

361.01530.005 Antenna Measurement Report



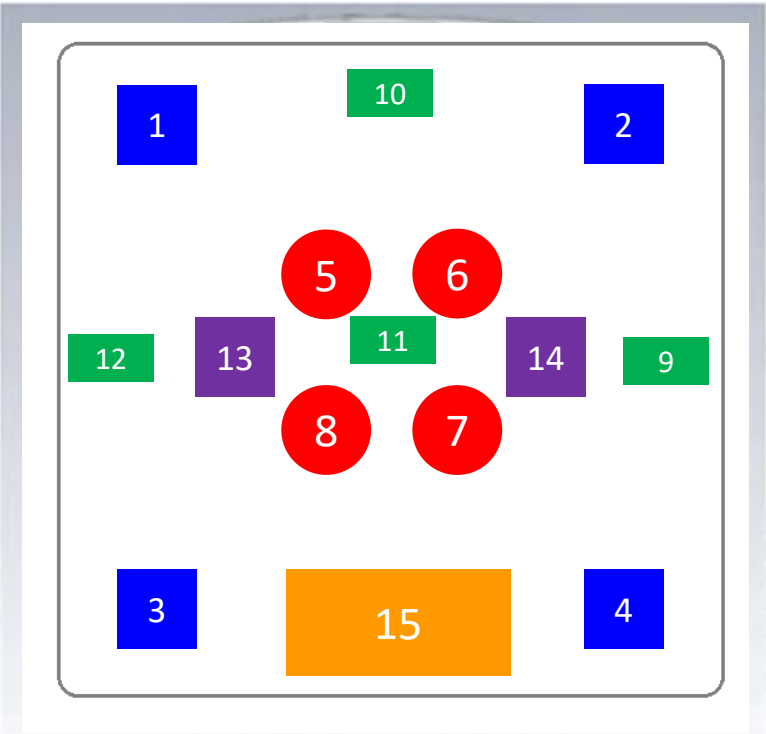
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Antenna Test Report Agenda

- **Antenna Sub-system Overview**
- **Antenna Performance Overview**
- **Measurement Environment**
- **MIMO1 Performance**
- **MIMO2 Performance**
- **MIMO3 Performance**
- **Aux Performance**
- **IoT Performance**

Foxconn Industrial Internet
富士康工业互联网

Antenna Sub-system Overview

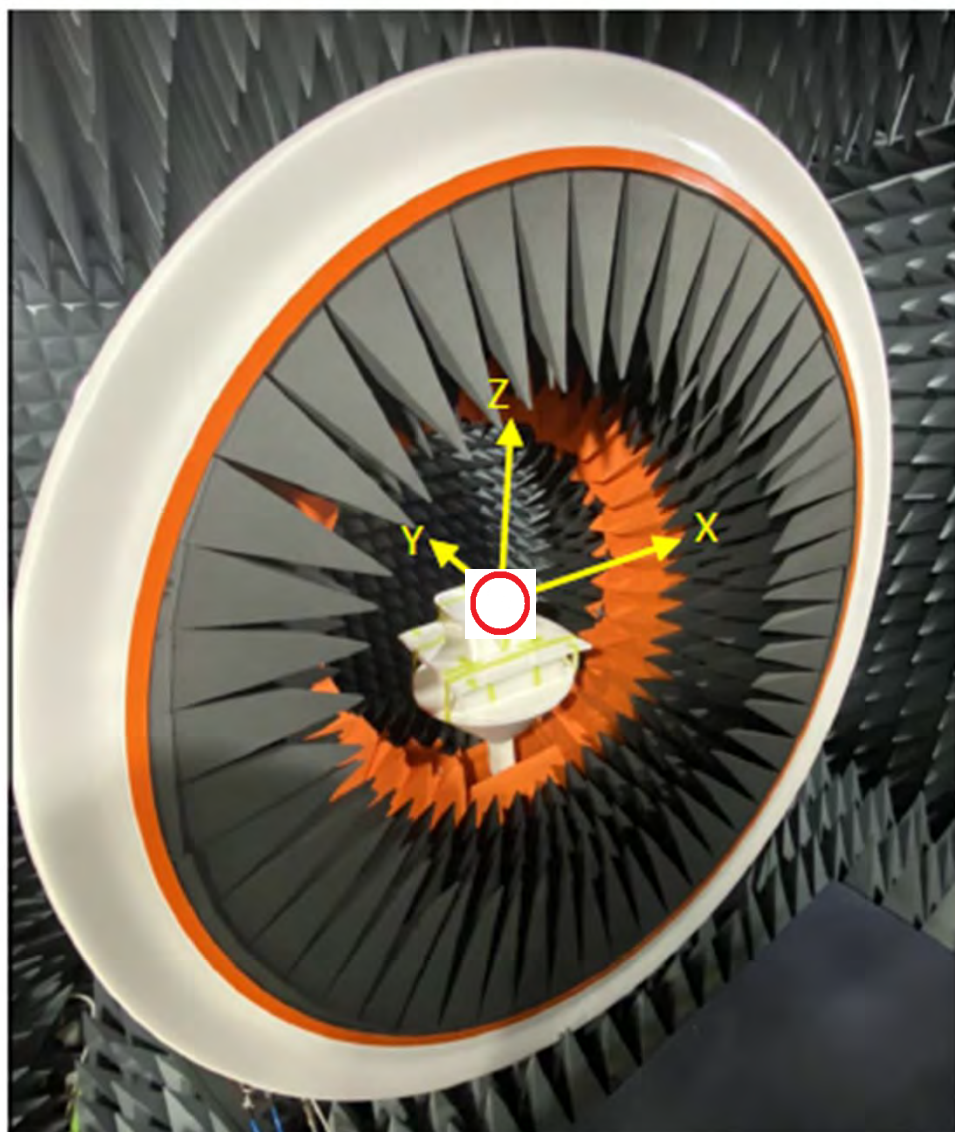


	MIMO1 (Ant1-4)	MIMO2 (Ant5-8)	MIMO3 (Ant9-12)	Aux (Ant13-14)	IoT (Ant15)
Working Frequency (MHz)	2400-2500 5150-5850	5150-5850	5935-7125	2400-2500 5150-7125	2400-2500
Type	PIFA	Dipole	PIFA	PIFA	PIFA
Polarization	V-pol	H-pol	V-pol	Mix	Mix
Efficiency	2G : 60% 5G : 60%	5G : 60%	6G : 60%	2G : 60% 5, 6G : 60%	2G : 65%
Peak gain	2G : 4 dBi 5G : 5 dBi	5G : 5 dBi	6G : 6 dBi	2G : 6 dBi 5, 6G : 6 dBi	2G : 5 dBi
Connector	IPEX 1L				

- Antenna mechanical design concept:
 - RF cable adopt OD 1.13 mm cables.
 - The antennas of MIMO1, MIMO3, AUX and IOT use metal stamping material which are been mounted on AL plate.
 - The antennas of MIMO2 will been heat-stick to top cover without any holder applied.

Antenna Cable length Overview

Antenna cable length		
Ant No.	Total length	Color
1	297.5	Black
2	359.5	Gray
3	288	White
4	347.5	Blue
5	247	Black + red tube 3mm
6	250	Gray + red tube 3mm
7	224.5	White + red tube 3mm
8	279	Blue + red tube 3mm
9	161	Blue + yellow tube 3mm
10	259	White + yellow tube 3mm
11	256	Gray + yellow tube 3mm
12	210	Black + yellow tube 3mm
13	179	Red
14	233	Red + white tube 3mm
15	106.5	White + black tube 3mm

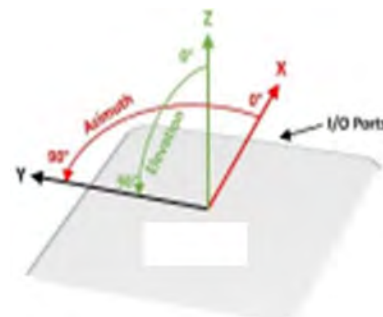


VNA Testing Information

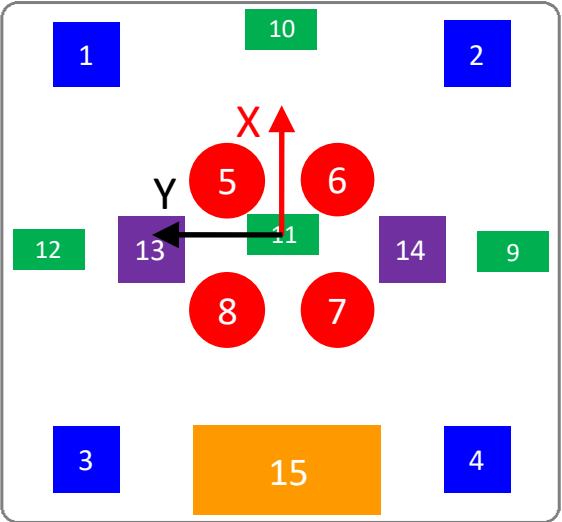
- VNA model : Keysight E5071C calibrated to 8.5 GHz.
- Frequency sweep : 500~8000 MHz / 1201 points
- Data collection : VSWR / Isolation

On-The-Air Passive Testing Information

- Chamber model : SATIMO Starlab 2019 calibrated to 10 GHz.
- Frequency sweep : 2400~2500 MHz / 20 MHz
5150~5850 MHz / 50 MHz
5950~7150 MHz / 50 MHz
- Angle increment : 3D scanning 5 deg
2D scanning 5 deg
- Data collection : Efficiency / Peak gain / Radiation pattern
- Orientation definition : Cisco's reference coordinate as below shown

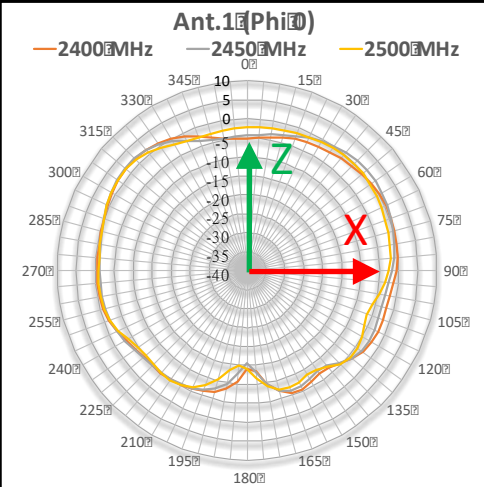


MIMO1 Performance – Radiation Pattern (A1)

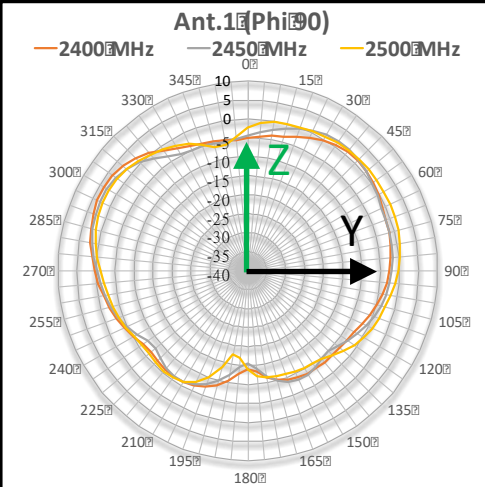


2.4 G

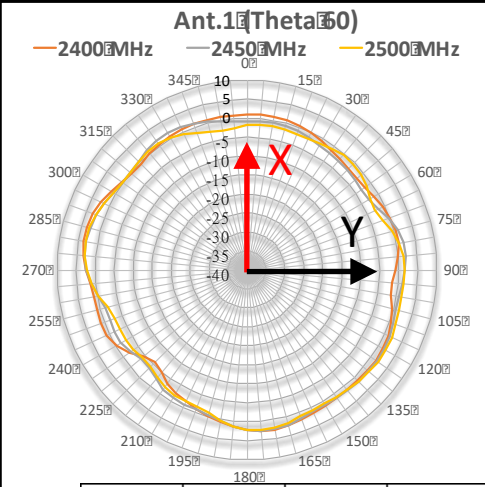
Phi 0



Phi 90



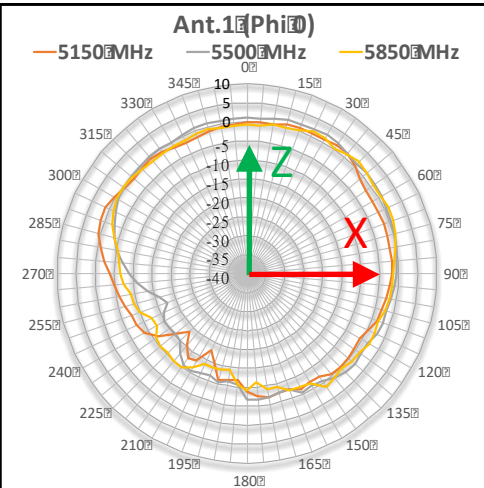
Theta 60



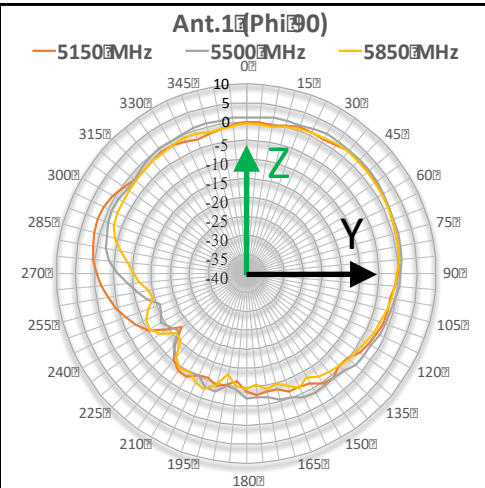
Ripple	Low	Mid	High
Ant.1	9.6	6.8	7.0

5 G

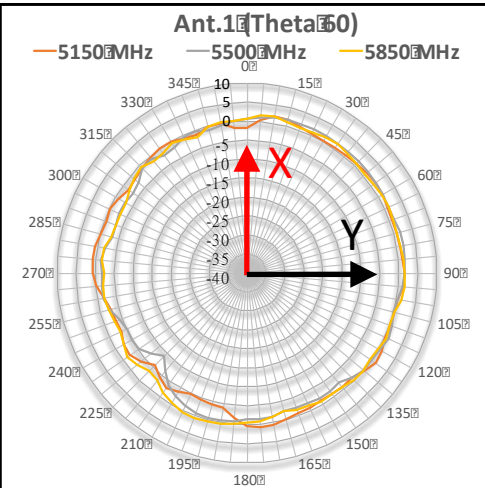
Phi 0



Phi 90

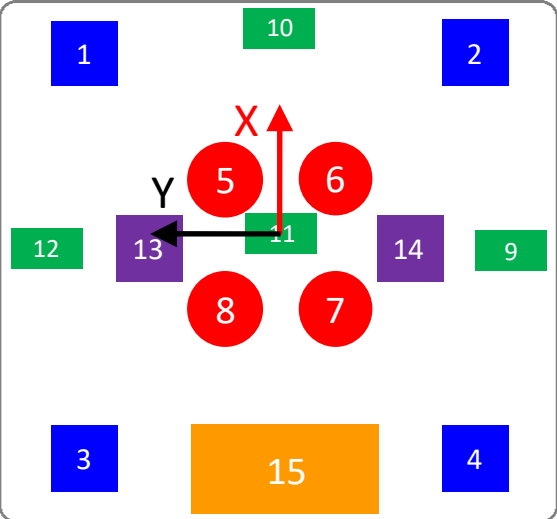


Theta 60



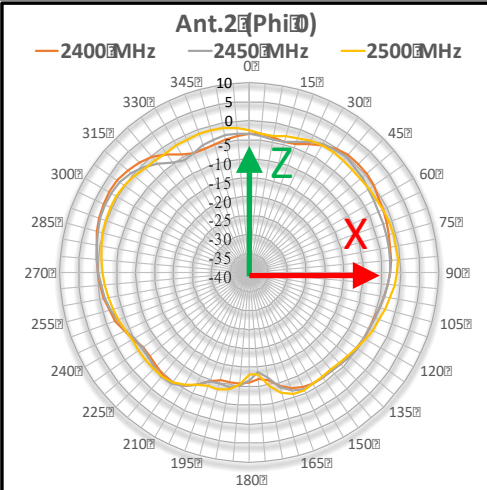
Ripple	Low	Mid	High
Ant.1	7.7	11.0	5.5

MIMO1 Performance – Radiation Pattern (A2)

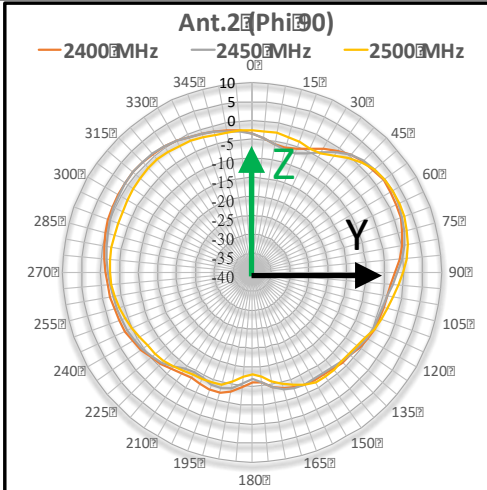


2.4 G

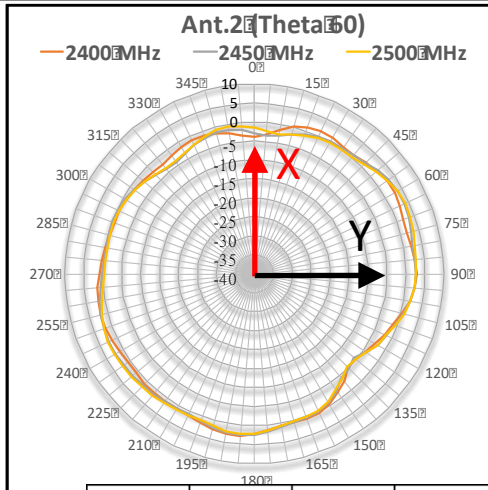
Phi 0



Phi 90



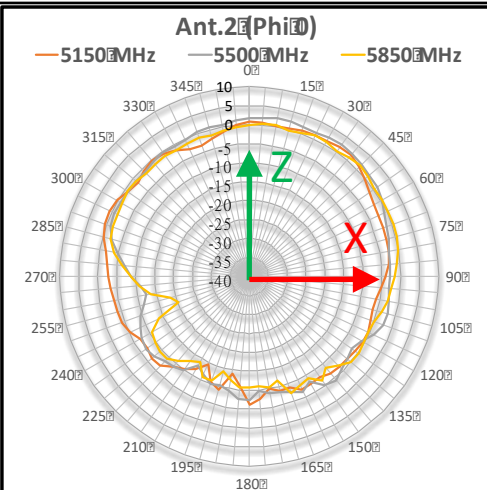
Theta 60



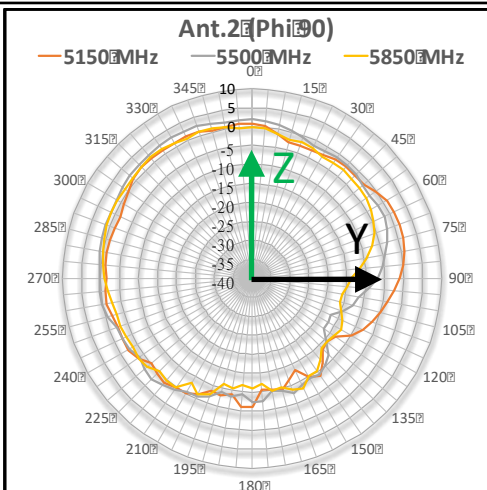
Ripple	Low	Mid	High
Ant.2	8.1	9.4	9.3

5 G

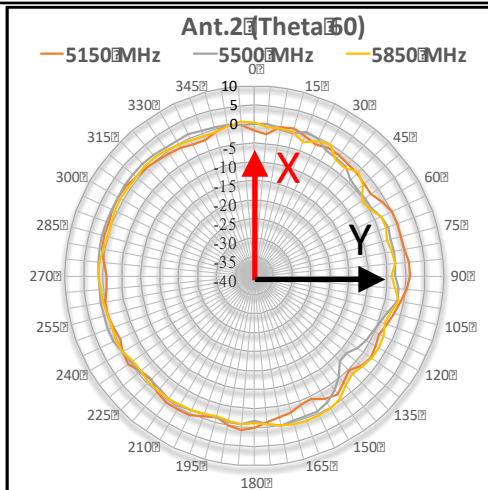
Phi 0



Phi 90

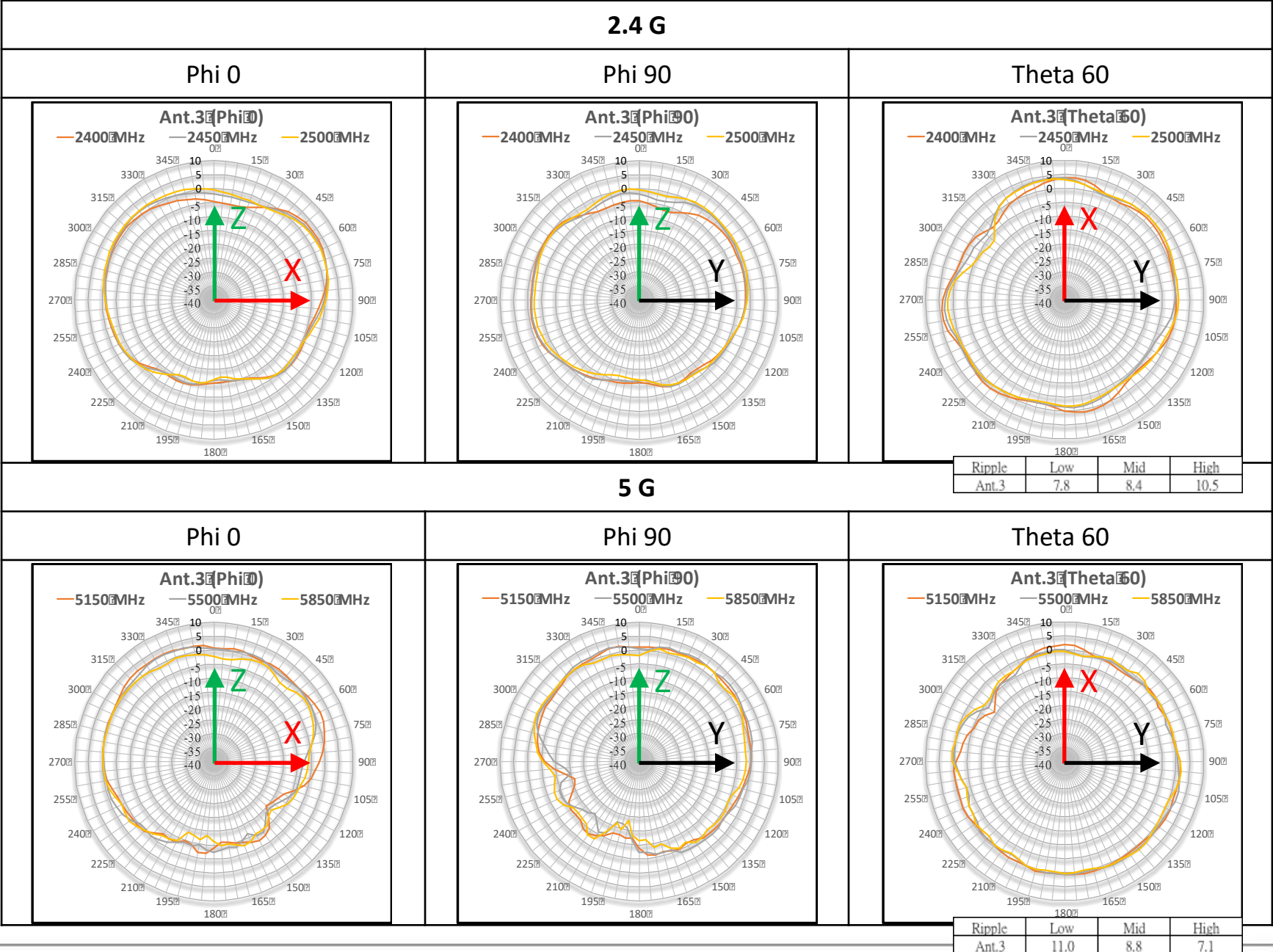
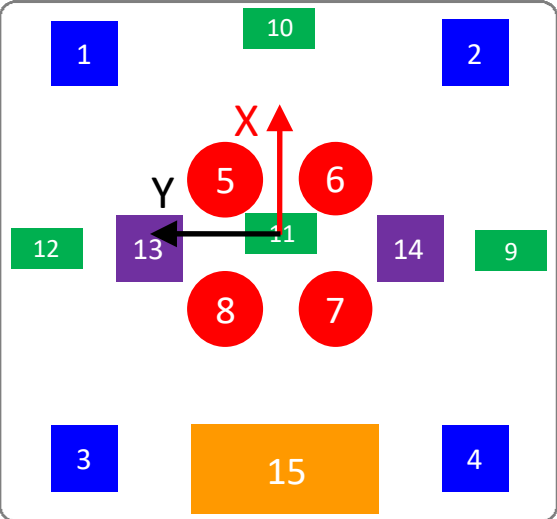


Theta 60

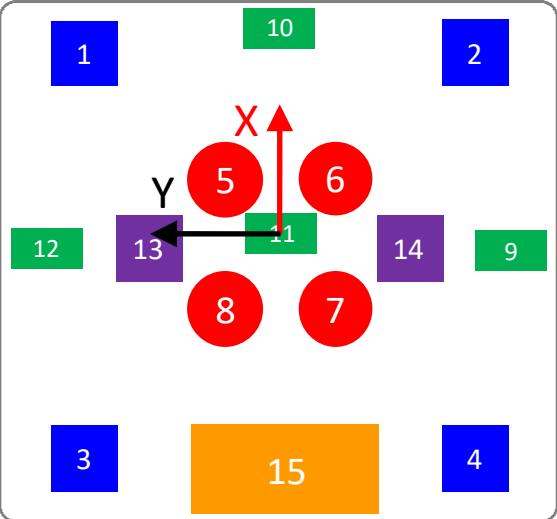


Ripple	Low	Mid	High
Ant.2	6.2	10.0	6.5

MIMO1 Performance – Radiation Pattern (A3)

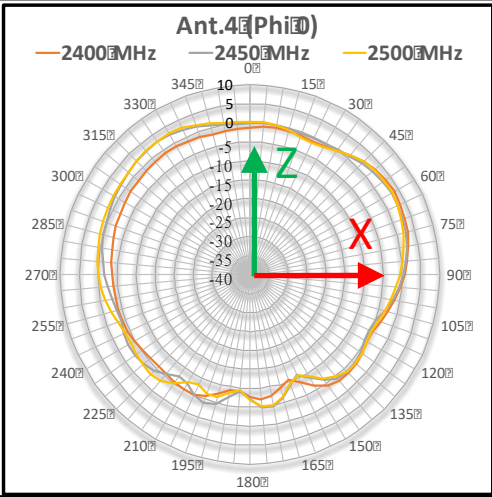


MIMO1 Performance – Radiation Pattern (A4)

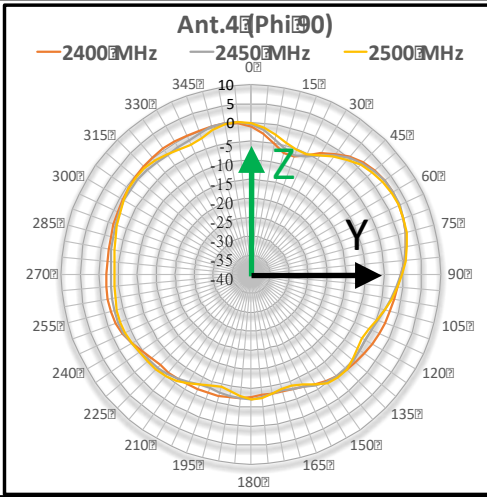


2.4 G

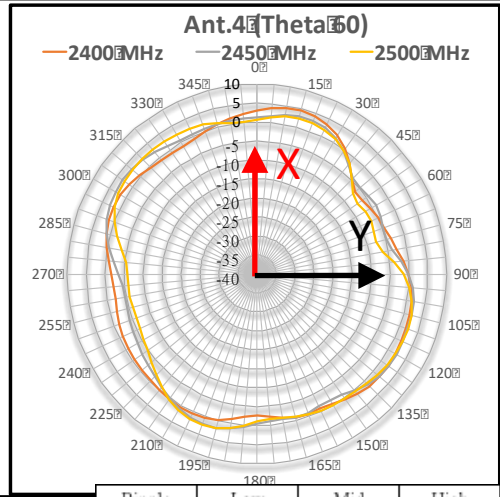
Phi 0



Phi 90



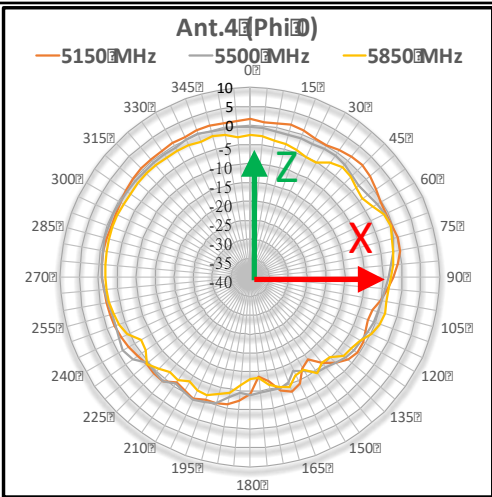
Theta 60



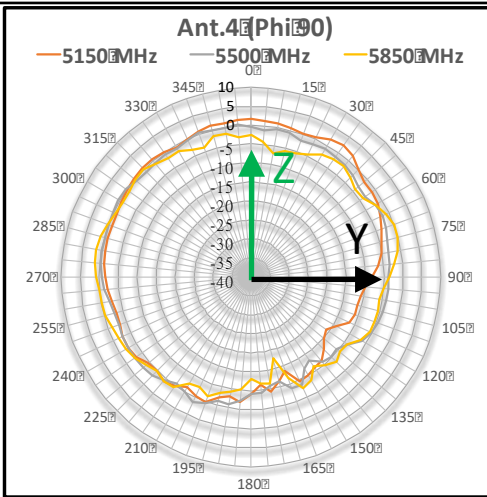
Ripple	Low	Mid	High
Ant.4	10.8	8.1	10.3

5 G

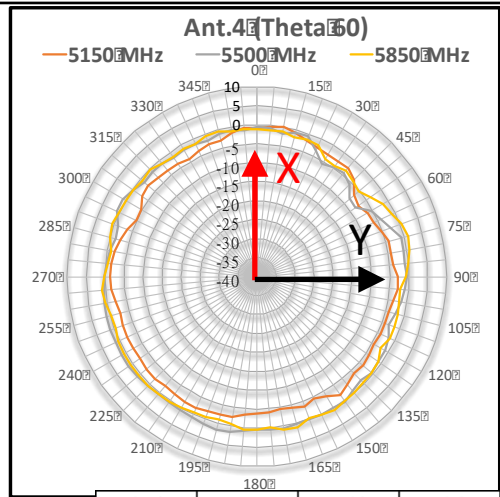
Phi 0



Phi 90

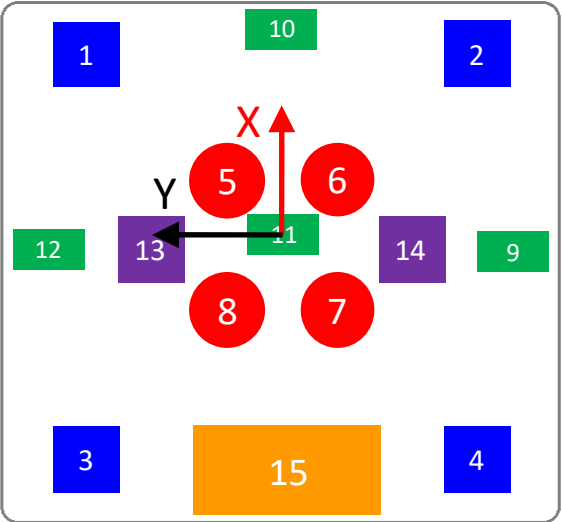


Theta 60



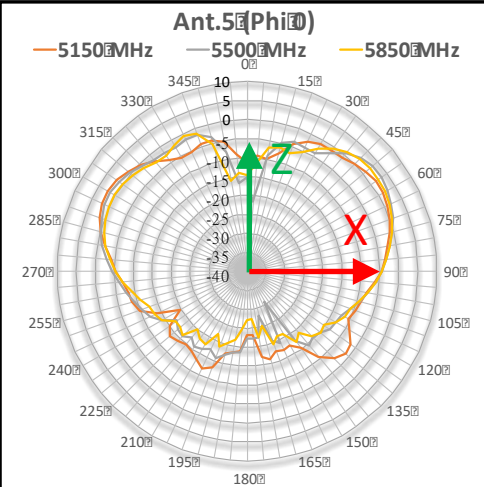
Ripple	Low	Mid	High
Ant.4	7.6	10.0	6.4

MIMO2 Performance – Radiation Pattern (A5/6)

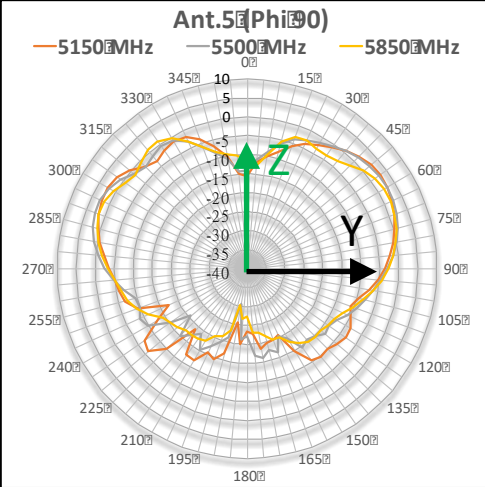


5 G – Ant.5

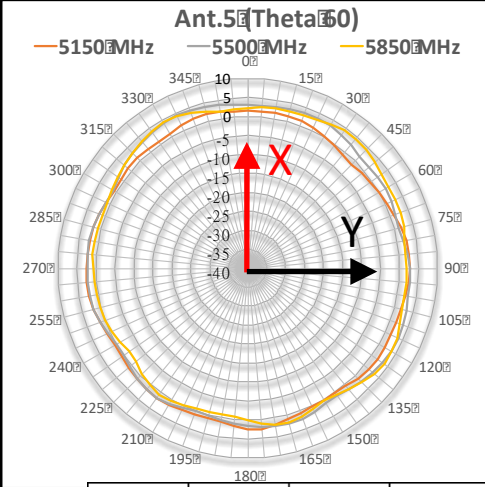
Phi 0



Phi 90



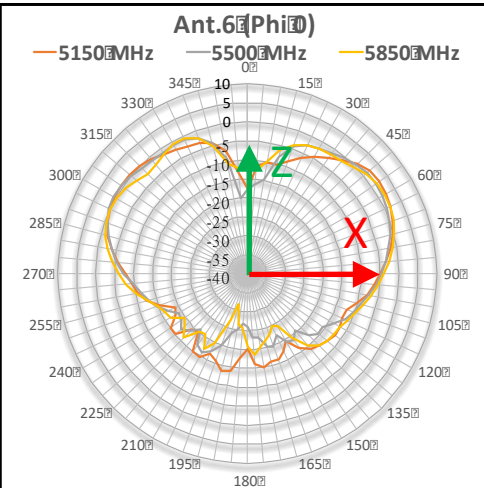
Theta 60



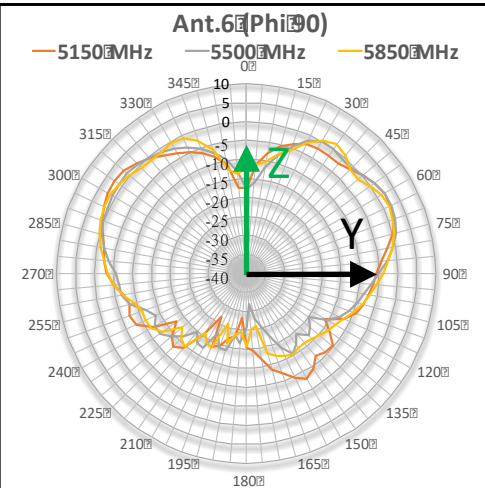
Ripple	Low	Mid	High
Ant.5	4.0	4.6	6.3

5 G – Ant.6

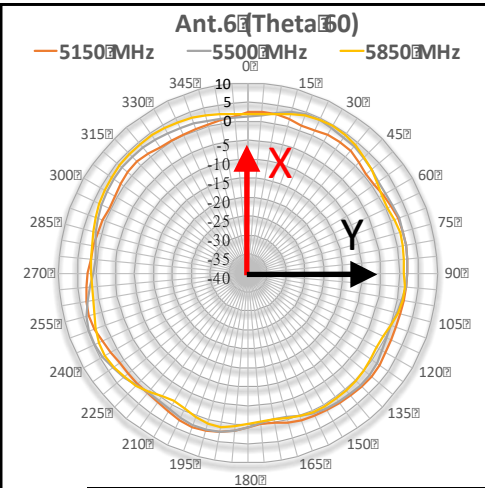
Phi 0



Phi 90

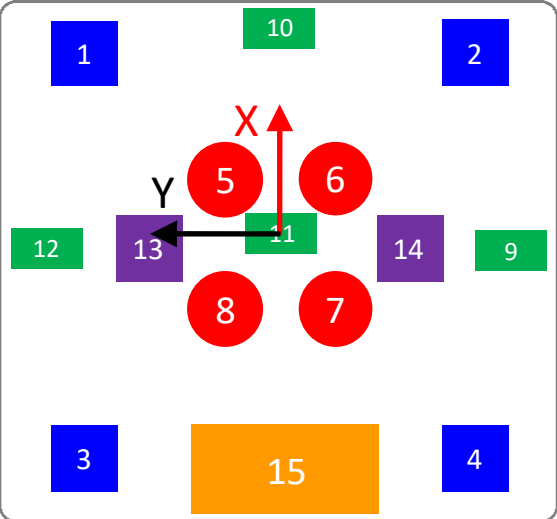


Theta 60

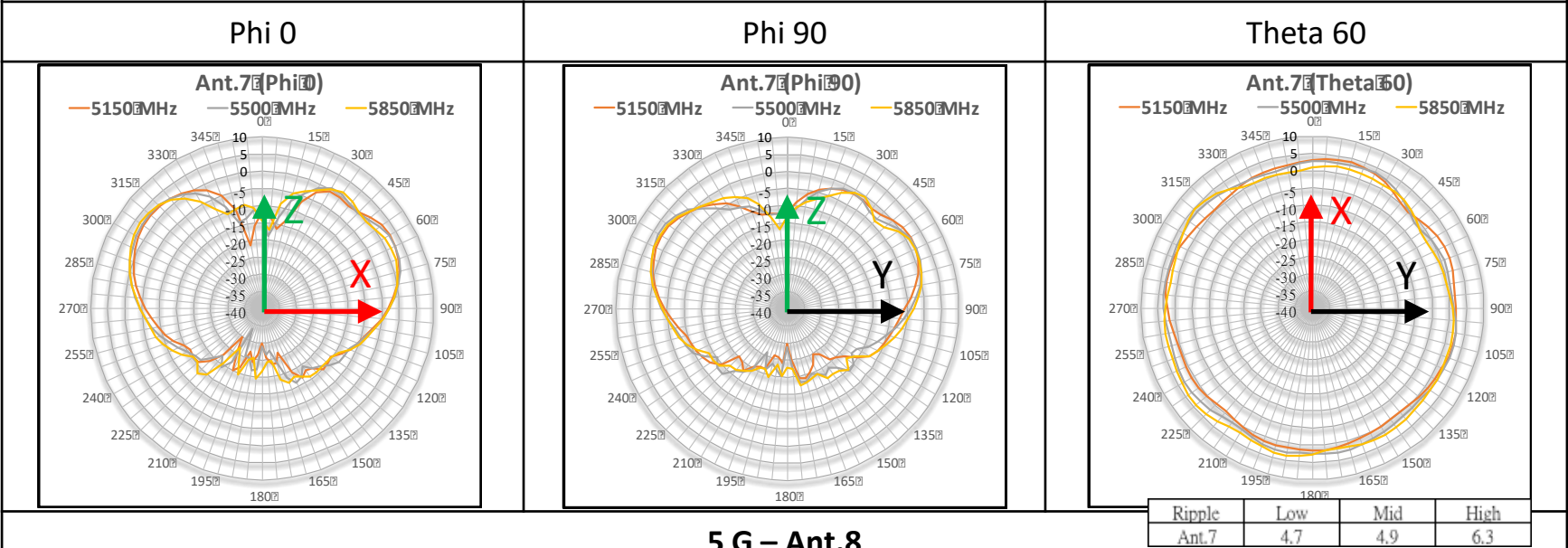


Ripple	Low	Mid	High
Ant.6	3.4	5.6	5.8

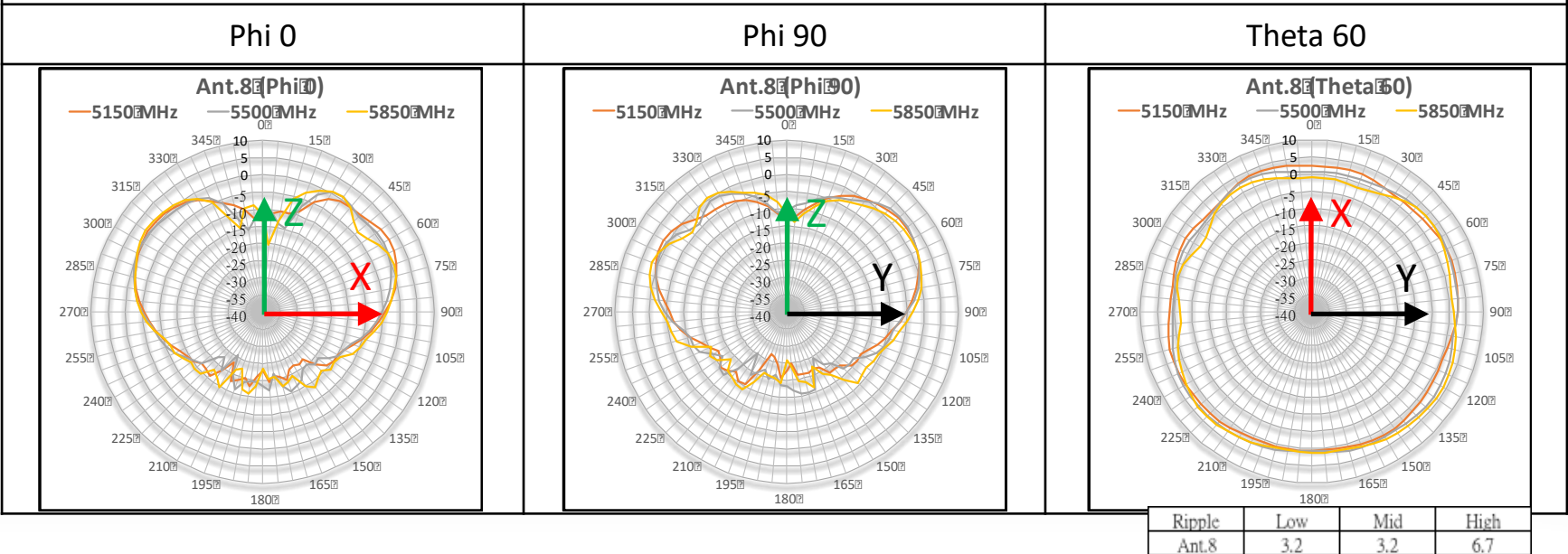
MIMO2 Performance – Radiation Pattern (A7/8)



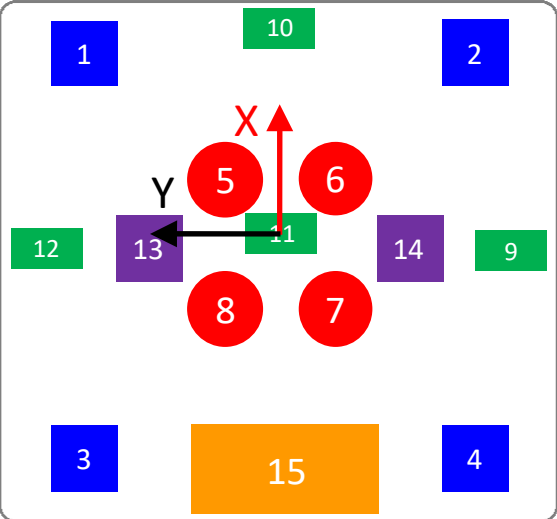
5 G – Ant.7



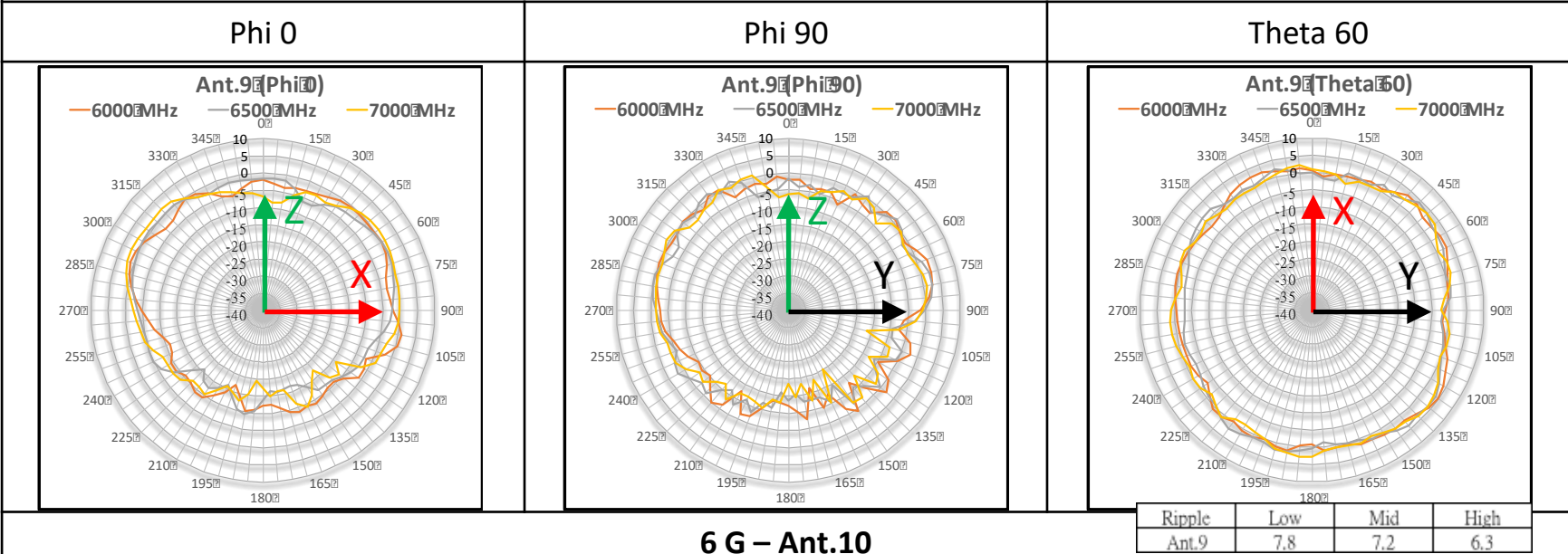
5 G – Ant.8



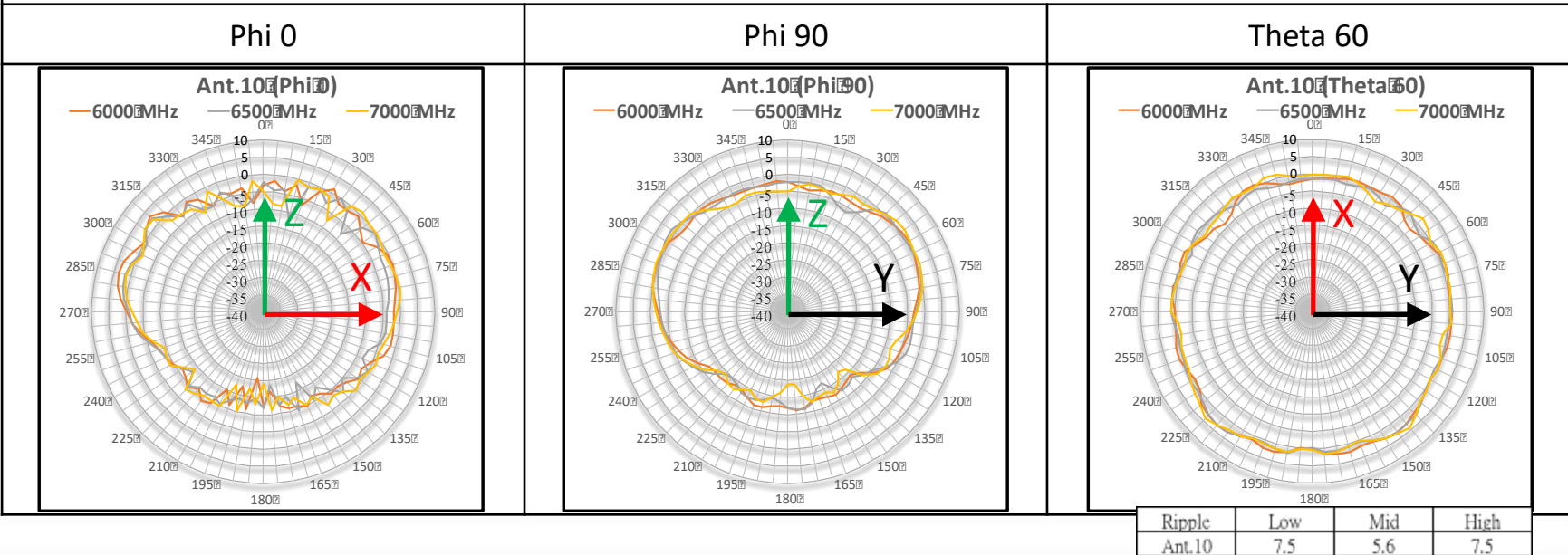
MIMO3 Performance – Radiation Pattern (A9/10)



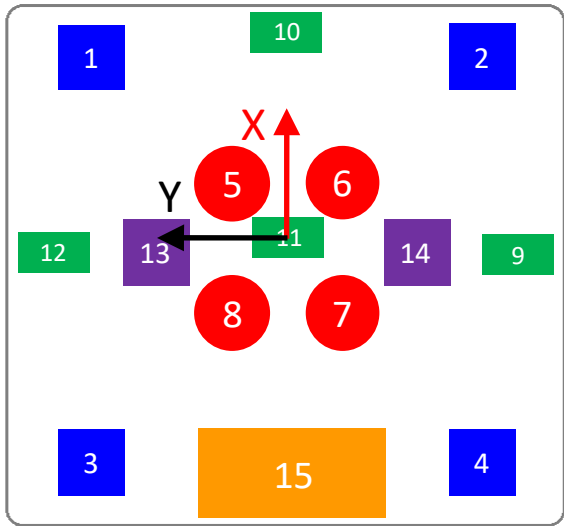
6 G – Ant.9



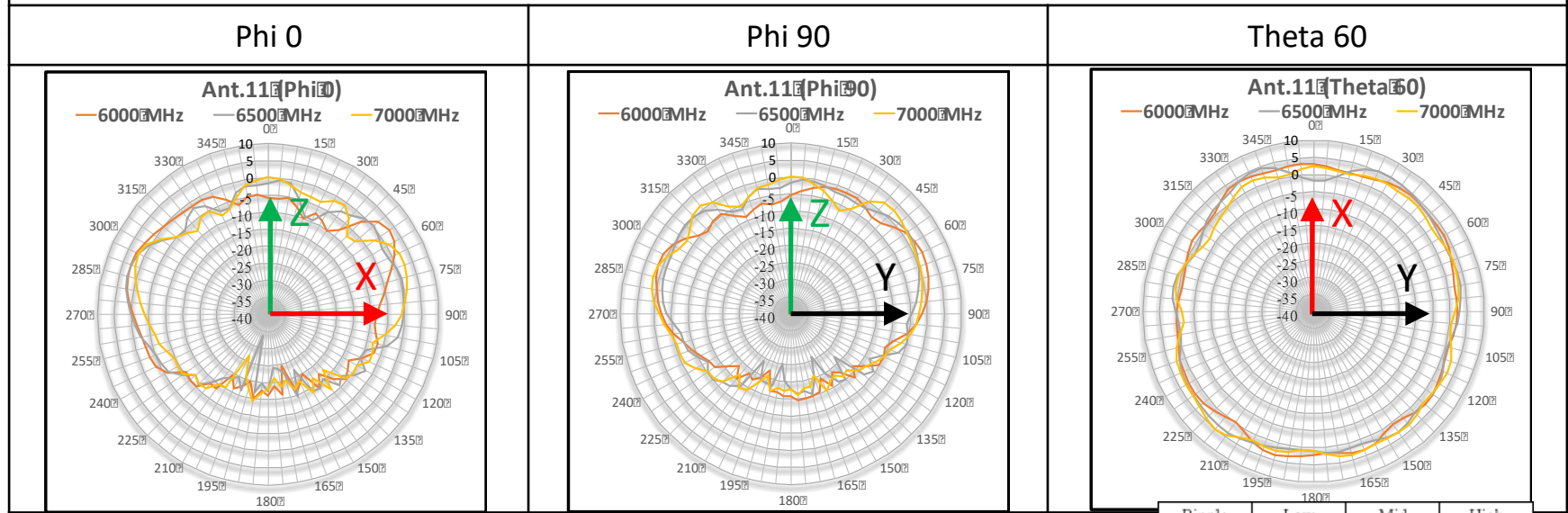
6 G – Ant.10



MIMO3 Performance – Radiation Pattern (A11/12)

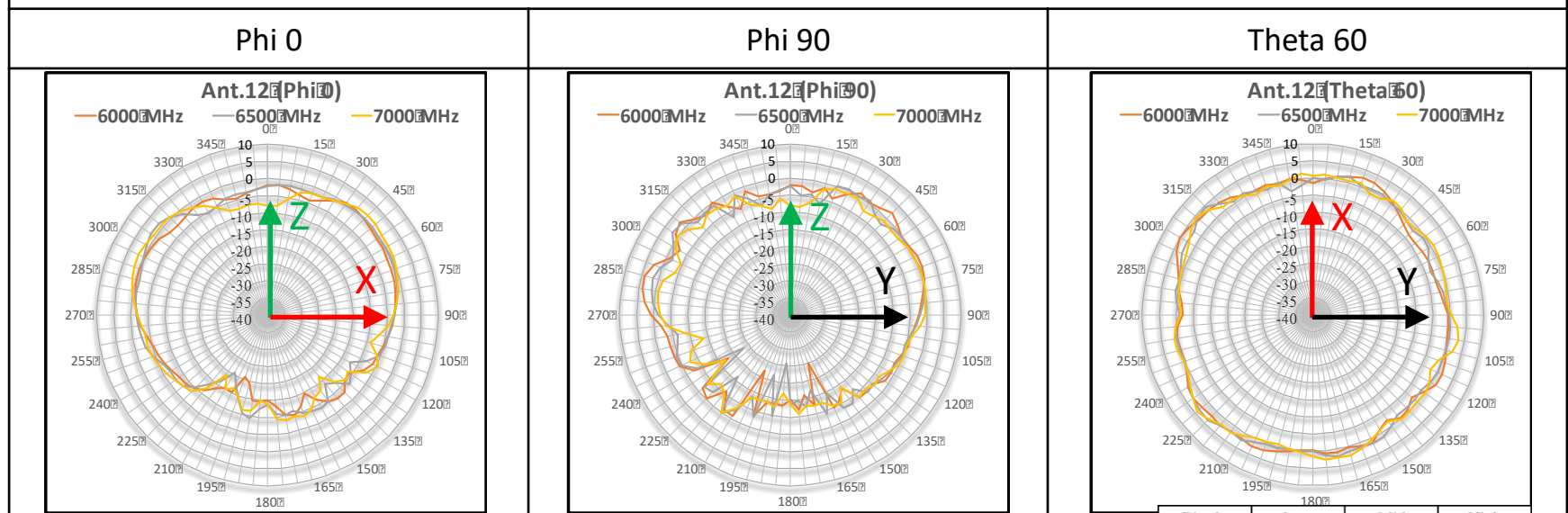


6 G – Ant.11



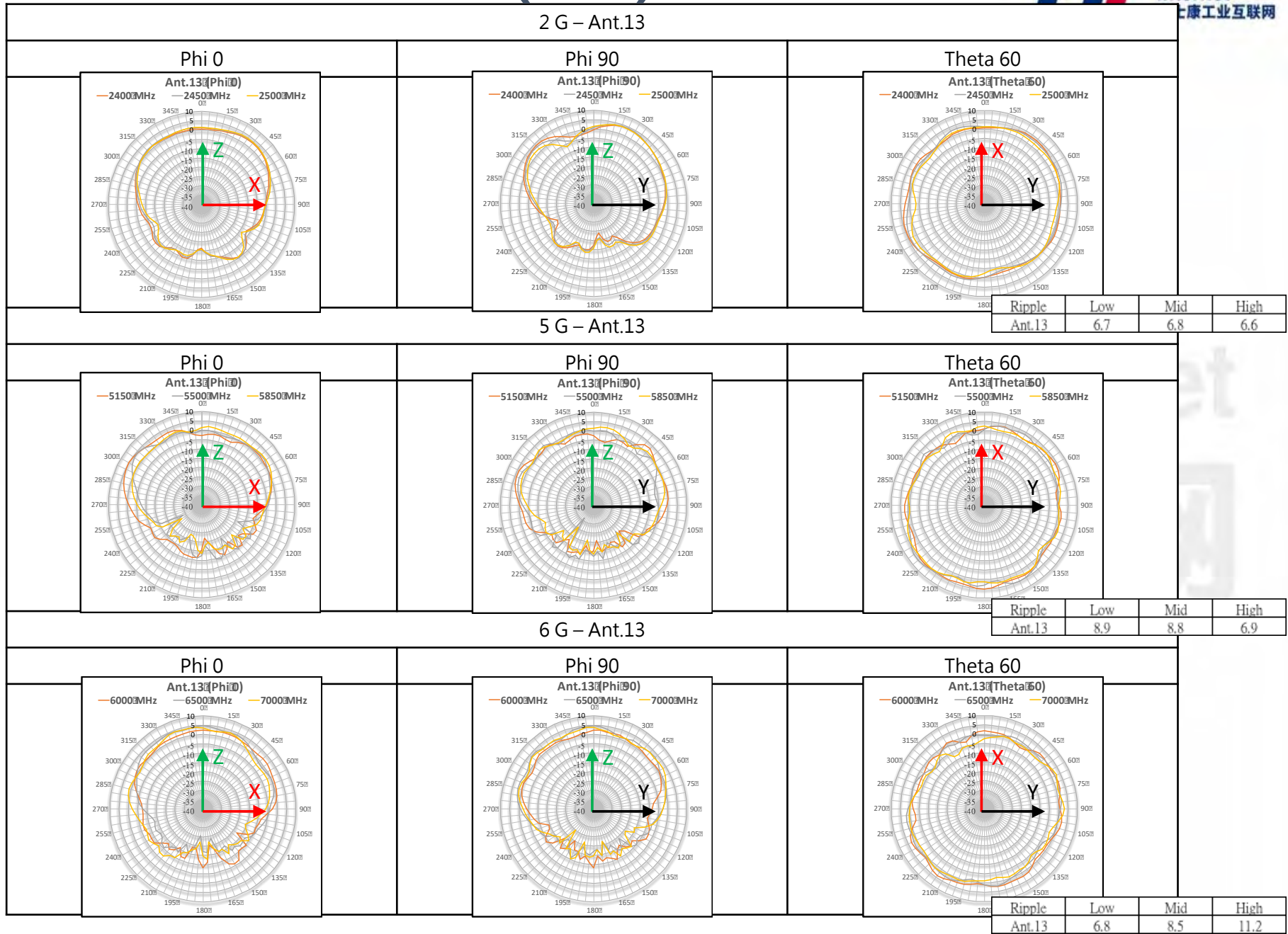
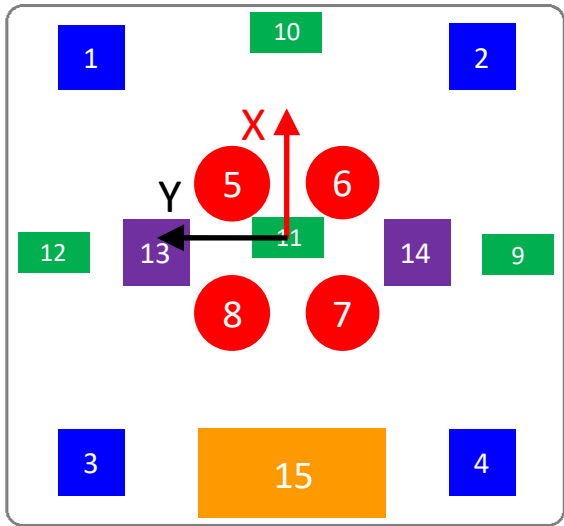
Ripple	Low	Mid	High
Ant.11	5.1	7.2	7.8

6 G – Ant.12

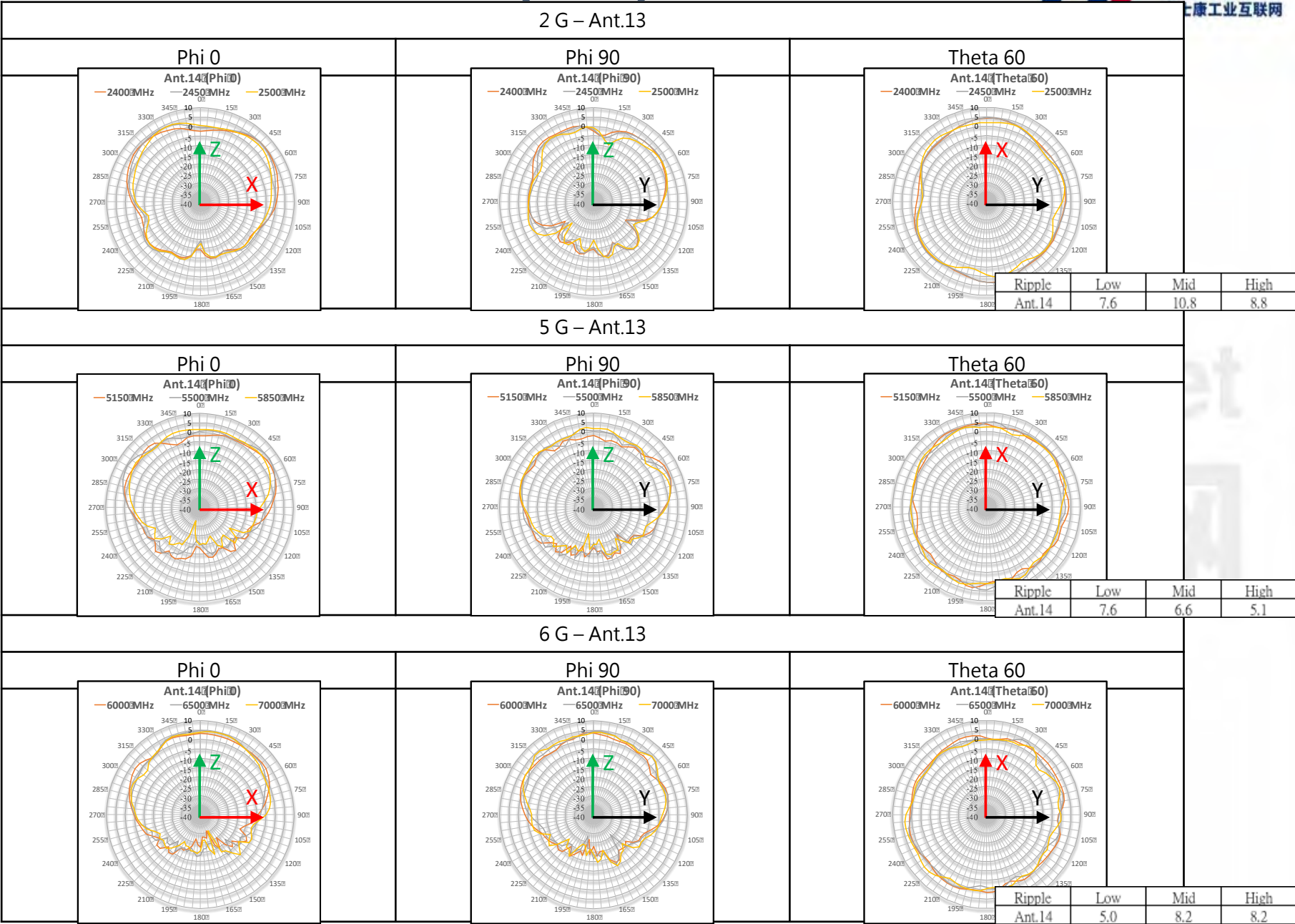
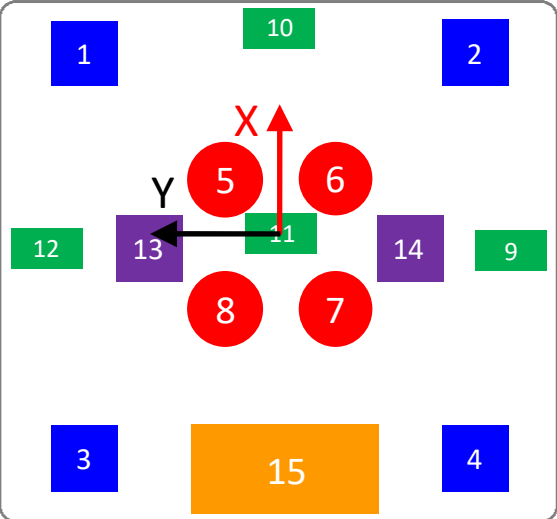


Ripple	Low	Mid	High
Ant.12	8.5	7.9	6.7

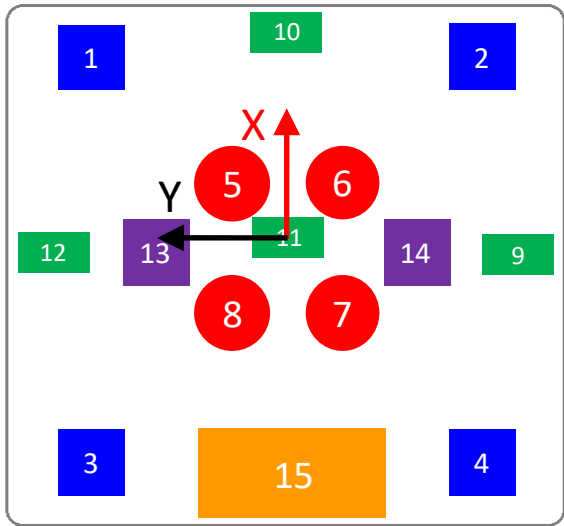
Aux Performance – Radiation Pattern (A13)



Aux Performance – Radiation Pattern (A14)



IoT Performance – Radiation Pattern (A15)



2.4 G

