








APPROVAL SHEET

Customer	PANTECH		
Supplier	KARAM SOLUTION		
Product Name	Sub Antenna		
Model Name	BUDDY		
Part No			
Maker Code	KRS-BUDDY-SA		
Date	April 1 , 2011		
Sample Picture	TOP	Bottom	
			
	Width: 59.56 mm , Length: 68.65 mm		
	Engineer	Review	Approved
Circuit			
	Andrew	Kavin	
Mechanism			
	Abel	James	
Quality			
	Colt	Allen	

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REVISION LIST

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ISSUE 1	2011.04.01		FIRST APPROVAL SPECIFICATION	
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1. Technical Items

1.1 Electrical Spec.

Electrical Spec.						
Frequency Range (MHz)	GPS		Bluetooth			
	1575 MHz		2400 ~ 2480 MHz			
Slide position	Down	UP	Down	UP	Down	UP
V.S.W.R	2.5	2.5	2.5	2.5	3.0	3.0
Peak GAIN E2-Plane (dBi)	-4.5	-5.0	-7.0	-5.5	-6.0	-6.0
Average GAIN H-Plane (dBi)	-6.0	-17.5	-9.0	-15.0	-10.0	-16.5
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	3.229 g

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1.3 Material Spec

NO	Part Name	Material	Processing	Post	Quantity	Material manufacturers	Processing manufacturers	Other
1	Carrier	PC (YSC1004A-KPA1)	Injection		1	LG Chemistry	DukSung	
2	Pattern	STS301 0.15T	Press		1	POONGSAN	Micron Tech	
3	Motor,Camera TAPE	TESA 4972			1	TESA	Wintec	
4	SPK TAPE	TESA 4972 + SRP 0.4T + TESA 4972			1	TESA	Wintec	
5								
6								
7								
8								
9								
10								
11								
12								
13								

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2. Test Equipment

The test equipments for antenna are as follows

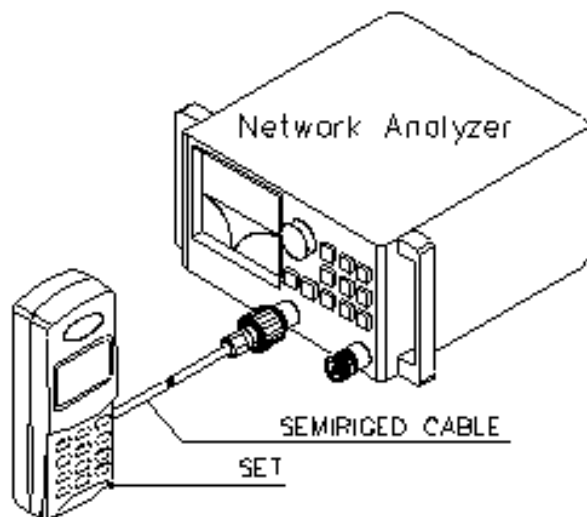
- ◆ Network Analyzer (Agilent 8753ES) to measure the V.S.W.R and impedance of antenna
- ◆ Spectrum Analyzer to measure the receiving signal intensity
- ◆ Standard Horn antenna that is adjustable in the GPS & Bluetooth band
- ◆ Anechoic Chamber installed the cables, connectors and equipments for measurement
- ◆ 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

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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 2.5:1 at GPS band(1575 MHz) & 3.0:1 at Bluetooth band(2400 ~ 2480MHz) on the free space.



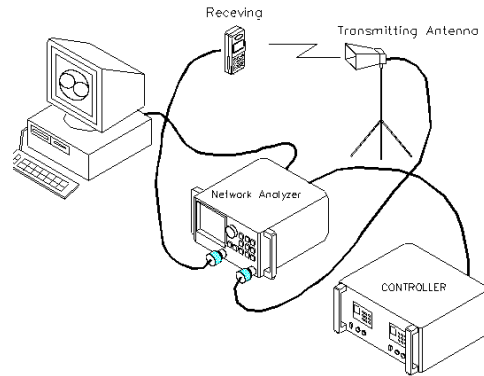
3.2 Radiation Pattern

The radiation pattern must have the omni-directional characteristic in GPS & Bluetooth band and H-plane.

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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 -5.0dBi at GPS band(1575 MHz) & -7.0dBi at Bluetooth band(2400 ~ 2480MHz).

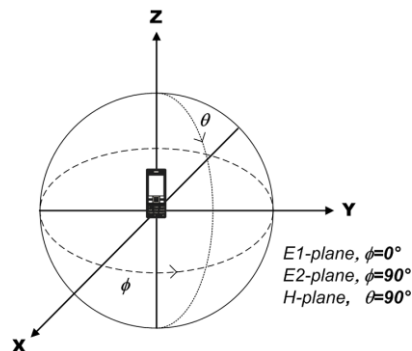


3.4 Test Method

The antenna is tested while mounted on handset with the correct matching circuit in free space. Radiation patterns are measured on at least 3 different frequencies: 1575 MHz, 2400MHz, 2480MHz.

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.



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4. Mechanical Specifications

4.1 Mechanical Configuration

The appearance of the antenna is in accordance with drawing.

4.2 CONTACT FORCE TEST

4.2.1 COMPRESSION TEST

Place the antenna on the compression test machine, fix the antenna, and press on the top contact point to the height PCB contact area. The force shall be within the range of 100gf to 500gf.

4.2.2 RESTITUTION TEST

Place the antenna on the compression test machine, fix the antenna, and press on the top contact point to the height PCB contact area. Antenna contact should have no more than 35% of shape change after 500 cycles of the performed test. The cycle time should keep 60times/1minute.

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.

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5. Environmental Demands

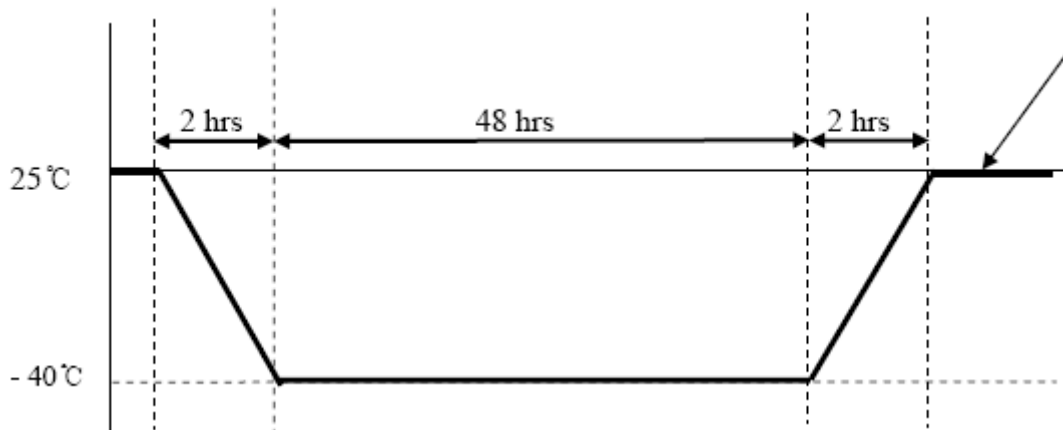
5.1 LOW TEMPERATURE SOAKING

The antenna should be placed in an environmental chamber at -40°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

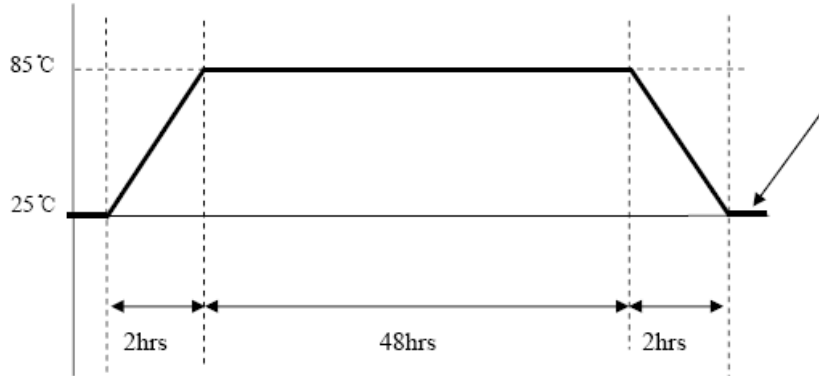
The antenna should be placed in an environmental chamber at $+85^{\circ}\text{C}$ for 48 hours.

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

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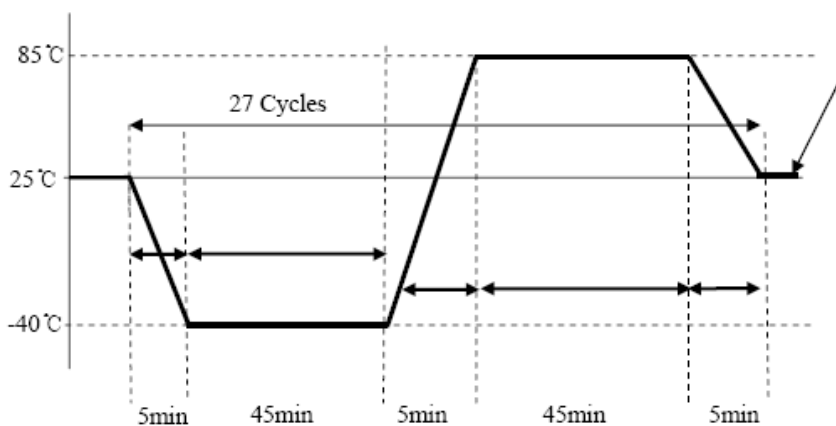


High Temperature soaking

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

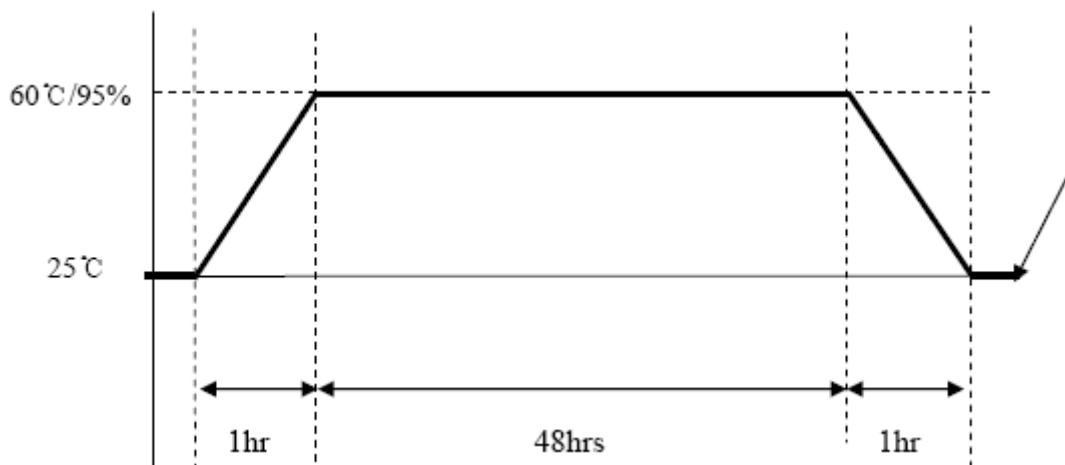
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5.4 STATIC HUMIDITY TEST

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.

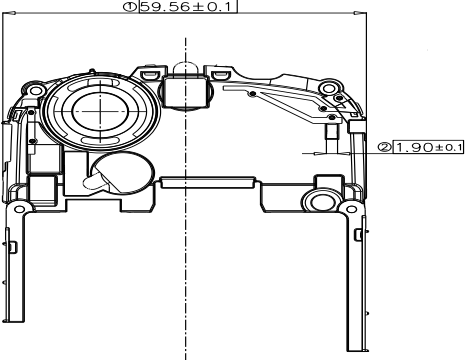
After test is complete, there shall be no visual deterioration or damage.

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

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6. Mechanical Demands

6.1 Dimensions

CTQ Item Dimensions Data				
				
Dimension Data				
Dimension (UNIT : mm)				
No.	CTQ Dimension		Appearance	Judgment
	1	2		
Spec	59.56 ± 0.10	1.90 ± 0.10		
X1	59.57	1.89	OK	OK
X2	59.58	1.87	OK	OK
X3	59.55	1.92	OK	OK
X4	59.54	1.96	OK	OK
X5	59.53	1.94	OK	OK
X6	59.57	1.88	OK	OK
X7	59.55	1.96	OK	OK
X8	59.58	1.94	OK	OK
X9	59.55	1.95	OK	OK
X10	59.52	1.92	OK	OK
Max	59.58	1.96	/	
Min	59.52	1.87		
Avg	59.55	1.92		
StDev	0.02	0.03		

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7. Antenna Drawing

Note

- General Tolerance: ±0.1
- Contact Working distance : 1.0 ~ 1.5mm
- Weight : 200±150gf
- Weld Height Management : max.0.4
- Make Is CTO Point.
- Weight : 9.223g
- Frequency Range : BT/GPS

No.	PART No.	DESCRIPTION	QTY	MATERIAL	REMARKS	REV.
5	KRS-BUDDY-SC	CUSTOM SPR BHM	1	TESA 4972	-	01
4	KRS-BUDDY-ST	TAPE MOTOR	1	TESA 4972	-	01
3	KRS-BUDDY-ST	TAPE CAMERA	1	TESA972/SPPV-41	-	01
2	KRS-BUDDY-SR	PATTERN	1	SISSOT(0.15T)	-	01
1	KRS-BUDDY-SF	BRACKET	1	PCLG 1009A (KPA1)	-	01

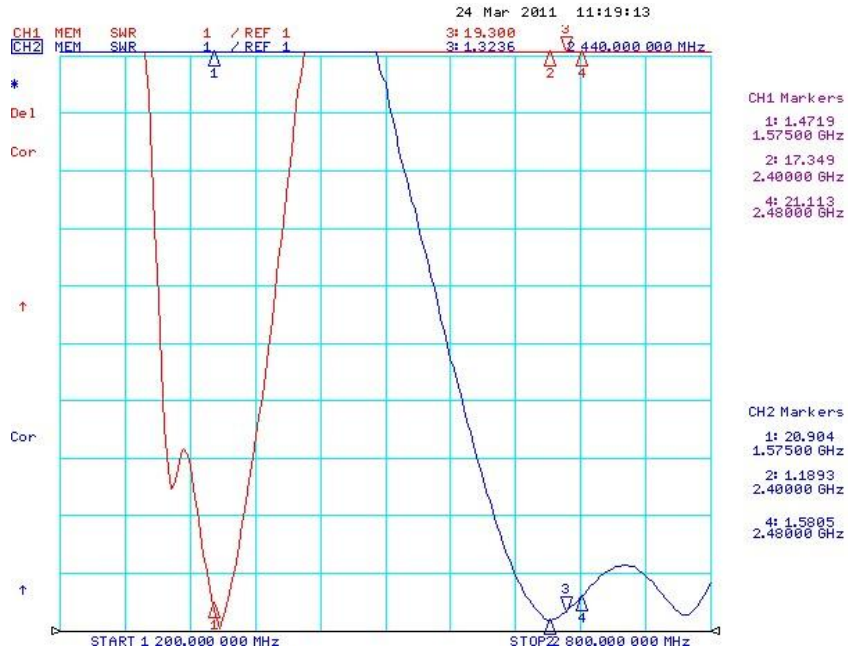
MATERIAL	FINISH	ANGLE	TOLERANCE	SCALE	REVISION
---	JIN, K	---	11.04.01	1/1	01
---	JIN, K	---	11.04.01	1/1	01
---	JIN, K	---	11.04.01	1/1	01
---	JIN, K	---	11.04.01	1/1	01
---	JIN, K	---	11.04.01	1/1	01

KRS-OC-D60(R01)

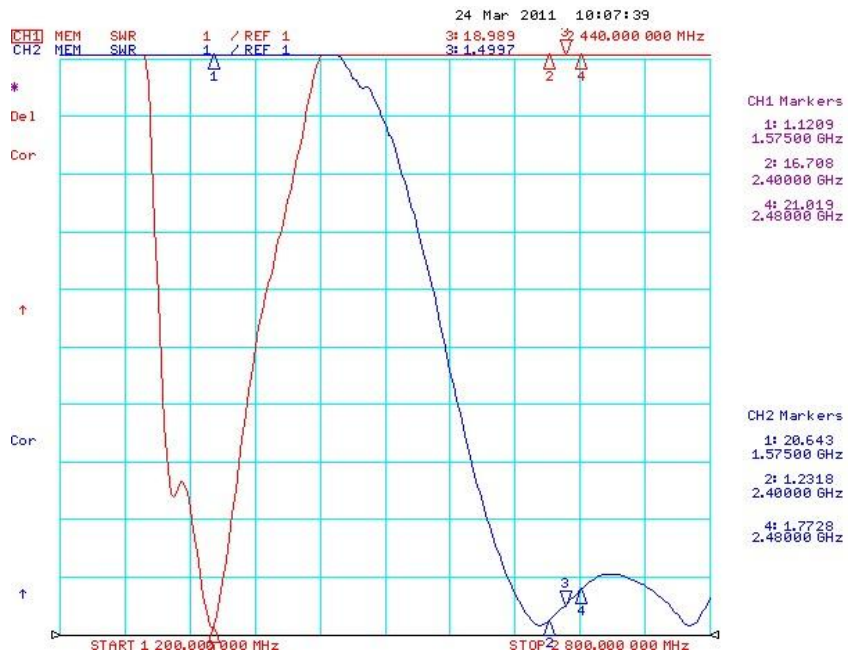
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8. Electrical data

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



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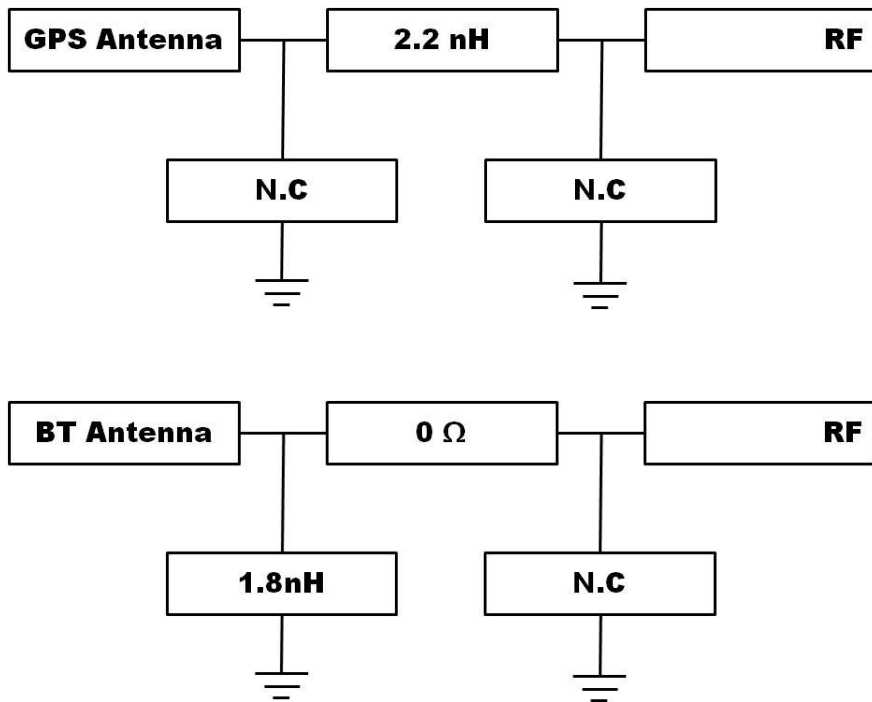


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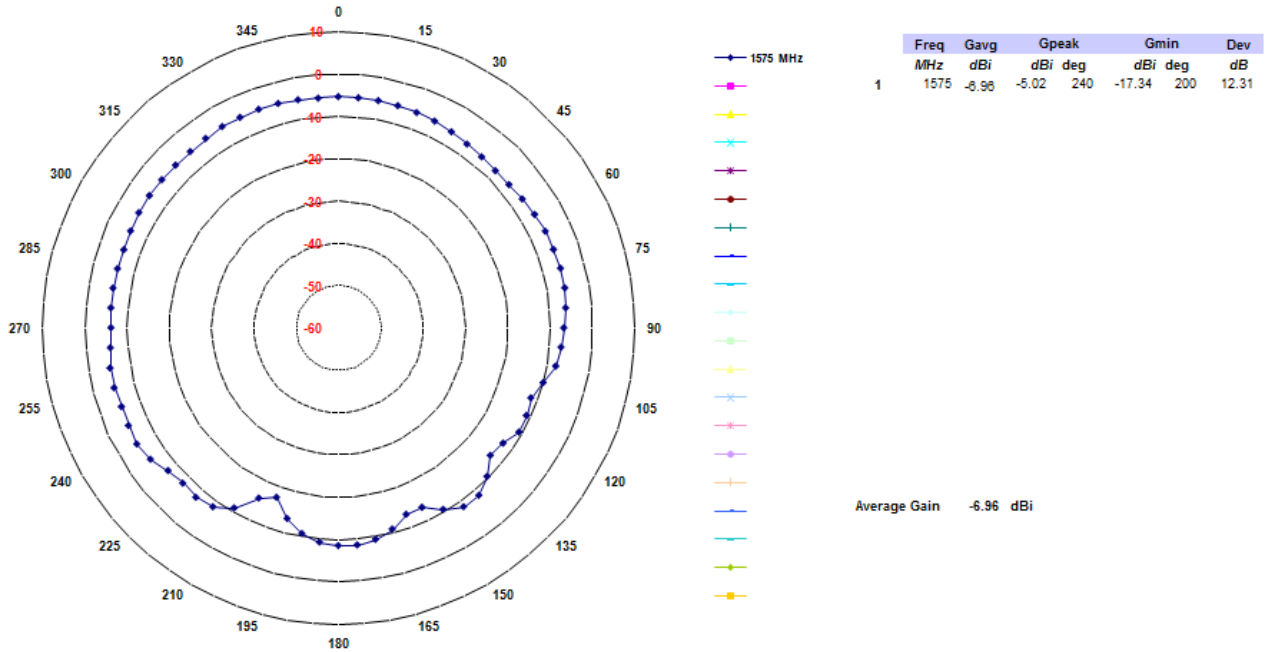
8.2 GAIN (with Matching Circuit)

→ Matching Circuit

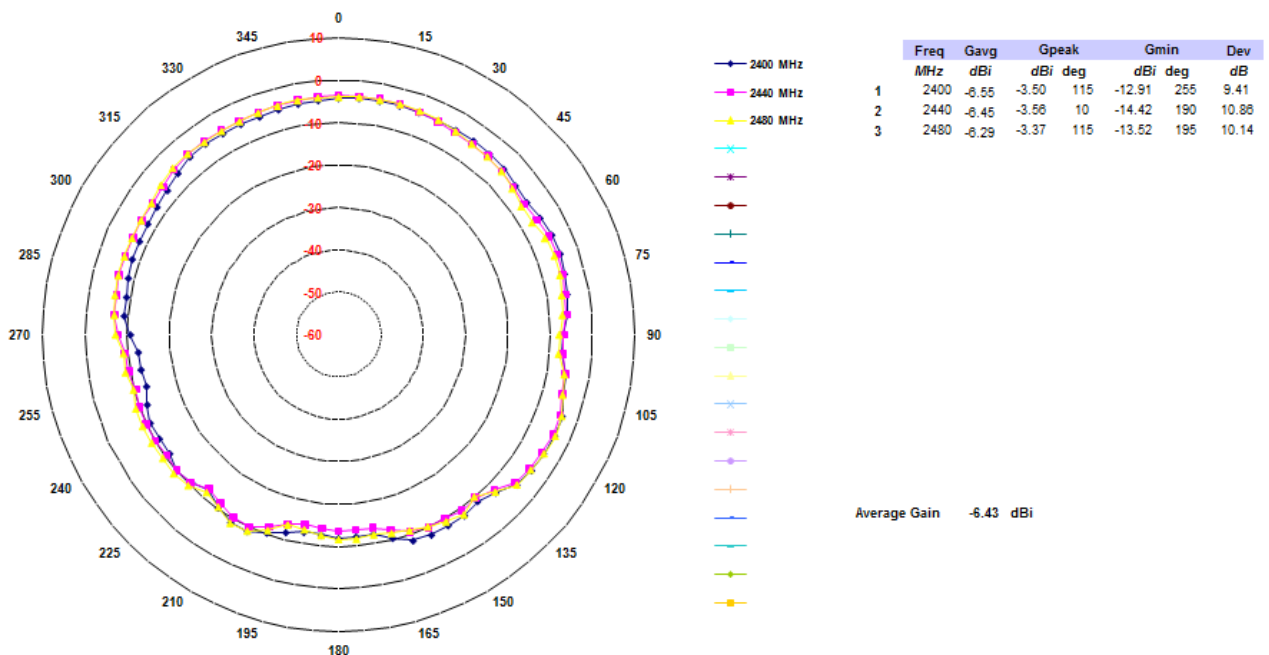


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→ Radiation pattern (E1-plane)

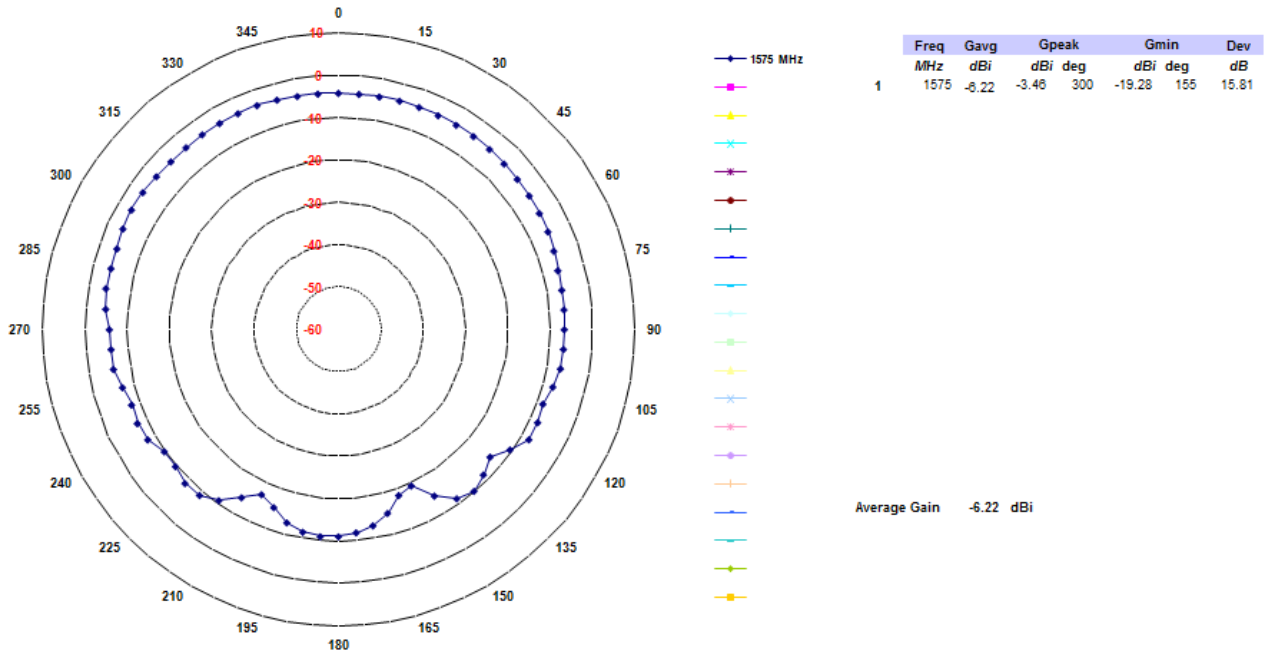


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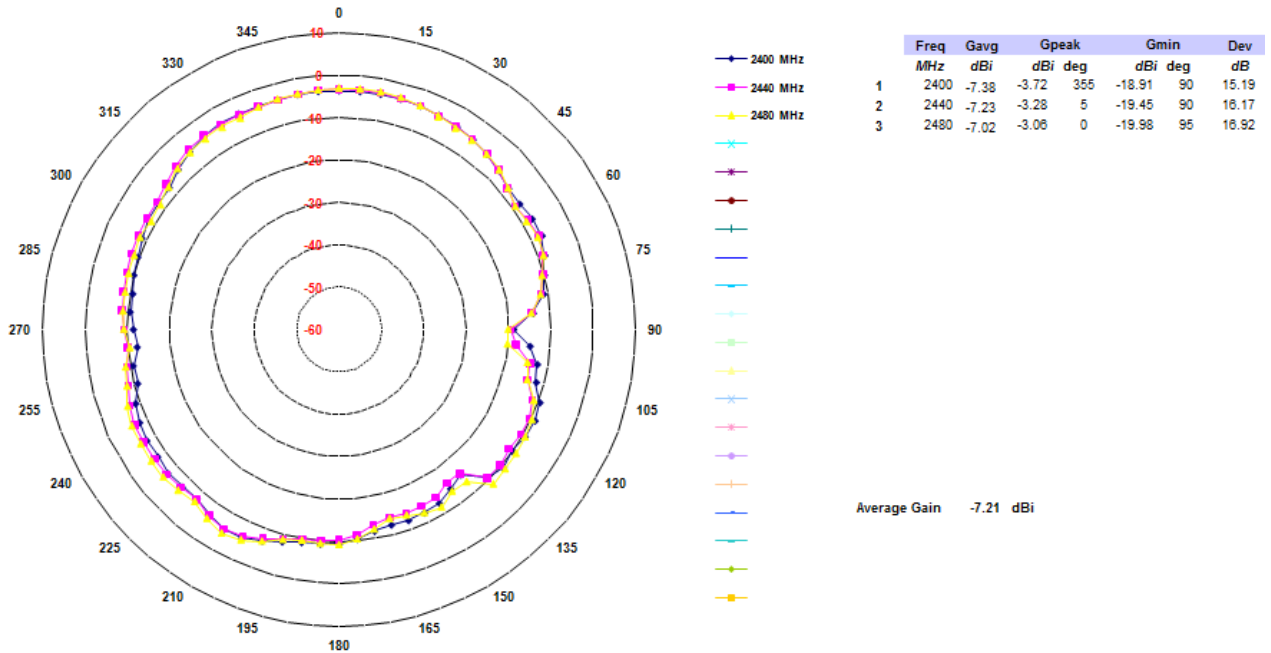


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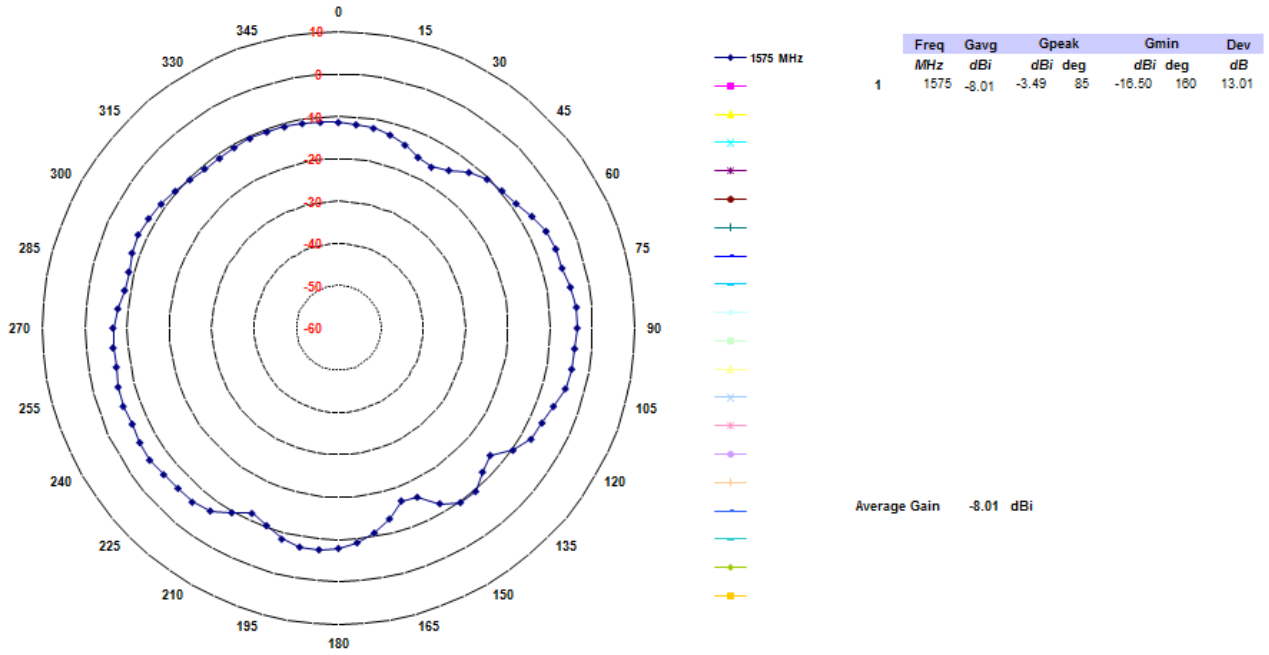
[GPS band-Slide up]



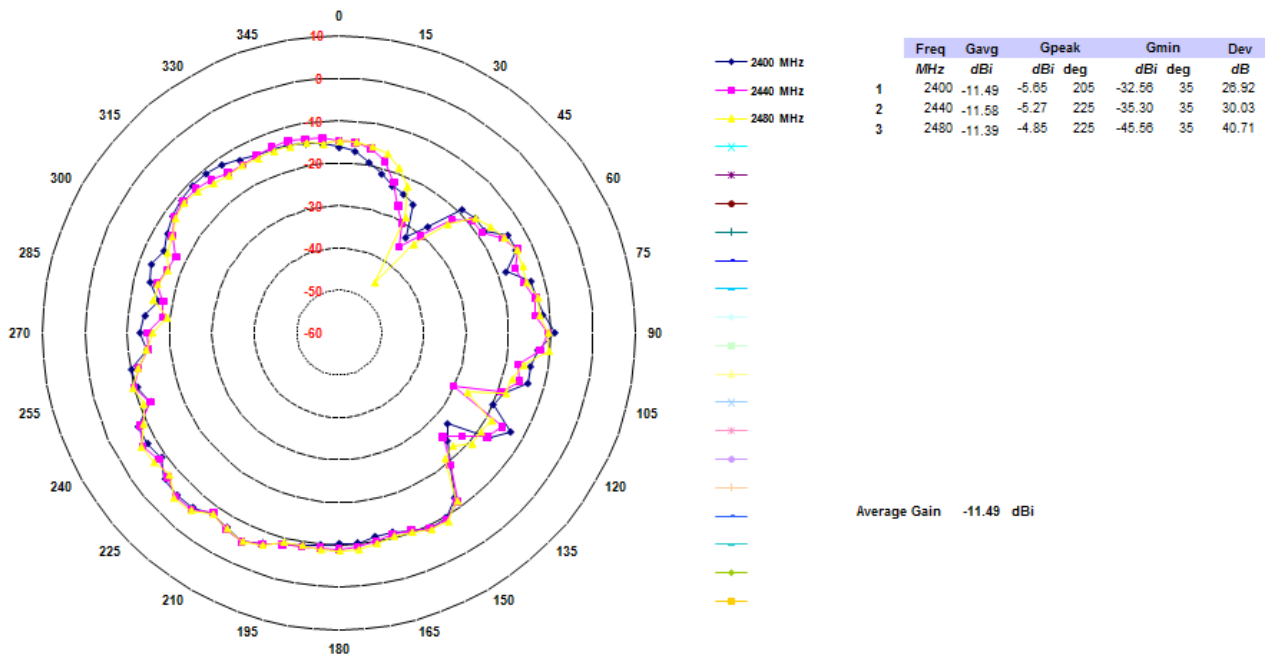
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→ Radiation pattern (E2-plane)

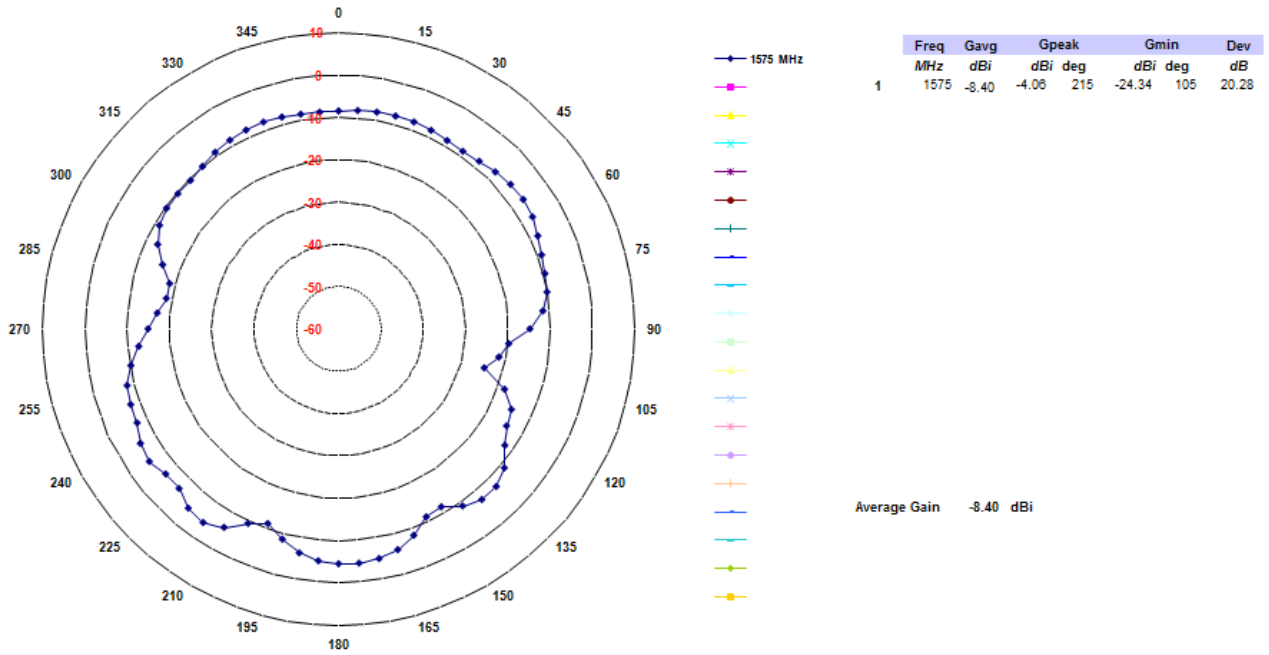


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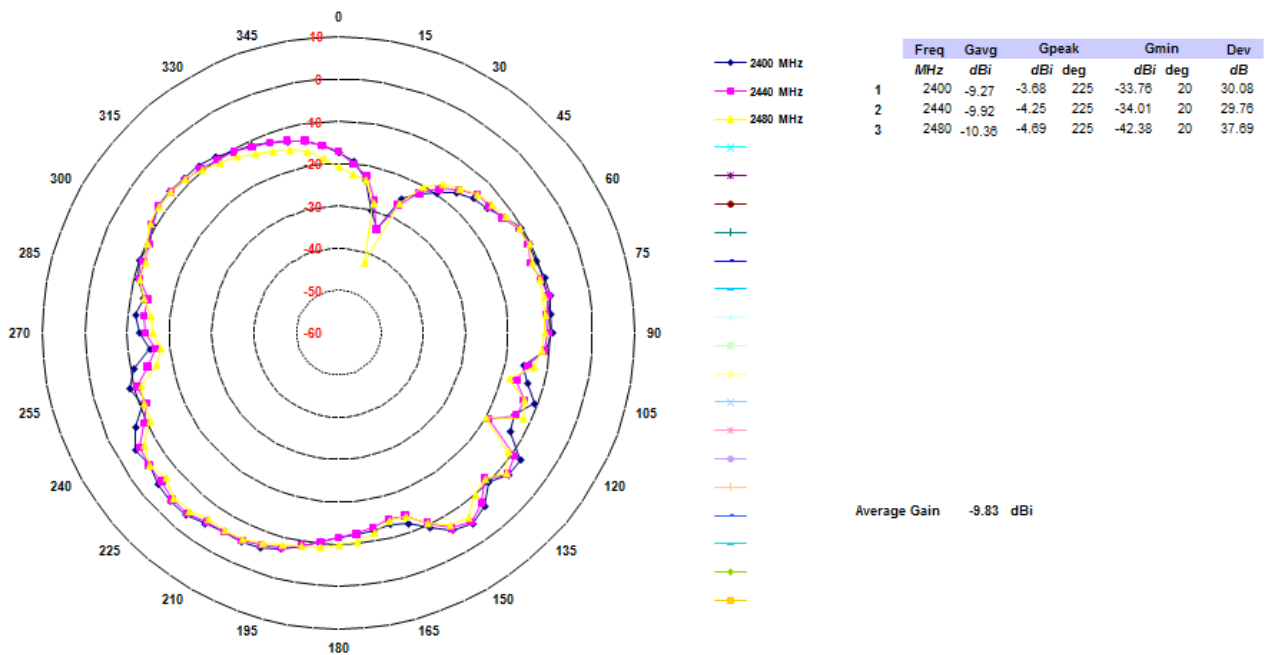


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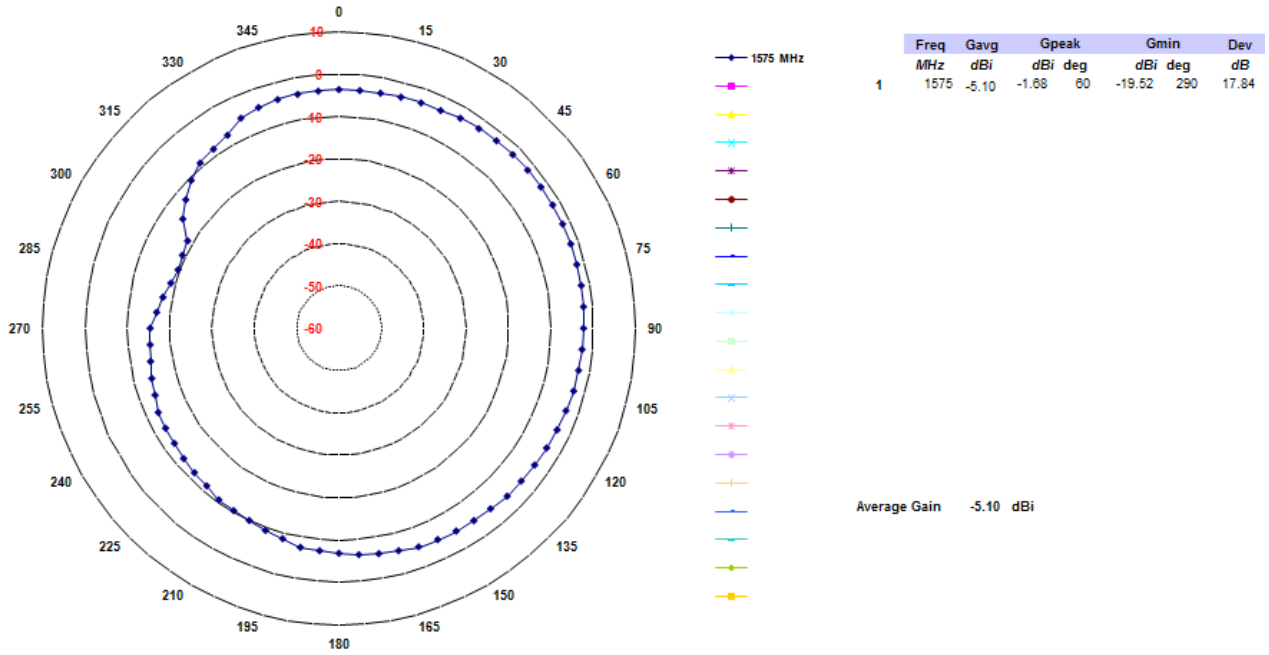
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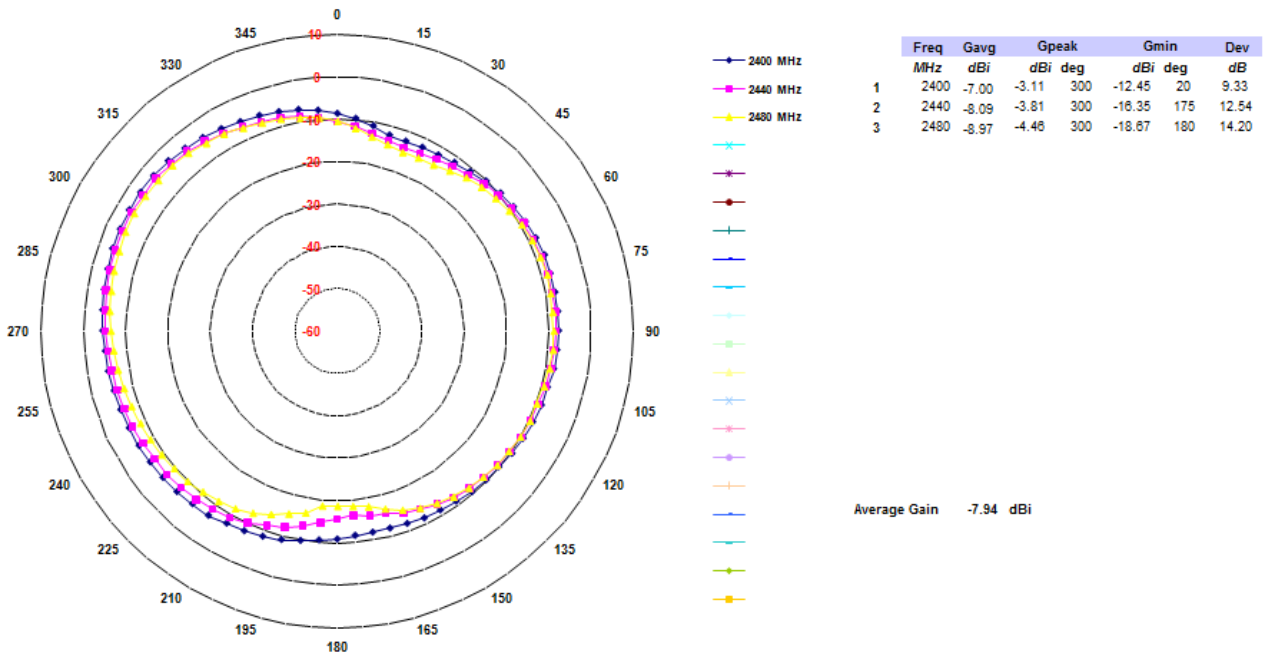
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→ Radiation pattern (H-plane)

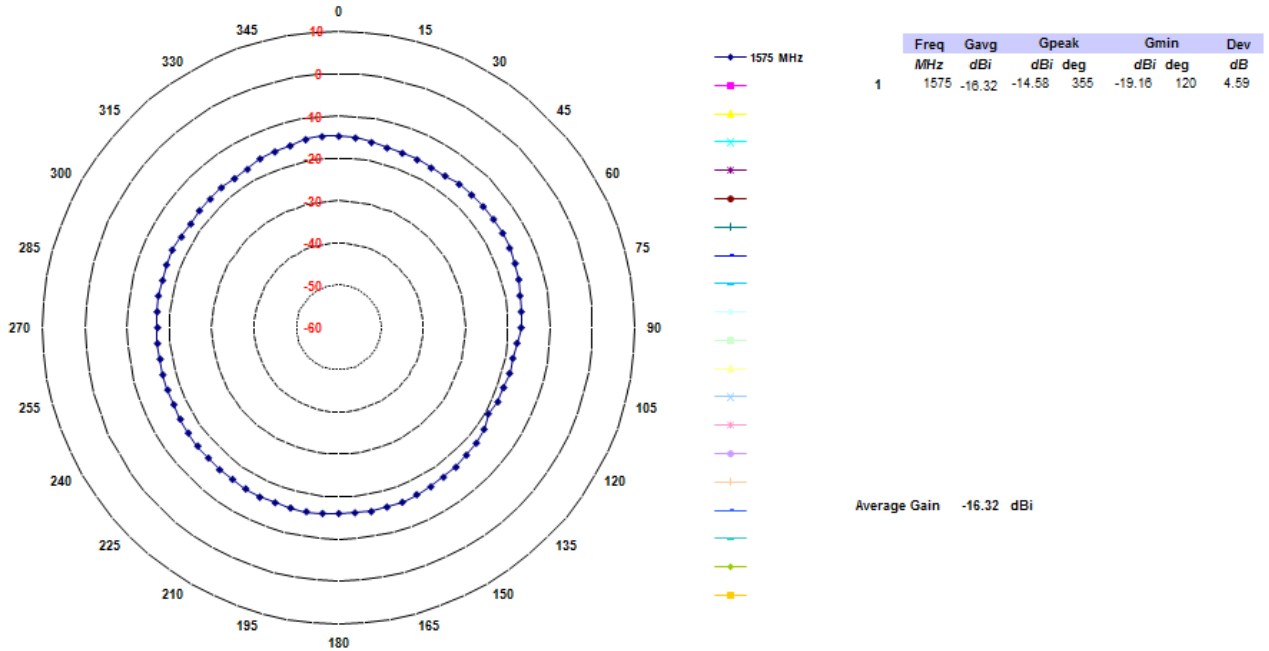


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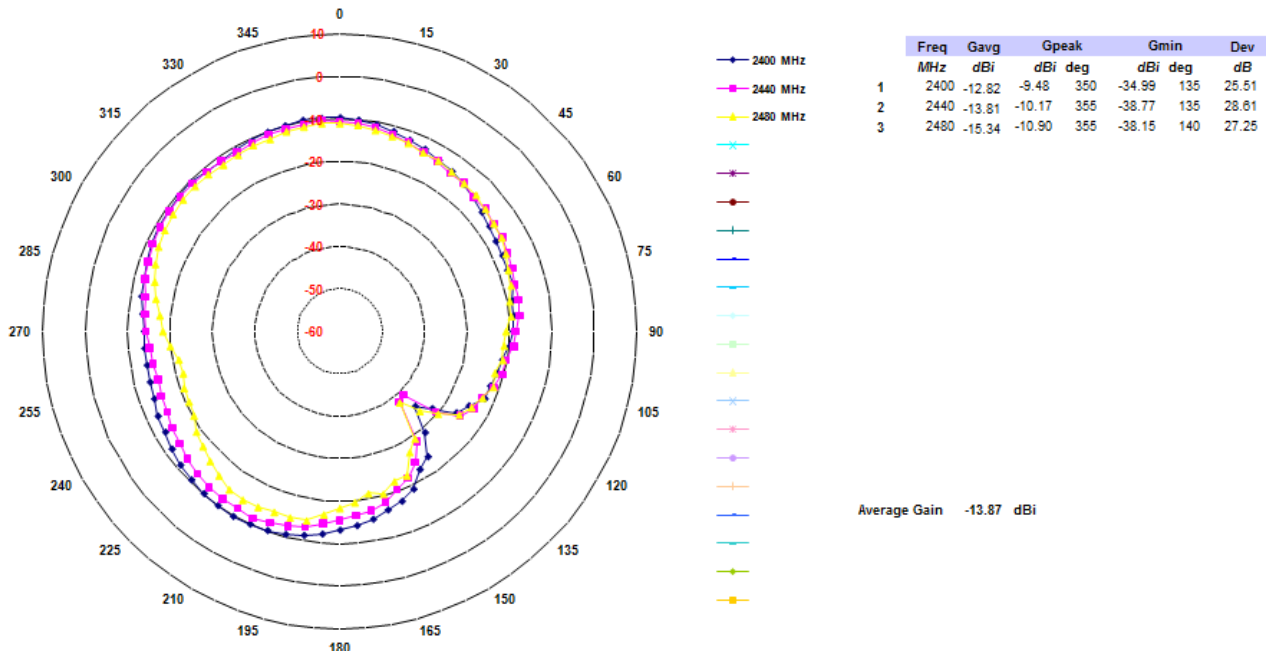


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[GPS band - Slide up]



[Bluetooth band - Slide up]