

Datasheet JLR EVAc roof pod antenna module

MOLEX CVS HILDESHEIM

2024.09.09

Revision history



Version	date	Details
0.1	2024.08.27	First Draft
0.2	2024.08.29	Second Draft, various updates on Mechanical and Electrical data
1.0	2024.09.09	Final Updates,minor changes

Supplier data



Customer Part Number	TEVA-18D862-DB
Description	BSE ASY ANT (GNSS + Cellular 1&2+ Wifi + V2X + SDARS + SRVM)
Molex Part Number	AS 3 47 12
Company	Molex CVS Hildesheim GmbH
Address	Daimlerring 31, D-31135 Hildesheim
Production site (address, country)	Molex CVS Shanghai, China

Mechanic



Design, geometry &
overview of components

Mechanical data

TEVA-18D862-DB / AS 34712 → BSE ASY ANT (GNSS + Cellular 1 & 2 + Wifi + V2X + SDARS + SRVM)

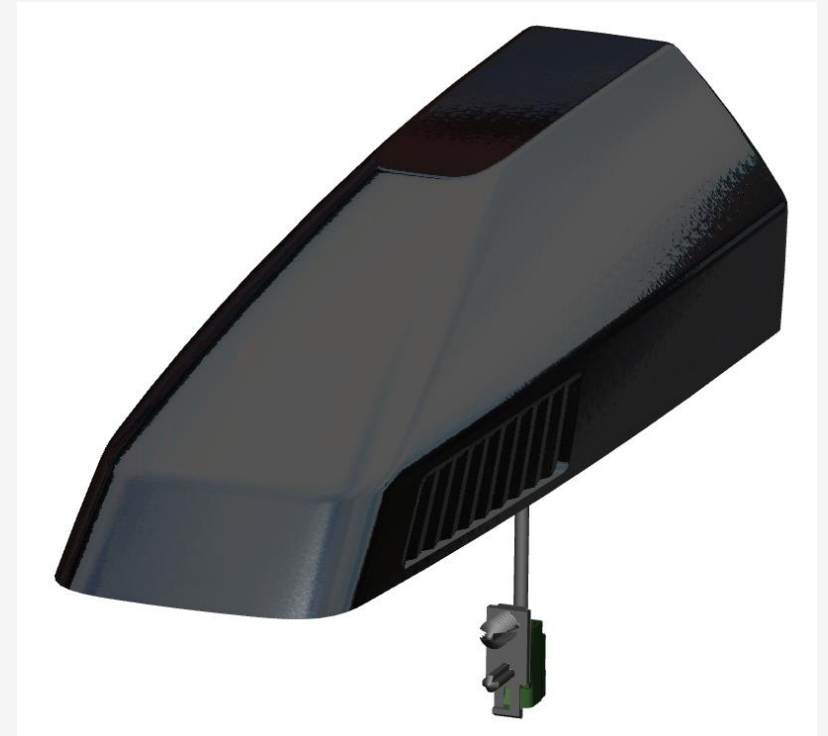
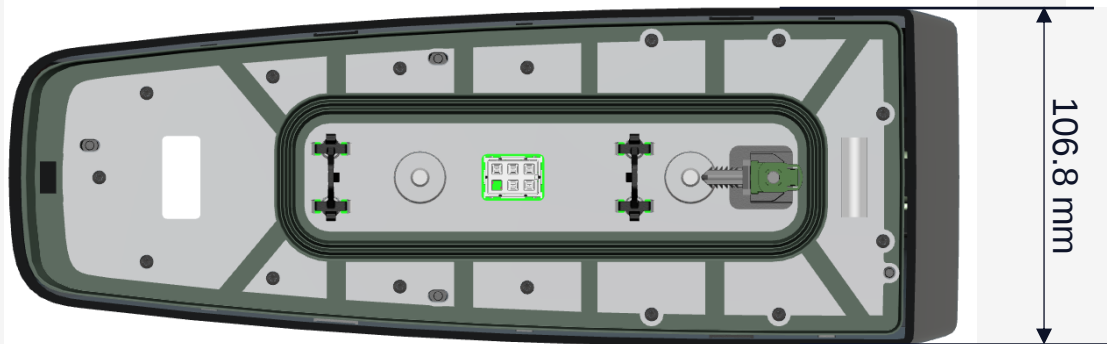
298.75 mm



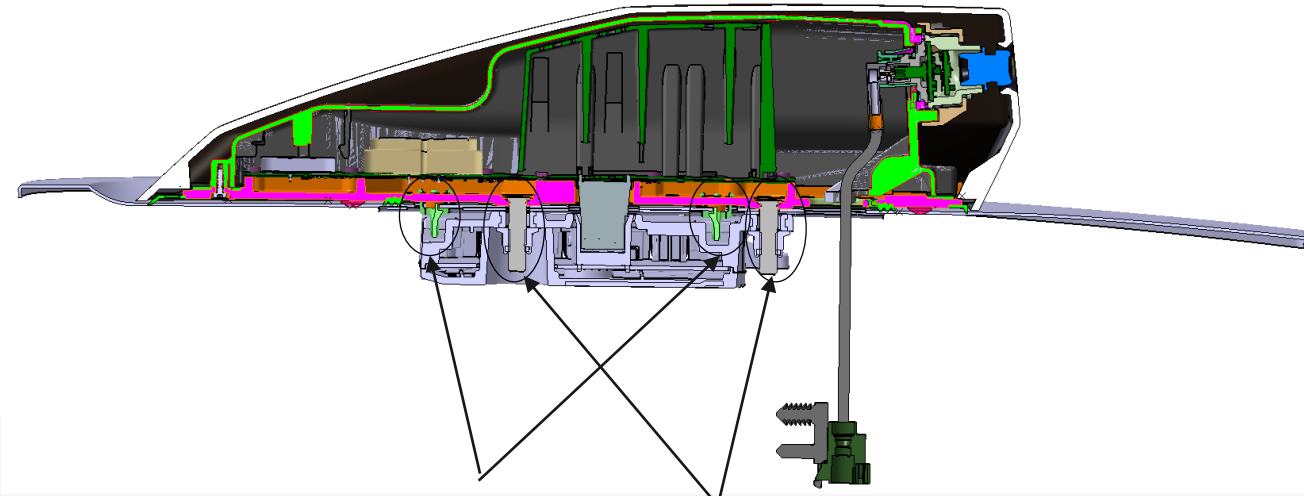
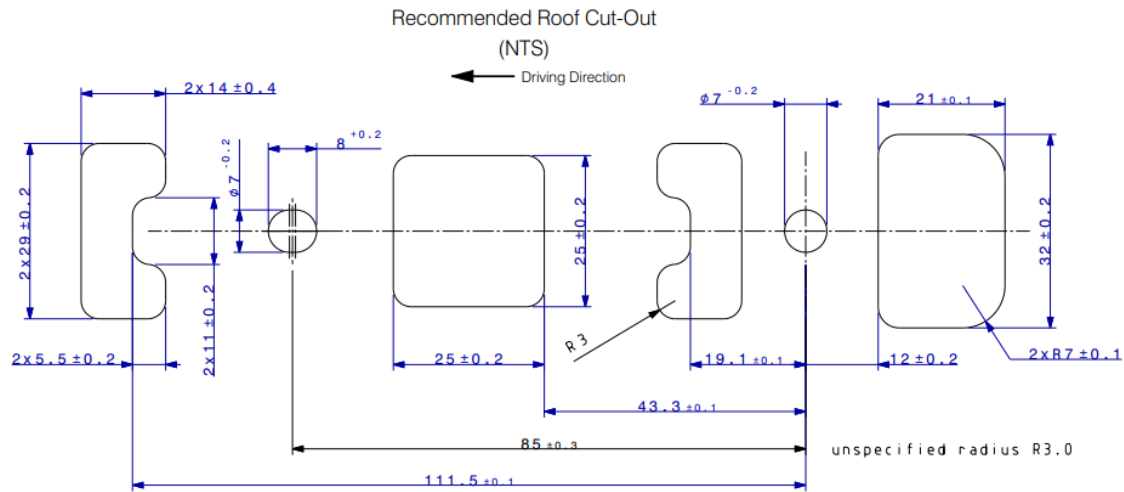
69 mm



106.8 mm



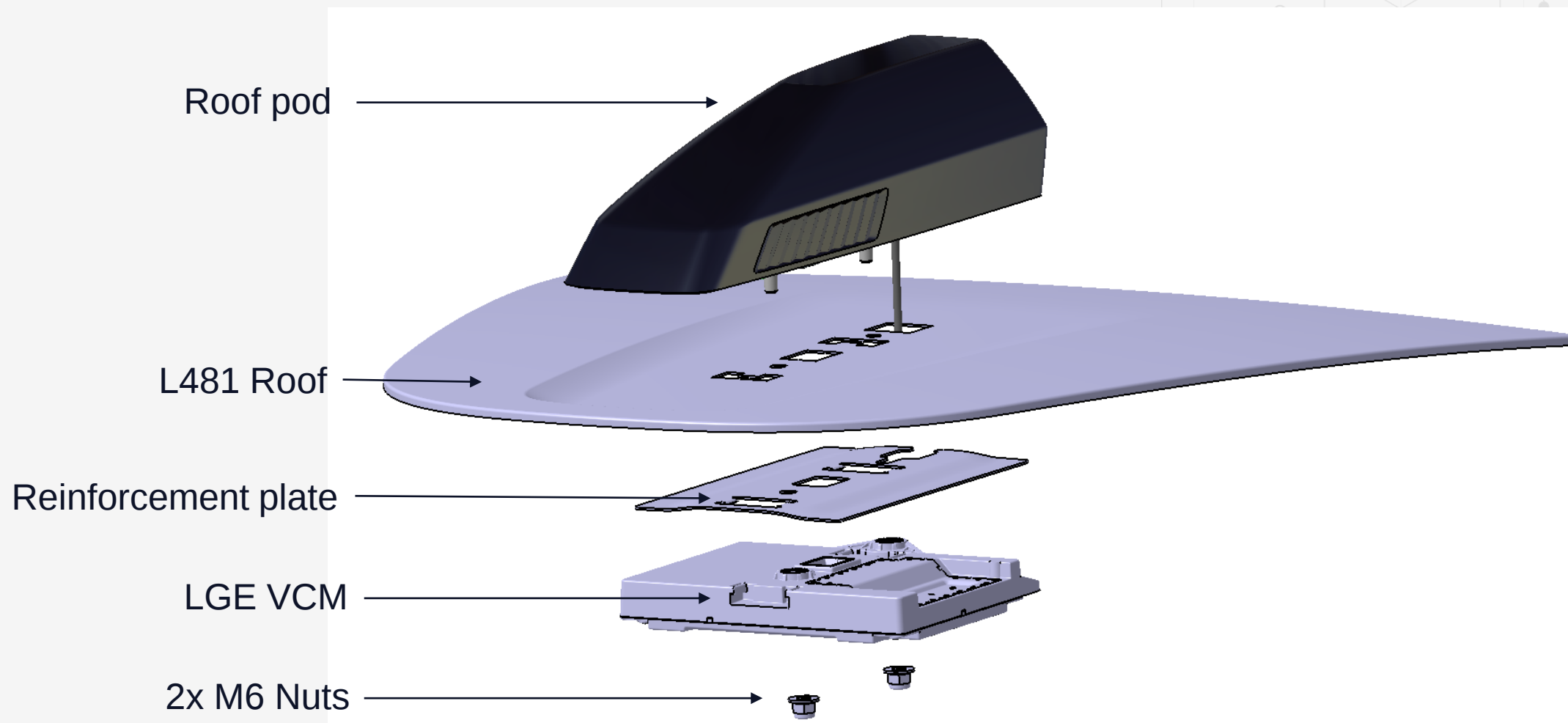
Mounting situation in vehicle



Prefixation to roof
/reinf. plate & VCM

Fixation with
M6 studs

Mounting situation in vehicle



GNSS



Active track parameter

Electrical parameter GNSS

Overview

Parameter	Min.	Typ.	Max.	Unit	Comment
Frequency high band L1	1559		1610	MHz	
Frequency low band L5	1164		1214	MHz	
Supply voltage	4,0	4,2	4,4	V	
Current consumption	20	30	100	mA	
Amplifier gain	20	24,3	50	dB	Level @ B2B connector
Gain ripple	-3,7		+ 2,3	dB	
Output return loss			-10	dB	
Noise Figure		< 2,0	2,5	dB	

Parameter	Min	Typ.	Max.	Unit
Antenna passive AVG Gain @ Zenith, L5	1.2	3.2	4.2	dBiC
Antenna passive AVG Gain @ Zenith, L1	0.2	0.9	1.3	dBiC

Electrical parameter

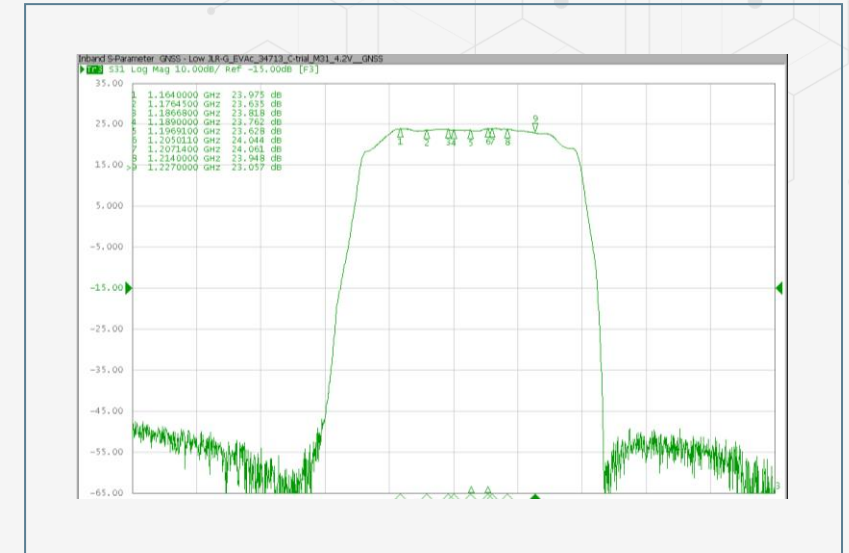
GNSS L5 @ 4.2V

- LNA gain =>

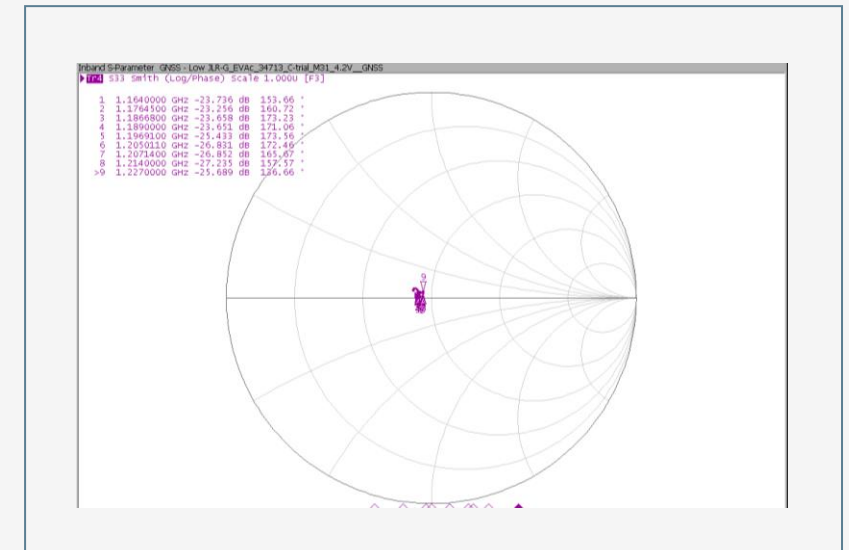
- LNA output return loss =>

Equipment (main/relevant):

- VNA E5071C [internal DE0064], next cal. 2025-09-27
- Power supply
- Bias-T Mini Circuits ZX85-12G-S+



Exemplary Graph



Exemplary Graph

Electrical parameter

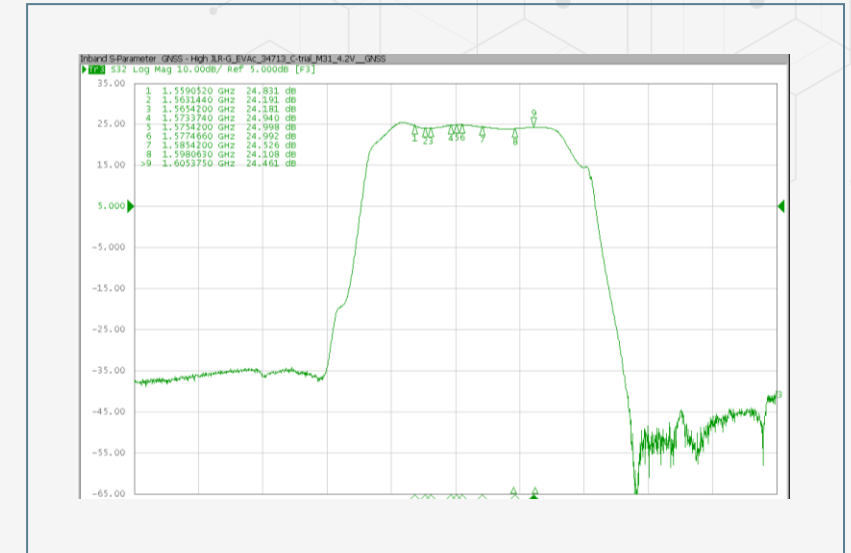
GNSS L1 @ 4.2V

- LNA gain =>

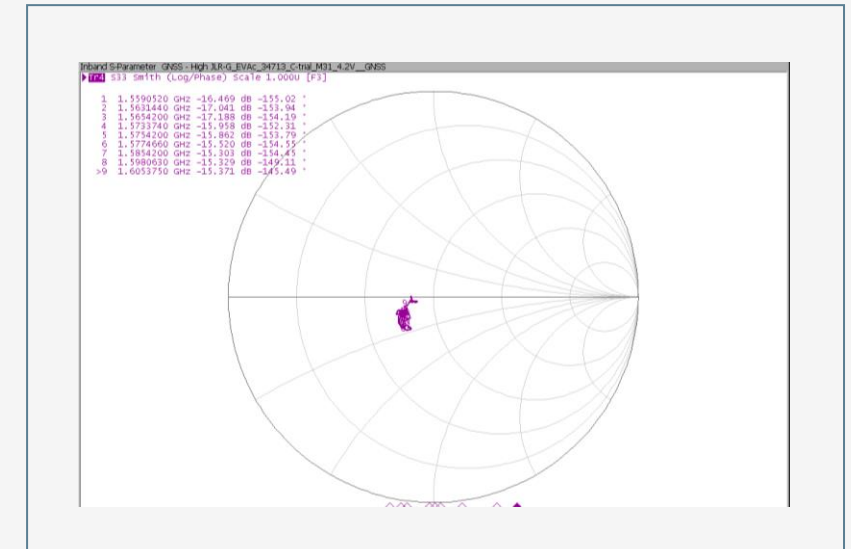
- LNA output return loss =>

Equipment (main/relevant):

- VNA E5071C [internal DE0064], next cal. 2025-09-27
- Power supply
- Bias-T Mini Circuits ZX85-12G-S+



Exemplary Graph



Exemplary Graph

Electrical parameter

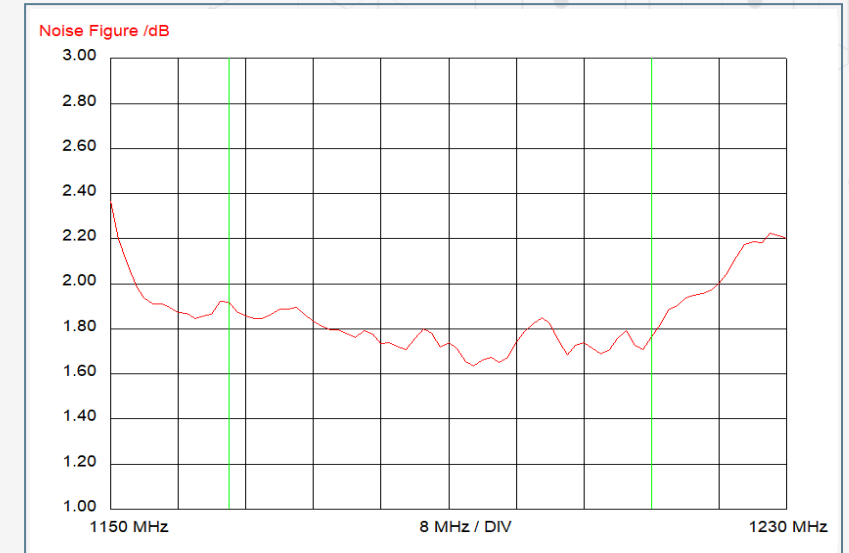
GNSS L1 + L5 @ 4.2V

- LNA Noise Figure L5 =>

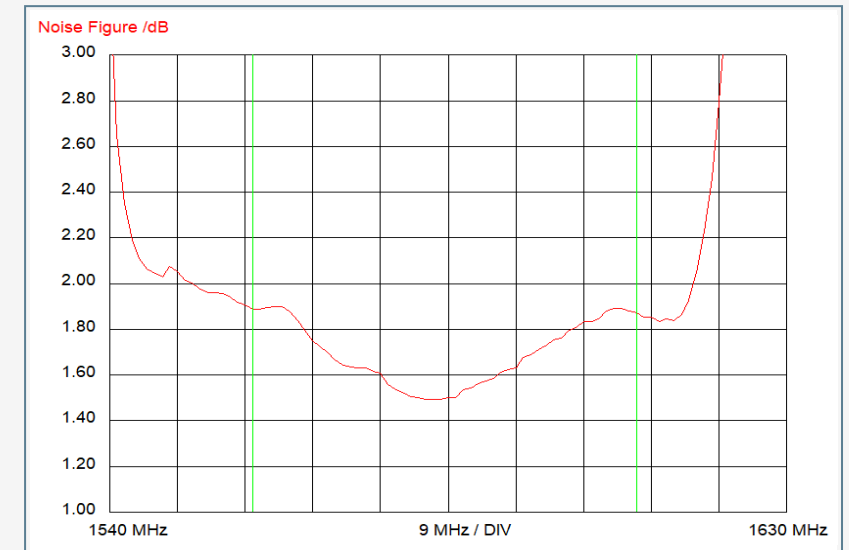
- LNA Noise Figure L1 =>

Equipment (main/relevant):

- FSP [internal DE0040], next cal. 2025-08-25 + NoiseProbe A [internal DE0039], next cal. 2024-10-16
- Power supply
- Bias-T Mini Circuits ZX85-12G-S+
- Noise Box



Exemplary Graph



Exemplary Graph

SDARS



Active track parameter

Electrical parameter SDARS

Overview

Parameter	Min.	Typ.	Max.	Unit	Comment
Frequency band	2320		2345	MHz	
Supply voltage	4,0	4,7	5,1	V	
Current consumption	50	100	150 (180 **)	mA	(**) Supply vol. 5,1V < U < 5.5V
Amplifier gain	20	22	24	dB	Including $\approx$ 4.3dB loss (*)
Output return loss			- 9,54	dB	VSWR 2,0:1
Noise Figure		0,8	1,0	dB	

(*) External PCB trace losses (e.g. TCU / VCM box), cable losses, adaptation losses, etc.

Parameter	Min	Typ.	Max.	Unit
Antenna passive AVG Gain @ Zenith	4.4	4.5	4.6	dBic

Electrical parameter

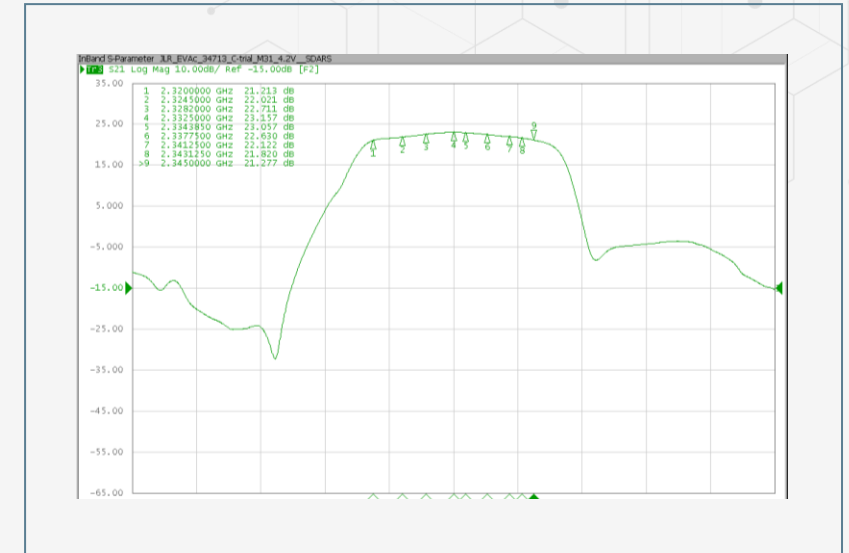
SDARS @ 4.7V

- LNA gain =>

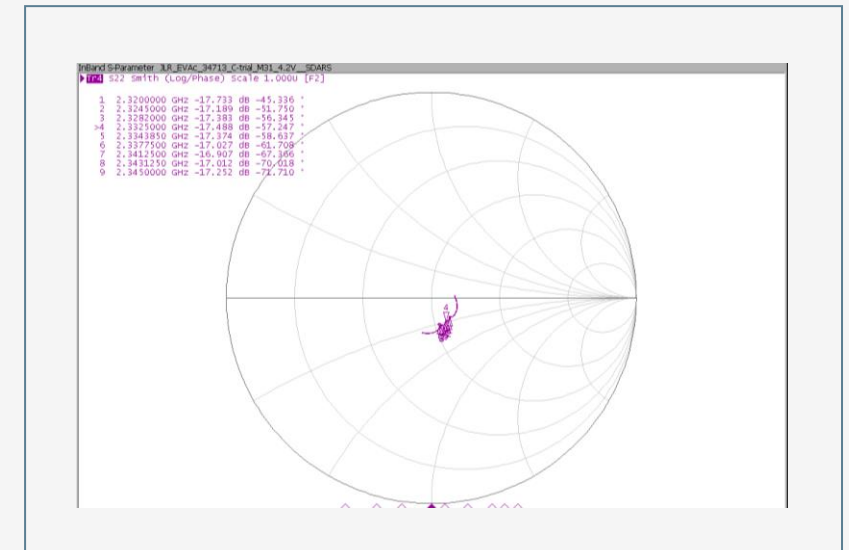
- LNA Output return loss =>

Equipment (main/relevant):

- VNA E5071C [internal DE0064], next cal. 2025-09-27
- Power supply
- Bias-T Mini Circuits ZX85-12G-S+ & 4.3dB Loss



Exemplary Graph



Exemplary Graph

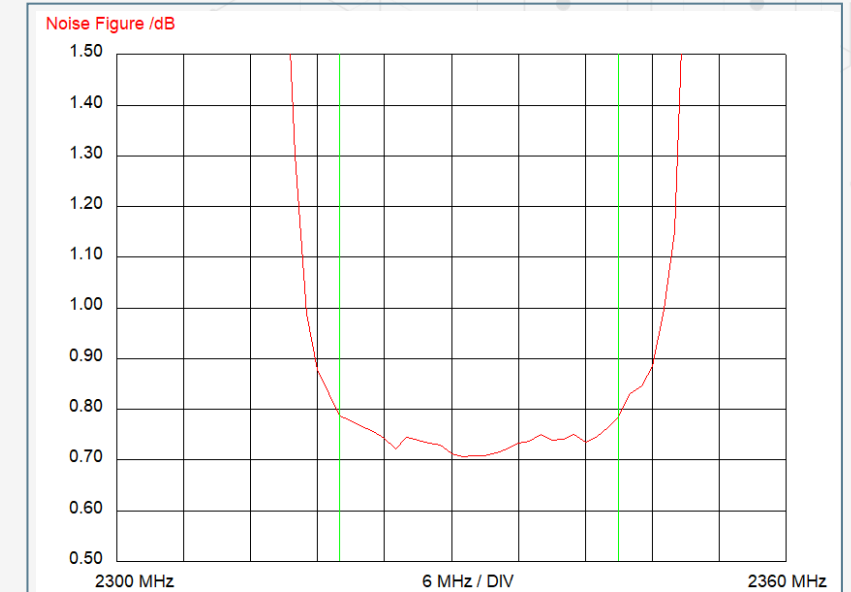
LNA Noise figure

SDARS @ 4.7V

- LNA Noise Figure SDARS =>

Equipment (main/relevant):

- FSP [internal DE0040], next cal. 2025-08-25+ NoiseProbe A [internal DE0039], next cal. 2024-10-16
- Power supply
- Bias-T Mini Circuits ZX85-12G-S+ & 4.3dB Loss
- Noise Box



Exemplary Graph

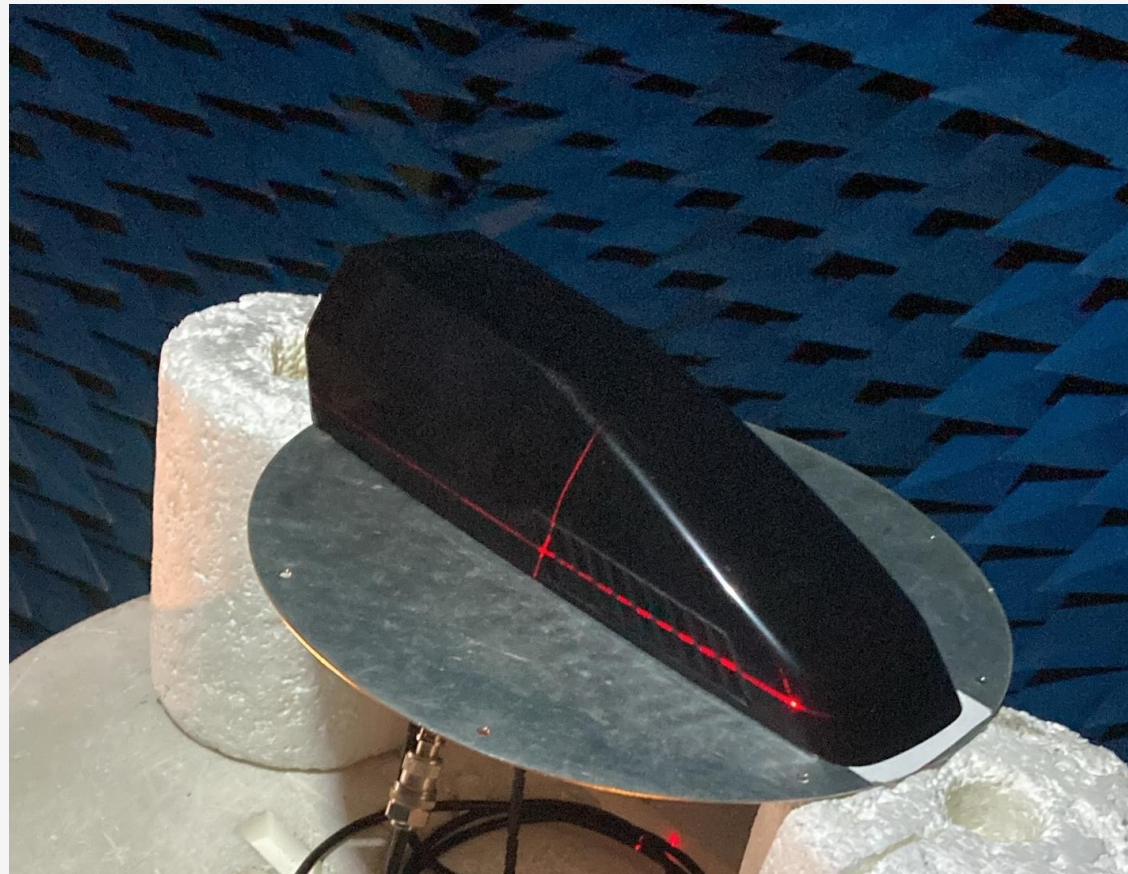
Antenna measurements



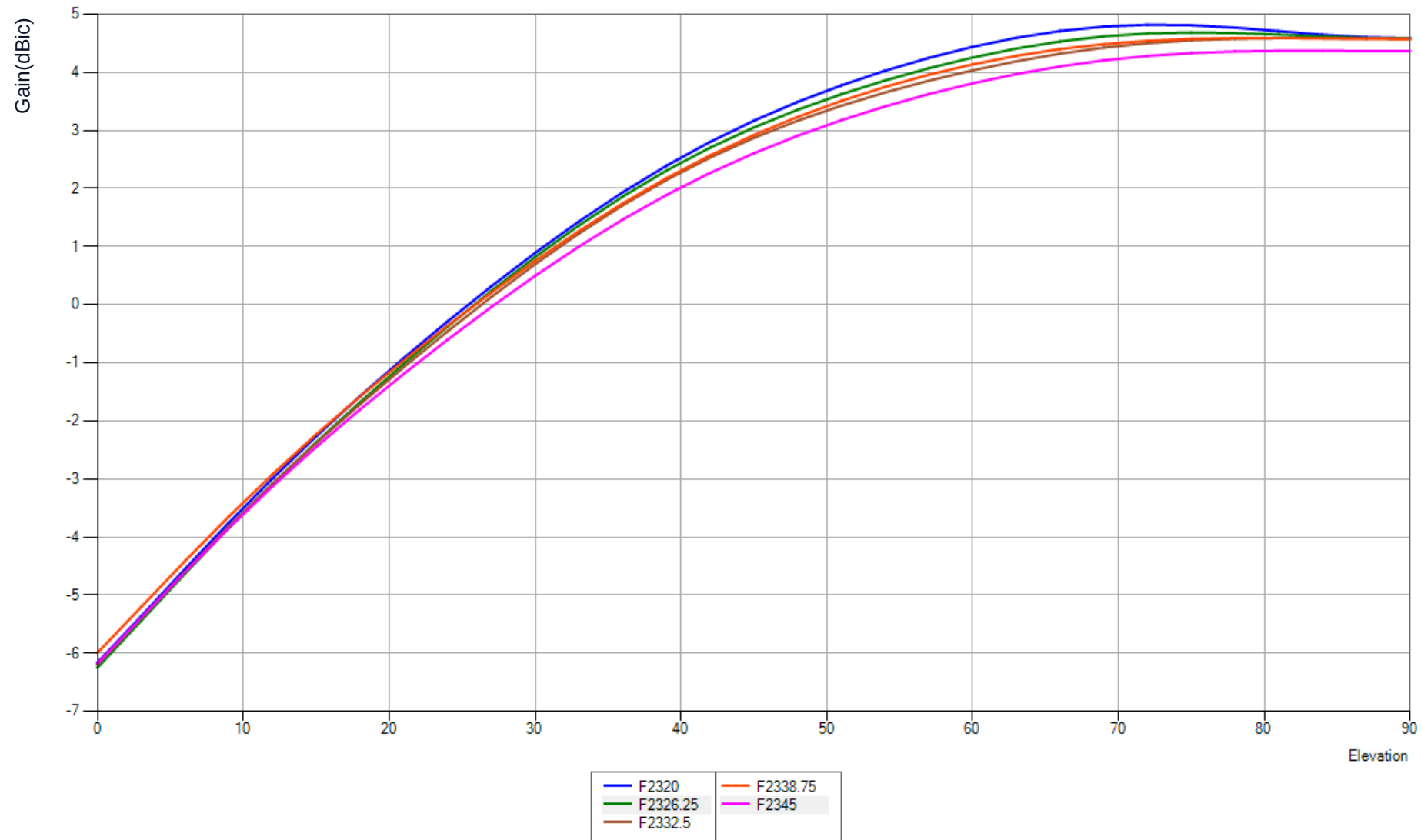
Passive parameter

Passive antenna measurements

The data is based on antenna measurement with MVG SG64 anechoic chamber in Molex Hildesheim with 300mm circular ground plane



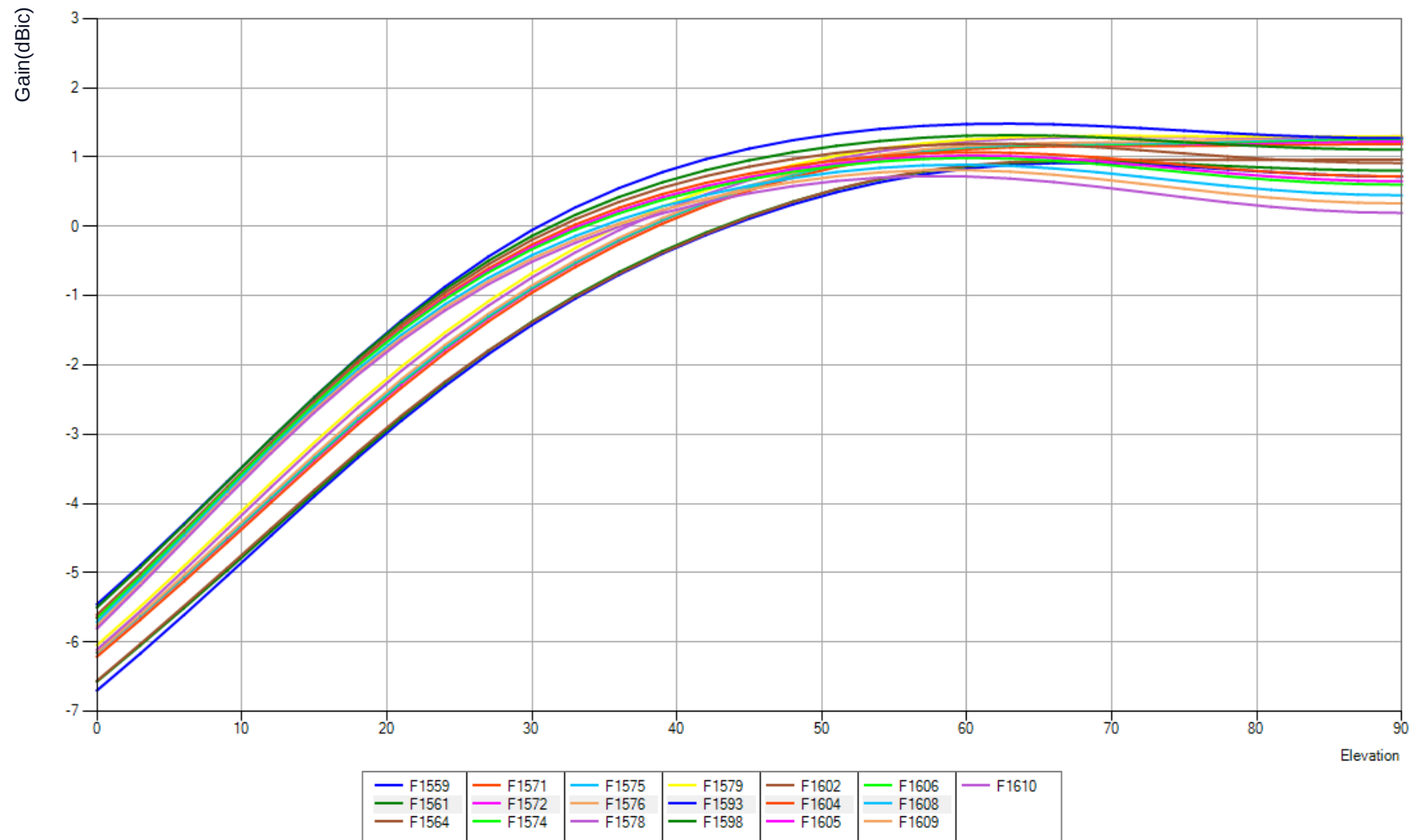
Average Gain over Elevation SDARS (LC-Polarization ,dBic)



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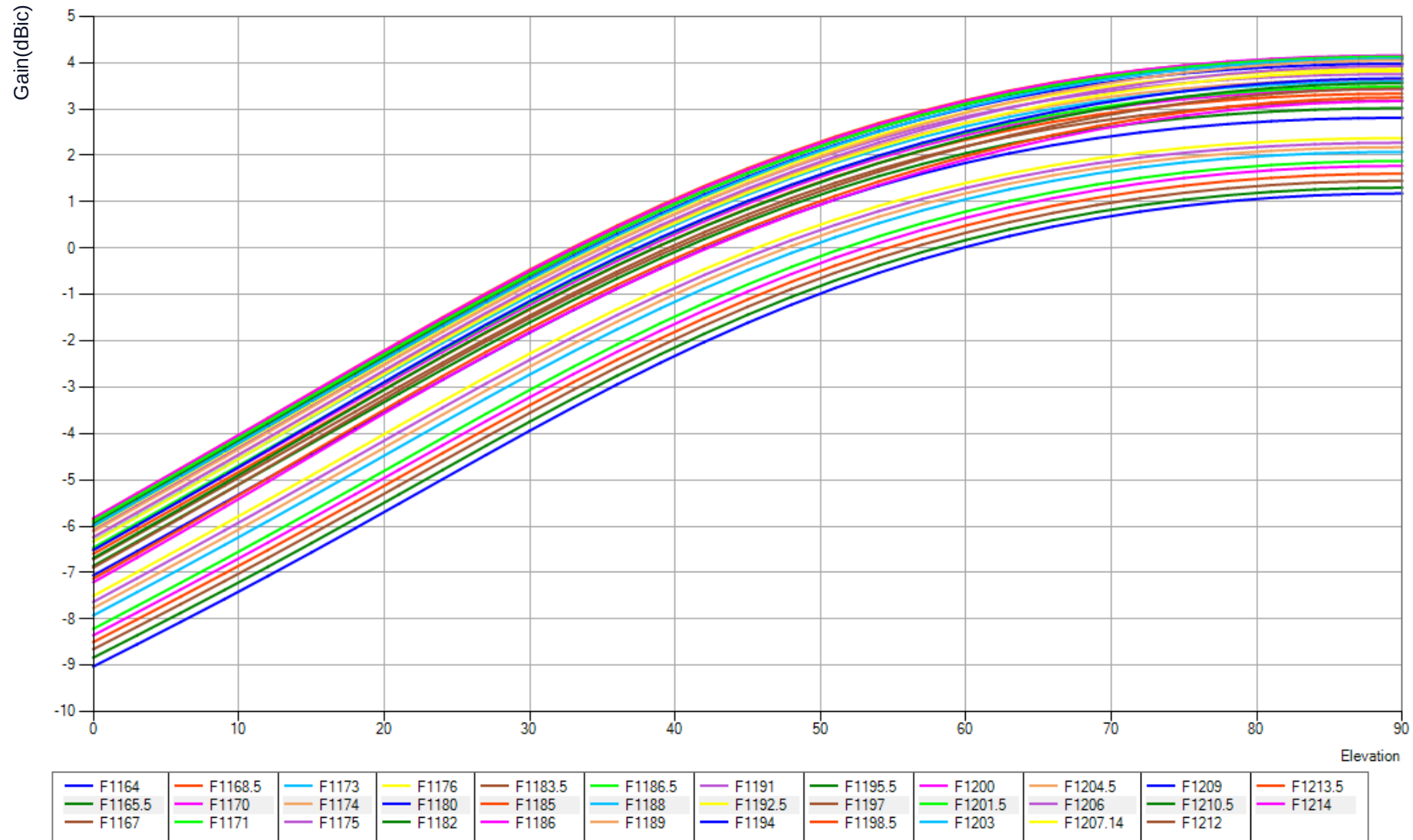
Average Gain over Elevation L1 (RC-Polarization ,dBic)



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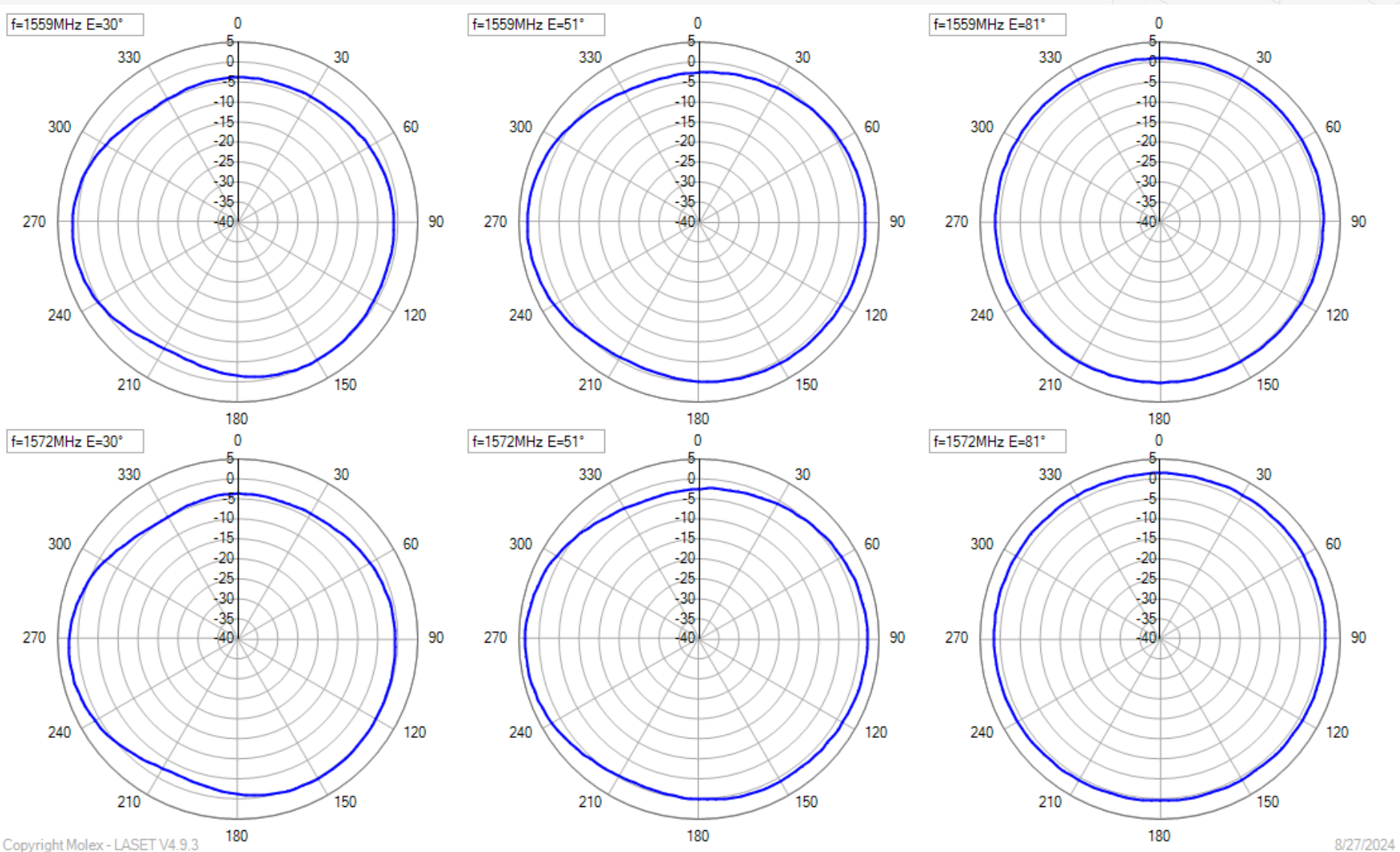
Average Gain over Elevation L5 (RC-Polarization,dBic)



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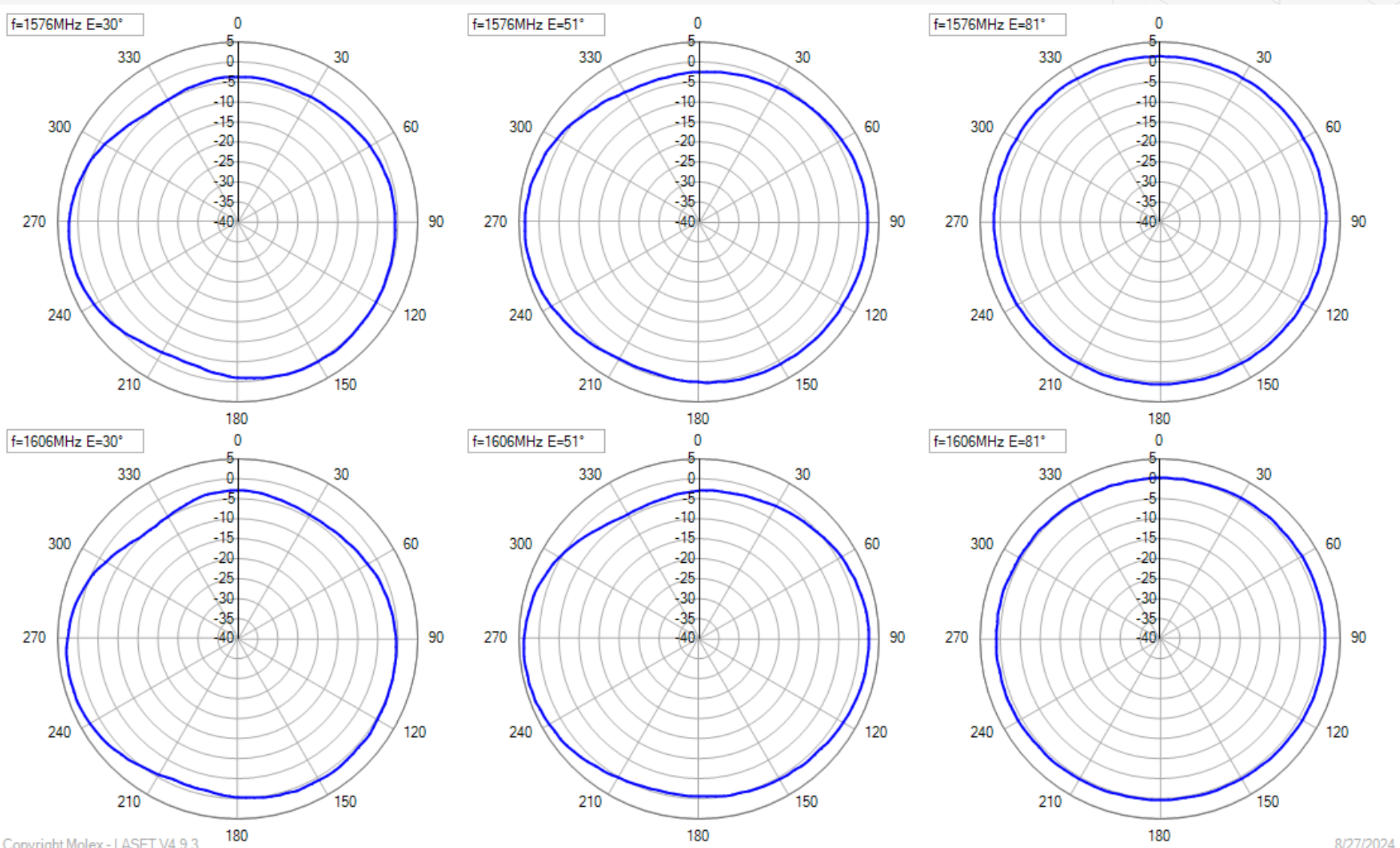
Horizontal Radiation Pattern GNSS L1(dBic)



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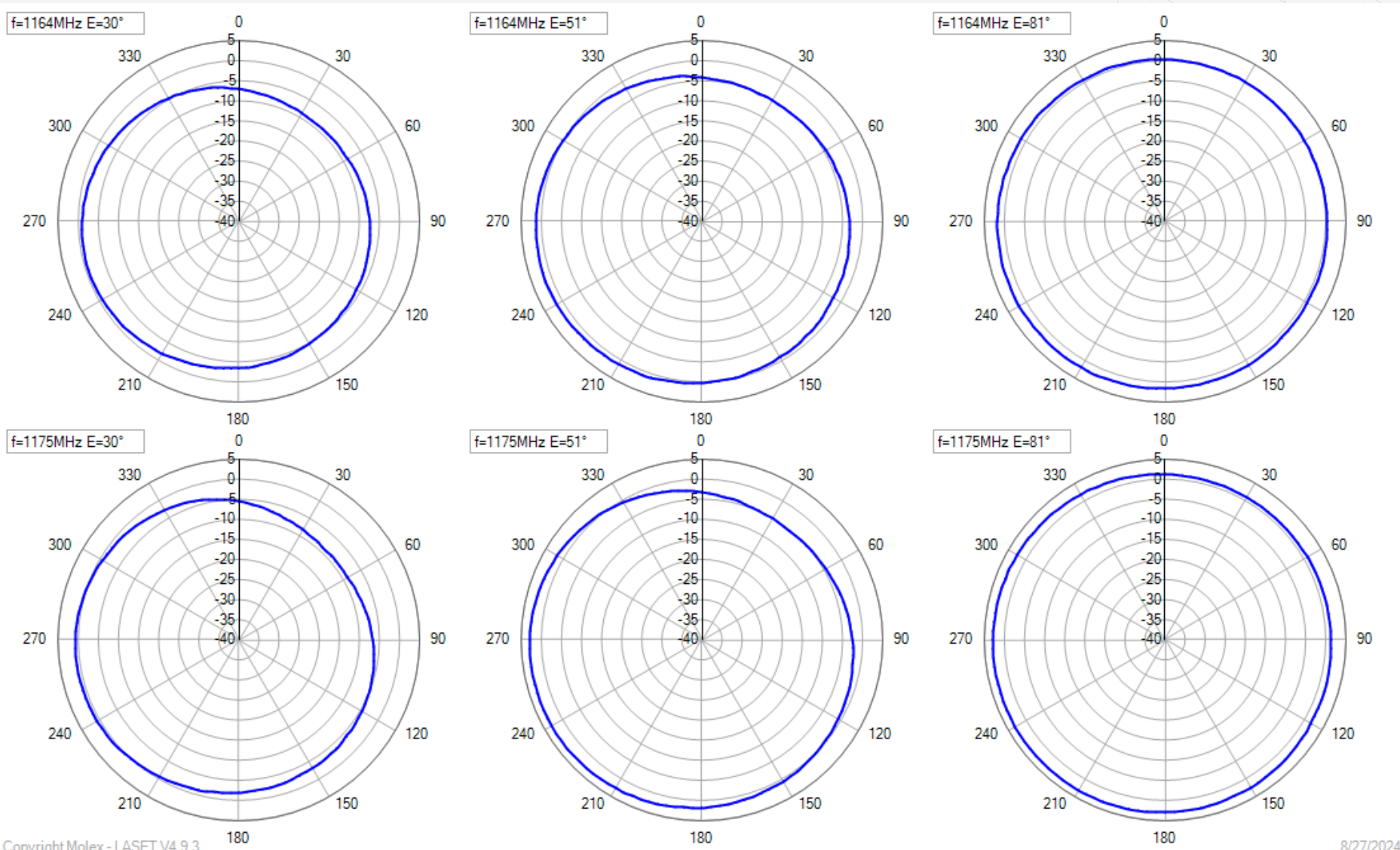
Horizontal Radiation Pattern GNSS L1(dBic)



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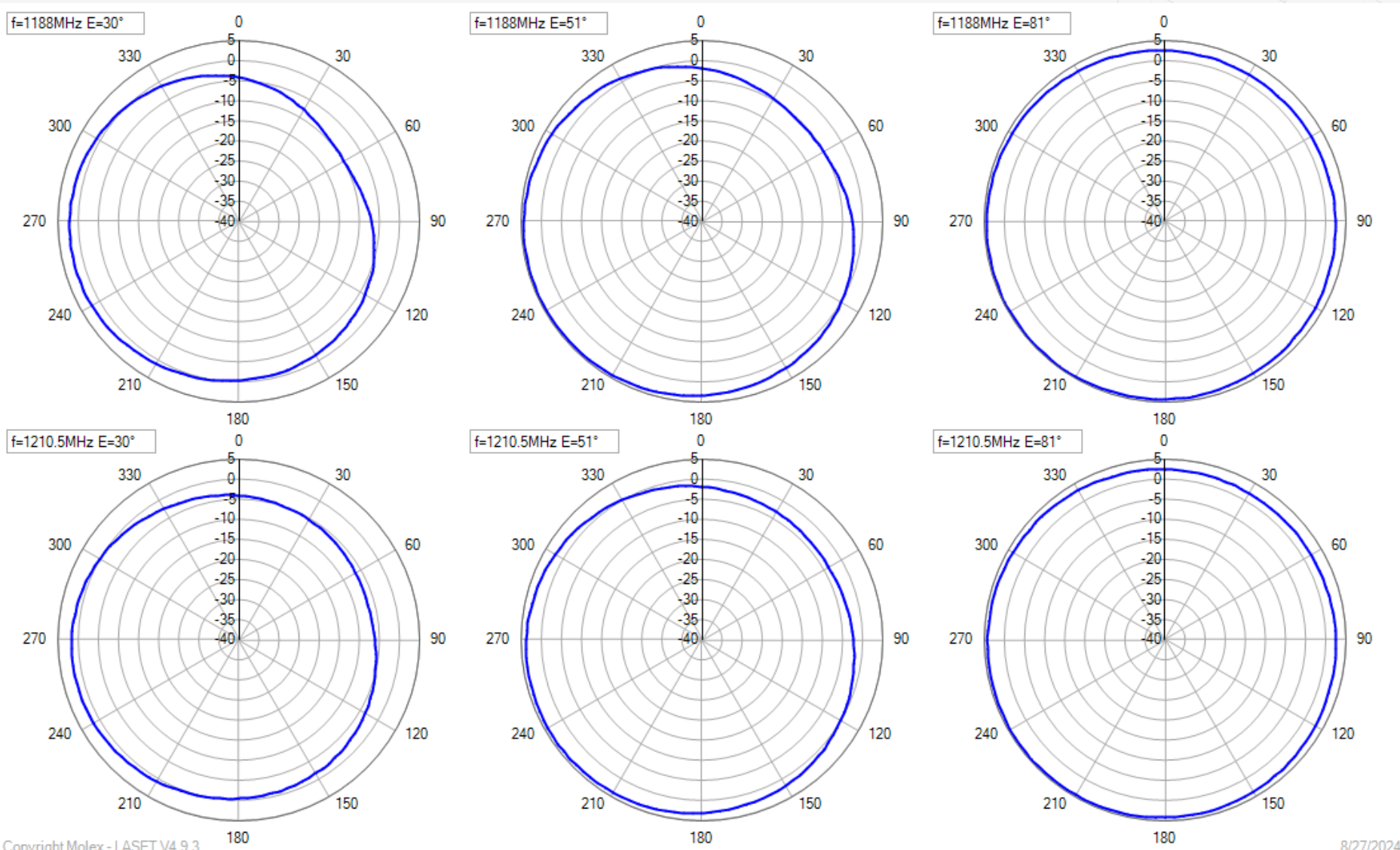
Horizontal Radiation Pattern GNSS L5(dBic)



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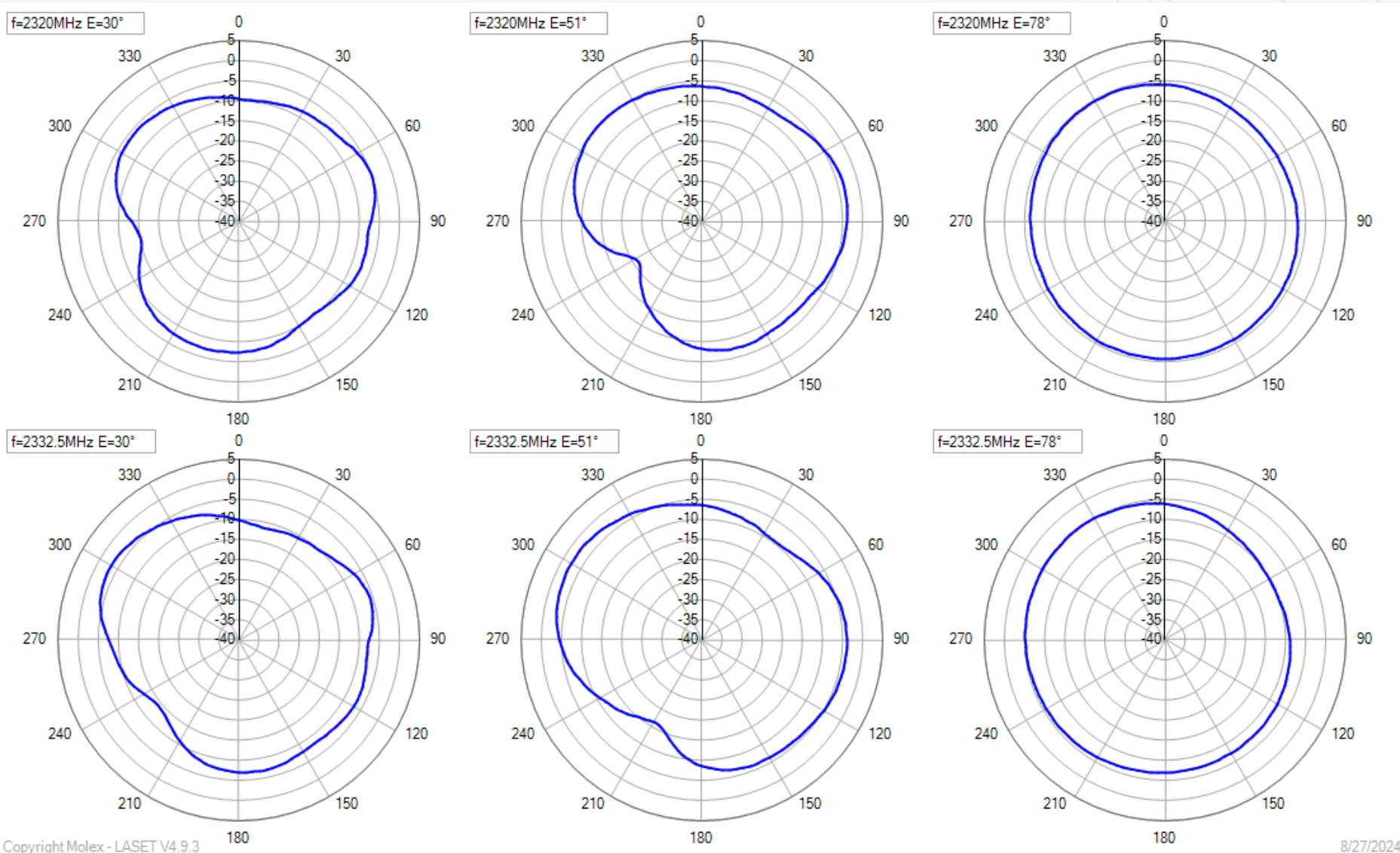
Horizontal Radiation Pattern GNSS L5 (dBic)



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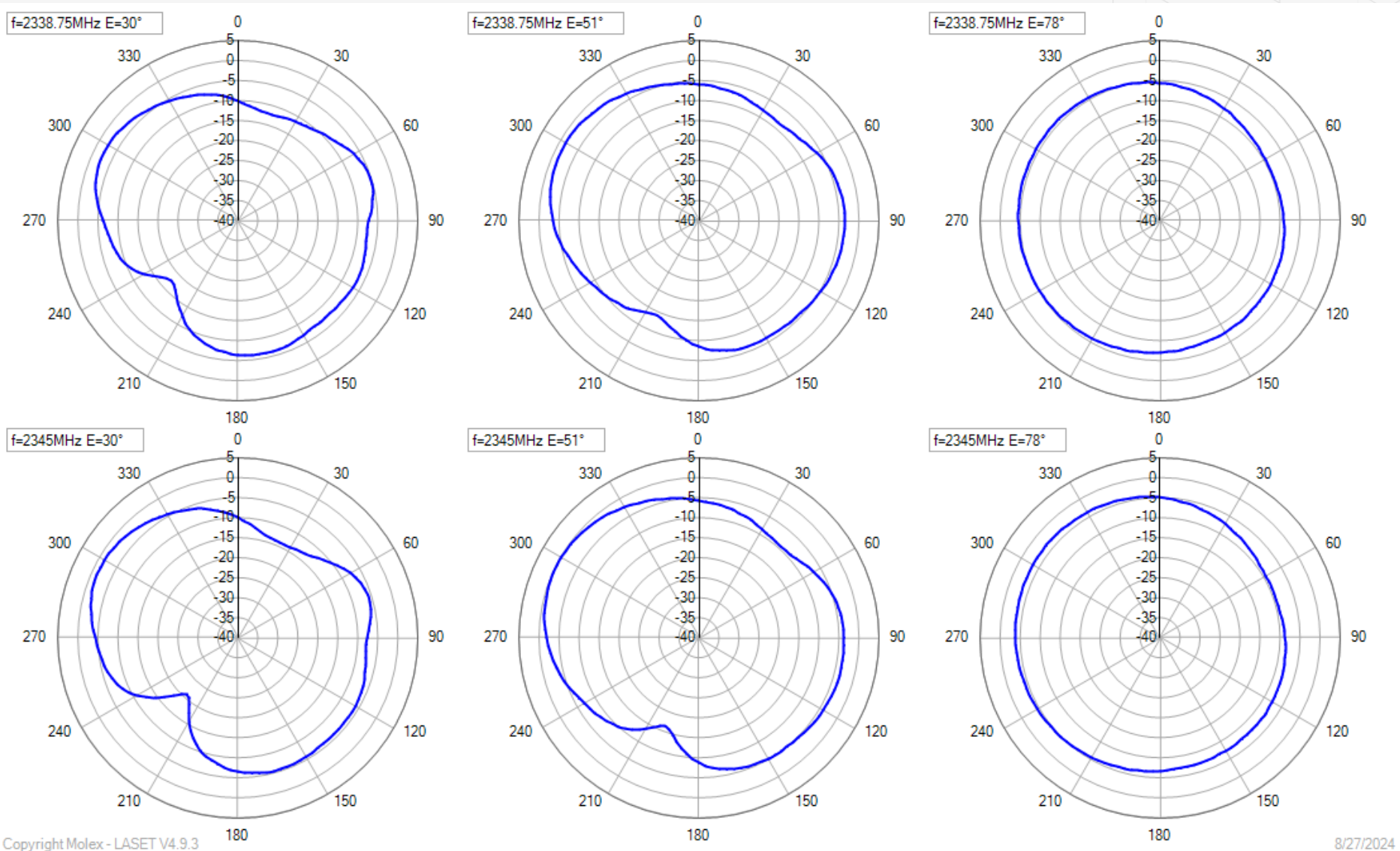
Horizontal Radiation Pattern SDARS(dBic)



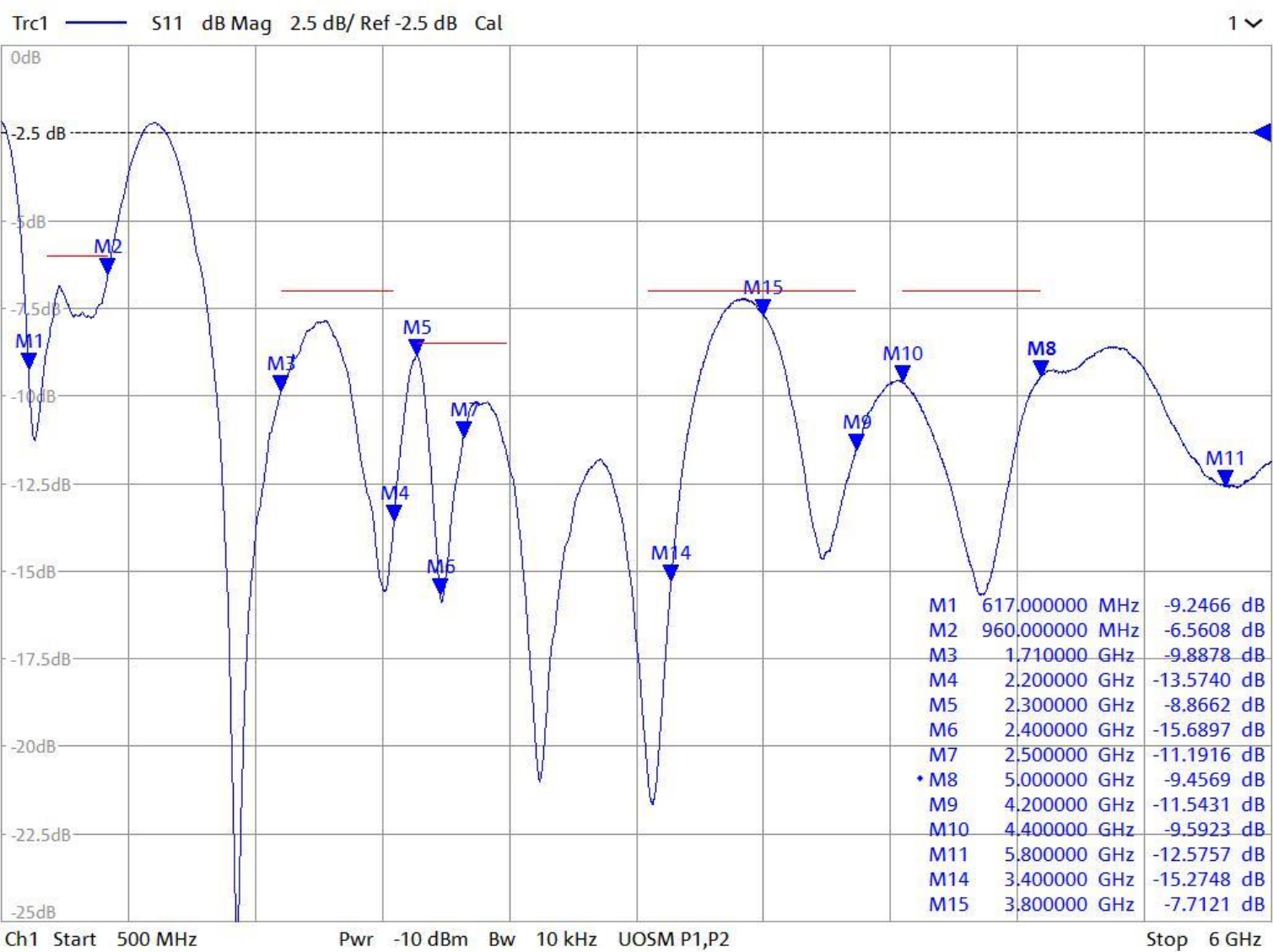
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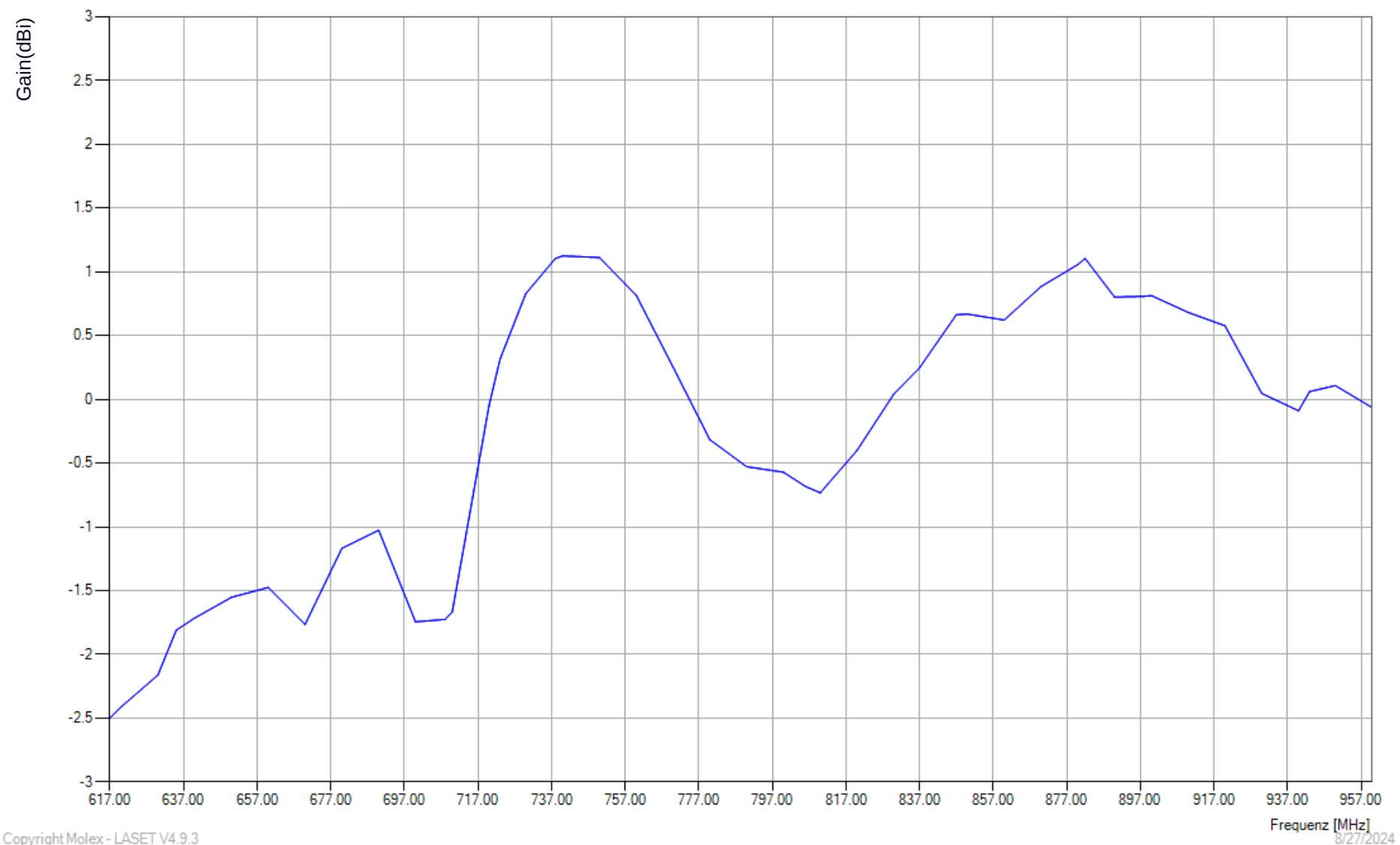
Horizontal Radiation Pattern SDARS (dBic)



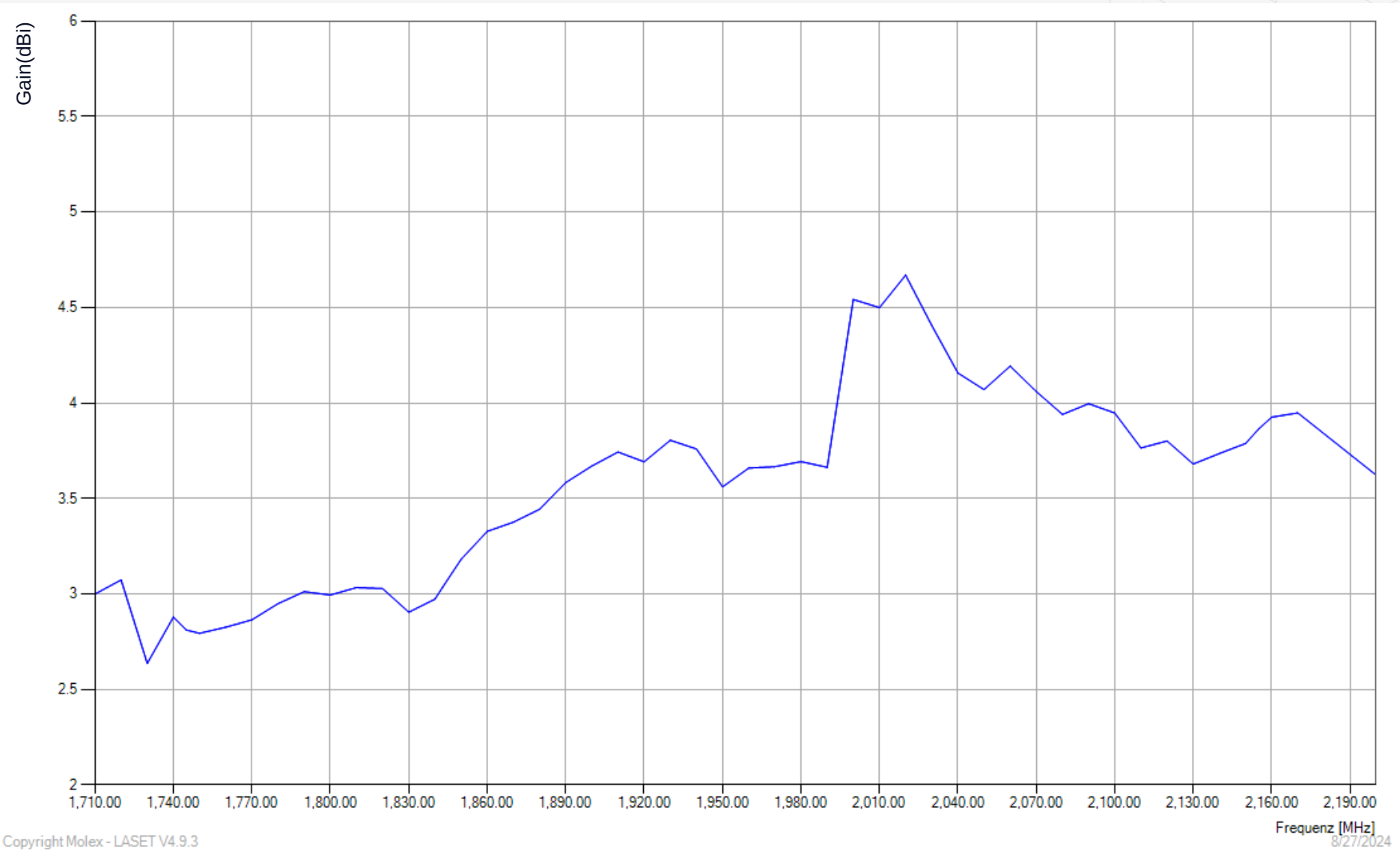
Return loss Cellular Antenna MIMO1



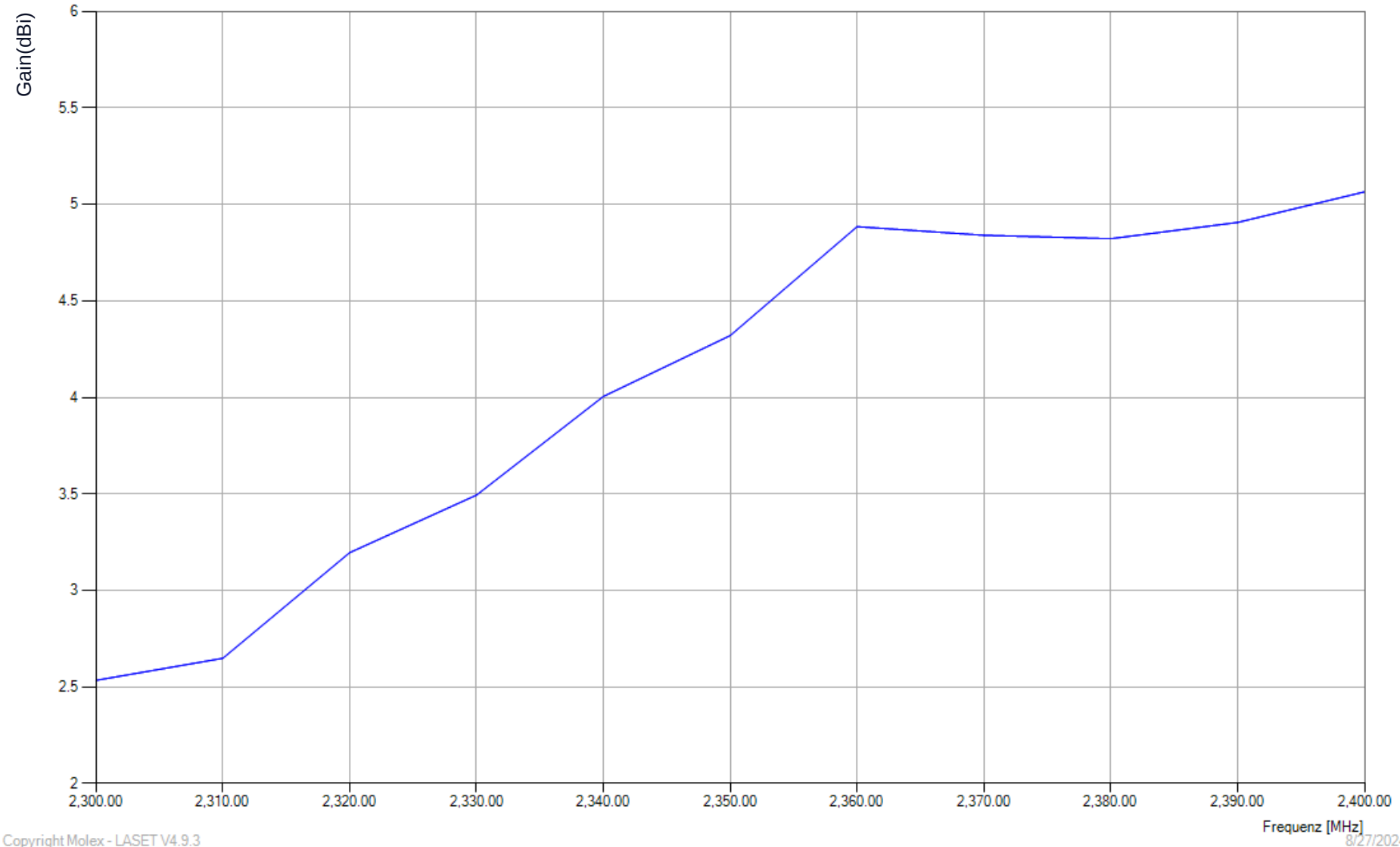
MIMO1 Max. Gain vs. Frequency (617 MHz-960 MHz)



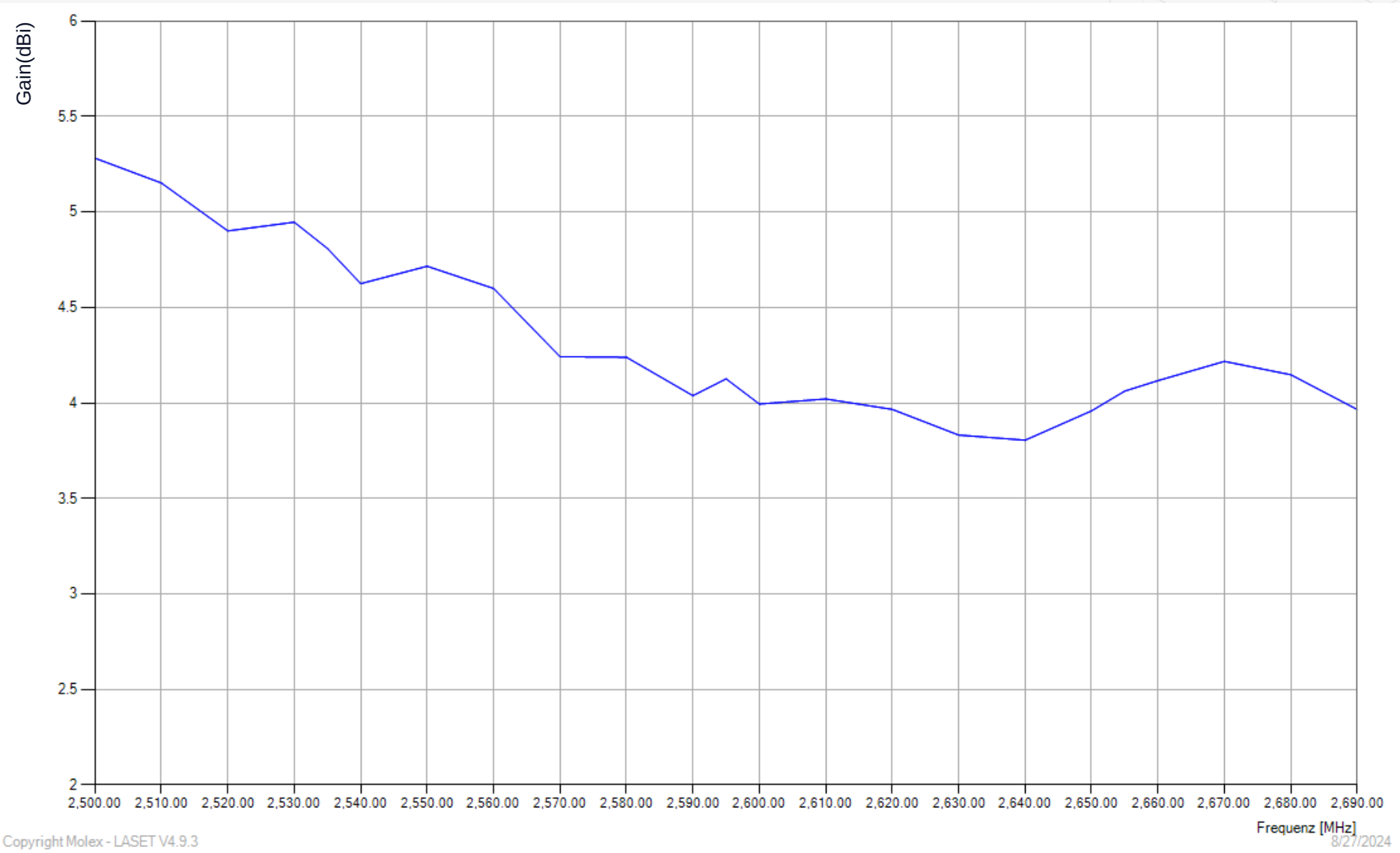
MIMO1 Max. Gain vs. Frequency (1710 MHz-2200 MHz)



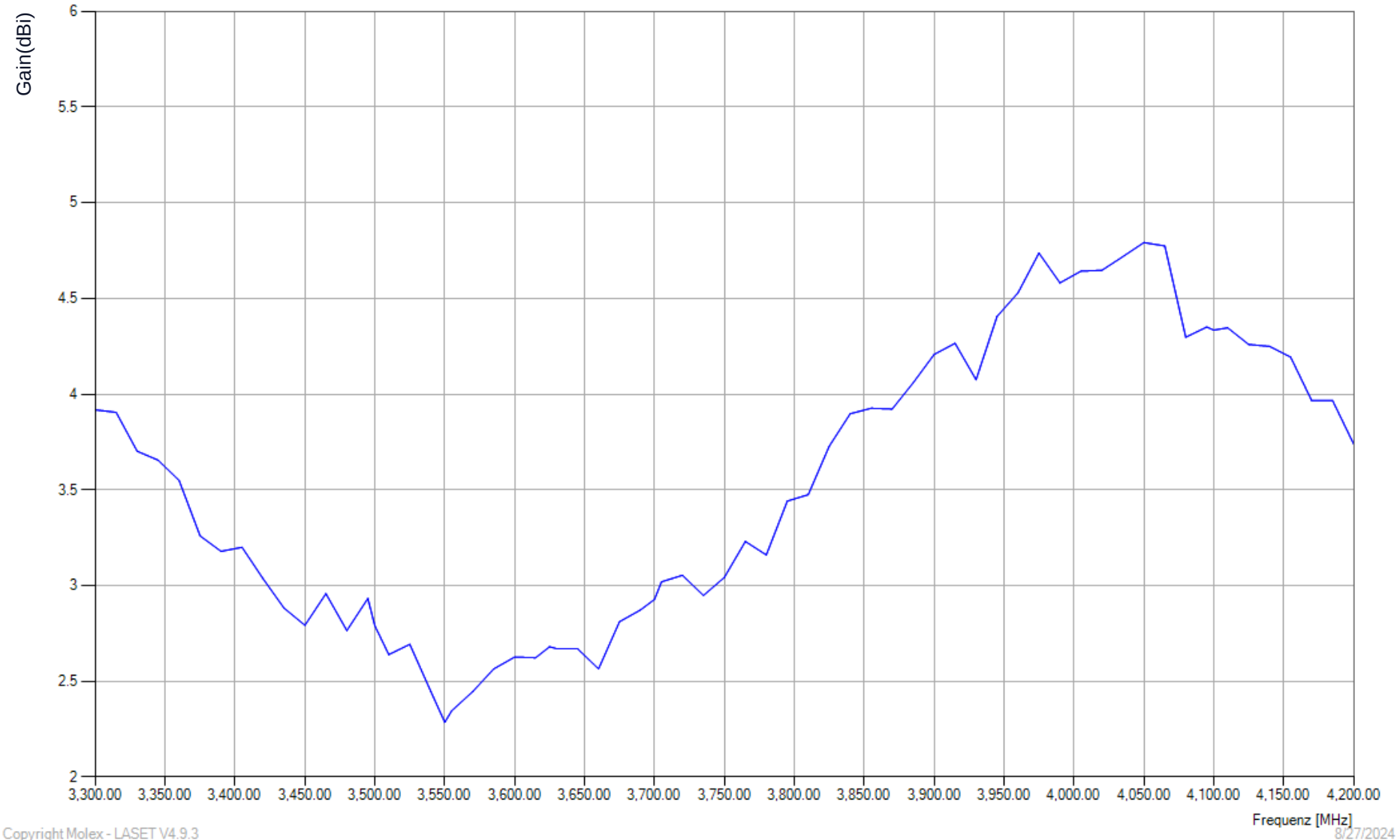
MIMO1 Max. Gain vs. Frequency (2300 MHz-2400 MHz)



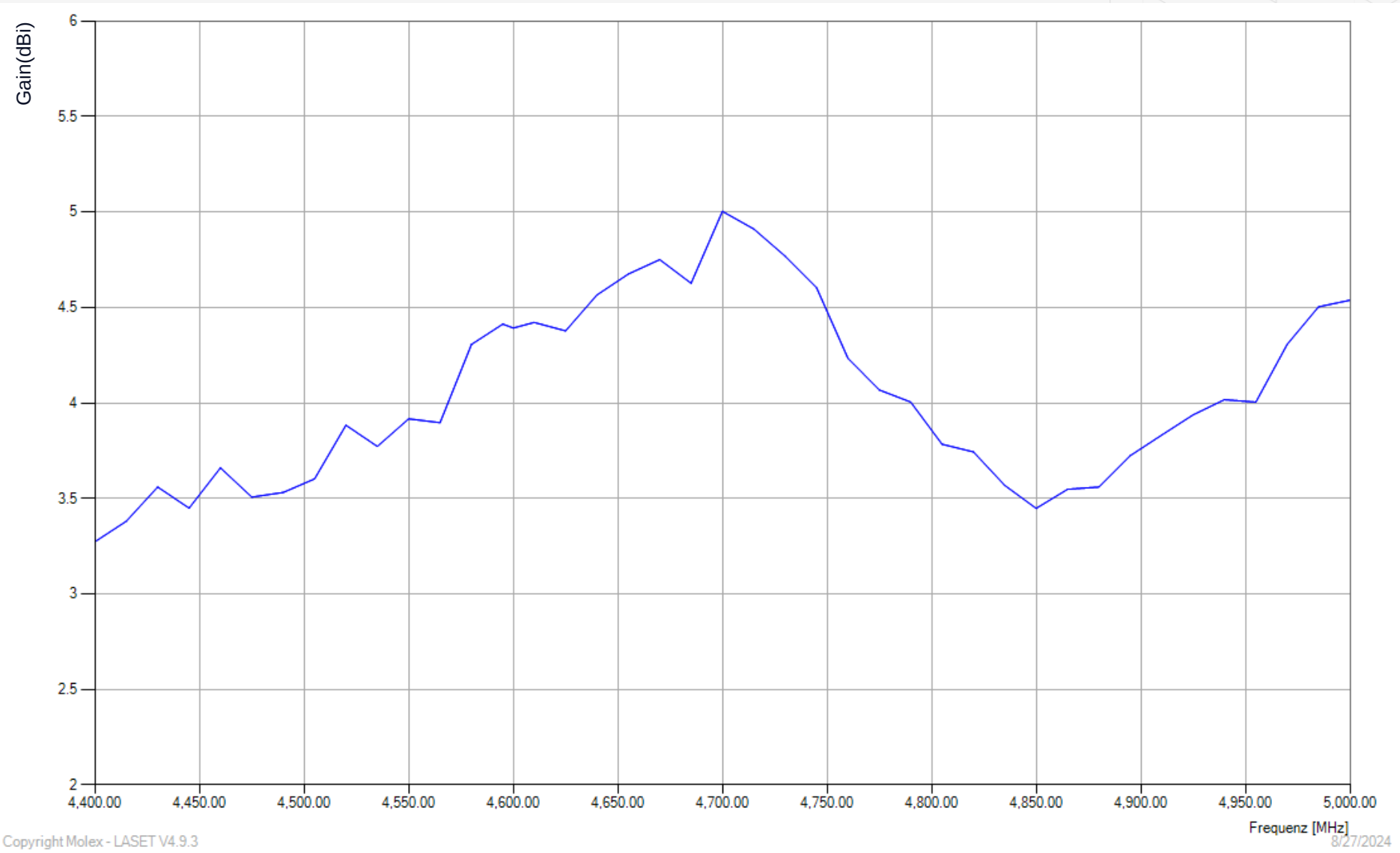
MIMO1 Max. Gain vs. Frequency (2500 MHz-2690 MHz)



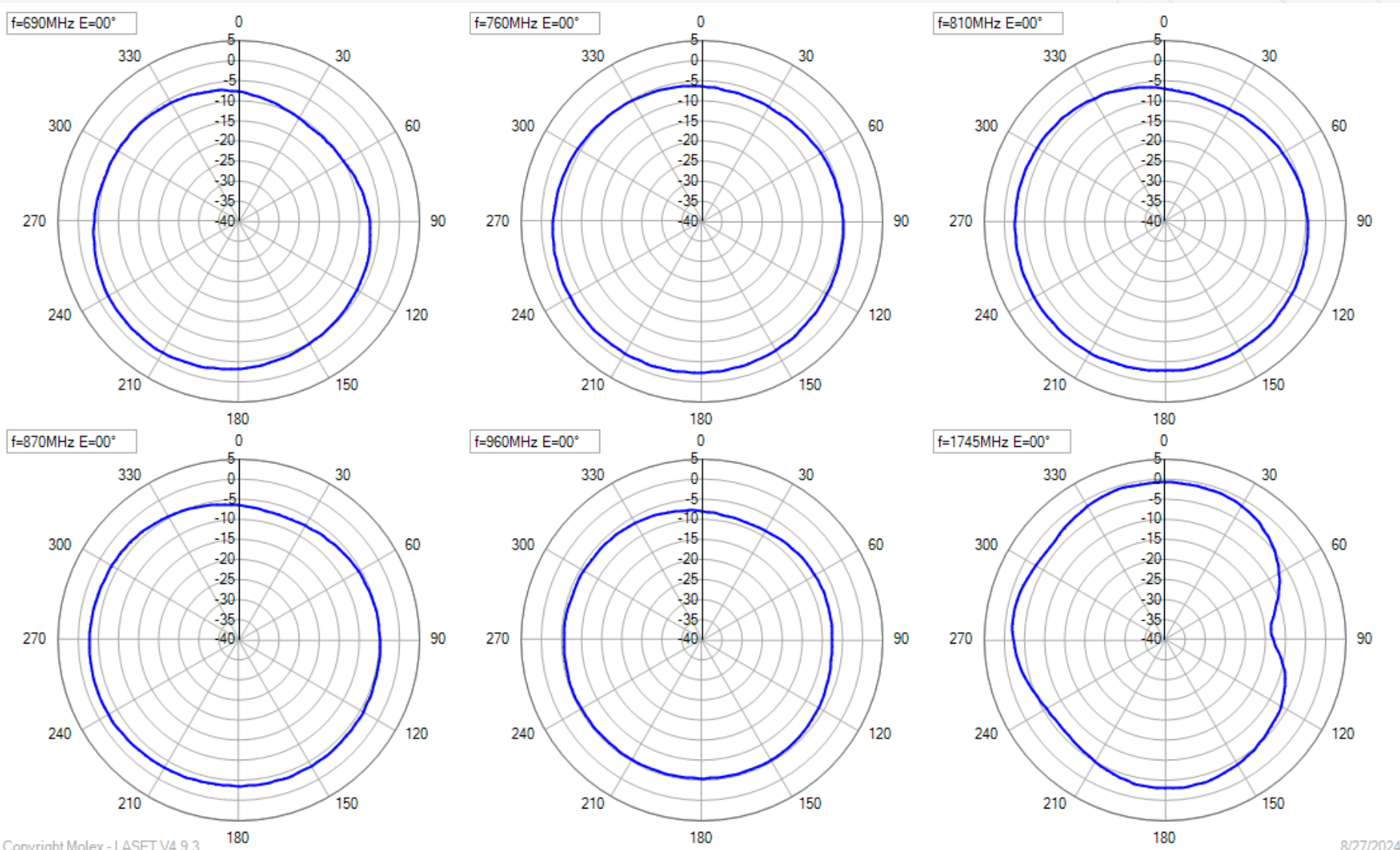
MIMO1 Max. Gain vs. Frequency (3300 MHz-4200 MHz)



MIMO1 Max. Gain vs. Frequency (4400 MHz-5000 MHz)



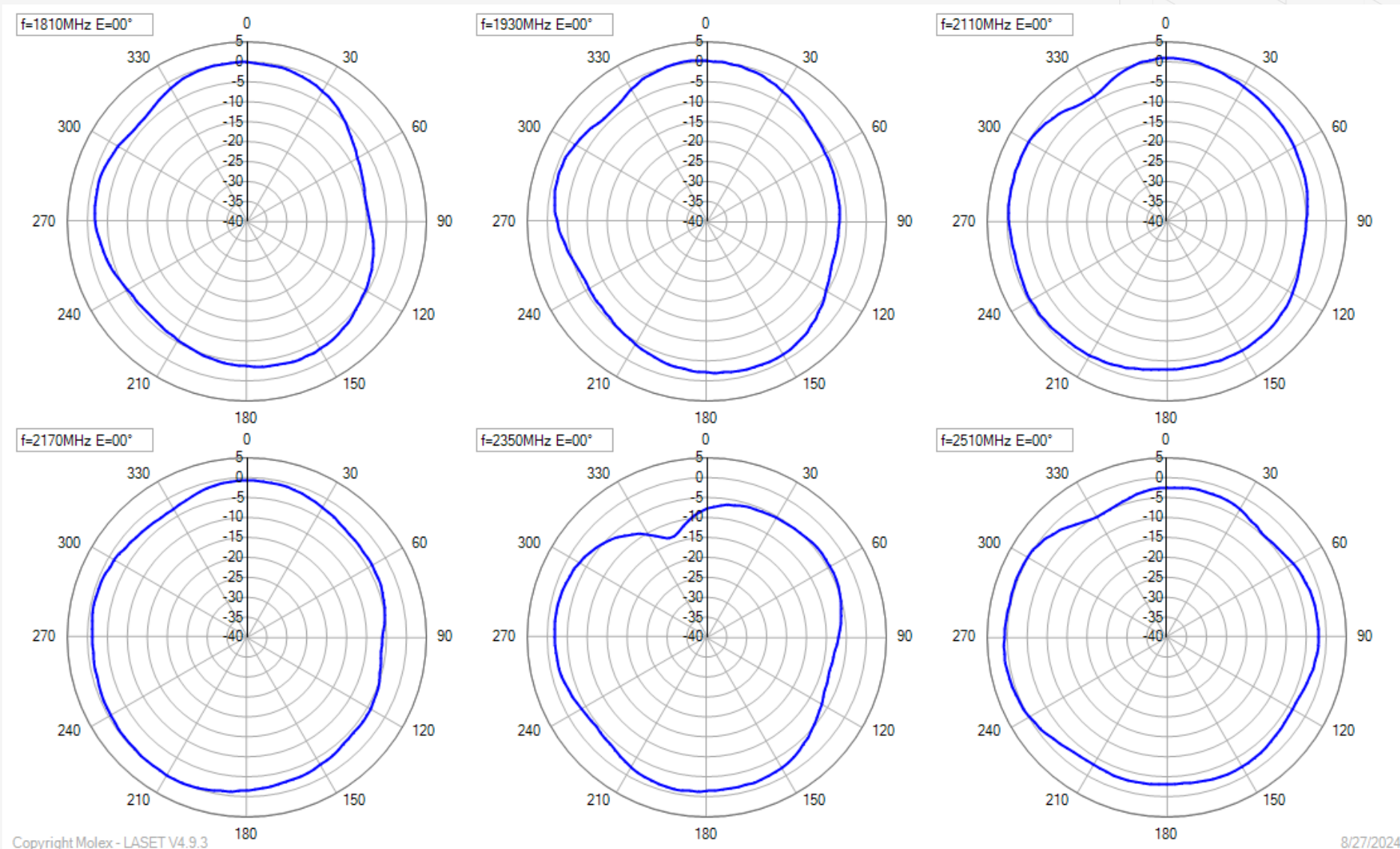
Horizontal Radiation Pattern MIMO1,dBi (EL0°)



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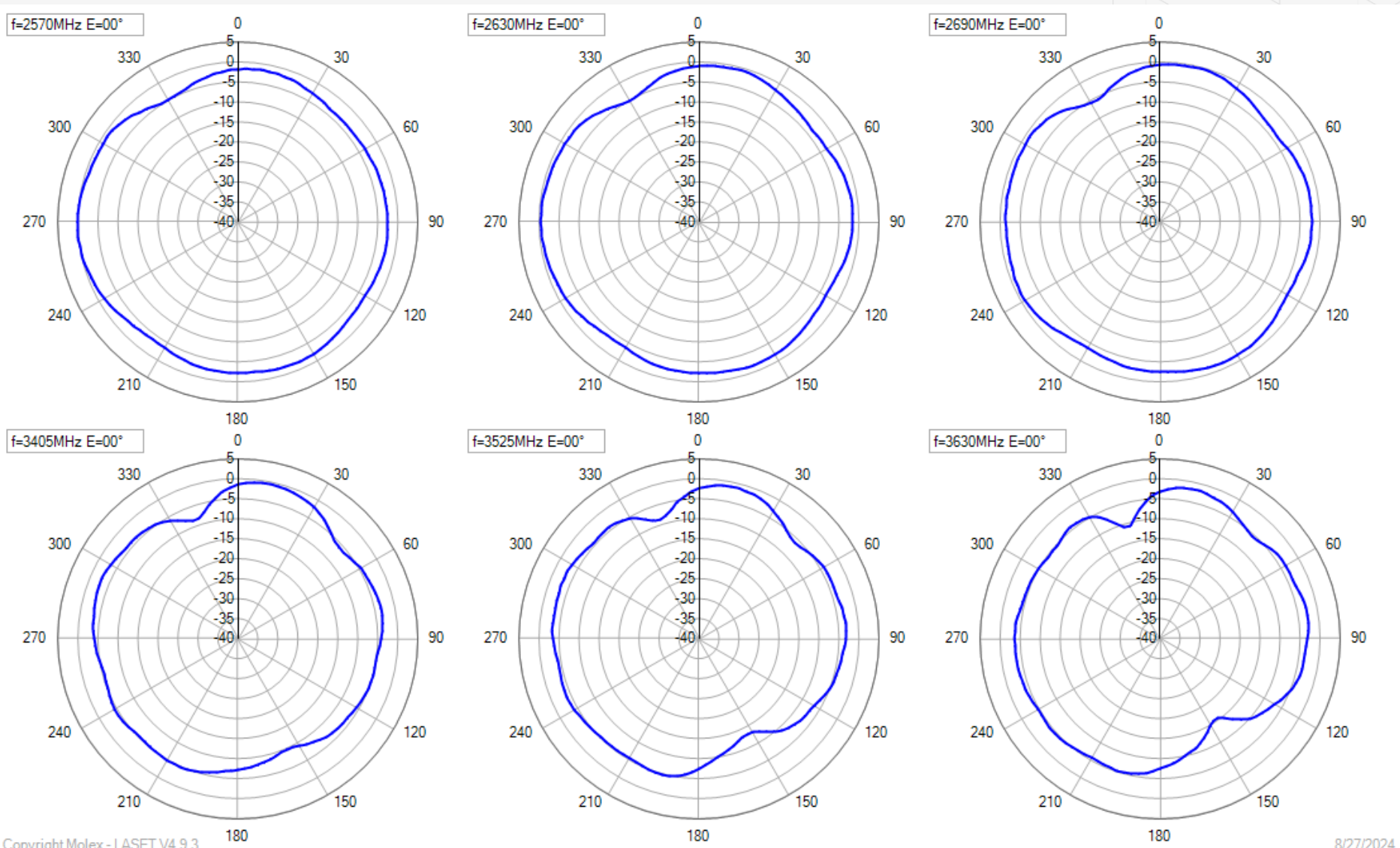
Horizontal Radiation Pattern MIMO1 ,dBi (EL0°)



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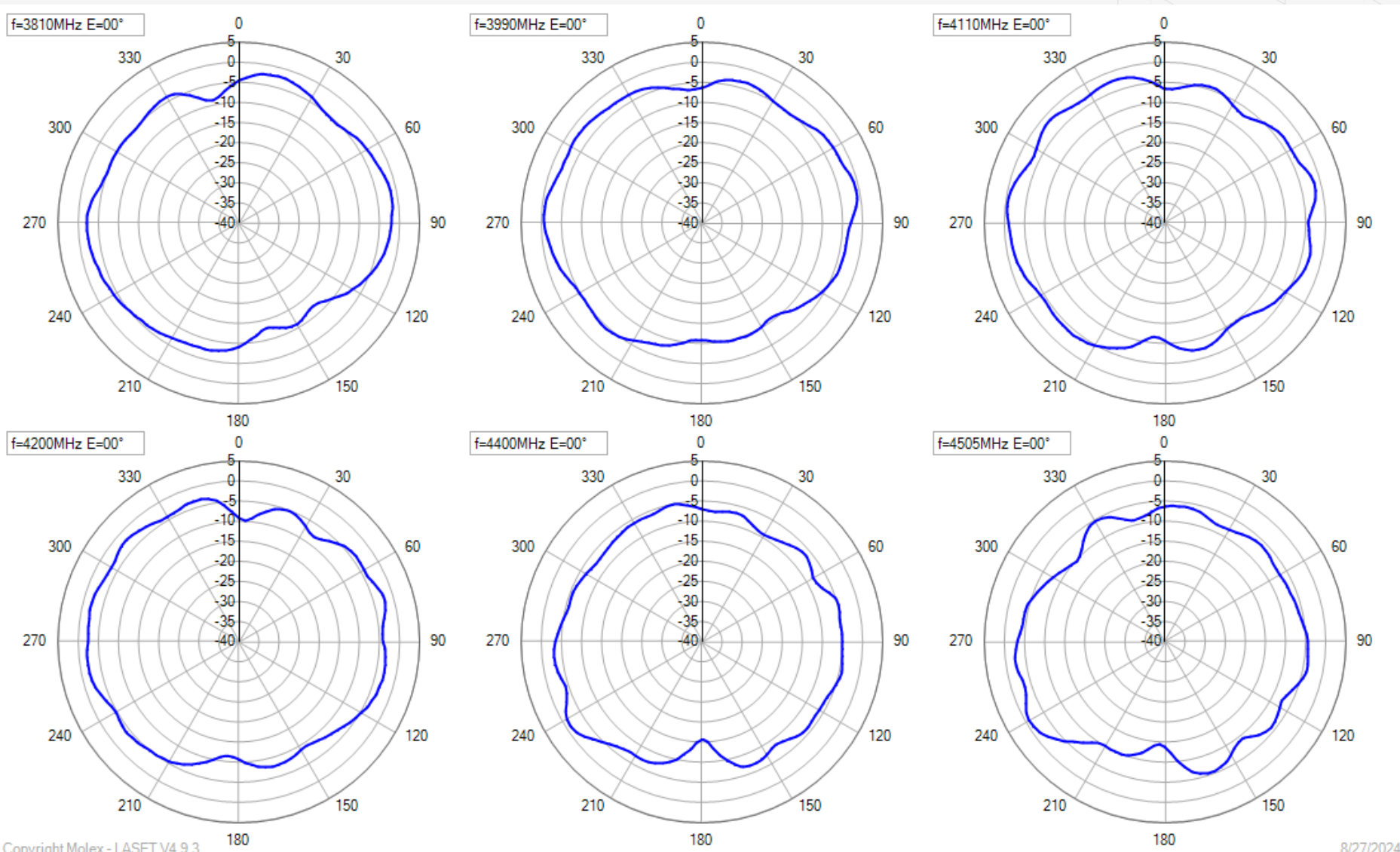
Horizontal Radiation Pattern MIMO1 ,dBi (EL0°)



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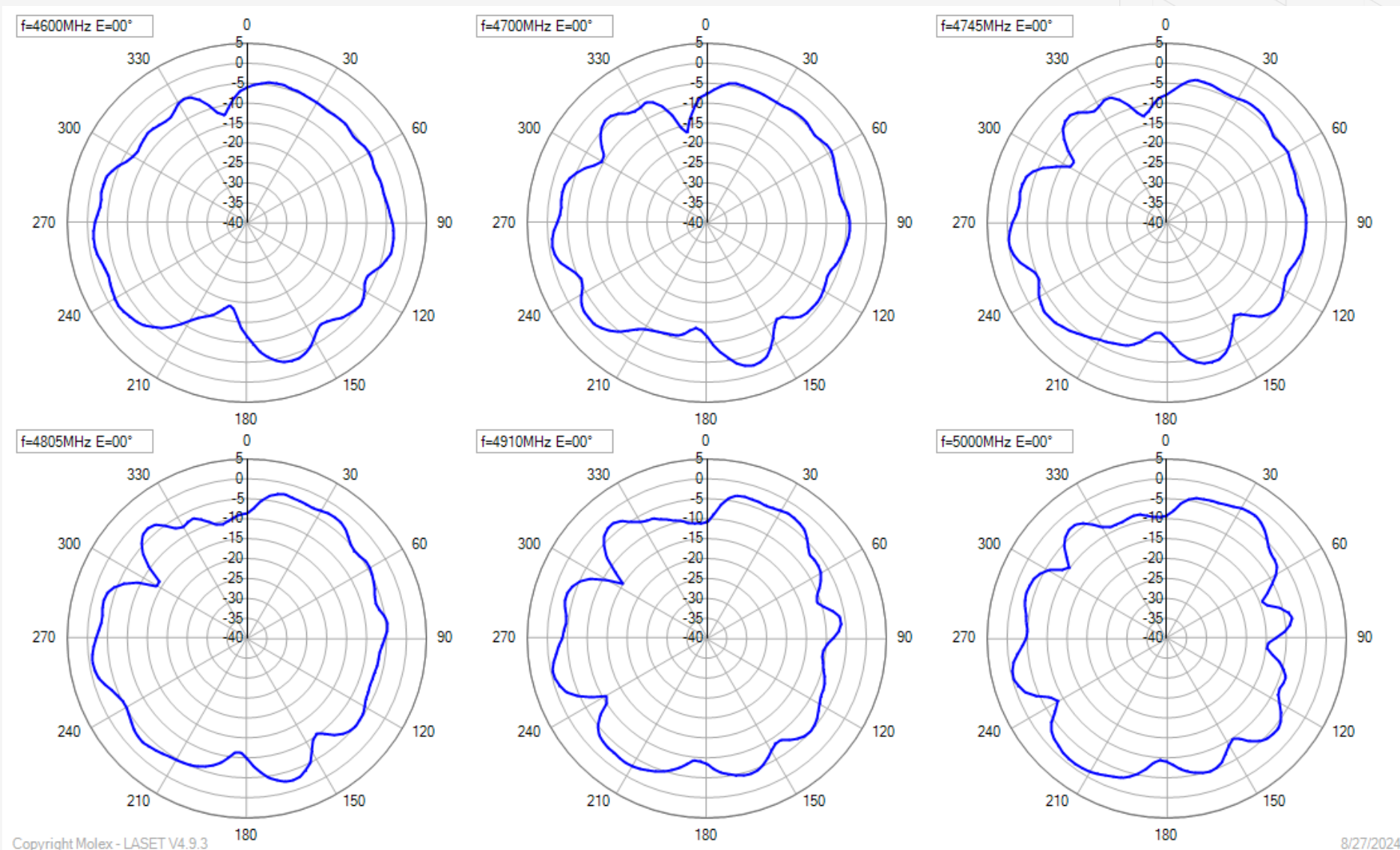
Horizontal Radiation Pattern MIMO1 ,dBi (EL0°)



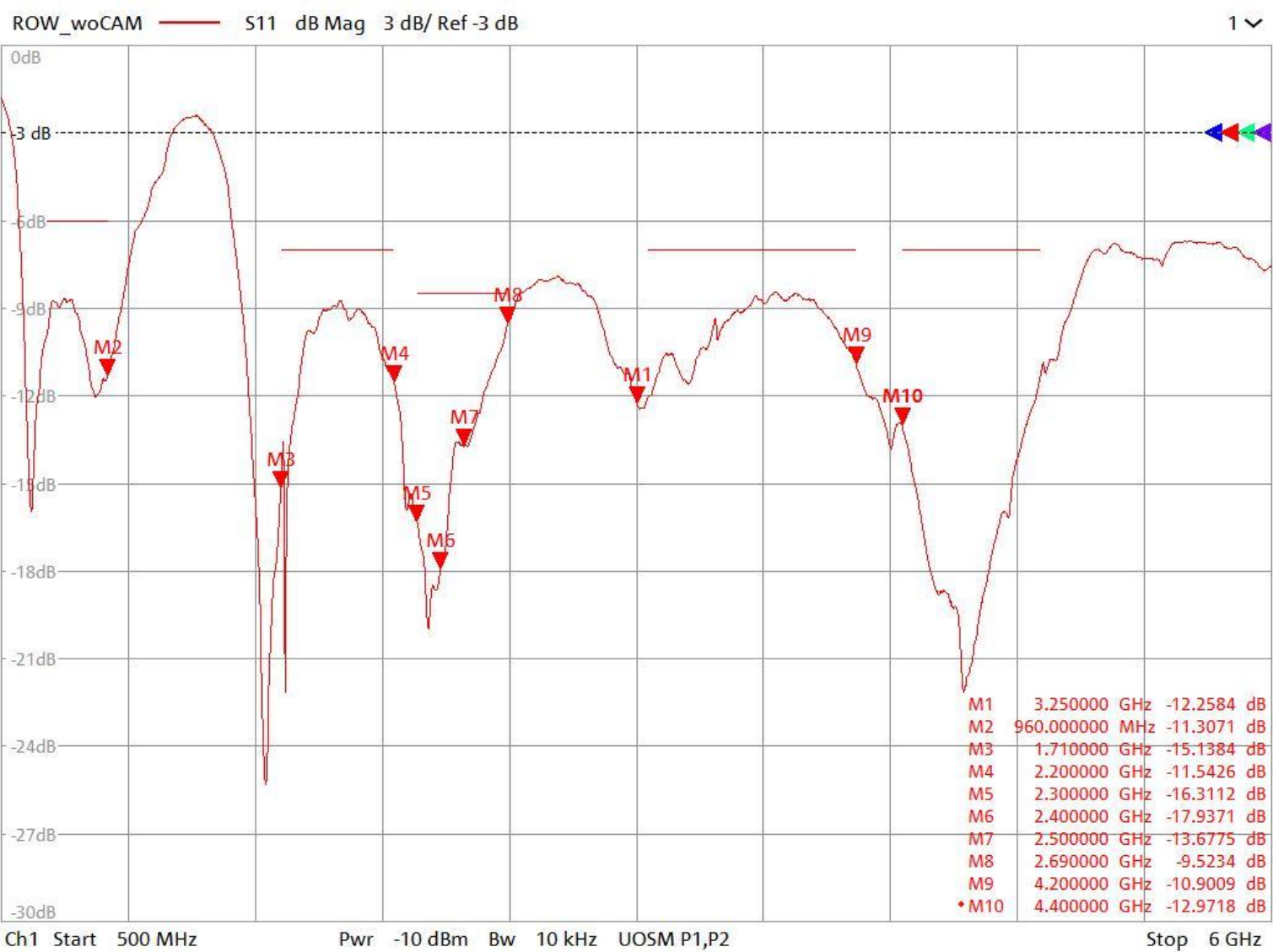
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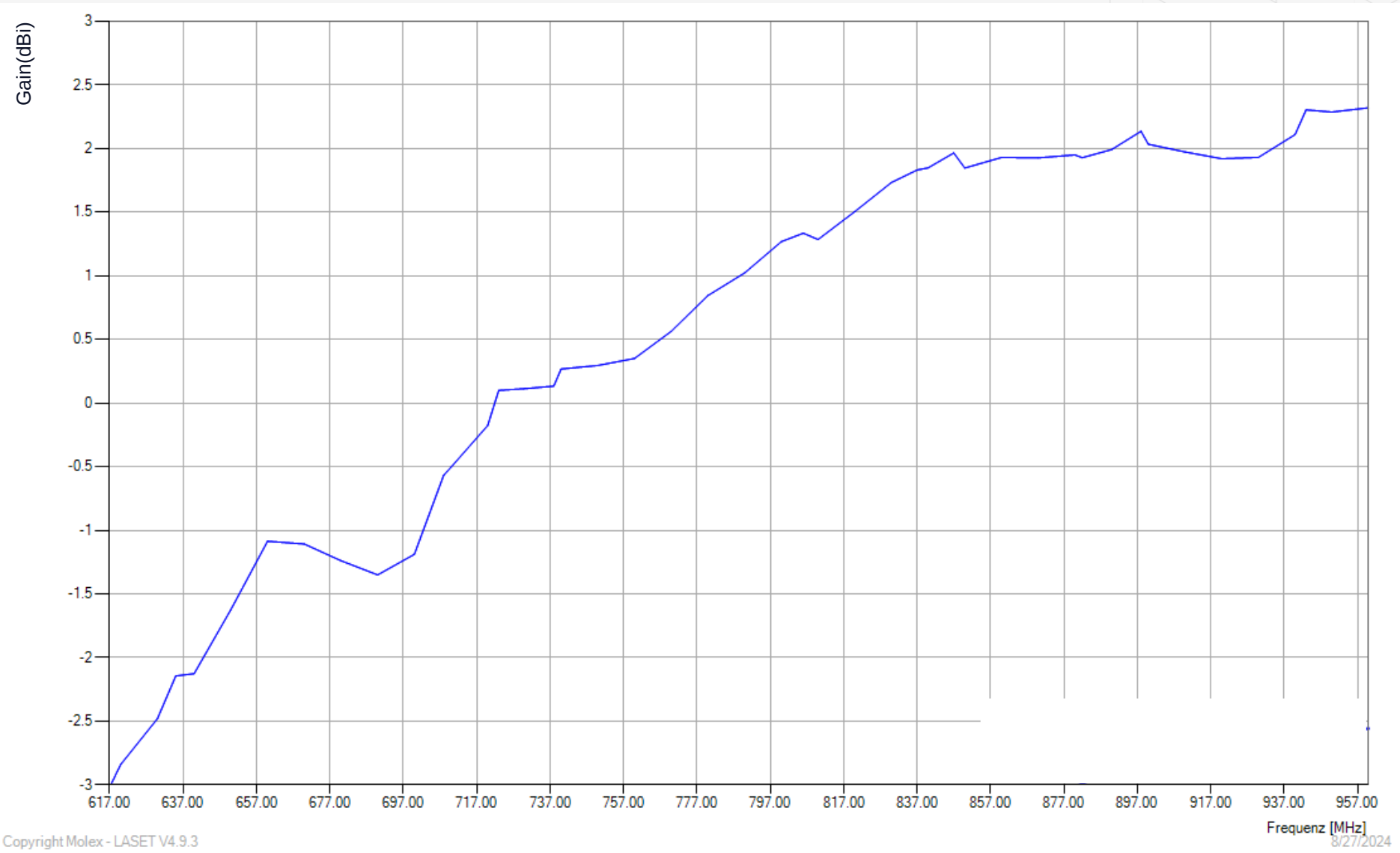
Horizontal Radiation Pattern MIMO1 ,dBi (EL0°)



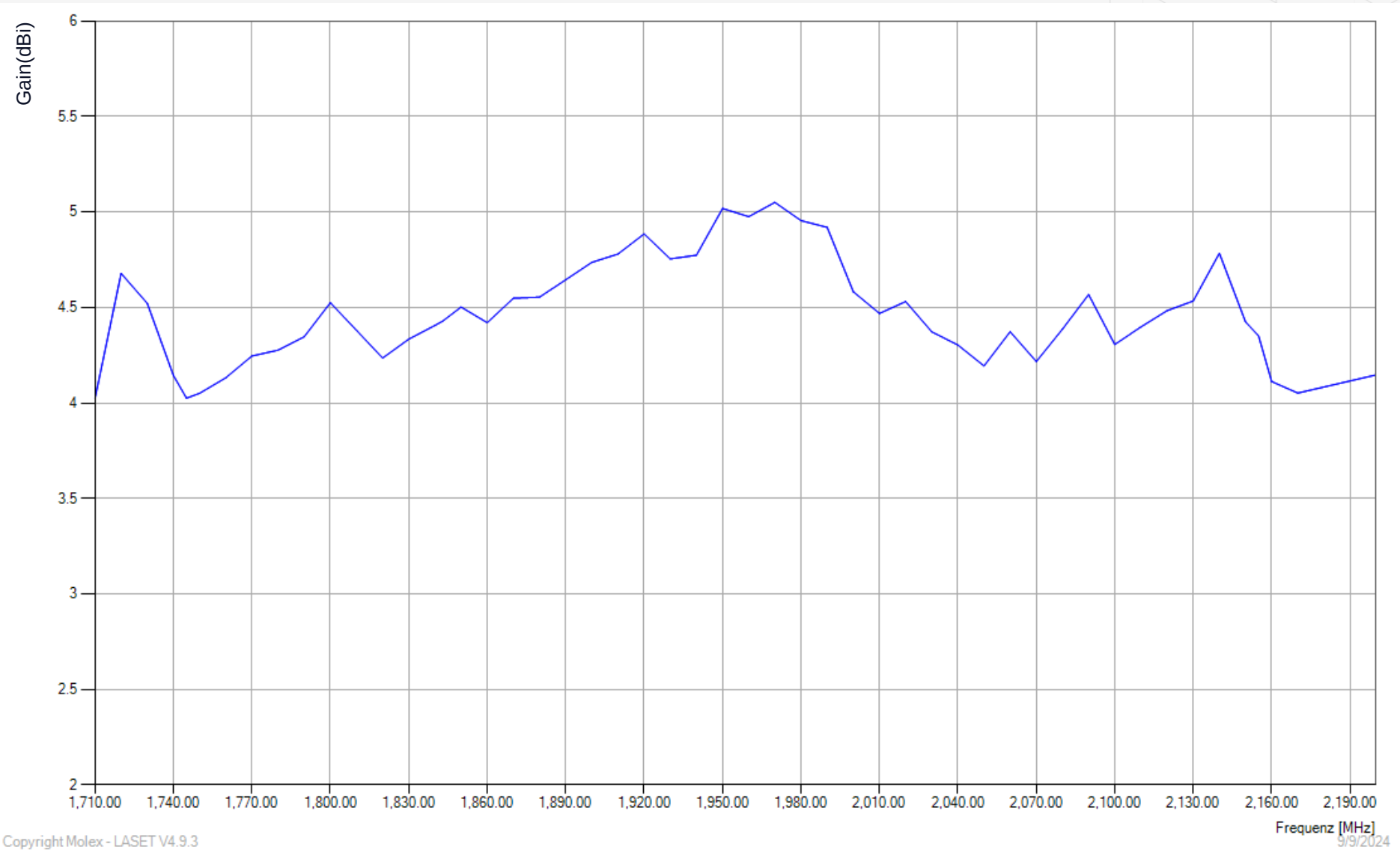
S-parameter MIMO2



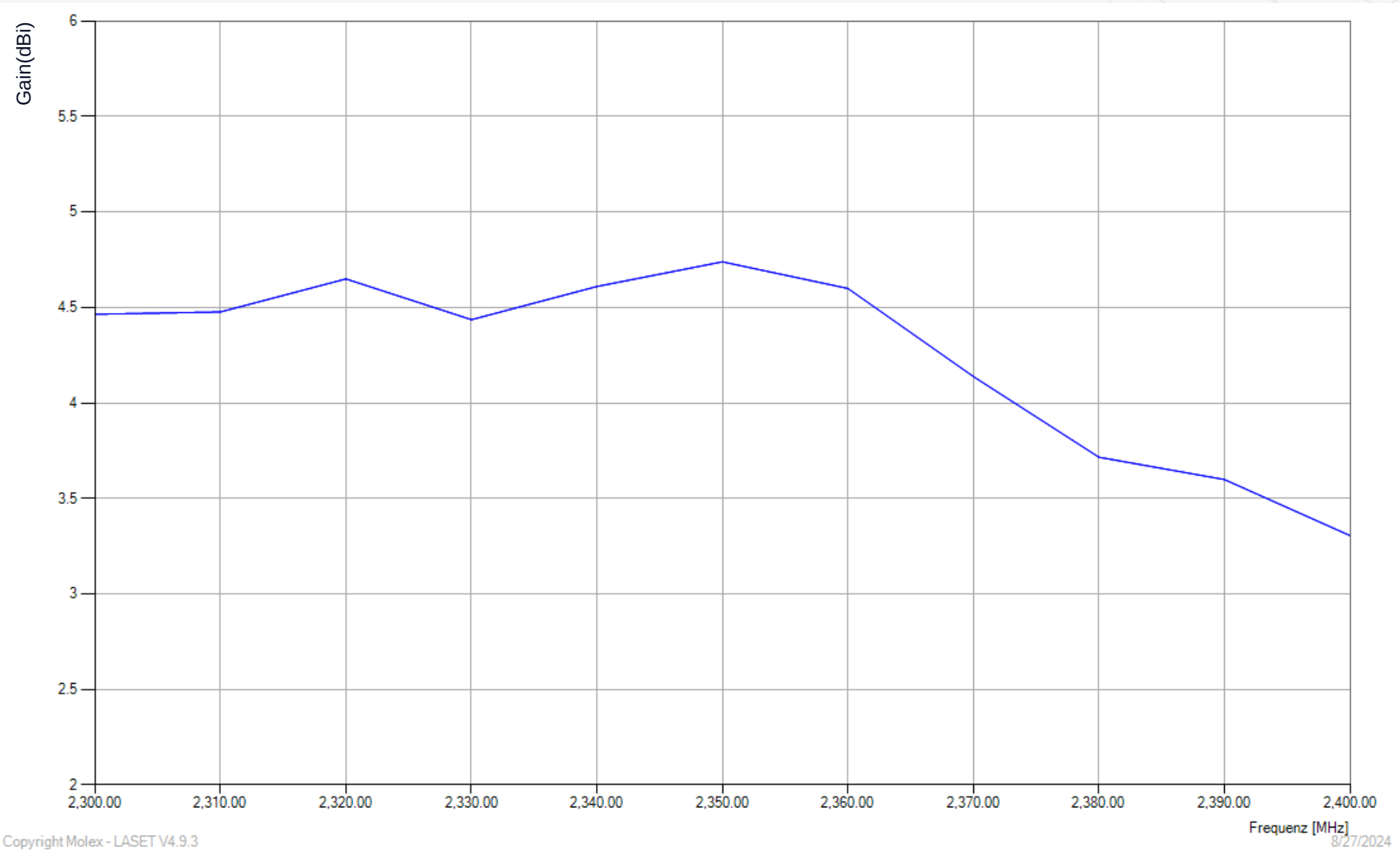
MIMO2 Max. Gain vs. Frequency (617 MHz-960 MHz)



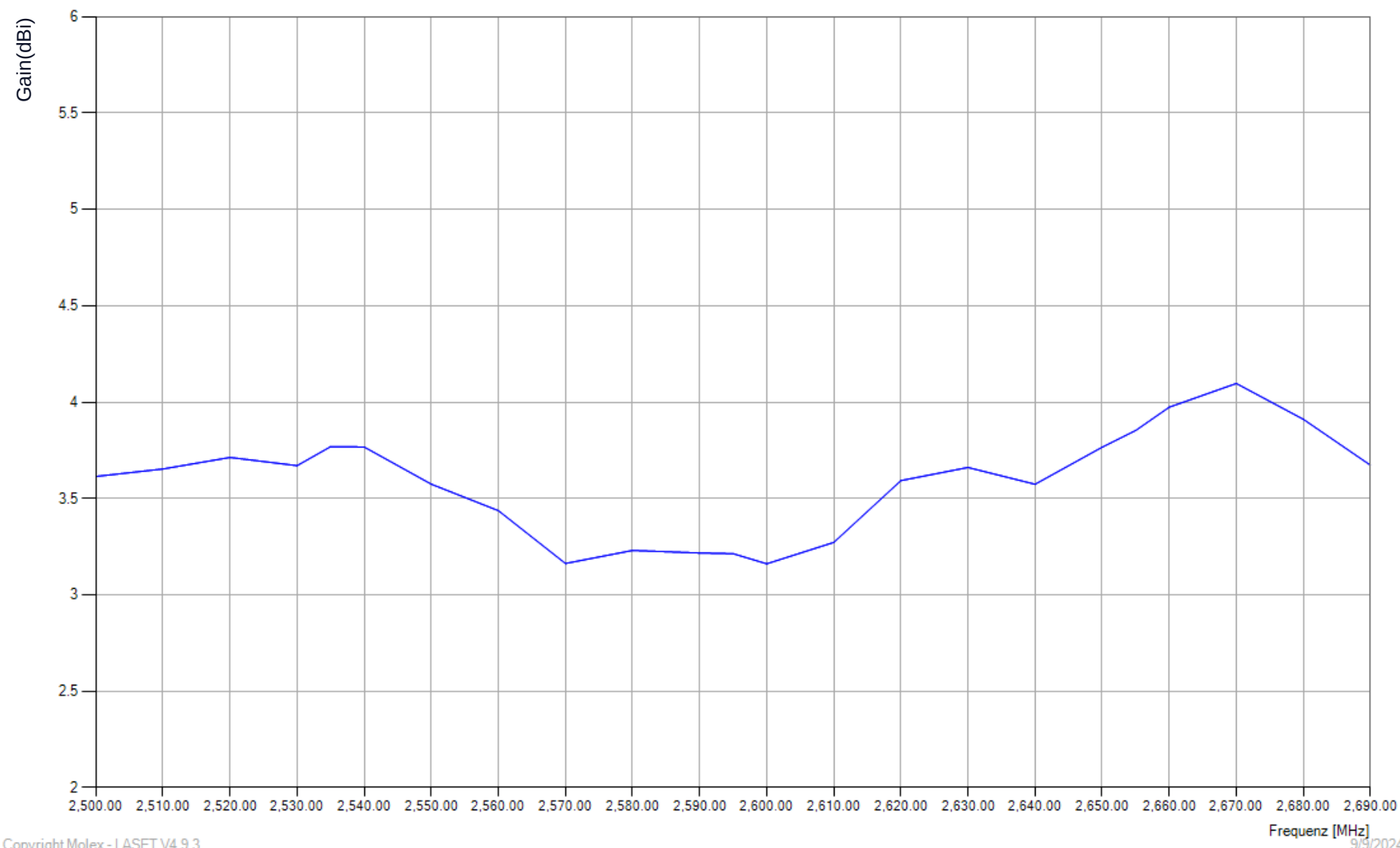
MIMO2 Max. Gain vs. Frequency (1710 MHz-2200 MHz)



MIMO2 Max. Gain vs. Frequency (2300 MHz-2400 MHz)



MIMO2 Max. Gain vs. Frequency (2500 MHz-2690 MHz)

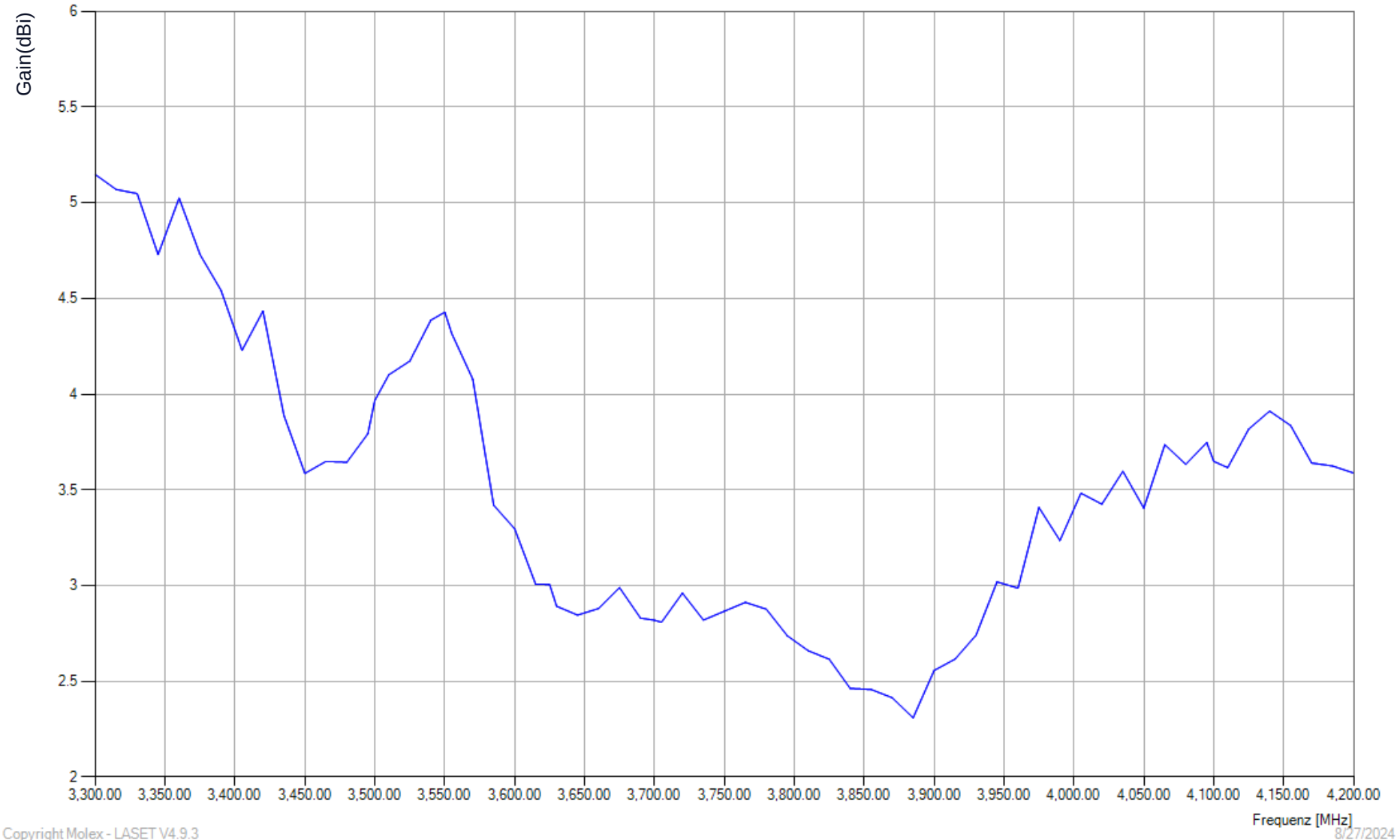


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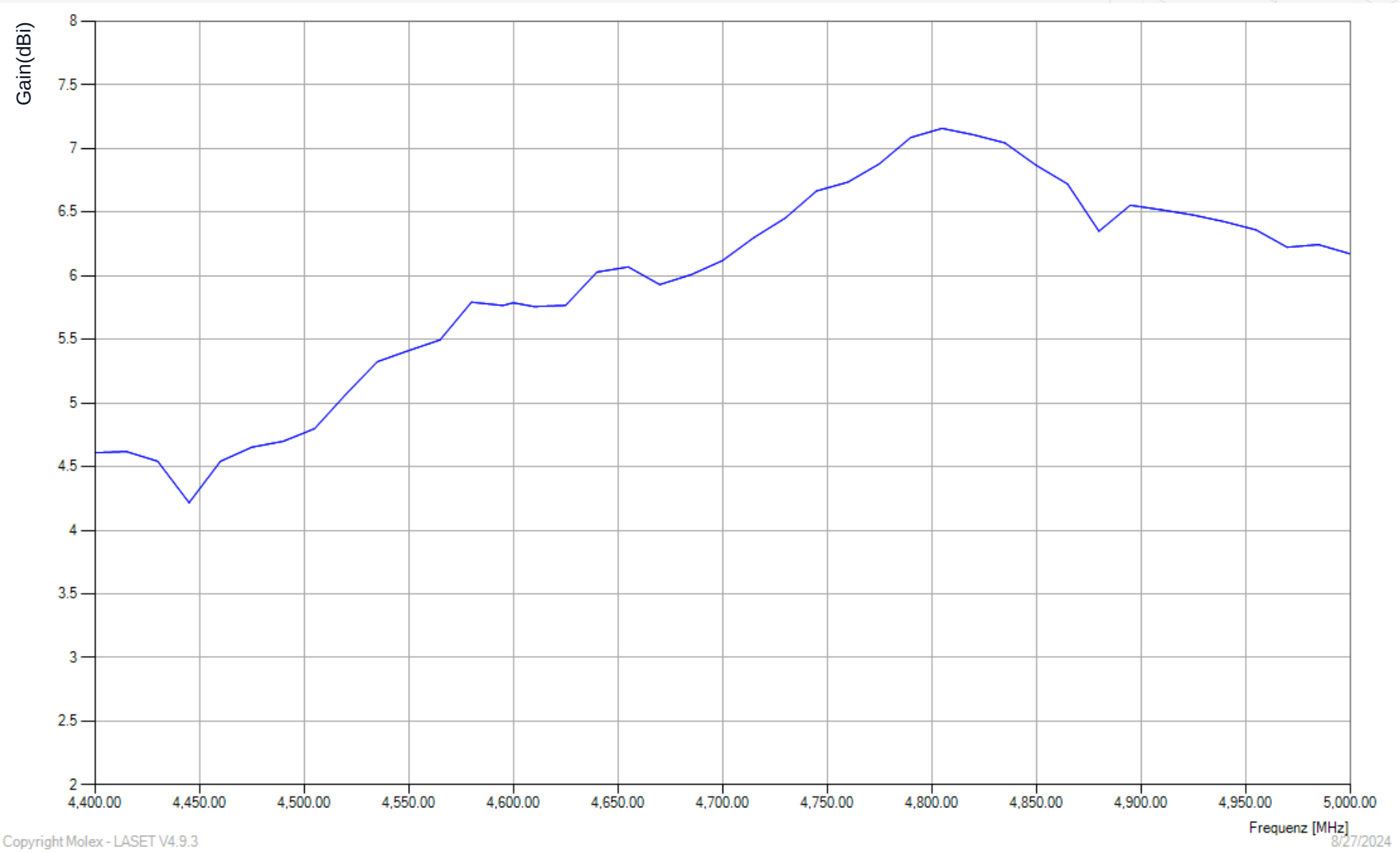
Frequenz [MHz]

9/9/2024

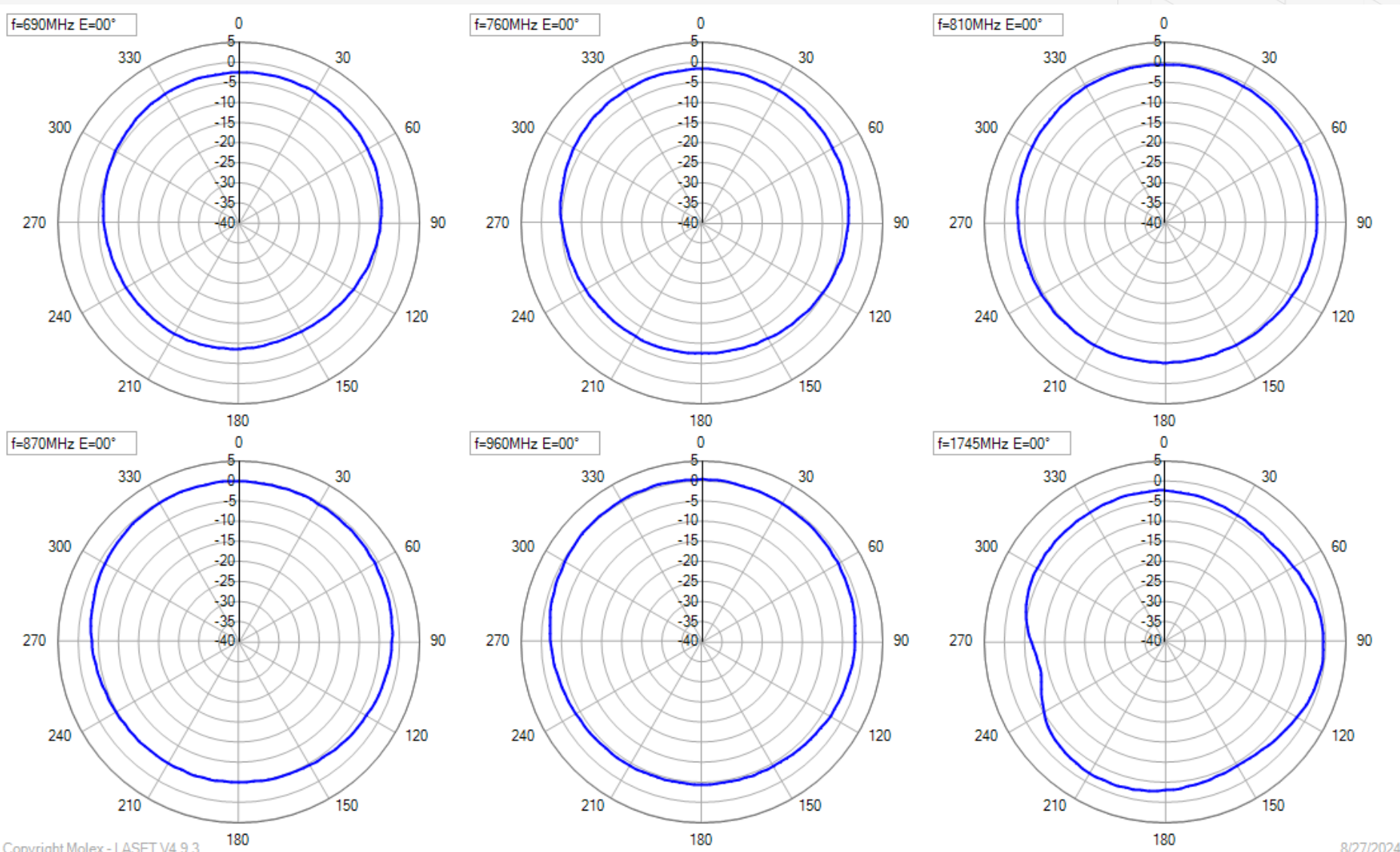
MIMO2 Max. Gain vs. Frequency (3300 MHz-4200 MHz)



MIMO2 Max. Gain vs. Frequency (4400 MHz-5000 MHz)



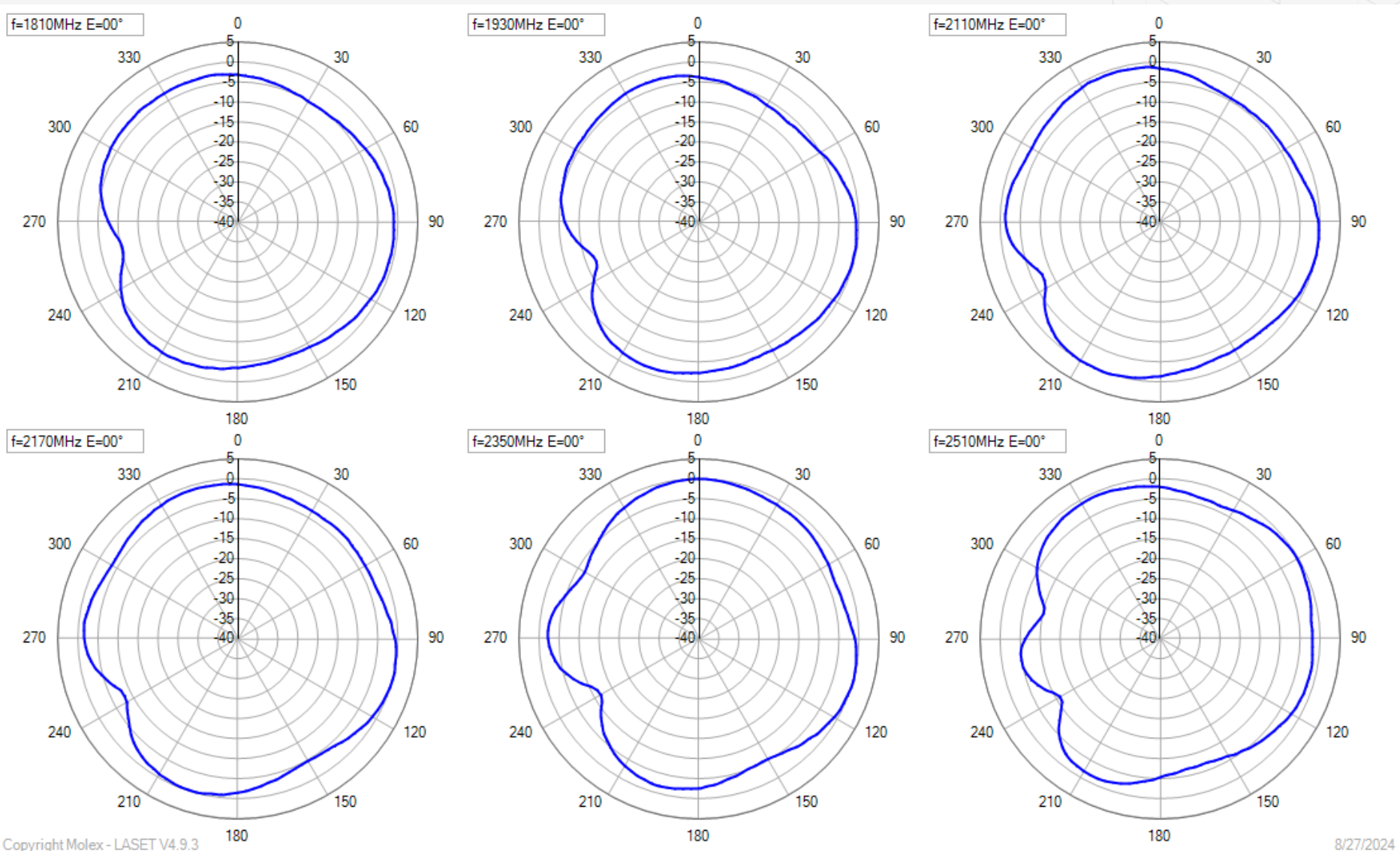
Horizontal Radiation Pattern MIMO2 ,dBi (EL0°)



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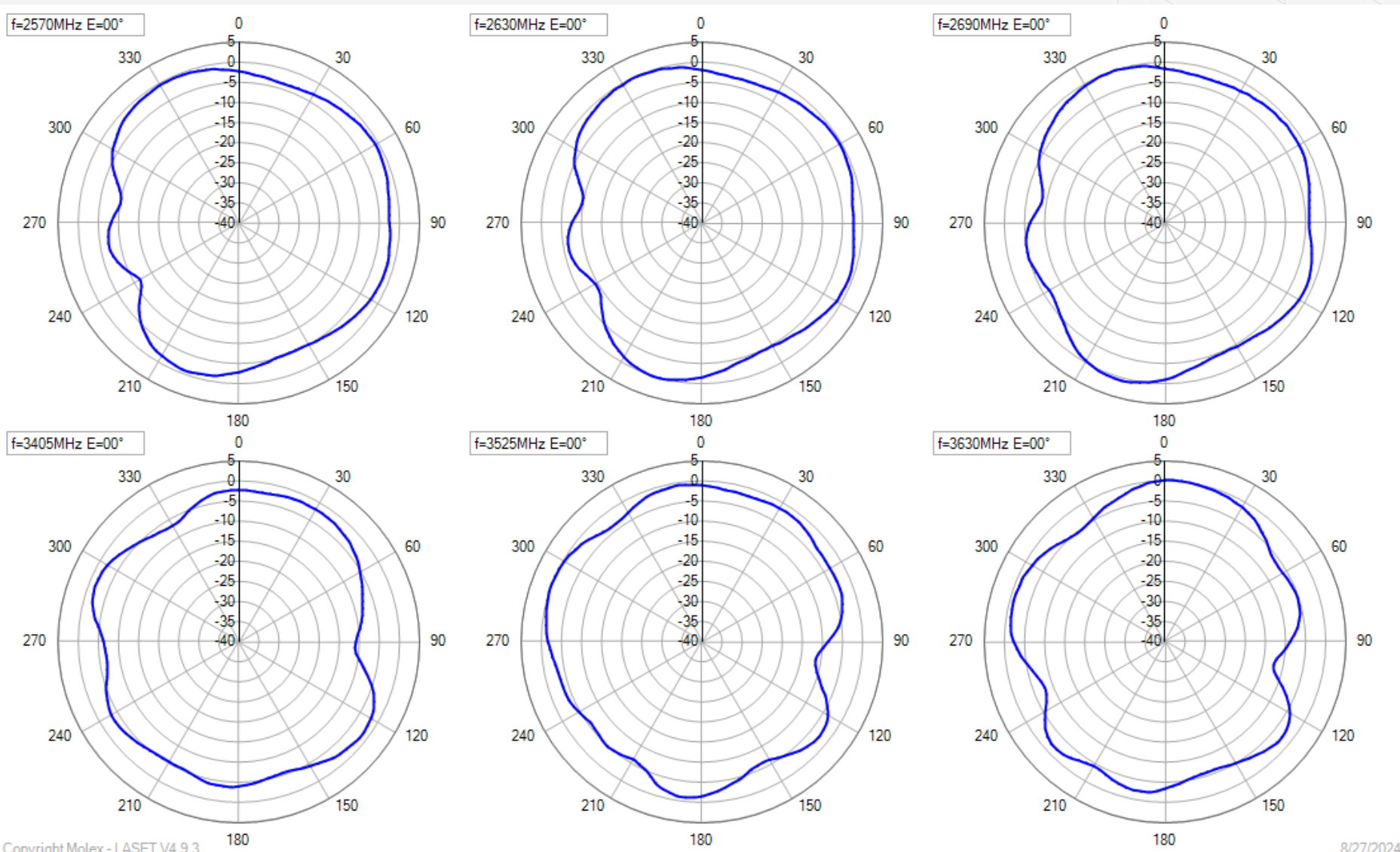
Horizontal Radiation Pattern MIMO2 ,dBi (EL0°)



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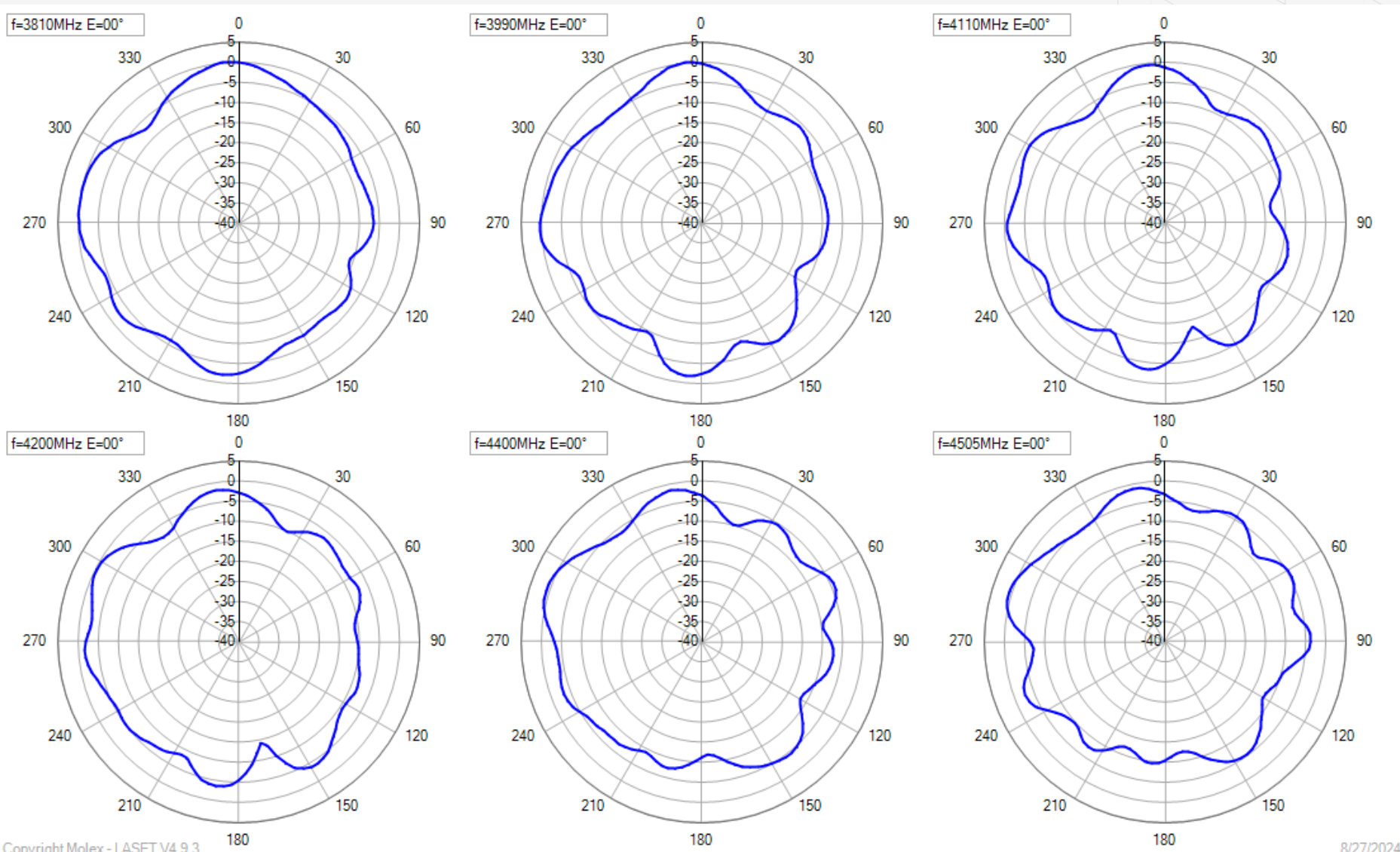
Horizontal Radiation Pattern MIMO2 ,dBi (EL0°)



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Horizontal Radiation Pattern MIMO2 ,dBi (EL0°)

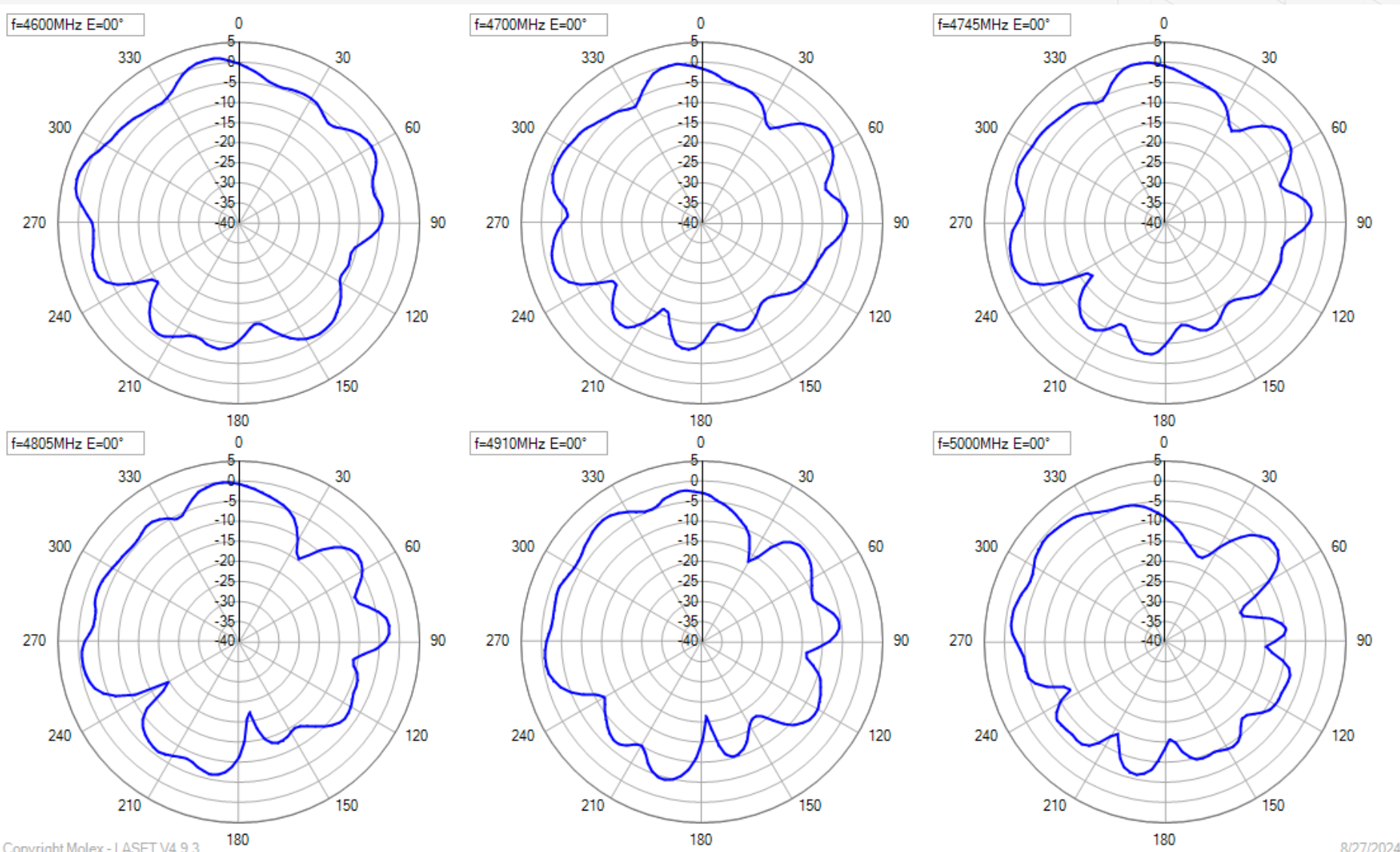


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Horizontal Radiation Pattern MIMO2 ,dBi (EL0°)

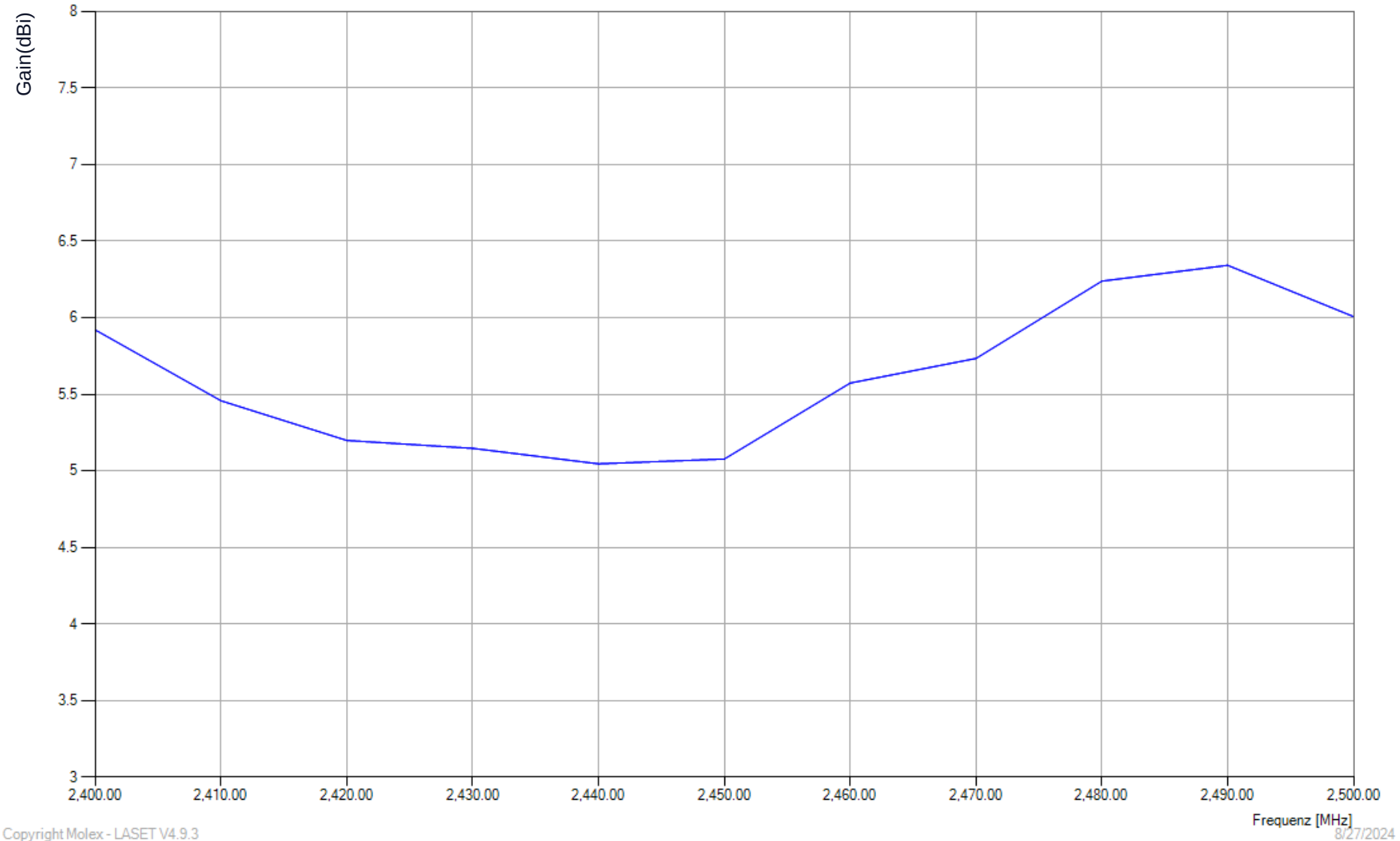


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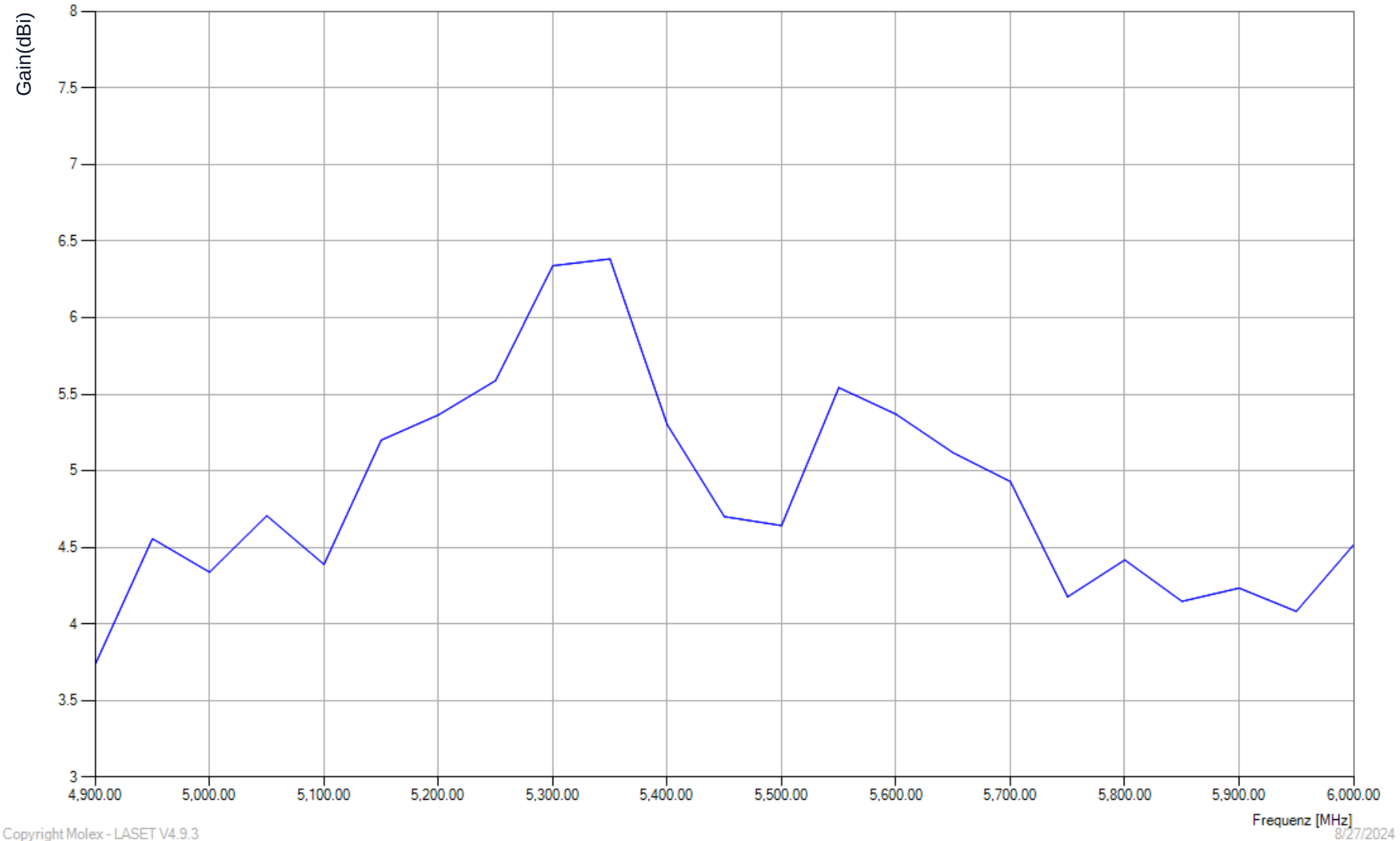
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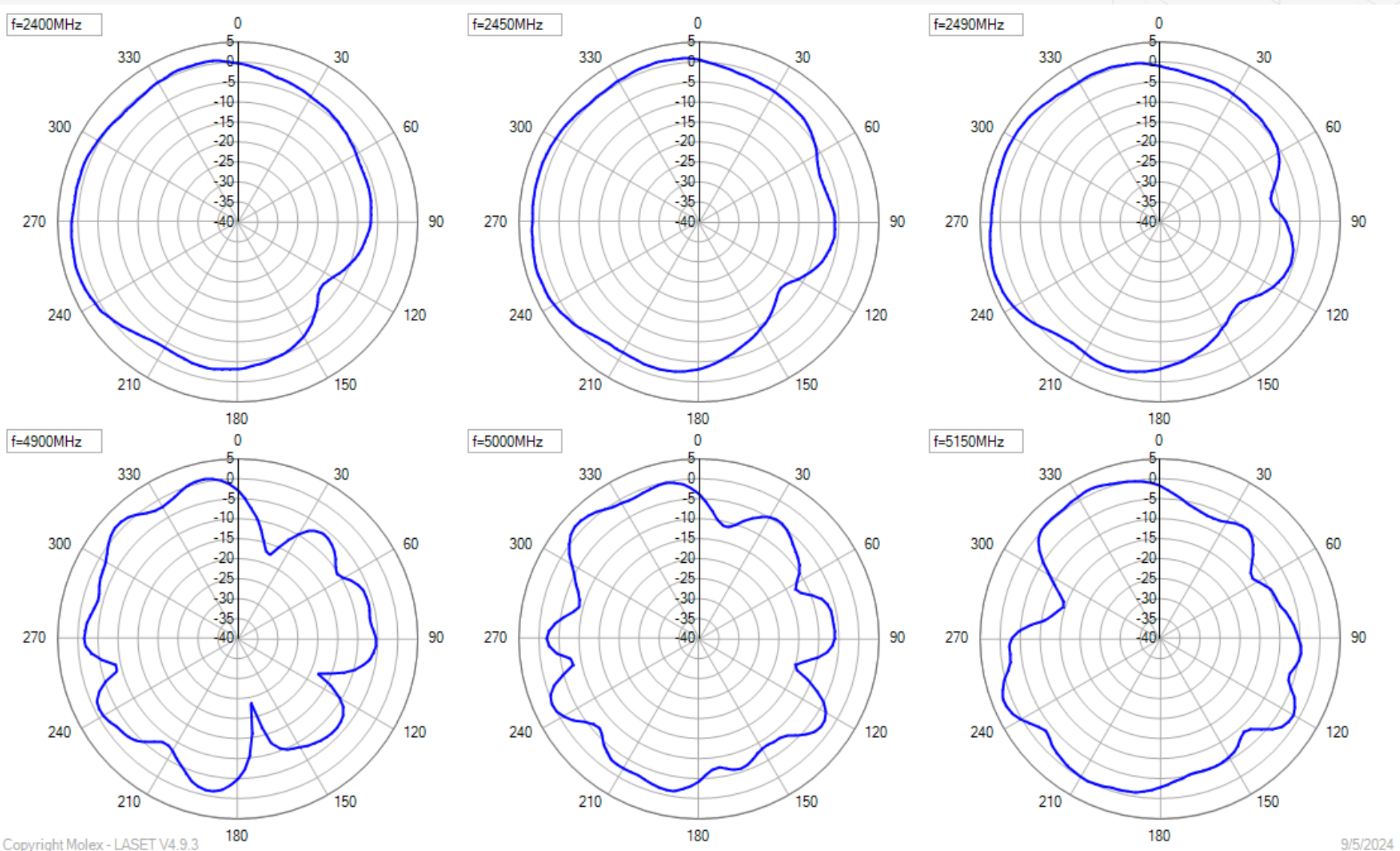
WIFI Max. Gain vs. Frequency (2400 MHz-2500 MHz)



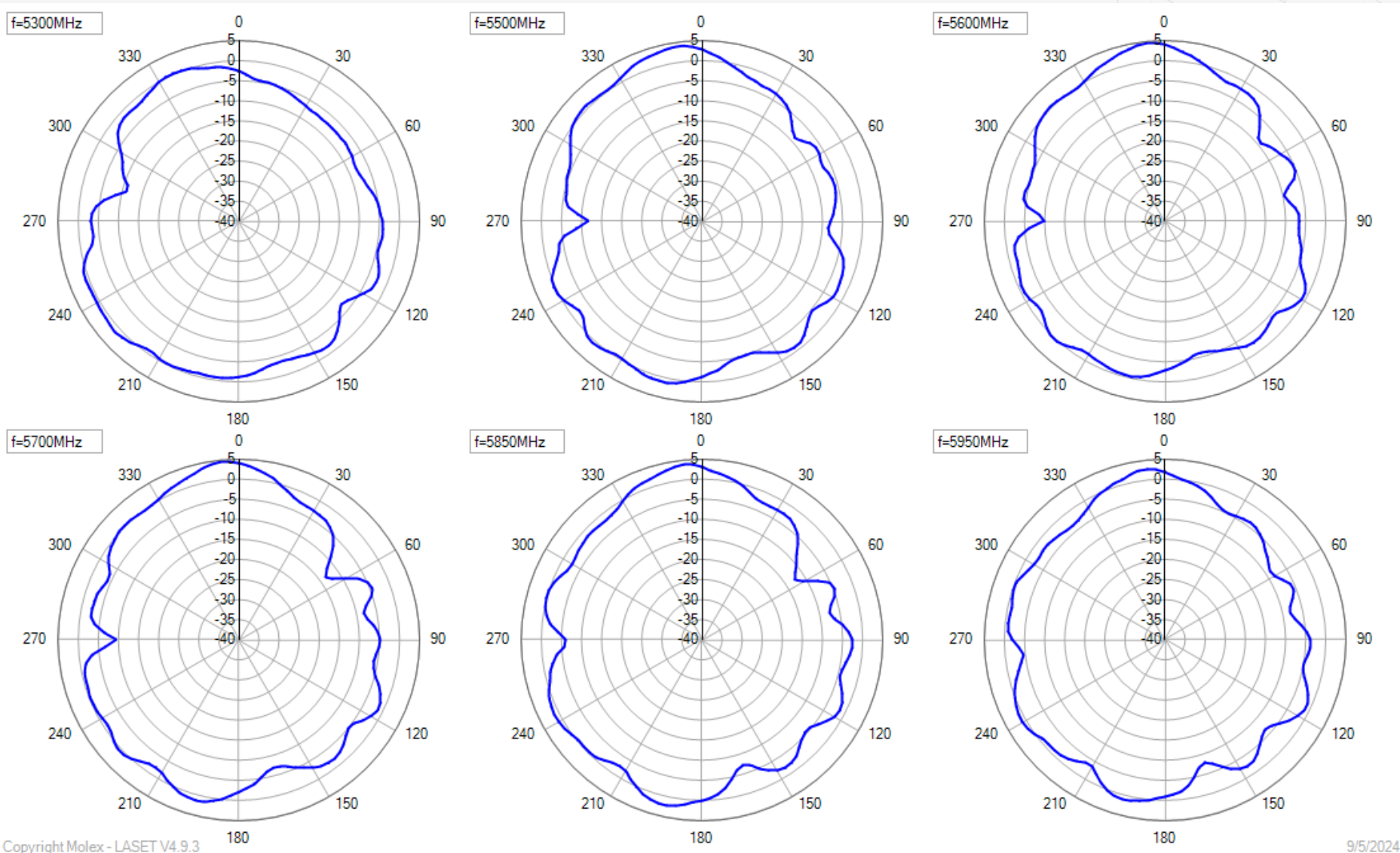
WIFI Max. Gain vs. Frequency (4900 MHz-6000 MHz)



Horizontal Radiation Pattern WIFI ,dBi (EL0°)



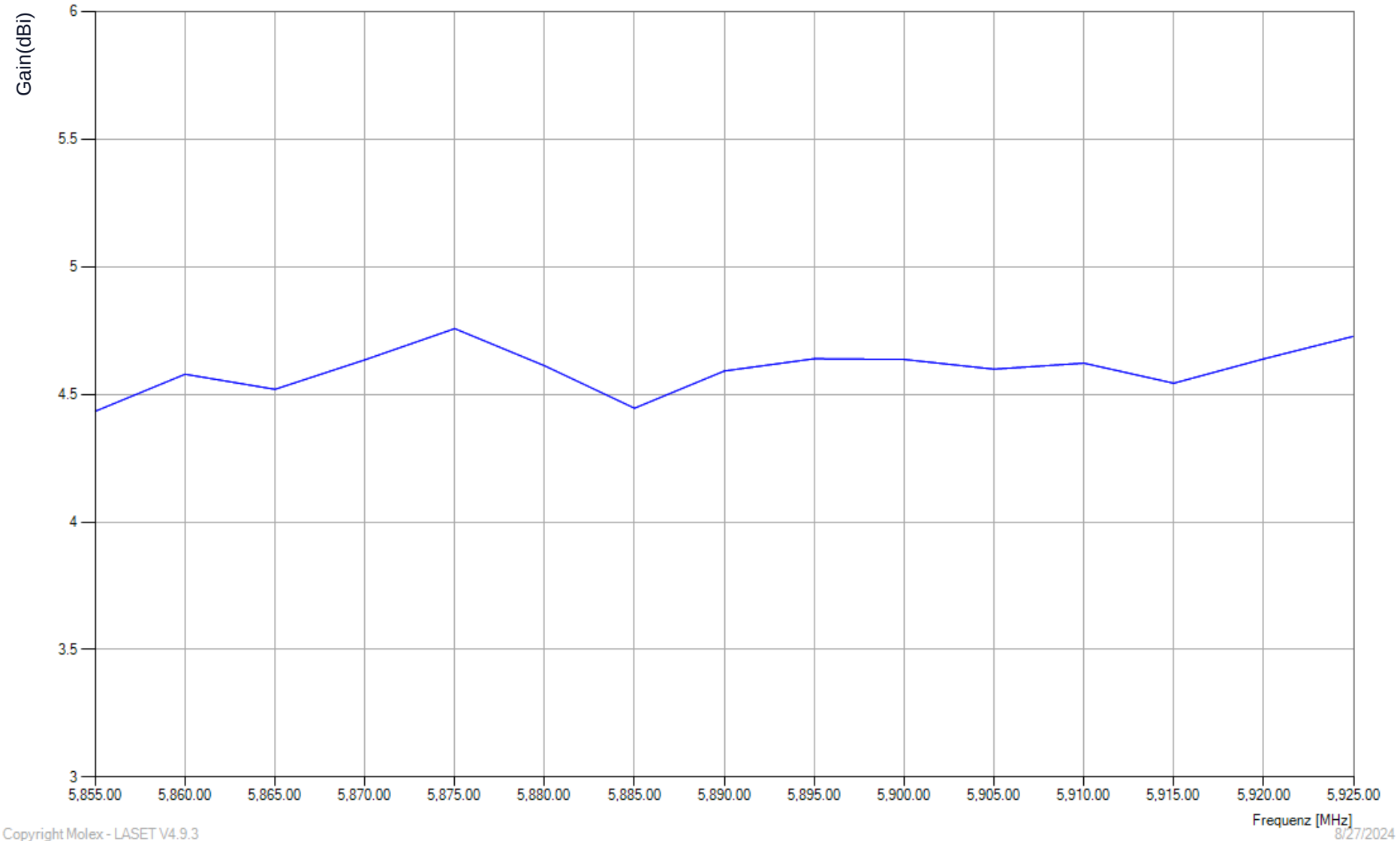
Horizontal Radiation Pattern WIFI ,dBi (EL0°)



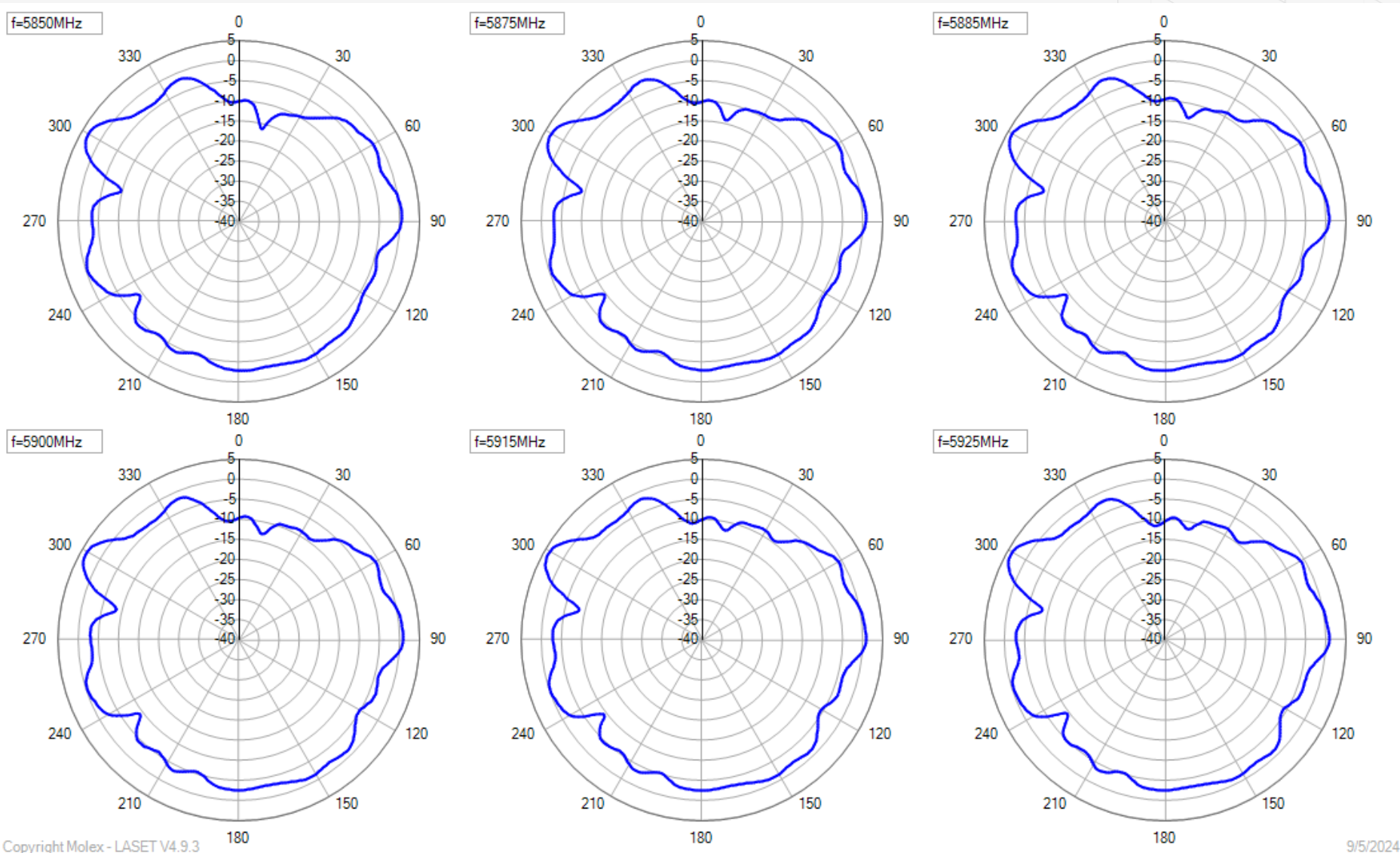
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V2X Max. Gain vs. Frequency (5855 MHz-5925 MHz)



Horizontal Radiation Pattern V2X ,dBi (EL0°)



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Max. Gain Summary, Cellular Antennas

E-UTRA Operating Band	Uplink (UL) band		Peak Gain(dBi)	
	F _{Low}	F _{High}	MIMO1	MIMO2
1	1920 MHz	1980 MHz	3.81	5.05
2	1850 MHz	1910 MHz	3.74	4.78
3	1710 MHz	1785 MHz	3.07	4.68
4	1710 MHz	1755 MHz	3.07	4.68
5	824 MHz	849 MHz	0.66	1.96
7	2500 MHz	2570 MHz	5.28	3.77
8	880 MHz	915 MHz	1.10	2.13
12	699 MHz	716 MHz	-1.67	-0.5
13	777 MHz	787 MHz	-0.32	0.84
14	788 MHz	798 MHz	-0.53	1.02
17	704 MHz	716 MHz	-1.67	-0.5
18	815 MHz	830 MHz	0.04	1.73
19	830 MHz	845 MHz	0.37	1.85
20	832 MHz	862 MHz	0.67	1.96

E-UTRA Operating Band	Uplink (UL) band		Peak Gain(dBi)	
	F _{Low}	F _{High}	MIMO1	MIMO2
25	1850 MHz	1915 MHz	3.74	4.78
26	814 MHz	849 MHz	0.66	1.96
28	703 MHz	748 MHz	1.12	0.27
29	N/A	NA		
30	2305 MHz	2315 MHz	2.65	4.48
32	NA	NA		
38	2570 MHz	2620 MHz	4.24	3.59
39	1880 MHz	1920 MHz	3.74	4.89
40	2300 MHz	2400 MHz	5.07	4.74
41	2496 MHz	2690 MHz	5.28	4.1
42	3400MHz	3599.9MHz	3.2	4.43
48	3550 MHz	3700 MHz	2.93	4.43
66	1710 MHz	1780 MHz	3.07	4.68
71	663 MHz	698 MHz	-1.03	-1.11
n77	3300 MHz	4200 MHz	4.79	5.15
n78	3300 MHz	3800 MHz	3.92	5.15
n79	4400 MHz	5000 MHz	5.00	7.16

Max. Gain Summary, WIFI and V2X

Operating Band	Uplink (UL) band		Peak Gain(dBi)
	F _{Low}	F _{High}	
WLAN 2.4GHz	2412 MHz	2472 MHz	5.73
WLAN 5.2GHz	5150 MHz	5350 MHz	6.38
WLAN 5.5GHz	5470 MHz	5850 MHz	5.54
WLAN 5.8GHz	5725 MHz	5850 MHz	4.42

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