[APPROVAL SHEET]

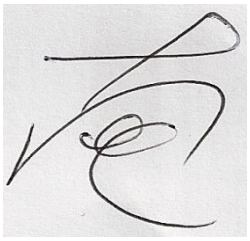
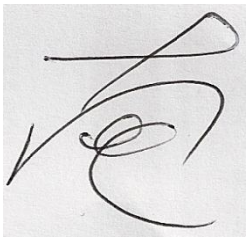
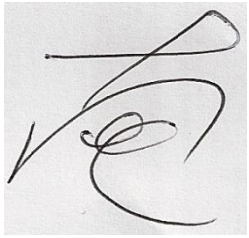
(WI-FI)

Nice Korea Components Co., Ltd

TEL : 031-470-8989

FAX : 031-470-8949

[APPROVAL SHEET]

Product	NKCBTF-F02	
Model	SPP-R200II	
Designed by	Checked by	Approved by
		

2013. 9. 14

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- Contents -

1. Revision History

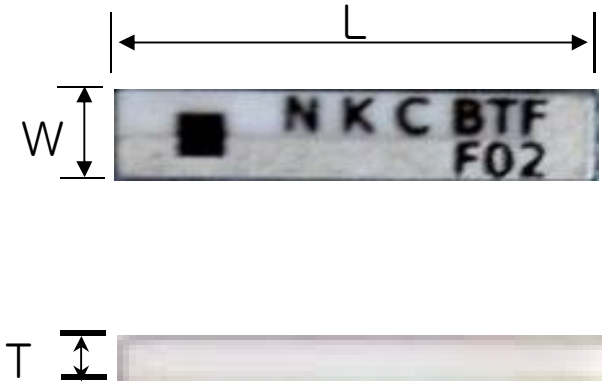
product	NKCBTF-F02	Model	SPP-R200II

Rev. No.	Rev. Issue	Page	Designed	Date
1.0	Appro. Issue	-	KC. NAM	2013.9.14

2. Features & Applications

2.1 Features

This ceramic chip antenna is applied to 2.4 GHz ISM band applications, i.e. Bluetooth. Zigbee, Wireless LAN, etc...

형태	Bulk Ceramic	
재질	유전체	Al_2O_3(Alumina)
	전극	은(Ag)
크기 (mm)	L = 10+/- 0.1	
	W = 2+/- 0.1	
	T = 1.2+/- 0.1	
Weight	97~100 mg	

3. Electrical Specifications

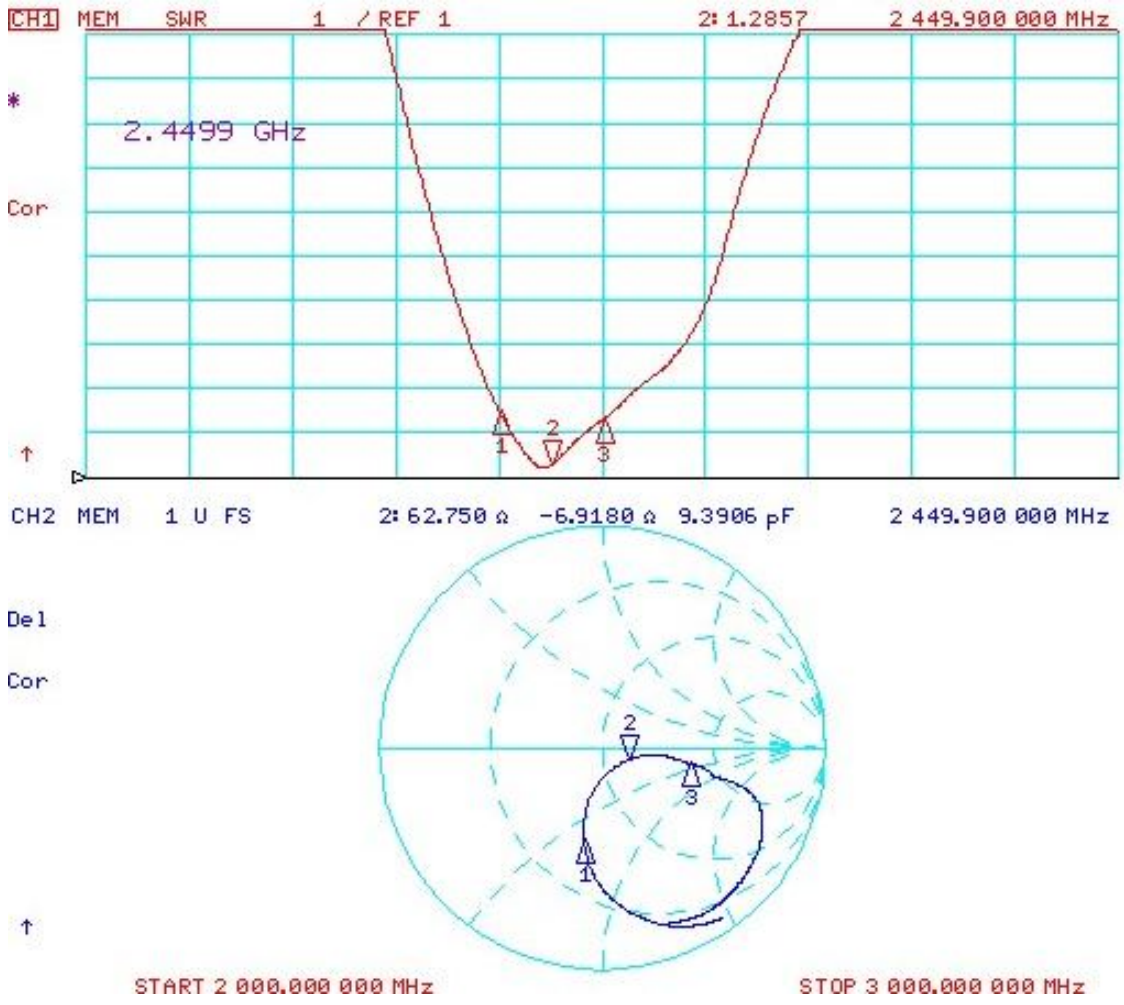
3-1.

* All item are measured in room temperature (24~26 'C).

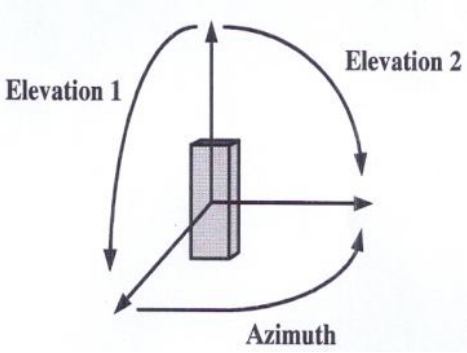
* All item are measured at customer set condition.

No.	Items	Typical Data
1	Frequency (MHz)	2400 ~2500
2	VSWR	3 : 1
3	Total Gain (Peak/AVG.) [dBi]	3.91 / -3.53
4	Impedance	50 ohm
5	Polarization	Linear

3-2. VSWR (S11)of USER SET condition



3-3. Radiation Patterns



Theta	Vertical Field of measured plane
Phi	Horizontal Field of measured plane

Gain(dBi)	Total Gain (Peak/Avg) [dBi]		3.91 / -3.53	
	Azimuth	H-pole	Peak	2.35
			Avg	-5.65
	Elevation	V-pole	Peak	0.73
			Avg	-7.67

Summary | **Multiple Frequency** | Multiple Cut | 3D-View | Reserved

		θ-Pol(H)					H(θ=90)				E1(φ=0)			
No.	Freq.	Eff.[%]	Avg.[dBi]	Peak[dBi]	θ[deg]	φ[deg]	Avg.[dBi]	Peak[dBi]	φ[deg]	BW[deg]	Avg.[dBi]	Peak[dBi]	θ[deg]	BW[
1	2.400	22.86	-6.41	1.46	130.00	100.00	-5.95	-1.36	100.00	72.16	-8.09	-0.68	165.00	99
2	2.420	26.09	-5.84	2.03	130.00	100.00	-5.47	-1.16	280.00	47.52	-7.50	0.00	165.00	99
3	2.430	26.99	-5.69	2.21	115.00	90.00	-5.48	-0.32	280.00	47.14	-7.29	0.13	165.00	2
4	2.450	27.23	-5.65	2.35	115.00	85.00	-5.86	-0.79	280.00	46.67	-7.15	0.13	165.00	99
5	2.500	23.82	-6.23	2.25	130.00	90.00	-6.98	-1.46	285.00	45.87	-7.75	-0.58	165.00	99

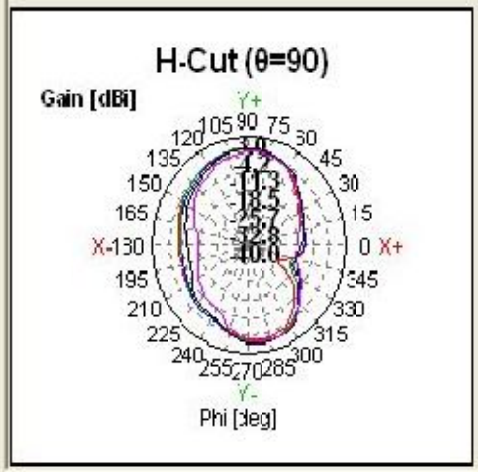
Plot Data

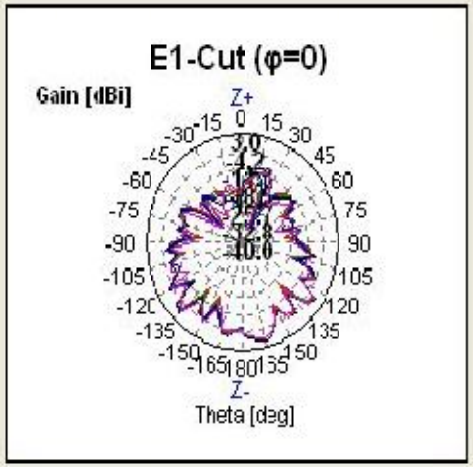
Polarization :

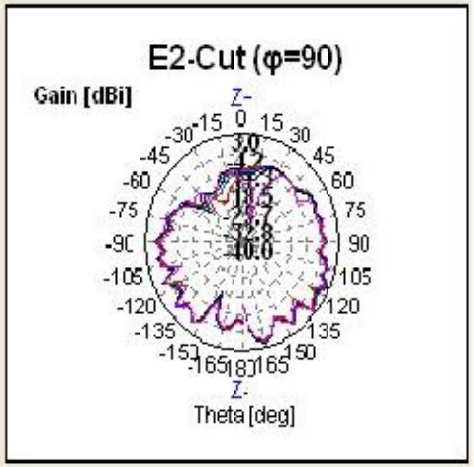
θ-pol(H)

Frequency : [GHz]

2.400
2.420
2.430
2.450
2.500







Graph Option

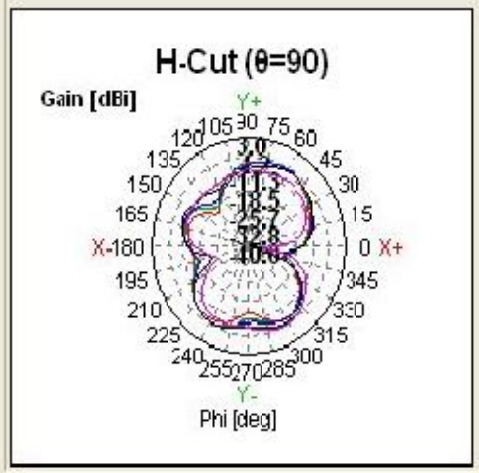
Style: ◉ Polar ○ Rectangular

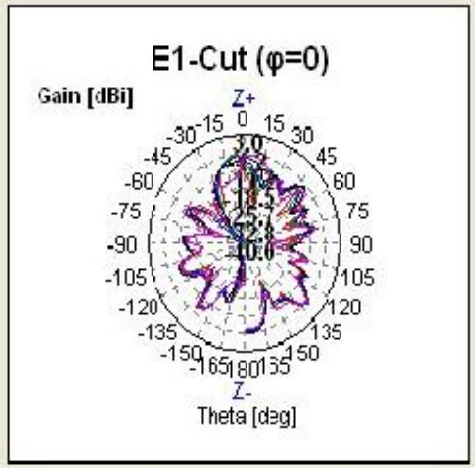
Zoom: H-Cut | E1-Cut | E2-Cut

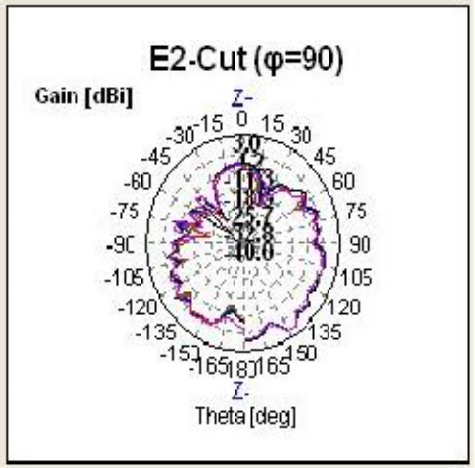
Scale: Max : 3 Min : -40 Apply

Summary | **Multiple Frequency** | Multiple Cut | 3D-View | Reserved

		φ-Pol(V)					H(θ=90)				E1(φ=0)			
No.	Freq.	Eff.[%]	Avg.[dBi]	Peak[dBi]	θ[deg]	φ[deg]	Avg.[dBi]	Peak[dBi]	φ[deg]	BW[deg]	Avg.[dBi]	Peak[dBi]	θ[deg]	BW[
1	2.400	14.53	-8.38	0.52	145.00	8500	-9.70	-5.58	65.00	66.49	-11.39	-3.48	130.00	
2	2.420	16.10	-7.93	0.59	145.00	8500	-9.04	-4.99	55.00	63.71	-10.95	-3.06	130.00	
3	2.430	16.68	-7.78	0.63	145.00	8500	-8.89	-5.00	55.00	62.15	-10.73	-3.03	130.00	
4	2.450	17.09	-7.67	0.73	145.00	8000	-8.76	-5.34	300.00	96.82	-10.71	-3.82	130.00	1
5	2.500	15.03	-8.23	0.50	145.00	7500	-9.81	-4.30	300.00	53.21	-11.06	-3.67	130.00	1







Plot Data

Polarization :

φ-pol(V)

Frequency :

2.400
2.420
2.430
2.450
2.500

[GHz]

Graph Option

Style

(•) Polar ( ) Rectangular

Zoom

H-Cut | E1-Cut | E2-Cut

Scale

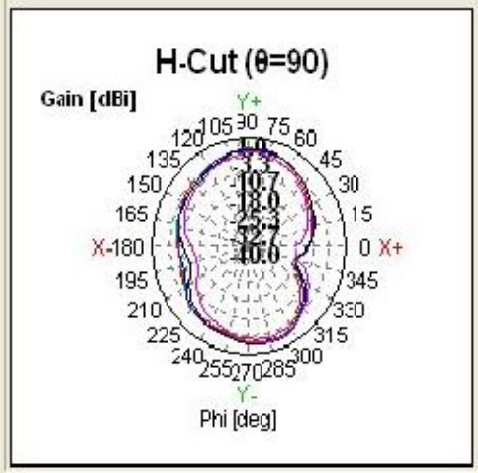
Max : 3

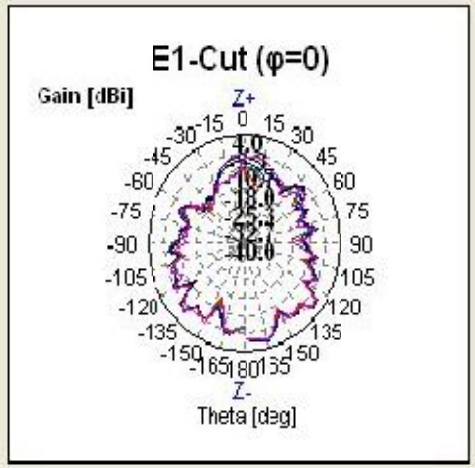
Min : -40

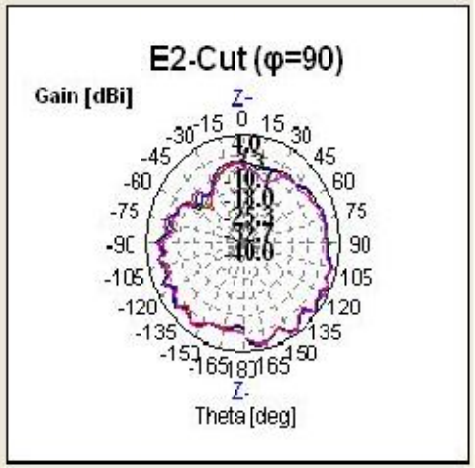
Apply

Summary | **Multiple Frequency** | Multiple Cut | 3D-View | Reserved

No.	Freq.	PwrSum Eff.[%]	Avg.[dBi]	Peak[dBi]	θ[deg]	φ[deg]	H(θ=90) Avg.[dBi]	Peak[dBi]	φ[deg]	BW[deg]	E1(φ=0) Avg.[dBi]	Peak[dBi]	θ[deg]	BW[
1	2.400	37.39	-4.27	3.23	130.00	85.00	-4.42	-0.34	90.00	75.65	-6.42	0.06	170.00	9
2	2.420	42.19	-3.75	3.69	130.00	85.00	-3.89	-0.52	85.00	75.17	-5.88	0.76	165.00	9
3	2.430	43.67	-3.60	3.80	130.00	85.00	-3.85	-0.16	285.00	73.85	-5.67	0.88	165.00	9
4	2.450	44.32	-3.53	3.91	130.00	85.00	-4.06	0.24	285.00	59.04	-5.56	0.73	165.00	9
5	2.500	38.84	-4.11	3.69	130.00	85.00	-5.76	-0.06	285.00	52.56	-6.08	0.25	130.00	







Plot Data

Polarization : Powr-Sum

Frequency : [GHz]

2.400
2.420
2.430
2.450
2.500

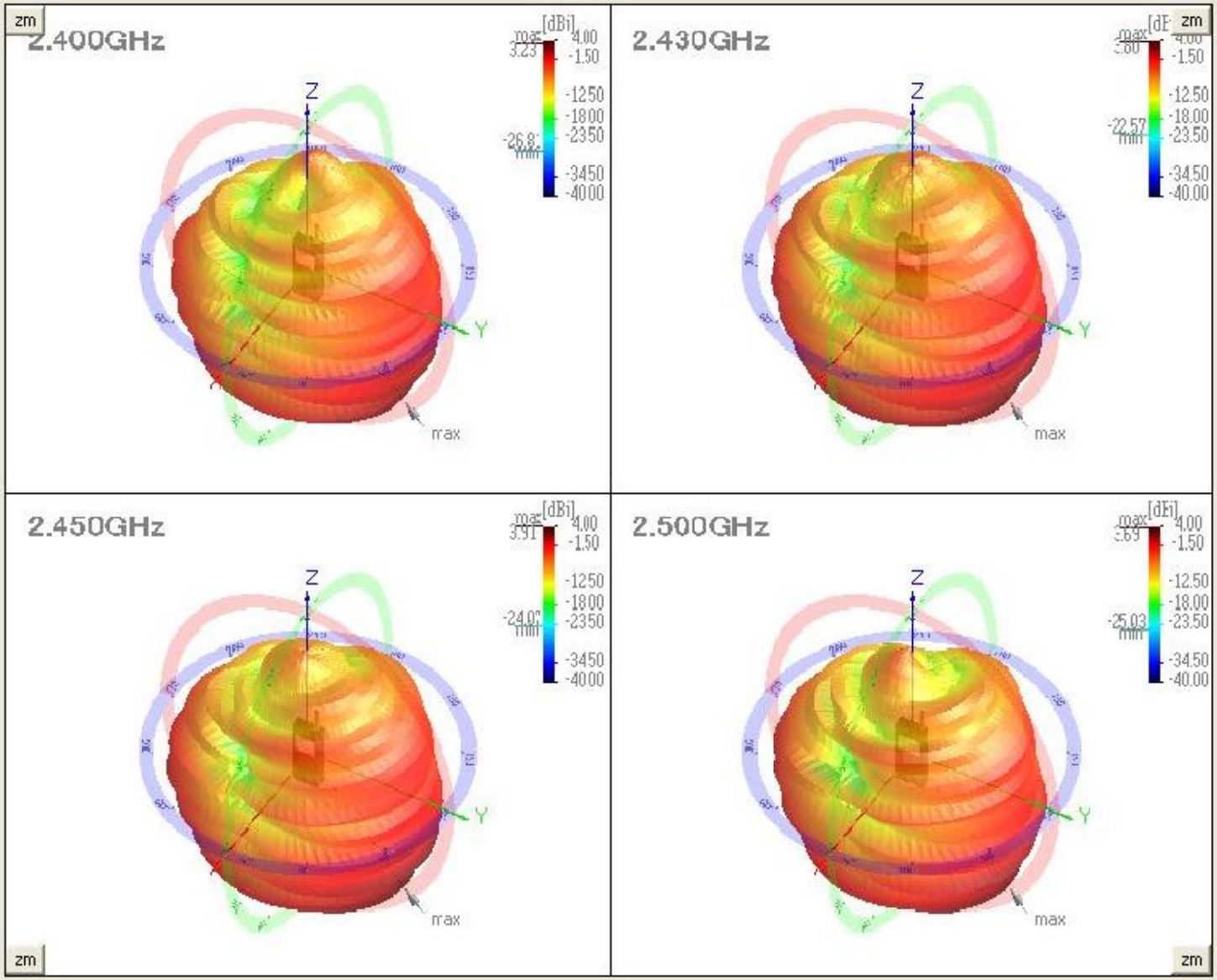
Graph Option

Style: (•) Polar ( ) Rectangular

Zoom: H-Cut | E1-Cut | E2-Cut

Scale: Max : 4 Min : -40 Apply

Summary | Multiple Frequency | Multiple Cut | **3D-View** | Reserved



Plot Data

Polarization :

Powr-Sum

Frequency :

2.400
2.425
2.430
2.450
2.500

[GHz]

Graph Option

- [ ] AutoRotation
- [x] View Phone
- [ ] SphereMapping
- [ ] Interpolation

x2

Scale

( ) Auto (•) User Defined

Max : 4

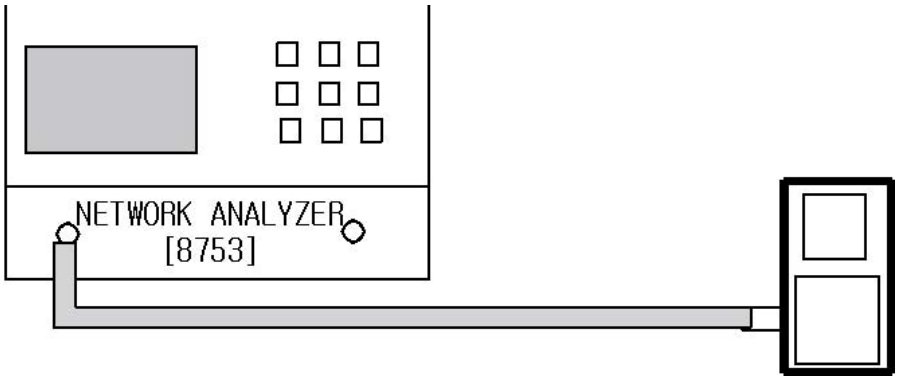
Min : -40

Apply

4. Measurements Method & Conditions

The measurement of antenna performance is measurement of gain, radiation pattern using ORBIT/FR apparatus in Anechoic chamber and measurement of VSWR using Network analyzer.

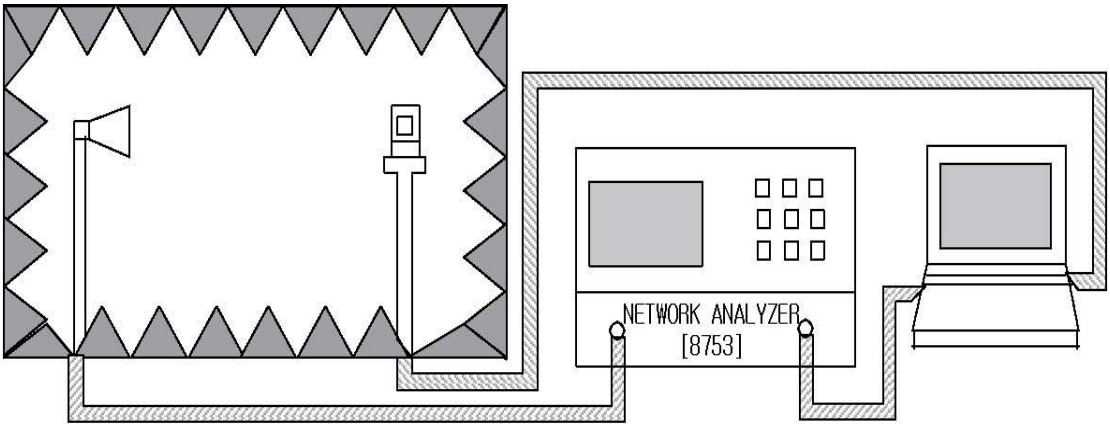
4-1. The measurement of Frequency and VSWR



[Measurement Method]

1. As seen the above, network analyzer is set up for S11 measurement.
2. The measurement frequency range is to set up from 2 GHz to 3 GHz.
3. Perform S11 one port full calibration.
4. Measure the VSWR of three points of Bluetooth frequency range such as 2.4 GHz, 2.45 GHz, and 2.5 GHz.

4-2. The measurement of Gain & Radiation Patterns



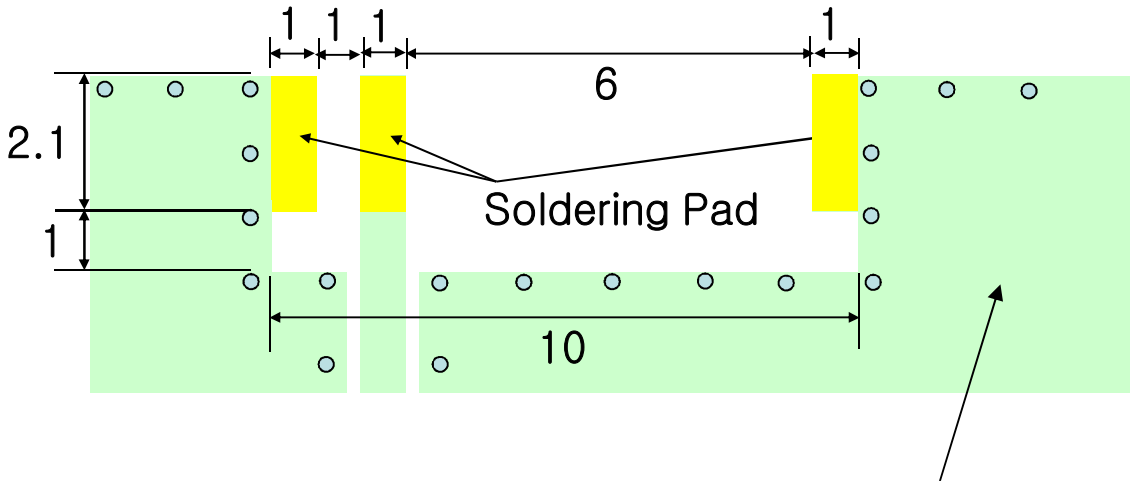
[Measurement Method]

1. As seen the above, network analyzer is to set up in Anechoic chamber.
2. As seen beneath, for the measurement planes as Azimuth, Elevation 1, and Elevation 2, measure Gain data of vertical polarization and horizontal polarization for each plane.

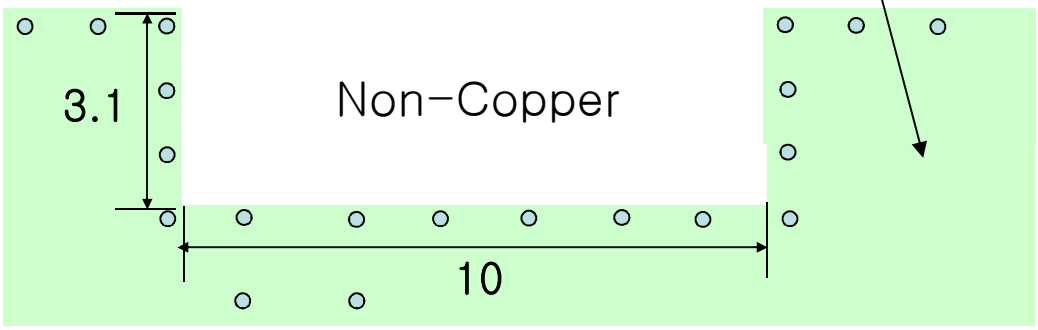
5. PCB Layout & Solder Pad size

5-1. Layout

(1) Top



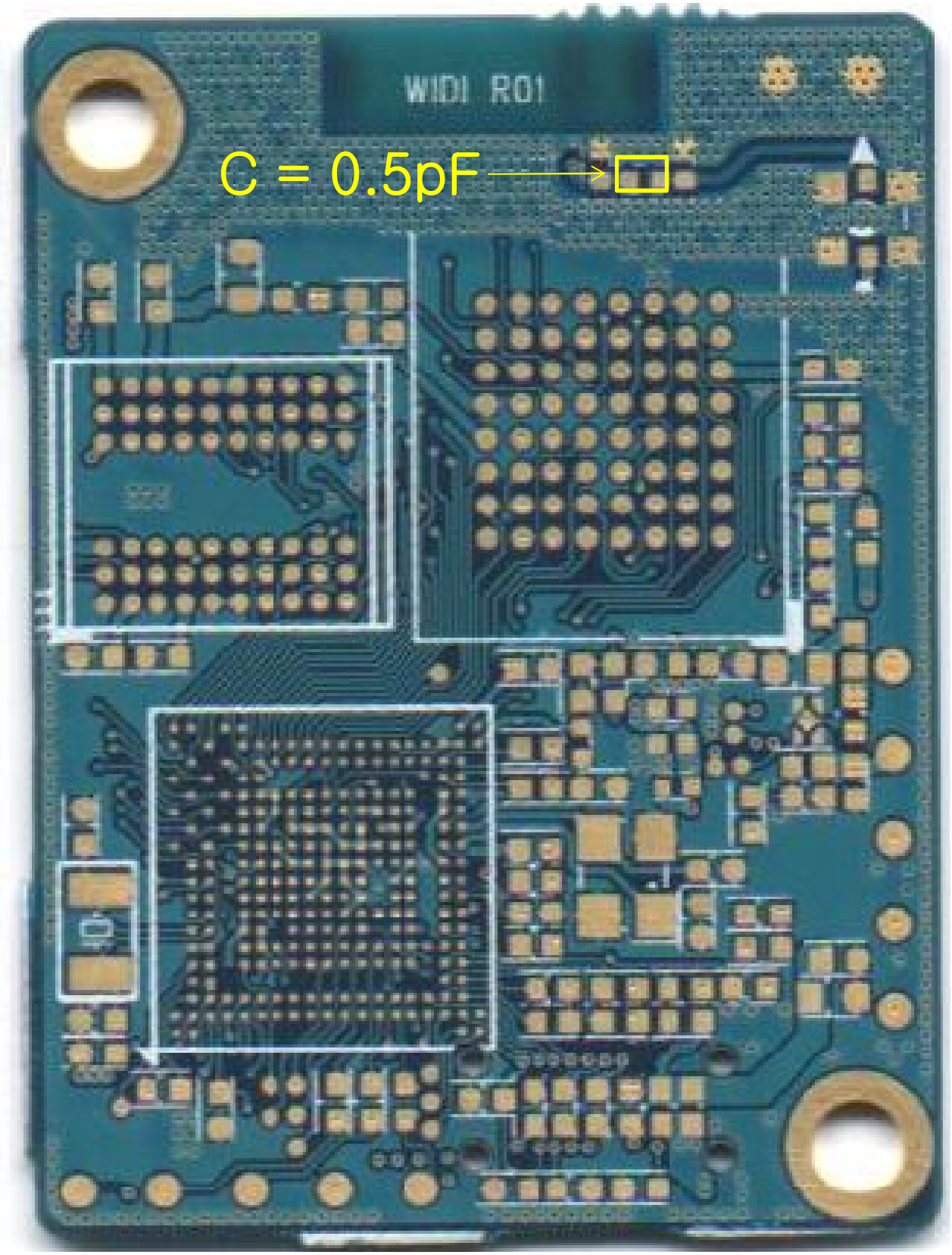
(2) Bottom



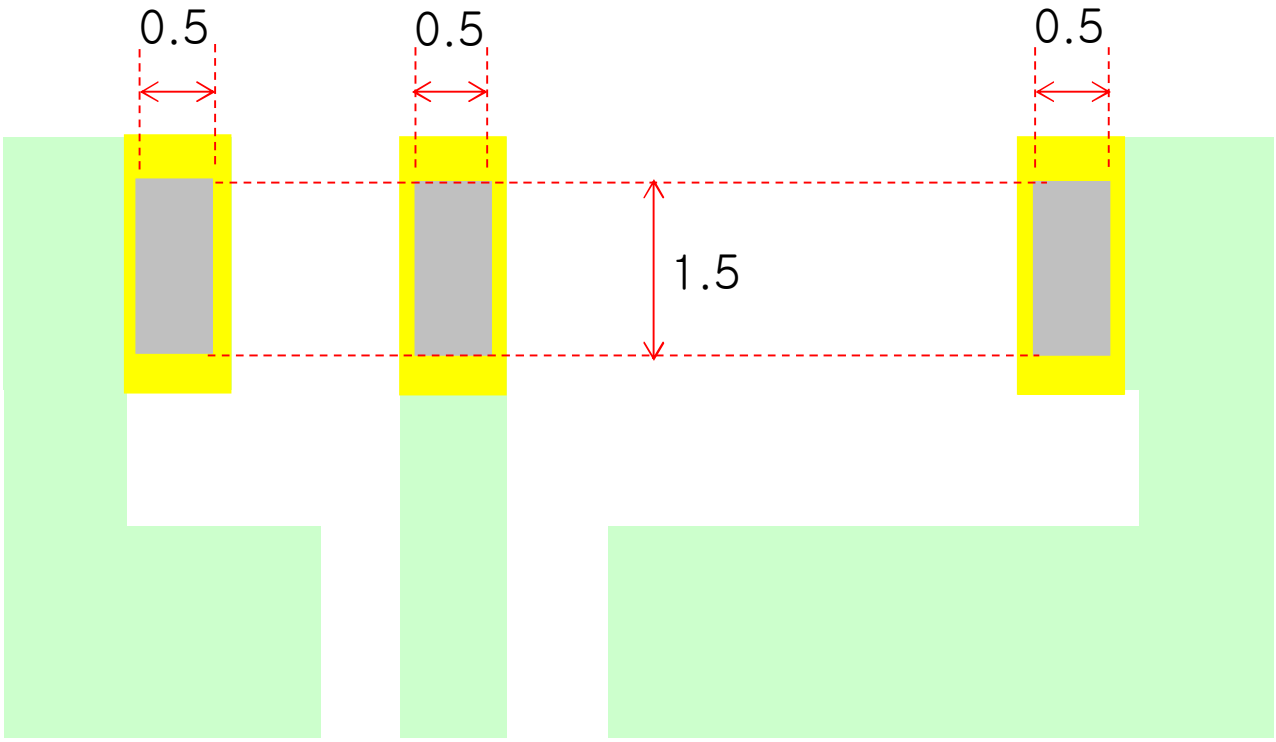
Unit : mm

tolerances : +/- 0.05

5-2. Matching Circuits



5-3. SOLDERING CREAM AREA



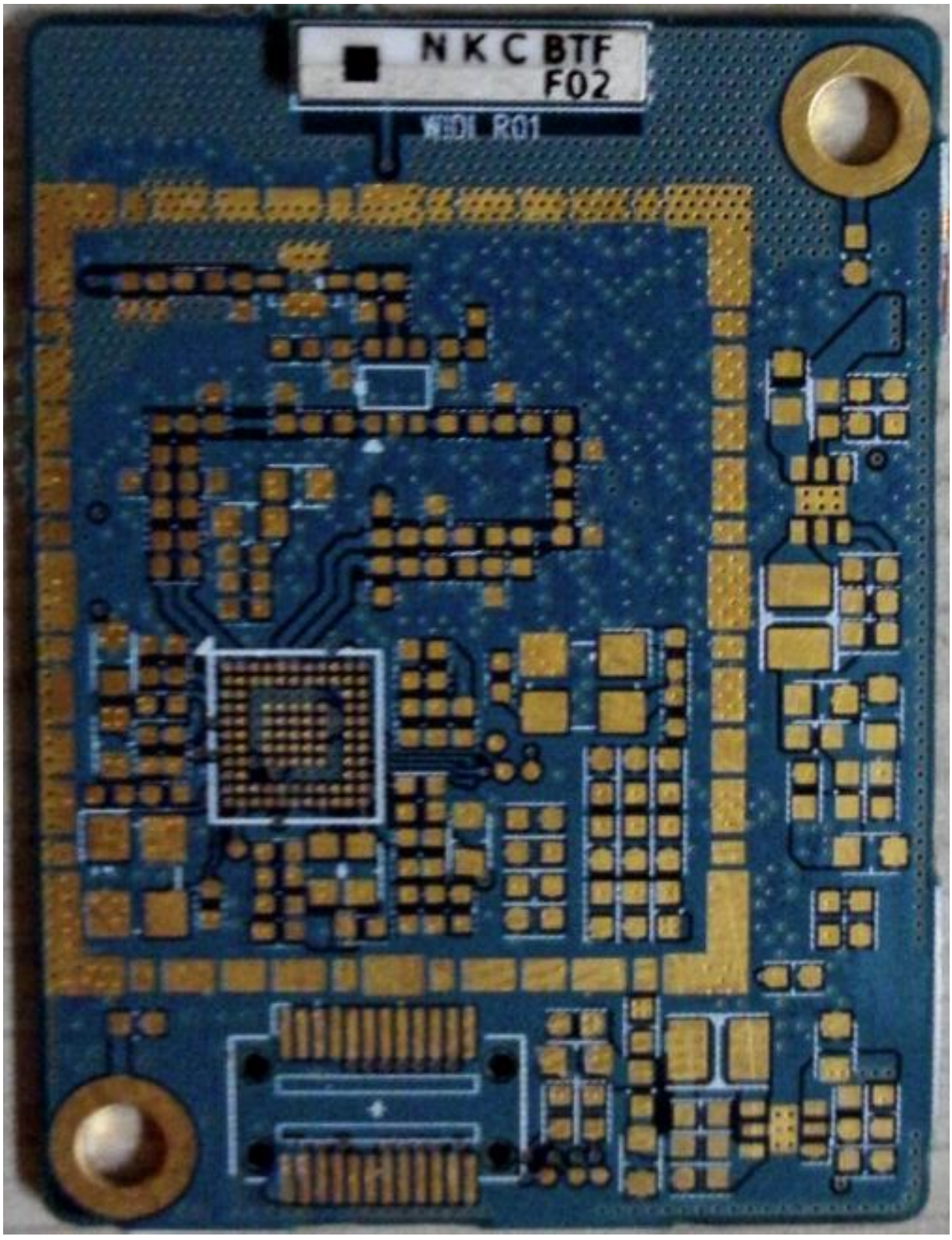
Unit: mm

Soldering Cream의 면적은 SMD 업체 현황(메탈 스크린 두께, 온도)에 따라 변경 될 수 있으므로 협의를 요함

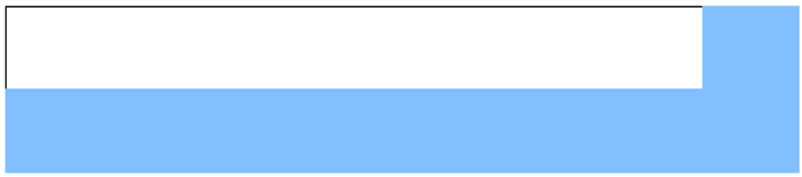
Solder Pad

Soldering Cream

5-4. Antenna position



6. Ag pattern



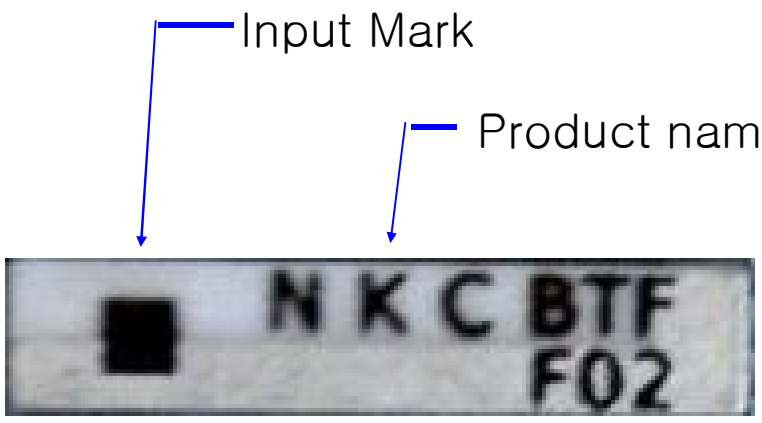
TOP

Side1

Bottom

Side2

7. Marking View



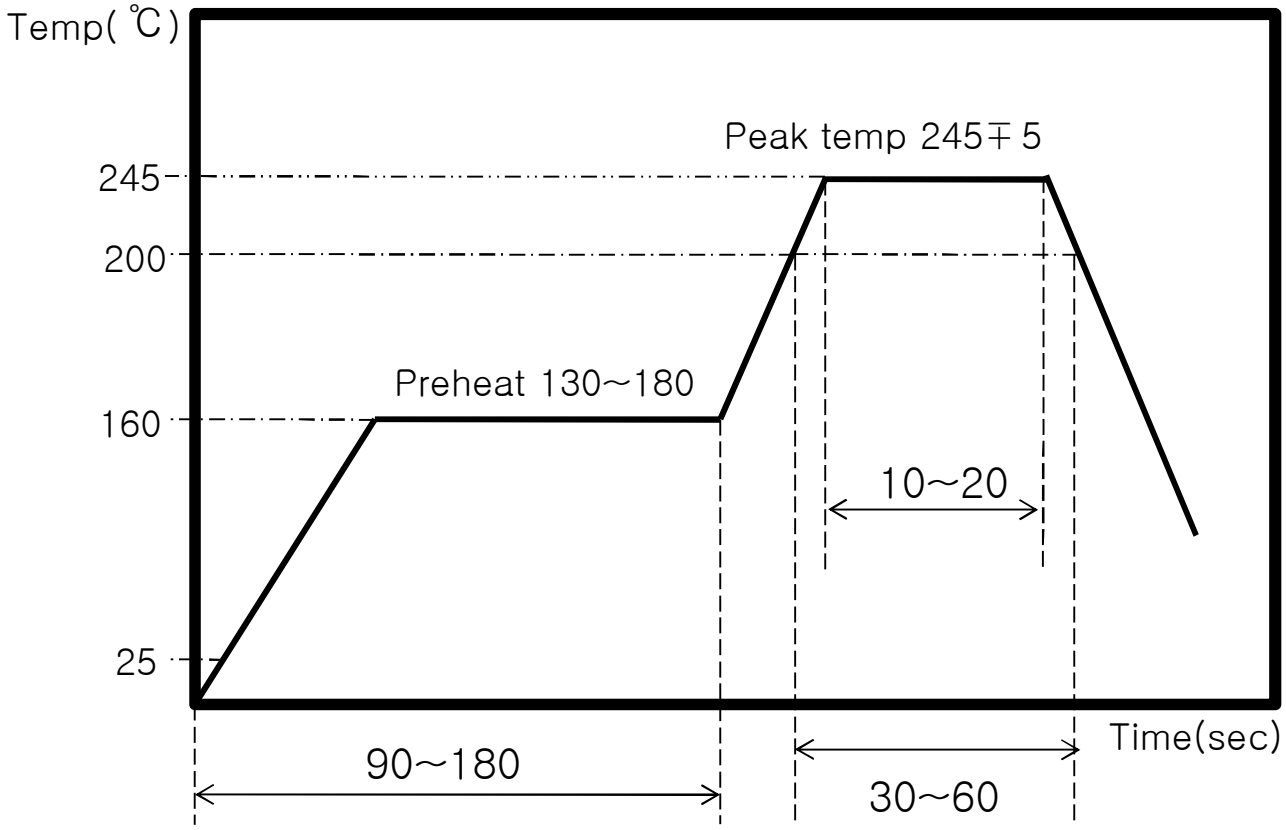
Only TOP part

7-1. 마킹 종류

* RF용 검정 잉크 사용

8. Reflow Profile

8-1. Standard reflow condition(Pb-free)

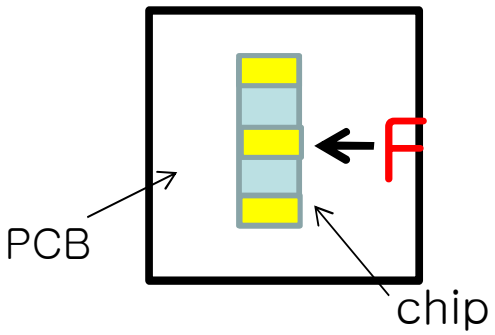


SMD 업체 현황에 따라 peak temp 및 시간은 변경 될 수 있으므로 협의를 요함

8-2. 수동 납땜 (인두기)을 할 경우(Pb-free)

인두 온도 : 340 'C / 시간 : 각 단 max 3 sec

9. Environmental Tests

No.	ITEM	TEST COND	TEST REQU
1	High Temperature Resistance	1. Temp: +125±5℃ 2. Time: 1000±24hrs 3. Measure Fc after left for 24hrs min. at room temp	1. Within electric spec(VSWR) 2. No visual damage
2	Low Temperature Resistance	1. Temp: -40±5℃ 2. Time: 1000±24hrs 3. Measure Fc after left for 48hrs min. at room temp	1. Within electric spec(VSWR) 2. No visual damage
3	Thermal Shock	1. 1cycle/step1:-40±3℃,30min step2:+125±3℃,30min 2. Number of cycle:30 3. Measure after left for 48hrs min. at room temp	1. Within electric spec(VSWR) 2. No visual damage
4	Humidity	1. Humidity:85%RH 2. Temp:+85±3℃ 3. Time:1000±24hrs 4. Measure Fc after left for 48hrs min. at room temp	1. Within electric spec(VSWR) 2. No visual damage
5	Adhesive strength of termination	1. Applied force on SMD chip till detached point from PCB. 	1. No mechanical damage by forces applied on the right 2. Strength(F)>5kgf