

豪岑電子金屬股份有限公司

HOW TSEN INTL. ELECTRONICS METAL CO., LTD.

P.T HOWSANINDO INDUSTRY(INDONESIA)

桃園縣 327 新屋鄉中山東路 2 段 130 巷 12 號

TAIWAN : NO.12 LANE 130. SEC, 2, CHUNG-SAN EAST RD., SHIN WU HSIANG TAOYUAN HSIEN, TAIWAN, R.O.C

TEL : 886-3-4777517 hunting FAX : 886-3-4777520

INDONESIA : JL PANGKALAN 1-B BANTAR GEBANG, BEKASI 17310 INDONESIA

TEL : 62-21-8250470 hunting FAX :62-21-8250473

SPECIFICATION FOR APPROVAL

Parts Name : 2G/3G Antenna

Type No : C-911

Rev. : E

Customer P/N : 1750006083

Date : Sep. 27th,2011

CUSTOMER APPROVAL & COMMENT

FULL NAME	POSITION	SIGNATURE	COMPANY STAMP	COMMENT

DATE :

豪岑電子金屬股份有限公司

HOWTSEN Intl. Electronic Metal

Sep. 27th 發行專用章

ISO 9001-2008

ENGINEERING

QC CHECK

HOW TSEN Intl. ELECTRONICS METAL CO., LTD.

ANTENNA SPECIFICATIONS FOR APPROVAL

1. General Description

- 1.1 Type No : C-911
- 1.2 Customer P/N : 1750006083

2. A DESCRIPTION & APPLICATION

*This antenna assembly is designed for use in portable °
Communications equipment over a temperature range °
Of -20 °C to +70 °C in an indoor / outdoor environment °*

3. Structure

Dimensions and material are be in conformity with the requirement of an approved drawing number °

4. Surface Appearance

Surface condition should not have scratch , pin hole , blistering (If necessary take sample for consideration)

5. ENVIRONMENTAL CHARACTERISTICS

- 5.1 Operating temperature range -20 °C to +65 °C °
- 5.2 Humidity range : 10 % RH to 80 % RH °

6. Electrical Characteristics

- 6.1 Testing Equipment : ADVANTEST R3767CG Network Analyzer
- 6.2 Frequency Band : GSM850/GSM900 / DCS1800 / PCS1900 / WCDMA2100 MHz
- 6.3 Frequency Marker : 880 / 960 / 1710 / 1880 / 1990 / 2170 MHz
- 6.4 Return Loss : ≤ -10.0 dB Maximum
- 6.5 V.S.W.R : 3.0:1.0 or less
- 6.6 Connector : SMA Male
- 6.7 Impedance : 50 Ω Nominal Value
- 6.8 Radiation Pattern : Near omni-directional in the horizontal plane
- 6.9 Admitted Power : 2W

7. Mechanical Capability

- 7.1 Qualification testing , all product shall be able to withstand the following testing °
- 7.2 Physical dimensions identified within this specification °
- 7.3 Pull Test : Tube has the capability of load 3 kgf-cm in a vertical position within 30 seconds °
- 7.4 Torque Test : 3 kgf-cm no damage happened °
- 7.5 Testing Conditions
 - 7.5.1 Precondition at -20 °C for 1 hour then expose to +80 °C taking final measurements for 120 hours °
 - 7.5.2 90%~95% relative humidity for 120 hours, finally allow to dry at room ambient for 4 hour °

8. Inspection Standard

8.1 : For Dimension to use the special inspection level of S-4 , AQL 1.0 ◦

8.2 : For Appearance to use MIL-STD-105DII AQL1.0 ◦

8.3 : For Mechanical Capability : Per lot Sampling, $n=5$, Ac 0 , Re 1 ◦

8.4 : For Environmental test : Per lot Sampling $n=3$, Ac 0 , Re 1 ◦

9. Packing Style

According to the specified packing method ◦

10. Others

Any changes in this specification should be agreed by both parties ◦

2G/3G Antenna

For : GSM850 / GSM900 / DCS1800 / PCS1900 / WCDMA2100 MHz

Type No. : C-911

Electrical Specification

Testing Equipment	ADVANTEST R3767CG Network Analyzer
Frequency Range	GSM850 / GSM900 / DCS1800 / GSM1900 / WCDMA2100 MHz
Frequency Marker	850/880/960/1710/1880 / 1990/2170 MHz
Return Loss	≤ -10.0 dB Maximum
V.S.W.R	2.0:1.0 or less
Connector	SMA Male
Impedance	50 Ω Nominal Value
Radiation Pattern	Near Omni-directional in the horizontal plane
Admitted Power	2W



Environmental & Mechanical Characters

Temperature	-20 °C to +65 °C
Weight	G
Dimensions	Ø



HOW TSEN INTL. ELECTRONICS METAL CO.,LTD.

TEST REPORT

- 1. Model : C-911
- 2. Quantity : 5 Pcs
- 3. Date Of Testing : March.10,2011
- 4. Testing Item : Pull Test
- 5. Testing Equipment : B-016 (Push-Pull Scale Fb30K)
- 6. Testing Conditions : Antenna Must Withstand a (3.0 Kgf-Cm)

Tensile Load Applied To Over Mold For 10 Seconds.

No Part Of The Antenna May Be Pulled Out Of The

Assembly Or From The Housing.



7. Testing Result :

Sample	1	2	3	4	5	6	7	8	9	10
OK or NG	ok	ok	ok	ok	ok	-	-	-	-	-

Approved :

Tester :

HOW TSEN INTL. ELECTRONICS METAL CO.,LTD.

TEST REPORT

1. Model : C-911
2. Quantity : 5 Pcs
3. Date Of Testing : March.10,2011
4. Testing Item : Torque Test
5. Testing Equipment : B-001 (Mechanical Torque Meter 2-TM30)
6. Testing Conditions : (3.0 Kgf-Cm) No Damage Happened.



7. Testing Result :

Sample	1	2	3	4	5	6	7	8	9	10
OK or NG	ok	ok	ok	ok	ok	-	-	-	-	-

Approved :

Tester :

Testing Equipment



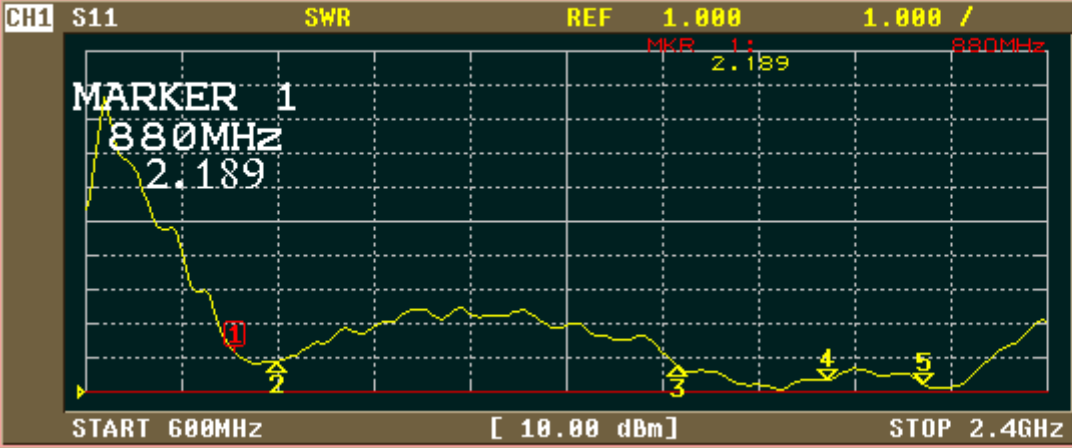
Log Magnitude



Smith Chart



V.S.W.R



BITMAP
FILE

SAVE TO
DISK

COMPRESSION

ON OFF

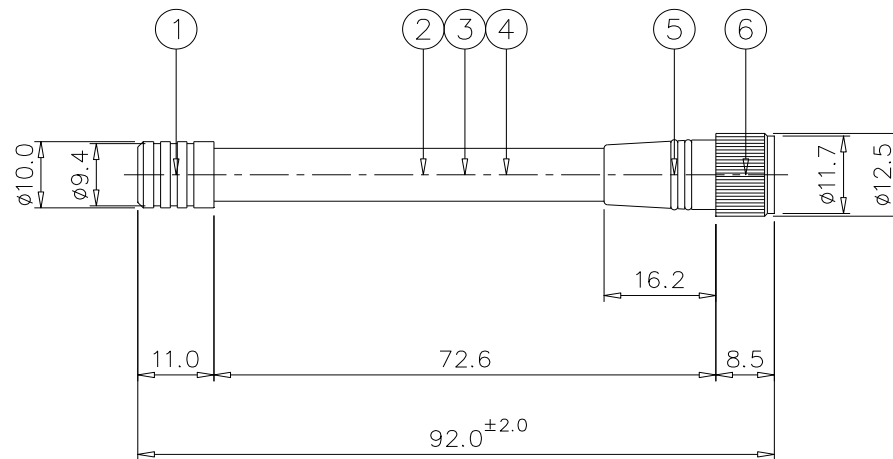
TRUNCATE


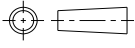
ON OFF

CH1 MARKER LIST

1:	880.000MHz	2.189
2:	960.000MHz	1.878
3:	1.710 000GHz	1.755
4:	1.990 000GHz	1.356
5:	2.170 000GHz	1.223
6:		
7:		
8:		
9:		
10:		

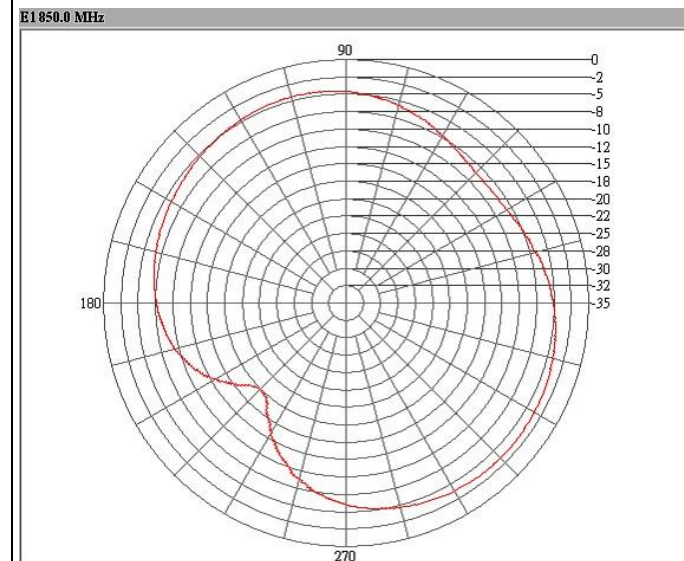
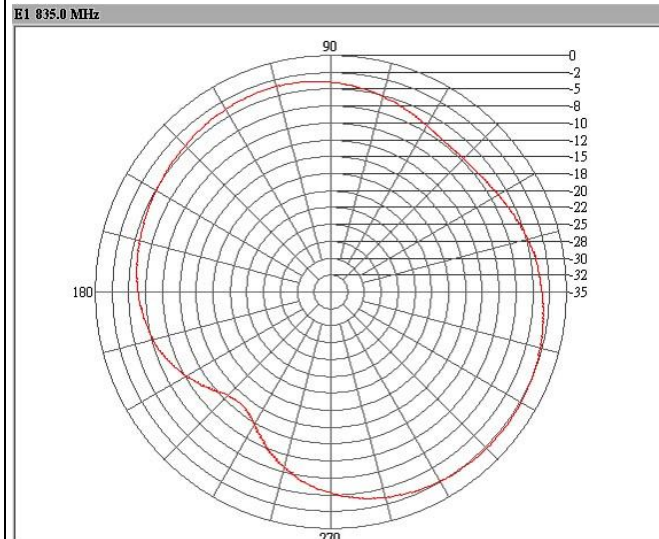
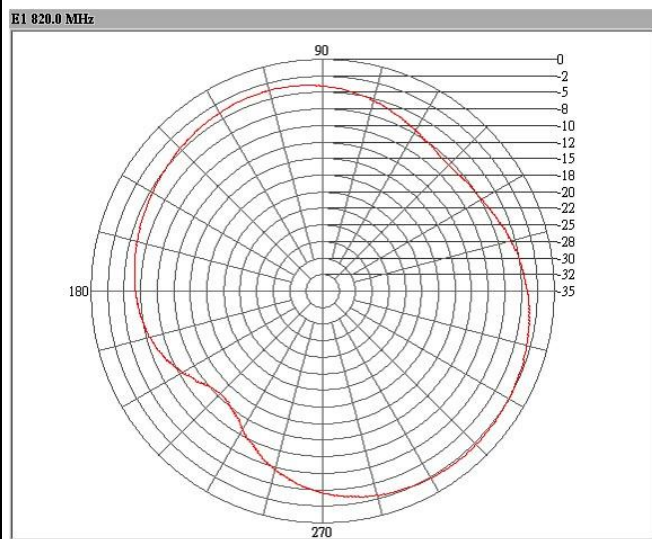
Return



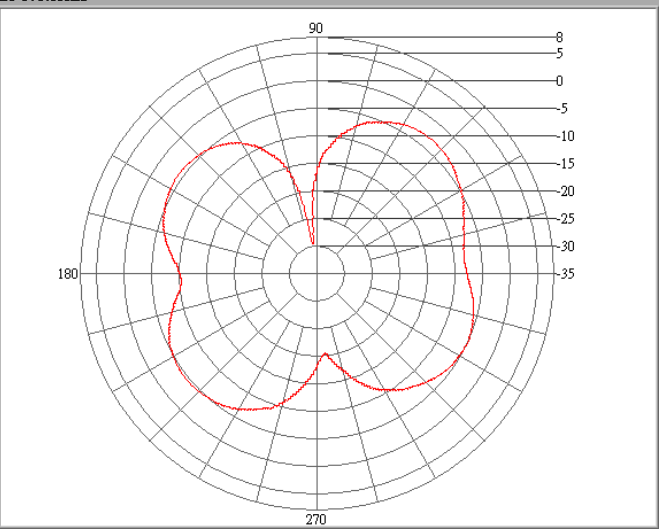
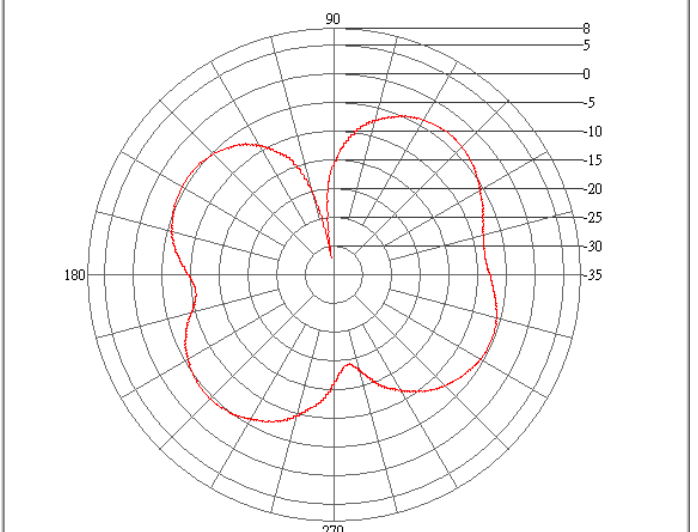
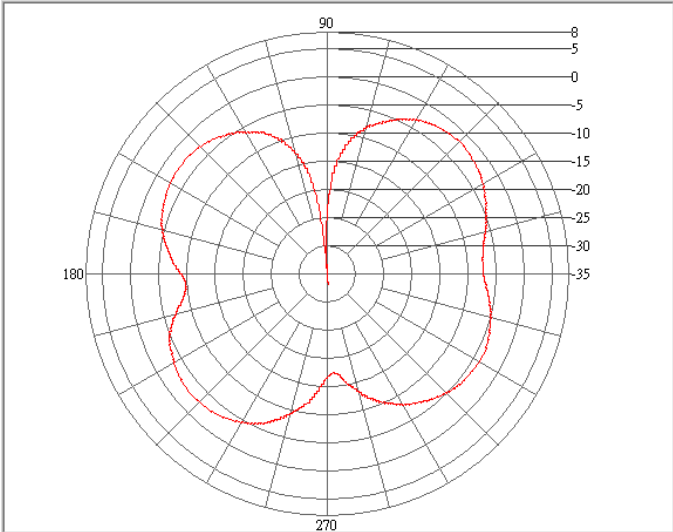
6	SMA Male	Brass C3604	1	BCr#1B+Golden						
5	O-Ring	Rubber	1	White	~6 ^{+0.05}	Scale 1:1	 HOW TSEN Intel. Electronics Metal Co., Ltd.			
4	Brass Tube	BST	1	-	7~30 ^{+0.10}	Unit:mm				
3	Cable	RG-316	1	Black	31~80 ^{+0.15}		Designed	Checked	Approved	Name
2	Tube	PU-98A	1	Black	81~250 ^{+0.20}		Charles			3G Antenna
1	CAP	ABS	1	Black	251~500 ^{+0.25}					Model No.
No	Paets Name	Material	QTY	Finish	Tolerances	Third Angle	Date	2011,03.10	Rev.B	C-911

2D Pattern E plane

820MHz		835MHz		850MHz	
E1		E1		E1	
Max Gain (dBi)	-3.2	Max Gain (dBi)	-3.28	Max Gain (dBi)	-2.5
Max Gain@Angle (degree)	309	Max Gain@Angle (degree)	316	Max Gain@Angle (degree)	315
Min Gain (dBi)	-13.12	Min Gain (dBi)	-13.69	Min Gain (dBi)	-17.48
Min Gain@Angle (degree)	227	Min Gain@Angle (degree)	230	Min Gain@Angle (degree)	225
Average Gain (dBi)	-5.06	Average Gain (dBi)	-4.96	Average Gain (dBi)	-6.08
-3dB Angle L (degree)	11.95	-3dB Angle L (degree)	20.1	-3dB Angle L (degree)	14.1
-3db Angle R (degree)	265.6	-3db Angle R (degree)	270	-3db Angle R (degree)	267.15
HPB (degree)	106.35	HPB (degree)	110.1	HPB (degree)	106.95
FBR (dB)	1.8	FBR (dB)	1.84	FBR (dB)	1.4

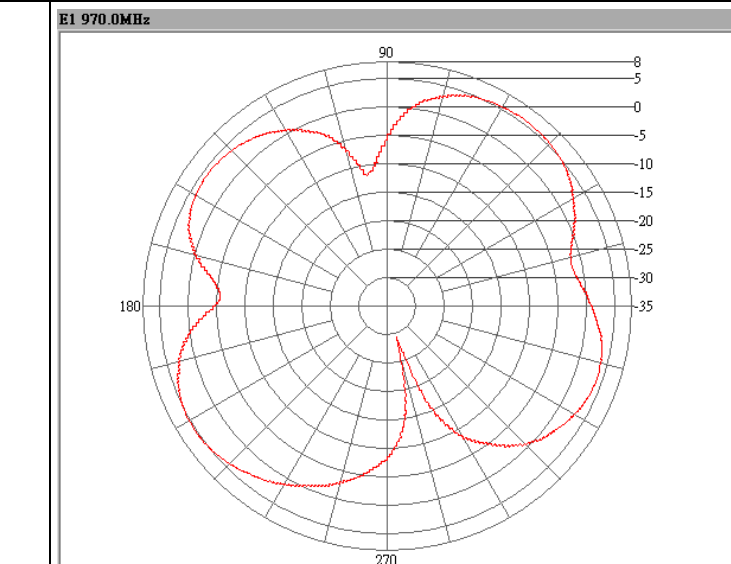
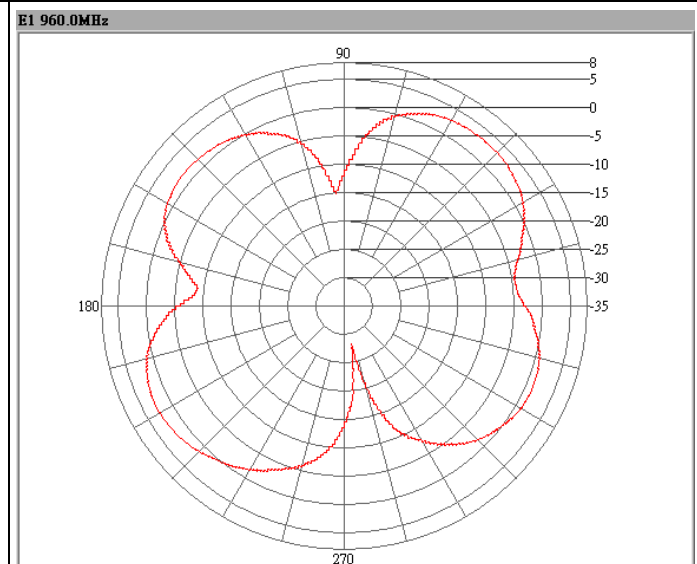
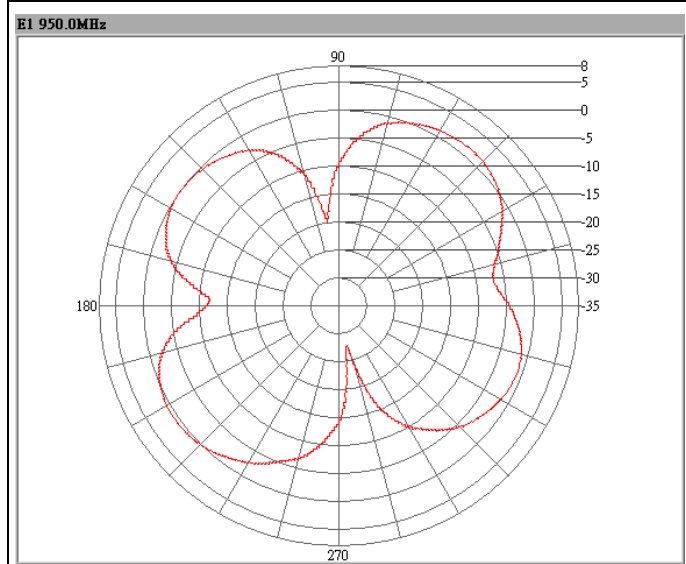


2D Pattern E Plane

870MHz	880MHz	890MHz																																																												
<table border="1"> <thead> <tr> <th colspan="2">E1</th> </tr> </thead> <tbody> <tr> <td>Max Gain (dBi)</td> <td>-2.99</td> </tr> <tr> <td>Max Gain@Angle (degree)</td> <td>48</td> </tr> <tr> <td>Min Gain (dBi)</td> <td>-29.59</td> </tr> <tr> <td>Min Gain@Angle (degree)</td> <td>99</td> </tr> <tr> <td>Average Gain (dBi)</td> <td>-6.72</td> </tr> <tr> <td>-3dB Angle L (degree)</td> <td>71.1</td> </tr> <tr> <td>-3db Angle R (degree)</td> <td>23.4</td> </tr> <tr> <td>HPB (degree)</td> <td>47.7</td> </tr> <tr> <td>FBR (dB)</td> <td>1.49</td> </tr> </tbody> </table>	E1		Max Gain (dBi)	-2.99	Max Gain@Angle (degree)	48	Min Gain (dBi)	-29.59	Min Gain@Angle (degree)	99	Average Gain (dBi)	-6.72	-3dB Angle L (degree)	71.1	-3db Angle R (degree)	23.4	HPB (degree)	47.7	FBR (dB)	1.49	<table border="1"> <thead> <tr> <th colspan="2">E1</th> </tr> </thead> <tbody> <tr> <td>Max Gain (dBi)</td> <td>-3.28</td> </tr> <tr> <td>Max Gain@Angle (degree)</td> <td>51</td> </tr> <tr> <td>Min Gain (dBi)</td> <td>-32.09</td> </tr> <tr> <td>Min Gain@Angle (degree)</td> <td>99</td> </tr> <tr> <td>Average Gain (dBi)</td> <td>-6.96</td> </tr> <tr> <td>-3dB Angle L (degree)</td> <td>71.8</td> </tr> <tr> <td>-3db Angle R (degree)</td> <td>25.55</td> </tr> <tr> <td>HPB (degree)</td> <td>46.25</td> </tr> <tr> <td>FBR (dB)</td> <td>1.14</td> </tr> </tbody> </table>	E1		Max Gain (dBi)	-3.28	Max Gain@Angle (degree)	51	Min Gain (dBi)	-32.09	Min Gain@Angle (degree)	99	Average Gain (dBi)	-6.96	-3dB Angle L (degree)	71.8	-3db Angle R (degree)	25.55	HPB (degree)	46.25	FBR (dB)	1.14	<table border="1"> <thead> <tr> <th colspan="2">E1</th> </tr> </thead> <tbody> <tr> <td>Max Gain (dBi)</td> <td>-1.75</td> </tr> <tr> <td>Max Gain@Angle (degree)</td> <td>43</td> </tr> <tr> <td>Min Gain (dBi)</td> <td>-36.95</td> </tr> <tr> <td>Min Gain@Angle (degree)</td> <td>94</td> </tr> <tr> <td>Average Gain (dBi)</td> <td>-5.34</td> </tr> <tr> <td>-3dB Angle L (degree)</td> <td>65.23</td> </tr> <tr> <td>-3db Angle R (degree)</td> <td>20.95</td> </tr> <tr> <td>HPB (degree)</td> <td>44.28</td> </tr> <tr> <td>FBR (dB)</td> <td>0.93</td> </tr> </tbody> </table>	E1		Max Gain (dBi)	-1.75	Max Gain@Angle (degree)	43	Min Gain (dBi)	-36.95	Min Gain@Angle (degree)	94	Average Gain (dBi)	-5.34	-3dB Angle L (degree)	65.23	-3db Angle R (degree)	20.95	HPB (degree)	44.28	FBR (dB)	0.93
E1																																																														
Max Gain (dBi)	-2.99																																																													
Max Gain@Angle (degree)	48																																																													
Min Gain (dBi)	-29.59																																																													
Min Gain@Angle (degree)	99																																																													
Average Gain (dBi)	-6.72																																																													
-3dB Angle L (degree)	71.1																																																													
-3db Angle R (degree)	23.4																																																													
HPB (degree)	47.7																																																													
FBR (dB)	1.49																																																													
E1																																																														
Max Gain (dBi)	-3.28																																																													
Max Gain@Angle (degree)	51																																																													
Min Gain (dBi)	-32.09																																																													
Min Gain@Angle (degree)	99																																																													
Average Gain (dBi)	-6.96																																																													
-3dB Angle L (degree)	71.8																																																													
-3db Angle R (degree)	25.55																																																													
HPB (degree)	46.25																																																													
FBR (dB)	1.14																																																													
E1																																																														
Max Gain (dBi)	-1.75																																																													
Max Gain@Angle (degree)	43																																																													
Min Gain (dBi)	-36.95																																																													
Min Gain@Angle (degree)	94																																																													
Average Gain (dBi)	-5.34																																																													
-3dB Angle L (degree)	65.23																																																													
-3db Angle R (degree)	20.95																																																													
HPB (degree)	44.28																																																													
FBR (dB)	0.93																																																													
<p>E1 870.0MHz</p> 	<p>E1 880.0MHz</p> 	<p>E1 890.0MHz</p> 																																																												

2D Pattern E plane

950MHz		960MHz		970MHz	
E1		E1		E1	
Max Gain (dBi)	1.69	Max Gain (dBi)	3.31	Max Gain (dBi)	5.69
Max Gain@Angle (degree)	50	Max Gain@Angle (degree)	49	Max Gain@Angle (degree)	54
Min Gain (dBi)	-27.65	Min Gain (dBi)	-28.17	Min Gain (dBi)	-29.27
Min Gain@Angle (degree)	282	Min Gain@Angle (degree)	281	Min Gain@Angle (degree)	286
Average Gain (dBi)	-2.51	Average Gain (dBi)	-0.59	Average Gain (dBi)	1.82
-3dB Angle L (degree)	75.8	-3dB Angle L (degree)	72.93	-3dB Angle L (degree)	76.53
-3db Angle R (degree)	29.47	-3db Angle R (degree)	25.63	-3db Angle R (degree)	29.63
HPB (degree)	46.33	HPB (degree)	47.3	HPB (degree)	46.9
FBR (dB)	1.26	FBR (dB)	1.46	FBR (dB)	1.68



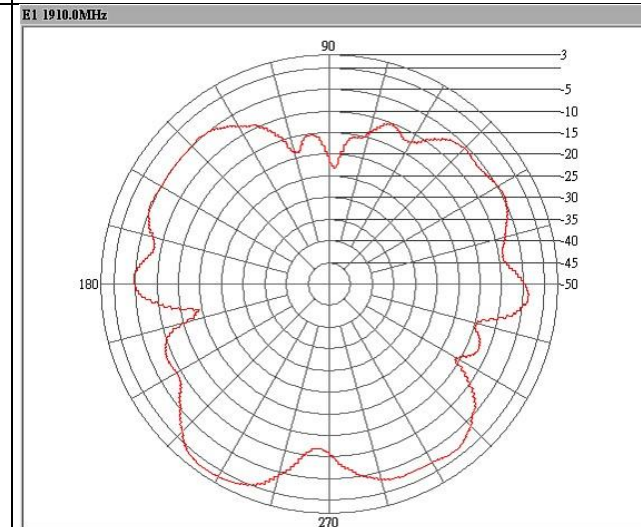
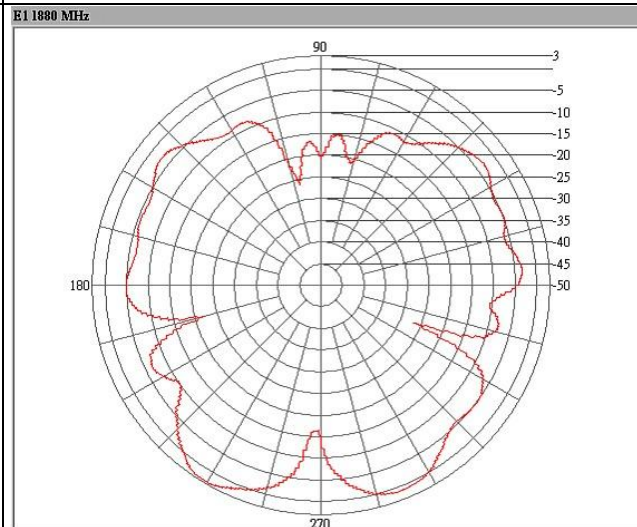
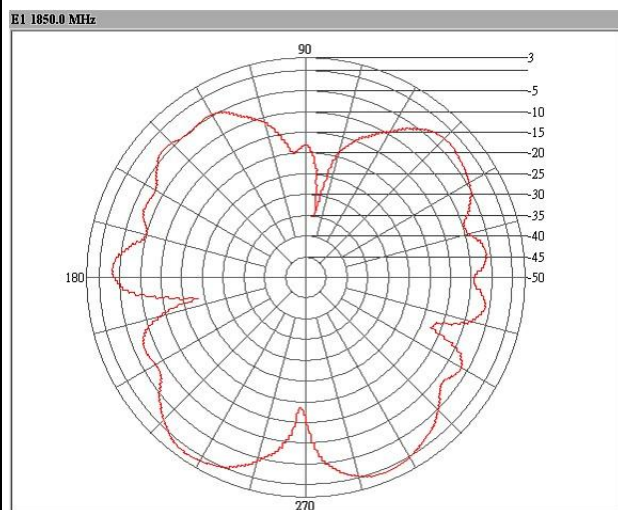
2D Pattern E plane

1700MHz		1710MHz		1720MHz	
E1		E1		E1	
Max Gain (dBi)	6.4	Max Gain (dBi)	7.46	Max Gain (dBi)	7.62
Max Gain@Angle (degree)	46	Max Gain@Angle (degree)	52	Max Gain@Angle (degree)	49
Min Gain (dBi)	-20.4	Min Gain (dBi)	-21.66	Min Gain (dBi)	-23.82
Min Gain@Angle (degree)	261	Min Gain@Angle (degree)	261	Min Gain@Angle (degree)	260
Average Gain (dBi)	-0.49	Average Gain (dBi)	0.35	Average Gain (dBi)	0.41
-3dB Angle L (degree)	64.07	-3dB Angle L (degree)	70.2	-3dB Angle L (degree)	68.35
-3db Angle R (degree)	29.12	-3db Angle R (degree)	35.02	-3db Angle R (degree)	33.08
HPB (degree)	34.95	HPB (degree)	35.18	HPB (degree)	35.27
FBR (dB)	16.61	FBR (dB)	17.63	FBR (dB)	17.79

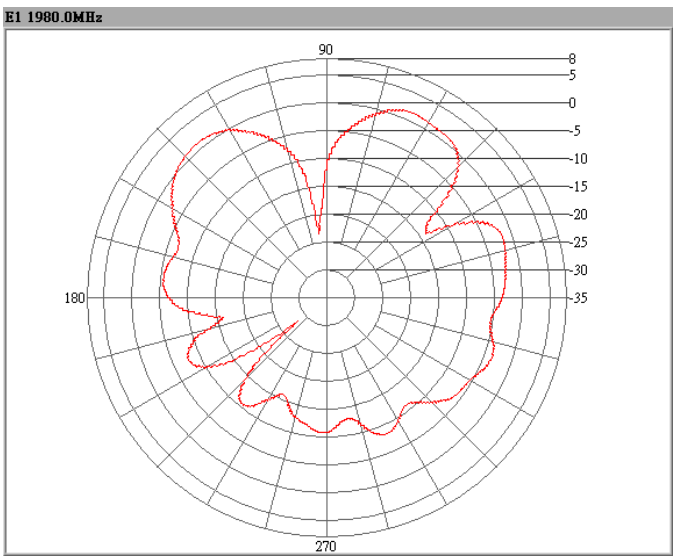
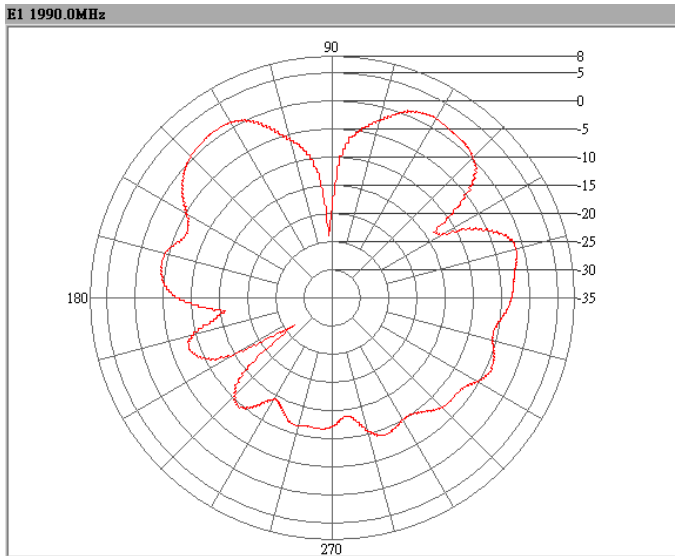
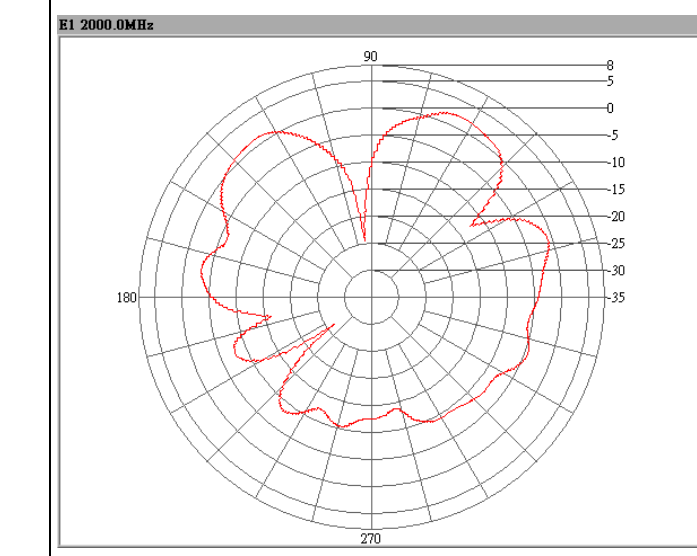
E1 1700.0MHz	E1 1710.0MHz	E1 1720.0MHz

2D Pattern E plane

1850MHz		18800MHz		1910MHz	
E1		E1		E1	
Max Gain (dBi)	1.4	Max Gain (dBi)	2.62	Max Gain (dBi)	1.59
Max Gain@Angle (degree)	236	Max Gain@Angle (degree)	238	Max Gain@Angle (degree)	236
Min Gain (dBi)	-35.18	Min Gain (dBi)	-26.99	Min Gain (dBi)	-23.25
Min Gain@Angle (degree)	82	Min Gain@Angle (degree)	338	Min Gain@Angle (degree)	87
Average Gain (dBi)	-4.75	Average Gain (dBi)	-4.52	Average Gain (dBi)	-5.37
-3dB Angle L (degree)	250.1	-3dB Angle L (degree)	251.97	-3dB Angle L (degree)	251.53
-3db Angle R (degree)	224.5	-3db Angle R (degree)	229.6	-3db Angle R (degree)	225.6
HPB (degree)	25.6	HPB (degree)	22.37	HPB (degree)	25.93
FBR (dB)	4.62	FBR (dB)	10.28	FBR (dB)	7.8

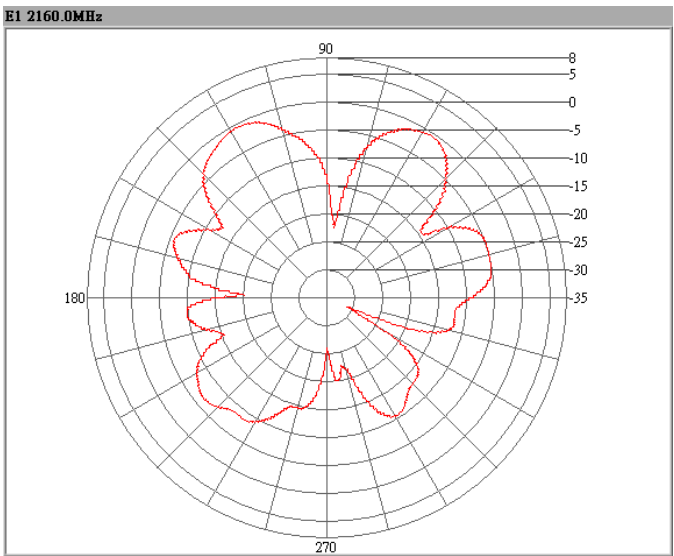
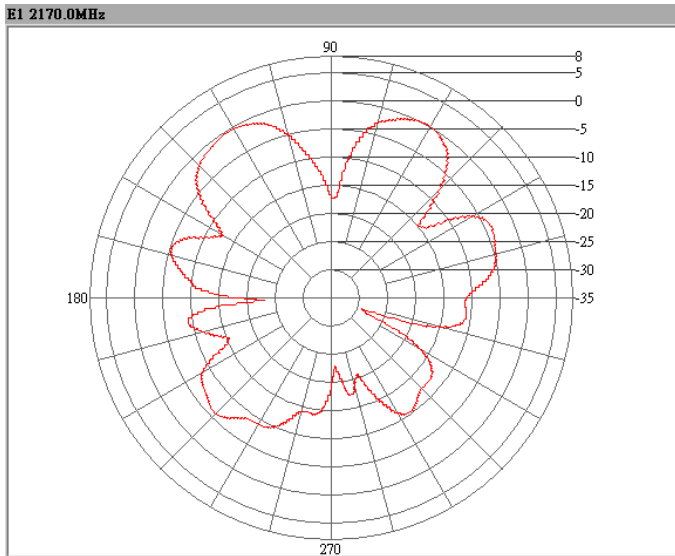
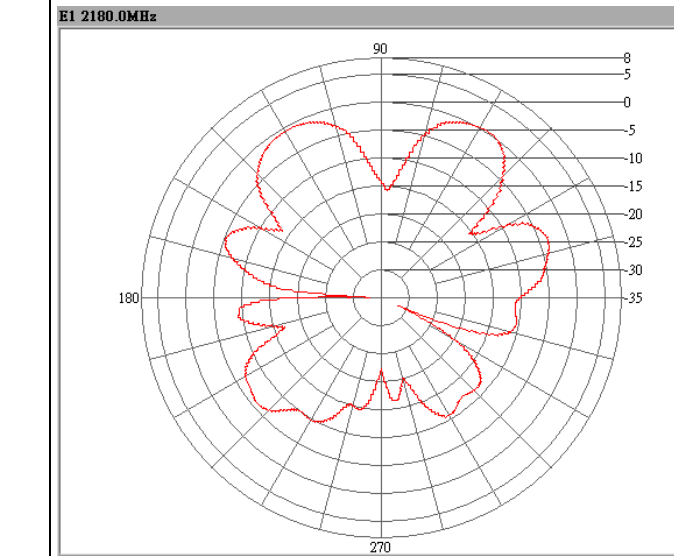


2D Pattern E plane

1980MHz	1990MHz	2000MHz
E1	E1	E1
Max Gain (dBi) 1.62	Max Gain (dBi) 1.87	Max Gain (dBi) 2.24
Max Gain@Angle (degree) 49	Max Gain@Angle (degree) 61	Max Gain@Angle (degree) 65
Min Gain (dBi) -23.82	Min Gain (dBi) -26.72	Min Gain (dBi) -26.55
Min Gain@Angle (degree) 260	Min Gain@Angle (degree) 216	Min Gain@Angle (degree) 216
Average Gain (dBi) 0.41	Average Gain (dBi) -4.14	Average Gain (dBi) -3.94
-3dB Angle L (degree) 68.35	-3dB Angle L (degree) 72.52	-3dB Angle L (degree) 75.8
-3db Angle R (degree) 33.08	-3db Angle R (degree) 41.36	-3db Angle R (degree) 45.45
HPB (degree) 35.27	HPB (degree) 31.16	HPB (degree) 30.35
FBR (dB) 17.79	FBR (dB) 12.69	FBR (dB) 11.72
E1 1980.0MHz 	E1 1990.0MHz 	E1 2000.0MHz 

2D Pattern E plane

2160MHz	2170MHz	2180MHz
E1	E1	E1
Max Gain (dBi)	Max Gain (dBi)	Max Gain (dBi)
-0.44	0.23	0.39
Max Gain@Angle (degree)	Max Gain@Angle (degree)	Max Gain@Angle (degree)
118	62	58
Min Gain (dBi)	Min Gain (dBi)	Min Gain (dBi)
-31.03	-29.29	-32.89
Min Gain@Angle (degree)	Min Gain@Angle (degree)	Min Gain@Angle (degree)
336	340	178
Average Gain (dBi)	Average Gain (dBi)	Average Gain (dBi)
-6.96	-6.38	-6.43
-3dB Angle L (degree)	-3dB Angle L (degree)	-3dB Angle L (degree)
134.4	75.2	71.87
-3db Angle R (degree)	-3db Angle R (degree)	-3db Angle R (degree)
105.48	50.2	47.31
HPB (degree)	HPB (degree)	HPB (degree)
28.92	25	24.55
FBR (dB)	FBR (dB)	FBR (dB)
9.98	8.93	9.34

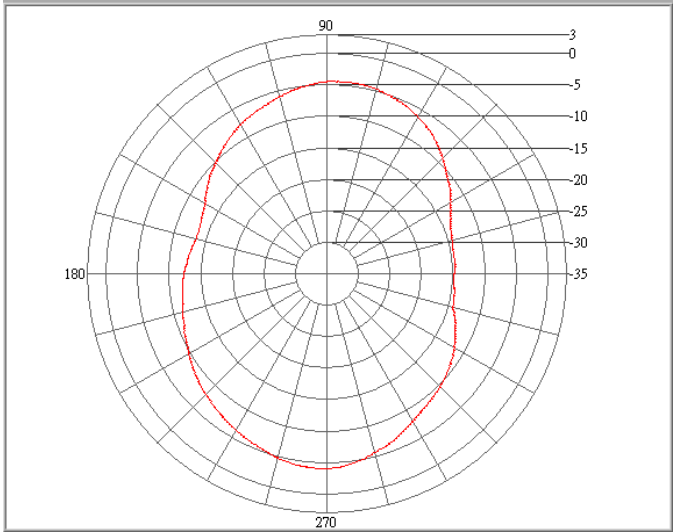
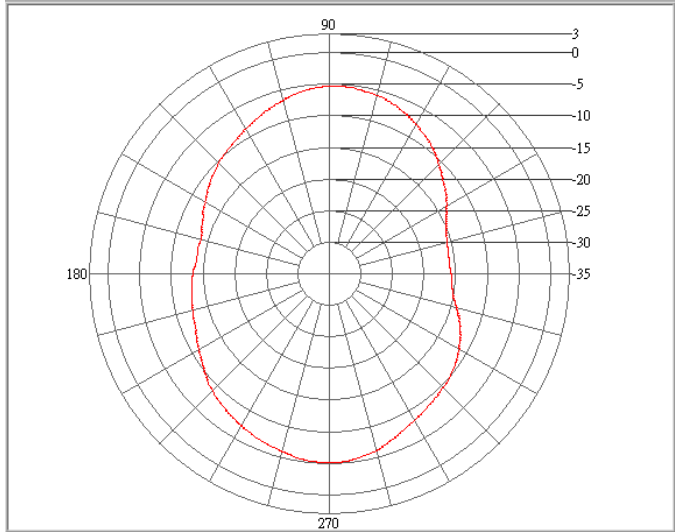
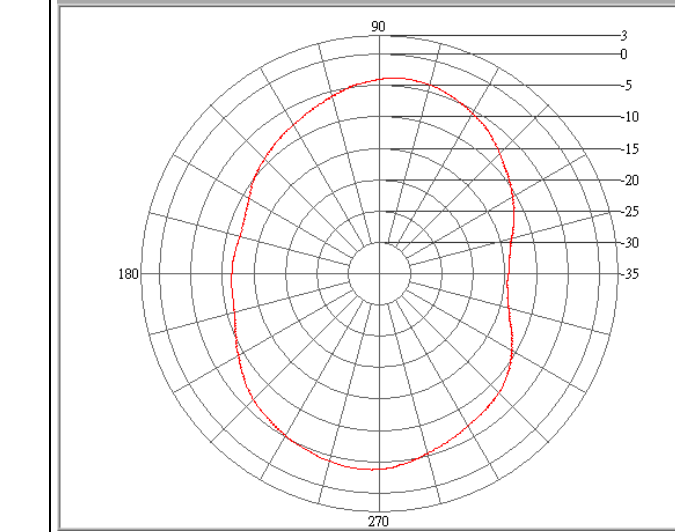
E1 2160.0MHz	E1 2170.0MHz	E1 2180.0MHz
		

2D Pattern H plane

820MHz	835MHz	850MHz
H	H	H
Max Gain (dBi) -7.44	Max Gain (dBi) -6.51	Max Gain (dBi) -6.34
Max Gain@Angle (degree) 287	Max Gain@Angle (degree) 40	Max Gain@Angle (degree) 42
Min Gain (dBi) -14.68	Min Gain (dBi) -13.35	Min Gain (dBi) -12.38
Min Gain@Angle (degree) 227	Min Gain@Angle (degree) 161	Min Gain@Angle (degree) 322
Average Gain (dBi) -10.11	Average Gain (dBi) -11.04	Average Gain (dBi) -10.75
-3dB Angle L (degree) 294.78	-3dB Angle L (degree) 125.9	-3dB Angle L (degree) 138.4
-3db Angle R (degree) 251.47	-3db Angle R (degree) 355	-3db Angle R (degree) 352.2
HPB (degree) 43.31	HPB (degree) 130.9	HPB (degree) 146.2
FBR (dB) 1.56	FBR (dB) 3.23	FBR (dB) 2.91

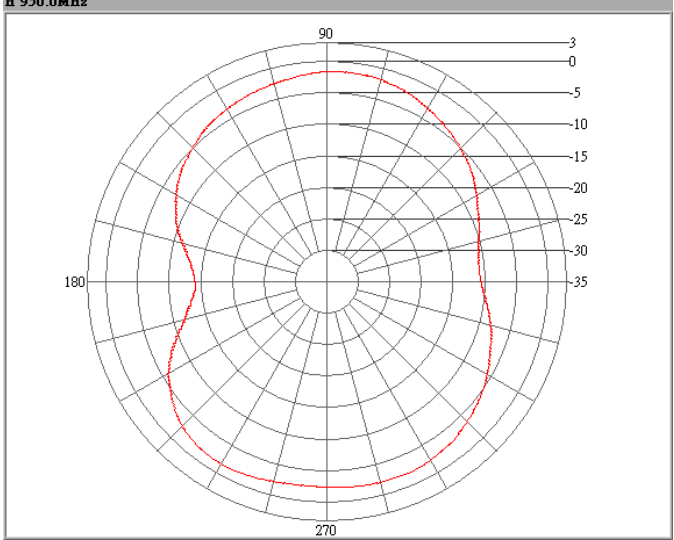
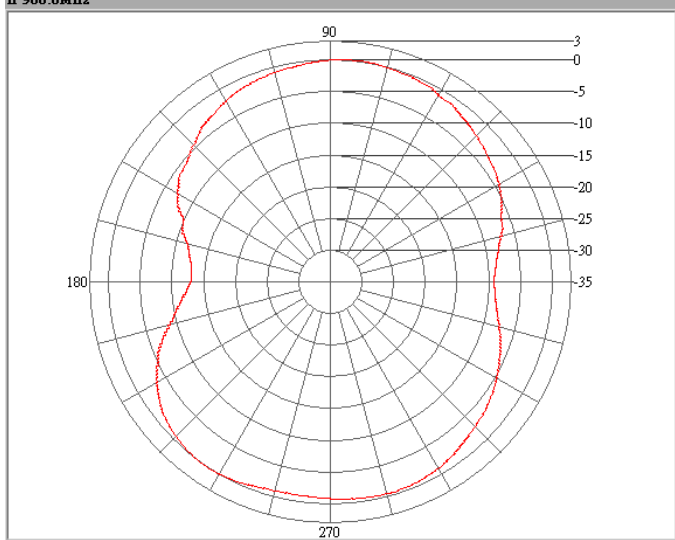
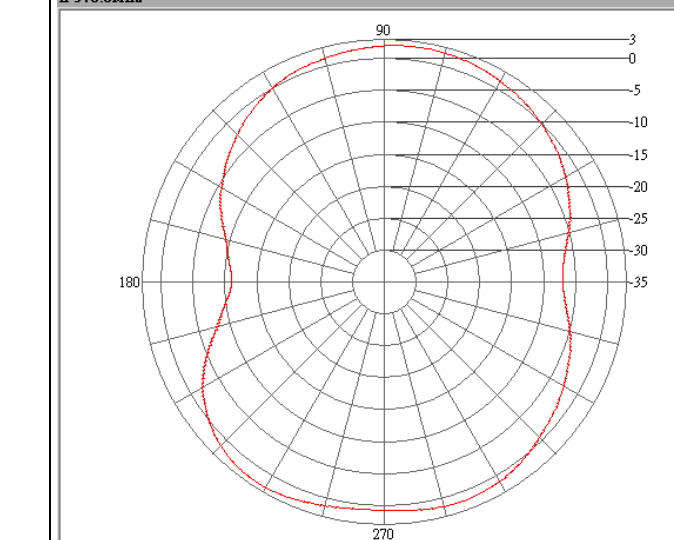
2D Pattern H plane

870MHz		880MHz		890MHz	
	H		H		H
Max Gain (dBi)	-4.02	Max Gain (dBi)	-5.06	Max Gain (dBi)	-3.64
Max Gain@Angle (degree)	267	Max Gain@Angle (degree)	273	Max Gain@Angle (degree)	81
Min Gain (dBi)	-14.91	Min Gain (dBi)	-15.95	Min Gain (dBi)	-14.6
Min Gain@Angle (degree)	360	Min Gain@Angle (degree)	4	Min Gain@Angle (degree)	356
Average Gain (dBi)	-7.95	Average Gain (dBi)	-8.79	Average Gain (dBi)	-7.24
-3dB Angle L (degree)	294.7	-3dB Angle L (degree)	299	-3dB Angle L (degree)	111.7
-3db Angle R (degree)	232.6	-3db Angle R (degree)	231.7	-3db Angle R (degree)	51.65
HPB (degree)	62.1	HPB (degree)	67.3	HPB (degree)	60.05
FBR (dB)	0.33	FBR (dB)	0.18	FBR (dB)	0.06

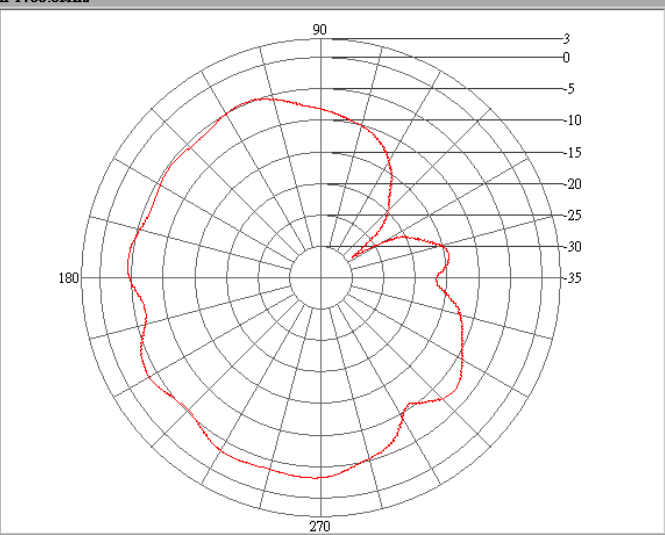
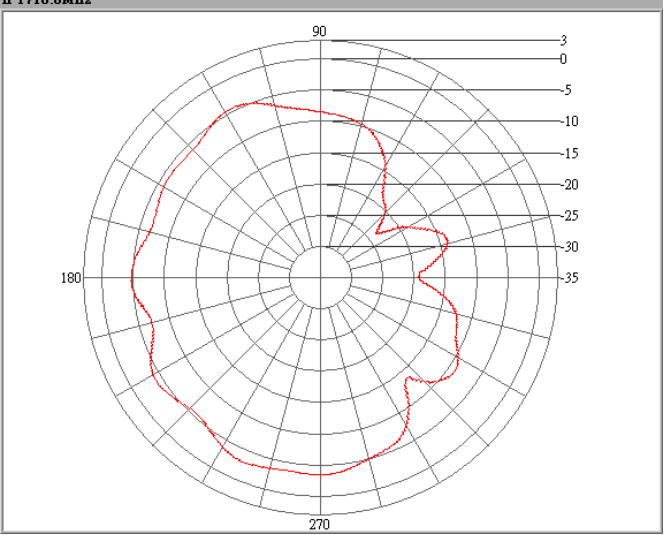
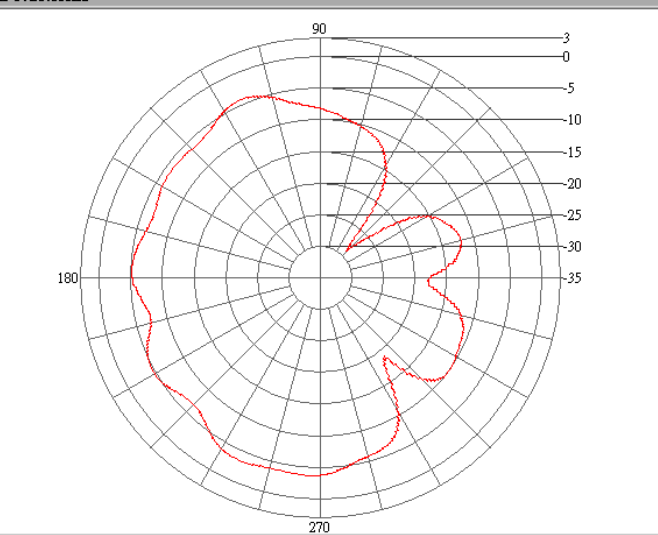
H 870.0MHz		H 880.0MHz		H 890.0MHz	
					

2D Pattern H plane

950MHz		960MHz		970MHz	
H		H		H	
Max Gain (dBi)	-1.53	Max Gain (dBi)	0.14	Max Gain (dBi)	2.22
Max Gain@Angle (degree)	240	Max Gain@Angle (degree)	81	Max Gain@Angle (degree)	238
Min Gain (dBi)	-14.09	Min Gain (dBi)	-13.1	Min Gain (dBi)	-11.03
Min Gain@Angle (degree)	183	Min Gain@Angle (degree)	177	Min Gain@Angle (degree)	178
Average Gain (dBi)	-4.24	Average Gain (dBi)	-2.62	Average Gain (dBi)	-0.61
-3dB Angle L (degree)	323	-3dB Angle L (degree)	125.8	-3dB Angle L (degree)	316.6
-3db Angle R (degree)	215.8	-3db Angle R (degree)	41.3	-3db Angle R (degree)	215
HPB (degree)	107.2	HPB (degree)	84.5	HPB (degree)	101.6
FBR (dB)	0.8	FBR (dB)	0.98	FBR (dB)	0.53

H 950.0MHz		H 960.0MHz		H 970.0MHz	
					

2D Pattern H plane

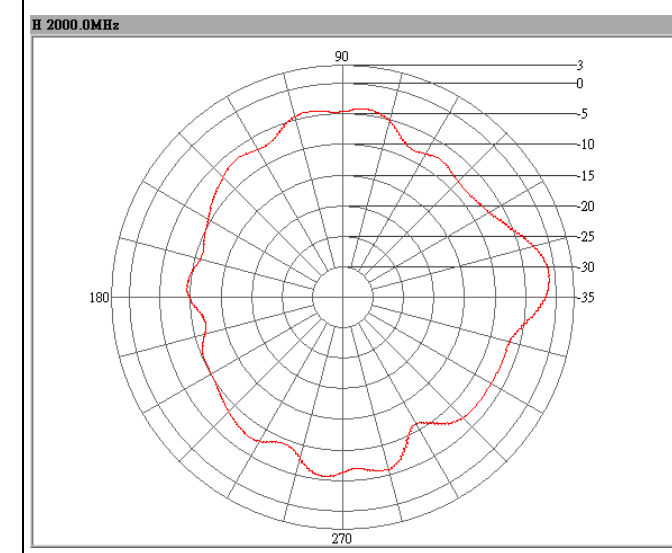
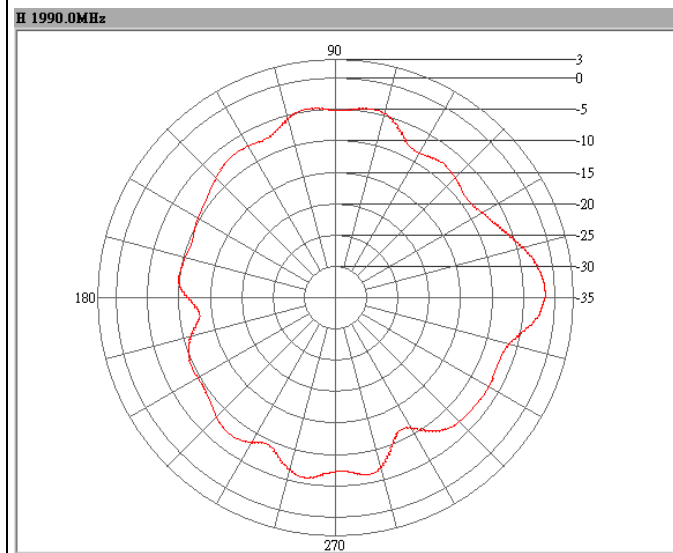
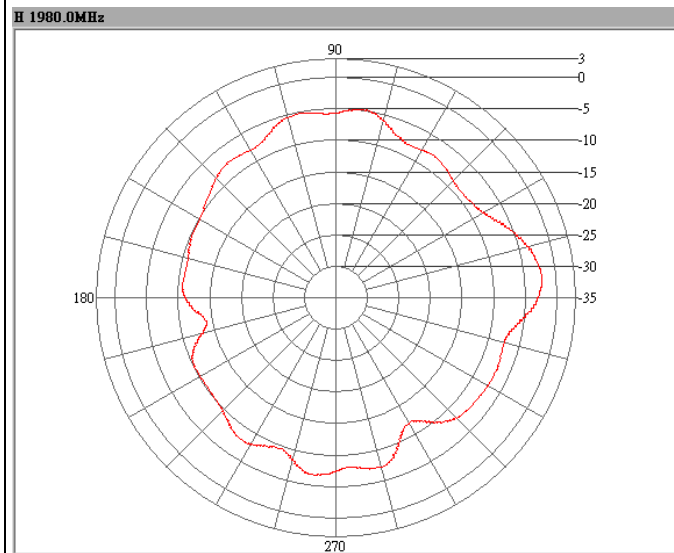
1700MHz	1710MHz	1720MHz
H	H	H
Max Gain (dBi)	Max Gain (dBi)	Max Gain (dBi)
Max Gain@Angle (degree)	Max Gain@Angle (degree)	Max Gain@Angle (degree)
Min Gain (dBi)	Min Gain (dBi)	Min Gain (dBi)
Min Gain@Angle (degree)	Min Gain@Angle (degree)	Min Gain@Angle (degree)
Average Gain (dBi)	Average Gain (dBi)	Average Gain (dBi)
-3dB Angle L (degree)	-3dB Angle L (degree)	-3dB Angle L (degree)
-3db Angle R (degree)	-3db Angle R (degree)	-3db Angle R (degree)
HPB (degree)	HPB (degree)	HPB (degree)
FBR (dB)	FBR (dB)	FBR (dB)
-3.14	-2.97	-3.35
268	247	246
-29.14	-23.74	-29.12
33	38	46
-6.57	-6.86	-7.15
291.7	295	291.15
195.23	201.67	228.25
96.47	93.33	62.9
4.37	6.73	7.14
H 1700.0MHz	H 1710.0MHz	H 1720.0MHz
		

2D Pattern H Plane

1850MHz	1880MHz	1910MHz
H	H	H
Max Gain (dBi)	Max Gain (dBi)	Max Gain (dBi)
Max Gain@Angle (degree)	Max Gain@Angle (degree)	Max Gain@Angle (degree)
Min Gain (dBi)	Min Gain (dBi)	Min Gain (dBi)
Min Gain@Angle (degree)	Min Gain@Angle (degree)	Min Gain@Angle (degree)
Average Gain (dBi)	Average Gain (dBi)	Average Gain (dBi)
-3dB Angle L (degree)	-3dB Angle L (degree)	-3dB Angle L (degree)
-3db Angle R (degree)	-3db Angle R (degree)	-3db Angle R (degree)
HPB (degree)	HPB (degree)	HPB (degree)
FBR (dB)	FBR (dB)	FBR (dB)
-1.94	-3.01	-2.7
315	335	279
-9.3	-13.7	-10.24
327	245	217
-4.7	-6.28	-5.87
321.7	340.63	286.97
288.38	329.27	269.52
33.32	11.36	17.44
1	0.99	0.5
<p>E1 1850.0 MHz</p>	<p>E1 1880 MHz</p>	<p>E1 1910.0MHz</p>

2D Pattern H plane

1980MHz		1990MHz		2000MHz	
	H		H		H
Max Gain (dBi)	-2.22	Max Gain (dBi)	-1.44	Max Gain (dBi)	-0.92
Max Gain@Angle (degree)	7	Max Gain@Angle (degree)	1	Max Gain@Angle (degree)	7
Min Gain (dBi)	-14.22	Min Gain (dBi)	-13.19	Min Gain (dBi)	-12.13
Min Gain@Angle (degree)	191	Min Gain@Angle (degree)	188	Min Gain@Angle (degree)	191
Average Gain (dBi)	-7.41	Average Gain (dBi)	-6.86	Average Gain (dBi)	-6.58
-3dB Angle L (degree)	21.07	-3dB Angle L (degree)	16.1	-3dB Angle L (degree)	18.73
-3db Angle R (degree)	353.45	-3db Angle R (degree)	349.95	-3db Angle R (degree)	353.8
HPB (degree)	27.62	HPB (degree)	26.15	HPB (degree)	24.93
FBR (dB)	8.81	FBR (dB)	8.36	FBR (dB)	8.74



2D Pattern H plane

2160MHz		2170MHz		2180MHz	
H		H		H	
Max Gain (dBi)	-6	Max Gain (dBi)	-5.41	Max Gain (dBi)	-6.19
Max Gain@Angle (degree)	27	Max Gain@Angle (degree)	28	Max Gain@Angle (degree)	26
Min Gain (dBi)	-31.16	Min Gain (dBi)	-32.9	Min Gain (dBi)	-35.65
Min Gain@Angle (degree)	121	Min Gain@Angle (degree)	127	Min Gain@Angle (degree)	122
Average Gain (dBi)	-10.16	Average Gain (dBi)	-10	Average Gain (dBi)	-10.57
-3dB Angle L (degree)	38.8	-3dB Angle L (degree)	42.15	-3dB Angle L (degree)	38.45
-3db Angle R (degree)	334	-3db Angle R (degree)	336	-3db Angle R (degree)	325.4
HPB (degree)	64.8	HPB (degree)	66.15	HPB (degree)	73.05
FBR (dB)	2.28	FBR (dB)	3.28	FBR (dB)	3.25

