

TEST REPORT



CTK Co., Ltd.
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Report No.:
CTK-2024-01094
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1. Applicant

- Name : Baelux Co., Ltd.
- Address : 82-4, Donggwang-ro, Seocho-gu, Seoul, Republic of Korea
- Date of Receipt : 2024-03-20

2. Manufacturer

- Name : Baelux Co., Ltd.
- Address : 82-4, Donggwang-ro, Seocho-gu, Seoul, Republic of Korea

3. Use of Report : For FCC Certification

4. Test Sample / Model : The New Lamp (Desk Light) / BNU-DL001BK

5. Date of Test : 2024-03-31 to 2024-04-02

6. Test Standard(method) used : FCC 47 CFR part 15 subpart C 15.209

7. Testing Environment: refer to 8 pages to 17 pages

8. Test Results : Compliance

9. Location of Test : ☒ Permanent Testing Lab ☐ On Site Testing (Address : 5, Dongbu-ro 221beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea)

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This report cannot be reproduced or copied without the written consent of CTK.

Approval	Tested by Gwanyong Kim: (Signature)	Technical Manager Young-taek Lee: (Signature)
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Remark. This report is not related to KOLAS accreditation and relevant regulation.

2024-04-15

CTK Co., Ltd.

REPORT REVISION HISTORY

Date	Revision	Page No
2024-04-15	Issued (CTK-2024-01094)	all

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1. General Description

1.1 Client Information

Company	Baelux Co., Ltd.
Contact Point	82-4, Donggwang-ro, Seocho-gu, Seoul, Republic of Korea
Contact Person	Name : HyungYong Park E-mail : hy.park@baelux.com

1.2 Product Information

FCC ID	2BFNPBNU-DL001
Product Description	The New Lamp (Desk Light)
Model name	BNU-DL001BK
Variant Model name	BNU-DL001WH (Color differences)
Charging Frequency	110 kHz ~ 205 kHz
RF Output Power	81.9 dBuV/m @ 3m
Output power	10 W
Antenna Type	Loop Coil
Charging Method	Directly contact
Power Source	DC 24 V

1.3 Antenna Information

☒	Integral antenna (antenna permanently attached)
☐	Temporary RF connector provided
☒	No temporary RF connector provided Transmit chains bypass antenna and soldered temporary RF connector provided for connected measurement. In case of conducted measurements the transmitter shall be connected to the measuring equipment via a suitable attenuator and correct for all losses in the RF path.
☐	External antenna (dedicated antennas)

2. Accreditations

2.1 Laboratory Accreditations and Listings

Country	Agency	Registration Number
USA	FCC	805871
CANADA	ISED	CN : 8737A CAB ID : KR0025
KOREA	NRRA	KR0025

2.2 Calibration Details of Equipment Used for Measurement

Test equipment and test accessories are calibrated on regular basis. The maximum time between calibrations is one year or what is recommended by the manufacturer, whichever is less. All test equipment calibrations are traceable to the Korea Research Institute of Standards and Science (KRISS), therefore, all test data recorded in this report is traceable to KRISS.

3. Test Specifications

3.1 Standards

FCC Part Section(s)	Requirement(s)	Status (Note 1)	Report Clause
15.203	Antenna Requirement	C	1.3
15.215(c)	Emission Bandwidth	C	4.1
15.209	Radiated Emissions	C	4.2
15.207	AC Power Line Conducted Emissions	C	4.3
<u>Note 1:</u> C=Complies NC=Not Complies NT=Not Tested NA=Not Applicable			
<u>Note 2:</u> The data in this test report are traceable to the national or international standards.			
<u>Note 3:</u> The sample was tested according to the following specification: ANSI C63.10-2013.			

3.2 Mode of operation during the test

Wireless charger were performed all charging conditions including variable loading and non-charging operation. It only contains data for worst case conditions.

Test Frequency

Test Item	Charging Frequencies
Transmitter Radiated emissions	148 kHz
Emission Bandwidth	145 kHz

Measurement Configuration

Tests Item	Transmitter Radiated Emissions, Emission Bandwidth
Condition	Radiated measurement
User Position	☒ EUT will be placed in fixed position.
	☐ EUT will be placed in mobile position and operating multiple positions.
	☐ EUT will be a hand-held or body-worn battery-powered devices and operating multiple positions.

3.3 Peripheral Devices

No.	Device	Manufacturer	Model No.	Serial No.
1	AC/DC Adaptor	DELTA ELECTRONICS, INC.	ADT-060A24AA	-
2	WPT Load	-	-	-

3.4 Measurement Uncertainty

The value of the measurement uncertainty for the measurement of each parameter.
 Coverage factor $k = 2$, Confidence levels of 95 %

Test Item	Uncertainty
Radiated emissions	3.88 dB(C.L. : Approx. 95%, $k = 2$)

3.5 Test Software

Radiated Test	ES10 Ver. 2022.04.000
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4. Technical Characteristic Test

4.1 Emission Bandwidth

Requirement

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§15.217 through 15.257 and in subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

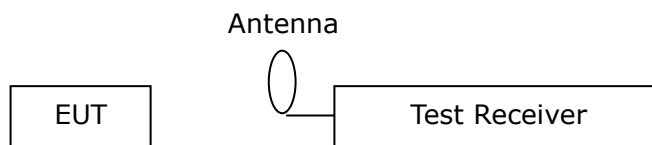
The occupied bandwidth or the "99% emission bandwidth" is defined as the frequency range between two points, one above and the other below the carrier frequency, within which 99% of the total transmitted power of the fundamental transmitted emission is contained. The occupied bandwidth shall be reported for all equipment in addition to the specified bandwidth required in the applicable RSSs.

In some cases, the "x dB bandwidth" is required, which is defined as the frequency range between two points, one at the lowest frequency below and one at the highest frequency above the carrier frequency, at which the maximum power level of the transmitted emission is attenuated x dB below the maximum in-band power level of the modulated signal, where the two points are on the outskirts of the in-band emission.

Test Procedures

For the emission bandwidth refer ANSI C63.10-2013, clause 6.9(Occupied bandwidth).

Test Setup



Test results

Test Date

2024-04-02

Testing Environment

Temperature: (22 ± 1) °C

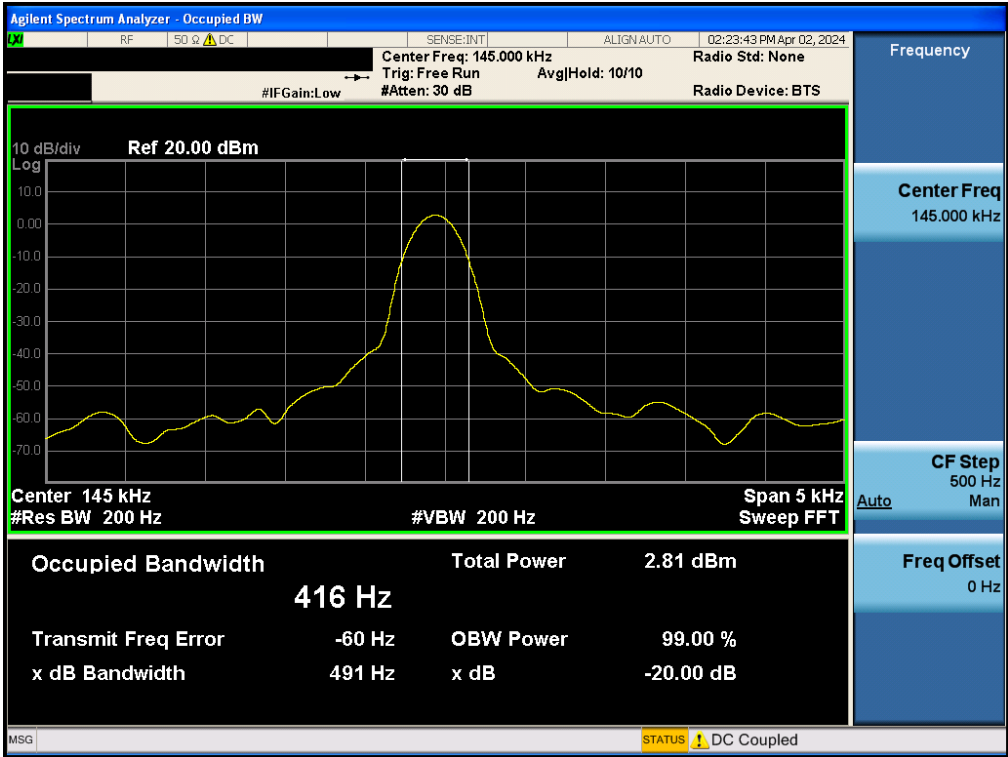
Relative Humidity: (33 ± 3) % R.H.

Emission Bandwidth	
20 dB Bandwidth	99 % Bandwidth
491 Hz	416 Hz



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4.2 Radiated emissions

FCC Requirement

FCC Part 15 § 15.209 (a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency [MHz]	Field Strength [uV/m]	Field Strength [dBuV/m]	Measurement Distance [meters]
0.009-0.490	2400/F(kHz)	48.5 – 13.8	300
0.490-1.705	24000/F(kHz)	33.8 – 23	30
1.705-30	30	29.5	30
30-88	100**	40	3
88-216	150**	43.5	3
216-960	200**	46	3
Above 960	500	54	3

** Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72MHz, 76-88MHz, 174-216MHz, 470-806MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g.15.231 and 15.241.

Note : The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

Test Location

☒ 10 m SAC (test distance : ☐ 10 m, ☒ 3 m)

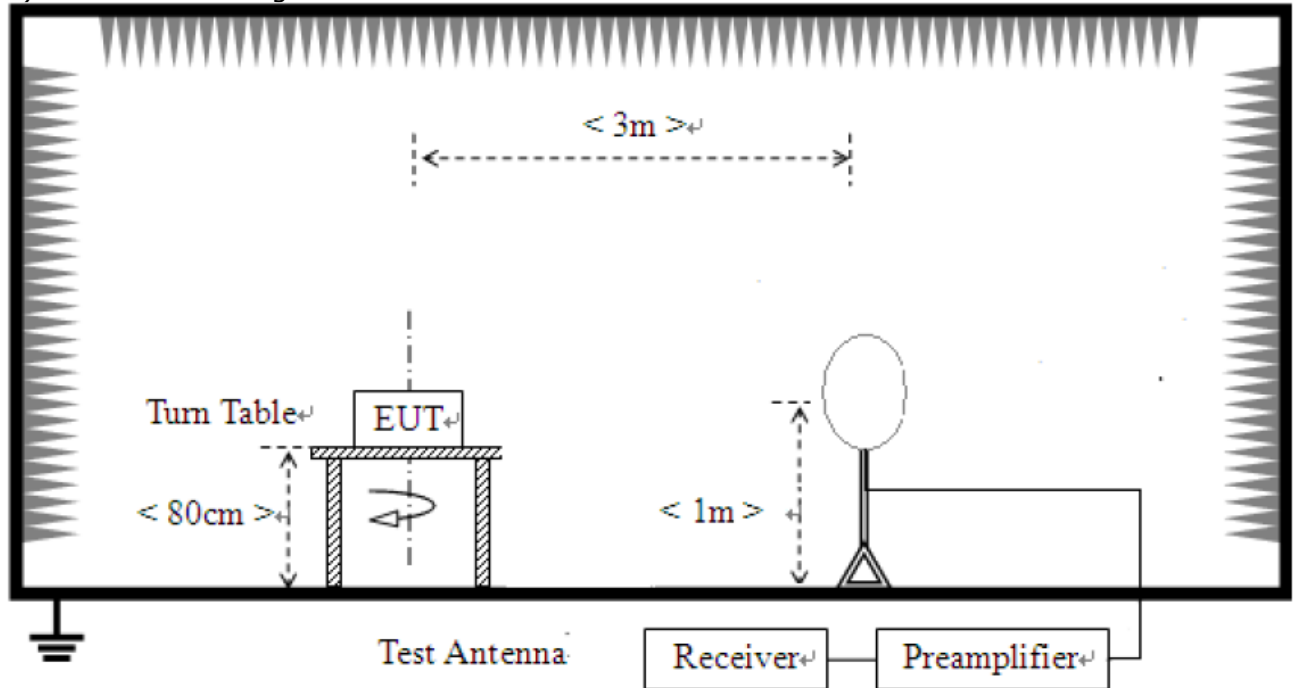
Test Procedures

Test Method	
☒	Refer as ANSI C63.10-2013, clause 6.4(Radiated emissions from unlicensed wireless devices below 30 MHz).
☒	Radiated emission tests shall be performed in the frequency range of 9 kHz to 30 MHz, using a calibrated loop antenna. When perpendicular to the ground plane, the lowest height of the magnetic antenna shall be 1 m above the ground and shall be positioned at the specified distance from the EUT. During the measurement the Loop Test Antenna rotates about its vertical axis for maximum response at each azimuth about the EUT.
☒	The results shall be by using the square of an inverse linear distance extrapolation factor(40 dB/decade).
☒	Refer as ANSI C63.10-2013, clause 6.5(Radiated emissions from unlicensed wireless devices in the frequency range of 30 MHz to 1000 MHz).
☒	In the frequency rage above 30 MHz, Bi-Log Test Antenna(30 MHz to 1 GHz) is used. Test Antenna height is carried from 1m to 4m above the ground to determine the maximum value of the field strength. The emissions levels at both horizontal and vertical polarizations should be tested.
☒	Emissions more than 20 dB below the limit do not need to be reported.

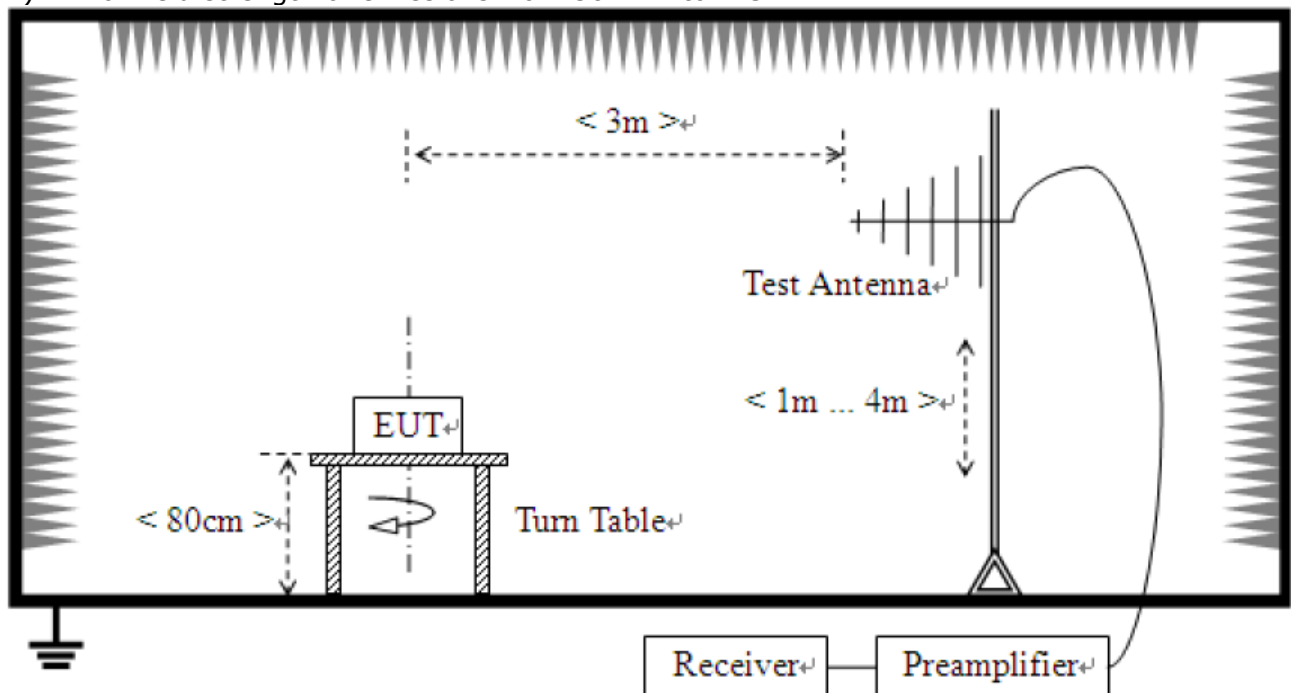
Measuring instrument Settings	
Frequency Range	9 kHz – 1 000 MHz
RBW	200 Hz (9 kHz – 150 kHz) 9 kHz (150 kHz – 30 MHz) 120 kHz (30 MHz – 1 000 MHz)
VBW	≥ RBW
Sweep time	auto couple
Detector function	CISPR quasi-peak(below 1 000 MHz)

Test Setup

- 1) For field strength of emissions from 9 kHz to 30 MHz



- 2) For field strength of emissions from 30 MHz to 1 GHz



Test results

1) Radiated emissions of fundamental frequency

Test Date

2024-03-31

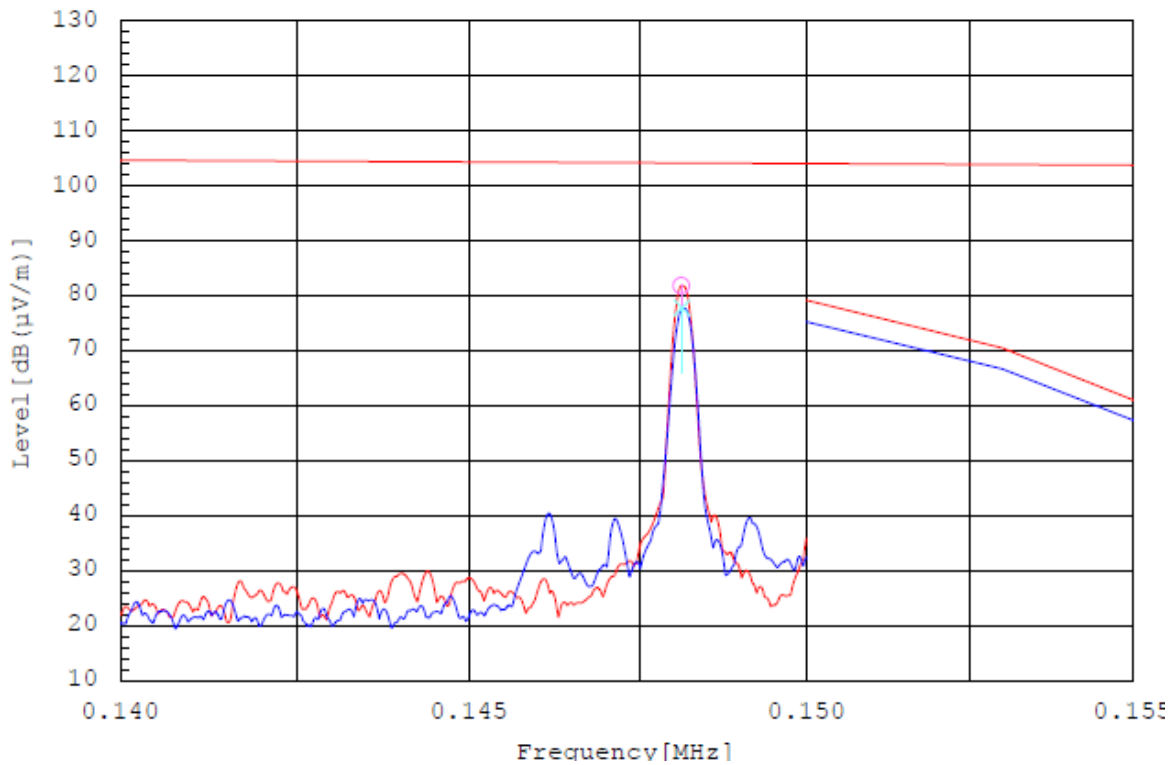
Testing Environment

Temperature: (18 ± 1) °C

Relative Humidity: (28 ± 3) % R.H.

The requirements are:

☒ Complies



Frequency [kHz]	Reading [dBuV]	c.f [dB/m]	Result [dBuV/m]
148	56.8	25.1	81.9

Remark :

1. Result = Reading + c.f(correction factor)
2. Correction factor = Antenna factor + Cable loss + 6 dB attenuator
3. FCC Limit : $20\log(2400/148) + 40\log(300/3) = 104.2$ dBuV/m
4. The test result in peak detector is less than quasi-peak limit.

2) Radiated emissions in the frequency range of 9 kHz to 30 MHz

Test Date

2024-03-31

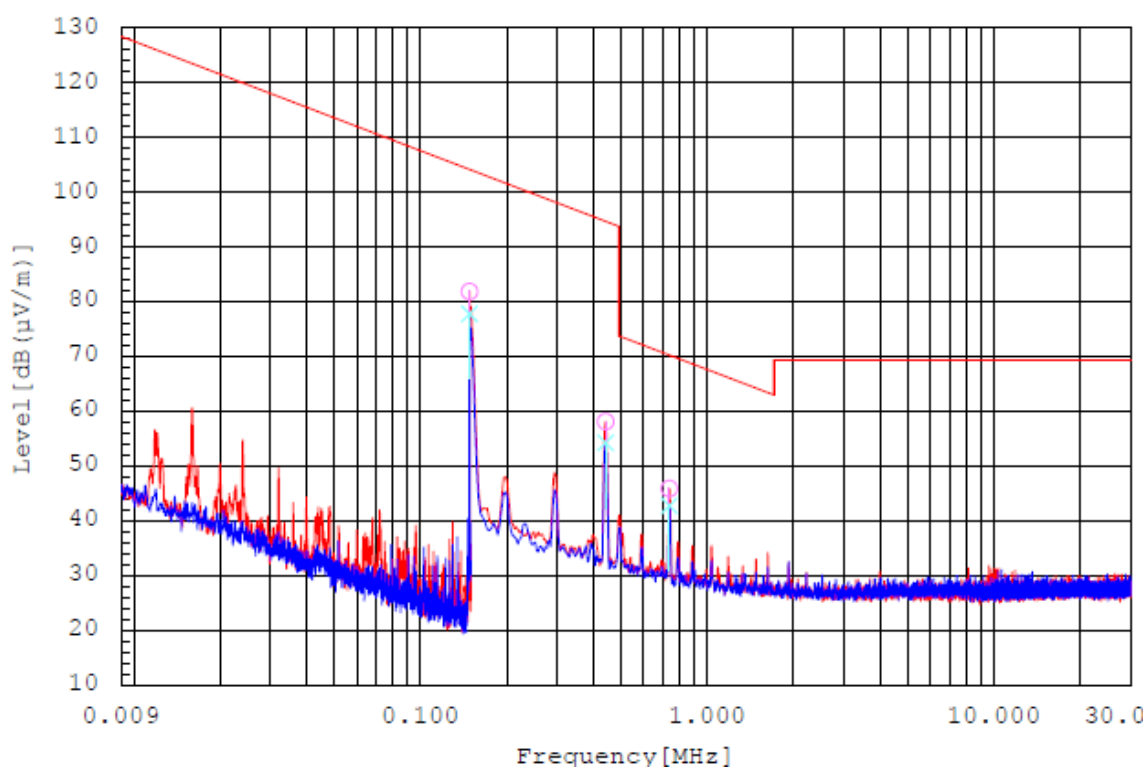
Testing Environment

Temperature: (18 ± 1) °C

Relative Humidity: (28 ± 3) % R.H.

The requirements are:

☒ Complies



No.	Frequency [MHz]	Reading [dBuV]	c.f [dB/m]	Result [dBuV/m]	Limit [dBuV/m]	Margin[dB]	Remark
1	0.148	56.8	25.1	81.9	104.2	22.3	Fundamental frequency
2	0.443	32.9	25.2	58.1	94.7	36.6	
3	0.738	20.8	25.1	45.9	70.3	24.4	

Remark :

1. Result = Reading + c.f(correction factor)
2. Correction factor = Antenna factor + Cable loss + 6 dB attenuator
3. The test result in peak detector is less than quasi-peak limit.

3) Radiated emissions in the frequency range of 30 MHz to 1 000 MHz

Test Date

2024-03-31

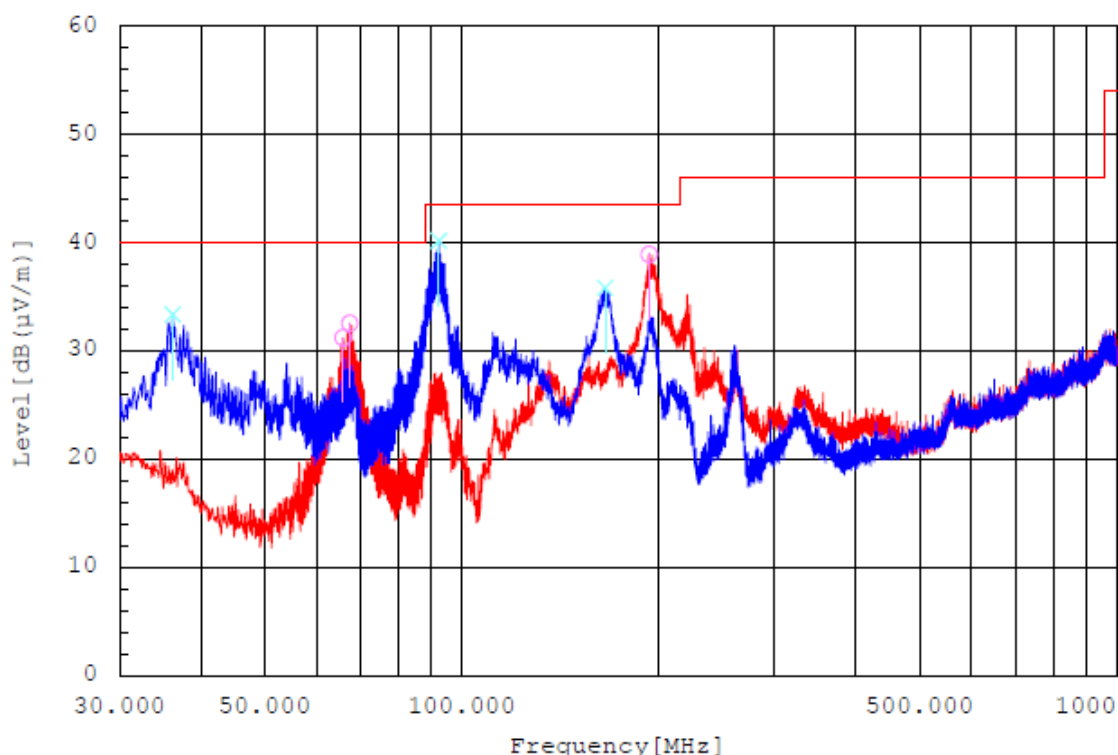
Testing Environment

Temperature: (18 ± 1) °C

Relative Humidity: (28 ± 3) % R.H.

The requirements are:

☒ Complies



No.	Frequency [MHz]	Pol.	Reading [dBuV]	c.f [dB/m]	Result [dBuV/m]	Limit [dBuV/m]	Margin[dB]	Remark
1	36.208	V	43.2	-9.8	33.4	40.0	6.6	
2	65.890	H	50.3	-19.1	31.2	40.0	8.8	
3	67.442	H	51.6	-19.0	32.6	40.0	7.4	
4	92.274	V	55.9	-15.7	40.2	43.5	3.3	
5	165.606	V	50.1	-14.3	35.8	43.5	7.7	
6	193.251	H	54.1	-15.2	38.9	43.5	4.6	

Remark :

1. Result = Reading + c.f(Correction factor)
2. Correction factor = Antenna factor + Cable loss + 6 dB attenuator - Amp Gain
3. The test result in peak detector is less than quasi-peak limit.

4.3 AC Power Line Conducted Emissions

FCC Requirement

For an intentional radiator 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 boundary between the frequency ranges.

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 ~ 0.5	66 to 56*	56 to 46*
0.5 ~ 5	56	46
5 ~ 30	60	50

* Decreases with the logarithm of the frequency.

Test Procedures

Refer as ANSI C63.10-2013, clause 6.2(Standard test method for ac power-line conducted emissions from unlicensed wireless devices).

Test Results

Test Date

2024-03-31

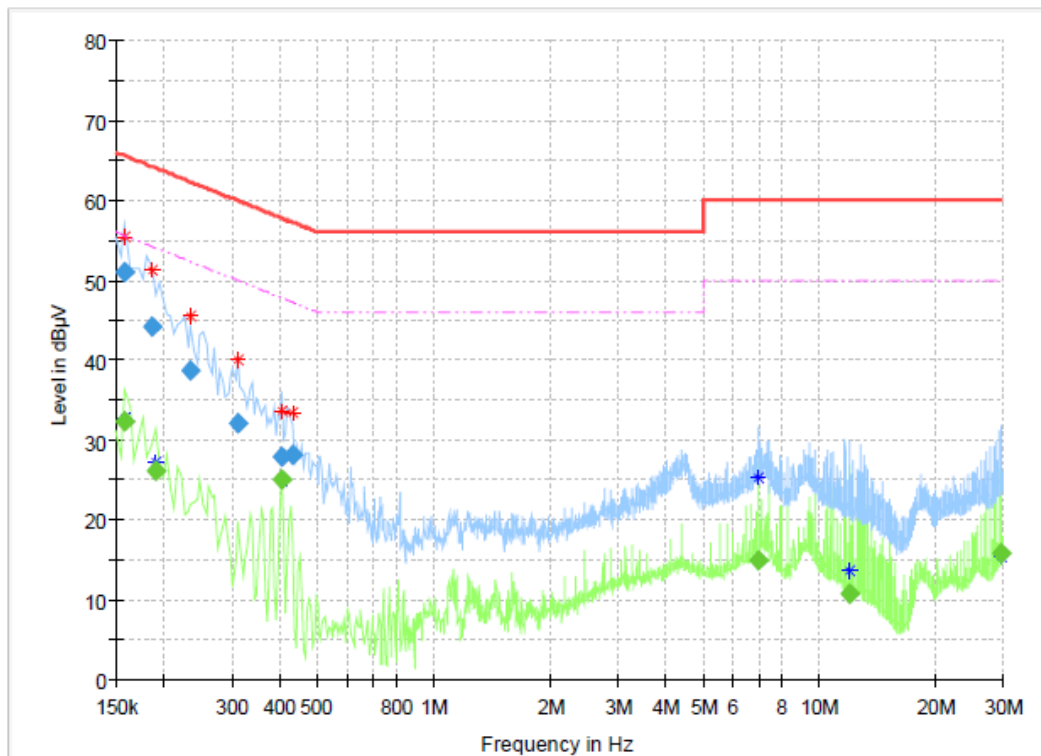
Testing Environment

Temperature: (18 ± 1) °C

Relative Humidity: (29 ± 3) % R.H.

The requirements are:

☒ Complies



Final Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.159000	50.92	---	65.52	14.59	15000.0	9.000	N	ON	9.8
0.159000	---	32.24	55.52	23.27	15000.0	9.000	L1	ON	9.9
0.186000	44.25	---	64.21	19.97	15000.0	9.000	L1	ON	9.9
0.190500	---	26.18	54.02	27.83	15000.0	9.000	L1	ON	9.9
0.235500	38.67	---	62.25	23.58	15000.0	9.000	L1	ON	9.7
0.312000	32.15	---	59.92	27.77	15000.0	9.000	N	ON	9.8
0.406500	---	25.09	47.72	22.63	15000.0	9.000	L1	ON	9.8
0.406500	27.90	---	57.72	29.82	15000.0	9.000	N	ON	9.8
0.433500	28.18	---	57.19	29.01	15000.0	9.000	L1	ON	9.8
6.954000	---	14.86	50.00	35.14	15000.0	9.000	N	ON	9.9
11.962500	---	10.85	50.00	39.15	15000.0	9.000	N	ON	9.9
29.814000	---	15.72	50.00	34.28	15000.0	9.000	N	ON	10.1

APPENDIX A – Test Equipment Used For Tests

No.	Name of Equipment	Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date
1	EMI Test Receiver	R&S	ESW44	102039	2023-05-03	2024-05-03
2	Active Loop Antenna	SCHWARZBECK	FMZB 1513	1513-125	2022-04-15	2024-04-15
3	BILOG ANTENNA	TESEQ	CBL6111D	60654	2023-08-21	2025-08-21
4	AMPLIFIER	SONOMA INSTRUMENT	310N	411011	2023-08-04	2024-08-04
5	6dB Attenuator	PASTERNAK	PE7AP006-06	L20210504000023	2023-08-04	2024-08-04
6	ATTENUATOR	NONE	6dB	190557	2023-09-25	2024-09-25
7	Signal Analyzer	Agilent	N9020A	US46470483	2023-12-05	2024-12-05
8	EMI Receiver	R&S	ESR3	102826	2023-05-03	2024-05-03
9	LISN	R&S	ENV216	102698	2023-05-03	2024-05-03

No.	Cable	Manufacturer	Model No.	Serial No.	Check Date
1	RF Cable (9 kHz ~ 1 GHz, Radiated)	HUBER+SUHNER	SUCOFLEX 104	MY27558/4	2024-03-05
2	RF Cable (9 kHz ~ 30MHz, Radiated)	CANARE	L-5D2W	N/A	2024-03-05
3	RF Cable (30 MHz ~ 1 GHz, Radiated)	CANARE	L-5D2W	N/A	2024-03-05

-END-