

emplus

AN-420 Antenna design proposal

V5.1
Tim Chao
2022/11/21

Agenda

- History
- Antenna Placement
- Return Loss & Isolation
- Gain table
- 2D Radiation Pattern
- Combine Pattern

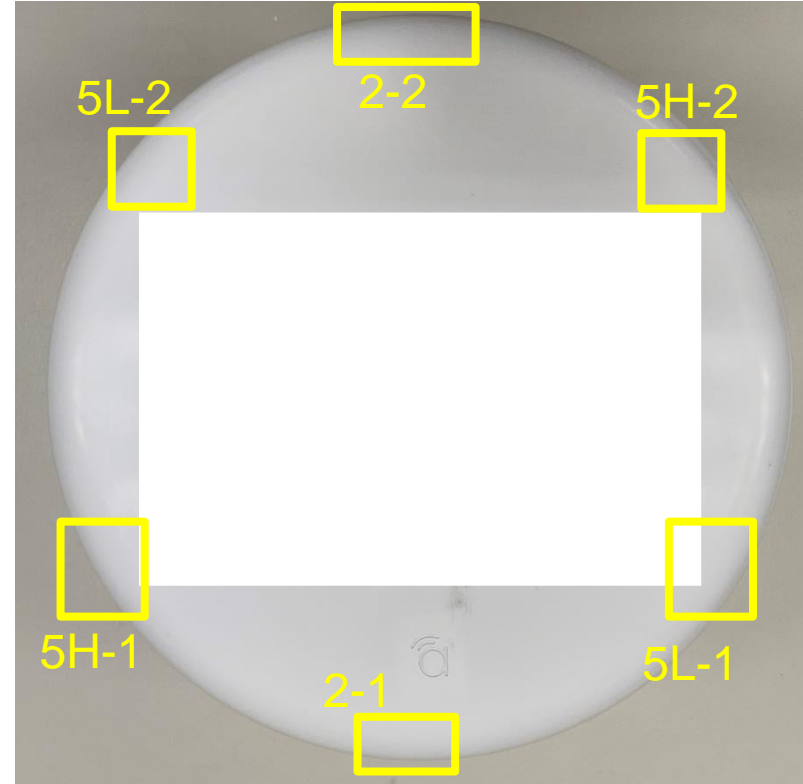
History

Date	Description	Version
2021/01/22	Drift	V0.1
2021/04/29	Change to slot 5G antenna, modify antenna location, improve High/Low band isolation	V0.2
2021/10/06	New antennas, new lower housing, modified heat plates	V1.0
2022/01/07	Final housing, 1.6mm ant PCB	V2.0
2022/01/19	Final housing(2022/01/18), 0.6mm ant PCB	V3.0
2022/06/30	S3 housing with final thermal solution, antenna rotation	V4.0
2022/11/04	S3 DVT sample, finetune 2-2 layout	V5.0
2022/11/21	Add antenna PN and pictures	V5.1

Antenna location

- AN-420 have total six antennas as figure :
- 2.45GHz * 2
- 5GHz Low band * 2
- 5GHz High band * 2

	Size	Material	PN	Type
2-1	15*23.5*0.6	FR4	7102A0568000	Dipole
2-2	15*23.5*0.6	FR4	7102A0572000	Dipole
5L-1	15.5*11.7*0.6	FR4	7102A0570000	Monopole
5L-2	11*19*0.6	FR4	7102A0571000	PIFA
5H-1	17*11.7*0.6	FR4	7102A0569000	Monopole
5H-2	11*19*0.6	FR4	7102A0567000	PIFA



Antenna picture

2-1



2-2



5L-1



5L-2



5H-1

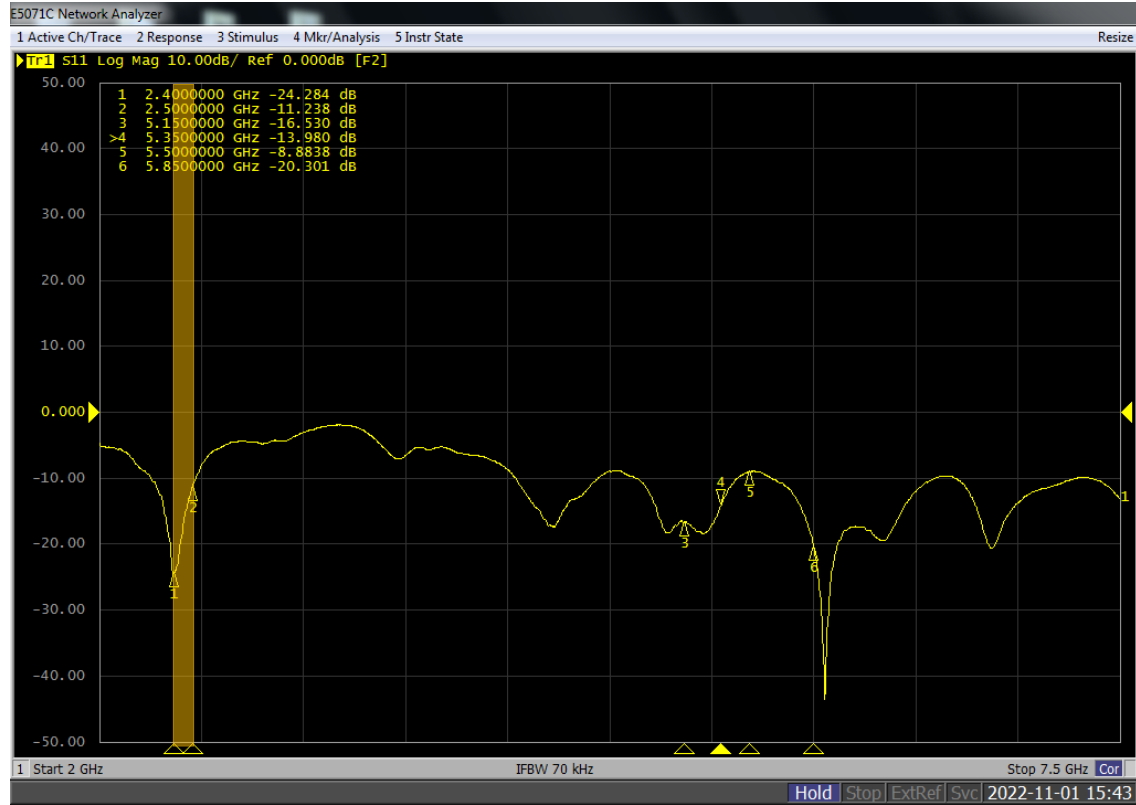


5H-2

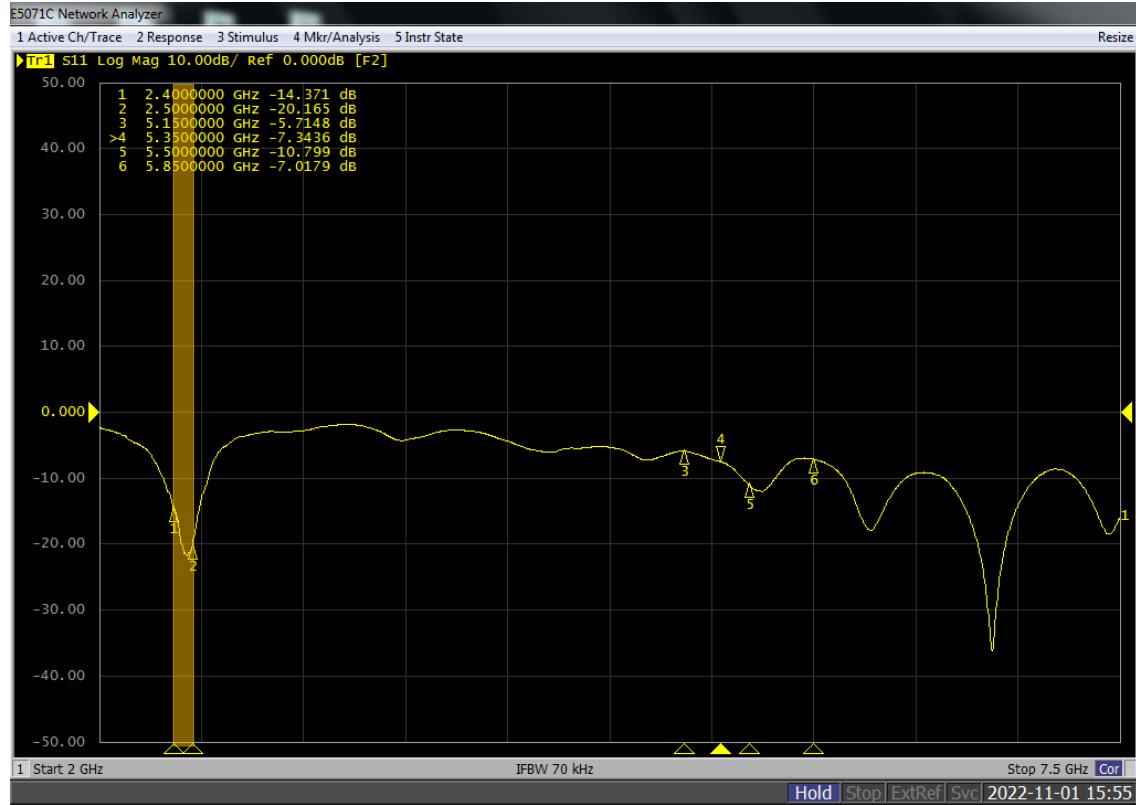


Manufactory : Advanced wireless & antenna inc.
Add.:B2-F,No.207-1,Sec.3,Beixin Rd.,Xindian
Dist.,New Taipei City,231,Taiwan

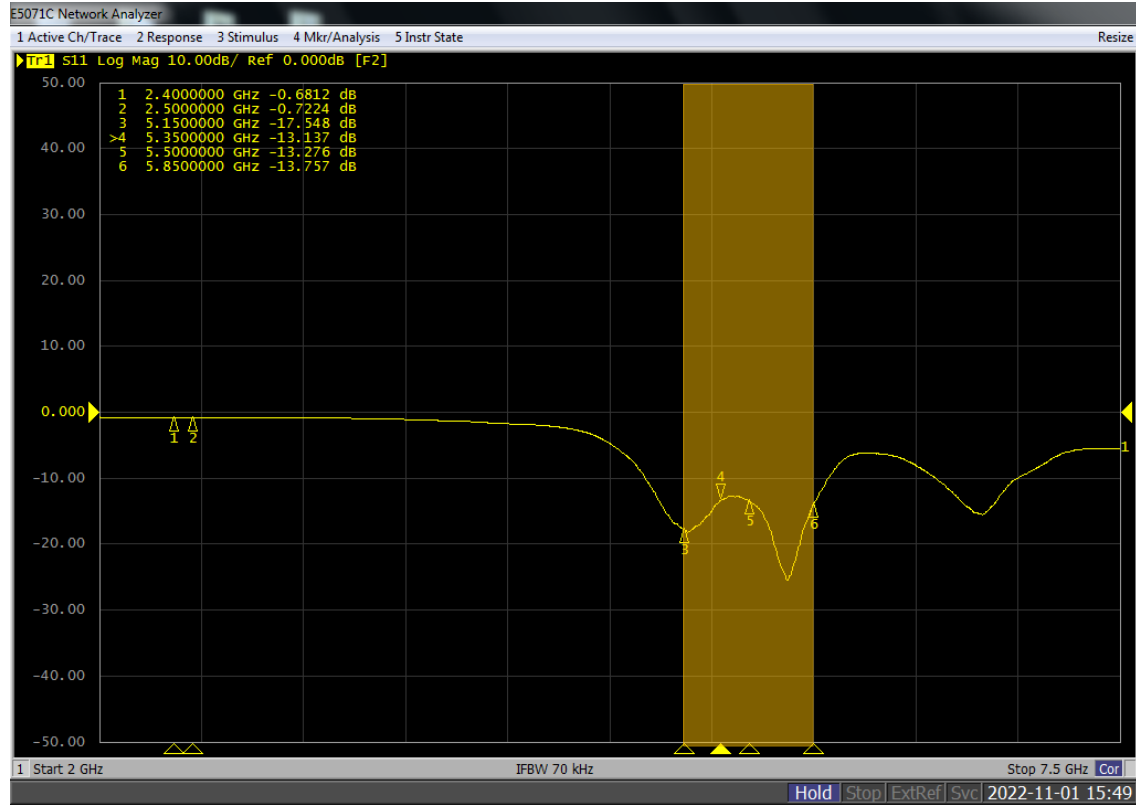
Return loss : 2-1



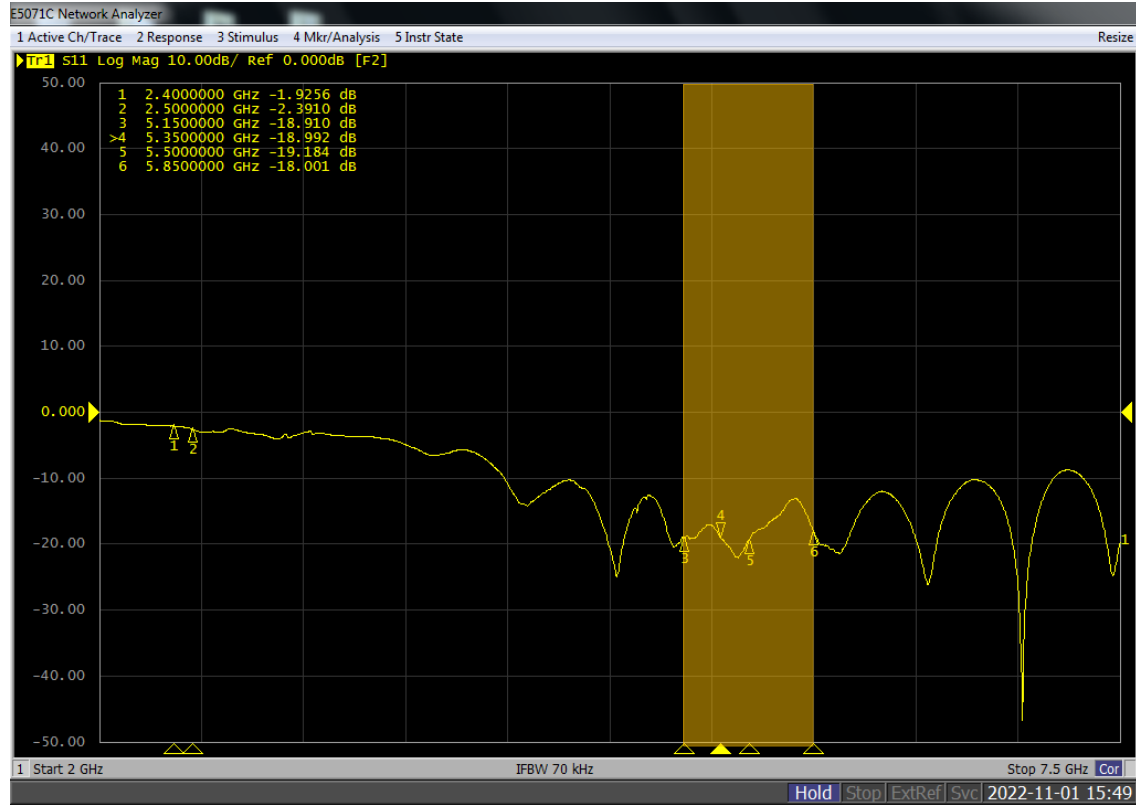
Return loss : 2-2



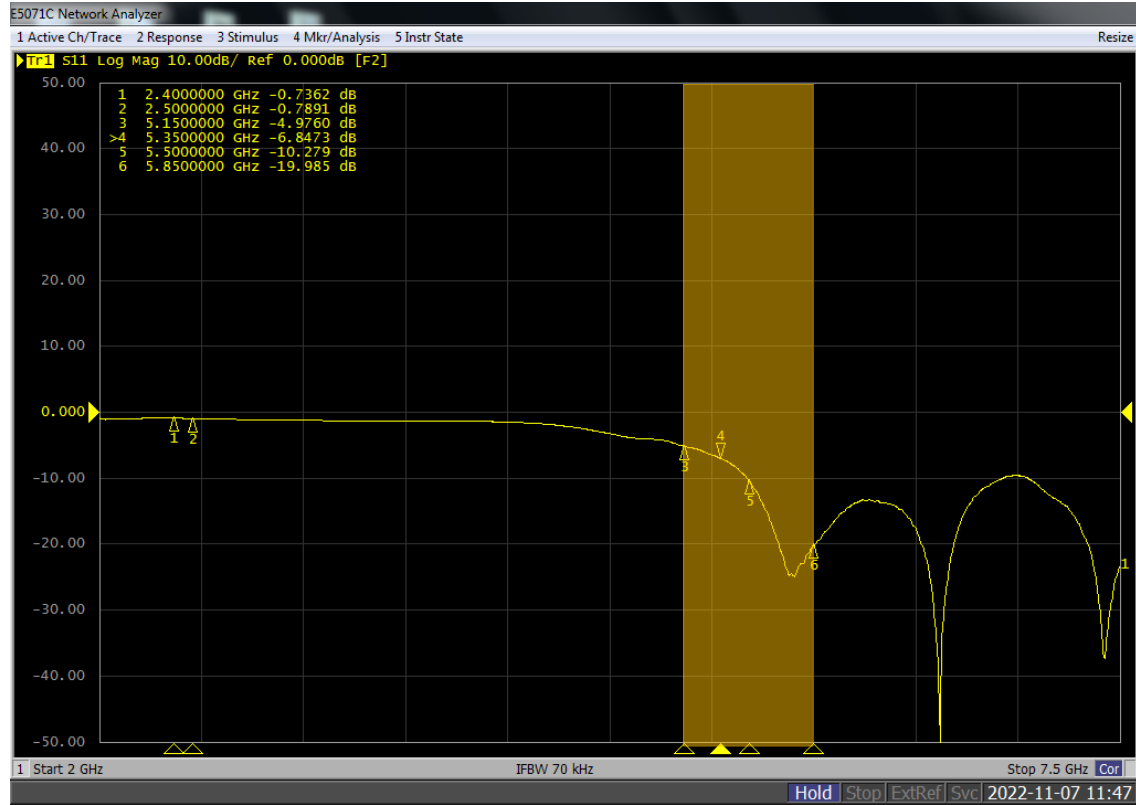
Return loss : 5L-1



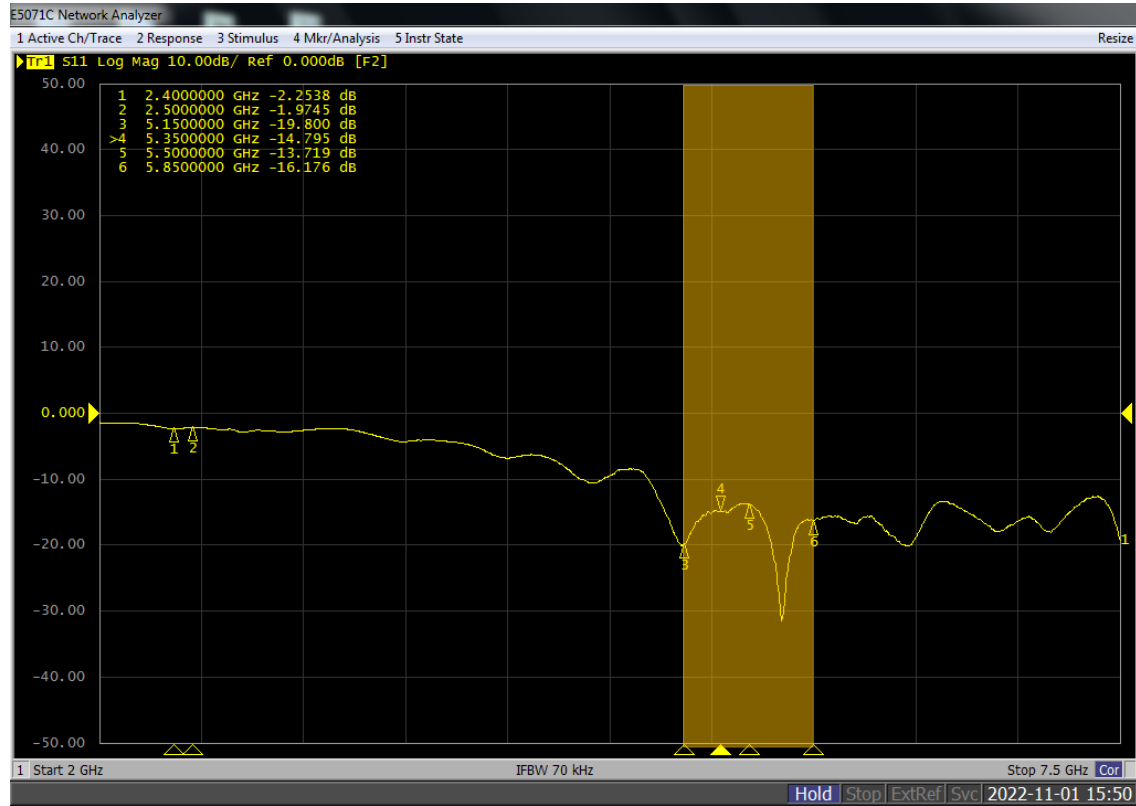
Return loss : 5L-2



Return loss : 5H-1



Return loss : 5H-2



Return loss table

S11(dB)	2.4GHz	2.5GHz	5.15GHz	5.35GHz	5.5GHz	5.85GHz
2-1	-24.2	-11.2				
2-2	-14.3	-20.1				
5L-1			-17.5	-13.1	-13.2	-13.7
5L-2			-18.9	-18.9	-19.1	-18.0
5H-1			-4.9	-6.8	-10.2	-19.9
5H-2			-19.8	-14.7	-13.7	-16.1

Criteria : S11 < -10dB



Isolation at 2.45GHz

	2-1	2-2	5L-1	5L-2	5H-1	5H-2
2-1	NA	-20.7	-30.4	-28.4	-33.7	-26.1
2-2	NA	NA	-36.0	-24.7	-38.4	-28.5
5L-1	NA	NA	NA	-43.2	-43.1	-38.9
5L-2	NA	NA	NA	NA	-48.1	-53.7
5H-1	NA	NA	NA	NA	NA	-35.7
5H-2	NA	NA	NA	NA	NA	NA

Criteria : S21 < -20dB



Isolation at 5.5GHz

	2-1	2-2	5L-1	5L-2	5H-1	5H-2
2-1	NA	-25.4	-27.7	-21.4	-20.1	-26.8
2-2	NA	NA	-26.4	-21.7	-33.6	-30.2
5L-1	NA	NA	NA	-30.8	-25.6	-27.7
5L-2	NA	NA	NA	NA	-25.1	-26.2
5H-1	NA	NA	NA	NA	NA	-28.3
5H-2	NA	NA	NA	NA	NA	NA

Criteria : S21 < -20dB

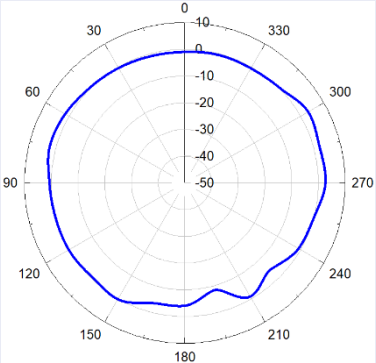
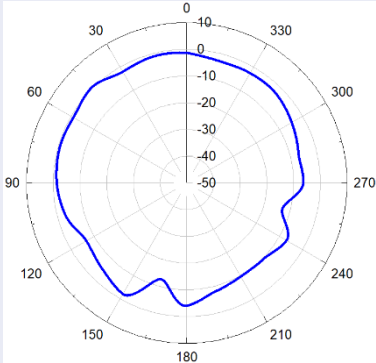
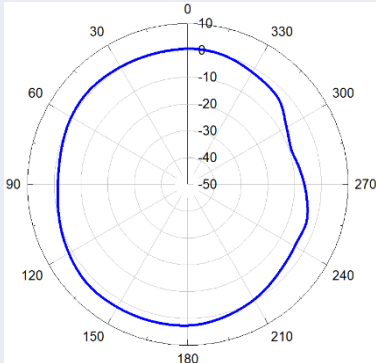


Gain table

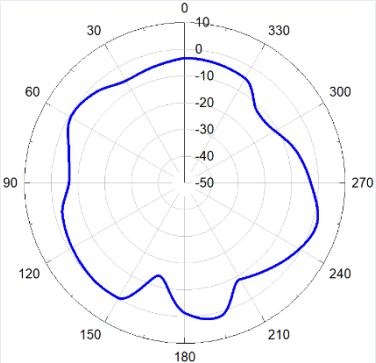
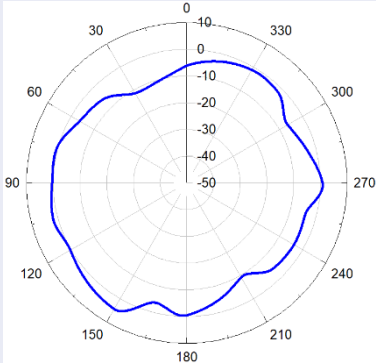
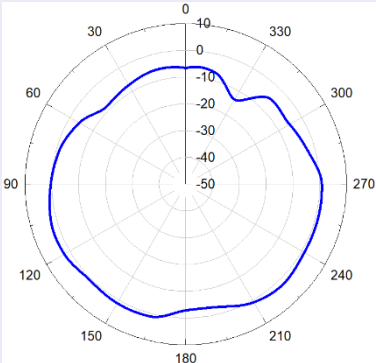
	Antenna	Peak gain (dBi)	Efficiency (%)
2.45GHz	2-1	4.5	74.6
	2-2	4.8	65.6
5GHz Lowband	5L-1	5.5	69
	5L-2	4.9	65.1
5GHz Highband	5H-1	5.6	74
	5H-2	5.0	69.2

Criteria : 2.45GHz > 3dBi ; 5.5GHz > 4dB Efficiency > 60%

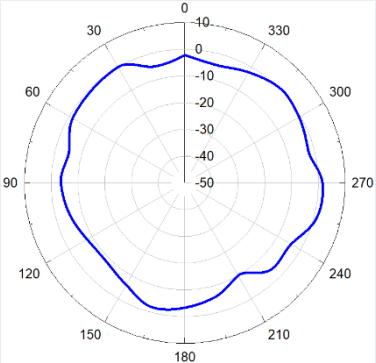
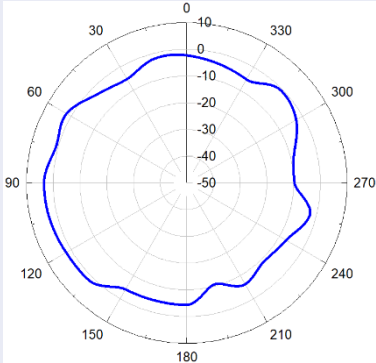
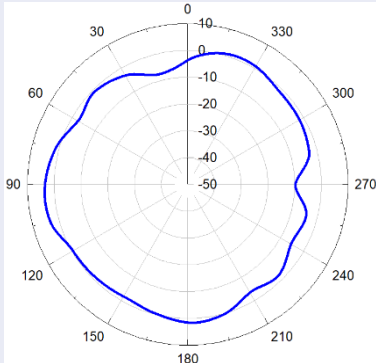
2D pattern : 2-1

Frequency	XZ Plane	YZ Plane	XY Plane
2.45GHz			

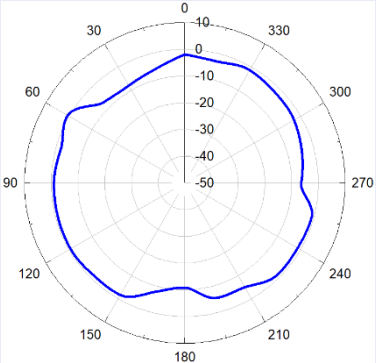
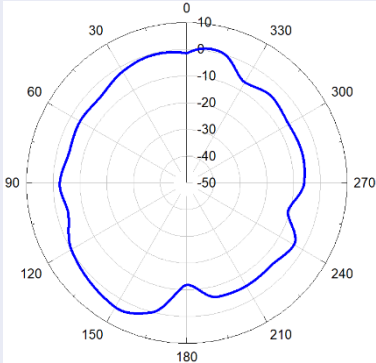
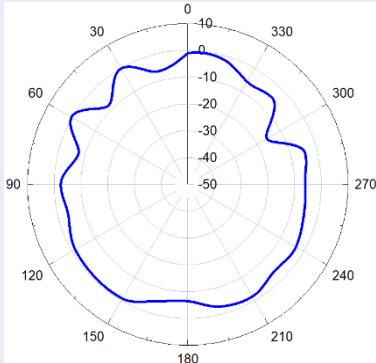
2D pattern : 2-2

Frequency	XZ Plane	YZ Plane	XY Plane
2.45GHz			

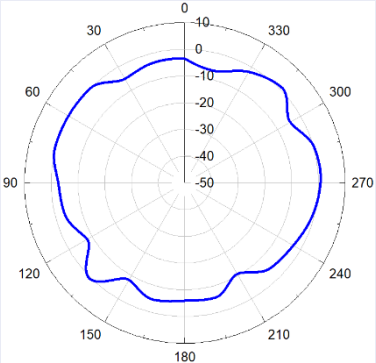
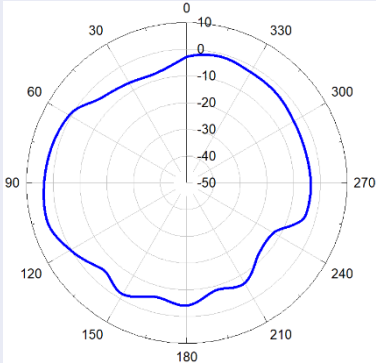
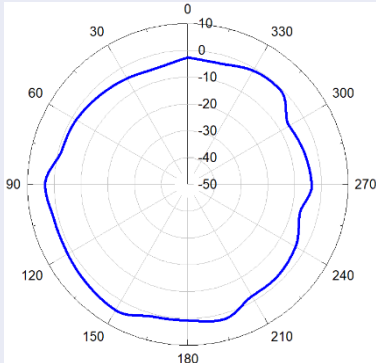
2D pattern : 5L-1

Frequency	XZ Plane	YZ Plane	XY Plane
5.35GHz			

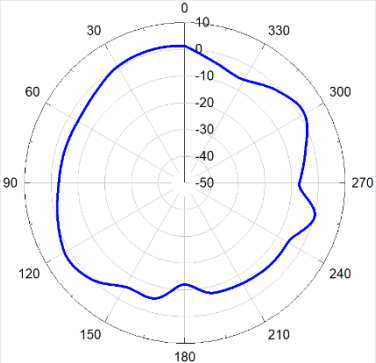
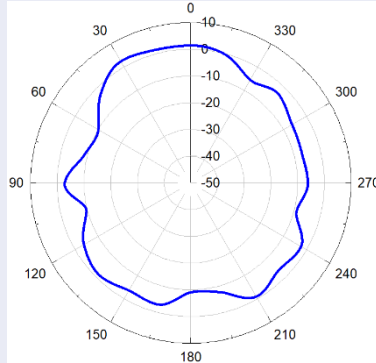
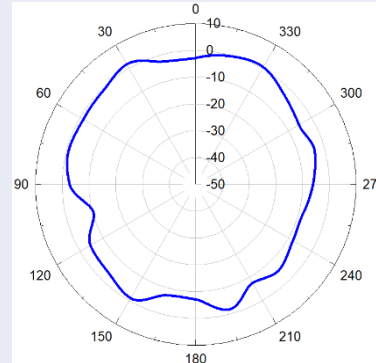
2D pattern : 5L-2

Frequency	XZ Plane	YZ Plane	XY Plane
5.35GHz			

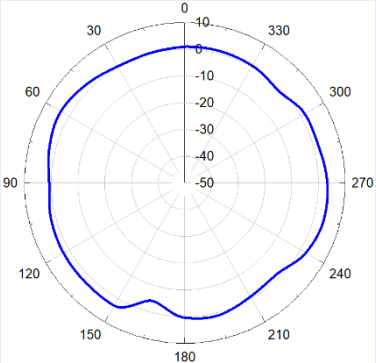
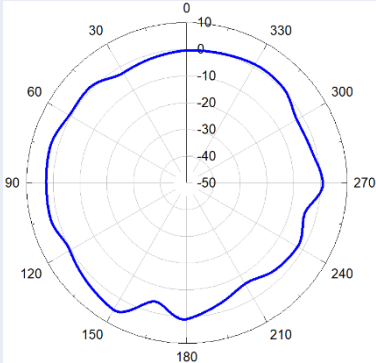
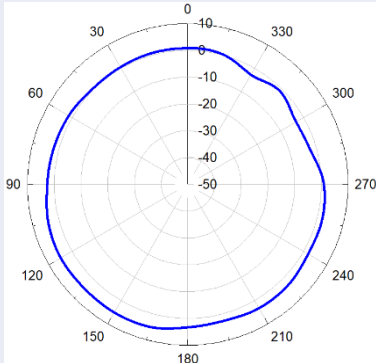
2D pattern : 5H-1

Frequency	XZ Plane	YZ Plane	XY Plane
5.75GHz			

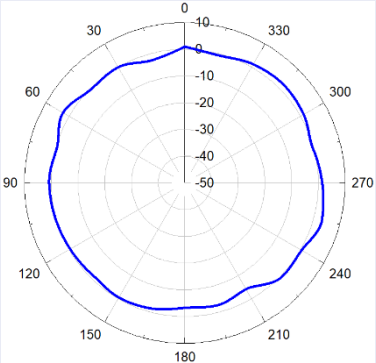
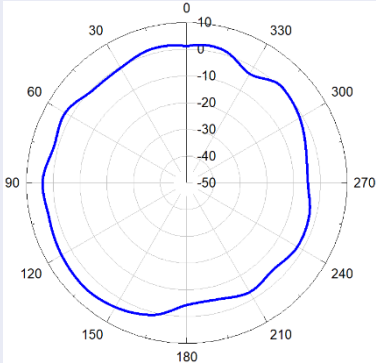
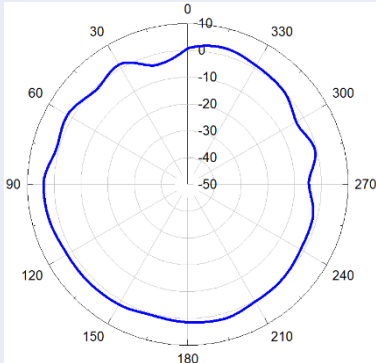
2D pattern : 5H-2

Frequency	XZ Plane	YZ Plane	XY Plane
5.75GHz			

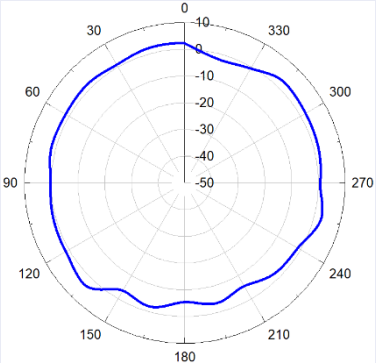
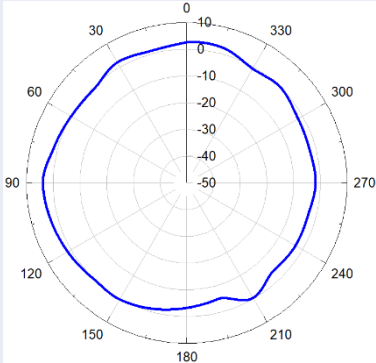
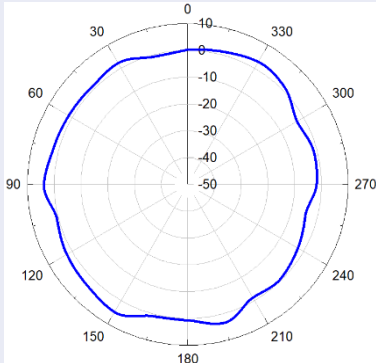
Combine pattern : 2.4GHz antennas

Frequency	XZ Plane	YZ Plane	XY Plane
2.45GHz			

Combine pattern : 5GHz Low-band antennas

Frequency	XZ Plane	YZ Plane	XY Plane
5.35GHz			

Combine pattern : 5GHz High-band antennas

Frequency	XZ Plane	YZ Plane	XY Plane
5.75GHz			

The logo for 'emplus' is centered in the image. It features the word 'emplus' in a lowercase, sans-serif font. The 'e' and 'm' are a light blue color, while the 'p' and 'l' are a darker blue, and the 'u' and 's' are a light blue. The background is a large, abstract graphic of two overlapping circles filled with a low-poly, geometric pattern of various shades of blue. The overall aesthetic is clean and modern.

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