[APPROVAL SHEET]



Nice Korea Components Co., Ltd

TEL: 031-470-8989

FAX: 031-470-8949

[APPROVAL SHEET]

Product	NKO	C-2
Model	SPP-	·R300
Designed by	Checked by	Approved by
/	/	/

2012. 8. 6

Nice Korea Components Co., Ltd

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1. Revision History

product	NKC-2		Model SPP-R300		P-R300	
Rev. No.	Rev. Issue	Pa	ge	De	signed	Date
1.0	Appro. Issue	_	_	KC	C. NAM	2012.8.6

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
	유전체	Al2O3(Alumina)
재질	전극	은(Ag)
크기 (mm)	L = 10 + / - 0.1 $W = 2 + / - 0.1$ $T = 1.2 + / - 0.1$	
Weight	97~100 mg	

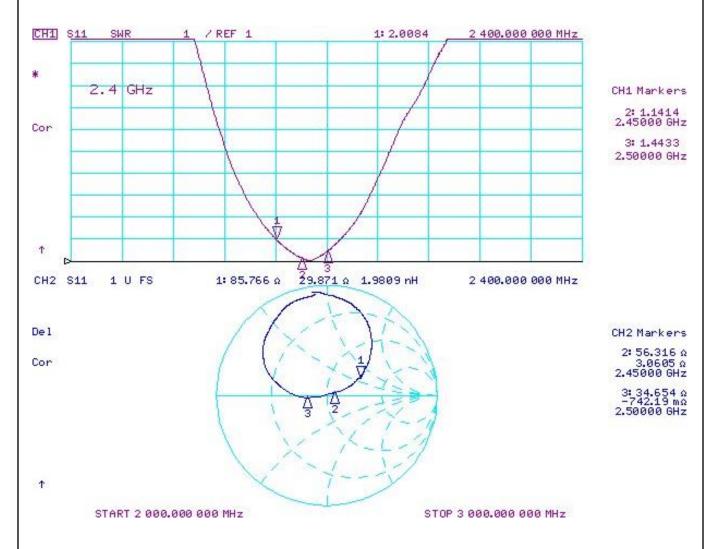
3. Electrical Specifications

3-1.

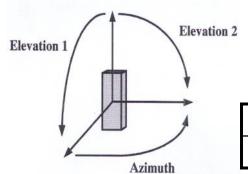
- * All item are measured in room temperature (24~25 'C).
- * All item are measured at customer set condition.

No.	Items	Typical Data
1	Frequency (MHz)	2400 ~2500
2	VSWR	2:1
3	Total Gain (Peak/AVG.) [dBi]	0
4	Impedance	50 ohm
5	Polarization	Linear

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

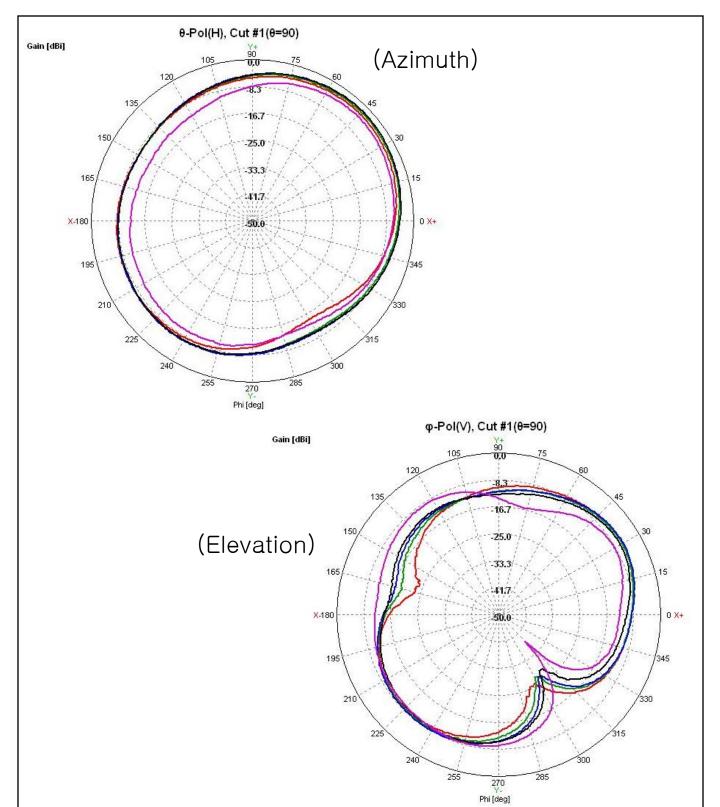


3-3. Radiation Patterns



Theta	Ve rtical Field of measured plane
Phi	Horizontal Field of measured plane

	Azimuth	Phi	Peak	-1.79
이득[dBi]	AZIIIIUIII	PIII	Avg	-5.93
(Co-Pola)	Elovation	Thata	Peak	-5.61
	Elevation	Theta	Avg	-10.31

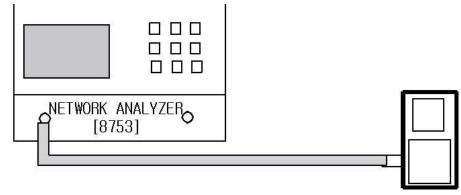


×		θ-Pol(H)					φ-Pol(V)					PwrSum				
No	Freq.[GHz]	Avg.[dBi]	Peak[dBi]	φ[deg]	Null[dBi]	φ[deg]	Avg.[dBi]	Peak[dBi]	φ[deg]	Null[dBi]	φ[deg]	Avg.[dBi]	Peak[dBi]	φ[deg]	Null[dBi]	φ[deg]
1	2.400	-6.97	-2.93	43.00	-14.85	298.00	-10.69	-5.84	32.00	-26.07	298.00	-5.44	-1.26	35.00	-14.54	298.00
2	2.420	-6.21	-2.27	41.00	-10.98	300.00	-10.68	-6.00	31.00	-27.72	300.00	-4.88	-0.86	39.00	-10.89	300.00
3	2.430	-5.86	-1.87	43.00	-10.33	299.00	-10.31	-5.61	32.00	-27.37	303.00	-4.52	-0.47	36.00	-10.17	299.00
4	2.450	-5.93	-1.79	44.00	-10.59	295.00	-11.11	-6.62	33.00	-28.74	308.00	-4.78	-0.72	37.00	-10.18	305.00
5	2.500	-8.61	-3.96	43.00	-13.54	292.00	-11.23	-8.71	30.00	-38.47	314.00	-6.71	-2.85	36.00	-12.32	306.00

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.

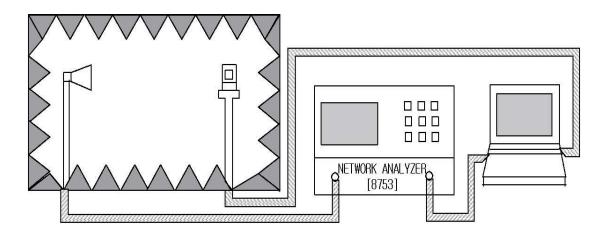
4-1. The measurement of Frequency and VSWR



[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

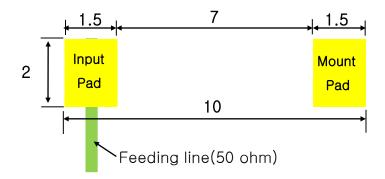


[Measurement Method]

- 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. Top Layout



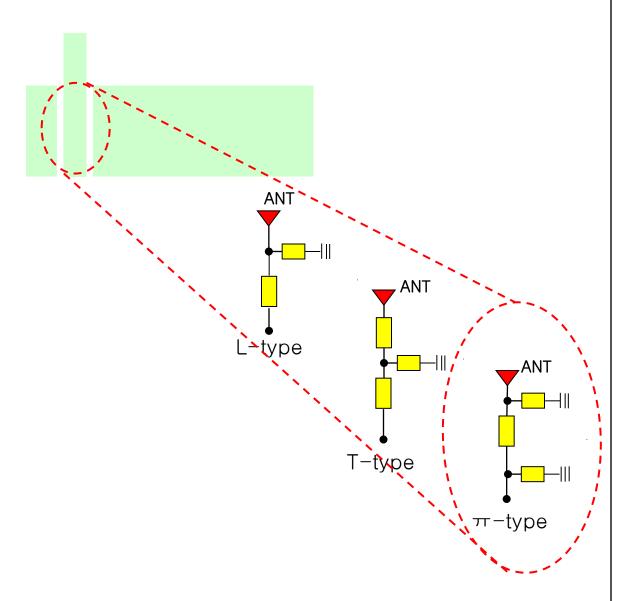
Solder Pad

Unit: mm

tolerances: +/- 0.05

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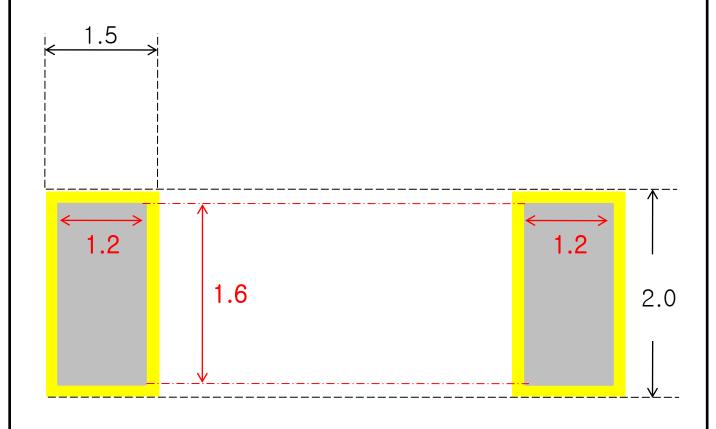
5-1. Matching Circuits



- (1) 실제 적용되는 Board의 GND SIZE 및 형태에 따른 Impedance 조정,
- (2) 설계된 전송선의 50 ohm miss-matching시 Impedance 조정,
- (3) 안테나 자체의 부족한 Impedance 조정,
- (4) 이 이외의 다른 변화에 따른 특성 조정에 Lumped elements 사용 시 3가지 종류 중 한가지의 matching circuit을 적용함.

Matching circuit 적용 시 matching circuit이 차지하는 면적 및 가장 좋은 결과를 얻을 수 있는 matching type를 선택함.

5-2. SOLDERING CREAM AREA



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

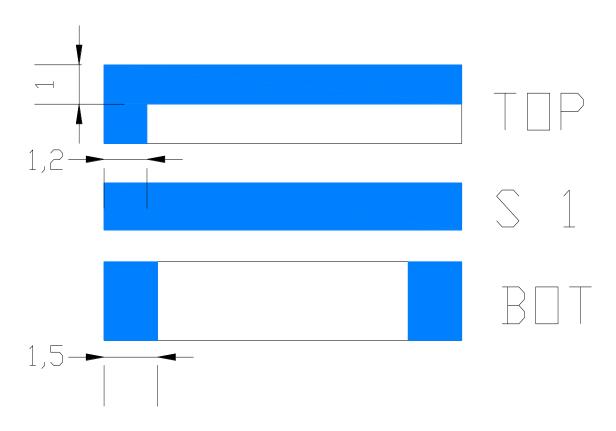


Soldering Cream

5-3. Antenna position



6. Ag pattern & Dimensions



7. Marking View

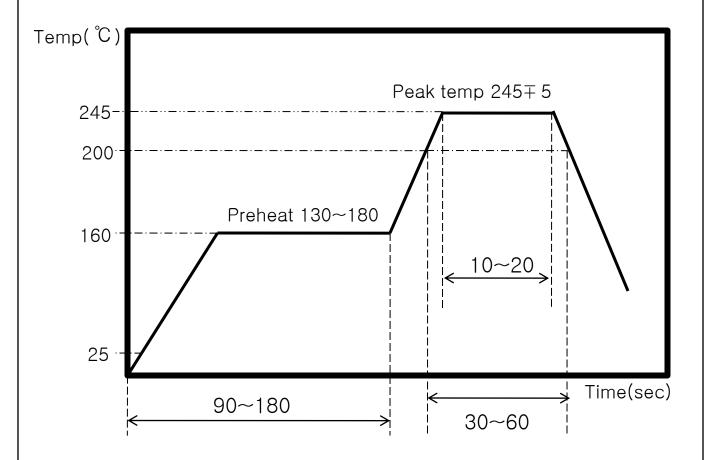


7-1. 마킹 종류

* 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

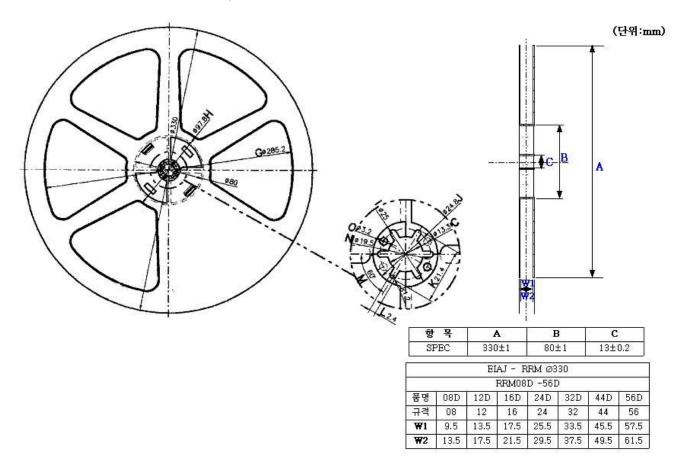
9. Environmental Tests

No.	ITEM	TEST COND	TEST REQU
1	High Temperature Resistance	 Temp: +125±5°C Time: 1000±24hrs Measure Fc after left for 24hrs min. at room temp 	 Within electric spec(VSWR) No visual damage
2	Low Temperature Resistance	 Temp: -40±5°C Time: 1000±24hrs 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	 Humidity:85%RH Temp:+85±3℃ Time:1000±24hrs 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. PCB chip	1. No mechanical damage by forces applied on the right 2. Strength(F)>5kgf

10. Packaging

10-1. Reel Taping Quantity 4,000 pcs / 1 reel

10-2. Carrier Tape & Reel Dimensions



11. Usage and Cautions

Safe-keeping conditions : 3 months in 20+/-15'C & less than 60%

12. RoHS Data

(1) Ceramic Power

시험성적서

한 국 세 라 믹 기 술 원

생적서번호 : 2011-1248

우153-801 서울시 궁친구 가산동 233-5 : 베이지 (1)/(총 3) (Tel: 02 3282 2416/7, Fax: 03 3282 2418)



1. 의 회 자

기관령/성당 : 최동세라믹 / 김원식

* 주 소 : 경기도 화성시 장안면 석포리 681-13, 14

의 퇴일자: 2011년 05월 23일

2. 시험성적서의 용도 : 품질관리

시험 시료명/물괄: 세라믹 Base

4. 시험기간: 2011년 05월 23일 ~ 2011년 06월 03일

5. 시험방법: KS C IEC 62321, 기기분석

6. 시험환경 ○ 온도 : (21 ± 1) ℃ , 삼대습도 : (37 ± 3) % R.H.

7. 시험결과

시료명	시험분석항목	시험분석결과	시험문석방법	비고
	Pb (mg/kg)	불점습(<5)		-
	Cd (mg/kg)	본점출(<1)		
	Hg (mg/kg)	봉검육(<1)	KS C IEC 62321	
	Cr" (mg/kg)	권검순(<0.1)	N2 C 1EC 02321	
서의의 Base	PBBs (mg/kg)	분건층	1	1
	PBDEs (mg/kg)	복권증		
	PFOS (mg/kg)	봉건축		7
	PFOA (mg/kg)	본건층	212194.23	
	Cl (mg/kg)	분관승	기기분석	10 2
	Br (mg/kg)	본검술		1

2. 용기 문서의 시용된기기는 PERKIN-BIMER자의 Claus 500 m 3. 삼기본격에 사용된 UV/Vis는 Varian Cary 100 입 6. 삼기 본격에 사용된 LCMS/MS는 AB sciex 3200 QTRAP 임, 5. 상기 문서에 사용된 IC는 Metrolan Models 임,

확 인 시험자: 최기인(78%) 기신.

기술적임자 : 박 더 원

2011 . 06 . 03

한 국 세 라 믹 기 술 원

비고) 이 선택서는 외복자가 제시한 시로 및 시로센으로 시험한 웹가진과로의 전체 처음에 대한 종살 및 성능을 보증하지 않습니다.

(2) Ag Paste

SGS

Test Report No. F490101/LF-CTSAYAA11-42073

Issued Date: 2012. 01. 05 Page 1 of 4

CHANGSUNG CORPORATION

11B-9L Namdong Industrial Area Namdong ku Incheon Korea

The following merchandise was submitted and identified by the client as : AYAA11-42073

Product Name Item No./Part No.

: 2011. 12. 30

Received Date Test Period : 2012.01.02 to 2012.01.05

Test Results.

For further details, please refer to following page(s)

: SGS Korea tested the sample(s) selected by applicant with following results.

SGS Korea Co. Ltd.

Timothy Jeon Jinhee Kim Cindy Park Jerry Jung/ Tosting Person

The second section was a second secon

SGS Kones Co. Ltd. 100 Cycles Milk Programmy Despite propring a Dynorgia to name at 1000 to 100 Cycle Association in the polymerous state (specific local programmy local prog

SGS

Test Report No. F690101/LF-CTSAYAA11-42073

Issued Date: 2012, 01, 05 Page 3 of 4



NOTE: (1) N.D. - Not detected (<MDL)

(1) N.D. - Not detected (-MDDL)
(2) mg/tg - point
(3) MDL - Method Detection Limit
(4) - 3 No regulation
(5) ** Boiling-widel-eartisation
(5) ** Boiling-widel-eartisation
Negative - Absence of CNT coating
Passive + Presence of CNT coating
notation is equal or granted than 0.02 mg/tg with 50 cm2 sample surface area.

Advanced the first special course and the same part and a second special course and the same part and

SGS

Test Report No. PROPERTY CONTRACTOR

Named Otton 2012 Ct. 10 Page 2 of 4

Sample No. Sample Descripto Itself Ro. Fact No. ANA411-02(12.03)

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Ten time	Unit	Test Method	MOS.	Bende
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lipatronotyperal -	10000	TATE OFFICE IS DICKETS LAST, GLOBB		9.0				
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Mondoronodymicy/ short.	7979	Mile reference to EC (2001 2008, GC MS)	1.5	80				
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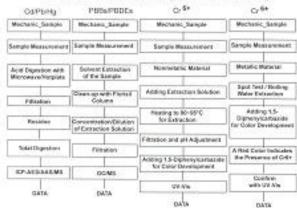
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SGS

Test Report No. reconsus-crawwww.aprz

leaved basis 2012-01-00. Page 4 of d

Testing Flow Chart for RoHS:Cd/Ptr/Hg/C/*/PBBs&PB0Es Testing.



The samples were desolved titlely by one-conditioning method according to above flow charitor books (ag deadon DNet). Object to

mg/s

NOTE: 11, NTE: I har created (-MDL)

27, register spare.

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TO Experiment Terror and the control of the control

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(3) Marking Ink





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