



Order No: 4790597179

Report No: 4790597179-FE1V1

Issue Date: Feb. 28, 2024

Date of Test: Mar. 02, 2023 to Apr. 06, 2023

Model No: MPT-E14R-UNA03

Variant model: -

FCC ID: 2A9GVMPT-E14R-UNA03

FCC 47 CFR PART 15 SUBPART B

Test Report For Ambulatory ECG Monitor

**HUINNO Co., Ltd.
3F, 4F, 5F, 19, Apgujeong-ro 79-gil, Gangnam-gu, Seoul, 06011, Republic of Korea**

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Summary of test results:

FCC Part 15 Subpart B ANSI C63.4-2014	Title	Applied	Test Result
FCC Part 15 B 15.107	Conducted emission limits	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> MET <input type="checkbox"/> NOT MET
FCC Part 15B 15.109	Radiated emission limits	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> MET <input type="checkbox"/> NOT MET

Decision rule

Decision rule for statement(s) of conformity is based on accuracy method specified in procedure 2, Clause 4.4.3 in IEC 115:2021

Conclusion:

The tests listed in the Summary of Testing section of this report have been performed by UL Korea Ltd. in accordance with the procedures stated in each test requirement and specification. The test list was determined by the Applicant as being applicable to the Equipment under Test. As a result, the subject product has been verified to comply or not comply as noted in the Summary of Testing with each test specification. The test results relate only to the items tested.

Tested by



Byoungjin Lim, Test Engineer
UL Korea Ltd.
Feb. 28, 2024

Reviewed by



Jinha Ko, Manager
UL Korea Ltd.
Feb. 28, 2024

HISTORY of REPORT REVISION

REVISION	DATE	COMMENTS
-	Feb. 28, 2024	1 st issued

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1.0 Applicant and manufacturer description

- **Applicant**

Name : HUINNO Co., Ltd.
Address : 3F, 4F, 5F, 19, Apgujeong-ro 79-gil, Gangnam-gu, Seoul, 06011,
Republic of Korea

- **Manufacturer**

Name : HUINNO Co., Ltd.
Address : 3F, 4F, 5F, 19, Apgujeong-ro 79-gil, Gangnam-gu, Seoul, 06011,
Republic of Korea

2.0 Test facility description

- **Test site**

Name : UL Korea, Ltd. Uiwang Laboratory
Address : 42, Obongsandan 1-ro, Uiwang-si, Gyeonggi-do, 16079 Republic of
Korea
FCC site designation No.: KR0161

Radiated emissions measurements are performed in the 10 m semi-anechoic chamber, which conforms to volumetric normalized site attenuation (VNSA) for 3 and 10 m measurements. The chamber also conforms to the SVSWR compliance requirements for 1-18 GHz measurements. The VNAS and SVSWR meet the technical requirements, as set, in CISPR 16 and ANSI C63.4 regulations. Facility test areas for conducted emissions and immunity testing also meet the construction and characteristics, as required by CISPR 16 and ANSI C63.4 regulations.

UL Korea Ltd. Uiwang Laboratory is accredited by IAS, Laboratory Code TL-1087. The full scope of accreditation can be viewed at <https://www.iasonline.org/wp-content/uploads/2022/05/TL-1087-Cert-New.pdf>

3.0 Description of EUT

3.1 Specification

20.1 Performance Characteristics

ECG Channels	1 channel
Memory capacity	14 days
Recording Format	Continuous
Service Life	Up to 14 days
Shelf Life	2 years
Out-of-Pouch Shelf life	Use upon opening

20.2 Electrical Characteristics

Protection Against Electrical Shock	Type BF Applied Part (Electrode)
	Internally powered ME equipment
ECG Frequency Response	0.5Hz to 50Hz
ECG Input Impedance	$\geq 10 \text{ M}\Omega$
ECG Differential Range	DC: $\pm 300 \text{ mV}$, AD: $\pm 15 \text{ mV}$
ECG A/D Sampling Rate	250 Hz
ECG Resolution	12bit
Frequency Band	<ul style="list-style-type: none">- 2.4 GHz radio transceiver- Number of Channels: 40 (2400-2483.5MHz)
Bandwidth width of the receiving section	1M
Each transmission frequency or frequency band.	2.4 GHz radio transceiver
Modulation Type and Frequency Characteristics	GFSK(Gaussian Frequency Shift Keying) modulation
Effective Radiated Power (ERP)	2.5mW (4dB) or less.

20.3 Power Characteristics

Patch Battery Type	CR2032, 225 mAh
Battery Life	14 days

20.4 Physical Characteristics

Patch Dimensions	29.30mm(W) x 48.90mm(D) x 8.70mm(H)
Patch Weight	12g (9g without battery)
Data transferred cradle (4port) Dimensions	170mm(W) x 92.2 mm(D) x 79.60mm(H)
Data transferred cradle (4port) Weight	245g
Data transferred cradle (1port) Dimensions	44.75mm(W) x 41.47 mm(D) x 13.90mm(H)
Data transferred cradle (1port) Weight	30g

* NOTE: USB Cable model number 'NMC-UB210BK'

Power adapter model number 'PG122-0502000ID'

3.2 General description of EUT

ITEM	DETAILS				
Product	Ambulatory ECG Monitor				
Model	MPT-E14R-UNA03				
Variant Model/Type No.	-				
Difference	-				
Classification	<input checked="" type="checkbox"/> Class B <input type="checkbox"/> Class A				
Internal clock frequency	<input type="checkbox"/> Below 1 GHz <input checked="" type="checkbox"/> Above 1 GHz (2.4 GHz ISM Band)				
Tested form	<input checked="" type="checkbox"/> Table-top <input type="checkbox"/> Floor-standing <input type="checkbox"/> Combination of two				
Electrical ratings	<table><tr><td>Input:</td><td>1) Power Supply of cradle: 100-240 V~, 50/60 Hz, 0.4 A 2) Ambulatory ECG Monitor: 3 Vdc (CR2032)</td></tr><tr><td>Output:</td><td>1) Power Supply of cradle: 5 Vdc, 2.0 A</td></tr></table>	Input:	1) Power Supply of cradle: 100-240 V~, 50/60 Hz, 0.4 A 2) Ambulatory ECG Monitor: 3 Vdc (CR2032)	Output:	1) Power Supply of cradle: 5 Vdc, 2.0 A
Input:	1) Power Supply of cradle: 100-240 V~, 50/60 Hz, 0.4 A 2) Ambulatory ECG Monitor: 3 Vdc (CR2032)				
Output:	1) Power Supply of cradle: 5 Vdc, 2.0 A				
Test voltage	120 V/60 Hz, Battery (3 Vdc)				
Note	-				

3.3 Variant model differences

None.

3.4 Device Modifications

None.

3.5 EUT Configuration(s)

The following peripheral devices and/or interface cables were connected during the measurement:

Peripheral Devices

[Configuration #1: Data transmitting_4 Port]

Device	Model No.	Serial No.	Manufacturer	Remark
Ambulatory ECG Monitor	MPT-E14R-UNA03	-	HUINNO Co., Ltd.	EUT
Cradle 4 Port	ACC-C04P-03	-	HUINNO Co., Ltd.	
Power Supply	PG122-05020000OID	-	Shenzhen Perfect Gallant Tec Co., Ltd.	
Laptop computer	HP ProBook 450 GB	-	HP Inc.	
AC/DC Adapter	TPN-AA06	-	ACBEL ELECTRONICS CO., LTD.	-

[Configuration #2: Data transmitting_1 Port]

Device	Model No.	Serial No.	Manufacturer	Remark
Ambulatory ECG Monitor	MPT-E14R-UNA03	-	HUINNO Co., Ltd.	EUT
Cradle 1 Port	ACC-C01P-03	-	HUINNO Co., Ltd.	
Laptop computer	HP ProBook 450 GB	-	HP Inc.	
AC/DC Adapter	TPN-AA06	-	ACBEL ELECTRONICS CO., LTD.	

[Configuration #3: ECG measuring]

Device	Model No.	Serial No.	Manufacturer	Remark
Ambulatory ECG Monitor	MPT-E14R-UNA03	-	HUINNO Co., Ltd.	EUT
ECG Monitoring Electrodes	ACC-E10S-03	-	HUINNO Co., Ltd.	
Cell phone	iPhone 2	-	Apple Inc.	

Input/Output Ports

[Configuration #1: Data transmitting_4 Port]

Port #	I/O Port		Type*	Cable Max. \geq 3 m	Cable Shielded	Comments
1	Mains	Power input	AC	1.8	Unshielded	Power Supply
2	USB	Cradle 4 Port	I/O	1.0	Shielded	Connected to laptop computer
3	ECG data upload pogo pin	Ambulatory ECG Monitor	I/O	Direct	-	Cradle

* Note: * AC= AC Power Port, DC = DC Power Port, N/E = Non-Electrical, I/O = Signal Input or Output Port (Not Involved in Process Control), TP = Telecommunication Ports

[Configuration #2: Data transmitting_1 Port]

Port #	I/O Port		Type*	Cable Max. ≥ 3 m	Cable Shielded	Comments
1	USB	Cradle 1 Port	I/O	1.0	Shielded	Connected to laptop computer
2	ECG data upload pogo pin	Ambulatory ECG Monitor	I/O	Direct	-	Cradle

* Note: * AC= AC Power Port, DC = DC Power Port, N/E = Non-Electrical, I/O = Signal Input or Output Port (Not Involved in Process Control), TP = Telecommunication Ports

[Configuration #3: ECG measuring]

Port #	I/O Port		Type*	Cable Max. ≥ 3 m	Cable Shielded	Comments
1	Electrode connection pin	Ambulatory ECG Monitor	I/O	Direct	-	Connected to ECG Monitoring Electrodes

* Note: * AC= AC Power Port, DC = DC Power Port, N/E = Non-Electrical, I/O = Signal Input or Output Port (Not Involved in Process Control), TP = Telecommunication Ports

Integrated parts

Device	Model No.	Serial No.	Manufacturer

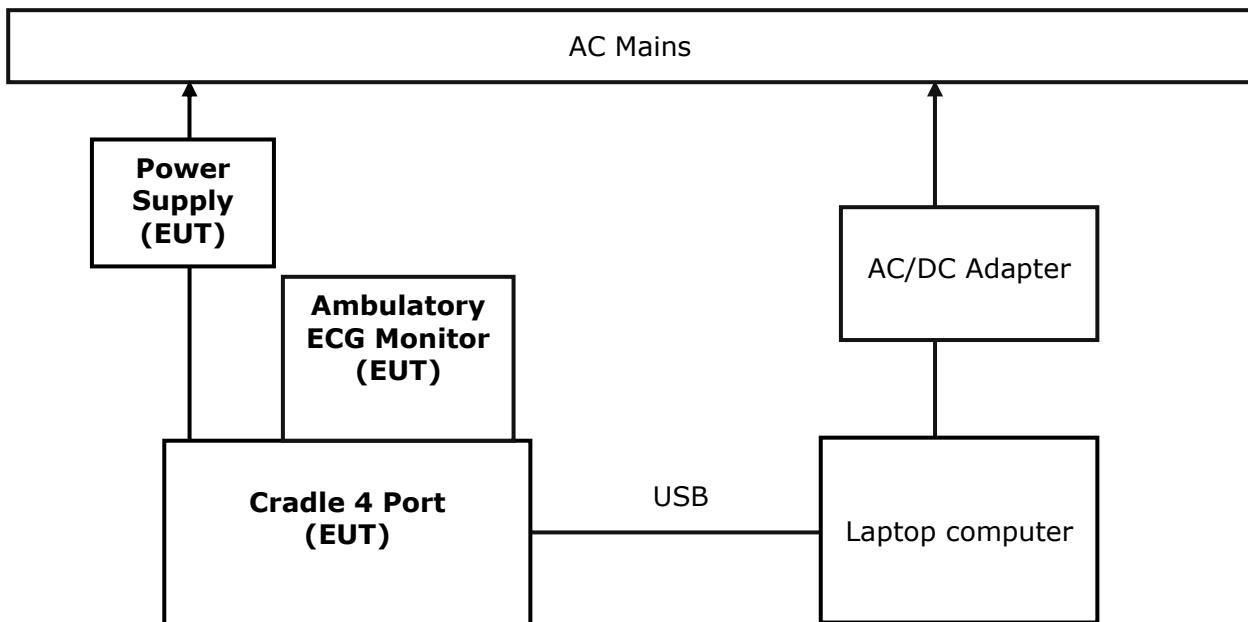
3.6 Description and method of exercising the EUT (modes)

Equipment under test was operated during the measurement under the following conditions:

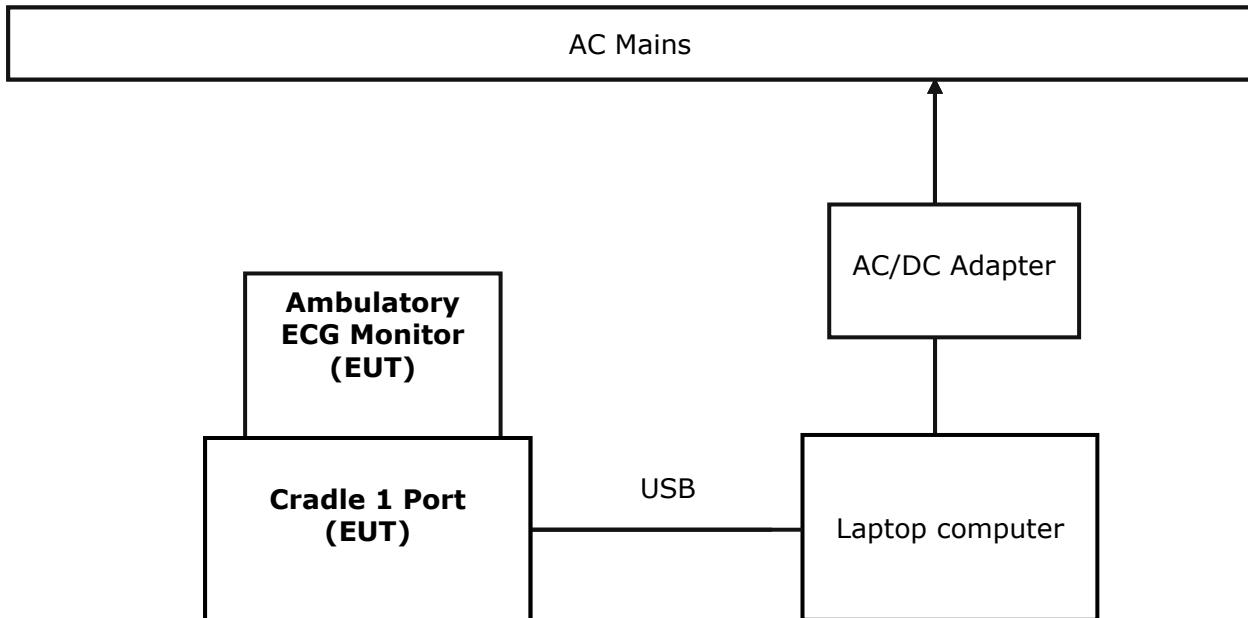
Mode	Description	Test voltage
#1 Data transmitting (Cradle 4 Port)	The EUT put on a data transferred cradle and then the stored data in the EUT was transmitted to a laptop PC through an USB port.	120 V/60 Hz
#2 Data transmitting (Cradle 1 Port)	The EUT put on a data transferred cradle and then the stored data in the EUT was transmitted to a laptop PC through an USB port.	120 V/60 Hz
#3 ECG measuring (Bluetooth communication)	ECG data was transmitted from the EUT to cell phone in real-time through bluetooth wireless communication.	Battery (3 Vdc)

3.7 Configuration of system under test

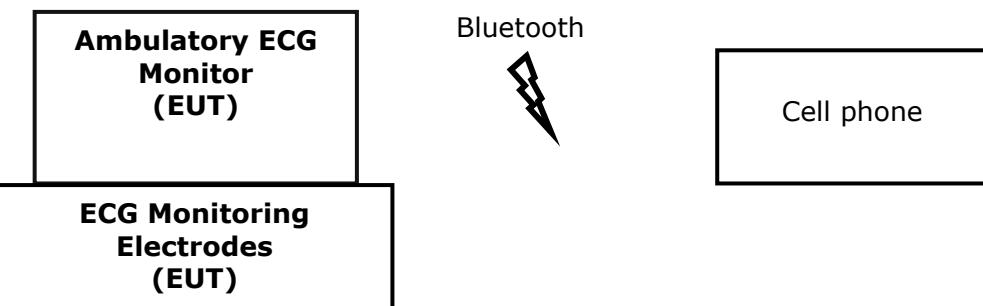
- Data transmitting (Cradle 4 Port)



- Data transmitting (Cradle 1 Port)



- ECG measuring (Bluetooth communication)



4.0 Uncertainty and calibration for measurement

4.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

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

Measurement Type	Frequency Range	Expanded Uncertainty	
Conducted Emission	150 kHz to 30 MHz	ENV216	1.96 dB
		ENV4200	2.04 dB
		ISN	2.48 dB
T Radiated Emission	30 MHz to 1000 MHz	4.74 dB	
	1 GHz to 6 GHz	5.06 dB	
	6 GHz to 18 GHz	5.38 dB	

These listed uncertainties are the worst case uncertainty for the entire range of measurement. Please note that the uncertainty values are provided for informational purposes only and not used in determining the Pass/Fail results.

4.2 Sample calculation

Where relevant, the following sample calculation is provided;

Field Strength (dB μ V/m) = Measured Voltage (dB μ V) + Antenna Factor (dB/m) + Cable Loss (dB) - Preamp Gain (dB)

ex. Receiver reading is 36.5 dB μ V, Ant. Fator 18.7 dB, Cable loss 0.6 dB, Preamp gain 26.9 dB, The result is;

$$36.5 \text{ dB}\mu\text{V} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} = 28.9 \text{ dB}\mu\text{V/m}$$

5.0 Applicable limits and test results

5.1 Conducted Emissions

5.1.1 Test procedure

The measurements were performed in a shielded room. The EUT was placed 0.4 m from vertical metal reference of plane, was kept at least 0.8 m from any other metal surface. In case of floor-standing equipment, place on a non-metallic table 0.1 m above horizontal metal reference plane.

EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 Ohm/50 μ H of coupling impedance for the measuring instrument.

5.1.2 Limit

(a) Except for Class A digital devices, for equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the band edges

Frequency of emission [MHz]	Conducted limit [dB μ V]	
	Quasi-peak	Average
0.15-50	66 to 55	56 to 46
0.5-5	56	46
5-30	60	50

(b) For a Class A digital device that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms LISN. Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency of emission [MHz]	Conducted limit [dB μ V]	
	Quasi-peak	Average
0.15-50	79	66
0.5-30	73	60

5.1.3 Test parameter

Test date : Apr. 06, 2023
Test location : Shielded room
Environmental condition : Temp.: 21.2 °C, Humid.: 38.2 %R.H.
Test voltage : 120 V/60 Hz
Test frequency range : 150 kHz to 30 MHz
6 dB bandwidth : 9 kHz
Test equipment :

Instrument	Model No.	Manufacturer	Serial No.	Due Date	Applied
EMI Test Receiver	ESR7	Rohde & Schwarz	102328	Feb. 14, 2024	<input checked="" type="checkbox"/>
2 Line LISN	ENV216	Rohde & Schwarz	102638	Feb. 14, 2024	<input checked="" type="checkbox"/>
4 Line LISN	ENV4200	Rohde & Schwarz	100519	Feb. 14, 2024	<input type="checkbox"/>

Photo of test set up for conducted voltage emissions

Test configuration: Configuration #1 (Data transmitting_4 Port)

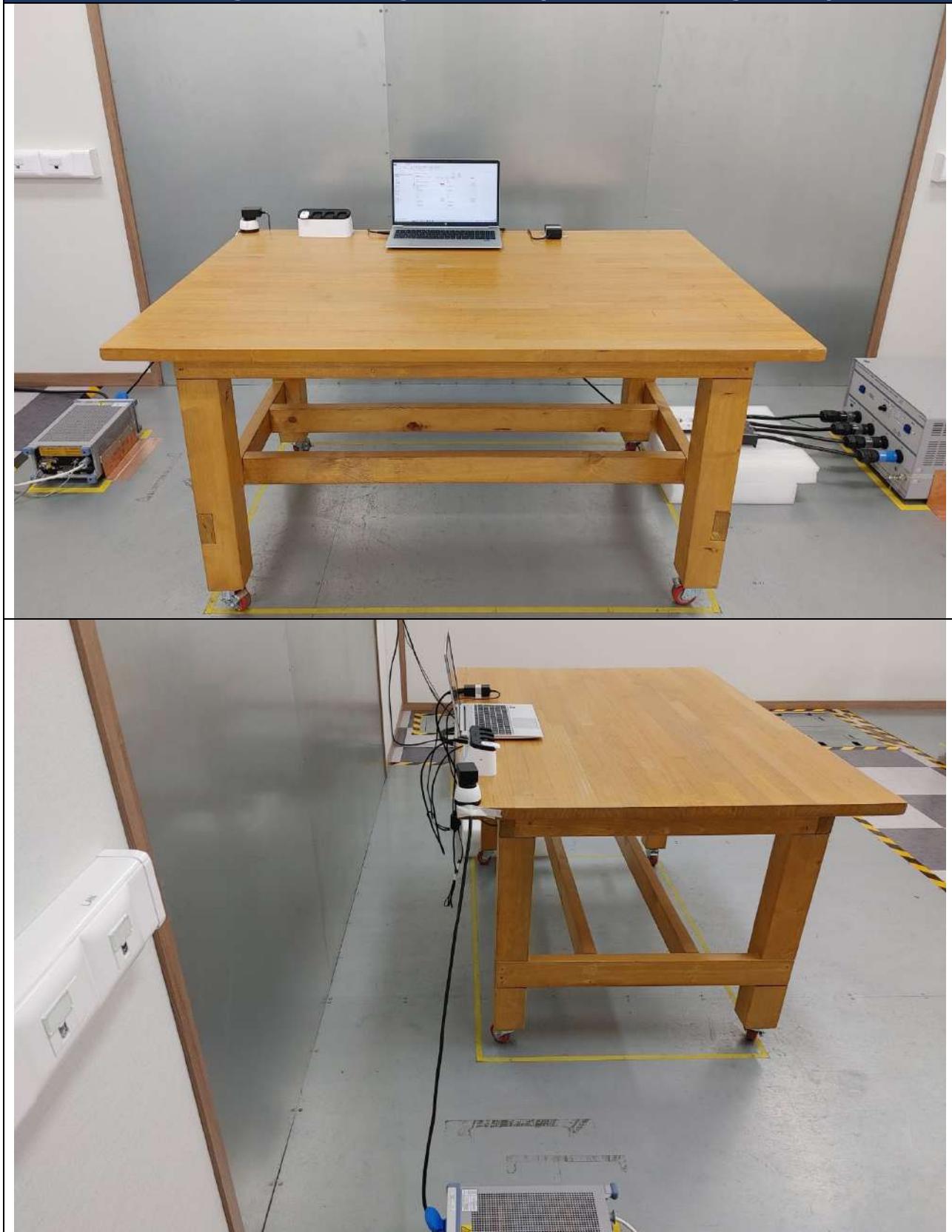
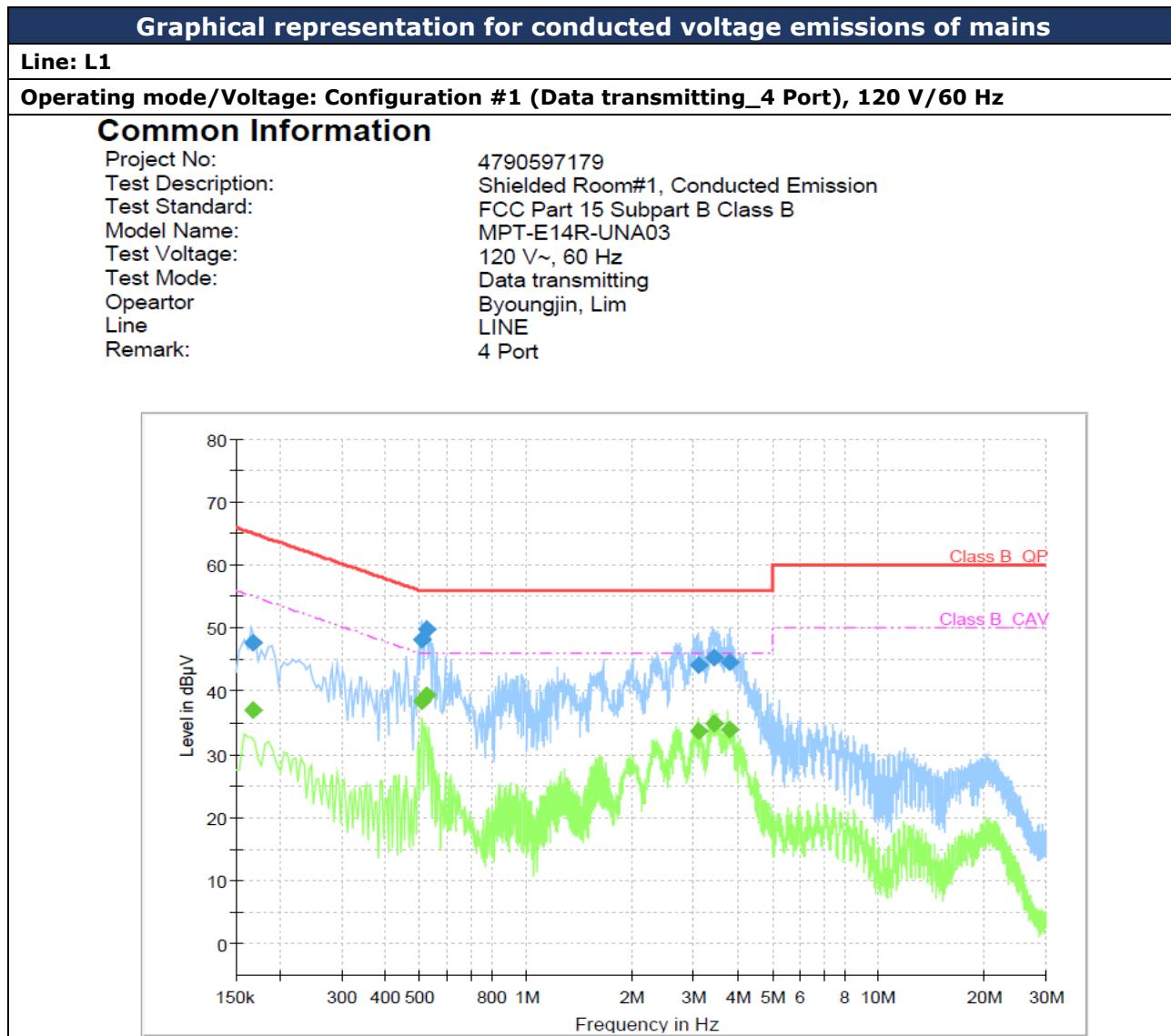


Photo of test set up for conducted voltage emissions

Test configuration: Configuration #2 (Data transmitting_1 Port)



5.1.4 Test results



Tabulated results for conducted voltage emission of mains

Frequency (MHz)	QuasiPeak (dB μ V)	CAverage (dB μ V)	Limit (dB μ V)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.167830	---	37.04	55.07	18.03	9.000	L1	ON	10.0
0.167830	47.68	---	65.07	17.39	9.000	L1	ON	10.0
0.504400	---	38.44	46.00	7.56	9.000	L1	ON	9.9
0.504400	48.19	---	56.00	7.81	9.000	L1	ON	9.9
0.522260	---	39.33	46.00	6.67	9.000	L1	ON	9.9
0.522260	49.87	---	56.00	6.13	9.000	L1	ON	9.9
3.085590	---	33.70	46.00	12.30	9.000	L1	ON	9.8
3.085590	44.24	---	56.00	11.76	9.000	L1	ON	9.8
3.403610	---	34.99	46.00	11.01	9.000	L1	ON	9.8
3.403610	45.33	---	56.00	10.67	9.000	L1	ON	9.8
3.788970	---	34.04	46.00	11.96	9.000	L1	ON	9.8
3.788970	44.51	---	56.00	11.49	9.000	L1	ON	9.8

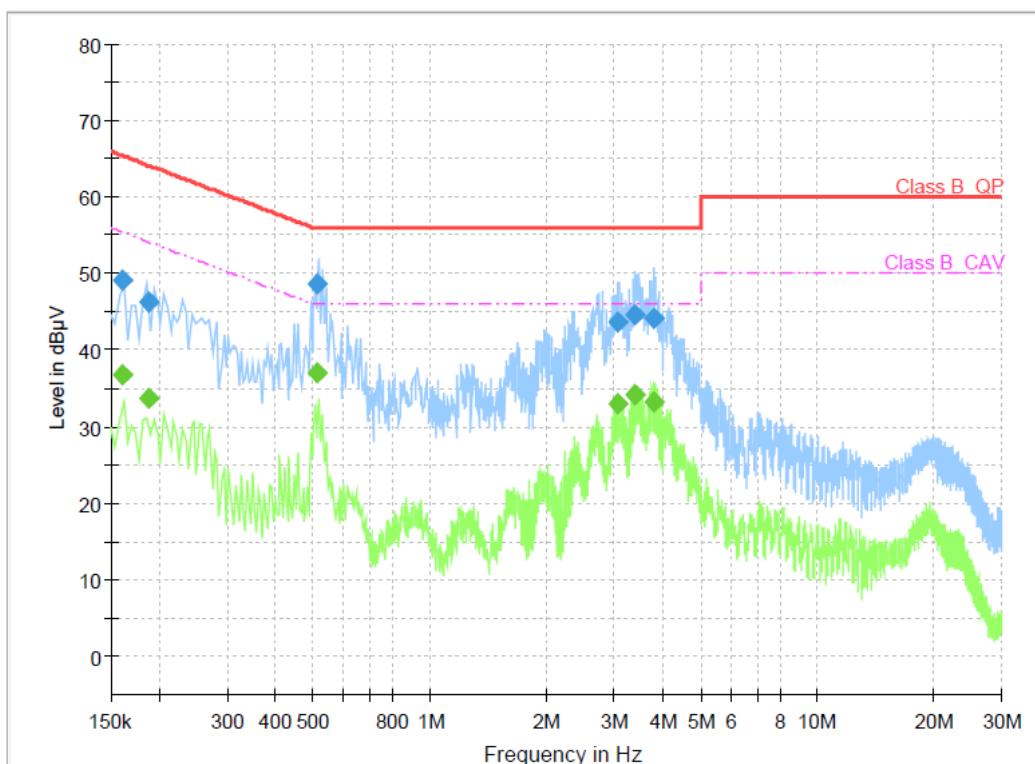
Graphical representation for conducted voltage emissions of mains

Line: Neutral

Operating mode/Voltage: Configuration #1 (Data transmitting_4 Port), 120 V/60 Hz

Common Information

Project No: 4790597179
Test Description: Shielded Room#1, Conducted Emission
Test Standard: FCC Part 15 Subpart B Class B
Model Name: MPT-E14R-UNA03
Test Voltage: 120 V~, 60 Hz
Test Mode: Data transmitting
Opearotor: Byoungjin, Lim
Line: NEUTRAL
Remark: 4 Port



Tabulated results for conducted voltage emission of mains

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.161100	---	36.74	55.41	18.67	9.000	N	ON	9.9
0.161100	49.23	---	65.41	16.17	9.000	N	ON	9.9
0.186960	---	33.72	54.17	20.45	9.000	N	ON	9.9
0.186960	46.18	---	64.17	18.00	9.000	N	ON	9.9
0.513700	---	37.05	46.00	8.95	9.000	N	ON	9.9
0.513700	48.75	---	56.00	7.25	9.000	N	ON	9.9
3.070070	---	33.11	46.00	12.89	9.000	N	ON	9.8
3.070070	43.58	---	56.00	12.42	9.000	N	ON	9.8
3.390530	---	34.25	46.00	11.75	9.000	N	ON	9.8
3.390530	44.73	---	56.00	11.27	9.000	N	ON	9.8
3.778170	---	33.27	46.00	12.73	9.000	N	ON	9.8
3.778170	44.06	---	56.00	11.94	9.000	N	ON	9.8

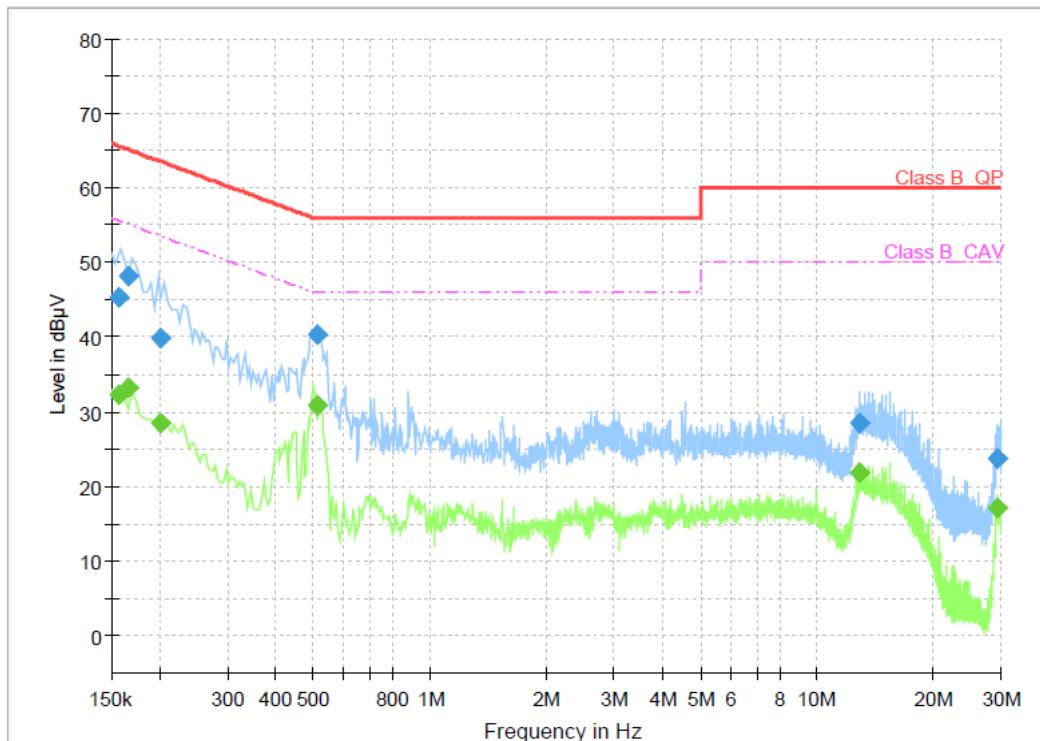
Graphical representation for conducted voltage emissions of mains

Line: L1

Operating mode/Voltage: Configuration #2 (Data transmitting_1 Port), 120 V/60 Hz

Common Information

Project No: 4790597179
Test Description: Shielded Room#1, Conducted Emission
Test Standard: FCC Part 15 Subpart B Class B
Model Name: MPT-E14R-UNA03
Test Voltage: 120 V~, 60 Hz
Test Mode: Data transmitting
Opearator: Byoungjin, Lim
Line: LINE
Remark: 1 Port



Tabulated results for conducted voltage emission of mains

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.156960	---	32.16	55.62	23.46	9.000	L1	ON	9.8
0.156960	45.40	---	65.62	20.22	9.000	L1	ON	9.8
0.166430	---	33.22	55.14	21.91	9.000	L1	ON	10.0
0.166430	48.22	---	65.14	16.92	9.000	L1	ON	10.0
0.199860	---	28.44	53.62	25.18	9.000	L1	ON	9.9
0.199860	39.96	---	63.62	23.66	9.000	L1	ON	9.9
0.511540	---	30.81	46.00	15.19	9.000	L1	ON	9.9
0.511540	40.31	---	56.00	15.69	9.000	L1	ON	9.9
12.958190	---	21.95	50.00	28.05	9.000	L1	ON	10.0
12.958190	28.50	---	60.00	31.50	9.000	L1	ON	10.0
29.356950	---	17.13	50.00	32.87	9.000	L1	ON	10.2
29.356950	23.65	---	60.00	36.35	9.000	L1	ON	10.2

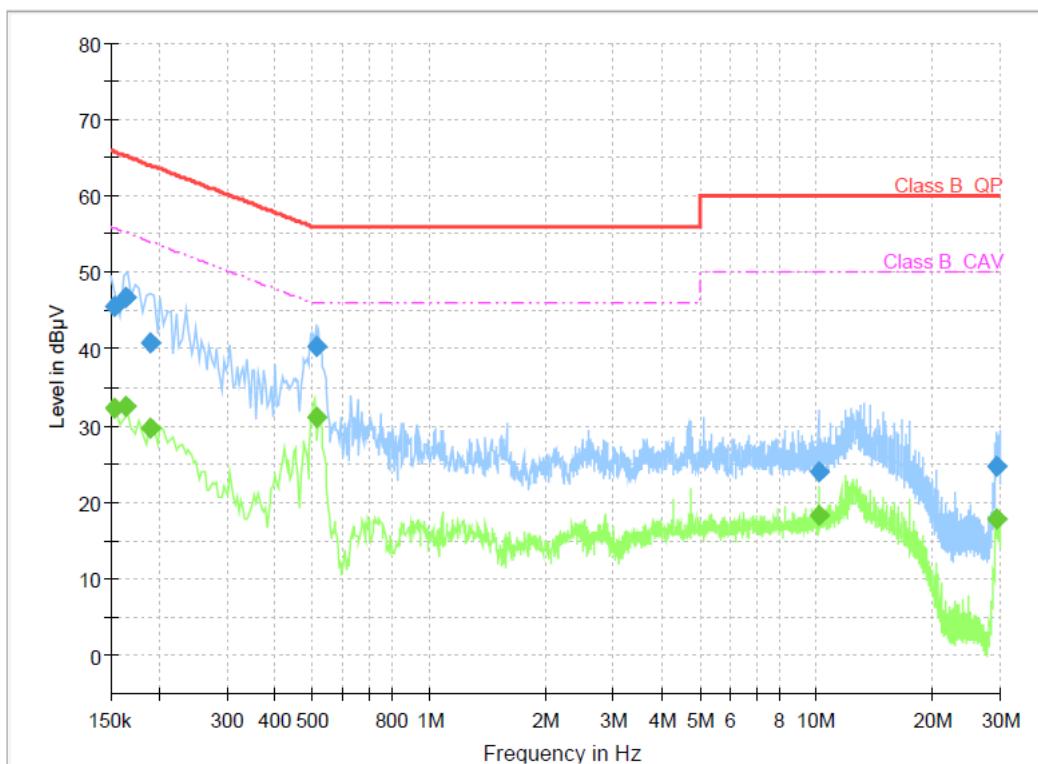
Graphical representation for conducted voltage emissions of mains

Line: Neutral

Operating mode/Voltage: Configuration #2 (Data transmitting_1 Port), 120 V/60 Hz

Common Information

Project No: 4790597179
Test Description: Shielded Room#1, Conducted Emission
Test Standard: FCC Part 15 Subpart B Class B
Model Name: MPT-E14R-UNA03
Test Voltage: 120 V~, 60 Hz
Test Mode: Data transmitting
Operator: Byoungjin, Lim
Line: NEUTRAL
Remark: 1 Port



Tabulated results for conducted voltage emission of mains

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.153050	---	32.38	55.83	23.45	9.000	N	ON	9.8
0.153050	45.60	---	65.83	20.23	9.000	N	ON	9.8
0.164100	---	32.54	55.25	22.71	9.000	N	ON	9.9
0.164100	46.73	---	65.25	18.52	9.000	N	ON	9.9
0.190590	---	29.58	54.01	24.43	9.000	N	ON	9.9
0.190590	40.75	---	64.01	23.26	9.000	N	ON	9.9
0.511560	---	31.06	46.00	14.94	9.000	N	ON	9.9
0.511560	40.39	---	56.00	15.61	9.000	N	ON	9.9
10.137430	---	18.20	50.00	31.80	9.000	N	ON	10.0
10.137430	23.94	---	60.00	36.06	9.000	N	ON	10.0
29.409790	---	17.72	50.00	32.28	9.000	N	ON	10.2
29.409790	24.79	---	60.00	35.21	9.000	N	ON	10.2

5.2 Radiated emissions (Below 1 GHz)

5.2.1 Test procedure

The EUT was placed on the top of a rotating table 0.8 m above the ground at a 10 m semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation. The EUT was set 10 m away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna mast.

The height of antenna is varied from (1-4) 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.

For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from (1-4) m and the rotatable table was turned from 0-360 degrees to find the maximum quasi-peak reading.

5.2.2 Limit

(a) Except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency of emission [MHz]	Field strength [μ V/m]	Field strength [dB μ V/m]
30-88	100	40.0
88-216	150	43.5
216-960	200	46.0
Above 960	500	54.0

(b) The field strength of radiated emissions from a Class A digital device, as determined at a distance of 10 meters, shall not exceed the following:

Frequency of emission [MHz]	Field strength [μ V/m]	Field strength [dB μ V/m]
30-88	90	39.1
88-216	150	43.5
216-960	210	46.4
Above 960	300	49.5

5.2.3 Test parameter

Test date : Mar. 02, 2023/ Mar. 13, 2023

Test location : 10 m semi-anechoic chamber

Test distance : 3 m, 10 m

Environmental condition : Temp.: 21.7 °C, Humid.: 33.0 %R.H.
Temp.: 18.0 °C, Humid.: 32.5 %R.H.

Test frequency range : 30 MHz-1000 MHz

6 dB bandwidth : 120 kHz

Test equipment :

Instrument	Model No.	Manufacturer	Serial No.	Due Date	Applied
EMI Test Receiver	ESW44	Rohde & Schwarz	101972	Feb. 14, 2024	<input checked="" type="checkbox"/>
Broadband Test Antenna	VULB9163	Schwarzbeck	1317	Apr. 27, 2023	<input checked="" type="checkbox"/>
Low Noise Amplifier	BTL-0340A	Broad-tek International	2121001	Aug. 08, 2023	<input checked="" type="checkbox"/>
Antenna Mast	MA4000-EP	Innco Systems GmbH	-	-	<input checked="" type="checkbox"/>
Turn Table	DT3000-3t	Innco Systems GmbH	-	-	<input checked="" type="checkbox"/>
Controller	CO3000	Innco Systems GmbH	CO3000/1279 /49380520/P	-	<input checked="" type="checkbox"/>

Photo of test set up for radiated emissions

Test configuration: Configuration #1 (Data transmitting_4 Port)
[Below 1 GHz]

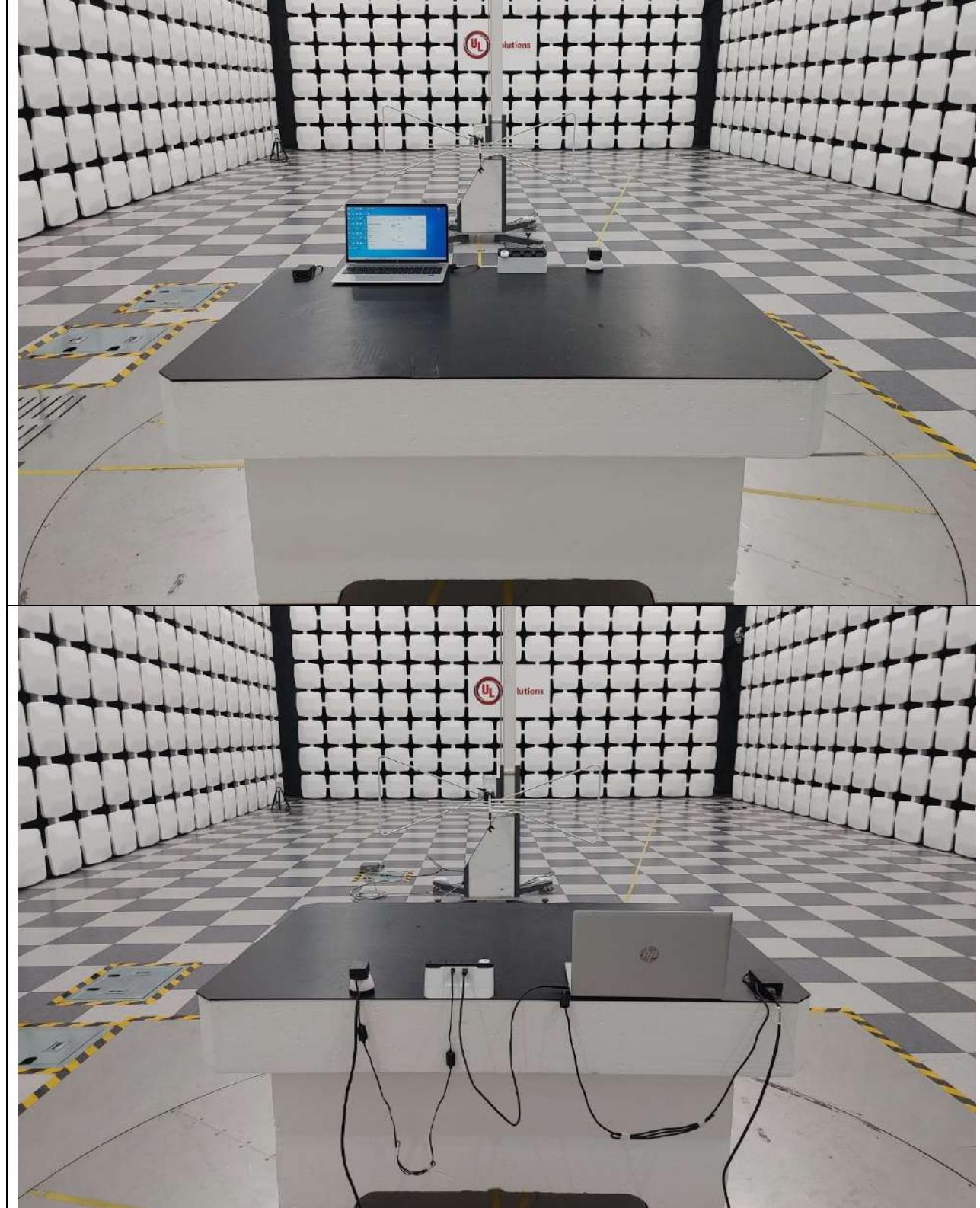


Photo of test set up for radiated emissions

**Test configuration: Configuration #2 (Data transmitting_1 Port)
[Below 1 GHz]**

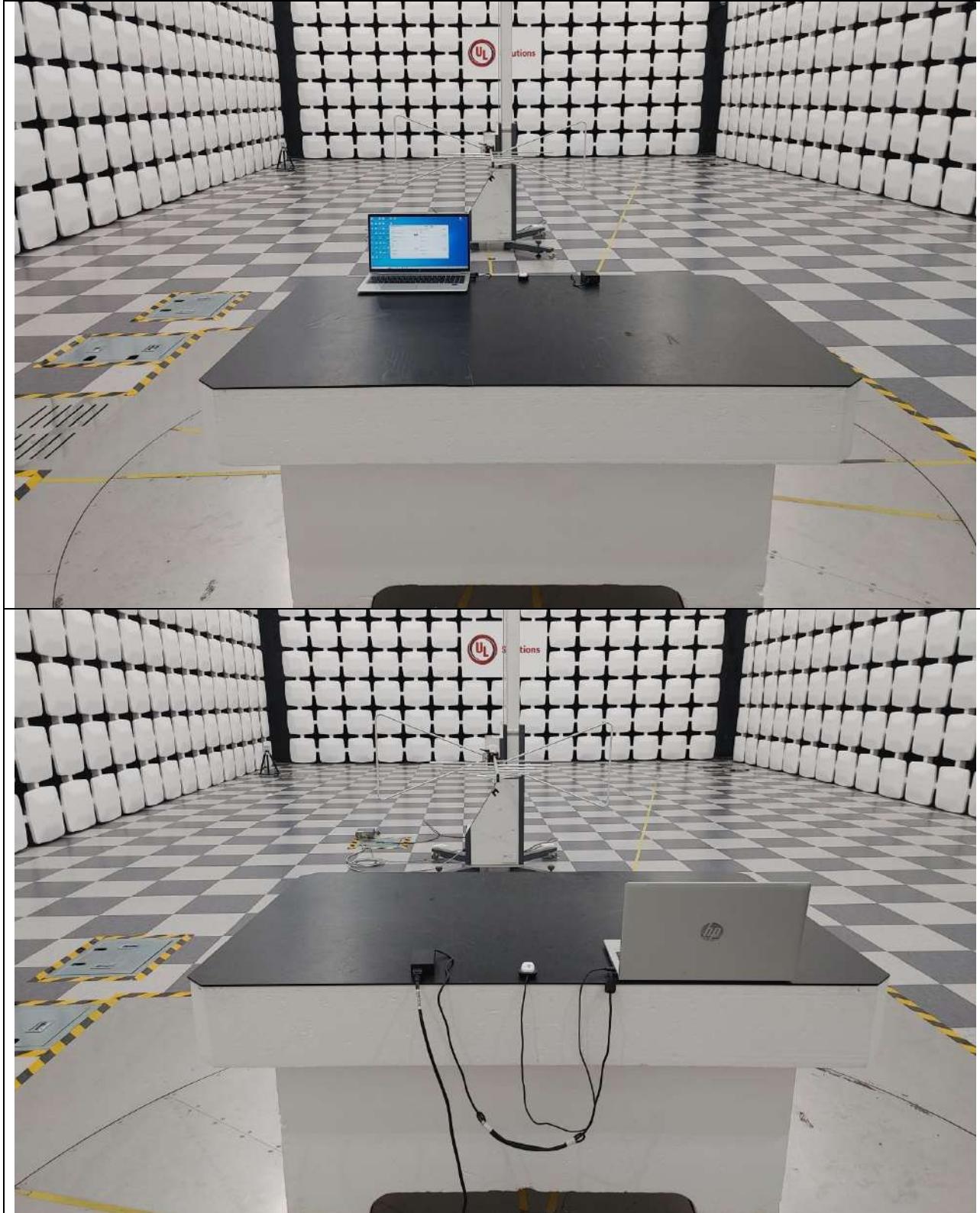
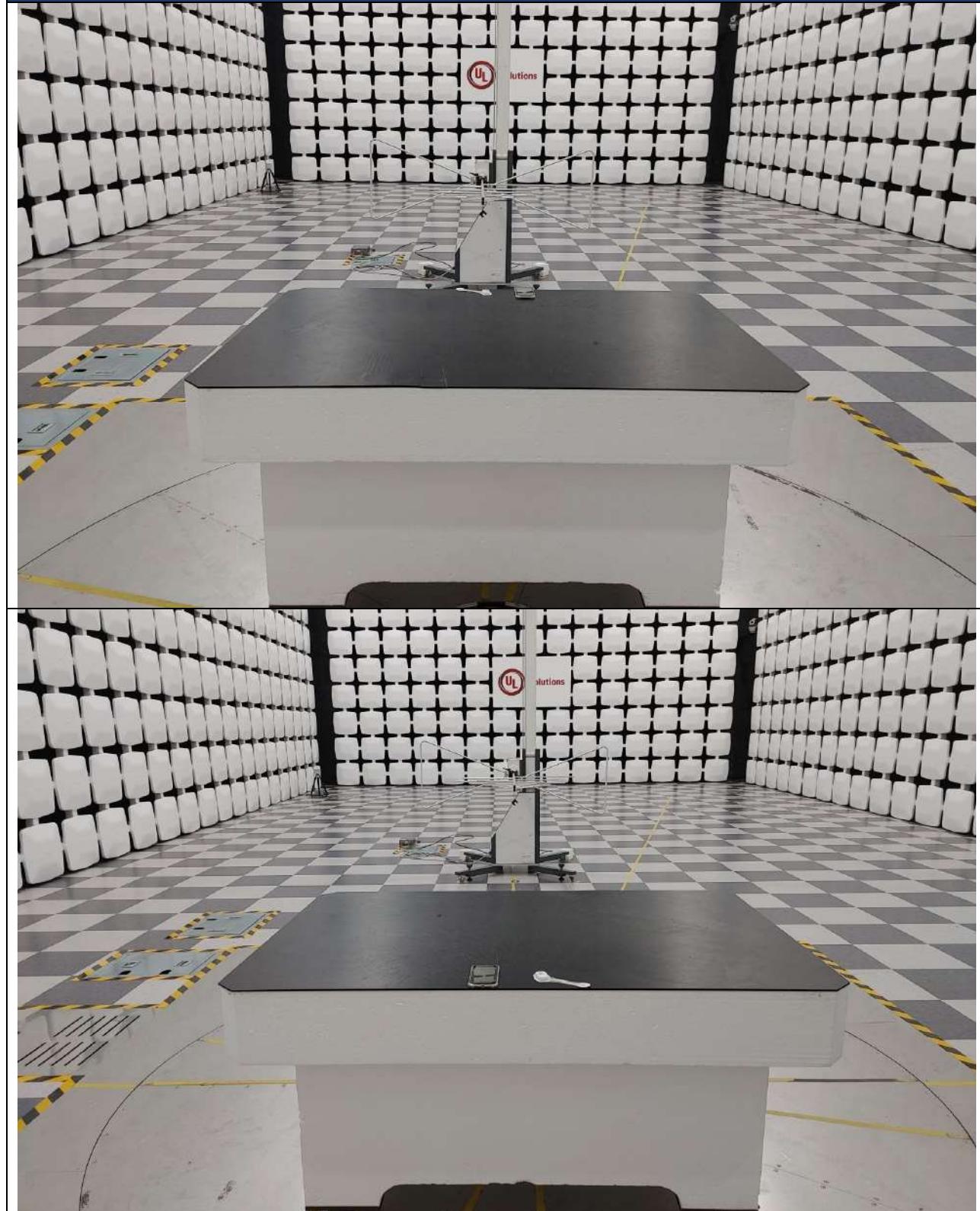
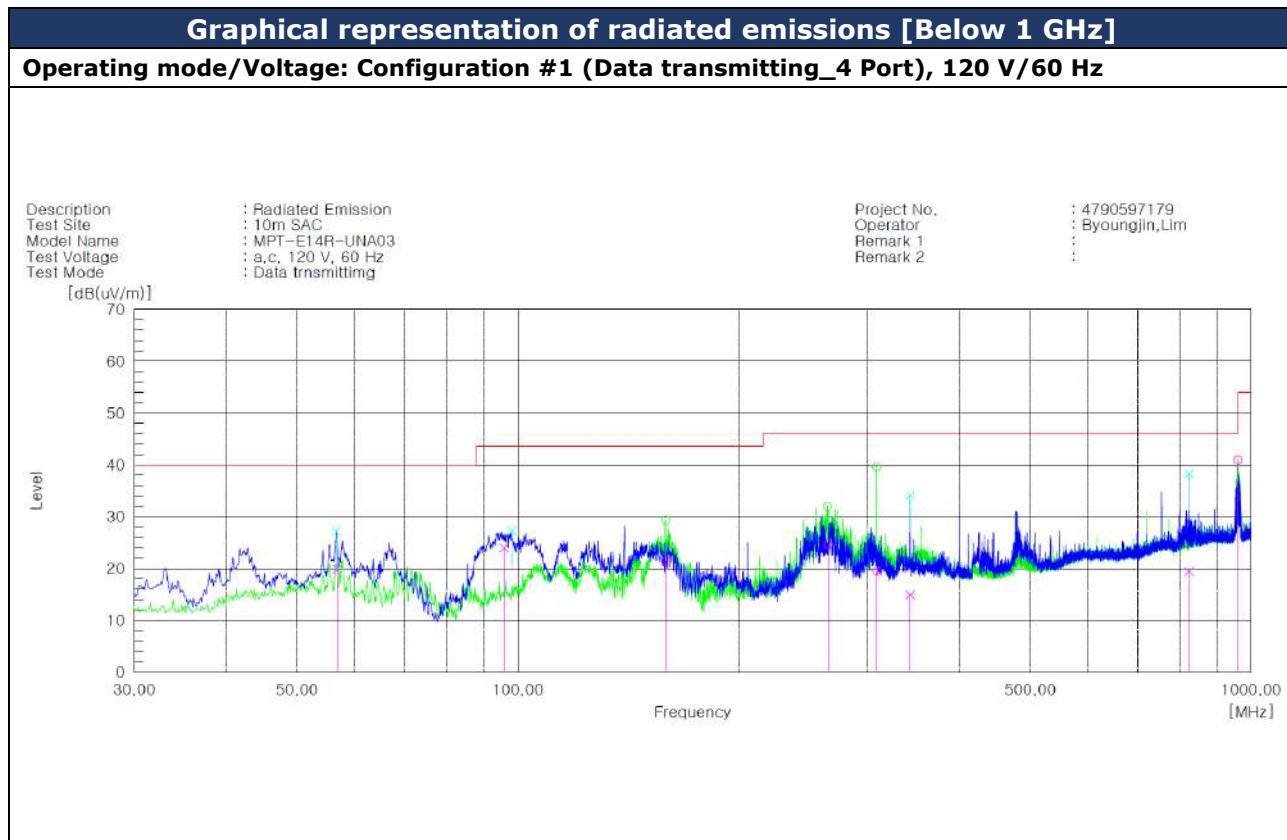


Photo of test set up for radiated emissions
Test configuration: Configuration #3 (ECG measuring)
[Below 1 GHz]



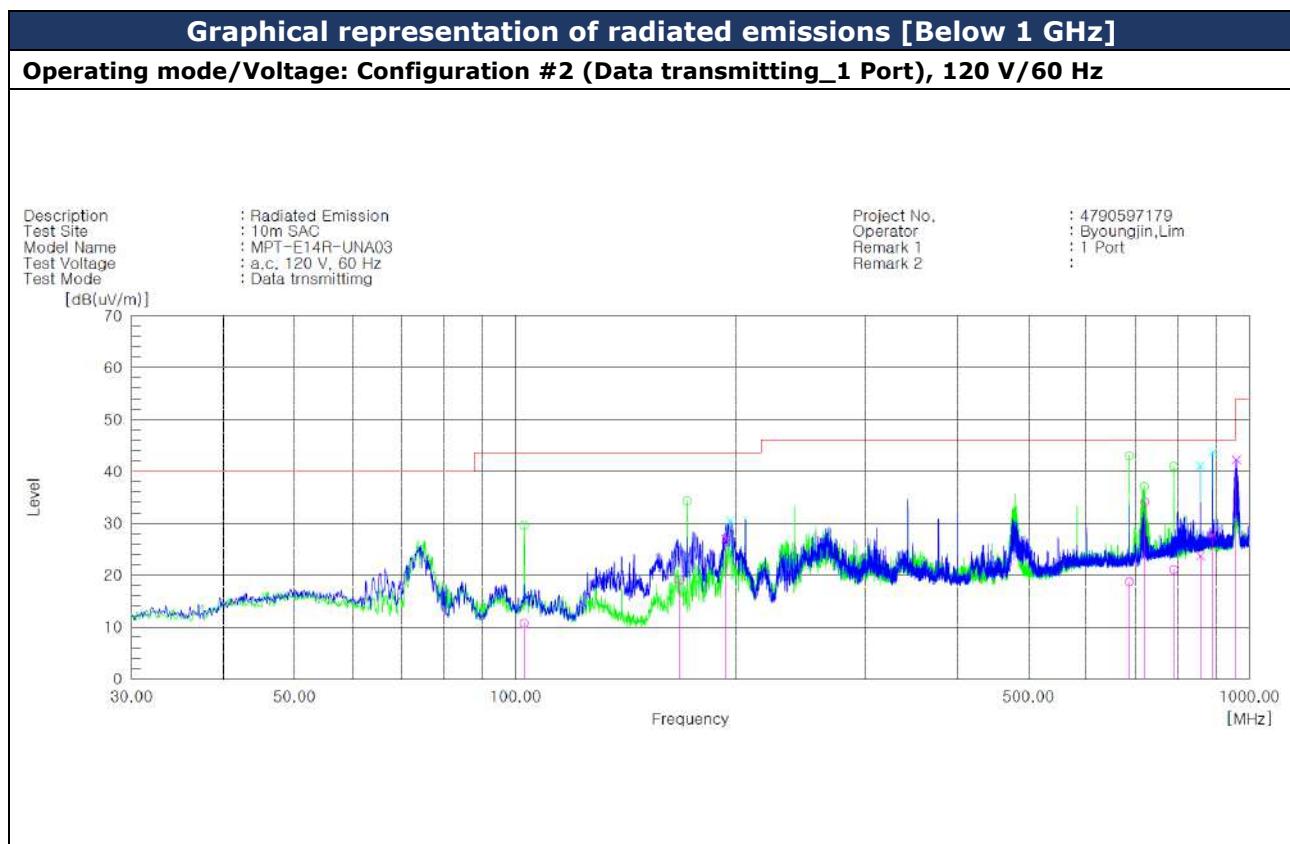
5.2.4 Test results



Tabulated results of radiated emission [Below 1 GHz]

--- Horizontal Polarization (QP)---								
No.	Frequency [MHz]	Reading [dB(uV)]	c.f [dB(1/m)]	Result [dB(uV/m)]	Limit [dB(uV/m)]	Margin [dB]	Height [cm]	Angle [deg]
1	158.979	45.6	-24.2	21.4	43.5	22.1	106.4	218.0
2	265.088	43.8	-19.1	24.7	46.0	21.3	100.0	239.3
3	308.644	37.2	-17.7	19.5	46.0	26.5	125.6	203.5
4	959.994	46.8	-5.8	41.0	46.0	5.0	136.8	217.3

--- Vertical Polarization (QP)---								
No.	Frequency [MHz]	Reading [dB(uV)]	c.f [dB(1/m)]	Result [dB(uV/m)]	Limit [dB(uV/m)]	Margin [dB]	Height [cm]	Angle [deg]
1	56.707	40.3	-20.4	19.9	40.0	20.1	104.8	205.5
2	95.776	45.7	-21.7	24.0	43.5	19.5	110.9	350.0
3	342.768	31.3	-16.3	15.0	46.0	31.0	157.3	358.9
4	822.699	26.8	-7.4	19.4	46.0	26.6	316.2	268.7



Tabulated results of radiated emission [Below 1 GHz]

--- Horizontal Polarization (QP)---

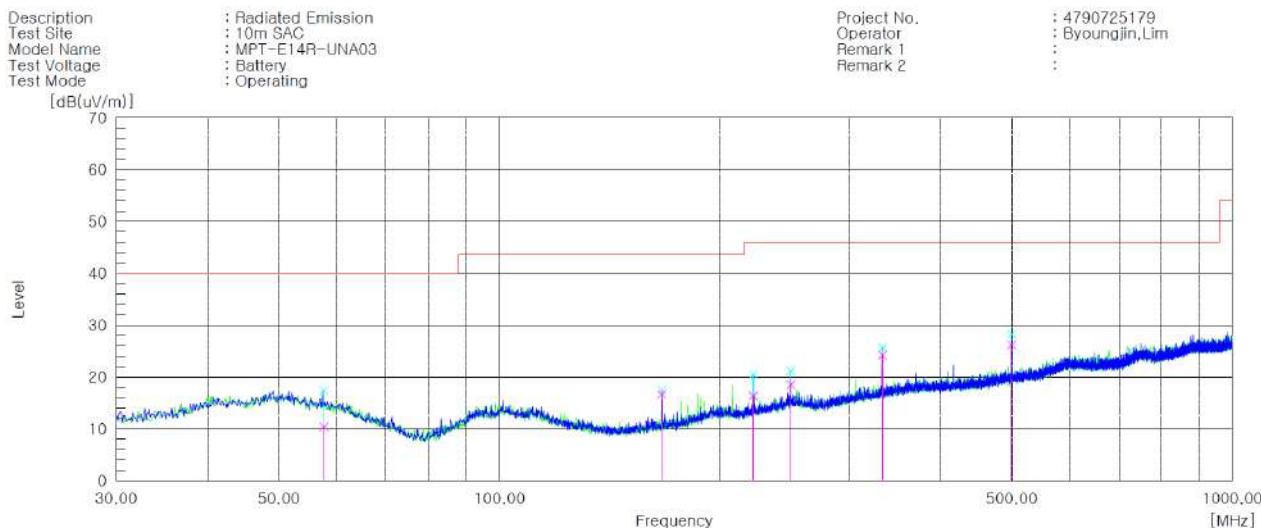
No.	Frequency [MHz]	Reading [dB(uV)]	c.f [dB(1/m)]	Result [dB(uV/m)]	Limit [dB(uV/m)]	Margin [dB]	Height [cm]	Angle [deg]
1	102.855	32.2	-21.5	10.7	43.5	32.8	384.1	211.4
2	167.525	42.7	-23.6	19.1	43.5	24.4	170.0	31.3
3	685.783	28.3	-9.7	18.6	46.0	27.4	289.3	201.8
4	720.005	43.1	-9.0	34.1	46.0	11.9	196.8	26.9
5	788.570	28.8	-7.7	21.1	46.0	24.9	171.4	322.0

--- Vertical Polarization (QP)---

No.	Frequency [MHz]	Reading [dB(uV)]	c.f [dB(1/m)]	Result [dB(uV/m)]	Limit [dB(uV/m)]	Margin [dB]	Height [cm]	Angle [deg]
1	193.489	48.6	-21.6	27.0	43.5	16.5	102.0	245.1
2	857.130	30.4	-6.7	23.7	46.0	22.3	120.6	75.6
3	891.436	33.8	-6.0	27.8	46.0	18.2	106.4	4.1
4	959.998	48.0	-5.8	42.2	46.0	3.8	101.0	355.5

Graphical representation of radiated emissions [Below 1 GHz]

Operating mode/Voltage: Configuration #3 (ECG measuring), Battery (3 Vdc)



Tabulated results of radiated emission [Below 1 GHz]

--- Vertical Polarization (QP) ---

No.	Frequency [MHz]	Reading [dB(uV)]	c.f [dB(1/m)]	Result [dB(uV/m)]	Limit [dB(uV/m)]	Margin [dB]	Height [cm]	Angle [deg]
1	57.590	31.0	-20.6	10.4	40.0	29.6	318.2	86.1
2	166.519	40.4	-23.7	16.7	43.5	26.8	100.0	196.0
3	222.023	37.1	-20.7	16.4	46.0	29.6	110.7	307.7
4	249.753	37.5	-19.0	18.5	46.0	27.5	100.0	200.5
5	333.037	40.9	-16.7	24.2	46.0	21.8	100.1	57.2
6	499.509	39.4	-13.1	26.3	46.0	19.7	208.1	289.6

5.3 Radiated emissions (Above 1 GHz)

5.3.1 Test procedure

The EUT was placed on the top of a rotating table 0.8 m above the ground at a 10 m semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation. The EUT was set 3 m away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna mast.

The height of antenna is varied from 1-4 m, the height of adjustment depends on the EUT height and the antenna 3 dB beamwidth both, to detect the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights and the rotatable table was turned from 0-360 degrees to find the maximum reading.

5.3.2 Test parameter

Test date :	Mar. 13, 2023/ Mar. 16, 2023
Test location :	10 m semi-anechoic chamber
Test distance :	3 m
Environmental condition :	Temp.: 22.5 °C, Humid.: 31.8 %R.H. Temp.: 20.3 °C, Humid.: 32.7 %R.H.
Test frequency range :	1 GHz-13 GHz
6 dB bandwidth :	1 MHz

Test equipment :

Instrument	Model No.	Manufacturer	Serial No.	Due Date	Applied
EMI Test Receiver	ESW44	Rohde & Schwarz	101972	Feb. 14, 2024	<input checked="" type="checkbox"/>
Horn Antenna	HF907	Rohde & Schwarz	102928	Feb. 21, 2024	<input checked="" type="checkbox"/>
Signal Conditioning Unit	SCU18F	Rohde & Schwarz	100798	Feb. 13, 2024	<input checked="" type="checkbox"/>
Horn Antenna	3160-9	ETS-LINDGREN	LM11495	Feb. 16, 2024	<input type="checkbox"/>
Signal Conditioning Unit	SCU26F	Rohde & Schwarz	100726	Feb. 15, 2024	<input type="checkbox"/>
Horn Antenna	3160-10	ETS-LINDGREN	514028	Feb. 16, 2024	<input type="checkbox"/>
Signal Conditioning Unit	SCU40	Rohde & Schwarz	100370	Feb. 15, 2024	<input type="checkbox"/>
Antenna Mast	MA4640/0800-EP-ET	Innco Systems GmbH	-	-	<input checked="" type="checkbox"/>
Turn Table	DT3000-3t	Innco Systems GmbH	-	-	<input checked="" type="checkbox"/>
Controller	CO3000	Innco Systems GmbH	CO3000/1279/49380520/P	-	<input checked="" type="checkbox"/>

Photo of test set up for radiated emissions

**Test configuration: Configuration #1 (Data transmitting_4 Port)
[Above 1 GHz]**

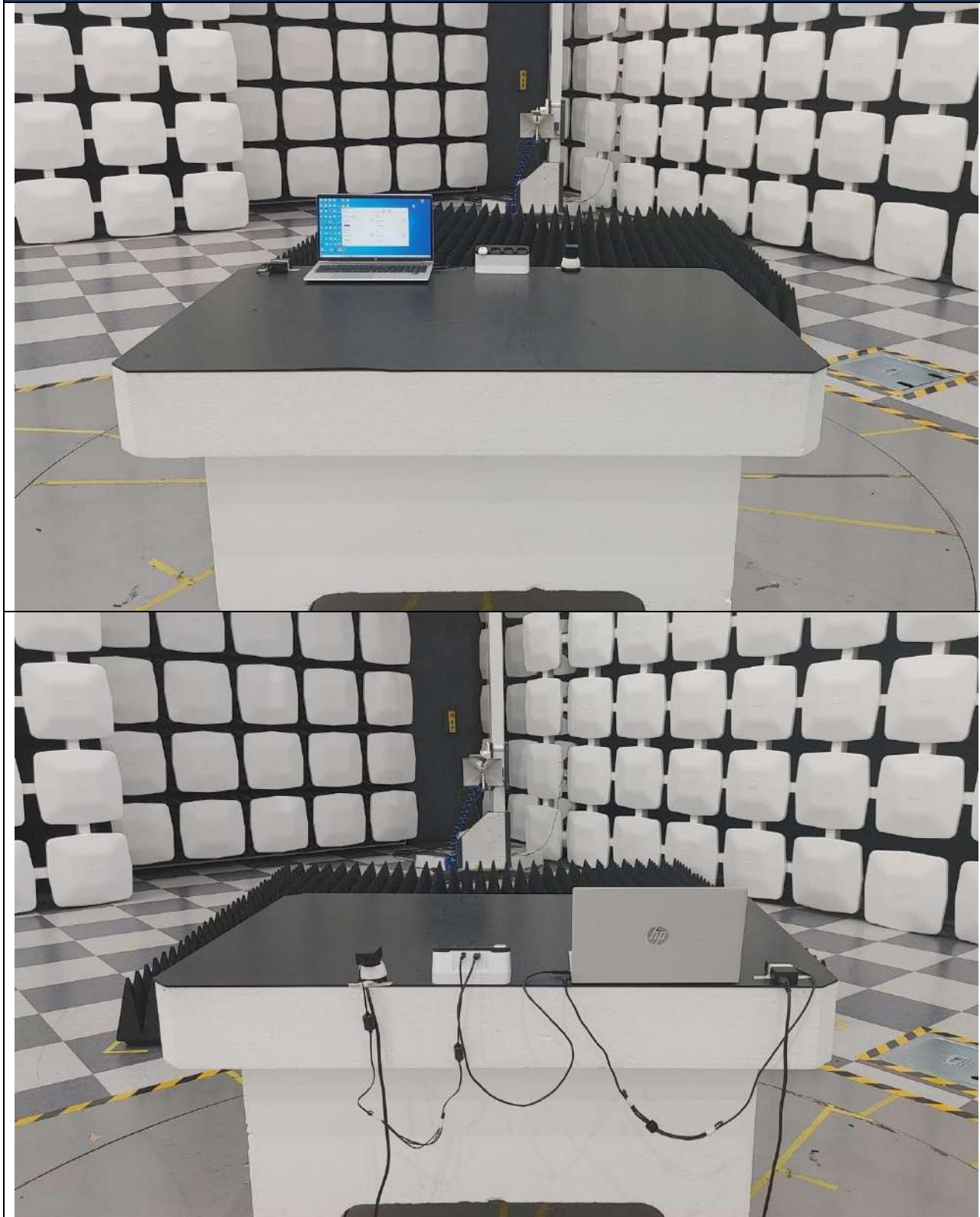
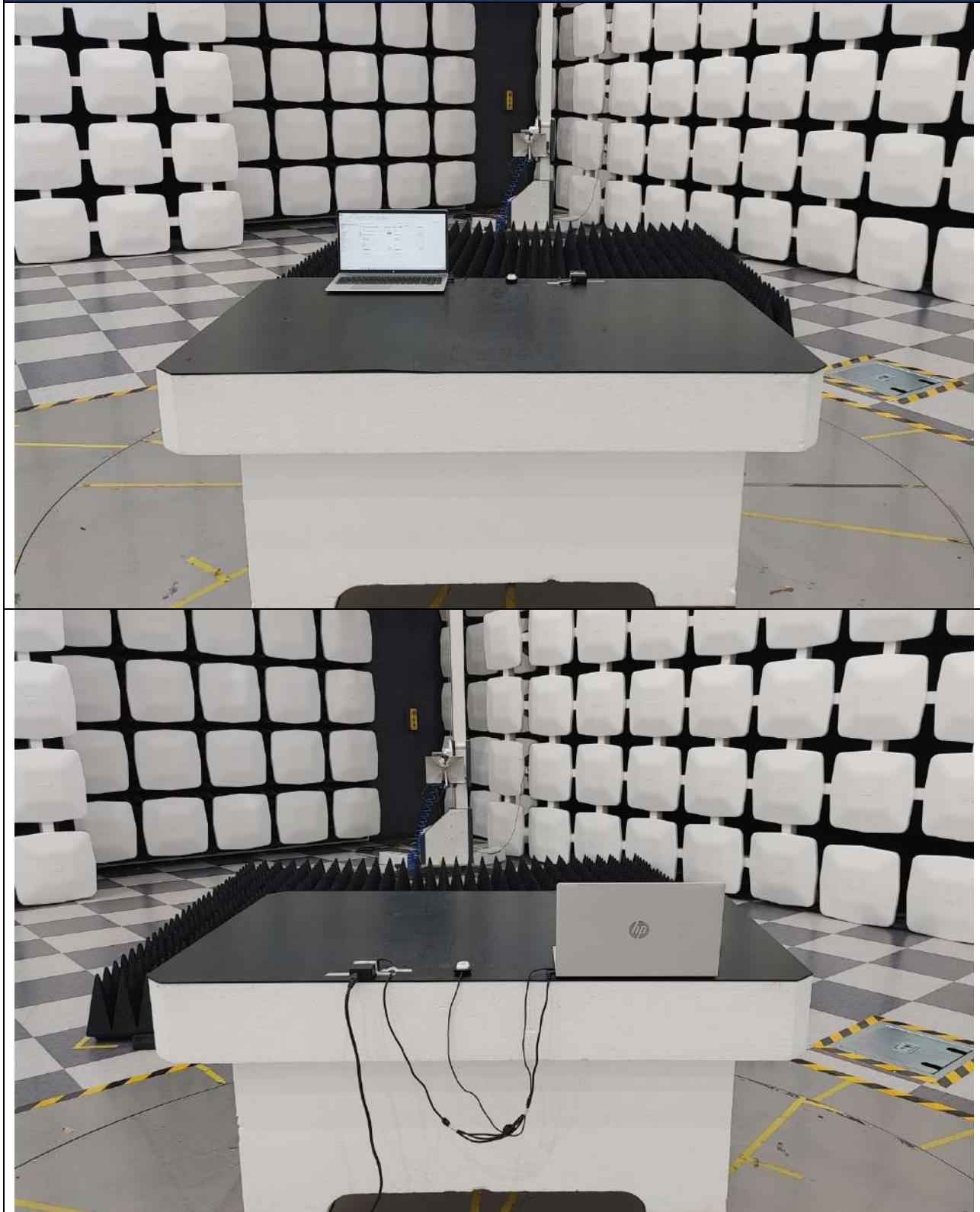
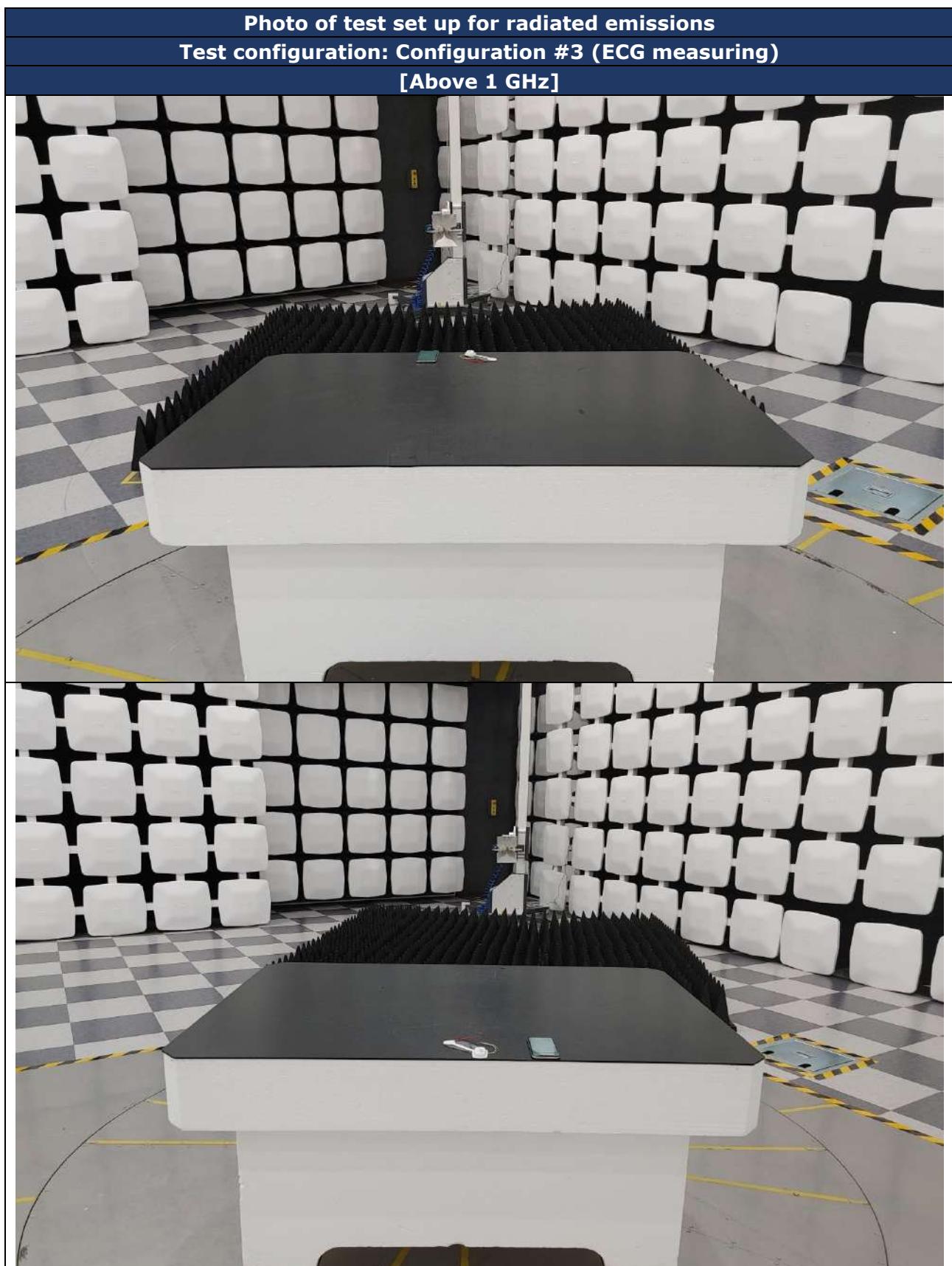


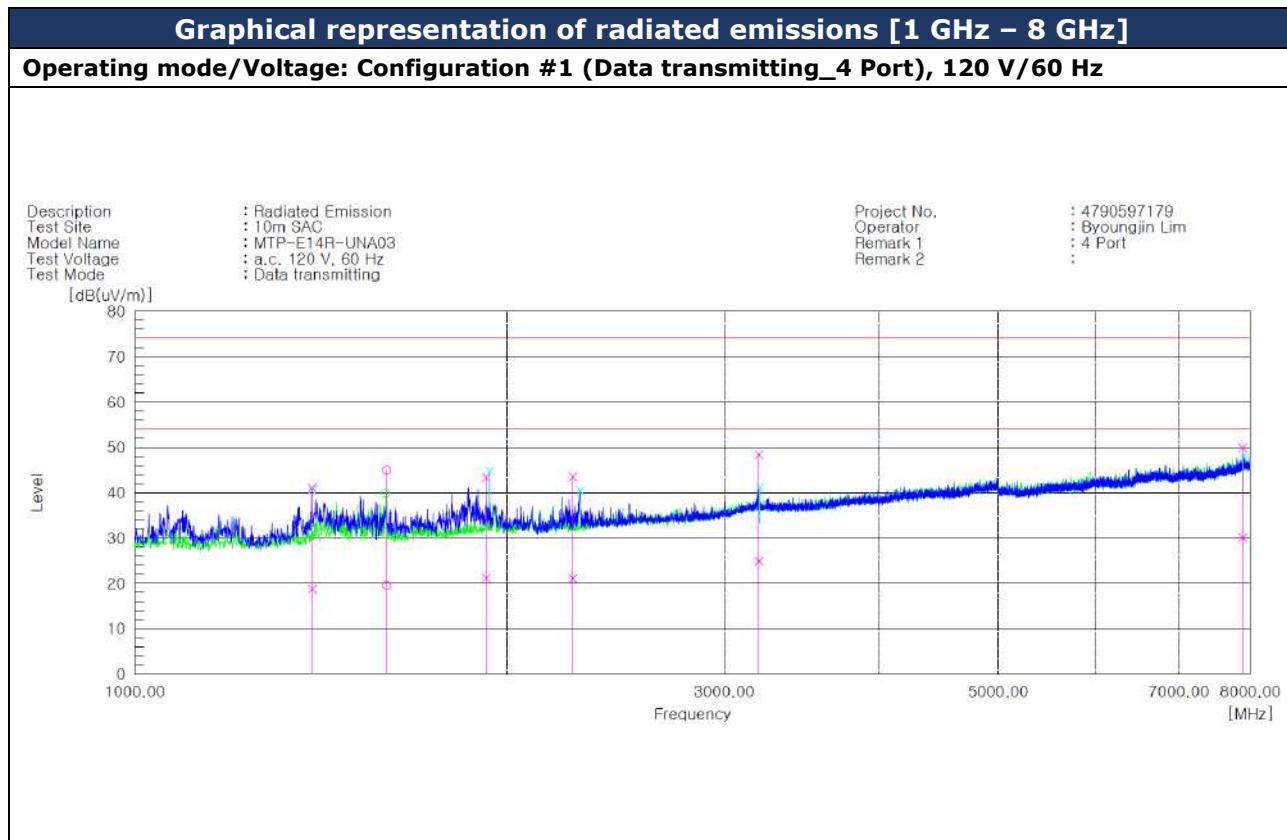
Photo of test set up for radiated emissions

**Test configuration: Configuration #2 (Data transmitting_1 Port)
[Above 1 GHz]**





5.3.3 Test results



Tabulated results of radiated emission [1 GHz – 8 GHz]

--- Horizontal Polarization (PK)---

No.	Frequency [MHz]	Reading [dB(uV)]	c.f [dB(1/m)]	Result [dB(uV/m)]	Limit [dB(uV/m)]	Margin [dB]	Height [cm]	Angle [deg]
1	1599.991	53.9	-9.0	44.9	74.0	29.1	269.0	359.0

--- Horizontal Polarization (CAV)---

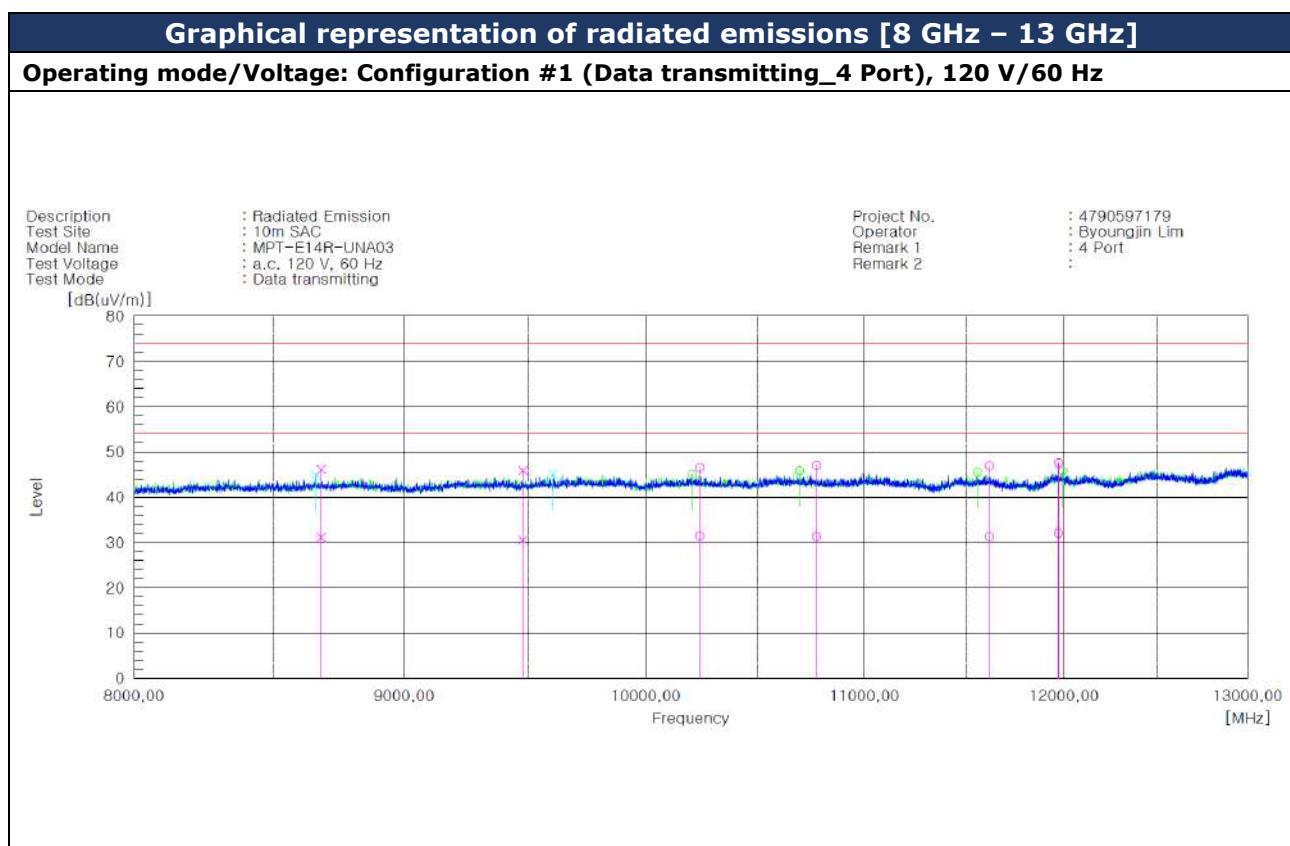
No.	Frequency [MHz]	Reading [dB(uV)]	c.f [dB(1/m)]	Result [dB(uV/m)]	Limit [dB(uV/m)]	Margin [dB]	Height [cm]	Angle [deg]
1	1599.991	28.6	-9.0	19.6	54.0	34.4	269.0	359.0

--- Vertical Polarization (PK)---

No.	Frequency [MHz]	Reading [dB(uV)]	c.f [dB(1/m)]	Result [dB(uV/m)]	Limit [dB(uV/m)]	Margin [dB]	Height [cm]	Angle [deg]
1	1391.370	51.6	-10.5	41.1	74.0	32.9	292.1	21.4
2	1924.820	50.3	-7.0	43.3	74.0	30.7	383.3	86.2
3	2262.551	49.2	-5.7	43.5	74.0	30.5	308.9	98.5
4	3200.157	48.2	0.2	48.4	74.0	25.6	305.2	148.6
5	7881.001	39.0	10.9	49.9	74.0	24.1	398.1	339.5

--- Vertical Polarization (CAV)---

No.	Frequency [MHz]	Reading [dB(uV)]	c.f [dB(1/m)]	Result [dB(uV/m)]	Limit [dB(uV/m)]	Margin [dB]	Height [cm]	Angle [deg]
1	1391.370	29.2	-10.5	18.7	54.0	35.3	292.1	21.4
2	1924.820	28.1	-7.0	21.1	54.0	32.9	383.3	86.2
3	2262.551	26.8	-5.7	21.1	54.0	32.9	308.9	98.5
4	3200.157	24.7	0.2	24.9	54.0	29.1	305.2	148.6
5	7881.001	19.2	10.9	30.1	54.0	23.9	398.1	339.5



Tabulated results of radiated emission [8 GHz – 13 GHz]

--- Horizontal Polarization (PK)---

No.	Frequency [MHz]	Reading [dB(uV)]	c.f [dB(1/m)]	Result [dB(uV/m)]	Limit [dB(uV/m)]	Margin [dB]	Height [cm]	Angle [deg]
1	10237.130	31.5	15.0	46.5	74.0	27.5	198.7	98.2
2	10771.090	32.0	15.0	47.0	74.0	27.0	102.8	34.7
3	11614.810	30.8	16.1	46.9	74.0	27.1	171.6	136.0
4	11971.230	30.6	16.9	47.5	74.0	26.5	191.2	203.3

--- Horizontal Polarization (CAV)---

No.	Frequency [MHz]	Reading [dB(uV)]	c.f [dB(1/m)]	Result [dB(uV/m)]	Limit [dB(uV/m)]	Margin [dB]	Height [cm]	Angle [deg]
1	10237.130	16.4	15.0	31.4	54.0	22.6	198.7	98.2
2	10771.090	16.3	15.0	31.3	54.0	22.7	102.8	34.7
3	11614.810	15.2	16.1	31.3	54.0	22.7	171.6	136.0
4	11971.230	15.1	16.9	32.0	54.0	22.0	191.2	203.3

--- Vertical Polarization (PK)---

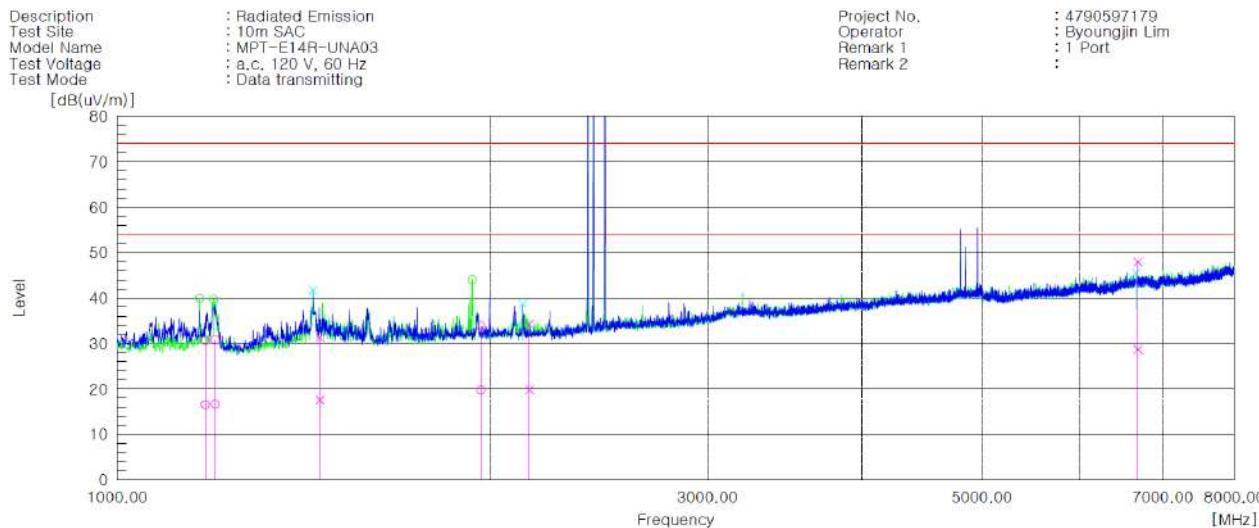
No.	Frequency [MHz]	Reading [dB(uV)]	c.f [dB(1/m)]	Result [dB(uV/m)]	Limit [dB(uV/m)]	Margin [dB]	Height [cm]	Angle [deg]
1	8680.058	33.2	12.9	46.1	74.0	27.9	298.5	316.9
2	9477.173	31.8	14.1	45.9	74.0	28.1	304.8	231.0

--- Vertical Polarization (CAV)---

No.	Frequency [MHz]	Reading [dB(uV)]	c.f [dB(1/m)]	Result [dB(uV/m)]	Limit [dB(uV/m)]	Margin [dB]	Height [cm]	Angle [deg]
1	8680.058	18.2	12.9	31.1	54.0	22.9	298.5	316.9
2	9477.173	16.4	14.1	30.5	54.0	23.5	304.8	231.0

Graphical representation of radiated emissions [1 GHz – 8 GHz]

Operating mode/Voltage: Configuration #2 (Data transmitting_1 Port), 120 V/60 Hz



Tabulated results of radiated emission [1 GHz – 8 GHz]

--- Horizontal Polarization (PK)---

No.	Frequency [MHz]	Reading [dB(uV)]	c.f [dB(1/m)]	Result [dB(uV/m)]	Limit [dB(uV/m)]	Margin [dB]	Height [cm]	Angle [deg]
1	1199.805	43.0	-12.2	30.8	74.0	43.2	293.6	307.8
2	1178.292	43.0	-12.3	30.7	74.0	43.3	168.4	152.1
3	1968.055	40.6	-6.8	33.8	74.0	40.2	207.4	308.3

--- Horizontal Polarization (CAV)---

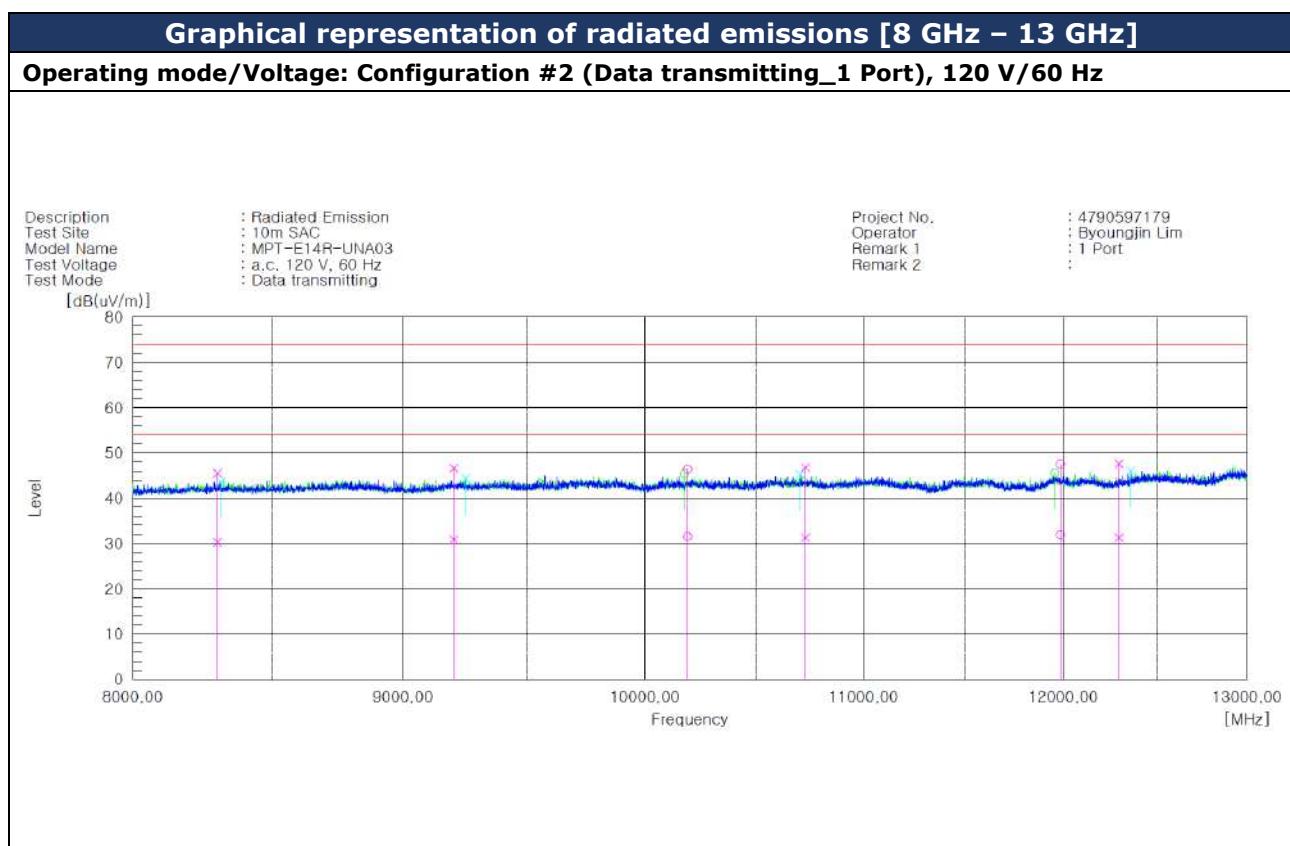
No.	Frequency [MHz]	Reading [dB(uV)]	c.f [dB(1/m)]	Result [dB(uV/m)]	Limit [dB(uV/m)]	Margin [dB]	Height [cm]	Angle [deg]
1	1199.805	28.9	-12.2	16.7	54.0	37.3	293.6	307.8
2	1178.292	28.9	-12.3	16.6	54.0	37.4	168.4	152.1
3	1968.055	26.6	-6.8	19.8	54.0	34.2	207.4	308.3

--- Vertical Polarization (PK)---

No.	Frequency [MHz]	Reading [dB(uV)]	c.f [dB(1/m)]	Result [dB(uV/m)]	Limit [dB(uV/m)]	Margin [dB]	Height [cm]	Angle [deg]
1	1458.148	41.2	-9.9	31.3	74.0	42.7	190.1	183.6
2	2153.562	40.4	-6.2	34.2	74.0	39.8	346.0	26.5
3	6684.041	39.1	8.9	48.0	74.0	26.0	107.0	274.1

--- Vertical Polarization (CAV)---

No.	Frequency [MHz]	Reading [dB(uV)]	c.f [dB(1/m)]	Result [dB(uV/m)]	Limit [dB(uV/m)]	Margin [dB]	Height [cm]	Angle [deg]
1	1458.148	27.5	-9.9	17.6	54.0	36.4	190.1	183.6
2	2153.562	26.1	-6.2	19.9	54.0	34.1	346.0	26.5
3	6684.041	19.8	8.9	28.7	54.0	25.3	107.0	274.1



Tabulated results of radiated emission [8 GHz – 13 GHz]

--- Horizontal Polarization (PK)---

No.	Frequency [MHz]	Reading [dB(uV)]	c.f [dB(1/m)]	Result [dB(uV/m)]	Limit [dB(uV/m)]	Margin [dB]	Height [cm]	Angle [deg]
1	10187.550	31.3	15.1	46.4	74.0	27.6	236.2	327.8
2	11986.020	30.6	16.9	47.5	74.0	26.5	120.8	228.6

--- Horizontal Polarization (CAV)---

No.	Frequency [MHz]	Reading [dB(uV)]	c.f [dB(1/m)]	Result [dB(uV/m)]	Limit [dB(uV/m)]	Margin [dB]	Height [cm]	Angle [deg]
1	10187.550	16.4	15.1	31.5	54.0	22.5	236.2	327.8
2	11986.020	15.0	16.9	31.9	54.0	22.1	120.8	228.6

--- Vertical Polarization (PK)---

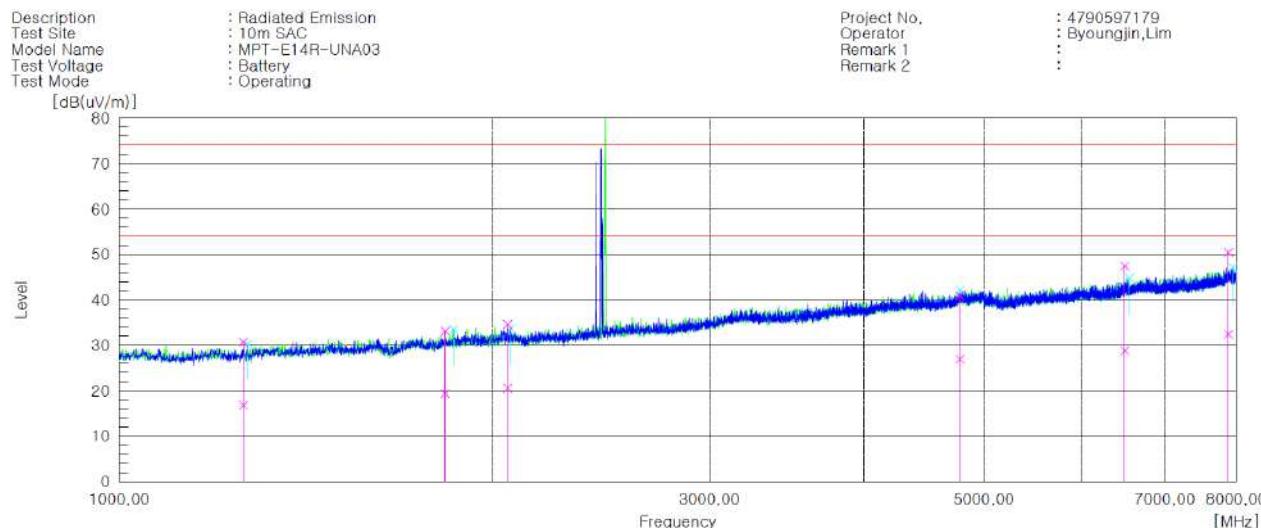
No.	Frequency [MHz]	Reading [dB(uV)]	c.f [dB(1/m)]	Result [dB(uV/m)]	Limit [dB(uV/m)]	Margin [dB]	Height [cm]	Angle [deg]
1	8300.701	33.4	12.1	45.5	74.0	28.5	198.5	195.8
2	9202.014	32.8	13.8	46.6	74.0	27.4	109.6	261.9
3	10724.670	31.8	15.0	46.8	74.0	27.2	242.3	179.6
4	12294.840	30.2	17.4	47.6	74.0	26.4	337.9	359.9

--- Vertical Polarization (CAV)---

No.	Frequency [MHz]	Reading [dB(uV)]	c.f [dB(1/m)]	Result [dB(uV/m)]	Limit [dB(uV/m)]	Margin [dB]	Height [cm]	Angle [deg]
1	8300.701	18.1	12.1	30.2	54.0	23.8	198.5	195.8
2	9202.014	17.1	13.8	30.9	54.0	23.1	109.6	261.9
3	10724.670	16.3	15.0	31.3	54.0	22.7	242.3	179.6
4	12294.840	13.9	17.4	31.3	54.0	22.7	337.9	359.9

Graphical representation of radiated emissions [1 GHz – 8 GHz]

Operating mode/Voltage: Configuration #3 (ECG measuring), Battery (3 Vdc)



Tabulated results of radiated emission [1 GHz – 8 GHz]

--- Vertical Polarization (PK)---

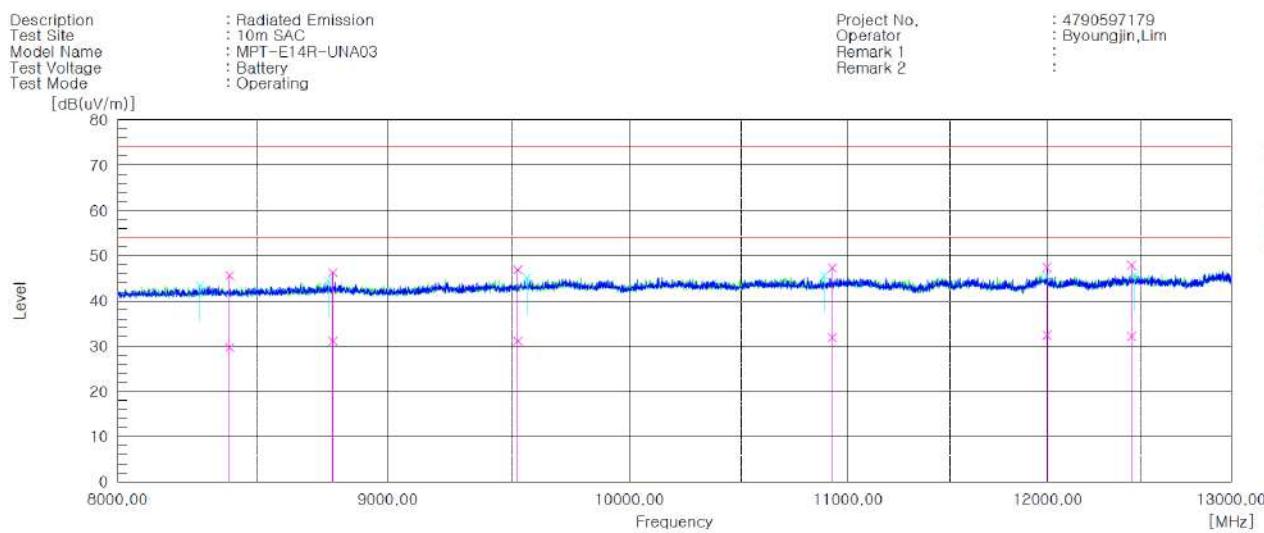
No.	Frequency [MHz]	Reading [dB(uV)]	c.f [dB(1/m)]	Result [dB(uV/m)]	Limit [dB(uV/m)]	Margin [dB]	Height [cm]	Angle [deg]
1	1260.233	42.6	-11.9	30.7	74.0	43.3	100.7	112.8
2	1834.123	40.9	-7.8	33.1	74.0	40.9	101.4	63.5
3	2060.592	41.2	-6.6	34.6	74.0	39.4	234.1	311.0
4	4780.260	36.0	5.0	41.0	74.0	33.0	120.7	242.3
5	6497.037	39.1	8.3	47.4	74.0	26.6	275.4	54.1
6	7877.206	39.9	10.5	50.4	74.0	23.6	151.6	304.7

--- Vertical Polarization (CAV)---

No.	Frequency [MHz]	Reading [dB(uV)]	c.f [dB(1/m)]	Result [dB(uV/m)]	Limit [dB(uV/m)]	Margin [dB]	Height [cm]	Angle [deg]
1	1260.233	28.7	-11.9	16.8	54.0	37.2	100.7	112.8
2	1834.123	27.2	-7.8	19.4	54.0	34.6	101.4	63.5
3	2060.592	27.2	-6.6	20.6	54.0	33.4	234.1	311.0
4	4780.260	21.9	5.0	26.9	54.0	27.1	120.7	242.3
5	6497.037	20.5	8.3	28.8	54.0	25.2	275.4	54.1
6	7877.206	21.9	10.5	32.4	54.0	21.6	151.6	304.7

Graphical representation of radiated emissions [8 GHz – 13 GHz]

Operating mode/Voltage: Configuration #3 (ECG measuring), Battery (3 Vdc)



Tabulated results of radiated emission [8 GHz – 13 GHz]

--- Vertical Polarization (PK)---

No.	Frequency [MHz]	Reading [dB(uV)]	c.f [dB(1/m)]	Result [dB(uV/m)]	Limit [dB(uV/m)]	Margin [dB]	Height [cm]	Angle [deg]
1	8399.819	34.0	11.6	45.6	74.0	28.4	125.3	60.8
2	8787.068	33.6	12.7	46.3	74.0	27.7	160.4	27.2
3	9524.693	32.9	14.0	46.9	74.0	27.1	386.6	266.6
4	10923.810	32.0	15.3	47.3	74.0	26.7	299.7	126.4
5	11996.620	30.5	16.9	47.4	74.0	26.6	236.8	257.8
6	12446.840	30.1	17.8	47.9	74.0	26.1	399.8	80.4

--- Vertical Polarization (CAV)---

No.	Frequency [MHz]	Reading [dB(uV)]	c.f [dB(1/m)]	Result [dB(uV/m)]	Limit [dB(uV/m)]	Margin [dB]	Height [cm]	Angle [deg]
1	8399.819	18.1	11.6	29.7	54.0	24.3	125.3	60.8
2	8787.068	18.4	12.7	31.1	54.0	22.9	160.4	27.2
3	9524.693	17.1	14.0	31.1	54.0	22.9	386.6	266.6
4	10923.810	16.6	15.3	31.9	54.0	22.1	299.7	126.4
5	11996.620	15.5	16.9	32.4	54.0	21.6	236.8	257.8
6	12446.840	14.4	17.8	32.2	54.0	21.8	399.8	80.4

6.0 EUT Photographs

EUT External Photographs

Front



Rear



● Cradle 4 Port



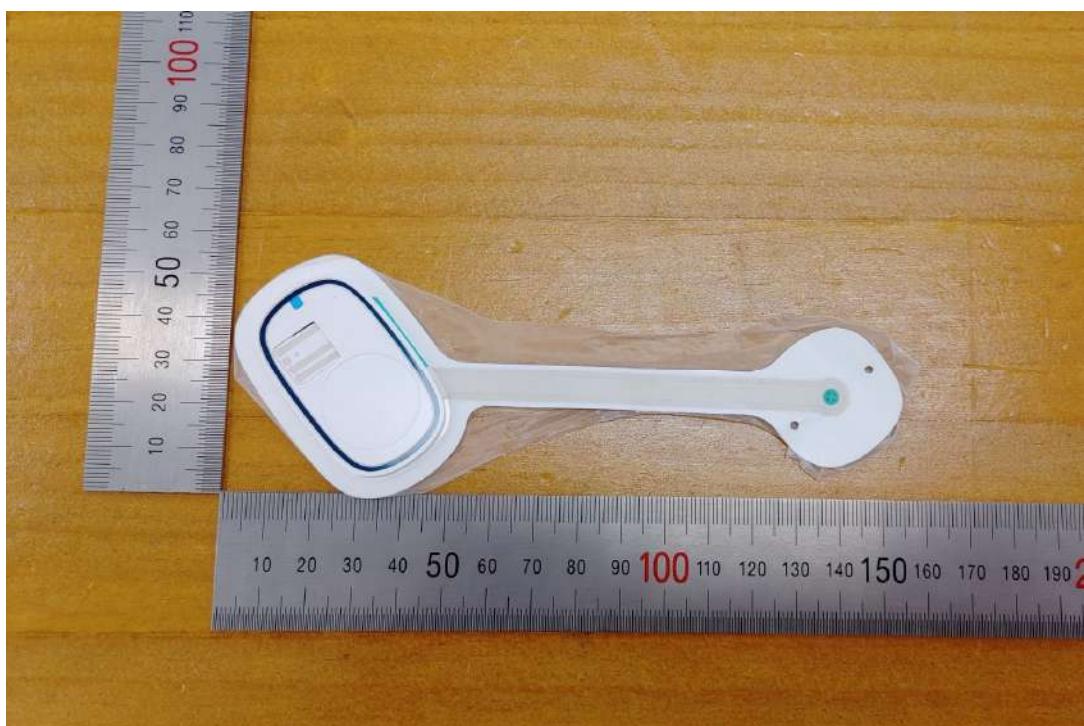
● Power Supply



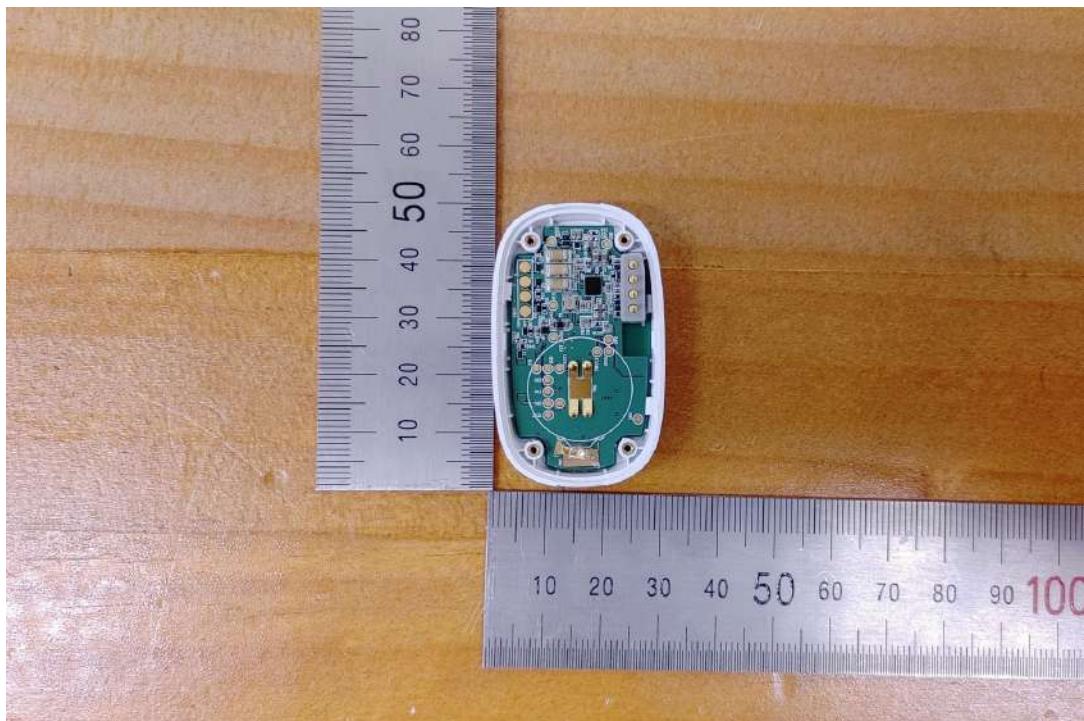
● Cradle 1 Port



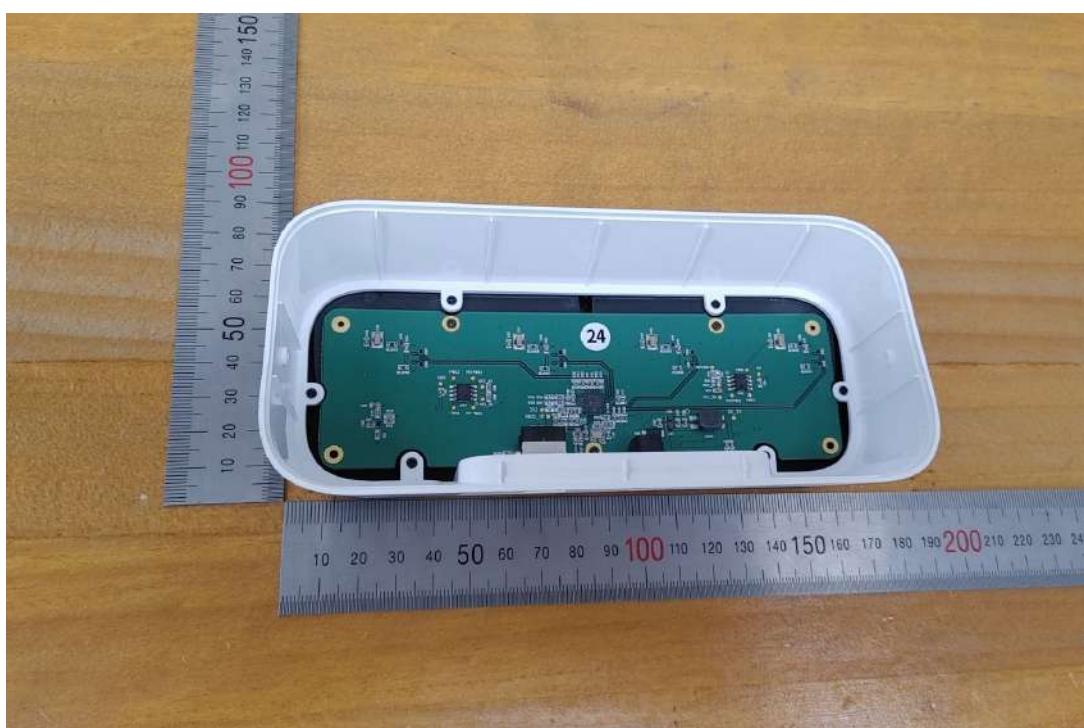
● ECG Monitoring Electrodes



EUT Internal Photographs



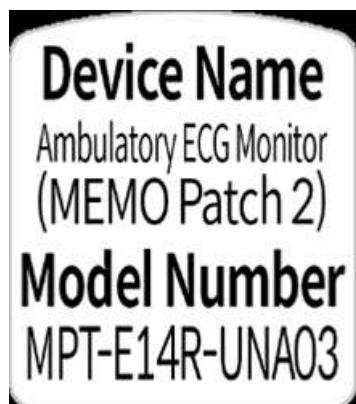
● Cradle 4 Port



● Cradle 1 Port



Label



End of test report