FCC Test Report

Report No.: AGC06724190103FE01

FCC ID	:	WMSBE144X
APPLICATION PURPOSE	:	Class Ⅱ Equipment
PRODUCT DESIGNATION	:	Flash Receiver
BRAND NAME	:	Bellman & Symfon
MODEL NAME	:	BE1442, BE1444
CLIENT	:	Bellman & Symfon Europe AB
DATE OF ISSUE	:	Mar. 07, 2019
STANDARD(S)	:	FCC Part 15 Rules
REPORT VERSION	:	V1.0

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

REPORT REVISE RECORD

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Mar. 07, 2019	Valid	Class Ⅱ Equipment

Note: Change the PCB of the flash function. Retest the conducted emission and radiated emission.

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1. VERIFICATION OF CONFORMITY

Applicant	Bellman & Symfon Europe AB
Address	Sodra Langebergsgatan 30 Askim,Vastra Gotaland Sweden 43632
Manufacturer	Bellman & Symfon Europe AB
Address	Sodra Langebergsgatan 30 Askim,Vastra Gotaland Sweden 43632
Factory	Xingtel Xiamen Group Co., LTD.
Address	Xingtel Building, Torch Industrial District. Xiamen, Fujian Province 361006
Product Designation	Flash Receiver
Brand Name	Bellman & Symfon
Test Model	BE1442
Series Model	BE1444
Difference description	All are the same except the model name
Date of test	Mar. 01, 2019~ Mar. 07, 2019
Deviation	None
Condition of Test Sample	Normal
Test Result	Pass
Report Template	AGCRT-US-BR/RF (2013-03-01)

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 C63.4 (2014) 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 subpart B.

Tested By Max Zhang

Max Zhang(Zhang Yi) Mar. 07, 2019

Reviewed By Bart Xie

Bart Xie(Xie Xiaobin) Mar. 07, 2019

Approved By Forrest Lei

Forrest Lei(Lei Yonggang)
Authorized Officer Mar. 07, 2019

2. GENERAL INFORMATION

2.1. PRODUCT DESCRIPTION

A major technical description of EUT is described as following

Hardware Version	001-1.2
Software Version	N/A
Highest Operate Frequency	433.92MHz(Radiated emission up to 3GHz)
EUT Supply	DC 7.5V by adapter or DC 4.8V by battery

2.2. RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for **FCC ID: WMSBE144X** filing to comply with Section 15.107&109 of the FCC Part 15, Subpart B Rules.

2.3. TEST METHODOLOGY

Both conducted and radiated testing was performed according to the procedures in ANSI C63.4 (2014).
Radiated testing was performed at an antenna to EUT distance 3 meters.

2.4. SPECIAL ACCESSORIES

Refer to section 5.1.

2.5. EQUIPMENT MODIFICATIONS

Not available for this EUT intended for grant.

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	Receiver mode at 433.92MHz

5. SYSTEM TEST CONFIGURATION

5.1. EQUIPMENT USED IN EUT SYSTEM

Item	Equipment	Model No.	ID or Specification	Remark
1	Flash Receiver	BE1442	2AKC6XHT-WF6E	EUT
2	Adapter 1	A122-0751500ID	DC 7.5V/1.5A	Marketed with EUT
3	Adapter 2	P12-075150 US	DC 7.5V/1.5A	Marketed with EUT
4	Bed shaker	BE1270	N/A	Support

5.2. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.109	Radiated Emission	Compliant
§15.107	Conducted Emission	Compliant

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
Designation Number	CN1259
A2LA Cert. No.	5054.02
Description	Attestation of Global Compliance(Shenzhen) Co., Ltd is accredited by A2LA

TEST EQUIPMENT OF CONDUCTED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESPI	101206	Jun. 12, 2018	Jun. 11, 2019
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, 2018	Jun. 11, 2019
EXA Signal Analyzer	Aglient	N9010A	MY53470504	Dec. 20, 2018	Dec. 19, 2019
Attenuator	Weinachel Corp	58-30-33	N/A	Jun. 12, 2018	Jun. 11, 2019
Double-Ridged Waveguide Horn	ETS LINDGREN	3117	00034609	May. 26, 2018	May. 25, 2020
Broadband Preamplifier	ETS LINDGREN	3117PA	00225134	Oct. 25, 2018	Oct. 24, 2019
ANTENNA	SCHWARZBECK	VULB9168	D69250	Sep. 28, 2017	Sep. 27, 2019

7. RADIATED EMISSION

7.1. MEASUREMENT PROCEDURE

1. Configure the EUT according to ANSI C63.4. 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 below 1GHz, use 120KHz RBW and VBW>=3RBW for QP reading.
7. For emissions above 1GHz, use 1MHz RBW and 3MHz VBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer.
8. 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.
9. 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.
10. 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.
11. 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.
12. Only the worst case is reported.

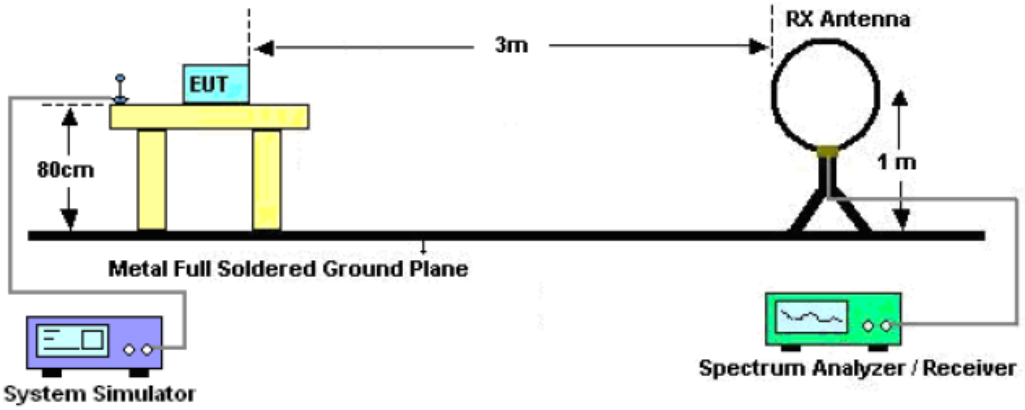
The following table is the setting of spectrum analyzer and receiver.

Spectrum Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RBW 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RBW 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RBW 120KHz for QP
Start ~Stop Frequency	1GHz~30GHz 1MHz/3MHz for Peak, 1MHz/10Hz for Average

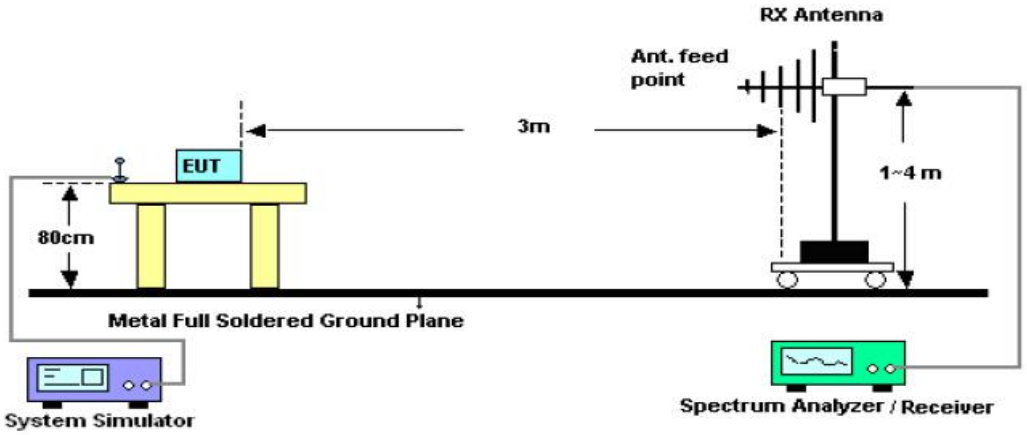
Receiver Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RBW 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RBW 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RBW 120KHz for QP

7.2. TEST SETUP

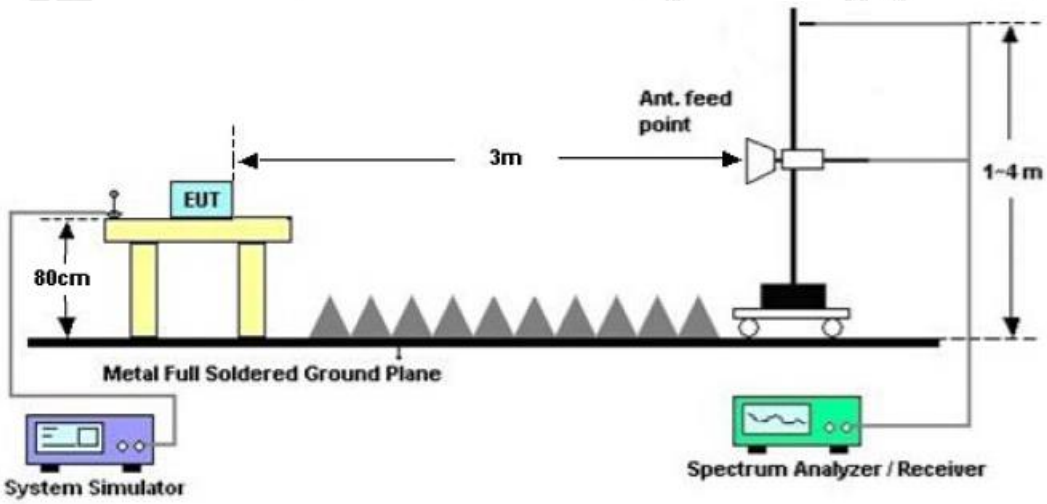
Radiated Emission Test-Setup Frequency Below 30MHz



RADIATED EMISSION TEST SETUP 30MHz-1000MHz



RADIATED EMISSION TEST SETUP ABOVE 1000MHz

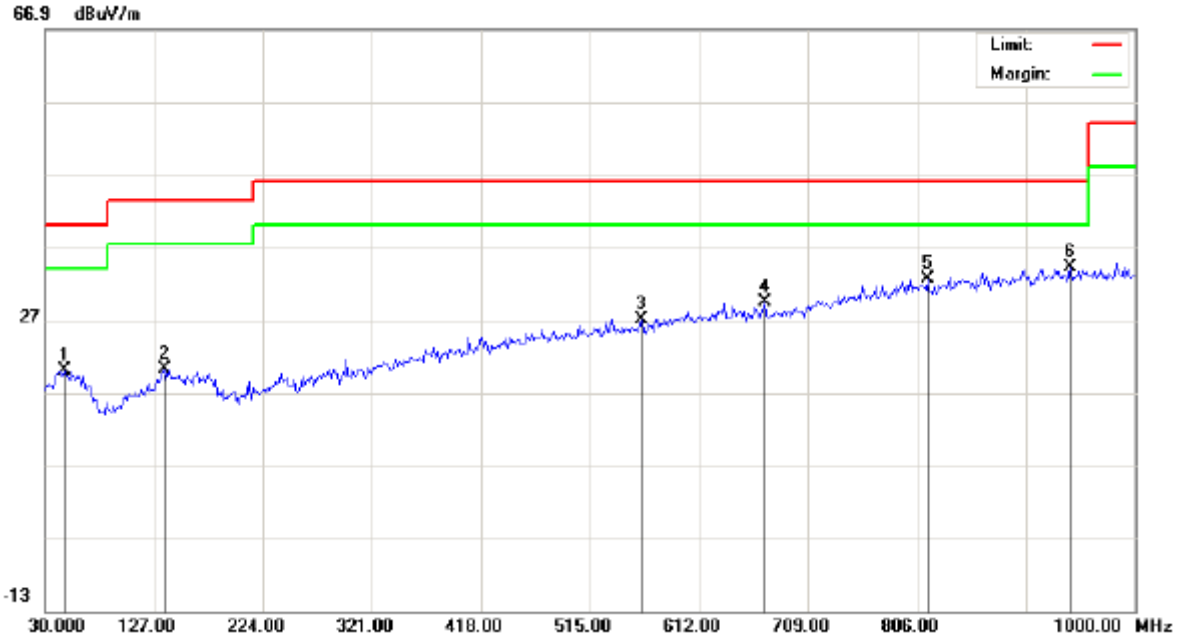


7.3. TEST RESULT

RADIATED EMISSION BELOW 30MHz

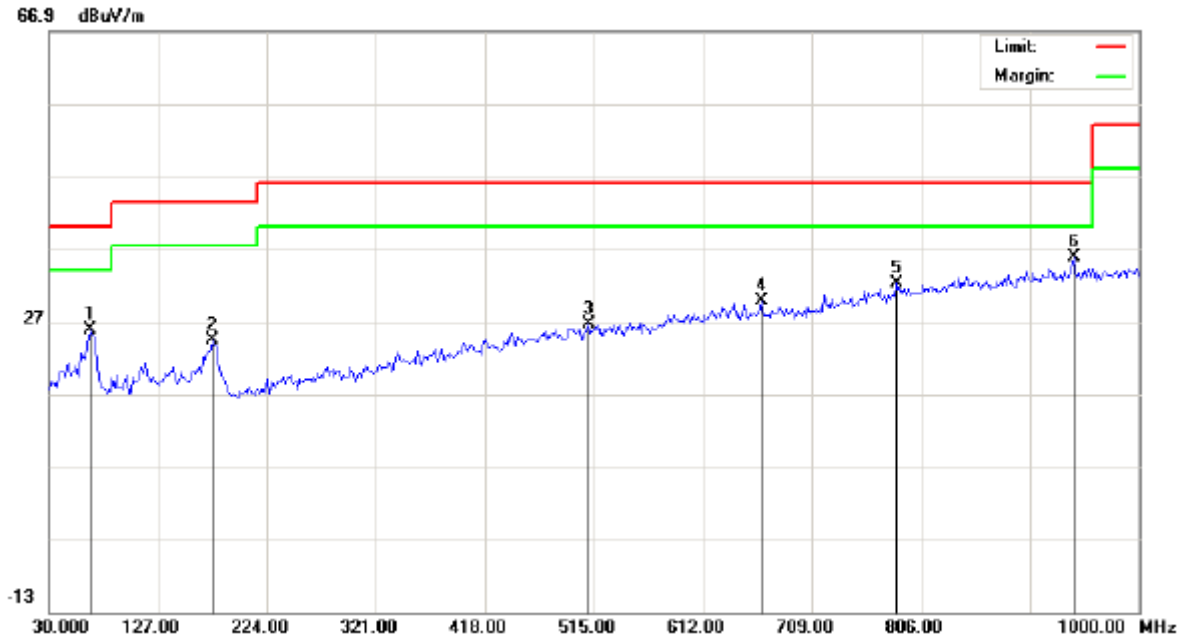
No emission found between lowest internal used/generated frequencies to 30MHz.

RADIATED EMISSION BELOW 1GHZ-Horizontal- **P12-075150US**



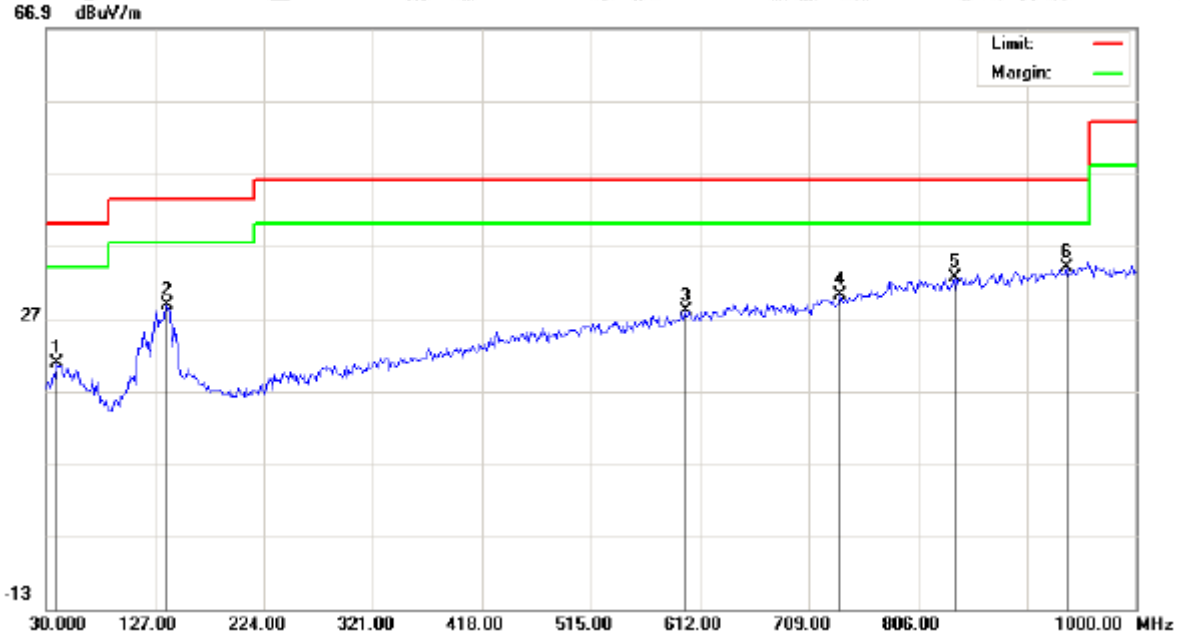
No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		47.7833	0.25	19.81	20.06	40.00	-19.94	peak			
2		136.7000	1.23	19.02	20.25	43.50	-23.25	peak			
3		560.2667	0.84	26.17	27.01	46.00	-18.99	peak			
4		670.2000	1.52	27.79	29.31	46.00	-16.69	peak			
5		815.7000	1.97	30.61	32.58	46.00	-13.42	peak			
6	*	941.8000	2.07	32.06	34.13	46.00	-11.87	peak			

RADIATED EMISSION BELOW 1GHZ-Vertical



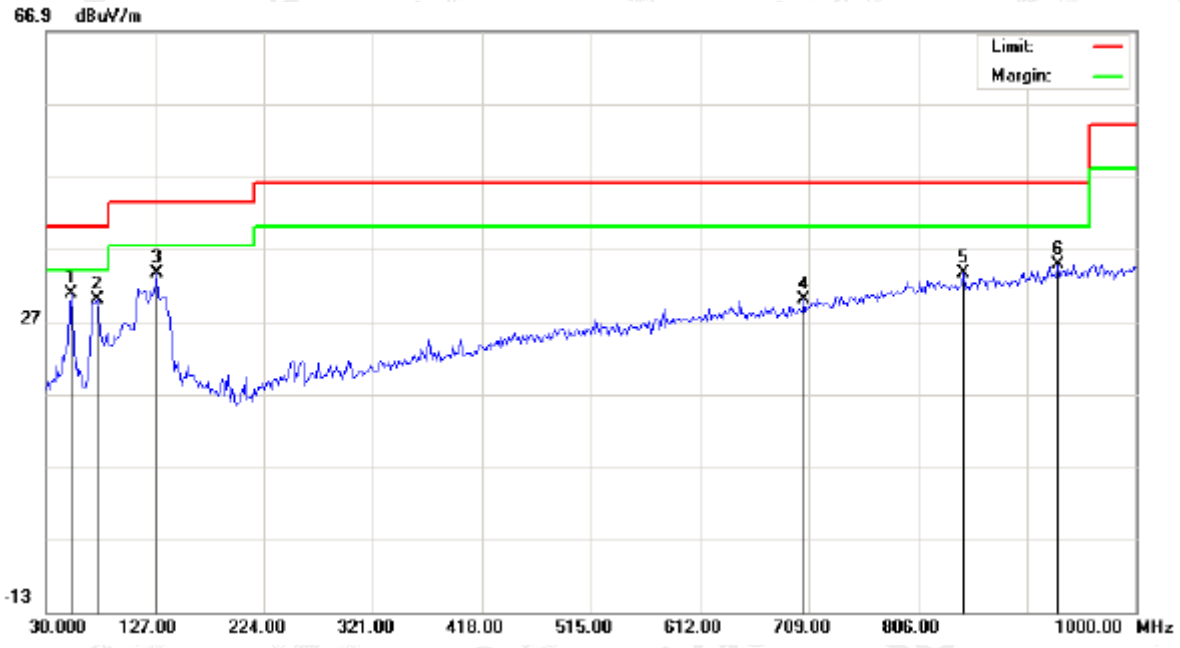
No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
	-	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		67.1833	8.14	17.61	25.75	40.00	-14.25	peak			
2		175.5000	6.78	17.59	24.37	43.50	-19.13	peak			
3		510.1500	1.45	25.19	26.64	46.00	-19.36	peak			
4		663.7333	2.04	27.71	29.75	46.00	-16.25	peak			
5		784.9833	2.20	30.07	32.27	46.00	-13.73	peak			
6	*	941.8000	3.65	32.06	35.71	46.00	-10.29	peak			

RADIATED EMISSION BELOW 1GHZ-Horizontal- **A122-0751500ID**



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		39.7000	0.77	19.98	20.75	40.00	-19.25	peak			
2		138.3167	9.77	19.12	28.89	43.50	-14.61	peak			
3		599.0667	1.10	26.93	28.03	46.00	-17.97	peak			
4		736.4833	1.20	28.97	30.17	46.00	-15.83	peak			
5		838.3333	1.61	30.90	32.51	46.00	-13.49	peak			
6	*	938.5667	1.99	32.03	34.02	46.00	-11.98	peak			

RADIATED EMISSION BELOW 1GHZ-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	*	52.6333	11.24	19.50	30.74	40.00	-9.26	peak			
2		75.2667	14.03	15.97	30.00	40.00	-10.00	peak			
3		128.6167	15.03	18.51	33.54	43.50	-9.96	peak			
4		704.1500	1.86	28.24	30.10	46.00	-15.90	peak			
5		846.4167	2.57	31.01	33.58	46.00	-12.42	peak			
6		930.4833	2.92	31.96	34.88	46.00	-11.12	peak			

RESULT: PASS

Note: 1. Factor=Antenna Factor + Cable loss - Amplifier gain, Margin=Measurement-Limit.
2. The “Factor” value can be calculated automatically by software of measurement system.
3. Emissions range from 1GHz to 3GHz have 20dB margin. No recording in the test report.
4. All the test modes had been tested, the mode 1 was the worst case. Only the data of the worst case would be record in this test report.

8. FCC LINE CONDUCTED EMISSION TEST

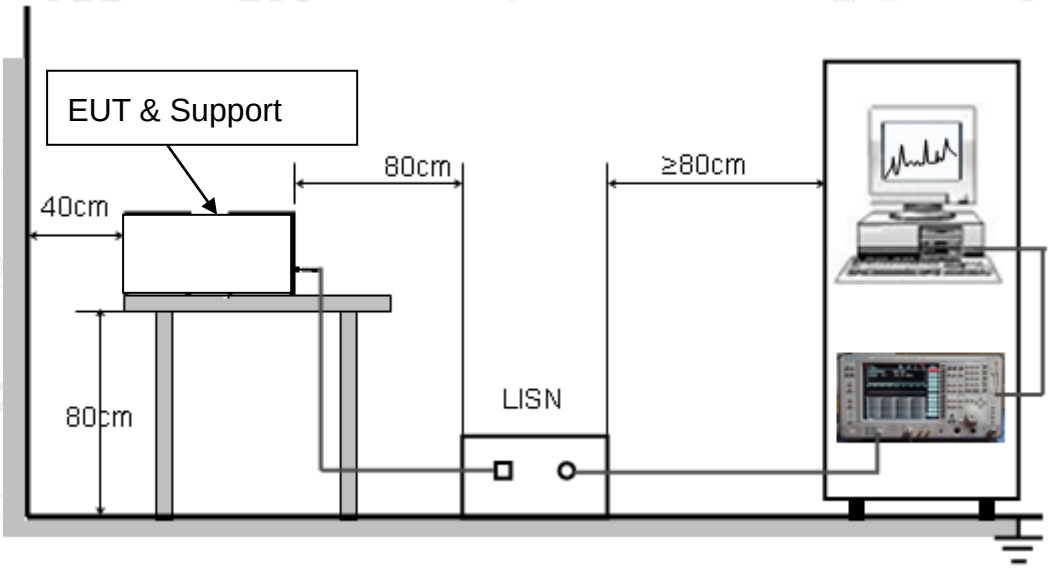
8.1. LIMITS OF LINE CONDUCTED EMISSION TEST

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 0.50 MHz.

8.2. BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST



8.3. 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 C63.4 (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. All support equipments received AC9V/1A power from a LISN, if any.
5. The EUT received DC charging voltage by PC which power 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.

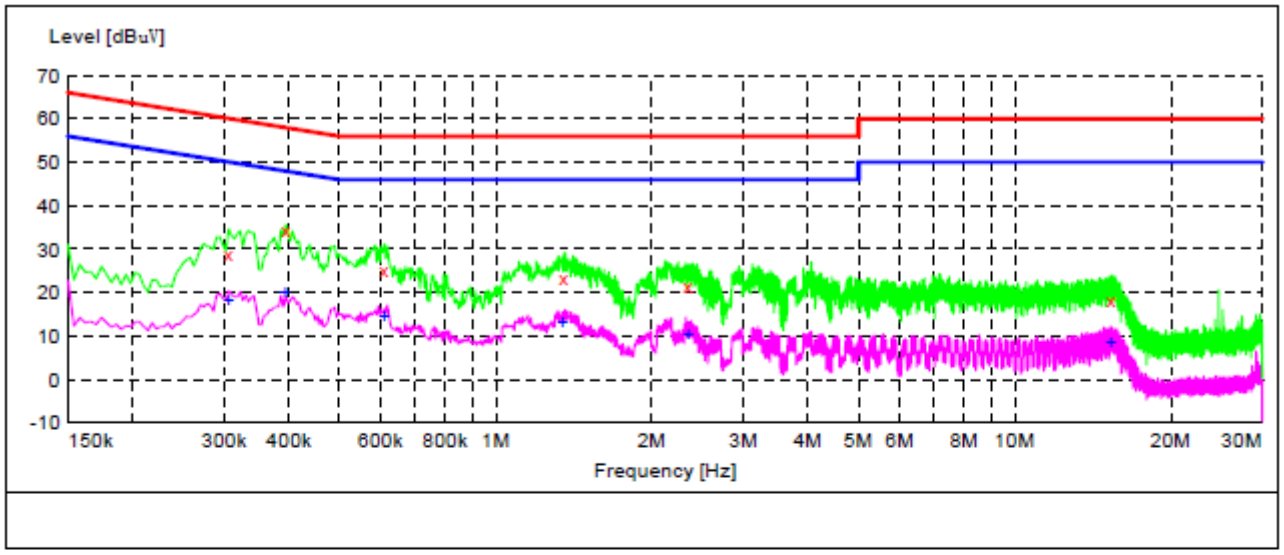
Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

8.4. 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.

8.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST

Line Conducted Emission Test Line 1-L **P12-075150US**



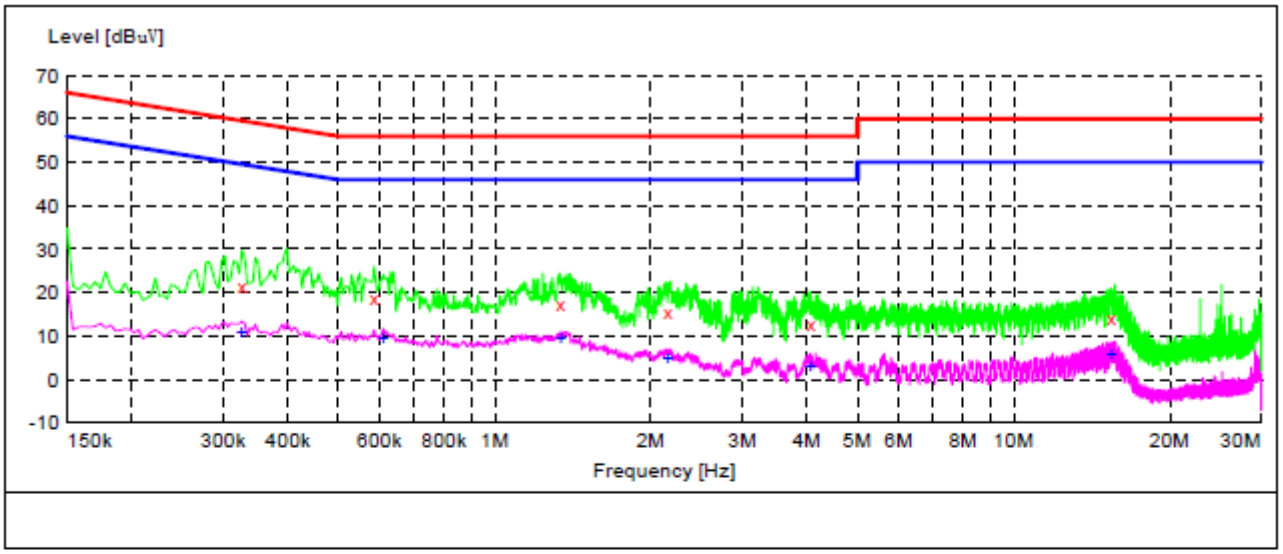
MEASUREMENT RESULT: "TEST_fin"

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.306000	28.90	10.2	60	31.2	QP	L1	FLO
0.394000	34.20	10.3	58	23.8	QP	L1	FLO
0.610000	25.10	10.3	56	30.9	QP	L1	FLO
1.354000	23.20	10.4	56	32.8	QP	L1	FLO
2.346000	21.50	10.4	56	34.5	QP	L1	FLO
15.334000	18.10	10.9	60	41.9	QP	L1	FLO

MEASUREMENT RESULT: "TEST_fin2"

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.306000	18.20	10.2	50	31.9	AV	L1	FLO
0.394000	20.10	10.3	48	27.9	AV	L1	FLO
0.610000	14.40	10.3	46	31.6	AV	L1	FLO
1.346000	13.00	10.4	46	33.0	AV	L1	FLO
2.346000	10.30	10.4	46	35.7	AV	L1	FLO
15.326000	8.60	10.9	50	41.4	AV	L1	FLO

Line Conducted Emission Test Line 2-N



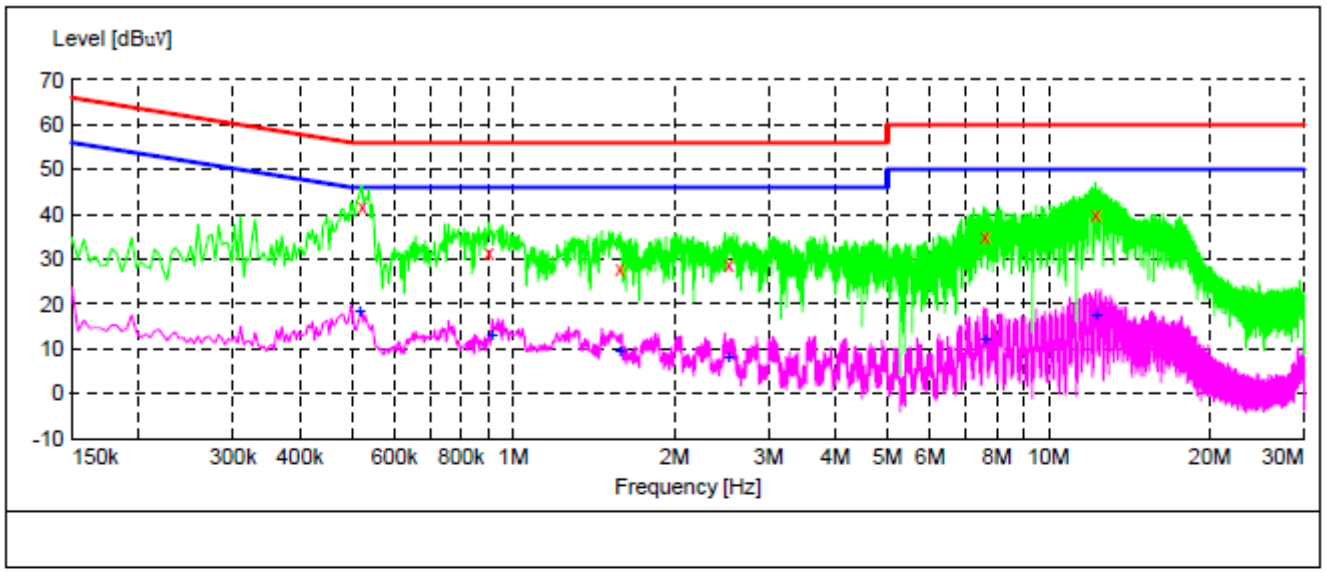
MEASUREMENT RESULT: "TEST_fin"

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.326000	21.40	10.2	60	38.2	QP	N	FLO
0.586000	18.80	10.3	56	37.2	QP	N	FLO
1.342000	17.30	10.4	56	38.7	QP	N	FLO
2.158000	15.40	10.4	56	40.6	QP	N	FLO
4.066000	12.90	10.4	56	43.1	QP	N	FLO
15.426000	14.20	10.9	60	45.8	QP	N	FLO

MEASUREMENT RESULT: "TEST_fin2"

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.326000	11.00	10.2	50	38.6	AV	N	FLO
0.610000	9.70	10.3	46	36.3	AV	N	FLO
1.342000	9.30	10.4	46	36.7	AV	N	FLO
2.154000	5.10	10.4	46	40.9	AV	N	FLO
4.066000	3.20	10.4	46	42.8	AV	N	FLO
15.426000	5.80	10.9	50	44.2	AV	N	FLO

Line Conducted Emission Test Line 1-L **A122-0751500ID**



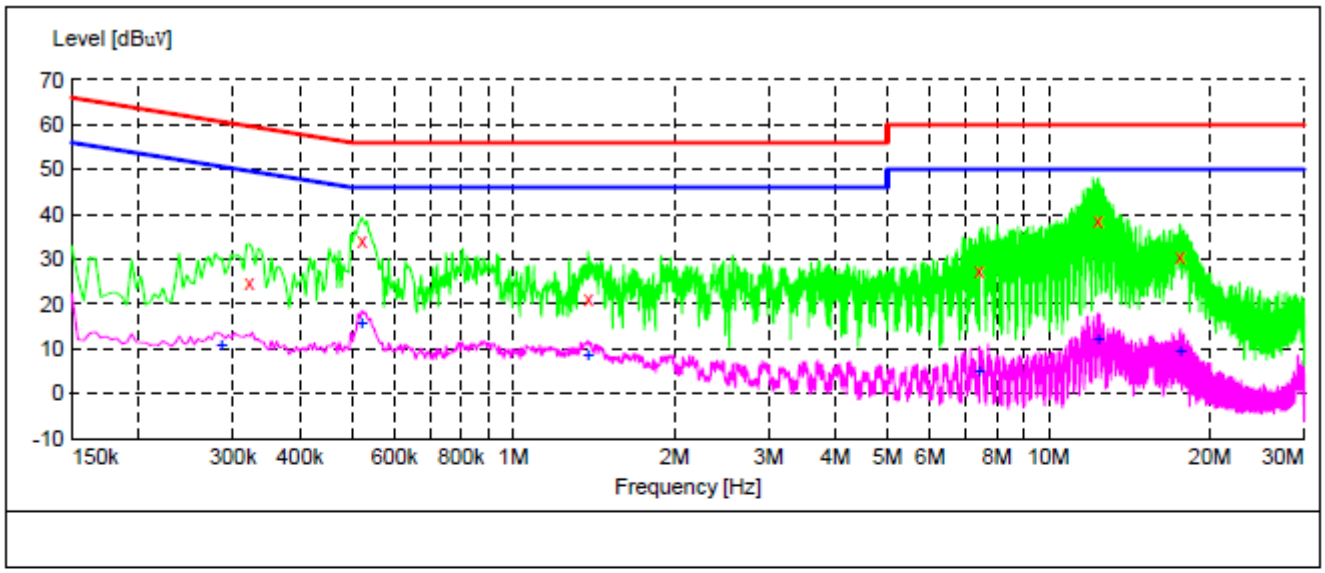
MEASUREMENT RESULT: "TEST_fin"

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.522000	41.60	10.3	56	14.4	QP	L1	FLO
0.902000	31.20	10.4	56	24.8	QP	L1	FLO
1.586000	27.70	10.4	56	28.3	QP	L1	FLO
2.530000	28.50	10.4	56	27.5	QP	L1	FLO
7.618000	35.00	10.6	60	25.0	QP	L1	FLO
12.266000	39.80	10.8	60	20.2	QP	L1	FLO

MEASUREMENT RESULT: "TEST_fin2"

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.518000	18.60	10.3	46	27.4	AV	L1	FLO
0.914000	13.10	10.4	46	32.9	AV	L1	FLO
1.586000	9.70	10.4	46	36.3	AV	L1	FLO
2.530000	8.00	10.4	46	38.0	AV	L1	FLO
7.618000	12.10	10.6	50	37.9	AV	L1	FLO
12.266000	17.60	10.8	50	32.4	AV	L1	FLO

Line Conducted Emission Test Line 2-N



MEASUREMENT RESULT: "TEST_fin"

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.322000	24.80	10.2	60	34.9	QP	N	FLO
0.522000	33.90	10.3	56	22.1	QP	N	FLO
1.382000	21.20	10.4	56	34.8	QP	N	FLO
7.422000	27.50	10.6	60	32.5	QP	N	FLO
12.370000	38.50	10.8	60	21.5	QP	N	FLO
17.606000	30.30	11.0	60	29.7	QP	N	FLO

MEASUREMENT RESULT: "TEST_fin2"

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.286000	11.00	10.2	51	39.6	AV	N	FLO
0.522000	15.90	10.3	46	30.1	AV	N	FLO
1.382000	8.60	10.4	46	37.4	AV	N	FLO
7.422000	5.10	10.6	50	44.9	AV	N	FLO
12.370000	12.00	10.8	50	38.0	AV	N	FLO
17.606000	9.70	11.0	50	40.3	AV	N	FLO

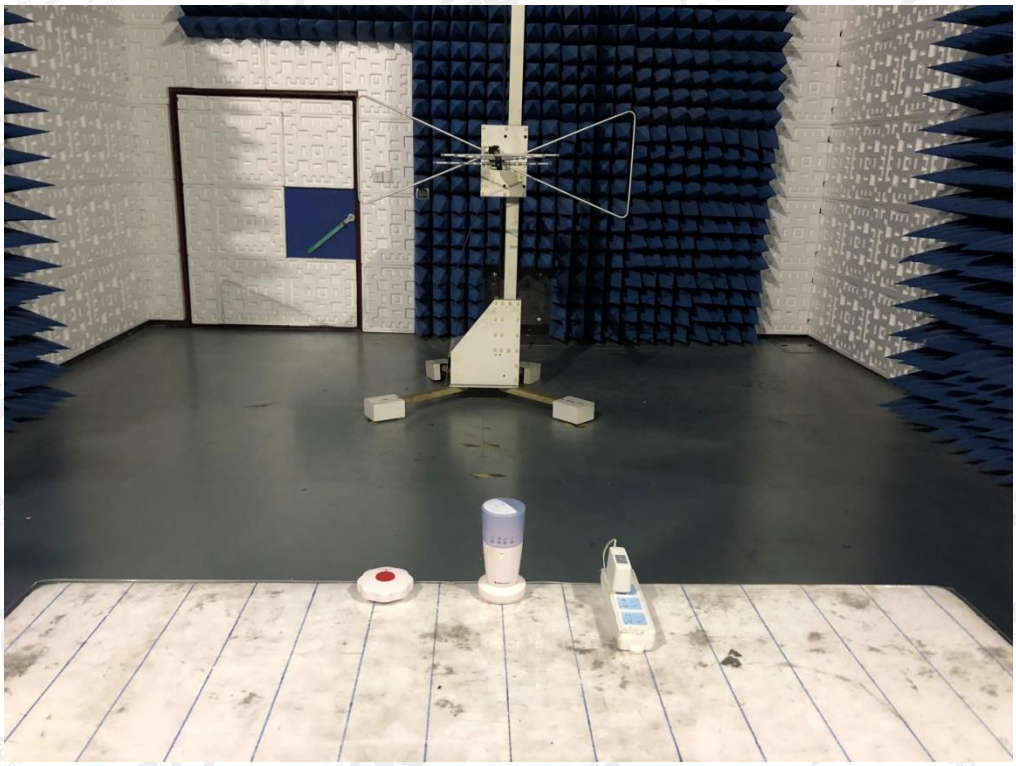
RESULT: PASS

Note: All the test modes had been tested, the mode 1 was the worst case. Only the data of the worst case would be record in this test report.

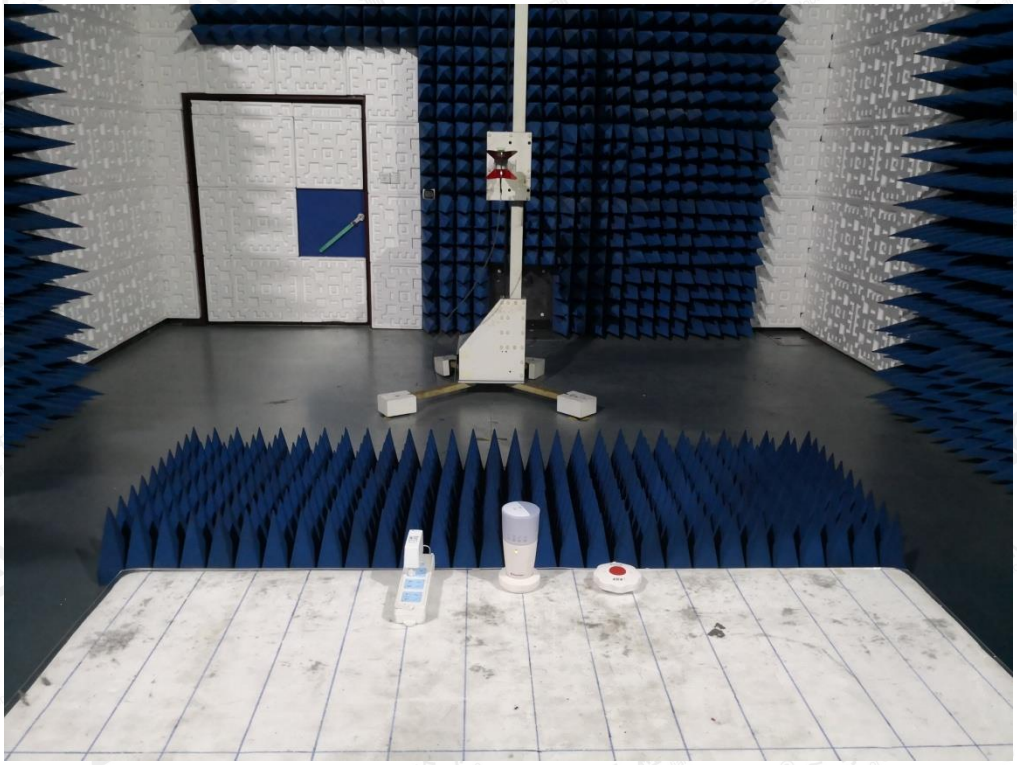
APPENDIX A: PHOTOGRAPHS OF TEST SETUP

FCC LINE CONDUCTED EMISSION TEST SETUP **P12-075150US**

FCC RADIATED EMISSION TEST SETUP BELOW 1GHZ

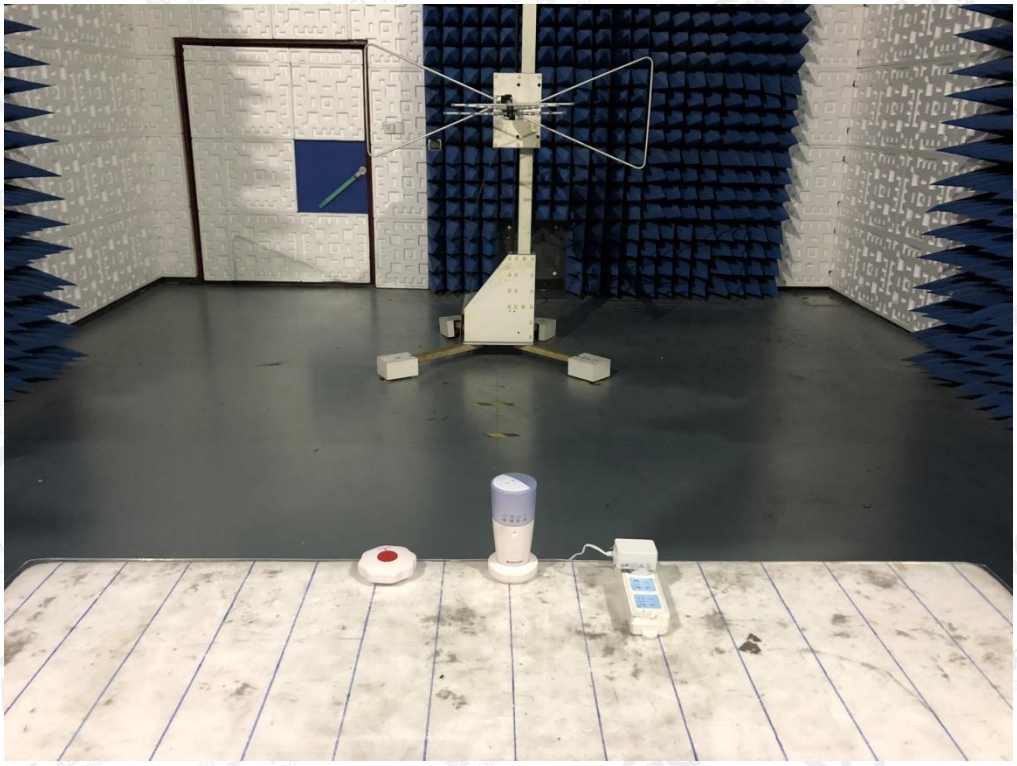


FCC RADIATED EMISSION TEST SETUP ABOVE 1GHZ

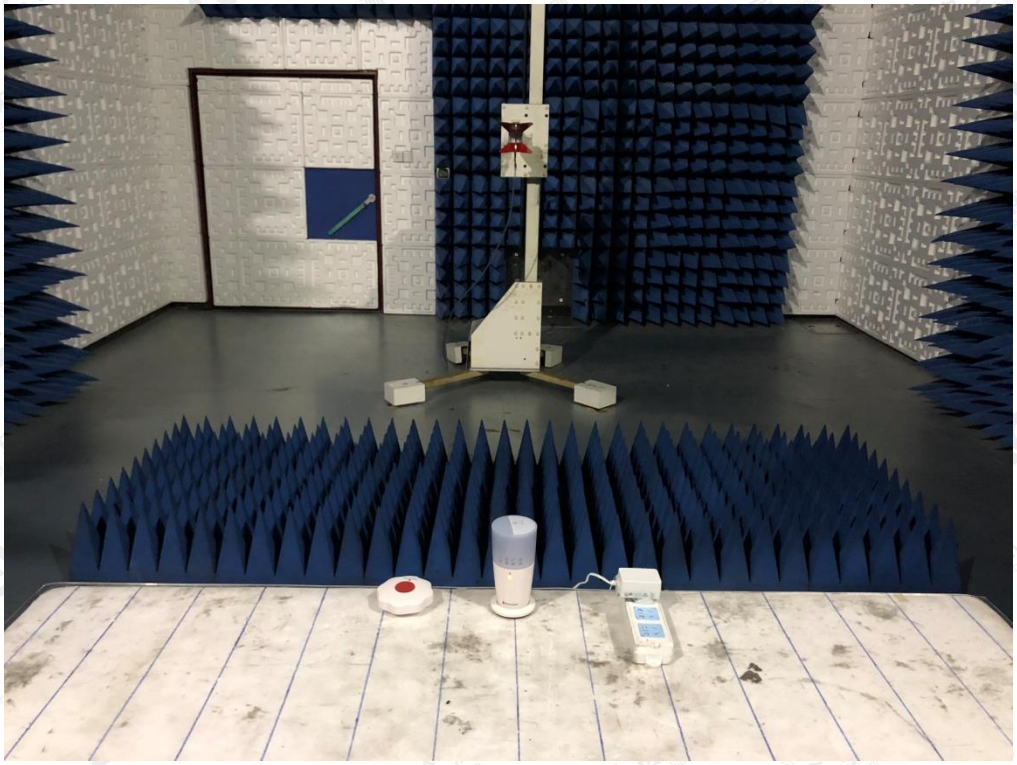


FCC LINE CONDUCTED EMISSION TEST SETUP **A122-0751500ID**

FCC RADIATED EMISSION TEST SETUP BELOW 1GHZ



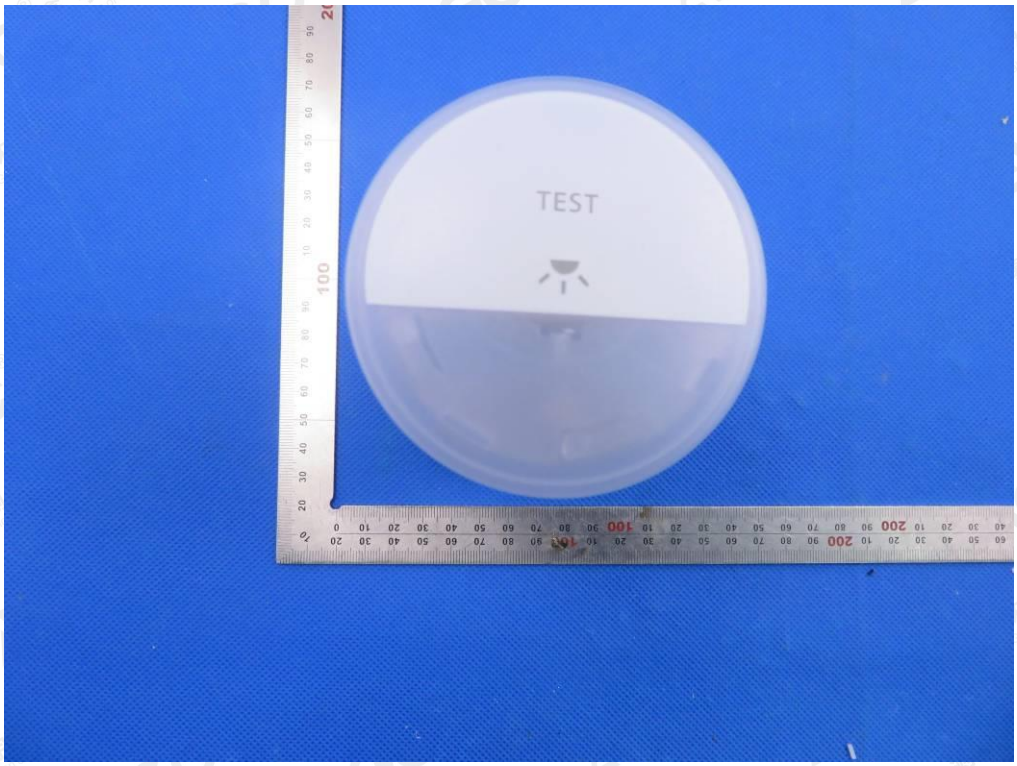
FCC RADIATED EMISSION TEST SETUP ABOVE 1GHZ



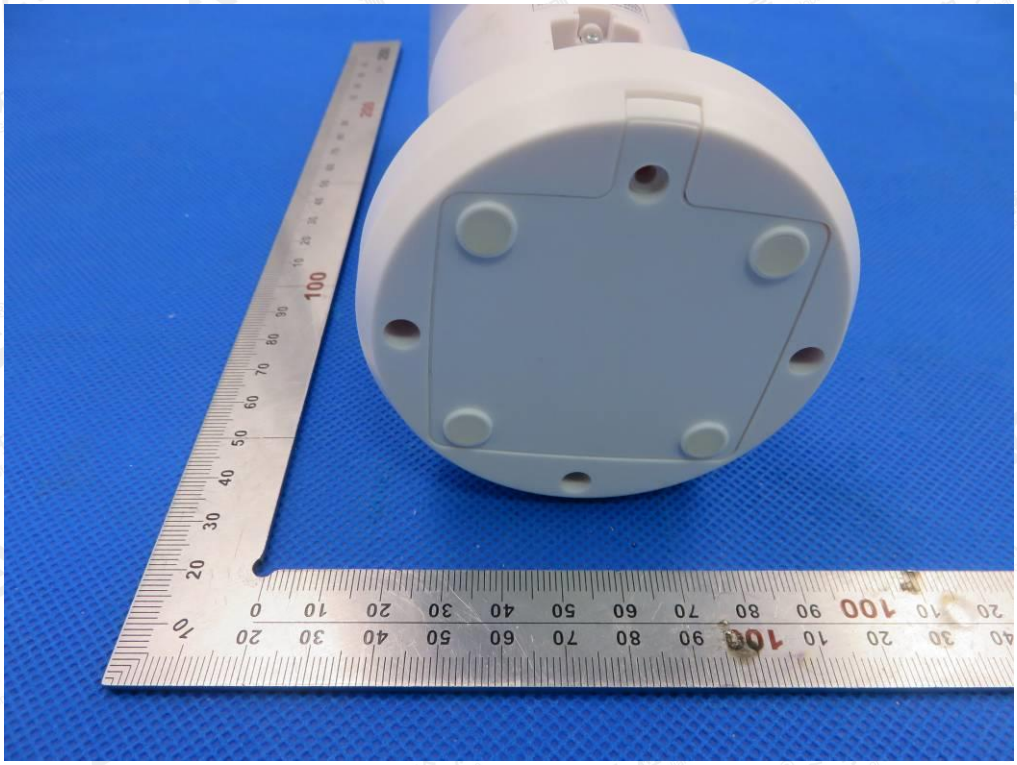
APPENDIX B: PHOTOGRAPHS OF EUT

ALL VIEW OF EUT

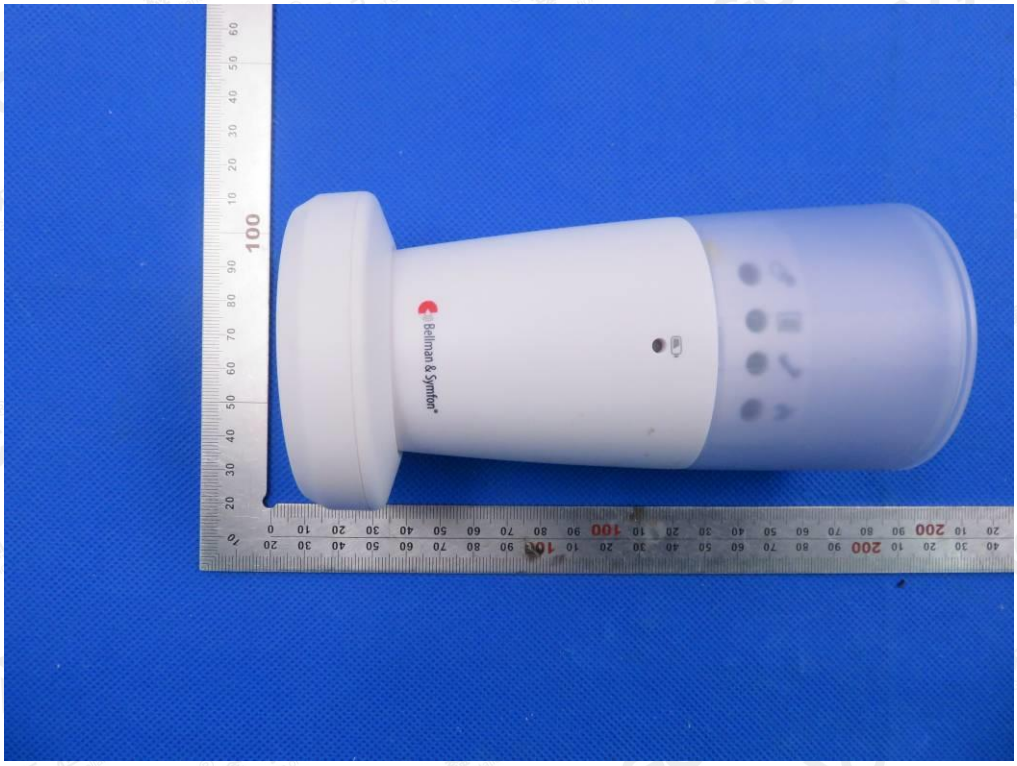
TOP VIEW OF EUT



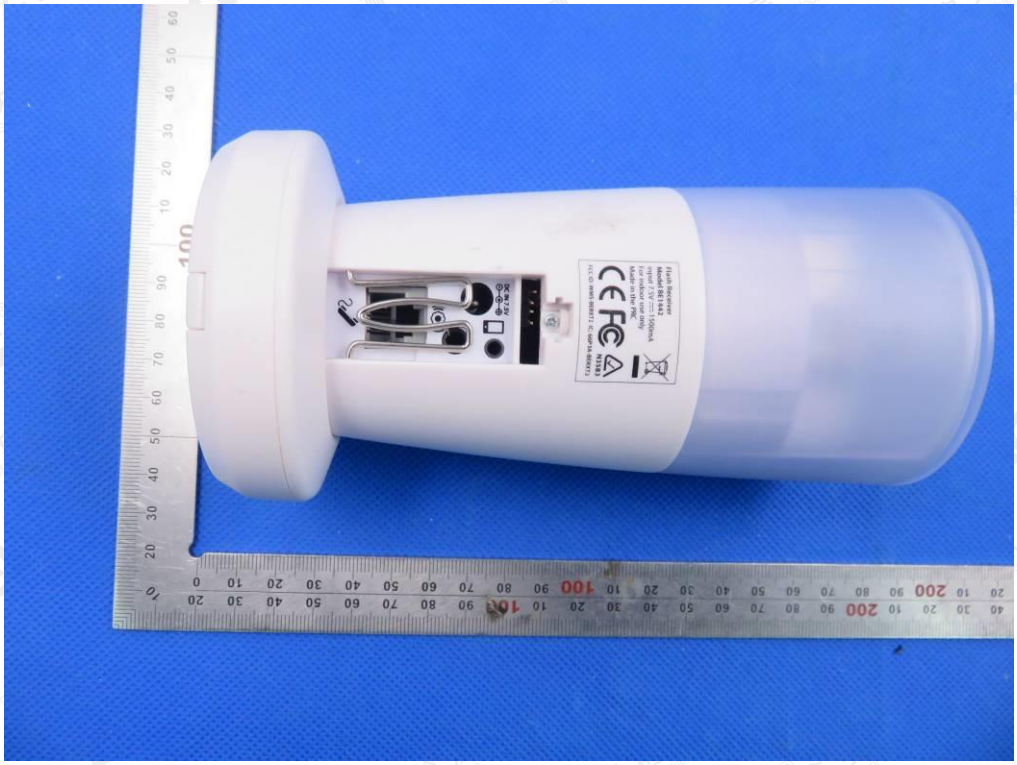
BOTTOM VIEW OF EUT



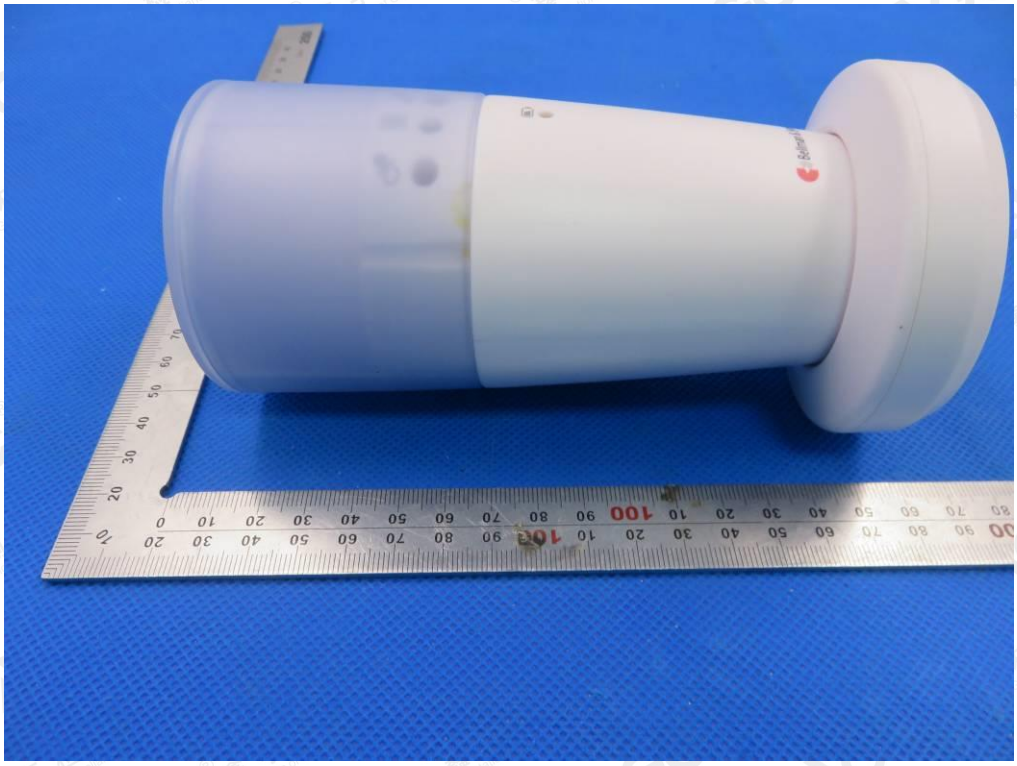
FRONT VIEW OF EUT



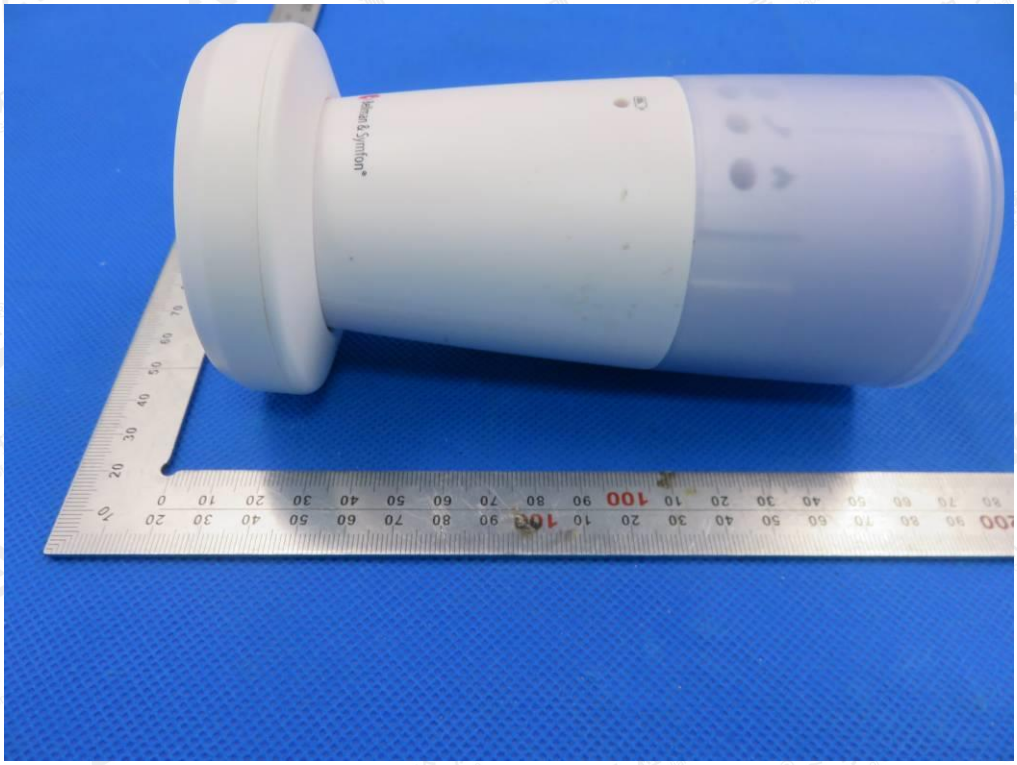
BACK VIEW OF EUT



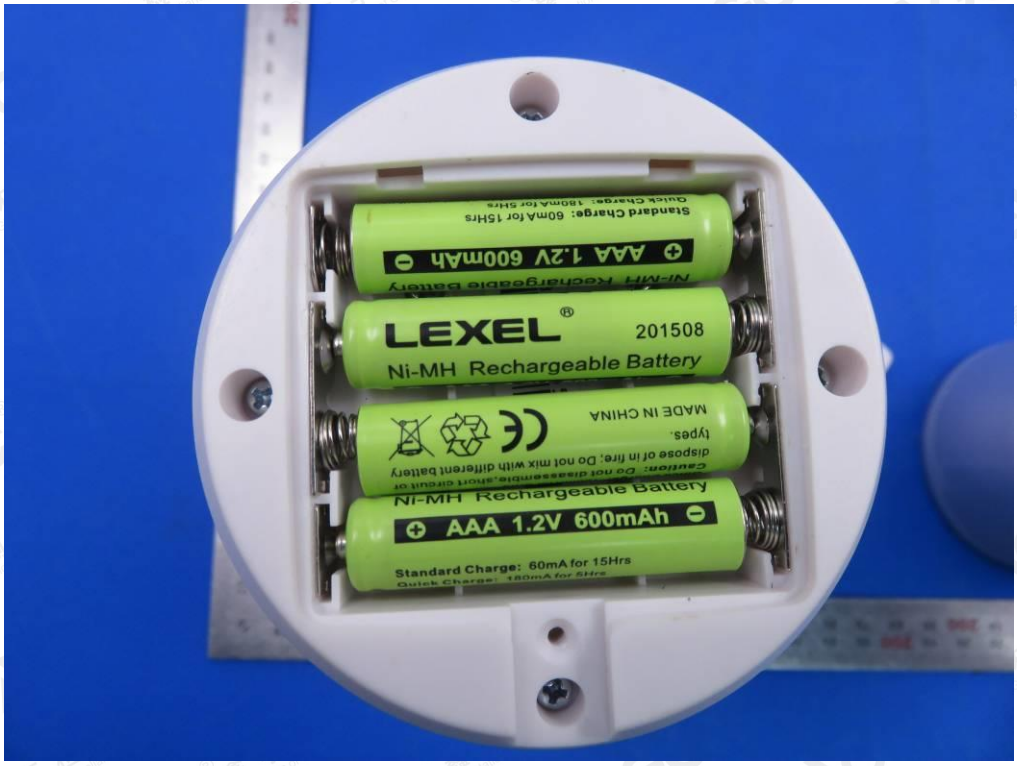
LEFT VIEW OF EUT



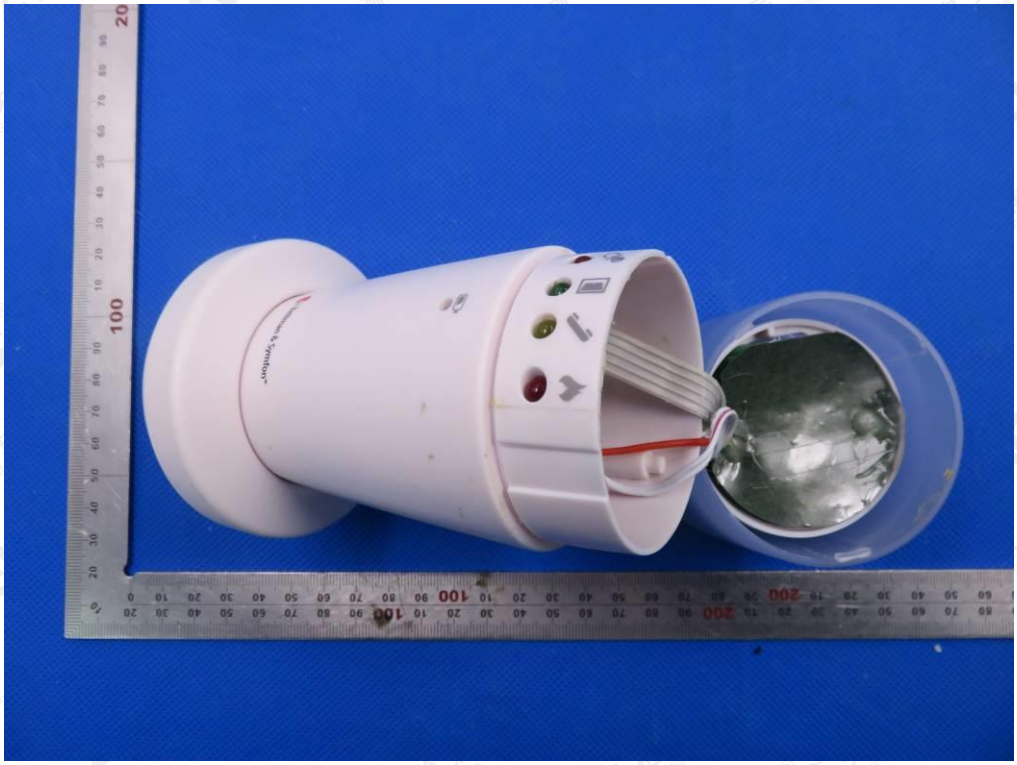
RIGHT VIEW OF EUT



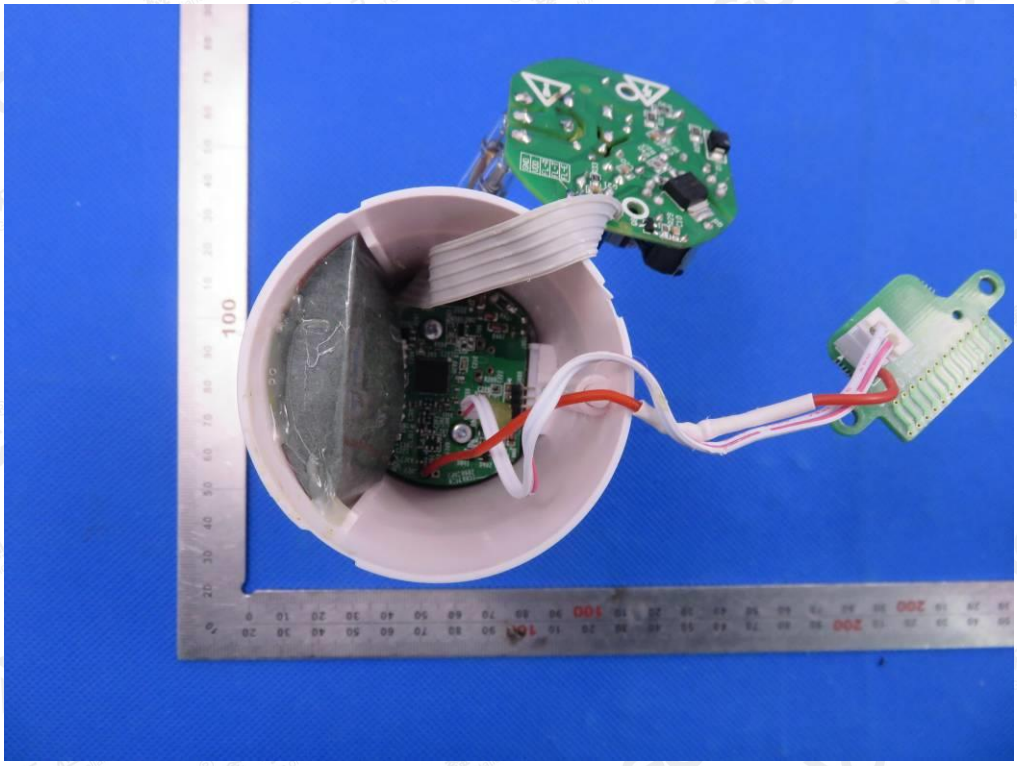
OPEN VIEW-1 OF EUT



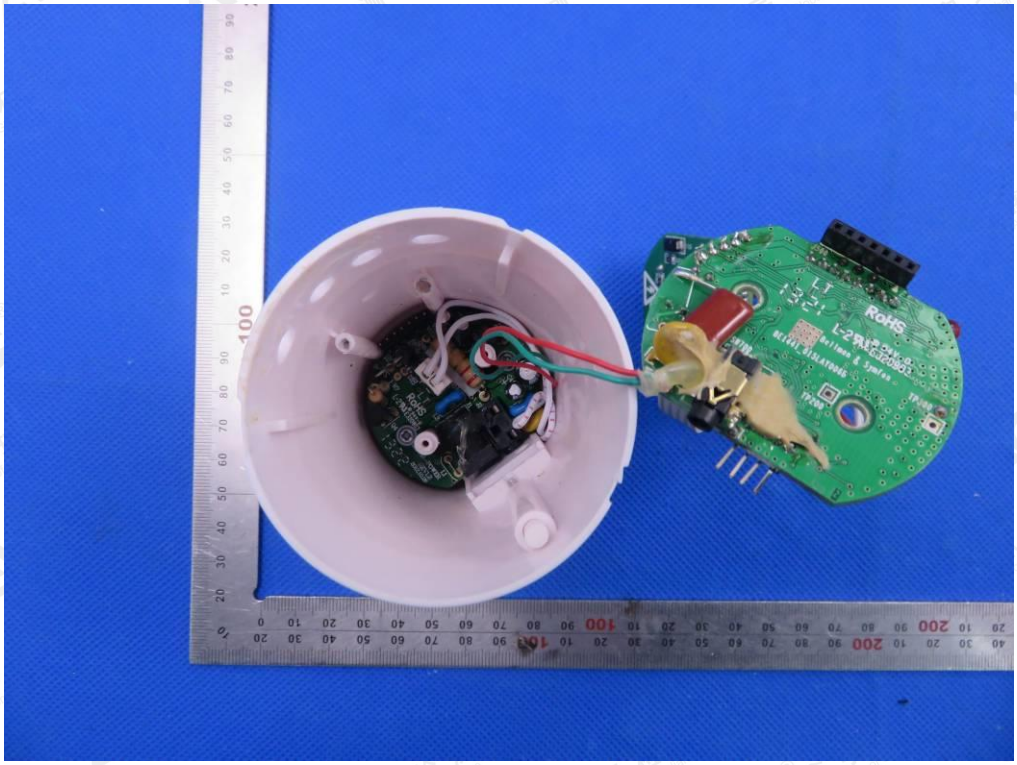
OPEN VIEW-2 OF EUT



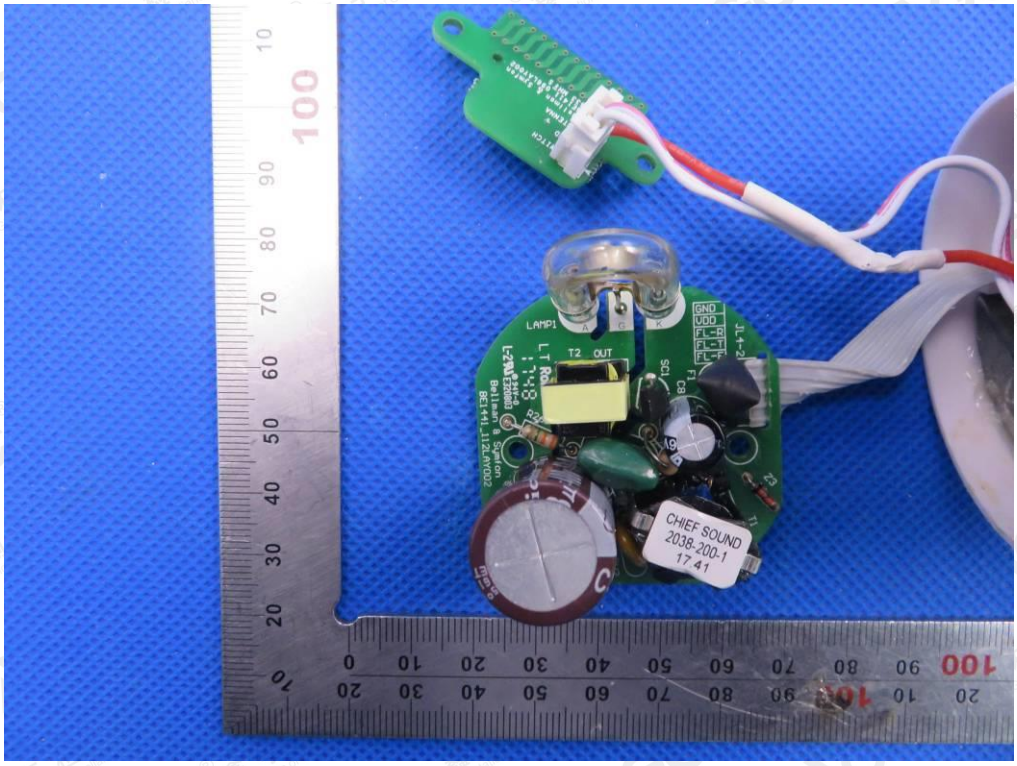
OPEN VIEW-3 OF EUT



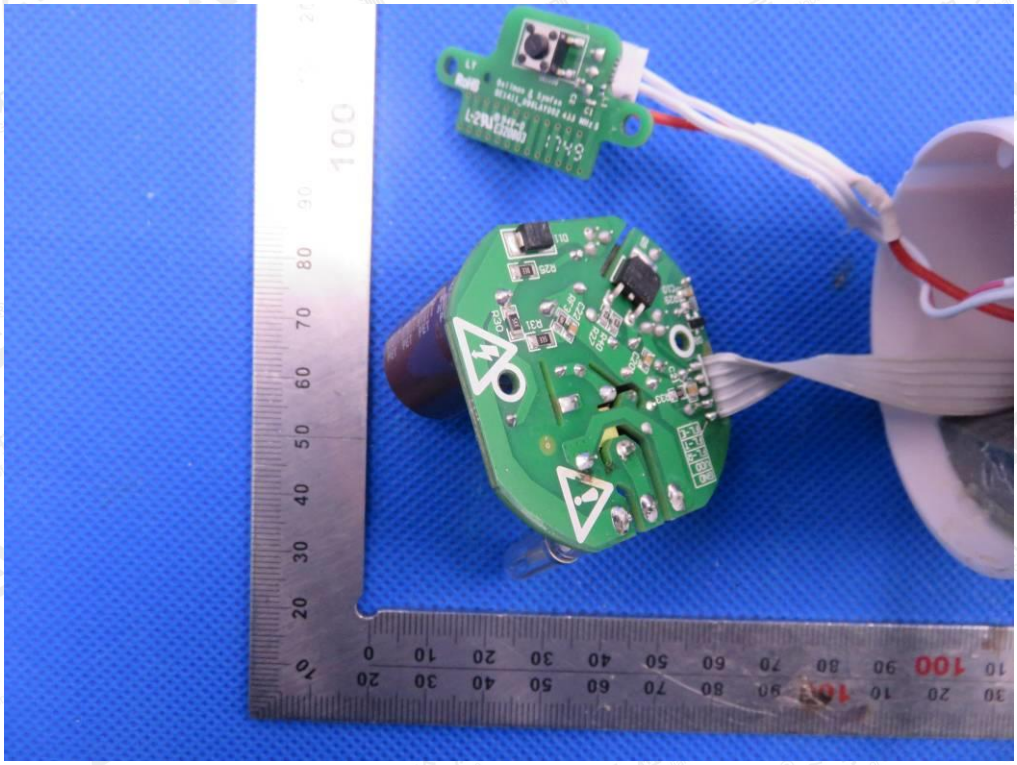
OPEN VIEW-4 OF EUT



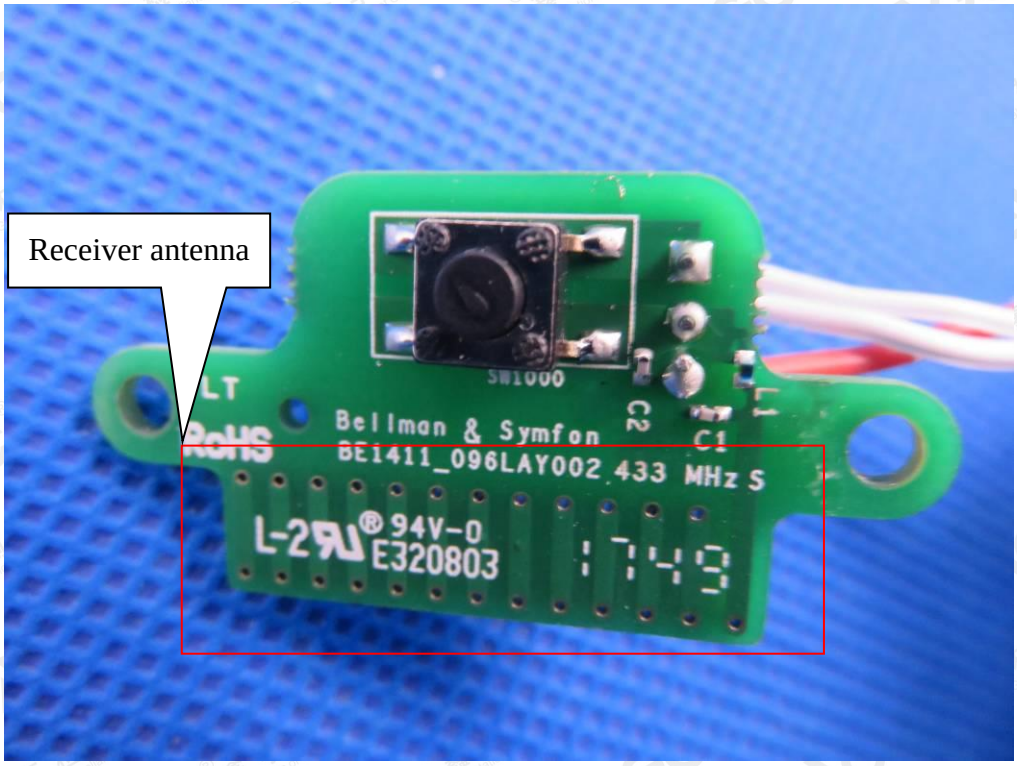
INTERNAL VIEW OF EUT-1



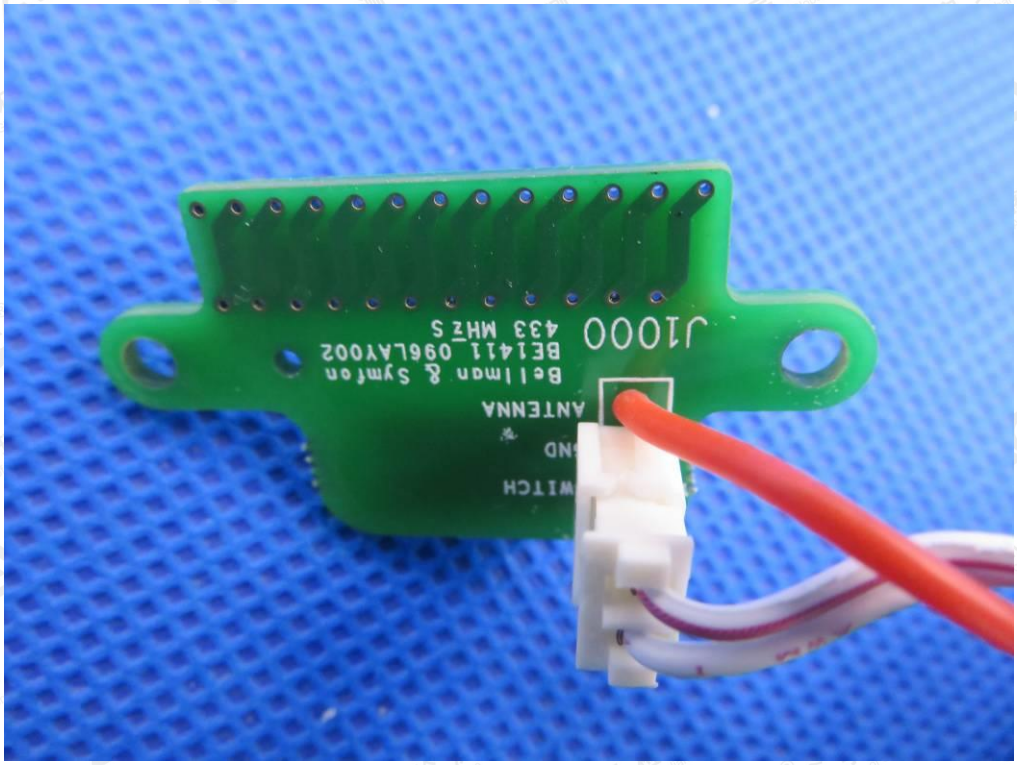
INTERNAL VIEW OF EUT-2



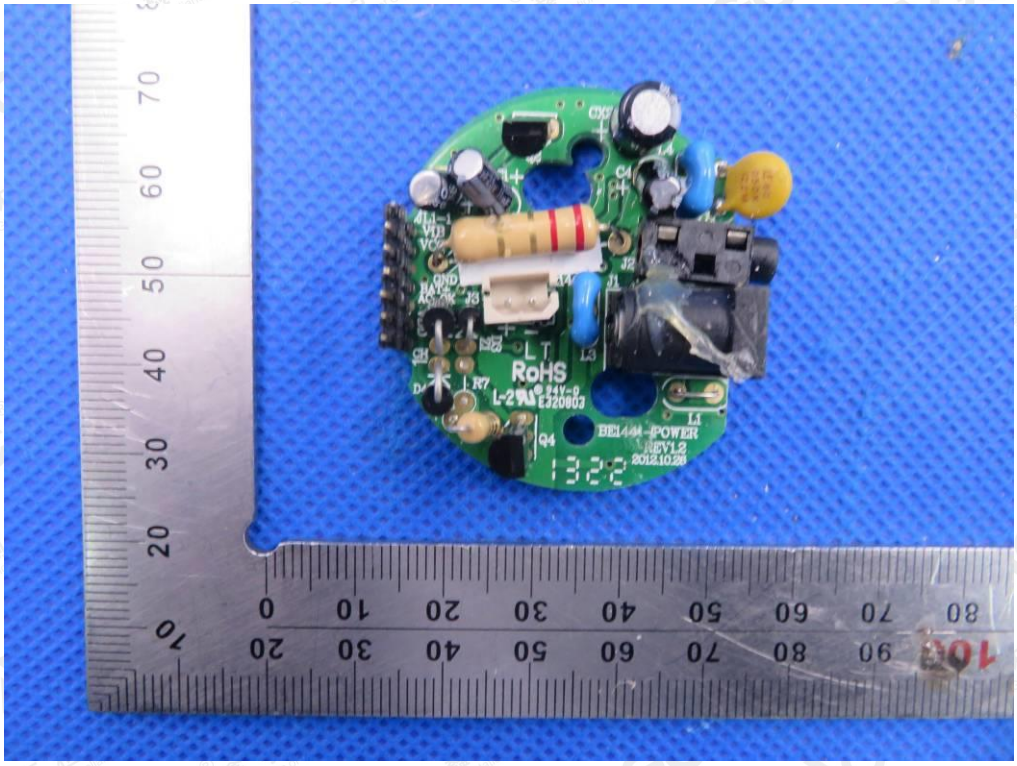
INTERNAL VIEW OF EUT-3



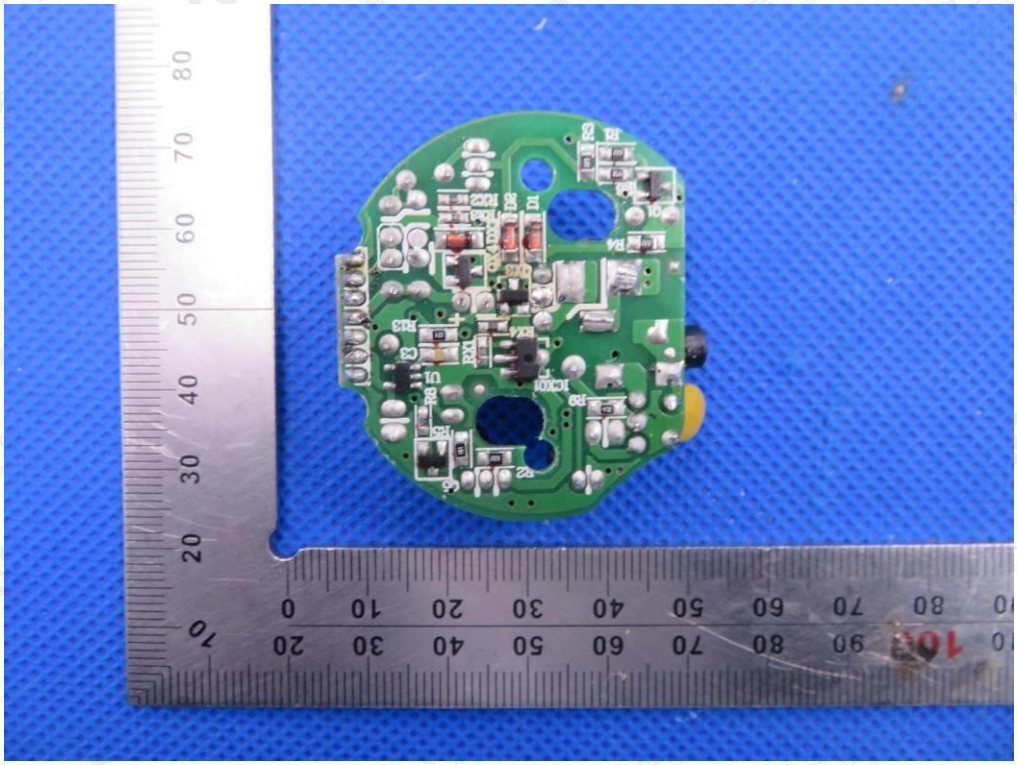
INTERNAL VIEW OF EUT-4



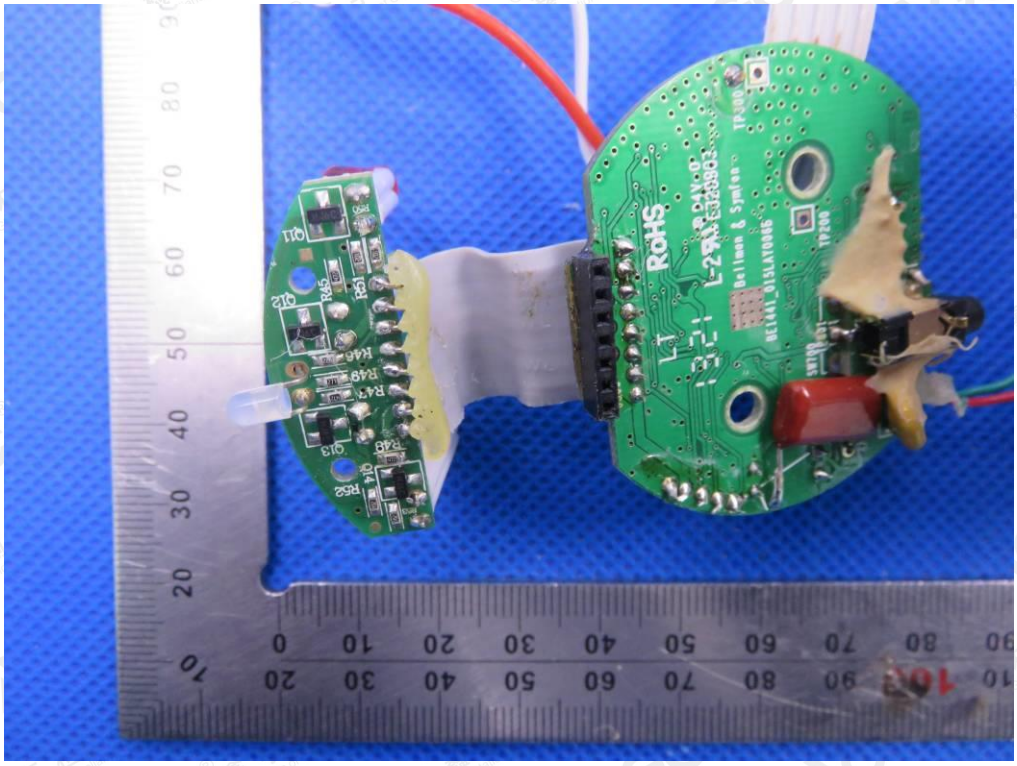
INTERNAL VIEW OF EUT-5



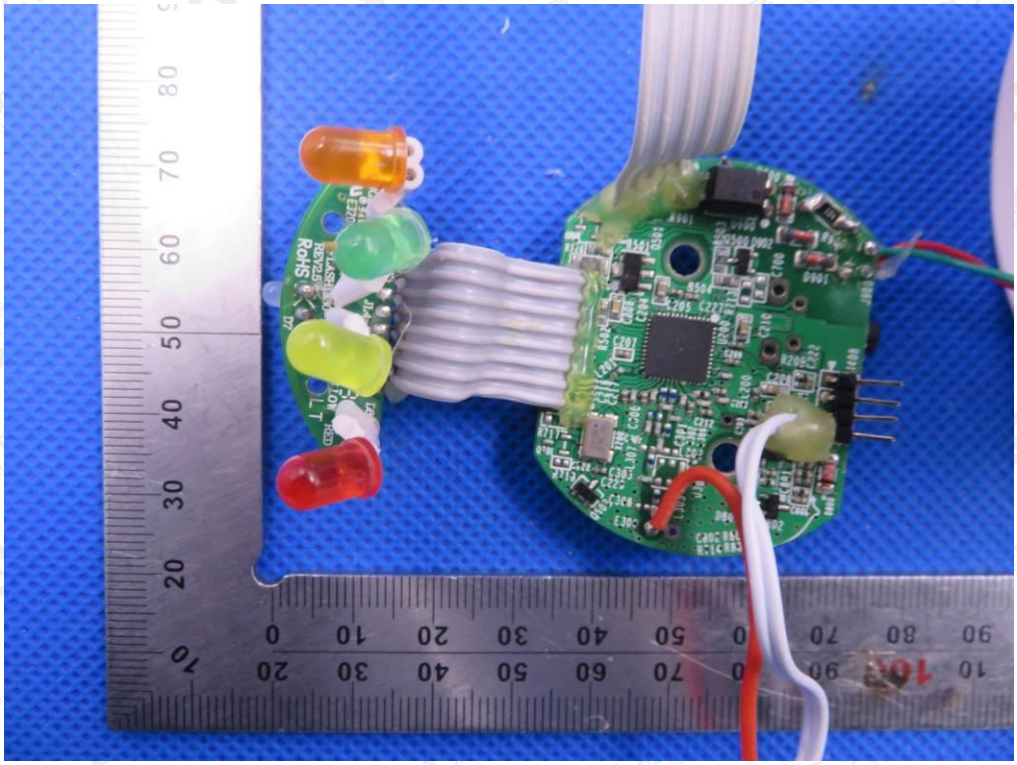
INTERNAL VIEW OF EUT-6



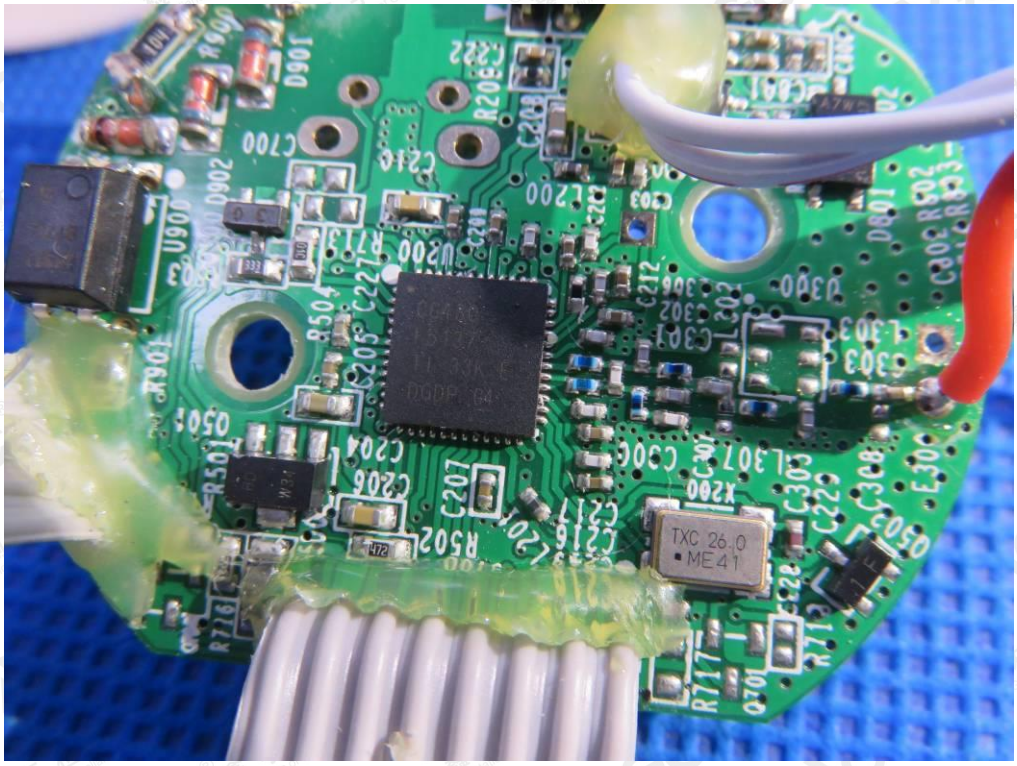
INTERNAL VIEW OF EUT-7



INTERNAL VIEW OF EUT-8



INTERNAL VIEW OF EUT-9



----END OF REPORT----