

Report No.:	TW2208027E
File reference No.:	2022-08-12
Applicant:	LEADER PREMIUMS LIMITED
Product:	wireless speaker
Model No.:	AE0213
Trademark:	N/A
Test Standards:	FCC Part 15.249
Test result:	It is herewith confirmed and four

t: It is herewith confirmed and found to comply with the requirements set up by ANSI C63.10 & FCC Part 15 Subpart C, Paragraph 15.249 regulations for the evaluation of electromagnetic compatibility

Approved By

Terry Tang

Terry Tang

Manager

Dated:

August 12, 2022

Results appearing herein relate only to the sample tested The technical reports is issued errors and omissions exempt and is subject to withdrawal at

## SHENZHEN TIMEWAY TESTING LABORATORIES

Zone C, 1st Floor, Block B, Jun Xiang Da Building, Zhongshan Park Road West, Tong Le Village, Nanshan District, Shenzhen, China Tel (755) 83448688, Fax (755) 83442996, E-Mail:info@timeway-lab.com



## **Special Statement**:

The testing quality ability of our laboratory meet with "Quality Law of People's Republic of China" Clause 19.

The testing quality system of our laboratory meet with ISO/IEC-17025 requirements, which is approved by CNAS. This approval result is accepted by MRA of APLAC.

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

## CNAS-LAB Code: L2292

The EMC Laboratory has been assessed and in compliance with CNAS-CL01 accreditation criteria for testing Laboratories (identical to ISO/IEC 17025:2017 General Requirements) for the Competence of testing Laboratories.

## FCC-Registration No.: 744189

The EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications commission. The acceptance letter from the FCC is maintained in our files. Registration No.: 744189.

## Industry Canada (IC) — Registration No.: 5205A

The EMC Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 5205A.

## A2LA (Certification Number:5013.01)

The EMC Laboratory has been accredited by the American Association for Laboratory Accreditation (A2LA). Certification Number:5013.01

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## 1.0 General Details

1.1 Test Lab Details

Name:SHENZHEN TIMEWAY TESTING LABORATORIES.Address:Zone C, 1st Floor, Block B, Jun Xiang Da Building, Zhongshan Park Road West, Tong Le<br/>Village, Nanshan District, Shenzhen, ChinaTelephone:(755) 83448688Fax:(755) 83442996Site on File with the Federal Communications Commission – United SatesRegistration Number: 744189For 3m Anechoic Chamber

1.2 Applicant Details

Applicant:LEADER PREMIUMS LIMITEDAddress:ROOM 901, HENGFU MANSION, NO.858, FUMINGROAD, NINGBO, CHINATelephone:--Fax:--

1.3 Description of EUT

Product:	wireless speaker
Manufacturer:	LEADER PREMIUMS LIMITED
Address:	ROOM 901, HENGFU MANSION, NO.858, FUMINGROAD, NINGBO,
	CHINA
Trademark:	N/A
Model Number:	AE0213
Additional Model Name	N/A
Rating:	DC5V, 1A
Battery:	DC3.7V, 500mAh Li-ion battery
Modulation Type:	GFSK, π/4DQPSK
Operation Frequency:	2402-2480MHz
Channel Number:	79
Channel Separation:	1MHz
Hardware Version:	Bluetooth Speaker-05
Software Version:	leader.1810.01
Serial No.:	AE0043
Antenna Designation	PCB antenna with gain -0.58dBi Max (Get from the antenna specification)

1.4 Submitted Sample: 1 Sample

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1.5 Test Duration 2022-08-02 to 2022-08-12

1.6 Test Uncertainty

Conducted Emissions Uncertainty =3.6dB Radiated Emissions below 1GHz Uncertainty =4.7dB Radiated Emissions above 1GHz Uncertainty =6.0dB Conducted Power Uncertainty =6.0dB Occupied Channel Bandwidth Uncertainty =5% Conducted Emissions Uncertainty =3.6dB Note: The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.

1.7 Test Engineer

Andy - Xing

The sample tested by

Print Name: Andy Xing

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2.0 Test Equipment					
Instrument Type	Manufacturer	Model	Serial No.	Date of Cal.	Due Date
ESPI Test Receiver	R&S	ESPI 3	100379	2022-06-17	2023-06-16
LISN	R&S	EZH3-Z5	100294	2022-06-17	2023-06-16
LISN	R&S	EZH3-Z5	100253	2022-06-17	2023-06-16
Impuls-Begrenzer	R&S	ESH3-Z2	100281	2022-06-17	2023-06-16
Loop Antenna	EMCO	6507	00078608	2021-06-18	2024-06-17
Spectrum	R&S	FSIQ26	100292	2022-06-17	2023-06-16
Horn Antenna	A-INFO	LB-180400-KF	J211060660	2021-07-02	2024-07-01
Horn Antenna	R&S	BBHA 9120D	9120D-631	2021-07-02	2024-07-01
Power meter	Anritsu	ML2487A	6K00003613	2022-06-17	2023-06-16
Power sensor	Anritsu	MA2491A	32263	2022-06-17	2023-06-16
Bilog Antenna	Schwarebeck	VULB9163	9163/340	2021-07-02	2024-07-01
9*6*6 Anechoic			N/A	2022-07-01	2023-06-30
EMI Test Receiver	RS	ESVB	826156/011	2022-06-17	2023-06-16
EMI Test Receiver	RS	ESH3	860904/006	2022-06-17	2023-06-16
Spectrum	HP/Agilent	ESA-L1500A	US37451154	2022-06-17	2023-06-16
Spectrum	HP/Agilent	E4407B	MY50441392	2022-06-17	2023-06-16
Spectrum	RS	FSP	1164.4391.38	2022-01-15	2023-01-14
RF Cable	Zhengdi	ZT26-NJ-NJ-8M/FA		2022-06-17	2023-06-16
RF Cable	Zhengdi	7m		2022-06-17	2023-06-16
RF Switch	EM	EMSW18	060391	2022-06-17	2023-06-16
Pre-Amplifier	Schwarebeck	BBV9743	#218	2022-06-17	2023-06-16
Pre-Amplifier	HP/Agilent	8449B	3008A00160	2022-06-17	2023-06-16
LISN	SCHAFFNER	NNB42	00012	2022-01-05	2023-01-04

#### 2.2 Automation Test Software

#### For Conducted Emission Test

Name	Version	
EZ-EMC	Ver.EMC-CON 3A1.1	

#### For Radiated Emissions

Name	Version
EMI Test Software BL410-EV18.91	V18.905
EMI Test Software BL410-EV18.806 High Frequency	V18.06

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adopt any other remedies which may be appropriate.



#### **3.0** Technical Details

#### 3.1 Summary of test results

The EUT has been tested according to the following specifications:				
Standard	Test Type	Result	Notes	
FCC Part 15, Paragraph 15.203	Antenna Requirement	Pass	Complies	
FCC Part 15, Paragraph 15.207	Conducted Emission Test	Pass	Complies	
FCC Part 15 Subpart C Paragraph 15.249(a) & 15.249(b) Limit	Field Strength of Fundamental	Pass	Complies	
FCC Part 15, Paragraph 15.209	Radiated Emission Test	Pass	Complies	
FCC Part 15 Subpart C Paragraph 15.249(d) Limit	Band Edge Test	Pass	Complies	

#### 3.2 Test Standards

FCC Part 15 Subpart C, Paragraph 15.249 , ANSI C63.4 :2014 and ANSI C63.10 :2013

#### 4.0 EUT Modification

No modification by SHENZHEN TIMEWAY TESTING LABORATORIES

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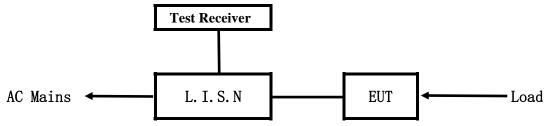
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## 5. Power Line Conducted Emission Test

5.1 Schematics of the test

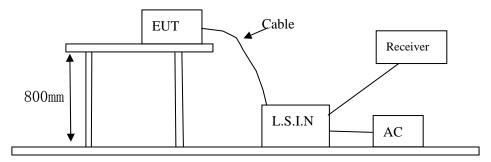


EUT: Equipment Under Test

5.2 Test Method and test Procedure

The EUT was tested according to ANSI C63.4-2014. The Frequency spectrum From 0.15MHz to 30MHz was investigated. The LISN used was 50ohm/50uH as specified by section 5.1 of ANSI C63.4 –2014. Test Voltage: 120V~, 60Hz

Block diagram of Test setup



## 5.3 Configuration of The EUT

The EUT was configured according to ANSI C63.4-2014. All interface ports were connected to the appropriate peripherals. All peripherals and cables are listed below. 79 channels are provided to the EUT

Device	Manufacturer	Model	FCC ID
wireless speaker	LEADER PREMIUMS LIMITED	AE0213	2APYY-AE0213

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B. Internal Device

2.	11100111a1 2 0 1 100			
	Device	Manufacturer	Model	FCC ID/DOC
	N/A			

C. Peripherals

Device	Manufacturer	Model	Rating
Power Supply	KEYU	KA23-0502000DEU	Input: 100-240V~, 50/60Hz, 0.35A;
			Output: DC5V, 2A

5.4 EUT Operating Condition

Operating condition is according to ANSI C63.4 -2014

A Setup the EUT and simulators as shown on follow

B Enable AF signal and confirm EUT active to normal condition

#### 5.5 Power line conducted Emission Limit according to Paragraph 15.207

Frequency	Limits (dB µ V)			
(MHz)	Quasi-peak Level	Average Le el		
$0.15~\sim~0.50$	66.0~56.0*	56.0~46.0*		
$0.50~\sim~5.00$	56.0	46.0		
$5.00~\sim~30.00$	60.0	50.0		

Notes: 1. \*Decreasing linearly with logarithm of frequency.

2. The tighter limit shall apply at the transition frequencies

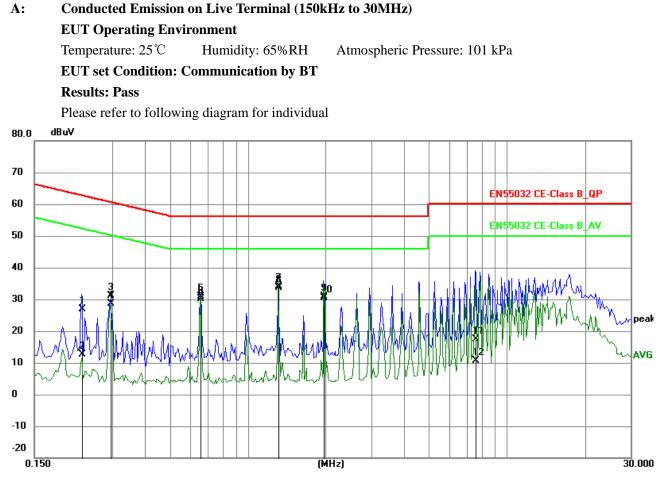
5.6 Test Results:

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No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.2280	17.16	9.75	26.91	62.52	-35.61	QP	Р
2	0.2280	2.78	9.75	12.53	52.52	-39.99	AVG	Р
3	0.2943	21.35	9.76	31.11	60.40	-29.29	QP	Р
4	0.2943	18.94	9.76	28.70	50.40	-21.70	AVG	Р
5	0.6570	21.04	9.78	30.82	56.00	-25.18	QP	Р
6	0.6570	20.24	9.78	30.02	46.00	-15.98	AVG	Р
7	1.3122	24.42	9.79	34.21	56.00	-21.79	QP	Р
8	1.3122	23.81	9.79	33.60	46.00	-12.40	AVG	Р
9	1.9674	21.02	9.80	30.82	56.00	-25.18	QP	Р
10	1.9674	20.59	9.80	30.39	46.00	-15.61	AVG	Р
11	7.5435	7.32	10.04	17.36	60.00	-42.64	QP	Р
12	7.5435	0.50	10.04	10.54	50.00	-39.46	AVG	Ρ

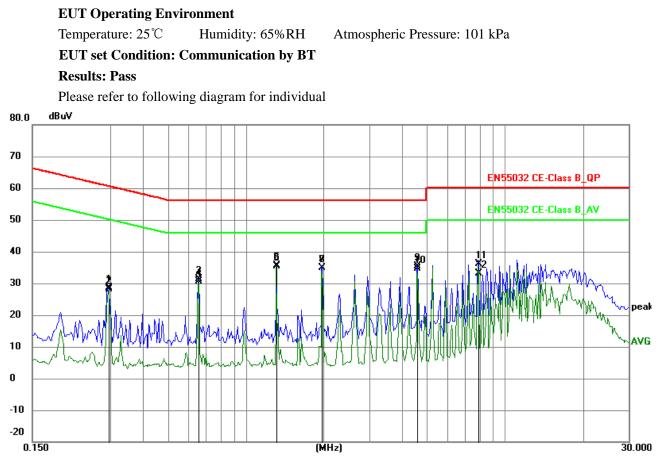
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B:



Conducted Emission on Neutral Terminal (150kHz to 30MHz)



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.2943	18.83	9.76	28.59	60.40	-31.81	QP	Ρ
2	0.2943	18.32	9.76	28.08	50.40	-22.32	AVG	Ρ
3	0.6570	21.55	9.78	31.33	56.00	-24.67	QP	Ρ
4	0.6570	20.91	9.78	30.69	46.00	-15.31	AVG	Ρ
5	1.3122	25.83	9.79	35.62	56.00	-20.38	QP	Ρ
6	1.3122	25.70	9.79	35.49	46.00	-10.51	AVG	Ρ
7	1.9674	25.20	9.80	35.00	56.00	-21.00	QP	Ρ
8	1.9674	25.01	9.80	34.81	46.00	-11.19	AVG	Ρ
9	4.5951	25.57	9.91	35.48	56.00	-20.52	QP	Ρ
10	4.5951	24.77	9.91	34.68	46.00	-11.32	AVG	Ρ
11	7.8750	25.96	10.05	36.01	60.00	-23.99	QP	Ρ
12	7.8750	23.16	10.05	33.21	50.00	-16.79	AVG	Ρ

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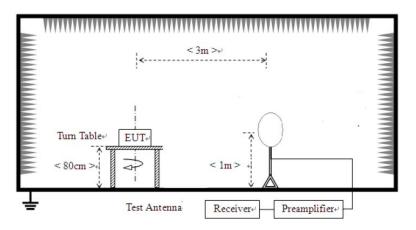


## 6 Radiated Emission Test

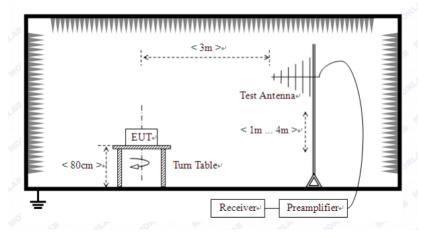
- 6.1 Test Method and test Procedure:
- The EUT was tested according to ANSI C63.10-2013. The radiated test was performed at Timeway EMC Laboratory. This site is on file with the FCC laboratory division, Registration No. 744189
- (2) The EUT, peripherals were put on the turntable which table size is 1m x 1.5 m, table high 0.8 m. All set up is according to ANSI C63.10-2013.
- (3) The frequency spectrum from 30 MHz to 25 GHz was investigated. All readings from 30 MHz to 1 GHz are quasi-peak values with a resolution bandwidth of 120 kHz. All readings are above 1 GHz, peak values with a resolution bandwidth of 1 MHz (Note: for Fundamental frequency radiated emission measurement, RBW=3MHz, VBW=10MHz). Measurements were made at 3 meters.
- (4) The antenna high is varied from 1 m to 4 m high to find the maximum emission for each frequency.
- (5) The antenna polarization: Vertical polarization and Horizontal polarization.

## Block diagram of Test setup

For radiated emissions from 9kHz to 30MHz



For radiated emissions from 30MHz to1GHz

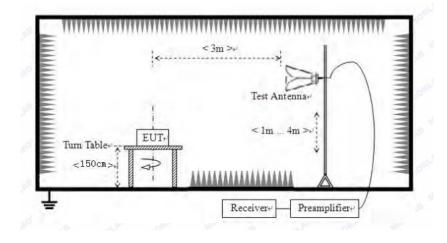


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For radiated emissions above 1GHz



- 6.2 Configuration of The EUT Same as section 5.3 of this report
- 6.3 EUT Operating Condition Same as section 5.4 of this report.
- 6.4 Radiated Emission Limit

All emission from a digital device, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strength specified below:

## A FCC Part 15 Subpart C Paragraph 15.249(a) Limit

Fundamental Frequency	Field Stre	ength of Fundame	ntal (3m)	Field St	trength of Harmo	onics (3m)
(MHz)	mV/m	dBu	V/m	uV/m	dBu	V/m
2400-2483.5	50	94 (Average)	114 (Peak)	500	54 (Average)	74 (Peak)

Note: 1. RF Field Strength  $(dBuV) = 20 \log RF$  Voltage (uV)

2.Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

3. The emission limit in this paragraph is based on measurement instrumentation employing an average detector.

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## B. Frequencies in restricted band are complied to limit on Paragraph 15.209.

1	1	81
Frequency Range (MHz)	Distance (m)	Field strength (dB $\mu$ V/m)
0.009-0.490	3	20log(2400/F(kHz)) +40log (300/3)
0.490-1.705	3	20log(24000/F(kHz)) +40log (30/3)
1.705-30	3	69.5
30-80	3	40.0
88-216	3	43.5
216-960	3	46.0
Above 960	3	54.0

Note: 1. RF Voltage (dBuV) =  $20 \log RF$  Voltage (uV)

2. In the Above Table, the tighter limit applies at the band edges.

3. Distance refers to the distance in meters between the measuring instrument antenna and the EUT

4. This is a handhold device. The radiated emissions should be tested under 3-axes position (Lying, Side, and Stand), After pre-test. It was found that the worse radiated emission was get at the lying position.

5. All scanning using PK detector. And the final emission level was get using QP detector for frequency range from 30-1000MHz.As to 1G-25G, the final emission level got using PK. For fundamental measurement, PK detector used.

6. For radiated emissions from 9kHz to 30MHz, the emission level is much less than the limit for more than 20dB. No necessary to take down the record.

7. Battery fully charged was used during tests.

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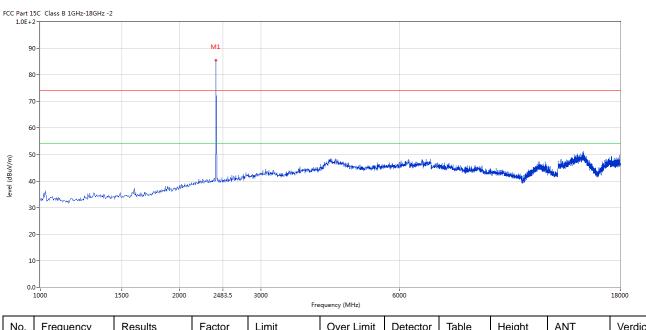
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# 6.5 Test resultA Fundamental & Harmonics Radiated Emission Data

Please refer to the following test plots for details: Low Channel-2402MHz

## Horizontal

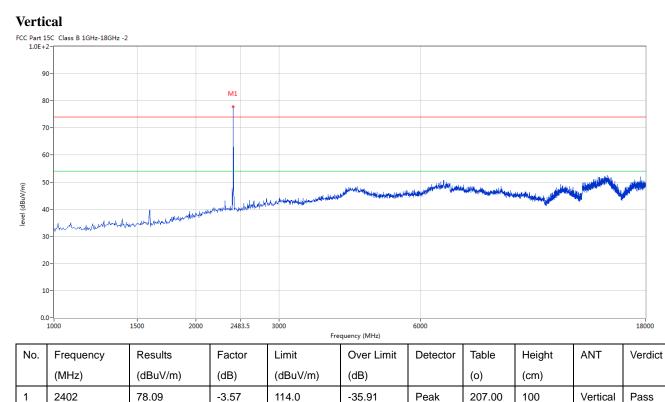


No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)		(o)	(cm)		
1	2402	85.55	-3.57	114.0	-28.45	Peak	215.00	100	Horizontal	Pass

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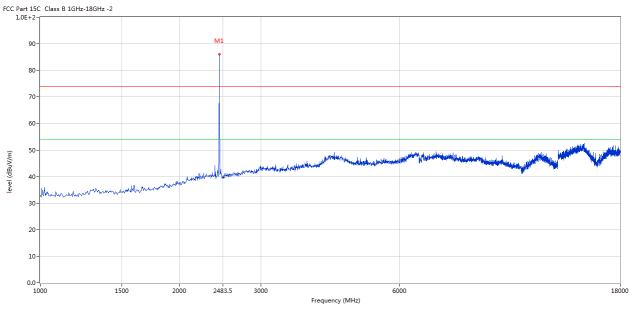
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## Please refer to the following test plots for details: Middle Channel-2441MHz

## Horizontal

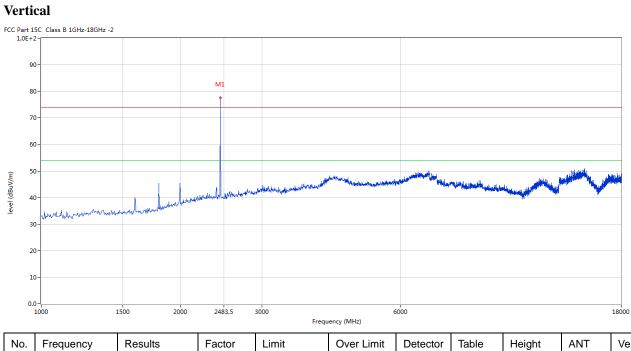


No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)		(o)	(cm)		
1	2441	86.10	-3.57	114.0	-27.90	Peak	223.00	100	Horizontal	Pass

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No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)		(o)	(cm)		
1	2441	77.65	-3.57	114.0	-36.35	Peak	194.00	100	Vertical	Pass

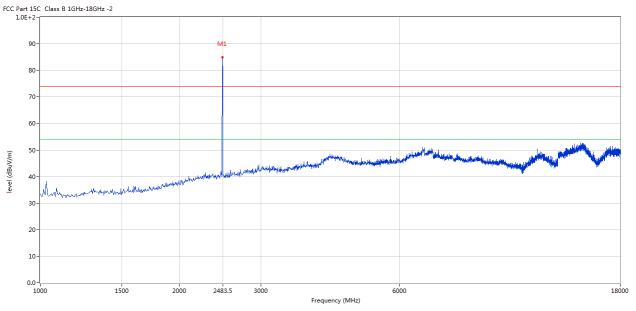
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## Please refer to the following test plots for details: High Channel-2480MHz

#### Horizontal

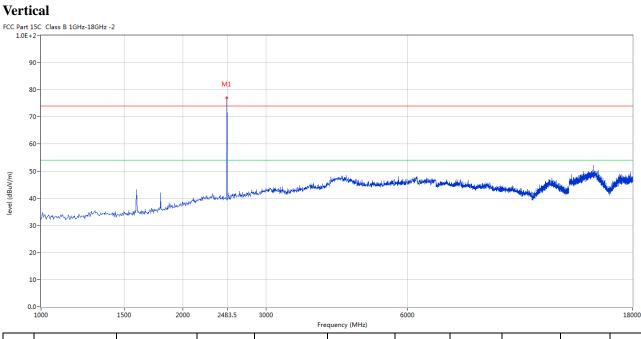


No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)		(o)	(cm)		
1	2480	85.17	-3.57	114.0	-28.83	Peak	142.00	100	Horizontal	Pass

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No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)		(o)	(cm)		
1	2480	77.12	-3.57	114.0	-36.88	Peak	151.00	100	Vertical	Pass

Note: (2) Emission Level = Reading Level + Antenna Factor + Cable Loss-Amplifier

(3)Margin=Emission-Limits

(4)According to section 15.35(b), the peak limit is 20dB higher than the average limit

(5) For test purpose, keep EUT continuous transmitting

(5)For emission above 18GHz and Below 30MHz, It is only the floor noise. No necessary to take down.

(6) the measured PK value less than the AV limit.

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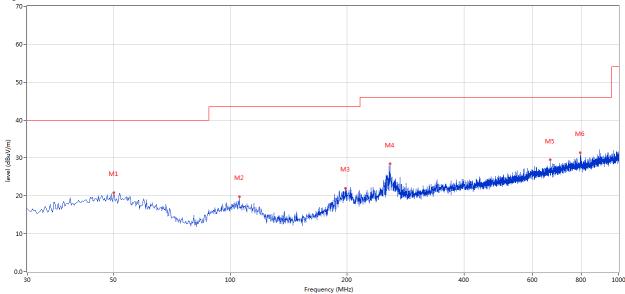
## B. General Radiated Emission Data Radiated Emission In Horizontal (30MHz----1000MHz)

EUT set Condition: Keep Tx transmitting

## Results: Pass

Please refer to following diagram for individual

FCC\_FCC Part 15C Class B 30MHz-1GHz



No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)		(o)	(cm)		
1	50.122	20.85	-11.38	40.0	-19.15	Peak	136.00	100	Horizontal	Pass
2	105.399	19.80	-13.25	43.5	-23.70	Peak	57.00	100	Horizontal	Pass
3	197.768	21.97	-13.50	43.5	-21.53	Peak	96.00	100	Horizontal	Pass
4	257.893	28.41	-11.84	46.0	-17.59	Peak	17.00	100	Horizontal	Pass
5	666.646	29.47	-4.50	46.0	-16.53	Peak	60.00	100	Horizontal	Pass
6	796.593	31.36	-3.07	46.0	-14.64	Peak	125.00	100	Horizontal	Pass

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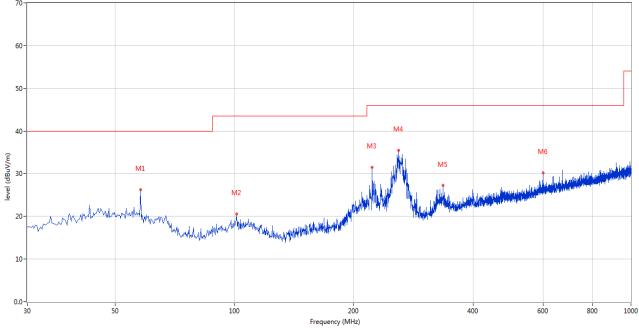
Radiated Emission In Vertical (30MHz----1000MHz)

EUT set Condition: Keep Tx transmitting

#### **Results:** Pass

Please refer to following diagram for individual

FCC\_FCC Part 15C Class B 30MHz-1GHz



No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)		(o)	(cm)		
1	57.881	26.24	-12.61	40.0	-13.76	Peak	219.00	200	Vertical	Pass
2	101.277	20.62	-13.45	43.5	-22.88	Peak	106.00	200	Vertical	Pass
3	222.497	31.47	-13.20	46.0	-14.53	Peak	89.00	100	Vertical	Pass
4	259.105	35.49	-11.86	46.0	-10.51	Peak	63.00	200	Vertical	Pass
5	335.959	27.23	-9.91	46.0	-18.77	Peak	360.00	200	Vertical	Pass
6	599.490	30.19	-5.01	46.0	-15.81	Peak	360.00	200	Vertical	Pass

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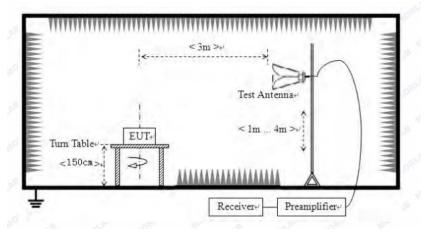


## 7. Band Edge

## 7.1 Test Method and test Procedure:

- The EUT was tested according to ANSI C63.10–2013. The radiated test was performed at Timeway EMC Laboratory. This site is on file with the FCC laboratory division, Registration No. 744189
- (2) Set Spectrum as RBW=1MHz, VBW=3MHz and Peak detector used for PK value. RBW=1MHz, VBW=10Hz and Peak detector used for AV value.
- (3) The antenna high is varied from 1 m to 4 m high to find the maximum emission for each frequency.
- (4) The antenna polarization: Vertical polarization and Horizontal polarization.

## 7.2 Radiated Test Setup



For the actual test configuration, please refer to the related items - Photos of Testing

## 7.3 Configuration of The EUT

Same as section 5.3 of this report

## 7.4 EUT Operating Condition

Same as section 5.4 of this report.

## 7.5 Band Edge Limit

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least

50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

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## 7.6 Test Result

	Product:		wireless sp	peaker		Polarity	y		Horizontal	
	Mode	Ke	eeping Trar	nsmitting		Test Volta	age		DC3.7V	
Te	mperature		24 deg.	С,		Humidi	ty		56% RH	
Te	est Result:		Pass							
2 Part 1 1.0E+	15C Class B 1GHz-18GHz 2-r	-2								_
9	0-							M1	\	
8	0-								$\mathbf{h}$	
7	0-									
6	0-							/		
5	0-							M2		
	•					M3	6	u.u •	\	
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3 2 1 0.	0- 0- 0- 2350			Fr	requency (MHz)					2410
3 2 1 0.	0- 0- 2350 Frequency	Results	Factor	Fi Limit	requency (MHz)	Detector	Table	Height		2410
3 2 1 0. <b>No.</b>	0- 0- 2350 Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Fi Limit (dBuV/m)	requency (MHz) Over Limit (dB)	Detector	Table (o)	(cm)	ANT	2410 Verdia
3 2 1 0. <b>NO.</b>	Contraction of the second seco	Results (dBuV/m) 85.40	Factor (dB) -3.57	Fi Limit (dBuV/m) 74.0	requency (MHz) Over Limit (dB) 11.40	Detector Peak	Table (o) 209.00	(cm) 100	ANT Horizontal	Verdia N/A
3 2 1 0. No.	0- 0-   0- <	Results (dBuV/m) 85.40 62.65	Factor (dB) -3.57 -3.57	Fr Limit (dBuV/m) 74.0 74.0	requency (MHz) Over Limit (dB) 11.40 -11.35	Detector Peak Peak	Table (o) 209.00 209.00	(cm) 100 100	ANT Horizontal Horizontal	2410 Verdic N/A Pass
3 2 1 0. <b>NO.</b>	Contraction of the second seco	Results (dBuV/m) 85.40	Factor (dB) -3.57	Fi Limit (dBuV/m) 74.0	requency (MHz) Over Limit (dB) 11.40	Detector Peak	Table (o) 209.00	(cm) 100	ANT Horizontal	Verdic N/A

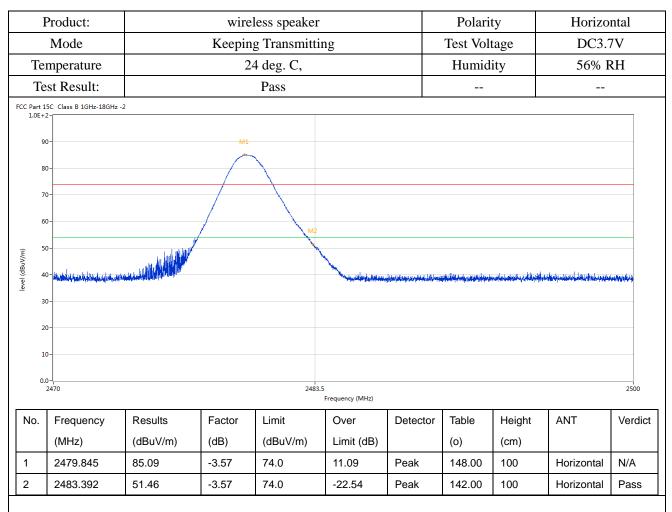
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Product:			wireless	speaker		Detect	or	Vertical													
	Mode	]	Keeping Transmitting				tage	DC3.7V													
Te	emperature		24 de		Humidity		56% RH														
Te	est Result:																				
C Part : 1.0E+	15C Class B 1GHz-18GHz +2-	z -2																			
g	90 -																				
8	80-								M1												
									$\bigwedge$												
7	70-								$\leftarrow$												
6	50 -							/													
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3 2 1	40 - Washington (1994) 30	Results	Factor	Limit		Detector	Table	Height	ANT	24											
3 2 1	40				Frequency (MHz)		Table (o)	Height (cm)	ANT	24											
2 2 1 0 No.	10	Results	Factor	Limit	Frequency (MHz)			-	ANT	24											
3	40 - trucht a syndidical and 30 - 20 - 10 - 2350 Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Frequency (MHz) Over Limit (dB)	Detector	(0)	(cm)		24 Verdia											
2 2 1 0 No.	10	Results (dBuV/m) 77.66	Factor (dB) -3.57	Limit (dBuV/m) 74.0	Frequency (MHz) Over Limit (dB) 3.66	Detector Peak	(o) 163.00	(cm) 100	Vertical	24 Verdia N/A											

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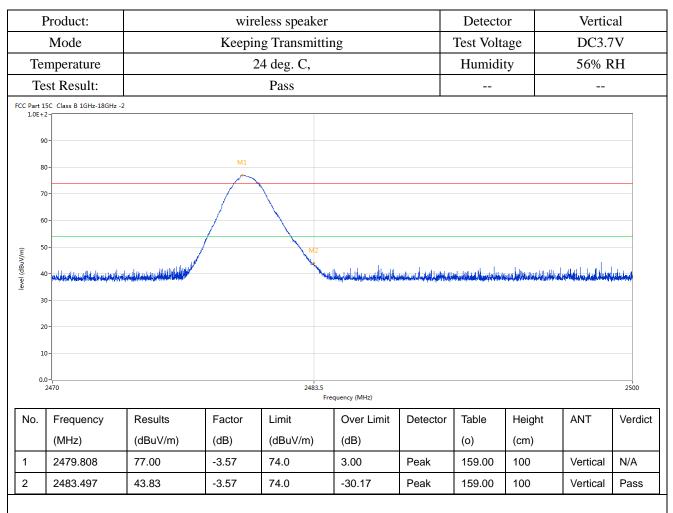




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Note: 1. The PK emission level less than the AV limit. No necessary to record the AV emission level.

2. All modulation type were tested and only the worst case was recorded in the test report. GFSK modulation was the worst case.

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## 8.0 Antenna Requirement

#### **Applicable Standard**

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

This product has an PCB antenna. The antenna gain is -0.58dBi Max. It fulfills the requirement of this section. Test Result: Pass

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GFSK Modulation									
Product:	Mec	hanical Ke	yboard		Test Mod	e:	Keep tra	ansmitting	
Mode	Keej	ping Trans	mitting		Test Volta	ge	DC	3.7V	
Temperature		24 deg. C	2,		Humidity	7	56%	6 RH	
Test Result:		Pass			Detector		Ι	PK	
20dB Bandwidth		859.72kH	[z						
Ref Lvl 10 dBm	Marker 1 [T1 ndB] ndB 20.00 dB BW 859.71943888 kHz			RBW VBW SWT	100 kHz		RF Att 20 dB Jnit dB		ı
10									1
					▼1	[T1]	-8	.80 dBm 068 GHz	A
0					ndB		2.40104	.00 dB	
			1		BW	85	9.71943	888 kHz	
-10			Acre		$\nabla_{\mathrm{T1}}$	[T1]	-28	.60 dBm	
				$\bigvee \backslash$	<b>V</b> -5	(	2.40154		
-20					▼ <sub>T2</sub>	[T1]	-29		
-30		T1	*		₹2 V		2.10210	JOI GHZ	1M
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-50							r n n n n n n n n n n n n n n n n n n n		
-60 W							4	un marine	
-70									
- 8 0									
-90. Center 2.40	2 GHz		300	kHz/			Sne	in 3 MHz	l
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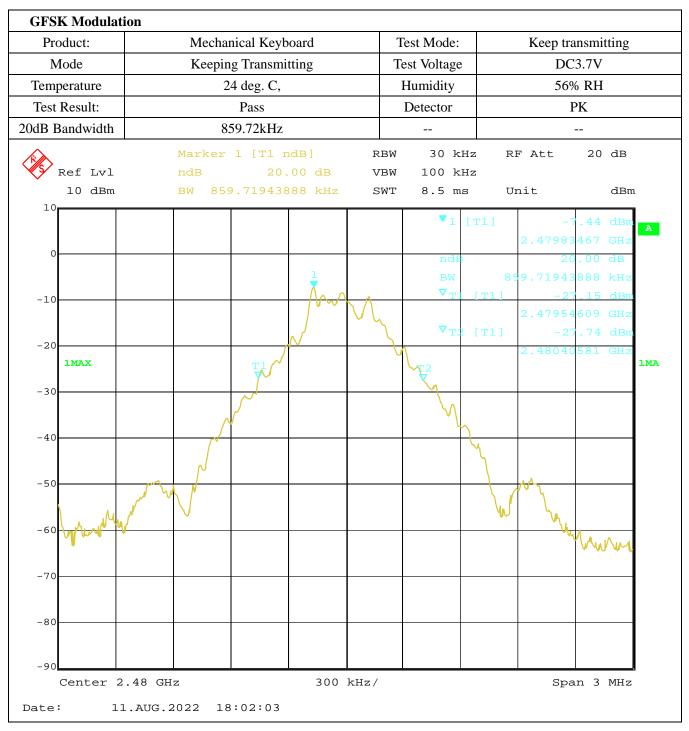
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GFSK Modula	ation											
Product:		Mechanical Keyboard					est Mode:	Keep transmitting				
Mode	Keeping Transmitting					Test Voltage		DC3.7V				
Temperature		24	4 deg. C,			I	Humidity		56% RH			
Test Result:			Pass			Detector			]	PK		
20dB Bandwidth		85	59.72kHz									
Ref Lvl 10 dBm	Ma nc BV	lВ	1 [T1 n 20. .719438	00 dB	V	BW BW WT	30 kH 100 kH 8.5 ms	Iz	F Att nit	20 dB dBm		
10							▼1 ndB	[T1]	-8 2.44083 20	.30 dBm 467 GHz .00 dB	A	
-10					$\sim$	η	BW ▼ <sub>T1</sub> ▼ <sub>T2</sub>	85 <u>(T1)</u> [T1]	9.71943 -28 2.44054 -28	.26 dBm		
-20 1MAX			Tł.	^_(		V	472 472		2.44140	581 GHz	<b>1MA</b>	
-40		N	<sup>م</sup> ر ,				- N	<u>ک</u>				
-50	mu								m			
-60		•						V	Lu Lu	where you		
-70										•••		
-80												
-90 Center 2	2.441 GHz			300	kHz/				Spa	an 3 MHz		
Date: 1	1.AUG.202	2 18	:03:30									

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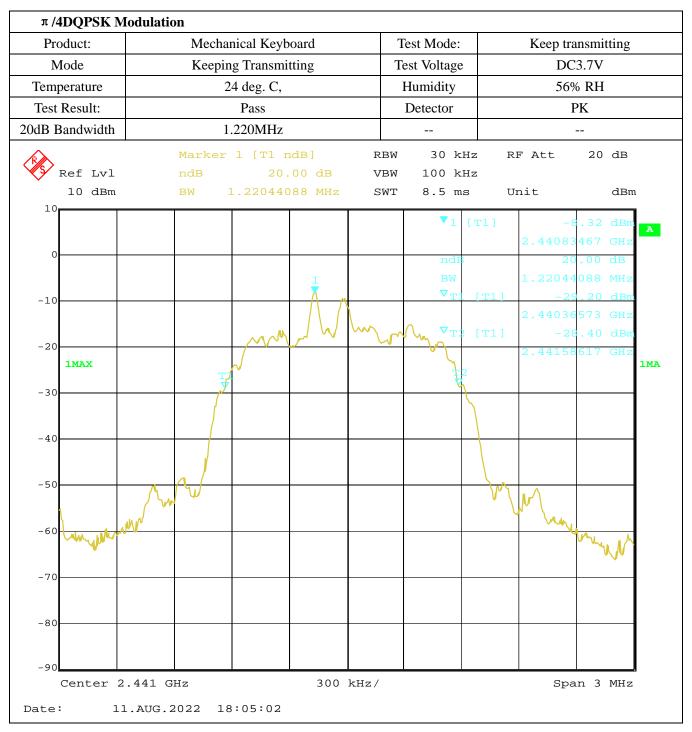
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π/4DQPSK M	lodulation								
Product:	Mec	hanical Ke	yboard		Test Mo	ie:	Keep transmitting		
Mode	Keep	Test Volt	age	DC3.7V					
Temperature		24 deg. C, Pass					56% RH PK		
Test Result:									
20dB Bandwidth									
<b>k</b>	Marker 1 [T1 ndB] R				30 k	Hz R	F Att	20 dB	
Ref Lvl	ndB		00 dB	VBW	100 k				
10 dBm	BW 1	1.22044088 MHz		SWT	8.5 m	is U	nit	dBm	
10					▼1	[T1]	- 8	.78 dBm	А
0							2.40183	8467 GHz	
0					ndI	8	20	0.00 dB	
			1		BW VT	[[T1]	1.22044	1088 MHz 1.47 dBm	
-10							2.40136		
		mm	$\mathcal{M}_{\mathcal{M}}$	m		2 [T1]	-29	9.26 dBm	
-20				~~~			2.40258	3617 GHz	1MA
	7	$\sim$				2			1.1.1.1
-30									
-40									
-50						M	m M.		
-60 MW/MM	~						M	Mugura	
-70									
-80									
-90 Center 2.	402 GHz		300	kHz/			Spa	an 3 MHz	
Date: 11.	.AUG.2022 18	:04:24							

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Product:	Mechanical Keyboard					Test Mode:	Keep transmitting			
Mode	Keeping Transmitting					est Voltage	DC3.7V			
Temperature		2	4 deg. C,		Humidity		56% RH			
Test Result:			Pass			Detector		Р	'К	
dB Bandwidth		1.	.226MHz							
	Marker 1 [T1 ndB]				RBW	30 kHz	z RF	Att	20 dB	
🛛 Ref Lvl		ndB		00 dB	VBW	100 kHz				
10 dBm		BW 1	1.226452	91 MHz	SWT	8.5 ms	Un	it	dBm	1 -
10						▼1 [	T1]	-7	.40 dBm	A
0								2.47983	467 GHz	
Ũ				1		ndB BW		20 1.22645	.00 dB 291 MHz	
-10				λο		⊳w ⊽ <sub>T1</sub>	[T1]	-27	.92 dBm	
-10						1		2.47936	573 GHz	
-20			$\sim$	» مر	the la	V VVV T2	[T1]	-27	.78 dBm	
1MAX		T/	$\checkmark$			12 12		2.48059	218 GHz	1M7
-30										
-40										
-50	Nrd/	/-\ <b>I</b> _V					V.V	M		
-60									- Ally A	
-70										
-80										
-90 Center 2	2.48 GH:	Z		300	kHz/			Spa	n 3 MHz	ļ

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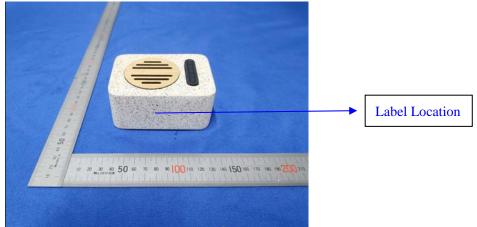
## 10.0 FCC ID Label

#### FCC ID: 2APYY-AE0213

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation

The label must not be a stick-on paper label. The label on these products must be permanently affixed to the product and readily visible at the time of purchase and must last the expected lifetime of the equipment not be readily detachable.

## Mark Location:



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#### 11.0 Photo of testing

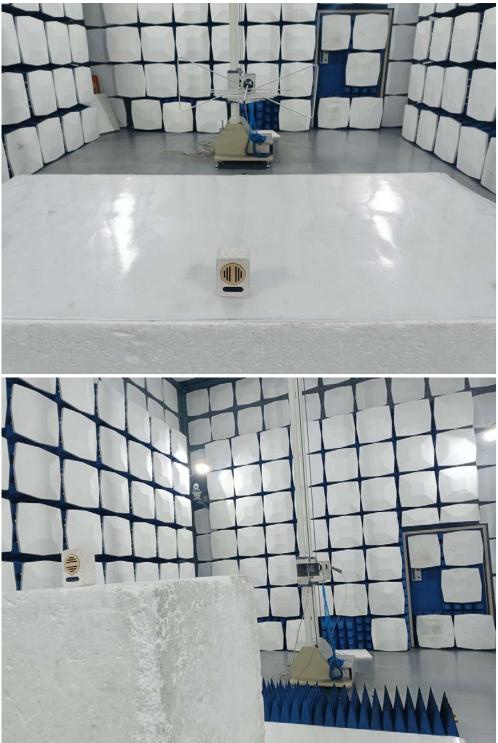
11.1 Conducted test View--



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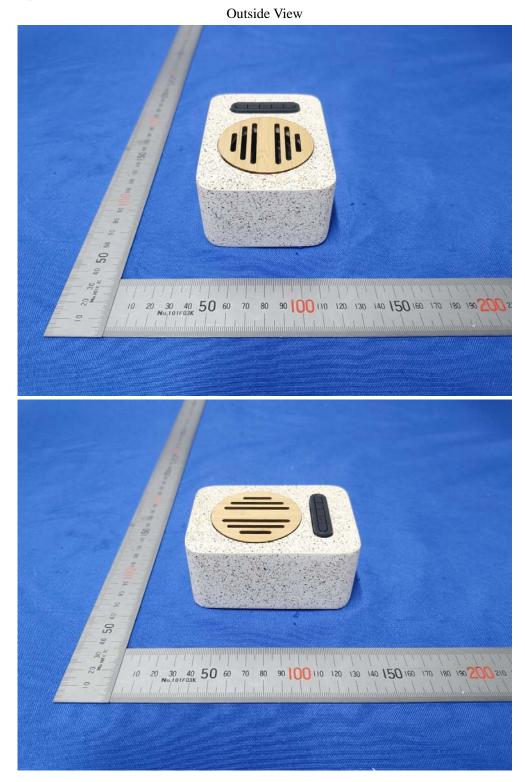
Radiated emission test view



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#### 11.2 Photographs – EUT

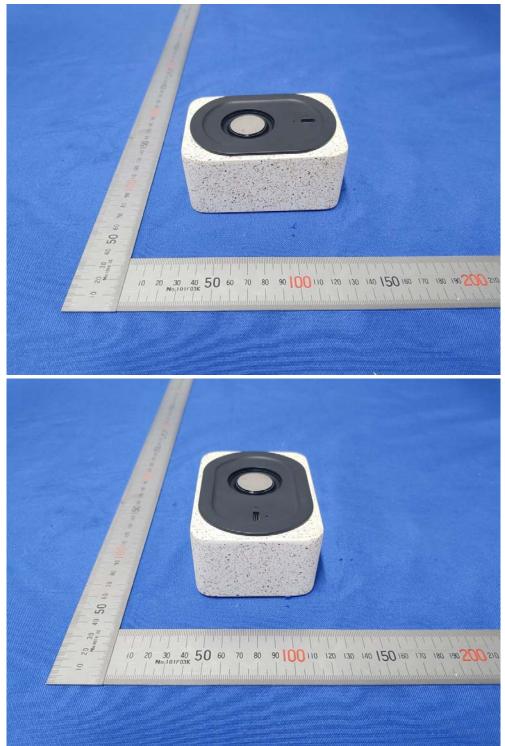


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Outside View



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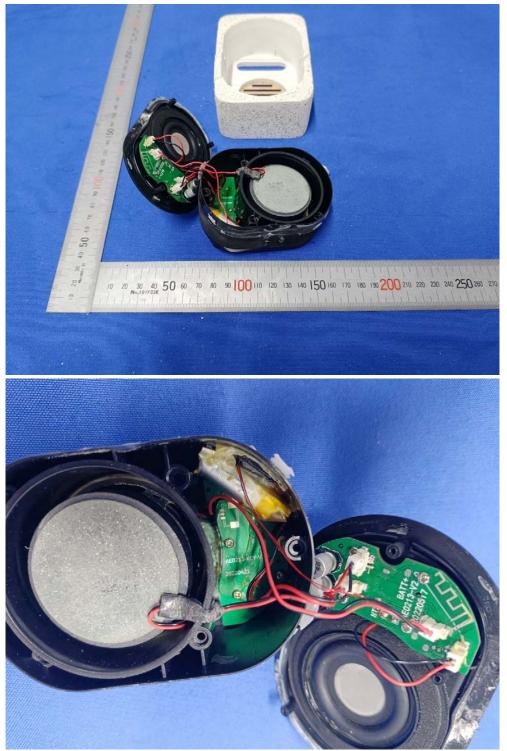
Outside View



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Inside view



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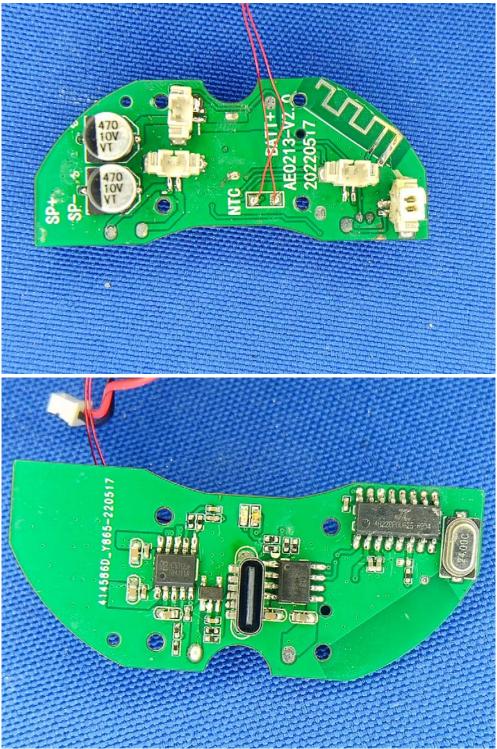
Inside view



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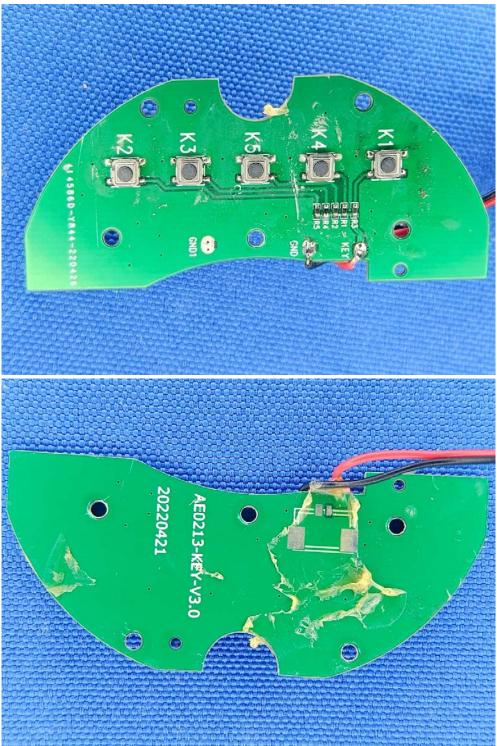
Inside view



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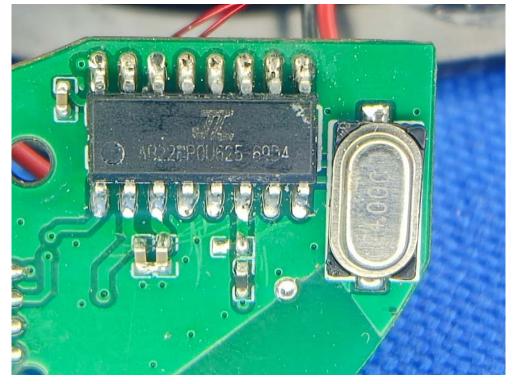
Inside view



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Inside view



--End of the report--

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