FCC Test Report

Report No.: AGC00439180101FE03

FCC ID	:	2ABV6ITL-DT0200-2C
APPLICATION PURPOSE	:	Original Equipment
PRODUCT DESIGNATION	:	Card Reader
BRAND NAME	:	N/A
MODEL NAME	:	ITL-DT/DT0200-2C, ITL-DT/DT0200-2C(Z)
CLIENT	:	Shenzhen ITLONG Intelligent Technology CO.,LTD
DATE OF ISSUE	:	May 11, 2018
STANDARD(S) **TEST PROCEDURE(S)**	:	FCC Part 15 Rules
REPORT VERSION	:	V1.0

Attestation of ***G***lobal ***C***ompliance (Shenzhen) Co., Ltd

REPORT REVISE RECORD

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	May 11, 2018	Valid	Initial Release

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1. VERIFICATION OF CONFORMITY

Applicant	Shenzhen ITLONG Intelligent Technology CO.,LTD
Address	12th Floor Buildig C1, Nanshan iPark, 1001Xueyuan Avenue, Nanshan District, Shenzhen, Guangdong, China.
Manufacturer	Shenzhen ITLONG Intelligent Technology CO.,LTD
Address	12th Floor Buildig C1, Nanshan iPark, 1001Xueyuan Avenue, Nanshan District, Shenzhen, Guangdong, China.
Product Designation	Card Reader
Brand Name	N/A
Test Model	ITL-DT/DT0200-2C
Series Model	ITL-DT/DT0200-2C(Z)
Model Difference	All the same except for the appearance. ITL-DT/DT0200-2C with LOGO and ITL-DT/DT0200-2C(Z) without.
Date of test	Jan. 22, 2018 to May 11, 2018
Deviation	None
Condition of Test Sample	Normal
Report Template	AGCRT-US-BR/RF

We hereby certify that:
The above equipment was tested by Attestation of Global Compliance (Shenzhen) Co., Ltd. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10 (2013) and the energy emitted by the sample EUT tested as described in this report is in compliance with radiated emission limits of FCC Rules Part 15.225.

Tested by Max Zhang

Max Zhang(Zhang Yi) May 11, 2018

Reviewed by Bart Xie

Bart Xie(Xie Xiaobin) May 11, 2018

2. GENERAL INFORMATION

A major technical description of EUT is described as following

Operation Frequency	13.56MHz
Maximum field strength	52.13 dBμV/m@3m
Modulation	ASK
Number of channels	1
Antenna Gain	2.813dBi
Antenna Designation	Internal Antenna (Met 15.203 Antenna requirement)
Hardware Version	ITL-DK7110(V1.4)
Software Version	DT0210 V6100
Power Supply	DC 12V-24V, 1A

3. MEASUREMENT UNCERTAINTY

The uncertainty is calculated using the methods suggested in the “Guide to the Expression of Uncertainty in measurement” (GUM) published by CISPR and ANSI.

- Uncertainty of Conducted Emission, Uc = ±3.2 dB
- Uncertainty of Radiated Emission below 1GHz, Uc = ±3.9 dB
- Uncertainty of Radiated Emission above 1GHz, Uc = ±4.8 dB

4. DESCRIPTION OF TEST MODES

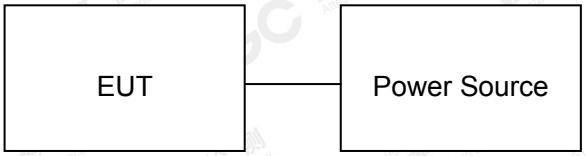
NO.	TEST MODE DESCRIPTION
1	Transmitting

Note:
1. All the test modes can be supply by adapter, only the result of the worst case was recorded in the report, if no other cases.
2. For Radiated Emission, 3axis were chosen for testing for each applicable mode.

5. SYSTEM TEST CONFIGURATION

5.1. CONFIGURATION OF EUT SYSTEM

Configure:



5.2. EQUIPMENT USED IN EUT SYSTEM

Item	Equipment	Model No.	ID or Specification	Remark
1	Card Reader	ITL-DT/DT0200-2C	2ABV6ITL-DT0200-2C	EUT
2	DC Source	55D23L-MF	12V 60Ah	Support * 2
3	Adaptor	MX15W-0502000UX	100-240V 50/60Hz 0.4A	Support
4	Jumper cable	--	0.5m	Support * 2

5.3. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.209	Radiated Emission	Compliant
§15.207	Conducted Emission	Compliant
§15.225	Frequency Tolerance	Compliant
§15.225	20dB bandwidth	Compliant

6. TEST FACILITY

Test Site	Attestation of Global Compliance (Shenzhen) Co., Ltd
Location	1-2F., Bldg.2, No.1-4, Chaxi Sanwei Technical Industrial Park, Gushu, Xixiang, Bao'an District B112-B113, Bldg.12, Baoan Bldg Materials Center, No.1 of Xixiang Inner Ring Road, Baoan District, Shenzhen 518012
NVLAP LAB CODE	600153-0
Designation Number	CN5028
Description	Attestation of Global Compliance(Shenzhen) Co., Ltd is accredited by National Voluntary Laboratory Accreditation program, NVLAP Code 600153-0

TEST EQUIPMENT OF RADIATED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESCI	10096	Jun.20, 2017	Jun.19, 2018
EXA Signal Analyzer	Aglient	N9010A	MY53470504	Dec.08, 2017	Dec.07, 2018
Horn antenna	SCHWARZBECK	BBHA 9170	#768	Sep.20, 2017	Sep.19, 2018
preamplifier	ChengYi	EMC184045SE	980508	Sep.15, 2017	Sep.14, 2018
Active loop antenna (9K-30MHz)	A.H.	SAS-562B	N/A	Mar.01, 2016	Feb.28, 2018
Double-Ridged Waveguide Horn	ETS LINDGREN	3117	00034609	May.18, 2017	May.17, 2019
Broadband Preamplifier	SCHWARZBECK	BBV 9718	9718-205	Jun.20, 2017	Jun.19, 2018
ANTENNA	SCHWARZBECK	VULB9168	D69250	Sep.28, 2017	Sep.27, 2018

TEST EQUIPMENT OF CONDUCTED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESPI	101206	Jun.20, 2017	Jun.19, 2018
LISN	R&S	ESH2-Z5	100086	Aug.21, 2017	Aug.20, 2018

7. RADIATED EMISSION

7.1TEST LIMIT

Standard FCC15.225 for within the 13.110MHz-14.010MHz band

Frequencies (MHz)	Field Strength at 30m (micorvolts/meter)	Field Strength at 30m (dBuV/m)	Field Strength at 3m (dBuV/m)
13.553~13.567	15.848	84	124
13.410~13.553 13.567~13.710	334	50.5	90.5
13.110~13.410 13.710~14.010	106	40.5	80.5

According to 15.35, on any frequency or frequencies below or equal to 1000 MHz, the limits Shown are based on measuring equipment employing a CISPR quasi-peak detector function and related measurement bandwidths, 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.

Standard FCC 15.209 for outside of the 13.110MHz-14.010MHz band

Frequency (MHz)	Distance Meters	Field Strengths Limit	
		μV/m	dB(μV)/m
0.009 ~ 0.490	300	2400/F(kHz)	---
0.490 ~ 1.705	30	24000/F(kHz)	---
1.705 ~ 30	30	30	---
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Above 1000	3	Other:74.0 dB(μV)/m (Peak) 54.0 dB(μV)/m (Average)	

Remark: (1) Emission level dBμV = 20 log Emission level μV/m
(2) The smaller limit shall apply at the cross point between two frequency bands.
(3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

7.2. MEASUREMENT PROCEDURE

1. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz VBW and RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer.
7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum values.
8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High - Low scan is not required in this case.

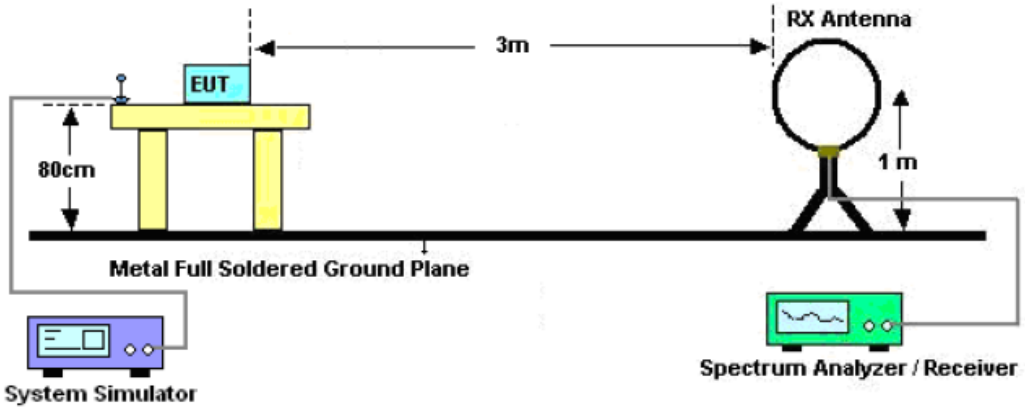
The following table is the setting of spectrum analyzer and receiver.

Spectrum Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RB 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RB 120KHz for QP

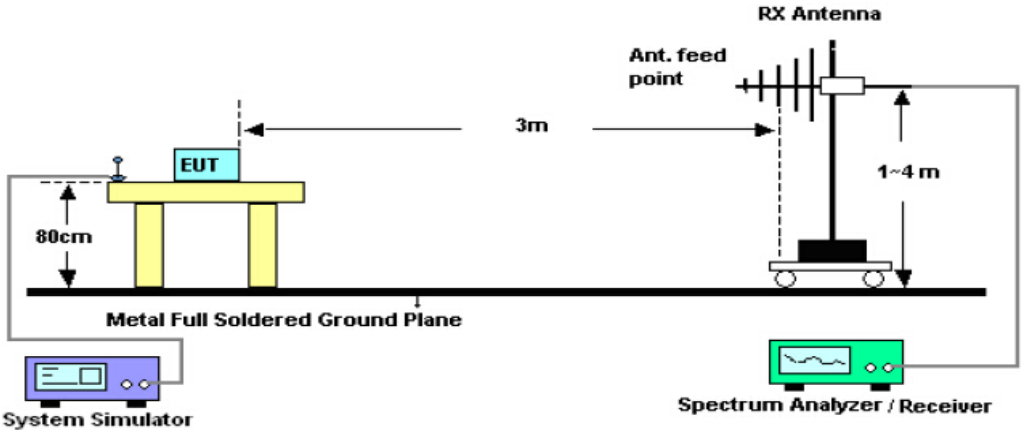
Receiver Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RB 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RB 120KHz for QP

7.3. TEST SETUP

Radiated Emission Test-Setup Frequency Below 30MHz



RADIATED EMISSION TEST SETUP 30MHz-1000MHz



7.4. TEST RESULT

DC 12V and DC 24V are both tested, but the worst case was recorded in this report only.

RADIATED EMISSION BELOW 30MHZ

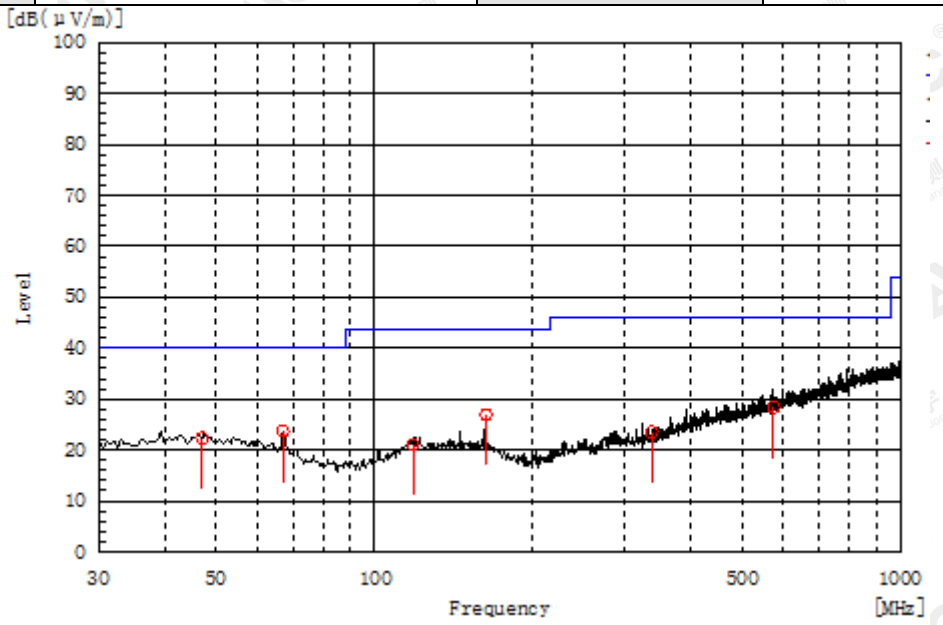
EUT：	Card Reader	Model Name	ITL-DT/DT0200-2C
Temperature：	20 ℃	Relative Humidtity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC12V
Test Mode ：	Mode 1	Polarization :	

Frequency	Reading	Correction Factor	Result	Limit	Margin	Polar	Detector
MHz	dBuV/m	dB/m	dBuV/m	dBuV/m	dB	Side/Face	
13.5600	58.31	-6.29	52.02	124	-71.98	Side	Peak
27.1200	37.05	-7.03	30.02	69.5	-39.48	Side	Peak
13.5600	58.42	-6.29	52.13	124	-71.87	Face	Peak
27.1200	35.81	-7.03	28.78	69.5	-40.72	Face	Peak

Note: Other emissions from 9 kHz to 30 MHz are considered as ambient noise. No recording in the test report.

RADIATED EMISSION 30MHz- 1GHZ

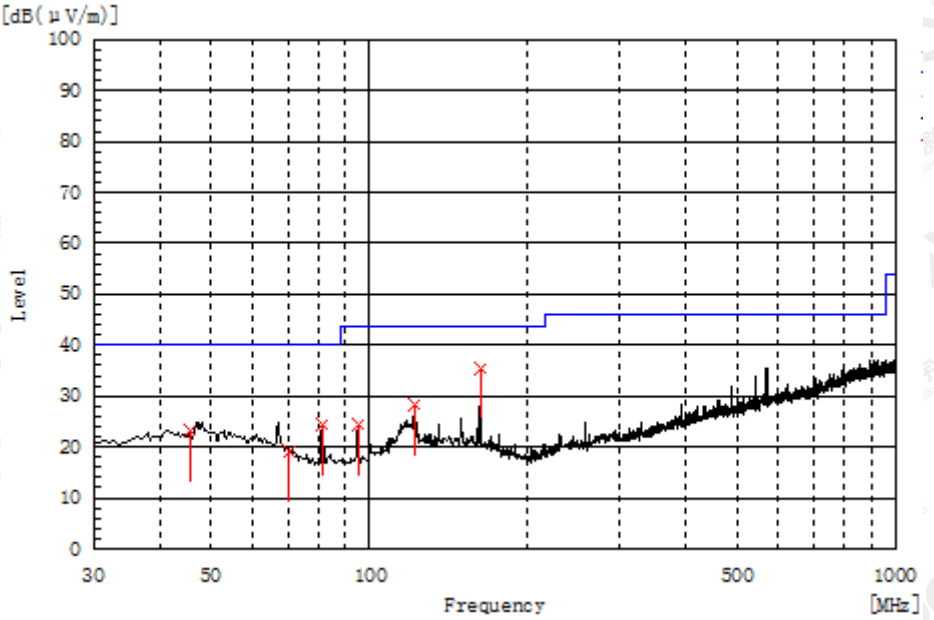
EUT：	Card Reader	Model Name	ITL-DT/DT0200-2C
Temperature：	20 ℃	Relative Humidtity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC12V
Test Mode ：	Mode 1	Polarization：	Horizontal



Frequency MHz	Polarization	Reading dB(uV)	Factor dB (1/m)	Level dB(uV/m) PK	Limit dB(uV/m) QP	Margin dB	Pass/Fail	Height cm	Angle deg
46.975	H	5.2	17.2	22.4	40.0	17.6	Pass	100.0	337.5
66.860	H	8.5	15.2	23.7	40.0	16.3	Pass	100.0	60.4
118.270	H	5.9	15.2	21.1	43.5	22.4	Pass	100.0	324.0
162.890	H	10.4	16.5	26.9	43.5	16.6	Pass	100.0	38.2
336.520	H	5.1	18.4	23.5	46.0	22.5	Pass	100.0	223.8
574.170	H	4.0	24.4	28.4	46.0	17.6	Pass	100.0	187.8

RESULT: PASS

EUT：	Card Reader	Model Name	ITL-DT/DT0200-2C
Temperature：	20 ℃	Relative Humidtity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC12V
Test Mode ：	Mode 1	Polarization：	Vertical



Frequency MHz	Polarization	Reading dB(uV)	Factor dB (1/m)	Level dB(uV/m) PK	Limit dB(uV/m) QP	Margin dB	Pass/Fail	Height cm	Angle Deg
45.520	V	5.9	17.3	23.2	40.0	16.8	Pass	100.0	171.2
70.255	V	4.8	14.4	19.2	40.0	20.8	Pass	100.0	64.2
81.410	V	12.1	12.3	24.4	40.0	15.6	Pass	150.0	299.5
94.990	V	11.7	12.7	24.4	43.5	19.1	Pass	150.0	314.2
121.665	V	12.7	15.5	28.2	43.5	15.3	Pass	100.0	163.0
162.890	V	19.0	16.5	35.5	43.5	8.0	Pass	100.0	339.6

RESULT: PASS

Note:

Factor=Antenna Factor + Cable loss, Margin=Result-Limit.

The “Factor” value can be calculated automatically by software of measurement system.

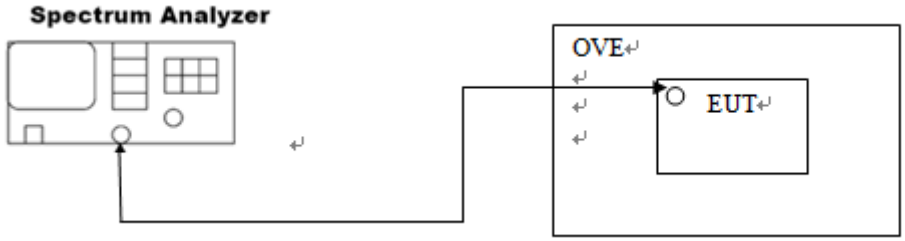
The mode 1 is the worst case, and only the data of the worst case recorded in this test report.

8. FREQUENCY STABILITY

8.1. MEASUREMENT PROCEDURE

1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
2. Set the EUT Work on the operation frequency.
3. Set SPA Centre Frequency = Operation Frequency, RBW= 1 KHz, VBW≥ 3×RBW.
4. Set SPA Trace 1 Max hold, then View.
5. The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value
6. Extreme temperature rule is -20°C~50°C.

8.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)



8.3. MEASUREMENT RESULTS

Operating frequency: 13.56MHz

DC 12V

Voltage vs. Frequency Stability (Test Temperature: 20℃)

Voltage(V)	Measurement Frequency (MHz)	Max. Deviation (MHz)	Limit(MHz)	Conclusion
12.0	13.56019	0.00023	0.001356	PASS
10.2	13.56024			
13.8	13.56015			

Temperature vs. Frequency Stability (Test Voltage: 12V)

Temperature	Measurement Frequency (MHz)	Max. Deviation (MHz)	Limit(MHz)	Conclusion
- 20℃	13.56021	0.00025	0.001356	PASS
-10℃	13.56017			
0℃	13.56015			
10℃	13.56021			
20℃	13.56019			
30℃	13.56023			
40℃	13.56025			
50℃	13.56024			

DC 24V

Voltage vs. Frequency Stability (Test Temperature: 20℃)

Voltage(V)	Measurement Frequency (MHz)	Max. Deviation (MHz)	Limit(MHz)	Conclusion
24.0	13.56015	0.00019	0.001356	PASS
20.4	13.56019			
27.6	13.56013			

Temperature vs. Frequency Stability (Test Voltage: DC 24V)

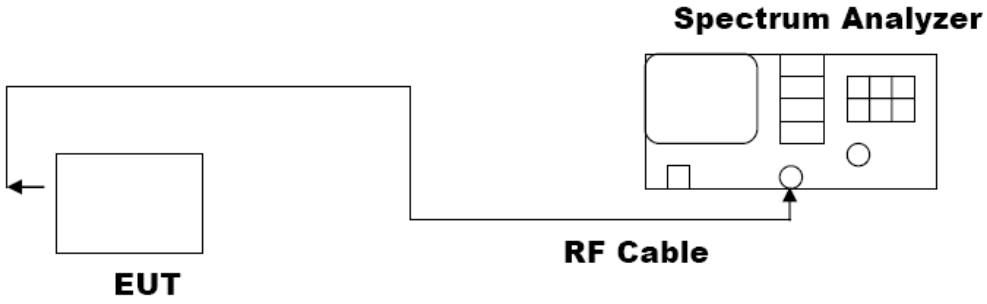
Temperature	Measurement Frequency (MHz)	Max. Deviation (MHz)	Limit(MHz)	Conclusion
- 20℃	13.56016	0.00022	0.001356	PASS
-10℃	13.56020			
0℃	13.56022			
10℃	13.56021			
20℃	13.56016			
30℃	13.56017			
40℃	13.56018			
50℃	13.56020			

9. 20DB BANDWIDTH

9.1. MEASUREMENT PROCEDURE

1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
2. Set the EUT Work on the operation frequency.
3. Set SPA Centre Frequency = Operation Frequency, RBW= 1 KHz, VBW≥ 3×RBW.
4. Set SPA Trace 1 Max hold, then View.

9.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

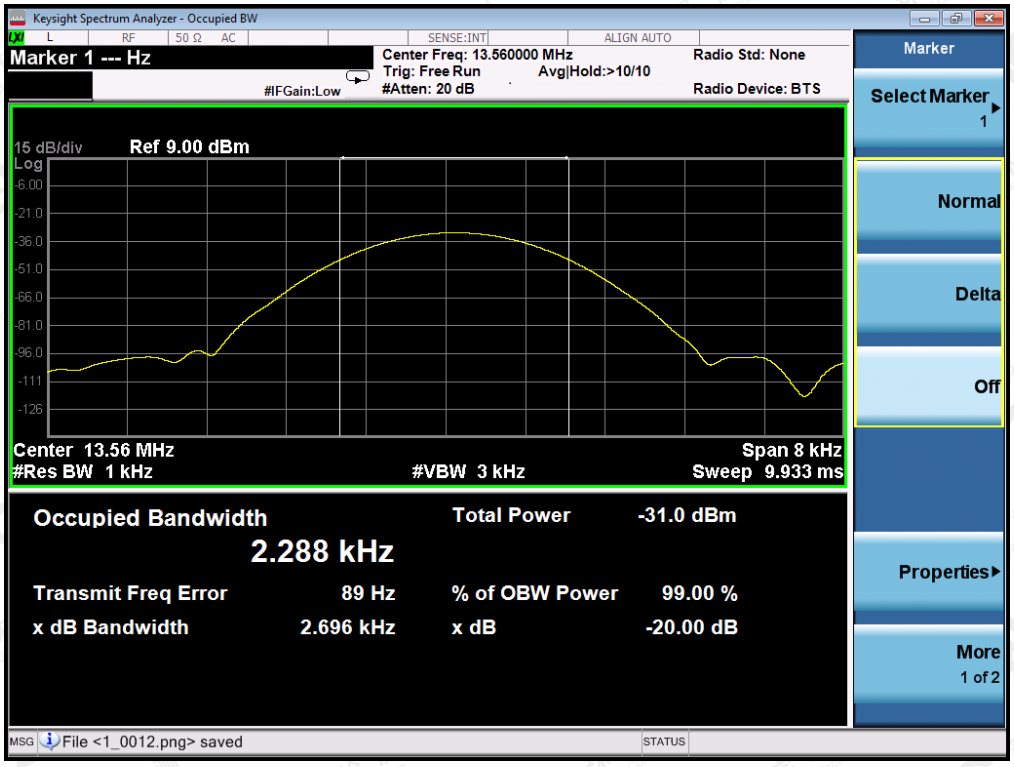


9.3. MEASUREMENT RESULTS

TEST ITEM	20DB BANDWIDTH
TEST MODE	Mode1

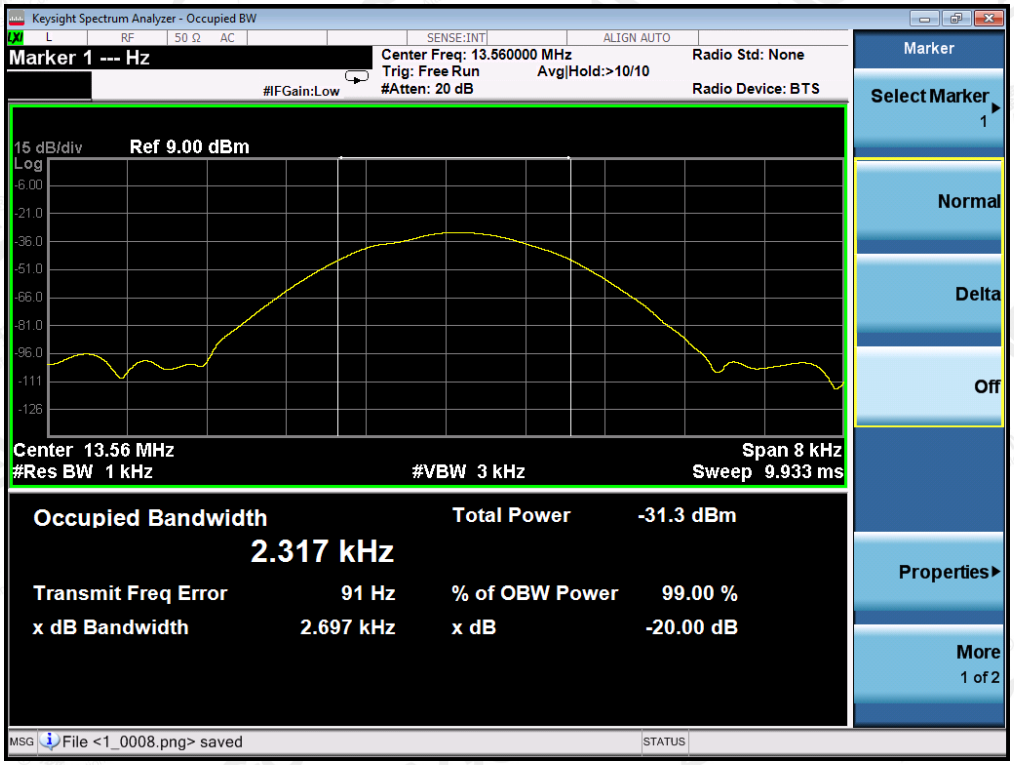
DC 12V

Operate channel	Test Data (kHz)	Criteria
	2.696	PASS



DC 24V

Operate channel	Test Data (kHz)	Criteria
	2.697	PASS



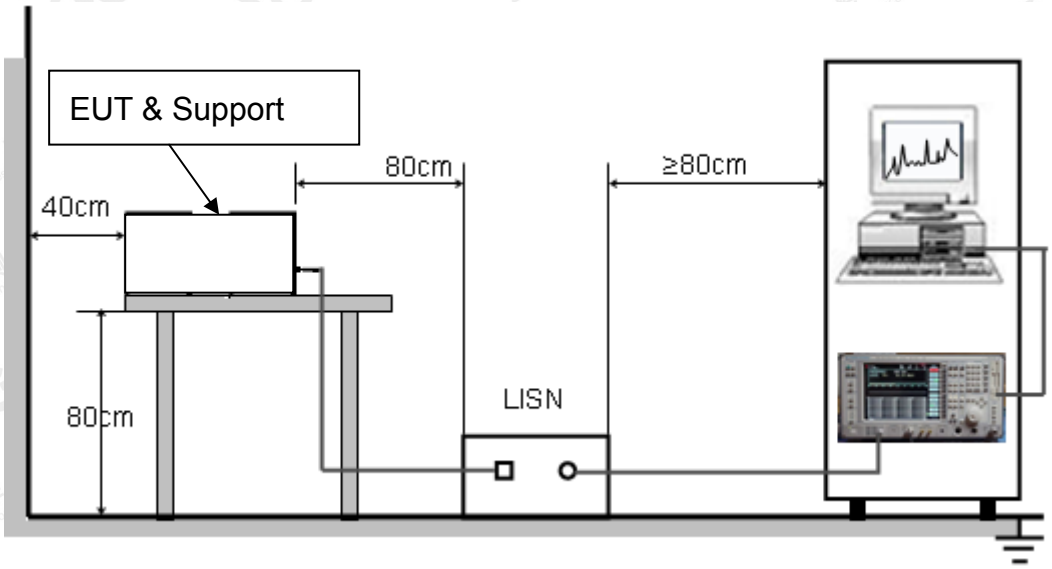
10. FCC LINE CONDUCTED EMISSION TEST

10.1. LIMITS OF LINE CONDUCTED EMISSION TEST

Frequency	Maximum RF Line Voltage	
	Q.P.(dBuV)	Average(dBuV)
150kHz~500kHz	66-56	56-46
500kHz~5MHz	56	46
5MHz~30MHz	60	50

Note:
1. The lower limit shall apply at the transition frequency.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

10.2. BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST



10.3. PRELIMINARY PROCEDURE OF LINE CONDUCTED EMISSION TEST

1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
2. Support equipment, if needed, was placed as per ANSI C63.10.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
4. All support equipments received AC120V/60Hz power from a LISN, if any.
5. The EUT received charging voltage by adapter which received 120V/60Hzpower by a LISN..
6. The test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7. Analyzer / Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.
8. During the above scans, the emissions were maximized by cable manipulation.
9. The test mode(s) were scanned during the preliminary test.

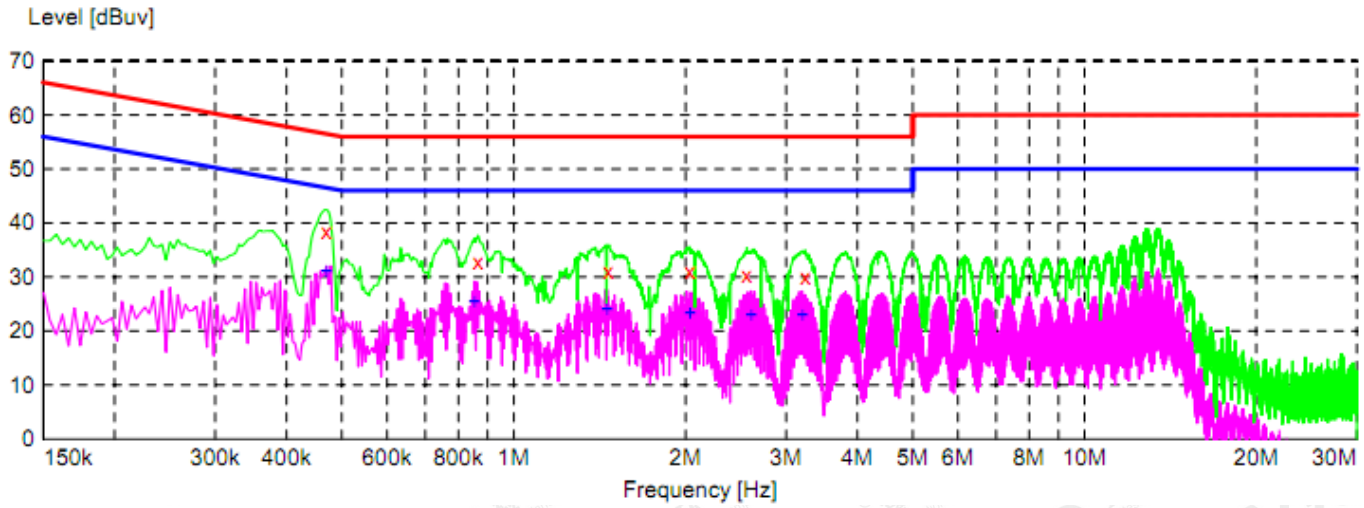
Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

10.4. FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST

1. EUT and support equipment was set up on the test bench as per step 2 of the preliminary test.
2. A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less –2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.
3. The test data of the worst case condition(s) was reported on the Summary Data page.

10.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST

LINE CONDUCTED EMISSION TEST-L1

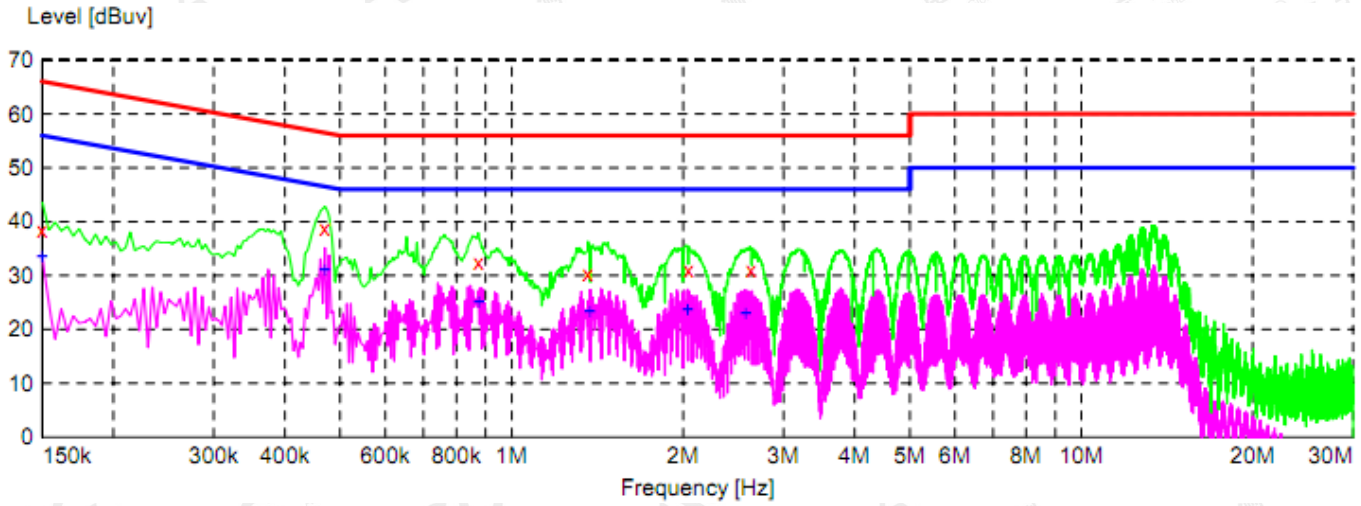


Frequency MHz	Level dBuv	Transd dB	Limit dBuv	Margin dB	Detector	Line	PE
0.470000	38.50	11.4	57	18.0	QP	L1	FLO
0.866000	32.70	11.3	56	23.3	QP	L1	FLO
1.466000	31.10	11.3	56	24.9	QP	L1	FLO
2.034000	31.00	11.3	56	25.0	QP	L1	FLO
2.562000	30.30	11.4	56	25.7	QP	L1	FLO
3.242000	30.00	11.4	56	26.0	QP	L1	FLO

Frequency MHz	Level dBuv	Transd dB	Limit dBuv	Margin dB	Detector	Line	PE
0.470000	31.10	11.4	47	15.4	AV	L1	FLO
0.854000	25.30	11.3	46	20.7	AV	L1	FLO
1.458000	23.90	11.3	46	22.1	AV	L1	FLO
2.038000	23.40	11.3	46	22.6	AV	L1	FLO
2.606000	22.90	11.4	46	23.1	AV	L1	FLO
3.202000	22.90	11.4	46	23.1	AV	L1	FLO

RESULT: PASS

LINE CONDUCTED EMISSION TEST-N



Frequency MHz	Level dBuv	Transd dB	Limit dBuv	Margin dB	Detector	Line	PE
0.150000	38.50	11.4	66	27.5	QP	N	FLO
0.470000	38.60	11.4	57	17.9	QP	N	FLO
0.874000	32.40	11.3	56	23.6	QP	N	FLO
1.362000	30.40	11.3	56	25.6	QP	N	FLO
2.046000	30.90	11.3	56	25.1	QP	N	FLO
2.630000	30.90	11.4	56	25.1	QP	N	FLO

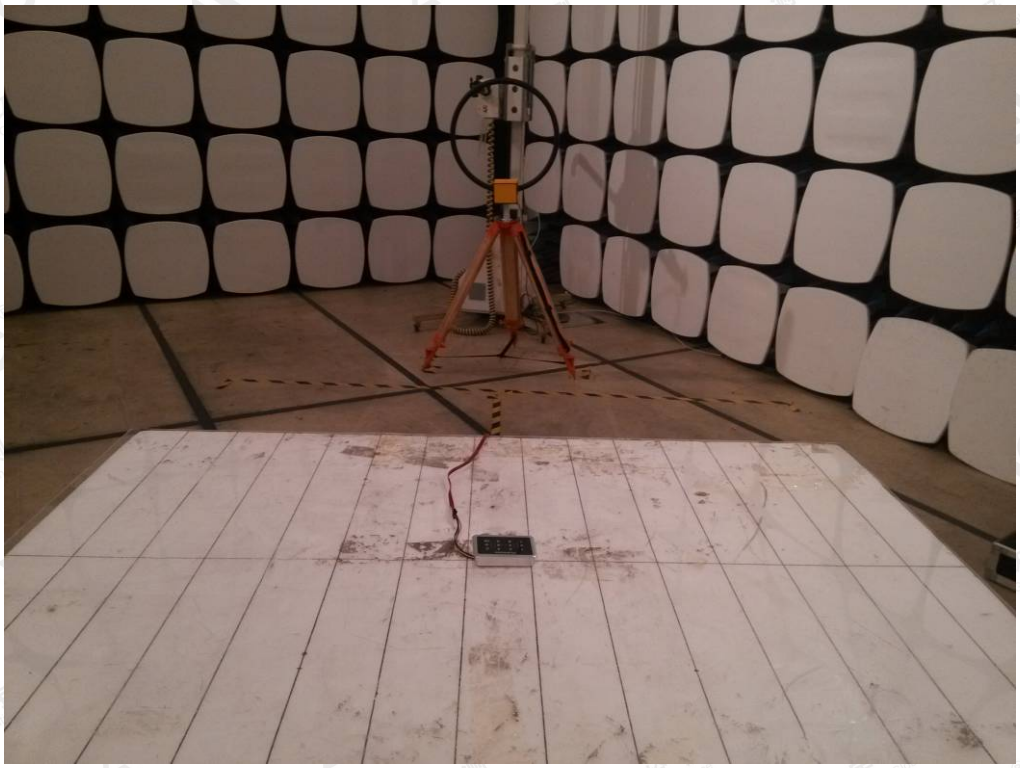
Frequency MHz	Level dBuv	Transd dB	Limit dBuv	Margin dB	Detector	Line	PE
0.150000	33.60	11.4	56	22.4	AV	N	FLO
0.470000	31.10	11.4	47	15.4	AV	N	FLO
0.874000	24.90	11.3	46	21.1	AV	N	FLO
1.370000	23.30	11.3	46	22.7	AV	N	FLO
2.038000	23.50	11.3	46	22.5	AV	N	FLO
2.570000	22.90	11.4	46	23.1	AV	N	FLO

RESULT: PASS

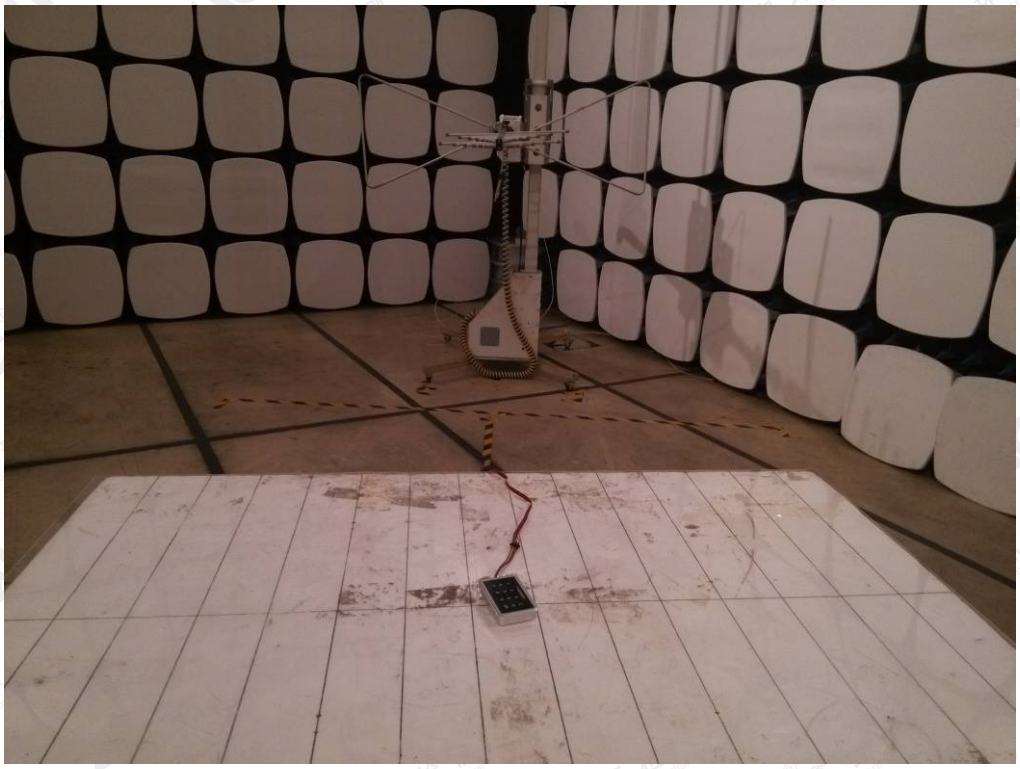
APPENDIX A: PHOTOGRAPHS OF TEST SETUP

FCC LINE CONDUCTED EMISSION TEST SETUP

RADIATED EMISSION TEST SETUP BELOW 30MHz

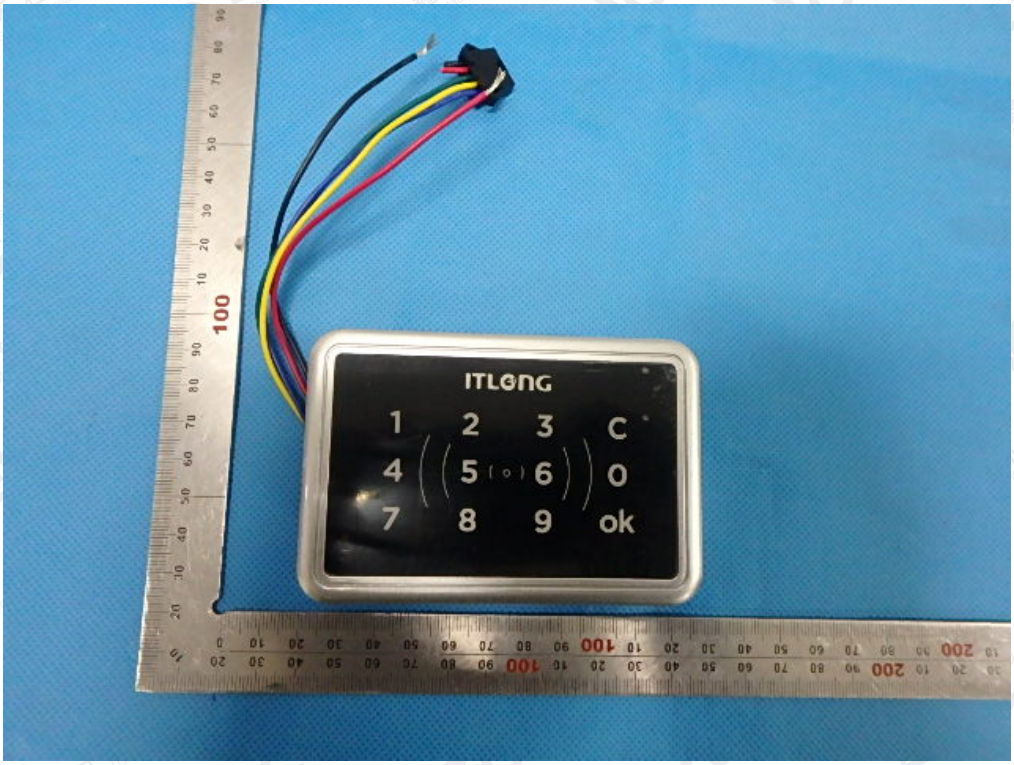


RADIATED EMISSION TEST SETUP BELOW 1GHz

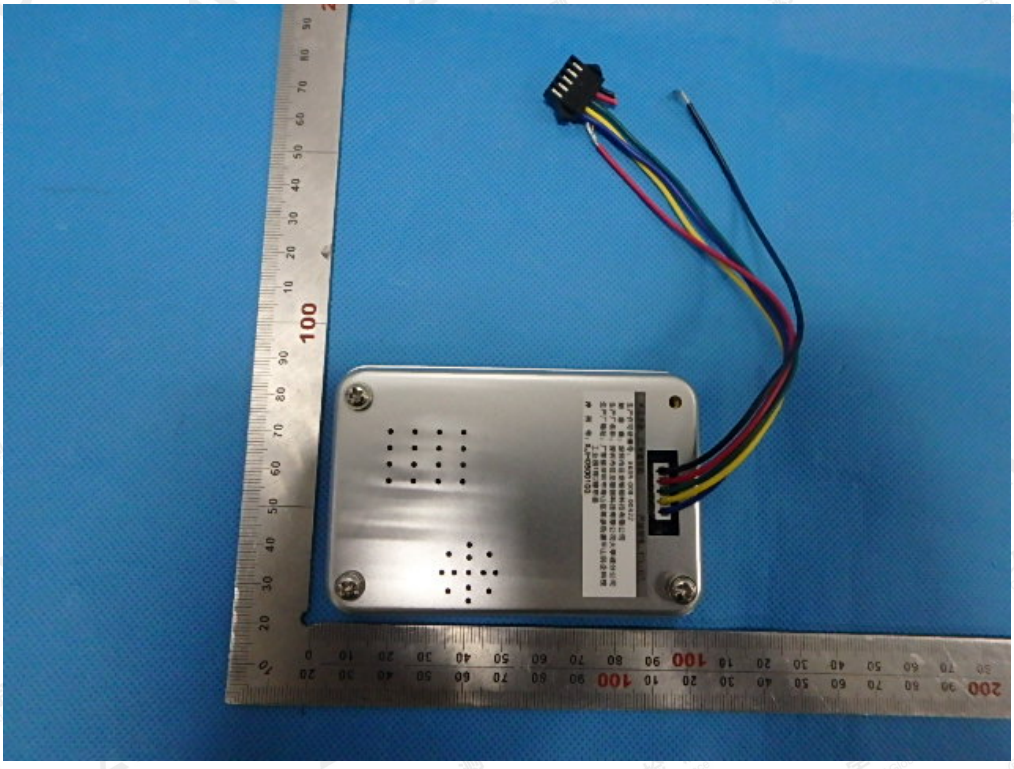


APPENDIX B: PHOTOGRAPHS OF EUT

ITL-DT/DT0200-2C TOP VIEW OF EUT

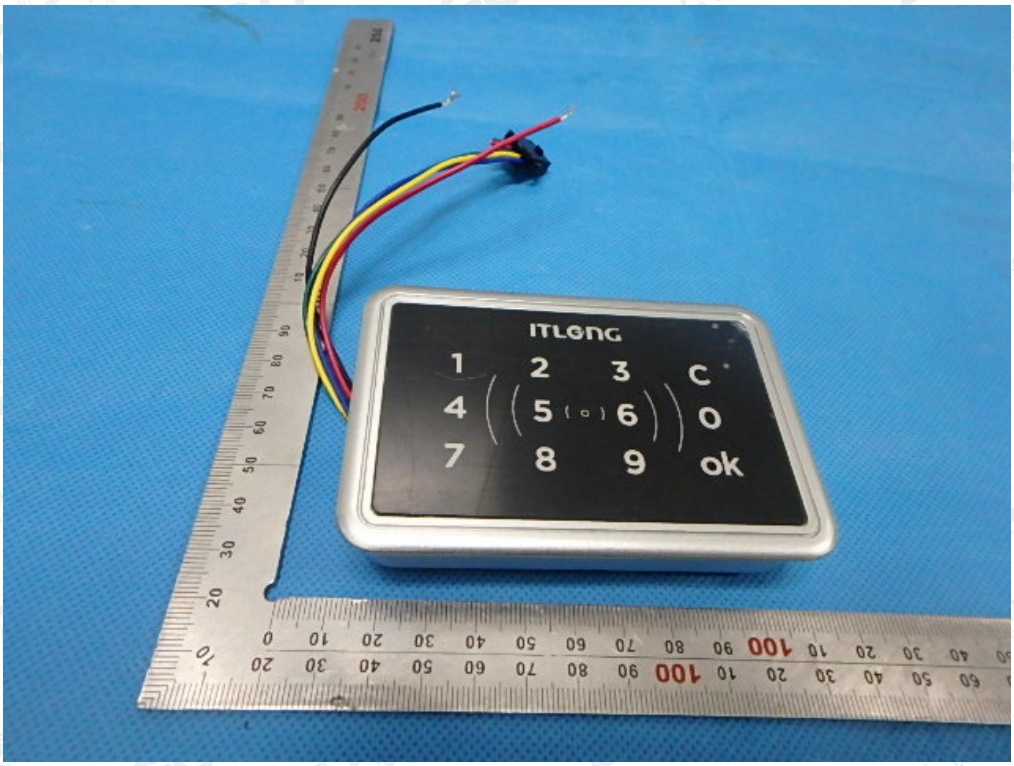


BOTTOM VIEW OF EUT

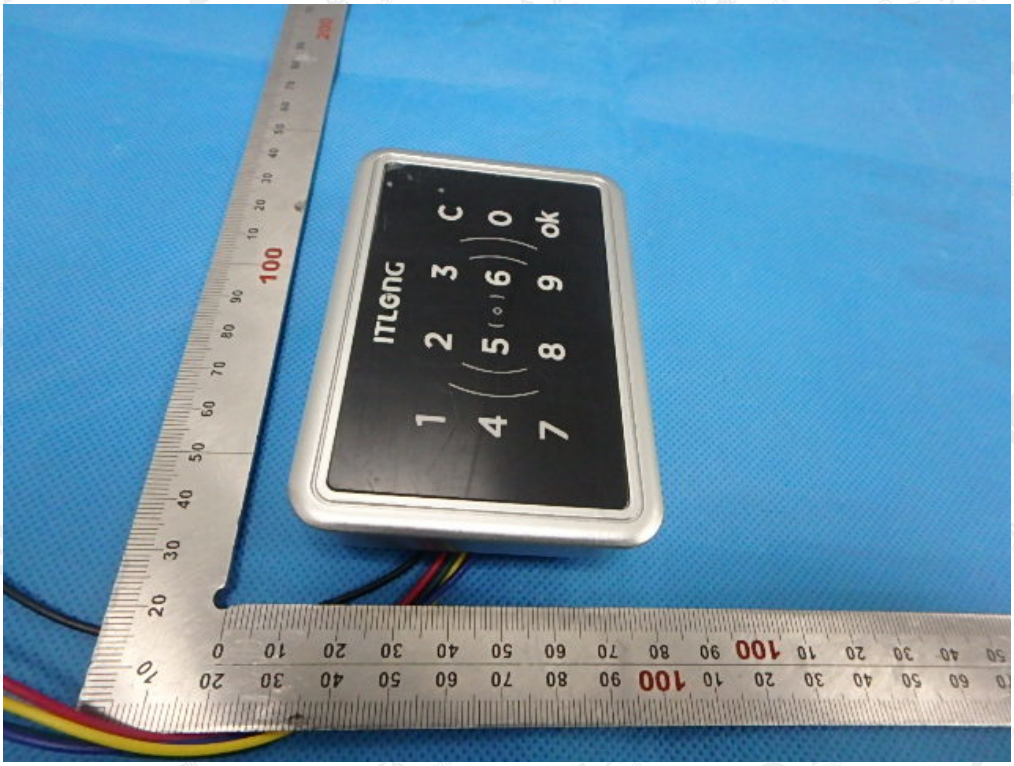


FRONT VIEW OF EUT

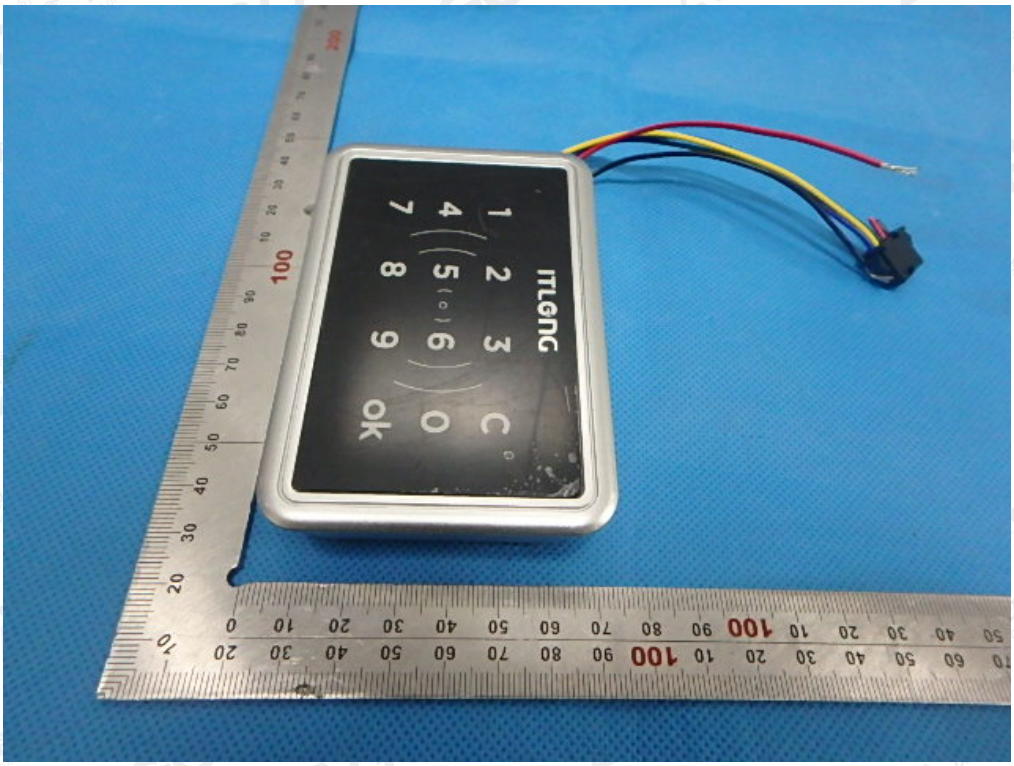
BACK VIEW OF EUT



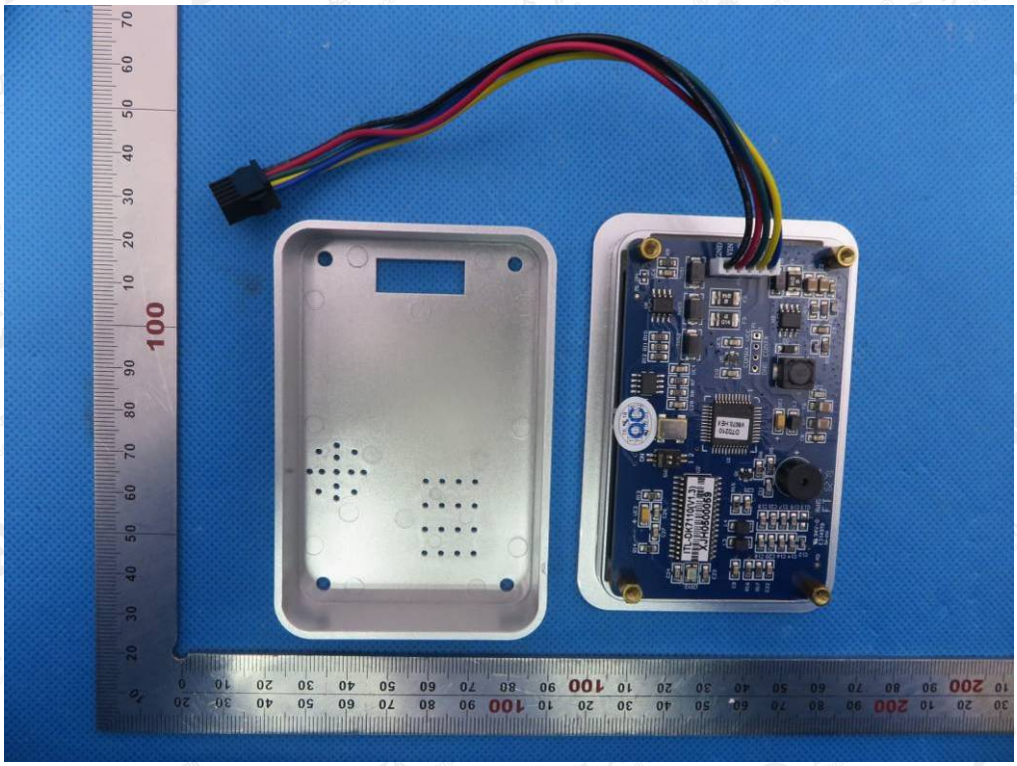
LEFT VIEW OF EUT



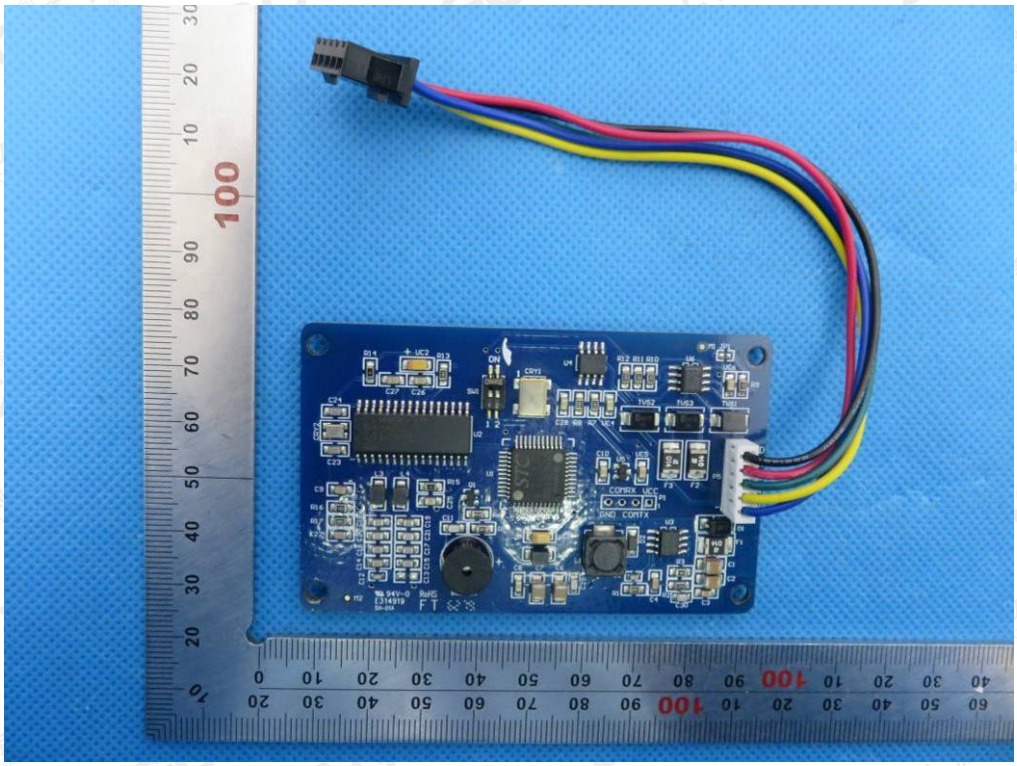
RIGHT VIEW OF EUT



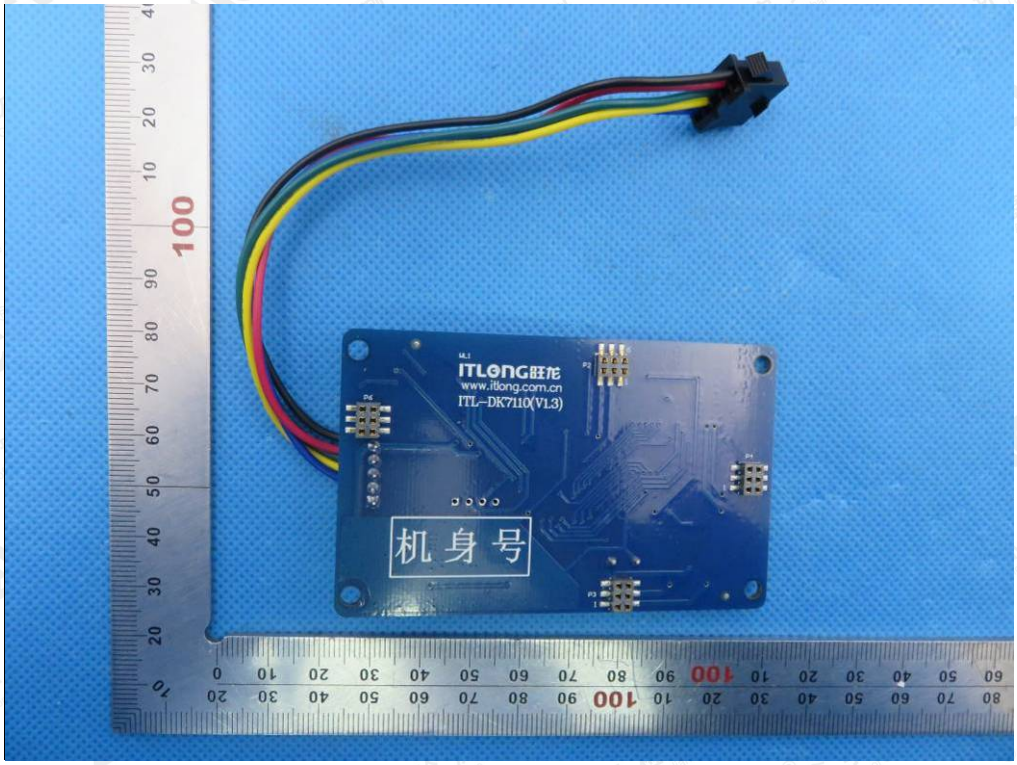
OPEN VIEW OF EUT



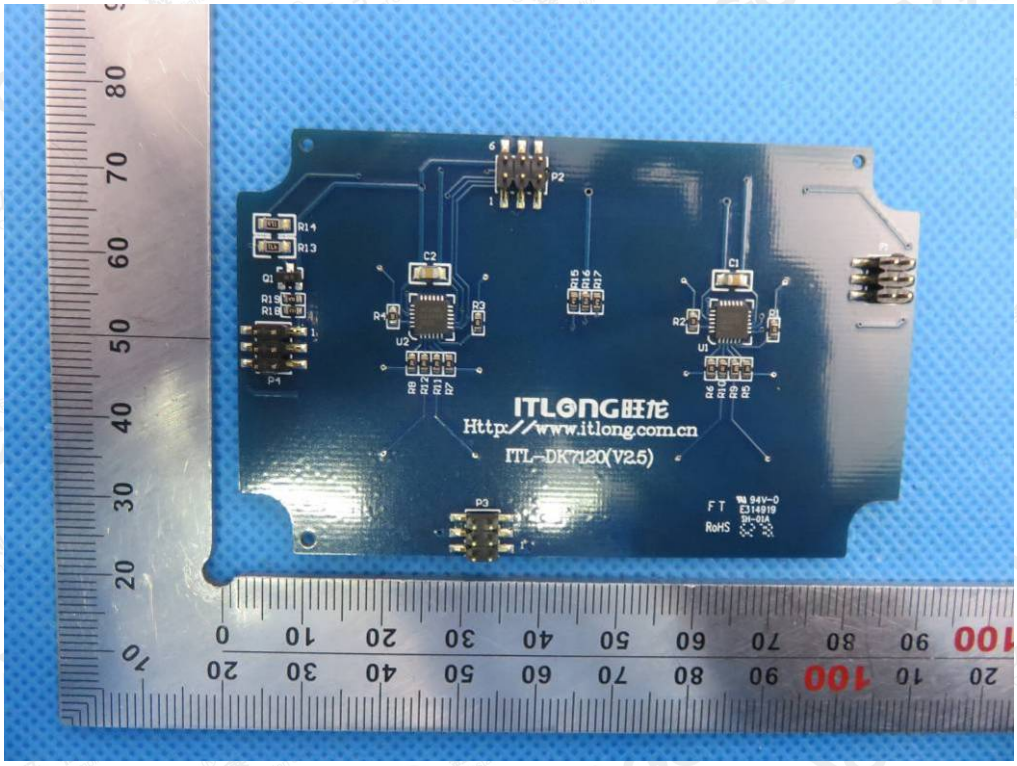
INTERNAL VIEW OF EUT-1



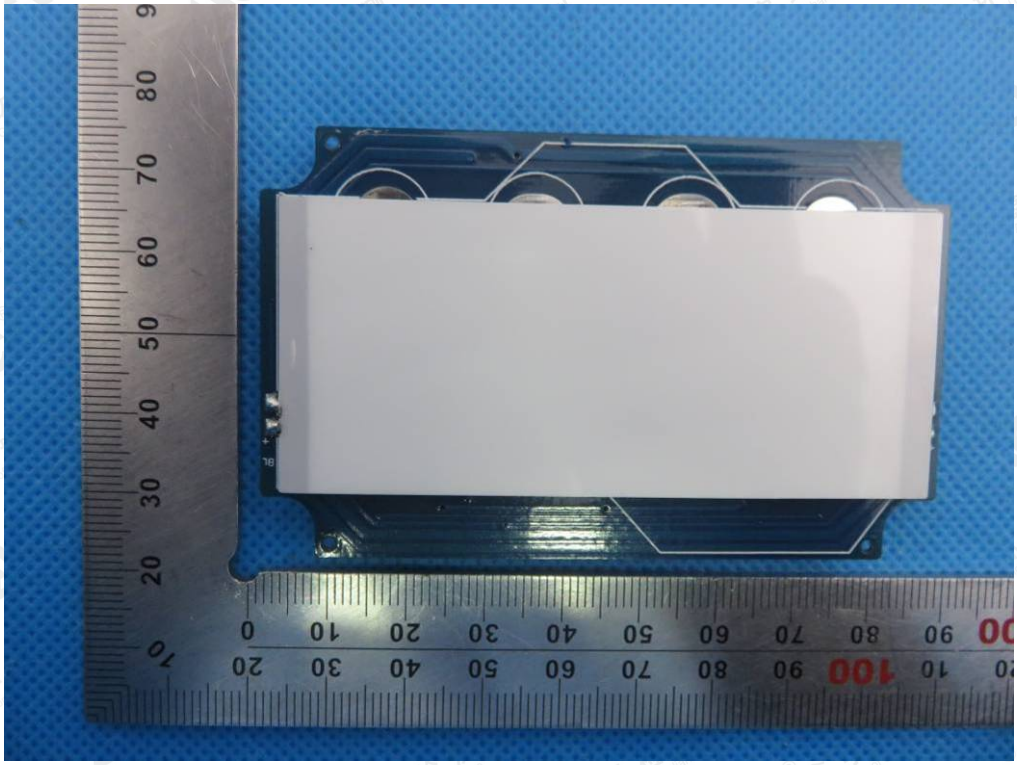
INTERNAL VIEW OF EUT-2



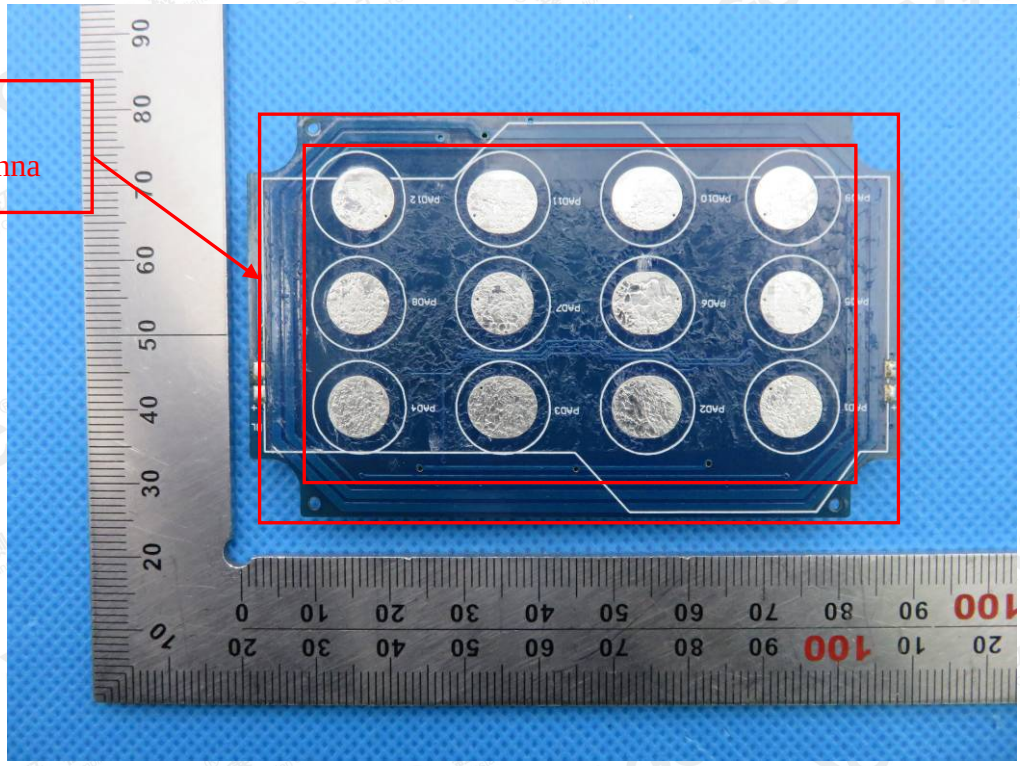
INTERNAL VIEW OF EUT-3



INTERNAL VIEW OF EUT-4

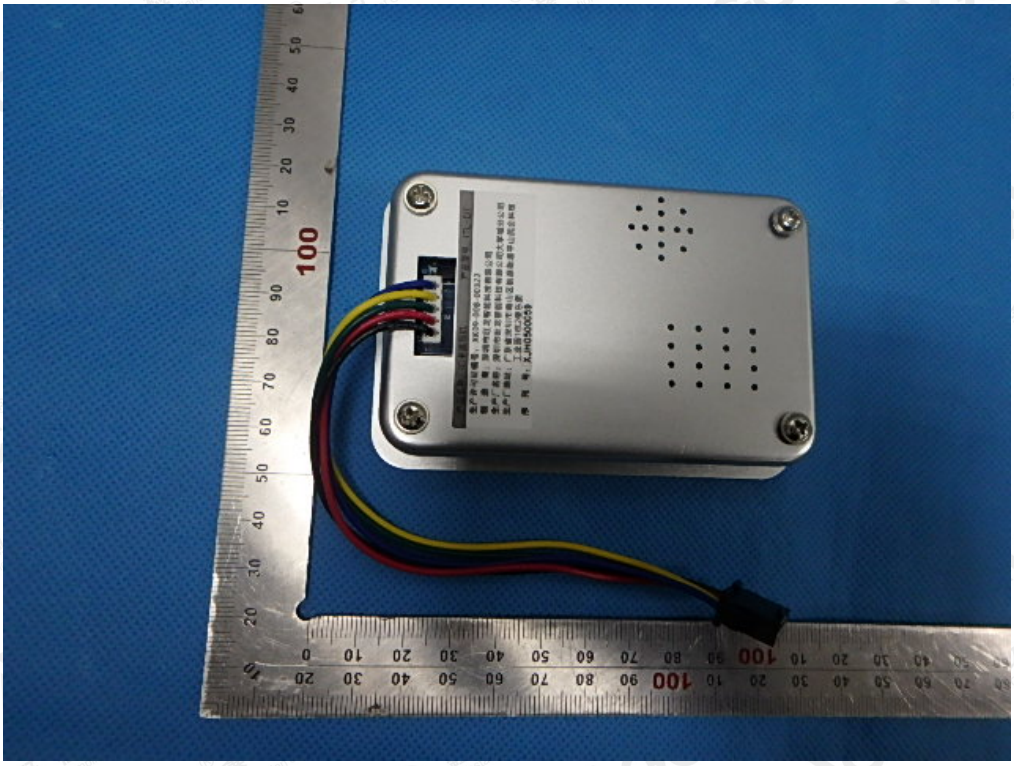


INTERNAL VIEW OF EUT-5

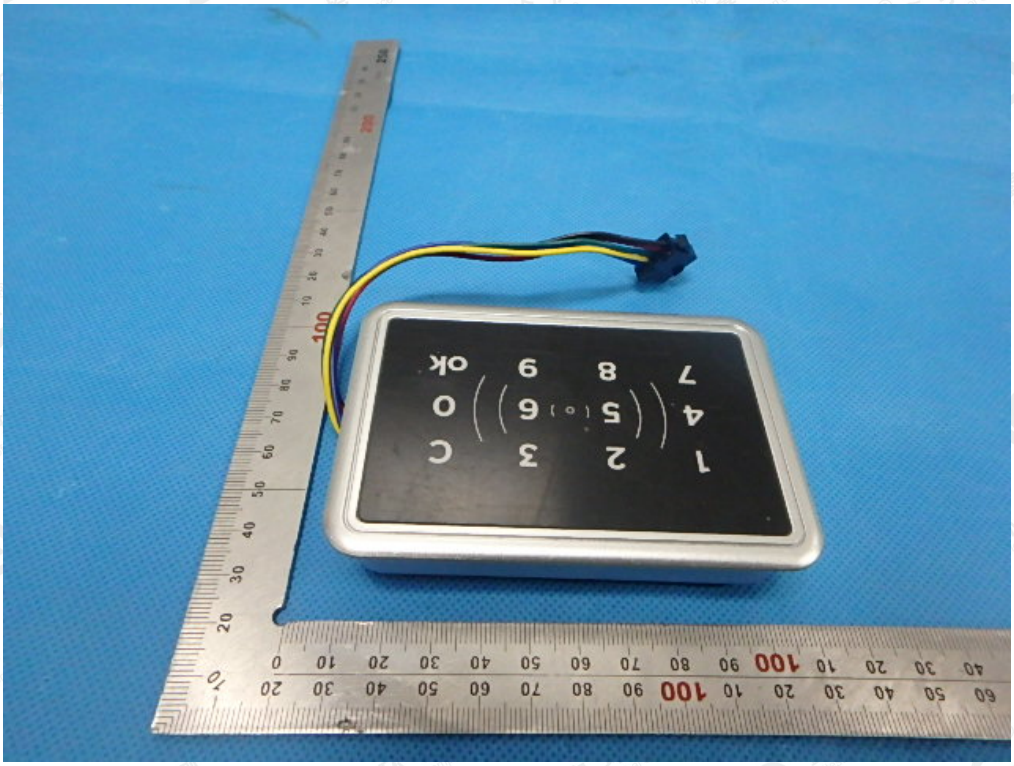


ITL-DT/DT0200-2C TOP VIEW OF EUT

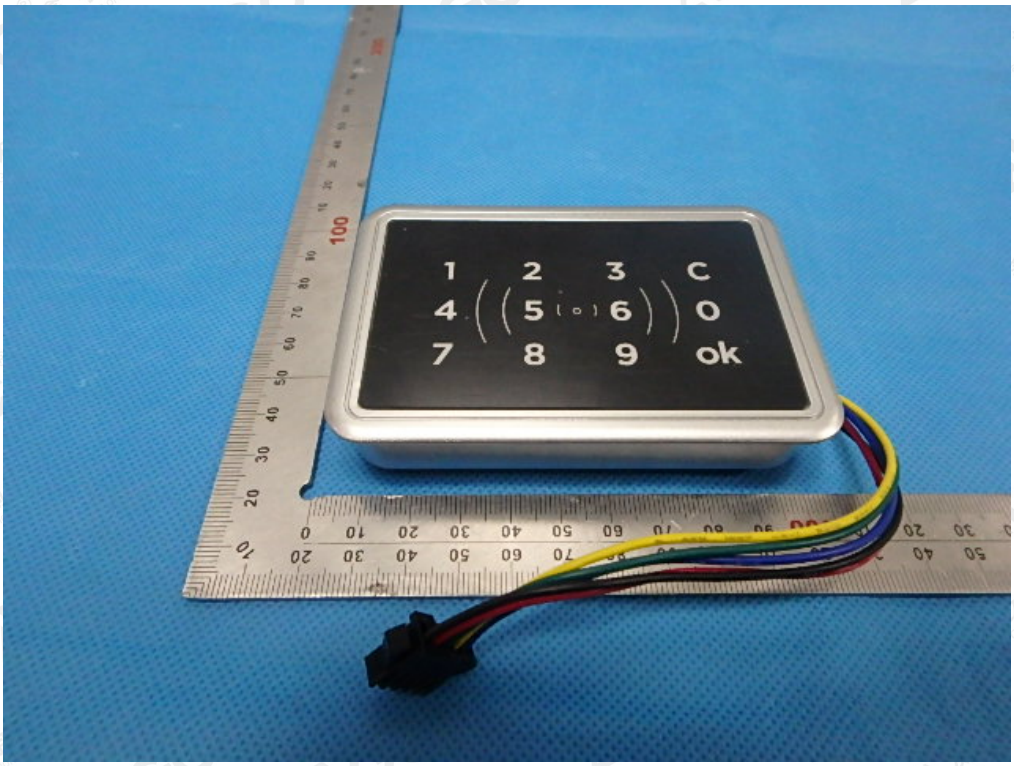
BOTTOM VIEW OF EUT



FRONT VIEW OF EUT



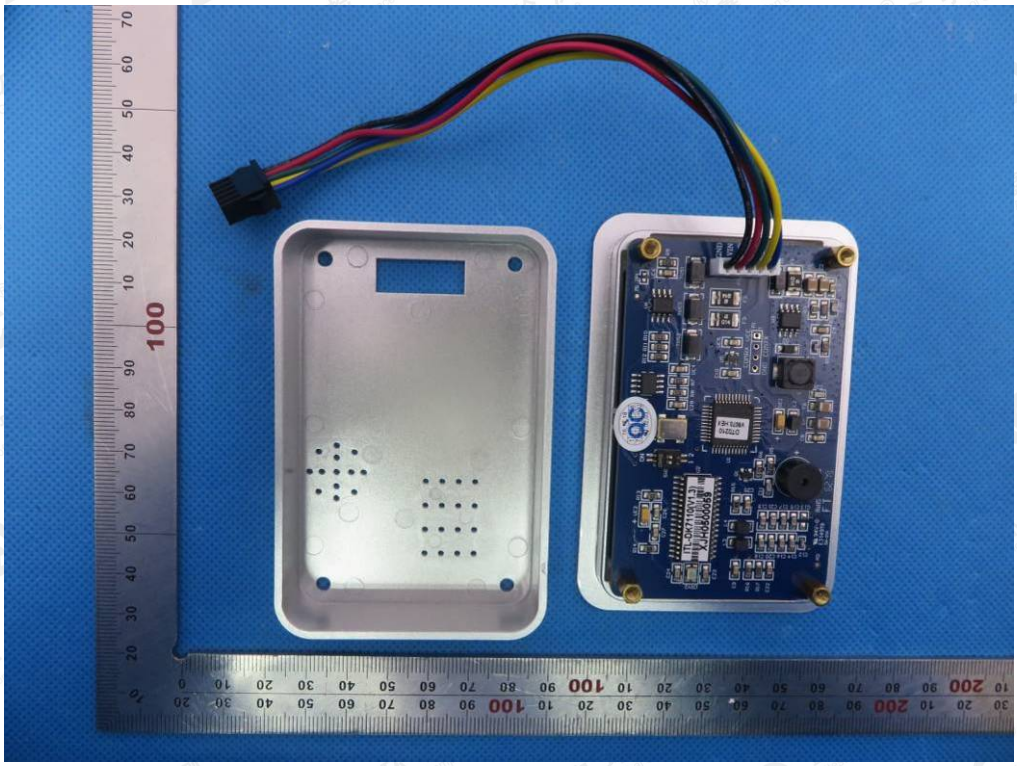
BACK VIEW OF EUT



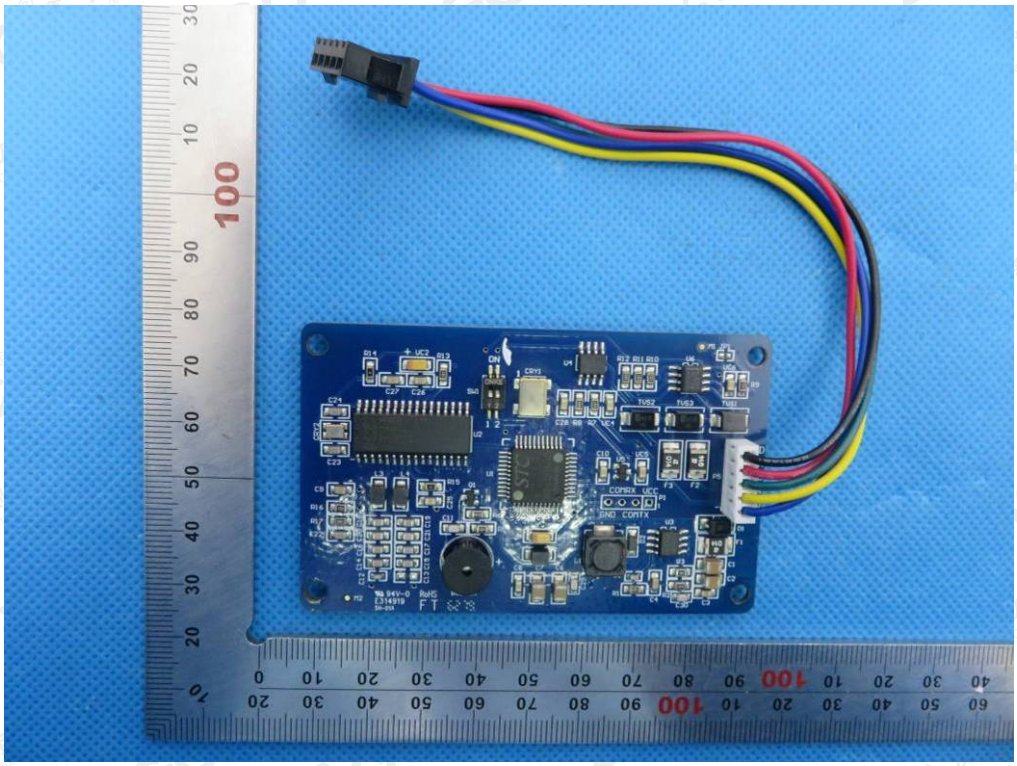
LEFT VIEW OF EUT

RIGHT VIEW OF EUT

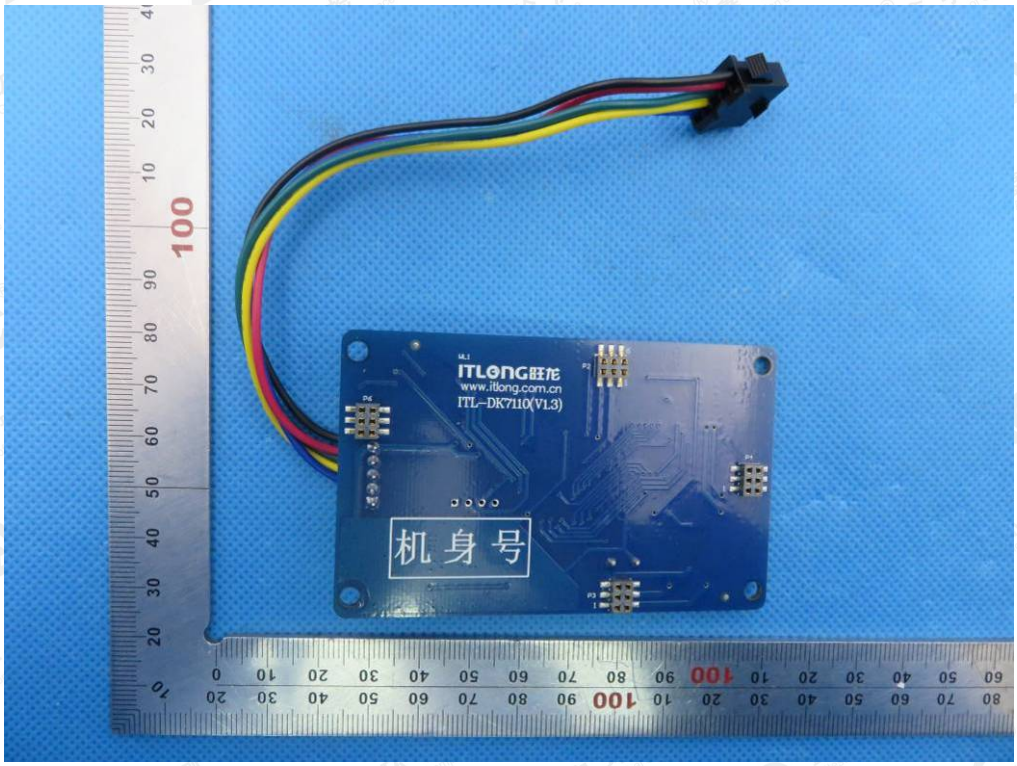
OPEN VIEW OF EUT



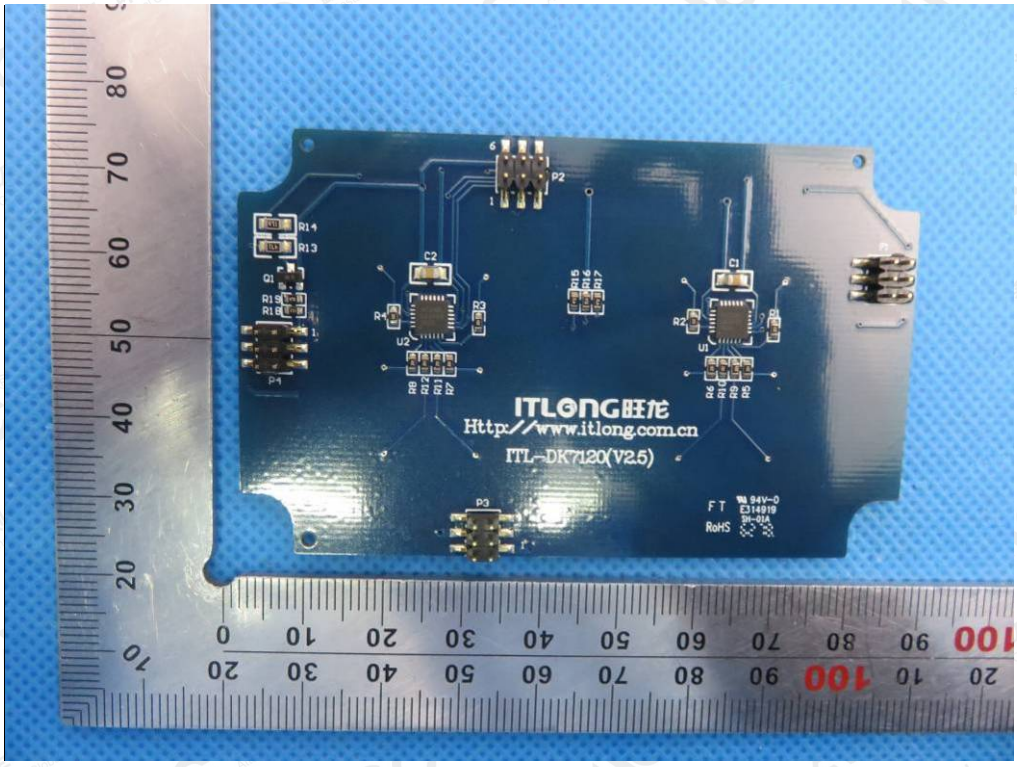
INTERNAL VIEW OF EUT-1



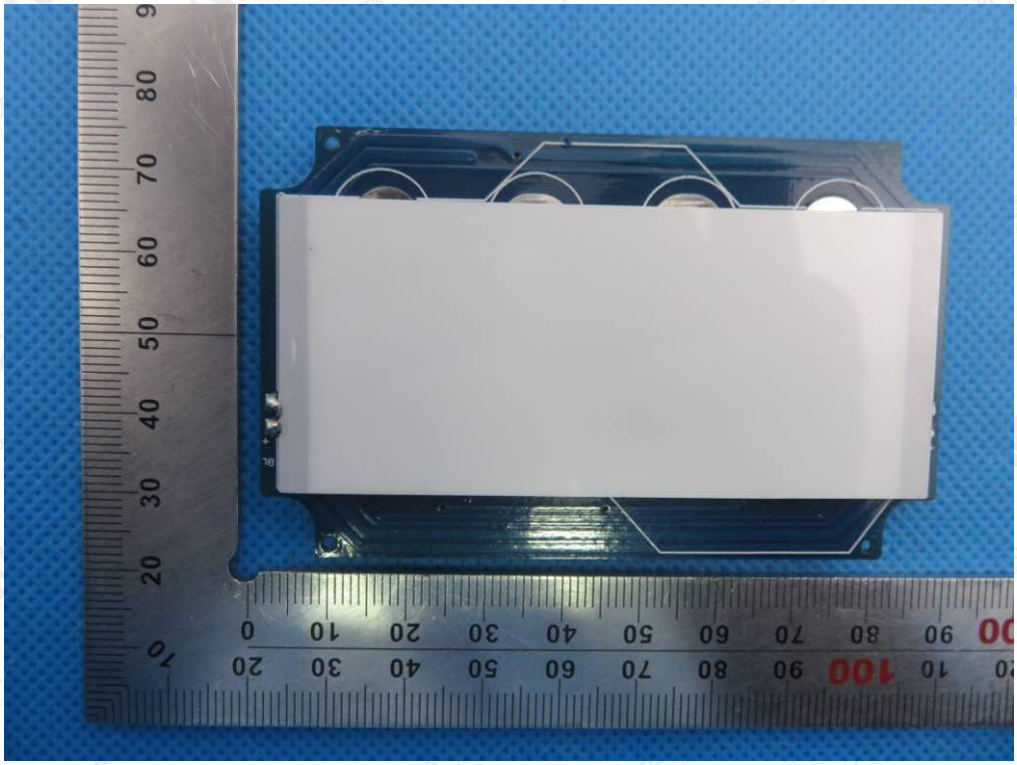
INTERNAL VIEW OF EUT-2



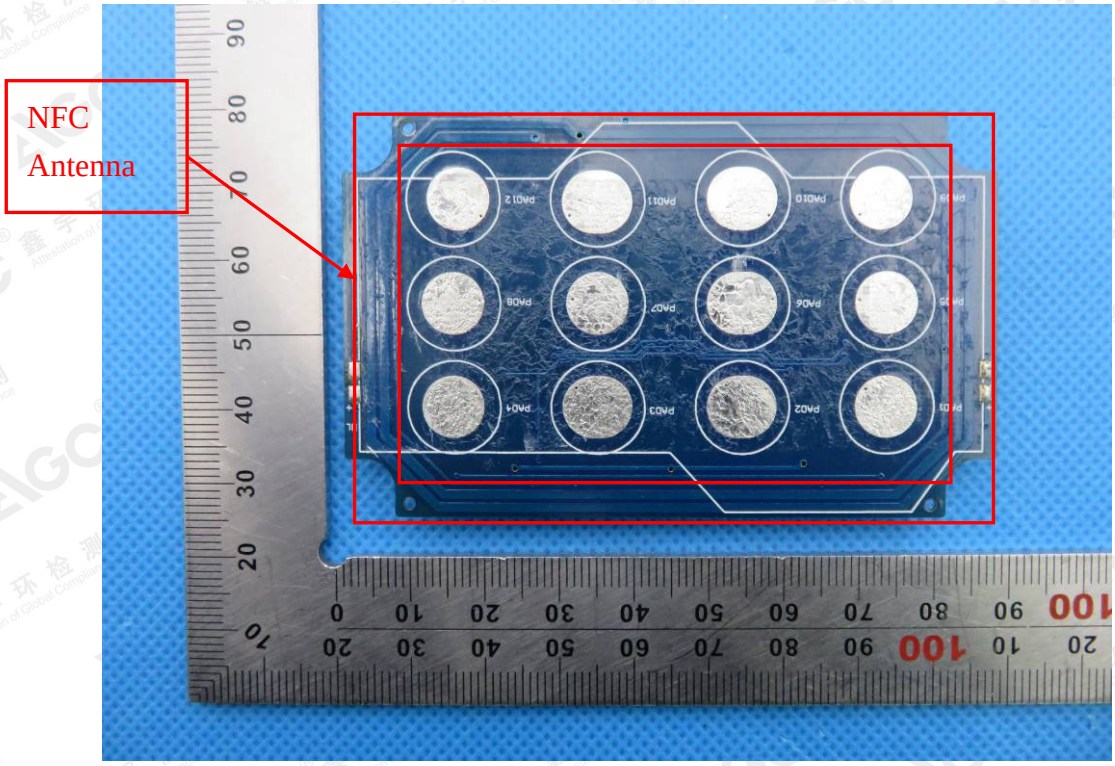
INTERNAL VIEW OF EUT-3



INTERNAL VIEW OF EUT-4



INTERNAL VIEW OF EUT-5



----END OF REPORT----