










# APPROVAL SHEET

<b>Customer</b>	PANTECH		
<b>Supplier</b>	KARAM SOLUTION		
<b>Product Name</b>	Main Antenna		
<b>Model Name</b>	BUDDY		
<b>Part No</b>			
<b>Maker Code</b>	KRS-BUDDY-MA		
<b>Date</b>	April 1 , 2011		
<b>Sample Picture</b>	<b>TOP</b>	<b>Bottom</b>	
			
	<b>Width: 59.44mm</b>		<b>Length: 14.72mm</b>
	<b>Engineer</b>	<b>Review</b>	<b>Approved</b>
<b>Circuit</b>			
	Clark	Sandy	
<b>Mechanism</b>			
	Abel	James	
<b>Quality</b>			
	Colt	Allen	

**Headquarters** : Shin Chang-gu, Gyeonggi-Siheung Eunhaeng Technotown 249, 4 th Floor Seoul, 429-836 Korea  
 TEL : 82-31-312-9577, FAX : 82-31-312-9670

**Reserch** : Rm.905, 448 DaeRyung Technotownlll Gasan-dong, Gumcheon-gu, Seoul, 153-772 Korea  
 TEL : 82-2-1661-9577, FAX : 82-2-2107-7299



Antenna Specifications		DATA	2011-04-01	REV.	A
MODEL	Buddy (Main Antenna)	TYPE	Built-in	PAGE	1

## REVISION LIST

REVISION	DATE	CHANGE CONTENTS	CHANGE CAUSE	REMARK
ISSUE 1	2011.04.01		FIRST APPROVAL SPECIFICATION	
FROM ISSUE TO	2011. . .			
FROM ISSUE TO	2011. . .			
FROM ISSUE TO	2011. . .			
FROM ISSUE TO	2011. . .			
FROM ISSUE TO	2011. . .			
FROM ISSUE TO	2011. . .			
FROM ISSUE TO	2011. . .			
FROM ISSUE TO	2011. . .			
FROM ISSUE TO	2011. . .			
FROM ISSUE TO	2011. . .			
FROM ISSUE TO	2011. . .			
FROM ISSUE TO	2011. . .			
FROM ISSUE TO	2011. . .			
FROM ISSUE TO	2011. . .			
FROM ISSUE TO	2011. . .			

Antenna Specifications		DATA	2011-04-01	REV.	A
MODEL	Buddy (Main Antenna)	TYPE	Built-in	PAGE	2

## - CONTENTS -

<b>1.</b>	<b>Technical Items</b> .....	3
	1.1 Electrical Spec.	
	1.2 Mechanical Spec.	
	1.3 Material Spec.	
<b>2.</b>	<b>Test Equipments</b> .....	7
<b>3.</b>	<b>Electrical Demands</b> .....	8
	3.1 V.S.W.R	
	3.2 Radiation Pattern	
	3.3 Gain	
	3.4 Test Method	
<b>4.</b>	<b>Mechanical Specification</b> .....	10
	4.1 Mechanical Configuration	
	4.2 Cross Cutting	
	4.3 Drop Test	
<b>5.</b>	<b>Environmental Demands</b> .....	11
	5.1 Low Temperature Soaking	
	5.2 High Temperature Soaking	
	5.3 Thermal Shock Test	
	5.4 Static Humidity Test	
	5.5 Salt Spray(Corrosion) Test	
<b>6.</b>	<b>Mechanical Demands</b> .....	14
	6.1 Dimensions	
<b>7.</b>	<b>Antenna Drawing</b> .....	15
<b>8.</b>	<b>Electrical data</b> .....	16
	8.1 V.S.W.R	
	8.2 GAIN (with Matching Circuit)	

<b>Antenna Specifications</b>		DATA	2011-04-01	REV.	A
MODEL	<b>Buddy (Main Antenna)</b>	TYPE	<b>Built-in</b>	PAGE	3

# 1. Technical Items

## 1.1 Electrical Spec.

Electrical Spec.					
Frequency Range(MHz)		V.S.W.R (Max)	Peak GAIN E2-Plane (Min. dBi)	Average GAIN H-Plane (Min. dBi)	
Slide down position					
Cellular /GSM850	Tx	824 – 849MHz	5.5	-5.0	-6.0
	Rx	869 - 894MHz	3.0	-2.5	-3.0
GSM900	Tx	880 – 915MHz	3.0	-2.5	-3.5
	Rx	925 - 960MHz	4.5	-3.5	-4.5
DCS	Tx	1710 – 1785MHz	4.0	-9.0	-8.0
	Rx	1805 - 1880MHz	4.0	-10.5	-8.0
USPCS /PCS	Tx	1850 – 1910MHz	3.5	-11.0	-8.0
	Rx	1930 - 1990MHz	3.0	-7.5	-10.0
Impedance (Nominal)		50 ohms			
Polarization		Vertical			
Radiation Pattern		Omni-Directional			
Maximum Power		2 Watts			

<b>Antenna Specifications</b>		DATA	2011-04-01	REV.	A
MODEL	<b>Buddy (Main Antenna)</b>	TYPE	<b>Built-in</b>	PAGE	4

Electrical Spec.					
Frequency Range(MHz)		V.S.W.R (Max)	Peak GAIN E2-Plane (Min. dBi)	Average GAIN H-Plane (Min. dBi)	
Slide up position					
Cellular /GSM850	Tx	824 – 849MHz	5.5	-4.5	-5.5
	Rx	869 - 894MHz	4.0	-2.0	-3.5
GSM900	Tx	880 – 915MHz	3.5	-2.0	-3.0
	Rx	925 - 960MHz	2.5	-1.5	-2.5
DCS	Tx	1710 – 1785MHz	4.0	-11.0	-8.0
	Rx	1805 - 1880MHz	4.0	-11.5	-7.5
USPCS /PCS	Tx	1850 – 1910MHz	3.5	-8.5	-7.0
	Rx	1930 - 1990MHz	3.0	-4.5	-10.0
Impedance (Nominal)		50 ohms			
Polarization		Vertical			
Radiation Pattern		Omni-Directional			
Maximum Power		2 Watts			

<b>Antenna Specifications</b>		DATA	2011-04-01	REV.	A
MODEL	<b>Buddy (Main Antenna)</b>	TYPE	<b>Built-in</b>	PAGE	5

## 1.2 Mechanical Spec.

Mechanical Spec.	
Connector	C-clip Contact Type
Overall length	See drawing
Operation Temperature	-30°C ~ +80°C
Weight	1.50 g

<b>Antenna Specifications</b>		DATA	2011-04-01	REV.	A
MODEL	<b>Buddy (Main Antenna)</b>	TYPE	<b>Built-in</b>	PAGE	6

### 1.3 Material Spec

NO	Part Name	Material	Processing	Post	Quantity	Material manufacturers	Processing manufacturers	Other
1	Carrier	PC (1004 ALL)	Dual Injection		1	LG Chemistry	SM TECH	
2	Carrier	ABS (ABSMP211)	Dual Injection		1	LG Chemistry	SM TECH	
3	Plating	113520	Catalyst (Solution)		1	MAC DERMID	Humantech	
4	Plating	113521	Catalyst (Solution)		1	MAC DERMID	Humantech	
5	Plating	Cu-Plate (117938)	Solution		1	MAC DERMID	Humantech	
6	Plating	Cu-Plate (117940)	Solution		1	MAC DERMID	Humantech	
7	Plating	Cu-Plate (117995)	Solution		1	MAC DERMID	Humantech	
8	Plating	Cu-Plate (117998)	Solution		1	MAC DERMID	Humantech	
9	Plating	Ni-Plate (113523)	NI-A Solution		1	MAC DERMID	Humantech	
10	Plating	Ni-Plate (113524)	NI-B Solution		1	MAC DERMID	Humantech	
11	Plating	Ni-Plate (113525)	NI-C Solution		1	MAC DERMID	Humantech	
12	After Processing	Primer (KM9910)	Spray		1	Korea Musashi	SM TECH	
13	After Processing	Urethane (NW79-K10-32719)	Spray		1	Korea Musashi	SM TECH	

<b>Antenna Specifications</b>		DATA	2011-04-01	REV.	A
MODEL	<b>Buddy (Main Antenna)</b>	TYPE	<b>Built-in</b>	PAGE	7

## 2. Test Equipment

The test equipments for antenna are as follows

- ◆ Network Analyzer (Agilent 8753ES) to measure the V.S.W.R and impedance of antenna
- ◆ Spectrum Analyzer to measure the receiving signal intensity
- ◆ Standard Horn antenna that is adjustable in USC, USPCS, GSM850/900,DCS, PCS band
- ◆ Anechoic Chamber installed the cables, connectors and equipments for measurement
- ◆ Dogmatic Caliper to measure the dimensions
- ◆ Torque Driver to measure the torque force of the helix
- ◆ Push/Pull gauge to measure the pulling force
- ◆ Climatic Chamber for environmental test

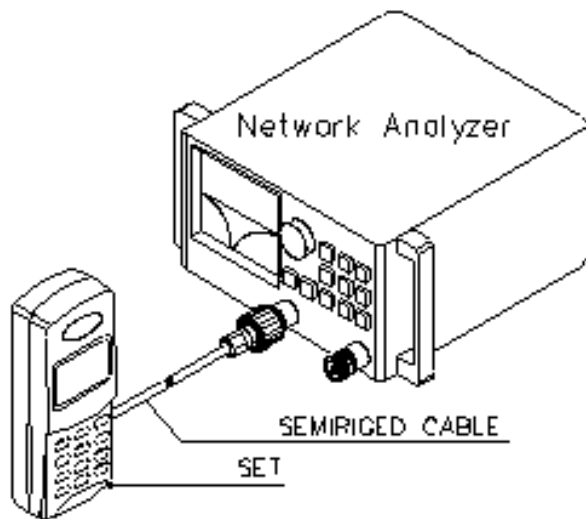


Antenna Specifications		DATA	2011-04-01	REV.	A
MODEL	Buddy (Main Antenna)	TYPE	Built-in	PAGE	8

### 3. Electrical Demands

#### 3.1 V.S.W.R

The V.S.W.R characteristics must satisfy the electrical demands. With Built-in Antenna mounted on a handset, the V.S.W.R of antenna must be less than 5.5:1(824 ~ 960MHz) and 4.0:1(1710 ~ 1990MHz) on the free space.



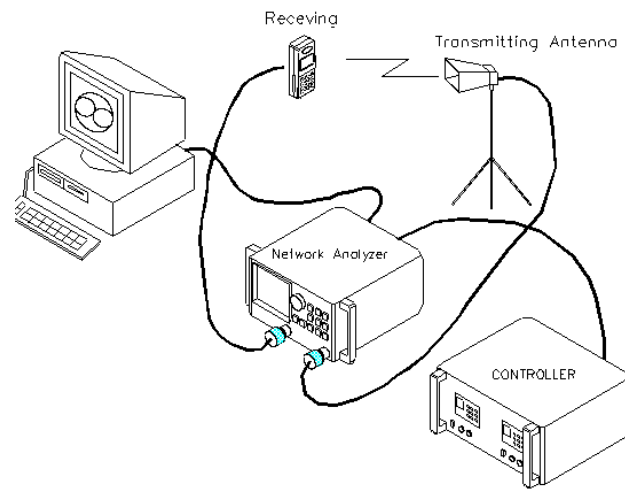
#### 3.2 Radiation Pattern

The radiation pattern must have the omni-directional characteristic in USC, USPCS, GSM850/900,DCS, PCS band and H-plane.

#### 3.3 Gain

The gain is expressed as dBi that standardizes the half-wave length dipole antenna. Built-in antenna mounted on a handset condition (E2-Plane), the minimum peak Gain of antenna must be bigger than -11.5dBi.

Antenna Specifications		DATA	2011-04-01	REV.	A
MODEL	Buddy (Main Antenna)	TYPE	Built-in	PAGE	9

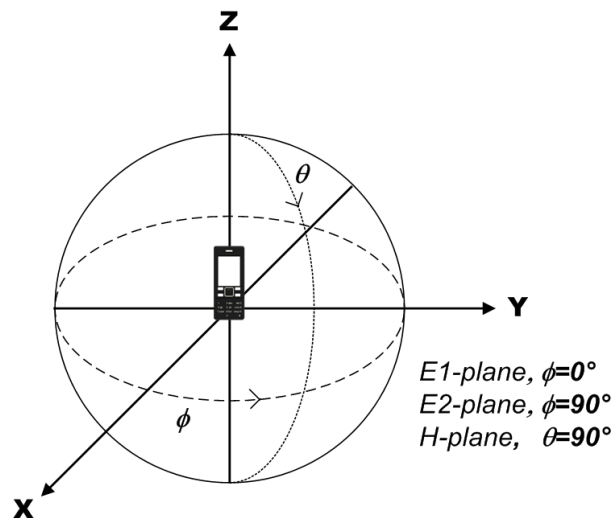


### 3.4 Test Method

The antenna is tested while mounted on handset with the correct matching circuit in free space.

The antenna is measured for 2 elevation cuts at two different azimuth positions ( $\Phi = 0, \Phi = 90$ ).

The results of the test will be correlated to the customer handset and the Measurement environment.



Antenna Specifications		DATA	2011-04-01	REV.	A
MODEL	Buddy (Main Antenna)	TYPE	Built-in	PAGE	10

## 4. Mechanical Specifications

### 4.1 Mechanical Configuration

The appearance of the antenna is in accordance with drawing.

### 4.2 Cross-Cutting

Go to the film processing department nuneulmandeunda 2mm gap.

Transparent Tape finger on the side close to a week to be detached from the vertical direction.

Go snow from one area of the entire 1/5 or detachment is considered to be dislocated. 2 \* 2mm Cross-cut one week after the closing and opening will not peel.

### 4.3 DROP TEST

The antenna assembled to the mobile phone provided by Pantech, should withstand 2 drops(per each slide open & close=Total 40times x 5pcs) / 3drops for bar type(30times x 5pcs) per every each 10 sides(added below 4corner surfaces) from 1.5m heights onto a steel plate 500x500mm with thickness of 20mm. The antenna should function mechanically after the test. Electrical characteristics should be within the specified range.

Antenna Specifications		DATA	2011-04-01	REV.	A
MODEL	Buddy (Main Antenna)	TYPE	Built-in	PAGE	11

## 5. Environmental Demands

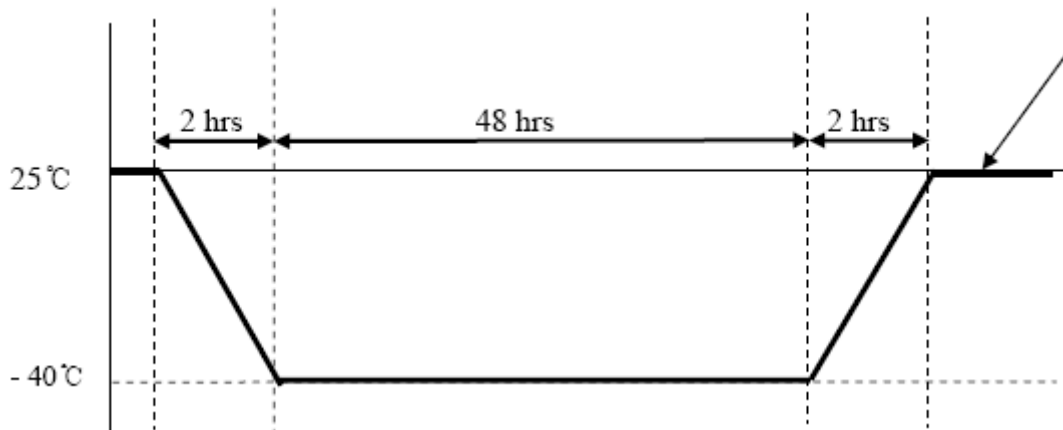
### 5.1 LOW TEMPERATURE SOAKING

The antenna should be placed in an environmental chamber at  $-40^{\circ}\text{C}$  for 48 hours.

Soak antenna at ambient temperature at least 1 hour after the test.

After test is complete, there shall be no visual deterioration or damage.

The antenna should function mechanically. Electrical characteristics should be within the specified range.



**Low Temperature soaking**

### 5.2 HIGH TEMPERATURE SOAKING

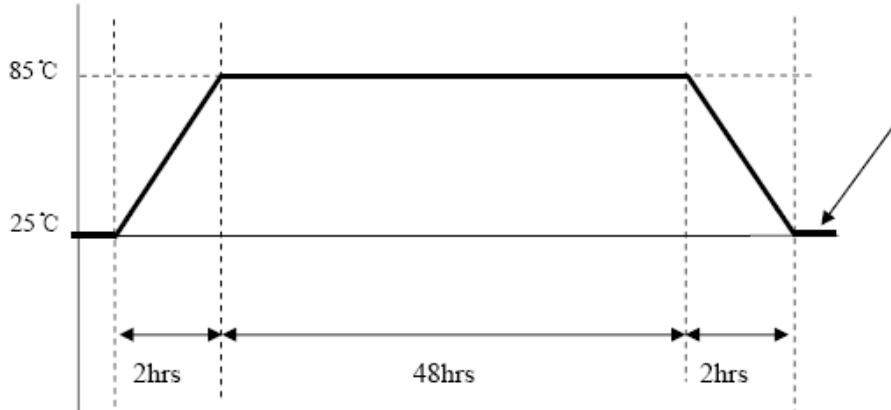
The antenna should be placed in an environmental chamber at  $+85^{\circ}\text{C}$  for 48 hours.

Soak antenna at ambient temperature at least 1 hour after the test.

After test is complete, there shall be no visual deterioration or damage.

The antenna should function mechanically. Electrical characteristics should be within the specified range

Antenna Specifications		DATA	2011-04-01	REV.	A
MODEL	Buddy (Main Antenna)	TYPE	Built-in	PAGE	12

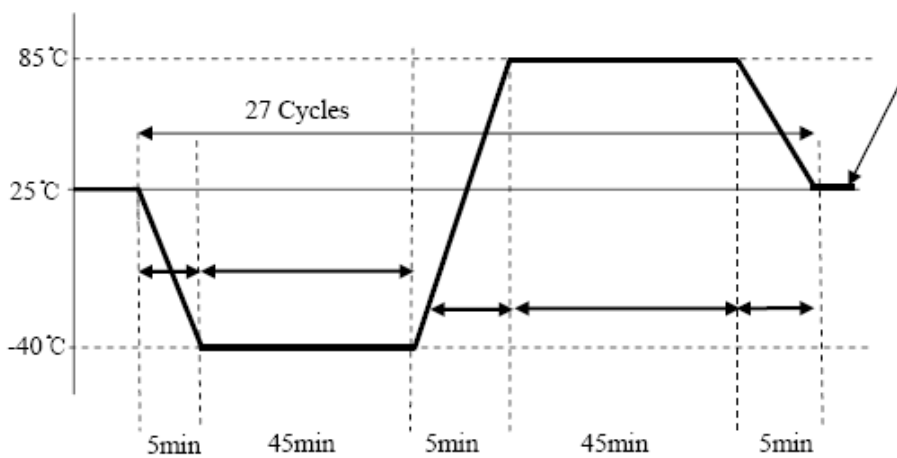


**High Temperature soaking**

### 5.3 THERMAL SHOCK TEST

Place the antenna in an environmental chamber at +25°C . Then expose antenna at temperature T1= -40°C during 45 minutes. Then expose antenna at temperature T2=+85°C during 45 minutes. Transfer time is 5 min. Repeat this cycle 27 times. After test is complete, there shall be no visual deterioration or damage.

The antenna should function mechanically. Electrical characteristics should be within the specified range



**Thermal Shock Test**

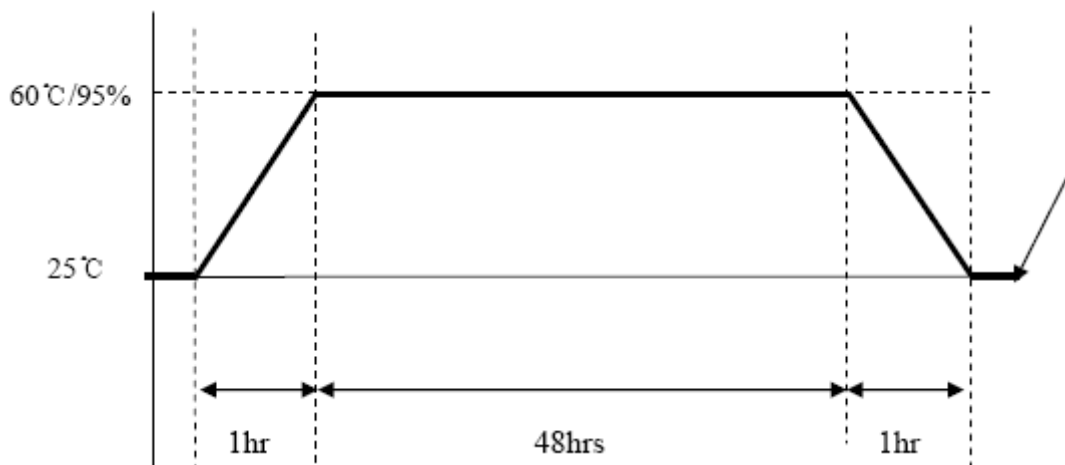
Antenna Specifications		DATA	2011-04-01	REV.	A
MODEL	Buddy (Main Antenna)	TYPE	Built-in	PAGE	13

## 5.4 STATIC HUMIDITY TEST

Place the complete in an environmental chamber at +25°C. Then increase temperature during 1 hour to +60° C with humidity increasing to 95% RH during 1 hours. Soak antenna with these parameters for 48 hours. After the finish initial ambient parameters should be achieved during 1 hour.

After test is complete, there shall be no visual deterioration or damage.

The antenna should function mechanically. Electrical characteristics should be within the specified range



Static Humidity Test

## 5.5 SALT SPRAY (CORROSION) TEST

Place complete antenna in Salt Spray Cabinet at temperature +35°C with the salt fog of NaCl solution (5%); soak time - 48 hours.

After test is complete, there shall be no visual deterioration or damage.

The antenna should function mechanically. Electrical characteristics should be within the specified range

Antenna Specifications		DATA	2011-04-01	REV.	A
MODEL	Buddy (Main Antenna)	TYPE	Built-in	PAGE	14

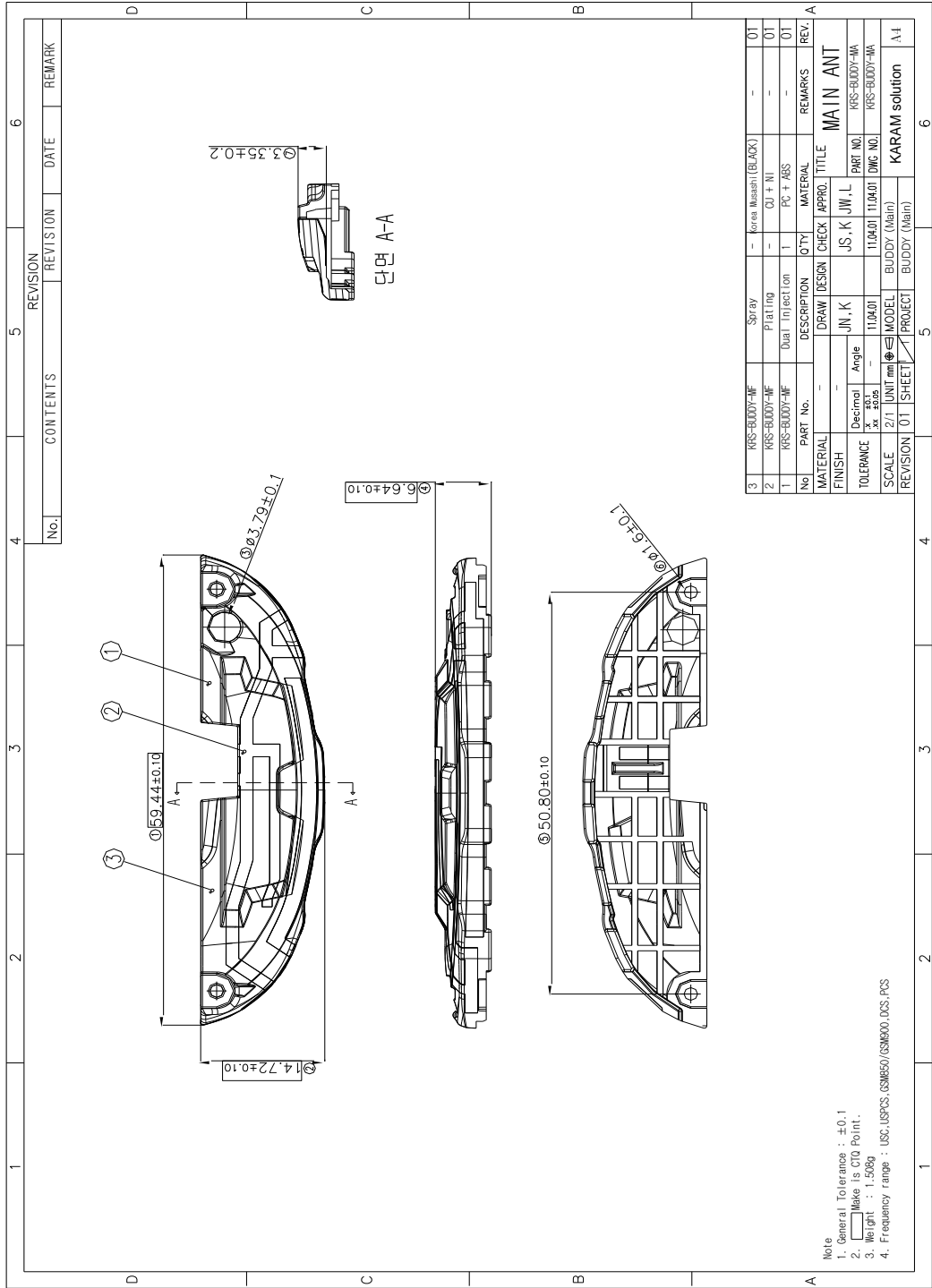
## 6. Mechanical Demands

### 6.1 Dimensions

CTQ Item Dimensions Data					
Dimension Data					
Dimension (UNIT : mm)					
No.	CTQ Dimension			Appearance	Judgment
	1	2	3		
Spec	59.44 ± 0.10	14.72 ± 0.10	6.64 ± 0.10		
X1	59.46	14.75	6.61	OK	OK
X2	59.45	14.75	6.63	OK	OK
X3	59.43	14.72	6.68	OK	OK
X4	59.41	14.76	6.64	OK	OK
X5	59.44	14.72	6.67	OK	OK
X6	59.42	14.77	6.62	OK	OK
X7	59.48	14.73	6.63	OK	OK
X8	59.46	14.75	6.64	OK	OK
X9	59.47	14.76	6.69	OK	OK
X10	59.46	14.75	6.65	OK	OK
Max	59.48	14.77	6.69	/	
Min	59.41	14.72	6.61		
Avg	59.45	14.75	6.65		
StDev	0.02	0.02	0.03		

Antenna Specifications		DATA	2011-04-01	REV.	A
MODEL	Buddy (Main Antenna)	TYPE	Built-in	PAGE	15

## 7. Antenna Drawing



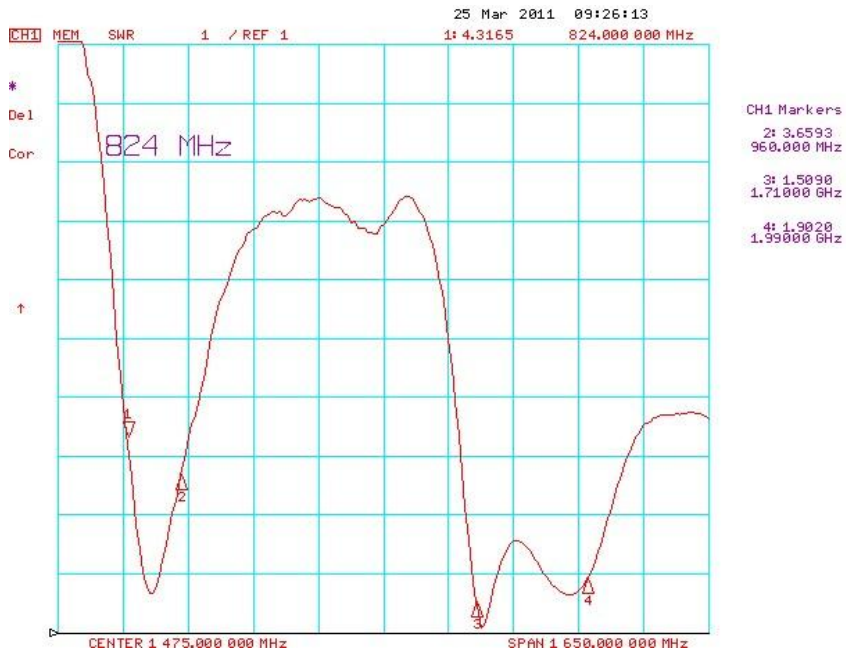
KRS-CC-D60(R01)



Antenna Specifications		DATA	2011-04-01	REV.	A
MODEL	Buddy (Main Antenna)	TYPE	Built-in	PAGE	16

## 8. Electrical data

### 8.1 Built-in antenna mounted on a handset V.S.W.R



[Slide down]

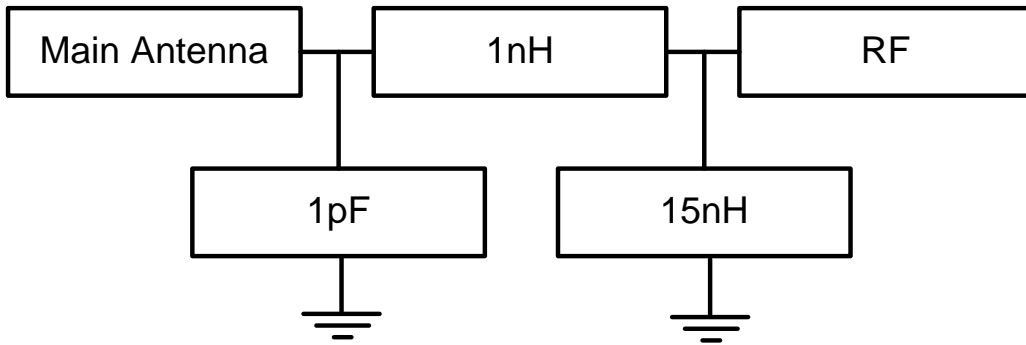


[Slide up]

Antenna Specifications		DATA	2011-04-01	REV.	A
MODEL	Buddy (Main Antenna)	TYPE	Built-in	PAGE	17

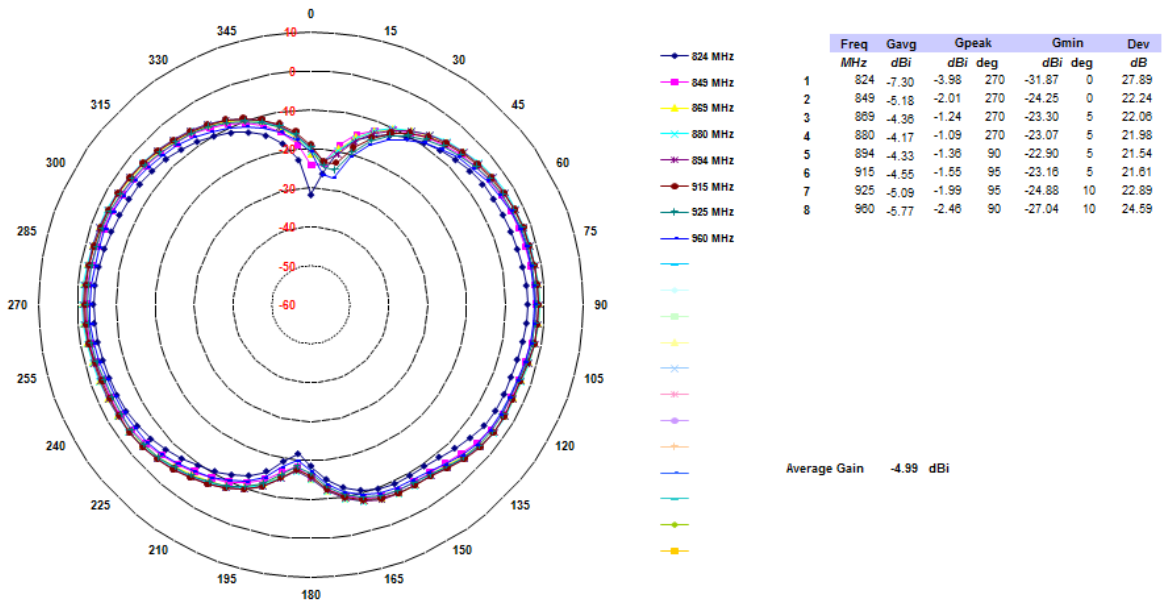
## 8.2 GAIN (with Matching Circuit)

→ Matching Circuit

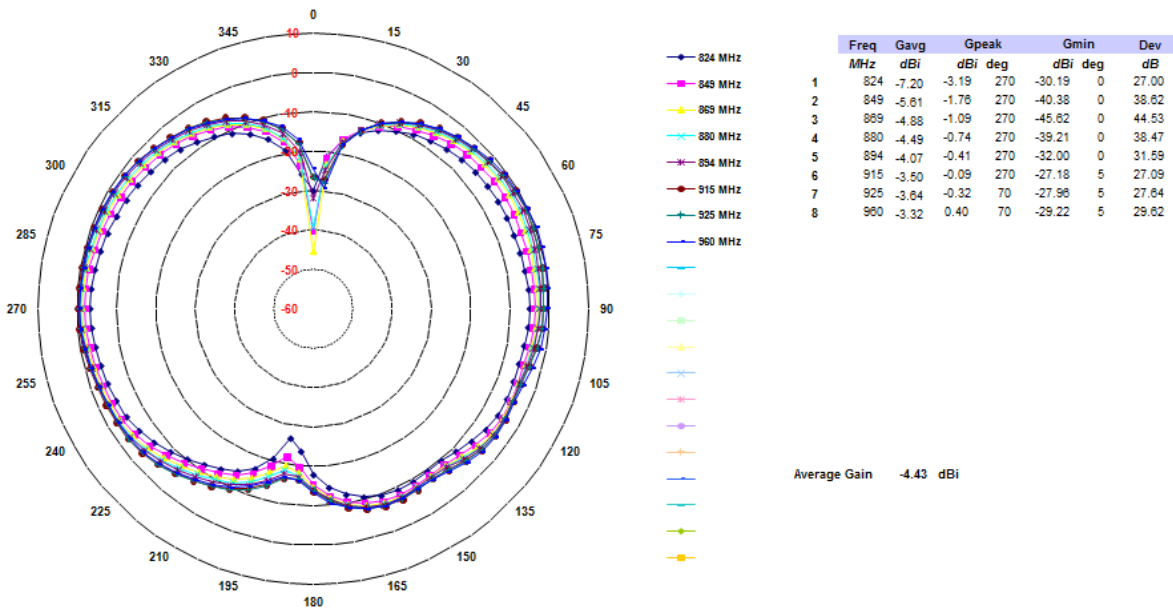


Antenna Specifications		DATA	2011-04-01	REV.	A
MODEL	Buddy (Main Antenna)	TYPE	Built-in	PAGE	18

→ Cellular/GSM850/GSM900 band



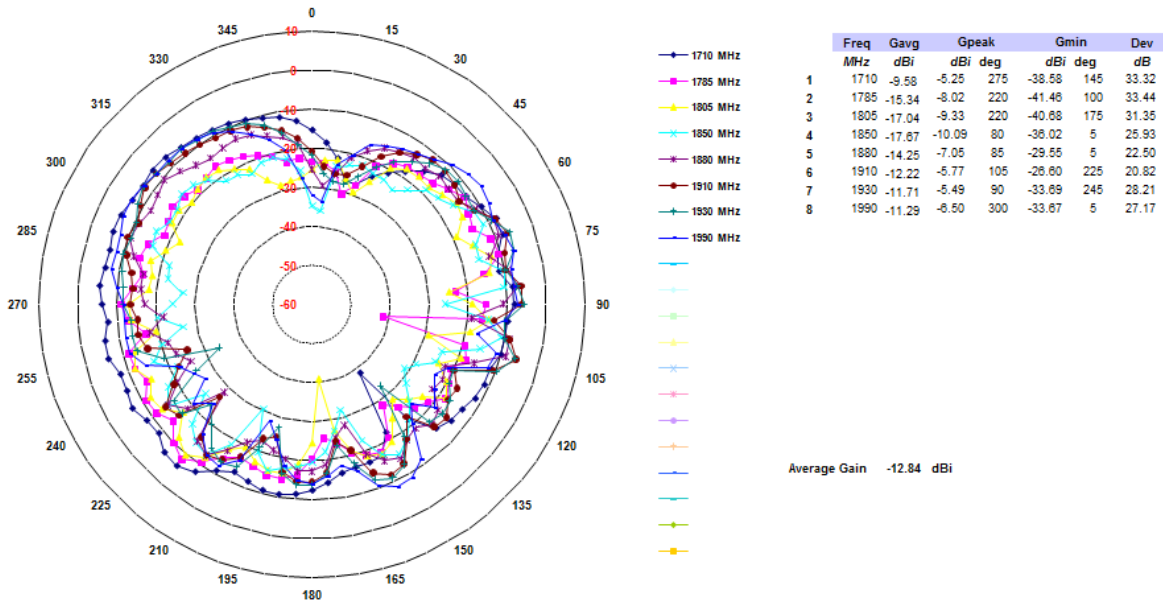
[Slide down]



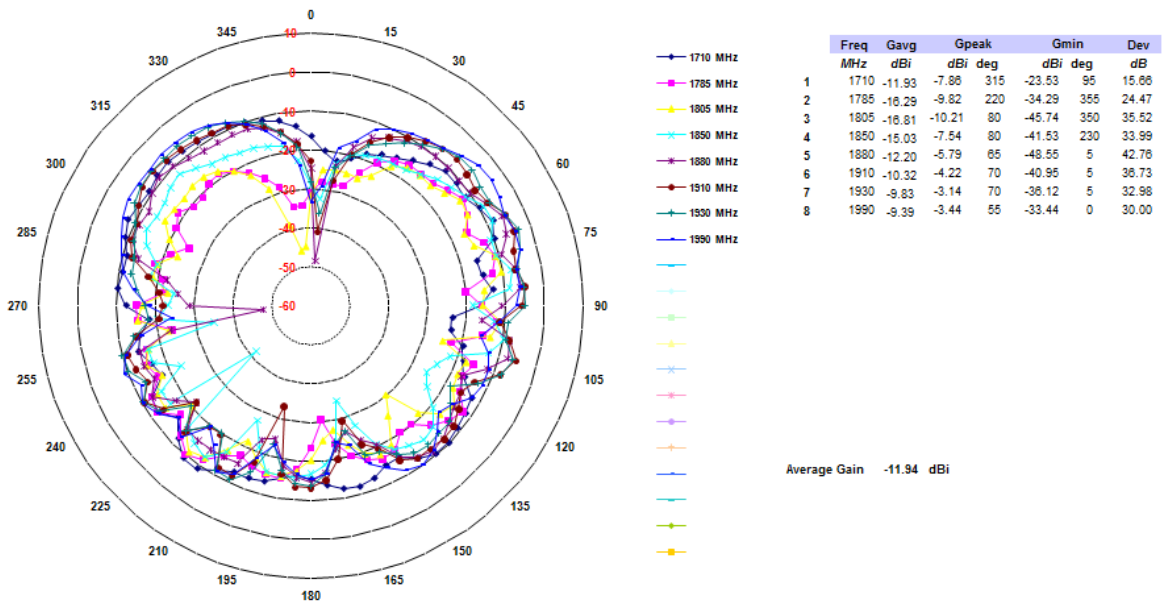
[Slide up]

Antenna Specifications		DATA	2011-04-01	REV.	A
MODEL	Buddy (Main Antenna)	TYPE	Built-in	PAGE	19

→ US PCS/DCS/PCS band



[Slide down]

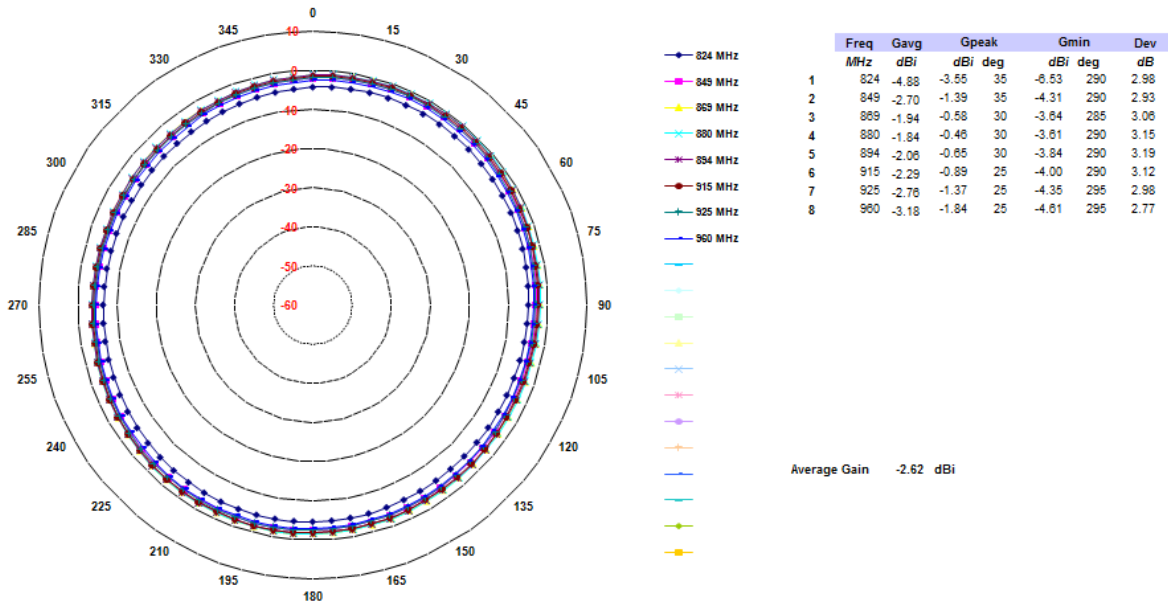


[Slide up]

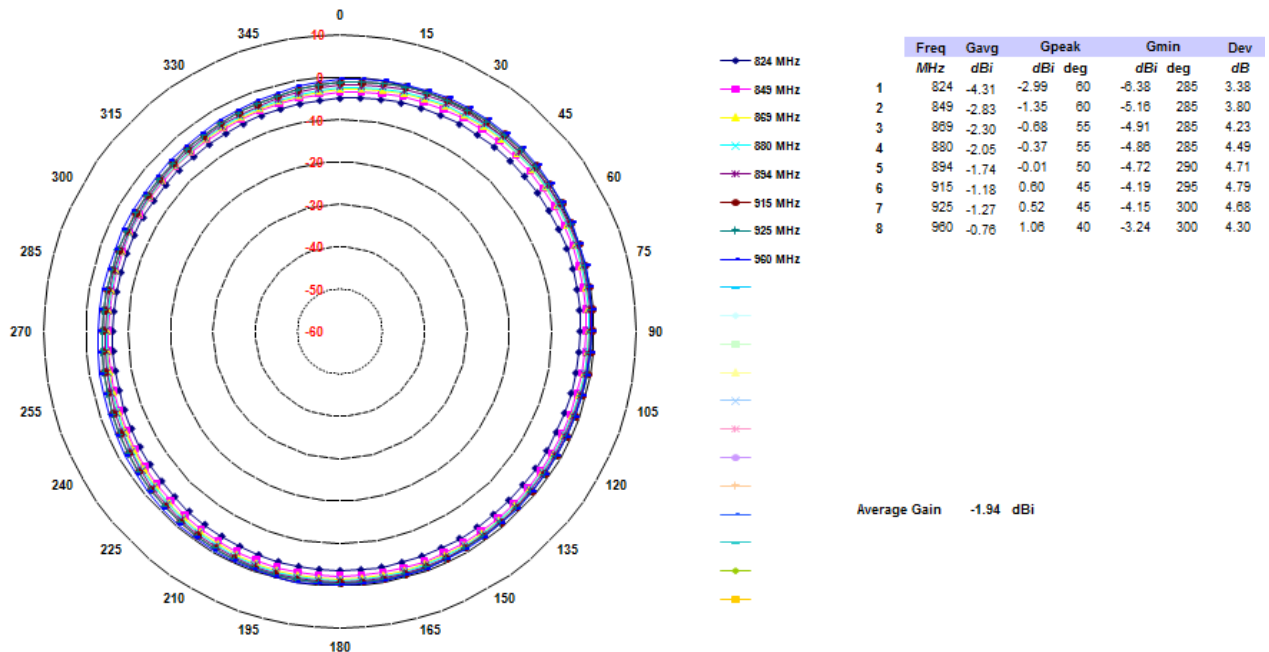
Antenna Specifications		DATA	2011-04-01	REV.	A
MODEL	Buddy (Main Antenna)	TYPE	Built-in	PAGE	20

H-Plane

→ Cellular/GSM850/GSM900 band



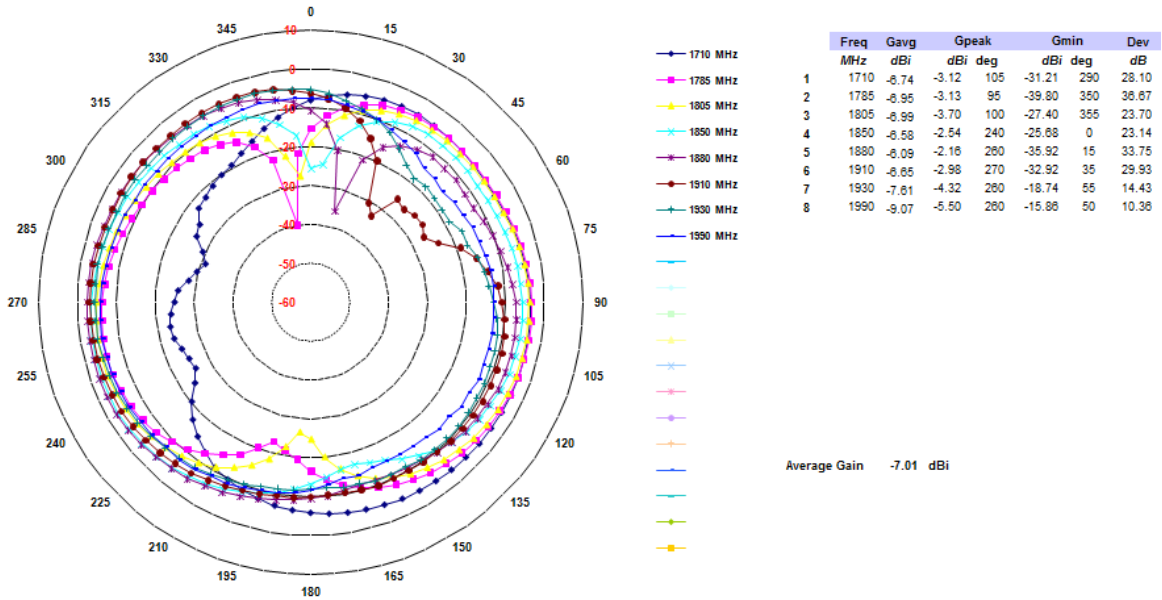
[Slide down]



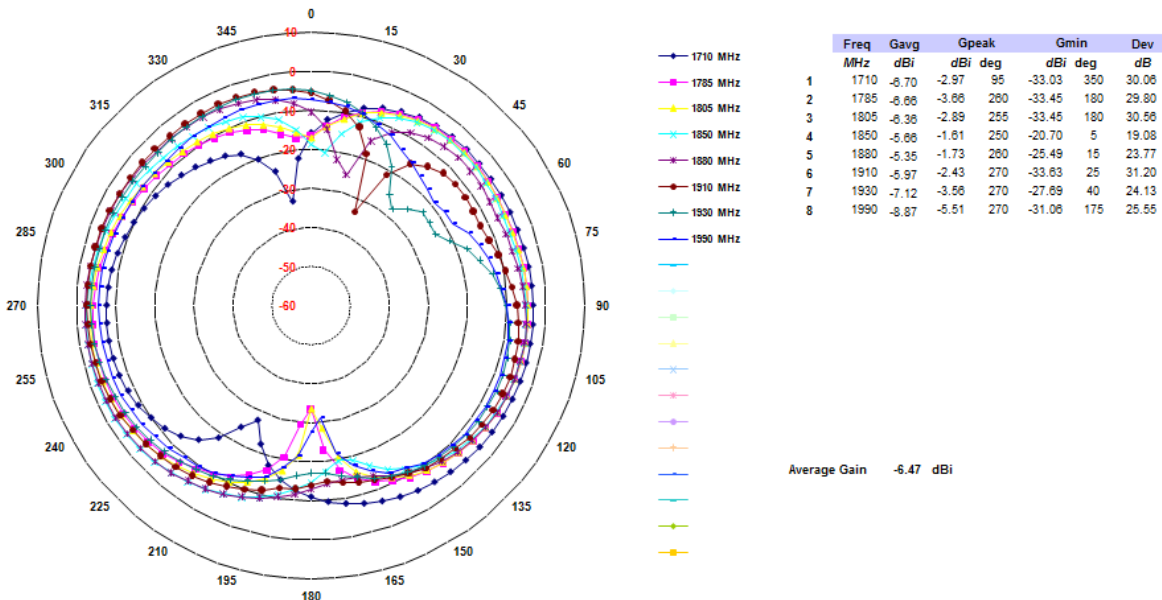
[Slide up]

Antenna Specifications		DATA	2011-04-01	REV.	A
MODEL	Buddy (Main Antenna)	TYPE	Built-in	PAGE	21

→ US PCS/DCS/PCS band



[Slide down]



[Slide up]