
FCC Test Report

Report No.: AGC00800191201FE03

FCC ID : 2AF63-IES3
APPLICATION PURPOSE : Original Equipment
PRODUCT DESIGNATION : Pivotal 20W wireless power transmitter
BRAND NAME : Pivotal Commware
MODEL NAME : IES3
APPLICANT : NEOSEN ENERGY
DATE OF ISSUE : Dec. 12, 2019
STANDARD(S) : FCC Part 15 Rules
TEST PROCEDURE(S)
REPORT VERSION : V1.0

Attestation of Global Compliance (Shenzhen) Co., Ltd

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Attestation of Global Compliance

Attestation of Global Compliance(Shenzhen)Co.,Ltd.

Add: 2/F., Building 2, Sanwei Chaxi Industrial Park, Sanwei Community,
Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China

Tel: +86-755 2523 4088

E-mail: agc@agc-cert.com

Service Hotline: 400 089 2118

REPORT REVISE RECORD

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



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1. VERIFICATION OF CONFORMITY

Applicant	NEOSEN ENERGY
Address	1506 CAPITAL AVE., SUITE 150, PLANO TX 75074
Manufacturer	NEOSEN ENERGY
Address	1506 CAPITAL AVE., SUITE 150, PLANO TX 75074
Factory	Suga Electronics
Address	Suga High-tech Industrial Park, No. 8, Fulong Road, Sanzhong, Qingxi Town, Dongguan, Guangdong, PRC
Product Designation	Pivotal 20W wireless power transmitter
Brand Name	Pivotal Commware
Test Model	IES3
Date of test	Dec. 04, 2019~Dec. 12, 2019
Deviation	No any deviation from the test method.
Condition of Test Sample	Normal
Test Result	Pass
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 Section 15.207, 15.209, 15.203 of the FCC Part 15, Subpart C Rules.

The results of testing in this report apply to the product/system which was tested only.

Prepared By



Calvin Liu
(Project Engineer)

Dec. 12, 2019

Reviewed By



Max Zhang
(Reviewer)

Dec. 12, 2019

Approved By



Forrest Lei
(Authorized Officer)

Dec. 12, 2019

2. GENERAL INFORMATION

2.1. PRODUCT DESCRIPTION

A major technical description of EUT is described as following

Operation Frequency	110-205kHz
Test Frequency	125.8kHz
Maximum field strength	55.65dBuV/m(PK)@3m
Modulation	FSK
Number of channels	1
Antenna Gain	0dBi
Antenna Designation	Coil Antenna
Hardware Version	OC7-11C_Pivotal-TX-p2
Software Version	FW.
Power Supply	DC 24V 1.5A



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, $U_c = \pm 3.2$ dB
- Uncertainty of Radiated Emission below 1GHz, $U_c = \pm 3.9$ dB
- Uncertainty of Radiated Emission above 1GHz, $U_c = \pm 4.8$ dB



4. DESCRIPTION OF TEST MODES

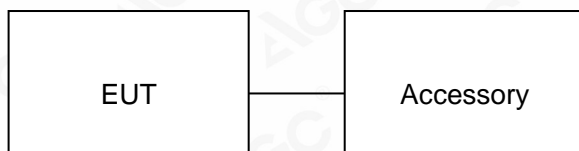
NO.	TEST MODE DESCRIPTION
1	Wireless charging Mode(Full load)
2	Wireless charging Mode(half load)
3	Wireless charging Mode(Null load)
<p>Note:</p> <p>1. The mode 1 was the worst case and only the data of the worst case record in this report.</p>	



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	Pivotal 20W wireless power transmitter	IES3	2AF63-IES3	EUT
2	Load	N/A	10W	Accessory
3	Adapter	PPL36U-240(PV)	DC 24V 1.5A	Accessory

5.3. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.209	Radiated Emission	Compliant
§15.215	20dB bandwidth	Compliant
§15.207	Conducted Emission	Compliant

Note: N/A stands for not applicable.

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
FCC Test Firm Registration Number	975832
A2LA Cert. No.	5054.02
Description	Attestation of Global Compliance(Shenzhen) Co., Ltd is accredited by A2LA

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. 20, 2018	Dec. 19, 2019
Active loop antenna (9K-30MHz)	ZHINAN	ZN30900C	18051	Jun.12, 2019	Jun.11, 2020
ANTENNA	SCHWARZBECK	VULB9168	494	Jan. 09, 2019	Jan. 08, 2021
Test software	Tonscend	JS32-RE	N/A	N/A	N/A
Test software	FARA	EZ EMC (Ver-03A)	N/A	N/A	N/A



7. RADIATED EMISSION

7.1 TEST LIMIT

Standard FCC 15.209

Frequency (MHz)	Distance Meters	Field Strengths Limit	
		μ V/m	dB(μ V)/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(μ V)/m (Peak) 54.0 dB(μ V)/m (Average)	
Remark: (1) Emission level dB μ V = 20 log Emission level μ V/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.			



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7.2. MEASUREMENT PROCEDURE

1. The EUT was placed on the top of the turntable 0.8 or 1.5 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. 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.

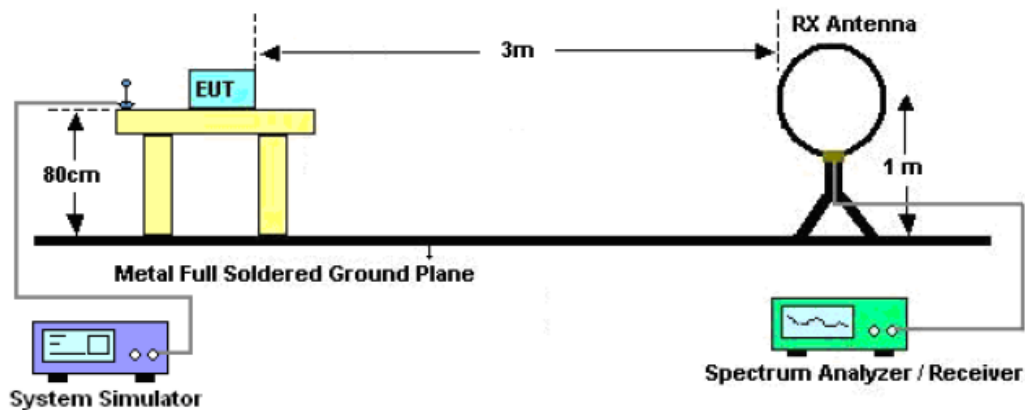
The following table is the setting of spectrum analyzer and receiver.

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

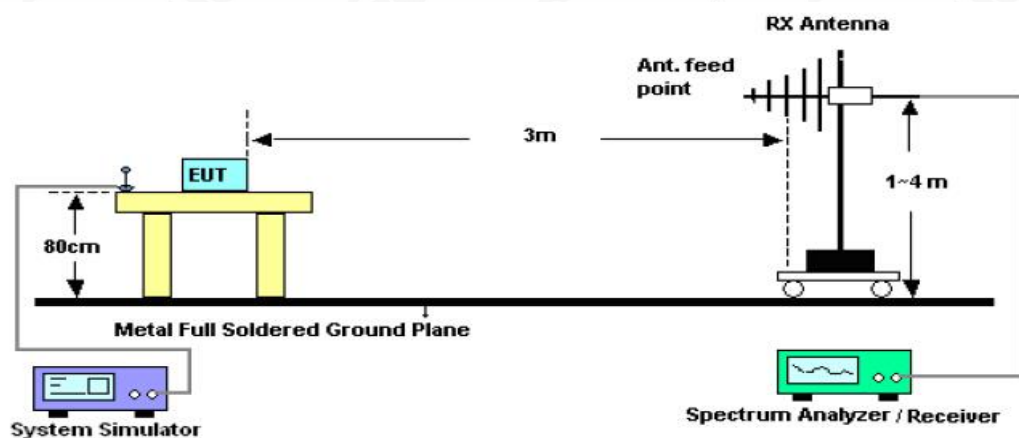
Receiver Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RB 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RB 120KHz for QP

7.3. TEST SETUP

Radiated Emission Test-Setup Frequency Below 30MHz



RADIATED EMISSION TEST SETUP 30MHz-1000MHz



7.4. TEST RESULT

RADIATED EMISSION BELOW 30MHZ

Frequency MHz	Polarization	Reading dB(uV) PK	Factor dB (1/m)	Level dB(uV/m) PK	Limit dB(uV/m) PK	Margin dB	Pass/Fail
0.1258	Face	45.25	10.40	55.65	105.61	-49.96	Pass
0.1258	Side	35.18	10.40	45.58	105.61	-60.03	Pass

Note1: No other emissions found between lowest internal used/generated frequencies to 30MHz. The peak level of the emission is less than the average limit, so the average level shall be less than the limit without test.

Note 2: $\text{Level(dBuV/m)} = \text{Reading(dBuV)} + \text{Factor(dB/m)}$

$\text{Factor(dB/m)} = \text{Antenna Factor(dB/m)} + \text{Cable loss(dB)} + \text{Attenuation(dB)}$ for Attenuator

$\text{Margin} = \text{Level} - \text{Limit}$

$\text{Limit(dBuV/m)} = 20\log(2400/F(\text{kHz})) + 40\log(300/3) = 105.22\text{dBuV/m.}$



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RADIATED EMISSION 30MHz- 1GHz

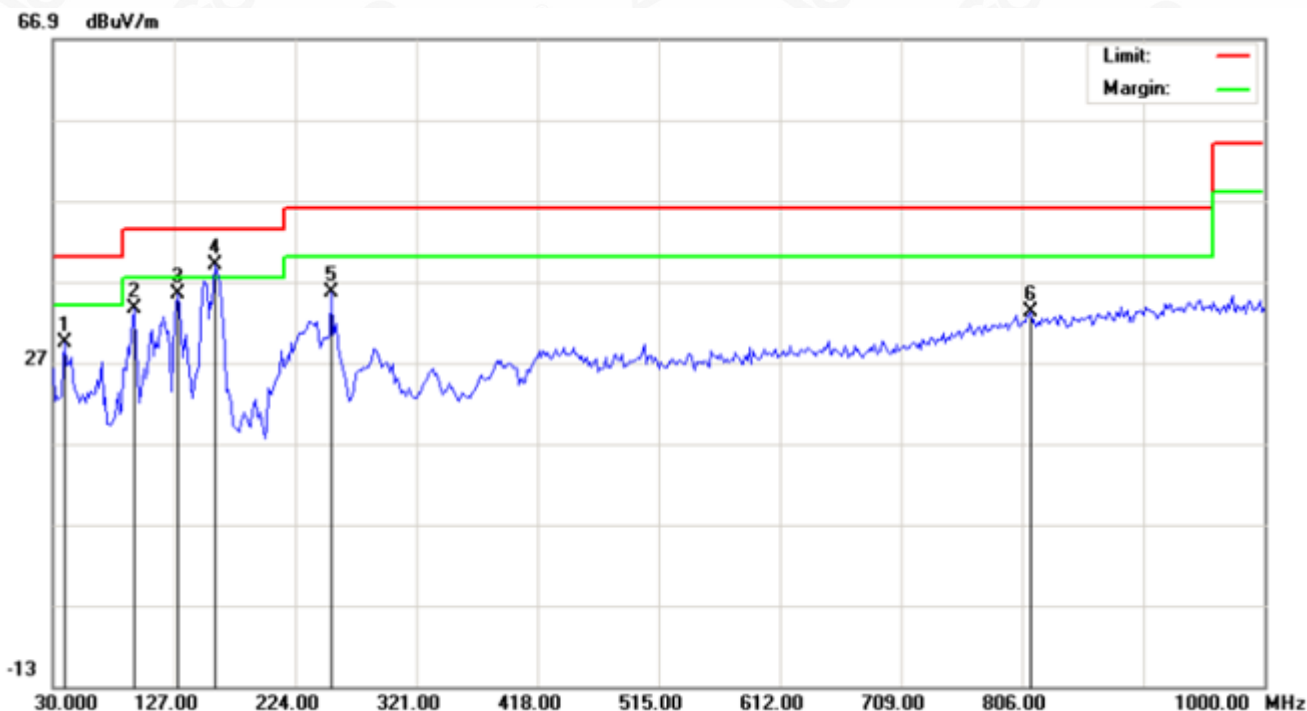
EUT :	Pivotal 20W wireless power transmitter	Model Name. :	IES3
Temperature :	23.5℃	Relative Humidity:	52.6%
Pressure :	1010 hPa	Test Voltage :	DC 24V
Test Mode :	Mode 1	Polarization :	Horizontal



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		94.6667	15.81	15.46	31.27	43.50	-12.23	peak			
2	*	136.7000	17.03	19.02	36.05	43.50	-7.45	peak			
3		164.1833	17.28	18.76	36.04	43.50	-7.46	peak			
4		256.3333	19.27	18.37	37.64	46.00	-8.36	peak			
5		424.4667	6.27	23.47	29.74	46.00	-16.26	peak			
6		899.7667	2.00	31.70	33.70	46.00	-12.30	peak			

RESULT: PASS

EUT :	Pivotal 20W wireless power transmitter	Model Name. :	IES3
Temperature :	23.5℃	Relative Humidity:	52.6%
Pressure :	1010 hPa	Test Voltage :	DC 24V
Test Mode :	Mode 1	Polarization :	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		39.7000	9.50	19.98	29.48	40.00	-10.52	peak			
2		94.6667	18.09	15.46	33.55	43.50	-9.95	peak			
3		130.2332	16.79	18.61	35.40	43.50	-8.10	peak			
4	*	159.3333	19.89	19.19	39.08	43.50	-4.42	peak			
5		253.1000	17.16	18.43	35.59	46.00	-10.41	peak			
6		812.4667	2.73	30.57	33.30	46.00	-12.70	peak			

RESULT: PASS

Note: Factor=Antenna Factor + Cable loss, Margin=Limit-Level.

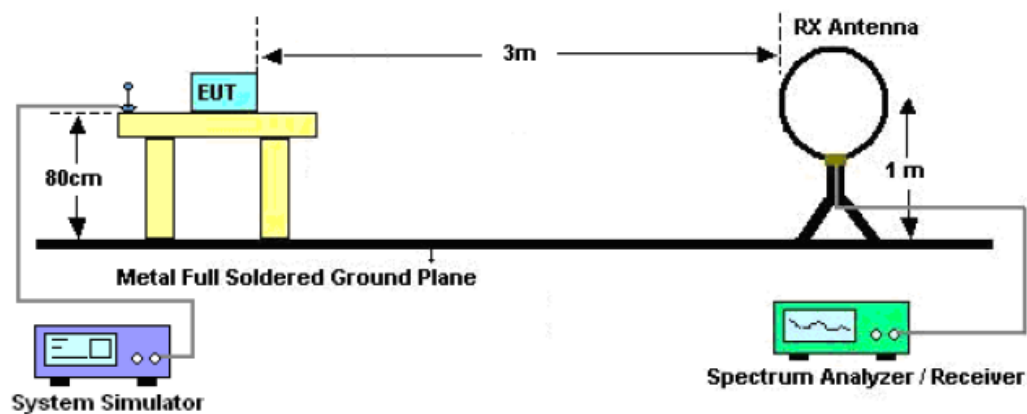
The "Factor" value can be calculated automatically by software of measurement system.

8. 20DB BANDWIDTH

8.1. 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. Set the EUT Work on operation frequency.
3. Set Span = approximately 2 to 5 times the 20 dB bandwidth, centered on a channel
The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW and video bandwidth (VBW) shall be approximately three times RBW; Sweep = auto; Detector function = peak
4. Set SPA Trace 1 Max hold, then View.

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

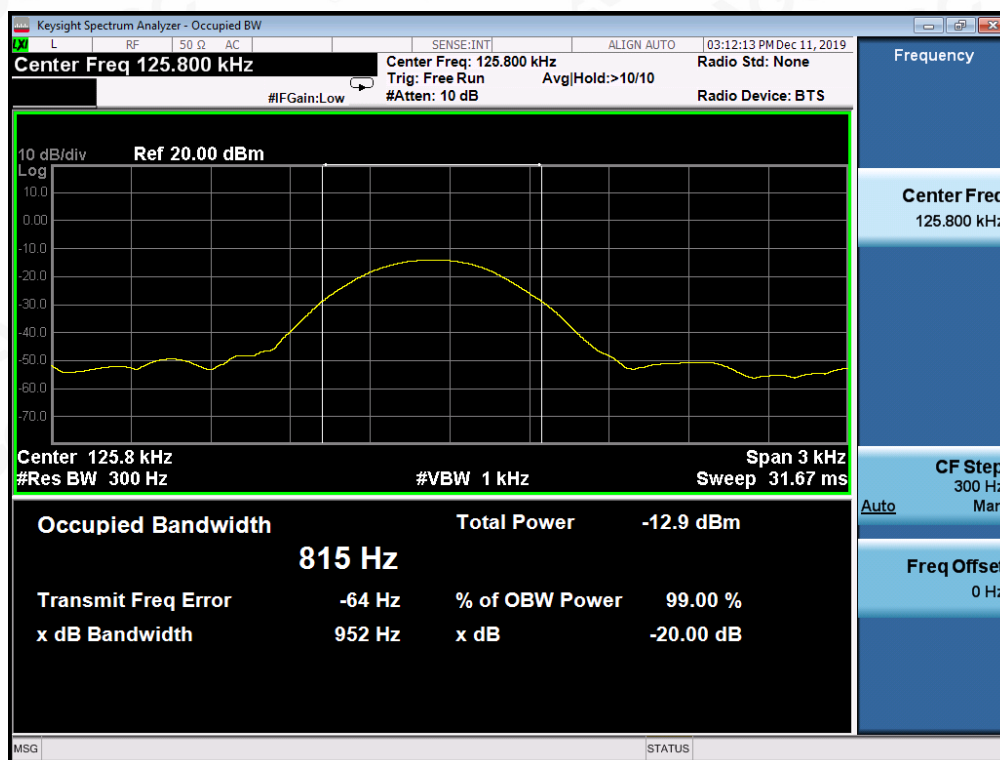


8.3. MEASUREMENT RESULTS

TEST ITEM	20DB BANDWIDTH
TEST MODULATION	FSK

Test Data (Hz)		Criteria
Operate Channel	952	PASS

TEST PLOT OF BANDWIDTH



9. FCC LINE CONDUCTED EMISSION TEST

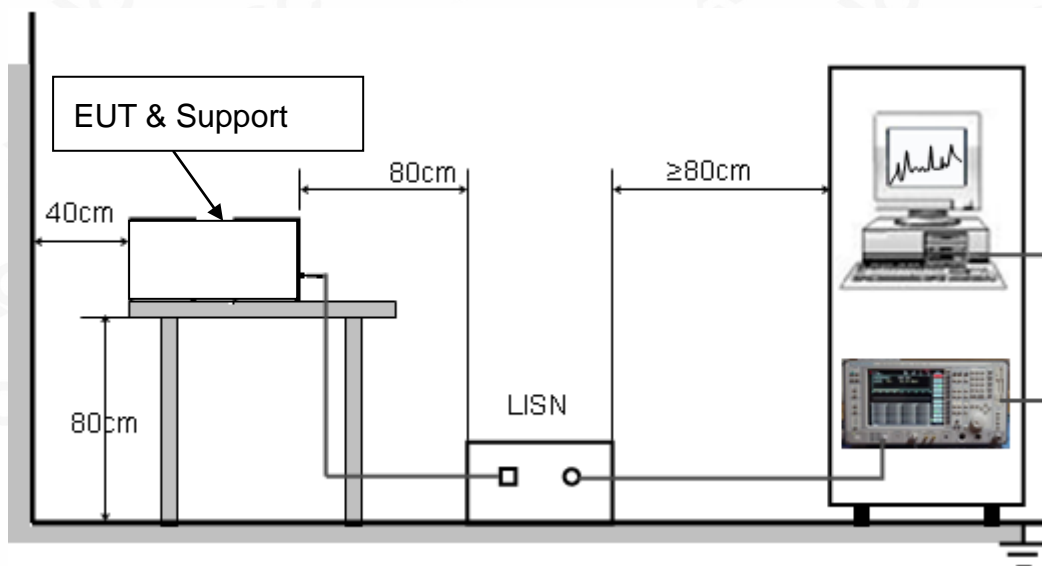
9.1. LIMITS OF LINE CONDUCTED EMISSION TEST

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.

9.2. BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST



9.3. 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/60Hz 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.

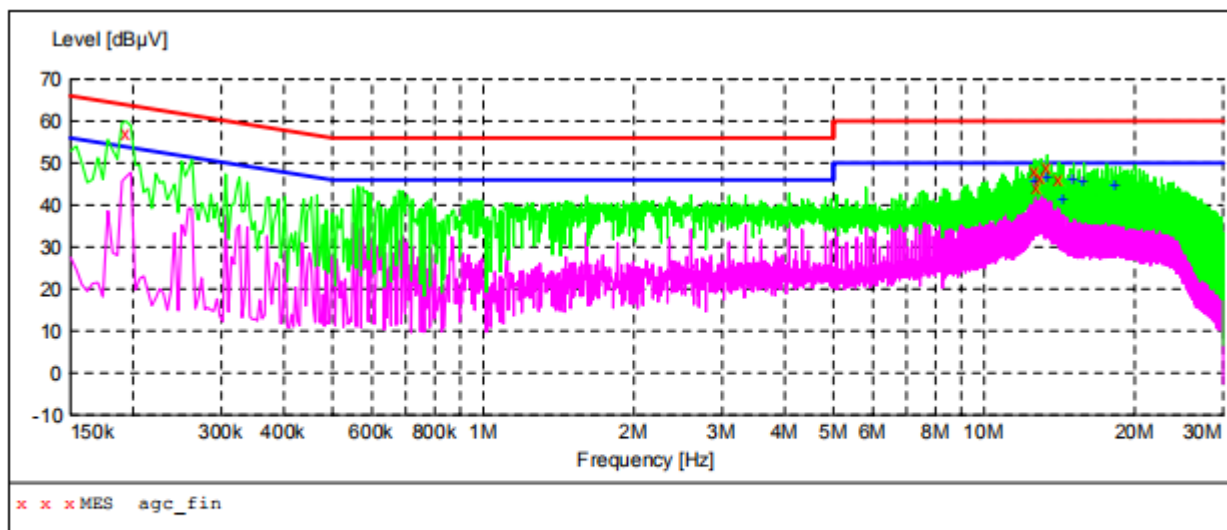
Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

9.4. 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.

9.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST

LINE CONDUCTED EMISSION TEST-L



MEASUREMENT RESULT: "agc_fin"

2019/12/11 14:14

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.194000	57.10	10.8	64	6.8	QP	L1	FLO
12.626000	48.20	11.7	60	11.8	QP	L1	FLO
12.750000	44.40	11.7	60	15.6	QP	L1	FLO
12.994000	46.40	11.7	60	13.6	QP	L1	FLO
13.362000	49.00	11.8	60	11.0	QP	L1	FLO
14.114000	46.20	11.8	60	13.8	QP	L1	FLO

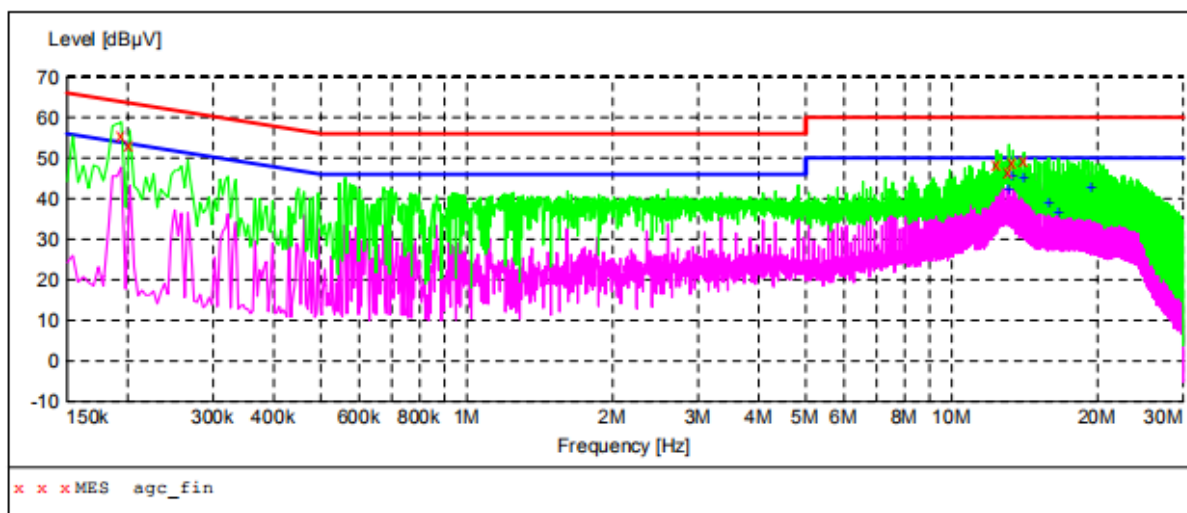
MEASUREMENT RESULT: "agc_fin2"

2019/12/11 14:14

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
12.622000	45.80	11.7	50	4.2	AV	L1	FLO
13.362000	46.80	11.8	50	3.2	AV	L1	FLO
14.358000	41.40	11.8	50	8.6	AV	L1	FLO
15.098000	46.30	11.9	50	3.7	AV	L1	FLO
15.838000	45.50	12.0	50	4.5	AV	L1	FLO
18.314000	44.60	12.2	50	5.4	AV	L1	FLO

RESULT: PASS

LINE CONDUCTED EMISSION TEST-N



MEASUREMENT RESULT: "agc_fin"

2019/12/11 14:17

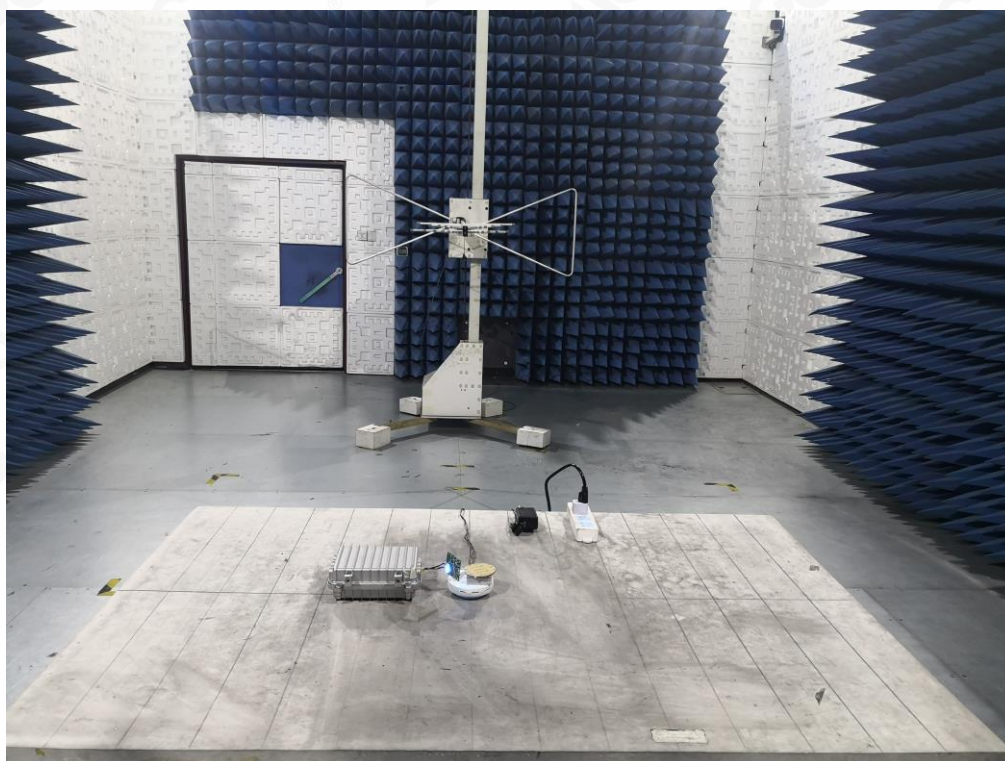
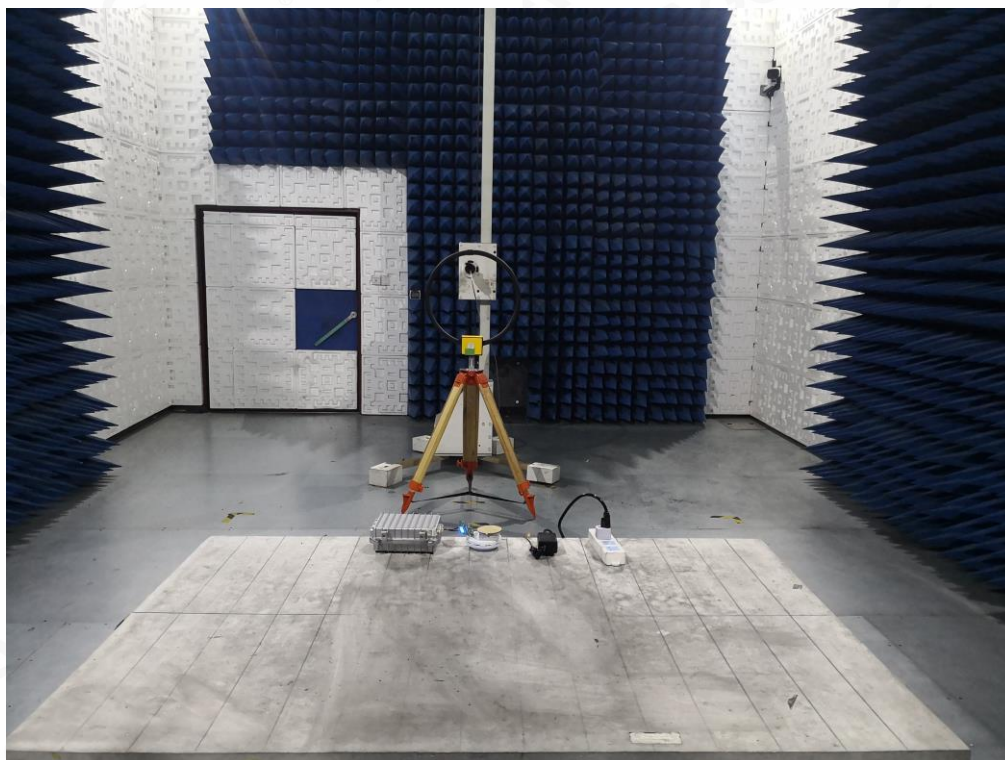
Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.194000	55.70	10.8	64	8.2	QP	N	FLO
0.202000	53.00	10.8	64	10.5	QP	N	FLO
12.382000	48.40	11.7	60	11.6	QP	N	FLO
13.126000	46.40	11.8	60	13.6	QP	N	FLO
13.370000	49.10	11.8	60	10.9	QP	N	FLO
14.106000	49.50	11.8	60	10.5	QP	N	FLO

MEASUREMENT RESULT: "agc_fin2"

2019/12/11 14:19

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
13.126000	42.10	11.8	50	7.9	AV	N	FLO
13.370000	45.60	11.8	50	4.4	AV	N	FLO
14.110000	45.30	11.8	50	4.7	AV	N	FLO
15.846000	38.70	12.0	50	11.3	AV	N	FLO
16.594000	36.70	12.0	50	13.3	AV	N	FLO
19.430000	42.80	12.3	50	7.2	AV	N	FLO

RESULT: PASS

APPENDIX A: PHOTOGRAPHS OF TEST SETUP
FCC RADIATED EMISSION TEST SETUP BELOW 1GHZ

FCC LINE CONDUCTED EMISSION TEST SETUP



APPENDIX B: PHOTOGRAPHS OF EUT

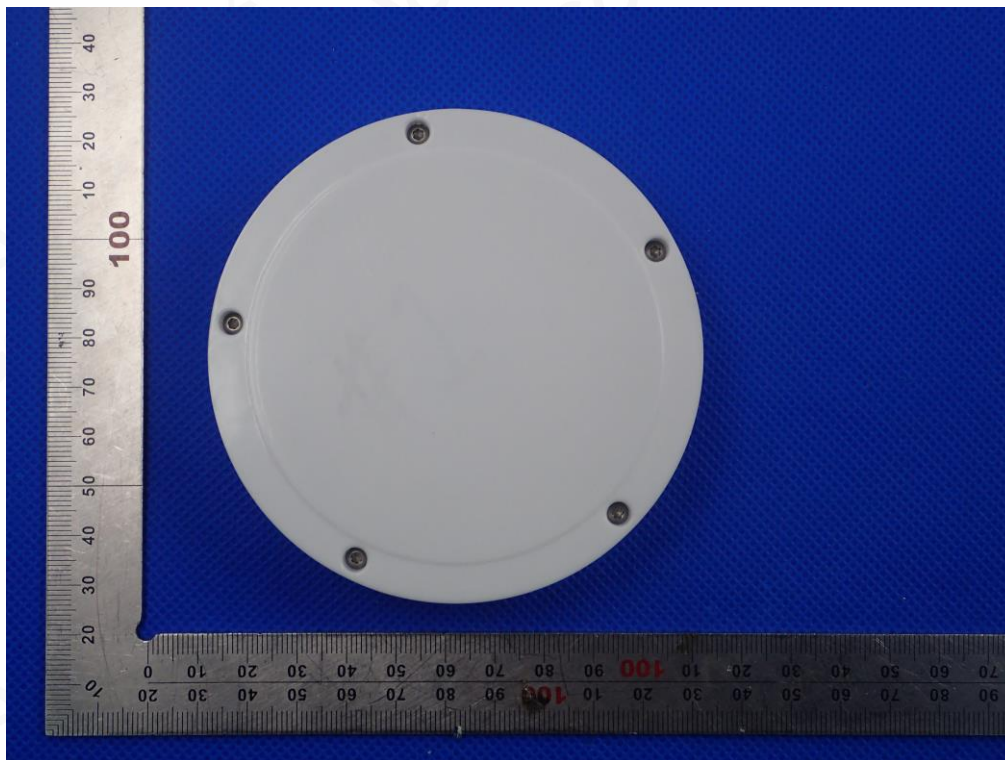
ALL VIEW OF EUT



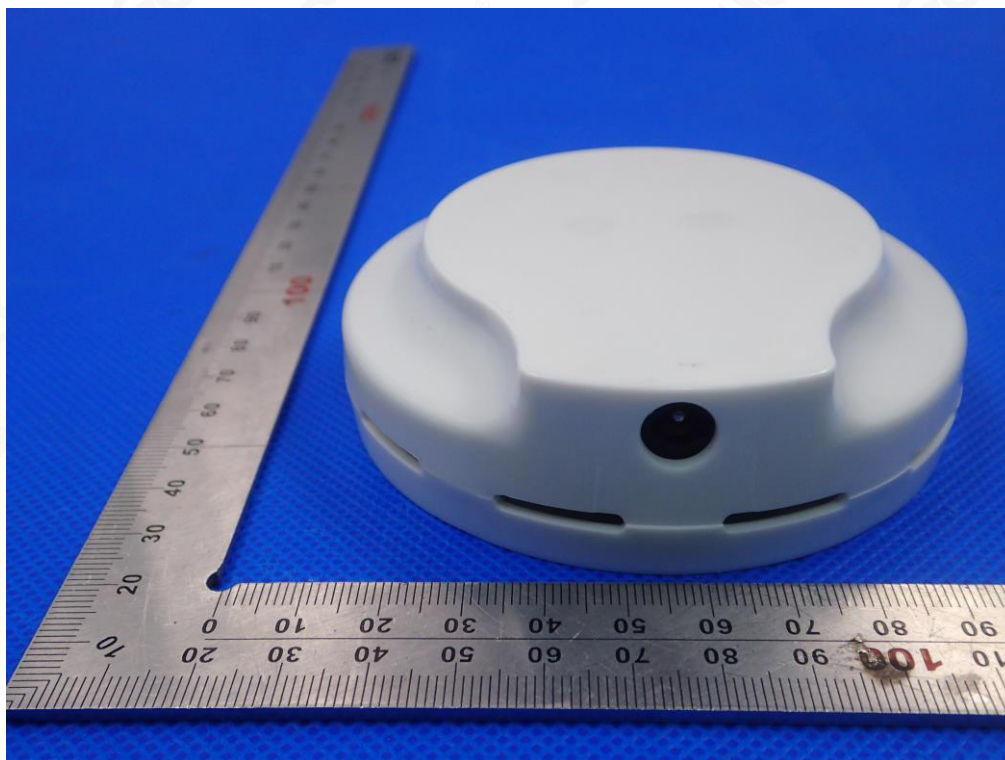
TOP VIEW OF EUT



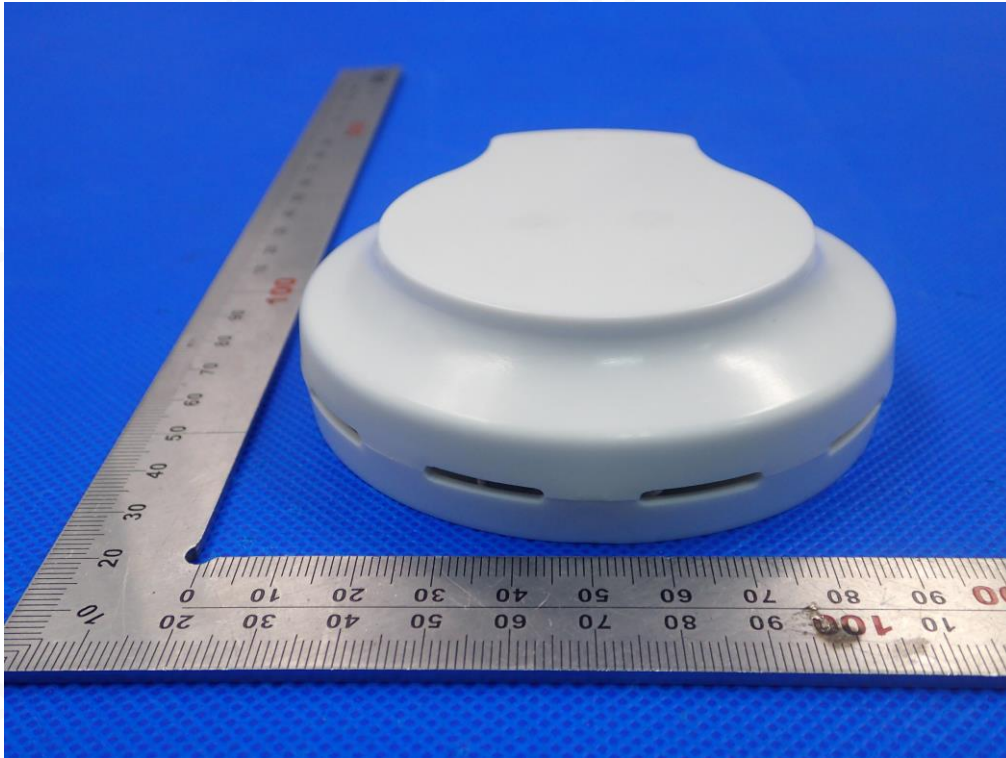
BOTTOM VIEW OF EUT



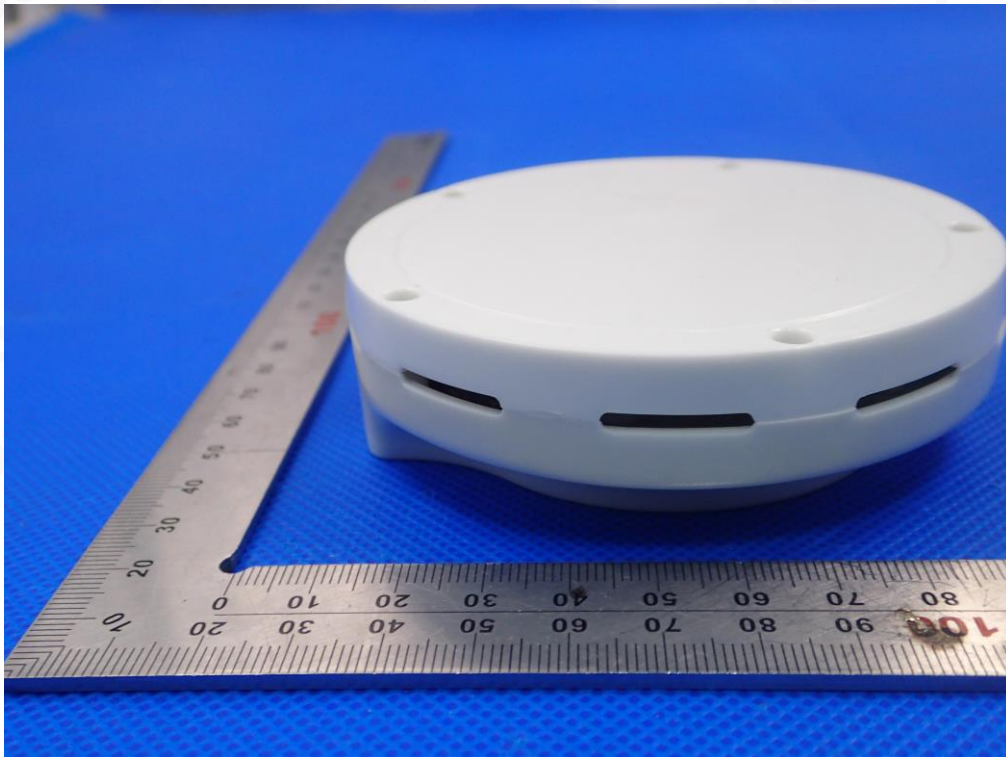
FRONT VIEW OF EUT



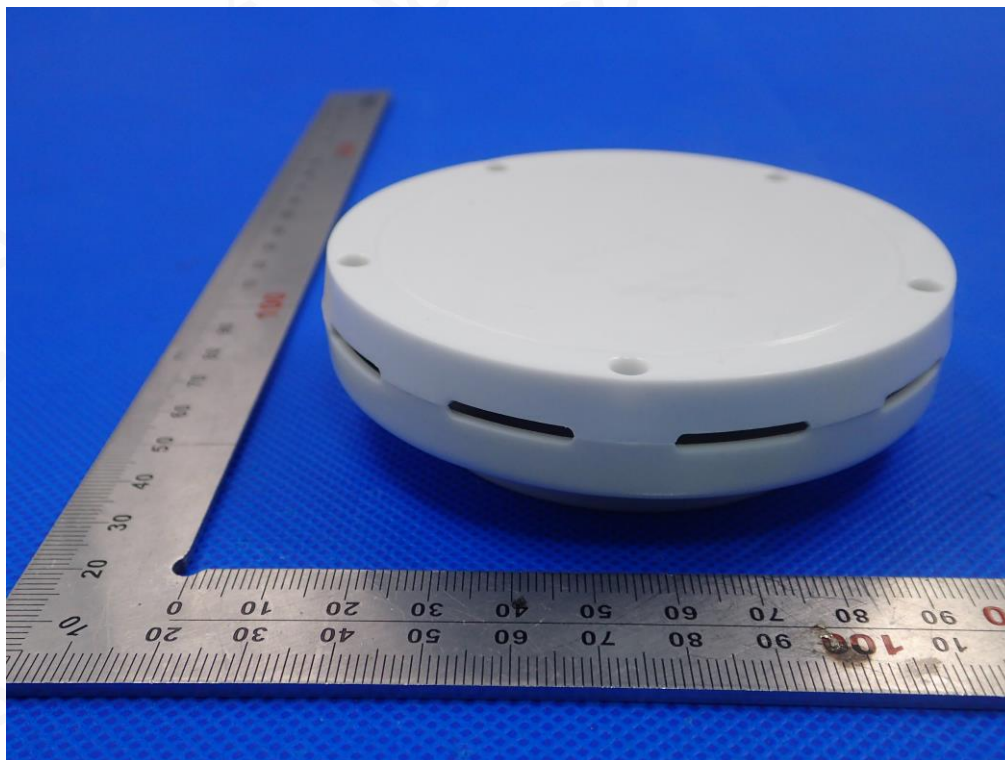
BACK VIEW OF EUT



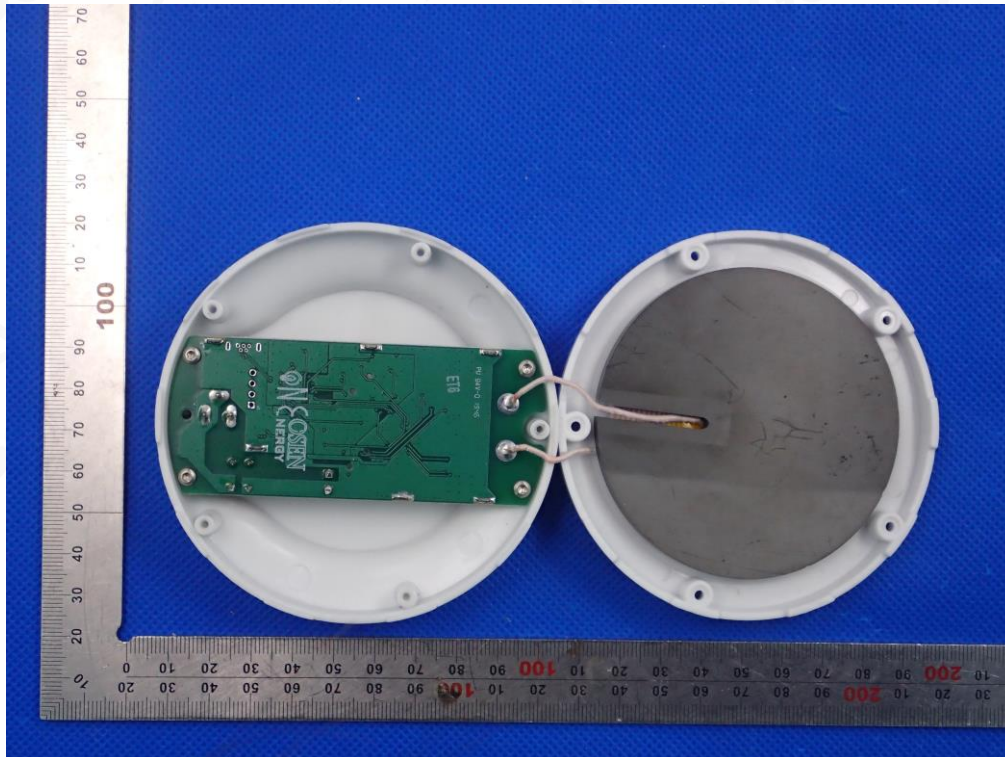
LEFT VIEW OF EUT



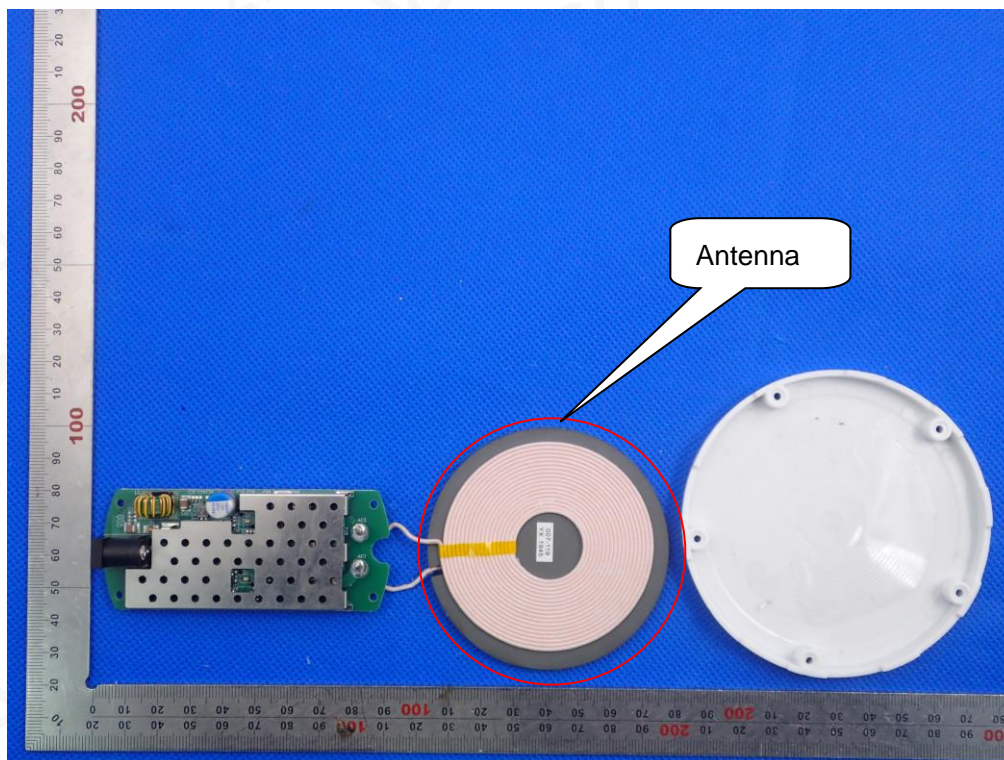
RIGHT VIEW OF EUT



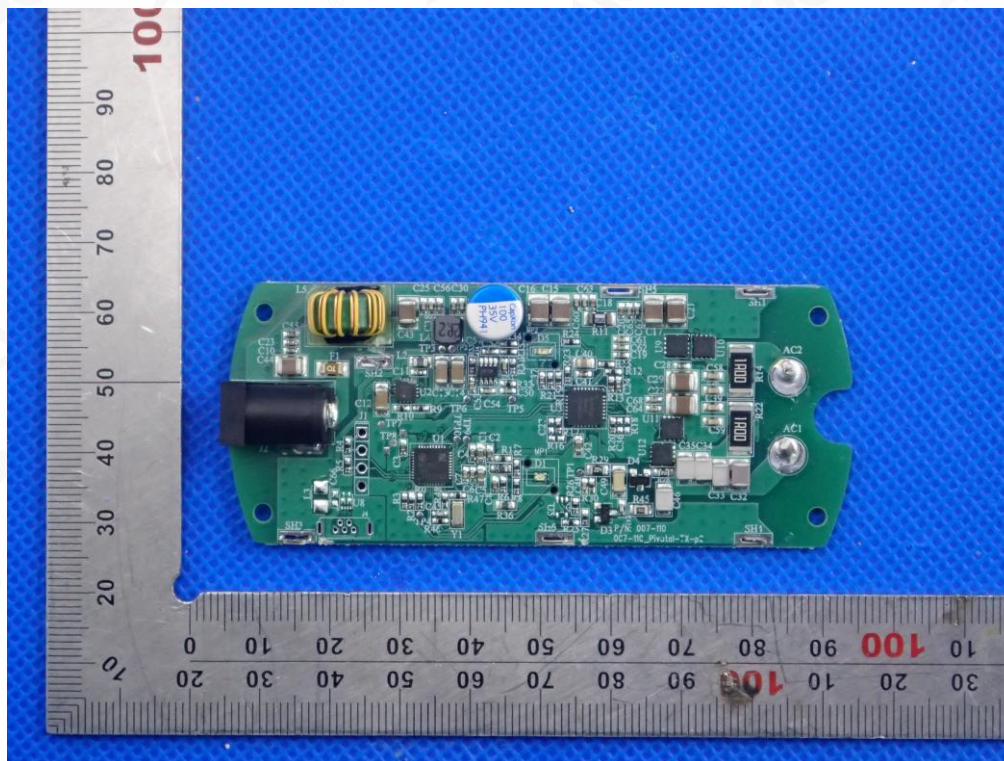
OPEN VIEW OF EUT-1



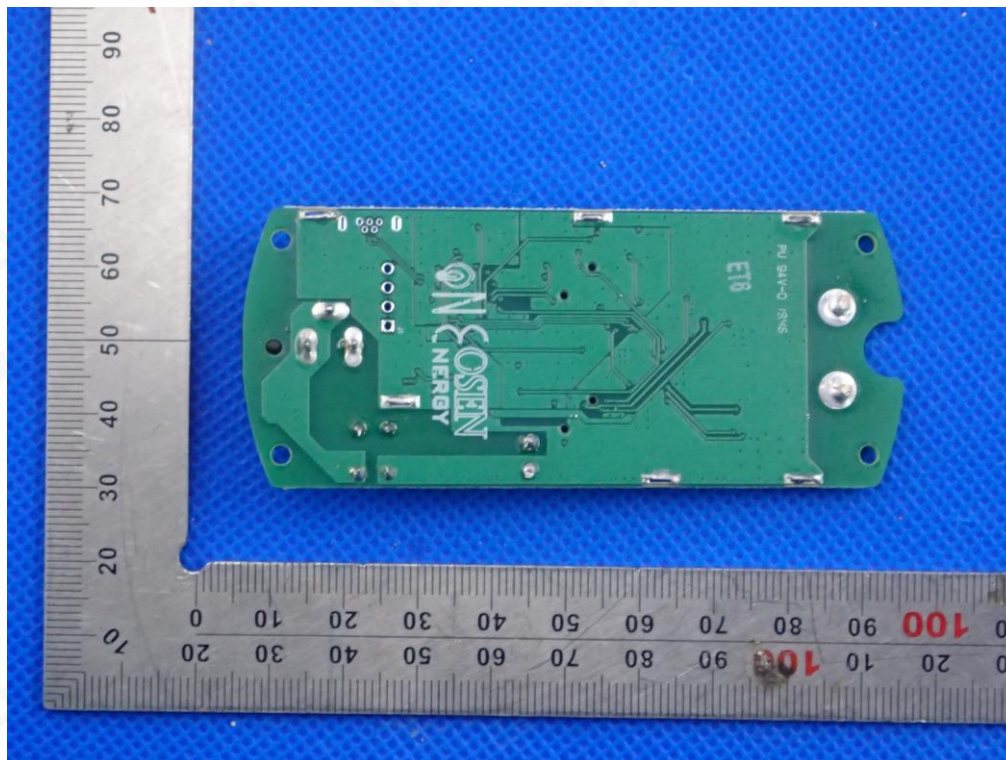
OPEN VIEW OF EUT-2



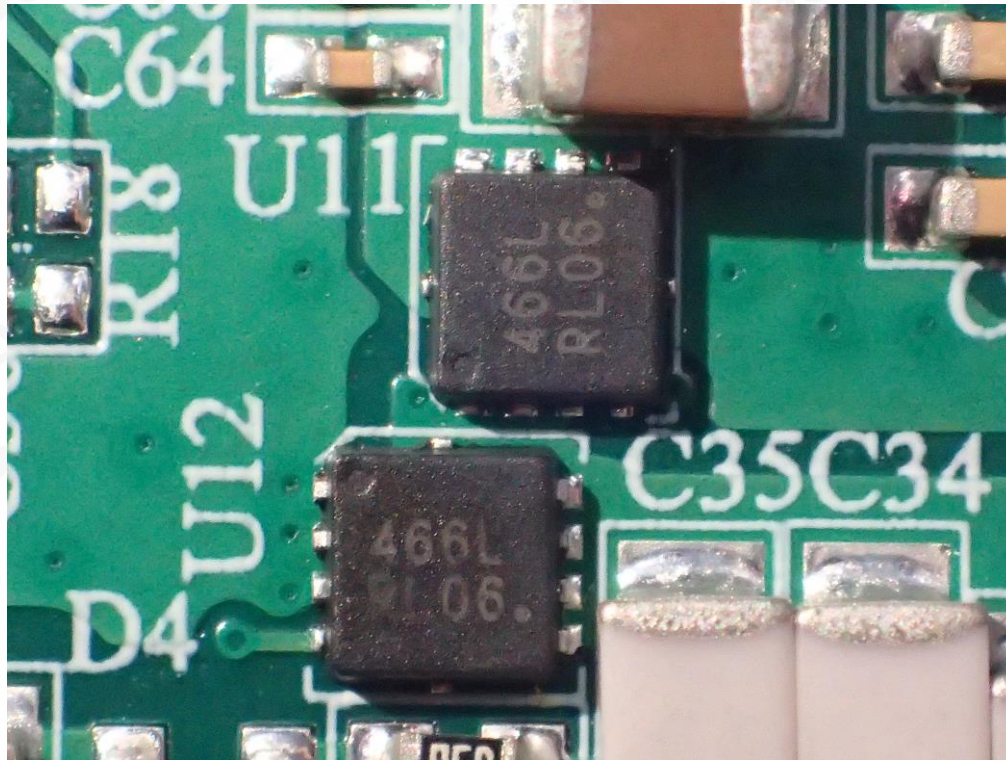
INTERNAL VIEW-1 OF EUT



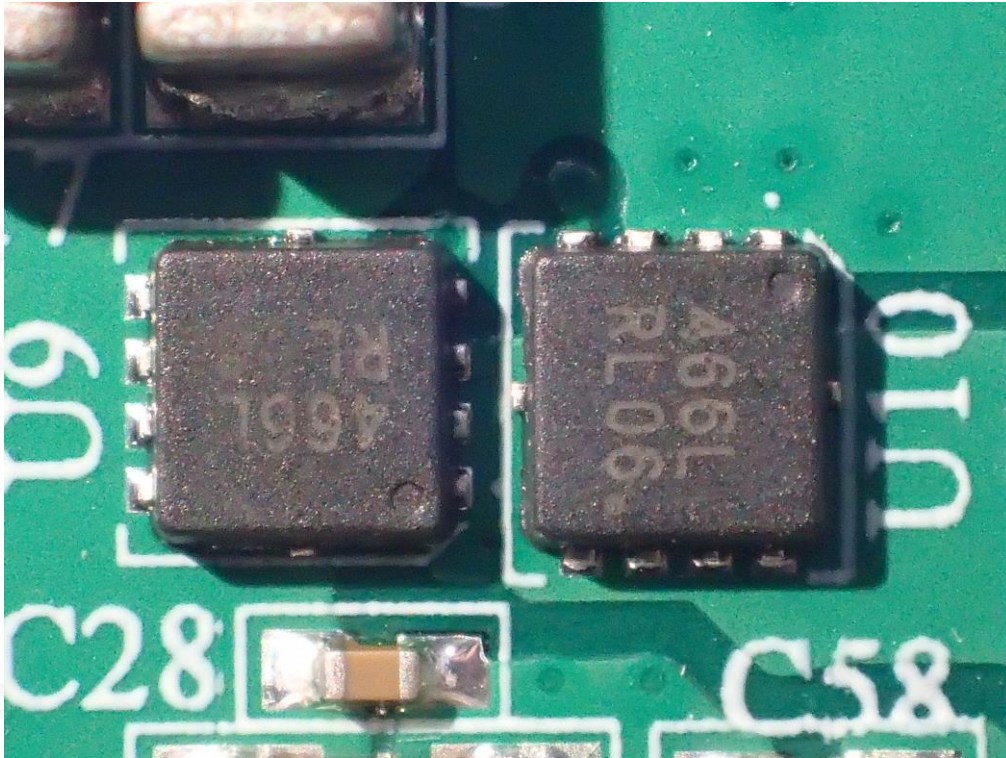
INTERNAL VIEW-2 OF EUT



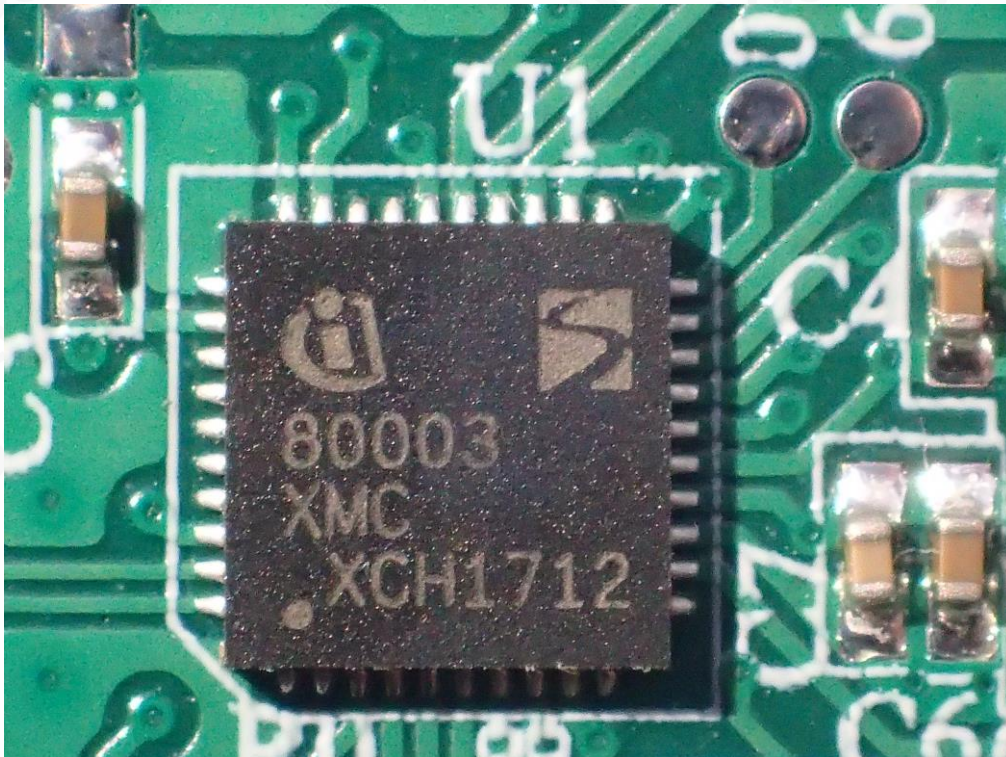
INTERNAL VIEW-3 OF EUT



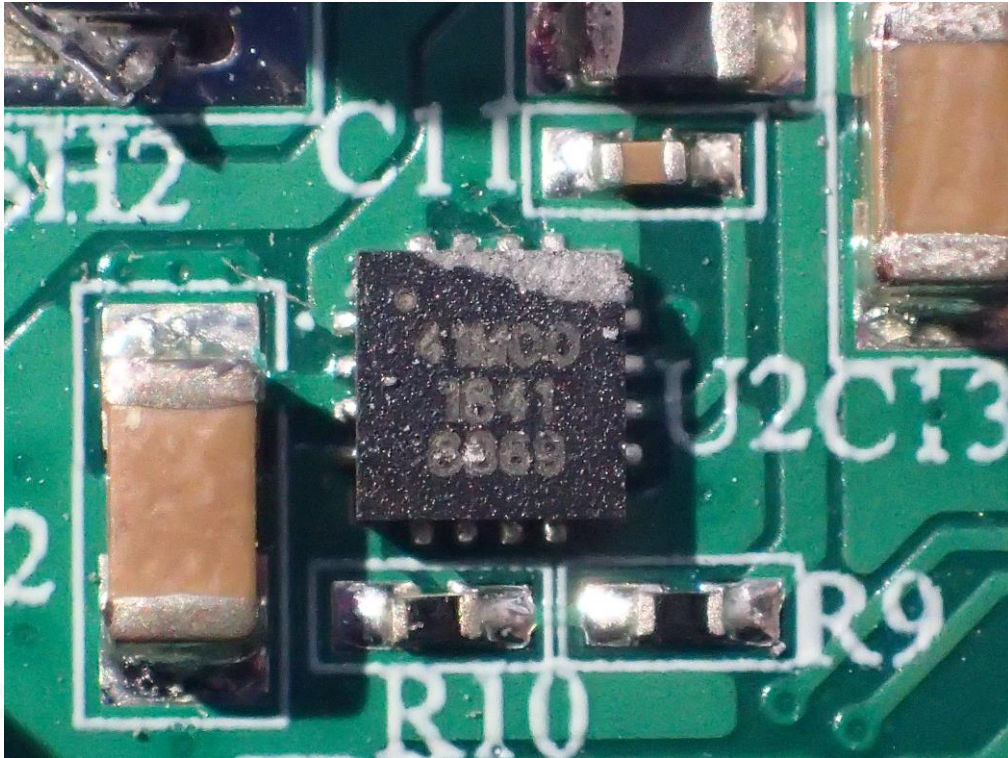
INTERNAL VIEW-4 OF EUT



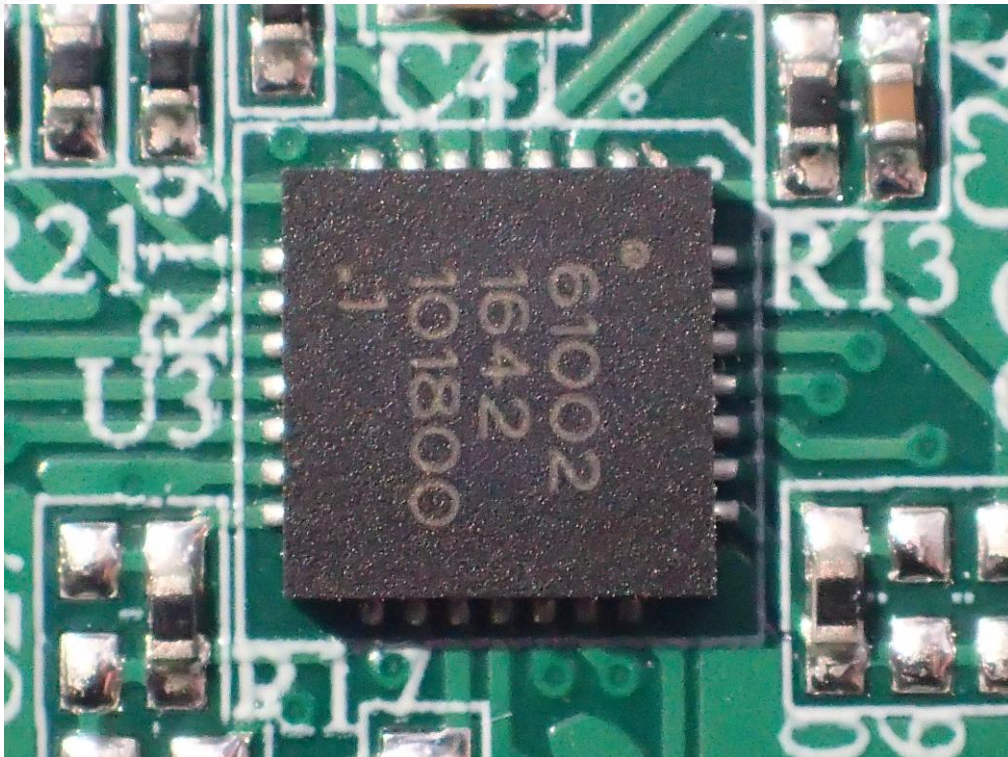
INTERNAL VIEW-5 OF EUT



INTERNAL VIEW-6 OF EUT



INTERNAL VIEW-7 OF EUT



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