



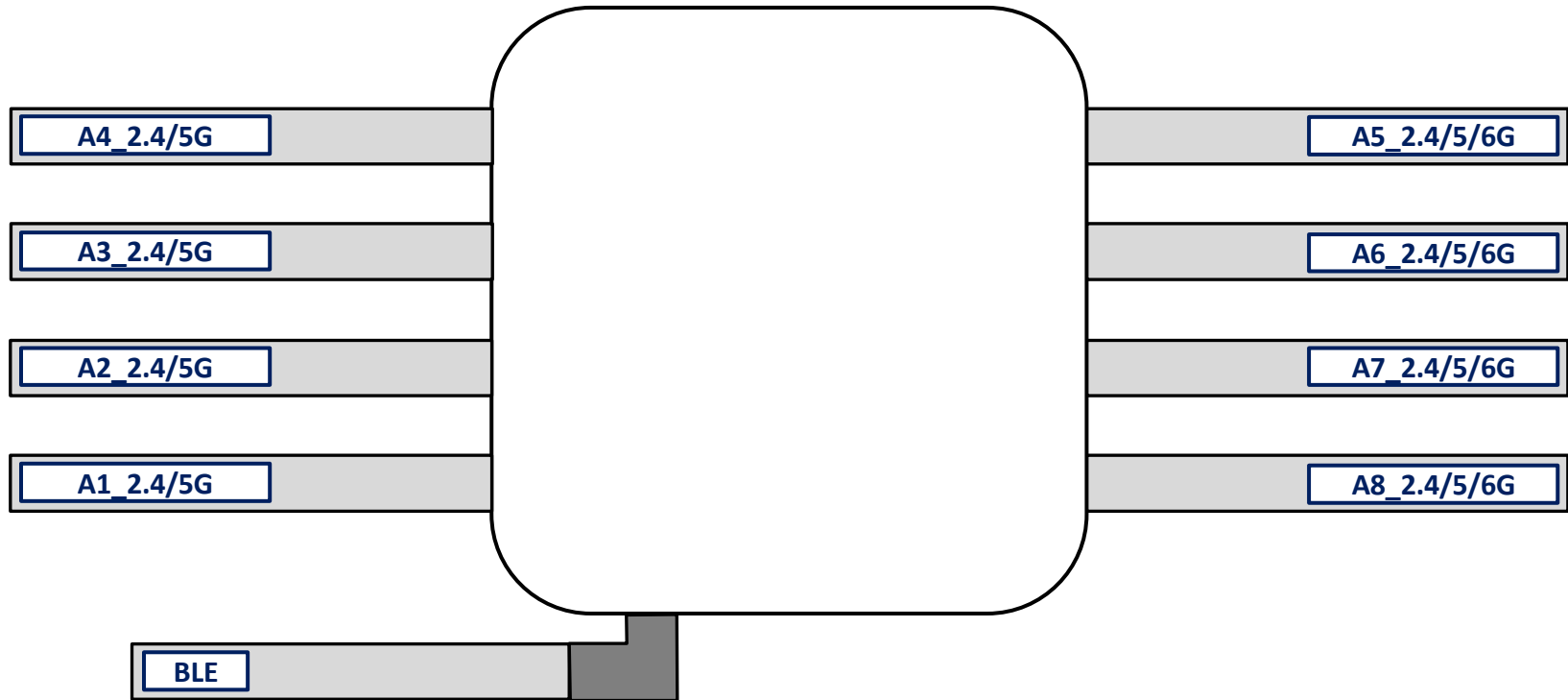
# FAP-432G

## Antenna Test Report

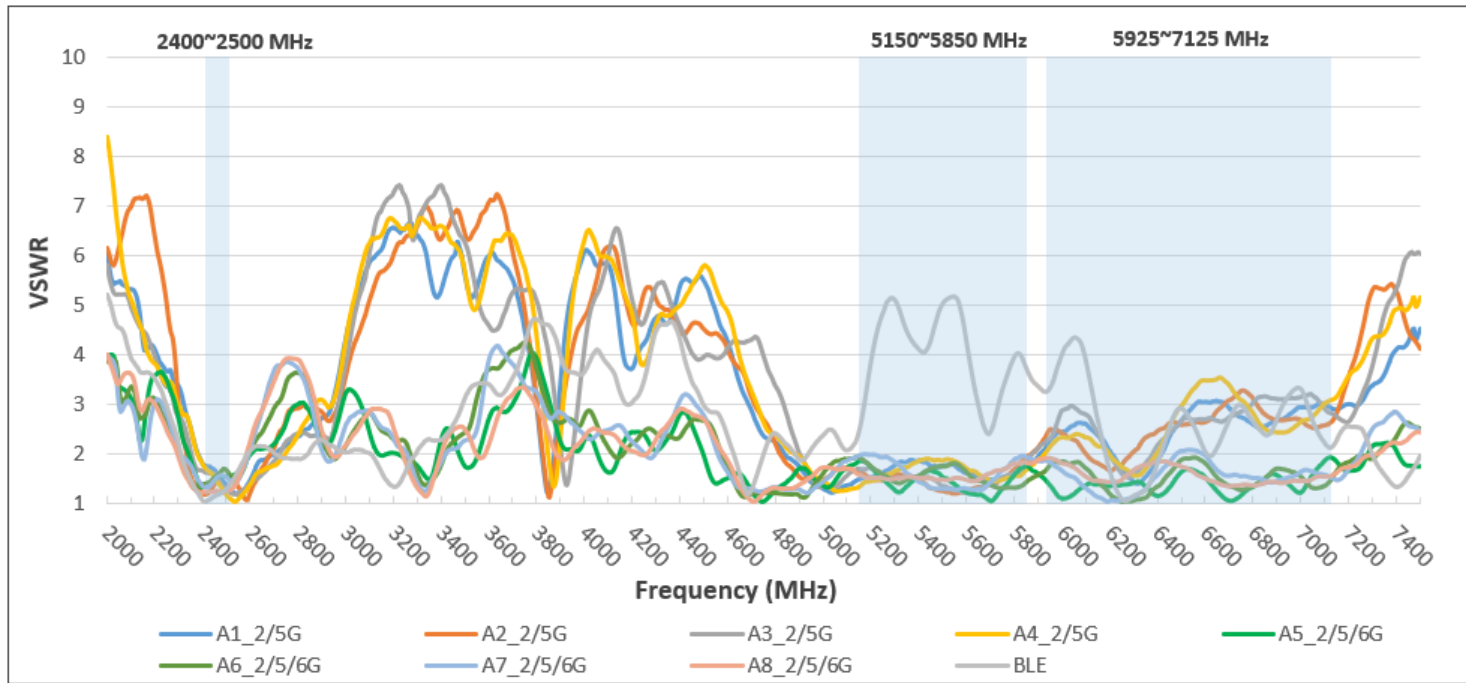
Senao Networks, Inc.

Customer	Fortinet
Project	FAP-432G
Project Description	Dual antenna*4 Tri antenna*4 BLE antenna*1
Date	2023/11/15
Prepared by	Tony
Report Version	A02

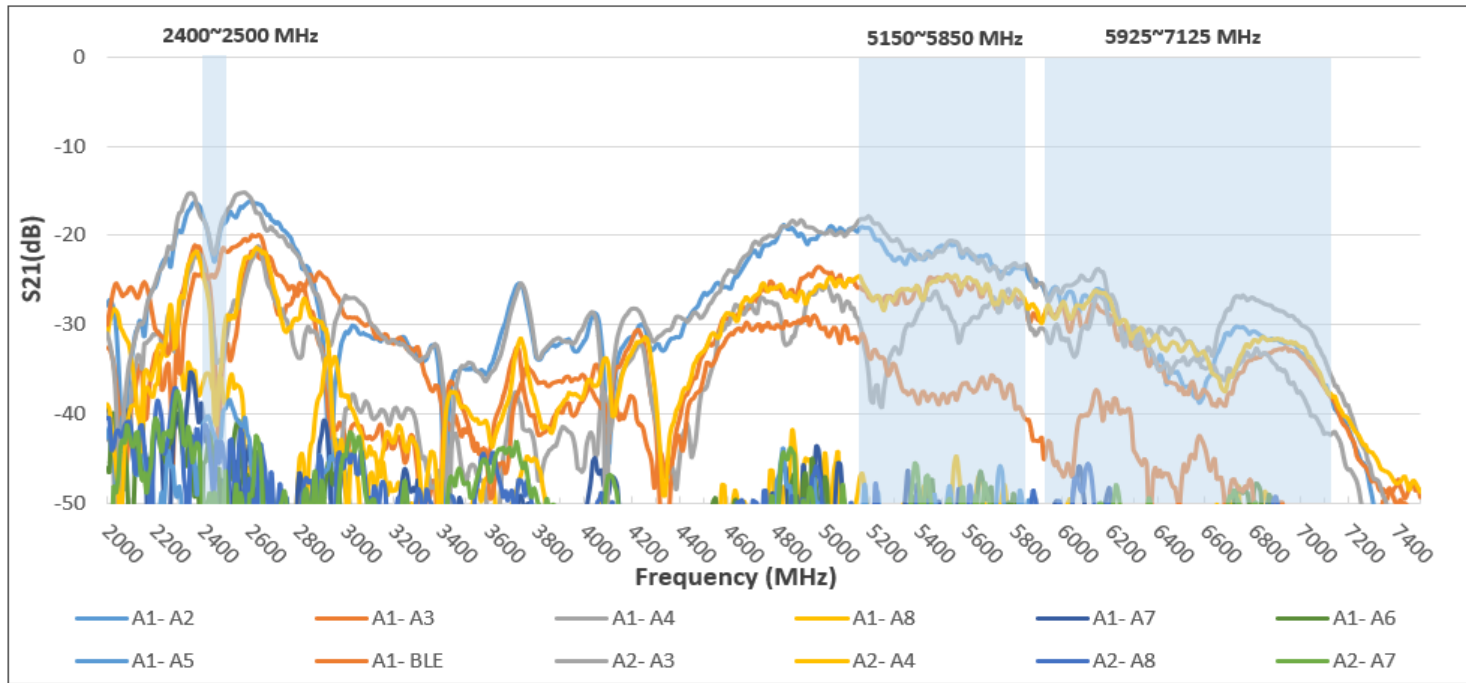
- **Agenda**
  - Placement and Specification
  - S11 & Isolation
  - Radiation Pattern
  - Combine Pattern
  - Efficiency and Gain



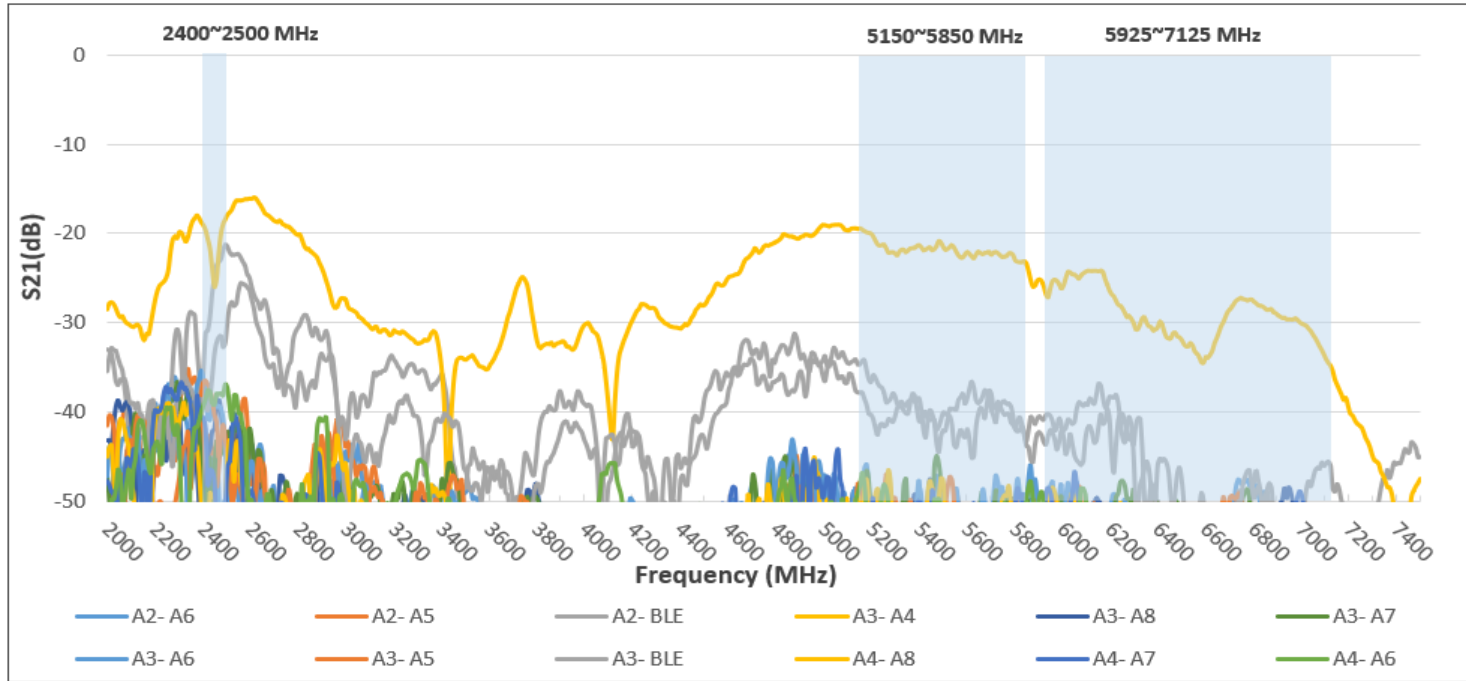
Ant No.	Brand	Description	Antenna P/N	Operating Band	Gain (dBi)	Efficiency (%)	Ant Type	Feeding
A 1~4	Senao	5718A0729300	7102A0827000	2400MHz ~ 2500 MHz 5150MHz ~ 5850 MHz	5.03@2G 6.40@5G	69.51@2G 72.77@5G	Dipole	Cable
A 5~8	Senao	5718A0727300	7102A0826000	2400MHz ~ 2500 MHz 5150MHz ~ 5850 MHz 5925MHz ~ 7125 MHz	4.86@2G 5.75@5G 5.95@6G	69.95@2G 69.43@5G 64.29@6G	Dipole	Cable
BLE	Senao	5718A0748300	7102A1221000	2400MHz ~ 2500 MHz	4.71	69.34	Dipole	Cable



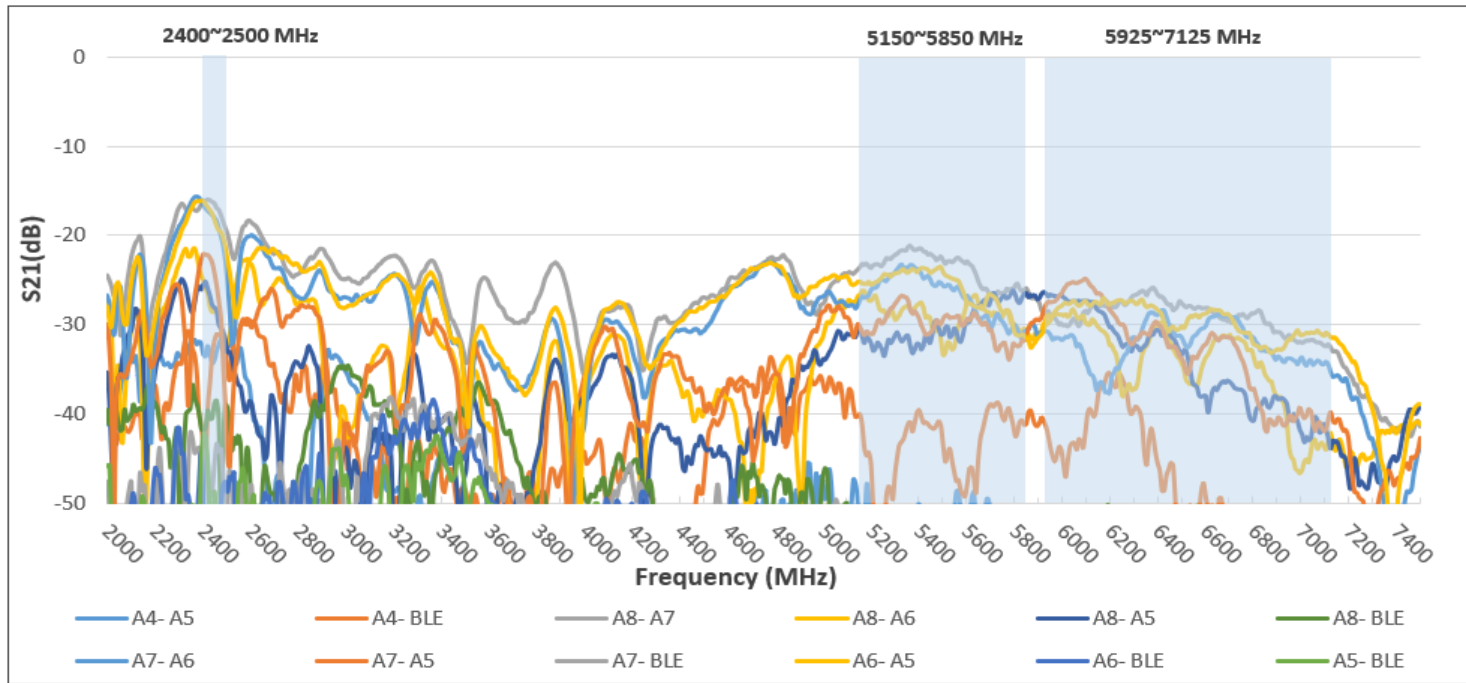
VSWR									
Freq. (MHz)	A1_2/5G	A2_2/5G	A3_2/5G	A4_2/5G	A5_2/5/6G	A6_2/5/6G	A7_2/5/6G	A8_2/5/6G	BLE
2400	1.76	1.16	1.63	1.76	1.32	1.37	1.31	1.22	1.03
2450	1.66	1.36	1.59	1.53	1.46	1.51	1.44	1.24	1.13
2500	1.38	1.52	1.27	1.20	1.54	1.68	1.52	1.23	1.26
5150	1.47	1.61	1.67	1.35	1.85	1.91	1.96	1.57	2.52
5500	1.76	1.18	1.26	1.86	1.38	1.80	1.26	1.50	5.17
5850	1.73	1.91	1.79	1.68	1.75	1.42	1.91	1.81	3.72
5925	2.11	2.34	2.25	2.03	1.45	1.66	1.84	1.91	3.24
6500	2.66	2.56	2.66	2.97	1.63	1.87	2.04	1.73	2.91
7125	2.92	2.61	2.81	3.08	1.92	1.45	1.51	1.54	2.11



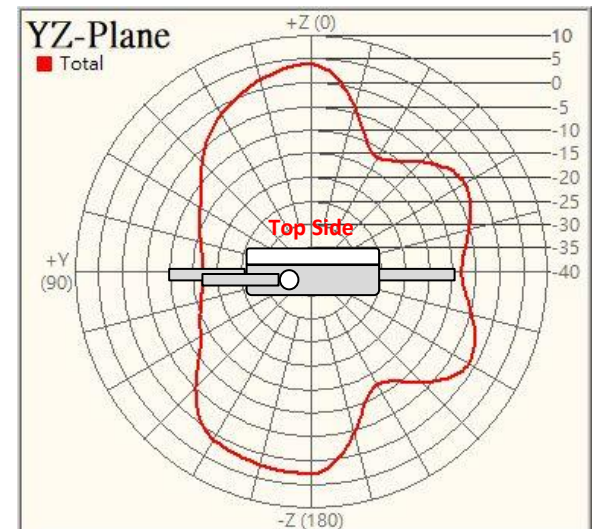
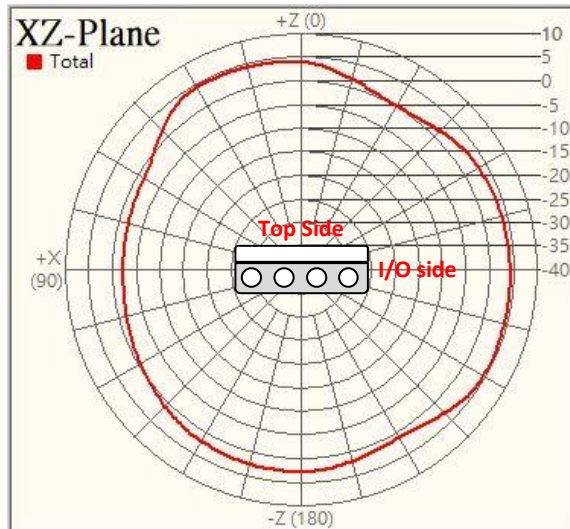
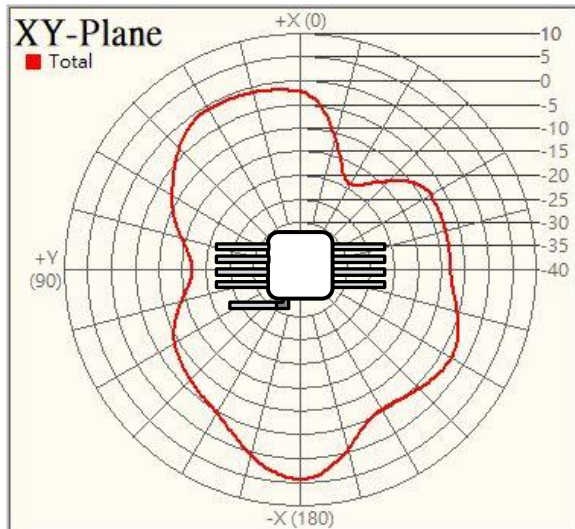
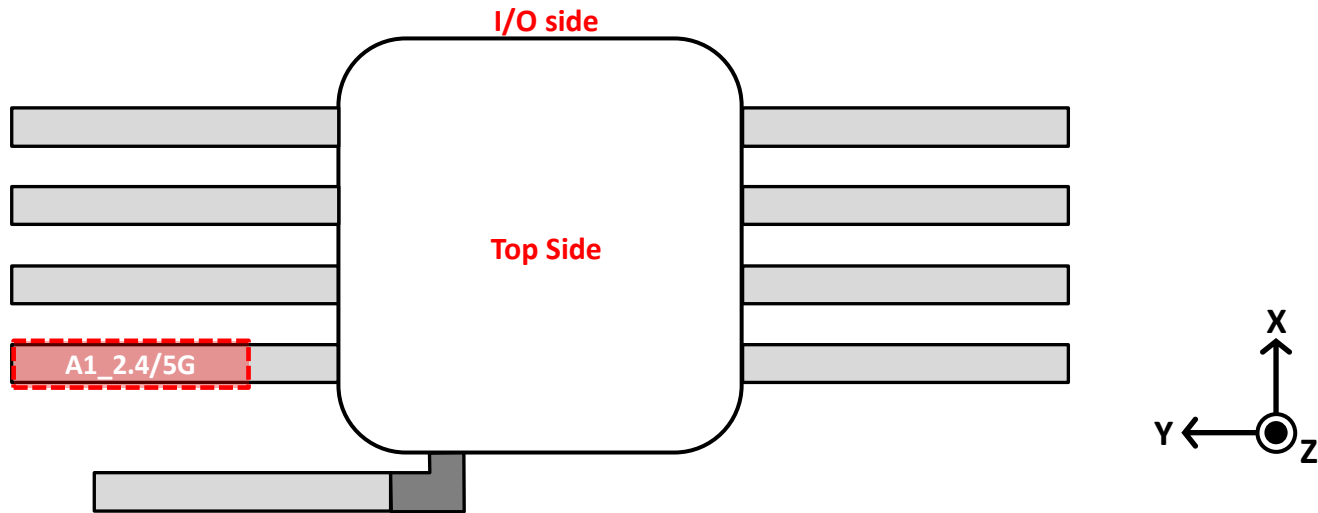
Isolation												
Freq. (MHz)	A1- A2	A1- A3	A1- A4	A1- A8	A1- A7	A1- A6	A1- A5	A1- BLE	A2- A3	A2- A4	A2- A8	A2- A7
2400	-18.03	-22.70	-23.22	-36.47	-41.69	-45.62	-41.00	-24.60	-18.29	-24.64	-41.39	-52.57
2450	-22.89	-32.38	-31.99	-37.78	-55.55	-45.22	-42.45	-24.75	-22.10	-40.45	-48.69	-48.83
2500	-18.52	-32.38	-32.16	-38.95	-50.07	-47.83	-39.45	-21.77	-17.67	-29.63	-46.78	-46.42
5150	-19.08	-25.76	-30.10	-47.19	-55.56	-67.38	-61.74	-31.59	-18.21	-24.59	-63.45	-54.34
5550	-21.01	-25.38	-29.75	-45.86	-55.06	-52.38	-53.42	-37.71	-20.66	-24.53	-61.27	-56.10
5850	-23.87	-28.12	-27.96	-57.07	-59.09	-55.25	-52.27	-40.67	-23.25	-27.78	-54.59	-55.78
5925	-25.94	-29.01	-30.55	-55.17	-70.08	-57.21	-51.07	-45.03	-25.65	-29.25	-65.16	-57.51
6500	-36.39	-37.03	-34.02	-56.07	-61.60	-59.64	-59.85	-47.41	-31.14	-32.97	-58.59	-55.10
7125	-37.86	-38.02	-42.37	-60.15	-67.09	-62.37	-67.58	-53.97	-35.62	-37.74	-60.25	-60.20



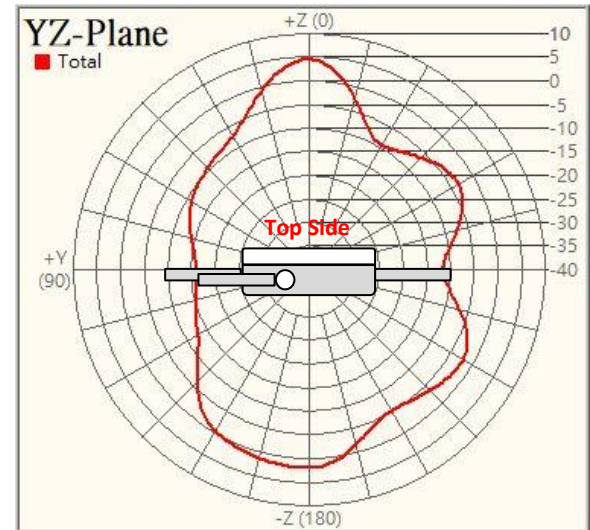
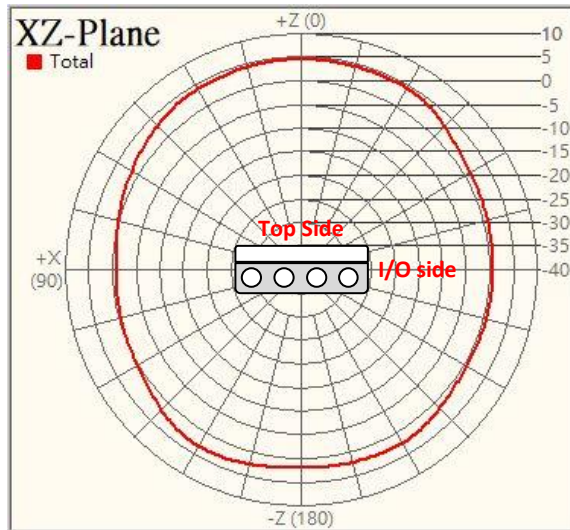
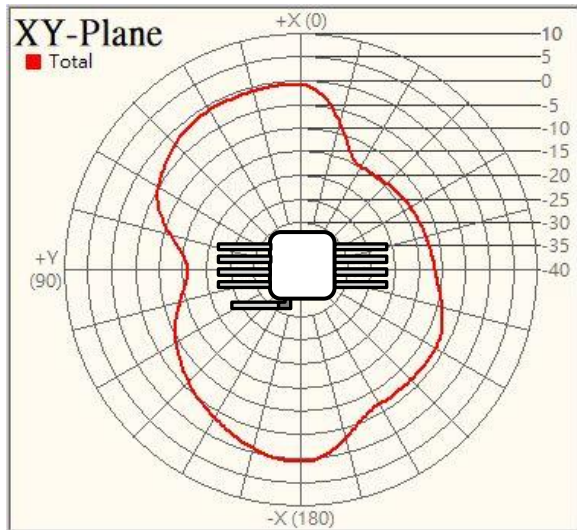
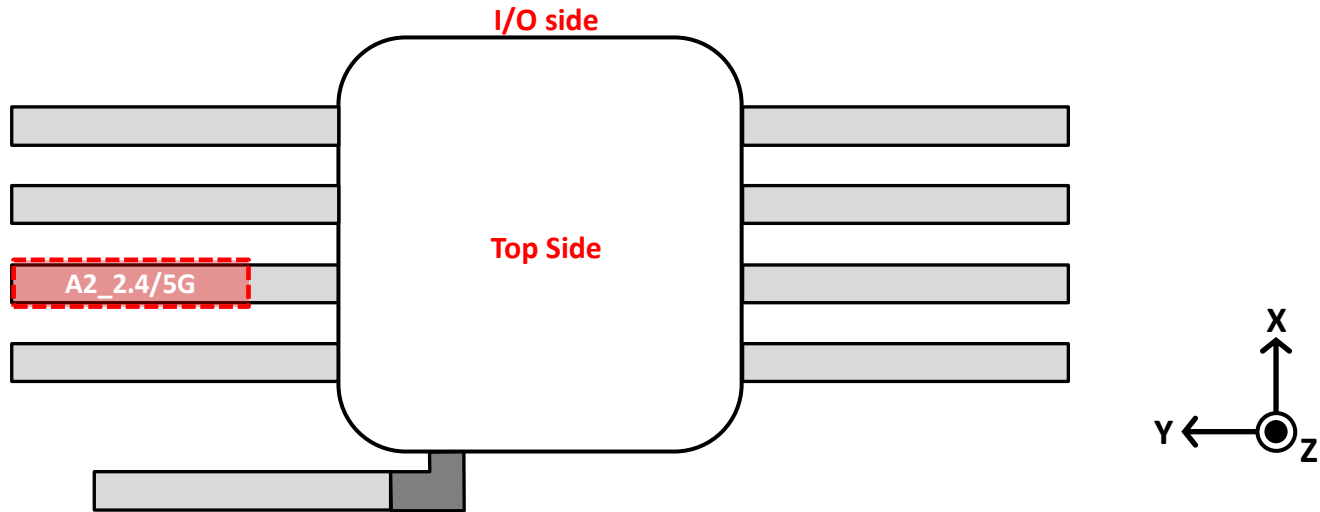
Isolation												
Freq. (MHz)	A2- A6	A2- A5	A2- BLE	A3- A4	A3- A8	A3- A7	A3- A6	A3- A5	A3- BLE	A4- A8	A4- A7	A4- A6
2400	-56.89	-49.13	-35.33	-19.16	-57.15	-51.08	-36.29	-36.70	-39.17	-52.61	-40.64	-39.21
2450	-50.77	-44.13	-25.00	-26.05	-41.89	-47.18	-38.84	-40.34	-33.52	-49.75	-47.81	-39.13
2500	-49.85	-43.77	-21.33	-18.47	-43.83	-43.76	-43.87	-43.02	-32.18	-50.50	-50.14	-36.85
5150	-60.12	-57.21	-34.69	-19.48	-55.92	-57.78	-60.09	-48.36	-37.83	-51.75	-52.57	-48.16
5550	-65.33	-50.14	-39.69	-21.67	-54.03	-64.76	-50.35	-50.24	-43.70	-55.15	-68.53	-52.46
5850	-50.57	-64.36	-43.33	-23.41	-56.70	-50.45	-57.00	-57.30	-43.73	-53.96	-52.29	-50.00
5925	-51.61	-52.42	-40.90	-25.98	-66.84	-52.52	-55.23	-61.78	-43.37	-54.65	-51.94	-50.57
6500	-55.22	-59.02	-53.77	-31.99	-61.46	-53.59	-51.36	-59.29	-47.66	-57.28	-54.66	-64.49
7125	-63.43	-54.14	-46.04	-34.87	-61.80	-64.47	-64.05	-66.84	-55.67	-63.76	-58.82	-63.28

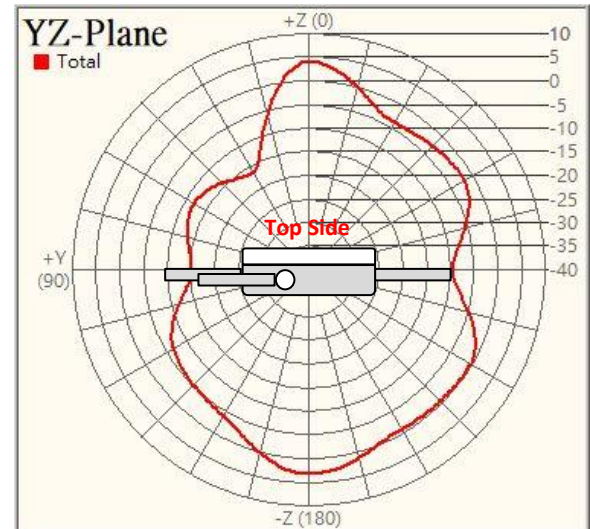
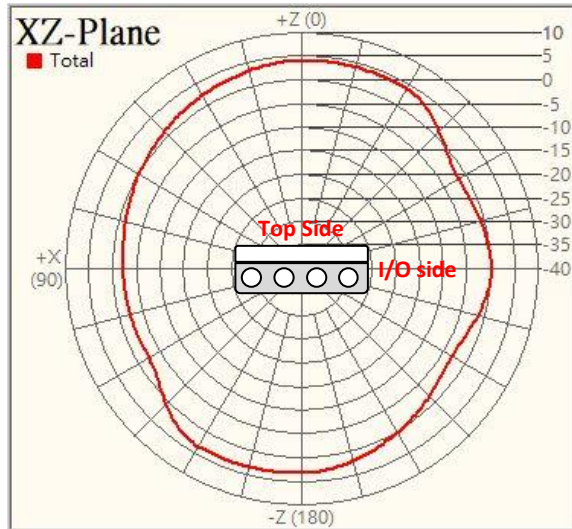
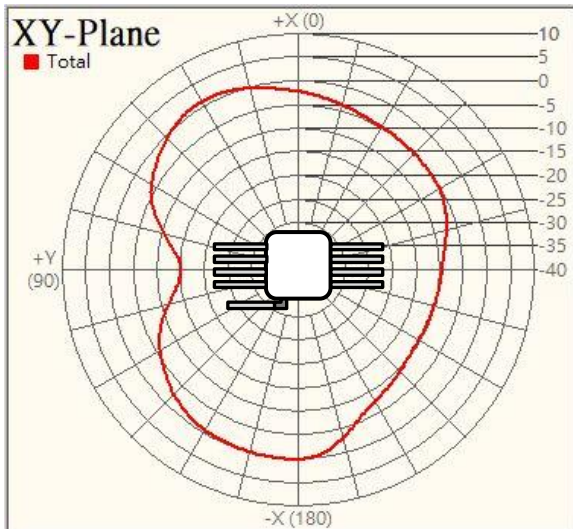
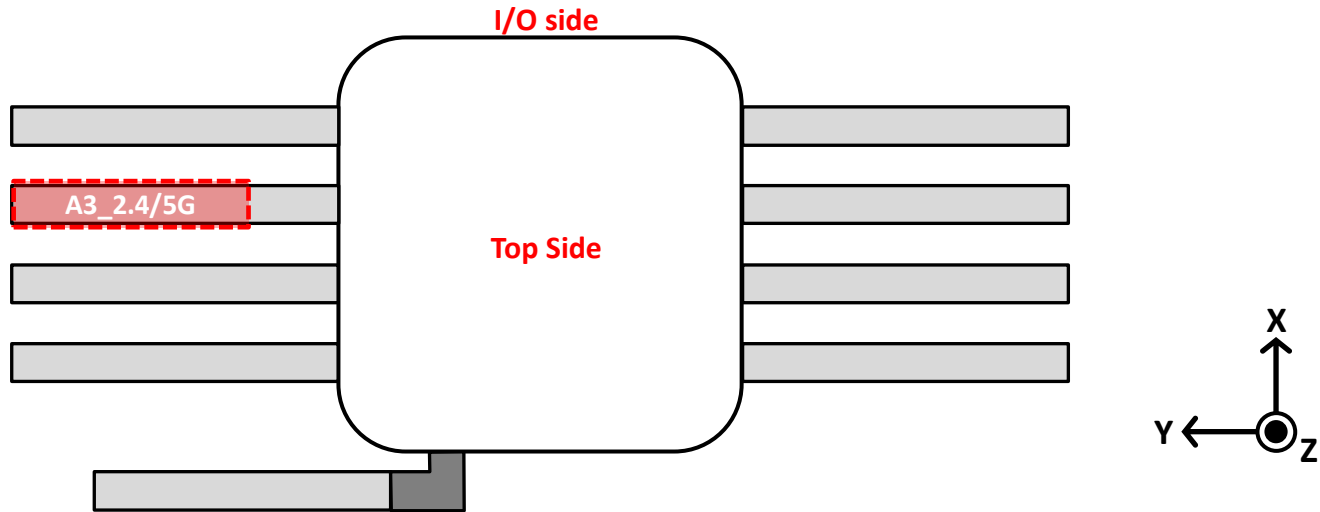


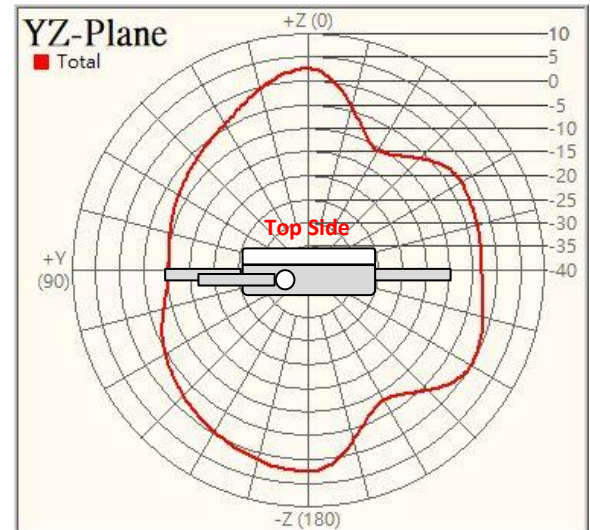
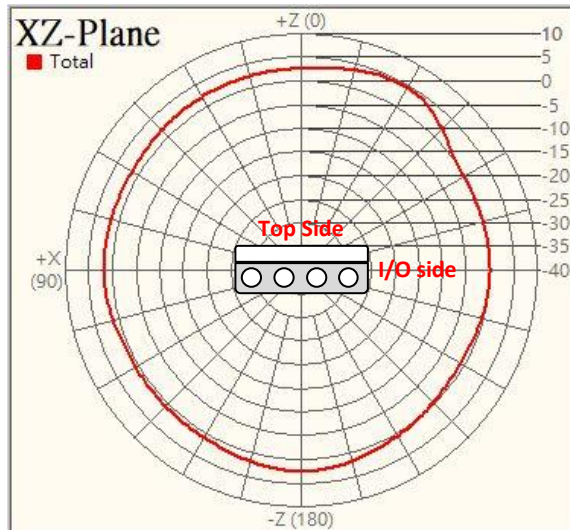
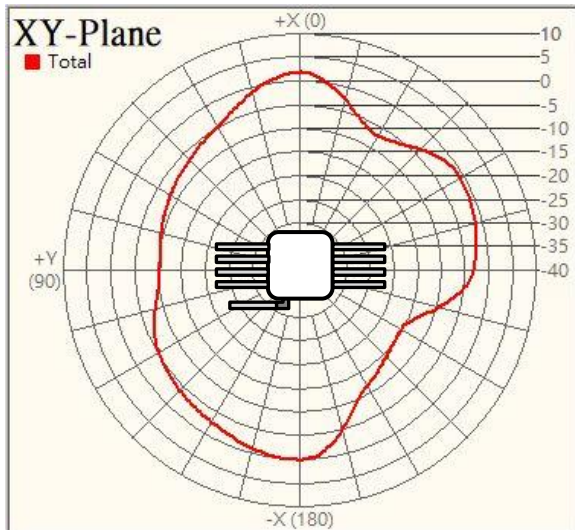
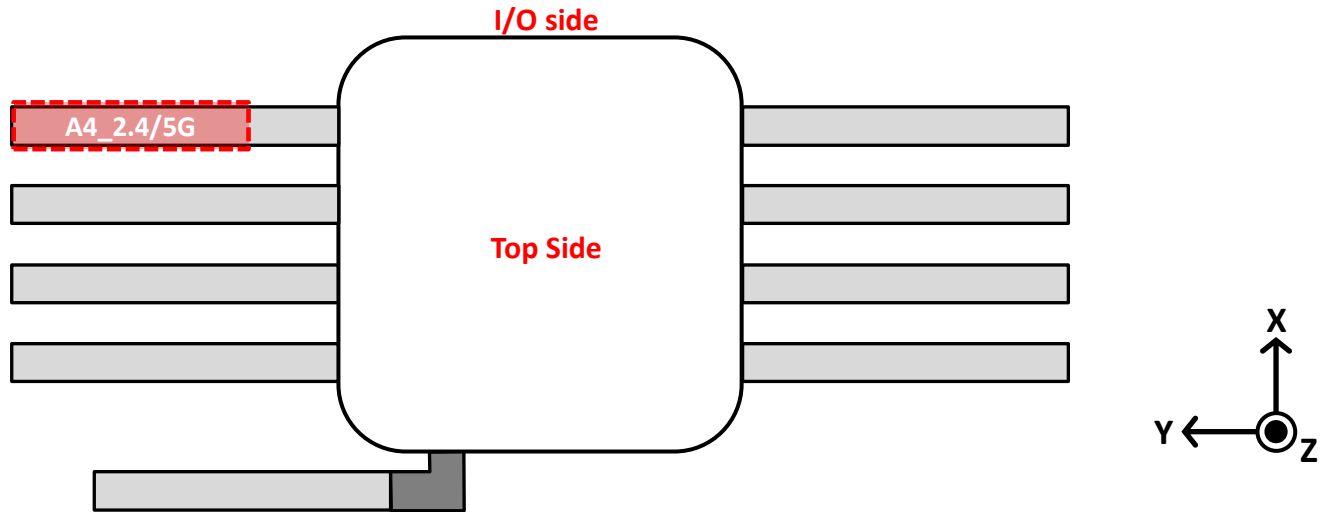
Isolation												
Freq. (MHz)	A4- A5	A4- BLE	A8- A7	A8- A6	A8- A5	A8- BLE	A7- A6	A7- A5	A7- BLE	A6- A5	A6- BLE	A5- BLE
2400	-33.30	-43.55	-16.11	-25.06	-25.54	-41.88	-16.61	-22.05	-49.64	-16.14	-49.64	-42.29
2450	-33.94	-31.88	-16.41	-28.40	-28.08	-38.83	-18.05	-24.12	-45.84	-18.18	-51.09	-48.82
2500	-32.19	-32.42	-19.20	-32.15	-31.71	-38.97	-22.80	-39.18	-53.38	-21.25	-47.66	-57.58
5150	-55.65	-40.11	-23.57	-26.67	-30.47	-55.53	-27.29	-30.22	-66.43	-25.13	-54.77	-57.67
5550	-51.17	-46.49	-22.86	-32.60	-30.43	-55.54	-26.17	-29.15	-60.28	-24.90	-60.10	-74.09
5850	-52.00	-41.15	-25.97	-30.59	-26.52	-58.47	-30.73	-31.06	-72.00	-31.43	-58.87	-61.86
5925	-53.78	-40.92	-28.75	-29.90	-26.35	-61.75	-30.65	-28.33	-55.74	-30.56	-59.92	-73.10
6500	-62.45	-55.87	-27.65	-34.39	-33.37	-52.20	-31.47	-33.74	-62.63	-30.18	-70.46	-65.24
7125	-59.02	-56.26	-32.56	-42.18	-43.87	-51.64	-35.34	-39.77	-61.29	-31.39	-69.40	-66.30

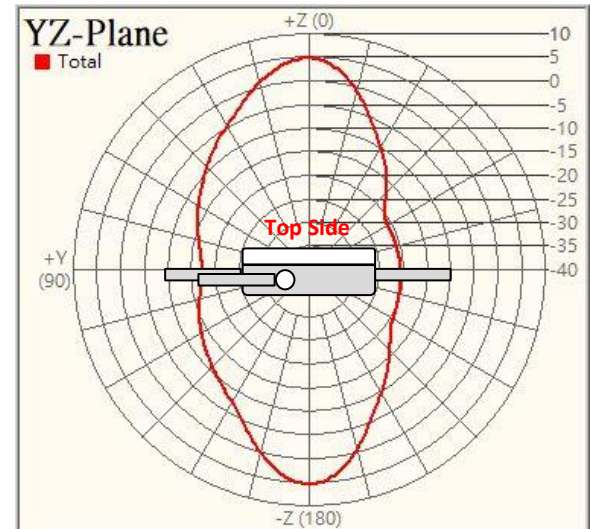
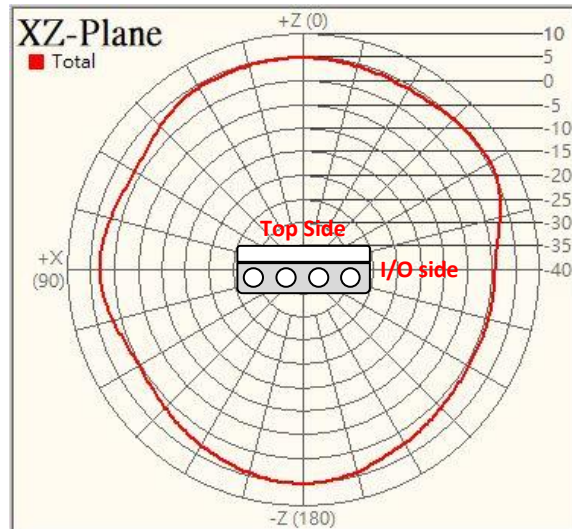
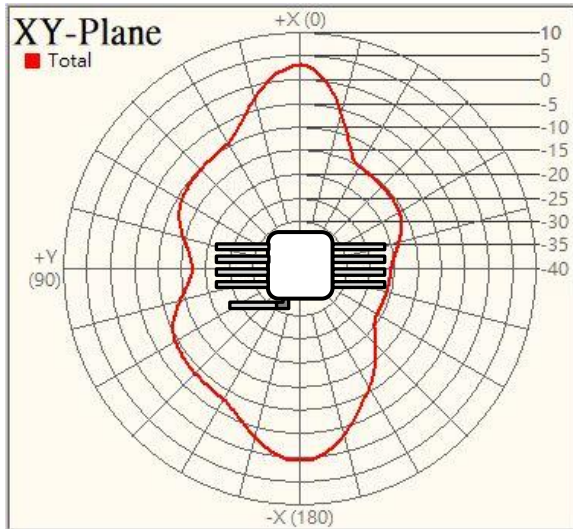
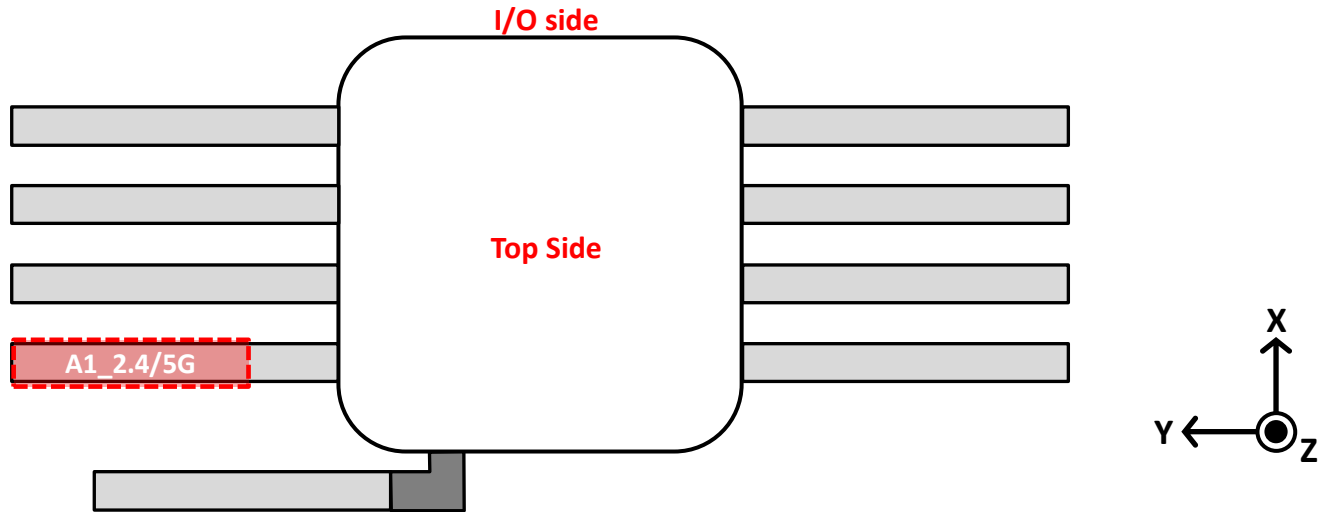


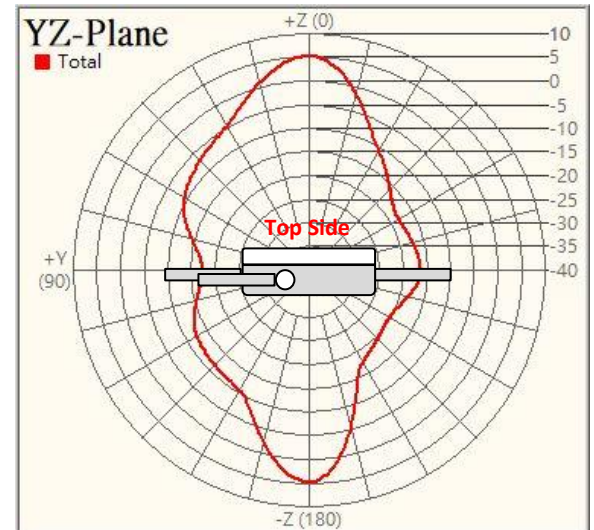
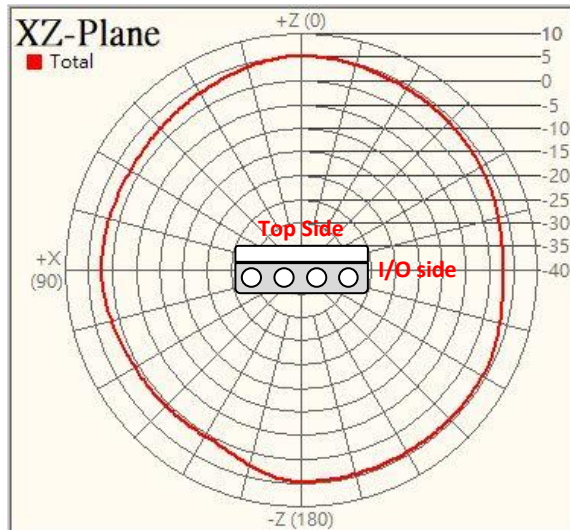
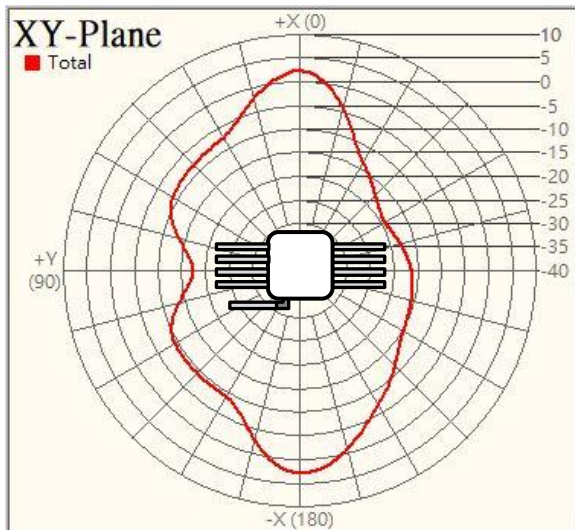
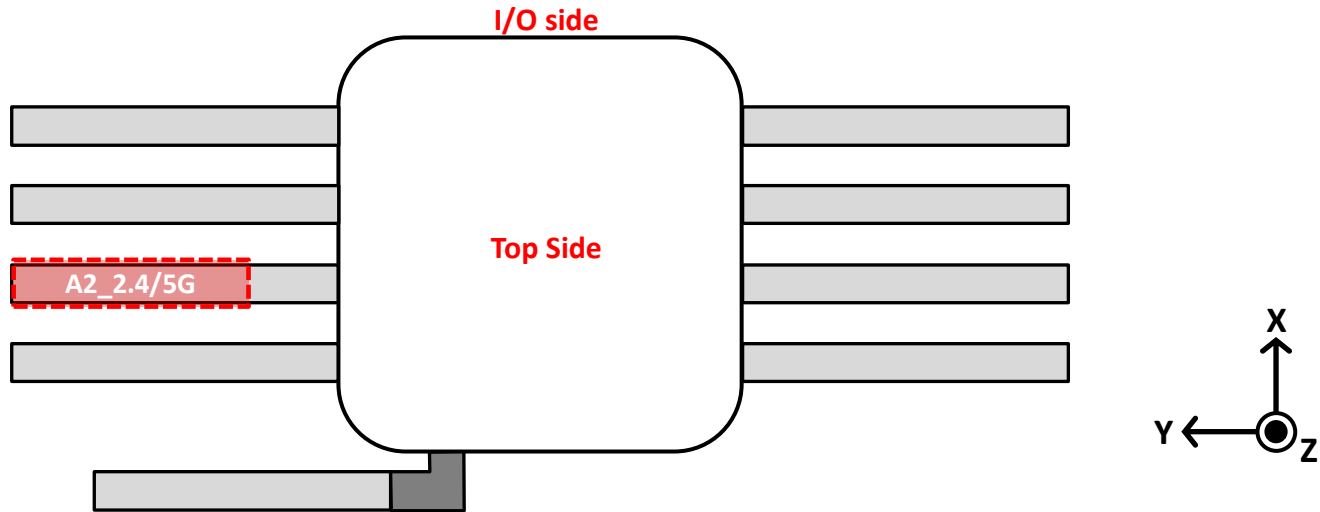


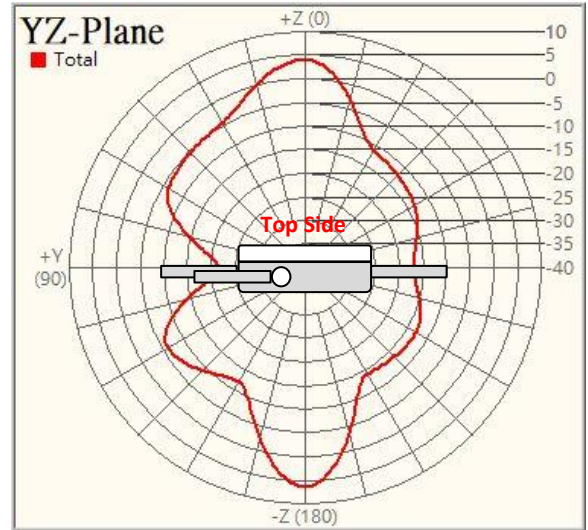
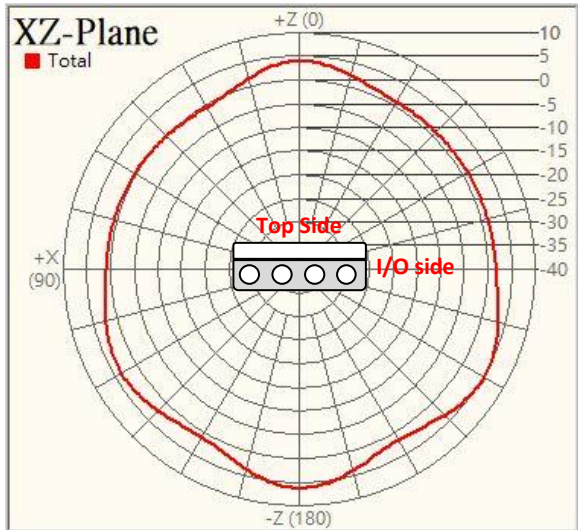
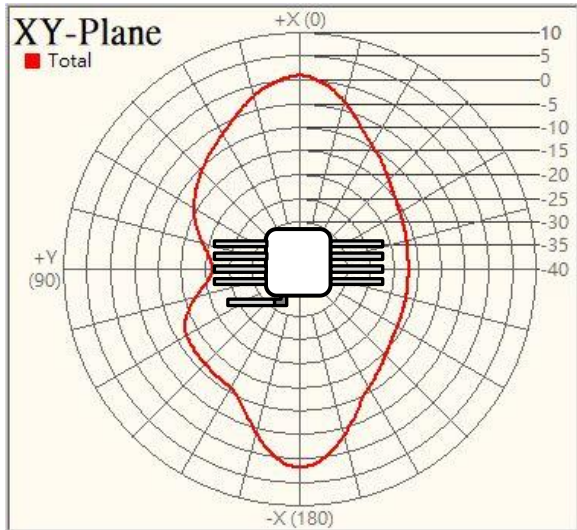
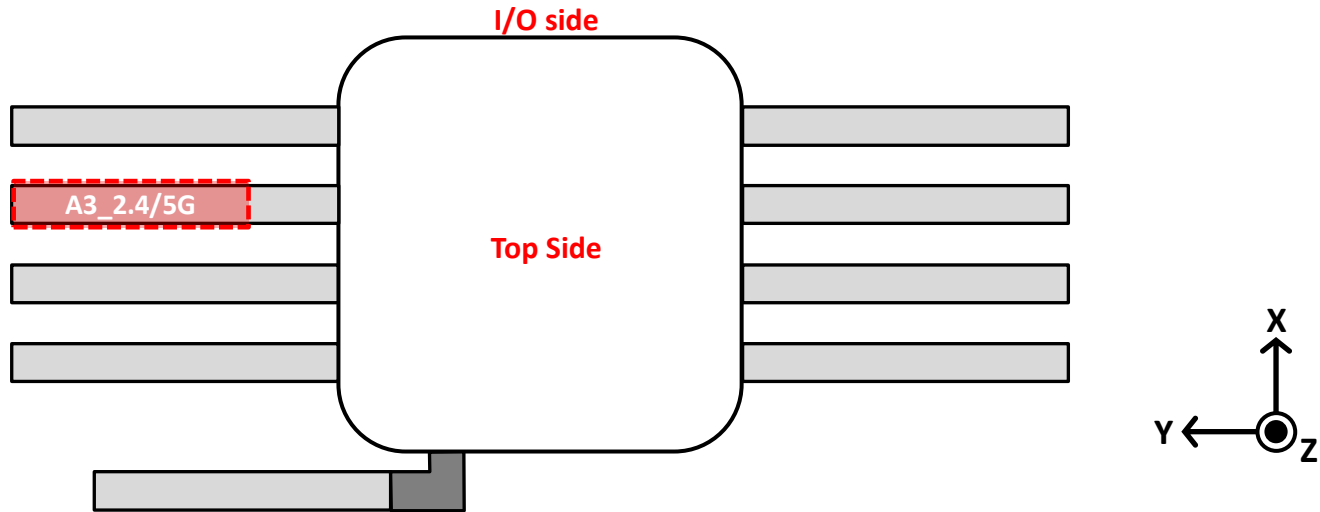


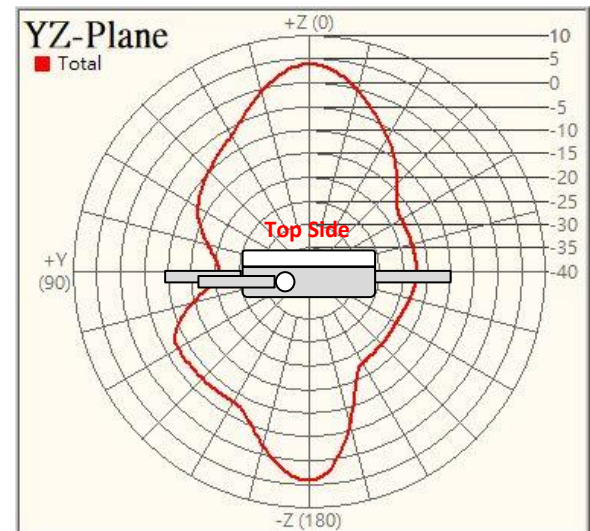
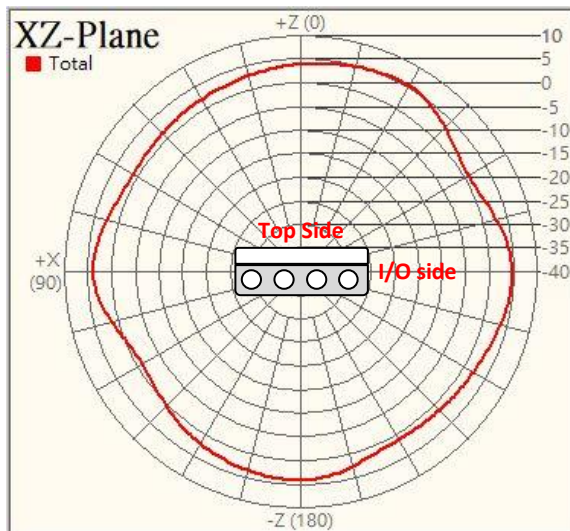
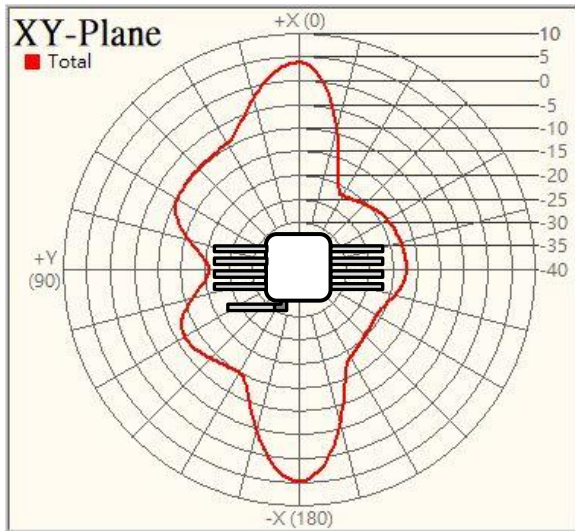
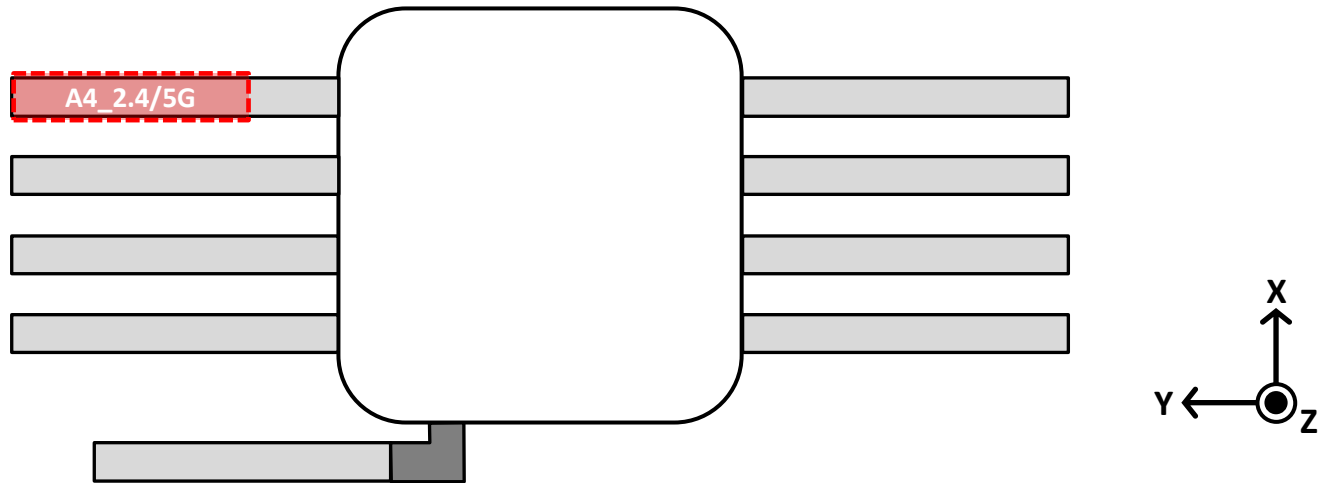


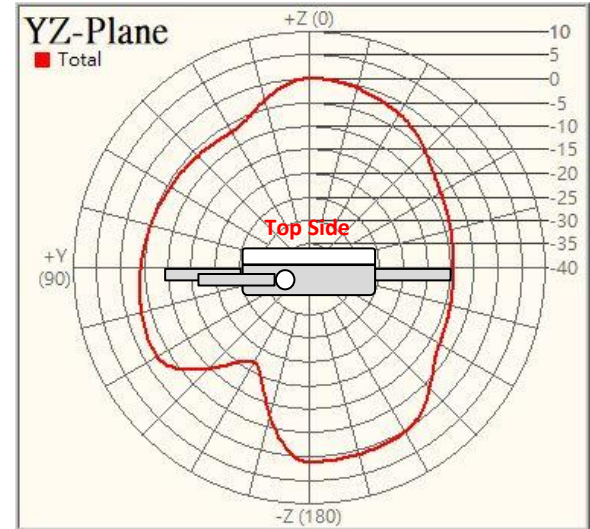
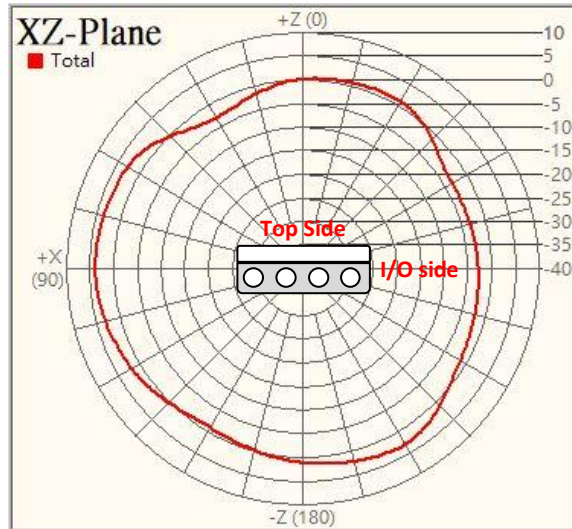
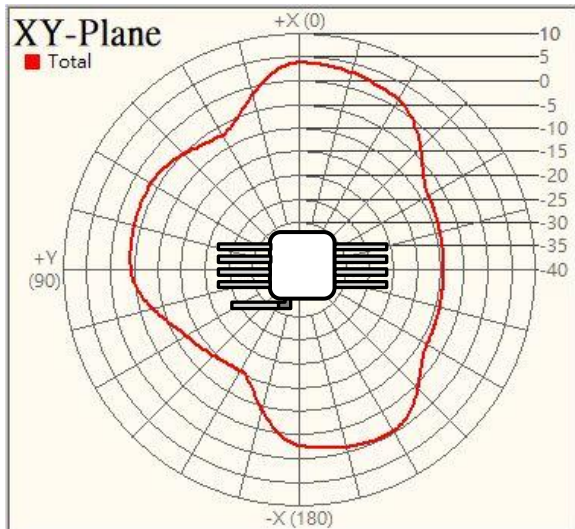
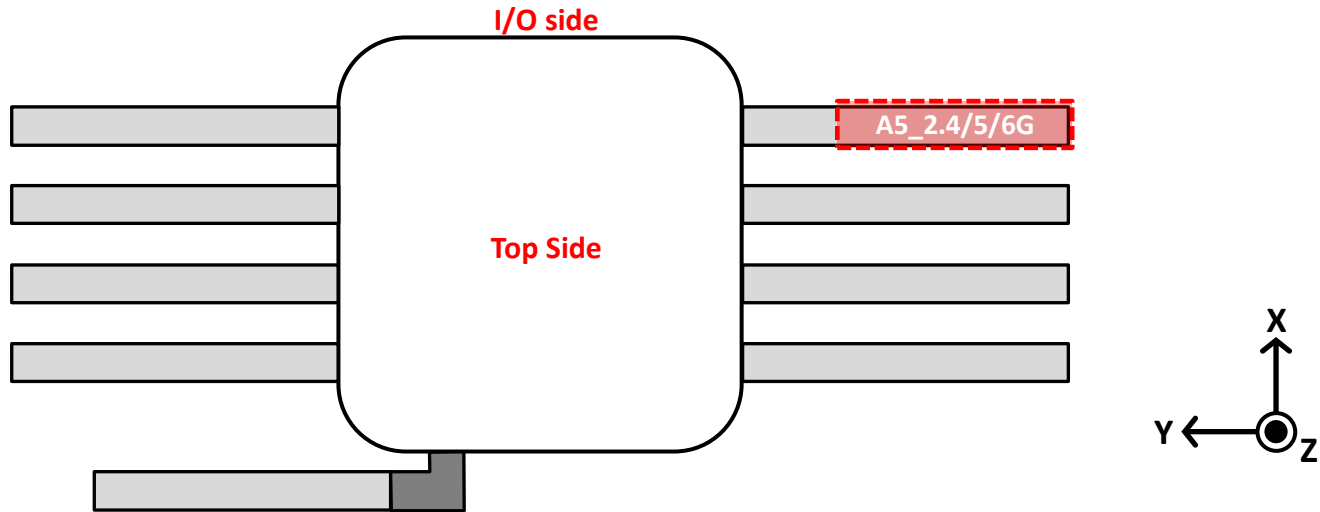




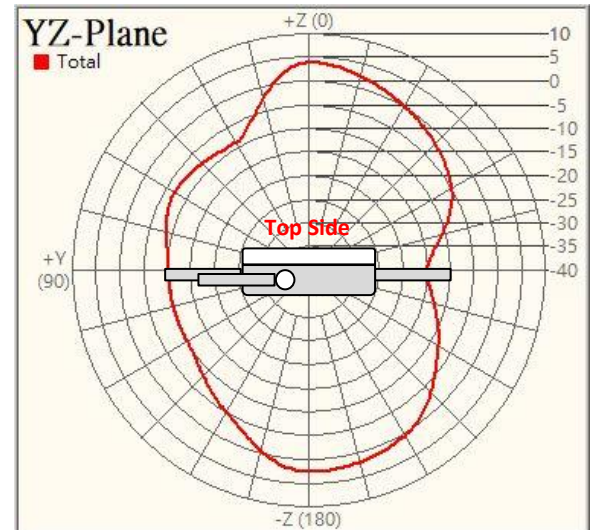
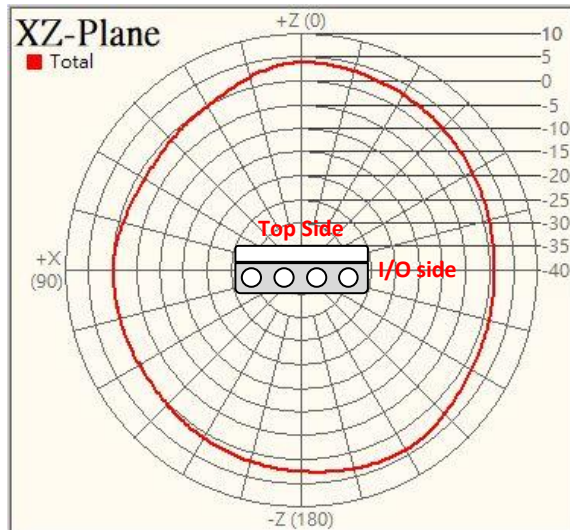
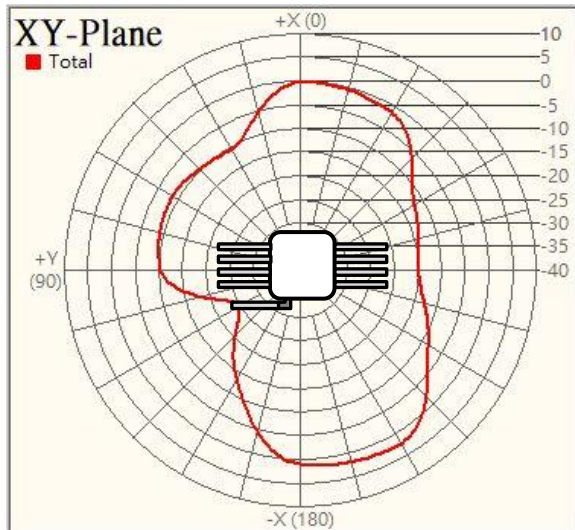
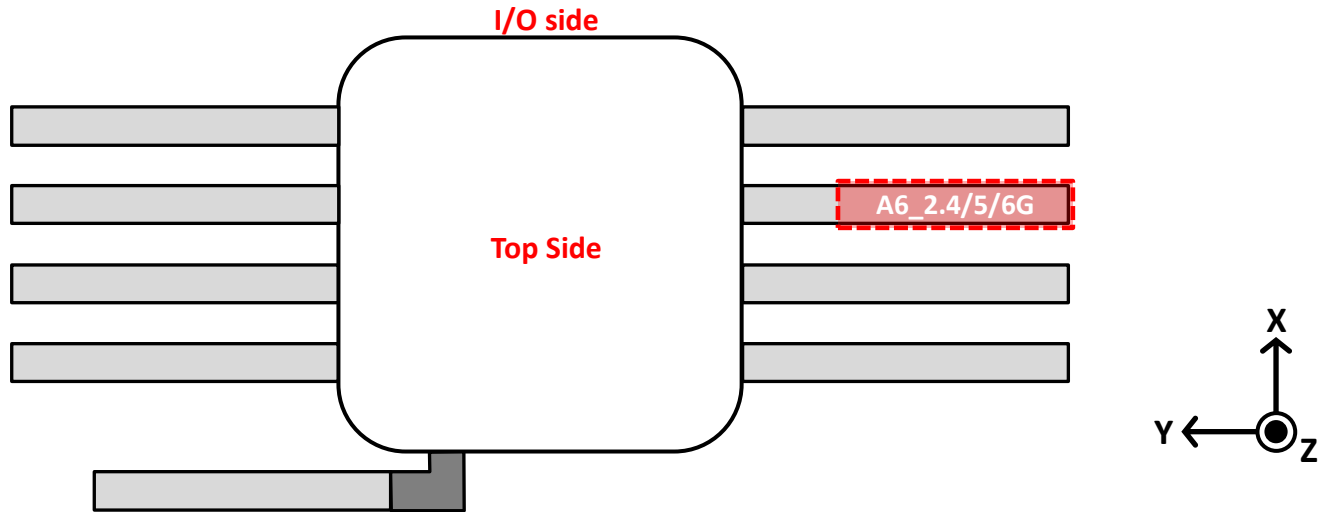


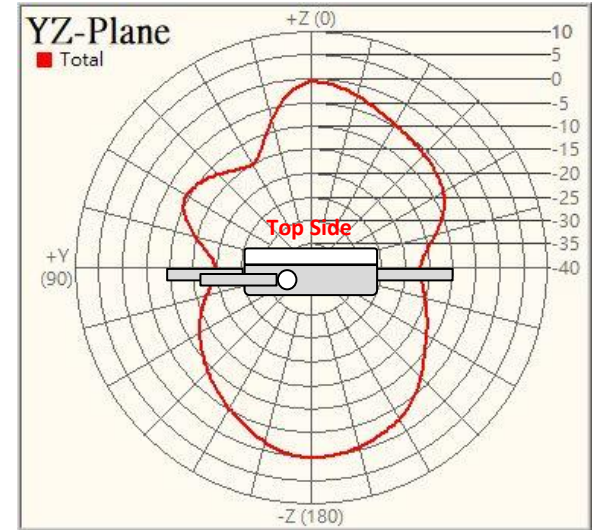
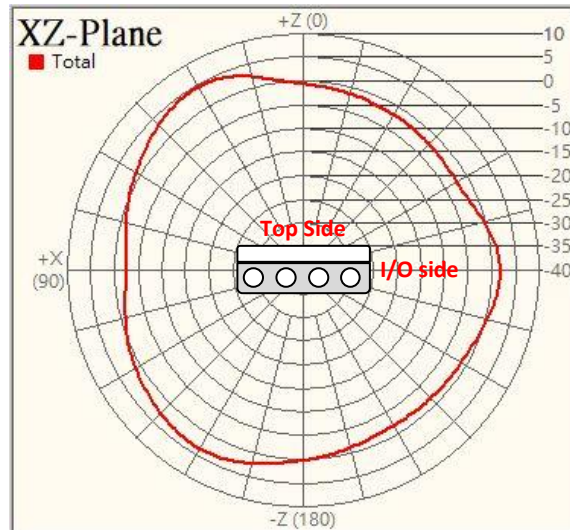
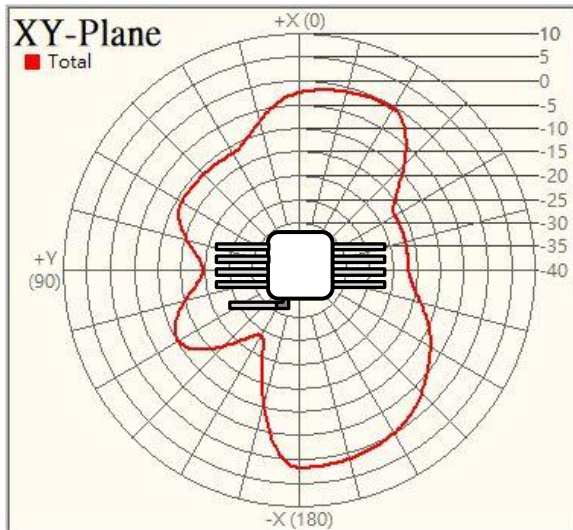
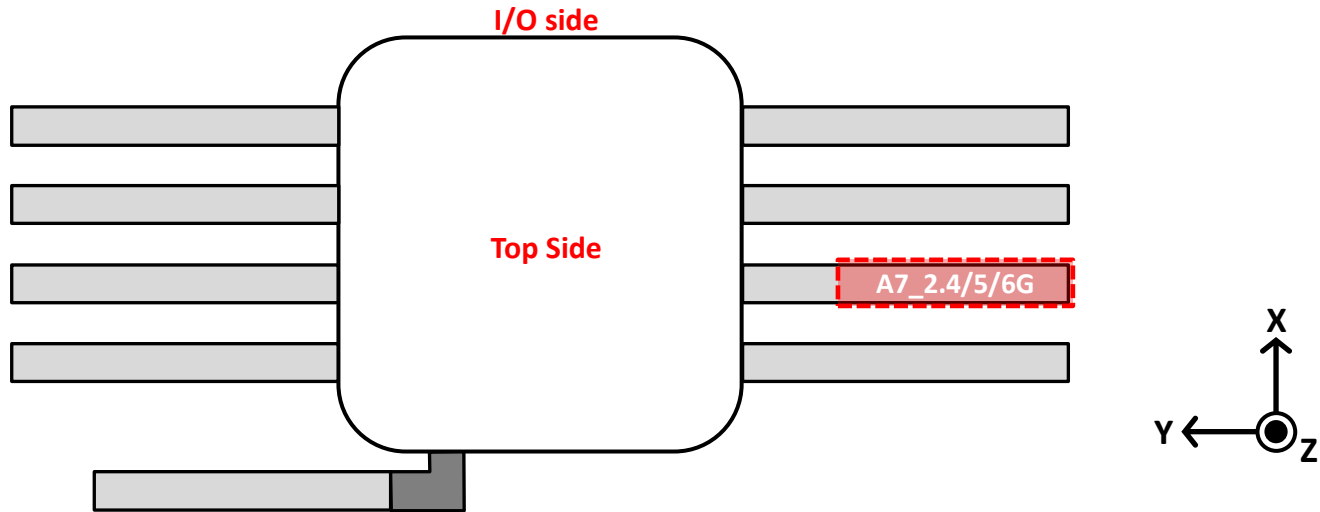


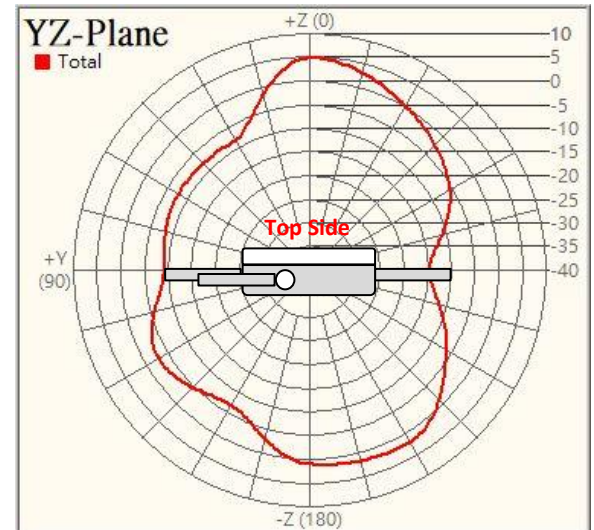
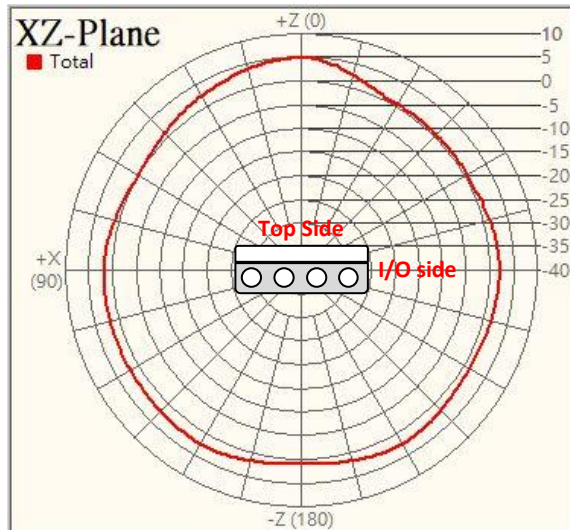
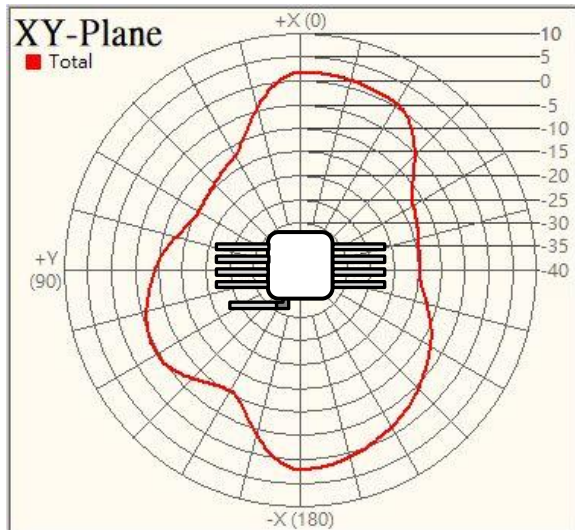
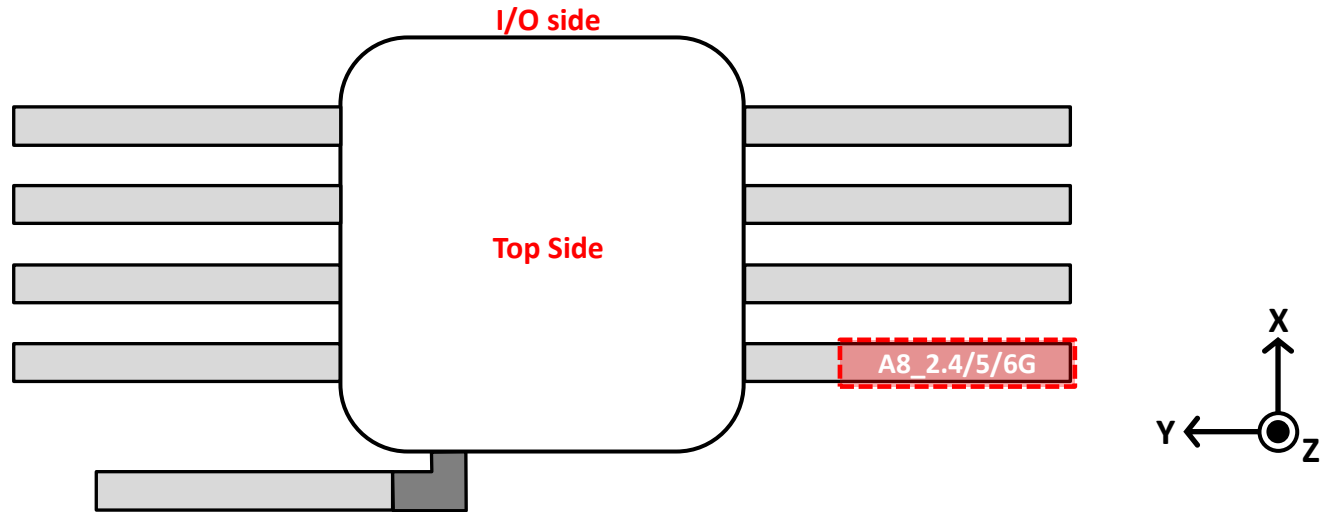


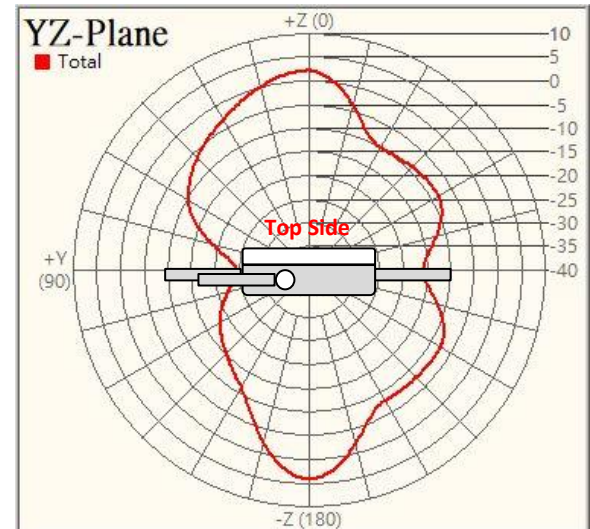
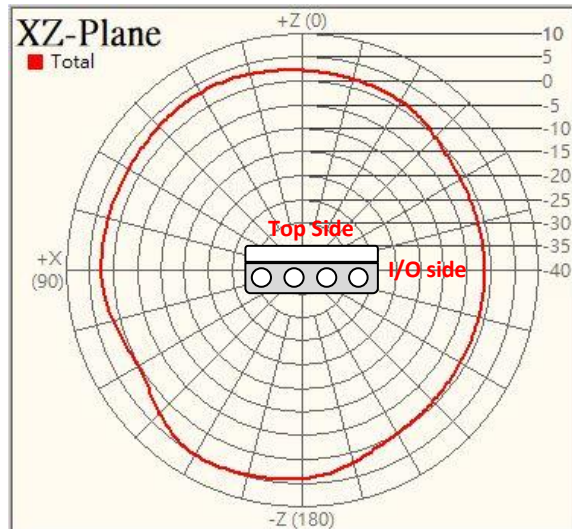
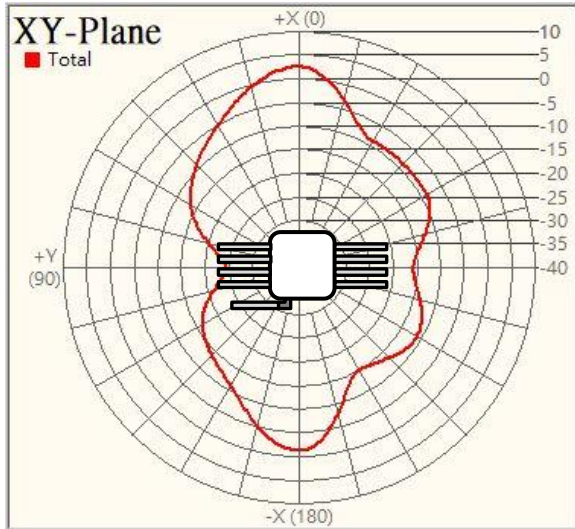
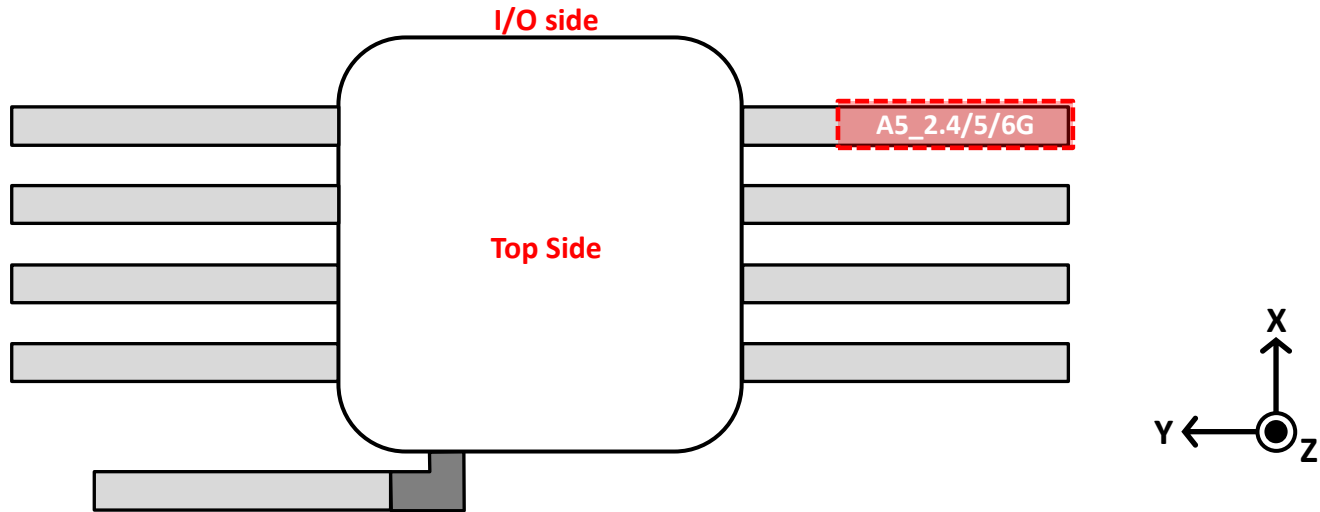


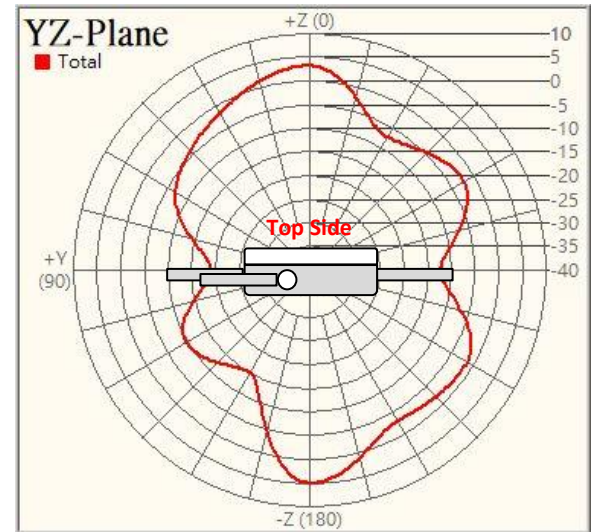
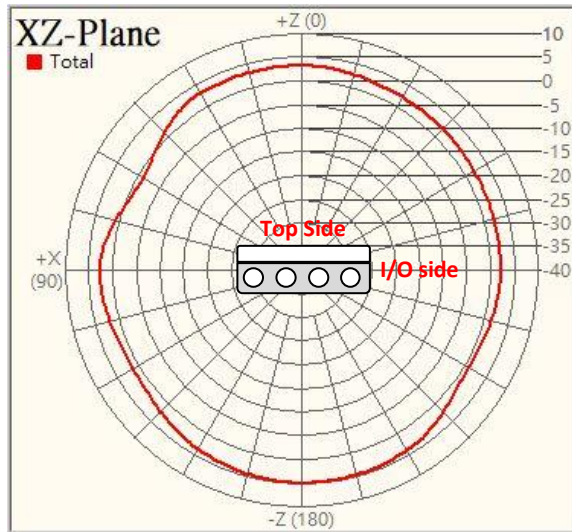
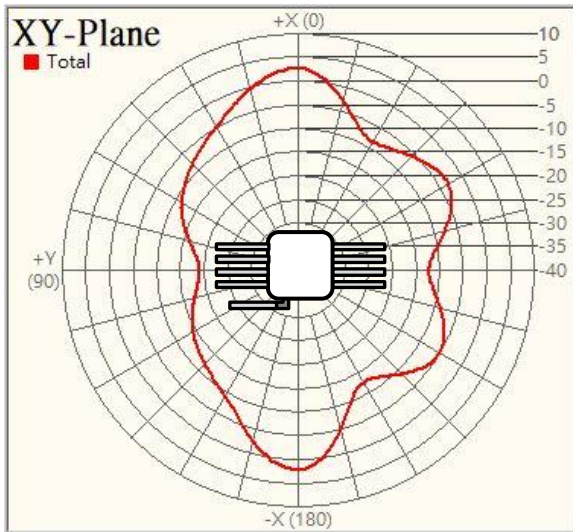
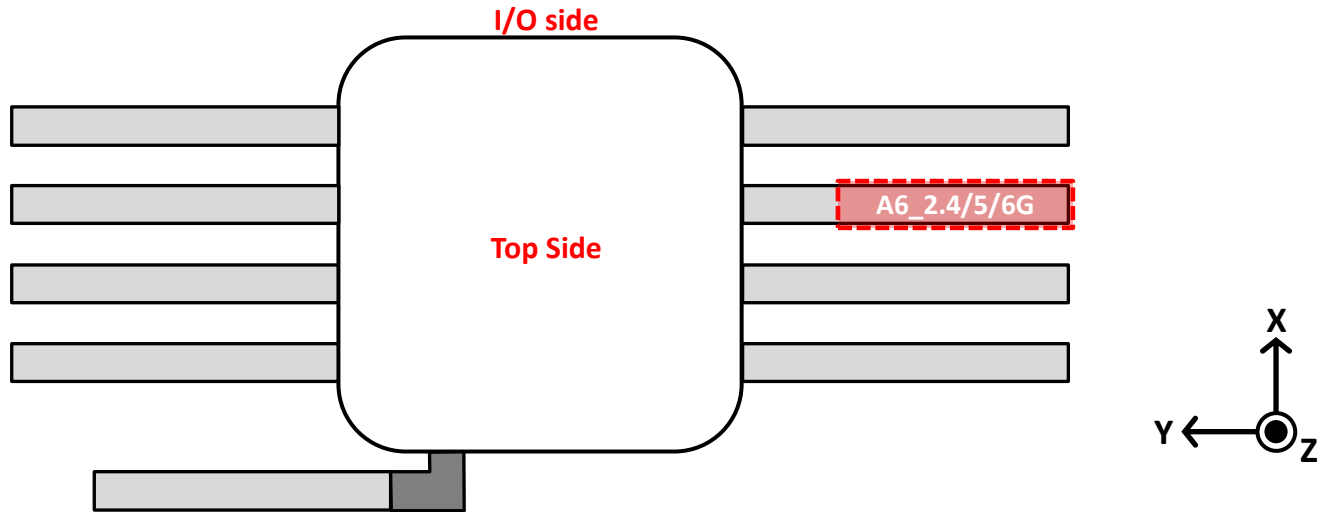


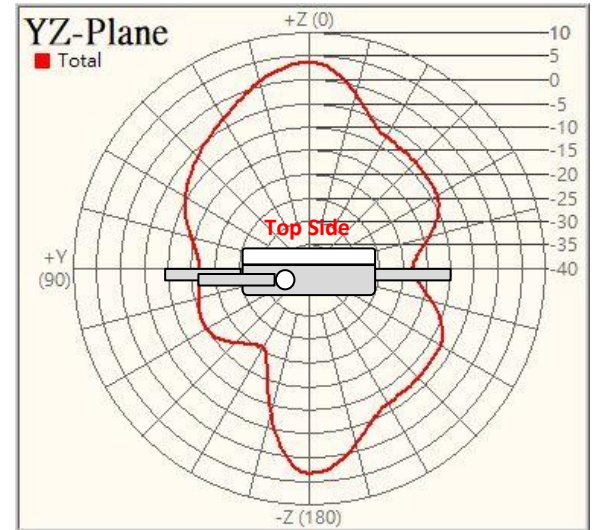
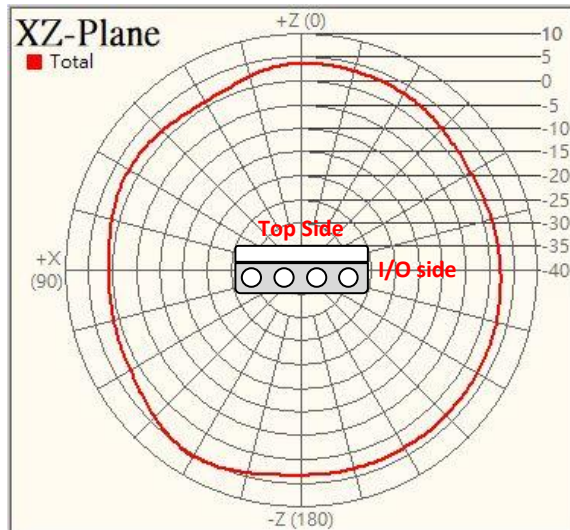
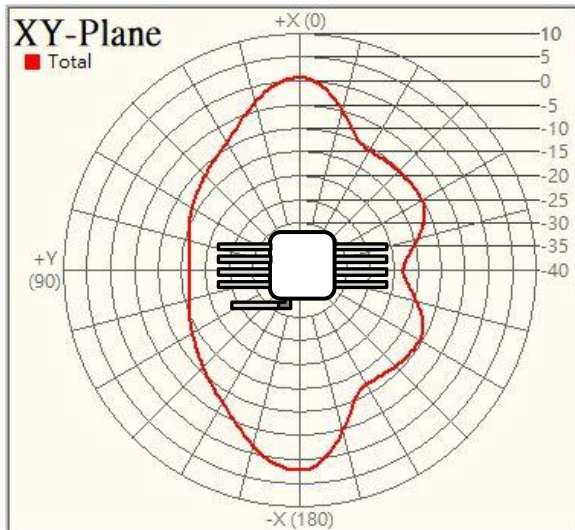
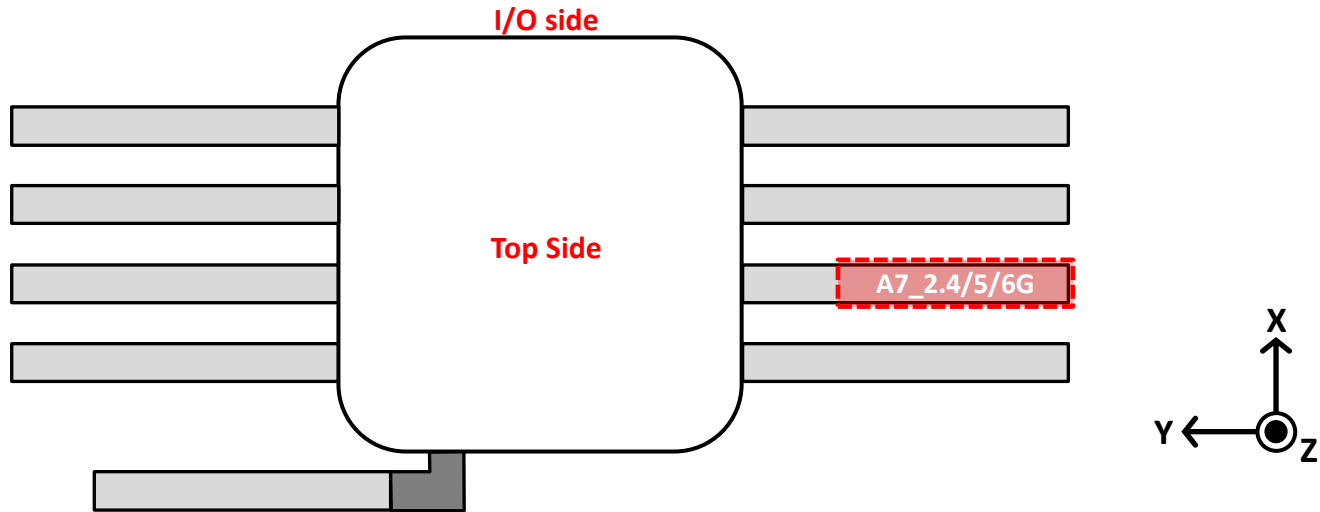


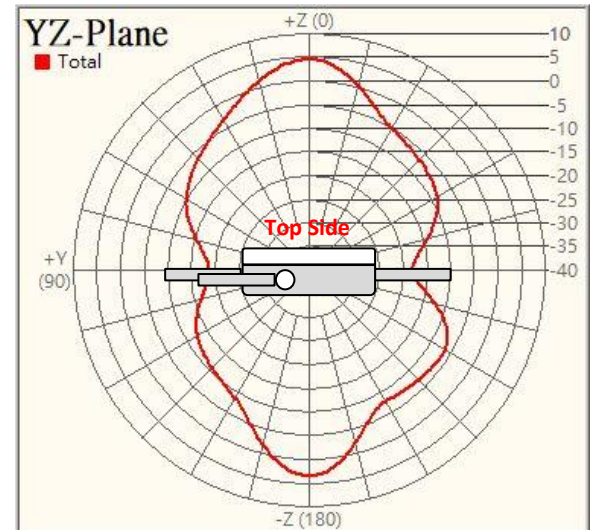
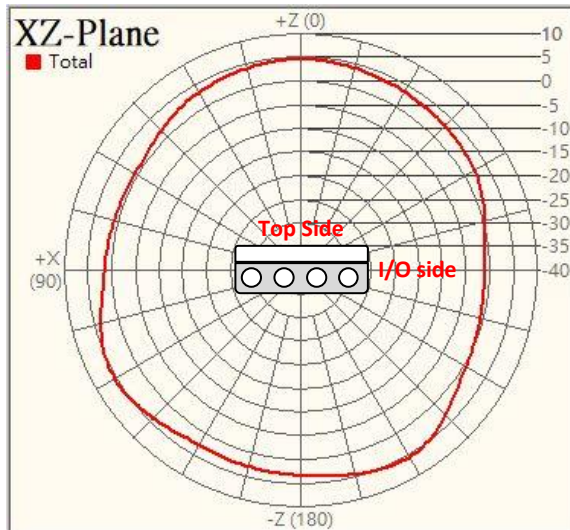
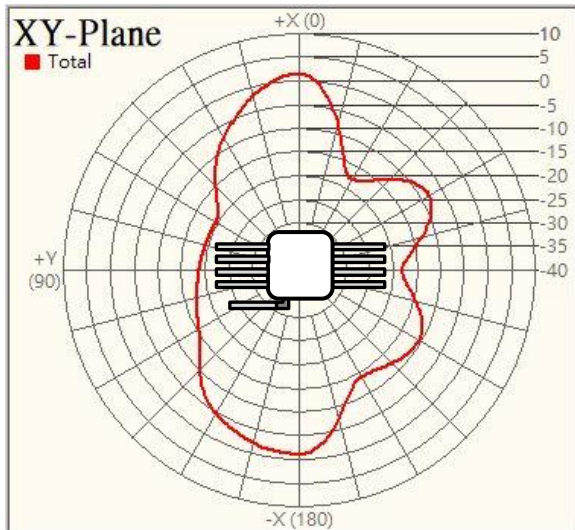
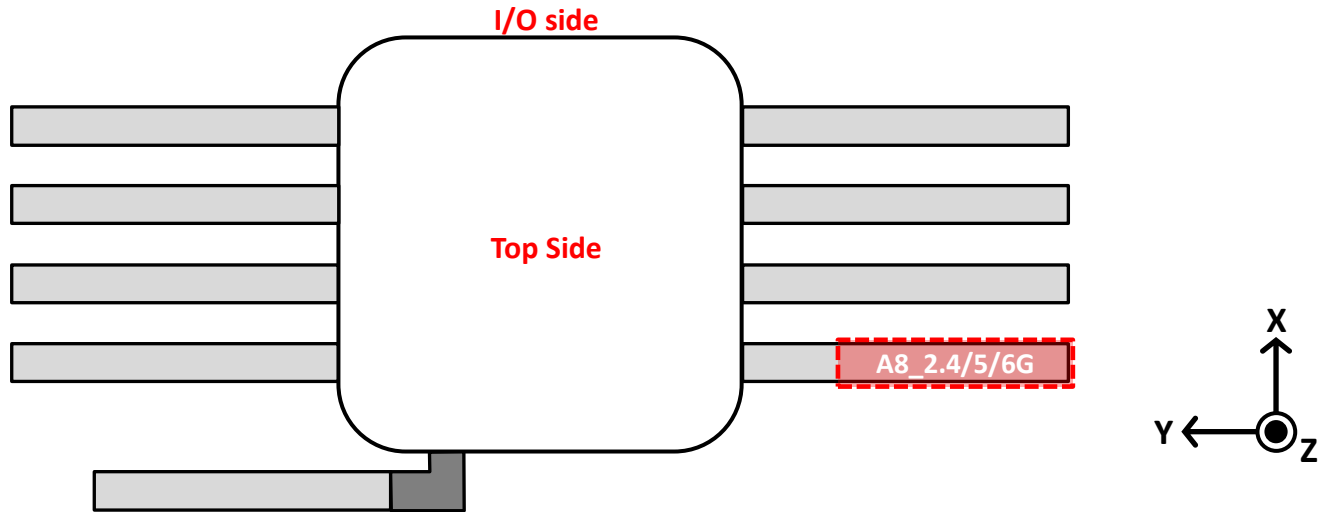


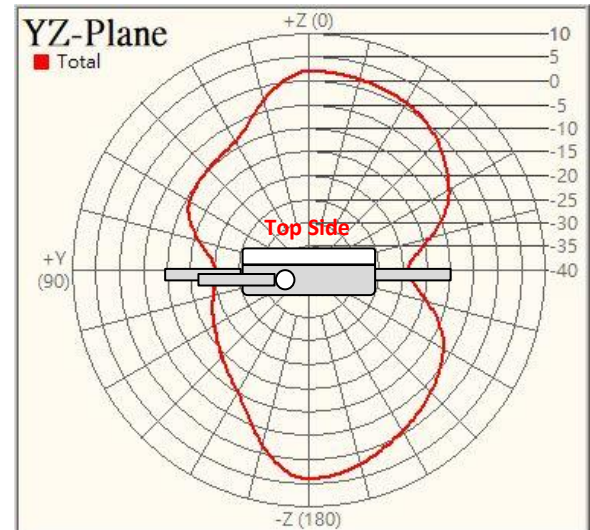
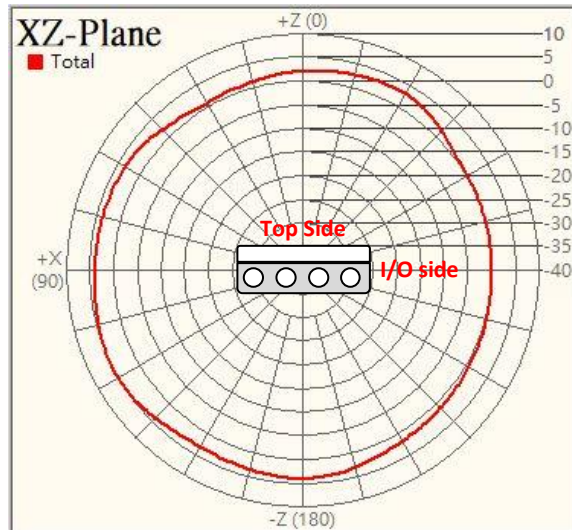
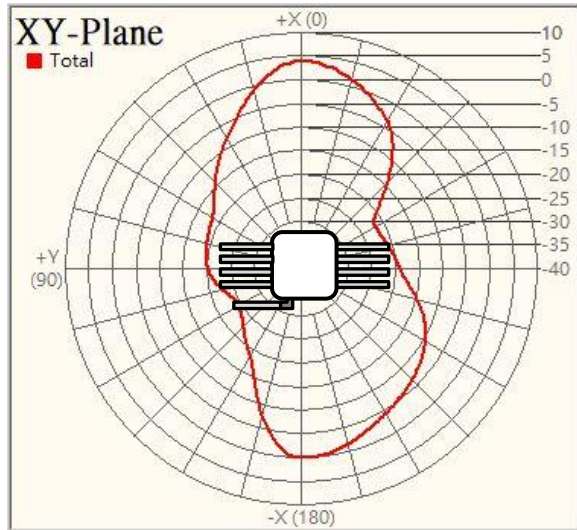
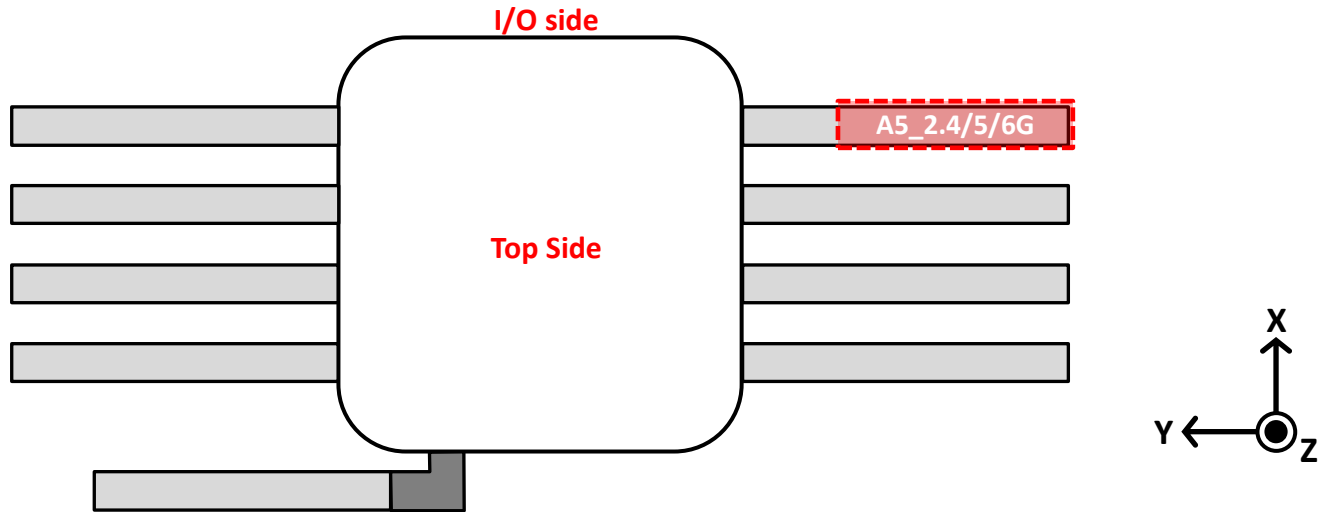




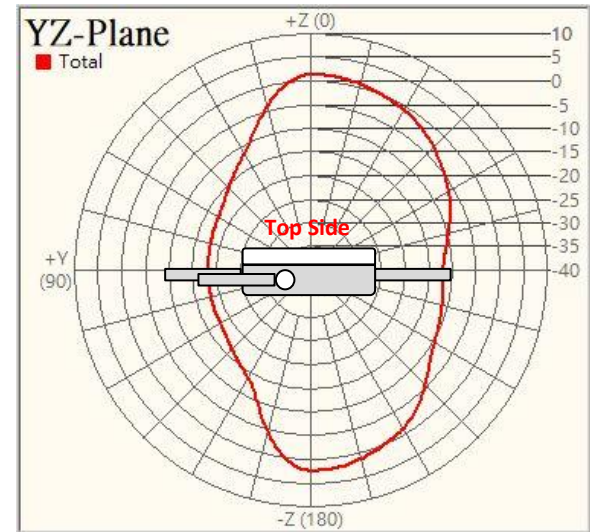
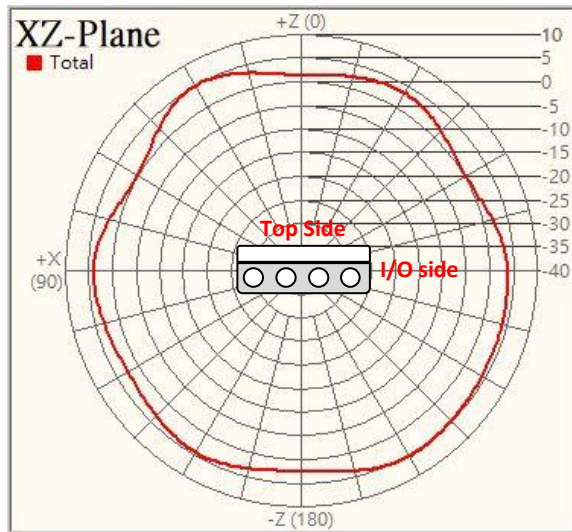
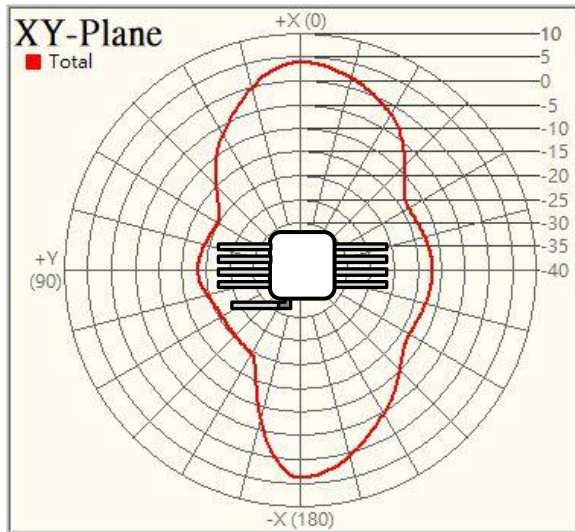
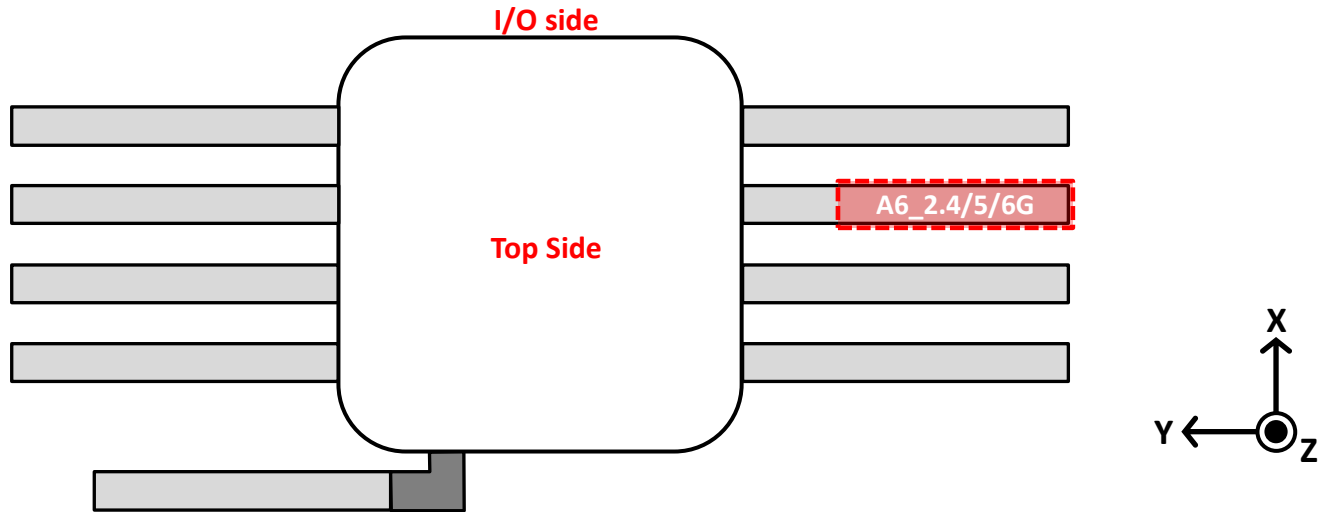


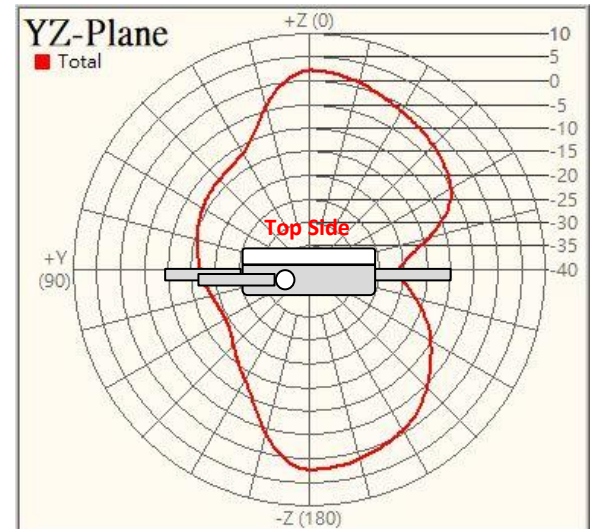
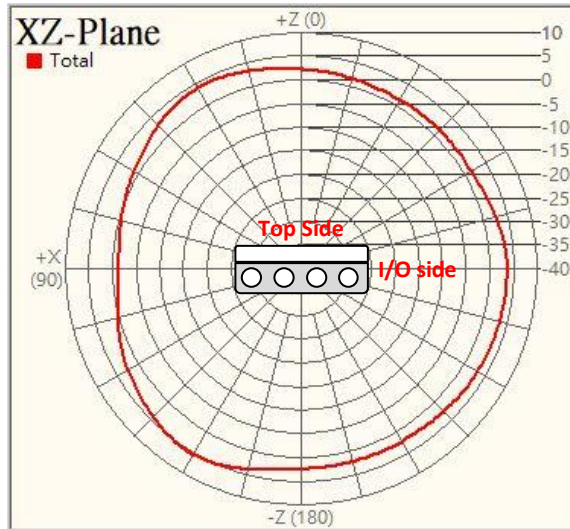
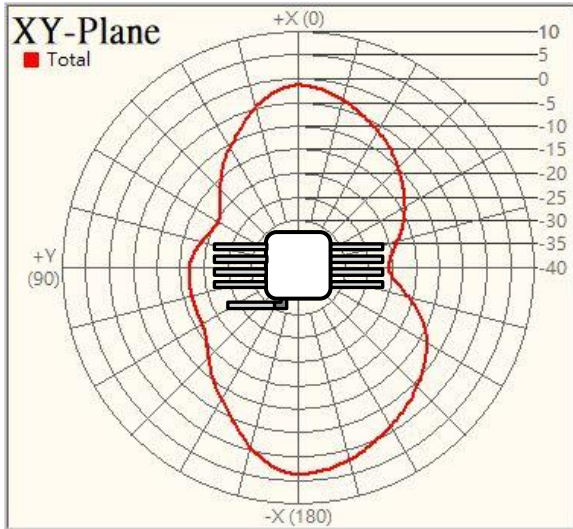
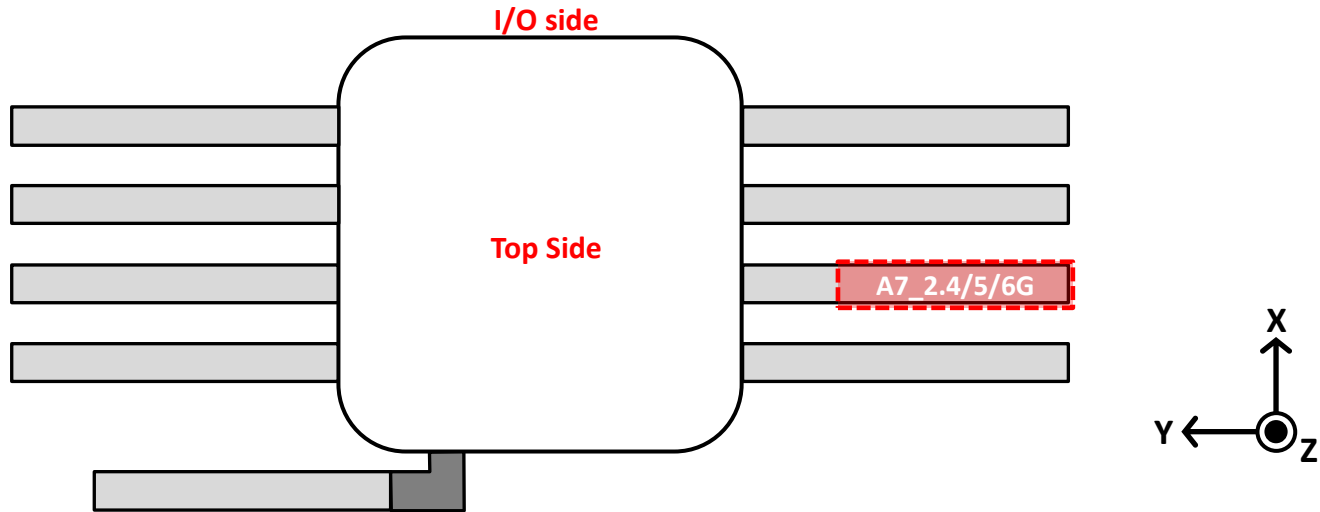


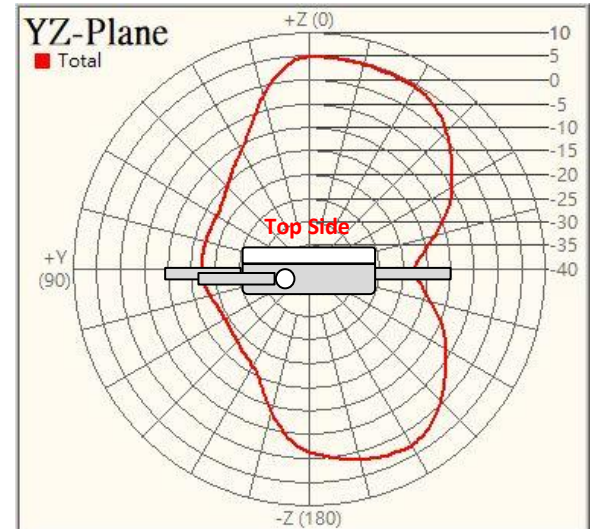
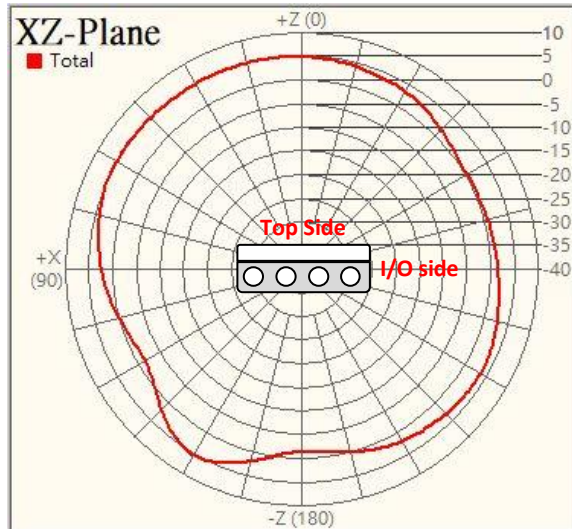
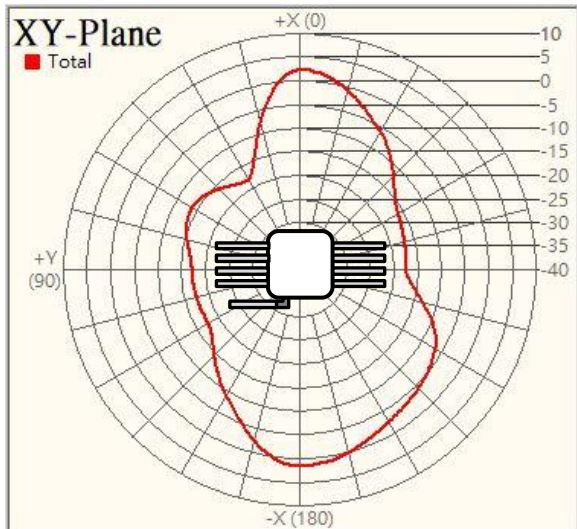
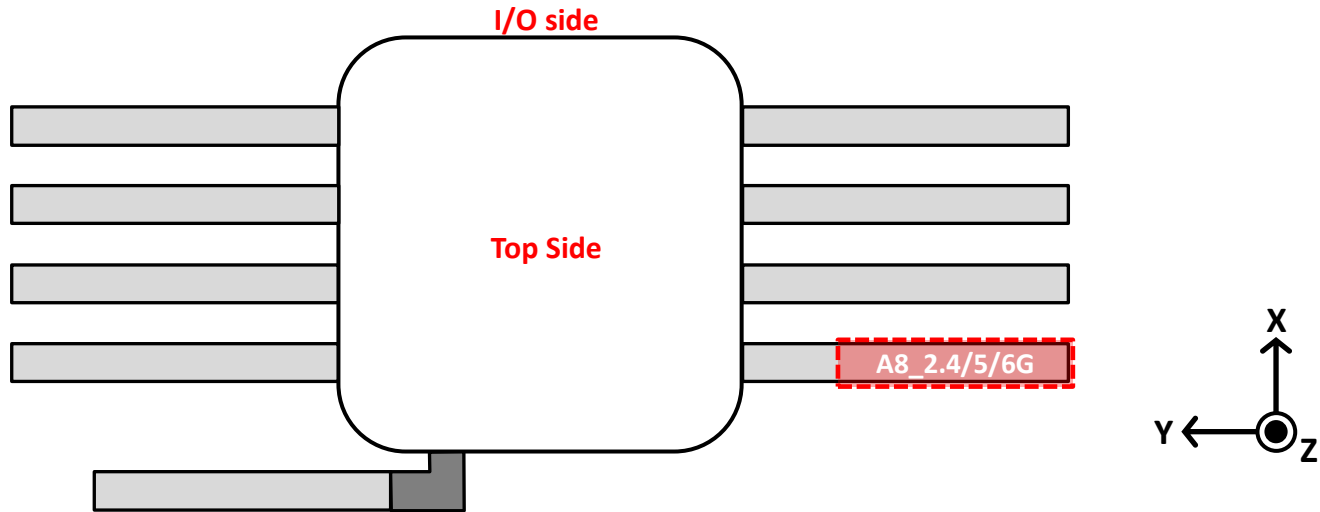




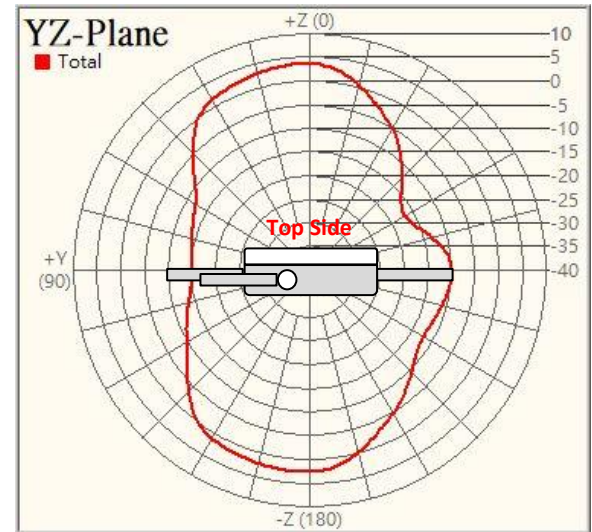
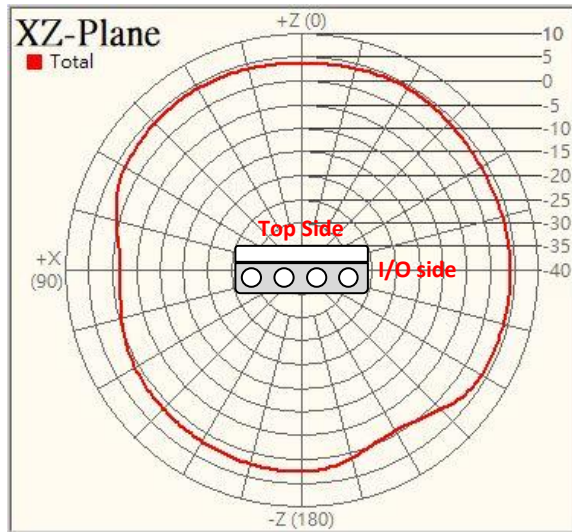
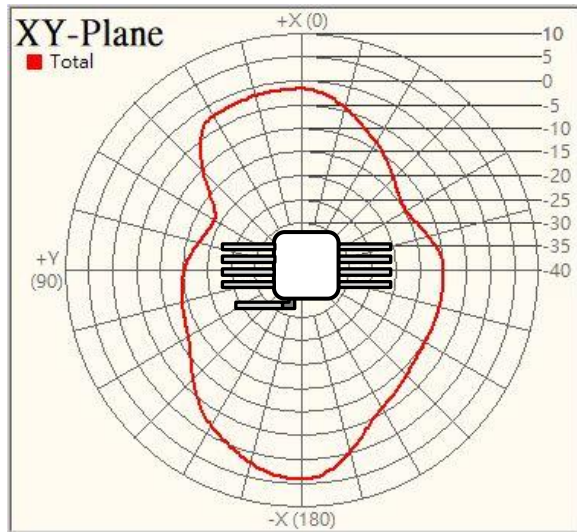
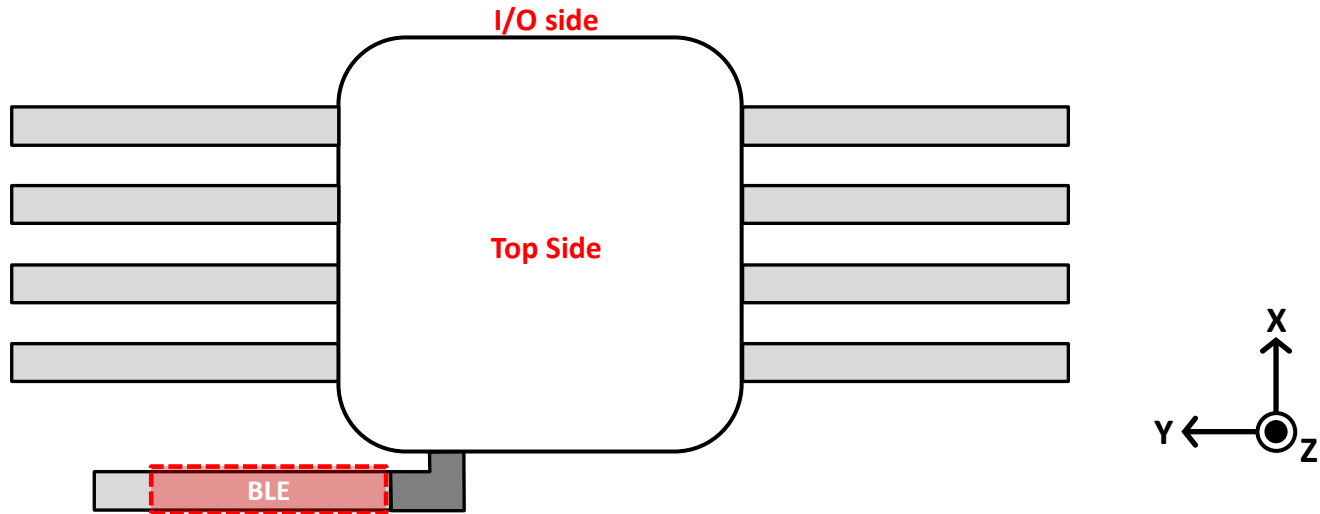




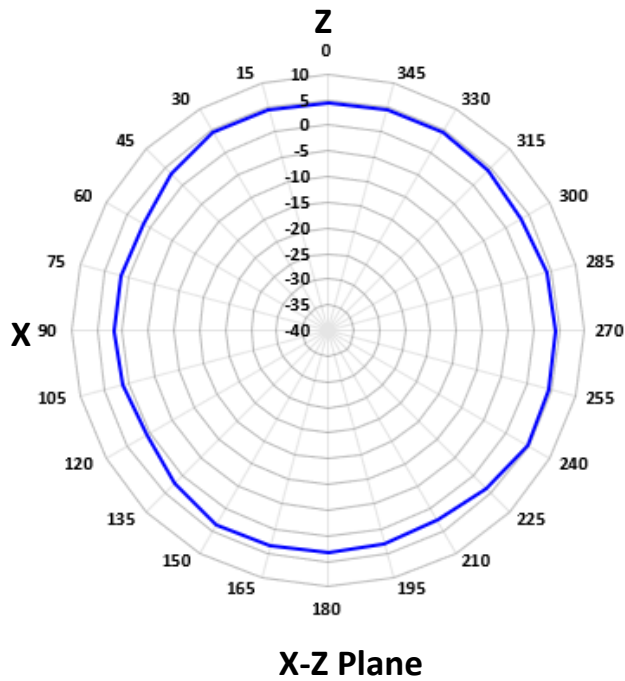
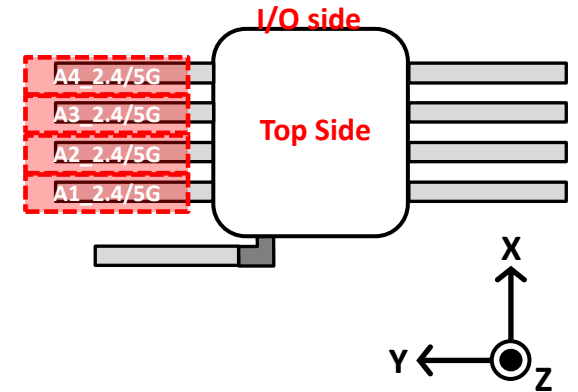
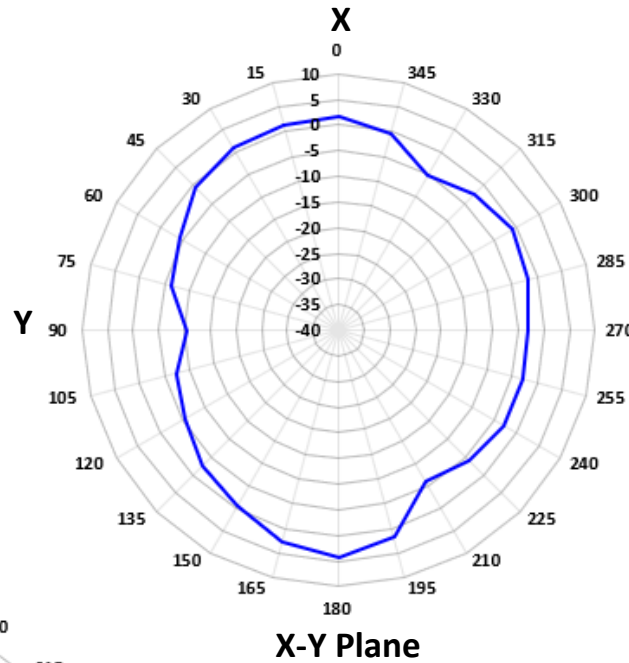




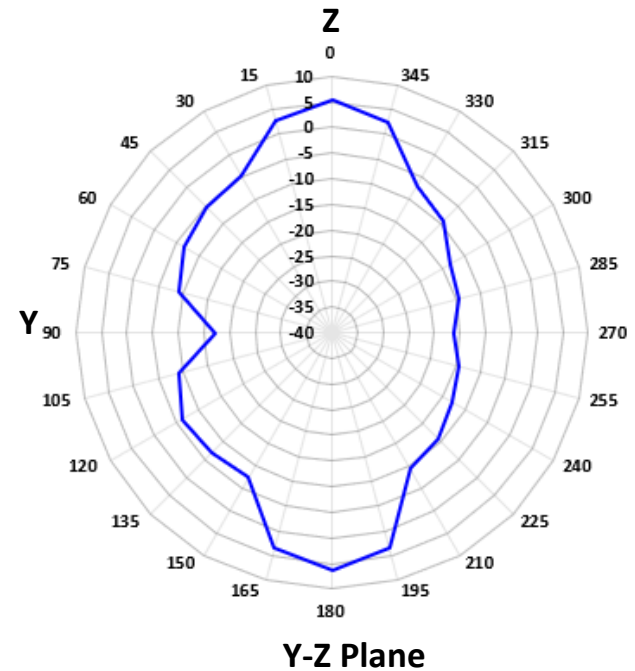
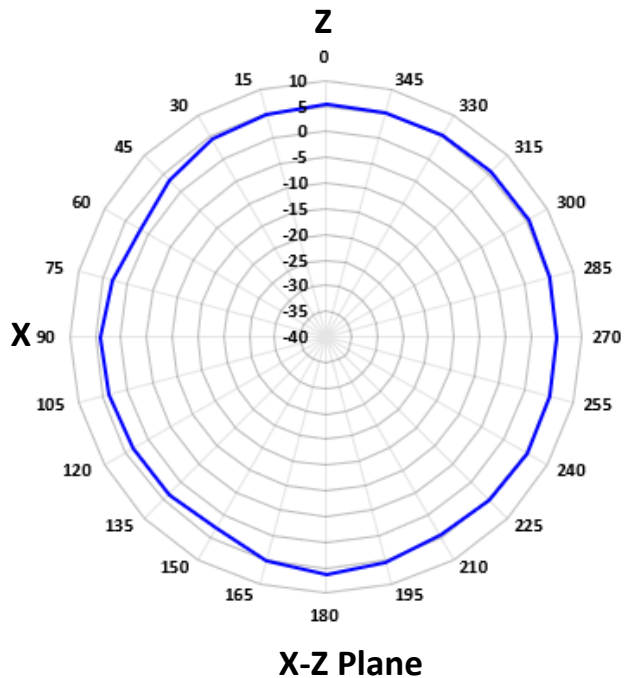
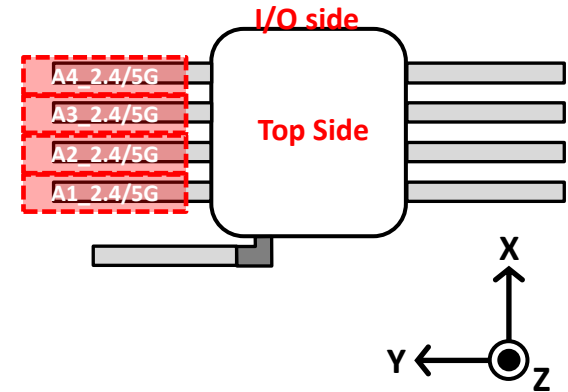
# 2D Radiation Pattern – BLE @ 2.45GHz



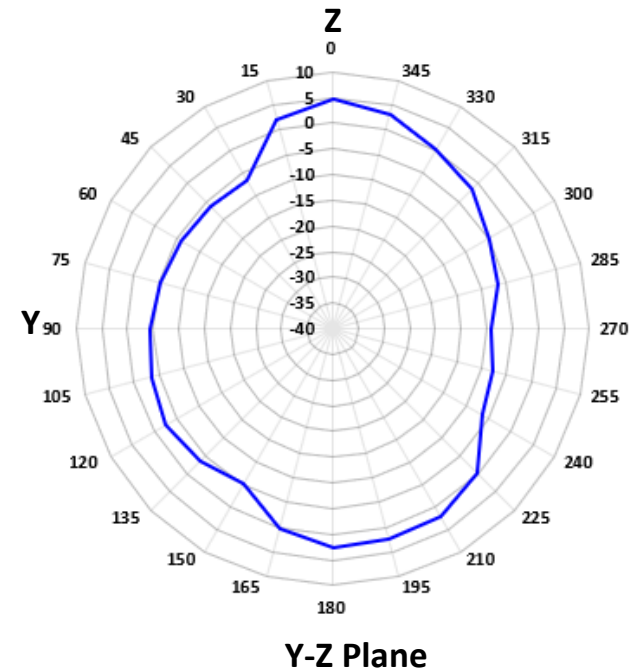
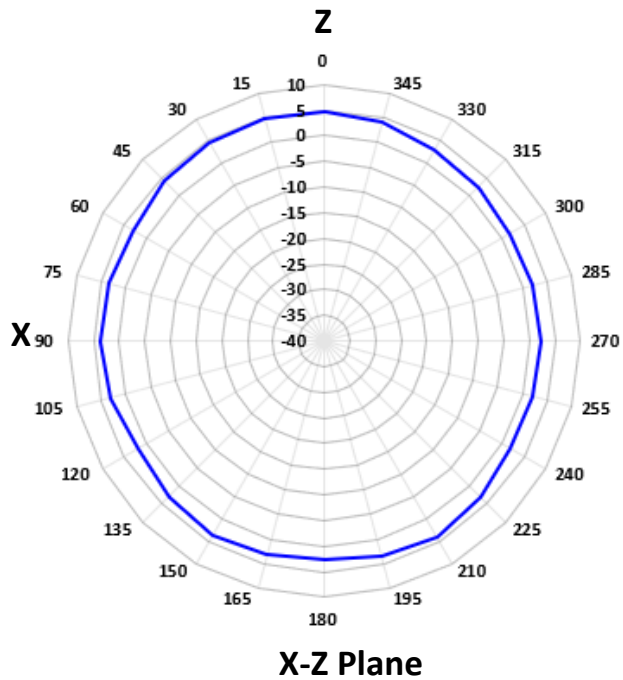
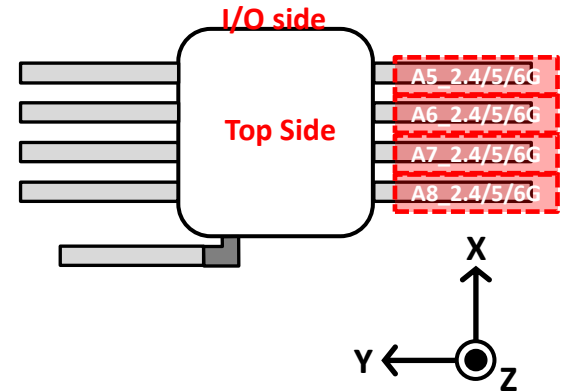
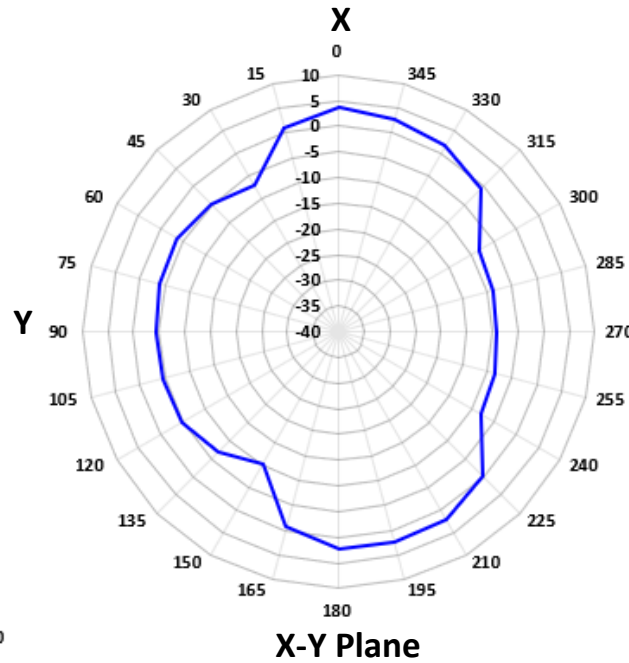
# Combine pattern – Radio 1 @2.45 GHz



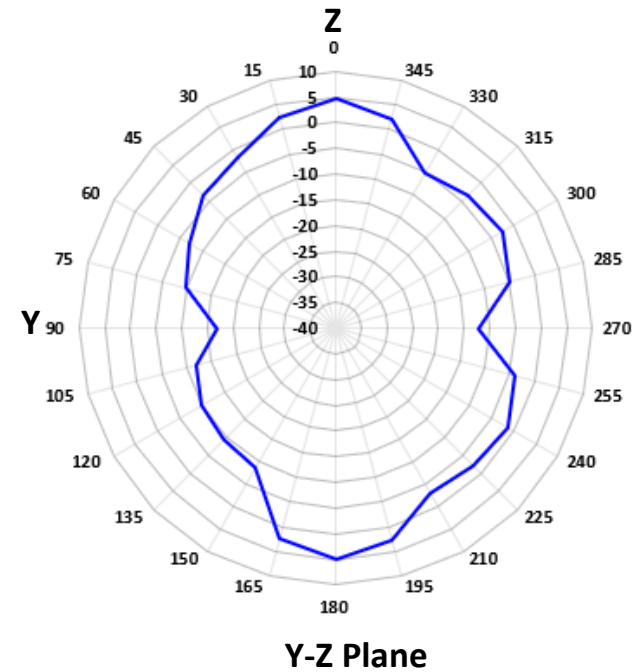
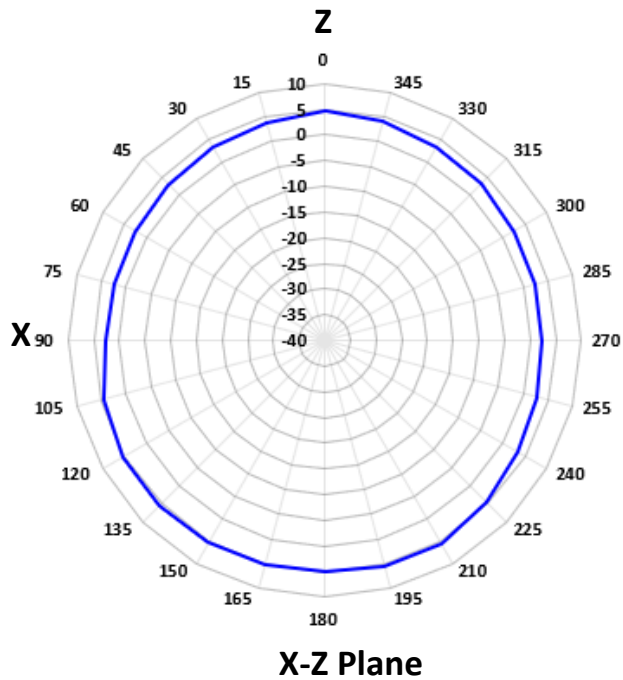
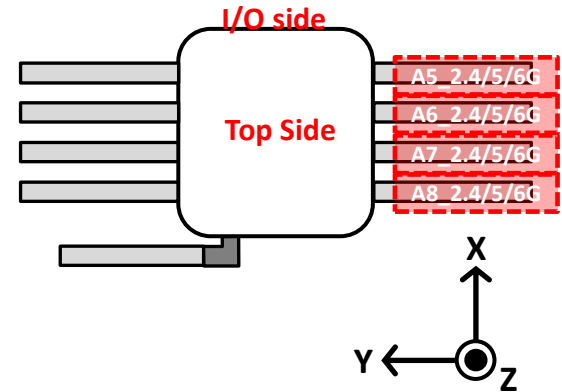
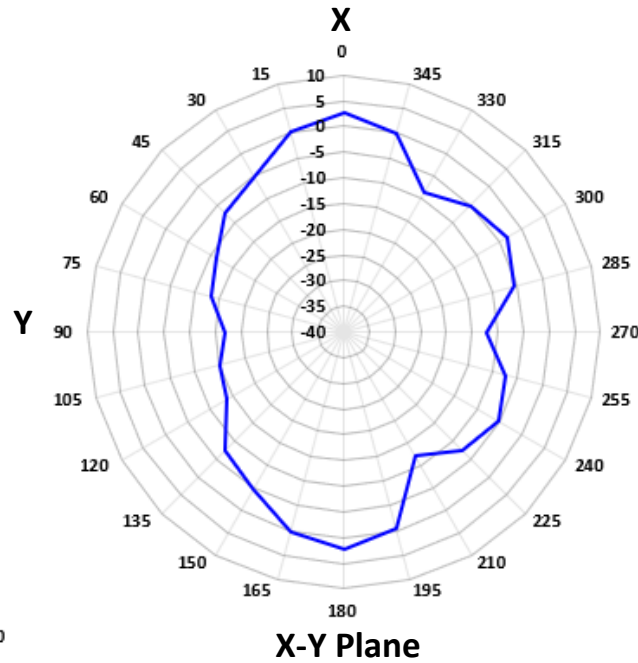
# Combine pattern – Radio 2 @5.55 GHz



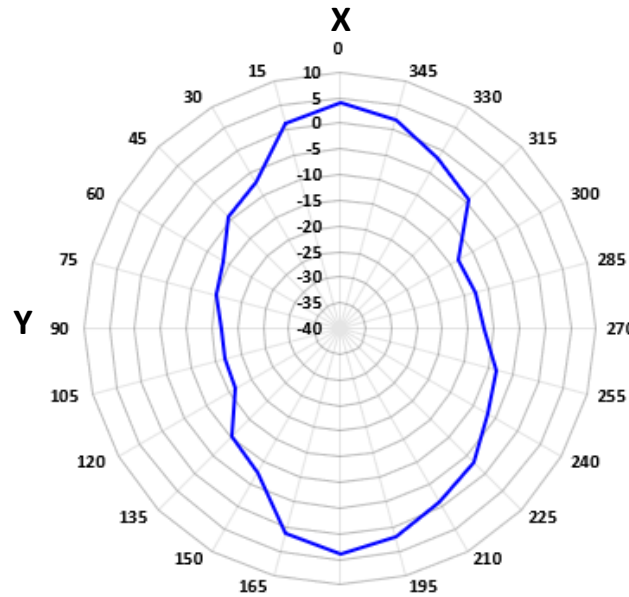
# Combine pattern – Radio 3 @2.45 GHz



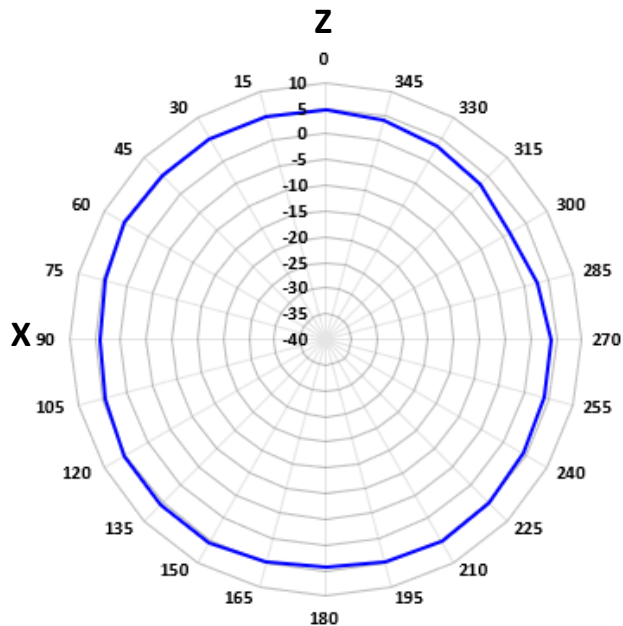
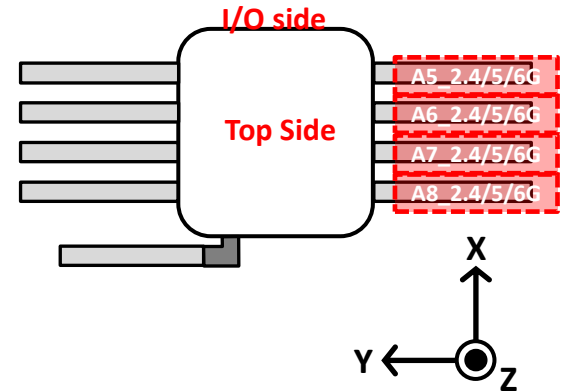
# Combine pattern – Radio 3 @5.55 GHz



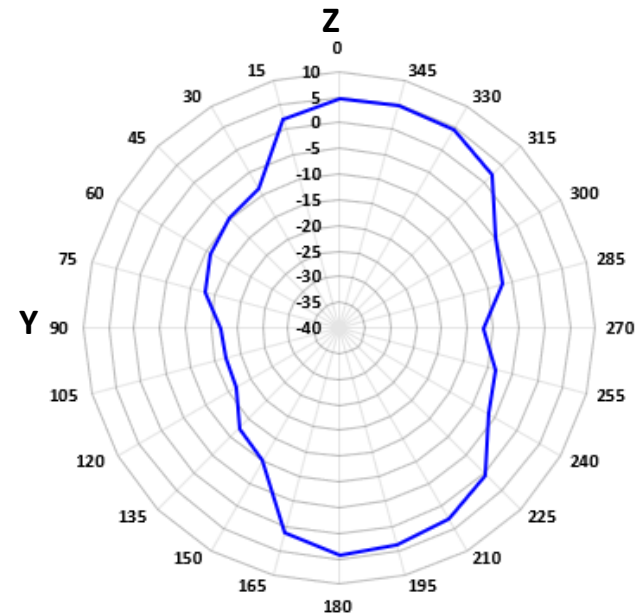




X-Y Plane



X-Z Plane



Y-Z Plane

Antenna Performance								
Freq. (MHz)	A1_2.4/5G		A2_2.4/5G		A3_2.4/5G		A4_2.4/5G	
	Efficiency (%)	Peak Gain (dBi)	Efficiency (%)	Peak Gain (dBi)	Efficiency (%)	Peak Gain (dBi)	Efficiency (%)	Peak Gain (dBi)
2400	64.68	4.22	64.96	4.76	63.10	3.80	68.19	4.59
2450	69.51	4.82	61.07	4.52	61.70	4.18	64.62	4.74
2500	65.19	4.64	62.96	4.65	63.45	5.03	63.55	4.78
5150	58.80	5.41	69.78	6.01	60.65	6.40	66.02	6.14
5500	62.94	5.79	66.59	5.21	59.72	6.37	62.39	5.53
5850	63.16	5.89	72.77	5.86	67.69	5.97	63.82	5.45

Antenna Performance								
Freq. (MHz)	A5_2.4/5/6G		A6_2.4/5/6G		A7_2.4/5/6G		A8_2.4/5/6G	
	Efficiency (%)	Peak Gain (dBi)	Efficiency (%)	Peak Gain (dBi)	Efficiency (%)	Peak Gain (dBi)	Efficiency (%)	Peak Gain (dBi)
2400	58.69	4.10	62.54	4.37	60.24	4.81	62.01	4.50
2450	66.80	4.24	68.51	3.98	61.53	4.75	69.61	4.86
2500	61.85	4.26	69.95	4.45	57.86	4.40	63.99	4.65
5150	61.09	5.04	66.47	5.13	66.35	5.39	67.74	5.38
5500	56.15	5.16	69.43	5.05	65.78	5.50	67.26	5.72
5850	61.45	5.75	61.46	5.54	61.57	5.24	66.98	5.31
5925	62.74	5.80	59.51	5.95	62.66	5.65	59.05	5.00
6500	59.38	5.21	61.47	5.44	50.99	5.52	64.29	5.47
7125	60.29	4.25	62.39	5.59	59.92	4.56	61.41	5.80

Antenna Performance		
Freq. (MHz)	BLE	
	Efficiency (%)	Peak Gain (dBi)
2400	66.82	4.71
2450	67.77	4.61
2500	69.34	4.61