

# TEST REPORT

EMI Test for FCC Certification of CAI+ Model

**APPLICANT**

BrainU Co., Ltd.

**REPORT NO.**

HCT-EM-2309-FC001

**DATE OF ISSUE**

September 18, 2023

**Tested by**

Gyeong-Seon Kim

(signature)

**Technical Manager**

Jeong-Hyun Choi

(signature)

**HCT CO., LTD.**

*Bongjai Huh*

**BongJai Huh / CEO**

**HCT Co., Ltd.**

74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383 KOREA

Tel. +82 31 645 6300 Fax. +82 31 645 6401



**HCT Co., Ltd.**

74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383 KOREA  
Tel. +82 31 645 6300 Fax. +82 31 645 6401

# TEST REPORT

EMI Test for  
FCC Certification

**REPORT NO.**

HCT-EM-2309-FC001

**DATE OF ISSUE**

September 18, 2023

**FCC ID.**

2BBOF-CAIPLUS

**Applicant**

**BrainU Co., Ltd.**

3F, 7, Yatap-ro 105beon-gil, Bundang-gu, Seongnam-si, Gyeonggi-do,  
Republic of Korea

**Product Name**  
**Model Name**

Depth of Anesthesia Monitoring System  
CAI+

**Date of Test**

September 07, 2023 to September 11, 2023

**Test Standard Used**

FCC CFR 47 PART 15 Subpart B Class A  
ANSI C63.4-2014

**Test Results**

Refer to the present document

**Manufacturer**

BrainU Co., Ltd.

The result shown in this test report refer only to the sample(s) tested unless  
otherwise stated.  
This test results were applied only to the test methods required by the standard.

## REVISION HISTORY

The revision history for this test report is shown in table.

Revision No.	Date of Issue	Description
0	September 18, 2023	Initial Release

The above Test Report is not related to the accredited test result by (KS Q) ISO/IEC 17025 and KOLAS(Korea Laboratory Accreditation Scheme), which signed the ILAC-MRA.

If this report is required to confirmation of authenticity, please contact to [www.hct.co.kr](http://www.hct.co.kr)



## CONTENTS

1. GENERAL INFORMATION	5
1.1 Description of EUT	5
1.2 Tested System Details	5
1.3 Cable Description	6
1.4 Noise Suppression Parts on Cable (I/O Cable)	7
1.5 Test Facility	8
1.6 Calibration of Measuring Instrument	8
1.7 Measurement Uncertainty	8
2. DESCRIPTION OF TESTING	9
2.1 Measurement of Conducted Emission	9
2.2 Configuration of Tested System	12
3. OPERATION OF THE EUT	13
4. MEASURING INSTRUMENTS	14
5. EMISSION TEST SUMMARY	15
5.1 Conducted Emission	15
5.2 Radiated Emission Below 1 GHz	20
5.3 Radiated Emission Above 1 GHz	22
6 APPENDIX A. TEST SETUP PHOTO	25

## 1. GENERAL INFORMATION

### 1.1 Description of EUT

FCC ID	2BBOF-CAIPLUS
Product Name	Depth of Anesthesia Monitoring System
Model Name	CAI+
Internal Clock	Main processor maximum operation clock: 100 MHz Wireless transceiver input clock: 32 MHz
Frequency Range	Bluetooth: 2 402 MHz to 2 480 MHz
Power Voltage	AC 100 to 240 V, 0.5 A Battery: DC 3.7 V, 2 000 mAh
Manufacturer	BrainU Co., Ltd.

### 1.2 Tested System Details

All equipment descriptions used in the tested system (including inserted cards) are:

Device Type	Model Name	Serial Number	Manufacturer
Depth of Anesthesia Monitoring System	CAI+	-	BrainU Co., Ltd.
Medical Power Supply*	BM010S05F	-	Bridge Power Corp.
Arbitrary Function Generator	AFG-2225	-	GWINSTEK
Sensor Cable	-	-	BrainU Co.,Ltd
Electrodes for scalp brain waves	CAIs	-	Hurev
Tablet PC	SM-T295N	-	SAMSUNG

\*Input: AC 100-240 V, 0.5 A, Output: DC 5 V, 2.0 A

### 1.3 Cable Description

[Adapter] Bluetooth + Sensor Cable Mode

Product Name	Port	Power Cord Shielded (Y/N)	I/O Cable Shielded (Y/N)	Length (m)
EUT	Charge/Data	N	N	1.8
	Sensor	N	N	1.0
Sensor Cable	4 Port	N	N	1.5

[Adapter] Bluetooth + Electrodes for scalp brain waves Mode

Product Name	Port	Power Cord Shielded (Y/N)	I/O Cable Shielded (Y/N)	Length (m)
EUT	Charge/Data	N	N	1.8
	Sensor	N	N	1.0
Electrodes for scalp brain waves	4 Port	N	N	1.5

[Battery] Bluetooth + Sensor Cable Mode

Product Name	Port	Power Cord Shielded (Y/N)	I/O Cable Shielded (Y/N)	Length (m)
EUT	Sensor	N	N	1.0
Sensor Cable	4 Port	N	N	1.5

[Battery] Bluetooth + Electrodes for scalp brain waves Mode

Product Name	Port	Power Cord Shielded (Y/N)	I/O Cable Shielded (Y/N)	Length (m)
EUT	Sensor	N	N	1.0
Electrodes for scalp brain waves	4 Port	N	N	1.5

#### 1.4 Noise Suppression Parts on Cable (I/O Cable)

[Adapter] Bluetooth + Sensor Cable Mode

Product Name	Port	Ferrite Bead (Y/N)	Location	Metal Hood (Y/N)	Location
EUT	Charge/Data	Y	End of EUT	Y	Both
	Sensor	N	N	Y	Both
Sensor Cable	4 Port	N	N	N	N

[Adapter] Bluetooth + Electrodes for scalp brain waves Mode

Product Name	Port	Ferrite Bead (Y/N)	Location	Metal Hood (Y/N)	Location
EUT	Charge/Data	Y	End of EUT	Y	Both
	Sensor	N	N	Y	Both
Electrodes for scalp brain waves	4 Port	N	N	N	N

[Battery] Bluetooth + Sensor Cable Mode

Product Name	Port	Ferrite Bead (Y/N)	Location	Metal Hood (Y/N)	Location
EUT	Sensor	N	N	Y	Both
Sensor Cable	4 Port	N	N	N	N

[Battery] Bluetooth + Electrodes for scalp brain waves Mode

Product Name	Port	Ferrite Bead (Y/N)	Location	Metal Hood (Y/N)	Location
EUT	Sensor	N	N	Y	Both
Electrodes for scalp brain waves	4 Port	N	N	N	N

## 1.5 Test Facility

Test site is located at 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Korea.

Those measurement facilities are constructed in conformance with the requirements of ANSI C63.4-2014.

The Normalized site attenuations (30 MHz to 1 GHz) and Site validation (1 GHz to 18 GHz) were performed in accordance with the standard in ANSI C63.4-2014 and ANSI C63.4a-2017

Our laboratories are accredited and designated in accordance with the provisions of Radio Waves ACT and International Standard ISO/IEC 17025:2017. (National Radio Research Agency, CABID No. KR0032)

## 1.6 Calibration of Measuring Instrument

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturers recommendations for utilizing calibration equipment, which is traceable to

recognized national standards. Especially, all antenna for measurement is calibrated in accordance with the requirements of C63.5:2017

## 1.7 Measurement Uncertainty

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.4-2014. All measurement uncertainty values are shown with a coverage factor of  $k = 2$  to indicate a 95 % level of confidence. The measurement data shown herein meets or exceeds the  $U_{CISPR}$  measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Parameter	Test Site	Expanded Uncertainty
Conducted Emission	EMI Shield Room	2.0 dB
Radiated Emission (30 MHz to 1 GHz)	3 m Semi Anechoic Chamber #1	5.8 dB
Radiated Emission (1 GHz to 18 GHz)	3 m Semi Anechoic Chamber #1	4.8 dB



## 2. DESCRIPTION OF TESTING

### 2.1 Measurement of Conducted Emission

The test procedure was in accordance with ANSI C63.4-2014, Clause 7.3

- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN).  
If the EUT is connected to the PC through USB, the AC power-line adapter of the PC is directly connected to a line impedance stabilization network (LISN).  
Other support units were connected to the power mains through another LISN. The two LISNs provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both conducted lines are measured in Quasi-Peak and Average mode, including the worst-case data points for each tested configuration.
- c. The frequency range from 150 kHz to 30 MHz was searched.

#### Conducted Emission Limits

Frequency (MHz)	Resolution Bandwidth (kHz)	Class A		Class B	
		Quasi-Peak (dBμV)	Average (dBμV)	Quasi-Peak (dBμV)	Average (dBμV)
0.15 to 0.5	9	79	66	66 to 56*	56 to 46*
0.5 to 5	9	73	60	56	46
5 to 30	9	73	60	60	50

\*Decreases with the logarithm of the frequency.

## 2.2 Measurement of Radiated Emission

The test procedure was in accordance with ANSI C63.4-2014, Clause 8.3

- a. The EUT was placed on the top of a turn table 0.8 meters above the ground at a semi-anechoic chamber.  
The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 m away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna height is varied from 1 m to 4 m above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 m to 4 m and the turn table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Quasi-Peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to Peak and Average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz.
- g. 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.  
(1 GHz to 40 GHz)

### Radiated Emission Limits

Frequency (MHz)	Class A				Class B	
	Antenna Distance (m)	Quasi-Peak (dBμV/m)	Antenna Distance (m)	Quasi-Peak (dBμV/m)	Antenna Distance (m)	Quasi-Peak (dBμV/m)
30 to 88	10	39.0	3	49.0	3	40.0
88 to 216	10	43.5	3	53.5	3	43.5
216 to 960	10	46.4	3	56.4	3	46.0
Above 960	10	49.5	3	59.5	3	54.0

Frequency (MHz)	Class A		Class B	
	Antenna Distance (m)	Quasi-Peak (dB $\mu$ V/m)	Antenna Distance (m)	Quasi-Peak (dB $\mu$ V/m)
30 to 230	10	40	10	30
230 to 1 000	10	47	10	37

Frequency (MHz)	Class A			Class B		
	Antenna Distance (m)	Peak (dB $\mu$ V/m)	Average (dB $\mu$ V/m)	Antenna Distance (m)	Peak (dB $\mu$ V/m)	Average (dB $\mu$ V/m)
Above 1 000	3	80	60	3	74	54

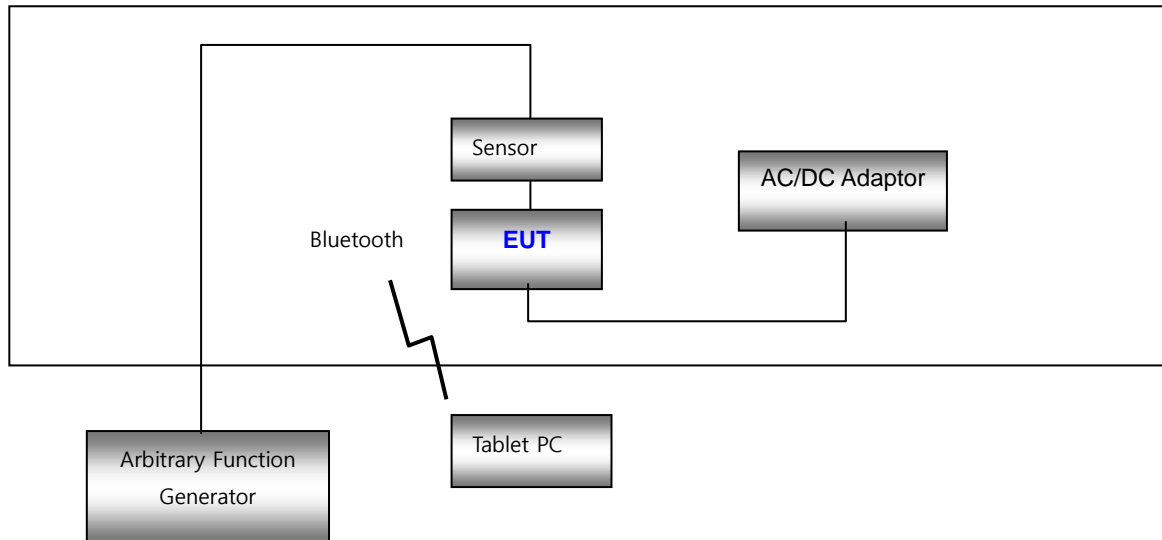
An unintentional radiator, including a digital device, the spectrum shall be investigated from the lowest radio frequency signal generated or used in the device, without going below the lowest frequency for which a Radiated Emission limit is specified, up to the frequency shown in the following table

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 to 108	1 000
108 to 500	2 000
500 to 1 000	5 000
Above 1 000	5th harmonic of the highest frequency or 40 GHz, whichever is lower

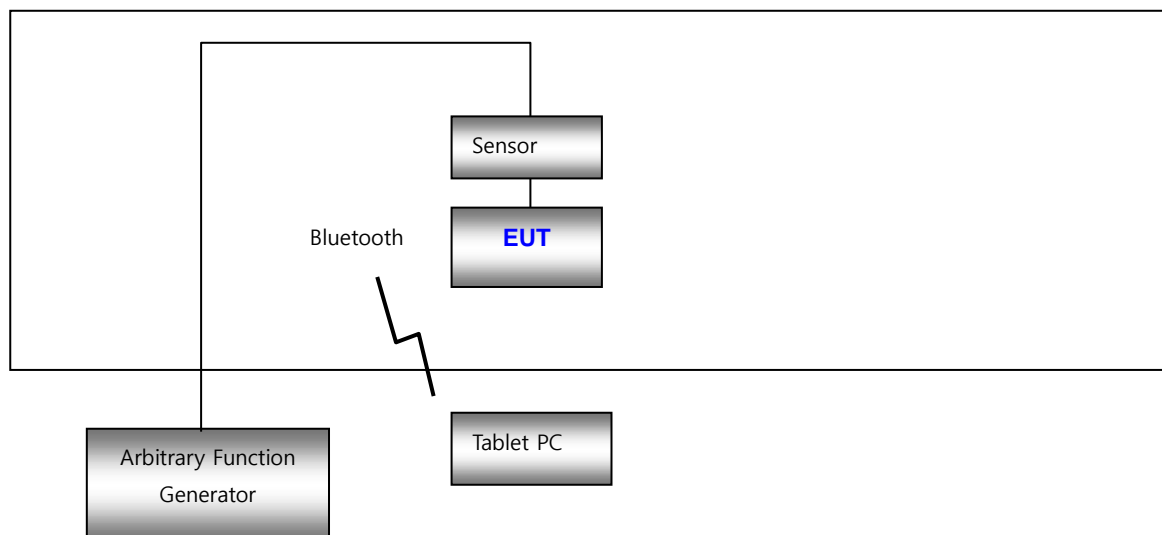
## 2.2 Configuration of Tested System

The layout was configured according to the manufacturer's guide.;

### [Adapter]



### [Battery]



### 3. OPERATION OF THE EUT

During preliminary test and final tests, the following operating mode was investigated.  
It was tested the following operating mode, after connecting all peripheral devices.

The Arbitrary Function Generator generates a waveform similar to brain waves, reads this waveform with a sensor cable or scalp brainwave electrode connected to the test equipment, and then tests it by monitoring whether the waveform is read normally in the app on a tablet PC wirelessly connected via Bluetooth.

#### Operating mode:

- Conducted Emission: [Adapter] Bluetooth + Sensor Cable Mode  
[Adapter] Bluetooth + Electrodes for scalp brain waves Mode
- Radiated Emission: [Adapter] Bluetooth + Sensor Cable Mode \*  
[Adapter] Bluetooth + Electrodes for scalp brain waves Mode \*  
[Battery] Bluetooth + Sensor Cable Mode  
[Battery] Bluetooth + Electrodes for scalp brain waves Mode  
[\*] The worst case of operating mode is report.

#### 4. MEASURING INSTRUMENTS

Type	Model Name	Manufacturer	Serial Number	Calibration Cycle	Next Calibration Date
<b>Conducted emission</b>					
<input checked="" type="checkbox"/> EMI Test Receiver	ESR7	Rohde & Schwarz	101910	1 year	05.26.2024
<input checked="" type="checkbox"/> LISN	ENV216	Rohde & Schwarz	102245	1 year	08.02.2024
<input checked="" type="checkbox"/> LISN	ENV216	Rohde & Schwarz	100073	1 year	05.11.2024
<input checked="" type="checkbox"/> Software	EMC32	Rohde & Schwarz	-	-	-
<b>Radiated emission below 1 GHz</b>					
<input checked="" type="checkbox"/> EMI test receiver	ESU40	Rohde & Schwarz	100524	1 year	05.09.2024
<input checked="" type="checkbox"/> Bilog Antenna	VULB 9168	SCHWARZBECK	255	2 year	03.10.2025
<input checked="" type="checkbox"/> Antenna master	MA4640-XP-ET	INNCO SYSTEM	-	N/A	-
<input checked="" type="checkbox"/> Antenna master controller	CO3000	INNCO SYSTEM	CO3000/870 /35990515/L	N/A	-
<input checked="" type="checkbox"/> Turn Table	1060	INNCO SYSTEM	-	N/A	-
<input checked="" type="checkbox"/> Turn Table controller	CO2000	INNCO SYSTEM	CO2000/095 /7590304/L	N/A	-
<input checked="" type="checkbox"/> Software	EMC32	Rohde & Schwarz	-	-	-
<b>Radiated emission above 1 GHz</b>					
<input checked="" type="checkbox"/> EMI test receiver	ESU40	Rohde & Schwarz	100524	1 year	05.09.2024
<input checked="" type="checkbox"/> Horn Antenna	BBHA 9120D	Schwarzbeck	01836	1 year	07.21.2024
<input checked="" type="checkbox"/> Power Amplifier	TK-PA18H	TESTEK	170034-L	1 year	11.04.2023
<input type="checkbox"/> Horn Antenna	BBHA 9170	Schwarzbeck	BBHA 9170 #786	1 year	11.17.2023
<input type="checkbox"/> Power Amplifier	TK-PA1840H	TESTEK	170030-L	1 year	02.22.2024
<input checked="" type="checkbox"/> Antenna master	MA4640-XP-ET	INNCO SYSTEM	-	N/A	-
<input checked="" type="checkbox"/> Antenna master controller	CO3000	INNCO SYSTEM	CO3000/870/ 35990515/L	N/A	-
<input checked="" type="checkbox"/> Turn Table	1060	INNCO SYSTEM	-	N/A	-
<input checked="" type="checkbox"/> Turn Table controller	CO2000	INNCO SYSTEM	CO2000/095/ 7590304/L	N/A	-
<input checked="" type="checkbox"/> Software	EMC32	Rohde & Schwarz	-	-	-

## 5. EMISSION TEST SUMMARY

### 5.1 Conducted Emission

#### 5.1.1 Operating Condition

The test results of conducted emission at mains ports provide the following information:

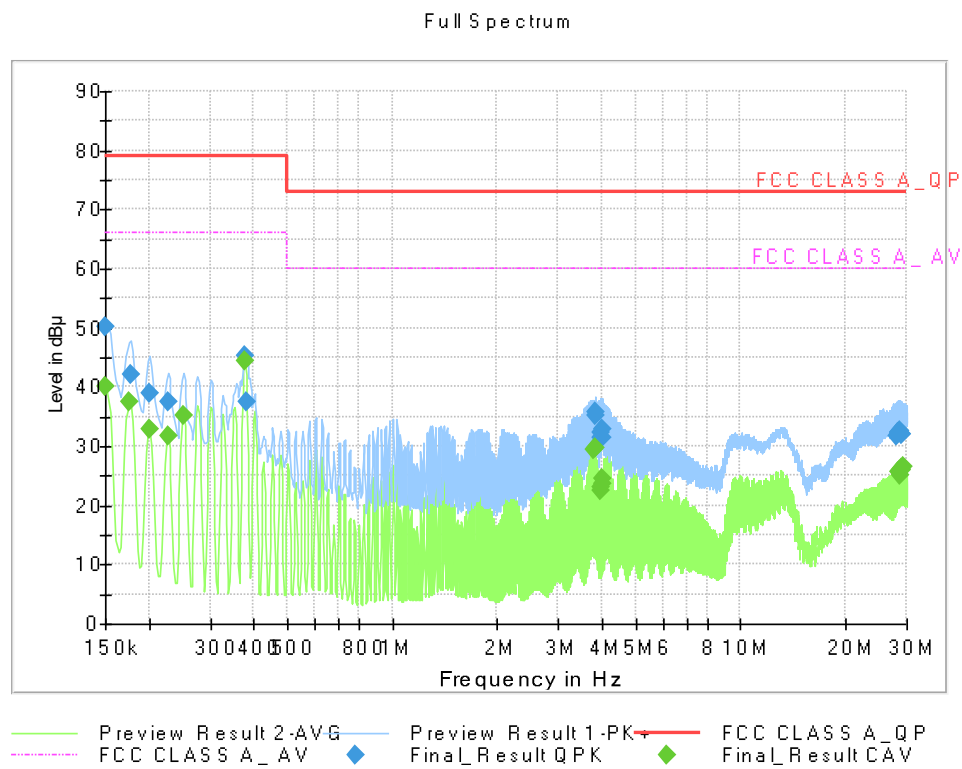
<b>Test Standard Used</b>	FCC CFR 47 PART 15 Subpart B Class A ANSI C63.4-2014
<b>Power Supply</b>	AC 120 V, 60 Hz
<b>Frequency Range</b>	150 kHz to 30 MHz
<b>Detector</b>	Quasi-Peak, CISPR-Average
<b>Bandwidth</b>	9 kHz (6 dB)
<b>Operating Mode</b>	[Adapter] Bluetooth + Sensor Cable Mode [Adapter] Bluetooth + Electrodes for scalp brain waves Mode
<b>Test Site</b>	EMI Shielded Room
<b>Temperature</b>	min. 22.4 °C / max. 25.3 °C
<b>Relative Humidity</b>	min. 53.2 % / max. 62.8 %
<b>Test Date</b>	September 11, 2023

A Conducted emission is calculated by the following equation:

- Calculation Formula:**
1. Conductor L1 = Hot, Conductor N = Neutral
  2. Corr. = LISN Factor + Cable Loss
  3. QuasiPeak or CAverage= Receiver Reading + Corr.
  4. Margin = Limit – QuasiPeak or CAverage

### 5.1.2 Measuring Data

Figure 1: Conducted Emission (0.15 to 30) MHz, [Adapter] Bluetooth + Sensor Cable Mode







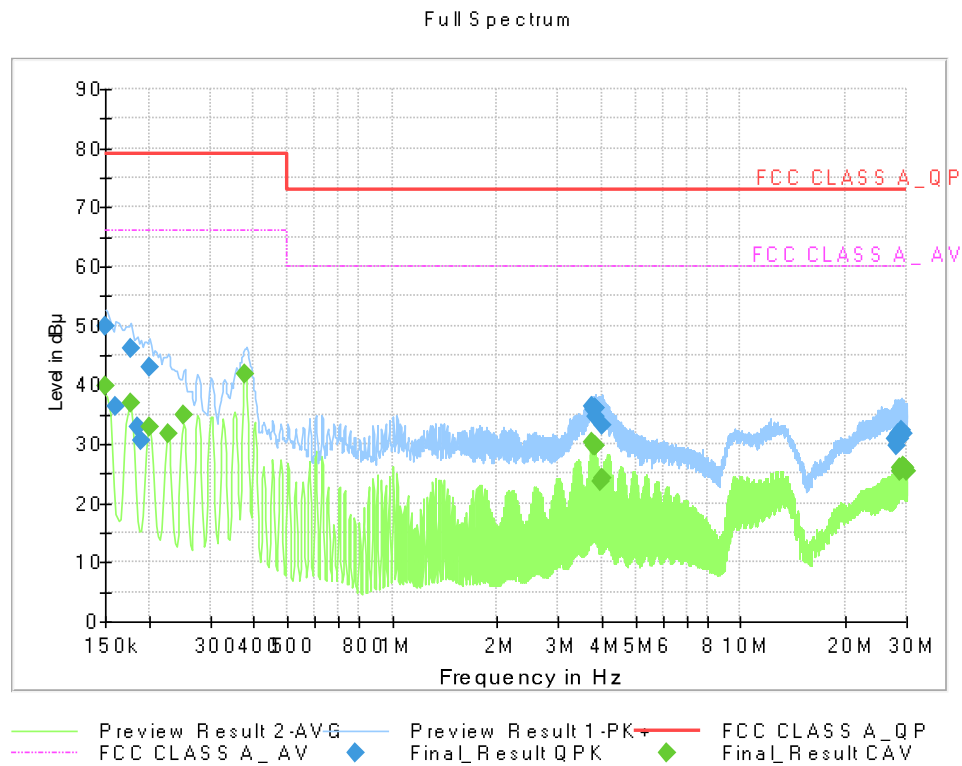
Final\_Result\_QPK

Frequency (MHz)	QuasiPeak (dBμV)	Limit (dBμV)	Margin (dB)	Bandwidth (kHz)	Line (L1/N)	Corr. (dB)
0.1500	50.07	79.00	28.93	9.000	N	9.7
0.1770	42.14	79.00	36.86	9.000	L1	9.7
0.2018	38.87	79.00	40.13	9.000	L1	9.7
0.2265	37.52	79.00	41.48	9.000	L1	9.7
0.3773	45.32	79.00	33.68	9.000	N	9.7
0.3818	37.41	79.00	41.59	9.000	L1	9.7
3.8233	35.19	73.00	37.81	9.000	N	9.8
3.8435	35.87	73.00	37.13	9.000	N	9.8
3.9673	31.49	73.00	41.51	9.000	N	9.8
3.9718	32.26	73.00	40.74	9.000	N	9.8
3.9920	31.58	73.00	41.42	9.000	N	9.8
3.9965	32.95	73.00	40.05	9.000	N	9.8
27.9635	31.72	73.00	41.28	9.000	N	10.0
28.2763	32.22	73.00	40.78	9.000	N	10.0
28.4315	32.39	73.00	40.61	9.000	N	10.0
28.7443	32.52	73.00	40.48	9.000	N	10.0
28.9018	32.05	73.00	40.95	9.000	N	10.0
29.0615	31.97	73.00	41.03	9.000	L1	10.0

Final\_Result\_CAV

Frequency (MHz)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Bandwidth (kHz)	Line (L1/N)	Corr. (dB)
0.1500	40.05	66.00	25.95	9.000	N	9.7
0.1748	37.49	66.00	28.51	9.000	N	9.7
0.2018	32.96	66.00	33.04	9.000	N	9.7
0.2265	31.85	66.00	34.15	9.000	N	9.7
0.2513	35.19	66.00	30.81	9.000	N	9.7
0.3773	44.33	66.00	21.67	9.000	N	9.7
3.7918	29.51	60.00	30.49	9.000	N	9.8
3.8435	29.62	60.00	30.38	9.000	N	9.8
3.9425	22.97	60.00	37.03	9.000	N	9.8
3.9673	22.57	60.00	37.43	9.000	N	9.8
3.9943	23.78	60.00	36.22	9.000	N	9.8
4.0190	24.50	60.00	35.50	9.000	N	9.8
28.4315	25.59	60.00	34.41	9.000	N	10.0
28.5890	25.05	60.00	34.95	9.000	N	10.0
28.7443	25.88	60.00	34.12	9.000	N	10.0
28.9018	25.98	60.00	34.02	9.000	N	10.0
29.0593	26.13	60.00	33.87	9.000	N	10.0
29.3720	26.49	60.00	33.51	9.000	N	10.0

Figure 2: Conducted Emission (0.15 to 30) MHz, [Adapter] Bluetooth + Electrodes for scalp brain waves Mode





Final\_Result\_QPK

Frequency (MHz)	QuasiPeak (dBμV)	Limit (dBμV)	Margin (dB)	Bandwidth (kHz)	Line (L1/N)	Corr. (dB)
0.1500	50.04	79.00	28.96	9.000	N	9.7
0.1613	36.27	79.00	42.73	9.000	N	9.7
0.1770	46.28	79.00	32.72	9.000	N	9.7
0.1860	32.88	79.00	46.12	9.000	N	9.7
0.1905	30.49	79.00	48.51	9.000	N	9.7
0.2018	42.90	79.00	36.10	9.000	N	9.7
3.7445	36.24	73.00	36.76	9.000	N	9.8
3.7940	35.86	73.00	37.14	9.000	N	9.8
3.8188	36.03	73.00	36.97	9.000	N	9.8
3.8435	36.11	73.00	36.89	9.000	N	9.8
3.8480	34.71	73.00	38.29	9.000	N	9.8
3.9965	33.09	73.00	39.91	9.000	N	9.8
27.6508	30.78	73.00	42.22	9.000	N	10.0
27.9568	29.81	73.00	43.19	9.000	N	10.0
28.2763	31.72	73.00	41.28	9.000	N	10.0
28.5845	30.88	73.00	42.12	9.000	N	10.0
28.9040	32.24	73.00	40.76	9.000	N	10.0
29.2190	31.84	73.00	41.16	9.000	N	10.0

Final\_Result\_CAV

Frequency (MHz)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Bandwidth (kHz)	Line (L1/N)	Corr. (dB)
0.1500	39.92	66.00	26.08	9.000	N	9.7
0.1770	36.88	66.00	29.12	9.000	N	9.7
0.2018	32.88	66.00	33.12	9.000	N	9.7
0.2265	31.72	66.00	34.28	9.000	N	9.7
0.2513	34.86	66.00	31.14	9.000	N	9.7
0.3773	41.93	66.00	24.07	9.000	N	9.7
3.7445	30.28	60.00	29.72	9.000	N	9.8
3.7940	29.84	60.00	30.16	9.000	N	9.8
3.8210	29.58	60.00	30.42	9.000	N	9.8
3.8458	29.64	60.00	30.36	9.000	N	9.8
3.9448	23.54	60.00	36.46	9.000	N	9.8
3.9965	24.24	60.00	35.76	9.000	N	9.8
28.5868	25.96	60.00	34.04	9.000	N	10.0
28.7443	25.33	60.00	34.67	9.000	N	10.0
28.9018	25.81	60.00	34.19	9.000	N	10.0
29.2145	26.21	60.00	33.79	9.000	N	10.0
29.5273	26.02	60.00	33.98	9.000	N	10.0
29.8423	25.37	60.00	34.63	9.000	N	10.0

## 5.2 Radiated Emission Below 1 GHz

### 5.2.1 Operating Condition

The test results of radiated emission provide the following information:

Used Test Standard	FCC CFR 47 PART 15 Subpart B Class A ANSI C63.4-2014
Power Supply	AC 120 V, 60 Hz
Frequency Range	30 MHz to 1 000 MHz
Detector	Quasi-Peak
Bandwidth	120 kHz (6 dB)
Measurement Distance	3 m *
Antenna Height	1 m to 4 m
Operating Mode	[Adapter] Bluetooth + Sensor Cable Mode [Adapter] Bluetooth + Electrodes for scalp brain waves Mode
Test Site	3 m Semi Anechoic Chamber #1
Temperature	min. 23.2 °C, max. 26.0 °C
Relative Humidity	min. 51.0 %, max. 61.0 %
Test Date	September 07, 2023 - September 08, 2023 -

\*The reason for testing in a 3 m chamber is because the device is within the NSA boundary.

A field strength is calculated by the following equation.

- Calculation Formula:**
1. POL. H = Horizontal, POL. V = Vertical
  2. QuasiPeak = Reading (Receiver Reading) + Corr.
  3. Corr. (Correction Factor) = Antenna Factor + Cable Loss
  4. Margin = Limit - QuasiPeak

## 5.2.2 Measuring Data

Figure 3: Radiated Emission (30 to 1 000) MHz, [Adapter] Bluetooth + Sensor Cable Mode

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Polarization (H/V)	Azimuth (deg)	Corr. (dB)
30.2400	29.74	49.00	19.26	107.0	V	320.0	18.5
32.8930	28.00	49.00	21.00	100.0	V	292.0	18.7
38.4630	26.00	49.00	23.00	108.8	V	282.0	19.2
67.6660	31.60	49.00	17.40	149.7	V	0.0	18.5
83.0870	33.31	49.00	15.69	100.0	V	48.0	15.2
104.7370	32.38	53.50	21.12	100.0	V	14.0	15.7

Figure 4: Radiated Emission (30 to 1 000) MHz, [Adapter] Bluetooth + Electrodes for scalp brain waves Mode

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Polarization (H/V)	Azimuth (deg)	Corr. (dB)
31.0800	29.06	49.00	19.94	100.0	V	112.0	18.5
44.8810	31.54	49.00	17.46	100.0	V	315.0	19.8
52.6180	33.94	49.00	15.06	100.0	V	251.0	20.0
73.7750	42.98	49.00	6.02	100.0	V	292.0	17.2
85.2890	33.86	49.00	15.14	108.8	V	313.0	15.0
931.5300	31.82	56.00	24.18	100.0	H	159.0	32.0

### 5.3 Radiated Emission Above 1 GHz

#### 5.3.1 Operating Condition

The test results of radiated emission provide the following information:

Used Test Standard	FCC CFR 47 PART 15 Subpart B Class A ANSI C63.4-2014
Power Supply	AC 120 V, 60 Hz
Detector	Peak, Average
Bandwidth	1 MHz
Highest Frequency	2 480 MHz
Tested Frequency Range	1 GHz to 18 GHz
Measurement Distance	3 m
Antenna Height	1 m to 4 m
Operating Mode	[Adapter] Bluetooth + Sensor Cable Mode [Adapter] Bluetooth + Electrodes for scalp brain waves Mode
Test Site	3 m Semi Anechoic Chamber #1
Temperature	min. 23.2 °C, max. 25.7 °C
Relative Humidity	min. 51.0 %, max. 60.5 %
Test Date	September 08, 2023

A field strength is calculated by the following equation.

- Calculation Formula:**
1. POL. H = Horizontal, POL. V = Vertical
  2. Peak or CAverage = Reading (Receiver Reading) + Corr.
  3. Corr. (Correction Factor) = Antenna Factor+ Cable Loss – Amplifier Gain
  4. Margin = Limit - Peak or CAverage

### 5.3.2 Measuring Data

Figure 5: Radiated Emission (1 to 18) GHz, [Adapter] Bluetooth + Sensor Cable Mode

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Polarization (H/V)	Azimuth (deg)	Corr. (dB)
2955.4450	32.76	---	80.00	47.24	100.0	H	108.0	-24.0
2955.4450	---	20.65	60.00	39.35	100.0	H	108.0	-24.0
3933.4650	---	22.45	60.00	37.55	129.7	H	270.0	-21.3
3933.4650	34.93	---	80.00	45.07	129.7	H	270.0	-21.3
6545.4950	38.90	---	80.00	41.10	100.0	V	81.0	-13.1
6545.4950	---	26.75	60.00	33.25	100.0	V	81.0	-13.1
7638.8150	---	29.65	60.00	30.35	150.1	V	156.0	-10.2
7638.8150	42.20	---	80.00	37.80	150.1	V	156.0	-10.2
8556.1650	42.08	---	80.00	37.92	119.3	H	45.0	-9.8
8556.1650	---	29.61	60.00	30.39	119.3	H	45.0	-9.8
9801.1050	43.94	---	80.00	36.06	150.1	V	140.0	-7.2
9801.1050	---	31.69	60.00	28.31	150.1	V	140.0	-7.2

Figure 6: Radiated Emission (1 to 18) GHz, [Adapter] Bluetooth + Electrodes for scalp brain waves Mode

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Polarization (H/V)	Azimuth (deg)	Corr. (dB)
2867.6100	33.34	---	80.00	46.66	140.7	H	188.0	-24.3
2867.6100	---	20.78	60.00	39.22	140.7	H	188.0	-24.3
4498.1150	35.92	---	80.00	44.08	124.6	V	89.0	-19.3
4498.1150	---	23.50	60.00	36.50	124.6	V	89.0	-19.3
6138.5900	37.90	---	80.00	42.10	149.9	H	182.0	-14.7
6138.5900	---	25.43	60.00	34.57	149.9	H	182.0	-14.7
8079.3300	---	29.86	60.00	30.14	134.7	H	1.0	-9.9
8079.3300	42.35	---	80.00	37.65	134.7	H	1.0	-9.9
9457.2950	43.81	---	80.00	36.19	100.0	H	69.0	-7.8
9457.2950	---	31.48	60.00	28.52	100.0	H	69.0	-7.8
11180.3900	---	32.79	60.00	27.21	127.7	V	164.0	-3.7
11180.3900	45.10	---	80.00	34.90	127.7	V	164.0	-3.7





## 6. APPENDIX A. TEST SETUP PHOTO

Please refer to Appendix. A and test setup photo file no. as follows;

File No.	Date of Issue	Description
HCT-EM-2309-FC001-P	September 18, 2023	Initial Release

End of report