FCC Test Report

Report No.: AGC00703190601FE01

PRODUCT DESIGNATION	:	2.4G Camera
BRAND NAME	:	Howell
MODEL NAME	:	WJ11, WJ12, WJ13, WJ14, WJ15
APPLICANT	:	Shenzhen Howell Intelligent Technology Co.,Ltd.
DATE OF ISSUE	:	Jul. 12, 2019
STANDARD(S)	:	FCC Part 15 Subpart B
REPORT VERSION	:	V1.0

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

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REPORT REVISE RECORD

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Jul. 12, 2019	Valid	Initial release

TABLE OF CONTENTS

1. VERIFICATION OF CONFORMITY 4
2. SYSTEM DESCRIPTION 5
3. MEASUREMENT UNCERTAINTY 5
4. PRODUCT INFORMATION 6
5. SUPPORT EQUIPMENT 7
6. TEST FACILITY 8
7. TEST ITEMS AND THE RESULTS 9
8. FCC LINE CONDUCTED EMISSION TEST 10
8.1. LIMITS OF LINE CONDUCTED EMISSION TEST 10
8.2. BLOCK DIAGRAM OF TEST SETUP 10
8.3. PROCEDURE OF LINE CONDUCTED EMISSION TEST 11
8.4. TEST RESULT OF LINE CONDUCTED EMISSION TEST 12
9. RADIATED EMISSION TEST 14
9.1. LIMITS OF RADIATED EMISSION TEST 14
9.2. BLOCK DIAGRAM OF TEST SETUP 14
9.3. PROCEDURE OF RADIATED EMISSION TEST 15
9.4. TEST RESULT OF RADIATED EMISSION TEST 16
APPENDIX A: PHOTOGRAPHS OF TEST SETUP 18
APPENDIX B: PHOTOGRAPHS OF EUT 20

1. VERIFICATION OF CONFORMITY

Applicant	Shenzhen Howell Intelligent Technology Co.,Ltd.
Address	5/F, No.13 Building, Nangang 2ndIndustrial Park, Songbai Road, Xili Town, NanShan District, Shenzhen, China 518055
Manufacturer	Shenzhen Howell Intelligent Technology Co.,Ltd.
Address	5/F, No.13 Building, Nangang 2ndIndustrial Park, Songbai Road, Xili Town, NanShan District, Shenzhen, China 518055
Factory	Shenzhen Howell Intelligent Technology Co.,Ltd.
Address	5/F, No.13 Building, Nangang 2ndIndustrial Park, Songbai Road, Xili Town, NanShan District, Shenzhen, China 518055
Product Designation	2.4G Camera
Brand Name	Howell
Test Model	WJ11
Measurement Procedure	ANSI C63.4: 2014
Date of test	Jun. 20, 2019 to Jul. 12, 2019
Deviation	None
Condition of Test Sample	Normal
Test Result	Pass
Report Template	AGCRT-US-IT/AC

The above equipment was tested by Attestation of Global Compliance (Shenzhen) Co., Ltd. for compliance with the requirements set forth in the FCC Rules and Regulations Part 15, the measurement procedure according to ANSI C63.4:2014. This said equipment in the configuration described in this report shows the maximum emission levels emanating from equipment are within the compliance requirements.

The test results of this report relate only to the tested sample identified in this report.

Tested By	Calvin Liu	
	Calvin Liu(Liu Junchen)	Jul. 12, 2019
Reviewed By	Max Zhang	
	Max Zhang(Zhang Yi)	Jul. 12, 2019
Approved By	Forrest Lei	
	Forrest Lei(Lei Yonggang) Authorized Officer	Jul. 12, 2019

2. SYSTEM DESCRIPTION

TEST MODE DESCRIPTION		
NO.	**TEST MODE DESCRIPTION**	**WORST**
1	Video with Charging mode	V
2	Camera with Charging mode	--
3	TF Card with Charging mode	--

Note:
1. V means EMI worst mode.
2. Only the data of the worst mode would be recorded in this report.

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. GENERAL DESCRIPTION

Highest Operating Frequency	2.462GHz
Hardware Version	XWL_WJ11_MainBoard_Rev1.5 2019.04.17
Software Version	21.117.0.7.50
Antenna Designation	Integrated antenna
Antenna Gain	2dBi
Power Supply	DC 5V by adapter or DC 3.7V by Battery

I/O Port Information (☒Applicable ☐Not Applicable)

I/O Port of EUT			
I/O Port Type	**Number**	**Specific**	**Tested With**
USB Port	1	1.00m Unshielded	1
TF port	1	--	1

5. SUPPORT EQUIPMENT

Device Type	Manufacturer	Model Name	Serial No.	Data Cable	Power Cable
Adapter	Jihongda	JHD-AP006U-050100BB-2	--	--	--

Note:
1 "-- "means no any support device during testing.

6. TEST FACILITY

Test Site	Attestation of Global Compliance (Shenzhen) Co., Ltd
Location	1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

TEST EQUIPMENT OF CONDUCTED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESPI	101206	Jun.12, 2019	Jun.11, 2020
LISN	R&S	ESH2-Z5	100086	Aug. 28, 2018	Aug. 27, 2019

TEST EQUIPMENT OF RADIATED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESCI	10096	Jun.12, 2019	Jun.11, 2020
EXA Signal Analyzer	Aglient	N9010A	MY53470504	Dec.07, 2018	Dec.08, 2019
Horn antenna	SCHWARZBECK	BBHA 9170	#768	Sep. 21,2017	Sep. 20,2020
Double-Ridged Waveguide Horn	ETS LINDGREN	3117	00034609	May. 26,2018	May. 25,2020
Broadband Preamplifier	SCHWARZBECK	BBV 9718	9718-205	Jun.12, 2019	Jun.11, 2020
ANTENNA	SCHWARZBECK	VULB9168	D69250	Sep.28, 2018	Sep.27,2019

7. TEST ITEMS AND THE RESULTS

Test item	Test Requirement	Test Method	Class/Severity	Result
CONDUCTED EMISSION	FCC Part 15 Rules	ANSI C63.4	Class B	Pass
RADIATED EMISSION	FCC Part 15 Rules	ANSI C63.4	Class B	Pass

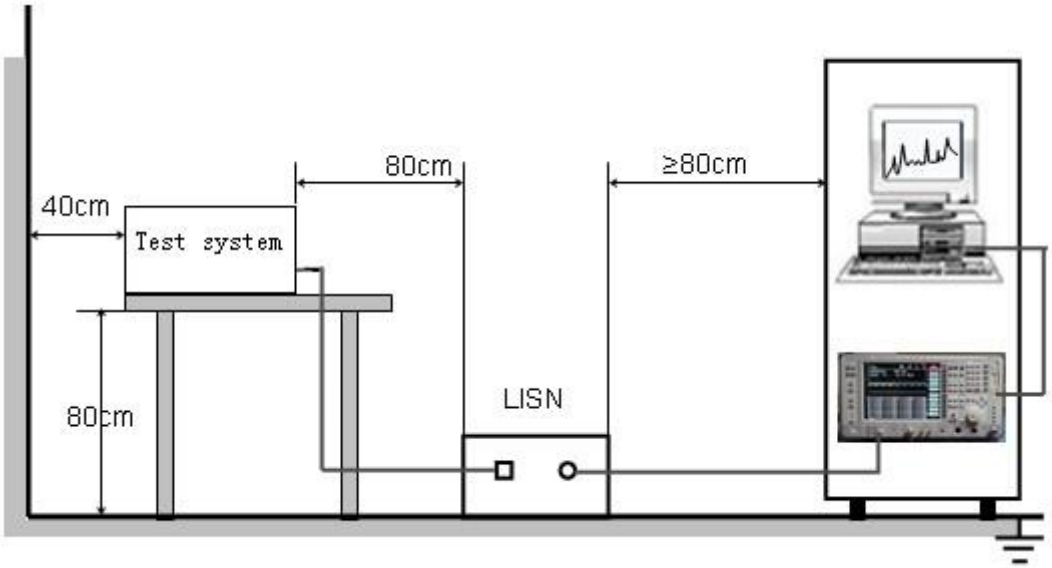
8. FCC LINE CONDUCTED EMISSION TEST

8.1. 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 0.50MHz.

8.2. BLOCK DIAGRAM OF TEST SETUP



8.3. 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 C63.4 (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 C63.4.

(3) All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.

(4) The EUT received AC120V/60Hz power from a LISN.

(5) The EUT 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.

(6) Analyzer / Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.

(7) During the above scans, the emissions were maximized by cable manipulation.

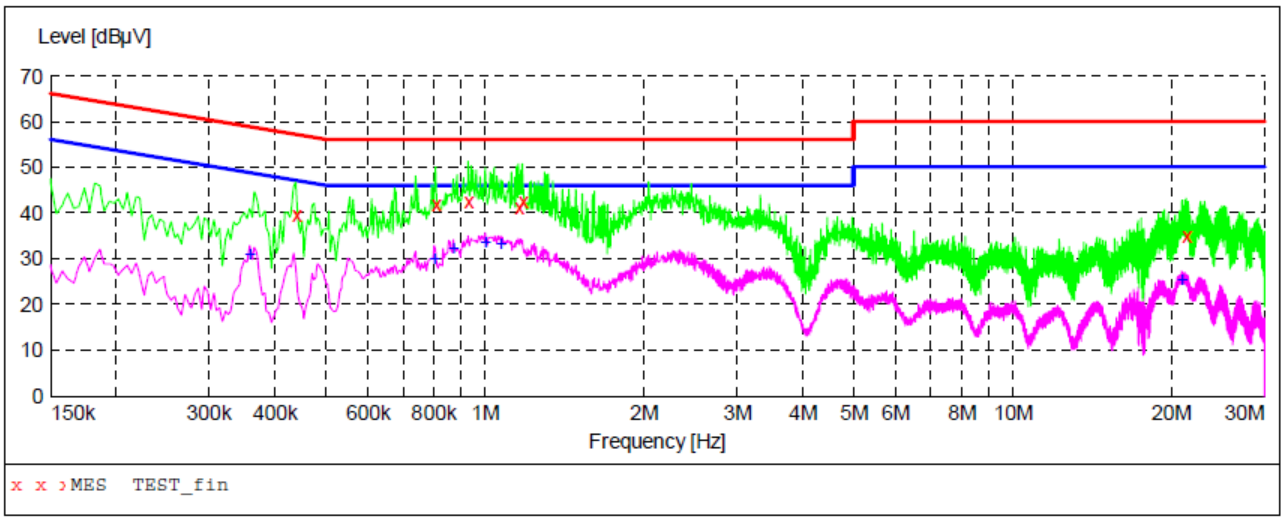
(8) A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions.

(9) 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.

The test data of the worst case condition (mode 1) was reported on the Summary Data page.

8.4. TEST RESULT OF LINE CONDUCTED EMISSION TEST

LINE CONDUCTED EMISSION TEST-L



MEASUREMENT RESULT: "TEST_fin"

6/27/2019 7:55PM

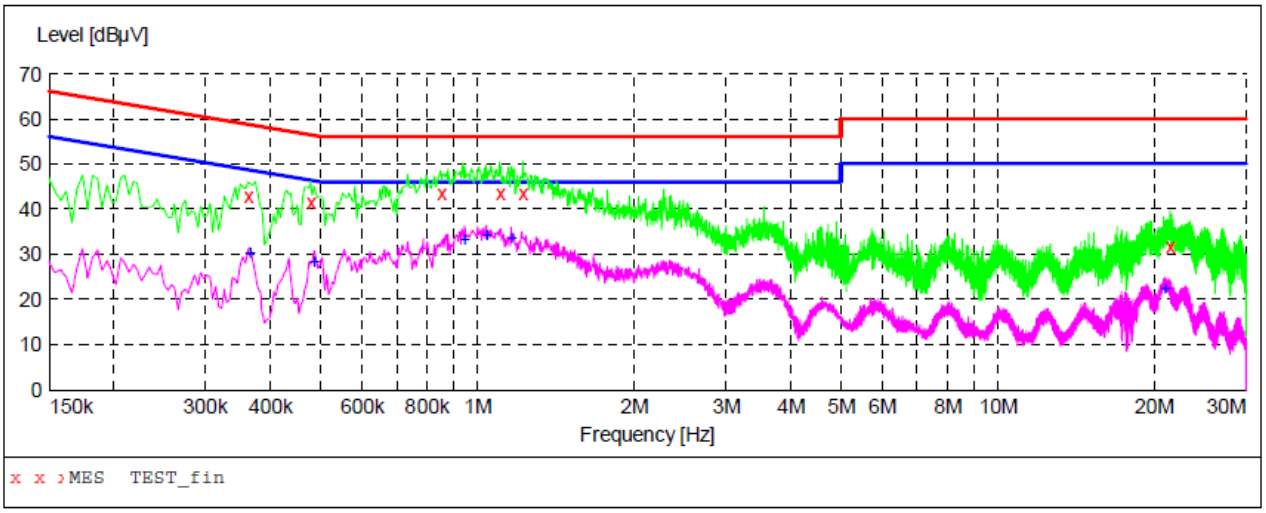
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.438000	39.60	10.7	57	17.5	QP	L1	FLO
0.806000	41.90	10.8	56	14.1	QP	L1	FLO
0.930000	42.60	11.2	56	13.4	QP	L1	FLO
1.158000	41.20	11.5	56	14.8	QP	L1	FLO
1.178000	42.40	11.5	56	13.6	QP	L1	FLO
21.286000	35.00	12.5	60	25.0	QP	L1	FLO

MEASUREMENT RESULT: "TEST_fin2"

6/27/2019 7:55PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.358000	31.20	10.5	49	17.6	AV	L1	FLO
0.802000	30.20	10.8	46	15.8	AV	L1	FLO
0.870000	32.50	11.0	46	13.5	AV	L1	FLO
1.002000	33.70	11.4	46	12.3	AV	L1	FLO
1.070000	33.30	11.4	46	12.7	AV	L1	FLO
20.914000	25.50	12.5	50	24.5	AV	L1	FLO

LINE CONDUCTED EMISSION TEST-N



MEASUREMENT RESULT: "TEST_fin"

6/27/2019 7:59PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.362000	43.10	10.5	59	15.6	QP	N	FLO
0.478000	41.40	11.0	56	15.0	QP	N	FLO
0.850000	43.60	10.9	56	12.4	QP	N	FLO
1.106000	43.80	11.5	56	12.2	QP	N	FLO
1.222000	43.60	11.5	56	12.4	QP	N	FLO
21.410000	31.90	12.6	60	28.1	QP	N	FLO

MEASUREMENT RESULT: "TEST_fin2"

6/27/2019 7:59PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.366000	30.60	10.5	49	18.0	AV	N	FLO
0.486000	28.50	11.1	46	17.7	AV	N	FLO
0.946000	33.40	11.3	46	12.6	AV	N	FLO
1.042000	34.30	11.4	46	11.7	AV	N	FLO
1.162000	33.70	11.5	46	12.3	AV	N	FLO
20.966000	22.70	12.5	50	27.3	AV	N	FLO

RESULT: PASS

9. RADIATED EMISSION TEST

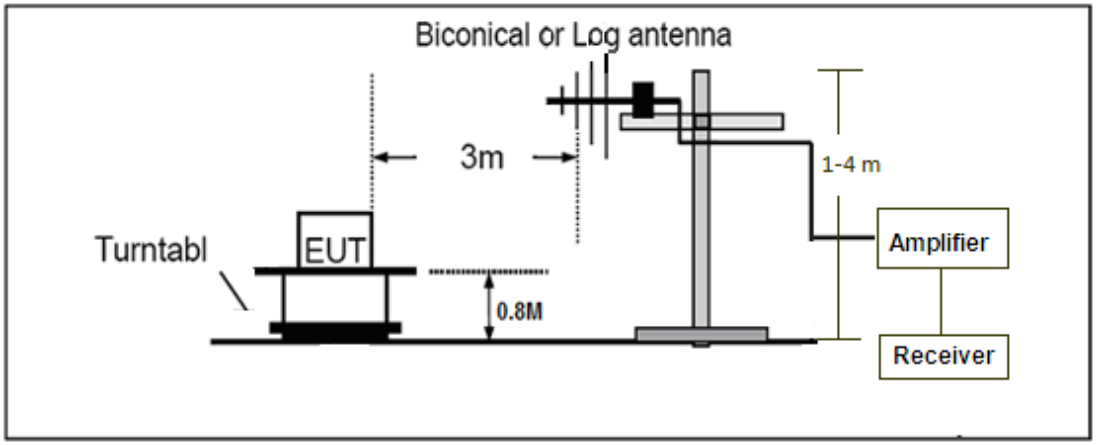
9.1. LIMITS OF RADIATED EMISSION TEST

Frequency (MHz)	Distance (m)	Maximum Field Strength Limit (dBuV/m/ Q.P.)
30~88	3	40.0
88~216	3	43.5
216~960	3	46.0
Above 960	3	54.0

Note: The lower limit shall apply at the transition frequency.

9.2. BLOCK DIAGRAM OF TEST SETUP

System Diagram of Connections between EUT and Simulators



9.3. PROCEDURE OF RADIATED 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 turntable with a height of 0.8 meters is used which is placed on the ground plane as per ANSI C63.4 (see Test Facility for the dimensions of the ground plane used). When the EUT is 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 C63.4.

(3) All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.

(4) The EUT received AC120V/60Hz power from socket under the turntable, if any.

(5) The antenna was placed at 3 meter away from the EUT as stated in FCC Part 15. The antenna connected to the Analyzer via a cable and at times a pre-amplifier would be used.

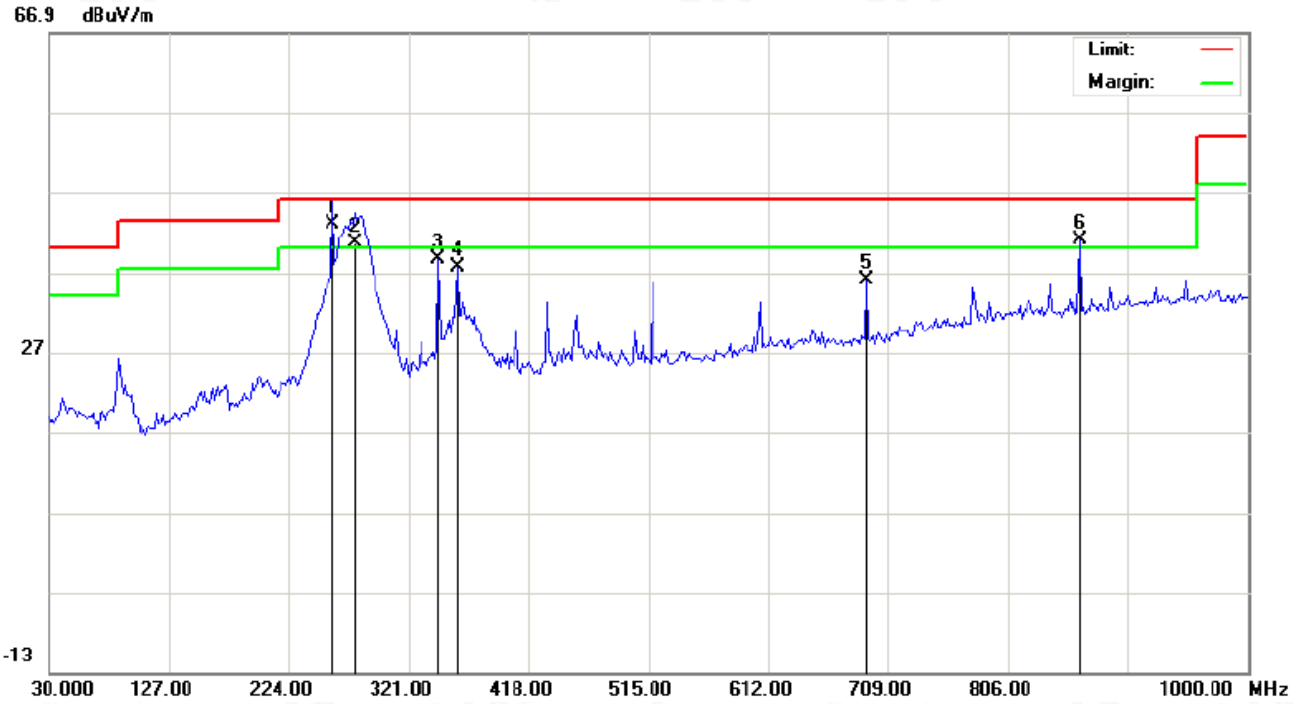
(6) The Analyzer / Receiver quickly scanned from 30MHz to 1000MHz. The EUT test program was started. Emissions were scanned and measured rotating the EUT to 360 degrees and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.

(7) The test mode(s) were scanned during the test:

(8) Recorded at least the six highest emissions. Emission frequency, amplitude, antenna position, polarization and turntable position were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit and Q.P./Peak reading is presented.

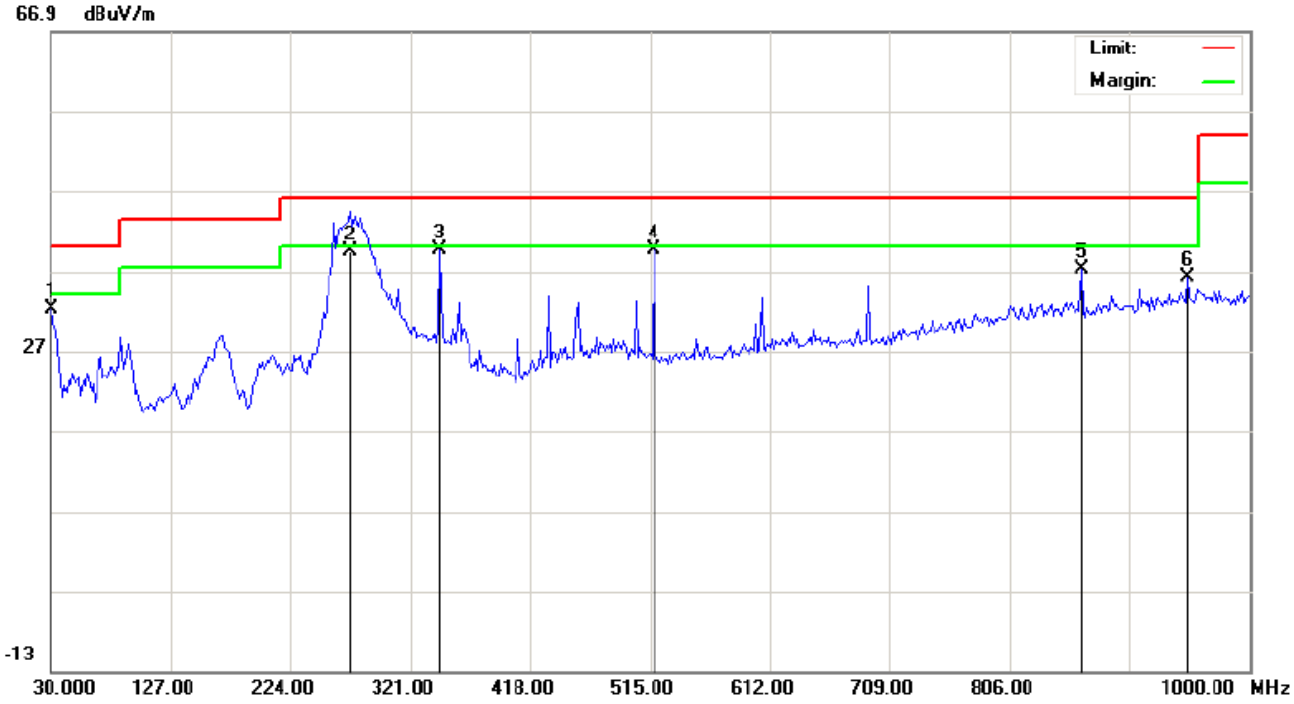
9.4. TEST RESULT OF RADIATED EMISSION TEST

Radiated Emission below 1GHz Test at 3m Distance-Horizontal



No.	Mk.	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1	*	259.2182	24.77	18.32	43.09	46.00	-2.91	QP			
2	!	277.3500	20.91	19.72	40.63	46.00	-5.37	QP			
3		345.2500	17.58	21.06	38.64	46.00	-7.36	peak			
4		359.8000	15.94	21.57	37.51	46.00	-8.49	peak			
5		691.2167	7.91	28.04	35.95	46.00	-10.05	peak			
6	!	864.2000	9.80	31.24	41.04	46.00	-4.96	peak			

Radiated Emission below 1GHz Test at 3m Distance-Vertical



No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
	-	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		30.0000	14.13	18.17	32.30	40.00	-7.70	peak			
2		272.5000	20.08	19.33	39.41	46.00	-6.59	QP			
3	*	345.2500	18.59	21.06	39.65	46.00	-6.35	peak			
4		518.2333	14.30	25.35	39.65	46.00	-6.35	peak			
5		864.2000	6.02	31.24	37.26	46.00	-8.74	peak			
6		949.8833	4.09	32.13	36.22	46.00	-9.78	peak			

RESULT: PASS

Note：

Measurement(dBuV/m)=Reading(dBuV)+Factor(dB/m)

Factor(dB/m)=Antenna Factor(dB/m)+Cable loss(dB)+Attenuation(dB)for Attenuator

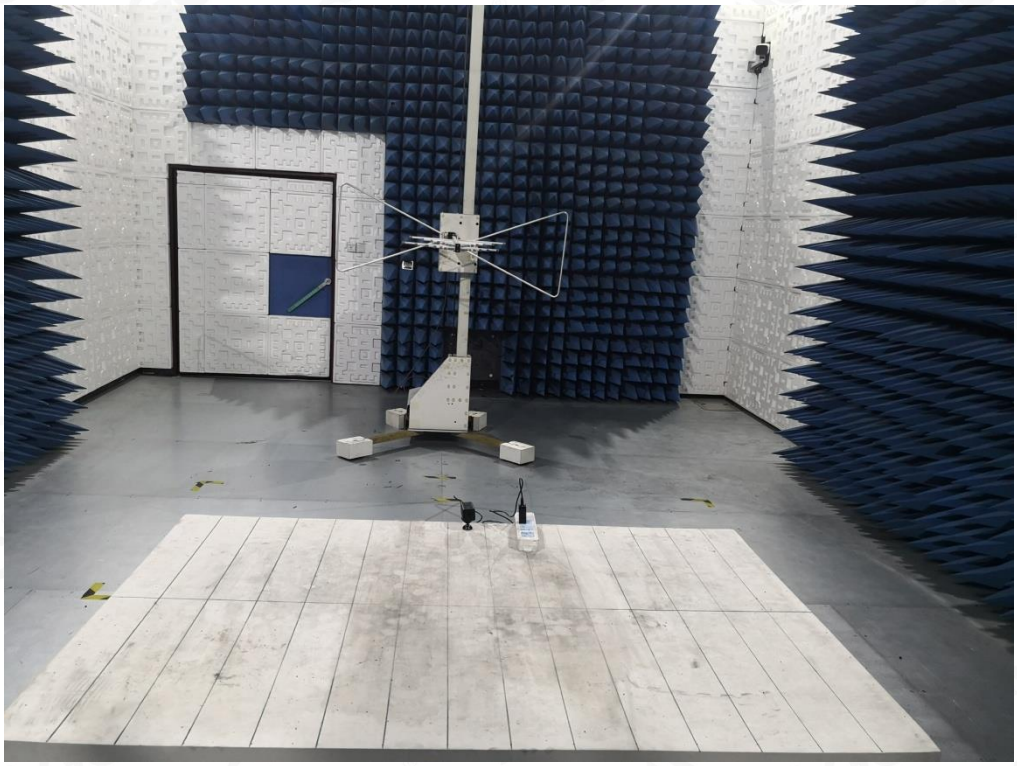
Over= Measurement -Limit

Remark: which 1GHz-12.5GHz are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

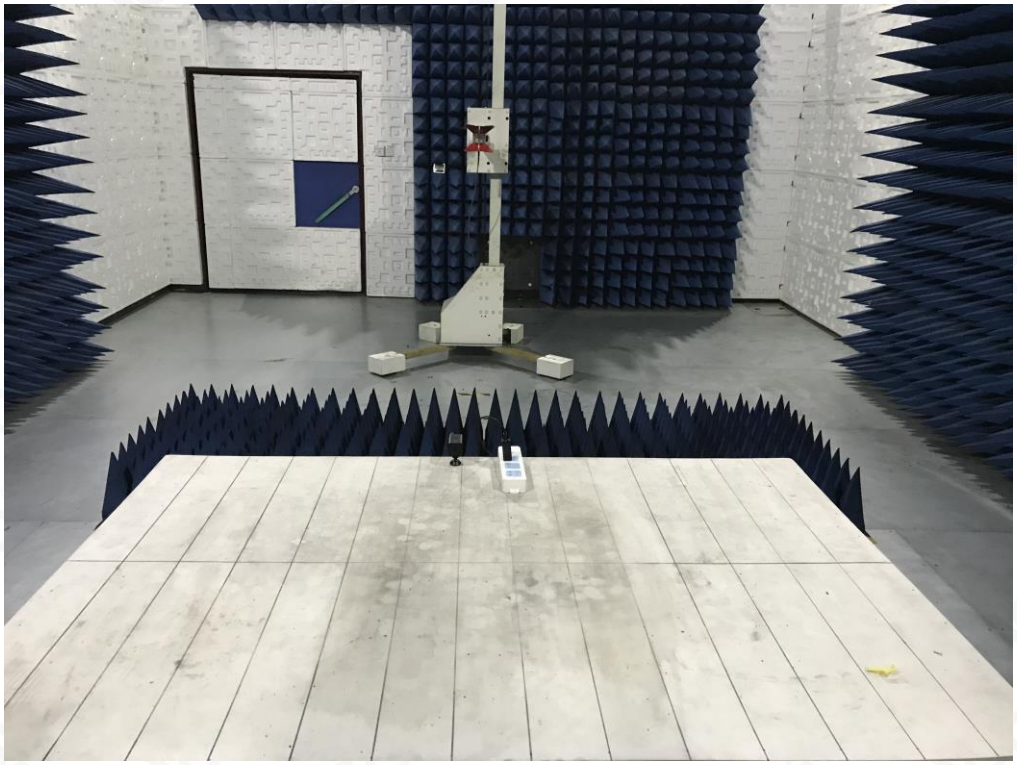
APPENDIX A: PHOTOGRAPHS OF TEST SETUP

FCC CONDUCTED EMISSION TEST SETUP

FCC RADIATED EMISSION TEST SETUP



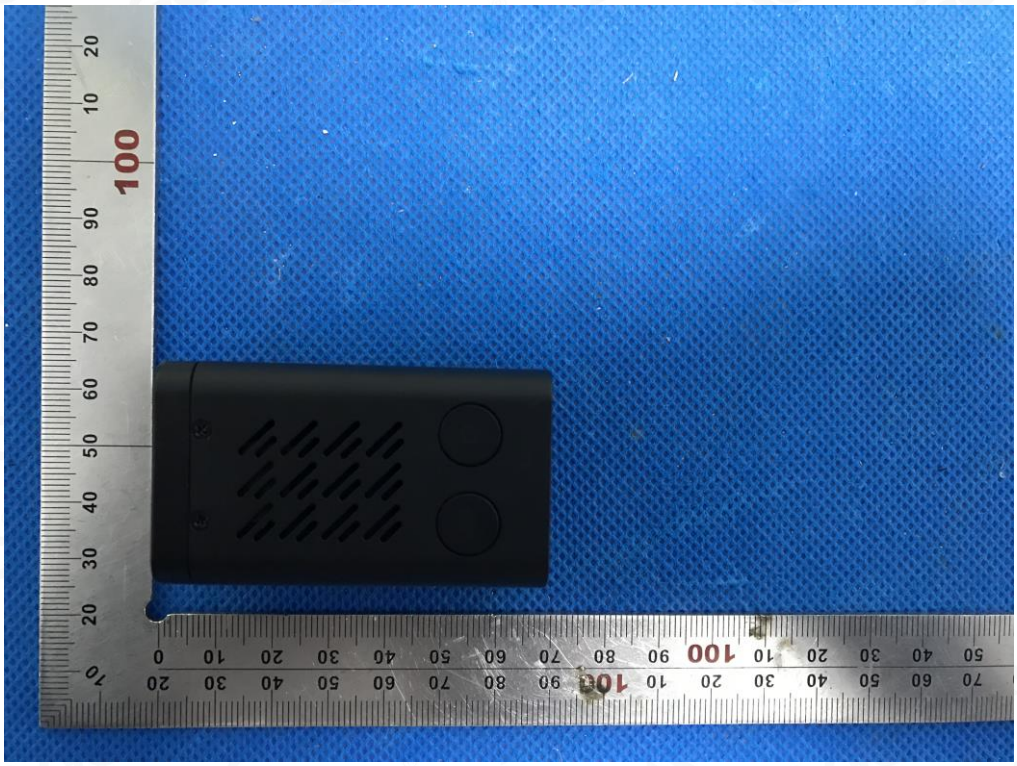
RADIATED EMISSION ABOVE 1G TEST SETUP



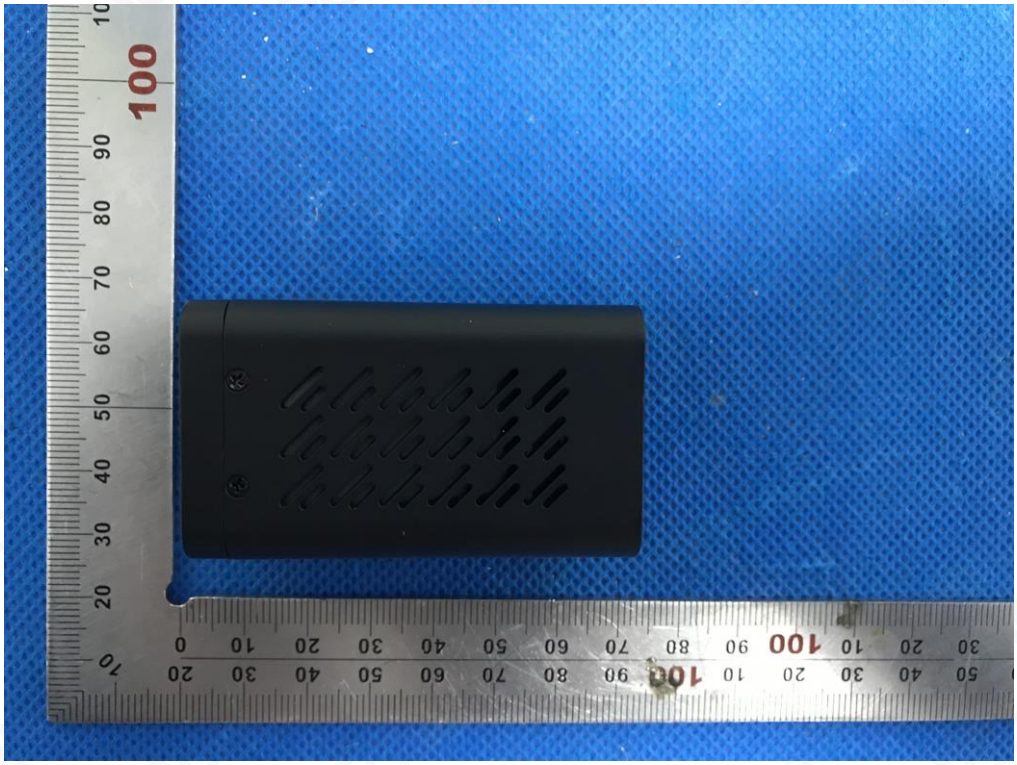
APPENDIX B: PHOTOGRAPHS OF EUT

ALL VIEW OF EUT

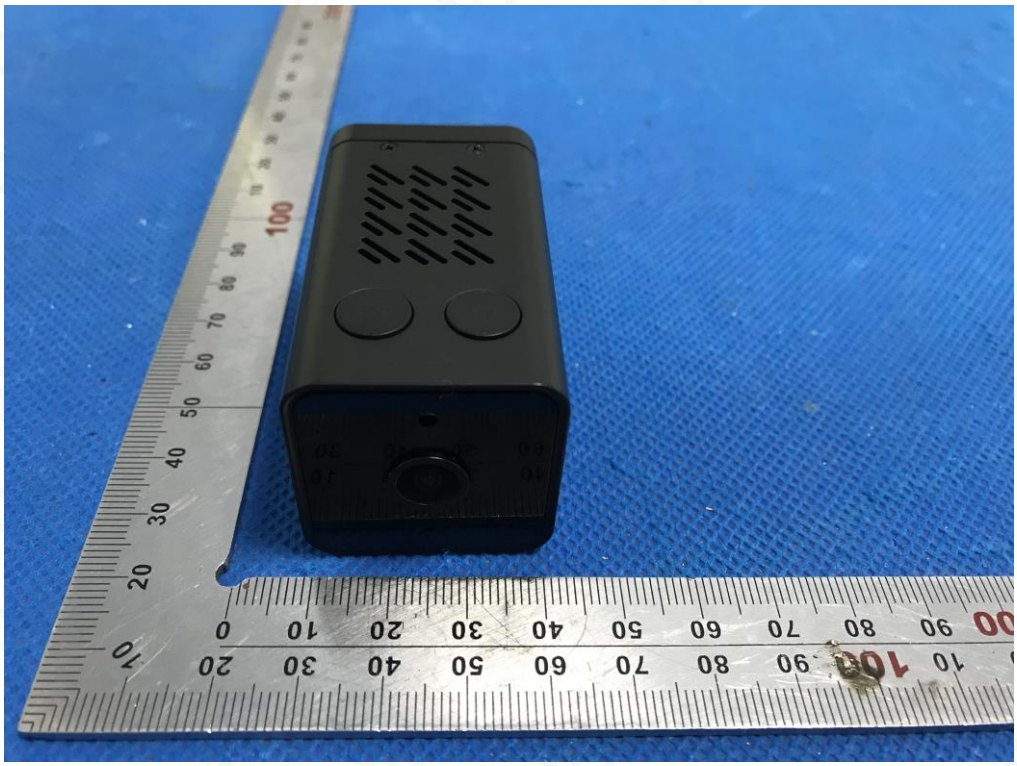
TOP VIEW OF EUT



BOTTOM VIEW OF EUT

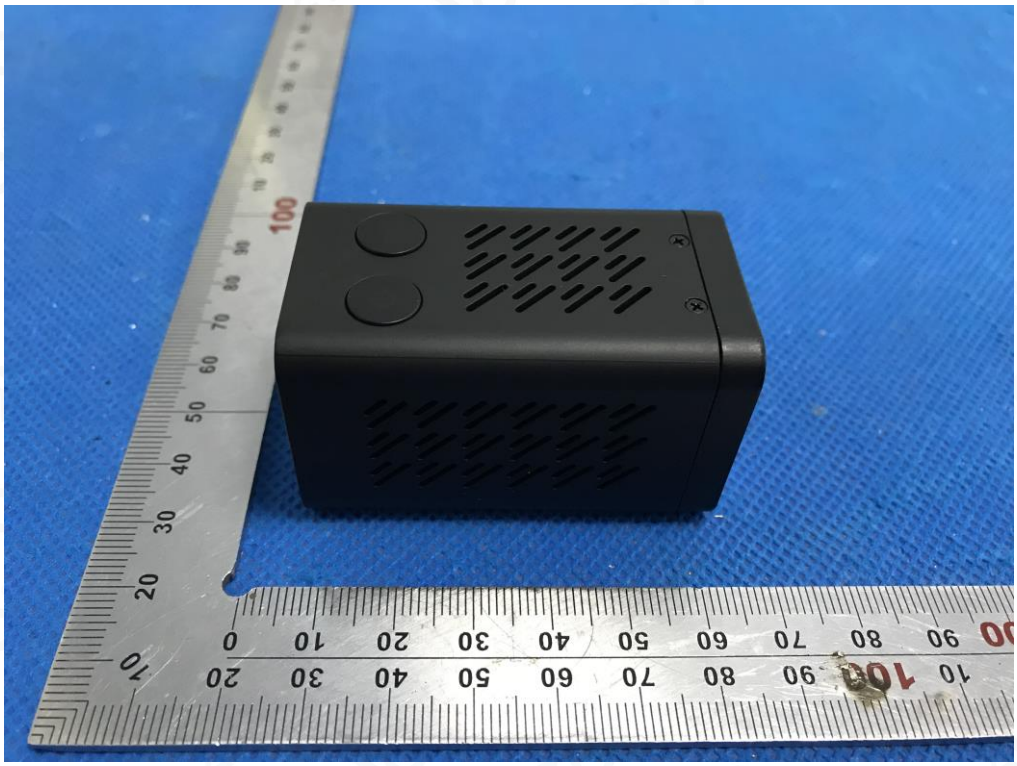


FRONT VIEW OF EUT

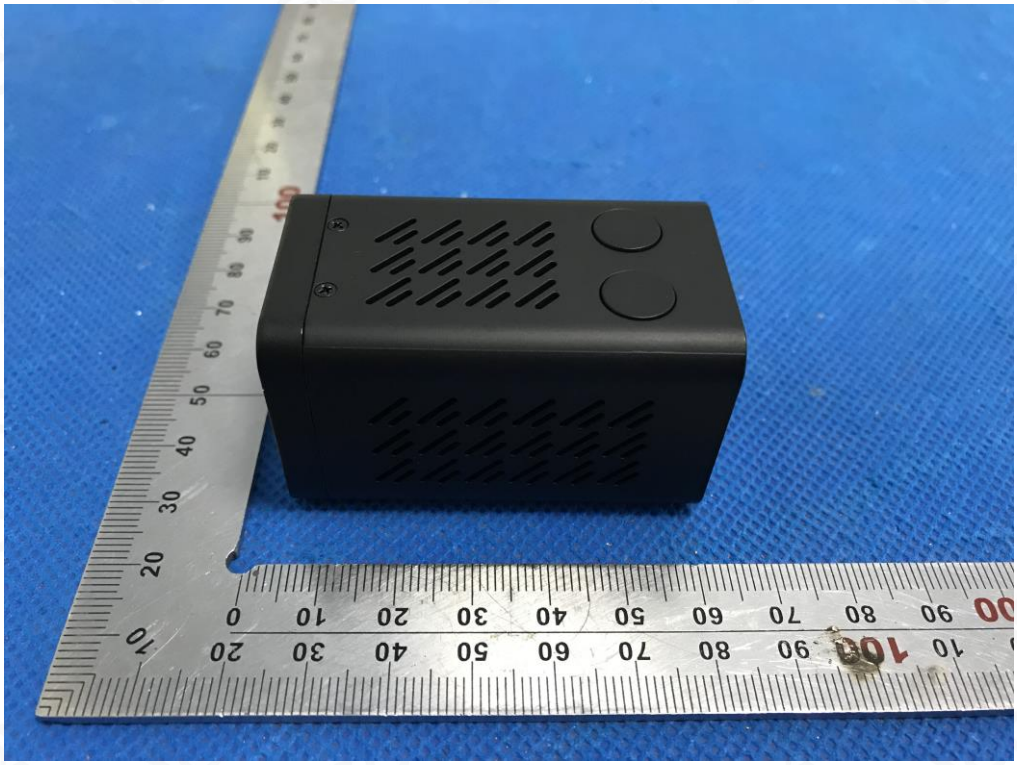


BACK VIEW OF EUT

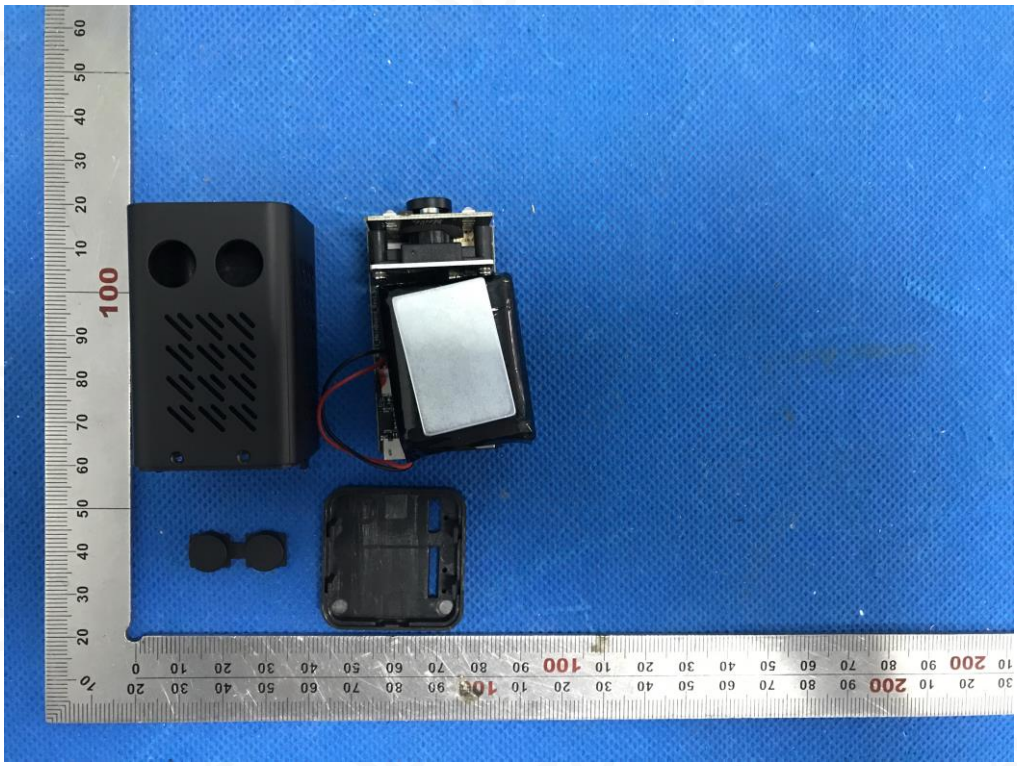
LEFT VIEW OF EUT



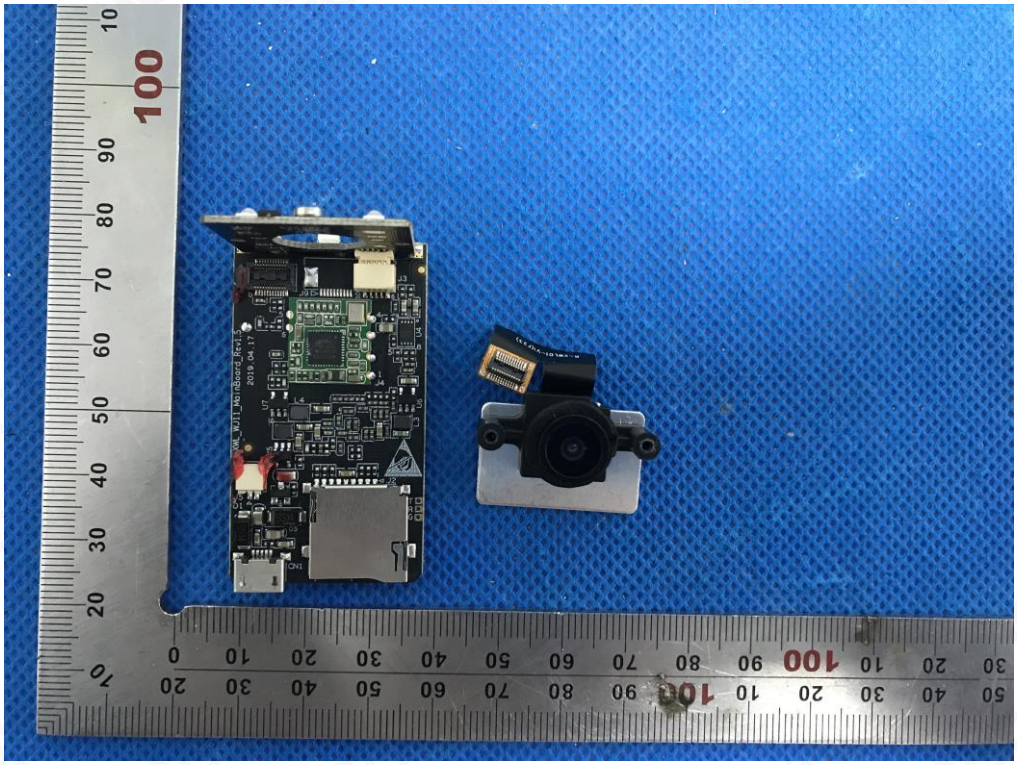
RIGHT VIEW OF EUT



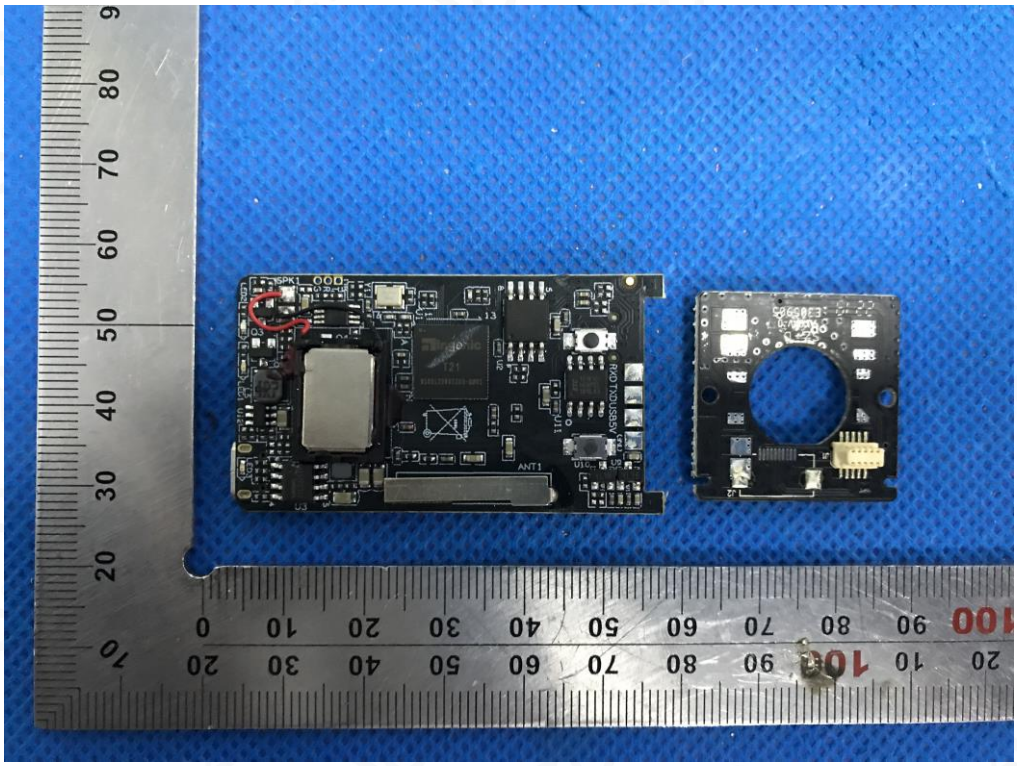
OPEN VIEW OF EUT



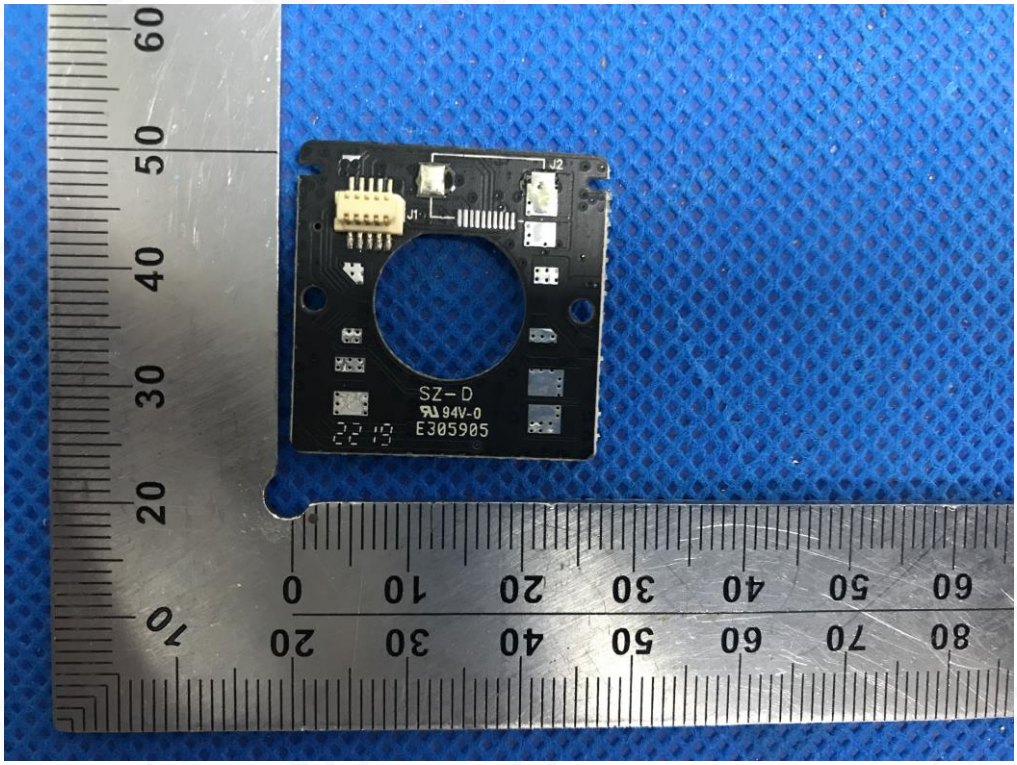
INTERNAL VIEW OF EUT-1



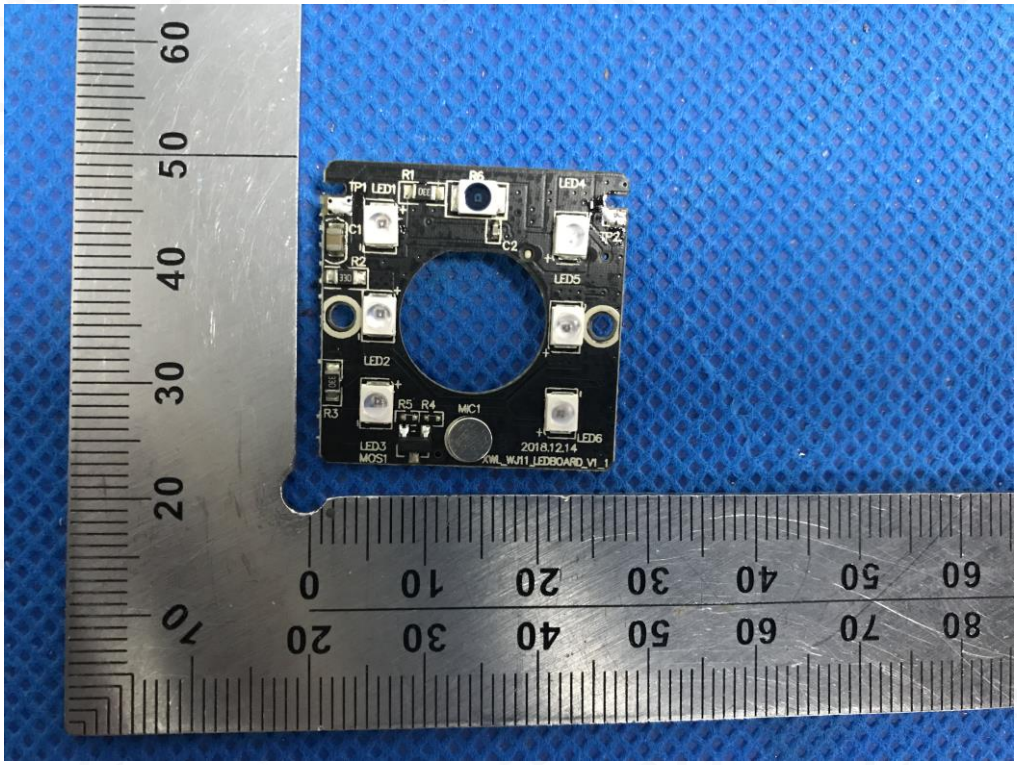
INTERNAL VIEW OF EUT-2



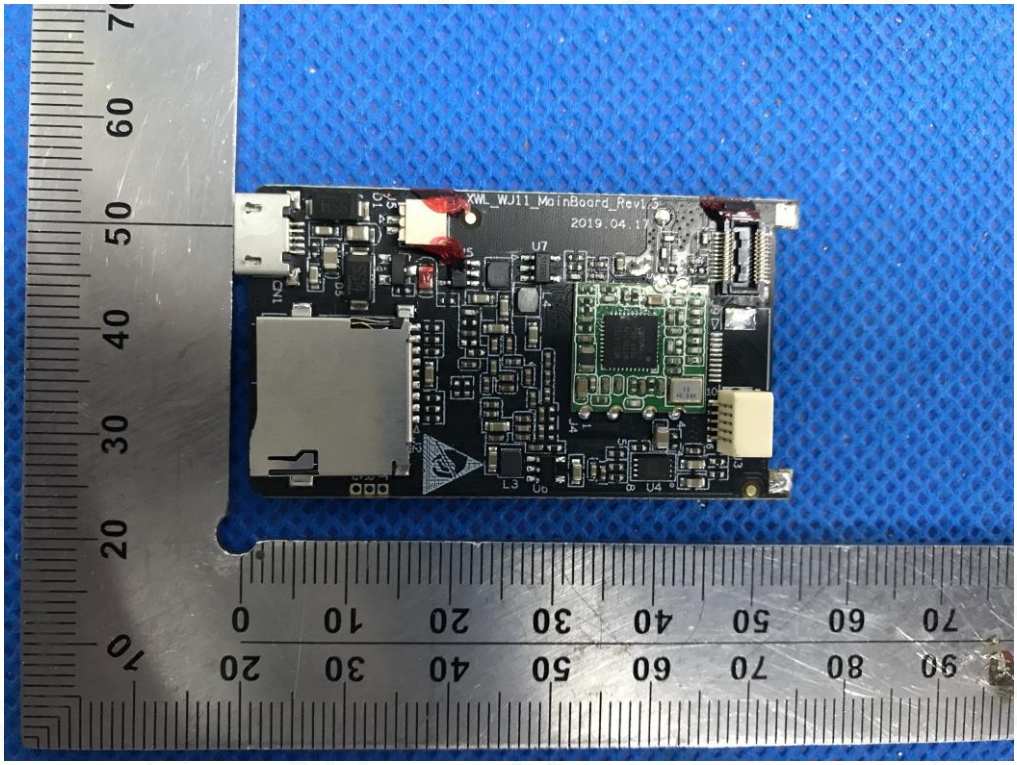
INTERNAL VIEW OF EUT-3



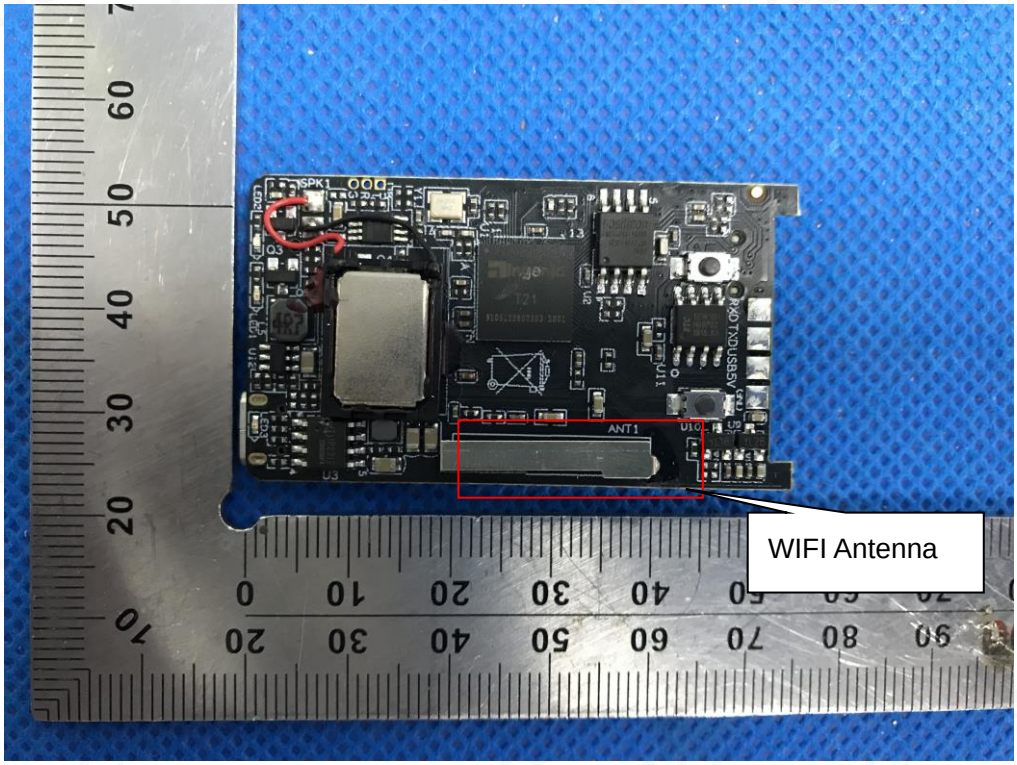
INTERNAL VIEW OF EUT-4



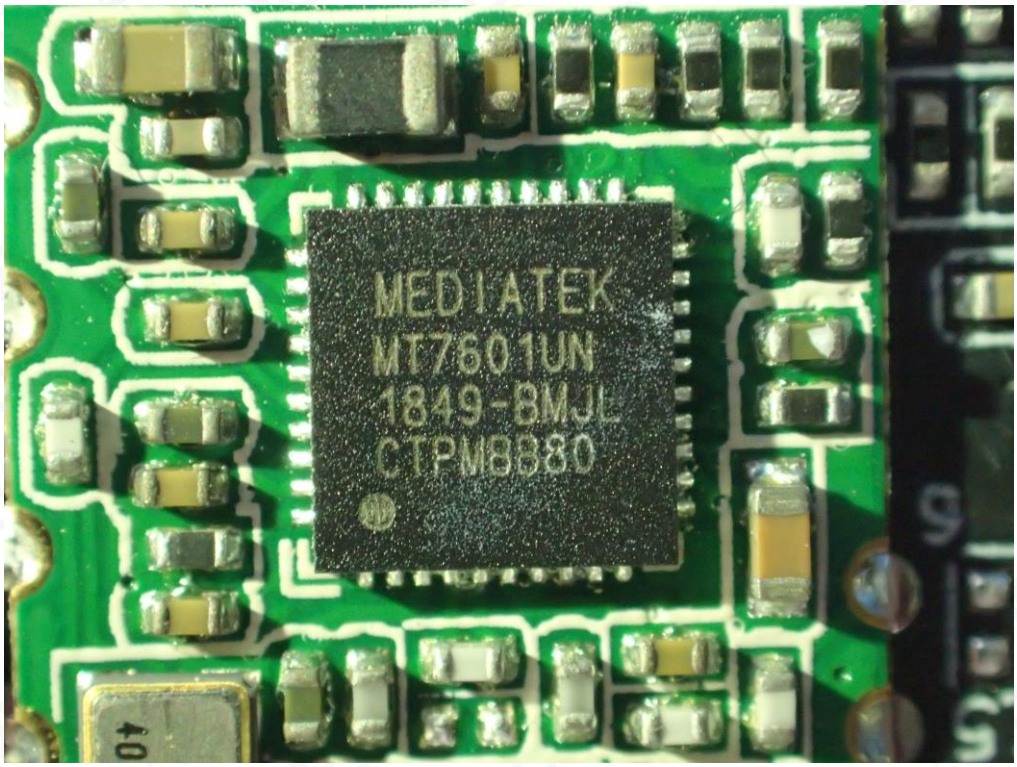
INTERNAL VIEW OF EUT-5



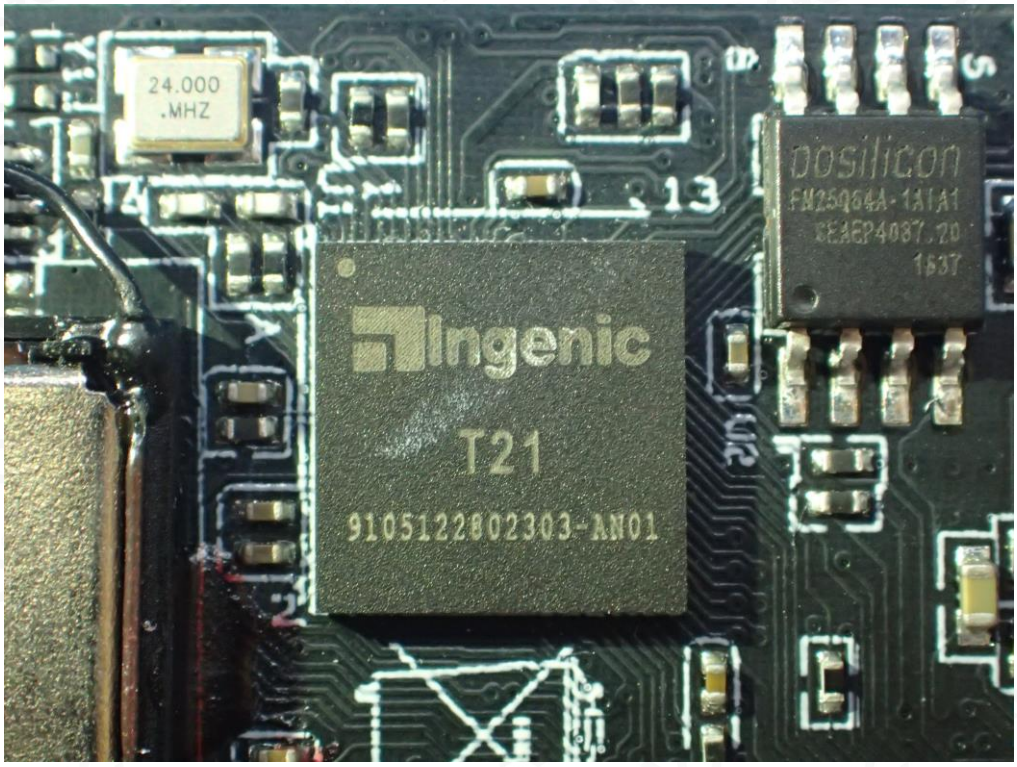
INTERNAL VIEW OF EUT-6



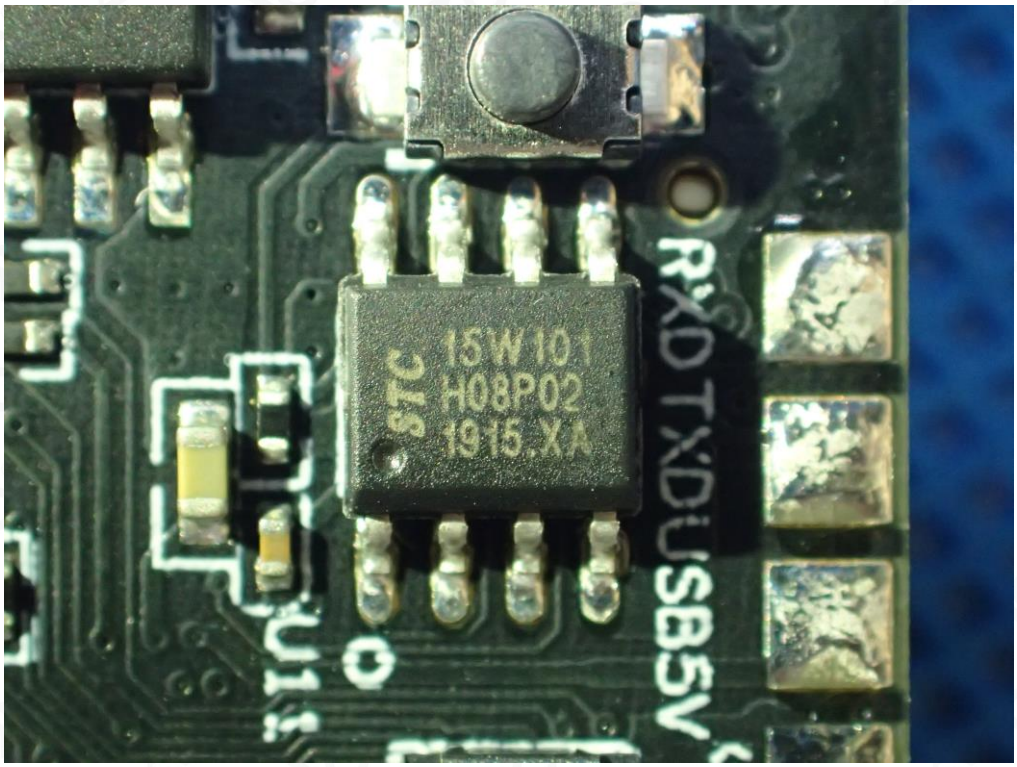
INTERNAL VIEW OF EUT-7



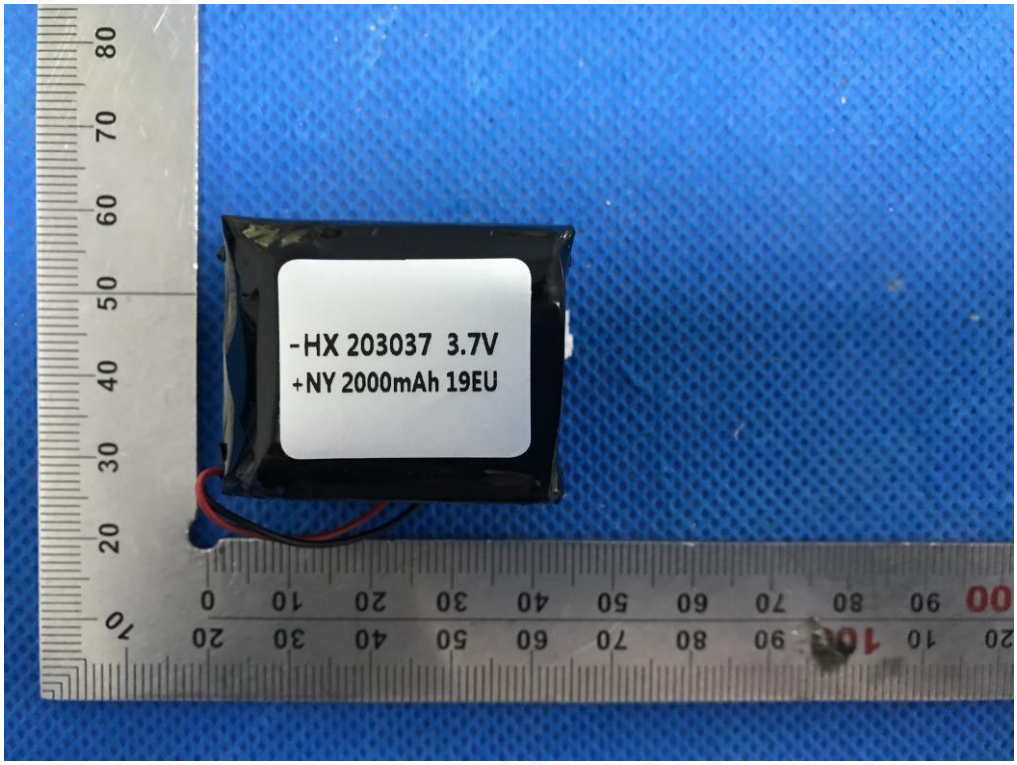
INTERNAL VIEW OF EUT-8



INTERNAL VIEW OF EUT-9



VIEW OF Battery



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