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### Test Report Declare

<b>Applicant</b>	:	Harman International Industries, Inc.
<b>Address</b>	:	8500 Balboa Boulevard, Northridge, CA 91329, UNITED STATES
<b>Equipment under Test</b>	:	Gaming Wireless Headphone, Wireless Headphone
<b>Model No.</b>	:	QUANTUM350WIRELESS, FREEWFHWIRELESS
<b>Trade Mark</b>	:	JBL
<b>Manufacturer</b>	:	Harman International Industries, Inc.
<b>Address</b>	:	8500 Balboa Boulevard, Northridge, CA 91329, UNITED STATES

**Test Standard Used:**

EN 55032:2015, EN 55032:2015/A11:2020, EN 55035:2017, EN 55035:2017/A11:2020, EN IEC 61000-3-2:2019, EN 61000-3-3:2013+A1:2019

**We Declare:**

The equipment described above is tested by Dongguan Dongdian Testing Service Co., Ltd. and in the configuration tested the equipment complied with the standards specified above. The test results are contained in this test report and Dongguan Dongdian Testing Service Co., Ltd. is assumed of full responsibility for the accuracy and completeness of these tests.

**After test and evaluation, our opinion is that the equipment in accordance with above standards about the electromagnetic compatibility requirements of Directive 2014/30/EU.**

<b>Report No.:</b>	DDT-R20120228-1E2		
<b>Date of Receipt:</b>	Feb. 08, 2021	<b>Date of Test:</b>	Feb. 09, 2021 ~ May. 14, 2021

*Prepared By:*



*Jerry Xue*

**Jerry Xue/Engineer**

*Approved By:*



**Damon Hu/EMC Manager**

Note: This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Dongguan Dongdian Testing Service Co., Ltd.

### Revision History

Rev.	Revisions	Issue Date	Revised By
---	Initial issue	May 17, 2021	

## 1. Summary of Test Results

Description of Test Item	Standard	Result
Conducted Disturbance at AC mains Terminals	EN 55032:2015, EN 55032:2015/A11:2020	PASS
Asymmetric mode conducted emissions	EN 55032:2015, EN 55032:2015/A11:2020	N/A
Radiated Disturbance test	EN 55032:2015, EN 55032:2015/A11:2020	PASS
Harmonic Current Emissions	EN IEC 61000-3-2:2014	Conform
Voltage Fluctuations & Flicker	EN 61000-3-3:2013	PASS
Electrostatic Discharge (ESD)	EN 55035:2017, EN 55035:2017/A11:2020	PASS
Continuous Radio Frequency Disturbances	EN 55035:2017, EN 55035:2017/A11:2020	PASS
Electrical Fast Transients (EFT)	EN 55035:2017, EN 55035:2017/A11:2020	PASS
Surges	EN 55035:2017, EN 55035:2017/A11:2020	PASS
Continuous Conducted Disturbances	EN 55035:2017, EN 55035:2017/A11:2020	PASS
Power-Frequency Magnetic Fields	EN 55035:2017, EN 55035:2017/A11:2020	PASS
Voltage Dips and Interruptions	EN 55035:2017, EN 55035:2017/A11:2020	PASS
Note: N/A is an abbreviation for Not Applicable, and means this item is not applicable for this device.		

## 2. General Test Information

### 2.1. Description of EUT

EUT* Name	: Gaming Wireless Headphone, Wireless Headphone
Model Number	: QUANTUM350WIRELESS, FREEWFHWIRELESS
EUT Function Description	: Please reference user manual of this device
Power supply	: DC 5V from external AC Adapter : DC 3.7V Polymer Li-ion built-in battery
EUT Class	: Class B
Maximum Work Frequency	: 2480MHz
Sample number	: S20120228-1E-1

Note1: EUT is abbreviation of equipment under test.

Note2: The EUT Name (Gaming Wireless Headphone, Wireless Headphone) For the same prototype, only the name description is not the same.

Note3: The Mode Number (QUANTUM350WIRELESS, FREEWFHWIRELESS) For the same prototype, only the name description is not the same.

Note4: The EUT Name and model Number used in this report is Gaming Wireless Headphone and QUANTUM350WIRELESS.

### 2.2. Primary Function of EUT

Function	Description
<input type="checkbox"/> Broadcast reception function	N/A
<input type="checkbox"/> Print	N/A
<input type="checkbox"/> Scan	N/A
<input type="checkbox"/> Display and display output	N/A
<input type="checkbox"/> Musical tone generating	N/A
<input type="checkbox"/> Networking	N/A
<input checked="" type="checkbox"/> Audio output	On-era devices
<input type="checkbox"/> Telephony	N/A
<input checked="" type="checkbox"/> Bluetooth	Bluetooth
<input checked="" type="checkbox"/> Other:	Charging internal battery by AC/DC power converter

Note: “” means the product does not have this function, “” means the product has this function, N/A means not applicable



### 2.3. Port of EUT

Port	Description
<input checked="" type="checkbox"/> AC mains power port	N/A
<input checked="" type="checkbox"/> DC network power port	Type-C port
<input checked="" type="checkbox"/> Wired network port	N/A
<input checked="" type="checkbox"/> Signal data/control port	N/A
<input checked="" type="checkbox"/> Antenna port	N/A
<input checked="" type="checkbox"/> Broadcast receiver tuner port	N/A
<input checked="" type="checkbox"/> Audio output port	N/A
<input checked="" type="checkbox"/> Video output port	N/A
<input checked="" type="checkbox"/> Other:	N/A

Note: "☒" means the product does not have this port, "☑" means the product has this port, N/A means not applicable

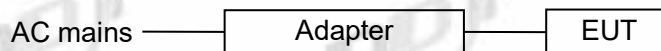
### 2.4. Accessories of EUT

Description of Accessories	Manufacturer	Model number	Description	Remark
USB Cable	Harman	N/A	Length: 1.00m, unshielded	N/A
USB Wireless Dongle	Harman	QUANTUM350WLTM, FREEWFHWIRELESSTM	Input:5V/1A	N/A

Note: The Mode Number (QUANTUM350WIRELESS, FREEWFHWIRELESS) For the same prototype, only the name description is not the same.

### 2.5. Block Diagram EUT Configuration for Test

For mode 1: Charging mode



### 2.6. Decision of Final Test mode

Emission	Conducted Disturbance at AC mains Terminals	Mode 1: Charging mode
	Radiated emission	Mode 1: Charging mode
	Voltage fluctuations & flicker	Mode 1: Charging mode
Immunity	Electrostatic discharge	Mode 1: Charging mode
	Continuous radio frequency disturbances	Mode 1: Charging mode
	Electrical fast transients	Mode 1: Charging mode
	Surges	Mode 1: Charging mode
	Continuous conducted disturbances	Mode 1: Charging mode
	Power-frequency magnetic fields	Mode 1: Charging mode
	Voltage dips and interruptions	Mode 1: Charging mode

## 2.7. Deviations of Test Standard

No Deviation.

## 2.8. Test Environment Conditions

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

Temperature range:	21-25°C
Humidity range:	40-75%
Pressure range:	86-106kPa

## 2.9. Test Laboratory

Dongguan Dongdian Testing Service Co., Ltd.

Add.: No. 17, Zongbu Road 2, Songshan Lake Sci&Tech, Industry Park, Dongguan City, Guangdong Province, China, 523808.

Tel.: +86-0769-38826678, <http://www.dgddt.com>, Email: [ddt@dgddt.com](mailto:ddt@dgddt.com).

CNAS Accreditation No. L6451; A2LA Accreditation Number: 3870.01

FCC Designation Number: CN1182, Test Firm Registration Number: 540522

Innovation, Science and Economic Development Canada Site Registration Number: 10288A

Conformity Assessment Body identifier: CN0048

VCCI facility registration number: C-20087, T-20088, R-20123, G-20118

**2.10. Measurement Uncertainty**

Test Item	Uncertainty
Conducted disturbance at mains terminals	3.32 dB (150 kHz-30 MHz)
Uncertainty for telecommunication port conduction emission test	AAN with aLCL = 55 ... 40 dBc: 3.64 dB AAN with aLCL = 65 ... 50 dBc: 4.08 dB AAN with aLCL = 75 ... 60 dBc: 4.56 dB
Uncertainty for radiation emission test (30 MHz-1 GHz)	4.70 dB (Antenna Polarize: V)
	4.84 dB (Antenna Polarize: H)
Uncertainty for radiation disturbance test (1 GHz to 6 GHz)	4.10 dB (1-6 GHz)
Uncertainty for Flicker test	0.2%
Uncertainty for Harmonic test	5%
Uncertainty for Electrostatic discharge	Rise time: 4% Peak current: 3.1% Current at 30 ns: 3.1% Current at 60 ns: 3.1%
Uncertainty for Surge	Peak of the open-circuit voltage impulse: 3% Front time of the open-circuit voltage impulse: 5% Width of the open-circuit voltage impulse: 5% Peak of the short-circuit current impulse: 2.7% Front time of the short-circuit current impulse: 5% Duration of the short-circuit current impulse: 3%
Uncertainty for Electrical fast transients	Voltage rise time: 3.7% Peak voltage value: 3.4% Voltage pulse width: 3.7%
Uncertainty for Continuous conducted disturbances	0.25dB
Uncertainty for Continuous radio frequency disturbances	1.12dB
Uncertainty for Power-frequency magnetic fields	10%
Uncertainty for Voltage dips and interruptions	3.7%
Temperature	0.4 °C
Humidity	2%

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





### 3.7. Test Procedure

- (1) The EUT was placed on a non-metallic table, 80cm above the ground plane.
- (2) Setup the EUT and assistant equipment as shown in section 2.5 and 3.6.
- (3) The EUT's power adapter was connected to the power mains through a line impedance stabilization network (L.I.S.N). which this provided a 50-ohm coupling impedance for the EUT (Please refer to the block diagram of the test setup and photographs). Both sides of power line were checked for maximum conducted disturbance. In order to find the maximum emission, the relative positions of equipment and all of the interface cables were changed according to EN 55032 on conducted disturbance emission test.
- (4) The bandwidth of test receiver is set at 9 kHz.
- (5) The frequency range from 150 kHz to 30MHz is checked.

### 3.8. Test Result

#### **PASS. (See below detailed test result)**

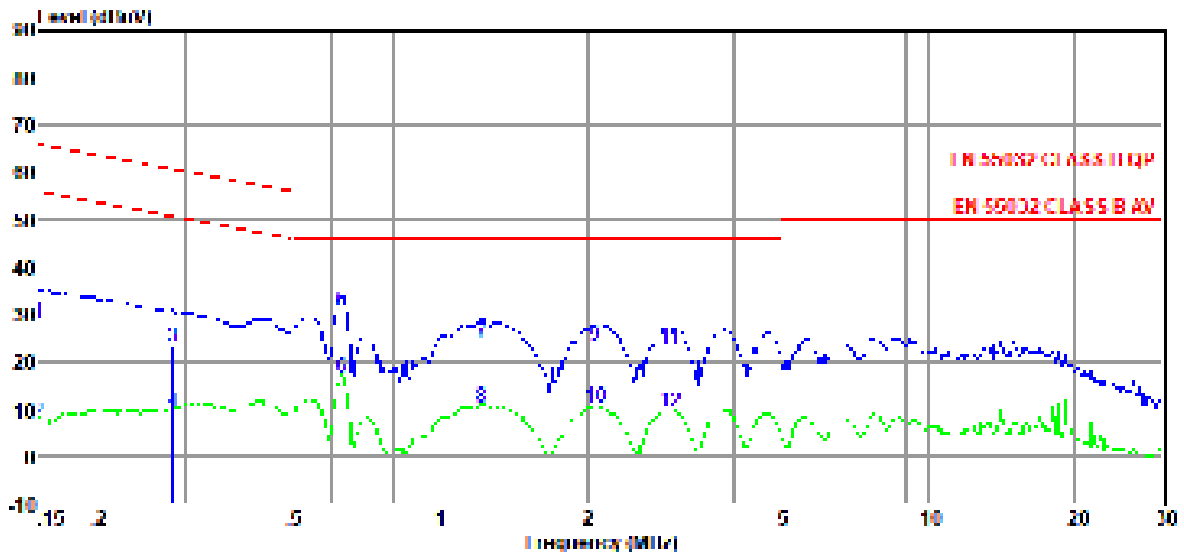
Note 1: All emissions not reported below are too low against the prescribed limits.

Note 2: "----" means Peak detection; "----" means Average detection.

# TR-4-E-010 Conducted Emission Test Result

**Test Site** : DDT 1# Shield Room **D:\2020 CE report data\Q20120228-1E\20210513 CE.EM6**  
**Test Date** : 2021-05-13 **Tested By** : Chunchieh Huang  
**EUT** : Gaming Wireless Headphone **Model Number** : QUANTUM350WIRELESS  
**Power Supply** : AC 240V/50Hz **Test Mode** : Charging mode  
**Condition** : TEMP:24.8°C, RH:53.8%, BP:101.4kPa **LISN** : 2020 ENV 216 1#/LINE  
**Memo** :

Data: 6



Item (Mark)	Freq. (MHz)	Read Level (dBμV)	LISN Factor (dB)	Cable Loss (dB)	Pulse Limiter Factor (dB)	Result Level (dBμV)	Limit Line (dBμV)	Over Limit (dB)	Detector	Phase
1	0.15	8.91	9.39	0.02	9.86	28.18	66.00	-37.82	QP	LINE
2	0.15	-12.08	9.39	0.02	9.86	7.19	56.00	-48.81	Average	LINE
3	0.28	3.77	9.41	0.02	9.86	23.06	60.72	-37.66	QP	LINE
4	0.28	-10.10	9.41	0.02	9.86	9.19	50.72	-41.53	Average	LINE
5	0.63	11.25	9.42	0.02	9.86	30.55	56.00	-25.45	QP	LINE
6	0.63	-2.74	9.42	0.02	9.86	16.56	46.00	-29.44	Average	LINE
7	1.22	4.78	9.42	0.04	9.86	24.10	56.00	-31.90	QP	LINE
8	1.22	-8.91	9.42	0.04	9.86	10.41	46.00	-35.59	Average	LINE
9	2.08	3.92	9.42	0.05	9.87	23.26	56.00	-32.74	QP	LINE
10	2.08	-9.09	9.42	0.05	9.87	10.25	46.00	-35.75	Average	LINE
11	2.96	3.25	9.44	0.06	9.87	22.62	56.00	-33.38	QP	LINE
12	2.96	-10.03	9.44	0.06	9.87	9.34	46.00	-36.66	Average	LINE

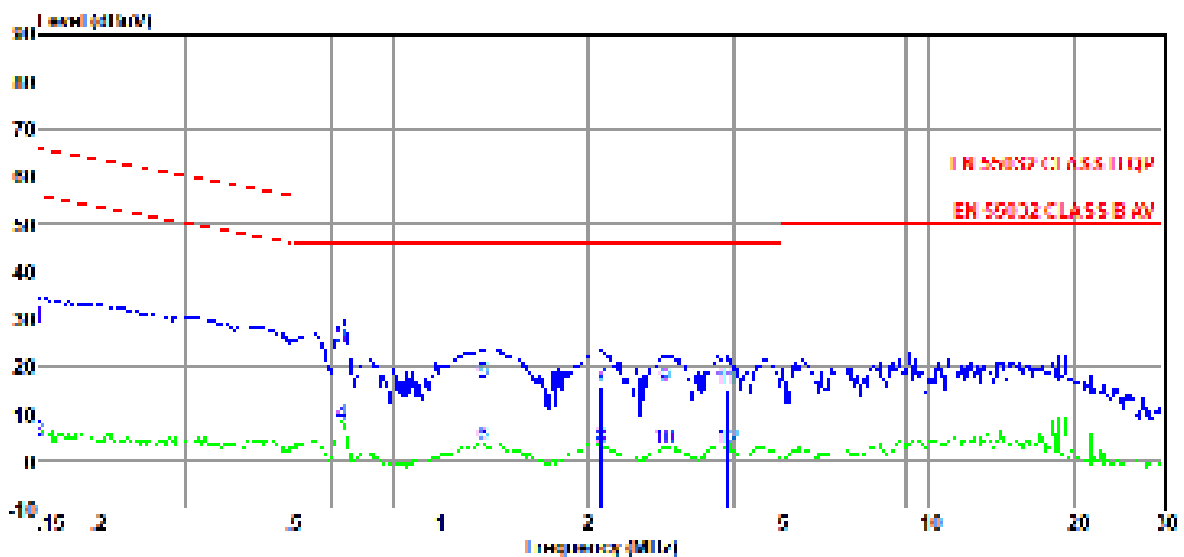
Note:

1. Result Level = Read Level + LISN Factor + Pulse Limiter Factor + Cable loss.
2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 200 Hz (9 kHz—150 kHz), 9 kHz (150 kHz—30 MHz).
4. Step size: 80Hz (0.009MHz-0.15MHz), 4 kHz (0.15MHz-30MHz), Scan time: auto.

# TR-4-E-010 Conducted Emission Test Result

**Test Site** : DDT 1# Shield Room **D:\2020 CE report data\Q20120228-1E\20210513 CE.EM6**  
**Test Date** : 2021-05-13 **Tested By** : Chunchieh Huang  
**EUT** : Gaming Wireless Headphone **Model Number** : QUANTUM350WIRELESS  
**Power Supply** : AC 240V/50Hz **Test Mode** : Charging mode  
**Condition** : TEMP:24.8°C, RH:53.8%, BP:101.4kPa **LISN** : 2020 ENV 216 1#/NEUTRAL  
**Memo** :

Data: 8



Item (Mark)	Freq. (MHz)	Read Level (dBµV)	LISN Factor (dB)	Cable Loss (dB)	Pulse Limiter Factor (dB)	Result Level (dBµV)	Limit Line (dBµV)	Over Limit (dB)	Detector	Phase
1	0.15	8.92	9.38	0.02	9.86	28.18	66.00	-37.82	QP	NEUTRAL
2	0.15	-15.28	9.38	0.02	9.86	3.98	56.00	-52.02	Average	NEUTRAL
3	0.63	4.41	9.39	0.02	9.86	23.68	56.00	-32.32	QP	NEUTRAL
4	0.63	-11.85	9.39	0.02	9.86	7.42	46.00	-38.58	Average	NEUTRAL
5	1.22	-2.69	9.39	0.04	9.86	16.60	56.00	-39.40	QP	NEUTRAL
6	1.22	-16.25	9.39	0.04	9.86	3.04	46.00	-42.96	Average	NEUTRAL
7	2.13	-3.83	9.40	0.05	9.87	15.49	56.00	-40.51	QP	NEUTRAL
8	2.13	-16.75	9.40	0.05	9.87	2.57	46.00	-43.43	Average	NEUTRAL
9	2.88	-4.07	9.41	0.06	9.87	15.27	56.00	-40.73	QP	NEUTRAL
10	2.88	-16.94	9.41	0.06	9.87	2.40	46.00	-43.60	Average	NEUTRAL
11	3.86	-4.35	9.43	0.07	9.87	15.02	56.00	-40.98	QP	NEUTRAL
12	3.86	-16.83	9.43	0.07	9.87	2.54	46.00	-43.46	Average	NEUTRAL

Note:

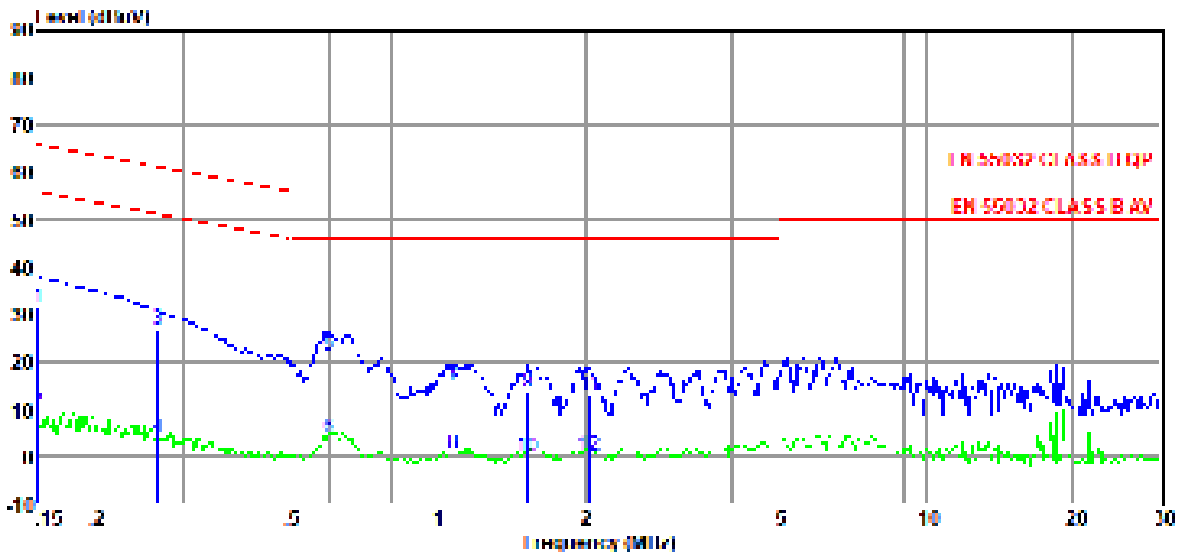
1. Result Level = Read Level + LISN Factor + Pulse Limiter Factor + Cable loss.
2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 200 Hz (9 kHz—150 kHz), 9 kHz (150 kHz—30 MHz).
4. Step size: 80Hz (0.009MHz-0.15MHz), 4 kHz (0.15MHz-30MHz), Scan time: auto.



# TR-4-E-010 Conducted Emission Test Result

**Test Site** : DDT 1# Shield Room **D:\2020 CE report data\Q20120228-1E\20210513 CE.EM6**  
**Test Date** : 2021-05-13 **Tested By** : Chunchieh Huang  
**EUT** : Gaming Wireless Headphone **Model Number** : QUANTUM350WIRELESS  
**Power Supply** : AC 120V/60Hz **Test Mode** : Charging mode  
**Condition** : TEMP:24.8°C, RH:53.8%, BP:101.4kPa **LISN** : 2020 ENV 216 1#/NEUTRAL  
**Memo** :

Data: 10



Item (Mark)	Freq. (MHz)	Read Level (dBμV)	LISN Factor (dB)	Cable Loss (dB)	Pulse Limiter Factor (dB)	Result Level (dBμV)	Limit Line (dBμV)	Over Limit (dB)	Detector	Phase
1	0.15	11.98	9.38	0.02	9.86	31.24	65.96	-34.72	QP	NEUTRAL
2	0.15	-10.15	9.38	0.02	9.86	9.11	55.96	-46.85	Average	NEUTRAL
3	0.27	7.37	9.38	0.02	9.86	26.63	61.25	-34.62	QP	NEUTRAL
4	0.27	-15.53	9.38	0.02	9.86	3.73	51.25	-47.52	Average	NEUTRAL
5	0.59	2.17	9.39	0.02	9.86	21.44	56.00	-34.56	QP	NEUTRAL
6	0.59	-15.59	9.39	0.02	9.86	3.68	46.00	-42.32	Average	NEUTRAL
7	1.08	-4.14	9.39	0.03	9.86	15.14	56.00	-40.86	QP	NEUTRAL
8	1.08	-18.96	9.39	0.03	9.86	0.32	46.00	-45.68	Average	NEUTRAL
9	1.53	-5.87	9.40	0.04	9.86	13.43	56.00	-42.57	QP	NEUTRAL
10	1.53	-19.69	9.40	0.04	9.86	-0.39	46.00	-46.39	Average	NEUTRAL
11	2.04	-6.61	9.40	0.05	9.87	12.71	56.00	-43.29	QP	NEUTRAL
12	2.04	-19.32	9.40	0.05	9.87	0.00	46.00	-46.00	Average	NEUTRAL

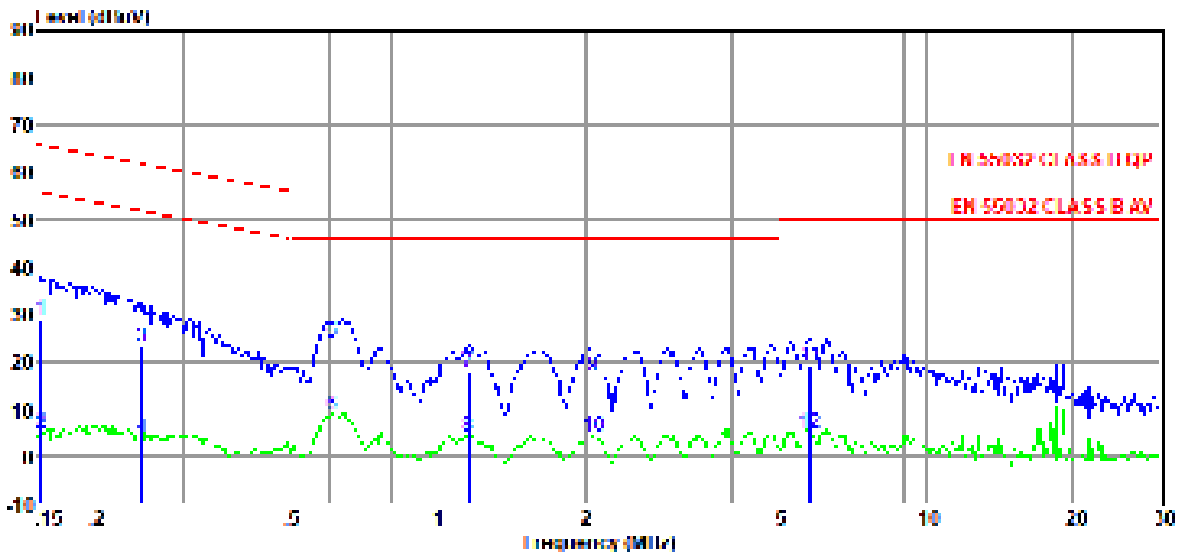
Note:

1. Result Level = Read Level + LISN Factor + Pulse Limiter Factor + Cable loss.
2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 200 Hz (9 kHz—150 kHz), 9 kHz (150 kHz—30 MHz).
4. Step size: 80Hz (0.009MHz-0.15MHz), 4 kHz (0.15MHz-30MHz), Scan time: auto.

# TR-4-E-010 Conducted Emission Test Result

**Test Site** : DDT 1# Shield Room **D:\2020 CE report data\Q20120228-1E\20210513 CE.EM6**  
**Test Date** : 2021-05-13 **Tested By** : Chunchieh Huang  
**EUT** : Gaming Wireless Headphone **Model Number** : QUANTUM350WIRELESS  
**Power Supply** : AC 120V/60Hz **Test Mode** : Charging mode  
**Condition** : TEMP:24.8°C, RH:53.8%, BP:101.4kPa **LISN** : 2020 ENV 216 1#/LINE  
**Memo** :

Data: 12



Item (Mark)	Freq. (MHz)	Read Level (dBμV)	LISN Factor (dB)	Cable Loss (dB)	Pulse Limiter Factor (dB)	Result Level (dBμV)	Limit Line (dBμV)	Over Limit (dB)	Detector	Phase
1	0.15	9.46	9.39	0.02	9.86	28.73	65.82	-37.09	QP	LINE
2	0.15	-14.61	9.39	0.02	9.86	4.66	55.82	-51.16	Average	LINE
3	0.25	3.76	9.41	0.02	9.86	23.05	61.86	-38.81	QP	LINE
4	0.25	-15.67	9.41	0.02	9.86	3.62	51.86	-48.24	Average	LINE
5	0.60	4.85	9.42	0.02	9.86	24.15	56.00	-31.85	QP	LINE
6	0.60	-10.70	9.42	0.02	9.86	8.60	46.00	-37.40	Average	LINE
7	1.15	-1.46	9.42	0.03	9.86	17.85	56.00	-38.15	QP	LINE
8	1.15	-15.23	9.42	0.03	9.86	4.08	46.00	-41.92	Average	LINE
9	2.08	-2.38	9.42	0.05	9.87	16.96	56.00	-39.04	QP	LINE
10	2.08	-15.37	9.42	0.05	9.87	3.97	46.00	-42.03	Average	LINE
11	5.77	-0.46	9.52	0.09	9.87	19.02	60.00	-40.98	QP	LINE
12	5.77	-14.67	9.52	0.09	9.87	4.81	50.00	-45.19	Average	LINE

Note:

1. Result Level = Read Level + LISN Factor + Pulse Limiter Factor + Cable loss.
2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 200 Hz (9 kHz—150 kHz), 9 kHz (150 kHz—30 MHz).
4. Step size: 80Hz (0.009MHz-0.15MHz), 4 kHz (0.15MHz-30MHz), Scan time: auto.

### 3.9. Test Photo



## 4. Radiated Emissions Test

### 4.1. General Information

Test and report Engineer	: Junchang Du and Lori Mi
Test and report Date	: May 12, 2021 ~ May 14, 2021

### 4.2. Test Equipment

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
<b>Radiation DQT 10m 1#chamber (below 1G)</b>					
Test Receiver	Rohde & Schwarz	ESU40	100012	Jan. 12, 2021	1 Year
Trilog Broadband Antenna	Schwarzbeck	VULB9163	331	Mar. 12, 2019	3 Year
Test software	Audix	E3	V 6.11111b	N/A	N/A
<b>Radiation 1#chamber (above 1G)</b>					
EMI Test Receiver	R&S	ESU8	100316	Sep. 24, 2020	1 Year
Spectrum analyzer	Agilent	E4447A	MY50180031	Jul. 01, 2020	1 Year
Double Ridged Horn Antenna	R&S	HF907	100276	Nov. 13, 2020	1 Year
Pre-amplifier	TERA-MW	TRLA-0040G35	101303	Sep. 28, 2020	1 Year
Pre-amplifier	A.H.	PAM-0118	360	Sep. 28, 2020	1 Year
RF Cable	N/A	SMAJ-SMAJ-1M+ SMAJ-SMAJ-11M	17070133+1 7070131	Sep. 30, 2020	1 Year
Test software	Audix	E3	V 6.11111b	N/A	N/A
Notes. N/A means Not applicable.					

### 4.3. Reference Standard

EN 55032:2015, EN 55032:2015/A11:2020





#### 4.5. Limits

##### Class A

Equipment	Frequency	Field Strengths Limits at 10m measuring distance dB( $\mu$ V)/m	Field Strengths Limits at 3m measuring distance dB( $\mu$ V)/m
Class A Equipment	30MHz to 230MHz	40	50
	230MHz to 1000MHz	47	57
	1GHz to 3GHz	/	Average:56; Peak:76
	3GHz to 6GHz	/	Average:60; Peak:80

##### Class B

Equipment	Frequency	Field Strengths Limits at 10m measuring distance dB( $\mu$ V)/m	Field Strengths Limits at 3m measuring distance dB( $\mu$ V)/m
Class B Equipment	30MHz to 230MHz	30	40
	230MHz to 1000MHz	37	47
	1GHz to 3GHz	/	Average:50; Peak:70
	3GHz to 6GHz	/	Average:54; Peak:74
FM receivers*	30MHz to 1000MHz	Fundamental 50	Fundamental 60
	30MHz to 300MHz	Harmonics 42	Harmonics 52
	300MHz to 1000MHz	Harmonics 46	Harmonics 56

\*: these relaxed limits apply only to emission at the fundamental and harmonic frequencies of the local oscillator signals at all other frequencies shall be compliant with the limits of class B equipment given above.

Note: (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.

#### 4.6. Assistant Equipment used for Test

Assistant equipment	Manufacturer	Model number	Description	other
Adapter	SAMSUNG	EP-TA200	N/A	Input: 100-240~, 50/60Hz, 0.5A; Output: 9V/1.67A or 5V/2A

#### 4.7. Test Procedure

- (1) The EUT was placed on a non-metallic table, 80 cm above the ground plane inside an semi-anechoic chamber.
- (2) Test antenna was located 3m / 10m (see note) 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 equipment and all of the interface cables were changed according to EN 55032 on radiated emission test.

- (3) Spectrum frequency from 30MHz to 1GHz / 6GHz was investigated.
- (4) 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 equipment and all of the interface cables were changed according to EN 55032 on Radiated Emission test.
- (5) For emissions from 30MHz to 1GHz, Quasi-Peak values were measured with EMI Receiver and the bandwidth of Receiver is 120 kHz.
- (6) For emissions above 1GHz, both Peak and Average level were measured with Spectrum Analyzer, and the RBW is set at 1MHz VBW is set at 3MHz.

Note: This test emissions from 30MHz to 1GHz was subcontracted to Bureau of Quality and Technology Supervision of Dongguan City.

#### 4.8. Test Result

**PASS. (See below detailed test result)**

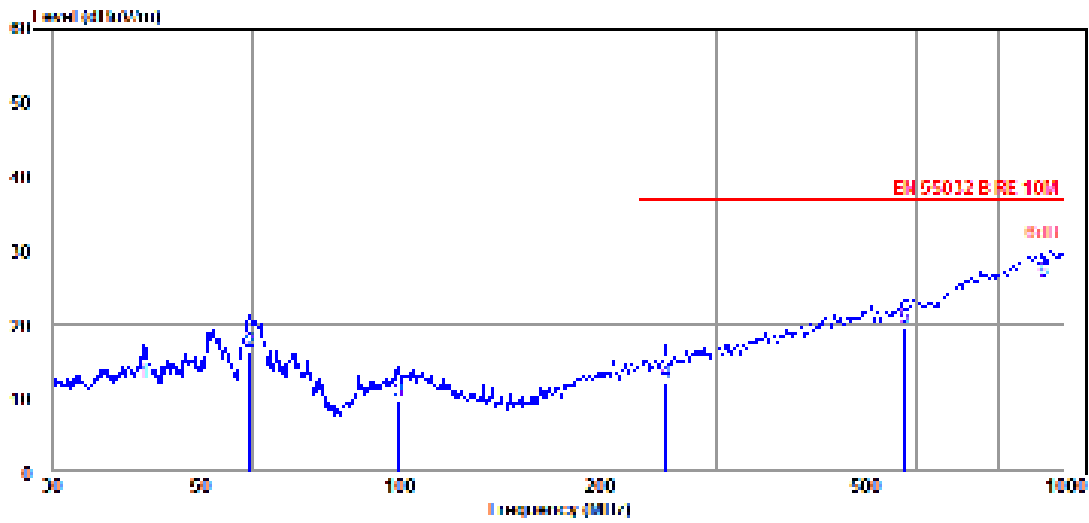
Note: All emissions not reported below are too low against the prescribed limits.



# TR-4-E-009 Radiated Emission Test Result

**Test Site** : DQT 10 m Chamber 1# D:\2020 Report test data\Q20120228-1E\20210512 10M RE.EM6  
**Test Date** : 2021-05-12 **Tested By** : Junchang Du  
**EUT** : Gaming Wireless Headphone **Model Number** : QUANTUM350WIRELESS  
**Power Supply** : AC 120V/60Hz **Test Mode** : Charging mode  
**Condition** : Temp:24.5°C,Humi:55%,Press:101.4kPa **Antenna/Distance** : DQT FACTOR/10m/VERTICAL  
**Memo** :

Data: 1



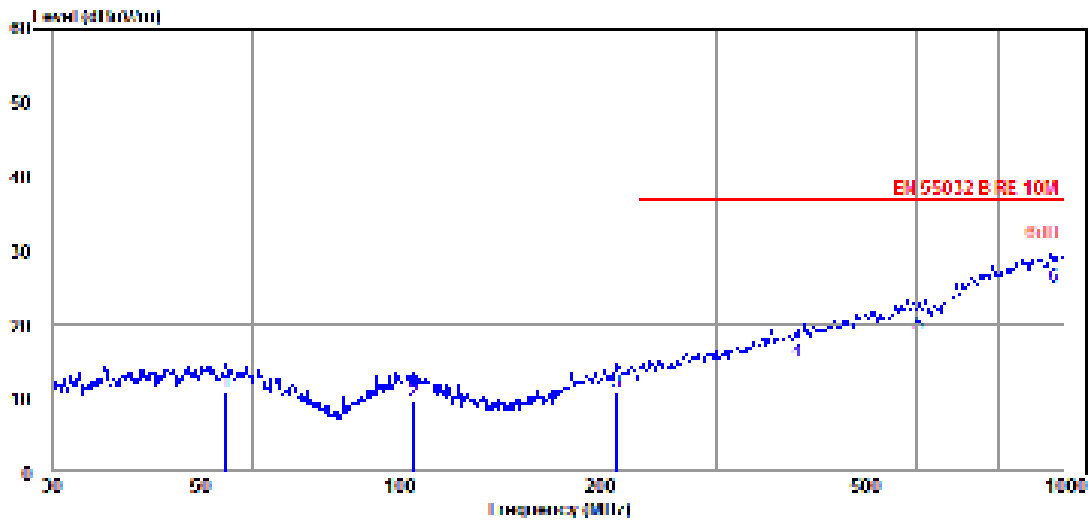
Item (Mark)	Freq. (MHz)	Read Level (dBμV)	Factor (dB/m)	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	41.28	-2.32	14.56	12.24	30.00	-17.76	QP	VERTICAL
2	59.44	1.71	14.56	16.27	30.00	-13.73	QP	VERTICAL
3	99.53	-4.44	13.82	9.38	30.00	-20.62	QP	VERTICAL
4	251.18	-3.23	15.41	12.18	37.00	-24.82	QP	VERTICAL
5	576.64	-2.25	21.86	19.61	37.00	-17.39	QP	VERTICAL
6	932.27	-1.97	27.67	25.70	37.00	-11.30	QP	VERTICAL

- Note: 1. Result Level = Read Level + Factor.  
 2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.  
 3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

# TR-4-E-009 Radiated Emission Test Result

**Test Site** : DQT 10 m Chamber 1# **D:\2020 Report test data\Q20120228-1E\20210512 10M RE.EM6**  
**Test Date** : 2021-05-12 **Tested By** : Junchang Du  
**EUT** : Gaming Wireless Headphone **Model Number** : QUANTUM350WIRELESS  
**Power Supply** : AC 120V/60Hz **Test Mode** : Charging mode  
**Condition** : Temp:24.5°C,Humi:55%,Press:101.4kPa **Antenna/Distance** : DQT FACTOR/10m/HORIZONTAL  
**Memo** :

Data: 2



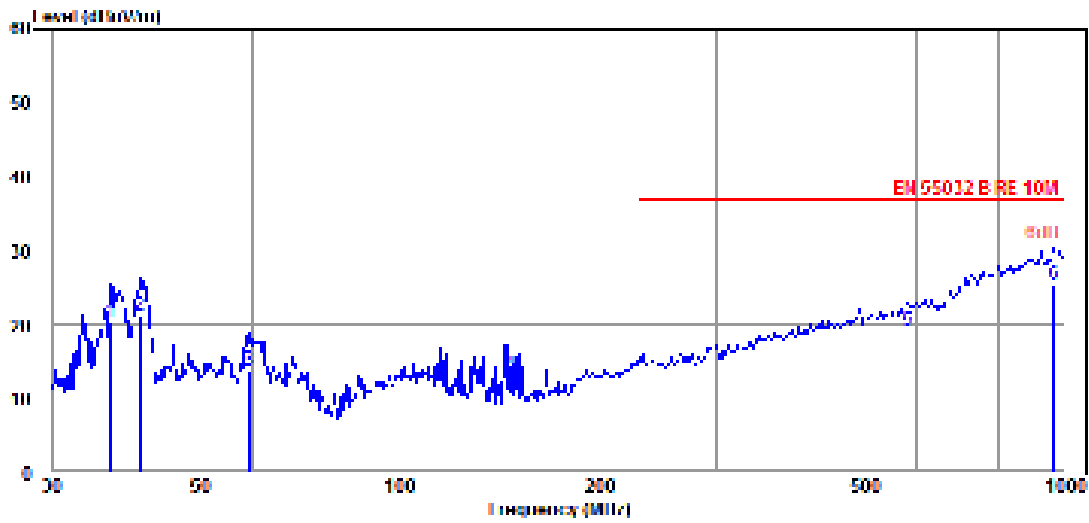
Item (Mark)	Freq. (MHz)	Read Level (dBμV)	Factor (dB/m)	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	54.64	-4.02	14.78	10.76	30.00	-19.24	QP	HORIZONTAL
2	104.90	-4.28	13.72	9.44	30.00	-20.56	QP	HORIZONTAL
3	212.27	-3.33	14.02	10.69	30.00	-19.31	QP	HORIZONTAL
4	397.63	-4.43	19.32	14.89	37.00	-22.11	QP	HORIZONTAL
5	605.66	-3.84	22.47	18.63	37.00	-18.37	QP	HORIZONTAL
6	968.93	-3.02	27.92	24.90	37.00	-12.10	QP	HORIZONTAL

- Note: 1. Result Level = Read Level + Factor.  
 2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.  
 3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

# TR-4-E-009 Radiated Emission Test Result

**Test Site** : DQT 10 m Chamber 1# **D:\2020 Report test data\Q20120228-1E\20210512 10M RE.EM6**  
**Test Date** : 2021-05-12 **Tested By** : Junchang Du  
**EUT** : Gaming Wireless Headphone **Model Number** : QUANTUM350WIRELESS  
**Power Supply** : AC 240V/50Hz **Test Mode** : Charging mode  
**Condition** : Temp:24.5°C,Humi:55%,Press:101.4kPa **Antenna/Distance** : DQT FACTOR/10m/VERTICAL  
**Memo** :

Data: 3



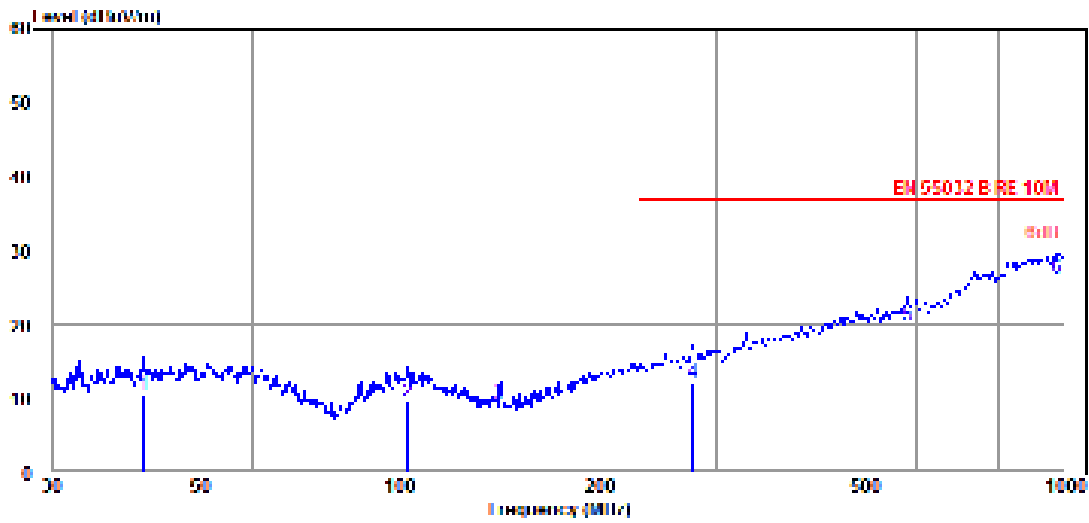
Item (Mark)	Freq. (MHz)	Read Level (dBμV)	Factor (dB/m)	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	36.64	6.72	13.78	20.50	30.00	-9.50	QP	VERTICAL
2	40.56	6.64	14.52	21.16	30.00	-8.84	QP	VERTICAL
3	59.23	-0.85	14.57	13.72	30.00	-16.28	QP	VERTICAL
4	147.40	3.06	10.13	13.19	30.00	-16.81	QP	VERTICAL
5	584.79	-2.85	22.10	19.25	37.00	-17.75	QP	VERTICAL
6	965.54	-2.52	27.89	25.37	37.00	-11.63	QP	VERTICAL

- Note: 1. Result Level = Read Level + Factor.  
 2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.  
 3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

# TR-4-E-009 Radiated Emission Test Result

**Test Site** : DQT 10 m Chamber 1# **D:\2020 Report test data\Q20120228-1E\20210512 10M RE.EM6**  
**Test Date** : 2021-05-12 **Tested By** : Junchang Du  
**EUT** : Gaming Wireless Headphone **Model Number** : QUANTUM350WIRELESS  
**Power Supply** : AC 240V/50Hz **Test Mode** : Charging mode  
**Condition** : Temp:24.5°C,Humi:55%,Press:101.4kPa **Antenna/Distance** : DQT FACTOR/10m/HORIZONTAL  
**Memo** :

Data: 4



Item (Mark)	Freq. (MHz)	Read Level (dBμV)	Factor (dB/m)	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	41.13	-3.97	14.56	10.59	30.00	-19.41	QP	HORIZONTAL
2	102.72	-4.32	13.81	9.49	30.00	-20.51	QP	HORIZONTAL
3	141.33	-0.86	10.12	9.26	30.00	-20.74	QP	HORIZONTAL
4	276.12	-3.81	16.05	12.24	37.00	-24.76	QP	HORIZONTAL
5	584.79	-2.32	22.10	19.78	37.00	-17.22	QP	HORIZONTAL
6	979.18	-1.93	28.02	26.09	37.00	-10.91	QP	HORIZONTAL

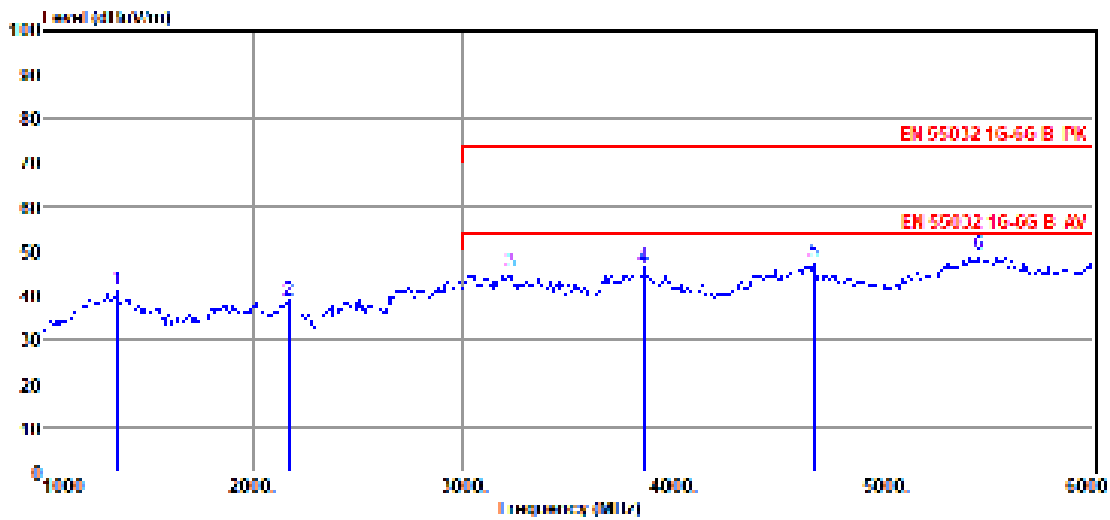
- Note: 1. Result Level = Read Level + Factor.  
 2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.  
 3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

**Radiated Emission test (1GHz-6GHz)**

**TR-4-E-009 Radiated Emission Test Result**

**Test Site** : DDT 3m Chamber 1# **D:\2020 RE 1# Report data\Q20120228-1E\0514 RE-H.EM6**  
**Test Date** : 2021-05-14 **Tested By** : Lori Mi  
**EUT** : Gaming Wireless Headphone **Model Number** : QUANTUM350WIRELESS  
**Power Supply** : AC 240V/50Hz **Test Mode** : Charging mode  
**Condition** : Temp:24.8°C,Humi:53.7%,Press:101.4kPa **Antenna/Distance** : 2020 HF907/3m/VERTICAL  
**Memo** :

Data: 11



Item (Mark)	Freq. (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	1350.00	54.57	24.75	40.99	2.97	41.30	70.00	-28.70	Peak	VERTICAL
2	2175.00	48.88	28.51	42.15	3.69	38.93	70.00	-31.07	Peak	VERTICAL
3	3225.00	52.98	31.16	43.13	4.47	45.48	74.00	-28.52	Peak	VERTICAL
4	3865.00	51.96	32.54	43.19	4.96	46.27	74.00	-27.73	Peak	VERTICAL
5	4675.00	50.97	33.86	42.85	5.47	47.45	74.00	-26.55	Peak	VERTICAL
6	5460.00	51.19	34.68	42.89	6.15	49.13	74.00	-24.87	Peak	VERTICAL

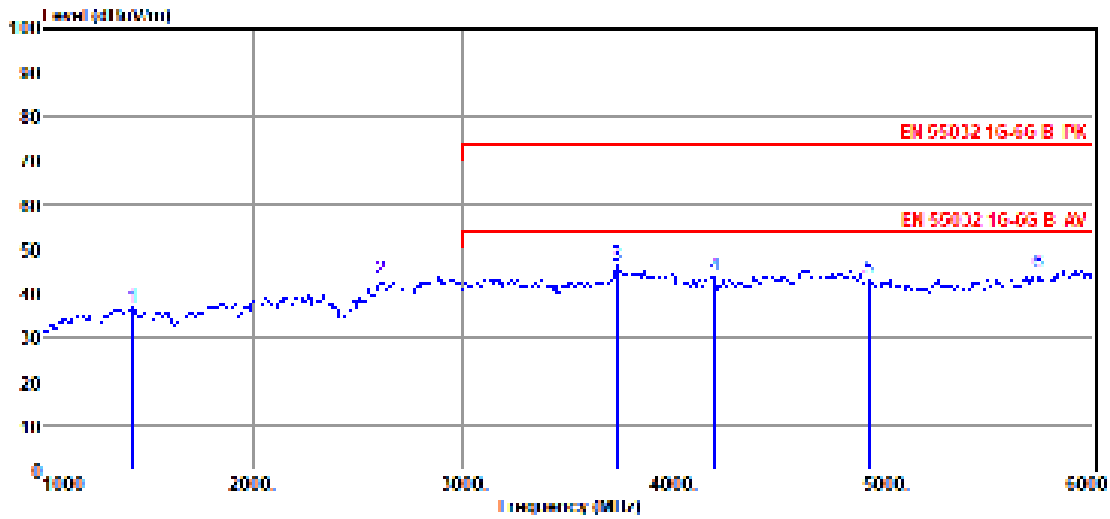
Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.  
 2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.  
 3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

# TR-4-E-009 Radiated Emission Test Result

**Test Site** : DDT 3m Chamber 1# **D:\2020 RE 1# Report data\Q20120228-1E\0514 RE-H.EM6**  
**Test Date** : 2021-05-14 **Tested By** : Lori Mi  
**EUT** : Gaming Wireless Headphone **Model Number** : QUANTUM350WIRELESS  
**Power Supply** : AC 240V/50Hz **Test Mode** : Charging mode  
**Condition** : Temp:24.8°C,Humi:53.7%,Press:101.4kPa **Antenna/Distance** : 2020 HF907/3m/HORIZONTAL

**Memo** :

Data: 12



Item (Mark)	Freq. (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor (dB)	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Over Limit (dB)	Detector	Polarization
1	1425.00	49.81	25.03	41.12	3.05	36.77	70.00	-33.23	Peak	HORIZONTAL
2	2615.00	52.39	29.55	42.69	4.02	43.27	70.00	-26.73	Peak	HORIZONTAL
3	3735.00	52.48	32.29	43.18	4.86	46.45	74.00	-27.55	Peak	HORIZONTAL
4	4200.00	48.88	33.09	43.09	5.18	44.06	74.00	-29.94	Peak	HORIZONTAL
5	4935.00	46.15	34.38	42.73	5.61	43.41	74.00	-30.59	Peak	HORIZONTAL
6	5740.00	46.47	34.85	43.00	6.43	44.75	74.00	-29.25	Peak	HORIZONTAL

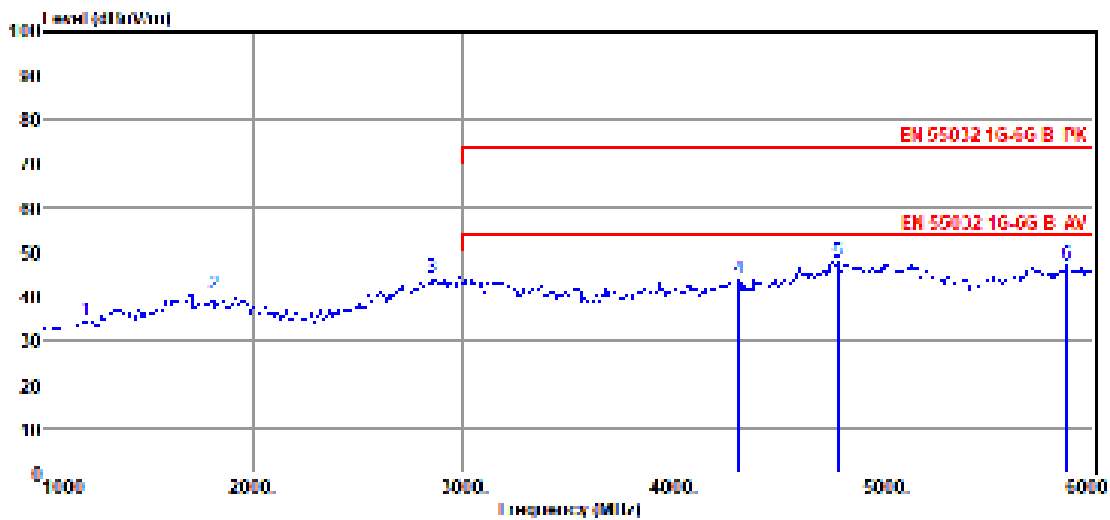
- Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.  
 2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.  
 3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

# TR-4-E-009 Radiated Emission Test Result

**Test Site** : DDT 3m Chamber 1# **D:\2020 RE 1# Report data\Q20120228-1E\0514 RE-H.EM6**  
**Test Date** : 2021-05-14 **Tested By** : Lori Mi  
**EUT** : Gaming Wireless Headphone **Model Number** : QUANTUM350WIRELESS  
**Power Supply** : AC 120V/60Hz **Test Mode** : Charging mode  
**Condition** : Temp:24.8°C,Humi:53.7%,Press:101.4kPa **Antenna/Distance** : 2020 HF907/3m/HORIZONTAL

**Memo** :

Data: 13



Item (Mark)	Freq. (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor (dB)	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Over Limit (dB)	Detector	Polarization
1	1200.00	48.30	24.14	40.72	2.80	34.52	70.00	-35.48	Peak	HORIZONTAL
2	1810.00	51.77	27.13	41.67	3.40	40.63	70.00	-29.37	Peak	HORIZONTAL
3	2850.00	53.04	30.21	42.95	4.18	44.48	70.00	-25.52	Peak	HORIZONTAL
4	4315.00	48.38	33.25	43.03	5.25	43.85	74.00	-30.15	Peak	HORIZONTAL
5	4790.00	50.95	34.09	42.80	5.53	47.77	74.00	-26.23	Peak	HORIZONTAL
6	5875.00	48.71	34.93	43.05	6.56	47.15	74.00	-26.85	Peak	HORIZONTAL

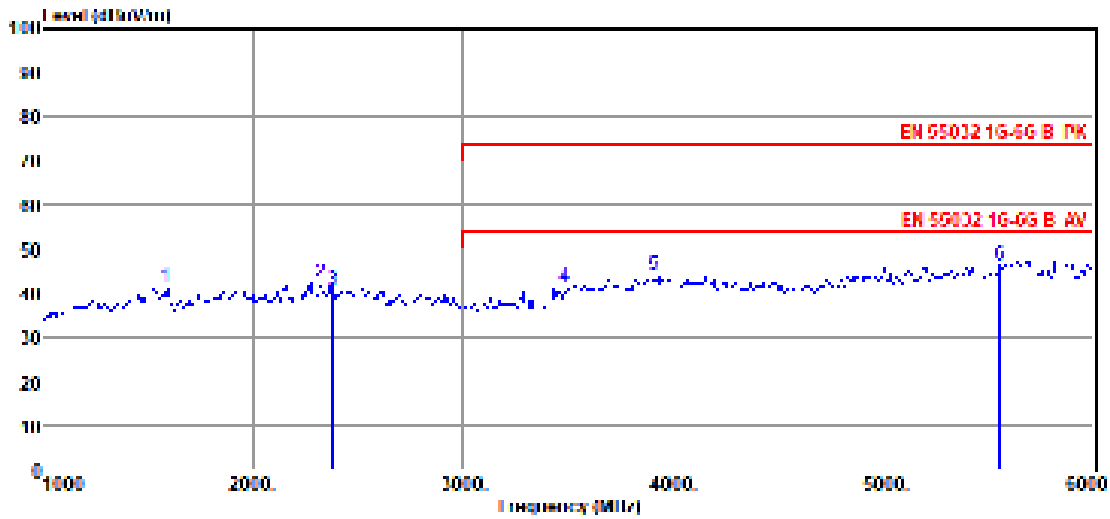
Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.  
 2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.  
 3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

# TR-4-E-009 Radiated Emission Test Result

**Test Site** : DDT 3m Chamber 1# **D:\2020 RE 1# Report data\Q20120228-1E\0514 RE-H.EM6**  
**Test Date** : 2021-05-14 **Tested By** : Lori Mi  
**EUT** : Gaming Wireless Headphone **Model Number** : QUANTUM350WIRELESS  
**Power Supply** : AC 120V/60Hz **Test Mode** : Charging mode  
**Condition** : Temp:24.8°C,Humi:53.7%,Press:101.4kPa **Antenna/Distance** : 2020 HF907/3m/VERTICAL

**Memo** :

Data: 14

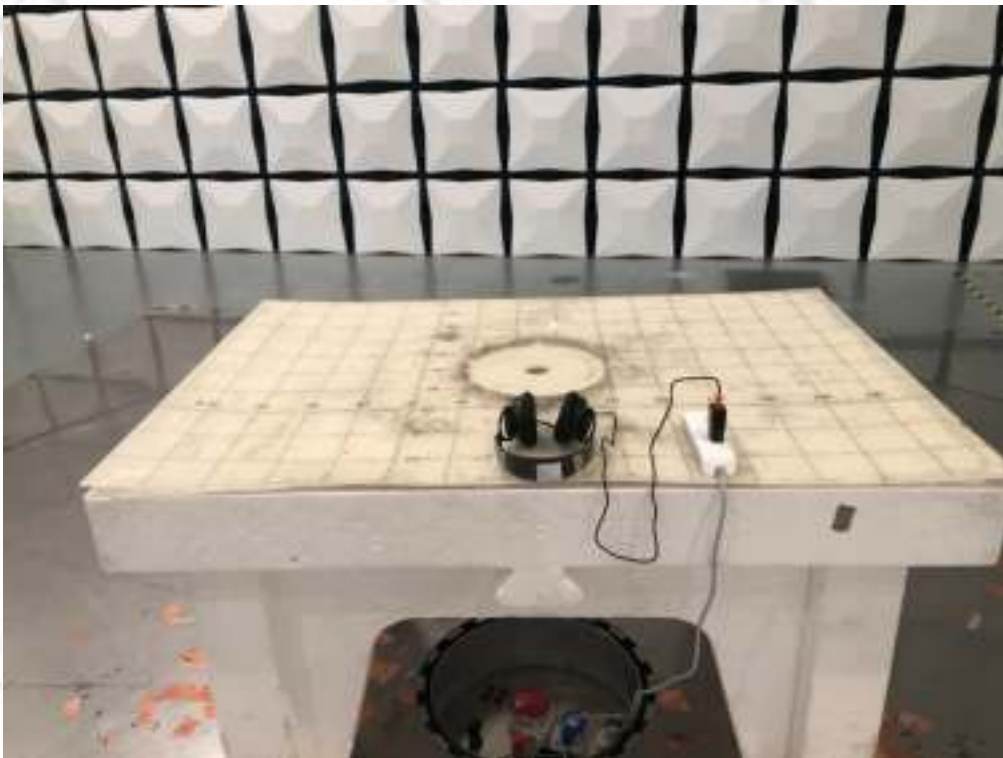


Item (Mark)	Freq. (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor (dB)	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Over Limit (dB)	Detector	Polarization
1	1590.00	53.75	25.87	41.37	3.21	41.46	70.00	-28.54	Peak	VERTICAL
2	2325.00	52.47	28.84	42.35	3.81	42.77	70.00	-27.23	Peak	VERTICAL
3	2380.00	50.63	28.96	42.41	3.85	41.03	70.00	-28.97	Peak	VERTICAL
4	3485.00	48.28	31.77	43.15	4.68	41.58	74.00	-32.42	Peak	VERTICAL
5	3915.00	49.99	32.64	43.19	4.99	44.43	74.00	-29.57	Peak	VERTICAL
6	5560.00	48.35	34.74	42.93	6.25	46.41	74.00	-27.59	Peak	VERTICAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.  
 2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.  
 3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.



#### 4.9. Test Photo







### 5.5. Harmonic Current limits

For Class A equipment

Harmonic order(n)	Maximum permissible harmonic current (A)
3	2.30
5	1.14
7	0.77
9	0.40
11	0.33
13	0.21
$15 \leq n \leq 39$	$0.15 \cdot 15/n$
Even harmonics	
2	1.08
4	0.43
6	0.30
$8 \leq n \leq 40$	$0.23 \cdot 8/n$

For Class B equipment

The harmonics of the input current shall not exceed the values given in class A equipment limits multiplied by a factor of 1.5.

For Class C equipment

Harmonic order(n)	Maximum permissible harmonic current expressed as a percentage of the input current at the fundamental frequency %
2	2
3	$30 \cdot \lambda$
5	10
7	7
9	3
$11 \leq n \leq 39$ (odd harmonic only)	$0.23 \cdot 8/n$

Note:  $\lambda$  is the circuit power factor.

For Class D equipment

Harmonic order(n)	Maximum permissible harmonic current per watt mA/W	Maximum permissible harmonic current (A)
3	3.4	2.30
5	1.9	1.14
7	1.0	0.77
9	0.5	0.40
11	0.35	0.33
$13 \leq n \leq 39$ (odd harmonic only)	$3.85/n$	Refer to Class A limit

### 5.6. Voltage Fluctuations & Flicker Limit

Test Item	Limit	Note
Pst	1.0	Pst means Short-term flicker indicator
Plt	0.65	Plt means long-term flicker indicator
Tdt	0.5	Tdt means maximum time that dt exceeds 3.3%
dmax(%)	4%	dmax means maximum relative voltage change.
dc(%)	3.3%	dc means relative steady-state voltage change.

### 5.7. Assistant Equipment used for Test

Assistant equipment	Manufacturer	Model number	Description	other
Adapter	SAMSUNG	EP-TA200	N/A	Input: 100-240~, 50/60Hz, 0.5A; Output: 9V/1.67A or 5V/2A

### 5.8. Test Procedure

#### For Harmonic current test:

The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce the maximum harmonic components under normal operating conditions for each successive harmonic component in turn. The correspondent test program of test instrument to measure the current harmonics emanated from EUT is chosen. The measure time shall be not less than the necessary for the EUT to be exercised.

#### For Voltage fluctuations & flicker

The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce the most unfavorable sequence of voltage changes under normal conditions during the flick measurement; the measure time shall include that part of whole operation changes. The observation period for short-term flicker indicator is 10 minutes and the observation period for long-term flicker indicator is 2 hours.

### 5.9. Test Result

**Harmonic current test result:**

Conform

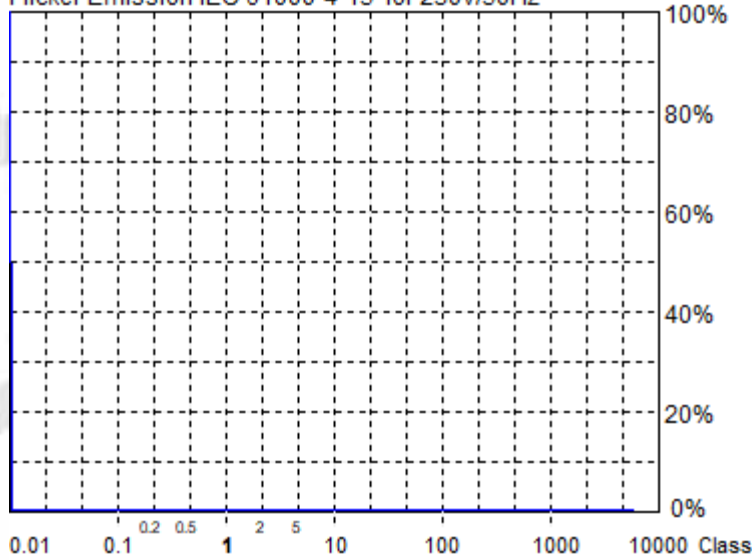
According to clause 7 of EN 61000-3-2, equipment with a rated power of 75W or less, no limits apply. It is considered to conform the requirements of the standard.

**Voltage fluctuations & flicker test result:**

**Flicker Emission - IEC 61000-3-3 , EN 61000-3-3**

Comply: IEC 61000-3-2 Ed.3.0 + Ed.4.0 - IEC 61000-4-7 Ed.2.0

Flicker Emission IEC 61000-4-15 for 230V/50Hz



<b>Actual Flicker (Fli):</b>	<b>0.00</b>
<b>Short-term Flicker (Pst):</b>	<b>0.07</b>
Limit (Pst):	1.00
<b>Long-term Flicker (Plt):</b>	<b>0.07</b>
Limit (Plt):	0.65
<b>Maximum Relative Volt. Change (dmax):</b>	<b>0.00%</b>
Limit (dmax):	4.00%
<b>Relative Steady-state Voltage Change (dc):</b>	<b>0.00%</b>
Limit (dc):	3.30%
<b>Tmax 3.30% (dt):</b>	<b>0.00ms</b>
Limit (dt>Lim):	500ms

**Flicker Emission - IEC 61000-3-3 , EN 61000-3-3**

2021/5/13 11:30:32

Urms = 231.7 V P = 0.638 W  
Irms = 0.004 A pf = 0.684

Range: 0.25 A  
V-nom: 230 V  
TestTime: 10 min (100%)

**Test completed, Result: PASSED**

HAR-1000 EMC-Partner

Full Bar : Actual Values  
Empty Bar : Maximum Values  
Circles : Average Values  
Blue : Current , Green : Voltage , Red : Failed

Operator	Elosky Liu		
Unit	Gaming Wireless Headphone		
Serial Number	QUANTUM350WIRELESS		
Test Mode	Charging mode		
Urms =	231.7V	Freq =	50.000
Irms =	0.004A	Ipk =	0.018A
P =	0.638W	S =	0.933VA
Test - Time :	1 x 10min = 10min		Range: 0.25 A
LIN (Line Impedance Network) :	L: 0.24ohm +j0.15ohm N: 0.16ohm +j0.10ohm		
Limits :	Plt :	0.65	Pst :
	dmax :	4.00 %	dc :
	dtLim:	3.30 %	dt>Lim:
			500ms

Test completed, Result: PASSED

	dmax
	[%]
1	0.000

### 5.10. Test Photo







### 6.5. Test levels and performance criterion

Test Level		Performance Criteria
Air Discharge	$\pm 2\text{kV}$ , $\pm 4\text{kV}$ and $\pm 8\text{kV}$	<b>B</b>
Contact Discharge	$\pm 4\text{kV}$	

Performance criteria B description: During the test, degradation of performance is allowed. However, no change of operating state or stored data is allowed to persist after the test. After the test, the EUT shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed, after the application of the phenomena below a performance level specified by the manufacturer, when the EUT is used as intended.

### 6.6. Assistant Equipment used for Test

Assistant equipment	Manufacturer	Model number	Description	other
Adapter	SAMSUNG	EP-TA200	N/A	Input: 100-240~, 50/60Hz, 0.5A; Output: 9V/1.67A or 5V/2A

### 6.7. Test Procedure

#### Air Discharge:

The test was applied on non-conductive surfaces of EUT. The round discharge tip of the discharge electrode was approached as fast as possible to touch the EUT. After each discharge, the discharge electrode was removed from the EUT. The generator was re-triggered for a new single discharge and repeated 20 times for each pre-selected test point. This procedure was repeated until all the air discharge completed.

#### Contact Discharge:

All the procedure was same as air discharge. Except that the generator was re-triggered for a new single discharge. The tip of the discharge electrode was touching the EUT before the discharge switch was operated.

#### Indirect discharge for horizontal coupling plane:

At least 20 single discharges were applied to the horizontal coupling plane, at points on each side of the EUT. The discharge electrode positions vertically at a distance of 0.1m from the EUT and with the discharge electrode touching the coupling plane.

#### Indirect discharge for vertical coupling plane:

At least 20 single discharges were applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X 0.5m, was placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges were applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.

**6.8. Test Result**

Ambient Condition : <u>23.6</u> °C <u>50.2</u> %RH <u>101.4</u> kPa						
Test Site: DDT 3# Shield Room			Power supply: AC 230V/50Hz			
Test Times: 20 times at each point for contact discharge; 20 times at each point for air discharge.						
Memo:						
Operation Mode	Type of discharge	Test Level	Test Point	Performance		Result (Pass/Fail)
				Required	Observation	
Charging mode	Contact to EUT	±4kV	/	B	A	Pass
	Contact to Coupling Planes	±4kV	Coupling Planes	B	A	Pass
	Air	±2kV, ±4kV, and ±8kV	1,2,3,4,5,6,7,8	B	A	Pass
Test Point:						
No.	Description	No.	Description	No.	Description	
1	Type-C port	4	LED	7	Trumpet	
2	Key	5	Port	8	Gap	
3	Rotary knob	6	MIC	9	USB port	
<b>Observation Description:</b>						
A: Operation as intend, no loss of function during test and after test.						

Photo of ESD point on EUT



6.9. Test Photo





### 7.5. Test levels and performance criterion

Swept frequency test		Performance Criteria
Frequency (MHz)	80 to 1000	<b>A</b>
Field Strength	3V/m rms voltage level of the unmodulated signal	
Modulation	AM modulated to a depth of 80% by a sine wave of <input checked="" type="checkbox"/> 1kHz, <input type="checkbox"/> 400Hz(note 1)	
Step Size	1% increments	
Dwell time	< 5 Sec.	

Spot frequency test		Performance Criteria
Frequency (MHz)	1800, 2600, 3500, 5000	<b>A</b>
Field Strength	3V/m rms voltage level of the unmodulated signal	
Modulation	AM modulated to a depth of 80% by a sine wave of <input checked="" type="checkbox"/> 1kHz, <input type="checkbox"/> 400Hz(note 1)	
Dwell time	< 5 Sec.	

Note 1: The 1kHz modulation may be replaced by a different audio modulation frequency more appropriate for a given EUT if, for example, 1kHz is not within the operating audio range of the EUT.

Performance criteria A description for devices with the audio output function: The measured acoustic interference ratio and/or the measured electrical interference ratio during the test shall be -20 dB or better.

For equipment with audio output function:

- The acoustic measurement method was selected according to clause G6.4.1 of EN 55035.  
 The electrical measurement method was selected according to clause G6.4.2 of EN 55035.

Performance criteria A for devices with the telephony function.

Frequency range MHz	Acoustic or electrical interference ratio	Equivalent direct measurement		
		dB(SPL)	Digital dBm0	Analogue dBm0
80 to 1000	-0 dB	75	-30	-30

Note: At the step in the frequency range, the lower limit shall be applied.

The interference ratio (electrical or acoustic) shall meet the limits in column 2; or,  
The acoustic level of the demodulated audio shall be less than the limits in column 3; or  
The digitally coded level of demodulated audio shall be less than limits in column 4; or,  
The analogue level of the demodulated audio shall be less than the limits in column 5.

Performance criteria A description for other devices: During and after the test the EUT shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a minimum performance level specified by the manufacturer when the EUT is used as intended.

### 7.6. Assistant Equipment used for Test

Assistant equipment	Manufacturer	Model number	Description	other
Adapter	SAMSUNG	EP-TA200	N/A	Input: 100-240~, 50/60Hz, 0.5A; Output: 9V/1.67A or 5V/2A

**7.7. Test Procedure**

The field sensor is placed on the EUT table (0.8 meter above the ground) which is 3 meters away from the transmitting antenna. Through the signal generator, power amplifier and transmitting antenna to produce a uniformity field strength (3V/m measured by field sensor) around the EUT table from frequency range specified and records the signal generator’s output level at the same time for whole measured frequency range. Then, put EUT and its simulators on the EUT turn table and keep them 3 meters away from the transmitting antenna which is mounted on an antenna tower and fixes at 1 meter height above the ground. Using the recorded signal generator’s output level to measure the EUT from frequency range specified and both horizontal & vertical polarization of antenna must be set and measured. Each of the four sides of EUT must be faced this transmitting antenna and measures individually.

**7.8. Test Result**

Ambient Condition : <u>  23.5  </u> °C <u>  45.5  </u> %RH <u>  101.4  </u> kPa						
Power supply: <u>AC 230V/50Hz</u>						
Field Strength : <input checked="" type="checkbox"/> 3V/m <input type="checkbox"/> 10V/m Steps: <input checked="" type="checkbox"/> 1% <input type="checkbox"/> other: Dwell time: <input checked="" type="checkbox"/> 1s <input type="checkbox"/> other:						
Swept Frequency Range: <input checked="" type="checkbox"/> 80MHz---1GHz; <input checked="" type="checkbox"/> 1800MHz, 2600MHz, 3500MHz, 5000MHz; <input type="checkbox"/> other:						
Modulation : <input type="checkbox"/> None <input checked="" type="checkbox"/> AM <input checked="" type="checkbox"/> 1kHz <input type="checkbox"/> 400Hz Modulation depth: <input checked="" type="checkbox"/> 80% <input type="checkbox"/> other:						
Memo:						
Operation Mode	EUT Position towards antenna	Antenna: Horizontal		Antenna: Vertical		Result (Pass/Fail)
		Required	Observation	Required	Observation	
Charging mode	Front	A	A	A	A	Pass
	Right	A	A	A	A	Pass
	Rear	A	A	A	A	Pass
	Left	A	A	A	A	Pass
A: Normal performance within limits specified by the manufacturer requestor or purchaser.						

7.9. Test Photo







### 8.5. Test levels and performance criterion

Test Level			Performance Criteria
Test voltage	±1kV For AC mains Port	±0.5kV for dc input or signal Port	B
Repetition Frequency	5kHz	5kHz	
Burst Duration	15ms	15ms	
Burst Period	300ms	300ms	
Inject Time(s)	120s	120s	
Inject Method	Direct For AC mains port	Direct For signal port Direct For dc input port	
Inject Line	AC Mains of adapter	DC input of adapter or Capacitive coupling clamp	

Note: This test shall be additionally performed on analogue/digital data ports, and DC network power ports, of radio equipment and associated ancillary equipment, if the cables may be longer than 3 m.

Performance criteria B description: During the test, degradation of performance is allowed. However, no change of operating state or stored data is allowed to persist after the test. After the test, the EUT shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed, after the application of the phenomena below a performance level specified by the manufacturer, when the EUT is used as intended.

### 8.6. Assistant Equipment used for Test

Assistant equipment	Manufacturer	Model number	Description	other
Adapter	SAMSUNG	EP-TA200	N/A	Input: 100-240~, 50/60Hz, 0.5A; Output: 9V/1.67A or 5V/2A

### 8.7. Test Procedure

The EUT and its simulators were placed on the ground reference plane and were insulated from it by a wood support 0.1m ± 0.01m thick. The ground reference plane was 1m\*1m metallic sheet with 0.65mm minimum thickness. This reference ground plane was project beyond the EUT by at least 0.1m on all sides and the minimum distance between EUT and all other conductive structure, except the ground plane was more than 0.5m. All cables to the EUT was placed on the wood support, cables not subject to EFT/B was routed as far as possible from the cable under test to minimize the coupling between the cables.

For DC input and AC power ports:

The EUT was connected to the power mains by using a coupling device that couples the EFT interference signal to AC power lines. Both positive transients and negative transients of test voltage were applied during compliance test and the duration of the test can't less than 2mins.

For signal ports:

The capacitive coupling clamp was connected to the power by using a coupling device that couples the EFT interference signal to capacitive coupling clamp. Both positive transients and negative transients of test voltage were applied during compliance test and the duration of the test can't less than 2mins.

**8.8. Test Result**

Ambient Condition : <u>23.3</u> °C <u>42.1</u> %RH <u>101.4</u> kPa						
Test Site: DDT 4# Shield Room                      Power supply: AC 230V/50Hz						
Port: <input checked="" type="checkbox"/> AC Mains <input type="checkbox"/> DC Supply <input type="checkbox"/> Signal:    Burst Period: <input checked="" type="checkbox"/> 300ms <input type="checkbox"/> Other:						
Coupling: <input checked="" type="checkbox"/> Direct <input type="checkbox"/> Capacitive Clamp			Test Time: <input checked="" type="checkbox"/> 120S <input type="checkbox"/> Other:			
Repetition Frequency: <input checked="" type="checkbox"/> 5kHz <input type="checkbox"/> 100kHz			Burst Duration: <input checked="" type="checkbox"/> 15ms <input type="checkbox"/> Other:			
Memo:						
Operation Mode	Line/port	Test Voltage	Performance			Result (Pass/Fail)
			Required	Observation(+)	Observation(-)	
Charging mode	L	1kV	B	A	A	Pass
	N	1kV	B	A	A	Pass
	L-N	1kV	B	A	A	Pass
Observation Description: A: Operation as intend, no loss of function during test and after test.						

**8.9. Test Photo**





Note: Applicable only to ports which, according to the manufacturer's specification, the cable lengths greater than 3m.

DC network power port		Performance Criterion
Line to reference ground	0.5 kV 1.2/50(8/20) $\mu$ s	B

Note: Applicable only to ports which, according to the manufacturer's specification, 1. The cable lengths greater than 3m; 2. May connect directly to outdoor cables.

Performance criteria B description: During the test, degradation of performance is allowed. However, no change of operating state or stored data is allowed to persist after the test. After the test, the EUT shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed, after the application of the phenomena below a performance level specified by the manufacturer, when the EUT is used as intended.

### 9.6. Assistant Equipment used for Test

Assistant equipment	Manufacturer	Model number	Description	other
Adapter	SAMSUNG	EP-TA200	N/A	Input: 100-240~, 50/60Hz, 0.5A; Output: 9V/1.67A or 5V/2A

### 9.7. Test Procedure

For line-to-neutral coupling mode, provide a 0.5 kV/1 kV 1.2/50 us voltage surge (at open-circuit condition) and 8/20 us current surge to EUT selected points.

For line-to-ground coupling mode, provide a 0.5 kV/1 kV/2 kV 1.2/50 us voltage surge (at open-circuit condition) and 8/20 us current surge to EUT selected points.

The number of pulses applied shall be as follows:

- Five positive pulses line-to-neutral at 90° phase
- Five negative pulses line-to-neutral at 270° phase

The following additional pulses are required only if the EUT has an earth connection or if the EUT is earthed via any AE.

- Five positive pulses line-to-earth at 90° phase
- Five negative pulses line-to-earth at 270° phase
- Five negative pulses neutral-to-earth at 90° phase
- Five positive pulses neutral-to-earth at 270° phase

Maximum 1/min repetition rate are applied during test.

Different phase angles are done individually.

For telecommunication surge test, each line of internet port to ground coupling mode, provide a 1.0kV 10/700us voltage surge (at open-circuit condition) and 5/320us current surge to EUT selected points.

At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are applied during test.

Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.

**9.8. Test Result**

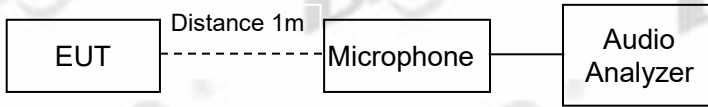
Ambient Condition : <u>  23.3  </u> °C <u>  42.1  </u> %RH <u>  101.4  </u> kPa											
Test Site: DDT 3# Shield Room						Power supply: AC 230V/50Hz					
Line : <input checked="" type="checkbox"/> AC Mains <input type="checkbox"/> DC Supply <input type="checkbox"/> Signal											
Wave Type: <input checked="" type="checkbox"/> 1.2/50us-8/20us <input type="checkbox"/> 10/700 us-5/320us											
Pluse times: <input checked="" type="checkbox"/> five positive pluses at 90°phase, five negative pluses at 270°phase. <input type="checkbox"/> five positive pluses and five negative pluses.											
Pulse Interval: 60S											
Memo:											
Operation Mode	Line/Port	0.5kV			1kV			2kV			Result  (Pass/Fail)
		Performance			Performance			Performance			
		Required	+	-	Required	+	-	Required	+	-	
Charging mode	L-N	B	A	A	B	A	A	/	/	/	Pass
Observation Description: A: Operation as intend, no loss of function during test and after test.											

**9.9. Test Photo**

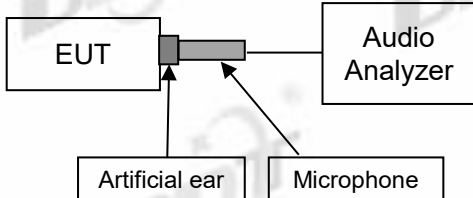




For audio output function (acoustic measurement)



For audio output function (on-ear acoustic measurement)



### 10.5. Test levels and Performance Criterion

Test Level		Performance Criteria
Frequency and Field Strength	0.15MHz to 10MHz, 3V rms voltage level of the unmodulated signal	<b>A</b>
	10MHz to 30MHz, 3V to 1V rms voltage level of the unmodulated signal	
	30MHz to 80MHz, 1V rms voltage level of the unmodulated signal	
Modulation	AM modulated to a depth of 80% by a sine wave of <input checked="" type="checkbox"/> 1kHz, <input type="checkbox"/> 400Hz (note 1)	
Step Size	1% increments	
Dwell time	1 Sec.	

Note 1: The 1kHz modulation may be replaced by a different audio modulation frequency more appropriate for a given EUT if, for example, 1kHz is not within the operating audio range of the EUT.

Performance criteria A description for devices with the audio output function: The measured acoustic interference ratio and/or the measured electrical interference ratio during the test shall be -20 dB or better.

- The acoustic measurement method was selected according to clause G6.4.1 of EN 55035.
- The electrical measurement method was selected according to clause G6.4.2 of EN 55035.

Performance criteria A for devices with the telephony function.

Frequency range MHz	Acoustic or electrical interference ratio	Equivalent direct measurement		
		dB(SPL)	Digital dBm0	Analogue dBm0
0.15 to 30	-20 dB	55	-50	-50
30 to 80	-10 dB	65	-40	-40

Note: At the step in the frequency range, the lower limit shall be applied.

- The interference ratio (electrical or acoustic) shall meet the limits in column 2; or,
- The acoustic level of the demodulated audio shall be less than the limits in column 3; or
- The digitally coded level of demodulated audio shall be less than limits in column 4; or,
- The analogue level of the demodulated audio shall be less than the limits in column 5.

Performance criteria A description for other devices: During and after the test the EUT shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a minimum performance level specified by the manufacturer when the EUT is used as intended.

**10.6. Assistant Equipment used for Test**

Assistant equipment	Manufacturer	Model number	Description	other
Adapter	SAMSUNG	EP-TA200	N/A	Input: 100-240~, 50/60Hz, 0.5A; Output: 9V/1.67A or 5V/2A

**10.7. Test Procedure**

The EUT are placed on an insulating support 0.1m high above a ground reference plane. CDN (coupling and decoupling device) is placed on the ground plane about 0.3m from EUT. Cables between CDN and EUT are as short as possible, and their height above the ground reference plane shall be between 30 and 50 mm (where possible).

The disturbance signal described below is injected to EUT through CDN.

The EUT operates within its operational mode(s) under intended climatic conditions after power on. The frequency range is swept from 0.150MHz to 80MHz/230MHz, the interference signal level according to clause 10.5, and with the disturbance signal 80% amplitude modulated with a 1kHz / 400Hz sine wave.

The rate of sweep shall not exceed  $1.5 \times 10^{-3}$  decades/s. Where the frequency is swept incrementally; the step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value.

Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion.

**10.8. Test Result**

Ambient Condition : <u>23.0</u> °C <u>50.0</u> %RH <u>101.4</u> kPa						
Test Site: DDT 4# Shield Room      Power supply: AC 230V/50Hz						
Modulation Signal: <input checked="" type="checkbox"/> 1kHz <input type="checkbox"/> 400Hz 80% AM <input type="checkbox"/> Other:						
Steps: <input checked="" type="checkbox"/> 1% <input type="checkbox"/> other: Dwell time: <input checked="" type="checkbox"/> 1s <input type="checkbox"/> other:						
Memo:						
Operation mode	Frequency Range	Injected Position	Strength(e.m.f) (unmodulated)	Required	Observation	Result (Pass/Fail)
Charging mode	0.15MHz-10MHz	AC port	3V	A	A	Pass
	10MHz-30MHz		3V-1V	A	A	Pass
	30MHz-80MHz		1V	A	A	Pass
Observation Description: A: Operation as intend, no loss of function during test and after test.						



**10.9. Test Photo**



## 11. Power-Frequency Magnetic Fields

### 11.1. General Information

Test and report Engineer	: Elosky Liu
Test and report Date	: May 12, 2021

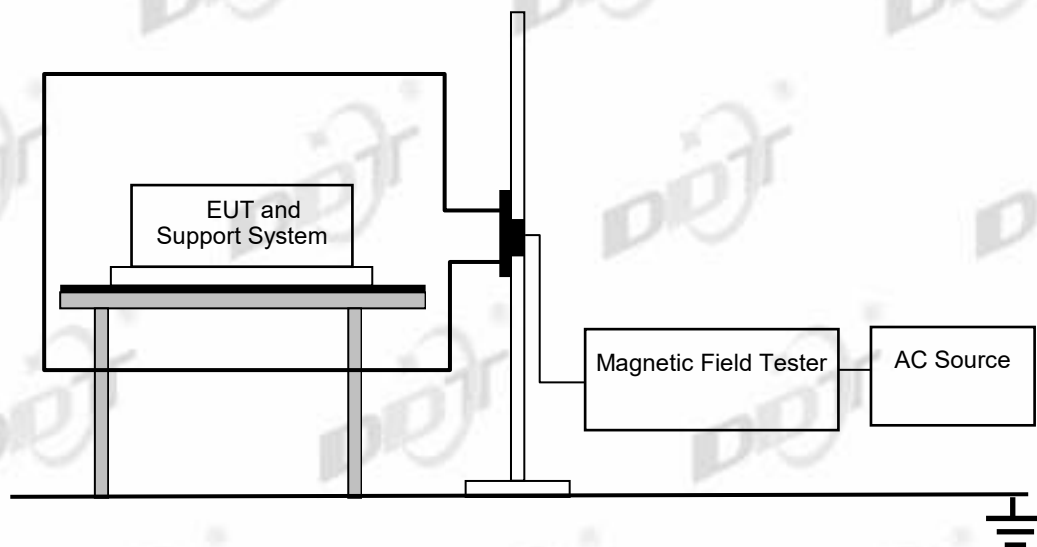
### 11.2. Test Equipment

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
Generator	EMC PARTNER	TRA3000F	TRA3000F-1502	Jul. 01, 2020	1 Year
Magnetic Field Tester	EMC-PARTNER	MF1000-1	207	Jul. 01, 2020	1 Year

### 11.3. Test and Reference Standards

EN 55035:2017, EN 61000-4-8:2010

### 11.4. Block Diagram of Test Setup



### 11.5. Test levels and performance criterion

Level	Magnetic Field Strength (A/m)	Performance Criterion
1	1	A

Performance criteria A description: During and after the test the EUT shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a minimum performance level specified by the manufacturer when the EUT is used as intended.

**11.6. Assistant Equipment used for Test**

Assistant equipment	Manufacturer	Model number	Description	other
Adapter	SAMSUNG	EP-TA200	N/A	Input: 100-240~, 50/60Hz, 0.5A; Output: 9V/1.67A or 5V/2A

**11.7. Test Procedure**

The EUT shall be subjected to the test magnetic field by using the induction coil of standard dimensions (1m\*1m) and shown in Section 11.4 Then induction coil shall then be rotated by 90° in order to expose the EUT to the test field with different orientations.

**11.8. Test Result**

Ambient Condition : <u>23.3</u> °C <u>45.5</u> %RH <u>101.4</u> kPa						
Test Site: DDT 4# Shield Room      Power supply: AC 230V/50Hz						
Memo:						
Operation Mode	Test Level	Testing Duration	Coil Orientation	Required	Observation	Result (Pass/Fail)
Charging mode	1A/m	5 min / coil	X	A	A	Pass
	1A/m	5 min / coil	Y	A	A	Pass
	1A/m	5 min / coil	Z	A	A	Pass
Observation Description: A: Operation as intend, no loss of function during test and after test.						

### 11.9. Test Photo





**12.6. Assistant Equipment used for Test**

Assistant equipment	Manufacturer	Model number	Description	other
Adapter	SAMSUNG	EP-TA200	N/A	Input: 100-240~, 50/60Hz, 0.5A; Output: 9V/1.67A or 5V/2A

**12.7. Test Procedure**

The EUT and test generator were setup as shown. The interruptions are introduced at selected phase angles with specified duration. Record any degradation of performance.

**12.8. Test Result**

Ambient Condition : <u>23.5</u> °C <u>45.5</u> %RH <u>101.4</u> kPa						
Test Site: DDT 4# Shield Room			Power supply: <u>AC 100V/60Hz</u>			
Memo:						
Operation Mode	Voltage Dips & Interruptions %Ur	Duration (in period)	Phase Angle	Required	Observation	Result (Pass/Fail)
Charging mode	0	0.5P	0°, 180°	B	A	Pass
	70	30P	0°, 180°	C	A	Pass
	0	300P	0°, 180°	C	B	Pass
<b>Observation Description:</b> A: Operation as intend, no loss of function during test and after test. B: EUT will stop charging and can recover by itself after test.						

Ambient Condition : <u>23.5</u> °C <u>45.5</u> %RH <u>101.4</u> kPa						
Test Site: DDT 4# Shield Room			Power supply: <u>AC 240V/50Hz</u>			
Memo:						
Operation Mode	Voltage Dips & Interruptions %Ur	Duration (in period)	Phase Angle	Required	Observation	Result (Pass/Fail)
Charging mode	0	0.5P	0°, 180°	B	A	Pass
	70	25P	0°, 180°	C	A	Pass
	0	250P	0°, 180°	C	B	Pass
<b>Observation Description:</b> A: Operation as intend, no loss of function during test and after test. B: EUT will stop charging and can recover by itself after test.						

### 12.9. Test Photo



### 13. Photos of the EUT





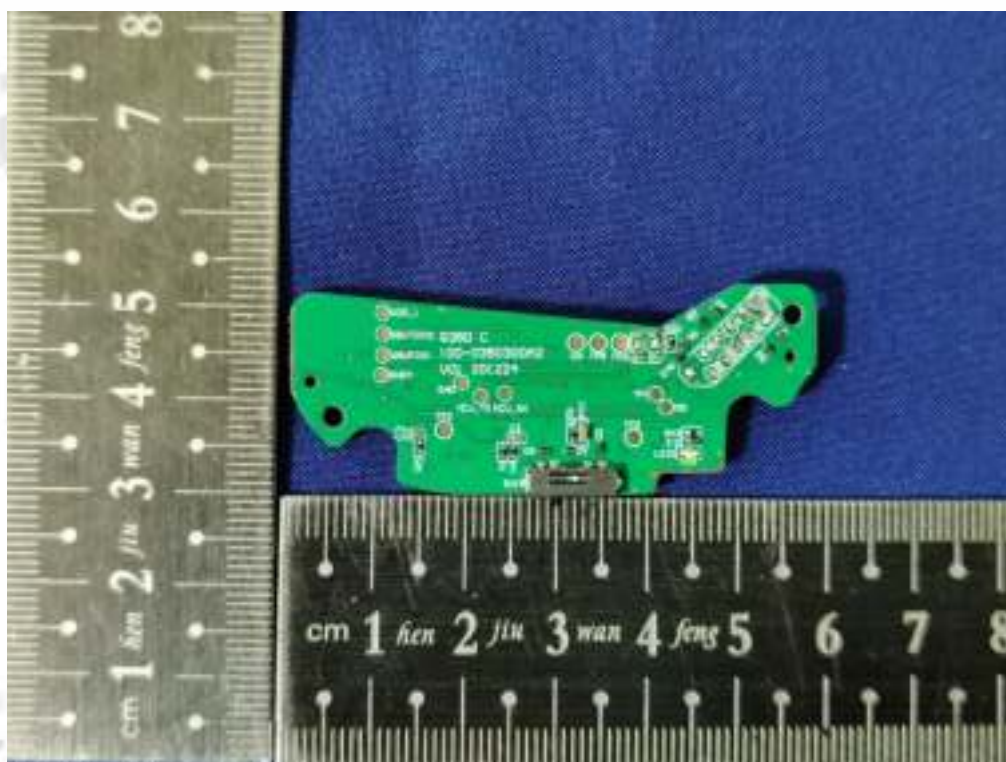
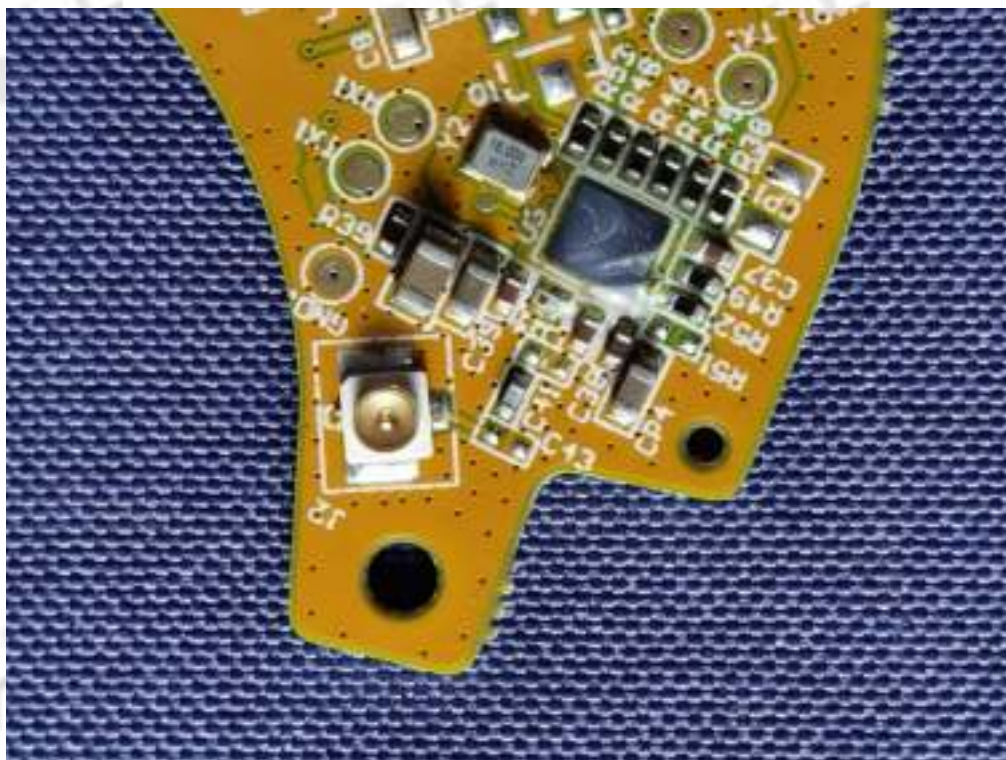


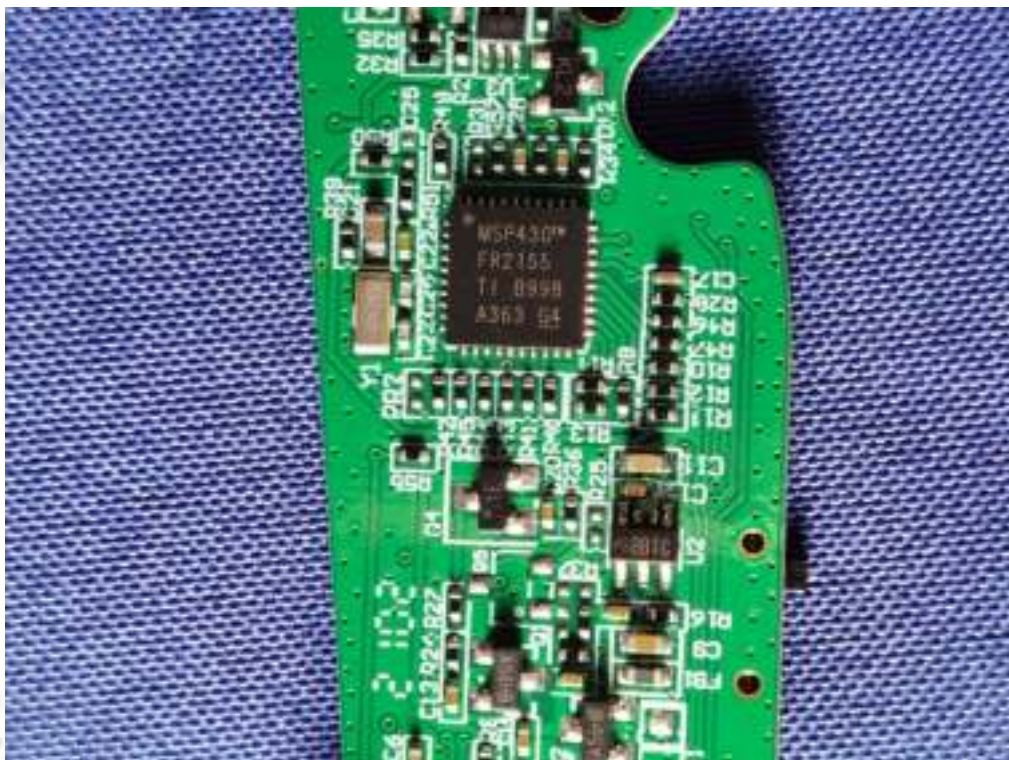
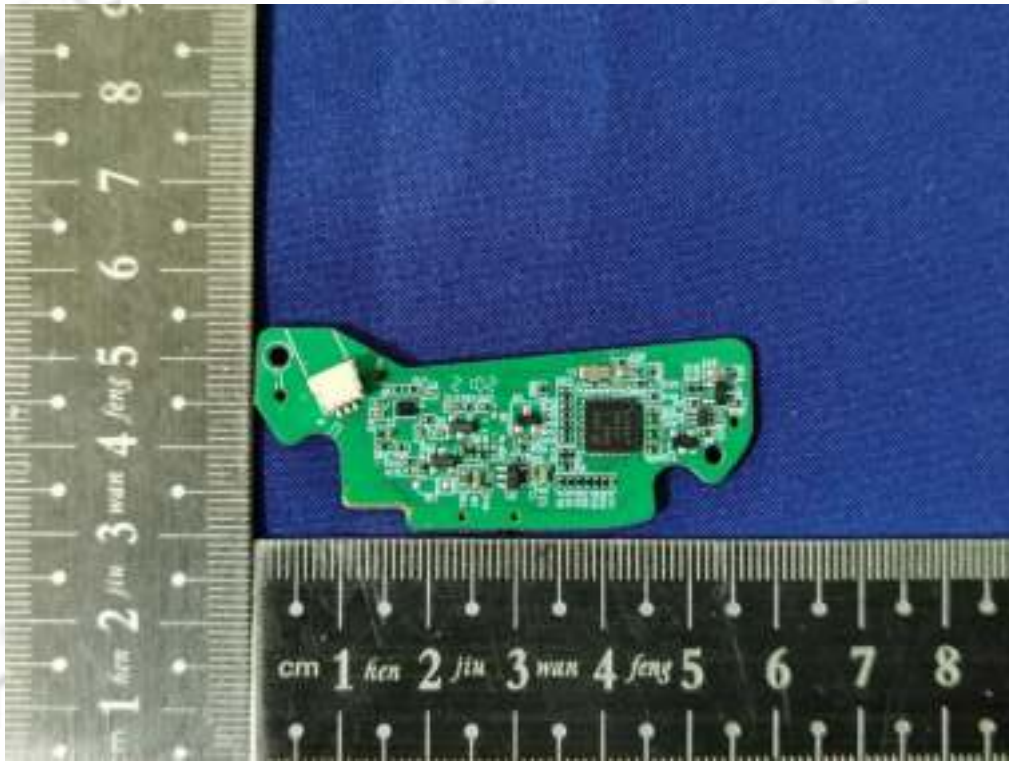


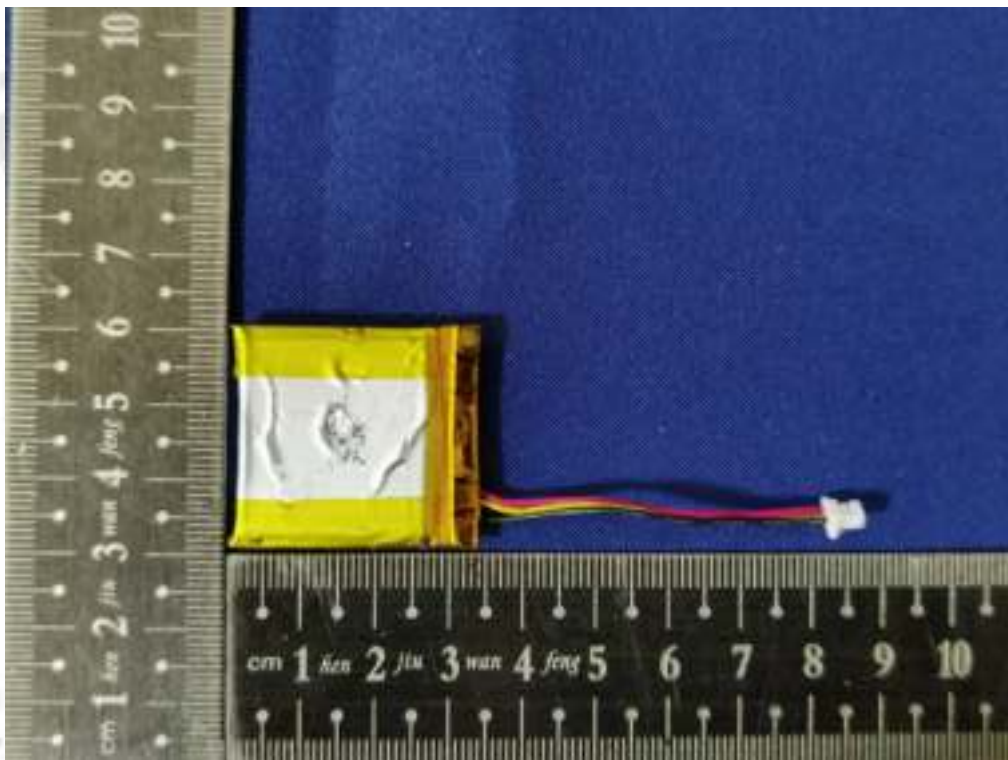




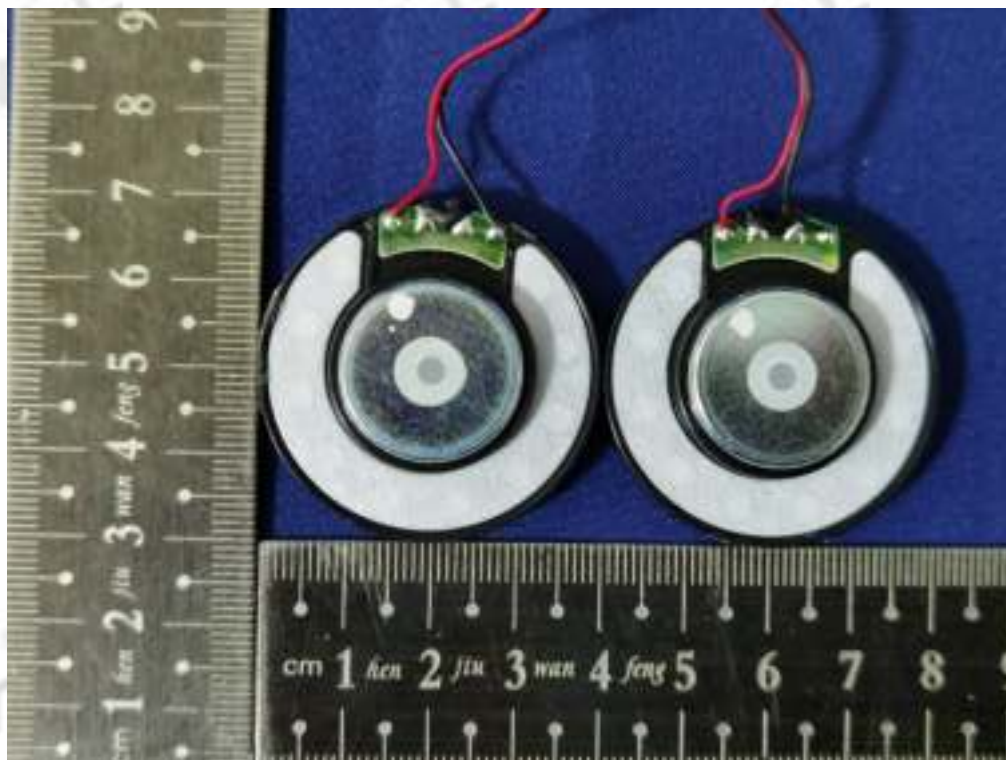


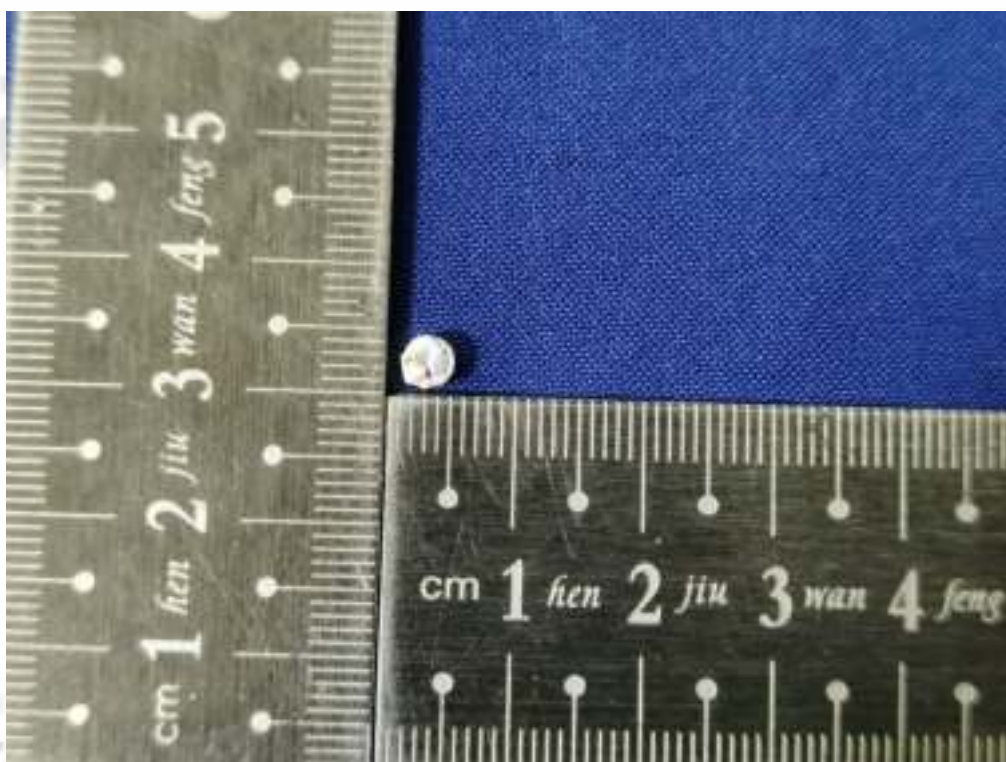


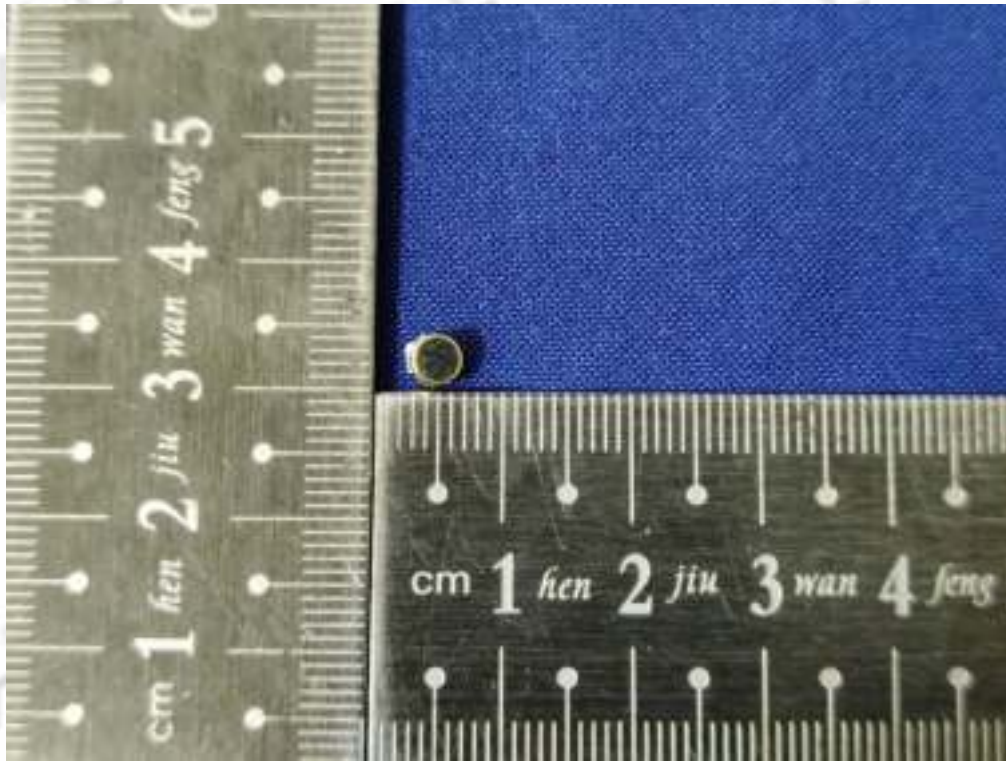




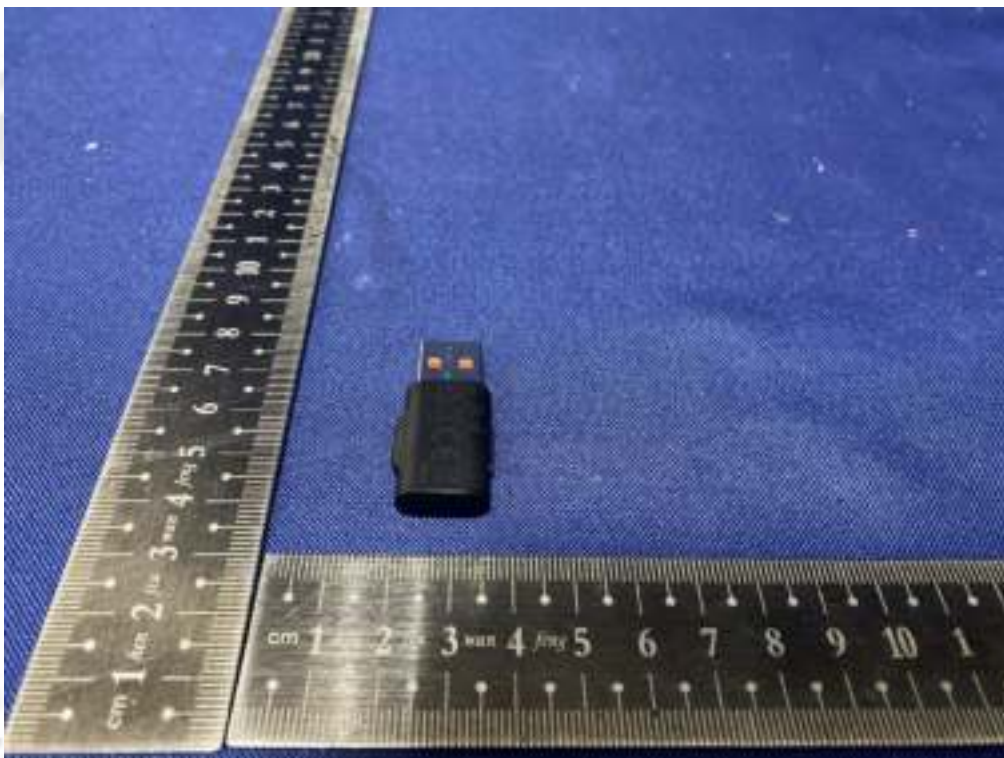


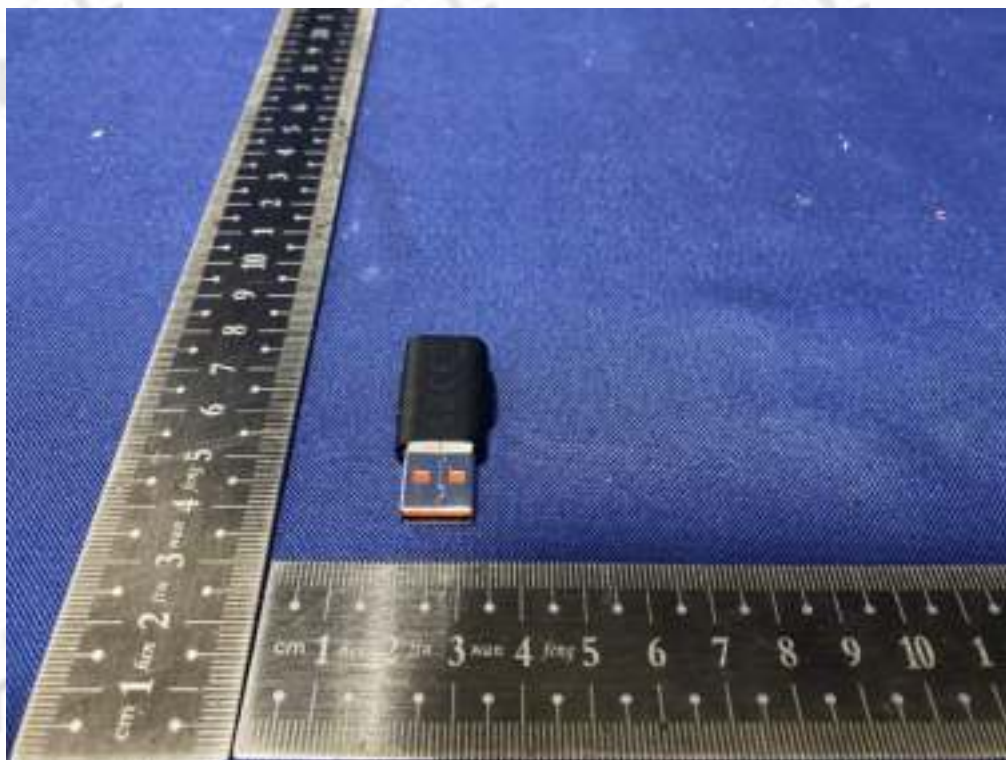


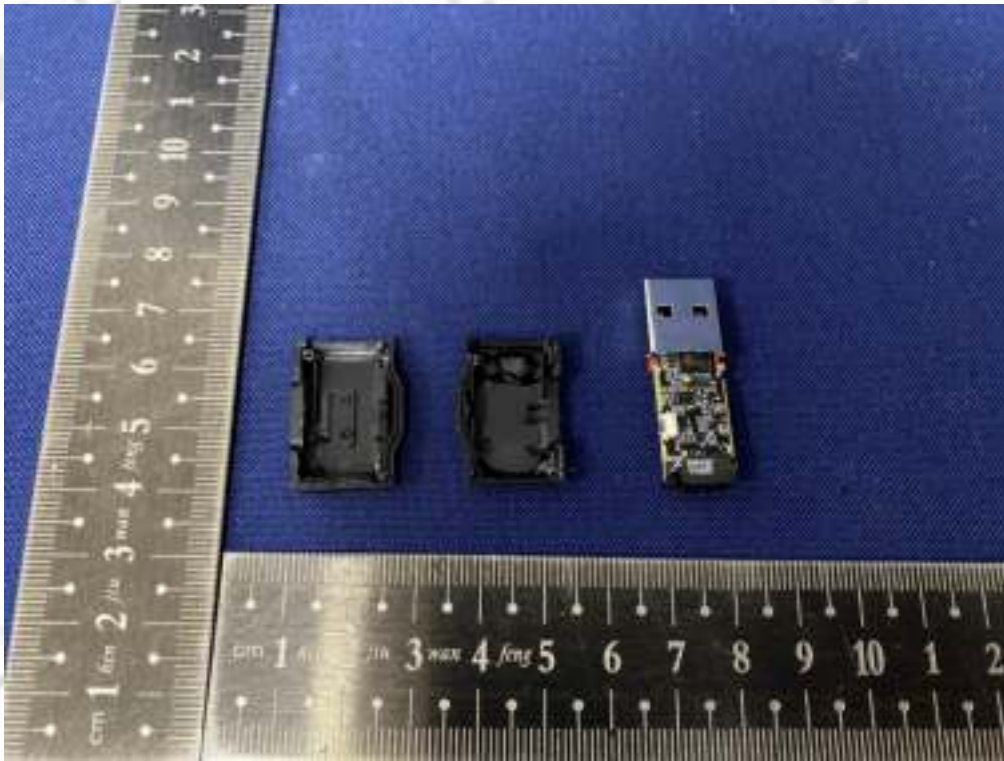


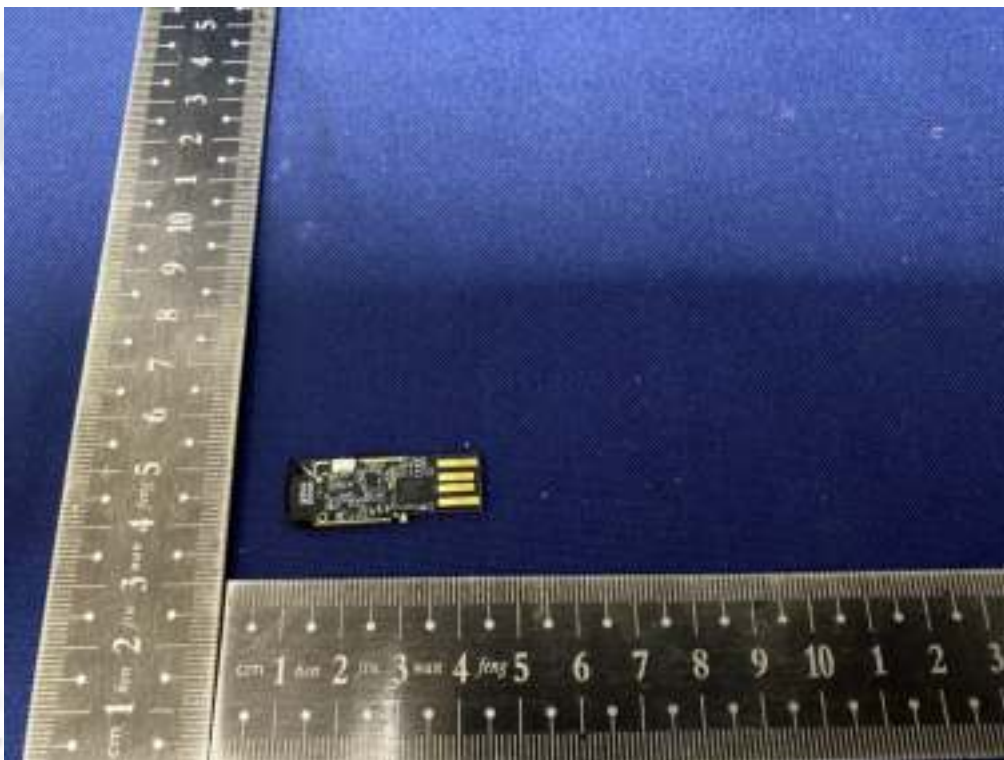
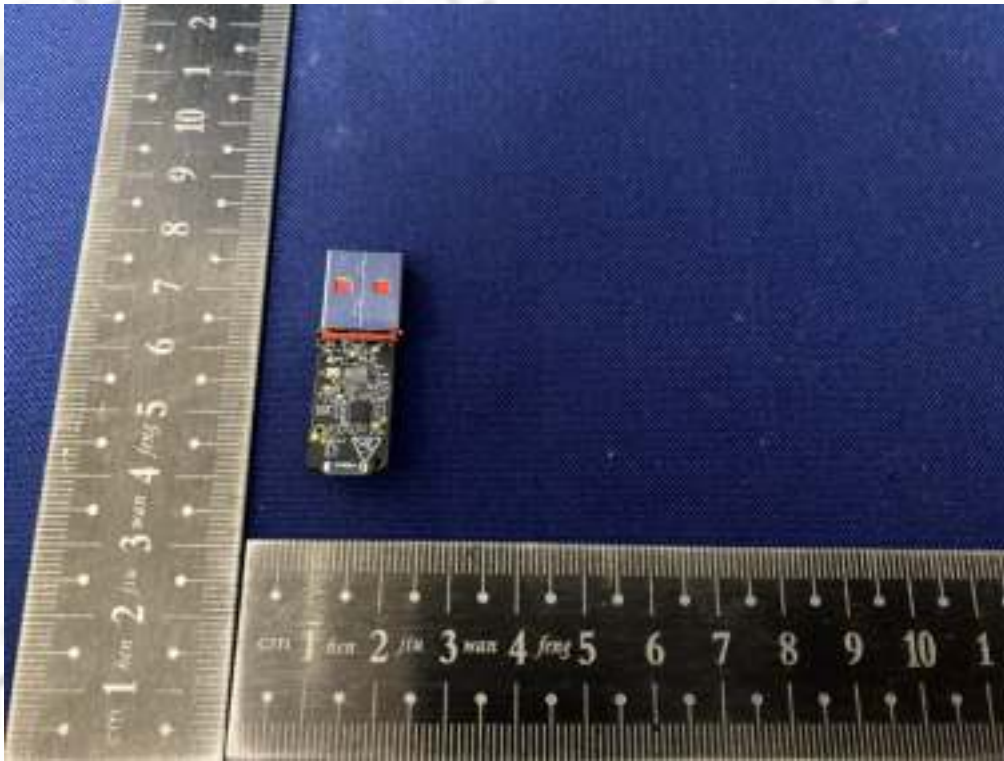




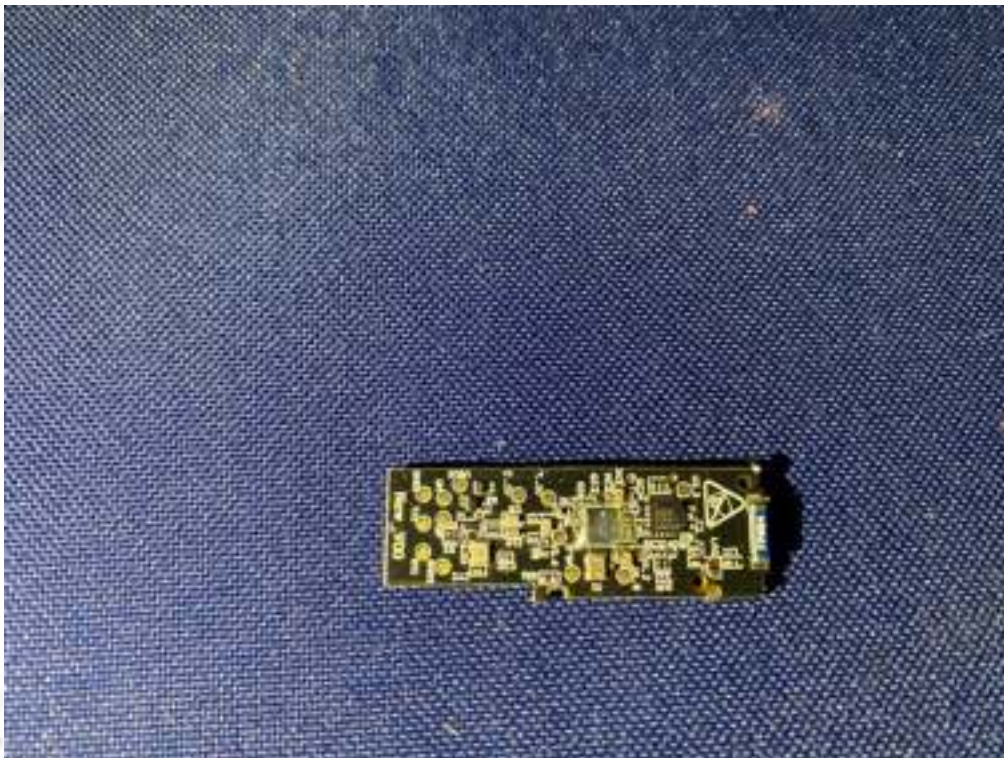
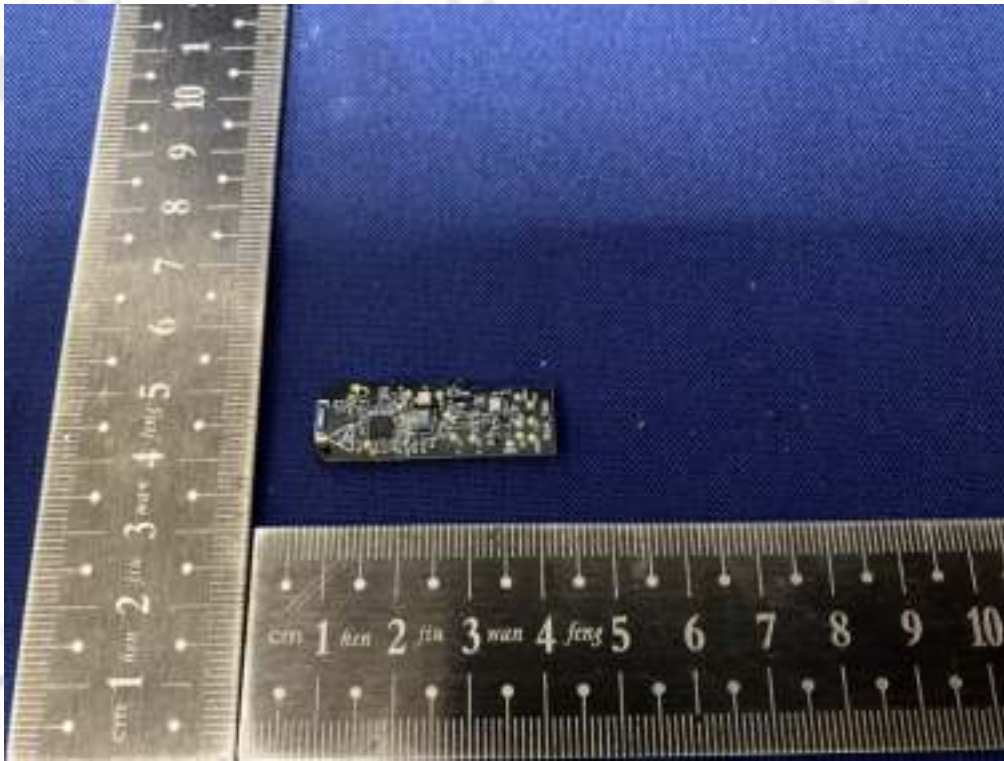


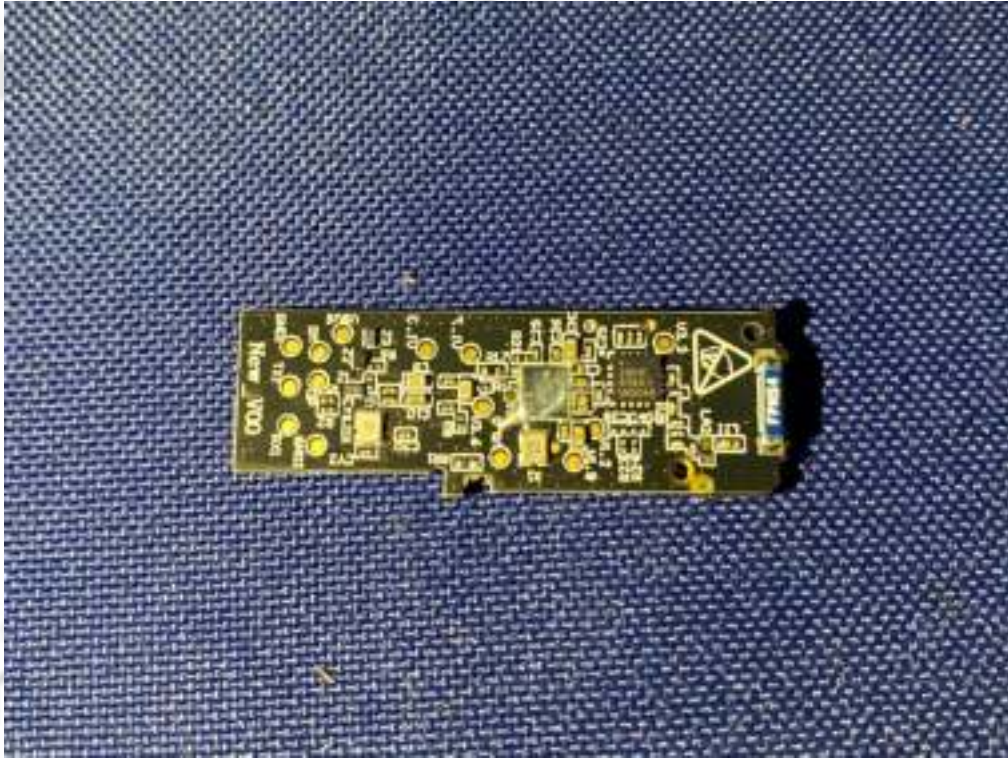












**END OF REPORT**