TEST REPORT

FCC PART 15 SUBPART B

Test report
On Behalf of
Innovative Concepts and Design LLC
For
Wireless Receiver

Model No.: UHF-6100

FCC ID: 2AE6GUHF-6100-R2

Prepared for :	**Innovative Concepts and Design LLC** **107 Trumbull Street, Bldg F8, Elizabeth, New Jersey, 07206-2165 United States**
Prepared By :	**Shenzhen HUAK Testing Technology Co., Ltd.** **1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China**
Date of Test:	**Nov. 28, 2018 ~ Dec. 05, 2018**
Date of Report:	**Dec. 05, 2018**
Report Number:	**HK1811141565E**

TEST RESULT CERTIFICATION

Applicant's name ..... :	Innovative Concepts and Design LLC
Address ..... :	107 Trumbull Street, Bldg F8, Elizabeth, New Jersey, 07206-2165 United States
Manufacture's Name ..... :	PROAUDIO ELECTRONICS CO., LIMITED
Address ..... :	FLAT 03H 15/F CARNIVAL COMMERCIAL BUILDING 18 JAVA ROAD NORTH POINT HK

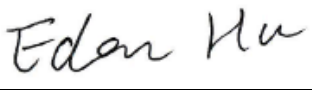
Product description

Trade Mark:	Gemini
Product name ..... :	Wireless Receiver
Model and/or type reference ... :	UHF-6100
Standards ..... :	**47 CFR FCC Part 15 Subpart B 15.107&15.109**

Date of Test ..... :	
Date (s) of performance of tests ..... :	Nov. 28, 2018 ~ Dec. 05, 2018
Date of Issue ..... :	Dec. 05, 2018
Test Result ..... :	**Pass**

Testing Engineer : 

(Gary Qian)

Technical Manager : 

(Eden Hu)

Authorized Signatory : 

(Jason Zhou)

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1.SUMMARY

1.1 TEST STANDARDS

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

1.2 TEST DESCRIPTION

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

1.3 TEST FACILITY

1.3.1 Address of the test laboratory

Shenzhen HUAK Testing Technology Co., Ltd.
Add.:1F, B2 Building, Junfeng Zhongcheng Zhizao Innovation Park,Heping Community, Fuhai Street, Bao'an District, Shenzhen, China

There is one 3m semi-anechoic chamber and two line conducted labs for final test. The Test Sites meet the requirements in documents ANSI C63.4 and CISPR 32/EN 55032 requirements.

1.3.2 Laboratory accreditation

The test facility is recognized, certified, or accredited by the following organizations:

IC Registration No.: 21210

The 3m alternate test site of Shenzhen HUAK Testing Technology Co., Ltd. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration No.: 21210 on May 24, 2016.

FCC Registration No.: CN1229

Test Firm Registration Number : 616276

1.4 STATEMENT OF THE MEASUREMENT UNCERTAINTY

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 “Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Shenzhen HUAK Testing Technology Co., Ltd. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for HUAK laboratory is reported:

Test	Measurement Uncertainty	Notes
Radiated Emission 30~1000MHz	±4.10dB	(1)
Radiated Emission Above 1GHz	±4.32dB	(1)
Conducted Disturbance0.15~30MHz	±3.20dB	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

2.GENERAL INFORMATION

2.1 ENVIRONMENTAL CONDITIONS

During the measurement the environmental conditions were within the listed ranges:

Normal Temperature:	25°C
Relative Humidity:	55 %
Air Pressure:	101 kPa

2.2 GENERAL DESCRIPTION OF EUT

Product Name:	Wireless Receiver
Model/Type reference:	UHF-6100
Power supply of adapter:	Input :AC 100-240V~50/60Hz Output: DC 12V 500mA
Operation Frequency	512~537.5MHz
Hardware Version:	UHF-6100RX Rev-C2
Software Version:	UHF-6100RX Rev-C2

Note: For more details, refer to the user's manual of the EUT.

2.3. DESCRIPTION OF TEST MODES

NO.	TEST MODE DESCRIPTION
1	Receiving at low channel
2	Receiving at middle channel
3	Receiving at high channel
Note: All the test modes had been tested, the mode 1 was the worst case recorded in the test report.	

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

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

2.5. 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.

2.6. ACCESSORIES USED

Item	Equipment	Model No.	Specification	Remark
1	Adapter	LX120050	DC 12V/0.5A	Market with EUT

2.7 EQUIPMENT USED

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.	Horn Antenna	Schewarzbeck	BBHA 9170	HKE-090	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.	Shielded room	Shiel Hong	4*3*3	HKE-039	Dec. 28, 2017	3 Year

The calibration interval was one year

3. RADIATED EMISSION

3.1. 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. Only the worst case is reported.

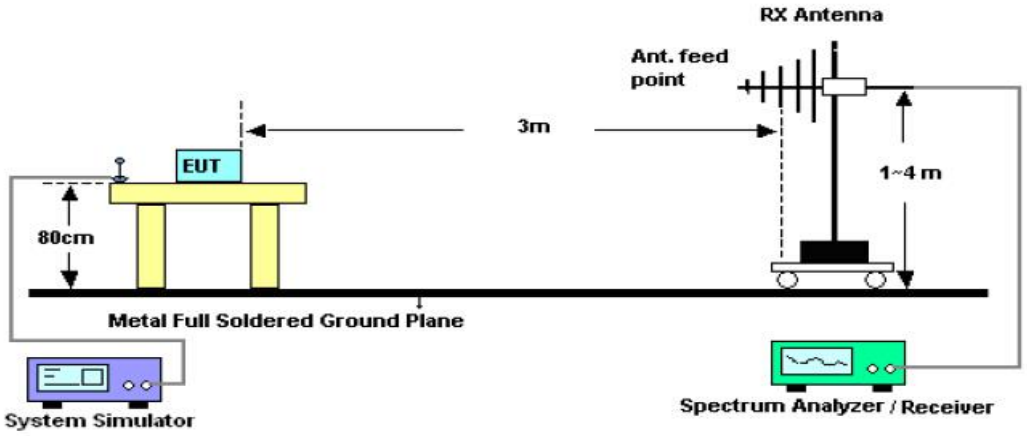
The following table is the setting of spectrum analyzer and receiver.

Spectrum Parameter	Setting
Start ~Stop Frequency	30MHz~1000MHz/RBW 120KHz for QP
Start ~Stop Frequency	1GHz~12.5GHz 1MHz/3MHz for Peak, 1MHz/10Hz for Average

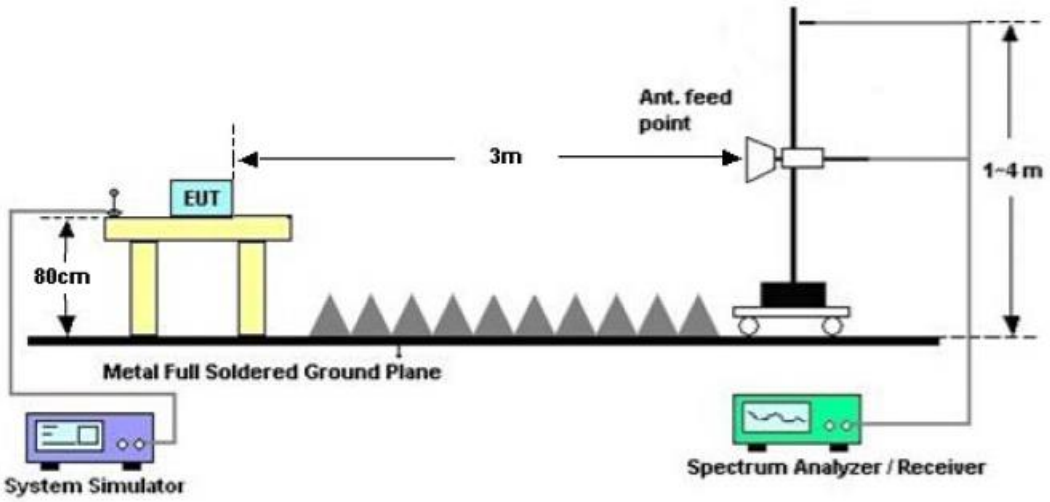
Receiver Parameter	Setting
Start ~Stop Frequency	30MHz~1000MHz/RBW 120KHz for QP

3.2. TEST SETUP

RADIATED EMISSION TEST SETUP 30MHz-1000MHz

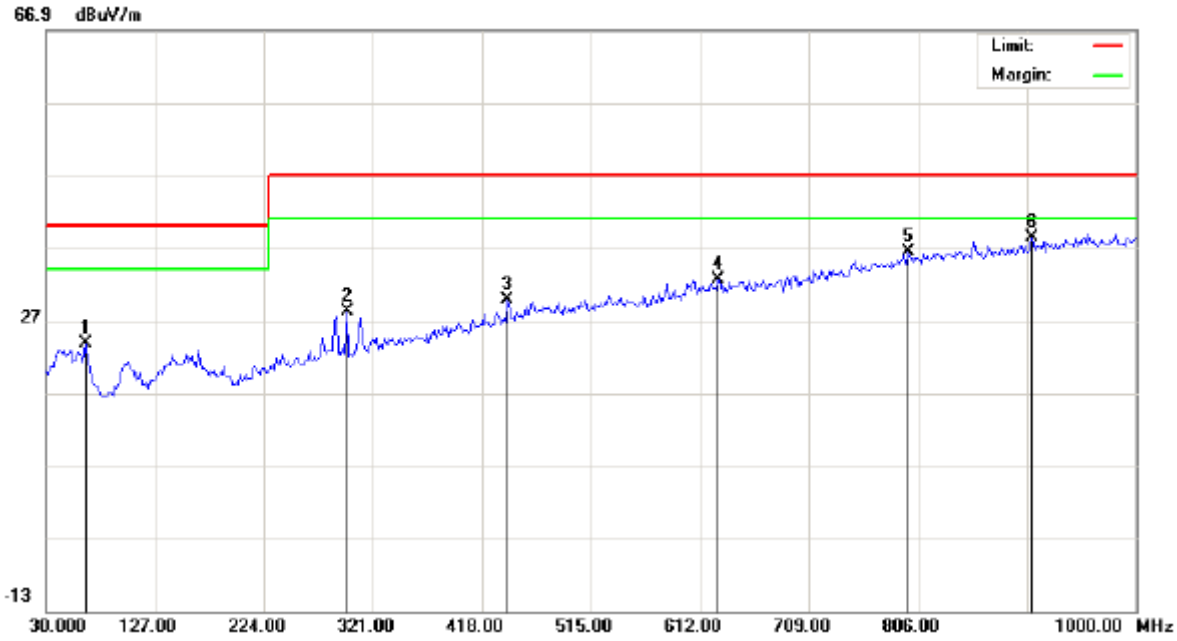


RADIATED EMISSION TEST SETUP ABOVE 1000MHz



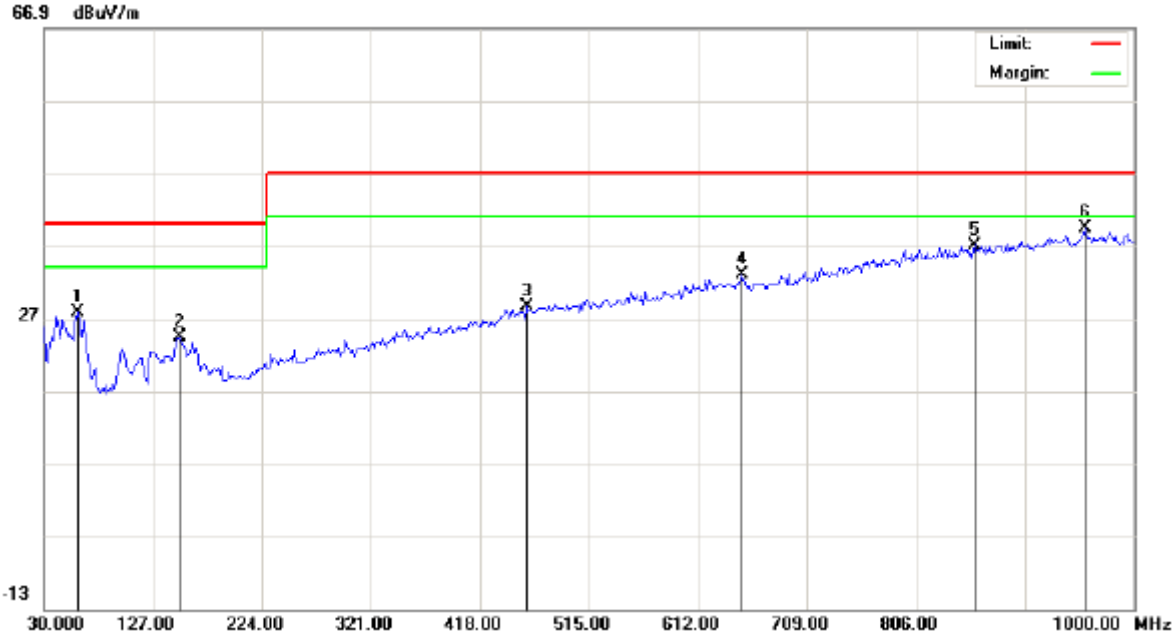
3.3. TEST RESULT

RADIATED EMISSION BELOW 1GHZ-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		65.5667	4.68	19.05	23.73	40.00	-16.27	peak			
2		298.3667	7.01	21.14	28.15	47.00	-18.85	peak			
3		440.6333	3.96	25.77	29.73	47.00	-17.27	peak			
4		628.1667	3.00	29.64	32.64	47.00	-14.36	peak			
5		797.9167	3.28	33.12	36.40	47.00	-10.60	peak			
6	*	907.8500	3.69	34.75	38.44	47.00	-8.56	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		60.7167	7.44	20.37	27.81	40.00	-12.19	peak			
2		151.2500	4.18	20.27	24.45	40.00	-15.55	peak			
3		460.0333	2.36	26.22	28.58	47.00	-18.42	peak			
4		650.8000	3.03	29.99	33.02	47.00	-13.98	peak			
5		857.7333	3.06	34.04	37.10	47.00	-9.90	peak			
6	*	956.3500	4.21	35.23	39.44	47.00	-7.56	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 5GHz have 20dB margin. No recording in the test report.

4. FCC LINE CONDUCTED EMISSION TEST

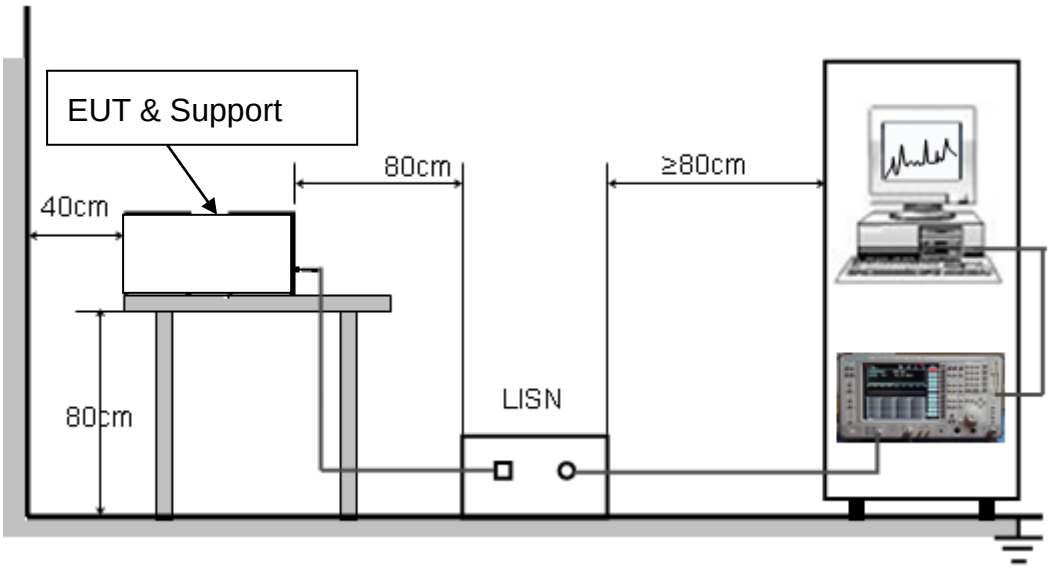
4.1. LIMITS OF LINE CONDUCTED EMISSION TEST

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.

4.2. BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST



4.3. 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 AC120V/60Hz power from a LISN, if any.
5. The EUT received DC charging voltage by PC 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.

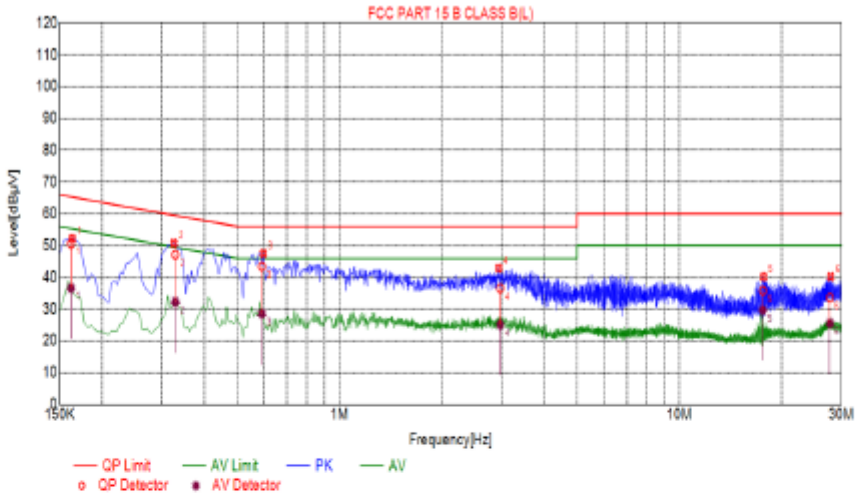
Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

4.4. 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.

4.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST

Line Conducted Emission Test Line 1-L



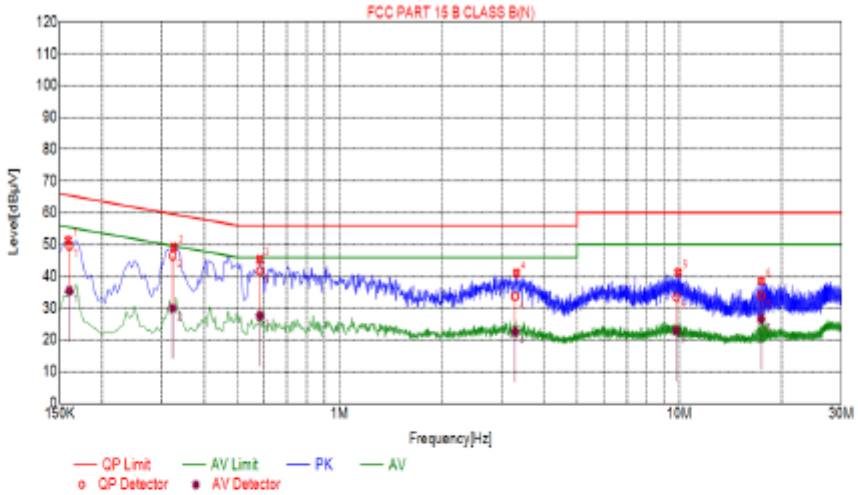
Suspected List

NO.	Freq. [MHz]	Level [dBµV]	Factor [dB]	Limit [dBµV]	Margin [dB]	Detector
1	0.1635	52.22	9.98	65.28	13.06	PK
2	0.3255	50.75	10.05	59.57	8.82	PK
3	0.5955	47.58	10.05	56.00	8.42	PK
4	2.9400	42.97	10.21	56.00	13.03	PK
5	17.6685	40.25	10.02	60.00	19.75	PK
6	27.8565	40.27	10.26	60.00	19.73	PK

Final Data List

NO.	Freq. [MHz]	Factor [dB]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]
1	0.1619	9.99	50.66	65.37	14.71	36.67	55.37	18.70
2	0.3286	10.04	47.17	59.49	12.32	32.28	49.49	17.21
3	0.5896	10.05	43.45	56.00	12.55	28.57	46.00	17.43
4	2.9694	10.21	36.57	56.00	19.43	25.16	46.00	20.84
5	17.5800	10.02	35.83	60.00	24.17	29.71	50.00	20.29
6	27.7219	10.26	33.59	60.00	26.41	25.52	50.00	24.48

Line Conducted Emission Test Line 2-N



Suspected List

NO.	Freq. [MHz]	Level [dBµV]	Factor [dB]	Limit [dBµV]	Margin [dB]	Detector
1	0.1590	51.36	10.01	65.52	14.16	PK
2	0.3255	49.24	10.05	59.57	10.33	PK
3	0.5820	46.34	10.05	56.00	10.66	PK
4	3.3135	41.02	10.24	56.00	14.98	PK
5	9.8970	41.29	10.07	60.00	18.71	PK
6	17.4210	38.56	10.01	60.00	21.44	PK

Final Data List

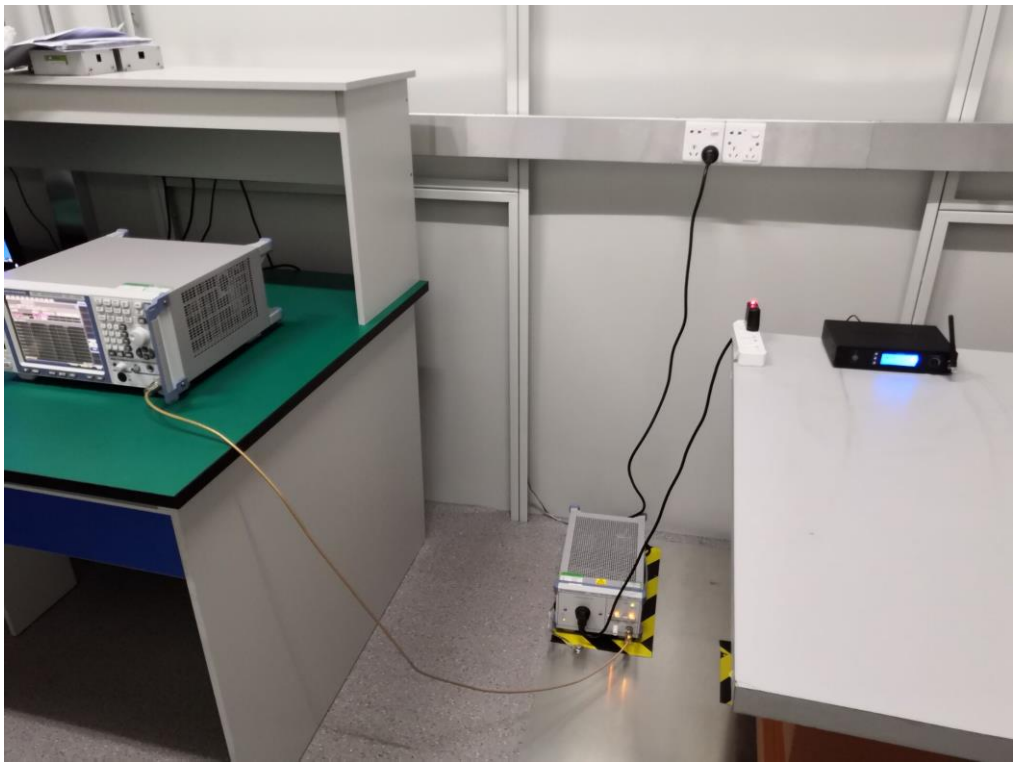
NO.	Freq. [MHz]	Factor [dB]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]
1	0.1600	10.00	49.64	65.46	15.82	35.47	55.46	19.99
2	0.3226	10.05	46.48	59.64	13.16	29.99	49.64	19.65
3	0.5829	10.05	41.71	56.00	14.29	27.59	46.00	18.41
4	3.2862	10.24	33.64	56.00	22.36	22.56	46.00	23.44
5	9.7985	10.07	33.48	60.00	26.52	23.00	50.00	27.00
6	17.4109	10.01	34.13	60.00	25.87	26.53	50.00	23.47

RESULT: PASS

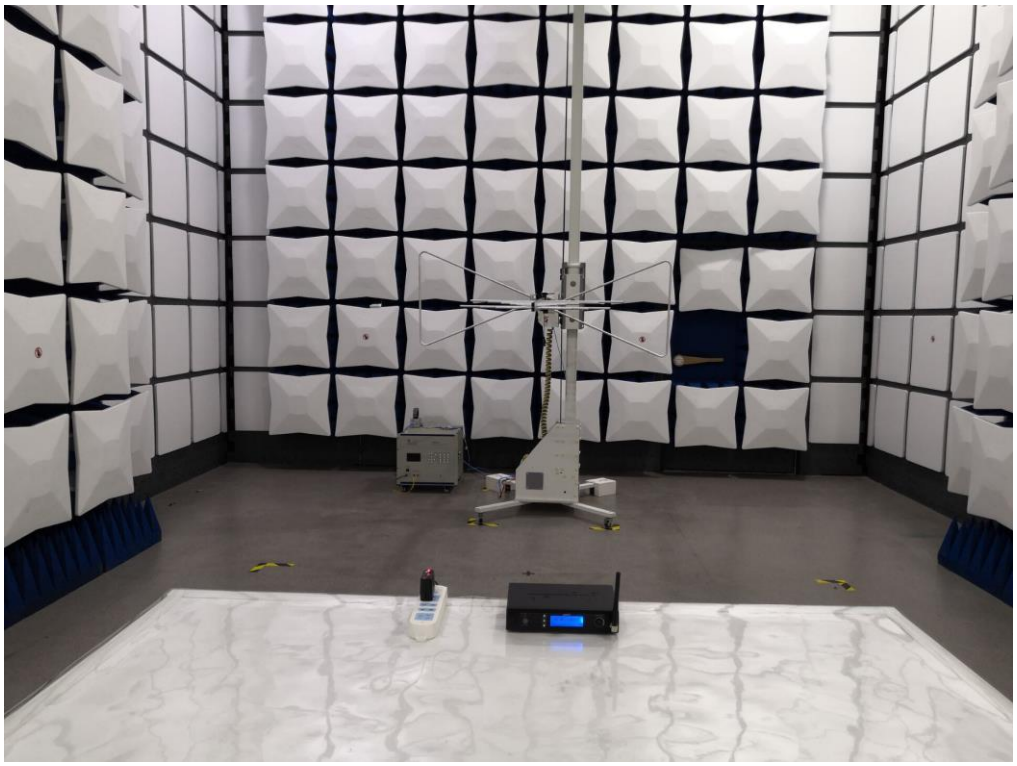
Note: All the test modes had been tested, the mode 1 was the worst case. Only the data of the worst case would be record in this test report.

APPENDIX A: PHOTOGRAPHS OF TEST SETUP

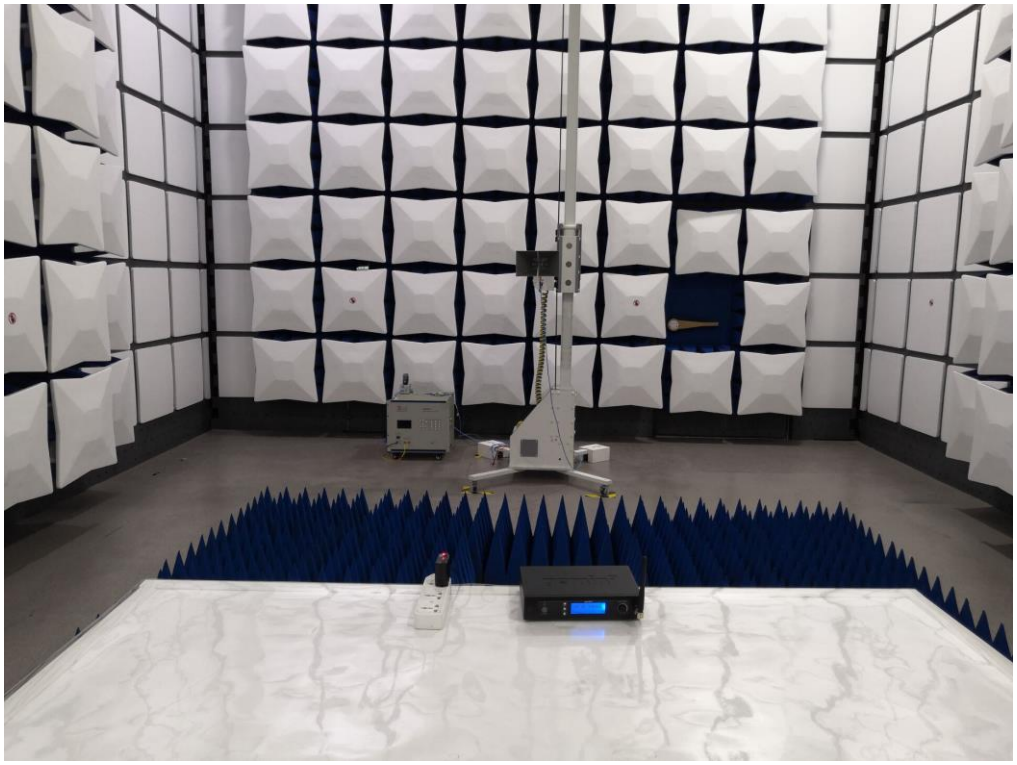
FCC LINE CONDUCTED EMISSION TEST SETUP



FCC RADIATED EMISSION TEST SETUP BELOW 1GHZ



FCC RADIATED EMISSION TEST SETUP ABOVE 1GHZ

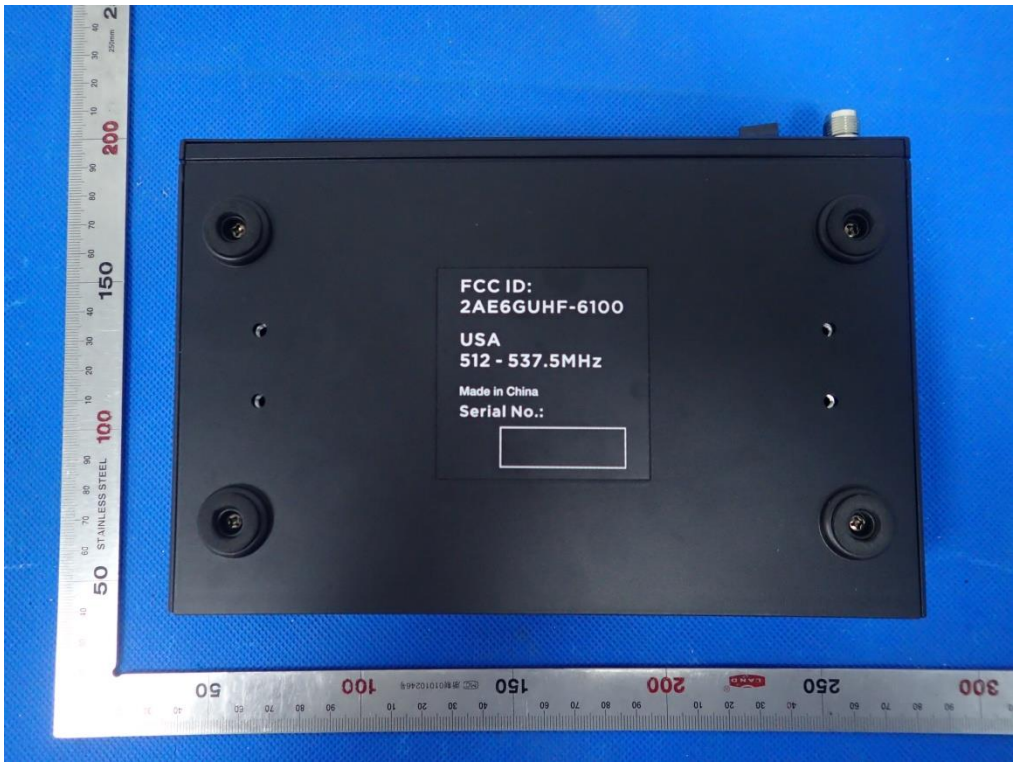


APPENDIX B: PHOTOGRAPHS OF EUT

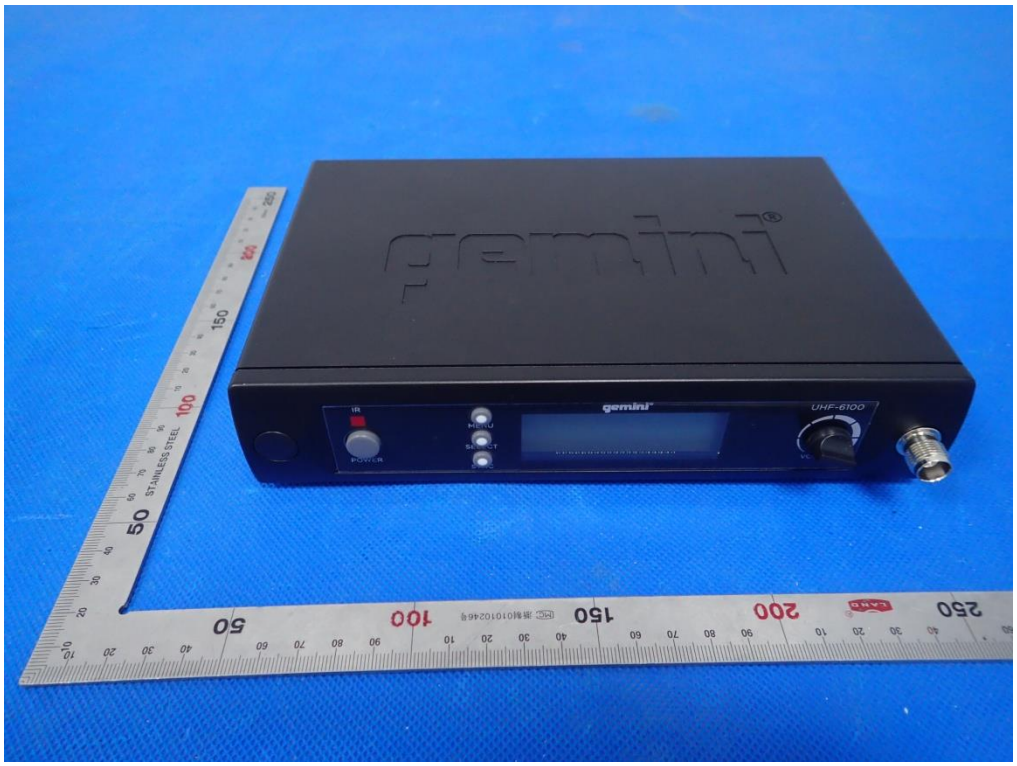
ALL VIEW OF EUT

TOP VIEW OF EUT

BOTTOM VIEW OF EUT

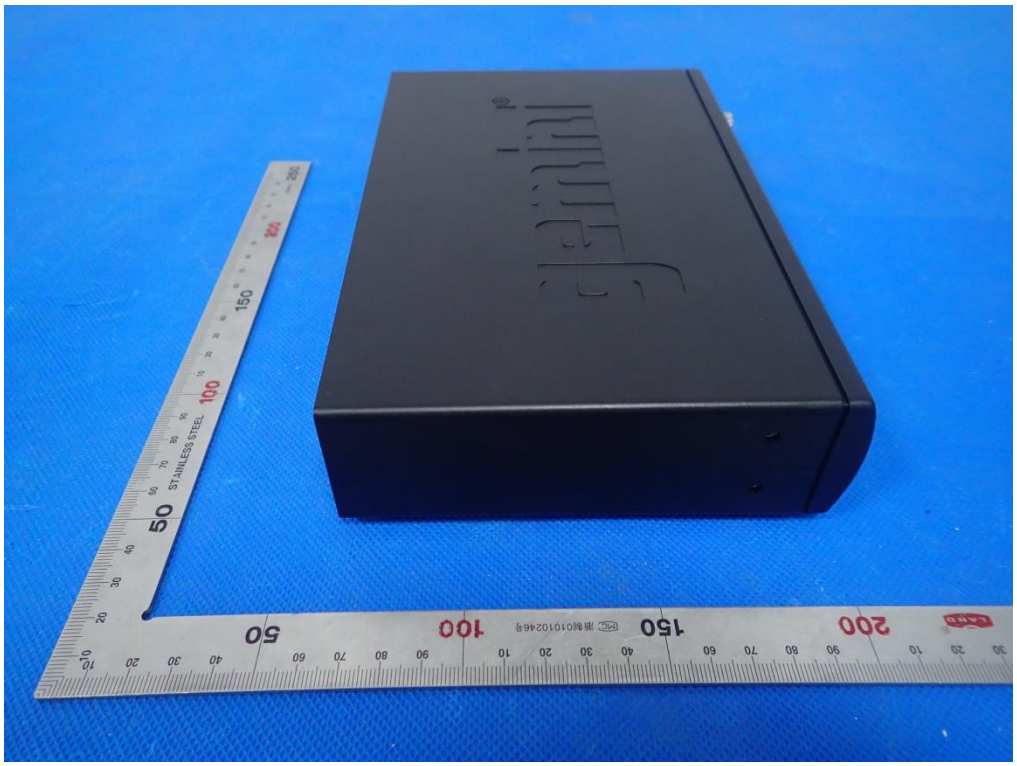


FRONT VIEW OF EUT

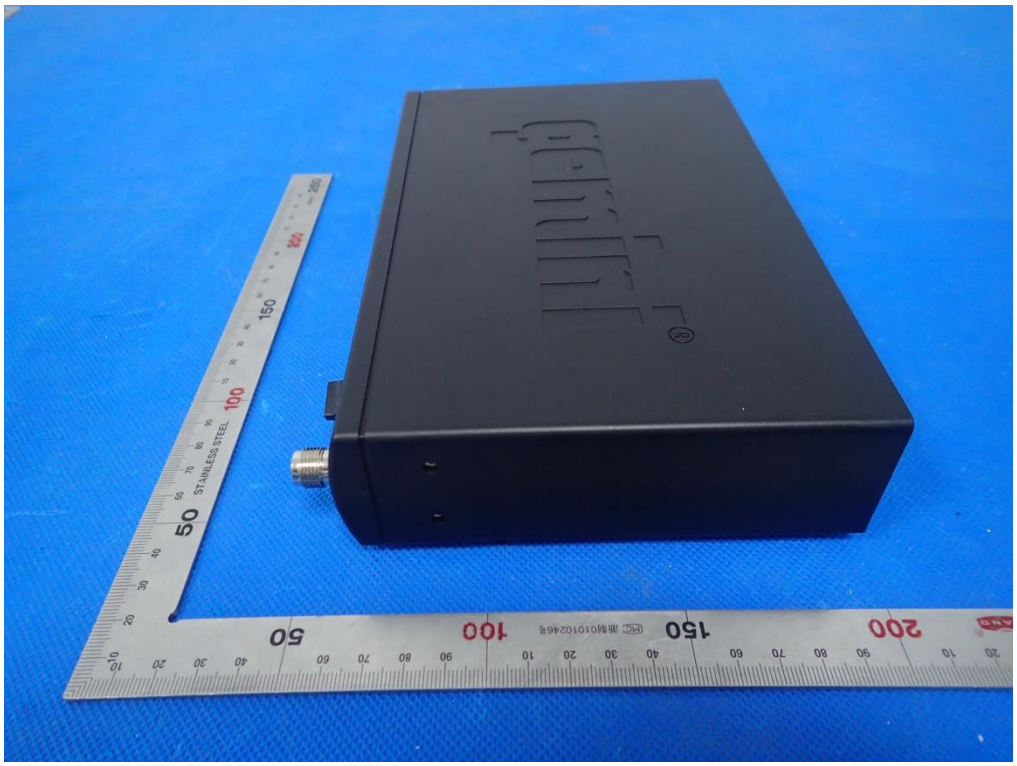


BACK VIEW OF EUT

LEFT VIEW OF EUT

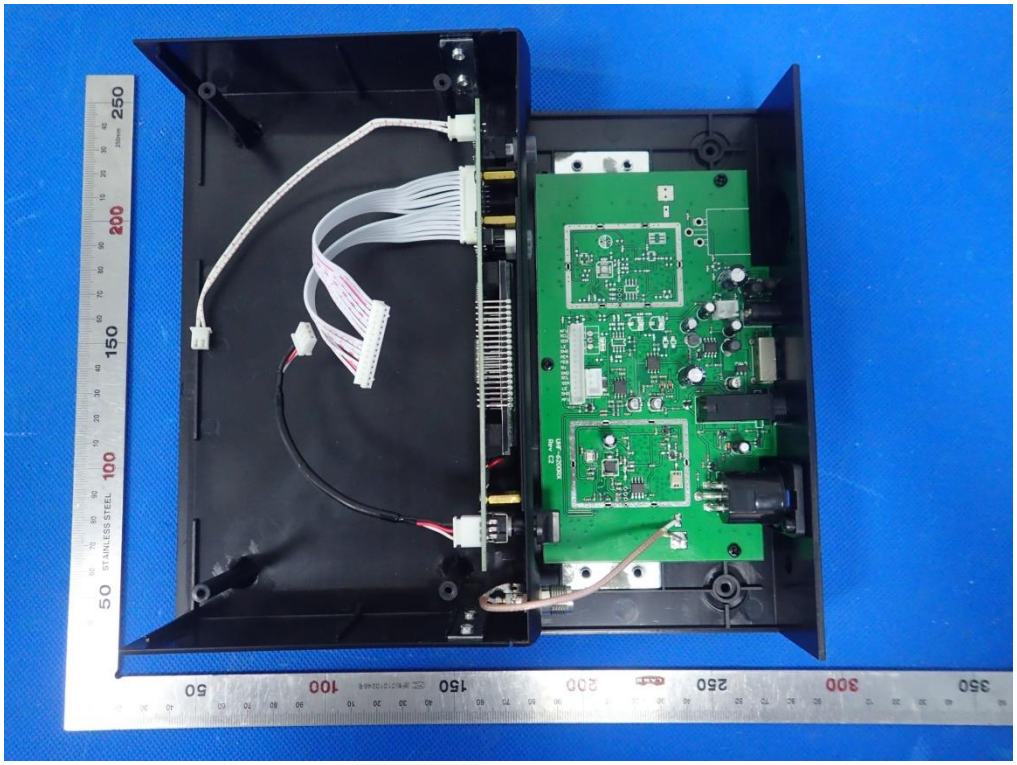


RIGHT VIEW OF EUT

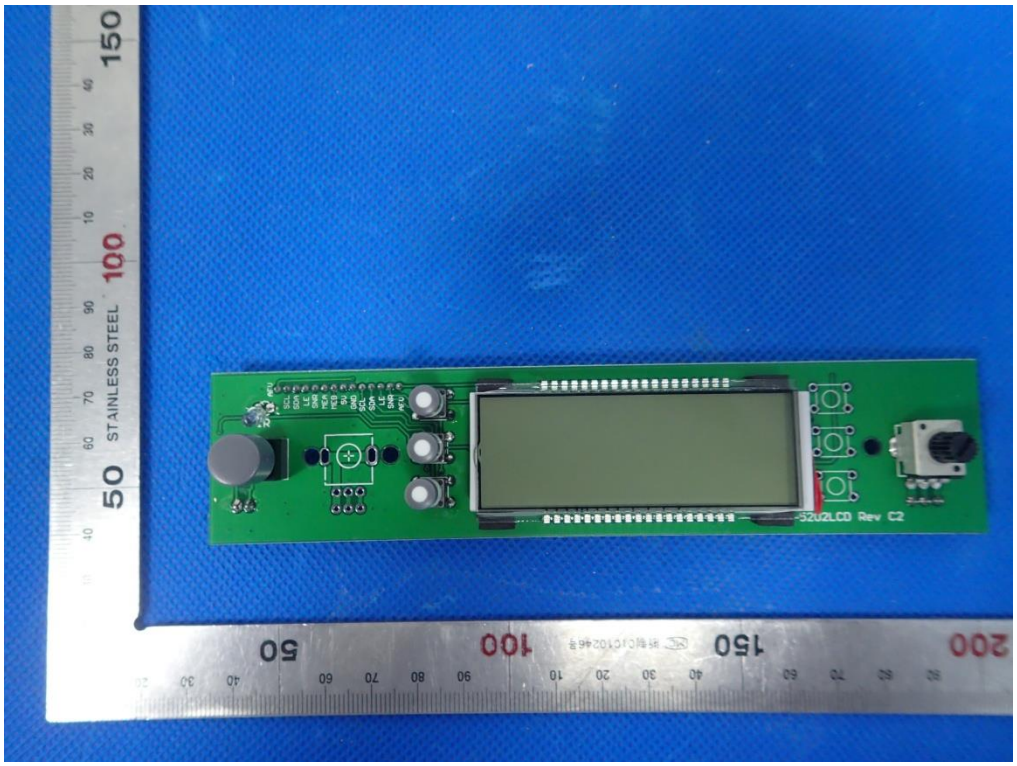


VIEW OF EUT (PORT)

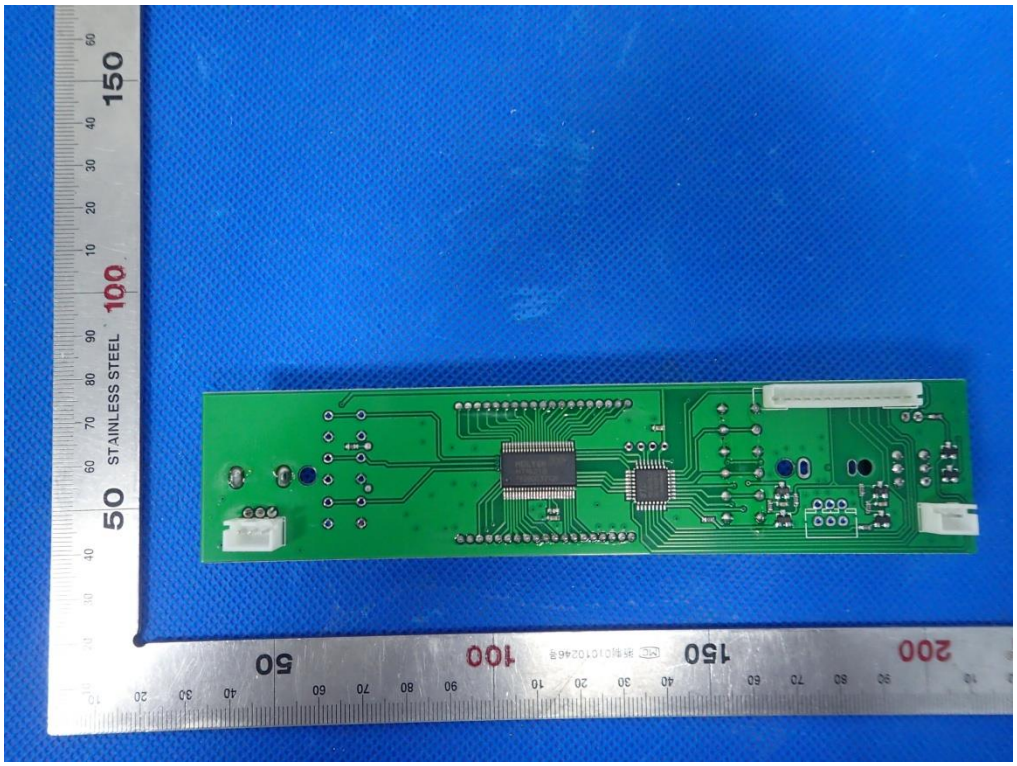
OPEN VIEW OF EUT



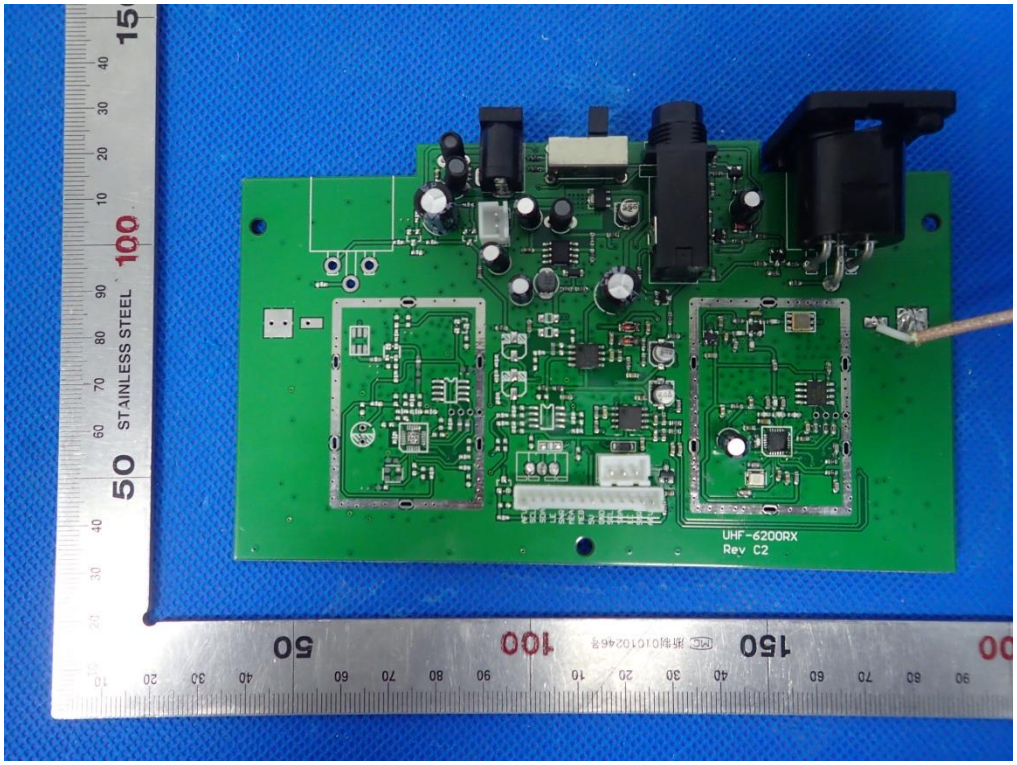
INTERNAL VIEW OF EUT-1



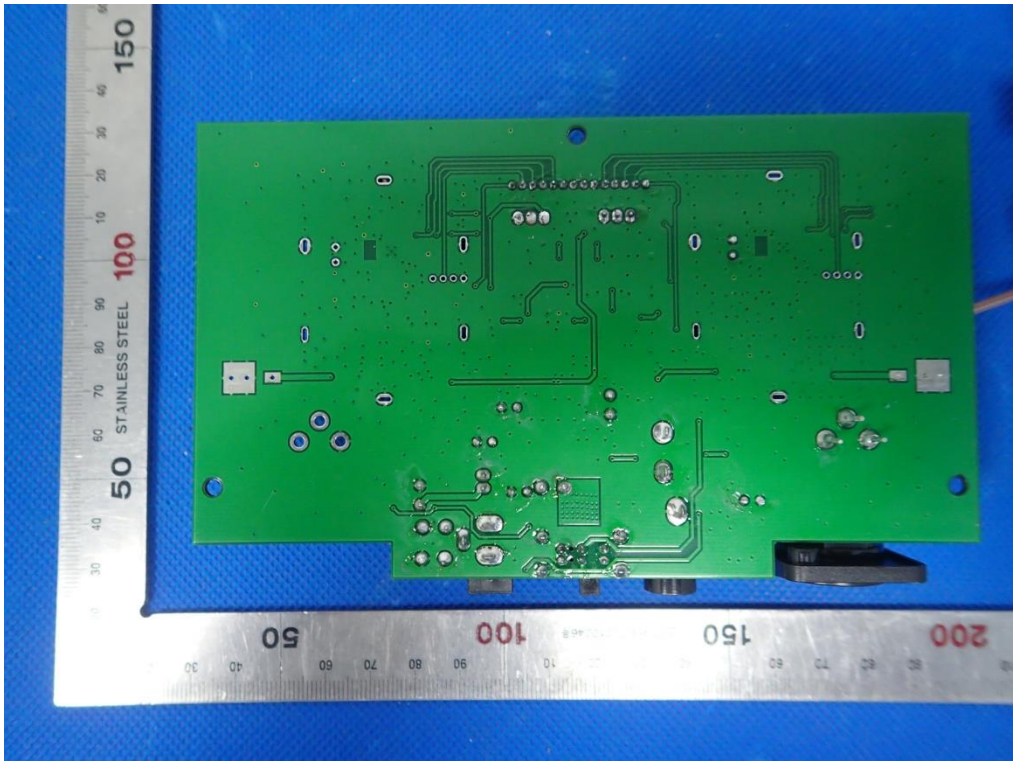
INTERNAL VIEW OF EUT-2



INTERNAL VIEW OF EUT-3



INTERNAL VIEW OF EUT-4



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