Certificate of Test

NCT CO., LTD.

211-71, Geumgok-ro, Hwaseong-si, Gyeonggido, 18511, Republic of Korea

(Tel: +82-31-323-6070 / Fax: +82-31-323-6071)

Report No .: NE2411-F001

Page (1) / (27)



1. Client

Name : DREAMUS COMPANY

o Address: 311, Gangnam-daero, Seocho-gu, Seoul, Republic of Korea

o Date of Receipt: Oct. 30, 2024

2. Use of Report: FCC SDoC

3. Test Sample

o Product Name / Model Name : D&E OFFICIAL LIGHT STICK / ODE-D&E-OLS01

4. Place of Test : X Fixed test Field test

(Address: 211-71, Geumgok-ro, Hwaseong-si, Gyeonggi-do, Republic of Korea(NCT CO., LTD.))

Date of Test: Nov. 05, 2024 ~ Nov. 13, 2024

Test method used: FCC Part 15 Subpart B

7. Testing Environment: Refer to 2.3 Test Condition

Test Results: Refer to the test results

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This Test Report cannot be reproduced, except in full

This test report is not related to KOLAS recognition and RRA designation.

Affirmation

Tested by

Wonhyung LEE



Technical Manager

Byeongcheol YOO



NCT CO., LTD.





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1. General information

1.1 Test Performed

Electromagnetic compatibility measurement facility (18511) is located at 211-71 Geumgok Road, Dongtan-myeon, Hwaseong-si, Gyeonggi-do, Republic of Korea.

Laboratory : NCT Co., Ltd.

Address : 211-71, Geumgok-ro, Hwaseong-si, Gyeonggi-do, Republic of Korea

Telephone : +82 (0)31-323-6070 Facsimile : +82 (0)31-323-6071

SITE MAP







2. Information about test item

2.1 Applicant information

Company name : DREAMUS COMPANY

Address : 311, Gangnam-daero, Seocho-gu, Seoul, Republic of Korea

Telephone / Facsimile : +82 10-4424-8911 / +82 507-517-0064

Contact name : DONG-HUN KIM

Manufacturer : DREAMUS COMPANY

Factory Address : 311, Gangnam-daero, Seocho-gu, Seoul, Republic of Korea

2.2 Equipment Under Test (EUT) description

Product name	D&E OFFICIAL LIGHT STICK	
Trademark	-	
Model and/or type reference	ODE-D&E-OLS01	
Additional model name	-	
Serial number	N/A	
Date (s) of performance of tests	Nov. 05, 2024 ~ Nov. 13, 204	
Date of receipt of test item	Oct. 30, 2024	
EUT condition	Pre-productions, not damaged	
Device Type	All other devices	
Device Class	CLASS B	
Interface Ports	Battery IN, USB-C	
EUT Power Source	Lighting(USB-C) : DC 5 V	
Ed i i dwei ddaide	Lighting(Battery) : DC 4.5 V	
Highest internal frequency	Below 108 MHz	
Firmware version	-	
Note	-	



2.3 Test condition

Environment Conditions	- Radiated Emissions	Below 1 GHz : (18.5 ± 1.0) °C / (38.9 ± 1.0) % R.H. Above 1 GHz : (-) °C / (-) % R.H.	
	- Conducted Emissions	(22.6 ± 1.0) °C / (38.4 ± 1.0) % R.H.	
Test mode	Lighting(USB-C) Mode, Lighting(Battery) Mode		
Test Voltage	Lighting(USB-C) Mode : AC 120 V, 60 Hz Lighting(Battery) Mode : DC 4.5 V		

2.4 Ancillary Equipment

[Lighting(USB-C) Mode]

Equipment	Model No.	Serial No.	Manufacturer
Adapter	N/A	N/A	N/A

[Lighting(Battery) Mode]

Equipment	Model No.	Serial No.	Manufacturer
AAA Battery(3EA)	N/A	N/A	N/A

2.5 Cable List

[Lighting(USB-C) Mode]

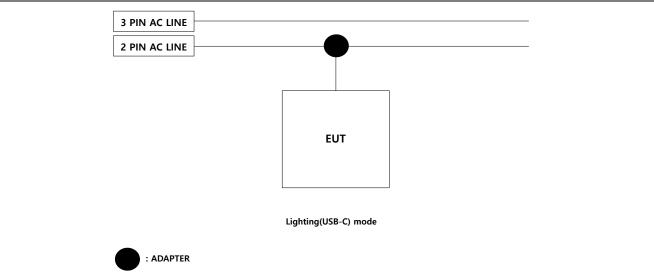
Cable List					
Type	Length	Shielding	Remarks		
Туре	(m)	(Cable/backshell)	From	to	
EUT	0.8	NO/NO	USB-C	Adapter (USB-A)	

[Lighting(Battery) Mode]

	Cable List				
Tyme	Length	Shielding	Remarks		
Туре	(m)	(Cable/backshell)	From to		
EUT	-	-	Battery IN	AAA Battery(3EA) (DC OUT)	

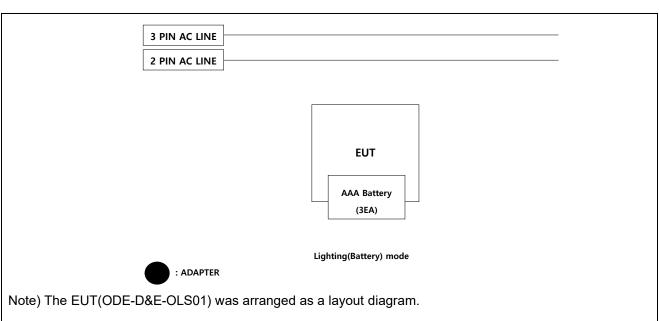


2.6 Block diagram of the EUT test



Note) The EUT(ODE-D&E-OLS01) was arranged as a layout diagram.

- 1. Test Mode / Operating Status
- Lighting(USB-C) mode: The EUT was tested by connecting the Adapter to a USB-C port, turning it on, and pressing the button to turn on the LED.



- 2. Test Mode / Operating Status
- Lighting(Battery) mode: The EUT was tested by connecting AAA batteries (3EA) to the Battery IN port, powering it up, and pressing the button to turn on the LED.



2.7 Modification

- Not Applicable

2.8 Configuration

Equipment Model No.		Serial No.	Manufacturer
Main board	iSL-B245M-MAIN-V1	N/A	N/A



3. Test Report

3.1 Test Summary

Applied Test items		Test method	Result
\boxtimes	Radiated disturbance	FCC Part 15.109 : (November 2, 2017)	С
	Conducted disturbance	FCC Part 15.107 : (November 2, 2017)	С

Note 1: C=Complies, N/C=Not Complies, N/T=Not Tested, N/A=Not Applicable

Frequency range to be scanned:

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)	Status (note 1)
Below 1.705	30	N/A
1.705 ~ 108	1 000	С
108 ~ 500	2 000	N/A
500 ~ 1 000	5 000	N/A
Above 1 000	5th harmonic of the highest frequency or 40 GHz, whichever is lower.	N/A

Note 1: C=Complies NC=Not Complies NT=Not Tested NA=Not Applicable

0.15 MHz ~ 30 MHz as conducted measurement

30 Mt ~ 1 000 Mt as Radiated measurement

1 GHz ~ 6 GHz as Radiated measurement

Bandwidth:

Measured by the CISPR quasi-peak function Bandwidth is 9 $^{\text{kHz}}$ in the frequency 0.15 $^{\text{MHz}}$ \sim 30 $^{\text{MHz}}$ and 120 $^{\text{kHz}}$ in the frequency 30 $^{\text{MHz}}$ \sim 1 000 $^{\text{MHz}}$.

Measured by the CISPR Peak function Bandwidth is 1 MHz in the frequency 1 GHz ~ 40 GHz.

A sample calculation:

COR. F (correction factor) = Antenna factor + Cable loss - Amp.gain

Emission Level = meter reading + COR.F

^{*} The data in this test report are traceable to the national or international standards.

^{*} Uncertainties was taken into consideration through consultation with the client, and only the test results were determined to meet the requested specifications.

^{*} The data in this test report are traceable to the national or international standards.



3.2 Test Report Version

Test Report No.	Date	Description
NE2411-F001	Nov. 19, 2024	Initial Issue



4. General information

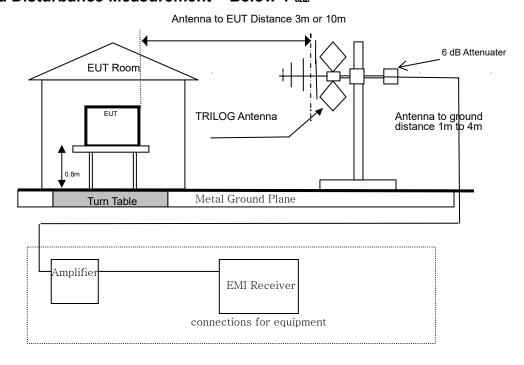
4.1 Test Site Description

Facility

All the testing facilities are periodically serviced as a daily check for equipment and cables systems, an every 6 months facility check for the facilities and a monthly check and annual calibration for testing equipment according to ISO/IEC 17025. All the testing facilities are used as the same specifications shown below. There are descriptions both for radiated disturbance measurement and conducted disturbance measurement conformed by ANSI C 63.4:2017.

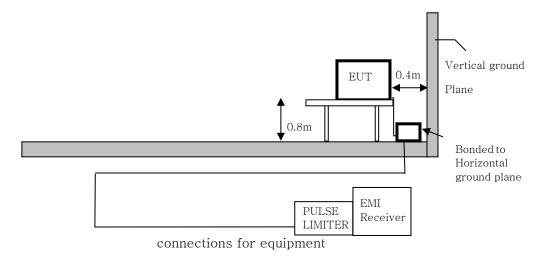
The NSA measurement of the OATS was performed on Jun 21, 2024 according to ANSI C 63.4:2017

4.2 Radiated Disturbance Measurement - Below 1 (#\)

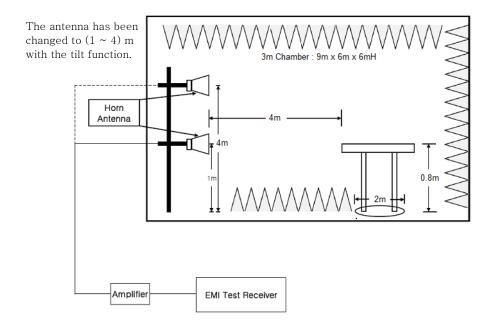




4.3 Conducted Disturbance Measurement



4.4 Radiated Disturbance Measurement - Above 1 @





5. Test Procedure

5.1 Radiated Disturbance Measurements - Below 1 @

- Test site is met the requirements of ANSI C 63.4:2014 and the distance between the EUT and the antenna is adjusted 3 m / 10 m.
- The turntable can be rotated 360 degrees.
- The antenna can be adjusted between 1 m and 4 m in height above the ground.
- The EUT is placed on the non-conducting table with 0.8 m height on the turntable.
- Measurements are carried out using a EMI test receiver with peak detectors (100 kHz bandwidth) and an EMI receiver with quasi-peak detectors (120 kHz bandwidth).
- · Refer to the list of test equipment used for the test.
- · TRILOG antenna are used as wideband antenna.
- The TRILOG antenna is used in the frequency range of 30 MHz ~ 1 000 MHz, the Horn antenna is used in the frequency range of 1 GHz ~ 40 GHz.
- · A variable attenuator is used for verifying amplifier's linearity.
- Rotating the turntable and adjusting the height of the antenna are carried out by control buttons on the console.
- Refer to "Brief Information"(page 4 ~ 6) about details of the EUT and configuration of the cables.
- · Measurement is carried out by a NCT EMC Lab. operator as manual operation.
 - searching for some of High disturbance frequency points than the other points with the following settings;
 - bandwidth 100 $\,^{\text{kHz}}$, frequency range 10 $\,^{\text{MHz}}$ between 30 $\,^{\text{MHz}}$ and 300 $\,^{\text{MHz}}$ and frequency range 50 $\,^{\text{MHz}}$ between 300 $\,^{\text{MHz}}$ and 1 $\,^{\text{GHz}}$.
 - searching the worst direction with the maximum level of the disturbance wave in rotating the turntable
 360 degrees at each searched frequency point.
- setting the height of the antenna with the maximum level of the disturbance wave from 1 m to 4 m.
- reading the disturbance level by the EMI receiver with quasi-peak detectors (120 ^{kHz} bandwidth) according to ANSI C 63.4:2014.
- measuring to vertical and horizontal polarization.
- calculating the measurement result with the following formula or equation:

(Measurement result = Measured value + Antenna factor + Cable loss - Amp. factor)



5.2 Radiated Disturbance Measurements - Above 1 @

- Test site is met the requirements of ANSI C 63.4:2014 and the distance between the EUT and the antenna isadjusted 3 m.
- The turntable can be rotated 360 degrees.
- The antenna can be adjusted between 1 m in height above the ground.
- The EUT is placed on the non-conducting table with 1 m height on the turntable.
- Measurements are carried out using a EMI test receiver with peak detectors (1 MHz bandwidth) and an EMI receiver with peak and average detectors (1 MHz bandwidth).
- Refer to the list of test equipment used for the test.
- · HORN antenna are used as wideband antenna.
- The HORN antenna is used in the frequency range of 1 GHz ~ 40 GHz.
- · A variable attenuator is used for verifying amplifier's linearity.
- Rotating the turntable and adjusting the height of the antenna are carried out by control buttons on the console.
- Refer to "Brief Information"(page 4 ~ 6) about details of the EUT and configuration of the cables.
- · Measurement is carried out by a NCT Lab. operator as manual operation.
- searching the worst direction with the maximum level of the disturbance wave in rotating the turn table 360 degrees at each searched frequency point.
- setting the height of the antenna with the maximum level of the disturbance wave from 1 m
- reading the disturbance level by the EMI receiver with peak and average detectors (1 ^{MHz} bandwidth) according to ANSI C 63.4:2014.
- measuring to vertical and horizontal polarization.
- calculating the measurement result with the following formula or equation:(Measurement result = Measured value + Antenna factor + Cable loss Amp. factor)



5.3 Conducted Disturbance Measurements

- The measurement is carried out on an open site with horizontal and metallic ground plane.
- An AMN(Artificial Mains Network) with a nominal impedance (50 Ω / 50 μ H) as defined in ANSI C 63.4:2014, shall be utilized.
- The AMN is grounded on a horizontal metal ground plane.
- Measurement is carried out using an EMI receiver with quasi-peak detectors and average detector. (Refer to the List of test equipment used for the test.)
- The shortest distance between the EUT and the AMN is 0.8 m.
- The EUT is placed on the non-conducting table with 0.8 m height.
- · A remote switch is used for changing phases between Line (L) and Neutral (N).
- · Refer to "Brief Information"(page 5-8) about details of the EUT and configuration of the cables.
- · Measurement is carried out as manual operation.
 - -detecting the maximized emission level using the maxhold function after setting the spectrum analyzer bandwidth 1 MHz and the frequency range from 150 kHz \sim 1 MHz \sim 5 MHz and 5 MHz \sim 30 MHz
 - searching the maximum frequency point of the disturbance wave in each frequency range.
 - reading the disturbance level of quasi-peak, average and Line (L) and Neutral (N) in 9 kHz bandwidth by the EMI receiver.
 - calculating the measurement result with the following formula or equation.

(Result = Reading + Cor.F.) (Margin = Limit- Result)



6. List of Equipment Used For the Tests

No.	Item	Model Name	Manufacturer	Serial No.	Interval	Next Cal.
1	Receiver	ESVS30	ROHDE & SCHWARZ	826006/015	1 Year	2025.05.23
2	RF AMPLIFIER	8447F	H.P	3113A05434	1 Year	2025.05.21
3	TRILOG Broadband Antenna(KOLAS)	VULB 9168	Schwarzbeck	01029	2 Year	2025.05.03
4	EMI Test Receiver	ESR	ROHDE&SCHWA RZ	102138	1 Year	2025.05.21
5	Double Ridged Broadband Horn Antenna(KOLAS)	BBHA 9120D	Schwarzbeck	02087	1 Year	2025.04.24
6	EMI Test Receiver	ESRP3	ROHDE&SCHWA RZ	102116	1 Year	2025.05.21
7	LISN(Without cord)	NSLK 8127	Schwarzbeck	00984	1 Year	2025.05.22
8	LISN(with cord)	NSLK 8127	Schwarzbeck	00984	1 Year	2025.10.28
9	LISN_SUB	NSLK 8127	Schwarzbeck	00983	1 Year	2025.05.21
10	DUMMY RESISTOR	PE6147	PASTERNACK	N/A	1 Year	2025.05.22
11	PULSE LIMITER	VTSD 9561-F	SCHWARZBECK	00623	1 Year	2025.02.26
12	Amplifier	TK-PA18H	TESTEK	190007-L	1 Year	2025.05.21
13	Signal Analyzer	MS2850A	Anritsu	6261831920	1 Year	2025.05.21



7. EMI DATA

7.1 Radiated Disturbance Measurements (Below 1 础)

■ FCC CLASS B

TEST SHEET(RE)

EUT Description

Order No: NE-241030-0880

MODEL : ODE-D&E-OLS01 Serial No. : -

POWER RATING : AC 120 V, 60 Hz Ambient : (18.5)°C, (38.9) % R.H.

Test Date: 2024.10.13 Test Engineer: Wonhyung LEE

Mode: Lighting(USB-C)

VULB9168(2023.05.03~2025.05.03) / Cable Loss(2024.06.26~2024.12.26)

8447F(2024.05.21~2025.05.21)

Freq.	Reading	(dBµV)	А	Н	Antenna	Cable Loss	Amp.	Result	Limit	Margin
(MHz)	Н	V	(°)	(m)	(dB/m)	(dB)	(dB)	(dBµV/m)	(dB)	(dB)
30.00	-	28.10	155	1.00	18.20	0.20	28.09	18.41	40.00	21.59
60.07	-	34.10	65	1.00	18.70	0.30	28.05	25.05	40.00	14.95
68.06	-	33.50	142	1.00	17.38	0.38	28.03	23.23	40.00	16.77
147.85	29.10	-	220	1.00	18.78	1.14	27.72	21.30	43.50	22.20
711.12	29.20	_	98	1.00	27.00	3.64	28.53	31.31	46.00	14.69
746.82	29.00	_	180	1.00	27.64	3.79	28.45	31.98	46.00	14.02

TEST EQUIPMENT USED: 1, 2, 3



TEST SHEET(RE)

EUT Description

Order No: NE-241030-0880

PRODUCT: D&E OFFICIAL LIGHT STICK Company: DREAMUS COMPANY

MODEL : ODE-D&E-OLS01 Serial No. : -

POWER RATING: DC 4.5 V Ambient: (18.5)°C, (38.9) % R.H.

Test Date: 2024.11.13 Test Engineer: Wonhyung LEE

Mode: Lighting(Battery)

VULB9168(2023.05.03~2025.05.03) / Cable Loss(2024.06.26~2024.12.26)

8447F(2024.05.21~2025.05.21)

Freq.	Reading	(dBµV)	А	Н	Antenna	Cable Loss	Amp.	Result	Limit	Margin
(MHz)	Н	V	(°)	(m)	(dB/m)	(dB)	(dB)	(dBµV/m)	(dB)	(dB)
30.00	ı	29.80	124	1.00	18.20	0.20	28.09	20.11	40.00	19.89
57.64	-	30.00	167	1.00	19.04	0.30	28.05	21.29	40.00	18.71
63.23	-	31.20	152	1.00	18.28	0.33	28.04	21.77	40.00	18.23
337.39	28.50	-	241	1.00	20.15	2.19	27.48	23.36	46.00	22.64
712.55	29.10	-	242	1.00	27.00	3.65	28.53	31.22	46.00	14.78
754.11	28.80	_	90	1.00	27.70	3.82	28.44	31.88	46.00	14.12

TEST EQUIPMENT USED: 1, 2, 3



7.2 Radiated Disturbance Measurements (Above 1 础)

Ν	ot	Δr	าท	lic	:al	ble	١
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TEST EQUIPMENT USED : -

- Due to the nature of the software, the $[\mathring{\ }]$ symbol of the Test Conditions in the measurement data is denoted by $[\mathring{\ }]$, and the $[\mu]$ symbol of the graph and measured values is denoted by [u].



7.3 Conducted Disturbance Measurements

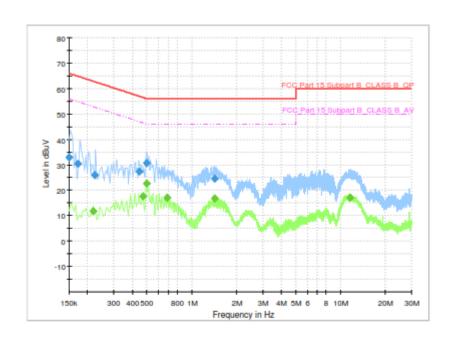
[LINE]

CE_L1 1/1

Test Report

Common Information

Test Description: Test Standard: Test Mode: Test Conditions: Operator Name: Comment: NE-241030-0880 FCC Part 15, Sub B Lighting(USB-C) AC 120 V, 60 Hz / 22.6 °C, 38.4 % R. H. Wonhyung LEE



Final Res	ult							
Frequency	QuasiPeak	CAverage	Limit	Margin	Meas. Time	Bandwidth	Line	Corr.
(MHz)	(dBuV)	(dBuV)	(dBuV)	(dB)	(ms)	(kHz)		(dB)
0.150000	32.99		66.00	33.01	1000.0	9.000	L1	9.8
0.172000	30.40		64,86	34.46	1000.0	9.000	L1	9.8
0.218000		11.70	52,90	41.19	1000.0	9.000		9.8
0.224000	26.03		62.67	36.64	1000.0	9.000		9.8
0.446000	27.42		56.95	29.53	1000.0	9.000	L1	9.9
0.470000		17.65	46.51	28.86	1000.0	9.000	L1	9.9
0.496000	30.78		56.07	25.29	1000.0	9.000		10.0
0.500000		22.69	46.00	23.31	1000.0			10.0
0.684000		17.17	46.00	28.83	1000.0	9.000	L1	10.0
1.432000		16.81	46.00	29.19	1000.0	9.000	L1	10.2
1.432000	24.66		56.00	31.34	1000.0	9.000	L1	10.2
11.544000		17.07	50.00	32.93	1000.0	9.000	L1	10.6

2024-11-13

TEST EQUIPMENT USED: 6, 8, 11

- Due to the nature of the software, the $[\degree]$ symbol of the Test Conditions in the measurement data is denoted by ['], and the $[\mu]$ symbol of the graph and measured values is denoted by [u].



[NEUTRAL]

CE_N 1/1

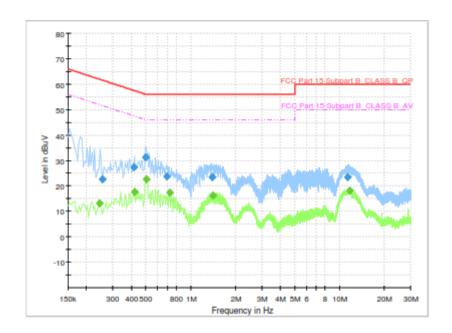
Test Report

Common Information

Test Description: Test Standard: Test Mode: Test Conditions: NE-241030-0880 FCC Part 15, Sub B Lighting(USB-C) AC 120 V, 60 Hz / 22.6 °C, 38.4 % R. H.

Wonhyung LEE

Operator Name: Comment:



Final Result

111141	1100	MIL.							
Frequ	ency	QuasiPeak	CAverage	Limit	Margin	Meas. Time	Bandwidth	Line	Corr.
(MH	łz)	(dBuV)	(dBuV)	(dBuV)	(dB)	(ms)	(kHz)		(dB)
0.	244000		13.03	51.96	38.92	1000.0	9.000	N	9.8
0.	254000	22.59		61.63	39.03	1000.0	9.000	N	9.8
0.	416000	27.36		57.53	30.17	1000.0		N	9.9
0.	420000		17.49	47.45	29.96	1000.0	9.000	N	9.9
0.	.500000	31.17		56.00	24.83	1000.0	9.000	N	10.0
0.	506000		22.54	46.00	23.46	1000.0	9.000	N	10.0
0.	692000	23.75		56.00	32,25	1000.0		N	10.0
0.	722000		17.38	46.00	28.62	1000.0	9.000	N	10.0
1.	.390000	23.45		56.00	32.55	1000.0	9.000	N	10.2
1.	408000		16.17	46.00	29.83	1000.0	9.000	N	10.2
11.	370000	23.53		60.00	36.47	1000.0	9.000	N	10.5
11.	680000		18.08	50.00	31.92	1000.0	9.000	N	10.6

2024-11-13

TEST EQUIPMENT USED: 6, 8, 11

- Due to the nature of the software, the [°] symbol of the Test Conditions in the measurement data is denoted by ['], and the $[\mu]$ symbol of the graph and measured values is denoted by [u].



8. PHOTOGRAPHS

Photograph of the Radiated Disturbance Measurements (Maximum emission configuration) - Below 1 @

[Front_Lighting(USB-C)]



[Rear_Lighting(USB-C)]





[Front_Lighting(Battery)]



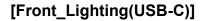
[Rear_Lighting(Battery)]





Photograph of the Radiated Disturbance Measurements (Maximum emission configuration) – Above 1 @b
[Front]
Not Applicable Output Description:
[Rear]
Not Applicable







[Rear_Lighting(USB-C)]





EUT Photo

Front of EUT

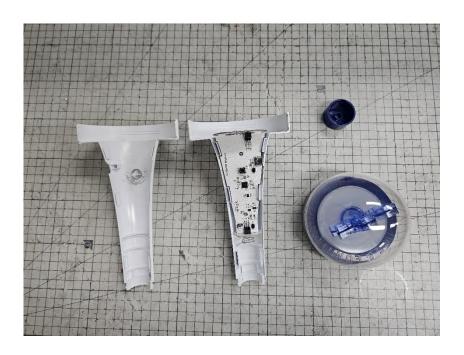


Rear of EUT

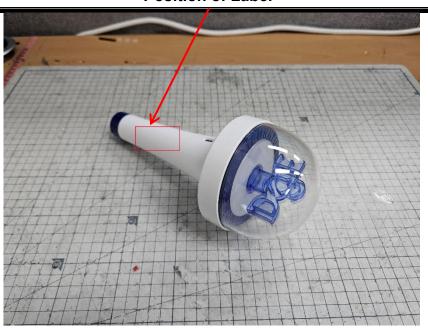




Internal of EUT

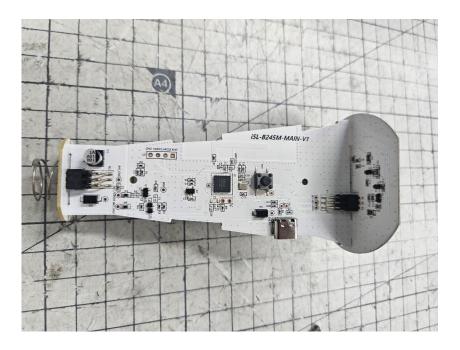


Position of Label





Front of Main board



Rear of Main board

