

T670sn Antenna Gains

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This document provides the azimuth cuts containing the maximum antenna gain at the listed frequency bands.

Table 1: Frequency Bands

No	Operational Band	Center Freq.	Designator
1	2400 - 2483.5 MHz	2.45 GHz	ISM
2	5150 - 5250 MHz	5.15 GHz / 5.3 GHz	UNII-1
3	5250 – 5725 MHz	5.5 GHz	UNII-2
4	5725 – 5850 MHz	5.8 GHz	UNII-3
5		5.9 GHz	UNII-4 (Not used; data not provided)
6	5925 – 6425 MHz	6.2 GHz	UNII-5
7	6425 – 6525 MHz	6.5 GHz	UNII-6
8	6525 – 6875 MHz	6.65 GHz	UNII-7
9	6875 – 7125 MHz	7 GHz	UNII-8

All antennas of access point T670sn were measured in a Satimo Stargate quasi-nearfield range (Figure 1) with Sima Noghianian as the operator. Each antenna was measured over the 2.4 GHz band and each UNII band. The maximum gain was taken from the measurements and is listed in Table 2. The antennas can work in two modes “sector” or “narrow”. The product is in development; therefore, the test unit has no serial number.

The product has 8 transmitting Sector antenna arrays, acronyms are given in front of each description in red:

1. one horizontally polarized dual-band 2.4/5 GHz antenna array (narrow mode) (**HDBN**),
2. one vertically polarized dual band 2.4/5 GHz antenna array (narrow mode) (**VDBN**),
3. one horizontally dual-band polarized 5/6 GHz antenna array (narrow mode) (**H6N**),
4. one vertically polarized dual band 5/6 GHz antenna array (narrow mode) (**V6N**),
5. one horizontally polarized dual-band 2.4/5 GHz antenna array (sector mode) (**HDBS**),
6. one vertically polarized dual band 2.4/5 GHz antenna array (sector mode) (**VDBS**),
7. one horizontally dual-band polarized 5/6 GHz antenna array (sector mode) (**H6S**), and
8. one vertically dual-band polarized 5/6 GHz antenna array (sector mode) (**V6S**).

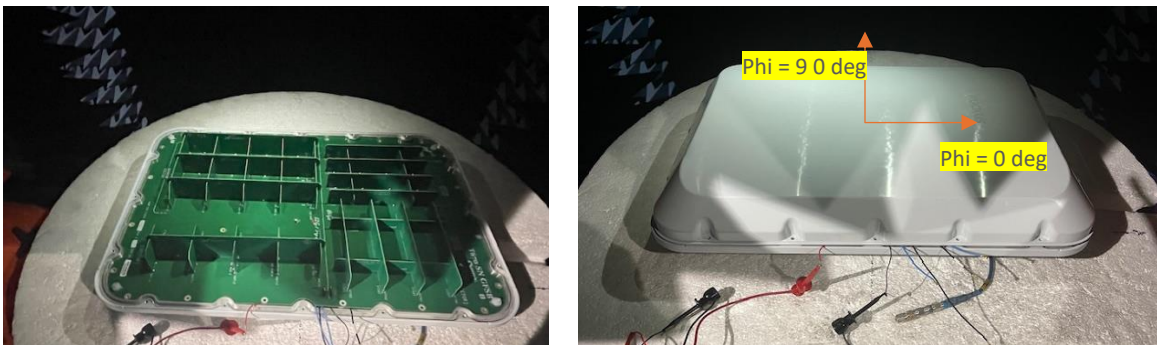


Figure 1: Satimo Antenna Measurement

The sector mode provides a wide beam on the horizontal plane (shown as $\Phi = 90^\circ$). The narrow mode provides a narrow beam on the horizontal plane (shown as $\Phi = 90^\circ$), as shown in Figure 2. The vertical plane has a narrow beam (shown as $\Phi = 0^\circ$), as shown in Figure 3.

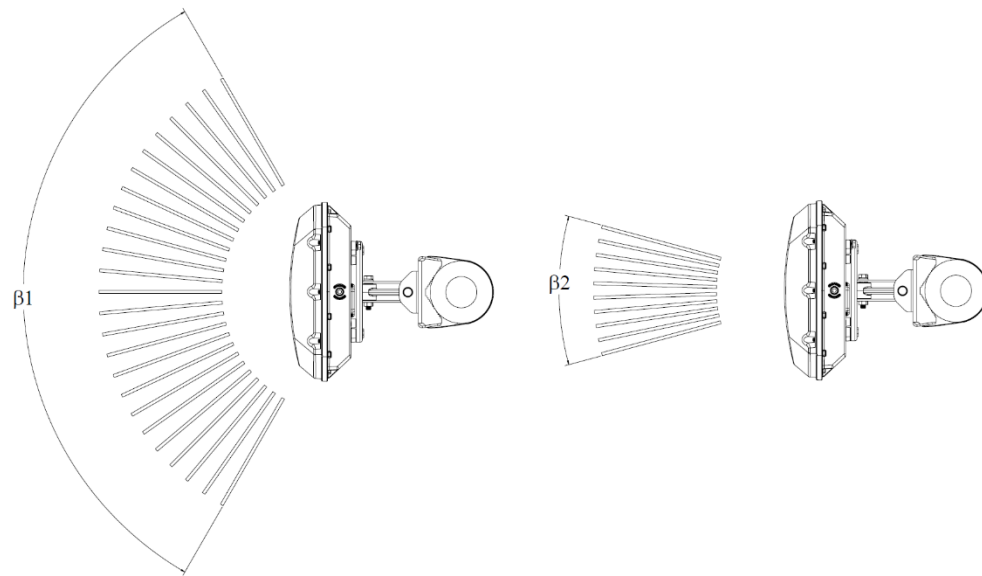


Figure 2: Horizontal plane (switchable beam), $\Phi = 90^\circ$

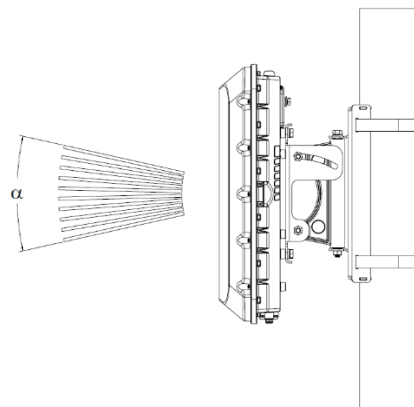


Figure 3: Vertical plane, $\Phi = 0^\circ$.

This product deploys a distinct MIMO system where dual RF outputs for each WiFi radio are connected to linearly cross-polarized antennas which are mounted on an antenna support board (that includes the power dividers and feed lines).

The horizontal and vertical internal antennas are cross-polarized to ensure transmitting outputs are orthogonally polarized replicas of each other and the phase centers of the two antennas are co-located.

Table 2: Antenna Gain

Narrow Mode (dBi)					
Band	Center	HDBN	VDBN	H6N	V6N
ISM	2.45	8.37	8.55		
UNII-1(a)	5.15	11.30	10.99	8.38	8.29
UNII-1(c)	5.30	11.57	11.19	8.00	10.58
UNII-2	5.50	11.44	12.82	11.17	11.36
UNII-3	5.80	10.96	11.91	11.75	9.54
UNII-5	6.20			10.82	10.08
UNII-6	6.50			9.65	7.33
UNII-7	6.65			8.88	8.76
UNII-8	7.00			8.39	8.02
Sector Mode (dBi)					
Band	Center	HDBS	VDBS	V6S	H6S
ISM	2.45	7.28	7.23		
UNII-1(a)	5.15	9.30	9.06	8.34	8.79
UNII-1(c)	5.30	9.26	9.62	7.32	8.58
UNII-2	5.50	10.52	11.31	8.64	9.19
UNII-3	5.80	8.60	9.41	8.50	9.53
UNII-5	6.20			8.35	8.89
UNII-6	6.50			7.99	8.97
UNII-7	6.65			7.24	8.17
UNII-8	7.00			7.24	7.77

30 degrees above the Horizon

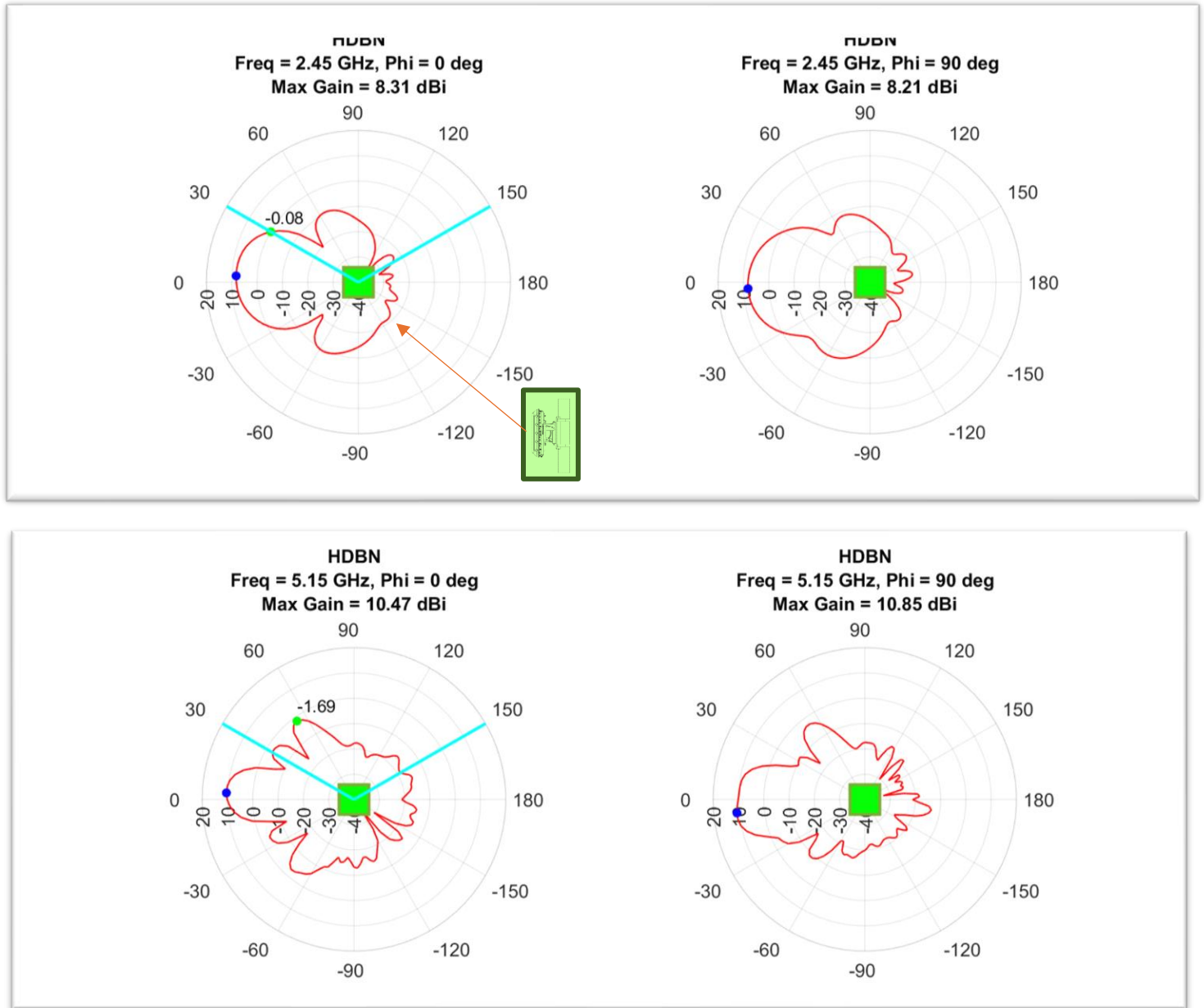
Narrow Mode (dBi)					
Band	Center	HDBN	VDBN	H6N	V6N
UNII-1	5.15	-1.69	-2.42	-2.66	-5.92
UNII-2(a)	5.30	-0.98	-2.93	-2.16	-3.46
UNII-5	6.20			-3.55	-3.86
UNII-6				-3.34	-6.17
UNII-7	6.65			-3.79	-5.86
Sector Mode (dBi)					
Band	Center	HDBS	VDBS	V6S	H6S
UNII-1	5.15	-1.60	-3.84	-5.28	-4.36
UNII-2(a)	5.30	-4.29	-6.03	-3.30	-3.30
UNII-5	6.20			-5.27	-2.81
UNII-6	6.50			-6.25	-4.11
UNII-7	6.65			-6.92	-2.52

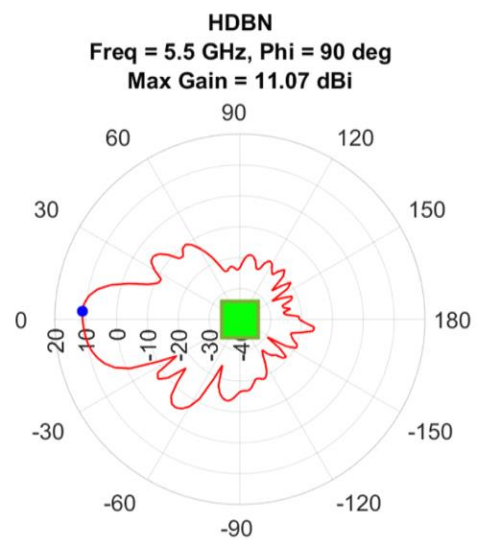
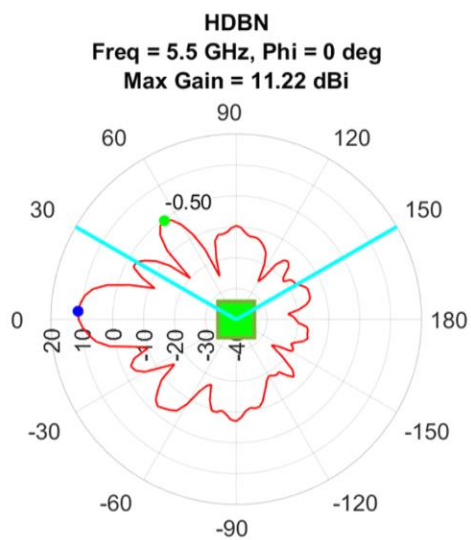
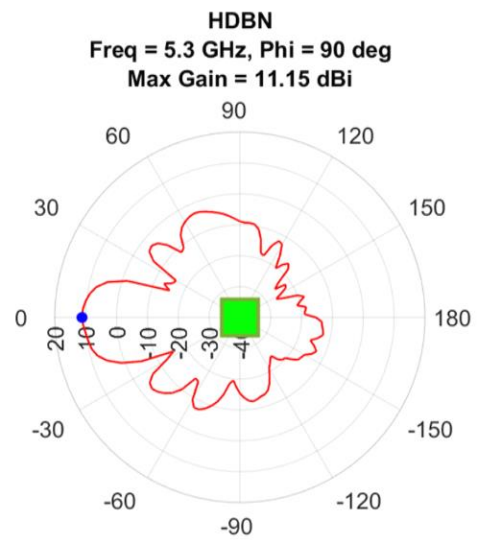
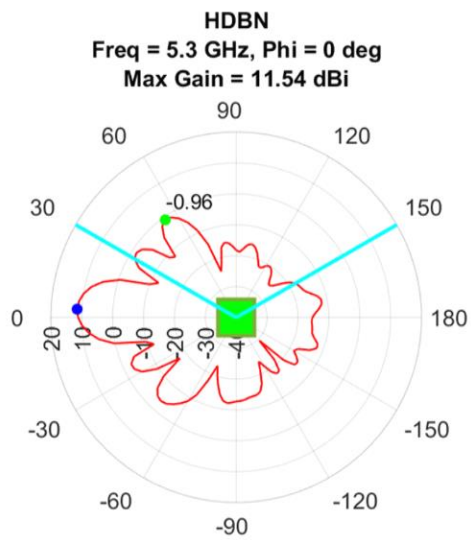
Test Equipment List and details:

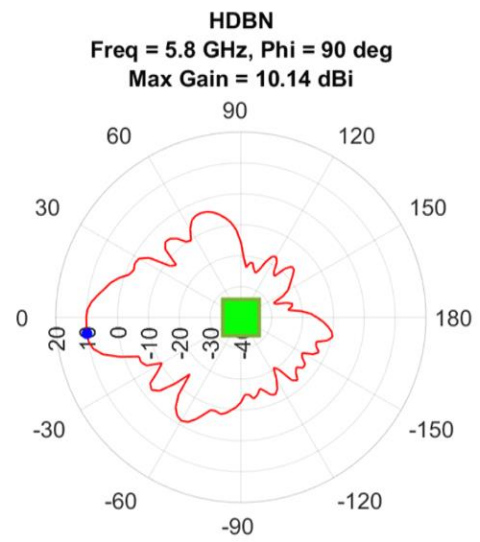
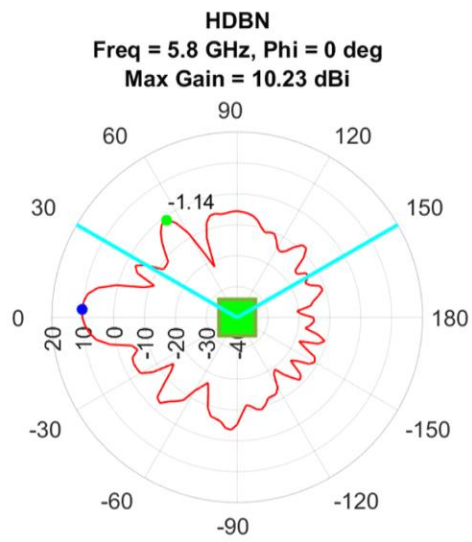
Test Equipment	Model	Brand	Serial No	Calibration date	Calibration due date
MVG StarLab near-field range	SL6	MVG	ATL2087S	5/14/2024	5/14/2025
Rx Antennas build in the MVG StarLab system	NA	NA	NA	Part of MVG StarLab system Calibration	Part of MVG StarLab system Calibration
Copper Mountain Vector Network Analyzer	S5180	Copper Mountain	22030001	8/21/2023	8/21/2024

Antenna Patterns

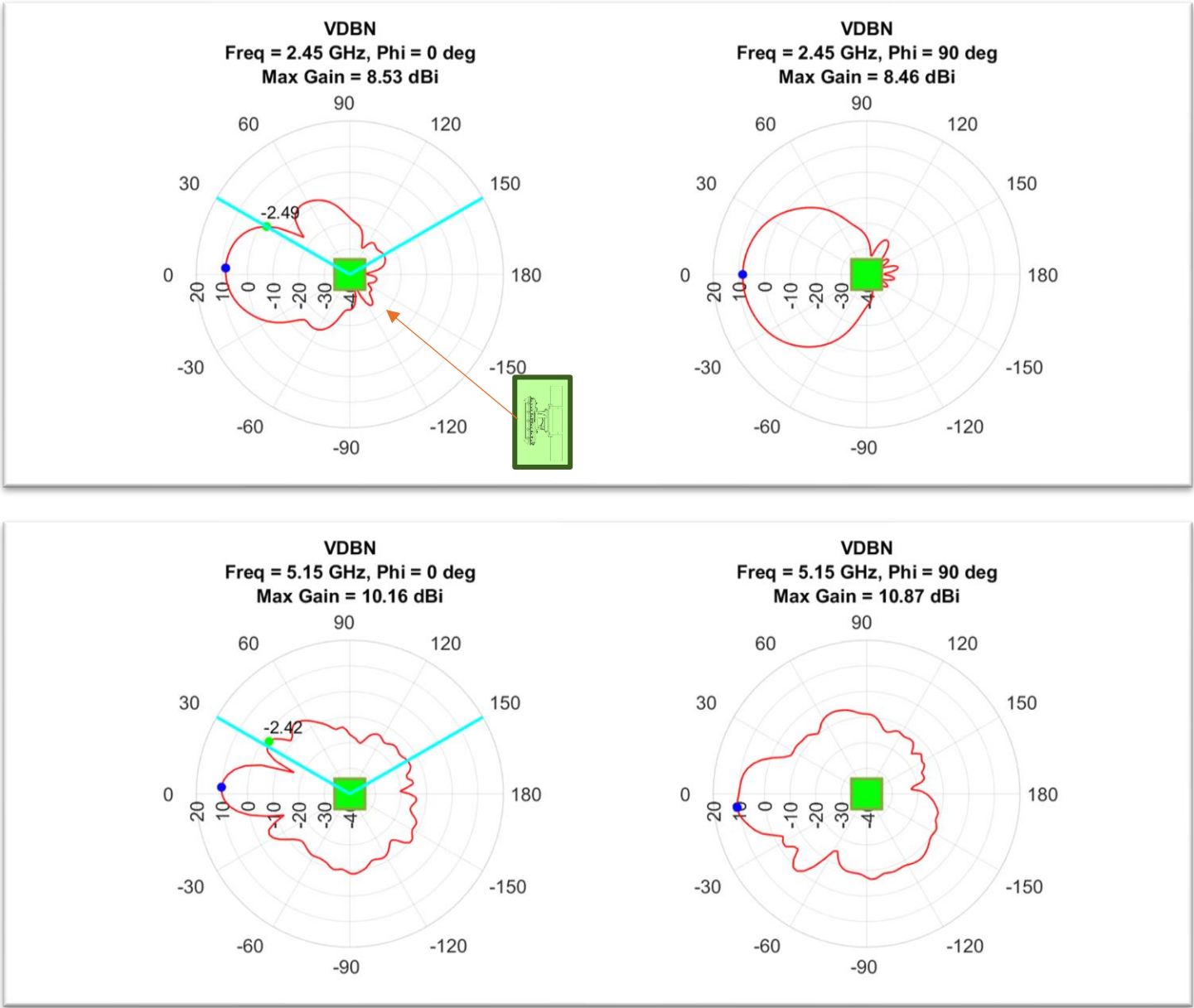
Antenna 1: Horizontally Polarized Dual-Band 2.4/5 GHz Antenna Array (Narrow Mode) (HDBN)
(Green square represents the AP)

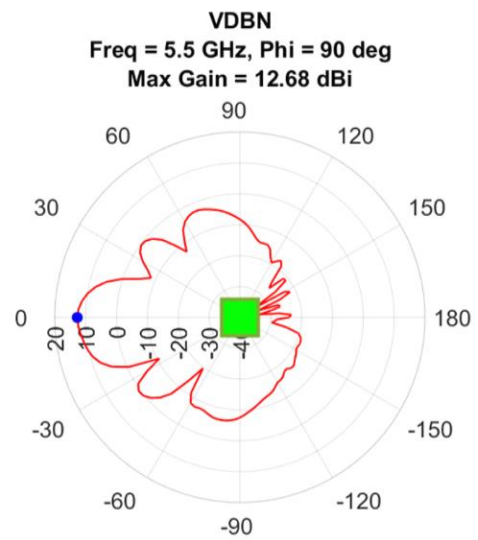
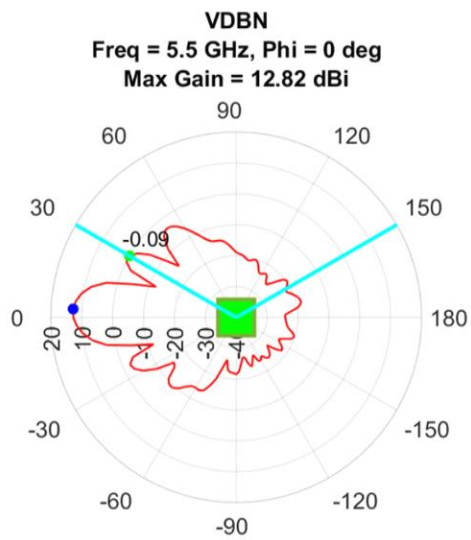
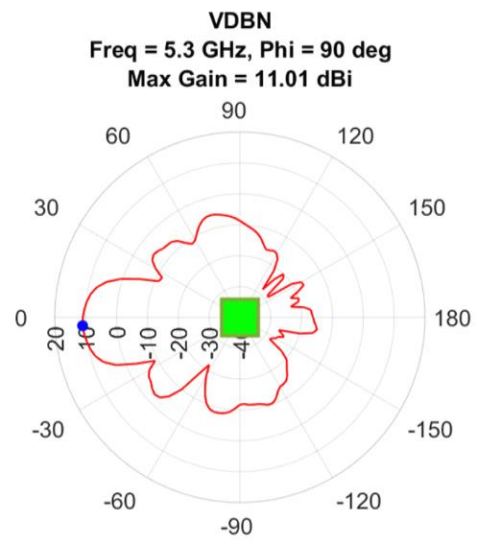
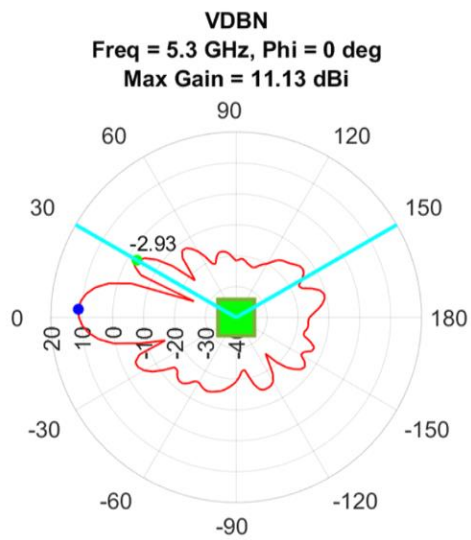


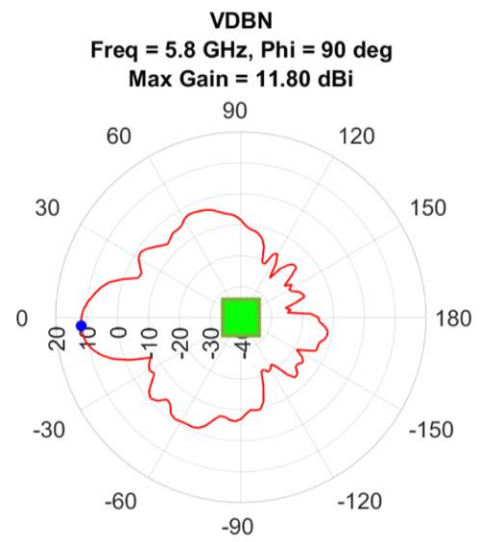
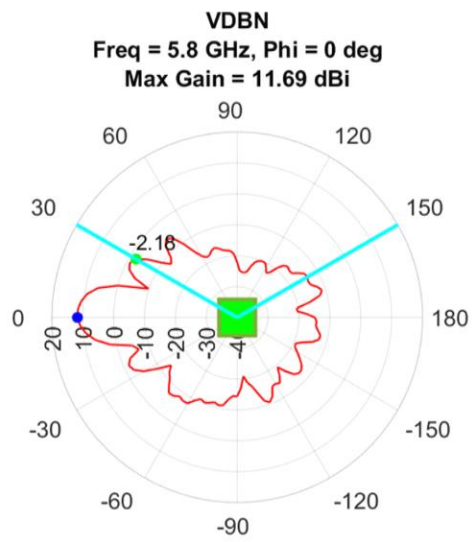




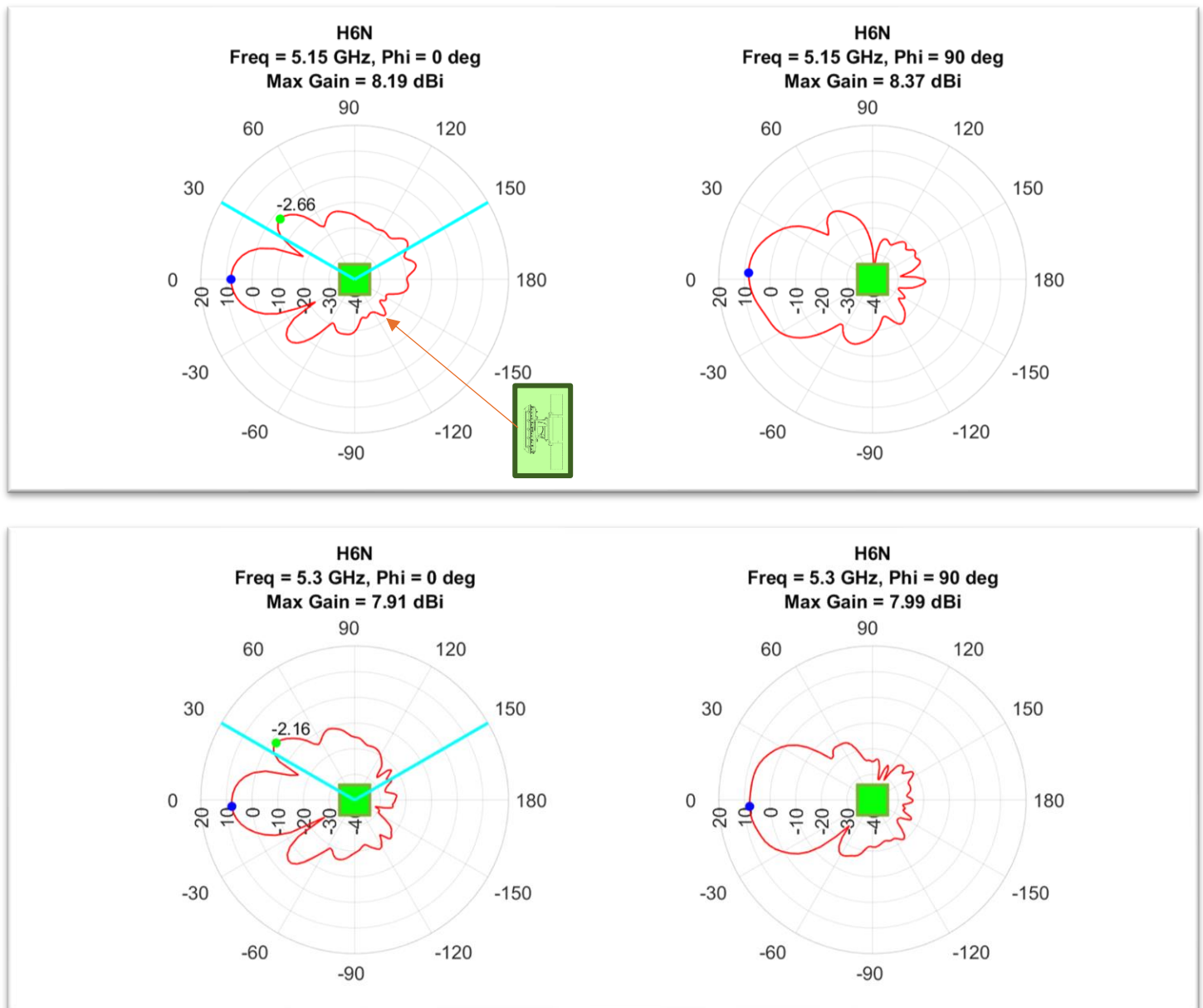
Antenna 2: Vertically Polarized Dual Band 2.4/5 GHz Antenna Array (Narrow Mode) (VDBN)

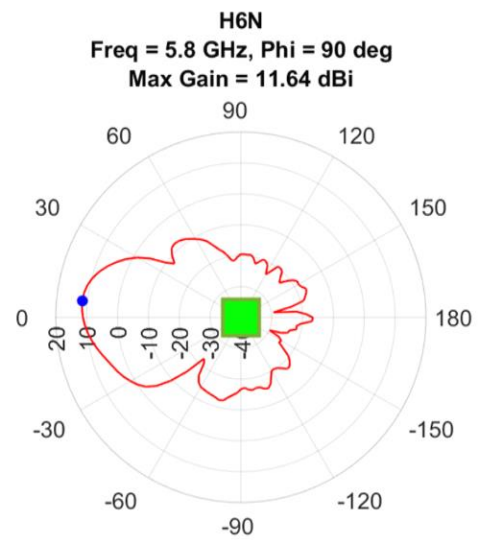
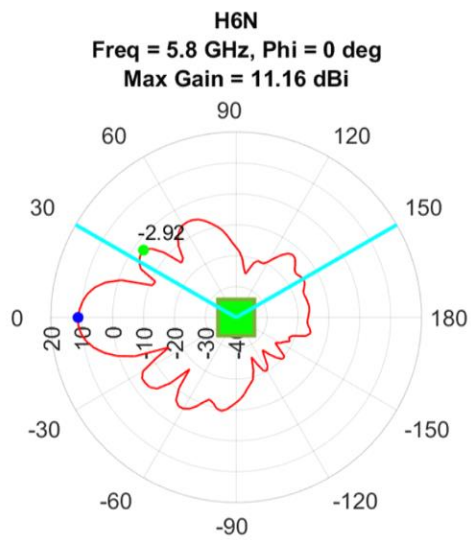
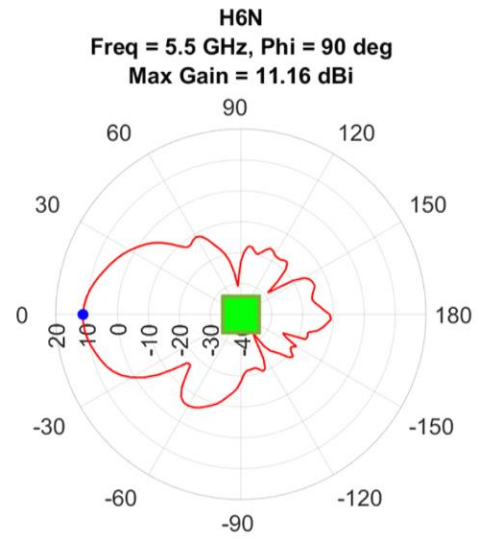
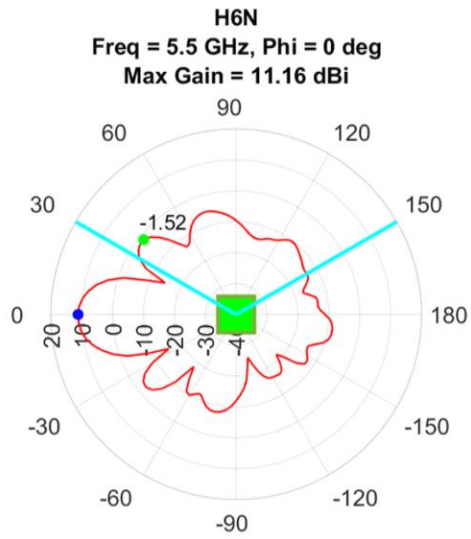


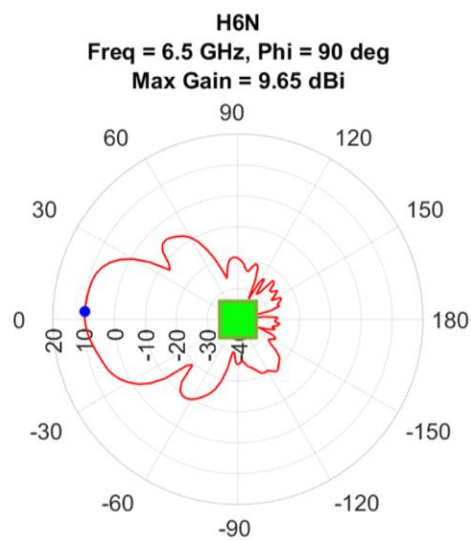
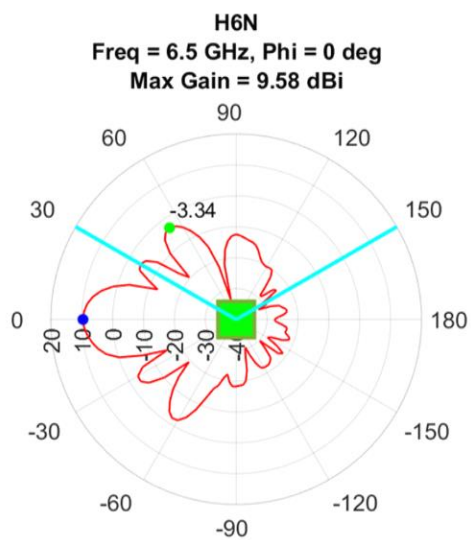
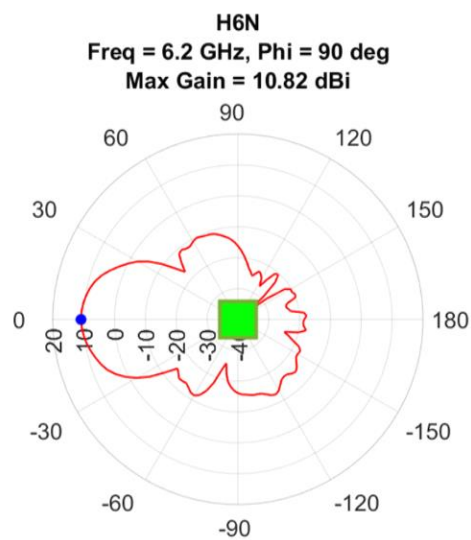
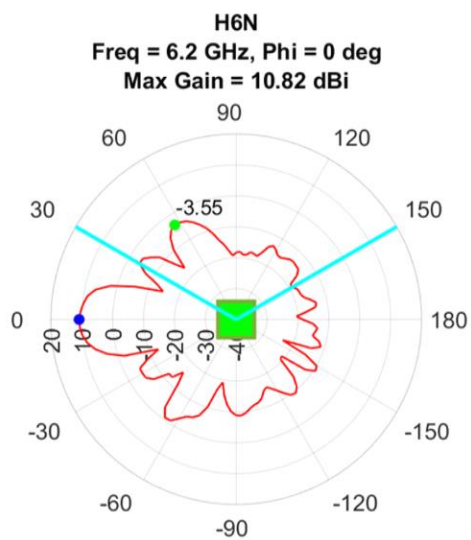


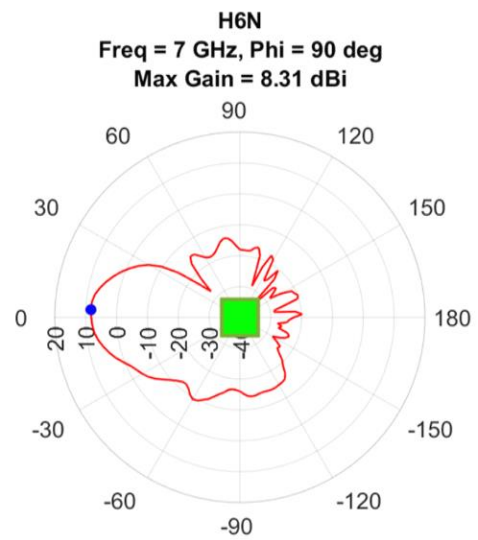
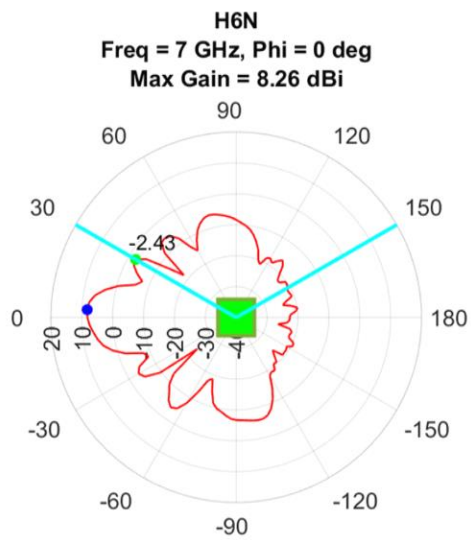
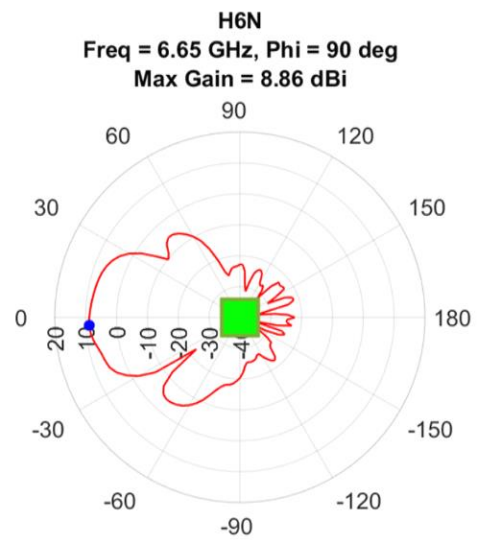
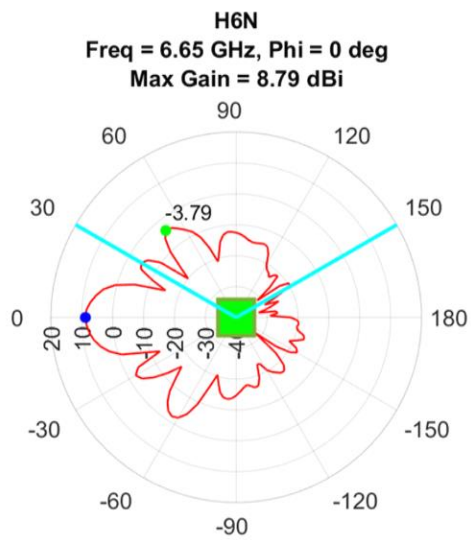


Antenna 3: Horizontally Dual-Band Polarized 5/6 GHz Antenna Array (Narrow Mode) (H6N)

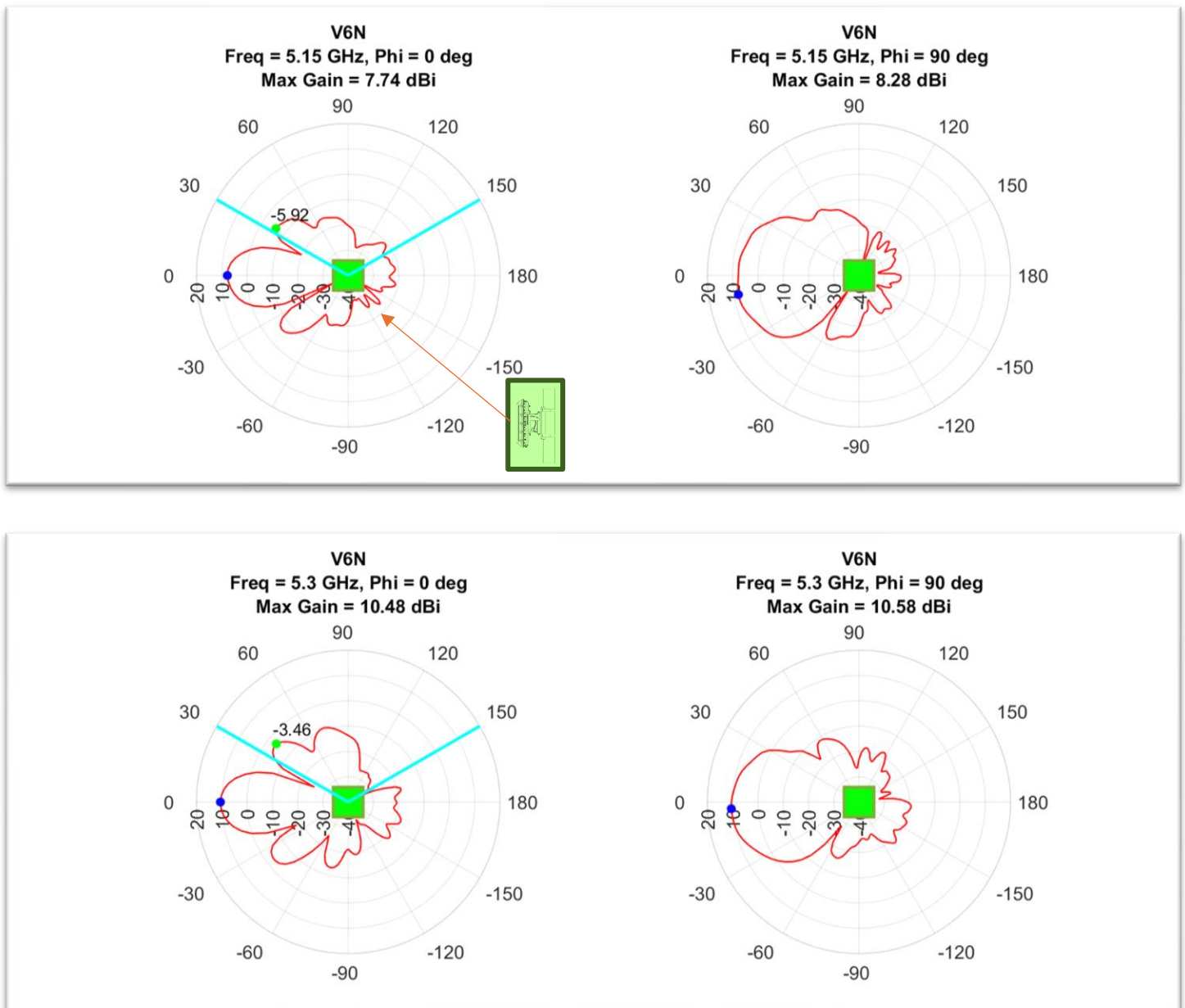


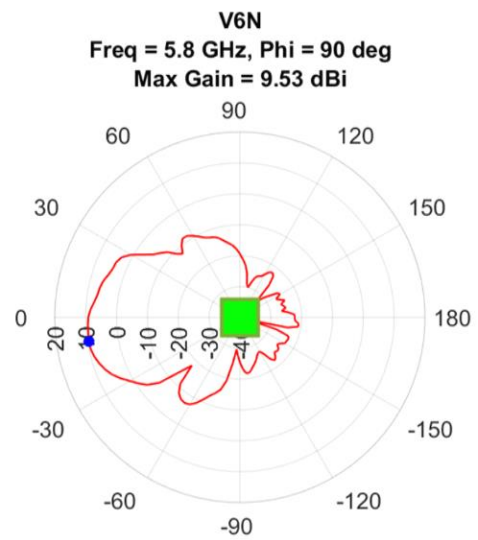
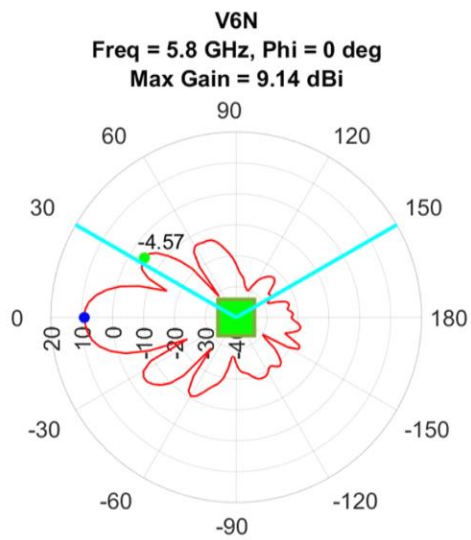
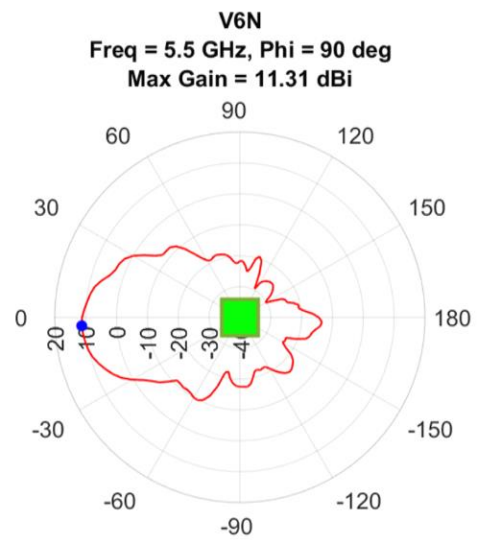
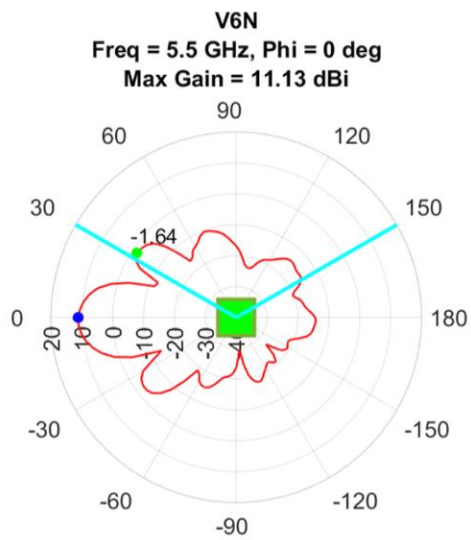


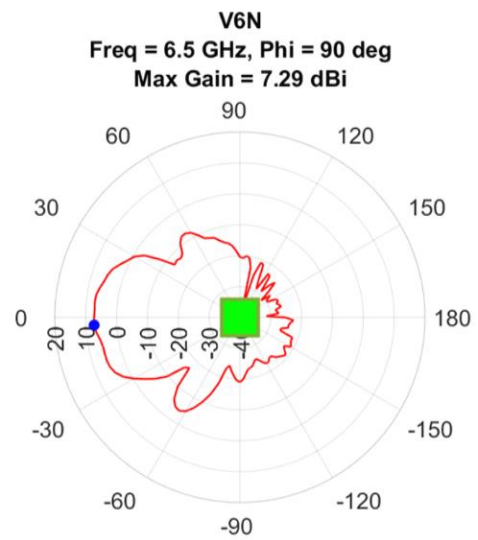
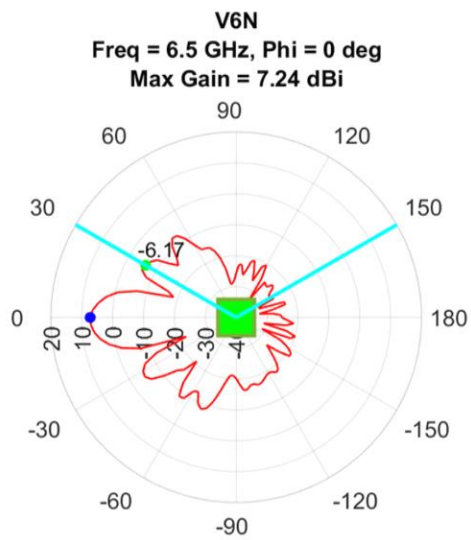
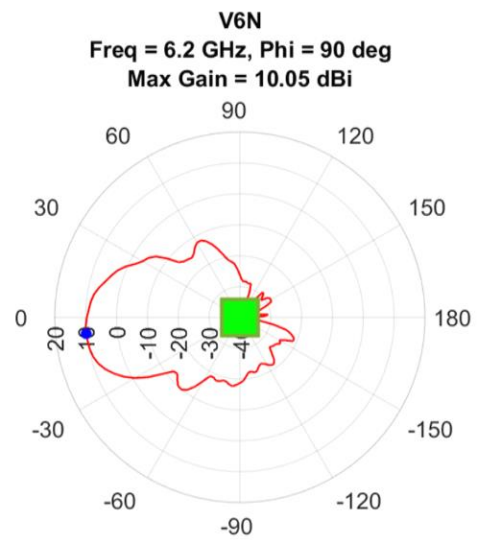
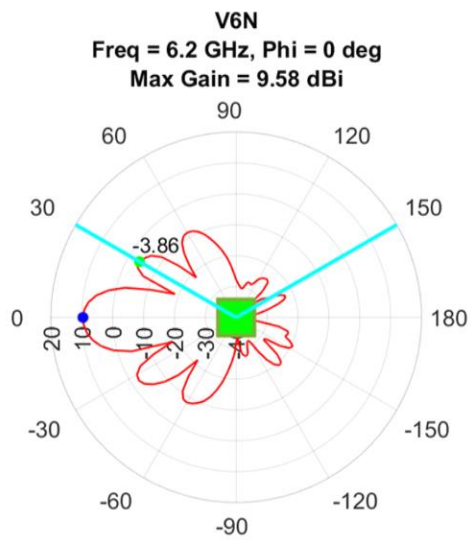


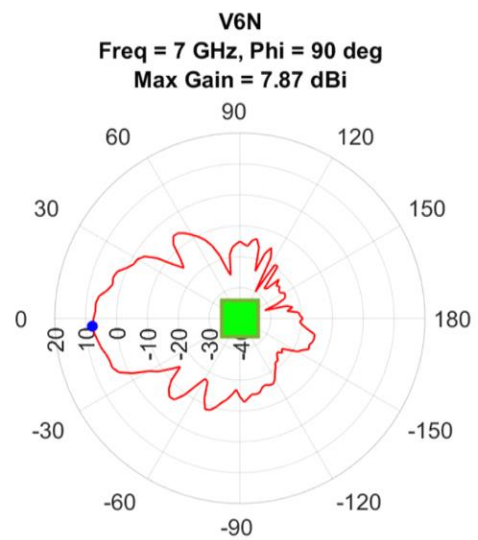
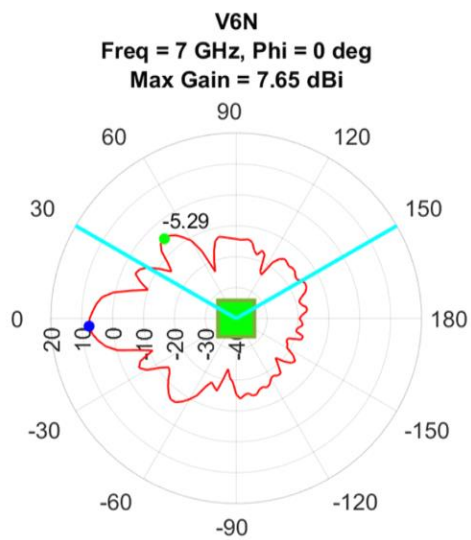
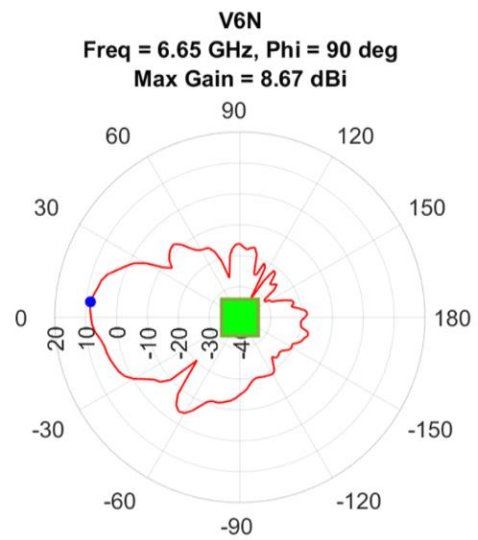
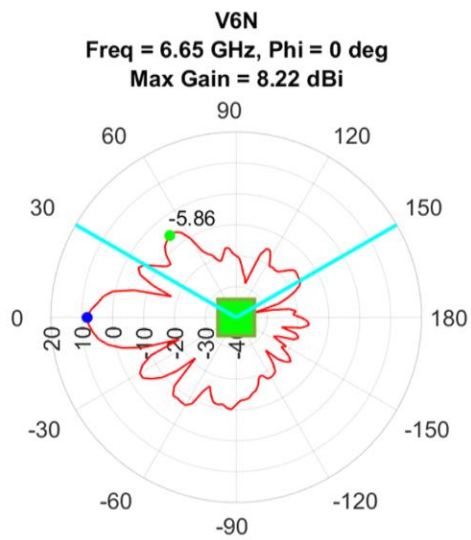


Antenna 4: Vertically Dual-Band Polarized 5/6 GHz Antenna Array (Narrow Mode) (V6N)

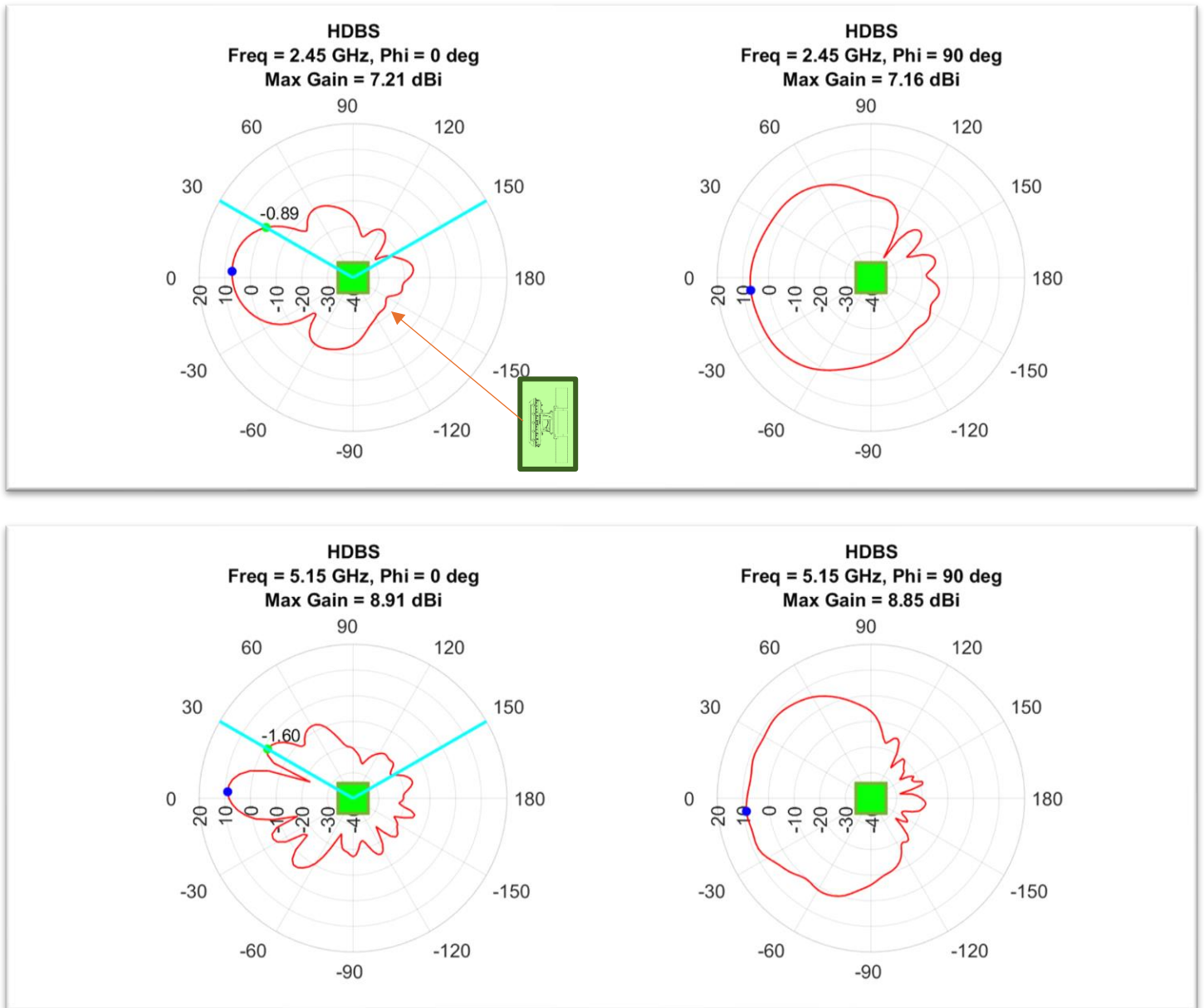


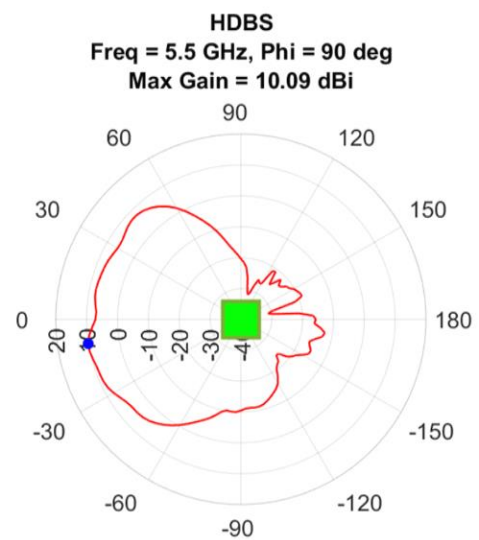
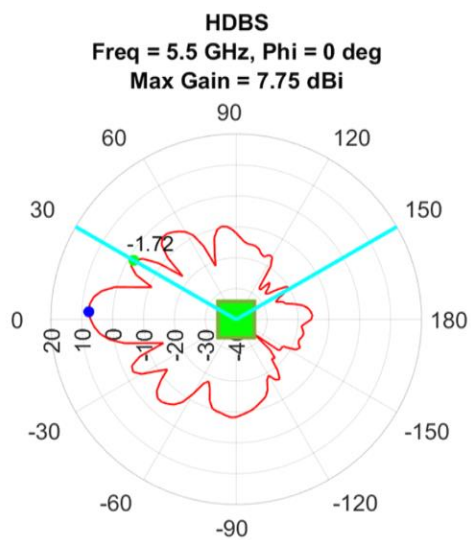
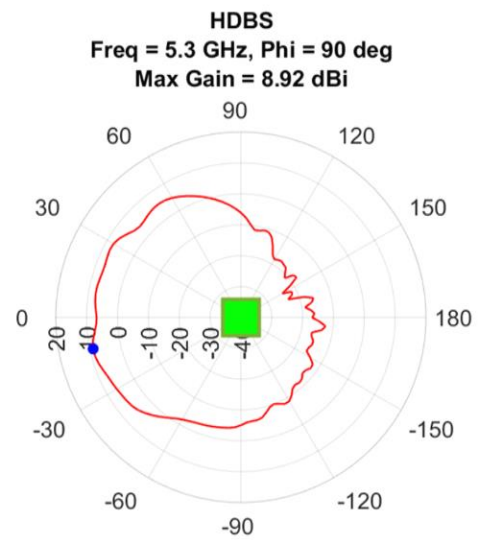
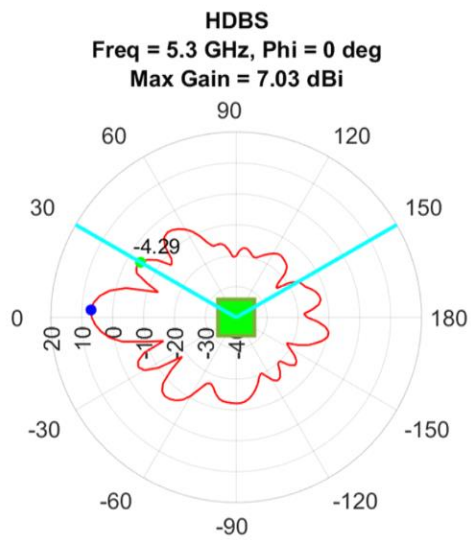


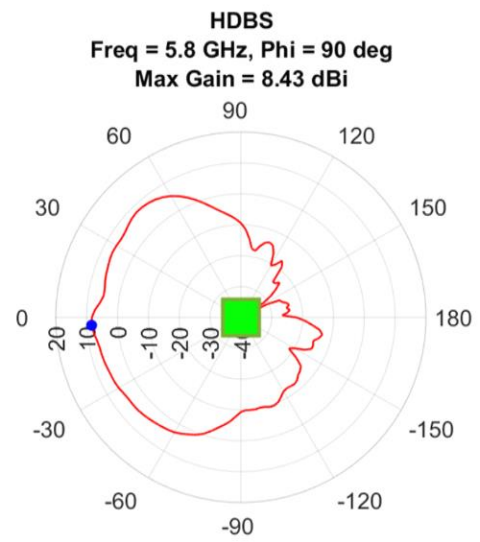
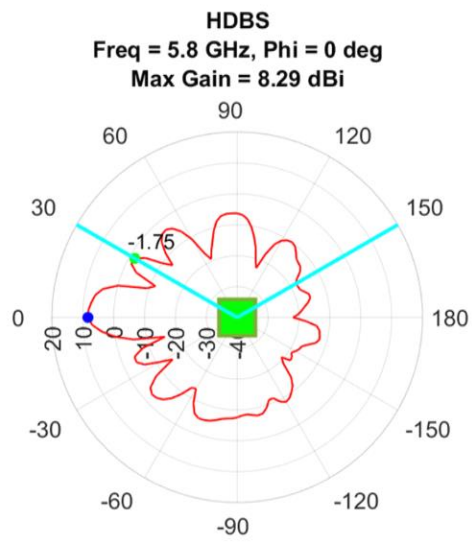




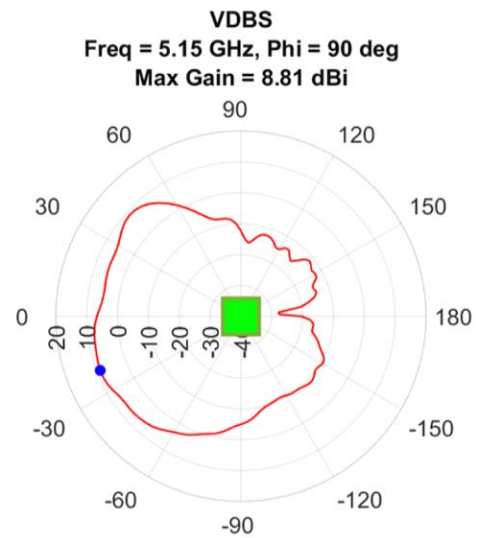
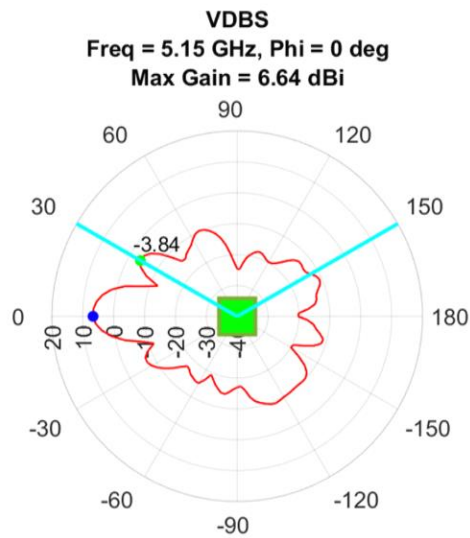
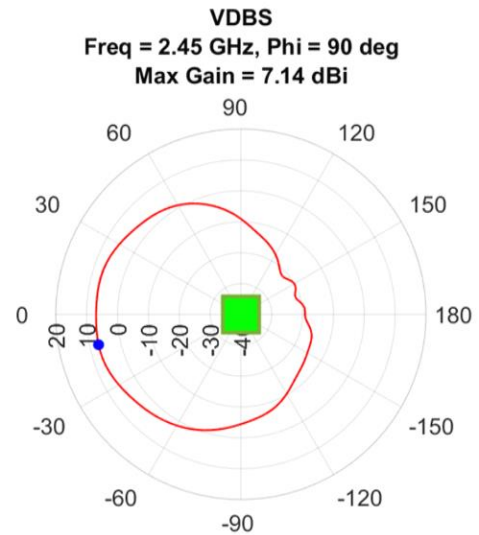
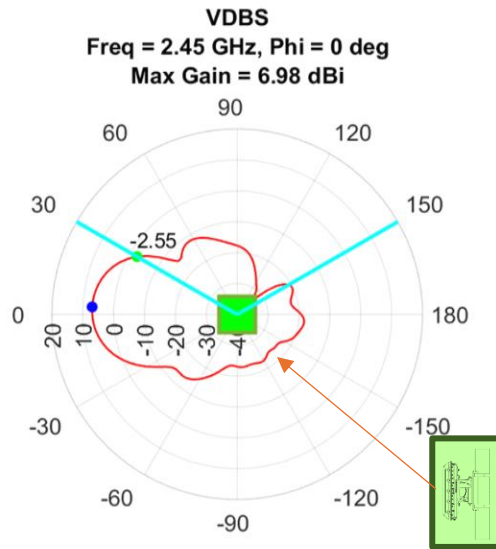
Horizontally Polarized Dual-Band 2.4/5 GHz Antenna Array (Sector Mode) (HDBS)

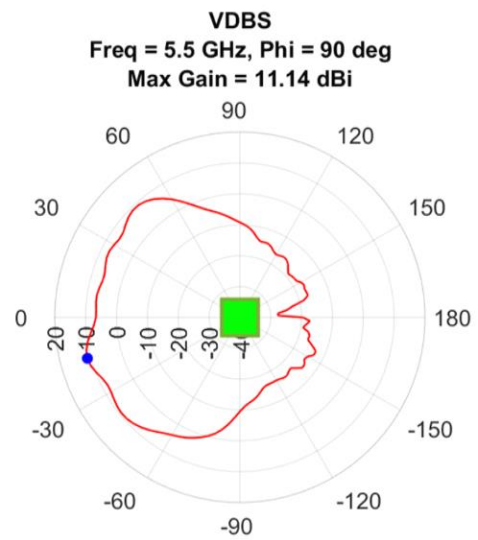
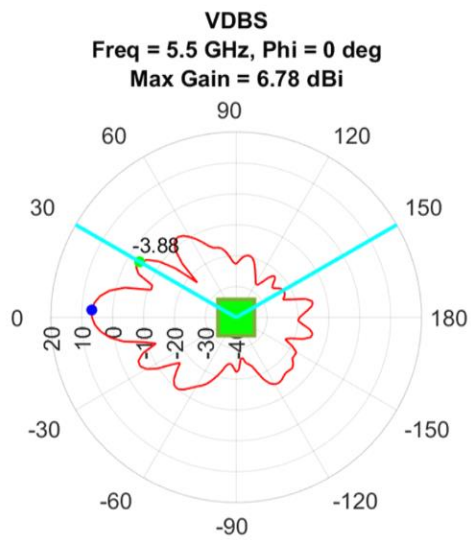
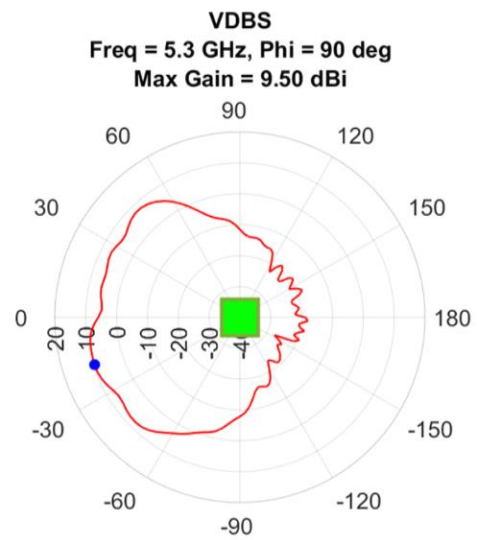
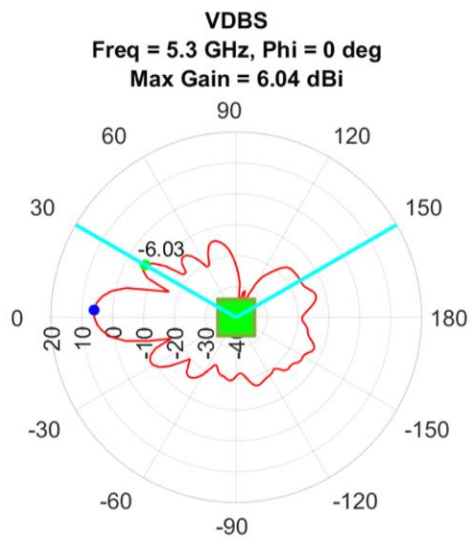


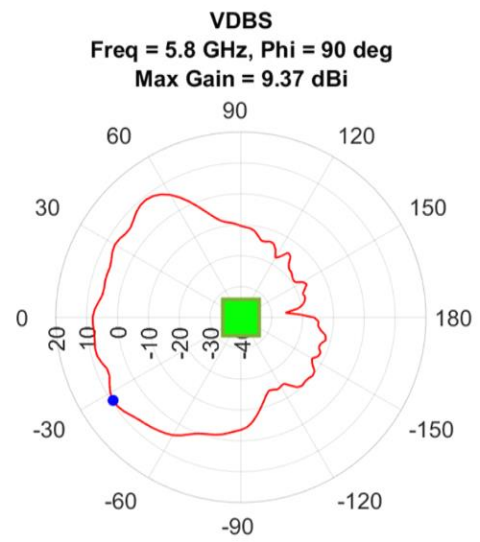
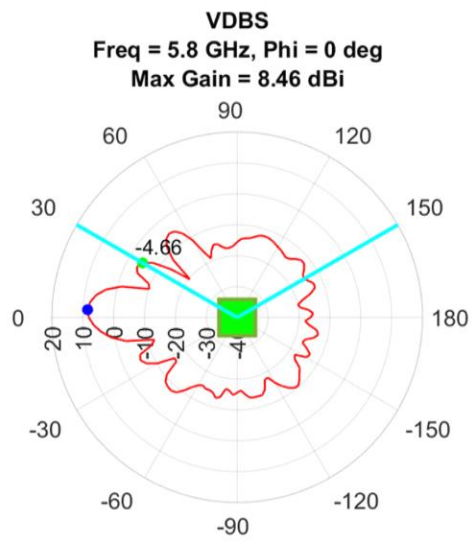




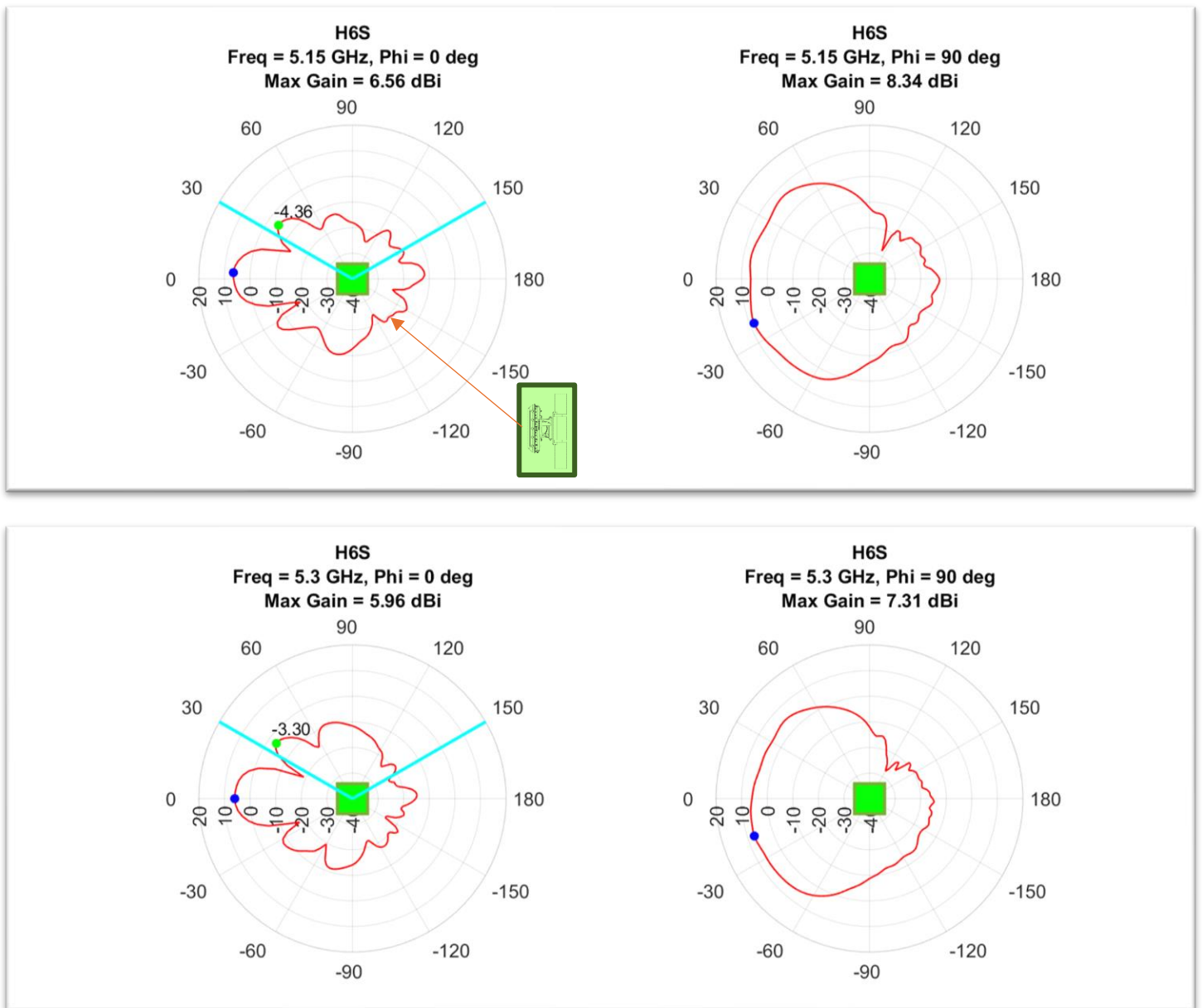
Vertically Polarized Dual Band 2.4/5 GHz Antenna Array (Sector Mode) (VDBS)

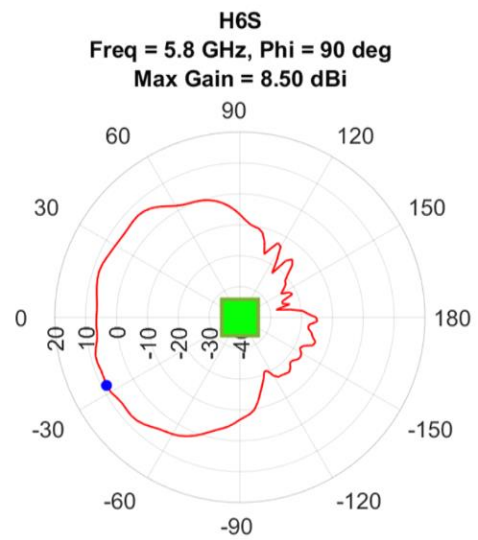
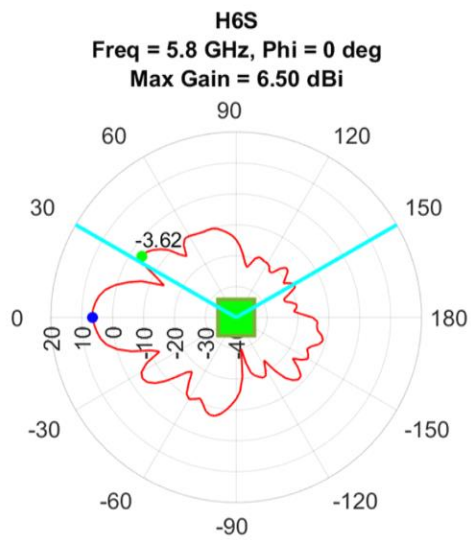
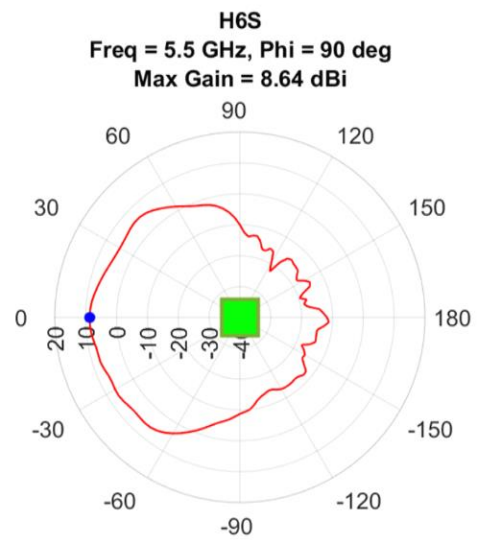
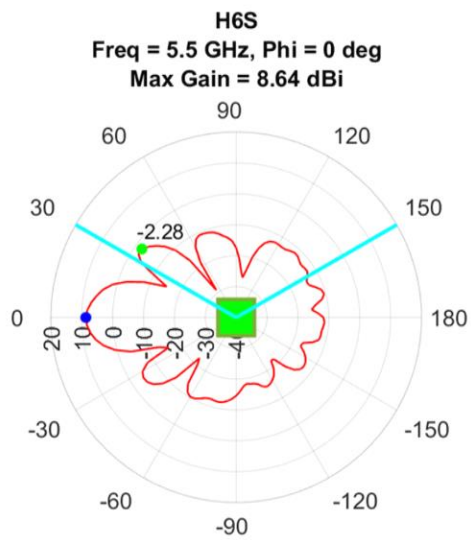


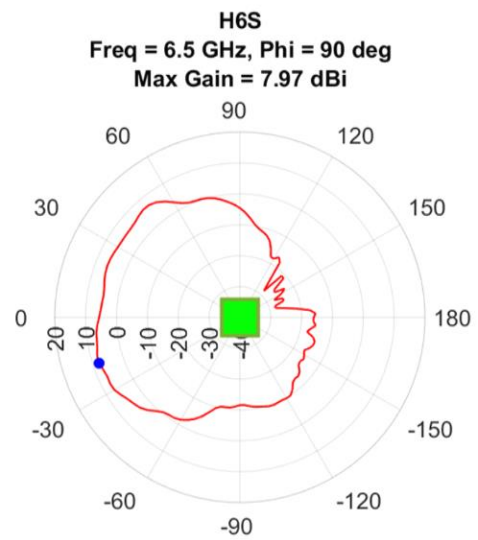
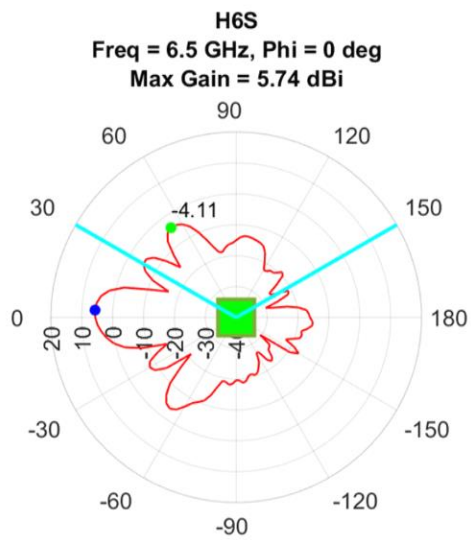
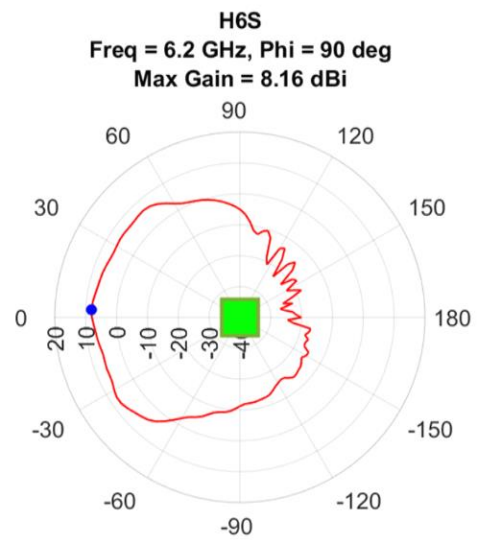
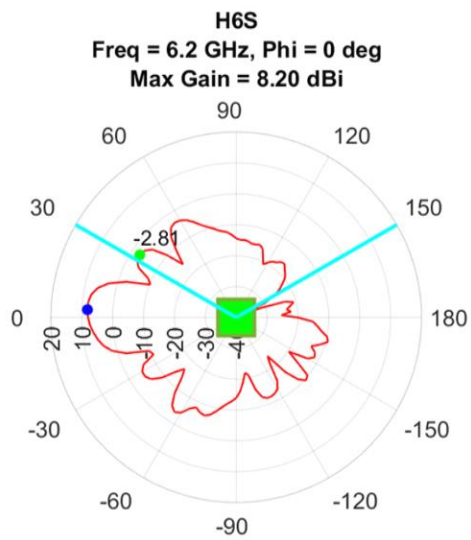


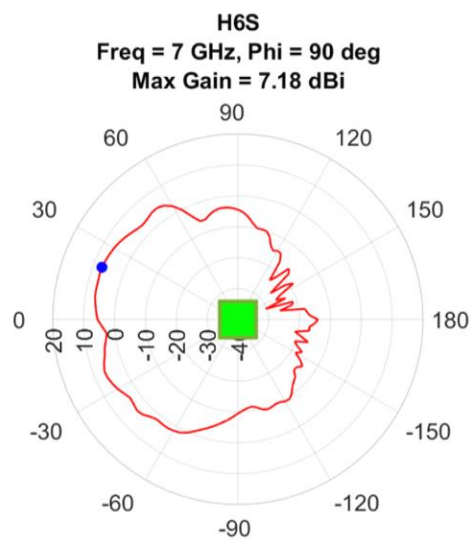
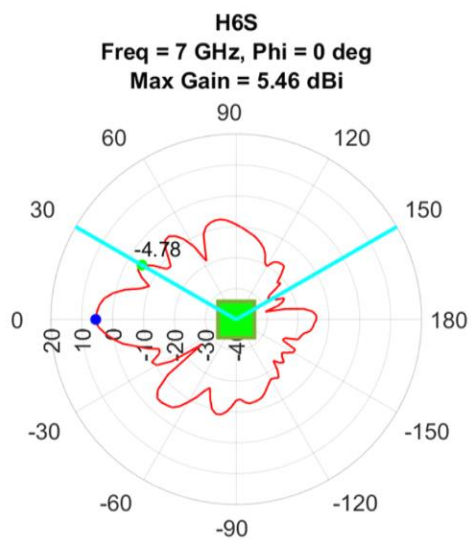
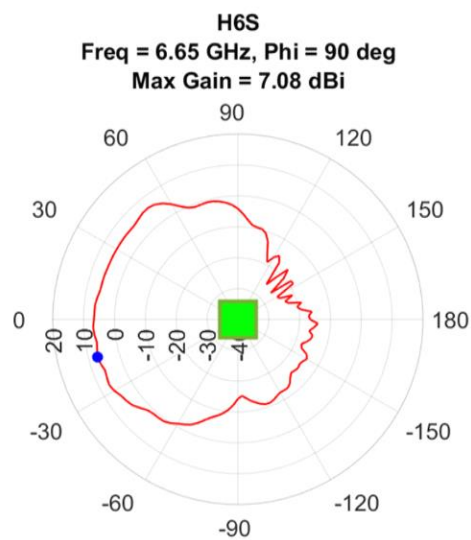
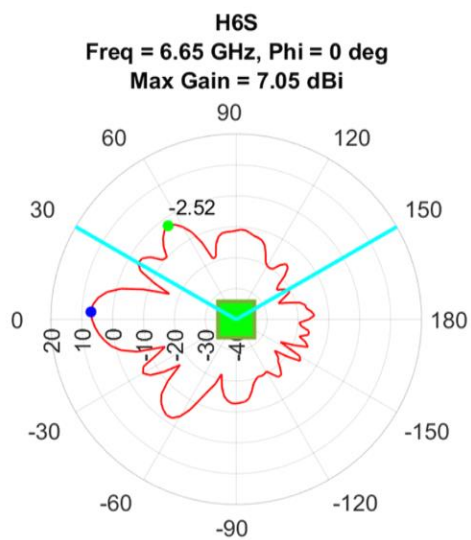


Horizontally Dual-Band Polarized 5/6 GHz Antenna Array (Sector Mode) (H6S)









Vertically Dual-Band Polarized 5/6 GHz Antenna Array (Sector Mode) (V6S)

