

자재시방서(승인원)	기안자	최민규 연구원/ND연구팀 (032-650-6259)
	완료일	2014-11-05 오전 09:33:20

작성부서	기안	그룹장	팀장
	최민규	곽귀동	유종은
			
	11-04 15:44	11-04 17:14	11-04 18:34

주관부서	사원
	정성엽
	
	11-05 09:33

문서번호	ND연구팀613-0043-영(수시)		
이관함	승인원	공개 범위	AV연구소 ND연구팀
수신처	한국구매팀, 구매관리팀, 생산기술팀, 생산팀, 품질관리팀		
참조자	고만석, 김기봉, 김동현, 안병준, 유재걸, 홍민희, 홍경국		
문서제목	E606-00017-001-0S		

자재코드	E606000170010S		
자재명	ANTENNA,MODULE		
규격	ACS2450HFL57 DIELECTRIC CHIP ANT		

모델명	VUDU SPARK		
설계변경 NO	REV NO.	일자	내용
중점 Check 사항			
환경문서번호			
검사방식	수입검사 규칙(B0-B701-01)에 준하여 검사할 것.		
구입방법	<input checked="" type="checkbox"/> 내수 <input type="checkbox"/> LOCAL <input type="checkbox"/> 수입		
협력업체명	PARTRON	제조업체명	PARTRON
첨부자료	<input checked="" type="checkbox"/> 협력업체승인원 <input type="checkbox"/> 도면 <input type="checkbox"/> 검사성적서 <input type="checkbox"/> 유해물질 불사용 확인서 <input type="checkbox"/> 부품재질별 성적서		
첨부파일경로	ftp://61.73.120.6/approval/E606-00017-001-0S.pdf		

※ 첨부파일 경로 예시 :[네트워크 연결] <ftp://61.73.120.6/APPROVAL/자재코드.PDF>

IMS-B101-07/01(1)

개발 단가		부품 타입	SMD		LIB	
-------	--	-------	-----	--	-----	--

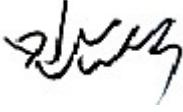
RoHS

H/F



MSL Level 1

Approval Sheet

Products	Dielectric Chip Antenna		
Customer	Inkel		
Model			
Customer CODE			
Supplier	PARTRON		
Supplier CODE	ACS2450HFL57		
Inkel	By designed	By checked	By approved
PARTRON	By designed	By checked	By approved
	김 흥 기		
	Antenna 2 Team	Quality Assurance	Laboratory
	Hongki.Kim	Nam-Sik. Min	Byoung-Jun.Yim
	10/24	10/24	10/24

2014 . 10. 24



22-6, Seokwoo-dong, Hwaseong-si, Gyeonggi-do, 445-170, KOREA

Tel : 82-31-201-7870~6

Fax : 82-31-201-7800

www.partron.co.kr

RoHS

H/F



MSL Level 1

SPECIFICATION

MODEL : ACS2450HFL57

DIELECTRIC CHIP ANTENNA

By designed	By checked	By approved
김 흥 기		
Antenna 2 Team	Quality Assurance	Laboratory
Hongki.Kim	Nam-Sik. Min	Byoung-Jun.Yim
10/24	10/24	10/24

2014 . 10. 24



22-6, Seokwoo-dong, Hwaseong-si, Gyeonggi-do, 445-170, KOREA
Tel : 82-31-201-7870~6
Fax : 82-31-201-7800
www.partron.co.kr

- Contents -

1. Revision History	4 p
2. Electrical Characteristics	5 p
3. Mechanical Characteristics	9 p
4. Measurement Process	12 p
5. Primary Inspection List	13 p
6. Reliability Condition	14 p
7. Soldering Condition	15 p
8. Attention	15 p
9. Packing	16 p
10. Process Control	19 p
11. RoHS Data	22 p



1. Revision

2. Electrical Characteristics

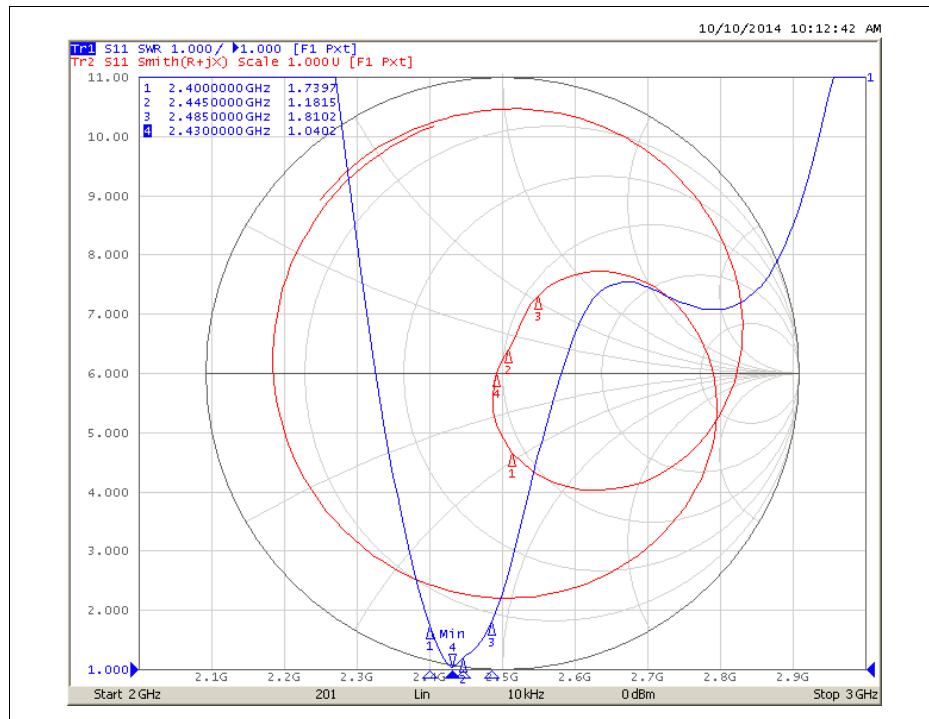
2.1 Set Condition

ITEM		SPEC	
Frequency Range [MHz]		2400 ~ 2485	
VSWR [Max]		3 : 1	
Bandwidth [MHz]		85	
Polarization		Linear	
Matching Value of ANT Matching Circuit (Direction, from Antenna to Module)	Antenna Matching Circuit	Series1 (Feed)	1.8nH
	T-Matching Circuit (nearby Module)	Series2	100pF
		Series3	100pF
Gain[dBi]	Azimuth Plane	Peak	-1.43
		Average	-4.20
	Elevation1 Plane	Peak	1.93
		Average	-2.81
	Elevation2 Plane	Peak	1.98
		Average	-3.78
	3D	Peak	3.66
		Average	-2.89

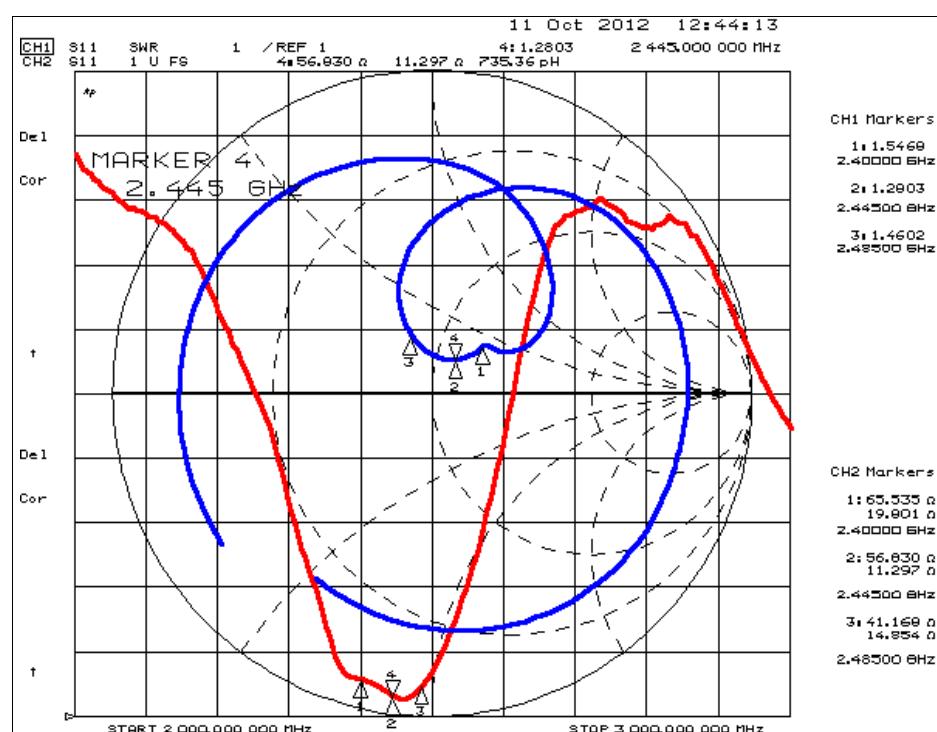
2.2 Test Fixture Condition

ITEM		SPEC	
Frequency Range [MHz]		1840 ~ 1920	
SWR [Max]		4.0 : 1	
Bandwidth [MHz]		80	

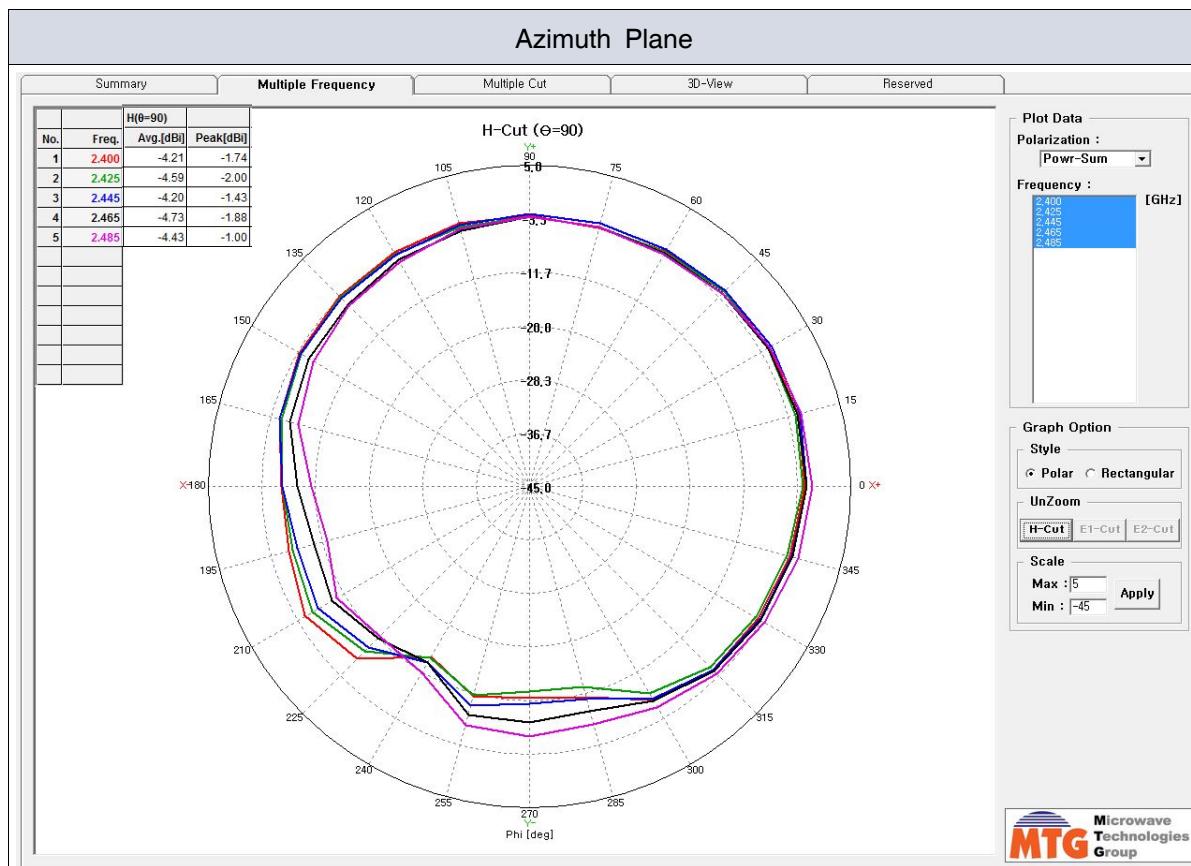
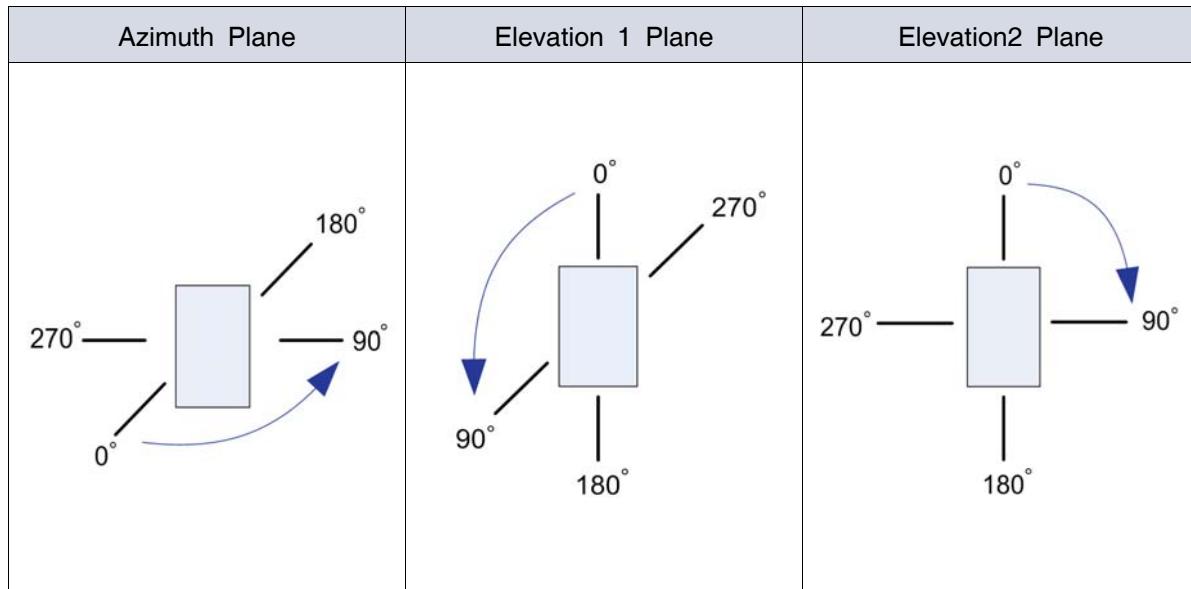
2.3 Graph of Set Condition

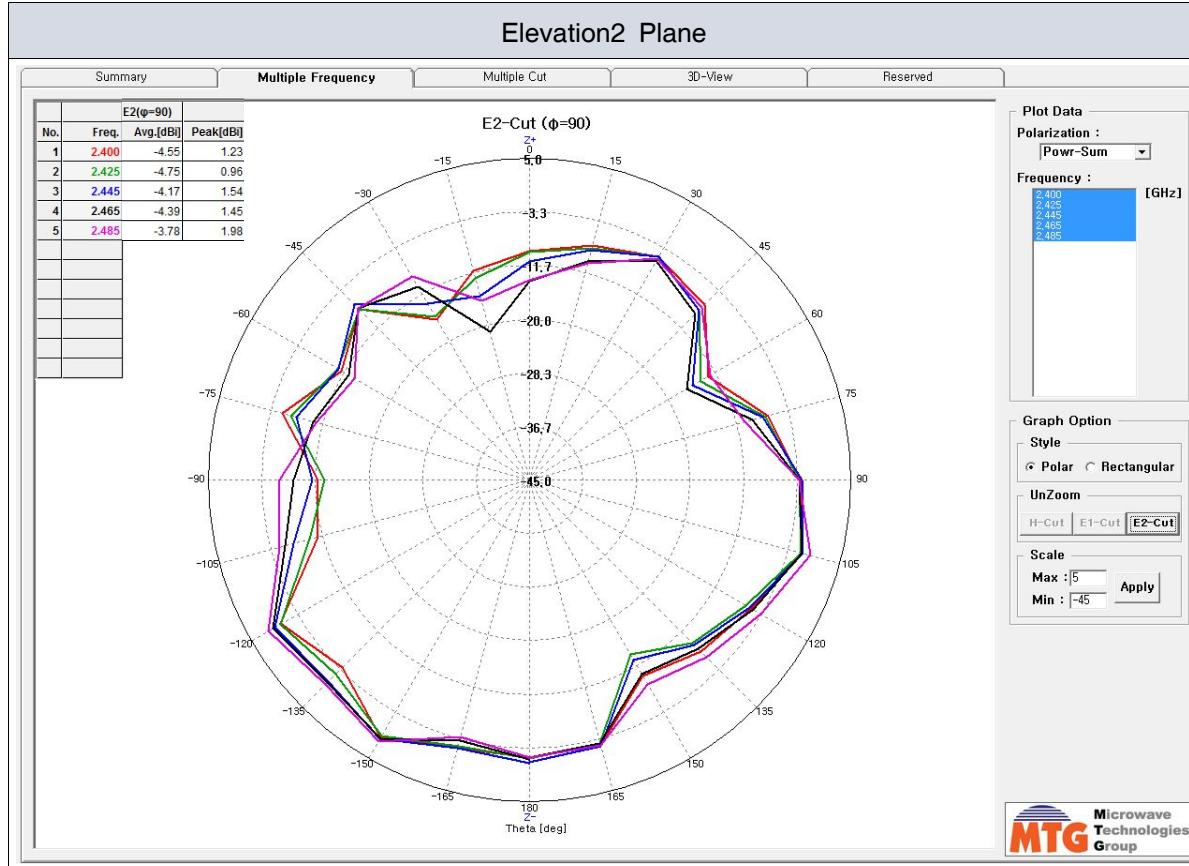
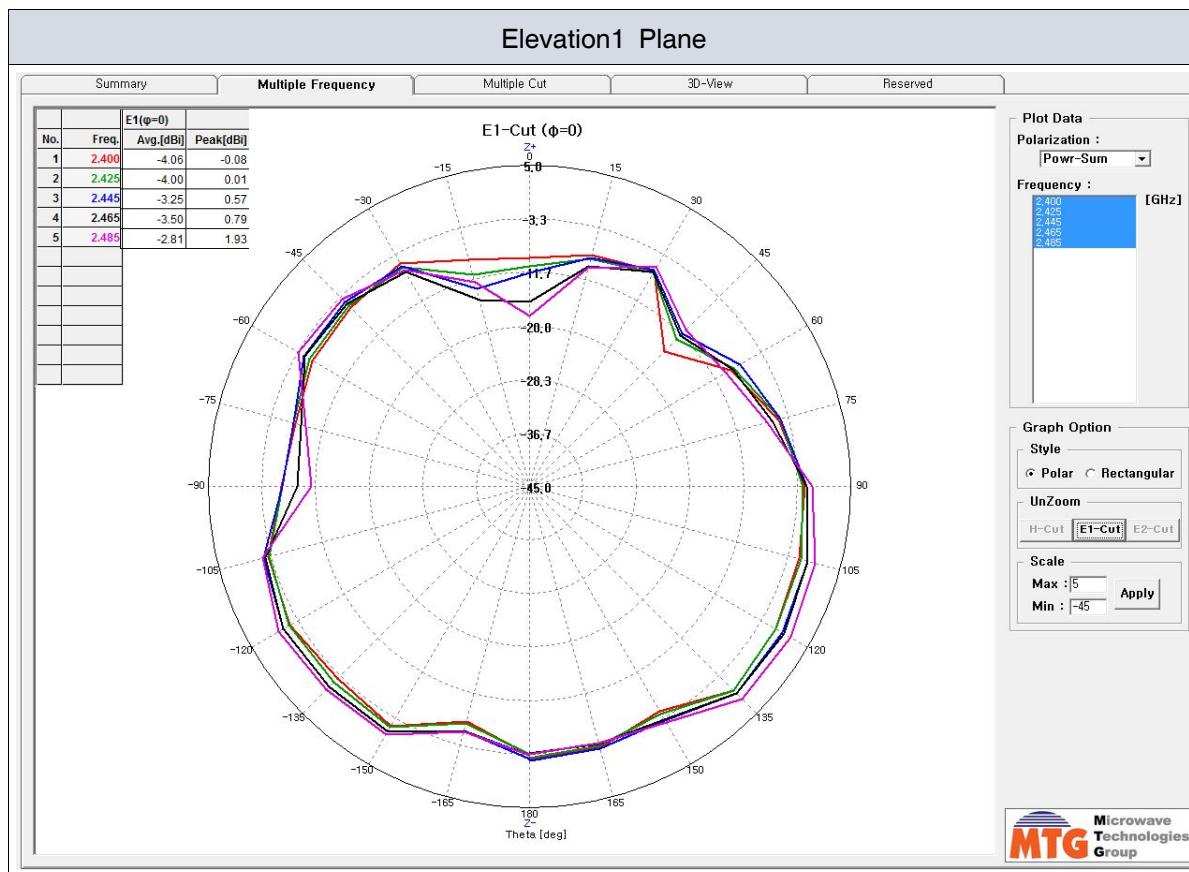


2.4 Graph of Test Fixture Condition

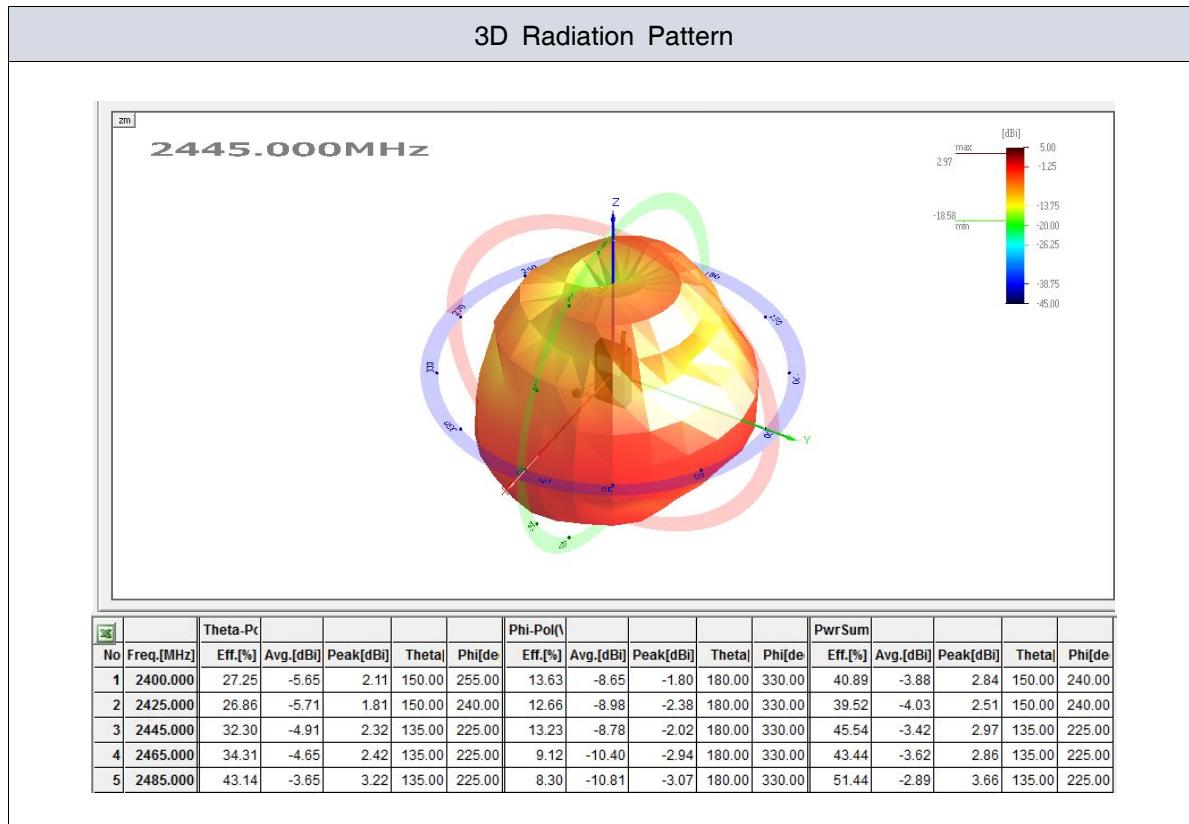


2.5 Radiation Pattern





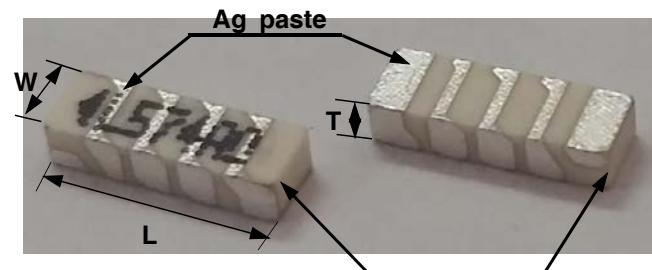
2.6 3D Radiation Pattern



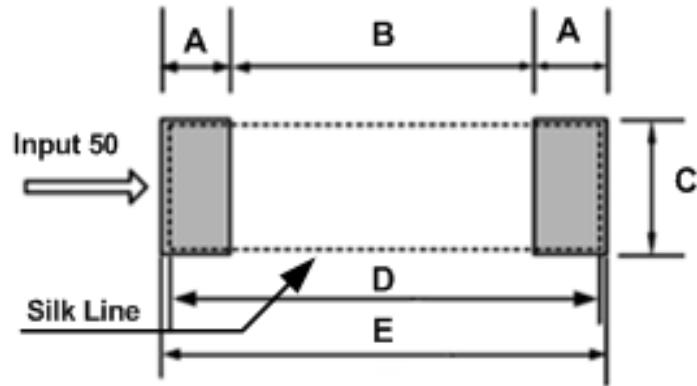
3. Mechanical Characteristics

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

3.1 Structure and Material

Material	Dielectric Block	3D Structure																							
		Ag Paste			Dielectric Block																				
Size [mm]	W = 2.0±0.1																								
																									
	T = 1.2±0.1																								
		Top-Side View						Bottom-Side View																	
Temperature [°C]	- 40 ~ +80																								
Humidity [%]	At the normal temperature, RH 100																								

3.2 PCB Layout & Soldering Pad Dimension

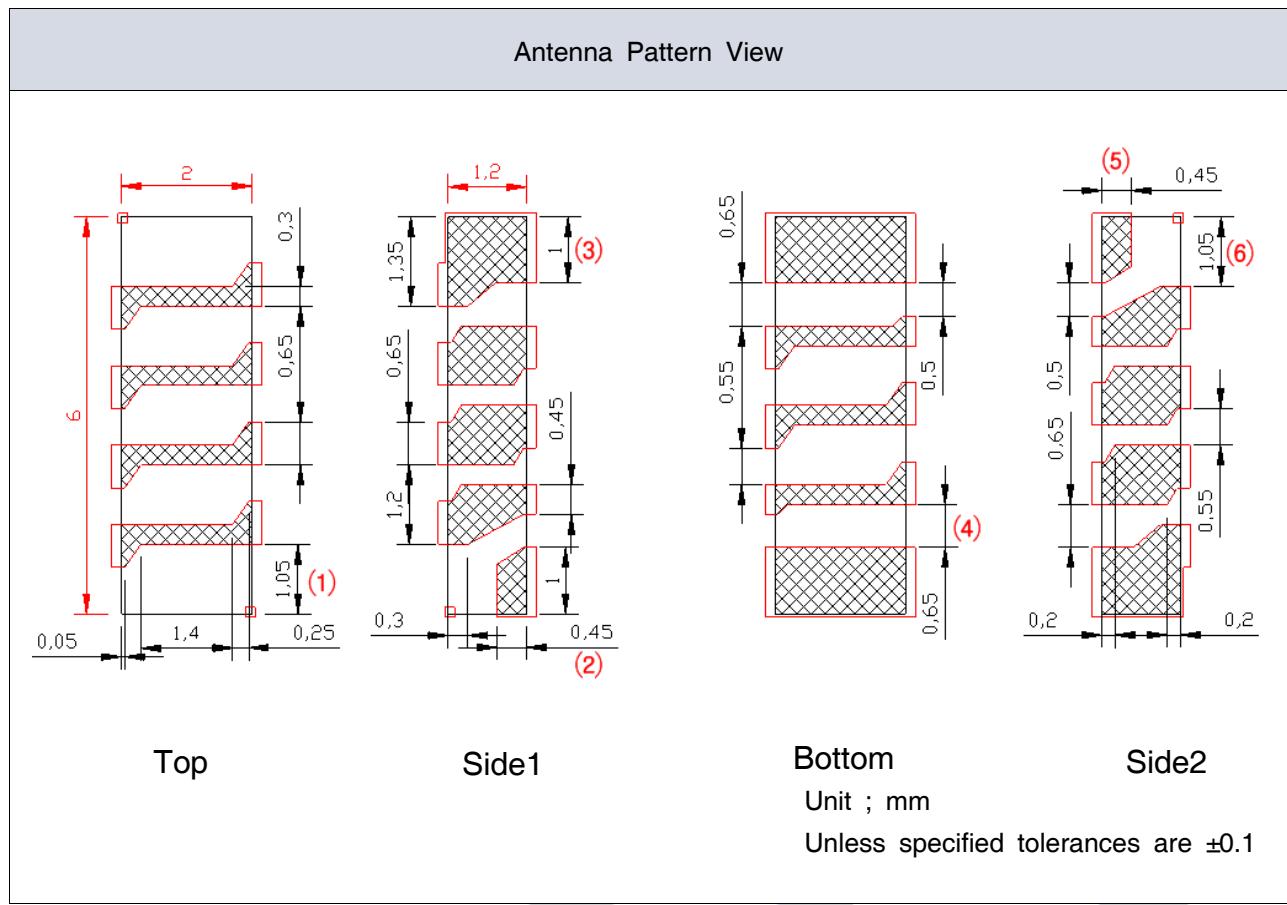


Parameter	A	B	C	D	E
Value[mm]	1.2	4.0	2.4	6.0	6.4

Unit ; mm

Unless specified tolerances are ± 0.1

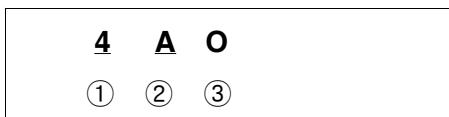
3.3 Antenna Pattern Dimension



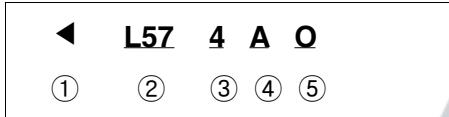
3.3.1 Real Measurement Value

	(1)	(2)	(3)	(4)	(5)	(6)
Drawing Dimension [mm]	1.05±0.1	0.45±0.1	1.0±0.1	0.65±0.1	0.45±0.1	1.05±0.1
1	1.136	0.440	1.033	0.640	0.513	1.099
2	0.962	0.460	0.953	0.634	0.509	1.036
3	1.036	0.507	1.026	0.645	0.470	1.108
4	1.122	0.490	1.022	0.640	0.474	1.080
5	0.982	0.461	0.970	0.669	0.503	1.073
Min [mm]	0.962	0.440	0.953	0.634	0.470	1.036
Max [mm]	1.136	0.507	1.033	0.669	0.513	1.108
Average [mm]	1.048	0.472	1.001	0.646	0.494	1.079

3.4 LOT Notation



3.5 Marking



4. Measurement Process

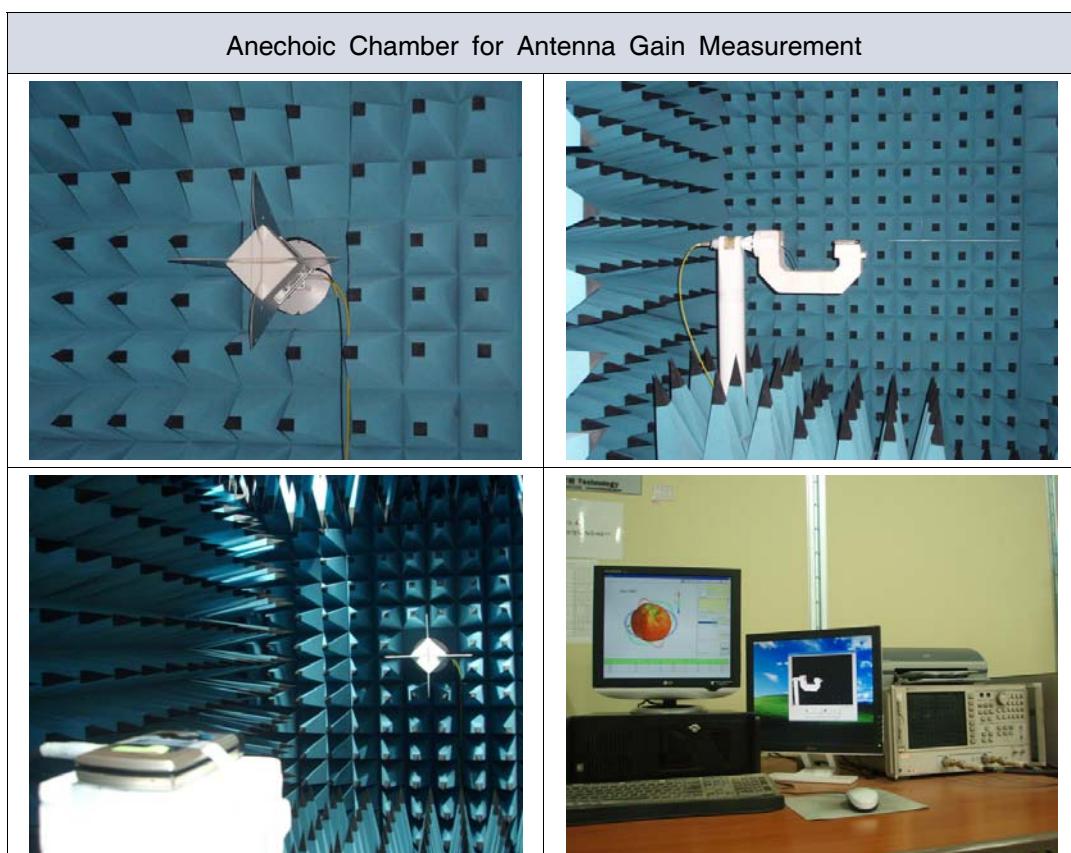
4.1 SWR/Returnloss

-The SWR/Returnloss is measured by Network Analyzer

	Set Condition	Test Fixture Condition
Network Analyzer	Agilent HP8753D or Advantest R3765CG	Agilent HP8753D or Advantest R3765CH
Cable	RF cable(300mm)	RF cable(300mm)
Test condition		

4.2 Gain

-The Antenna Gain is measured using the set at Anechoic Chamber



5. Primary Inspection List

Item	Electrical Characteristic [MHz]		Mechanical Dimension [mm]		
	VSWR 4.0 : 1 [Max]		W=2.0±0.1	L=6.0±0.1	T=1.2±0.1 CTQ
Standard	1840 MHz	1920 MHz			
1	2.21	1.99	2.03	6.02	1.23
2	2.06	2.13	2.04	6.01	1.24
3	1.96	2.11	2.04	6.00	1.24
4	2.09	2.06	2.05	6.01	1.24
5	1.98	2.23	2.04	6.00	1.24
6	2.10	1.97	2.04	6.01	1.25
7	1.95	2.27	2.04	6.01	1.24
8	1.88	2.38	2.03	6.00	1.23
9	2.04	2.14	2.04	6.01	1.24
10	2.08	2.04	2.03	6.01	1.24
11	1.81	2.38	2.04	6.02	1.24
12	2.03	1.99	2.05	6.01	1.25
13	2.32	1.84	2.04	6.03	1.24
14	1.94	2.16	2.05	6.00	1.25
15	1.83	2.44	2.04	5.99	1.24
16	2.28	1.83	2.06	6.02	1.24
17	2.33	1.79	2.04	6.00	1.25
18	2.17	1.89	2.04	6.01	1.25
19	1.66	2.22	2.03	6.01	1.24
20	1.68	2.33	2.04	6.00	1.23
X	2.02	2.11	2.04	6.01	1.24
σ	0.19	0.19	0.01	0.01	0.01
Cpk	3.42	3.20	2.58	3.23	4.67
Decision	OK	OK	OK	OK	OK

6. Reliability Condition

6.1 ENVIRONMENT TEST

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

6.2 Thermal Shock Test , Reflow Test

ITEM	TEST CONDITION	LIMIT
Thermal Shock	-40°C±3°C/30min ↔ +85°C±3°C/30min cycle : 15 cycle recovery time : within 5min	SAME as 6-1
Reflow	Pre Heating 200±5°C, 30~60 sec Peak Heating 260°C±5°C, 30sec Max	

6.3 Mechanical Test

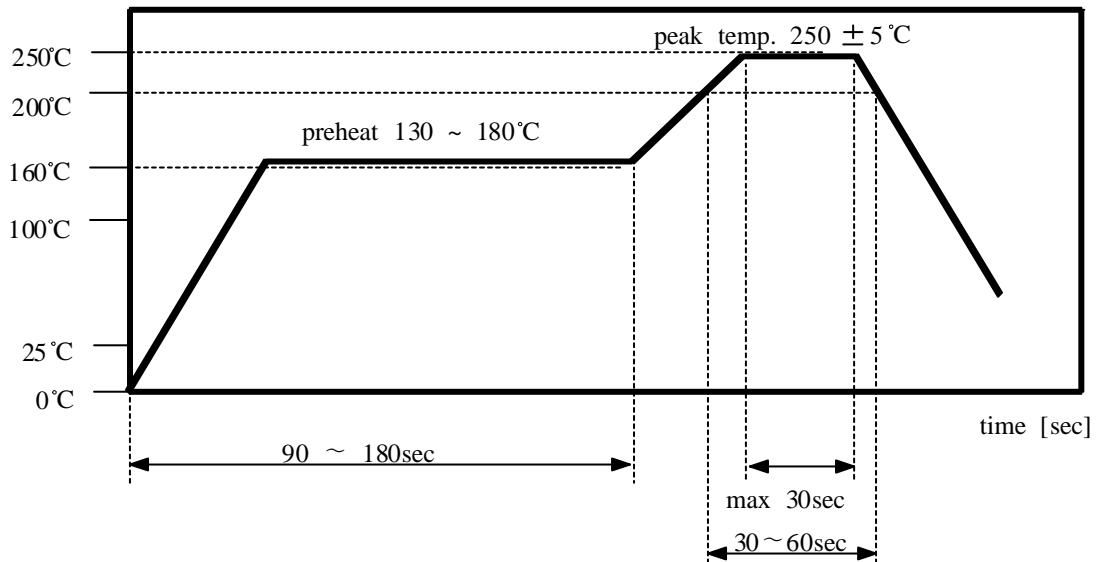
ITEM	TEST CONDITION	LIMIT
Random Vibration	Frequency 10~500Hz - 10 x9.8m/s ² (G) Sweep time 15min , X.Y.Z each 5 times	*After the test, specimen sheet meet the electrical specification
Drop	Height 152cm , 5 times (Each Surface)	

6.4 Reliability Test Result

* Appendix

7. Soldering Condition

7.1 Reflow Soldering



7.2 Manual Soldering

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

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

8. Attention

8.1 Temperature Condition

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

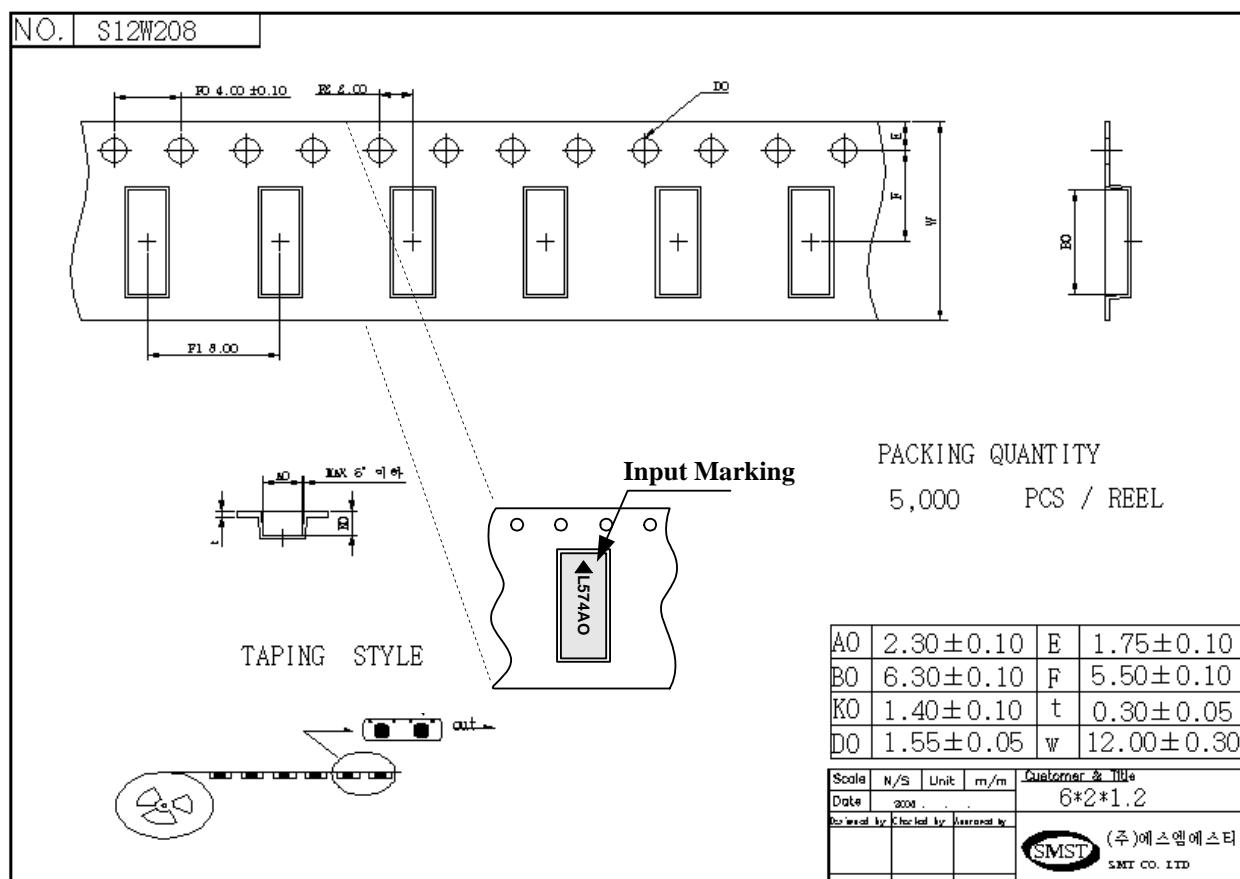
8.2 MSL LEVEL 1 (JEDEC J-STD-020C)

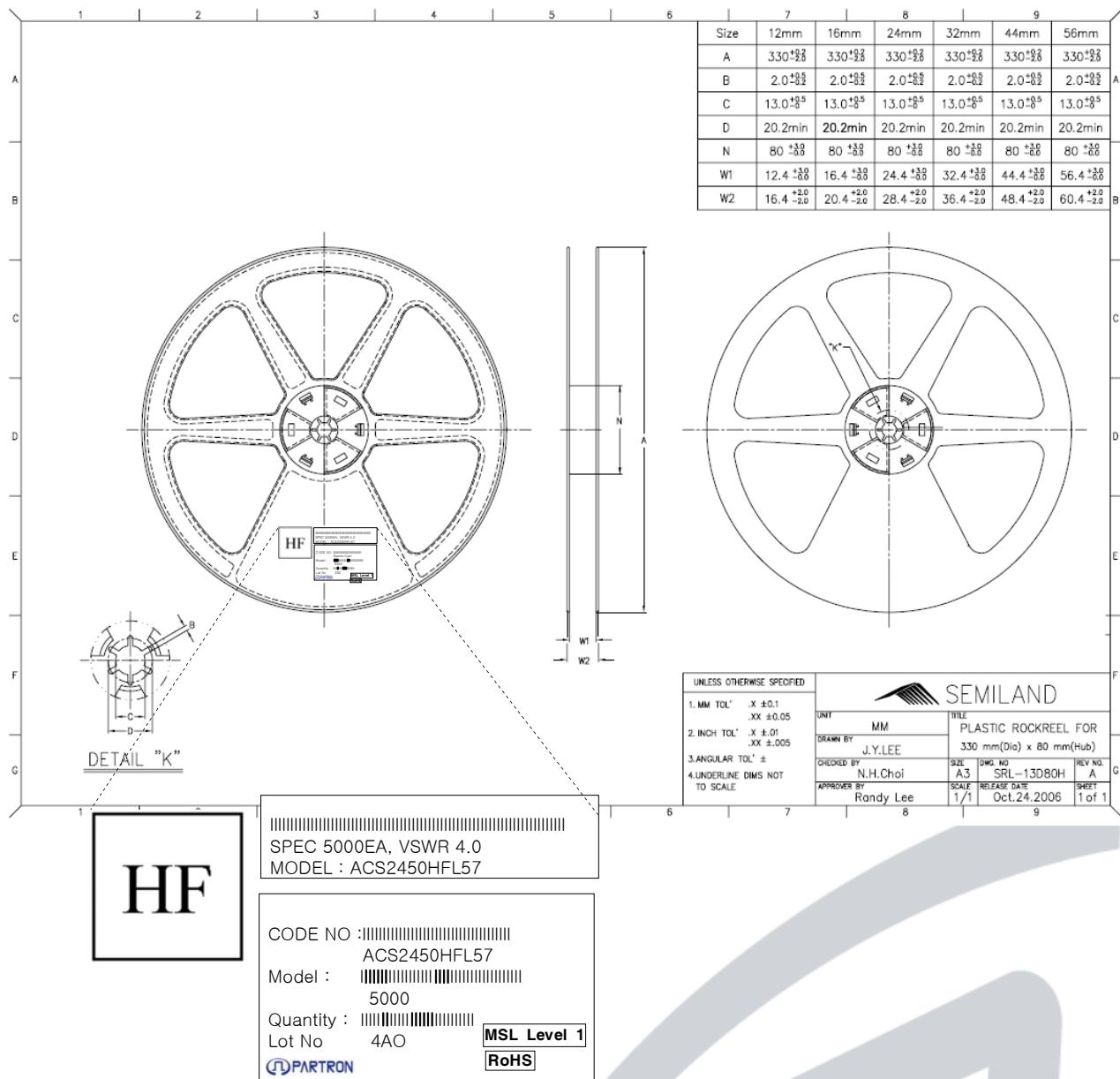
	Floor Life		Soak Requirements	
	Time	Conditions	Time	Conditions
1	Unlimited	= < 30°C/85%RH	168+5/-0	= < 85°C/85%RH

9. Packing

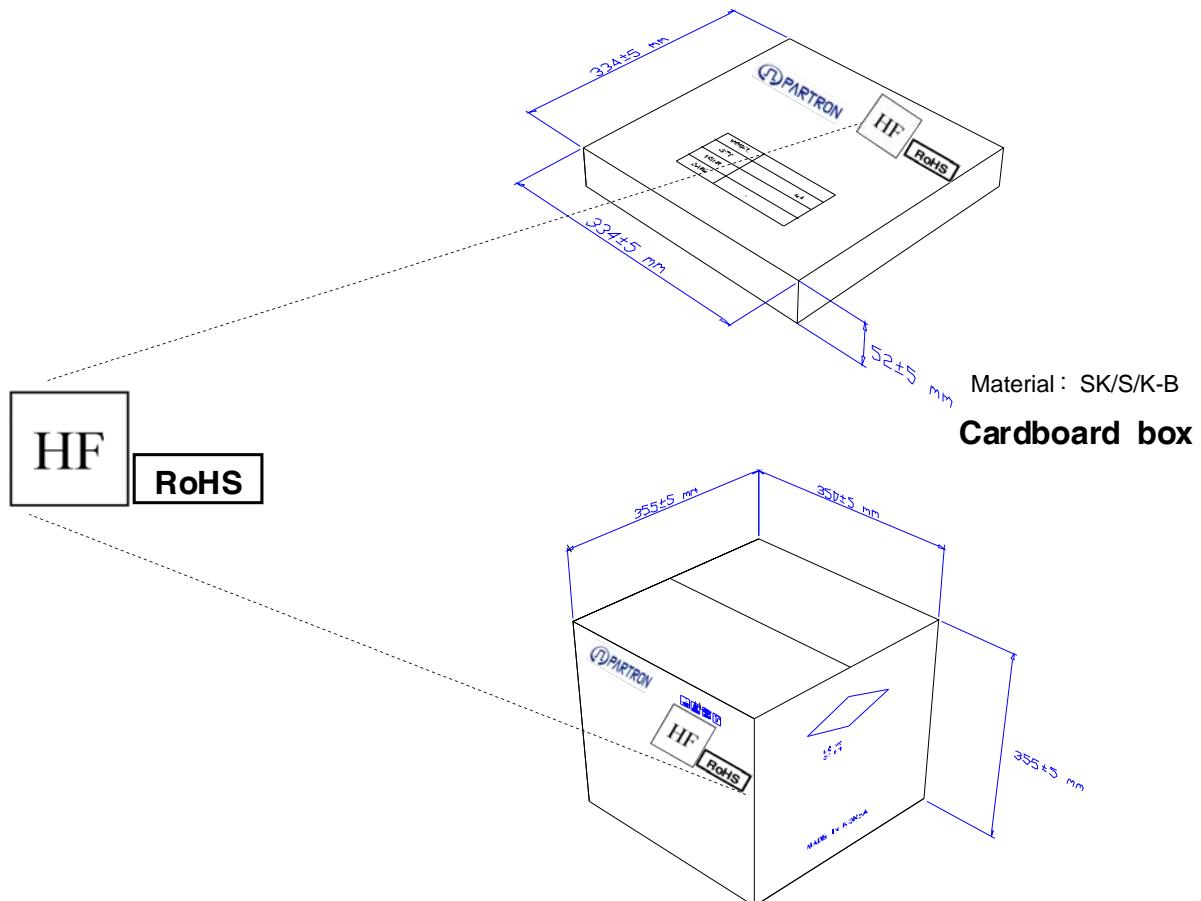
9.1 Carrier/Reel

ITEM	Material	Surface Resistance	Packing Method
Carrier	A-PET	Typical $10^8\Omega$	Heat press
Reel	A-PET		Air press (Using S-460G)





9.2 Box Specification



10. Process Control

Product		Issued/Revision		Process Control					Record	By designed	By checked	By approved	
CHIP ANTENNA		Issued	04.04.06						PRCP-C001				
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
Ceramic POWDER			Import Inspection						shrinking rate permittivity	refer to Guide Sheet	Micrometer Network	10ea/LOT	C/sheet
POWDER lubricant			powder	Mixer					mixing	POWDER lubricant	Scale	PER MIXING	-
			Shaping CTQ Process (Weight, dimension)	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
			Plasticity	Plasticity Hole	SETTER Outside Temperature PROFILE	refer to Guide Sheet	all 2/day 1/month	C/sheet					
			Block CTQ Process (dimension)						wide length shape	refer to Guide Sheet	Micrometer Calipers Visual Inspection	20ea/LOT 20ea/LOT all	C/sheet
AG PASTE			SIDE1 PAD Printing CTQ Process (Printing dimension)	Printer screen	Squeeze velocity/pressure SNAP	refer to Guide Sheet	1/day	-	PATTERN Dimension aspect	refer to Guide Sheet	Microscope	10ea/3Jig	c/sheet
			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

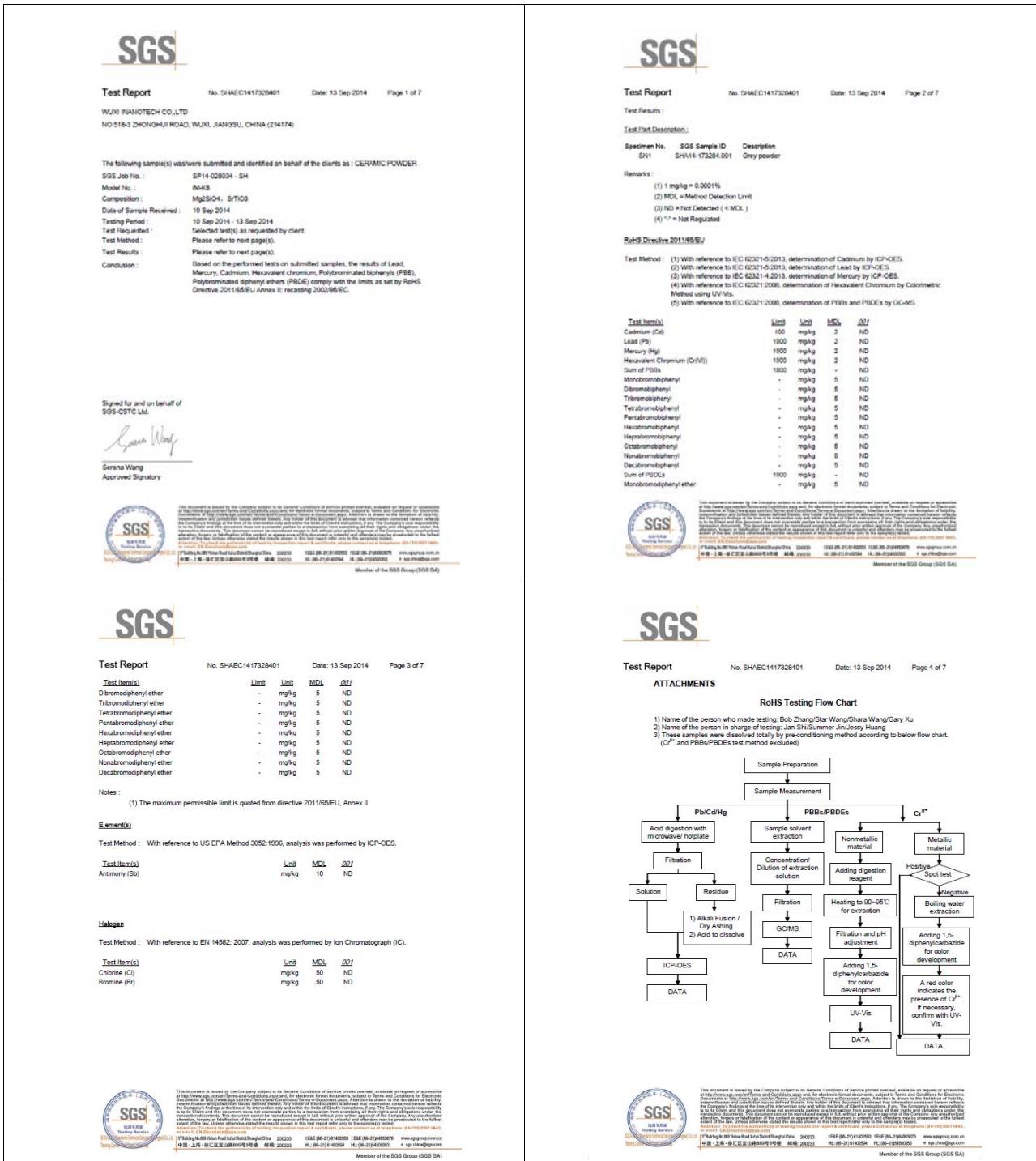
Product			Issued/Revision		Process Control				Record	By designed	By checked	By approved		
CHIP ANTENNA			Issued	04.04.06					PRCP-C001					
Input Materials	FLOW CHART		Process name	Management of Factors				Management of quality						
	preparation	Main Process		Equipment Name	Checked	Condition	Cycle of management	Record	Checked Item	Margin	Method of Inspection	Cycle of management	Record	
AG PASTE		<input type="radio"/>	SIDE 2 PAD Printing CTQ	Printer screen	Squeeze velocity/pressure SNAP	refer to Guide Sheet	1/day	-	PATTERN Dimension aspect	refer to Guide Sheet	Microscope	10ea/3Jig	c/sheet	Rework
		<input type="radio"/>	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
		<input type="radio"/>	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		<input type="radio"/>	TOP printing CTQ	Printer screen	Squeeze velocity/pressure SNAP	refer to Guide Sheet	1/day	-	PATTERN dimension	refer to Guide Sheet	measure	10ea/3Jig	c/sheet	Rework
		<input type="radio"/>	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		<input type="radio"/>	BOTTOM PAD Printing CTQ	printer screen	Squeeze velocity/pressure SNAP	refer to Guide Sheet	1/day	-	PATTERN dimension aspect	refer to Guide Sheet	measure Microscope	10ea/3Jig	c/sheet	Rework

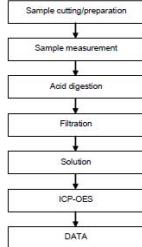
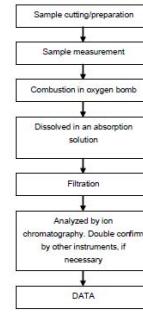
Product		Issued/Revision		Process Control				Record	By	By	By			
CHIP ANTENNA		Issued	04.04.06					PRCP-C001						
Input Materials	FLOW CHART		Process name	Management of Factors				Management of quality						
	prepara	Main Process		Equipment Name	Checked	Condition	Cycle of management	Record	Checked Item	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 CTQ	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

11. RoHS Data

1) Ceramic Powder

Parts Name	iM-K8
Tester Organization	SGS Testing KOREA co. Ltd.
Measurement Tester	Please see the 'method' in the test report
Measurement Data	Please see the report under the table



 <p>Test Report ATTACHMENTS</p> <p>Elements Testing Flow Chart</p> <p>1) Name of the person who made testing: Star Wang/ Jan Shi 2) Name of the person in charge of testing: Jeff Zhang</p>  <p>SGS SGS Testing Service SGS China SGS Group Member of the SGS Group (SGS SA)</p>	 <p>Test Report ATTACHMENTS</p> <p>Halogen Testing (oxygen bomb) Flow Chart</p> <p>1) Name of the person who made testing: Selly Yin 2) Name of the person in charge of testing: Linda Li</p>  <p>SGS SGS Testing Service SGS China SGS Group Member of the SGS Group (SGS SA)</p>
 <p>Test Report No. SHAEC1417328401 Date: 13 Sep 2014 Page 7 of 7</p> <p>Sample photo:</p>  <p>SGS authenticate the photo on original report only *** End of Report ***</p> <p>SGS SGS Testing Service SGS China SGS Group Member of the SGS Group (SGS SA)</p>	 <p>Test Report No. SHAEC1417328401 Date: 13 Sep 2014 Page 7 of 7</p> <p>SGS SGS Testing Service SGS China SGS Group Member of the SGS Group (SGS SA)</p>

2) Ag Paste

Parts Name	DNF2010C
Tester Organization	SGS Testing KOREA co. Ltd.
Measurement Tester	Please see the 'method' in the test report
Measurement Data	Please see the report under the table

4401 Version2	4401 Version2
---------------	---------------

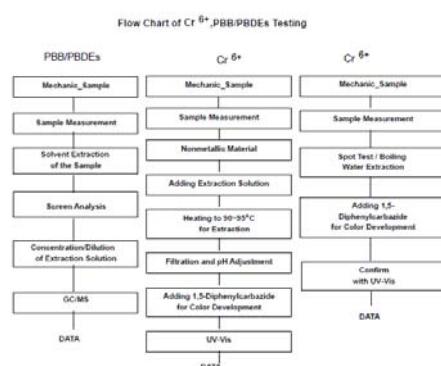
4401 Version2	4401 Version2
---------------	---------------

SGS

Test Report No. F000101LFCTRAYAA143857

Issued Date : 2014-06-17

Page 5 of 6



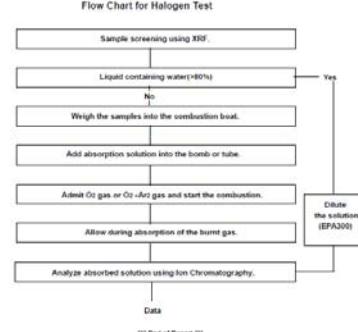
FACT Version 2 800-787-2262 | www.fact.org | www.fact.org/2012

SGS

Test Report No. F000101LF/CT8AYAA11285K

Issued Date : 2014.03.17

Page 6 of 6



3) Marking Ink(Black Ink)

Parts Name	IR/IC-270BK INK
Tester Organization	SGS Testing KOREA co. Ltd.
Measurement Tester	Please see the 'method' in the test report
Measurement Data	Please see the report under the table

