



Antenna test report

Customers: DK
Project: DK042Pro
Structure: Xiao Xiang-13316888409
RF: Liu Houxiong-17328763286
Date: 2023-11-11



Report type:

Version number: V1.0

Machine status: FCC IC

Debug the frequency band:

GSM:B2/B3/B5/B8

WCDMA:W1/W2/W4/W5/W8

CDMA:BC0/BC1/BC10

FDD-LTE: B1/B2/B3/B4/B5/B7/B8/B12/B13/B17/B18/B19/B20/B25/B26/B28B/B28A/B30/B66

TDD-LTE: B34/B38/B39/B40/B41

GPS and other satellite positioning antenna

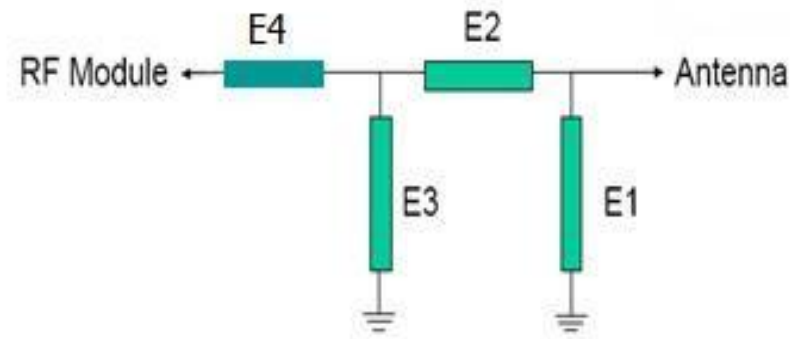
2.4G/5.8G WIFI

Bluetooth

PCB panel (lower antenna):

0201 Specifications

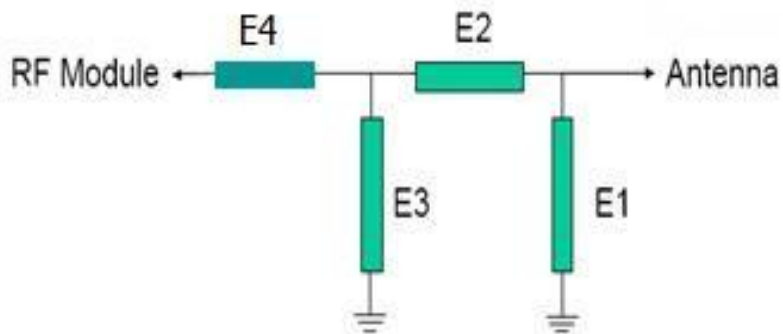
Element	Value	PCB No
E1 (0201)	10nH	C302
E2 (0201)	8.2pf	R301
E3 (0201)	无	C303
E4 (0201)	0 Ω	R306



Top antenna (motherboard):

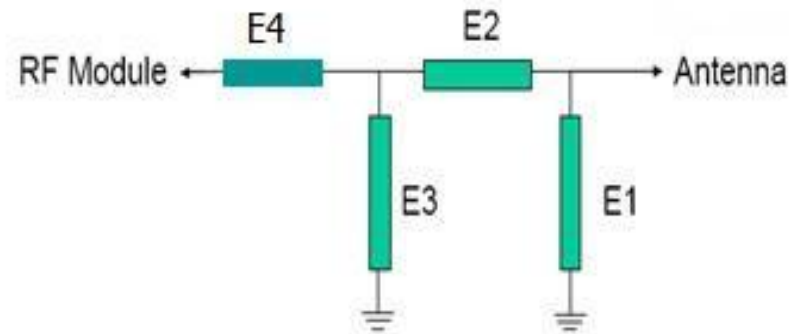
0201 Specifications

Element	Value	No
E1 (0201)	9.1nH	L2403
E2 (0201)	5.6pf	R2405
E3 (0201)	无	L2404
E4 (0201)	0 Ω	R2406



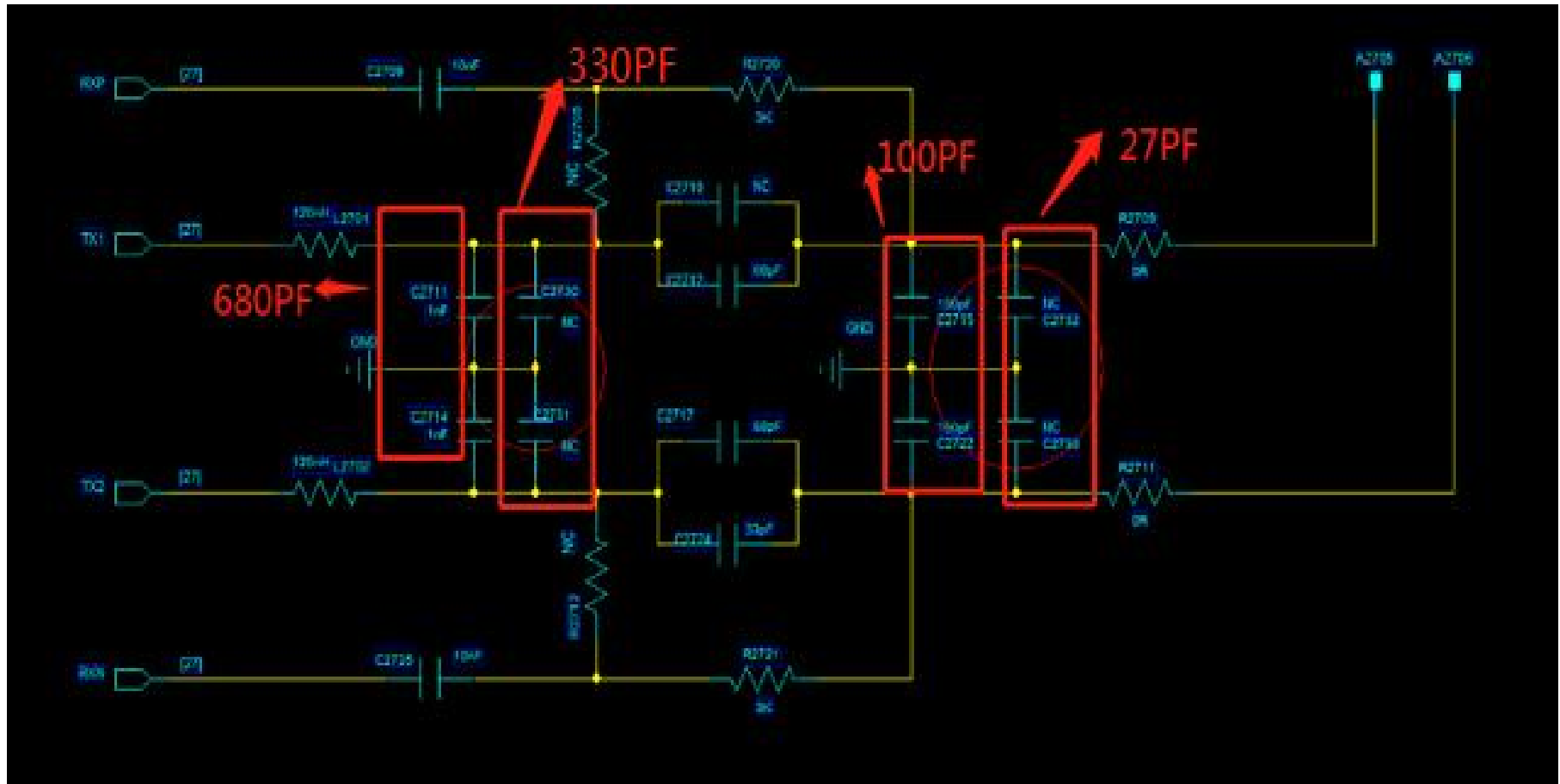
Three-in-one antenna (motherboard) :

0201 Specifications		
Element	Value	No
E1 (0201)	无	
E2 (0201)	0 Ω	
E3 (0201)	无	
E4 (0201)	0 Ω	

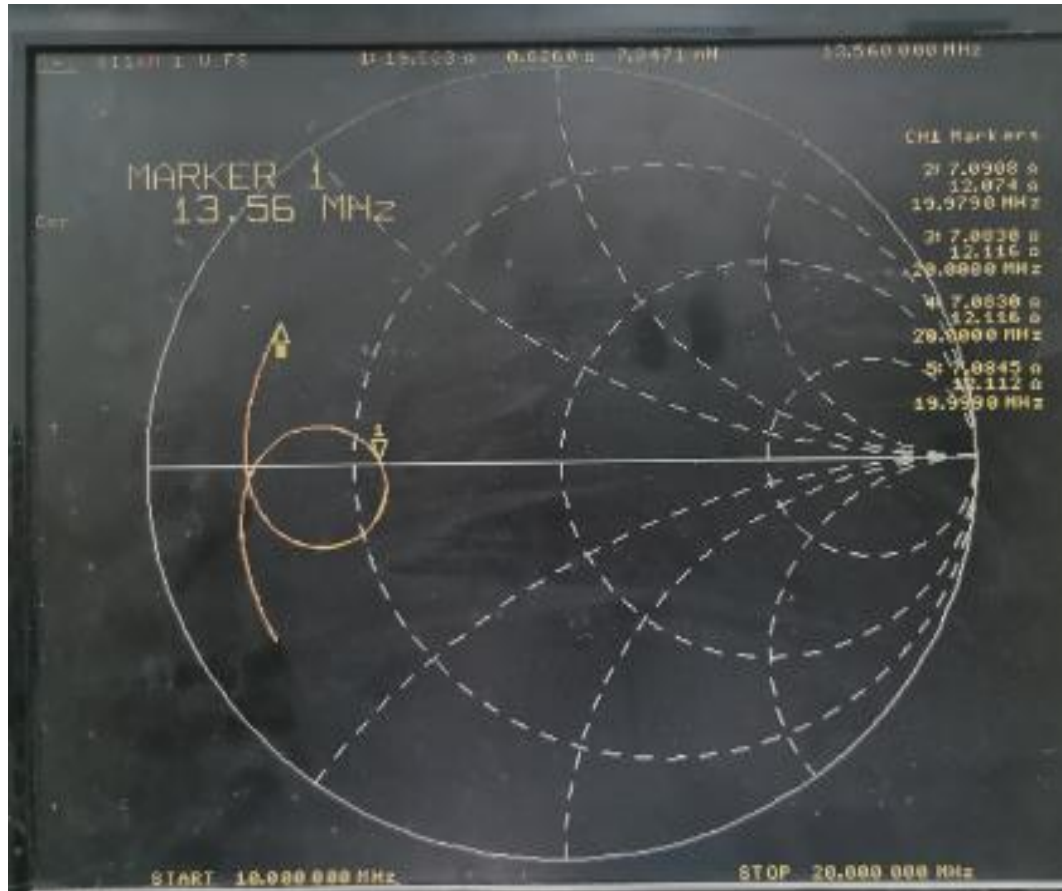


NFC antenna (motherboard):

Motherboard matching modification diagram, the best results, to meet the card 1-card 4 Reading Index, card a distance of 36 mm or so.



NFC antenna (motherboard) :



0201 Specifications		
Element	Value	No
E1	680pf	C2711
E2	680pf	C2714
E3	330pf	C2730
E4	330pf	C2731
E5	100pf	C2715
E6	100pf	C2722
E7	27pf	C2732
E8	27pf	C2733



PCB panel (lower antenna) :

Small panel main antenna switch logic		
RF1	0 Ω C304	GSM:B2/B3 LTE-FDD:B1/2/3/4/7/25/30/66 LTE_TDD:B34/38/39/40/41 WCDMA:B1/B2/B4 CDMA:BC1
RF2	22nH C305	FDD-LTE:B12/17/B28B/B28A
RF3	20PF C306	GSM:B8 LTE-FDD:8 WCDMA:B8 CDMA:BC10
RF4	8. 2nH C307	GSM:B5 LTE-FDD:B5/B13/18/19/20/26 WCDMA:B5 CDMA:BC0



PCB motherboard (on antenna) :

Main Board diversity on antenna switch logic		
RF1	0 Ω C2402	GSM:B2/B3 LTE-FDD:B1/2/3/4/7/25/30/66 LTE_TDD:B34/38/39/40/41 WCDMA:B1/B2/B4 CDMA:BC1
RF2	18nH C2403	FDD-LTE:B12/17/B28B/B28A/
RF3	18PF C2405	GSM:B8 LTE-FDD:8 WCDMA:B8 CDMA:BC10
RF4	5.6nH C2404	GSM:B5 LTE-FDD:B5/B13/18/19/20/26 WCDMA:B5 CDMA:BC0

GSM	Band	Channal	TRP	TIS
	GSM850	128	24.6	-103.6
		190	25.4	-103.3
		251	25.5	-102.4
	EGSM	1	27.3	-103.6
		62	27.7	-103.7
		124	27.8	-104.8
	DCS	512	24.5	-103.5
		698	24.8	-103.8
		885	25.6	-104.6
	PCS	512	25.5	-104.3
		661	25.6	-104.5
		810	25.8	-104.6

WCDMA	Band	Channa1	TRP	TIS
	WCDMA Band 1	10562	18.8	
		10700	18.7	
		10838	18.3	-105.8
	WCDMA Band 2	9662	18.5	
		9800	18.7	
		9938	18.8	-105.5
	WCDMA Band 4	1538	18.3	
		1675	18.6	
		1738	18.7	-104.7
	WCDMA Band 5	4357	16.2	
		4410	15.7	
		4458	15.4	-105.6

FDD-LTE (10M)	Band	Channal	TRP	TIS
	W8	5900	16.7	
		5900	16.5	
		5900	16.4	-105.6
	B1	50	18.8	
		300	18.6	
		550	18.3	-93.5
	B2	650	18.5	
		900	18.7	
		1150	19.5	-93.4
	B3	1250	18.4	
		1575	18.5	
		1900	18.7	-93.2

FDD-LTE (10M)	Band	Channel	TRP	TIS
	B4	2000	18.5	
		2175	18.6	
		2350	18.7	-92.5
	B5	2450	16.5	
		2525	15.8	
		2600	15.6	-90.2
	B7	2800	18.2	
		3100	18.4	
		3400	18.5	-92.4
	B8	3500	16.8	
		3625	16.7	
		3750	16.5	-91.2

FDD-LTE (10M)	Band	Channa1	TRP	TIS
	B12	5060	15.4	
		5095	15.5	
		5130	15.8	-91.6
	B13			
		5230	16.4	-91.3
	B17	5780	15.8	
		5790	16.2	
		5800	16.3	-91.4
	B18	5900	16.5	
		5925	15.8	
		5950	15.7	-90.6

FDD-LTE (10M)	Band	Channel	TRP	TIS
	B19	6050	15.8	
		6075	15.6	
		6100	15.4	-90.2
	B20	6200	15.4	
		6300	16.6	
		6400	15.7	-90.6
	B25	8090	18.8	
		8365	19.5	
		8640	19.4	-92.8
	B26	8740	16.5	
		8865	15.7	
		8990	15.5	-90.5

FDD-LTE (10M)	Band	Channel	TRP	TIS
	B28A	9310	15.5	
		9360	15.4	
		9410	15.6	-89.6
	B28B	9460	15.4	
		9510	15.7	
		9560	16.1	-89.8
	B30			
		9820	16.7	-91.6
	B66	66536	18.2	
		66786	18.4	
		67036	18.5	-92.3

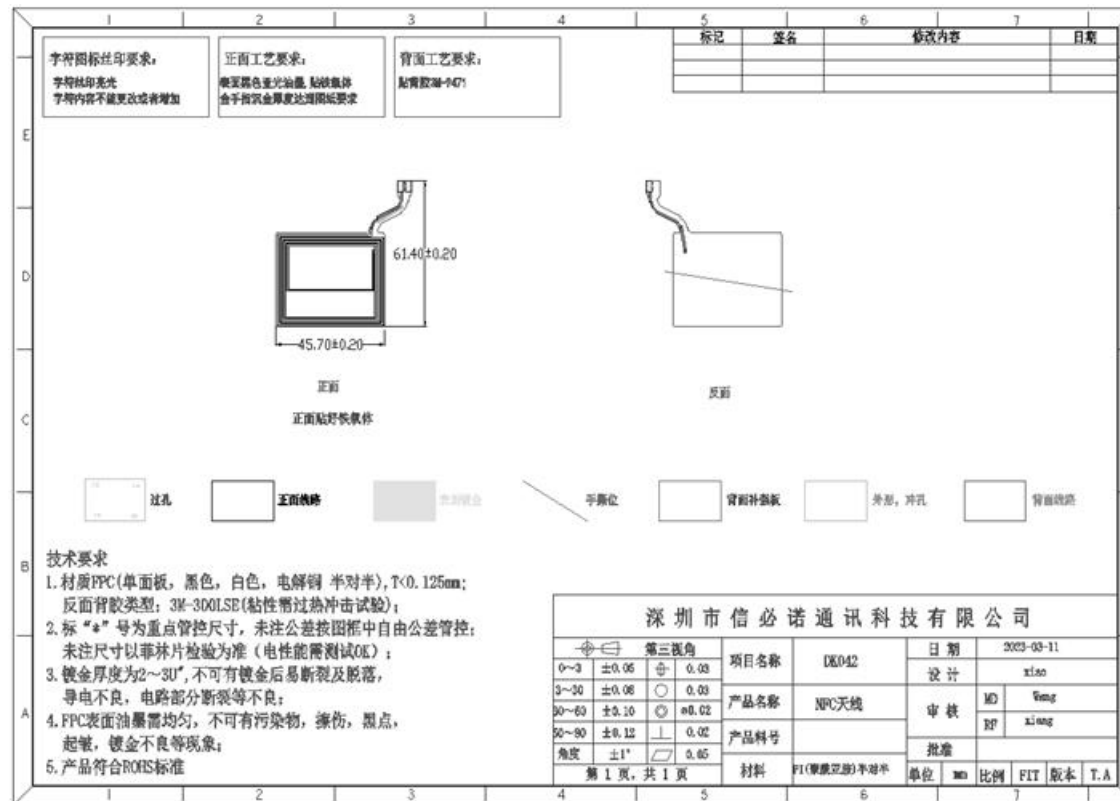
TDD-LTE (20M)	Band	Channel	TRP	TIS
	B34	36250	18.2	
		36275	18.5	
		36300	18.7	-91.5
	B38	37850	18.4	
		38000	18.7	
		38150	19.8	-91.8
	B39	38350	18.6	
		38450	18.8	
		38550	19.8	-92.4
	B40	38750	18.4	
		39150	18.5	
		39550	18.6	-90.7

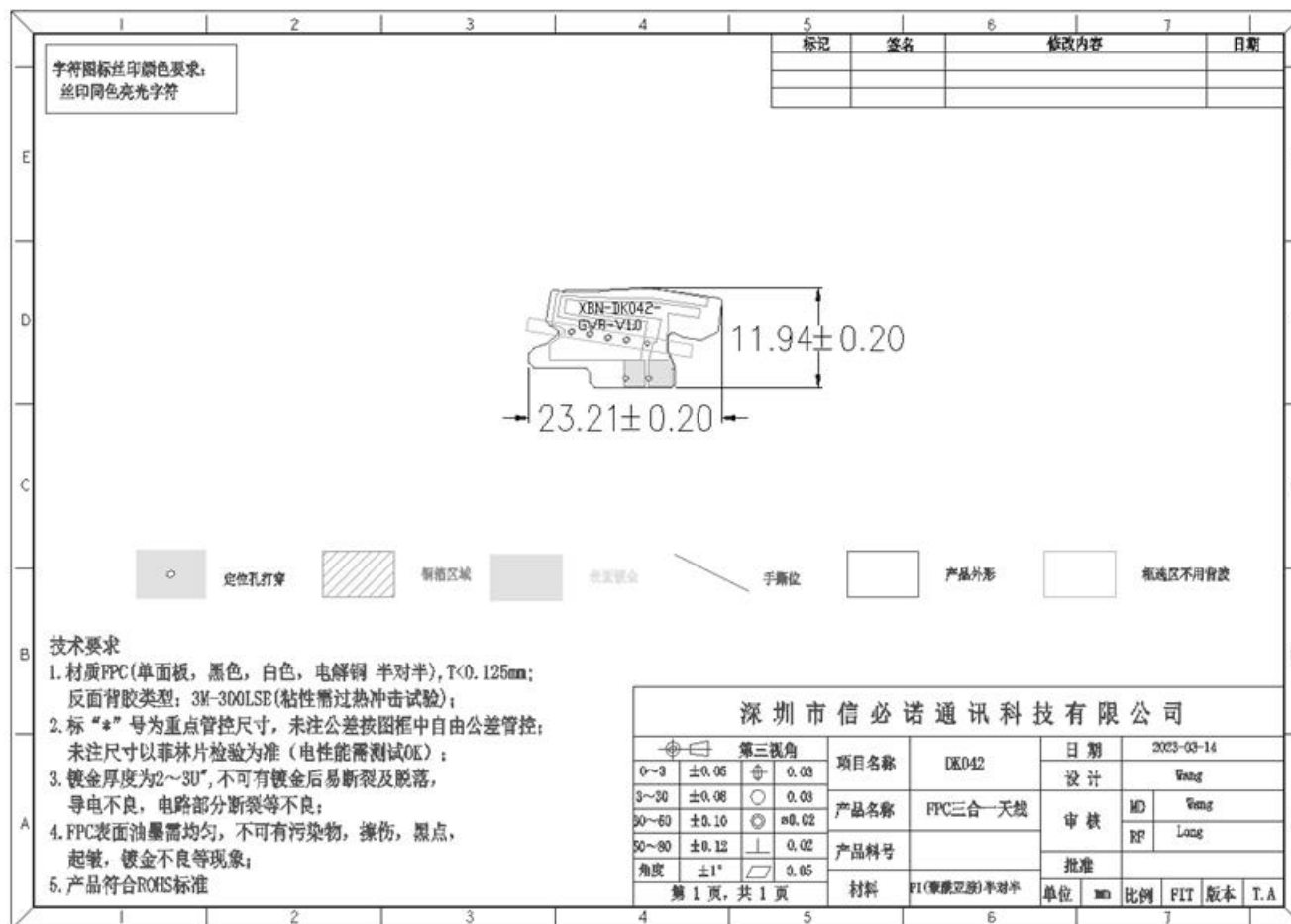
TDD-LTE (20M) -CDMA	Band	Channel	TRP	TIS
	B41	40620		
		40140	18.7	-92.2
		41240		
	BC0	50	16.5	
		300	16.5	
		550	15.6	-102.8
	BC1	1250	18.7	
		1575	18.8	
		1900	18.8	-103.6
	BC10	2800	16.2	
		3100	16.4	
		3400	15.6	-103.4

2. 4G	Band	Channel	TRP	TIS	5. 8G	Band	Channel	TRP	TIS
	b (11M)	1	12. 4			a (54M)	36	11. 8	
		6	12. 5				100	11. 7	
		13	12. 8	-83. 6			165	11. 6	-71. 4
	g (54M)	1	10. 8			n (MCS7)	36	10. 8	
		6	11. 1				100	10. 7	
		13	11. 3	-71. 5			165	10. 6	-67. 5
	n (MCS7)	1	10. 5			AC	36	10. 7	
		6	10. 7				100	10. 8	
		13	11. 5	-66. 5			165	11. 2	-65. 7

NFC antenna (motherboard):

NFC antenna data	
Label	Read distance (mm)
卡1	36
卡2	33
卡3	25
卡4	14





Main antenna gain, passive data

Freq (MHz)	Effi (%)	Gain (dBi)
700	17.49	-4.03
710	20	-3.14
720	20.83	-2.97
730	21.38	-2.83
740	21.94	-3.08
750	24.22	-2.07
810	27.32	-2.42
820	26.48	-2.48
830	35.75	-1.18
840	31.71	-1.45
850	29.88	-1.48
910	30.15	-1.45
920	22.78	-3.09
930	21.37	-3.17
940	22.06	-3.05
950	23.02	-2.95
960	24.84	-2.65

Freq (MHz)	Effi (%)	Gain (dBi)
1710	26.05	-1.04
1720	26.1	-0.86
1730	23.86	-1.73
1740	23.97	-1.6
1750	23.82	-1.78
1760	26.26	-1.29
1770	24.82	-1.51
1780	22.68	-2.04
1880	41.2	-0.04
1890	39.77	-0.05
1900	38.19	0.04
1910	38.52	0.33
1920	40.86	0.85
1930	43	1.12
1940	45.12	1.45
1950	47.79	1.73
1960	48.71	1.95
1970	49.59	2.08
1980	47.62	1.87
1990	46.16	1.73
2000	46.64	1.73

Freq (MHz)	Effi (%)	Gain (dBi)
2500	27.24	-1.38
2510	23.49	-1.89
2520	24.85	-1.54
2530	29.17	-0.69
2540	30.33	-0.32
2550	26.73	-0.91
2560	26.32	-0.92
2570	26.55	-0.95
2580	30.46	-0.26
2590	34.07	0.05
2600	34.97	0.41
2610	30.72	-0.3
2620	28.73	-0.87
2630	32.42	-0.22
2640	37.98	0.39
2650	37.92	0.39
2660	35.03	-0.21
2670	32.98	-0.59
2680	34.17	-0.68
2690	38.93	0.19
2700	38.49	0.22

Three-in-one antenna gain, passive data

Freq (MHz)	Effi (%)	Gain (dBi)
1550	38.36	0.83
1555	39.51	1.02
1560	37.38	0.78
1565	37.83	0.99
1570	41.84	1.45
1575	44.47	1.91
1580	44.92	2.19
2400	39.73	1.28
2410	44.01	1.45
2420	42.08	1.39
2430	44.44	1.47
2440	49.16	1.63
2450	40.52	1.71
2460	47.29	1.52
2470	40.09	1.88
2480	45.42	2.39
2490	43.52	2.01
2500	40.13	1.61

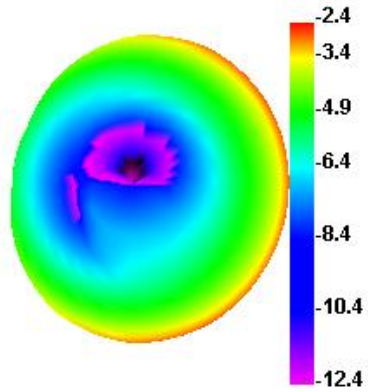
Freq (MHz)	Effi (%)	Gain (dBi)
5100	21.21	-2.17
5200	19.7	-2.45
5300	20.08	-2.18
5400	20.15	-2.19
5500	20.24	-2.15
5600	19.99	-1.86
5700	21.21	-1.49
5800	23.63	-1.07
5900	19.4	-1.55

Freq (MHz)	Effi (%)	Gain (dBi)
700	16.55	-4.19
710	17.16	-4.19
720	17.79	-4.17
730	20.21	-3.23
740	22.7	-2.72
750	24.66	-2.54
810	22.12	-3.13
820	22.62	-3.27
830	21.9	-3.52
840	17.16	-4.19
850	17.79	-4.17
910	20.21	-3.23
920	22.7	-2.72
930	24.66	-2.54
940	22.12	-3.13
950	22.62	-3.27
960	21.9	-3.52

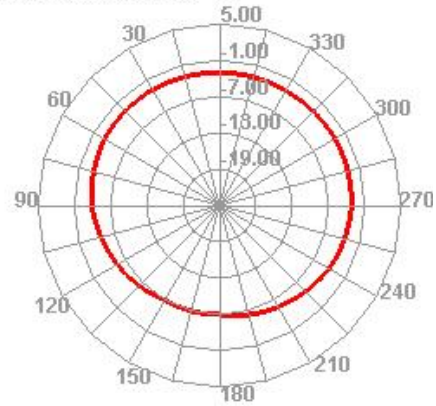
Freq (MHz)	Effi (%)	Gain (dBi)
1710	46.33	0.98
1720	49.91	1.5
1730	53.86	1.68
1740	45.6	1.22
1750	48.73	1.45
1760	46.3	1.24
1770	40.23	0.78
1780	41.83	1.14
1880	39.05	0.87
1890	34.07	0.29
1900	34.97	0.47
1910	33.17	-0.09
1920	32.3	-0.57
1930	32.68	-0.75
1940	31.43	-1.13
1950	28.64	-1.72
1960	26.45	-2.31
1970	24.4	-2.68
1980	28.48	-2.07
1990	27.55	-2.34
2000	24.42	-2.42

Freq (MHz)	Effi (%)	Gain (dBi)
2500	25.28	-1.81
2510	26.85	-1.96
2520	22.5	-2.9
2530	25.71	-1.92
2540	22.93	-2.4
2550	21.7	-2.71
2560	23.52	-2.58
2570	19.28	-3.39
2580	21.87	-2.77
2590	23.13	-2.31
2600	20.74	-2.52
2610	25.16	-1.63
2620	27.01	-1.25
2630	24.69	-1.86
2640	30.85	-1
2650	27.8	-1.56
2660	27.63	-0.67
2670	27.65	-0.6
2680	32.57	-0.05
2690	24.02	-1.57
2700	25.28	-1.81

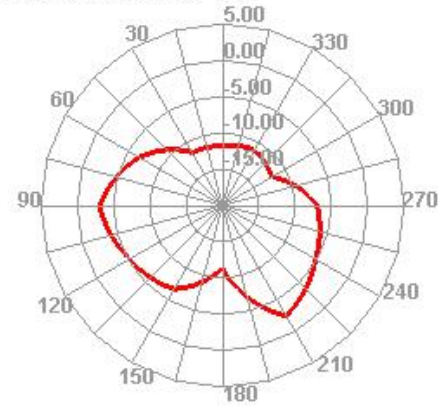
690.000MHz



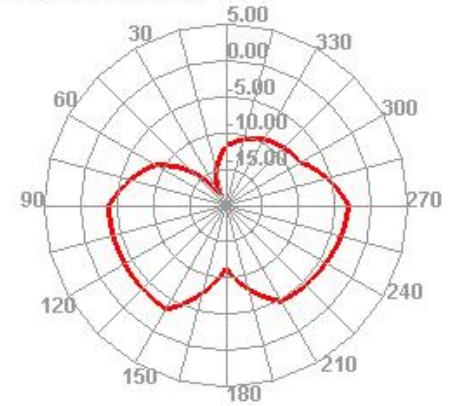
690.000MHz H



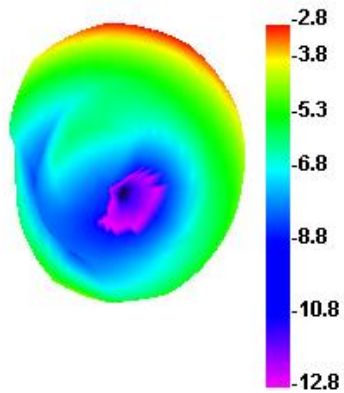
690.000MHz E1



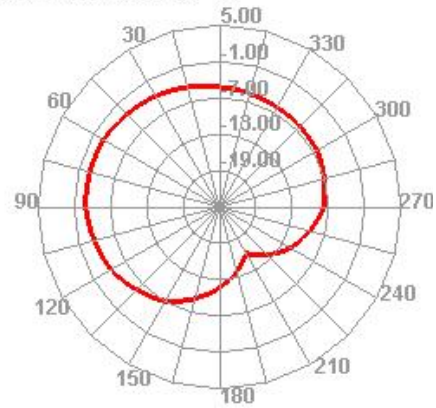
690.000MHz E2



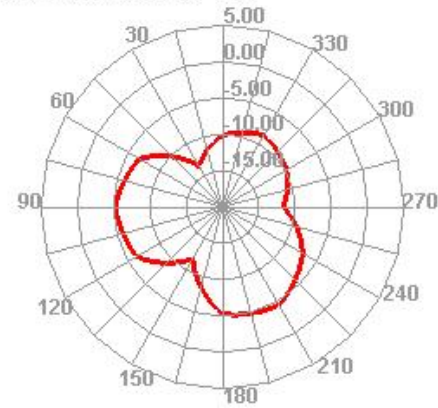
850.000MHz



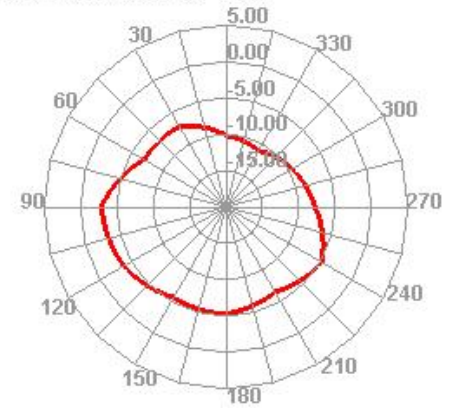
850.000MHz H



850.000MHz E1

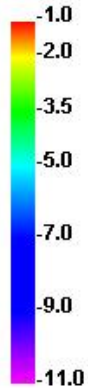
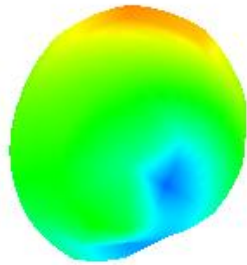


850.000MHz E2

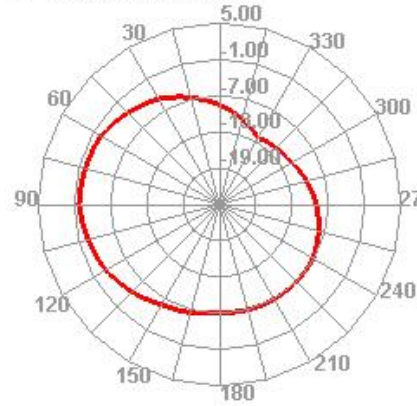


3D map (main antenna)

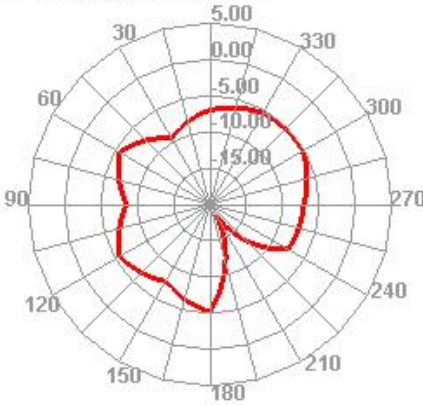
1710.000MHz



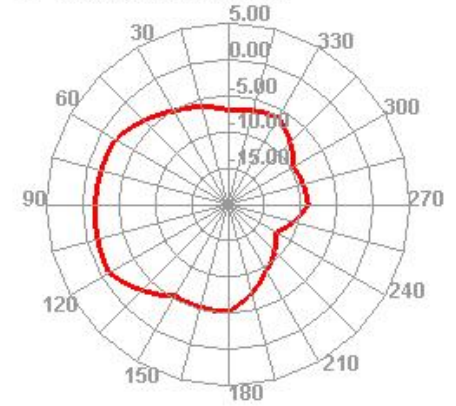
1710.000MHz H



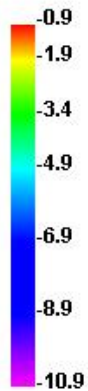
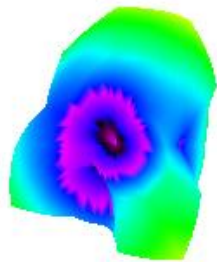
1710.000MHz E1



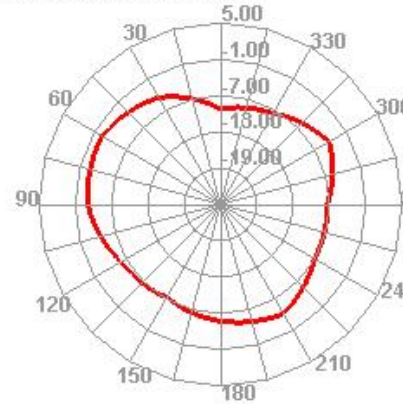
1710.000MHz E2



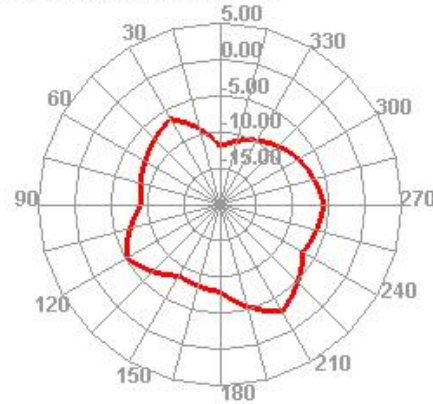
2220.000MHz



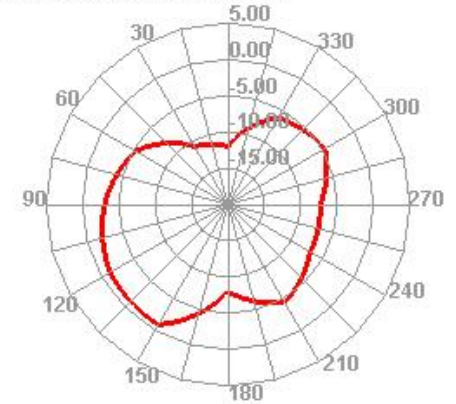
2220.000MHz H



2220.000MHz E1



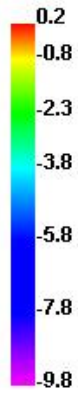
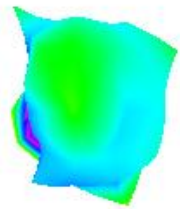
2220.000MHz E2



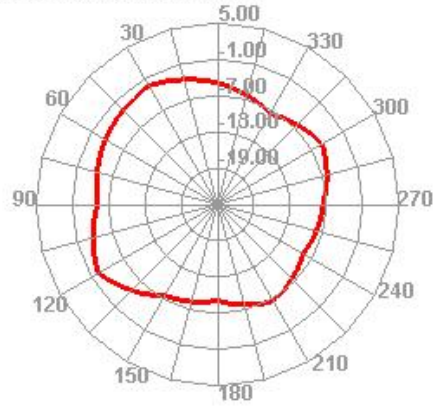


3D map (main antenna)

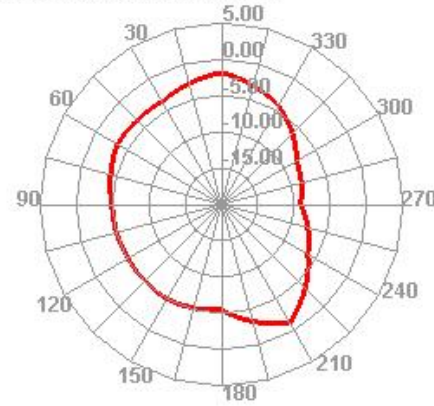
2750.000MHz



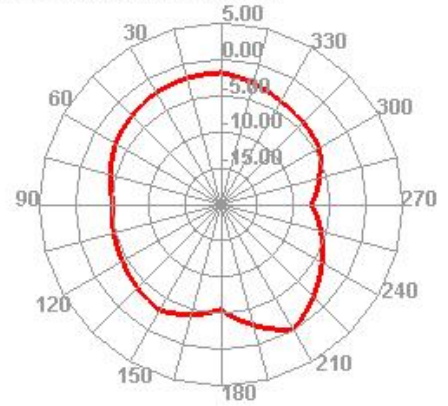
2750.000MHz H



2750.000MHz E1



2750.000MHz E2

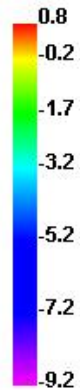
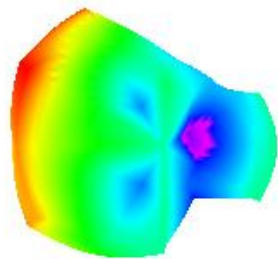




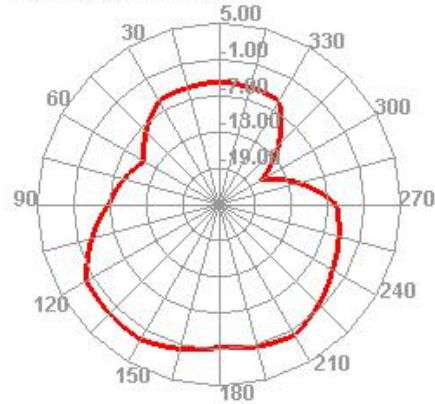
信必诺
XINBINUO

3D image (three-in-one antenna)

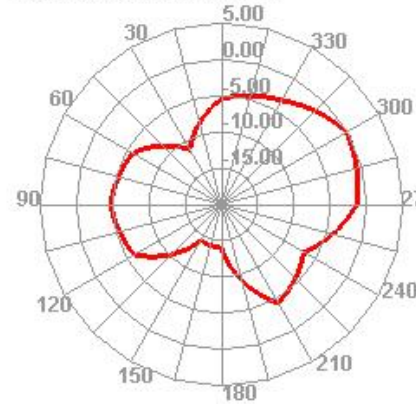
1560.000MHz



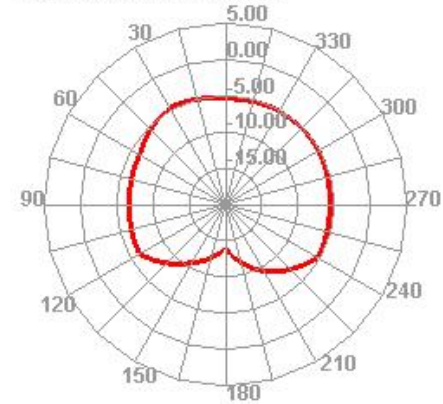
1560.000MHz H



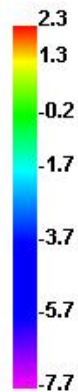
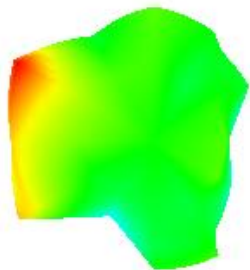
1560.000MHz E1



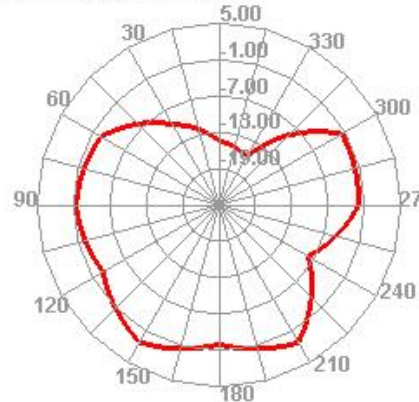
1560.000MHz E2



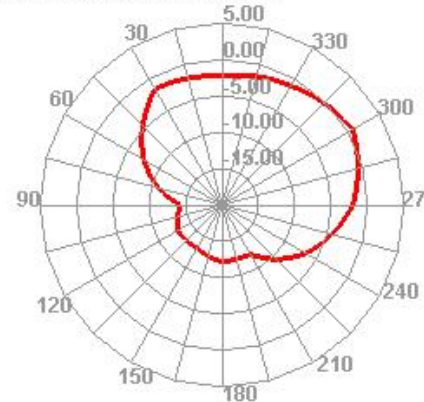
2400.000MHz



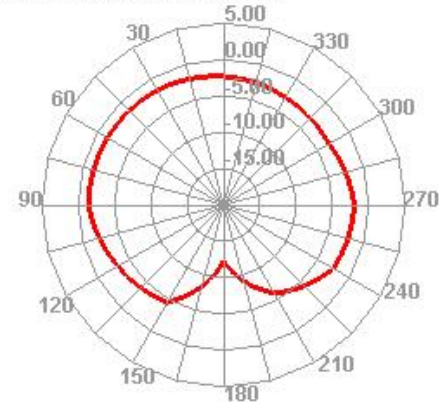
2400.000MHz H



2400.000MHz E1



2400.000MHz E2

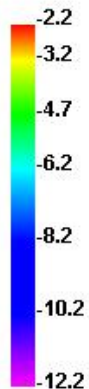
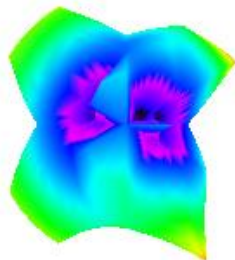




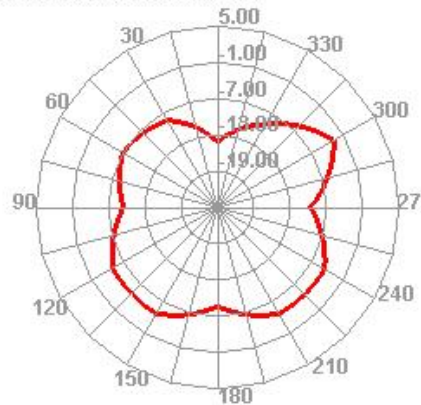
信必诺
Xin Binuo

3D image (three-in-one antenna)

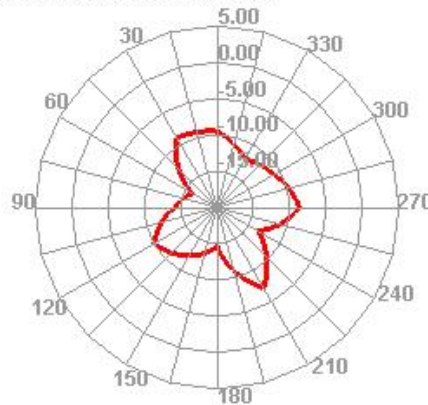
5150.000MHz



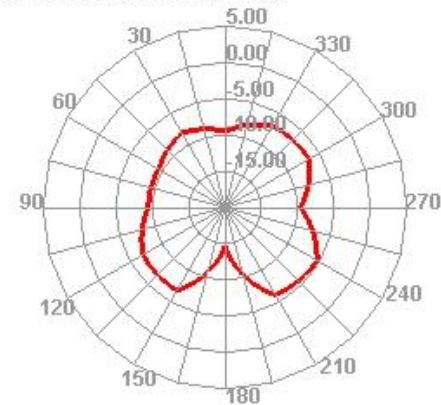
5150.000MHz H



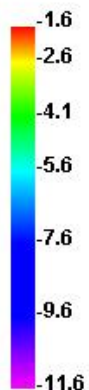
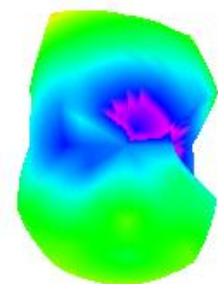
5150.000MHz E1



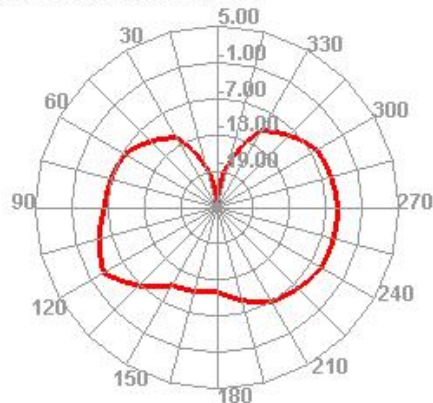
5150.000MHz E2



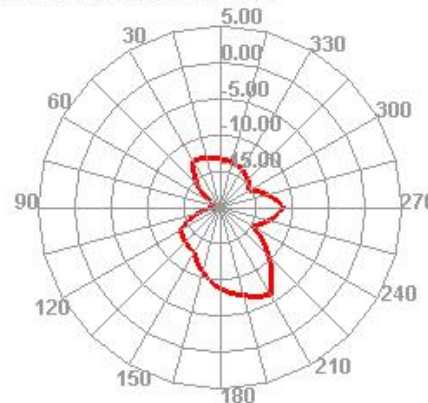
5849.973MHz



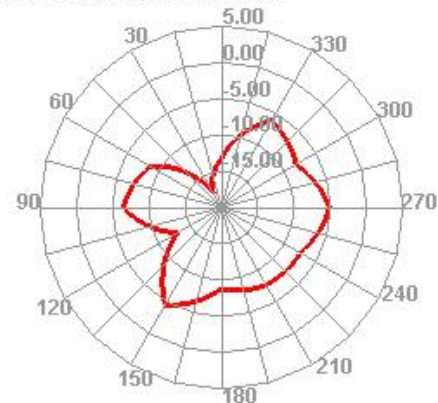
5849.973MHz H



5849.973MHz E1



5849.973MHz E2



GPS measurements:

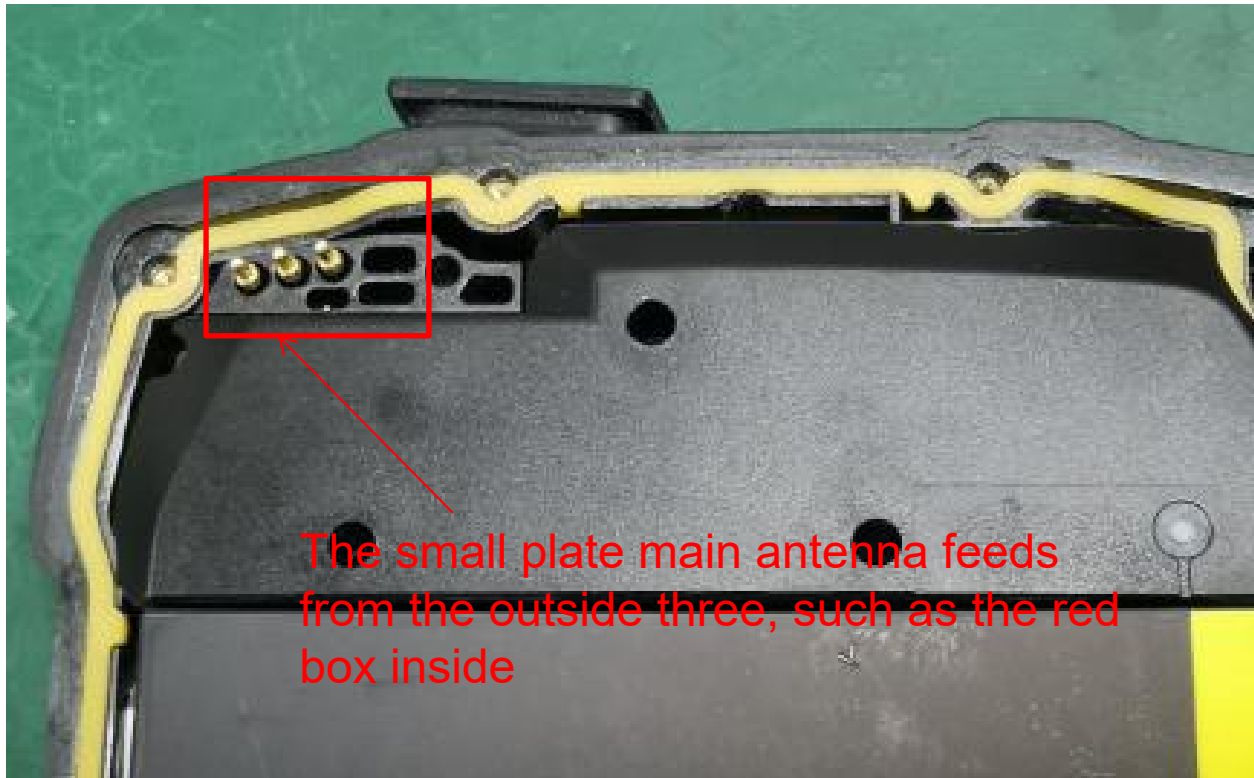
Location: The Pinot noir roof

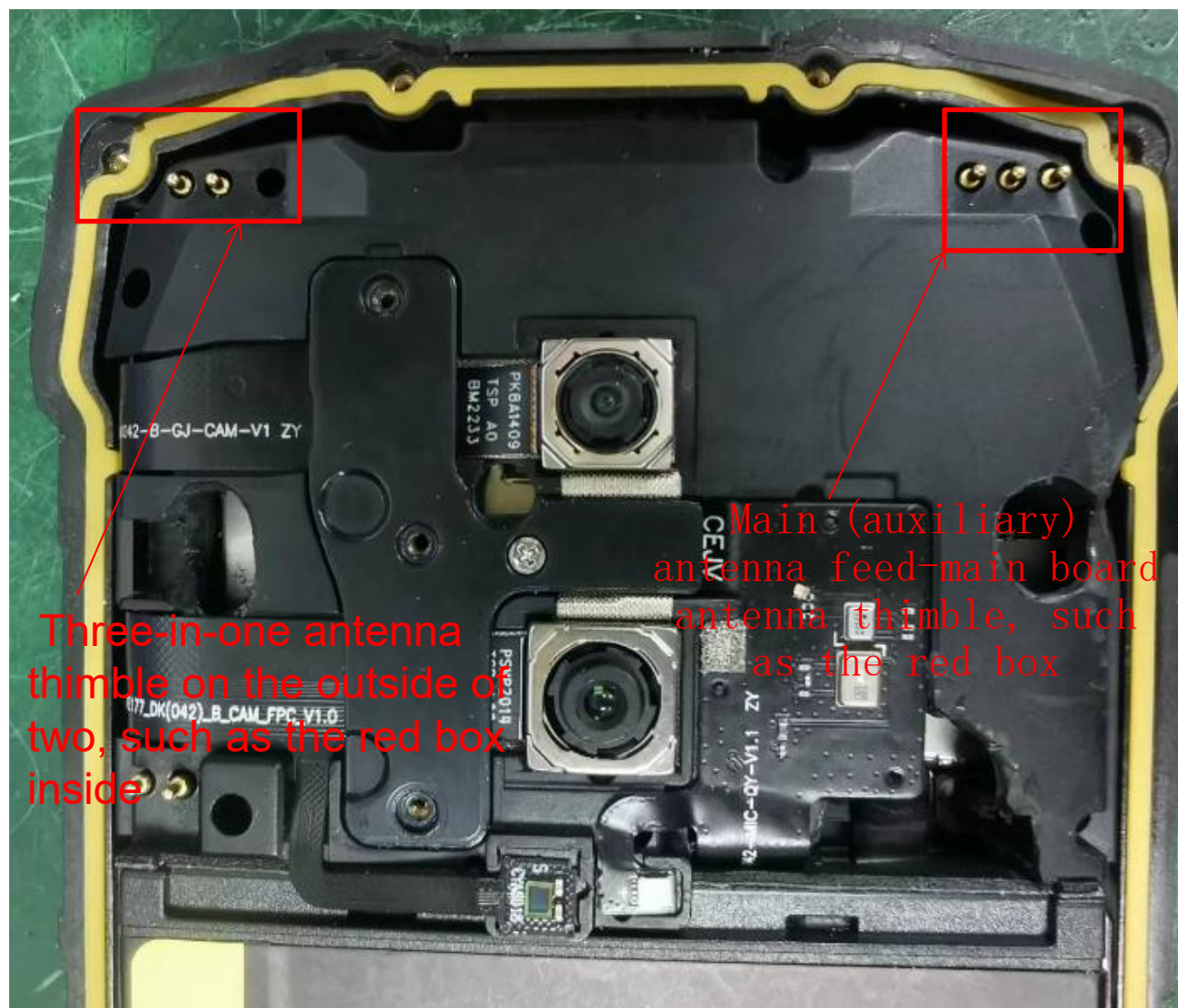
The weather: Cloudy-overcast

The test results are as follows:

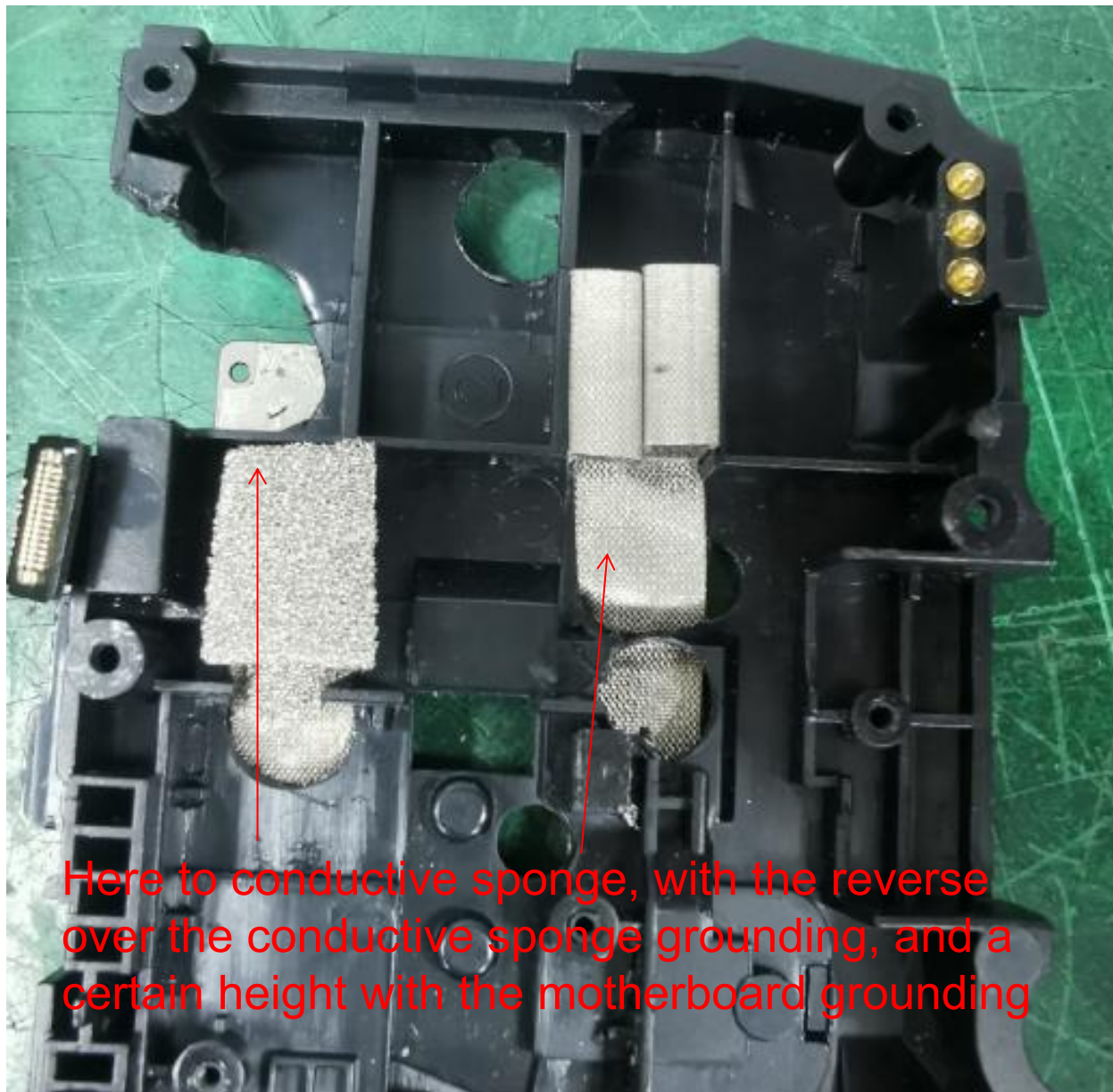
LLIT ES CNR	LLIT ES LOC	INFO RMAT ION	NMEA LOG	GPS TEST	MPE STAT US
G:GPS R:GLN B:BD E:GAL Q:QZS L:L1S I:IRNSS S:SBAS					
Average CNR					
G:38.9/-/- R:32.5/-/-					
B:33.0/-/- E:31.6/-/-					
Q:38.8/-/- L:-/-/- I:-/-/-					
S:43.0/-/-					
SVID	Fq	CNR	Elevation	Azimuth	
 3 L1	40.5	16.00	240.00		
 4 L1	37.6	49.00	309.00		
 8 L1	35.5	37.00	199.00		
 9 L1	45.6	14.00	320.00		
 16 L1	33.4	58.00	347.00		
 22 L1	38.4	28.00	153.00		
 26 L1	33.2	39.00	31.00		
 27 L1	40.2	68.00	164.00		
 31 L1	46.0	30.00	89.00		
 65 L1	28.2	24.00	315.00		
 71 L1	42.9	28.00	193.00		
 72 L1	34.0	51.00	255.00		
 73 L1	34.7	14.00	57.00		
 74 L1	18.6	35.00	12.00		
 75 L1	35.4	25.00	309.00		
 82 L1		7.00	22.00		

SATE LLIT ES CNR	SATE LLIT ES LOC	INFO RMAT ION	NMEA LOG	GPS TEST	MPE STAT US
G:GPS R:GLN B:BD E:GAL Q:QZS L:L1S I:IRNSS S:SBAS					
Average CNR					
G:37.1/-/- R:31.8/-/-					
B:34.0/-/- E:28.2/-/-					
Q:39.5/-/- L:-/-/- I:-/-/-					
S:43.0/-/-					
ID	CNR	ID	CNR	ID	CNR
G3	39.4/-/-	G4	37.4/-/-	G8	33.0/-/-
G16	35.5/-/-	G18	23.5/-/-	G22	37.4/-/-
G27	42.5/-/-	G31	46.3/-/-	R65	20.9/-/-
R72	30.2/-/-	R73	35.5/-/-	R74	22.8/-/-
R83	24.1/-/-	R84	38.2/-/-	R85	35.8/-/-
B2	31.0/-/-	B3	39.7/-/-	B4	35.9/-/-
B6	30.7/-/-	B7	26.6/-/-	B9	28.9/-/-
B12	0.0/-/-	B14	30.0/-/-	B16	37.2/-/-
B24	35.8/-/-	B26	27.3/-/-	B29	36.7/-/-
B35	42.2/-/-	E13	42.5/-/-	E14	30.0/-/-
E19	25.2/-/-	E21	25.4/-/-	E26	19.1/-/-
Q2	36.0/-/-	Q3	45.0/-/-	Q4	37.0/-/-
S40	0.0/-/-	S49	0.0/-/-	S50	43.0/-/-

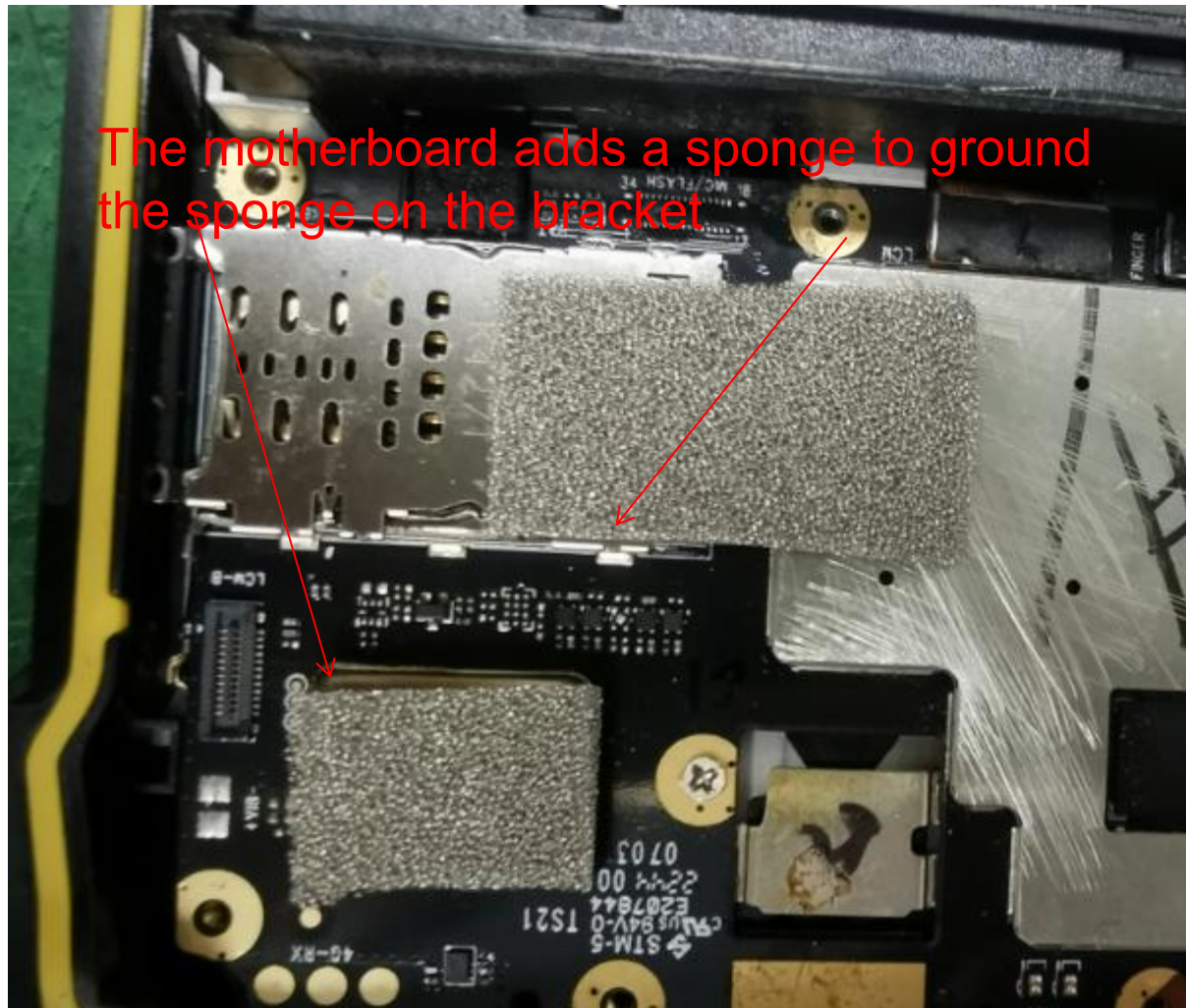




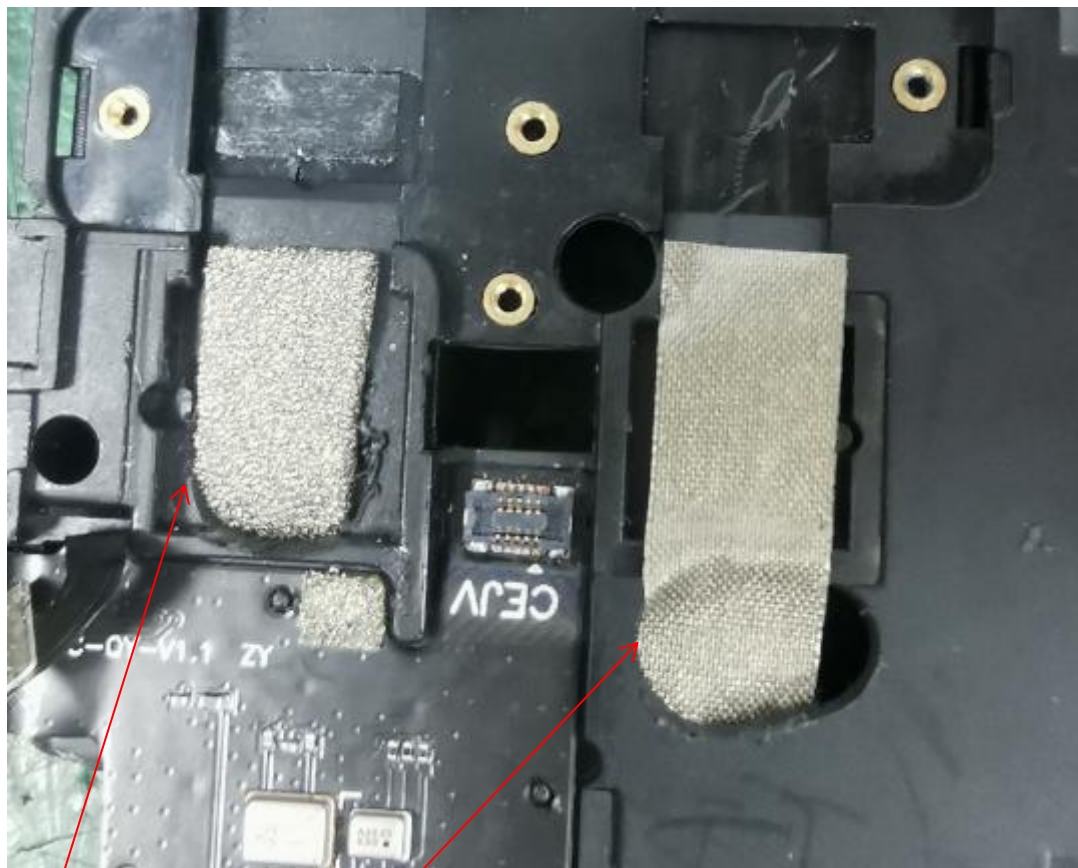
1



2



3



The perforated position as shown in the picture, the conductive cloth and the conductive sponge, back through to ground with the camera

4

Complete
grounding and
grounding

