



Antenna Debugging Report

Customer: Duoke

Project: DK086 US version

Structure: Xiaoxiang-13316888409

RF: Long Yaobin -15874137313

Date: September 2, 2024



Antenna Debugging Report

Report type:

Version number: V1.0

Machine status: T0 machine

Debugging frequency band:

GSM:B2/B3/B5/B8

WCDMA:B2/B4/B5

FDD-LTE: B1/B2/B3/B4/B5/B7/B8/B12/B17/B20/B26/B28A/B28B/B66

TDD-LTE: B38/B40/B41

GPS and other satellite positioning antennas

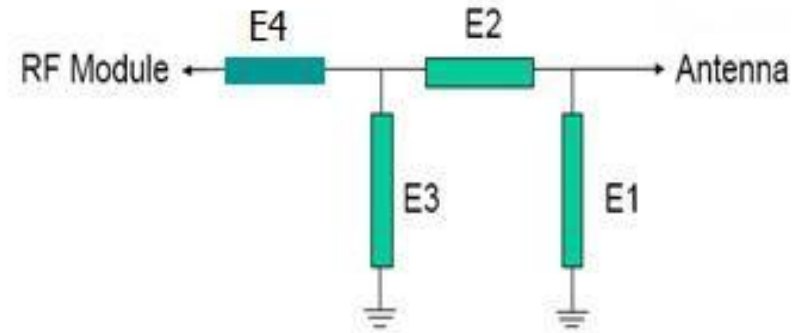
2.4G/5G WIFI

Bluetooth

PCB sub board antenna:

0201 specification

Element	Value	PCBTag Number
E1 (0201)	9.1nH	L001
E2 (0201)	0 Ω	R001
E3 (0201)	NC	L002
E4 (0201)	0 Ω	R004
E5 (0201)	0 Ω	C009

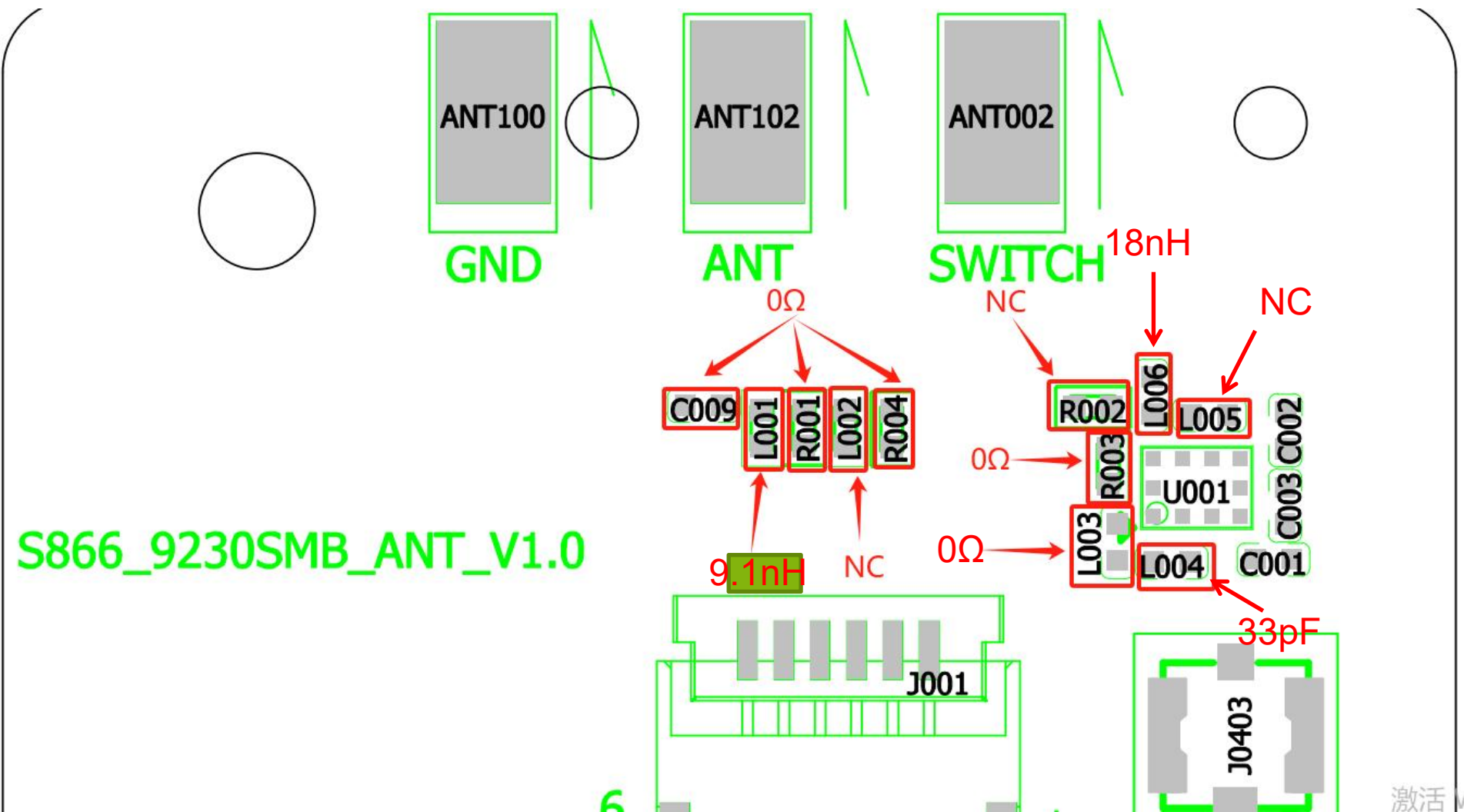


Diversity antenna motherboard (no changes):

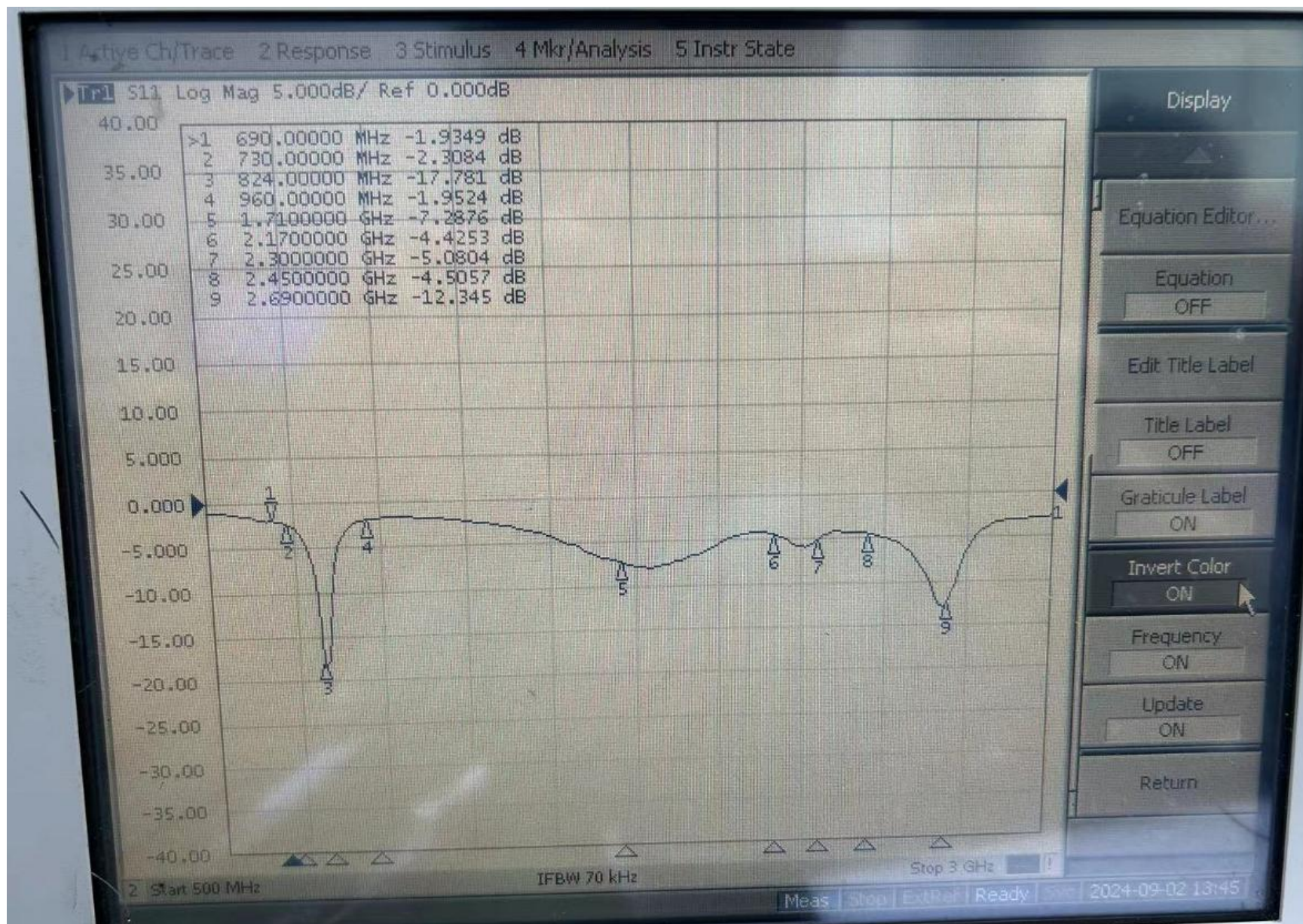


PCB small board main antenna:

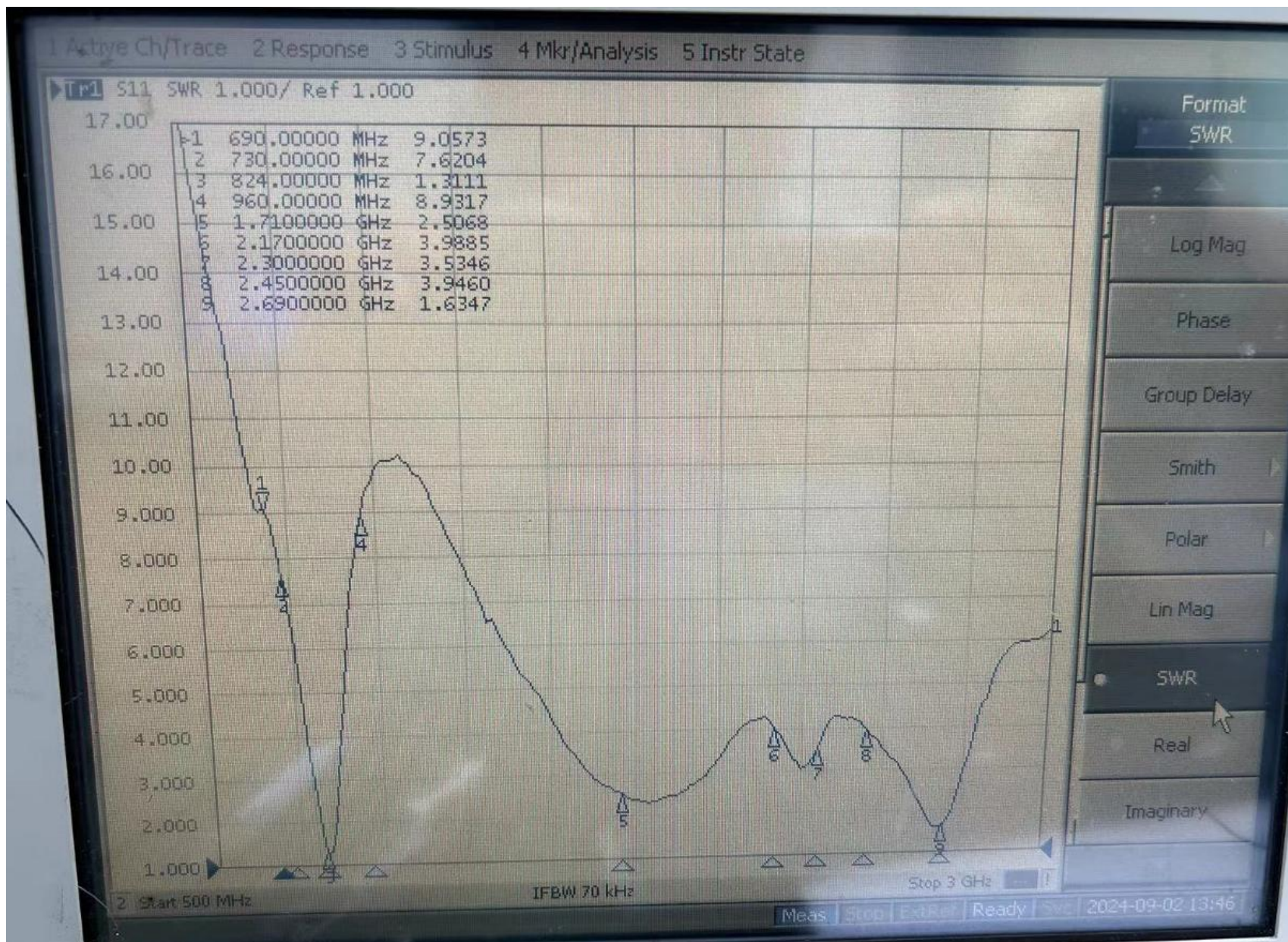
DK086 small board main antenna switch logic		
RF1	0 Ω (Tag NumberL003)	GSM:850/1800/1900 LTE-FDD:B1/2/3/4/5/20/26/66 WCDMA:B2/4/5
RF2	33pF (Tag NumberL004)	GSM:900 LTE-FDD:B8 LTE-TDD:B40
RF3	18nH (Tag NumberL006)	LTE-FDD:B7/B12/17/28A/28B LTE-TDD:B38/41
RF4	NC (Tag NumberL005)	

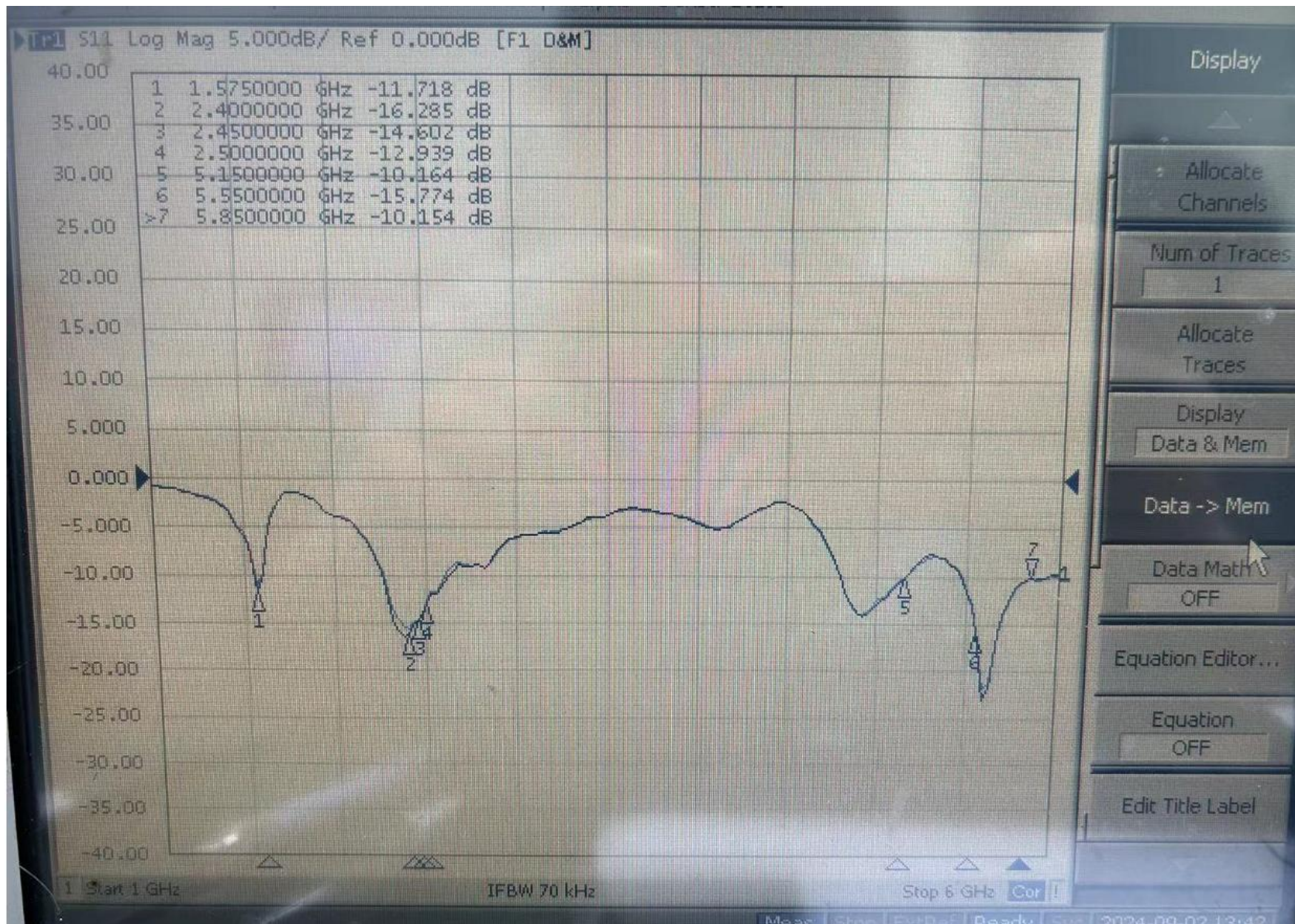


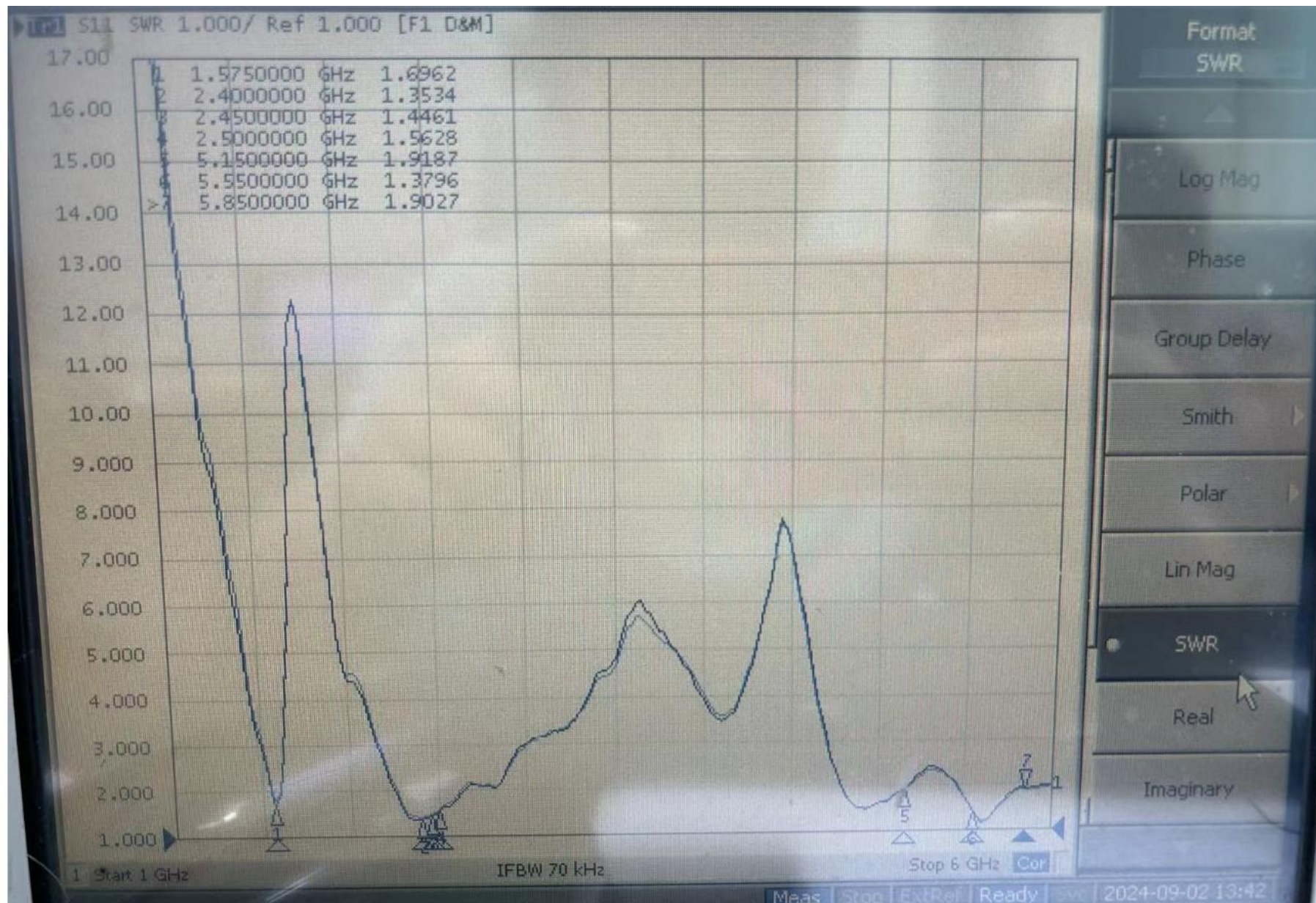
Passive main antenna LOG MAG



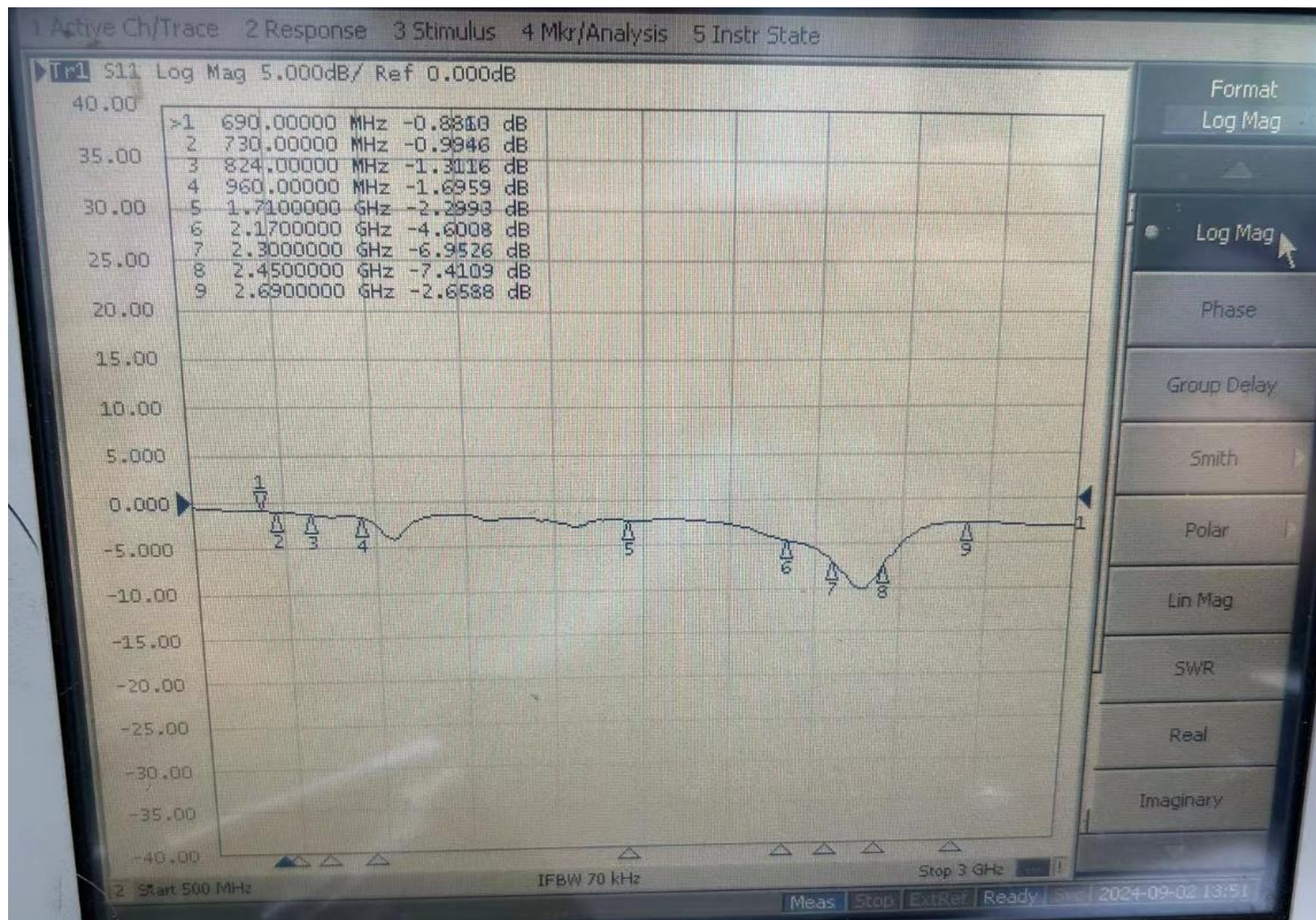
Passive main antenna SWR







Diversity antenna LOG MAG



Diversity antenna SWR





Antenna gain

Frequency（MHZ）	Average Gain(dBi)	Peak Gain(dBi)	Frequency（MHZ）	Average Gain(dBi)	Peak Gain(dBi)
GSM850	-6.1	-2.9	LTE B17	-6.9	-3.5
GSM900	-8.4	-4.8	LTE B20	-6.1	-2.9
DCS1800	-4.2	1.2	LTE B26	-6.2	-3.1
PCS1900	-4.6	0.8	LTE B28A	-7.2	-3.9
WCDMA B2	-4.9	0.4	LTE B28B	-7.1	-3.8
WCDMA B4	-4.4	1.0	LTE B66	-4.5	1.0
WCDMA B5	-6.1	-2.9	LTE B38	-5.7	-1.5
LTE B1	-3.9	1.4	LTE B40	-4.9	0.3
LTE B2	-4.9	0.4	LTE B41	-5.6	-1.3
LTE B3	-4.2	1.2	WIFI 2.4G/BT	-5.1	-0.5
LTE B4	-4.4	0.8	WIFI 5.8G	-5.5	-1.3
LTE B5	-6.4	-2.9	GPS	-3.2	0.8
LTE B7	-5.6	-1.3			
LTE B8	-8.4	-4.8			
LTE B12	-6.3	-3.1			



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OTA Test – Screen Out				
GSM	Band	Channal	Main+sub TRP	Main+Divisional TIS
	GSM850	128	26. 8	
		190	26. 7	
		251	26. 1	-102. 3
	EGSM	1	24. 2	
		62	25. 5	
		124	25. 3	-100. 8
	DCS	512	25. 2	
		698	25. 3	
		885	25. 2	-103. 6
	PCS	512	25. 1	
		661	25. 2	
		810	24. 9	-102. 9



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OTA Test - Screen Out				
WCDMA	Band	Channal	Main+sub TRP	Main+Divisional TIS
	Band2	9662	18.6	
		9800	18.8	
		9938	18.2	-103.7
	Band4	1538	18.7	
		1675	18.7	
		1738	18.9	-101.8
	Band5	4357	17.1	
		4410	17.2	
		4458	16.9	-102.3



Antenna Debugging Report

OTA Test – Screen Out				
FDD-LTE (10M)	Band	Channal	Main+sub TRP	Main+Divisional TIS
	B1	50	18.9	
		300	19.1	
		550	18.8	-92.3
	B2	650	19.2	
		900	19.3	
		1150	19.4	-93.1
	B3	1250	19.2	
		1575	18.9	
		1900	19.4	-92.6
	B4	2000	18.7	
		2175	18.9	
		2350	18.8	-93.3



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OTA Test - Screen Out				
FDD-LTE (10M)	Band	Channal	Main+sub TRP	Main+Divisional TIS
	B5	2450	18.3	
		2525	18.1	
		2600	17.8	-90.2
	B7	2800	16.8	
		3100	16.3	
		3400	16.1	-90.4
	B8	3500	15.2	
		3625	16.3	
		3750	16.4	-89.1
	B12	5060	15.6	
		5095	16.6	
		5130	16.9	-90.9



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OTA Test – Screen Out				
FDD-LTE (10M)	Band	Channal	Main+sub TRP	Main+Divisional TIS
	B17	5780	15.6	
		5790	16.3	
		5800	16.6	-89.2
	B20	6200	18.2	
		6300	18.3	
		6400	17.1	-91.6
	B26	8740	17.8	
		8865	18.3	
		8990	18.5	-89.1
	B28A	9310	16.3	
		9360	15.9	
		9410	15.9	-88.6



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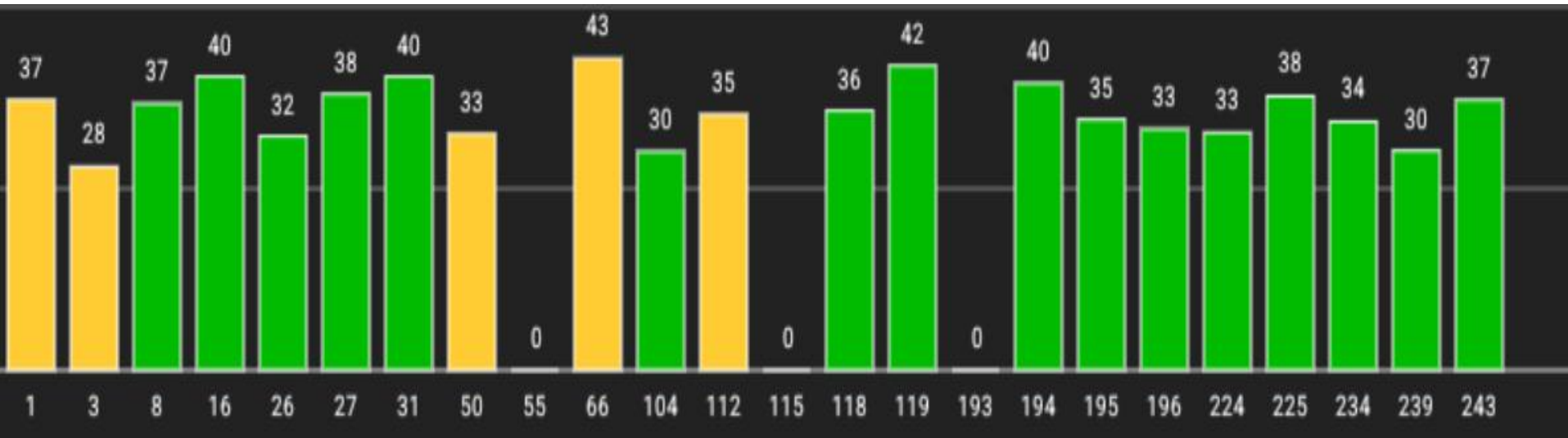
OTA Test – Screen Out				
FDD-LTE (10M)	Band	Channal	Main+sub TRP	Main+Divisional TIS
	B28B	9460	15.7	
		9510	15.9	
		9560	16.7	-88.9
	B66	66536	18.5	
		66786	18.1	
		67036	18.7	-91.9



Antenna Debugging Report

OTA Test – Screen Out				
TDD-LTE (20M)	Band	Channal	Main+sub TRP	Main+Divisional TIS
	B38	37850	16.1	
		38000	16.7	
		38150	17.1	-89.2
	B40	38750	18.1	
		39150	18.8	
		39550	19.1	-91.5
	B41	40140		
		40620	15.6	-89.1
		41240		

GPS antenna measurement, location: rooftop
Weather: Sunny



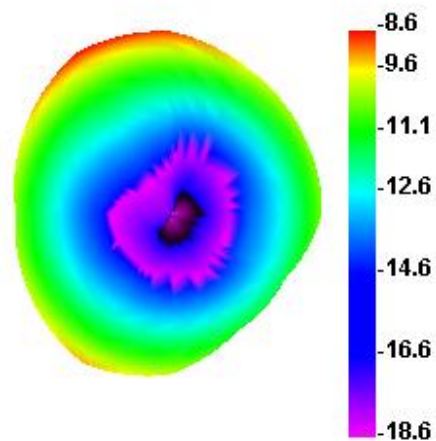


Antenna Debugging Report

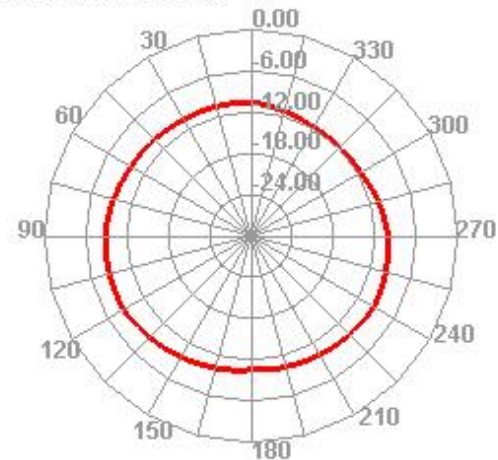
WIFI - Free Space

2.4G	Band	Channel	TRP	TIS	5G	Band	Channel	TRP	TIS
	b(11M)	1	14.5			a(54M)	36	11.3	
		6	15.2				100	11.7	
		13	15.6	-83.2			165	11.8	-70.9
	g(54M)	1	13.2			n(MCS7)	36	11.1	
		6	13.4				100	11.5	
		13	13.3	-71.1			165	11.4	-66.1
	n(MCS7)	1	12.4			ac(MCS8)	36	11.2	
		6	12.5				100	11.5	
		13	12.7	-66.1			165	11.4	-65.3

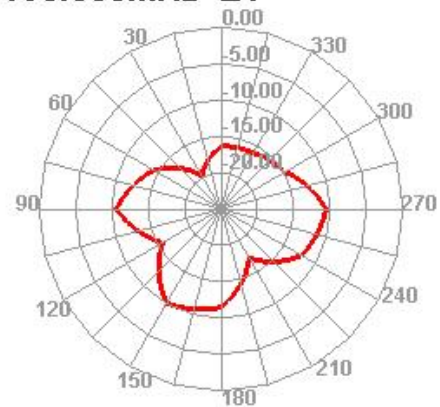
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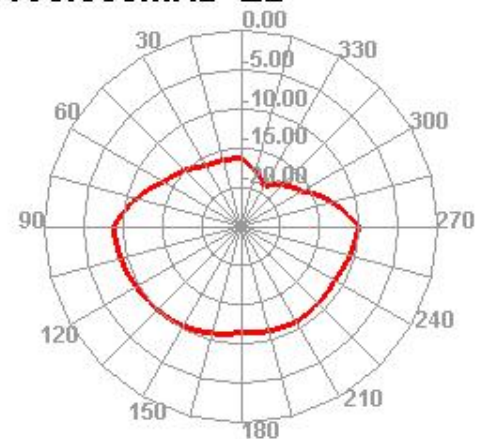
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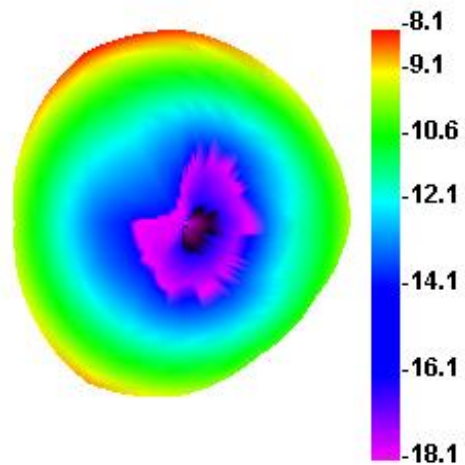
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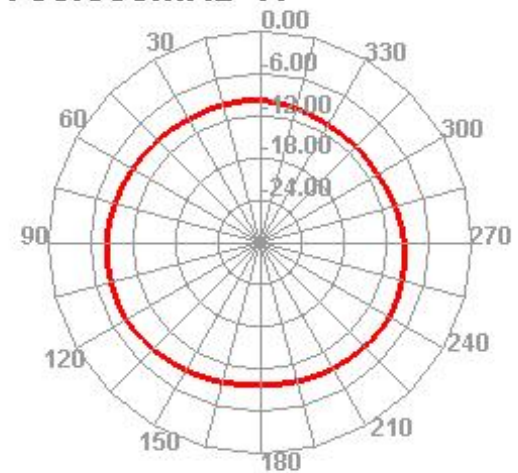
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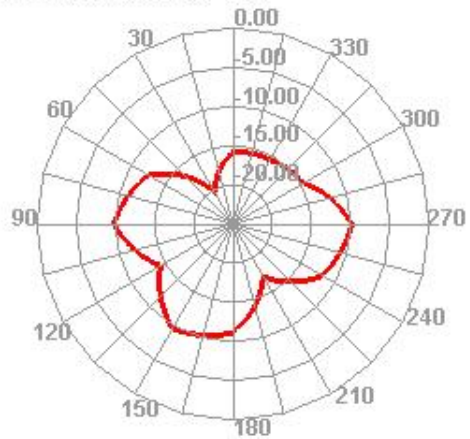
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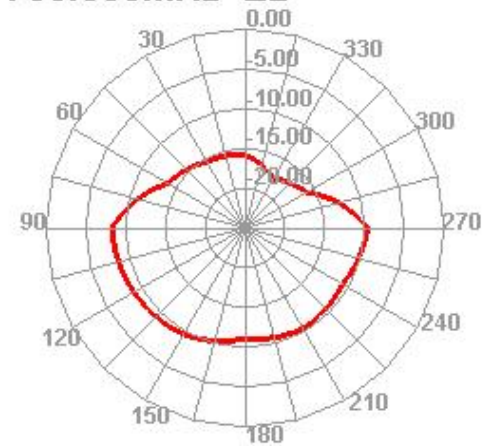
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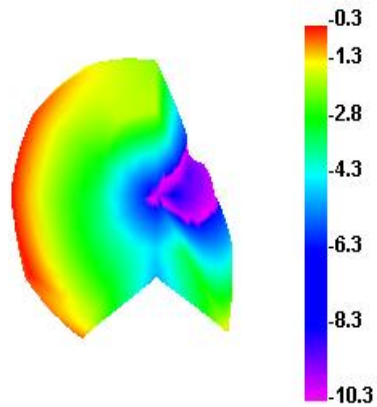
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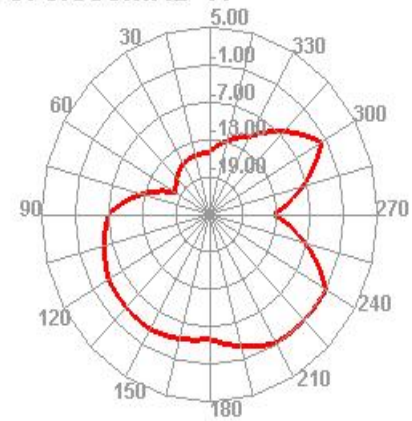
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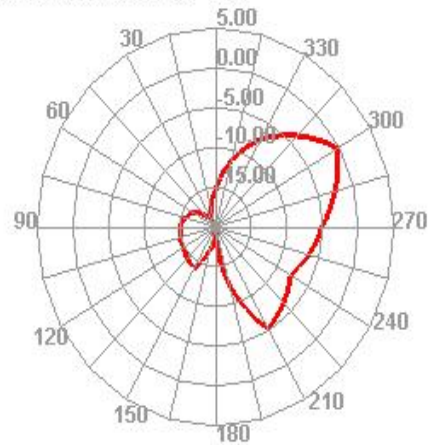
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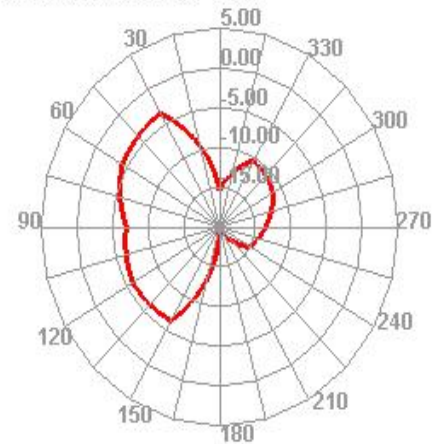
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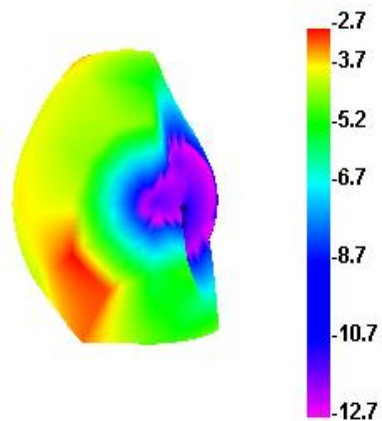
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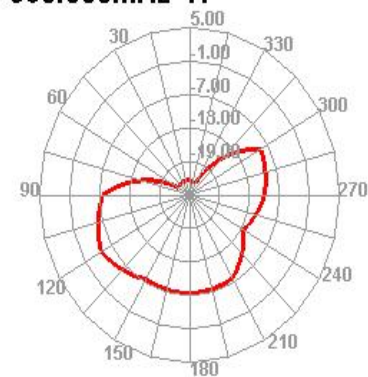
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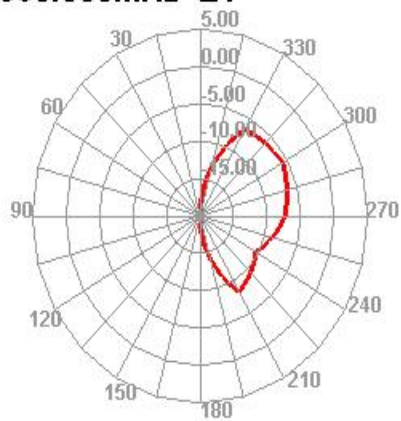
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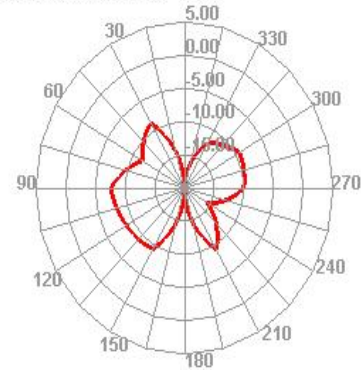
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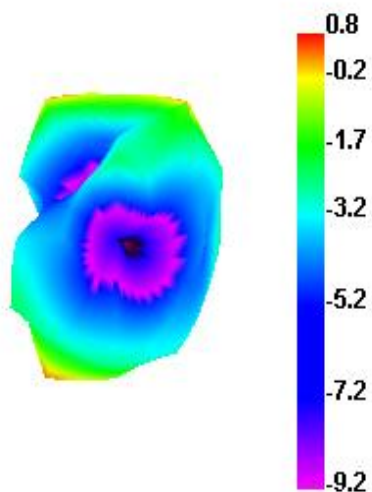
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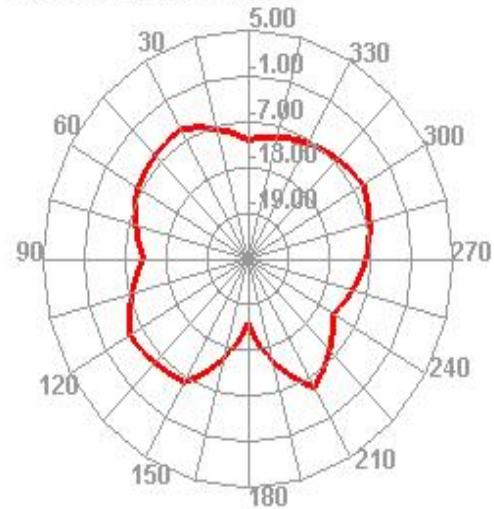
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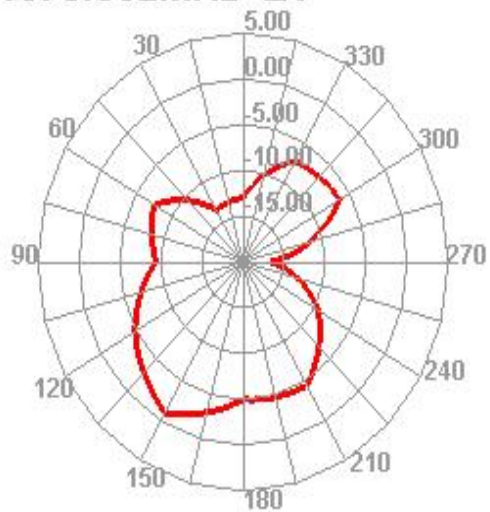
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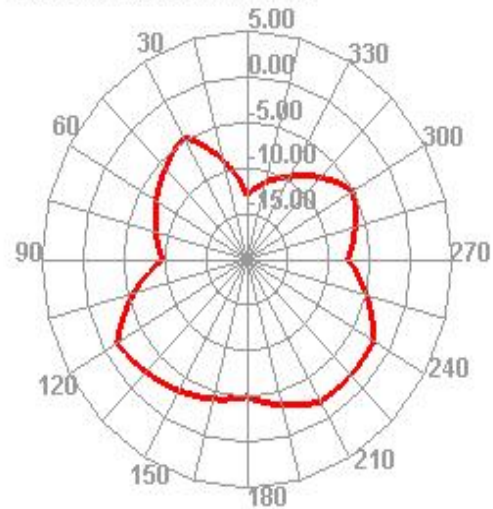
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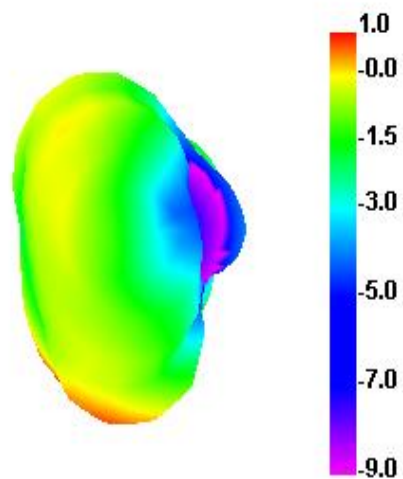
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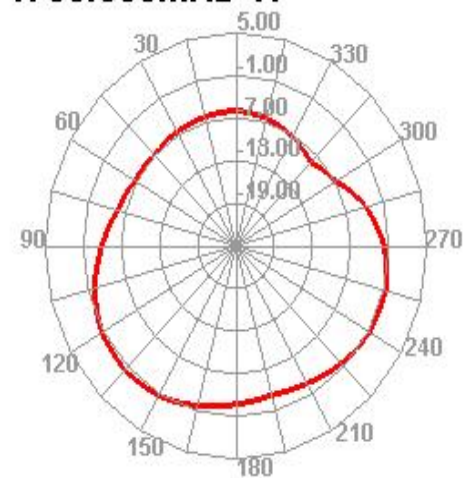
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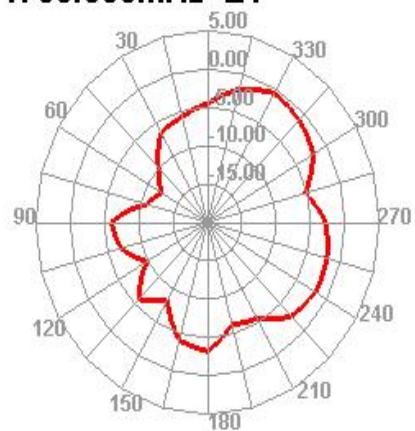
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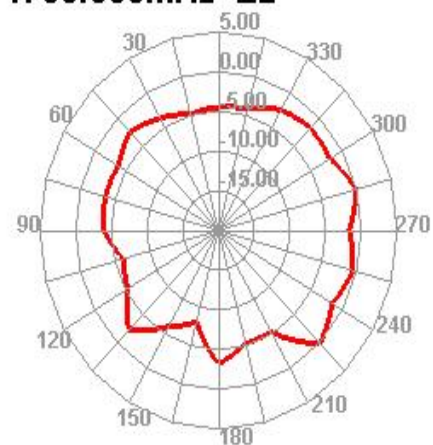
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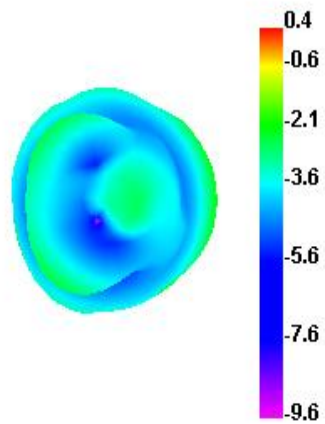
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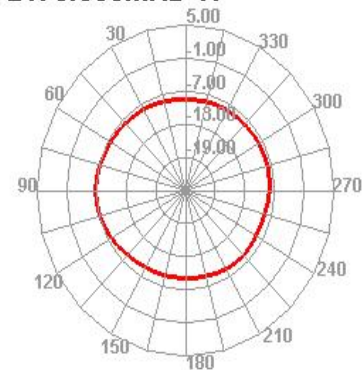
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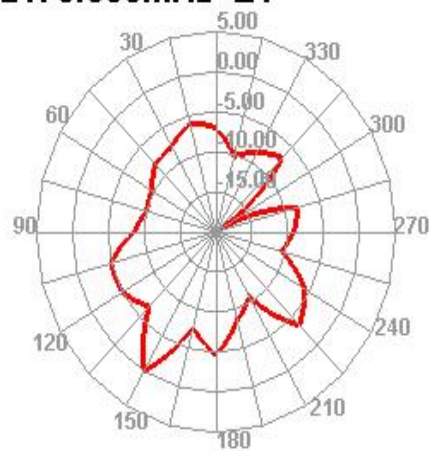
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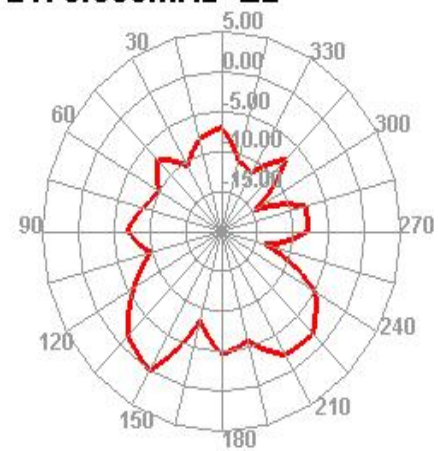
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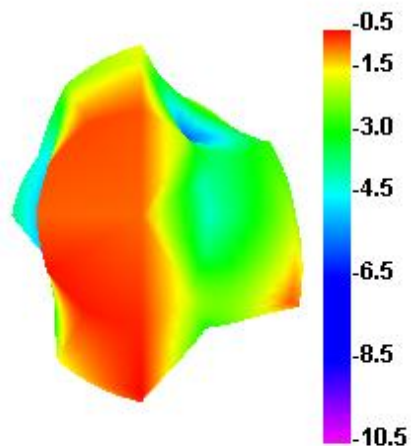
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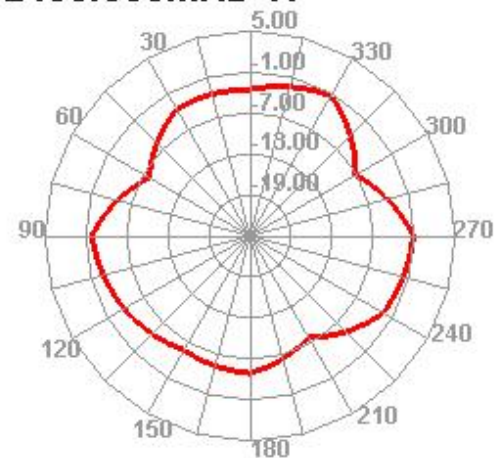
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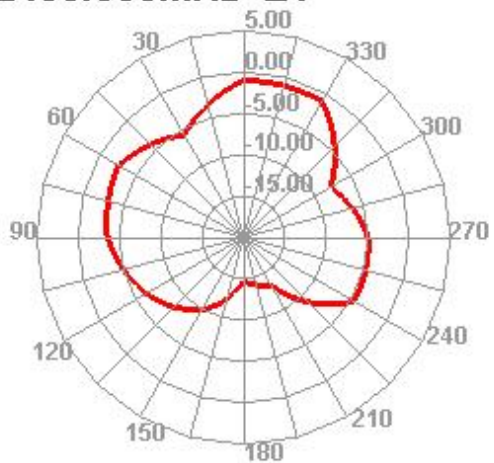
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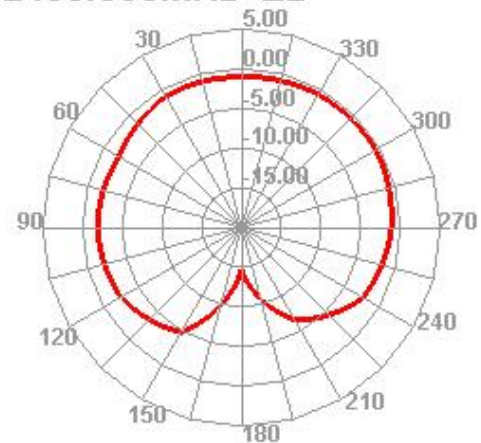
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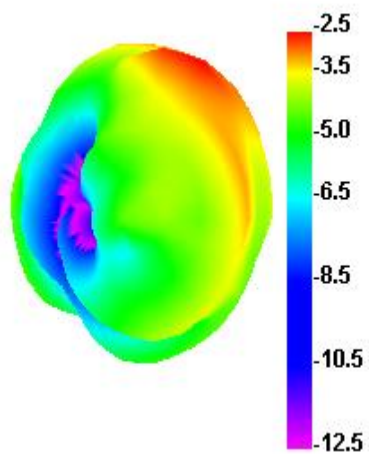
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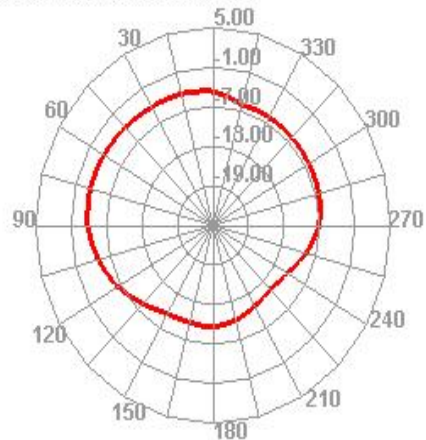
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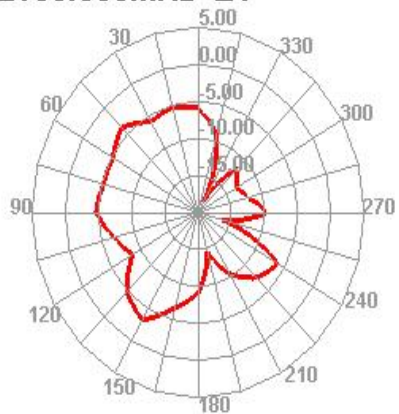
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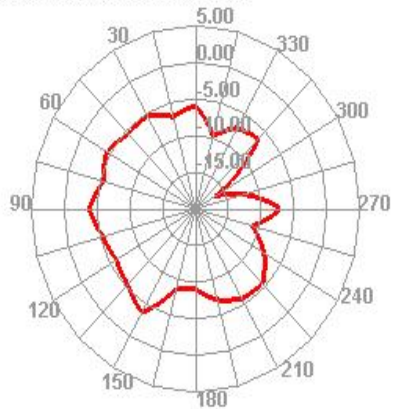
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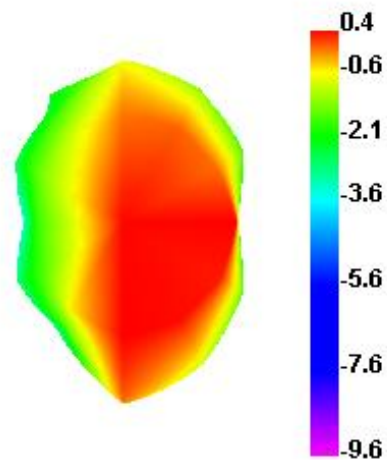
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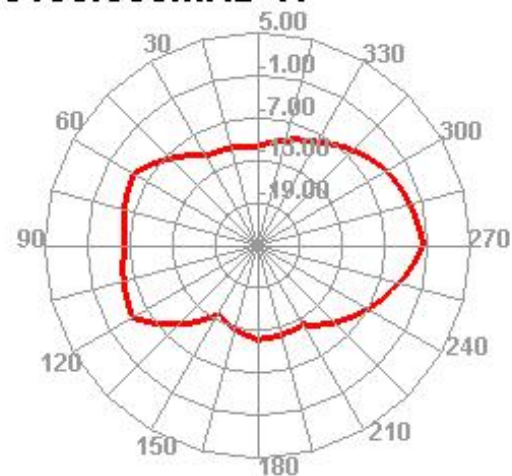
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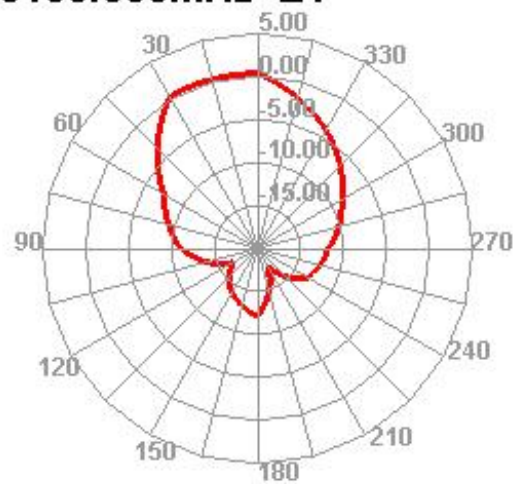
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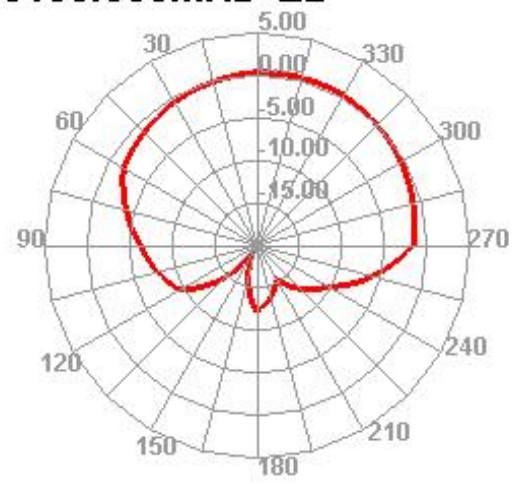
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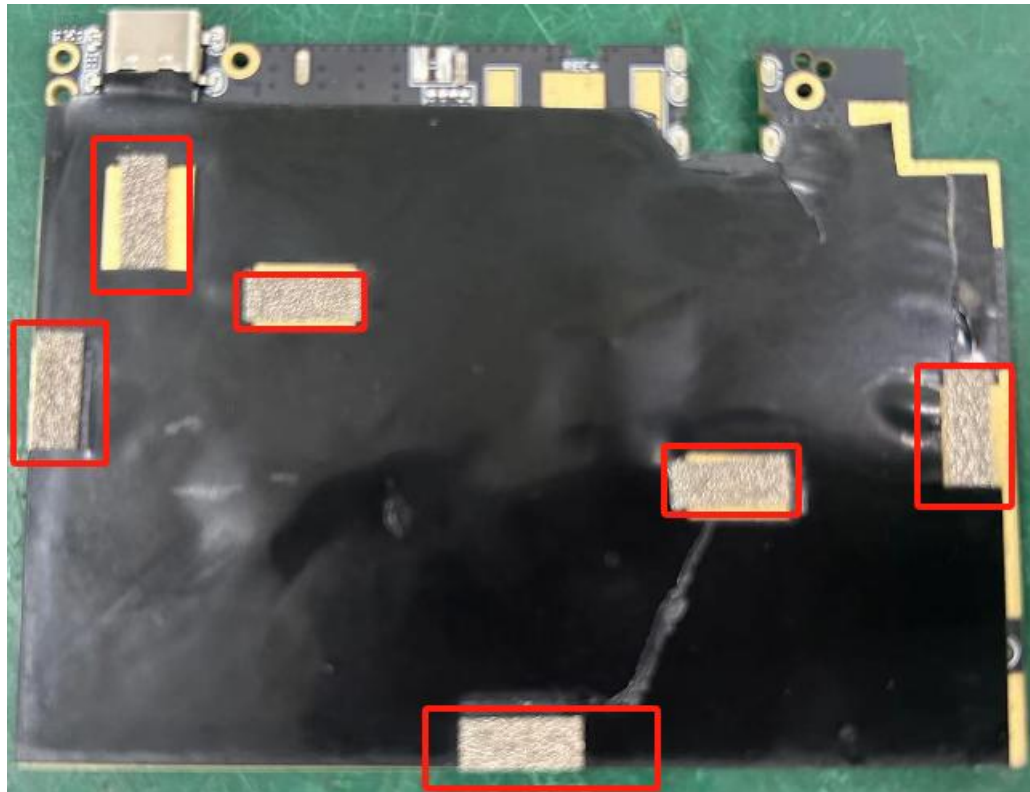
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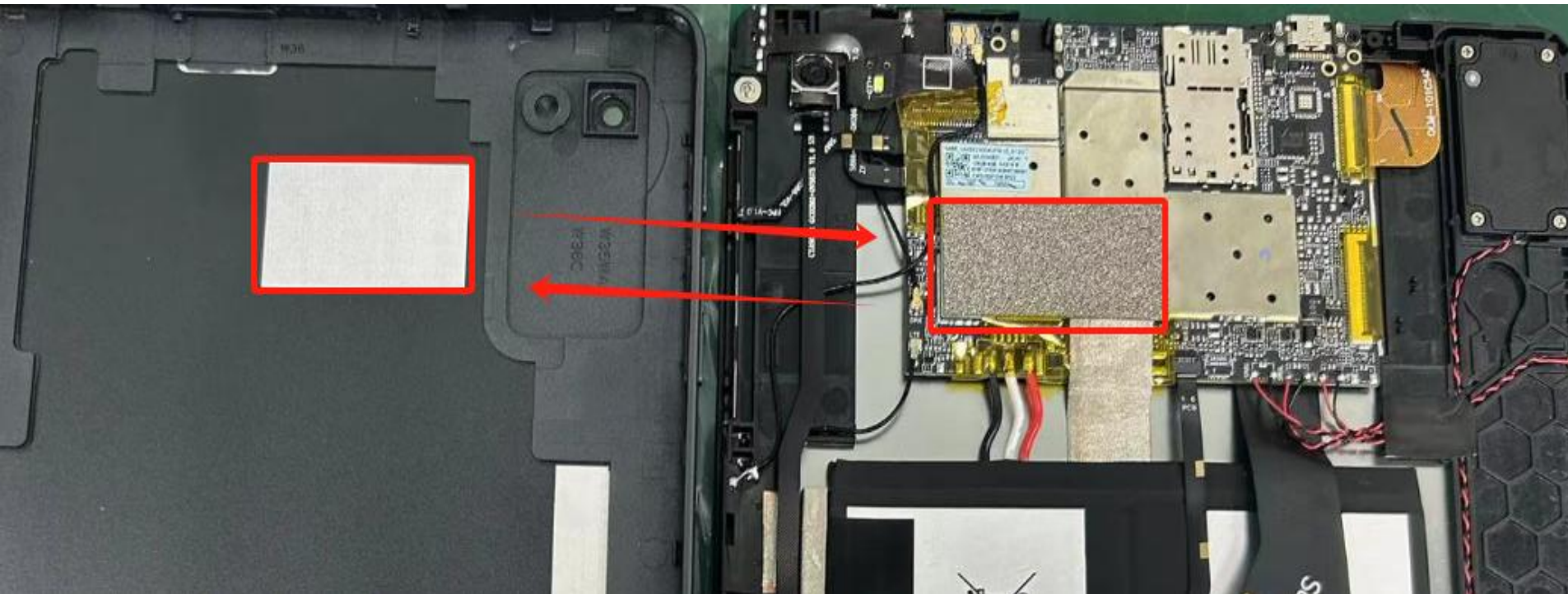
5100.000MHz E2



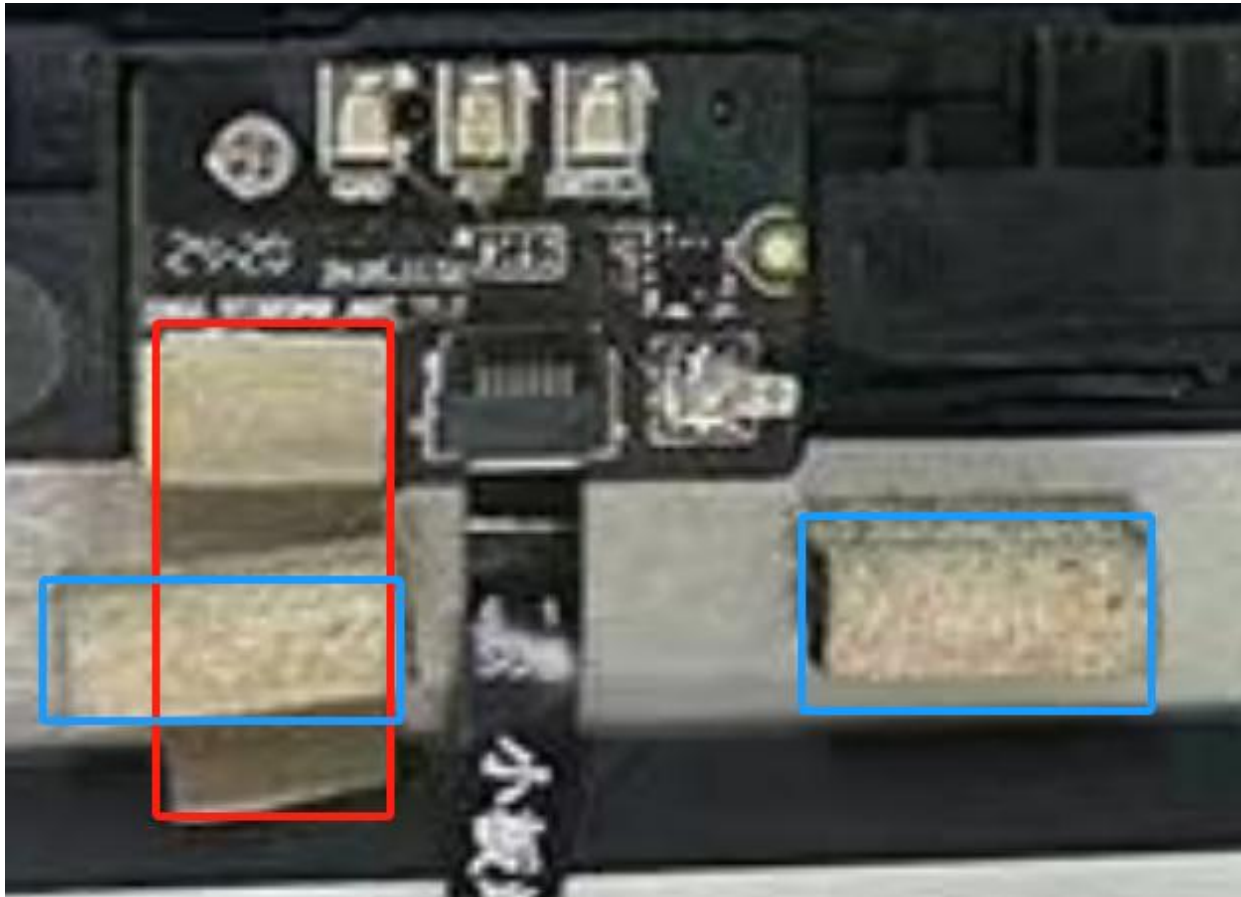
As shown in the red box in the figure, a conductive sponge with a height of 1mm is attached to the back of the motherboard and fully grounded to the screen metal.



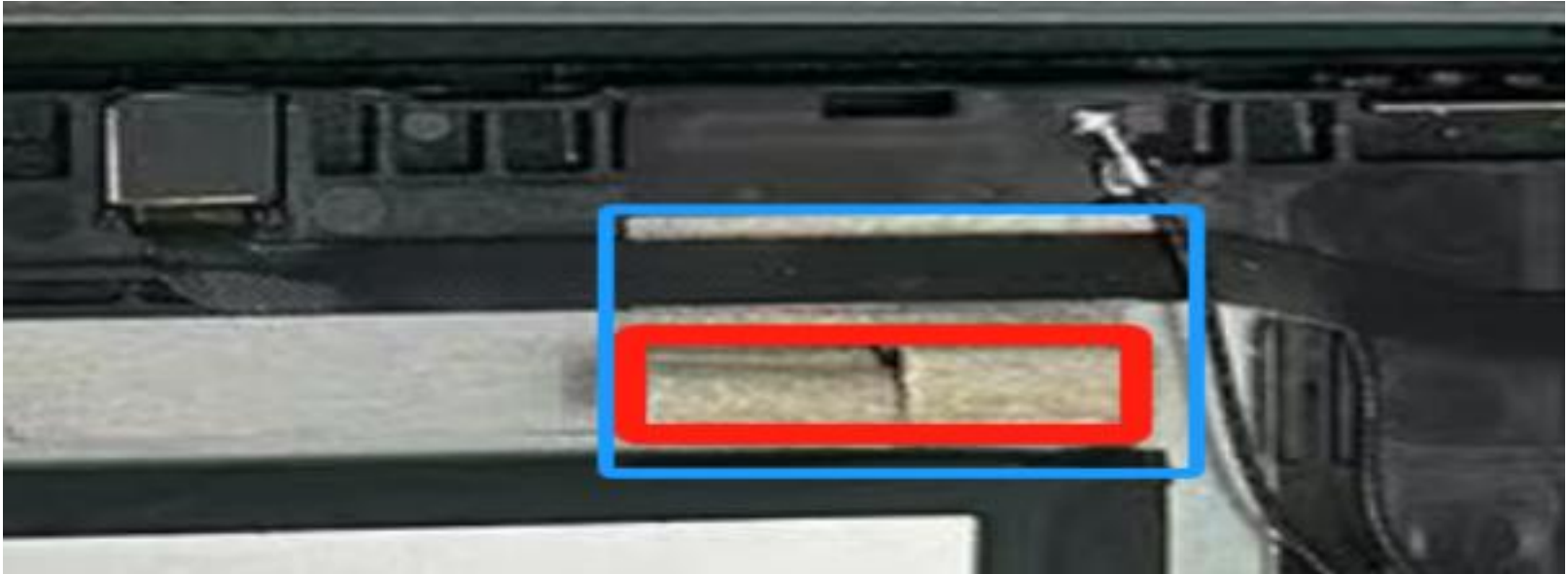
As shown in the figure: First, apply insulation glue to the back of the motherboard to shield the components. Then, press down on the motherboard and extend a conductive cloth from the shielding cover to the ground below the battery. Attach 40mm * 20mm * 1.0mm high-density conductive sponge and ground it to the laser engraved part of the metal back shell.



As shown in the figure, the elongated conductive cloth extends from the exposed copper part of the main antenna small board in the red box to the screen metal grounding. Add a large block of conductive foam with sufficient height inside the blue box to ground the metal back shell.



As shown in the figure, a conductive cloth is attached to the exposed copper part of the three in one antenna and extended to the grounding above the screen metal. Then, a conductive foam with sufficient height is attached to the grounding at the laser engraved part of the metal back shell.



As shown in the figure: Pull a large strip of conductive cloth from the laser engraved part of the rear shell to extend above the plastic bracket, and increase the height of the conductive foam and the conductive cloth extending to the plastic bracket by exposing the copper on the small board.

