



ANTENNA OF THINGS

— AOT ANTENNA REPORT —

Antenna Solution for Aruba AP763

-Passive Measurement Report-

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Date: 2025-08-29

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Revision History



Released Date	Version	Record
2024/06/06	Rev.01	Initial solution
2024/06/14	Rev.02	Improve solution
2024/06/28	Rev.03	Improve solution
2024/08/13	Rev.04	Measurement with mockup antenna samples
2024/10/23	Rev.05	Modify the reflector to PCB
2024/12/29	Rev.06	Add 3D printed Top and Bottom Cover
2025/03/25	Rev.07	Add latest Top and Bottom Cover and modify the antenna solutions
2025/04/23	Rev.08	Improve the antenna solutions
2025/08/29	Rev.09	Add uncorrelated gain

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ANTENNA REQUIREMENTS

- Project Introduce
- Antenna Requirements Review



Project Introduce

- Brief Project Description:
 - Project Name: Aruba AP763
 - Category: AP Router
- Antenna Configuration:
 - 2 x 2G4/5G Band Omni Antennas
 - 2 x 2G4/5G Band Directional Antennas
 - 2 x 5G Band Omni Antennas
 - 2 x 5G Band Directional Antennas
 - 4 x 6G Band Omni Antennas
 - 4 x 6G Band Directional Antennas
 - 1 x GNSS L1+L5 Band Antenna
 - 2x BLE Band Antennas
- Antennas in AOT proposal are:
 - 19 x off-board antennas
 - 16 x PCB and 3 x Stamped Metal Type
 - Cable-fed



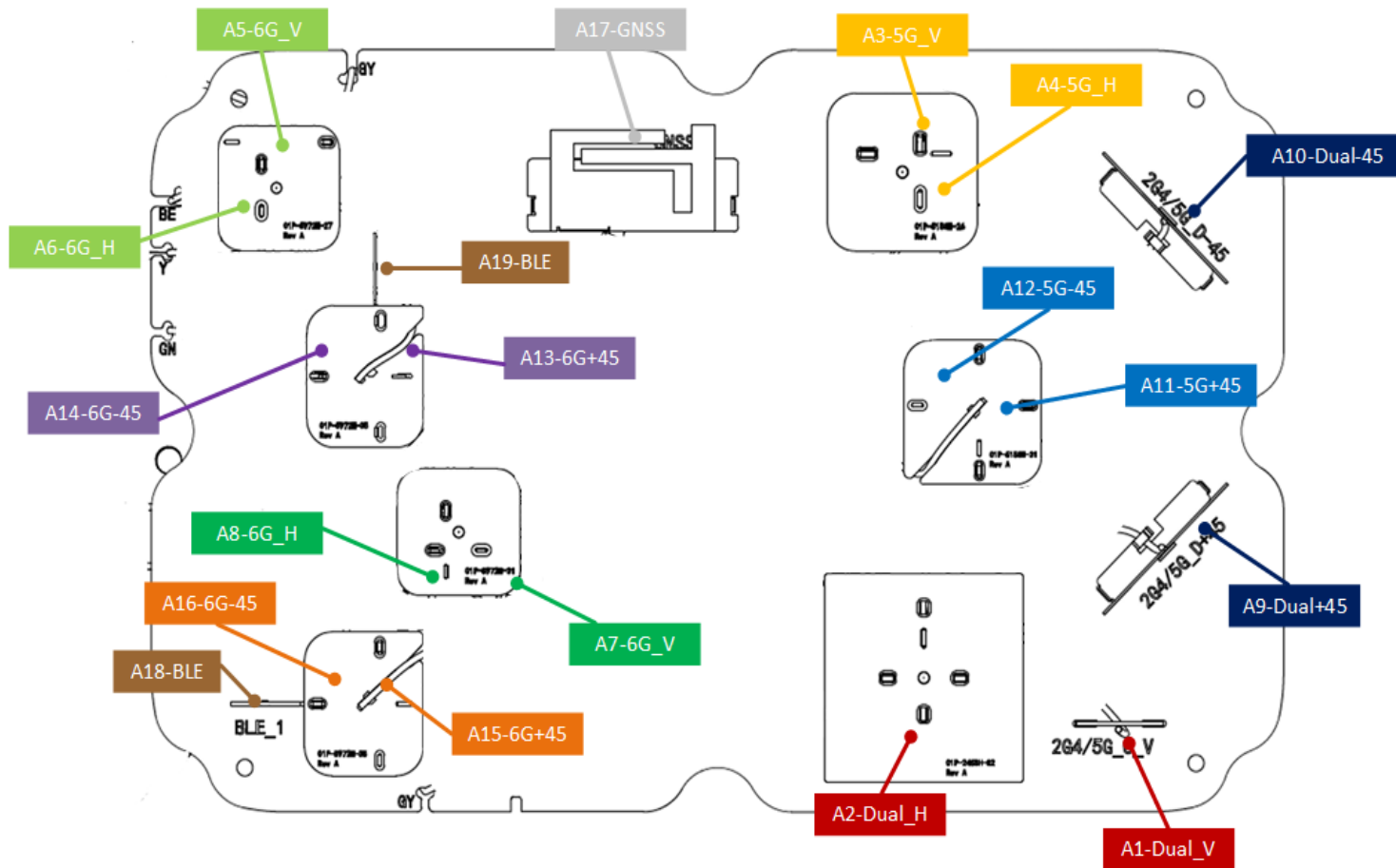
Antenna Requirements Review

- Basic Requirement
 - Frequency Range
 - 2G4/5G Band Antennas
 - 2400-2490MHz/5150-5850MHz
 - 5G Band Antennas
 - 5150-5850MHz
 - 6G Band Antenna
 - 5925-7125MHz
 - BLE Band Antennas
 - 2400-2490MHz
 - GNSS Band Antennas
 - L1+L5 Band
 - Return Loss
 - >10dB for all Band Antennas
 - Isolation
 - >20dB for WIFI 2G4 band antennas
 - >20dB for WIFI 5G band antennas
 - >20dB for WIFI 6G band antennas
 - >25dB for BLE band antennas
 - >33dB @5150MHz~7125MHz for 5G band & 6G band antennas
 - Mode 1 Omni Pattern
 - Vertical + Horizontal POL
 - Mode 2 Directional Pattern
 - $\pm 45^\circ$ POL



AOT ANTENNA SOLUTIONS

AOT Antenna Solutions



SIDE NOTES

- Mode 1 Omni Patterns
 - A1 is Dual Band V-POL
 - A2 is Dual Band H-POL
 - A3 is 5G Band V-POL
 - A4 is 5G Band H-POL
 - A5/A7 are 6G Band V-POL
 - A6/A8 are 6G Band H-POL
- Mode 2 Directional Patterns
 - A9 is Dual Band +45°
 - A10 is Dual Band -45°
 - A11 is 5G Band +45°
 - A12 is 5G Band -45°
 - A13/A15 are 6G Band +45°
 - A14/A16 are 6G Band -45°
- A17 is GNSS L1+L5 Band Antennas
- A18/A19 are BLE Band Antennas



ANTENNA PERFORMANCE SUMMARY

- Test Results include SW Board and Cable



Omni Antenna Performance



Item	SPC
Peak Gain (dBi)	4dBi< Max Gain<5dBi
Average gain @H plane	>0dB
Horizontal cut Gain Flatness	<5dB

		Ant1_V (2.4G+5G)						Ant2_H(2.4G+5G)					
		2.4	2.45	2.48	5.2	5.5	5.8	2.4	2.45	2.48	5.2	5.5	5.8
Peak Gain (dBi)		2.3	2.2	1.8	5.1	5.0	4.9	4.2	4.4	4.5	3.3	3.7	3.9
Average Gain (dBi)	Theta90	-1.4	-0.8	-0.9	-1.4	-1.3	-1.2	-1.9	-2.1	-2.3	0.5	0.2	-0.3
	Theta80	-1.2	-0.7	-0.8	0.5	0.4	0.8	-0.1	-0.1	-0.3	0.7	0.4	0.1
	Theta70	-0.8	-0.2	-0.2	0.2	-0.2	-0.5	1.2	1.0	1.1	0.2	-0.6	-1.5
Flatness (dB)	Theta90	9.5	10.2	10.6	12.2	12.5	11.1	5.4	5.3	5.4	6.8	6.8	8.0
	Theta80	9.8	9.3	10.5	12.1	12.5	12.3	4.2	4.3	5.1	4.8	6.6	8.3

Omni Antenna Performance



Item		SPC					
Peak Gain (dBi)		4dBi< Max Gain<5dBi					
Average gain @H plane		>0dB					
Horizontal cut Gain Flatness		<5dB					
		Ant3_V (5G)			Ant4_H (5G)		
		5.2	5.5	5.8	5.2	5.5	5.8
Peak Gain (dBi)		4.6	4.7	4.3	3.8	3.8	3.9
Average Gain (dBi)	Theta90	-1.4	-1.5	-1.8	0.3	0.2	0.2
	Theta80	-0.2	-0.3	-0.4	0.8	0.9	0.9
	Theta70	-0.5	-1.1	-1.8	-0.2	-0.6	-1.3
Flatness (dB)	Theta90	11.0	12.9	11.2	6.7	8.9	8.9
	Theta80	13.5	10.1	13.8	8.7	7.9	8.5



Omni Antenna Performance



Item		SPC											
Peak Gain (dBi)		4dBi< Max Gain<5dBi											
Average gain @H plane		>0dB											
Horizontal cut Gain Flatness		<5dB											
		Ant5_V (6G)			Ant6_H (6G)			Ant7_V (6G)			Ant8_H (6G)		
		6.1	6.5	6.9	6.1	6.5	6.9	6.1	6.5	6.9	6.1	6.5	6.9
Peak Gain (dBi)		5.3	5.5	5.7	4.0	4.0	4.4	5.4	5.3	5.1	4.2	4.0	3.8
Average Gain (dBi)	Theta90	-1.2	-1.1	-0.7	0.8	0.5	0.7	-1.8	-1.9	-1.8	0.1	-0.3	-0.5
	Theta80	0.6	0.7	1.0	0.7	0.9	1.4	0.8	-0.5	-0.5	1.2	1.2	1.3
	Theta70	0.4	0.2	0.2	-0.7	-0.2	0.2	0.1	-1.4	-2.1	-0.9	-0.8	-0.9
Flatness (dB)	Theta90	12.8	12.5	12.7	6.3	7.0	8.4	10.8	11.8	12.1	10.4	8.6	10.2
	Theta80	12.7	12.8	13.8	8.4	8.6	6.2	12.7	13.3	13.2	6.8	5.8	6.7



Directional Antenna Performance



Item		SPC											
Peak Gain (dBi)		6.5dBi < Max Gain <8dBi											
3 dB Beam Width		80*80(V*H)											
Peak gain direction Deviation degree		<5°											
		Ant9_+45 (2.4G+5G)						Ant10_-45 (2.4G+5G)					
		2.4	2.45	2.48	5.2	5.5	5.8	2.4	2.45	2.48	5.2	5.5	5.8
Peak Gain (dBi)		6.7	6.4	6.3	6.3	6.5	5.6	6.1	6.5	6.6	6.3	5.3	5.2
3dB Beamwidth	XZ	72	70	78	76	71	76	76	74	74	74	84	88
	YZ	72	72	76	72	80	72	76	80	76	84	78	92
Deviation	XZ	-6	-6	-4	0	-6	-4	6	6	6	0	6	0
	YZ	4	6	6	0	6	4	-6	-6	-6	6	6	0

Directional Antenna Performance

Item		SPC					
Peak Gain (dBi)		6.5dBi < Max Gain <8dBi					
3 dB Beam Width		80*80(V*H)					
Peak gain direction Deviation degree		<5°					
		Ant11_+45 (5G)			Ant12_-45 (5G)		
		5.2	5.5	5.8	5.2	5.5	5.8
Peak Gain (dBi)		6.5	6.7	6.8	6.4	6.6	7.3
3dB Beamwidth	XZ	72	72	74	72	74	72
	YZ	80	78	72	76	72	72
Deviation	XZ	0	0	0	0	0	4
	YZ	-4	0	-2	6	0	0



Directional Antenna Performance



Item		SPC											
Peak Gain (dBi)		6.5dBi < Max Gain <8dBi											
3 dB Beam Width		80*80(V*H)											
Peak gain direction Deviation degree		<5°											
		Ant13_+45 (6G)			Ant14_-45 (6G)			Ant15_+45 (6G)			Ant16_-45 (6G)		
		6.1	6.5	6.9	6.1	6.5	6.9	6.1	6.5	6.9	6.1	6.5	6.9
Peak Gain (dBi)		6.4	7.6	7.8	7.6	8.2	7.3	6.9	7.6	7.6	7.5	7.2	7.3
3dB Beamwidth	XZ	72	76	72	72	70	70	74	72	74	72	70	74
	YZ	78	72	72	74	72	80	70	72	72	70	76	76
Deviation	XZ	2	6	-2	6	6	0	-2	0	6	0	0	0
	YZ	2	0	4	-6	-4	0	-6	0	6	-6	0	4



BLE Antenna Performance



Item	SPC
Peak Gain (dBi)	4dBi< Max Gain<5dBi
Horizontal cut Gain Flatness	<10dB

		Ant18 (BLE)			Ant19 (BLE)		
		2.4	2.45	2.48	2.4	2.45	2.48
Peak Gain (dBi)		2.1	3.3	3.2	5.3	5.7	5.6
Average Gain (dBi)	Theta90	-2.4	-1.2	-0.9	-2.7	-1.8	-1.8
	Theta80	-2.0	-0.5	-0.2	-1.3	-0.4	-0.5
	Theta70	-1.6	0.0	0.2	0.2	0.6	0.5
Flatness (dB)	Theta90	17.0	16.5	17.0	17.2	18.4	14.3
	Theta80	15.4	10.8	11.3	19.4	19.0	16.2

GPS Antenna Performance



Item		SPC	
Peak Gain (dBi)		Max Gain>2dBi	
Horizontal cut Gain Flatness		<5dB	
		Ant17 (GPS)	
		1.176	1.575
Peak Gain (dBi)		-0.2	2.4
Average Gain (dBi)	Theta90	-2.7	-2.3
	Theta80	-2.3	-1.4
	Theta70	-1.8	-0.7
Flatness (dB)	Theta90	3.9	10.5
	Theta80	4.0	8.9



Isolation Summary



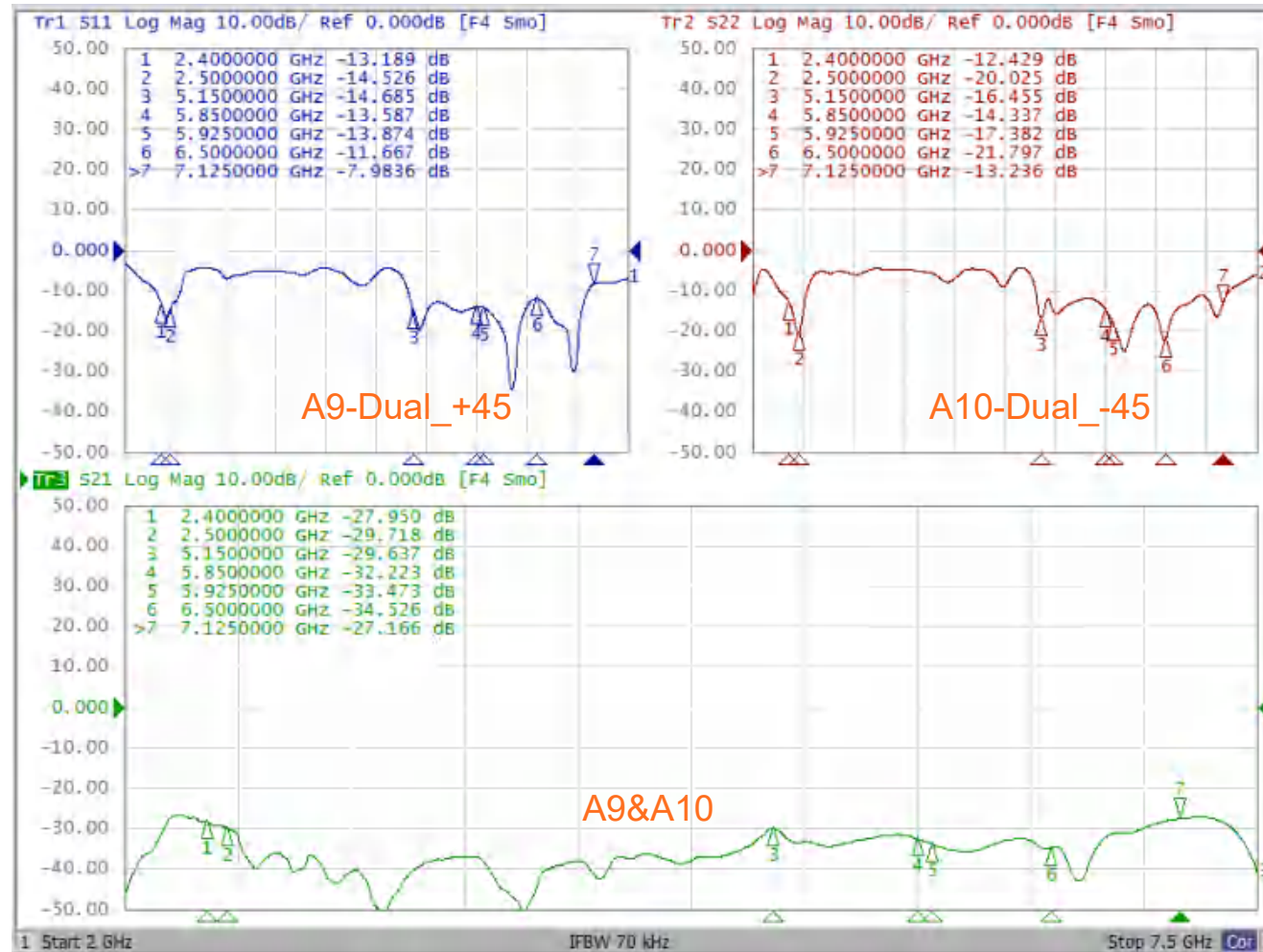
Isolation	Ant1	Ant2	Ant 3	Ant 4	Ant 5	Ant 6	Ant 7	Ant 8	Ant 9	Ant10	Ant11	Ant12	Ant13	Ant14	Ant15	Ant16	Ant17	Ant18	Ant19
Ant 1	\	29	20	38	34	46	31	44	\	\	\	\	\	\	\	\	25	24	27
Ant 2		\	38	27	34	33	35	28	\	\	\	\	\	\	\	\	44	32	29
Ant 3			\	22	\	\	\	\	\	\	\	\	\	\	\	\	23	\	\
Ant 4				\	\	\	\	\	\	\	\	\	\	\	\	\	31	\	\
Ant 5					\	27	32	22	\	\	\	\	\	\	\	\	22	\	\
Ant 6						\	26	39	\	\	\	\	\	\	\	\	27	\	\
Ant 7							\	28	\	\	\	\	\	\	\	\	31	\	\
Ant 8								\	\	\	\	\	\	\	\	\	36	\	\
Ant 9									\	27	22	35	34	42	39	40	29	40	29
Ant 10										\	32	22	35	35	38	48	38	46	40
Ant 11											\	34	\	\	\	\	30	\	\
Ant 12												\	\	\	\	\	25	\	\
Ant 13													\	21	30	30	32	\	\
Ant 14														\	27	30	28	\	\
Ant 15															\	23	29	\	\
Ant 16																\	25	\	\
Ant 17																	\	\	\
Ant 18																		\	29
Ant 19																			\

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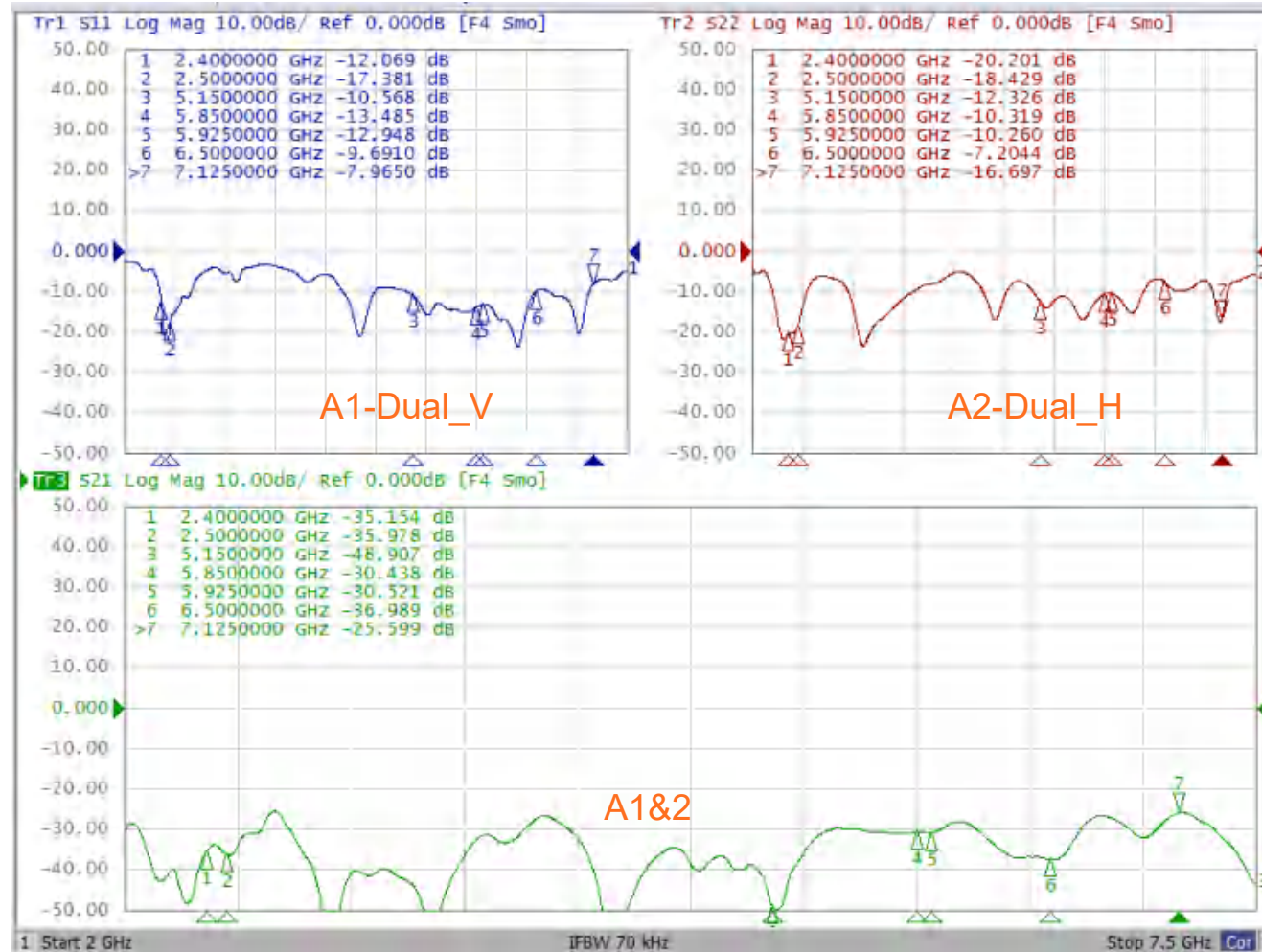
Antenna Return Loss & Isolation

- Return Loss
- Isolation

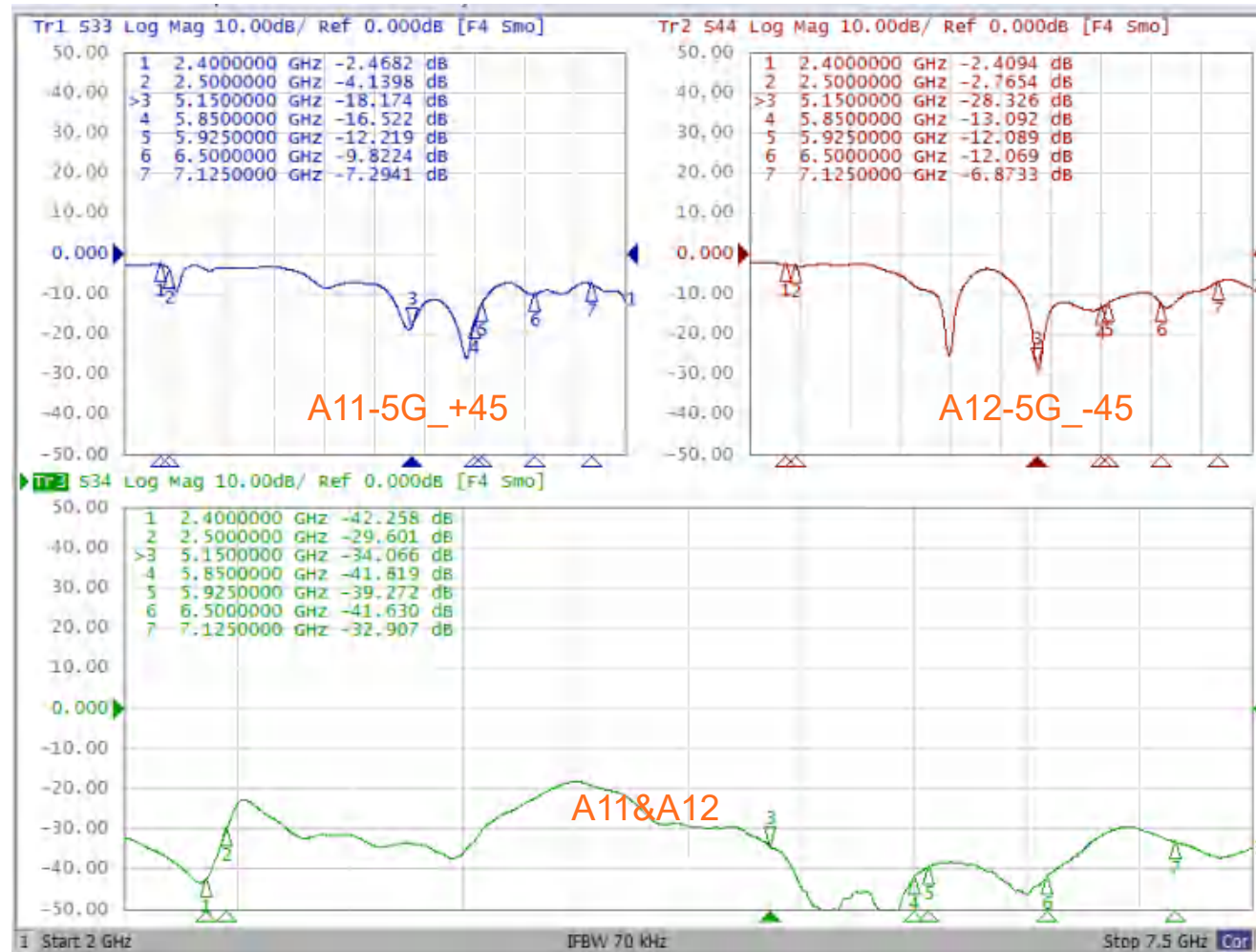
Return Loss of 2G4_5G_D Band Antennas Switch Off



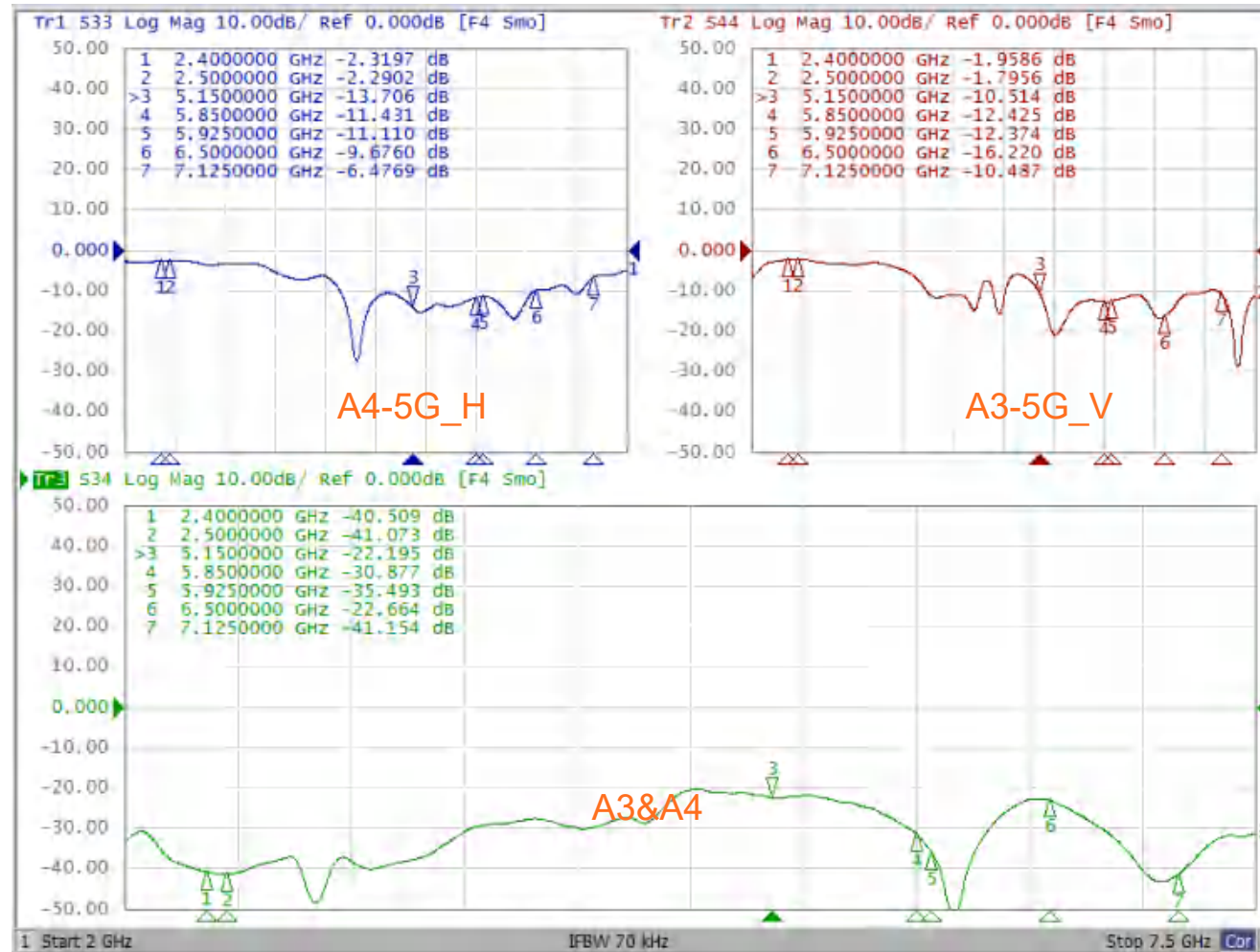
Return Loss of 2G4_5G_O Band Antennas Switch On



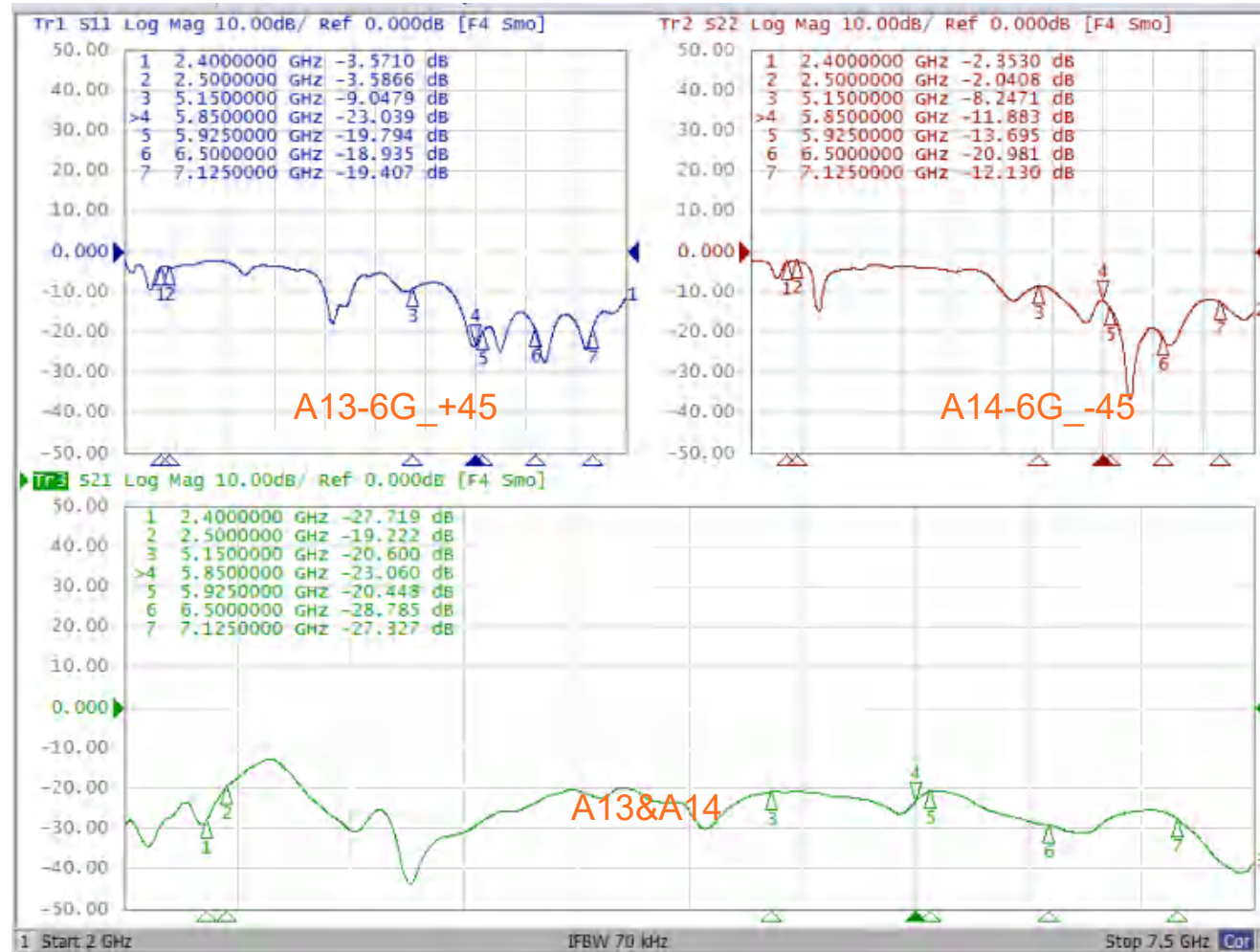
Return Loss of 5G_D Band Antennas Switch Off



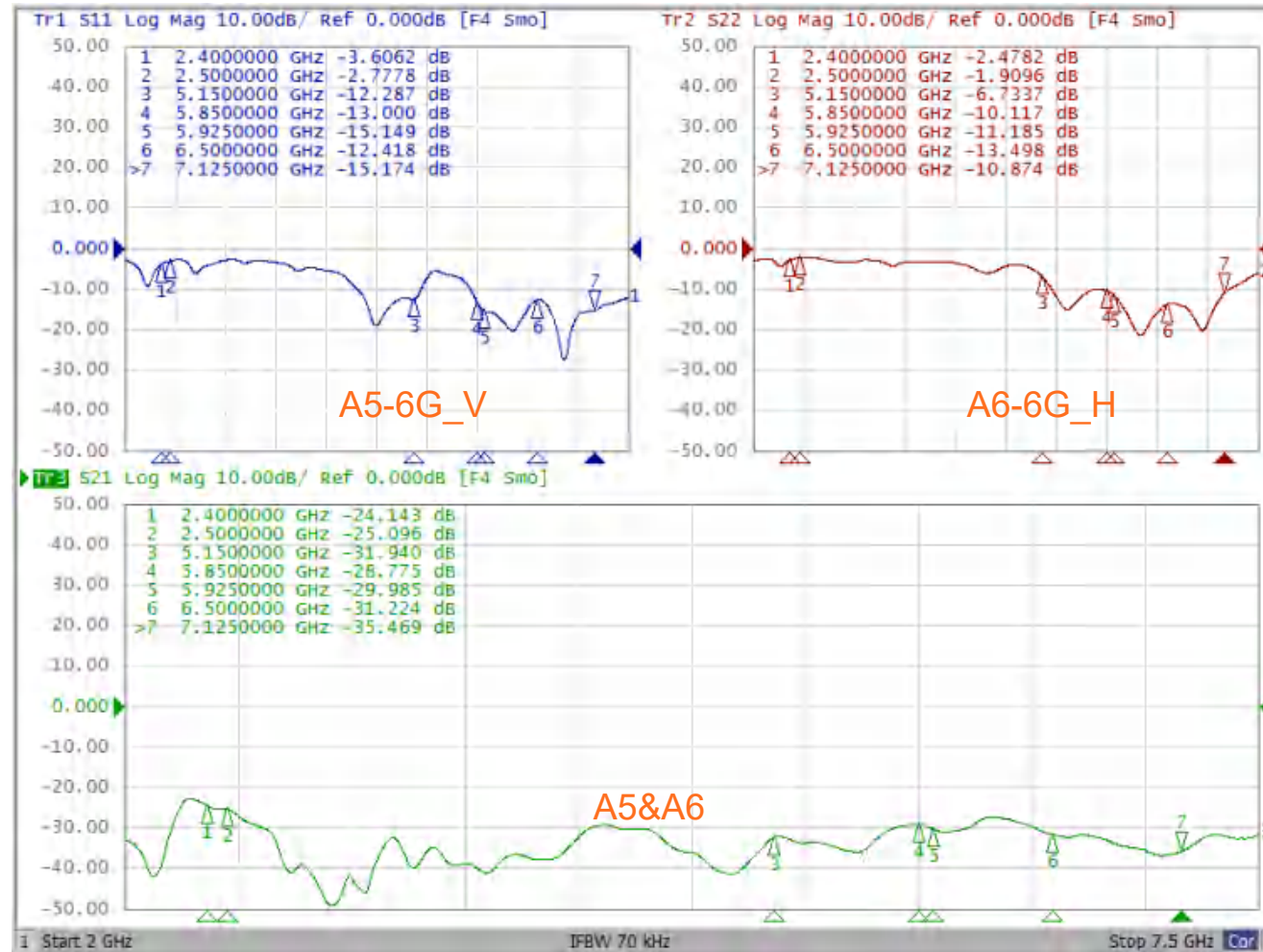
Return Loss of 5G_O Band Antennas Switch On



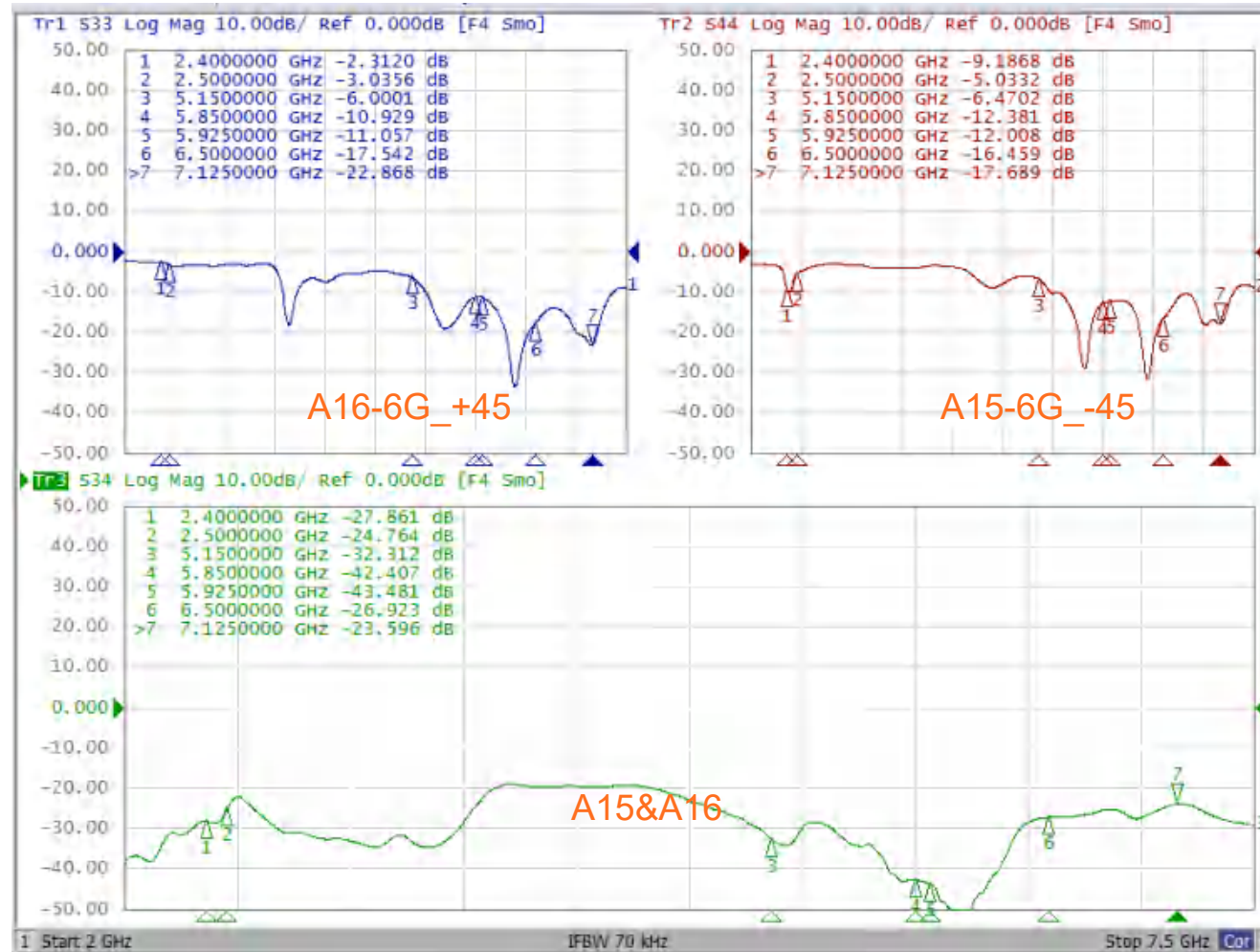
Return Loss of 6G_D_Band Antennas Switch On_1



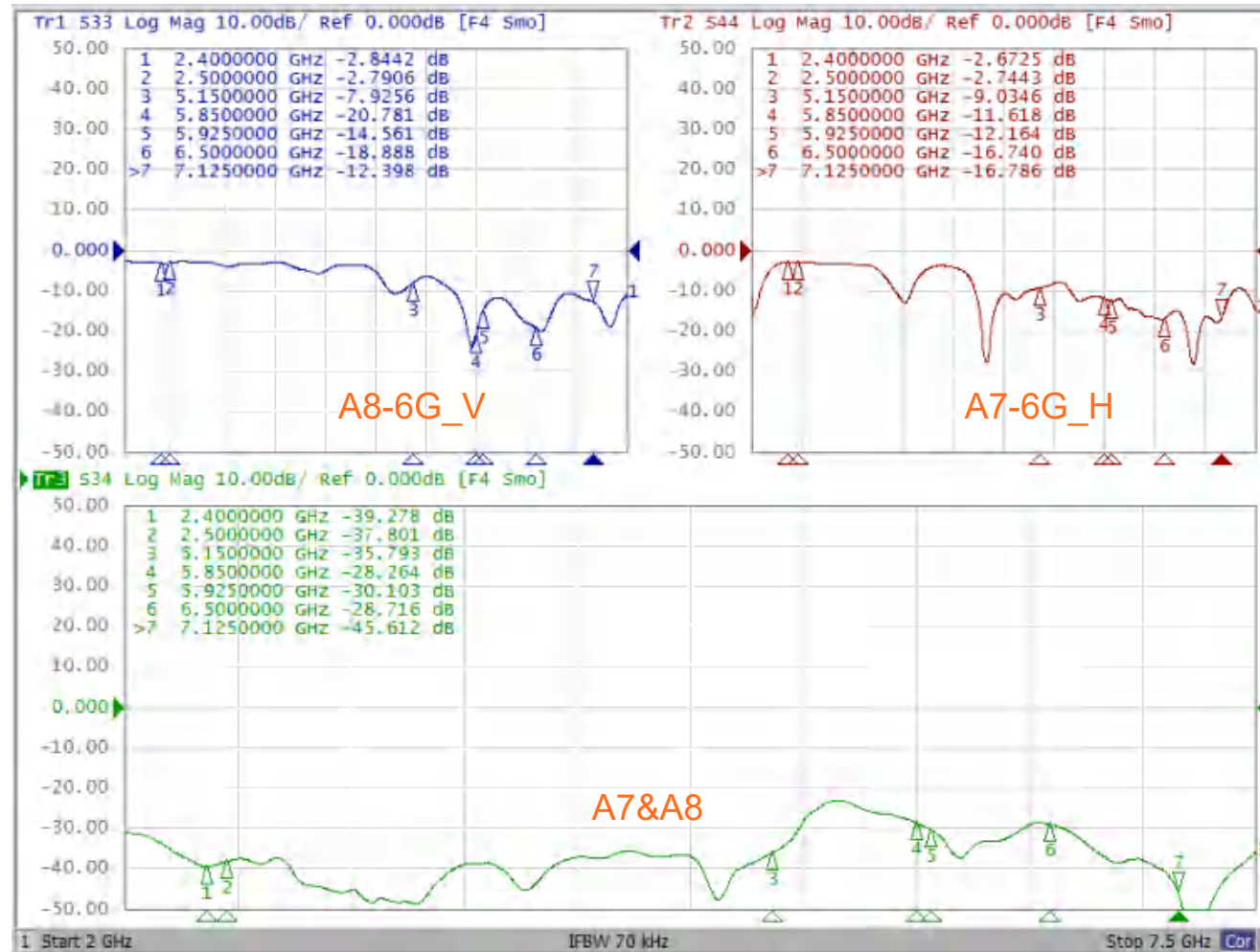
Return Loss of 6G_O_Band Antennas Switch On_1



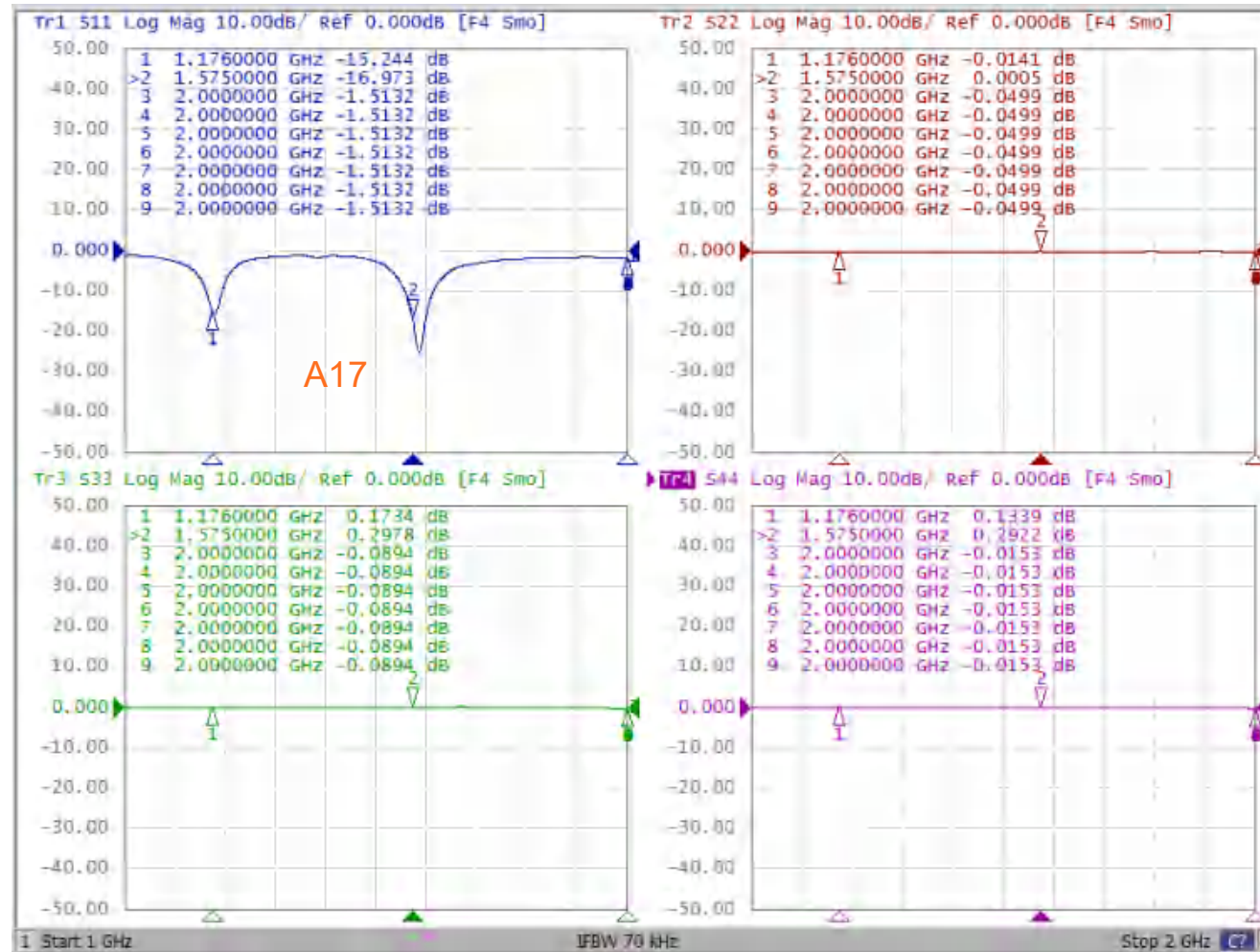
Return Loss of 6G_D Band Antennas Switch Off_2



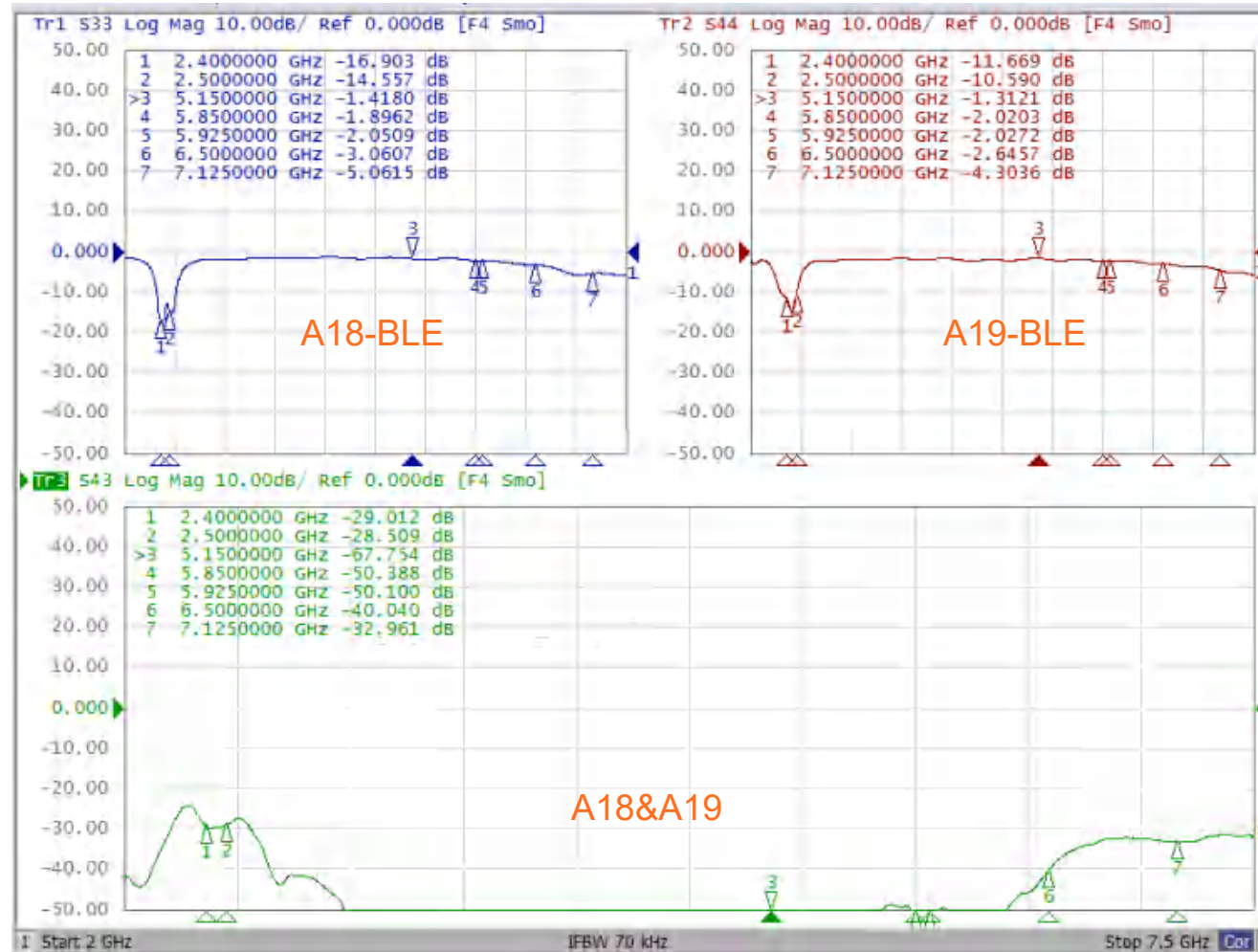
Return Loss of 6G_O_Band Antennas Switch On_2



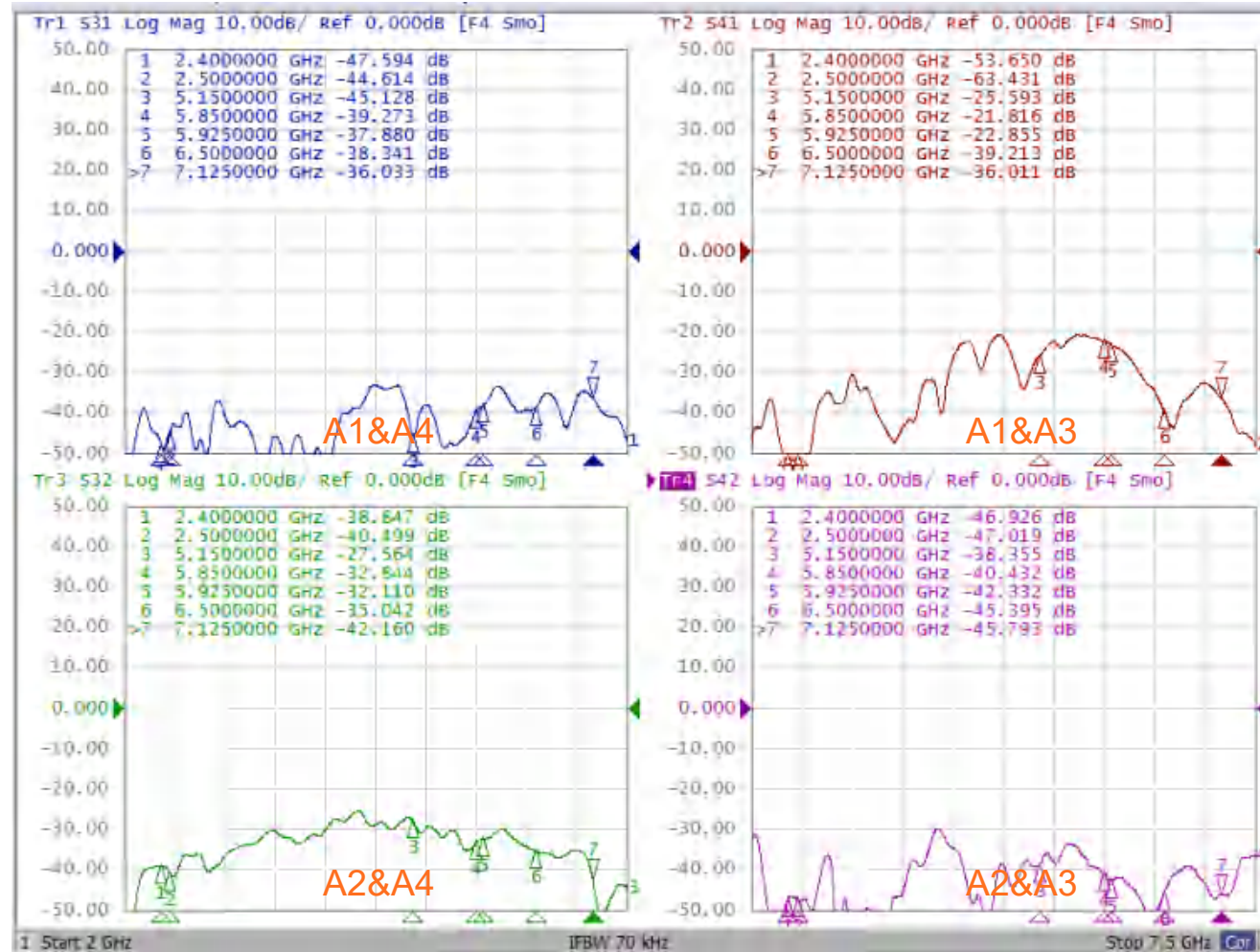
Return Loss of GNSS_Band Antennas



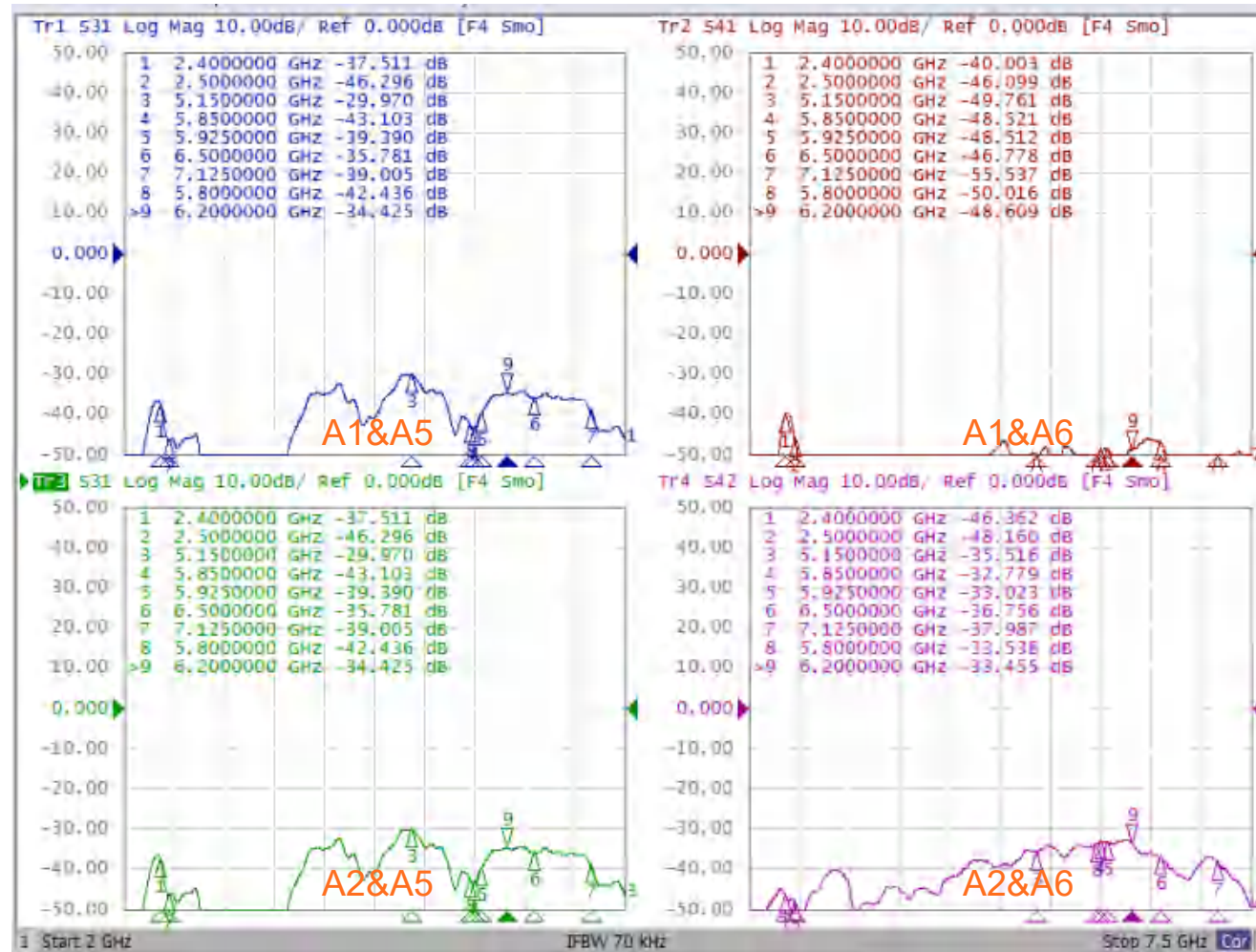
Return Loss of BLE_Band Antennas



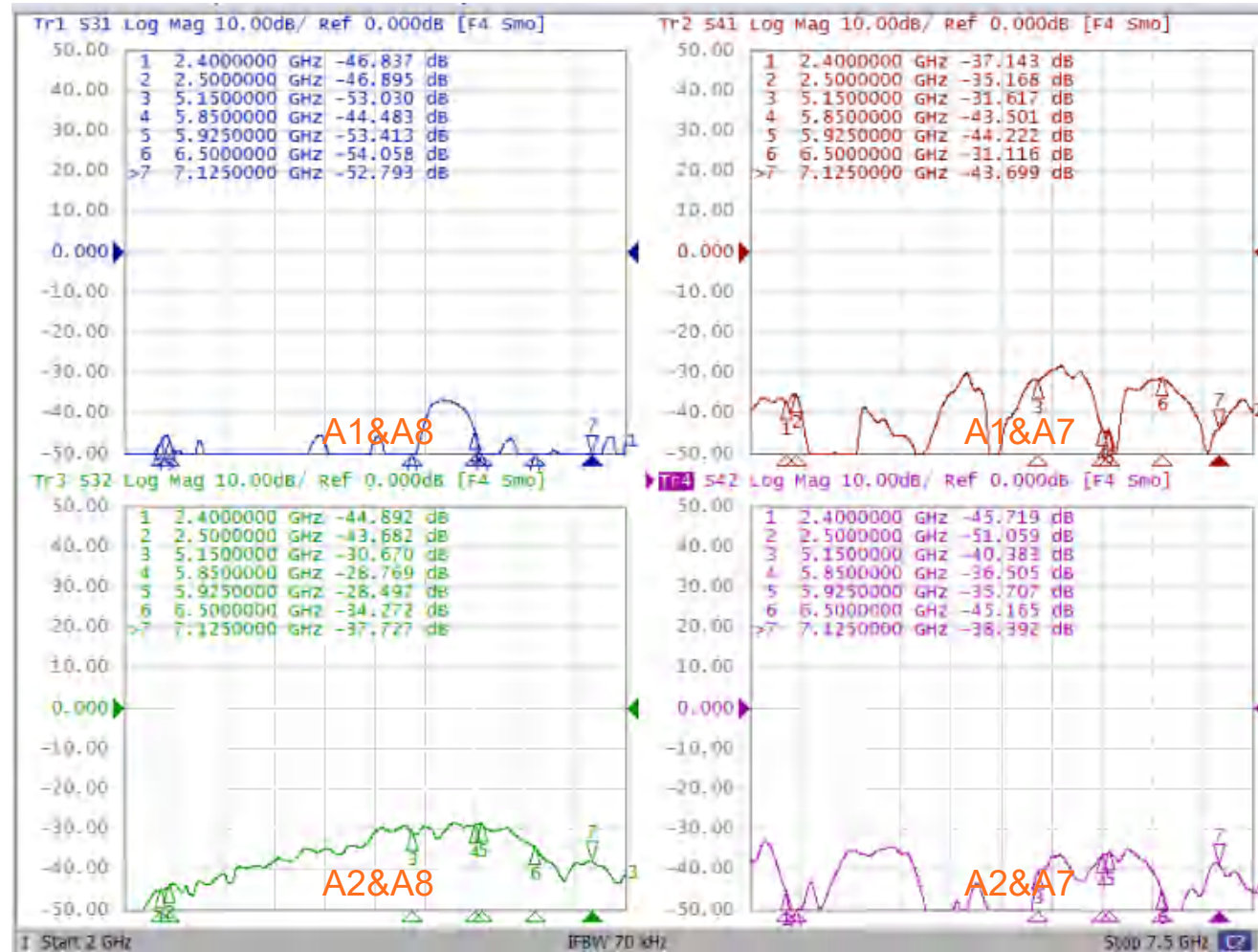
Isolation of Dual_O&5G_O Band Antennas



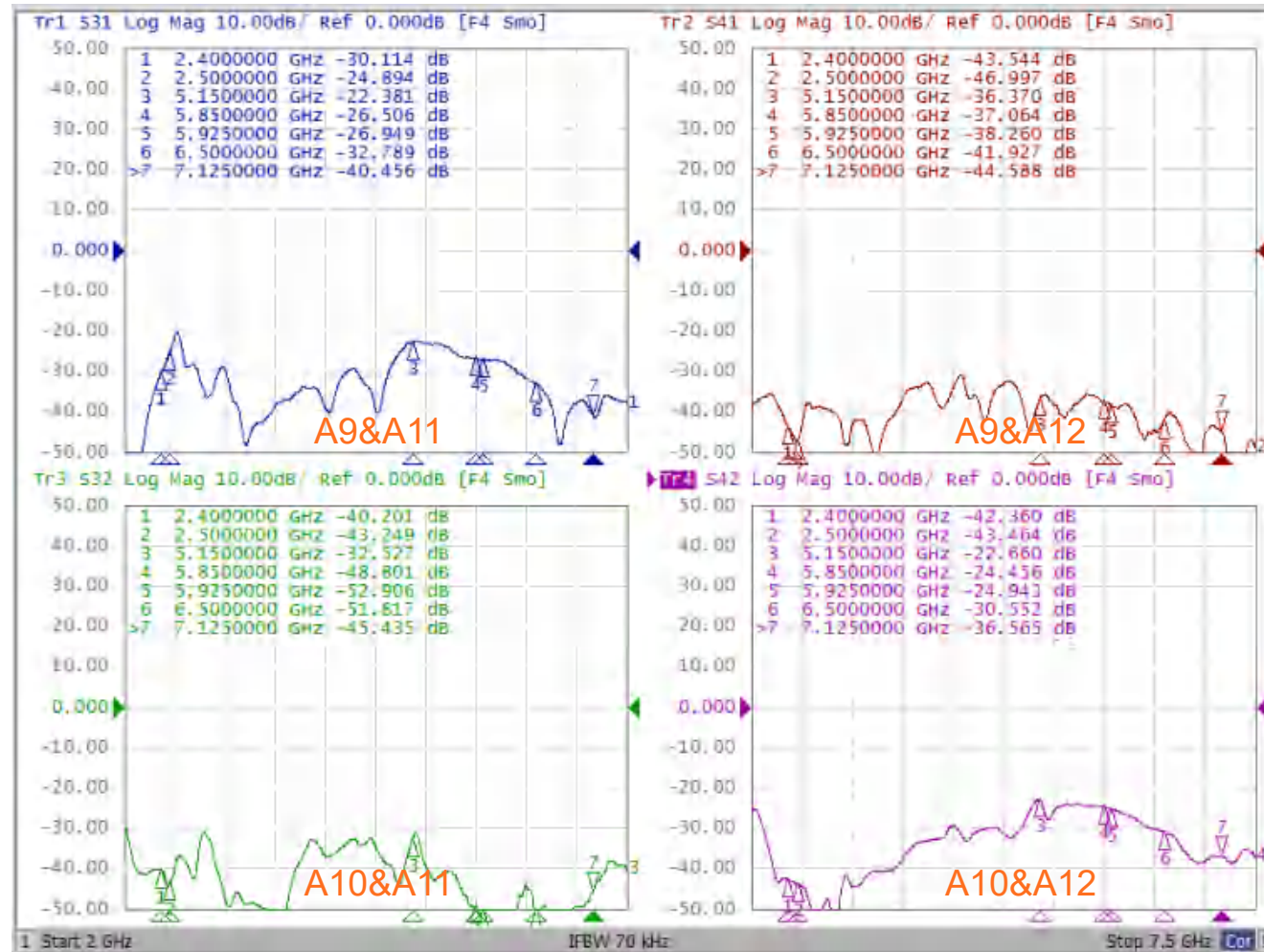
Isolation of Dual_O&6G_O_1 Band Antennas



Isolation of Dual_O&6G_O_2 Band Antennas



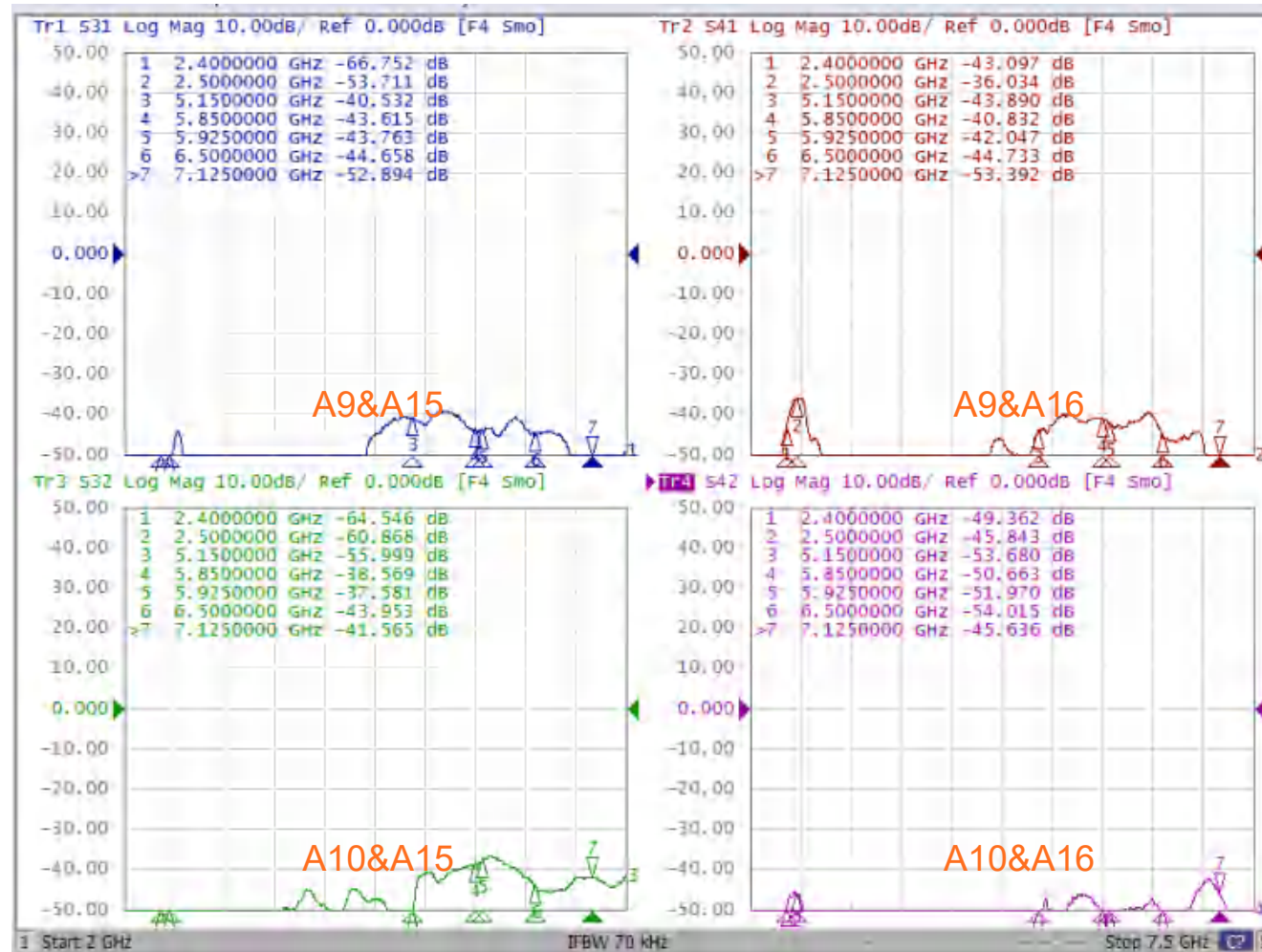
Isolation of Dual_D&5G_D Band Antennas



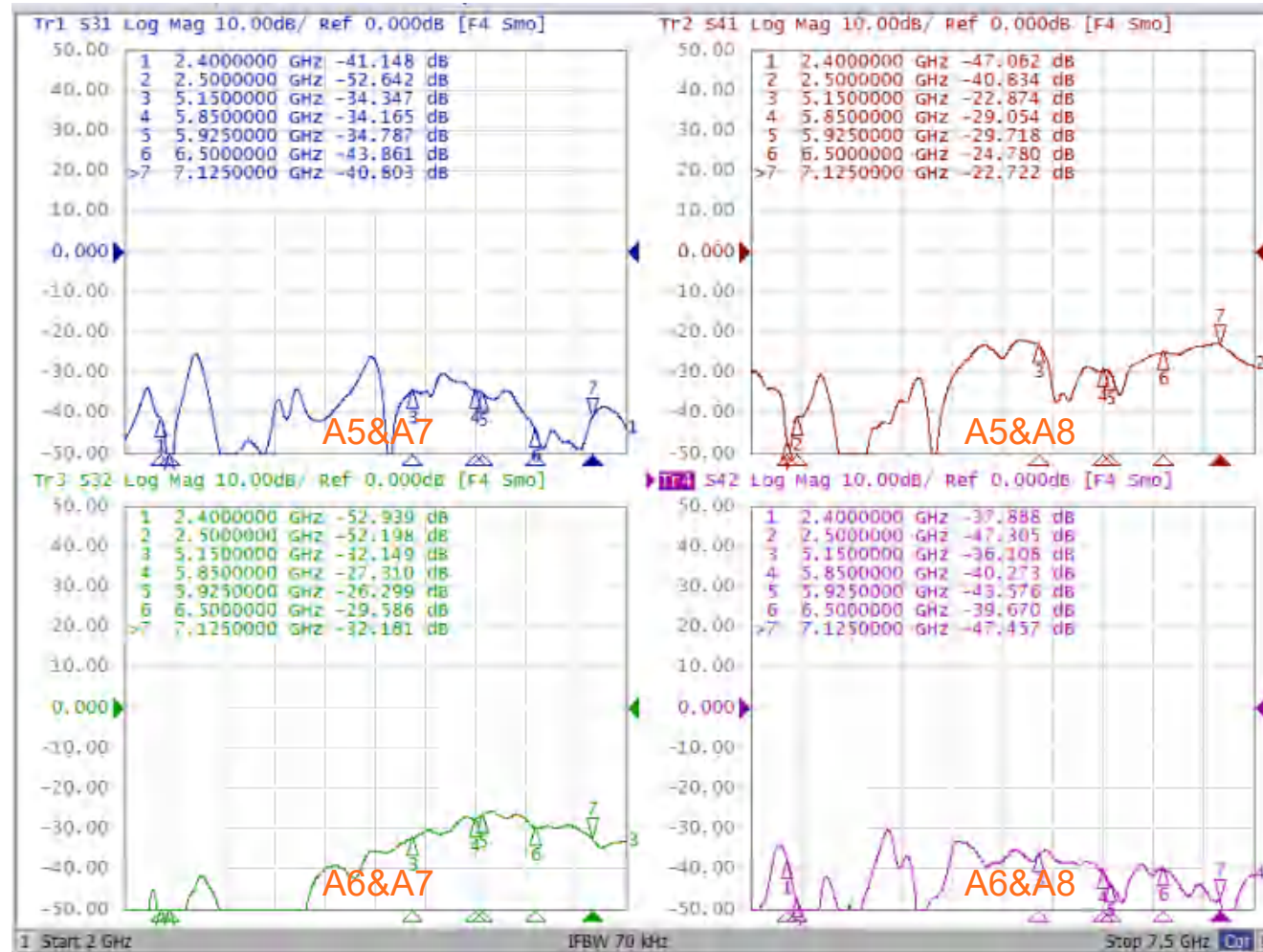
Isolation of Dual_D&6G_D_1 Band Antennas



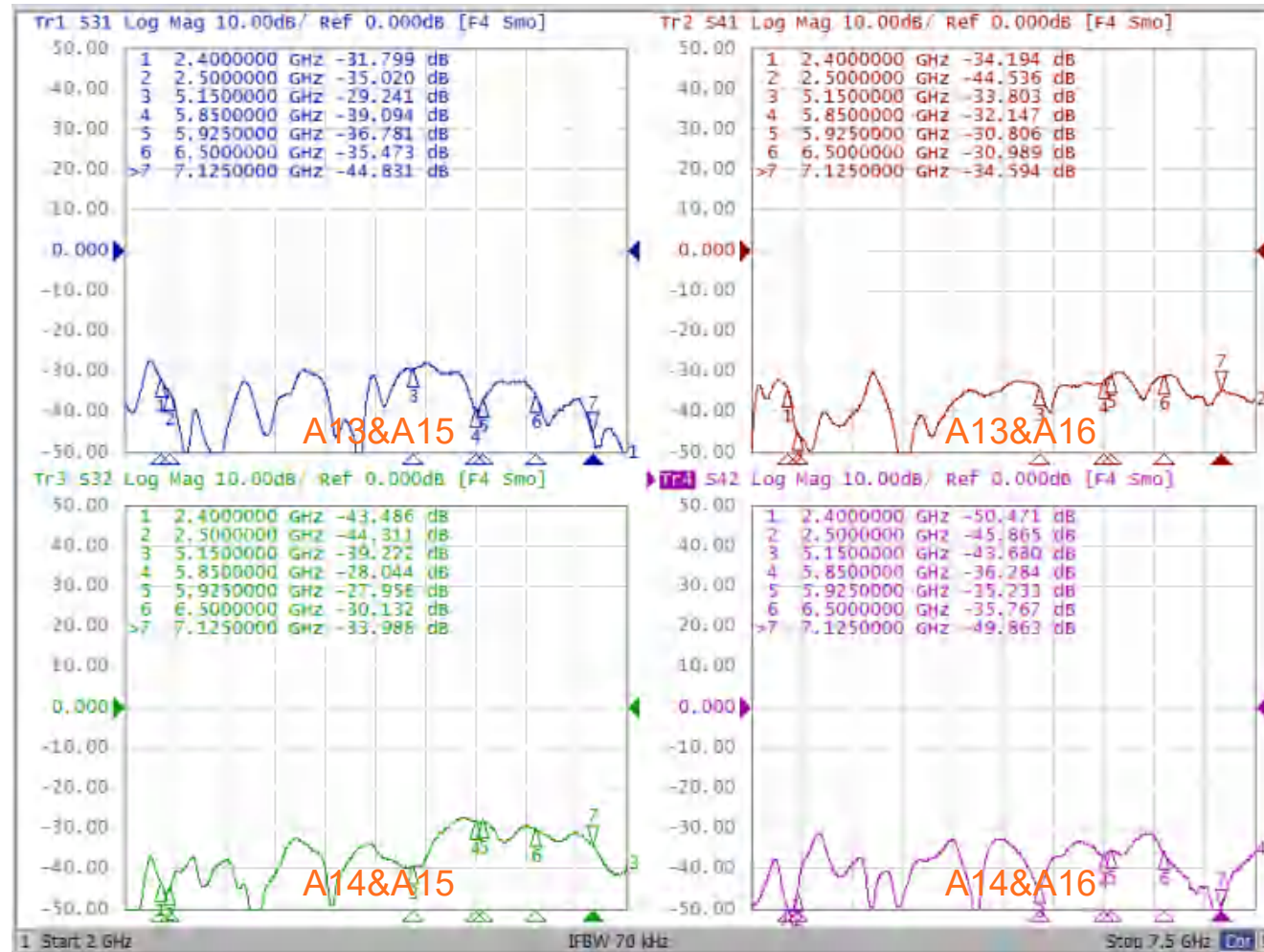
Isolation of Dual_D&6G_D_2 Band Antennas



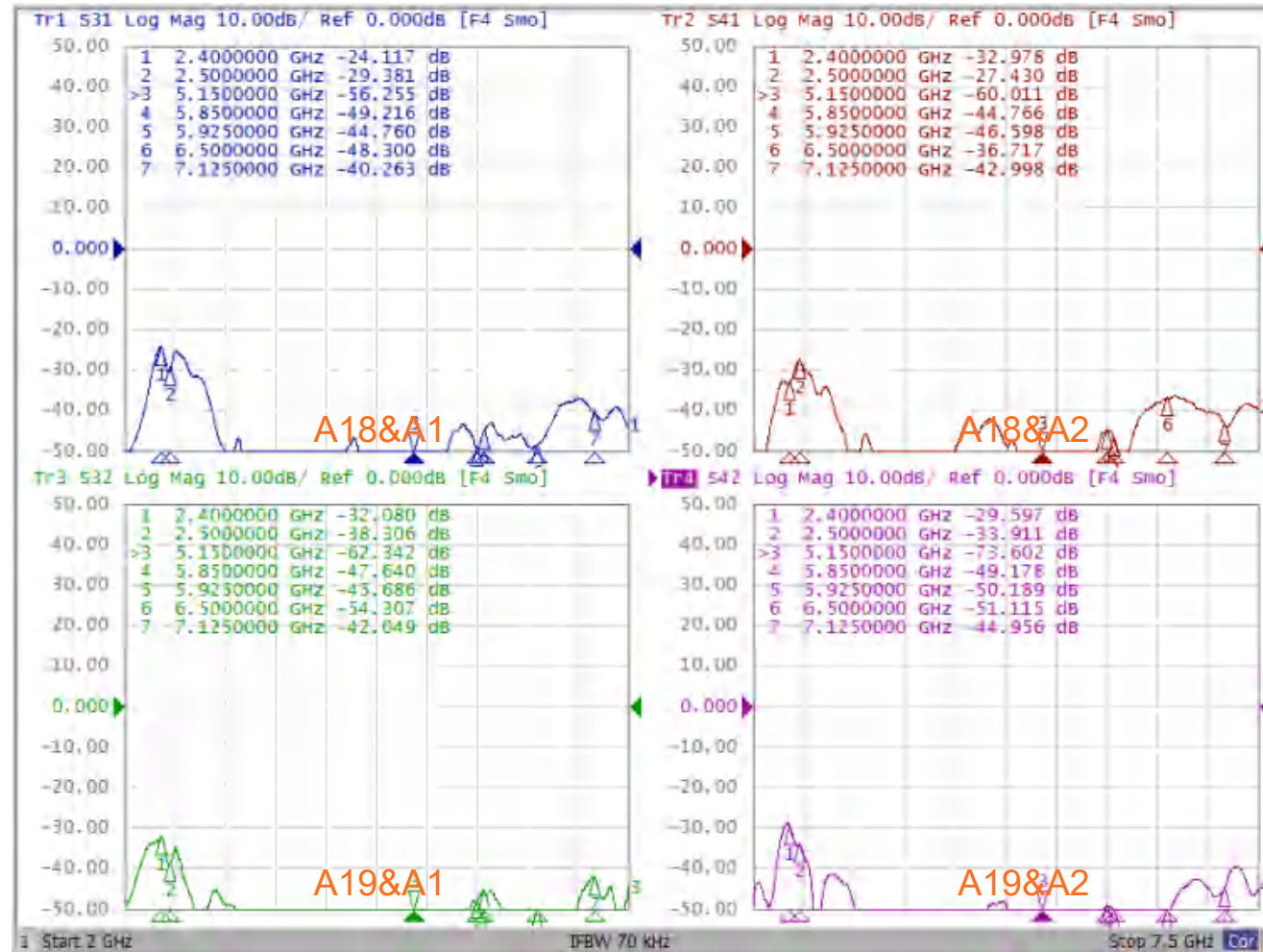
Isolation of 6G_O_1&6G_O_2 Band Antennas



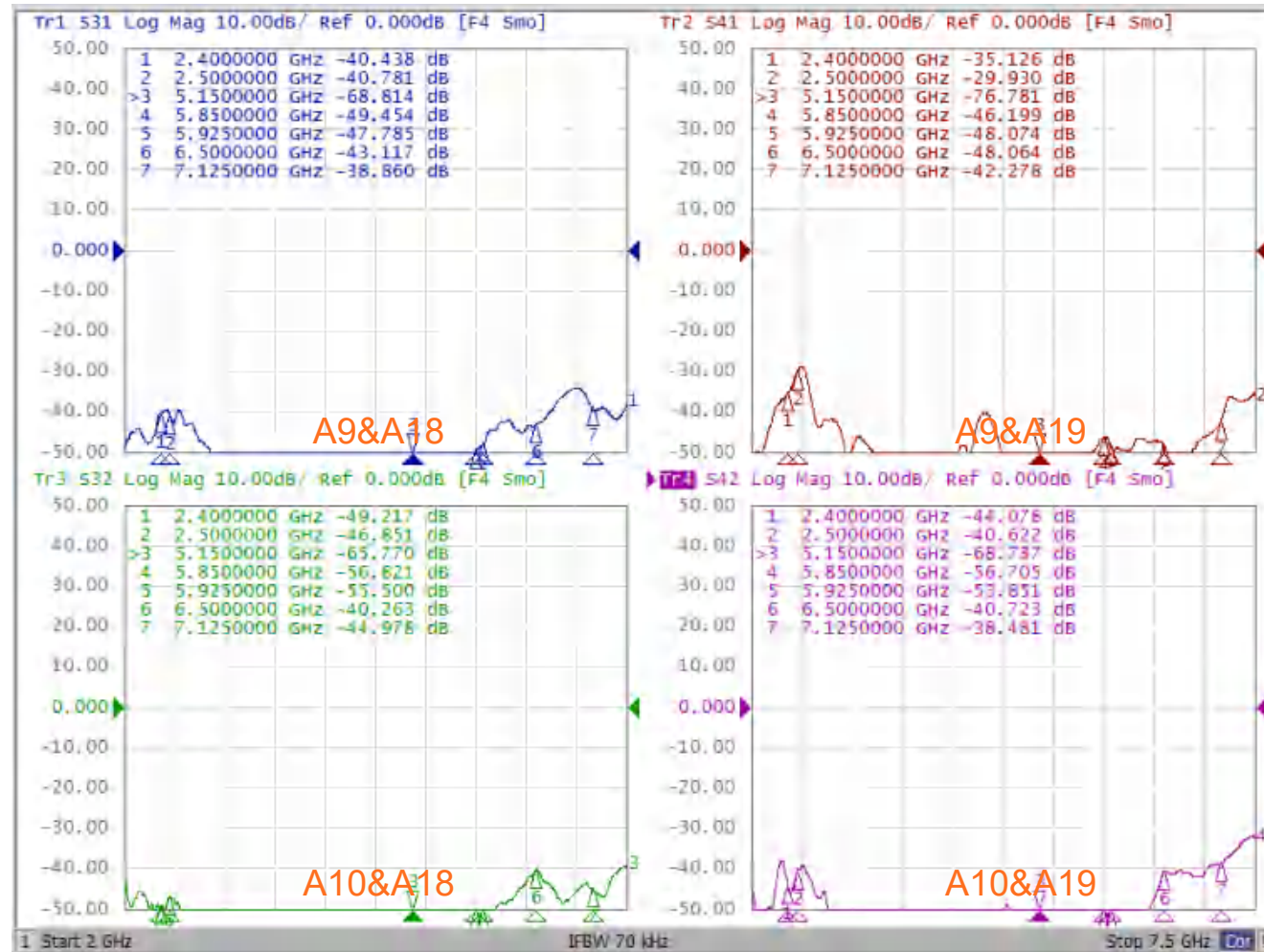
Isolation of 6G_D_1&6G_D_2 Band Antennas



Isolation of BLE&Dual_O Band Antennas



Isolation of BLE&Dual_D Band Antennas



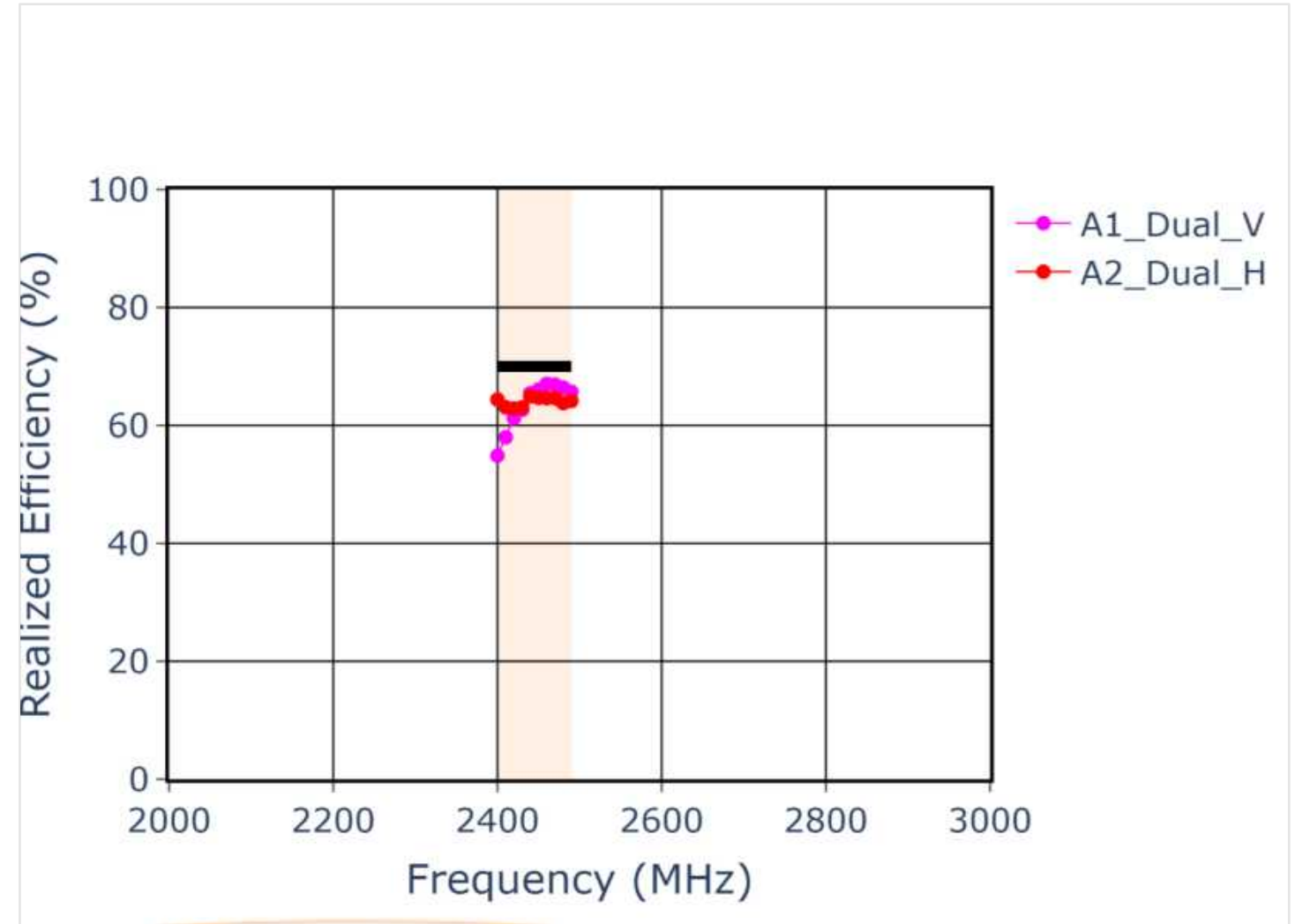


Radiated Performance: Grouped by Antennas, Polarization: Total

- Realized Efficiency

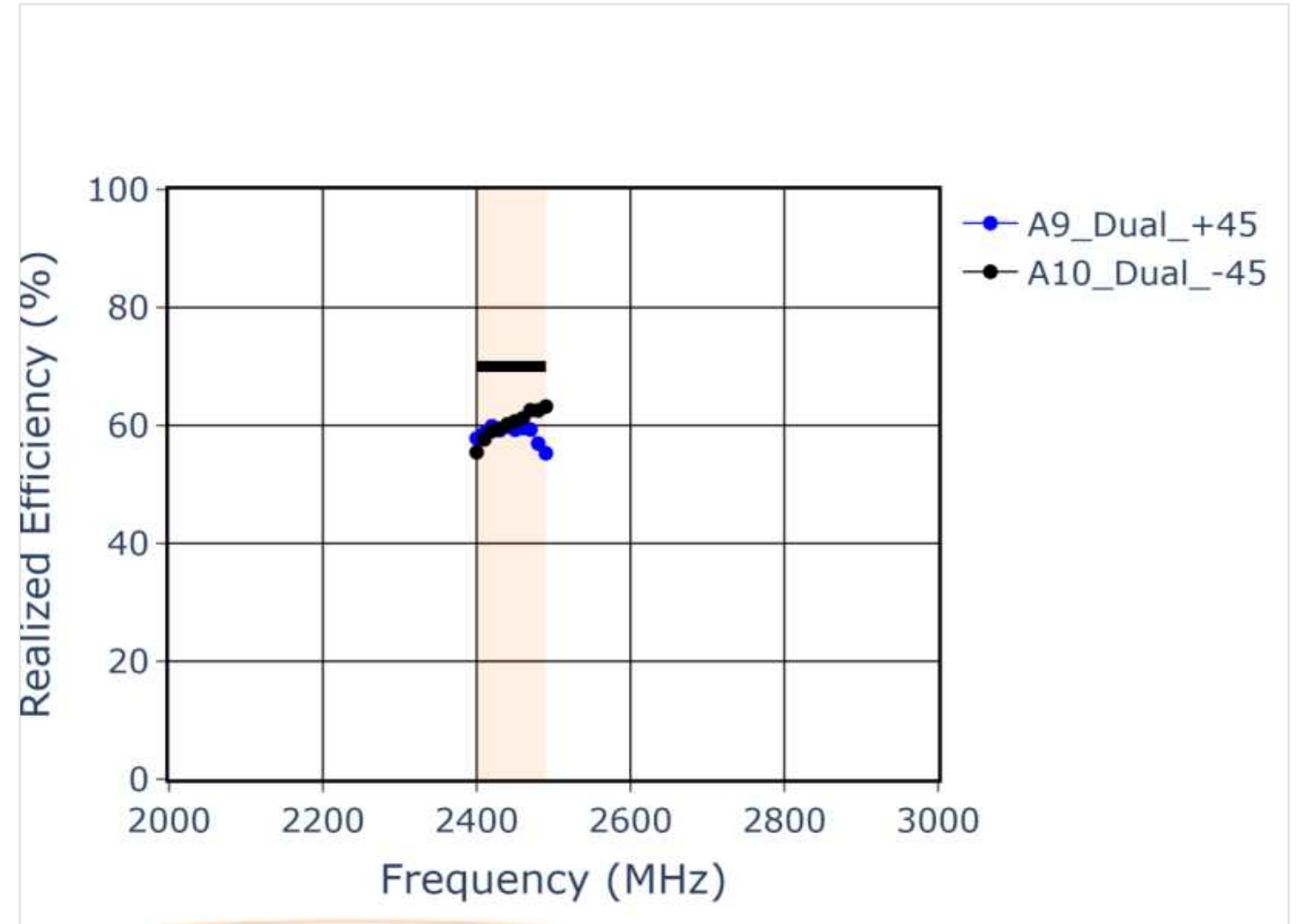
Realized Efficiency of Antennas in 2G4_O Band

Frequency/MHz	A1_Dual_V(%)	A2_Dual_H(%)
2400	55	64
2410	58	63
2420	61	63
2430	63	63
2440	65	65
2450	66	65
2460	67	65
2470	67	65
2480	66	64
2490	66	64



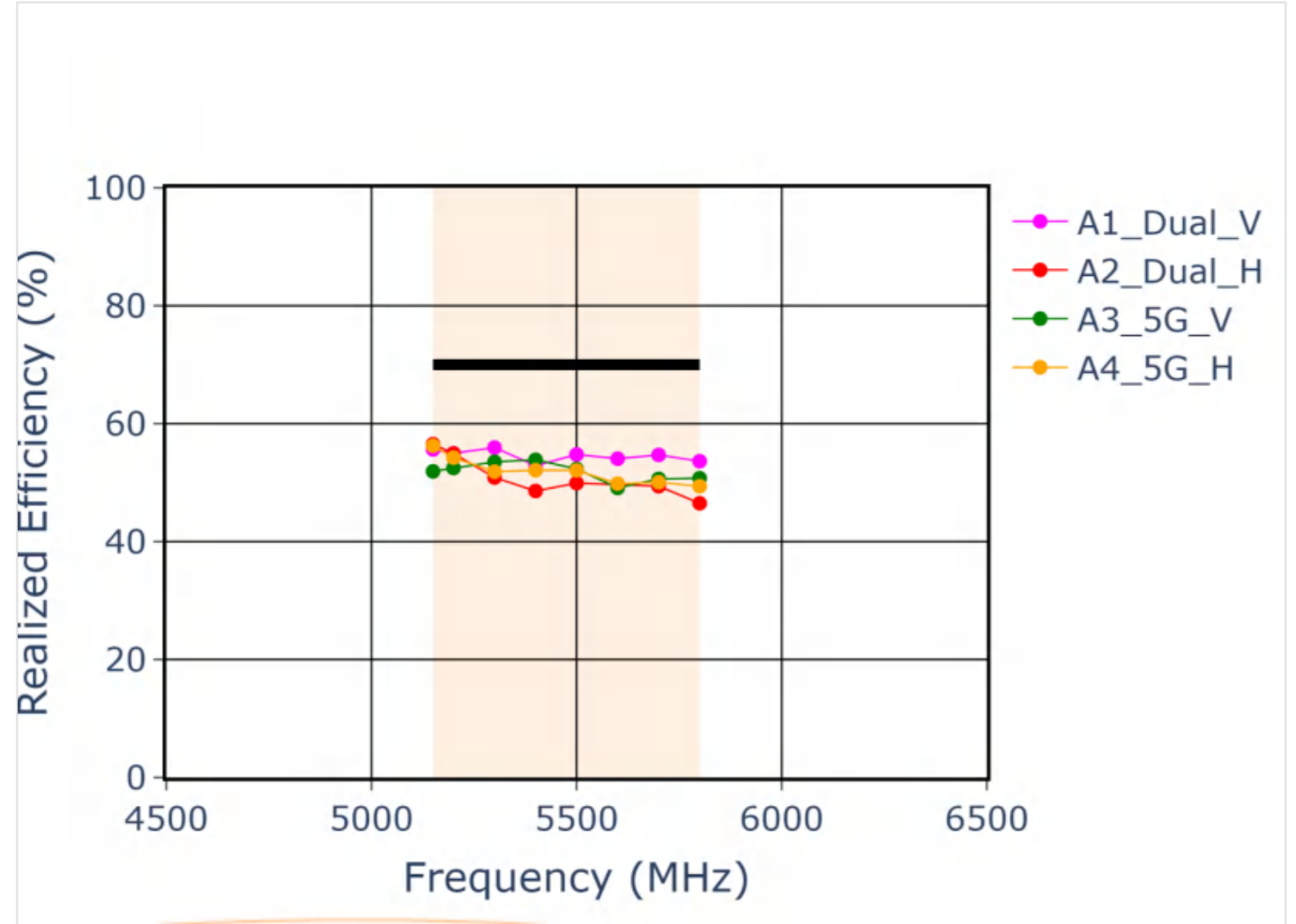
Realized Efficiency of Antennas in 2G4_D Band

Frequency/MHz	A9_Dual_+45(%)	A10_Dual_-45(%)
2400	58	55
2410	59	58
2420	60	59
2430	59	59
2440	60	60
2450	59	61
2460	60	61
2470	59	63
2480	57	63
2490	55	63



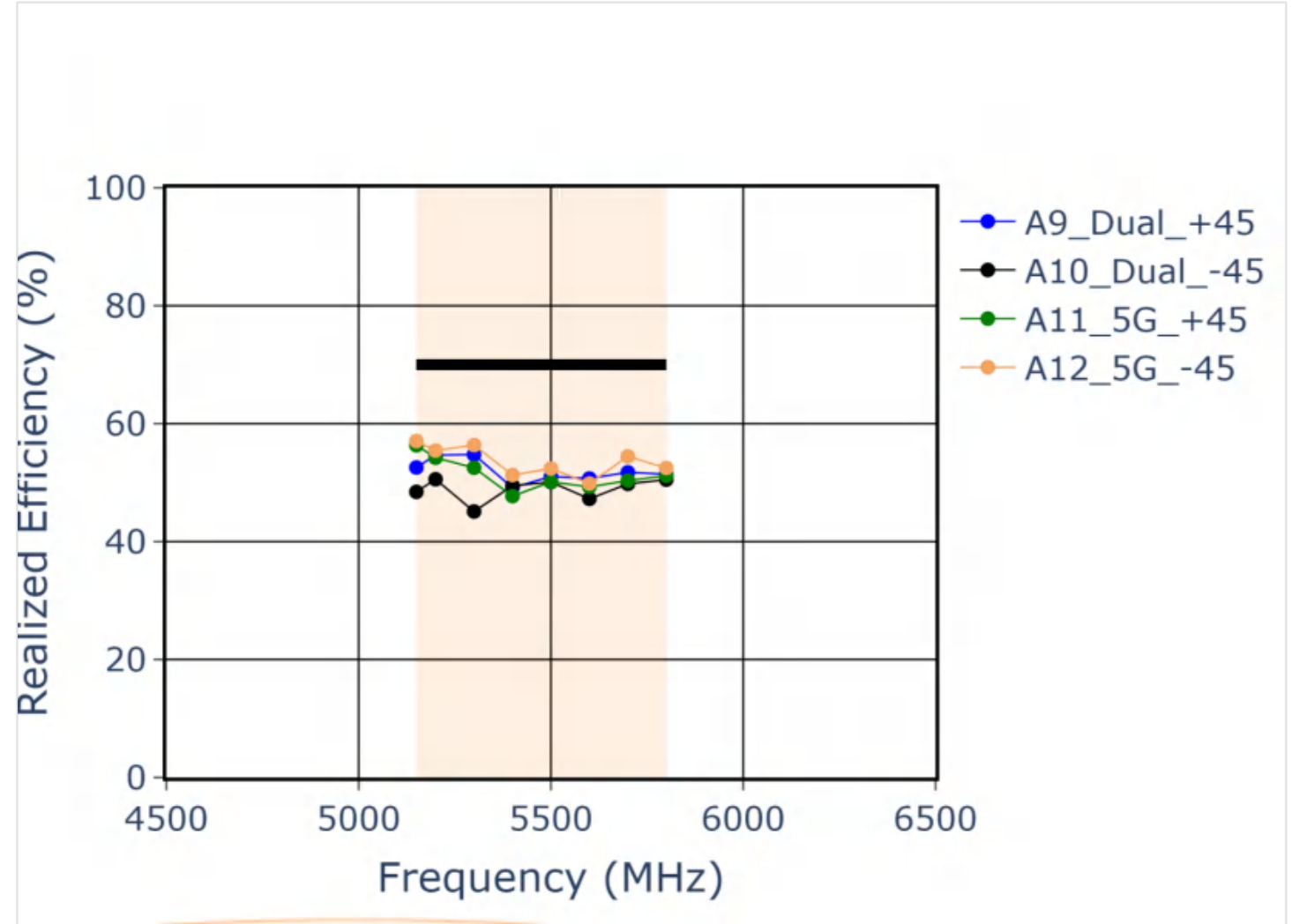
Realized Efficiency of Antennas in 5G_O Band

Frequency/MHz	A1_Dual_V(%)	A2_Dual_H(%)	A3_5G_V(%)	A4_5G_H(%)
5150	56	57	52	56
5200	55	55	52	54
5300	56	51	54	52
5400	53	49	54	52
5500	55	50	52	52
5600	54	50	50	50
5700	55	49	51	50
5800	54	47	51	50
5850	51	46	50	50



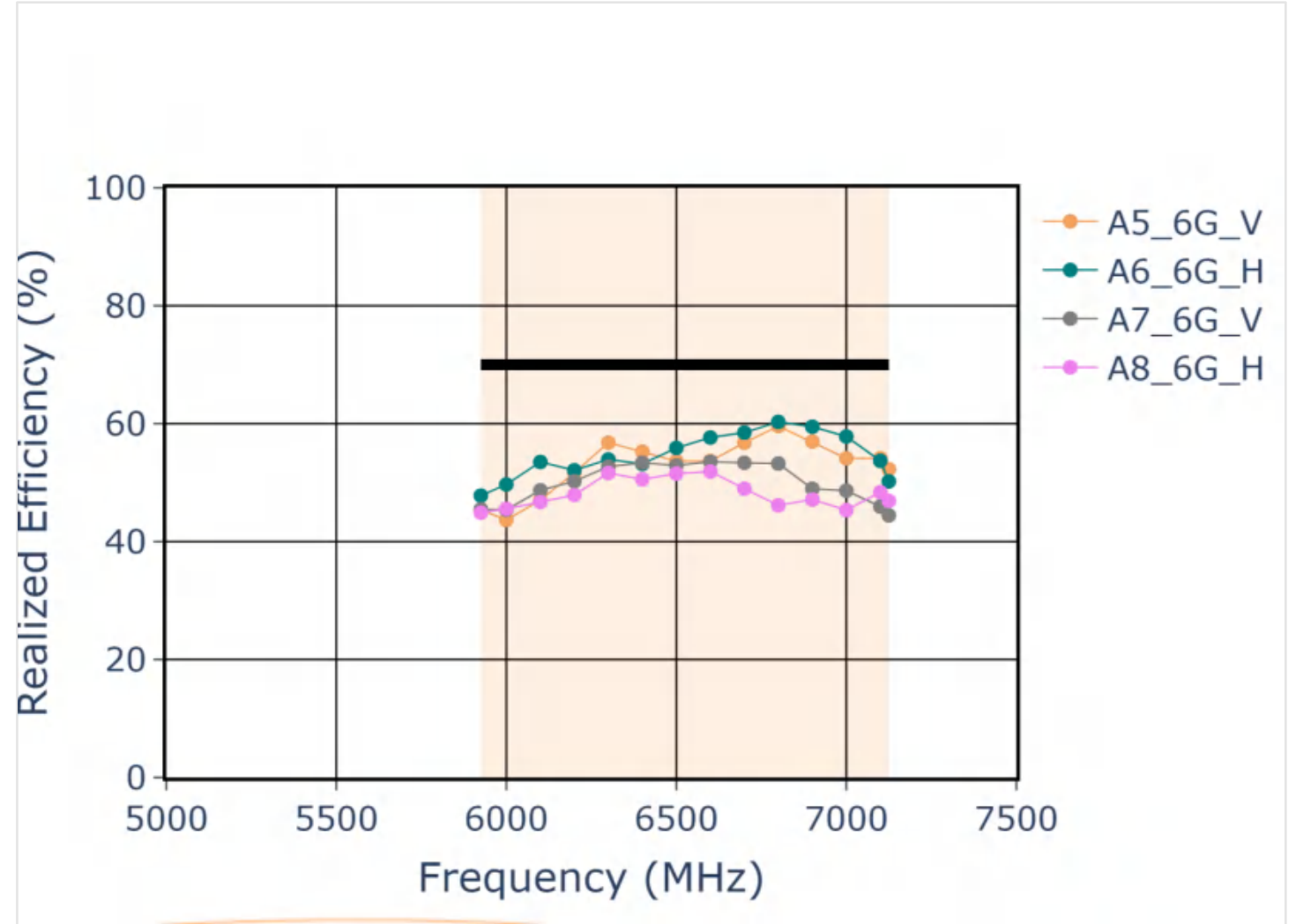
Realized Efficiency of Antennas in 5G_D Band

Frequency/MHz	A9_Dual_+45(%)	A10_Dual_-45(%)	A11_5G_+45(%)	A12_5G_-45(%)
5150	53	48	56	57
5200	55	51	54	55
5300	55	45	53	56
5400	49	49	48	51
5500	51	50	50	52
5600	51	48	49	50
5700	52	50	50	54
5800	51	51	51	52
5850	50	51	51	53



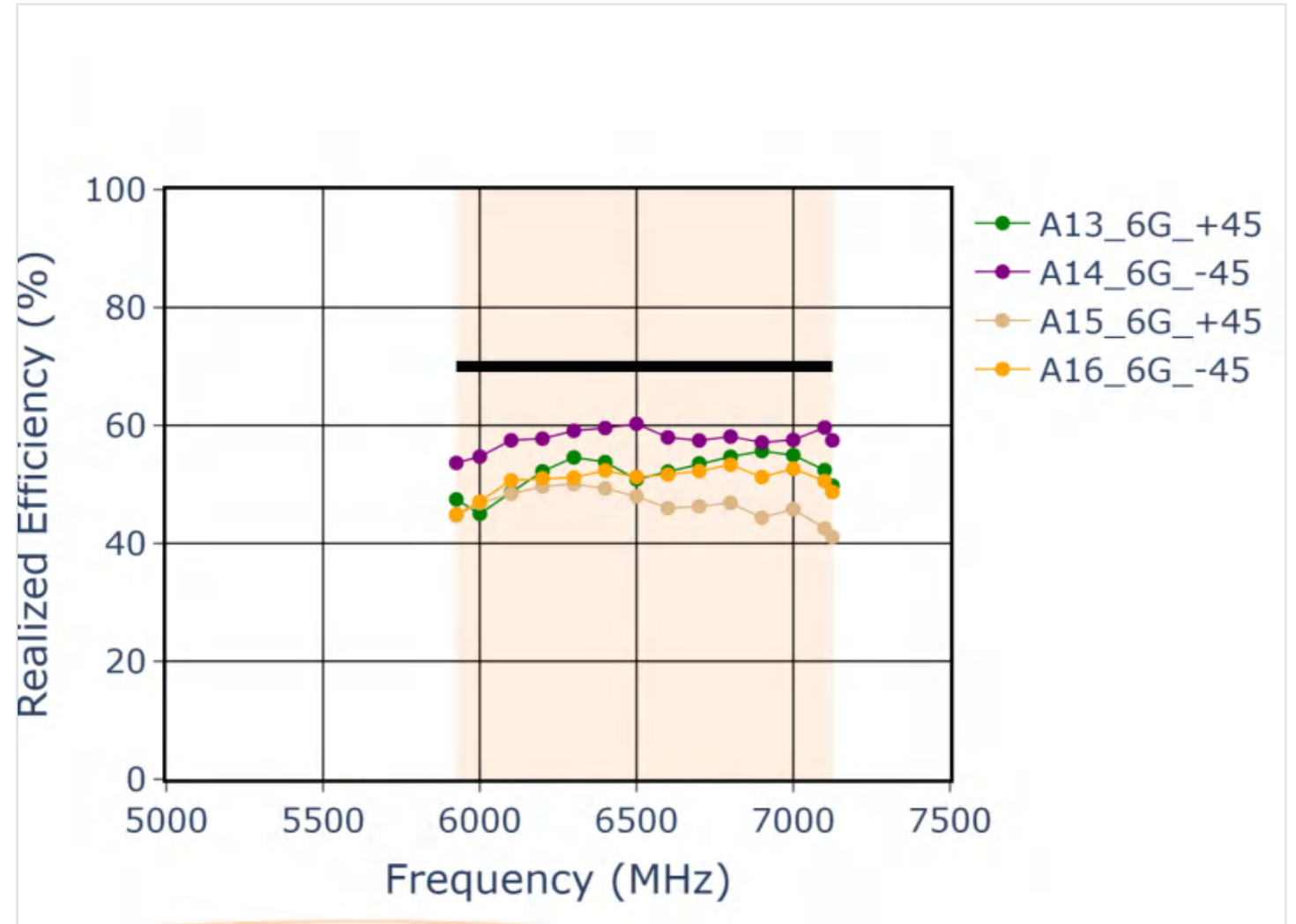
Realized Efficiency of Antennas in 6G_O Band

Frequency/MHz	A5_6G_V (%)	A6_6G_H (%)	A7_6G_V (%)	A8_6G_H (%)
5925	45	48	45	45
6000	44	50	45	46
6100	47	54	49	47
6200	52	52	50	48
6300	57	54	53	52
6400	55	53	53	51
6500	54	56	53	52
6600	54	58	54	52
6700	57	58	53	49
6800	60	60	53	46
6900	57	59	49	47
7000	54	58	49	45
7100	54	54	46	48
7125	52	50	45	47



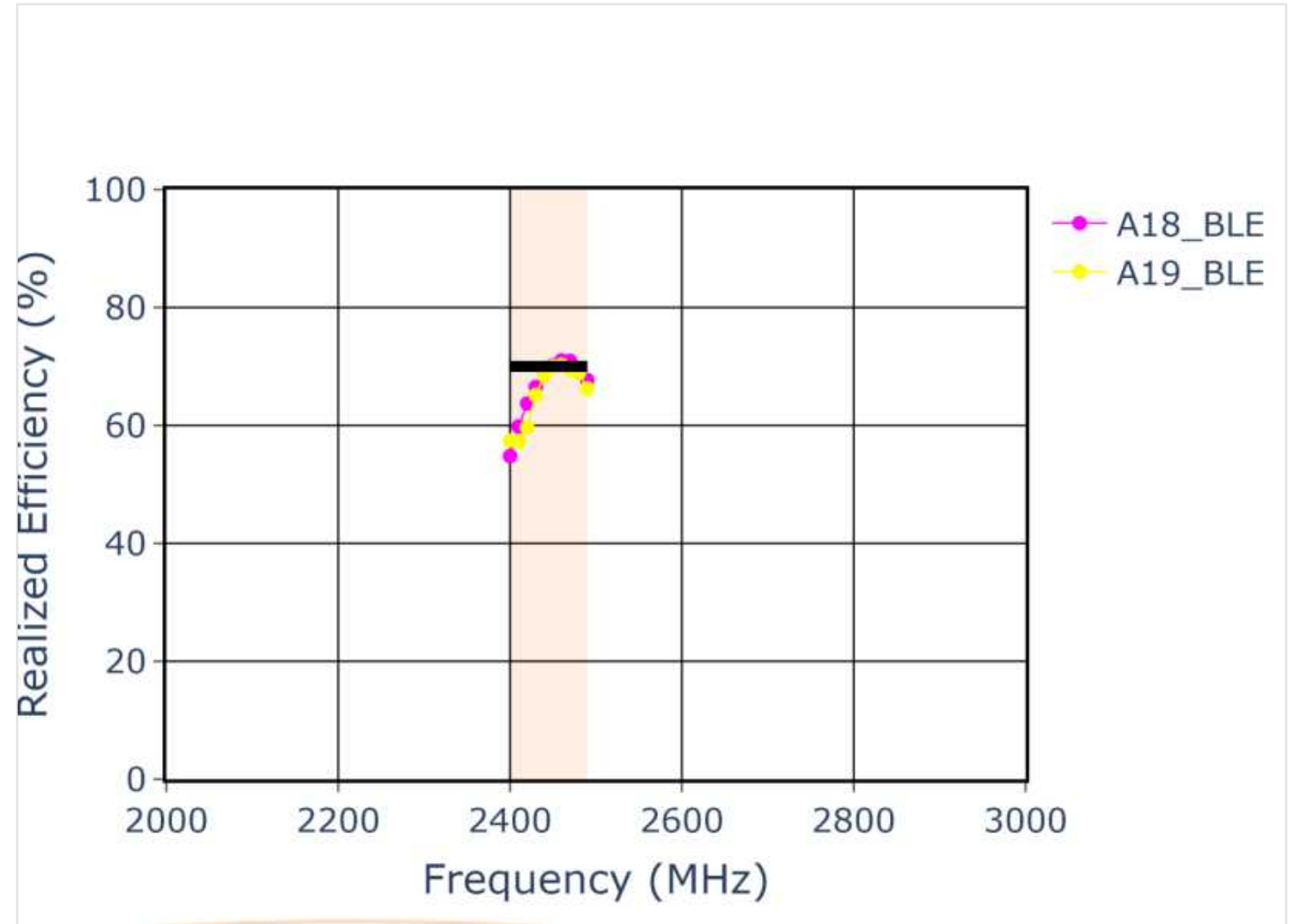
Realized Efficiency of Antennas in 6G_D Band

Frequency/MHz	A13_6G_+45(%)	A14_6G_-45(%)	A15_6G_+45(%)	A16_6G_-45(%)
5925	47	54	45	45
6000	45	55	47	47
6100	49	57	48	51
6200	52	58	50	51
6300	55	59	50	51
6400	54	60	49	52
6500	51	60	48	51
6600	52	58	46	52
6700	54	57	46	52
6800	55	58	47	53
6900	56	57	44	51
7000	55	58	46	53
7100	52	60	44	51
7125	50	57	42	49



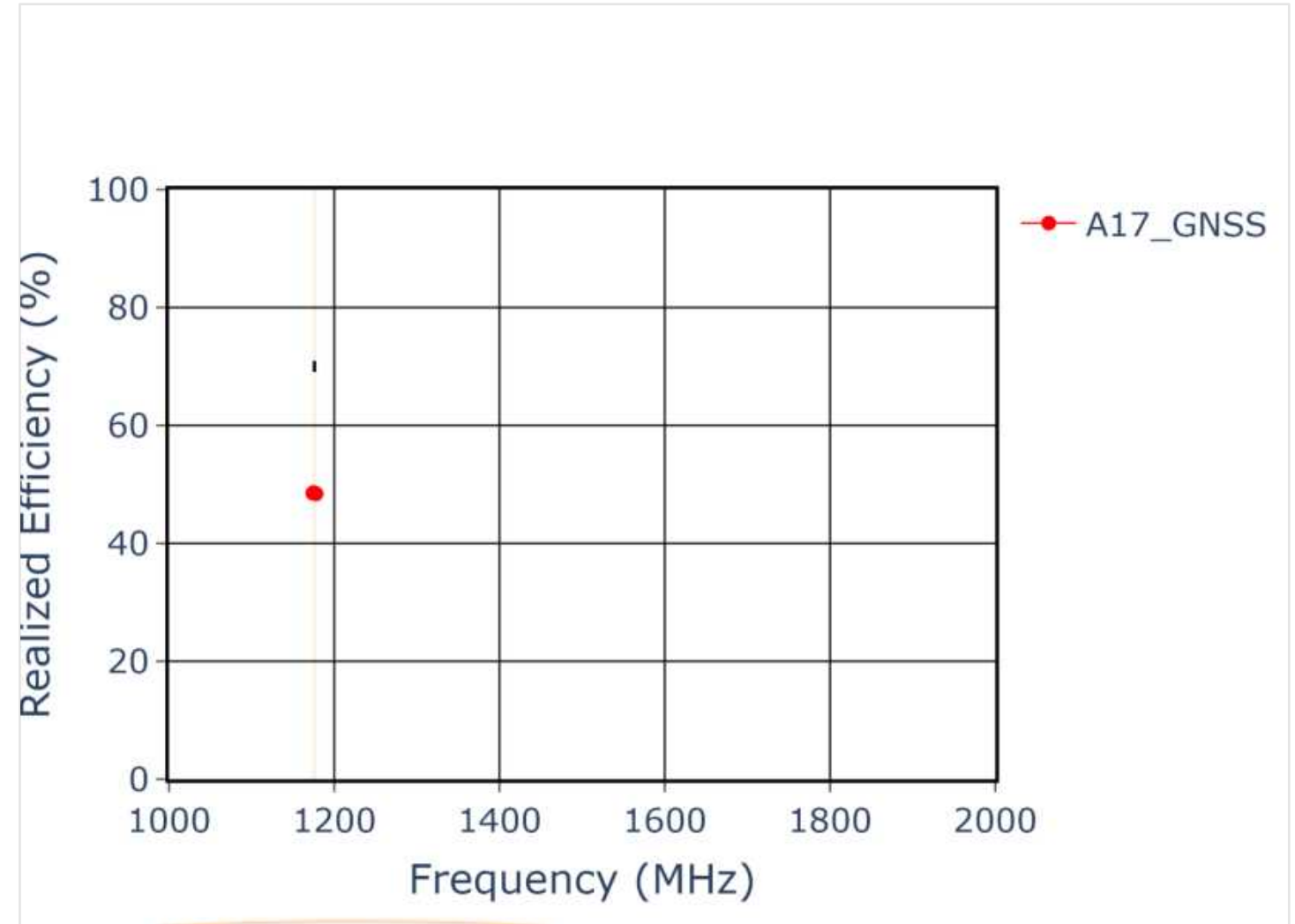
Realized Efficiency of Antennas in BLE Band

Frequency/MHz	A18_BLE(%)	A19_BLE(%)
2400	55	57
2410	60	57
2420	64	60
2430	67	65
2440	69	69
2450	70	70
2460	71	70
2470	71	69
2480	70	69
2490	68	66



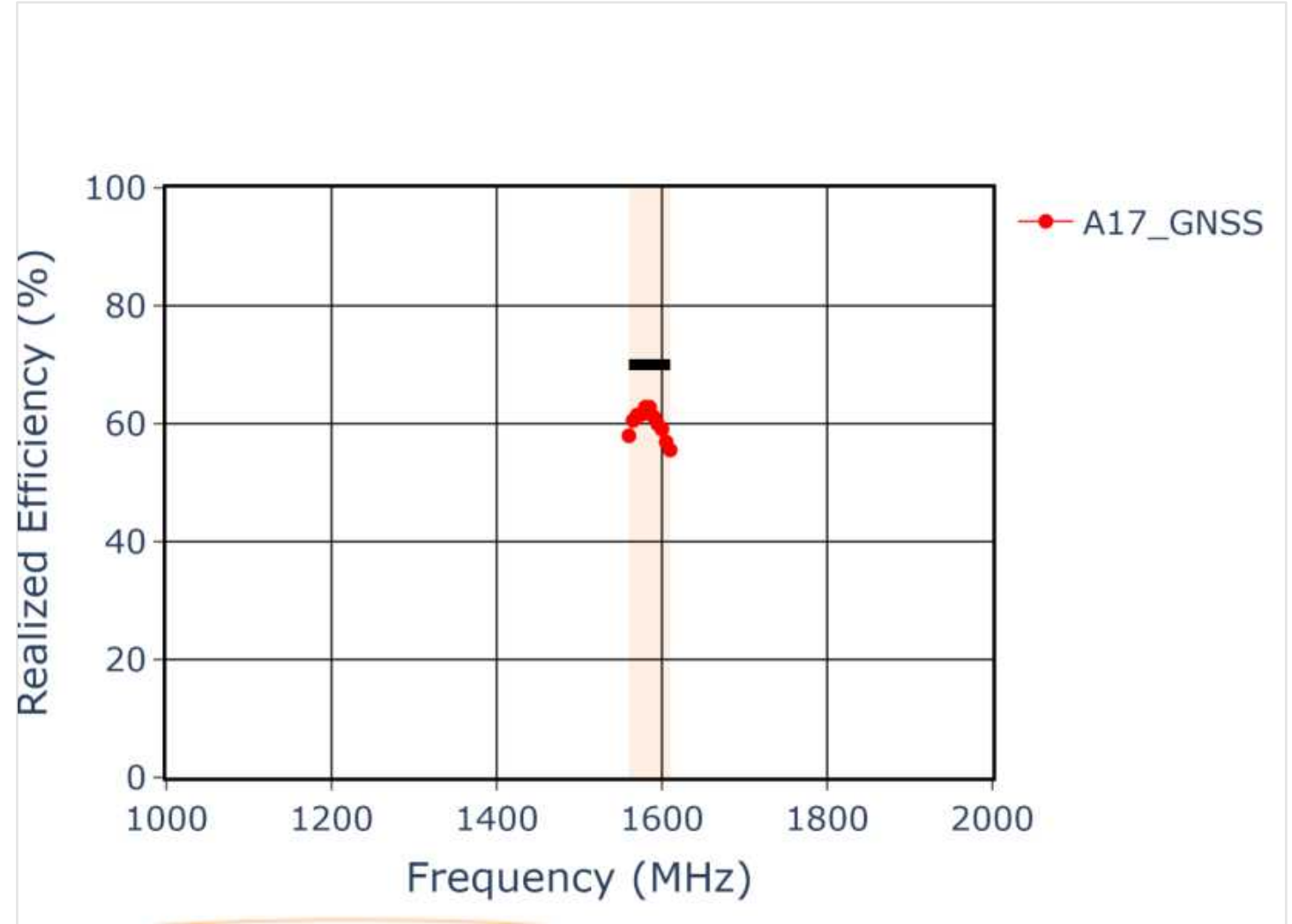
Realized Efficiency of Antennas in L5 Band

Frequency/MHz	A17_GNSS(%)
1174	49
1175	49
1176	49
1177	48
1178	48



Realized Efficiency of Antennas in L1 Band

Frequency/MHz	A17_GNSS(%)
1560	58
1565	61
1570	61
1575	62
1580	63
1585	63
1590	61
1595	60
1600	59
1605	57
1610	56

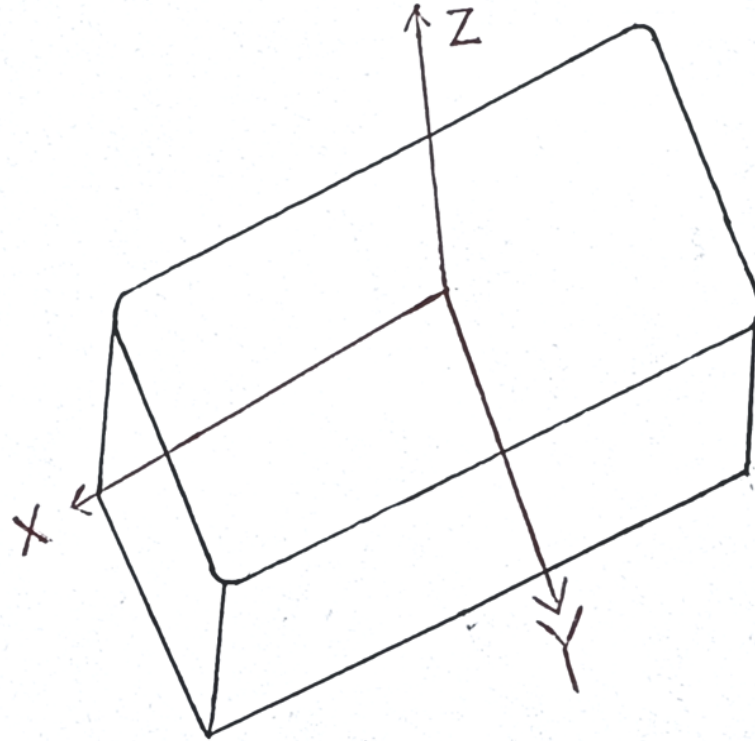


6

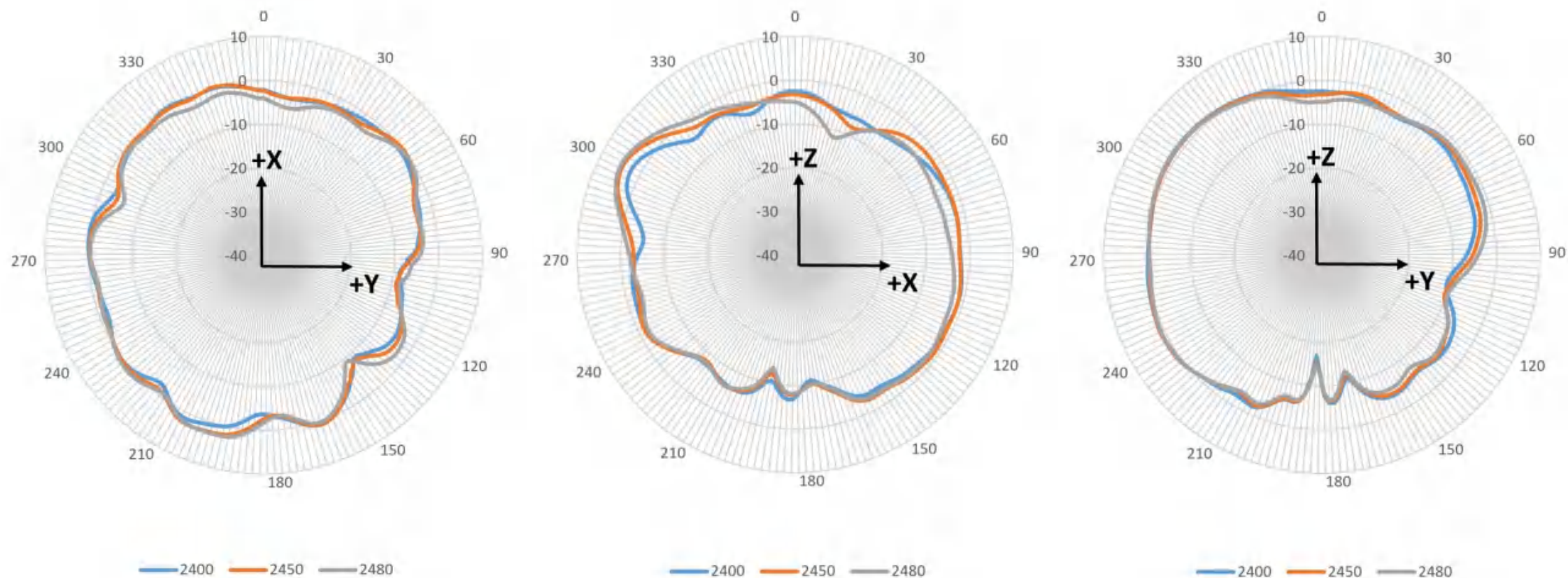
REALIZED GAIN RADIATION PATTERNS

- Realized Gain Radiation Patterns in Specified Frequency Bands
- 3D Gain Patterns in Specified Frequency Bands

Orientation Of DUT For Radiation Pattern Visualization



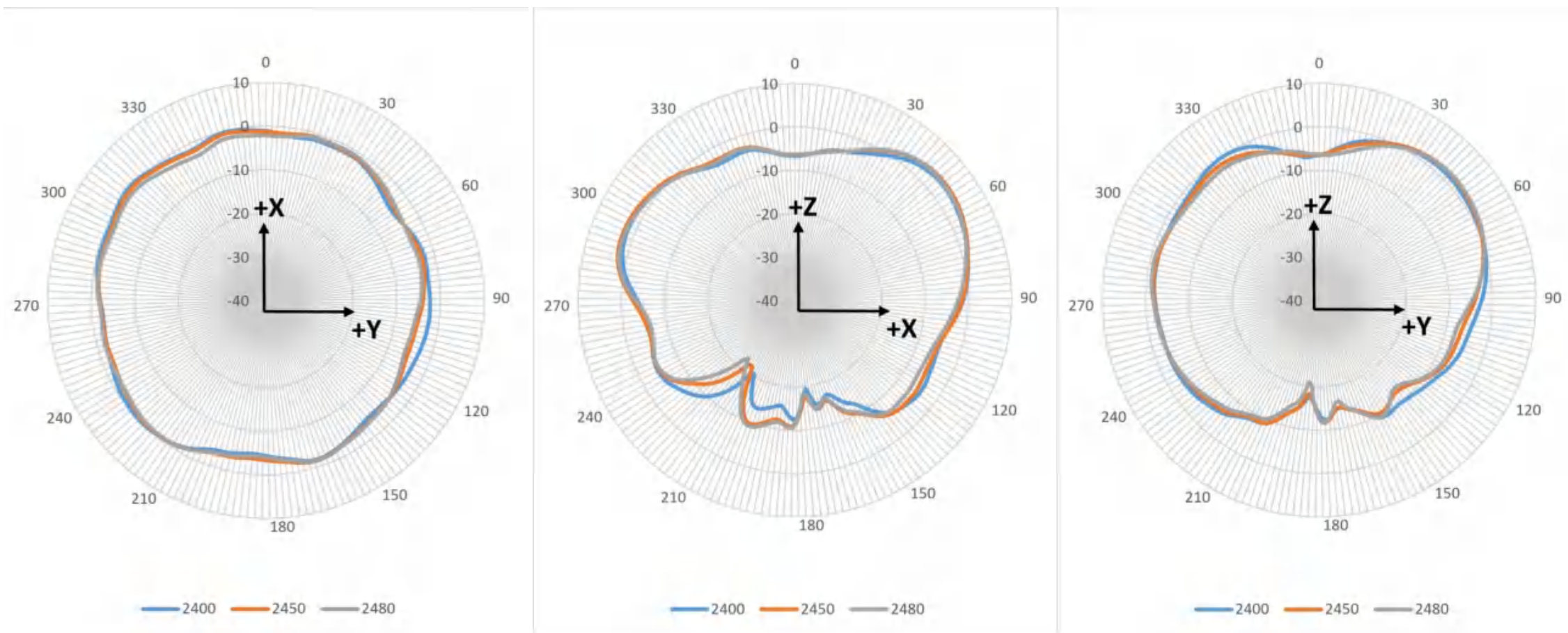
Realized Gain Radiation Patterns of A1_Dual_V Antenna in 2G4_O Band: Total Polarization



Realized Gain Radiation Patterns of A2_Dual_H Antenna in 2G4_O Band: Total Polarization



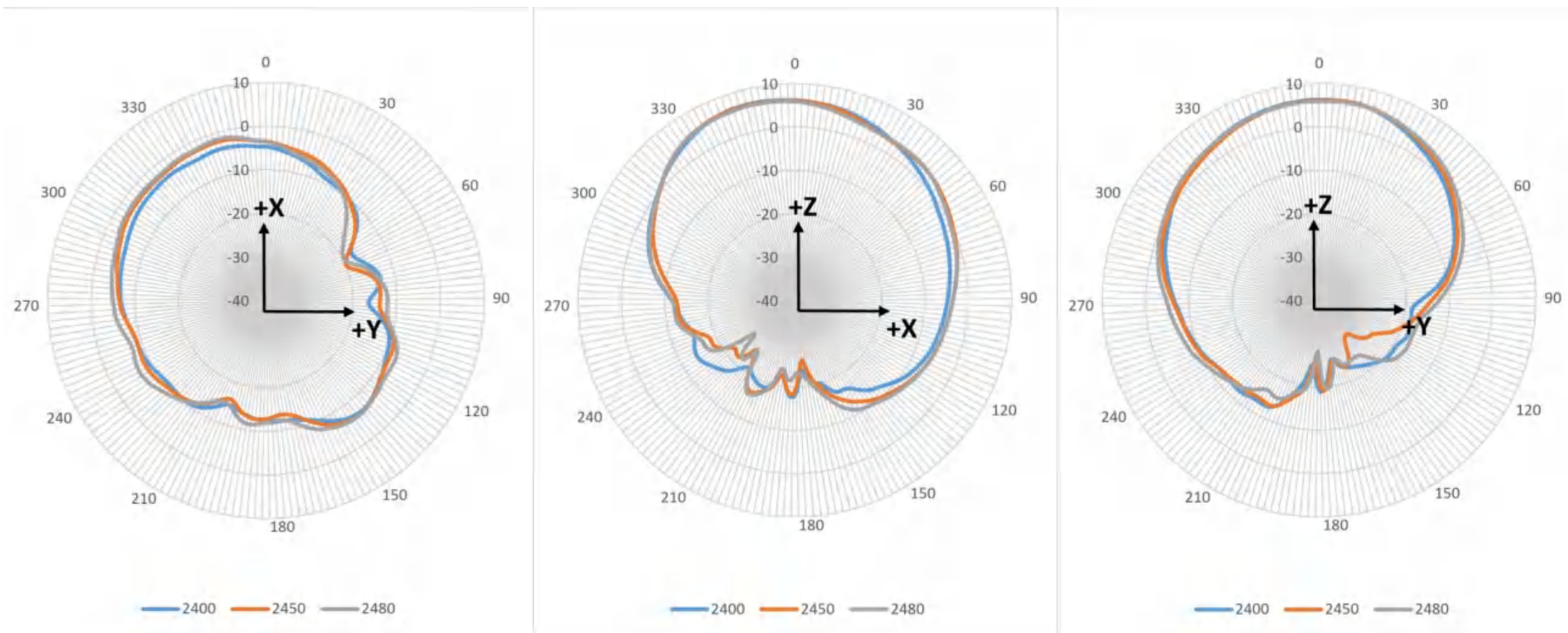
OF THINGS



Realized Gain Radiation Patterns of A9_Dual_+45 Antenna in 2G4_D Band: Total Polarization



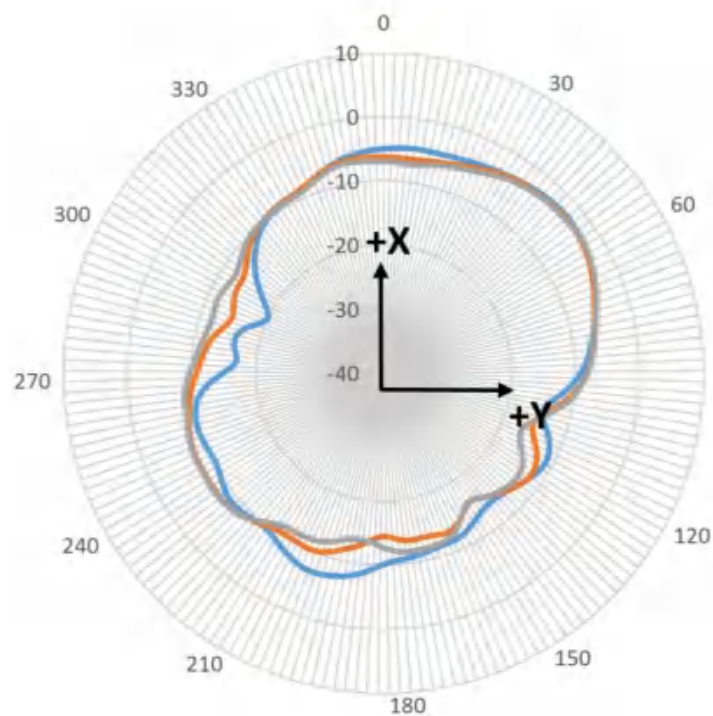
OF THINGS



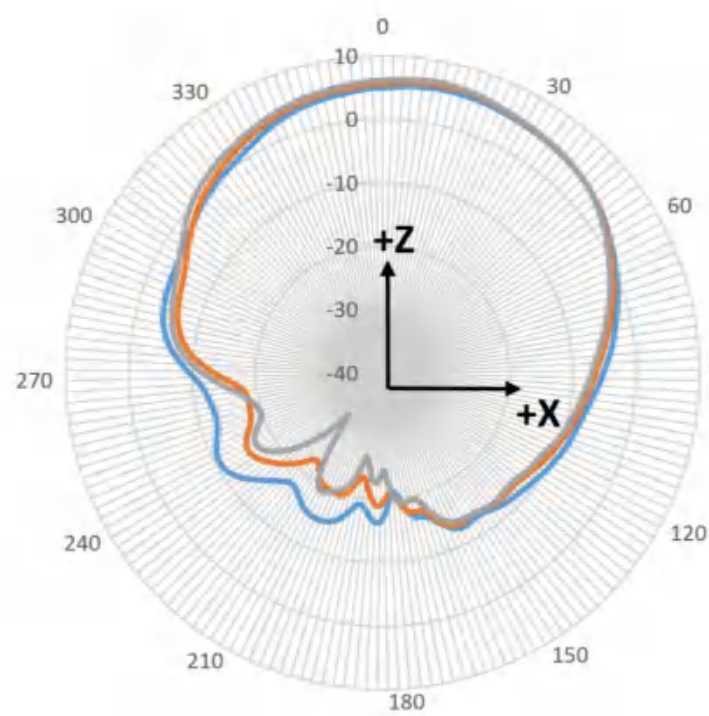
Realized Gain Radiation Patterns of A10_Dual_-45 Antenna in 2G4_D Band: Total Polarization



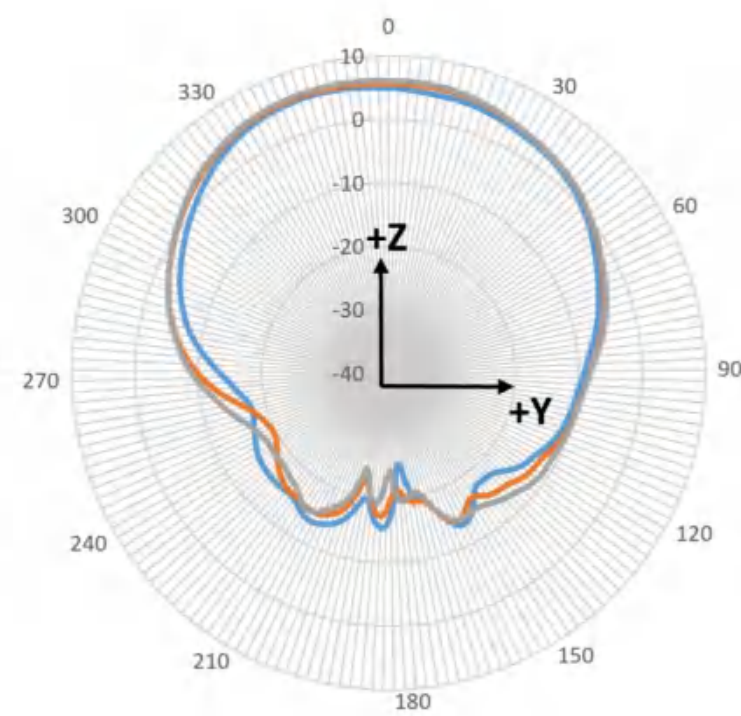
OF THINGS



— 2400 — 2450 — 2480



— 2400 — 2450 — 2480

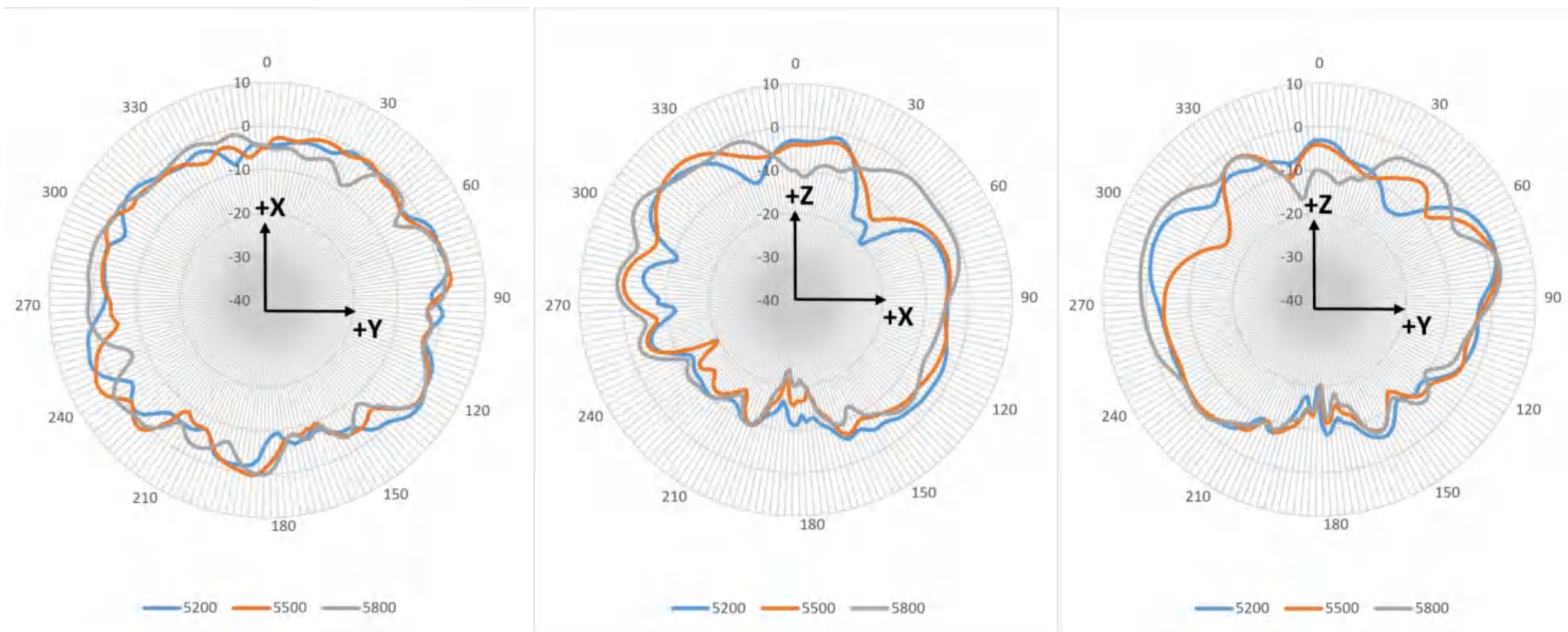


— 2400 — 2450 — 2480

Realized Gain Radiation Patterns of A1_Dual_V Antenna in 5G_O Band: Total Polarization



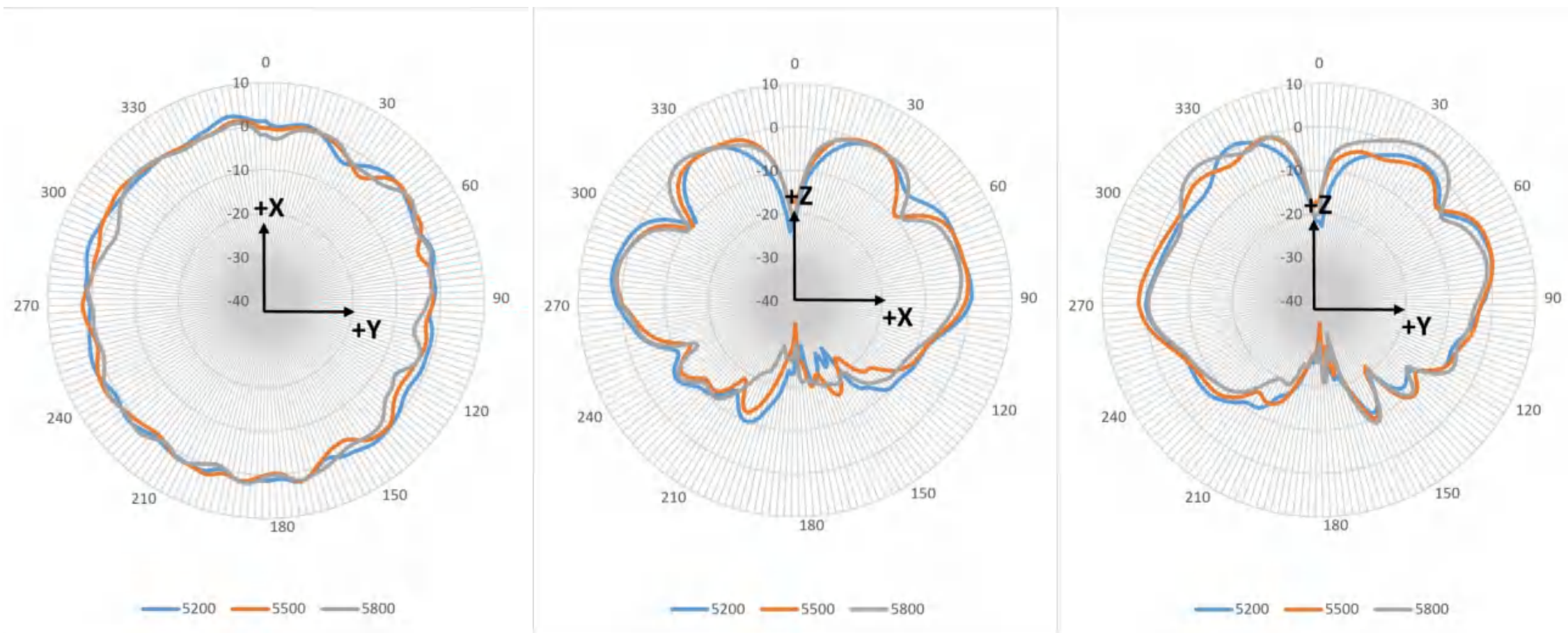
OF THINGS



Realized Gain Radiation Patterns of A2_Dual_H Antenna in 5G_O Band: Total Polarization



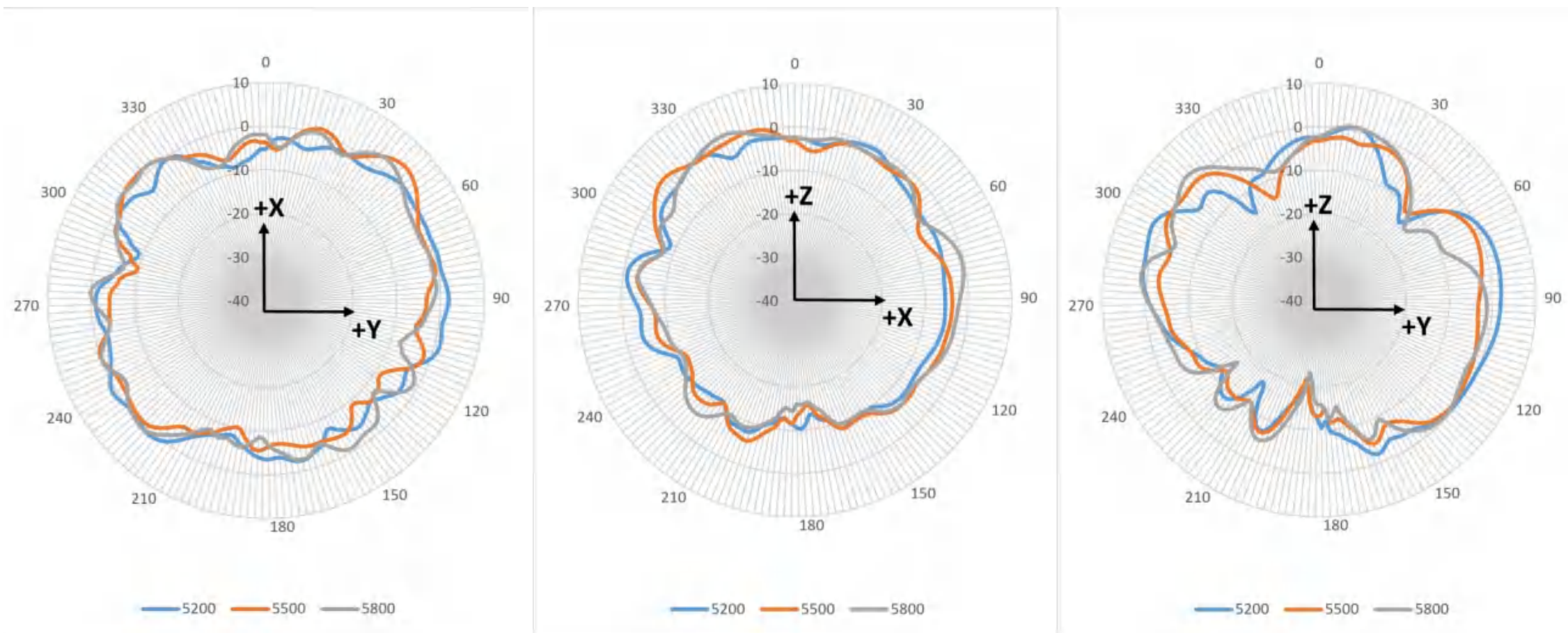
OF THINGS



Realized Gain Radiation Patterns of A3_5G_V Antenna in 5G_O Band: Total Polarization



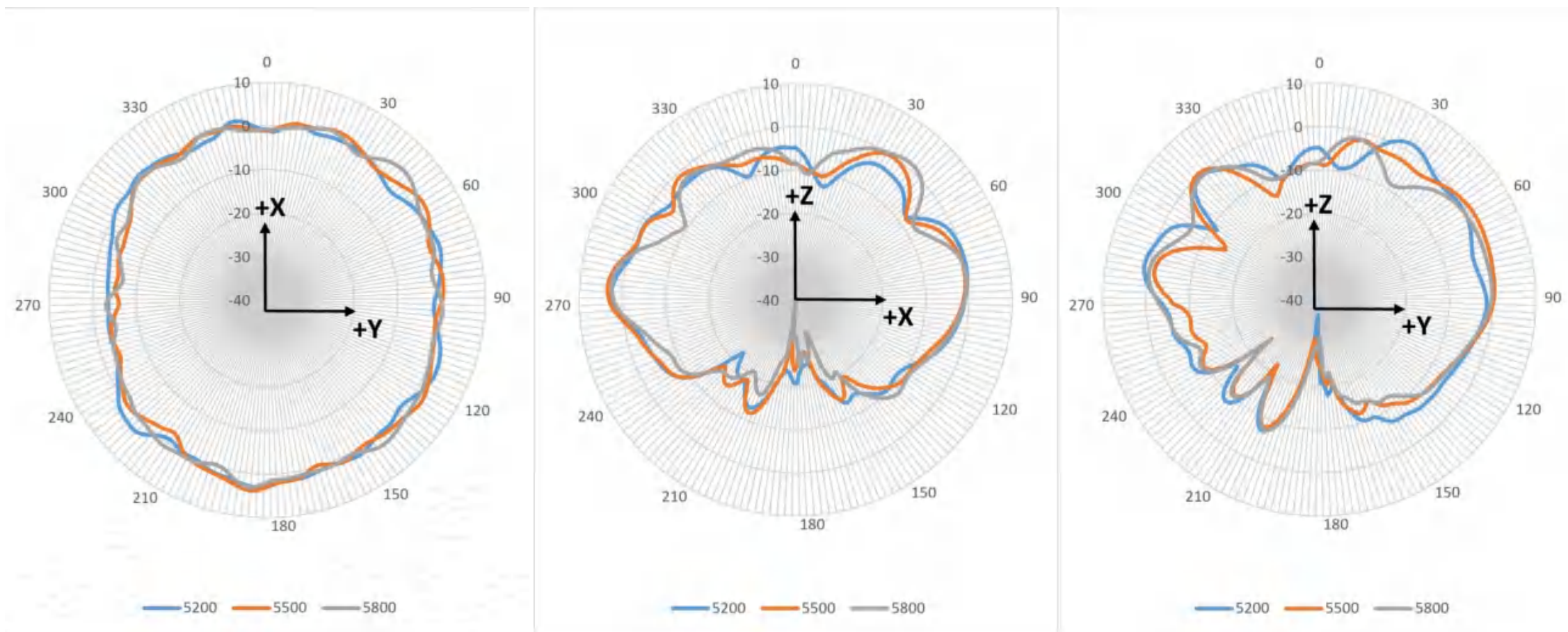
OF THINGS



Realized Gain Radiation Patterns of A4_5G_H Antenna in 5G_O Band: Total Polarization



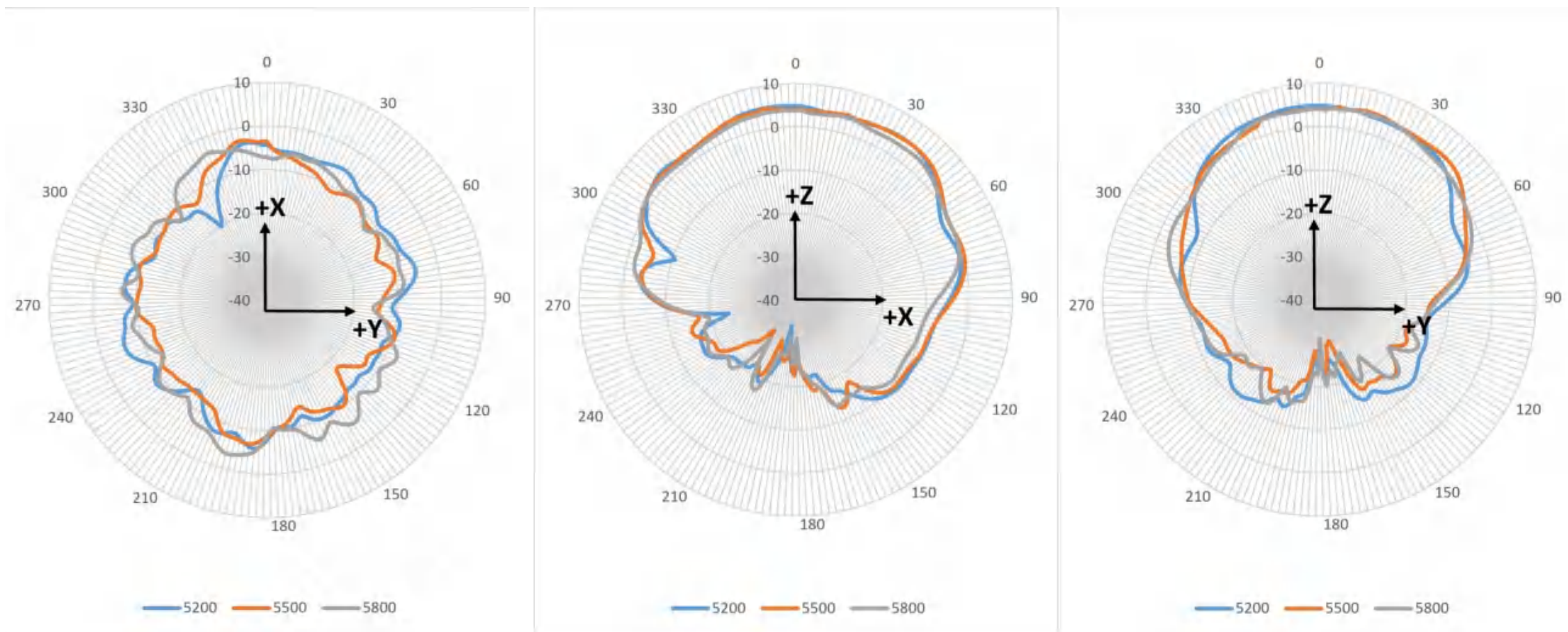
OF THINGS



Realized Gain Radiation Patterns of A9_Dual_+45 Antenna in 5G_D Band: Total Polarization



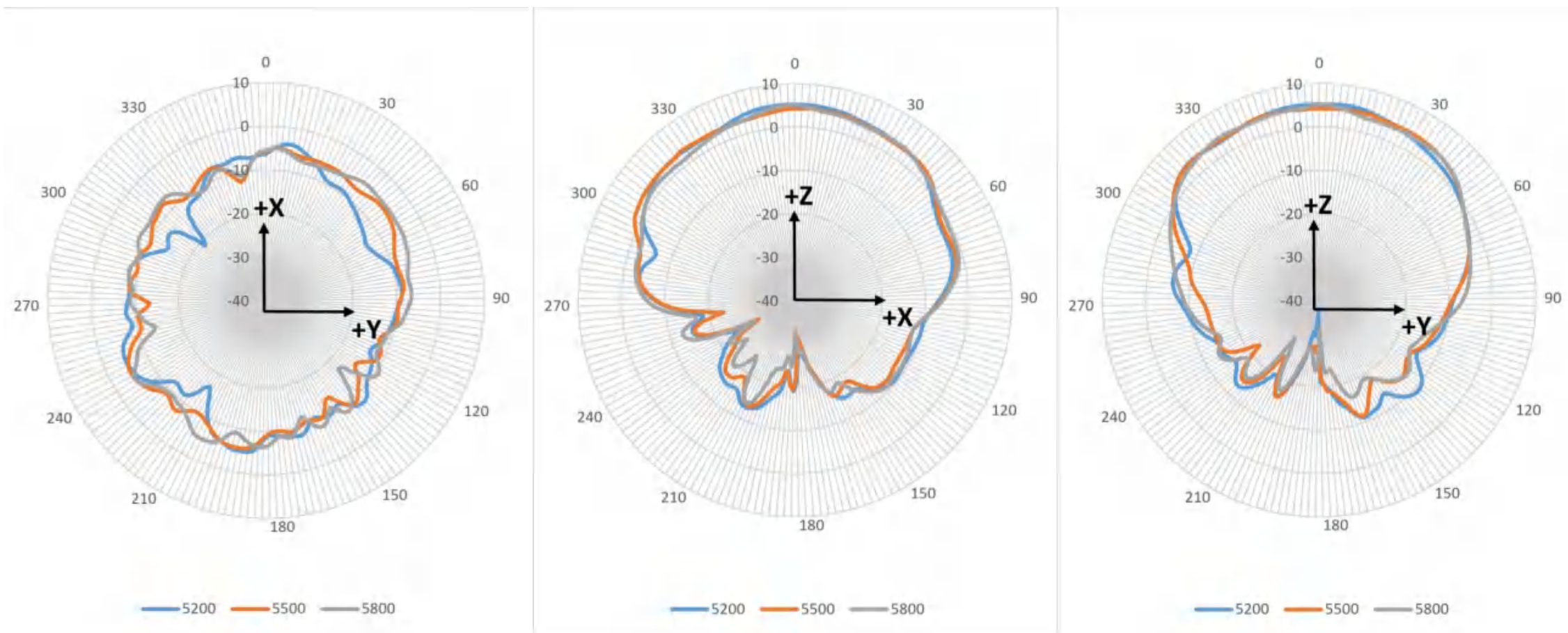
OF THINGS



Realized Gain Radiation Patterns of A10_Dual_-45 Antenna in 5G_D Band: Total Polarization



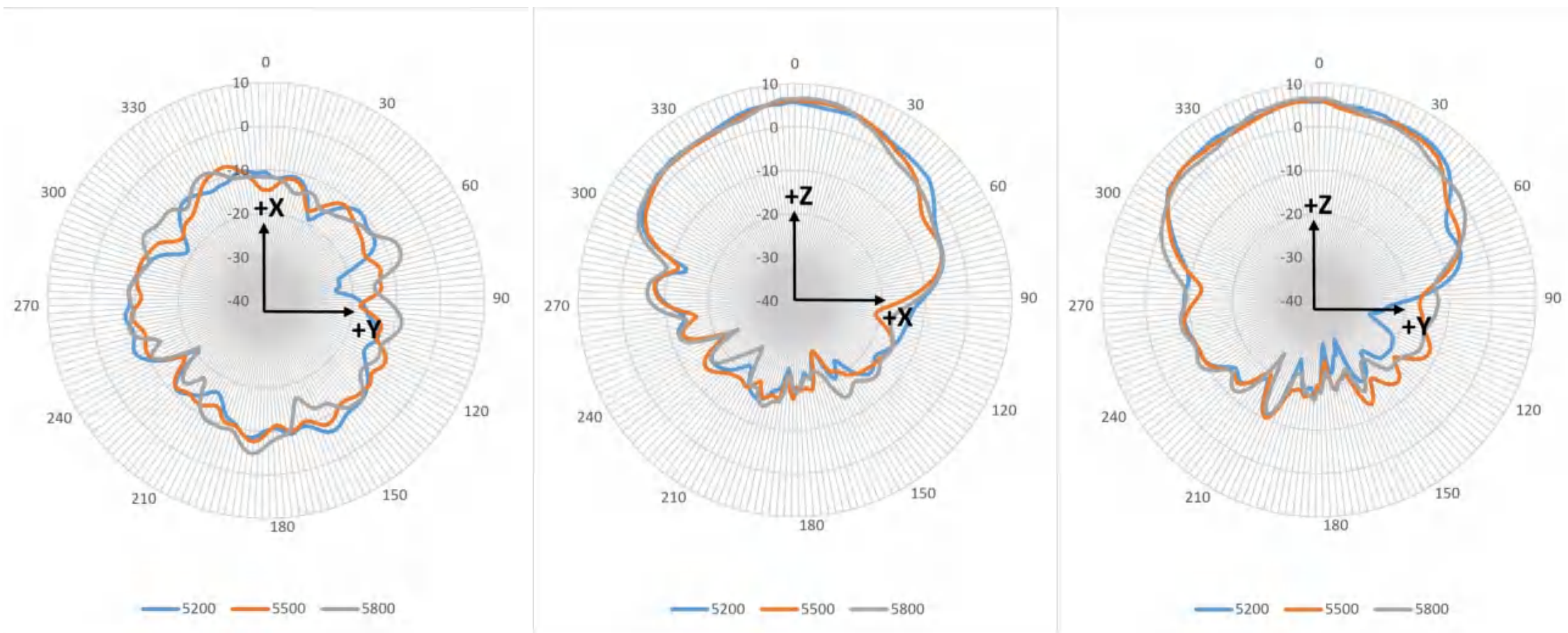
OF THINGS



Realized Gain Radiation Patterns of A11_5G_+45 Antenna in 5G_D Band: Total Polarization



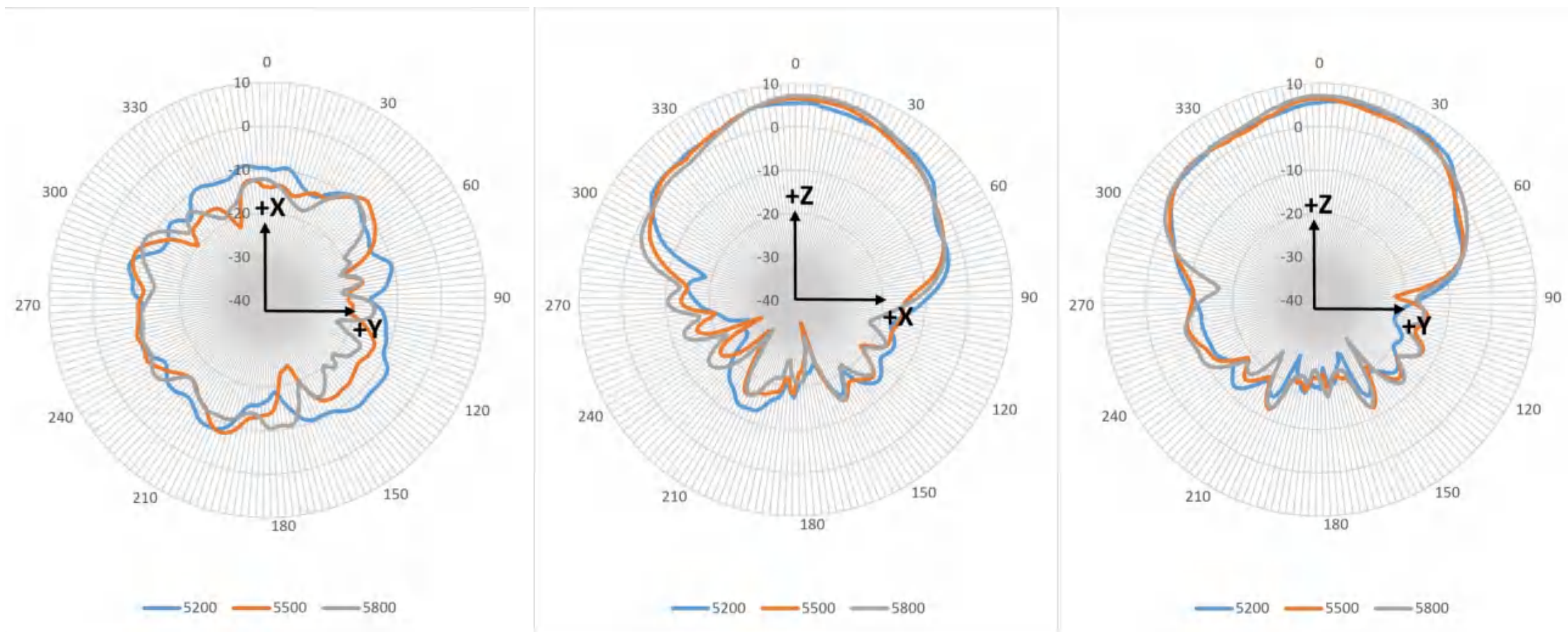
OF THINGS



Realized Gain Radiation Patterns of A12_5G_-45 Antenna in 5G_D Band: Total Polarization



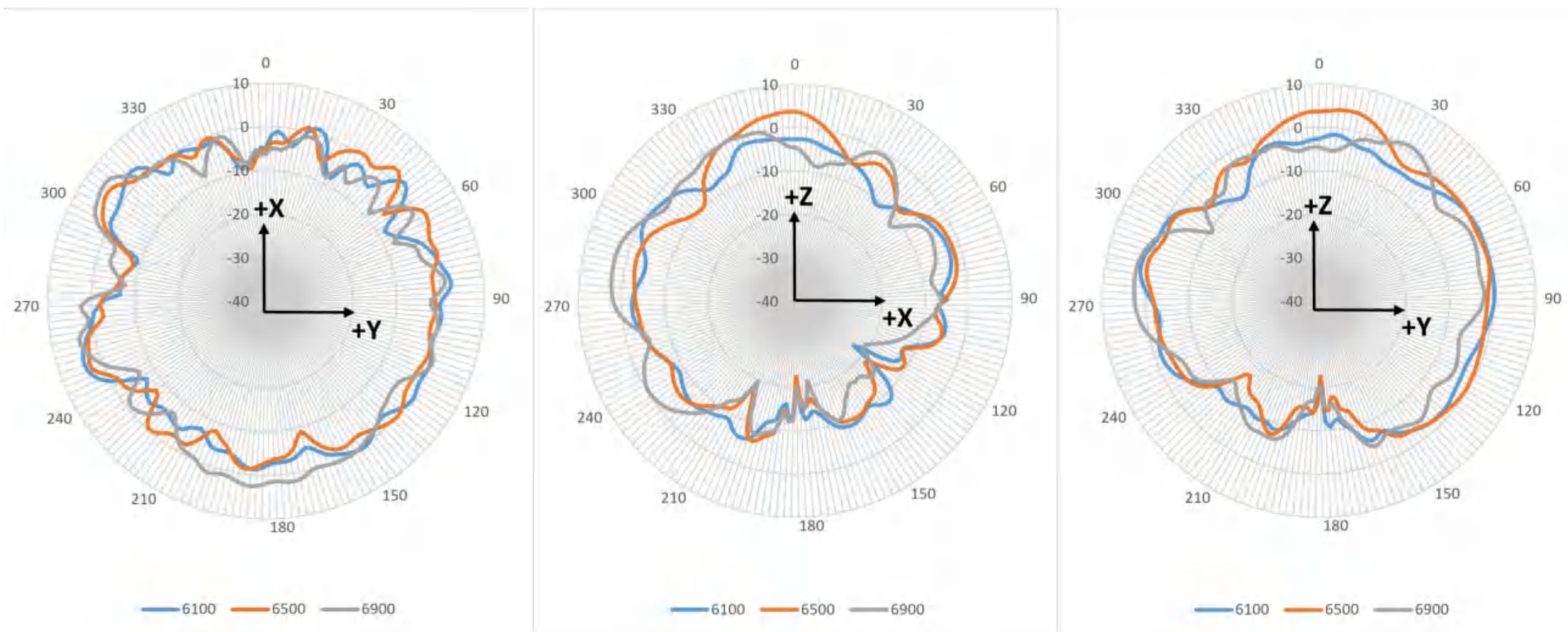
OF THINGS



Realized Gain Radiation Patterns of A5_6G_V Antenna in 6G_O Band: Total Polarization



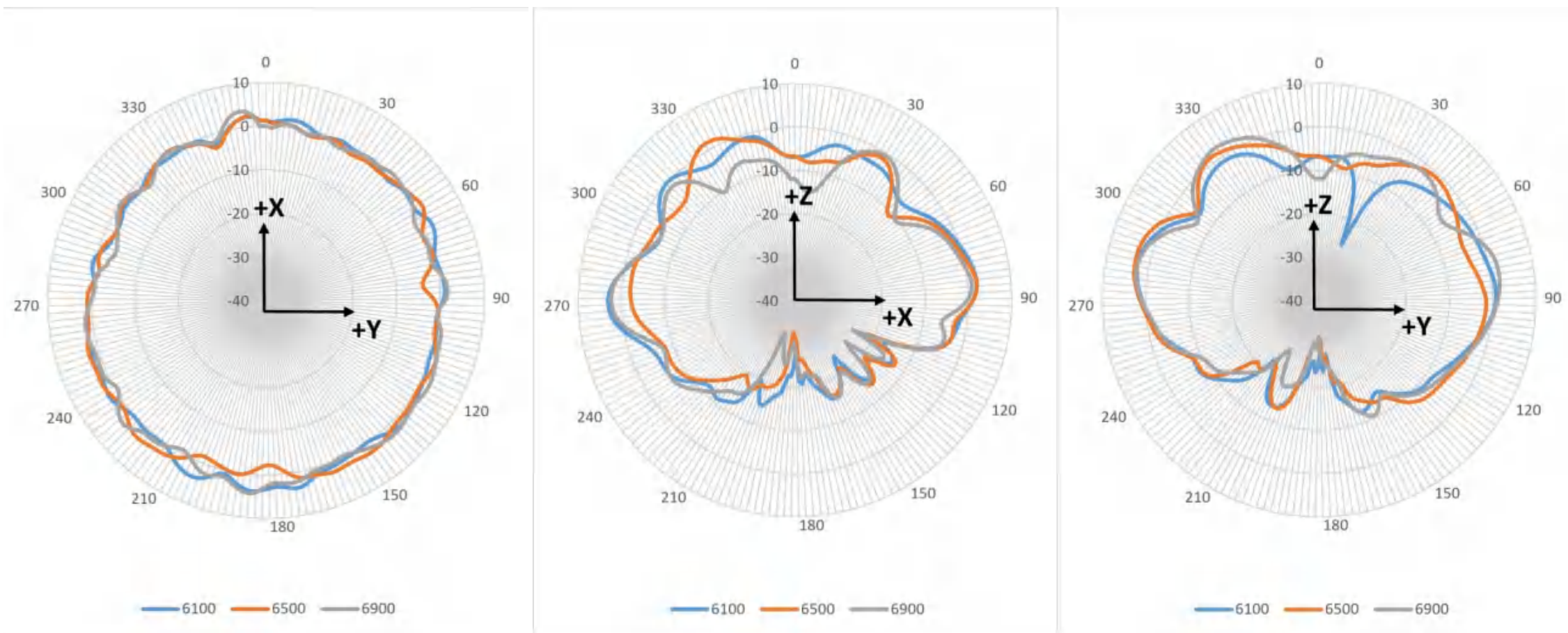
OF THINGS



Realized Gain Radiation Patterns of A6_6G_H Antenna in 6G_O Band: Total Polarization



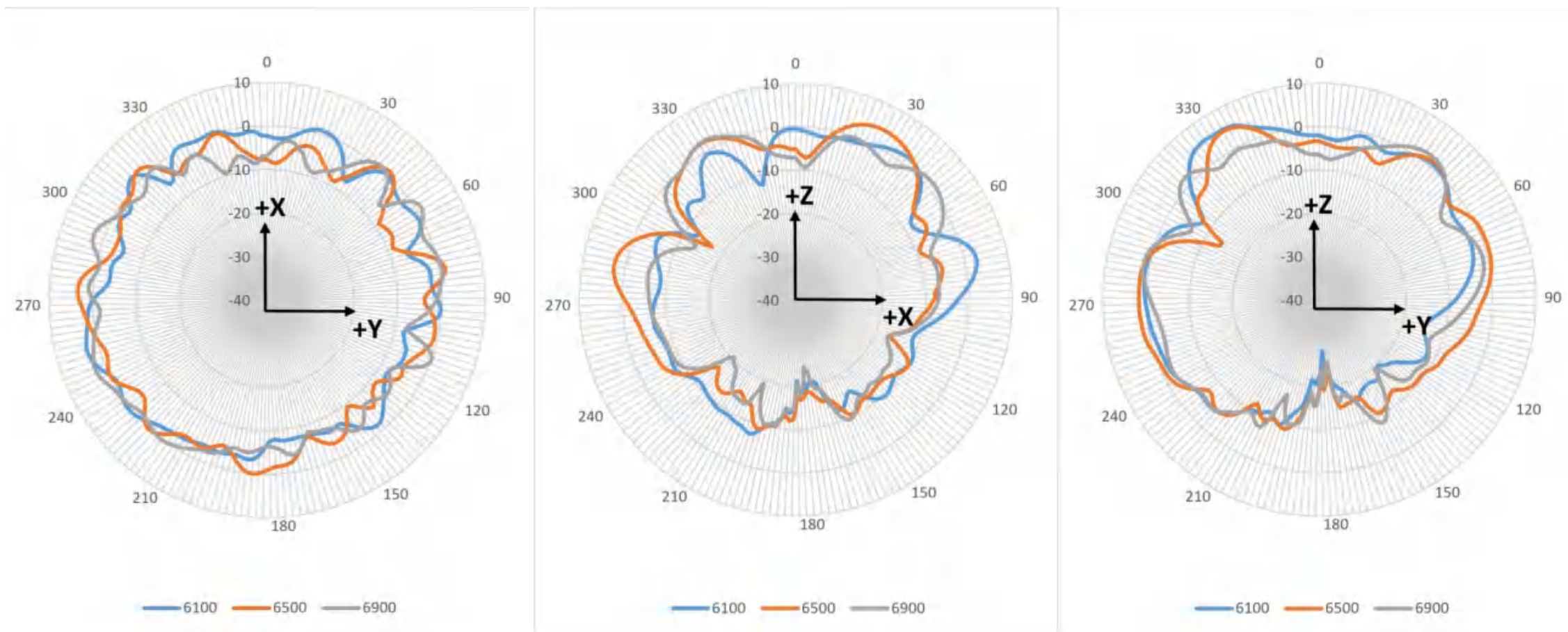
OF THINGS



Realized Gain Radiation Patterns of A7_6G_V Antenna in 6G_O Band: Total Polarization



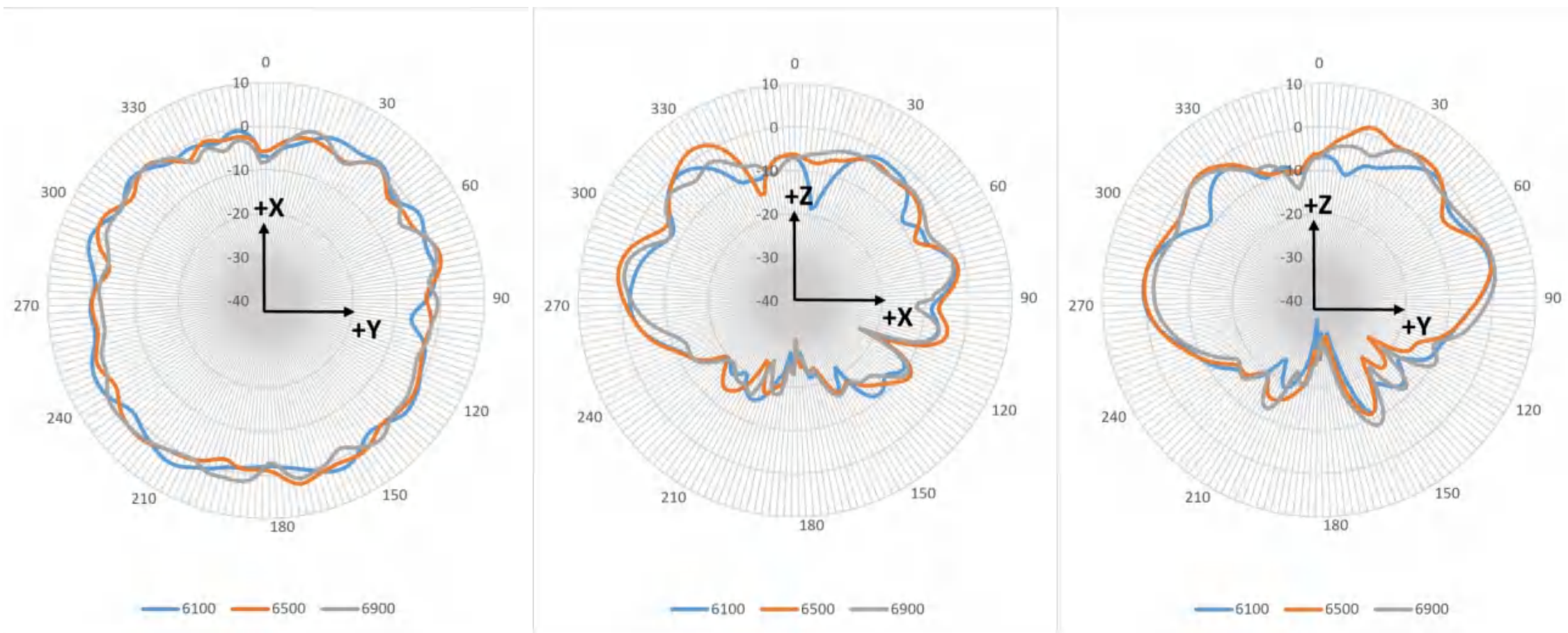
OF THINGS



Realized Gain Radiation Patterns of A8_6G_H Antenna in 6G_O Band: Total Polarization



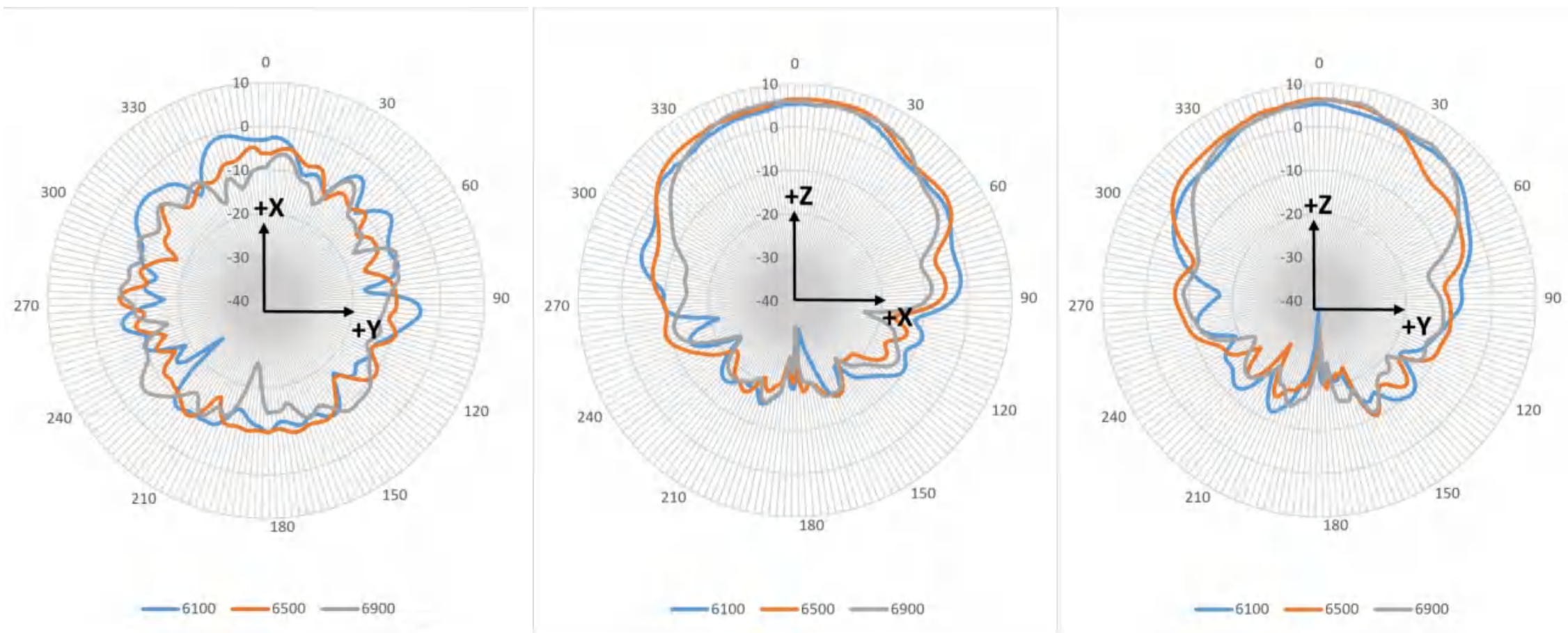
OF THINGS



Realized Gain Radiation Patterns of A13_6G_+45 Antenna in 6G_D Band: Total Polarization



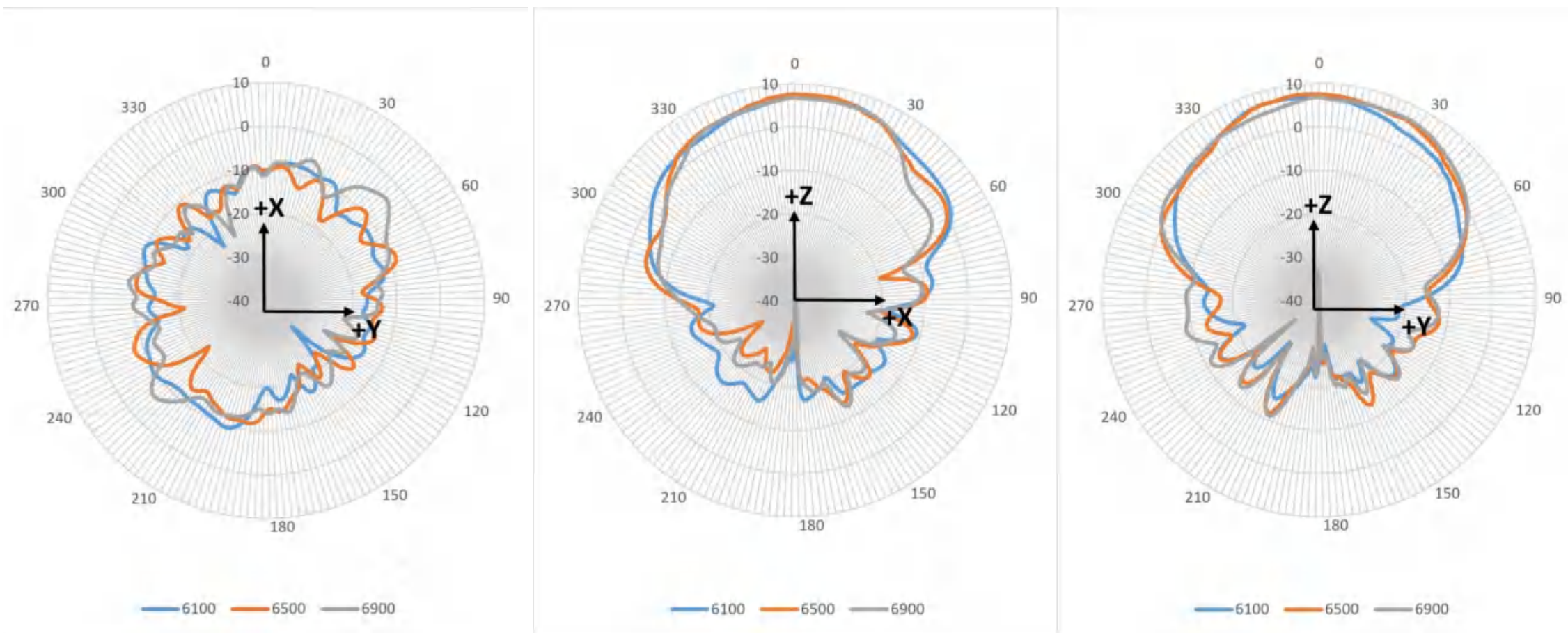
OF THINGS



Realized Gain Radiation Patterns of A14_6G_-45 Antenna in 6G_D Band: Total Polarization



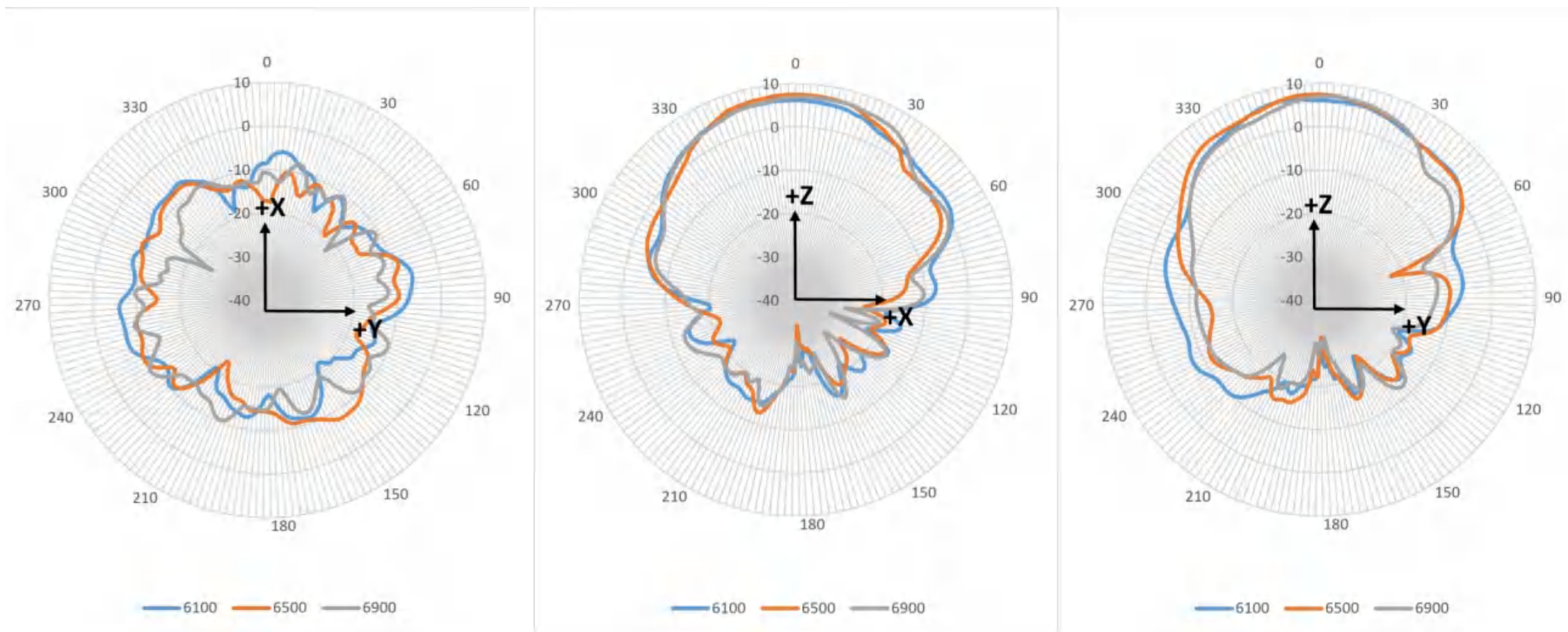
OF THINGS



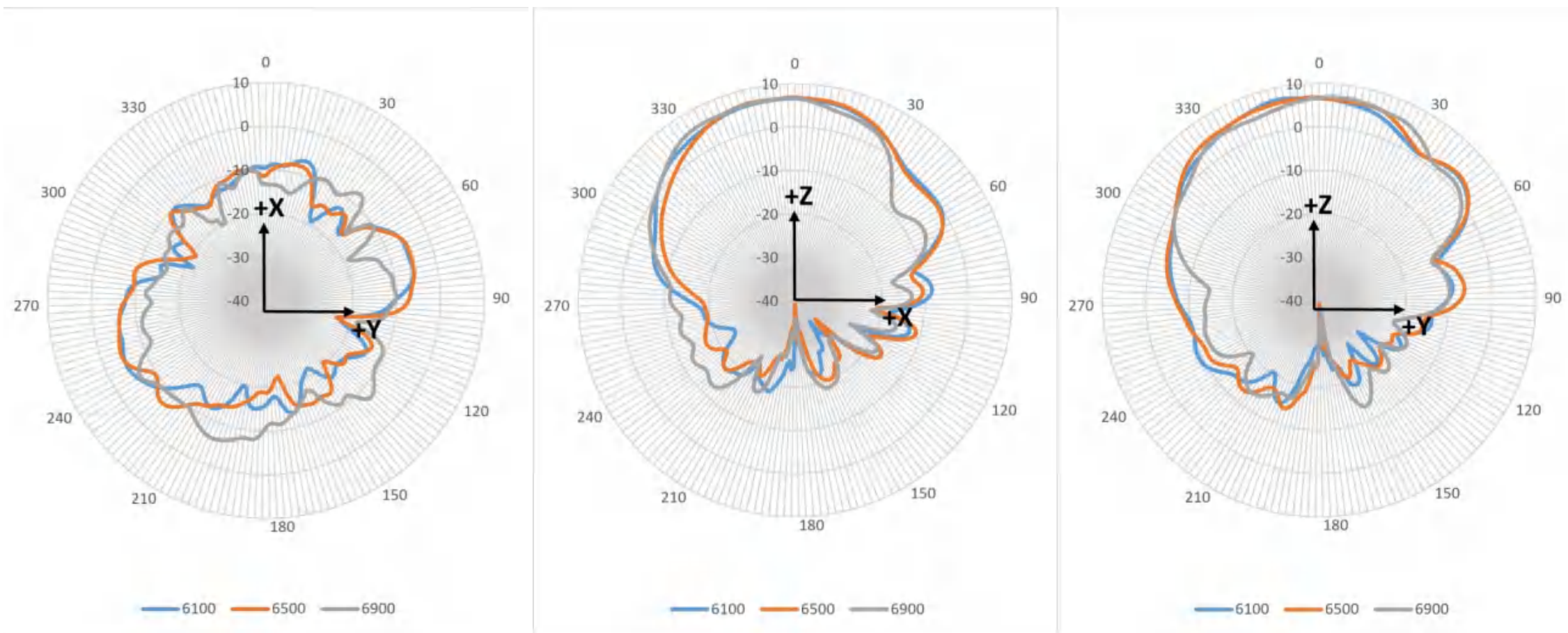
Realized Gain Radiation Patterns of A15_6G_+45 Antenna in 6G_D Band: Total Polarization



OF THINGS



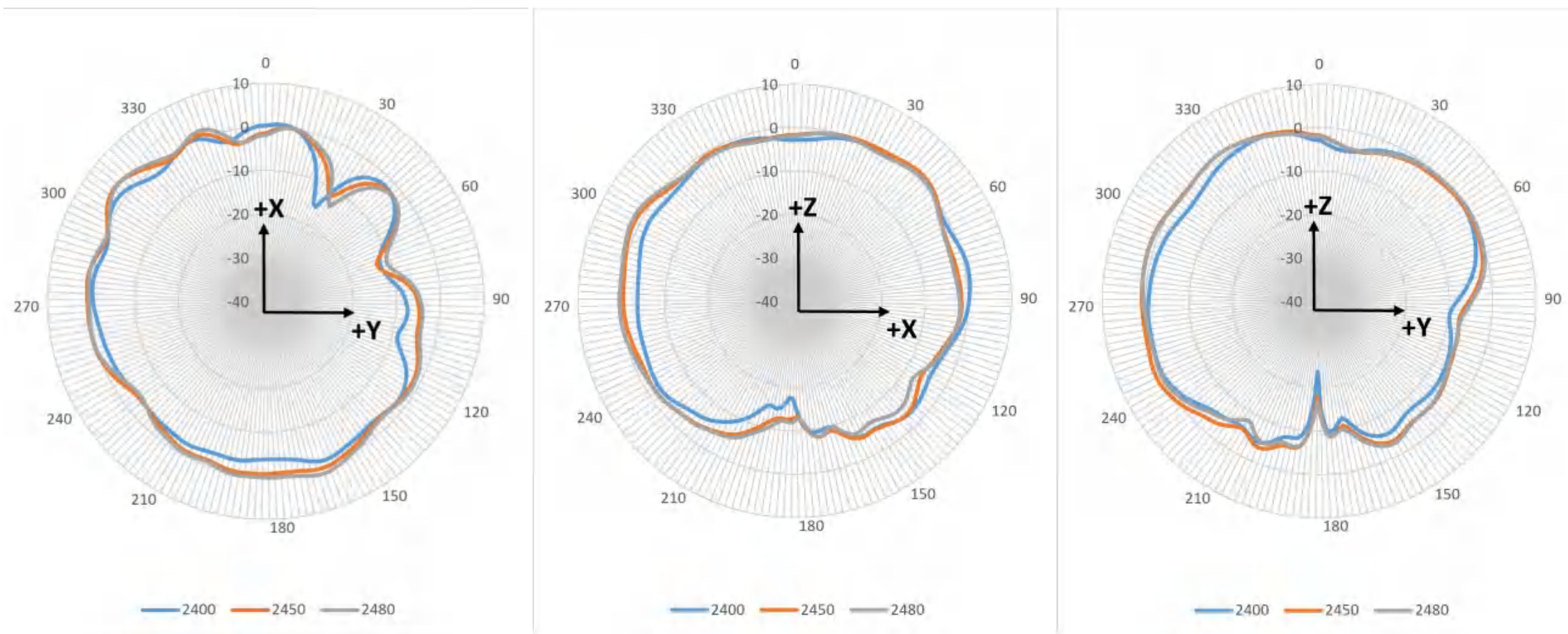
Realized Gain Radiation Patterns of A16_6G_-45 Antenna in 6G_D Band: Total Polarization



Realized Gain Radiation Patterns of A18_BLE Antenna in BLE Band: Total Polarization



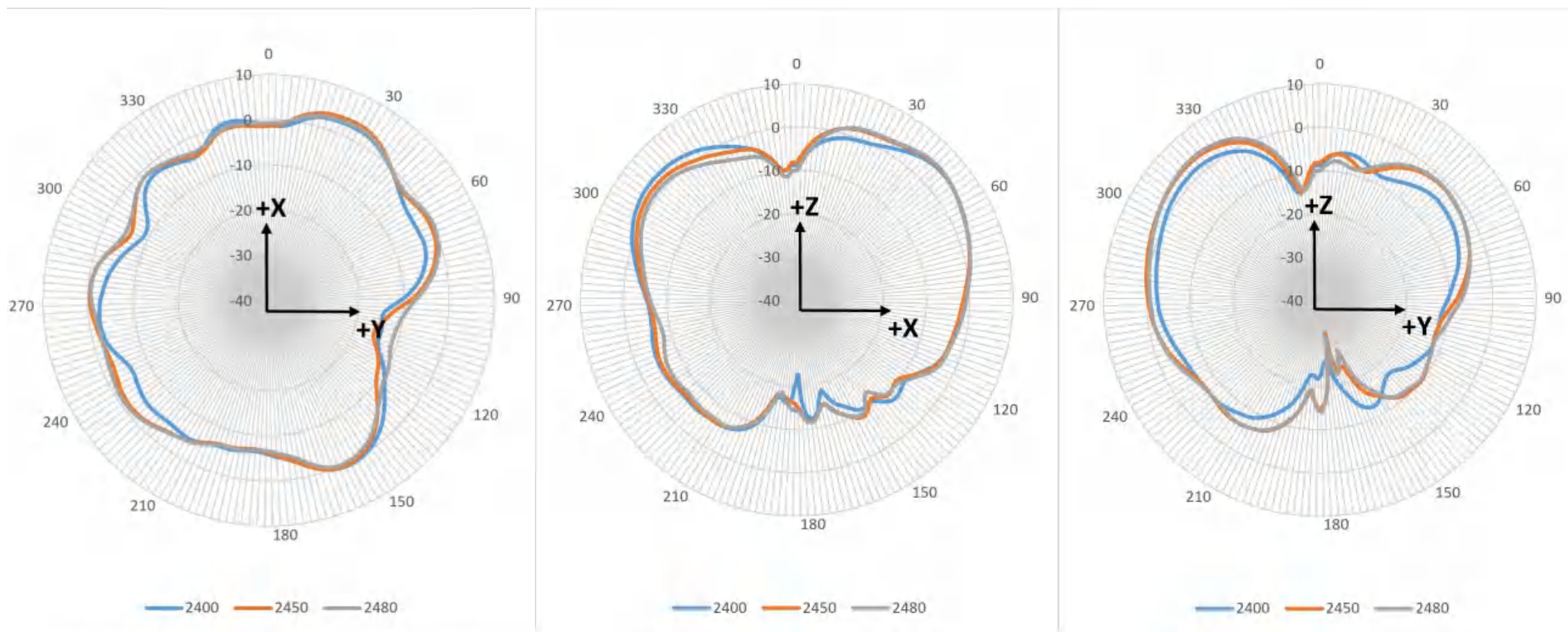
OF THINGS



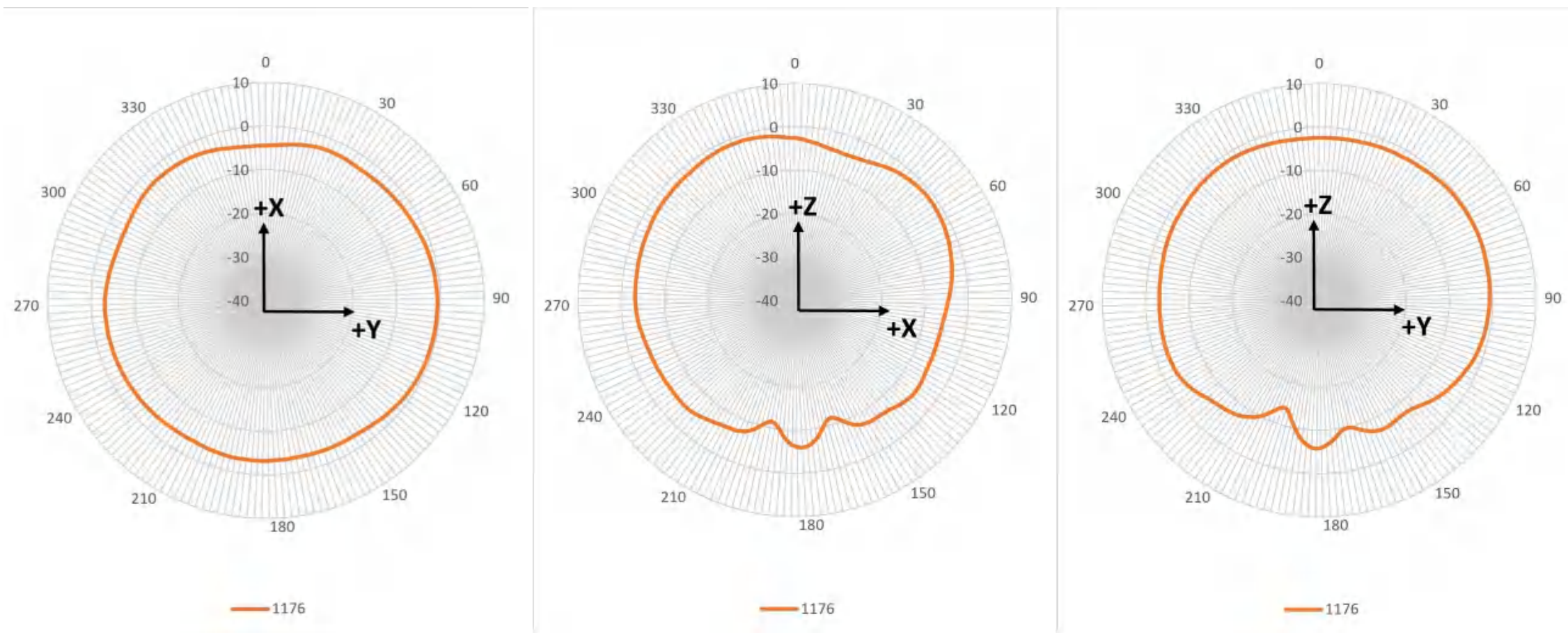
Realized Gain Radiation Patterns of A19_BLE Antenna in BLE Band: Total Polarization



OF THINGS



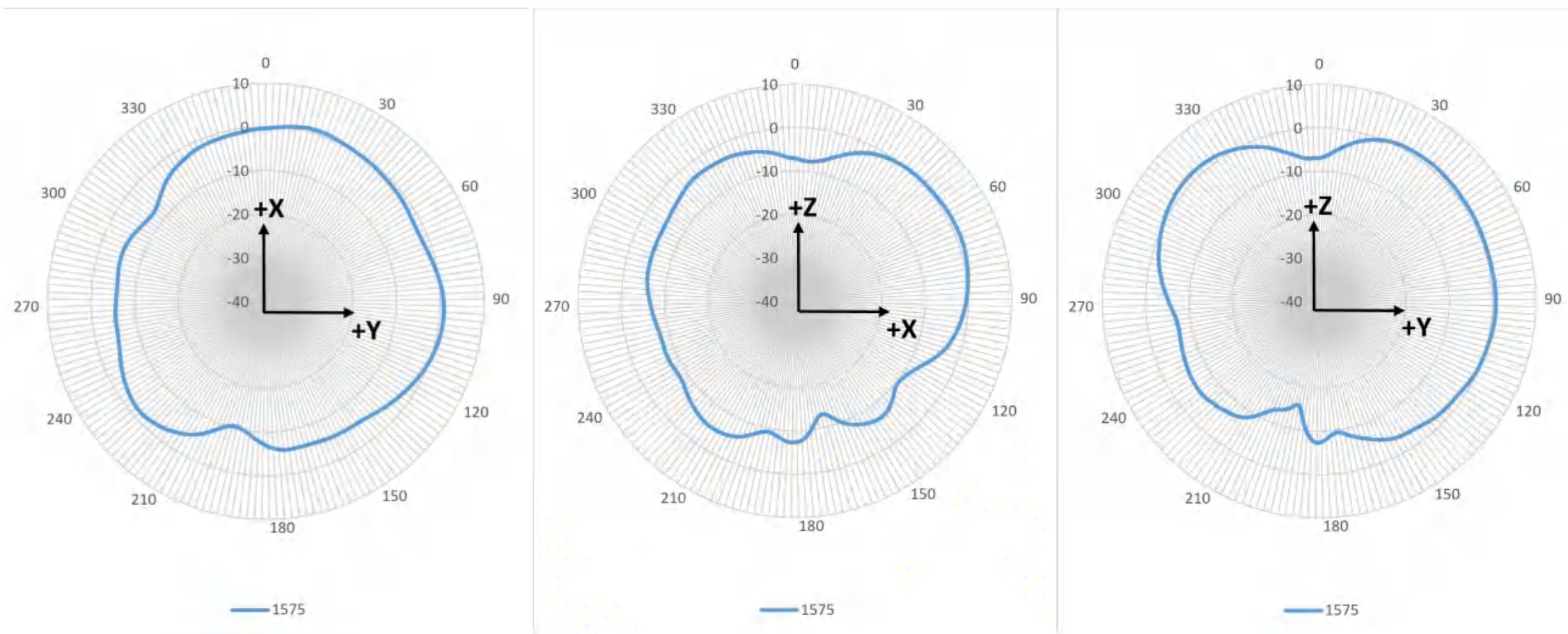
Realized Gain Radiation Patterns of A17_GNSS Antenna in L5 Band: Total Polarization



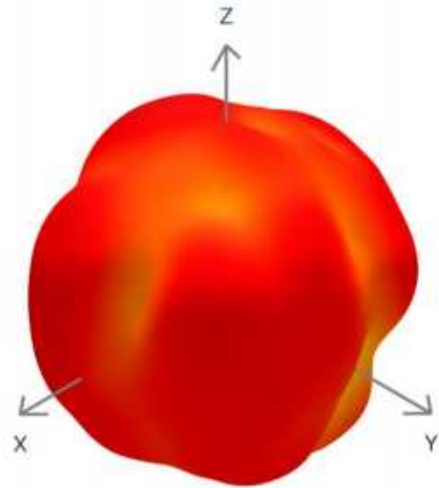
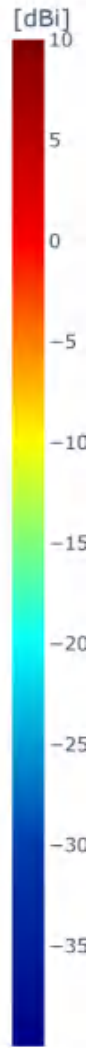
Realized Gain Radiation Patterns of A17_GNSS Antenna in L1 Band: Total Polarization



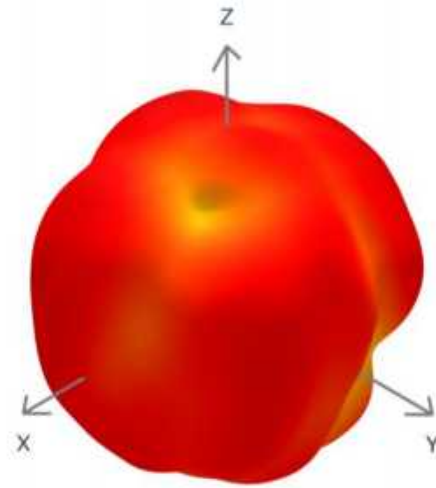
OF THINGS



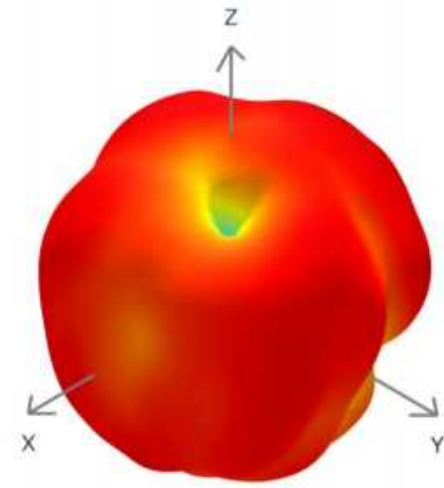
Realized Gain Radiation Patterns of A1_Dual_V Antenna in 2G4_O Band: Total Polarization



2400 MHz

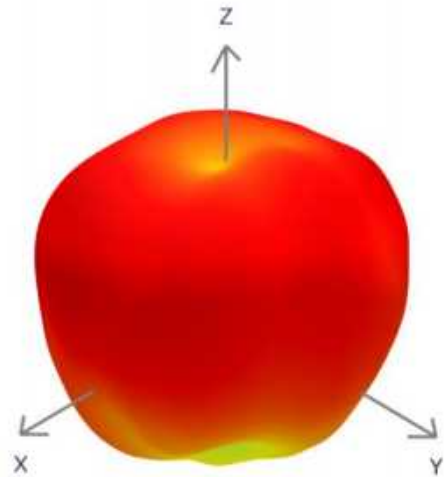


2450 MHz

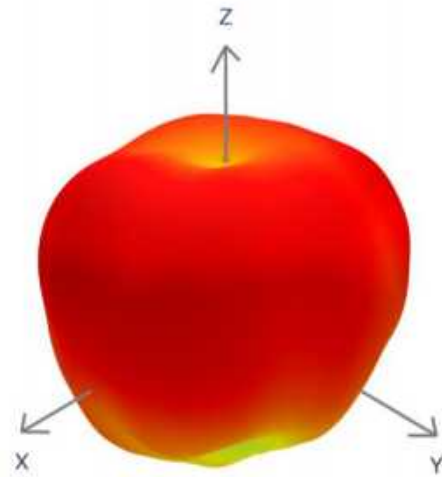


2480 MHz

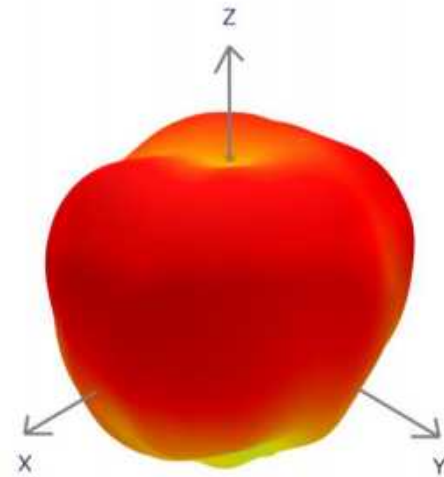
Realized Gain Radiation Patterns of A2_Dual_H Antenna in 2G4_O Band: Total Polarization



2400 MHz

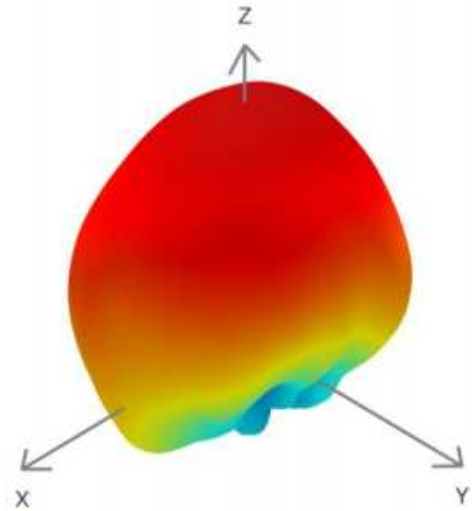


2450 MHz

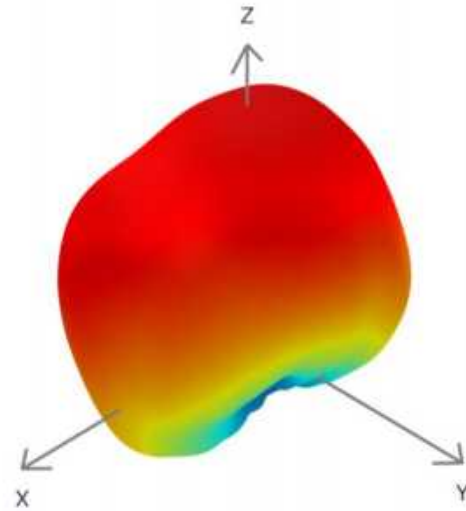


2480 MHz

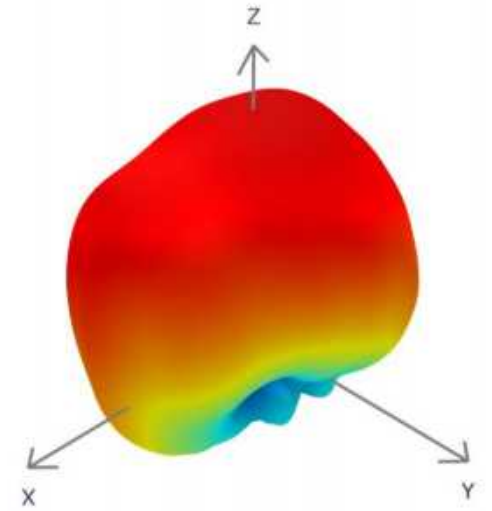
Realized Gain Radiation Patterns of A9_Dual_+45 Antenna in 2G4_D Band: Total Polarization



2400 MHz

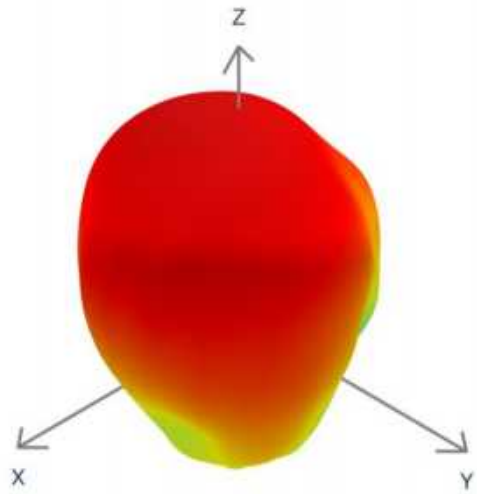


2450 MHz

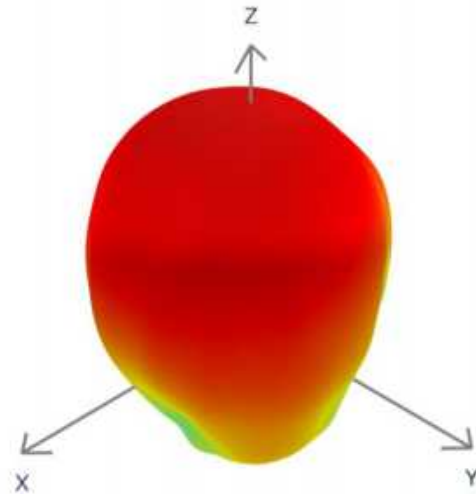


2480 MHz

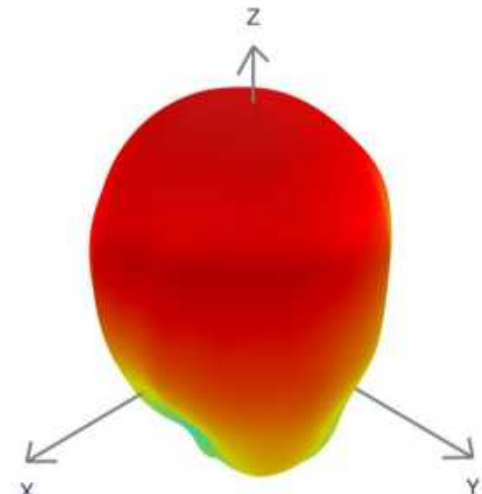
Realized Gain Radiation Patterns of A10_Dual_-45 Antenna in 2G4_D Band: Total Polarization



2400 MHz

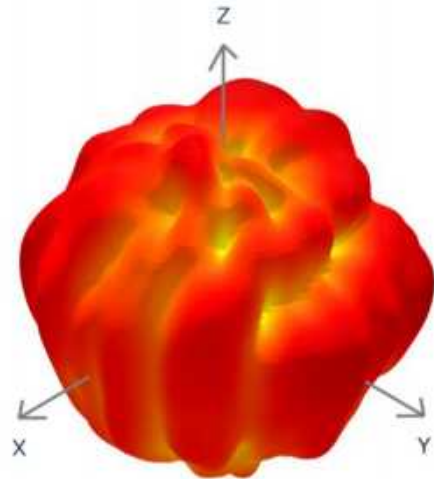
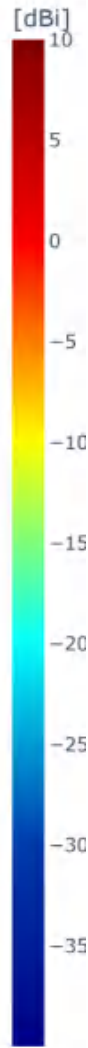


2450 MHz

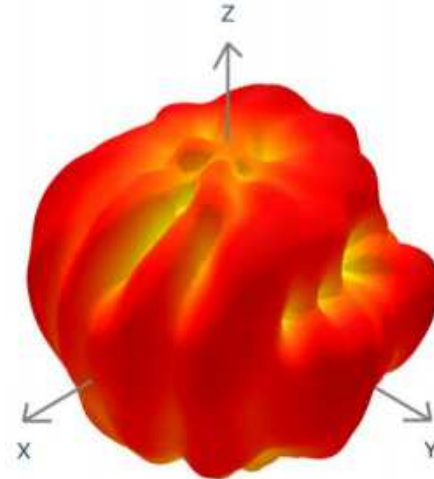


2480 MHz

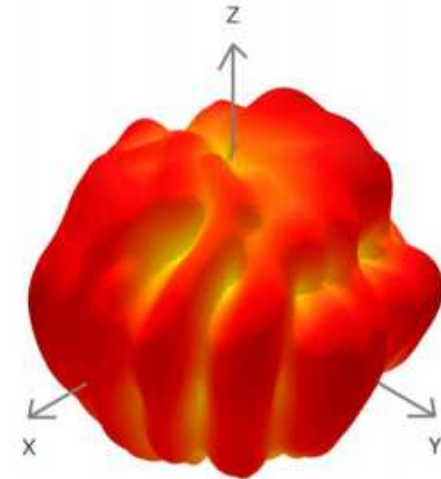
Realized Gain Radiation Patterns of A1_Dual_V Antenna in 5G_O Band: Total Polarization



5200 MHz

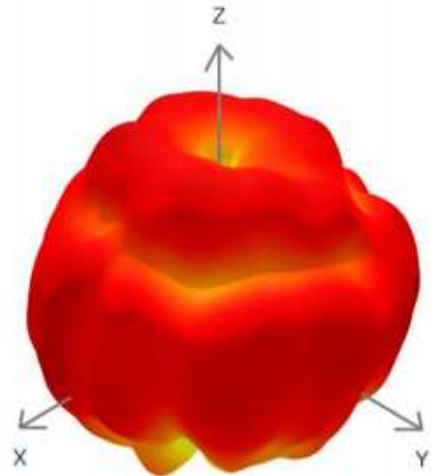
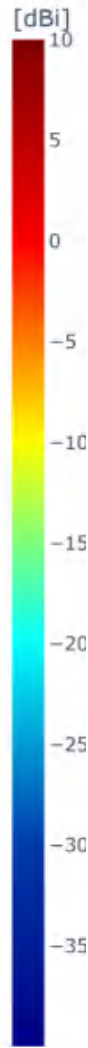


5500 MHz

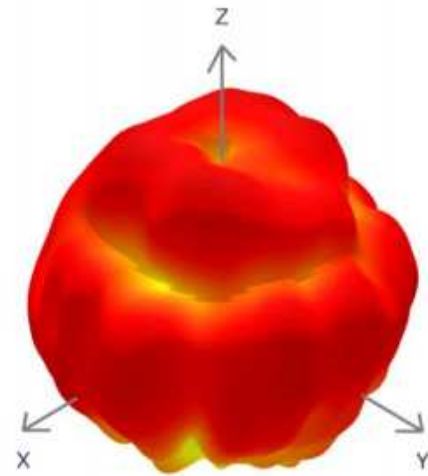


5800 MHz

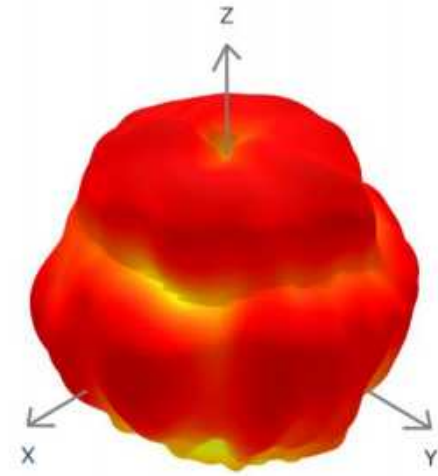
Realized Gain Radiation Patterns of A2_Dual_H Antenna in 5G_O Band: Total Polarization



5200 MHz

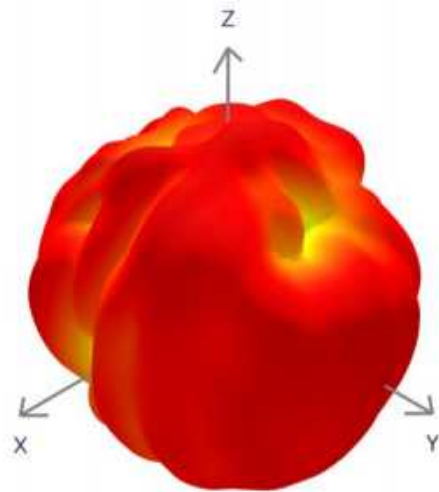
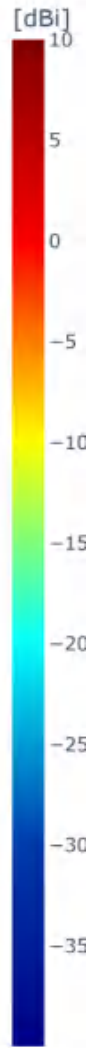


5500 MHz

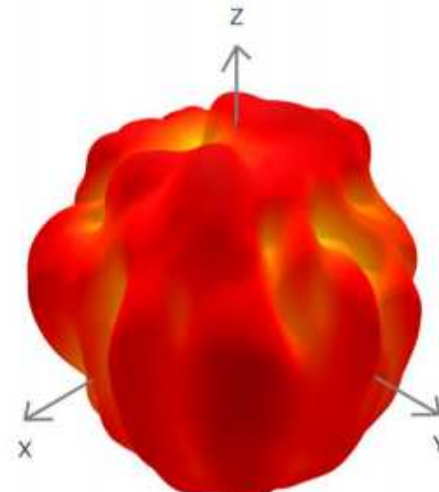


5800 MHz

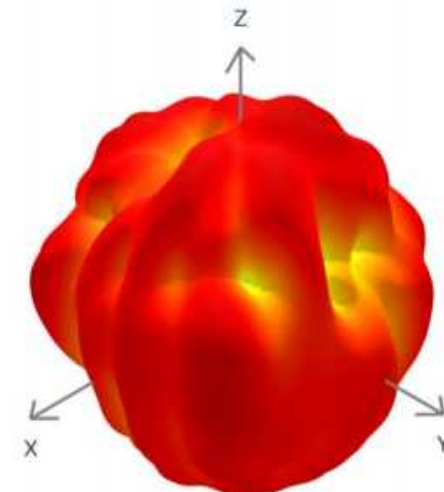
Realized Gain Radiation Patterns of A3_5G_V Antenna in 5G_O Band: Total Polarization



5200 MHz

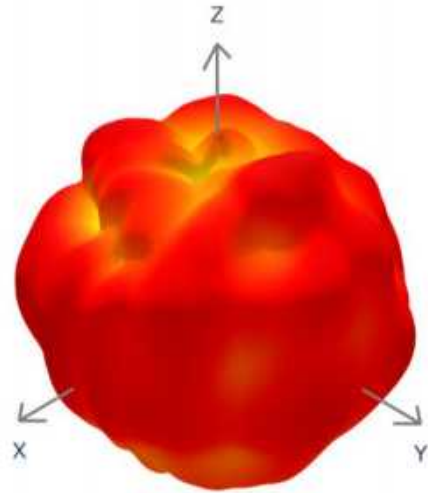
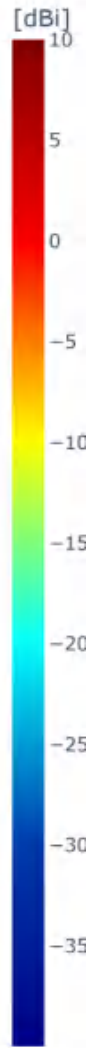


5500 MHz

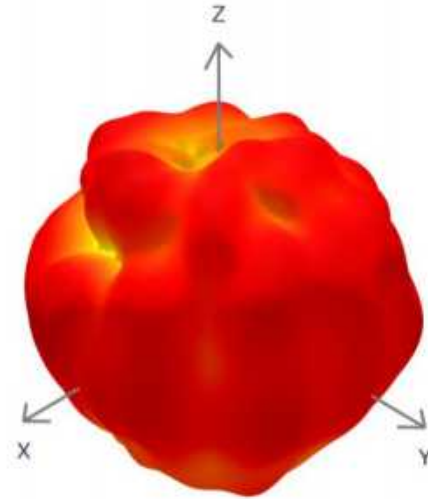


5800 MHz

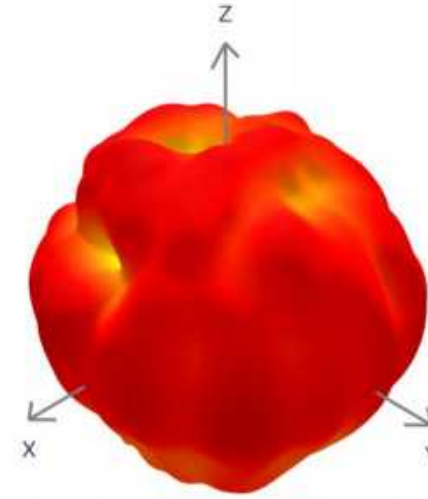
Realized Gain Radiation Patterns of A4_5G_H Antenna in 5G_O Band: Total Polarization



5200 MHz

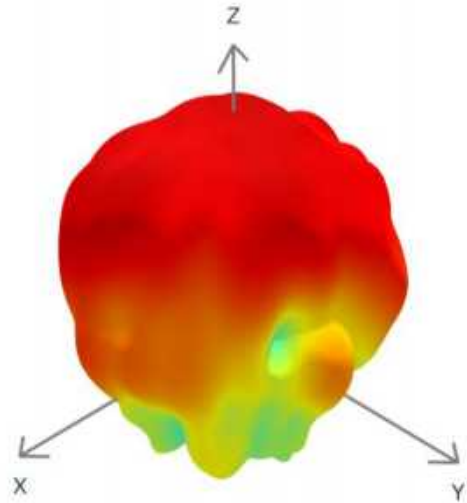
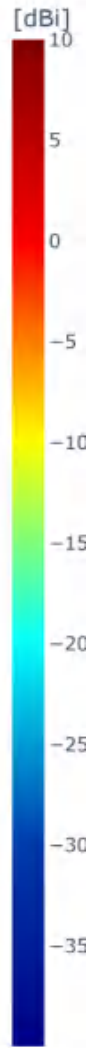


5500 MHz

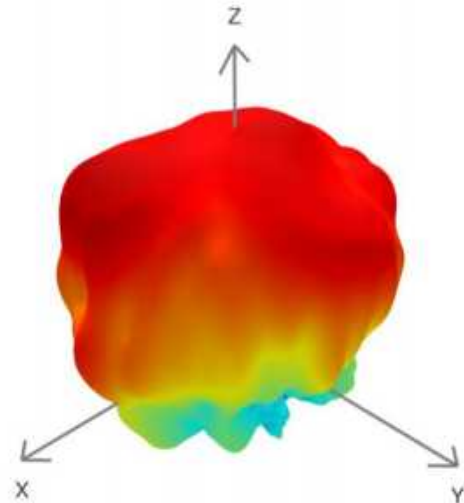


5800 MHz

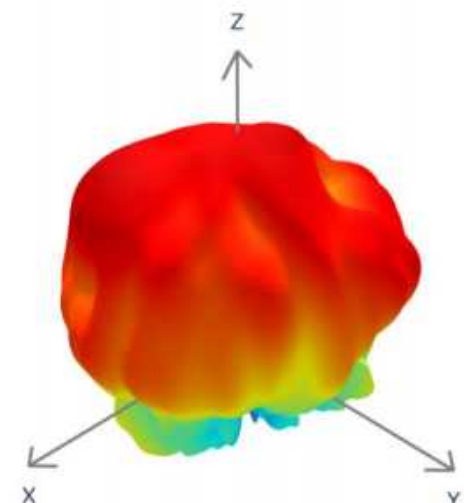
Realized Gain Radiation Patterns of A9_Dual_+45 Antenna in 5G_D Band: Total Polarization



5200 MHz

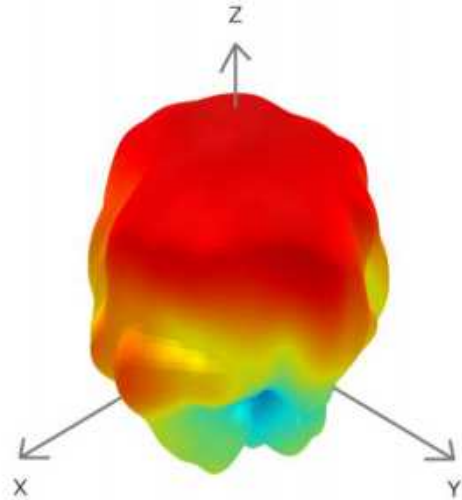


5500 MHz

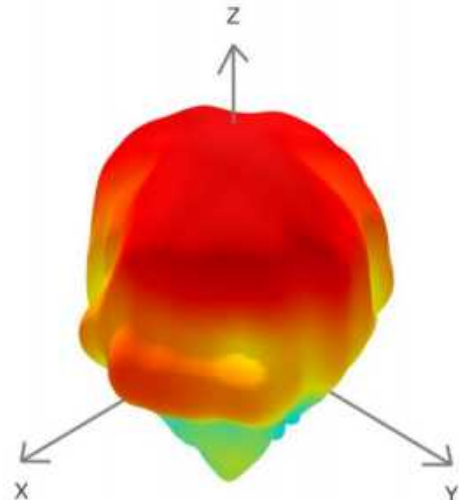


5800 MHz

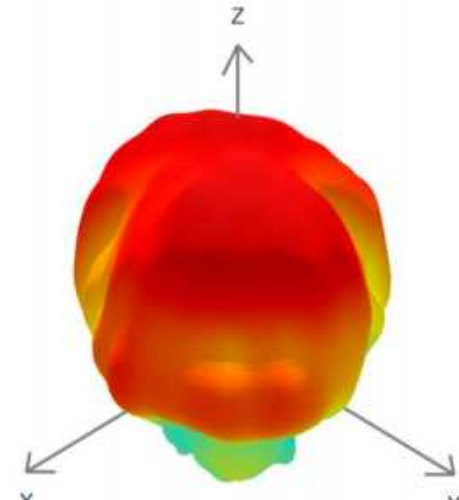
Realized Gain Radiation Patterns of A10_Dual_-45 Antenna in 5G_D Band: Total Polarization



5200 MHz

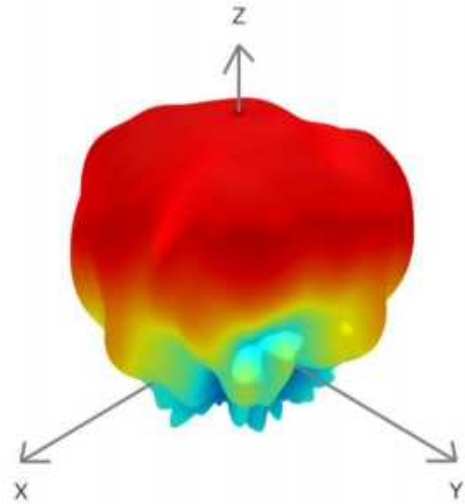
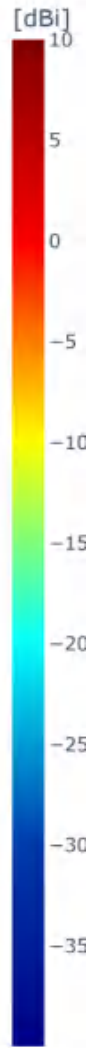


5500 MHz

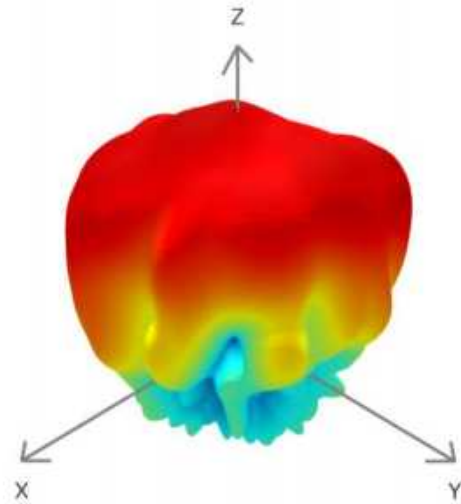


5800 MHz

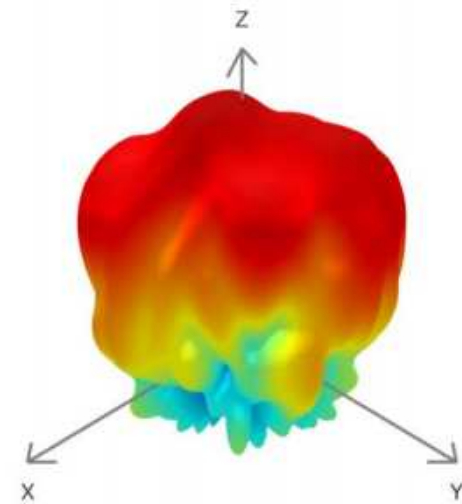
Realized Gain Radiation Patterns of A11_5G_+45 Antenna in 5G_D Band: Total Polarization



5200 MHz

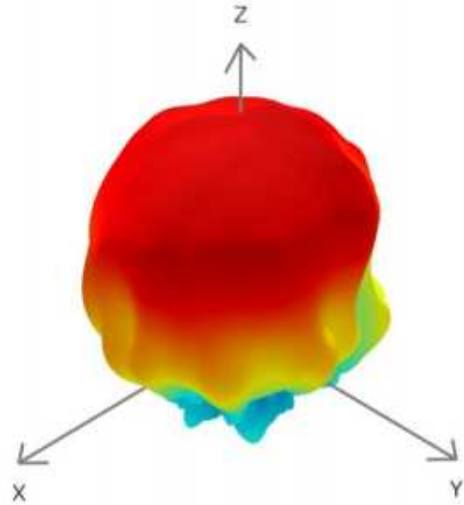


5500 MHz

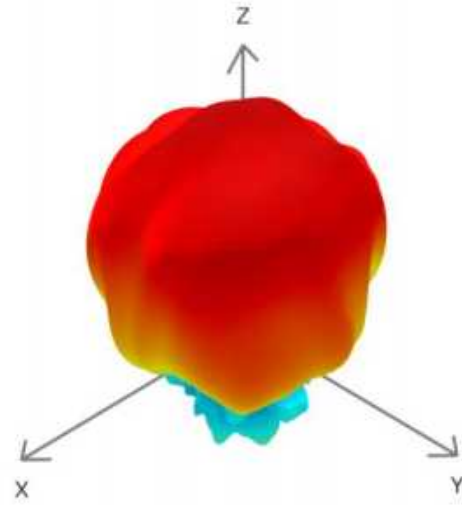


5800 MHz

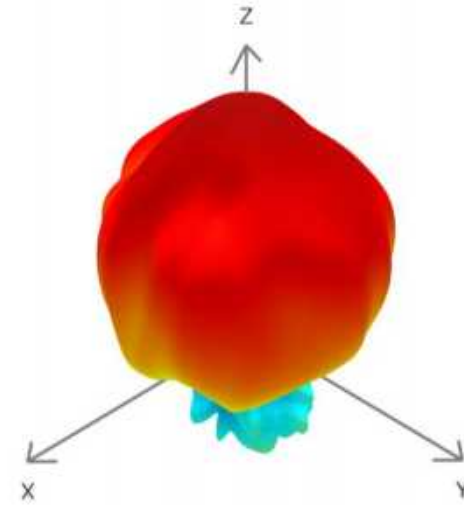
Realized Gain Radiation Patterns of A12_5G_-45 Antenna in 5G_D Band: Total Polarization



5200 MHz

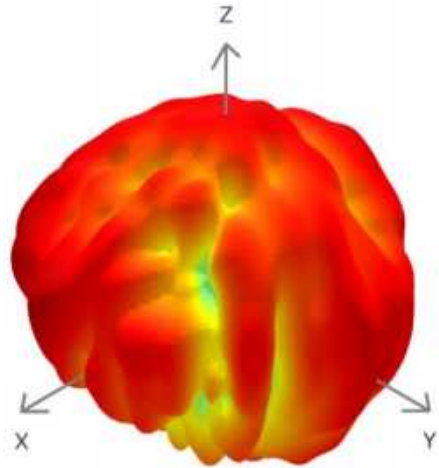


5500 MHz

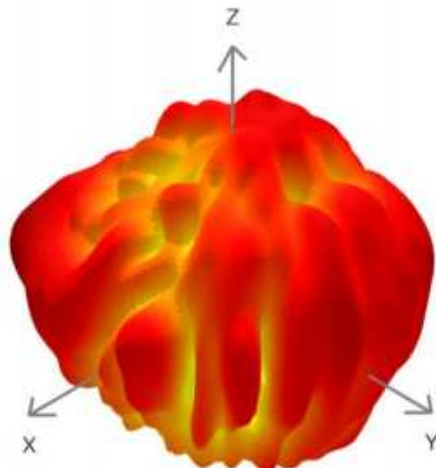


5800 MHz

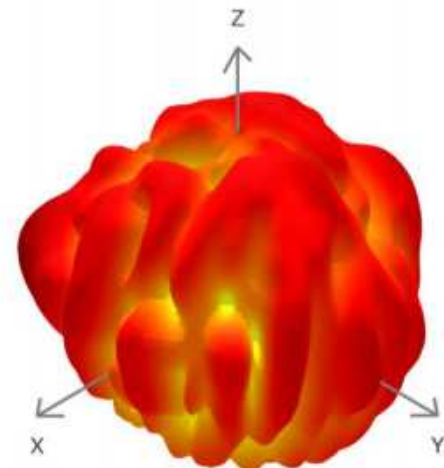
Realized Gain Radiation Patterns of A5_6G_V Antenna in 6G_O Band: Total Polarization



6100 MHz

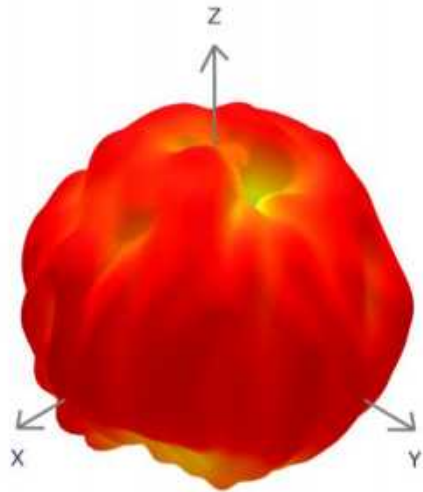
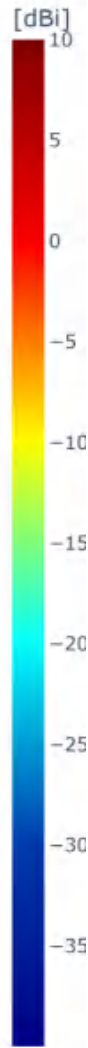


6500 MHz

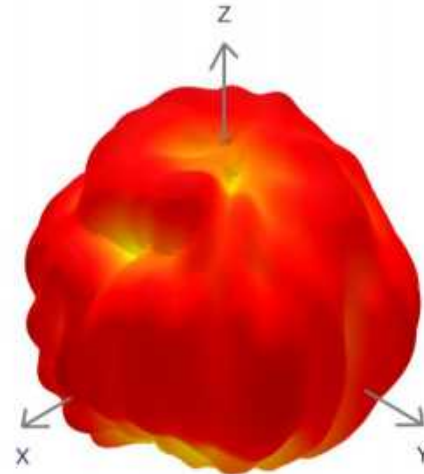


6900 MHz

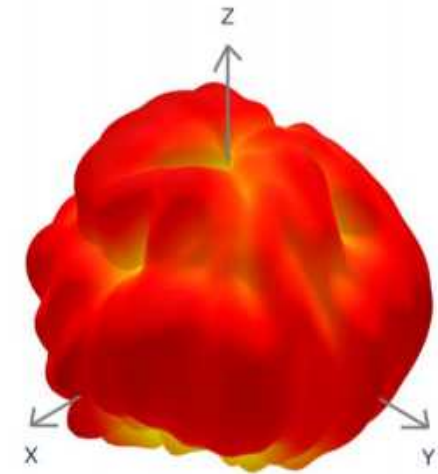
Realized Gain Radiation Patterns of A6_6G_H Antenna in 6G_O Band: Total Polarization



6100 MHz

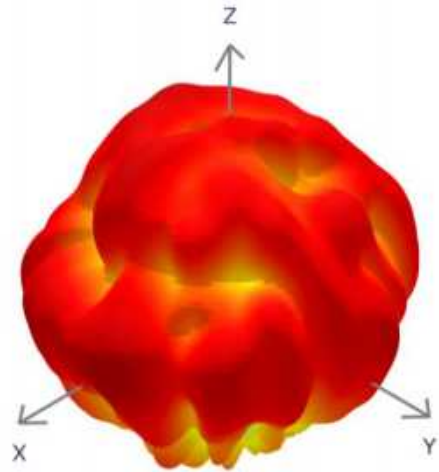


6500 MHz

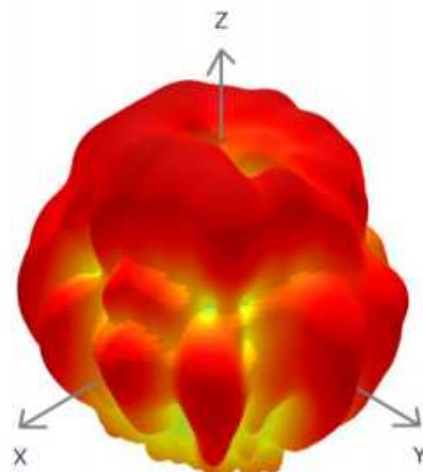


6900 MHz

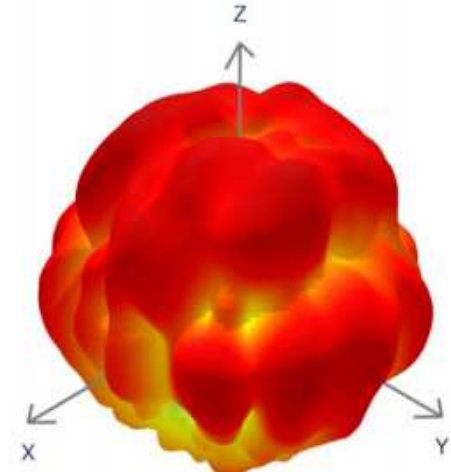
Realized Gain Radiation Patterns of A7_6G_V Antenna in 6G_O Band: Total Polarization



6100 MHz

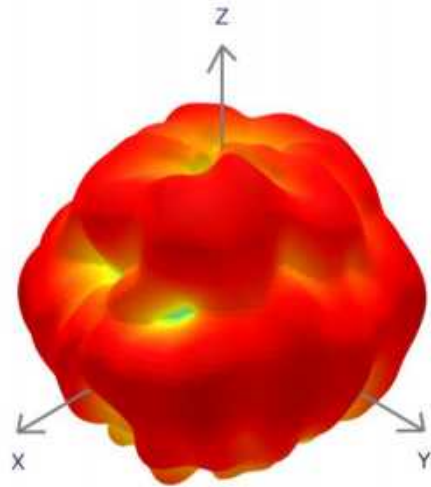


6500 MHz

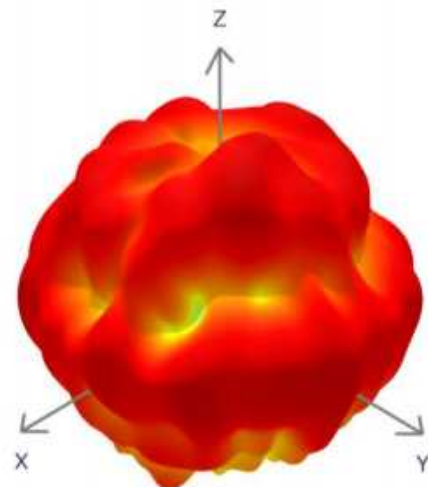


6900 MHz

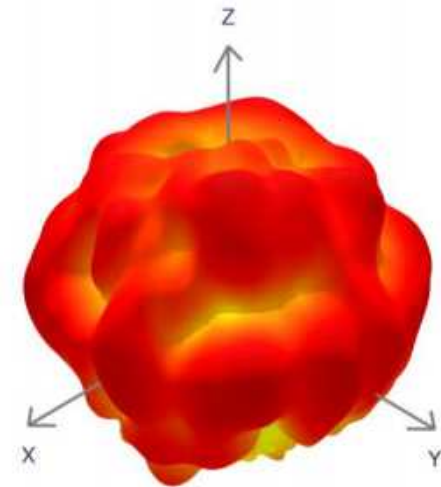
Realized Gain Radiation Patterns of A8_6G_H Antenna in 6G_O Band: Total Polarization



6100 MHz

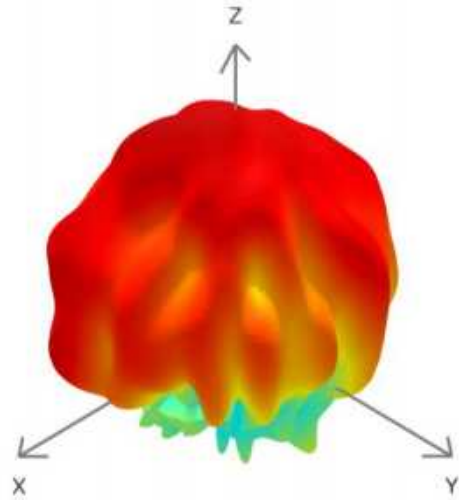
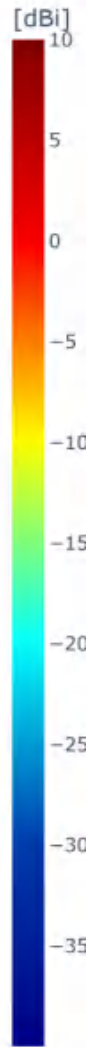


6500 MHz

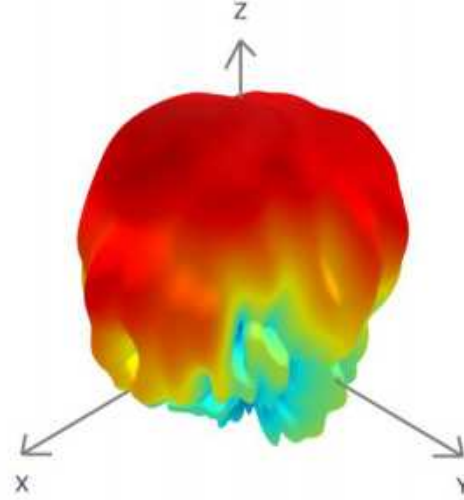


6900 MHz

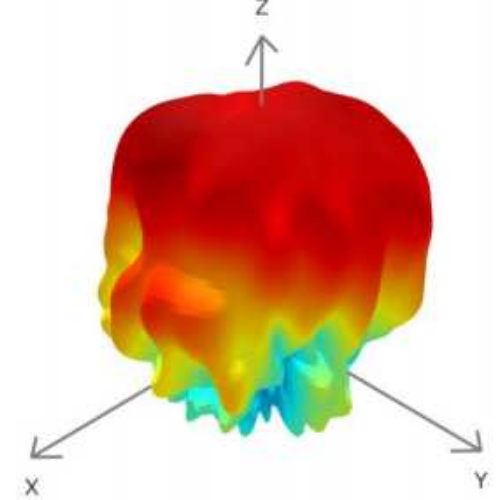
Realized Gain Radiation Patterns of A13_6G_+45 Antenna in 6G_D Band: Total Polarization



6100 MHz

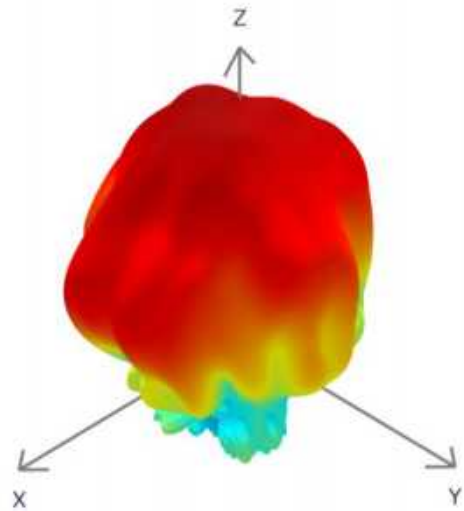


6500 MHz

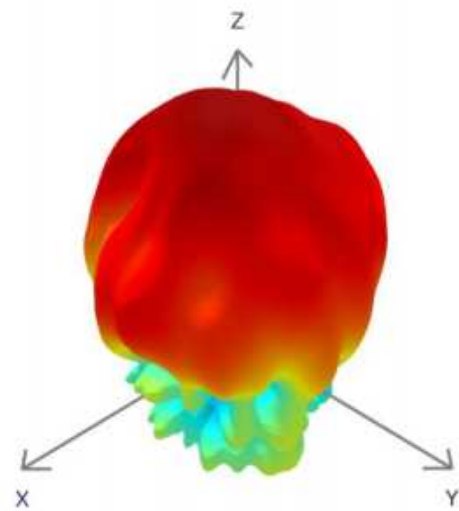


6900 MHz

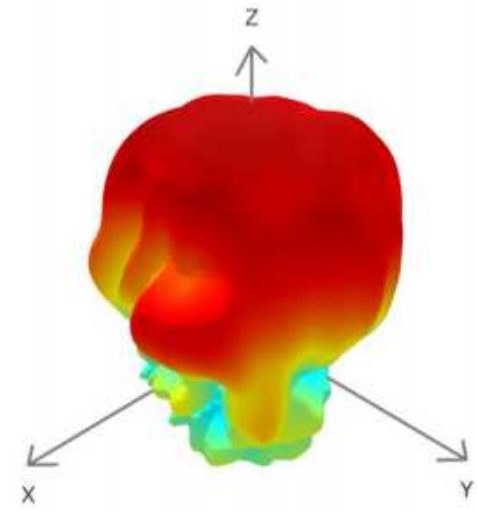
Realized Gain Radiation Patterns of A14_6G_-45 Antenna in 6G_D Band: Total Polarization



6100 MHz

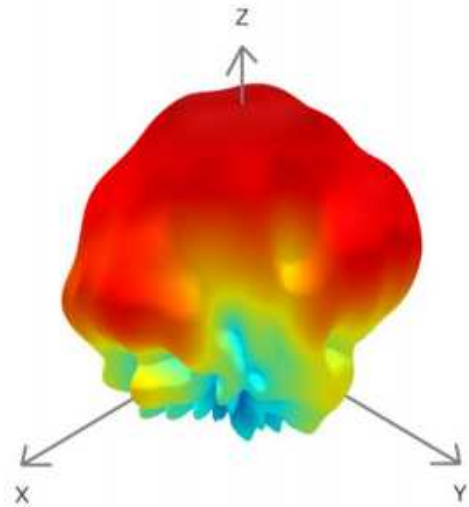
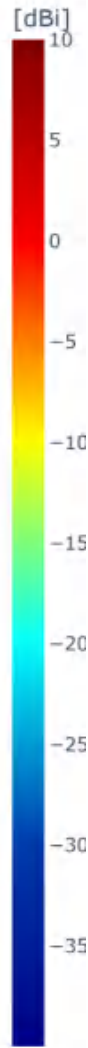


6500 MHz

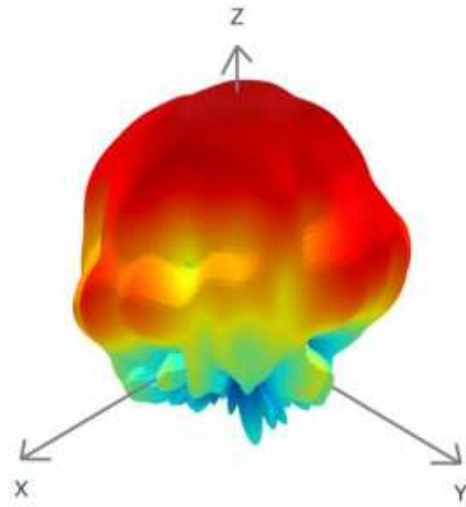


6900 MHz

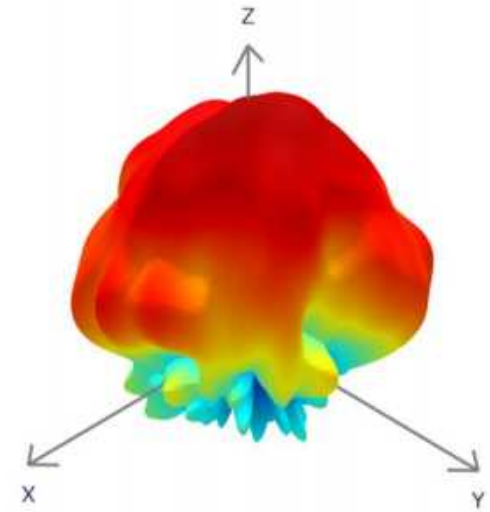
Realized Gain Radiation Patterns of A15_6G_+45 Antenna in 6G_D Band: Total Polarization



6100 MHz

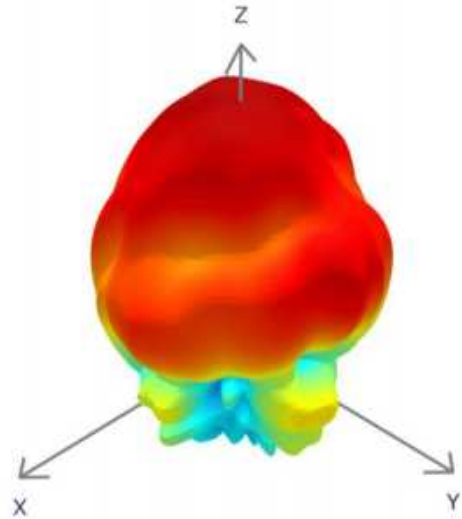


6500 MHz

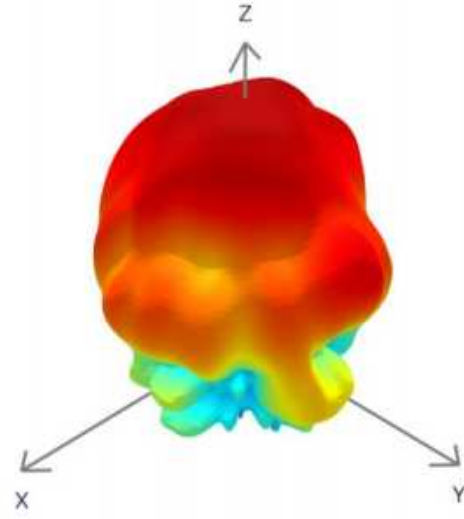


6900 MHz

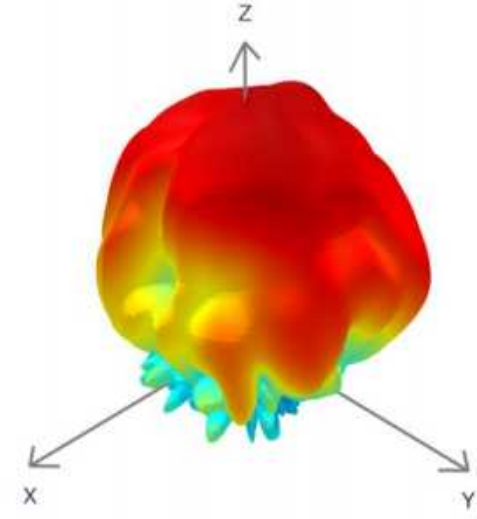
Realized Gain Radiation Patterns of A16_6G_-45 Antenna in 6G_D Band: Total Polarization



6100 MHz

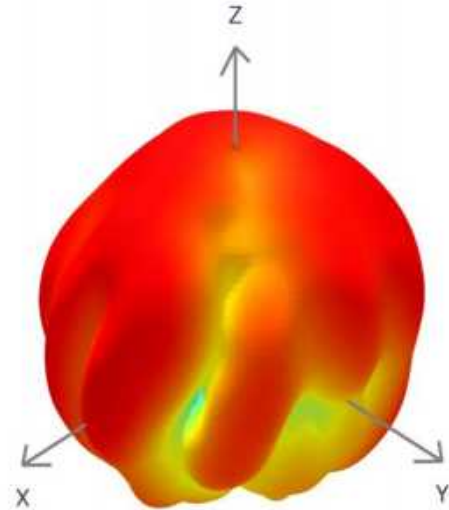
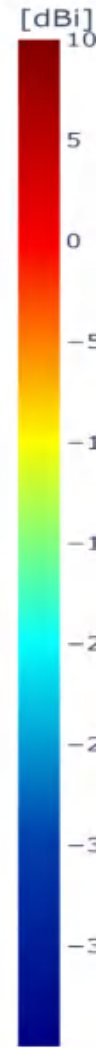


6500 MHz

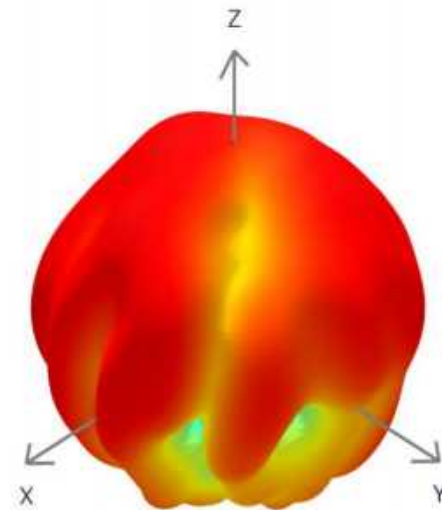


6900 MHz

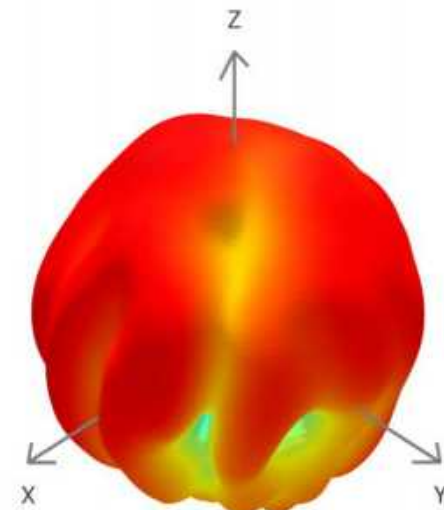
Realized Gain Radiation Patterns of A18_BLE Antenna in BLE Band: Total Polarization



2400 MHz

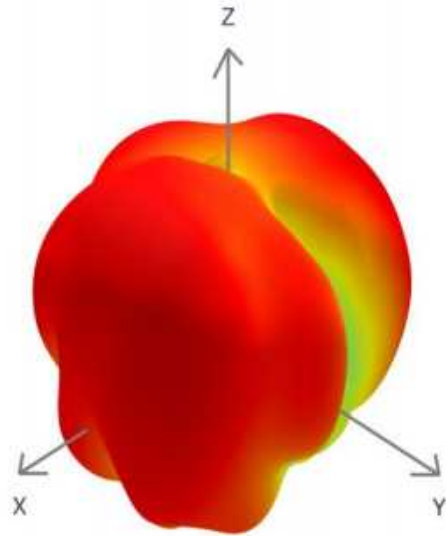
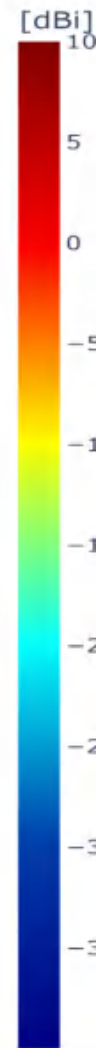


2450 MHz

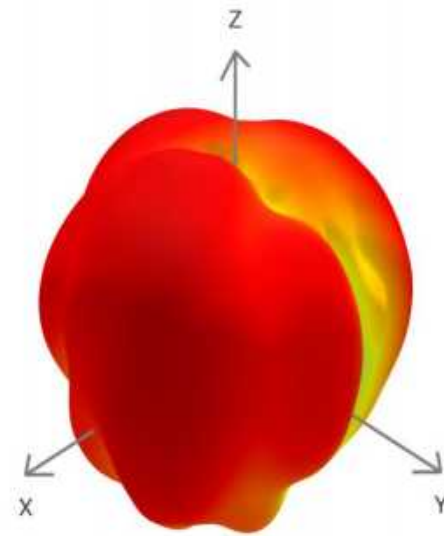


2480 MHz

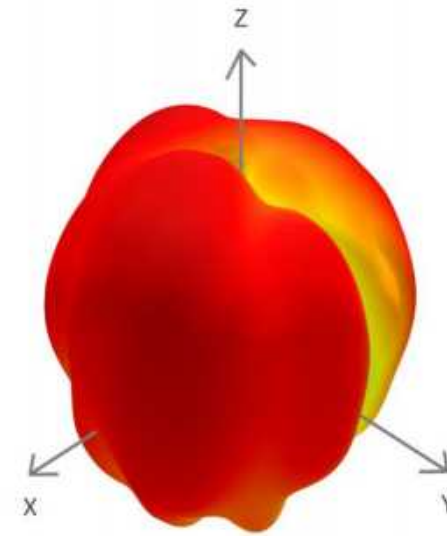
Realized Gain Radiation Patterns of A19_BLE Antenna in BLE Band: Total Polarization



2400 MHz

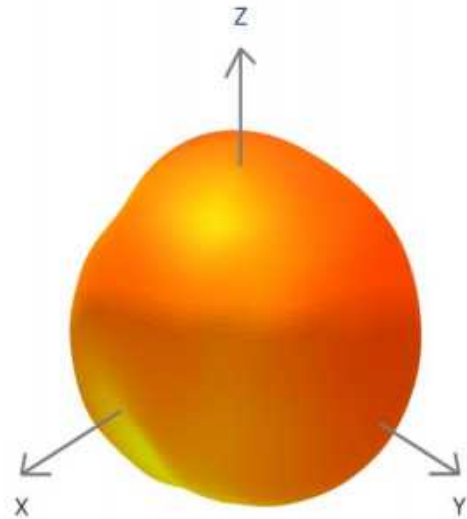
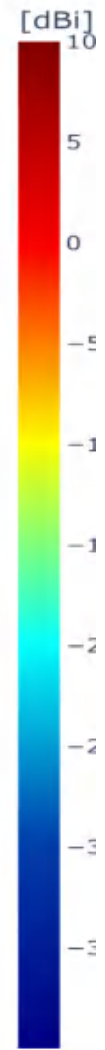


2450 MHz

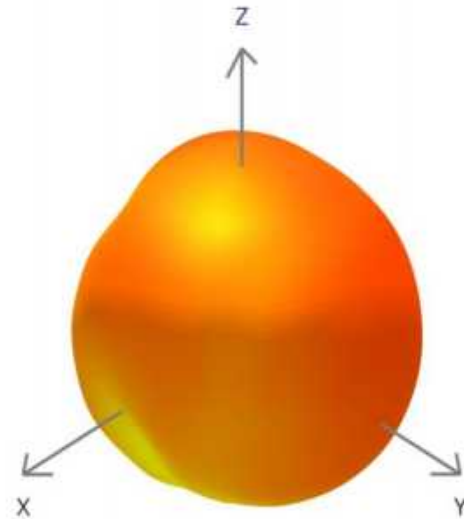


2480 MHz

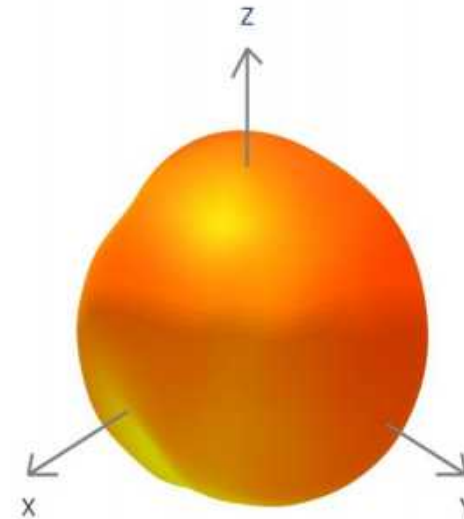
Realized Gain Radiation Patterns of A17_GNSS Antenna in L5 Band: Total Polarization



1175 MHz

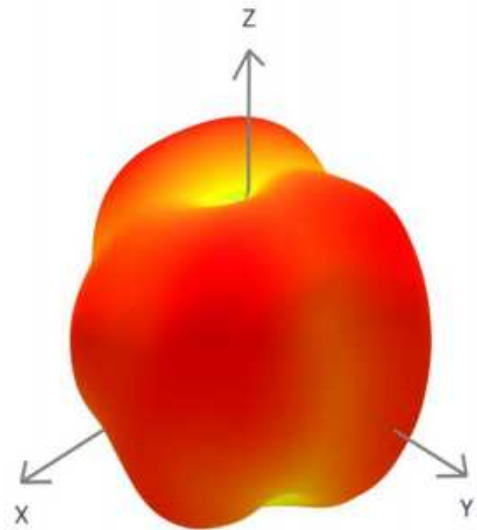
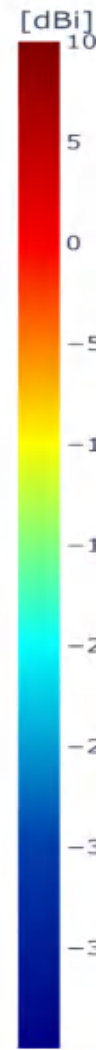


1176 MHz

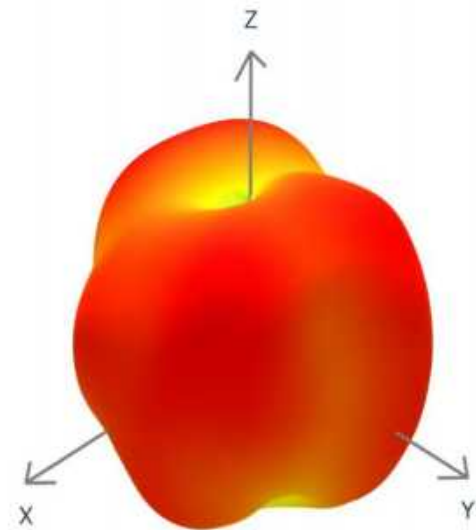


1177 MHz

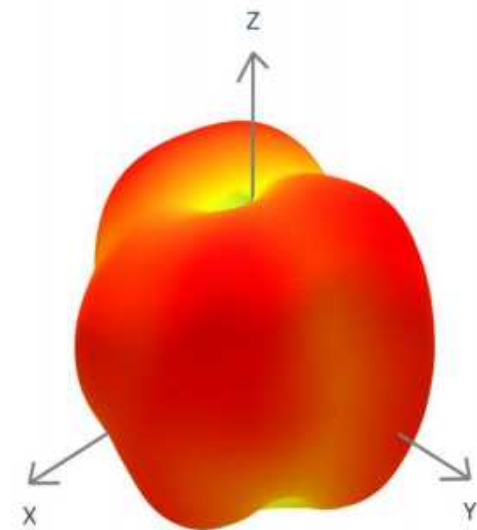
Realized Gain Radiation Patterns of A17_GNSS Antenna in L1 Band: Total Polarization



1570 MHz



1575 MHz



1580 MHz

Uncorrelated Gain

Mode	Pattern	Frequency	Uncorrelated peak gain
2.4G 2*2	Omni	2400	2.4
	Omni	2450	2.8
	Omni	2480	2.0
5G 2*2 ch0&ch1	Omni	5200	3.9
	Omni	5500	3.0
	Omni	5800	3.2
6G 2*2 ch0&ch1	Omni	6100	4.2
	Omni	6500	4.5
	Omni	6900	3.8
5G 4*4 ch0-ch3	Omni	5200	2.2
	Omni	5500	3.0
	Omni	5800	2.1
6G 4*4 ch0-ch3	Omni	6100	3.2
	Omni	6500	3.1
	Omni	6900	2.4
2.4G 2*2	Directional	2400	5.5
	Directional	2450	6.0
	Directional	2480	6.0
5G 2*2 ch0&ch1	Directional	5200	5.9
	Directional	5500	4.7
	Directional	5800	4.4
6G 2*2 ch0&ch1	Directional	6100	6.7
	Directional	6500	7.4
	Directional	6900	6.8
5G 4*4 ch0-ch3	Directional	5200	5.7
	Directional	5500	5.4
	Directional	5800	5.9
6G 4*4 ch0-ch3	Directional	6100	6.7
	Directional	6500	7.2
	Directional	6900	6.4
BLE 1	2.4GHz – 2.5GHz		3.3
BLE 2	2.4GHz – 2.5GHz		5.7

$$\text{Uncorrelated Gain} = 10 \cdot \log_{10} \left(\frac{(10^{A1/10}) + (10^{A2/10}) + (10^{A3/10}) + (10^{A4/10})}{4} \right)$$

THANK YOU!
