

Antenna Specifications		DATA	2009-12-08	REV.	A
MODEL	COACH	TYPE	BUILT-IN	PAGE	3/21

# ANTENNA SPECIFICATION



**KARAM Solution**

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Antenna Specifications		DATA	2009-12-08	REV.	A
MODEL	COACH	TYPE	BUILT-IN	PAGE	4/21

## - CONTENTS -

- 1. Technical Items**
    - 1.1 Electrical Spec.
    - 1.2 Mechanical Spec.
  
  - 2. Test Equipments**
  
  - 3. Electrical Demands**
    - 3.1 V.S.W.R
    - 3.2 Radiation Pattern
    - 3.3 Gain
  
  - 5. Environmental Demands**
    - 5.1 Thermal Shock Test
    - 5.2 Humidity Test
    - 5.3 Temperature Cycling Test
    - 5.4 Salt Spray Test
  
  - 6. Antenna Drawing**
  
  - 7. Electrical data (V.S.W.R, GAIN & Matching Circuit Diagram)**
    - 7.1 V.S.W.R
    - 7.2 GAIN (with Matching Circuit)
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<b>Antenna Specifications</b>		DATA	2009-12-08	REV.	A
MODEL	<b>COACH</b>	TYPE	<b>BUILT-IN</b>	PAGE	5/21

# 1. Technical Items

## 1.1 Electrical Spec.

Electrical Spec.								
Frequency Range (MHz)	Cellular				US-PCS			
	Tx1		Rx1		Tx2		Rx2	
	824 – 849MHz		869 - 894MHz		1850 - 1910MHz		1930 - 1990MHz	
Folder position	Folder close	Folder open	Folder close	Folder open	Folder close	Folder open	Folder close	Folder open
V.S.W.R (Max)	3.5	4.0	4.0	2.0	5.0	5.5	4.5	4.5
GAIN (E2, Peak Min)	-3.2dBi	-3.0dBi	-4.0dBi	-1.5dBi	-9.5dBi	-7.5dBi	-10.0dBi	-7.7dBi
Impedance (Nominal)	50 ohms							
Polarization	VERTICAL							
Radiation Pattern	OMNI-DIRECTIONAL							
Maximum Power	2 Watts							

## 1.2 Mechanical Spec.

Mechanical Spec.	
Connector	CONTACT PIN TYPE
Overall length	See drawing
Operation Temperature	-30 °C ~ +80 °C
Weight	0.9 g

<b>Antenna Specifications</b>		DATA	2009-12-08	REV.	A
MODEL	<b>COACH</b>	TYPE	<b>BUILT-IN</b>	PAGE	6/21

## 2. Test Equipment

The test equipments for antenna are as follows

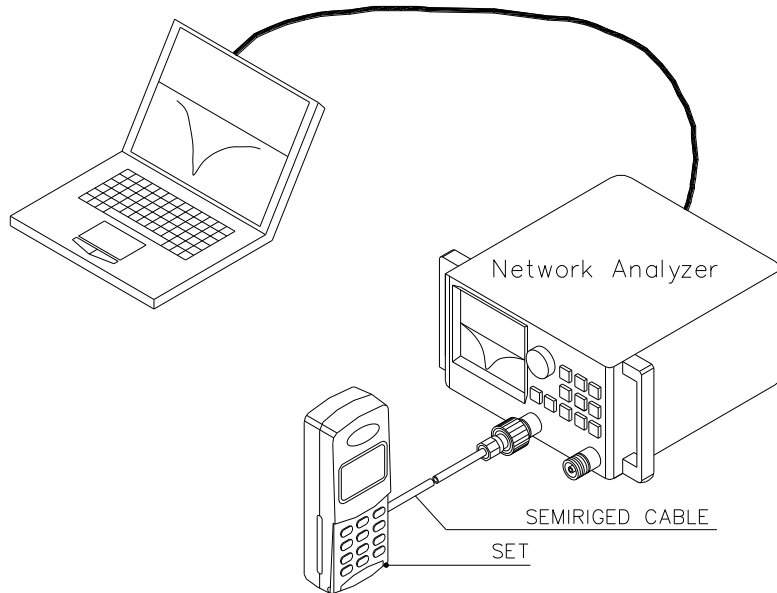
- ◆ Network Analyzer (Agilent E5071A) to measure the V.S.W.R and impedance of antenna
  - ◆ Spectrum Analyzer to measure the receiving signal intensity
  - ◆ Standard Horn antenna that is adjustable in the Cellular band
  - ◆ Standard Horn antenna that is adjustable in the US-PCS band
  - ◆ Anechoic 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	2009-12-08	REV.	A
MODEL	COACH	TYPE	BUILT-IN	PAGE	7/21

### 3. Electrical Demands

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

The V.S.W.R characteristics must satisfy the electrical demands. The V.S.W.R of antenna must be less than 4.0:1(824 ~ 894MHz) at Cellular, 5.5:1(1850 ~ 1990MHz) at US-PCS band on the free space.



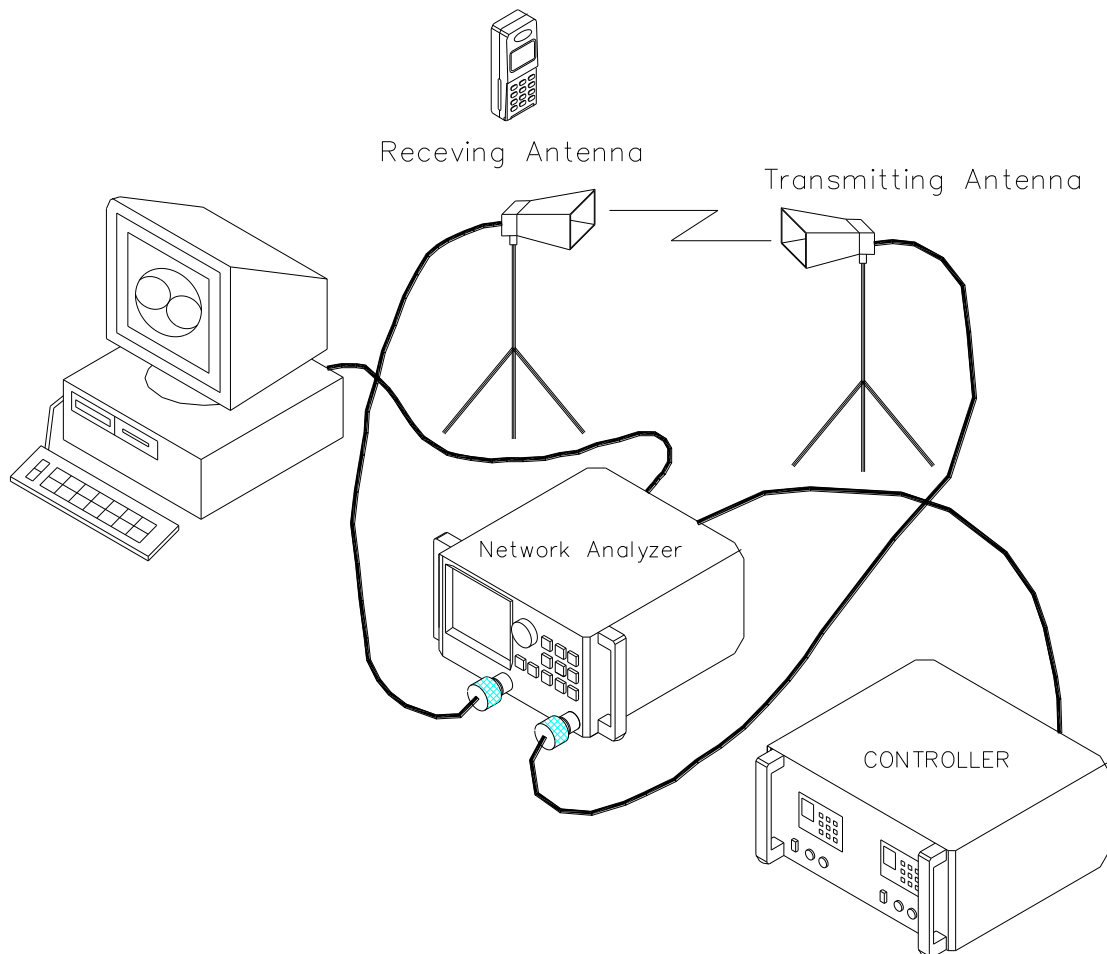
Antenna Specifications		DATA	2009-12-08	REV.	A
MODEL	COACH	TYPE	BUILT-IN	PAGE	8/21

### 3.2 Radiation Pattern

The radiation pattern must have the omni-directional characteristic in Cellular/ PCS Band and H-PLANE.

### 3.3 Gain

The gain is expressed as dBi that standardizes the half-wave length dipole antenna. The minimum Gain(E2 plane) of antenna must be bigger than  $-4.0\text{dBi}$ , in Cellular,  $-10.0\text{dBi}$ , in US-PCS band.



Antenna Specifications		DATA	2009-12-08	REV.	A
MODEL	COACH	TYPE	BUILT-IN	PAGE	9/21

## 4. Environmental Demands

### 4.1 Operation Temperature Test

- Test A: Place the antennas for testing in chamber. The chamber condition should be as follows:

1hours at -20°C

- Final measurements: The antenna shall be visually inspected and electrically and also mechanically checked as required by products standard.

- Test B: Place the antennas for testing in chamber. The chamber condition should be as follows:

1hours at 70°C

- Final measurements: The antenna shall be visually inspected and electrically and also mechanically checked as required by products standard.

### 4.2 Humidity Test

- Test: Place the antennas for testing in chamber. The chamber condition should be as follows:

24hours at +55°C, Relative humidity is 95%.

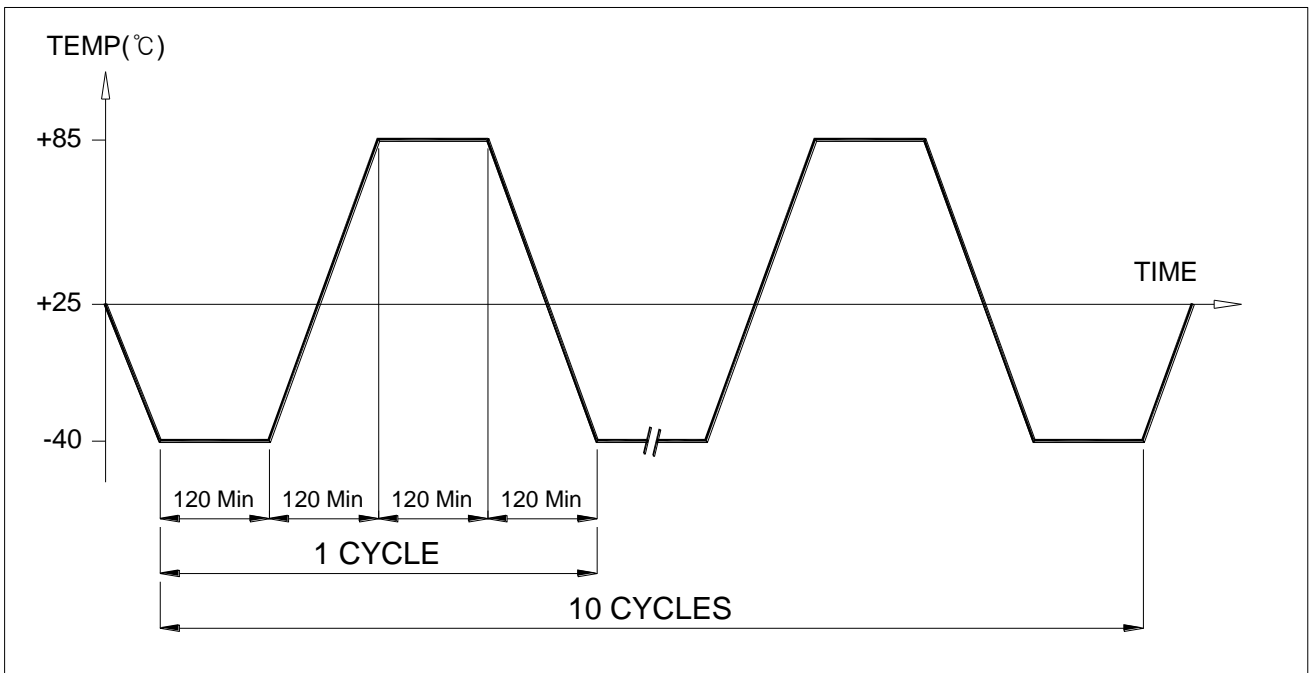
- Final measurements: The antenna shall be visually inspected and electrically and also mechanically checked as required by products standard
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Antenna Specifications		DATA	2009-12-08	REV.	A
MODEL	COACH	TYPE	BUILT-IN	PAGE	10/21

### 4.3 Temperature Cycling Test

The antenna shall withstand 10 repeated cycles of 120 minutes at  $-40^{\circ}\text{C}$  and 120 minutes at  $+85^{\circ}\text{C}$  with a maximum transition time between temperature extremes of 120 minutes.

After the test, no visual deterioration shall occur. After the test, the antenna shall satisfy the electrical demands.



### 4.4 Salt spray Test

In salt fog chamber, expose test antennas to a  $35^{\circ}\text{C}$ , 5% salt fog atmosphere for 48 hours. After the test, the antenna shall be continued. The antenna shall satisfy the electrical demands.



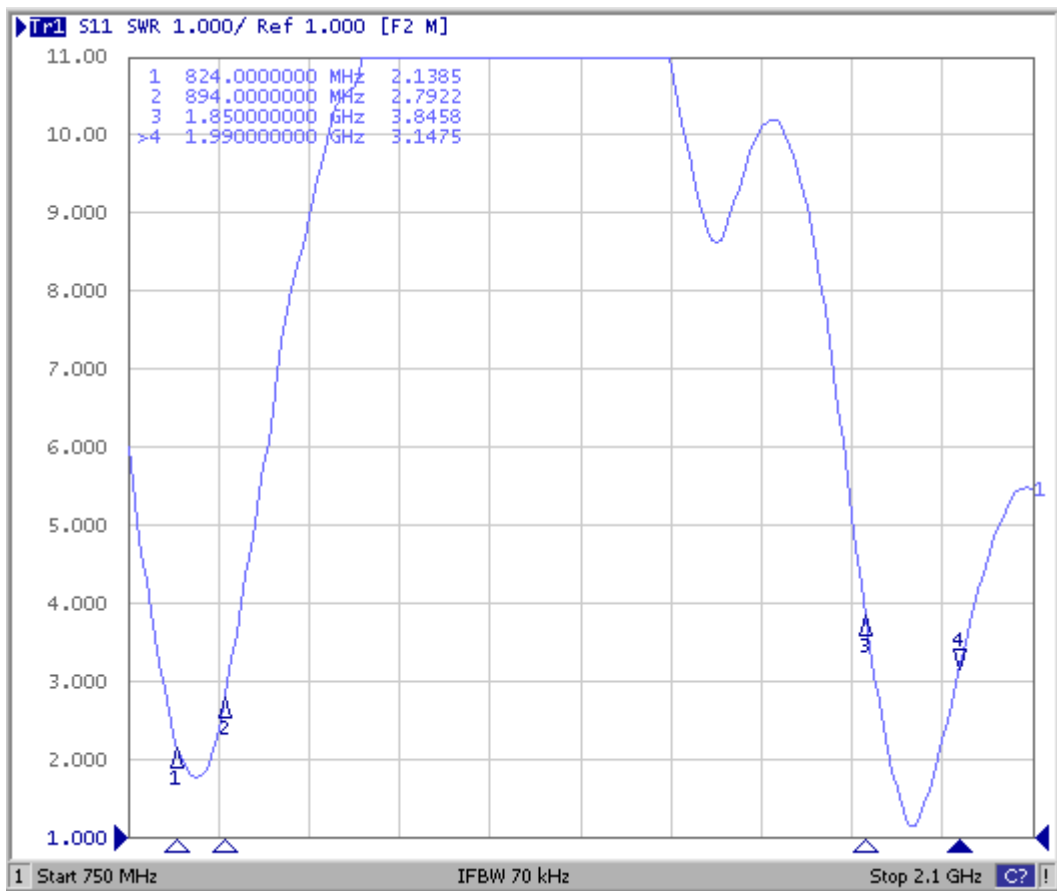


Antenna Specifications		DATA	2009-12-08	REV.	A
MODEL	COACH	TYPE	BUILT-IN	PAGE	12/21

## 6. Electrical data

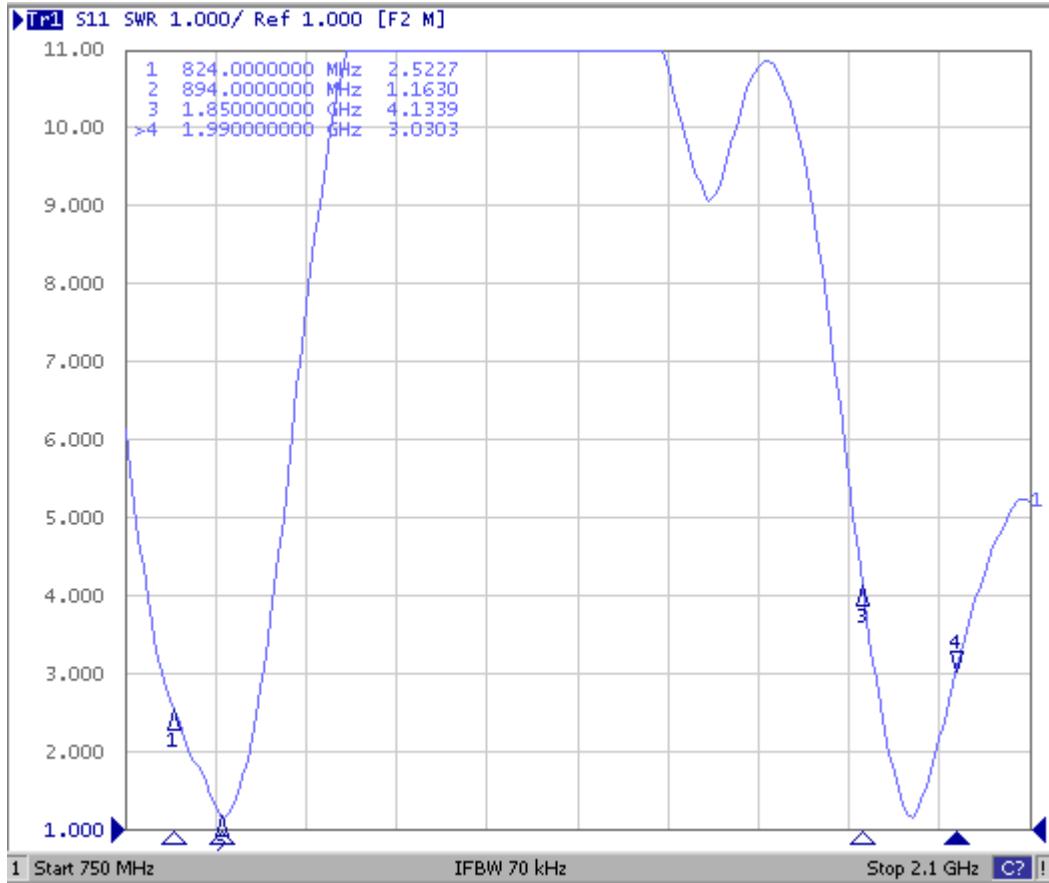
→ V. S.W.R

### 6.1 V.S.W.R



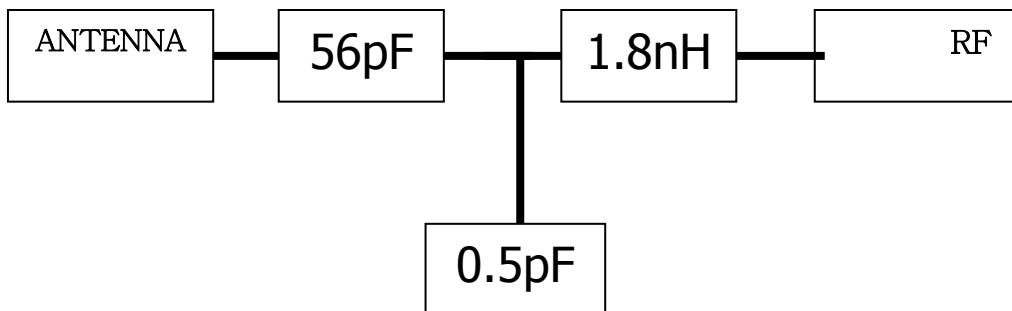
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Antenna Specifications		DATA	2009-12-08	REV.	A
MODEL	COACH	TYPE	BUILT-IN	PAGE	13/21



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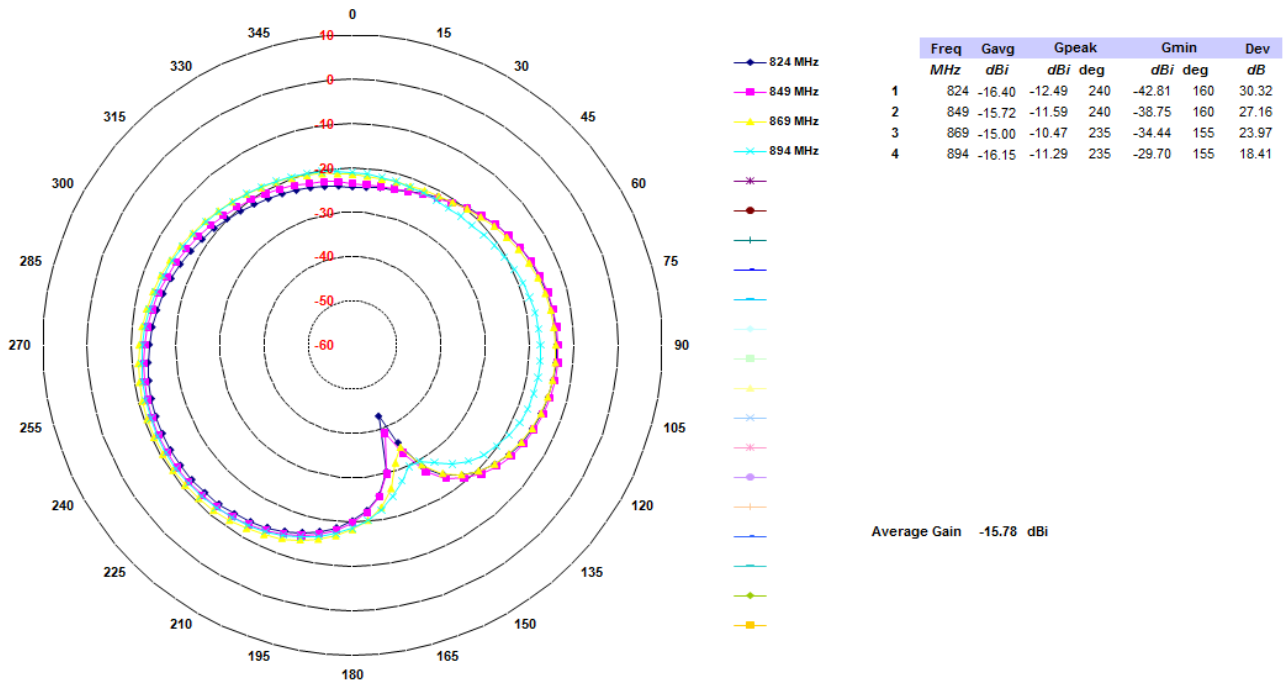
→ Matching Network



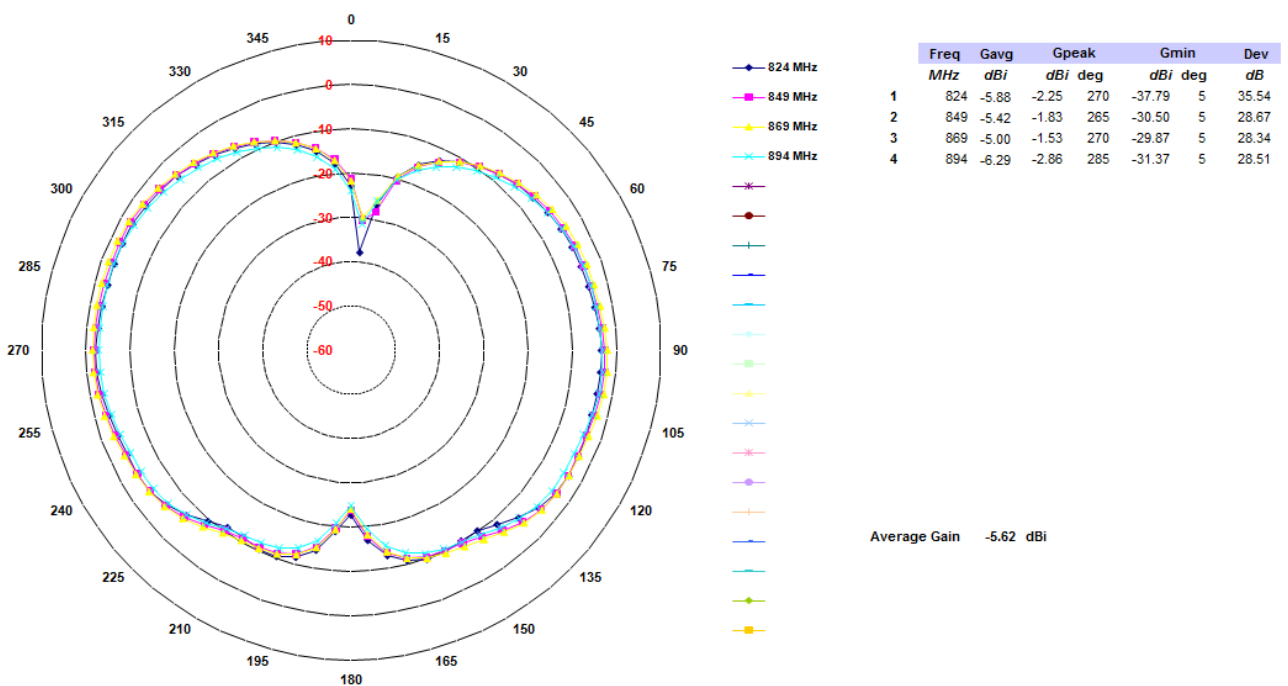
Antenna Specifications		DATA	2009-12-08	REV.	A
MODEL	COACH	TYPE	BUILT-IN	PAGE	14/21

→ Radiation Gain

## 6.2 GAIN (with Matching Circuit)

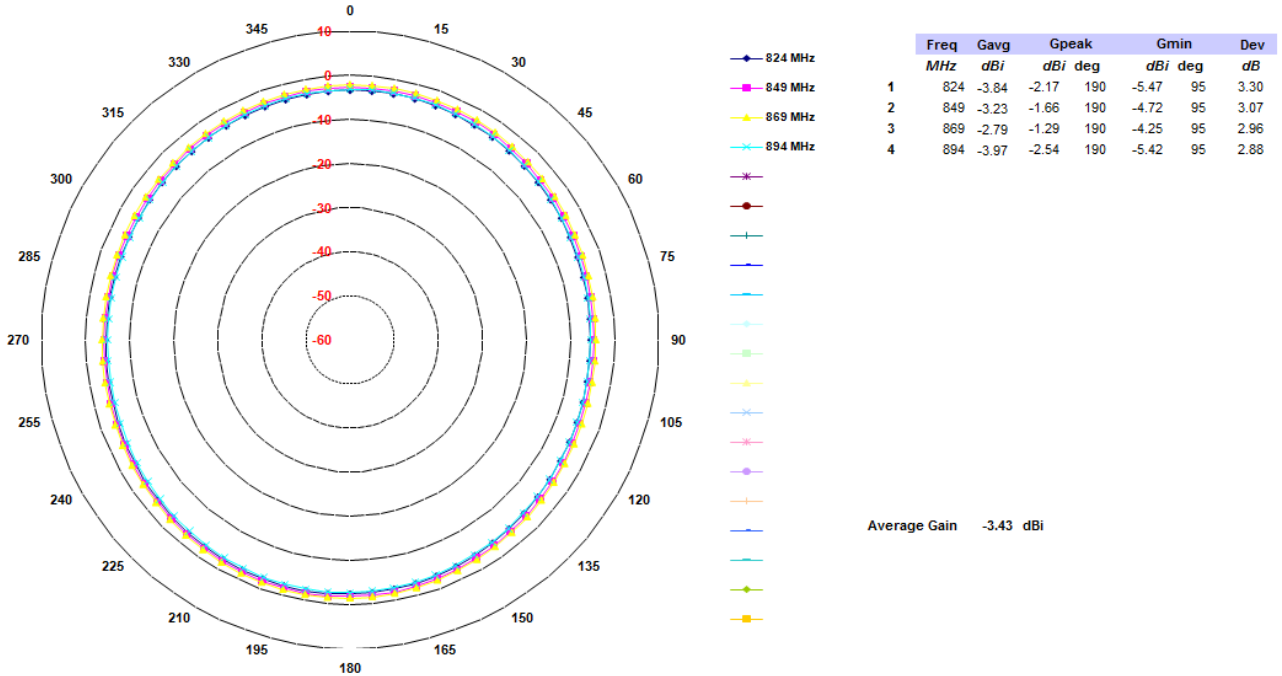


[Cellular Band : Folder close E1-plane]



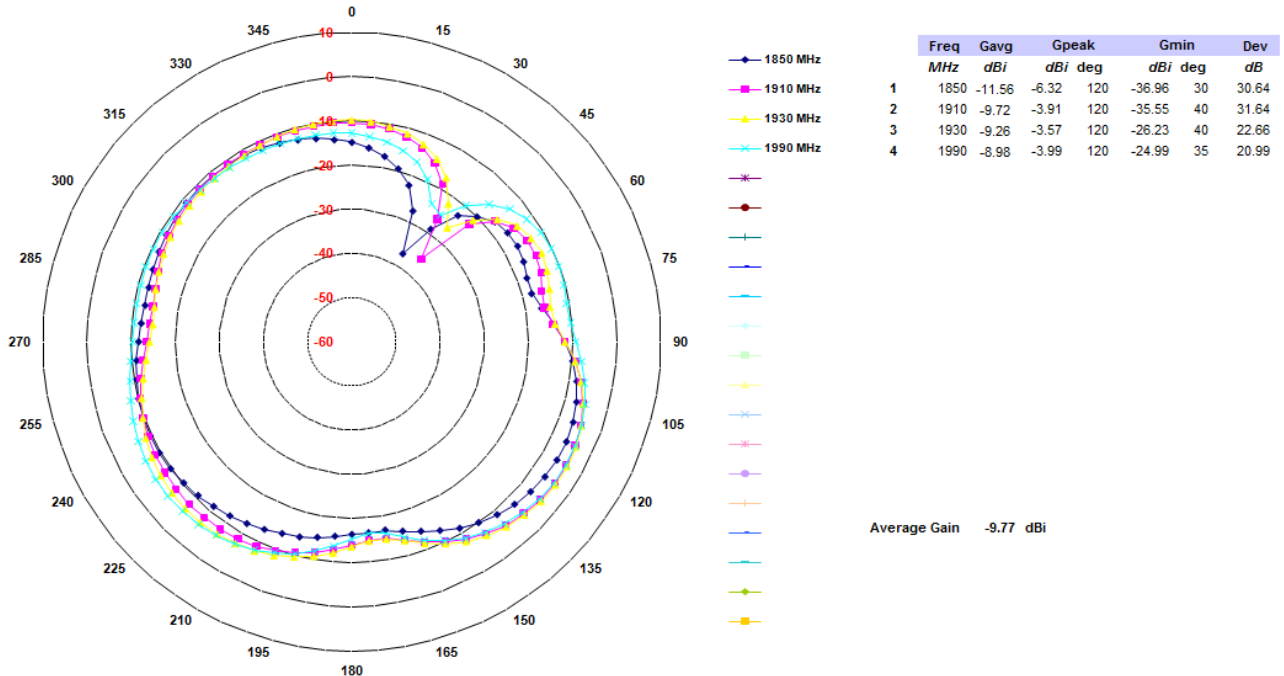
[Cellular Band : Folder close E2-plane]

Antenna Specifications		DATA	2009-12-08	REV.	A
MODEL	COACH	TYPE	BUILT-IN	PAGE	15/21

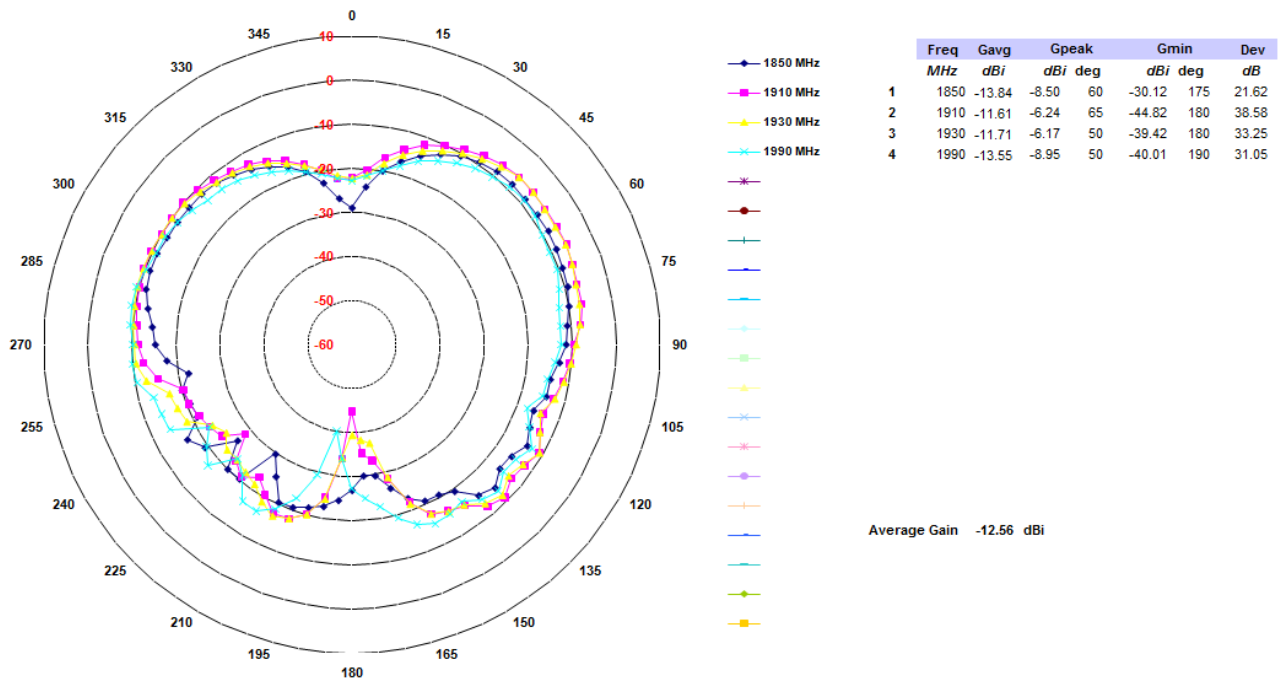


[Cellular Band : Folder close H-plane]

Antenna Specifications		DATA	2009-12-08	REV.	A
MODEL	COACH	TYPE	BUILT-IN	PAGE	16/21

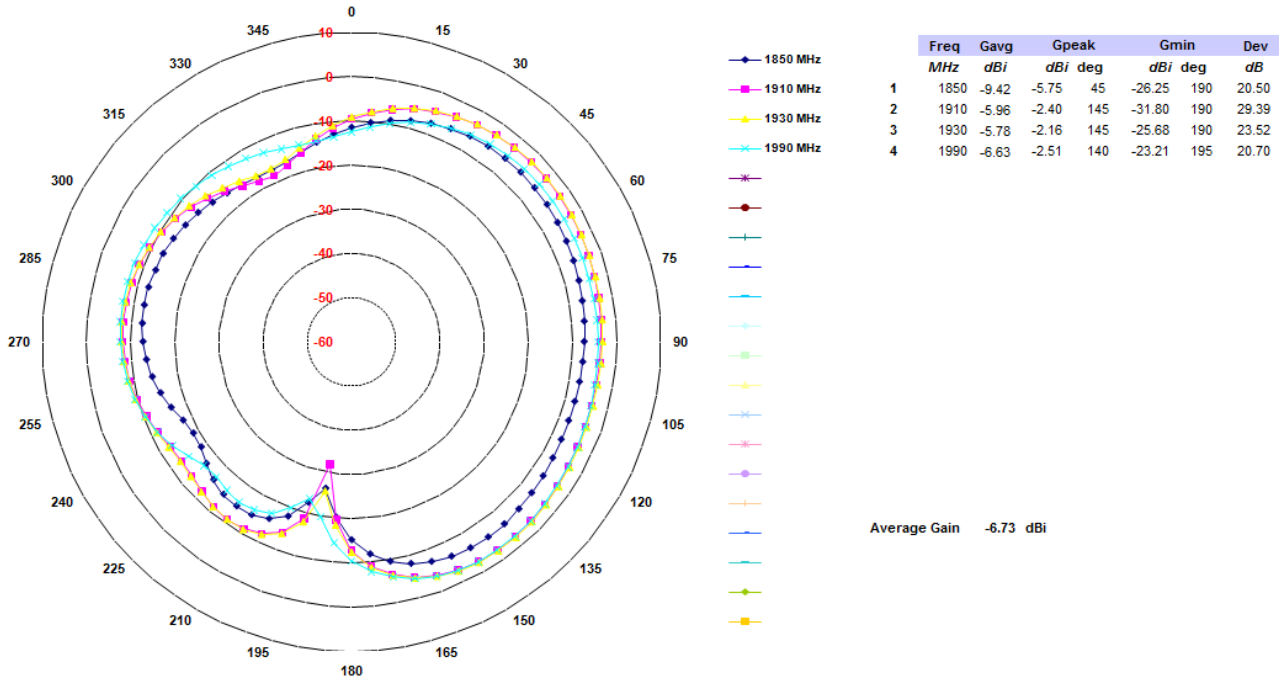


[US-PCS Band : Folder close E1-plane]



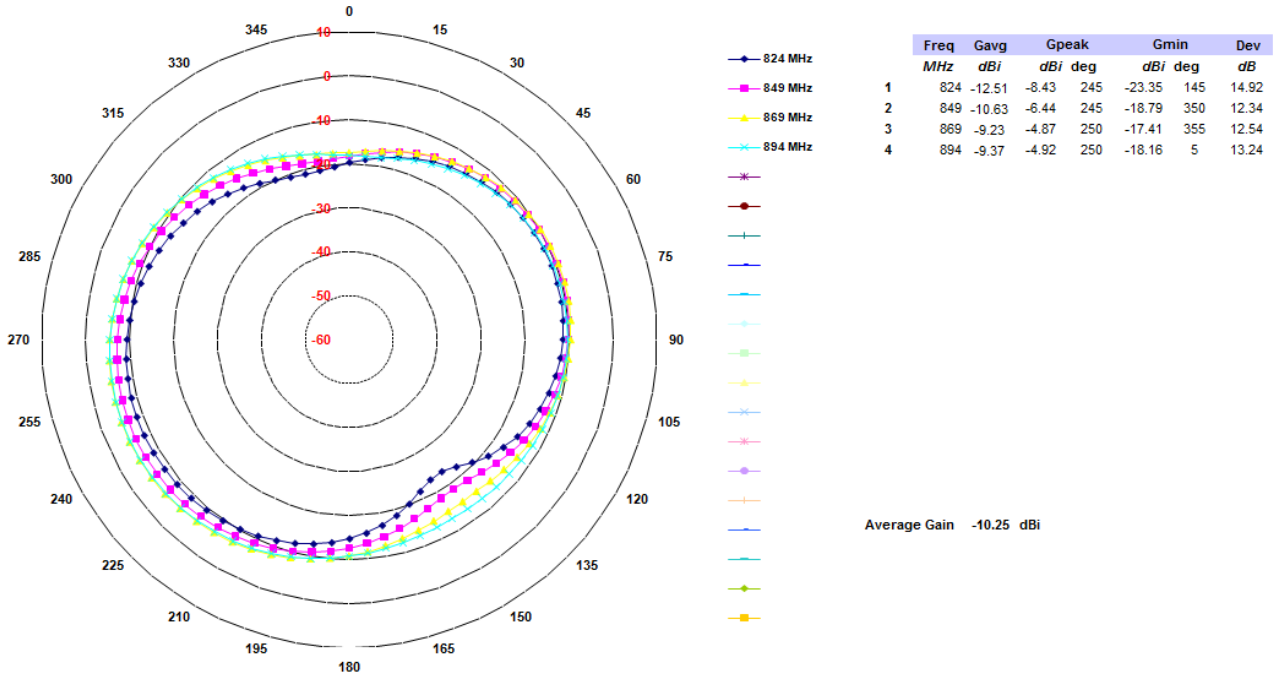
[US-PCS Band : Folder close E2-plane]

Antenna Specifications		DATA	2009-12-08	REV.	A
MODEL	COACH	TYPE	BUILT-IN	PAGE	17/21

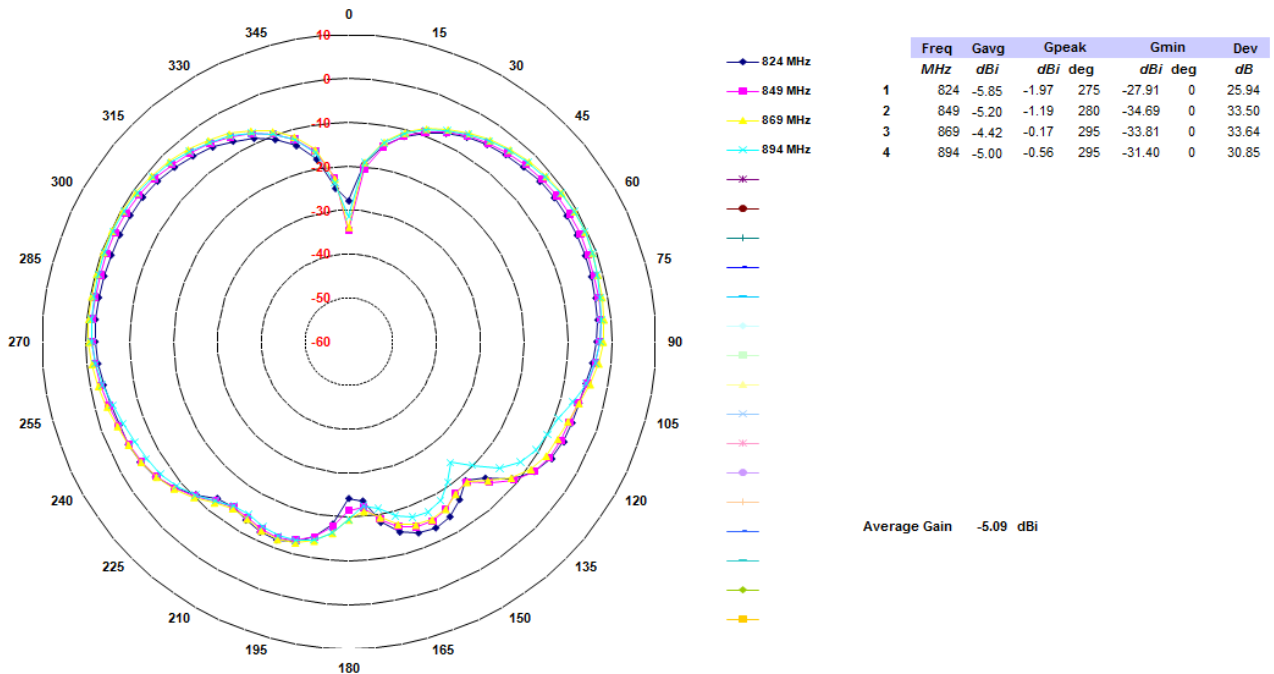


[US-PCS Band : Folder close H-plane]

Antenna Specifications		DATA	2009-12-08	REV.	A
MODEL	COACH	TYPE	BUILT-IN	PAGE	18/21



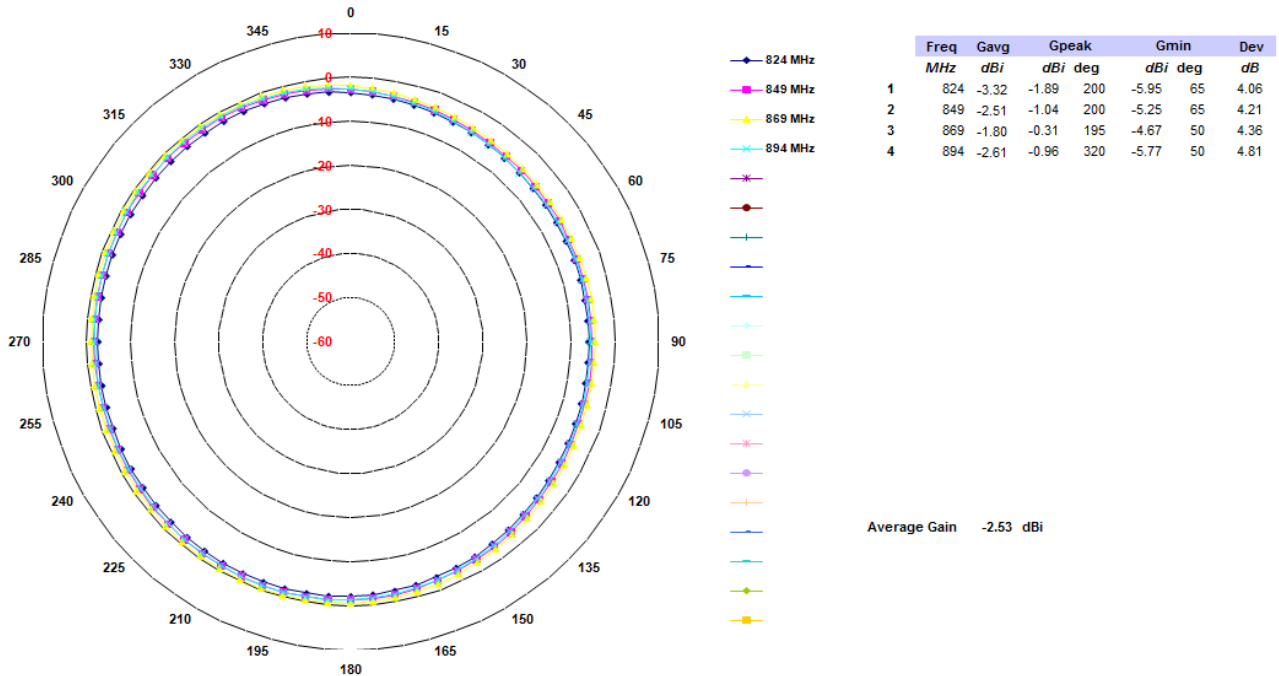
[Cellular Band : Folder open E1-plane]



[Cellular Band : Folder open E2-plane]

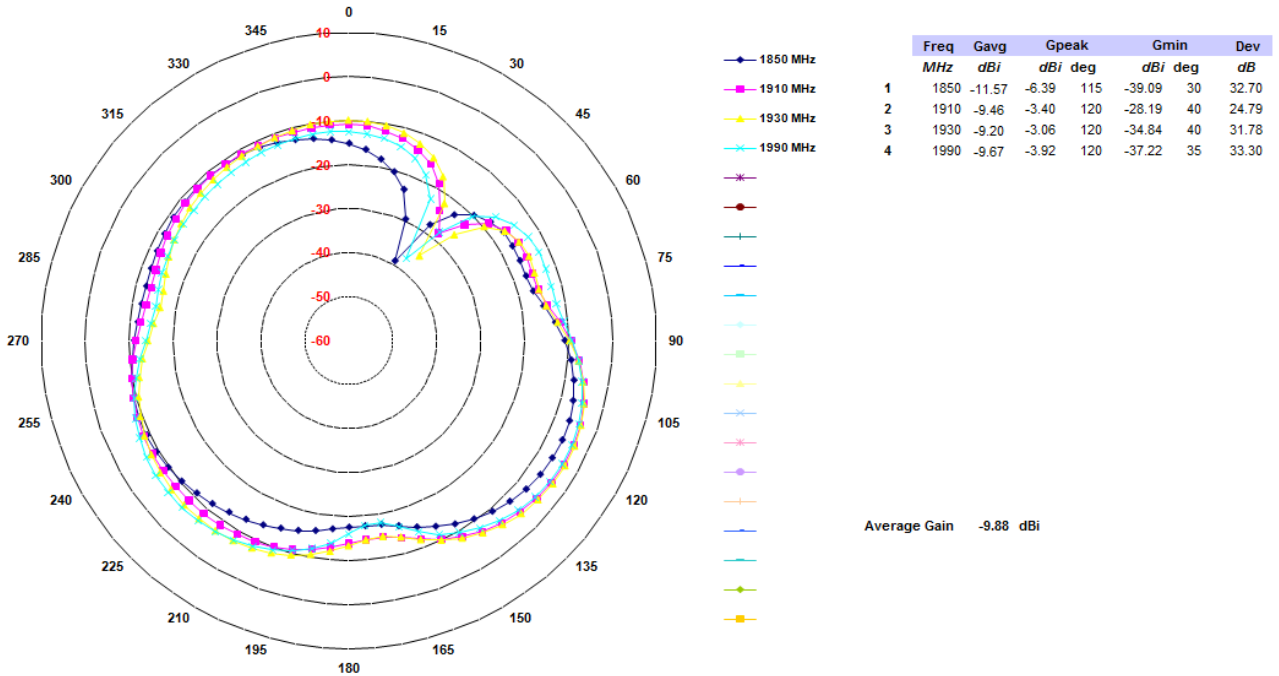


Antenna Specifications		DATA	2009-12-08	REV.	A
MODEL	COACH	TYPE	BUILT-IN	PAGE	19/21

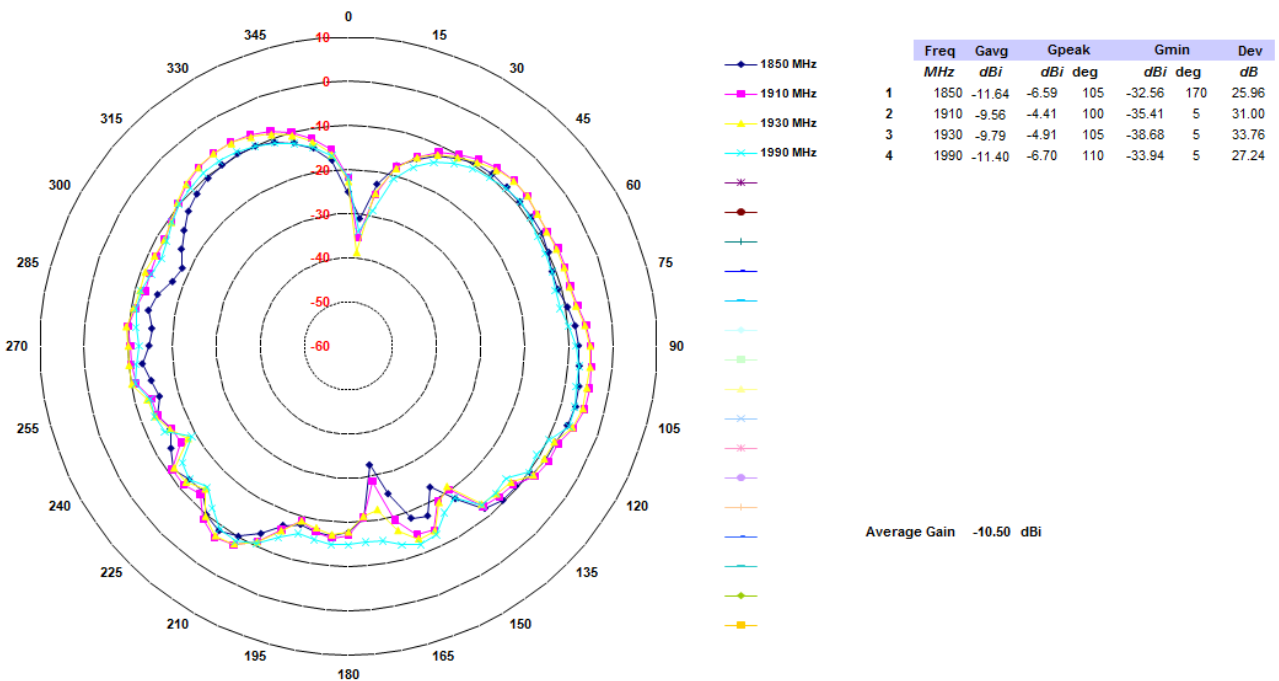


[Cellular Band : Folder open H-plane]

Antenna Specifications		DATA	2009-12-08	REV.	A
MODEL	COACH	TYPE	BUILT-IN	PAGE	20/21

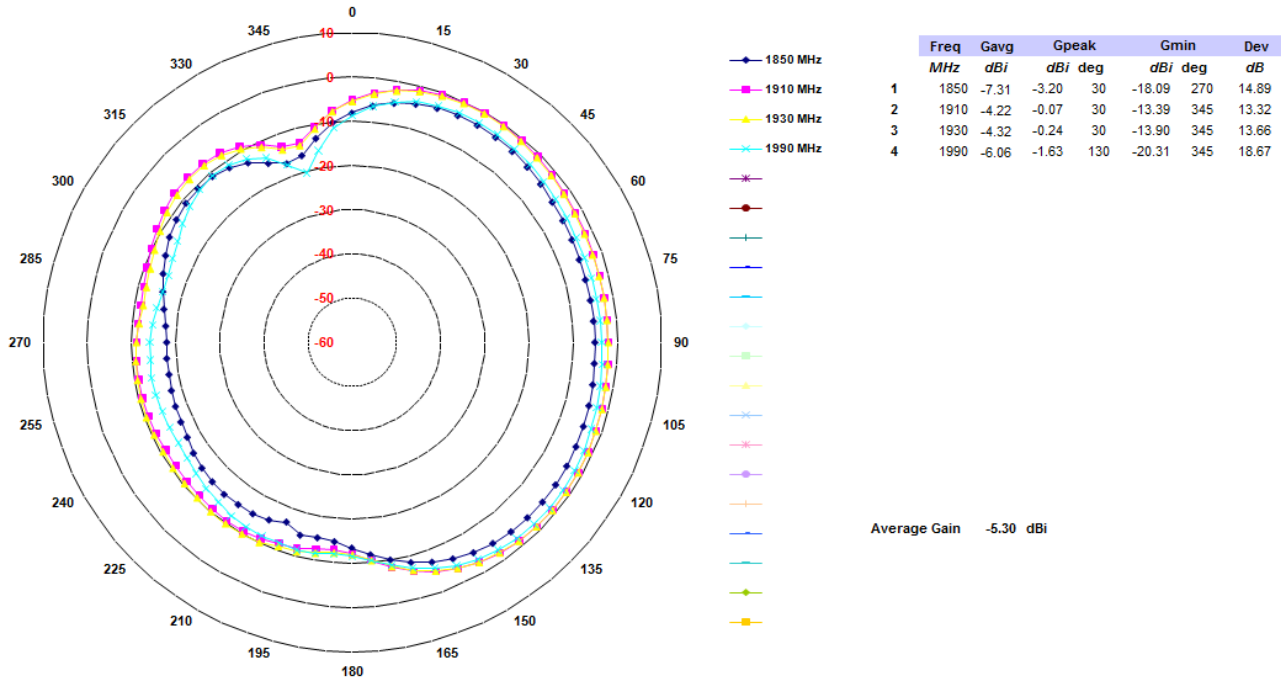


[US-PCS Band : Folder open E1-plane]



[US-PCS Band : Folder open E2-plane]

Antenna Specifications		DATA	2009-12-08	REV.	A
MODEL	COACH	TYPE	BUILT-IN	PAGE	21/21



[US-PCS Band : Folder open H-plane]