FCC TEST REPORT

Product	:	Immobilizer Programmer
Trade mark	:	SmartSafe
Model/Type reference	:	X-PROG 3
Serial Number	:	N/A
Report Number	:	EED32M800165
FCC ID	:	2AYANPROG3
Date of Issue	:	Jan. 29, 2021
Test Standards	:	47 CFR Part 15 Subpart C
Test result	:	PASS

Prepared for:

SHENZHEN SMARTSAFE TECH CO.,LTD.
3F, Building B, Qiao'an Technology Industrial Park, Guanlan, Longhua New District, Shenzhen,China

Prepared by:

Centre Testing International Group Co., Ltd.
Hongwei Industrial Zone, Bao'an 70 District, Shenzhen, Guangdong, China
TEL: +86-755-3368 3668
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Compiled By: Ware Xin — Ware Xin

Reviewed by: Aaron Ma — Aaron Ma

Approved by: David Wang — David Wang

Date: Jan. 29, 2021

Check No.:3948191020

2 Version

Version No.	Date	Description
00	Jan. 29, 2021	Original

3 Test Summary

Test Item	Test Requirement	Test method	Result
Antenna Requirement	47 CFR Part 15 Subpart C Section 15.203	ANSI C63.10-2013	PASS
AC Power Line Conducted Emission	47 CFR Part 15 Subpart C Section 15.207	ANSI C63.10-2013	PASS
Spurious Emissions	47 CFR Part 15 Subpart C Section 15.209	ANSI C63.10-2013	PASS
Occupied Bandwidth	47 CFR Part 15 Subpart C Section 2.1049	ANSI C63.10-2013	PASS

Remark:
Company Name and Address shown on Report, the sample(s) and sample Information was/ were provided by the applicant who should be responsible for the authenticity which CTI hasn't verified.

4 Contents

5 General Information

5.1 Client Information

Applicant:	SHENZHEN SMARTSAFE TECH CO.,LTD.
Address of Applicant:	3F, Building B, Qiao'an Technology Industrial Park, Guanlan, Longhua New District, Shenzhen,China
Manufacturer:	SHENZHEN SMARTSAFE TECH CO.,LTD.
Address of Manufacturer:	3F, Building B, Qiao'an Technology Industrial Park, Guanlan, Longhua New District, Shenzhen,,China

5.2 General Description of EUT

Product Name:	Immobilizer Programmer	
Model No.(EUT):	X-PROG 3	
Trade Mark:	SmartSafe	
Frequency Range:	125kHz	
Software Version:	V1.01	
Hardware version:	V1.00.000	
Modulation Type:	ASK	
Number of Channels:	1 (declared by the client)	
Sample Type:	Portable production	
Antenna Type:	Loop antenna	
Antenna Gain:	0dB	
Power Supply:	AC adapter	Input: 100-240V~50/ 60Hz 1.3A Output: DC 12.0V ⎓ 3A
	DC	DC 12V
Sample Received Date:	Nov. 24, 2020	
Sample tested Date:	Nov. 24, 2020 to Jan. 29, 2021	

5.3 Test Environment and Mode

Operating Environment:	
Temperature:	24.0 °C
Humidity:	52 % RH
Atmospheric Pressure:	1010 mbar
Test mode:	
Transmitting mode:	Keep the EUT in transmitting mode with modulation.

5.4 Description of Support Units

The EUT has been tested independently.

5.5 Test Location

All tests were performed at:
Centre Testing International Group Co., Ltd
Building C, Hongwei Industrial Park Block 70, Bao'an District, Shenzhen, China
Telephone: +86 (0) 755 33683668 Fax:+86 (0) 755 33683385
No tests were sub-contracted.

FCC Designation No.: CN1164

5.6 Deviation from Standards

None.

5.7 Abnormalities from Standard Conditions

None.

5.8 Other Information Requested by the Customer

None.

5.9 Measurement Uncertainty (95% confidence levels, k=2)

No.	Item	Measurement Uncertainty
1	Radio Frequency	7.9×10^{-8}
2	RF power, conducted	0.46dB (30MHz-1GHz)
		0.55dB (1GHz-18GHz)
3	Radiated Spurious emission test	4.3dB (30MHz-1GHz)
		4.5dB (1GHz-18GHz)
4	Conduction emission	3.5dB (9kHz to 150kHz)
		3.1dB (150kHz to 30MHz)
5	Temperature test	0.64°C
6	Humidity test	3.8%
7	DC power voltages	0.026%

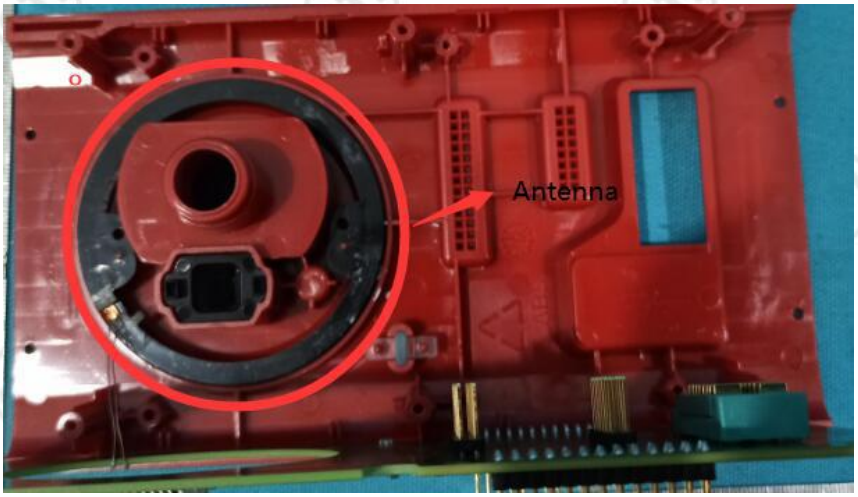
6 Equipment List

Conducted disturbance Test					
Equipment	**Manufacturer**	**Model No.**	**Serial Number**	**Cal. date (mm-dd-yyyy)**	**Cal. Due date (mm-dd-yyyy)**
Receiver	R&S	ESCI	100435	04-28-2020	04-27-2021
Temperature/ Humidity Indicator	Defu	TH128	/	---	---
LISN	R&S	ENV216	100098	03-05-2020	03-04-2021
Barometer	changchun	DYM3	1188	---	---

3M Semi/full-anechoic Chamber					
Equipment	**Manufacturer**	**Model No.**	**Serial Number**	**Cal. date (mm-dd-yyyy)**	**Cal. Due date (mm-dd-yyyy)**
3M Chamber & Accessory Equipment	TDK	SAC-3	---	05-24-2019	05-23-2022
TRILOG Broadband Antenna	Schwarzbeck	VULB9163	9163-618	05-16-2020	05-15-2021
Loop Antenna	Schwarzbeck	FMZB 1519B	1519B-076	04-25-2018	04-24-2021
Receiver	R&S	ESCI7	100938-003	10-16-2020	10-15-2021
Multi device Controller	maturo	NCD/070/10711112	---	---	---
Temperature/ Humidity Indicator	Shanghai qixiang	HM10	1804298	06-29-2020	06-28-2021
Cable line	Fulai(7M)	SF106	5219/6A	---	---
Cable line	Fulai(6M)	SF106	5220/6A	---	---
Cable line	Fulai(3M)	SF106	5216/6A	---	---
Cable line	Fulai(3M)	SF106	5217/6A	---	---

7 Test results and Measurement Data

7.1 Antenna Requirement

Standard requirement:	47 CFR Part 15C Section 15.203
15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.	
EUT Antenna:	
The antenna is integrated on the main Loop antenna and no consideration of replacement. The best case gain of the antenna is 0 dBi.	

7.2 Conducted Emissions

Test Requirement: 47 CFR Part 15C Section 15.207
Test Method: ANSI C63.10
Test Frequency Range: 150kHz to 30MHz

Limit:

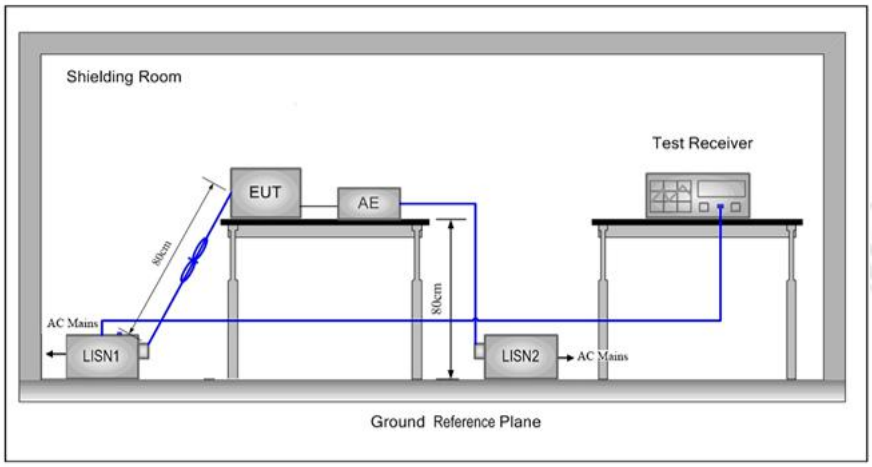
Frequency range (MHz)	Limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

Test Procedure:

1) The mains terminal disturbance voltage test was conducted in a shielded room.
2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.
3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,
4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.
5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10: 2013 on conducted measurement.

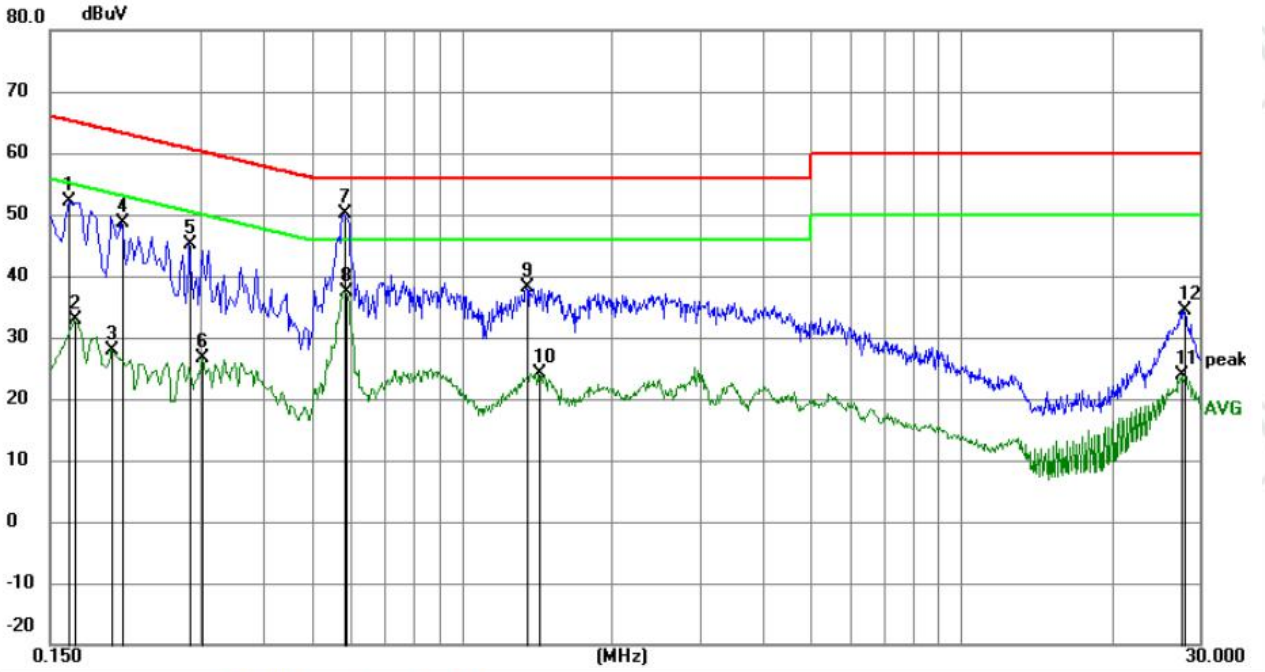
Test Setup:



Test Mode: Transmitting mode
Test voltage: 120V/60Hz
Instruments Used: Refer to section 6 for details
Test Results: Pass

Measurement Data

Live Line:

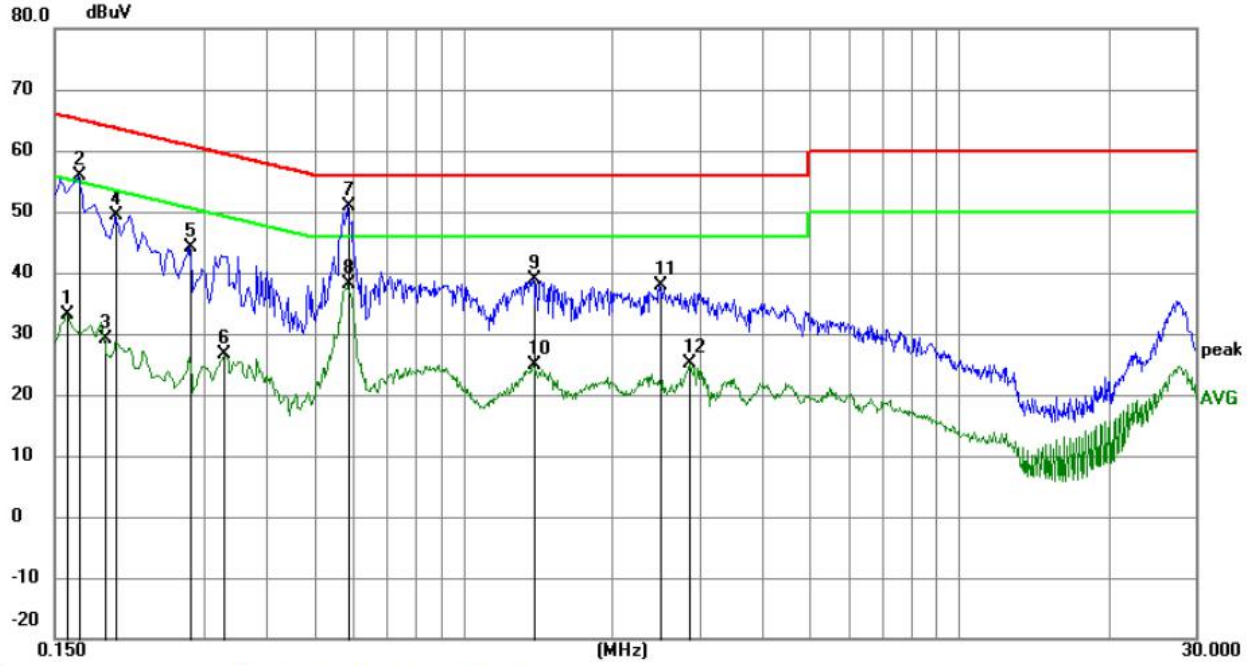


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1635	42.23	9.87	52.10	65.28	-13.18	QP	
2		0.1680	22.99	9.87	32.86	55.06	-22.20	AVG	
3		0.1995	18.13	9.87	28.00	53.63	-25.63	AVG	
4		0.2085	38.77	9.89	48.66	63.26	-14.60	QP	
5		0.2850	35.10	10.04	45.14	60.67	-15.53	QP	
6		0.3030	16.65	10.07	26.72	50.16	-23.44	AVG	
7	*	0.5820	40.10	10.05	50.15	56.00	-5.85	QP	
8		0.5865	27.37	10.05	37.42	46.00	-8.58	AVG	
9		1.3515	28.27	9.82	38.09	56.00	-17.91	QP	
10		1.4325	14.32	9.81	24.13	46.00	-21.87	AVG	
11		27.6270	13.78	10.02	23.80	50.00	-26.20	AVG	
12		28.0005	24.25	10.02	34.27	60.00	-25.73	QP	

Notes:

1. The following Quasi-Peak and Average measurements were performed on the EUT:
2. Final Test Level =Receiver Reading + LISN Factor + Cable Loss.

Neutral Line:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1590	23.35	9.87	33.22	55.52	-22.30	AVG	
2		0.1680	46.05	9.87	55.92	65.06	-9.14	QP	
3		0.1884	19.38	9.87	29.25	54.11	-24.86	AVG	
4		0.1995	39.49	9.87	49.36	63.63	-14.27	QP	
5		0.2805	34.10	10.03	44.13	60.80	-16.67	QP	
6		0.3300	16.64	10.04	26.68	49.45	-22.77	AVG	
7	*	0.5865	40.93	10.05	50.98	56.00	-5.02	QP	
8		0.5865	28.12	10.05	38.17	46.00	-7.83	AVG	
9		1.3829	29.19	9.81	39.00	56.00	-17.00	QP	
10		1.3829	15.13	9.81	24.94	46.00	-21.06	AVG	
11		2.4945	28.02	9.79	37.81	56.00	-18.19	QP	
12		2.8635	15.34	9.79	25.13	46.00	-20.87	AVG	

Notes:

1. The following Quasi-Peak and Average measurements were performed on the EUT:
2. Final Test Level =Receiver Reading + LISN Factor + Cable Loss.

7.3 Spurious Emissions

Test Requirement: 47 CFR Part 15C Section 15.231(b) and 15.209

Test Method: ANSI C63.10

Test Site: Measurement Distance: 3m (Semi-Anechoic Chamber)

Receiver Setup:

Frequency	Detector	RBW	VBW	Remark
0.009MHz-0.090MHz	Peak	10kHz	30kHz	Peak
0.009MHz-0.090MHz	Average	10kHz	30kHz	Average
0.090MHz-0.110MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
0.110MHz-0.490MHz	Peak	10kHz	30kHz	Peak
0.110MHz-0.490MHz	Average	10kHz	30kHz	Average
0.490MHz -30MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak
Above 1GHz	Peak	1MHz	3MHz	Peak
	Peak	1MHz	10Hz	Average

Test Setup:

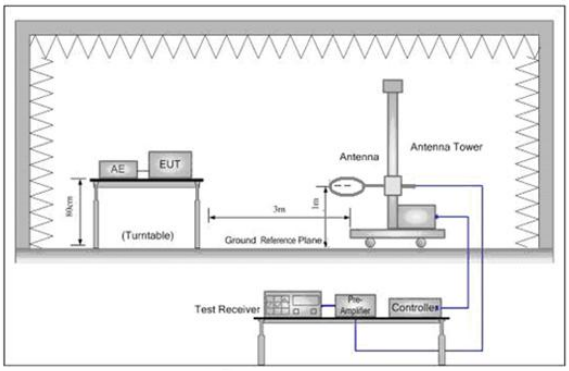


Figure 1. Below 30MHz

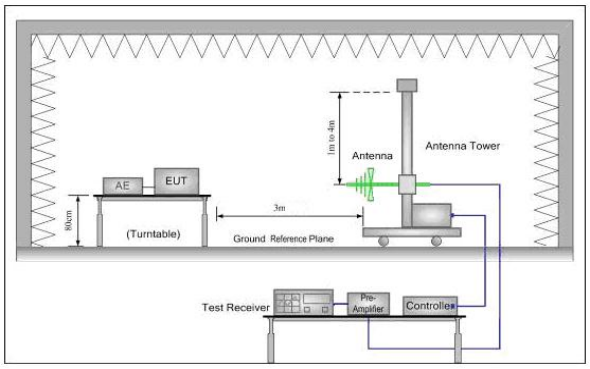


Figure 2. 30MHz to 1GHz

Test Procedure:

Below 1GHz test procedure as below:

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rota table table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

Limit: (Spurious Emissions)

Frequency	Field strength (microvolt/meter)	Limit (dBμV/m)	Remark	Measurement distance (m)
0.009MHz-0.490MHz	2400/F(kHz)	-	-	300
0.490MHz-1.705MHz	24000/F(kHz)	-	-	30
1.705MHz-30MHz	30	-	-	30
30MHz-88MHz	100	40.0	Quasi-peak	3
88MHz-216MHz	150	43.5	Quasi-peak	3
216MHz-960MHz	200	46.0	Quasi-peak	3
960MHz-1GHz	500	54.0	Quasi-peak	3
Above 1GHz	500	54.0	Average	3

Note: 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.

Test Mode: Transmitting mode

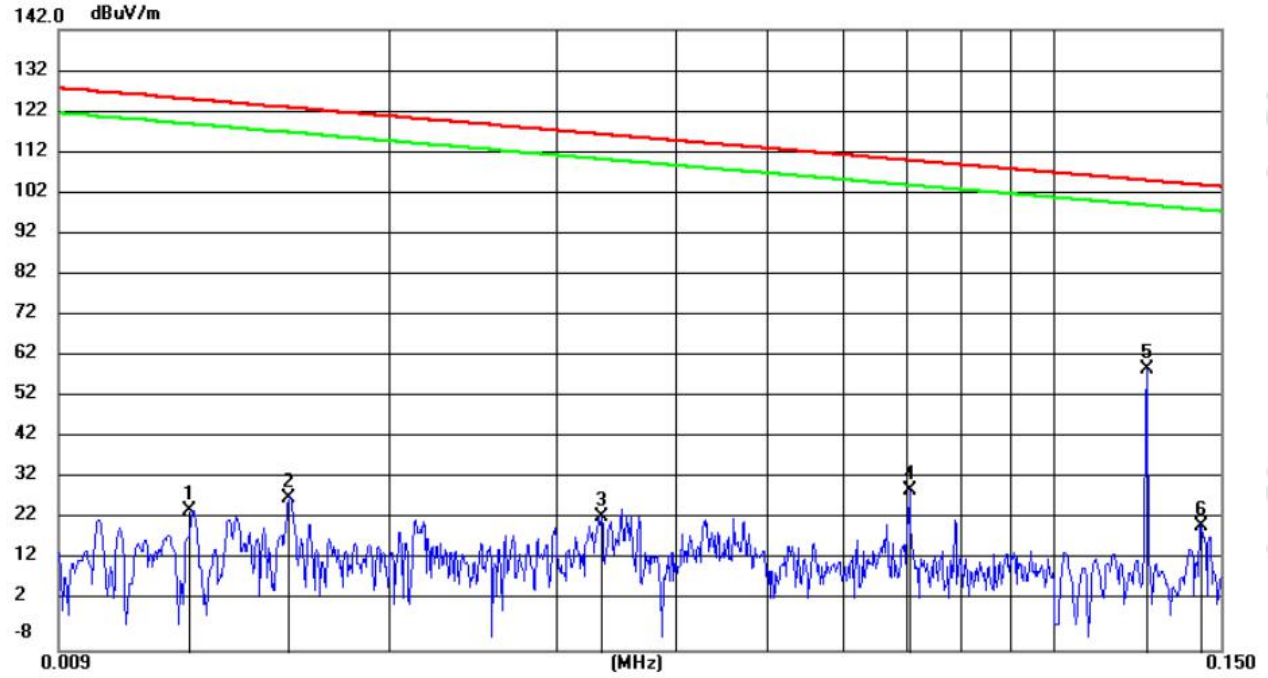
Test Voltage: DC 12V

Instruments Used: Refer to section 6 for details

Test Results: Pass

Measurement Data

9kHz~150kHz:

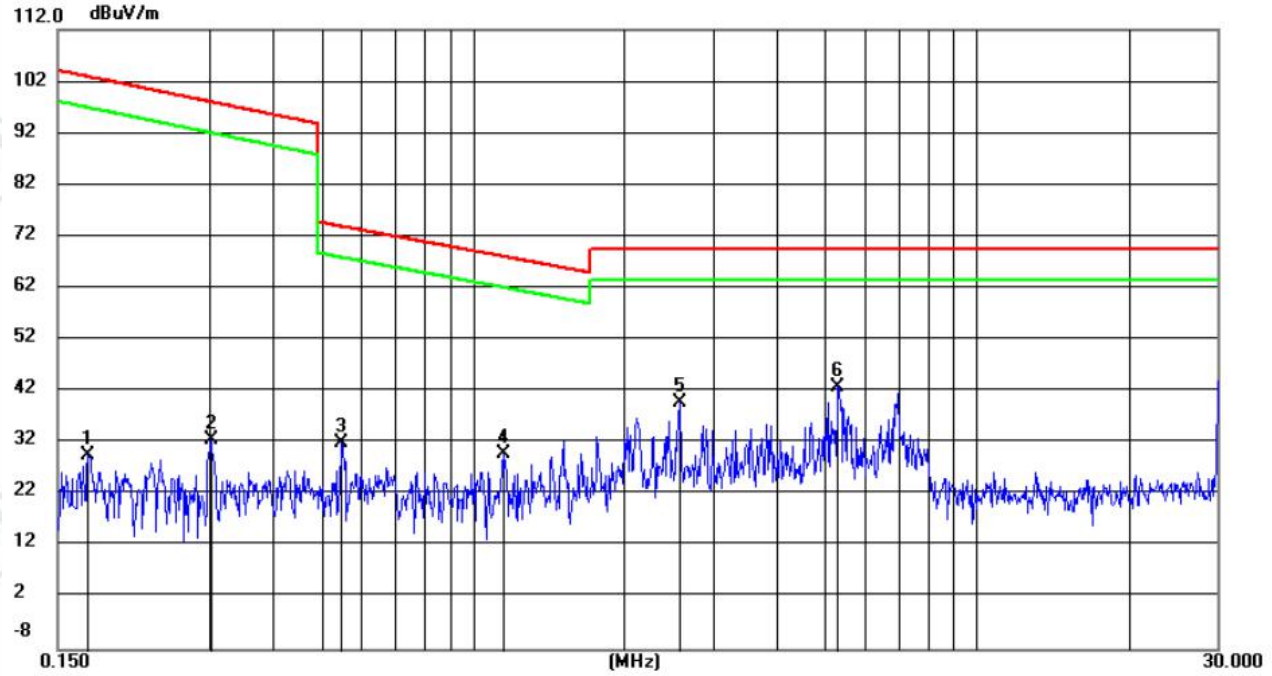


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		0.0123	4.39	21.47	25.86	125.18	-99.32	peak			
2		0.0157	7.68	21.28	28.96	123.12	-94.16	peak			
3		0.0334	4.14	20.48	24.62	116.75	-92.13	peak			
4		0.0704	10.46	20.52	30.98	110.46	-79.48	peak			
5	*	0.1252	39.43	20.67	60.10	105.60	-45.50	peak			
6		0.1429	1.70	20.64	22.34	104.49	-82.15	peak			

Remark:

1. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
2. The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:
   Final Test Level =Receiver Reading - Correct Factor
   Correct Factor = Preamplifier Factor– Antenna Factor–Cable Factor
3. The highest frequency is 125kHz of the EUT, so upper frequency of measurement range is 30MHz.

150kHz~30MHz:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		0.1720	9.16	20.60	29.76	102.89	-73.13	peak			
2		0.3017	12.12	20.50	32.62	98.01	-65.39	peak			
3		0.5493	11.50	20.48	31.98	73.90	-41.92	peak			
4		1.1473	9.72	20.30	30.02	68.09	-38.07	peak			
5		2.5807	19.69	20.30	39.99	69.54	-29.55	peak			
6	*	5.3049	22.59	20.41	43.00	69.54	-26.54	peak			

Remark:

1. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
2. The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:
   Final Test Level =Receiver Reading - Correct Factor
   Correct Factor = Preamplifier Factor– Antenna Factor–Cable Factor
3. The highest frequency is 125kHz of the EUT, so upper frequency of measurement range is 30MHz.

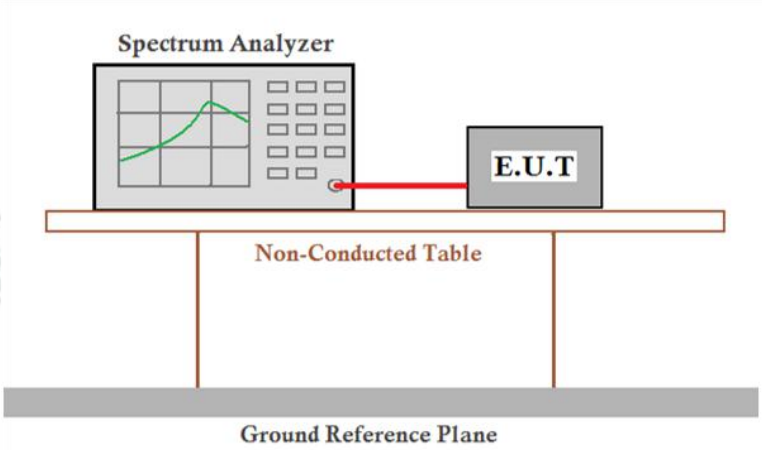
7.4 Occupied Bandwidth

Test Requirement: 47 CFR Part 15C Section 2.1049

Test Method: ANSI C63.10

Limit: The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated are each equal to 0.5% of the total mean power radiated by a given emission.

Test Setup:



Test Mode: Transmitting mode

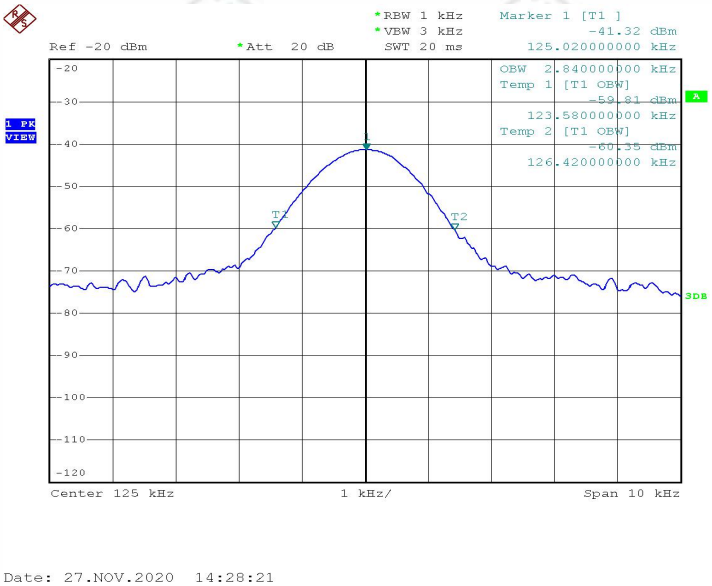
Instruments Used: Refer to section 6 for details

Test Results: Pass

Measurement Data

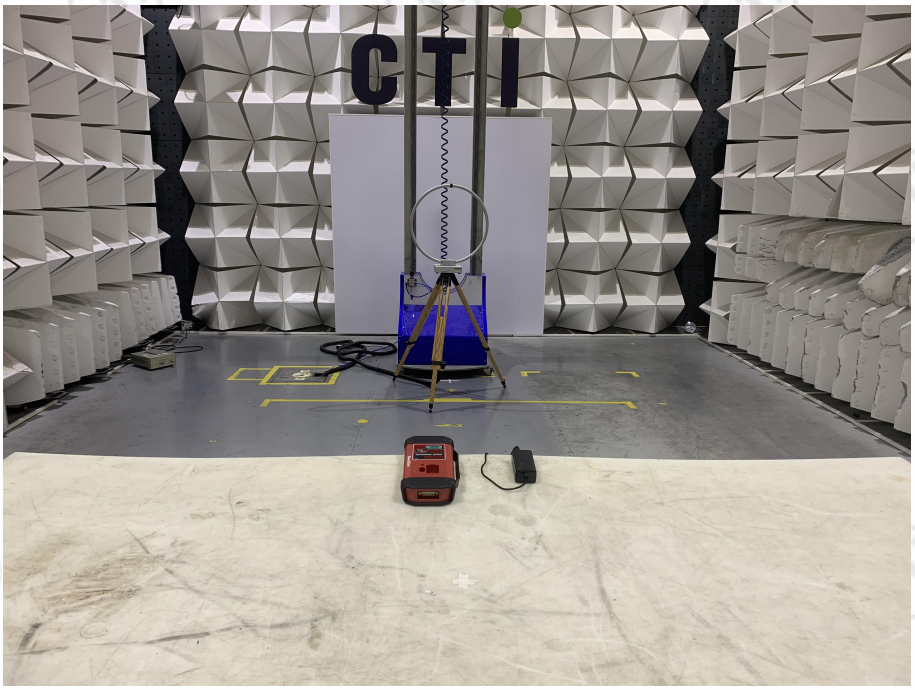
Occupied bandwidth	Results
2.86KHz	Pass

Test plot as follows:



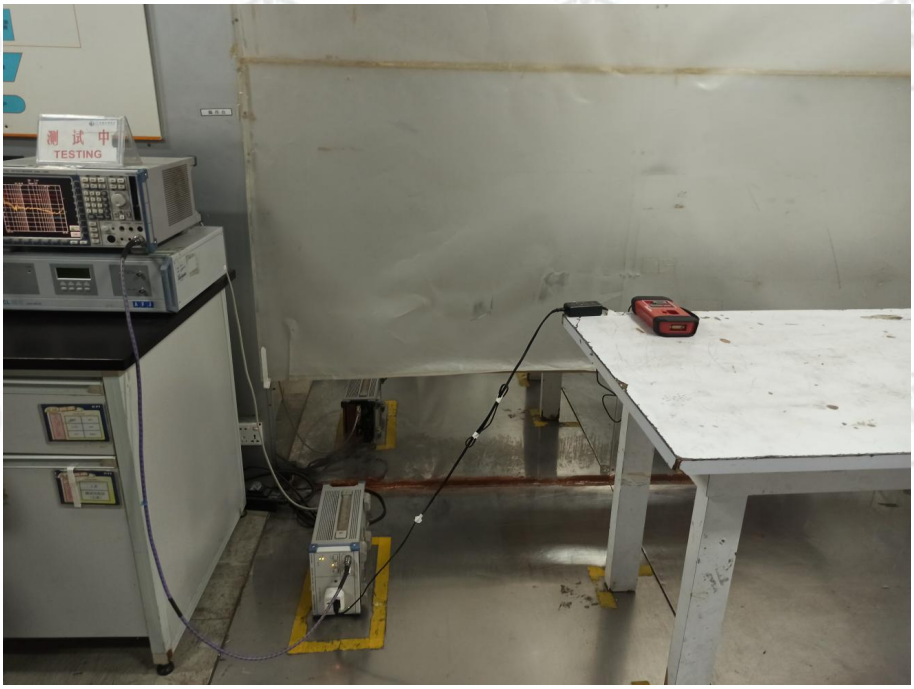
APPENDIX 1 PHOTOGRAPHS OF TEST SETUP

Test Model No.: X-PROG 3



Radiated emission Test Setup (Below 30MHz)

Radiated emission Test Setup (Below 1G)



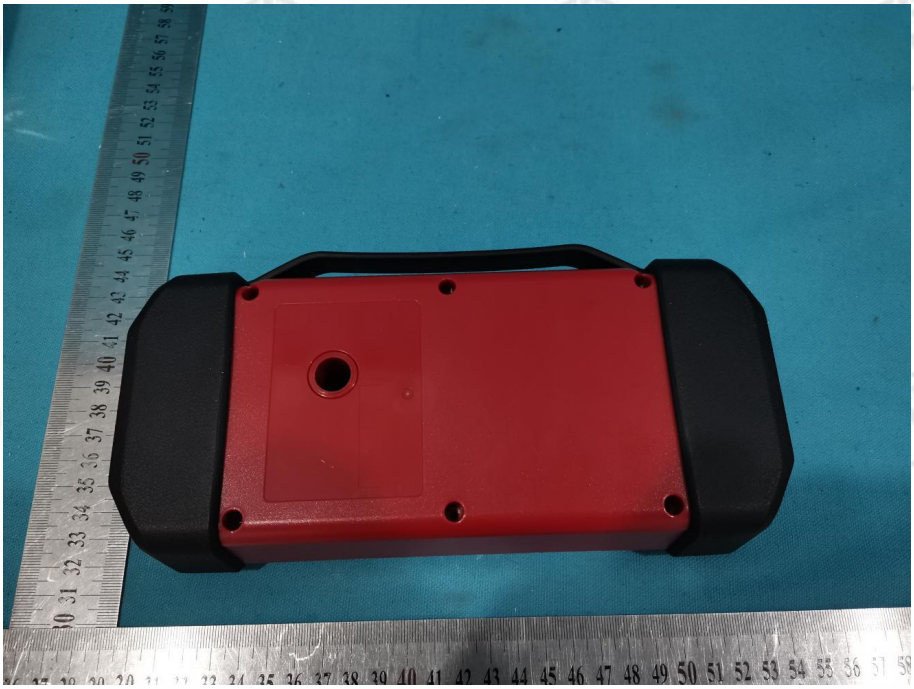
Conducted Emissions Test Setup

APPENDIX 2 PHOTOGRAPHS OF EUT

Test model No.: X-PROG 3

View of Product-1

View of Product-2



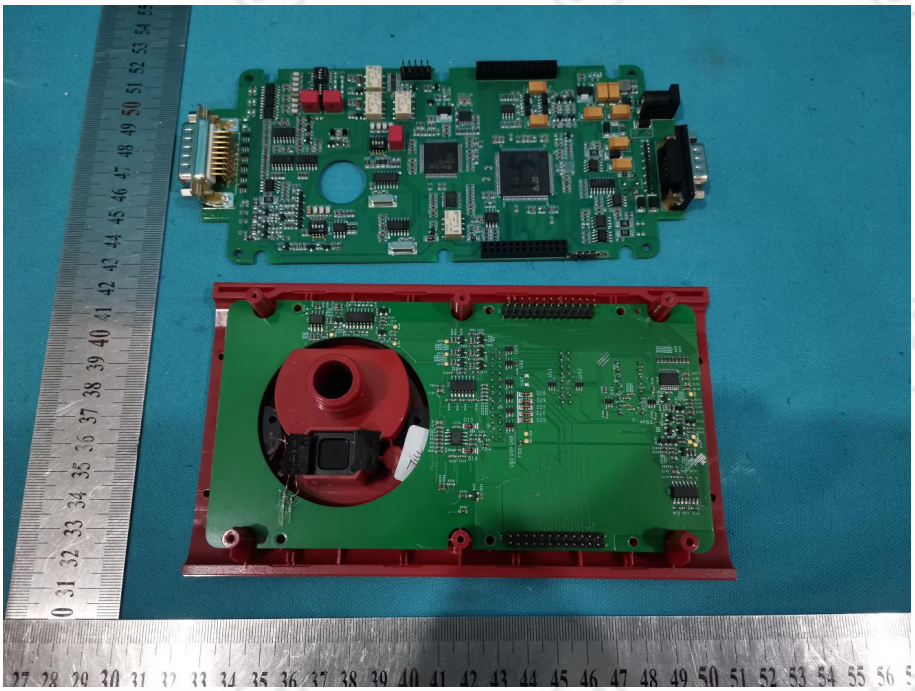
View of Product-3

View of Product-4

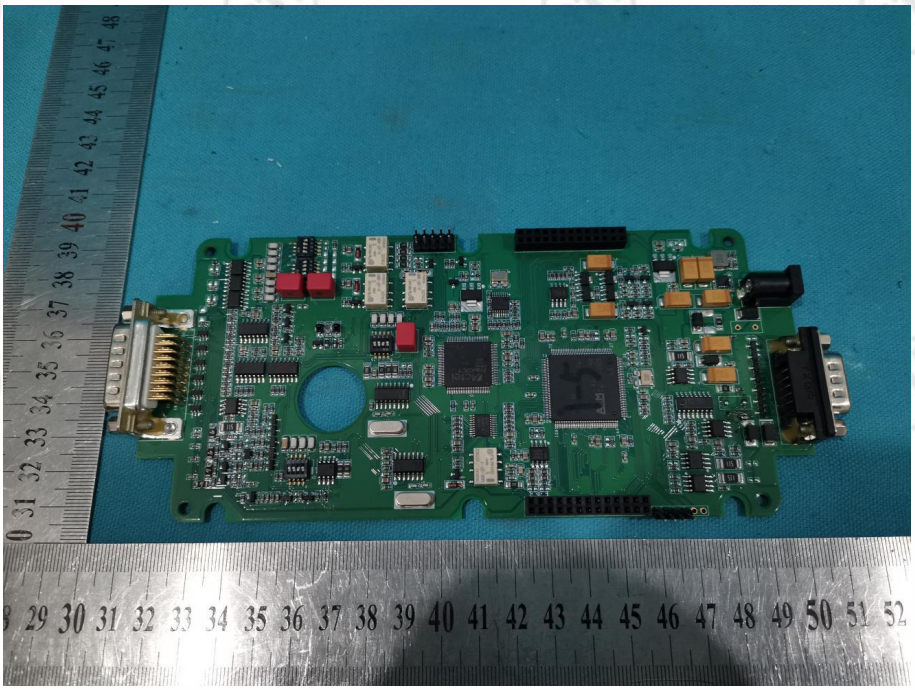
View of Product-5

View of Product-6

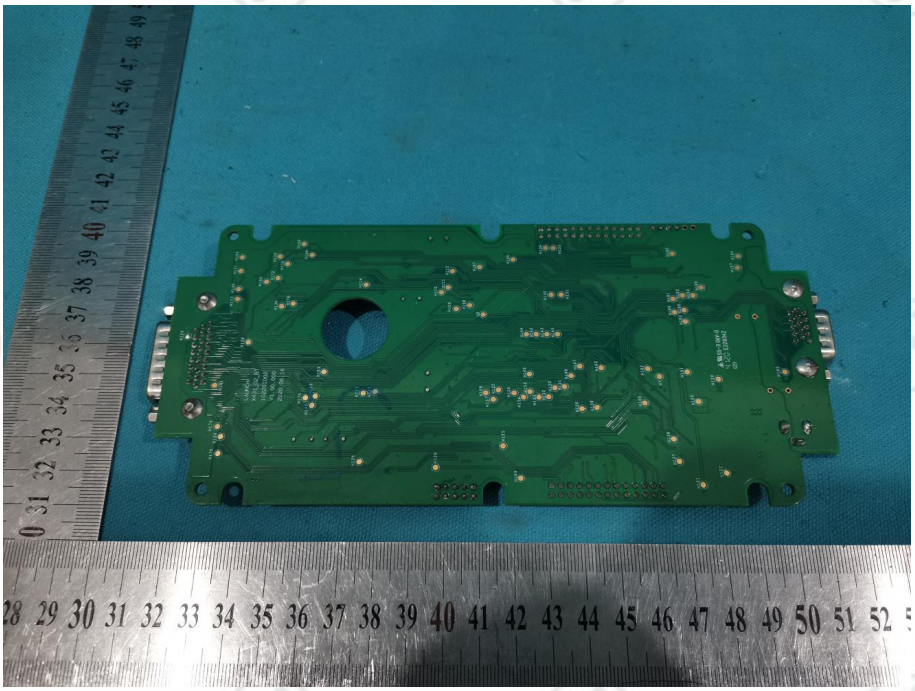
View of Product-7



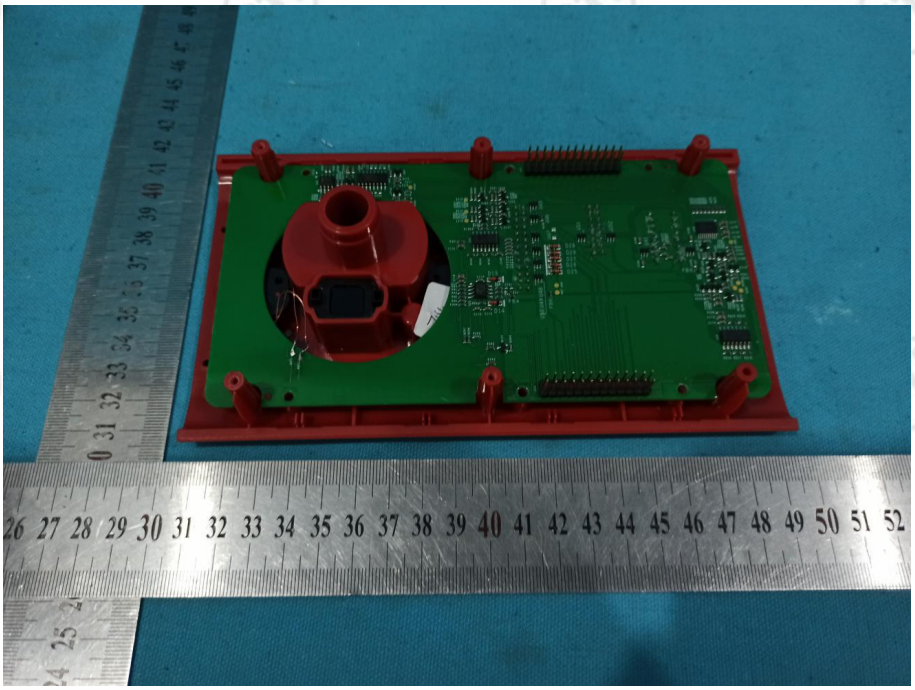
View of Product-8



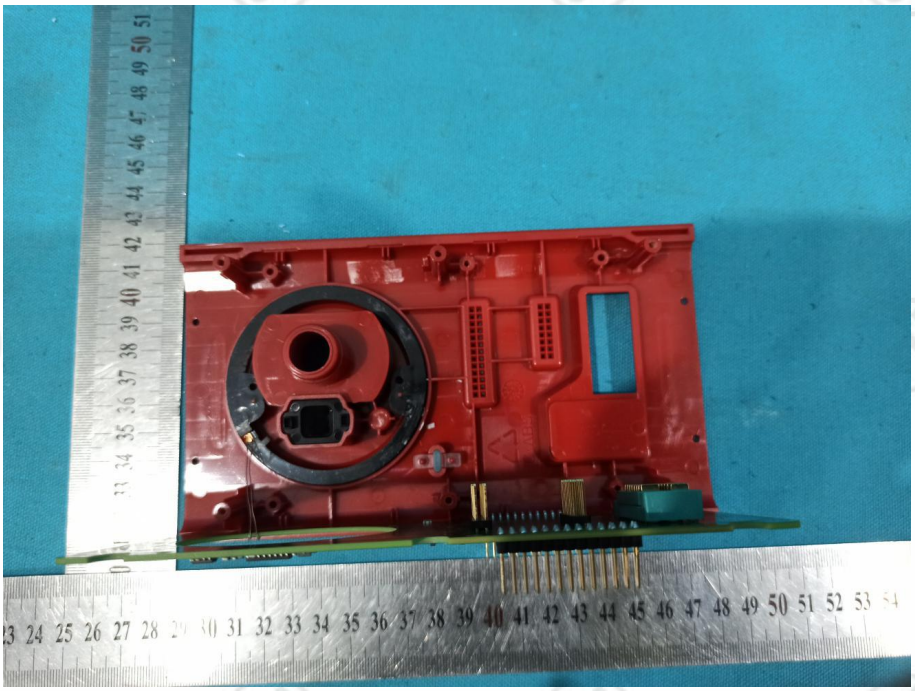
View of Product-9



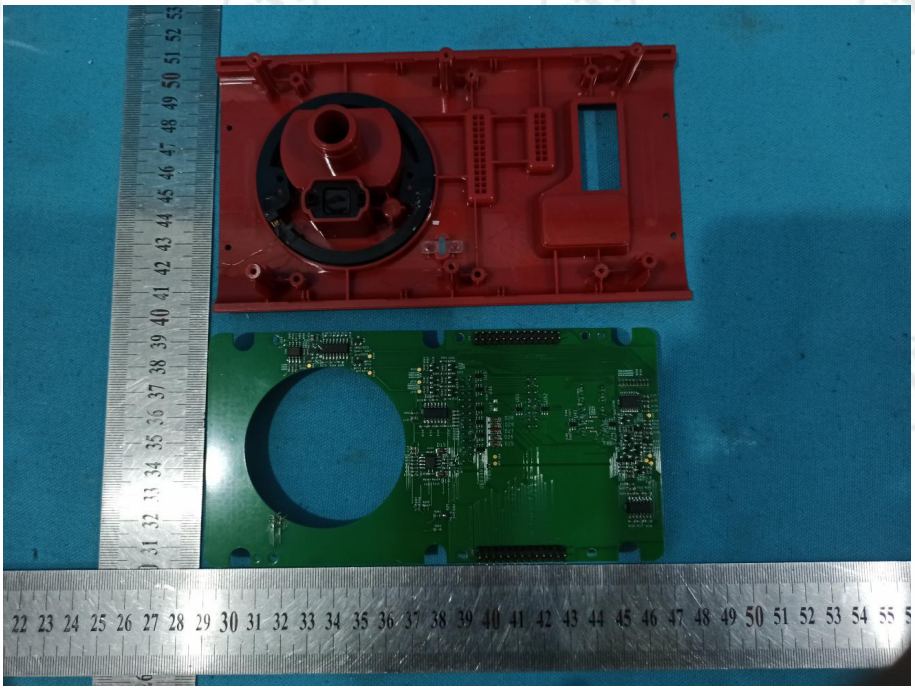
View of Product-10



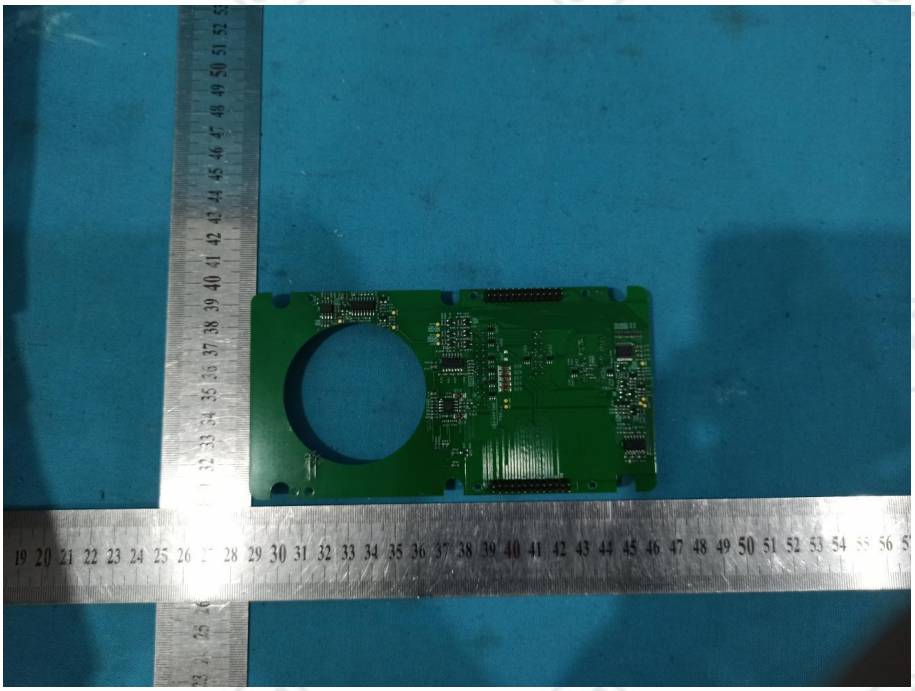
View of Product-11



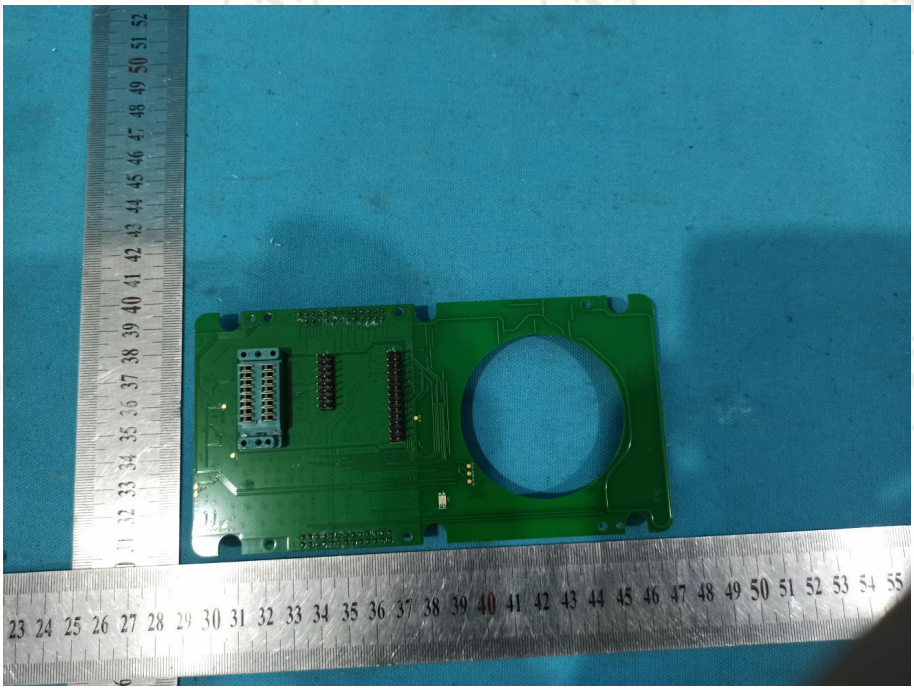
View of Product-12



View of Product-13



View of Product-14



View of Product-15

View of Product-16

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*** End of Report ***