



Antenna List for Module Integration - for Module PN 576253.

FCCID: 2AHLA-576253

ICID: 4811A-576253

This module has been granted modular approval for mobile applications. OEM integrators for host products may use the module in their final products without additional FCC / IC (Industry Canada) certification if they meet the following conditions. Otherwise, additional FCC / IC approvals must be obtained. **(Note: This module is not being sold commercially to any OEM, Bosch Automotive Service Solutions will exclusively utilize this module within our products.)**

The Following is a list of Approved Antennas for use in integration into a product:

Taoglas Antenna Solutions - Part Number: FXP840.07.0155B

- Antenna Type: Flexible-Poly Material Antenna. Monopole. Dual-band 2.4GHz / 5GHz.
- Antenna Gain: The maximum antenna gain including cable loss in a mobile-only exposure condition must not exceed 2.5dBi at 2.4GHz and 2.5dBi at 5.8GHz (Peak Gain).
- Antenna Mount: Adhesive Backed for mounting on inside of product plastic housing.
- Antenna Connector: IPEX MHF1 Connector (U.FL compatible connector), 155mm cable length.

Yageo Phycomp - Part Number: ANTX150P111B24553

- Antenna Type: PCB Antenna. Monopole. Dual-band 2.4GHz / 5GHz.
- Antenna Gain: The maximum antenna gain including cable loss in a mobile-only exposure condition must not exceed 3.2dBi at 2.4GHz and 3.4dBi at 5.8GHz (Peak Gain).
- Antenna Mount: Adhesive Backed for mounting on inside of product plastic housing.
- Antenna Connector: IPEX MHF1 Connector (U.FL compatible connector), 150mm cable length.

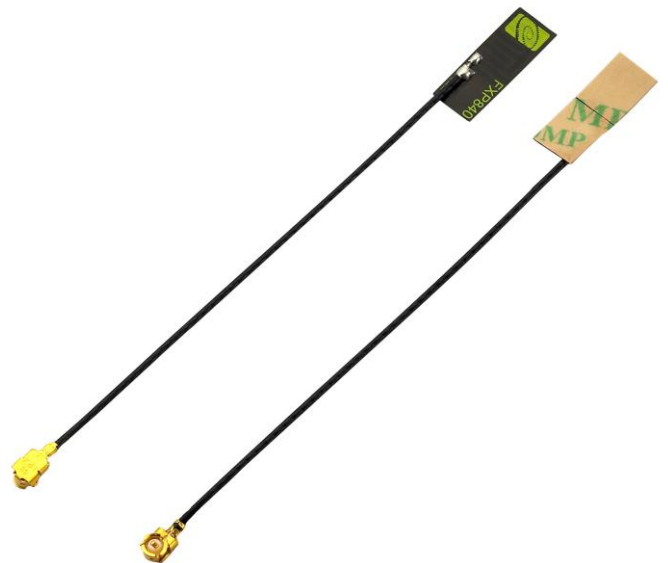
The final host / module combination may also need to be evaluated against the FCC Part 15B criteria for unintentional radiators in order to be properly authorized for operation as a Part 15 digital device.

If the final host / module combination is intended for use as a portable device the host manufacturer is responsible for separate approvals for the SAR requirements from FCC Part 2.1093 and RSS-102.

SPECIFICATION

PATENT PENDING

- Part No. : **FXP.840.07.0055B**
- Product Name : FXP.840 Freedom Series
Super Small Monopole
Dual-band 2.4 GHz /5 GHz Antenna
- Features : Flexible and Tiny - Ultra Low Profile 14mm*5mm*0.1mm
2dBi Peak Gain
Adheres directly inside of product plastic or glass housing
Form factor and cable routing convenient for integration
IPEX MHF1 Connector (U.FL compatible)
55mm \varnothing 0.81mm mini-coaxial cable
Customizable cable and connector
RoHS Compliant



1. Introduction

The patent pending FXP.840 is a super small monopole ultra-low profile antenna for 2.4/5 GHz bands that includes Bluetooth and Wi-Fi dual-band application. The FXP.840 has a peak gain of 2.5dBi at 2.4GHz and efficiencies of 40%, and 2.5dBi gain and 53% efficiency at 5.8GHz.

This Taoglas patent pending antenna is unique in the market because it is made from poly-flexible material, has a tiny form factor (14mm*5.0mm*0.1mm) and has double-sided 3M tape for easy "peel and stick" mounting.

The cable routes conveniently directly out of the bottom of the antenna, reducing the volume the antenna takes up in the device to an absolute minimum compared to other designs. The FXP.840 is the ideal all-round antenna solution for fitting into narrow 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.

The cable and connector are customizable according to customer requirements.

Many module manufacturers specify peak gain requirements for any antennas that is to be connected to that module. Upon testing of any of our antenna 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 requirements. Taoglas can then issue a specification and/or report for this selected WiFi antennas in your device that will clearly show it complying with the peak gain requirements, so you can be assured you are meeting regulatory requirements for that module.

It is better not to select an embedded antenna with very low free-space peak gain (<2dBi) directly, as this antenna would have worse performance in your device, and lead to compromised performance compared to using a Taoglas antenna.

2. Specification

ELECTRICAL		
Antenna	FXP.840	
Standard	2400 MHz	5800 MHz
Operation Frequency (MHz)	2410-2490 MHz	4900~5800 MHz
Polarization	Linear	Linear
Impedance	50 Ohms	50 Ohms
Max VSWR	2:1	2.5:1
Max Return Loss (dB)	-10	-7.0
Peak Gain (dBi)	2.0	2.5
Efficiency (%)	40	53
Average Gain (dB)	-3.9	-2.8
Radiation Properties	Omni	Omni
Max Input Power	2W max	2W max

* The FXP840 antenna performance was measured on a 30x30 mm 2.0"ABS plastic plane.

MECHANICAL	
Dimensions (mm)	14 x 5.0 x 0.1
Required Space (mm)	14 x 5.0 x 0.1
Material	Polymer
Connector	IPEX MHF1

ENVIRONMENTAL	
Operation Temperature	-40°C to 85°C
Storage Temperature	-40°C to 85°C
Relative Humidity	40% to 95%
RoHs Compliant	Yes

3. Antenna Characteristics

3.1 Test set-up

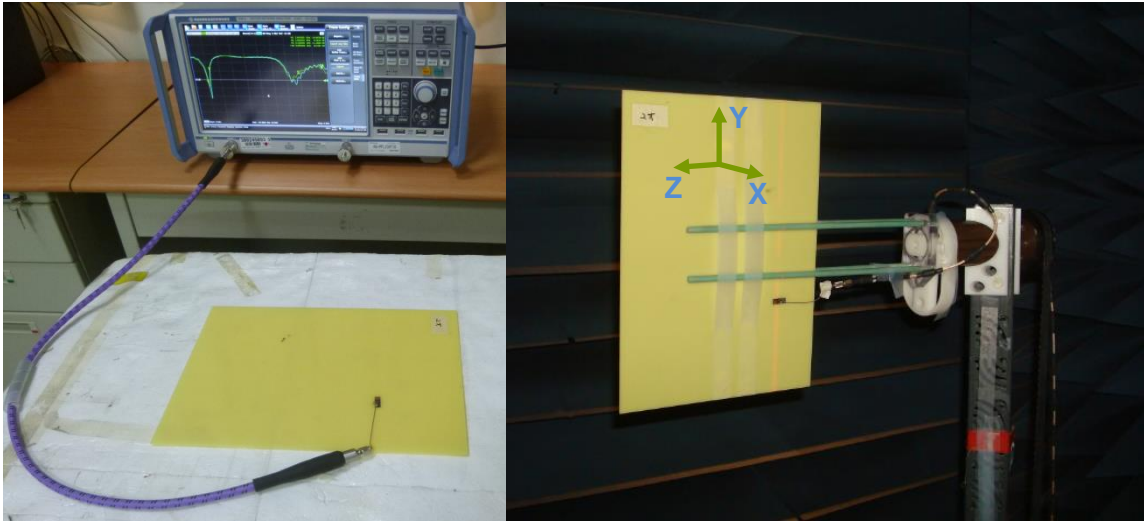


Figure 1. Impedance measurements (left side) and peak gain, efficiency and radiation pattern measurements (right side).

3.2 Return Loss

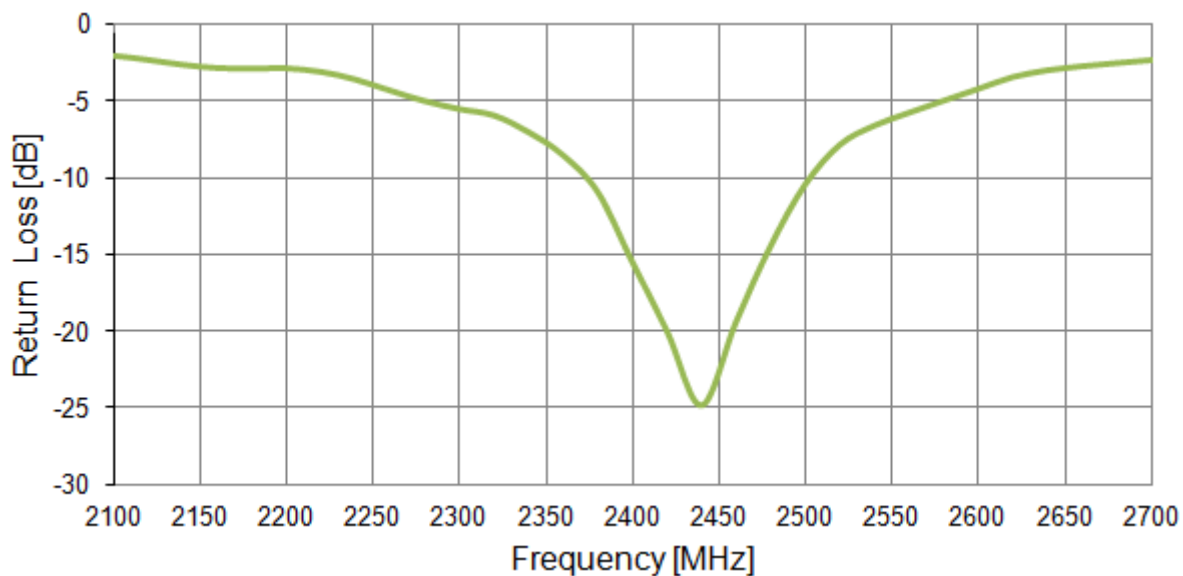


Figure 2. Return loss of the FXP840 antenna from 2100 MHz to 2700 MHz.

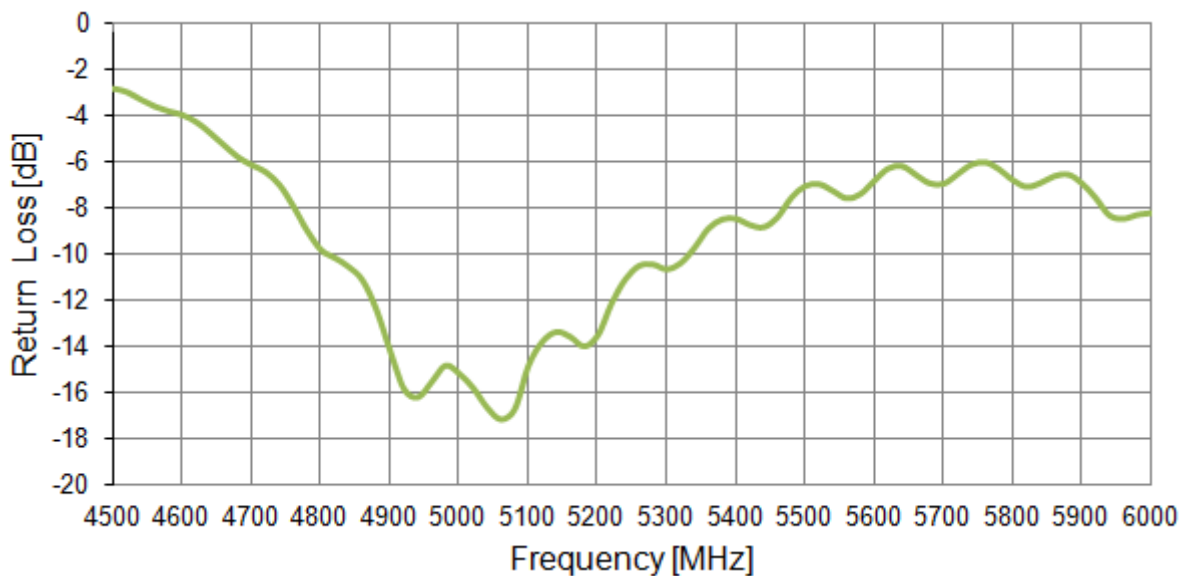


Figure 3. Return loss of the FXP840 antenna from 4500 MHz to 6000 MHz.

3.3 VSWR

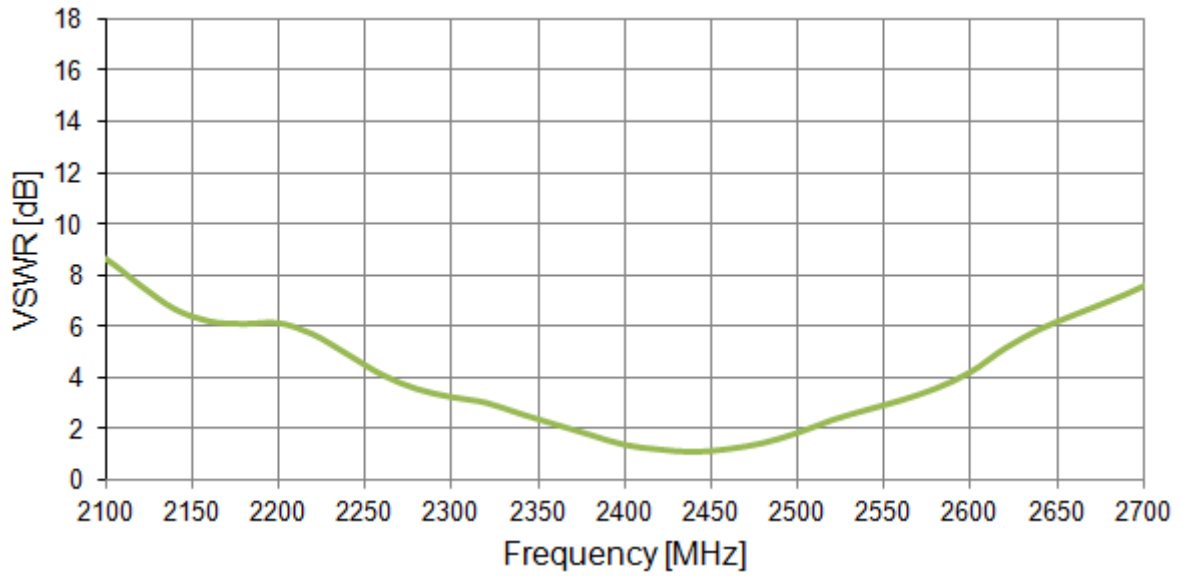


Figure 4. VSWR of the FXP840 antenna from 2100 MHz to 2700 MHz.

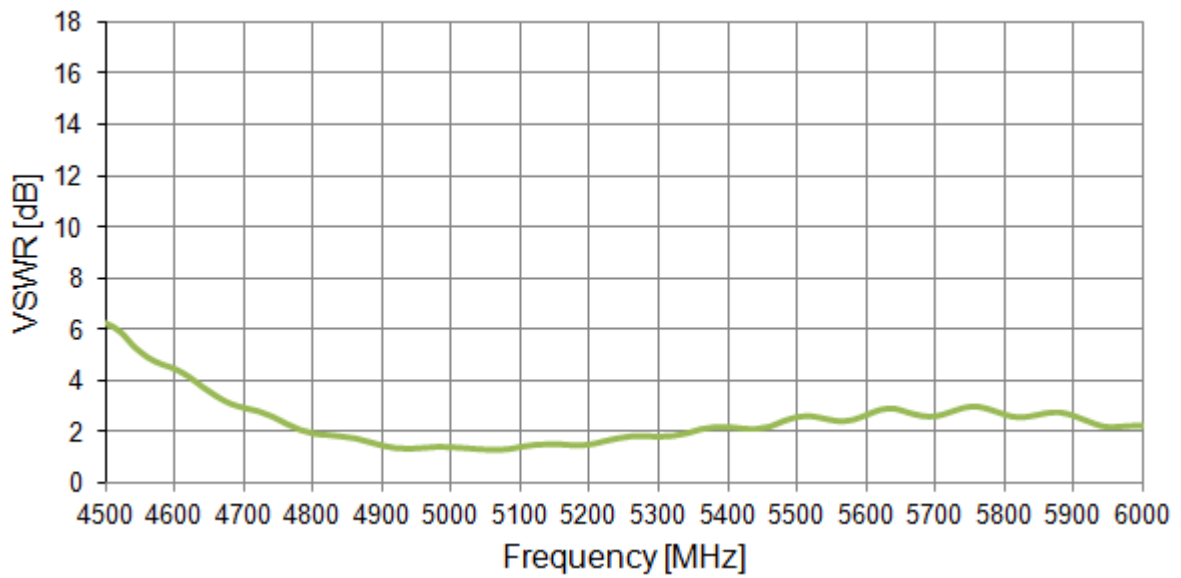


Figure 5. VSWR of the FXP840 antenna from 4500 MHz to 6000 MHz

3.4 Efficiency

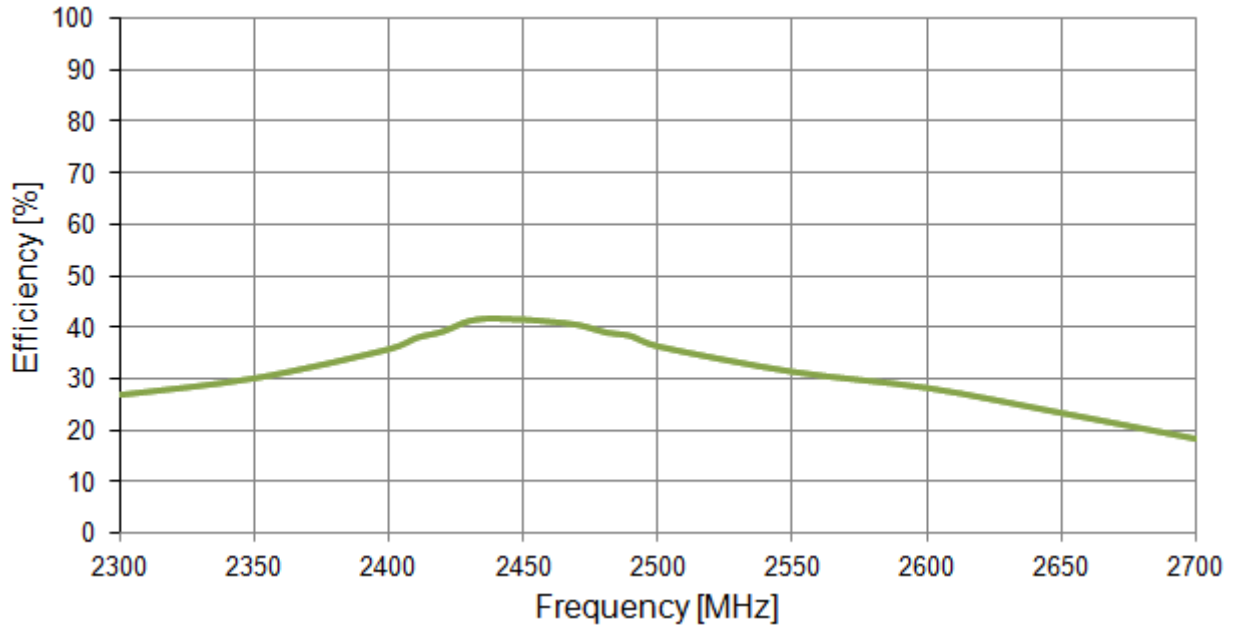


Figure 6. Efficiency of the FXP840 antenna from 2300 MHz to 2700 MHz.

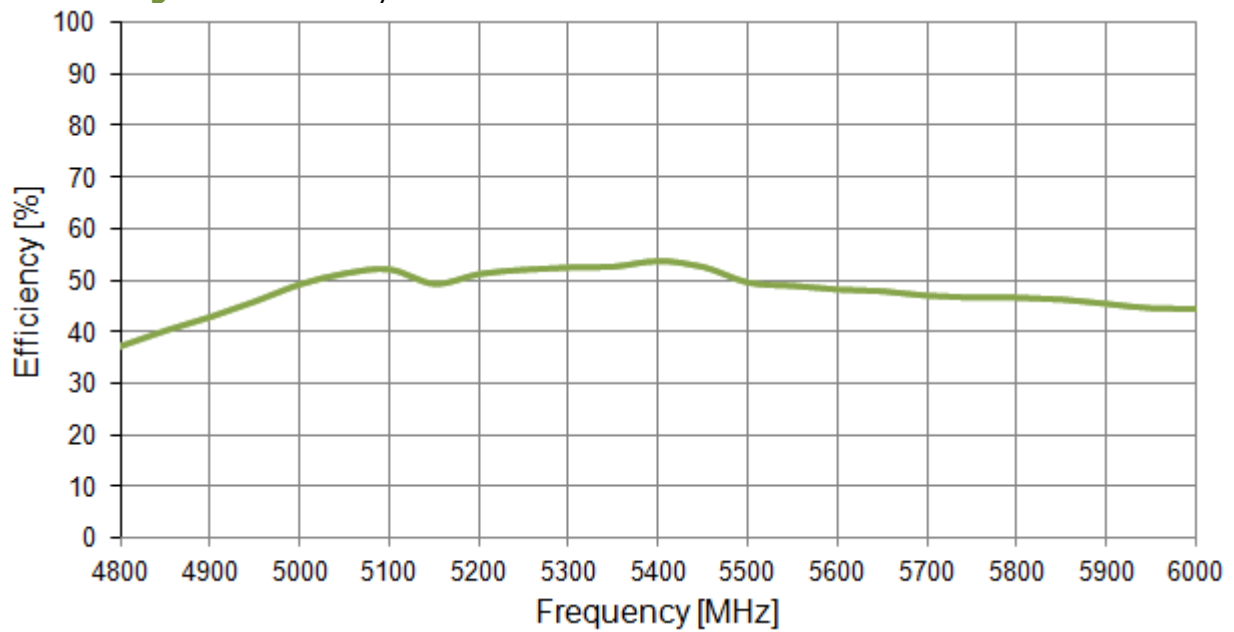


Figure 7. Efficiency of the FXP840 antenna from 4800 MHz to 6000 MHz.

3.5 Peak Gain

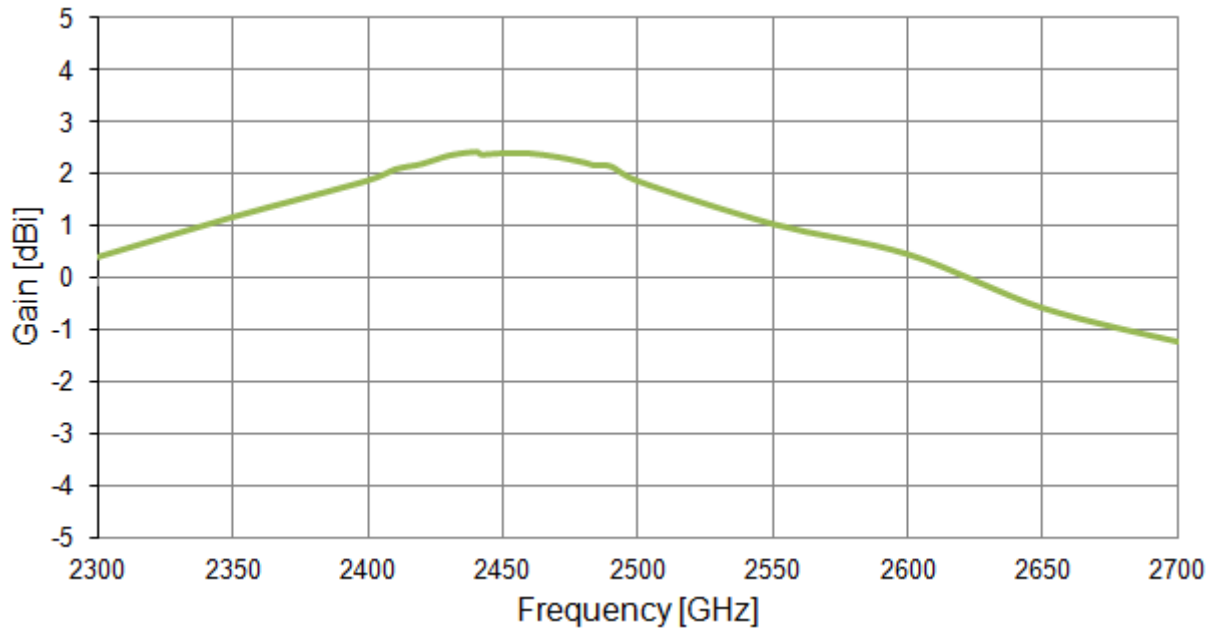


Figure 8 Peak Gain of the FXP840 antenna from 2300 MHz to 2700 MHz.

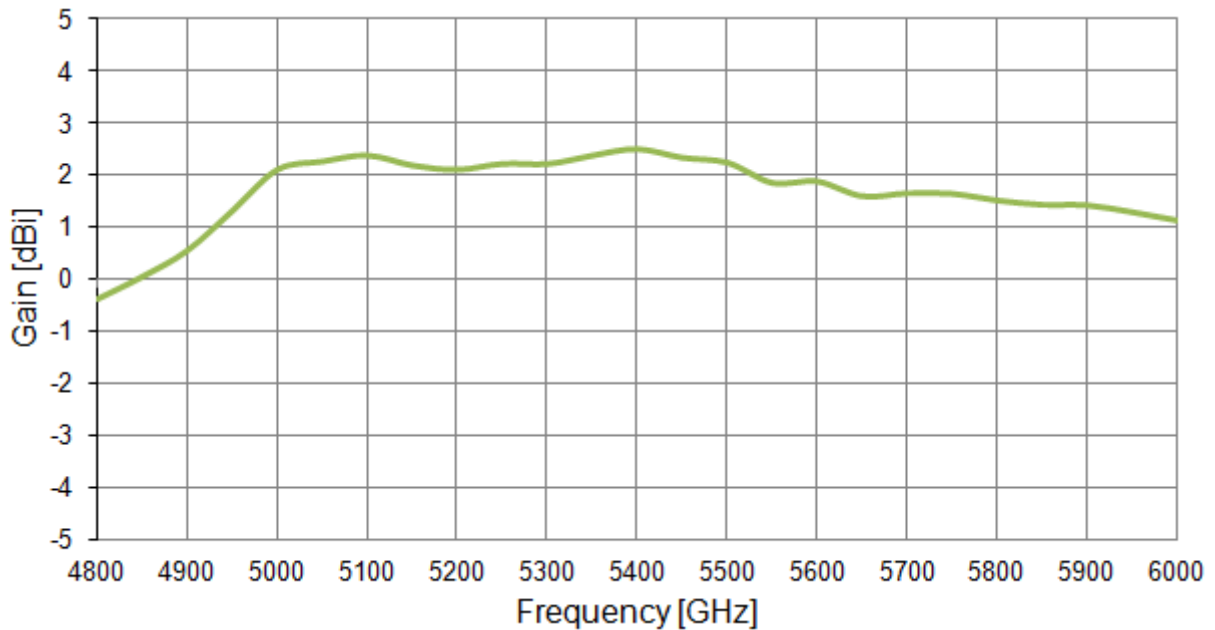


Figure 9. Peak Gain of the FXP840 antenna from 4800 MHz to 6000 MHz.

3.6 Average Gain

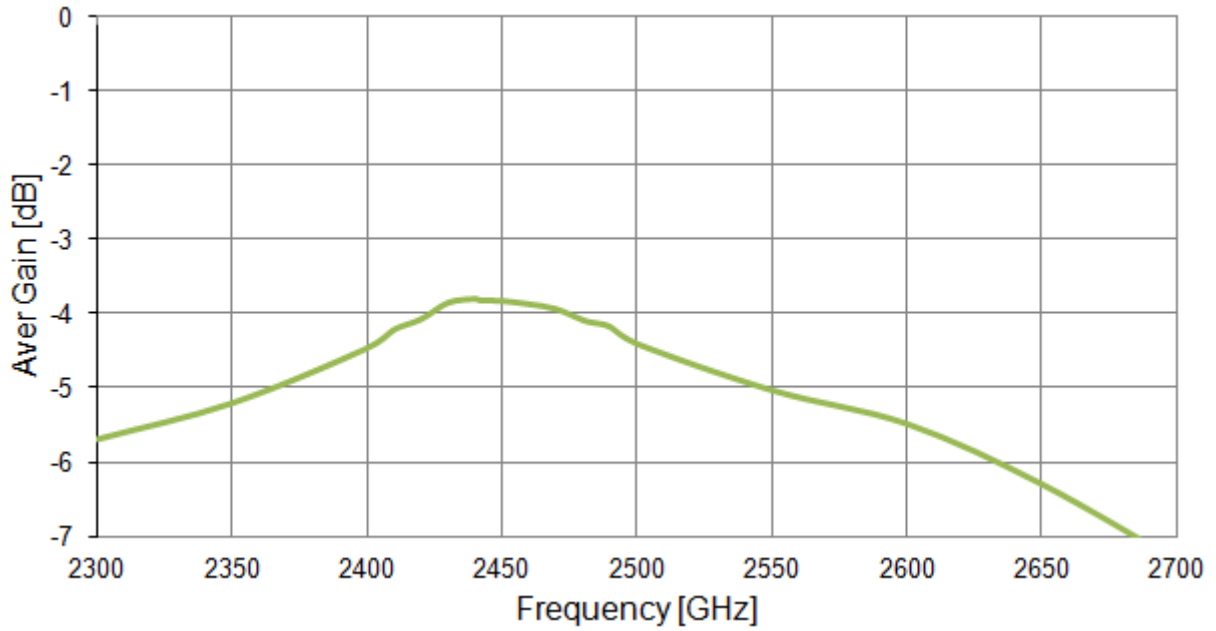


Figure 10. Average Gain of the FXP840 antenna from 2300 MHz to 2700 MHz.

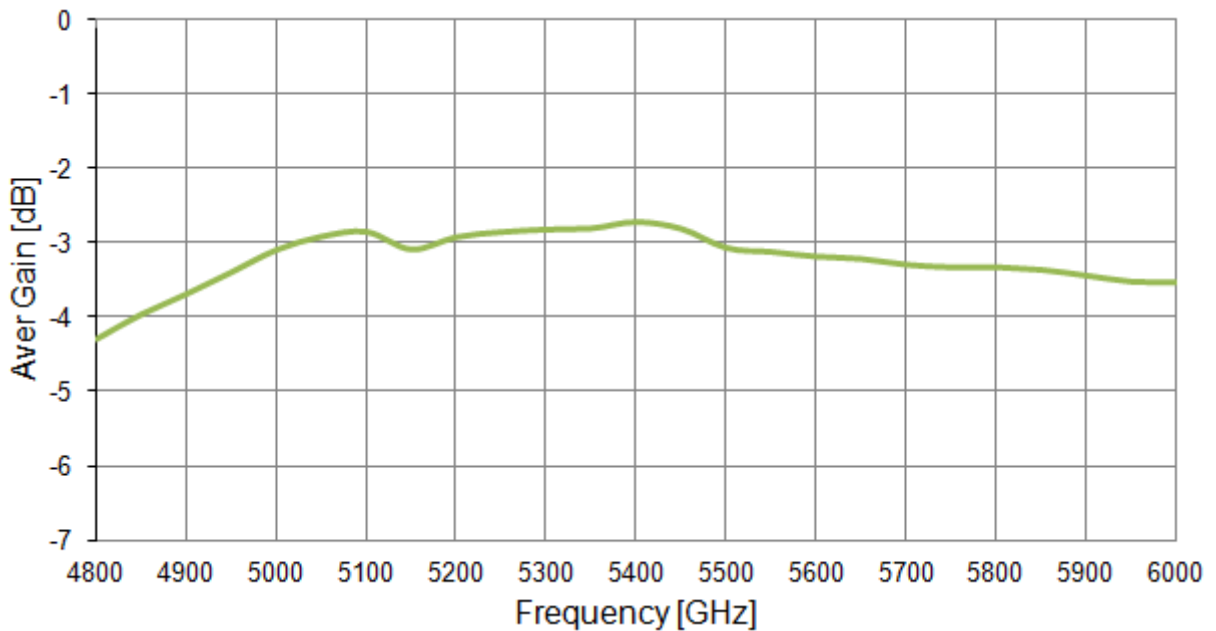


Figure 11 Average Gain of the FXP840 antenna from 4800 MHz to 6000 MHz.

3.7 3D radiation patterns

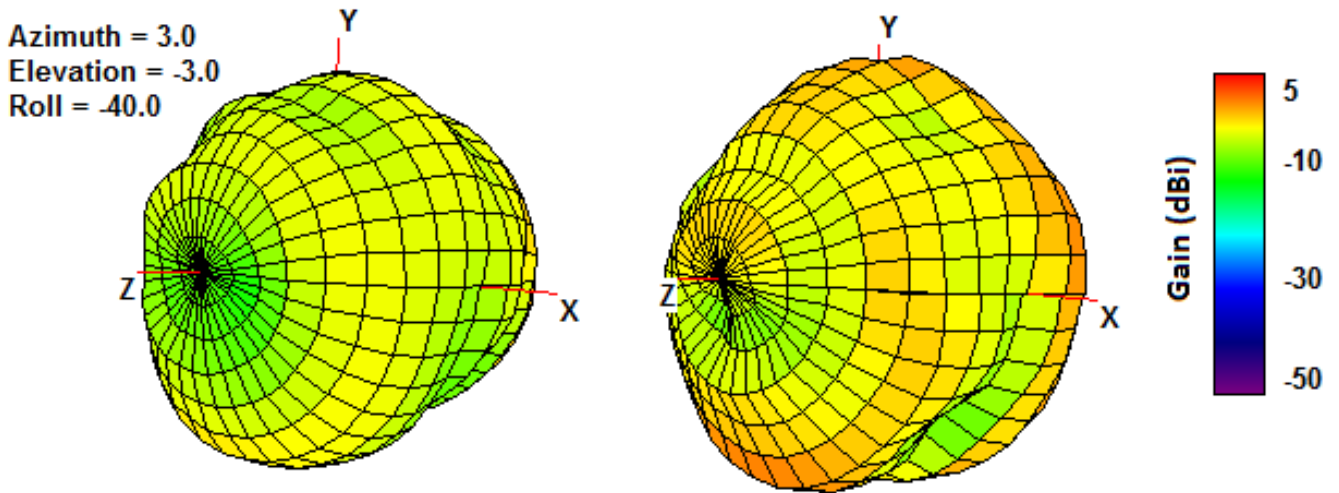
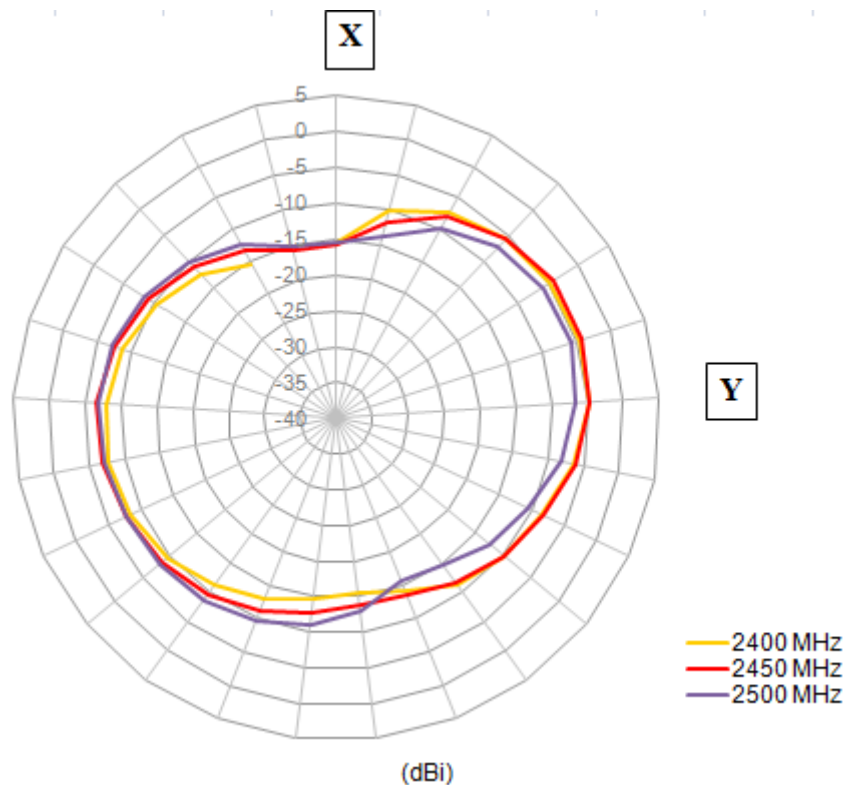


Figure 12. 3D Radiation Pattern at 2450 MHz (left side), Radiation Pattern at 5000 MHz (right side) of the FXP840 Antenna.

3.8 2D radiation patterns



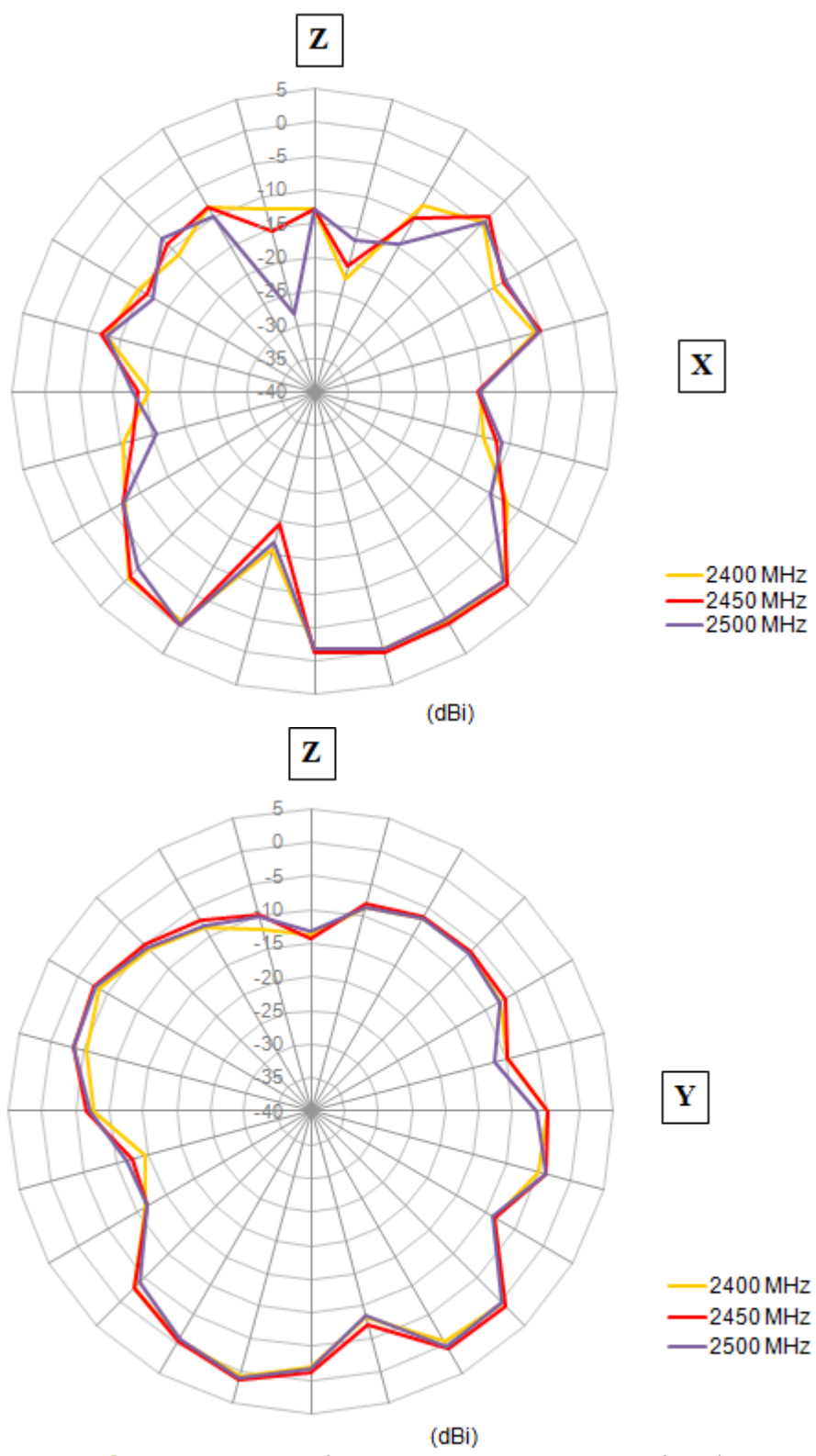
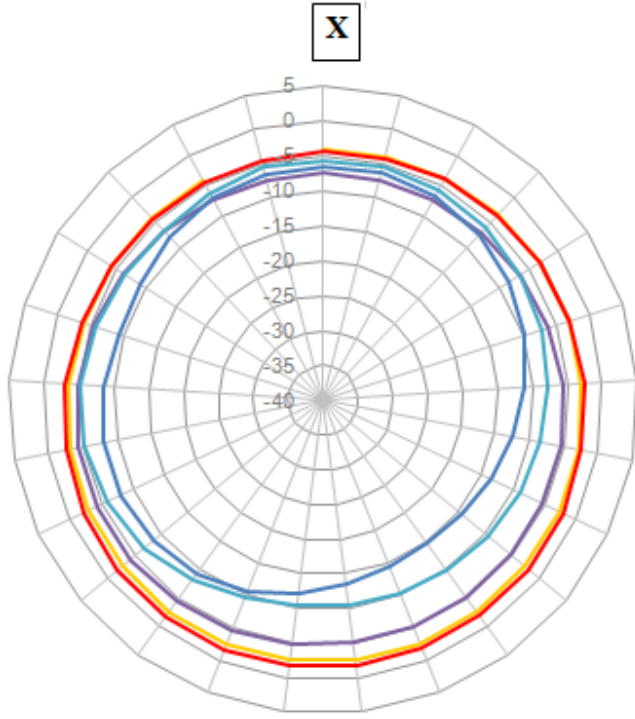


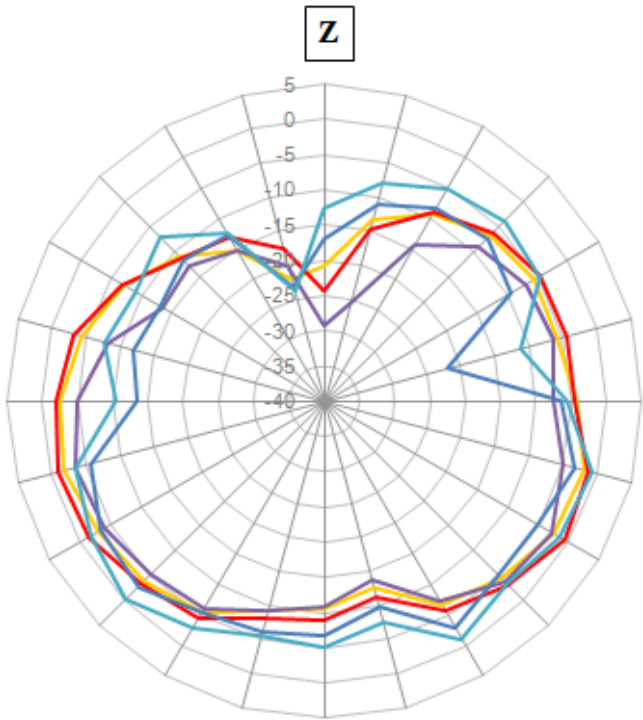
Figure 13. 2D Radiation Pattern at 2400MHz band



(dBi)

Y

- 4800 MHz
- 5000 MHz
- 5400 MHz
- 5500 MHz
- 5800 MHz



(dBi)

X

- 4800 MHz
- 5000 MHz
- 5400 MHz
- 5500 MHz
- 5800 MHz

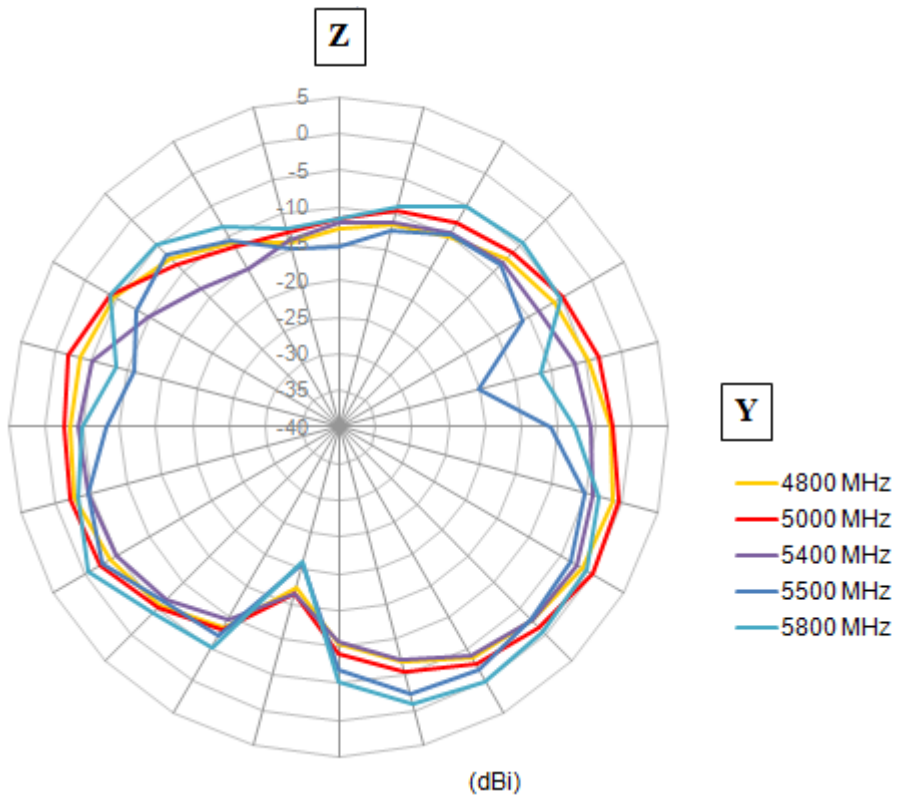
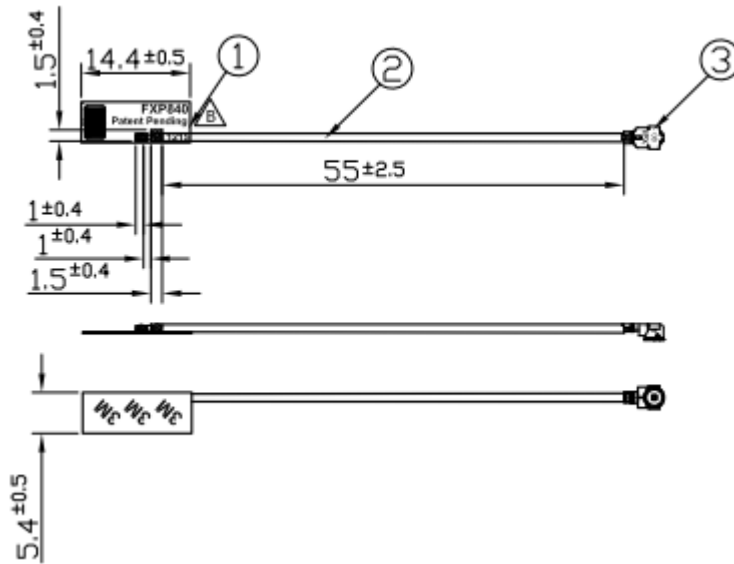


Figure 14. 2D Radiation Pattern at 5800MHz band

4. Antenna Drawing



	Name
①	FXP840 FPCB
②	0.81 Coaxial Cable
③	IPEX MHF1

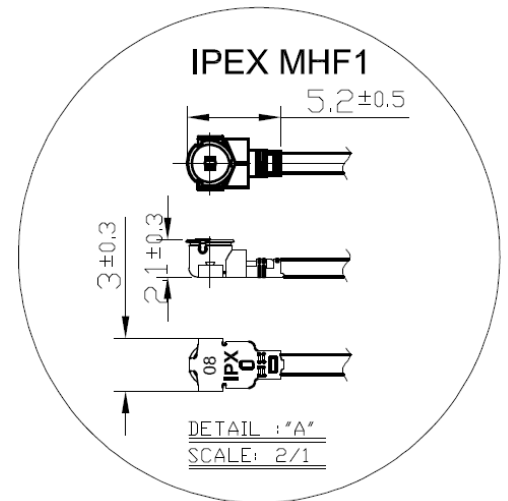


Figure 15. Antenna drawing

5. Packaging

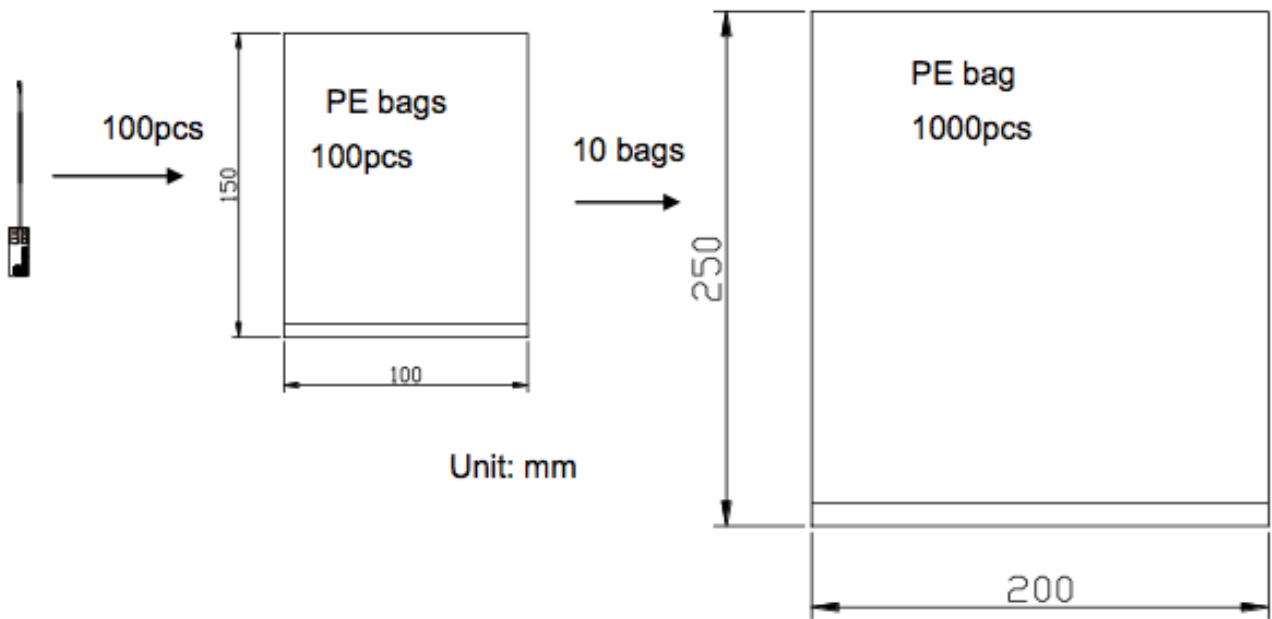


Figure 16. Package of the FXP840 Antenna.

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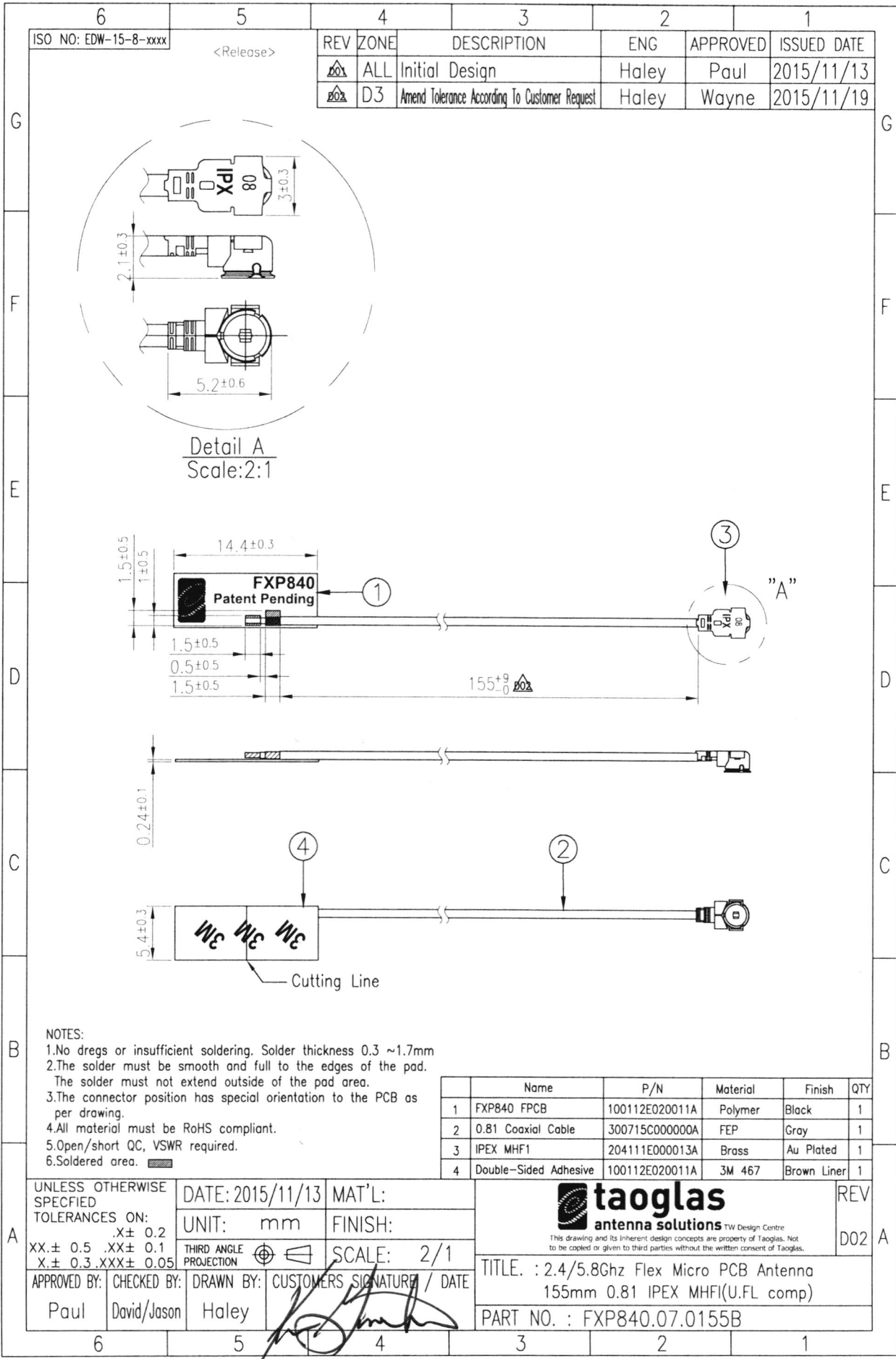
Mouser Electronics

Authorized Distributor

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[Taoglas:](#)

[FXP840.07.0055B](#)



6	5	4	3	2	1		
ISO NO: EDW-15-8-xxxx		REV	ZONE	DESCRIPTION	ENG	APPROVED	ISSUED DATE
<Release>		△	ALL	Initial Design	Haley	Paul	2015/11/13
		△	D3	Amend Tolerance According To Customer Request	Haley	Wayne	2015/11/19

Detail A
Scale: 2:1

- NOTES:
- 1.No dregs or insufficient soldering. Solder thickness 0.3 ~1.7mm
 - 2.The solder must be smooth and full to the edges of the pad. The solder must not extend outside of the pad area.
 - 3.The connector position has special orientation to the PCB as per drawing.
 - 4.All material must be RoHS compliant.
 - 5.Open/short QC, VSWR required.
 - 6.Soldered area.

	Name	P/N	Material	Finish	QTY
1	FXP840 FPCB	100112E020011A	Polymer	Black	1
2	0.81 Coaxial Cable	300715C000000A	FEP	Gray	1
3	IPEX MHF1	204111E000013A	Brass	Au Plated	1
4	Double-Sided Adhesive	100112E020011A	3M 467	Brown Liner	1

UNLESS OTHERWISE SPECIFIED TOLERANCES ON: .X± 0.2 XX± 0.5 .XX± 0.1 X.± 0.3 .XXX± 0.05	DATE: 2015/11/13	MAT'L:
	UNIT: mm	FINISH:
	THIRD ANGLE PROJECTION	SCALE: 2/1
	APPROVED BY: Paul	CHECKED BY: David/Jason
CUSTOMERS SIGNATURE / DATE		

taoglas
antenna solutions
TW Design Centre
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TITLE: . 2.4/5.8Ghz Flex Micro PCB Antenna
155mm 0.81 IPEX MHF1(U.FL comp)
PART NO. : FXP840.07.0155B

Bosch Automotive Service Solutions

Standard E-Item Initiation Form

Date:

E-Item (Bosch Part Number):

Description:

Project Number: Annual Usage:

Product Type: Moisture Level:

Item Group:

Sales Statistics Group:
Administrative Change #

Approved Mfg: MFG P/N: A/D: ROHS: T/R:

Approved Mfg:	MFG P/N:	A/D:	ROHS:	T/R:

Notes:

Originator/Engineer:

Approved: Component Engineer

DATA SHEET

WIRELESS COMPONENTS
PCB type antenna
ANTX150P111B24553
2.40 ~ 2.50GHz / 5.150 ~ 5.875 GHz



FEATURES & BENEFITS

- The smallest PCB antenna in the market
- Miniature design allows users to save required space
- Double-side adhesive tape makes it easy to instal in device
- Ranges of types of connector and cable provide a flexible design options
- Halogen free and RoHS compliant

APPLICATIONS

- Tablet / Desktop PC
- Internet TV / STB / Game console / Camera
- WiFi network devices (IEEE 802.11b/g/n)
- Bluetooth / ZigBee devices
- Car Infotainment
- Smart meter
- Lighting control
- POS terminal
- Wireless Industrial Control

ORDERING INFORMATION – GLOBAL PART NUMBER, PHYCOMP CTC & 12NC

All part numbers are identified by the series, packing type, material, size, antenna type, working frequency and packing quantity.

**YAGEO BRAND ordering code
GLOBAL PART NUMBER (PREFERRED)**

ANT X150 P III B 2455 3
(1) (2) (3) (4) (5) (6) (7)

(1) FAMILY

ANT = Antenna products

(2) CONNECTOR & CABLE LENGTH (MM)

X = I-PEX
150 = 150mm

(3) ANTENNA TYPE

P=PCB

(4) SERIAL NUMBER

Serial number III

(5) PACKAGE TYPE

B = Bulk

(6) WORKING FREQUENCY

2455 = 2.40 ~ 2.50 GHz / 5.150 ~ 5.875 GHz

(7) CABLE TYPE

3 = 1.13mm diameter Mini-Coaxial Cable

SPECIFICATIONS

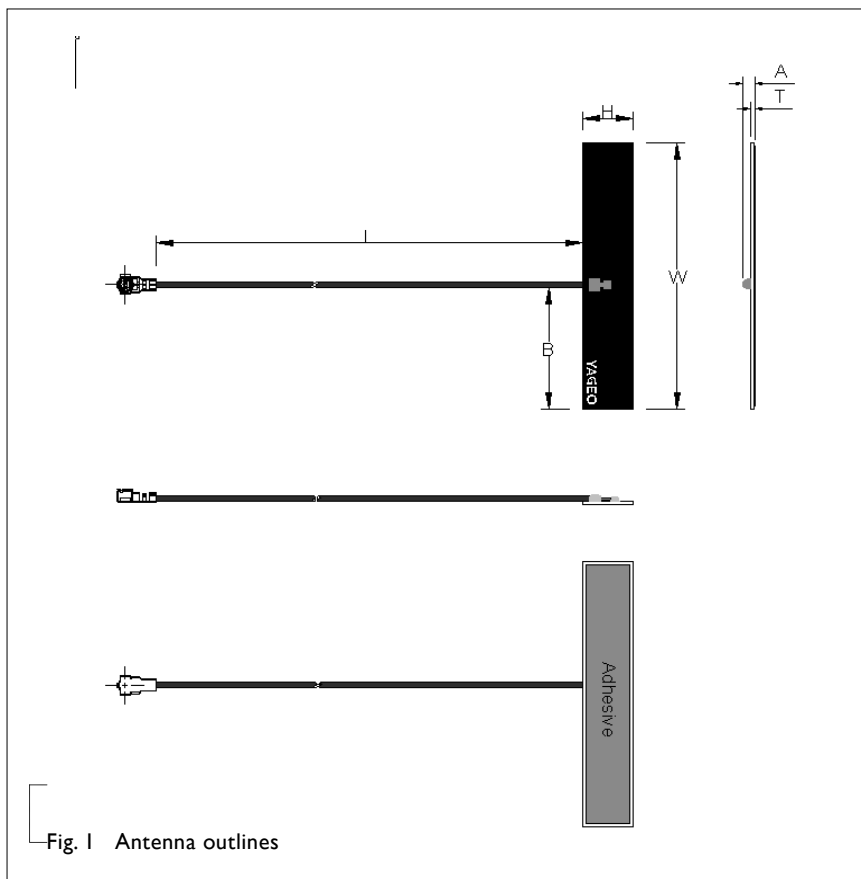
DESCRIPTION	VALUE
Working Frequency	2.40 ~ 2.50 GHz / 5.150 ~ 5.875 GHz
VSWR	2.5:1 max / 2.5:1 max
Peak Gain	3.2 dBi / 3.4 dBi
Polarization	Linear
Radiation Pattern	Omni-directional
Impedance	50 Ω Nominal
Operating Temperature	- 40 °C to 85 °C
Maximum Power	1 W
PCB Dimension	40mm x 8mm x 0.55mm
Radio Connector	I-PEX (20278-112R-13)
Cable Diameter / Length / Color	1.13mm / 150mm / Black
Mounting	Adhesive Tape (HF-DS)

DIMENSIONS

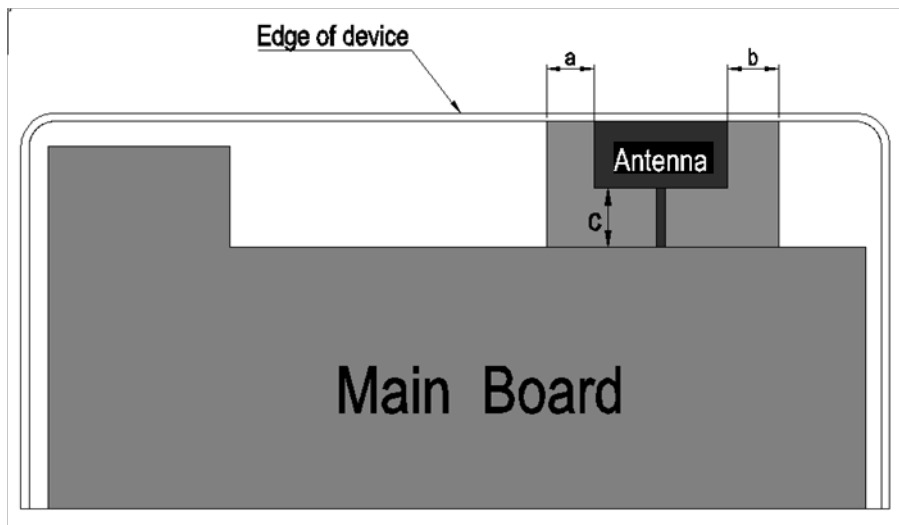
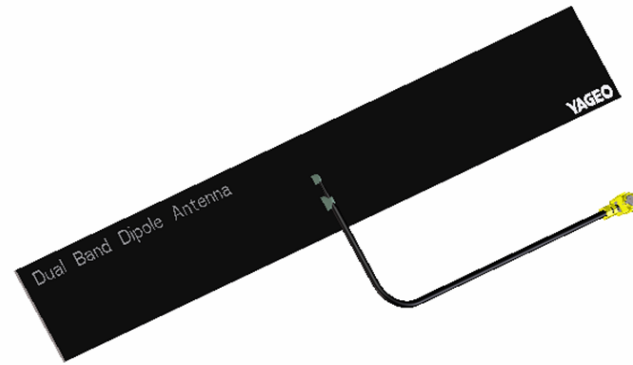
Table 2 Mechanical Dimension

DIMENSION	VALUE
L (mm)	150 ±3.00
W (mm)	40±0.30
H (mm)	8±0.30
B (mm)	4±1.00
T (mm)	0.55±0.15
A (mm)	2.30Max

OUTLINES



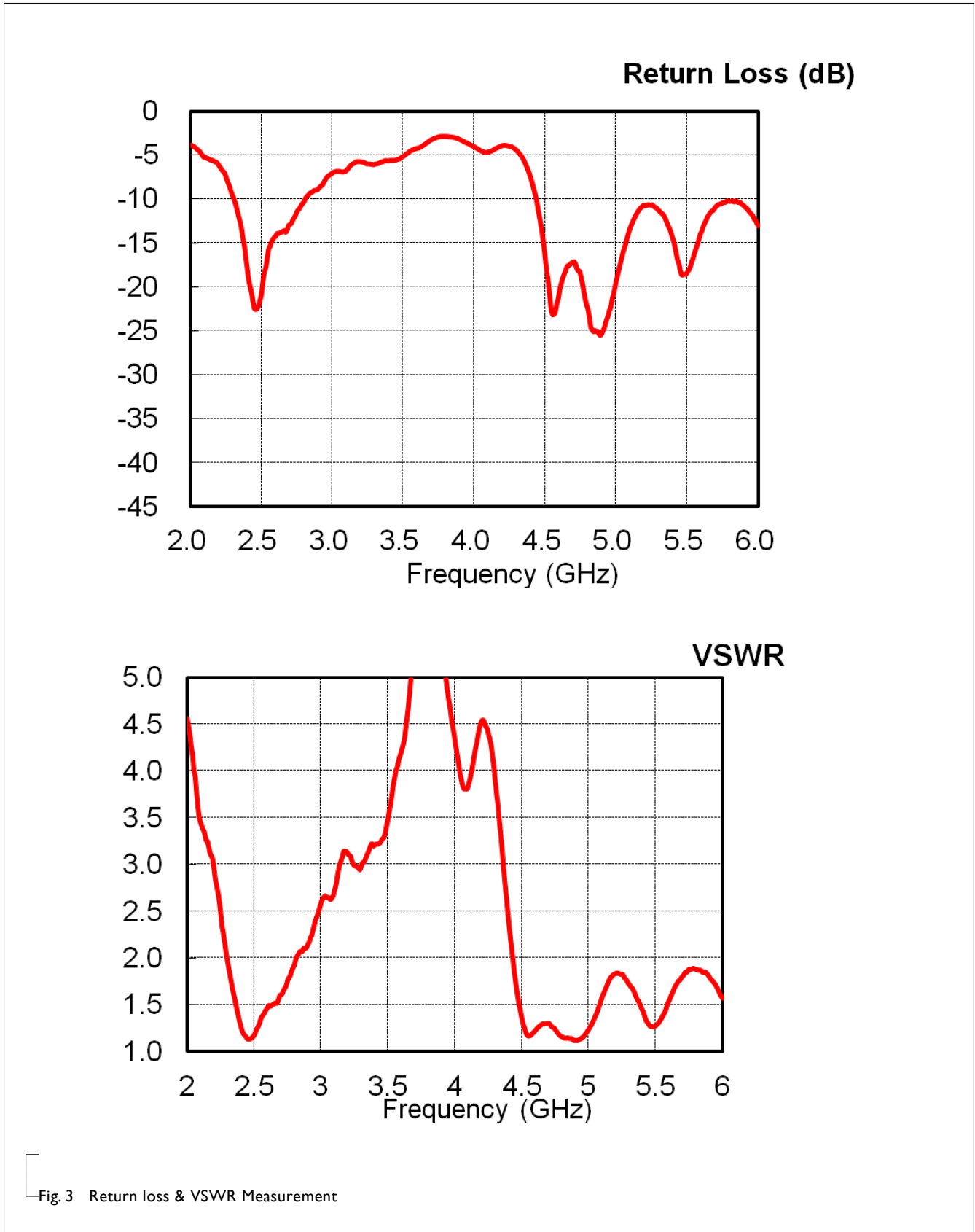
APPLICATION INSTRUCTION



Antenna element should be placed at the edge of device, has minimum clearance from metallic object:
 A: 5 mm Min
 B: 5 mm Min
 C: 10 mm Min

Fig. 2 Application Instruction

RETURN LOSS & VSWR



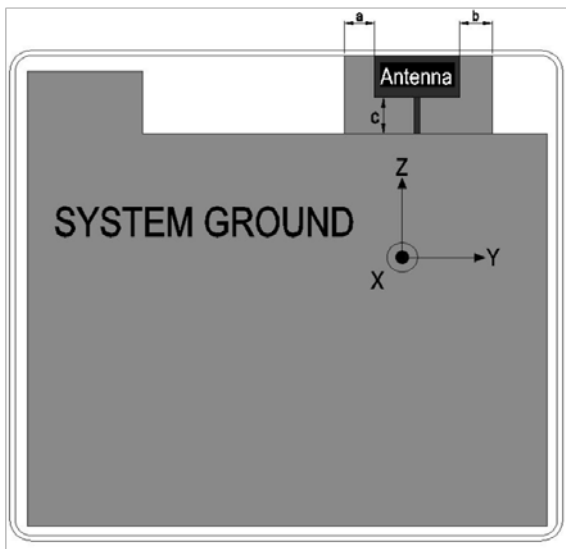
ANTENNA GAIN & EFFICIENCY

Table 3

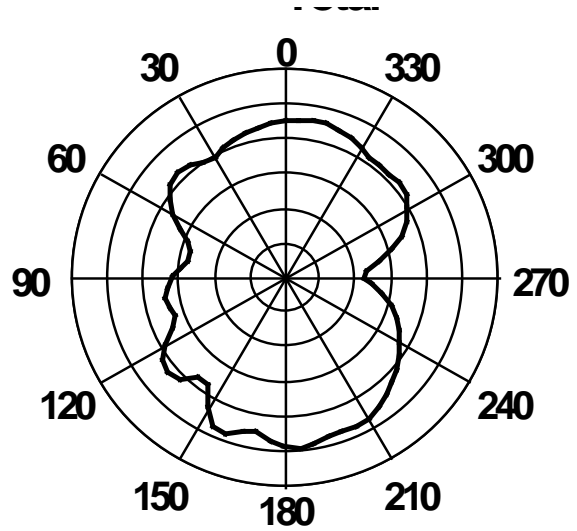
FREQUENCY (GHz)	AVERAGE GAIN (dBi)	EFFICIENCY (%)	PEAK GAIN (dBi)
2.40	-0.8	83.2	3.2
2.45	-1.1	78.4	2.9
2.50	-2.0	63.4	2.4

ANTENNA RADIATION PATTERNS

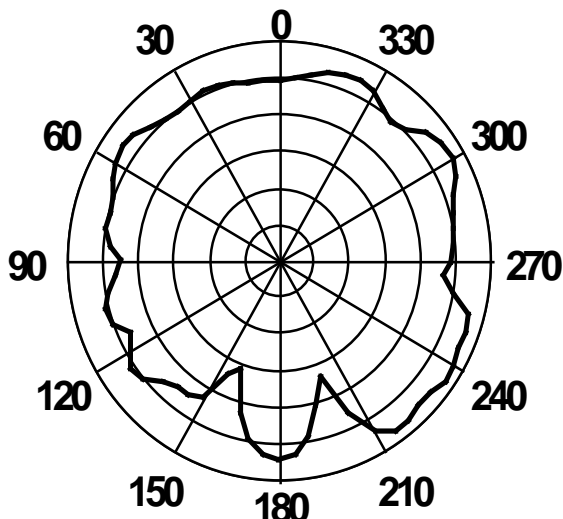
Scale: 5 dBi / div Max : 5 dBi Min : -25 dBi



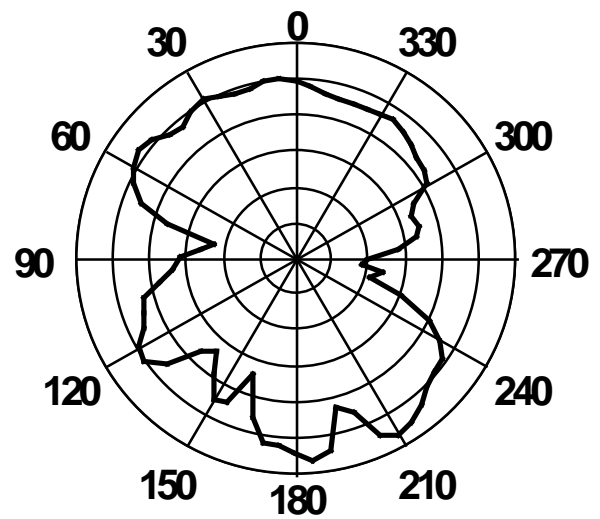
Device Setup & Coordinates



X-Y Plane



X-Z Plane



Y-Z Plane

Fig. 4 Antenna radiation patterns at 2.45 GHz

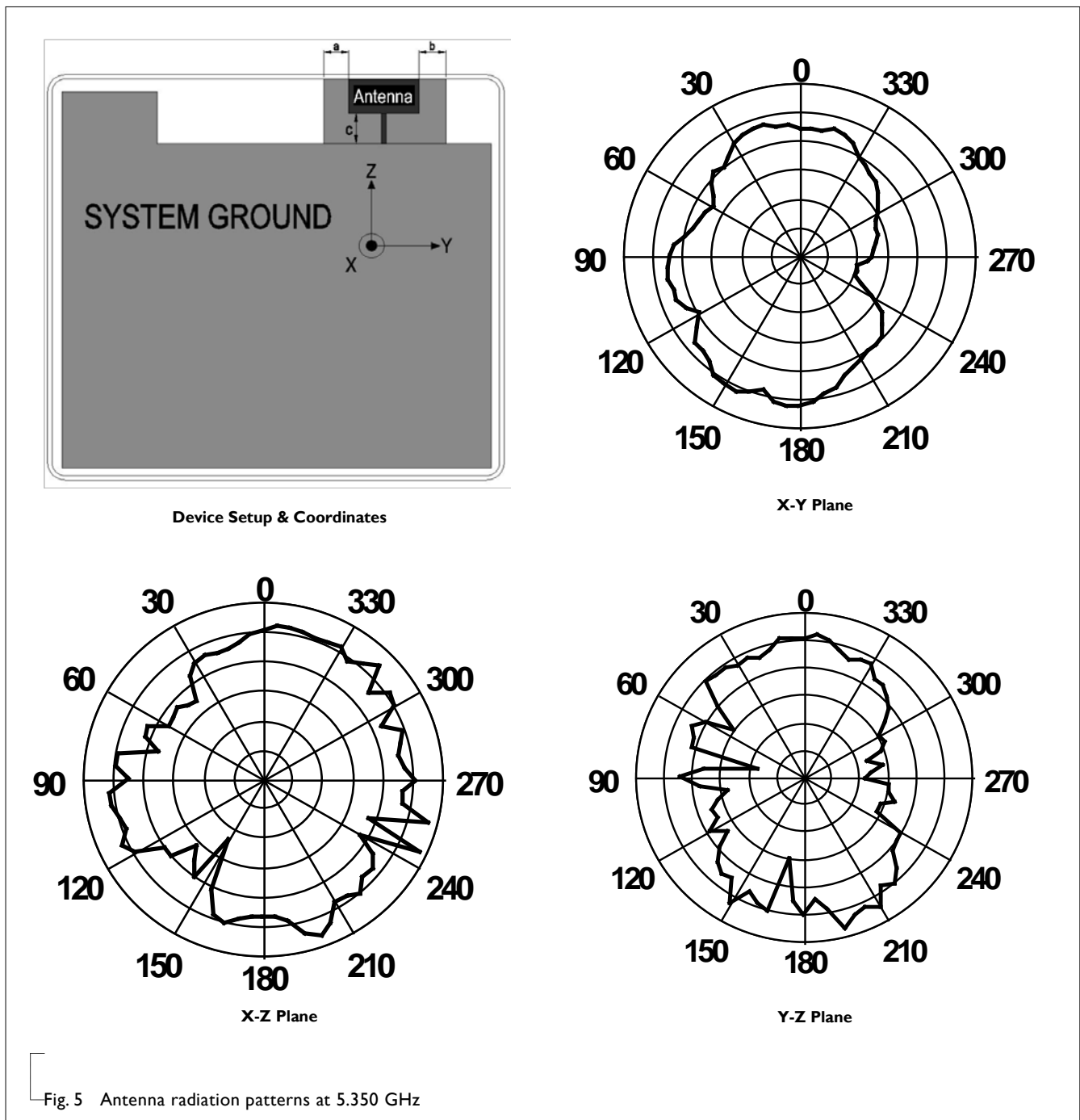
ANTENNA GAIN & EFFICIENCY

Table 4

FREQUENCY (GHz)	AVERAGE GAIN (dBi)	EFFICIENCY (%)	PEAK GAIN (dBi)
5.150	-2.3	59.4	2.5
5.350	-2.4	57.9	1.6
5.475	-2.3	59.0	1.7
5.725	-2.4	58.0	3.4
5.875	-2.4	57.5	2.0

ANTENNA RADIATION PATTERNS

Scale: 5 dBi / div Max : 5 dBi Min : -25 dBi



REVISION HISTORY

REVISION	DATE	CHANGE NOTIFICATION	DESCRIPTION
Version 0	Apr. 29, 2015	-	- New data sheet for PCB type antenna, 2.40 ~ 2.50GHz / 5.150 ~ 5.875 GHz