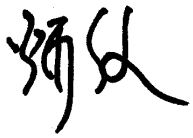
MSL Level 1

Approval Sheet

Products	Dielectric Chip Antenna		
Customer	Ubi&mobi		
Model	UMBM01		
Customer CODE			
Supplier	PARTRON		
Supplier CODE	ACS2450HBAUBM		
Ubi&mobi	By designed	By checked	By approved
PARTRON	By designed	By checked	By approved
			
	Research 2P	Quality Assurance	Laboratory
	Chanik.Jeon	Kwang-Gyu.Lee	Byoung-Jun.Yim
	03/16	03/16	03/16

2007 . 03. 16

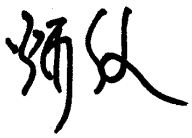
partron
33 Banwol-dong, Hwaseong-si, Gyeonggi-do,Korea 455-300
Tel : 82-31-201-7870~6
Fax : 82-31-201-7800
www.partron.co.kr

MSL Level 1

SPECIFICATION

MODEL : ACS2450HBAUBM

DIELECTRIC CHIP ANTENNA

By designed	By checked	By approved
		
Research, 2P	Quality Assurance	Laboratory
Chan-Ik.Jeon	Kwang-Gyu.Lee	Byoung-Jun.Yim
03/16	03/16	03/16

2007 . 03. 16

partron
33 Banwol-dong, Hwaseong-si, Gyeonggi-do,Korea 455-300
Tel : 82-31-201-7870~6
Fax : 82-31-201-7800
www.partron.co.kr

- Contents -

1. Revision

Revision No	Originator	Description of changes	Date of changes
Ver 1.0	Chanik.Jeon	Issued	2007.03.16

2. Electrical Characteristics

2.1 Single Element Spec

ITEM	SPEC
Frequency Range [MHz]	2400 ~ 2485
SWR [Max]	3 : 1
Bandwidth [MHz]	85
Gain (Peak) [dBi]	2.32

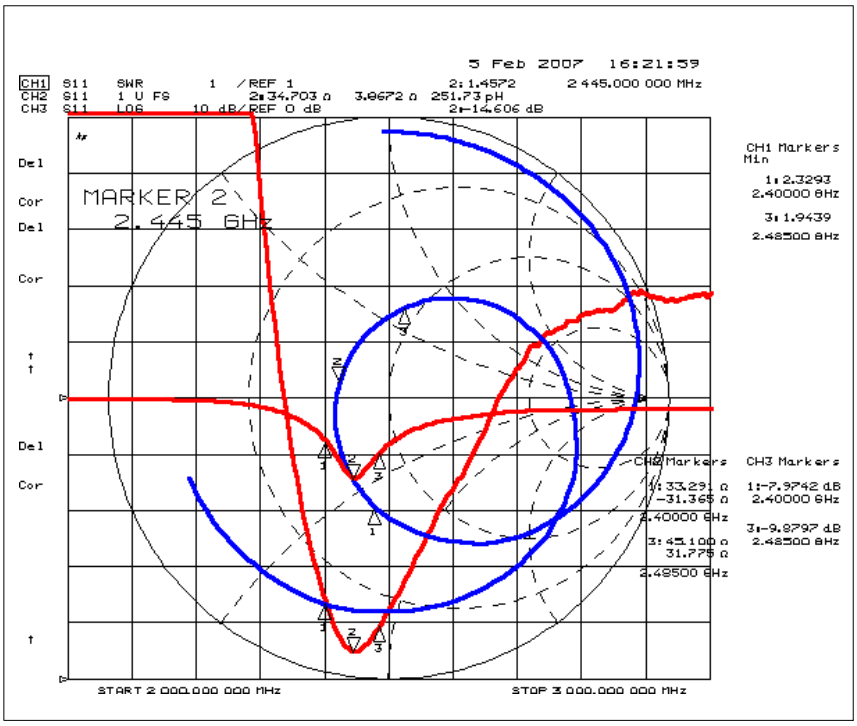
2.2 Set Condition

ITEM				SPEC
Frequency Range [MHz]				2400 ~ 2485
VSWR [Max]				3 : 1
Bandwidth [MHz]				85
Polarization				Linear
Gain[dBi]	Total Gain (Peak / Avg) [dBi]			2.32 / -2.8
	Azimuth	Theta	Peak	-0.34
			Average	-3.15
		Phi	Peak	-4.66
			Average	-10.43
	Elevation 1	Theta	Peak	-5.36
			Average	-10.78
		Phi	Peak	1.77
			Average	-2.13
	Elevation 2	Theta	Peak	-6.57
			Average	-11.16
		Phi	Peak	2.32
			Average	-3.13

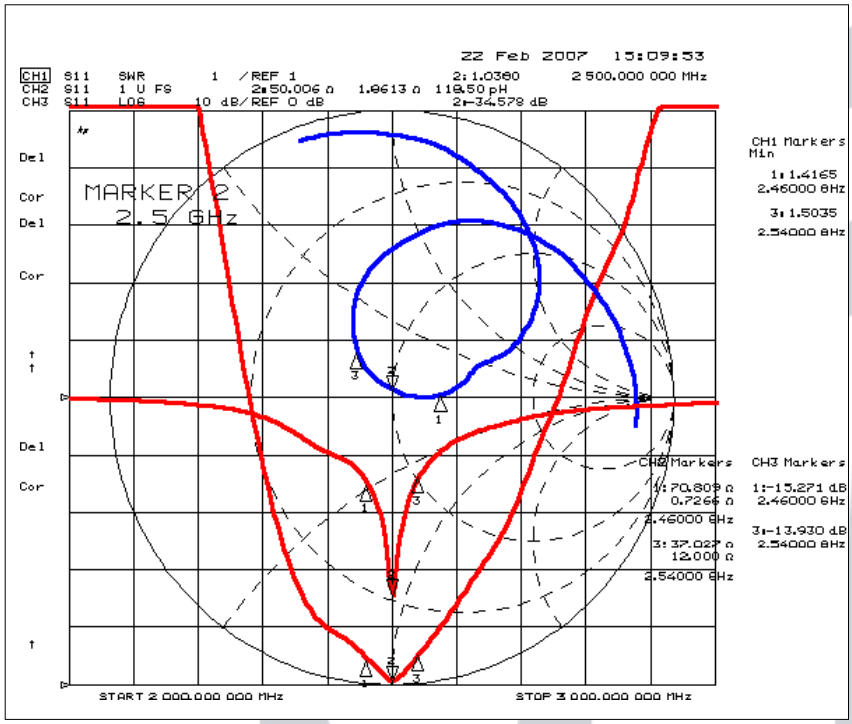
2.3 Test Fixture Condition

ITEM	SPEC CTQ
Frequency Range [MHz]	2460 ~ 2540
SWR [Max]	3 : 1
Bandwidth [MHz]	80

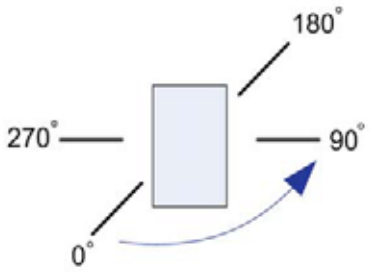
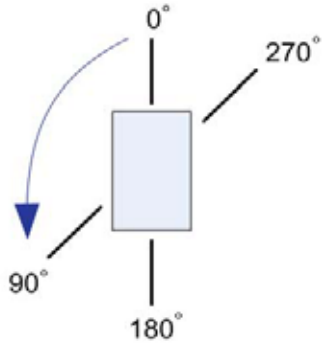
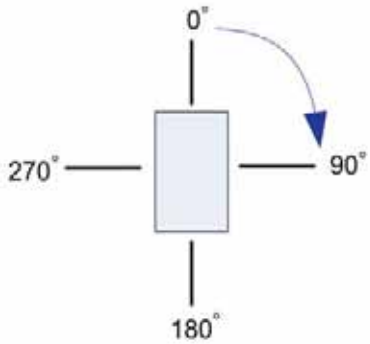
2.4 S11 Graph of Set Condition

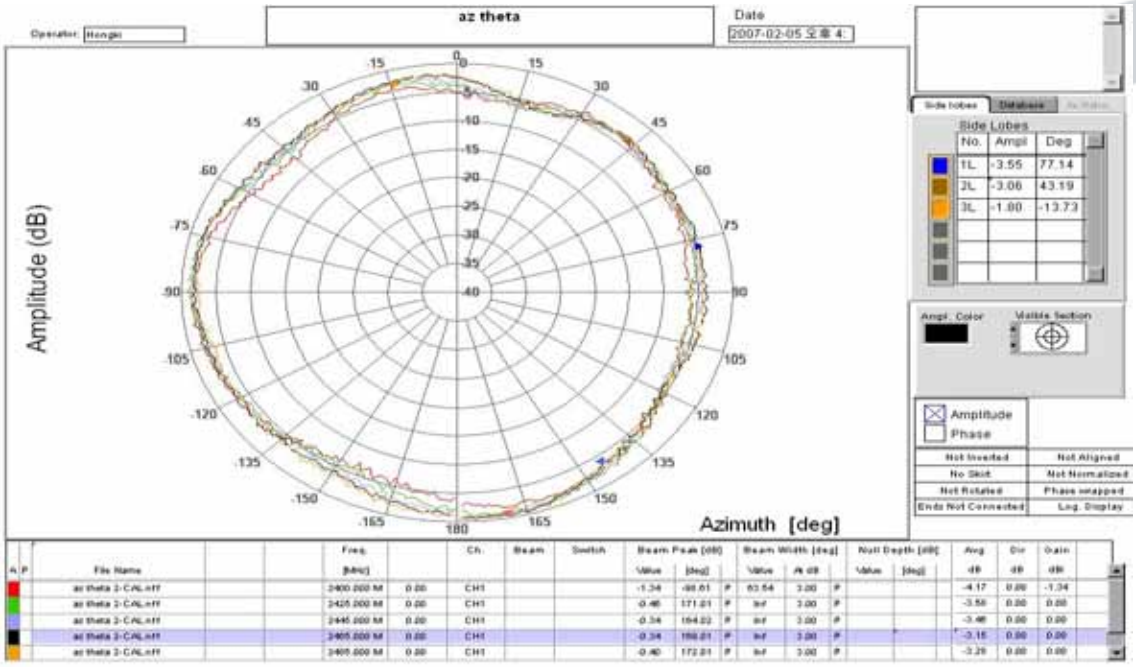


2.5 S11 Graph of Test Fixture Condition CTQ

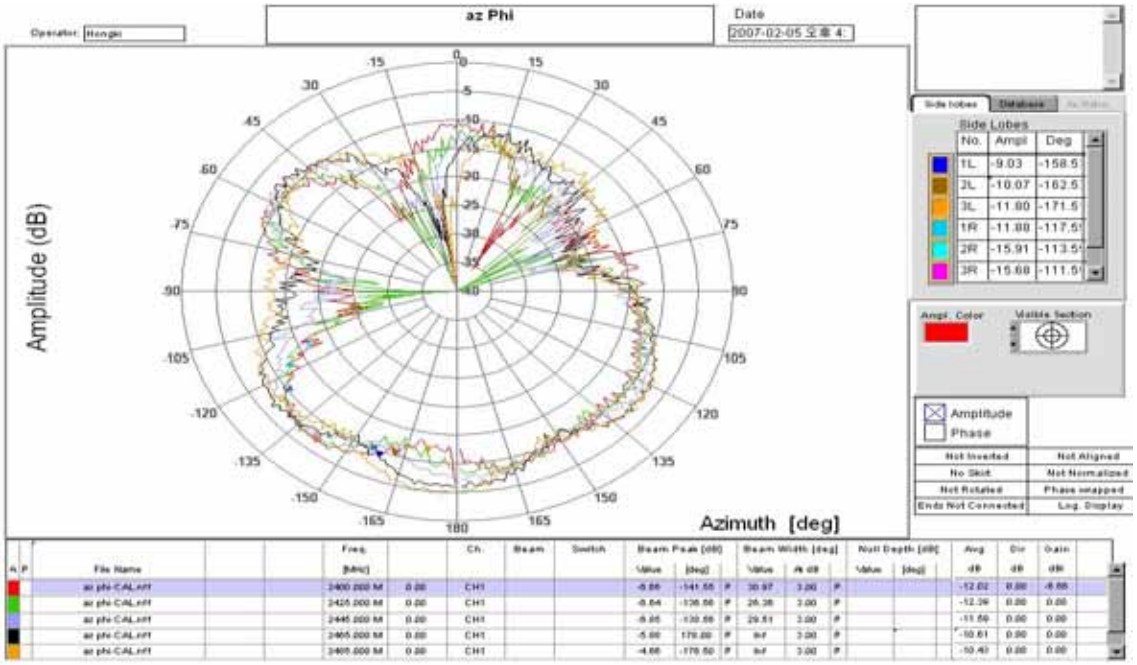


2.6 Radiation Pattern

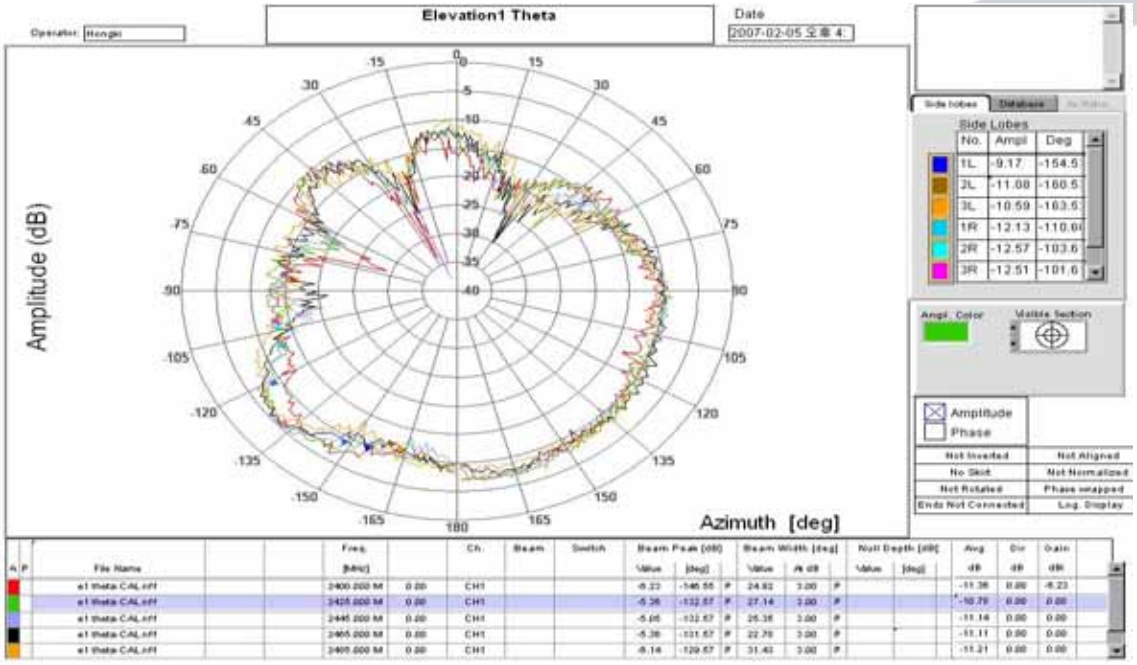
Azimuth Plane	Elevation1 Plane	Elevation2 Plane
		
Theta	Vertical field of measured plane	
Phi	Horizontal field of measured plane	

Azimuth Theta


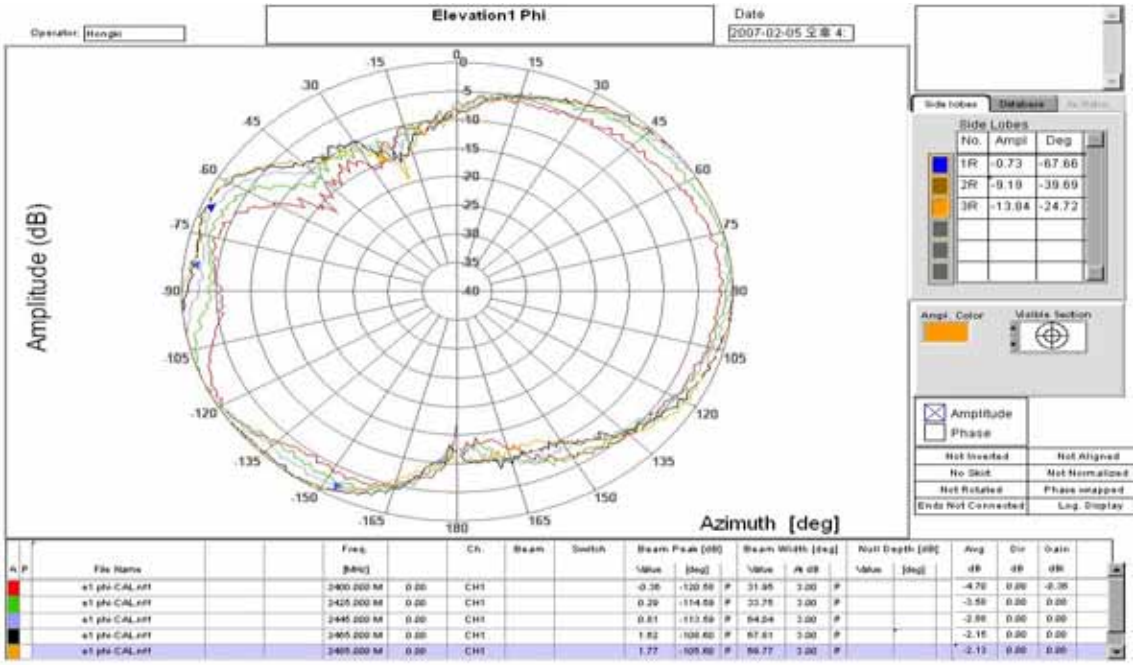
Azimuth Phi



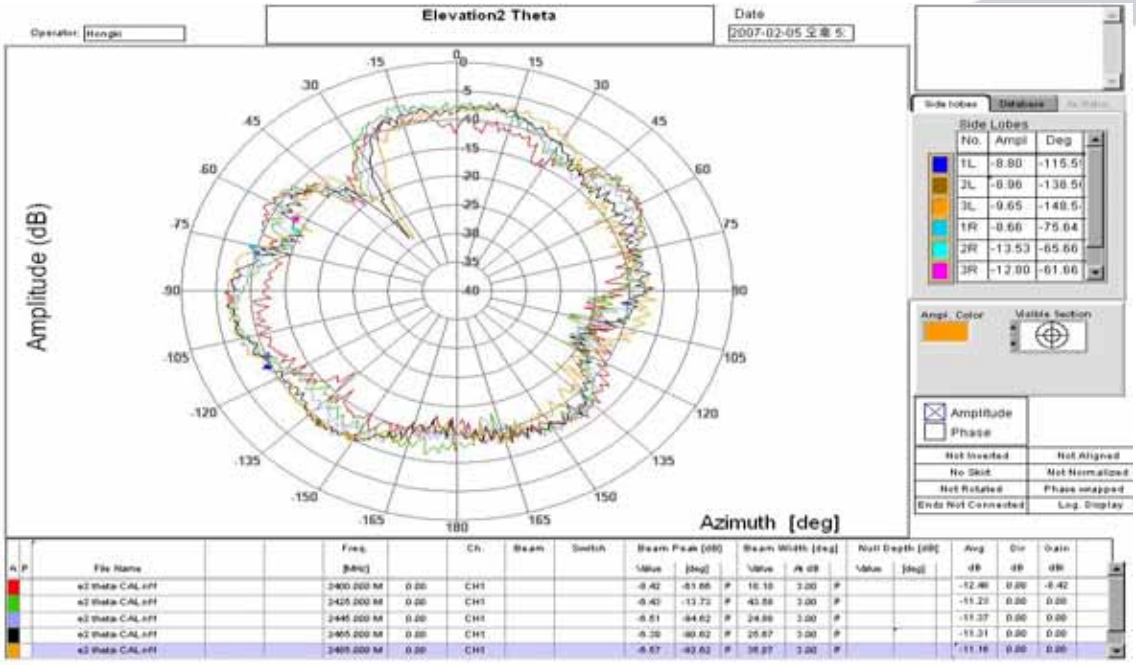
Elevation1 Theta



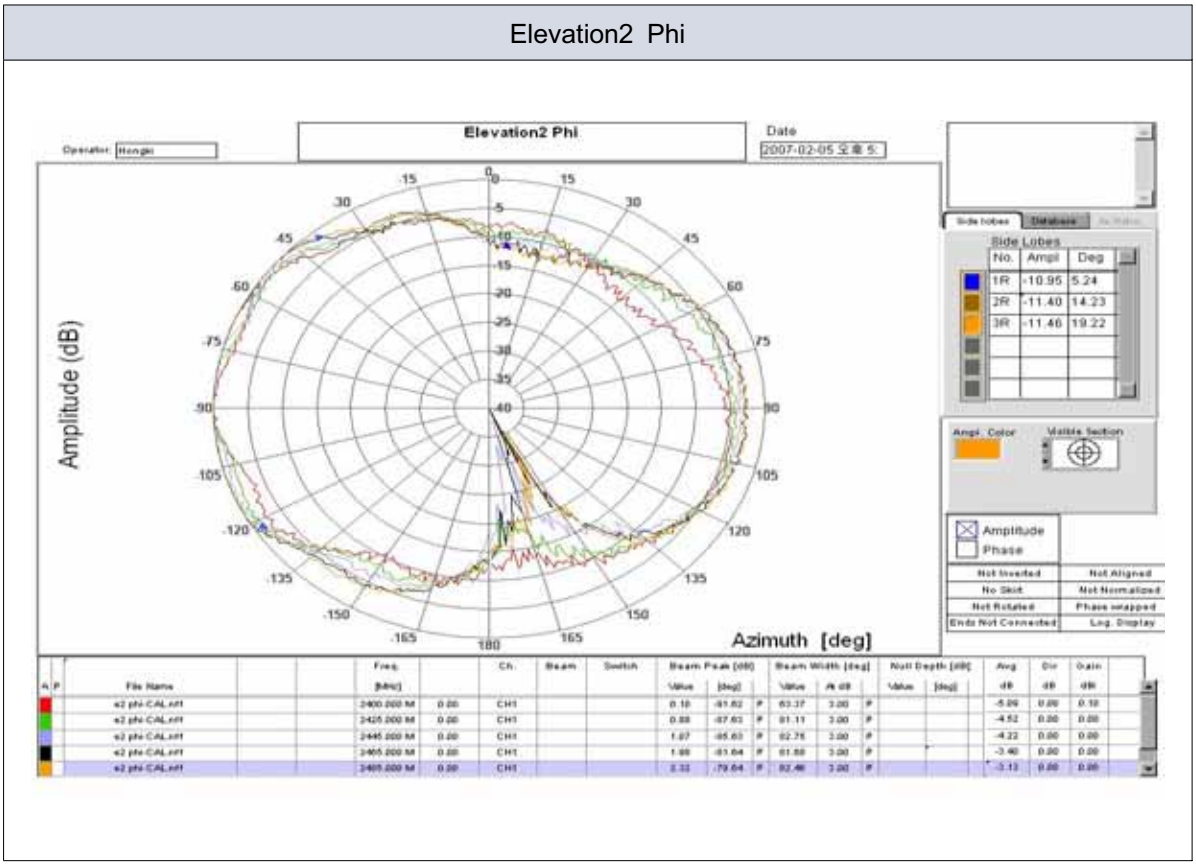
Elevation1 Phi



Elevation2 Theta



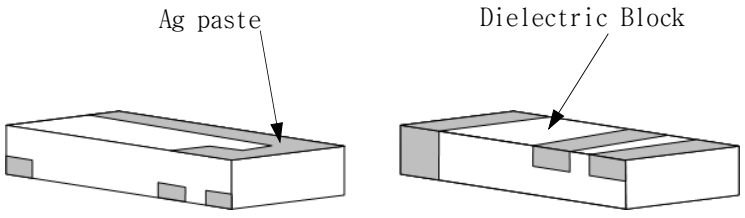
Elevation2 Phi



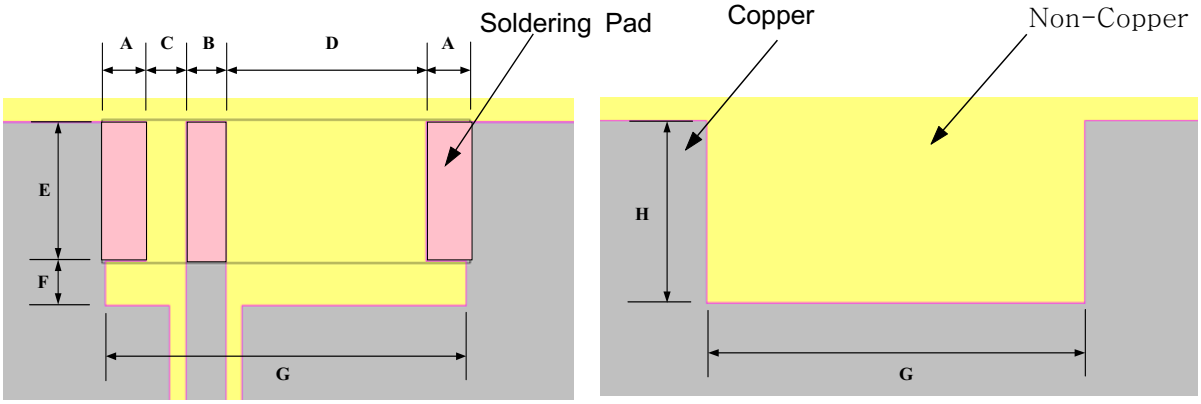
3. Mechanical Characteristics

- The structure is materialized printing Ag paste at the dielectric block

3.1 Structure and Material

Material	Dielectric Block (MMS-08)	3D Structure
	Ag Paste (Metech)	
Size [mm]	W = 2.0±0.1	
	L = 8.0±0.1	
	T = 1.2±0.1	
Temperature [℃]	- 40 ~ +80	
Humidity [%]	At the normal temperature, RH 100	

3.2 PCB Layout & Soldering Pad Dimension



Top Layout **Bottom Pattern**

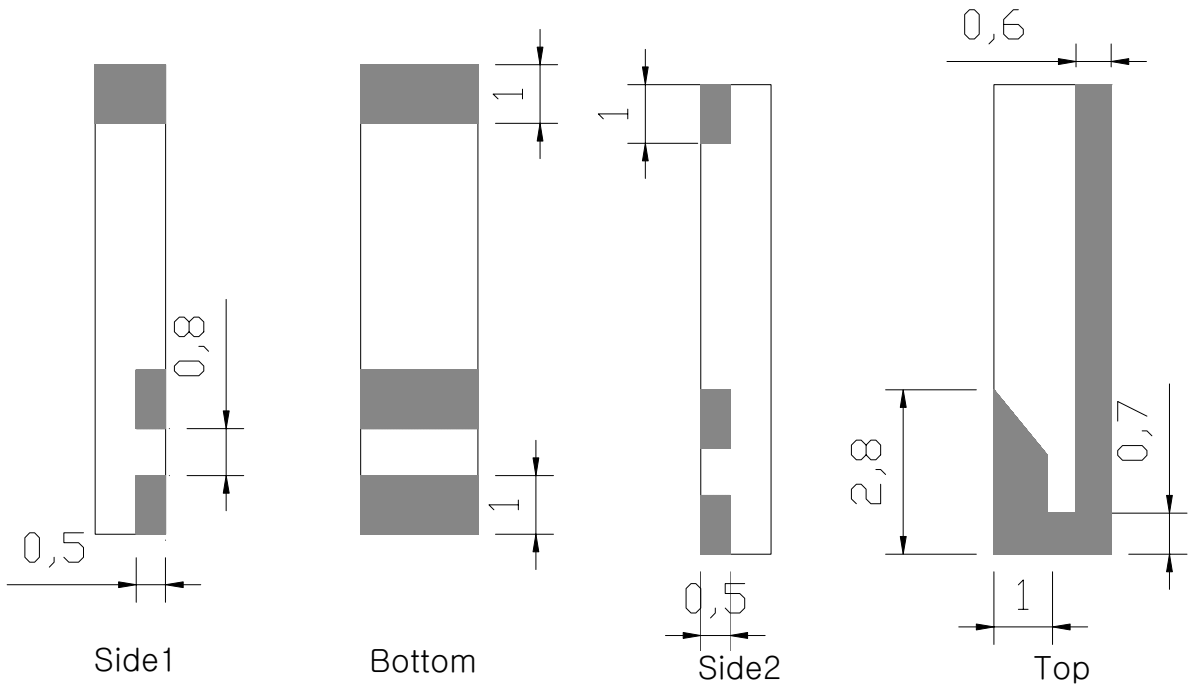
Parameter	A	B	C	D	E	F	G	H
Value[mm]	**1.1**	**1.0**	**0.8**	**4.2**	**2.2**	**1.0**	**8.2**	**3.2**

Unit ; mm

Unless specified tolerances are ±0.1

3.3 Antenna Pattern Dimension

Antenna Pattern View



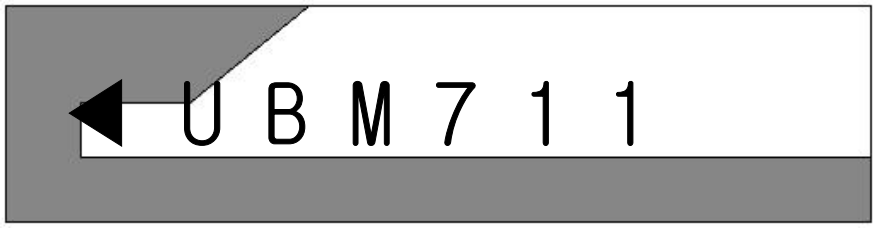
3.4 LOT Notation

7	1	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

Marking View



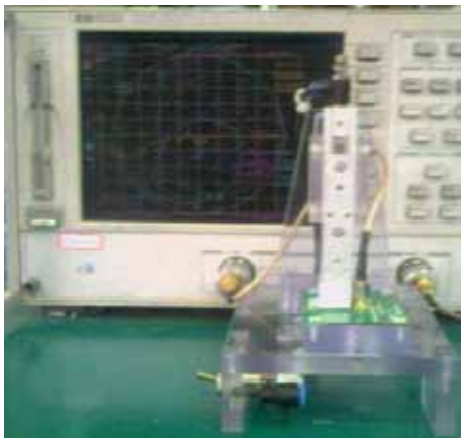
◀	U	B	M	7	1	1
①	②		③	④	⑤	

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. Measurement Process

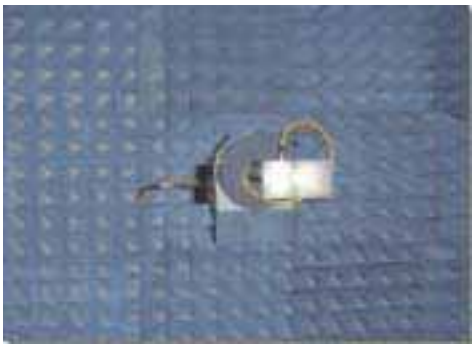
4.1 SWR/Returnloss

The SWR/Returnloss is measured by Network Analyzer

Set Condition	Test Fixture Condition
	

4.2 Gain

The Antenna Gain is measured using the set at Anechoic Chamber

Anechoic Chamber	
	
	

5. Primary Inspection List

Item	Electrical Characteristic [MHz] CTQ		Mechanical Dimension [mm] CTQ		
Standard	VSWR 3.0 Max		W=2.0±0.1	L=8.0±0.1	T=1.2±0.1
	2460	2540			
1	1.41	1.50	2.02	8.01	1.22
2	1.35	1.46	2.03	8.01	1.23
3	1.60	1.69	2.04	8.02	1.24
4	1.36	1.45	2.02	8.02	1.22
5	1.59	1.68	2.04	8.03	1.23
6	1.40	1.49	2.02	8.02	1.23
7	1.37	1.46	2.03	8.03	1.23
8	1.39	1.48	2.03	8.01	1.22
9	1.44	1.43	2.04	8.03	1.22
10	1.42	1.51	2.03	8.02	1.24
11	1.41	1.50	2.04	8.03	1.23
12	1.55	1.64	2.02	8.02	1.23
13	1.57	1.66	2.02	8.03	1.24
14	1.42	1.51	2.03	8.03	1.22
15	1.40	1.49	2.03	8.02	1.23
16	1.53	1.62	2.04	8.02	1.24
17	1.54	1.63	2.02	8.03	1.25
18	1.39	1.48	2.03	8.03	1.23
19	1.40	1.49	2.02	8.01	1.24
20	1.44	1.53	2.03	8.04	1.23
X	1.44	1.53	2.03	8.02	1.23
σ	0.08	0.08	0.01	0.01	0.01
Cpk	6.28	5.75	2.96	2.93	2.66
Approval	OK	OK	OK	OK	OK

6. Reliability Condition

6.1 ENVIRONMENT TEST

ITEM	TEST CONDITION	LIMIT
High Temperature Resistance	+85℃±3℃, 120hr±2hr	*After the test, specimen would be kept at 25℃±5℃ for 1 hours *specimen sheet meet the electrical specification
Low Temperature Resistance	-40℃±3℃ , 120hr±2hr	
Humidity Resistance	+60±3℃, RH90~95% ,120hr±2hr	

6.2 Thermal Shock Test , Reflow Test

ITEM	TEST CONDITION	LIMIT
Thermal Shock	-40℃±3℃(2Hr) ↔ +85℃±3℃(2Hr) cycle : 15cycle recovery time : with in 5min	SAME as 6-1
Reflow	Pre Heating : 140±10℃ , 60～120 sec peak Heating : 240℃,10sec Max	

6.3 Mechanical Test

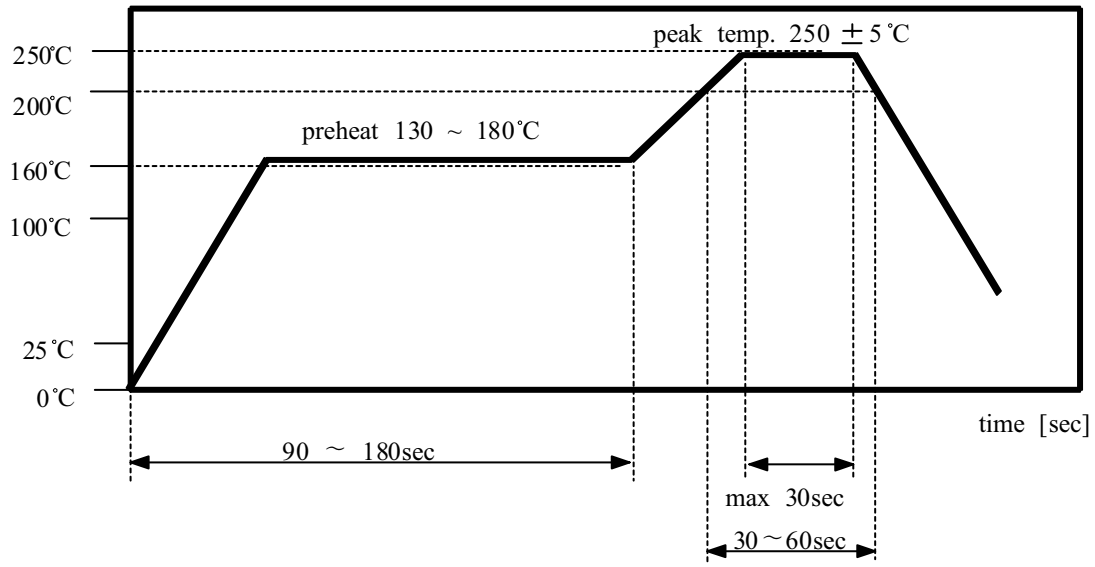
ITEM	TEST CONDITION	LIMIT
Random Vibration	Frequency 10~500Hz - 10 ×9.8㎨(G) Sweep time 15min , X.Y.Z each 5 times	*After the test, specimen sheet meet the electrical specification
Drop	Height 120㎝ , 12 times Height 152㎝ , 19 times	

6.4 Reliability Test Result

※ Appendix

7. Soldering Condion

7.1 Reflow Soldering



7.2 Manual Soldering

Pre-heating Temperature : 120℃ , 60 ~ 300 sec.

Soldering Temperature : 340℃±5℃ , 5sec max per each terminal

8. Attention

8.1 Temperature Condition

	Range of Temperature	unit
Application	-40 ~ +85	℃
Keeping	-40 ~ +85	℃

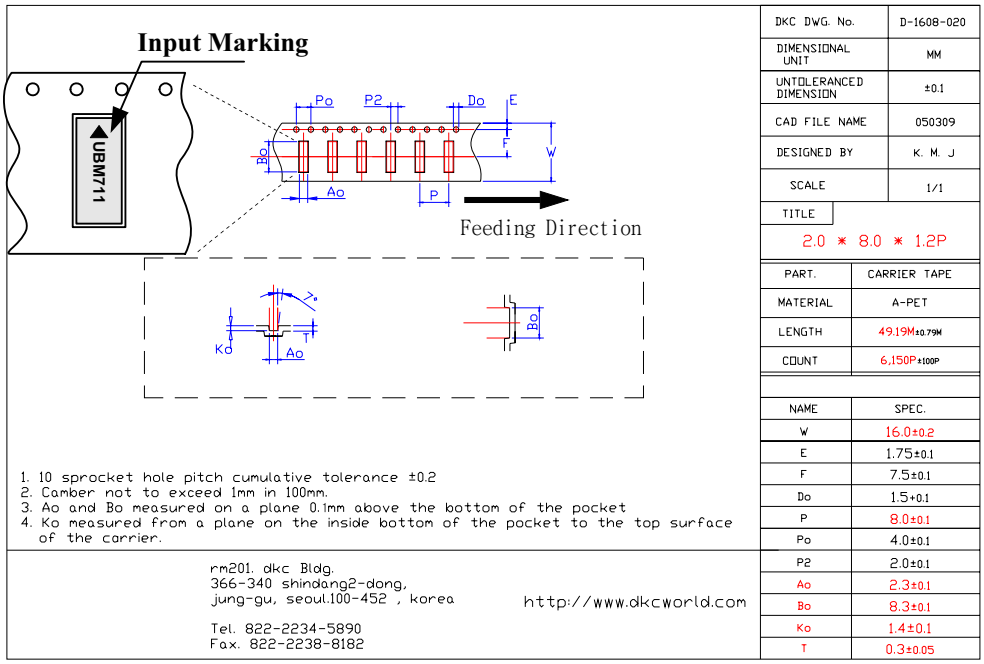
8.2 MSL LEVEL 1 (JEDEC J-STD-020C)

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

9. Packing

9.1 Carrier/Reel

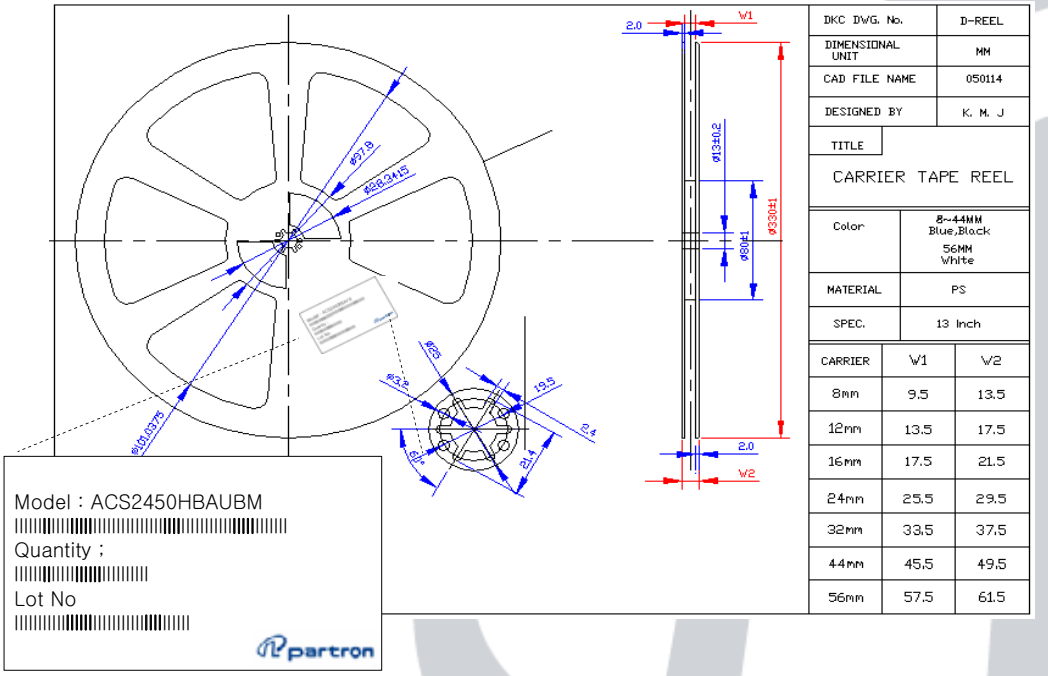
Material	Surface Resistance	Method
PET	Typical $10^8\Omega$	Heat Press



DKC DWG. No.	D-1608-020
DIMENSIONAL UNIT	MM
UNTOLERANCED DIMENSION	±0.1
CAD FILE NAME	050309
DESIGNED BY	K. M. J
SCALE	1/1
TITLE	2.0 * 8.0 * 1.2P

PART.	CARRIER TAPE
MATERIAL	A-PET
LENGTH	49.19M±0.79M
COUNT	6,150P±100P

NAME	SPEC.
W	16.0±0.2
E	1.75±0.1
F	7.5±0.1
Do	1.5+0.1
P	8.0±0.1
Po	4.0±0.1
P2	2.0±0.1
Ao	2.3±0.1
Bo	8.3±0.1
Ko	1.4±0.1
T	0.3±0.05

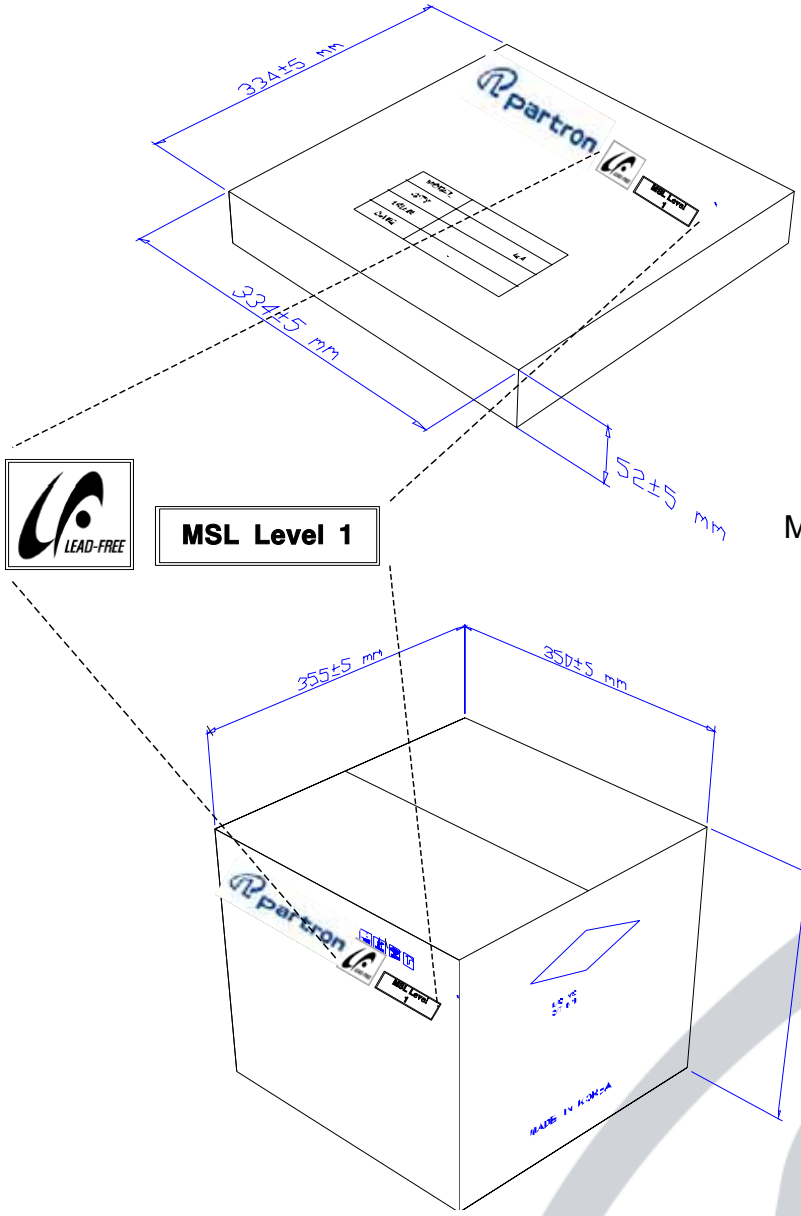


DKC DWG. No.	D-REEL
DIMENSIONAL UNIT	MM
CAD FILE NAME	050114
DESIGNED BY	K. M. J
TITLE	CARRIER TAPE REEL

Color	8~44MM Blue,Black 56MM White
MATERIAL	PS
SPEC.	13 Inch

CARRIER	W1	W2
8mm	9.5	13.5
12mm	13.5	17.5
16mm	17.5	21.5
24mm	25.5	29.5
32mm	33.5	37.5
44mm	45.5	49.5
56mm	57.5	61.5

9.2 Box Specification



Material : SK/S/K-B
Cardboard box

10. Process Control

Product	Issued/Revision		Process Control	Record	By designed	By checked	By approved
CHIP ANTENNA	Issued	04.04.06		PRCP-C001			
	Revised	05.04.03					

Input Materials	FLOW CHART		Process name	Management of Factors					Management of quality					
	preparation	Main Process		Equipment Name	Checked	Condition	Cycle of management	Record	Checked Item	Margin	Method of Inspection	Cycle of management	Record	Action
Ceramic POWDER		◇	Import Inspection						shrinking rate permittivity	refer to Guide Sheet	Micrometer Network	10ea/LOT	C/sheet	Return
POWDER lubricant	○		powder	Mixer					mixing	POWDER lubricant	Scale	PER MIXING	-	Exhaust
		○	Shaping	Press	pressure Mold Condition	refer to Guide Sheet	Per LOT 1/day	parameter C/SHEET	dimension weight density aspect	refer to Guide Sheet	Micrometer scale Calculated Visual	5/100EA 10ea/lot	LOT CARD	Exhaust
		○	Plasticity	Plasticity Hole	SETTER Outside Temperature PROFILE	refer to Guide Sheet	all 2/day 1/month	C/sheet						
		◇	Block						wide length shape	refer to Guide Sheet	Micrometer Calipers Visual Inspection	20ea/LOT 20ea/LOT all	C/sheet	Exhaust
AG PASTE		○	SIDE1 PAD Printing	Printer screen	Squeeze velocity/presure SNAP	refer to Guide Sheet	1/day	-	PATTERN Dimension aspect	refer to Guide Sheet	Microscope	10ea/3Jig	c/sheet	Rework
		○	Dry	Dryer Dry Jig	Temperature Belt speed	refer to Guide Sheet	1/week	Parameter	Dry Condition Printed condition breakage	refer to Guide Sheet	Visual Inspection	all	Lot card	Rework

Product	Issued/Revision		Process Control	Record	By designed	By checked	By approved
CHIP ANTENNA	Issued	04.04.06		PRCP-C001			
	Revised	05.04.03					

Input Materials	FLOW CHART		Process name	Management of Factors					Management of quality					
	preparation	Main Process		Equipment Name	Checked	Condition	Cycle of management	Record	Checked Item	Margin	Method of Inspection	Cycle of management	Record	Action
AG PASTE		◯	SIDE 2 PAD Printing	Printer screen	Squeeze velocity/presure SNAP	refer to Guide Sheet	1/day	-	PATTERN Dimension aspect	refer to Guide Sheet	Microscope	10ea/3Jig	c/sheet	Rework
		◯	Dry	Dryer Dry Jig	Temperature Belt speed	refer to Guide Sheet	1/week	Parameter	Dry Condition Printed condition breakage	refer to Guide Sheet	Visual Inspection	all	Lot card	Rework
		◯	Baking	Baking Hole mesh net	Temperature Belt speed	refer to Guide Sheet	1/week	Parameter C/Sheet	Breakage Pollution	refer to Guide Sheet	Visual Inspection	all	Lot card	Exhaust Rework
AG PASTE		◯	TOP printing	Printer screen	Squeeze velocity/presure SNAP	refer to Guide Sheet	1/day	-	PATTERN dimension	refer to Guide Sheet	measure	10ea/3Jig	c/sheet	Rework
		◯	Dry	Dryer Dry Jig	Temperature Belt speed	refer to Guide Sheet	1/week	Parameter	Dry Condition Printed condition breakage	refer to Guide Sheet	Visual Inspection	all	Lot card	Rework
AG PASTE		◯	BOTTOM PAD Printing CTQ	printer screen	Squeeze velocity/presure SNAP	refer to Guide Sheet	1/day	-	PATTERN dimension aspect	refer to Guide Sheet	measure Microscope	10ea/3Jig	c/sheet	Rework

Product	Issued/Revision		Process Control	Record	By designed	By checked	By approved
CHIP ANTENNA	Issued	04.04.06		PRCP-C001			
	Revised	05.04.03					

Input Materials	FLOW CHART		Process name	Management of Factors					Management of quality					
	preparation	Main Process		Equipment Name	Checked	Condition	Cycle of management	Record	Checked Item	Margin	Method of Inspection	Cycle of management	Record	Action
		○	Dry	Dryer Dry Jig	Temperature Belt speed	refer to Guide Sheet	1/week	Parameter	Dry Condition Printed condition breakage	refer to Guide Sheet	Visual Inspection	all	Lot card	Rework
		○	Baking	Baking Hole mesh net	Temperature Belt speed	refer to Guide Sheet	1/week	Parameter C/Sheet	Breakage Pollution	refer to Guide Sheet	Visual Inspection	all	Lot card	Exhaust Rework
		◇	aspect inspection						aspect	Reference SPL refer to Guide Sheet	Visual Inspection microscope	all	Lot card production diary	Exhaust repair
		○	MARKING	Marking Machine					marking	Reference SPL	Visual Inspection	all	Lot card production diary	Rework Exhaust
		◇	Electrical Characteristic	NETWORK Inspection Jig	proofreading Condition	refer to Guide Sheet	1/2hour	C/sheet	Electrical Characteristic	refer to Guide Sheet	Network	all	Lot card production diary	Exhaust repair
		◇	aspect inspection						aspect dimension	Reference SPL refer to Guide Sheet	Visual Inspection microscope	all	Lot card production diary	Exhaust repair
Carrier cover reel		○	Taping						Quantity Direction aspect	refer to Guide Sheet	Manual	all	Lot card production diary	Rework
		◇	shipper inspection	NETWORK Inspection Jig	proofreading Condition	refer to Guide Sheet	1/person	C/sheet	Electrical Characteristic aspect packing	refer to Guide Sheet	Network microscope Visual Inspection	refer to Guide Sheet	Result Paper	return Exhaust
packing box label		○	packing	bar code printer					packing P/N Quantity	refer to Guide Sheet	Visual Inspection	all	-	Rework
		◇	packing inspection						packing P/N Quantity	refer to Guide Sheet	Visual Inspection	all	-	return

10. RoHS Data

1) Ceramic Powder

SGS

Test Report

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

The following sample(s) was/were submitted and identified by/on behalf of the client as :

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

Test Result(s) : - Please see the next page(s) -

Daniel Yeh, M.R. / Operation Manager
Signed for and on behalf of
SGS TAIWAN LTD.

SGS

Test Report

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

Test Result(s)

PART NAME NO.1 : WHITE POWDER

Test Item (s):	Unit	Method	MDL	Result No.1
PBBs (Polybrominated biphenyls)	---	---	---	---
Monobromobiphenyl	%	With reference to USEPA3540C. Analysis was performed by HPLC/DAD, LC/MS or GC/MS. (prohibited by 2002/95/EC (RoHS), 83/264/EEC, and 76/769/EEC)	0.0005	N.D.
Dibromobiphenyl	%		0.0005	N.D.
Tribromobiphenyl	%		0.0005	N.D.
Tetrabromobiphenyl	%		0.0005	N.D.
Pentabromobiphenyl	%		0.0005	N.D.
Hexabromobiphenyl	%		0.0005	N.D.
Heptabromobiphenyl	%		0.0005	N.D.
Octabromobiphenyl	%		0.0005	N.D.
Nonabromobiphenyl	%		0.0005	N.D.
Decabromobiphenyl	%		0.0005	N.D.
Total PBBs (Polybrominated biphenyls)/Sum of above	%		-	N.D.
PBBEs(PBDEs) (Polybrominated biphenyl ethers)	---	---	---	---
Monobromobiphenyl ether	%	With reference to USEPA3540C. Analysis was performed by HPLC/DAD, LC/MS or GC/MS. (prohibited by 2002/95/EC (RoHS), 83/264/EEC, and 76/769/EEC)	0.0005	N.D.
Dibromobiphenyl ether	%		0.0005	N.D.
Tribromobiphenyl ether	%		0.0005	N.D.
Tetrabromobiphenyl ether	%		0.0005	N.D.
Pentabromobiphenyl ether	%		0.0005	N.D.
Hexabromobiphenyl ether	%		0.0005	N.D.
Heptabromobiphenyl ether	%		0.0005	N.D.
Octabromobiphenyl ether	%		0.0005	N.D.
Nonabromobiphenyl ether	%		0.0005	N.D.
Decabromobiphenyl ether	%		0.0005	N.D.
Total PBBEs(PBDEs) (Polybrominated biphenyl ethers)/Sum of above	%		-	N.D.
Total of Mono to Nona-brominated biphenyl ether. (Note 4)	%		-	N.D.

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Test Report

FUJI TITANIUM IND. CO., LTD.
12-8, SENGEN-CHO, HIRATSUKA-CITY, KANAKAWA-
PREF. JAPAN. (T) 81-463-32-0210

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Test Item (s):	Unit	Method	MDL	Result No.1
Chromium VI (Cr+6)	ppm	UV-VIS(US EPA 7196A) after reference to US EPA 3060A.	2	N.D.
Cadmium (Cd)	ppm	ICP-AES after reference to EN 1122, method B:2001 or other acid digestion.	2	N.D.
Mercury (Hg)	ppm	ICP-AES after reference to US EPA 3052 or other acid digestion.	2	N.D.
Lead (Pb)	ppm	ICP-AES after reference to US EPA 3050B or other acid digestion.	2	19.3

NOTE: (1) N.D. = Not Detected (<MDL)
(2) ppm = mg/kg
(3) MDL = Method Detection Limit
(4) Decabromobiphenyl ether (DecaBDE) in polymeric applications is exempted by Commission Decision of 13 Oct 2005 amending Directive 2002/95/EC notified under document 2005/717/EC.
(5) PBBEs=PBDEs=Polybrominated Diphenyl Ethers=PBDOs=PBBOs.
(6) " - " = Not Regulation
(7) " --- " = Not Applicable

SGS

Test Report

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PREF. JAPAN. (T) 81-463-32-0210

Report No. : CE/2006/75167
Date : 2006/07/25
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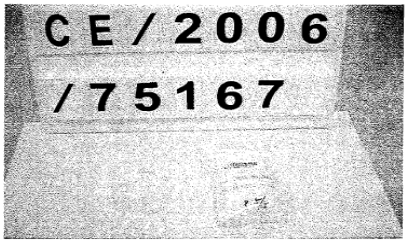
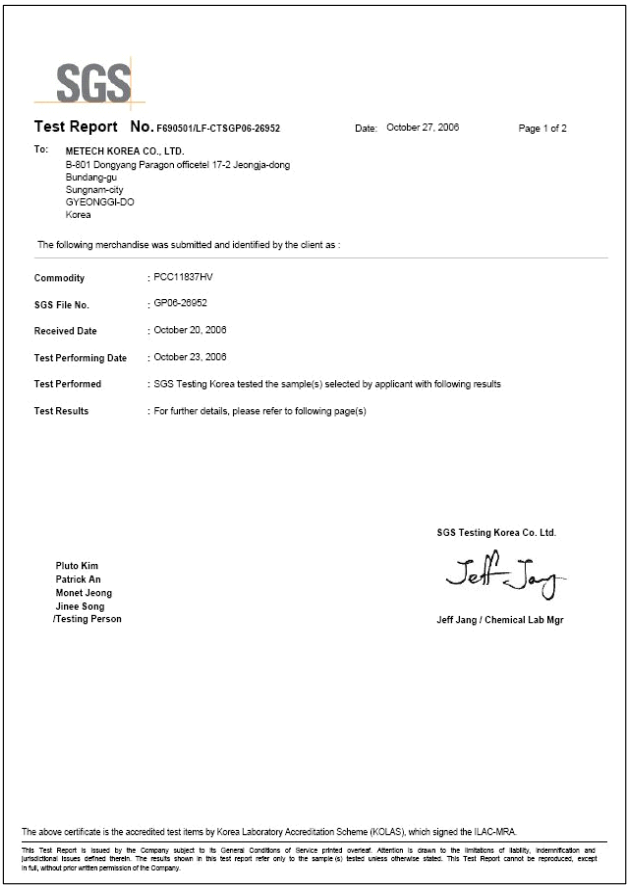


** End of Report **

2) Ag paste



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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.

Pluto Kim
Patrick An
Monet Jeong
Jinee Song
/Testing Person

Jeff Jang / Chemical Lab Mgr

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

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

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.

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 ILAC-MRA.

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3) Marking ink