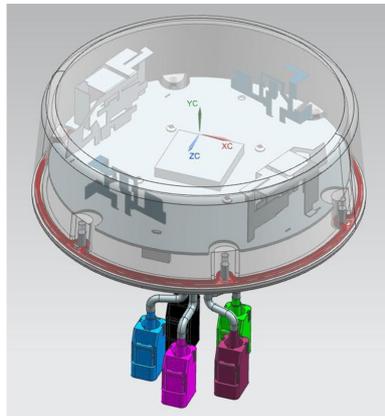


GNSS+LTE *2+WIFI+BT 5-in-1 Charging pile Antenna



I Antenna Parameter

1.1 GNSS antenna

- (1)GPS L1 /BDS B1 ;
- (2)Freq. Range: 1559~1609 MHz;
- (3)Operation Voltage: 3V~5V;
- (4)Operation Current: 9±3mA@3V;
- (5)Gain (PCBA): 20±3dB;
- (6) Finished antenna Gain: 10±3dB (Relative Gain) @2.5 M cable;
- (7) Noise factor: ≤2dB;
- (8)V.S.W.R: ≤2.0:1;
- (9)Impedance: 50Ω

1.2 Communication antennas

- (1) LTE main/div antenna freq: 700-960/1710-2690MHz;
 - (2) BT antenna freq: 2400-2500MHz;
 - (3) WIFI antenna freq.: 2400-2500/5150-5850MHz;
 - (2) V.S.W.R:4G main/div antenna: 700-960<3;1710-2690<2.0;
- BT antenna: 2400-2500<1.5;
- WIFI antenna: 2400-2500<1.5;5150-5850<1.5
- (3) Antenna Gain >-2.5dB
 - (4) Impedance: 50Ω

1.3 Working Temp.: -40℃~+85℃;

1.4 Storage Temp.: -40℃~+95℃;

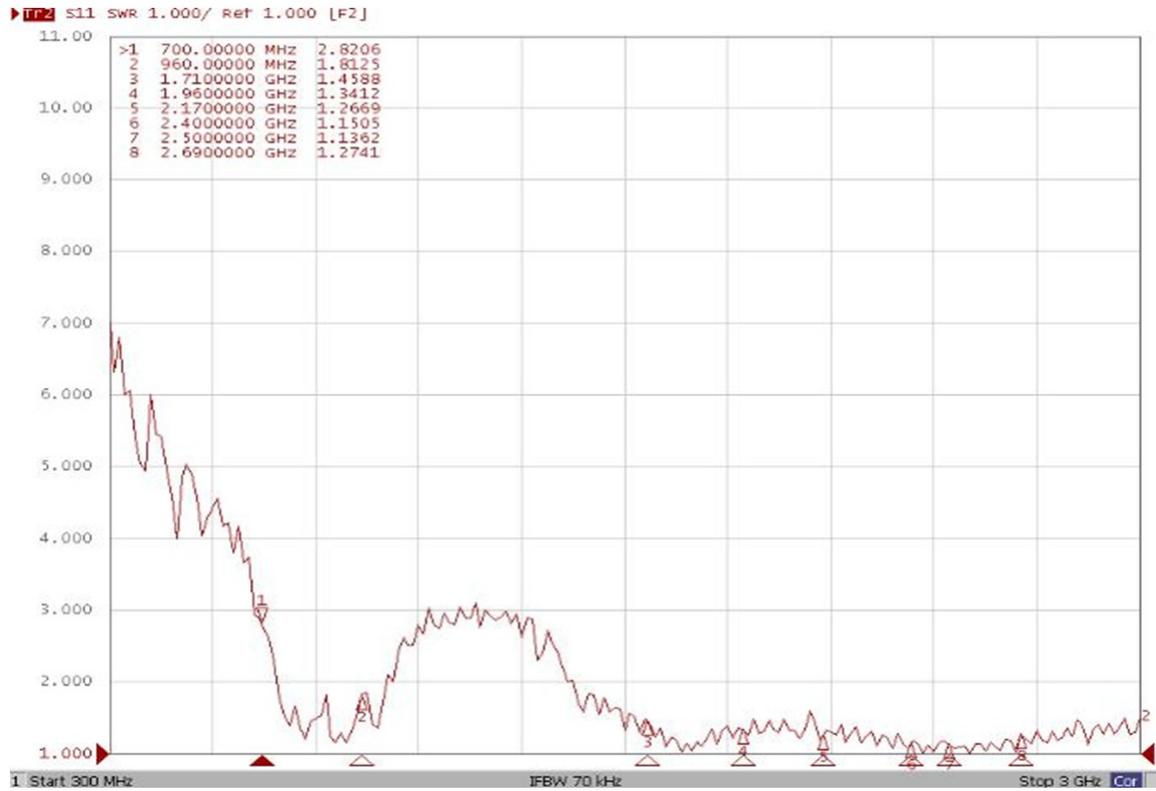
1.5 Connector withdrawal force: ≥100N,

1.6 Housing Protection Level: IP67

II LTE Antenna Test Result

2.1 Main antenna 700-960MHz 1710-2690 MHz

VSWR



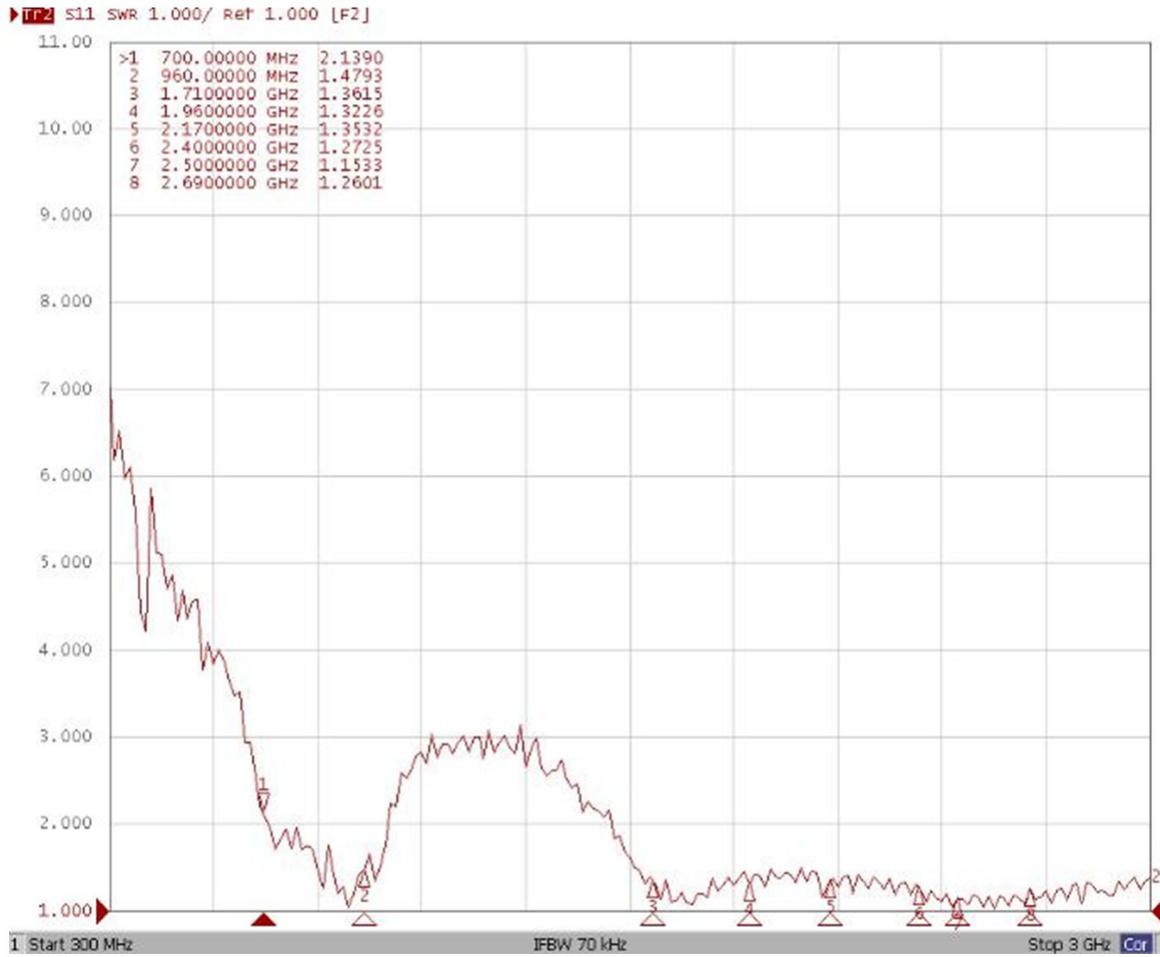
Frequency(MHz)	700	960	1710	1960	2170	2400	2500	2690
VSWR	2.82	1.81	1.45	1.34	1.26	1.15	1.13	1.27

2.2 Main antenna efficiency & Gain

Freq.	Efficiency	Loss	Gain	Freq.	Efficiency	Loss	Gain
700	24.12%	-6.18	-2.11	1800	29.38%	-5.32	1.57
710	28.62%	-5.43	-1.88	1830	29.96%	-5.23	1.85
720	27.10%	-5.67	-1.54	1860	30.06%	-5.22	1.21
730	28.33%	-5.48	-1.73	1890	28.56%	-5.44	0.89
740	31.25%	-5.05	-0.55	1920	30.98%	-5.09	0.74
750	30.22%	-5.2	-0.68	1950	31.35%	-5.04	0.71
760	31.28%	-5.05	-0.52	1980	33.42%	-4.76	0.65
770	32.55%	-4.87	0.58	2010	29.64%	-5.28	0.34
780	33.42%	-4.76	1.63	2040	28.59%	-5.44	0.87
790	32.00%	-4.95	0.98	2070	30.17%	-5.2	0.31
800	27.22%	-5.65	0.12	2100	30.11%	-5.21	0.67
810	32.66%	-4.86	1.24	2130	29.04%	-5.37	0.22
820	37.00%	-4.32	1.72	2160	28.73%	-5.42	-0.07
830	28.57%	-5.44	1.4	2190	29.42%	-5.31	0.46
840	26.07%	-5.84	0.58	2220	29.42%	-5.31	0.46
850	34.05%	-4.68	1.21	2250	29.57%	-5.29	0.71
860	32.97%	-4.82	0.4	2280	31.01%	-5.08	1.15
870	30.74%	-5.12	0.53	2310	30.30%	-5.19	1.53
880	33.83%	-4.71	1.42	2340	30.48%	-5.16	1.83
890	36.65%	-4.36	0.31	2370	30.42%	-5.17	1.76
900	31.28%	-5.05	1.03	2400	29.01%	-5.37	2.08
910	33.61%	-4.73	0.32	2430	27.65%	-5.58	1.46
920	27.82%	-5.56	0.23	2460	29.94%	-5.24	1.2
930	29.93%	-5.24	0.41	2490	30.02%	-5.23	0.8
940	29.56%	-5.29	-0.18	2520	28.73%	-5.42	0.77
950	24.93%	-6.03	-1.66	2550	28.50%	-5.45	0.67
960	22.42%	-6.49	-2.22	2580	29.01%	-5.37	0.52
1710	30.02%	-5.23	2.26	2640	28.94%	-5.39	0.84
1740	29.23%	-5.34	2.48	2670	29.48%	-5.3	0.19
1770	31.04%	-5.08	1.65	2700	30.39%	-5.17	-0.31
/	/	/	/	2610	28.53%	-5.45	0.79
1710	30.02%	-5.23	2.26	2640	28.94%	-5.39	0.84
1740	29.23%	-5.34	2.48	2670	29.48%	-5.3	0.19
1770	31.04%	-5.08	1.65	2700	30.39%	-5.17	-0.31

2.3 Div Antenna 700-960MHz 1710-2690 MHz

VSWR

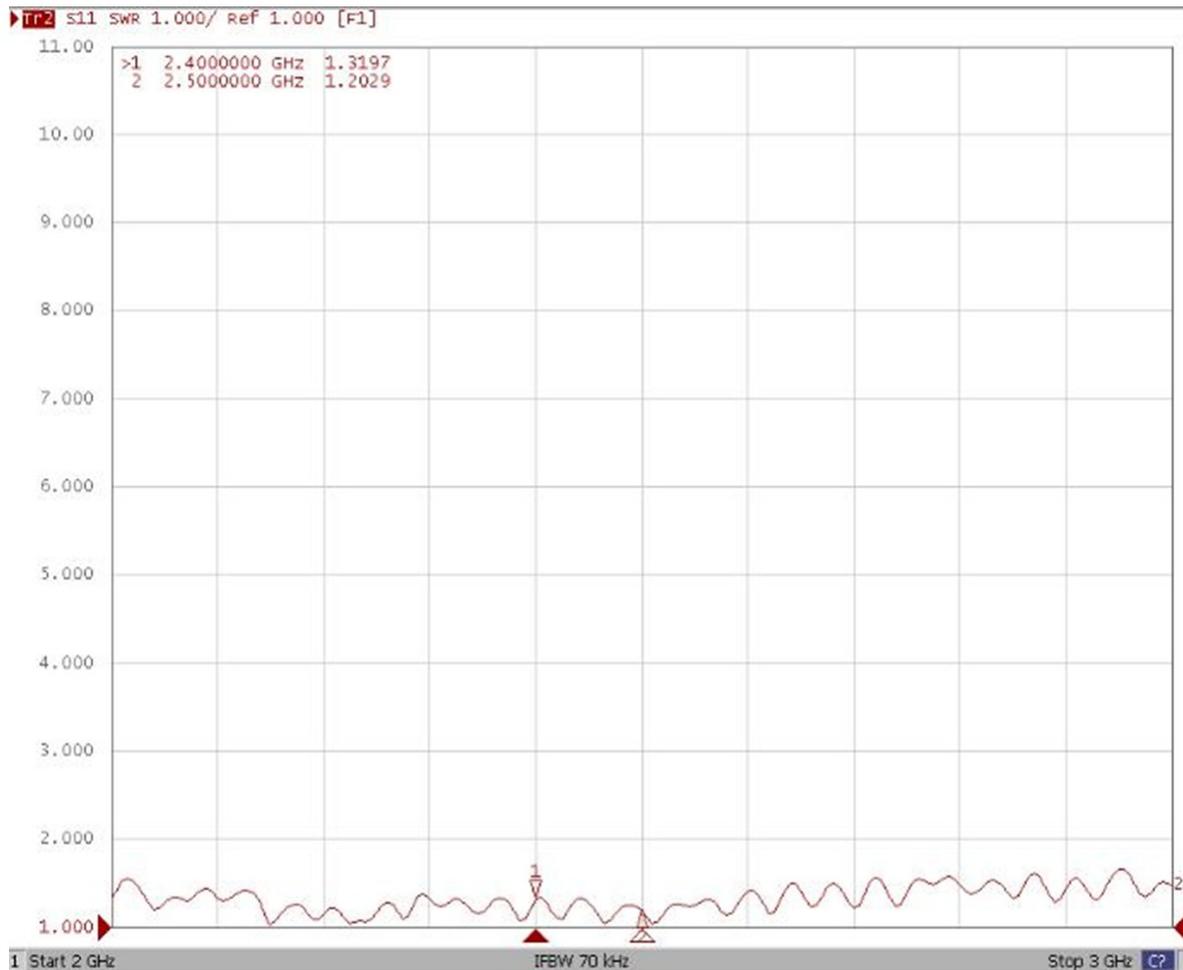


Frequency(MHz)	700	960	1710	1960	2170	2400	2500	2690
VSWR	2.13	1.47	1.36	1.32	1.35	1.27	1.15	1.26

2.4 Div Antenna Efficiency&Gain

Freq.	Efficiency	Loss	Gain	Freq.	Efficiency	Loss	Gain
700	20.12%	-6.96	-1.44	1800	28.44%	-5.46	0.42
710	21.38%	-6.7	-1.32	1830	28.11%	-5.51	0.37
720	24.52%	-6.1	-1.02	1860	27.60%	-5.59	0.38
730	27.63%	-5.59	-0.62	1890	28.31%	-5.48	0.29
740	25.44%	-5.94	-0.85	1920	26.34%	-5.79	0.88
750	28.92%	-5.39	-0.78	1950	29.14%	-5.36	0.53
760	29.32%	-5.33	-0.71	1980	30.46%	-5.16	0.44
770	29.11%	-5.36	-0.63	2010	30.11%	-5.21	0.54
780	29.55%	-5.3	-0.58	2040	28.13%	-5.51	0.64
790	19.65%	-7.07	-1.55	2070	28.29%	-5.48	1.13
800	32.08%	-4.94	-0.46	2100	29.38%	-5.32	1.31
810	35.79%	-4.46	-0.43	2130	29.71%	-5.27	0.97
820	22.38%	-6.5	0.12	2160	28.10%	-5.51	0.32
830	24.26%	-6.15	0.85	2190	27.35%	-5.63	0.56
840	31.11%	-5.07	0.75	2220	28.90%	-5.39	1.05
850	29.56%	-5.29	0.27	2250	31.23%	-5.05	1.42
860	30.23%	-5.2	-0.45	2280	32.88%	-4.83	1.85
870	37.03%	-4.31	1.25	2310	32.25%	-4.91	1.94
880	32.88%	-4.83	1.74	2340	29.89%	-5.25	1.76
890	37.25%	-4.29	1.39	2370	29.29%	-5.33	1.57
900	35.11%	-4.55	1.64	2400	28.69%	-5.42	0.95
910	34.23%	-4.66	1.23	2430	27.22%	-5.65	0.82
920	35.11%	-4.55	-0.6	2460	27.06%	-5.68	0.8
930	31.59%	-5	0.9	2490	26.68%	-5.74	0.95
940	32.98%	-4.82	0.91	2520	26.64%	-5.74	0.31
950	30.12%	-5.21	0.04	2550	28.11%	-5.51	-0.06
960	30.29%	-5.33	0.1	2580	27.67%	-5.58	-0.02
1710	28.12%	-5.51	0.27	2640	30.01%	-5.23	0.94
1740	27.22%	-5.65	0.49	2670	30.25%	-5.19	0.89
1770	28.88%	-5.39	0.13	2700	28.75%	-5.41	0.77
/	/	/	/	2610	27.74%	-5.57	0.45

2.5 BT antenna 2.4GHz VSWR

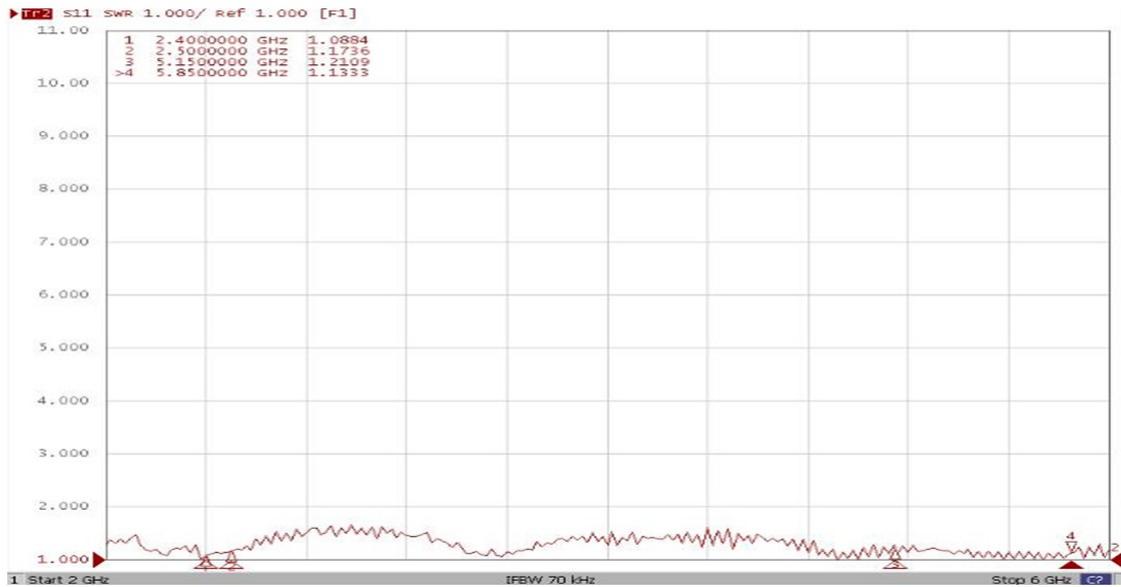


Frequency(MHz)	2400	2500
VSWR	1.31	1.20

2.6 BT antenna Efficiency &Gain

Freq.	Efficiency	Loss	Gain
2400	30.29%	-5.19	0.13
2410	29.29%	-5.33	0.2
2420	29.21%	-5.34	-0.16
2430	29.85%	-5.25	-0.69
2440	29.53%	-5.3	-0.86
2450	28.82%	-5.4	-0.96
2460	28.35%	-5.47	-0.88
2470	28.20%	-5.5	-0.64
2480	27.61%	-5.59	-0.55
2490	27.13%	-5.67	-0.54
2500	27.28%	-5.64	-0.54

2.7 WIFI Antenna VSWR



Frequency(MHz)	2400	2500	5150	5850
VSWR	1.08	1.17	1.21	1.13

2.8 WIFI Antenna Efficiency &Gain

Freq.	Efficiency	Loss	Gain	Freq.	Efficiency	Loss	Gain
2400	28.04%	-5.52	1.12	5390	0.1	-10	1.03
2410	29.03%	-5.37	0.89	5410	0.1	-10.1	1.01
2420	29.14%	-5.36	1.06	5430	0.1	-10.07	0.91
2430	28.60%	-5.44	1.37	5450	0.1	-10.13	0.74
2440	27.88%	-5.55	1.45	5470	0.1	-10.1	0.54
2450	28.46%	-5.46	1.47	5490	0.1	-10.2	0.29
2460	28.31%	-5.48	1.66	5510	0.1	-10.18	0.13
2470	28.43%	-5.46	1.49	5530	0.1	-10.19	-0.02
2480	28.22%	-5.49	0.72	5550	0.09	-10.24	0.05
2490	27.73%	-5.57	0.05	5570	0.1	-10.14	-0.09
2500	27.71%	-5.57	0.38	5590	0.09	-10.35	-0.65
5150	11.00%	-9.74	1.92	5630	0.09	-10.35	-1.12
5170	10.00%	-9.8	1.87	5650	0.09	-10.5	-1.22
5190	10.00%	-9.84	1.73	5670	0.09	-10.51	-0.67
5210	10.00%	-9.89	1.45	5690	0.09	-10.41	-0.85
5230	10.00%	-9.97	1.16	5710	0.09	-10.5	-1.36
5250	10.00%	-10.01	1.74	5730	0.09	-10.47	-1.45
5270	10.00%	-10.02	1.46	5750	0.09	-10.57	-1.19
5290	10.00%	-9.99	1.44	5770	0.09	-10.55	-0.71
5310	10.00%	-10.01	1.44	5790	0.09	-10.63	-0.77
5330	10.00%	-9.95	1.43	5810	0.09	-10.66	-0.97
5350	10.00%	-9.9	1.36	5830	0.08	-10.73	-1.1
5370	10.00%	-9.97	1.08	5850	0.08	-10.79	-1.4
/	/	/	/	5610	0.09	-10.34	-0.88

2.9 LTE antenna Active parameter

2.9.1 Chinese Version LTE/WCDMA ACTIVE TEST RESULT:

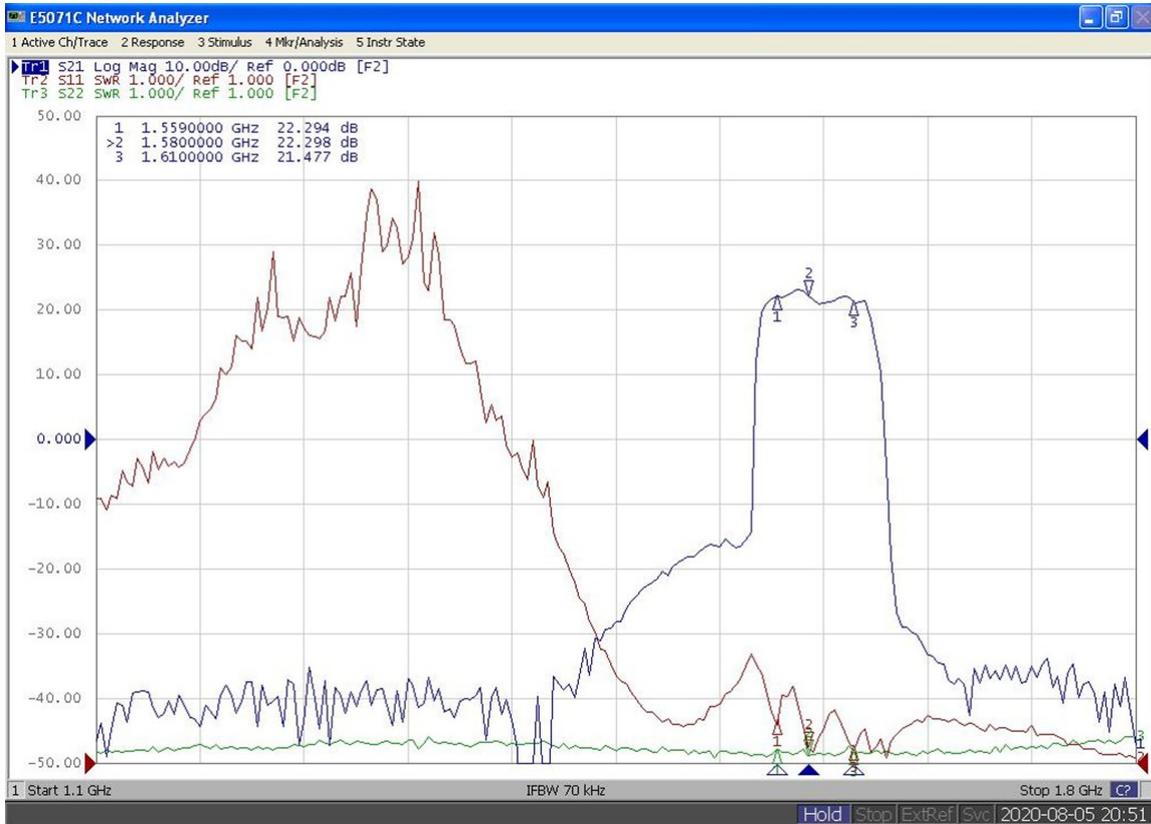
Band		channel	TIS	TRP
WCDMA	1	10562	-105.33	16.73
		10700	-104.98	16.88
		10838	-104.74	17.25
	8	2937	-105.97	17.48
		3012	-105.51	17.44
		3088	-105.12	17.23
LTE	1	18050	-95.44	17.3
		18300	-94.87	17.22
		18550	-95.28	17.33
	3	19250	-95.31	16.11
		19575	-94.88	16.93
		19900	-94.48	17.03
	5	20450	-93.75	17.39
		20525	-94.22	17.35
		20600	-94.52	17.34
	8	21500	-95.92	17.99
		21625	-94.88	17.37
		21750	-95.14	16
	34	36225	-93.12	15.81
		36275	-94.67	16.08
		36325	-94.33	16.12
	38	37850	-91.23	16.55
		38000	-90.55	16.25
		38150	-90.33	16.68
	39	38350	-93.92	17.42
		38450	-92.84	17.58
		38550	-92.34	17.45
	40	38750	-90.56	15.1
		39150	-89.75	15.46
		39550	-89.22	15.61
	41	39750	-91.23	16.17
		40620	-89.92	16.01
		41490	-90.11	15.5

2.9.2 EU VERSION LTE/WCDMA ACTIVE TEST RESULT:

Band		channel	TIS	TRP
WCDMA	1	10562	-105.32	16.31
		2937	-105.21	17.48
		3012	-104.65	17.56
	5	3088	-104.46	17.13
		10700	-104.98	16.81
		10838	-104.77	17.33
	8	18050	-95.12	16.9
		18300	-95.01	17.13
		18550	-94.21	17.22
LTE	1	19250	-93.12	16.12
		19575	-94.45	16.55
		19900	-94.64	16.92
	3	20450	-94.22	17.17
		20525	-93.83	16.98
		20600	-93.75	16.22
	5	20800	-95.32	17.28
		21100	-94.91	17.69
		21400	-94.14	17.01
	7	21500	-95.23	18.29
		21625	-94.91	18.07
		21750	-94.82	17.76
	8	24200	-95.82	16.68
		24300	-95.12	16.42
		24400	-95.44	16.13
	20	27260	-91.33	17.02
		27435	-91.12	16.59
		27610	-91.03	16.61
	28	37850	-89.92	16.25
		38000	-90.74	16.74
		38150	-90.24	16.53
	38	38750	-88.92	15.5
		39150	-89.11	16.43
		39550	-88.66	16.56
	40	2937/2712	-104.32	17.36
		3012/2788	-103.89	16.3
		3088/2863	-104.44	17.2

III GNSS Antenna Test Result

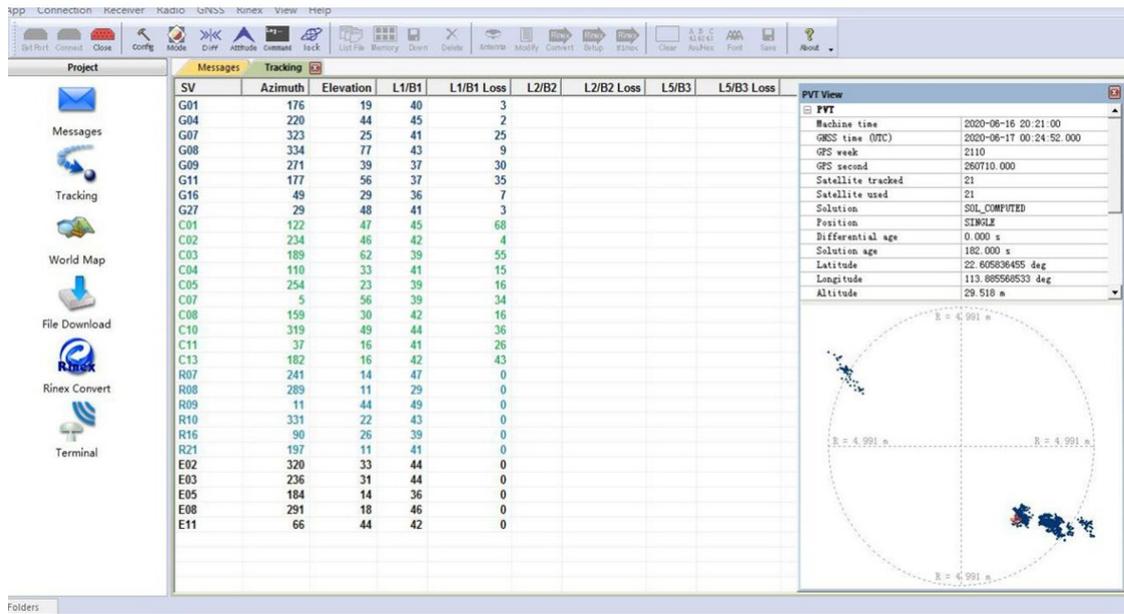
3.1 GNSS antenna Gain(LNA)



GNSS Relative Gain Test data

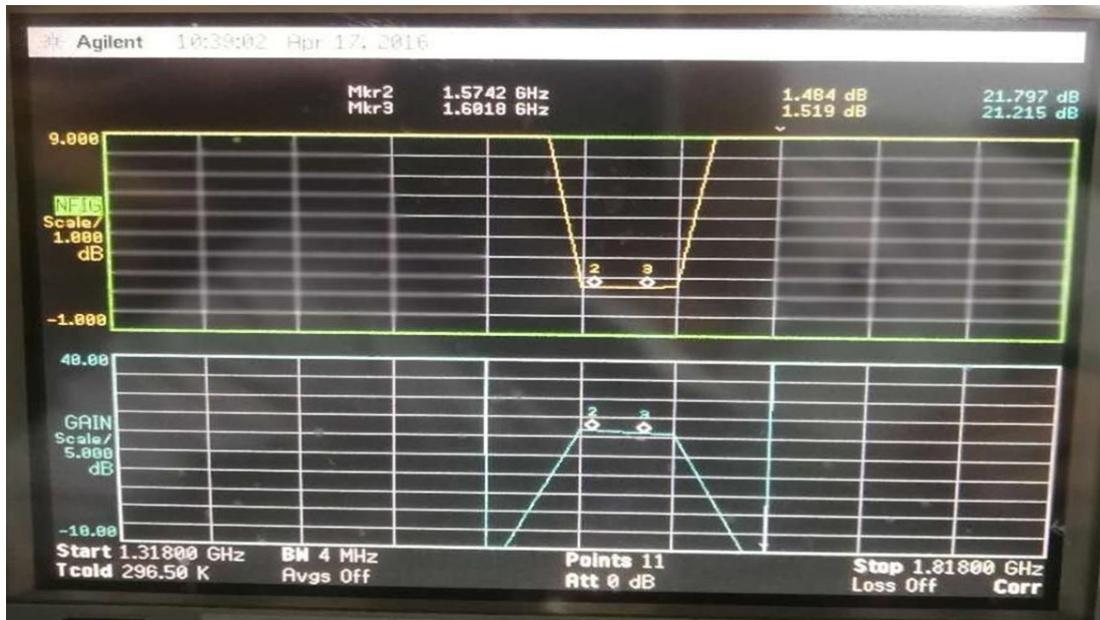
MARKER	Frequency/MHz	Gain/dB	VSWR /S11
1	1559	22.2	1.86
2	1580	22.2	1.67
3	1610	21.4	1.59

3.2 GNSS antenna reality test (Static)



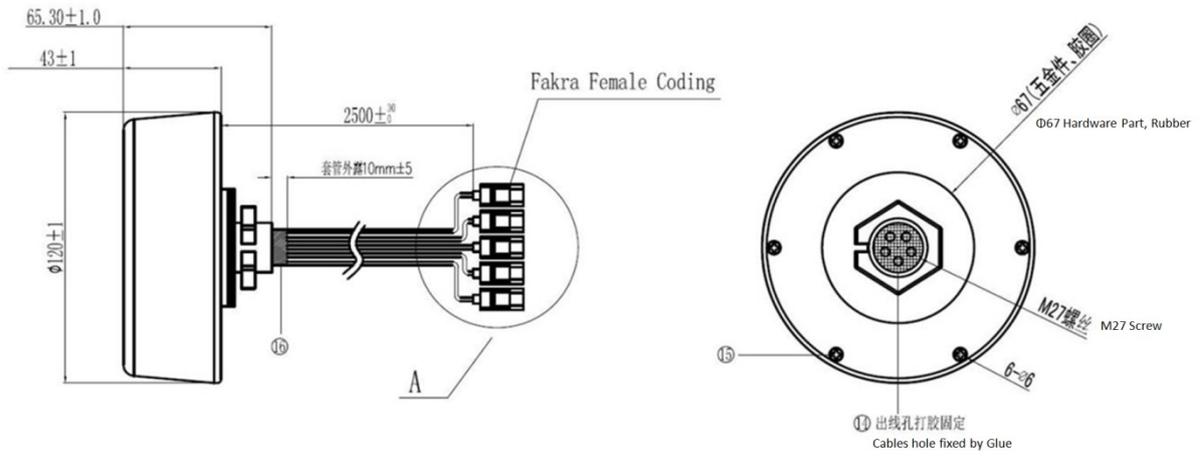
Outdoor 4th floor roof, Sunny.

3.3 GNSS antenna noise factor (LNA)



GNSS noise factor Test Result		
MARKER	Frequency/MHz	NNoise Factor/dB
1	1575	1.48
2	1601	1.51

IV Antenna structure



Installation: by Nuts.