FCC TEST REPORT

Test report

On Behalf of

Shenzhen JBT Smart Lighting Co.,LTD

For

LED STRIP

Model No.: GN-EW002-999, GNU-EW002-999, GNC-EW002-999, GNC-EW002-999, MI-EW003-999W, GN-EW002-999, MI-EW003-999W, 837004, 837003

FCC ID: 2AKG3GNEW002999

Prepared for :	**Shenzhen JBT Smart Lighting Co.,LTD** **No.7 Building,No.1 Furong Road,Furong Industrial Park,Shajing Town,Baoan District,Shenzhen City China.**
Prepared By :	**Shenzhen HUAK Testing Technology Co., Ltd.** **1F, B2 Building, Junfeng Zhongcheng Zhizao Innovation Park, Fuhai Street, Bao'an District, Shenzhen City, China**
Date of Test:	**Aug.30, 2018 ~ Sep.03, 2018**
Date of Report:	**Sep.04, 2018**
Report Number:	**HUAK180905986E**

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1. VERIFICATION OF CONFORMITY

Applicant	Shenzhen JBT Smart Lighting Co., LTD
Address	No.7 Building, No.1 Furong Road, Furong Industrial Park, Shajing Town, Baoan District, Shenzhen City China.
Manufacturer	Shenzhen JBT Smart Lighting Co., LTD
Address	No.7 Building, No.1 Furong Road, Furong Industrial Park, Shajing Town, Baoan District, Shenzhen City China.
Product Designation	LED STRIP
Brand Name	N/A
Test Model	GN-EW002-999
Series Models	GNU-EW002-999, GNC-EW002-999, GNC-EW002-999, MI-EW003-999W, GN-EW002-999, MI-EW003-999W, 837004, 837003
Model Difference	All the same except from the model name.
Measurement Procedure	ANSI C63.4: 2014
Date of test	Aug.30, 2018 to Sep.03, 2018
Deviation	None
Condition of Test Sample	Normal
Test Result	Pass
Report Template	AGCRT-US-IT/AC(2013-03-01)

The above equipment was tested by Shenzhen HUAK Testing Technology 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.

Testing Engineer : Gary Qian

(Gary Qian)

Technical Manager : Eden Hu

(Eden Hu)

Authorized Signatory : Jason Zhou

(Jason Zhou)

2. SYSTEM DESCRIPTION

TEST MODE DESCRIPTION		
NO.	**TEST MODE DESCRIPTION**	**WORST**
1	Light on mode	V
Note:1. V means EMI worst mode.		

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 Radiated Conducted Emission, Uc = ±2.56 dB
- Uncertainty of Radiated Emission Below 1G, Uc = ±3.92 dB
- Uncertainty of Radiated Emission Above 1G, Uc = ±4.28 dB

4. PRODUCT INFORMATION

Housing Type	Plastic and metal
Hardware Version	TYWE3S
Software Version	3.3.1
FCC ID	2AKG3GNEW002999
Adapter Model	JK120100-S37USVD
Adapter Input Rating	AC 100-240V 50/60Hz 0.5A
Adapter Output Rating	DC 12V 1000mA

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

I/O Port of EUT			
I/O Port Type	**Number**	**Cable Description**	**Tested With**
DC Input port	1	1.50m Unshielded	1
6 pin port	1	0.10m Unshielded	1

5. SUPPORT EQUIPMENT

Device Type	Manufacturer	Model Name	Serial No.	Data Cable	Power Cable
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Note:
1.“-- “means no any support device during testing.

6. TEST FACILITY

Site	Shenzhen HUAK Testing Technology Co., Ltd.
Location	1F, B2 Building, Junfeng Zhongcheng Zhizao Innovation Park, Fuhai Street, Bao'an District, Shenzhen City, China
Designation Number	CN1229
Test Firm Registration Number	616276

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	L.I.S.N. Artificial Mains Network	R&S	ENV216	HKE-002	Dec. 28, 2017	1 Year
2.	Receiver	R&S	ESCI 7	HKE-010	Dec. 28, 2017	1 Year
3.	RF automatic control unit	Tonscend	JS0806-2	HKE-060	Dec. 28, 2017	1 Year
4.	Spectrum analyzer	R&S	FSP40	HKE-025	Dec. 28, 2017	1 Year
5.	Spectrum analyzer	Agilent	N9020A	HKE-048	Dec. 28, 2017	1 Year
6.	Preamplifier	Schwarzbeck	BBV 9743	HKE-006	Dec. 28, 2017	1 Year
7.	EMI Test Receiver	Rohde & Schwarz	ESCI 7	HKE-010	Dec. 28, 2017	1 Year
8.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	HKE-012	Dec. 28, 2017	1 Year
9.	Loop Antenna	Schwarzbeck	FMZB 1519 B	HKE-014	Dec. 28, 2017	1 Year
10.	Horn Antenna	Schewarzbeck	9120D	HKE-013	Dec. 28, 2017	1 Year
11.	Pre-amplifier	EMCI	EMC051845 SE	HKE-015	Dec. 28, 2017	1 Year
12.	Pre-amplifier	Agilent	83051A	HKE-016	Dec. 28, 2017	1 Year
13.	EMI Test Software EZ-EMC	Tonscend	JS1120-B Version	HKE-083	Dec. 28, 2017	N/A
14.	Power Sensor	Agilent	E9300A	HKE-086	Dec. 28, 2017	1 Year
15.	Spectrum analyzer	Agilent	N9020A	HKE-048	Dec. 28, 2017	1 Year
16.	Signal generator	Agilent	N5182A	HKE-029	Dec. 28, 2017	1 Year
17.	Signal Generator	Agilent	83630A	HKE-028	Dec. 28, 2017	1 Year
18.	Shielded room	Shiel Hong	4*3*3	HKE-039	Dec. 28, 2017	3 Year

7. FCC LINE CONDUCTED EMISSION TEST

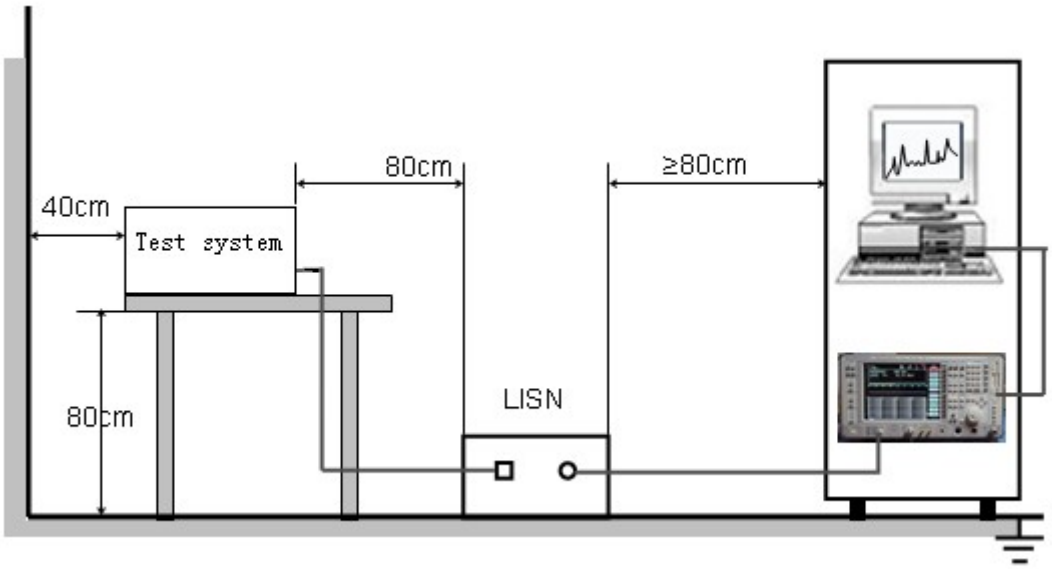
7.1. LIMITS OF LINE CONDUCTED EMISSION TEST

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.
   For unintentional device, according to § 15.107(a) Line Conducted Emission Limits is as following
   For intentional device, according to §15.207(a) Line Conducted Emission Limit is same as above table.

7.2. BLOCK DIAGRAM OF TEST SETUP

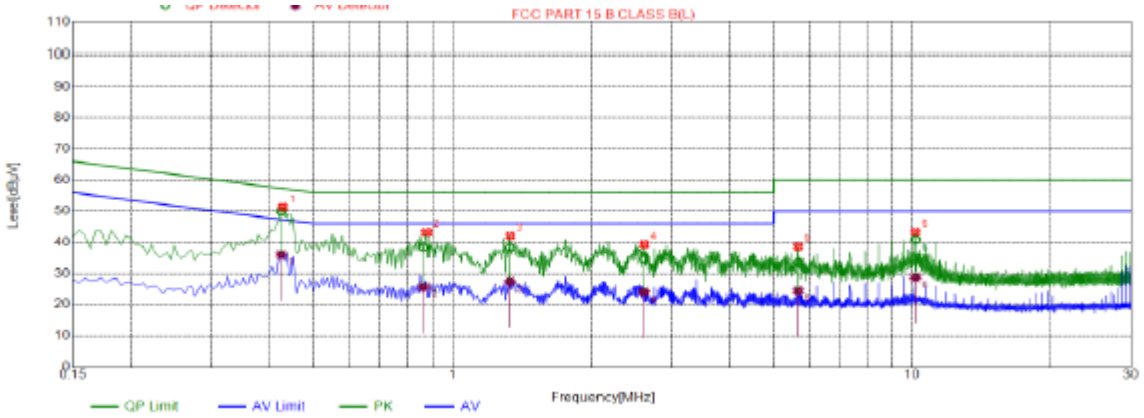


7.3. PROCEDURE OF LINE CONDUCTED EMISSION TEST

(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 DC12V power from adapter which 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.

7.4. TEST RESULT OF LINE CONDUCTED EMISSION TEST

LINE CONDUCTED EMISSION TEST-L

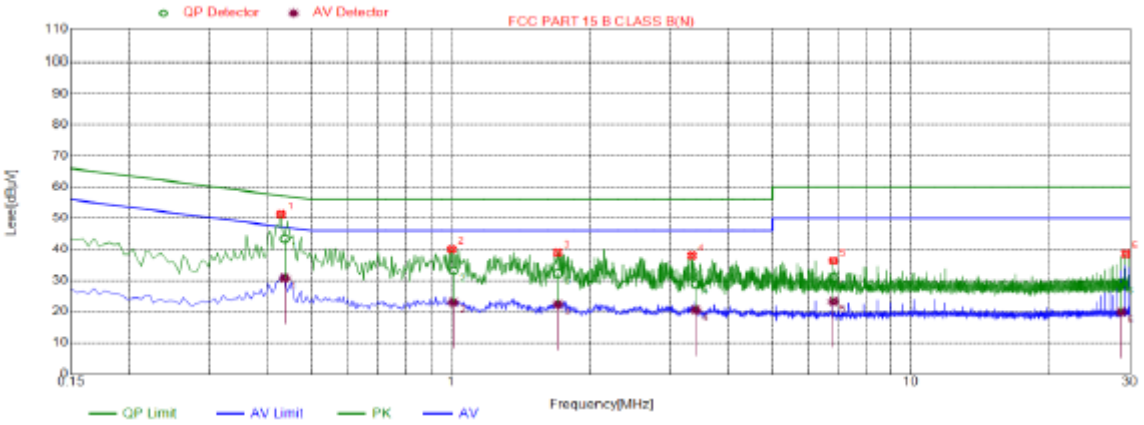


NO.	Freq. [MHz]	Level [dBµV]	Factor [dB]	Limit [dBµV]	Margin [dB]	Detector
1	0.4290	51.37	10.05	57.27	5.90	PK
2	0.8790	43.29	10.06	56.00	12.71	PK
3	1.3290	42.11	10.10	56.00	13.89	PK
4	2.6070	39.42	10.21	56.00	16.58	PK
5	5.6490	38.63	10.25	60.00	21.37	PK
6	10.1670	43.38	10.06	60.00	16.62	PK

NO.	Freq. [MHz]	Factor [dB]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]
1	0.4260	10.04	50.06	57.33	7.27	36.09	47.33	11.24
2	0.8689	10.06	38.46	56.00	17.54	25.72	46.00	20.28
3	1.3276	10.10	38.37	56.00	17.63	27.46	46.00	18.54
4	2.6066	10.21	34.68	56.00	21.32	24.05	46.00	21.95
5	5.6506	10.25	33.62	60.00	26.38	24.43	50.00	25.57
6	10.1721	10.06	40.86	60.00	19.14	28.81	50.00	21.19

RESULT: PASS

LINE CONDUCTED EMISSION TEST-N



NO.	Freq. [MHz]	Level [dBµV]	Factor [dB]	Limit [dBµV]	Margin [dB]	Detector
1	0.4290	51.26	10.05	57.27	6.01	PK
2	1.0005	40.11	10.06	56.00	15.89	PK
3	1.7025	39.05	10.13	56.00	16.95	PK
4	3.3360	38.03	10.24	56.00	17.97	PK
5	6.7785	36.35	10.21	60.00	23.65	PK
6	29.3820	38.63	10.26	60.00	21.37	PK

NO.	Freq. [MHz]	Factor [dB]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]
1	0.4376	10.05	43.42	57.11	13.69	30.78	47.11	16.33
2	1.0077	10.06	33.15	56.00	22.85	22.96	46.00	23.04
3	1.7051	10.13	32.29	56.00	23.71	22.42	46.00	23.58
4	3.4012	10.24	28.94	56.00	27.06	20.53	46.00	25.47
5	6.7805	10.21	30.98	60.00	29.02	23.23	50.00	26.77
6	28.7680	10.26	29.26	60.00	30.74	19.91	50.00	30.09

RESULT: PASS

8. FCC RADIATED EMISSION TEST

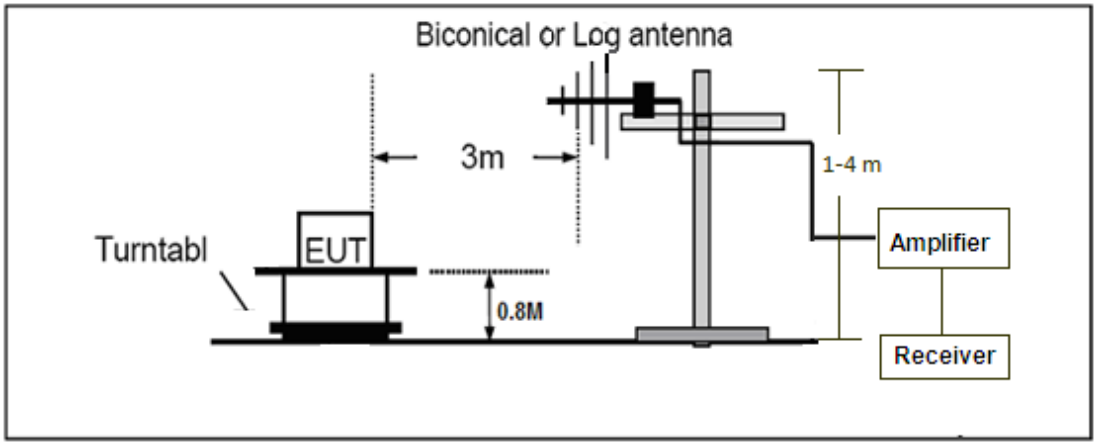
8.1. LIMITS OF RADIATED EMISSION TEST

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.

8.2. BLOCK DIAGRAM OF TEST SETUP

System Diagram of Connections between EUT and Simulators



8.3. 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 was turned on. All support equipments 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.

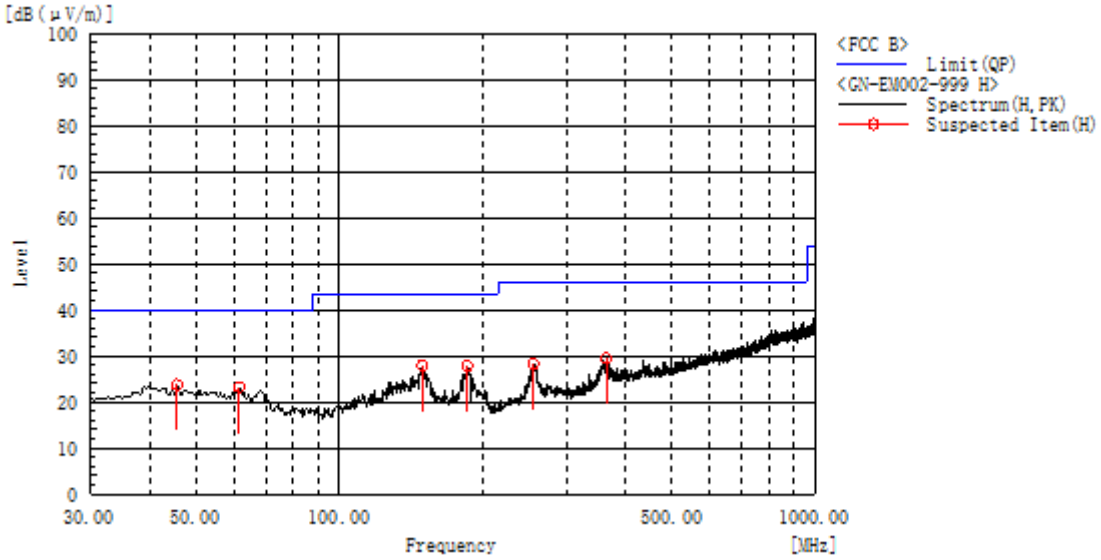
(6) The Analyzer / Receiver quickly scanned from 30MHz to 1000MHz. The EUT test program was started. Emissions were scanned and measured rotating the EUT to 360 degrees and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize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

8.4. TEST RESULT OF RADIATED EMISSION TEST

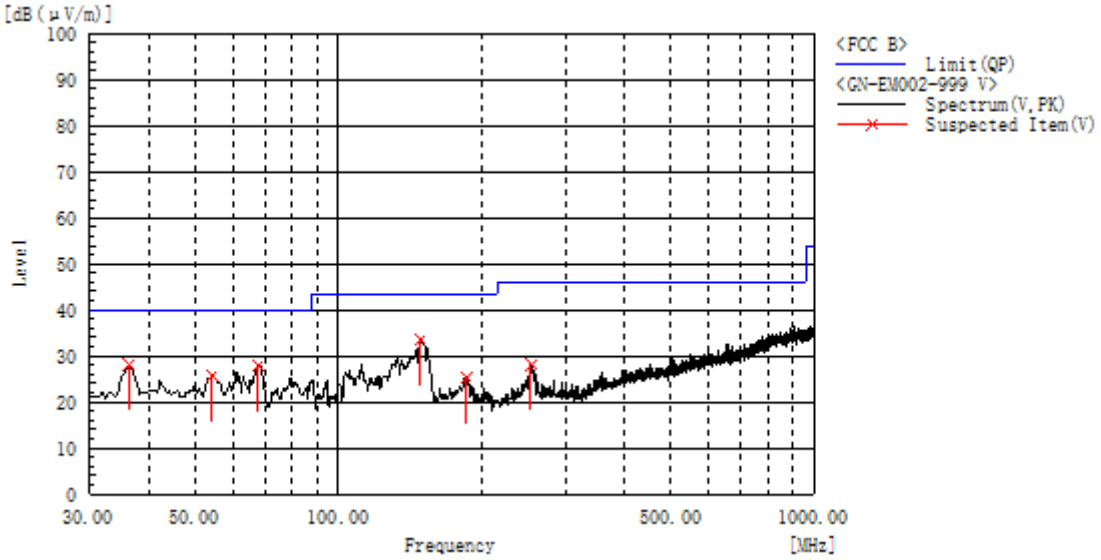
Radiated Emission Test at 3m Distance-Horizontal



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
45.520	H	6.4	17.3	23.7	40.0	16.3	Pass	150.0	23.9
61.525	H	7.2	16.0	23.2	40.0	16.8	Pass	150.0	23.9
149.310	H	11.3	16.6	27.9	43.5	15.6	Pass	150.0	142.3
185.685	H	13.9	14.0	27.9	43.5	15.6	Pass	150.0	334.8
256.010	H	12.3	16.0	28.3	46.0	17.7	Pass	150.0	20.6
364.165	H	9.9	19.5	29.4	46.0	16.6	Pass	150.0	20.6

RESULT: PASS

Radiated Emission Test at 3m Distance-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
36.305	V	11.5	16.6	28.1	40.0	11.9	Pass	100.1	292.1
54.250	V	8.8	16.8	25.6	40.0	14.4	Pass	100.1	215.9
67.830	V	12.9	15.0	27.9	40.0	12.1	Pass	100.1	195.1
148.340	V	17.0	16.6	33.6	43.5	9.9	Pass	100.1	198.3
186.170	V	11.5	14.0	25.5	43.5	18.0	Pass	100.1	261.0
254.070	V	12.1	16.0	28.1	46.0	17.9	Pass	100.1	138.9

RESULT: PASS

Note：

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

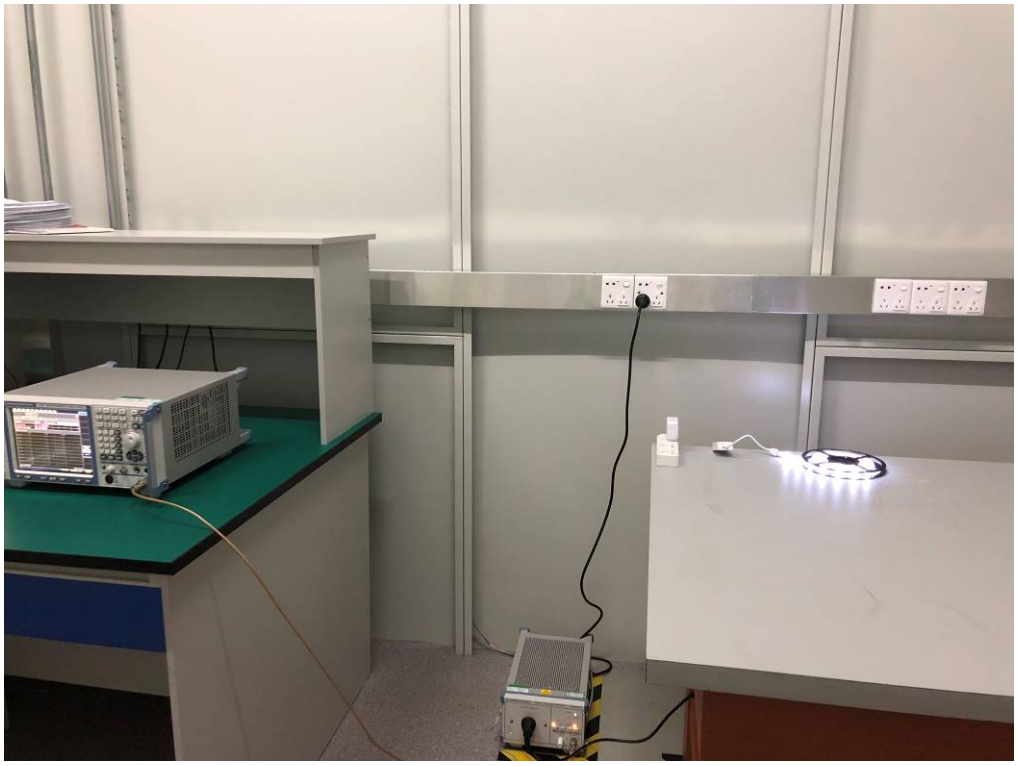
Factor(dB/m)=Antenna Factor(dB/m)+Cable loss(dB)+Attenuation(dB)for Attenuator

Margin= Limit -Level

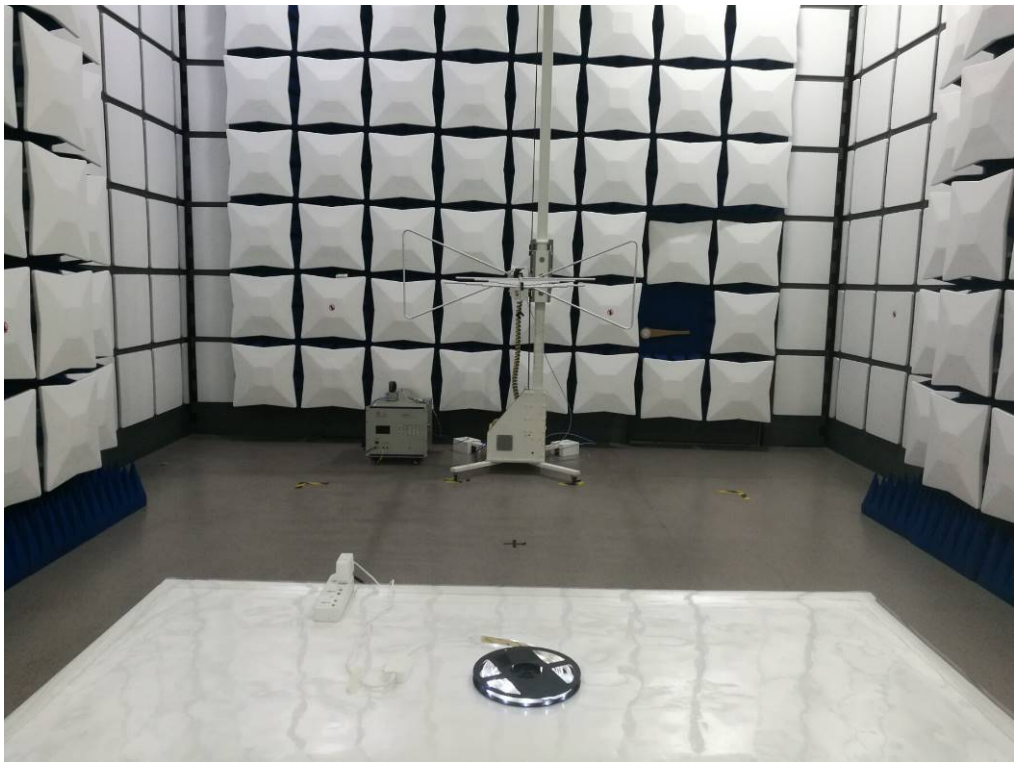
All Other modes above 1GHz have more than 20db margin, no recording in the report

APPENDIX A: PHOTOGRAPHS OF TEST SETUP

FCC LINE CONDUCTED EMISSION TEST SETUP

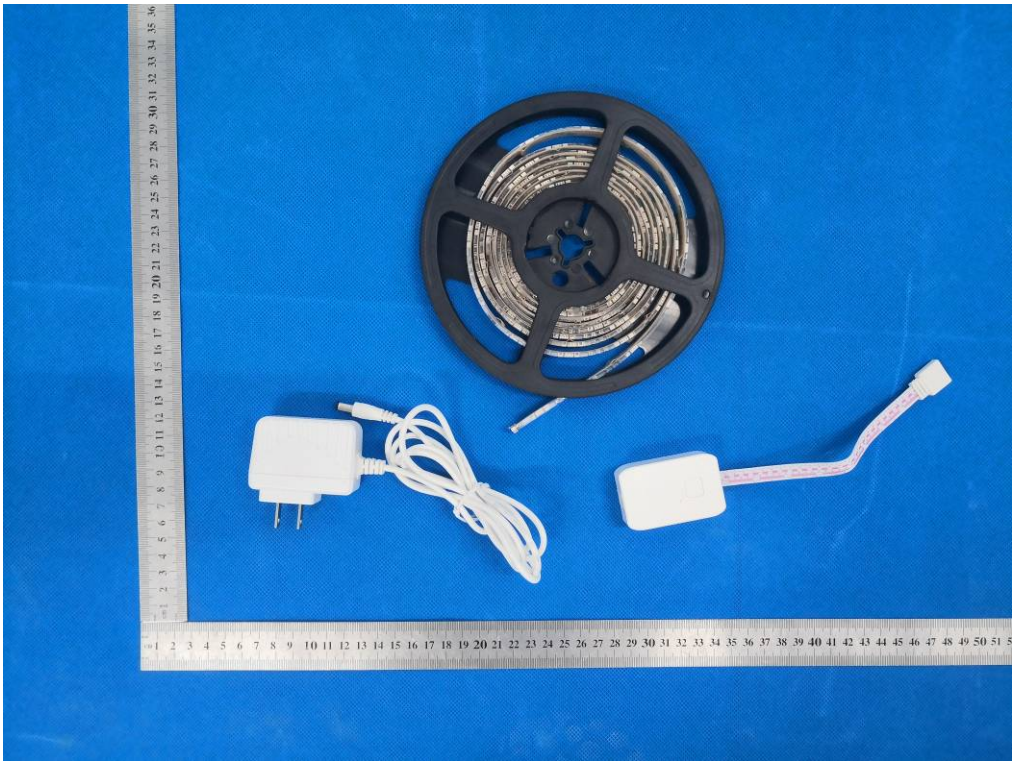


FCC RADIATED EMISSION TEST SETUP

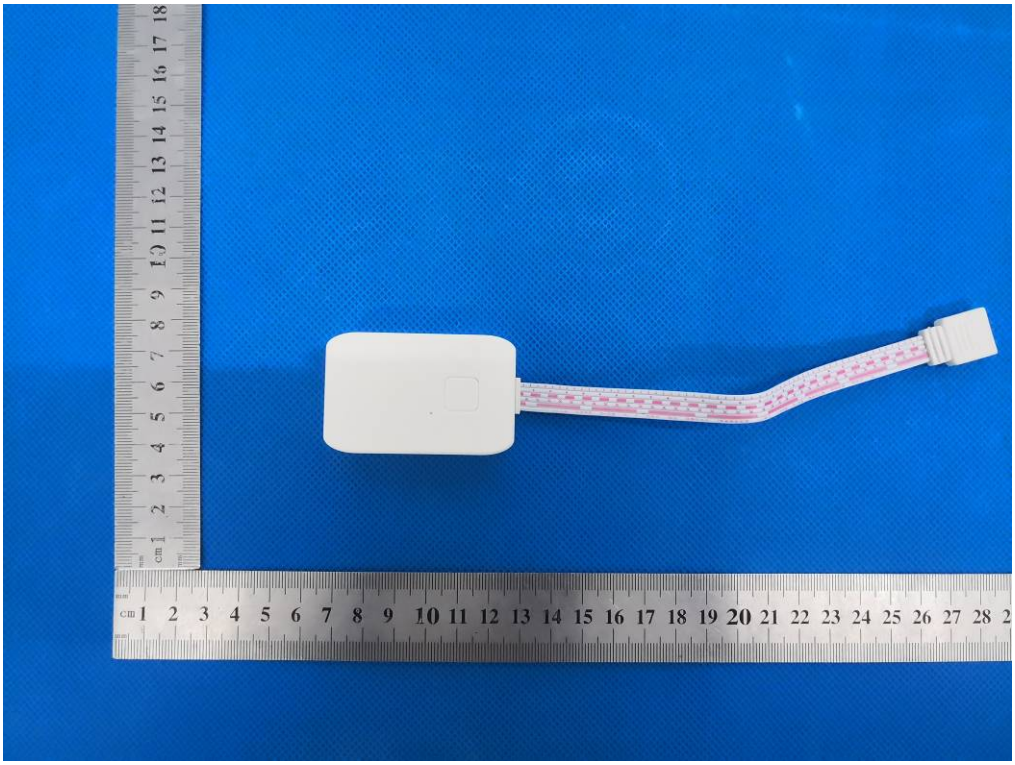


APPENDIX B: PHOTOGRAPHS OF EUT

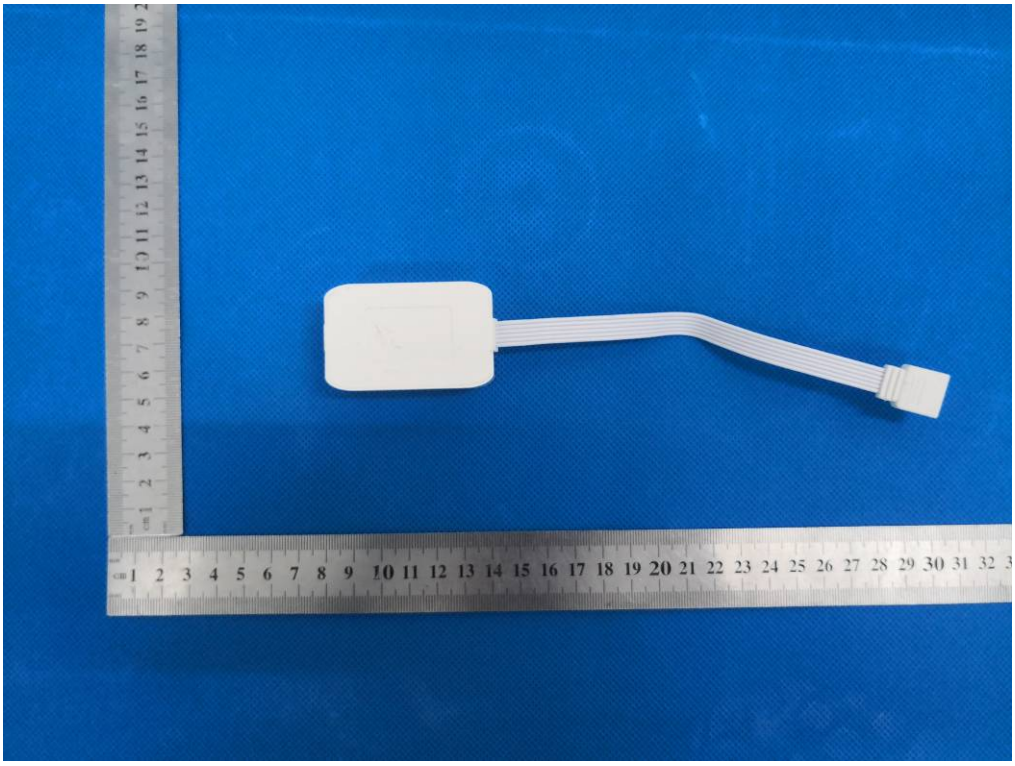
ALL VIEW OF EUT



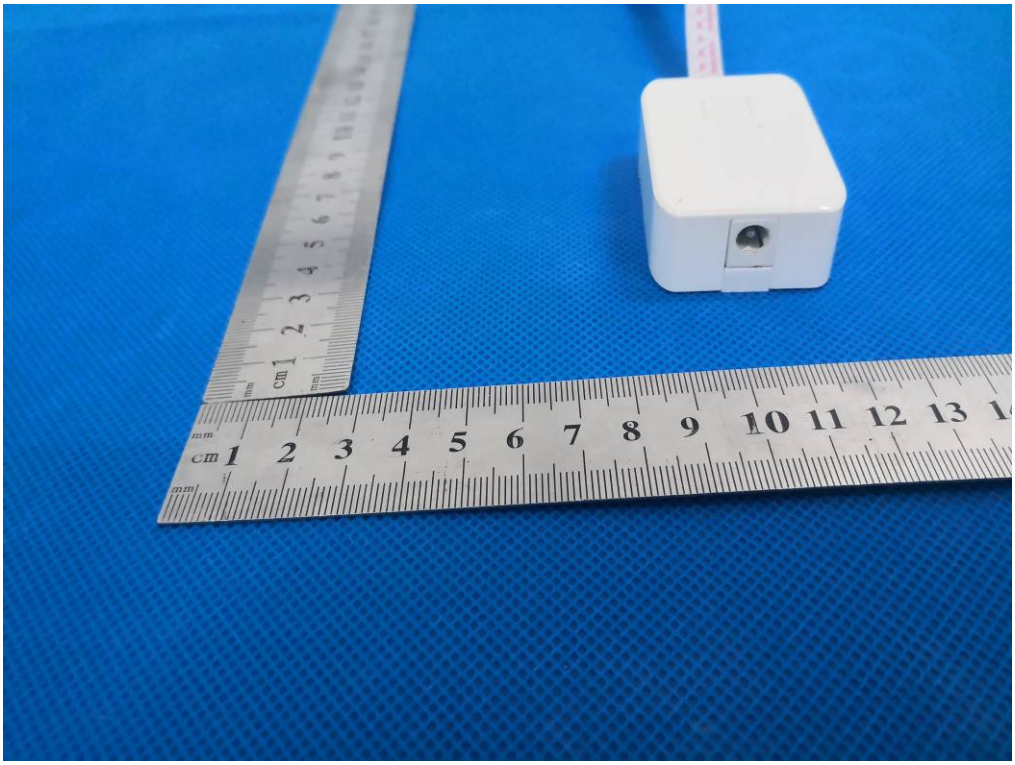
TOP VIEW OF EUT



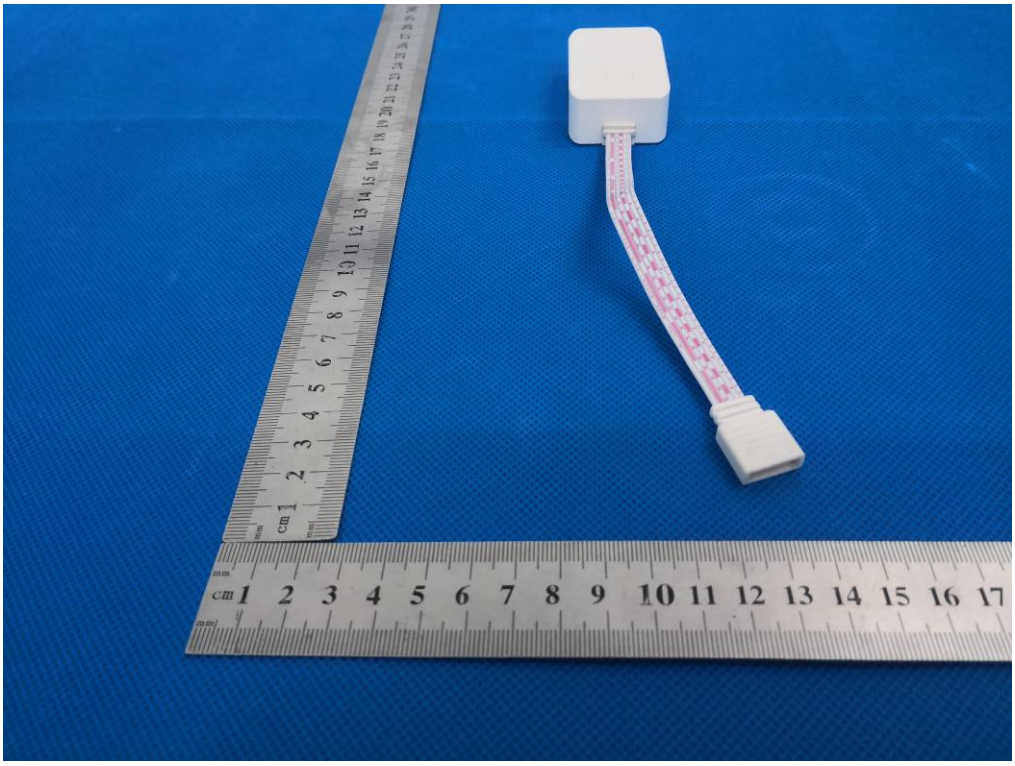
BOTTOM VIEW OF EUT



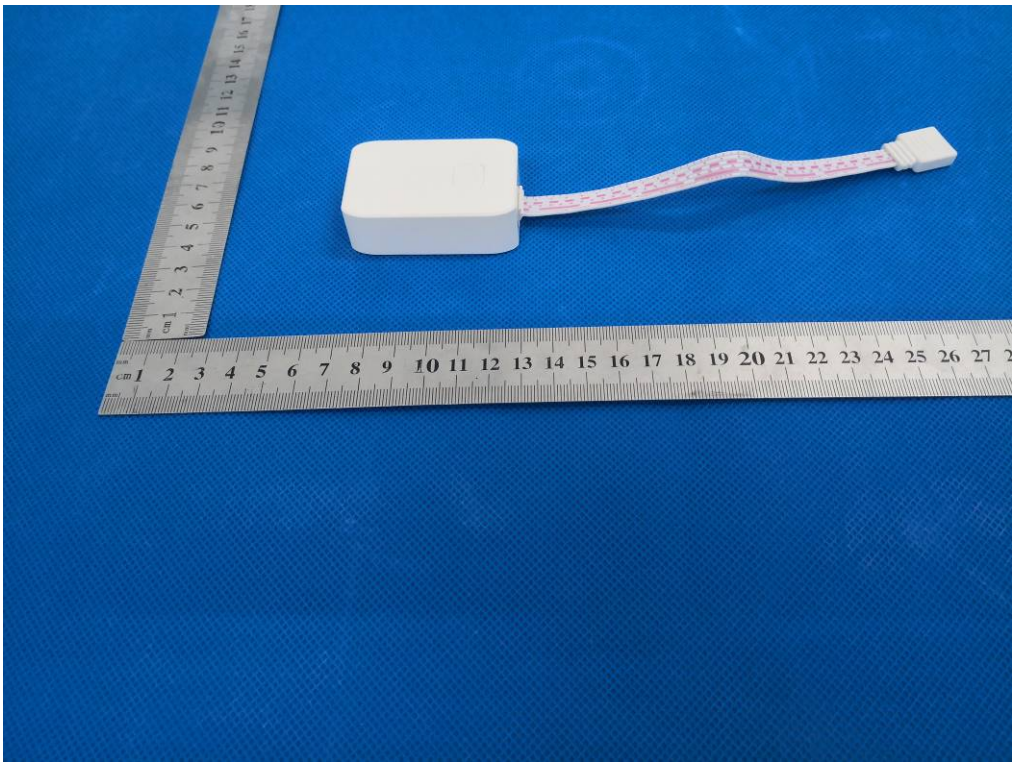
FRONT VIEW OF EUT



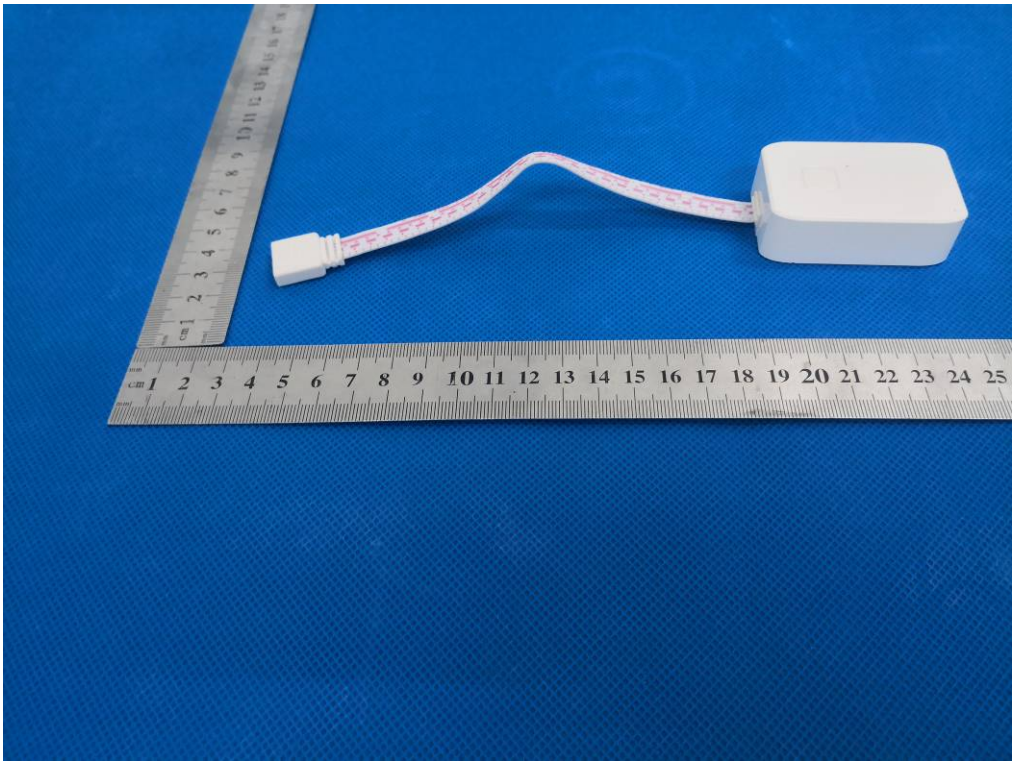
BACK VIEW OF EUT



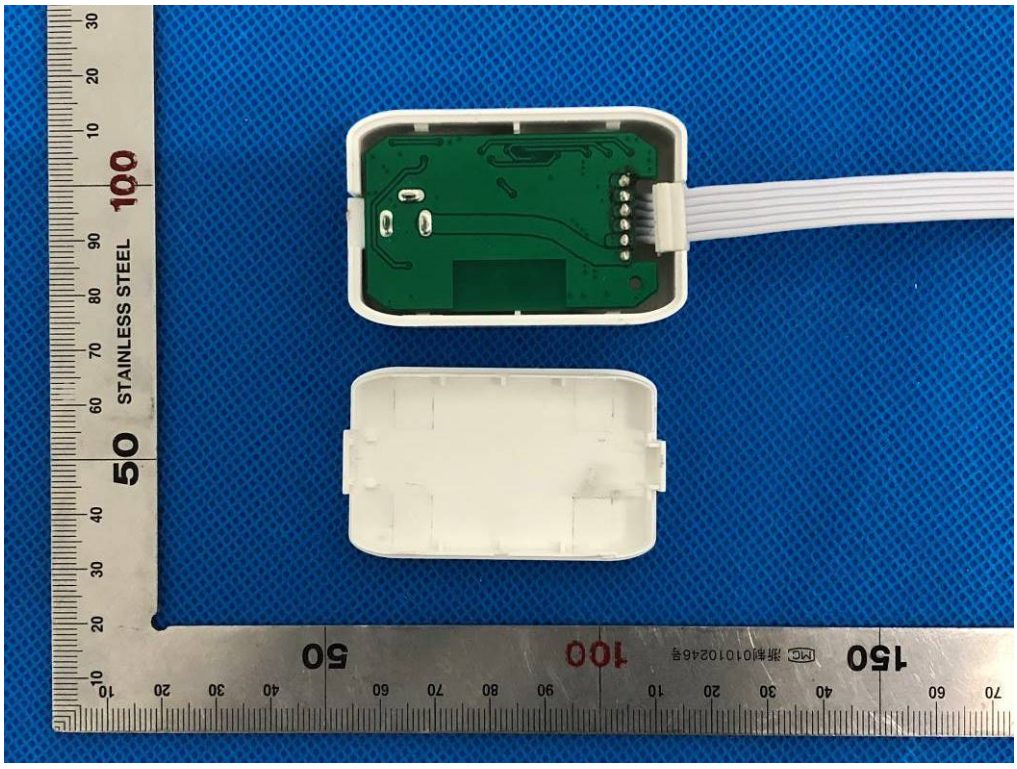
LEFT VIEW OF EUT



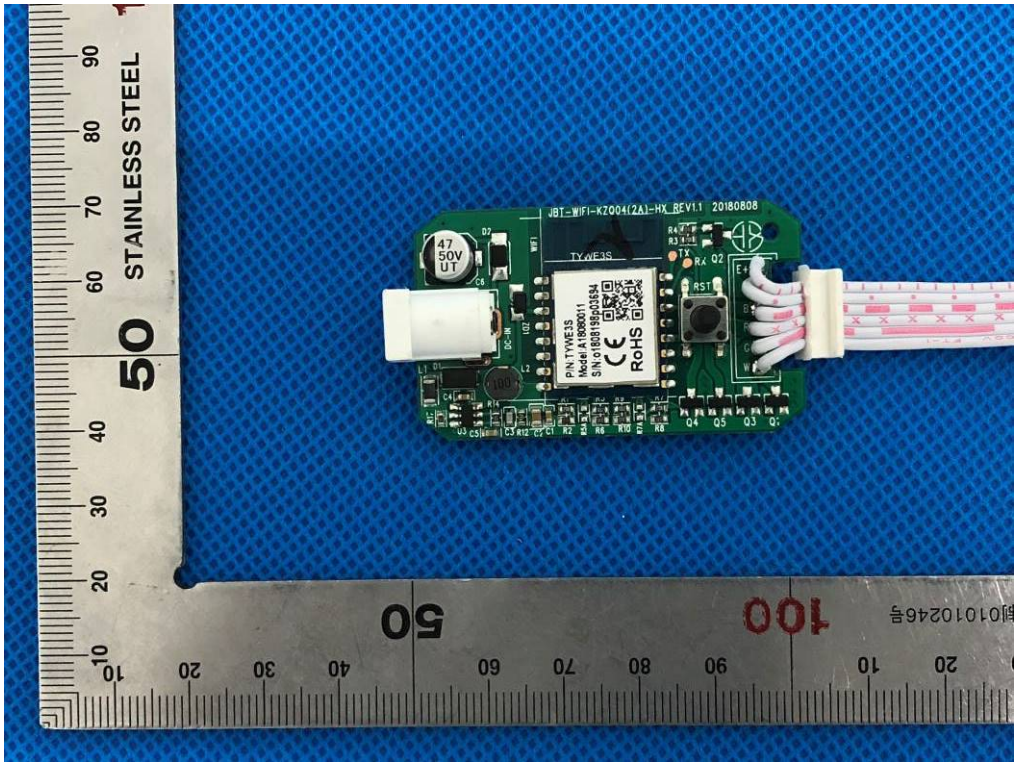
RIGHT VIEW OF EUT



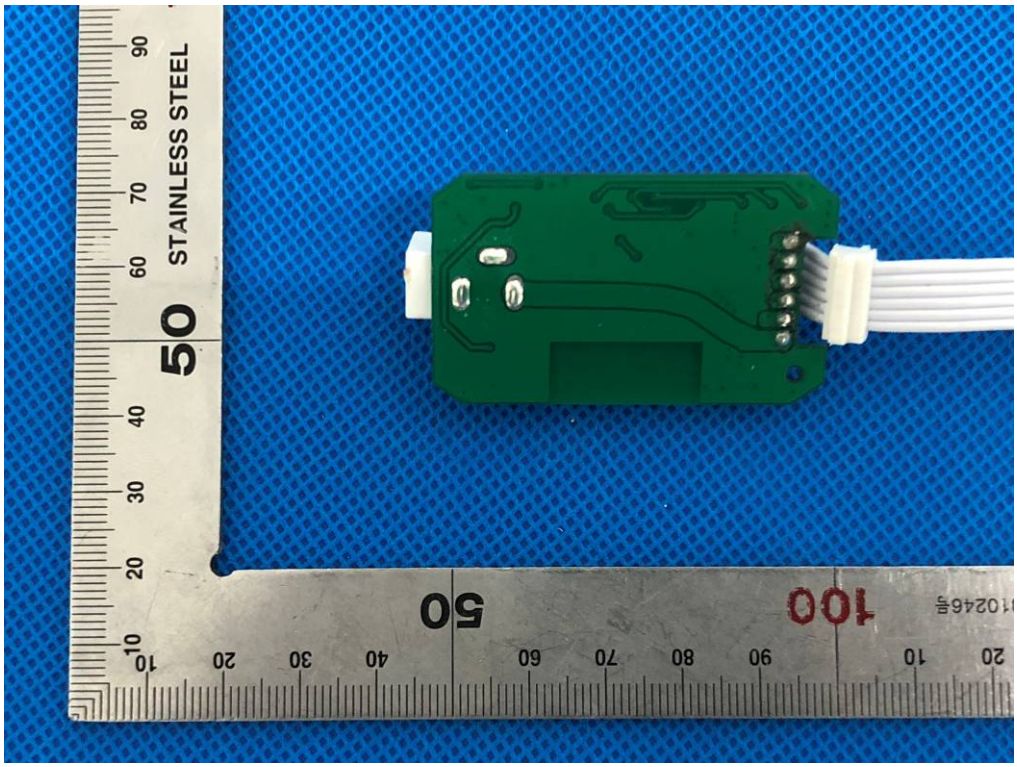
OPEN VIEW OF EUT



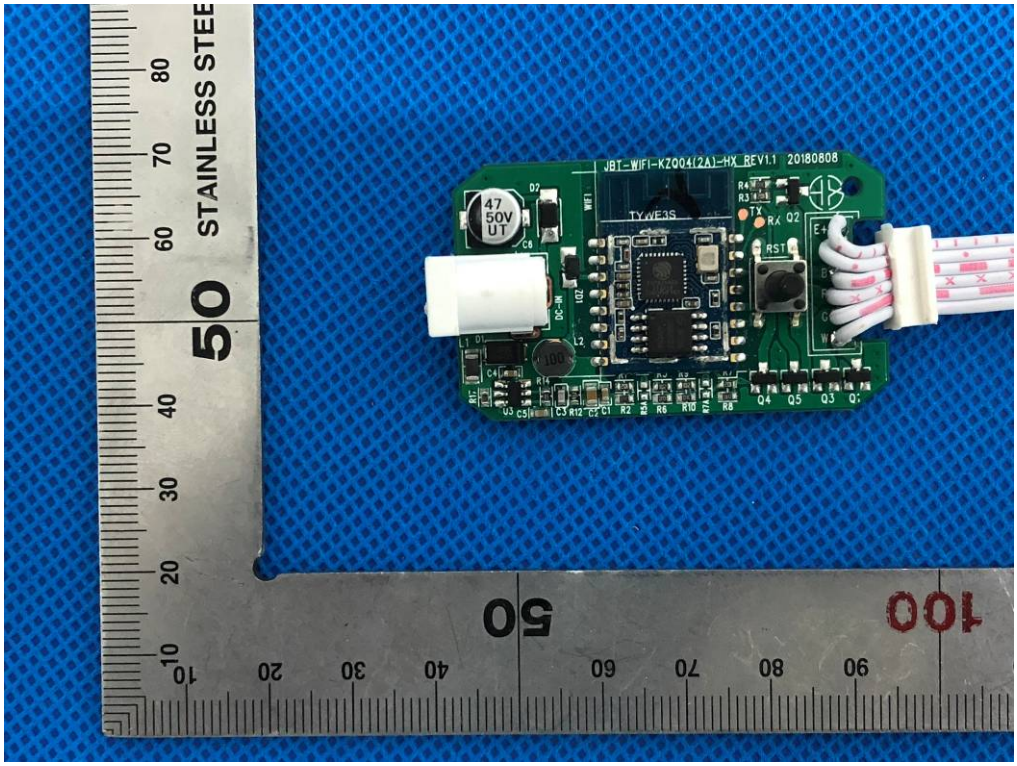
INTERNAL VIEW OF EUT-1



INTERNAL VIEW OF EUT-2



INTERNAL VIEW OF EUT-3



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