

U-ANT2401

Meander-Type Printed Circuit Antenna Layout Guide

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Application Note

AN-2400-08

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U-ANT2401**Meander-Type Printed Circuit Antenna Layout Guide**

1. General Information

UBEC's 3-C-0M09-005000001UC is a meander-type printed circuit antenna. It is used in UBEC's 2.4GHz RF chips and products. The low cost 3-C-0M09-005000001UC antenna has a small footprint and offers excellent performance.

This layout guide provides the detailed layout information and the associated microstrip design in order to realize the intrinsic performance of 3-C-0M09-005000001UC. For a complete board design, please refer to UBEC's UZ2400 application note AN-2400-05 for more details.

UBEC Part Number	3-C-0M09-005000001UC	
Dimension (W x L)	13.0 x 8.5	Mm x mm
Frequency Range	2400-2500	MHz
Bandwidth	100	MHz
Impedance	50	Ohm
Return Loss	-42	dB
Gain	-0.8	dBi

2. Meander Antenna Design Guidelines

- ❑ The feeding transmission line impedance should be kept at 50Ω and keep the transmission line in the printed circuit board (PCB) routing as straight and as short as possible.
- ❑ To reduce the RF signal reflections, sharp angles/turns of transmission lines in the PCB routing should be avoided. For example, a 45-degree turn is preferred over a 90-degree turn in doing the routing.
- ❑ The RF transmission lines are recommended to be printed on the top layer and referenced to the same unabridged ground plane.
- ❑ Place the ground plane and sufficient ground vias to surround the RF transmission line to reduce the noise interference and maximize the RF performance.
- ❑ Since the RF Antenna is a sensitivity component, it is highly recommended that the designer should keep the antenna placement area ($13.0 \times 8.5 \text{ mm}^2$) clear of other objects, particularly no other metallic objects and/or components should be placed on or near this area. (Please refer to Fig.1)
- ❑ To achieve good RF signal quality, the RF transmission line signals should not get too close to the digital circuit sections and added Pi-filter circuits are highly recommended to further reduce the potential noise coupling.

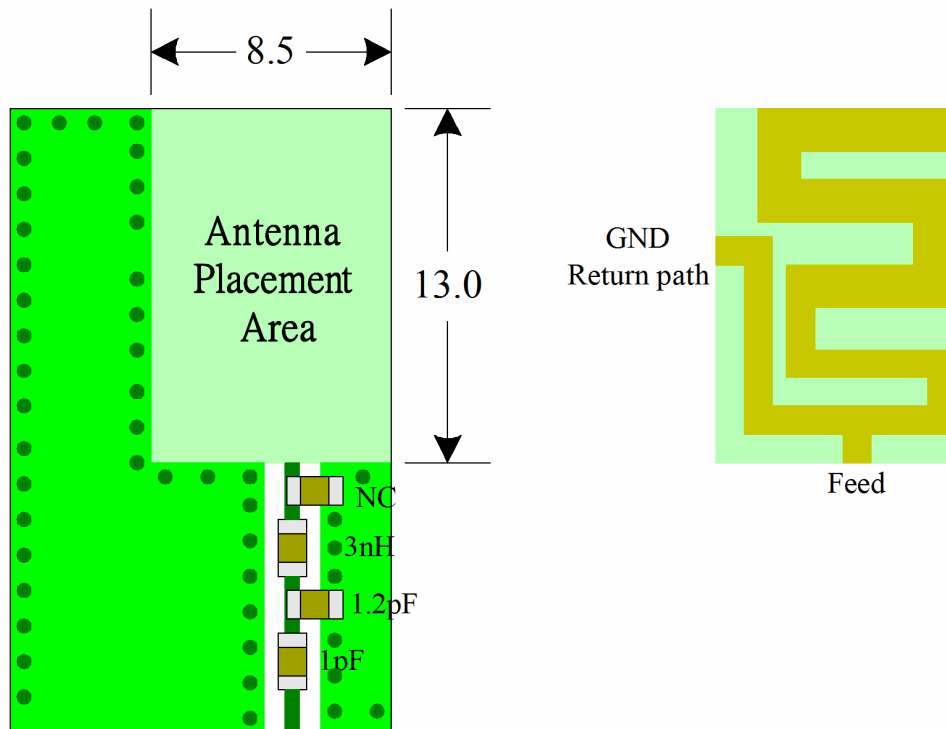
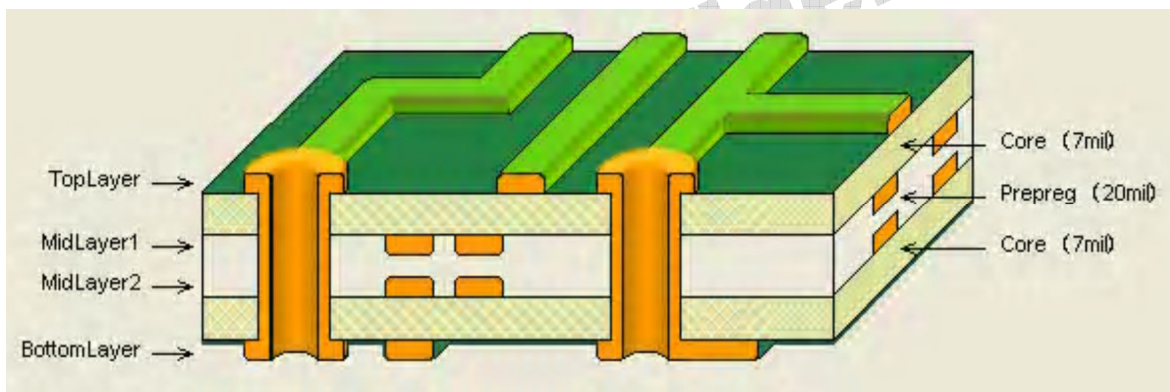


Fig. 1 Antenna placement note

An implementation example is given below.



- ☐ Substrate 1 (Core) = 7 mil
- ☐ Substrate 2 (Pre-preg) = 20 mil
- ☐ Substrate 3 (Core) = 7 mil
- ☐ Copper Toper Layer = 1.8 mil (0.5 oz)
- ☐ Copper Mid-layer 1 = 1.2 mil (0.5 oz)
- ☐ Copper Mid-layer 2 = 1.2 mil (0.5 oz)
- ☐ Copper Bottom Layer = 1.8 mil (0.5 oz)
- ☐ Characteristic impedance = 50 Ω

- ### 3. Mechanical Dimensions

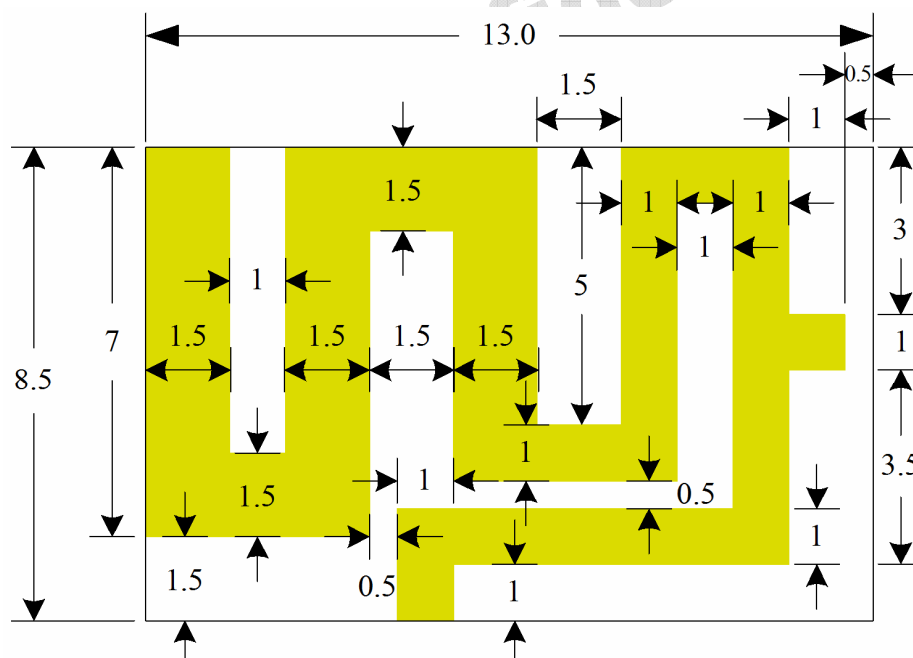
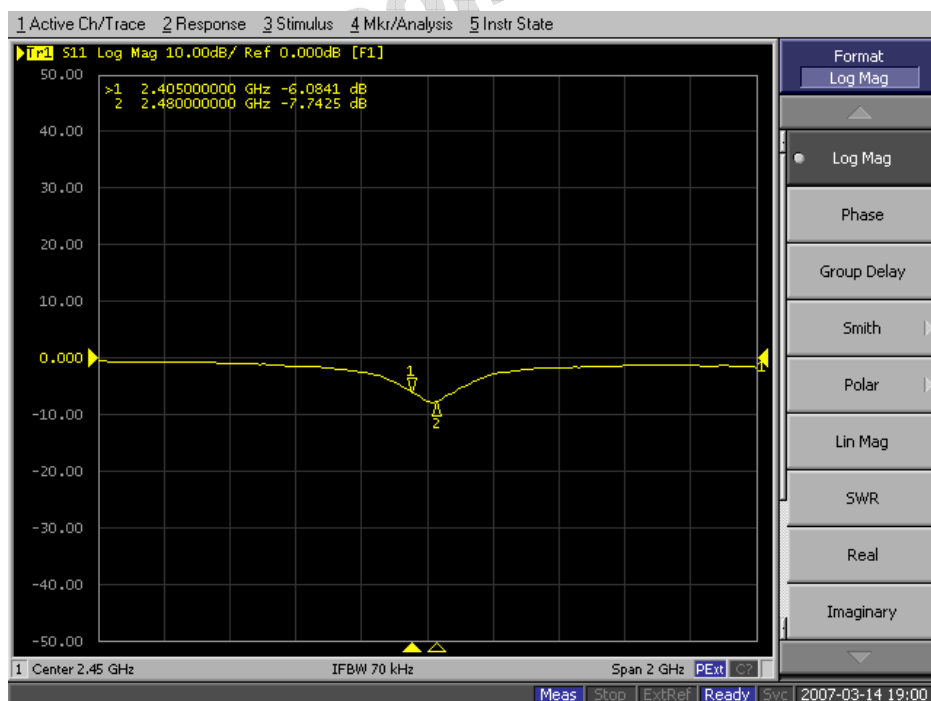
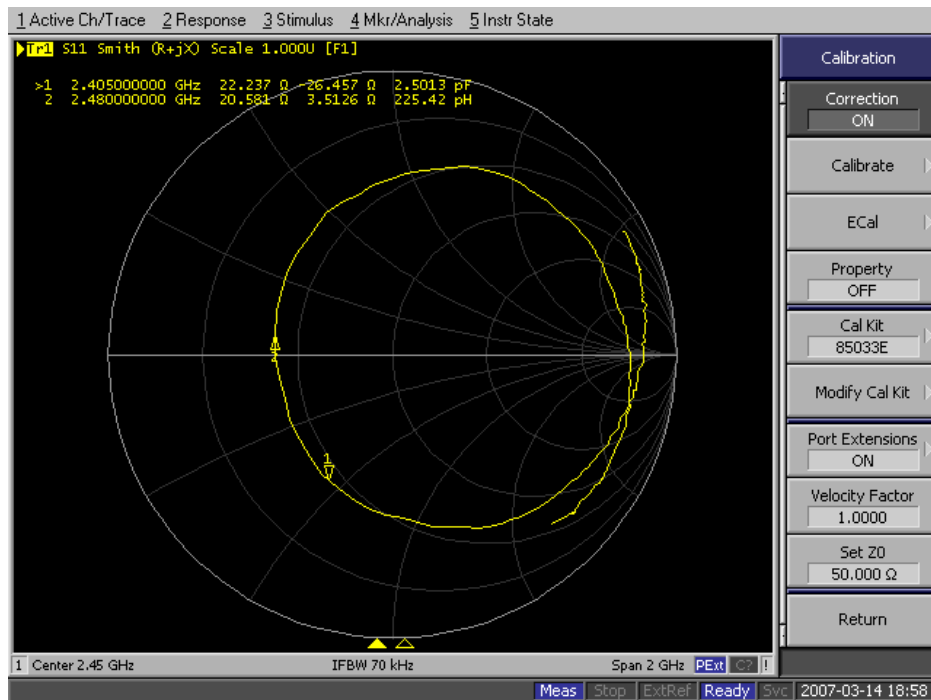


Fig. 2 Meander Antenna physical dimensions

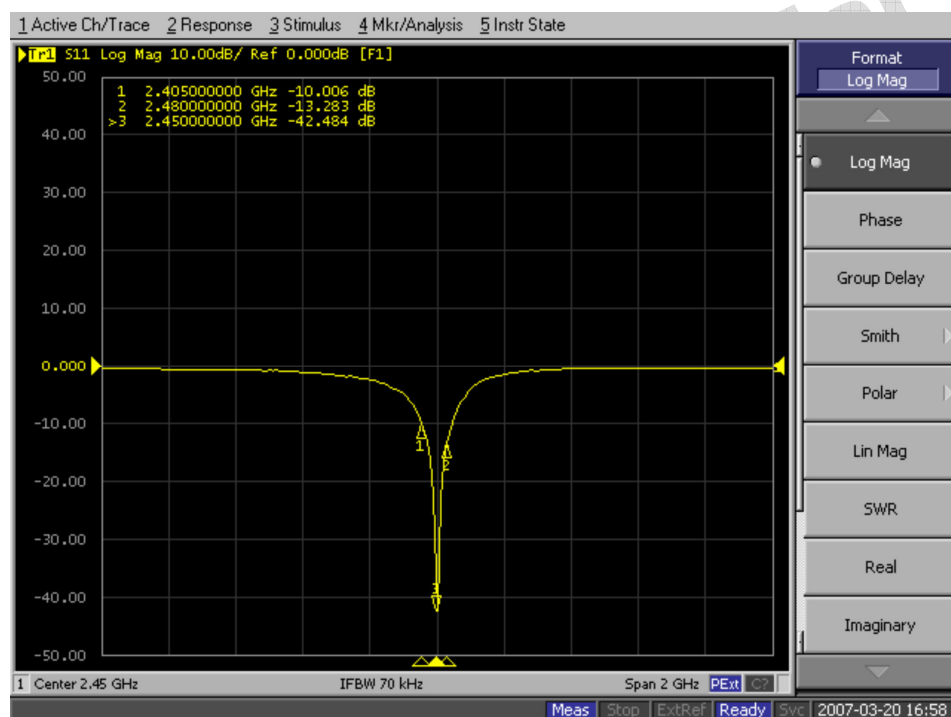
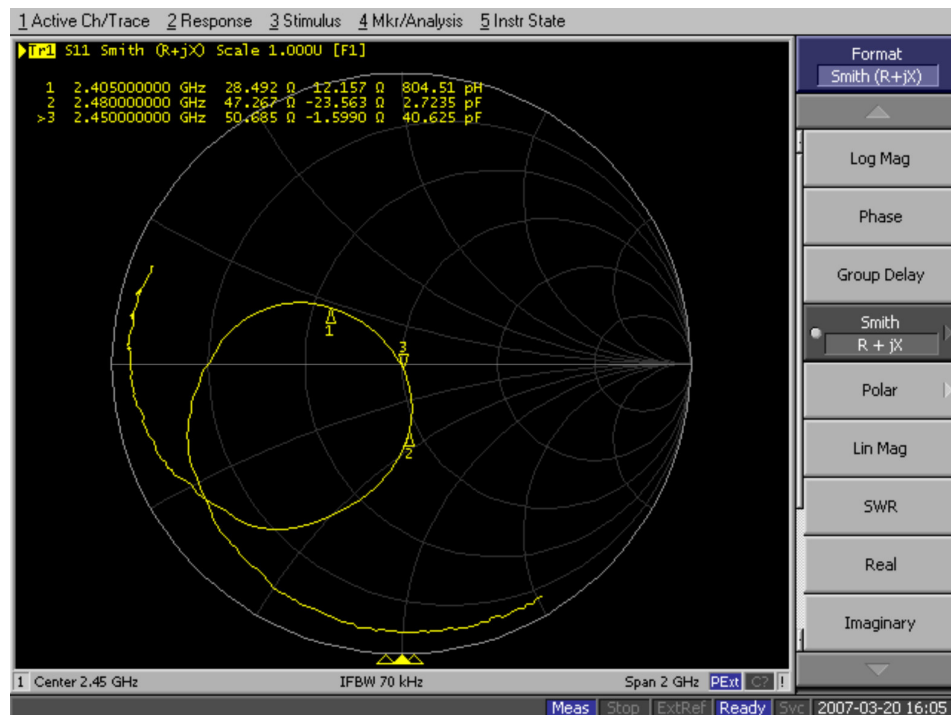
4. UBEC Meander Antenna Verification Test Results

4.1. Return Loss

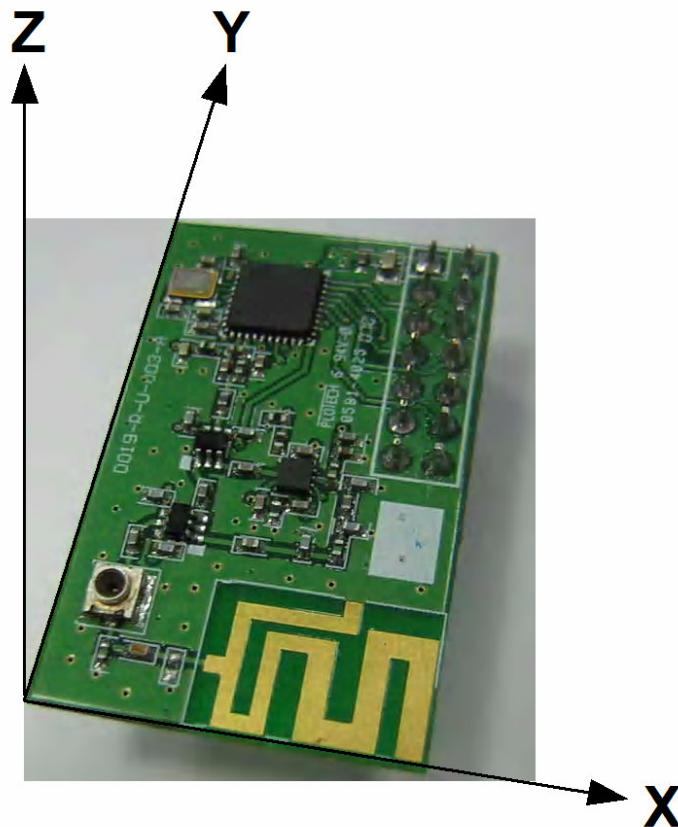
a. Without a matching Circuit



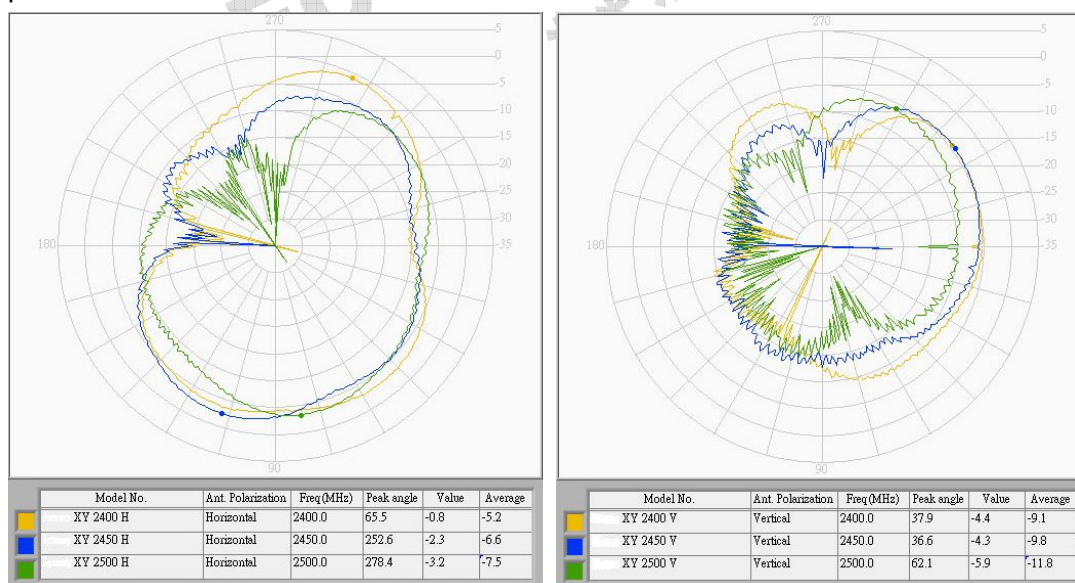
b. With a matching Circuit

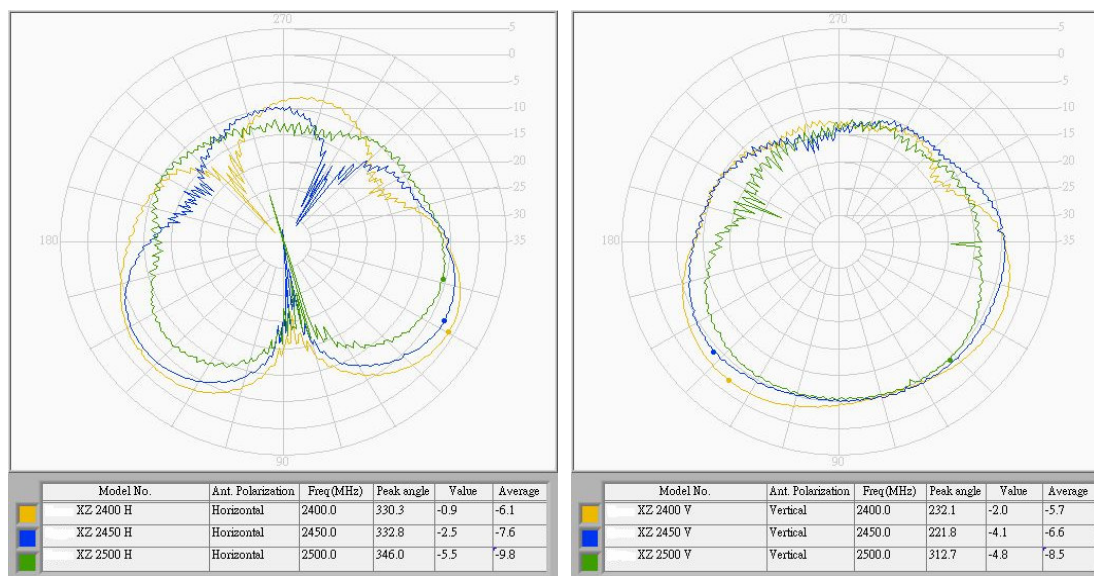
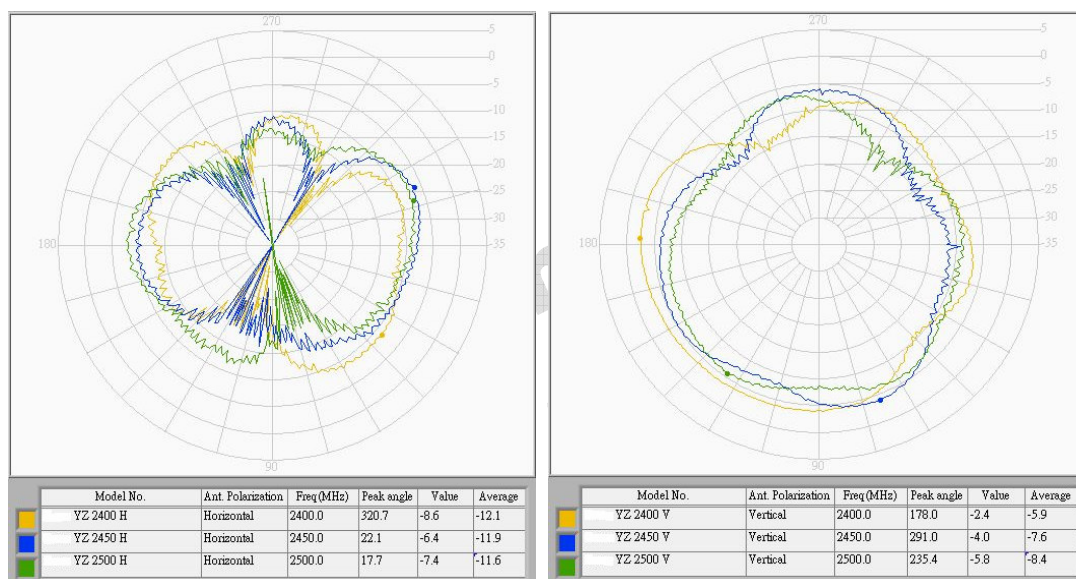


4.2. Radiation Patterns



a. XY polarization scan



b. XZ polarization scan

c. YZ polarization scan


Revision History

Revision	Date	Description of Change
0.0	May 20, 2007	Initial version

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