

CC3135MOD Approved Antennas - Knox

<i>Manufacturer</i>	<i>Antenna</i>	<i>Description</i>	<i>Type</i>	<i>2.4 GHz Peak Gain</i>	<i>5 GHz Peak Gain</i>	<i>Connector Type</i>	<i>Notes</i>
Taoglas Limited	FXP840.07.0055B	Dual Band	Flex Cable	3.35	3.37	U.FL	
LSR/TE	001-0012	Dual Band	Dipole	2.0	2.0	RP-SMA	1
AIR802	ANRD245X05-RSP	Dual Band	Dipole	5.0	5.0	RP-SMA	
Taoglas Limited	GW.71.5153	Dual Band	Dipole	3.8	5.5	RP-SMA	
Molex	1461530100	Dual Band	Flex Cable	3.0	4.5	U.FL	
Pulse/Larson Electronics	NMO5E2400B	Single Band	Whip	2.95	N/A	HF(Male)	

Notes:

- 1) Antenna previously approved by TI



TAOGLAS®



Datasheet

Freedom

Part No:
FXP840.07.0055B

Description

FXP840 Freedom Series super small Wi-Fi® 2.4/5.8/7.125GHz flexible monopole antenna with Wi-Fi® 6 capabilities

Features:

- Wi-Fi® (Including Wi-Fi® 6) 2.4-2.5, 4.9-5.8, 5.9-7.125 GHz
- Flexible and Tiny - Ultra Low Profile
- Adheres directly inside of product plastic or glass housing
- Form factor and cable routing convenient for integration
- I-PEX MHF I Connector (U.FL compatible)
- 55mm Ø 0.81mm mini-coaxial cable
- Dimensions: 14*5*0.1mm
- RoHS & Reach Compliant

1.	Introduction	3
2.	Specification	5
3.	Antenna Characteristics	6
4.	Radiation Patterns	10
5.	Mechanical Drawing	20
6.	Packaging	21
	Changelog	22

Taoglas makes no warranties based on the accuracy or completeness of the contents of this document and reserves the right to make changes to specifications and product descriptions at any time without notice. Taoglas reserves all rights to this document and the information contained herein. Reproduction, use or disclosure to third parties without express permission is strictly prohibited.

Ireland & USA
ISO 9001:2015
Certified



Taiwan
ISO 9001:2015
Certified



1. Introduction



The patent pending FXP840 is a super small, ultra-low profile monopole antenna for Wi-Fi® applications over the 2.4, 4.9-5.8 and 5.8-7.125GHz bands. Engineered for Wi-Fi® (including Wi-Fi® 6), Bluetooth®, ZigBee® and other applications in these bands, including C-V2X and DSRC.

This Taoglas patent pending antenna is unique in the market because it is made from poly-flexible material, has a tiny form factor, just 14mm*5.0mm*0.1mm, and has double-sided 3M tape for easy “peel and stick” mounting. The cable routes conveniently directly from the edge of the antenna, reducing the volume the antenna takes up in the device to an absolute minimum, compared to other antenna designs.

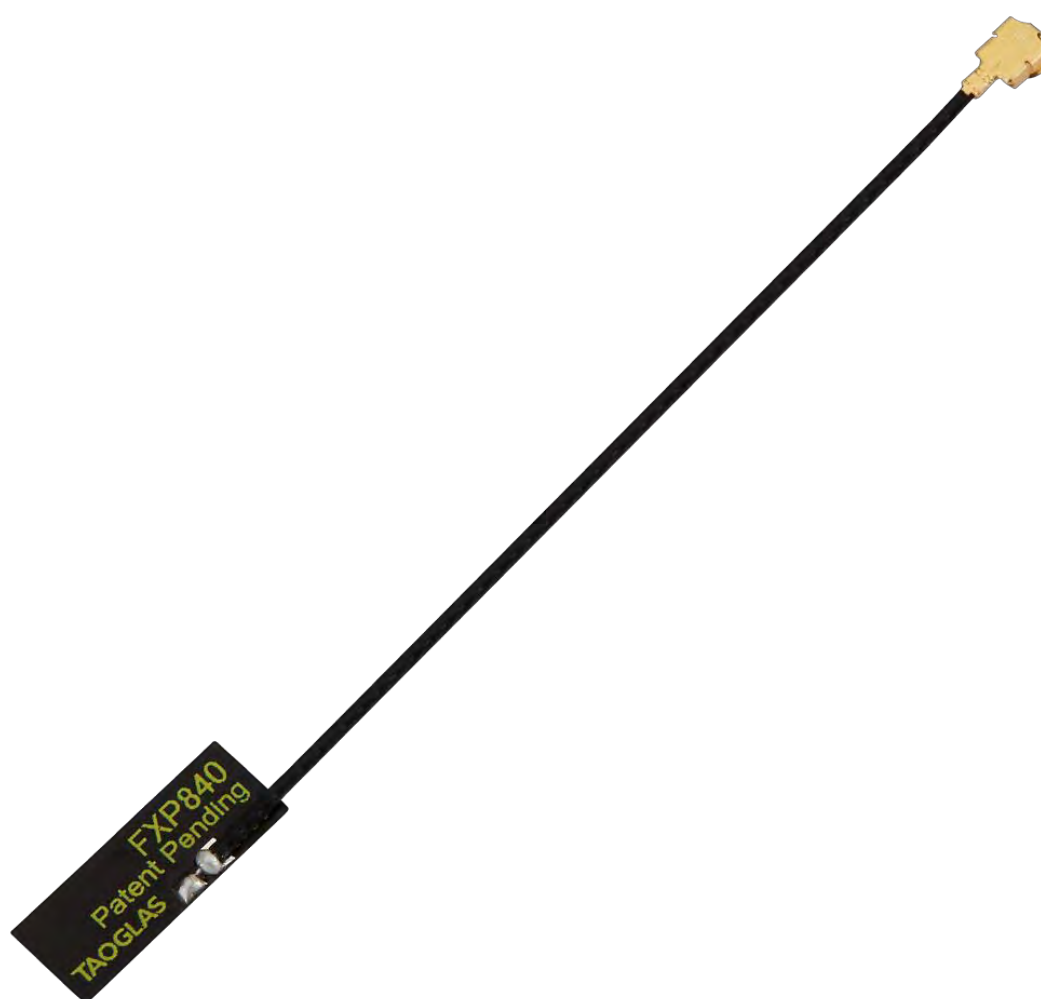
The FXP840 is the ideal all-round antenna solution for fitting into compact spaces and still maintaining high performance, for example on the inside top or adjacent side applied directly to the plastic housing of LCD monitors, tablets, smartphones.

Many module manufacturers specify peak gain limits for any antennas that are to be connected to that module. Those peak gain limits are based on free-space conditions. In practice, the peak gain of an antenna tested in free-space can degrade by at least 1 or 2dBi when put inside a device. So ideally you should go for a slightly higher peak gain antenna than mentioned on the module specification to compensate for this effect, giving you better performance.

Upon testing of any of our antennas with your device and a selection of appropriate layout, integration technique, or cable, Taoglas can make sure any of our antennas’ peak gain will be below the peak gain limits. Taoglas can then issue a specification and/or report for the selected antenna in your device that will clearly show it complying with the peak gain limits, so you can be assured you are meeting regulatory requirements for that module.

For example, a module manufacturer may state that the antenna must have less than 2dBi peak gain, but you don't need to select an embedded antenna that has a peak gain of less than 2dBi in free-space. This will give you a less optimized solution. It is better to go for a slightly higher free-space peak gain of 3dBi or more if available. Once that antenna gets integrated into your device, performance will degrade below this 2dBi peak gain due to the effects of GND plane, surrounding components, and device housing. If you want to be absolutely sure, contact Taoglas and we will test. Choosing a Taoglas antenna with a higher peak gain than what is specified by the module manufacturer and enlisting our help will ensure you are getting the best performance possible without exceeding the peak gain limits.

The cable and connector are fully customizable. For more information, or how to integrate the antenna into your device, contact your local Taoglas customer service team.



2. Specification

Wi-Fi Electrical								
Band	Frequency (MHz)	Efficiency (%)	Average Gain (dB)	Peak Gain (dBi)	Impedance	Polarization	Radiation Pattern	Max. input power
Wi-Fi - 2GHz	2400-2500	39.8	-4.00	3.35	50 Ω	Linear	Omni	2W
Wi-Fi - 5GHz	5150-5850	28.3	-5.48	3.37				
Wi-Fi - 6GHz	5925-7125	35.4	-4.51	5.31				
Tested on 1mm ABS (Plastic)								

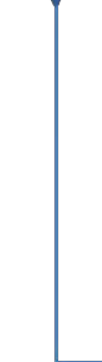
Mechanical	
Dimensions	14 x 5 x 0.1 mm
Material	Polymer
Connector	I-PEX MHF I (U.FL Compatible)
Cable	55mm of $\varnothing$ 0.81mm
Weight	1g

Environmental	
Operation Temperature	-40°C to +85°C
Storage Temperature	-40°C to +85°C
Humidity	Non-condensing 65°C 95% RH
RoHS Compliant	Yes
REACH Compliant	Yes

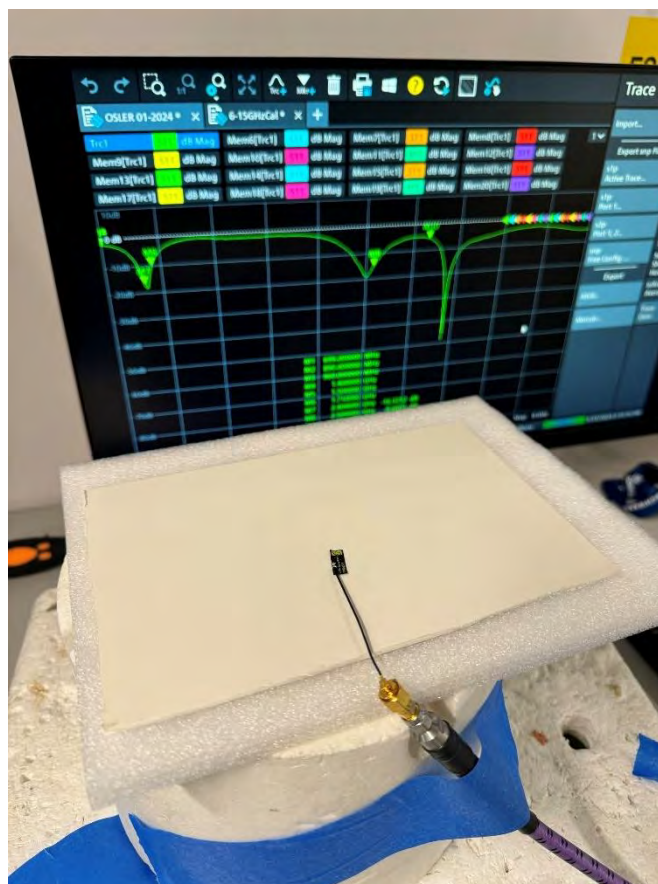
3. Antenna Characteristics

3.1 Test Setup

AUT

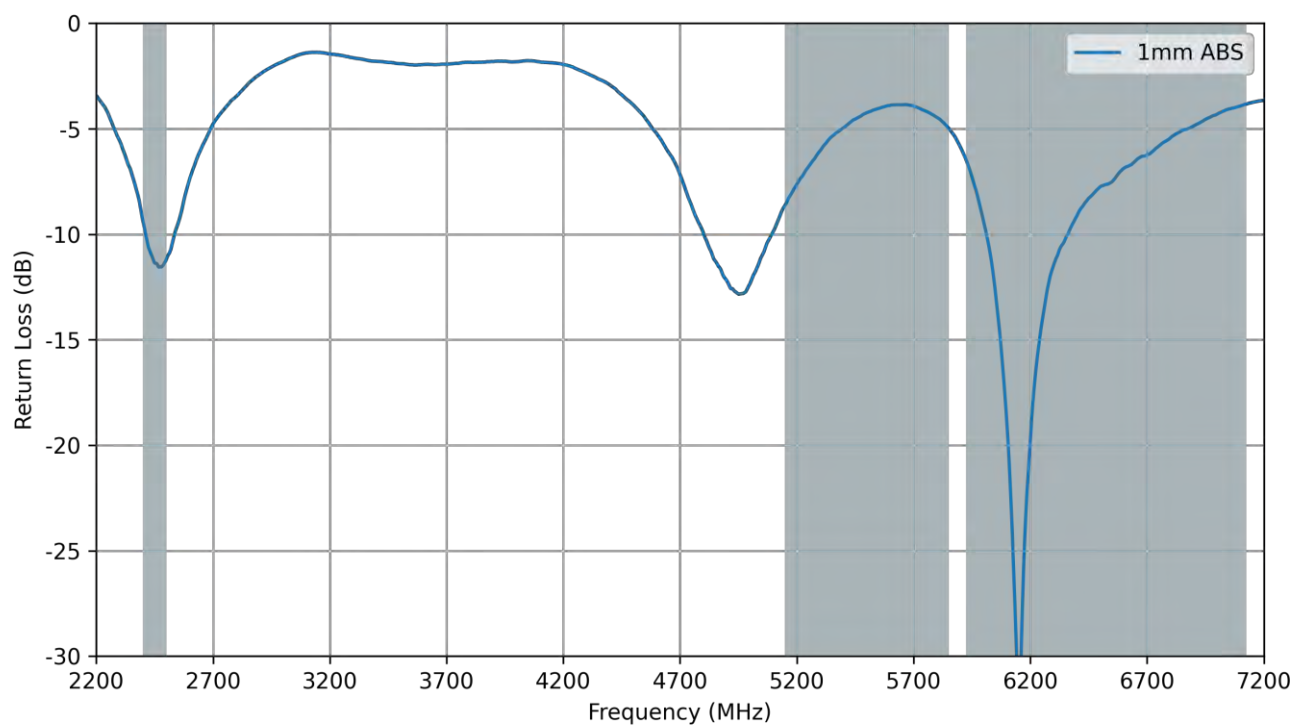


Vector Network Analyzer

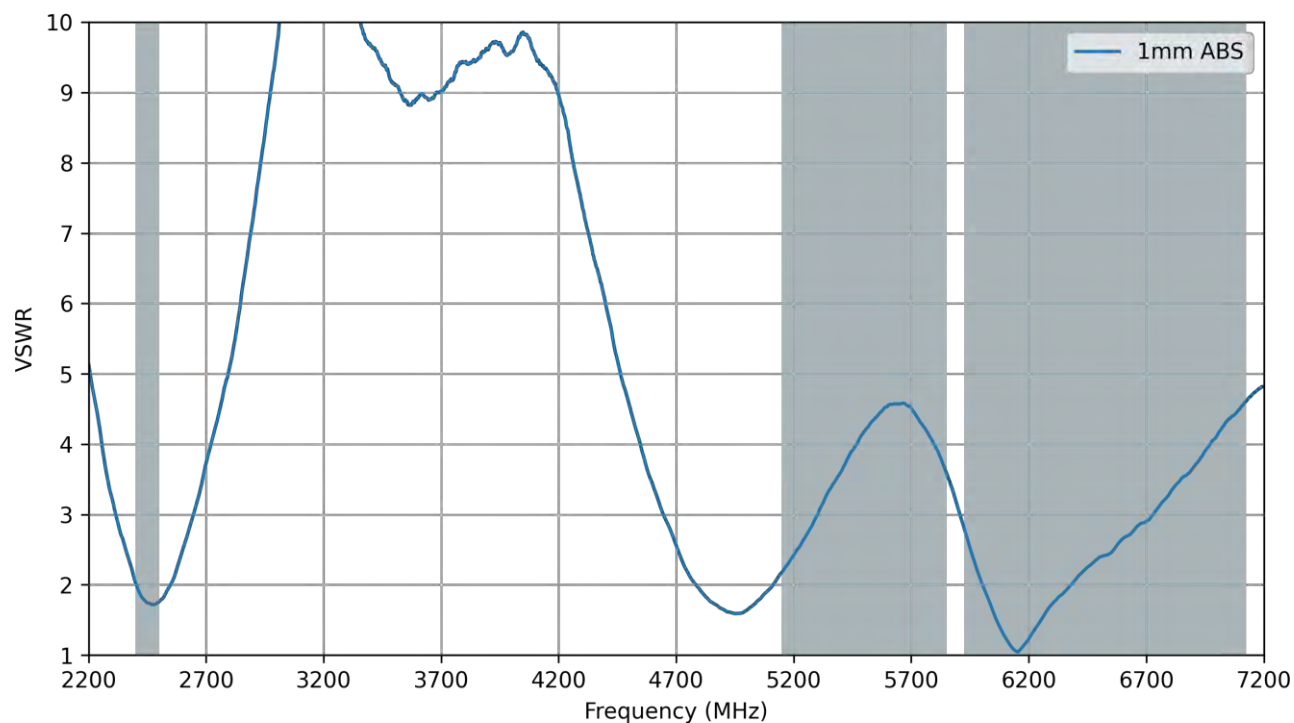


VNA test setup on 1mm ABS (Plastic) Ground Plane

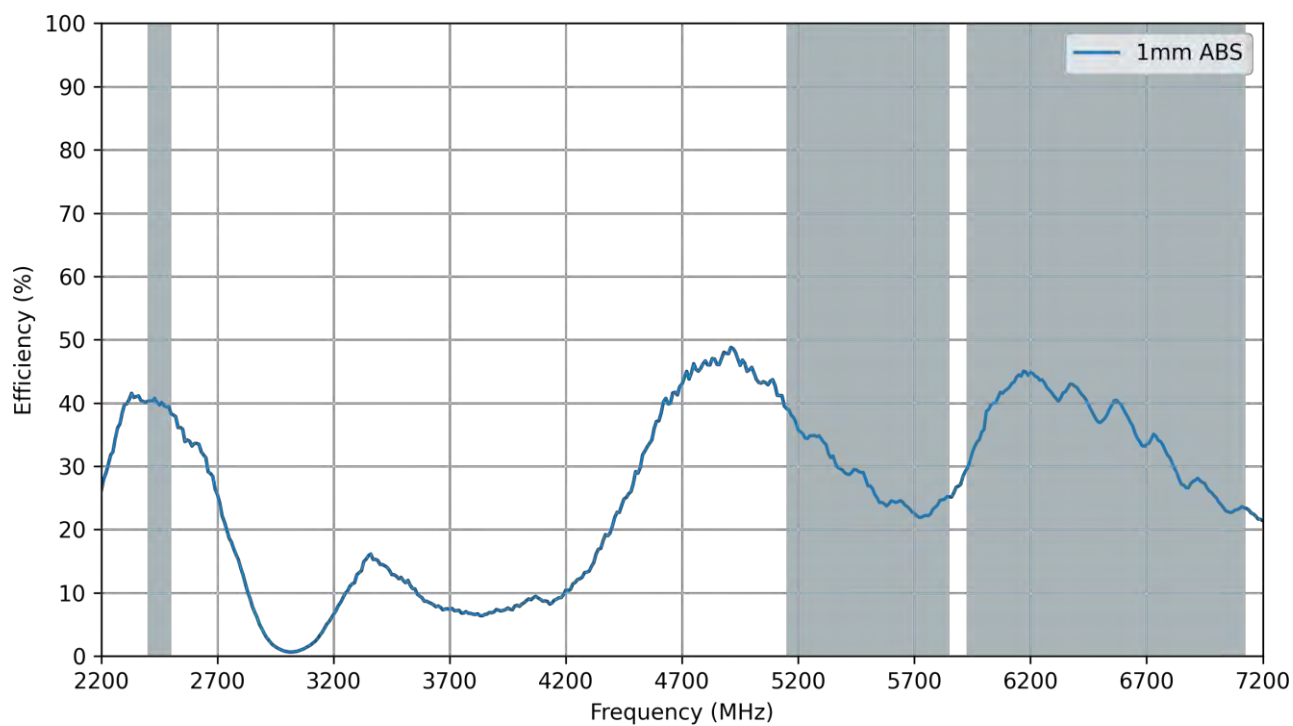
3.2 Return Loss



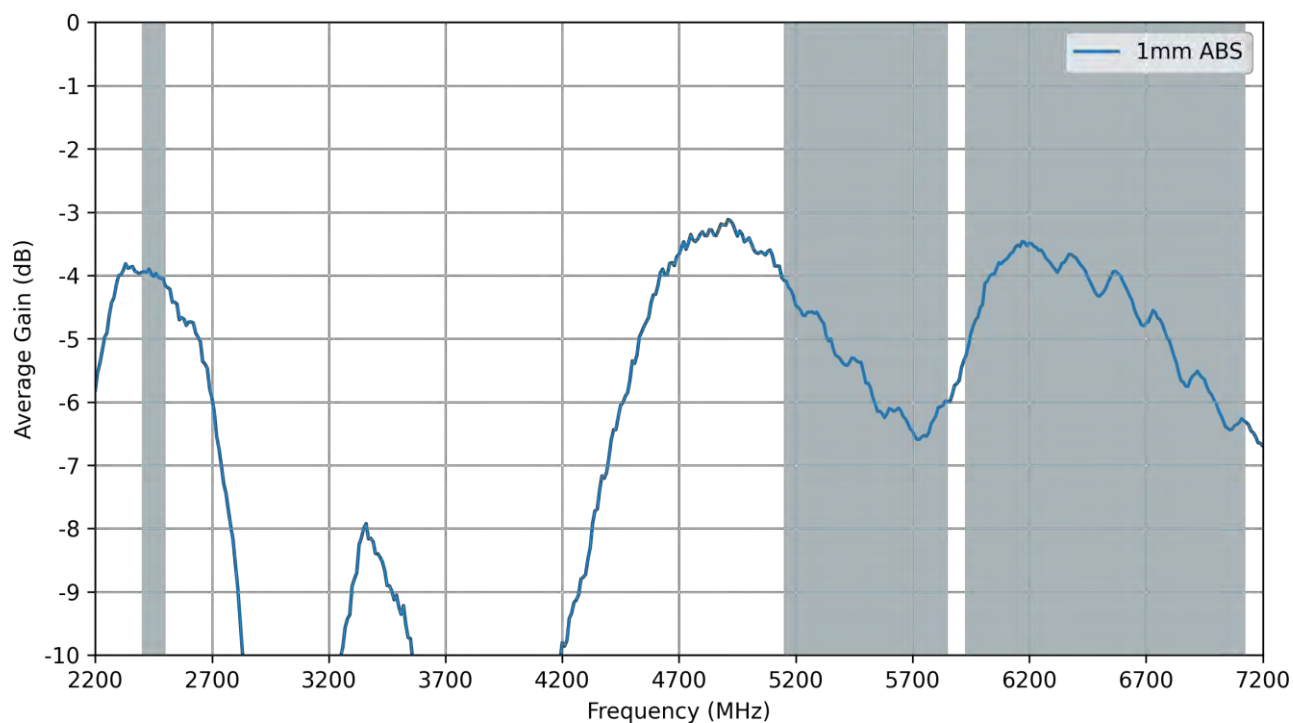
3.3 VSWR



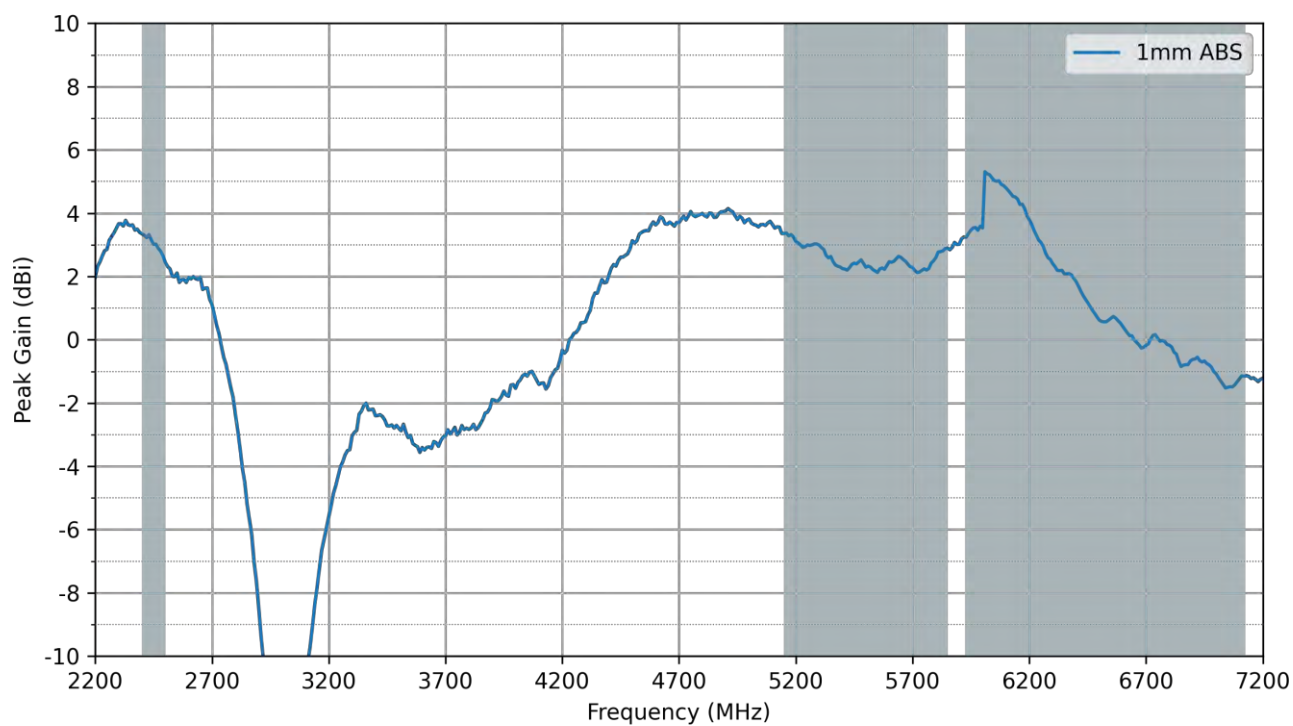
3.4 Efficiency



3.5 Average Gain

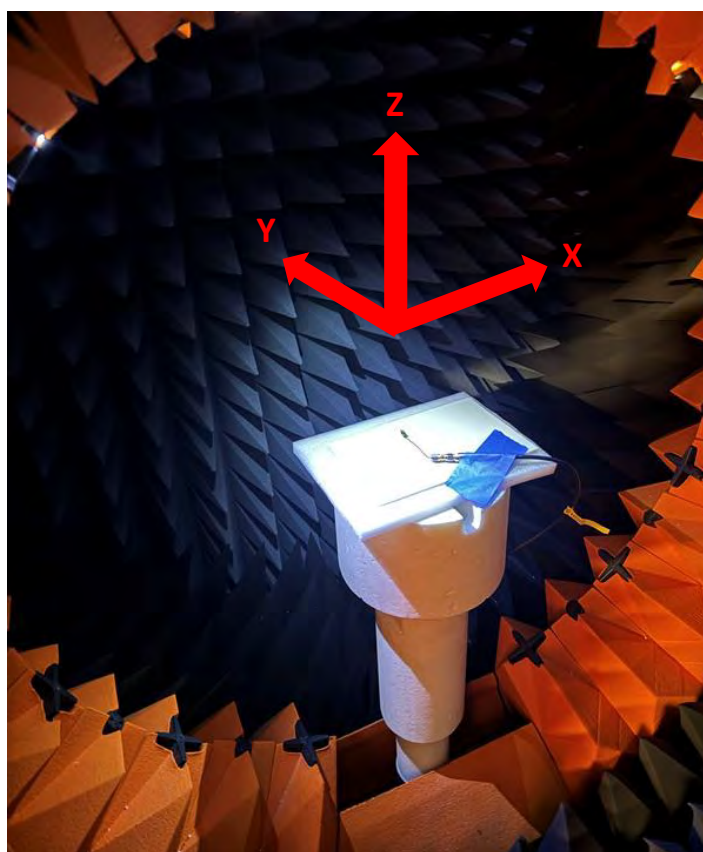
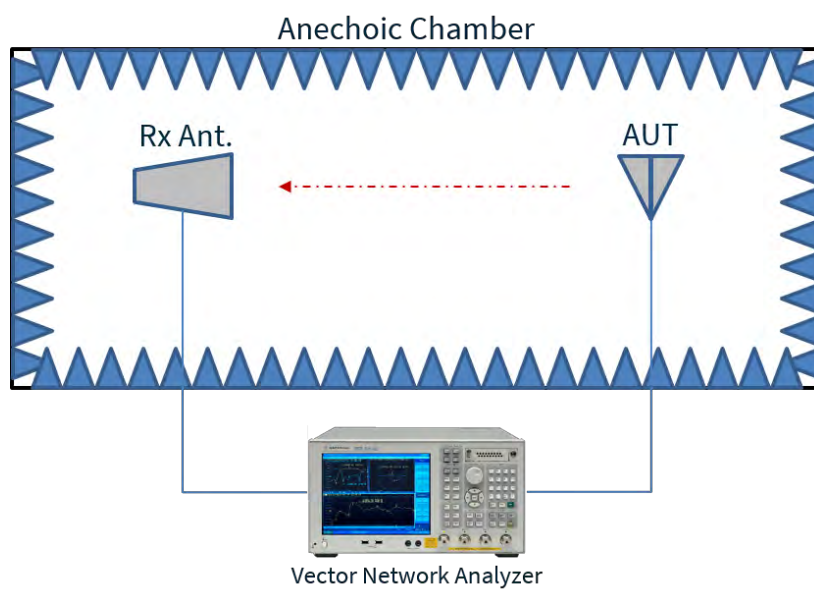


3.6 Peak Gain



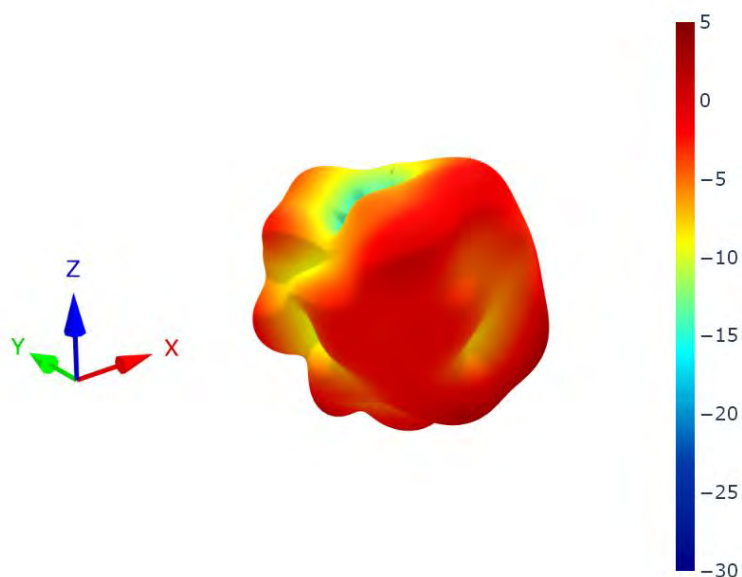
4. Radiation Patterns

4.1 Test Setup

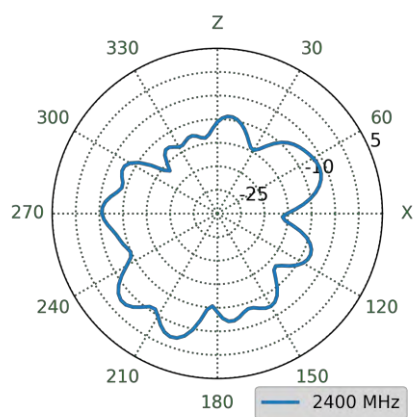


Chamber test setup on 1mm ABS (Plastic) Ground Plane

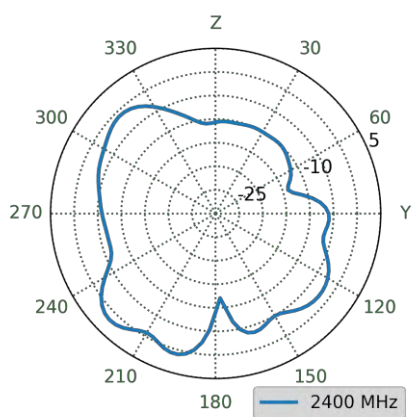
4.2 Patterns at 2400 MHz



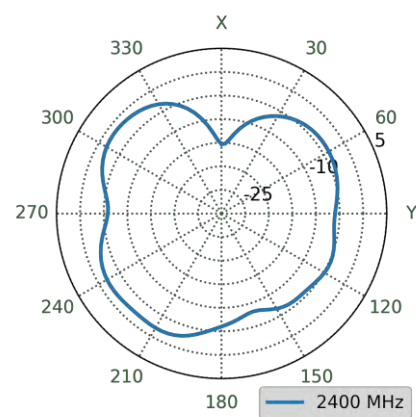
XZ Plane



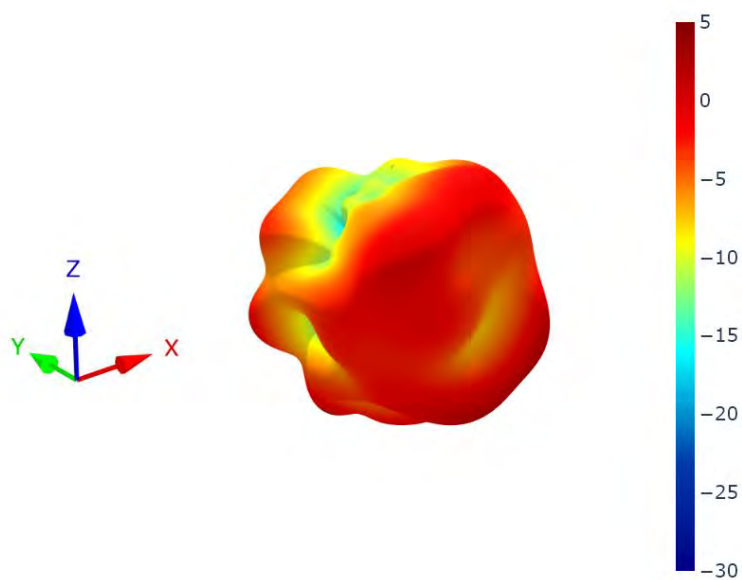
YZ Plane



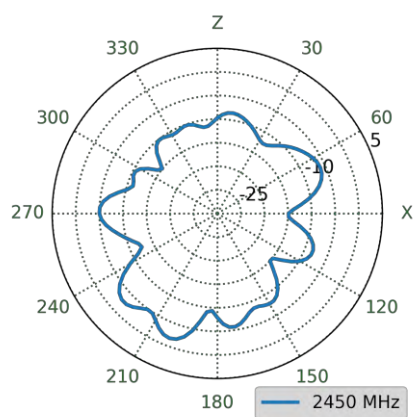
XY Plane



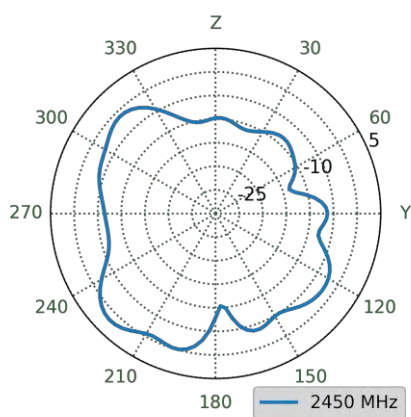
4.3 Patterns at 2450 MHz



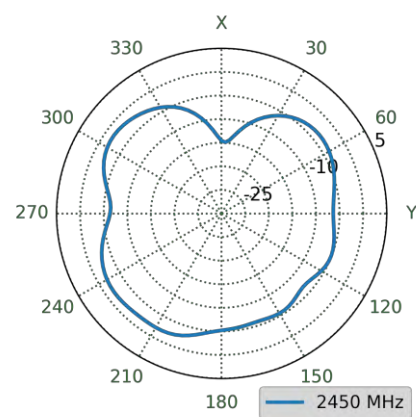
XZ Plane



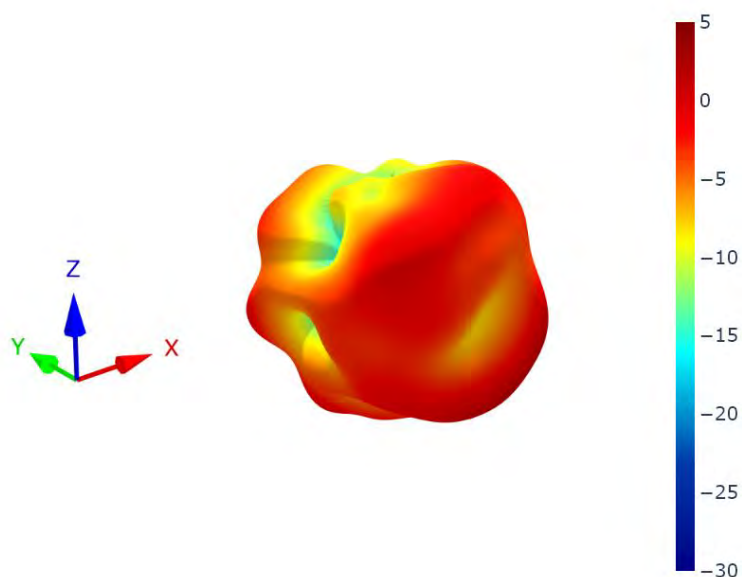
YZ Plane



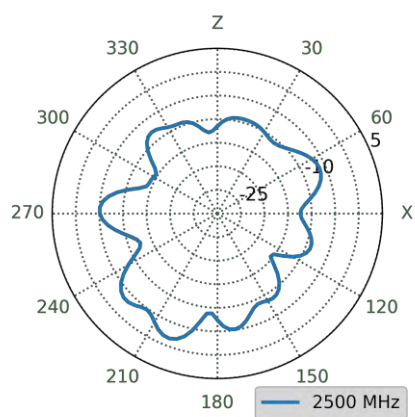
XY Plane



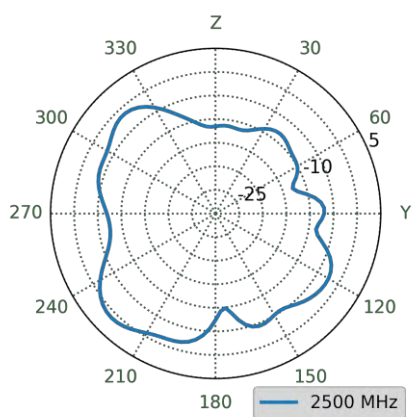
4.4 Patterns at 2500 MHz



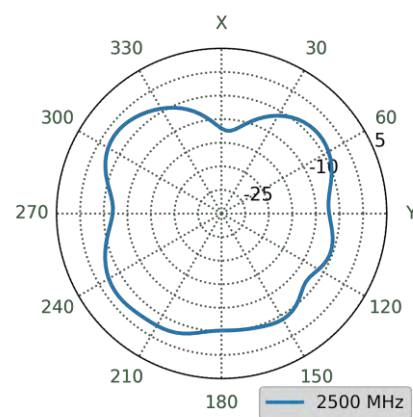
XZ Plane



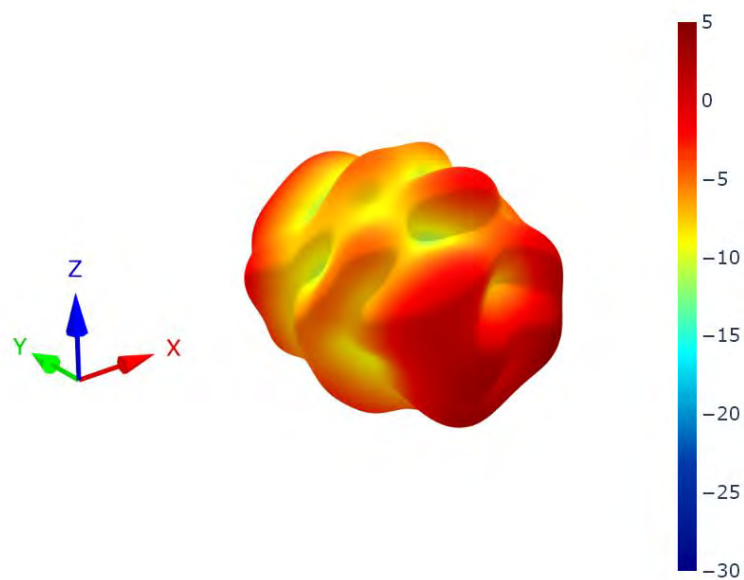
YZ Plane



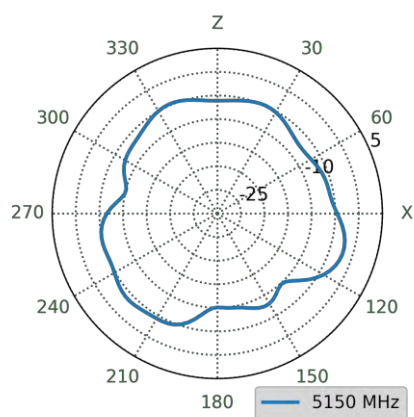
XY Plane



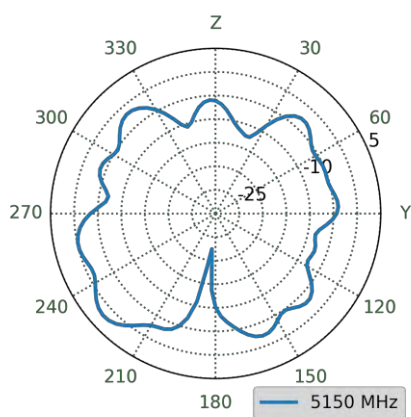
4.5 Patterns at 5150 MHz



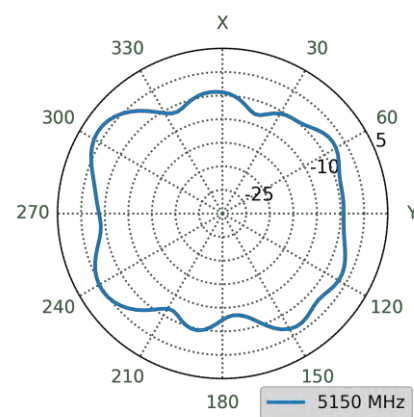
XZ Plane



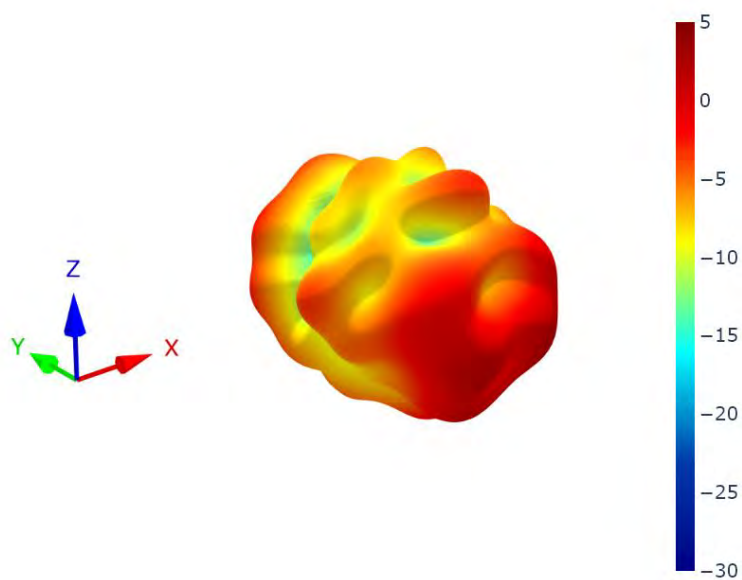
YZ Plane



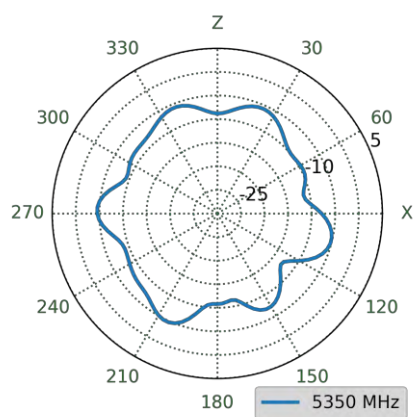
XY Plane



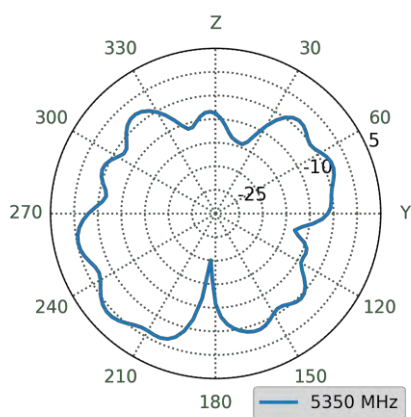
4.6 Patterns at 5350 MHz



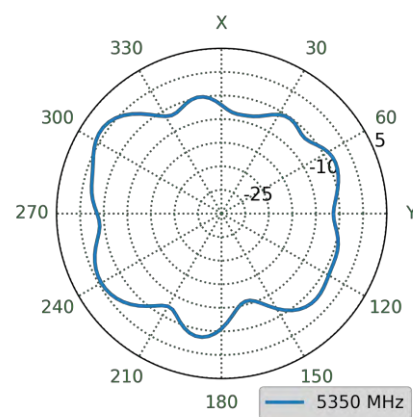
XZ Plane



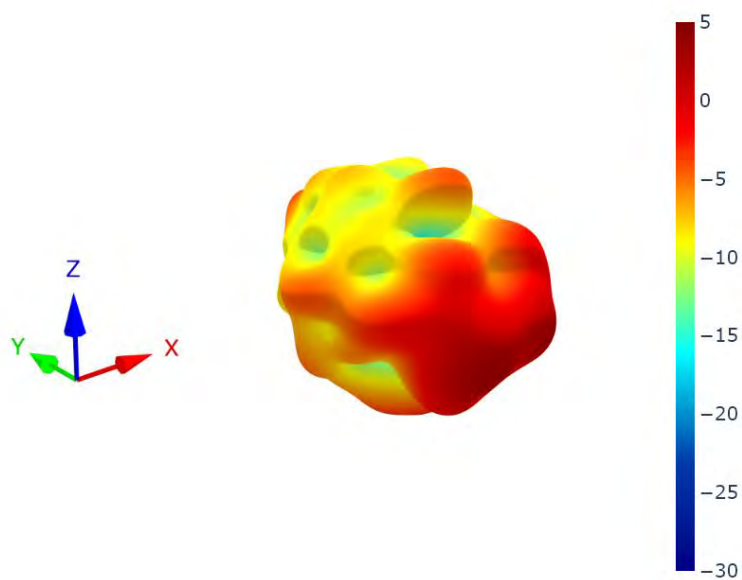
YZ Plane



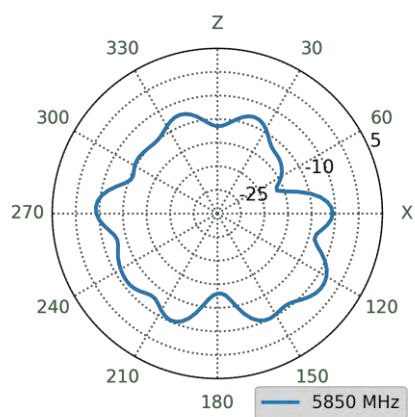
XY Plane



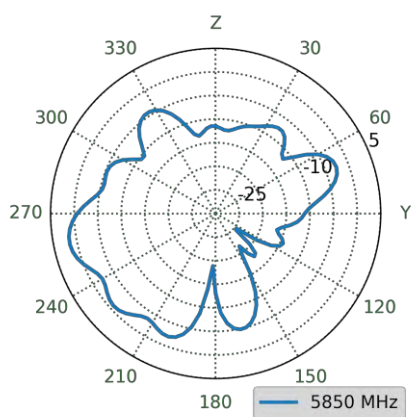
4.7 Patterns at 5850 MHz



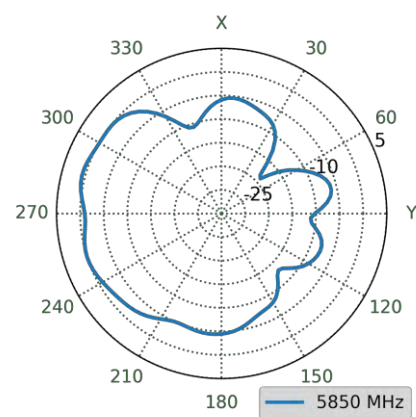
XZ Plane



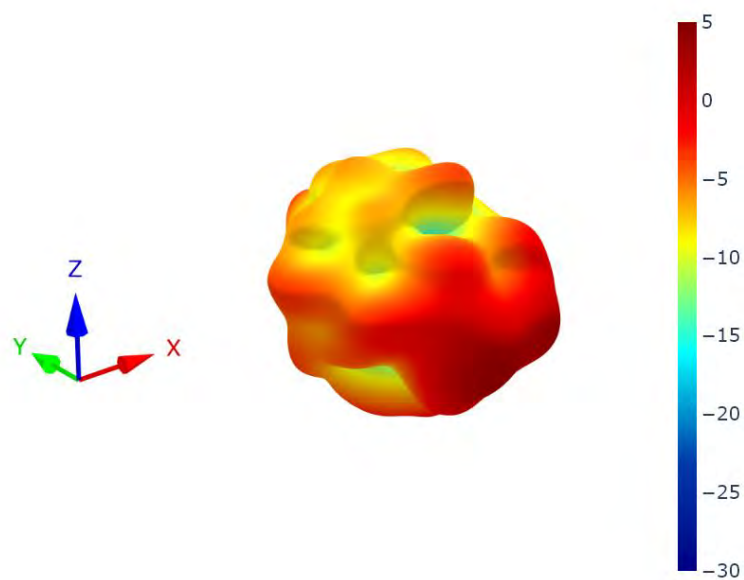
YZ Plane



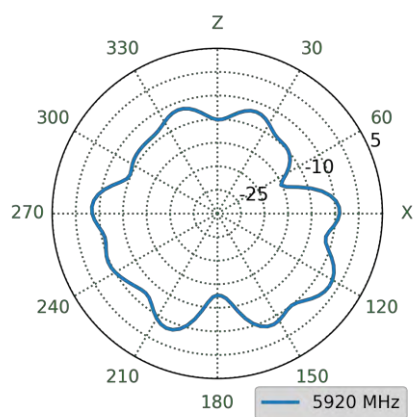
XY Plane



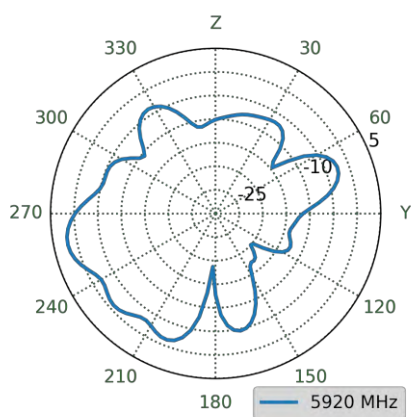
4.8 Patterns at 5925 MHz



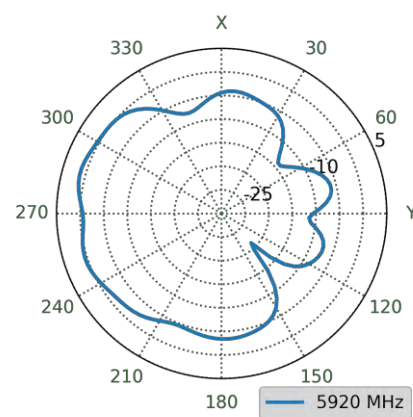
XZ Plane



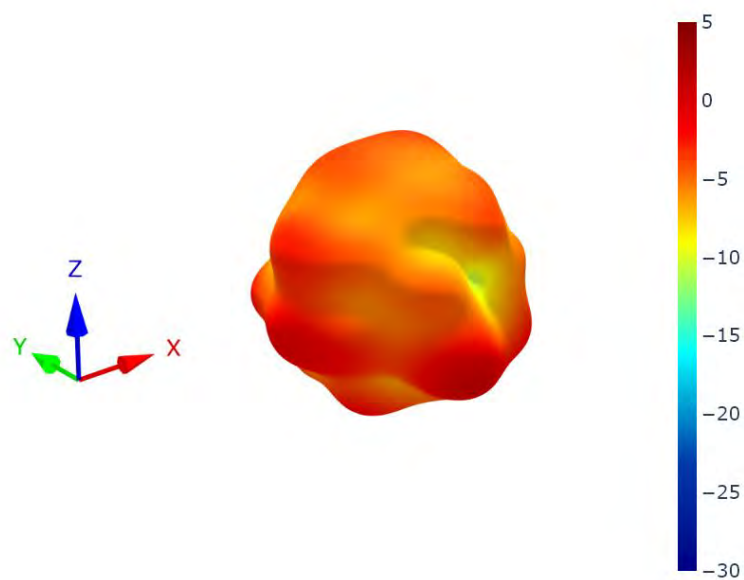
YZ Plane



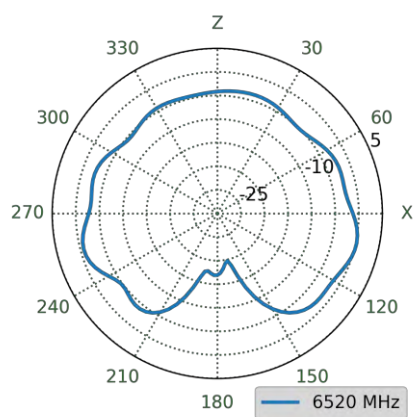
XY Plane



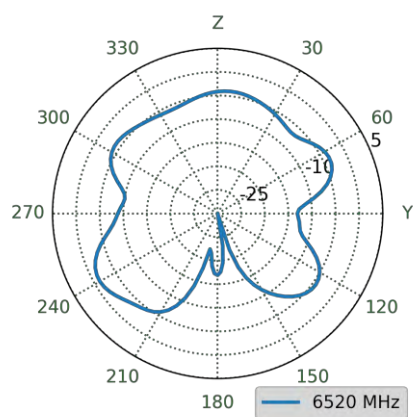
4.9 Patterns at 6525 MHz



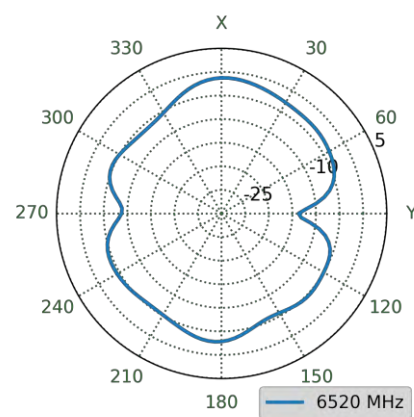
XZ Plane



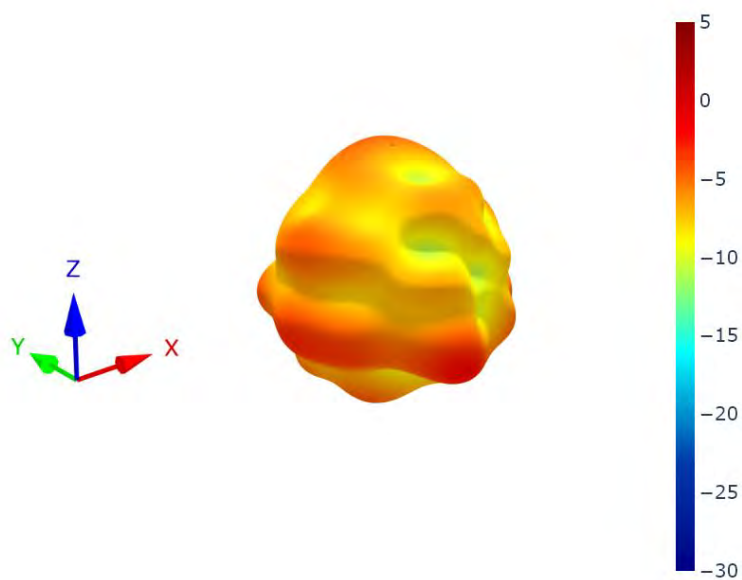
YZ Plane



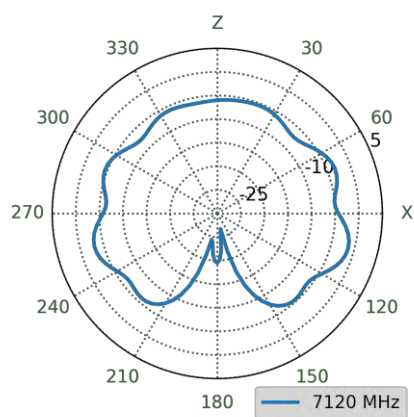
XY Plane



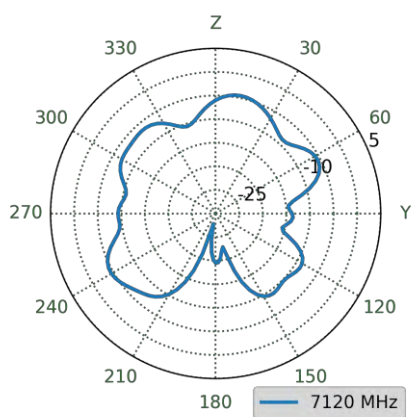
4.10 Patterns at 7125 MHz



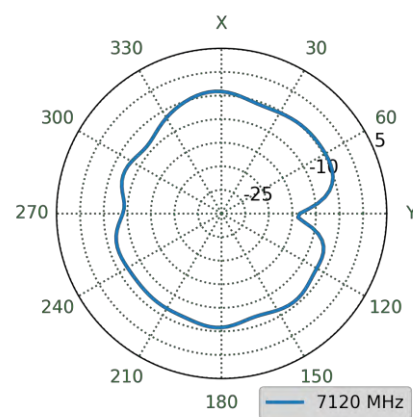
XZ Plane



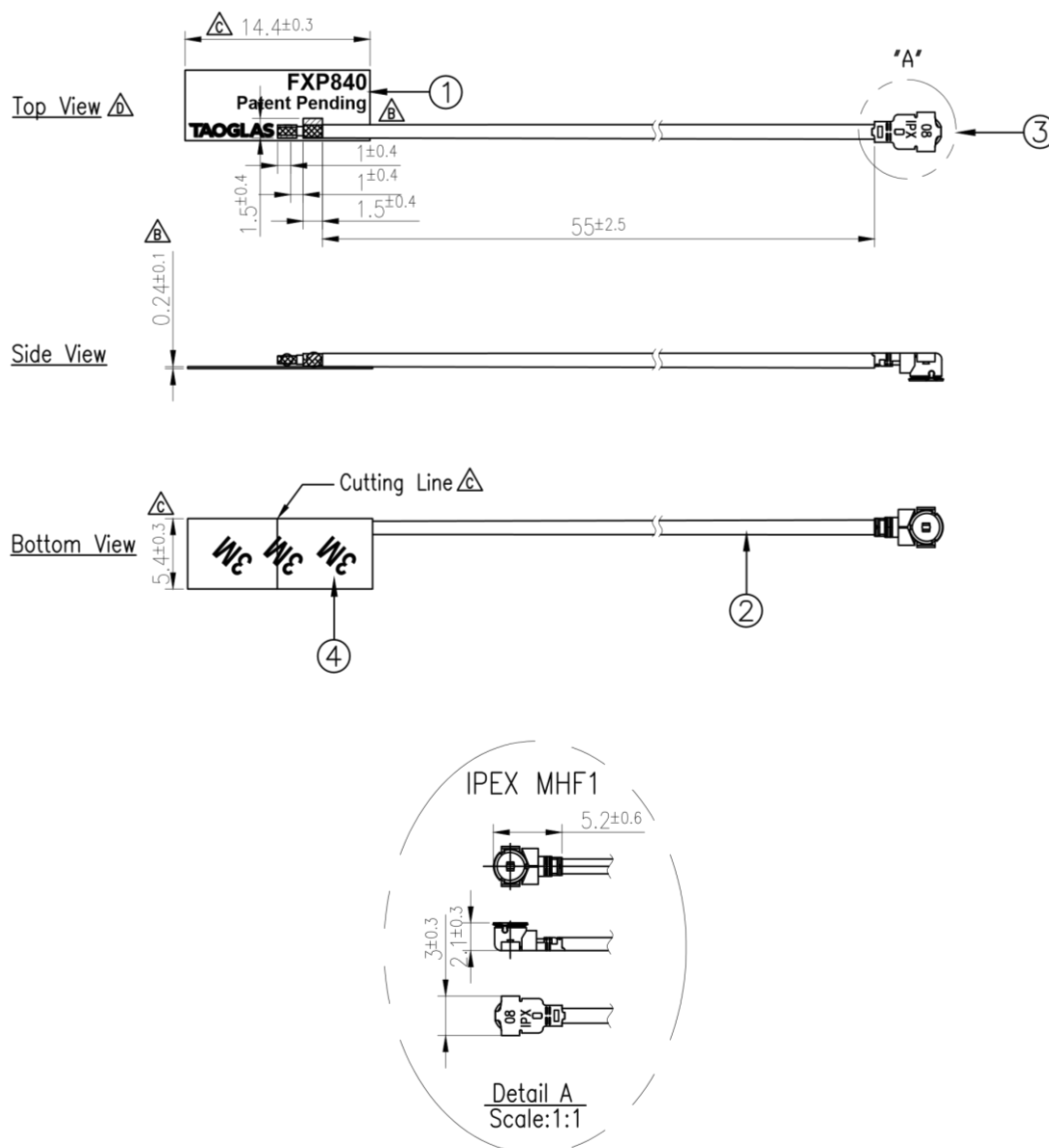
YZ Plane



XY Plane



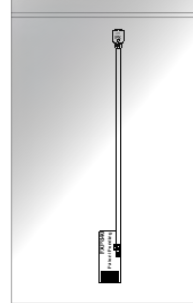
5. Mechanical Drawing



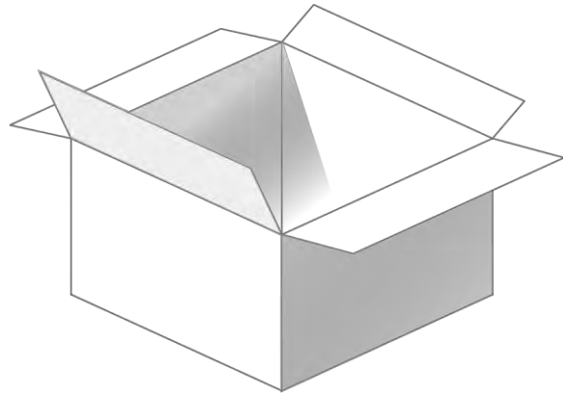
	Name	P/N	Material	Finish	QTY
1	FXP840 FPCB	100112E020011A	Polymer	Black	1
2	0.81 Coaxial Cable	300815C010000A	FEP	Black	1
3	IPEX MHF1	204111E000013A	Brass	Gold	1
4	Double-Sided Adhesive	100112E020011A	3M 467	Brown Liner	1

6. Packaging

1pcs FXP840.07.0055B per PE Bag
Weight - 1g



2000pcs FXP840.07.0055B per carton
Dimensions - 230*160*175mm
Weight - 6.8Kg



Changelog for the datasheet

SPE-12-8-115 - FXP840.07.0055B

Revision: K (Current Version)

Date:	2024-02-13
Changes:	Full datasheet update.
Changes Made by:	Gary West

Previous Revisions

Revision: J

Date:	2020-09-04
Changes:	Updated Wi-Fi 6 info
Changes Made by:	Jack Conroy

Revision: E

Date:	2017-03-08
Changes:	Added Note on Intro
Changes Made by:	Aine Doyle

Revision: I

Date:	2017-03-08
Changes:	ECR-18-8-259
Changes Made by:	Russell Meyler

Revision: D

Date:	2012-11-19
Changes:	Packaging Details Updated
Changes Made by:	Aine Doyle

Revision: H

Date:	2018-06-27
Changes:	Updated Peak Gain
Changes Made by:	Jack Conroy

Revision: C

Date:	2012-10-02
Changes:	Updated Drawing
Changes Made by:	Aine Doyle

Revision: G

Date:	2018-06-27
Changes:	Updated Peak Gain
Changes Made by:	Carol Faughnan

Revision: B

Date:	2012-09-27
Changes:	Packaging Details Updated
Changes Made by:	Aine Doyle

Revision: F

Date:	2017-05-07
Changes:	PCN-17-8-081
Changes Made by:	Aine Doyle

Revision: A (Original First Release)

Date:	2012-09-13
Notes:	
Author:	Technical Writer



www.taoglas.com





001-0012

Waterproof Dipole Antenna 2400-2500 MHz/4910-5850 MHz

ELECTRICAL SPECIFICATION

Model Name	001-0012	
Operating Frequency (MHz)	2400-2500	4910-5850
VSWR - max	≤ 2.5:1	
Gain (dBi)	2.0	2.0
Nominal Impedance (Ohms)	50	
Polarization	Linear vertical	

MECHANICAL SPECIFICATION

Dimensions - mm (inches)	114.0 x 13.0 (4.94 x 0.51)
Weight - g (oz.)	18.0 (0.63)
Radome Material	Black

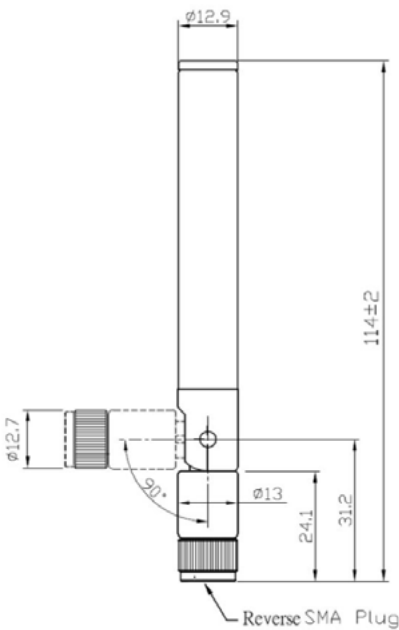
ENVIRONMENTAL SPECIFICATION

Operating Temperature - °C (°F)	-40 to +85°C (-40 to +185°F)
UL Rating	UL 94HB
Ingress Protection Rating	IP67

CONFIGURATION

PART NUMBER	DESCRIPTION
001-0012	2.4/5.5 GHz waterproof dipole antenna for Reverse Polarity SMA connector
080-0013	U.FL to Reverse Polarity SMA cable, 105 mm, O-ring seal
080-0014	U.FL to Reverse Polarity SMA cable, 210 mm, O-ring seal

MECHANICAL DRAWING



TYPICAL ANTENNA REFLECTION PERFORMANCE

Straight Antenna Position

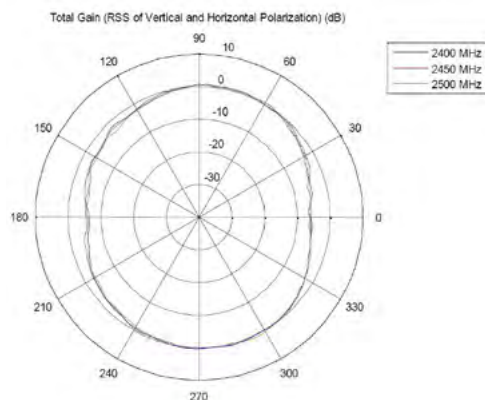


Bent Antenna Position

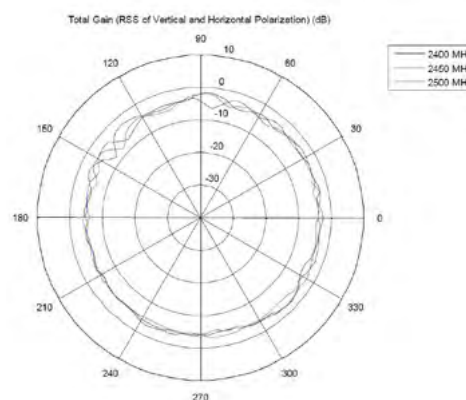


RADIATION PATTERNS

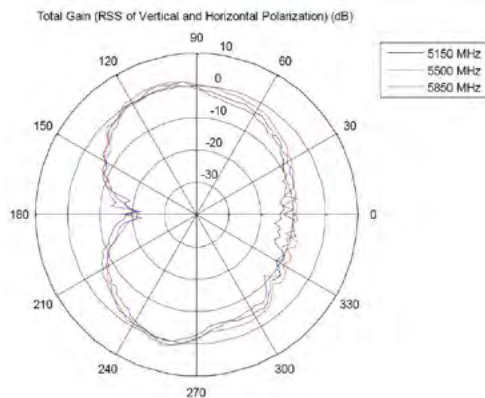
2.4 GHz (E-Plane)



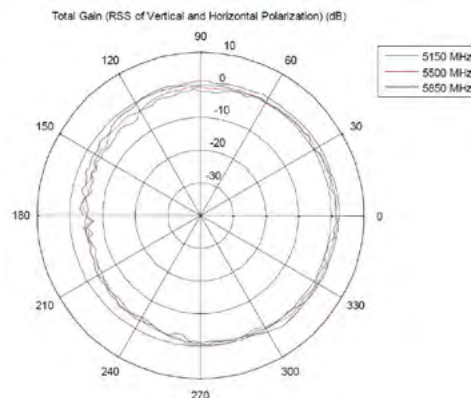
2.4 GHz (H-Plane)



5 GHz (E-Plane)



5 GHz (H-Plane)



TE TECHNICAL SUPPORT CENTER

USA:	+1 (800) 522-6752
Canada:	+1 (905) 475-6222
Mexico:	+52 (0) 55-1106-0800
Latin/S. America:	+54 (0) 11-4733-2200
Germany:	+49 (0) 6251-133-1999
UK:	+44 (0) 800-267666
France:	+33 (0) 1-3420-8686
Netherlands:	+31 (0) 73-6246-999
China:	+86 (0) 400-820-6015

te.com

TE, and TE connectivity (logo) are trademarks owned or licensed by the TE Connectivity Ltd. family of companies. All other logos, products and/or company names referred to herein might be trademarks of their respective owners.

The information given herein, including drawings, illustrations and schematics which are intended for illustration purposes only, is believed to be reliable. However, TE Connectivity makes no warranties as to its accuracy or completeness and disclaims any liability in connection with its use. TE Connectivity's obligations shall only be as set forth in TE Connectivity's Standard Terms and Conditions of Sale for this product and in no case will TE Connectivity be liable for any incidental, indirect or consequential damages arising out of the sale, resale, use or misuse of the product. Users of TE Connectivity products should make their own evaluation to determine the suitability of each such product for the specific application.

TE Connectivity warrants to the original end user customer of its products that its products are free from defects in material and workmanship. Subject to conditions and limitations TE Connectivity will, at its option, either repair or replace any part of its products that prove defective because of improper workmanship or materials. This limited warranty is in force for the useful lifetime of the original end product into which the TE Connectivity product is installed. Useful lifetime of the original end product may vary but is not warranted to exceed one (1) year from the original date of the end product purchase.

©2022 TE Connectivity. All Rights Reserved.

08/22 Original

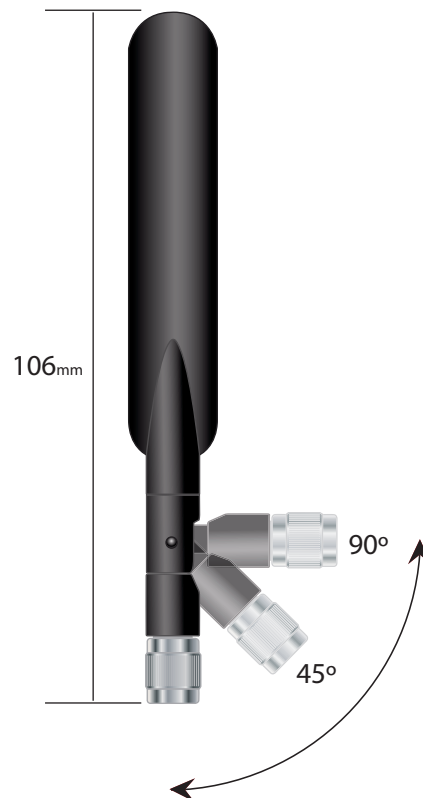


ANRD245X05 *Dual-Band 2.4 + 5.1 to 5.8 GHz* *Indoor Dipole Antenna*

Model ANRD245X05 is a dual band dipole (rubber duck) style antenna for the 2.4 GHz and 5.1 to 5.8 GHz bands. This indoor antenna provides high gain (5 dBi) in each band and tilt and swivel functions.

Applications

- WiFi (WLAN)



ANRD245X05 Specifications

Frequency

2400 to 2485 MHz and 5.1 to 5.8 GHz

Gain

5 dBi at 2.4 GHz

5 dBi from 5.1 to 5.8 GHz

VSWR

≤ 1.5 at 2.4 GHz

≤ 2.0 from 5.1 to 5.8 GHz

Polarization

Vertical

Vertical Beam Width

47°

Horizontal Beam Width

360°

Impedance

50 Ω

Max. Input Power

5 watts

Weight

0.022 lbs (10 g)

Length

4.27 inches (108.5 mm)

Connector

RP-SMA, SMA, or RP-TNC available

Finish

Matte black

White available on RP-SMA and RP-TNC

Flame Rating

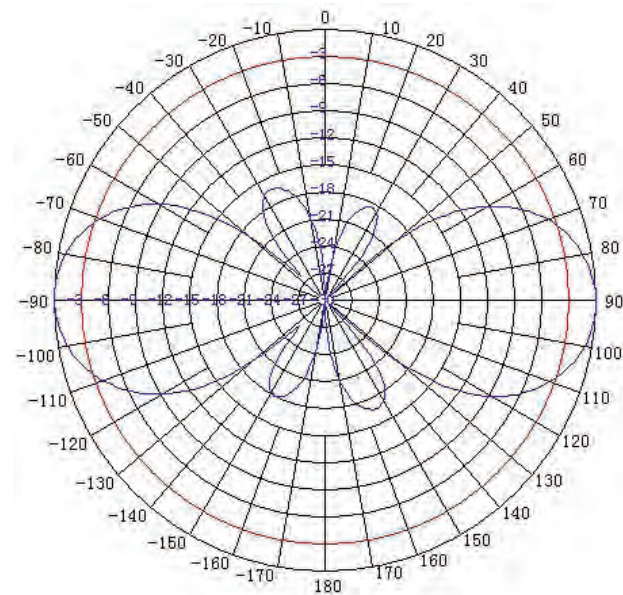
UL 94HB

Operating Temperature

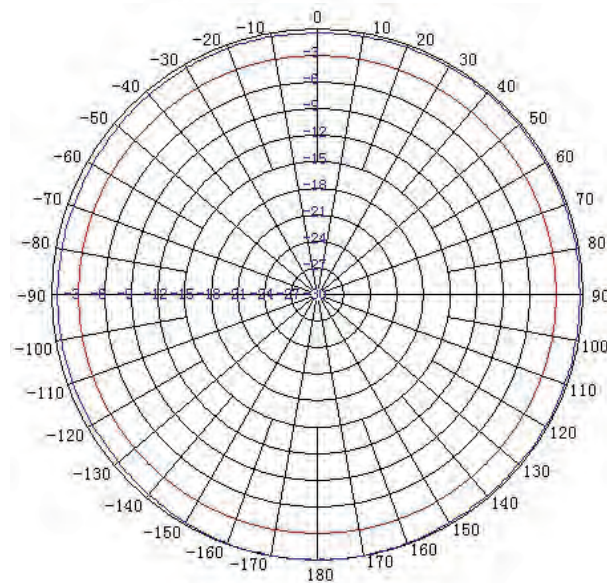
-40°F to +140°F (-40°C to +60°C)

RoHS Compliant

Yes



E-Plane (vertical)



H-Plane (Horizontal)

Ordering Information

ANRD245X05-RSP

Black with RP-SMA (reverse polarity SMA) connector

ANRD245X05-W-RSP

White with RP-SMA (reverse polarity SMA) connector

ANRD245X05-RTP

Black with RP-TNC (reverse polarity TNC) connector

ANRD245X05-W-RTP

White with RP-TNC (reverse polarity TNC) connector

ANRD245X05-SMA

Black with SMA connector

AIR802

2570 Beverly Drive, Ste #140

Aurora, IL 60502

Tel: (630) 428.3108

sales@air802.com

www.AIR802.com

SPECIFICATION

Part No.	: GW.71.5153
Product Name	: 2.4GHz/5.8GHz Terminal Mount Dipole Antenna for ISM Band and WLAN IEEE 802.11a/b/g/h
Feature	: 5dBi High Performance Antenna RP-SMA(M) Hinged Antenna RoHS Compliant



1. Introduction

Many module manufacturers specify peak gain limits for any antennas that are to be connected to that module. Those peak gain limits are based on free-space conditions. In practice, the peak gain of an antenna tested in free-space can degrade by at least 1 or 2dBi when put inside a device. So ideally you should go for a slightly higher peak gain antenna than mentioned on the module specification to compensate for this effect, giving you better performance.

Upon testing of any of our antennas with your device and a selection of appropriate layout, integration technique, or cable, Taoglas can make sure any of our antennas' peak gain will be below the peak gain limits. Taoglas can then issue a specification and/or report for the selected antenna in your device that will clearly show it complying with the peak gain limits, so you can be assured you are meeting regulatory requirements for that module.

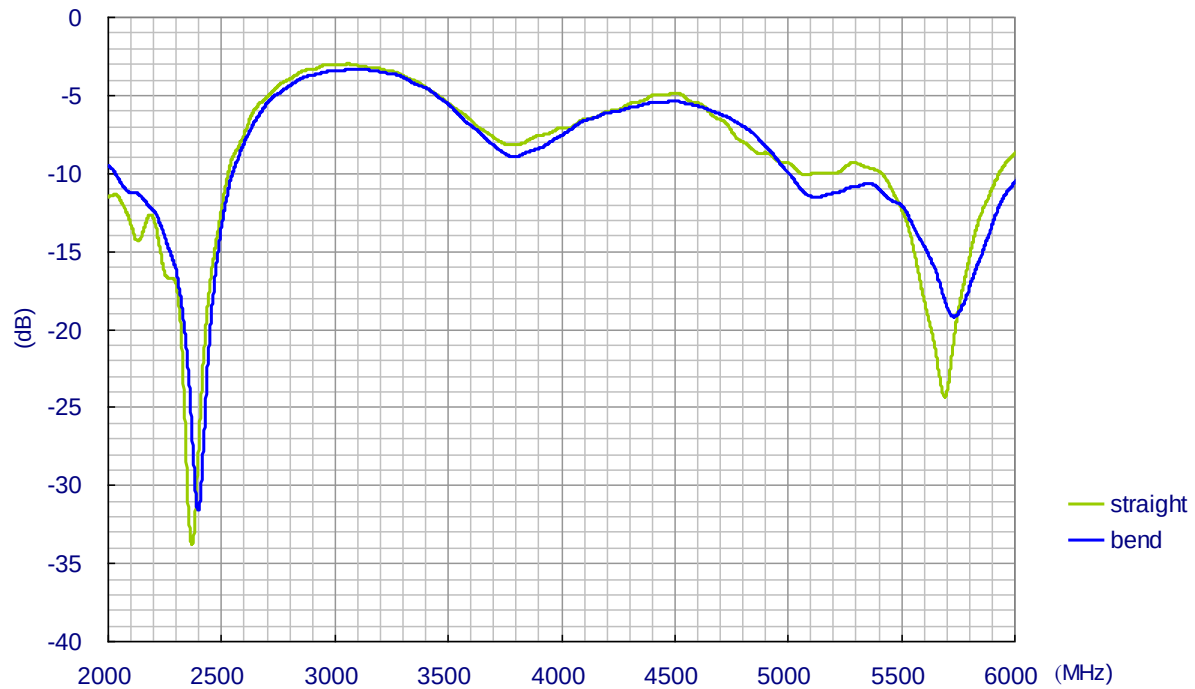
For example, a module manufacturer may state that the antenna must have less than 2dBi peak gain, but you don't need to select an embedded antenna that has a peak gain of less than 2dBi in free-space. This will give you a less optimized solution. It is better to go for a slightly higher free-space peak gain of 3dBi or more if available. Once that antenna gets integrated into your device, performance will degrade below this 2dBi peak gain due to the effects of GND plane, surrounding components, and device housing. If you want to be absolutely sure, contact Taoglas and we will test. Choosing a Taoglas antenna with a higher peak gain than what is specified by the module manufacturer and enlisting our help will ensure you are getting the best performance possible without exceeding the peak gain limits.

2. Specification

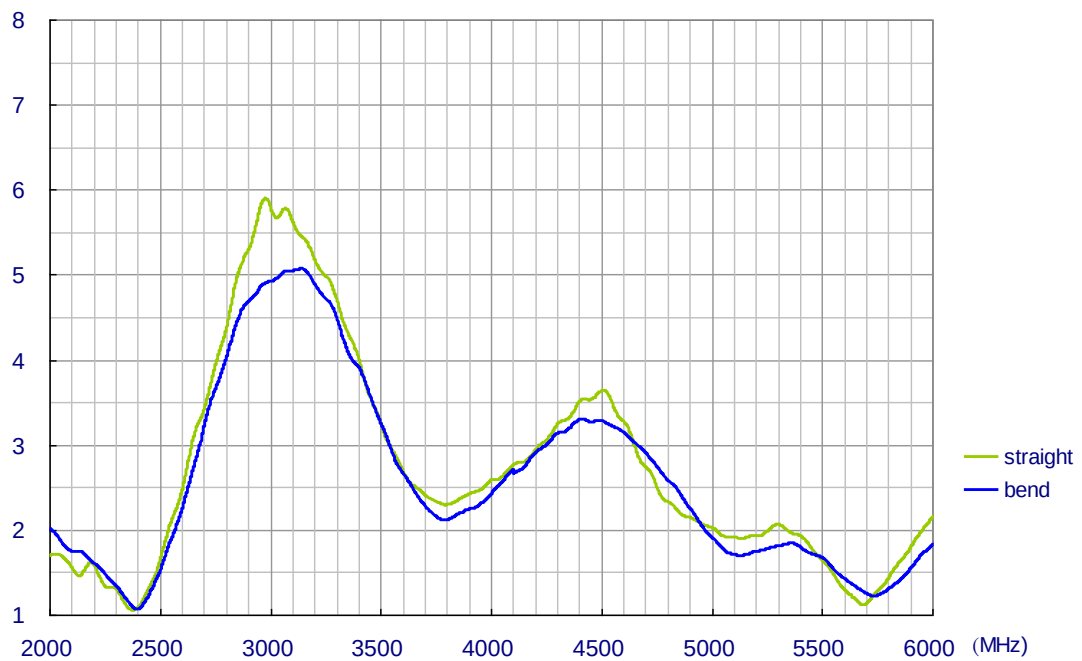
ELECTRICAL		
Frequency	2.4 ~ 2.5GHz,	4.9 ~ 5.8GHz
VSWR	<2	<2.1
Peak Gain (straight)	3.3dBi	4.9dBi
Peak Gain (bend)	3.8dBi	5.5dBi
Average Gain (straight)	-0.9dBi	-1.5dBi
Average Gain (bend)	-0.7dBi	-0.0dBi
Efficiency (straight)	80%	71%
Efficiency (bend)	86%	83%
Polarization	Linear	
Impedance	50 Ohms	
Radiation Pattern	Omni	
Input Power	2W max.	
MECHANICAL		
Antenna Length	194mm	
Antenna Diameter	12.8mm	
Weight	24.6g	
Antenna Body Material	TPU	
ENVIRONMENTAL		
Temperature Range	-40°C to 85°C	
Humidity	Non-condensing 65°C 95% RH	

3. Antenna S11 Property

3.1. Return Loss

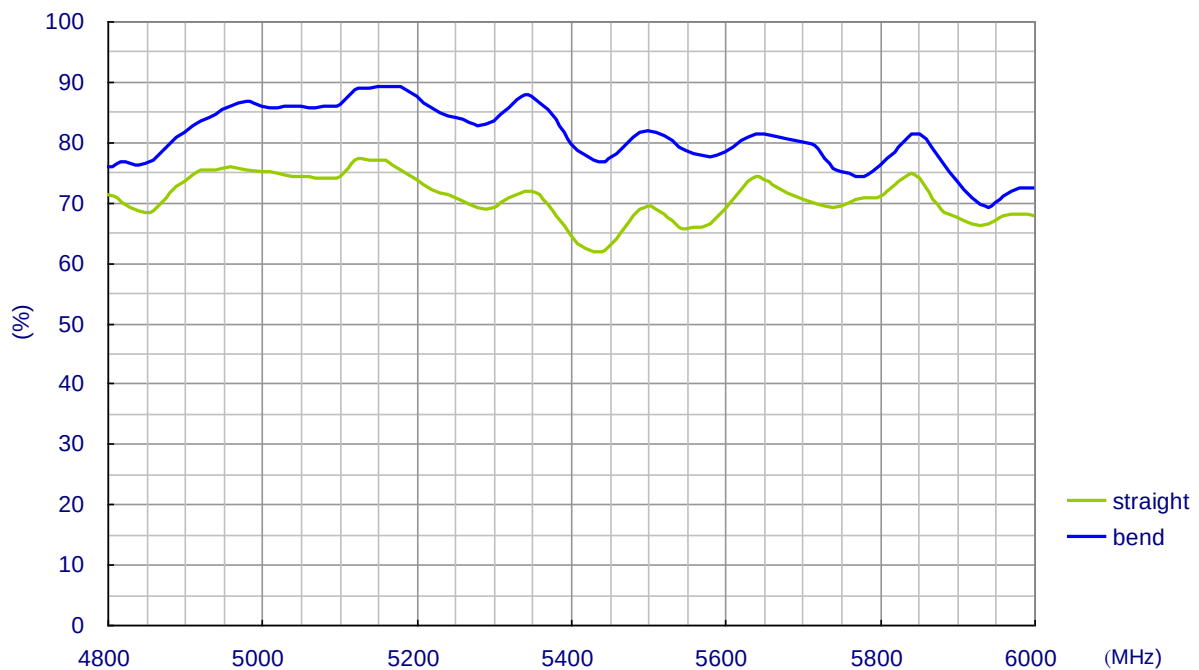
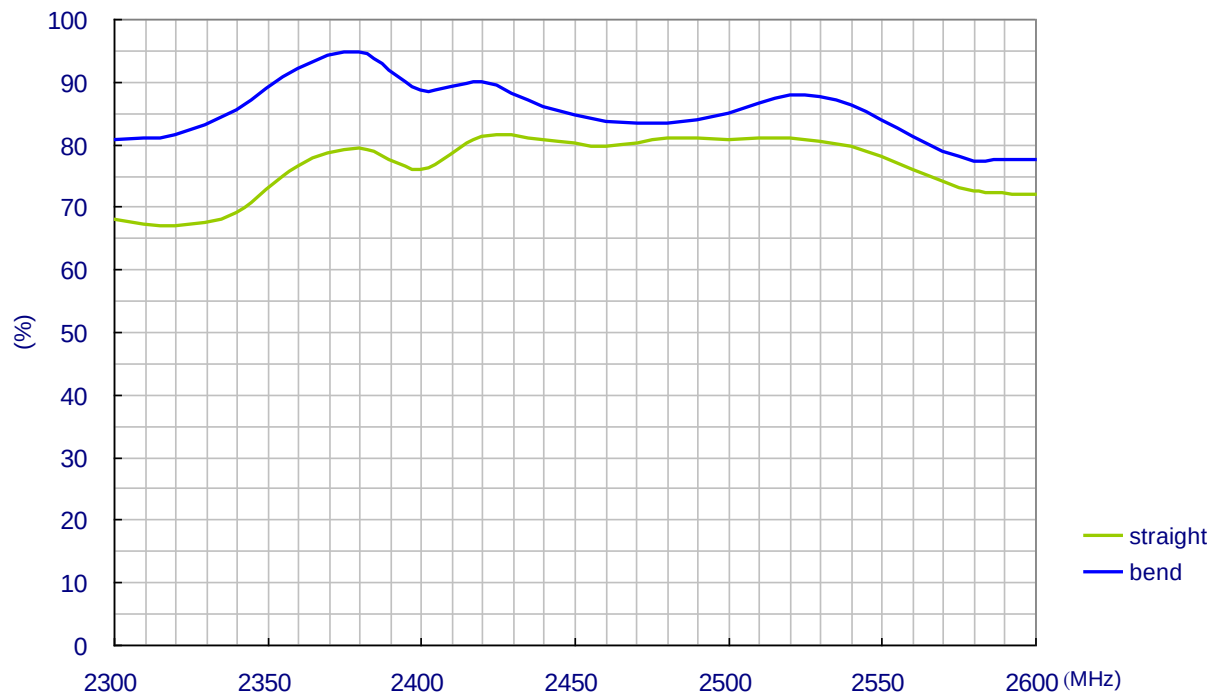


3.2. VSWR

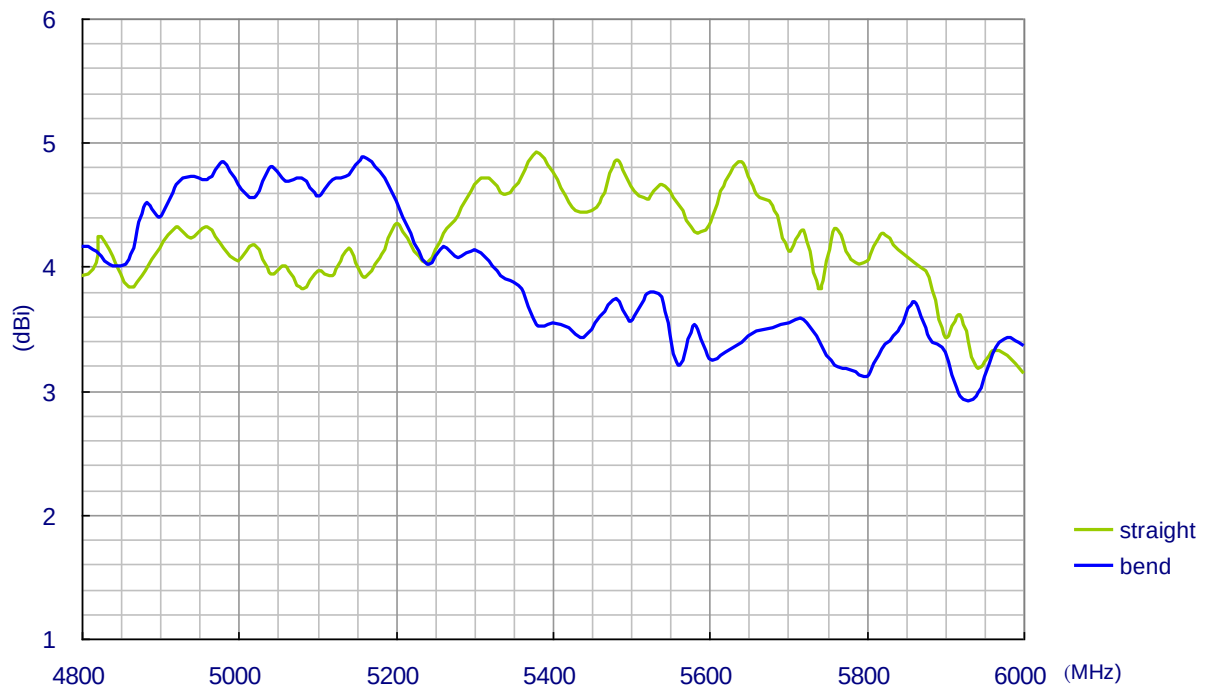
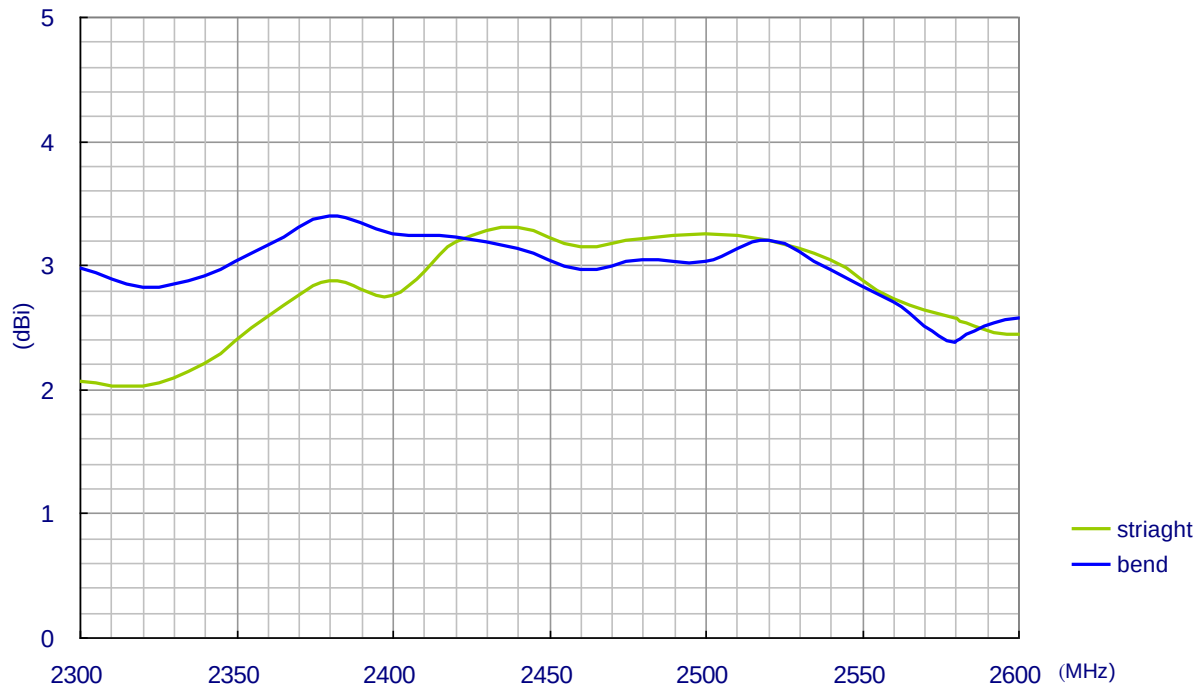


4. 3D Radiation Property

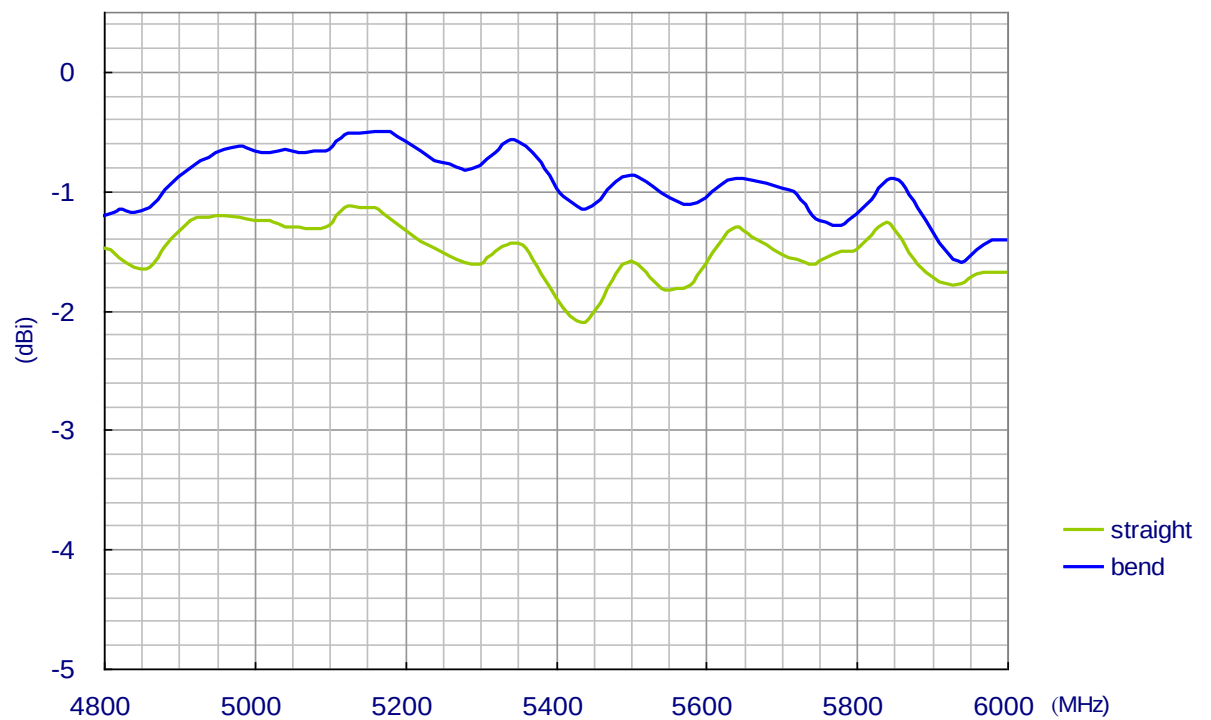
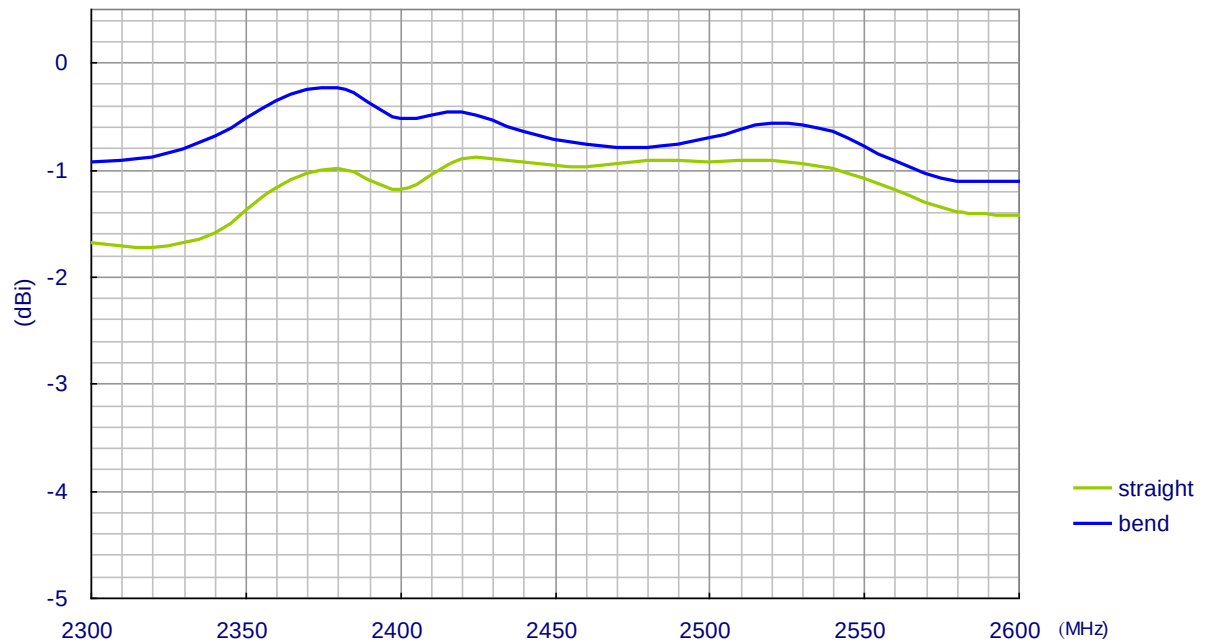
4.1. Radiation Efficiency



4.2. Peak Gain

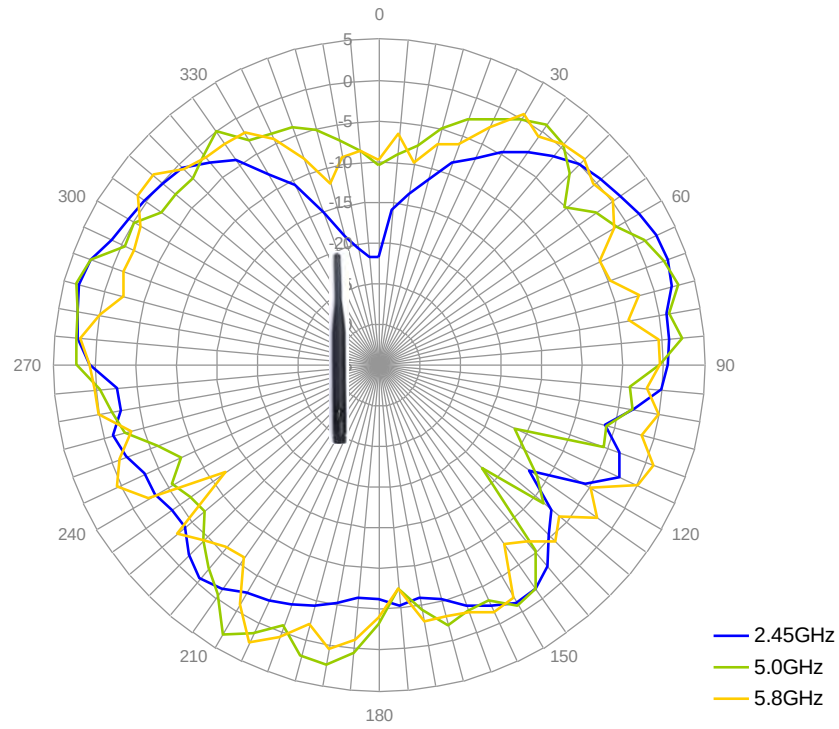


4.3. Average Gain

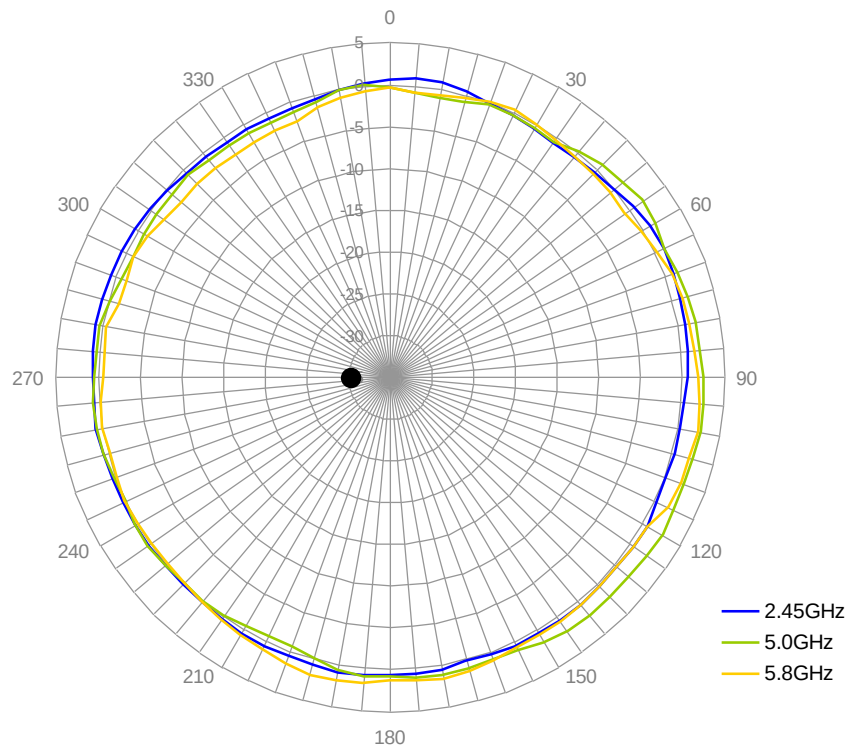


4.4. Radiation Pattern

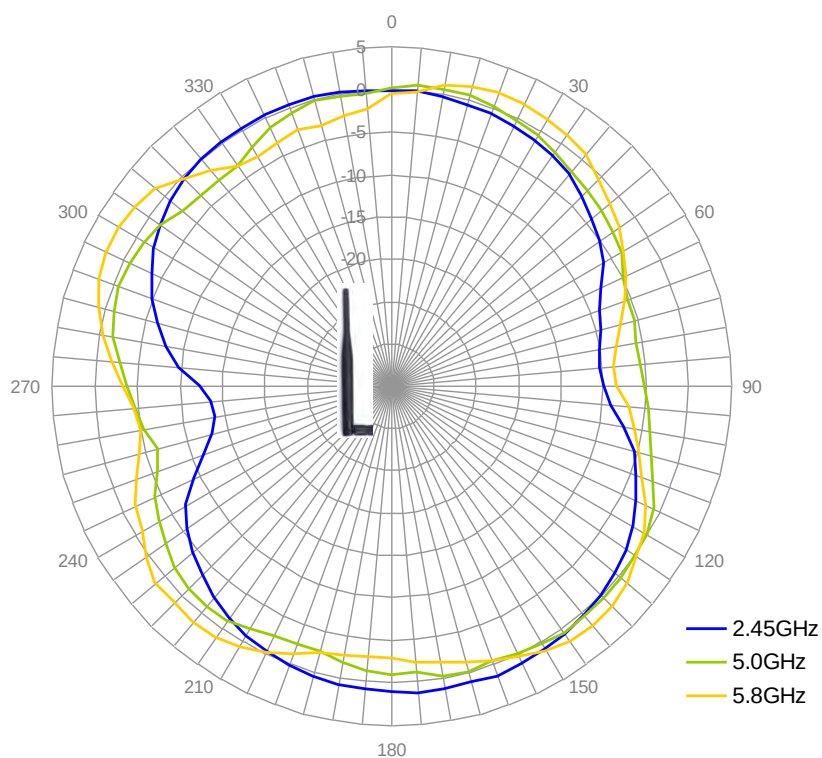
E-Plane Radiation of Straight Position



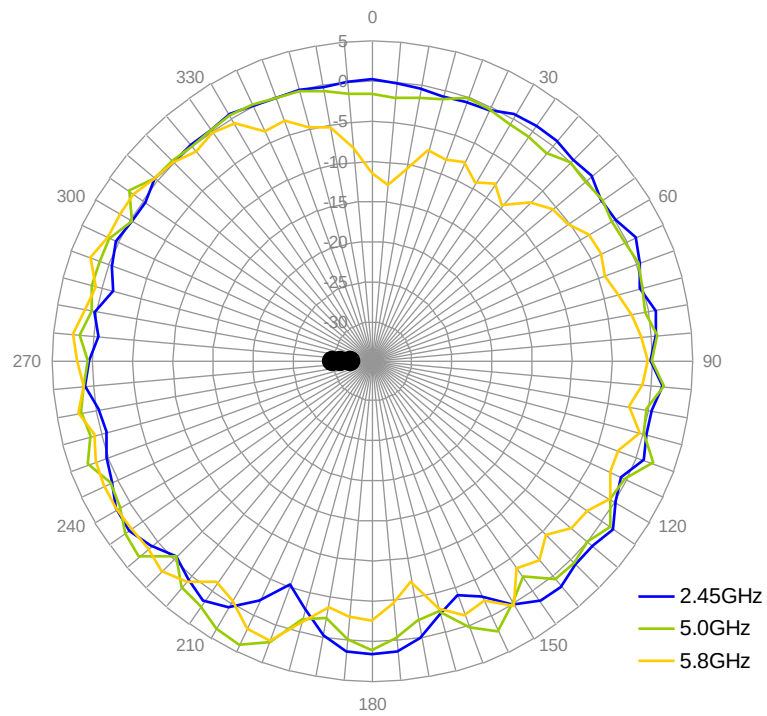
H-Plane Radiation of Straight Position



E-Plane Radiation of Bend Position



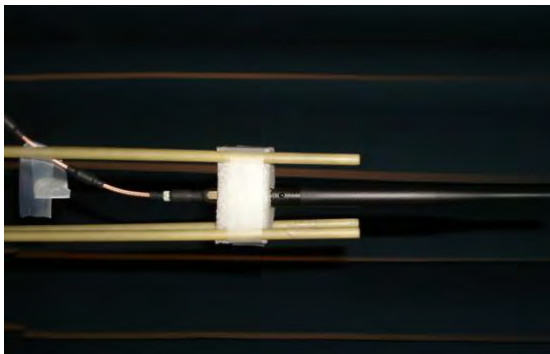
H-Plane Radiation of Bend Position



5. Ground Plane Effect

Three ground setups are used to see the affect of positioning GW.71 close to ground -

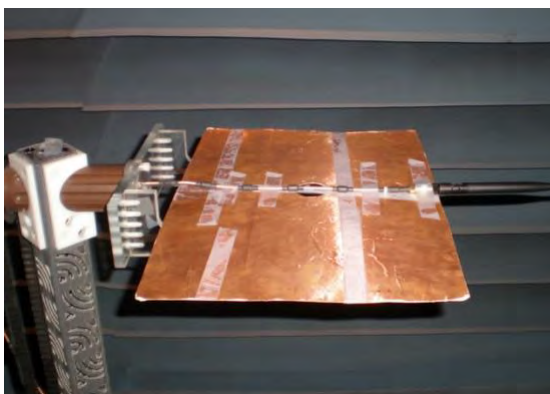
1. Small Ground (15 x 9cm) – common size of CPE devices.
GW.71 is mounted at the longer edge for testing.
2. Big Ground Edge (45 x 30cm) – simulate the effect of mounting antenna on a base station device. GW.71 is mounted at the centre of the longer edge.
3. Big Ground Centre (45 x 30cm) – simulate the effect of mounting antenna in a centre of a big ground plane, such as vehicle top.



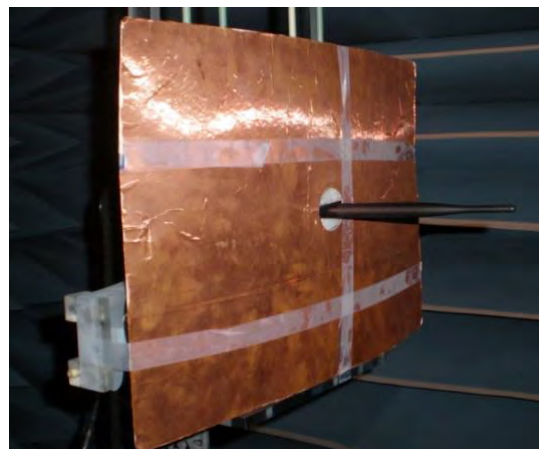
Free space



Small ground edge



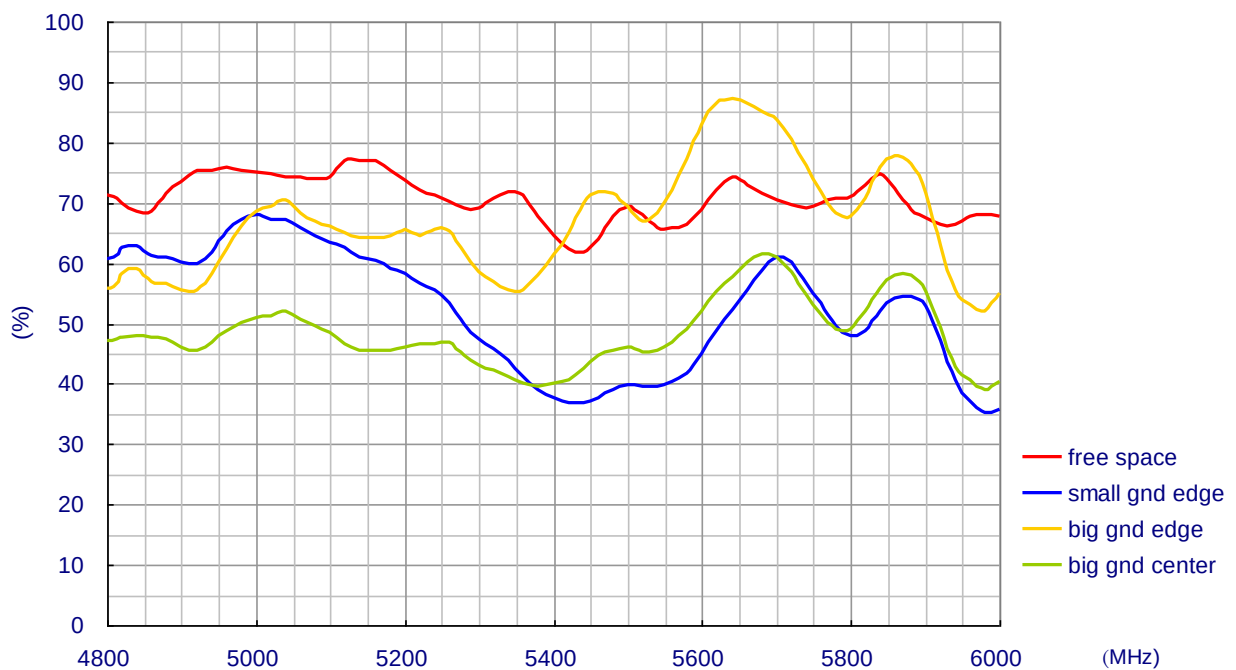
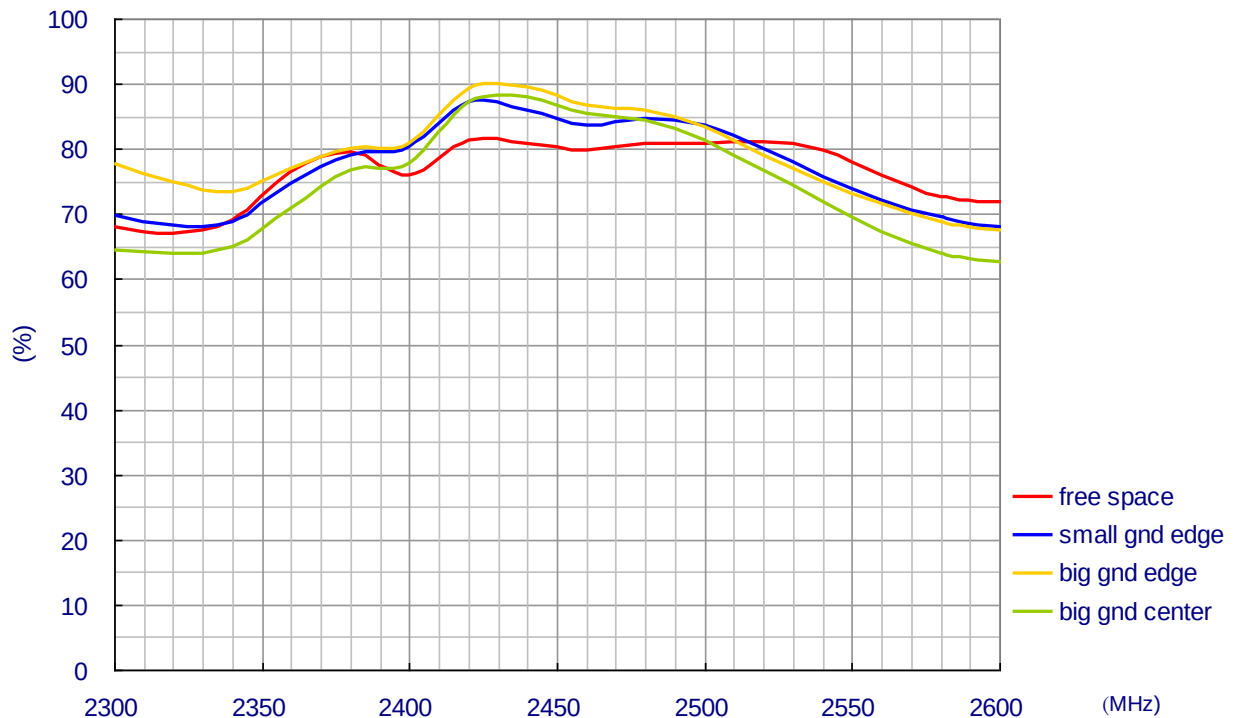
Big ground edge



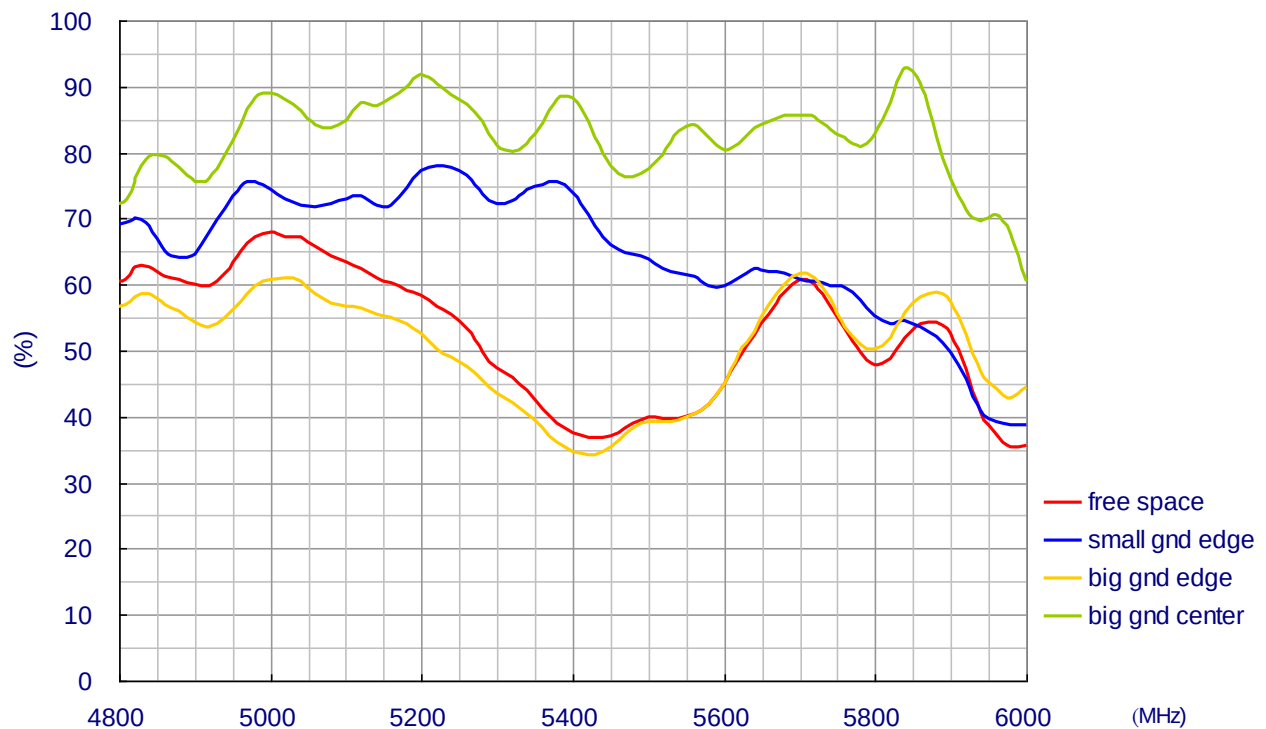
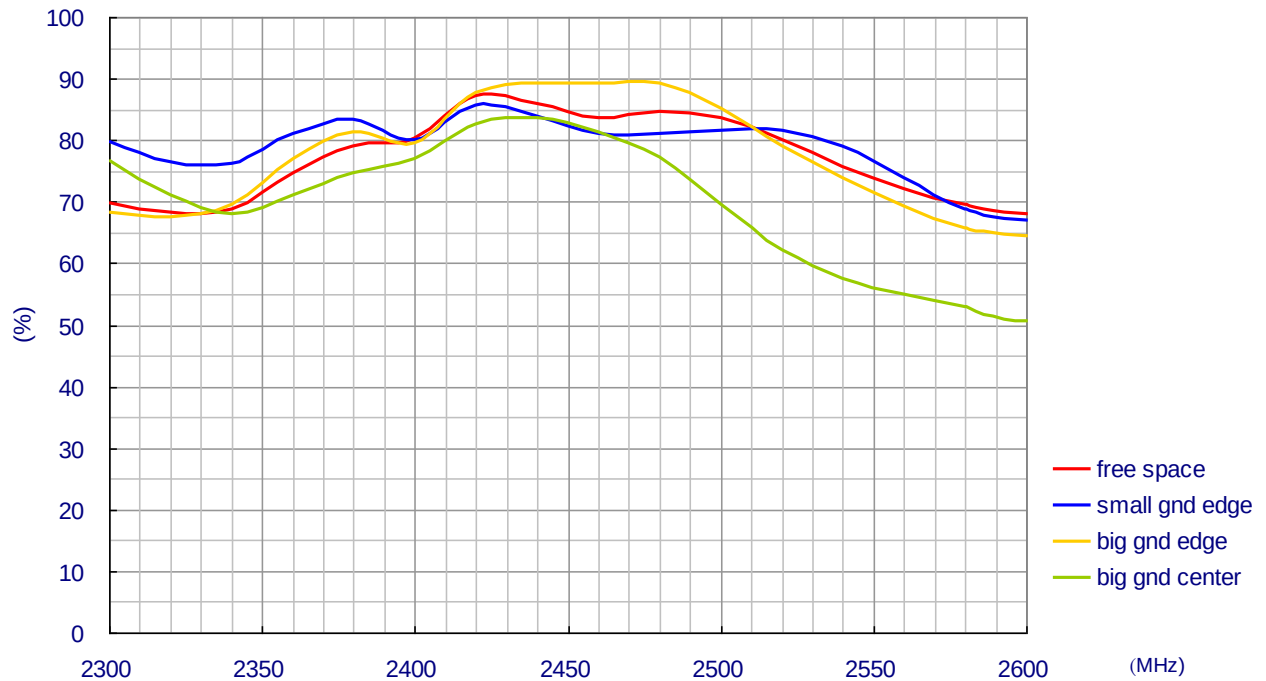
Big ground center

6. Radiation Property of GW.71 with Different Ground

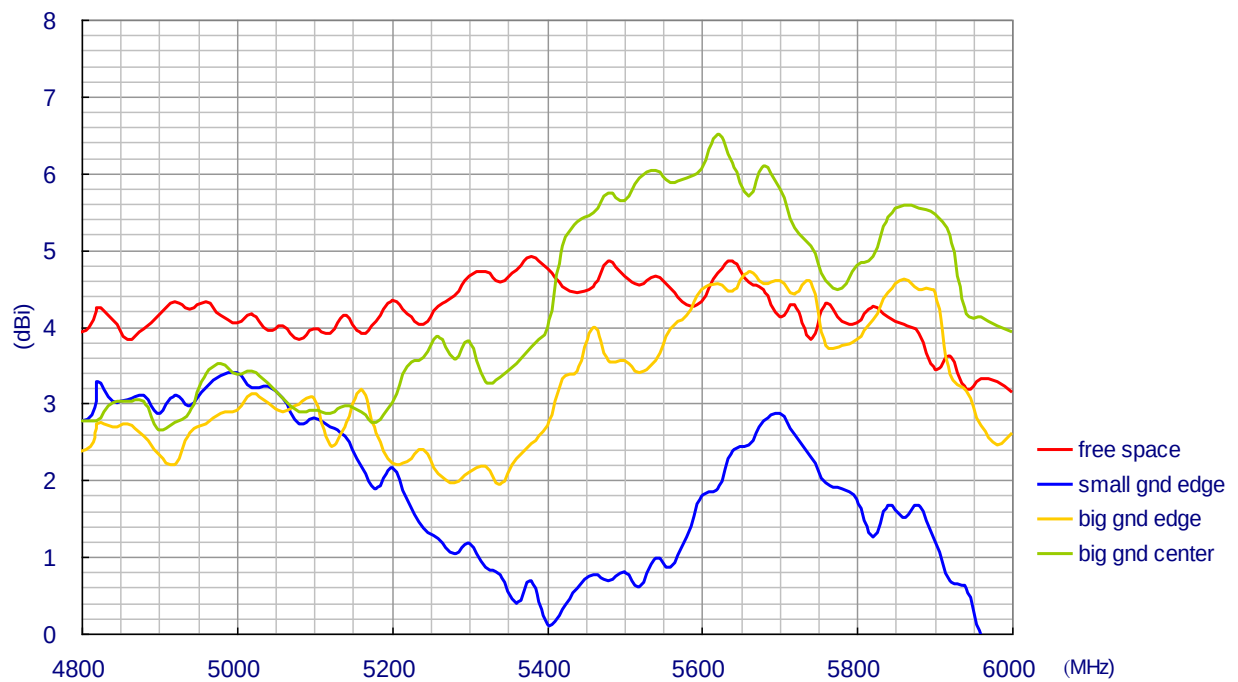
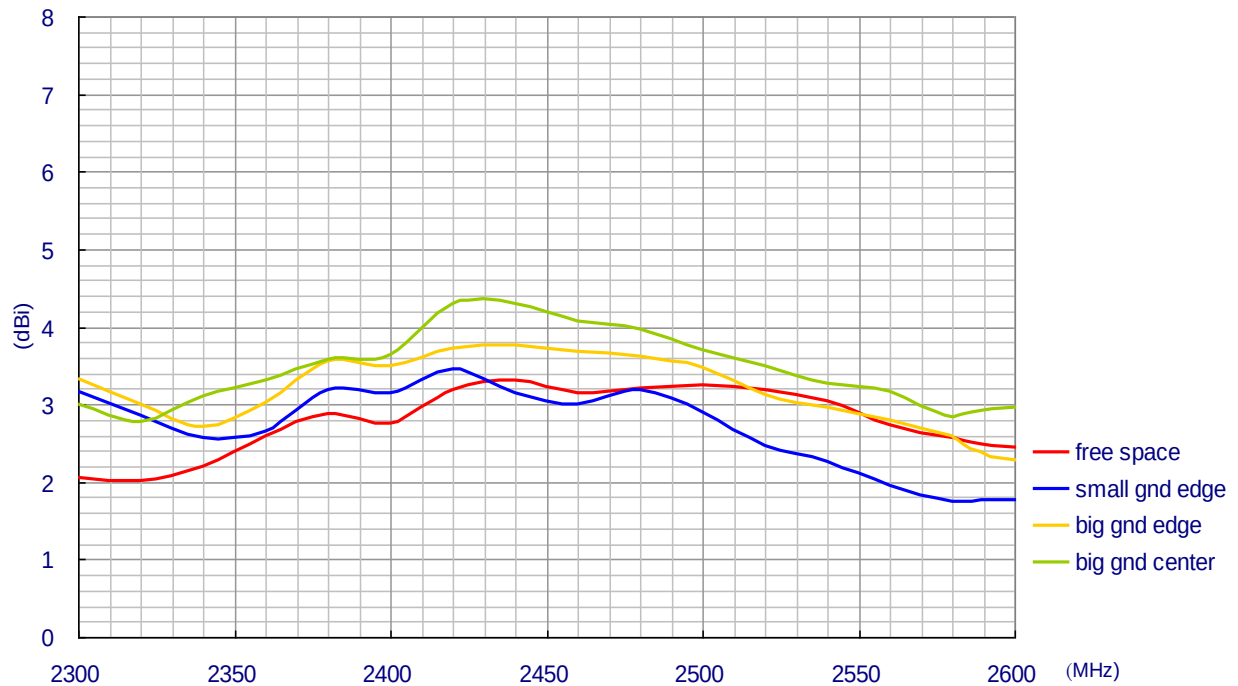
6.1. Radiation Efficiency of Straight GW.71



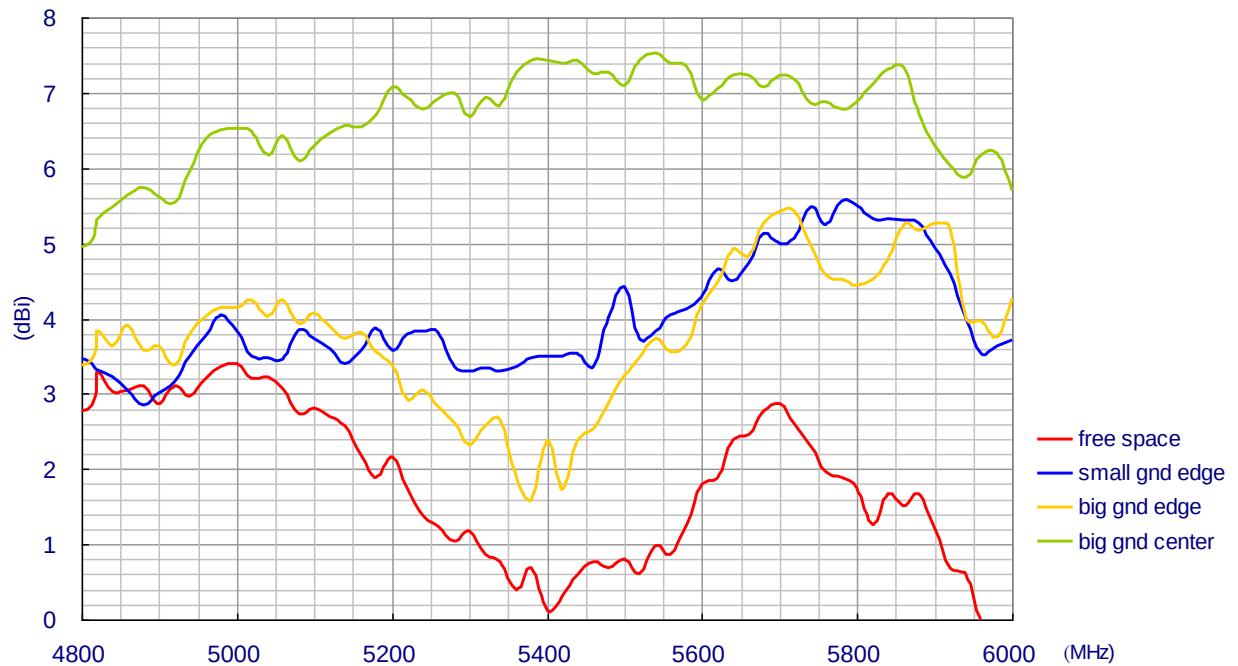
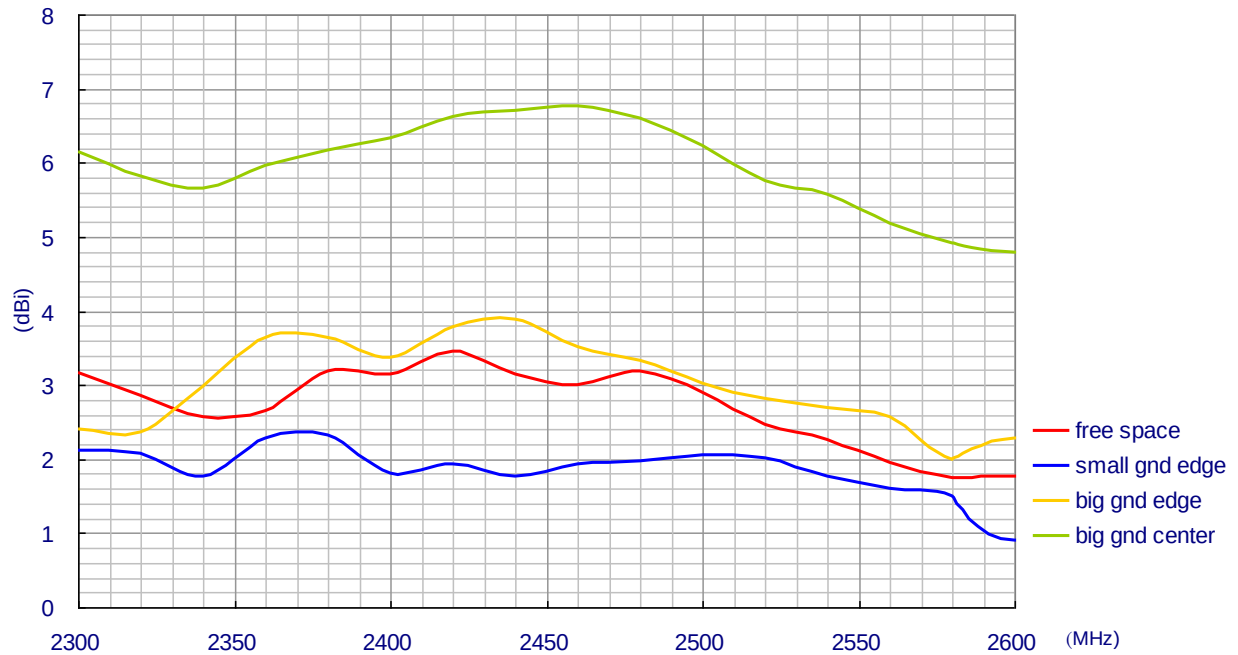
6.2. Radiation Efficiency of Bend GW.71



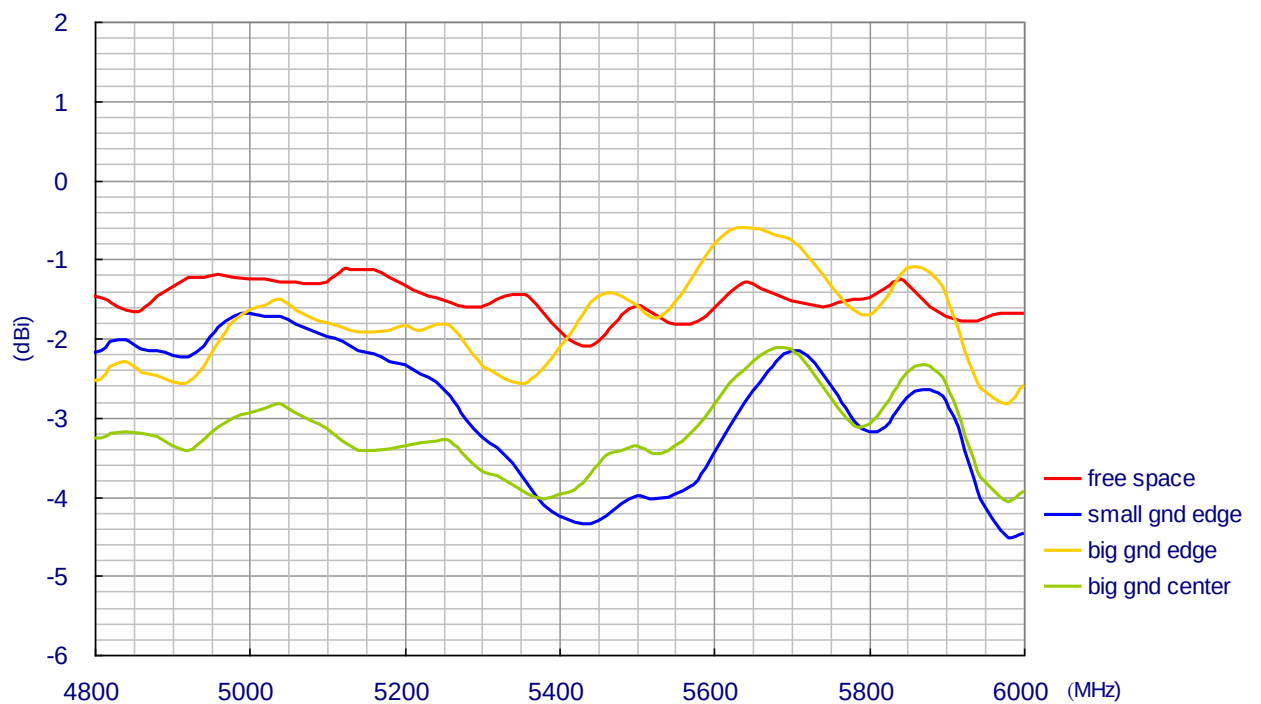
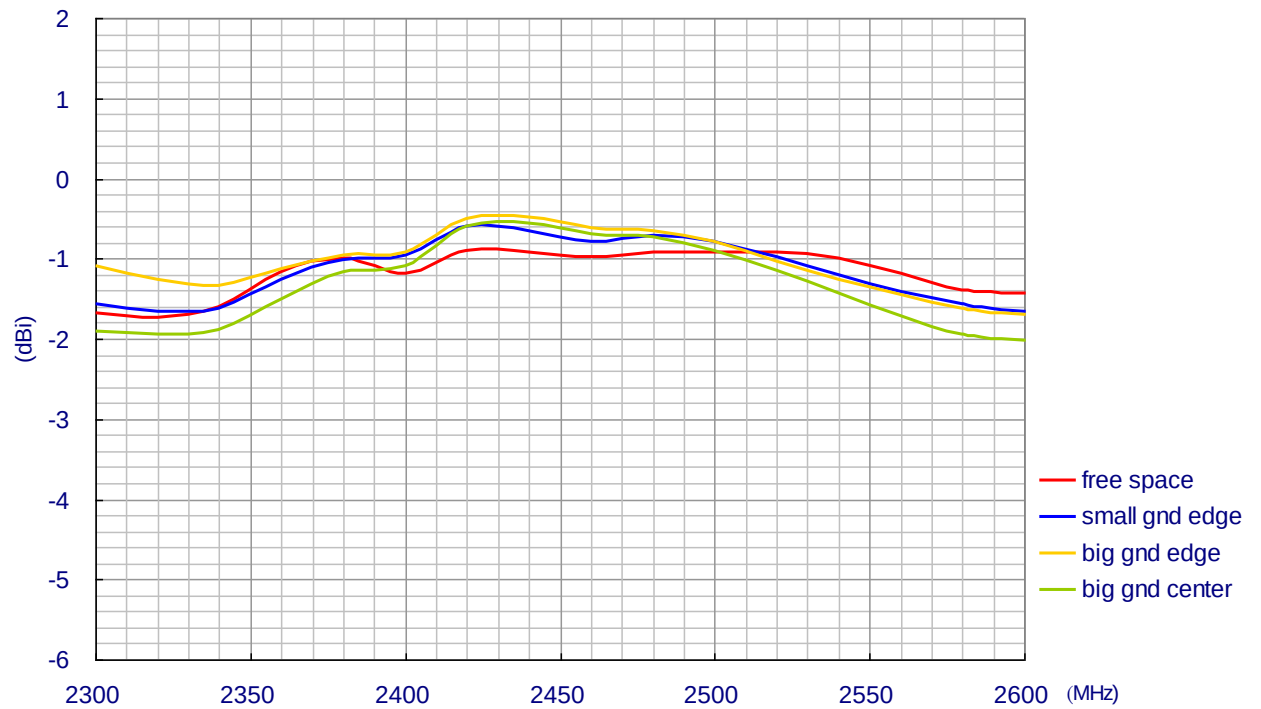
6.3. Peak Gain of Straight GW.71



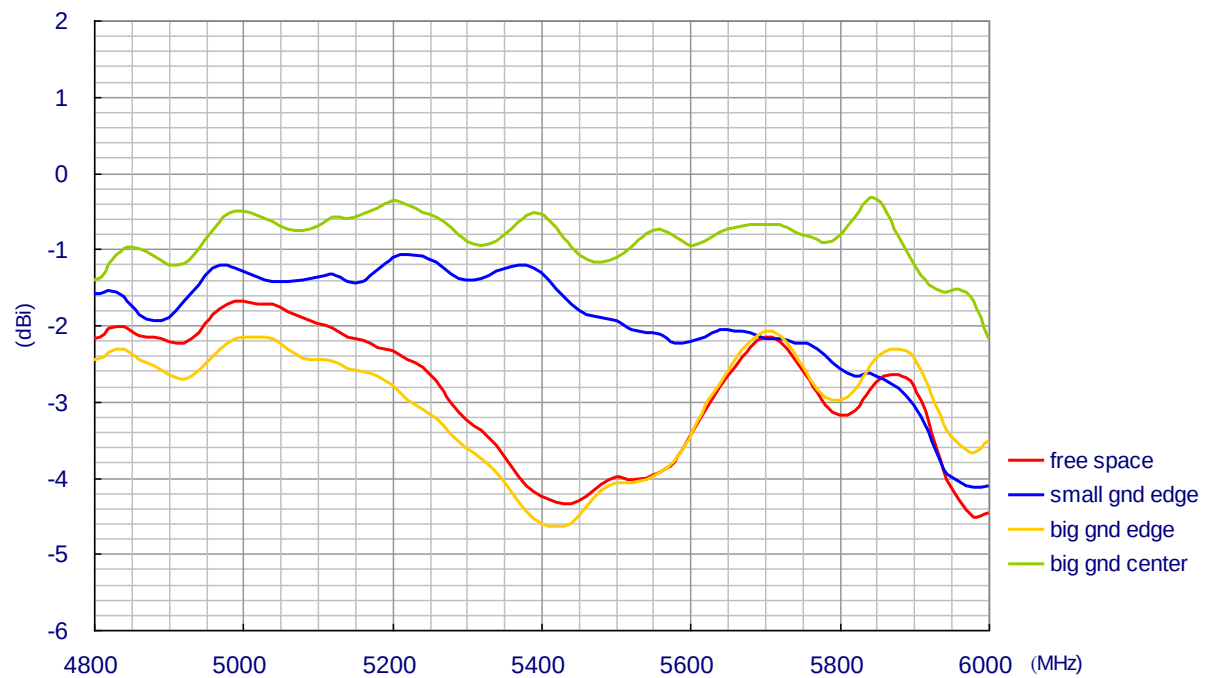
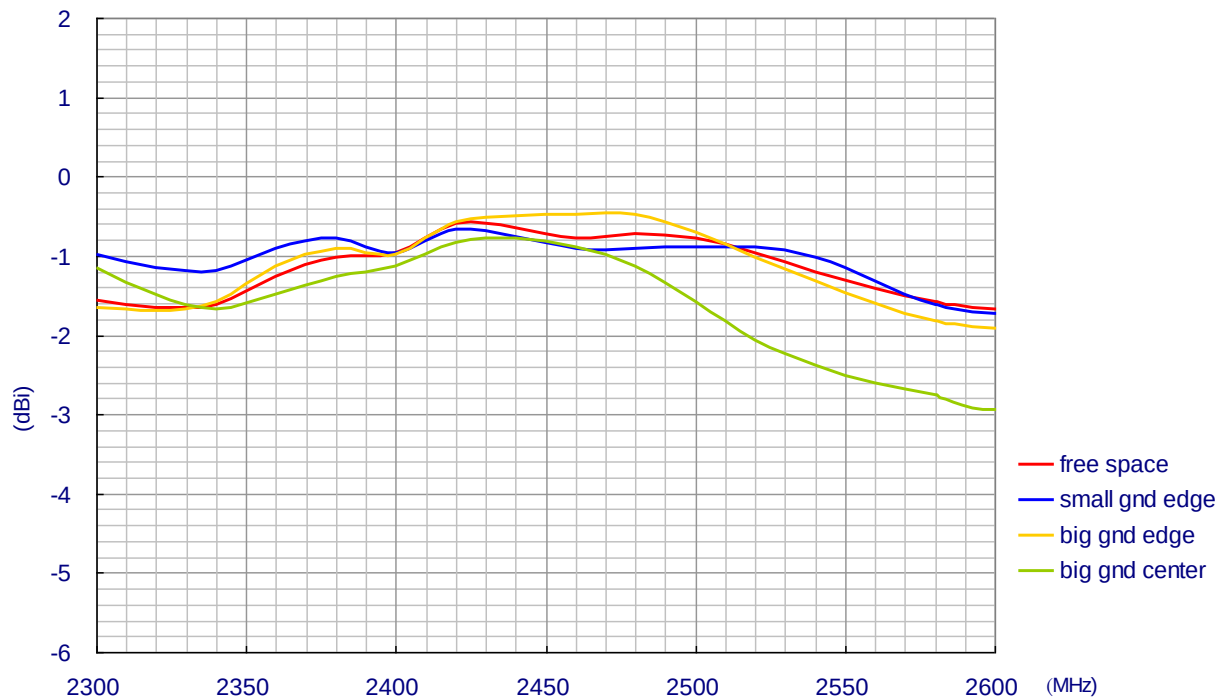
6.4. Peak Gain of Bend GW.71



6.5. Average Gain of Straight GW.71

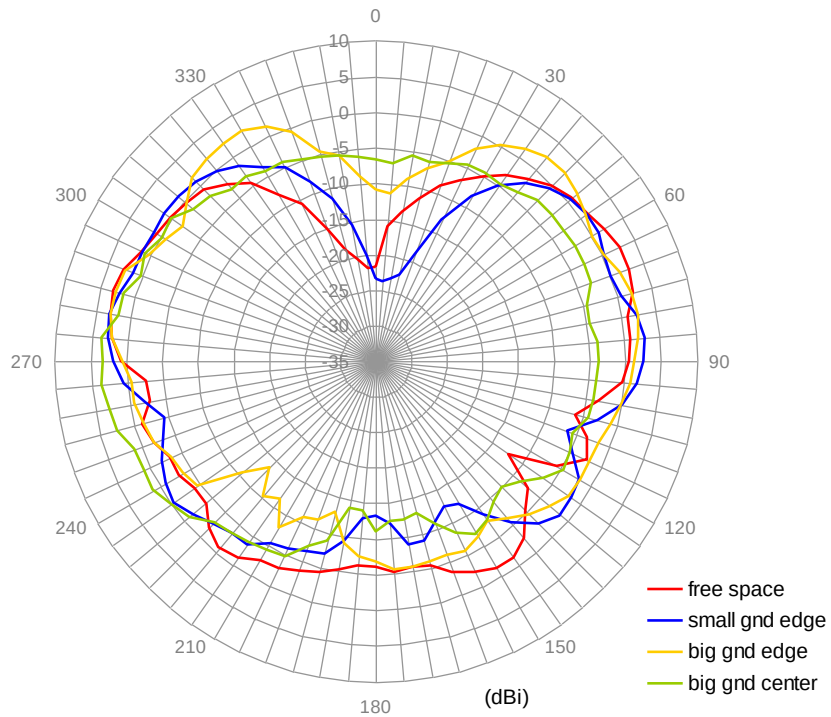


6.6. Average Gain of Bend GW.71

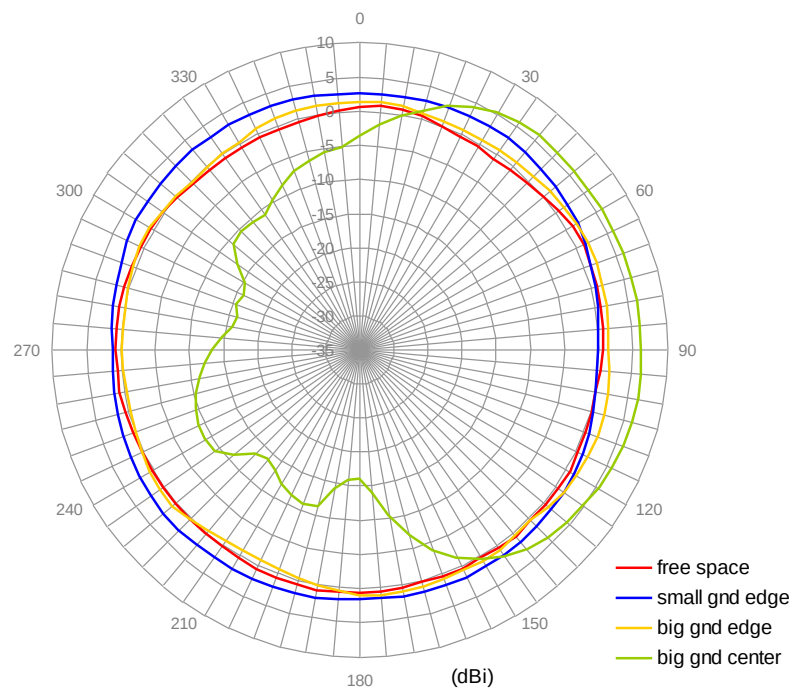


6.7. Radiation Pattern of Straight GW.71 at 2.45GHz

E-Plane Radiation

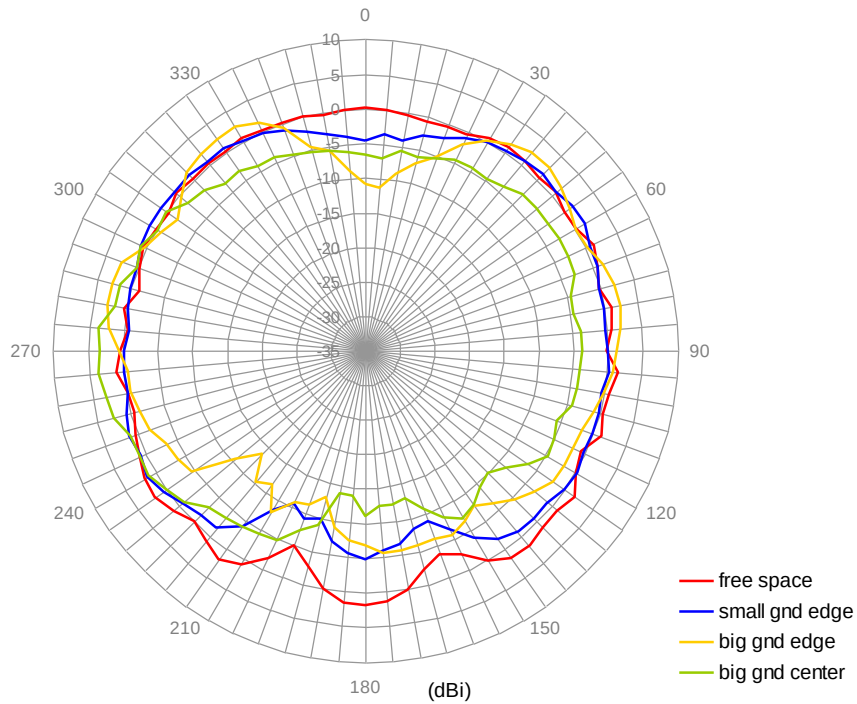


H-Plane Radiation

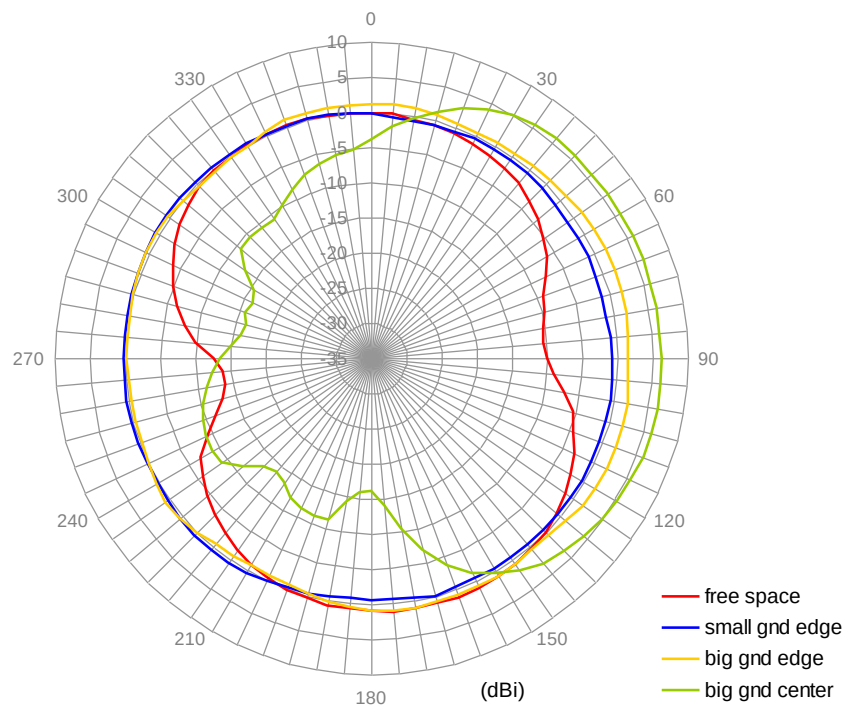


6.8. Radiation Pattern of Bend GW.71 at 2.45GHz

E-Plane Radiation

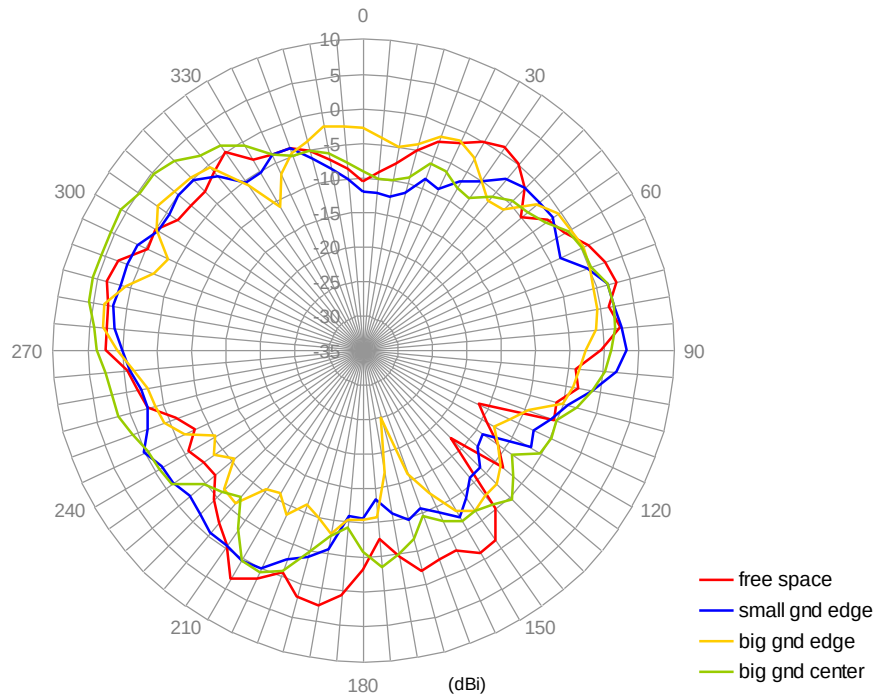


H-Plane Radiation

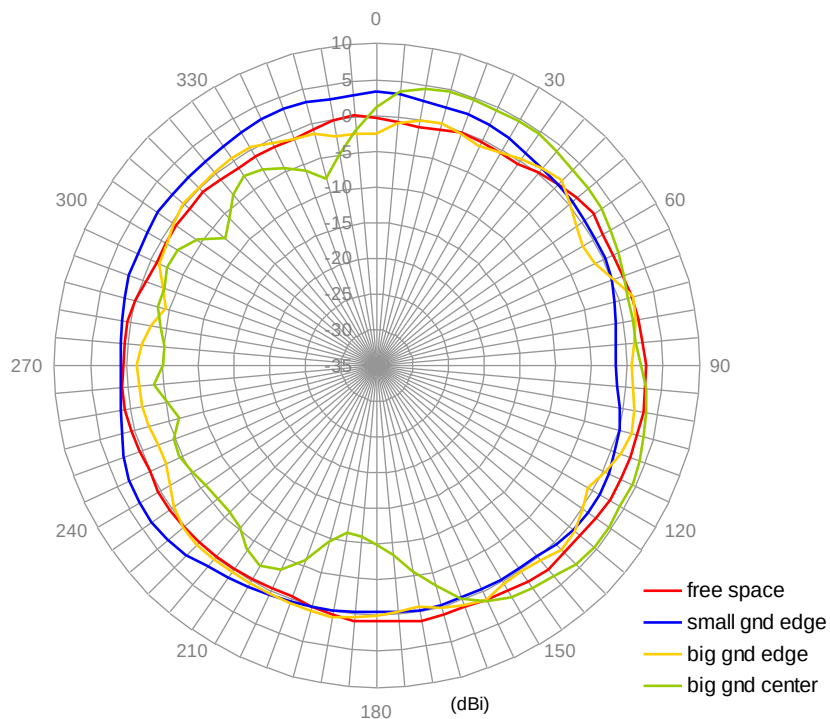


6.9. Radiation Pattern of Straight GW.71 at 5.0GHz

E-Plane Radiation

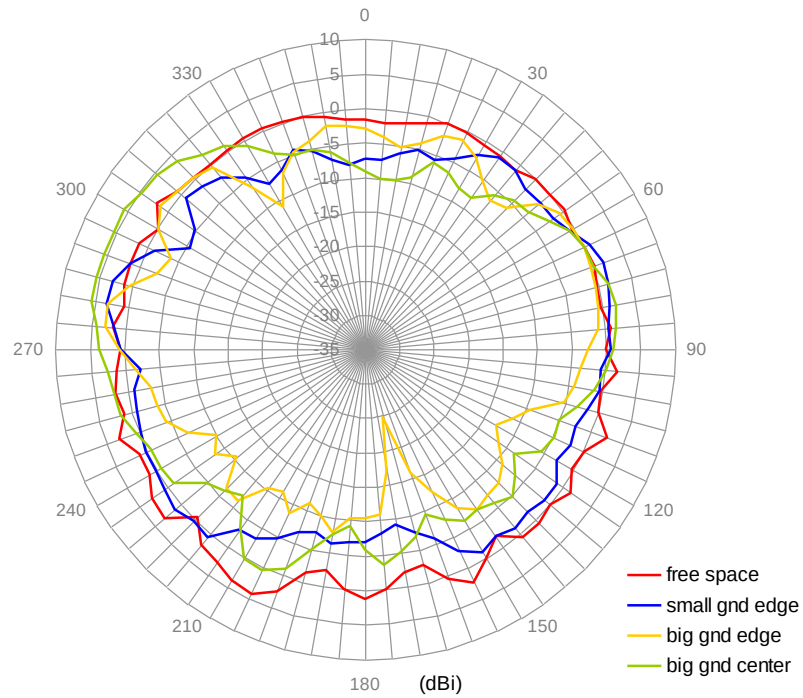


H-Plane Radiation

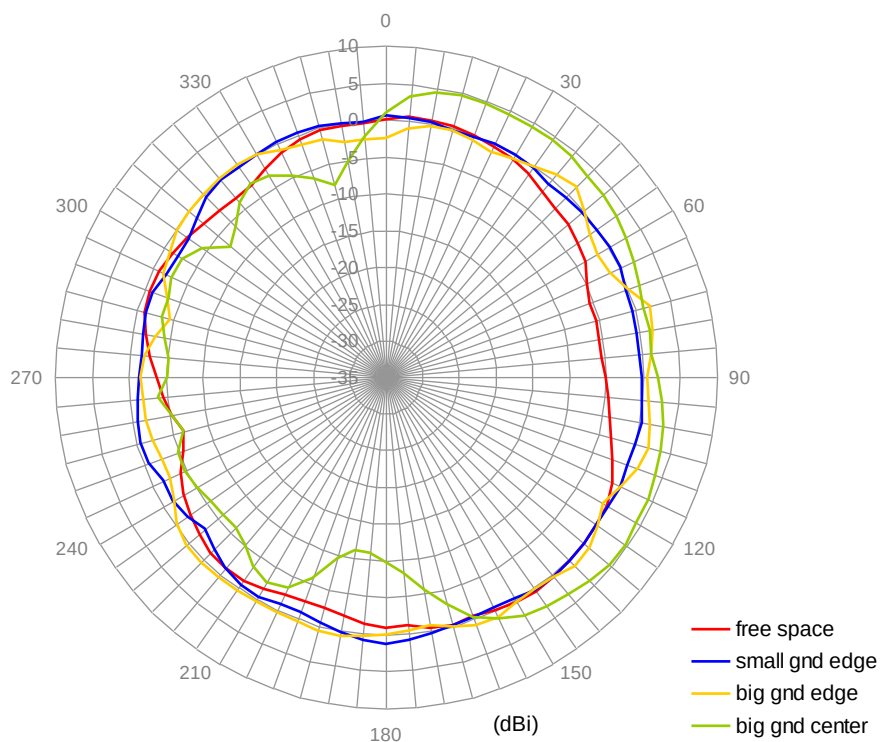


6.10. Radiation Pattern of Bend GW.71 at 5.0GHz

E-Plane Radiation

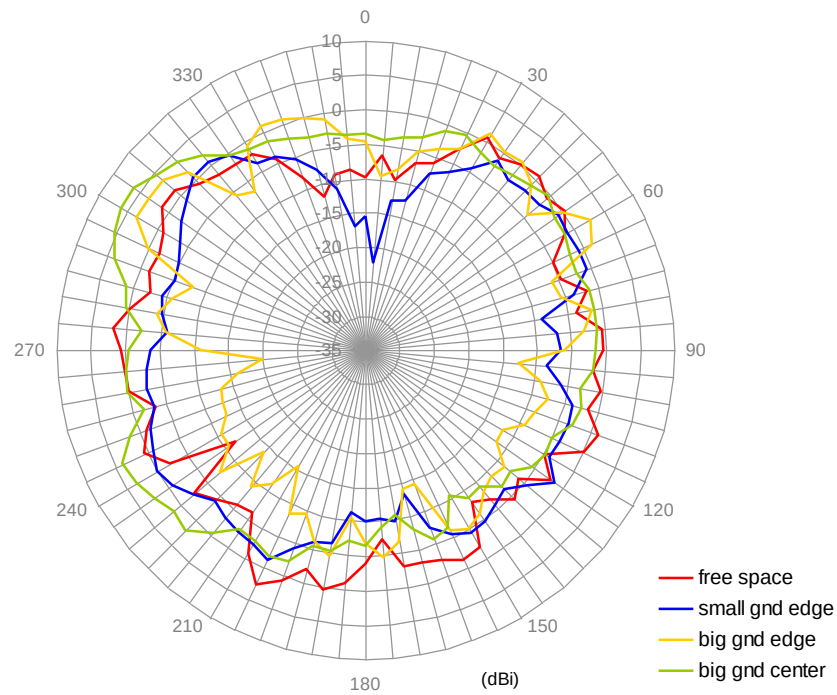


H-Plane Radiation

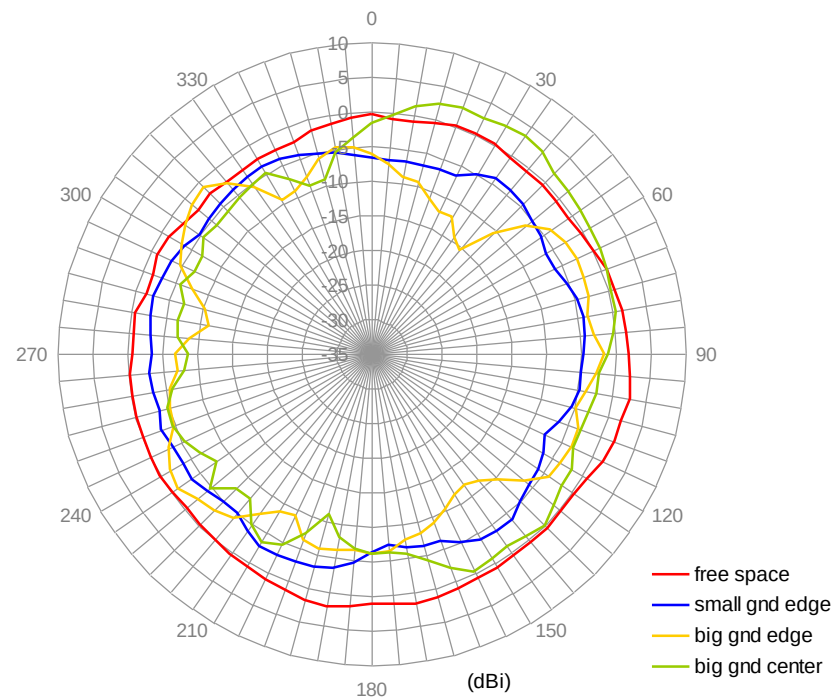


6.11. Radiation Pattern of Straight GW.71 at 5.8GHz

E-Plane Radiation

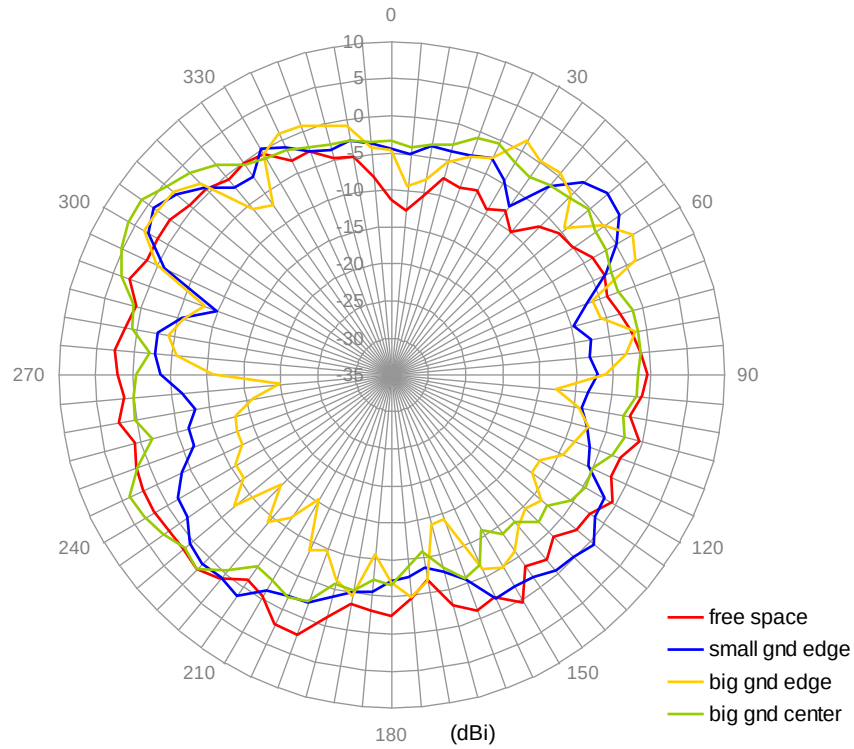


H-Plane Radiation

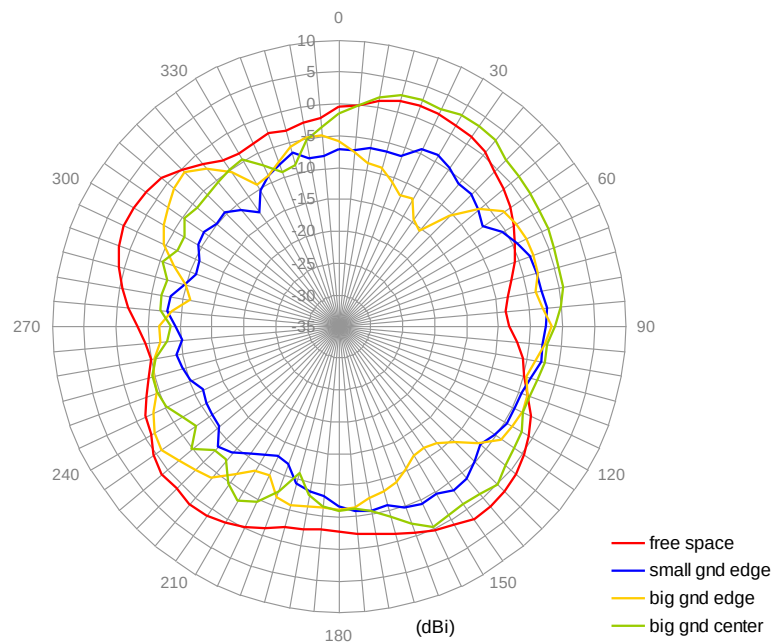


6.12. Radiation Pattern of Bend GW.71 at 5.8GHz

E-Plane Radiation

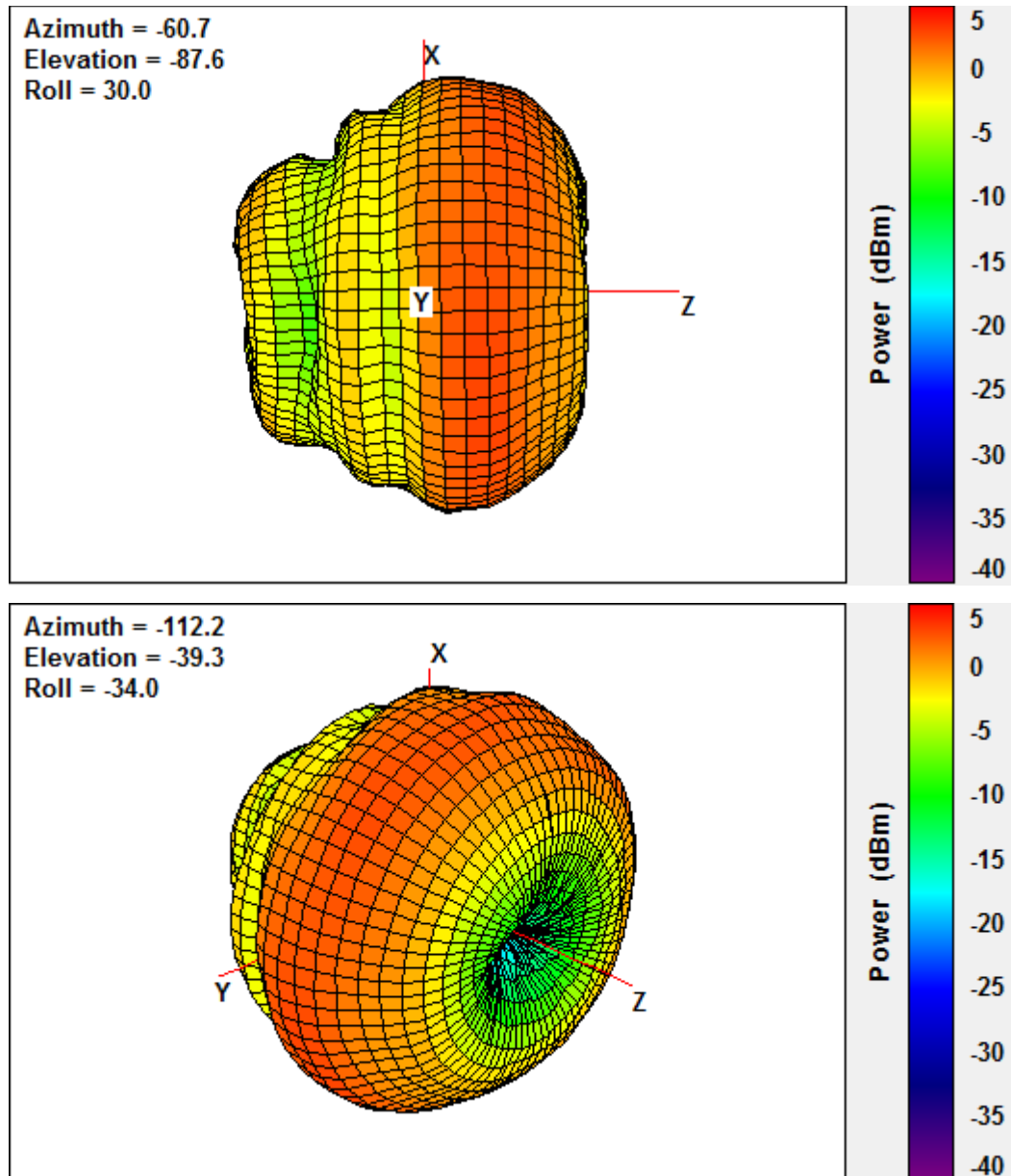


H-Plane Radiation

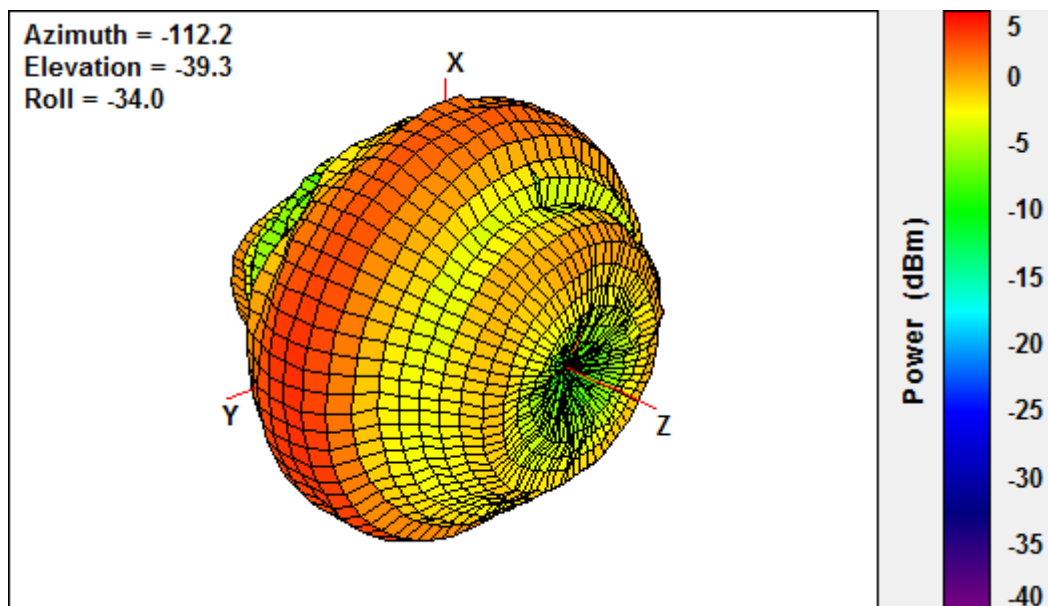
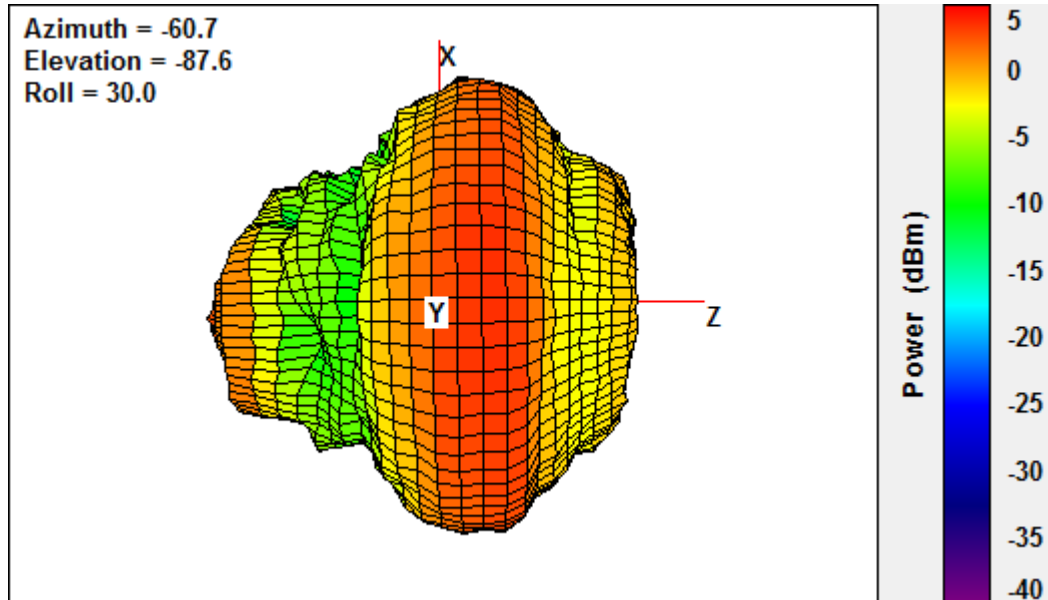


7. 3-D Radiation Patterns (Straight in free space)

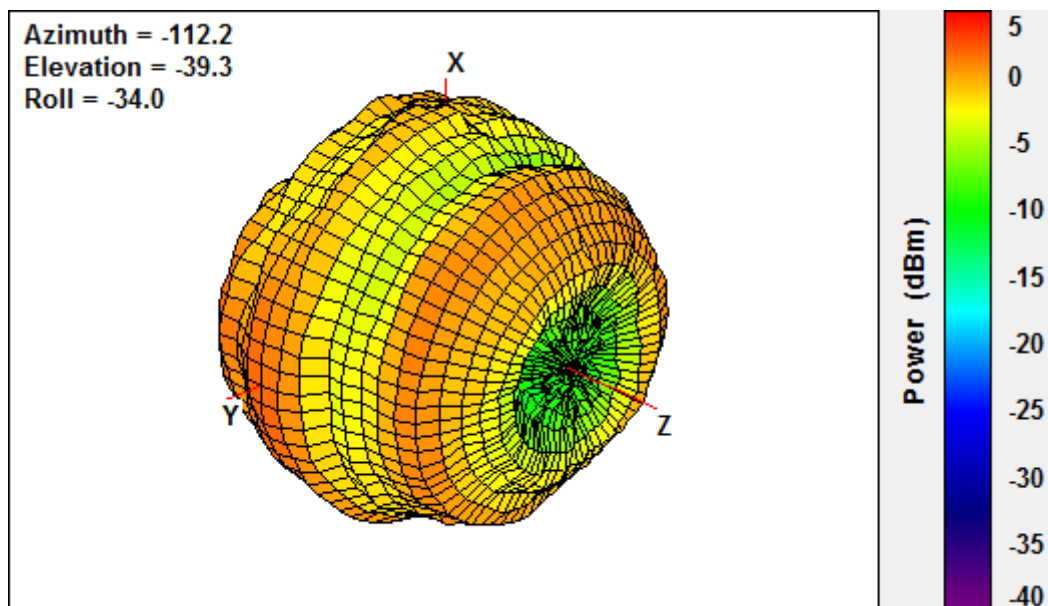
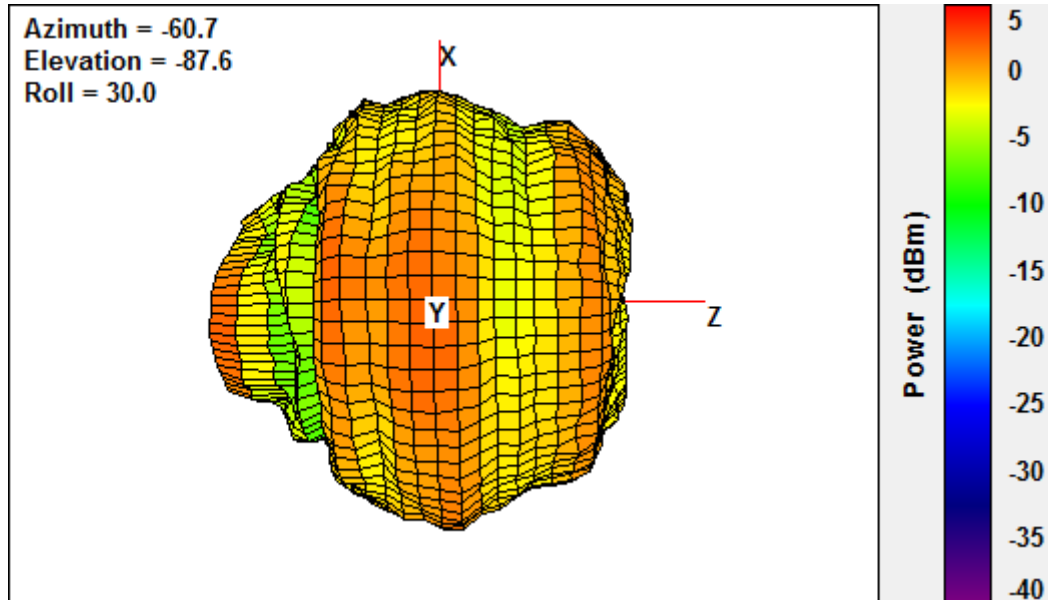
2450MHz



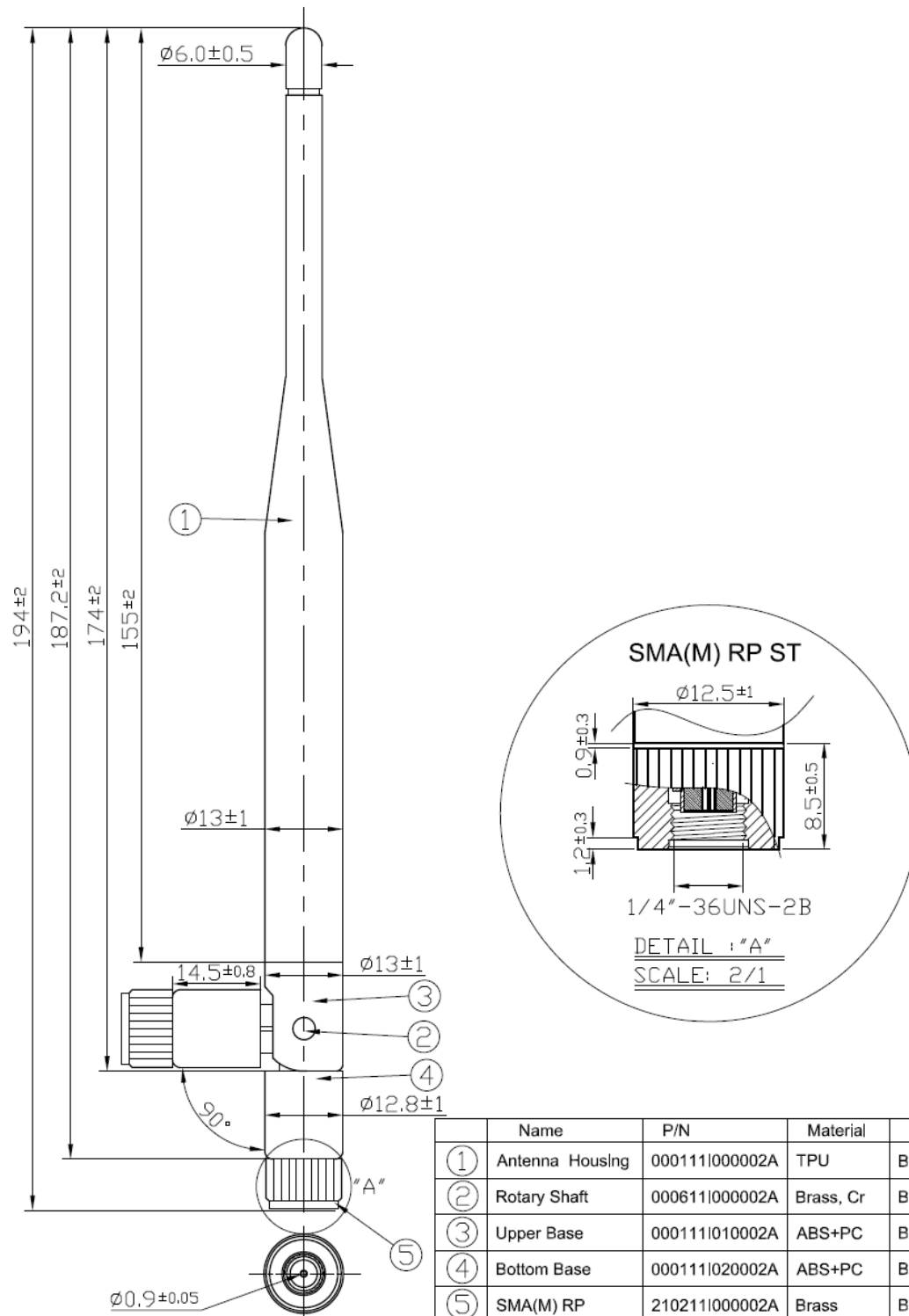
5000MHz



5800MHz



8. Antenna Drawing



9. Packaging

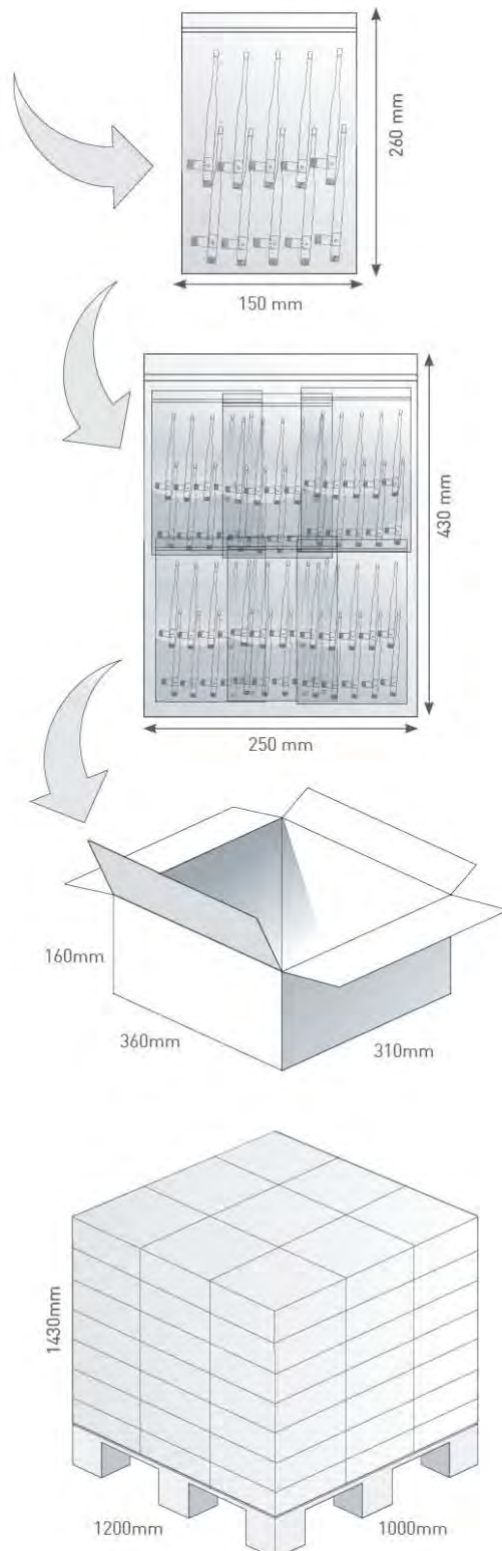
GW.71.5153 Packaging Specifications

10 pcs GW.71.5153 per PE bag
PE Bag Dimensions - 150*260mm
Weight - 257g

100 PE bags per large PE bag
100 pcs GW.71.5153 per large PE bags
Large PE bag Dimensions - 250*430mm
Weight - 2.57kg

4 Large PE bags per carton
400 pcs GW.71.5153 per carton
Carton Dimensions - 360*310*160mm
Weight - 10.7kg

Pallet Dimensions 1200*1000*1430mm
63 Cartons per Pallet
9 Cartons per layer
7 Layers





Taoglas makes no warranties based on the accuracy or completeness of the contents of this document and reserves the right to make changes to specifications and product descriptions at any time without notice. Taoglas reserves all rights to this document and the information contained herein.

Reproduction, use or disclosure to third parties without express permission is strictly prohibited.

© Taoglas



PRODUCT SPECIFICATION

TITLE

2.4/5GHz Balance Flex Antenna

TABLE OF CONTENTS

- 1.0 SCOPE
- 2.0 PRODUCT DESCRIPTION
- 3.0 APPLICABLE DOCUMENTS AND SPECIFICATIONS
- 4.0 RATINGS
- 5.0 PERFORMANCE
- 6.0 TEST GROUPINGS
- 7.0 PACKING

KNOX PART NUMBER	KNOX REVISION	KNOX PART DESCRIPTION	EXISTING KNOX ENG. APPROVED VENDORS	EXTERNAL VENDOR PART NUMBER
32227	A	(VCD) RF ANTENNA, 2.4/5GHZ, FLAT PATCH, 200MM CABLE, DIGIKEY#WM16862-ND	DIGIKEY	WM16862-ND
			MOUSER	538-146153-0200
			NEWARK	77AC6917
NOTES: 1. OFF THE SHELF PART. 2. THIS DRAWING IS FOR REFERENCE PURPOSES ONLY. 3. PLEASE SEE TABLE TO THE RIGHT FOR A LIST OF EXISTING KNOX ENG. APPROVED VENDORS. 4. ONLY KNOX ENGINEERING APPROVED ALTERNATE VENDOR PART NUMBERS MAY BE USED IN THE STEAD OF THE REFERENCED PART NUMBER SHOWN ON THIS DRAWING.				

REVISION:	ECR/ECN INFORMATION:	TITLE:	SHEET No.
B	EC No: 2016-0043 DATE: 2015/11/23	2.4/5GHz Balance Flex Antenna	1 of 7
DOCUMENT NUMBER:	CREATED / REVISED BY:	CHECKED BY:	APPROVED BY:
PS-146153-100	ZLRAO 2015/11/23	Chris Yu 2015/11/23	Welson Tan2015/11/23



PRODUCT SPECIFICATION

2.4/5GHz Balance Flex Antenna

1.0 SCOPE

This Product Specification covers the mechanical, electrical and environmental performances requirements and test methods for 2.4/5GHz balance flex antenna.

2.0 PRODUCT DESCRIPTION

2.1 PRODUCT NAME AND SERIES NUMBER (S)

Product name: 2.4/5 GHz Balance Flex Antenna 1461530100

2.2 Design and Construction

Antenna shall be of the design, construction and physical dimensions specified on the applicable sales drawing.

2.3 Materials

- a) Flex: Refer to respective Molex sales or engineering drawings
- b) Plating: Refer to respective Molex sales or engineering drawings
- c) Cable Line: Refer to respective Molex sales or engineering drawings
- d) Connector: OD1.13MM RF 2.5H plug connector. Please contact sales if you need to use other connector.

3.0 APPLICABLE DOCUMENTS AND SPECIFICATIONS

See drawings and other sections of this specification for the relevant reference documents. In cases where the specification differs from the drawings, the drawings take precedence.

4.0 RATINGS

4.1 RF POWER

2 WATTS

4.2 TEMPERATURE

Operating: - 30°C to + 85°C
Storage : - 40°C to + 95°C

4.3 HUMIDITY

Operating : -30°Cto+85°C
-30°Cto+50°C, 85%RH or less
+50°Cto+85°C, 60%RH or less

Storage : -40°Cto+95°C
-40°Cto+50°C, 85%RH or less
+50°Cto+95°C, 60%RH or less

REVISION:	ECR/ECN INFORMATION:	TITLE:	SHEET No.
B	EC No: 2016-0043 DATE: 2015/11/23	2.4/5GHz Balance Flex Antenna	2 of 7
DOCUMENT NUMBER:	CREATED / REVISED BY:	CHECKED BY:	APPROVED BY:
PS-146153-100	ZLRAO 2015/11/23	Chris Yu 2015/11/23	Welson Tan2015/11/23



PRODUCT SPECIFICATION

5.0 PERFORMANCE

5.1 ELECTRICAL REQUIREMENTS FOR CABLE LENGTH 50mm (1461530050)

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENTS	
5.1.1	Frequency Range	2.4GHz~5.85GHz	2.4GHz~2.5GHz	5.15GHz~5.85GHz
5.1.2	Return Loss	Antenna loaded on PC/ABS housing with 100mm long, 1.13mm diameter micro coaxial cable. Measured by VNA5071C	< -10 dB	
5.1.3	Peak Gain	Measure antenna on recommended PC/ABS housing through OTA chamber	3.2 dBi	4.75 dBi
5.1.4	Total Efficiency	Measure antenna on recommended PC/ABS housing through OTA chamber	>78%	>75%
5.1.5	Polarization	Measure antenna through the OTA chamber	Linear	
5.1.6	Input Impedance	Measure antenna on recommended PC/ABS housing through VNA E5071C	50 Ohms	

5.2 ELECTRICAL REQUIREMENTS FOR CABLE LENGTH 100mm (1461530100)

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT	
5.2.1	Frequency Range	2.4GHz~5.85GHz	2.4GHz~2.5GHz	5.15GHz~5.85GHz
5.2.2	Return Loss	Antenna loaded on PC/ABS housing with 100mm long, 1.13mm diameter micro coaxial cable. Measured by VNA5071C	< -10 dB	
5.2.3	Peak Gain	Measure antenna on recommended PC/ABS housing through OTA chamber	3.0 dBi	4.5 dBi
5.2.4	Total Efficiency	Measure antenna on recommended PC/ABS housing through OTA chamber	>75%	>70%
5.2.5	Polarization	Measure antenna through the OTA chamber	Linear	
5.2.6	Input Impedance	Measure antenna on recommended PC/ABS housing through VNA E5071C	50 Ohms	

5.3 ELECTRICAL REQUIREMENTS FOR CABLE LENGTH 150mm (1461530150)

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT	
5.3.1	Frequency Range	2.4GHz~5.85GHz	2.4GHz~2.5GHz	5.15GHz~5.85GHz

<u>REVISION:</u>	<u>ECR/ECN INFORMATION:</u>	<u>TITLE:</u>			<u>SHEET No.</u>
B	<u>EC No:</u> 2016-0043 <u>DATE:</u> 2015/11/23	2.4/5GHz Balance Flex Antenna			3 of 7
<u>DOCUMENT NUMBER:</u> PS-146153-100		<u>CREATED / REVISED BY:</u> ZLRAO 2015/11/23	<u>CHECKED BY:</u> Chris Yu 2015/11/23	<u>APPROVED BY:</u> Welson Tan2015/11/23	
TEMPLATE FILENAME: PRODUCT_SPEC[SIZE_A4](V.1).DOC					



PRODUCT SPECIFICATION

5.3.2	Return Loss	Antenna loaded on PC/ABS housing with 100mm long, 1.13mm diameter micro coaxial cable. Measured by VNA5071C	< -10 dB	
5.3.3	Peak Gain	Measure antenna on recommended PC/ABS housing through OTA chamber	2.8 dBi	4.2 dBi
5.3.4	Total Efficiency	Measure antenna on recommended PC/ABS housing through OTA chamber	>72%	>66%
5.3.5	Polarization	Measure antenna through the OTA chamber	Linear	
5.3.6	Input Impedance	Measure antenna on recommended PC/ABS housing through VNA E5071C	50 Ohms	

5.4 ELECTRICAL REQUIREMENTS FOR CABLE LENGTH 200mm (1461530200)

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT	
5.4.1	Frequency Range	2.4GHz~5.85GHz	2.4GHz~2.5GHz	5.15GHz~5.85GHz
5.4.2	Return Loss	Antenna loaded on PC/ABS housing with 100mm long, 1.13mm diameter micro coaxial cable. Measured by VNA5071C	< -10 dB	
5.4.3	Peak Gain	Measure antenna on recommended PC/ABS housing through OTA chamber	2.6 dBi	4.0 dBi
5.4.4	Total Efficiency	Measure antenna on recommended PC/ABS housing through OTA chamber	>69%	>62%
5.4.5	Polarization	Measure antenna through the OTA chamber	Linear	
5.4.6	Input Impedance	Measure antenna on recommended PC/ABS housing through VNA E5071C	50 Ohms	

5.5 ELECTRICAL REQUIREMENTS FOR CABLE LENGTH 250mm (1461530250)

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT	
5.5.1	Frequency Range	2.4GHz~5.85GHz	2.4GHz~2.5GHz	5.15GHz~5.85GHz
5.5.2	Return Loss	Antenna loaded on PC/ABS housing with 100mm long, 1.13mm diameter micro coaxial cable. Measured by VNA5071C	< -10 dB	
5.5.3	Peak Gain	Measure antenna on recommended PC/ABS housing through OTA chamber	2.4 dBi	3.7 dBi

REVISION:	ECR/ECN INFORMATION:	TITLE:	SHEET No.
B	EC No: 2016-0043 DATE: 2015/11/23	2.4/5GHz Balance Flex Antenna	4 of 7
DOCUMENT NUMBER:	CREATED / REVISED BY:	CHECKED BY:	APPROVED BY:
PS-146153-100	ZLRAO 2015/11/23	Chris Yu 2015/11/23	Welson Tan2015/11/23



PRODUCT SPECIFICATION

5.5.4	Total Efficiency	Measure antenna on recommended PC/ABS housing through OTA chamber	>66%	>58%
5.5.5	Polarization	Measure antenna through the OTA chamber	Linear	
5.5.6	Input Impedance	Measure antenna on recommended PC/ABS housing through VNA E5071C	50 Ohms	

5.6 ELECTRICAL REQUIREMENTS FOR CABLE LENGTH 300mm (1461530300)

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT	
5.6.1	Frequency Range	2.4GHz~5.85GHz	2.4GHz~2.5GHz	5.15GHz~5.85GHz
5.6.2	Return Loss	Antenna loaded on PC/ABS housing with 100mm long, 1.13mm diameter micro coaxial cable. Measured by VNA5071C	< -10 dB	
5.6.3	Peak Gain	Measure antenna on recommended PC/ABS housing through OTA chamber	2.2 dBi	3.3 dBi
5.6.4	Total Efficiency	Measure antenna on recommended PC/ABS housing through OTA chamber	>63%	>55%
5.6.5	Polarization	Measure antenna through the OTA chamber	Linear	
5.6.6	Input Impedance	Measure antenna on recommended PC/ABS housing through VNA E5071C	50 Ohms	

5.7 CABLE LOSS

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENTS	
5.7.1	Frequency Range	2GHz~6GHz	2GHz~3GHz	5GHz~6GHz
5.7.2	Attenuation	1m cable measured by VNA5071C	≤3.5dB/m	≤5dB/m

5.8 CABLE LENGTH AFFECT THE ANTENNA PERFORMANCE

Balance antenna resonance is insensitive by cable's length, but the cable's loss will affect the total efficiency. Refer to 5.7

REVISION:	ECR/ECN INFORMATION:	TITLE:			SHEET No.
B	EC No: 2016-0043 DATE: 2015/11/23	2.4/5GHz Balance Flex Antenna			5 of 7
DOCUMENT NUMBER:		CREATED / REVISED BY:	CHECKED BY:	APPROVED BY:	
PS-146153-100		ZLRAO 2015/11/23	Chris Yu 2015/11/23	Welson Tan2015/11/23	



PRODUCT SPECIFICATION

5.9 MECHANICAL REQUIREMENTS

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT
5.9.1	Pull test	Test machine :Max intelligent load tester Stick the Flex antenna in a PC block, pull cable in horizontal direction	Pull force <18N

5.10 RELIABILITY REQUIREMENTS

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT
5.10.1	Cross section	Cross section on pad soldering area. Check under microscope	No soldering problem

5.11 ENVIRONMENTAL REQUIREMENTS

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT
5.11.1	Temperature /Humidity cycling	Test condition: 1) The device under test is kept for 30 mins in an environment with a temperature of -40 °C. 2) Kept for 4 Hours in an environment with a temperature of 85 degrees and a relative humidity of 95%. 3) Kept for 2 Hours in an environment with a temperature of 125 degrees and a relative humidity of 95%. 4) The cycle is repeated until a total of 40 cycles have been completed. Hereafter the conditions are stabilized at room temperature.	1) Parts should meet RF spec before and after test. 2) No cosmetic problem
5.11.2	Temperature Shock	Test condition: The device under test at -40 °C ↔ 125 °C by 100 cycles, Dwell of 30 mins, transition time between Dwell 30 secs (~ 61 mins / cycle) and each item should be measured after exposing them in normal temperature and humidity for 24 h.	1) Parts should meet RF spec before and after test. 2) No cosmetic problem
5.11.3	High Temperature	Test condition: 1) Temperature:125°C , time:1008hours 2) There is no substantial obstruction to air flow across and around the samples, and the samples are not touching each other	1) Parts should meet RF spec before and after test. 2) No cosmetic problem

REVISION:	ECR/ECN INFORMATION:	TITLE:	SHEET No.
B	EC No: 2016-0043 DATE: 2015/11/23	2.4/5GHz Balance Flex Antenna	6 of 7
DOCUMENT NUMBER:	CREATED / REVISED BY:	CHECKED BY:	APPROVED BY:
PS-146153-100	ZLRAO 2015/11/23	Chris Yu 2015/11/23	Welson Tan 2015/11/23



PRODUCT SPECIFICATION

5.11.4	Salt mist test	1. Test condition: The device under test is exposed to a spray of a 5% (by volume) resolution of NaCl in water for 2 hours. Thereafter the device under test is left for 1 week in room temperature at a relative humidity of 95%. The cycle is repeated until a total of 2 cycles have been completed. Here after the conditions are stabilized at room temperature.	1) Parts should meet RF spec before and after test. 2) No visible corrosion. Discoloration accept.
--------	----------------	--	--

The meaning of text “**No Cosmetic Problem**” in the table above is:

- a. no soldering problem
- b. no adhesion problem of glue
- c. no peel off of plating
- d. Cable & connector assembly orientation rotates 20°Max

6.0 TEST GROUPINGS

Test Item	Description	Group1	Group2	Group3	Group4	Group5	Group6
5.9.1	Pull test	X					
5.10.1	Cross section		X				
5.11.1	Temperature /Humidity cycling			X			
5.11.2	Temperature Shock				X		
5.11.3	High Temperature					X	
5.11.4	Salt mist test						X
	Sample Quantity	5	5	5	5	5	5

7.0 PACKAGING

Refer to the Molex related packaging drawings.

REVISION:	ECR/ECN INFORMATION:	TITLE:	SHEET No.
B	EC No: 2016-0043 DATE: 2015/11/23	2.4/5GHz Balance Flex Antenna	7 of 7
DOCUMENT NUMBER:	CREATED / REVISED BY:	CHECKED BY:	APPROVED BY:
PS-146153-100	ZLRAO 2015/11/23	Chris Yu 2015/11/23	Welson Tan 2015/11/23
TEMPLATE FILENAME: PRODUCT_SPEC[SIZE_A4](V.1).DOC			

LTE, 4G, BROADBAND

NOTE: All NMO mount antennas listed in this catalog section require the NMOHF-style (high frequency 27 MHz - 6 GHz) mount.

LTE, 4G BROADBAND WHIPS

Model	Type	Frequency (MHz)	Gain (dBd/dBi)	Max Height (In)	VSWR	Cable Assembly
EF2405NMO	Elevated Feed	2400-2500	2.9/5	16	<1.5:1	Order Separately
EF4905NMO	Elevated Feed	4900-5000	2.9/5	12	<1.5:1	Order Separately
NMO4E4900B	Elevated Feed	4900-5350	1.9/4	4.5	2:1	Order Separately
NMO4E5350B	Elevated Feed	5350-5925	4.9/4	4.5	2:1	Order Separately
NMO5E2400B	Collinear	2400-2500	2.95	8.5	1.5:1	Order Separately
R380500109	Dipole	2400-2500	0/2	3.5	1.5:1	Order Separately
R380500125	Dipole	2400-2500	0/2	2.5	1.5:1	Order Separately
SPDA17RP2400/5900	PCB	2400-2500 4900-5900	0/2 2.9/5	6 (Bent) 7 (Straight)	2:1	Order Separately
SPDA17806/2170LAR	PCB	806-960 1710-2170	0/5 0/5	6 (Bent) 7.5 (Straight)	2.5:1	Order Separately
SPDA24700/2700	PCB	698-960 1710-2170 2500-2700	0/0 0/0 0/0	9 (Straight)	2.5:1	Order Separately



GPS LTE DIRECT MOUNTS

Model	Frequency (MHz)	Gain (dBd/dBi)	Polarization	VSWR	Mounting	Voltage	Size H x Dia (In)	Cable	Conn
GPSDM700/2500FFS	698-960/1710-2170/2300-2700	.9/3	Linear Vertical	2.0:1	3/4" Hole	3 or 5	3.5 x 4.16	17' RG-58	FME
	2400-2485/5150-5850	3.9/6	Linear Vertical					17' RG-58	FME
	1575.42	5 dBic	RHCP					17' RG-174	SMA



The most commonly used cable assembly/mount is the NMOKHFUD (27 MHz to 6 GHz) with 17' of UD (RG-58/U Dual Shield).

www.pulseelectronics.com/products/antennas

NOTE: Antennas are not to scale

LTE, 4G, BROADBAND

NOTE: All NMO mount antennas listed in this catalog section require the NMOHF-style (high frequency 27 MHz - 6 GHz) mount.

700/800/900/1850 MHz LOW PROFILE

Model	Frequency (MHz)	Gain (dBd/dBi)	Mount	Size H x DIA (In)	Power Rating (Watts)	Color	Cable Assembly
LPT825/19NMOHF	Cellular: 806-960 PCS: 1710-2170 ISM: 2400	.8/3 .8/3 1.9/4	NMOHF	3 x 1.75	10	Black	Order Separately
LPT2400NMOHF	2400-2500	2.9/5	NMOHF	3 x 1.75	10	Black	Order Separately
SLPT698/2170NMOHF	LTE: 698-960 PCS: 1710-2170 ISM: 2400-2700	2.35/4.5 3.45/5.6 1.85/4	NMOHF	3 x 1.75	10	Black	Order Separately
SLPT2400NMOHF	2400-2500	2.15/4.3	NMOHF	2.6 x 1.5	10	Black	Order Separately
SLPT4900NMOHF	4900-5900	3.35/5.5	NMOHF	2.6 x 1.5	10	Black	Order Separately
SLPT2400/5900NMOHF	2400-2500 4900-5900	2.15/4.3 3.35/5.5	NMOHF	2.6 x 1.5	10	Black	Order Separately
LPT698/2170DM	LTE: 698-960 PCS: 1710-2170 ISM: 2400-2700	2.35/4.5 3.45/5.6 1.85/4	Direct (N Female)	3 x 1.75	10	Black	Order Separately
SLPT2400DMN	2400-2500	2.15/4.3	Direct (N Female)	2.6 x 1.5	10	Black	Order Separately
SLPT4900DMN	4900-5900	3.35/5.5	Direct (N Female)	2.6 x 1.5	10	Black	Order Separately
SLPT2400/5900DMN	2400-2500 4900-5900	2.15/4.3 3.35/5.5	Direct (N Female)	2.6 x 1.5	10	Black	Order Separately



LTE, 4G, BROADBAND STEALTH BLADES

Stealth Blade antennas have a gain of 2.14 dBi, a maximum power of 3 Watts and linear polarization

Model	Frequency (MHz)	Type	Dimensions L x W (In)	Color	Coax	Connector
SB24003	2400-2500	Dipole	3 x .75	Black	3' RG-174	No Conn
SB24006	2400-2500	Dipole	3 x .75	Black	6' RG-174	No Conn
SB2400SMA3	2400-2500	Dipole	3 x .75	Black	3' RG-174	SMA
SB2400SMA6	2400-2500	Dipole	3 x .75	Black	6' RG-174	SMA
SB2400SMB3	2400-2500	Dipole	3 x .75	Black	3' RG-174	SMB
SB2400SMB6	2400-2500	Dipole	3 x .75	Black	6' RG-174	SMB
SB2400MMCX3	2400-2500	Dipole	3 x .75	Black	3' RG-174	MMCX
SB2400MMCX6	2400-2500	Dipole	3 x .75	Black	6' RG-174	MMCX



LTE, 4G, BROADBAND PANELS

Model	Frequency (MHz)	Gain (dBd/dBi)	VSWR	Size L x W x D (In)	Polarization	Connector
PA2101850N	1850-1990	7.9/10	2:1	9.5 x 4 x .8	Vertical	N Female
PA4142400N	2400-2485	12.5/14.2	1.5:1	9.5 x .8 x 8.6	Vertical	N Female



NOTE: Antennas are not to scale

1 800 ANTENNA (268-3662)

LTE, 4G, BROADBAND

LTE, 4G, BROADBAND RADOME OMNIS

NOTE: Radome Omni antennas have the following specifications:

Radome Enclosure: Pultruded Fiberglass (UV Protected)

VSWR: 2.0:1

Power Rating: 20 Watts

Ingress Protection: IP67

Polarization: Vertical

Suggested mounting brackets for N Female connectors are FB2BRACKET or FB3BRACKET. See Page 45 for FB brackets.



Single Band Radome Omnis



RO806/2170NM

Model	Frequency (MHz)	Gain (dBd/dBi)	Length (In)	Connector
RO2404NM	2400-2500	1.9/4	11.5	N Male
RO2406NF	2400-2500	3.9/6	11.5	N Female
RO2406NM	2400-2500	3.9/6	11.5	N Male
RO2408NF	2400-2500	5.9/8	20	N Female
RO2408NM	2400-2500	5.9/8	20	N Male
RO2408NFD (downtilt)	2400-2500	5.9/8	20	N Female
RO2408NMD (downtilt)	2400-2500	5.9/8	20	N Male
RO2408NFU (uptilt)	2400-2500	5.9/8	20	N Female
RO2408NMU (uptilt)	2400-2500	5.9/8	20	N Male
RO4910NF	4940-4990	7.8/10	18	N Female
RO4910NM	4940-4990	7.8/10	18	N Male
RO5206NF	5150-5350	3.9/6	6.75	N Female
RO5410NF	5470-5725	7.8/10	16.5	N Female
RO5210NF	5150-5350	7.8/10	16.5	N Female
RO5210NM	5150-5350	7.8/10	16.5	N Male
RO5410NM	5470-5725	7.8/10	16.5	N Male
RO5805NF	5150-5825	2.8/5	6.75	N Female
RO5805NM	5150-5825	2.8/5	6.75	N Male
RO5806NF	5725-5875	3.9/6	6.75	N Female
RO5810NF	5725-5875	7.8/10	16.5	N Female
RO5810NM	5725-5875	7.8/10	16.5	N Male
RO806/2170NM	806-960 1710-2170	1.9/4 1.9/4	16.5	N Male