Test Report

DEKRA
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Report No. :
YI-QA-24-EMC-I034
Page (1)/(26)Pages

1. Client

- Company : O-JIN CORPORATION
- Address : 61-1, Seosomun-ro, Seodaemun-gu, Seoul South Korea
- Date of receipt : 2024-11-01
- Contact Person : Sak Lee
- E-mail : slee@o-jin.co.kr
- Tel/Fax : +82-10-3955-8653 / -

2. Sample Description

- Product name : Charging Dock
- Model number : IMMC100

3. Date of Test: 2024-11-12 ~ 2024-11-13

4. Location of Test: ■ Permanent Testing Lab ☐ On Site Testing
(Address: 498-2, Geumeo-ro, Pogok-eup, Cheoin-gu, Yongin-si, Gyeonggi-do, Republic of Korea)

5. Test method used: FCC 47 CFR Part 15 Subpart B (Class B)
ANSI C63.4a_2017

6. Test Results

Test Items	Test Results
Conducted Emission	Complied
Radiated Emission (BELOW 1 GHz)	Complied
Radiated Emission (ABOVE 1 GHz)	Complied
Antenna power conduction	N/A

The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

	Tested by	Techincal manager
Affirmation	Name : Jeong Hun Kim 김 정 훈	Name : Woo Ram Han 한 우 람

The above test certificate is a test report not related to the Korean Laboratory Accreditation Scheme.

2024-11-20

DEKRA Korea Co., Ltd.

Report History

Revision	Date	Description
-	2024-11-20	Initial release

Table of Contents

1 General Information

1.1 Notes

The test results of this test report relate exclusively to the test item specified in 2.2. The DEKRA Korea Co., Ltd. does not assume responsibility for any conclusions and generalisations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of the DEKRA Korea Co., Ltd.

1.2 Testing Laboratory

Test Location :
DEKRA Korea Co., Ltd.

P. O. box 17030
Address :
498-2, Geumeo-ro, Pogok-eup, Cheoin-gu, Yongin-si, Gyeonggi-do, Republic of Korea
Affiliated facilities:
494, Geumeo-ro, Pogok-eup, Cheoin-gu, Yongin-si, Gyeonggi-do, Republic of Korea
Tel : +82-31-338-8837
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E-mail : roony.ahn@dekra.com
Internet : https://www.dekra.kr

2 Applicant Information

2.1 EUT Details

Product name	**Charging Dock**
Model number	**IMMC100**
Variant model name	**N/A**
Serial number	**N/A**
Test voltage	**AC 120 V, 60 Hz**
Power supply	**AC 120 V, 60 Hz**
Interface	**USB(1), USB-C(1), 4PIN(1)**
Frequency range	**N/A**
Test Site Registration Number	**FCC (KR0151)**
Manufacture	**ManJo Tech** **548 Prima BizTower 24, Homaesil-ro 90beon-gil, Gwonseon-gu,Suwon-si, Gyeonggi-do, Korea**

2.2 Test mode and Condition

Test mode	**Normal Operation Mode**
Test voltage	**AC 120 V, 60 Hz**

2.3 Peripheral Equipment

Test set-up of EUT

Description	Model	Serial No.	Manufacturer
Charging Dock	IMMC100	None	ManJo Tech
Mouse1	MR0083	None	Logitech
Mouse2	None	None	None
Notebook	13Z970	703NZZA026429	LG
Adapter	ADS-40MSG-19 19040GPK	EAY63128601	Shenzhen Honor Electronic Co.,Ltd.

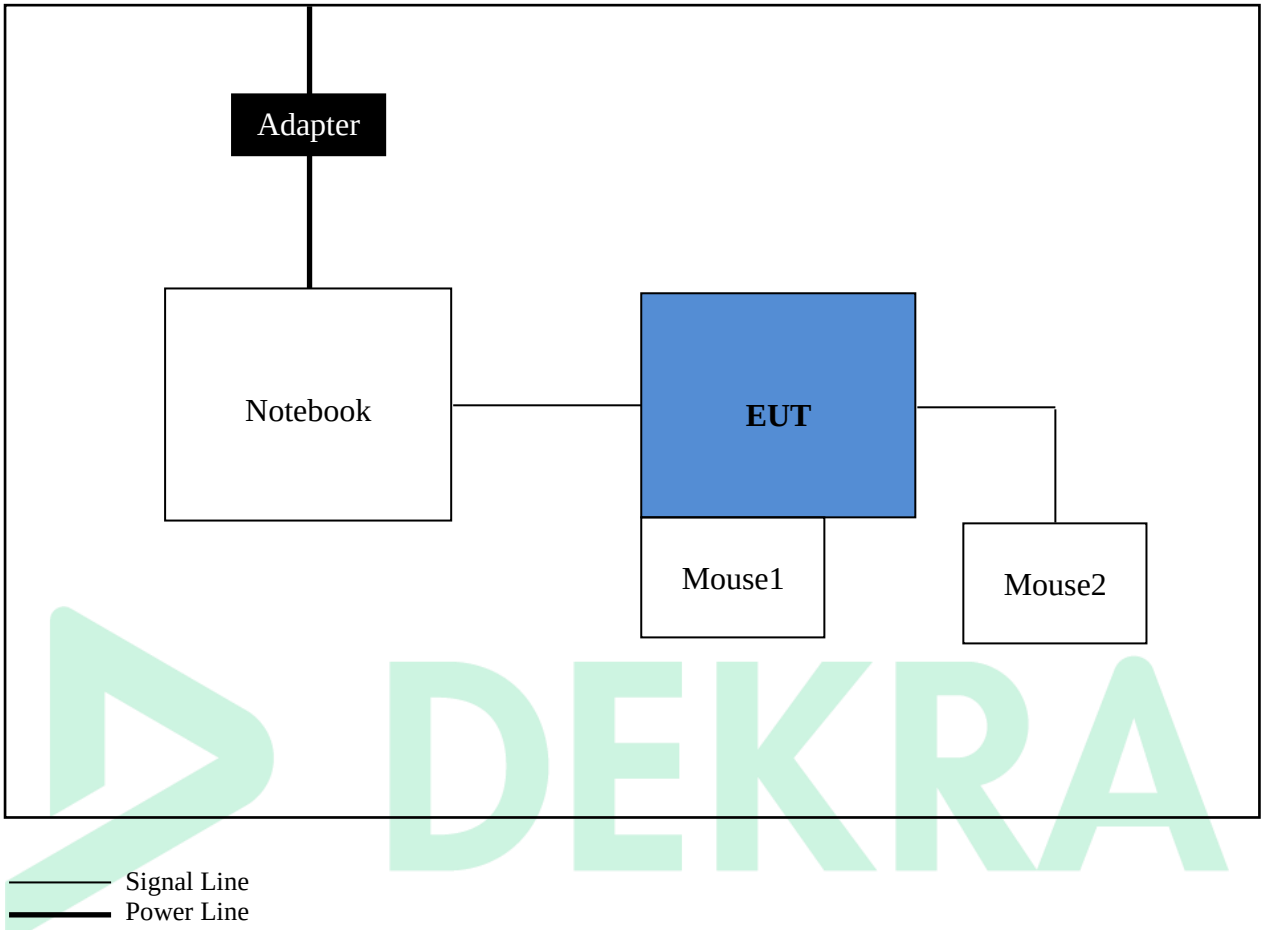
Component parts of EUT

Description	Model	Serial No.	Manufacturer
-	-	-	-

2.4 Cable list

Start		END		Cable Spec.		
Name	I/O Port	Name	I/O Port	Length (m)	Shield	Core
EUT	USB-C	Notebook	USB	1.0	Unshielded	N
	USB	Mouse 2	USB	1.0	Unshielded	N
	4PIN	Mouse 1	4PIN	Direct	-	-
Notebook	DC IN	Adapter	DC OUT	1.0	Unshielded	N

2.5 Test System Layout



3 Description of Tests

3.1 Conducted Emission Measurement

Conducted emissions measurements were made in accordance with section 11, "Measurement of Information Technology Equipment" of ANSI C63.4-2014. The measurement was performed over the frequency range of 0.15 MHz to 30 MHz using a 50Ω/50uH LISN as the input transducer to a Spectrum Analyzer or a Field Intensity Meter. The measurements were made with the detector set for "Peak" amplitude within a bandwidth of 10 kHz or for "quasi-peak" within a bandwidth of 9 kHz.
The line-conducted emission test is conducted inside a shielded anechoic chamber room with 1m x 1.5m x 0.8m wooden table which is placed 40cm away from the vertical wall and 1.5m away from the side wall of the chamber room. Two LISNs are bonded to bottom plane of the shielded room. The EUT is powered from the Com-power LISN and the support equipment is powered from the another Com-power LISN. Power to the LISNs is filtered by a noise cut power line filters. All electrical cables are shielded by braided tinned steel tubing with inner ϕ 1.2cm. If the EUT is a DC-powered device, power will be derived from the source power supply it normally will be powered from and these supply lines will be connected to the Com-power LISN. All interconnecting cables more than 1m were shortened by non-inductive bundling (serpentine fashion) to a 1m length. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the Signal Analyzer Spectrum Analyzer to determine the frequency producing the max. Emission from the EUT. The frequencies are producing the max. Level was reexamined using the detector function set to the CISPR Quasi-Peak mode by manual, after scanned by automatic Peak mode from 0.15 to 30 MHz. The bandwidth of the Spectrum Analyzer was set to 9 kHz. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Each emission was maximized by switching power lines, varying the mode of operation or resolution, clock or data exchange speed, if applicable, whichever determined the worst-case emission. Each emission reported was calibrated using self-calibrating mode.

Photographs of the worst-case emission can be seen in photographs of conducted emission test setup.

3.2 Radiated Emission Measurement

Preliminary measurements were made at indoors 3 m semi EMC Anechoic Chamber using broadband antennas, broadband amplifier, and spectrum analyzer to determine the emission frequencies producing the maximum EME.

Appropriate precaution was taken to ensure that all emissions from the EUT were maximized and investigated. The system configuration, mode of operation, turntable azimuth with respect to the antenna was noted for each frequency found. The spectrum was scanned from 30 MHz to 1 000 MHz using bilog antenna and above 1 000 MHz, linearly polarized double ridge horn antennas were used. Above 1 GHz, linearly polarized double ridge horn antennas were used. The measurements were performed with three frequencies which were selected as bottom, middle and top frequency in the operating band. Emission levels from the EUT with various configurations were examined on the spectrum analyzer connected with the RF amplifier and plotted graphically.

Final measurements were made outdoors open site at 10 m test range using bilog antenna. The output from the antenna was connected, via a pre-selector or a preamplifier, to the input of the EMI Measuring Receiver and Spectrum analyzer(for above 1 GHz). The detector function was set to the quasi-peak or peak mode as appropriate. The measurement bandwidth on the Field strength receiver was set to at least 120 kHz (1 MHz for measurement above 1 GHz), with all post-detector filtering no less than 10 times the measurement bandwidth. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition.

Each frequency found during preliminary measurement was examined and investigated as the same set up and configuration which produced the maximum emission The EUT, support equipment and interconnecting cables were configured to the set-up producing the maximum emission for the frequency and were placed on top of a 0.8-meter high non-metallic 1 m x 1.5 m table. The turntable containing the system was rotated and the antenna height was varied 1 m to 4 m and stopped at the azimuth or height producing the maximum emission.

Each emission was maximized by varying the mode of operating frequencies of the EUT. The system was tested in all the three orthogonal planes and changing the polarity of the antenna. The worst case emissions are recorded in the data tables. If necessary, the radiated emission measurement could be performed at a closer distance to ensure higher accuracy and the results were extrapolated to the specified distance using an inverse linear distance extrapolation factor(20 dB/decade) as per section 15.31(f).

Photographs of the worst-case emission test setup can be seen in Appendix 1.

3.3 Antenna-conducted power measurements

A typical signal or an unmodulated CW signal at the operating frequency of the EUT shall be supplied to the EUT for all measurements. Such a signal may be supplied by either a signal generator with an antenna in close proximity to the EUT or directly conducted into the antenna terminals of the EUT. The signal level shall be sufficient to stabilize the local oscillator of the EUT.

Antenna-conducted power measurements was performed when a receiver is measured for radiated emissions with a terminating resistor instead of an antenna connected to the antenna input terminals of the device. Power available from the receive antenna terminals was to be determined by measurement of the voltage present at these terminals. For frequencies below or equal to 1 000 MHz, a quasi-peak detector shall be used for these measurements. If the peak detected signals are below the limit, then no further investigation of the quasi-peak readings is required. For frequencies above 1 000 MHz, both a peak and an Cispr-average detector shall be used for these measurements. When emissions limits are specified for both Cispr-average and peak detection, if the peak measured value meets the Cispr-average limit, it is unnecessary to perform an Cispr-average measurement.

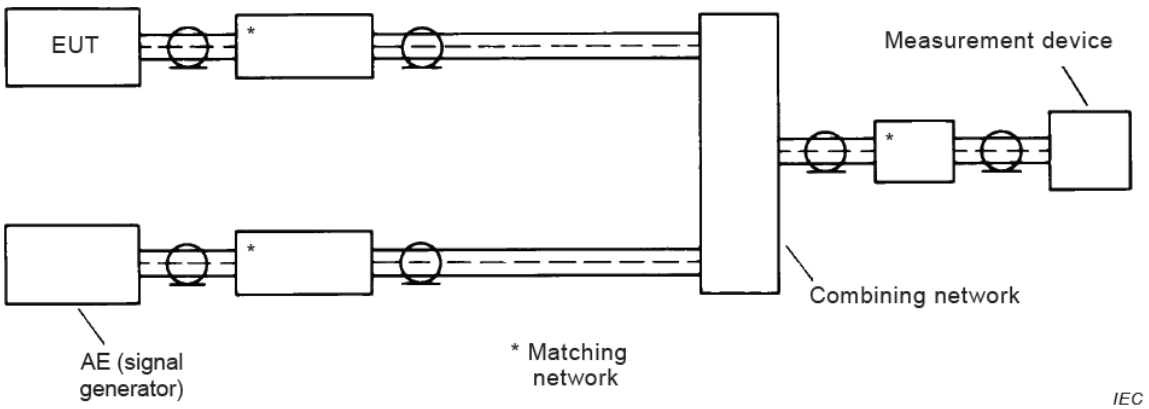
Antenna–conducted power measurements was performed with the EUT antenna terminals connected to measuring instrument (R&S / ESR3) using a impedance-matching pad(UNMP-5075+ / MINI-CIRCUITS) to connect the measurement instrument to the antenna terminals of the EUT.

Losses in decibels in impedance-matching network used was added to the measured values in $dB\mu V$.

With the receiver tuned to one of the number of frequencies, measure both the frequency and voltage present at the antenna input terminals over the frequency range specified in the individual equipment requirements.

The measurements was repeated with the receiver tuned to another frequency until the number of frequencies had been successively measured.

Power available from the receive antenna terminals is the ratio of V2 / R, where V is the loss-corrected voltage measured at the antenna terminals, and R is the impedance of the measuring instrument.



4 Test Condition

4.1 Test Configuration

The device was configured for testing in a typical fashion (as a customer would normally use it). During the tests, the EUT and the supported equipments were installed to meet FCC requirement and operated in a manner which tends to maximize its emission level in a typical application.

Radiated Emission Test

Preliminary radiated emission tests were conducted using the procedure in ANSI C63.4/2014 Clause 8.3.1.1 to determine the worst operating condition. Final radiated emission tests were conducted at 10 m open field test site.

5 Test summary and results

5.1 Summary of Test Results

The measurement results were obtained with the EUT tested in the conditions described in this report.

FCC Rule Parts	Measurement Required	Result	Remark
15.107(a)	Conducted Emission	Passed by – 17.36 dB	-
15.109(a)	Radiated Emissions	Passed by – 8.29 dB	Below 1 GHz
15.109(a)	Radiated Emissions	Passed by – 16.78 dB	Above 1 GHz
15.111	Antenna-conducted power measurements	N/A	-

※ Remark

* Conducted Emission
Measurement Uncertainty = $U(Co(y)) = k \times uc(Co(y)) = 2 \times 1.241 = 2.48$ dB

* Radiated Emission (BELOW 1 GHz) HORIZONTAL/ VERTICAL
Measurement Uncertainty = $U(Co(y)) = k \times uc(Ro(y)) = 2 \times 2.328 = 4.66$ dB
Measurement Uncertainty = $U(Co(y)) = k \times uc(Ro(y)) = 2 \times 2.880 = 5.76$ dB

* Radiated Emission (ABOVE 1 GHz)
Measurement Uncertainty = $U(Co(y)) = k \times uc(Ro(y)) = 2 \times 2.570 = 5.14$ dB
(The coverage factor k =2 yields approximately a 95 % level of confidence.)
These results are satisfied in accordance with decision rules, including measurements and estimates of measurement uncertainty

5.2 Conducted Emission

5.2.1 Test Results : **Complied**

5.2.2 Measurement equipment

Kind of Equipment	Manufacture / Model	S/N	Calibrated until
TWO LINE-V- NETWORK	Rohde & Schwarz / ESH3-Z5	100296	2025.11.05
EMI TEST RECEVER	Rohde & Schwarz / ESR3	101873	2025.05.13
PULSE LIMITER	Rohde & Schwarz / ESH3-Z2	100288	2025.05.13
Software	Rohde & Schwarz / EMC32	Version 10.50.10	N/A

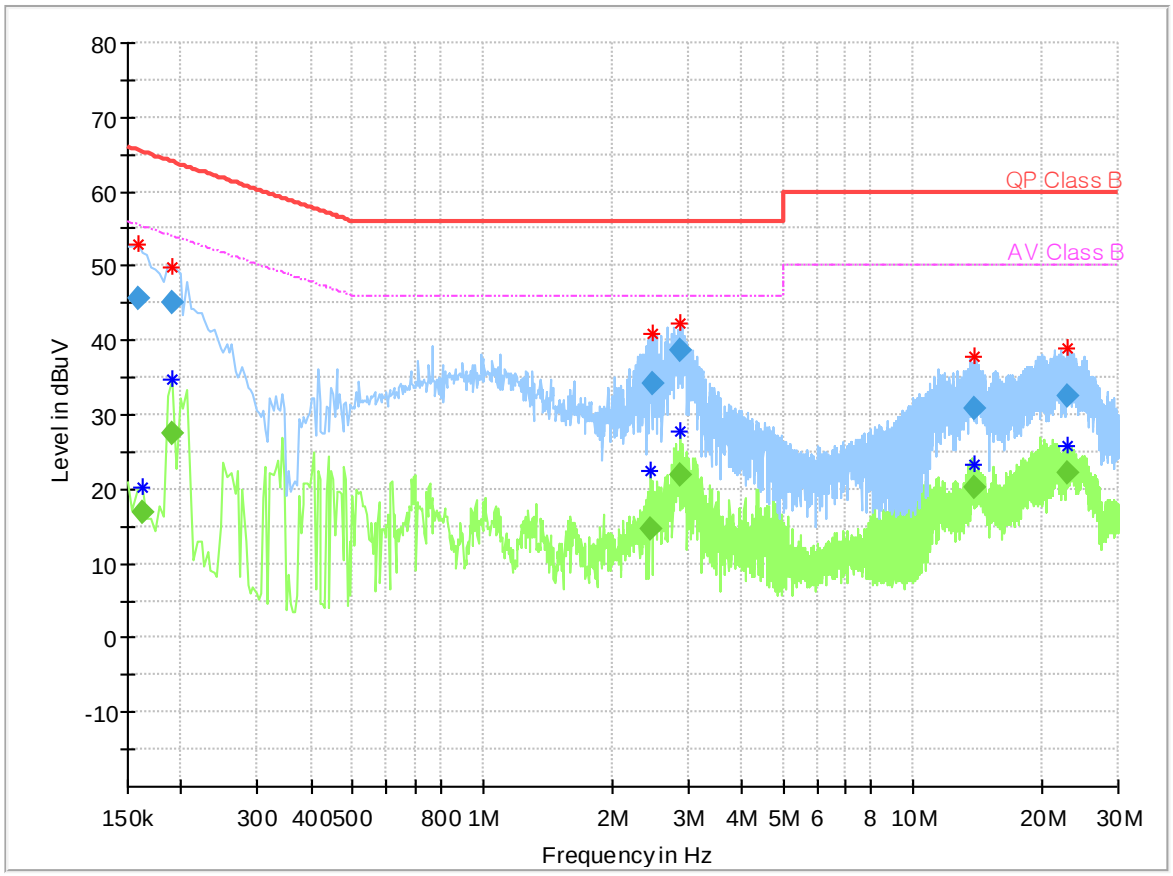
5.2.3 Testing Environment

Test Date: 2024-11-13
Temperature: 23.0 ℃
Humidity: 49.0 % R.H.
Atmospheric Pressure: 100.0 kPa

5.2.4 Test Data

Common Information

Test Description:	Conducted Emission
Test Site:	Shield Room
Project No.:	0452-01-02/24
Model Name:	IMMC100
Test Mode:	Operating mode
Test Date:	2024.11.13



Final_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	PE	Corr. (dB)
0.16	45.70	---	65.57	19.86	7000.0	9.00	N	GND	10.04
0.16	---	16.76	55.36	38.60	7000.0	9.00	L1	GND	10.05
0.19	---	27.53	54.04	26.51	7000.0	9.00	N	GND	10.04
0.19	45.14	---	64.04	18.90	7000.0	9.00	N	GND	10.04
2.47	---	14.65	46.00	31.35	7000.0	9.00	N	GND	10.23
2.49	34.08	---	56.00	21.92	7000.0	9.00	L1	GND	10.26
2.88	---	21.84	46.00	24.16	7000.0	9.00	N	GND	10.26
2.88	38.64	---	56.00	17.36	7000.0	9.00	N	GND	10.26
13.86	30.81	---	60.00	29.19	7000.0	9.00	N	GND	11.13
13.89	---	20.29	50.00	29.71	7000.0	9.00	N	GND	11.14
22.87	32.60	---	60.00	27.40	7000.0	9.00	L1	GND	11.63
22.95	---	22.18	50.00	27.82	7000.0	9.00	L1	GND	11.63

5.3 Radiated Emissions (BELOW 1 GHz)

5.3.1 Test Results : **Complied**

5.3.2 Measurement equipment

Kind of Equipment	Manufacture / Model	S/N	Calibrated until
EMI TEST RECEIVER	ROHDE & SCHWARZ / ESW44	103182	2025.08.29
Antenna Mast	INNCO / MA4640-XP-ET	N/A	N/A
Controller	INNCO / CO3000	CO3000/812/34240914/L	N/A
AMPLIFIER	SONOMA / SONOMA 310N	186486	2025.11.05
TRILOG Supper Broadband test Antenna	SCHWARZBECK / VULB9161 SE	4159	2026.03.21
Software	ROHDE & SCHWARZ / EMC32	Version 10.20.01	N/A

5.3.3 Testing Environment

Test Date: 2024-11-12
Temperature: 23.0 ℃
Humidity: 46.0 % R.H.
Atmospheric Pressure: 100.1 kPa

NOTES :

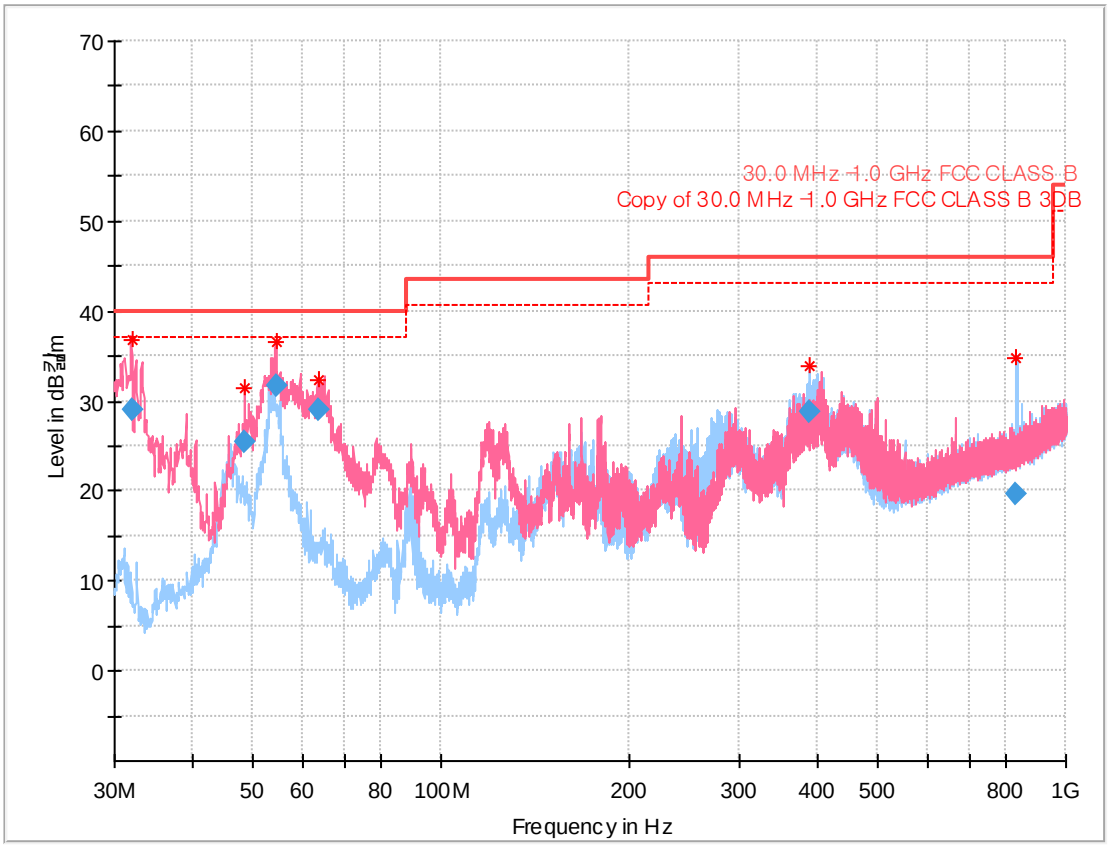
1. * H : Horizontal polarization , ** V : Vertical polarization
2. Emission Level = Reading + Antenna factor + Cable loss + AMP Gain
3. Margin value = Emission Level - Limit
4. dBμV=20log Emission Level(μV/m) ex) 20*log(90)

5.3.4 Test Data

The following table shows the highest levels of radiated emissions on both polarization of horizontal and vertical
Measurement Distance: 3 m

Common Information

Test Description:	Radiated Emission Below 1 GHz
Test Site:	3 m Semi Anechoic Chamber
Project No.:	0452-01-02/24
Model Name:	IMMC100
Test Mode:	Operating mode
Test Date:	2024.11.12



Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
32.000000	29.09	40.00	10.91	5000.0	120.000	115.3	V	150.0	-20.5
48.578067	25.48	40.00	14.52	5000.0	120.000	100.0	V	255.0	-19.1
54.360428	31.71	40.00	8.29	5000.0	120.000	130.1	V	280.0	-17.0
63.493182	29.02	40.00	10.98	5000.0	120.000	100.0	V	28.0	-19.8
388.308167	28.71	46.02	17.31	5000.0	120.000	107.2	H	240.0	-12.7
830.047231	19.65	46.02	26.37	5000.0	120.000	314.4	H	164.0	-3.3

5.4 Radiated Emissions (ABOVE 1 GHz)

5.4.1 Test Results : **Complied**

5.4.2 Measurement equipment

Kind of Equipment	Manufacture / Model	S/N	Calibrated until
EMI TEST RECEIVER	ROHDE & SCHWARZ / ESW44	103182	2025.08.29
Antenna Mast	INNCO / MA4640-XP-ET	N/A	N/A
Controller	INNCO / CO3000	CO3000/812/34240914/L	N/A
Double-ridged horn antenna	R&S / HF906	100236	2025.06.11
Low Noise Amplifier	TESTEK / TK-PA18H	170013-L	2025.05.13
Software	ROHDE & SCHWARZ / EMC32	Version 10.20.01	N/A

5.4.3 Testing Environment

Test Date: 2024-11-12
Temperature: 23.0 ℃
Humidity: 46.0 % R.H.
Atmospheric Pressure: 100.1 kPa

5.3.4 Test Data for above 1 GHz

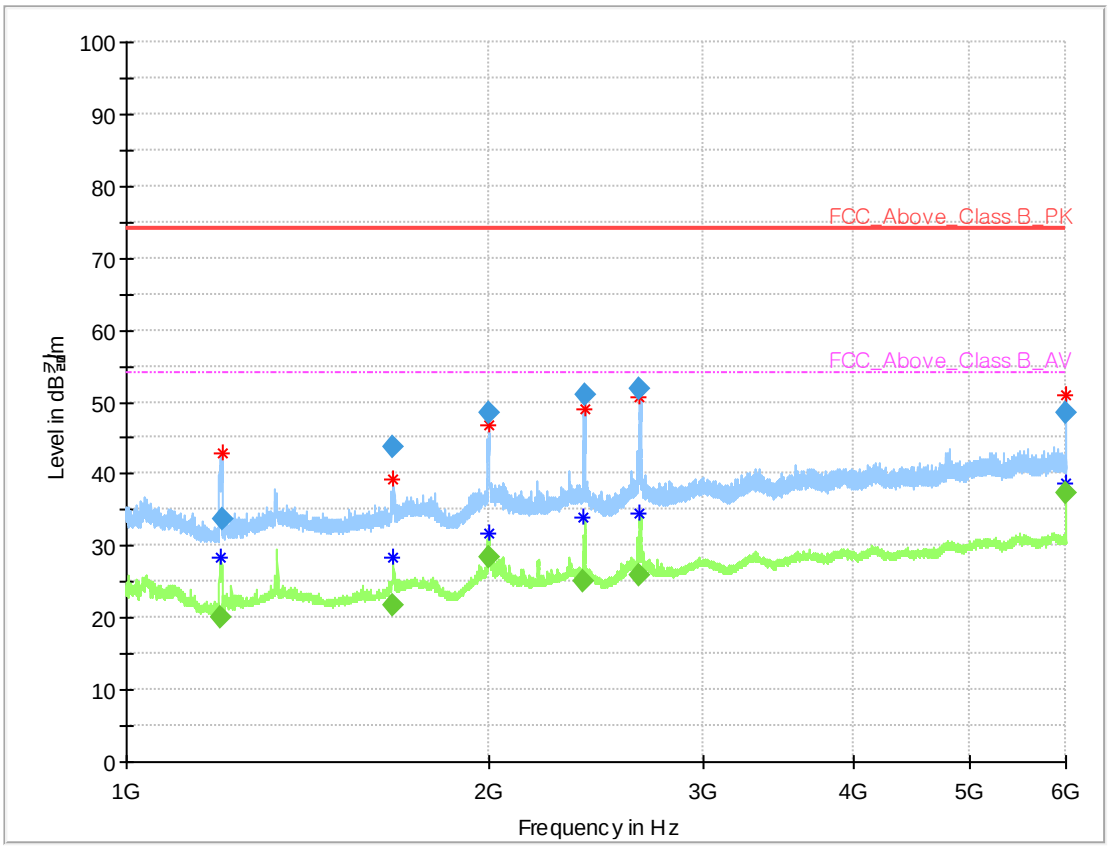
The following table shows the highest levels of radiated emissions on both polarization of horizontal and vertical
Measurement Distance: 3 m

NOTES :

1. * H : Horizontal polarization , ** V : Vertical polarization
2. Emission Level = Reading + Antenna factor + Cable loss + AMP Gain
3. Margin value = Emission Level - Limit

Common Information

Test Description:	Radiated Emission Above 1 GHz
Test Site:	3 m Semi Anechoic Chamber
Project No.:	0452-01-02/24
Model Name:	IMMC100
Test Mode:	Operating mode
Test Date:	2024.11.12

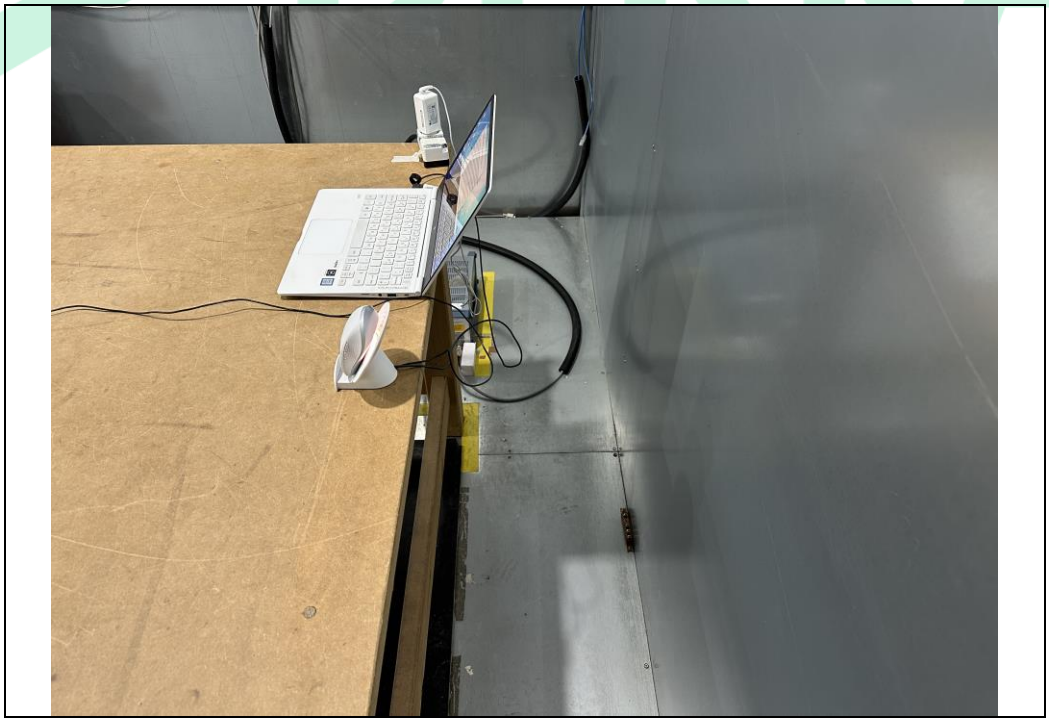


Final_Result

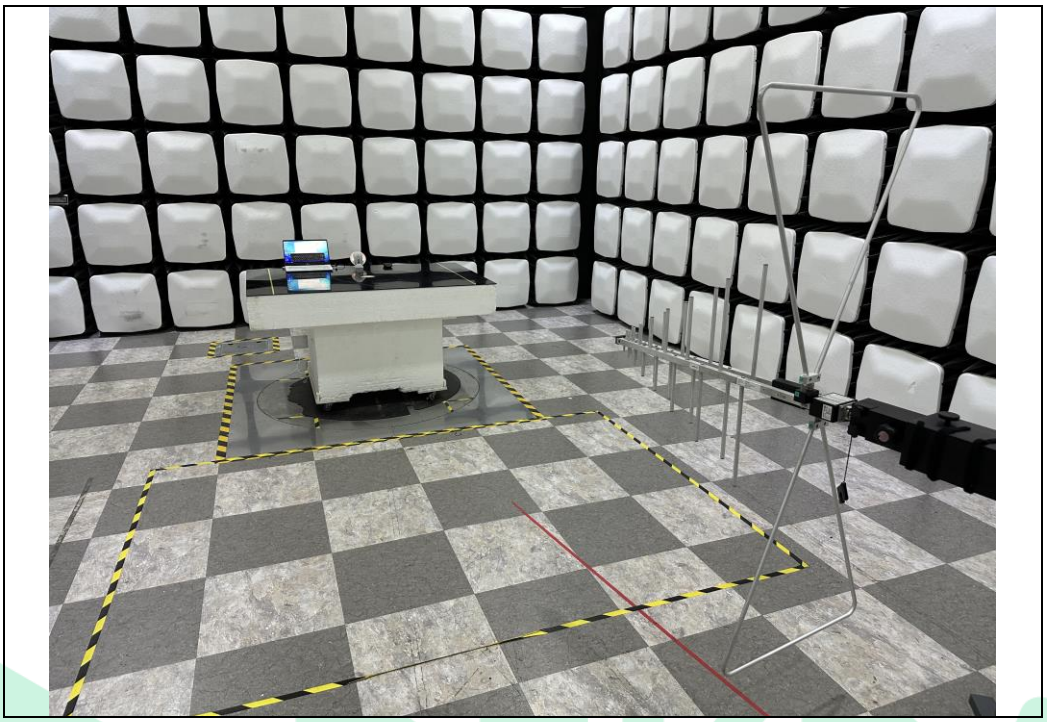
Frequency (MHz)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1194.750000	---	20.08	54.00	33.92	1000.000	230.2	V	122.0	-15.1
1202.303000	33.68	---	74.00	40.32	1000.000	400.0	H	348.0	-15.1
1661.047000	---	21.80	54.00	32.20	1000.000	213.4	V	15.0	-12.6
1662.751000	43.66	---	74.00	30.34	1000.000	193.2	V	-15.0	-12.6
1996.673000	48.54	---	74.00	25.46	1000.000	293.7	V	0.0	-10.4
1999.710000	---	28.42	54.00	25.58	1000.000	276.6	V	0.0	-10.4
2391.500000	---	24.97	54.00	29.03	1000.000	130.0	V	167.0	-8.9
2399.985000	50.89	---	74.00	23.11	1000.000	100.0	V	170.0	-8.9
2660.533000	51.68	---	74.00	22.32	1000.000	100.0	V	15.0	-7.7
2663.799000	---	26.03	54.00	27.97	1000.000	100.0	V	-15.0	-7.7
5994.926000	48.57	---	74.00	25.43	1000.000	124.0	V	26.0	2.3
5996.185300	---	37.22	54.00	16.78	1000.000	100.0	V	21.0	2.3

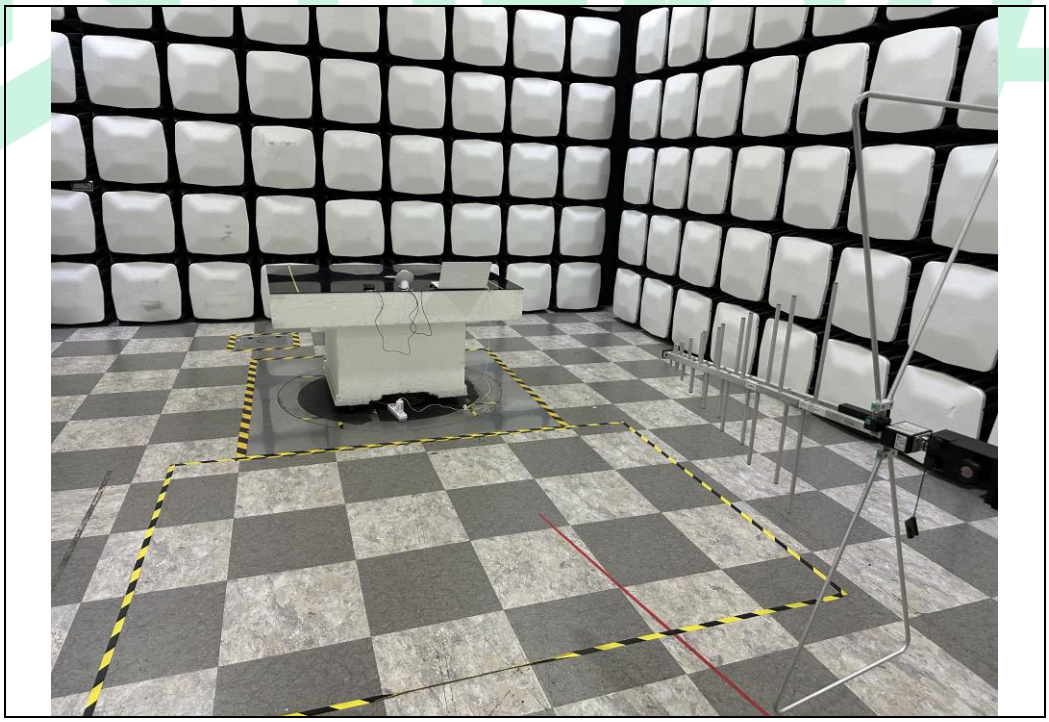
Appendix 1. Test Setup Photographs

Conducted Emission Test Setup

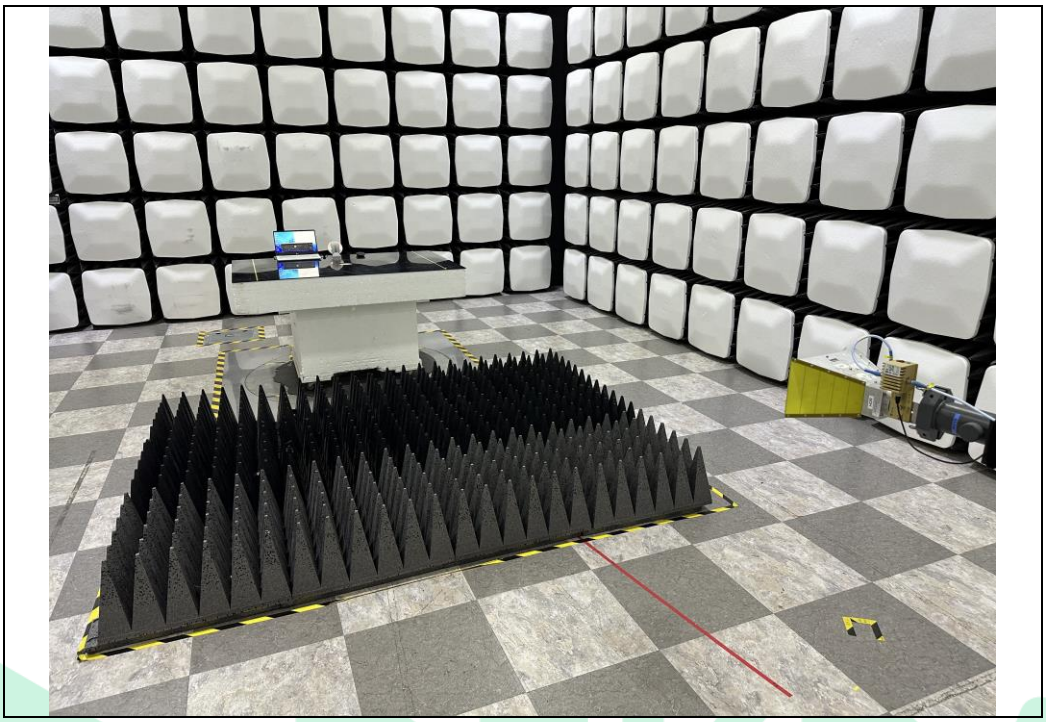


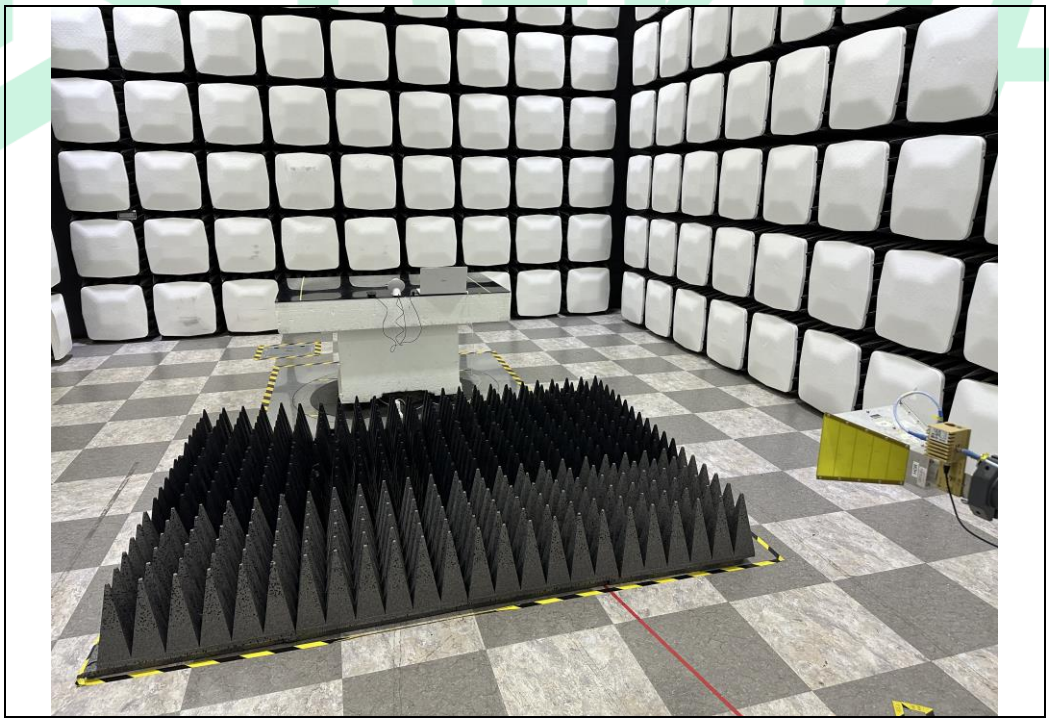
Radiated Emission Test Setup (BELOW 1 GHz)





Radiated Emission Test Setup (ABOVE 1 GHz)

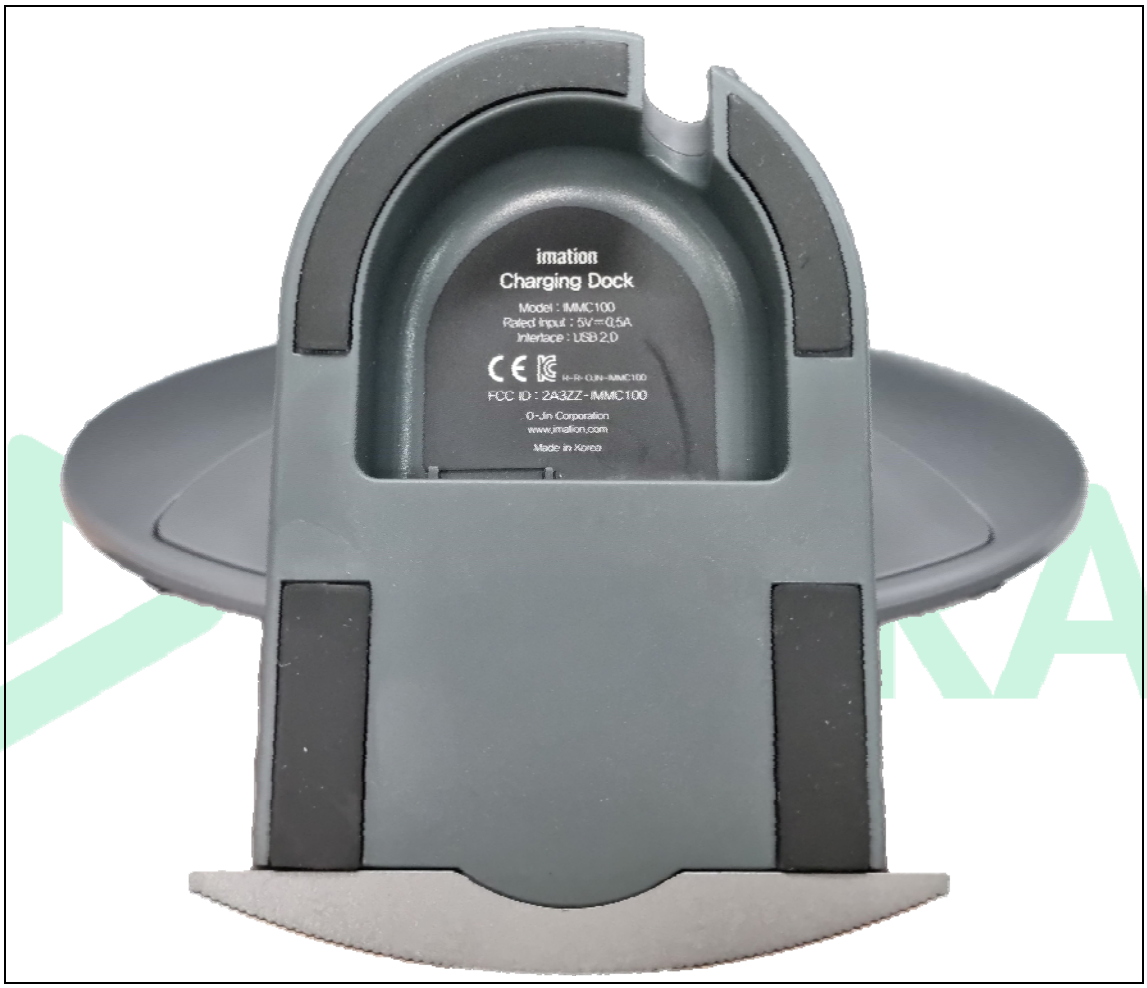




Appendix 2. FCC ID Label and location

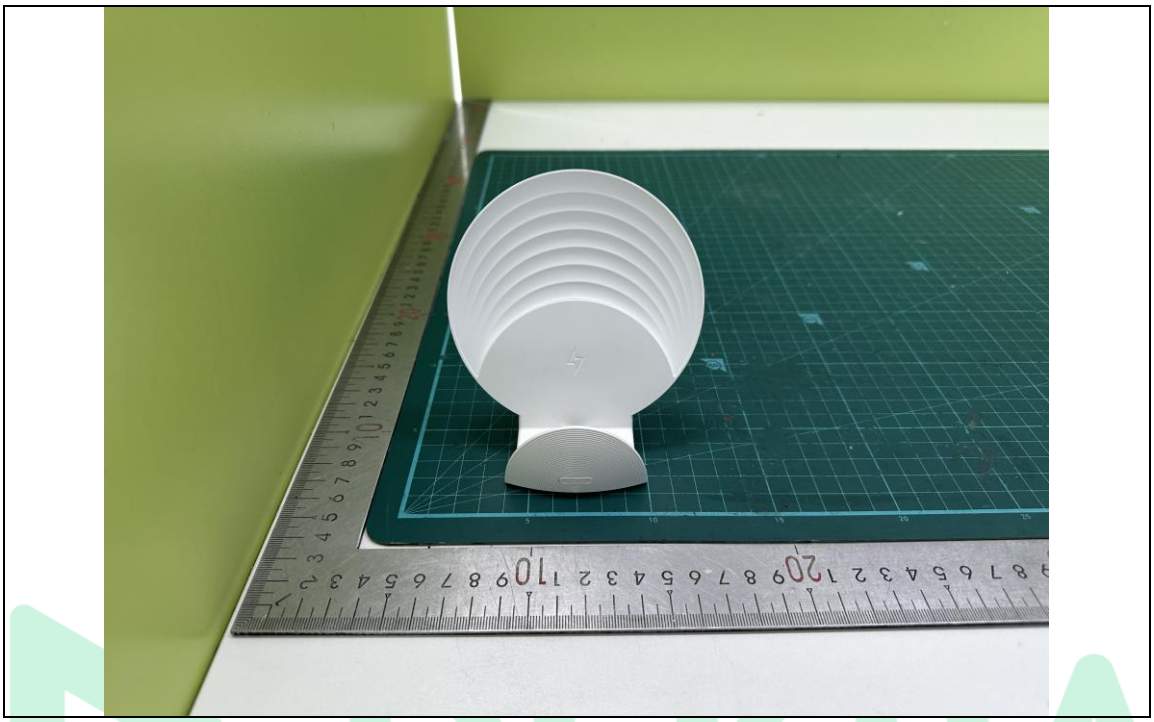
Product Label Sample with FCC ID Label information

Following is a sample copy of the label that will be placed on the rear cabinet of the product.
The FCC identifier is marked in the product label.
The warning statement and Information to the User are described in the user manual.

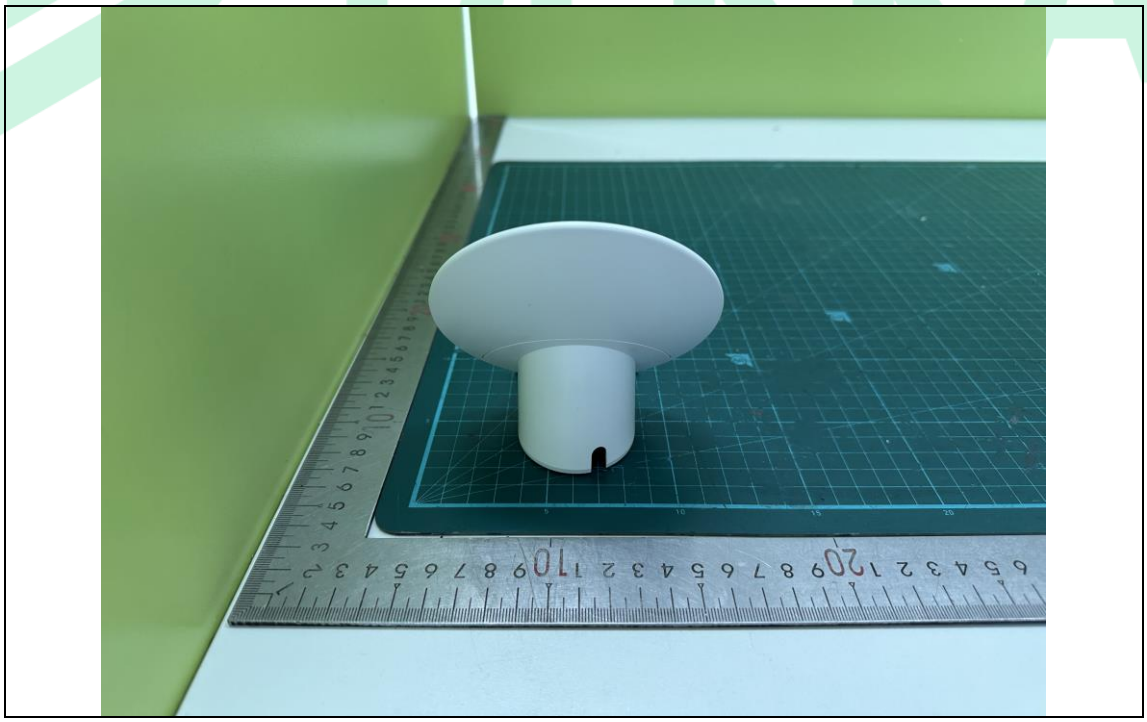


Appendix 3 Photos of EUT

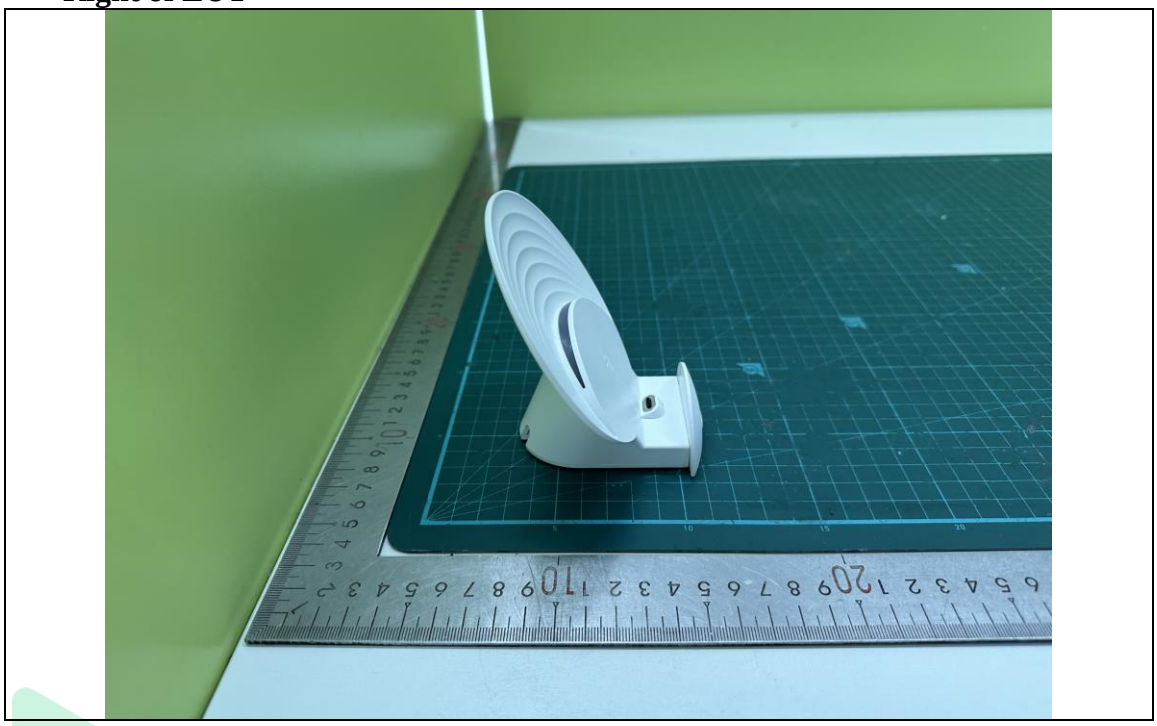
Front of EUT



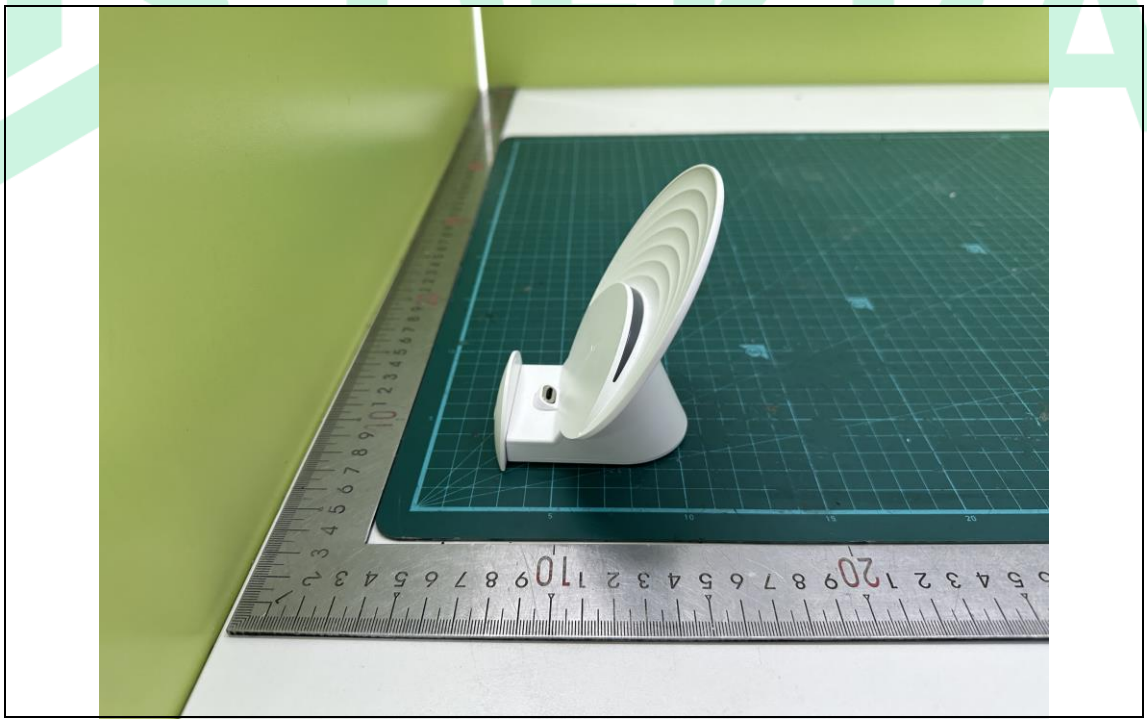
Rear of EUT



Right of EUT



Left of EUT



Top of EUT

Button of EUT

Inside of EUT