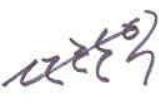




MSL Level 1

승 인 원

제 품 명	칩안테나		
사 용 자	텔리안		
적 용 모 델	MGQ7180		
사용자 CODE			
공급자	주식회사 파트론		
공급자 CODE	ACS2450EBAMQ		
텔 리 안	작성자	검토자	승인자
(주)파트론	작성자	품질합의	승인자
			
	개발 2P	품질보증파트	연구소
	전찬익	이광규	임병준
	02/12	02/12	02/12

2007 . 02. 12



경기도 화성시 반월동 33번지 나동 455-300

Tel : 031-201-7870~6

Fax : 031-201-7800

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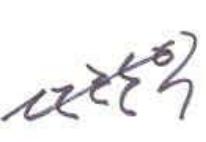


MSL Level 1

SPECIFICATION

MODEL : ACS2450EBAMQ

DIELECTRIC CHIP ANTENNA

작성자	검토자	승인자
		
개발 2P	품질보증파트	연구소
전찬익	이광규	임병준
02/12	02/12	02/12

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1. 이력관리

2. 전기적 특성

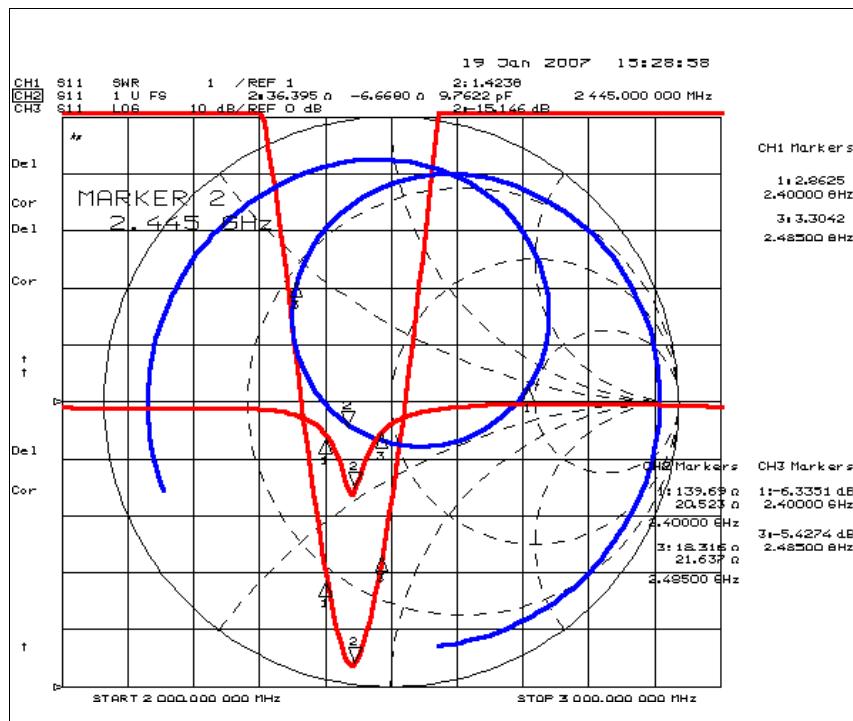
2.1 Set 실장 측정

ITEM			SPEC
Frequency Range [MHz]			2400 ~ 2485
VSWR [Max]			3 : 1
Bandwidth [MHz]			85
Polarization			Linear
Gain[dBi]	Total Gain (Peak / Avg) [dBi]		1.31 / -5.9
	Azimuth	Theta	Peak -3.95
		Theta	Average -9.28
	Elevation 1	Phi	Peak -4.04
		Phi	Average -10.04
	Elevation 1	Theta	Peak -2.09
		Theta	Average -5.53
	Elevation 2	Phi	Peak -0.47
		Phi	Average -6.34
	Elevation 2	Theta	Peak -8.58
		Theta	Average -14.81
		Phi	Peak 1.31
		Phi	Average -3.86

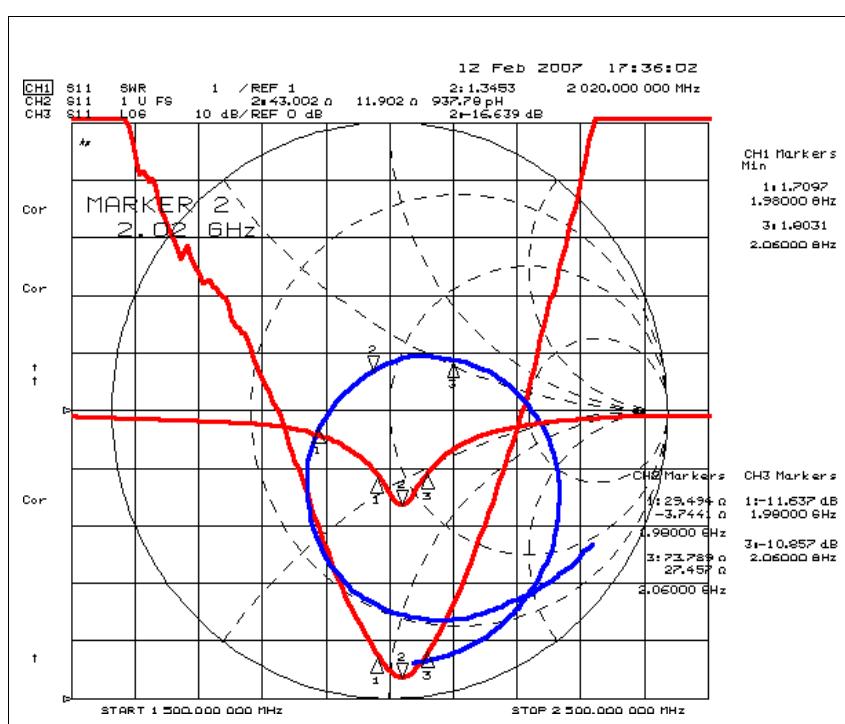
2.2 Test Fixture 측정

ITEM	SPEC	CTQ
Frequency Range [MHz]	1980 ~ 2060	
SWR [Max]	3 : 1	
Bandwidth [MHz]	80	

2.4 Set 실장 측정 Graph

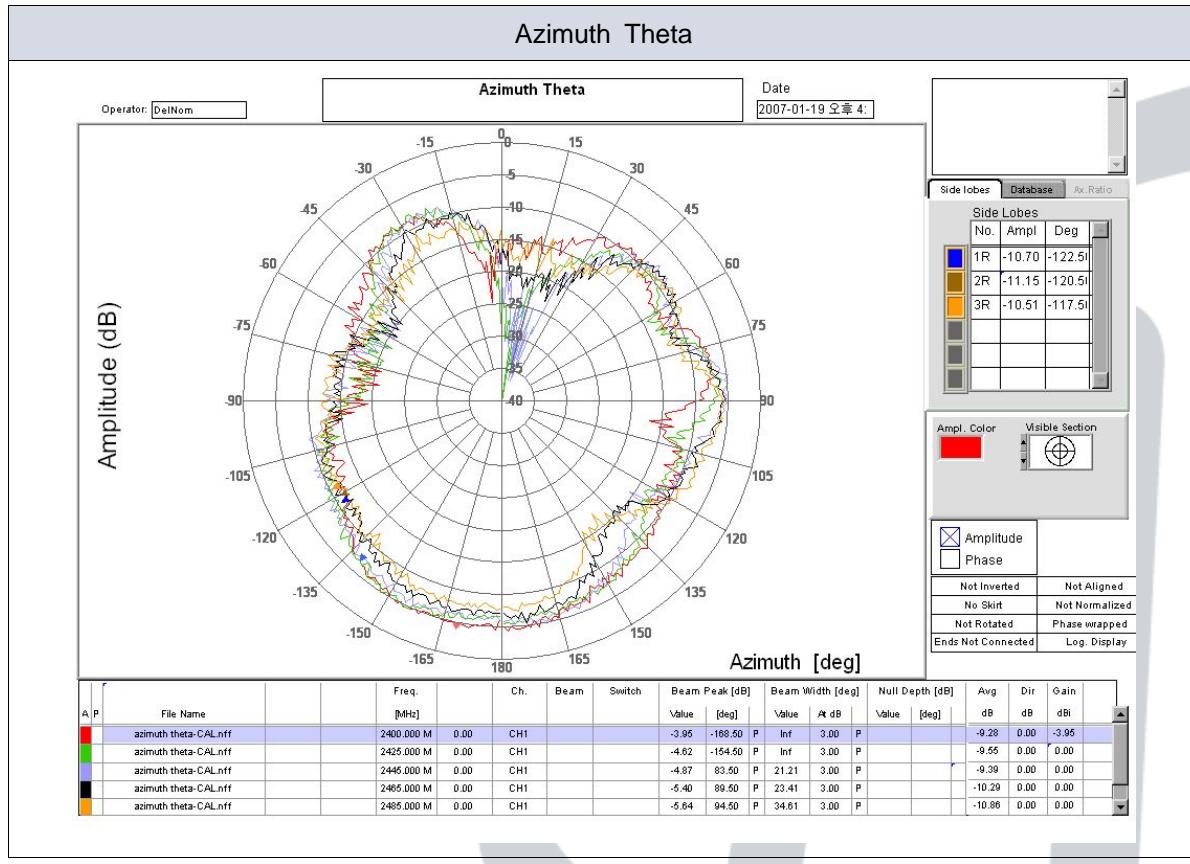


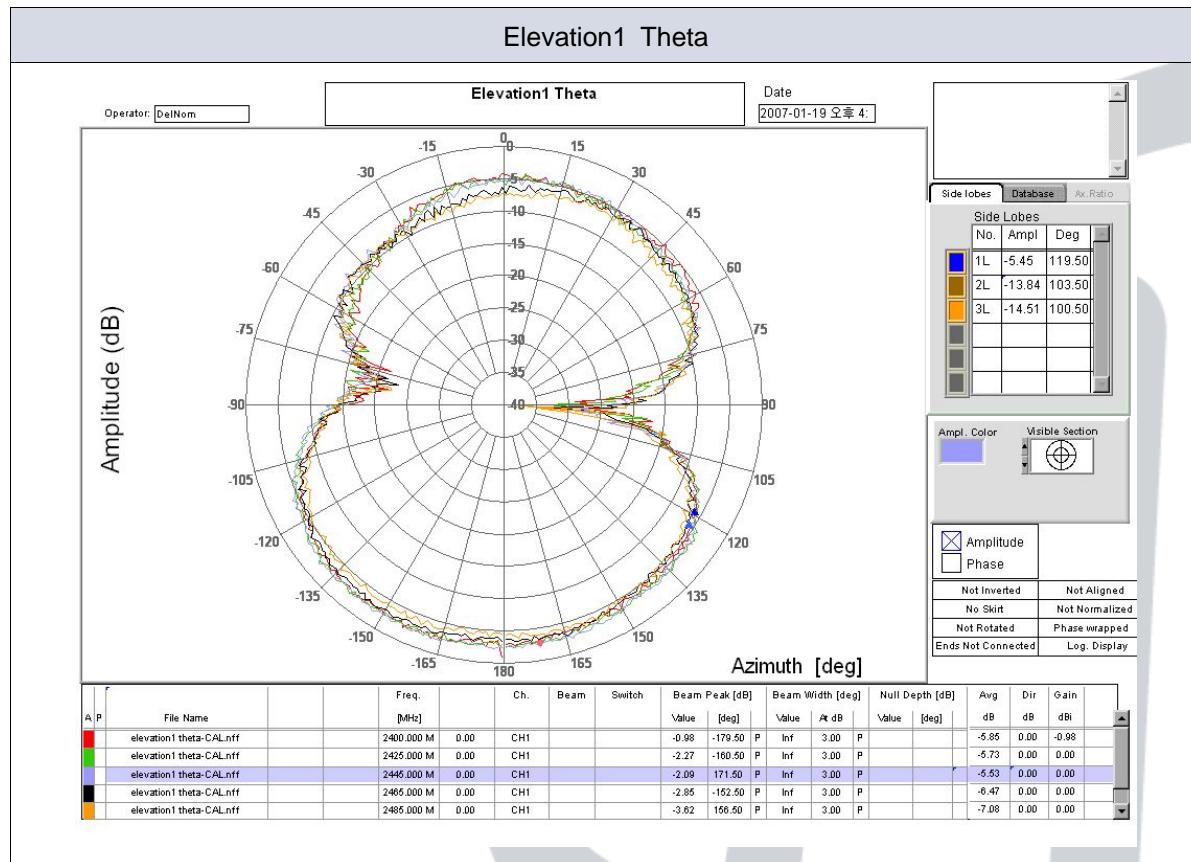
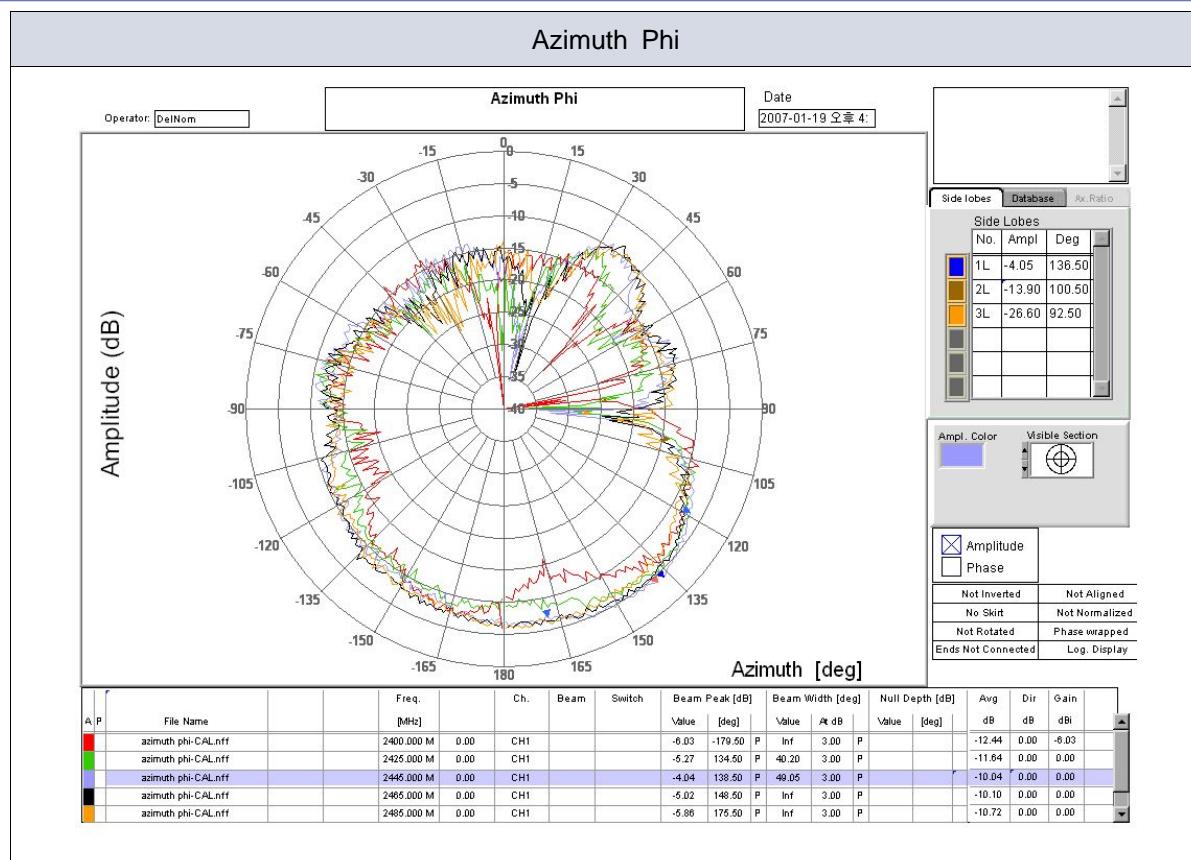
2.5 Test Fixture 측정 Graph

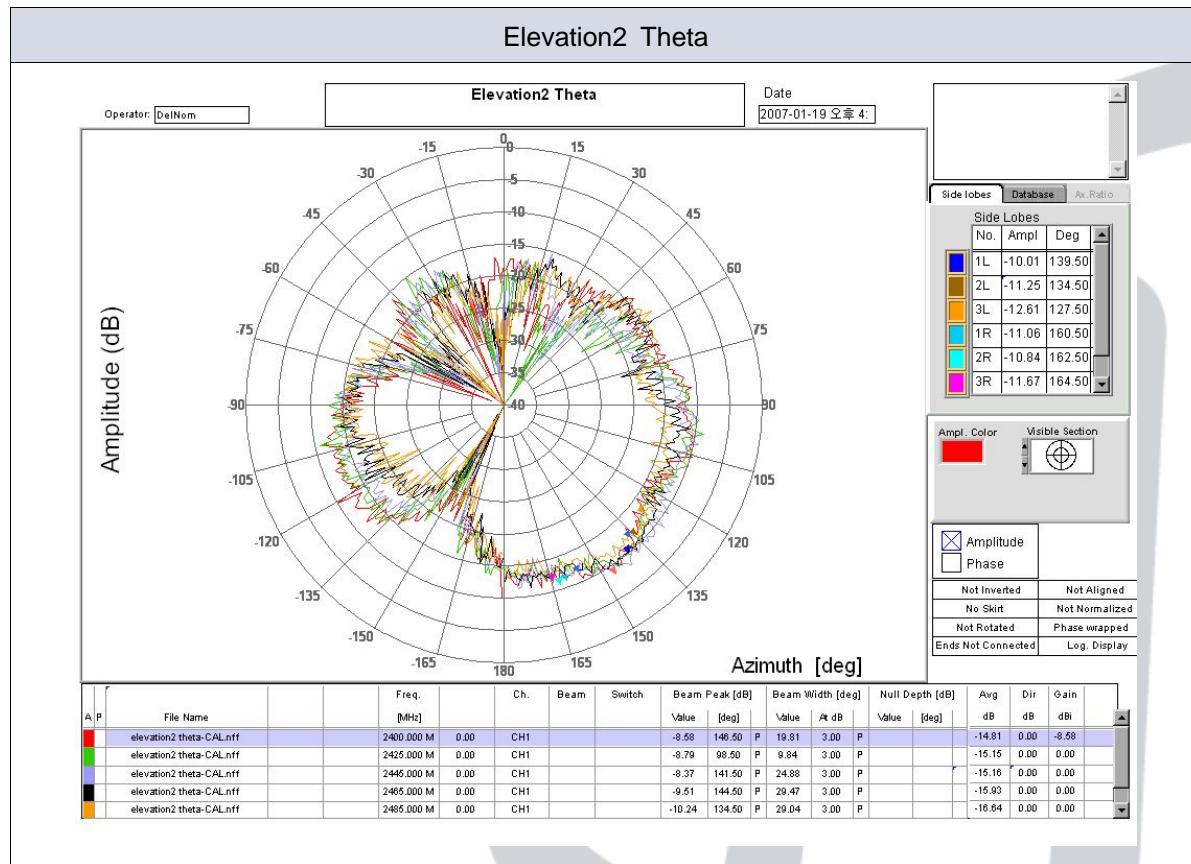
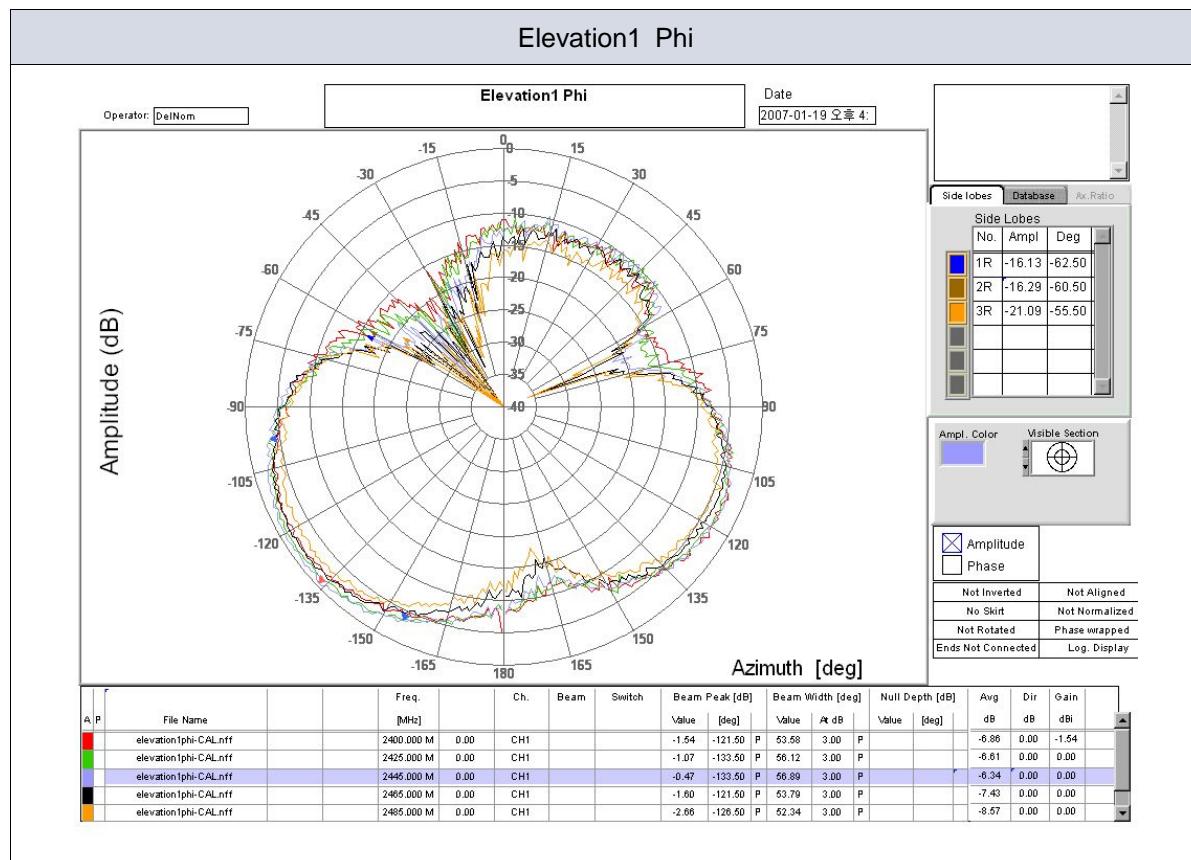


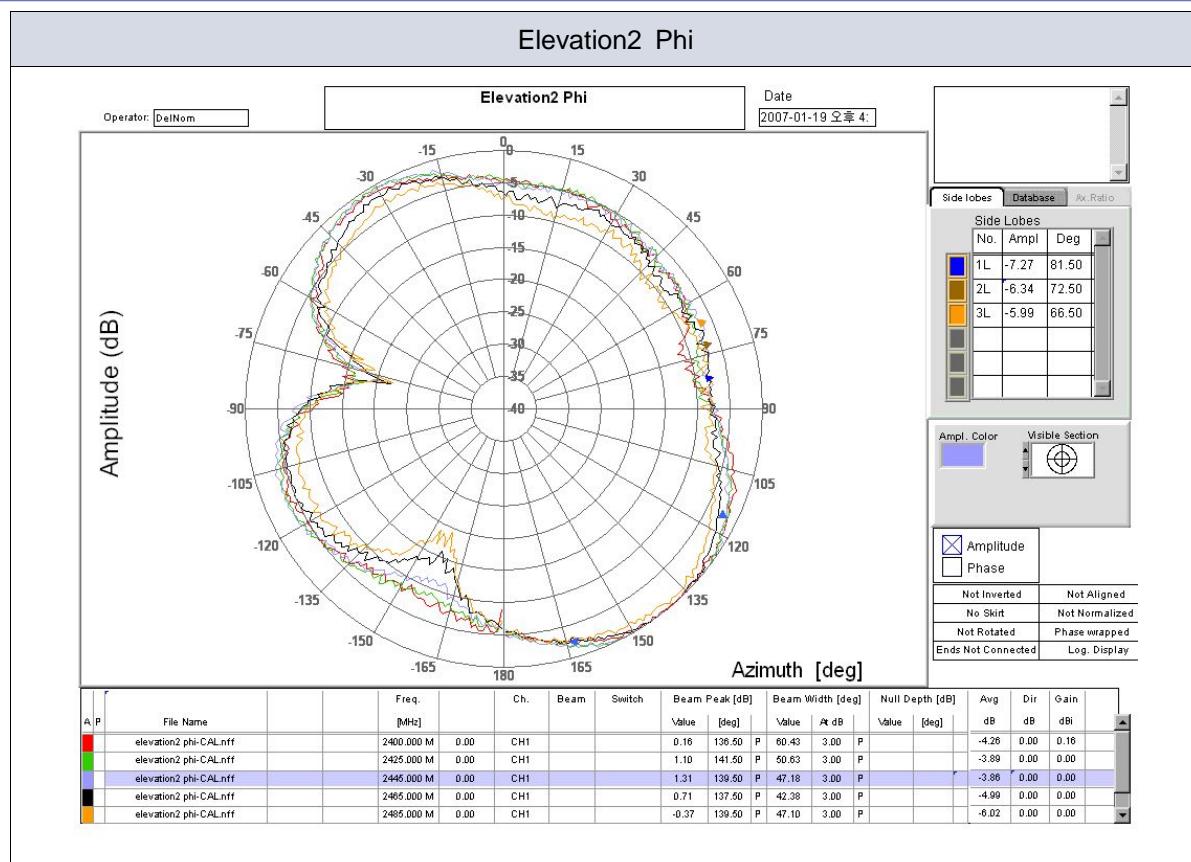
2.6 방사패턴

Azimuth Plane	Elevation 1 Plane	Elevation2 Plane
Theta	Vertical field of measured plane	
Phi	Horizontal field of measured plane	









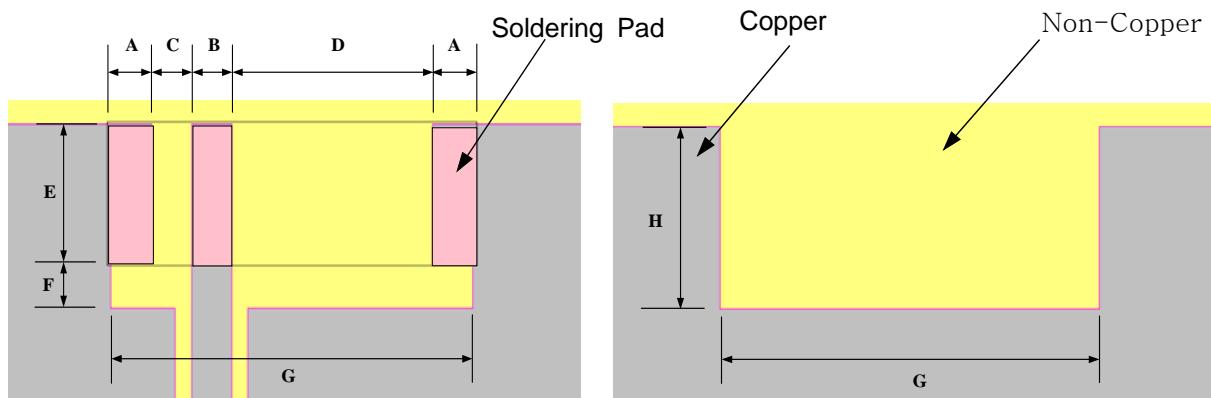
3. 기구적 특성

- 직방체의 형상을 갖는 유전체 소체에 은(Ag) Paste로 패턴을 형성하여 특성을 구현함

3.1 구조와 재질

Material	Dielectric Block (MMS-08)	3D Structure	
		Ag Paste (Metech)	
Size [mm]	W = 2.0±0.1		
	L = 5.4±0.1		
	T = 1.2±0.1		
Temperature [°C]		- 40 ~ +80	
Humidity [%]		At the normal temperature, RH 100	

3.2 PCB Layout & Soldering Pad Dimension

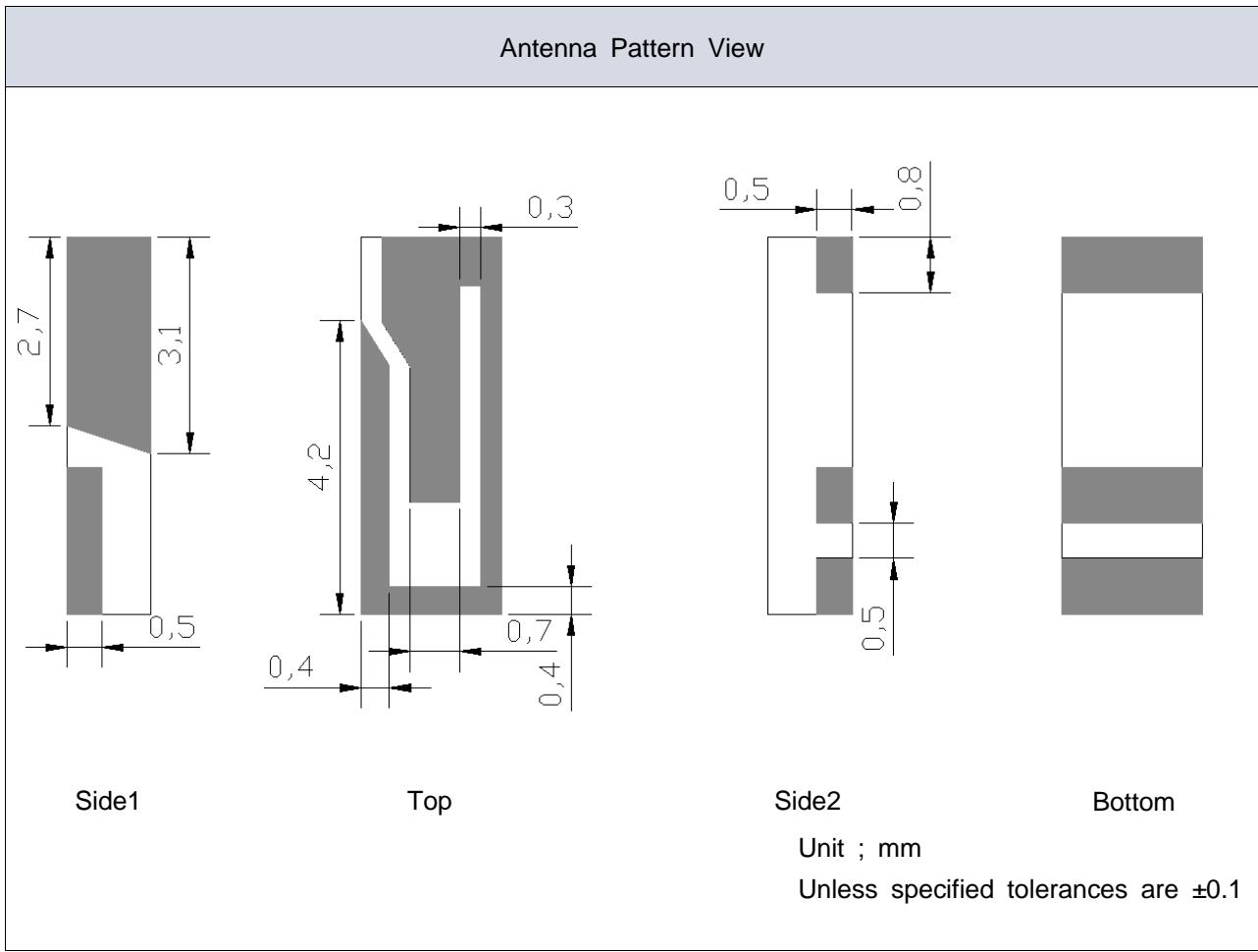

Top Layout
Bottom Pattern

Parameter	A	B	C	D	E	F	G	H
Value[mm]	0.9	0.8	0.5	2.5	2.2	more than 1.5	more than 5.6	more than 3.7

Unit ; mm

Unless specified tolerances are ± 0.1

3.3 안테나 패턴 도면

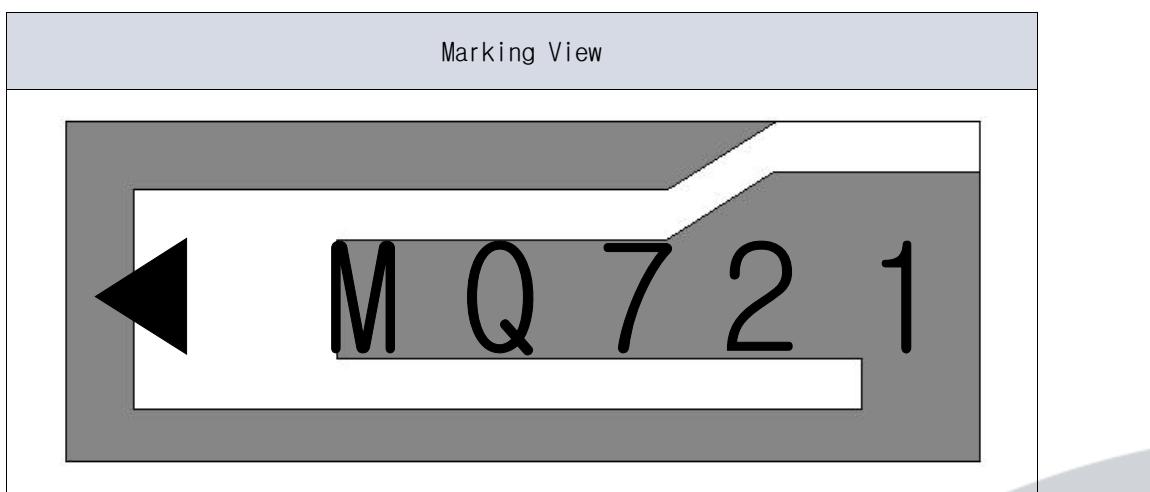


3.4 LOT 번호 표기법

7	2	1
①	②	③

- ① Year ; 1 - 2001, 2 - 2002, 7 - 2007
- ② Month ; 1 - January, 2 - February 9 - September, A - October, B - November ..
- ③ Date : 1 - 1st , 2 - 2nd A - 10th, B - 11th

3.5 Marking 사양



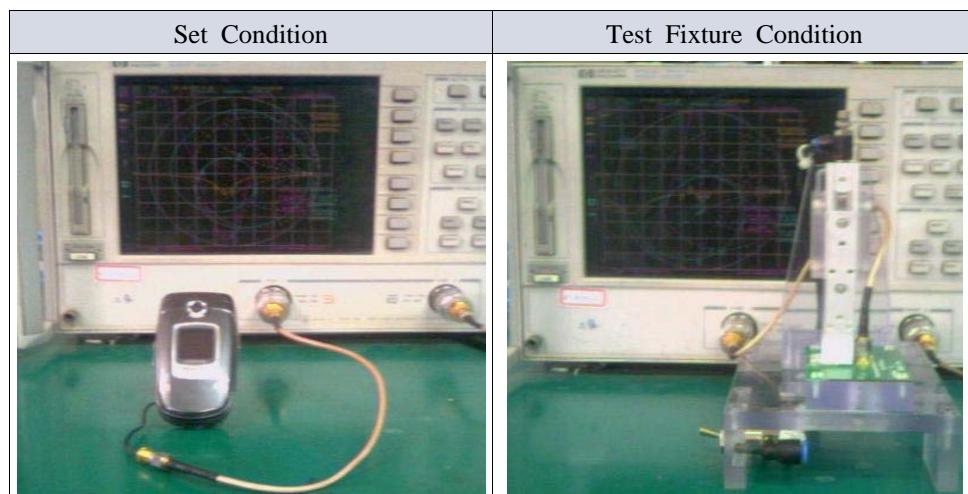
◀	M	Q	7	2	1
①	②	③	④	⑤	

- ① Input Signal
- ② Serial
- ③ Year; 1 - 2001, 2 - 2002, 7 - 2007
- ④ Month ; 1 - January, 2 - February 9 - September, A - October, B - November
- ⑤ Date : 1 - 1st , 2 - 2nd A - 10th, B - 11th

4. 시험 방법

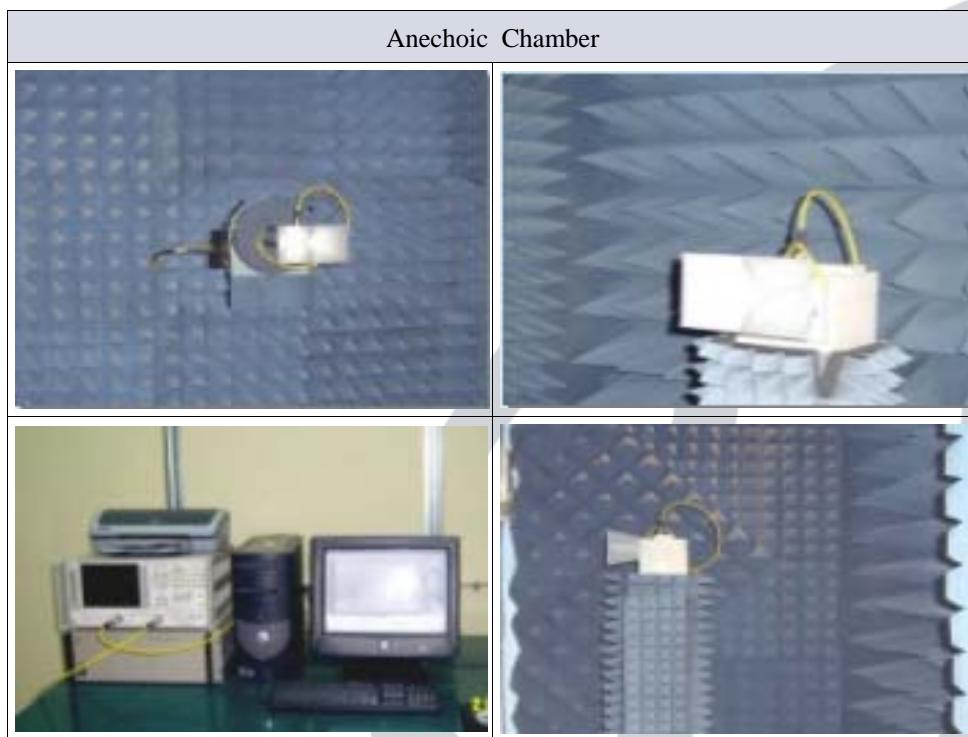
4.1 SWR/Returnloss

Network Analyzer를 이용하여 SWR/Returnloss를 측정하며 표본 SPL을 선별 Test Fixture를 이용 양품과 불량품을 선별한다.



4.2 Gain

당사가 보유한 전파 무반사실에서 상기4.1에서 측정된 Set를 이용하여 Antenna Gain을 측정한다.



5. 초기 검사 성적서

검사항목 규격	특성 [MHz] 		지수 [mm] 		
	VSWR 3.0 Max		W=2.0±0.1	L=5.4±0.1	T=1.2±0.1
	1980	2060			
1	1.70	1.80	2.02	5.41	1.23
2	1.95	1.71	2.03	5.42	1.23
3	1.92	1.74	2.03	5.43	1.23
4	1.93	1.70	2.03	5.41	1.22
5	1.77	1.85	2.02	5.41	1.23
6	1.88	1.75	2.04	5.41	1.24
7	1.88	1.72	2.02	5.42	1.24
8	1.96	1.74	2.03	5.42	1.22
9	1.89	1.76	2.02	5.42	1.24
10	1.84	1.76	2.03	5.42	1.24
11	1.93	1.73	2.03	5.40	1.23
12	1.95	1.71	2.02	5.40	1.24
13	1.85	1.80	2.04	5.42	1.22
14	1.91	1.88	2.02	5.41	1.23
15	1.90	1.86	2.03	5.41	1.23
16	1.94	1.83	2.03	5.42	1.24
17	1.86	1.81	2.02	5.40	1.22
18	1.91	1.83	2.04	5.40	1.24
19	1.87	1.79	2.02	5.41	1.23
20	1.84	1.81	2.02	5.42	1.24
X	1.88	1.77	2.02	5.41	1.23
σ	0.06	0.05	0.01	0.01	0.01
Cpk	5.75	7.39	3.28	3.31	2.91
판정	OK	OK	OK	OK	OK

6. 신뢰성 보증조건

6.1 환경 시험

항목	조 건	비고
고온방치	+85°C±3°C, 120hr±2hr	
저온방치	-40°C±3°C, 120hr±2hr	*시험 후 상온(25°C ± 5°C)에서 1시간 방치 후 측정한다. *테이블1의 전기적 특성을 만족하여야 한다
내습시험	+60±3°C, RH90~95%, 120hr±2hr	
ESD	MIL-STD-883D 3015.7(HBM), Class3B(8KV) 테스트 횟수 : 100회	*테이블1의 전기적 특성을 만족하여야 한다

6.2 열충격, REFLOW시험

항목	조 건	비고
열충격	-40°C ± 3°C / 45min ↔ +85°C ± 3°C / 45min cycle : 30 cycle 온도변환시간 : 5min 미만	6-1와 동일
Reflow	Pre Heating 200±5°C, 30~60 sec Peak Heating 260°C ± 5°C, 30sec Max	

6.3 기계적 시험

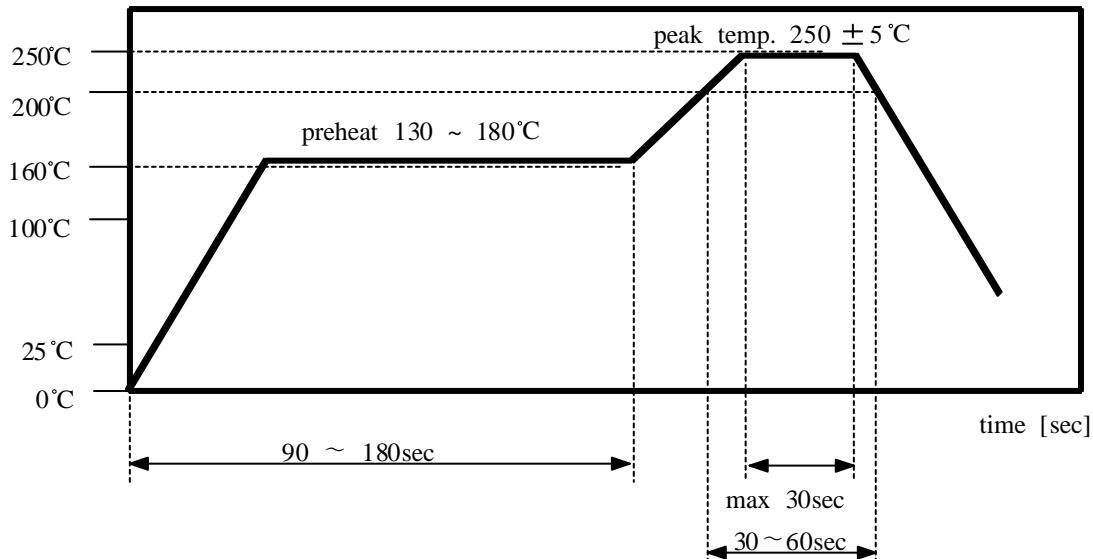
항목	조 건	비고
진동시험	주파수: 10~500Hz에서 10 × 9.8m/s ² (G) Sweep time 15min, X.Y.Z each 5 times	
낙하시험	높이 152cm에서 각 면 5회 낙하(지그낙하)	*시험 후 테이블1의 전기적 특성을 만족하여야 한다
휨 강도	휨 정도 : 2mm 속도 : 0.5mm/초 지속시간 5초	
고착강도	PCB에 SMT후 힘 F를 주어 제품이 PCB에서 떨어질때까지 힘 F를 증가	*F > 5kgf 을 만족하여야 한다

6.4 신뢰성 시험 성적서

※ 별첨

7. 납땜 조건

7.1 표준 열경화(Reflow) 조건



7.2 수동 납땜 (납땜 인두기를 사용할 경우)

예 열 : 120°C / 시 간 : 60 ~ 300 sec.

인두온도 : 340°C ±5°C / 시 간 : 각 단 최대 5 sec.

8. 주의 사항

8.1 온도 조건

	Range of Temperature	unit
Application	-40 ~ +85	°C
Keeping	-40 ~ +85	°C

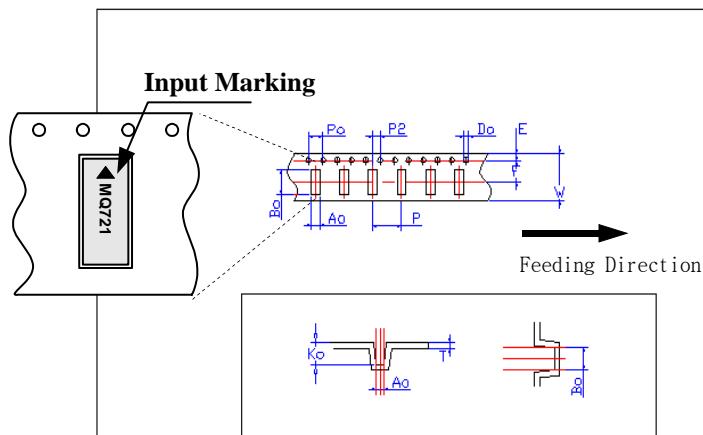
8.2 MSL LEVEL 1 (JEDEC J-STD-020C)

	Floor Life		Soak Requirements	
	Time	Conditions	Time	Conditions
	Unlimited	= < 30°C / 85%RH	168+5/-0	= < 85°C / 85%RH

9. 포장 사양

9.1 Carrier/Reel 사양

재질	표면저항	포장방식
대전 방지용 A-PET	Typical $10^8 \Omega$	열 압착식



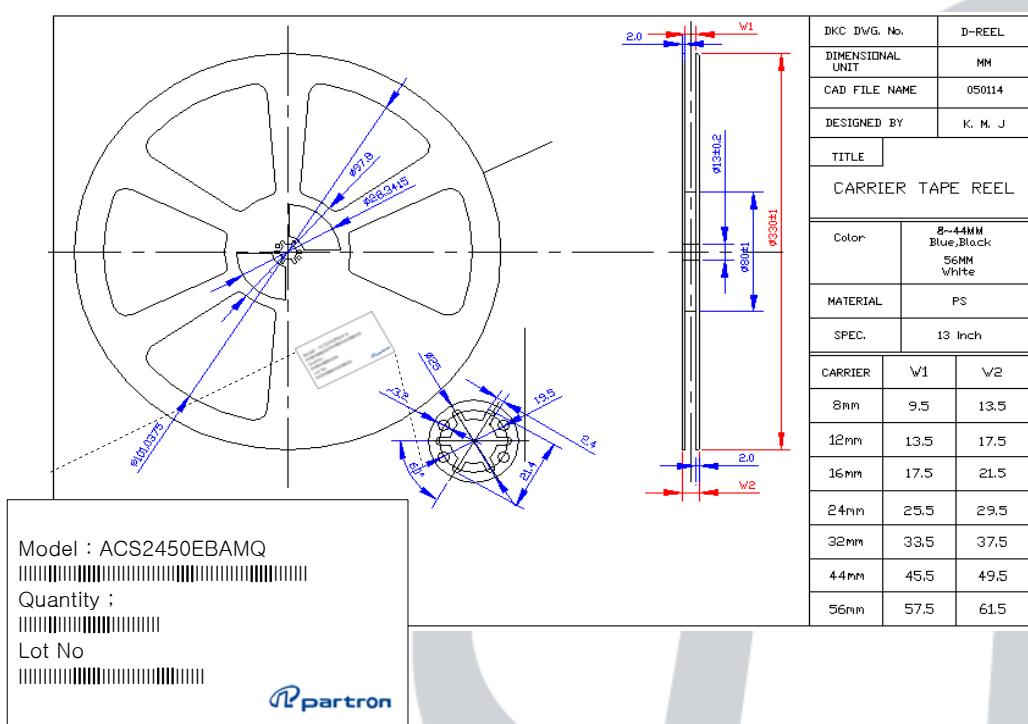
- 10 sprocket hole pitch cumulative tolerance ± 0.2
2. Camber not to exceed 1mm in 100mm
3. Ao and Bo measured on a plane 0.3mm above the bottom of the pocket
4. Ko measured from a plane on the inside bottom of the pocket to the top surface of the carrier,



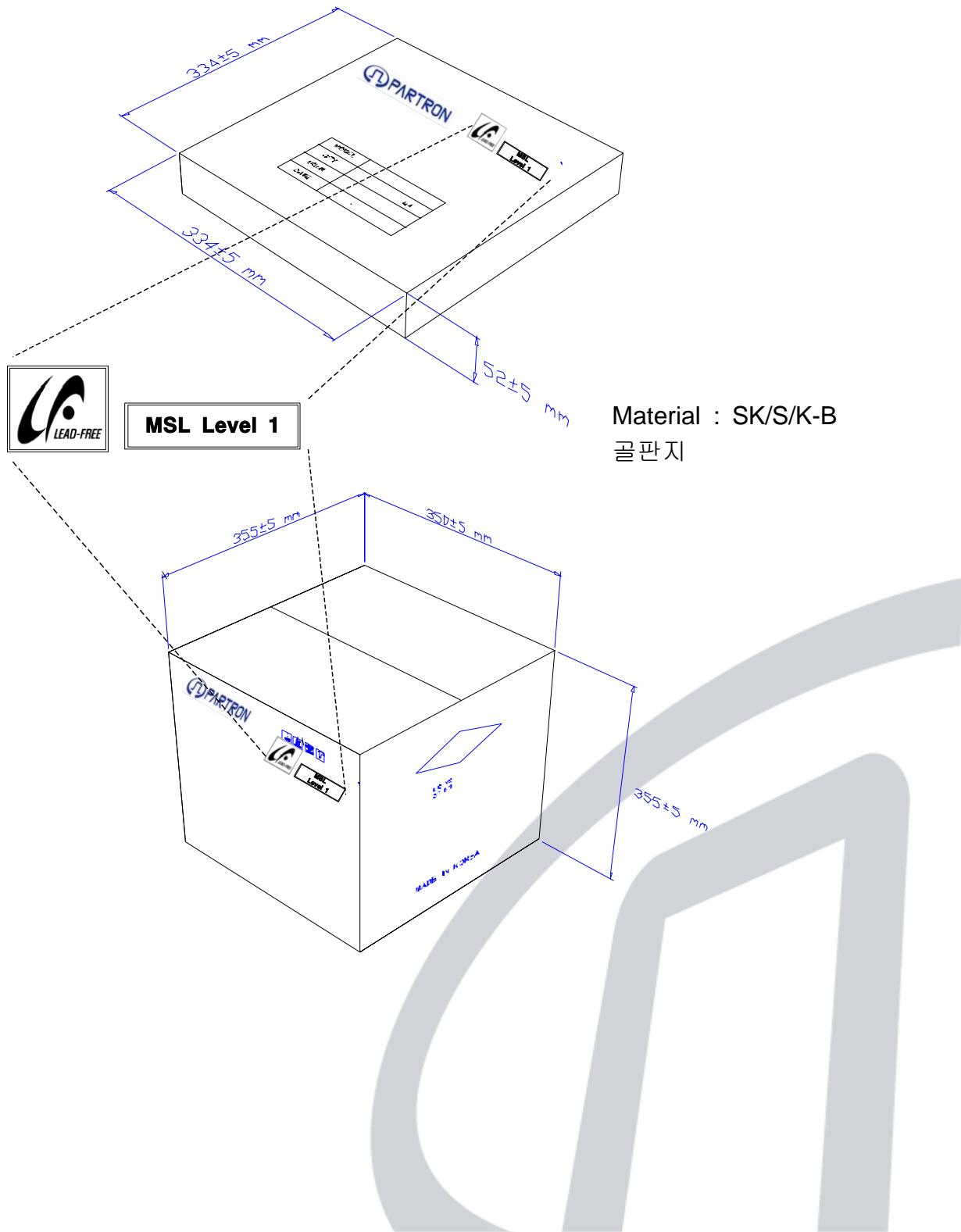
rm201, dkc Bldg.
366-340 shindang2-dong,
Jung-gu, seoul 100-452, korea
Tel. 822-2234-5890
Fax. 822-2238-8182

<http://www.dkcworld.com>

CAD FILE NAME	041217
DIMENSIONAL UNIT	MM
UNTOLERANCED DIMENSION	± 0.1
DKC DWG. No.	I-1208-053
DATE.	2004.12.17
DESIGNED BY	K. M. J
SCALE	1/1
CUSTOMER	PARTRON
TITLE	SAMPLE (2.0±0.4±1.2)
PART.	CARRIER TAPE
MATERIAL	A-PET
LENGTH	49.6M
COUNT	6200POCKET
NAME	SPEC.
W	12±0.3
E	1.75±0.1
F	5.5±0.1
Do	15±0.1
P	8.0±0.1
Po	4.0±0.1
P2	2.0±0.1
Ao	2.3±0.1
Bo	5.7±0.1
Ko	1.4±0.1
T	0.25±0.05



9.2 Box 사양



10. 관리공정도

제품		발행 /개정		품질관리공정도					관리번호	기안	심의	결정		
CHIP ANTENNA		Issued Revised	04.04.06 05.04.03						PRCP-C001					
투입자재	FLOW CHART		공정명	요인관리					품질특성관리					
	준비	본공정		설비명	관리항목	조건	관리주기	기록관리	관리항목	관리한계	검사방법	관리주기	기록관리	조치사항
세라믹 파우더		◇	수입검사						수축율 유전율	작업지도서 참조	Micrometer Network	10개/LOT	C/sheet	반품
파우더 윤활제	○		분말	Mixer					溷합	파우더:윤활 제	저울	溷합시	-	폐기
	○	○	성형	프레스	양압 금형상태	작업지도서 참조	매LOT 1회/일	parameter C/SHEET	치수 무게 밀도 외관	작업지도서 참조	Micrometer 저울 Calculated Visual	5/100개검 사 10개/LOT	LOT CARD	폐기
	○	○	소성	소성로	SETTER 외관 온도 PROFILE	작업지도서 참조	전수 2회/일 1회/월	C/sheet						
	◇	○	소체						폭 길이 모양	검사지도서 참조	Micrometer Calipers 목시	20개/LOT 20개/LOT 전수	C/sheet	폐기
AG PASTE	○	SIDE1 PAD 인쇄	인쇄기 screen	스크류 속도 /압력 SNAP	작업지도서 참조	1회/일	-	PATTERN치수 외관	작업지도서 참조	측정기 현미경	10개/3Jig	c/sheet	재작업	
	○	건조	건조기 건조Jig	온도 Belt speed	작업지도서 참조	1회/주	Parameter	건조상태 인쇄상태 파손	작업지도서 참조	목시	전수검사	Lot card	재작업	

제품			발행 / 개정		품질관리공정도					관리번호	기안	심의	결정	
CHIP ANTENNA			Issued Revised							PRCP-C001				
투입자재	FLOW CHART		공정명	요인관리					품질특성관리					
	준비	본공정		설비명	관리항목	조건	관리주기	기록관리	관리항목	관리한계	검사방법	관리주기	기록관리	조치사항
AG PASTE		<input type="radio"/>	SIDE 2 PAD 인쇄	인쇄기 screen	스퀴즈 속도 /압력 SNAP	작업지도서 참조	1회/일	-	PATTERN치수 외관	작업지도서 참조	측정기 현미경	10개 /3Jig	c/sheet	재작업
		<input type="radio"/>	건조	건조기 건조Jig	온도 Belt speed	작업지도서 참조	1회/주	Parameter	건조상태 인쇄상태 파손	작업지도서 참조	목시	전수검사	Lot card	재작업
		<input type="radio"/>	소부	소부로 mesh망	온도 Belt speed	작업지도서 참조	1회/주	Parameter C/Sheet	소체파손 오염	작업지도서 참조	목시	전수	Lot card	폐기 재작업
AG PASTE		<input type="radio"/>	TOP 인쇄	인쇄기 screen	스퀴즈 속도 /압력 SNAP	작업지도서 참조	1회/일	-	PATTERN치수	작업지도서 참조	측정기	10개 /3Jig	c/sheet	재작업
		<input type="radio"/>	건조	건조기 건조Jig	온도 Belt speed	작업지도서 참조	1회/주	Parameter	건조상태 인쇄상태 파손	작업지도서 참조	목시	전수검사	Lot card	재작업
AG PASTE		<input type="radio"/>	BOTTOM PAD 인쇄 <i>(초중증불 관리)</i> CTQ공정	인쇄기 screen	스퀴즈 속도 /압력 SNAP	작업지도서 참조	1회/일	-	PATTERN치수 외관	작업지도서 참조	측정기 현미경	10개 /3Jig	c/sheet	재작업

제품		발행 /개정		품질관리공정도					관리번호	기안	심의	결정		
CHIP ANTENNA		Issued Revised	04.04.06. 05.04.03						PRCP-C001					
투입자재	FLOW CHART		공정명	요인관리					품질특성관리					
	준비	본공정		설비명	관리항목	조건	관리주기	기록관리	검사항목	관리한계	검사방법	관리주기	기록관리	조치사항
		○	건조	건조기 건조Jig	온도 Belt speed	작업지도서 참조	1회/주	Parameter	건조상태 인쇄상태 파손	작업지도서 참조	목시	전수검사	Lot card	재작업
		○	소부	소부로 mesh망	온도 Belt speed	작업지도서 참조	1회/주	Parameter C/Sheet	소체파손 오염	작업지도서 참조	목시	전수	Lot card	폐기 재작업
		◇	외관검사						제품외관	한도견본 작업지도서 참조	목시 현미경	전수	Lot card 생산일보	폐기 수리
		○	MARKING	마킹기					마킹외관	한도견본	목시	전수	Lot card 생산일보	재작업 폐기
		◇	특성검사	NETWORK 검사지그	교정상태	작업지도서 참조	1회/반	C/sheet	전기적 특성	작업지도서 참조	Network	전수	Lot card 생산일보	폐기 수리
		◇	외관검사						제품외관 제품치수	한도견본 작업지도서 참조	목시 현미경	전수	Lot card 생산일보	폐기 수리
Carrier cover reel		○	Taping						수량 역삼 외관	작업지도서 참조	수작업	전수	Lot card 생산일보	재작업
		◇	출하검사	NETWORK 검사지그	교정상태	작업지도서 참조	1회/반	C/sheet	전기적특성 제품외관 포장상태	검사지도서	Network 현미경 목시	작업 지도서	성적서	return 폐기
포장 box label		○	포장	bar code pr inter					포장상태 기종호입 포장수량	포장작업 지도서	목시	전수	-	재작업
		◇	포장검사						포장상태 기종호입 포장수량	포장작업 지도서	목시	전수	-	return

11. 유해물질 분석 성적서

1) Ceramic Powder

<div style="text-align: center;"> Test Report <p>FUJI TITANIUM IND. CO., LTD. 12-8, SENGEN-CHO, HIRATSUKA-CITY, KANAKAWA-PREF. JAPAN. (T) 81-463-32-0210 Report No. : CE/2006/75167 Date : 2006/07/25 Page : 1 of 4</p> <p>The following sample(s) was/were submitted and identified by/on behalf of the client as :</p> <p>Sample Description : MIXTURE OF (1) MAGNESIUM SILICATE (2) STRONTIUM ZIRCONATE (3) BARIUM TITANATE Style/Item No. : MMS-08 (B) Sample Received : 2006/07/18 Testing Period : 2006/07/18 TO 2006/07/25</p> <p>Test Result(s) : - Please see the next page(s) -</p> <p style="text-align: right;"><i>[Signature]</i> Daniel Yeh, M.R., Operation Manager Signed for and on behalf of SGS TAIWAN LTD.</p> <p><small>The content of this PDF file is in accordance with the original issued reports for reference only. This Test Report cannot be reproduced, except in full, without prior written permission of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this report is unlawful and offenders may be prosecuted to the fullest extent of the law. SGS TAIWAN LIMITED NO 106-1, Wu-Kung Road, WaKu Industrial Zone, Taoyuan County, Taiwan 33606 (03) 22995201 (03) 22995227 www.sgs.com.tw</small></p> </div>	<div style="text-align: center;"> Test Report <p>FUJI TITANIUM IND. CO., LTD. 12-8, SENGEN-CHO, HIRATSUKA-CITY, KANAKAWA-PREF. JAPAN. (T) 81-463-32-0210 Report No. : CE/2006/75167 Date : 2006/07/25 Page : 2 of 4</p> <p>Test Results! PART NAME NO.1 : WHITE POWDER</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Test Item (s):</th> <th>Unit</th> <th>Method</th> <th>MDL</th> <th>Result No.1</th> </tr> </thead> <tbody> <tr> <td>PBBs [Polybrominated biphenyls]</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> </tr> <tr> <td>Monobromobiphenyl</td> <td>%</td> <td></td> <td>0.0005</td> <td>N.D.</td> </tr> <tr> <td>Dibromobiphenyl</td> <td>%</td> <td></td> <td>0.0005</td> <td>N.D.</td> </tr> <tr> <td>Tribromobiphenyl</td> <td>%</td> <td></td> <td>0.0005</td> <td>N.D.</td> </tr> <tr> <td>Tetrabromobiphenyl</td> <td>%</td> <td></td> <td>0.0005</td> <td>N.D.</td> </tr> <tr> <td>Pentabromobiphenyl</td> <td>%</td> <td>With reference to USEPA3540C. 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This Test Report cannot be reproduced, except in full, without prior written permission of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this report is unlawful and offenders may be prosecuted to the fullest extent of the law. Yeh, Daniel (03) 22995201 (03) 22995227 www.sgs.com.tw</small></p> </div>	Test Item (s):	Unit	Method	MDL	Result No.1	PBBs [Polybrominated biphenyls]	---	---	---	---	Monobromobiphenyl	%		0.0005	N.D.	Dibromobiphenyl	%		0.0005	N.D.	Tribromobiphenyl	%		0.0005	N.D.	Tetrabromobiphenyl	%		0.0005	N.D.	Pentabromobiphenyl	%	With reference to USEPA3540C. Analysis was performed by HPLC/DAD.	0.0005	N.D.	Hexabromobiphenyl	%	LC/MS or GC/MS.	0.0005	N.D.	Heptabromobiphenyl	%	(prohibited by 2002/95/EC (RoHS), 83/264/EEC, and 76/769/EEC)	0.0005	N.D.	Octabromobiphenyl	%	LC/MS or GC/MS.	0.0005	N.D.	Nonabromobiphenyl	%	(prohibited by 2002/95/EC (RoHS), 83/264/EEC, and 76/769/EEC)	0.0005	N.D.	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2) Ag paste

SGS

Test Report No. F690501/LF-CTSGP06-26952 **Date:** October 27, 2006 **Page:** 1 of 2

To: METECH KOREA CO., LTD.
B-801 Dongyang Paragon officetel 17-2 Jeongja-dong
Bundang-gu
Sungnam-city
GYEONGGI-DO
Korea

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

Commodity	:	PCC11837HV
SGS File No.	:	GP06-26952
Received Date	:	October 20, 2006
Test Performing Date	:	October 23, 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.

Jeff Jang / Chemical Lab Mgr

The above certificate is the accredited test items by Korea Laboratory Accreditation Scheme (KOLAS), which signed the IAC-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 jurisdiction 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-CTSGP06-26952 **Date:** October 27, 2006 **Page:** 2 of 2

Sample No. : GP06-26952.001
Sample Description : PCC11837HV
Item No./Part No. : N/A
Comments : Material is silver paste.

Test Item	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 3000A(1996), US EPA 7190A(1992), UV	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 Scheme (KOLAS), which signed the IAC-MRA.

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3) Marking ink

SGS

Test Report No. F690501/LF-CTSGP06-27074 **Date:** October 27, 2006 **Page:** 1 of 3

To: METECH KOREA CO., LTD.
5102, Dongyang Techno Town 7th
Kasan-dong
Kwondo-gu
SEOUl
Korea

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

Commodity	:	099-01258 black ink
SGS File No.	:	GP06-27074
Received Date	:	October 20, 2006
Test Performing Date	:	October 23, 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.

Jeff Jang / Chemical Lab Mgr

The 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 jurisdiction 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-CTSGP06-27074 **Date:** October 27, 2006 **Page:** 2 of 3

Sample No. : GP06-27074.001
Sample Description : 099-01258 black ink
Stylet No. : N/A

Test Item	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 3000A(1996), US EPA 7190A(1992), UV	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) = No regulation
(5) = Quantitative Analysis (No. unit)
(6) Negative = Undetectable / Positive = Detectable

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SGS

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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) = Quantitative Analysis (No. unit)
(6) Negative = Undetectable / Positive = Detectable

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