

TEST REPORT

Verified Code: 583858

Report No.:	E202012281203-2-G3	Application No.:	E202012281203
Client:	Cellphone-Mate Inc.dba SureCall		
Address:	48346 Milmont Drive Fremont, CA 94538 United States		
Sample Description:	In-building 2-Way Emergency Radio Communication Enhancement Booster		
Model:	SC-GuardianA2B		
Test Specification:	FCC PART 90 §90.223-RF exposure		
Receipt Date:	2021-01-06		
Test Date:	2021-01-07 to 2021-01-20		
Issue Date:	2021-03-03		
Test Result:	Pass		
Prepared By: Test Engineer Xie Jang	Reviewed By: Technical Manager Wu Haoting	Approved By: Manager 	
Other Aspects:			
Note: This report instead the report E202012281203-2-G2, and from the date of issuance of this report, the report which being replaced become invalid.			
Abbreviations: ok / P = passed; fail / F = failed; n.a. / N = not applicable;			
The test result in this test report refers exclusively to the presented test sample. This report shall not be reproduced except in full, without the written approval of GRGT.			



DIRECTIONS OF TEST

- 1. This station carries out test task according to the national regulation of verifications which can be traced to National Primary Standards and BIPM.**
- 2. The test report merely corresponds to the test sample. It is not permitted to copy extracts of these test result without the written permission of the test laboratory.**
- 3. If there is any objection concerning the test, the client should inform the laboratory within 15 days from the date of receiving the test report.**

TABLE OF CONTENTS

1	Applicant information.....	3
1.1	Client information	3
1.2	Manufacturer and Factory	3
2	General description of EUT	3
2.1	Basic description of EUT	3
3	Assessment result summary	5
4	Radio frequency radiation exposure	6
4.1	Applicable Standard	6
4.2	Limits for Maximum Permissible Exposure (MPE).....	6
4.3	Test results.....	6
4.3.1	700MHz Band:.....	6
4.3.2	800MHz Band:.....	8
4.4	Test Results	9
	APPENDIX A. PHOTOGRAPHS OF EUT	10
A.1	External photos.....	10
A.2	Internal photos	13
A.2.1	DIF Board	14
A.2.2	RF Board.....	16
A.2.3	Sentry Board	18
A.2.4	Multiband combiner.....	19
A.2.5	Power supply module.....	22

1 Applicant information

1.1 Client information

Name: Cellphone-Mate Inc.dba SureCall
Address: 48346 Milmont Drive Fremont, CA 94538 United States

1.2 Manufacturer and Factory

Manufacture Name: Cellphone-Mate Inc.dba SureCall
Address: 2nd Floor, Yutian Building North, Yangtian Road, Mabian Industrial Zone, Baoan District, Shenzhen, Guangdong, China, 518101
Factory: Cellphone-Mate Inc. dba SureCall
Address: 2nd Floor, Yutian Building North, Yangtian Road, Mabian Industrial Zone, Baoan District, Shenzhen, Guangdong, China, 518101

2 General description of EUT

2.1 Basic description of EUT

Product Name: In-building 2-Way Emergency Radio Communication Enhancement Booster
Product Model: SC-GuardianA2B
Adding Model: /
Trade Name: SureCall
Power Supply^①: AC 100~240V, 50/60Hz
Typical working voltage: AC 120V, 50/60Hz
Power cord: AC power cord (1m)
Frequency Band^②: 700MHz Band:
Downlink: 758MHz ~ 768MHz, Uplink: 788MHz ~ 798MHz
Downlink: 769MHz ~ 775MHz, Uplink: 799MHz ~ 805MHz
800MHz Band:
Downlink: 851MHz ~ 861MHz, Uplink: 806MHz ~ 816MHz
Type of Modulation^③: C4FM, Tetra ,Analog FM and LTE
Nominal Output Power: Downlink: 33dBm
Uplink: 30dBm
Nominal System Gain: Downlink: 90dB
Uplink: 90dB
EUT Operating Temperature: -20 ℃ to +50 ℃
Operating Humidity: 5% to 95%
Antenna Type: N/A^④

Note: ^① Power Supply of The device is AC 100~240V, 50/60 Hz.

^② PS Guardband : Downlink 768MHz~769MHz and Uplink 798MHz ~ 799MHz.

- ③ LTE Modulation : Downlink 758MHz ~768MHz, Uplink 788MHz ~ 798MHz, and LTE channel Bandwidth is 10MHz.
- ④ It's an indoor device, The EUT does not provide antenna by Manufacturer's statement, but these calculations of antenna gain is based on the highest ERP possible from the EUT considering maximum power, the output power range by Manufacturer statement is $33 \pm 1\text{dBm}$ for Downlink and $30 \pm 1\text{dBm}$ for Uplink, so the Antenna gain shall not exceed 3 dBi for Downlink and 6 dBi for Uplink when the project is used.

3 Assessment result summary

Item	Assessment Requirement	Assessment Method
RF exposure	FCC PART 90 §90.223	FCC PART 1.1307(b) FCC PART 2.1091 FCC PART 2.1093

4 Radio frequency radiation exposure

4.1 Applicable Standard

According to the requirements of FCC PART 90 § 90.223, the test method of RF exposure is based on FCC PART 1.1307(b), FCC PART 2.1091 and FCC PART 2.1093, so RF exposure is calculated.

4.2 Limits for Maximum Permissible Exposure (MPE)

The limits are shown in Table 4-1.

Table 4-1 Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m ²)	Averaging Time E ² , H ² or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f ₂)*	30
30-300	27.5	0.073	0.2	30
300-1500	--	--	f/1500	30
1500-100,000	--	--	1.0	30

Note: f=frequency in MHz; *=Plane-wave equivalent power density

Prediction of MPE limit at given distance, equations from OET Bulletin 65, Edition 97 - 01:

$$S = (P * G) / (4 * \pi * R^2) \text{ (where PG = EIRP) Where:}$$

S = power density

P= power input to antenna

G= numeric gain of the antenna

R= distance to the center of radiation of the antenna

4.3 Test results

Devices that operate under CFR47 Part 90 are subject to routine environmental evaluation for RF exposure prior to equipment authorization or use if they operate at frequencies of 1.5 GHz or below and limit for power density for general population/uncontrolled exposure is f/1500 W/m². The output power range by Manufacturer statement is 33±1dBm for Downlink and 30±1dBm for Uplink, The maximum antenna gain is 3dBi for Downlink and 6dBi for uplink, Therefore, in this report, MPE adopts the maximum output power evaluation, that is, the maximum output power of downlink is 34dBm, and the maximum output power of uplink is 31dBm.so it has the following assessment:

4.3.1 700MHz Band:

4.3.1.1 Frequency range: 758MHz~768MHz/788MHz ~798MHz

4.3.1.1.1 Downlink (758MHz~768MHz)

Prediction frequency (MHz):	763
Maximum peak output power at antenna input terminal (dBm):	34.0
Maximum peak output power at antenna input terminal (W):	2.512

Maximum antenna gain (dBi): 3.0
 Maximum RF output power (W): 5.0
 MPE limit for uncontrolled exposure at predication frequency (W/ m }:
 $S = f/1500 = 763/1500$ 0.509

$$R1 = \sqrt{\frac{PG}{4\pi S}} = \sqrt{\frac{5.0}{0.509 * 4 * 3.14}} \approx 0.8843m$$

$$\text{Conversely, when } R > 0.8843m, \text{ and } S < \frac{PG}{4\pi R^2} = \frac{5.0}{4 * 3.14 * 0.8843^2} \approx 0.509(W/m^2)$$

4.3.1.1.2 Uplink (788MHz ~798MHz)

Prediction frequency (MHz): 793
 Maximum peak output power at antenna input terminal (dBm): 31.0
 Maximum peak output power at antenna input terminal (W): 1.259
 Maximum antenna gain (dBi): 6.0
 Maximum RF output power (W): 5.0
 MPE limit for uncontrolled exposure at predication frequency (W/ m }:
 $S = f/1500 = 793/1500$ 0.529

$$R1 = \sqrt{\frac{PG}{4\pi S}} = \sqrt{\frac{5.0}{0.529 * 4 * 3.14}} \approx 0.8675m$$

$$\text{Conversely, when } R > 0.8675m, \text{ and } S < \frac{PG}{4\pi R^2} = \frac{5.0}{4 * 3.14 * 0.8675^2} \approx 0.529(W/m^2)$$

4.3.1.2 Frequency range: 769MHz~775MHz/799MHz ~805MHz

4.3.1.2.1 Downlink (769MHz~775MHz)

Prediction frequency (MHz): 772
 Maximum peak output power at antenna input terminal (dBm): 34.0
 Maximum peak output power at antenna input terminal (W): 2.512
 Maximum antenna gain (dBi): 3.0
 Maximum RF output power (W): 5.0
 MPE limit for uncontrolled exposure at predication frequency (W/ m }:
 $S = f/1500 = 772/1500$ 0.515

$$R1 = \sqrt{\frac{PG}{4\pi S}} = \sqrt{\frac{5.0}{0.515 * 4 * 3.14}} \approx 0.8792m$$

$$\text{Conversely, when } R > 0.8792m, \text{ and } S < \frac{PG}{4\pi R^2} = \frac{5.0}{4 * 3.14 * 0.8792^2} \approx 0.515(W/m^2)$$

4.3.1.2.2 Uplink (799MHz ~805MHz)

Prediction frequency (MHz):	802
Maximum peak output power at antenna input terminal (dBm):	31.0
Maximum peak output power at antenna input terminal (W):	1.259
Maximum antenna gain (dBi):	6.0
Maximum RF output power (W):	5.0
MPE limit for uncontrolled exposure at predication frequency (W/ m }: S= f/1500=802/1500	0.535

$$R1 = \sqrt{\frac{PG}{4\pi S}} = \sqrt{\frac{5.0}{0.535 * 4 * 3.14}} \approx 0.8626m$$

$$\text{Conversely, when } R > 0.8626m, \text{ and } S < \frac{PG}{4\pi R^2} = \frac{5.0}{4 * 3.14 * 0.8626^2} \approx 0.535(W/m^2)$$

4.3.2 800MHz Band:

4.3.2.1.1 Downlink (851MHz~861MHz)

Prediction frequency (MHz):	856
Maximum peak output power at antenna input terminal (dBm):	34.0
Maximum peak output power at antenna input terminal (W):	2.512
Maximum antenna gain (dBi):	3.0
Maximum RF output power (W):	5.0
MPE limit for uncontrolled exposure at predication frequency (W/ m }: S= f/1500=856/1500	0.571

$$R1 = \sqrt{\frac{PG}{4\pi S}} = \sqrt{\frac{5.0}{0.571 * 4 * 3.14}} \approx 0.8349m$$

$$\text{Conversely, when } R > 0.8349m, \text{ and } S < \frac{PG}{4\pi R^2} = \frac{5.0}{4 * 3.14 * 0.8349^2} \approx 0.571(W/m^2)$$

4.3.2.1.2 Uplink (806MHz~816MHz)

Prediction frequency (MHz):	811
Maximum peak output power at antenna input terminal (dBm):	31.0
Maximum peak output power at antenna input terminal (W):	1.259
Maximum antenna gain (dBi):	6.0
Maximum RF output power (W):	5.0
MPE limit for uncontrolled exposure at predication frequency (W/ m }: S= f/1500=811/1500	0.541

$$R1 = \sqrt{\frac{PG}{4\pi S}} = \sqrt{\frac{5.0}{0.541 * 4 * 3.14}} \approx 0.8578m$$

$$\text{Conversely, when } R > 0.8578\text{m, and } S < \frac{PG}{4\pi R^2} = \frac{5}{4 \times 3.14 \times 0.8578^2} \approx 0.541 (\text{W/m}^2)$$

4.4 Test Results

The above all ,when the Maximum antenna gain is 3dBi for downlink and the shortest distance from the human specific is 0.8843m, the device is compliant with the requirement MPE limit for uncontrolled exposure.

APPENDIX A. PHOTOGRAPHS OF EUT

A.1 External photos



Top surface



Front surface



Side surface-1



Side surface-2

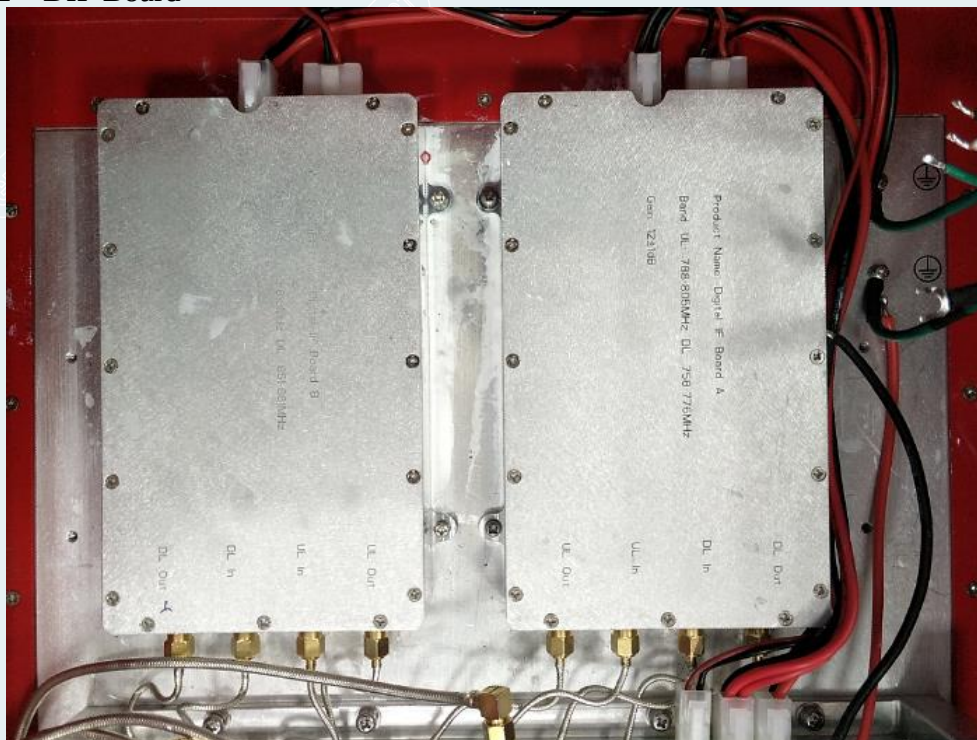


Behind surface

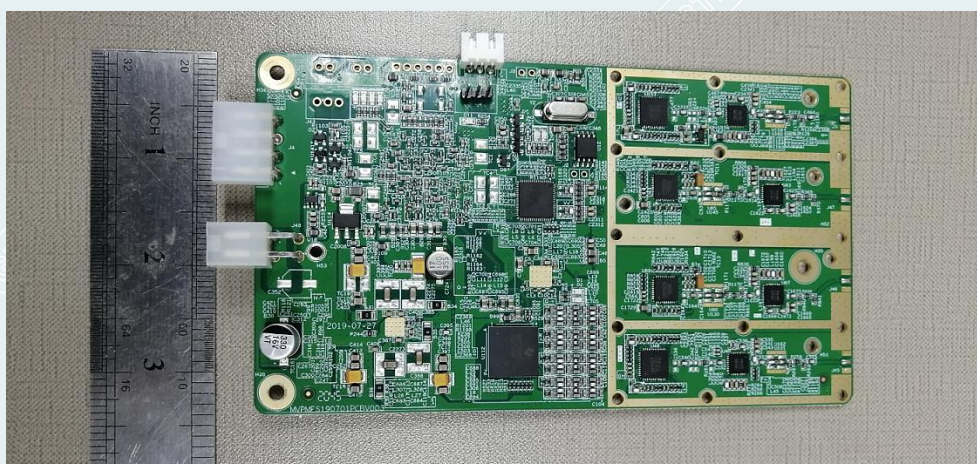
A.2 Internal photos



A.2.1 DIF Board



DIF A and DIF B



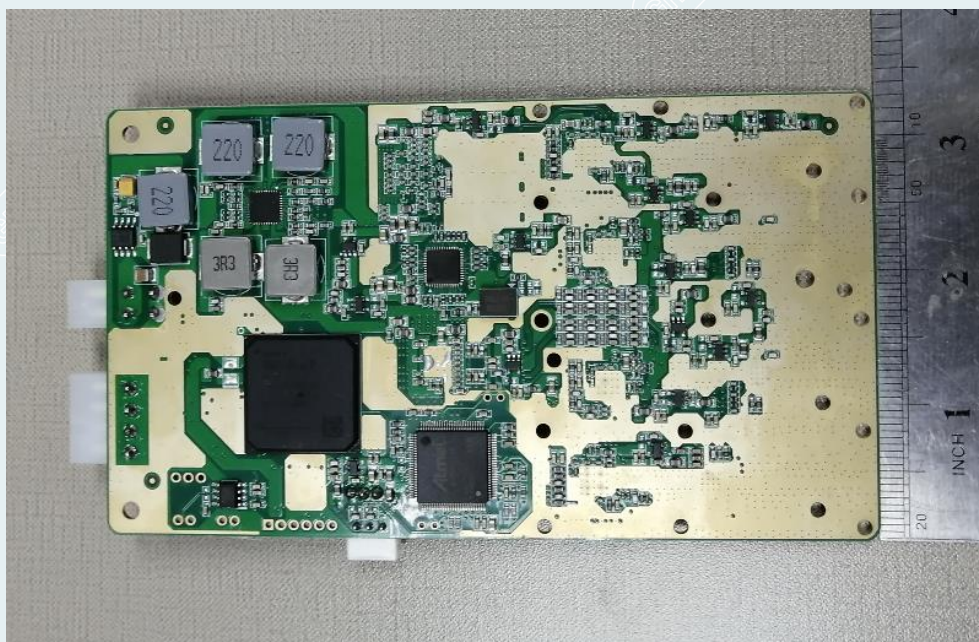
DIF Board-A



DIF Board-A



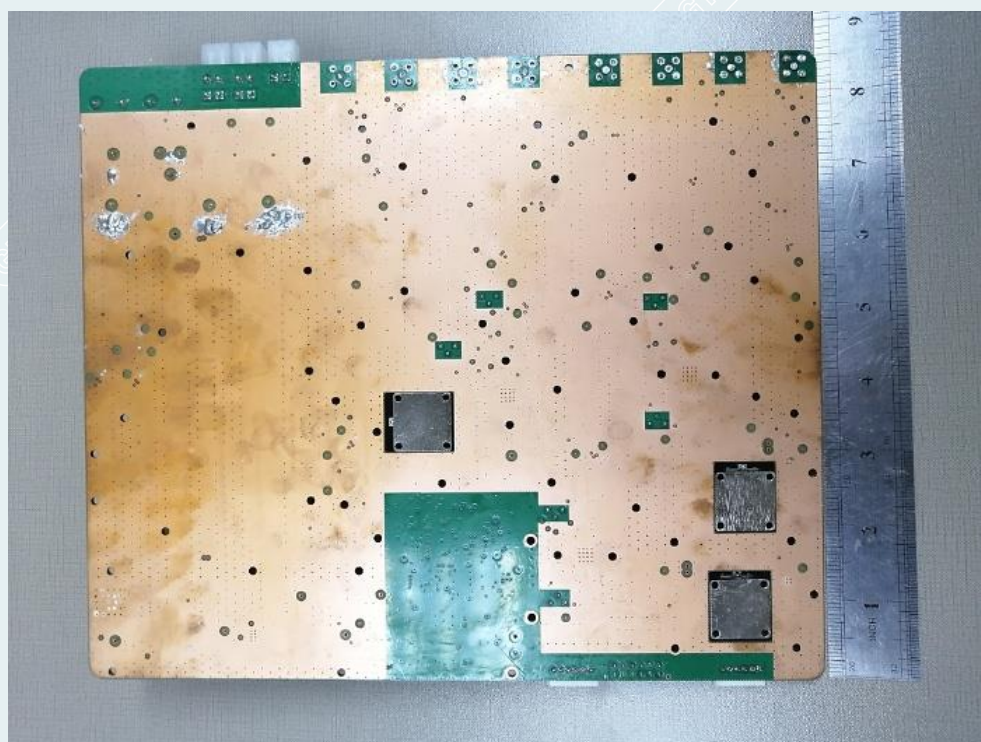
DIF Board-B



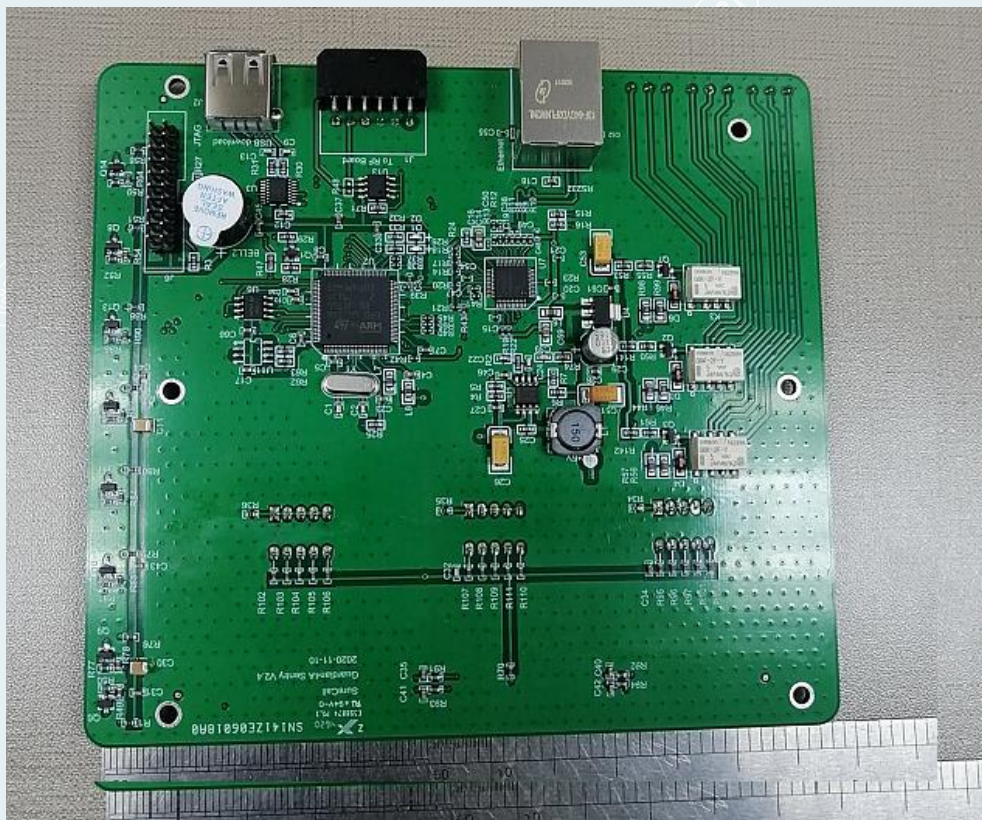
DIF Board-B

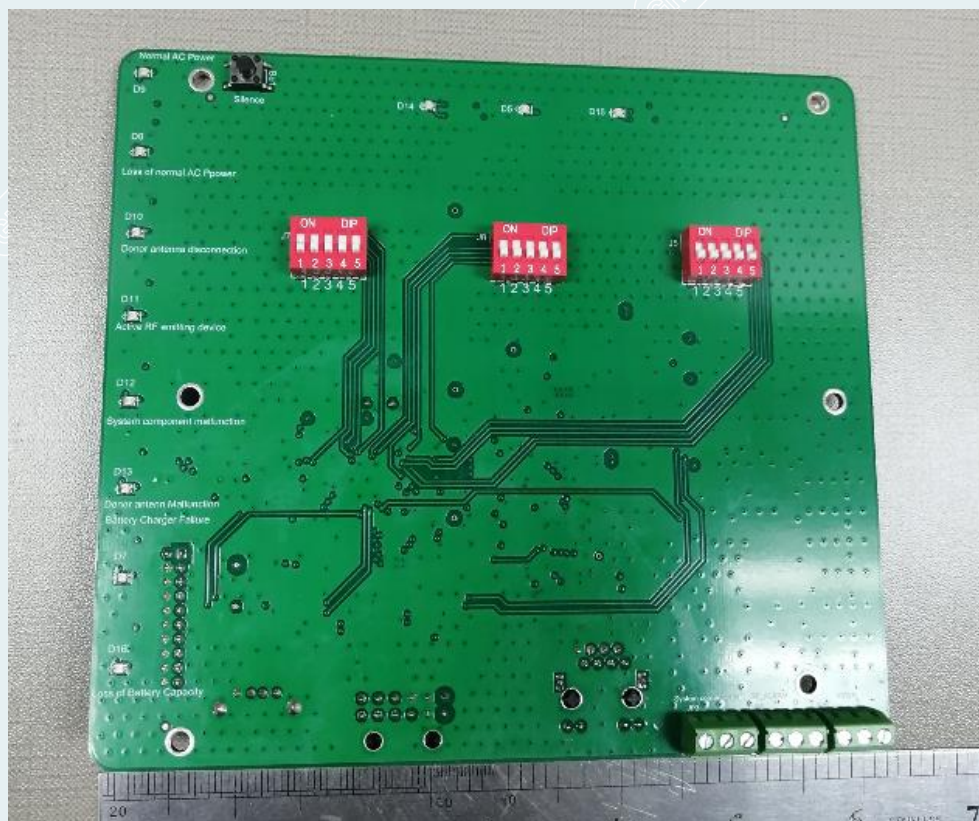
A.2.2 RF Board



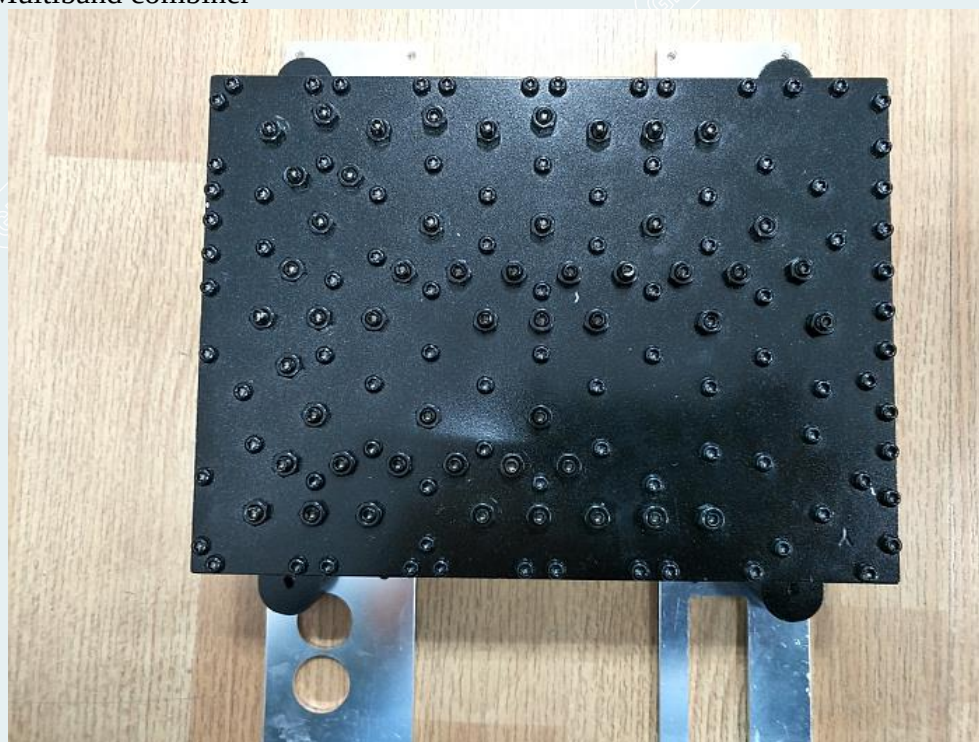


A.2.3 Sentry Board

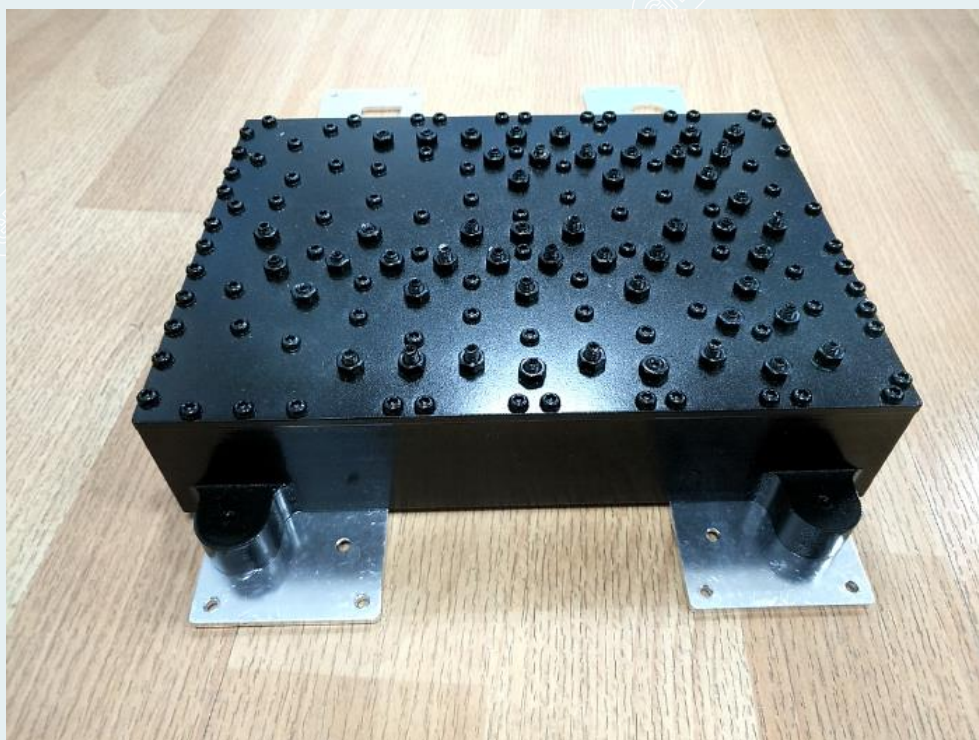




A.2.4 Multiband combiner







A.2.5 Power supply module







-----This is the last page of the report.-----