ONE PLUS ONE
Wireless Communication

深圳市一加一无线通讯技术有限公司

承认书

APPROVAL SHEET

客户 Customer	华星
项目名 Project	D99B
料号 Part NO.	
规格 Specification	MAIN+DIV+GPS/WIFI/BT Antennas

APPROVAL			
OnePlusOne:			
RF Check	ME Check	QC Check	Confirm By
Customer:			
EE Check	PM Check	QC Check	Confirm By

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Contents

1 Antenna description

It summarize Main and DIV and GPS/WIFI/BT antennas for project D99B. MAIN antenna's frequency band is 824-960MHz&1710-2690MHZ, Main antenna's type is IFA. DIV antenna's frequency band is 860~894MHz&1805~2690MHz. GPS/WIFI/BT antenna's frequency band is 1575.42MHz&2400-2500MHz. GPS/WIFI/BT antenna's type is IFA.

Part number of antenna： FPC Antenna pictures

1.1 Part number

Part number of antenna：**D99B-MAIN, D99B-DIV, D99B-G/W/B.**

1.2 Antenna pictures

2 Electrical Performance

2.1 Specificatio

Main		
Frequency Range	824MHz~960MHz	1710MHz~2690MHz
Return Loss	<-2	<-5
Efficiency	>25%	>30%

DIV		
Frequency Range	860MHz~894MHz	1805MHz~2690MHz
Return Loss	<-5	<-5
Efficiency	>25%	>30%

GPS/WIFI/BT		
Frequency Range	1575.42MHz	2400MHz~2500MHz
Return Loss	<-5	<-5
Efficiency	>35%	>35%

2.2 Measurement Set-up

2.2.1 VSWR and Return Loss

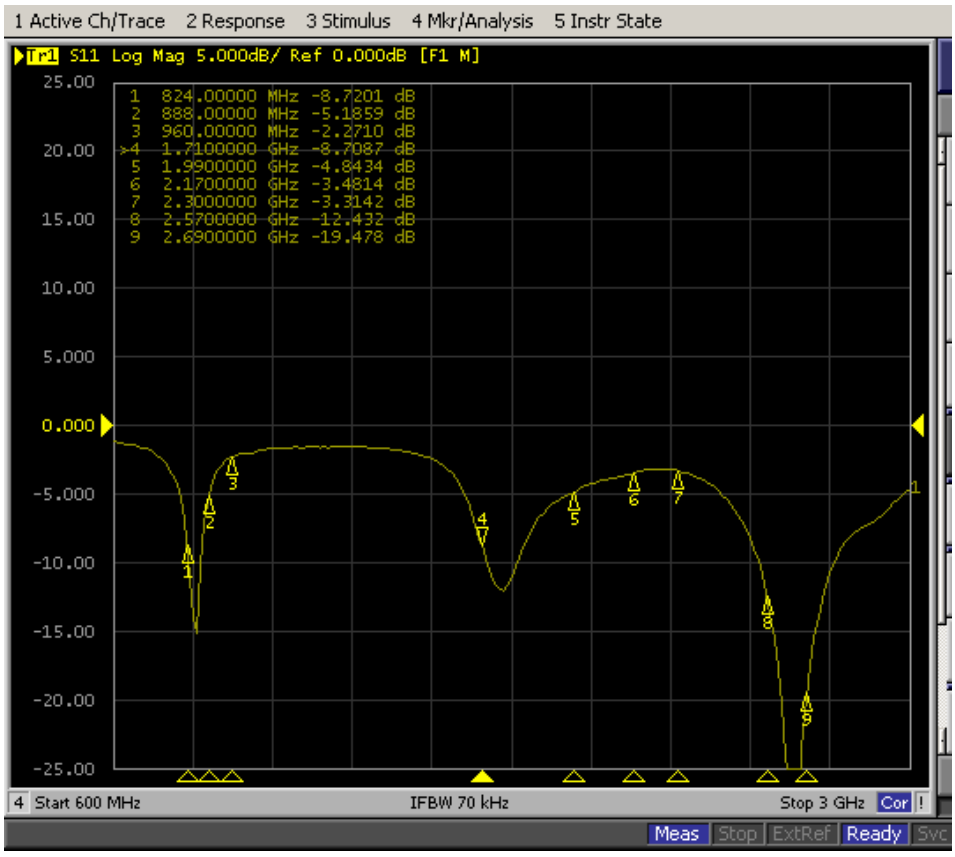
VSWR measurements (S_{11}) were performed using an Agilent ENA series Network Analyzer and the previously described test fixture. Coaxial chokes were used to mitigate surface currents on the outside of the cabling. The testing was performed in free space.

2.2.2 Efficiency and Gain

The gain of the antenna was measured in OPO's 3D anechoic chamber in Shenzhen, China. The chamber is a ETS system capable of doing tests from 380MHz to 6GHz. Coaxial chokes on the feed cable were used to mitigate surface currents during passive tests. The measurement results are calibrated using dipole standards. For TRP and TIS the chamber uses a 8960 / MT8820C to establish the connection with the mobile device and read the power.

3 Reference measurement data

3.1 Passive



无源参数

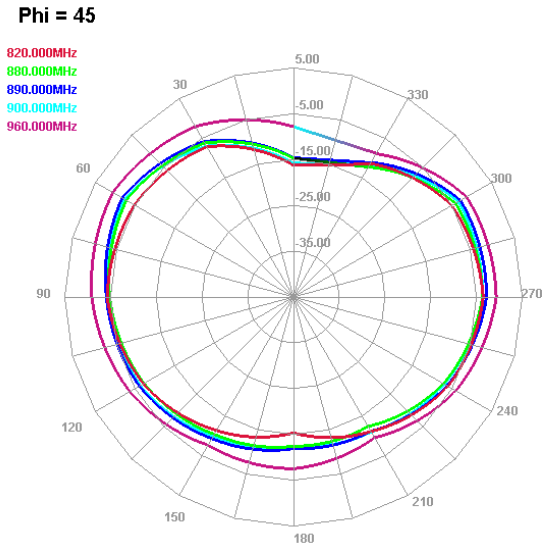
Band	Effi(%)	效率（dB）	增益（dBi）
G850	27.11	-5.67	-2.51
	26.01	-5.85	-3.4
	26.53	-5.76	-3.12
G900	27.55	-5.6	-3.25
	34.92	-4.57	-2.2
	31.59	-5.01	-2.39
G1800	36.63	-4.36	0.52
	37.33	-4.28	0.62
	34.69	-4.6	0.29
G1900	37.05	-4.31	0.66
	34	-4.69	0.35
	37.75	-4.23	0.82

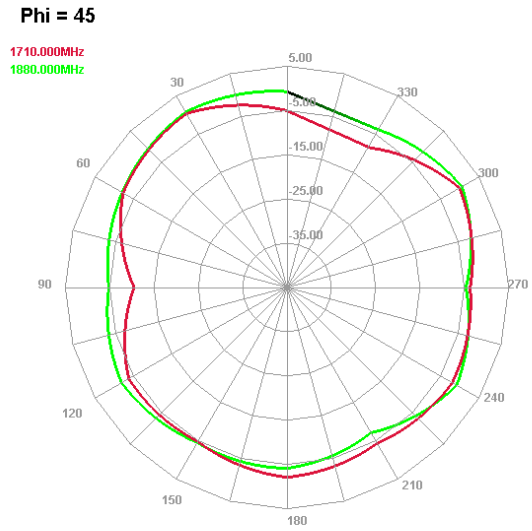
Band	Effi(%)	效率（dB）	增益（dBi）
FDD-B1	38.62	-4.13	0.15
	39.76	-4.01	0.23
	33.81	-4.71	0.37
FDD-B2	33.27	-4.78	0.5
	42.09	-3.76	0.51
	38.17	-4.18	0.04
FDD-B3	40.23	-3.95	0.5
	46.45	-3.33	0.19
	47.74	-3.21	0.35
FDD-B4	31.75	-4.98	0.08
	40.8	-3.89	0.29
	43.11	-3.65	0.12

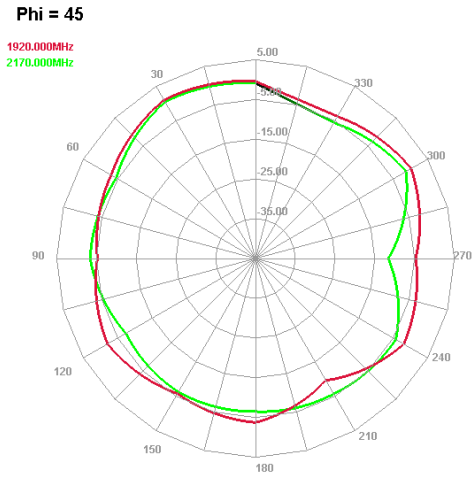
Band	Effi(%)	效率（dB）	增益（dBi）
FDD-B5	25.76	-5.89	-2.57
	27.8	-5.56	-2.68
	25.38	-5.95	-2.81
FDD-B8	28.16	-5.5	-3.04
	30.57	-5.15	-2.81
	35.5	-4.5	-2.22
FDD-B12	24.82	-6.05	-3.52
	27.8	-5.56	-2.65
	25.55	-5.93	-2.58
FDD-B13	26.97	-5.69	-2.58
	31.57	-5.01	-1.71
	27.73	-5.57	-2.19
FDD-B28	27.78	-5.56	-2.04
	26.17	-5.82	-1.54
	24	-6.2	-1.25

Band	Effi(%)	效率（dB）	增益（dBi）
W2100	36.09	-4.43	0.29
	37.69	-4.24	0.39
	36.03	-4.43	0.76
W1900	45.81	-3.39	1.53
	48.19	-3.17	1.97
	33.66	-4.73	0.61
W900	26.1	-5.83	-2.72
	29.92	-5.24	-2.91
	34.62	-4.61	-2.19
W850	25.03	-6.02	-2.85
	26.88	-5.71	-2.12
	32.04	-4.94	-2.33

方向图



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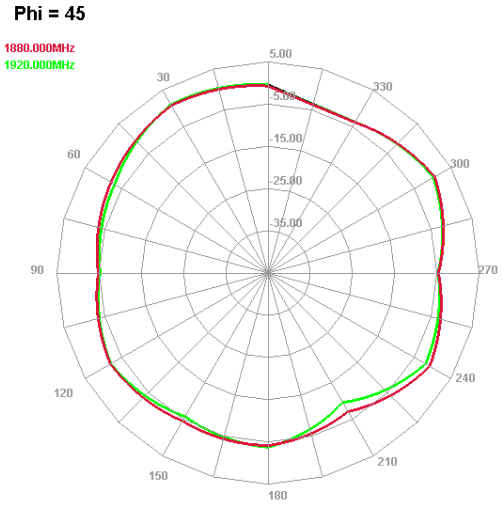
1920.000MHz
2170.000MHz
5.00
-5.00
-15.00
-25.00
-35.00
30
330
60
300
90
270
120
240
150
210
180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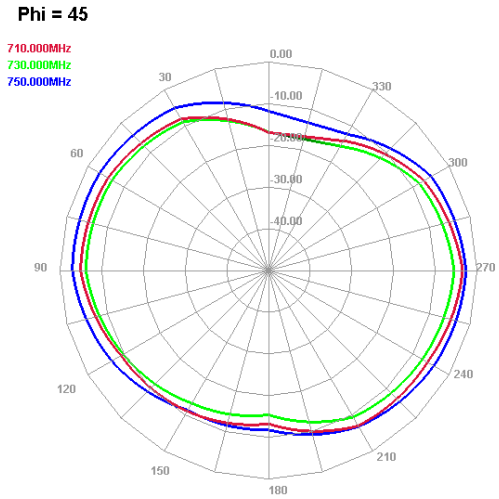
1880.000MHz
1920.000MHz
5.00
-5.00
-15.00
-25.00
-35.00
30
330
60
300
90
270
120
240
150
210
180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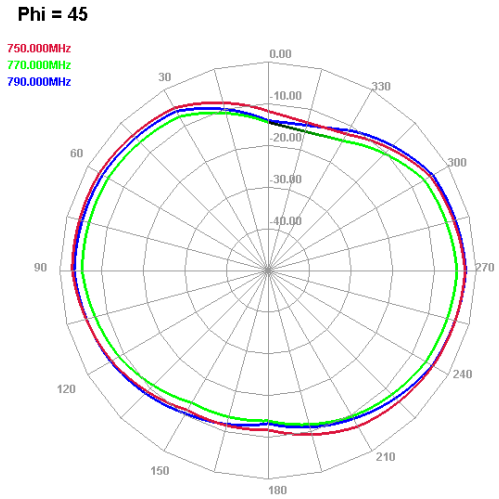
710.000MHz
730.000MHz
750.000MHz
0.00
-10.00
-20.00
-30.00
-40.00
30
330
60
300
90
270
120
240
150
210
180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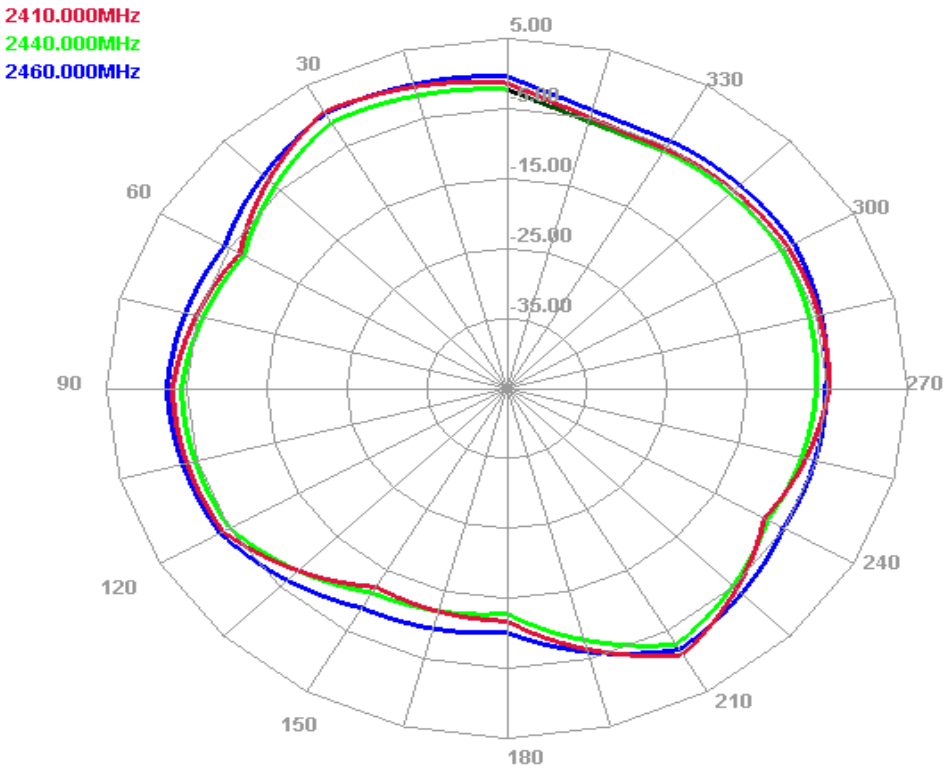
750.000MHz
770.000MHz
790.000MHz
0.00
-10.00
-20.00
-30.00
-40.00
30
330
60
300
90
270
120
240
150
210
180

Test	BT								
Test Point ID	1	2	3	4	5	6	7	8	9
Freq. (MHz)	2400	2410	2420	2430	2440	2450	2460	2470	2480
Efficiency (%)	28.48	30.33	30.64	31.59	34.48	43.08	40.08	34	32.64
效率(dB)	-5.45	-5.18	-5.14	-5	-4.62	-3.66	-3.97	-4.68	-4.86
增益(dBi)	-0.26	0.01	0.04	0.03	0.35	2.77	2.69	0.3	0.13

Test	WIFI								
Test Point ID	1	2	3	4	5	6	7	8	9
Freq. (MHz)	2400	2410	2420	2430	2440	2450	2460	2470	2480
Efficiency (%)	38.32	37.49	41.76	29.6	29.59	26.71	43.22	26.53	27.59
效率(dB)	-4.17	-4.26	-3.79	-5.29	-5.29	-5.73	-3.64	-5.76	-5.59
增益(dBi)	0.63	0.2	0.72	-0.53	-0.51	-0.77	0.33	-0.82	-0.57

Phi = 45



MAIN Return Loss

3.2 Active

Band	Channel	TRP	TIS	高
G850	L	24.47		
	M	24.94		
	H	25.06	-102.06	-100.84
G900	L	25.24		
	M	25.26		
	H	25.31	-101.18	-99.11
G1800	L	23.41		
	M	23.89		
	H	24.18	-102.13	-101.42
G1900	L	24.49		
	M	25.09		
	H	25.24	-102.34	-101.82
W2100	L	17.24		
	M	16.85		
	H	17.01	-102.96	
W1900	L	17.06		
	M	17.12		
	H	17.14	-102.49	
W900	L	16.59		
	M	16.57		
	H	16.67	-102.71	
W850	L	16.34		
	M	16.37		
	H	16.41	-103.13	

Band	Channel	TRP	TIS
FDD-B1	L	16.47	
	M	16.72	
	H	16.49	-89.42
FDD-B2	L	17.04	
	M	16.97	
	H	16.83	-92.12
FDD-B3	L	17.03	
	M	16.43	
	H	16.54	-90.05
FDD-B4	L	16.21	
	M	16.52	
	H	16.56	-90.49
FDD-B5	L	16.19	
	M	16.22	
	H	16.34	-90.36
FDD-B8	L	16.24	
	M	16.27	
	H	16.32	-90.18
FDD-B12	L	15.59	
	M	15.64	
	H	16.51	-90.17
FDD-B13	L	16.27	
	M	16.31	
	H	16.25	-90.34
FDD-B28	L	15.64	
	M	16.21	
	H	16.48	-90.15

3.3 GPS Performance Descriptions

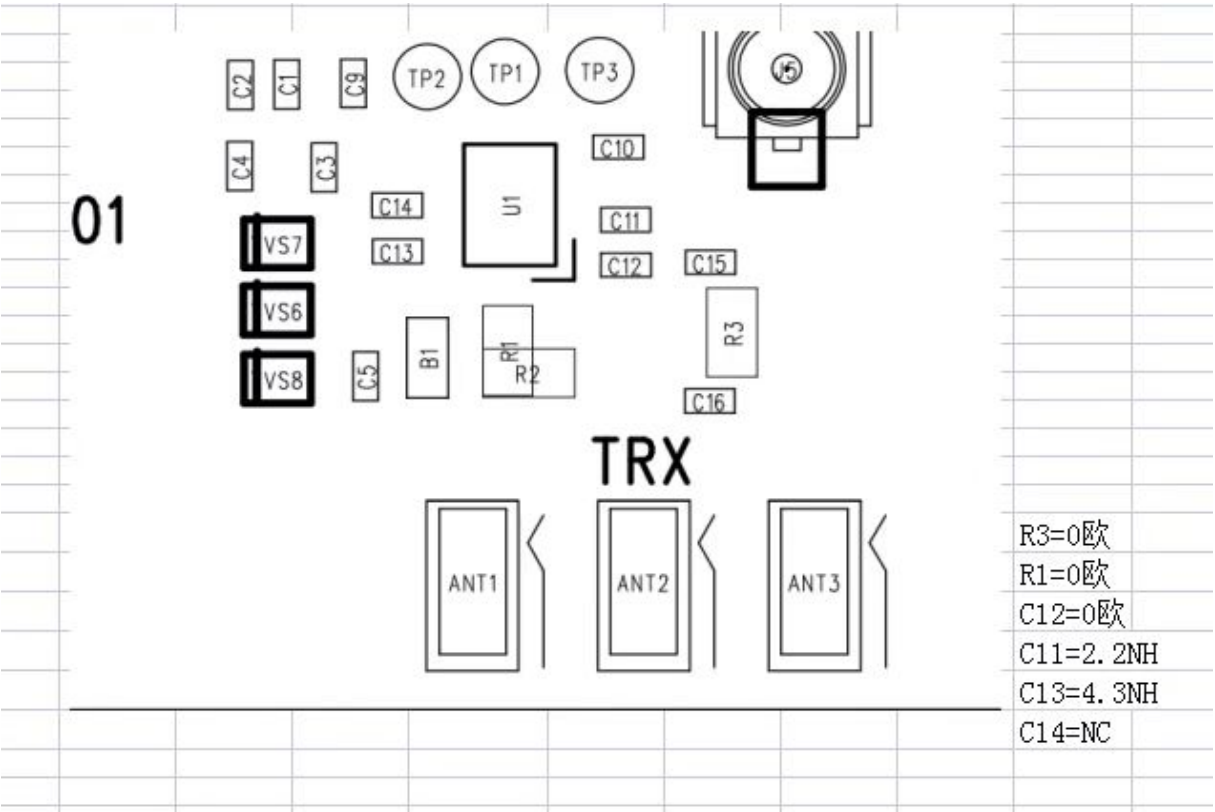
3.4WIFI Performance Descriptions

WiFi有源数据

	Wifi 2G TRP			ifi 2G TIS
	1	6	11	11
b模	2412	2437	2462	2462
	11.73	12.25	11.63	-82.54

	Wifi 5G TRP			ifi 5G TIS
	36	64	149	149
a模	5180	5320	5745	5745
	11.85	13.46	13.9	-74.37

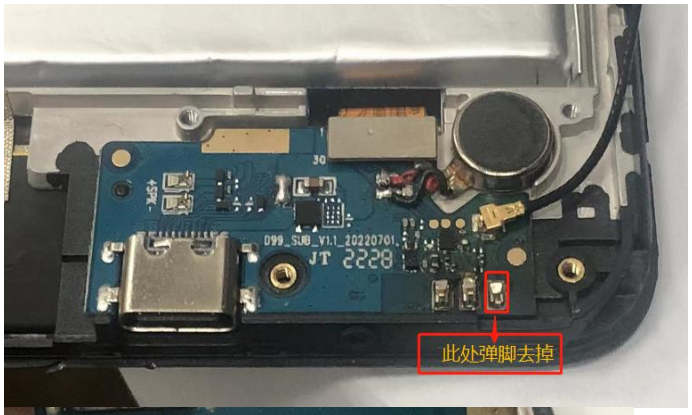
3.5Matching Circuit Description.

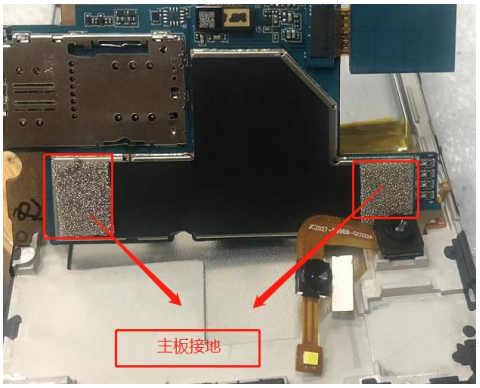


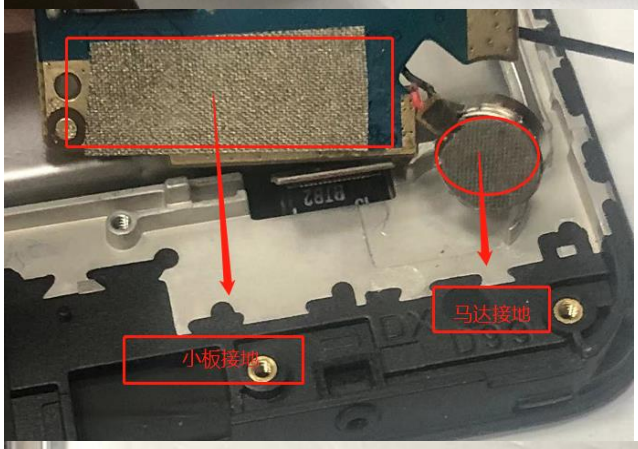
开关逻辑

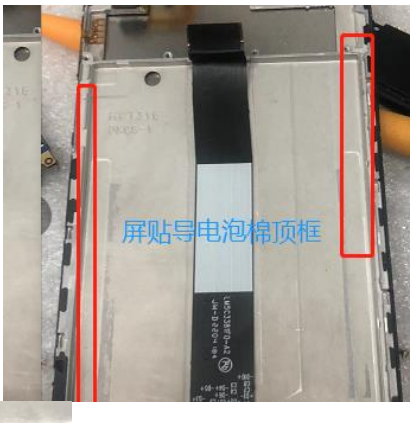
RF1	G900/1800/1900/W1/2/8/LTE/1/2/3/4/8
RF2	G850/W5/LTE/5
RF3	LTE/12/13/28

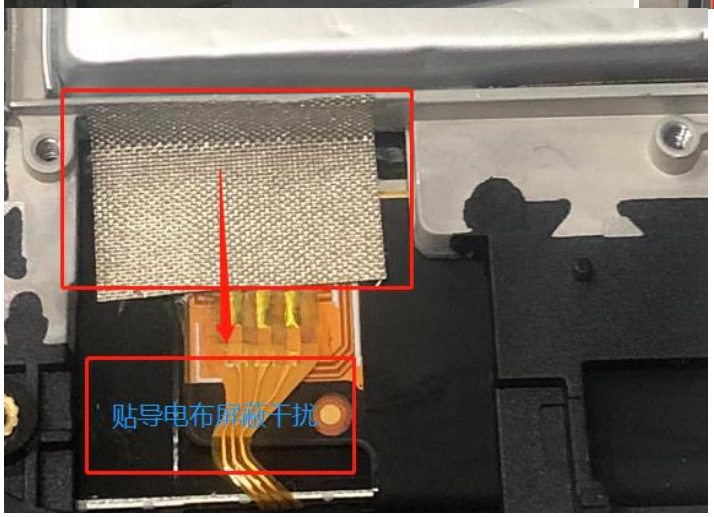
Environmental Manipulation











4 Mechanical description

4.1 Drawings