

APPROVAL SHEET

CUSTOMER NAME:	
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TYPE NAME: 4G Patch Antenna

SPECIFICATION: RP-SMA-JW1.5 Nickel-Plated Plastic Elbow
/RG174cable/1.5M

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|----------------------|-------------------------------------|
| 1. Newly Approved | ☒ |
| 2. Material Approved | ☐ |
| 3. SPEC Approved | ☐ |

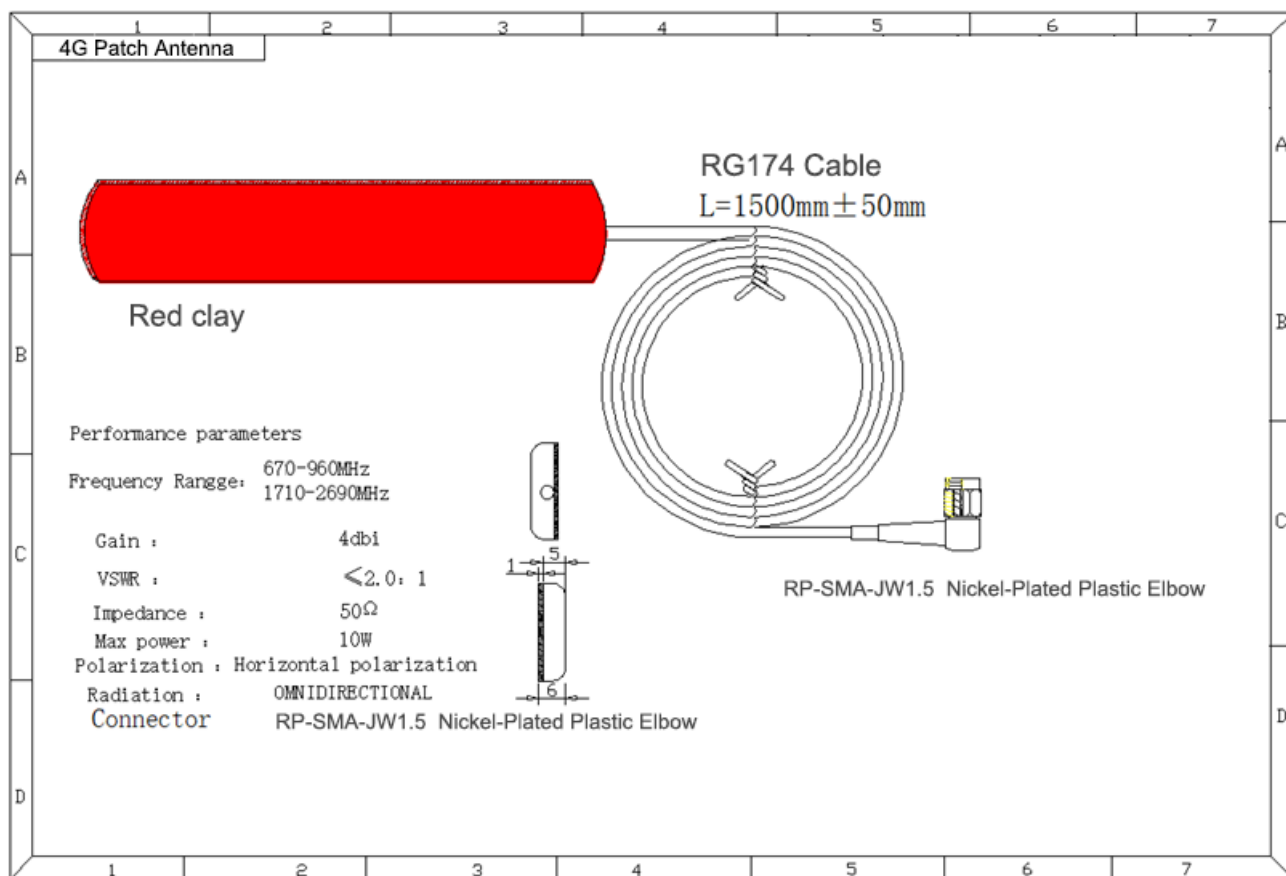
Manufacturer/Supplier (Approval by)			Customer (Approval by)		
APPROVAL BY:			(APPROVAL BY) :		
APPROVAL DATE:			(APPROVAL DATE) :		
SUPPLIER			CUSTOMER		
Q. Dept	E. Dept	S. Dept	TESTED	CHECKED	APPROVED
Zaifeng Hou	Shihai Wang	Yangping Zhang			
DATE:			DATE:		

Electrical Performance Specifications

Model	4G Patch Antenna
Frequency Range-MHz	670MHz~960MHz, 1710MHz~2690MHz
Gain dB	4.21dBi
VSWR (± 0.2)	$\leq 2.0:1$
Input impedance- Ω	50
Polarization	Vertical
Maximum Power-W	20
Connector Type	RP-SMA-JW1.5
Cable Length-m	RG174Cable 1.5m
Weight-g	45g
Installation	Adhesive
Environmental	1. Working Temp $-40^{\circ}\text{C}\sim+85^{\circ}\text{C}$ 2. Humidity Humidity $95\%\sim 100\%R$

1. Antenna Dimensions

1-1 Structure Picture



2. Test Equipment and Anechoic Chamber

2-1 Test Equipment

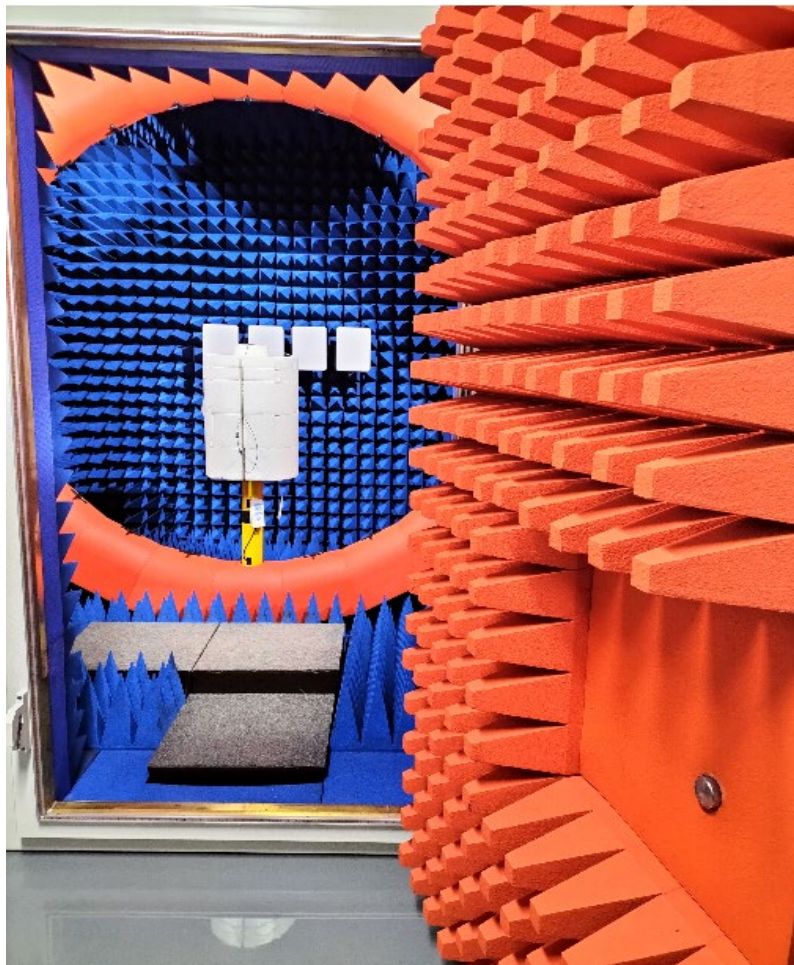
For measuring passive parameters and VSWR, the **5071C Vector Network Analyzer** is used. For active OTA measurements, the **CMW500 test anechoic chamber** is employed.



2-2 测试暗室

Using a multi-probe switching measurement method allows for fast antenna testing. Compared with the traditional mechanical rotation method, the testing speed can be increased by an order of magnitude. The vertically mounted multi-probe switching architecture enables the antenna under test to be placed horizontally on the test bench. This setup has several advantages: it can support heavy objects, the rotation of the device under test is unaffected by changes in gravity direction, and placement is simple and convenient.

Considering the limitation of test distance, the near-field measurement method can directly obtain amplitude and phase distribution under near-field conditions. Through rigorous data transformation, accurate far-field radiation patterns can be derived



3-1 Frequency Requirements

The 4G antenna operates in the frequency bands 670–960 MHz and 1710–2690 MHz, with resonance occurring within these ranges.

3-2 Passive S11 Parameter Measurement

The passive S11 parameter is measured by connecting one end of a 50 Ω coaxial cable to the antenna, and the other end to the network analyzer. During testing, the fixture must be at least 20 cm away from any metal objects.

4. Anechoic Chamber Test Data

4-1 Passive Test Data

The anechoic chamber supports passive mode measurements for both passive and active

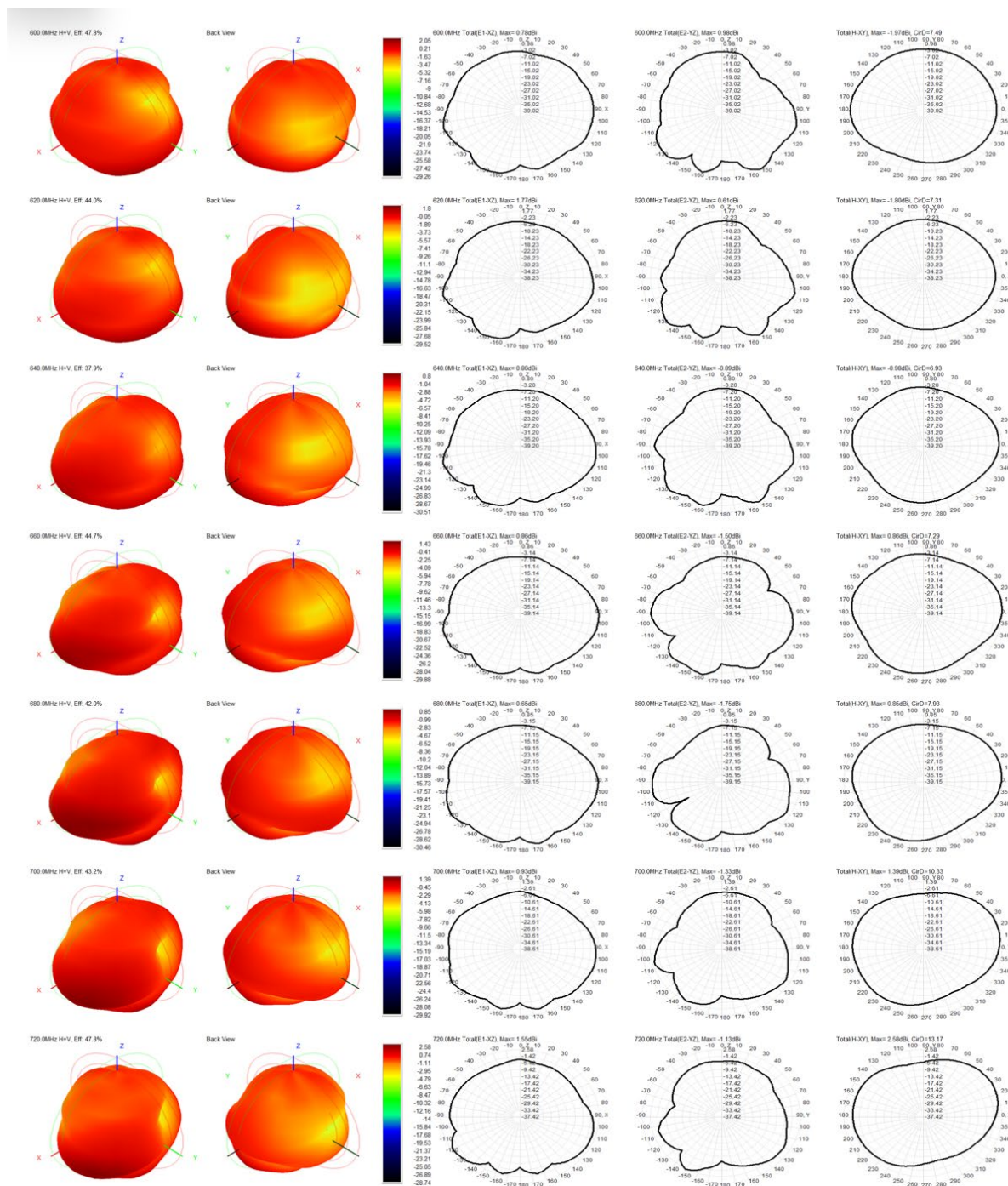
antennas. It can test gain, efficiency, beamwidth, front-to-back ratio, null depth, beam offset angle, and other related parameters. ◦

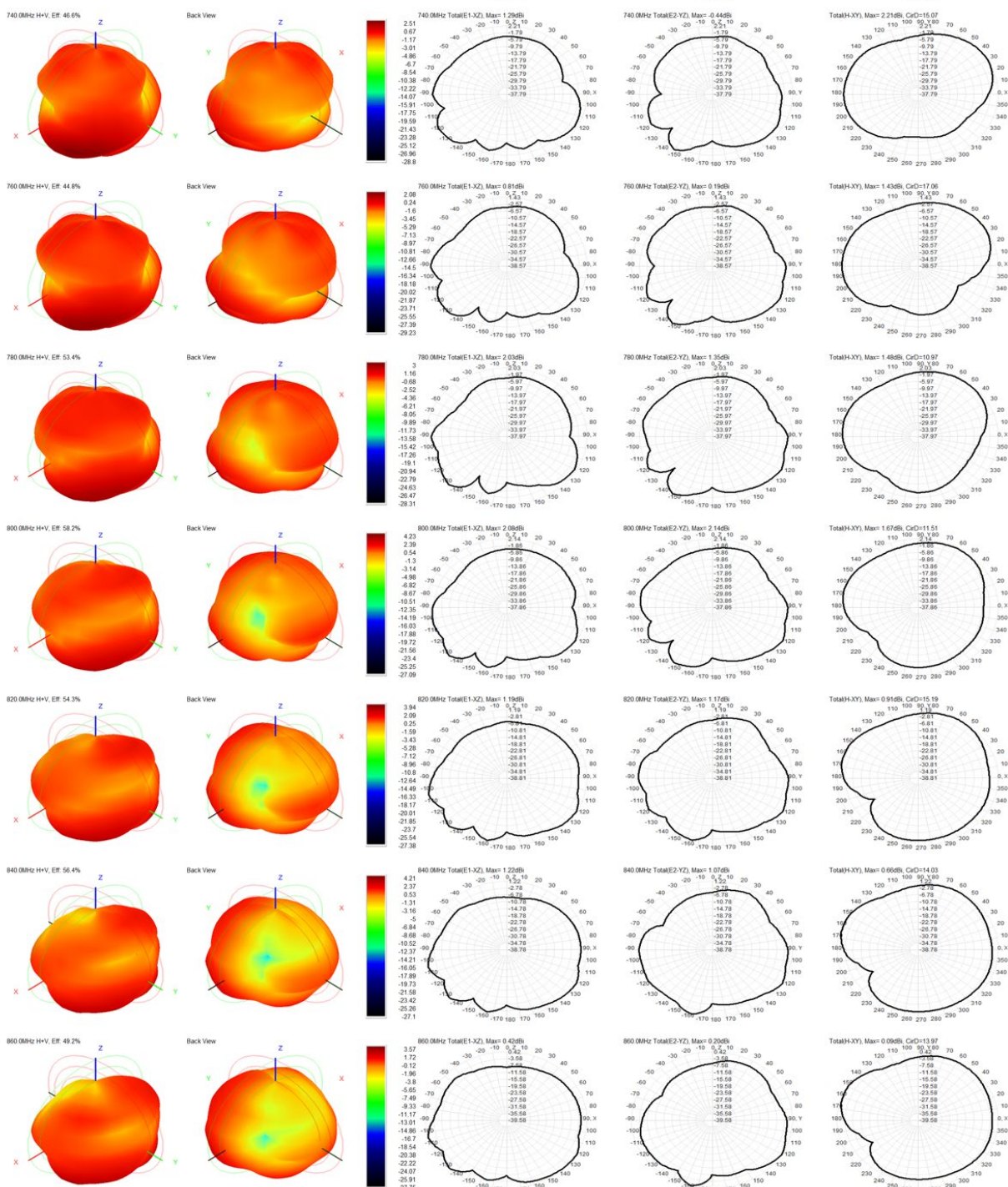
Frequency ID	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Frequency (MHz)	600	620	640	660	680	700	720	740	760	780	800	820	840	860	880	900	920	940	960	1710	1730	1750	1770	1790
Efficiency (dBi)	-3.21	-3.57	-4.21	-3.50	-3.77	-3.65	-3.21	-3.32	-3.49	-2.72	-2.35	-2.65	-2.49	-3.08	-3.79	-3.45	-3.23	-3.01	-2.98	-5.26	-5.68	-4.86	-4.90	-6.02
Gain (dBi)	2.05	1.80	0.80	1.43	0.85	1.39	2.58	2.51	2.08	3.00	4.23	3.94	4.21	3.57	2.30	2.07	2.22	2.62	2.27	-0.93	-1.18	-0.45	-0.09	-0.81
Efficiency (%)	47.80	43.98	37.94	44.72	42.02	43.19	47.79	46.58	44.81	53.40	58.22	54.35	56.43	49.23	41.74	45.19	47.56	49.95	50.35	29.80	27.07	32.67	32.33	24.99
Directivity (dB)	5.26	5.36	5.01	4.93	4.62	5.04	5.79	5.83	5.57	5.73	6.58	6.58	6.70	6.64	6.09	5.52	5.45	5.63	5.25	4.33	4.50	4.41	4.81	5.21
Peak Gain Position (Theta)	150.00	150.00	105.00	105.00	90.00	90.00	90.00	120.00	120.00	120.00	120.00	120.00	120.00	120.00	120.00	105.00	105.00	135.00	135.00	120.00	75.00	135.00	120.00	120.00
Peak Gain Position (Phi)	120.00	120.00	180.00	165.00	15.00	30.00	30.00	165.00	150.00	150.00	135.00	135.00	135.00	135.00	135.00	150.00	150.00	135.00	120.00	45.00	45.00	165.00	60.00	45.00
Efficiency ThetaPol (%)	37.73	32.53	23.41	24.09	22.23	24.35	29.04	30.02	29.62	35.31	37.95	34.87	34.64	28.49	24.24	27.67	30.72	33.62	33.97	26.58	24.52	29.29	28.27	21.29
Efficiency PhiPol (%)	10.08	11.45	14.53	20.63	19.79	18.85	18.75	16.56	15.19	18.08	20.26	19.48	21.78	20.74	17.49	17.51	16.84	16.33	16.37	3.21	2.55	3.38	4.07	3.70
Upper Hem. Efficiency (%)	15.92	13.76	13.47	17.66	17.72	17.75	17.98	16.57	15.93	19.44	21.65	19.56	19.05	16.17	14.95	17.77	19.11	18.31	17.08	13.26	12.27	13.75	12.36	8.90
Lower Hem. Efficiency (%)	31.88	30.22	24.47	27.05	24.29	25.44	29.81	30.01	28.88	33.95	36.57	34.79	37.38	33.06	26.79	27.42	28.44	31.64	33.27	16.54	14.79	18.92	19.97	16.09

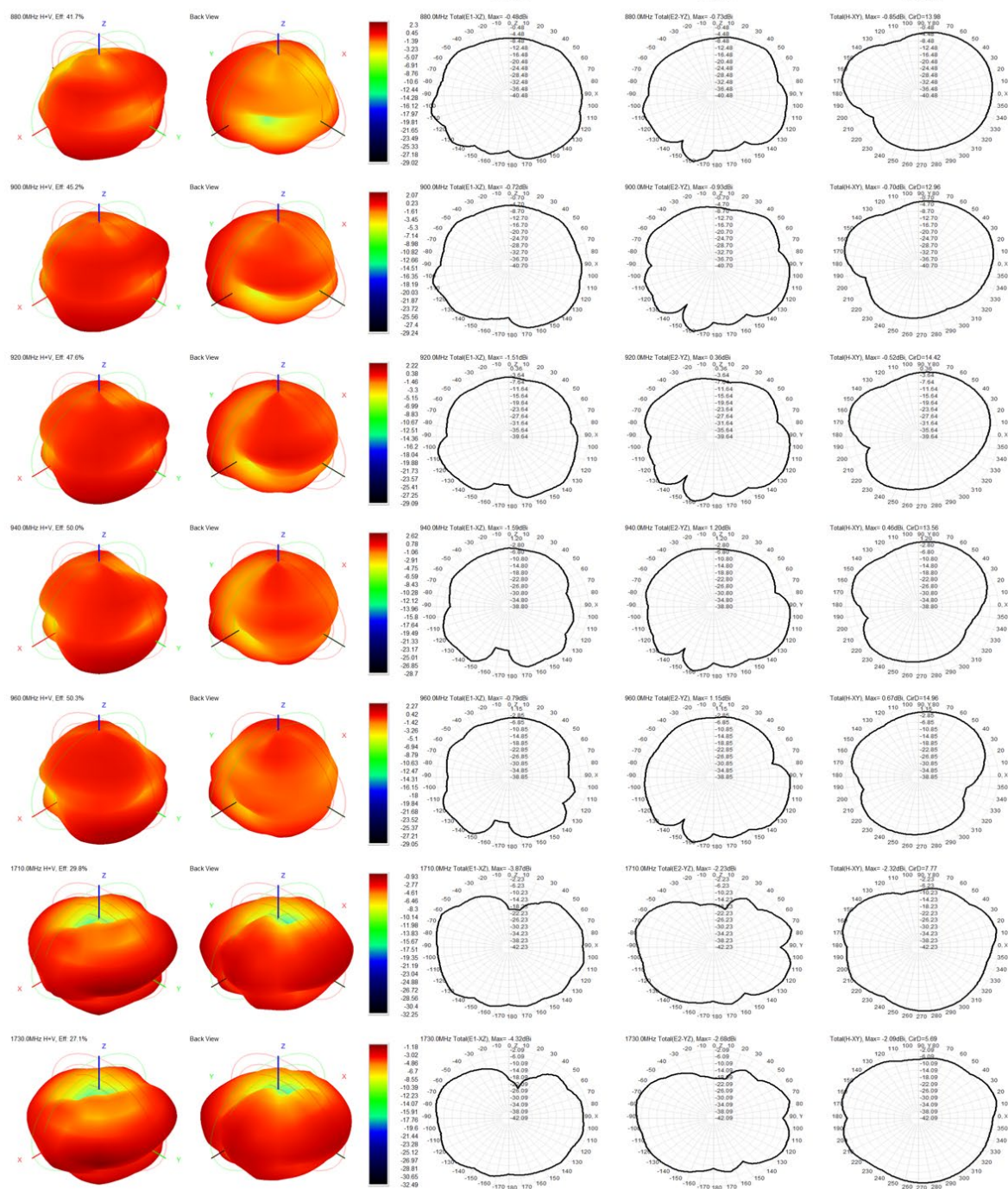
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Frequency (MHz)	1810	1830	1850	1870	1890	1910	1930	1950	1970	1990	2010	2030	2050	2070	2090	2110	2130	2150	2170	2300	2320	2340	2360	2380
Efficiency (dBi)	-5.44	-5.05	-6.12	-5.97	-5.23	-5.91	-5.84	-4.51	-4.77	-5.93	-5.43	-5.49	-6.43	-5.70	-4.82	-5.47	-5.66	-4.86	-5.48	-5.41	-6.54	-6.14	-5.35	-6.14
Gain (dBi)	0.64	1.84	0.98	0.74	1.37	0.81	0.74	2.65	2.35	0.77	0.78	0.84	0.36	1.27	2.00	1.41	0.93	1.32	1.06	0.44	-0.88	-0.20	0.16	-1.67
Efficiency (%)	28.56	31.29	24.43	25.28	30.00	25.62	26.08	35.43	33.36	25.55	28.66	28.28	22.73	26.90	32.98	28.40	27.15	32.66	28.34	28.80	22.17	24.32	29.15	24.32
Directivity (dB)	6.08	6.89	7.10	6.71	6.60	6.73	6.58	7.15	7.12	6.69	6.21	6.32	6.80	6.97	6.82	6.88	6.59	6.18	6.53	5.84	5.66	5.94	5.51	4.47
Peak Gain Position (Theta)	135.00	135.00	135.00	135.00	135.00	120.00	135.00	135.00	120.00	135.00	135.00	135.00	135.00	135.00	120.00	135.00	135.00	135.00	135.00	135.00	90.00	90.00	90.00	90.00
Peak Gain Position (Phi)	150.00	150.00	150.00	150.00	165.00	45.00	150.00	150.00	150.00	60.00	135.00	150.00	150.00	150.00	60.00	135.00	135.00	150.00	150.00	135.00	135.00	120.00	120.00	120.00
Efficiency ThetaPol (%)	23.75	25.43	19.39	19.72	23.16	19.97	20.86	28.39	26.12	19.86	22.79	22.70	18.33	21.94	27.00	23.42	22.70	27.39	23.85	26.29	20.24	22.15	26.60	22.56
Efficiency PhiPol (%)	4.81	5.86	5.04	5.56	6.84	5.66	5.22	7.04	7.24	5.70	5.87	5.57	4.40	4.96	5.98	4.98	4.45	5.27	4.48	2.51	1.94	2.17	2.55	1.76
Upper Hem. Efficiency (%)	9.07	9.40	7.15	7.28	8.65	7.68	7.96	10.08	8.75	6.77	8.09	8.54	7.19	7.85	8.66	7.60	7.64	9.50	8.09	10.17	8.58	10.19	12.52	10.72
Lower Hem. Efficiency (%)	19.49	21.89	17.28	18.00	21.36	17.95	18.12	25.35	24.61	18.78	20.57	19.73	15.55	19.05	24.32	20.79	19.51	23.16	20.25	18.63	13.59	14.14	16.63	13.60

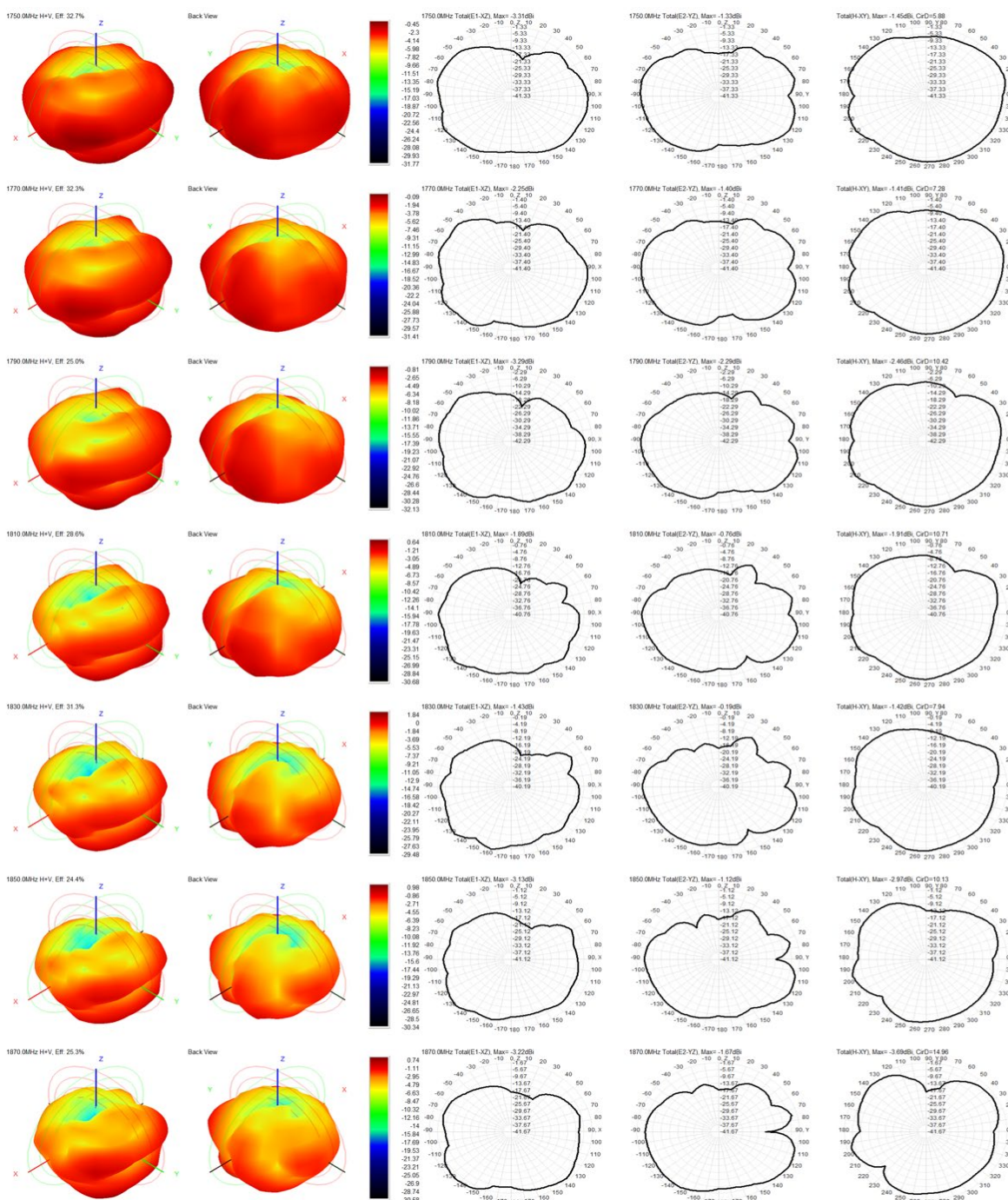
Frequency ID	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
Frequency (MHz)	2400	2420	2440	2460	2480	2500	2520	2540	2560	2580	2600	2620	2640	2660	2680	2700	3560	3580	3600	3620	3640	3660	3680	3700
Efficiency (dBi)	-6.08	-5.31	-5.60	-5.30	-4.51	-4.91	-5.87	-5.99	-5.25	-5.05	-4.81	-4.32	-4.55	-6.39	-7.20	-6.48	-8.54	-8.81	-9.57	-8.08	-7.96	-8.62	-7.87	-7.64
Gain (dBi)	-2.01	-0.74	-0.72	0.13	0.38	-0.34	-1.19	-1.37	-1.10	-0.25	-0.08	0.12	-0.02	-2.09	-2.78	-1.41	-3.68	-3.10	-4.71	-2.37	-1.44	-2.82	-2.09	-1.51
Efficiency (%)	24.67	29.43	27.52	29.50	35.39	32.30	25.88	25.18	29.84	31.29	33.00	37.00	35.09	22.97	19.04	22.47	14.00	13.14	11.05	15.57	16.01	13.73	16.34	17.22
Directivity (dB)	4.07	4.58	4.88	5.44	4.89	4.57	4.68	4.62	4.16	4.79	4.74	4.44	4.53	4.30	4.42	5.07	4.86	5.72	4.86	5.71	6.52	5.81	5.77	6.13
Peak Gain Position (Theta)	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	45.00	165.00	45.00	105.00	105.00	105.00	105.00	150.00
Peak Gain Position (Phi)	75.00	105.00	105.00	120.00	120.00	75.00	105.00	105.00	105.00	120.00	120.00	75.00	75.00	105.00	105.00	120.00	240.00	75.00	75.00	135.00	135.00	135.00	75.00	165.00
Efficiency ThetaPol (%)	23.27	27.82	26.02	28.23	34.10	31.01	24.84	24.31	28.87	30.30	32.04	35.83	33.71	22.04	18.28	21.38	12.38	11.32	9.73	13.52	13.38	11.34	13.45	14.07
Efficiency PhiPol (%)	1.40	1.60	1.50	1.27	1.29	1.29	1.04	0.87	0.96	0.99	0.96	1.16	1.39	0.93	0.76	1.09	1.63	1.82	1.32	2.05	2.63	2.39	2.89	3.15
Upper Hem. Efficiency (%)	11.29	14.15	13.78	14.46	17.11	16.13	13.74	14.23	17.67	18.95	19.90	22.31	22.01	14.93	12.21	13.79	10.04	8.60	7.19	10.04	9.78	8.15	9.62	9.98
Lower Hem. Efficiency (%)	13.38	15.28	13.74	15.04	18.28	16.17	12.13	10.95	12.17	12.34	13.10	14.69	13.08	8.04	6.84	8.68	3.96	4.54	3.86	5.52	6.23	5.58	6.72	7.24

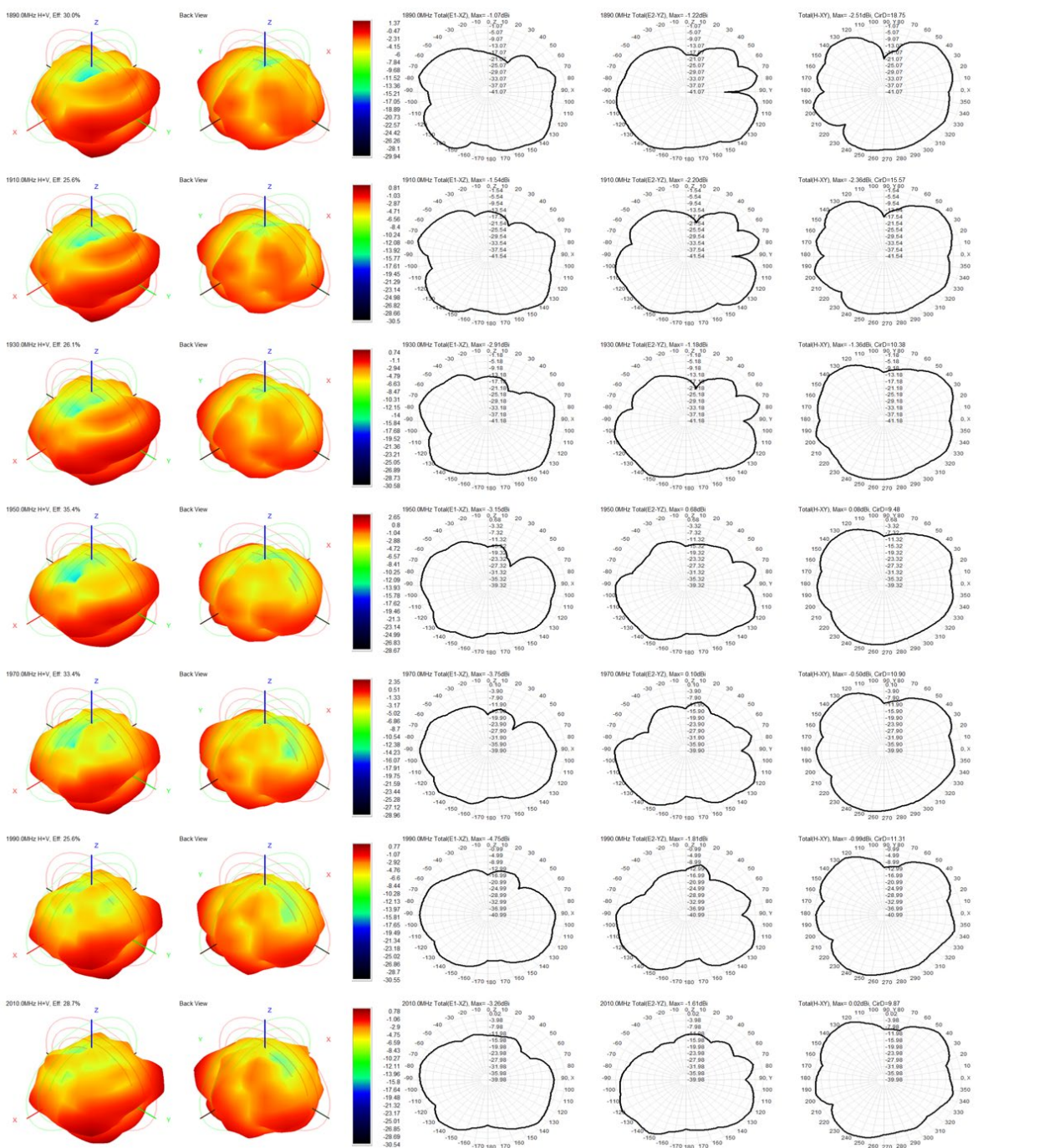
(The above data are based on measurements conducted by Ruida YL Laboratory.)

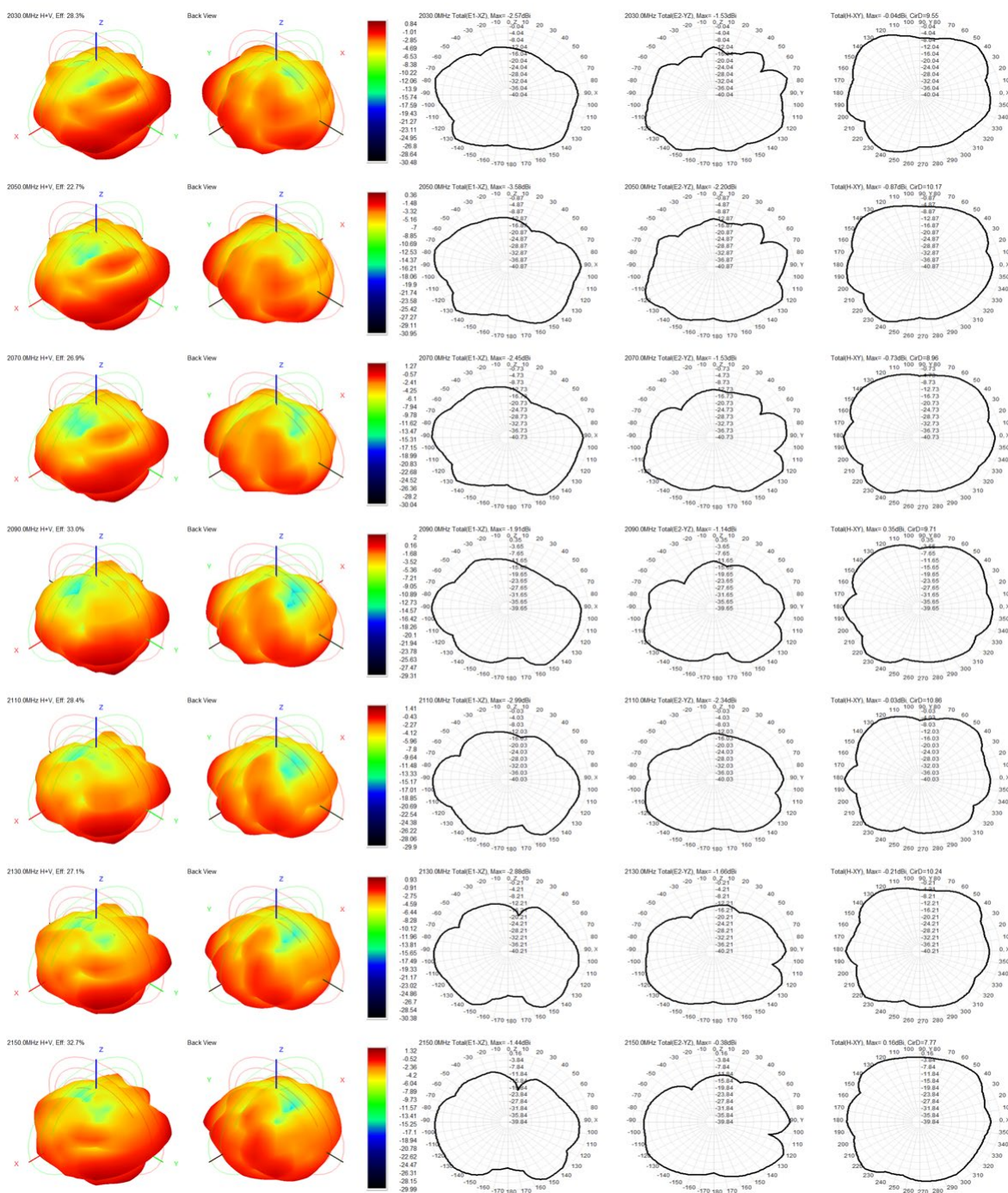


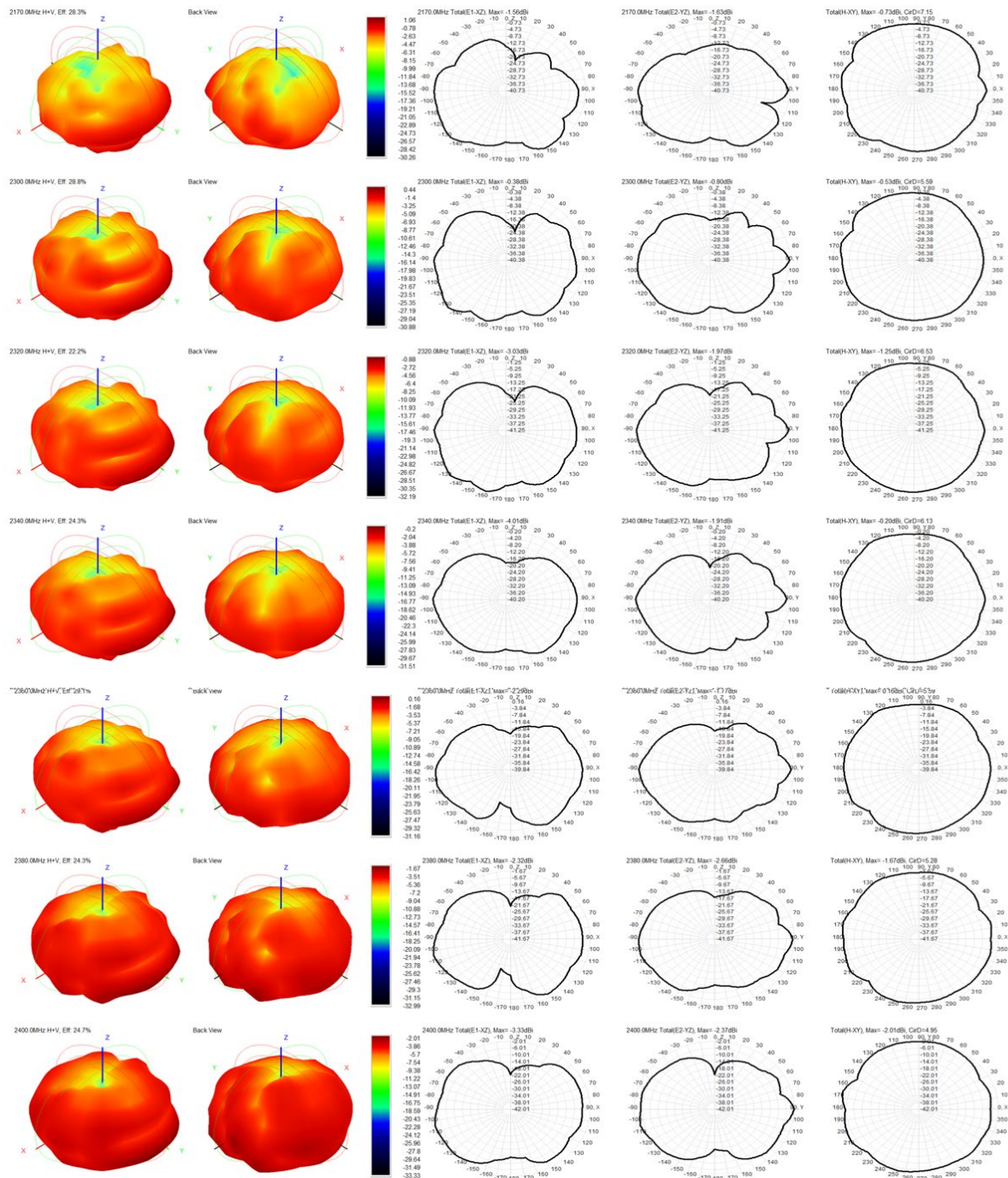


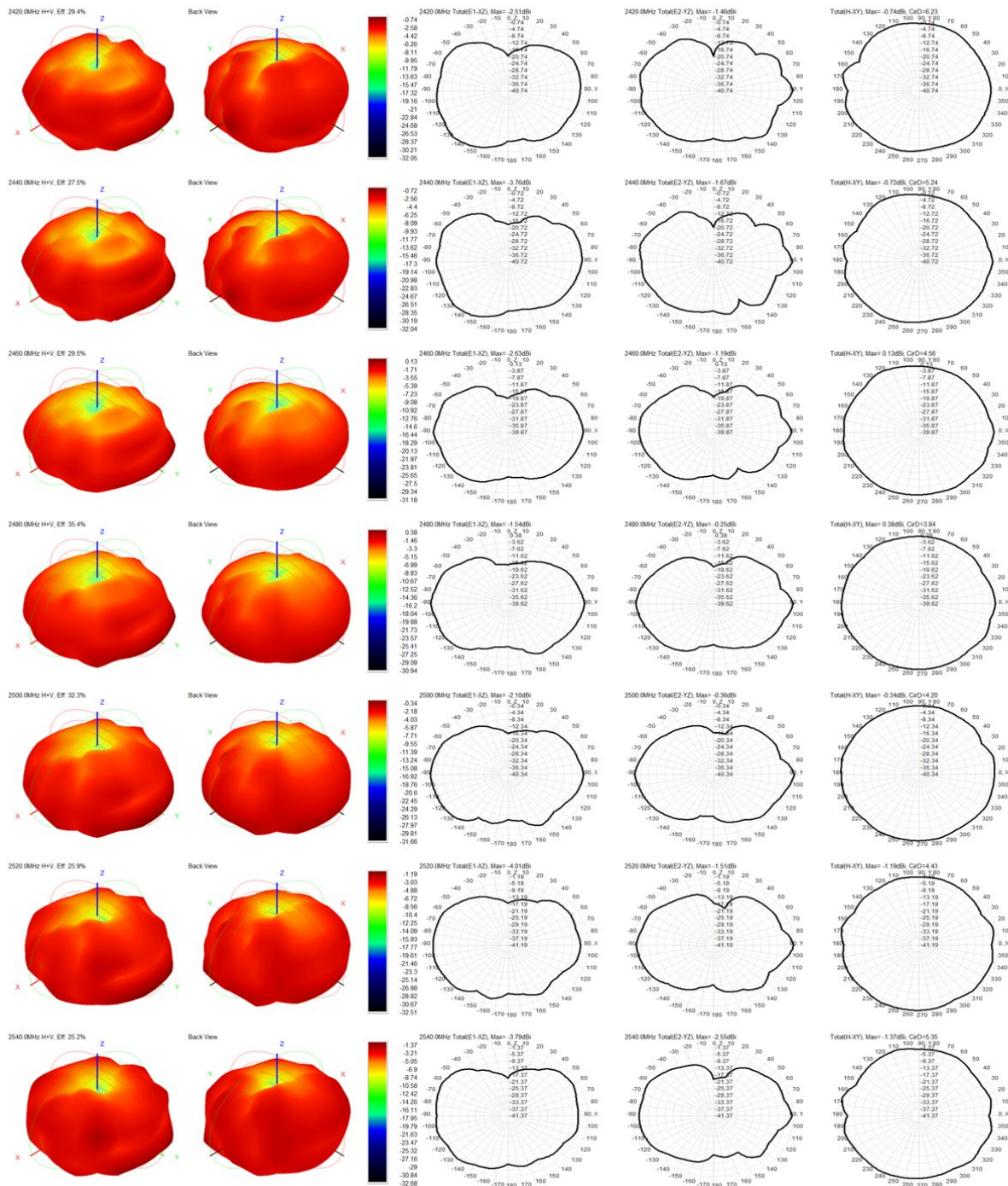


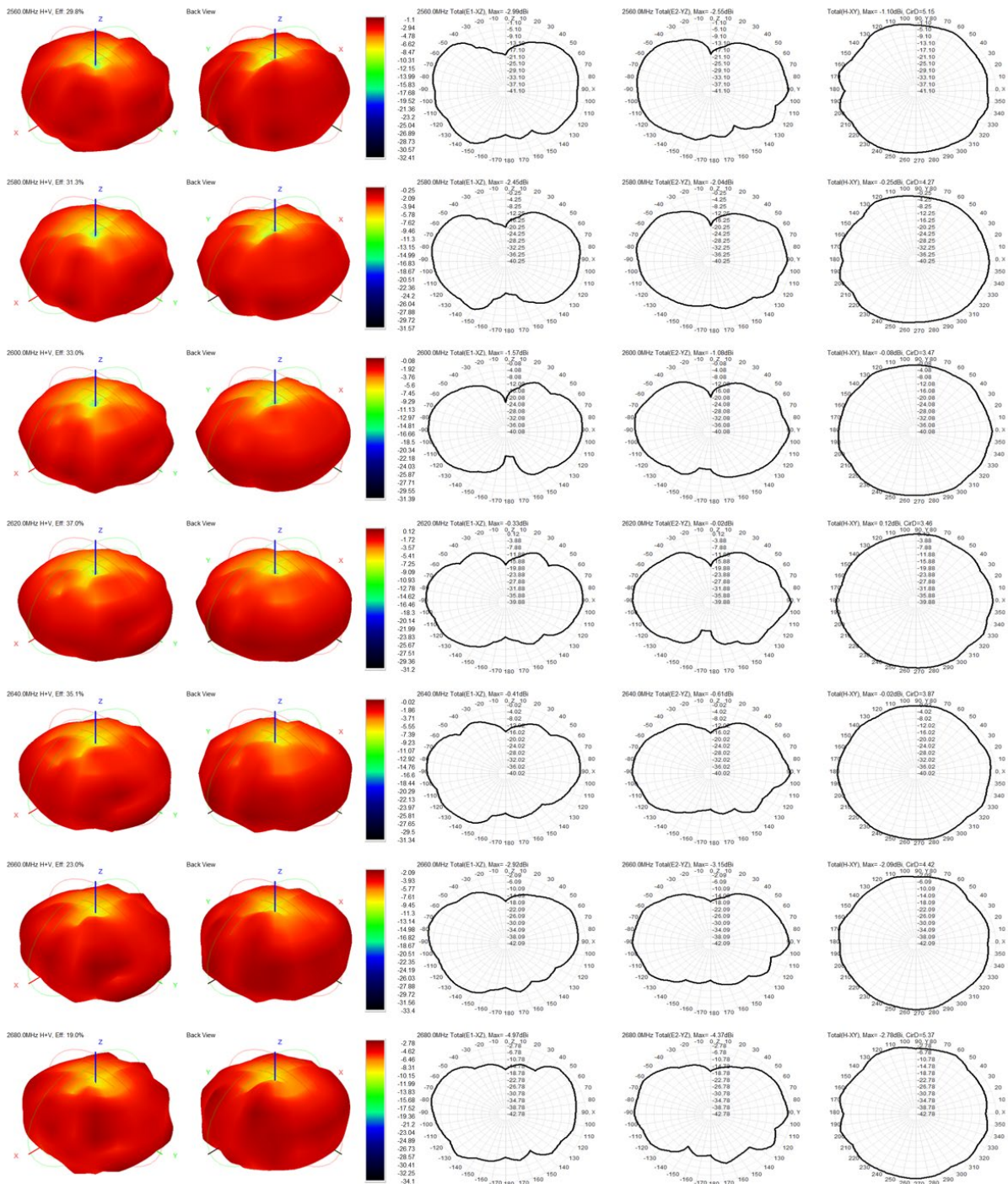


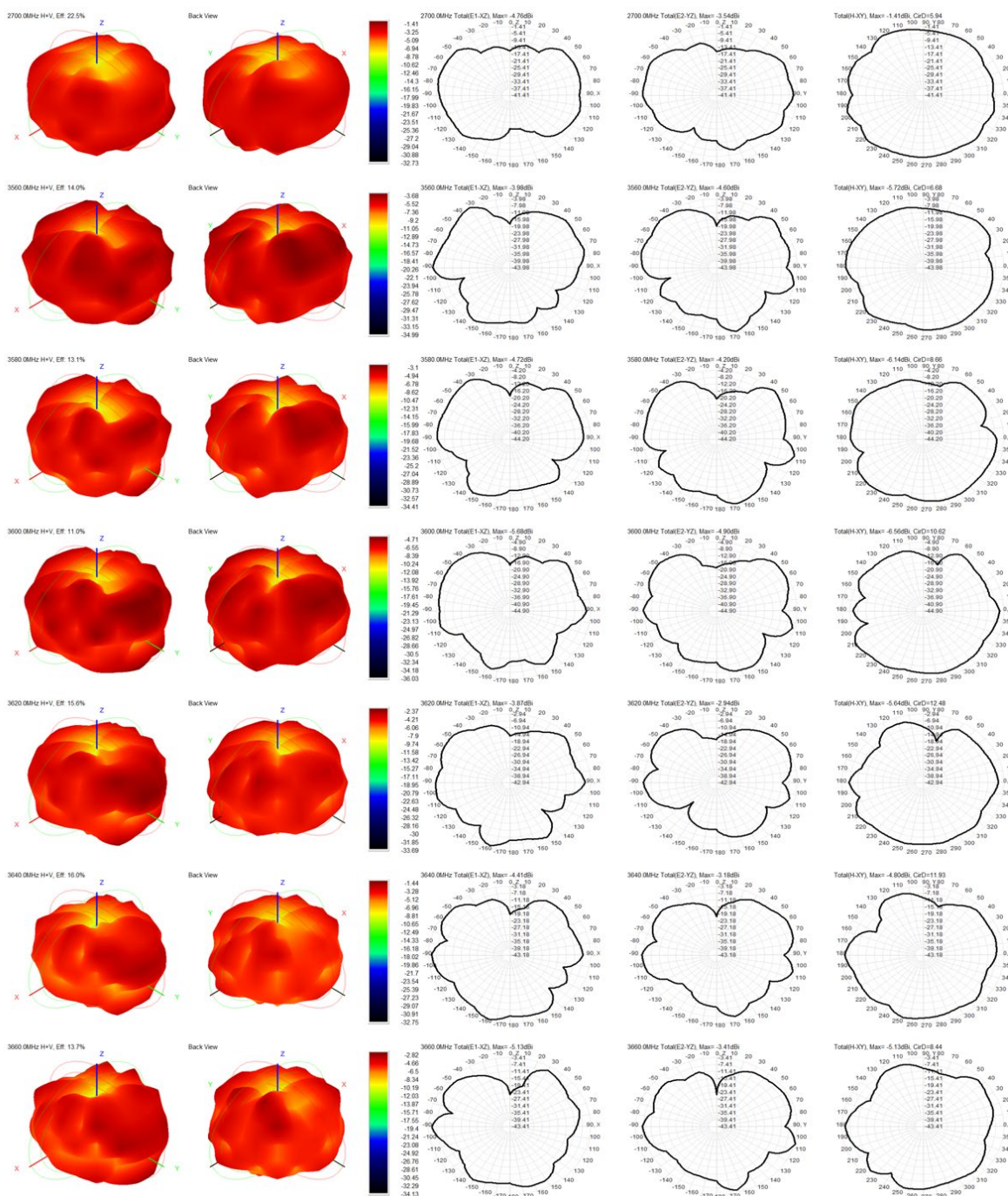


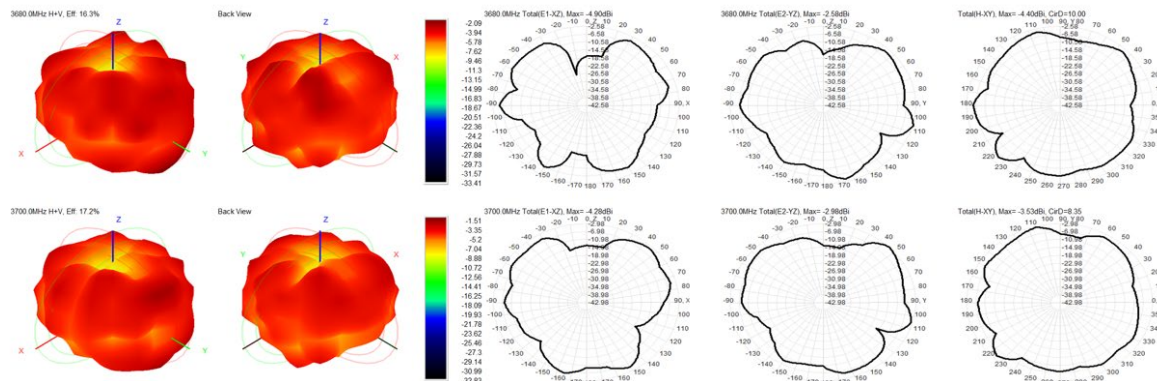












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