FCC Test Report

Report No.: AGC06246160204FE03

FCC ID	:	2AEWCBTSPEAKER
APPLICATION PURPOSE	:	Class II Permissive Change
PRODUCT DESIGNATION	:	SKULL SPEAKER
BRAND NAME	:	N/A
MODEL NAME	:	URBT-1083
CLIENT	:	Uni-rich Technology Limited
DATE OF ISSUE	:	Mar.24,2016
STANDARD(S) **TEST PROCEDURE(S)**	:	FCC Part 15 Rules
REPORT VERSION	:	V1.0

Attestation of Global Compliance (Shenzhen) Co., Ltd

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Report Revise Record

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Mar.24,2016	Valid	Original Report

Note: The original report can be referred to NO.AGC06246160201FE03

Only Radiated Emission, the product basic information and product appearance for the differences based on the original product.

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1. VERIFICATION OF CONFORMITY

Applicant	Uni-rich Technology Limited
Address	Unit D, 6th Floor, Haribest Industrial Building 45-47 Au Pui Wan Street, Fotan, Shatin, N.T. HK
Manufacturer	Uni-rich Technology Limited
Address	Unit D, 6th Floor, Haribest Industrial Building 45-47 Au Pui Wan Street, Fotan, Shatin, N.T. HK
Product Designation	SKULL SPEAKER
Brand Name	N/A
Test Model	URBT-1083
Date of test	Feb.16,2016 to Feb.18,2016
Deviation	None
Condition of Test Sample	Normal
Report Template	AGCRT-US-BR/RF

We hereby certify that:

The above equipment was tested by Dongguan Precise Testing Service 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 (2009) 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 15.249.

Tested By

Time Huang(Huang Nanhui) Mar.24,2016

Reviewed By

Forrest Lei(Lei Yonggang) Mar.24,2016

Approved By

Solger Zhang(Zhang Hongyi)
Authorized Officer
Mar.24,2016

2. GENERAL INFORMATION

2.1. PRODUCT DESCRIPTION

A major technical description of EUT is described as following

Operation Frequency	2.402 GHz to 2.480GHz
Bluetooth Version	V3.0
Modulation	GFSK, π /4-DQPSK, 8DPSK
Number of channels	79
Hardware Version	V1.1
Software Version	2.1
Antenna Designation	PCB Antenna (Met 15.203 Antenna requirement)
Antenna Gain	0dBi
Power Supply	DC3.7V by battery
Note: The USB port only used for charging and can't be used to transfer data with PC.	

2.2. TABLE OF CARRIER FREQUENCYS

Frequency Band	Channel Number	Frequency
2400~2483.5MHZ	0	2402MHZ
	1	2403MHZ
	:	:
	38	2440 MHZ
	39	2441 MHZ
	40	2442 MHZ
	:	:
	77	2479 MHZ
	78	2480 MHZ

3. MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement y ±U，where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2，providing a level of confidence of approximately 95 %。

No.	Item	Uncertainty
1	Conducted Emission Test	±3.18dB
2	All emissions,radiated	±3.91dB
3	Temperature	±0.5°C
4	Humidity	±2%

4. DESCRIPTION OF TEST MODES

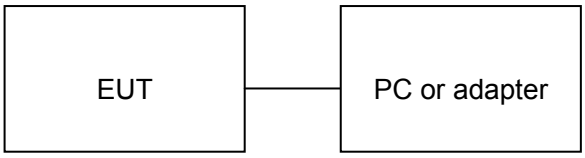
NO.	TEST MODE DESCRIPTION
1	BT Link with charging
2	BT Link without charging

Note:
1. All the test modes can be supply by battery, only the result of the worst case was recorded in the report, if no other cases.
2. For Radiated Emission, 3axis were chosen for testing for each applicable mode.
3.The EUT used fully-charged battery when tested.

5. SYSTEM TEST CONFIGURATION

5.1. CONFIGURATION OF EUT SYSTEM

Configure 1: (Normal hopping)



5.2. EQUIPMENT USED IN EUT SYSTEM

Item	Equipment	Model No.	ID or Specification	Remark
1	SKULL SPEAKER	N/A	URBT-1083	EUT
2	PC	DELL	INSPIRON	A.E

5.3. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.249	Radiated Emission	Compliant
§15.249	Band Edges	N/A
§15.207	Conduction Emission	N/A
§15.215	BANDWITH	N/A

Note: N/A stands for not applicable

6. TEST FACILITY

Site	Dongguan Precise Testing Service Co., Ltd.
Location	Building D,Baoding Technology Park,Guangming Road2,Dongcheng District, Dongguan, Guangdong, China,
FCC Registration No.	371540
Description	The test site is constructed and calibrated to meet the FCC requirements in documents ANSI C63.4:2009.

7. ALL TEST EQUIPMENT LIST

FOR RADIATED EMISSION TEST (BELOW 1GHZ)

Radiated Emission Test Site					
Name of Equipment	**Manufacturer**	**Model Number**	**Serial Number**	**Last Calibration**	**Due Calibration**
EMI Test Receiver	Rohde & Schwarz	ESCI	101417	July 4, 2015	July 3, 2016
Trilog Broadband Antenna (25M-1GHz)	SCHWARZBECK	VULB9160	9160-3355	July 4, 2015	July 3, 2016
Signal Amplifier	SCHWARZBECK	BBV 9475	9745-0013	July 4, 2015	July 3, 2016
RF Cable	SCHWARZBECK	AK9515E	96221	July 4, 2015	July 3, 2016
3m Anechoic Chamber	CHENGYU	966	PTS-001	June 6, 2015	June 5, 2016
MULTI-DEVICE Positioning Controller	Max-Full	MF-7802	MF780208339	N/A	N/A
Active loop antenna (9K-30MHz)	Schwarzbeck	FMZB1519	1519-038	June 6, 2015	June 5, 2016
Spectrum analyzer	Agilent	E4407B	MY46185649	June 6, 2015	June 5, 2016
Radiation Cable 1	MXT	RS1	R005	June 6, 2015	June 5, 2016
Radiation Cable 2	MXT	RS1	R006	June 6, 2015	June 5, 2016

8. RADIATED EMISSION

8.1TEST LIMIT

Standard FCC15.249

Fundamental Frequency	Field Strength of Fundamental (millivolts/meter)	Field Strength of Harmonics (microvolts/meter)
900-928MHz	50	500
2400-2483.5MHz	50	500
5725-5875MHz	50	500
24.0-24.25GHz	250	2500

Standard FCC 15.209

Frequency (MHz)	Distance Meters	Field Strengths Limit	
		μ V/m	dB(μV)/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(μV)/m (Peak) 54.0 dB(μV)/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.

8.2. 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. 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 above 1GHz, use 1.5MHz VBW and RBW for peak reading. Then 1.5MHz RBW and 10Hz VBW for average reading in spectrum analyzer.

Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.

7. 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.
8. 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.
9. 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.
10. 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.

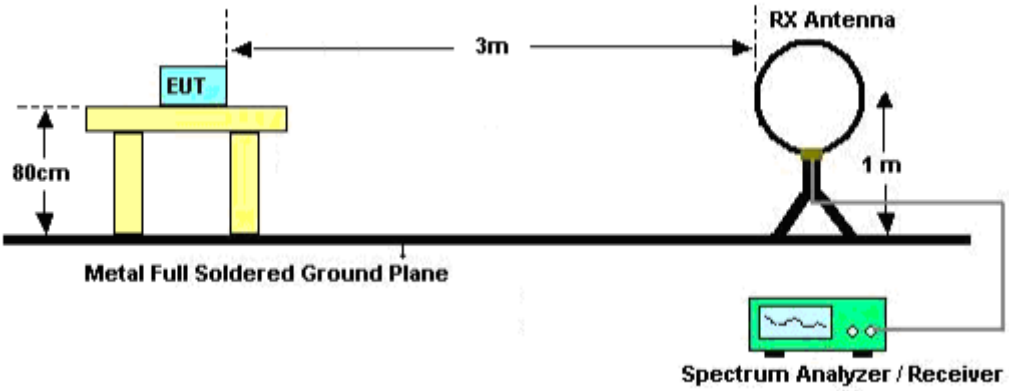
The following table is the setting of spectrum analyzer and receiver.

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
Start ~Stop Frequency	1GHz~26.5GHz 1.5MHz/1.5MHz for Peak, 1.5MHz/10Hz for Average

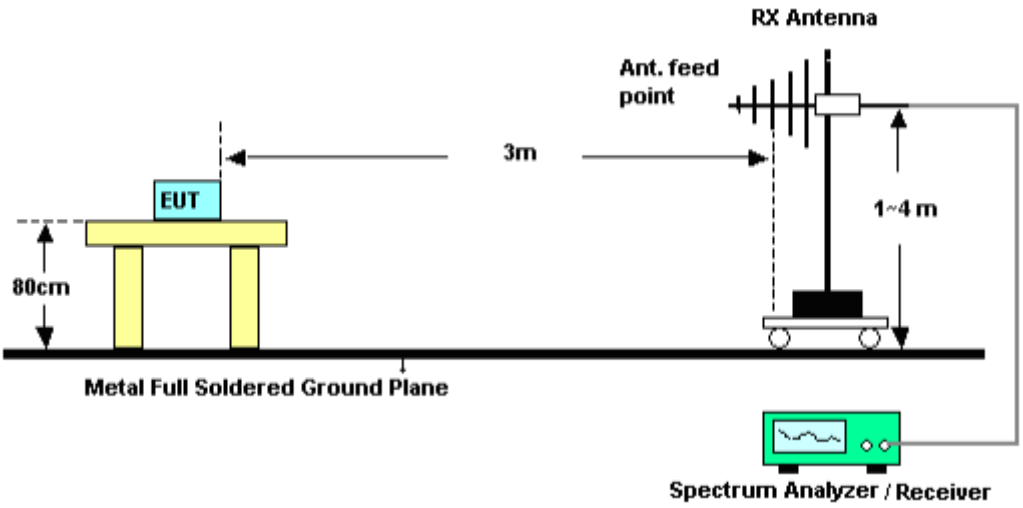
Receiver Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RB 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RB 120KHz for QP

8.3. TEST SETUP

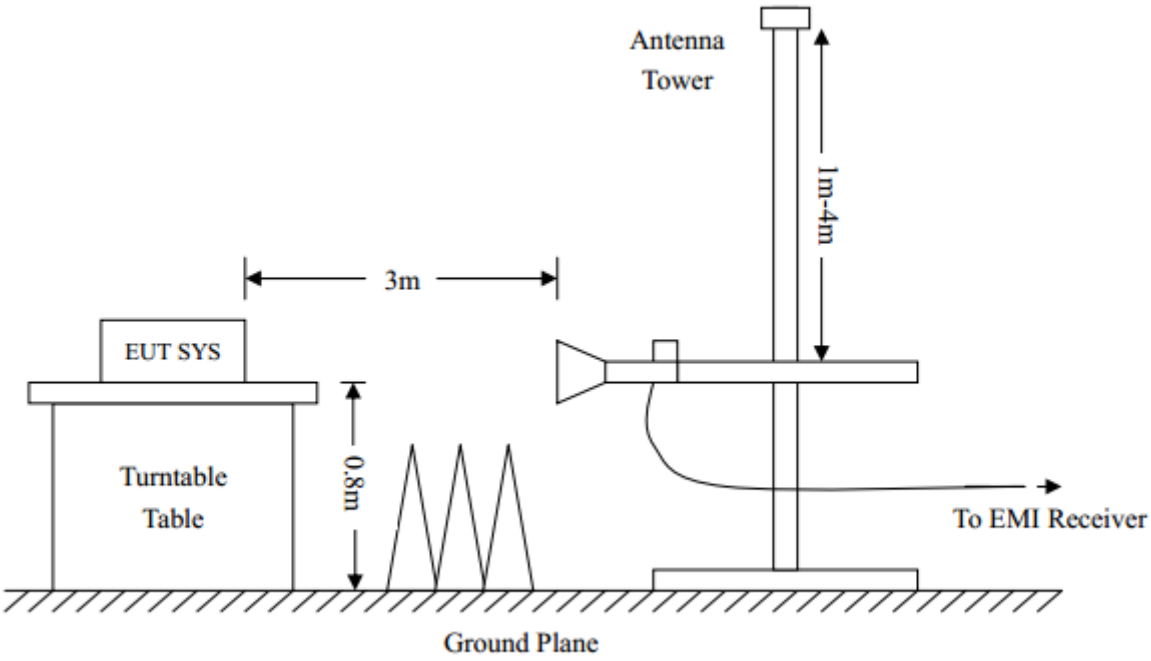
Radiated Emission Test-Setup Frequency Below 30MHz



RADIATED EMISSION TEST SETUP 30MHz-1000MHz



RADIATED EMISSION TEST SETUP ABOVE 1000MHz



8.4. TEST RESULT

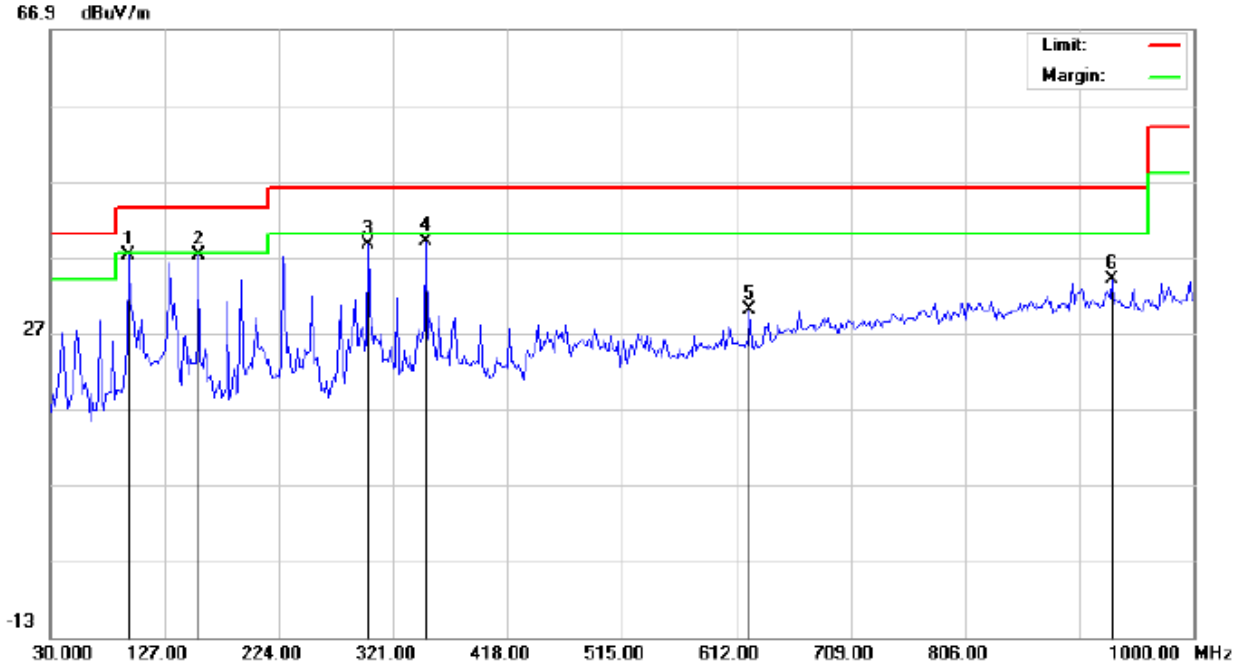
(Worst modulation: GFSK)

RADIATED EMISSION BELOW 30MHZ

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

RADIATED EMISSION BELOW 1GHZ

RADIATED EMISSION TEST- (30MHZ-1GHZ)-LOW CHANNEL-HORIZONTAL

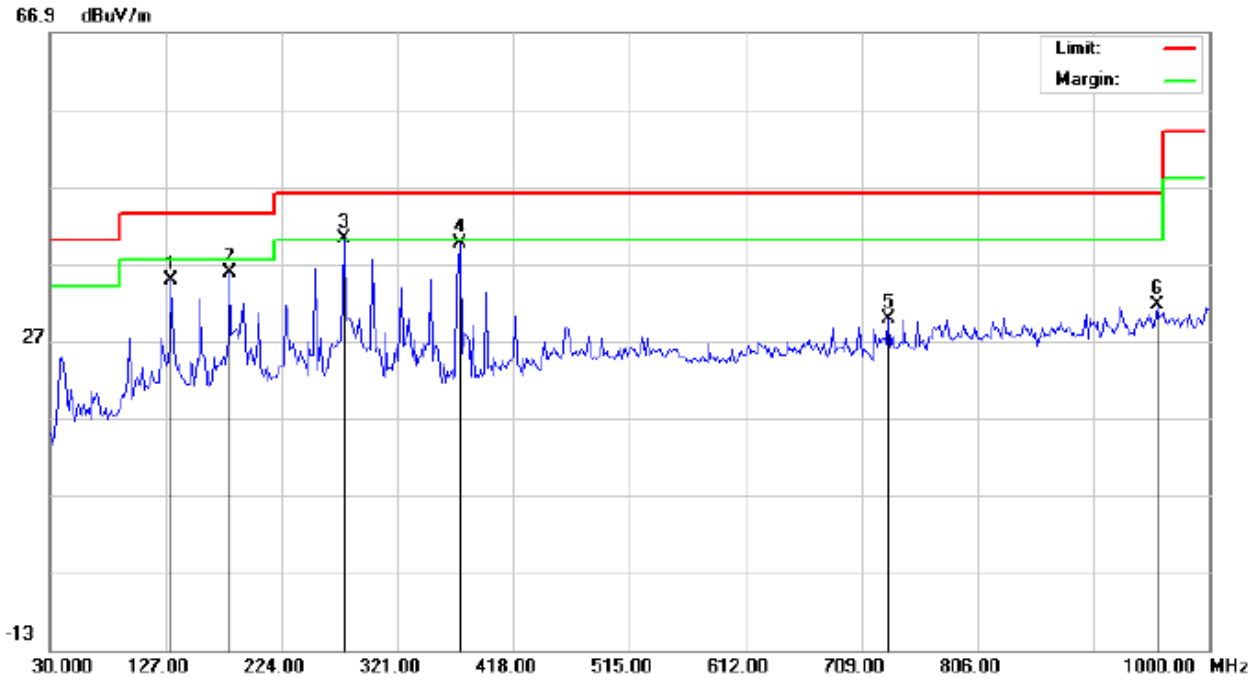


Site: Conduction	Polarization: *Horizontal*	Temperature: 23.1
Limit: FCC Class B 3M Radiation	Power:	Humidity: 53.6 %
EUT: SKULL SPEAKER	Distance:	
M/N: URBT-1083		
Mode: Low Channel TX		
Note:		

No.	Mk.	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dBuV/m	dBuV/m	dBuV/m	dB		cm	degree	
1		96.2833	30.39	6.77	37.16	43.50	-6.34	peak			
2	*	156.0999	25.93	11.28	37.21	43.50	-6.29	peak			
3		299.9833	23.27	15.41	38.68	46.00	-7.32	peak			
4		348.4833	20.39	18.64	39.03	46.00	-6.97	peak			
5		623.3167	6.16	23.79	29.95	46.00	-16.05	peak			
6		930.4833	4.55	29.46	34.01	46.00	-11.99	peak			

RESULT: PASS

RADIATED EMISSION TEST- (30MHZ-1GHZ)-LOW CHANNEL -VERTICAL



Site: Conduction
Limit: FCC Class B 3M Radiation
EUT: SKULL SPEAKER
M/N: URBT-1083
Mode: Low Channel TX
Note:

Polarization: *Vertical*
Power:
Distance:

Temperature: 23.1
Humidity: 53.6 %

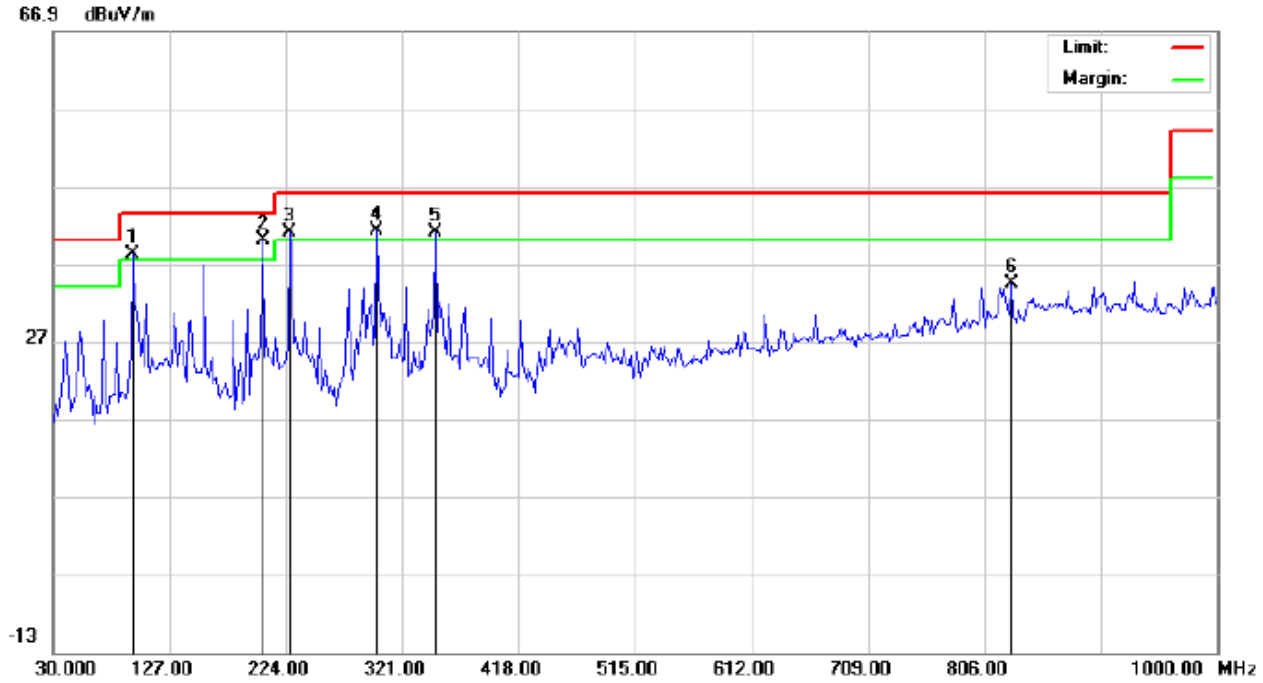
No.	Mk.	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dBuV/m	dBuV/m	dBuV/m	dB		cm	degree	
1		131.8499	22.94	11.80	34.74	43.50	-8.76	peak			
2		180.3500	21.77	13.98	35.75	43.50	-7.75	peak			
3	*	275.7332	25.51	14.68	40.19	46.00	-5.81	peak			
4		372.7333	20.69	18.89	39.58	46.00	-6.42	peak			
5		731.6332	3.71	26.10	29.81	46.00	-16.19	peak			
6		956.3500	1.59	29.94	31.53	46.00	-14.47	peak			

RESULT: PASS

Note: 1. Factor=Antenna Factor + Cable loss, Margin=Measurement-Limit.

2. The “Factor” value can be calculated automatically by software of measurement system.

RADIATED EMISSION TEST- (30MHZ-1GHZ)-MIDDLE CHANNEL-HORIZONTAL



Site: Conduction
Limit: FCC Class B 3M Radiation
EUT: SKULL SPEAKER
M/N: URBT-1083
Mode: Middle Channel TX
Note:

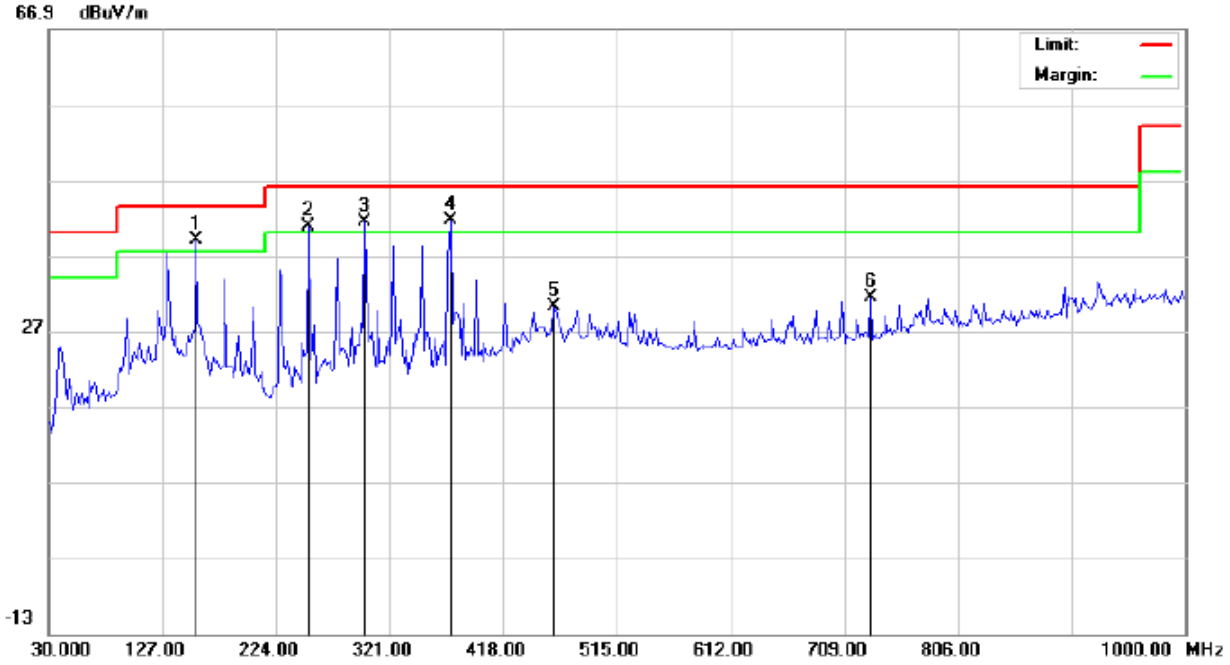
Polarization: *Horizontal*
Power:
Distance:

Temperature: 23.1
Humidity: 53.6 %

No.	Mk.	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dBuV/m	dBuV/m	dBuV/m	dB		cm	degree	
1	!	96.2833	31.39	6.77	38.16	43.50	-5.34	peak			
2	*	204.6000	28.48	11.53	40.01	43.50	-3.49	peak			
3	!	227.2333	31.73	9.22	40.95	46.00	-5.05	peak			
4	!	299.9833	25.77	15.41	41.18	46.00	-4.82	peak			
5	!	348.4833	22.39	18.64	41.03	46.00	-4.97	peak			
6		828.6332	7.17	27.31	34.48	46.00	-11.52	peak			

RESULT: PASS

RADIATED EMISSION TEST- (30MHZ-1GHZ)- MIDDLE CHANNEL -VERTICAL



Site: Conduction	Polarization: *Vertical*	Temperature: 23.1
Limit: FCC Class B 3M Radiation	Power:	Humidity: 53.6 %
EUT: SKULL SPEAKER	Distance:	
M/N: URBT-1083		
Mode: Middle Channel TX		
Note:		

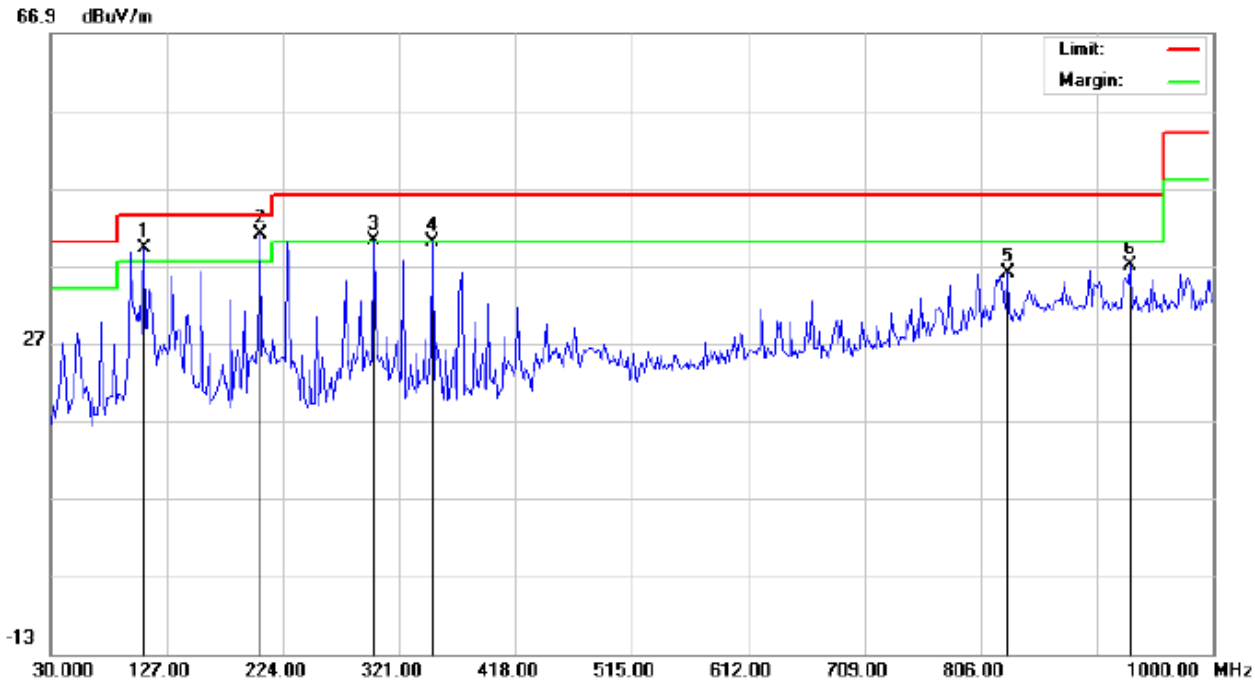
No.	Mk.	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dBuV/m	dBuV/m	dBuV/m	dB		cm	degree	
1	!	156.0999	23.62	15.30	38.92	43.50	-4.58	peak			
2	!	251.4833	26.88	13.94	40.82	46.00	-5.18	peak			
3	!	299.9833	25.94	15.41	41.35	46.00	-4.65	peak			
4	*	372.7333	22.69	18.89	41.58	46.00	-4.42	peak			
5		461.6500	9.41	20.72	30.13	46.00	-15.87	peak			
6		731.6332	5.21	26.10	31.31	46.00	-14.69	peak			

RESULT: PASS

Note: 1. Factor=Antenna Factor + Cable loss, Margin=Measurement-Limit.

2. The “Factor” value can be calculated automatically by software of measurement system.

RADIATED EMISSION TEST- (30MHZ-1GHZ)-HIGH CHANNEL-HORIZONTAL



Site: Conduction
Limit: FCC Class B 3M Radiation
EUT: SKULL SPEAKER
M/N: URBT-1083
Mode: High Channel TX
Note:

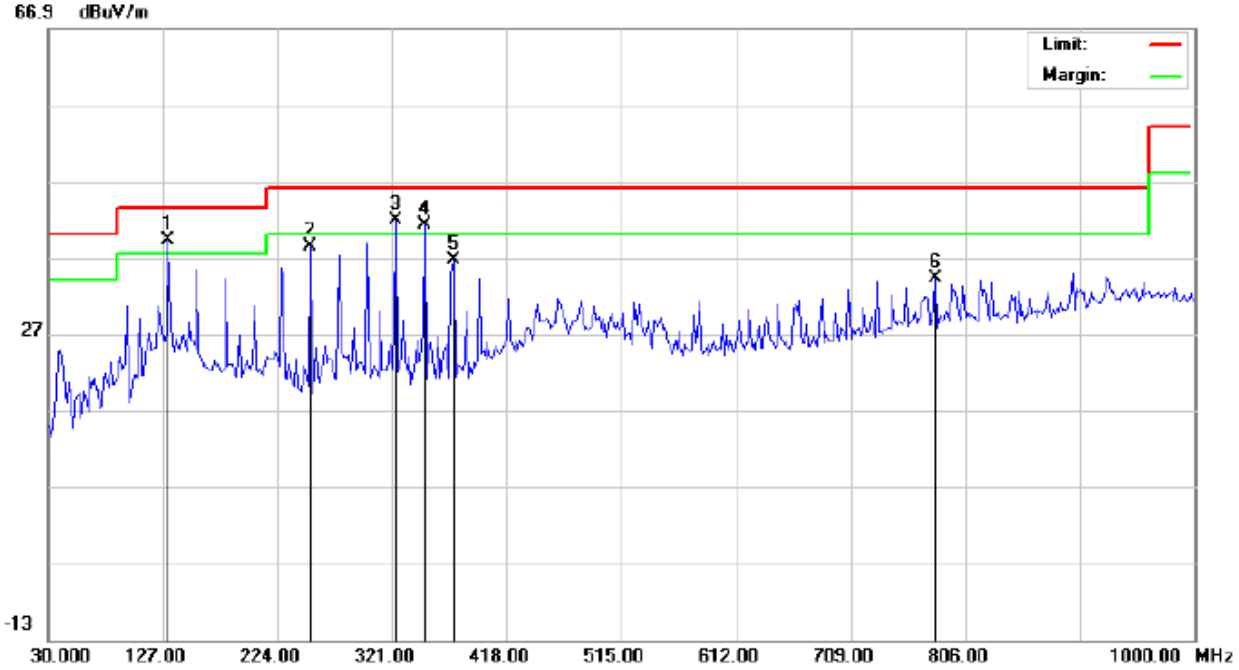
Polarization: *Horizontal*
Power:
Distance:

Temperature: 23.1
Humidity: 53.6 %

No.	Mk.	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dBuV/m	dBuV/m	dBuV/m	dB		cm	degree	
1	!	107.6000	30.49	8.72	39.21	43.50	-4.29	peak			
2	*	204.6000	29.48	11.53	41.01	43.50	-2.49	peak			
3	!	299.9833	24.77	15.41	40.18	46.00	-5.82	peak			
4	!	348.4833	21.39	18.64	40.03	46.00	-5.97	peak			
5		828.6332	8.67	27.31	35.98	46.00	-10.02	peak			
6		930.4833	7.55	29.46	37.01	46.00	-8.99	peak			

RESULT: PASS

RADIATED EMISSION TEST- (30MHZ-1GHZ)-HIGH CHANNEL -VERTICAL



Site: Conduction	Polarization: *Vertical*	Temperature: 23.1
Limit: FCC Class B 3M Radiation	Power:	Humidity: 53.6 %
EUT: SKULL SPEAKER	Distance:	
M/N: URBT-1083		
Mode: High Channel TX		
Note:		

No.	Mk.	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dBuV/m	dBuV/m	dBuV/m	dB		cm	degree	
1	*	131.8500	27.44	11.80	39.24	43.50	-4.26	peak			
2		251.4833	24.38	13.94	38.32	46.00	-7.68	peak			
3	!	324.2333	24.69	17.02	41.71	46.00	-4.29	peak			
4	!	348.4833	22.61	18.64	41.25	46.00	-4.75	peak			
5		372.7333	17.69	18.89	36.58	46.00	-9.42	peak			
6		780.1332	7.09	27.05	34.14	46.00	-11.86	peak			

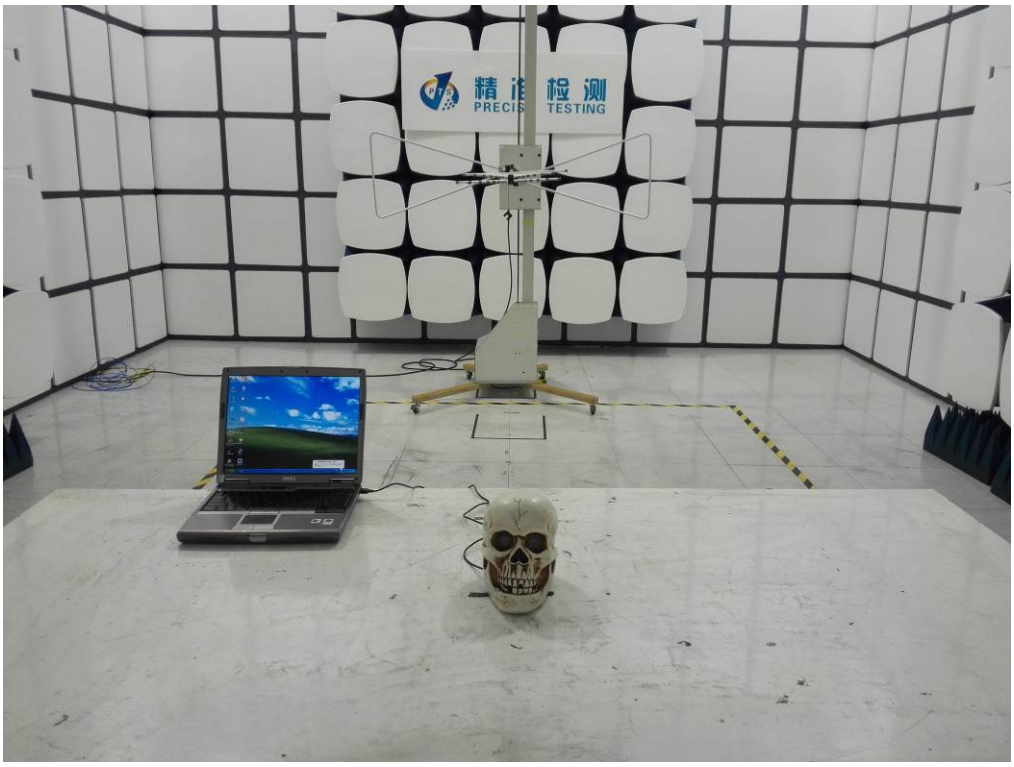
RESULT: PASS

Note: 1. Factor=Antenna Factor + Cable loss, Margin=Measurement-Limit.

2. The “Factor” value can be calculated automatically by software of measurement system.

APPENDIX A: PHOTOGRAPHS OF TEST SETUP

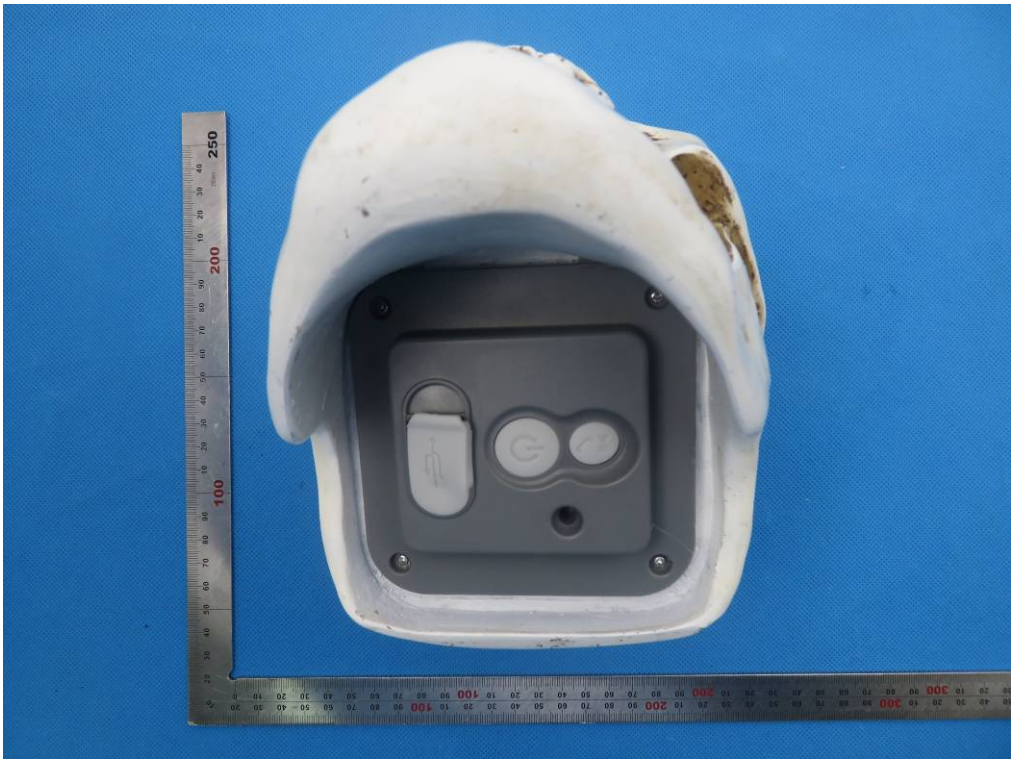
FCC RADIATED EMISSION TEST SETUP



APPENDIX B: PHOTOGRAPHS OF EUT

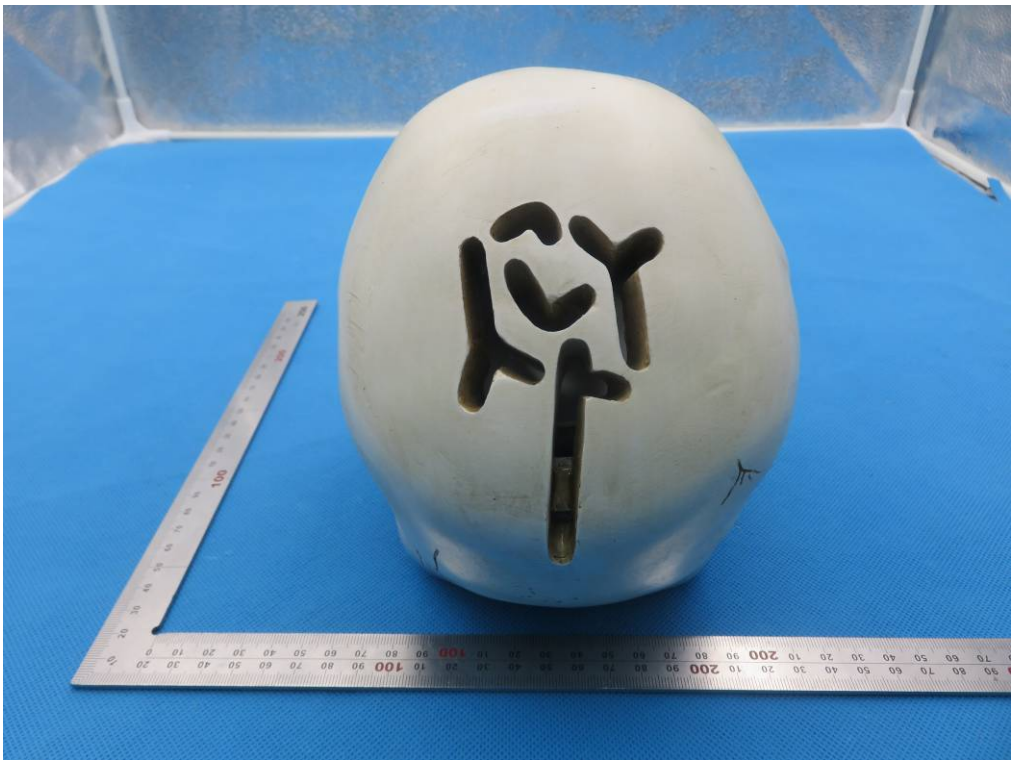
TOP VIEW OF EUT

BOTTOM VIEW OF EUT



FRONT VIEW OF EUT

BACK VIEW OF EUT



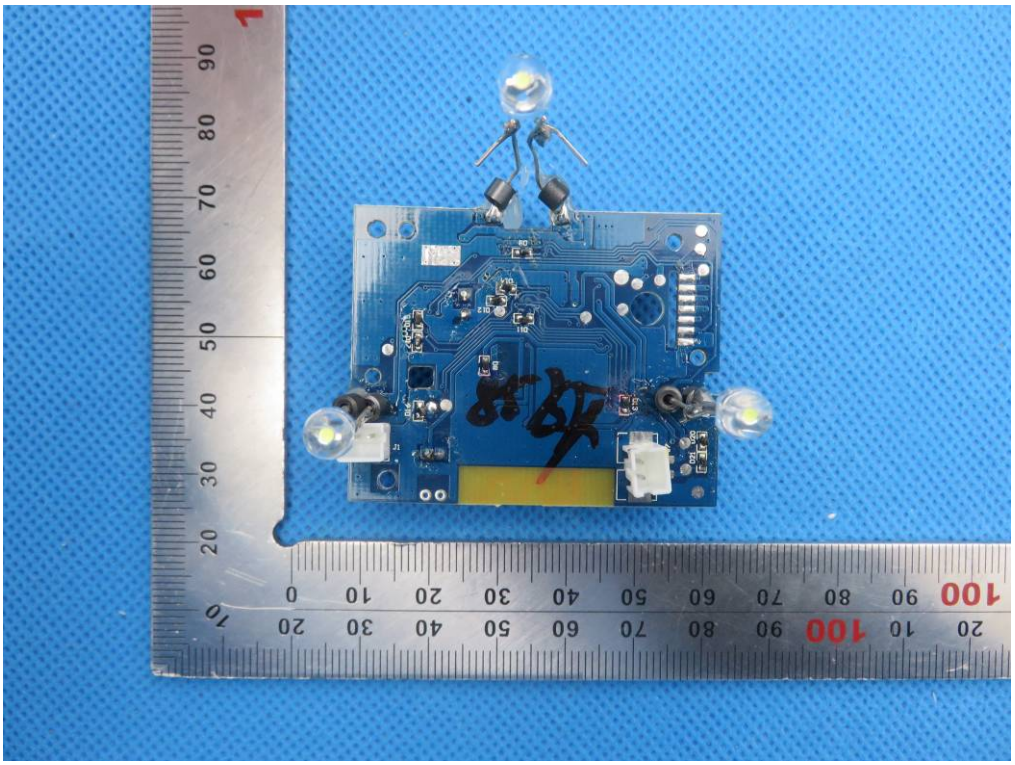
LEFT VIEW OF EUT

RIGHT VIEW OF EUT

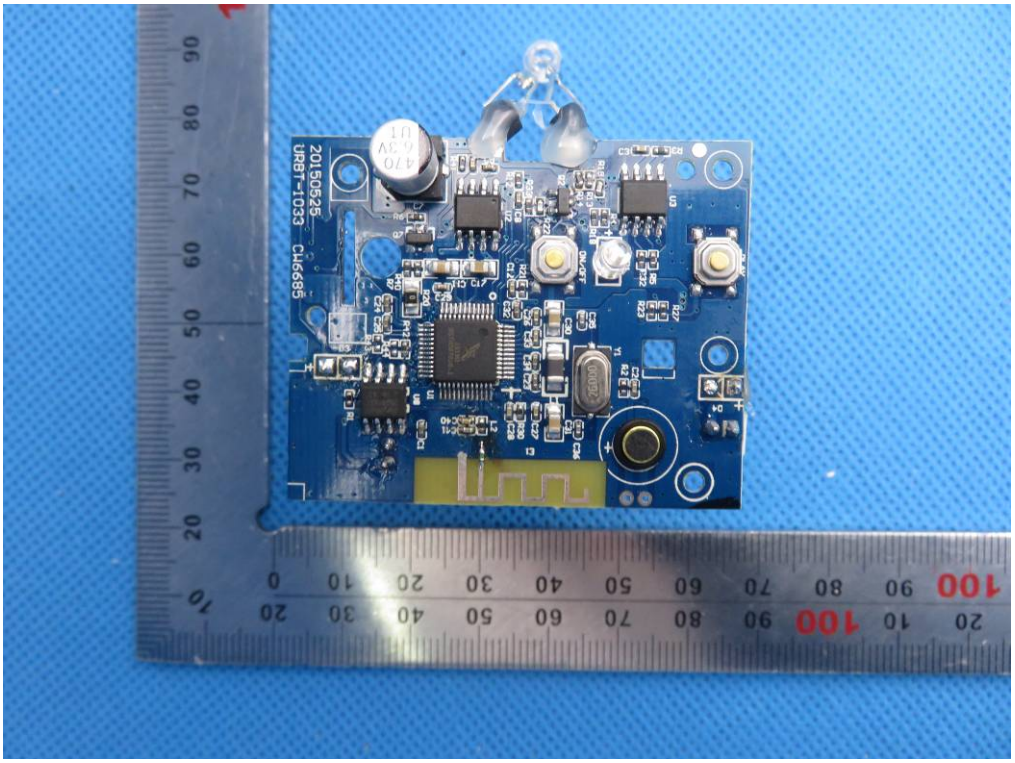
VIEW OF EUT (PORT)

VIEW OF EUT (OPEN)

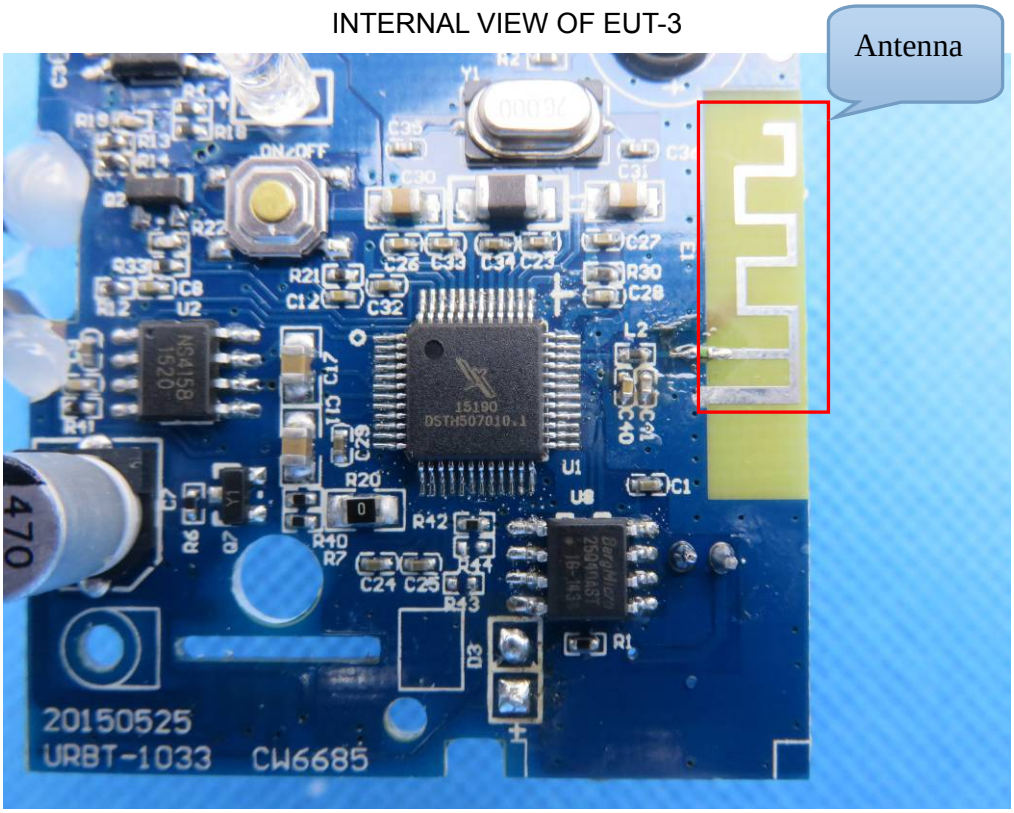
INTERNAL VIEW OF EUT-1



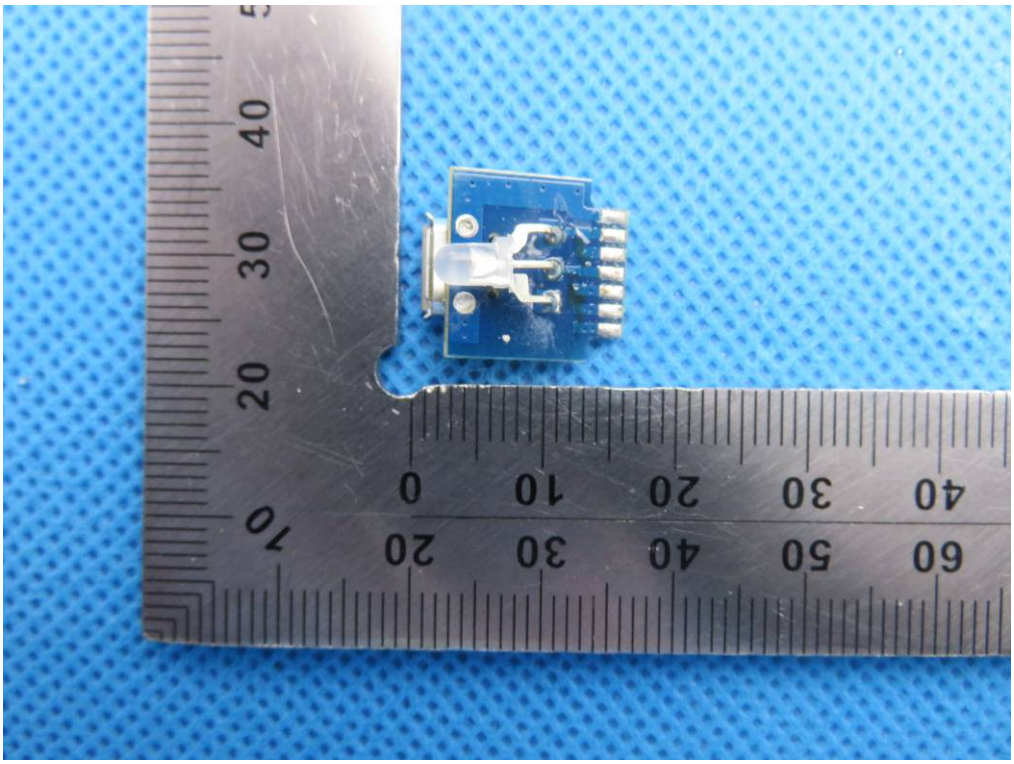
INTERNAL VIEW OF EUT-2



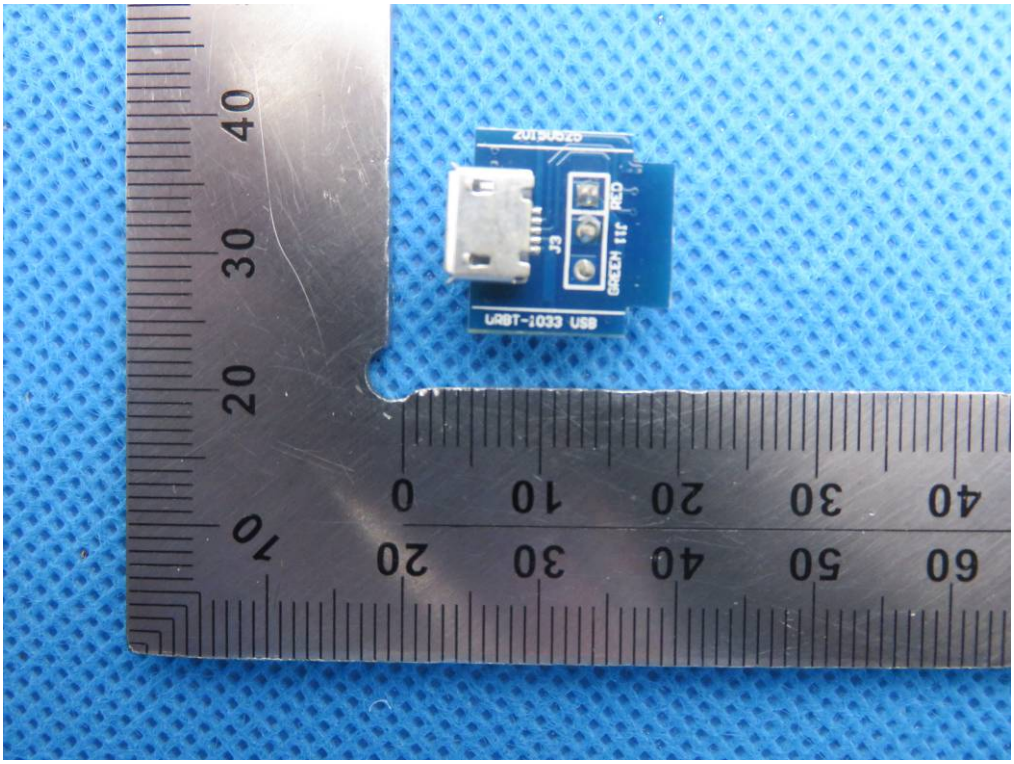
INTERNAL VIEW OF EUT-3



INTERNAL VIEW OF EUT-4



INTERNAL VIEW OF EUT-5



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