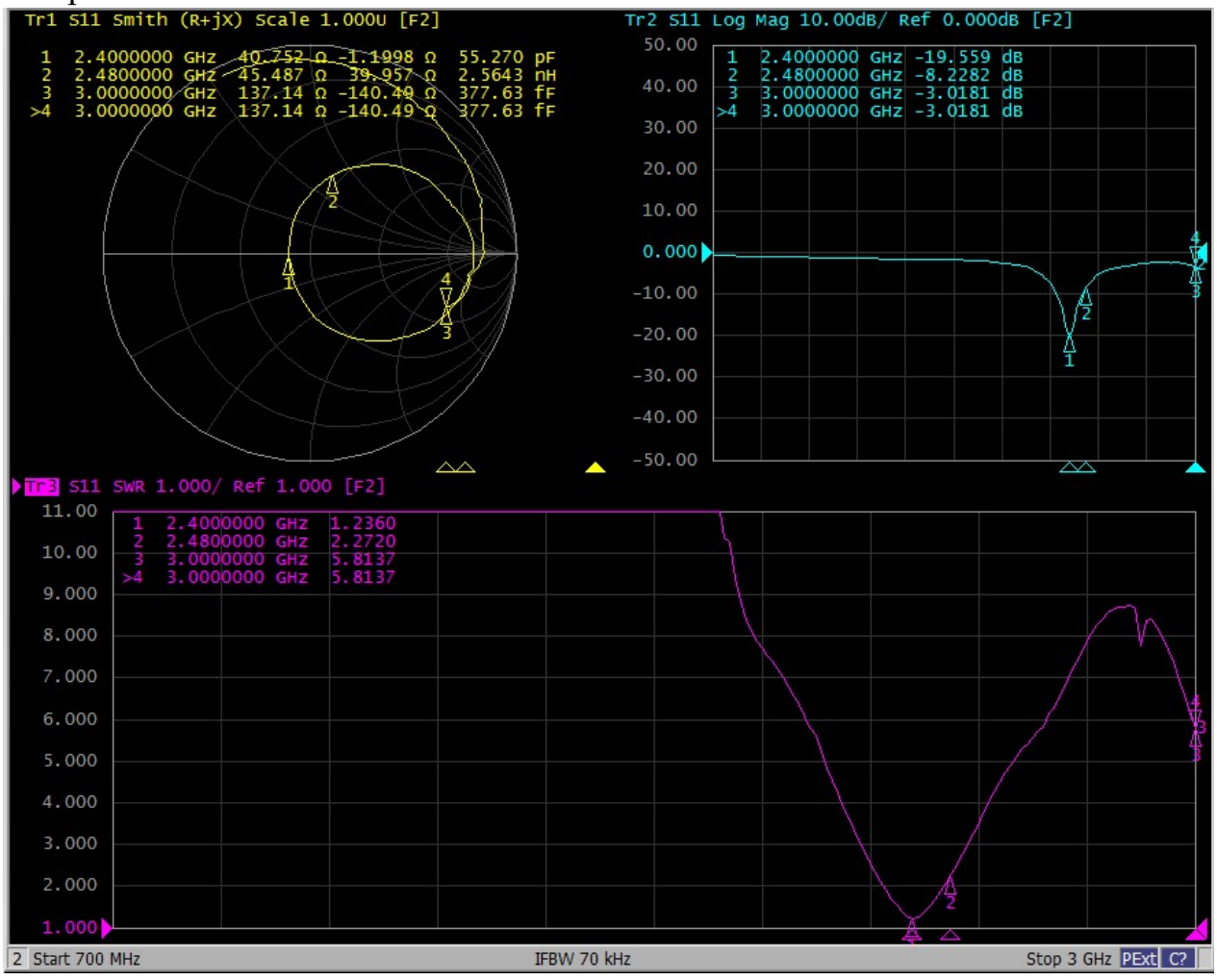
I: The report of passive data

Angilent E5071C

S11 parameter：



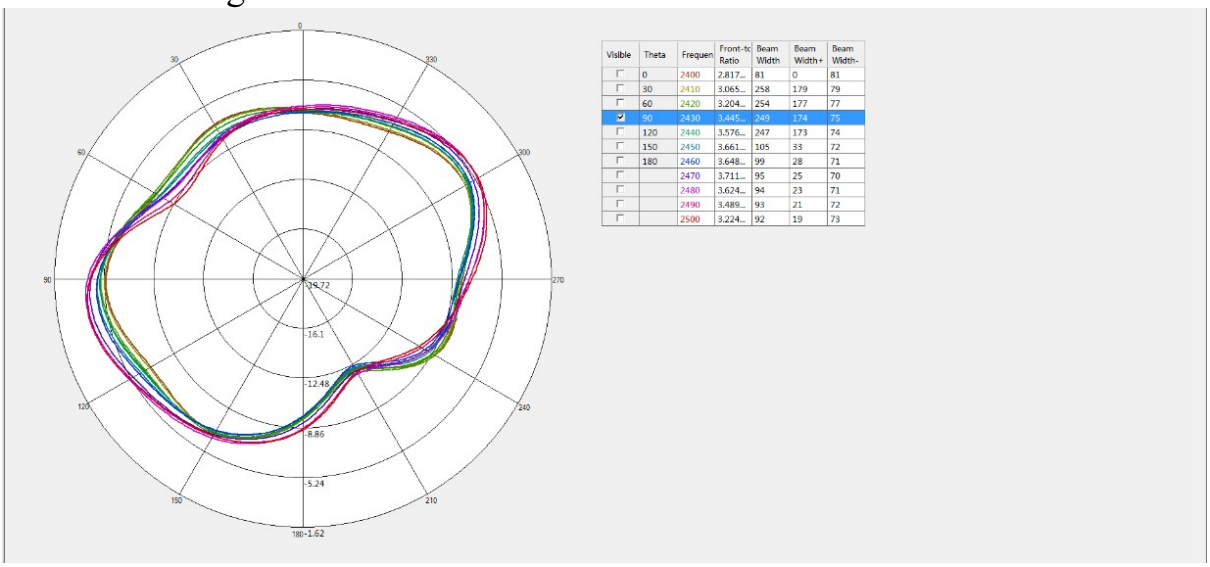
Efficiency：

Free space			
Frequency（MHz）	Efficiency	Efficiency (dB)	Gain (dBi)
2400	20.67	-6.8	-3.5
2410	20.72	-6.8	-3.4
2420	21.08	-6.8	-3.2
2430	20.55	-6.9	-3.1
2440	20.22	-6.9	-2.9
2450	20.78	-6.8	-2.6
2460	20.53	-6.9	-2.4
2470	22.04	-6.6	-2.0
2480	23.06	-6.4	-1.7
Average value	21.07	-6.77	-2.75

Headform			
Frequency（MHz）	Efficiency	Efficiency (dB)	Gain (dBi)
2400	9.31	-10.3	-3.2
2410	9.27	-10.3	-3.2
2420	9.29	-10.3	-3.3
2430	8.93	-10.5	-3.4
2440	8.57	-10.7	-3.6
2450	8.55	-10.7	-3.7
2460	8.18	-10.9	-3.9
2470	8.47	-10.7	-3.8
2480	8.51	-10.7	-3.9
Average value	8.79	-10.57	-3.57

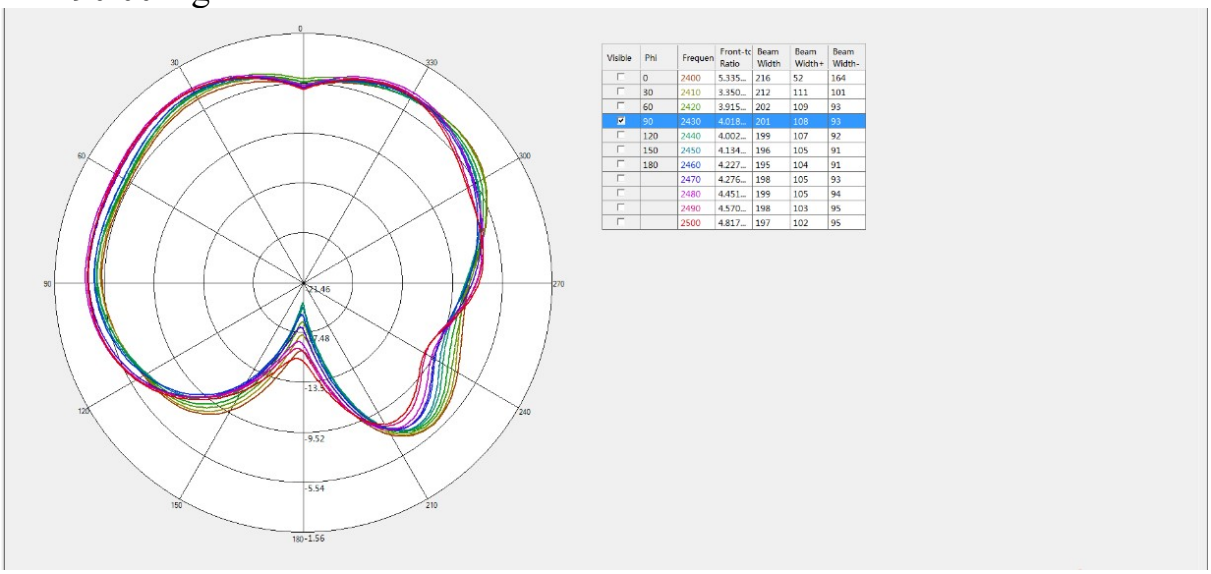
Antenna radiation pattern（Free space）:

Theta=90.00deg



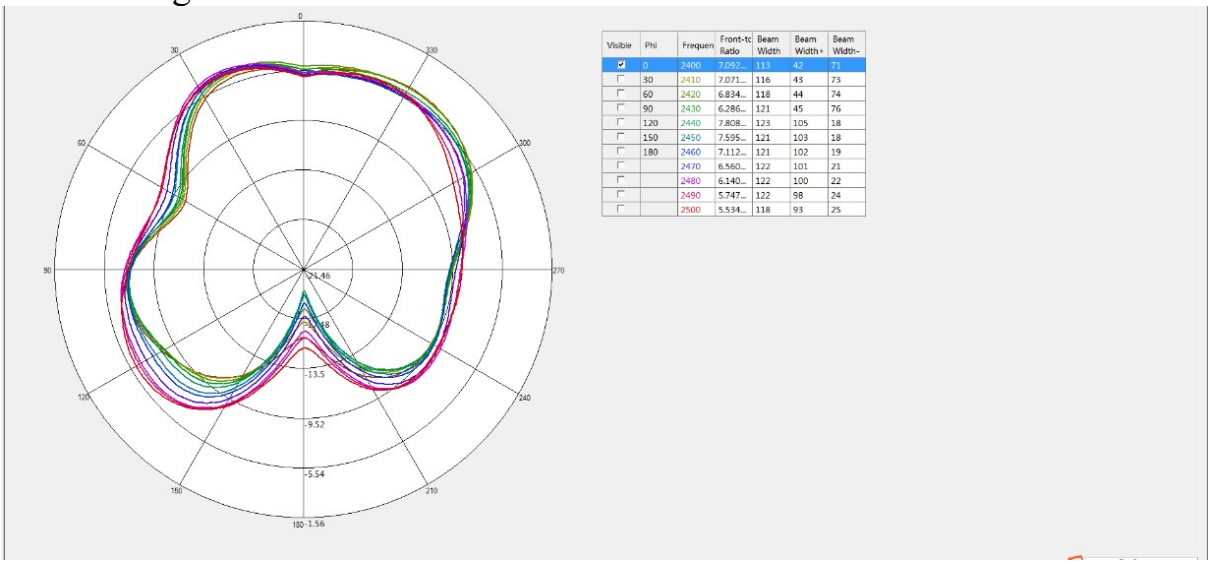
Visible	Theta	Frequen	Front-to Ratio	Beam Width	Beam Width+	Beam Width-
☐	0	2400	2.817...	81	0	81
☐	30	2410	3.065...	258	179	79
☐	60	2420	3.204...	254	177	77
☑	90	2430	3.445...	249	174	75
☐	120	2440	3.576...	247	173	74
☐	150	2450	3.661...	105	33	72
☐	180	2460	3.648...	99	28	71
☐		2470	3.711...	95	25	70
☐		2480	3.624...	94	23	71
☐		2490	3.489...	93	21	72
☐		2500	3.224...	92	19	73

Phi=90.00deg



Visible	Phi	Frequen	Front-to Ratio	Beam Width	Beam Width+	Beam Width-
☐	0	2400	5.335...	216	52	164
☐	30	2410	3.350...	212	111	101
☐	60	2420	3.915...	202	109	93
☑	90	2430	4.018...	201	108	93
☐	120	2440	4.002...	199	107	92
☐	150	2450	4.134...	196	105	91
☐	180	2460	4.227...	195	104	91
☐		2470	4.276...	198	105	93
☐		2480	4.451...	199	105	94
☐		2490	4.570...	198	103	95
☐		2500	4.817...	197	102	95

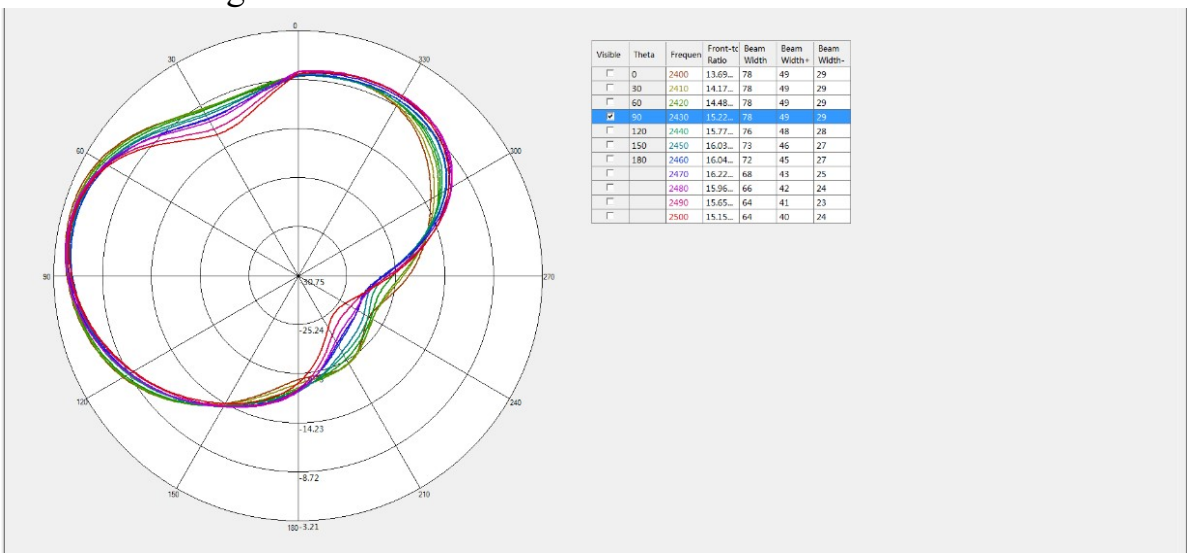
Phi=0.00deg



Visible	Phi	Frequen	Front-to Ratio	Beam Width	Beam Width+	Beam Width-
☑	0	2400	7.092...	113	42	71
☐	30	2410	7.071...	116	43	73
☐	60	2420	6.834...	118	44	74
☐	90	2430	6.286...	121	45	76
☐	120	2440	7.808...	123	105	18
☐	150	2450	7.595...	121	103	18
☐	180	2460	7.112...	121	102	19
☐		2470	6.560...	122	101	21
☐		2480	6.140...	122	100	22
☐		2490	5.747...	122	98	24
☐		2500	5.534...	118	93	25

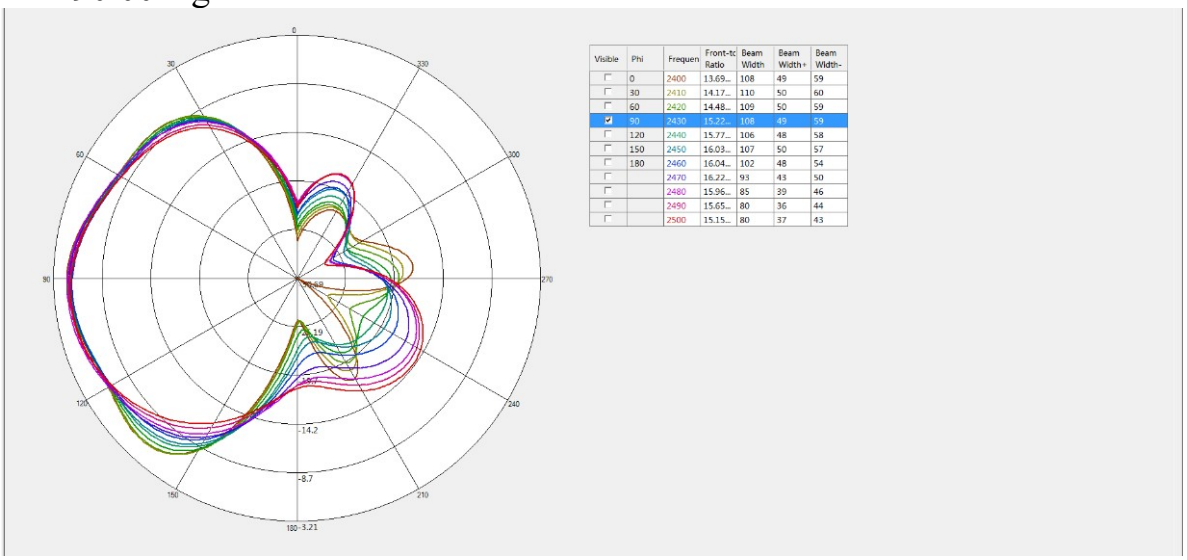
Antenna radiation pattern（Headform）:

Theta=90.00deg



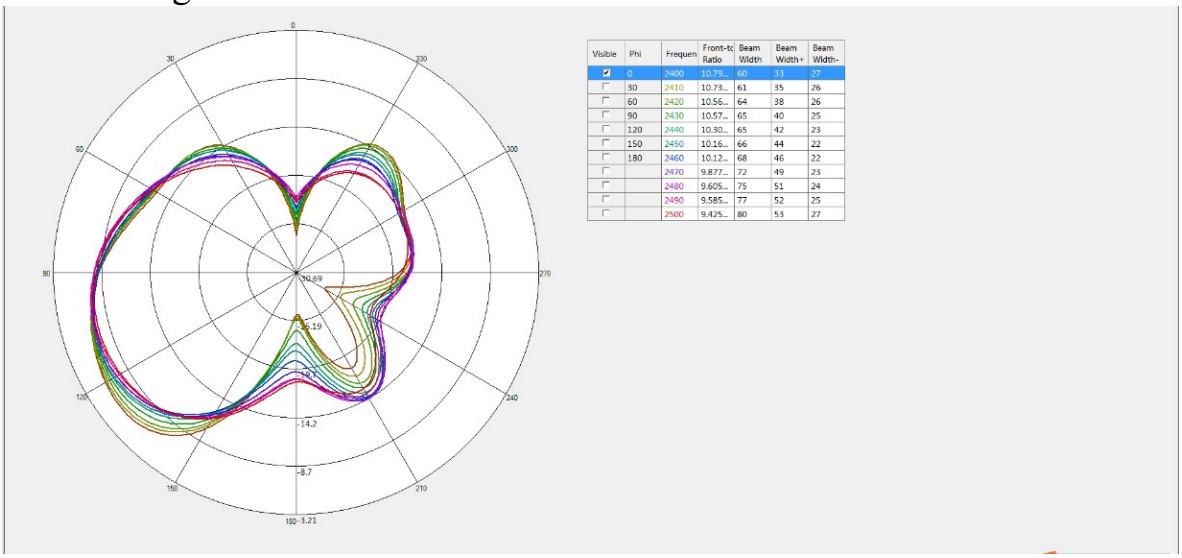
Visible	Theta	Frequen	Front-to Ratio	Beam Width	Beam Width+	Beam Width-
☐	0	2400	13.69...	78	49	29
☐	30	2410	14.17...	78	49	29
☐	60	2420	14.48...	78	49	29
☑	90	2430	15.22...	78	49	29
☐	120	2440	15.77...	76	48	28
☐	150	2450	16.03...	73	46	27
☐	180	2460	16.04...	72	45	27
☐		2470	16.22...	68	43	25
☐		2480	15.96...	66	42	24
☐		2490	15.65...	64	41	23
☐		2500	15.15...	64	40	24

Phi=90.00deg



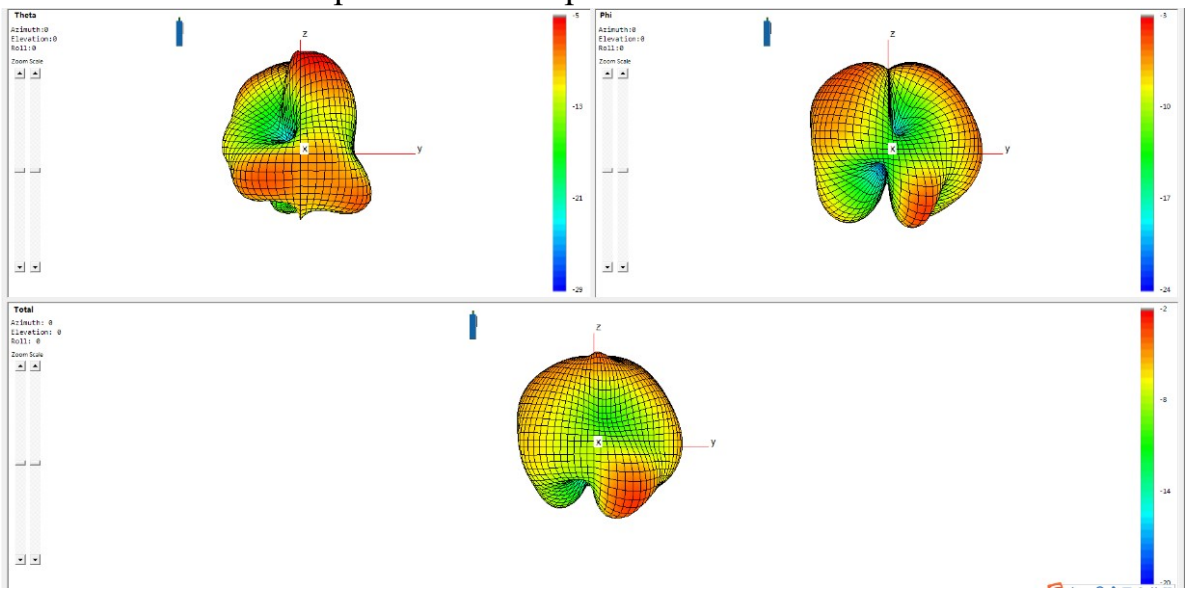
Visible	Phi	Frequen	Front-to Ratio	Beam Width	Beam Width+	Beam Width-
☐	0	2400	13.69...	108	49	59
☐	30	2410	14.17...	110	50	60
☐	60	2420	14.48...	109	50	59
☑	90	2430	15.22...	108	49	59
☐	120	2440	15.77...	106	48	58
☐	150	2450	16.03...	107	50	57
☐	180	2460	16.04...	102	48	54
☐		2470	16.22...	93	43	50
☐		2480	15.96...	85	39	46
☐		2490	15.65...	80	36	44
☐		2500	15.15...	80	37	43

Phi=0.00deg

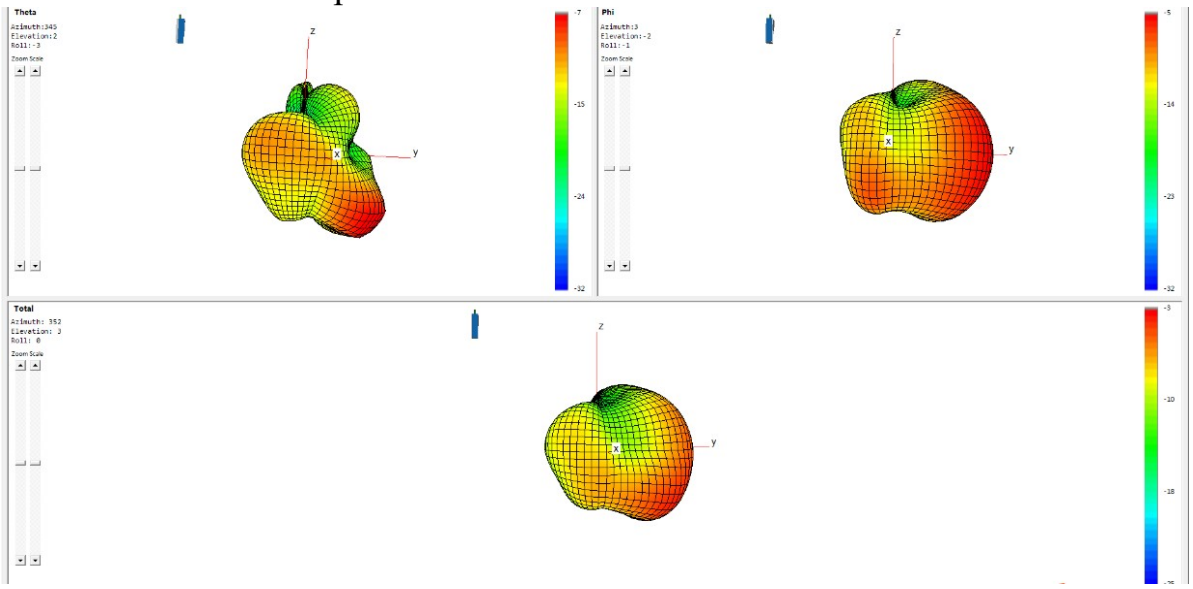


Visible	Phi	Frequen	Front-to Ratio	Beam Width	Beam Width+	Beam Width-
☑	0	2400	10.79...	60	33	27
☐	30	2410	10.73...	61	35	26
☐	60	2420	10.56...	64	38	26
☐	90	2430	10.57...	65	40	25
☐	120	2440	10.30...	65	42	23
☐	150	2450	10.16...	66	44	22
☐	180	2460	10.12...	68	46	22
☐		2470	9.877...	72	49	23
☐		2480	9.605...	75	51	24
☐		2490	9.585...	77	52	25
☐		2500	9.425...	80	53	27

3D Antenna radiation pattern（Free space）:



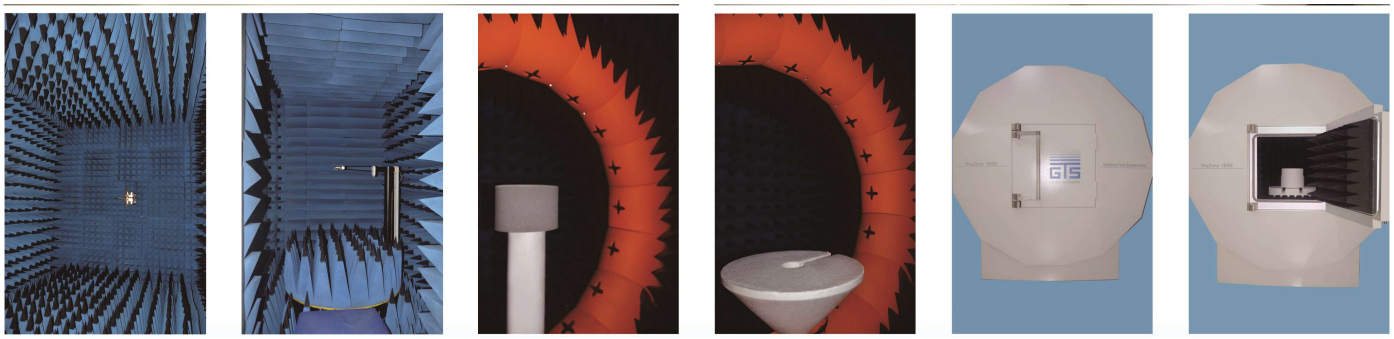
3D Antenna radiation pattern（Headform）:



II：3D Active test report of antenna

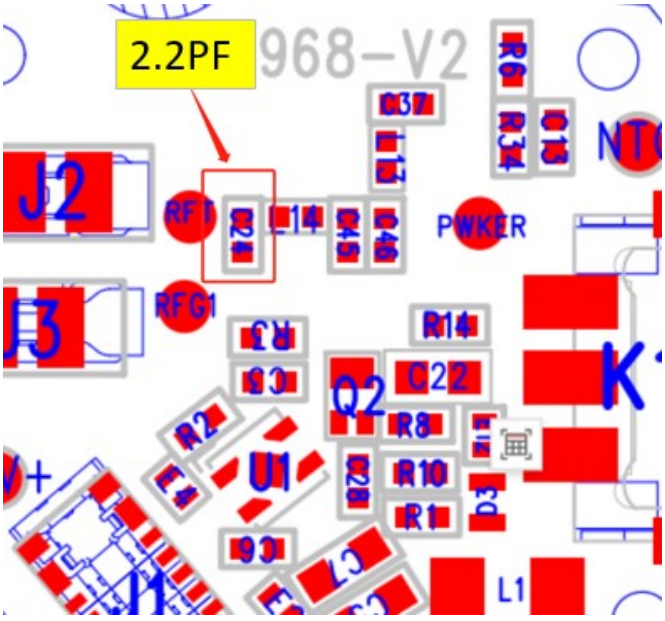
Free space	Channel	TRP（dBm）	TIS（dBm）
R	CH 0	8.5	-92.5
	CH 39	8.2	-92.1
	CH 78	7.6	-91.7

Headform	Channel	TRP（dBm）	TIS（dBm）
R	CH 0	3.2	-86.3
	CH 39	2.4	-85.8
	CH 78	1.5	-85.4

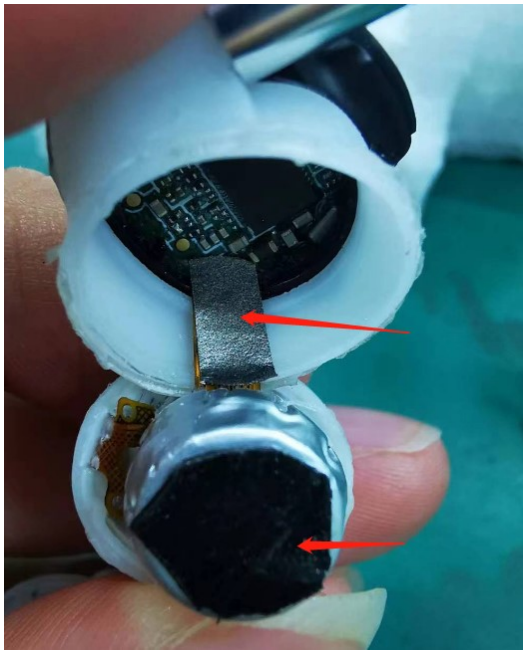


OTA Standard Chamber

III：Matching circuit



IV：Environmental treatment plan



1. Stick the same width of absorbing material near the BTB seat of the main FPC to the battery position.
2. Stick PET foam in the direction near the chip to separate the battery from the chip and prevent direct contact.

V：Structure file：