SPK ELECTRONICS CO., LTD.

SPECIFICATION

OF PRODUCTS

CUSTOMER ： _____

PRODUCT NAME： Dielectric Antenna

PART NUMBER ： SPK-GSMANT-900A

Approved by	Checked by	Drawn by

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SPK ELECTRONICS CO., LTD.

PART NUMBER: SPK-GSMANT-900A

1 SCOPE

This specification covers the dielectric antenna for **880~960**MHz**, 1710~1990**MHz.

2 Name of the product

This product is named “Dielectric Antenna”.

3 Electrical characteristics

3-1 Electrical characteristics of antenna

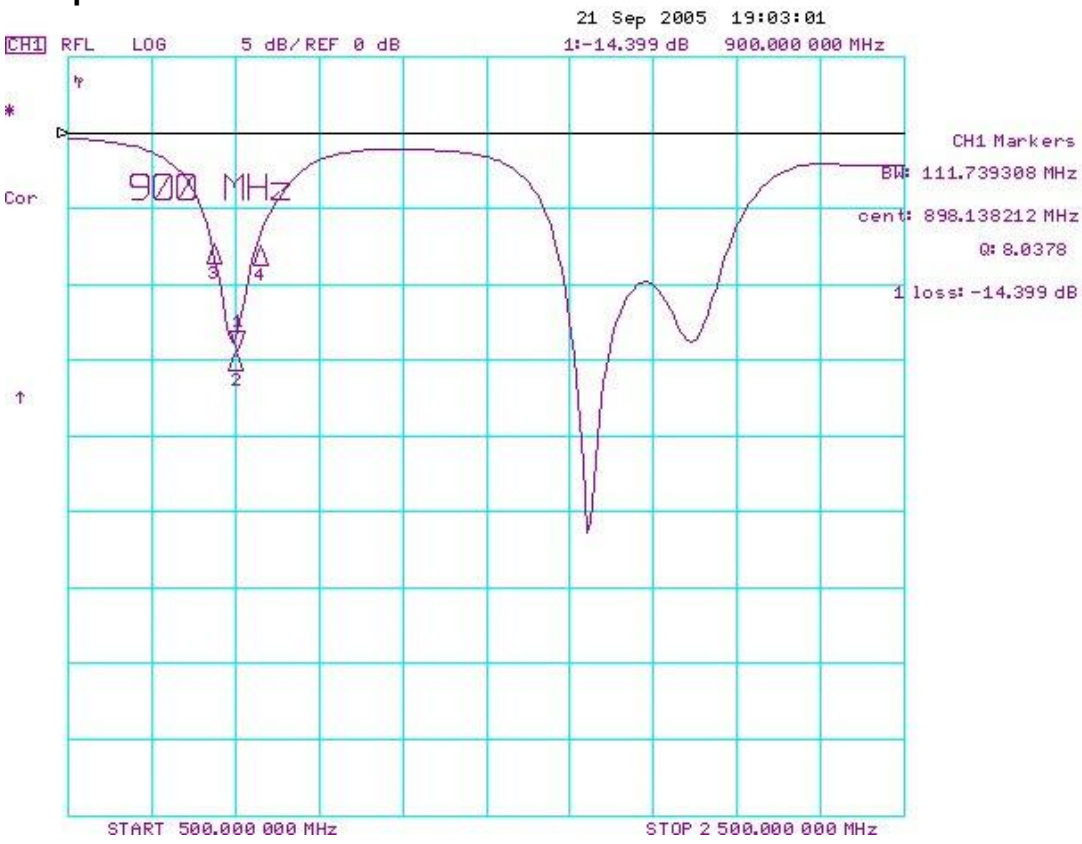
The antenna has the electrical characteristics given in Table 1 under the standard installation conditions shown in the figure of Evaluation Board.

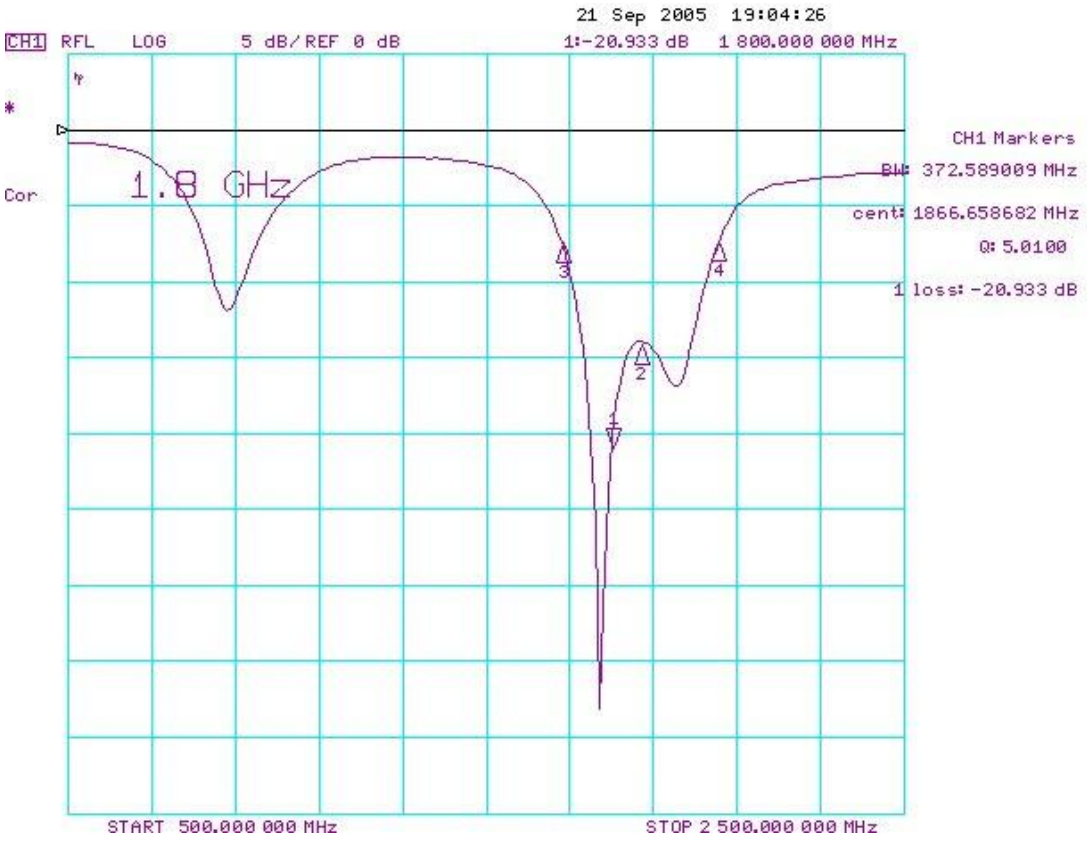
Table 1

No	Parameter	Specification
1	Working Frequency	**880~960 MHz , 1710~1990 MHz**
2	Dimension	**29.8*6*5 mm**
3	VSWR	2.5 max (depends on the special environment)
4	Polarization	Linear
5	Impedance	50 Ω
6	Operating Temperature	-40~105℃
7	Termination	Ag (Environmentally-Friendly Pb Free)

* Actual value will depend on customer ground plane size

S11 Response curve





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

Power average gain

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

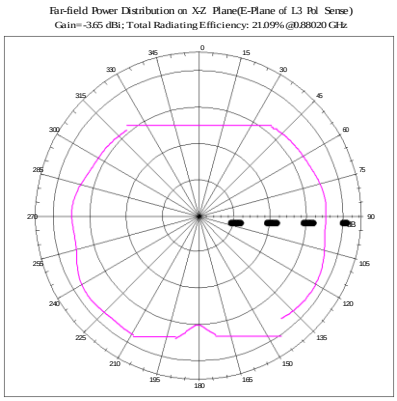
GSM1900

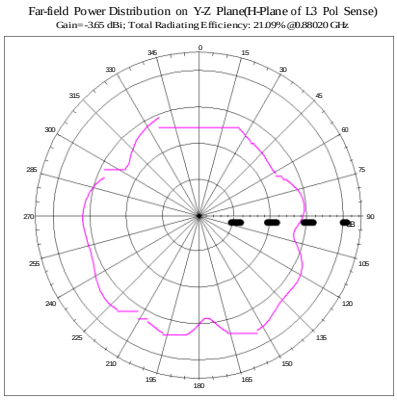
Frequency (GHz)		Plane	Average Gain (dBi)
TX	**1850.2**	XY plane	-3.511
		YZ plane	-4.649
		XZ plane	-1.147
	1880.0	XY plane	-3.746
		YZ plane	-4.124
		XZ plane	-1.435

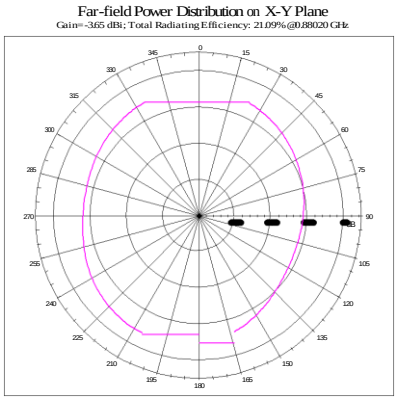
	1909.8	XY plane	-4.683
		YZ plane	-4.228
		XZ plane	-2.525
RX	**1930.2**	XY plane	-5.539
		YZ plane	-4.270
		XZ plane	-3.257
	1960.0	XY plane	-6.444
		YZ plane	-4.441
		XZ plane	-4.126
	1989.8	XY plane	-8.068
		YZ plane	-5.359
		XZ plane	-5.477

Antenna Pattern For Blue Tooth

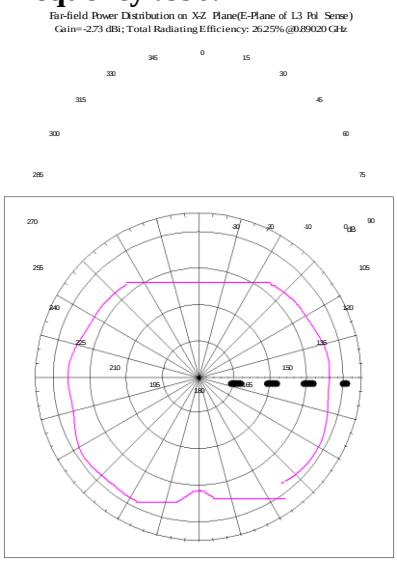
GSM900
Frequency :880.2 MHz

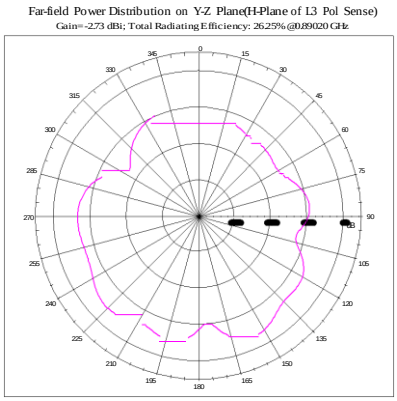


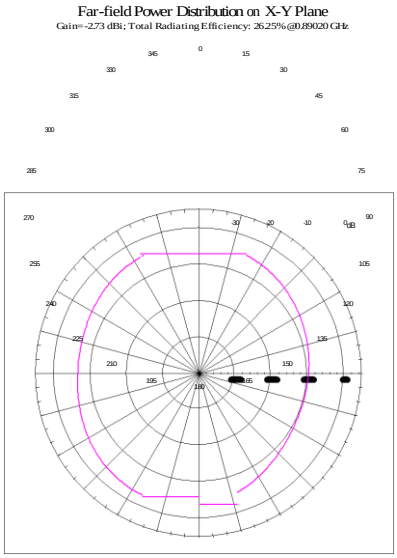




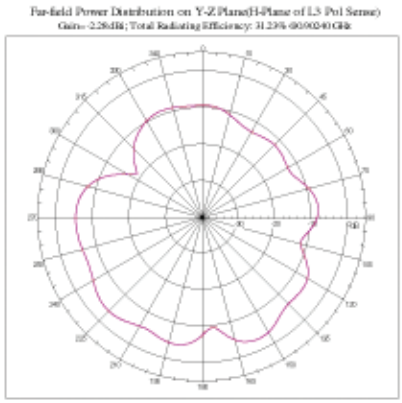
Frequency :890.2 MHz

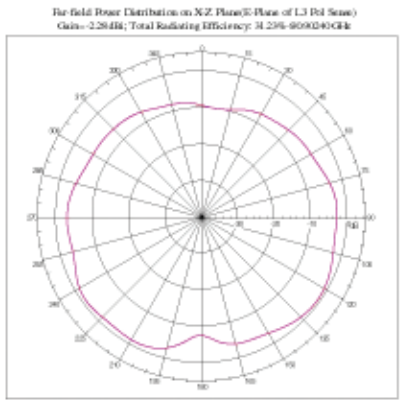




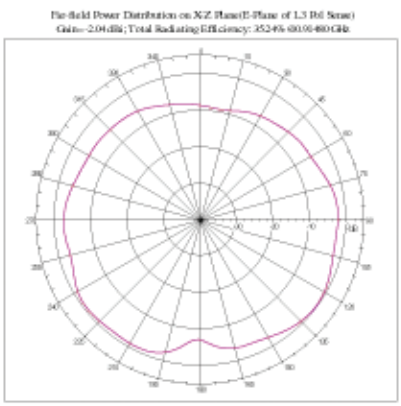


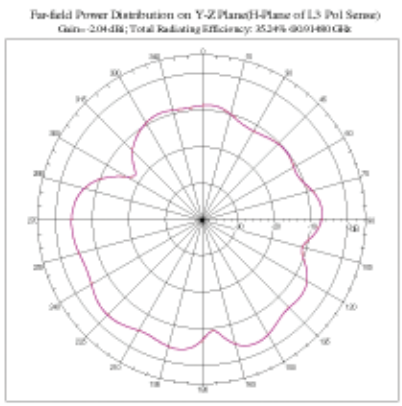
Frequency :902.4MHz



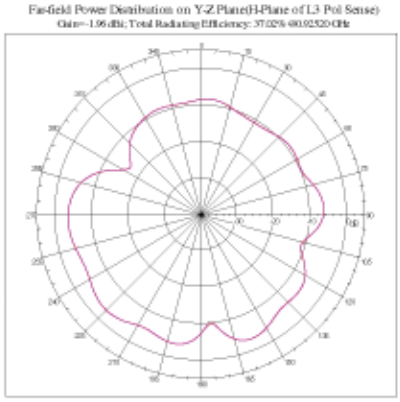


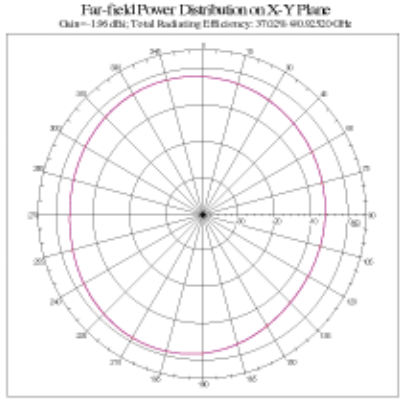
Frequency :914.8MHz





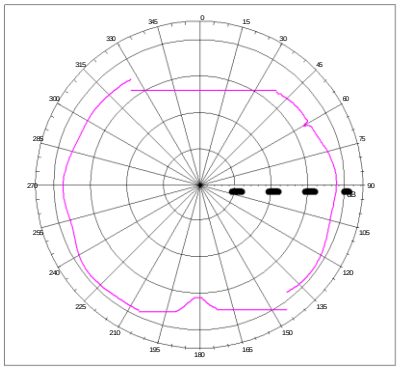
Frequency :925.2MHz



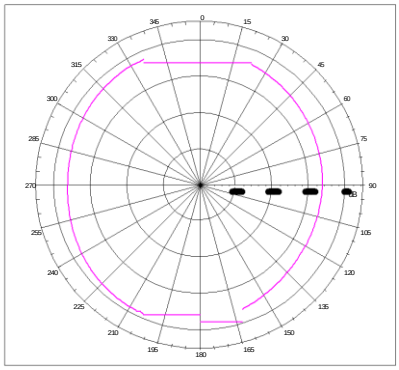


Frequency :935.2MHz

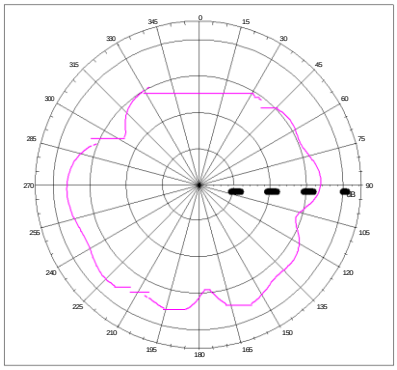
Far-field Power Distribution on X-Z Plane(E-Plane of L3 Pol Sense)
Gain=-2.54 dBi; Total Radiating Efficiency: 33.33% @0.93520 GHz



Far-field Power Distribution on X-Y Plane
Gain=-2.54 dBi; Total Radiating Efficiency: 33.33% @0.93520 GHz

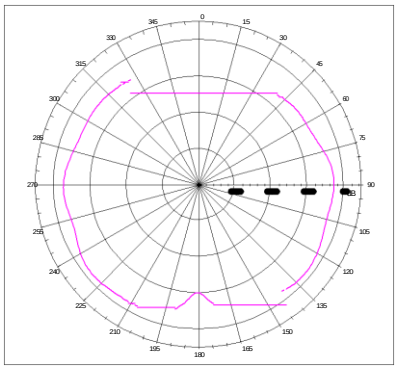


Far-field Power Distribution on Y-Z Plane(H-Plane of L3 Pol Sense)
Gain=-2.54 dBi; Total Radiating Efficiency: 33.33% @0.93520 GHz

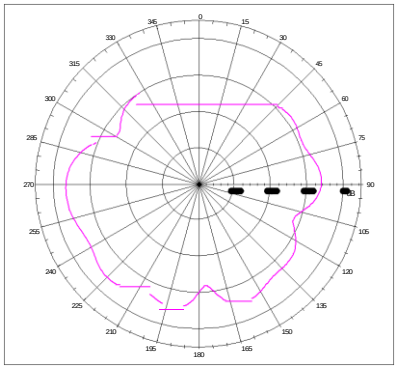


Frequency :947.4MHz

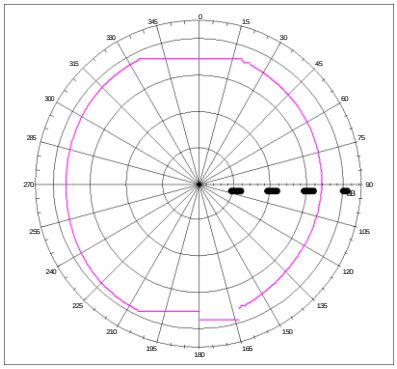
Far-field Power Distribution on X-Z Plane(E-Plane of L3 Pol Sense)
Gain=-2.96 dBi; Total Radiating Efficiency: 31.17% @0.947740 GHz



Far-field Power Distribution on Y-Z Plane(H-Plane of L3 Pol Sense)
Gain=-2.96 dBi; Total Radiating Efficiency: 31.17% @0.947740 GHz

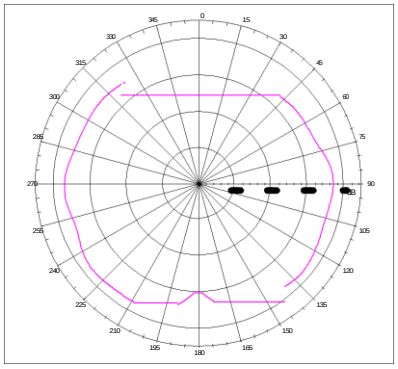


Far-field Power Distribution on X-Y Plane
Gain=-2.96 dBi; Total Radiating Efficiency: 31.17% @0.947740 GHz

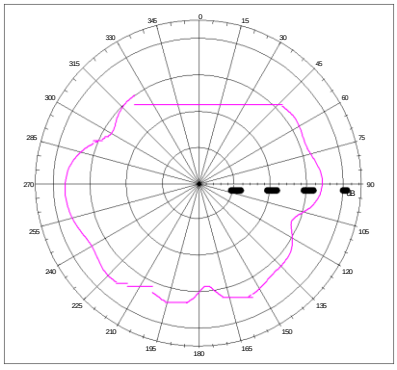


Frequency :959.8MHz

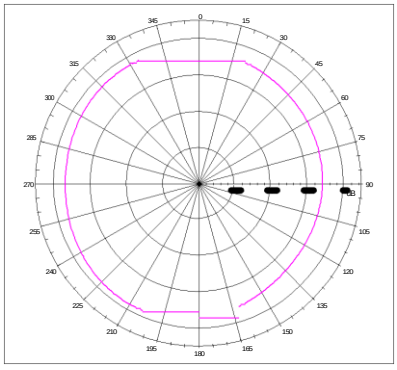
Far-field Power Distribution on X-Z Plane(E-Plane of L3 Pol Sense)
Gain=-3.16 dBi; Total Radiating Efficiency: 29.47% @0.959980 GHz



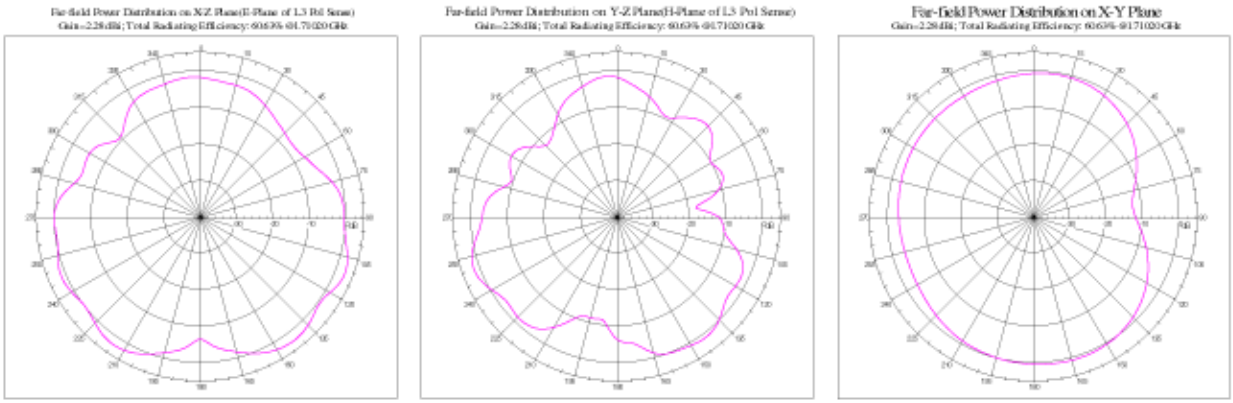
Far-field Power Distribution on Y-Z Plane(H-Plane of L3 Pol Sense)
Gain=-3.16 dBi; Total Radiating Efficiency: 29.47% @0.959980 GHz



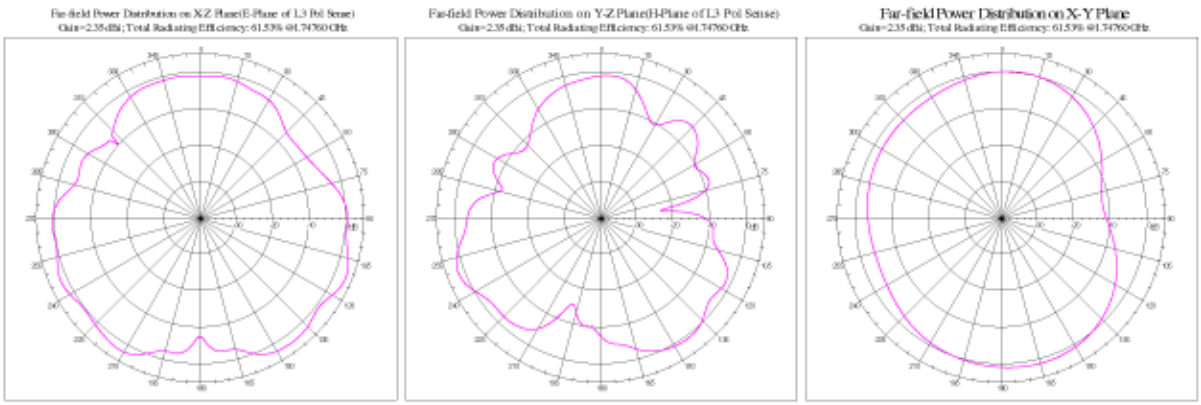
Far-field Power Distribution on X-Y Plane
Gain=-3.16 dBi; Total Radiating Efficiency: 29.47% @0.959980 GHz



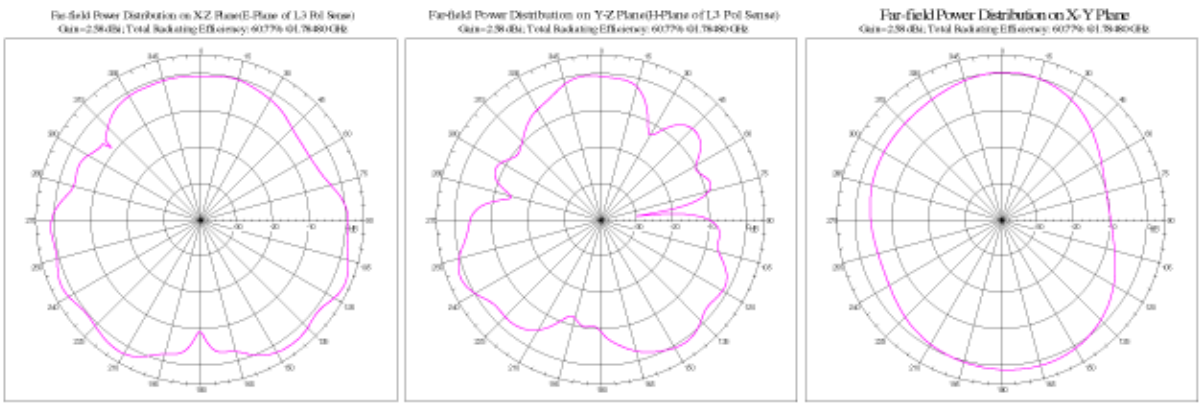
GSM1800
Frequency :1710.2 MHz



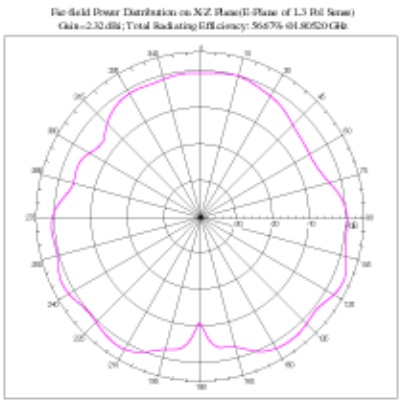
Frequency :1747.6 MHz



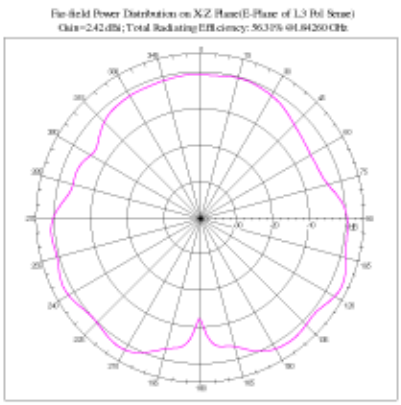
Frequency :1784.8 MHz

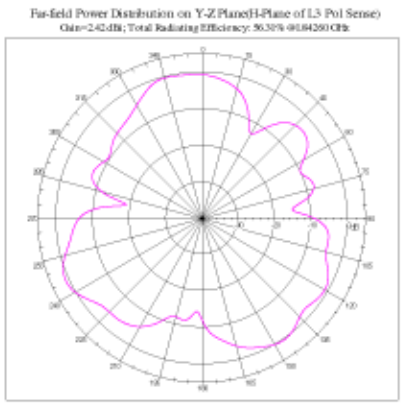


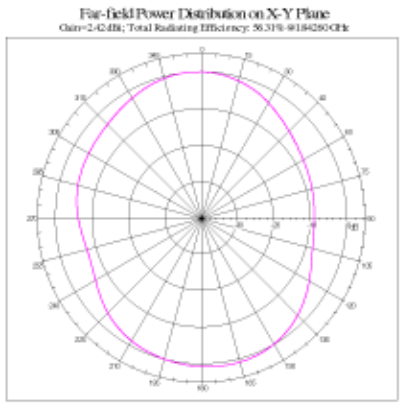
Frequency :1805.2 MHz



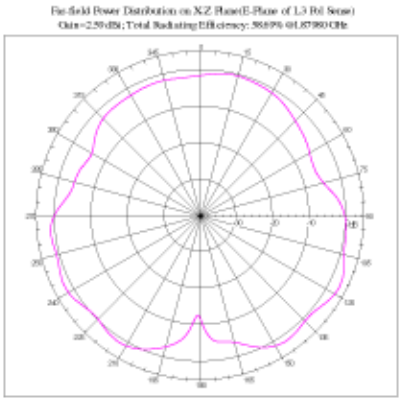
Frequency :1842.6 MHz

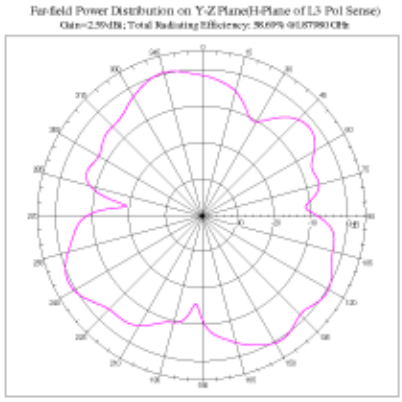


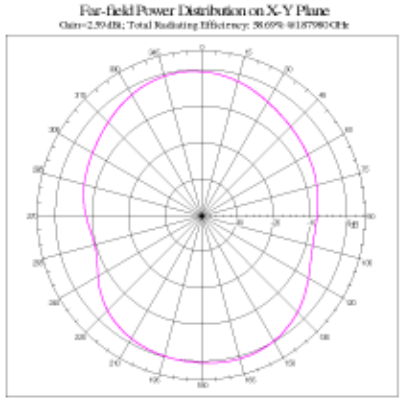




Frequency :1879.8 MHz

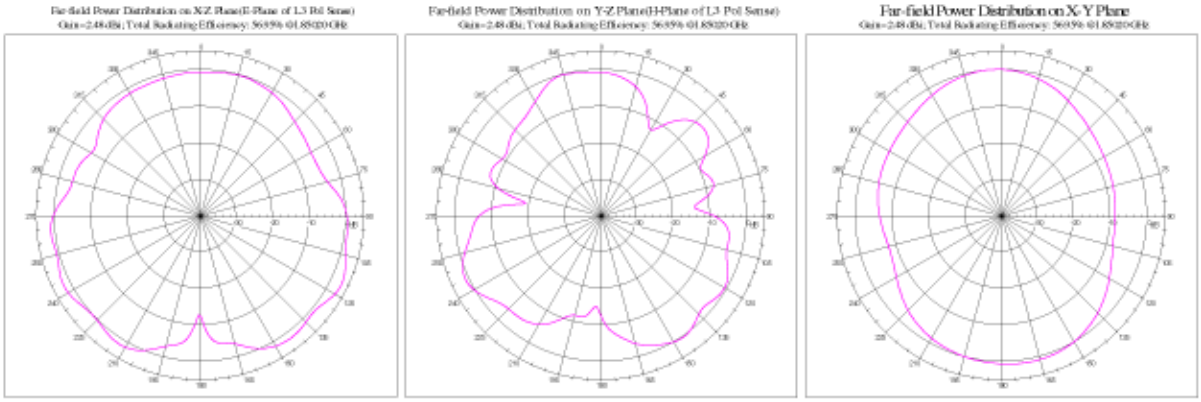




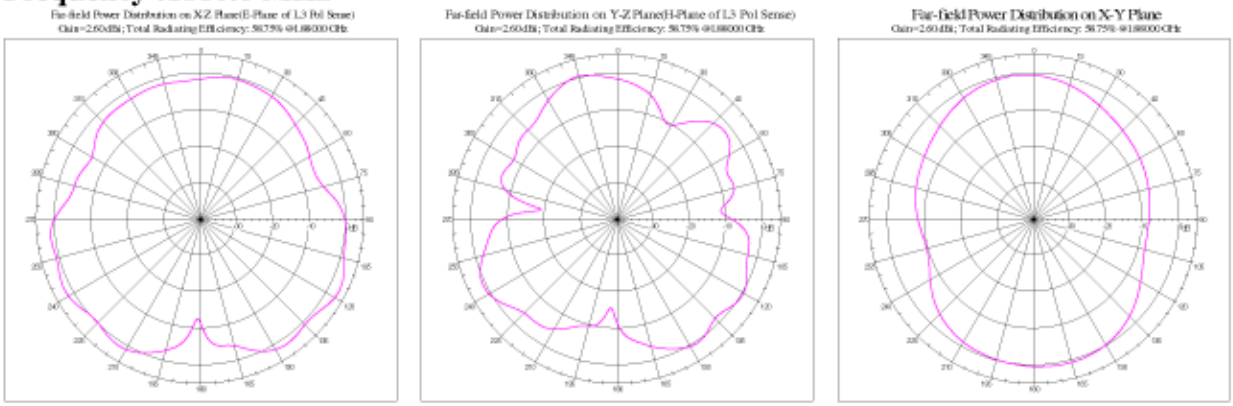


GSM1900

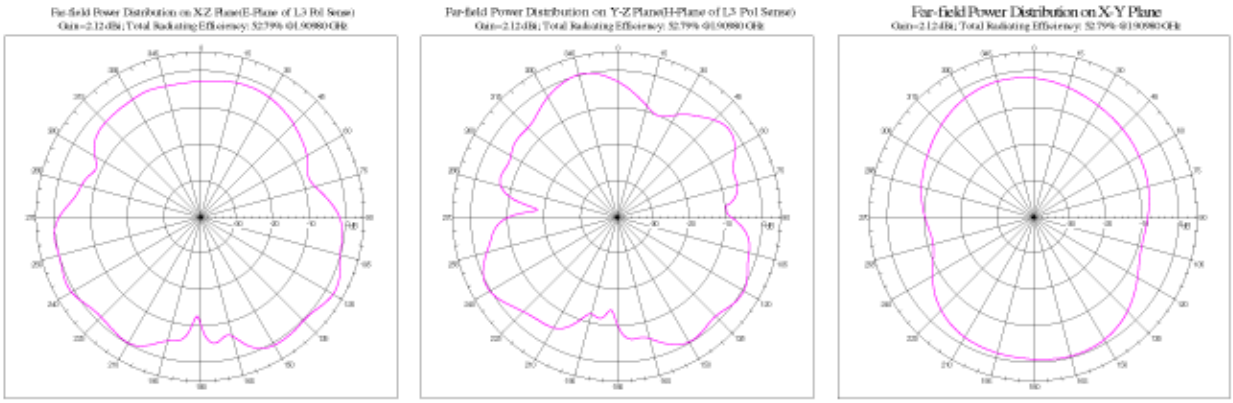
Frequency :1850.2 MHz



Frequency :1880.0 MHz



Frequency :1909.8 MHz



4 Environmental conditions

4-1 Operating conditions

The antenna has the electrical characteristics given in Tables 1 in the temperature range of -30℃ to +85℃ and under the environmental conditions of +40℃ and 0-95 % r.h..

4-2 Storage temperature range

The storage temperature range of product is -40℃ to +100℃

5 Reliability tests

5-1. Low-temperature test

Expose the specimen to -30 ℃ for 500 hours and then to normal temperature/humidity for 24 hours or more. After this test, examine its appearance and functions.

5-2 High-temperature test

Expose the specimen to +85 ℃ for 500 hours and then to normal temperature/humidity for 24 hours or more. After this test, examine its appearance and functions.

5-3 High-temperature/high-humidity test

Subject the object to the environmental conditions of +85℃ and 90-95% r.h. for 96 hours, then expose to normal temperature/humidity for 24 hours or more. After this test, examine its appearance and functions.

5-4 Thermal shock test

Subject the object to cyclic temperature change (-30℃, 30 minutes $\Longleftrightarrow$ +85℃, 30 minutes) for 5 cycles, the expose to normal temperature/humidity for 24 hours or more.

5-5 Vibration test

5-5-1 Sinusoidal vibration test

Subject the object to vibrations of 5 to 200 to 5Hz swept in 10 minutes, 4.5G at maximum (2mm amplitude), in X and Y directions for two hours each and in Z direction for four hours. After this test, examine its appearance functions.

5-5-2 Vibration test in packaged condition

Subject the object, which is packaged as illustrated, to vibrations of 15 to 60 to 15Hz swept in 6 minutes, 4G at maximum (2mm amplitude at maximum), applied in X, Y and Z directions for two hours each, i.e. six hours in total. After this test, examine its appearance and functions.

5-6 Free fall test in packaged condition

Drop the object, which is packaged as illustrated, to a concrete surface from the height of 90 cm, on one comer, three edges and six faces once each, i.e. 10 times in total. After this test, examine its appearance and functions.

5-7. Soldering Heat Resistance Test:

After the lead pins of the unit are soaked in solder bath at 270 ± 5℃ for 10± 0.5 seconds and then be left for more than 1 hour at 25±5℃ in less than 65% relative humidity.

5-8. Adhesion Test:

The device is subjected to be soldered on test PCB. Then apply 0.5Kg(5N) of force for 10±1 seconds in the direction of parallel to the substrate. (the soldering should be done by reflow and be conducted with care so that the soldering is uniform and free of defect by stress such as heat shock) .

6 Inspection

As for the examination in the mass production, the receiving character of the ratio wave sent in a shield box from the standard antenna and VSWR are confirmed in the picking out examination.

7 Warranty

If any defect occurs form the product during proper use within a year after delivery, it will be repaired or replaced free of charge.

8 Other

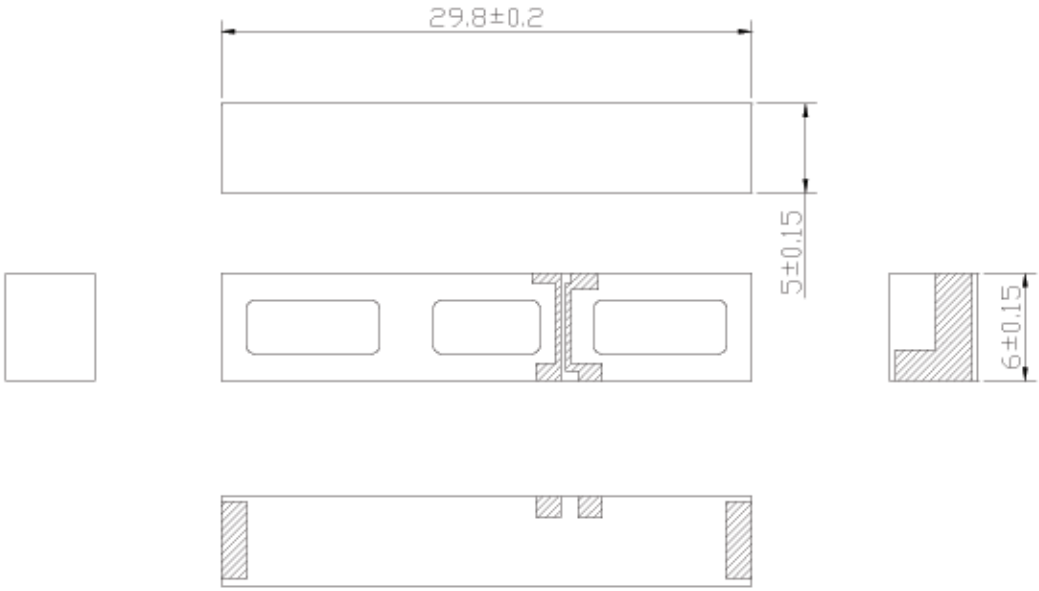
Any question arising from this specification manual shall be solved by arrangement made by both parties.

9 Precautions for use

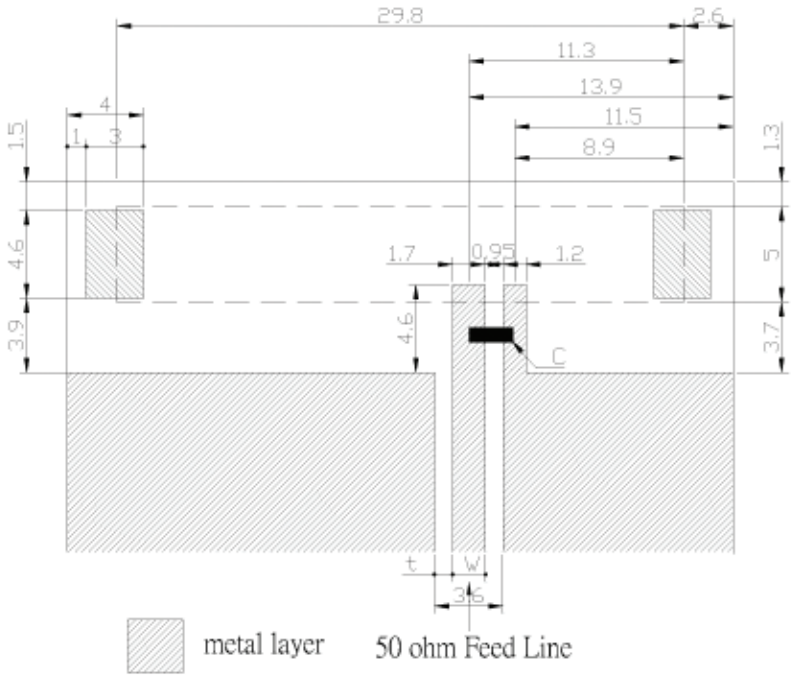
- Antenna pattern use a Ag electrode.
- Please don’t use the corrosion gas (sulfur gas, chlorine gas) in the atmosphere.
- Please don’t direct solder onto the gold electrode of Antenna pattern.

10. Drawings

Shape and Dimension



Recommend foot print for Evaluation Board

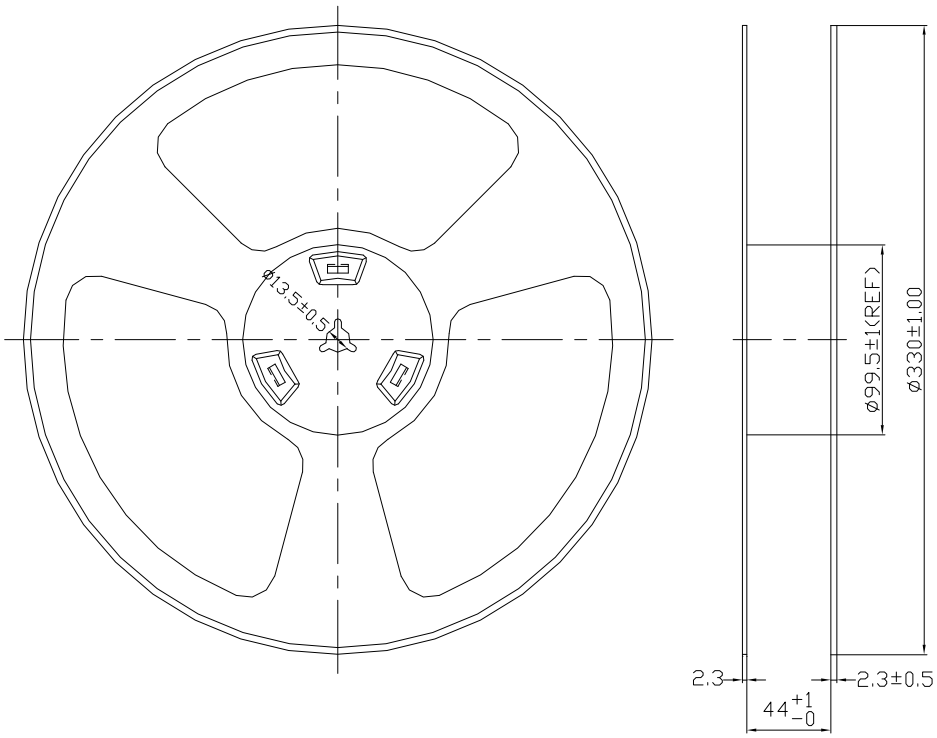


t,w=Unique dimensioning according to your PCB.
C=inductor and capacitor values according to
your specific device.

Delivery mode

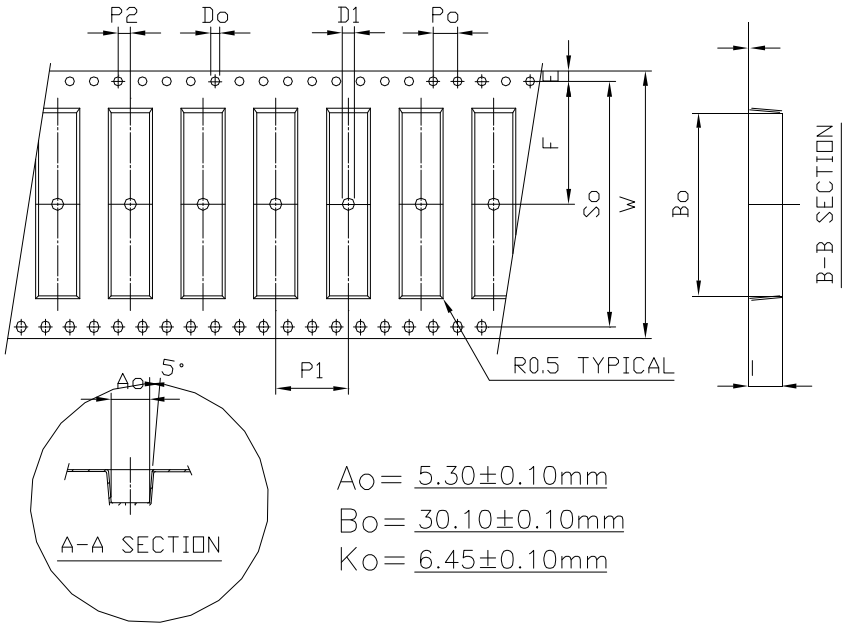
1 Blister tape to IEC 286-3，polyester。

2 Pieces/tape：450



Unit: mm

S I I	S
I 1	—
I	I 0±0 10
1	12 0±0 10
I 2	2 0±0 15
D	1 5
D1	2 0(M)
I	1 /5±0 10
I	20 2±0 10
10I	I0 0±0 10
W	I I 0±0 30
I	0 30±0 05
S	I0 I±0 10

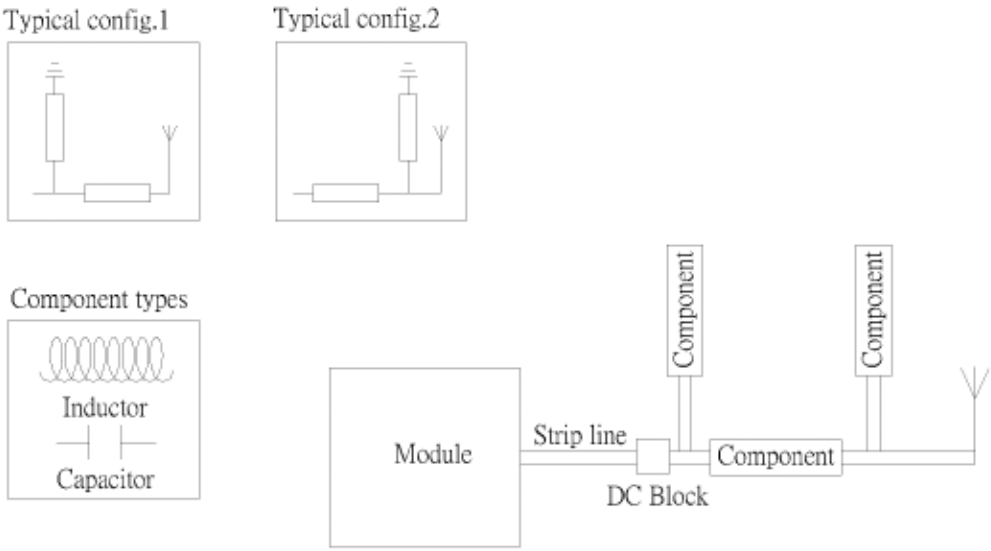


Ao= 5.30±0.10mm

Bo= 30.10±0.10mm

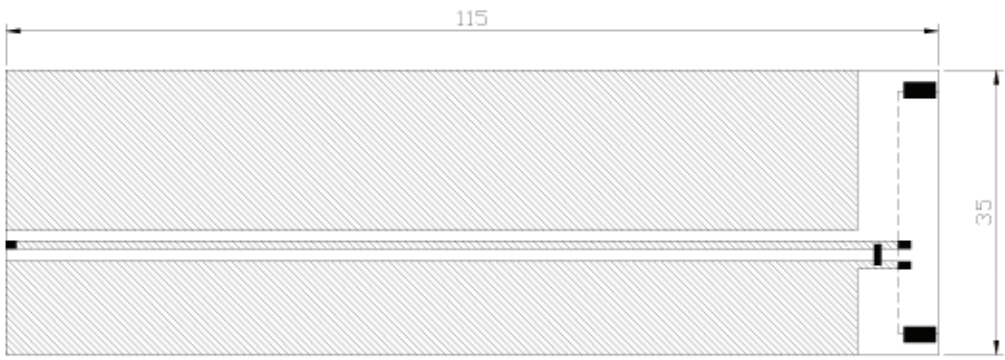
Ko= 6.45±0.10mm

Transmission line and matching



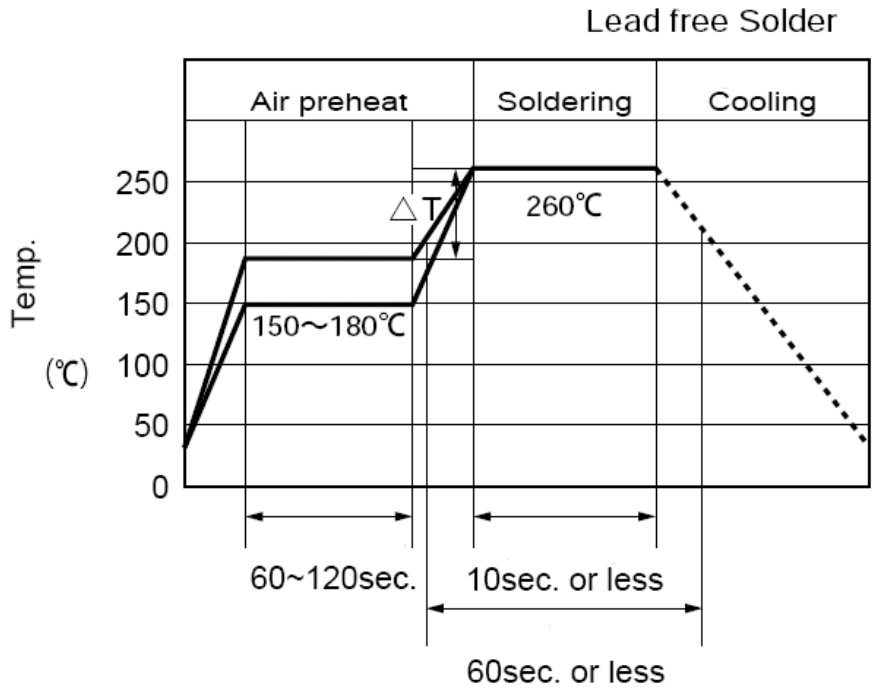
The matching network has to be individually designed using one,two or three components.

Test board dimensions



The testboard is designed for evaluation purposes for

11.Recommended Reflow Temperature Profile



(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℃.
(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/liter

Cleaning time: 5minutes max.