

# APPROVAL SHEET

**Customer** : PANTECH  


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**Item** : Link2  


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**Description** : Inverted F Antenna  


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**Customer p/no** :  


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**Date** : 2011. 03.30  


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## CUSTOMER'S APPROVED

A p p r o v e d			
	EN'GR	CHKD	APPD
<b>Pantech</b>			
	<b>Approval Date</b>		
	<b>Approval No.</b>		
	<b>DESC</b>		




Rev No ;

	Cuit.	Mech.	Safety	EMI
<b>Chkd</b>				
<b>Appd</b>				

Document No.	KAT-1103-IN018P	Rev. No.	IR
Model Name	KIN-QU4-PC1056	Date	2011. 03.30
Application System	GSM850/GSM900/GSM1800/GSM1900 W850/W1900	Customer	PANTECH
Notice			
<p><b>DONGNAM Co., Ltd.</b>  [R&amp;D Center]  Address : 102-103, Bucheon-technopark, 364, Samjung-Dong, Ojung-Gu, Bucheon-city,  Kyounggi-Do, Korea  Tel : +82-32-621-1666 / Fax : +82-32-621-1670</p>			

## DongNam's Approved

**Project Manager : Keun Sung Jang**

Investigation	Verification	Approval
		
Approval No.		
Approval Date		



DONGNAM Co., Ltd.

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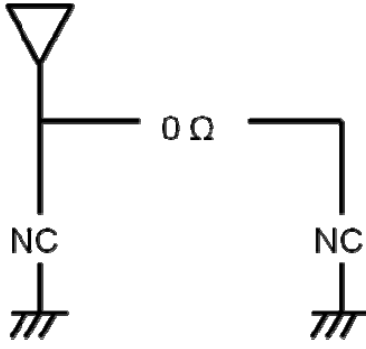
**1. Revision History**

Rev No.	Rev Date	Des.	Page	History	Drafter	Remarks
IR	2011. 03.30					



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## 2. Electrical And Mechanical Specifications

Electrical Specifications	
Frequency Range	824 MHz ~ 894 MHz / 880 MHz ~ 960 MHz 1710 MHz ~ 1880 MHz / 1850 MHz ~ 1990 MHz
V.S.W.R	EGSM900 <span style="float: right;">≤ 14.0</span>
	GSM850 <span style="float: right;">≤ 5.5</span>
	DCS1800 <span style="float: right;">≤ 10.5</span>
	PCS1900 <span style="float: right;">≤ 3.5</span>
Gain(Avg.)	EGSM900 <span style="float: right;">≥ -13.0 dBi</span>
	GSM850 <span style="float: right;">≥ -8.5 dBi</span>
	DCS1800 <span style="float: right;">≥ -12.5 dBi</span>
	PCS1900 <span style="float: right;">≥ -7.5 dBi</span>
Nominal Impedance	50 ohm
Radiation Pattern	Omni – Directional
Polarization	Linear
Power Handling	3 watts (max)
Matching Value	

Mechanical Specifications	
Dimensions	47.70X12.10X5.20mm
Weight	1.10g
Radiator	STS304 / 0.15t
Operating Temp	-20 ~ 90 °C
Operating Humidity	0 ~ 95 %



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### 3 Measurement Setup

#### 3.1 Test Equipments

Network Analyzer	HP8753E
Calibration Kit	HP85033E
Adaptor	SMA Type Female ↔ SMA male

#### 3.2 Test Equipments Setting

Split display	On
Sweep setup	Number of points : 401
Test port power	0 dBm
Measure	Channel 1 : S11

#### 3.3 Calibration

Calibration	Cal. Kit : 3.5mmD/E
Calibration menu	→ S11 1-Port
Open → Short → Load	
Done	



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#### 4. Test Procedures

##### 4.1 VSWR.

Step 1. Connect ANT port with cable included adaptor to port1 of Network analyzer.

Step 2. Point out markers on network analyzer display at

Step 3. Measurement Inspect VSWR

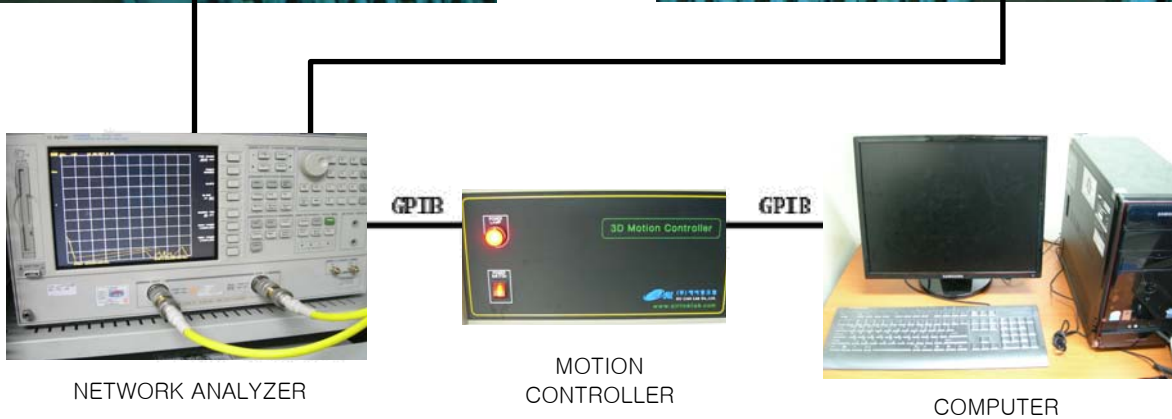
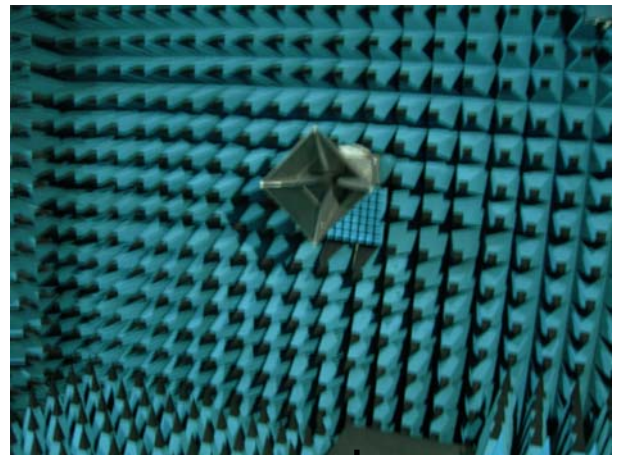
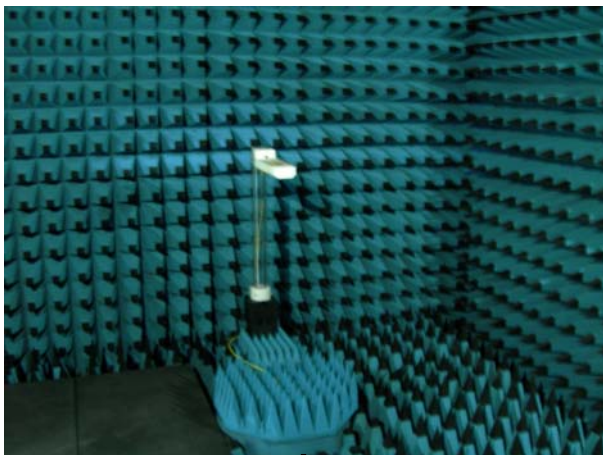
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### 4.2 Radiation pattern and Gain

Step 1. Calibrate chamber system for gain measurement using horn antenna. At the same time set up software program for chamber system control.

Step 2. Change over from a horn antenna to measuring antenna on target positioner.

Step 3. Start a software program for chamber system control & measuring







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**5. Measurement Data**

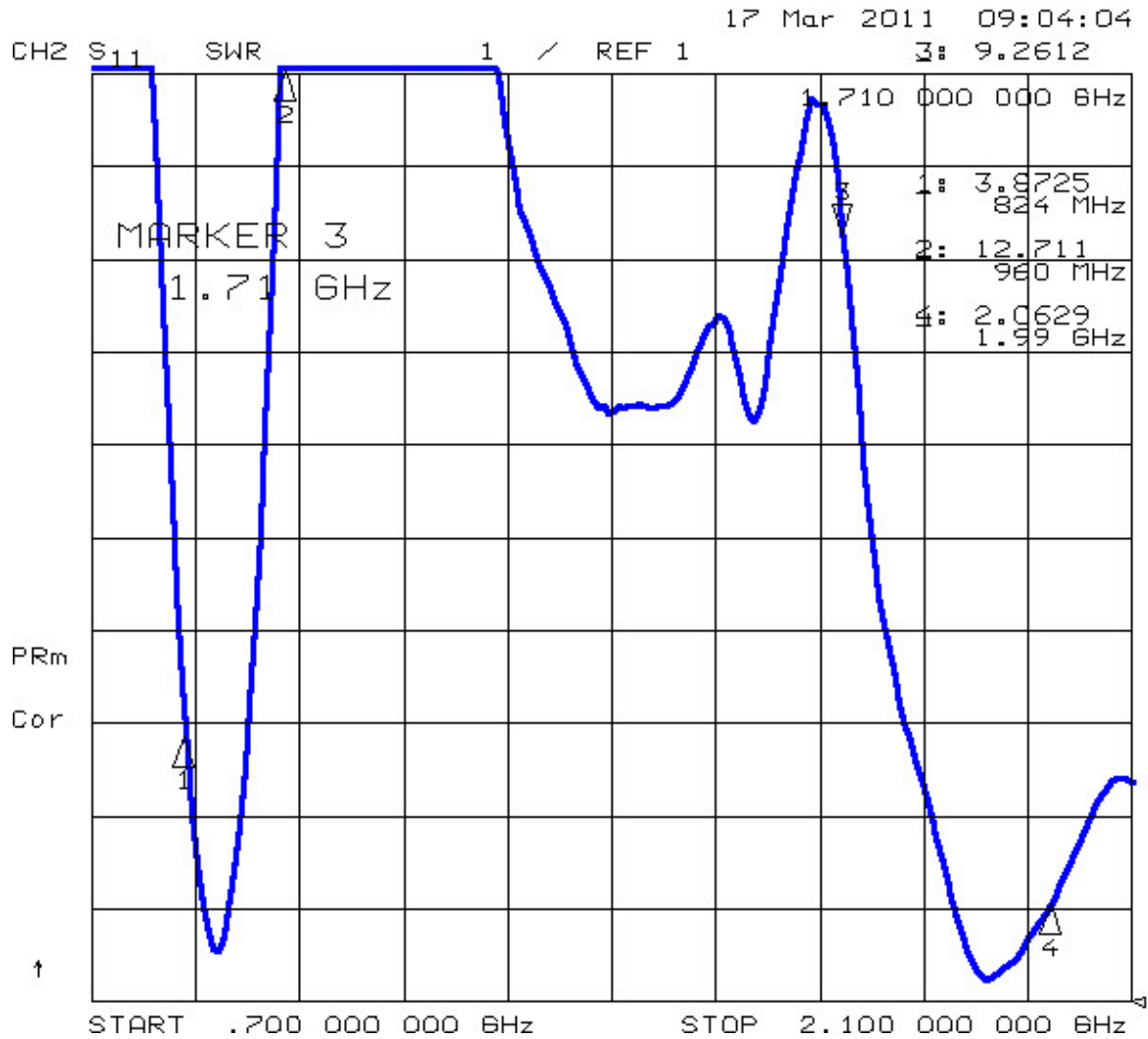
<b>Model Name</b>	<b>KIN-QU4-PC1056</b>		
<b>Written by</b>	<b>Keun Sung Jang</b>	<b>Authorized by</b>	<b>YOUNGCHUN AHN</b>
<b>Instrument</b>	<b>Network Analyzer: 8753ES (HP)</b>		
<b>Subject</b>	<b>Inverted F Antenna</b>		
<b>Frequency</b>	824 MHz ~ 894 MHz / 880 MHz ~ 960 MHz 1710 MHz ~ 1880 MHz / 1850 MHz ~ 1990 MHz		

<b>Items</b>	<b>Spec</b>		<b>Test Result (#1)</b>
<b>Frequency</b>	<b>824 MHz ~ 894 MHz / 880 MHz ~ 960 MHz</b> <b>1710 MHz ~ 1880 MHz / 1850 MHz ~ 1990 MHz</b>		<b>O.K</b>
<b>V.S.W.R</b>	EGSM900	≤ 14.0	<b>O.K</b>
	GSM850	≤ 5.5	<b>O.K</b>
	DCS1800	≤ 10.5	<b>O.K</b>
	PCS1900	≤ 3.5	<b>O.K</b>
<b>Gain(Avg.)</b>	EGSM900	≥ -13.0 dBi	<b>O.K</b>
	GSM850	≥ -8.5 dBi	<b>O.K</b>
	DCS1800	≥ -12.5 dBi	<b>O.K</b>
	PCS1900	≥ -7.5 dBi	<b>O.K</b>
<b>Polarization</b>	<b>Linear</b>		<b>Linear</b>



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### 5.1 SWR

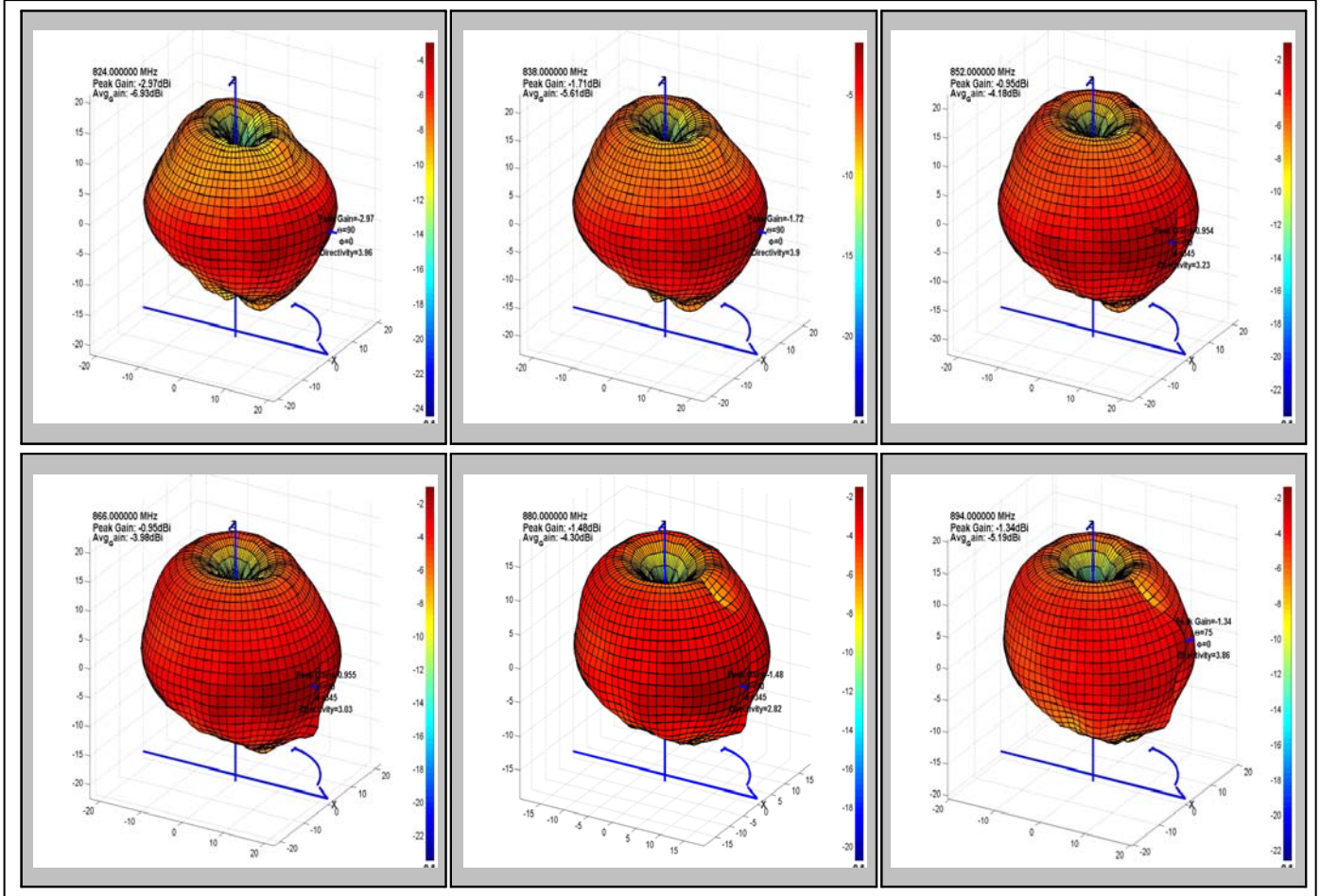




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### 5.2 Gain & Pattern

#### GSM850

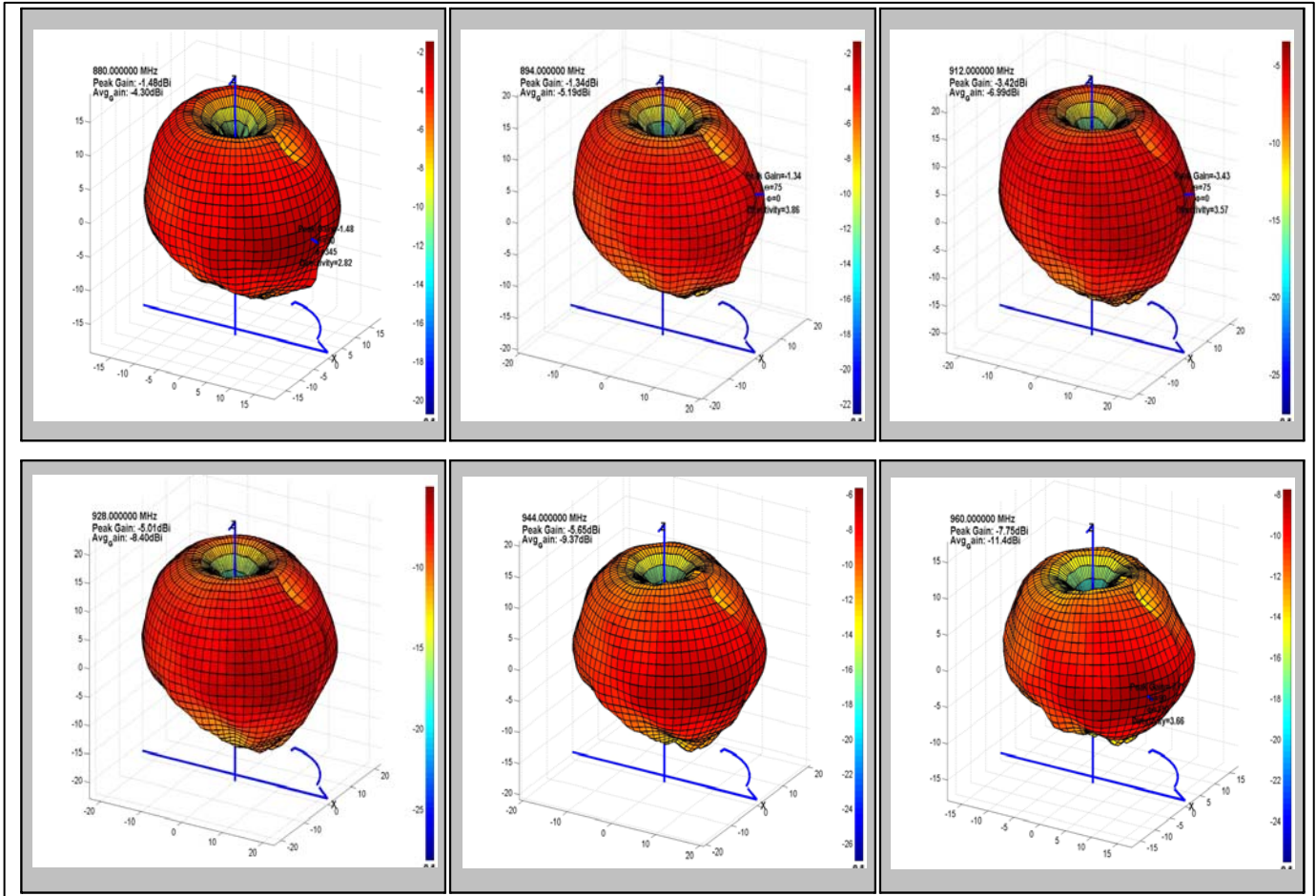


Frequency	Efficiency	Average Gain			Max Gain			Max Position	Directivity
		Ver	Hor	Total	Ver	Hor	Total		
824.000000 MHz	20.3 %	-19.2 dBi	-7.2 dBi	-6.9 dBi	-10.2 dBi	-3.6 dBi	-3.0 dBi	Theta90/Pie0	3.96 dB
838.000000 MHz	27.4 %	-18.1 dBi	-5.9 dBi	-5.6 dBi	-9.4 dBi	-2.3 dBi	-1.7 dBi	Theta90/Pie0	3.90 dB
852.000000 MHz	38.2 %	-16.6 dBi	-4.4 dBi	-4.2 dBi	-9.1 dBi	-1.0 dBi	-1.0 dBi	Theta90/Pie345	3.23 dB
866.000000 MHz	39.9 %	-16.3 dBi	-4.3 dBi	-4.0 dBi	-5.3 dBi	-1.0 dBi	-1.0 dBi	Theta90/Pie345	3.03 dB
880.000000 MHz	37.1 %	-17.0 dBi	-4.5 dBi	-4.3 dBi	-7.1 dBi	-1.5 dBi	-1.5 dBi	Theta90/Pie345	2.82 dB
894.000000 MHz	30.2 %	-17.9 dBi	-5.4 dBi	-5.2 dBi	-5.2 dBi	-2.6 dBi	-1.3 dBi	Theta75/Pie0	3.86 dB



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EGSM900

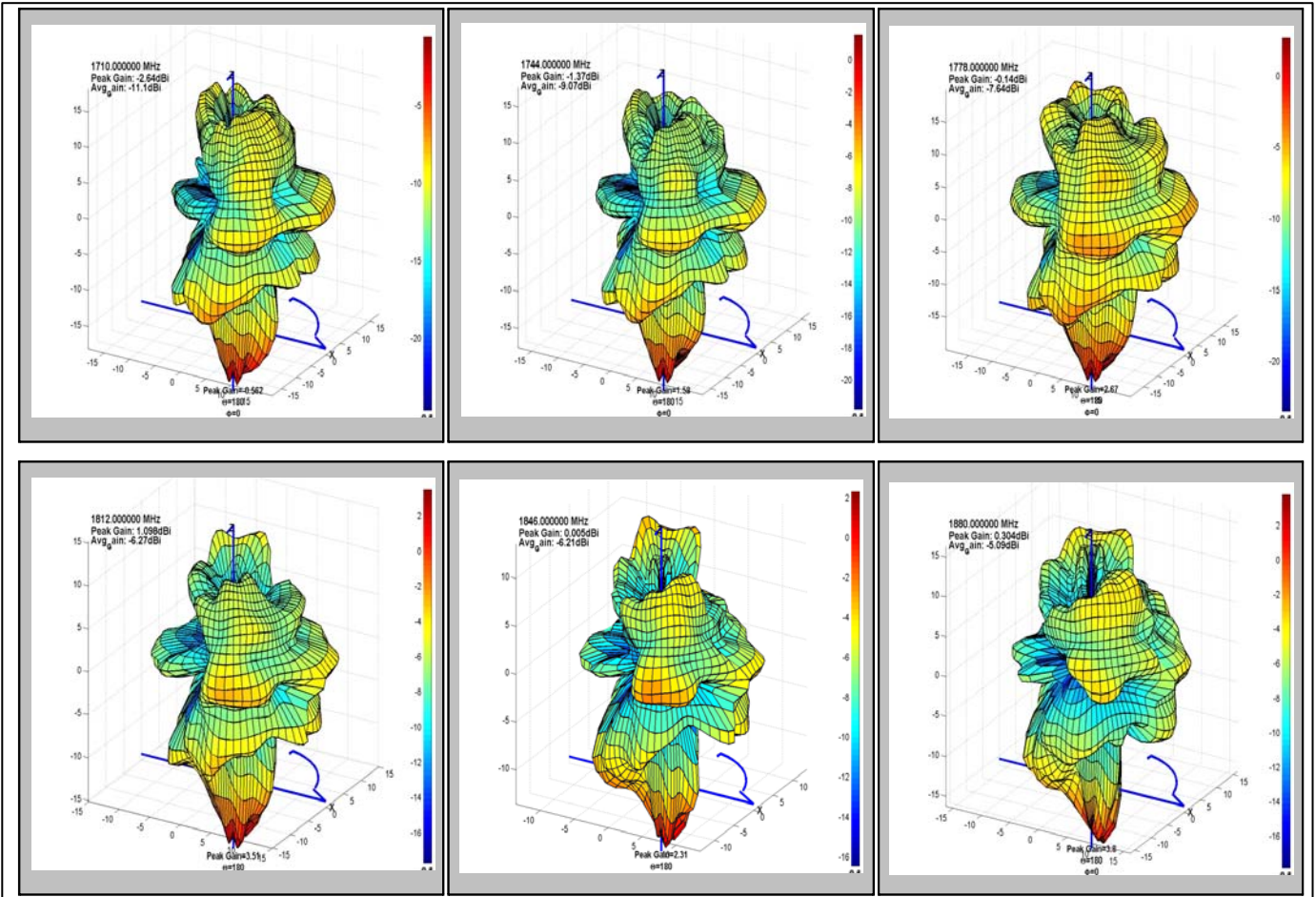


Frequency	Efficiency	Average Gain			Max Gain			Max Position	Directivity
		Ver	Hor	Total	Ver	Hor	Total		
880.000000 MHz	37.1 %	-17.0 dBi	-4.5 dBi	-4.3 dBi	-7.1 dBi	-1.5 dBi	-1.5 dBi	Theta90/Pie345	2.82 dB
894.000000 MHz	30.2 %	-17.9 dBi	-5.4 dBi	-5.2 dBi	-5.2 dBi	-2.6 dBi	-1.3 dBi	Theta75/Pie0	3.86 dB
912.000000 MHz	20.0 %	-19.8 dBi	-7.2 dBi	-7.0 dBi	-7.8 dBi	-4.2 dBi	-3.4 dBi	Theta75/Pie0	3.57 dB
928.000000 MHz	14.4 %	-21.8 dBi	-8.6 dBi	-8.4 dBi	-10.1 dBi	-5.2 dBi	-5.0 dBi	Theta90/Pie120	3.40 dB
944.000000 MHz	11.6 %	-23.2 dBi	-9.6 dBi	-9.4 dBi	-12.2 dBi	-5.8 dBi	-5.7 dBi	Theta90/Pie120	3.72 dB
960.000000 MHz	7.2 %	-25.3 dBi	-11.6 dBi	-11.4 dBi	-15.1 dBi	-7.9 dBi	-7.8 dBi	Theta90/Pie330	3.66 dB



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**DCS1800**

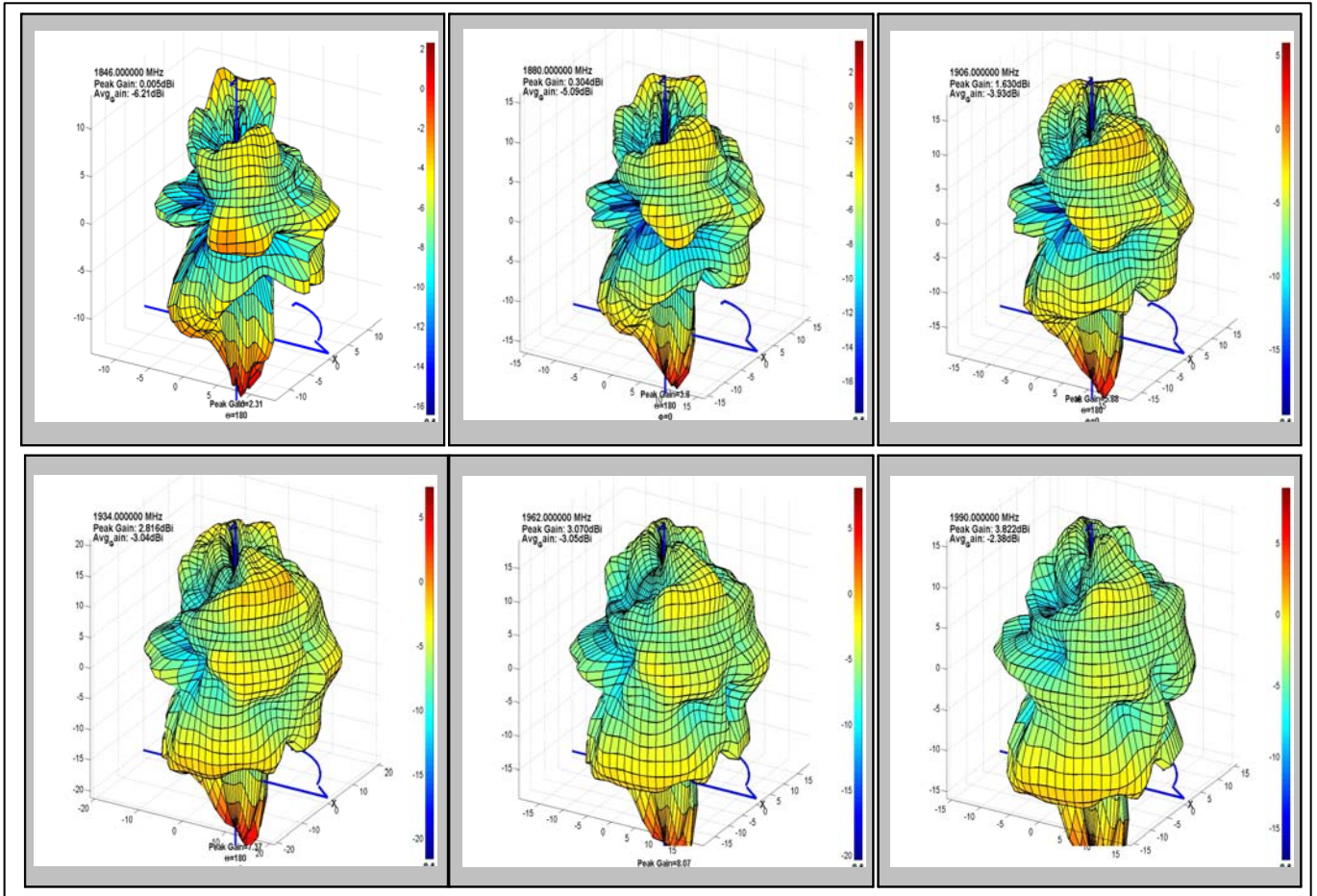


Frequency	Efficiency	Average Gain			Max Gain			Max Position	Directivity
		Ver	Hor	Total	Ver	Hor	Total		
1710.000000 MHz	7.7 %	-14.7 dBi	-13.6 dBi	-11.1 dBi	-3.6 dBi	-3.6 dBi	-2.6 dBi	Theta180/Pie0	8.47 dB
1744.000000 MHz	12.4 %	-12.7 dBi	-11.5 dBi	-9.1 dBi	-1.4 dBi	-1.4 dBi	-1.4 dBi	Theta180/Pie0	7.70 dB
1778.000000 MHz	17.2 %	-11.5 dBi	-9.9 dBi	-7.6 dBi	-0.3 dBi	-0.4 dBi	-0.1 dBi	Theta180/Pie0	7.50 dB
1812.000000 MHz	23.6 %	-10.2 dBi	-8.5 dBi	-6.3 dBi	0.5 dBi	0.5 dBi	1.1 dBi	Theta180/Pie0	7.37 dB
1846.000000 MHz	23.9 %	-10.3 dBi	-8.3 dBi	-6.2 dBi	-0.7 dBi	-0.7 dBi	0.0 dBi	Theta180/Pie0	6.22 dB
1880.000000 MHz	30.9 %	-8.8 dBi	-7.5 dBi	-5.1 dBi	0.8 dBi	0.8 dBi	0.3 dBi	Theta180/Pie0	5.40 dB



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PCS1900



Frequency	Efficiency	Average Gain			Max Gain			Max Position	Directivity
		Ver	Hor	Total	Ver	Hor	Total		
1846.000000 MHz	23.9 %	-10.3 dBi	-8.3 dBi	-6.2 dBi	-0.7 dBi	-0.7 dBi	0.0 dBi	Theta180/Pie0	6.22 dB
1880.000000 MHz	30.9 %	-8.8 dBi	-7.5 dBi	-5.1 dBi	0.8 dBi	0.8 dBi	0.3 dBi	Theta180/Pie0	5.40 dB
1906.000000 MHz	40.4 %	-7.4 dBi	-6.6 dBi	-3.9 dBi	2.9 dBi	2.9 dBi	1.6 dBi	Theta180/Pie0	5.57 dB
1934.000000 MHz	49.7 %	-6.2 dBi	-5.9 dBi	-3.0 dBi	4.3 dBi	4.4 dBi	2.8 dBi	Theta180/Pie0	5.86 dB
1962.000000 MHz	49.5 %	-6.1 dBi	-6.0 dBi	-3.1 dBi	5.0 dBi	5.1 dBi	3.1 dBi	Theta180/Pie0	6.12 dB
1990.000000 MHz	57.8 %	-5.2 dBi	-5.6 dBi	-2.4 dBi	5.9 dBi	5.9 dBi	3.8 dBi	Theta180/Pie0	6.20 dB