Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

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Email & Skype: info@chipsmall.com Web: www.chipsmall.com
Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China

SPECIFICATION

Part No.	:	**PA.22A**

Product Name	:	**Dielectric PIFA Antenna**

Description	:	Tri-band - 880~960 MHz, 1710~1990 MHz, 0dB Gain
		Size: 29.8mm*6mm*5mm
		RoHS Compliant

1. Scope

This specification is for a Tri-band GSM miniature PIFA (Dielectric Planar Inverted-F Type Antenna) (DPA™) Antenna for internal SMT mounting.
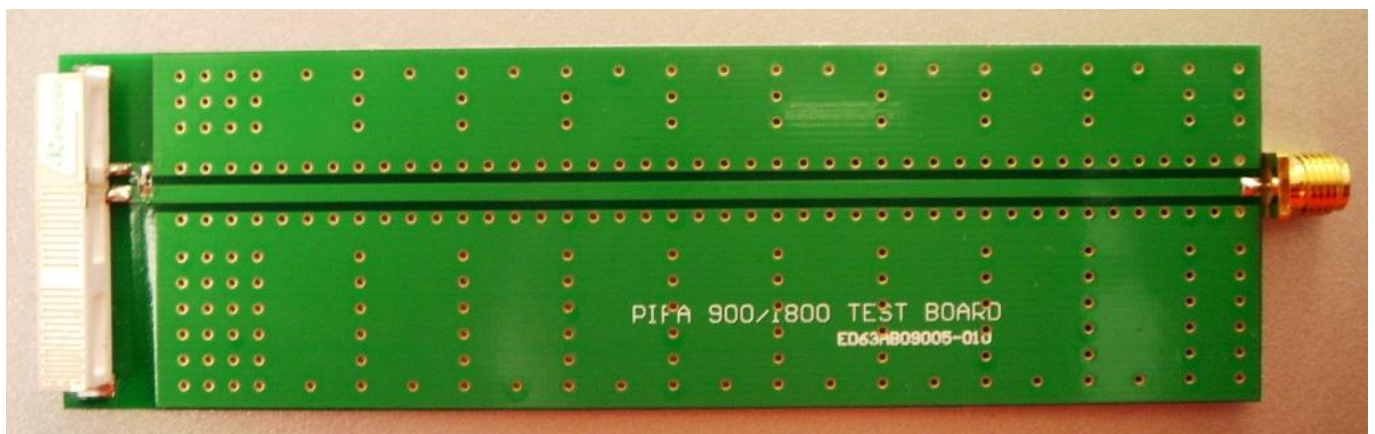
Note: The antenna also shows a response at 850MHz which means the antenna can also be defined on quad-band, depending on the target specification for the device itself.

2. Electrical Specifications

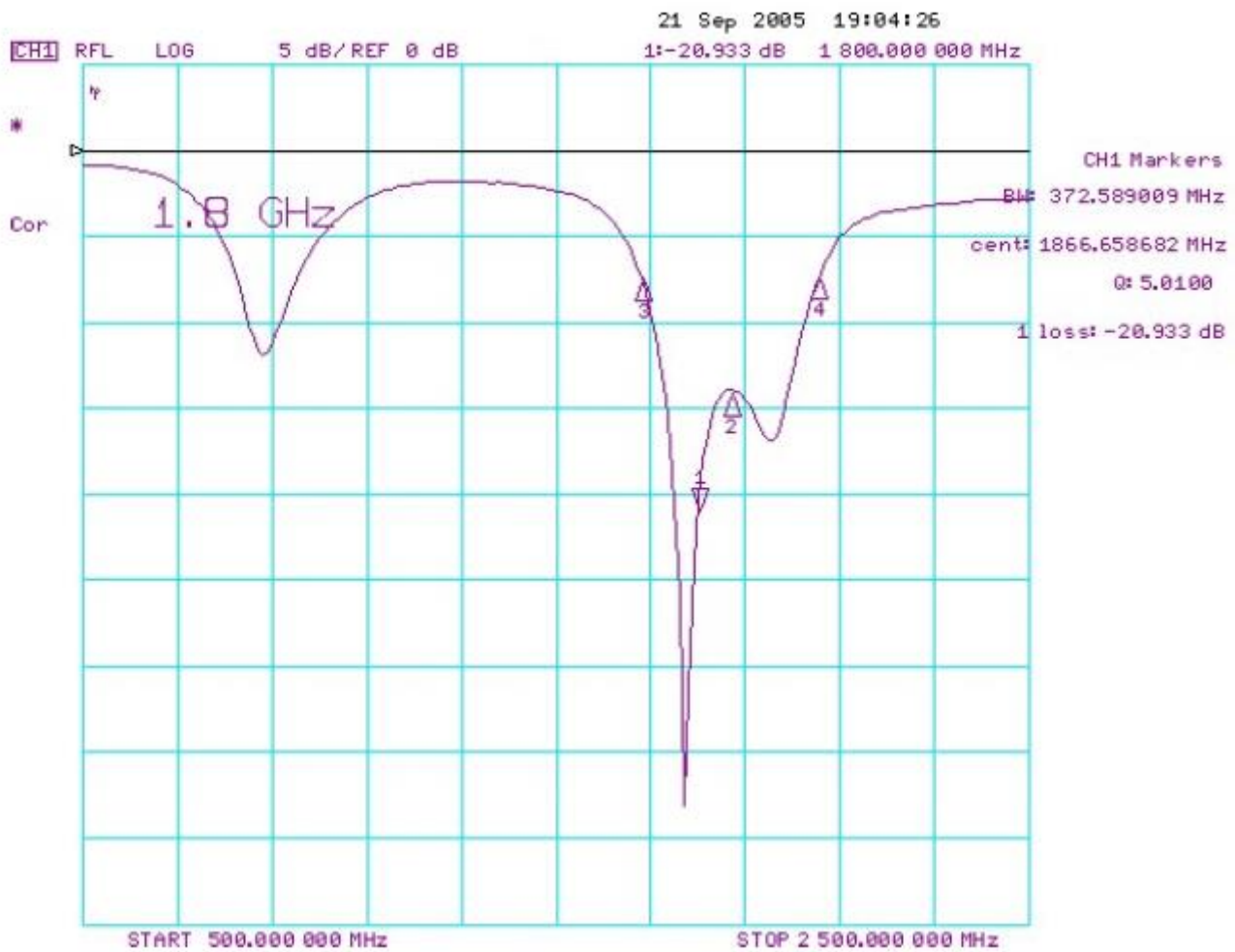The antenna has the electrical characteristics given in Table 1 under the Taoglas standard installation conditions as shown in the Evaluation Board (Figure

No.	Parameter	Specification
1	Frequency	880~960 MHz , 1710~1990 MHz
2	Dimensions	29.8*6.0*5.0 mm
3	Impedance	50 Ω
4	VSWR	2.5 max (depends on environment)
5	Polarization	Linear
6	Operating Temperature	-40~85°C
7	Termination	Ag (Environmentally Friendly Lead-Free)

*Data is measured on Taoglas Evaluation Board (reference ground plane) pictured below

2.1   S11 Response Curve

CH1 RFL LOG 5 dB/REF 0 dB 1:-20.933 dB 1 800.000 000 MHz

1.8 GHz

CH1 Markers

BW 372.589009 MHz

cent 1866.658682 MHz

Q: 5.0100

1 loss: -20.933 dB

Cor

START 500.000 000 MHz

STOP 2 500.000 000 MHz
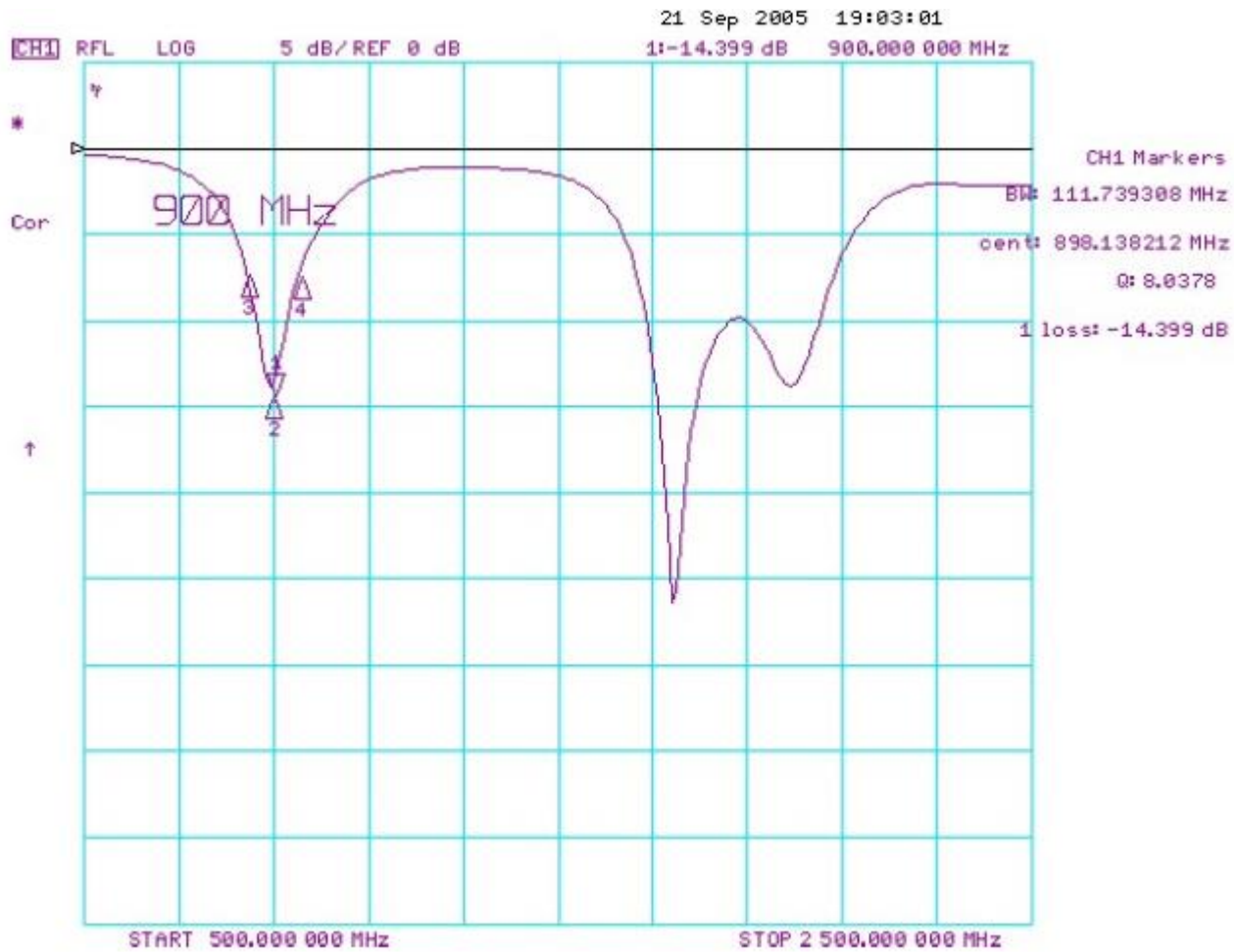
Radiation patterns also available (measured in free space and on evaluation board)

2.2 Gain and Efficiency

GSM900

	Frequency (MHz)	Peak Gain (dBi)	Efficiency (%)
TX	880.2	-3.65	21.09
	890.2	-2.73	26.25
	902.4	-2.28	31.23
	914.8	-2.04	35.24
RX	925.2	-1.96	37.02
	935.2	-2.54	33.33
	947.4	-2.96	31.17
	959.8	-3.16	29.47

GSM1800

	Frequency (MHz)	Peak Gain (dBi)	Efficiency (%)
TX	1710.2	2.28	60.63
	1747.6	2.35	61.53
	1784.8	2.58	60.77
RX	1805.2	2.32	56.67
	1842.6	2.43	56.31
	1879.8	2.59	58.69

GSM1900

	Frequency (MHz)	Peak Gain (dBi)	Efficiency (%)
TX	1850.2	2.48	56.95
	1880.0	2.60	58.75
	1909.8	2.12	52.79
RX	1930.2	2.01	52.02
	1960.0	1.31	47.26
	1989.8	0.30	38.62

GSM900

| Frequency (GHz)		Plane	Average Gain (dBi)
TX	880.2	XY plane	-7.133
		YZ plane	-9.766
		XZ plane	-6.101
	890.2	XY plane	-5.968
		YZ plane	-8.845
		XZ plane	-5.126
	902.4	XY plane	-4.898
		YZ plane	-8.892
		XZ plane	-4.350
	914.8	XY plane	-4.077
		YZ plane	-7.477
		XZ plane	-3.865
RX	925.2	XY plane	-3.599
		YZ plane	-7.202
		XZ plane	-3.732
	935.2	XY plane	-3.802
		YZ plane	-7.648
		XZ plane	-4.290
	947.4	XY plane	-3.788
		YZ plane	-7.843
		XZ plane	-4.579
	959.8	XY plane	-3.801
		YZ plane	-7.913
		XZ plane	-5.187

GSM1800

Frequency (GHz)		Plane	Average Gain (dBi)
TX	1710.2	XY plane	-2.648
		YZ plane	-4.661
		XZ plane	-1.687
	1747.6	XY plane	-2.529
		YZ plane	-4.696
		XZ plane	-1.207
	1784.8	XY plane	-2.685
		YZ plane	-4.687
		XZ plane	-0.888
RX	1805.2	XY plane	-3.193
		YZ plane	-4.911
		XZ plane	-1.105
	1842.6	XY plane	-3.468
		YZ plane	-4.753
		XZ plane	-1.145
	1879.8	XY plane	-3.745
		YZ plane	-4.131
		XZ plane	-1.430

GSM1900

Frequency (GHz)		Plane	Average Gain (dBi)
TX	1850.2	XY plane	-3.511
		YZ plane	-4.649
		XZ plane	-1.147
	1880.0	XY plane	-3.746
		YZ plane	-4.124
		XZ plane	-1.435
	1909.8	XY plane	-4.683
		YZ plane	-4.228
		XZ plane	-2.525
RX	1930.2	XY plane	-5.539
		YZ plane	-4.270
		XZ plane	-3.257
	1960.0	XY plane	-6.444
		YZ plane	-4.441
		XZ plane	-4.126
	1989.8	XY plane	-8.068
		YZ plane	-5.359
		XZ plane	-5.477

GSM900
Frequency :880.2 MHz

Far-field Power Distribution on X-Z Plane(E-Plane of L3 Pol Sense)
Gain=-3.65 dBi; Total Radiating Efficiency: 21.09%@08.8020 GHz
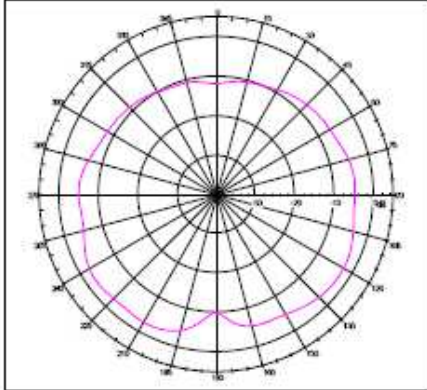
Far-field Power Distribution on Y-Z Plane(H-Plane of L3 Pol Sense)
Gain=-3.65 dBi; Total Radiating Efficiency: 21.09%@08.8020 GHz
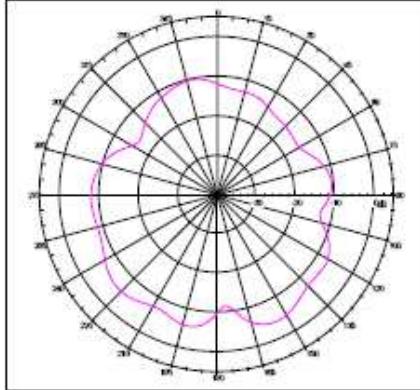
Far-field Power Distribution on X-Y Plane
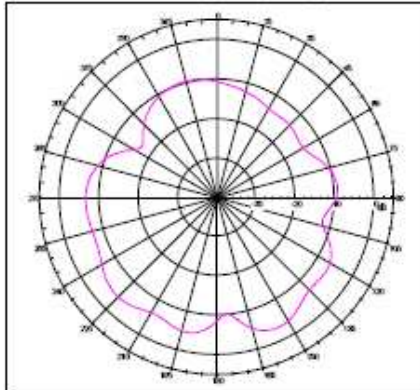Gain=-3.65 dBi; Total Radiating Efficiency: 21.09%@08.8020 GHz
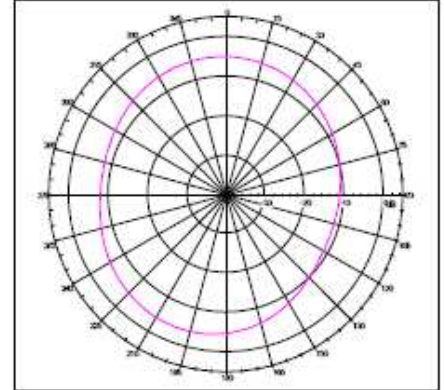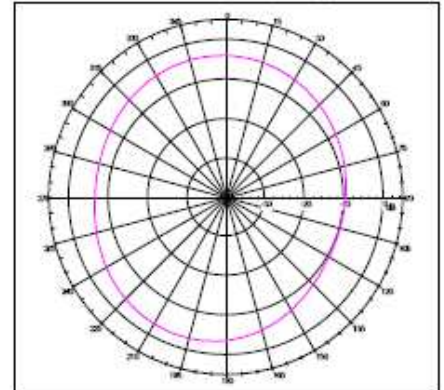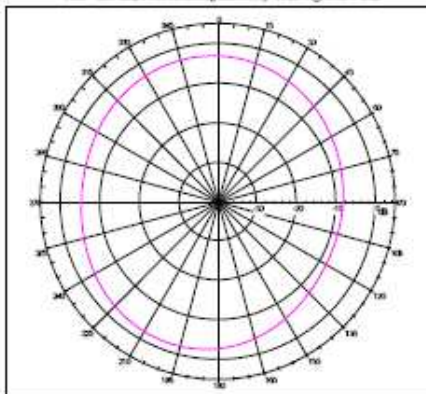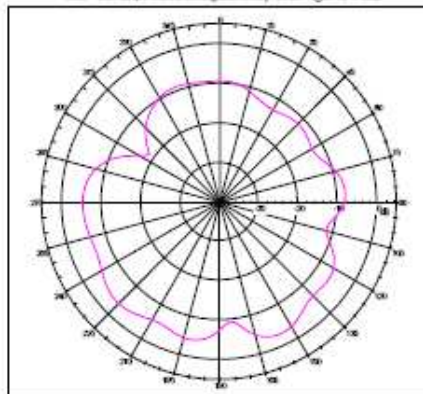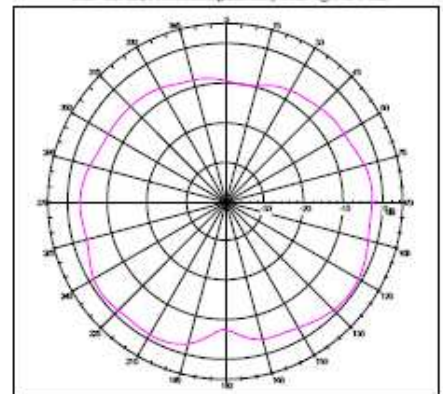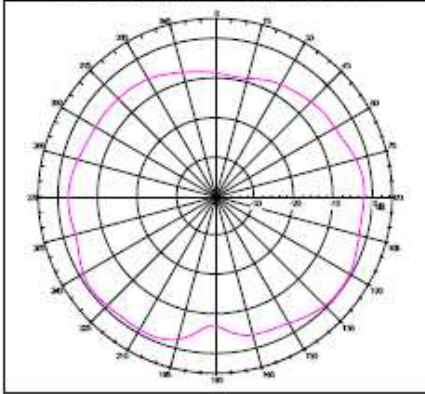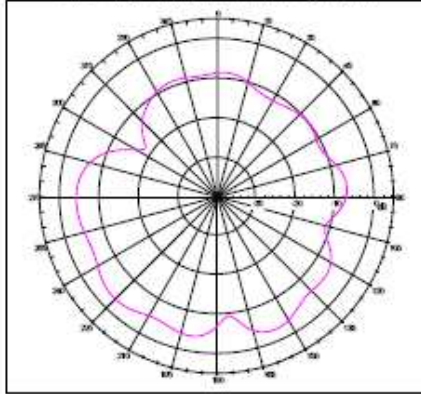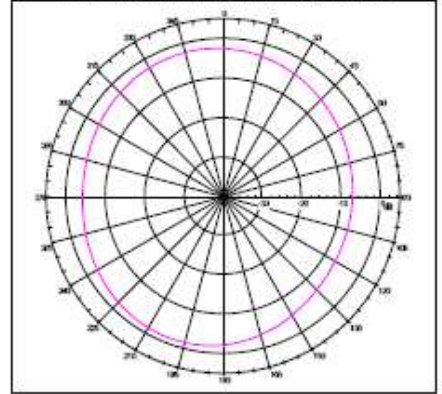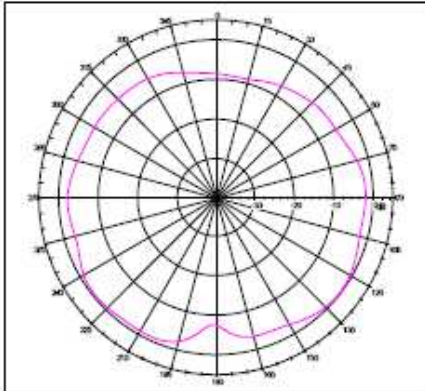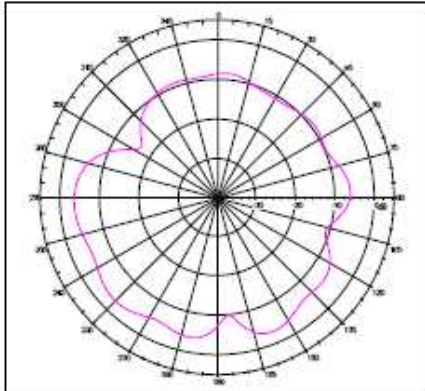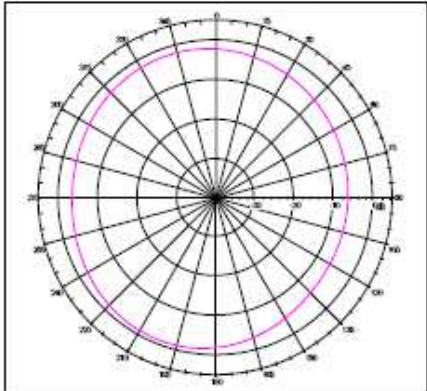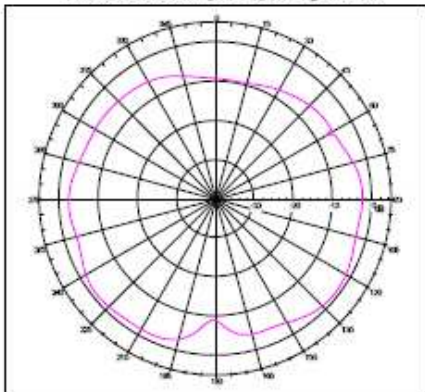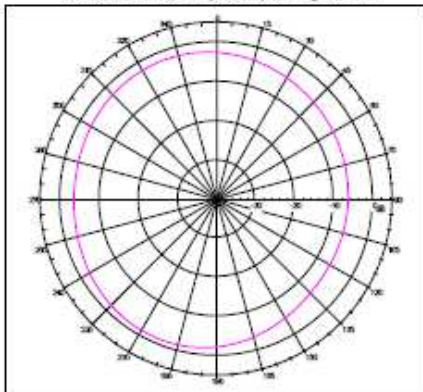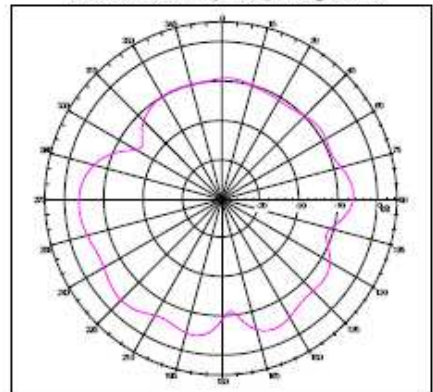
Frequency :890.2 MHz

Far-field Power Distribution on X-Z Plane(E-Plane of L3 Pol Sense)
Gain=-2.73 dBi; Total Radiating Efficiency: 26.25%@08.9020 GHz
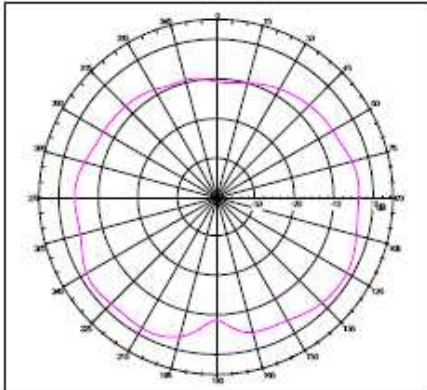
Far-field Power Distribution on Y-Z Plane(H-Plane of L3 Pol Sense)
Gain=-2.73 dBi; Total Radiating Efficiency: 26.25%@08.9020 GHz

Far-field Power Distribution on X-Y Plane
Gain=-2.73 dBi; Total Radiating Efficiency: 26.25%@08.9020 GHz

Frequency :902.4MHz

Far-field Power Distribution on X-Y Plane
Gain=-2.28 dBi; Total Radiating Efficiency: 31.23%@09.0240 GHz

Far-field Power Distribution on Y-Z Plane(H-Plane of L3 Pol Sense)
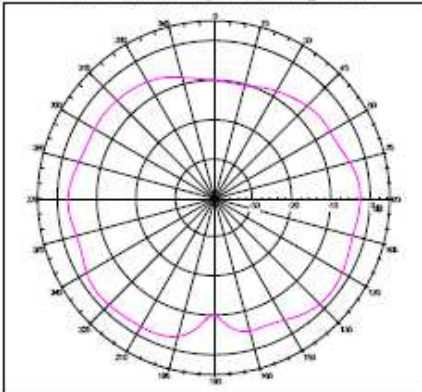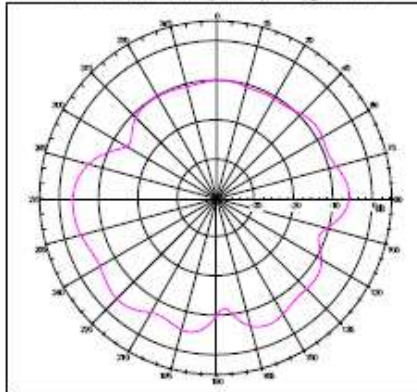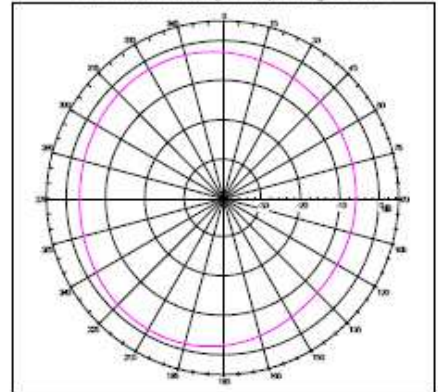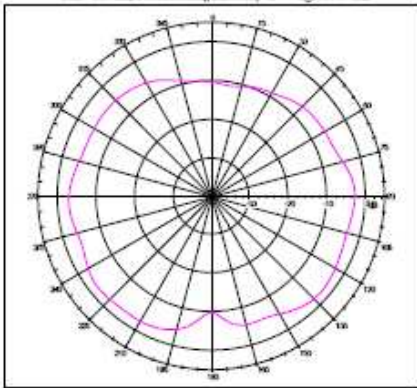Gain=-2.28 dBi; Total Radiating Efficiency: 31.23%@09.0240 GHz

Far-field Power Distribution on X-Z Plane(E-Plane of L3 Pol Sense)
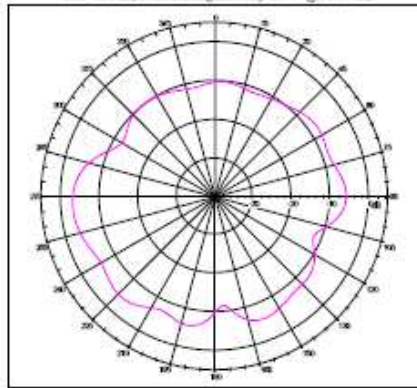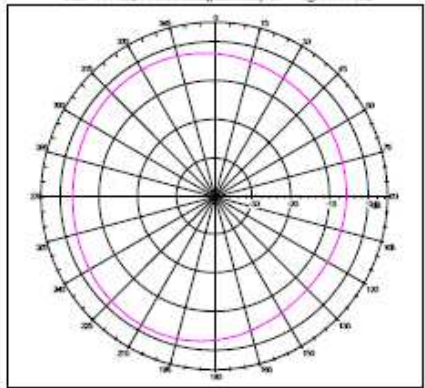Gain=-2.28 dBi; Total Radiating Efficiency: 31.23%@09.0240 GHz

Frequency :914.8MHz

Far-field Power Distribution on X-Z Plane(E-Plane of L3 Pol Sense)
Gain=-2.04 dB; Total Radiating Efficiency: 35.24%@091.480GHz

Far-field Power Distribution on Y-Z Plane(H-Plane of L3 Pol Sense)
Gain=-2.04 dB; Total Radiating Efficiency: 35.24%@091.480GHz

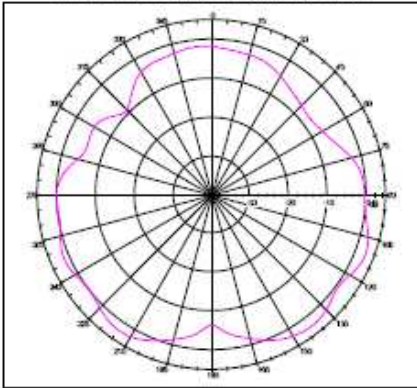Far-field Power Distribution on X-Y Plane
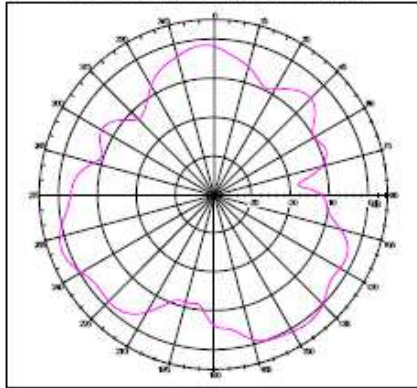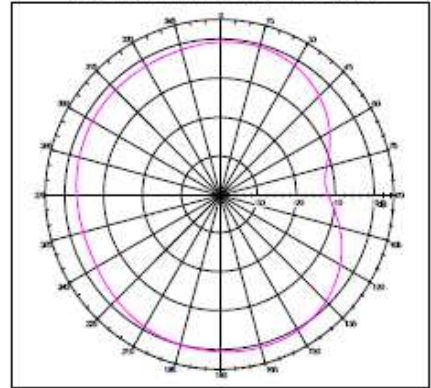Gain=-2.04 dB; Total Radiating Efficiency: 35.24%@091.480GHz

Frequency :925.2MHz

Far-field Power Distribution on X-Z Plane(E-Plane of L3 Pol Sense)
Gain=-1.96 dB; Total Radiating Efficiency: 37.02%@092520GHz

Far-field Power Distribution on Y-Z Plane(H-Plane of L3 Pol Sense)
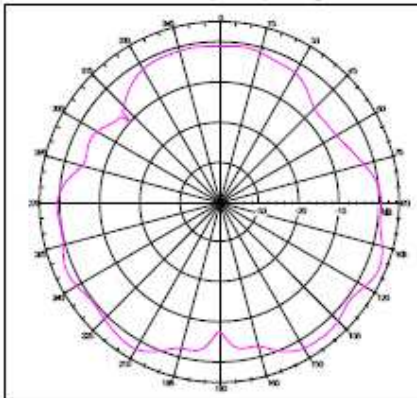Gain=-1.96 dB; Total Radiating Efficiency: 37.02%@092520GHz

Far-field Power Distribution on X-Y Plane
Gain=-1.96 dB; Total Radiating Efficiency: 37.02%@092520GHz

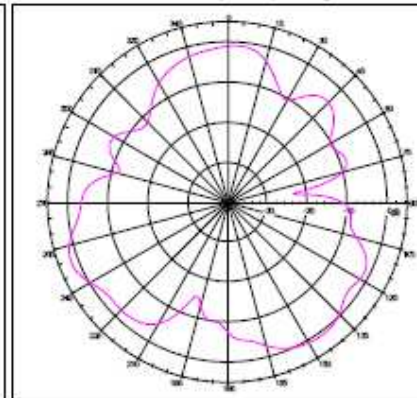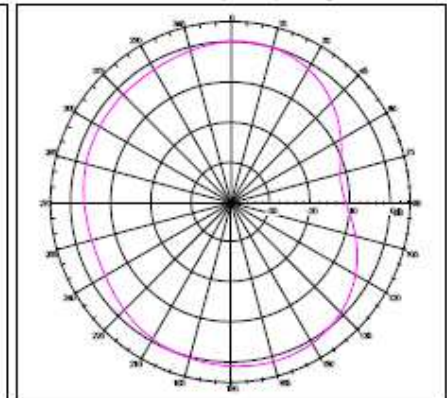# Frequency :935.2MHz

Far-field Power Distribution on X-Z Plane(E-Plane of L3 Pol Sense)
Gain=-2.54 dB; Total Radiating Efficiency: 33.33%@09520GHz

Far-field Power Distribution on X-Y Plane
Gain=-2.54 dB; Total Radiating Efficiency: 33.33%@09520GHz

Far-field Power Distribution on Y-Z Plane(H-Plane of L3 Pol Sense)
Gain=-2.54 dB; Total Radiating Efficiency: 33.33%@09520GHz

Frequency :947.4MHz

Far-field Power Distribution on X-Z Plane(E-Plane of L3 Pol Sense)
Gain=-2.96 dBi; Total Radiating Efficiency: 31.17%@0.9474GHz

Far-field Power Distribution on Y-Z Plane(H-Plane of L3 Pol Sense)
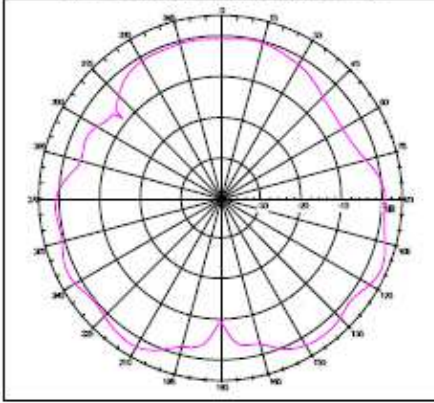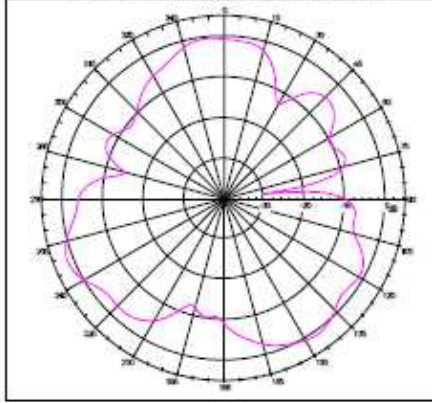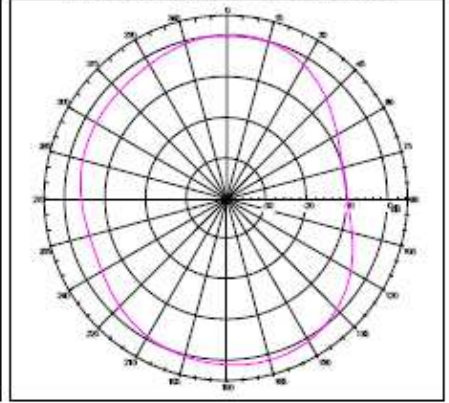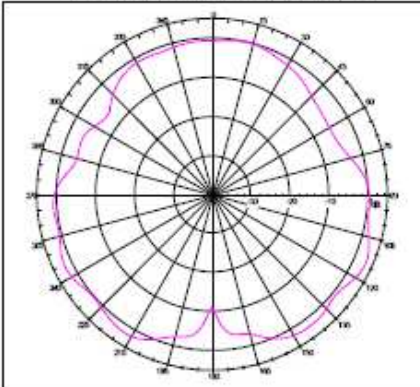Gain=-2.96 dBi; Total Radiating Efficiency: 31.17%@0.9474GHz

Far-field Power Distribution on X-Y Plane
Gain=-2.96 dBi; Total Radiating Efficiency: 31.17%@0.9474GHz

Frequency :959.8MHz

Far-field Power Distribution on X-Z Plane(E-Plane of L3 Pol Sense)
Gain=-3.16 dBi; Total Radiating Efficiency: 29.47%@0.9598GHz

Far-field Power Distribution on Y-Z Plane(H-Plane of L3 Pol Sense)
Gain=-3.16 dBi; Total Radiating Efficiency: 29.47%@0.9598GHz

Far-field Power Distribution on X-Y Plane
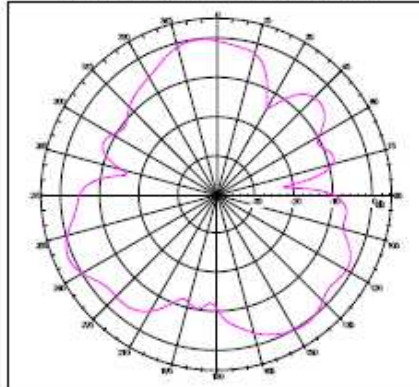Gain=-3.16 dBi; Total Radiating Efficiency: 29.47%@0.9598GHz
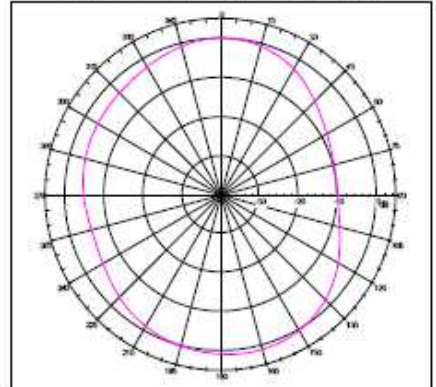
GSM1800
Frequency :1710.2 MHz

Far-field Power Distribution on X-Z Plane(E-Plane of L3 Pol Sense)
Gain=2.28 dBi; Total Radiating Efficiency: 60.60%@1.71020 GHz

Far-field Power Distribution on Y-Z Plane(H-Plane of L3 Pol Sense)
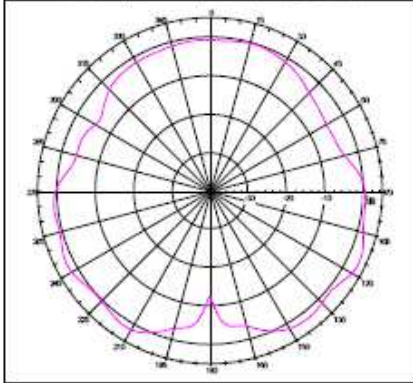Gain=2.28 dBi; Total Radiating Efficiency: 60.60%@1.71020 GHz

Far-field Power Distribution on X-Y Plane
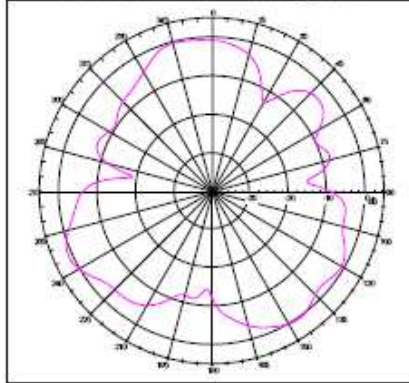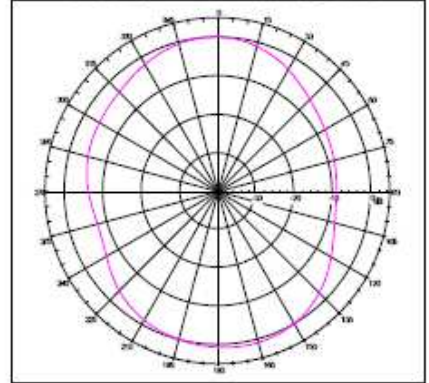Gain=2.28 dBi; Total Radiating Efficiency: 60.60%@1.71020 GHz

Frequency :1747.6 MHz

Far-field Power Distribution on X-Z Plane(E-Plane of L3 Pol Sense)
Gain=2.35 dBi; Total Radiating Efficiency: 61.53%@1.74760 GHz

Far-field Power Distribution on Y-Z Plane(H-Plane of L3 Pol Sense)
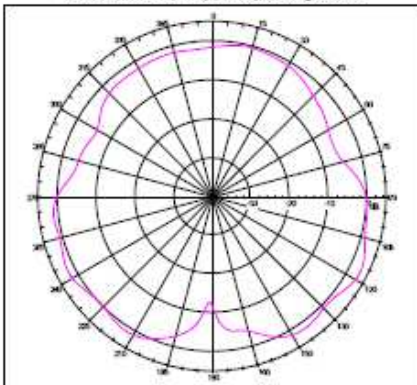Gain=2.35 dBi; Total Radiating Efficiency: 61.53%@1.74760 GHz

Far-field Power Distribution on X-Y Plane
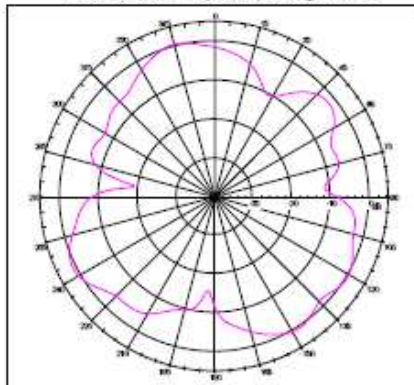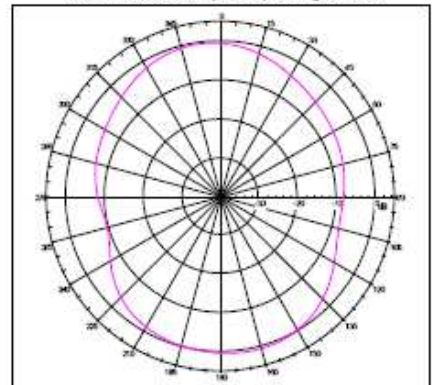Gain=2.35 dBi; Total Radiating Efficiency: 61.53%@1.74760 GHz

Frequency :1784.8 MHz

Far-field Power Distribution on X-Z Plane(E-Plane of L3 Pol Sense)
Gain=2.58 dBi; Total Radiating Efficiency: 60.77%@1.7848 GHz

Far-field Power Distribution on Y-Z Plane(H-Plane of L3 Pol Sense)
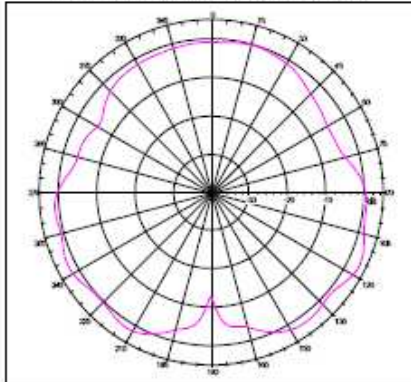Gain=2.58 dBi; Total Radiating Efficiency: 60.77%@1.7848 GHz

Far-field Power Distribution on X-Y Plane
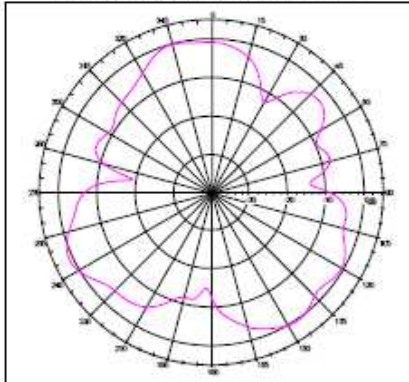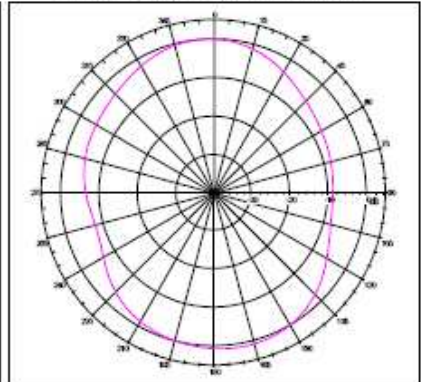Gain=2.58 dBi; Total Radiating Efficiency: 60.77%@1.7848 GHz

Frequency :1805.2 MHz

Far-field Power Distribution on X-Z Plane(E-Plane of L3 Pol Sense)
Gain=2.32 dBi; Total Radiating Efficiency: 56.67%@1.8052 GHz

Far-field Power Distribution on Y-Z Plane(H-Plane of L3 Pol Sense)
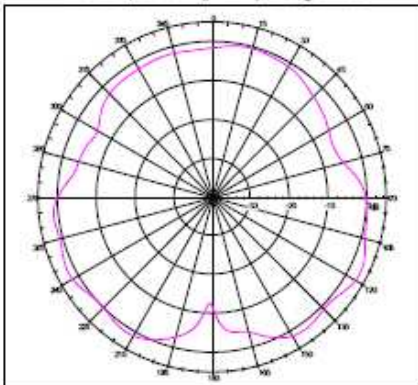Gain=2.32 dBi; Total Radiating Efficiency: 56.67%@1.8052 GHz

Far-field Power Distribution on X-Y Plane
Gain=2.32 dBi; Total Radiating Efficiency: 56.67%@1.8052 GHz

Frequency :1842.6 MHz

Far-field Power Distribution on X-Z Plane(E-Plane of L3 Pol Sense)
Gain=2.42 dBi; Total Radiating Efficiency: 56.31% @1.84260 GHz

Far-field Power Distribution on Y-Z Plane(H-Plane of L3 Pol Sense)
Gain=2.42 dBi; Total Radiating Efficiency: 56.31% @1.84260 GHz

Far-field Power Distribution on X-Y Plane
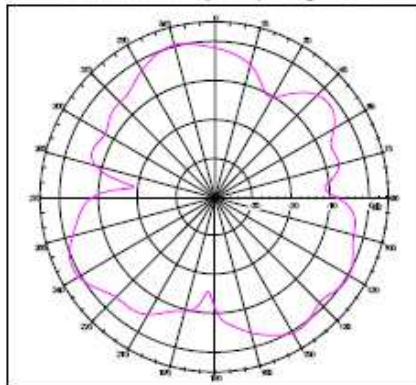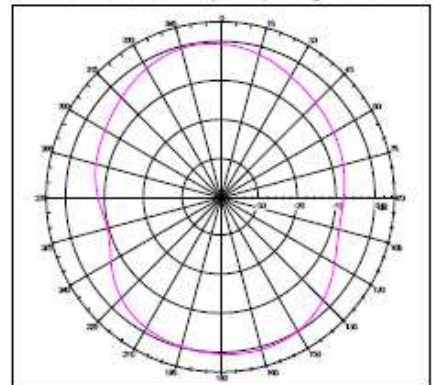Gain=2.42 dBi; Total Radiating Efficiency: 56.31% @1.84260 GHz

Frequency :1879.8 MHz

Far-field Power Distribution on X-Z Plane(E-Plane of L3 Pol Sense)
Gain=2.59 dBi; Total Radiating Efficiency: 58.69% @1.87980 GHz

Far-field Power Distribution on Y-Z Plane(H-Plane of L3 Pol Sense)
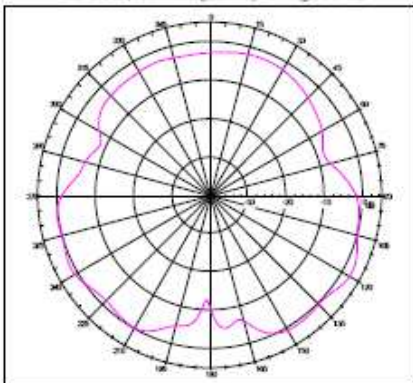Gain=2.59 dBi; Total Radiating Efficiency: 58.69% @1.87980 GHz

Far-field Power Distribution on X-Y Plane
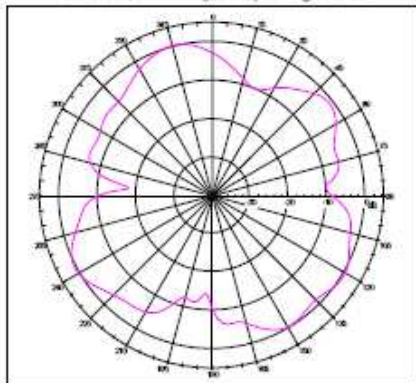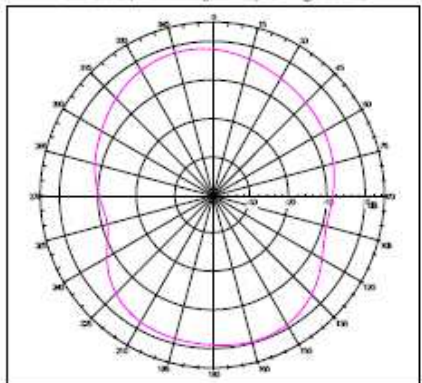Gain=2.59 dBi; Total Radiating Efficiency: 58.69% @1.87980 GHz

GSM1900

Frequency :1850.2 MHz

Frequency :1880.0 MHz

Frequency :1909.8 MHz

Frequency : 1930.2 MHz

Far-field Power Distribution on X-Z Plane(E-Plane of L3 Pol Sense)
Gain=1.80 dBi; Total Radiating Efficiency: 50.11%@1.93020 GHz

Far-field Power Distribution on Y-Z Plane(H-Plane of L3 Pol Sense)
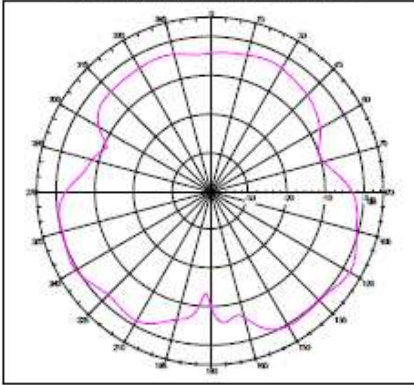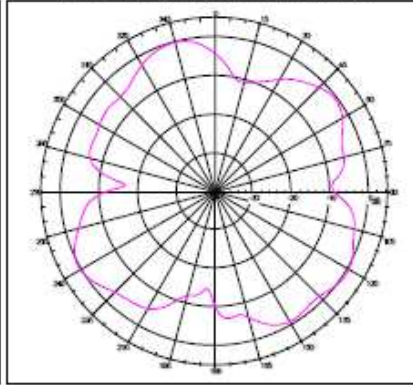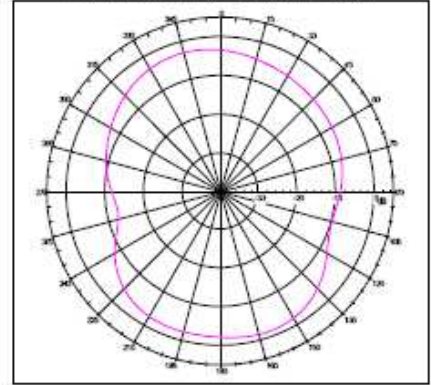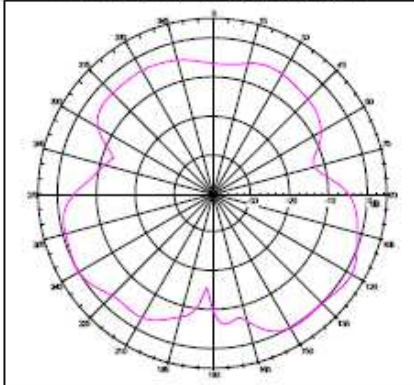Gain=1.80 dBi; Total Radiating Efficiency: 50.11%@1.93020 GHz

Far-field Power Distribution on X-Y Plane
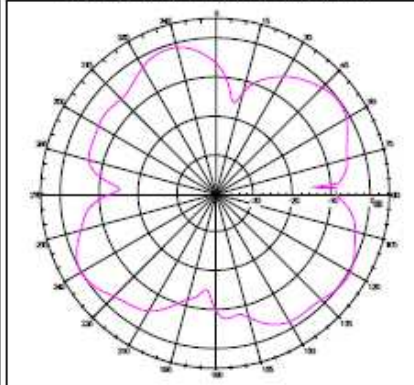Gain=1.80 dBi; Total Radiating Efficiency: 50.11%@1.93020 GHz
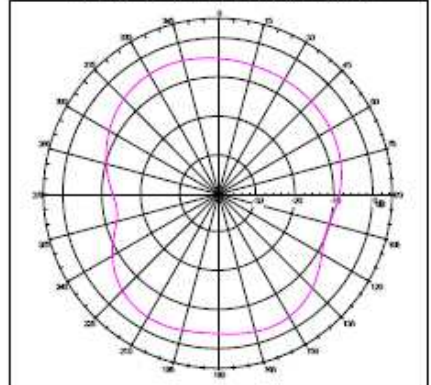
Frequency : 1960.0 MHz

Far-field Power Distribution on X-Z Plane(E-Plane of L3 Pol Sense)
Gain=1.31 dBi; Total Radiating Efficiency: 47.26%@1.96000 GHz

Far-field Power Distribution on Y-Z Plane(H-Plane of L3 Pol Sense)
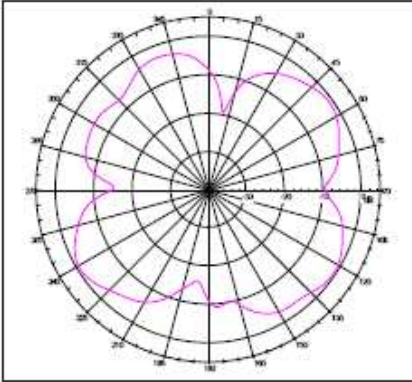Gain=1.31 dBi; Total Radiating Efficiency: 47.26%@1.96000 GHz

Far-field Power Distribution on X-Y Plane
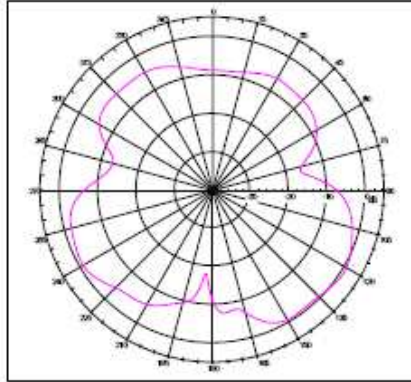Gain=1.31 dBi; Total Radiating Efficiency: 47.26%@1.96000 GHz
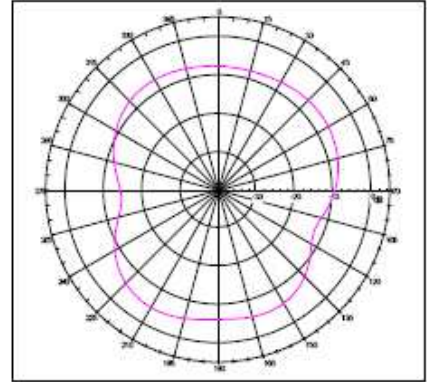
Frequency : 1989.8 MHz

Far-field Power Distribution on Y-Z Plane(H-Plane of L3 Pol Sense)
Gain=0.30 dBi; Total Radiating Efficiency: 38.62% @1.98980 GHz

Far-field Power Distribution on X-Z Plane(E-Plane of L3 Pol Sense)
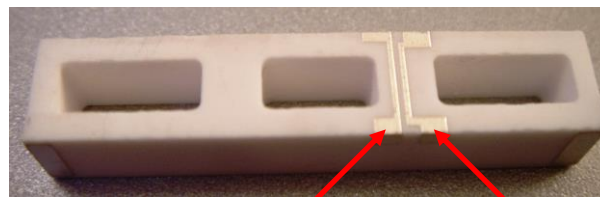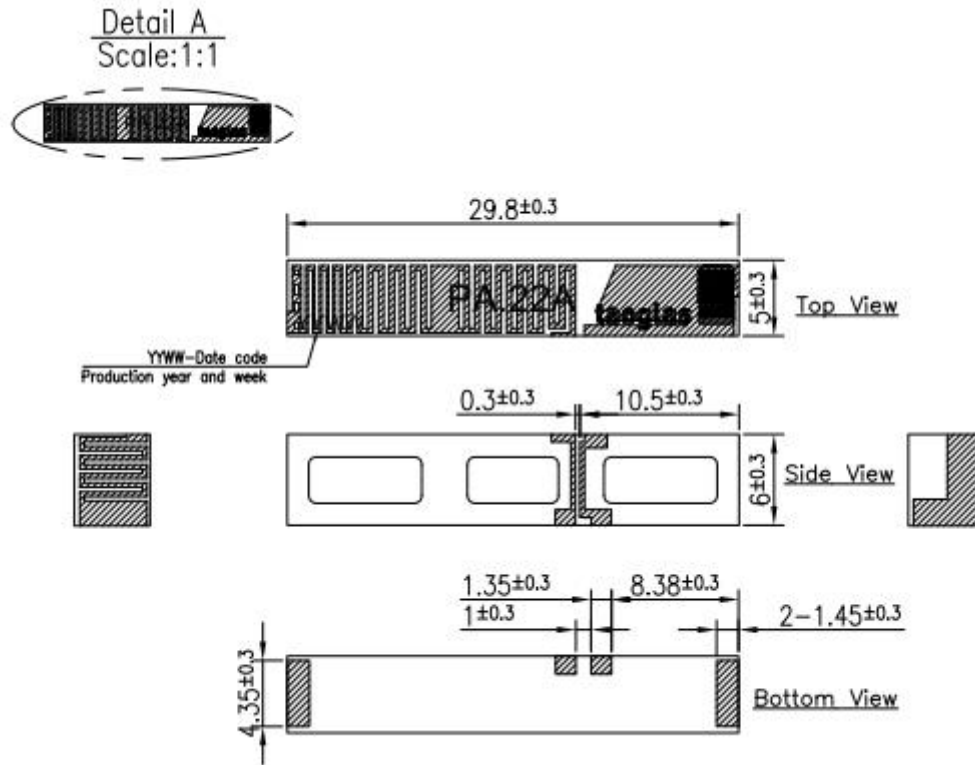Gain=0.30 dBi; Total Radiating Efficiency: 38.62% @1.98980 GHz

Far-field Power Distribution on X-Y Plane
Gain=0.30 dBi; Total Radiating Efficiency: 38.62% @1.98980 GHz

3. Mechanical Dimensions

3.1 PA.22 Antenna

Detail A
Scale:1:1

29.8±0.3

5±0.3   Top View

PA.22A taoglas

YYWW-Date code
Production year and week

0.3±0.3   10.5±0.3

6±0.3   Side View
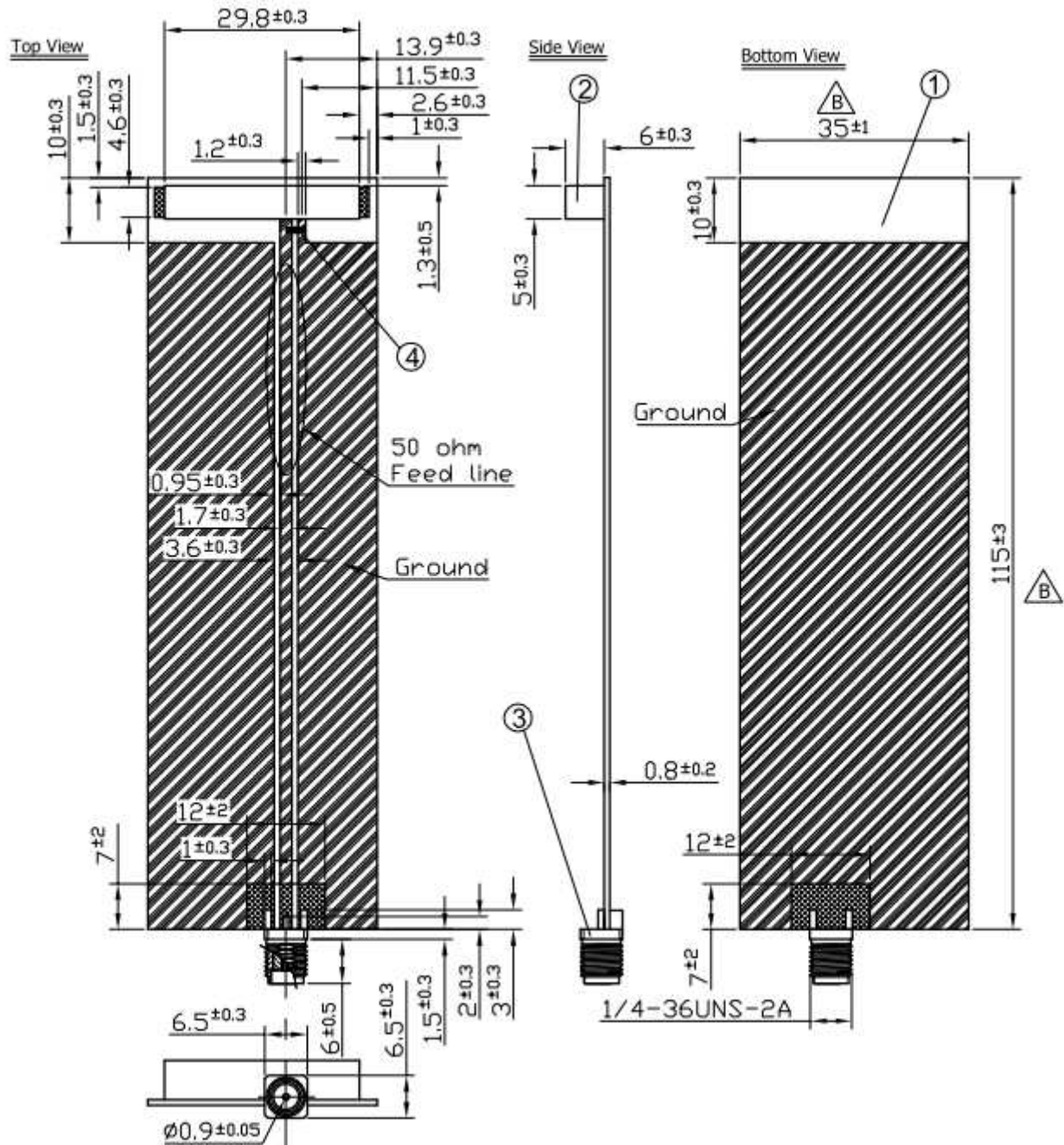
1.35±0.3   8.38±0.3

1±0.3   2-1.45±0.3

4.35±0.3   Bottom View

feed to module
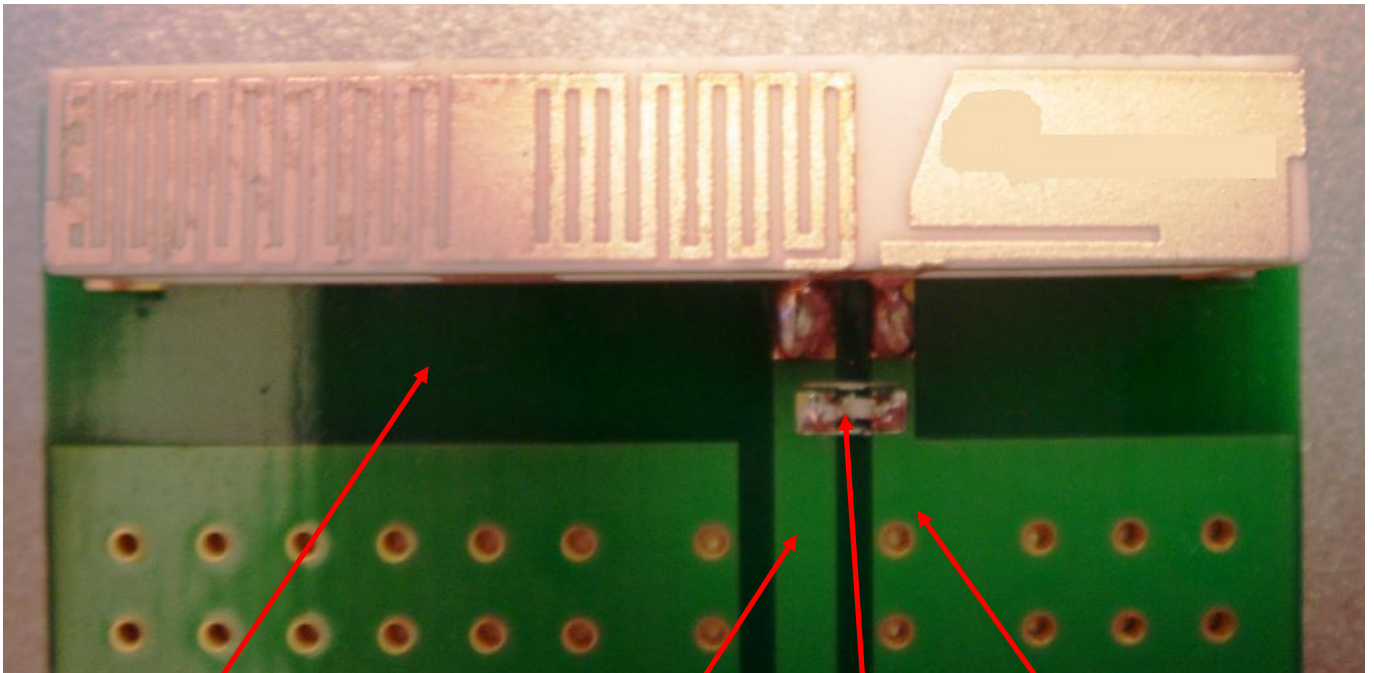
to ground

solder pads
(mechanical only)

3.2 Evaluation board dimensions

Note:
1. Unique dimensioning according to your PCB
   inductor and capacitor values according to you specific device
2. Copper area
3. Soldered area
4. Clearance area

3.3 Recommended layout (as per Taoglas evalution board)
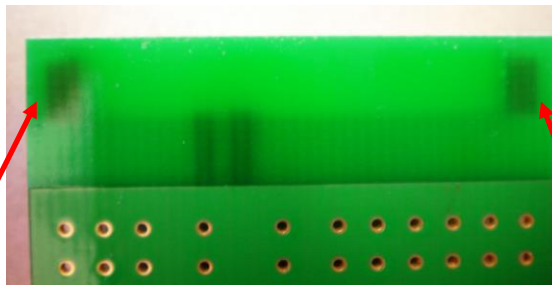

Non metal area
6mm clearance ideally
(minimum 4mm clearance)

feed to module

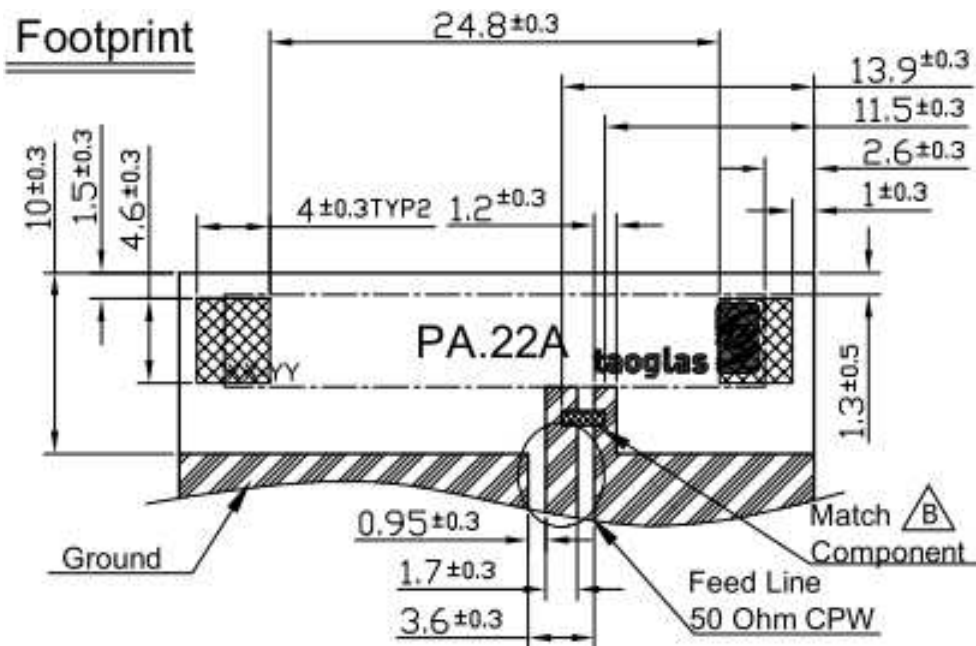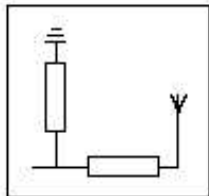4.7nH inductor
For EVB only

to ground

View from underneath board – note solder pads either side – laid out on non metal area
Layout dimensions - Allow 6mm clearance all around if possible (minimum 4mm)

Footprint

PA.22A

Ground

Match Component B

Feed Line
50 Ohm CPW

24.8±0.3

13.9±0.3

11.5±0.3

2.6±0.3

1±0.3

10±0.3

1.5±0.3

4.6±0.3

4±0.3TYP2

1.2±0.3

1.3±0.5

0.95±0.3

1.7±0.3

3.6±0.3

3.4 Recommended Transmission Line and Matching Network

Typical config.1
Typical config.2

Component types

Inductor

Capacitor

Module

Strip line

DC Block
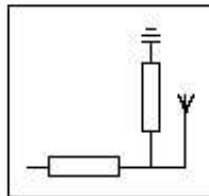
Component
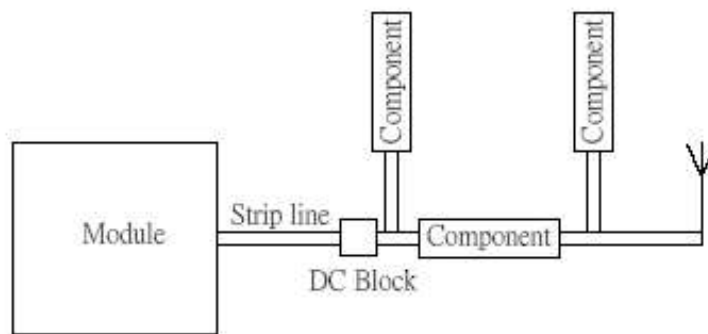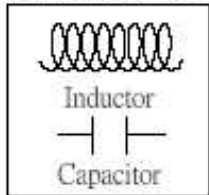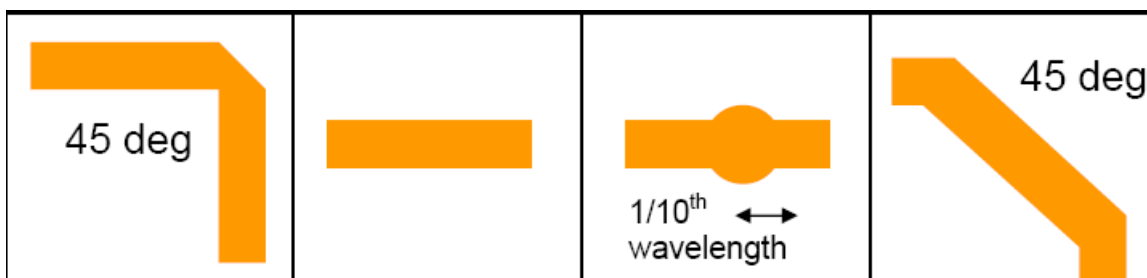
Component

Component

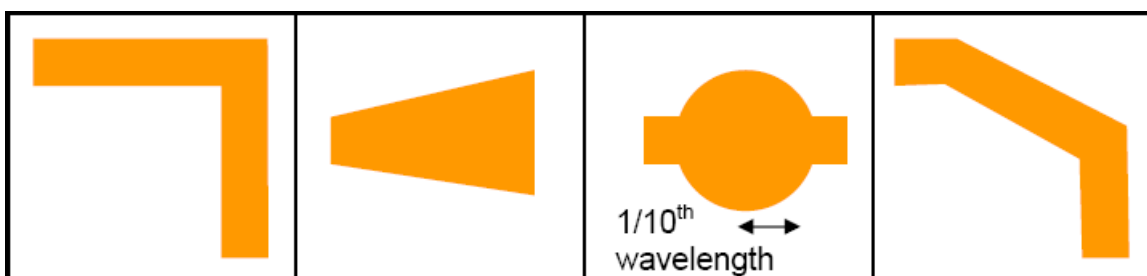The matching network has to be individually designed using one, two or three components.

Note: The PA.22 can be made "quad band" with appropriate matching circuit

Guidelines for routing RF when designing a PCB;

1) Good

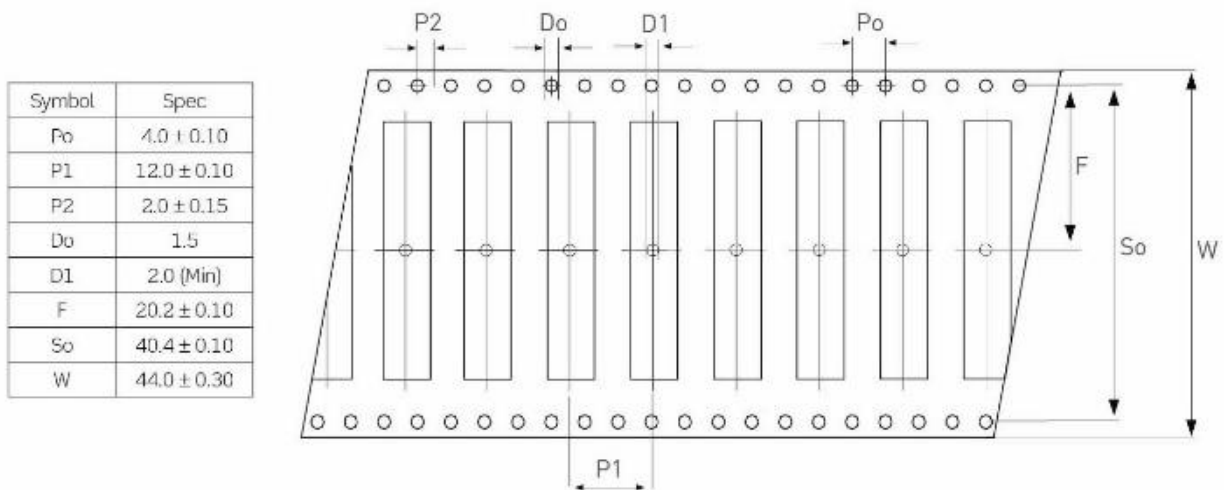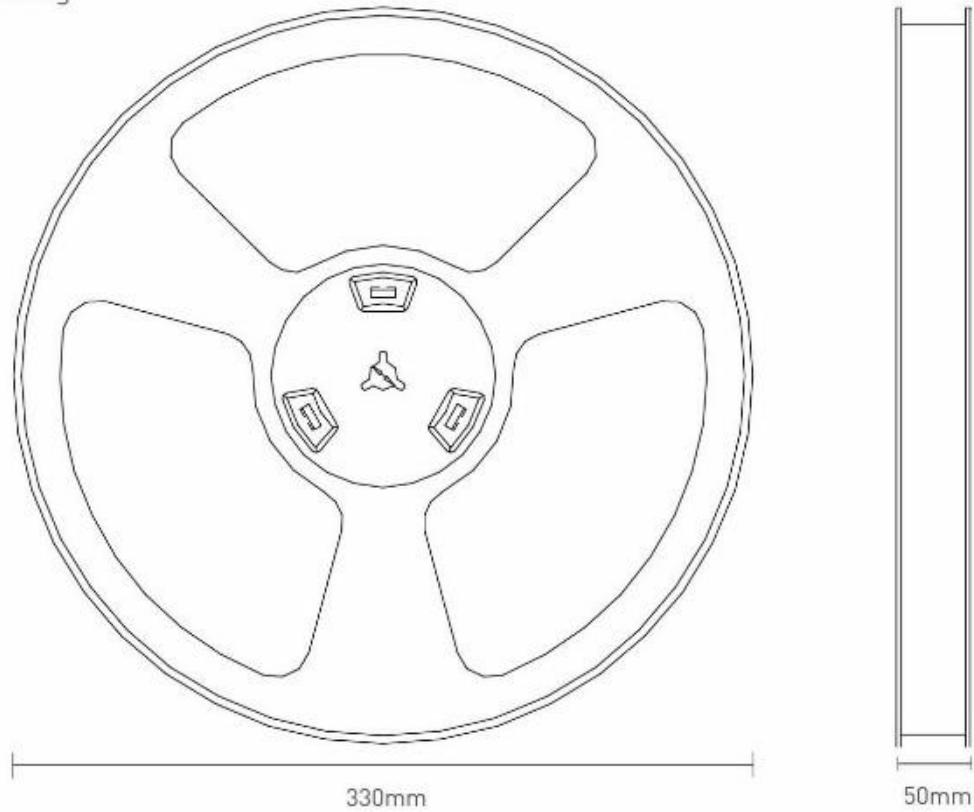45 deg

1/10th wavelength

45 deg

2) Bad

1/10th wavelength

4. Packaging

450 pc PA.22.A
1 reel per small inner box
Dimensions - 330*50mm
Weight - 3.3kg

330mm

50mm

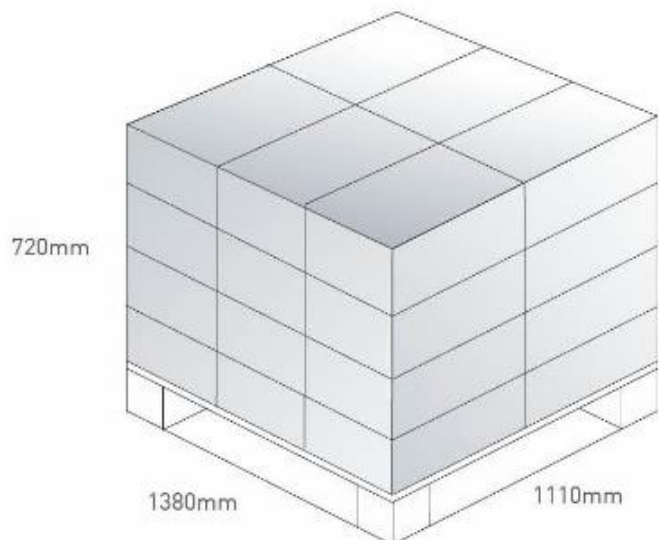| Symbol	Spec
Po	4.0 ± 0.10
P1	12.0 ± 0.10
P2	2.0 ± 0.15
Do	1.5
D1	2.0 (Min)
F	20.2 ± 0.10
So	40.4 ± 0.10
W	44.0 ± 0.30

450 pc PA.22.A
1 reel in small inner box
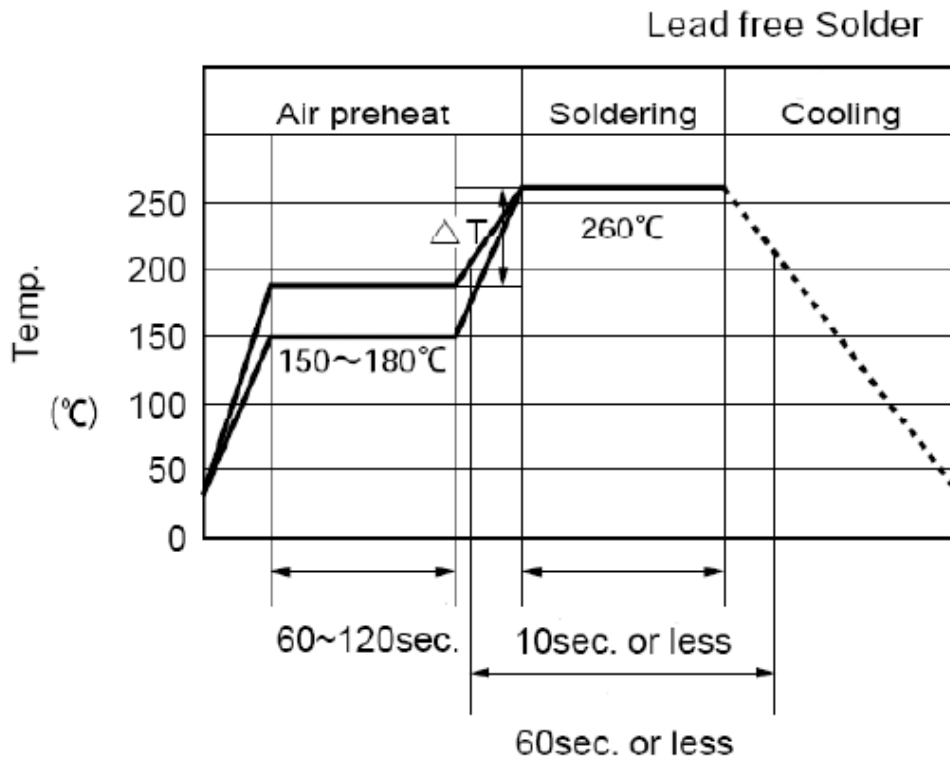Dimensions - 350*350*70
Weight - 3.6Kg
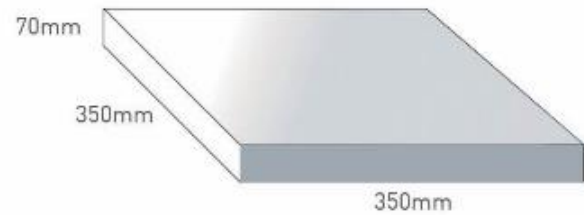
4 boxes / 1800 pcs in one carton
Carton Dimensions - 370*360*275mm
Weight -14.4Kg
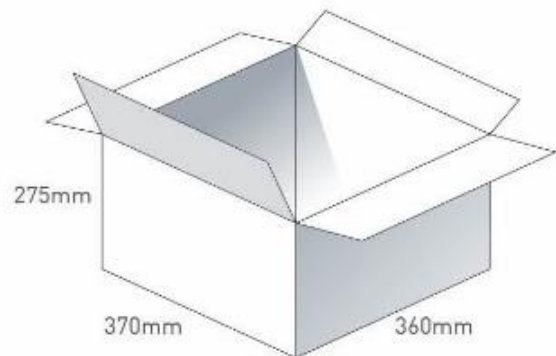
Pallet Dimensions 1110*720*1380mm
24 Cartons per Pallet
6 Cartons per layer
4 Layers

5. Recommended Reflow Temperature Profile

Lead free Solder

(1) Time shown in the above figures is measured from the point when chip surface reaches temperature.

(2) Temperature difference in high temperature part should be within 110°C.

(3) After soldering, do not force cool, allow the parts to cool gradually.

*General attention to soldering:

● High soldering temperatures and long soldering times can cause leaching of the termination, decrease in adherence strength, and the change of characteristic may occur.

● for soldering, please refer to the soldering curves above. However, please keep exposure to temperatures exceeding 200°C to under 50 seconds.

● please use a mild flux (containing less than 0.2wt% Cl). Also, if the flux is water soluble, be sure to wash thoroughly to remove any residue from the underside of components that could affect resistance.

Cleaning:

When using ultrasonic cleaning, the board may resonate if the output power is too high. Since this vibration can cause cracking or a decrease in the adherence of the termination, we recommend that you use the conditions below.

Frequency: 40 kHz max. - Output power: 20W/Iiter -Cleaning time: 5minutes max.