



SPK ELECTRONICS CO., LTD.

SPECIFICATION

PART NO.	:	SPK-ANT-DPAF0S00	<hr/>
PRODUCT NAME	:	Dielectric Antenna(30*5*5 mm)	<hr/>
DESCRIPTION	:	Combined GSM 4Band and W-CDMA2100 Antenna ROHS Compliant Product	<hr/>

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PART NUMBER: SPK-ANT-DPAF0S00

1 SCOPE

This specification covers the dielectric antenna for **824~960MHz, 1710~2170 MHz** application.

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 SPK standard installation conditions shown in the figure of Evaluation Board.

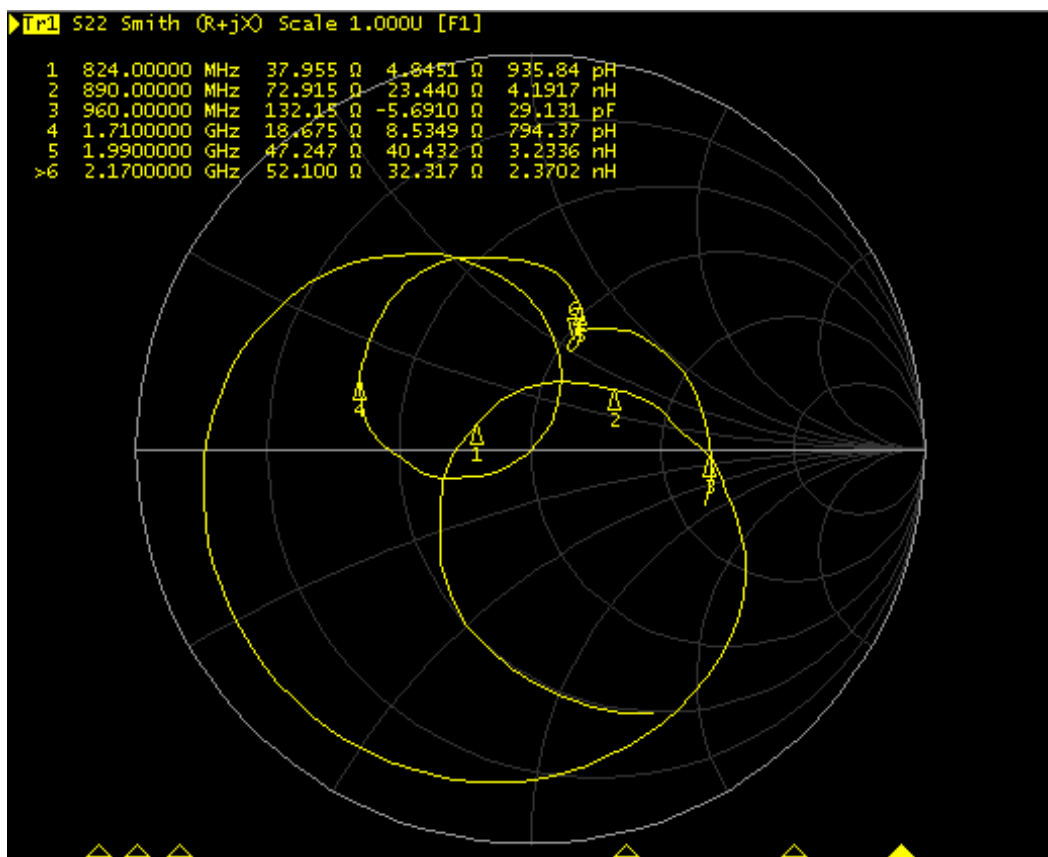
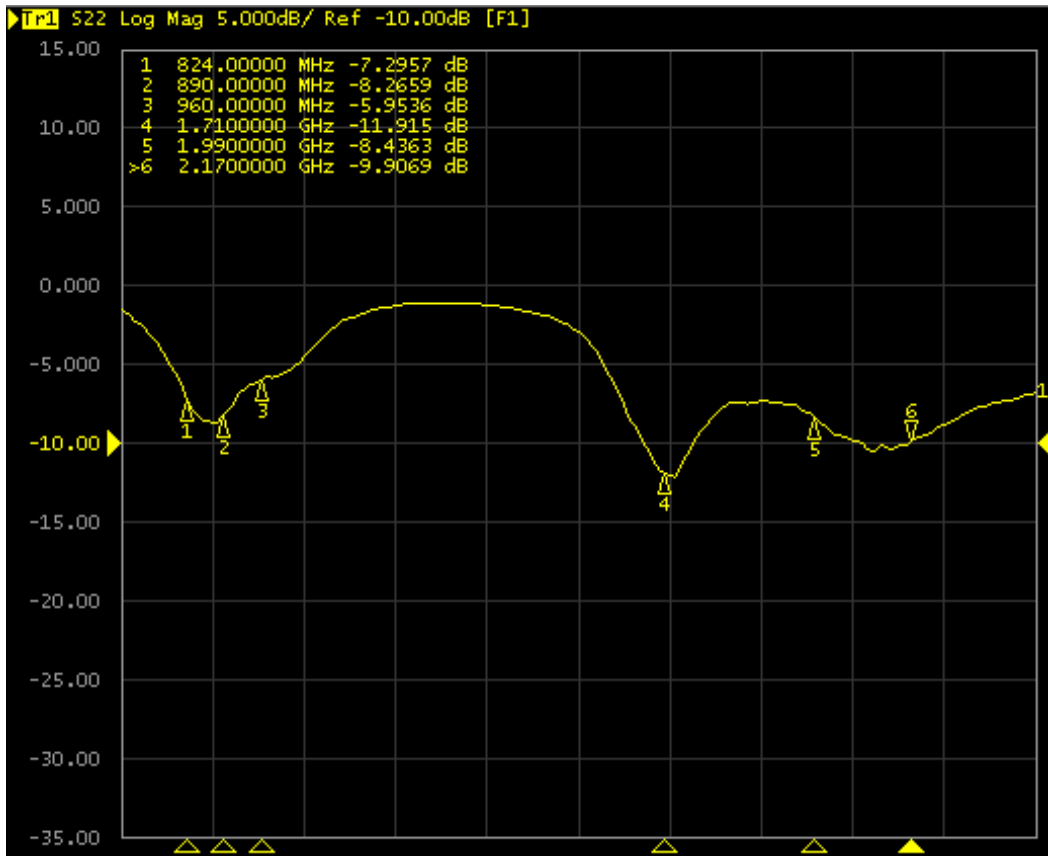
Table 1

No	Parameter	Specification	
1	Working Frequency	824~960 MHz,1710~2170 MHz	
2	Dimension	30x5x5 mm	
3	VSWR	3 max (depends on the special environment)	
4	Polarization	Linear	
5	Impedance	50 Ω	
6	Operating Temperature	-40~85°C	
7	Termination	Ag (Environmentally-Friendly Pb Free)	
8	Efficiency(%)	824~960 MHz	55
		1710~2170 MHz	60

* Evaluation board size 40X120 mm

* Actual Electrical value will depend on customer ground plane size

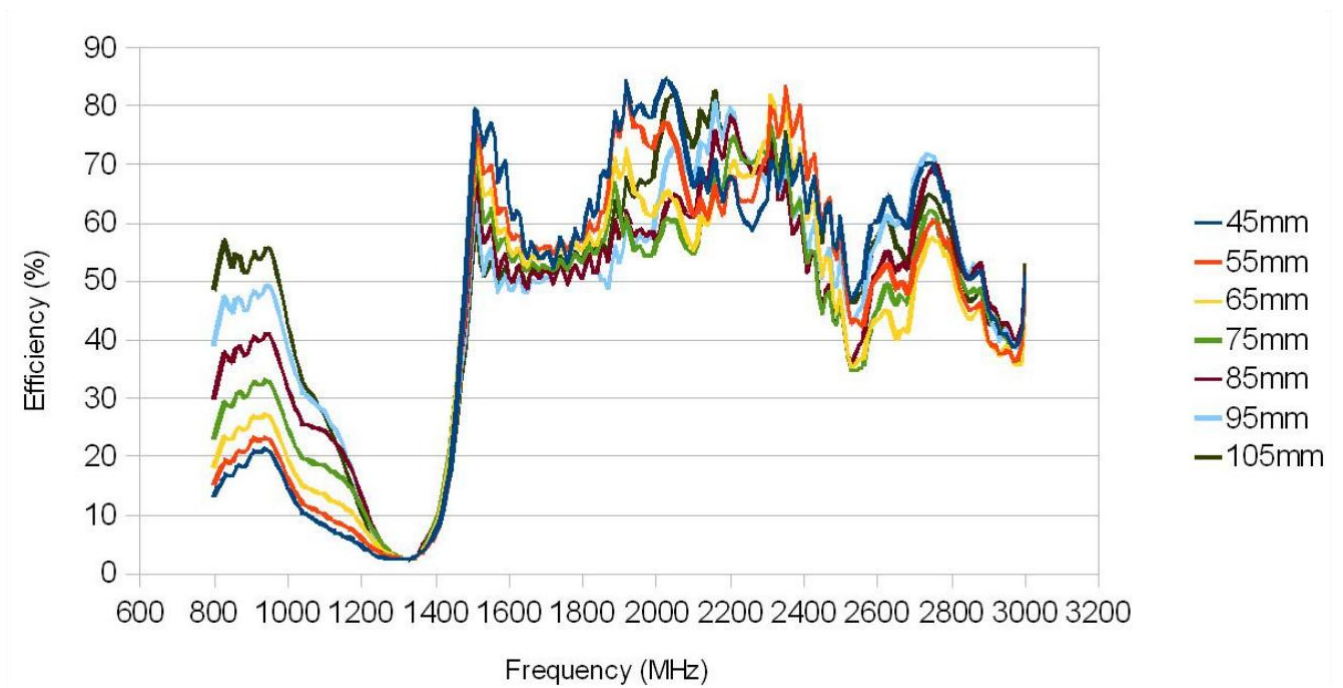
S22 Response curve



Gain and Efficiency

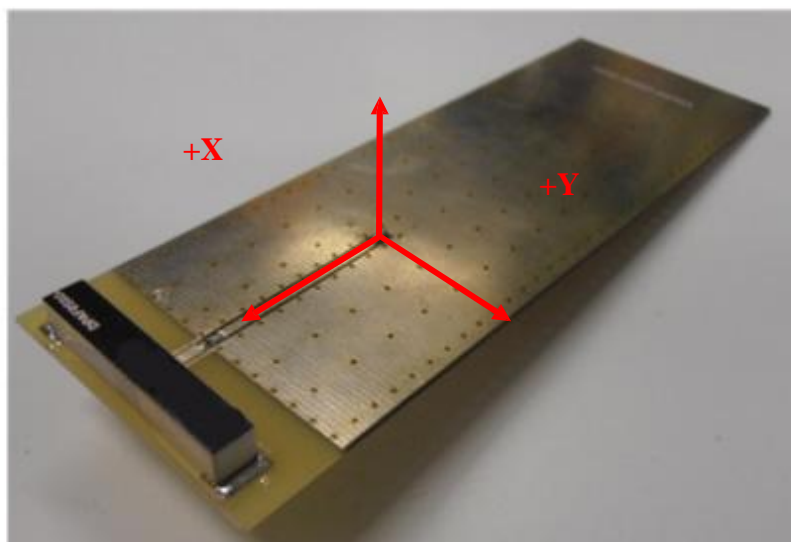
(Ground length: 107mm)

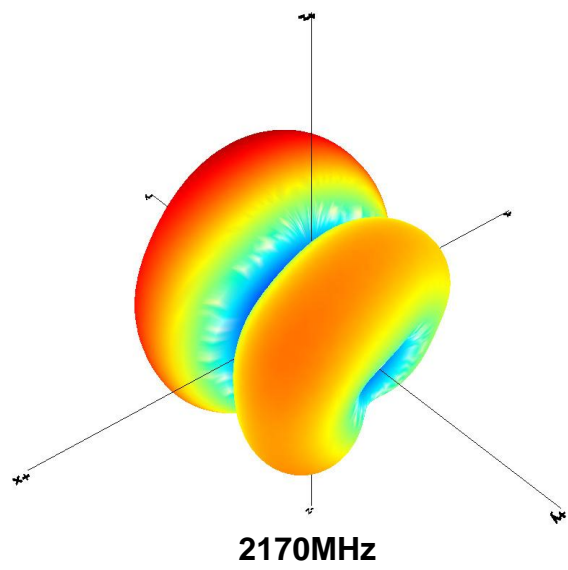
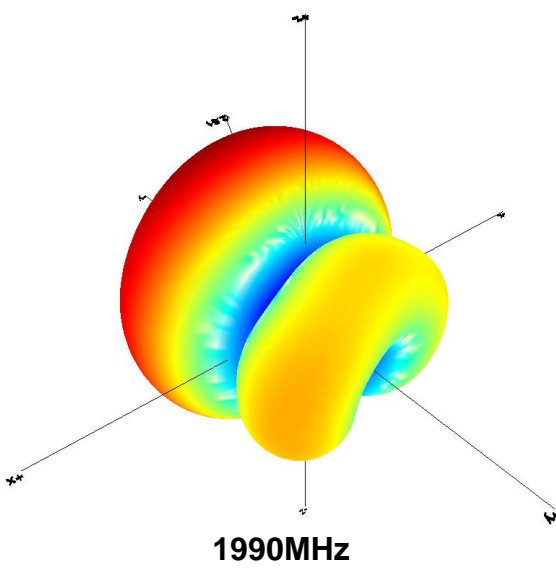
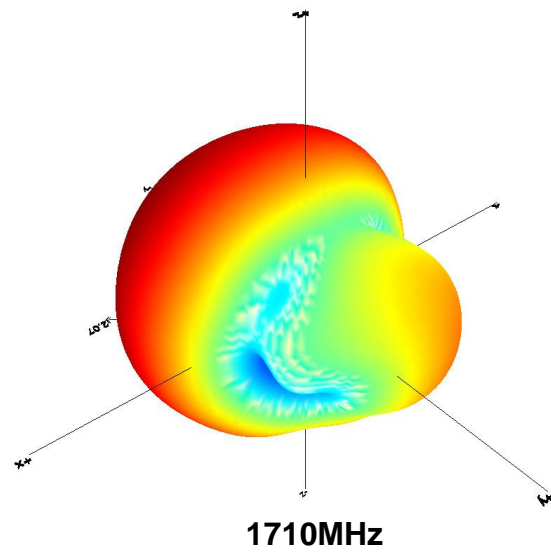
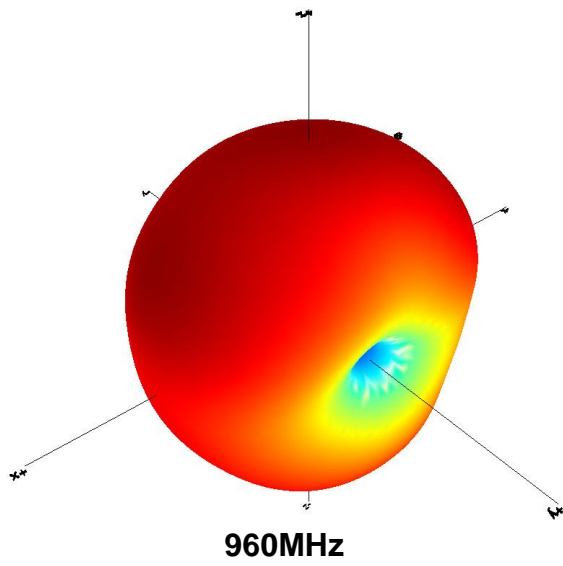
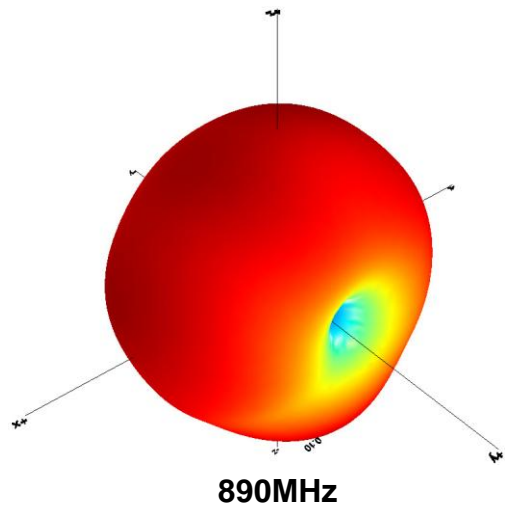
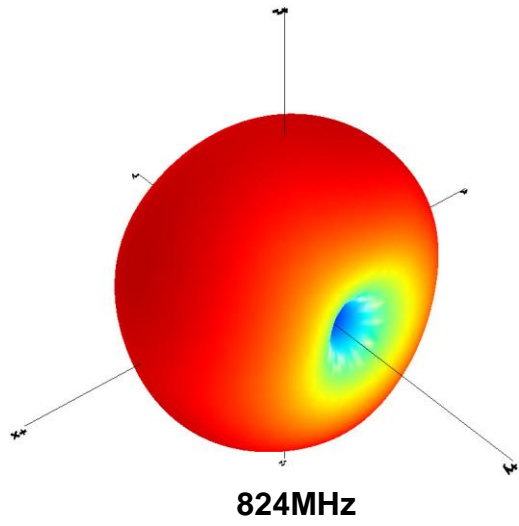
Penta-Band antenna peak gain parameter summary										
Band	GSM (MHz)				DCS (MHz)		PCS (MHz)		WCDMA (MHz)	
	824	890	880	960	1710	1880	1850	1990	2110	2170
Peak Gain(dBi)	0.77	0.10	0.55	-0.18	2.08	1.78	2.12	2.70	3.03	3.12
Efficiency(%)	59.4	53.15	54.12	54.57	54.42	53.18	53.90	58.94	66.10	63.80



3D Radiation Pattern (measure on EVB)

+Z





4 Environmental conditions

4-1 Operating conditions

The antenna has the electrical characteristics given in Tables 1 in the temperature range of -40°C to $+85^{\circ}\text{C}$ and under the environmental conditions of $+40^{\circ}\text{C}$ and 0-95 % r.h..

4-2 Storage temperature range

The storage temperature range of product is -40°C to $+85^{\circ}\text{C}$

5 Reliability tests

5-1. Low-temperature test

Expose the specimen to -30°C 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 $+85^{\circ}\text{C}$ 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 $+85^{\circ}\text{C}$ 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°C , 30 minutes \leftrightarrow $+85^{\circ}\text{C}$, 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, check the appearance and functions.

5-7. Soldering Heat Resistance Test:

After the lead pins of the unit are soaked in solder bath at $270 \pm 5^{\circ}\text{C}$ for 10 ± 0.5 seconds and then be left for more than 1 hour at $25 \pm 5^{\circ}\text{C}$ 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

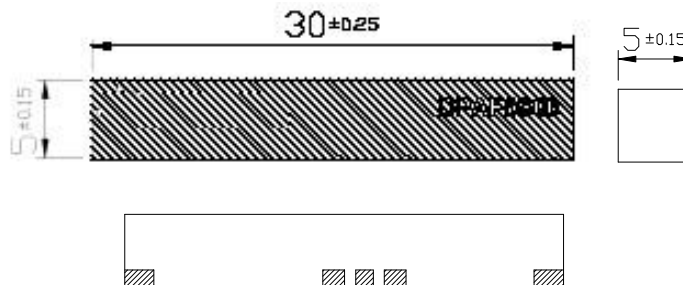
Any question arising from this specification manual shall be solved by arrangement made by both parties.

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.

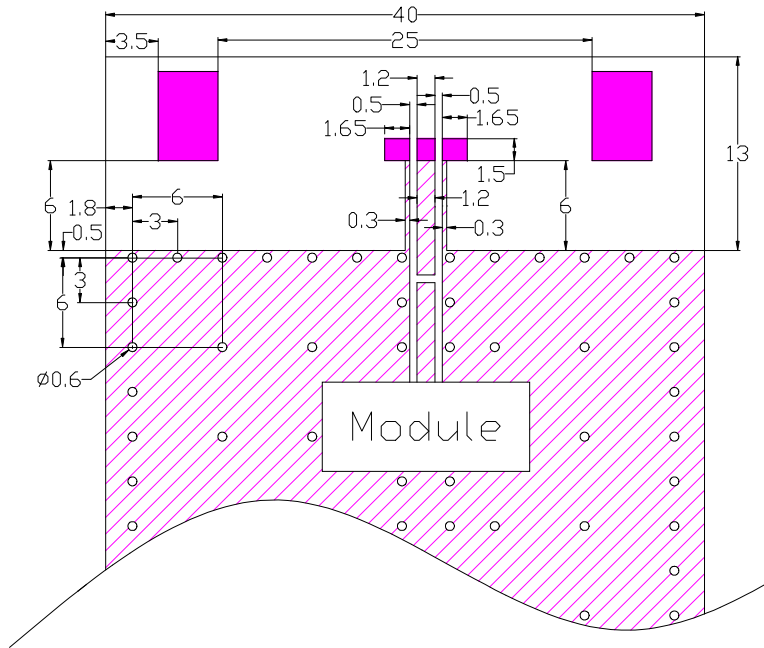
10. Drawings

Shape and Dimension

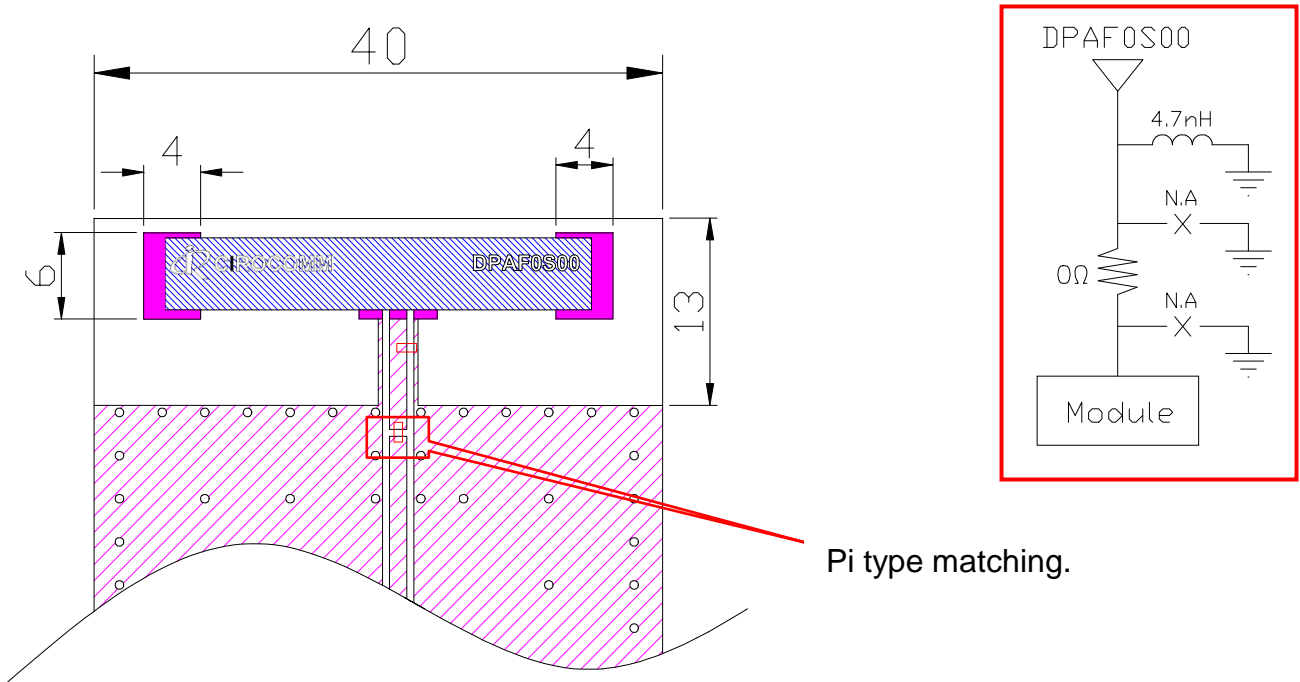


Unit:mm

Customer's Requirement Layout Dimension



Antenna Environment on Demo Board Matching Circuit

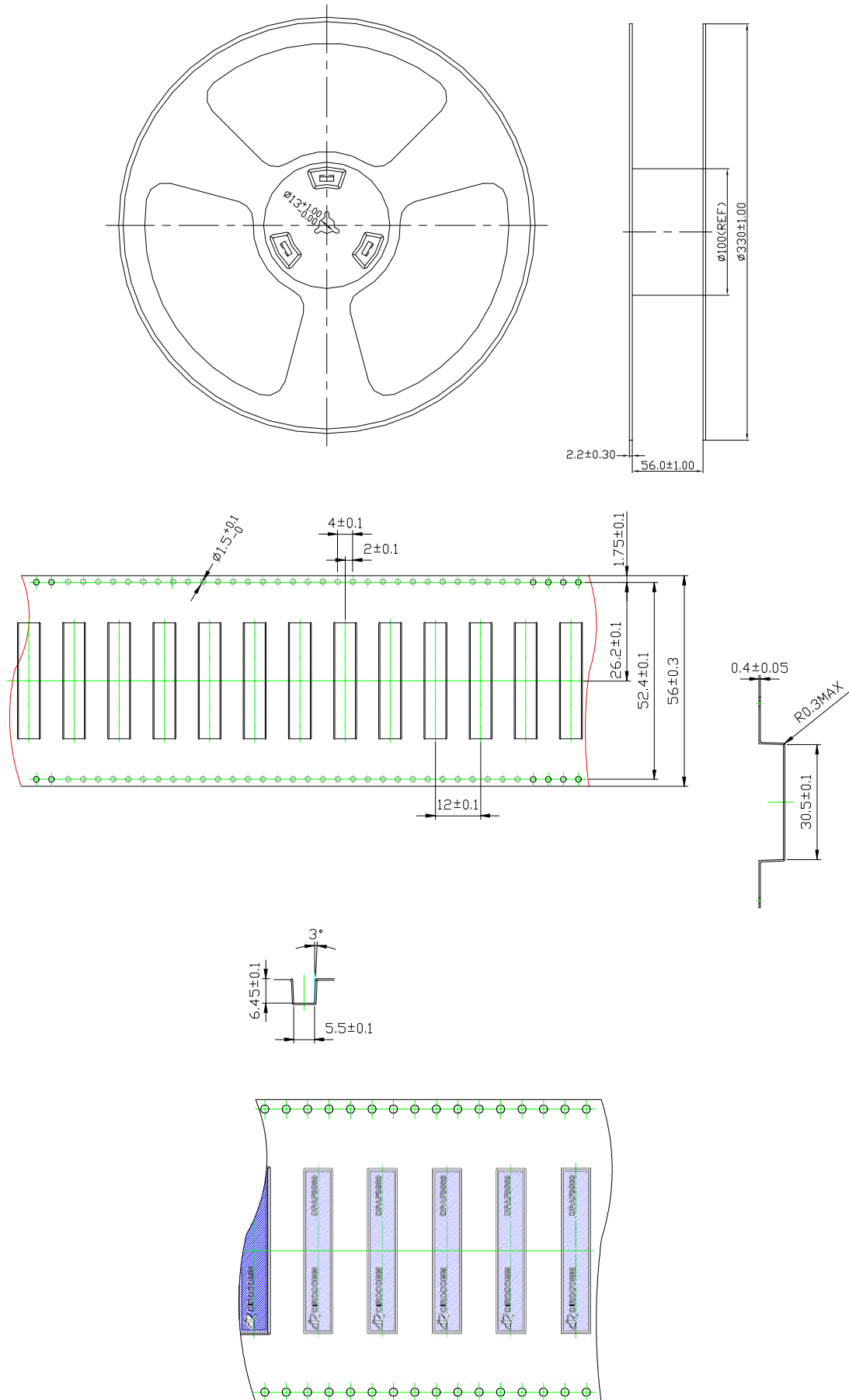


Between antenna and module need a pi type matching circuit.

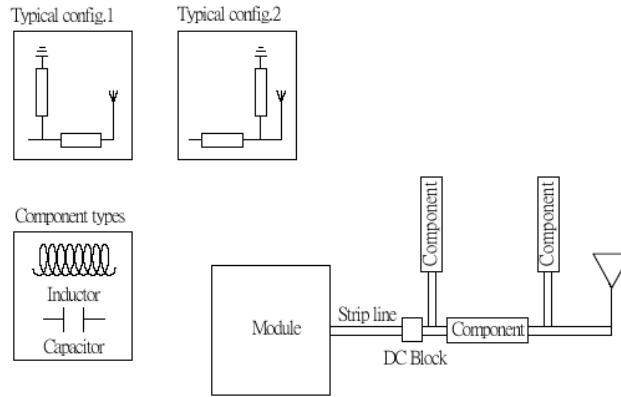
Delivery mode

1 Blister tape to IEC 286-3 , polyester ◦

2 Pieces/tape : 450



Transmission line and matching



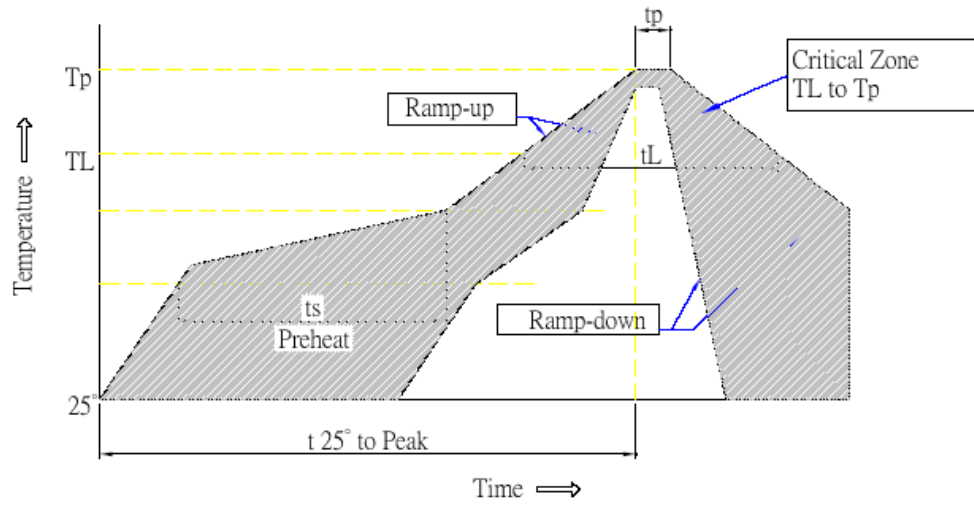
The matching network has to be individually designed using one, two or three components.

11. Recommended Reflow Temperature Profile

SPK-ANT-DPAF0S00 Planer Inverted-F antenna can be assembled following either Sn-Pb or Pb-free assembly. According to the Standard **IPC/JEDEC J-STD-020C**, the temperature profile suggested is as follow:

Phase	Profile features	Sn-Pb Assembly	Pb-Free Assembly (SnAgCu)
RAMP-UP	Avg. Ramp-up Rate (T _{max} to TP)	3°C/second (max)	3°C/second(max)
PREHEAT	-Temperature Min(T _{Smin}) -Temperature Max(T _{Smin}) -Time(t _{Smin} to t _{Smax})	100°C 150°C 60-120 seconds	100°C 150°C 60-120 seconds
REFLOW	-Temperature(T _L) -Total Time above T _L (t _L)	183°C 60-150 seconds	217°C 60-150 seconds
PEAK	-Temperature(T _P) -Time(t _p)	235°C 10-30 second	260°C 20-40 second
RAMP-DOWN	Rate	6°C / second max.	6°C / second max.
Time from 25°C to Peak Temperature		6 minutes max.	8 minutes max.

Next graphic shows temperature profile(gray zone)for the antenna assembly process in reflow ovens.



Temperatures profile