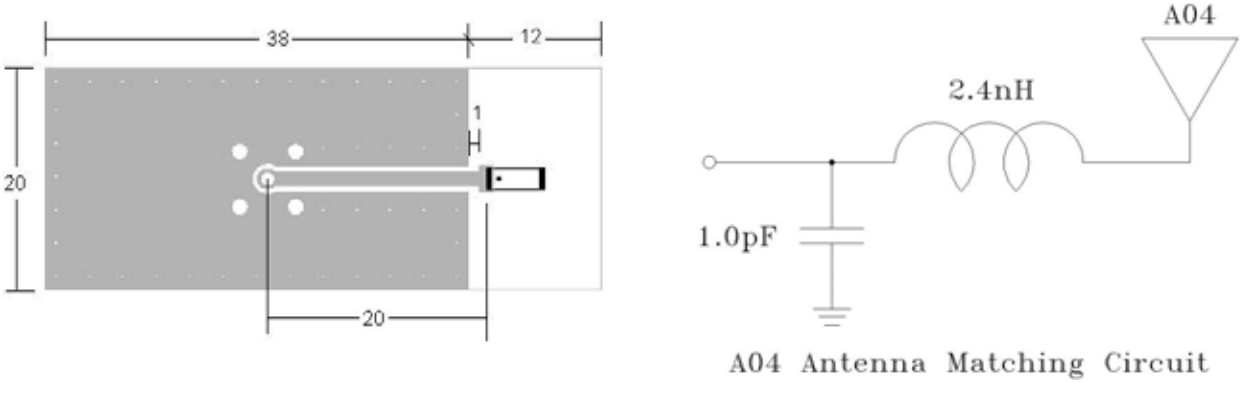
"驊原"微波多層片狀陶瓷天線 GPL 系列產品用於無線區域網路、藍芽天線、手機多頻天線、GPS 等小體積貼版式設計。

"WIESON" microwave multi-layer chip ceramic antenna GPL series are designed to be used in WLAN, Bluetooth, multiple-band mobile phone antenna, GPS, etc and compact size SMD chip design.

二. 外型尺寸 Dimensions



三. 測試電路 Evaluation Board

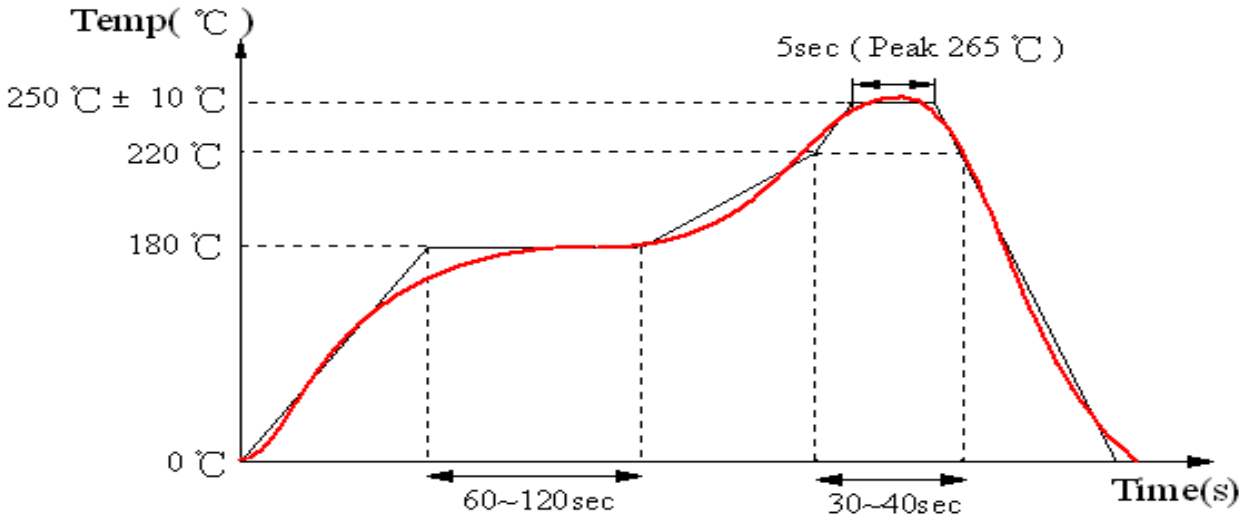


四. 電氣特性Electrical Characteristics

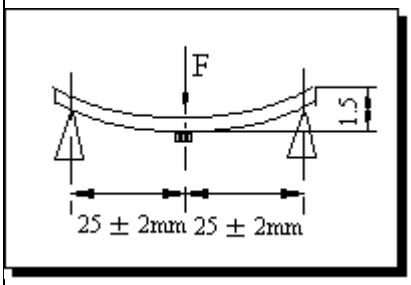
項目	Item	特性	Specification
中心頻率	Center Frequency	2450 ± 25 MHz	
頻寬	Bandwidth	>150MHz	
增益	Gain	1.5 dBi Typical	
電壓駐波比	VSWR	2.0 MAX.	
極化方式	Polarization	線性	Linear
方位角	Azimuth Beam width	全向性	Omni-directional
阻抗	Impedance	50 Ohm	

※本天線在應用 PCB 上通過設計匹配電路，將天線工作頻率調整到 2.45GHz 的中心頻率。

五. 回流焊溫度Reflow Soldering Standard Condition



六. 環境測試Environmental Test

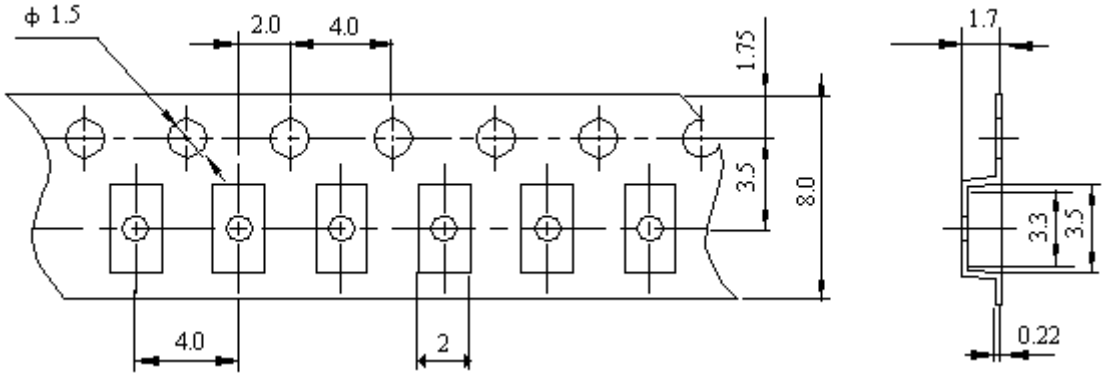
測試項目 Item		測試條件 Requirement
振動	Vibration Resist	在振動頻率爲 10~55Hz 振幅爲 1.5mm 沿 X,Y,Z 方向各振動 2 小時
落摔	Drop Shock	在 100CM 高度處按 X,Y,Z 三個面分別自由落下在木質地板上共 3 次
焊接耐熱	Solder Heat Proof	能承受經 120~150℃的溫度預熱 120 秒後，在 230℃+10℃的焊錫浸 5±0.5 秒。
結合力	Tensile Strength of Terminal	在產品電極端上或表面上能承受 1 公斤拉力 10±1 秒。
耐彎曲	Bending Resist Test	 將產品按圖焊在 1.6±0.2mm 的 PCB 中間，由箭頭方向施力：1mm/s，彎曲距離：1.5mm，保持 5±1 秒，產品金屬無脫落。
耐濕熱	Moisture Proof	在溫度爲 60±2℃，相對濕度 90~95%的恆溫恆濕機器中放置 96 小時，在常溫中恢復 1~2 小時。
高溫	High Temperature Endurance	在溫度爲 85±5℃的恆溫箱中放置 24±2 小時，在常溫中恢復 1~2 小時。
低溫	Low Temperature Endurance	在溫度爲-40±5℃的恆溫箱中放置 24±2 小時，在常溫中恢復 1~2 小時。
冷熱衝擊	Temperature Cycle Test	在-25℃中保持 30 分鐘，在+85℃中保持 30 分鐘，共循環 5 次後在常溫中恢復 1~2 小時。

基礎條件

項目	Item	條件 Requirement
溫度範圍	Temperature range	25±5℃
相對濕度範圍	Relative Humidity range	55~75%RH
工作溫度	Operating Temperature range	-40℃~+85℃
儲存溫度	Storage Temperature range	-40℃~+85℃

七.包裝 Packaging

1. Plastic Tape

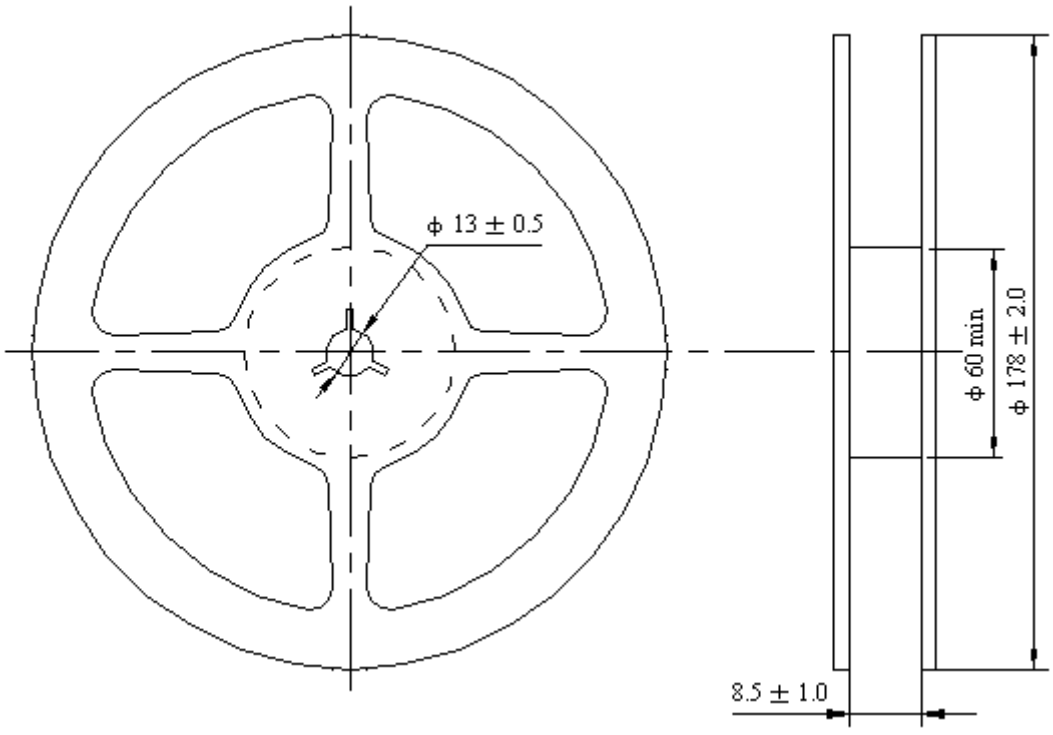


Remarks for Package：

Reserve a length of 150~200mm for the trailer of the carrier and 250~300 mm for the leader of the carrier and further 250mm of cover tape at the leading part of the carrier.

2. Reel

(3000 pcs/Reel)



八. 測試報告 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.

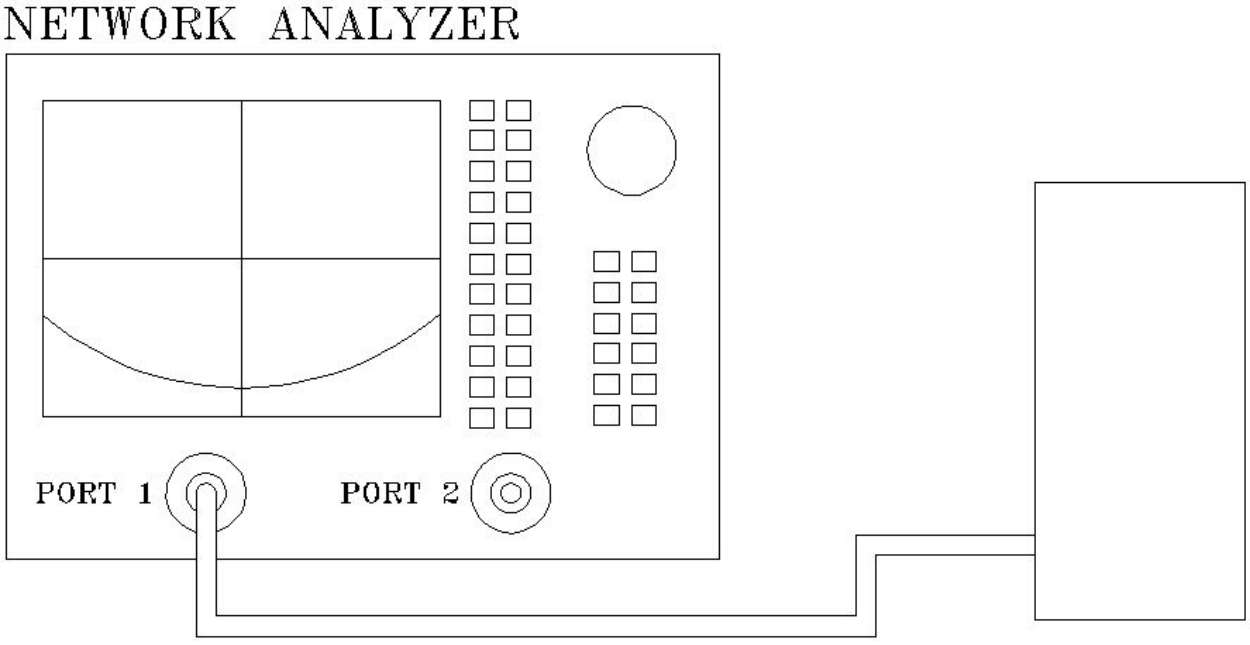
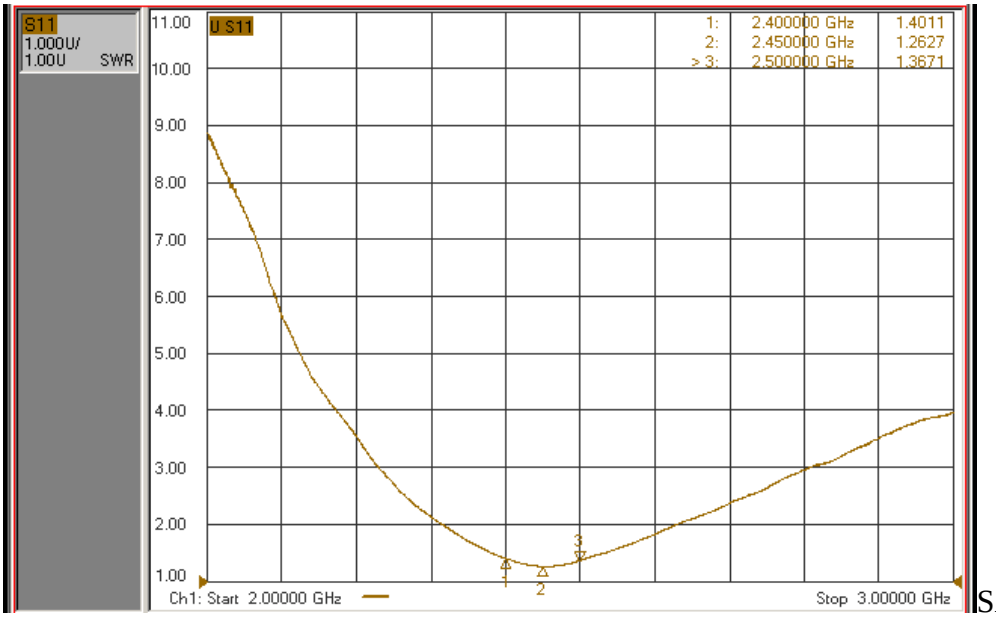


Fig. 1 LTCC antenna measured in Network Analyzer.

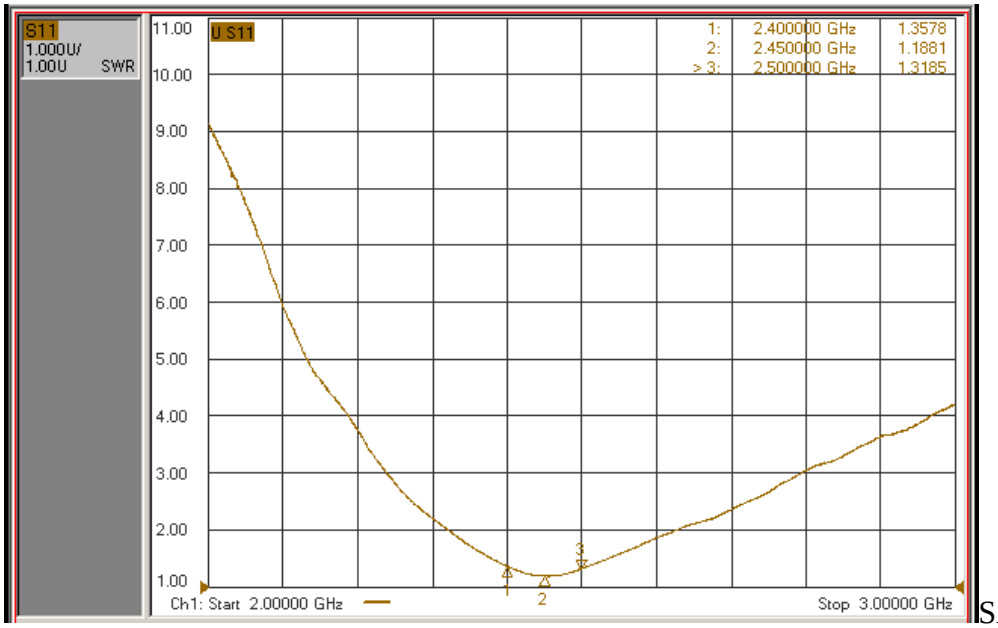
II. Test Value：

A. VSWR

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



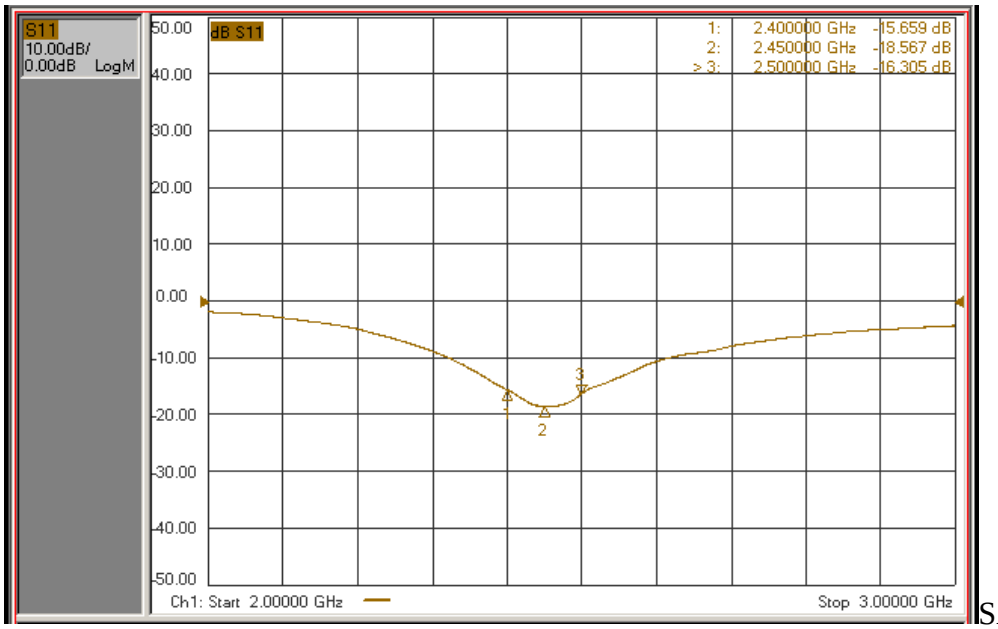
SAMLE-1



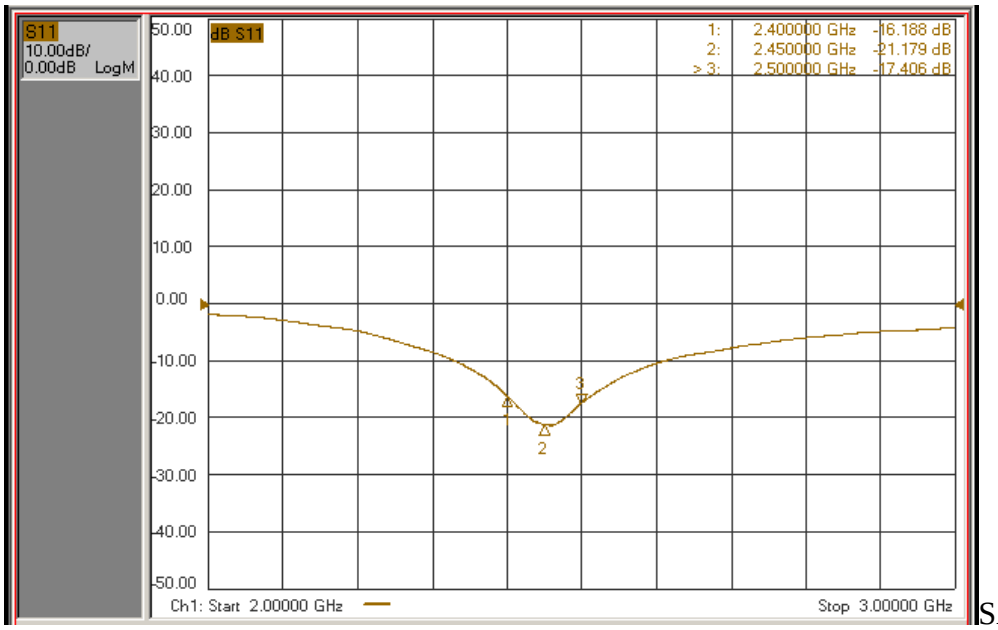
SAMPLE-2

B. RETURN LOSS

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

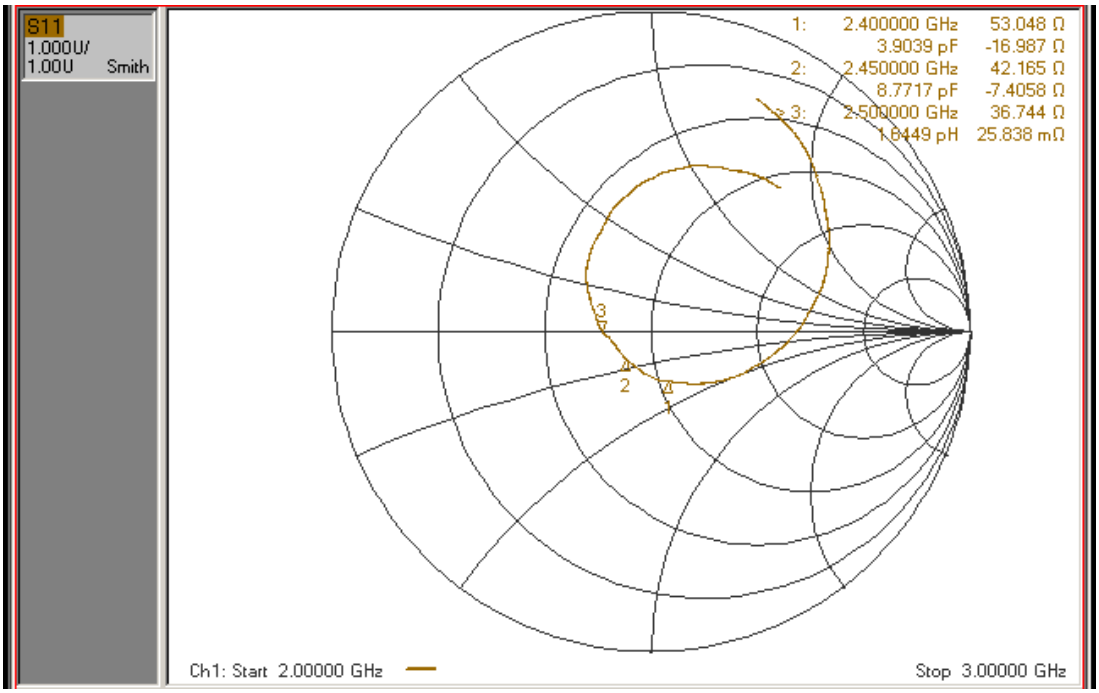


SAMPLE-1

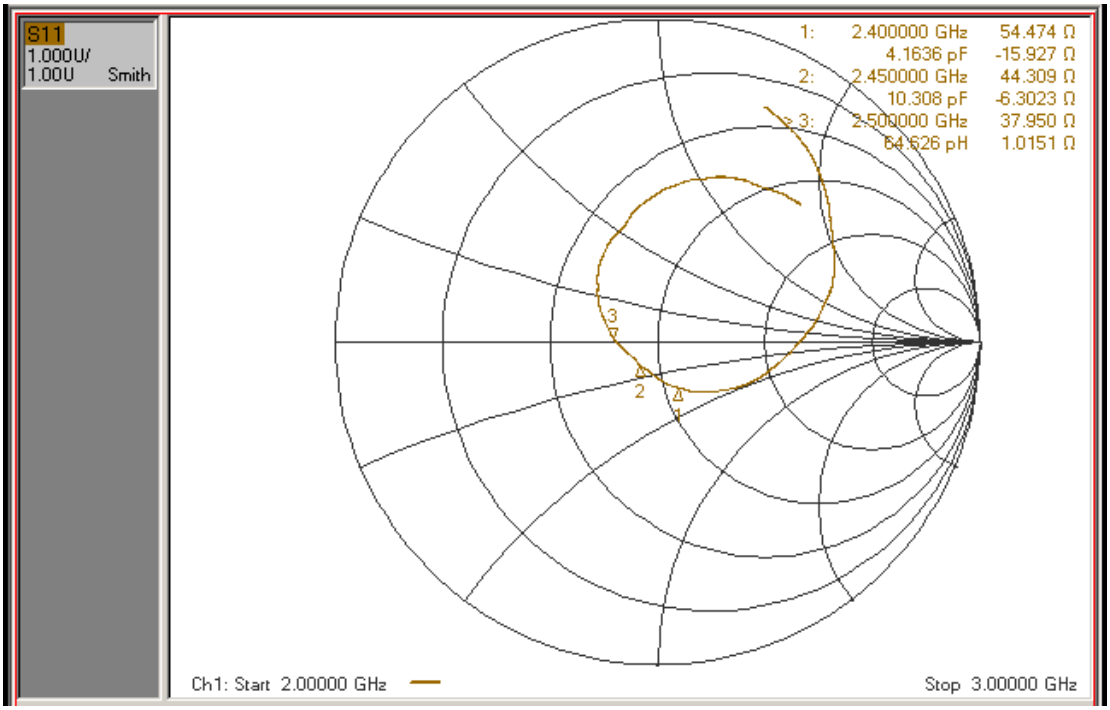


SAMPLE-2

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.

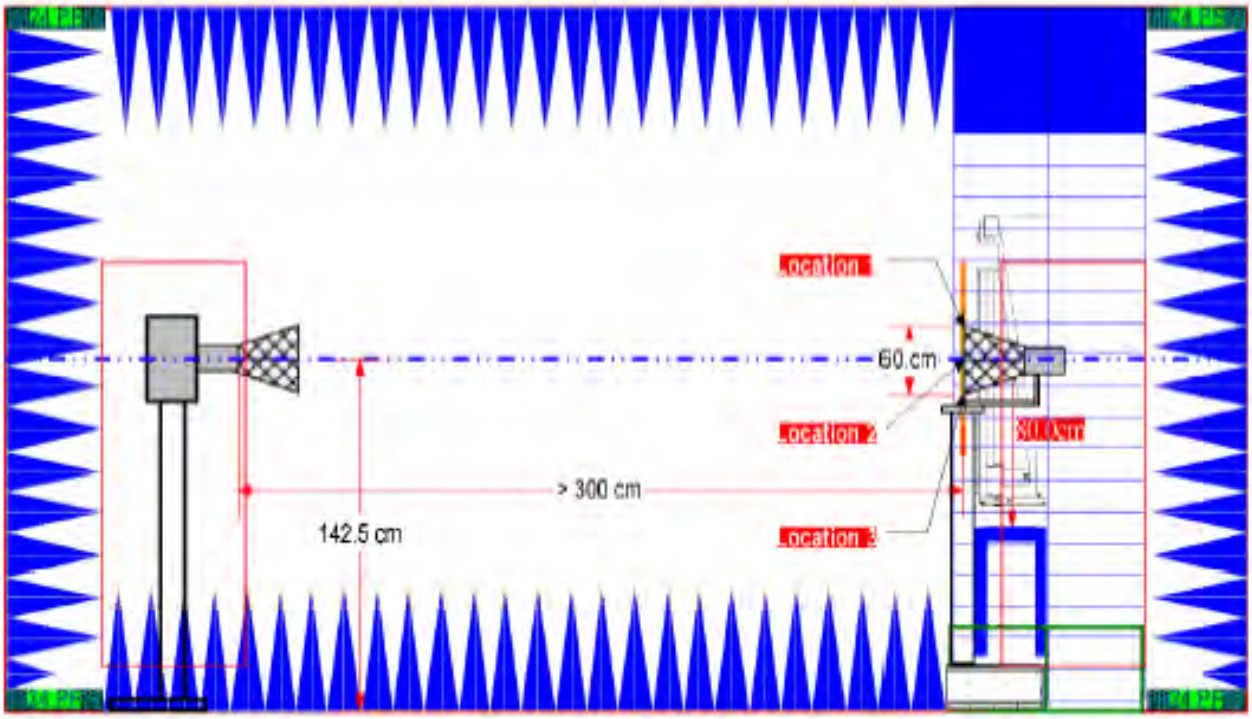


Fig. 2 The interior components of the anechoic.

(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

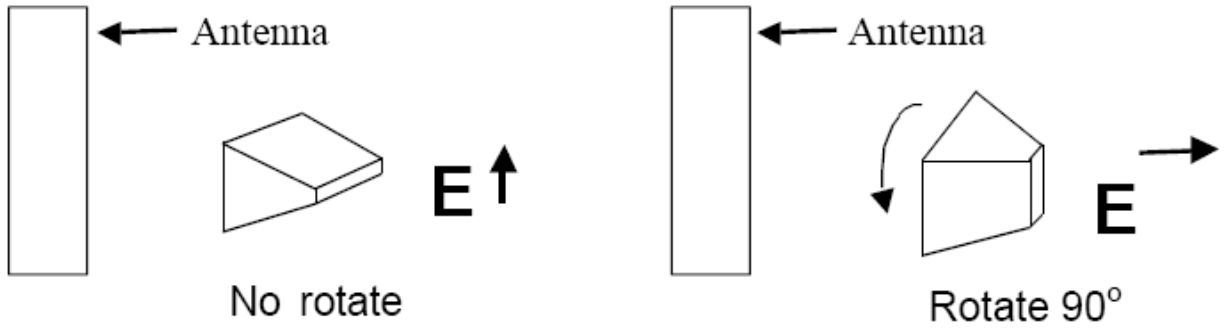
P_{AUT}：Measured Power of AUT

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：

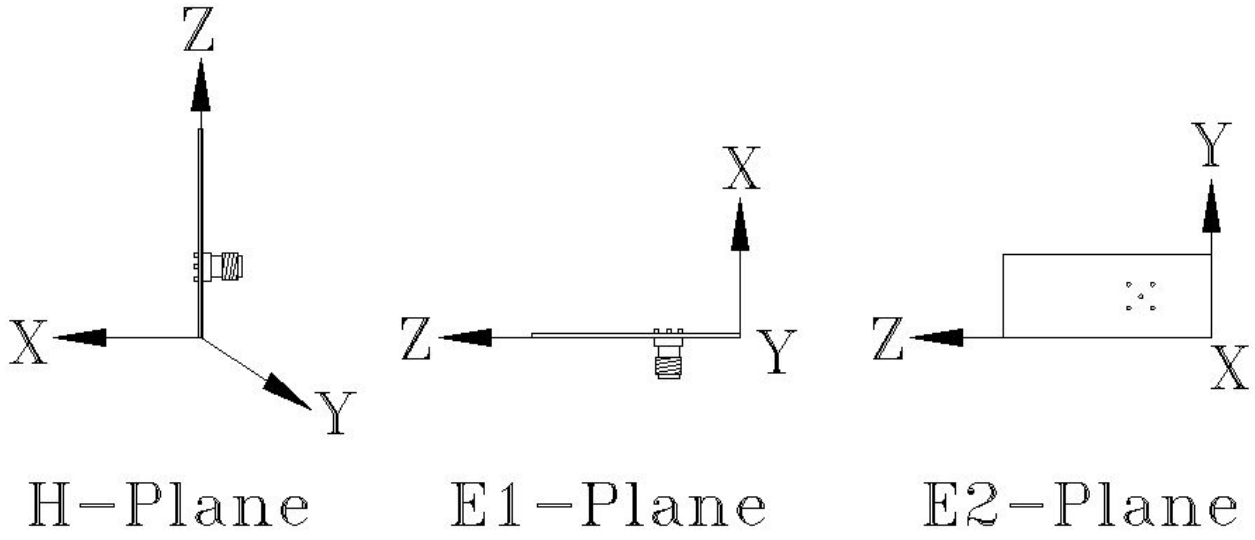


Fig. 4. The plane definition：H-Plane , E1-Plane and E2-Plane.

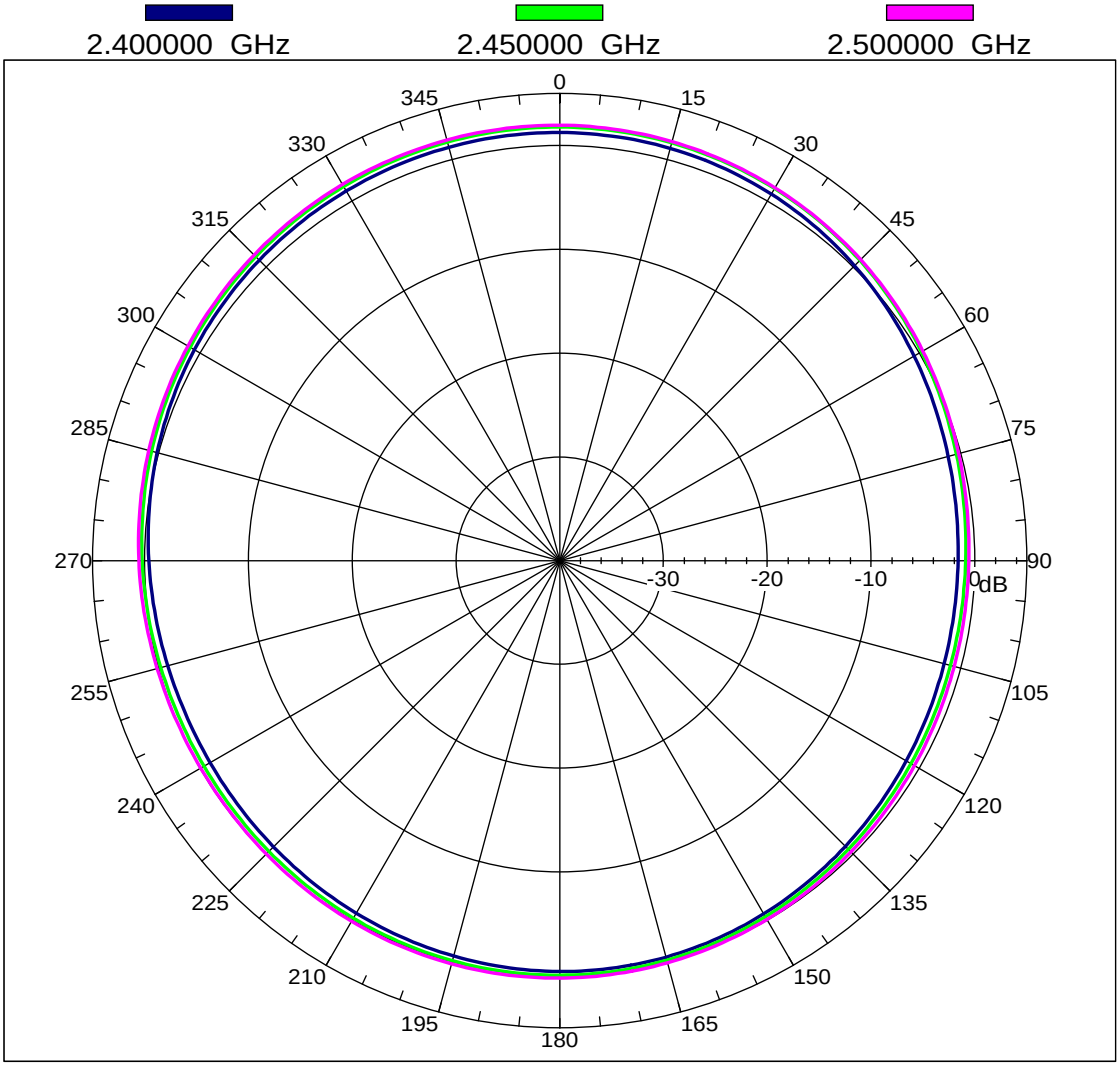
Ⅱ. Test Value：

A. Sample-1

（1）H-Plane

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

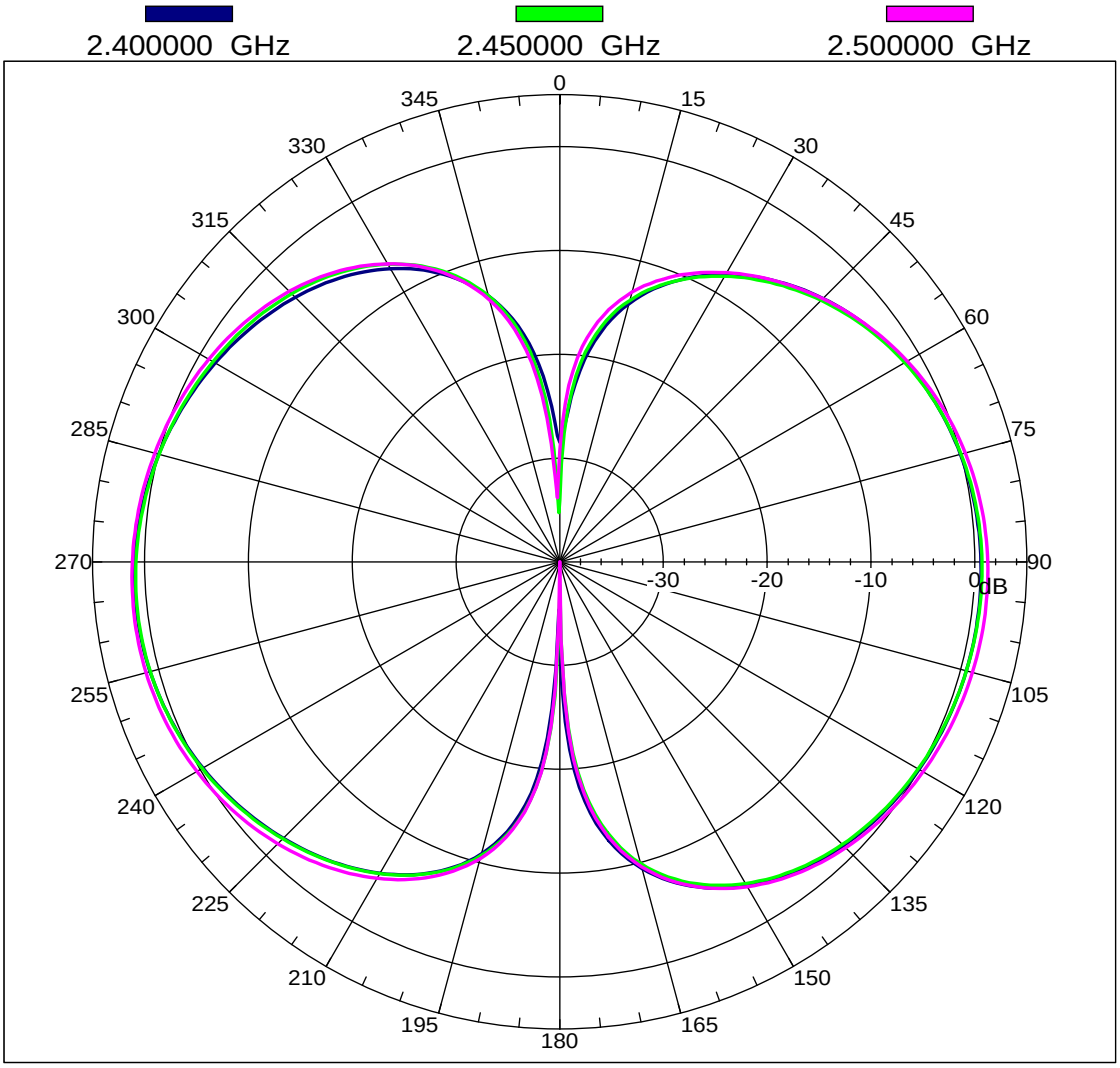
Far-field amplitude of A04 LTCC Chip Antenna H-Plane.nsi



（2）E1-Plane

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

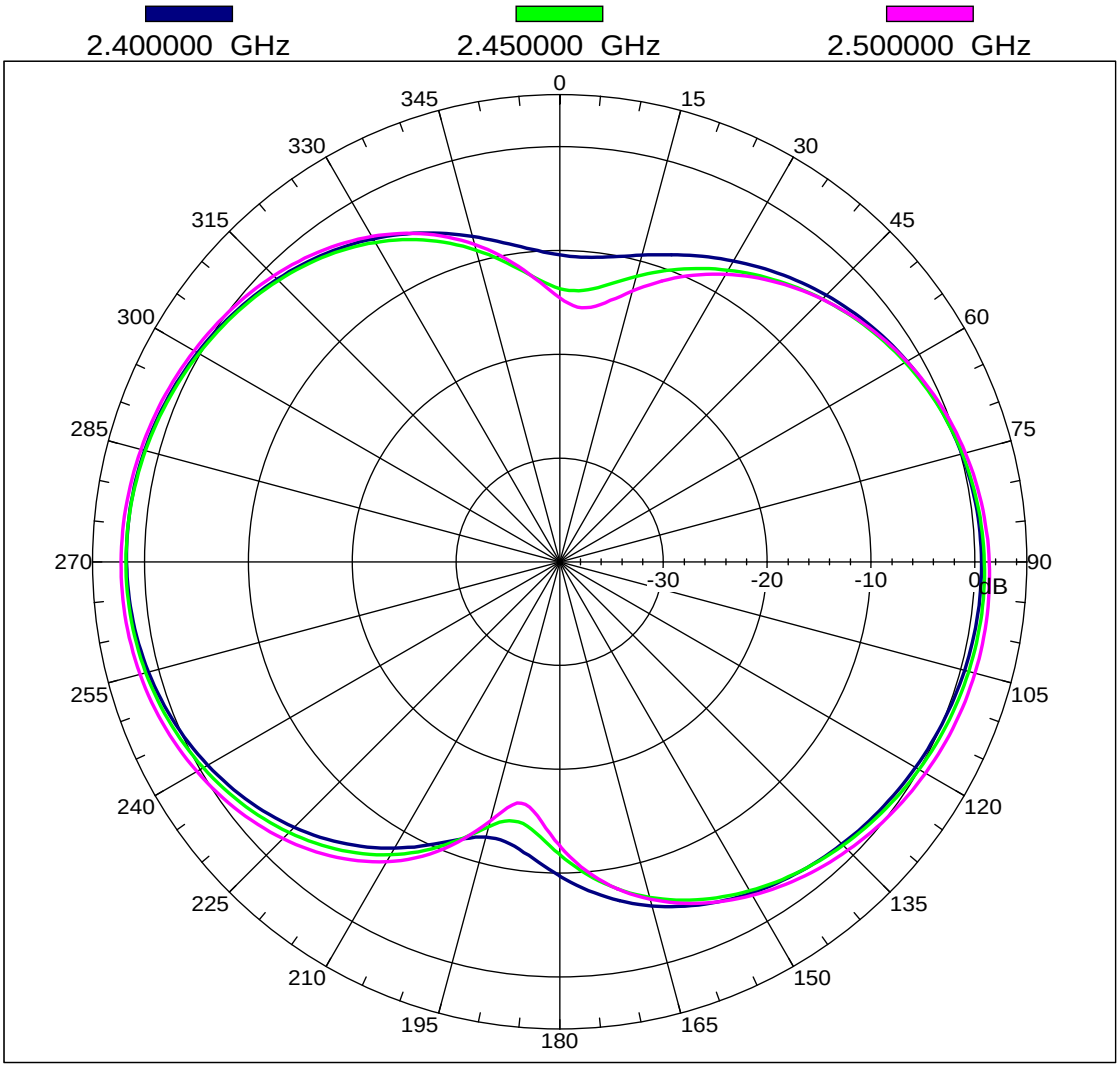
Far-field amplitude of A04 LTCC Chip Antenna E1-Plane.nsi



（3）E2-Plane

Frequency / Gain（dBi）	2.40GHz	2.45GHz	2.50GHz
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

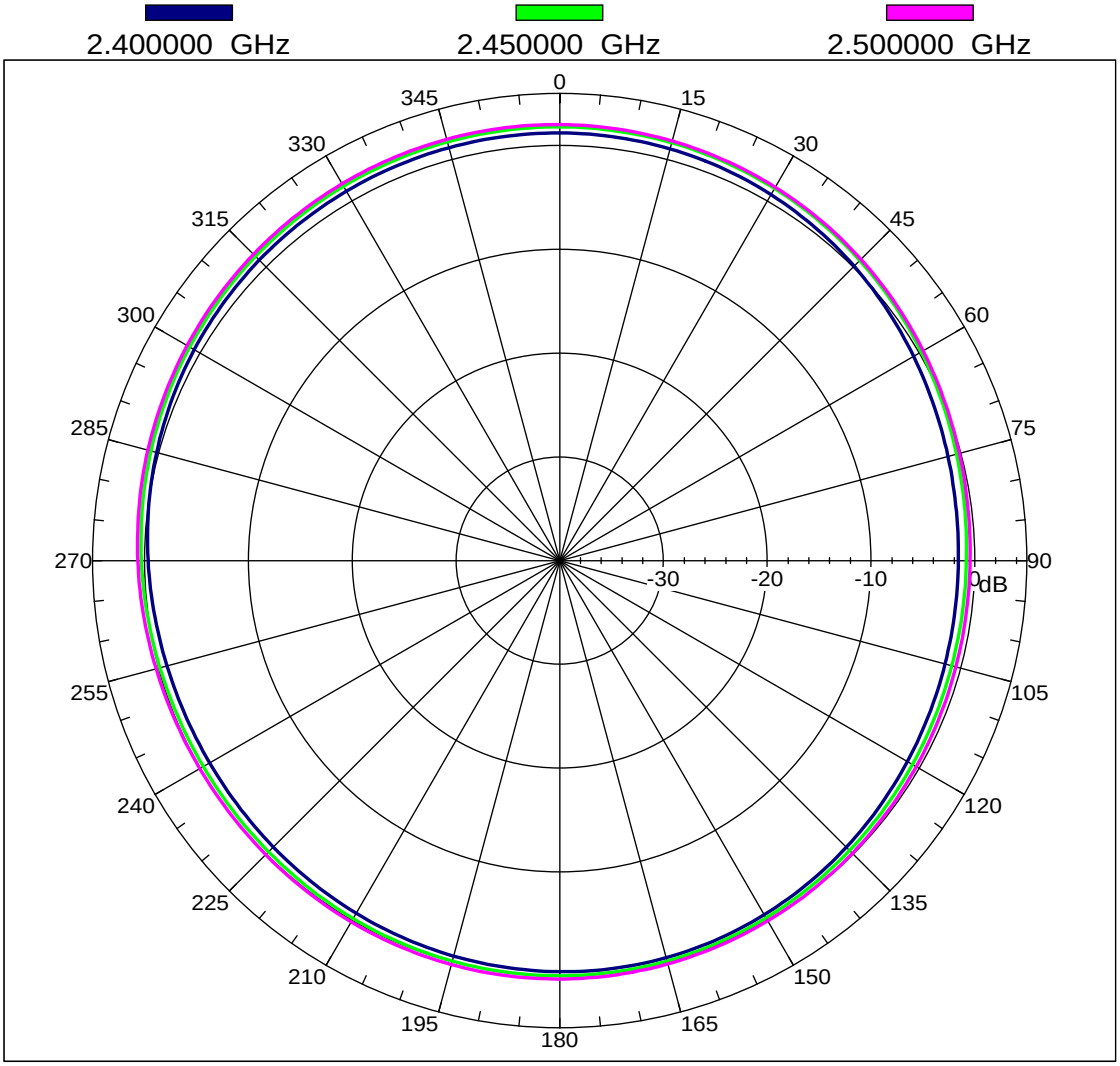


B. Sample-2

（1）H-Plane

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

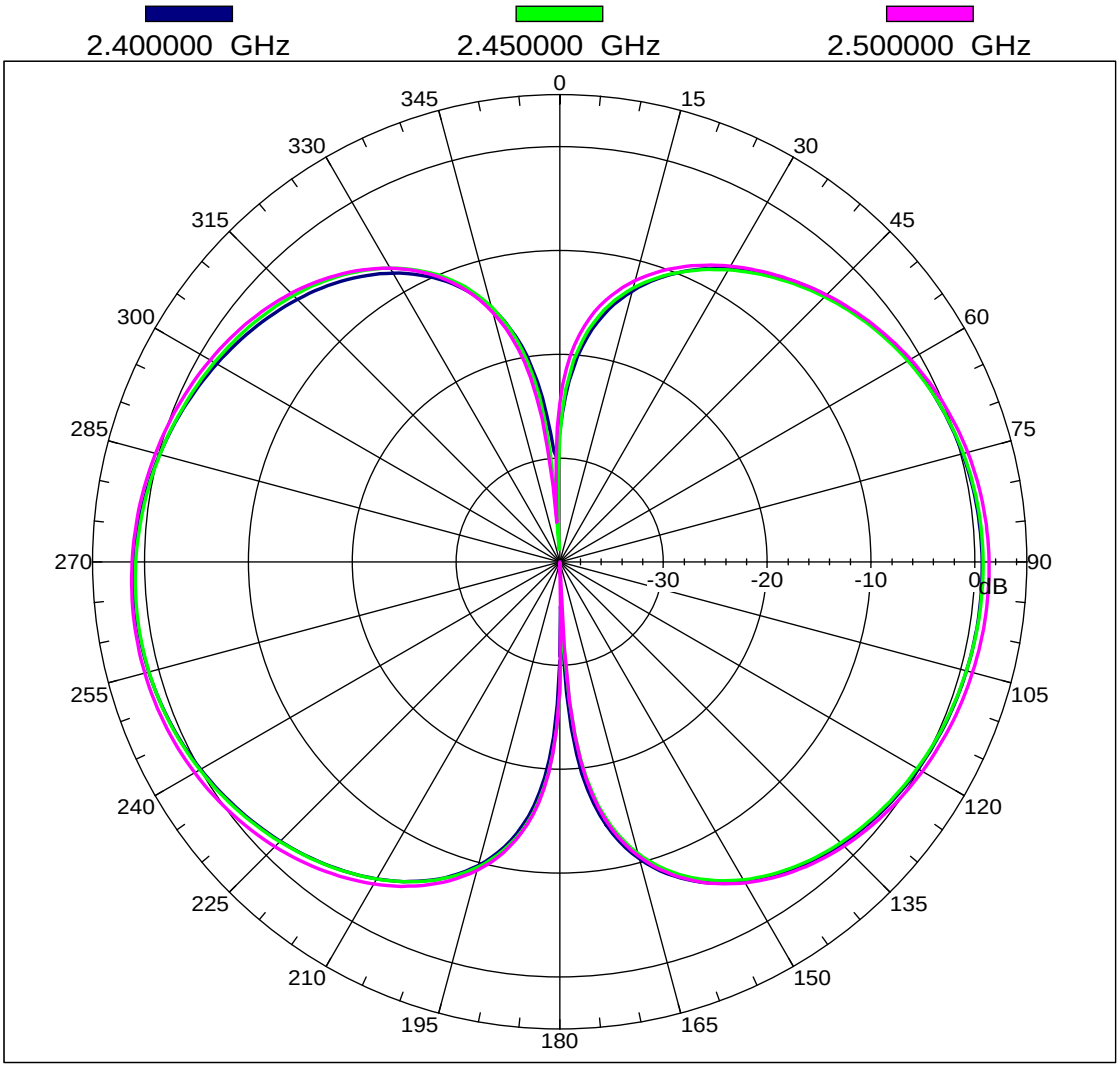
Far-field amplitude of A04 LTCC Chip Antenna H-Plane.nsi



（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

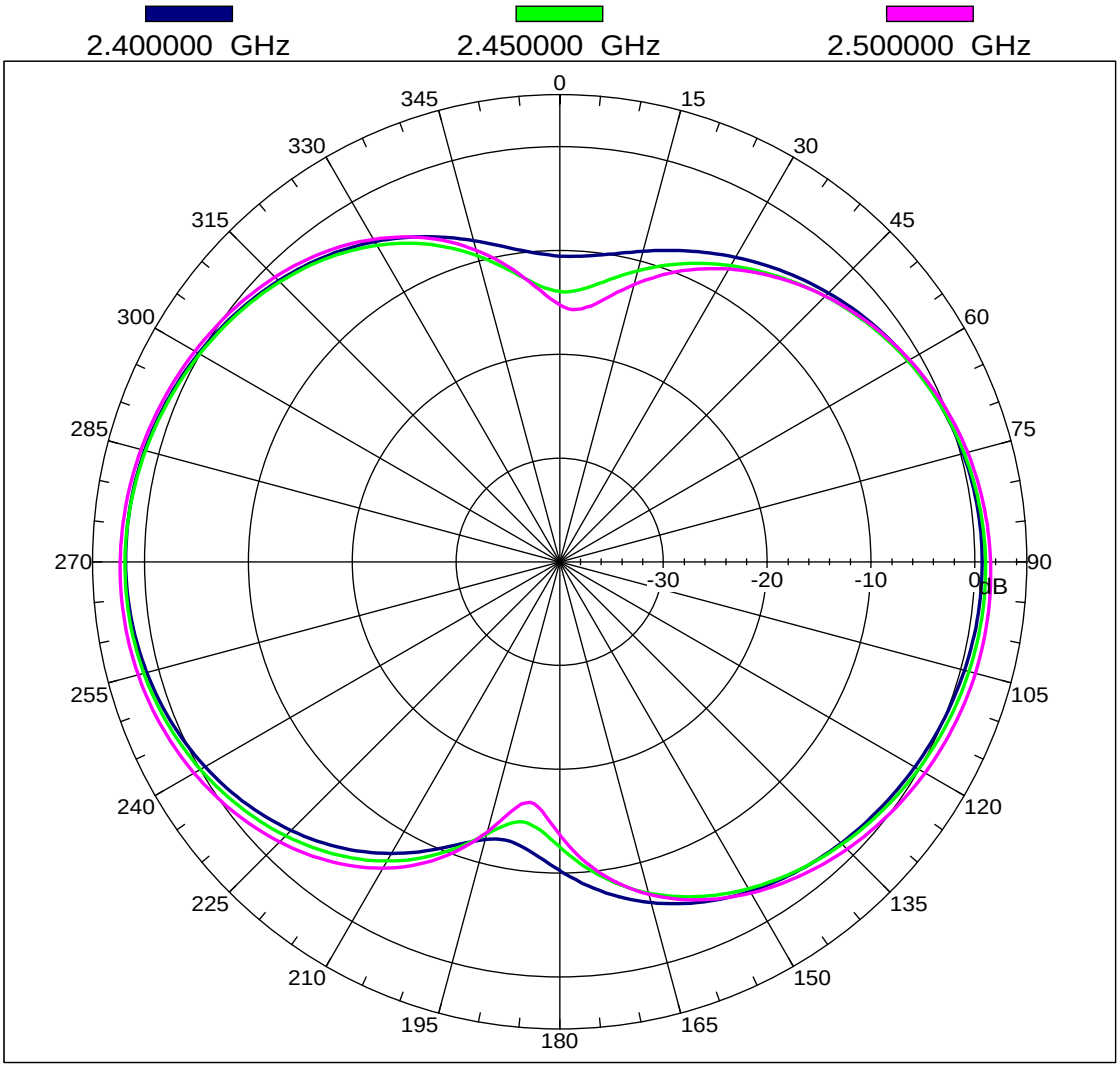
Far-field amplitude of A04 LTCC Chip Antenna E1-Plane.nsi



（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



TEST REPORT NUMBER: SZHH0038564301

APPLICANT: JIAXING JIALI ELECTRIC CO., LTD
NO.1 ZHENGYUAN ROAD IN TANGHUI
INDUSTRIAL GARDEN, JIAXING,
ZHEJIANG PROVINCE

ATTN: ZHOU JIAN LI

DATE: May 12, 2009

SAMPLE DESCRIPTION:
ONE (1) SUBMITTED SAMPLE SAID TO BE **GREY CERAMIC WITH SILVER COLOR METAL & LIGHT GREY TREATED LAYER (MULTI LAYER DIELECTRIC PRODUCT 多层介质产品).**

****

TESTS CONDUCTED:
AS REQUESTED BY THE APPLICANT, FOR DETAILS REFER TO ATTACHED PAGE(S)

****

AUTHORIZED BY:
FOR INTERTEK TESTING SERVICES
SHENZHEN LTD.

KARBON M.Y. WU
GENERAL MANAGER

Intertek Testing Services Shenzhen Ltd.-TFH Division
7/F., ShekouTechnology Main Building, Industrial 7th Road,Shekou,Shenzhen, China
Tel: (86-755) 2602 0111 Fax: (86-755) 2683 7118/9 Postcode: 518067

TEST REPORT NUMBER: SZHH0038564301

TESTS CONDUCTED

RoHS CHEMICAL TEST

(A) TEST RESULT SUMMARY:

TESTING ITEM	RESULT
CADMIUM (Cd) CONTENT (mg/kg)	ND(<2)
LEAD (Pb) CONTENT (mg/kg)	ND(<2)
MERCURY (Hg) CONTENT (mg/kg)	ND(<2)
CHROMIUM (VI)(Cr^{6+}) CONTENT (mg/kg)	ND(<1)
POLYBROMINATED BIPHENYLS (PBBs)(mg/kg)	
MONOBROMOBIPHENYL (MonoBB)	ND(<5)
DIBROMOBIPHENYL (DiBB)	ND(<5)
TRIBROMOBIPHENYL (TriBB)	ND(<5)
TETRABROMOBIPHENYL (TetraBB)	ND(<5)
PENTABROMOBIPHENYL (PentaBB)	ND(<5)
HEXABROMOBIPHENYL (HexaBB)	ND(<5)
HEPTABROMOBIPHENYL (HeptaBB)	ND(<5)
OCTABROMOBIPHENYL (OctaBB)	ND(<5)
NONABROMOBIPHENYL (NonaBB)	ND(<5)
DECABROMOBIPHENYL (DecaBB)	ND(<5)
POLYBROMINATED DIPHENYL ETHERS (PBDEs)(mg/kg)	
MONOBROMODIPHENYL ETHER (MonoBDE)	ND(<5)
DIBROMODIPHENYL ETHER (DiBDE)	ND(<5)
TRIBROMODIPHENYL ETHER (TriBDE)	ND(<5)
TETRABROMODIPHENYL ETHER (TetraBDE)	ND(<5)
PENTABROMODIPHENYL ETHER (PentaBDE)	ND(<5)
HEXABROMODIPHENYL ETHER (HexaBDE)	ND(<5)
HEPTABROMODIPHENYL ETHER (HeptaBDE)	ND(<5)
OCTABROMODIPHENYL ETHER (OctaBDE)	ND(<5)
NONABROMODIPHENYL ETHER (NonaBDE)	ND(<5)
DECABROMODIPHENYL ETHER (DecaBDE)	ND(<5)

CHEMIST: LV LINNA

mg/kg = MILLIGRAM PER KILOGRAM = ppm
< = LESS THAN
ND = NOT DETECTED

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Intertek Testing Services Shenzhen Ltd.-TFH Division
7/F., ShekouTechnology Main Building, Industrial 7th Road,Shekou,Shenzhen, China
Tel: (86-755) 2602 0111 Fax: (86-755) 2683 7118/9 Postcode: 518067

TEST REPORT NUMBER: SZHH0038564301

TESTS CONDUCTED

(B) RoHS REQUIREMENT:

RESTRICTED SUBSTANCES	LIMITS
CADMIUM (Cd)	0.01% (100 ppm)
LEAD (Pb)	0.1% (1000 ppm)
MERCURY (Hg)	0.1% (1000 ppm)
CHROMIUM (VI) (Cr^{6+})	0.1% (1000 ppm)
POLYBROMINATED BIPHENYLS (PBBs)	0.1% (1000 ppm)
POLYBROMINATED DIPHENYL ETHERS (PBDEs)	0.1% (1000 ppm)

THE ABOVE LIMITS WERE QUOTED FROM 2002/95/EC AND AMENDMENT 2005/618/EC FOR HOMOGENEOUS MATERIAL.

(C) TEST METHOD:

TESTING ITEM	TESTING METHOD	REPORTING LIMIT
CADMIUM (Cd) CONTENT	WITH REFERENCE TO IEC 62321 EDITION 1.0:2008, BY ACID DIGESTION AND DETERMINED BY ICP - OES	2 mg/kg
LEAD (Pb) CONTENT	WITH REFERENCE TO IEC 62321 EDITION 1.0:2008, BY ACID DIGESTION AND DETERMINED BY ICP - OES	2 mg/kg
MERCURY (Hg) CONTENT	WITH REFERENCE TO IEC 62321 EDITION 1.0:2008, BY ACID DIGESTION AND DETERMINED BY ICP - OES	2 mg/kg
CHROMIUM (VI)(Cr^{6+}) CONTENT	WITH REFERENCE TO IEC 62321 EDITION 1.0:2008, BY ALKALINE DIGESTION AND DETERMINED BY UV-VIS SPECTROPHOTOMETER	1 mg/kg
POLYBROMINATED BIPHENYLS (PBBs)& POLYBROMINATED DIPHENYL ETHERS (PBDEs)	WITH REFERENCE TO IEC 62321 EDITION 1.0:2008, BY SOLVENT EXTRACTION AND DETERMINED BY GC/MS AND FURTHER HPLC CONFIRMATION WHEN NECESSARY	5 mg/kg

DATE SAMPLE RECEIVED : MAY 08, 2009
TESTING PERIOD : MAY 08, 2009 TO MAY 11, 2009

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Intertek Testing Services Shenzhen Ltd.-TFH Division
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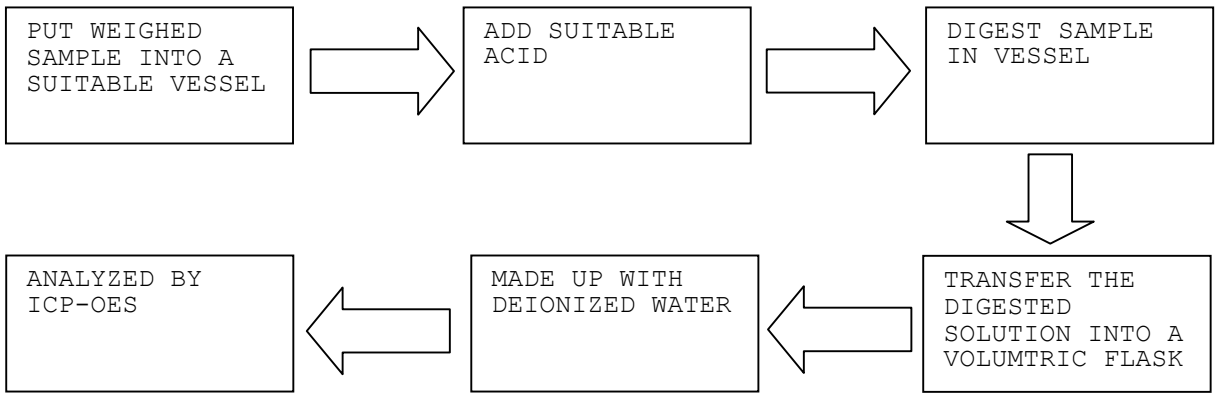
Tel: (86-755) 2602 0111 Fax: (86-755) 2683 7118/9 Postcode: 518067

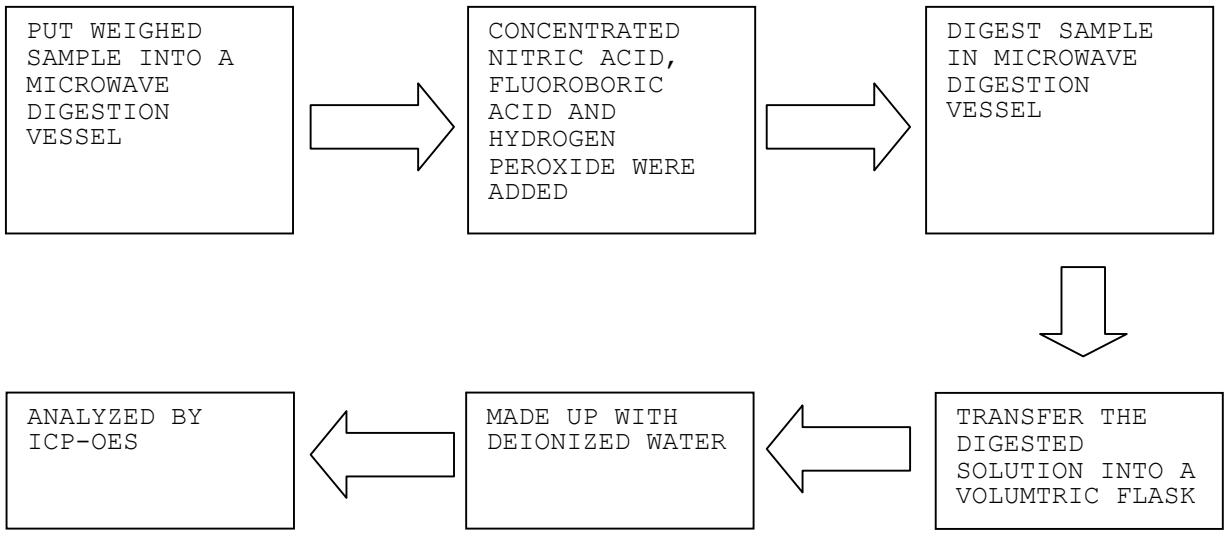
TESTS CONDUCTED

(D) MEASUREMENT FLOWCHART:

1. TEST FOR Cd/Pb CONTENTS



2. TEST FOR Hg CONTENT



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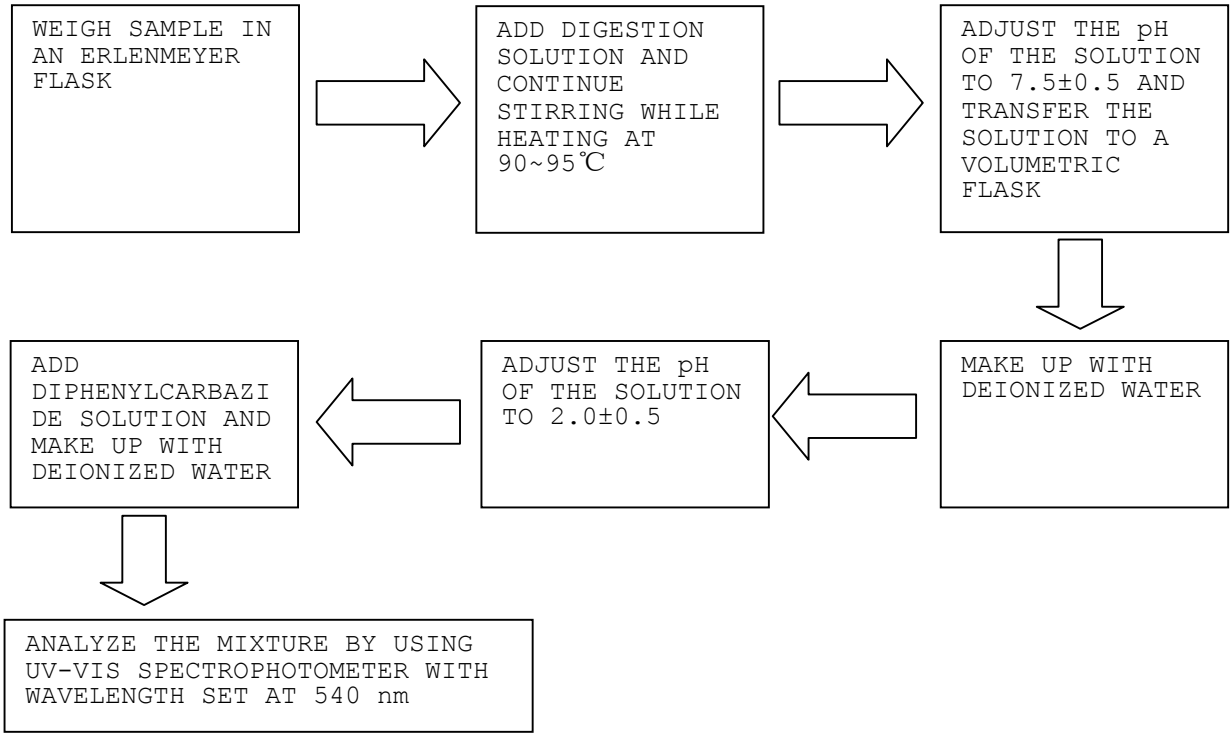
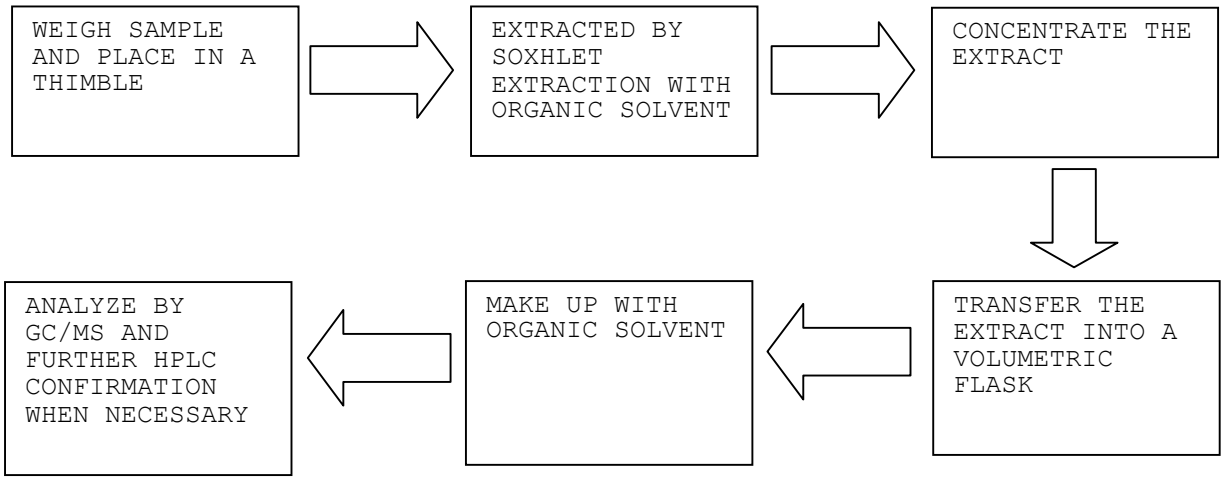
Tel: (86-755) 2602 0111 Fax: (86-755) 2683 7118/9 Postcode: 518067

TESTS CONDUCTED

3. TEST FOR CHROMIUM (VI)(Cr^{6+}) CONTENT (ALKALINE DIGESTION)



4. TEST FOR PBBs/PBDEs CONTENTS



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END OF REPORT

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