

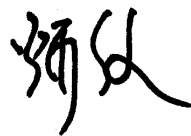
RoHS

H/F



MSL Level 1

Approval Sheet

Products	Dielectric Chip Antenna		
Customer	Essys		
Customer CODE	M3571500121		
Supplier	PARTRON		
Supplier CODE	ACS2450HBAGN4		
Essys	By designed	By checked	By approved
PARTRON	By designed	By checked	By approved
	김 홍 기		
	Antenna 2 Team	Quality Assurance	Laboratory
	Hongki.Kim	Nam-Sik. Min	Byoung-Jun.Yim
	05/26	05/26	05/26

2015 . 05. 26



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

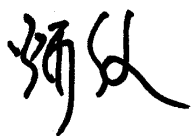


MSL Level 1

SPECIFICATION

MODEL : ACS2450HBAGN4

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
05/26	05/26	05/26

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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

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2. Electrical Characteristics

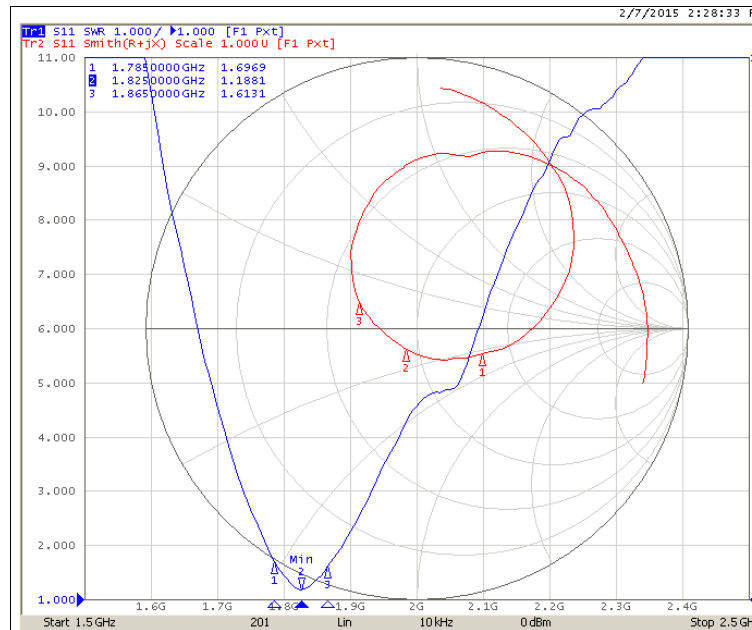
2.1 Set Condition

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)	Pi-Matching Circuit (nearby Module)	Series	1.0nH		
		Shunt	N/C		
		Freq,[MHz]	2400	2445	2485
Gain[dBi]	Azimuth Plane	Avg Gain	-6.46	-6.22	-5.54
	Elevation1 Plane	Avg Gain	-4.37	-4.74	-4.48
	Elevation2 Plane	Avg Gain	-6.28	-6.22	-5.87
	3D	Avg Gain	-5.08	-5.30	-5.12

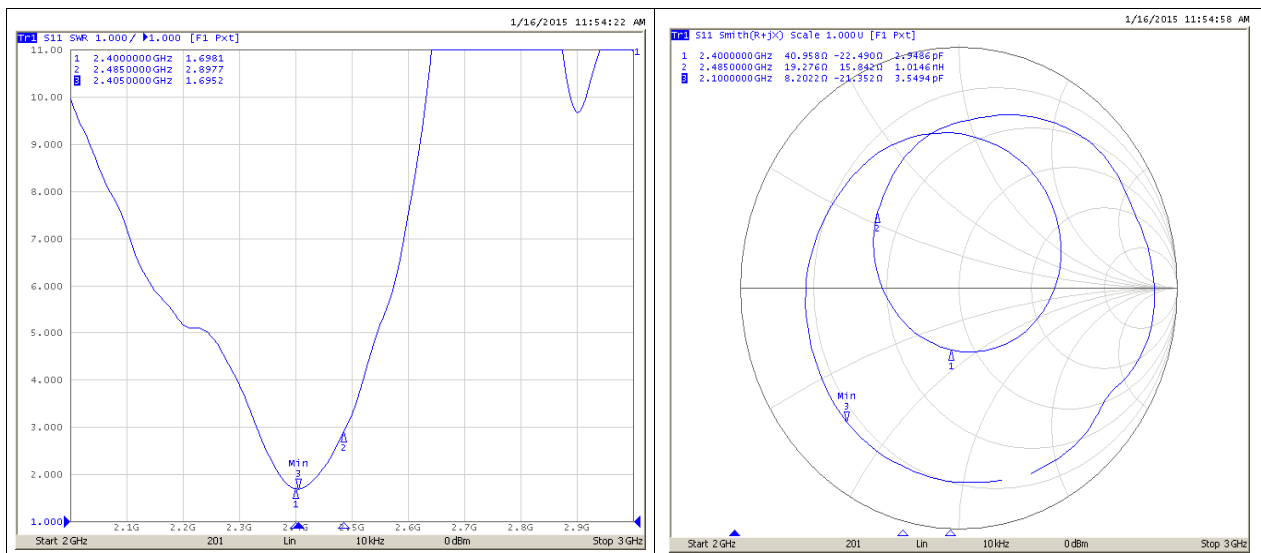
2.2 수동 지그 측정

항 목	특 성
Frequency Range [MHz]	1785 ~ 1865
Lower frequency(1785 MHz) SWR [Min~Max]	1.0 ~ 3.0 : 1 (Typ 2.0 : 1)
Upper frequency(1865 MHz) SWR [Min~Max]	1.0 ~ 3.0 : 1 (Typ 2.0 : 1)

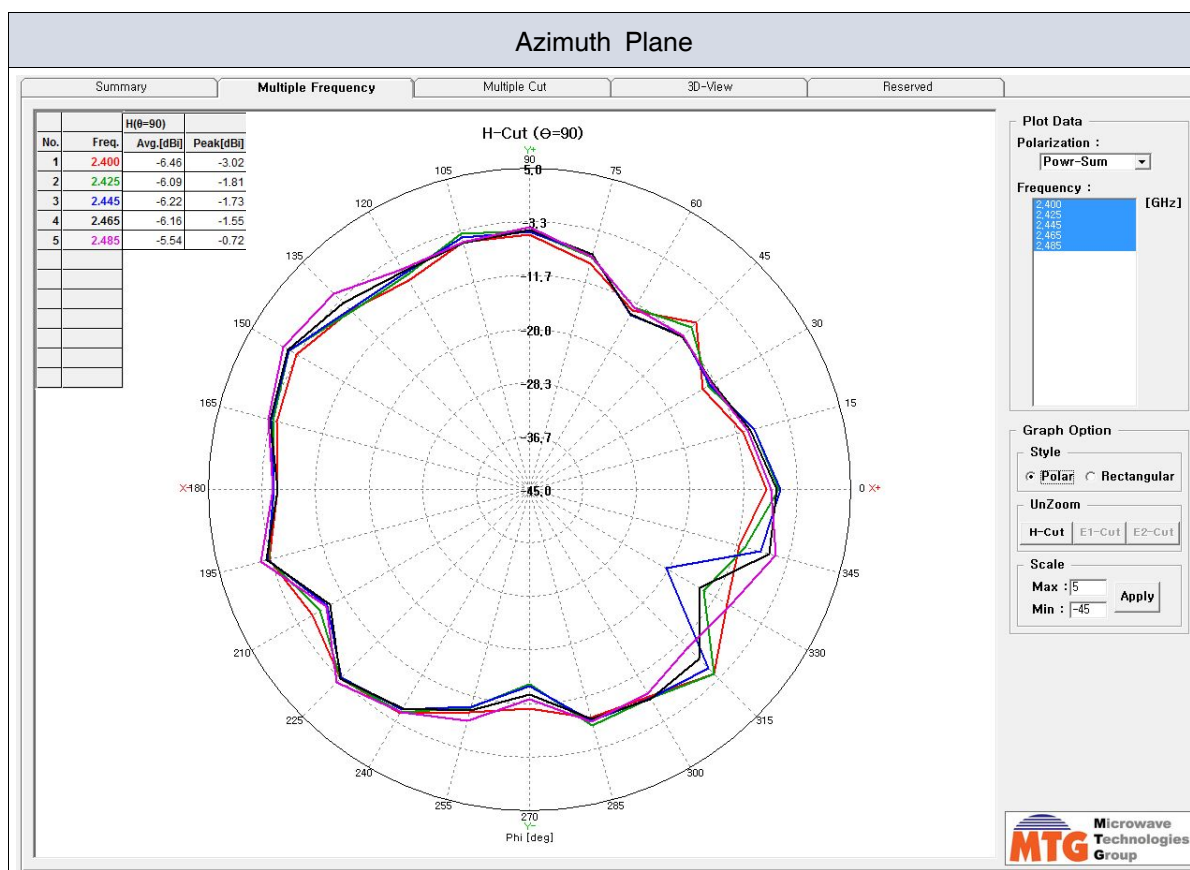
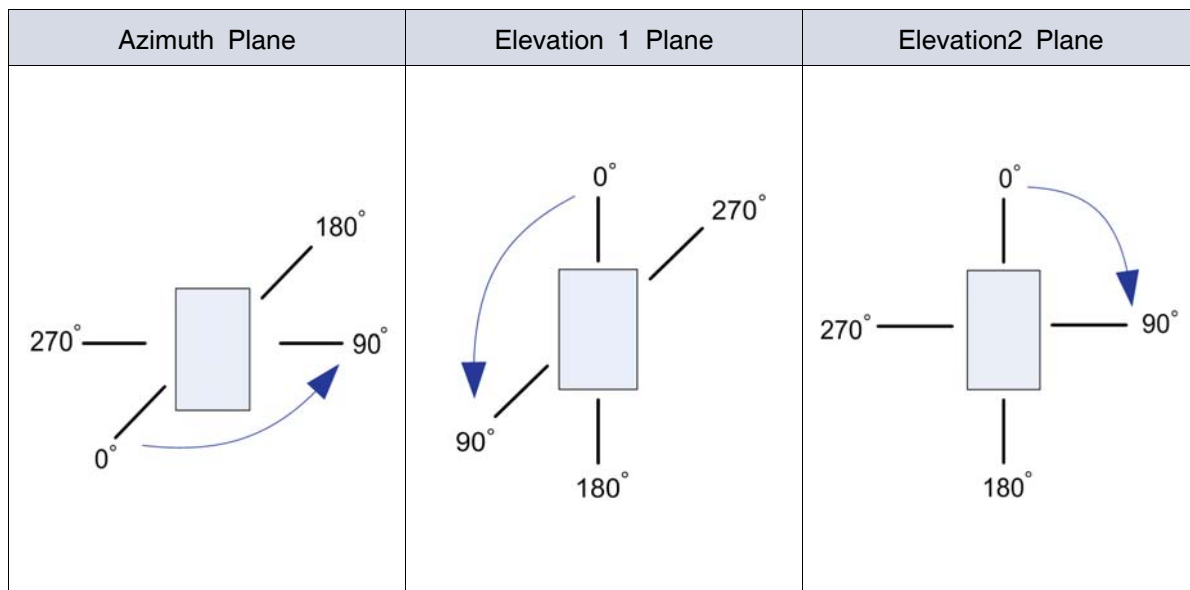
2.3 Graph of Test Fixture Condition

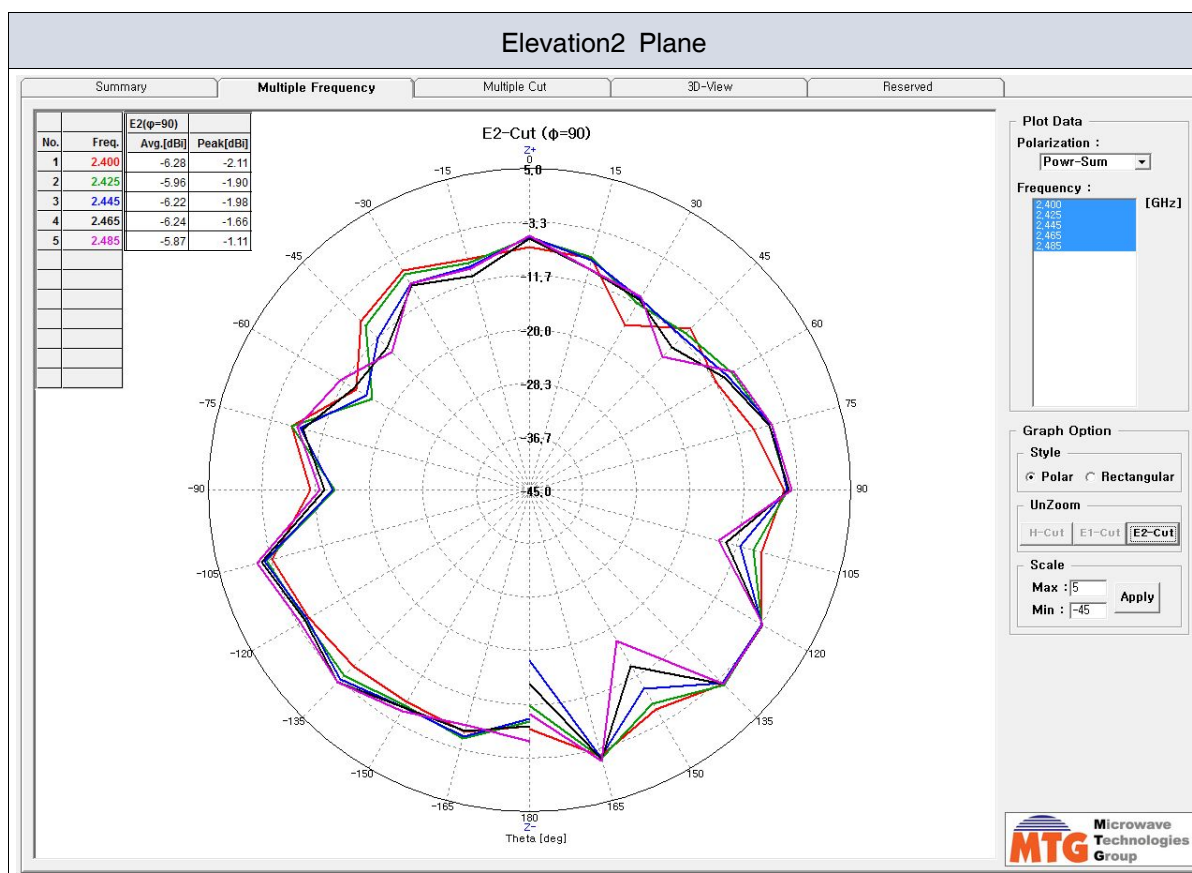
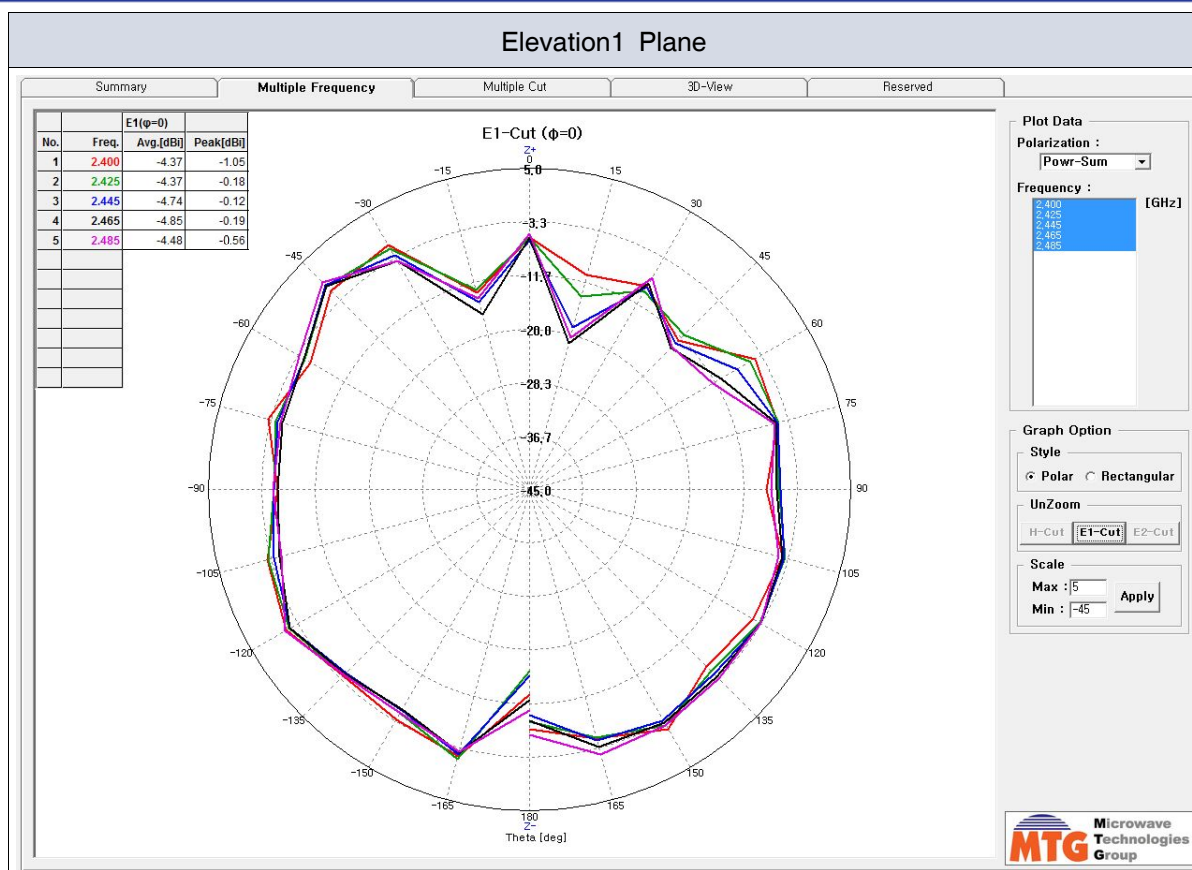


2.4 Graph of Set VSWR&Smith Chart

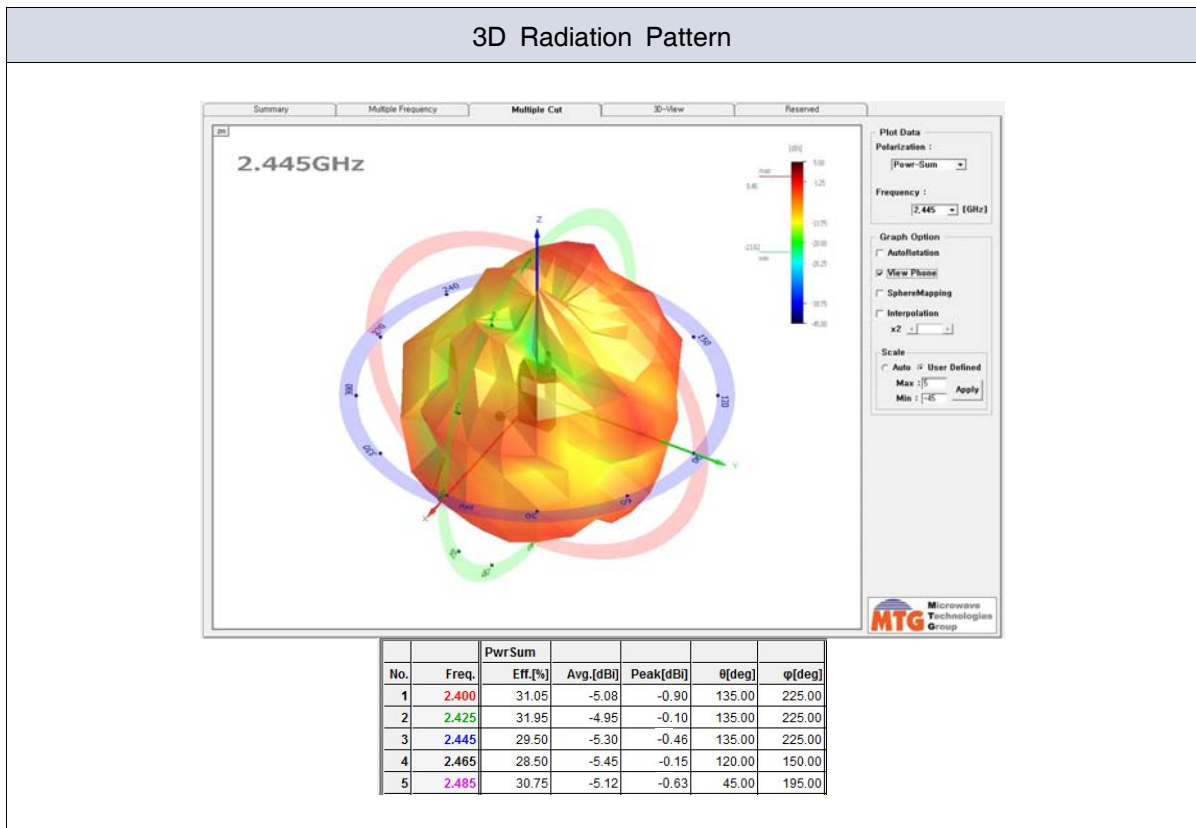


2.5 Radiation Pattern





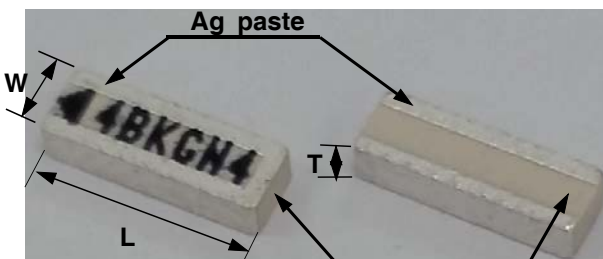
2.6 3D Radiation Pattern



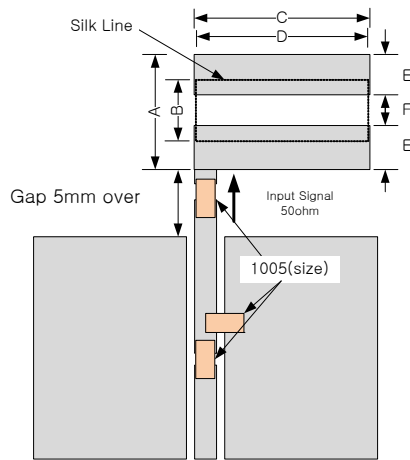
3. Mechanical Characteristics

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

3.1 Structure and Material

Material	Dielectric Block	3D Structure	
	Ag Paste		
Size [mm]	W = 2.0±0.1		
	L = 6.0±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

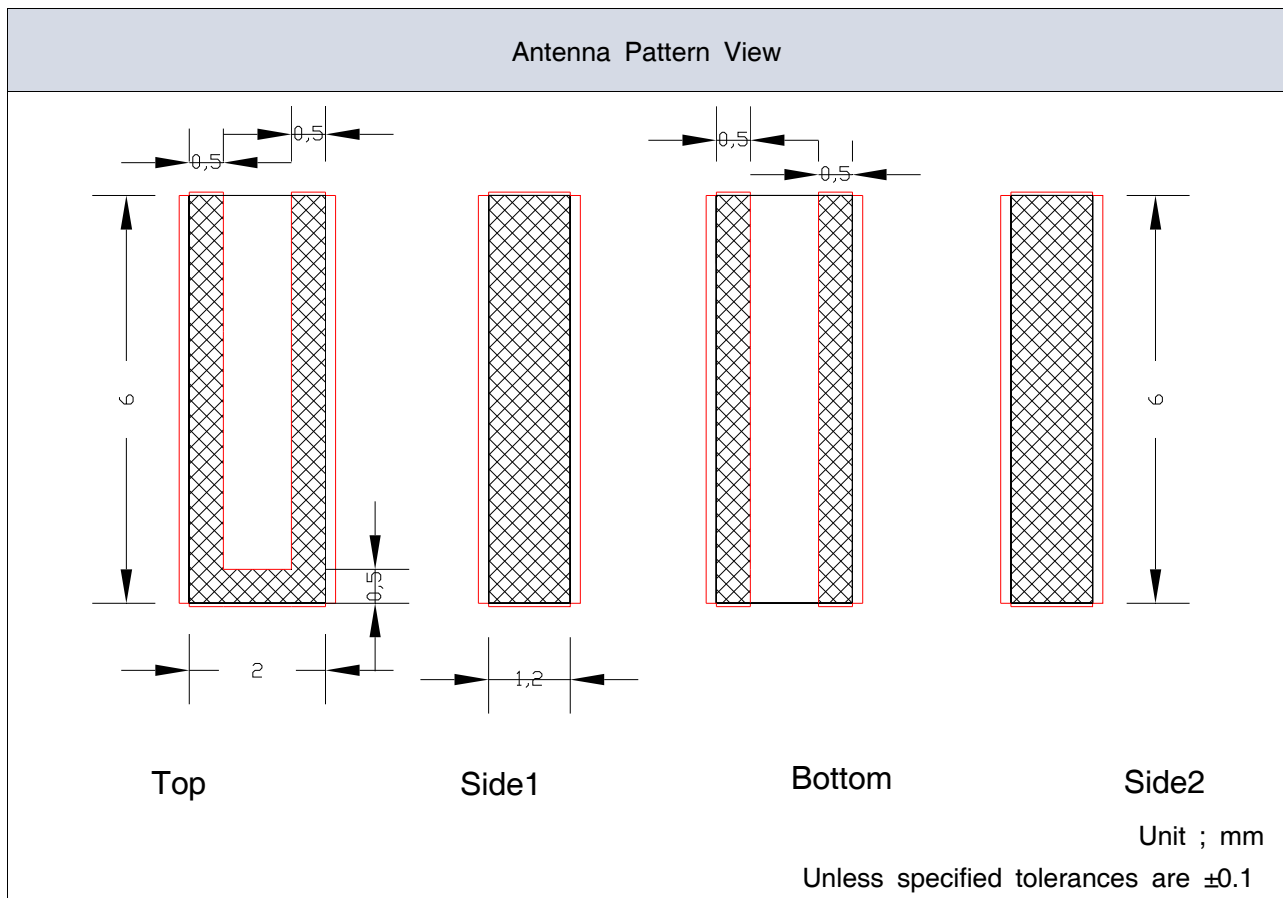


A	4.0
B	2.0
C	6.2
D	6.0
E	1.5
F	1.0

Unit ; mm

Unless specified tolerances are ± 0.1

3.3 Antenna Pattern Dimension



3.4 LOT Notation

4	B	K
①	②	③

- ① Year ; 4 - 2014, 9 - 2019, 0 - 2020
- ② Month ; 1 - January, 2 - February, A - October, B - November
- ③ Date ; 1 - 1st, 2 - 2nd, 3 - 3rd K - 20th, L - 21th

3.5 Marking



◀	4	B	K	GN4
①	②	③	④	⑤

- ① Input Signal
- ② Year ; 4 - 2014, 5 - 2015, 9 - 2019, 0 - 2020
- ③ Month ; 1 - January, 2 - February, A - October, B - November
- ④ Date ; 1 - 1st, 2 - 2nd, 3 - 3rd K - 20th, L - 21th
- ⑤ Serial

4. Measurement Process

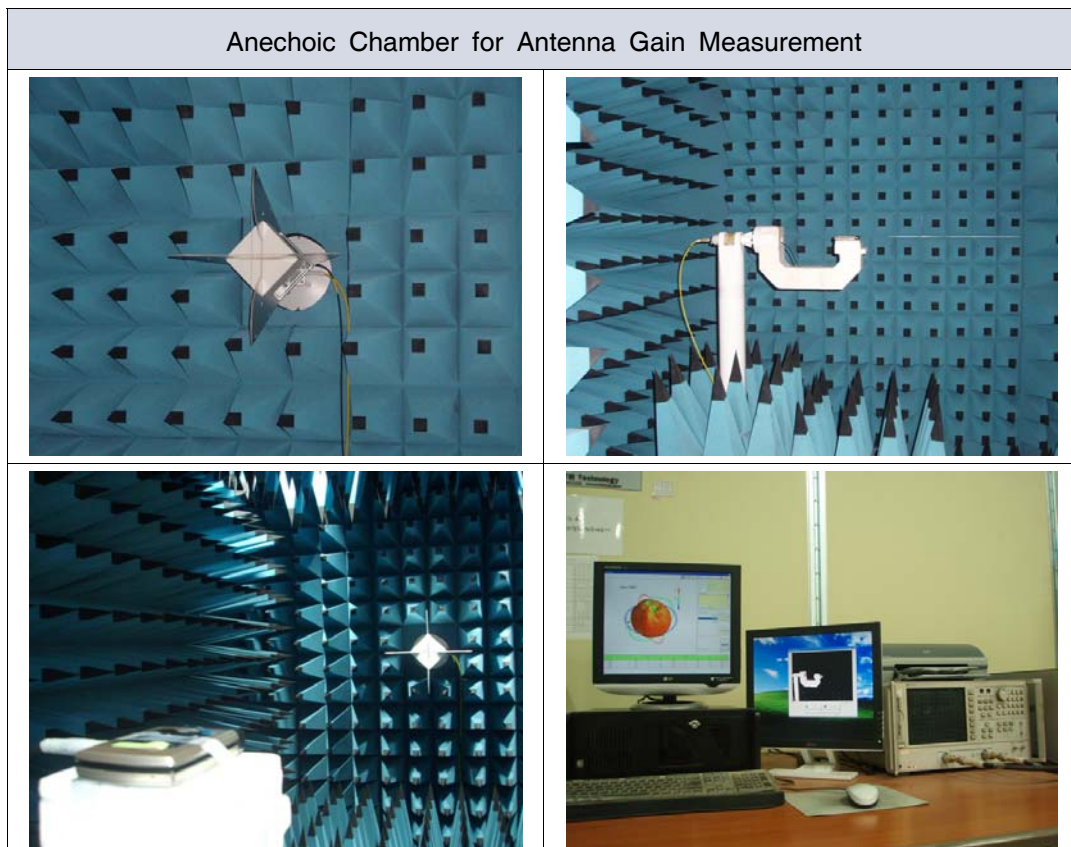
4.1 SWR/Returnloss

-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



8. Primary Inspection List

Item	Electrical Characteristic [MHz]		Mechanical Dimension [mm]		
	VSWR Max		W=2.0±0.1	L=6.0±0.1	T=1.2±0.1
	1785 MHz	1865 MHz			
1	1.69	1.61	2.03	6.02	1.23
2	1.76	1.68	2.04	6.01	1.24
3	1.75	1.62	2.04	6.00	1.24
4	1.66	1.58	2.05	6.01	1.24
5	1.67	1.57	2.04	6.00	1.24
6	1.66	1.59	2.04	6.01	1.25
7	1.60	1.59	2.04	6.01	1.24
8	1.65	1.60	2.03	6.00	1.23
9	1.64	1.59	2.04	6.01	1.24
10	1.69	1.53	2.03	6.01	1.24
11	1.71	1.60	2.04	6.02	1.24
12	1.70	1.55	2.05	6.01	1.25
13	1.63	1.63	2.04	6.03	1.24
14	1.65	1.63	2.05	6.00	1.25
15	1.64	1.54	2.04	5.99	1.24
16	1.71	1.62	2.06	6.02	1.24
17	1.62	1.56	2.04	6.00	1.25
18	1.74	1.63	2.04	6.01	1.25
19	1.72	1.53	2.03	6.01	1.24
20	1.65	1.59	2.04	6.00	1.23
X	1.68	1.59	2.04	6.01	1.24
σ	0.04	0.04	0.01	0.01	0.01
Cpk	9.86	12.24	2.58	3.23	4.67
Decision	OK	OK	OK	OK	OK

5. Reliability Condition

5.1 ENVIRONMENT TEST

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

5.2 Thermal Shock Test, Reflow Test

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

5.3 Mechanical Test

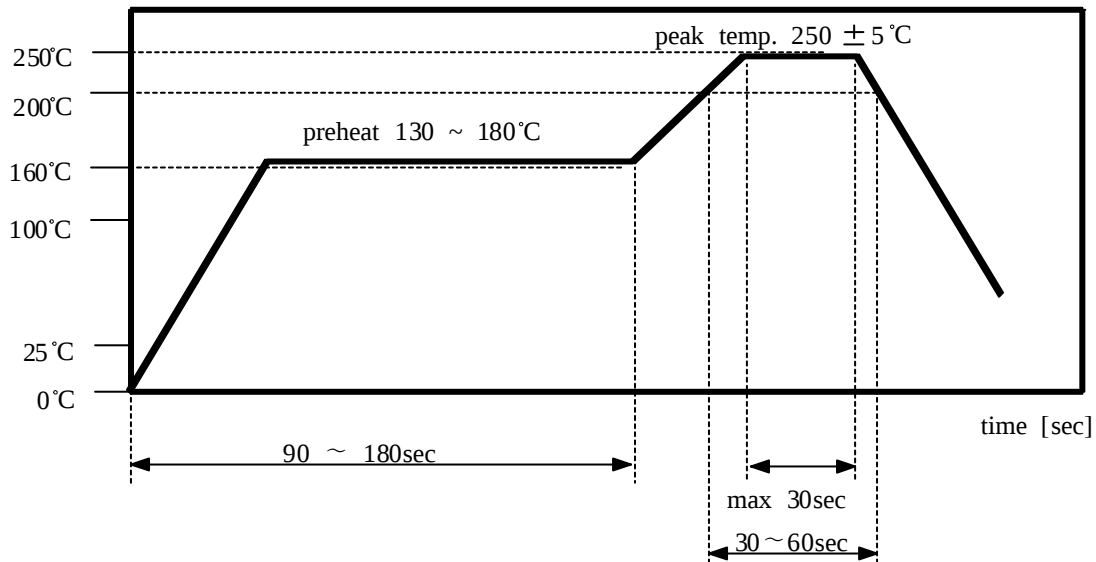
ITEM	TEST CONDITION	LIMIT
Random Vibration	Frequency 10~500Hz - 10 ×9.8m/s ² (G) Sweep time 15min, X.Y.Z each 5 times	*After the test, specimen sheet meet the electrical specification
Drop	Height 152cm, 5 times (Each Surface)	

5.4 Reliability Test Result

※ Appendix

6. Soldering Condon

6.1 Reflow Soldering



6.2 Manual Soldering

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

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

7. Attention

7.1 Temperature Condition

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

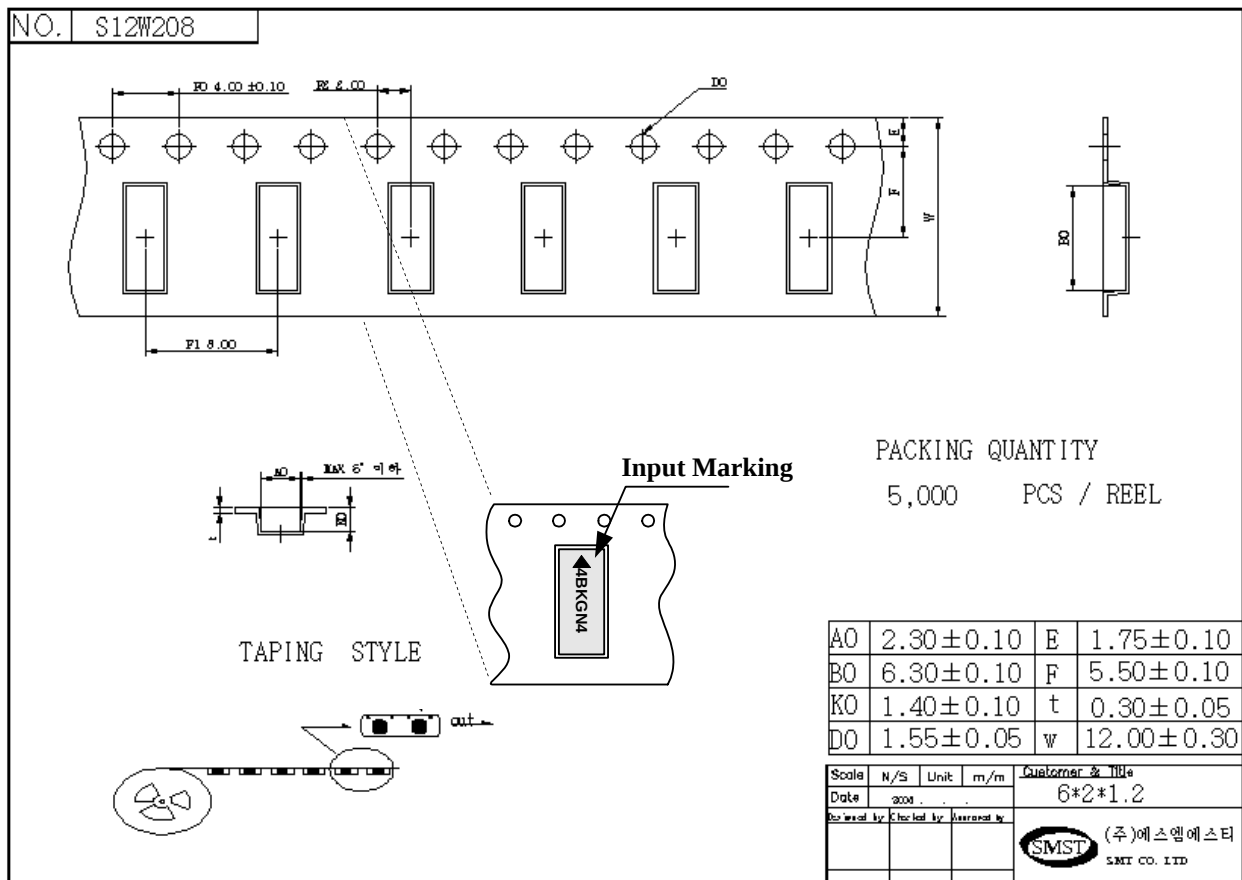
7.2 MSL LEVEL 1 (JEDEC J-STD-020C)

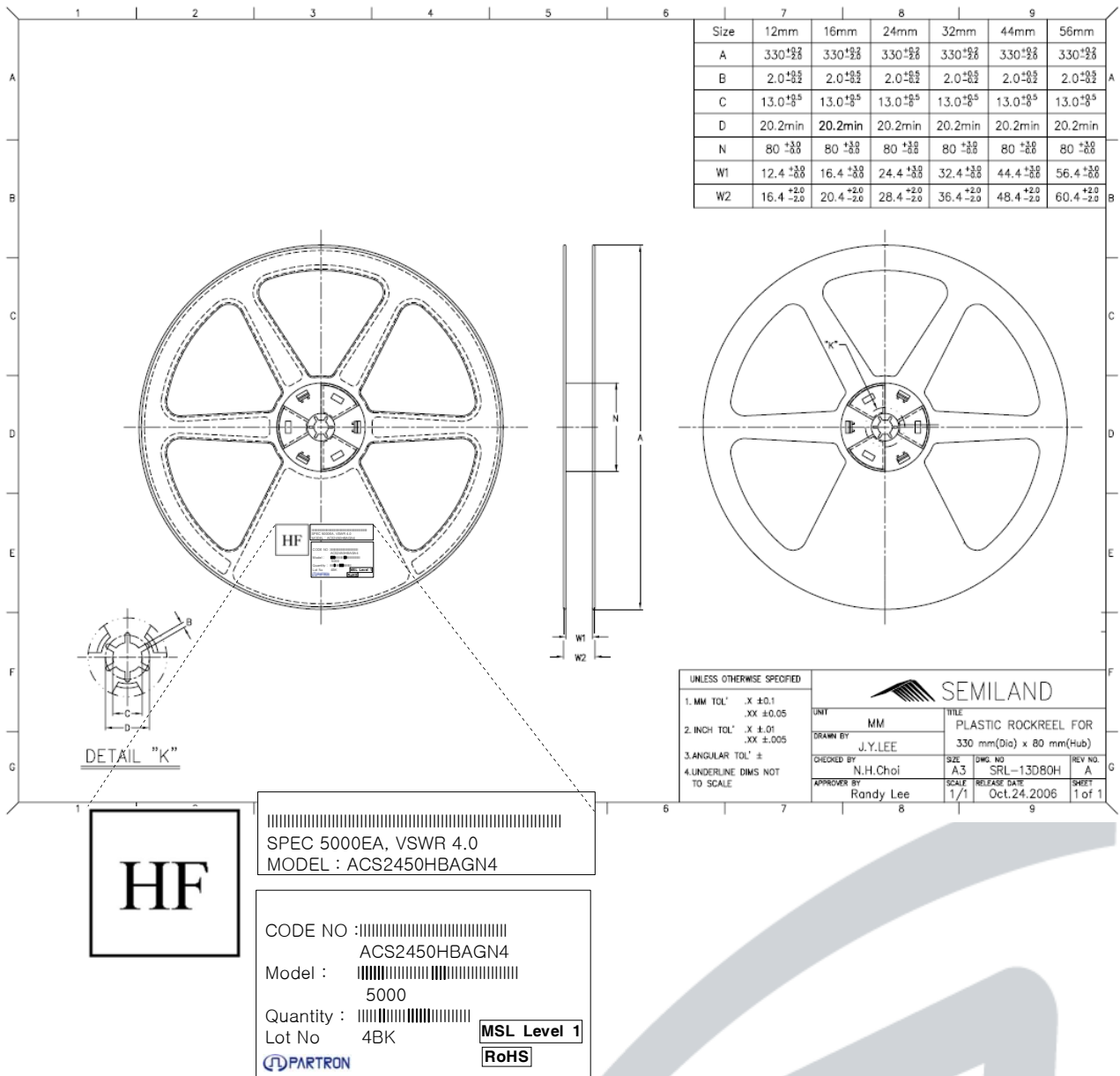
	Floor Life		Soak Requirements	
	Time	Conditions	Time	Conditions
1	Unlimited	= < 30°C/85%RH	168+5/-0	= < 85°C/85%RH

8. Packing

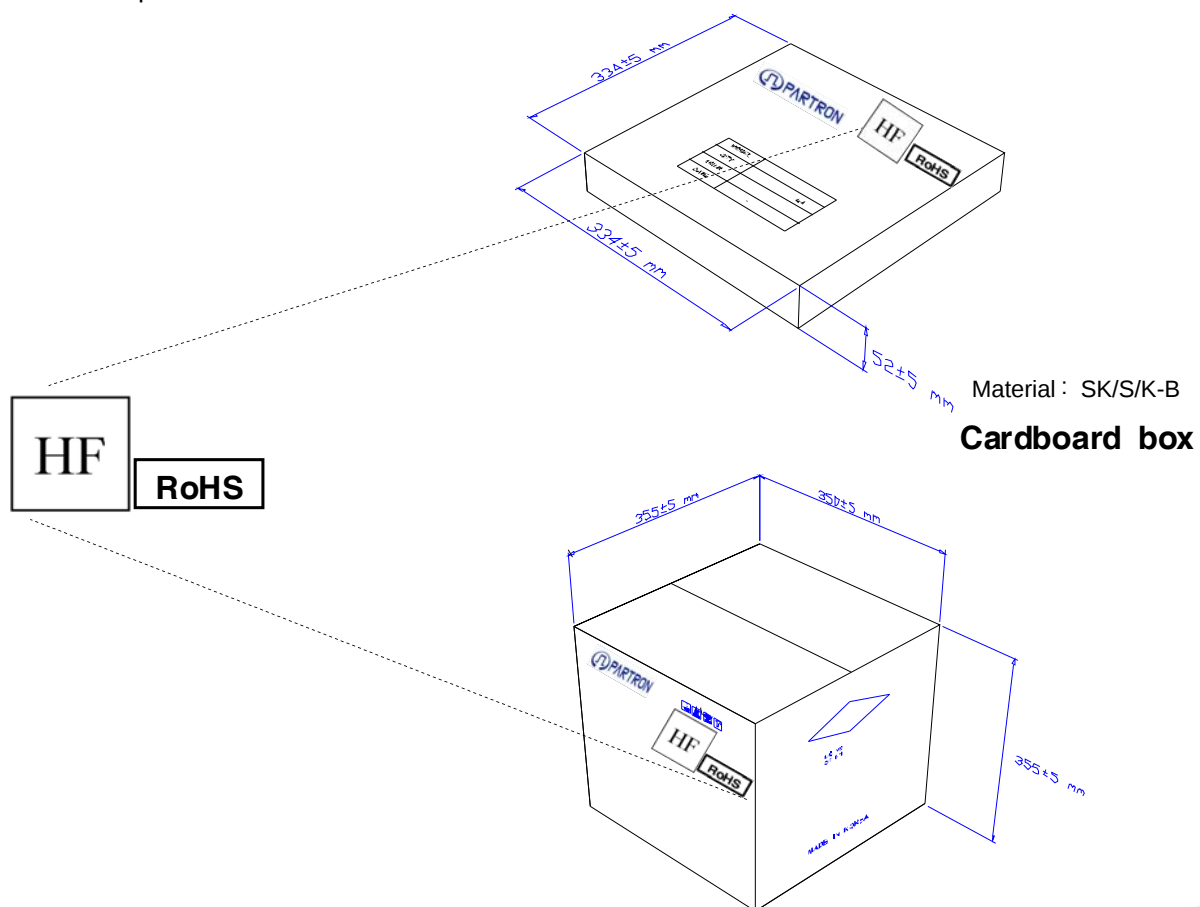
8.1 Carrier/Reel

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





8.2 Box Specification



9. 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 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	Exhaust
		○	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	Exhaust
AG PASTE		○	SIDE1 PAD Printing CTQ Process (Printing dimension)	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					
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 CTQ	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 CTQ	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	By	By		
CHIP ANTENNA			Issued Revised	04.04.06 05.04.03					PRCP-C001					
Input Materials	FLOW CHART		Process name	Management of Factors					Management of quality					
	prepara tion	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