

➤ **Customer:** Duoke

➤ **Project:** DK066P

➤ **ME:** Xiao Xiang

TEL-13316888409

➤ **RF:** Long ShaoChang

TEL- 18873873276

➤ **Date:** 22.8.2024

Catalogue

1.Basic information	3
2.Matching circuit	4
3.Antenna return loss.....	5
4.Gain	7
5.OTA.....	8
6.EMC optimization.....	21

1.Basic information

Frequency band:

GSM:850/900/1800/1900.

WCDMA:B2/B4/B5.

FDD LTE: B2/B3//B4/B5/B7/B12/B13/B17/B26/B28A/B28B/B66.

TDD LTE: B40/B41.

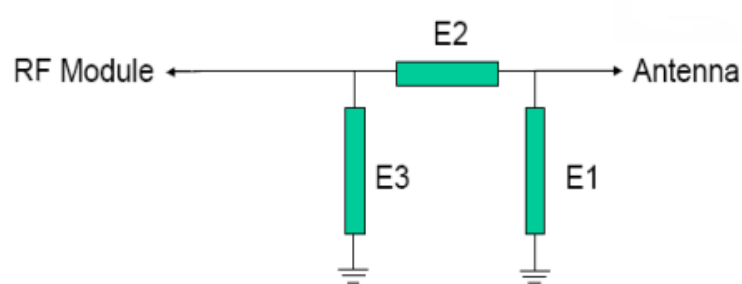
Others:

GPS/Beidou/GLONASS/Galileo,80211.a/b/g/n/ac 2.4G/5G,Bluetooth.

NFC.

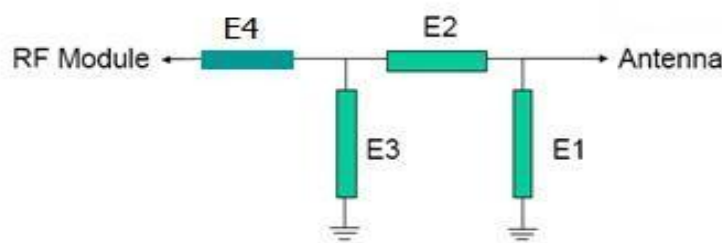
2. Matching circuit

2.1 Divided antenna



Element	Value
E1 (0201)	NA
E2 (0201)	0Ω
E3 (0201)	NA

2.2 Main antenna

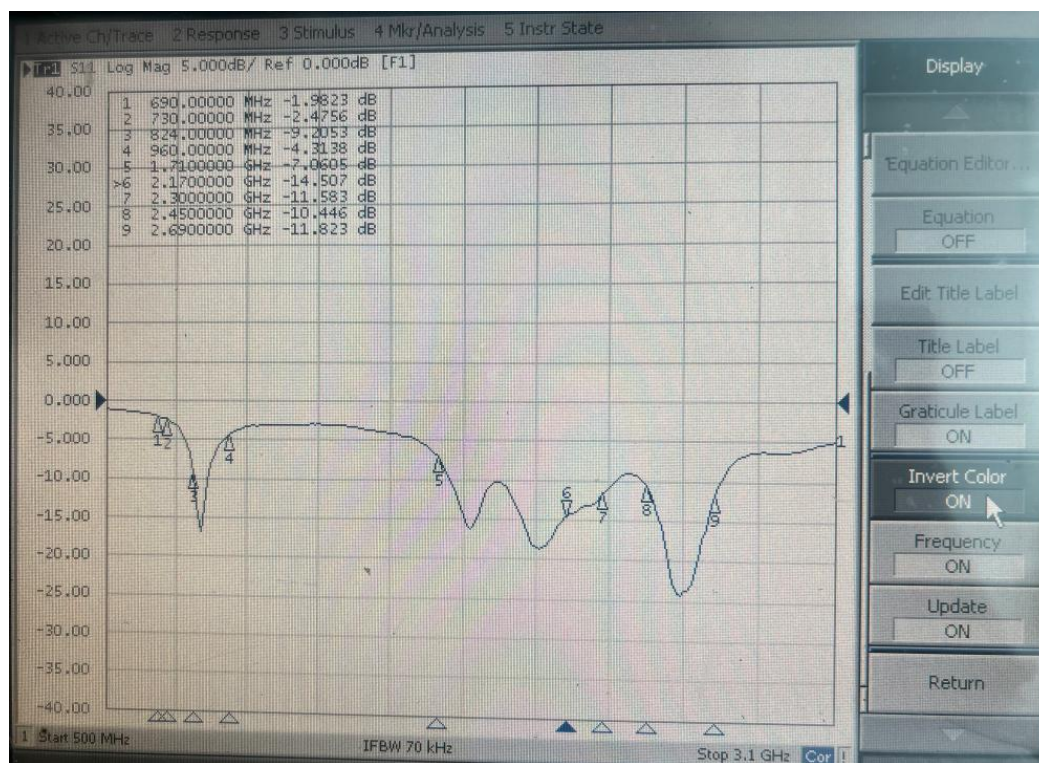


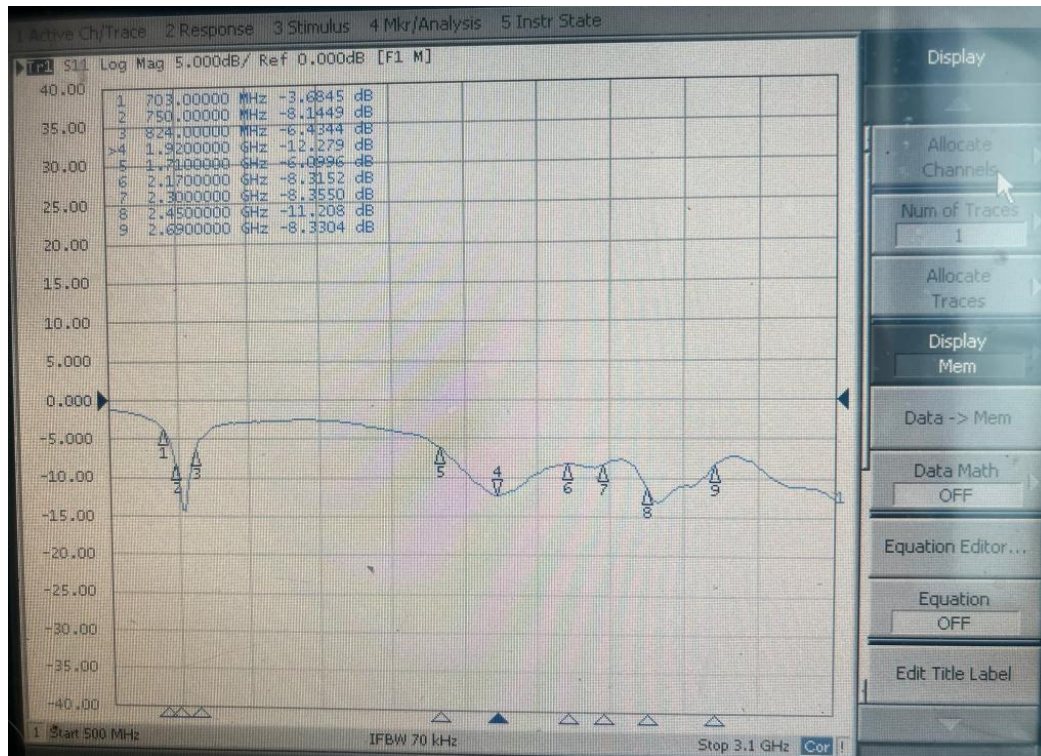
Element	Value	PCB NUM
E1	NC	L201

E2	0Ω	C209
E3	10nH	L202
E4	8.2pf	C210

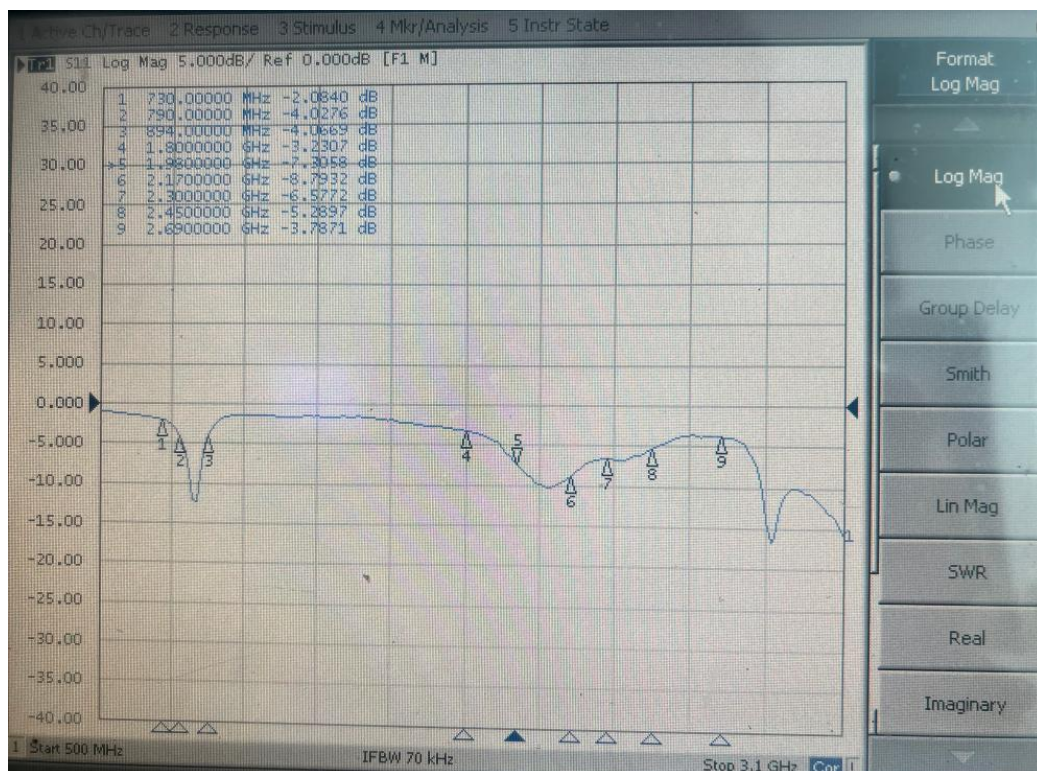
3. Antenna return loss

3.1 Main antenna return loss

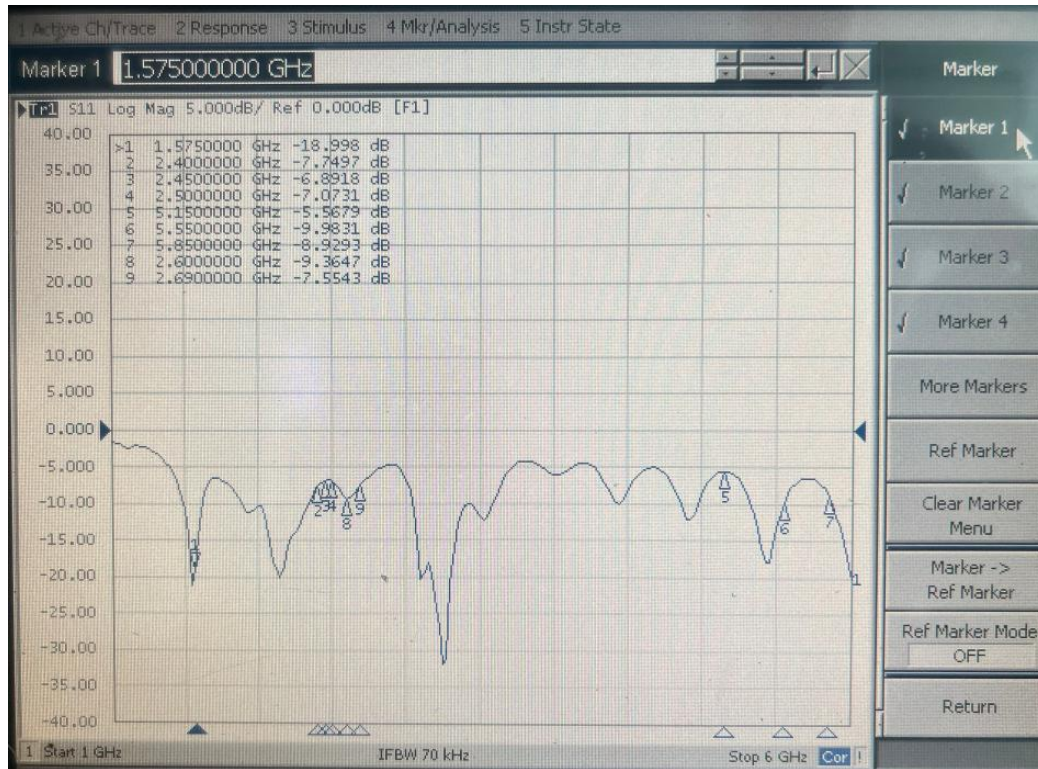




3.2 Divided antenna return loss



3.3 GPS/WIFI/Bluetooth antenna return loss



4. Gain

Band	Avg Gain/dBi	Peak Gain/dBi
GSM850	-7.2	-3.1
GSM900	-8.5	-3.9
DCS1800	-4.1	-0.6
PCS1900	-3.2	0.2
WCDMA B2	-3.2	0.2
WCDMA B4	-4.1	0.2
WCDMA B5	-7.2	-3.1
FDD-B2	-3.2	0.2
FDD-B3	-4.1	-0.6
FDD-B4	-4.1	0.2
FDD-B5	-7.2	-3.1
FDD-B7	-5.3	-1.1
FDD-B12	-7.4	-3.5
FDD-B13	-7.1	-3.4
FDD-B17	-7.4	-3.5
FDD-B26	-7.1	-3.0
FDD-B28a	-7.5	-3.4

FDD-B28b	-7.4	-3.3
FDD-B66	-4.1	0.2
TDD-B40	-4.5	0.1
TDD-B41	-5.1	-0.8
GPS	-3.3	1.5
WIFI/2.4G	-3.4	1.7
WIFI/5.8G	-4.1	-1.2
Bluetooth	-3.5	1.7

5. OTA

5.1 Antenna OTA

Free Space-3D					
Band	Channel	TRP/dBm	TIS/dBm (P+DIV)	TIS/dBm (P)	TIS/dBm (DIV)
GSM850	128	23.5			
	190	23.3			
	251	23.2	-97.2	-98.5	-92.4
EGSM	1	22.8			
	62	23.1			
	124	23.1	-96.5	-96.3	
DCS	512	24.2			
	698	24.5			
	885	25.1	-103.2	-104.3	
PCS	512	25.6			
	661	25.5			
	810	25.9	-103.5	-103.7	
B2-10M	650	18.4			
	900	18.6			
	1150	18.2	-94.8	-93.5	-91.2
B3-10M	1250	17.5			
	1575	18.1			
	1900	18.8	-94.2	-92.5	-92.3
B4-10M	2000	17.7			
	2175	18.2			
	2350	18.9	-95.9	-93.8	-91.7
B5-10M	2450	15.1			
	2525	15.4			
	2600	15.8	-91.6	-89.8	-88.7
B7-10M	2800	16.8			

	3100	16.9			
	3400	16.7	-93.2	-90.1	-91.8
B12-10M	5060	14.3			
	5095	14.7			
	5130	15.1	-91.4	-90.1	-86.6
B13-10M					
	5230	14.6	-90.2	-88.6	-86.5
B17-10M	5780	14.5			
	5790	14.9			
	5800	15.2	-90.1	-88.7	-84.2
B26-10M	8740	15.5			
	8865	15.8			
	8990	16.3	-90.3	-89.6	-87.1
B66-10M	66536	17.8			
	66786	18.3			
	67036	18.9	-95.7	-93.6	-91.5
B28a-10M	9310	15.3			
	9360	15.1			
	9410	15.1	-90.4	-89.8	-87.1
B28b-10M	9460	14.7			
	9510	15.2			
	9560	15.5	-90.2	-88.4	-87.4
B40-20M	38750	17.3			
	39150	17.4			
	39550	17.2	-89.4	-88.6	-86.1
B41-20M	40620	16.5	-90.1	-88.7	-87.8
b (11M)	1	12.1			
	6	11.2			

	13	11.8	-82.6		
g (54M)	1	10.4			
	6	10.3			
	13	10.5	-71.1		
n (MCS7)	1	10.3			
	6	10.1			
	13	10.4	-65.4		
a (54M)	36	10.6			
	56	10.9			
	165	10.8	-71.5		
n (MCS7)	36	10.4			
	56	10.6			
	165	10.5	-66.8		

NFC antenna test data	
Label	Distance (mm)
1	38
2	36
3	29
4	15

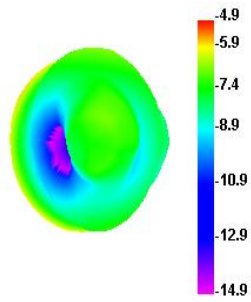
5.2 GPS testing



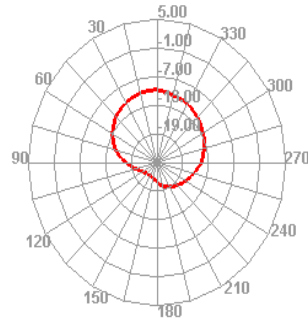
5.3 Antenna radiation pattern

5.3.1 GSM/WCDMA/FDD/TDD

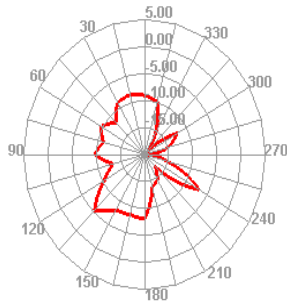
1800.000MHz



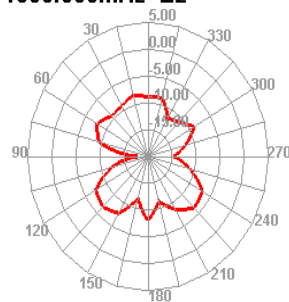
1800.000MHz H



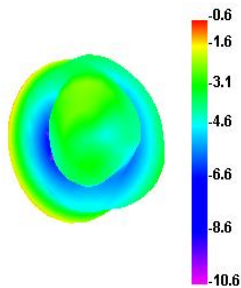
1800.000MHz E1



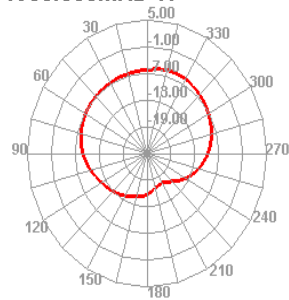
1800.000MHz E2



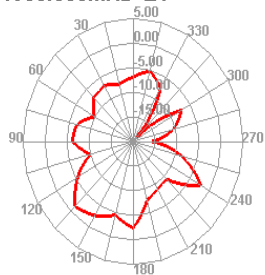
1900.000MHz



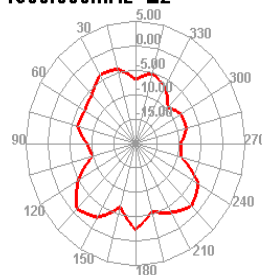
1900.000MHz H



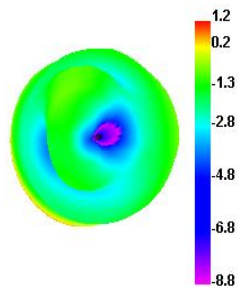
1900.000MHz E1



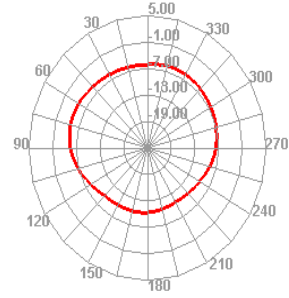
1900.000MHz E2



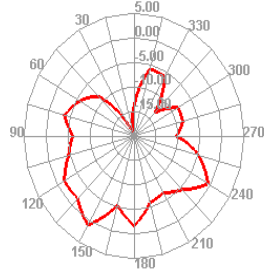
2000.000MHz



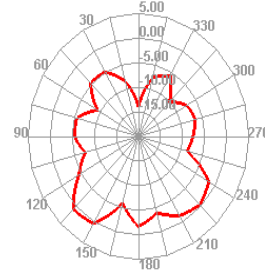
2000.000MHz H



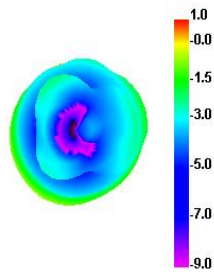
2000.000MHz E1



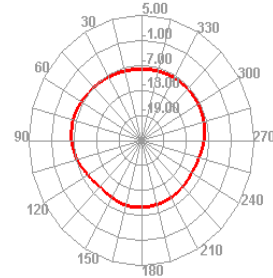
2000.000MHz E2



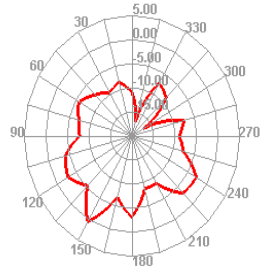
2100.000MHz



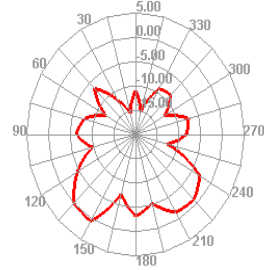
2100.000MHz H



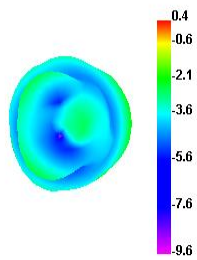
2100.000MHz E1



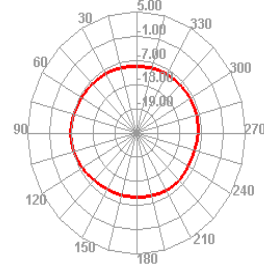
2100.000MHz E2



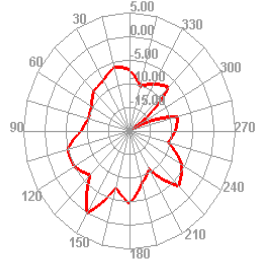
2170.000MHz



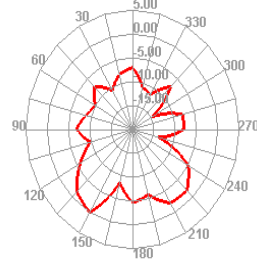
2170.000MHz H



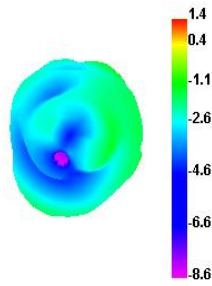
2170.000MHz E1



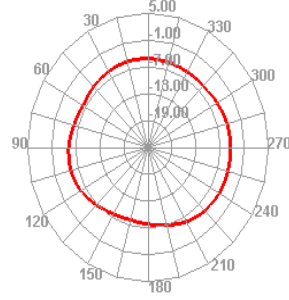
2170.000MHz E2



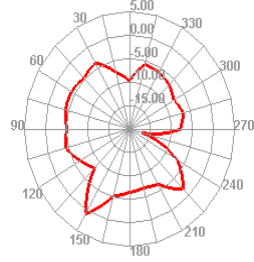
2300.000MHz



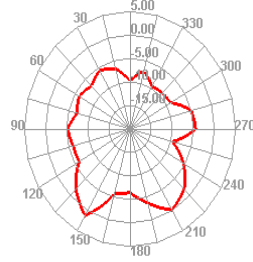
2300.000MHz H



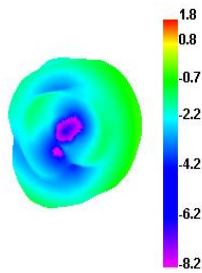
2300.000MHz E1



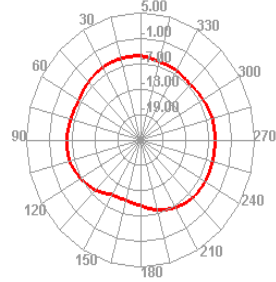
2300.000MHz E2



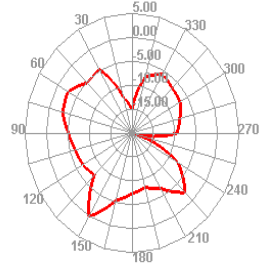
2350.000MHz



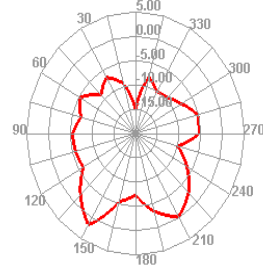
2350.000MHz H



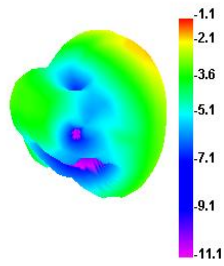
2350.000MHz E1



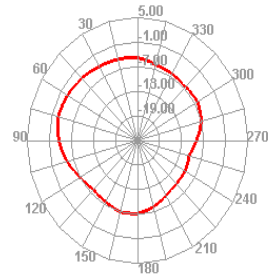
2350.000MHz E2



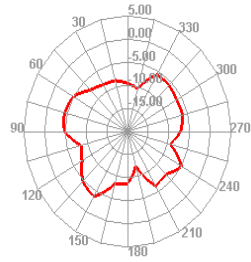
2550.000MHz



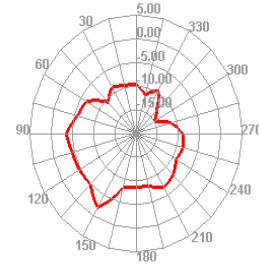
2550.000MHz H



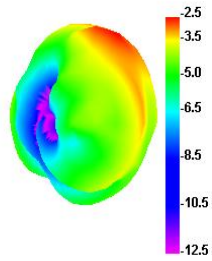
2550.000MHz E1



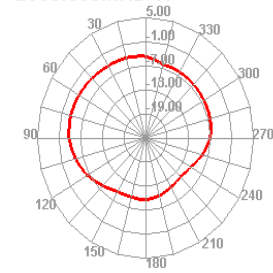
2550.000MHz E2



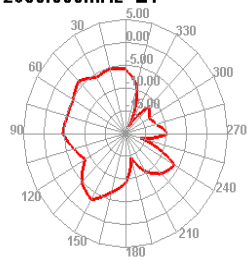
2650.000MHz



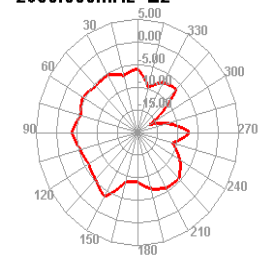
2650.000MHz H



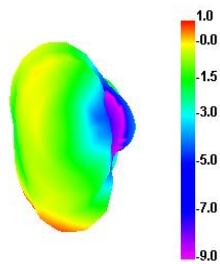
2650.000MHz E1



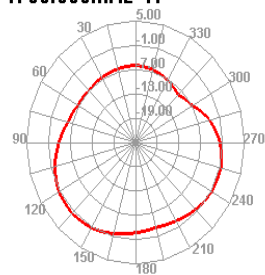
2650.000MHz E2



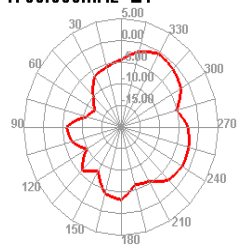
1700.000MHz



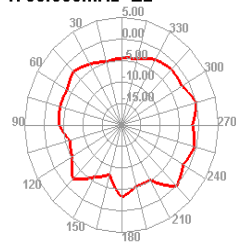
1700.000MHz H



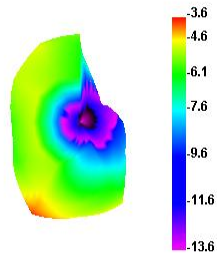
1700.000MHz E1



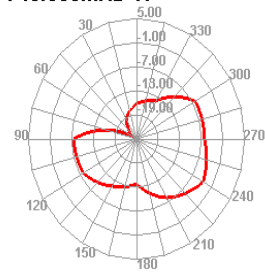
1700.000MHz E2



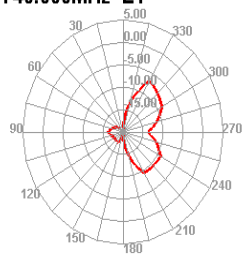
740.000MHz



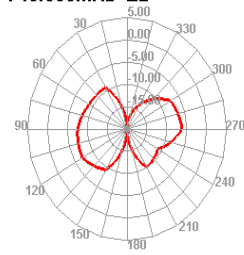
740.000MHz H



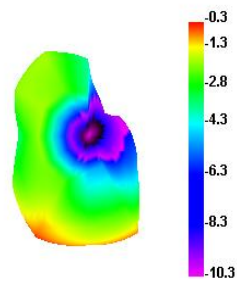
740.000MHz E1



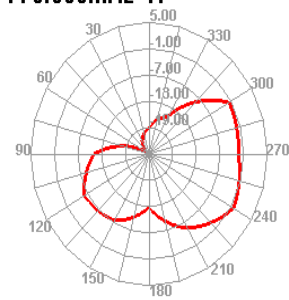
740.000MHz E2



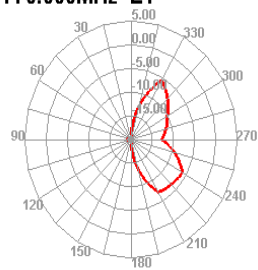
770.000MHz



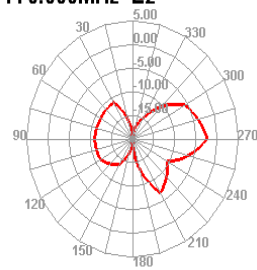
770.000MHz H



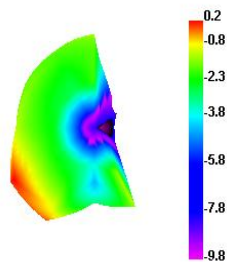
770.000MHz E1



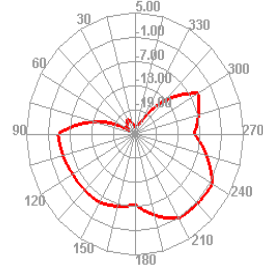
770.000MHz E2



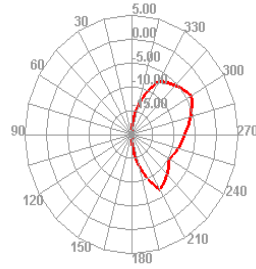
820.000MHz



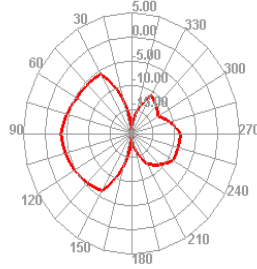
820.000MHz H



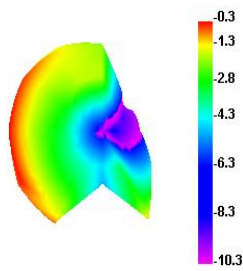
820.000MHz E1



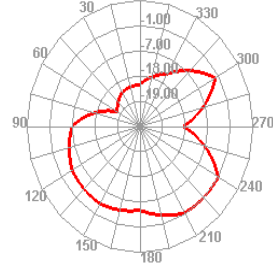
820.000MHz E2



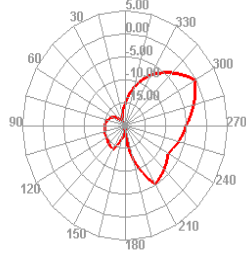
870.000MHz



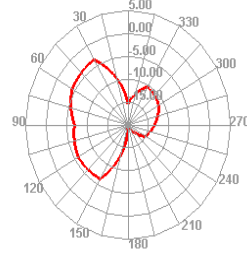
870.000MHz H



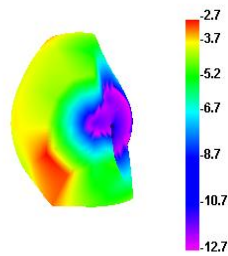
870.000MHz E1



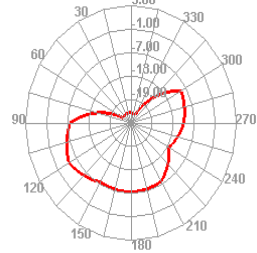
870.000MHz E2

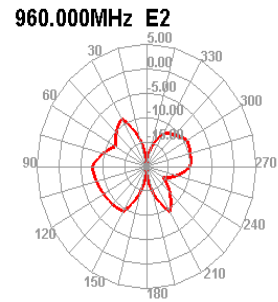
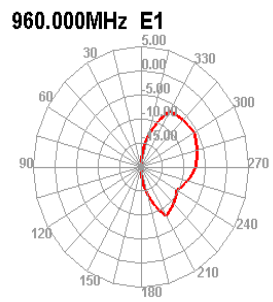


960.000MHz

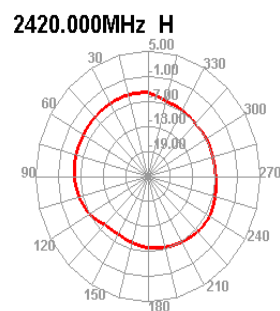
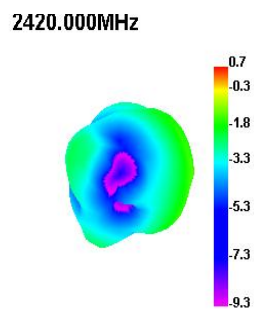
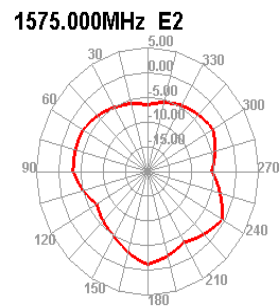
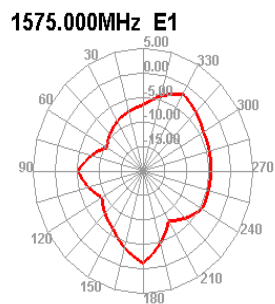
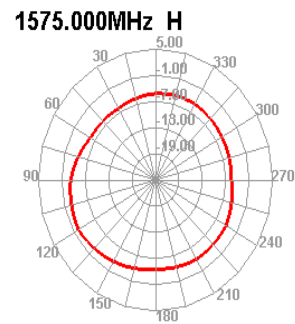
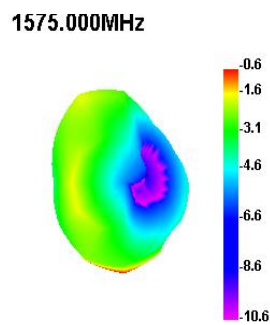


960.000MHz H

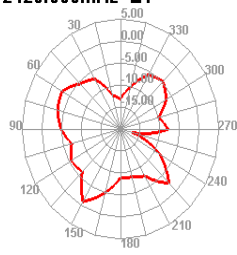




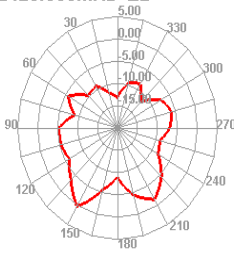
5.3.2 GPS/WIFI/BT



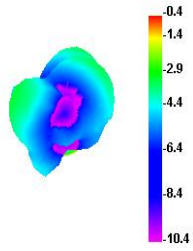
2420.000MHz E1



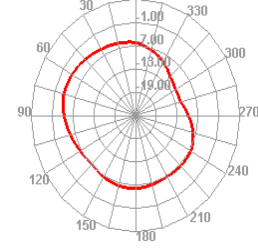
2420.000MHz E2



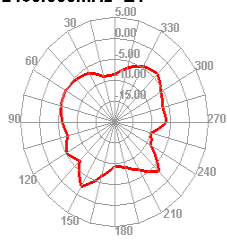
2460.000MHz



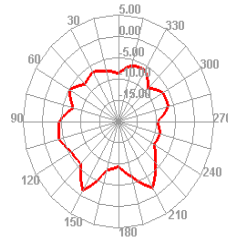
2460.000MHz H



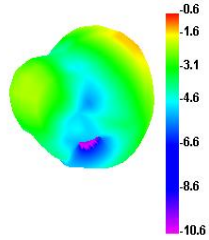
2460.000MHz E1



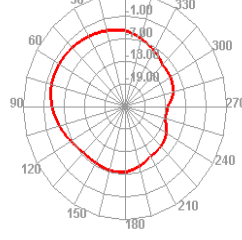
2460.000MHz E2



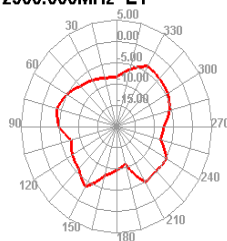
2500.000MHz



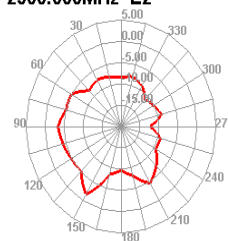
2500.000MHz H



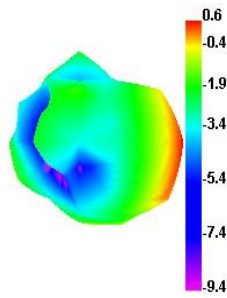
2500.000MHz E1



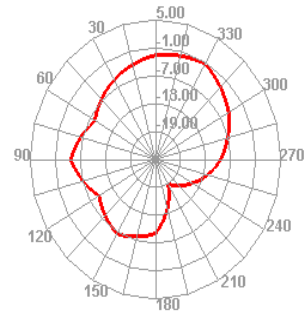
2500.000MHz E2



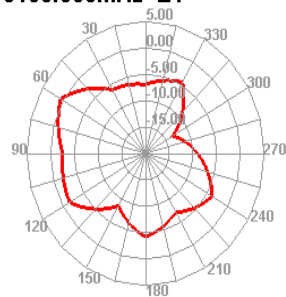
5150.000MHz



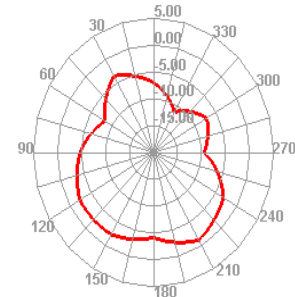
5150.000MHz H



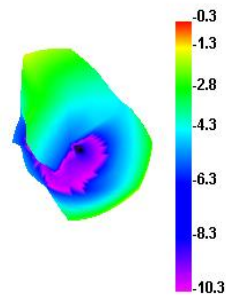
5150.000MHz E1



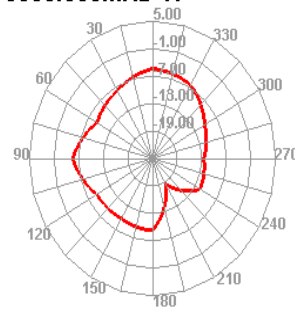
5150.000MHz E2



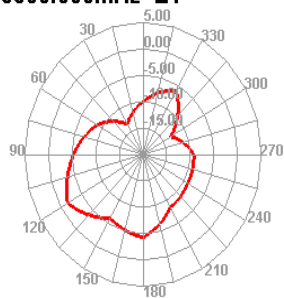
5500.000MHz



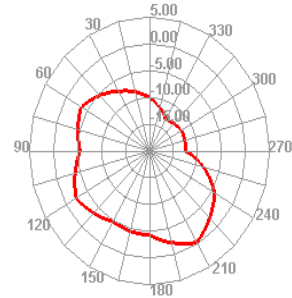
5500.000MHz H



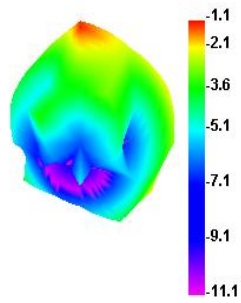
5500.000MHz E1



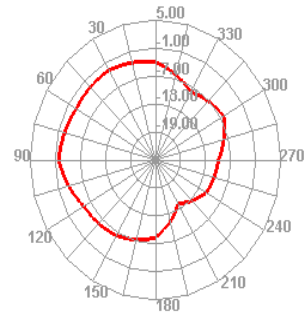
5500.000MHz E2



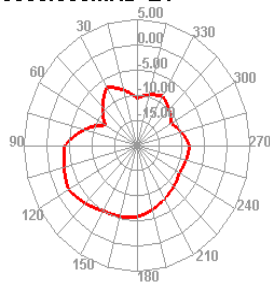
5850.000MHz



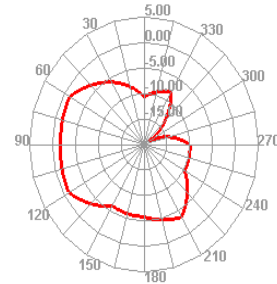
5850.000MHz H



5850.000MHz E1



5850.000MHz E2



6.EMC optimization

Reference Figure 1,Ground the PCB to the metal frame with conductive foam.

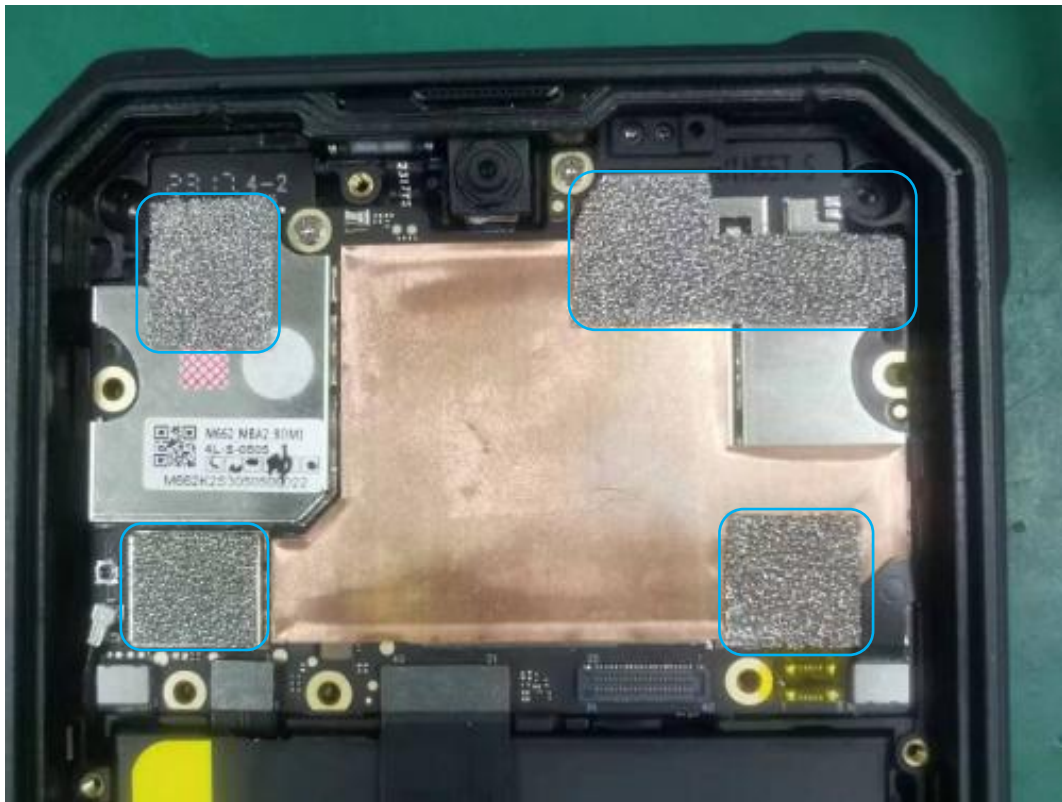


Figure 1

Reference Figure 2, Add conductive foam at the red mark to make the screen metal frame and the middle frame well through.

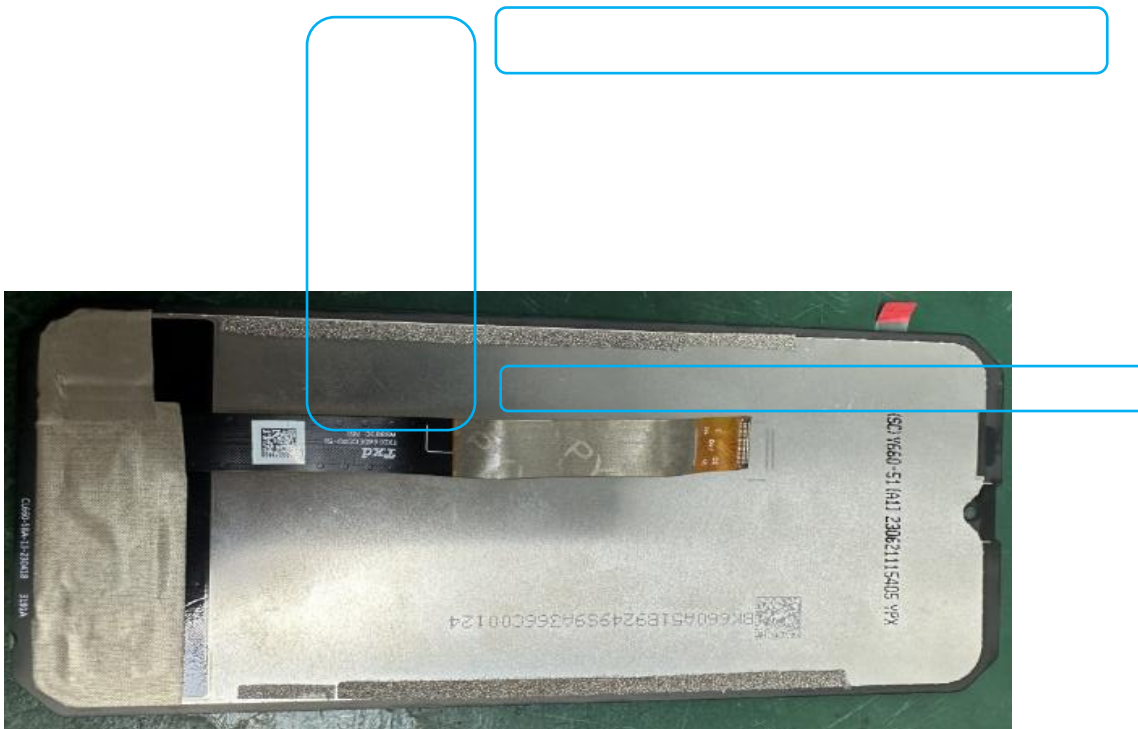


Figure 2

Reference Figure 3, Ensure proper grounding of motor, speaker, and FPC interfaces.



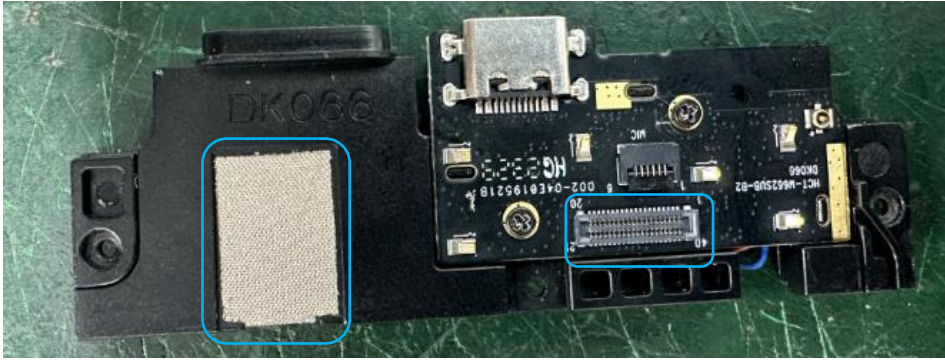


Figure 3