Shenzhen xingtong wireless technology co.,
Telephone：+86-755-27850514 Fax：+86-0755-27850514
Address: 3/F, Building A1, Qiangrongdong Industrial Zone,
Jiuwei, Xixiang, Baoan District, Shenzhen

Product specification

Product number: MT022

Product name: MT022-LTE-ANT

Product item number:ANT-MT022-LTE-ANT-XT002

Producer	Audit	Date
Huangjiajun	Wu Yanlong	2024-07-11

Customer confirmation:

Customer name: Shenzhen Xinruizhi Industrial Co., Ltd
Approval ： Date ：
Notes ：

Please accept your signature and seal and return one copy to our company for filing. Thank you for your cooperation!

1.Product Constrution:

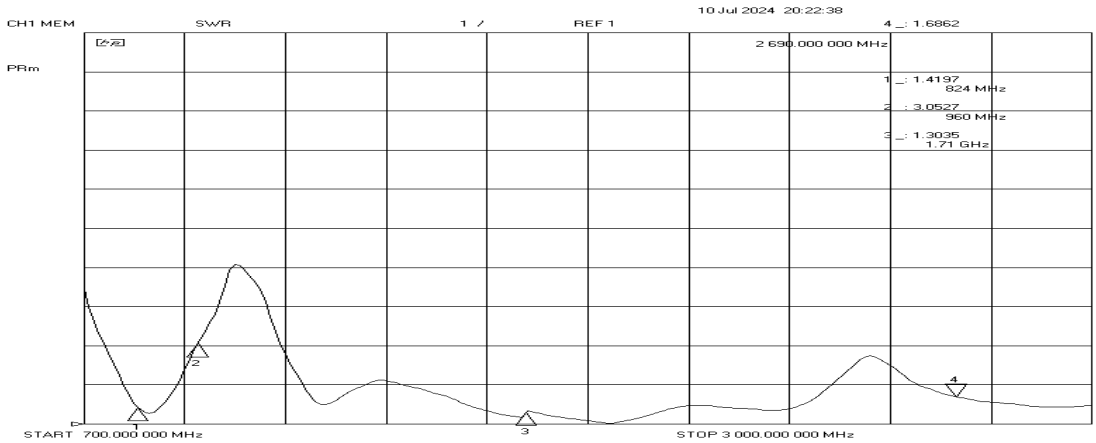
- 1. Antenna material：FPC
- 2. Adhesive type：3M9470
- 3. Antenna size：See engineering drawing at the end page
- 4. Coaxial line size：not have

2. parameters

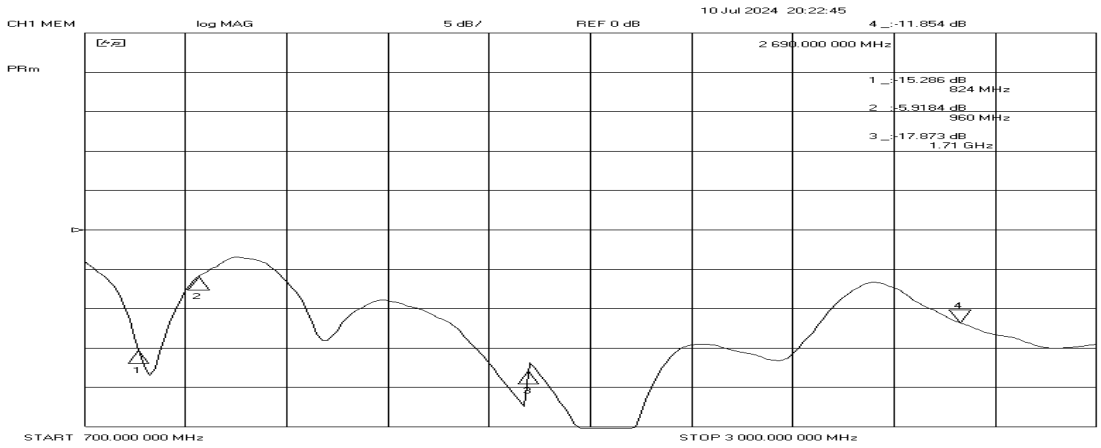
- Scope of use: customer-supplied machines
- Antenna frequency: 703-960Mhz 1710-2690Mhz
- Polarization method: horizontal/vertical
- Antenna free space gain: 2G≥-6.37dbi 3G≥-2.87dbi 4G≥-2.34dbi
- Installation mode: Antenna pasted inside the bottom shell
- Packing method: use PE bag+packing box

3.S11 value of antenna (S11)

- 3.1：antenna standing wave ratio



- 3.2：Antenna return loss value



4.Antenna performance (OTA)

■ 4.1：Antenna matching recommendations

Matching without modification

■ 4.2：Antenna OTA/ efficiency/gain (test instruments: network analyzer, oscilloscope, customer engineering prototype, various standard cards, etc.)

Low-frequency-2D

700-900Mhz

Frequency ID	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Frequency (MHz)	700.0	710.0	720.0	730.0	740.0	750.0	760.0	770.0	780.0	790.0	800.0	810.0	820.0	830.0	840.0	850.0	860.0	870.0	880.0	890.0	900.0
Efficiency (dBi)	-9.88	-9.82	-9.57	-9.65	-9.34	-9.00	-8.62	-8.52	-8.45	-8.37	-8.44	-8.20	-8.00	-7.95	-7.65	-7.26	-7.08	-6.54	-6.31	-6.15	-5.94
Gain (dBi)	-6.37	-6.35	-6.03	-6.22	-5.57	-5.02	-4.70	-4.75	-4.56	-4.54	-4.73	-4.46	-3.97	-3.70	-3.27	-2.90	-2.90	-2.61	-2.45	-2.16	-1.73
Efficiency (%)	10.29	10.42	11.05	10.85	11.65	12.58	13.73	14.07	14.30	14.54	14.33	15.13	15.85	16.05	17.17	18.81	19.57	22.17	23.36	24.29	25.45
Directivity (dB)	3.51	3.48	3.54	3.43	3.77	3.98	3.92	3.77	3.89	3.84	3.70	3.74	4.03	4.24	4.38	4.36	4.18	3.94	3.86	3.98	4.21
Peak Gain Position (Theta)	120.00	90.00	90.00	90.00	135.00	135.00	135.00	105.00	105.00	105.00	105.00	135.00	135.00	135.00	135.00	135.00	135.00	135.00	135.00	135.00	135.00
Peak Gain Position (Phi)	255.00	285.00	285.00	285.00	75.00	75.00	75.00	270.00	270.00	270.00	270.00	255.00	255.00	240.00	240.00	240.00	240.00	240.00	255.00	255.00	255.00
Efficiency ThetaPol (%)	7.31	7.31	7.72	7.59	8.28	9.08	9.97	10.18	10.26	10.35	10.07	10.53	10.92	10.95	11.67	12.67	13.12	14.89	15.68	16.23	16.91
Efficiency PhiPol (%)	2.98	3.10	3.32	3.26	3.37	3.50	3.77	3.90	4.04	4.19	4.26	4.60	4.93	5.10	5.50	6.14	6.45	7.28	7.68	8.05	8.54
Upper Hem. Efficiency (%)	2.88	3.11	3.44	3.35	3.36	3.29	3.35	3.41	3.61	3.89	4.03	4.37	4.53	4.34	4.33	4.63	4.90	5.72	6.25	6.69	7.09
Lower Hem. Efficiency (%)	7.40	7.31	7.60	7.50	8.29	9.29	10.38	10.66	10.70	10.66	10.30	10.76	11.31	11.71	12.84	14.18	14.67	16.45	17.12	17.60	18.36

880-960Mhz

19	20	21	22	23	24	25	26	27
880.0	890.0	900.0	910.0	920.0	930.0	940.0	950.0	960.0
-6.31	-6.15	-5.94	-5.81	-5.88	-5.88	-6.00	-6.24	-6.50
-2.45	-2.16	-1.73	-1.39	-1.38	-1.38	-1.58	-1.66	-1.70
23.36	24.29	25.45	26.22	25.79	25.83	25.12	23.77	22.37
3.86	3.98	4.21	4.42	4.50	4.50	4.42	4.58	4.80
135.00	135.00	135.00	135.00	135.00	135.00	135.00	105.00	105.00
255.00	255.00	255.00	255.00	255.00	255.00	240.00	270.00	270.00
15.68	16.23	16.91	17.28	16.94	16.92	16.45	15.44	14.26
7.68	8.05	8.54	8.94	8.86	8.92	8.67	8.33	8.10
6.25	6.69	7.09	7.22	6.82	6.46	6.03	5.74	5.53
17.12	17.60	18.36	19.01	18.98	19.38	19.08	18.03	16.84

Mid-frequency-2D

1710-2170Mhz

Frequency ID	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Frequency (MHz)	1700.0	1710.0	1720.0	1730.0	1740.0	1750.0	1760.0	1770.0	1780.0	1790.0	1800.0	1810.0	1820.0	1830.0	1840.0	1850.0	1860.0	1870.0
Efficiency (dBi)	-6.95	-6.95	-7.02	-6.90	-6.91	-7.08	-7.05	-6.92	-7.01	-6.75	-6.72	-6.69	-6.53	-6.37	-6.44	-6.09	-6.04	-6.15
Gain (dBi)	-2.87	-2.66	-2.75	-2.58	-2.71	-2.66	-2.42	-2.07	-1.91	-1.54	-1.57	-1.57	-1.59	-1.41	-1.42	-0.99	-0.95	-1.23
Efficiency (%)	20.17	20.17	19.84	20.42	20.37	19.59	19.74	20.33	19.89	21.16	21.30	21.44	22.24	23.08	22.71	24.62	24.87	24.24
Directivity (dB)	4.09	4.30	4.28	4.32	4.20	4.42	4.62	4.85	5.10	5.21	5.14	5.12	4.94	4.96	5.02	5.09	5.09	4.93
Peak Gain Position (Theta)	135.00	135.00	135.00	135.00	135.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00
Peak Gain Position (Phi)	120.00	135.00	135.00	135.00	135.00	75.00	75.00	90.00	105.00	105.00	120.00	105.00	105.00	105.00	105.00	105.00	105.00	75.00
Efficiency ThetaPol (%)	14.54	14.08	13.45	13.38	12.97	12.14	11.98	12.03	11.53	12.04	11.88	11.81	12.00	12.33	11.98	12.94	12.90	12.31
Efficiency PhiPol (%)	5.62	6.09	6.40	7.03	7.40	7.45	7.76	8.30	8.36	9.12	9.42	9.63	10.24	10.74	10.73	11.68	11.98	11.94
Upper Hem. Efficiency (%)	10.28	9.99	9.63	9.79	9.78	9.53	9.77	10.14	9.82	10.07	9.71	9.50	9.80	10.25	10.16	11.02	11.03	10.62
Lower Hem. Efficiency (%)	9.89	10.18	10.21	10.62	10.59	10.06	9.97	10.19	10.07	11.08	11.59	11.94	12.44	12.82	12.55	13.61	13.85	13.62

1880-2020Mhz

Frequency ID	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
Frequency (MHz)	1880.0	1890.0	1900.0	1910.0	1920.0	1930.0	1940.0	1950.0	1960.0	1970.0	1980.0	1990.0	2000.0	2010.0	2020.0
Efficiency (dBi)	-5.98	-5.85	-5.78	-5.50	-5.38	-5.62	-5.37	-5.32	-5.28	-5.16	-5.07	-5.28	-5.11	-5.05	-5.09
Gain (dBi)	-1.20	-1.10	-1.05	-0.74	-0.62	-0.94	-0.78	-0.64	-0.53	-0.28	-0.16	-0.33	-0.21	-0.07	-0.04
Efficiency (%)	25.22	26.03	26.44	28.16	28.97	27.41	29.01	29.37	29.62	30.47	31.09	29.68	30.82	31.29	30.99
Directivity (dB)	4.78	4.75	4.72	4.76	4.76	4.68	4.59	4.68	4.76	4.88	4.91	4.94	4.90	4.98	5.04
Peak Gain Position (Theta)	180.00	135.00	135.00	135.00	135.00	135.00	135.00	120.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
Peak Gain Position (Phi)	90.00	150.00	150.00	150.00	150.00	150.00	135.00	90.00	120.00	120.00	120.00	120.00	120.00	120.00	120.00
Efficiency ThetaPol (%)	12.77	13.20	13.51	14.25	14.61	13.72	14.50	14.66	14.90	15.42	15.80	15.19	15.84	16.29	16.21
Efficiency PhiPol (%)	12.45	12.83	12.93	13.91	14.35	13.69	14.52	14.71	14.72	15.05	15.30	14.49	14.98	15.01	14.78
Upper Hem. Efficiency (%)	10.97	11.28	11.40	12.08	12.36	11.63	12.24	12.33	12.34	12.55	12.65	12.03	12.56	12.85	12.82
Lower Hem. Efficiency (%)	14.25	14.75	15.04	16.08	16.61	15.78	16.78	17.04	17.28	17.92	18.44	17.65	18.27	18.45	18.17

2030-2180Mhz

Frequency ID	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49
Frequency (MHz)	2030.0	2040.0	2050.0	2060.0	2070.0	2080.0	2090.0	2100.0	2110.0	2120.0	2130.0	2140.0	2150.0	2160.0	2170.0	2180.0
Efficiency (dBi)	-4.79	-4.73	-4.75	-4.61	-4.50	-4.75	-4.42	-4.53	-4.68	-4.60	-4.44	-4.65	-4.35	-4.40	-4.66	-4.47
Gain (dBi)	0.39	0.47	0.46	0.49	0.56	0.33	0.77	0.69	0.46	0.39	0.40	0.20	0.53	0.53	0.33	0.43
Efficiency (%)	33.20	33.64	33.47	34.58	35.52	33.50	36.14	35.20	34.02	34.68	36.01	34.30	36.72	36.35	34.18	35.73
Directivity (dB)	5.18	5.20	5.22	5.11	5.06	5.08	5.19	5.23	5.14	4.99	4.83	4.85	4.88	4.93	4.99	4.90
Peak Gain Position (Theta)	90.00	90.00	90.00	90.00	90.00	105.00	105.00	105.00	105.00	105.00	105.00	105.00	105.00	105.00	105.00	105.00
Peak Gain Position (Phi)	120.00	120.00	120.00	120.00	120.00	120.00	120.00	120.00	105.00	120.00	120.00	105.00	105.00	105.00	105.00	105.00
Efficiency ThetaPol (%)	17.59	17.94	18.10	18.69	19.15	18.07	19.79	19.58	18.99	19.58	20.54	19.88	21.50	21.46	20.34	21.26
Efficiency PhiPol (%)	15.61	15.70	15.38	15.88	16.37	15.42	16.35	15.62	15.04	15.10	15.47	14.42	15.22	14.89	13.85	14.47
Upper Hem. Efficiency (%)	13.78	14.00	13.97	14.42	14.77	13.84	14.81	14.40	14.12	14.73	15.47	14.73	15.67	15.42	14.45	15.19
Lower Hem. Efficiency (%)	19.42	19.64	19.51	20.16	20.75	19.66	21.33	20.80	19.91	19.95	20.55	19.57	21.05	20.93	19.73	20.55

High-frequency-2D

2300-2400Mhz

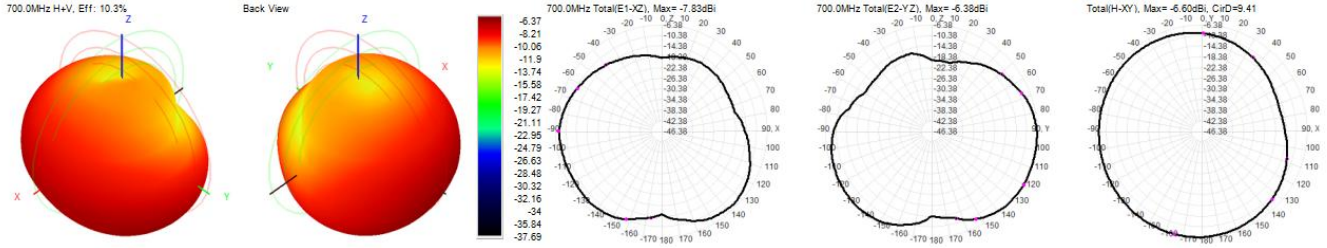
Frequency ID	1	2	3	4	5	6	7	8	9	10	11
Frequency (MHz)	2300.0	2310.0	2320.0	2330.0	2340.0	2350.0	2360.0	2370.0	2380.0	2390.0	2400.0
Efficiency (dBi)	-4.95	-5.22	-5.44	-5.31	-5.65	-5.87	-5.79	-5.98	-6.40	-6.03	-6.37
Gain (dBi)	0.08	-0.06	-0.29	-0.13	-0.50	-0.73	-0.67	-0.84	-1.32	-0.93	-1.31
Efficiency (%)	31.95	30.05	28.55	29.43	27.25	25.91	26.38	25.21	22.93	24.97	23.04
Directivity (dB)	5.04	5.17	5.16	5.18	5.15	5.13	5.12	5.14	5.08	5.09	5.07
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
Peak Gain Position (Phi)	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	75.00	75.00	75.00
Efficiency ThetaPol (%)	21.48	20.20	19.20	19.63	18.05	16.77	16.54	15.31	13.65	14.84	13.90
Efficiency PhiPol (%)	10.47	9.86	9.35	9.80	9.21	9.14	9.84	9.90	9.28	10.13	9.14
Upper Hem. Efficiency (%)	15.56	14.76	14.08	14.51	13.33	12.56	12.74	12.17	11.10	12.11	11.21
Lower Hem. Efficiency (%)	16.39	15.30	14.47	14.93	13.92	13.35	13.64	13.05	11.82	12.87	11.83

2500-2690Mhz

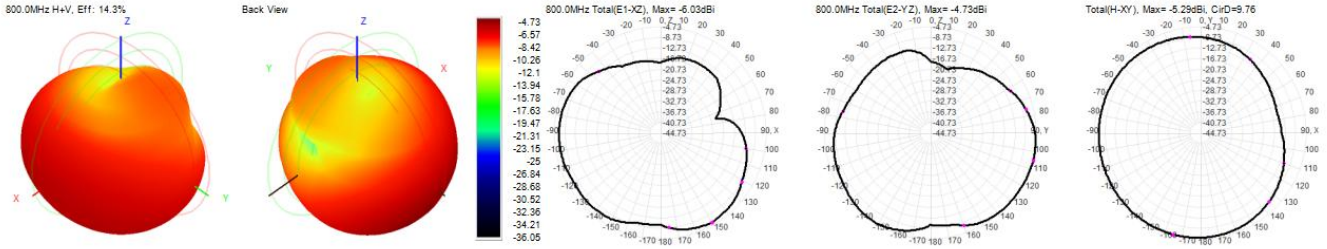
Frequency ID	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Frequency (MHz)	2500.0	2510.0	2520.0	2530.0	2540.0	2550.0	2560.0	2570.0	2580.0	2590.0	2600.0	2610.0	2620.0	2630.0	2640.0	2650.0	2660.0	2670.0	2680.0	2690.0	2700.0
Efficiency (dBi)	-7.67	-7.57	-7.59	-7.98	-7.62	-7.88	-8.01	-7.86	-7.80	-7.90	-7.48	-7.45	-7.38	-6.80	-6.71	-6.41	-5.97	-5.83	-5.74	-5.12	-5.32
Gain (dBi)	-2.17	-1.99	-1.99	-2.44	-2.23	-2.56	-2.77	-2.69	-2.65	-2.94	-2.51	-2.61	-2.58	-2.09	-1.84	-1.26	-0.72	-0.56	-0.53	0.12	-0.07
Efficiency (%)	17.11	17.51	17.42	15.91	17.31	16.30	15.81	16.38	16.59	16.21	17.88	18.00	18.28	20.89	21.31	22.85	25.30	26.15	26.69	30.76	29.37
Directivity (dB)	5.50	5.58	5.60	5.54	5.39	5.32	5.24	5.17	5.15	4.96	4.97	4.84	4.80	4.71	4.88	5.15	5.25	5.27	5.21	5.24	5.25
Peak Gain Position (Theta)	105.00	105.00	105.00	105.00	105.00	105.00	105.00	105.00	105.00	105.00	105.00	105.00	105.00	105.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
Peak Gain Position (Phi)	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	120.00	105.00	105.00	105.00	105.00	105.00	105.00
Efficiency ThetaPol (%)	14.72	14.86	14.53	13.00	13.95	12.98	12.45	12.88	13.07	12.80	14.11	14.21	14.42	16.39	16.59	17.50	19.03	19.24	19.11	21.25	19.47
Efficiency PhiPol (%)	2.39	2.65	2.89	2.91	3.36	3.33	3.36	3.49	3.52	3.41	3.77	3.79	3.87	4.50	4.73	5.35	6.27	6.90	7.58	9.51	9.90
Upper Hem. Efficiency (%)	7.95	8.05	7.97	7.21	7.79	7.32	7.09	7.32	7.42	7.25	7.97	7.98	8.08	9.23	9.43	10.18	11.39	11.87	12.18	14.09	13.43
Lower Hem. Efficiency (%)	9.16	9.46	9.44	8.70	9.52	8.98	8.72	9.06	9.16	8.96	9.91	10.02	10.21	11.66	11.88	12.67	13.91	14.28	14.51	16.66	15.93

Low frequency 3D

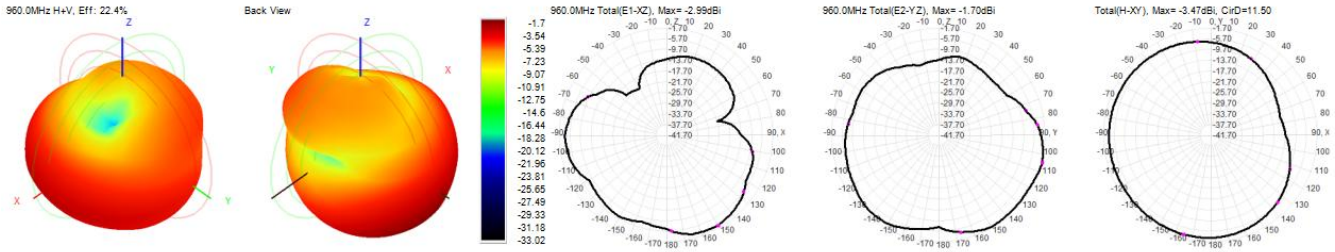
700Mhz



800Mhz

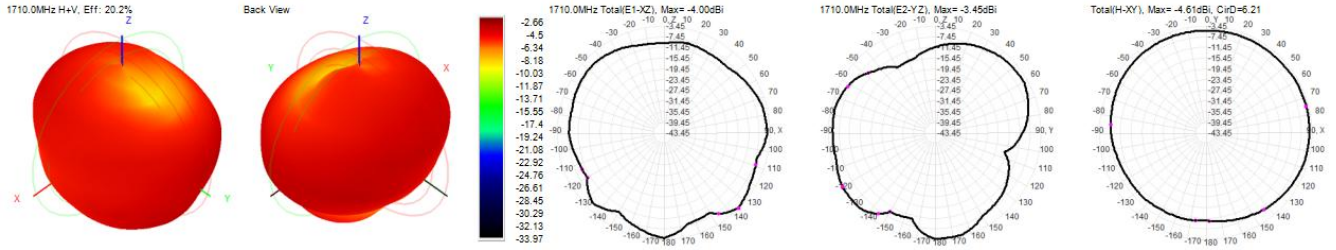


960Mhz

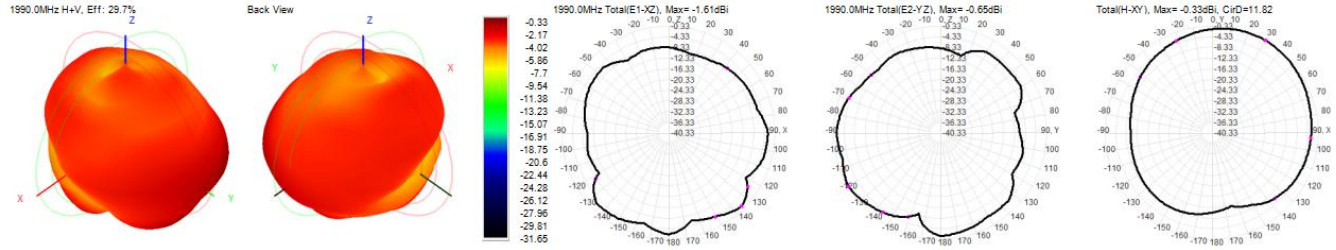


Mid range 3D

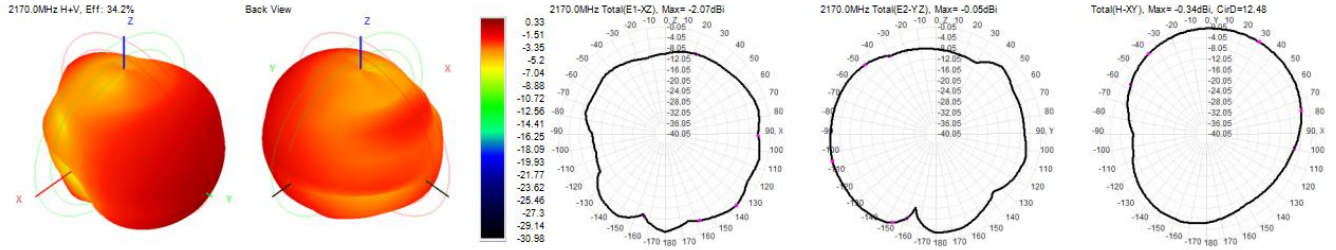
1710MHZ



1990MHZ

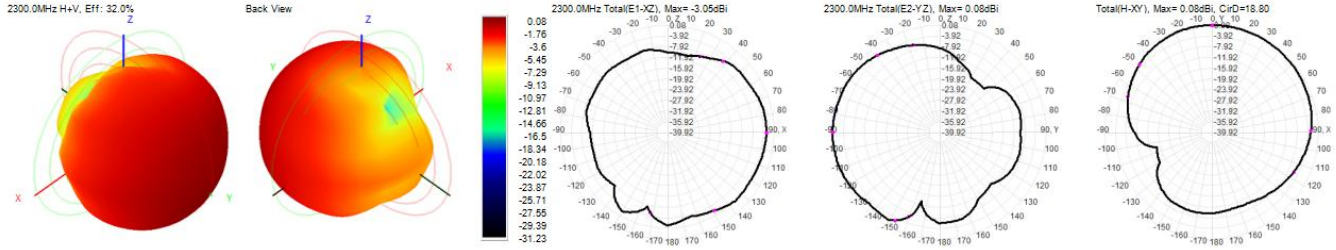


2170MHZ

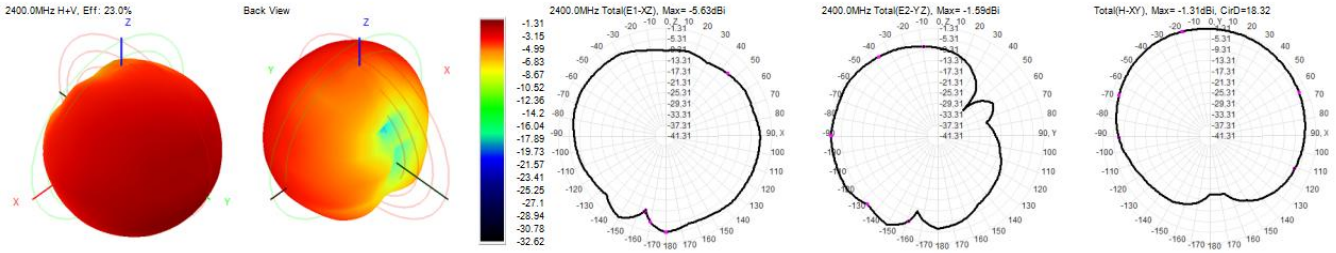


High frequency 3D

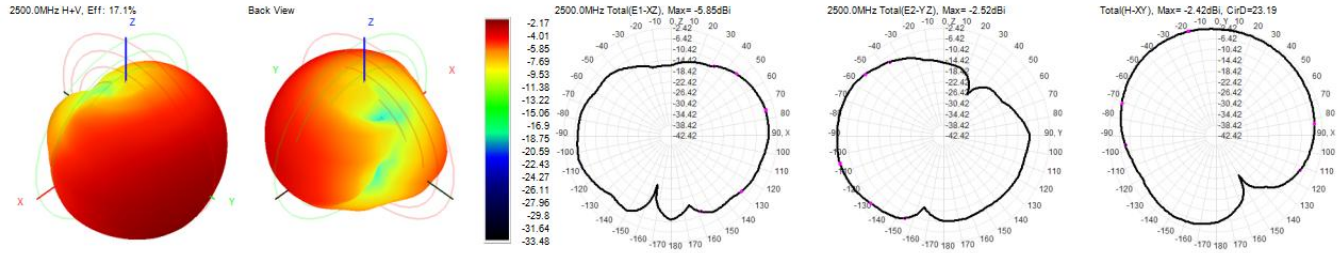
2300Mhz



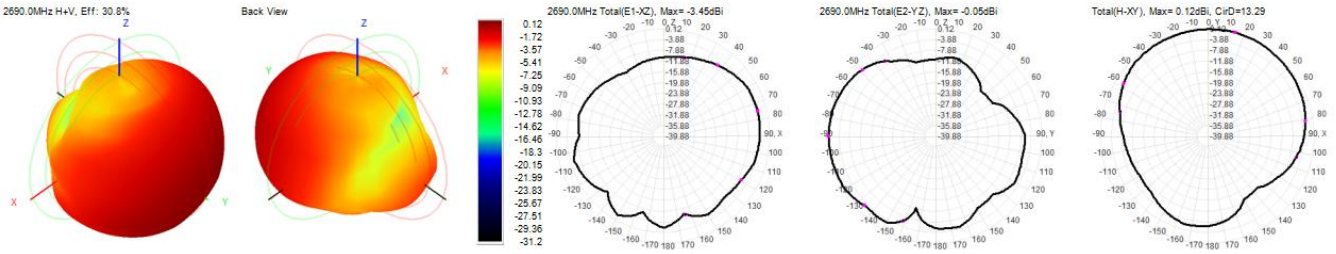
2400Mhz



2500Mhz

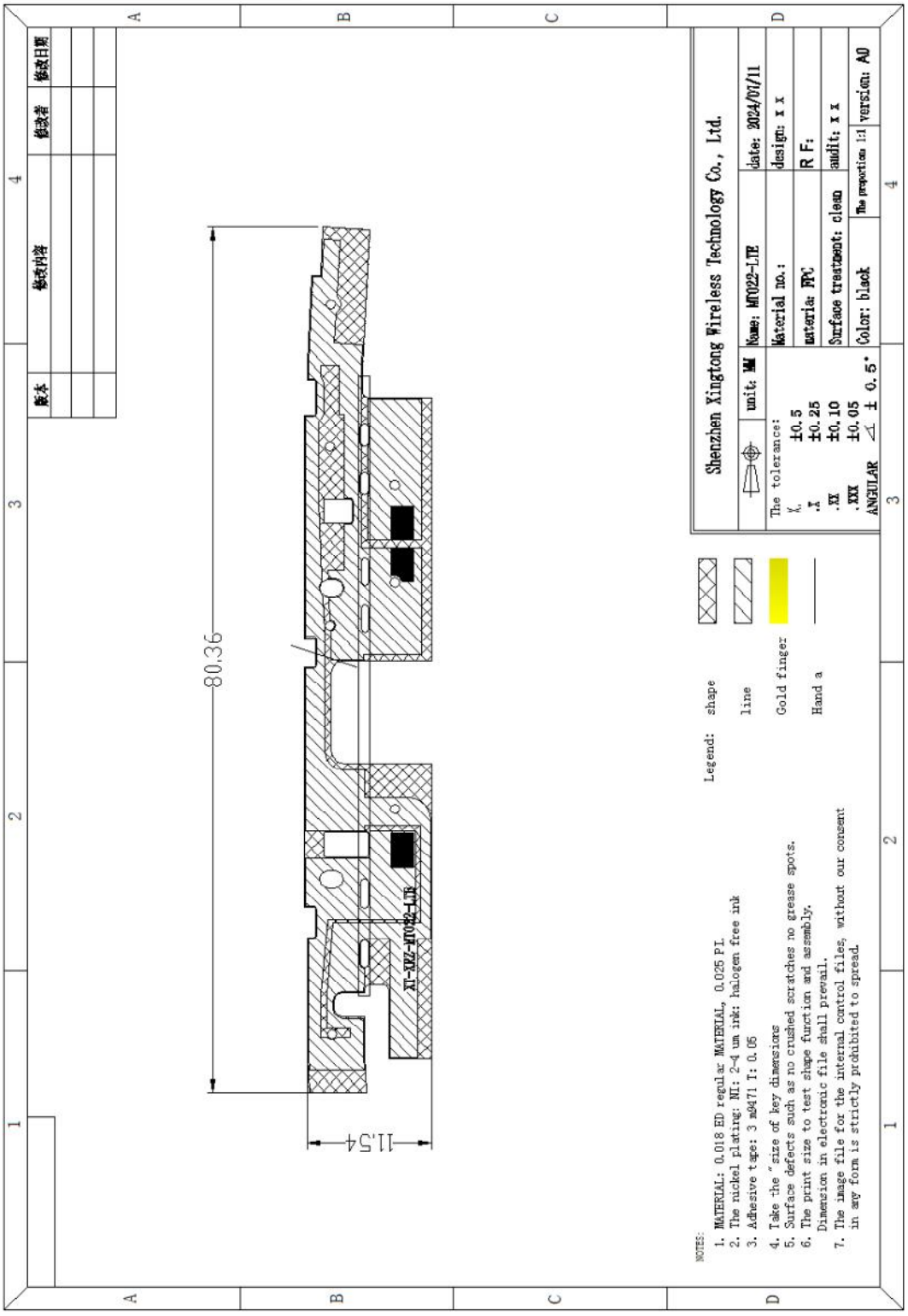


2690Mhz



5. Attached figure:

■ 5.1：Finished antenna drawing



6. Maintenance verification:

Tests/test items	Maintainability	Inspection order number
Product name/specification	LTE built-in fpc antenna	Test quantity: 5PCS
Date of inspection: 2024/07/11		Completiondate: 2024/07/11

Test/inspection equipment:

1. The tensile tester tests 5 times. (The tester is shown in the figure)

Note: Uniform speed test is required, not extreme speed test.

Projects / Condition	Maintaining force between terminal and cable ≥ 0.6kgf.				
Test times	1	2	3	4	5
test result	0.6	0.7	0.7	0.9	0.7

Test/inspection result: acceptable

Test/inspection judgment: ■Qualified □Unqualified □Make no judgment

Test: Zhu Yongjian Audit: Wu Yanlong

7. Reliability test:

Serialnumber	test item	Test requirements	testing tool	test result
1	Resistance to tin melting	288℃, 10S, no delamination, no foaming	Tin furnace	Ok
2	weldability	245℃, 5s, smooth tin surface, solder surface≥95%	Tin furnace	Ok
3	Pulling force	N/A	tautness meter	Ok
4	Reverse pulling force	N/A	tautness meter	Ok
5	Peel strength (covering film)	≥0.35kg/cm	peel strength	Ok
6	Peel strength (copper foil)	≥0.8kg/cm	peel strength	Ok
7	Hot melt adhesive fluidity	0.1～0.15	/	Ok

7. Matters needing attention:

After opening, please carefully check whether the goods are complete. If there is any damage, please contact us immediately.