승 인 원

품 명 : Multilayer Chip Antenna
Part No. : ALA931C4

Radiopulse	입 안	심 사	결 정

아모텍	작 성	검 토		승 인
	10/17	10/17	10/18	10/18

2006. 10. 17

주식회사 아 모 텍

목 차

1. 제/개정 이력

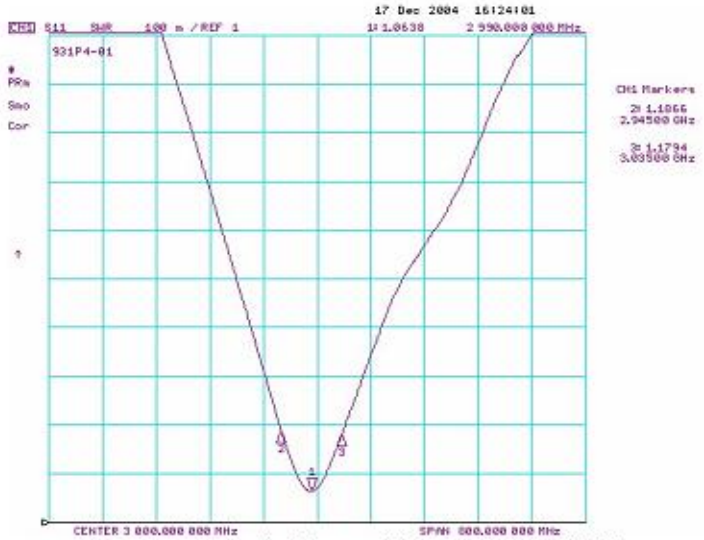
날 짜	제 목	내 용	페이지
2006.10.17		신규 작성	

2. 제품 규격

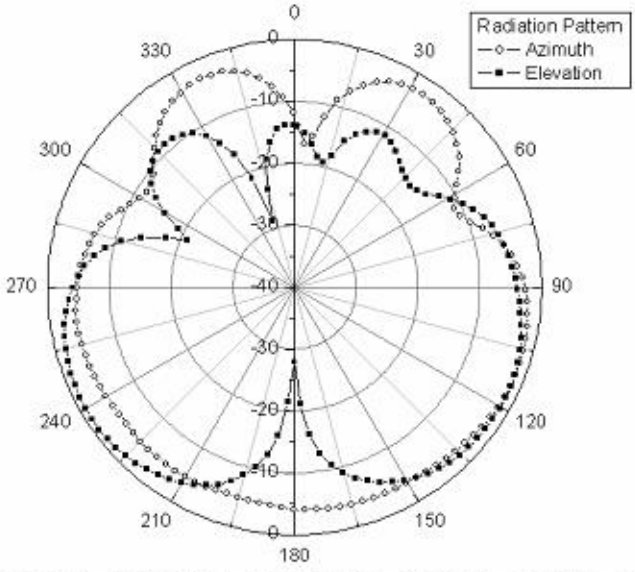
2.1 전기적 특성

구분	항목	규격	비고
1	동작 주파수	2.4 ~ 2.49 GHz	ISM band
2	정재파비	최대 2.5 : 1 @ 2990±45 MHz	수동 Jig 상에서 측정
3	방사이득	Max. 0dBi	Reference board 상에서 ISM 대역으로 매칭 후 측정 (Azimuth)
4	방사패턴	Omni-directional	
5	임피던스	공칭 50 Ω	

※ 출하검사 시 2번 항목(정재파비) 측정



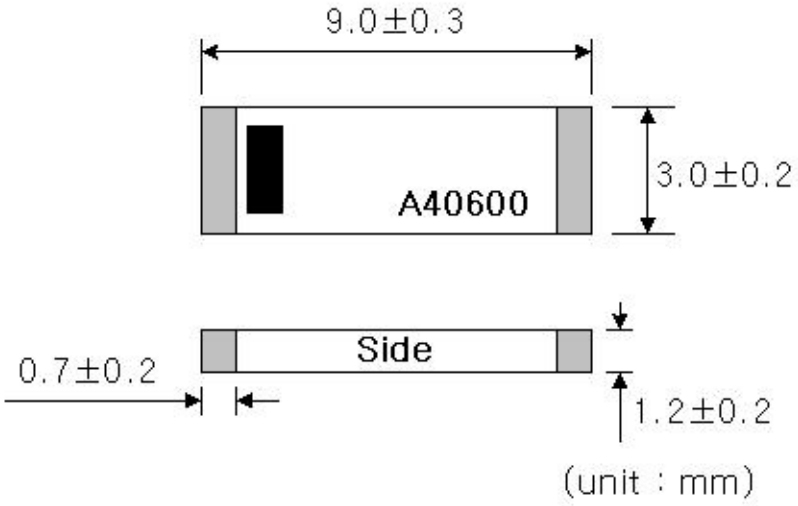
[VSWR : 수동 Jig 상에서의 측정값]



[Radiation Pattern : Bluetooth 대역에 매칭후 측정]

2.2 기계적 특성

구분	항목	규격		단위
1	크기	가로	9.0 ±0.3	mm
		세로	3.0 ±0.2	
		높이	1.2 ±0.2	
2	단위질량	97± 9		mg
3	동작온도	-30 ~ +70		℃
4	저장온도	-40 ~ +85		℃



[그림 Chip 안테나 dimension]

2.3 Part No. 및 Lot No.표기법

Part No. ALA(1) 931(2) C4(3)

(1) : Amotech LTCC Antenna
(2) : Chip size
(3) : Version & 주파수규격

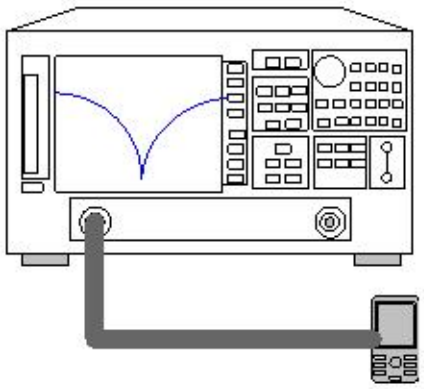
Lot No. MA(1) 09(2) A4(3) 0606(4) 01(5)

(1) : Mass-product Antenna
(2) : Chip size
(3) : Version & 주파수규격
(4) : 제조 년/월
(5) : 양산 일련번호

3. 시험방법

3.1 VSWR 측정법

사용 계측기 : Network Analyzer 8753ES



[시험절차]

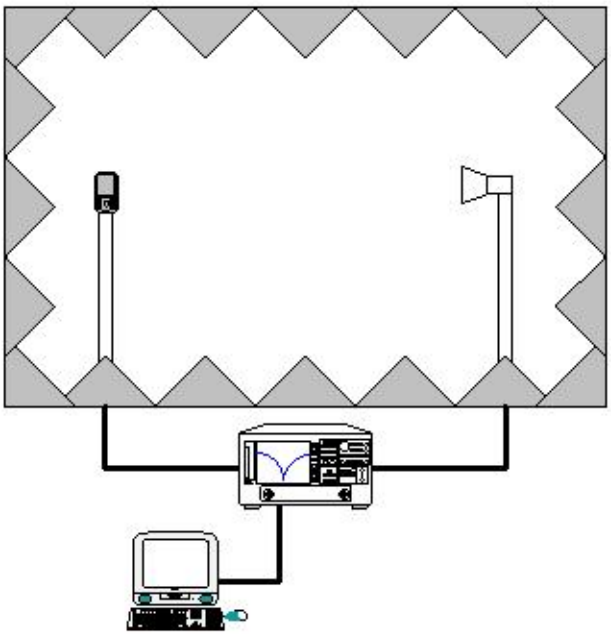
ⓐ 그림과 같이 계측기를 setup 한다.

ⓑ f_0± 400 MHz 대역에서 calibration 을 실시하여 50ohm 종단기를 달아 -55dB 이하임을 확인한다.

ⓒ 측정 시료를 port cable 에 장착하여 규격주파수 대역에서 가장 높은 VSWR 을 기록 측정한다.

3.2 방사이득 측정법

사용장비 및 계측기 : 무반향실 (8*4*4 size), Network Analyzer 8753ES

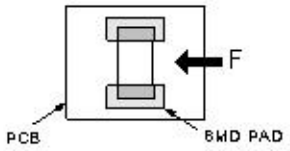
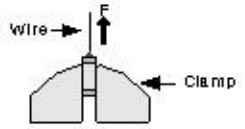


[시험절차]

ⓐ Reference 혼 안테나를 사용하여 calibration 을 한다.

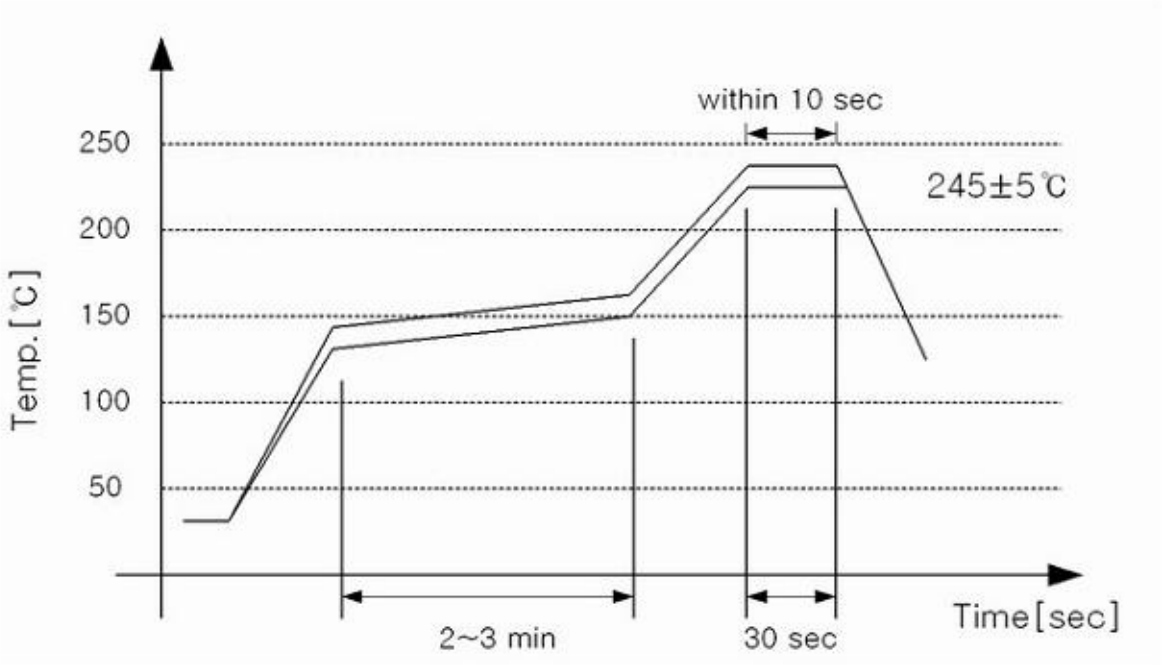
ⓑ 사용주파수 대역을 설정하고 그림과 같이 시료를 장착하여 측정방위에 따라 측정한다.

4. 신뢰성 시험조건

구분	항목	테스트 조건	요구 사항
1	Humidity	1. 60℃, 95%RH, 48Hr	1. 외관 손상 없음 2. VSWR 특성 만족
2	Thermal Shock	1. +80℃(30min)→1~2mim → -40℃ (30min) 2. cycle 횟수 : 10회	1. 외관 손상 없음 2. VSWR 특성 만족
3	고온 보존	1. +85℃, 96Hr	1. 외관 손상 없음 2. VSWR 특성 만족
4	저온 보존	1. -40℃, 96Hr	1. 외관 손상 없음 2. VSWR 특성 만족
5	고착 강도	1. SMT 되어 있는 시료가 PCB 에서 떨어 질 때까지 힘 F 를 증가 	1. 옆으로 미는 힘 F 에 의한 기계적 손상 없음 2. 힘의 세기 F > 7 kgf
6	인장 강도	1. Wire : 0.6~0.8mm Cu wire 	1. 잡아 당기는 힘 F 에 의한 기계적 손상 없음 2. 힘의 세기 F > 3 kgf

5. 납땜조건 (권고사항)

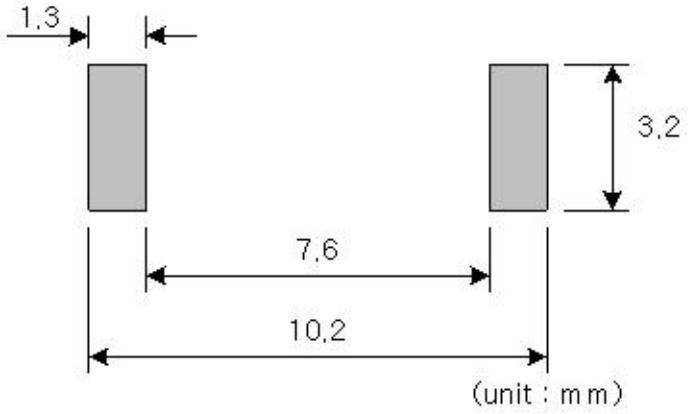
5.1 납땜온도조건 (Pb-free 조건)



안테나의 특성 저하를 막기 위해 다음과 같은 납땜 조건을 지켜야 한다.

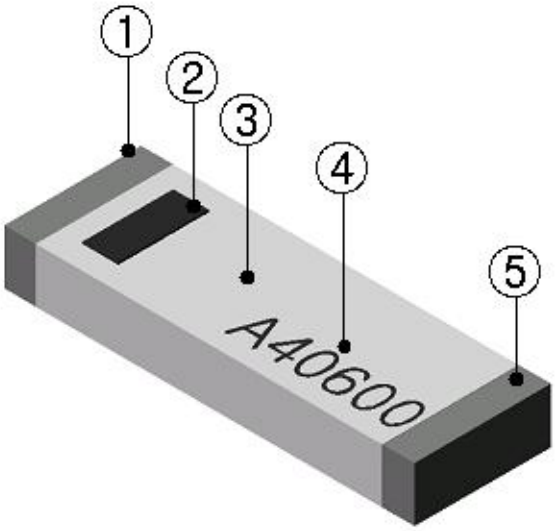
- Reflow soldering 조건으로 납땜을 진행하여야 하며, Flow soldering 을 하여서는 안 된다.
- 비활성 Flux 를 사용하여야 한다.(최대 Cl 함량 0.2% 미만)
- Reflow cycle 횟수는 3회 이내로 해야 한다.

5.2 PCB 패턴설계조건



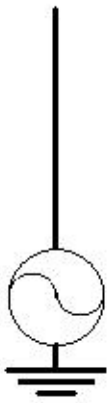
6. 구조 및 재질

6.1 재료사양



구분	명칭	기능	재료
1	외부전극	납땜, 신호입력	Ag/Ni/Sn
2	방향 index	신호 입력단 표시	Ceramic
3	세라믹 소체	-	Ceramic
4	부품명 index	부품명, 주차 표시	Ceramic
5	외부전극	납땜	Ag/Ni/Sn

6.2 등가회로



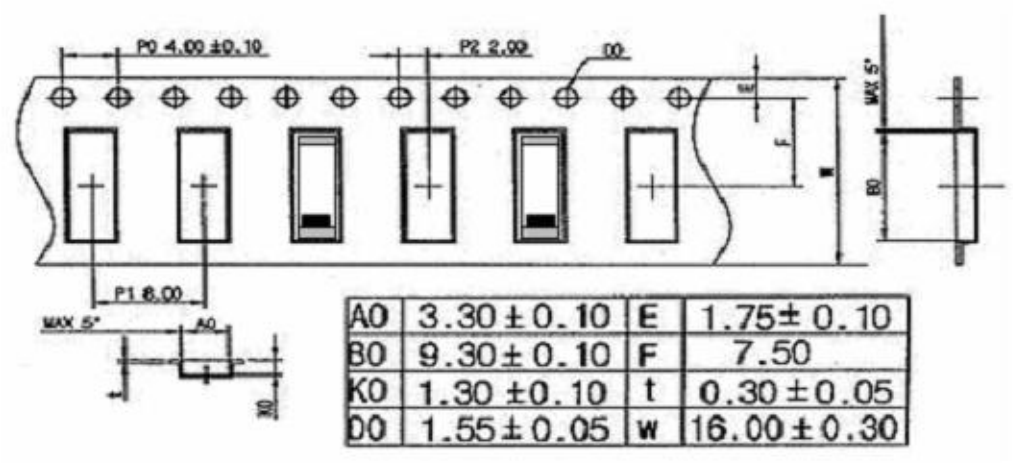
7. 주의사항

① 보관환경은 15~35℃, 상대습도 45~75 %의 대기에서 보관되어야 함. (MSL Level 2)
② 칩 안테나는 고온고습에서 방치되거나 또는 황이나 염소가스에 노출될 경우 전극의 납땜성 저하를 일으킬 수 있음.
③ 칩 안테나 자체 무게에 의한 세라믹 소체의 기계적 crack을 막기 위해 충격, 낙하 등을 피해야 함.

8. 포장 사양

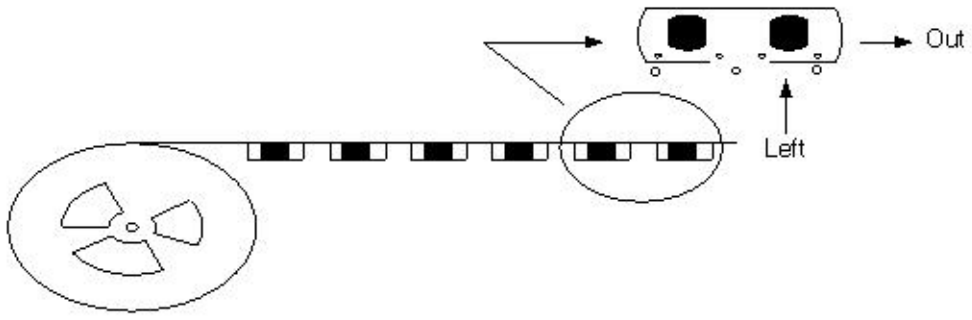
8.1 Carrier tape 사양

8.1.1 크기



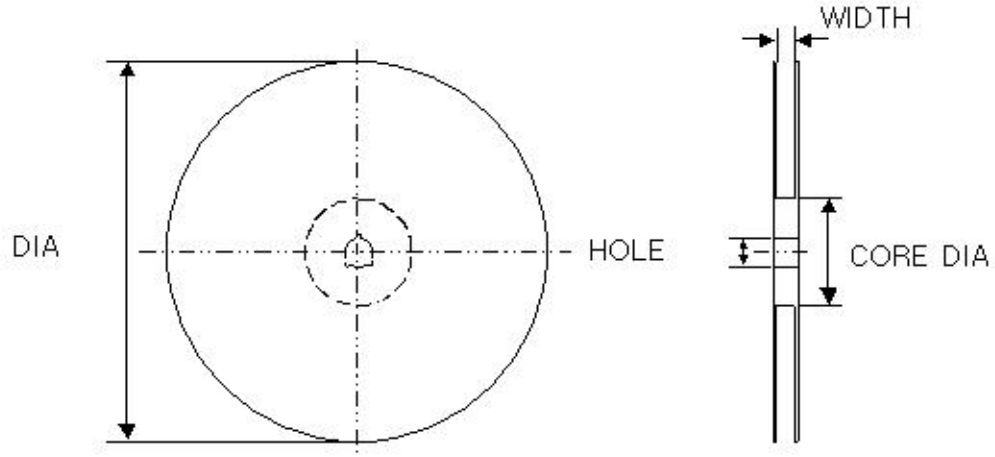
A0	3.30 ± 0.10	E	1.75± 0.10
B0	9.30 ± 0.10	F	7.50
K0	1.30 ±0.10	t	0.30 ± 0.05
D0	1.55 ± 0.05	W	16.00 ± 0.30

8.1.2 칩 위치



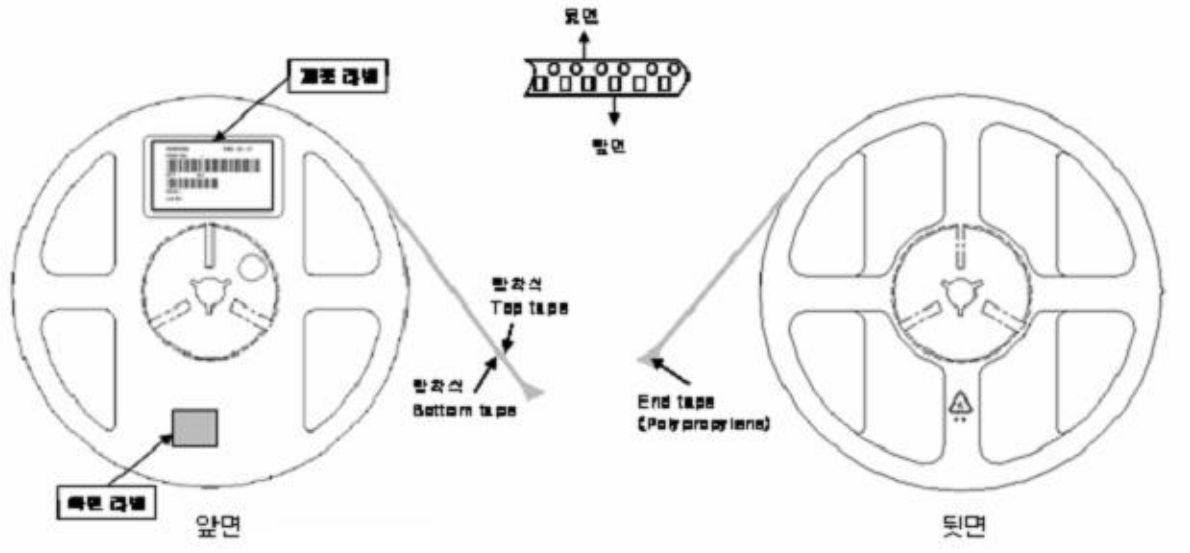
8.2 릴(Reel) 사양

8.2.1 크기



항목	DIA	WIDTH	CORE DIA	HOLE
치수(㎜)	180.0 ± 0.3	17.0 ± 0.3	60.0 ± 1	13.0 ± 0.5

8.2.2 라벨 부착 및 Winding 방법

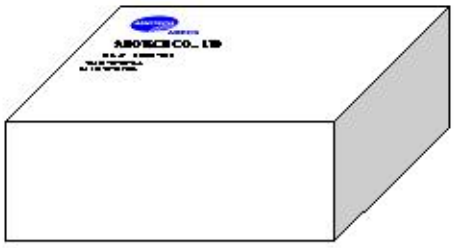


8.3 박스 포장 사양

8.3.1 소형 박스

크기 : 185 (L) x 185 (W) x 68 (H) (mm^3)

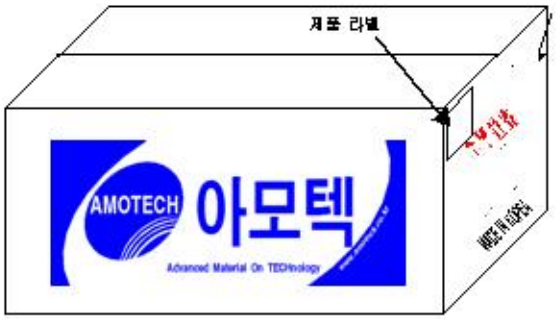
수량 : 3 reel (1,000 ea/reel × 3 reel = 3000 ea)



8.3.2 중형 박스

크기 : 365 (L) x 200 (W) x 200 (H) (mm^3)

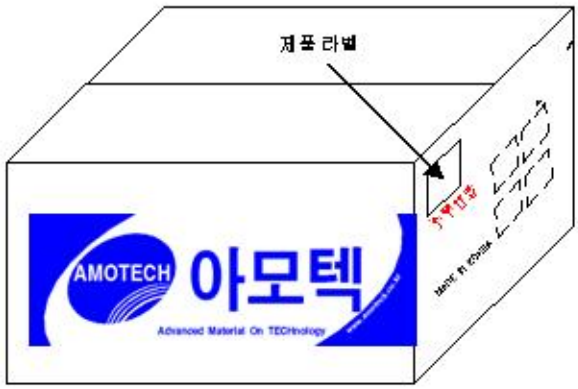
수량 : 5 소형 박스(3,000 ea/소형 박스× 5 소형 박스 = 15,000 ea)



8.3.3 대형 박스

크기 : 390 (L) x 390 (W) x 280 (H) (mm^3)

수량 : 14 소형 박스 (3,000 ea/ 소형 박스 ×14 소형 박스 = 42,000 ea)



9. 유해물질 성적서

9.1 제품 성분 분석

SGS

Test Report No. F690501/LF-CTSGP06-244B0 Date: September 25, 2006 Page 1 of 3

To: **AMOTECH CO., LTD.**
5BL-1L, 617
Namchon-dong
Namdong-gu
INCHEON 405-100
Korea

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

Commodity	: Multilayer Chip Antenna
SGS File No.	: GP06-24480
Received Date	: September 18, 2006
Test Performing Date	: September 19, 2006
Test Performed	: SGS Testing Korea tested the sample(s) selected by applicant with following results
Test Results	: For further details, please refer to following page(s)

SGS Testing Korea Co. Ltd.

Jade Jang
Monet Jeong
Jully Oh
Jerry Jung
/Testing Person

Jeff Jang / Chemical Lab Mgr

Sample No. : GP06-24480.001

Sample Description : Multilayer Chip Antenna

Style/Item No. : Multilayer Chip Antenna

Heavy Metals

Test Items	Unit	Test Method	MDL	Results
Cadmium (Cd)	mg/kg	US EPA 3050B(1996), US EPA 6010B(1996), ICP	0.5	N.D.
Lead (Pb)	mg/kg	US EPA 3050B(1996), US EPA 6010B(1996), ICP	5	N.D.
Mercury (Hg)	mg/kg	US EPA 3052(1996), US EPA 6010B(1996), ICP	2	N.D.
Hexavalent Chromium (Cr VI)	mg/kg	US EPA 3060A(1996), US EPA 7196A(1992), UV	1	N.D.

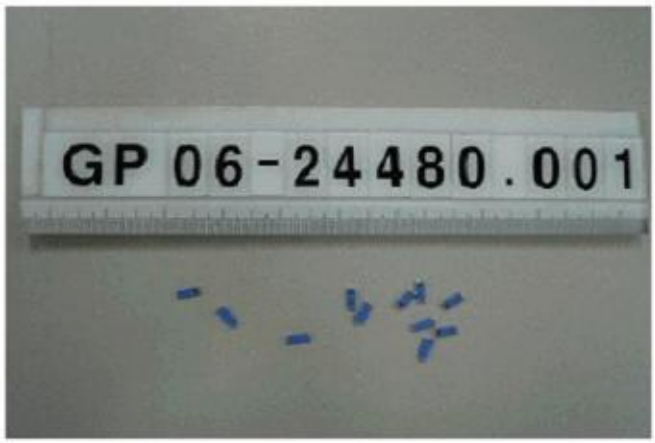
Flame Retardants-PBBs/PBDEs

Test Items	Unit	Test Method	MDL	Results
Monobromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Dibromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Tribromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Tetrabromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Pentabromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Hexabromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Heptabromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Octabromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Nonabromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Decabromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Monobromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Dibromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Tribromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Tetrabromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Pentabromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Hexabromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Heptabromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Octabromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Nonabromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Decabromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.

NOTE: (1) N.D. = Not detected.(<MDL)
(2) ppm = mg/kg
(3) MDL = Method Detection Limit
(4) - = No regulation
(5) ** = Qualitative analysis (No Unit)
(6) Negative = Undetectable / Positive = Detectable

This Test Report is issued by the Company subject to its General Conditions of Service printed overleaf. Attention is drawn to the limitations of liability, indemnification and jurisdictional issues defined therein. The results shown in this test report refer only to the sample (s) tested unless otherwise stated. This Test Report cannot be reproduced, except in full, without prior written permission of the Company.

Picture of Sample as Received:



*** End ***

NOTE: (1) N.D. = Not detected.(<MDL)
(2) ppm = mg/kg
(3) MDL = Method Detection Limit
(4) - = No regulation
(5) ** = Qualitative analysis (No Unit)
(6) Negative = Undetectable / Positive = Detectable

9.2 Powder

SGS

Test Report No. F690501/LF-CTSGP06-05191 Date: March 14, 2006

To: **AMOTECH CO., LTD.**
5BL-1L, 617
Namchon-dong
Namdong-gu,
INCHEON 405-100
Korea

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

Commodity	: CERAMIC POWDER
SGS File No.	: GP06-05191
Received Date	: March 07, 2006
Test Performing Date	: March 08, 2006
Test Performed	: SGS Testing Korea tested the sample(s) selected by applicant with following results
Test Results	: For further details, please refer to following page(s)

SGS Testing Korea Co. Ltd.

Brendan Lee
Patrick An
Monet Jeong
Jinee Song
/Testing Person

Jeff Jang / Technical Mgr

Jason Han / Lab Director

The above certificate is the accredited test items by Korea Laboratory Accreditation Schmee (KOLAS), which signed the ILAC-MRA.

This Test Report is issued by the Company subject to its General Conditions of Service printed overleaf. Attention is drawn to the limitations of liability, indemnification and jurisdictional issues defined therein. The results shown in this test report refer only to the sample (s) tested unless otherwise stated. This Test Report cannot be reproduced, except in full, without prior written permission of the Company.

Sample No. : GP06-05191.001

Sample Description : CERAMIC POWDER

Style/Item No. : MLS-22C

Heavy Metals

Test Items	Unit	Test Method	MDL	Results
Cadmium(Cd)	mg/kg	US EPA 3050B(1996), US EPA 6010B(1996)	0.5	N.D.
Lead (Pb)	mg/kg	US EPA 3050B(1996), US EPA 6010B(1996)	5	N.D.
Mercury (Hg)	mg/kg	US EPA 3052(1996), US EPA 6010B(1996)	2	N.D.
Hexavalent Chromium (Cr VI)	mg/kg	US EPA 3060A(1996), US EPA 7196A(1992)	1	N.D.

Picture of Sample as Received:

*** End ***

NOTE: (1) N.D. = Not detected.(<MDL)
(2) ppm = mg/kg
(3) MDL = Method Detection Limit
(4) Estimated expanded uncertainty U with a coverage factor k =2, corresponding to a level of confidence of about 95%

The above certificate is the accredited test items by Korea Laboratory Accreditation Schmee (KOLAS), which signed the ILAC-MRA.

This Test Report is issued by the Company subject to its General Conditions of Service printed overleaf. Attention is drawn to the limitations of liability, indemnification and jurisdictional issues defined therein. The results shown in this test report refer only to the sample (s) tested unless otherwise stated. This Test Report cannot be reproduced, except in full, without prior written permission of the Company.

SGS

Test Report No. F690501/LF-CTSGP06-05192 Date: March 14, 2006 Page 1 of 2

To: **AMOTECH CO., LTD.**
5BL-1L, 617
Namchon-dong
Namdong-gu,
INCHEON 405-100
Korea

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

Commodity	: AG PASTE
SGS File No.	: GP06-05192
Received Date	: March 07, 2006
Test Performing Date	: March 08, 2006
Test Performed	: SGS Testing Korea tested the sample(s) selected by applicant with following results
Test Results	: For further details, please refer to following page(s)

SGS Testing Korea Co. Ltd.

Brendan Lee
Patrick An
Monet Jeong
Jinee Song
/Testing Person

Jeff Jang / Technical Mgr

Jason Han / Lab Director

The above certificate is the accredited test items by Korea Laboratory Accreditation Schmee (KOLAS), which signed the ILAC-MRA.

This Test Report is issued by the Company subject to its General Conditions of Service printed overleaf. Attention is drawn to the limitations of liability, indemnification and jurisdictional issues defined therein. The results shown in this test report refer only to the sample (s) tested unless otherwise stated. This Test Report cannot be reproduced, except in full, without prior written permission of the Company.

Sample No. : GP06-05192.001

Sample Description : AG PASTE

Style/Item No. : ET-1833B

Heavy Metals

Test Items	Unit	Test Method	MDL	Results
Cadmium(Cd)	mg/kg	US EPA 3050B(1996), US EPA 6010B(1996)	0.5	N.D.
Lead (Pb)	mg/kg	US EPA 3050B(1996), US EPA 6010B(1996)	5	N.D.
Mercury (Hg)	mg/kg	US EPA 3052(1996), US EPA 6010B(1996)	2	N.D.
Hexavalent Chromium (Cr VI)	mg/kg	US EPA 3060A(1996), US EPA 7196A(1992)	1	N.D.

Picture of Sample as Received:

*** End ***

NOTE: (1) N.D. = Not detected.(<MDL)
(2) ppm = mg/kg
(3) MDL = Method Detection Limit
(4) Estimated expanded uncertainty U with a coverage factor *k* =2, corresponding to a level of confidence of about 95%

The above certificate is the accredited test items by Korea Laboratory Accreditation Schmee (KOLAS), which signed the ILAC-MRA.

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