

Technical Data

CHW1010-ANT2-1.1

FEATURES

- **CoreHW CHW1010-ANT2** antenna module for Bluetooth® Low Energy 5.1 AoX direction finding systems
- Operating frequency range: 2400-2483 MHz
- CoreHW CHW1010 SP16T Bluetooth AoA/AoD antenna switch
- Connectors for radio frequency signals and CoreHW CHW1010 SP16T GPIO control signals
- Sixteen patch antenna elements
- Low cost 4-layer PCB stack-up structure
- Optimized phase balance between antenna chains
- Firmware support and antenna models available
- PCB dimensions: 150mm x 150mm

APPLICATIONS

- *Asset tracking in factories, offices, logistics etc.*
- *Access control*
- *People tracking*
- *Wayfinding*
- *Point-of-interest services*
- *Proximity marketing*
- *Shopping guidance and assistance*
- *Equipment and facilities utilization*
- *Consumer behavior analysis*
- *Security services*
- *Item finding*

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The antenna elements in this array are all used in normal operation, but never used simultaneously - only one element is active at a time. Normal operation is to sequence through the elements one at a time.

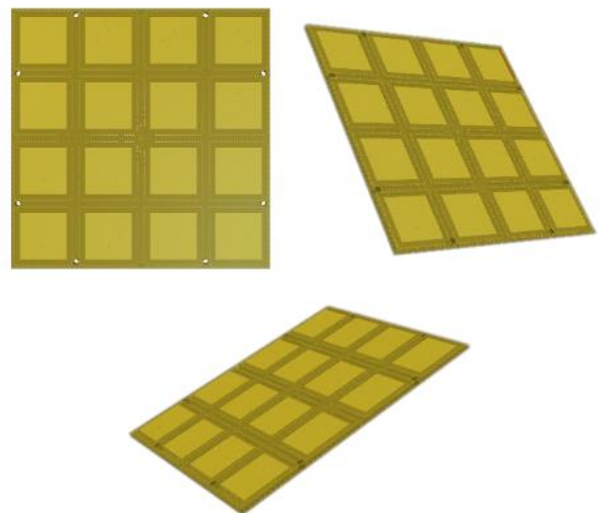
GENERAL DESCRIPTION

CoreHW CHW1010-ANT2 is an antenna module consisting of sixteen patch antenna elements. The antenna array PCB is intended for direction and positioning system solution providers.

CHW1010-ANT2 antenna array board contains CoreHW CHW1010 SP16T Bluetooth AoA/AoD capable antenna switch for antenna controls and Bluetooth CTE sampling. The device comprises of very low phase mismatch antenna switch array which enables real high accuracy positioning.

CHW1010-ANT2 antenna module enables system solutions which are insensitive to multipath signal and has outstanding position accuracy down to 10cm level.

CoreHW offers an AoA reference design system with CoreHW firmware and Windows PC positioning engine SW with user interface (GUI). The reference system contains four patch antenna array-based locators. The reference system can be used for laboratory tests and PoC testing in real use case scenarios.



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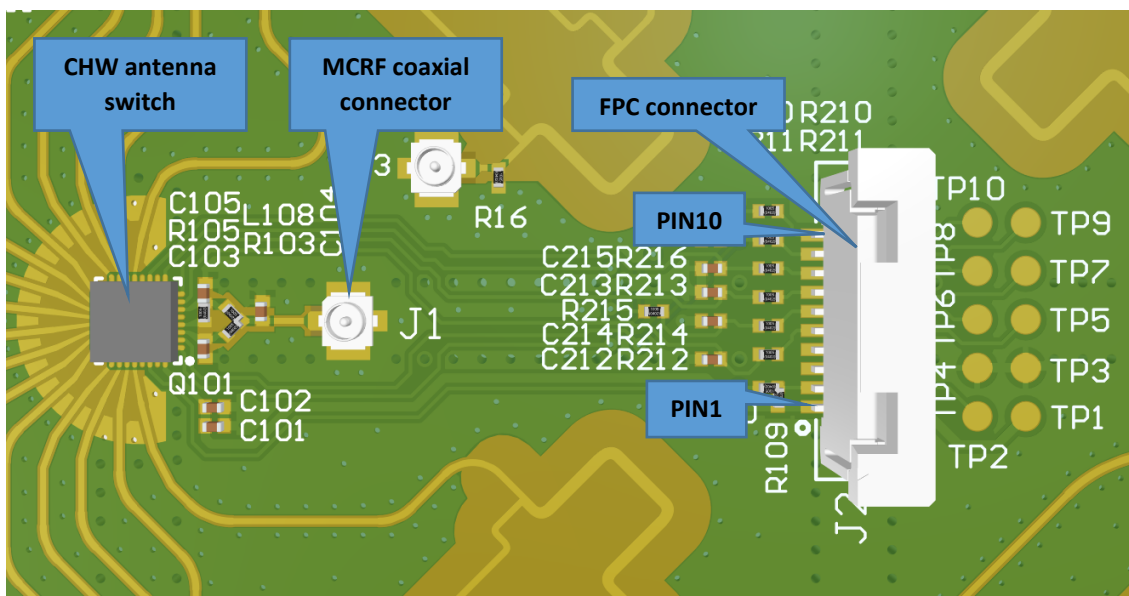
CHW1010-ANT2 PCB CONNECTORS AND SIGNAL PINS

Table 1. Connector types

RF connector	GPIO connector
MCRF coaxial 50 Ohms	FPC vert 10pos, pitch 1mm

Table 2. GPIO pin contacts

Pin	Purpose	Description
1	VBAT	Supply voltage (3V nominal)
2	Unused	Unused
3	GND	GND
4	GND	GND
5	D1	ANT_SELO
6	D3	ANT_SEL2
7	D2	ANT_SEL1
8	D4	ANT_SEL3
9	D0	Digital control input
10	EN	Chip enable

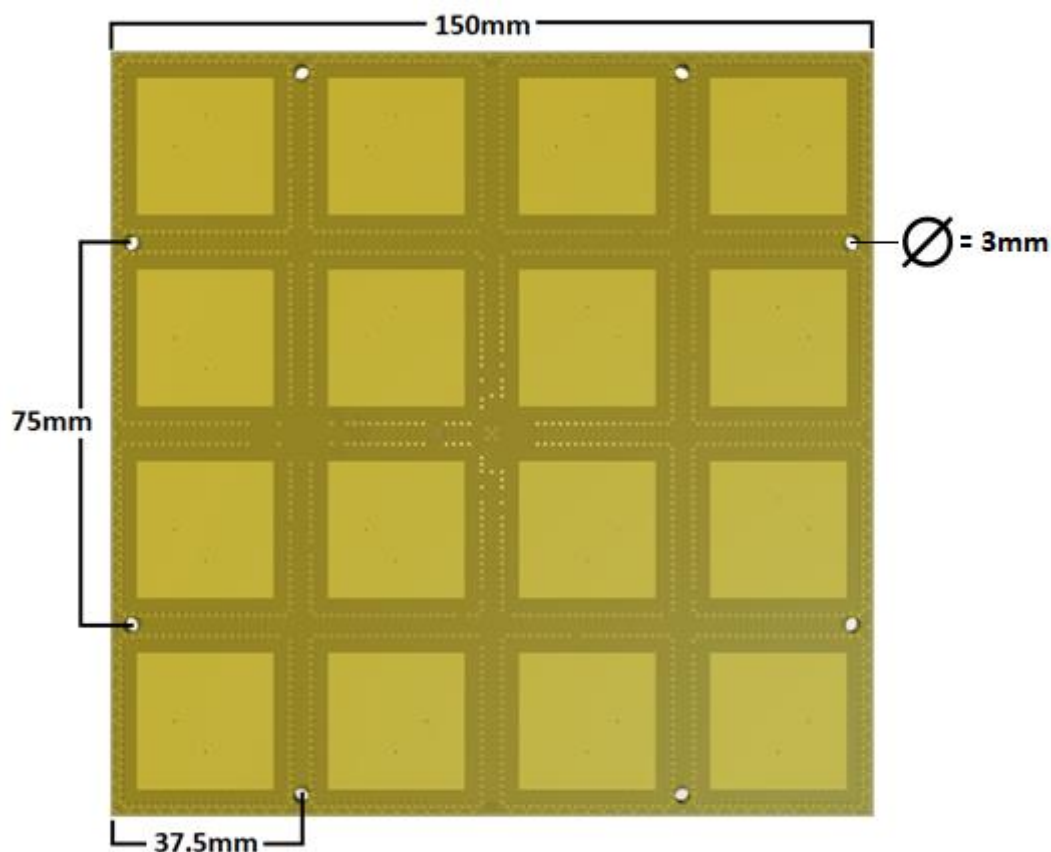


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DIMENSIONS

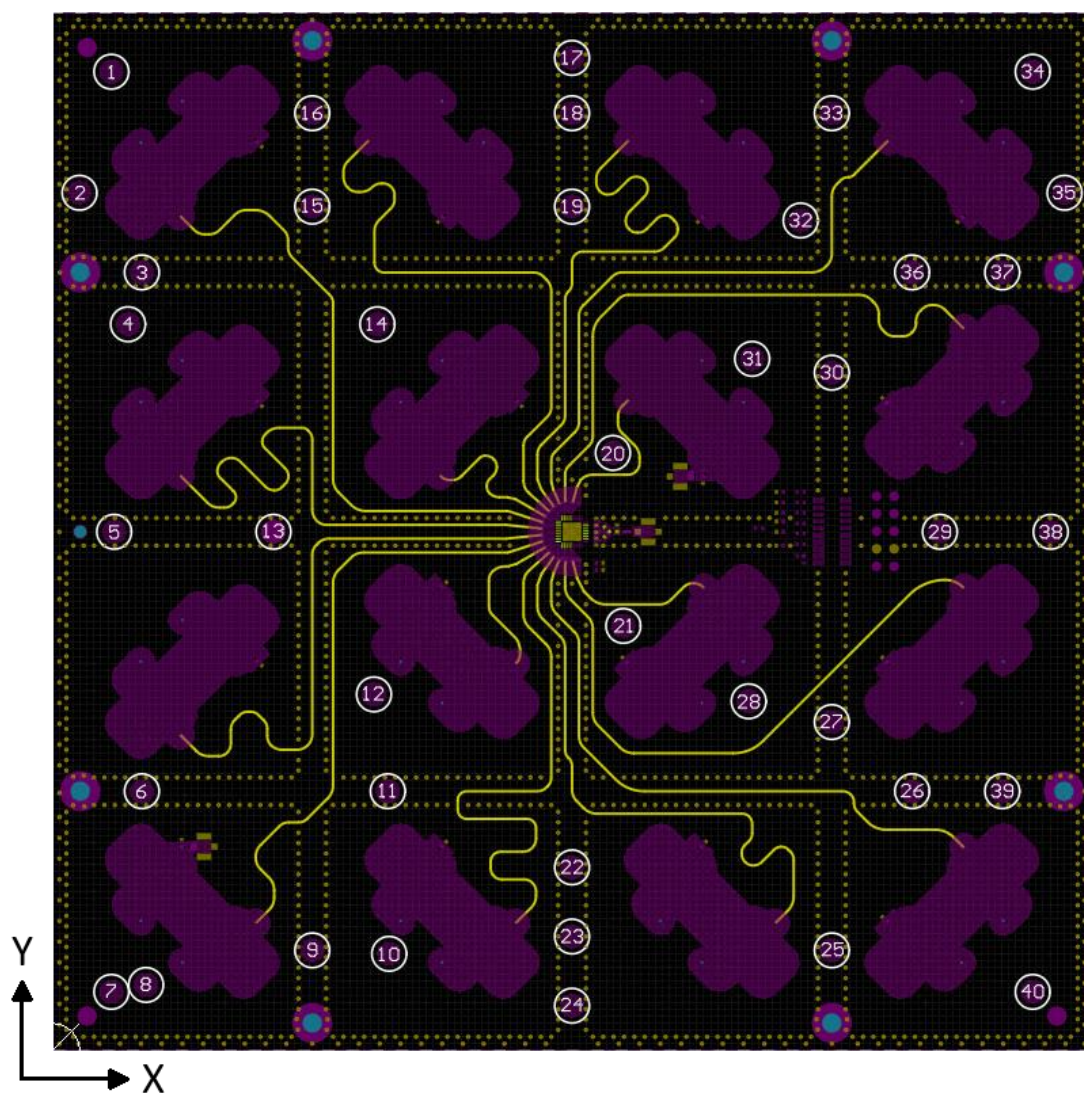
PCB thickness: 3.6 mm



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PCB GROUND POINT COORDINATES



GND Points	x [mm]	y [mm]
1	8.5	141.5
2	3.9	124
3	12.9	112.5
4	10.9	105
5	8.9	75
6	12.9	37.5
7	8.5	8.5
8	13.5	9.5
9	37.5	14.5
10	48.6	14
11	48.4	37.5
12	46.4	51.5
13	31.9	75
14	46.9	105
15	37.5	122
16	37.5	135.5
17	75	143.5
18	75	135.5
19	75	122
20	80.9	86.4
21	82.4	61.4
22	75	26.5
23	75	16.5
24	75	6.5
25	112.5	14.5
26	124.1	37.5
27	112.5	47.5
28	100.5	50.5
29	128.1	75
30	112.5	98
31	101	100
32	108	120
33	112.5	135.5
34	141.5	141.5
35	146.1	124
36	124.1	112.5
37	137.1	112.5
38	144.1	75
39	137.1	37.5
40	141.5	8.5

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CONTACT DETAILS

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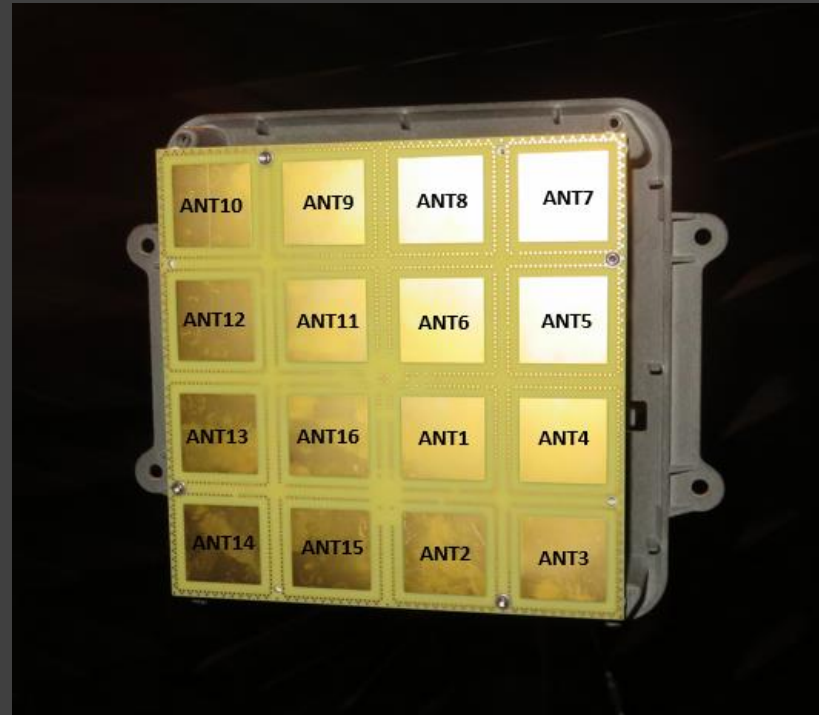
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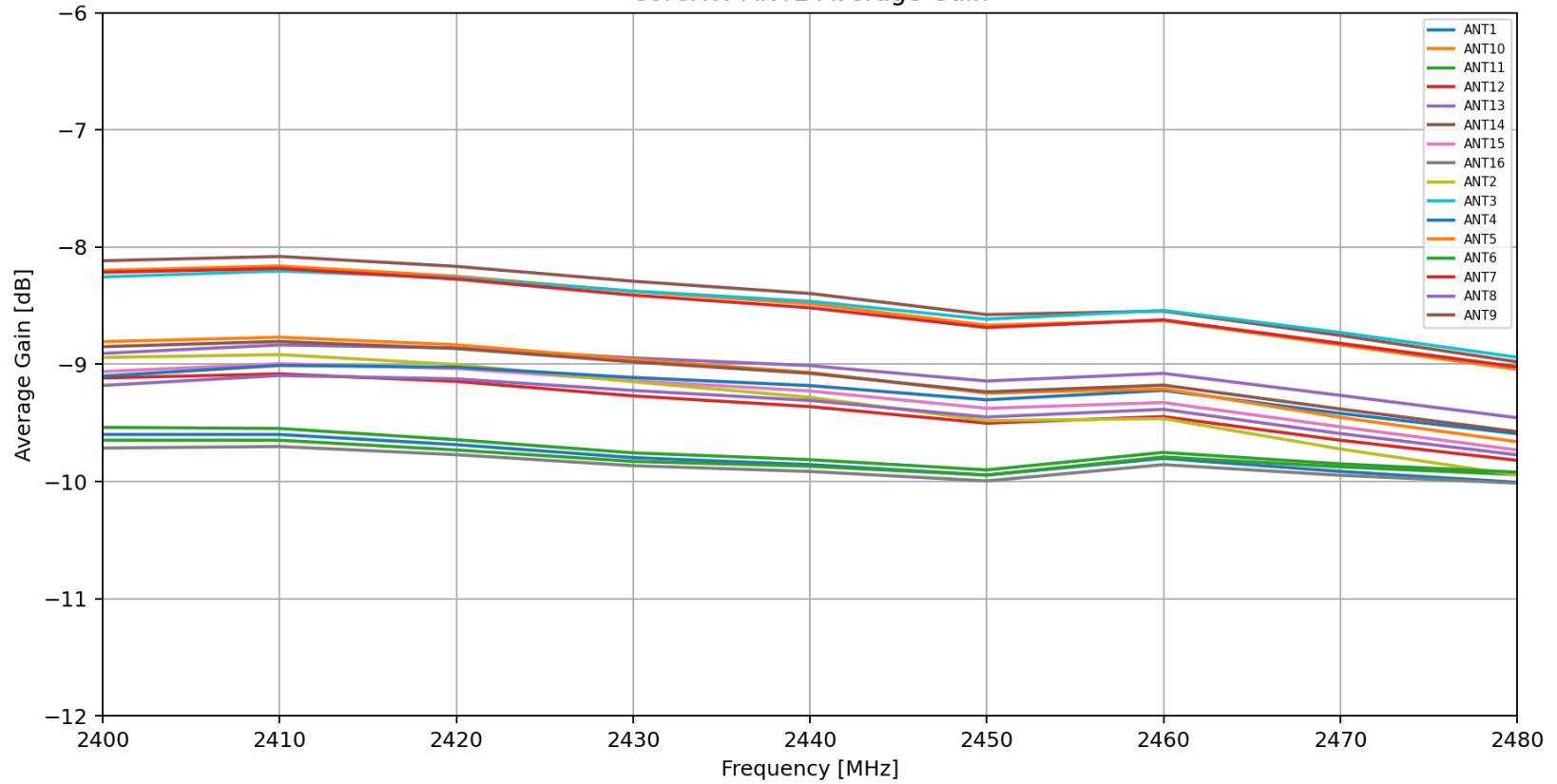
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CoreHW ANT2 Average Gain and Maximum Gain

CoreHW ANT2 Antenna Array Elements



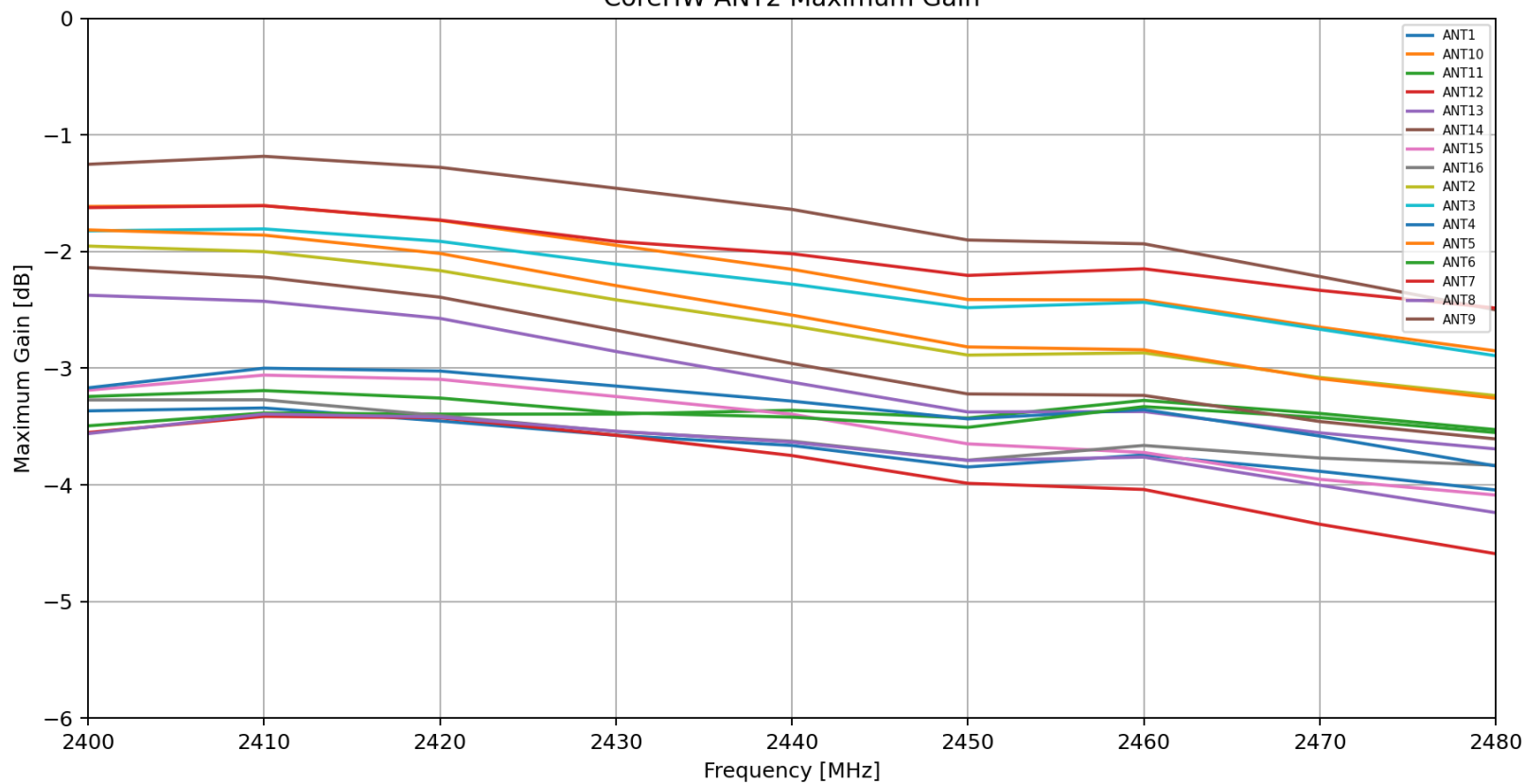
CoreHW ANT2 Average Gain



Average Gain [dB]

	2400 [MHz]	2410 [MHz]	2420 [MHz]	2430 [MHz]	2440 [MHz]	2450 [MHz]	2460 [MHz]	2470 [MHz]	2480 [MHz]
ANT1	-9.60	-9.60	-9.69	-9.80	-9.86	-9.95	-9.80	-9.91	-10.01
ANT2	-8.94	-8.92	-9.00	-9.15	-9.28	-9.48	-9.46	-9.72	-9.95
ANT3	-8.26	-8.20	-8.26	-8.37	-8.46	-8.62	-8.54	-8.73	-8.94
ANT4	-9.10	-9.01	-9.02	-9.11	-9.18	-9.30	-9.22	-9.42	-9.59
ANT5	-8.81	-8.77	-8.83	-8.96	-9.07	-9.25	-9.21	-9.45	-9.66
ANT6	-9.54	-9.55	-9.64	-9.76	-9.81	-9.90	-9.75	-9.85	-9.92
ANT7	-8.22	-8.18	-8.27	-8.41	-8.52	-8.69	-8.62	-8.82	-9.02
ANT8	-9.18	-9.10	-9.12	-9.22	-9.31	-9.45	-9.38	-9.59	-9.77
ANT9	-8.85	-8.81	-8.87	-8.98	-9.08	-9.24	-9.18	-9.38	-9.57
ANT10	-8.20	-8.16	-8.25	-8.38	-8.48	-8.67	-8.63	-8.84	-9.04
ANT11	-9.65	-9.65	-9.73	-9.83	-9.87	-9.95	-9.79	-9.88	-9.94
ANT12	-9.12	-9.08	-9.15	-9.27	-9.36	-9.50	-9.45	-9.65	-9.82
ANT13	-8.91	-8.84	-8.86	-8.95	-9.01	-9.14	-9.08	-9.27	-9.46
ANT14	-8.12	-8.08	-8.16	-8.29	-8.40	-8.58	-8.55	-8.75	-8.98
ANT15	-9.06	-9.00	-9.04	-9.14	-9.23	-9.38	-9.33	-9.53	-9.73
ANT16	-9.71	-9.70	-9.77	-9.87	-9.91	-10.00	-9.86	-9.95	-10.01

CoreHW ANT2 Maximum Gain



Maximum Gain [dB]

	2400 [MHz]	2410 [MHz]	2420 [MHz]	2430 [MHz]	2440 [MHz]	2450 [MHz]	2460 [MHz]	2470 [MHz]	2480 [MHz]
ANT1	-3.37	-3.34	-3.45	-3.58	-3.66	-3.85	-3.74	-3.88	-4.04
ANT2	-1.95	-2.00	-2.16	-2.41	-2.64	-2.89	-2.87	-3.08	-3.24
ANT3	-1.82	-1.81	-1.91	-2.11	-2.28	-2.48	-2.43	-2.67	-2.89
ANT4	-3.17	-3.00	-3.02	-3.15	-3.28	-3.43	-3.36	-3.58	-3.84
ANT5	-1.81	-1.86	-2.02	-2.29	-2.54	-2.82	-2.84	-3.09	-3.26
ANT6	-3.24	-3.19	-3.26	-3.38	-3.42	-3.51	-3.33	-3.42	-3.55
ANT7	-1.62	-1.61	-1.73	-1.91	-2.02	-2.20	-2.15	-2.33	-2.48
ANT8	-3.56	-3.39	-3.42	-3.54	-3.63	-3.79	-3.76	-4.00	-4.24
ANT9	-2.14	-2.22	-2.39	-2.67	-2.96	-3.22	-3.23	-3.46	-3.61
ANT10	-1.61	-1.61	-1.73	-1.95	-2.15	-2.41	-2.42	-2.65	-2.85
ANT11	-3.49	-3.38	-3.39	-3.39	-3.36	-3.43	-3.28	-3.39	-3.53
ANT12	-3.55	-3.41	-3.42	-3.58	-3.75	-3.99	-4.04	-4.34	-4.59
ANT13	-2.37	-2.43	-2.57	-2.86	-3.12	-3.38	-3.37	-3.55	-3.69
ANT14	-1.25	-1.18	-1.28	-1.46	-1.64	-1.90	-1.93	-2.21	-2.50
ANT15	-3.19	-3.06	-3.10	-3.24	-3.40	-3.65	-3.72	-3.95	-4.09
ANT16	-3.27	-3.27	-3.41	-3.54	-3.63	-3.79	-3.66	-3.77	-3.83

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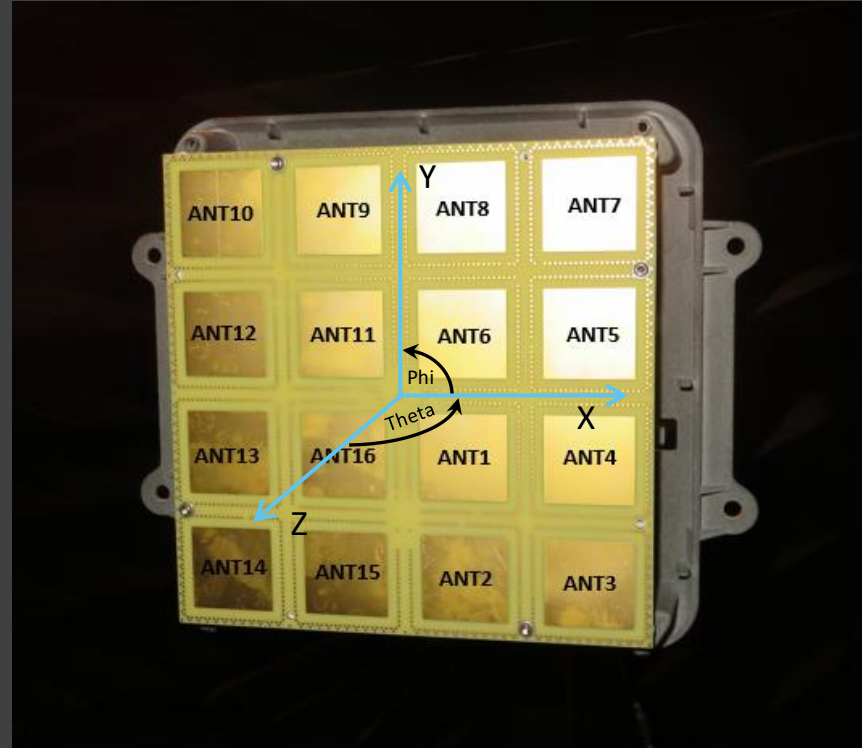
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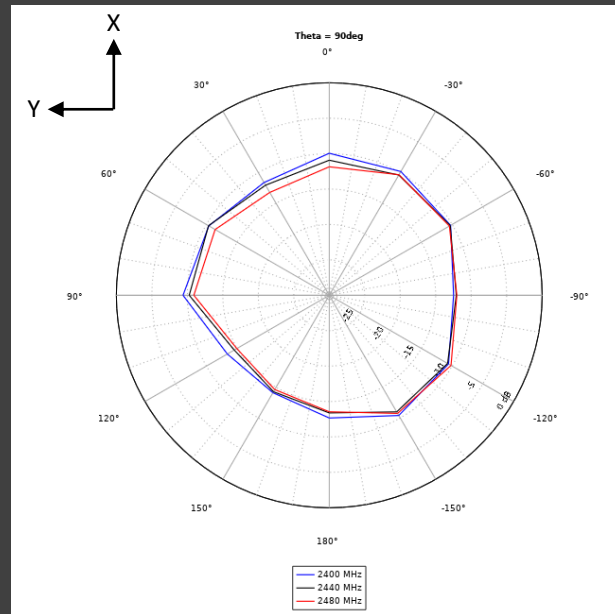
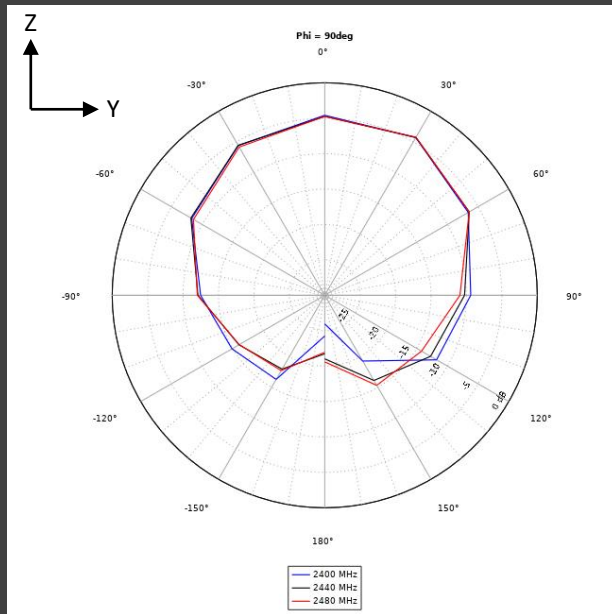
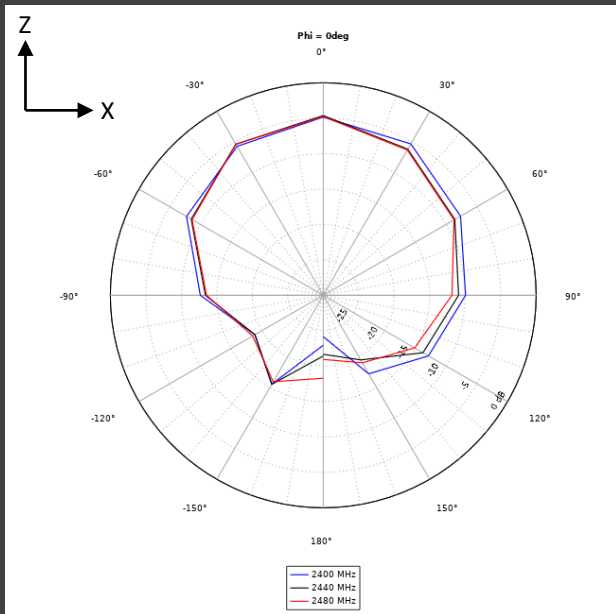
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CoreHW ANT2 2D Radiation Patterns

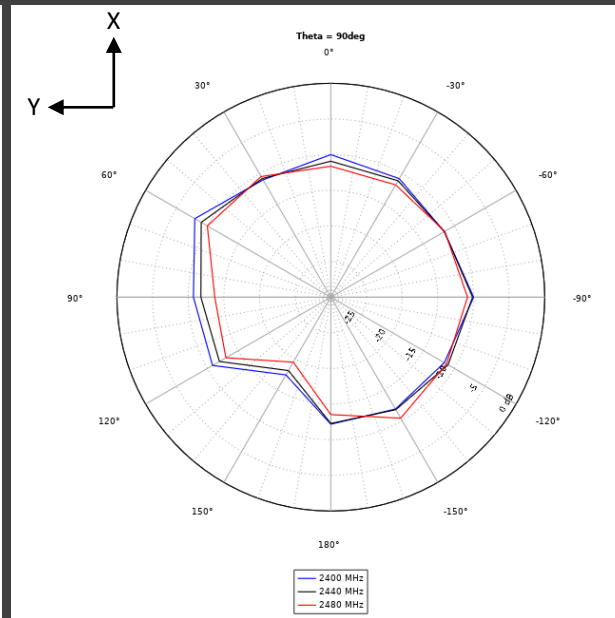
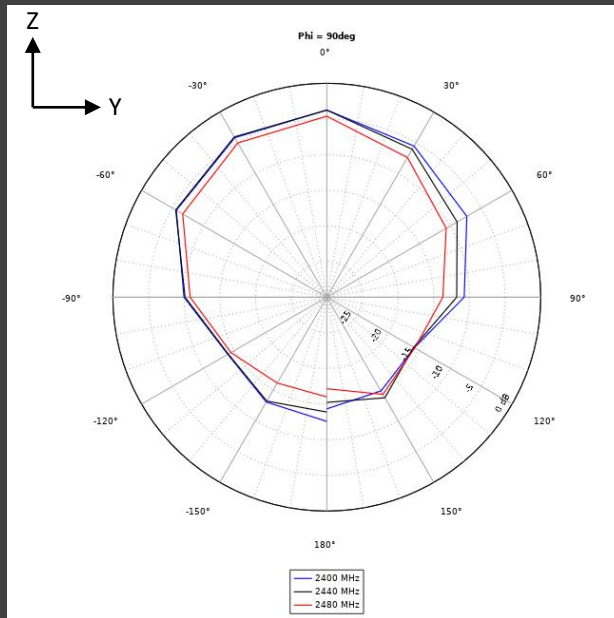
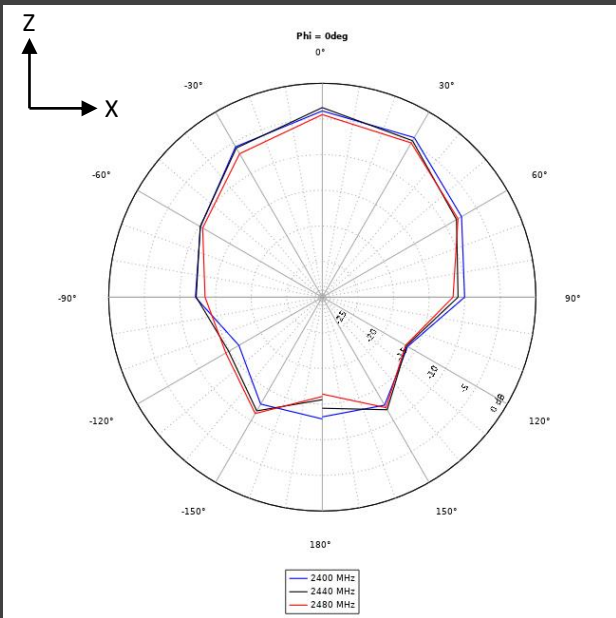
Theta 0 degree and Phi 0 degree position



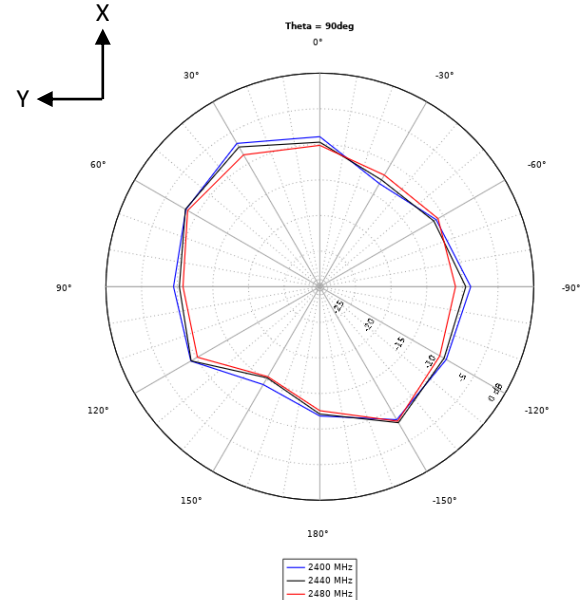
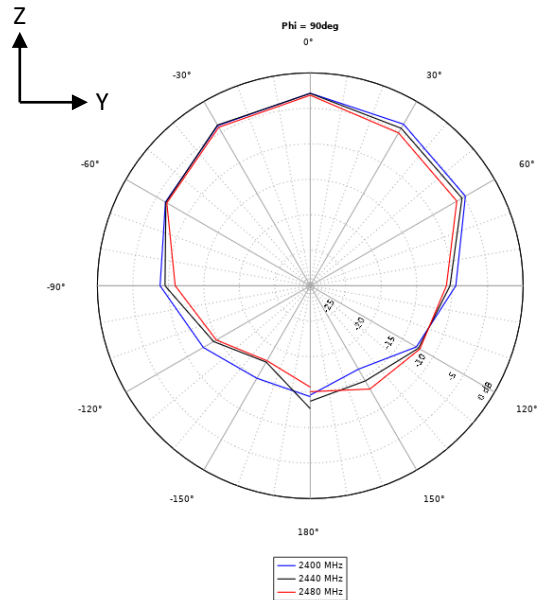
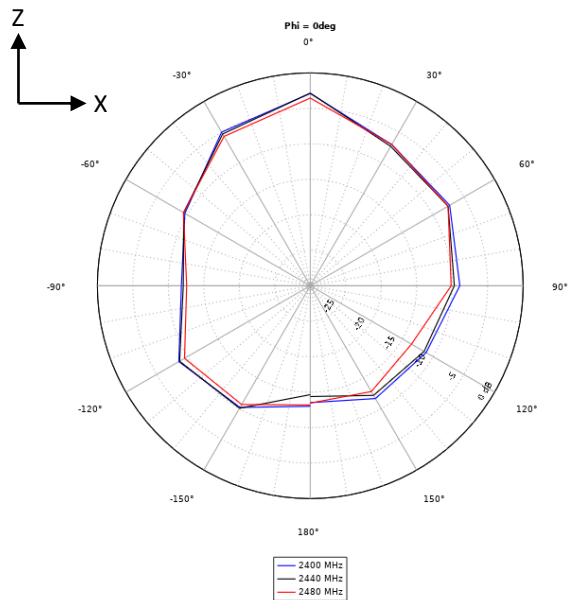
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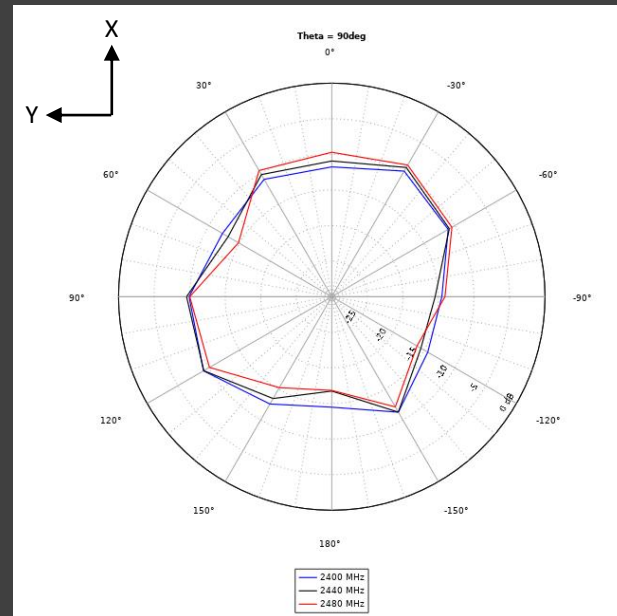
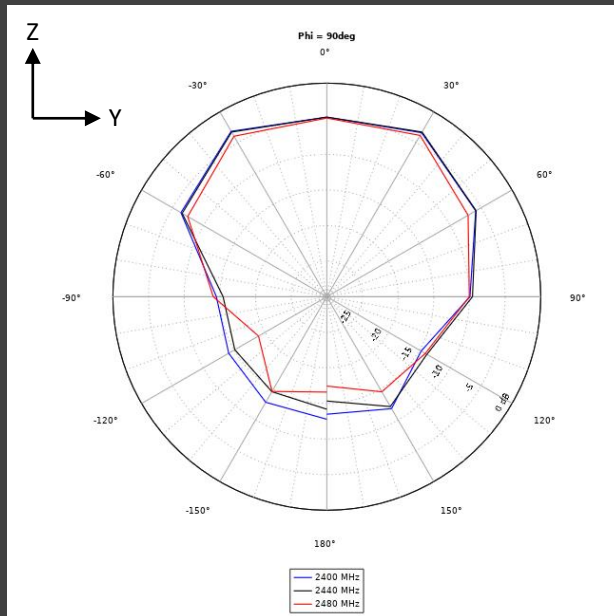
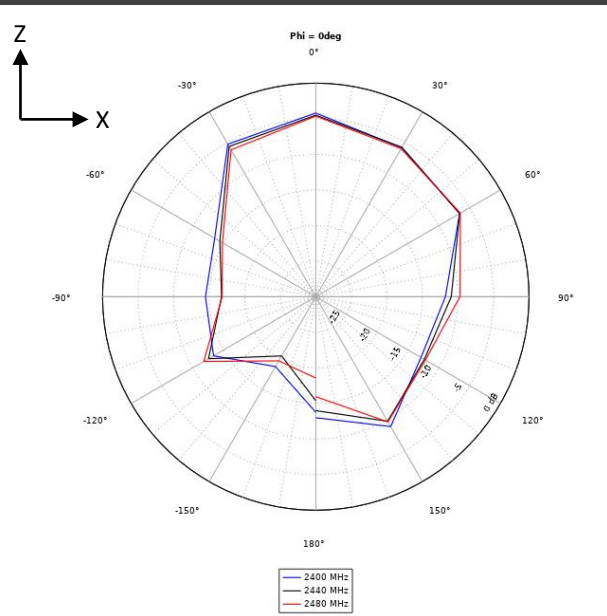
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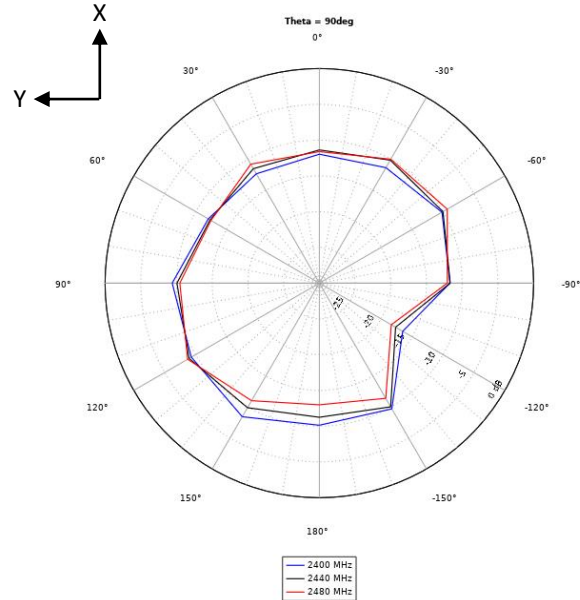
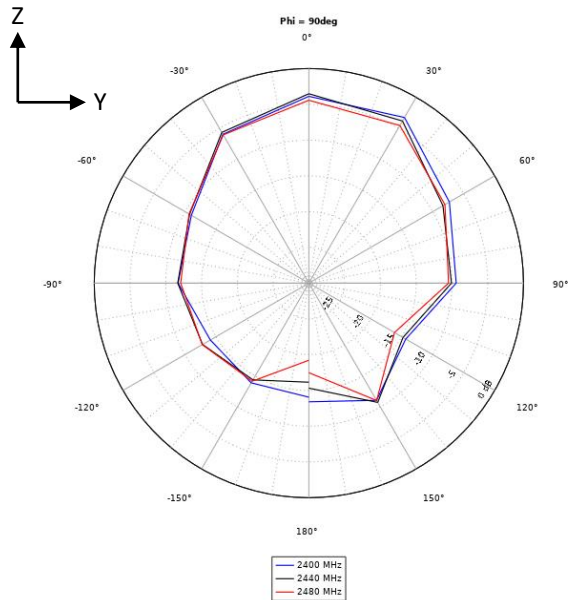
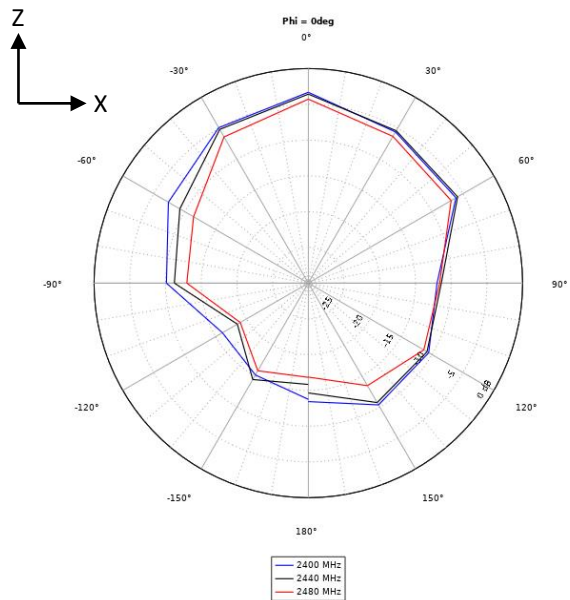
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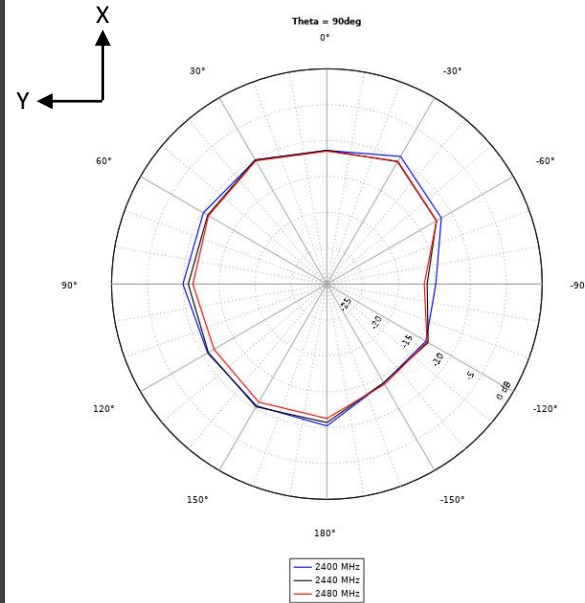
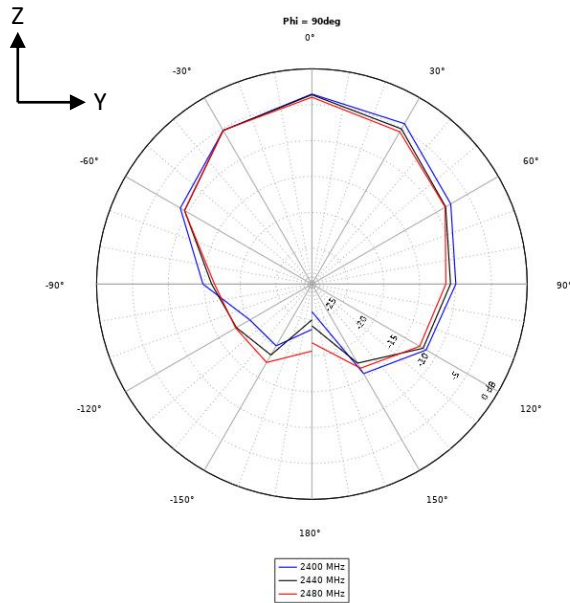
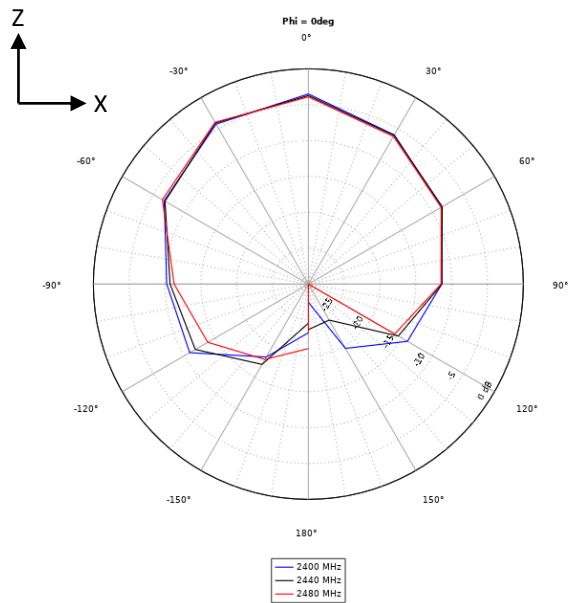
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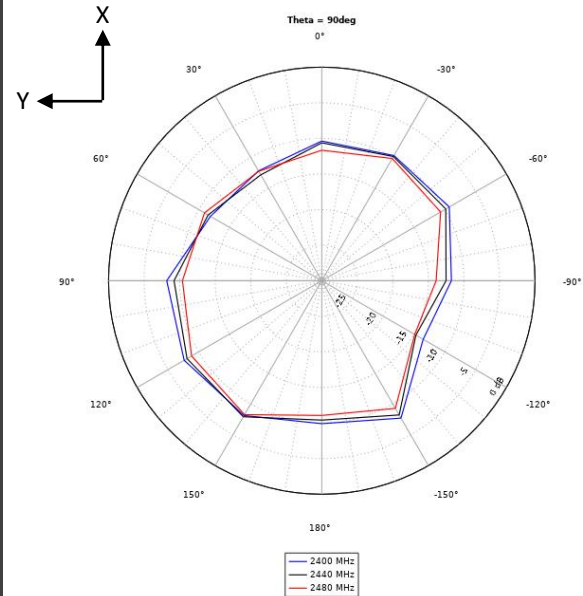
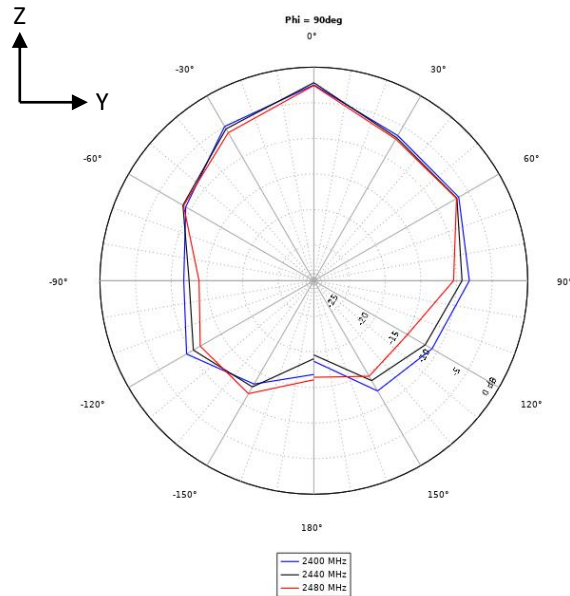
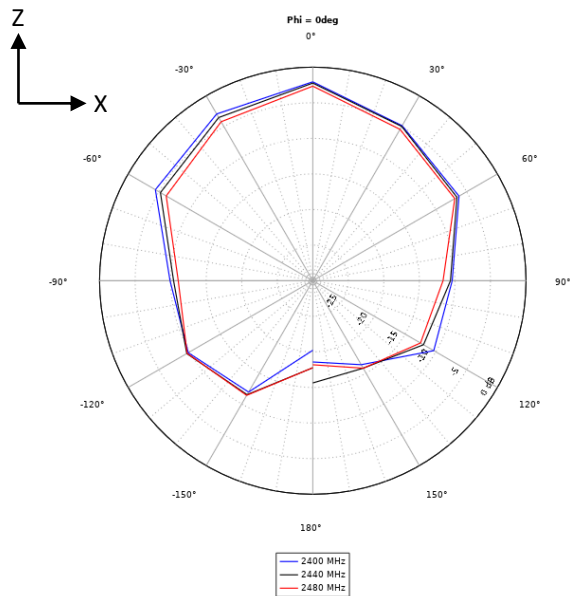
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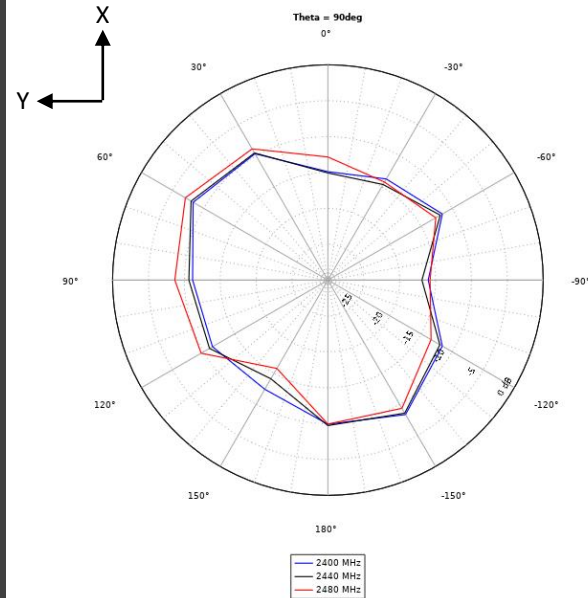
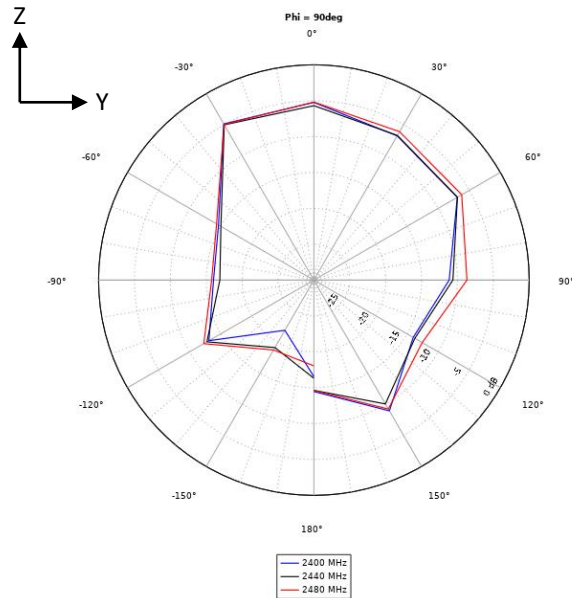
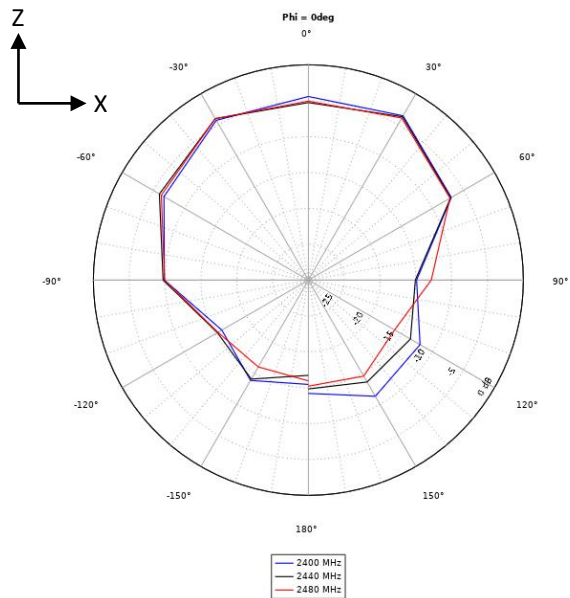
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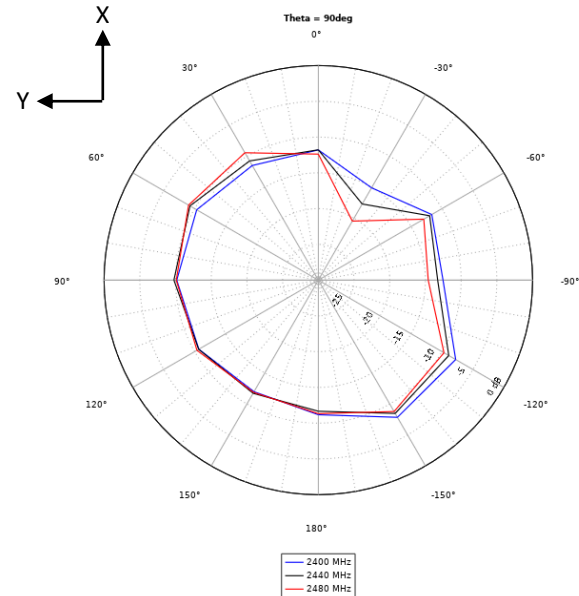
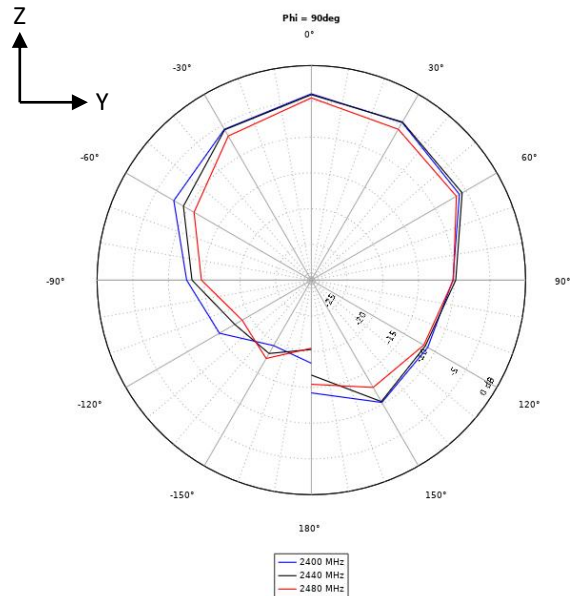
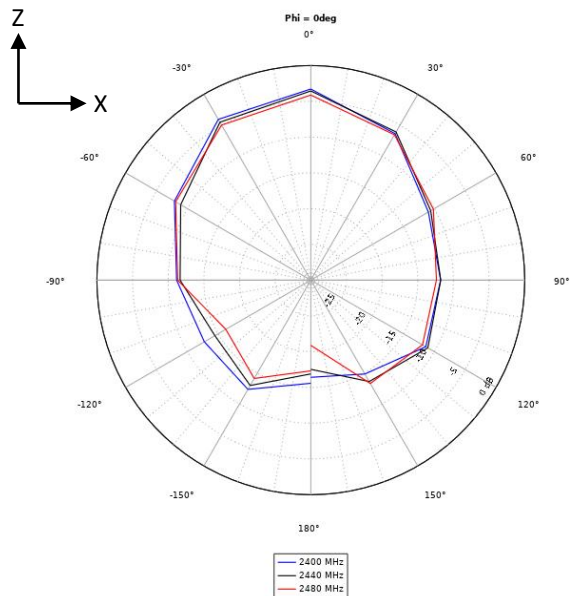
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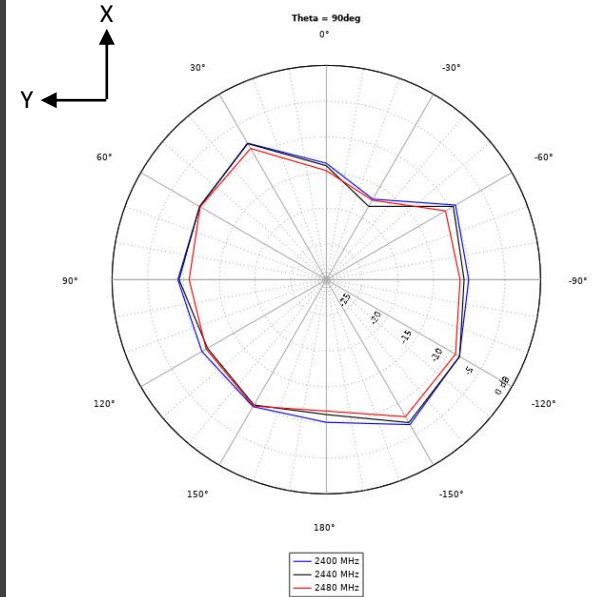
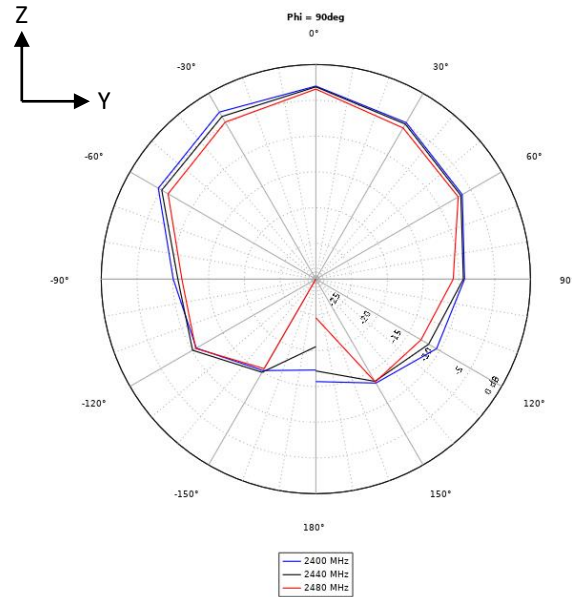
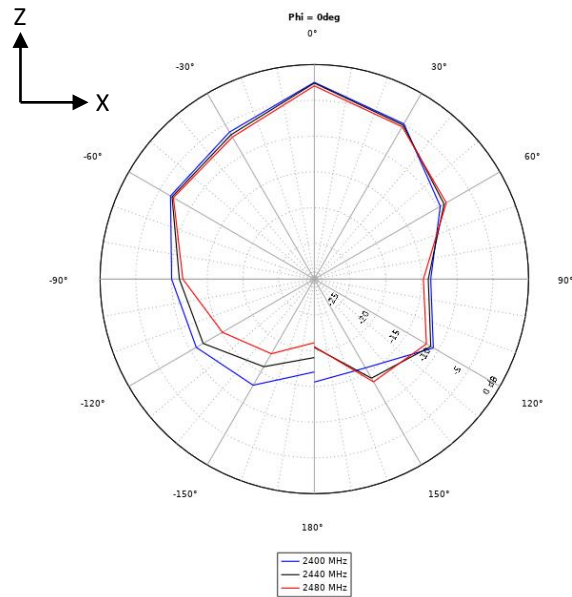
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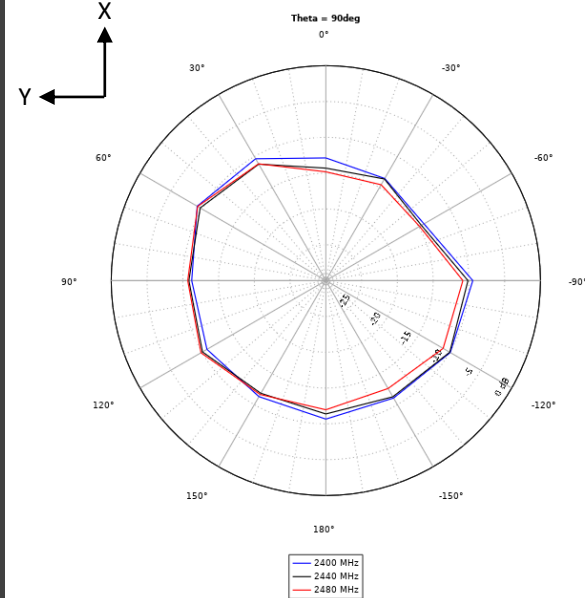
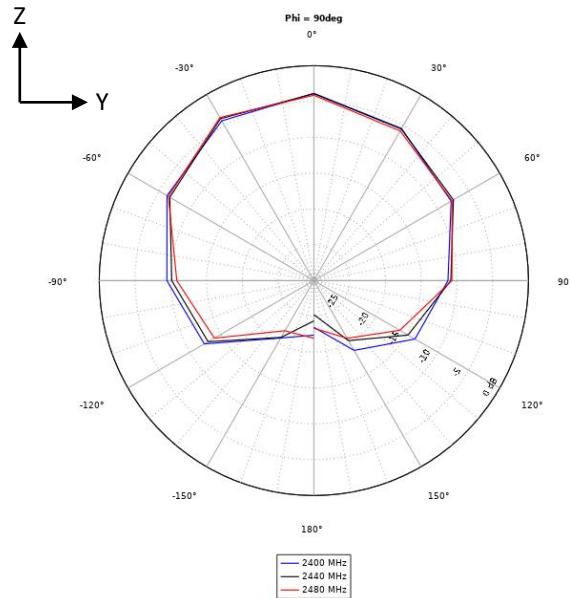
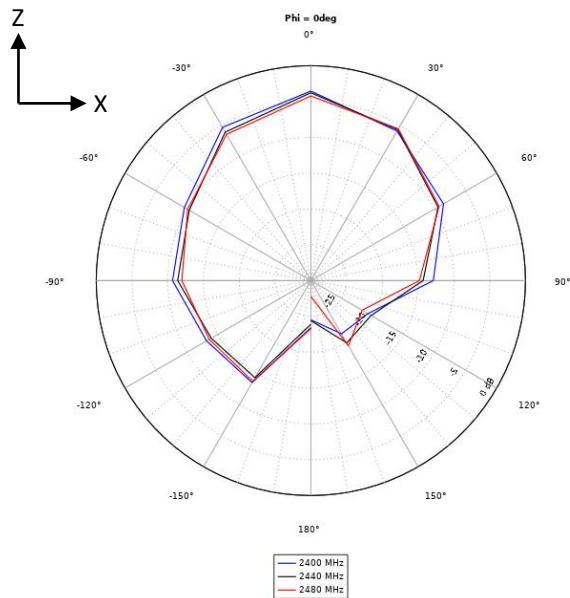
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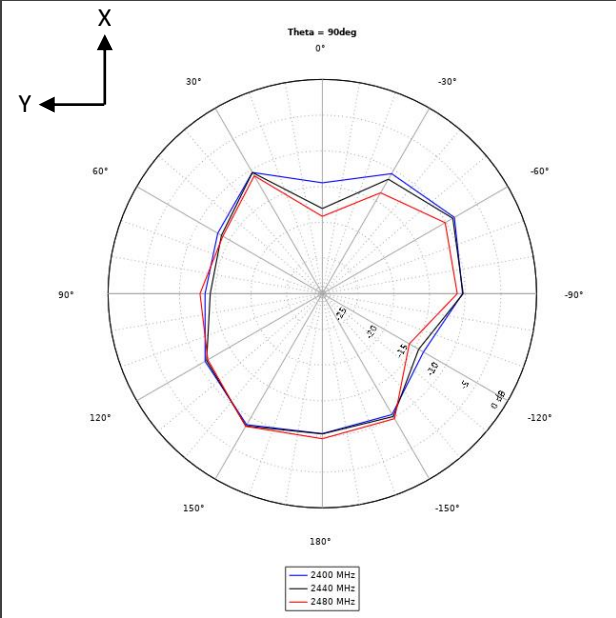
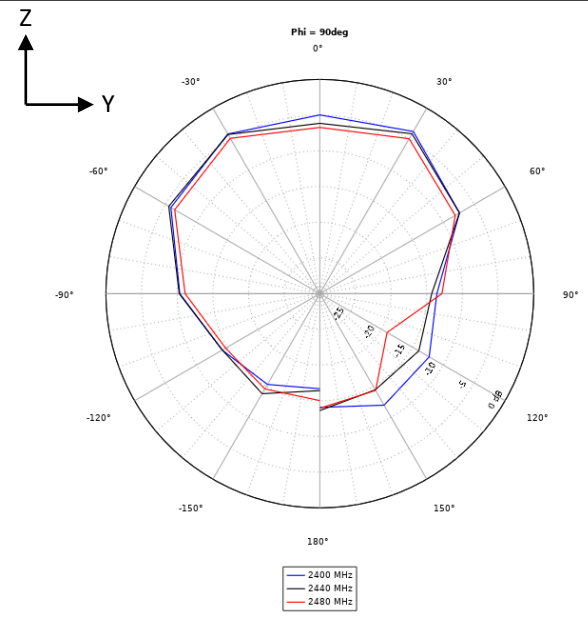
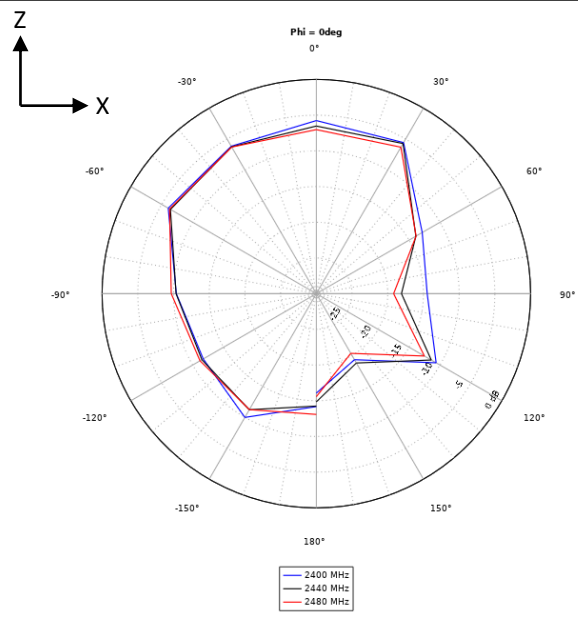
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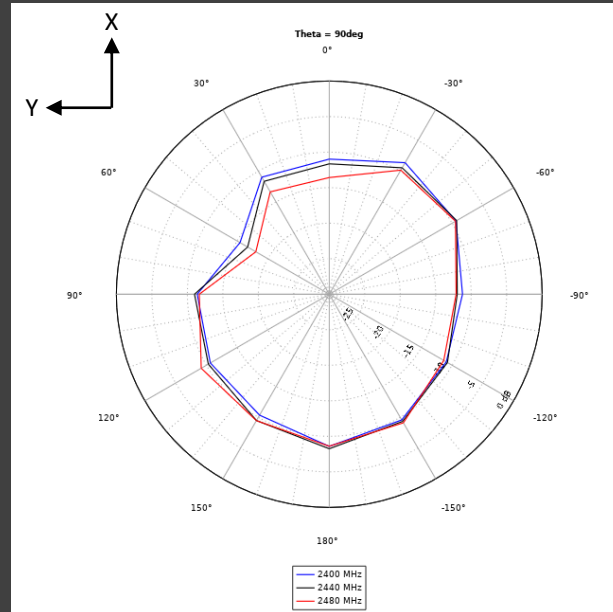
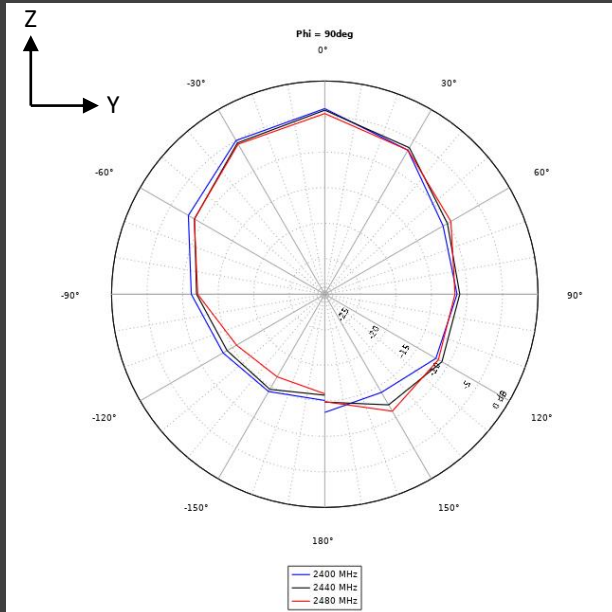
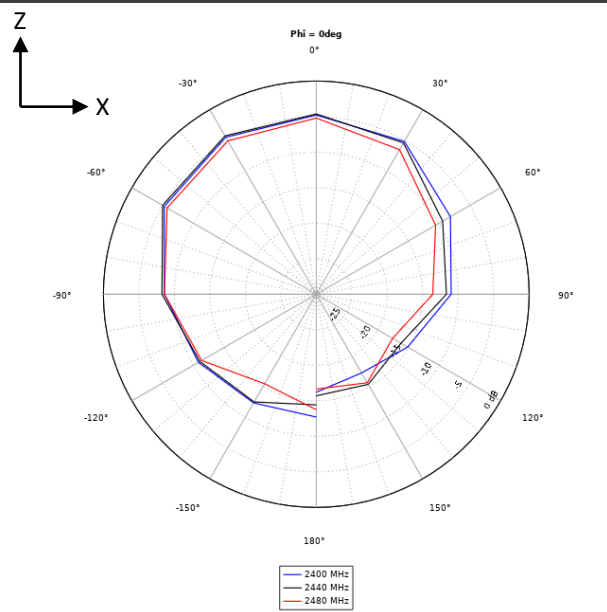
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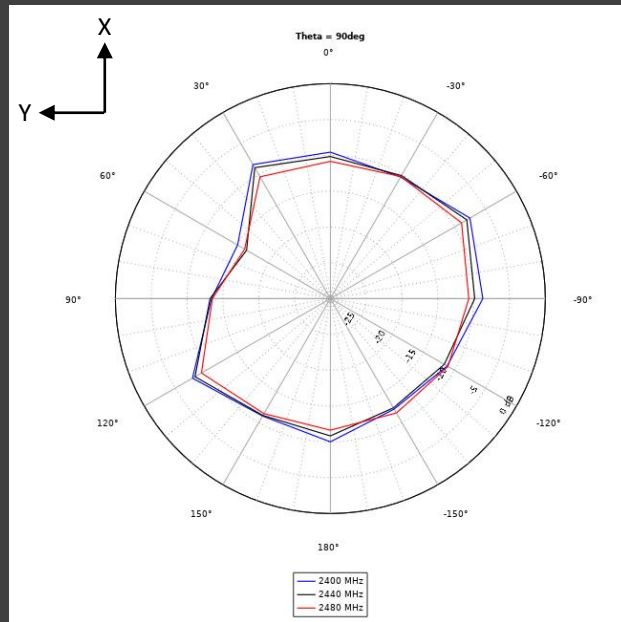
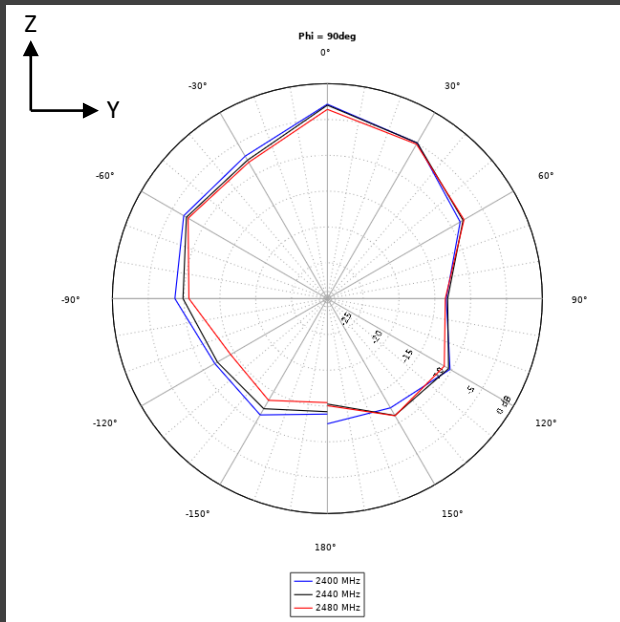
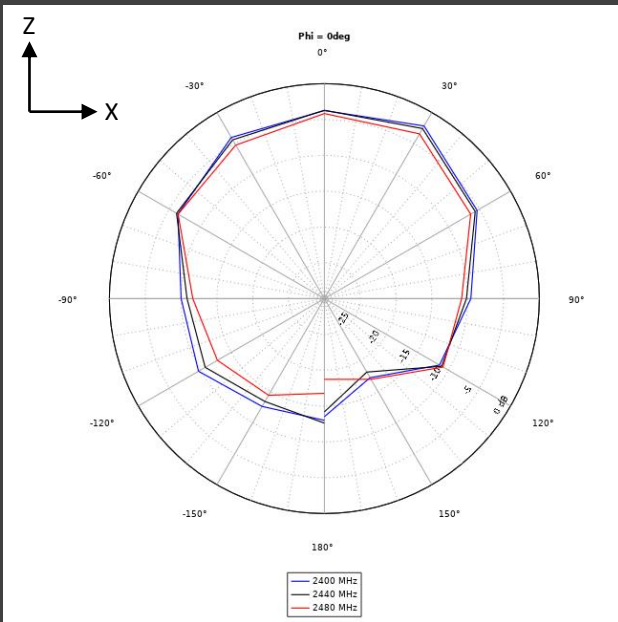
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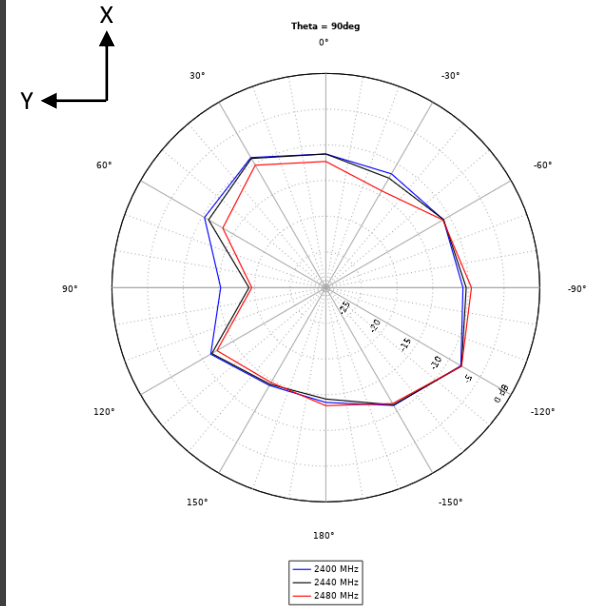
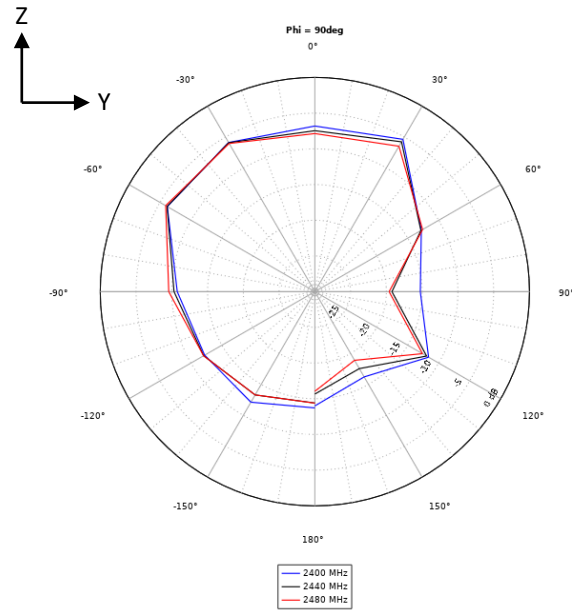
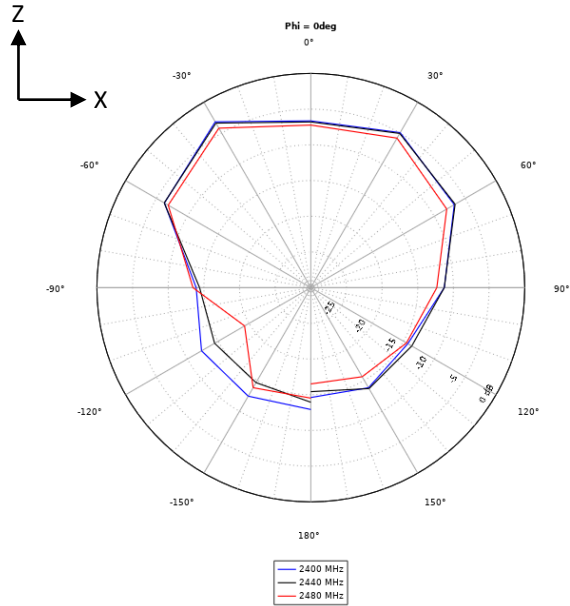
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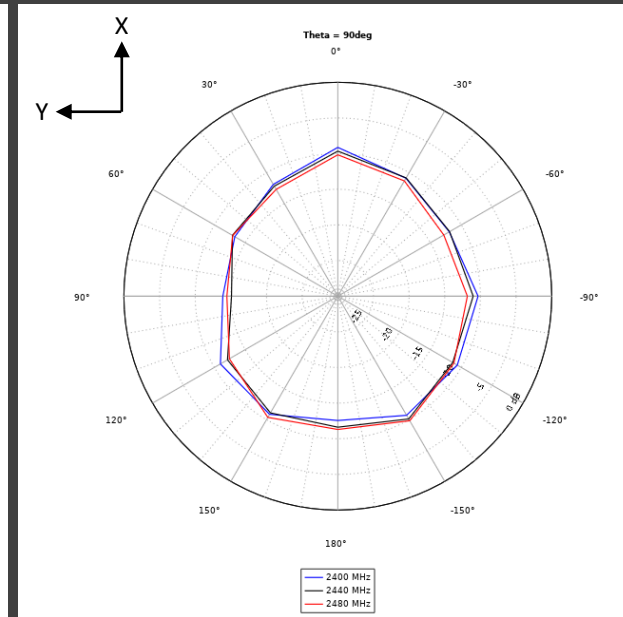
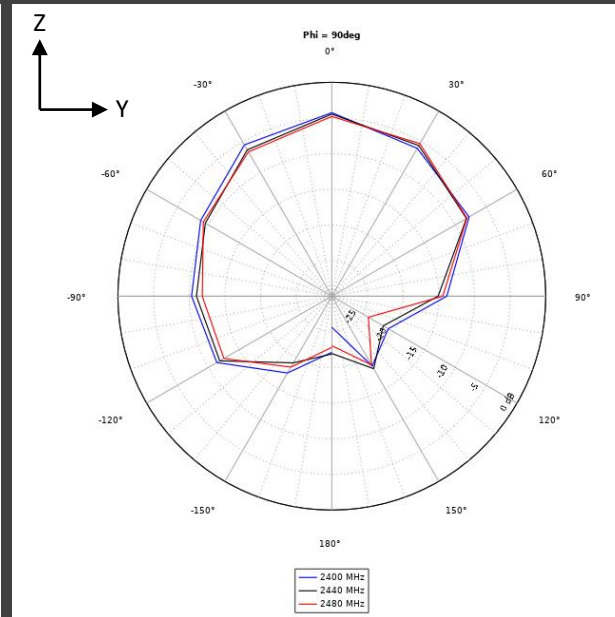
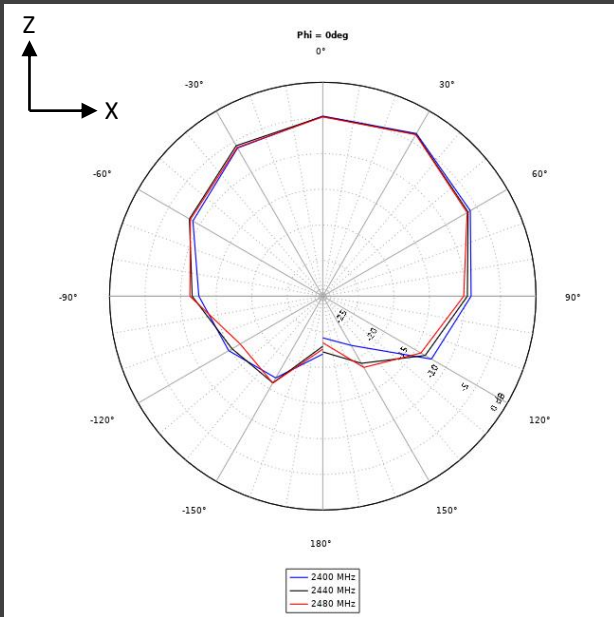
ANT14



ANT15



ANT16



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