


ANTENNA SPECIFICATIONS

CUSTOMER	
SUPPLIER	ARRO CO.LTD
PRODUCT NAME	CDMA PT111
PRODUCT NAME	SUB ANTENNA
CUSTOMER Part No.	53C03000420
Product Part No.	IBS-0427

3D	
ANT.Size : 52.94*39.33*6.35	

DEPARTMENT	DRAFTING	CHECK	APPROVAL
H/W			
	IS.KIM	KS.KIM	SH.LEE
M/D			
	JY.SHIM	CS.MOOM	HJ.JUNG
Q.C			
	JS.LEE	WH.KIM	BH,JO

APPROVAL SHEET LIST

Customer Part No.	53C03000420
Product Part No.	IBS-0427
Date (제출일)	2011.06.14

Model	Type	Rev	ARRO	A
CDMA PT111	SUB Antenna		PANTECH	A

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CDMA PT111	SUB Antenna		PANTECH	A

1. Revision History

1.1 Approval History

Approval History List							
No	Rev		Date	REVISION	Place	Department requests	Proceeding
	Pantech	ARRO					
1	A	A	2011.06.14	New RIVISON	-	R&D	
2							
3							
4							
5							

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2. Technical Properties

2.1 Electrical Properties

FREQUENCY RANGE[MHz] (Set Measurement)	USC, JCDMA (843~ 875Mhz)		GPS (1,575Mhz)	IMT- 2000 (2,110~ 2,130Mhz)		B.T 2,400~ 2,483Mhz	
MEASUREMENT FREQUENCY POINT[MHz]	843Mhz	875Mhz	1,575Mhz	2,110Mhz	2,130Mhz	2,130Mhz	2,483Mhz
GAIN(PEAK/ AVG) [dBi]	- 14.7/- 20.5		2.1/- 3.0	- 1.9/- 7.0		0.0 / - 3.3	
VSWR (MAX)	8:1	15:1	2:1	2:1	2:1	2:1	
Impedance	50 Ohm						
Radiation Pattern	Omni- directional						
Power Handling	2 Watt						

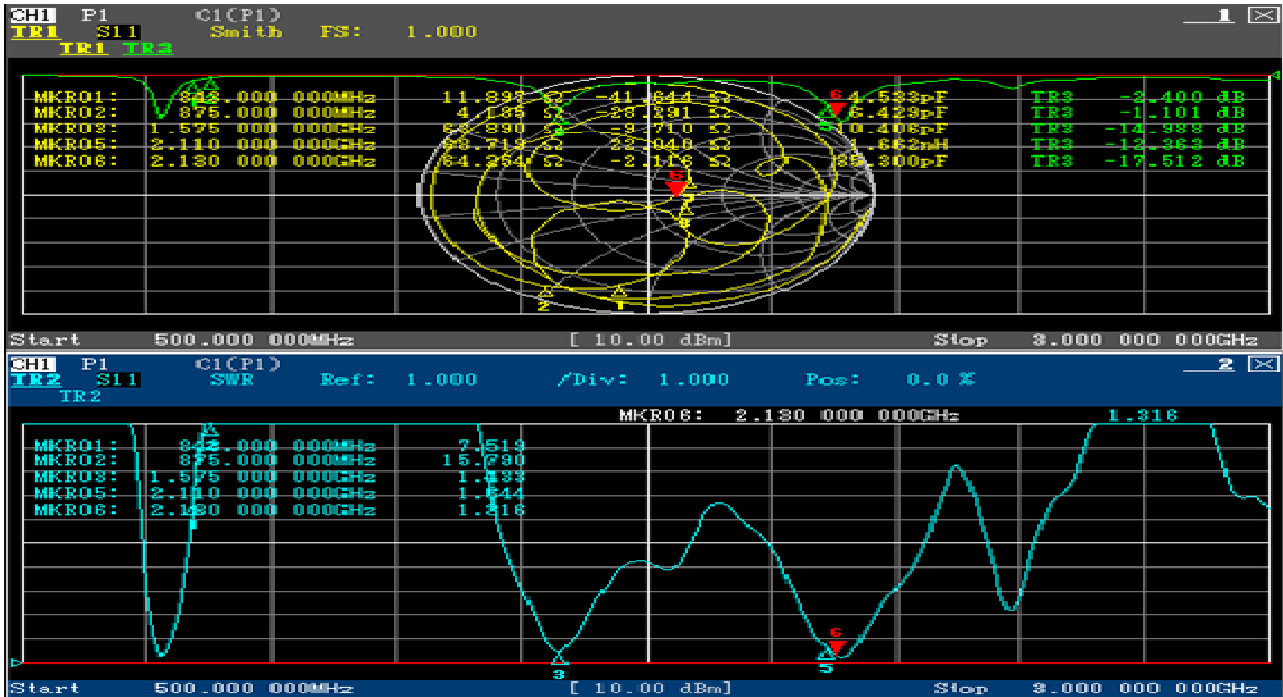
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2.1 Electrical Properties

2.1.1 Electrical Properties of Set "Div Antenna" ("V.S.W.R" included)



[Picture 2- 1] V.S.W.R

FREQUENCY RANGE[MHz] (Set Measurement)	843~ 875Mhz		1,575Mhz	2,110~ 2,130Mhz	
MEASUREMENT FREQUENCY POINT[MHz]	843Mhz	875Mhz	1,575Mhz	2,110Mhz	2,130Mhz
VSWR	MAX 8:1	MAX 15:1	MAX 2:1	MAX 2:1	MAX 2:1

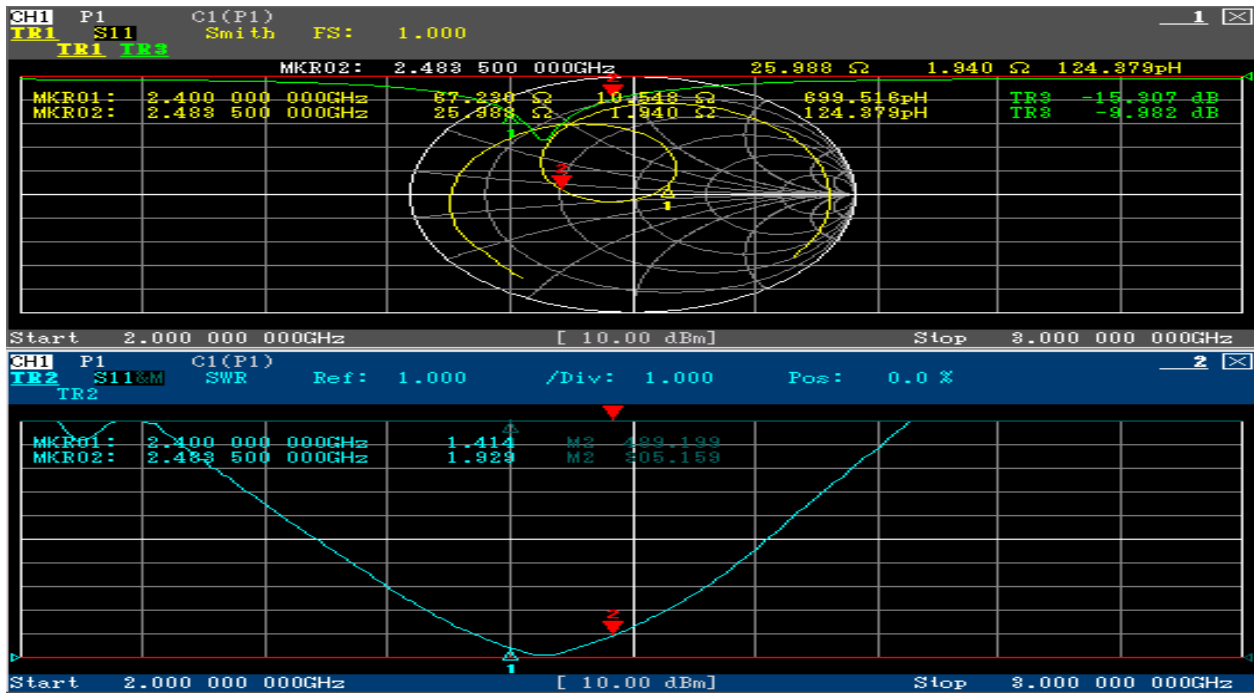
[Chart 2- 1] Electrical Properties of set

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2.1.2 Electrical Properties of Set "BT/Wifi Antenna" ("V.S.W.R" included)



[Picture 2- 2] V.S.W.R

FREQUENCY RANGE[MHz] (Set Measurement)	2,400 ~ 2,483 Mhz
MEASUREMENT FREQUENCY POINT[MHz]	2,400 ~ 2,483 Mhz
VSWR	MAX 2:1

[Chart 2- 2] Electrical Properties of set

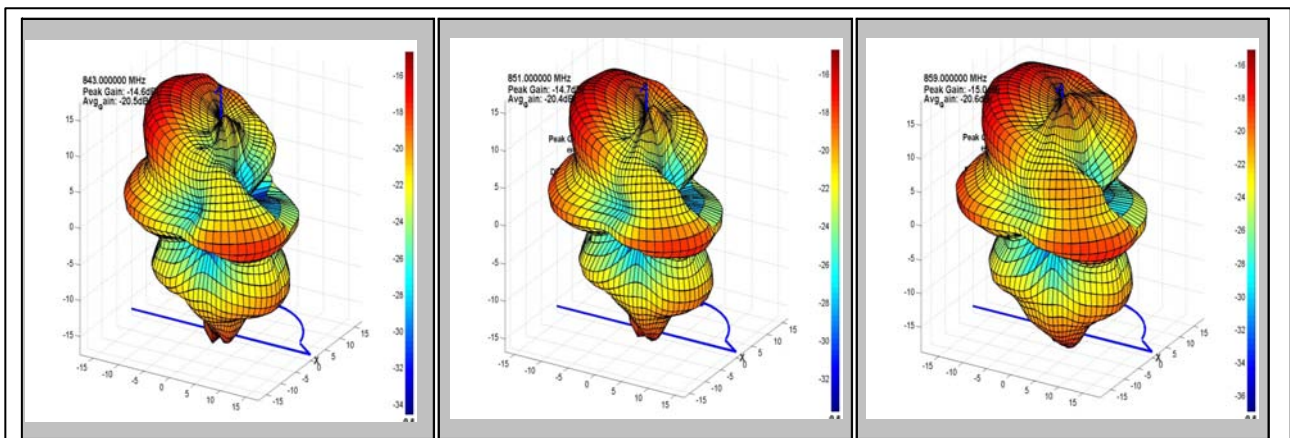
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2.1.3 3D Efficiency & Gain & Radiation Pattern of Div Antenna

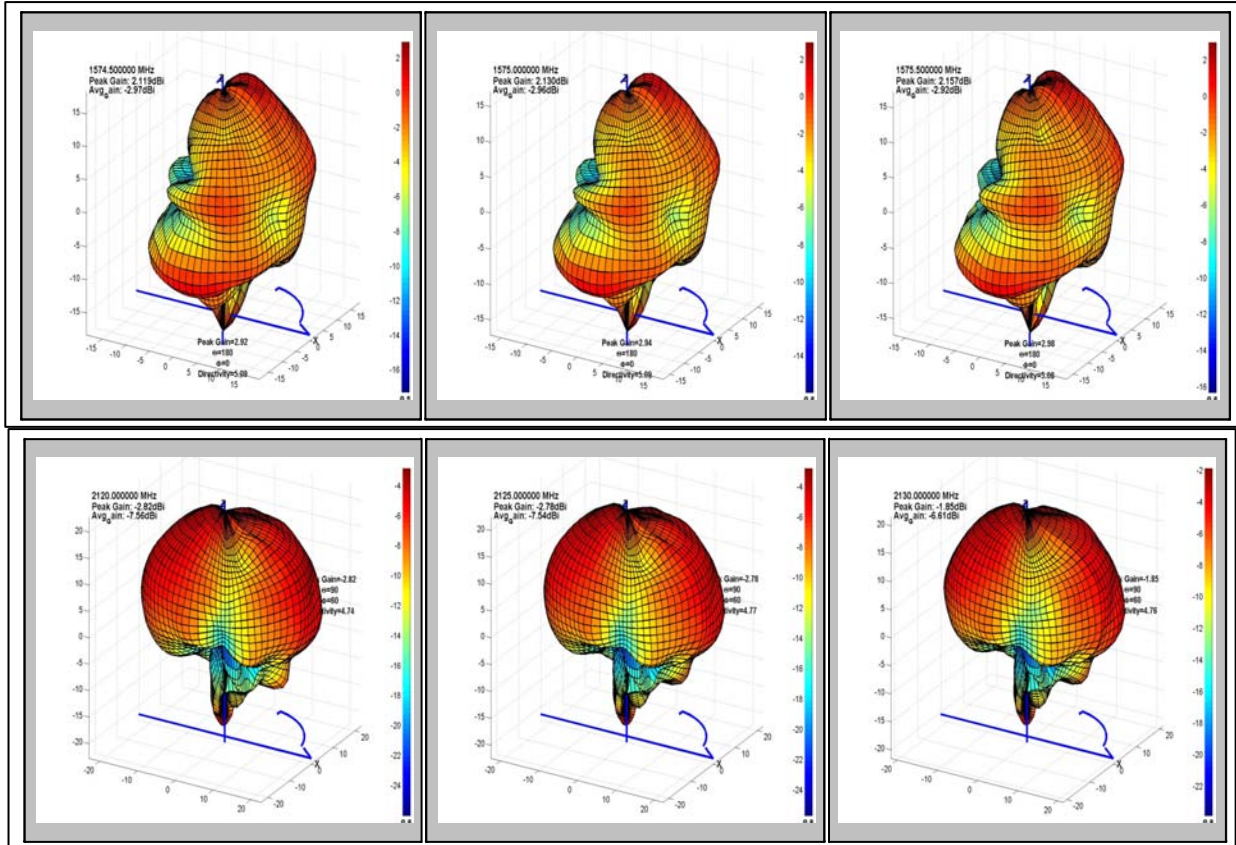
Frequency	Efficiency	Average Gain			Max Gain		
		Ver	Hor	Total	Ver	Hor	Total
843.000000 MHz	0.9 %	-24.6 dBi	-22.8 dBi	-20.6 dBi	-17.4 dBi	-16.2 dBi	-14.7 dBi
851.000000 MHz	0.9 %	-24.1 dBi	-22.9 dBi	-20.5 dBi	-17.3 dBi	-16.2 dBi	-14.7 dBi
859.000000 MHz	0.9 %	-23.9 dBi	-23.4 dBi	-20.6 dBi	-17.7 dBi	-16.5 dBi	-15.1 dBi
867.000000 MHz	0.9 %	-23.4 dBi	-23.4 dBi	-20.4 dBi	-17.5 dBi	-16.4 dBi	-14.7 dBi
875.000000 MHz	1.0 %	-22.9 dBi	-23.1 dBi	-20.0 dBi	-16.5 dBi	-16.0 dBi	-14.0 dBi
1574.000000 MHz	50.5 %	-5.8 dBi	-6.1 dBi	-3.0 dBi	1.3 dBi	-0.1 dBi	2.0 dBi
1574.500000 MHz	50.5 %	-5.9 dBi	-6.1 dBi	-3.0 dBi	1.4 dBi	-0.1 dBi	2.1 dBi
1575.000000 MHz	50.6 %	-5.8 dBi	-6.1 dBi	-3.0 dBi	1.4 dBi	-0.1 dBi	2.1 dBi
1575.500000 MHz	51.0 %	-5.8 dBi	-6.1 dBi	-2.9 dBi	1.4 dBi	0.0 dBi	2.2 dBi
1576.000000 MHz	51.5 %	-5.8 dBi	-6.0 dBi	-2.9 dBi	0.9 dBi	0.0 dBi	1.7 dBi
2110.000000 MHz	11.8 %	-12.4 dBi	-12.2 dBi	-9.3 dBi	-5.9 dBi	-6.6 dBi	-4.7 dBi
2115.000000 MHz	19.5 %	-10.1 dBi	-10.1 dBi	-7.1 dBi	-3.7 dBi	-4.3 dBi	-2.5 dBi
2120.000000 MHz	17.5 %	-10.9 dBi	-10.3 dBi	-7.6 dBi	-4.0 dBi	-4.2 dBi	-2.8 dBi
2125.000000 MHz	17.6 %	-10.8 dBi	-10.3 dBi	-7.5 dBi	-4.0 dBi	-4.0 dBi	-2.8 dBi
2130.000000 MHz	21.8 %	-9.8 dBi	-9.4 dBi	-6.6 dBi	-3.1 dBi	-3.0 dBi	-1.9 dBi



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Radiation Pattern (3D MASUREMENT)

GAIN(PEAK/ AVG)[dBi]	843~ 875Mhz	1,575Mhz	2,110~ 2,130Mhz
	- 14.7/- 20.5	2.1/- 3.0	- 1.9/- 7.0
INPUT IMPEDANCE(Ω)	50 Ohm		
POLARIZATION	LINEAR		
RADIATION PATTERN	OMNIDIRECTIONAL		

[Chart 2- 3] Total Antenna Gain of Set

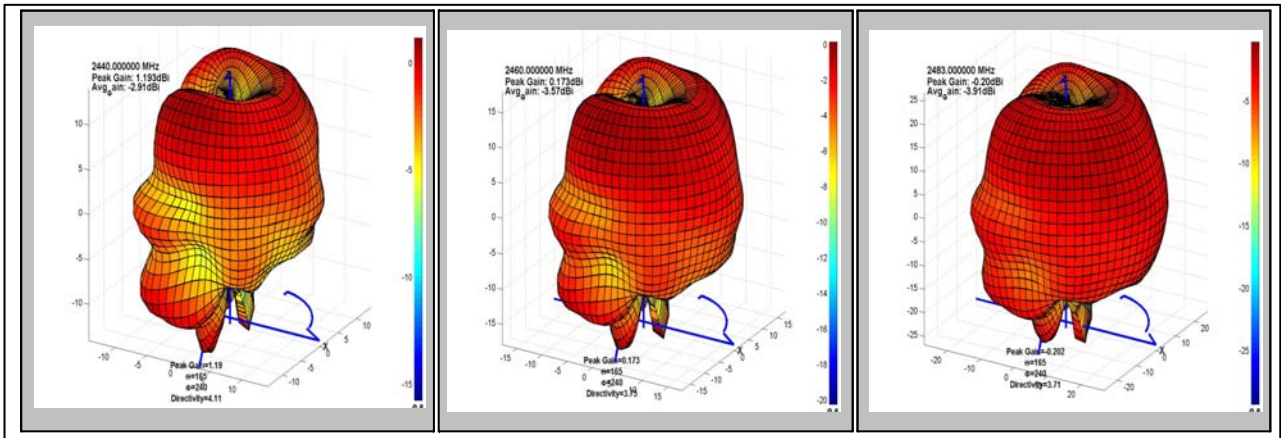
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2.1.4 3D Efficiency & Gain & Radiation Pattern of BT/Wifi Antenna

Frequency	Efficiency	Average Gain			Max Gain		
		Ver	Hor	Total	Ver	Hor	Total
2400.000000 MHz	47.0 %	-7.3 dBi	-6.2 dBi	-3.3 dBi	-0.1 dBi	-1.4 dBi	-0.5 dBi
2420.000000 MHz	50.0 %	-6.2 dBi	-4.5 dBi	-3.0 dBi	-0.2 dBi	0.0 dBi	0.0 dBi
2440.000000 MHz	51.1 %	-7.2 dBi	-4.9 dBi	-2.9 dBi	0.5 dBi	-0.8 dBi	-0.1 dBi
2460.000000 MHz	47.9 %	-7.3 dBi	-5.4 dBi	-3.2 dBi	-0.4 dBi	-1.1 dBi	-0.2 dBi
2483.000000 MHz	47.0 %	-7.3 dBi	-5.5 dBi	-3.3 dBi	-0.7 dBi	-1.0 dBi	-0.2 dBi



Radiation Pattern (3D MASUREMENT)

GAIN(PEAK/ AVG)[dBi]	0.0 / - 3.3
INPUT IMPEDANCE(Ω)	50 Ohm
POLARIZATION	LINEAR
RADIATION PATTERN	OMNIDIRECTIONAL

[Chart 2- 3- 1] Total Antenna Gain of Set

APPROVAL SHEET LIST

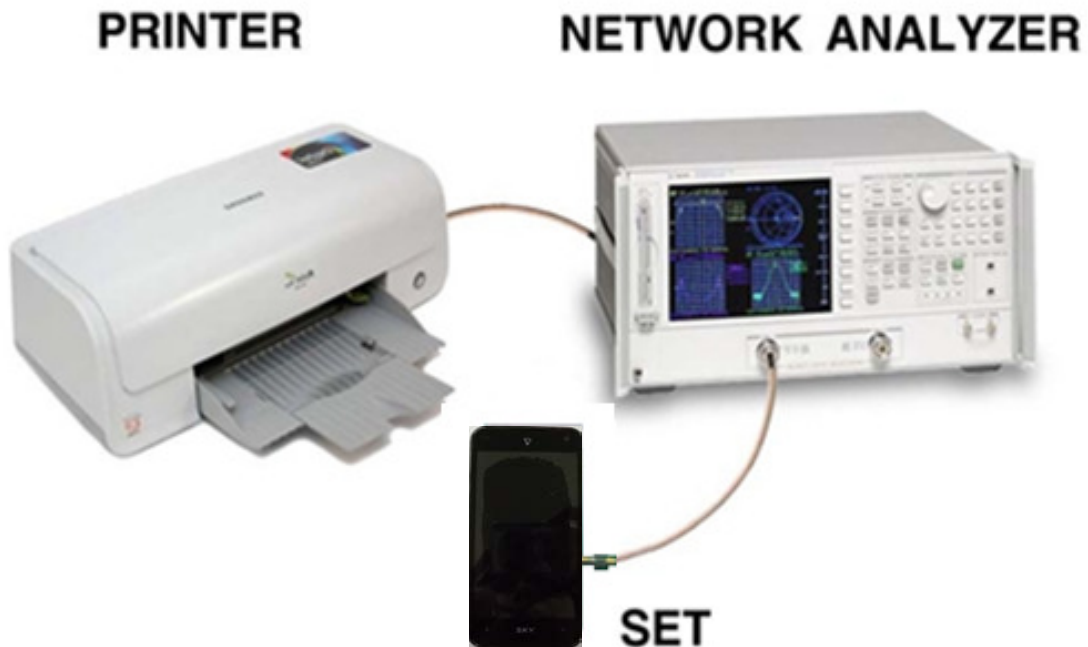
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2.2 Measurement Method

2.2.1 VSWR & Smith chart Measurement Method

Measurement Method: Setting equipments as shown in fig. 2-4, connecting the hand set to the reflection port of the Network Analyzer, measure the impedance.



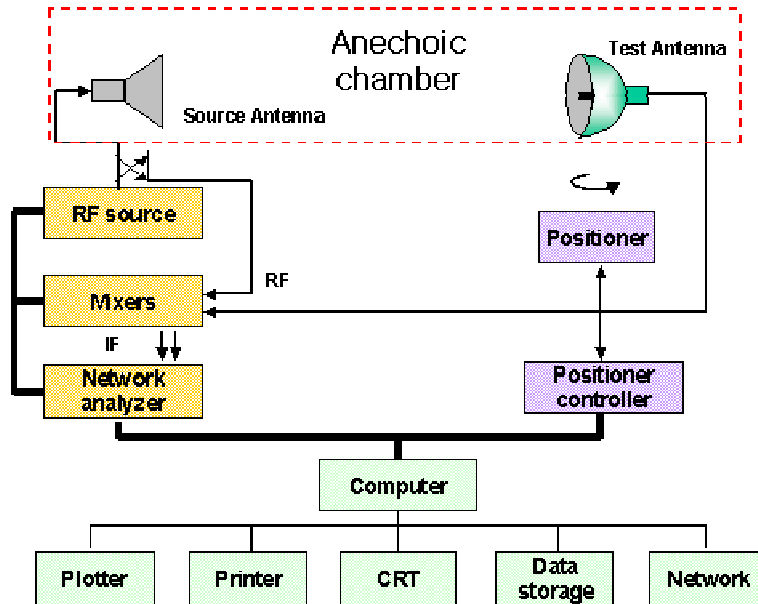
[fig. 2- 4] Measurement Method of V.S.W.R

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2) Measurement Method of Gain : As shown in fig.2.6, setting the horn antenna as standard antenna, measure the gain by [dBi].



[fig. 2-6] Measurement Method of Gain



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2.2.2 Measurement equipment

Setting equipments as shown in fig. 2-7, connecting the measurement jig to the reflection port of the Network Analyzer, measure VSWR of the reference antenna and specimens

	Measurement Method of Set	Measurement Method of Jig
Network Analyzer	Advantest R3768	Advantest R3768
cable	RF cable(300 mm)	RF cable(300 mm)
Test condition		

[fig. 2- 7] Measurement Method of Set & Jig

Antenna Gain Chamber [fig. 2- 8] . Measurement Method of Set use Antenna Gain Test.[fig. 2- 7] .



[Picture 2- 8] Antenna Gain Test

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3. Mechanical Details

3.1 Material Certification

Division	Homogeneous Materials	Component Materials	Processing	Ingredients Suppliers	Processing Companies	STATUS	Remarks
1	BASE	PC + GF30%	INJECTION MOLDING	LG Chemical	PARANG	RESIN	BLACK
2	CCL	Copper Foil Adhesive PI Film	Laminated	INNOX Corporation	V FLEX	Foil	MCH/MDH 1mil ½ oz
3	PSR	SPI-606G Yellow	PRINT	A PLUS TECH	V FLEX	SHEET	BHPX ½ mil
4	TAPE	Acrylic Rosin Resin	TAPE	KD TECH	V FLEX	SHEET	KGK-200A
5	FIBER GLASS	GLASS FIBER	Laminated	HANKUK FIBER	V FLEX	SHEET	0.1t
6	Ni Plate	Ni	plating	KPM Tech	ASTAR CO.LTD	Solution	1~3um
	Au Plate	Au	plating	HeeSeong CO.LTD	ASTAR CO.LTD	Solution	min 0.03µm
7	Ink	EPOXY RESIN IMIDAZOLE PIGMENT INORGANIC FILLERS BUTYL CELLSOLVE ACETATE SOLVENT NAPHTHA	PRINT	SEOUL Chemical	OK-ELECTRONIC	Ink	SCM-500W HF2

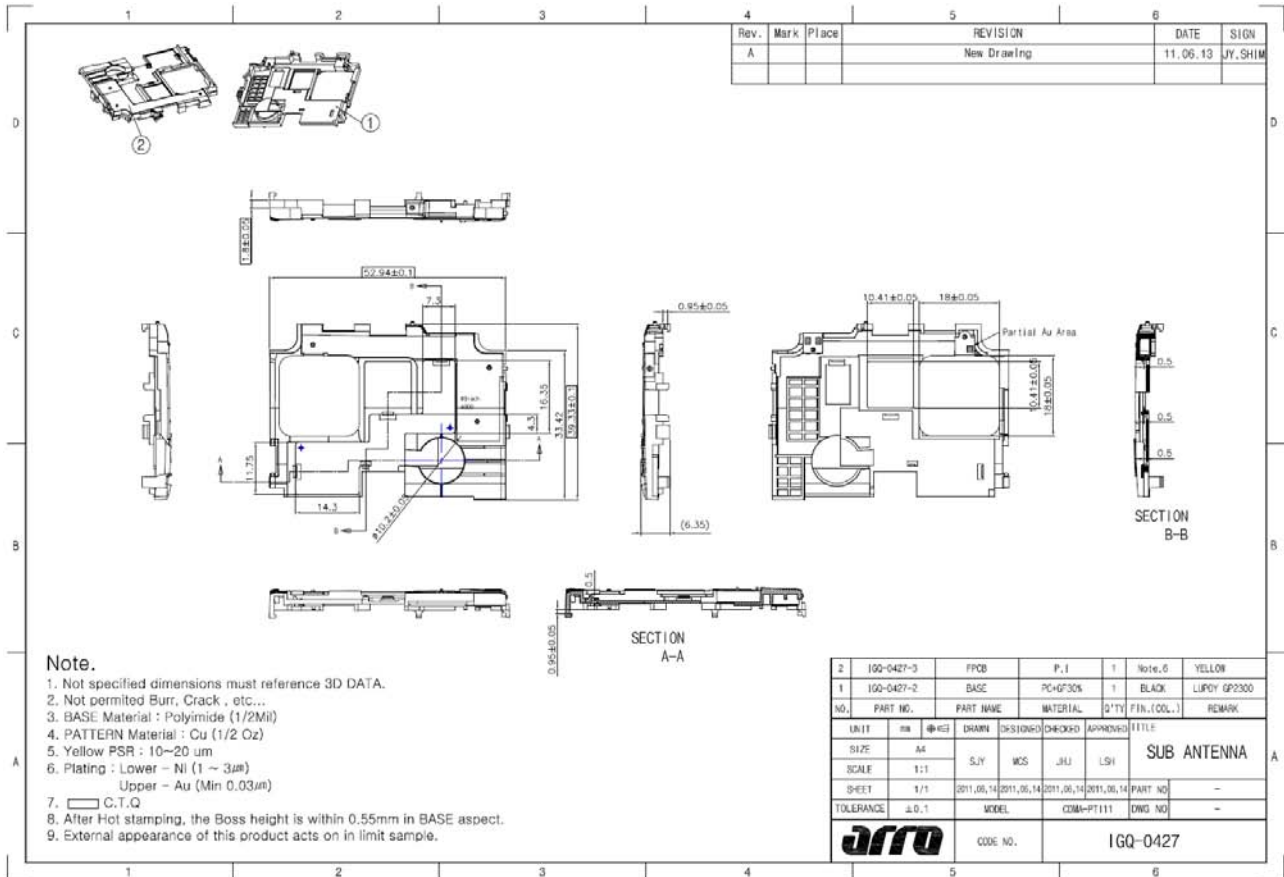
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3.2 Mechanical Requirements

3.2.1 Drawing

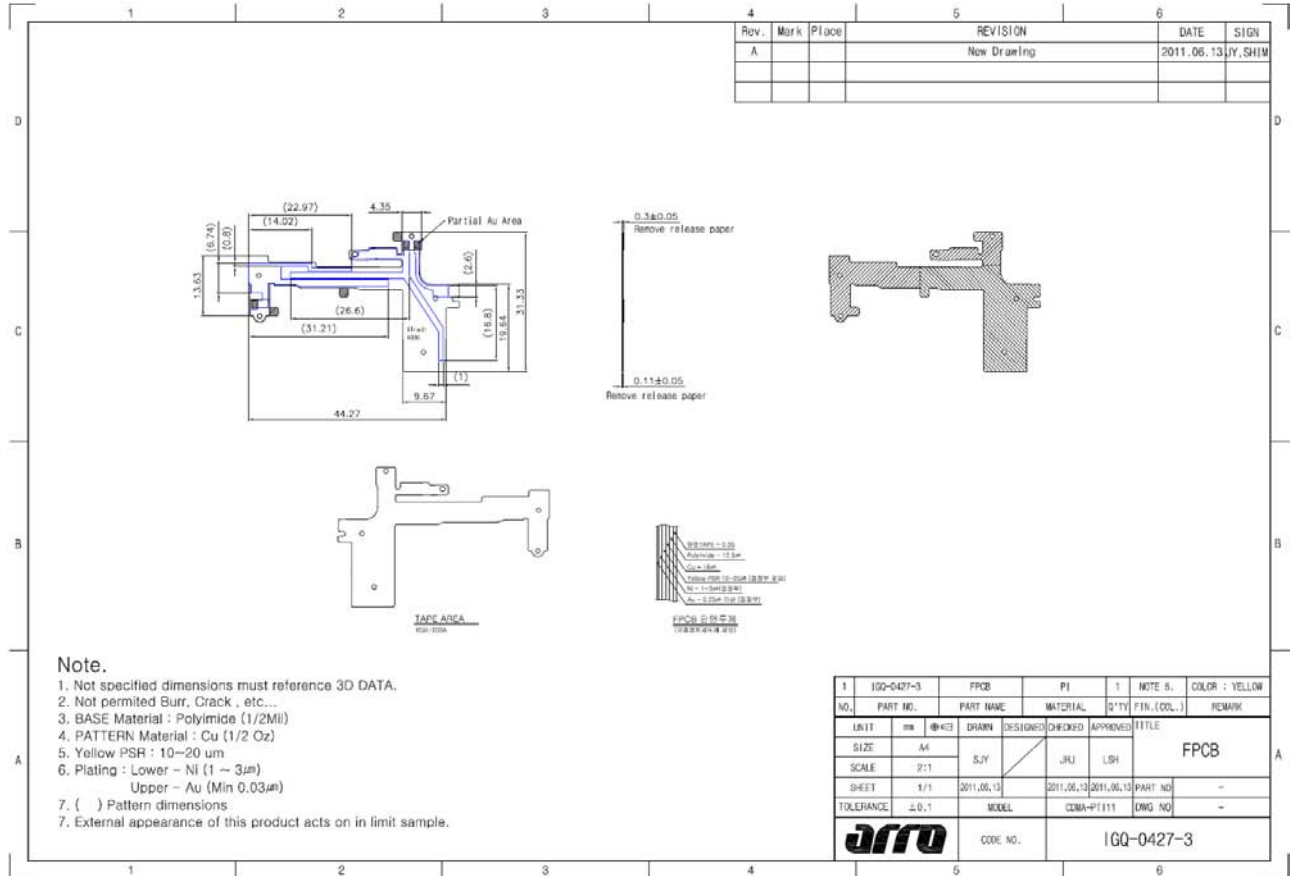


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3.2.2 Pattern Drawing



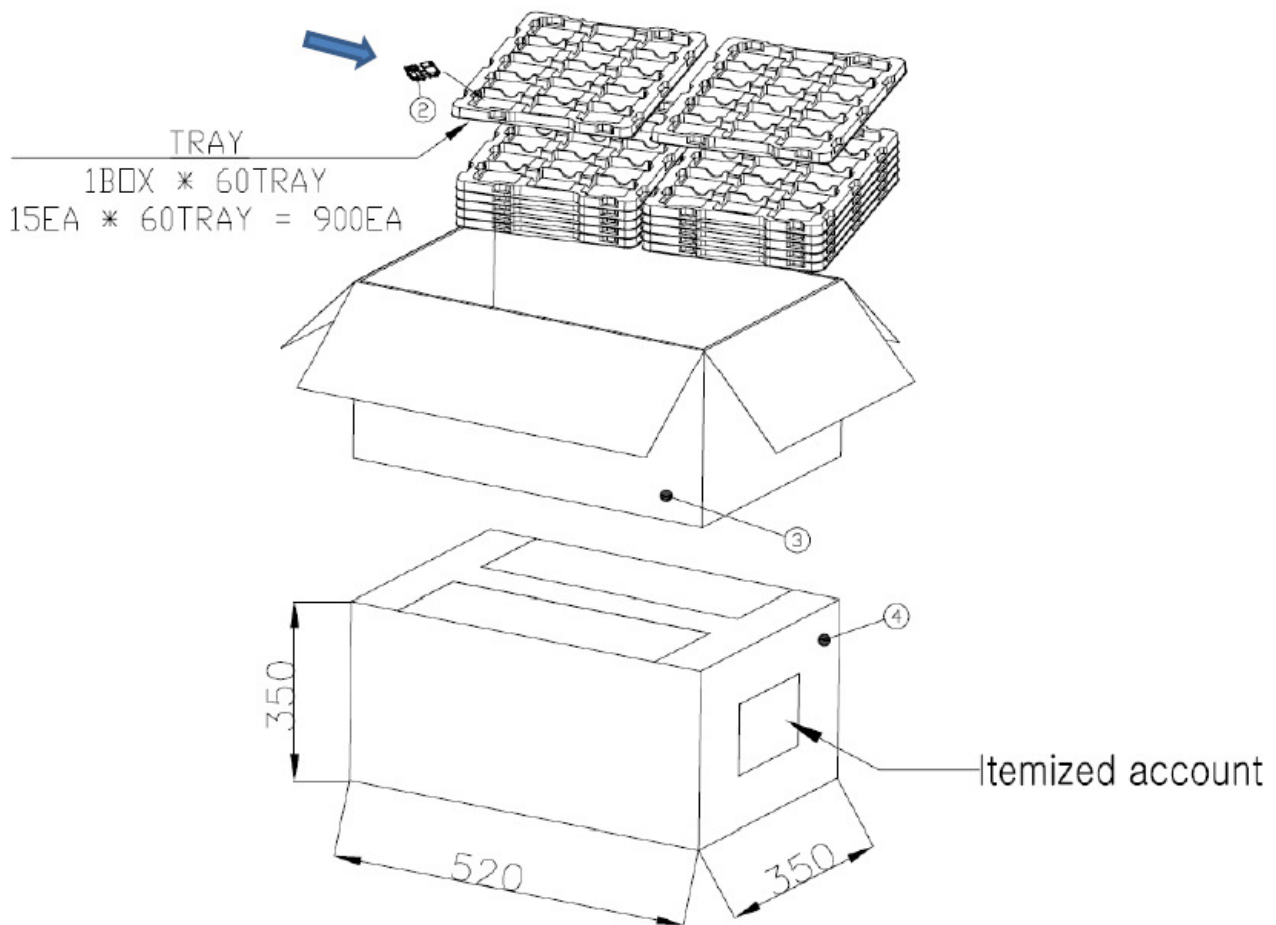
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3.2.3 Packing Condition

NO	Part Name	Quantity	Material	Remarks
1	TRAY	60EA	PET	335*250*15
2	ANTENNA	900EA	-	-
3	PAD	1EA	-	320*240*1.0
4	CARTON BOX	1EA	-	520*350*350



Handling Precautions



Handling this product an impact (fall, overload load, etc.) can occur if the product more likely, so handle with care

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3.2.4 LOT Marking Method

	CDMA PT111 LOT MARKING									
	Model	CDMA PT111								
	Customer	Pantech								
										
LOT MARKING	A 1 6 E					Remarks				
A	Production Line					A-LINE (ANYANG)				
1	Production Year					2011				
5	Production Month					May				
E	Production Date					14 days				
Production Line	Anyang A	Anyang B	Anyang C	Gumi G						
ARRO MARKING	A	B	C	G						
Production Year	2010	2011	2012	2013						
ARRO MARKING	0	1	2	3						
Production Month	JAN	FEB	MAR	APR	MAY	JUN	OCT	NOV	DEC	
ARRO MARKING	1	2	3	4	5	6	A	B	C	
Production Date	1	2	3	4	5	6	7	8	9	
ARRO MARKING	1	2	3	4	5	6	7	8	9	
Production Date	10	11	12	13	14	15	16	17	18	
ARRO MARKING	A	B	C	D	E	F	G	H	I	
Production Date	19	20	21	22	23	24	25	26	27	
ARRO MARKING	J	K	L	M	N	O	P	Q	R	
Production Date	28	29	30	31						
ARRO MARKING	S	T	U	V						

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4. Q.C Details

4.1 Test Requirements

Test Environmental Conditions: Electrical, mechanical and environmental testing before a treatment based on the standard condition after test. Standard health meter temperature 15 ~ 25 ° C and 25- 80% relative humidity, barometric pressure and 86 ~ 106KPa meaning, the purpose of pretreatment prior to testing the impact of history removed or neutralized or partially processed goods for the purpose of testing should. This test method refers to the first process, the characteristics of Test Products measuring and testing purposes prior to a stable state to be sake.

(Based on standard conditions: 20 ° C, atmospheric pressure)

- Mechanical testing of the entire process is to 1 hour.
- After environmental testing and mechanical testing process shall be 2 hours ago
- However, I continue the process after the exam preparation course for all history there is an extension.

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4.2 Dimensions (C.T.Q included)

CDMA PT111 SUB Ant. Dimension Measurement		ARRO									
		DATE	2011.06.13								
구분	C.T.Q items and critical dimension measurement DATA										
STANDARDS											
	DIM1	DIM2	DIM3	DIM4	DIM5	DIM6	DIM7	DIM8	DIM9	DIM10	
ITEMS	52.94 ± 0.1	39.33 ± 0.1	33.42 ± 0.1	10.2 ± 0.05	14.3 ± 0.1	1.8 ± 0.05	10.41 ± 0.05	10.41 ± 0.05	18.0 ± 0.05	18.0 ± 0.05	
1	52.91	39.30	33.43	10.21	14.34	1.78	10.41	10.42	18.02	18.00	
2	52.92	39.29	33.43	10.20	14.36	1.79	10.42	10.42	18.01	17.99	
3	52.95	39.28	33.45	10.22	14.34	1.78	10.41	10.41	18.02	17.98	
4	52.92	39.29	33.43	10.21	14.35	1.80	10.41	10.44	18.00	18.00	
5	52.91	39.30	33.42	10.22	14.35	1.78	10.42	10.41	18.00	17.99	
6	52.92	39.32	33.43	10.20	14.36	1.79	10.42	10.42	18.02	17.98	
7	52.92	39.30	33.45	10.22	14.36	1.78	10.42	10.42	18.01	18.00	
8	52.92	39.29	33.42	10.21	14.35	1.79	10.41	10.41	18.02	17.99	
9	52.91	39.28	33.43	10.21	14.34	1.80	10.41	10.43	18.01	17.99	
10	52.93	39.29	33.44	10.22	14.34	1.80	10.42	10.42	18.00	17.98	
11	52.92	39.31	33.43	10.21	14.36	1.79	10.41	10.44	18.00	18.00	
12	52.91	39.29	33.42	10.21	14.35	1.78	10.41	10.41	18.02	17.99	
13	52.94	39.30	33.43	10.21	14.35	1.78	10.41	10.42	18.01	17.98	
14	52.93	39.32	33.45	10.22	14.35	1.80	10.42	10.41	18.01	18.00	
15	52.92	39.30	33.42	10.20	14.36	1.78	10.41	10.43	18.01	17.99	
16	52.91	39.29	33.43	10.21	14.36	1.80	10.42	10.42	18.02	17.98	
17	52.92	39.28	33.42	10.21	14.35	1.79	10.41	10.44	18.01	18.00	
18	52.92	39.33	33.45	10.22	14.34	1.78	10.41	10.44	18.00	17.99	
19	52.92	39.32	33.43	10.20	14.35	1.79	10.41	10.42	18.00	17.97	
20	52.92	39.29	33.42	10.22	14.36	1.79	10.42	10.43	18.01	17.99	
MAX	52.95	39.33	33.45	10.22	14.36	1.8	10.42	10.44	18.02	18	
MIN	52.91	39.28	33.42	10.20	14.34	1.78	10.41	10.41	18.00	17.97	
Range	0.04	0.05	0.03	0.02	0.02	0.02	0.01	0.03	0.02	0.03	
Average	52.921	39.2985	33.4315	10.2115	14.351	1.7885	10.414	10.423	18.01	17.9895	
Results	0.K	0.K	0.K	0.K	0.K	0.K	0.K	0.K	0.K	0.K	

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4.3 Q.C PROCESS

DATE	Rev.No	Page No	Q C PROCESS										No	CREAT	CONTACT	CHECK	APPROVAL
2011.06.13	0	1/1											QC-0613	Q.C	L.J.S		C.B.H
MODEL	CDMA PT111																
input material	FLOW CHART			Process name	Related Standards	Factor Management				Quality Management				Related defect	Administration Division		
material part name	material part	Production Process	QC Inspection			Tooling Equipment	Management items	Management often	How to record	Management items	Instrument	Management often	How to record				
FPCB BASE TRAY		Incoming inspection	Inspection Standards						Appearance Dim's	Visual V/C	Every LOT SPL'	Inspection Report	Appearance Dim's	Inspector			
		Sub- Ass'y	work instructions						Appearance	Visual	Every LOT SPL'	work sheet	Appearance	Worker			
		Process inspection * CTQ (VSWR)	Inspection Standards	VNA (VSWR) JIG	VNA CAL	Every LOT	work sheet	VSWR	VNA	Every LOT SPL'	Inspection Report	VSWR	Inspector 1人				
TRAY		Incoming inspection	Inspection Standards			Every LOT	work sheet		Visual	Every LOT SPL'	work sheet	Appearance	Inspector 1人				
Box Paper Box Tape		Shipment inspection package	work instructions						Appearance Dim's VSWR	Visual V/C VNA	Every LOT SPL'	Shipment Inspection	Appearance VSWR	Inspector 1人			
													TOTAL	4人			

* CTQ(Pattern)
(Plating thickness)
LOWER : Ni - 1 ~ 3µm
UPPER : Au - Min 0.03µm

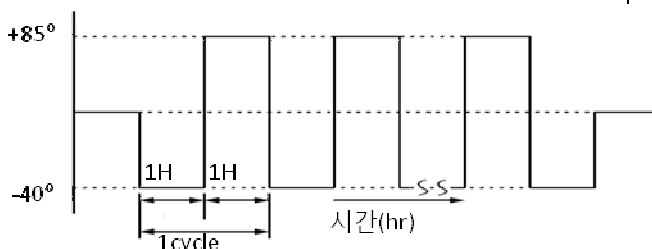
Whole process and gloves, slippers worn

APPROVAL SHEET LIST

Customer Part No.	53C03000420
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Date (제출일)	2011.06.14

Model	Type	Rev	ARRO	A
CDMA PT111	SUB Antenna		PANTECH	A

4.4 Reliability Tests.

Humidity storage test	<ul style="list-style-type: none"> condition: 60 °C, 95% 48 hours Antenna Electrical characteristics must be satisfied Should be no exterior damage. 	<ul style="list-style-type: none"> Antenna Electrical characteristics must be satisfied Should be no exterior damage.
Low Temperature Storage Test	<ul style="list-style-type: none"> condition: -40 °C 48 hours later 	<ul style="list-style-type: none"> Antenna Electrical characteristics must be satisfied Should be no exterior damage.
High Temperature Storage Test	<ul style="list-style-type: none"> condition: +85 °C 48 hours later 	<ul style="list-style-type: none"> Antenna Electrical characteristics must be satisfied Should be no exterior damage.
Thermal shock test	<ul style="list-style-type: none"> Temperature conditions: $-40 \pm 3 \text{ }^{\circ}\text{C} / \text{min}$ $\leftrightarrow +85 \pm 3 \text{ }^{\circ}\text{C} / \text{min}$ Test CYCLE: 27cycle Temperature Conversion Time: Under 5min 	<ul style="list-style-type: none"> Antenna Electrical characteristics must be satisfied Should be no exterior damage.
Salt Spray Test	<ul style="list-style-type: none"> 5% salt water, 35 °C 48hr 	<ul style="list-style-type: none"> Antenna Electrical characteristics must be satisfied Should be no exterior damage.

APPROVAL SHEET LIST

Customer Part No.	53C03000420
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CDMA PT111	SUB Antenna		PANTECH	A

4.5 C.T.Q (Dimension CPK)

PROCESS CAPABILITY STUDY

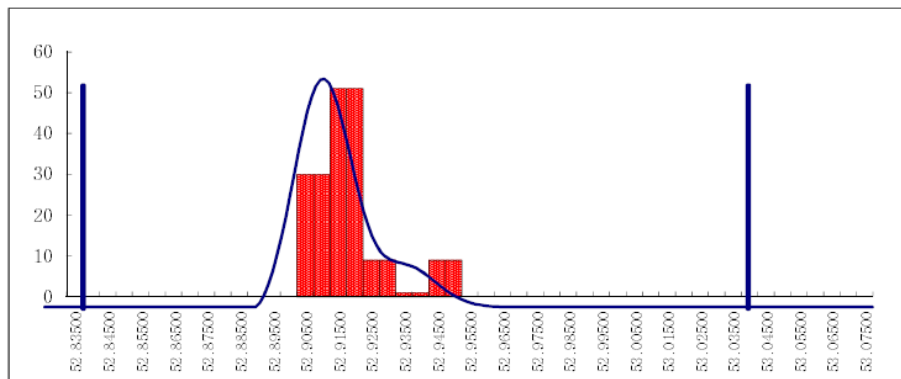
(공정 능력)

결 계	작성	검토	승인
	L.JS		M.MS

53C03000420

관리NO: 11.06.14	SPEC상한: 53.040	측정자 : 이종수					
제품명: CDMA PT111	SPEC하한: 52.840	측정기간: 11.06.14					
공정 : ASSY'	공 차: 0.200	최소단위: 0.010					
항목 : 전장	SPEC중간: 52.940	Xo : 0.000					
	x 1	x 2	x 3	x 4	x 5	GROUP평균	RANGE
GROUP 1	52.910	52.920	52.950	52.920	52.910	52.9220	0.0400
GROUP 2	52.920	52.920	52.920	52.910	52.930	52.9200	0.0200
GROUP 3	52.920	52.910	52.940	52.930	52.920	52.9240	0.0300
GROUP 4	52.910	52.920	52.920	52.920	52.920	52.9180	0.0100
GROUP 5	52.910	52.920	52.920	52.920	52.910	52.9160	0.0100
GROUP 6	52.910	52.920	52.920	52.920	52.950	52.9240	0.0400
GROUP 7	52.920	52.930	52.950	52.920	52.910	52.9260	0.0400
GROUP 8	52.910	52.930	52.910	52.920	52.920	52.9180	0.0200
GROUP 9	52.920	52.910	52.910	52.920	52.920	52.9160	0.0100
GROUP 10	52.920	52.910	52.920	52.910	52.920	52.9160	0.0100
GROUP 11	52.930	52.950	52.910	52.920	52.920	52.9260	0.0400
GROUP 12	52.920	52.910	52.910	52.910	52.950	52.9200	0.0400
GROUP 13	52.920	52.930	52.920	52.910	52.920	52.9200	0.0200
GROUP 14	52.920	52.910	52.920	52.920	52.910	52.9160	0.0100
GROUP 15	52.930	52.950	52.930	52.920	52.920	52.9300	0.0300
GROUP 16	52.910	52.920	52.910	52.950	52.920	52.9220	0.0400
GROUP 17	52.920	52.930	52.950	52.920	52.910	52.9260	0.0400
GROUP 18	52.920	52.910	52.920	52.920	52.910	52.9160	0.0100
GROUP 19	52.910	52.920	52.920	52.910	52.920	52.9160	0.0100
GROUP 20	52.920	52.920	52.920	52.950	52.910	52.9240	0.0400
MEAN = 52.9208	MIN = 52.910	MAX = 52.950	N = 100				
SIGMA = 0.0110	Cp = 3.04	Cpk = 2.46	k = 0.19				
	PC% = 99.99%	PCK% = 99.99%					
SPEC상한 벗어날확률 = 0.00%	SPEC하한 벗어날확률 = 0.00%						
KURTOSIS(첨도) = 4.85	SKEWNESS(비대칭도) = 1.48						
6*sigma 분포구간 = 52.888 ~ 52.954							

도수분포



LENGTH CPK = 2.46

APPROVAL SHEET LIST

Customer Part No.	53C03000420
Product Part No.	IBS-0427
Date (제출일)	2011.06.14

Model	Type	Rev	ARRO	A
CDMA PT111	SUB Antenna		PANTECH	A

PROCESS CAPABILITY STUDY

(공정 능력)

결 계	작성	검토	승인
	L.JS		M.MS

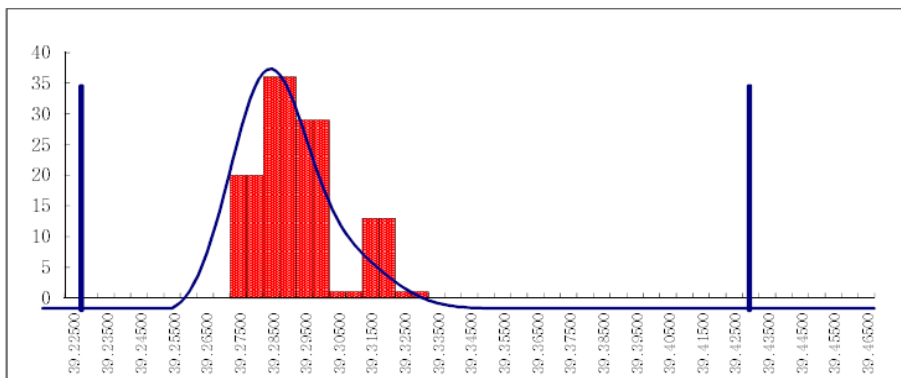
53C03000420

관리NO: 11.06.14	SPEC상한: 39.430	측정자 : 이종수
제품명: CDMA PT111	SPEC하한: 39.230	측정기간: 11.06.14
공정 : ASSY'	공 차: 0.200	최소단위: 0.010
항목 : 전폭	SPEC중간: 39.330	Xo : 0.000

	x 1	x 2	x 3	x 4	x 5	GROUP 평균	RANGE
GROUP 1	39.300	39.290	39.280	39.290	39.300	39.2920	0.0200
GROUP 2	39.320	39.300	39.290	39.280	39.290	39.2960	0.0400
GROUP 3	39.310	39.290	39.300	39.320	39.300	39.3040	0.0300
GROUP 4	39.290	39.280	39.330	39.320	39.290	39.3020	0.0500
GROUP 5	39.300	39.290	39.290	39.320	39.300	39.3000	0.0300
GROUP 6	39.280	39.290	39.300	39.290	39.280	39.2880	0.0200
GROUP 7	39.320	39.290	39.280	39.300	39.300	39.2980	0.0400
GROUP 8	39.280	39.290	39.300	39.290	39.290	39.2900	0.0200
GROUP 9	39.320	39.300	39.280	39.290	39.300	39.2980	0.0400
GROUP 10	39.290	39.300	39.320	39.300	39.290	39.3000	0.0300
GROUP 11	39.290	39.280	39.280	39.290	39.300	39.2880	0.0200
GROUP 12	39.290	39.300	39.300	39.300	39.280	39.2940	0.0200
GROUP 13	39.290	39.290	39.320	39.280	39.290	39.2940	0.0400
GROUP 14	39.320	39.280	39.290	39.300	39.300	39.2980	0.0400
GROUP 15	39.290	39.280	39.290	39.290	39.320	39.2940	0.0400
GROUP 16	39.300	39.290	39.280	39.280	39.320	39.2940	0.0400
GROUP 17	39.290	39.290	39.280	39.300	39.280	39.2880	0.0200
GROUP 18	39.290	39.300	39.320	39.290	39.300	39.3000	0.0300
GROUP 19	39.300	39.300	39.290	39.280	39.300	39.2940	0.0200
GROUP 20	39.290	39.290	39.320	39.280	39.300	39.2960	0.0400

MEAN = 39.2954	MIN = 39.280	MAX = 39.330	N = 100
SIGMA = 0.0135	Cp = 2.46	Cpk = 1.61	k = 0.35
	PC% = 16.0%	Pck% = 62.1%	
SPEC상한 벗어날확률 = 0.00%		SPEC하한 벗어날확률 = 0.00%	
KURTOSIS(첨도) = 3.07		SKEWNESS(비대칭도) = 0.84	
6*sigma 분포구간 = 39.255 ~ 39.336			

도수분포



WIDTH CPK = 1.61

APPROVAL SHEET LIST

Customer Part No.	53C03000420
Product Part No.	IBS-0427
Date (제출일)	2011.06.14

Model	Type	Rev	ARRO	A
CDMA PT111	SUB Antenna		PANTECH	A

PROCESS CAPABILITY STUDY

(공정 능력)

결 계	작성	검토	승인
	L.JS		M.MS

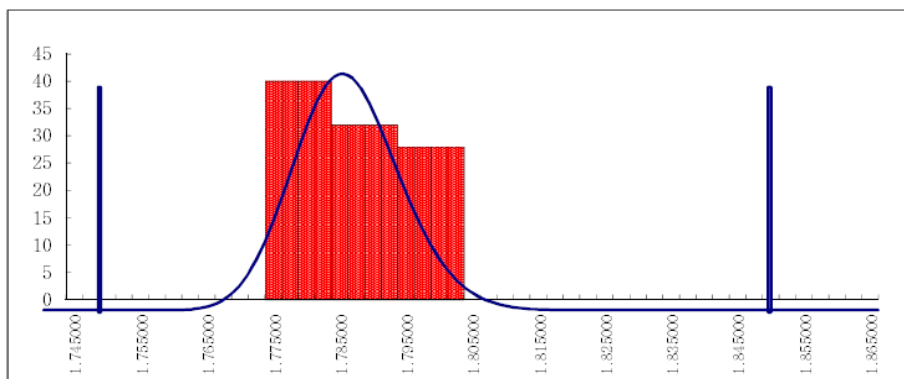
53C03000420

관리NO: 11.06.14	SPEC상한: 1.850	측정자: 이종수
제품명: CDMA PT111	SPEC하한: 1.750	측정기간: 11.06.14
공정: ASSY'	공 차: 0.100	최소단위: 0.010
항목: 두께	SPEC중간: 1.800	Xo: 0.000

	x 1	x 2	x 3	x 4	x 5	GROUP평균	RANGE
GROUP 1	1.780	1.790	1.780	1.800	1.780	1.7860	0.0200
GROUP 2	1.790	1.780	1.790	1.800	1.800	1.7920	0.0200
GROUP 3	1.790	1.780	1.780	1.800	1.780	1.7860	0.0200
GROUP 4	1.800	1.790	1.780	1.790	1.790	1.7900	0.0200
GROUP 5	1.780	1.790	1.790	1.790	1.780	1.7860	0.0100
GROUP 6	1.800	1.800	1.780	1.790	1.780	1.7900	0.0200
GROUP 7	1.790	1.800	1.780	1.780	1.780	1.7860	0.0200
GROUP 8	1.800	1.800	1.780	1.790	1.790	1.7920	0.0200
GROUP 9	1.790	1.780	1.800	1.800	1.780	1.7900	0.0200
GROUP 10	1.790	1.780	1.790	1.780	1.790	1.7860	0.0100
GROUP 11	1.800	1.780	1.800	1.800	1.780	1.7920	0.0200
GROUP 12	1.790	1.780	1.780	1.780	1.780	1.7820	0.0100
GROUP 13	1.790	1.800	1.790	1.800	1.800	1.7960	0.0100
GROUP 14	1.790	1.800	1.790	1.780	1.780	1.7880	0.0200
GROUP 15	1.800	1.780	1.800	1.790	1.790	1.7920	0.0200
GROUP 16	1.780	1.800	1.800	1.780	1.790	1.7900	0.0200
GROUP 17	1.790	1.800	1.780	1.780	1.800	1.7900	0.0200
GROUP 18	1.790	1.780	1.790	1.790	1.780	1.7860	0.0100
GROUP 19	1.780	1.780	1.800	1.800	1.780	1.7880	0.0200
GROUP 20	1.800	1.790	1.790	1.780	1.780	1.7880	0.0200

MEAN = 1.7888	MIN = 1.780	MAX = 1.800	N = 100
SIGMA = 0.0075	Cp = 2.22	Cpk = 1.72	k = 0.22
	PC% = 67.19%	PCk% = 58.29%	
SPEC상한 벗어날확률 = 0.00%		SPEC하한 벗어날확률 = 0.00%	
KURTOSIS(첨도) = 1.52		SKEWNESS(비대칭도) = 0.23	
6*sigma 분포구간 = 1.766 ~ 1.811			

도수분포



THICKNESS CPK = 1.72

APPROVAL SHEET LIST

Customer Part No.	53C03000420
Product Part No.	IBS-0427
Date (제출일)	2011.06.14

Model	Type	Rev	ARRO	A
CDMA PT111	SUB Antenna		PANTECH	A

4.6 RoHS REPORT

4.6.1 Green Certificates

Green Certificates

Receive : PANTECH

1. Our company is an international regulation of hazardous substances in response to the green of our products to guarantee the warranty is made.
2. Our company is providing you all the products / components / raw materials / packaging materials submitted with respect to hazardous substances that our company's information (profile on environmentally hazardous substances) to guarantee the correct information.
3. We pay the company a part of Subsidiary and the materials used for each unit of parts, packing materials and manufacturing processes against environmental restrictions on the additives (the ROHS, HALOGEN) that there is no longer in the proof
4. We operate our company based on the environmentally hazardous substances supplied by the U.S. compliance or hazardous substance of our error, due to discrepancies between your and my three lawsuits related to toxic substances in the environment, conflict and thereby the case of To you for any loss or damages caused by mutual agreement to ensure that responsibility.

Warranty period: May 24, 2011 to May 24, 2012
 (a 1 year warranty period, and both companies separately before the contract expiration date to see a doctor if you are not automatically considered to be extended one year.)

2011 . 06 . 14

Address : : 205-11, Anyang 7-dong, Manan-qu,
 Anyang-si, Gyeonggi-do, Korea

Company : ARRO.CO.LTD

ARRO CO., LTD.

C E O : KH.KIM



 PRESIDENT / KEUNHA KIM