



FCC TEST REPORT

FCC ID: 2AJJ2-SPEAKER

On Behalf of

NOKTA MUHENDISLIK A.S.

WIRELESS LOUDSPEAKER

Model No.: WIRELESS SPEAKER

Prepared for : NOKTA MUHENDISLIK A.S.

Address : EMEK MAH. SAKIZ SOK. NO: 4/1, 34785 SANCAKTEPE,
ISTANBUL, TURKEY

Prepared By : Shenzhen Alpha Product Testing Co., Ltd.

Address : Building i, No.2, Lixin Road, Fuyong Street, Bao'an District,
518103, Shenzhen, Guangdong, China

Report Number : A2105083-C01-R09

Date of Receipt : May 24, 2021

Date of Test : May 24, 2021– June 7, 2021

Date of Report : June 7, 2021

Version Number : V0

TABLE OF CONTENTS

Description	Page
1. General Information	5
1.1. Description of Device (EUT).....	5
1.2. Accessories of Device (EUT)	5
1.3. Tested Supporting System Details.....	6
1.4. Block Diagram of connection between EUT and simulators.....	6
2. Summary of Standards and Results	7
2.1. Description of Standards and Results	7
2.2. Test Mode Description.....	8
2.3. Test Equipment List.....	9
2.4. Test Facility	10
2.5. Measurement Uncertainty	10
3. Power Line Conducted Emission Test.....	11
3.1. Test Limits	11
3.2. Block Diagram of Test Setup.....	11
3.3. Configuration of EUT on Test	12
3.4. Operating Condition of EUT	12
3.5. Test Procedure	12
3.6. Test Results.....	13
4. Radiated Emission Test.....	16
4.1. Test Limit.....	16
4.2. Block Diagram of Test Setup.....	17
4.3. Configuration of EUT on Test	18
4.4. Operating Condition of EUT	18
4.5. Test Procedure	18
4.6. Test Results.....	19
5. Photograph.....	25
5.1. Photo of Radiated Emission Test (In Semi Anechoic Chamber).....	25
5.2. Photo of Power Line Conducted	26
6. Photos of the EUT.....	27

TEST REPORT DECLARATION

Applicant : NOKTA MUHENDISLIK A.S.
Address : EMEK MAH. SAKIZ SOK. NO: 4/1, 34785 SANCAKTEPE,
ISTANBUL, TURKEY
Manufacturer : NOKTA MUHENDISLIK A.S.
Address : EMEK MAH. SAKIZ SOK. NO: 4/1, 34785 SANCAKTEPE,
ISTANBUL, TURKEY
EUT Description : WIRELESS LOUDSPEAKER
(A) Model No. : WIRELESS SPEAKER
(B) Trademark : NOKTA MAKRO DETECTION ECHNOLOGIES

Measurement Standard Used:

FCC Rules and Regulations Part 15 Subpart B Class B, ANSI C63.4:2014

The device described above is tested by Shenzhen Alpha Product Testing Co., Ltd. to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The test results are contained in this test report and Shenzhen Alpha Product Testing Co., Ltd. is assumed full responsibility for the accuracy and completeness of test. Also, this report shows that the EUT is technically compliant with the FCC Part 15 requirements.

This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Shenzhen Alpha Product Testing Co., Ltd.

Tested by (name + signature).....: Lucas Pang
Project Engineer



Approved by (name + signature).....: Simple Guan
Project Manager



Date of issue.....: June 7, 2021

Revision History

Revision	Issue Date	Revisions	Revised By
V0	June 7, 2021	Initial released Issue	Lucas Pang

1. General Information

1.1. Description of Device (EUT)

Product Name : WIRELESS LOUDSPEAKER

Model Number : WIRELESS SPEAKER

Diff : N/A

Operating Frequency : 2440-2460MHz (RX only)

Test Voltage : AC 120V/60Hz

Antenna Type : Internal Antenna

EUT information : Input : DC 5V from Notebook or DC 3.7V from battery

Trademark : NOKTA MAKRO DETECTION TECHNOLOGIES

Note: The EUT has only receiver function.

Software version : V1.0

Hardware version : WAB-01MBR-1220R00

1.2. Accessories of Device (EUT)

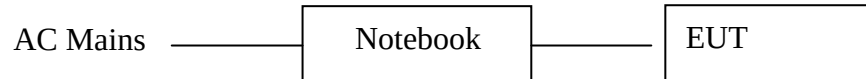
Power Source : N/A

1.3. Tested Supporting System Details.

No.	Description	Manufacturer	Model	Serial Number	Certification or DOC
1.	Notebook PC	Lenovo	ThinkPad E14	N/A	N/A

1.4. Block Diagram of connection between EUT and simulators

For Tests



Signal Cable Description of the above Support Units

No.	Port Name	Cable	Length	Shielded (Yes or No)	Detachable (Yes or No)
/	/	/	/	/	/
/	/	/	/	/	/

2. Summary of Standards and Results

2.1. Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below:

EMISSION			
Description of Test Item	Standard	Limits	Results
Power Line Conducted Emission Test	FCC Part 15 ANSI C63.4:2014	Class B	P
Radiated Emission Test	FCC Part 15 ANSI C63.4:2014	Class B	P
Note: 1. P is an abbreviation for Pass. 2. F is an abbreviation for Fail. 3. N/A is an abbreviation for Not Applicable.			

2.2.Test Mode Description

For Conducted Emission and Radiated Emission Test		
Mode No.	Test Mode	Test Voltage
1.	Working	AC 120V/60Hz
2.	Charging	AC 120V/60Hz

2.3.Test Equipment List

For Power Line Conducted Emission Test Equipment:

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde & Schwarz	ESCI	101165	2020.09.02	1 Year
2.	L.I.S.N.#1	Schwarz beck	NSLK8126	8126466	2020.09.02	1 Year
3.	L.I.S.N.#2	ROHDE&SCHWARZ	ENV216	101043	2020.09.02	1 Year
4.	Pulse Limiter	Schwarz beck	9516F	9618	2020.09.02	1 Year

For Frequency Range 30MHz~1GHz Radiated Emission Test Equipment:

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Test Receiver	Rohde&Schwarz	ESR	1316.3003K03-102082-Wa	2020.09.02	1 Year
2	Bilog Antenna	Schwarz beck	VULB 9168	9168-627	2020.04.12	2 Year

For Frequency Range above 1GHz Radiated Emission Test Equipment:

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Spectrum analyzer	ROHDE&SCHWARZ	FSU	1166.1660.26	2020.09.02	1 Year
2	Horn Antenna	Schwarz beck	BBHA 9120 D	BBHA 9120 D(1201)	2020.04.12	2 Year
3	Amplifier	Agilent	8449B	3008A02664	2020.09.02	1 Year

2.4. Test Facility

Shenzhen Alpha Product Testing Co., Ltd.

Building i, No.2, Lixin Road, Fuyong Street, Bao'an District, 518103, Shenzhen, Guangdong, China

June 21, 2018 File on Federal Communication Commission

Registration Number: 293961

2.5. Measurement Uncertainty

Test Item	Uncertainty
Uncertainty for Conduction emission test	2.74dB
Uncertainty for Radiation Emission test (<1G)	3.77 dB (Distance: 3m Polarize: V)
	3.80 dB (Distance: 3m Polarize: H)
Uncertainty for Radiation Emission test (>1G)	4.13 dB (Distance: 3m Polarize: V)
	4.16 dB (Distance: 3m Polarize: H)
(95% confidence levels, k=2)	

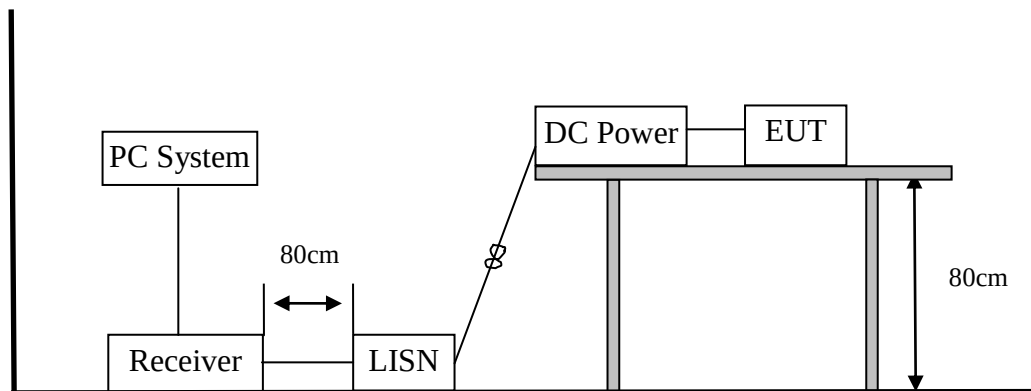
3. Power Line Conducted Emission Test

3.1. Test Limits

Frequency	Maximum RF Line Voltage	
	Quasi-Peak Level dB(μ V)	Average Level dB(μ V)
150kHz ~ 500kHz	66 ~ 56*	56 ~ 46*
500kHz ~ 5MHz	56	46
5MHz ~ 30MHz	60	50

- Notes:
1. Emission level=Read level + LISN factor-Preamplifier factor + Cable loss
 2. * Decreasing linearly with logarithm of frequency.
 3. The lower limit shall apply at the transition frequencies.

3.2. Block Diagram of Test Setup



3.3.Configuration of EUT on Test

The following equipment are installed on Power Line Conducted Emission Test to meet the commission requirement and operating regulations in a manner which tends to maximize its emission characteristics in a normal application.

3.4.Operating Condition of EUT

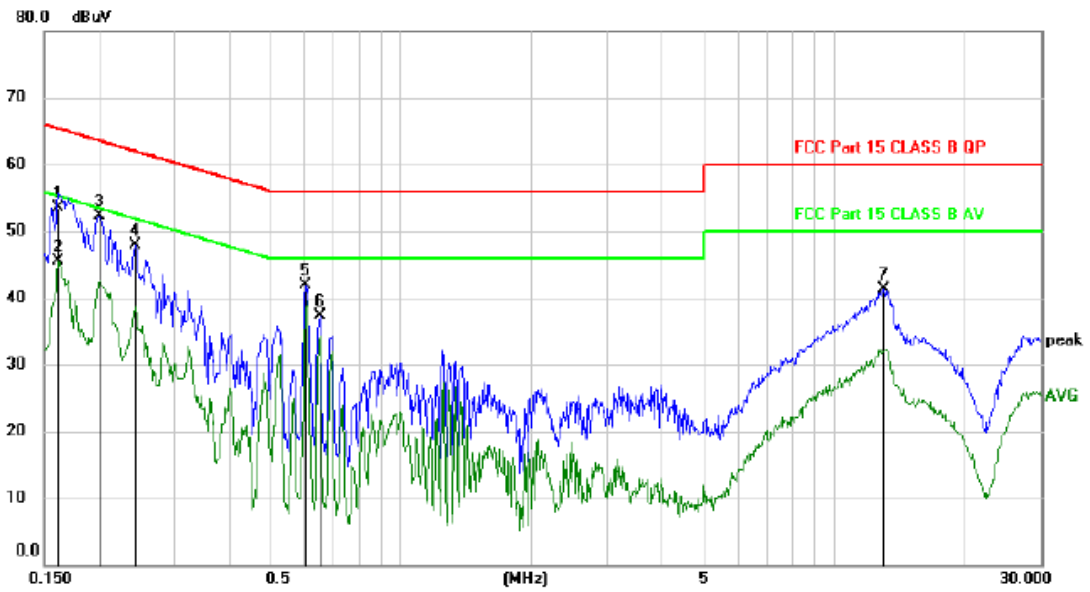
- (1) Setup the EUT as shown as Section 3.2.
- (2) Turn on the power of all equipment.
- (3) Let the EUT work in test mode and 15 minutes before taking the test.

3.5.Test Procedure

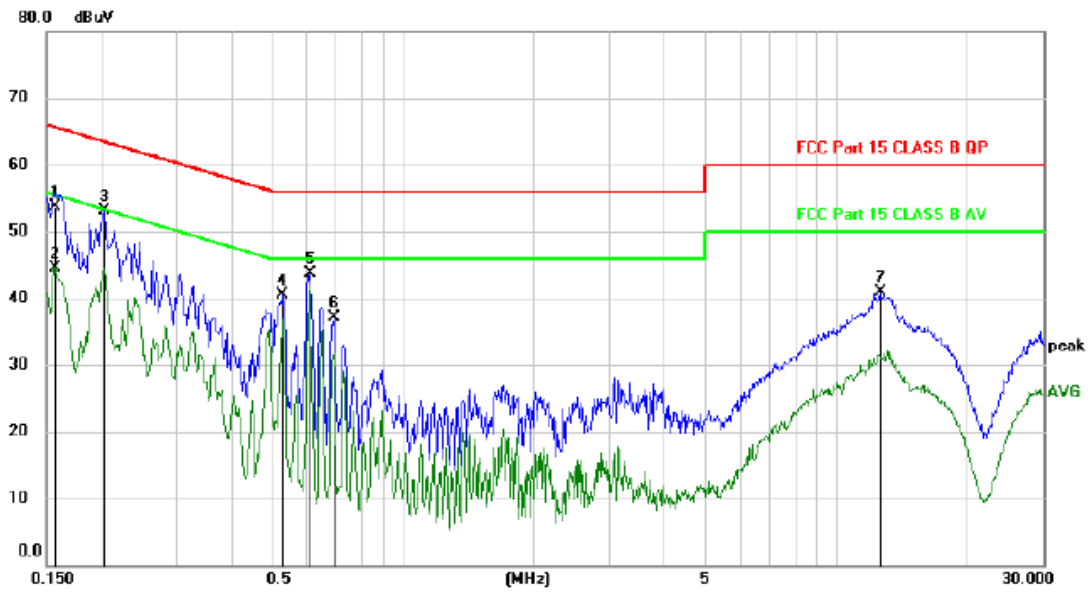
- (1) The EUT was placed on a non-metallic table, 80cm above the ground plane. The EUT Power connected to the power mains through a line impedance stabilization network (L.I.S.N. 1#). This provided a 50-ohm coupling impedance for the EUT (Please refer to the block diagram of the test setup and photographs). The other peripheral devices power cord connected to the power mains through a line impedance stabilization network (L.I.S.N.#2). Both sides of power line were checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.4:2014 on conducted Emission test.
- (2) The frequency range from 150kHz to 30MHz is checked, the bandwidth of test receiver (R&S TEST RECEIVER ESCI) is set at 9kHz.

3.6. Test Results

Test Date : 2021.5.28	Temperature : 24°C
Test Engineer : Lucas Pang	Humidity : 56%
Test Mode : Charging	
Test Results : Pass	
Note: 1. The test results are listed in next pages. 2. If the limits for the measurement with the average detector are met when using a receiver with a quasi-peak detector, the test unit shall be deemed to meet both limits and the measurement with the average detector need not be carried out.	

Phase: L

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin		
		MHz	Level	Factor	ment			Detector	Comment
			dBuV	dB	dBuV	dBuV	dB		
1		0.1620	43.58	9.93	53.51	65.36	-11.85	QP	
2	*	0.1620	35.66	9.93	45.59	55.36	-9.77	AVG	
3		0.2010	42.46	9.92	52.38	63.57	-11.19	peak	
4		0.2429	37.99	9.96	47.95	62.00	-14.05	peak	
5		0.6028	31.92	9.92	41.84	56.00	-14.16	peak	
6		0.6480	27.29	9.92	37.21	56.00	-18.79	peak	
7		13.0289	31.05	10.28	41.33	60.00	-18.67	peak	

Phase: N

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1		0.1572	43.70	9.94	53.64	65.61	-11.97	QP	
2		0.1572	34.52	9.94	44.46	55.61	-11.15	AVG	
3	*	0.2038	43.21	9.92	53.13	63.45	-10.32	peak	
4		0.5280	30.62	9.95	40.57	56.00	-15.43	peak	
5		0.6088	33.87	9.92	43.79	56.00	-12.21	peak	
6		0.6900	27.25	9.93	37.18	56.00	-18.82	peak	
7		12.6478	30.60	10.27	40.87	60.00	-19.13	peak	

4. Radiated Emission Test

4.1. Test Limit

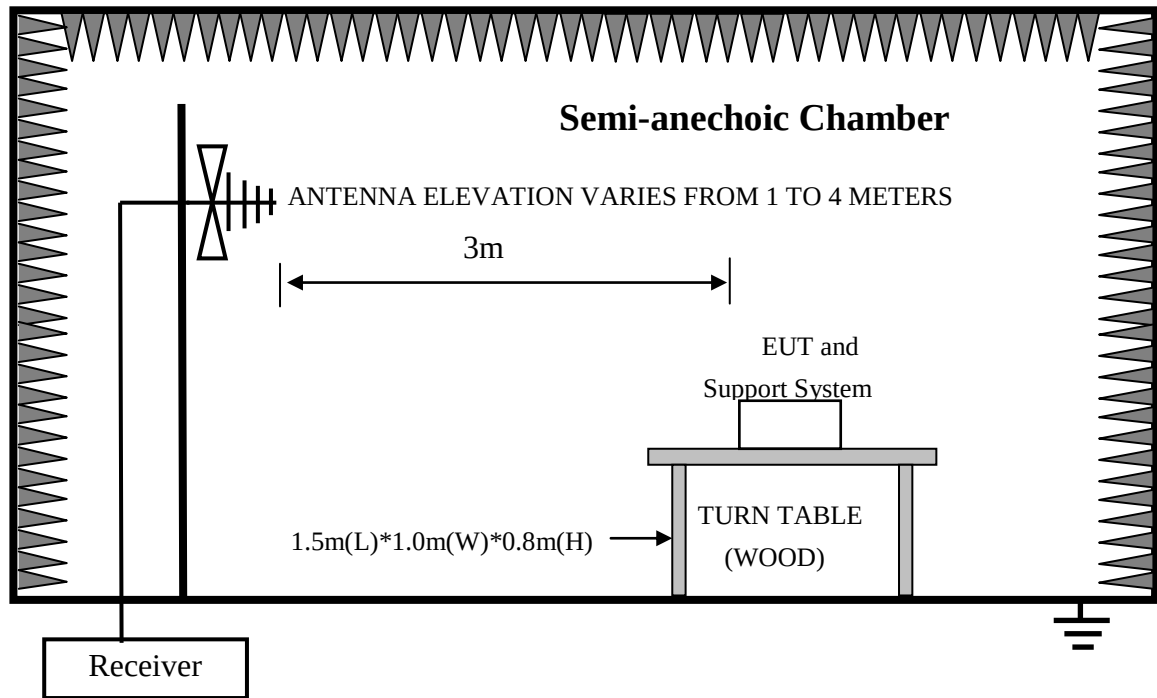
Frequency MHz			Distance (Meters)	Limits dB(μ V)/m
30	~	88	3	40.0
88	~	216	3	43.5
216	~	960	3	46.0
960	~	1000	3	54.0
Above 1GHz			3	74(Peak) 54(Average)

- Notes:
1. The smaller limit shall apply at the cross point between two frequency bands.
 2. Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.
 3. Frequency range of radiated measurements:

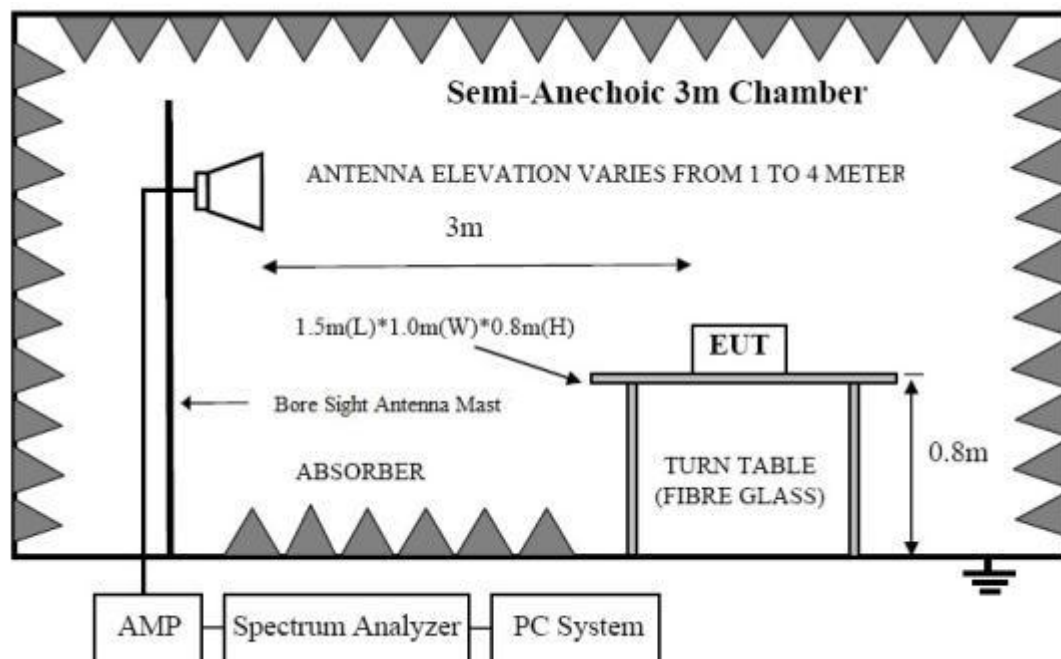
Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30
1.705-108	1000
108-500	2000
500-1000	5000
Above 1000	5th harmonic of the highest frequency or 40 GHz, whichever is lower.

4.2. Block Diagram of Test Setup

In Semi Anechoic Chamber (3m) Test Setup Diagram for 30MHz~1000MHz



In Semi Anechoic Chamber (3m) Test Setup Diagram for Above 1GHz



4.3.Configuration of EUT on Test

The following equipment are installed on Radiated Emission Test to meet the commission requirements and operating regulations in a manner that tends to maximize its emission characteristics in normal application.

4.4.Operating Condition of EUT

- (1) Setup the EUT as shown as Section 4.2.
- (2) Turn on the power of all equipment.
- (3) Let the EUT work in test mode and 15 minutes before taking the test.

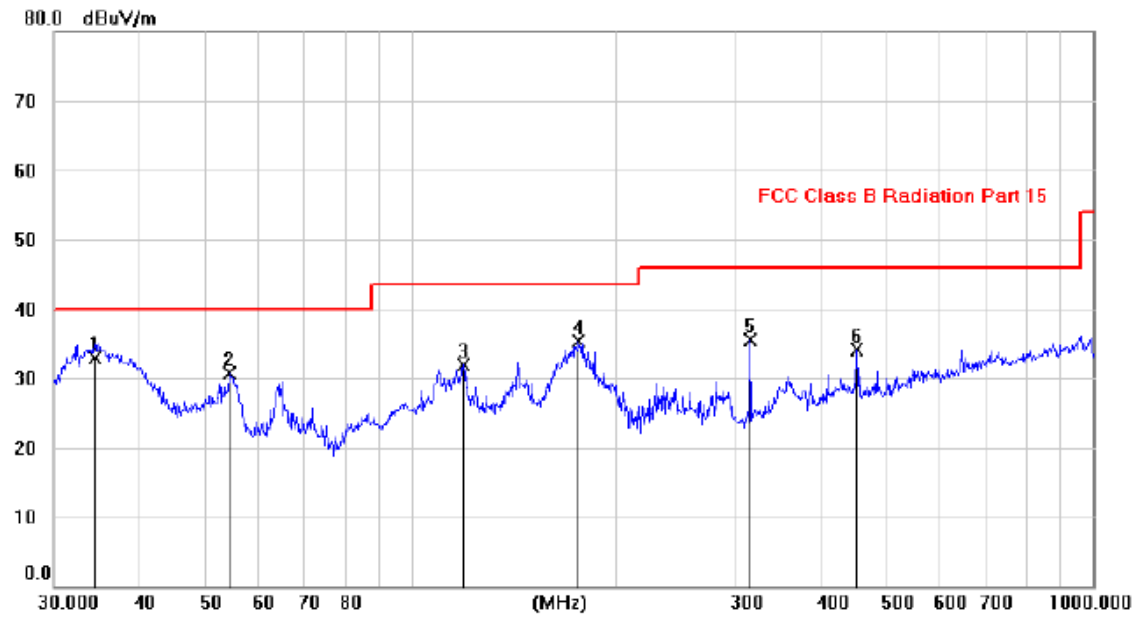
4.5.Test Procedure

- (1) The EUT was placed on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber. An antenna was located 3m from the EUT on an adjustable mast. A pre-scan was first performed in order to find prominent radiated emissions. For final emissions measurements at each frequency of interest, the EUT were rotated and the antenna height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.4:2014 on Radiated Emission test.
- (2) For the radiated emission test above 1GHz:
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.
- (3) The frequency range from 30MHz to 1000MHz is checked, the bandwidth of test receiver (R&S TEST RECEIVER ESR) is set at 120kHz.
- (4) The frequency range from above 1GHz is checked, the bandwidth of spectrum analyzer (Spectrum Analyzer FSU) is set at 1MHz.
- (5) The frequency range from 30MHz to 1000MHz was pre-scanned with a peak detector and all final readings of measurement from Test Receiver are Quasi-Peak values, the frequency range from 1GHz to 6GHz was pre-scanned with a peak detector and all final readings of measurement from Spectrum Analyzer are peak and average values checked, all measurement distance is 3m in 3m semi anechoic chamber.
- (6) The test results are reported on Section 4.7.

4.6. Test Results

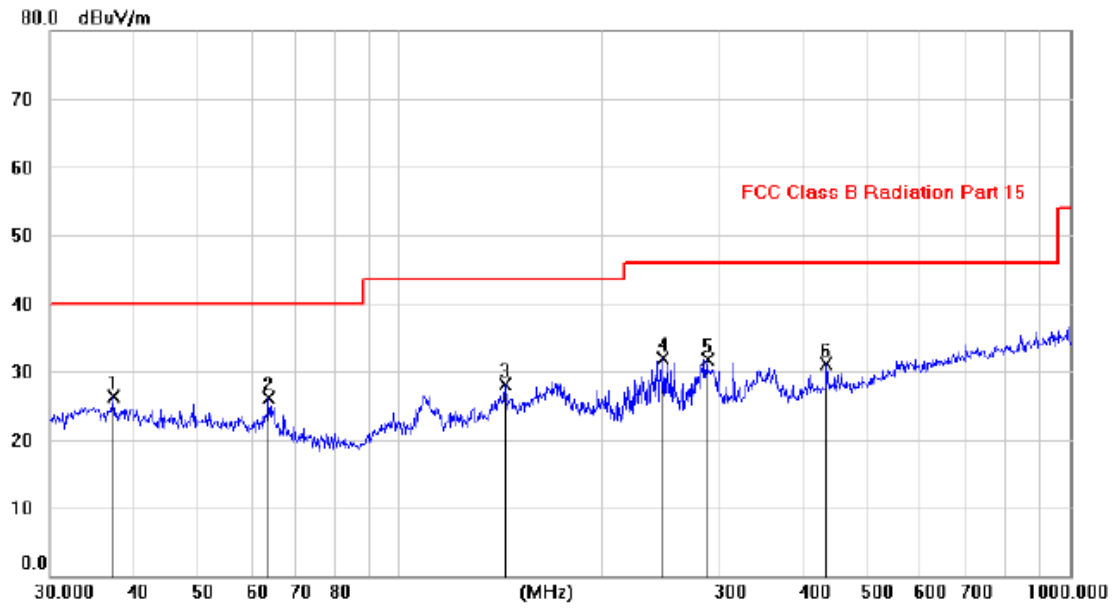
Frequency Range : 30MHz~1000MHz	
Test Date : 2021.5.25	Temperature : 24℃
Test Engineer : Lucas Pang	Humidity : 56%
Test Mode : Charging	
Test Results : PASS	
Note: 1. The test results are listed in next pages. 2. If the limits for the measurement with the average detector are met when using a receiver with a peak detector, the test unit shall be deemed to meet both limits and the measurement with the average detector and quasi-peak detector need not be carried out.	

Antenna polarity: Vertical



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Antenna	Table	
		MHz	Level	Factor	ment			Height	Degree	
			dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1	*	34.4769	19.26	13.70	32.96	40.00	-7.04	QP		
2		54.2039	17.09	13.69	30.78	40.00	-9.22	peak		
3		119.5199	18.97	12.99	31.96	43.50	-11.54	peak		
4		176.5367	22.13	13.17	35.30	43.50	-8.20	peak		
5		314.8913	20.94	14.48	35.42	46.00	-10.58	peak		
6		450.7660	16.55	17.58	34.13	46.00	-11.87	peak		

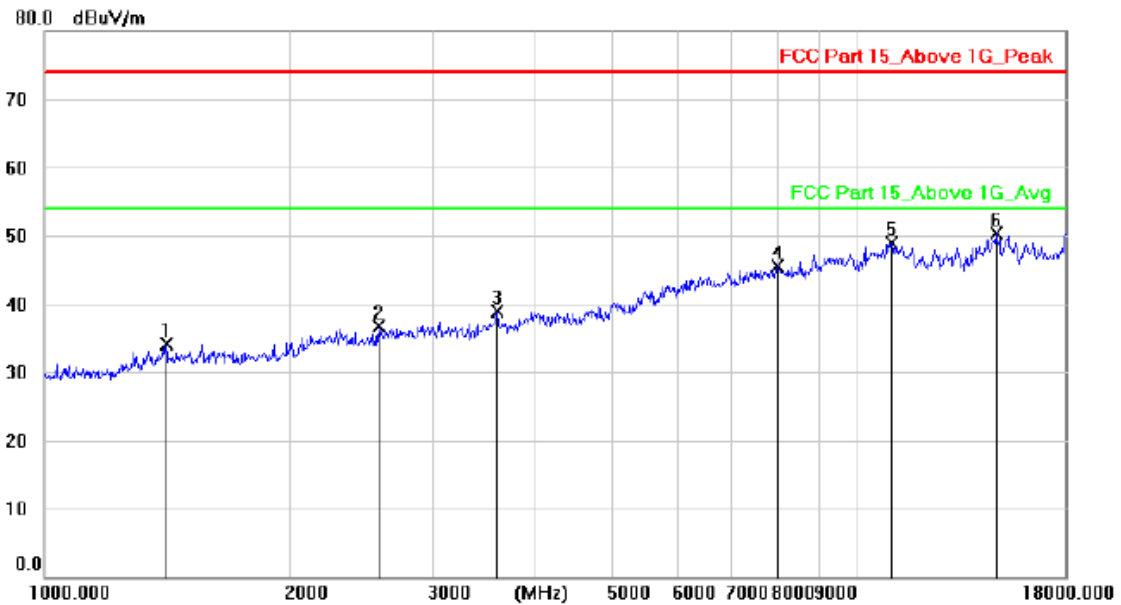
Antenna polarity: Horizontal



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Antenna	Table	
		MHz	Level	Factor	ment			Height	Degree	
			dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	37.3160	12.11	14.10	26.21	40.00	-13.79	peak		
2		63.7290	13.60	12.52	26.12	40.00	-13.88	peak		
3		143.5944	13.61	14.58	28.19	43.50	-15.31	peak		
4		247.1324	19.17	12.71	31.88	46.00	-14.12	peak		
5		287.1501	18.00	13.79	31.79	46.00	-14.21	peak		
6		434.0144	13.88	17.18	31.06	46.00	-14.94	peak		

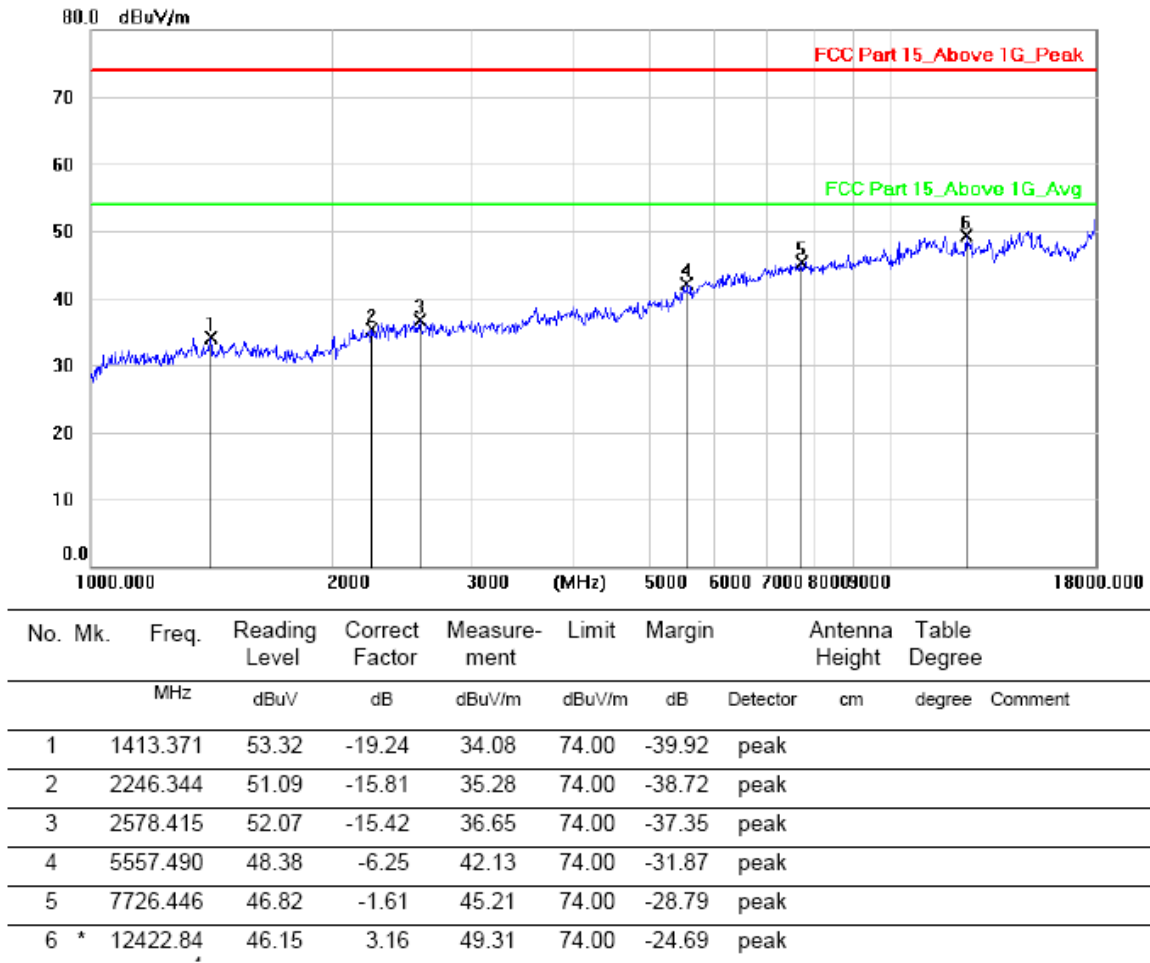
Frequency Range : Above 1GHz	
Test Date : 2021.5.25	Temperature : 24°C
Test Engineer : Lucas Pang	Humidity : 56%
Test Mode : Charging	
Test Results : PASS	
Note:	1. The test results are listed in next pages. 2. If the limits for the measurement with the average detector are met when using a receiver with a peak detector, the test unit shall be deemed to meet both limits and the measurement with the average detector and quasi-peak detector need not be carried out.

Antenna polarity: Vertical



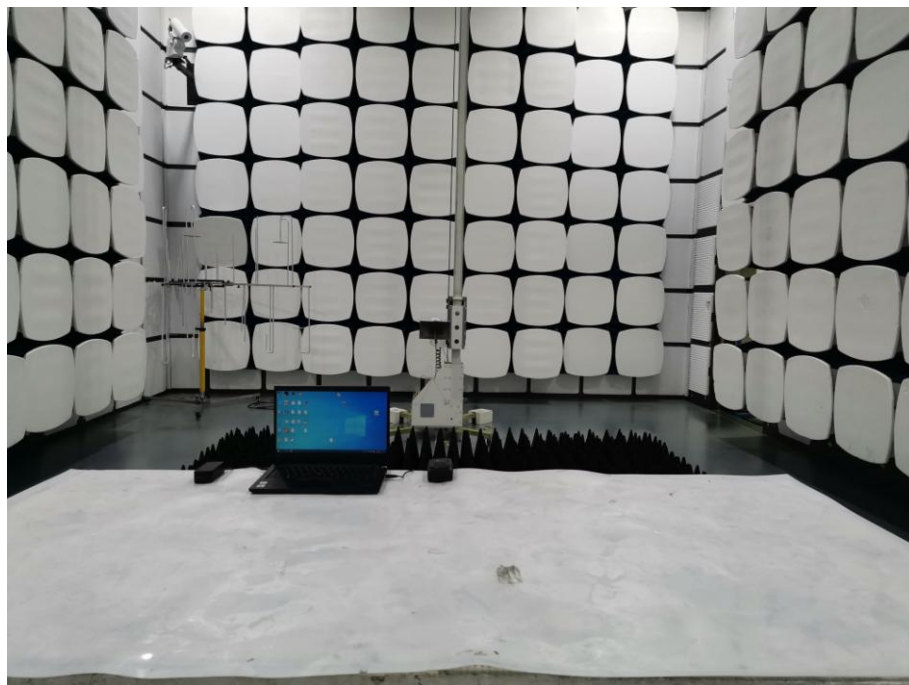
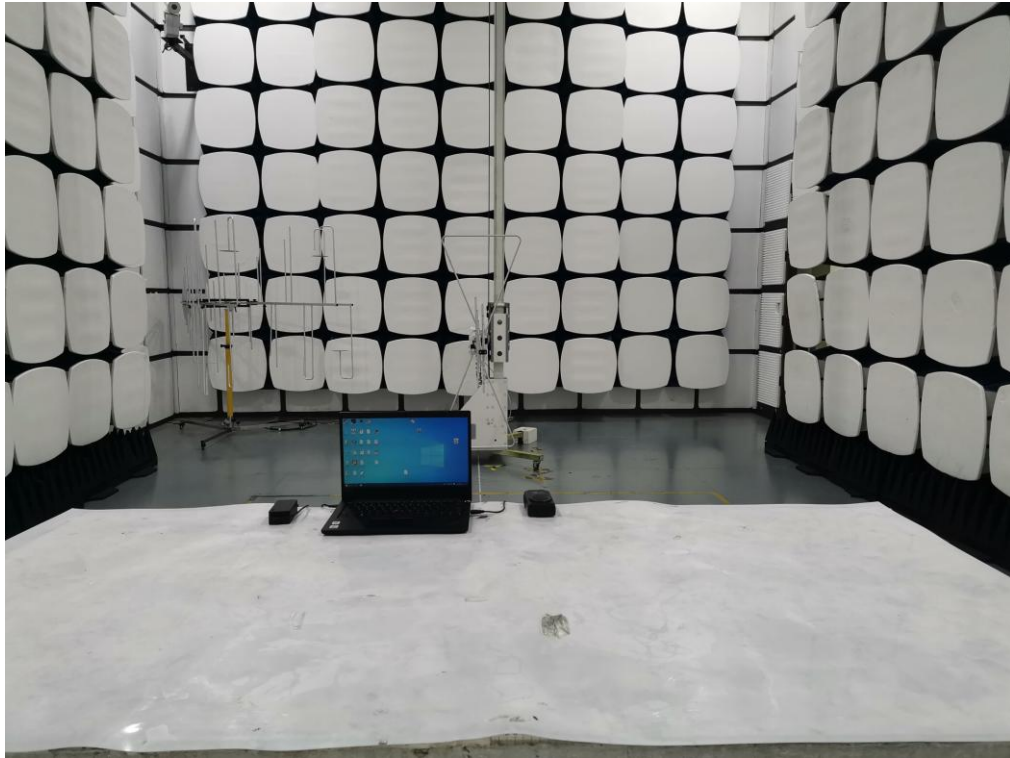
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		1413.371	53.32	-19.24	34.08	74.00	-39.92			peak
2		2578.415	52.07	-15.42	36.65	74.00	-37.35			peak
3		3599.244	51.68	-12.69	38.99	74.00	-35.01			peak
4		7987.583	46.76	-1.29	45.47	74.00	-28.53			peak
5		11034.55	46.27	2.63	48.90	74.00	-25.10			peak
6	*	14788.15	45.03	5.27	50.30	74.00	-23.70			peak

Antenna polarity: Horizontal



5. Photograph

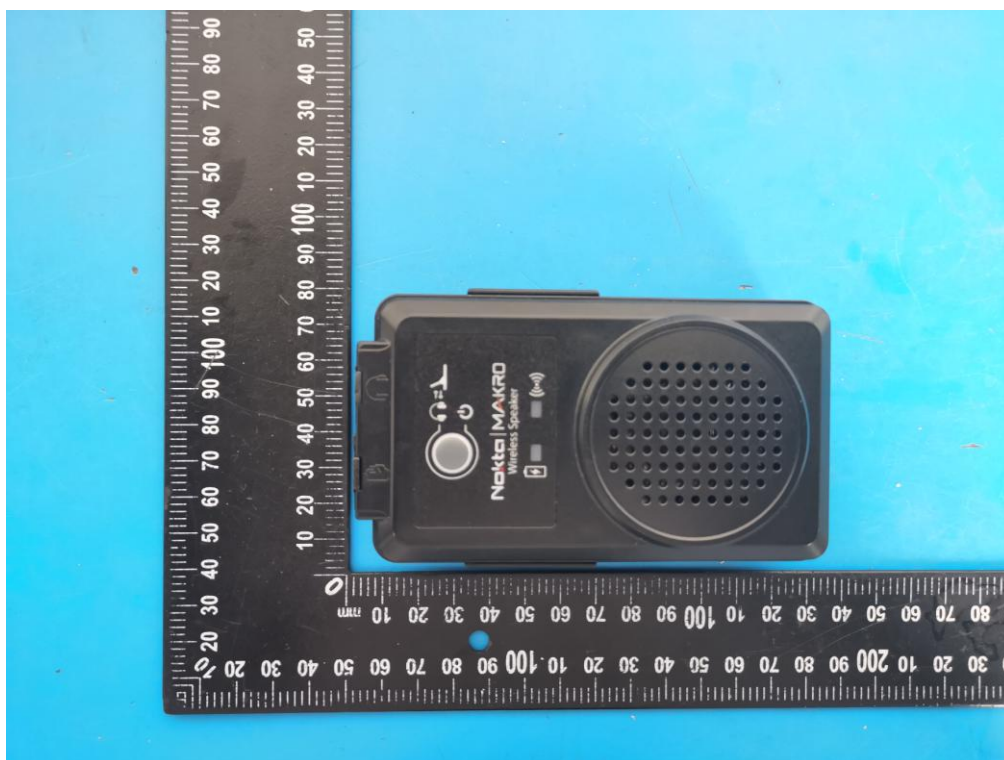
5.1. Photo of Radiated Emission Test (In Semi Anechoic Chamber)



5.2.Photo of Power Line Conducted



6. Photos of the EUT

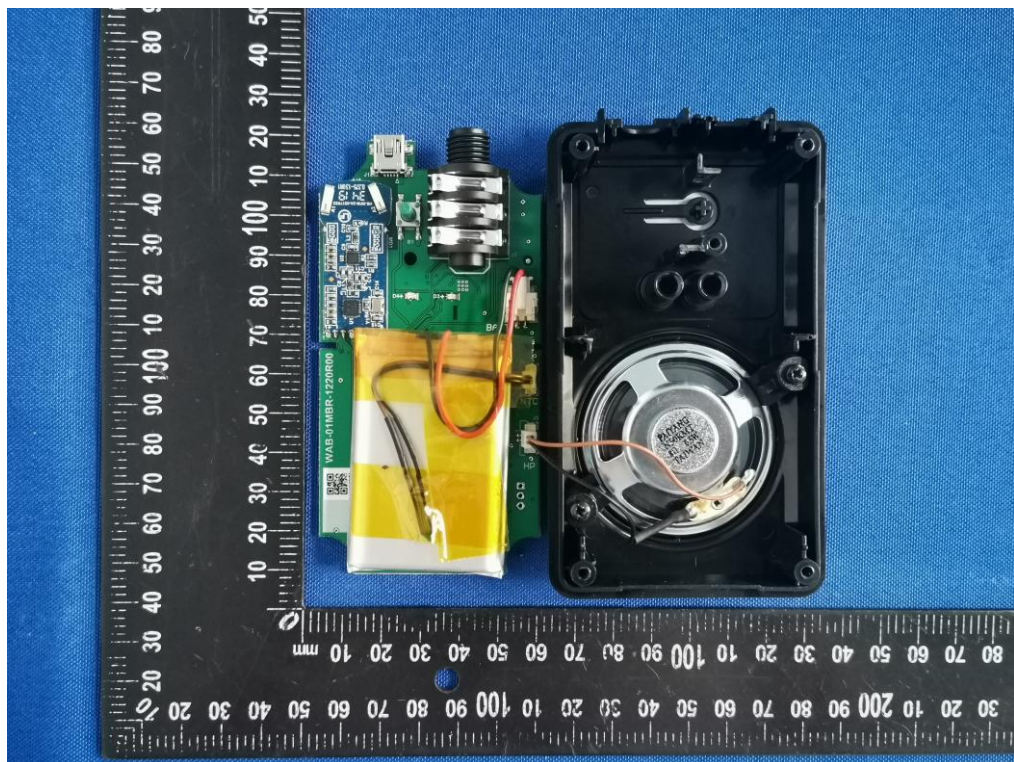
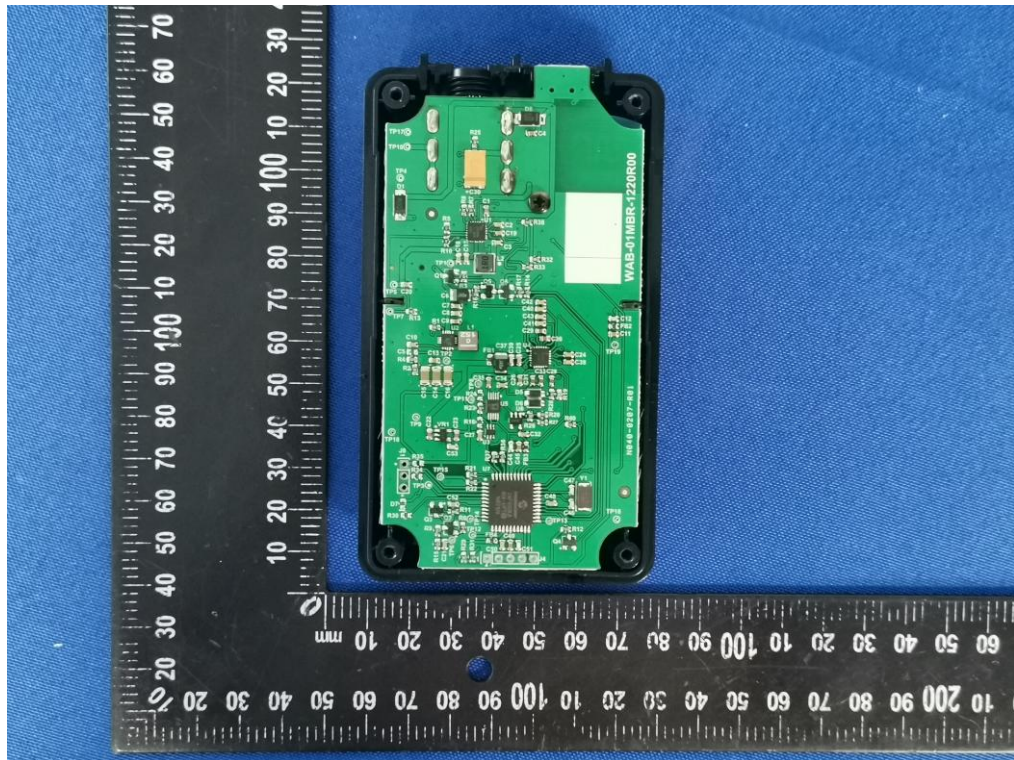


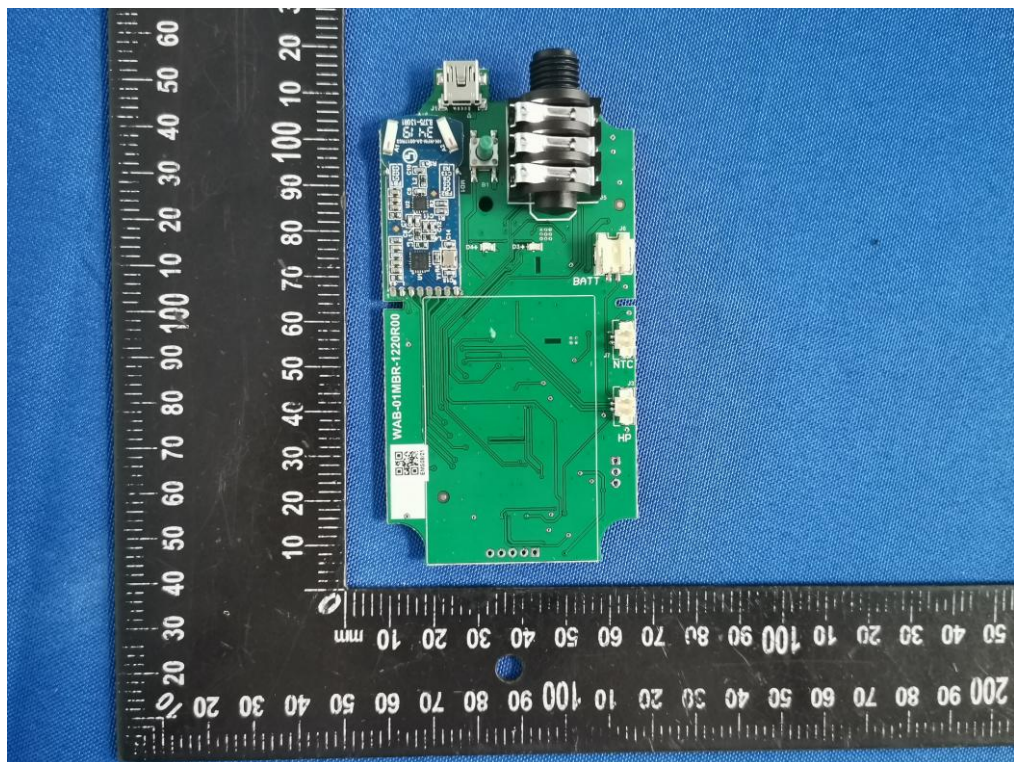
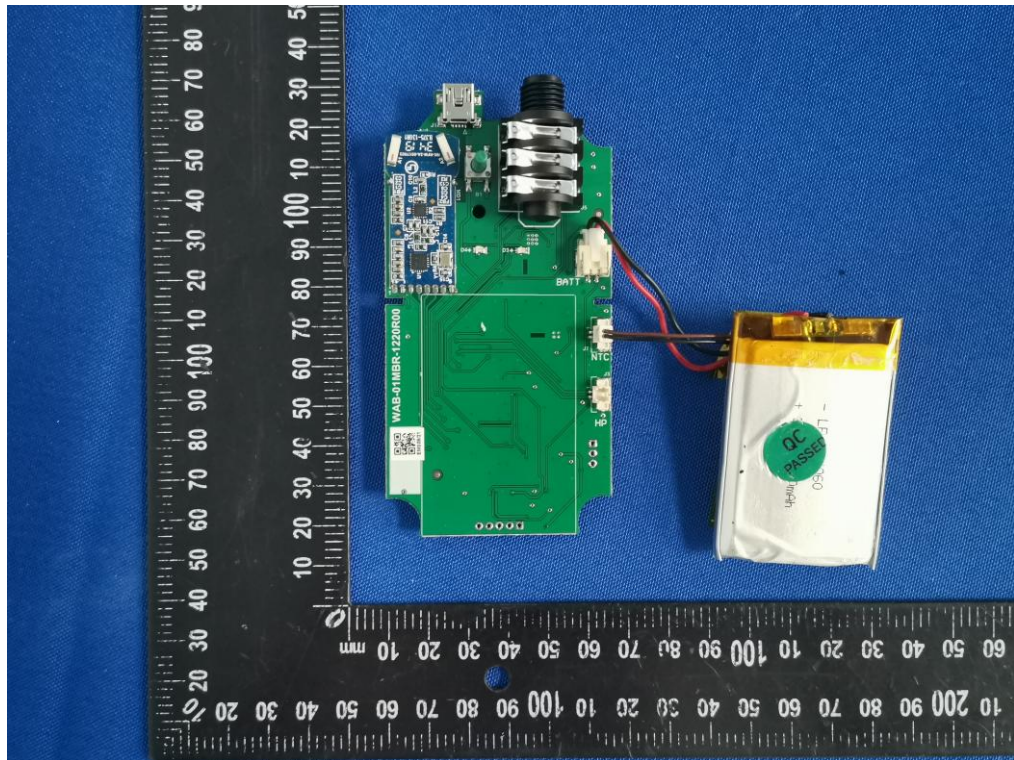


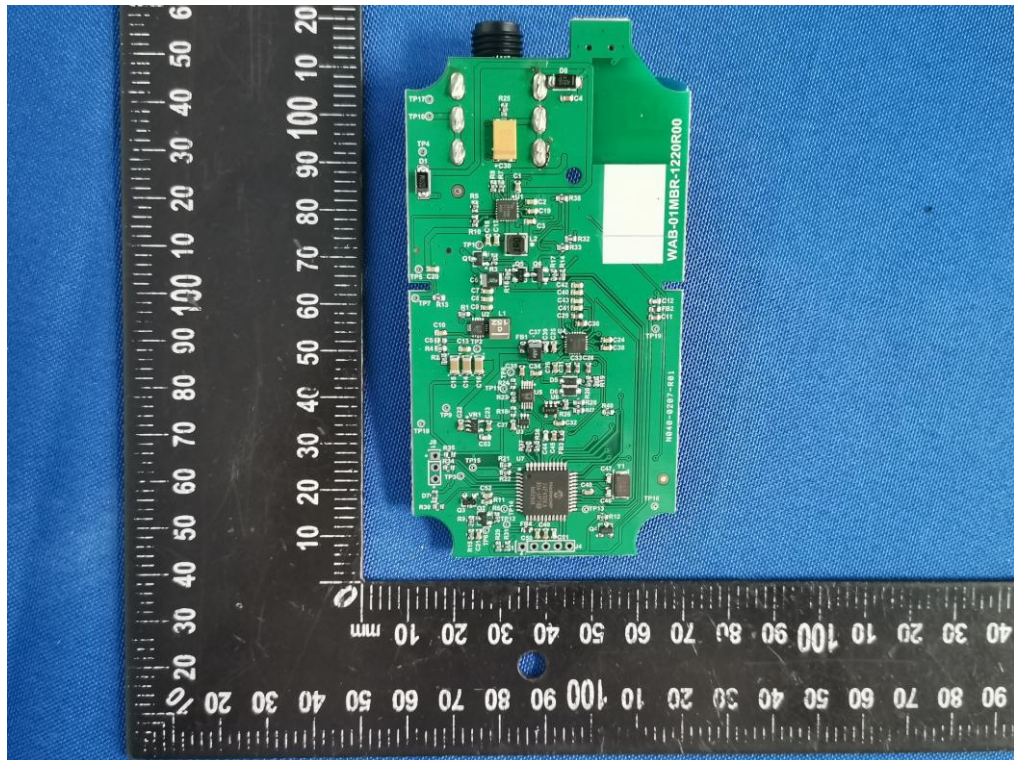


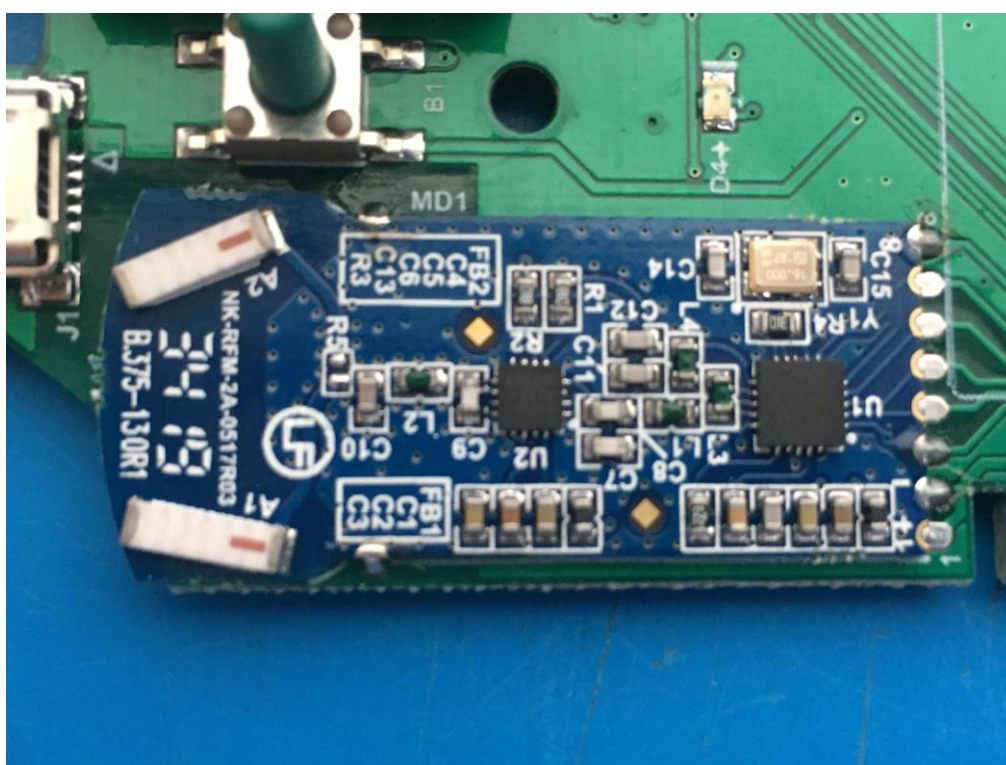












----END OF REPORT----