TEST REPORT

CTK Co., Ltd.
(Ho-dong), 113, Yejik-ro, Cheoin-gu,
Yongin-si, Gyeonggi-do, Korea
Tel: +82-31-339-9970
Fax: +82-31-624-9501

1. Applicant

◦ Name : UNION COMMUNITY

◦ Address : 12F, Munjeong Daemyeong Valeon bldg, 127 Beobwon-ro Songpa-gu

◦ Date of Receipt : 2024-07-25

2. Manufacturer

◦ Name : UNION COMMUNITY

◦ Address : 12F, Munjeong Daemyeong Valeon bldg, 127 Beobwon-ro Songpa-gu

3. Use of Report : For FCC Certification

4. Test Sample / Model : UBio-N Face Mini / UBio-N Face Mini

5. Date of Test : 2024-09-05 to 2024-09-19

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

7. Testing Environment : refer to 6 page

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, Republic of Korea)

Approval	Tested by Bong-seok Kim: (Signature)	Technical Manager Young-taek Lee: (Signature)

2024-09-24

CTK Co., Ltd.

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REPORT REVISION HISTORY

Date	Revision	Page No
2024-09-24	Issued (CTK-2024-02637)	All

CONTENTS

1. General Product Description

1.1 Applicant Information

Company	UNION COMMUNITY
Contact Point	12F, Munjeong Daemyeong Valeon bldg, 127 Beobwon-ro Songpa-gu
Contact Person	Name : CHO, MIN-GU E-mail : mgcho@unioncomm.co.kr Tel : +82-02-6488-3261

1.2 Product Information

FCC ID	XX2-UBIONFACEMINI
Product Description	UBio-N Face Mini
Model name	UBio-N Face Mini
Variant Model name	-
FVIN	N/A
Operationg Frequency	125 kHz
RF Output Power	62.8 dBuV/m @ 3m
That may have multiple primary coils	No
Antenna Type	Integral
Power Source	DC 24 V, PoE

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
Note 1: C=Complies NC=Not Complies NT=Not Tested NA=Not Applicable			
Note 2: The data in this test report are traceable to the national or international standards.			
Note 3: The sample was tested according to the following specification: ANSI C63.10-2013.			

3.2 Testing Environment

Test Item		Test Date	Temperature (℃)	Relative Humidity (%)
Bandwidth		2024-09-05	25	57
Transmitter emission (Radiated)	1) 9 kHz to 30 MHz	2024-09-09	22	55
	2) 30 MHz to 1 GHz	2024-09-19	21	60
AC Conducted Emission		2024-09-05	24	50

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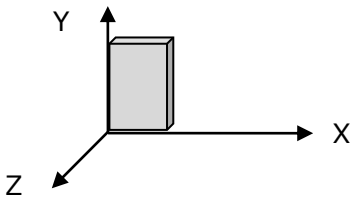
3.3 Mode of operation during the test

It is configured so that the maximum level is transmitted continuously.

Test Frequency

Operating Frequencies
125 kHz

The Worst Case 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.
Operating Mode	DC 24 V mode(Power supply)
EUT faces identified relative to view from receiving antenna	

3.4 Peripheral Devices

No.	Device	Manufacturer	Model No.	Serial No.
1	DC Power Supply	Topward Electric Instruments	6303D	711196

3.5 Maximum 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	3.82 dB(C.L. : Approx. 95%, k = 2)

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.

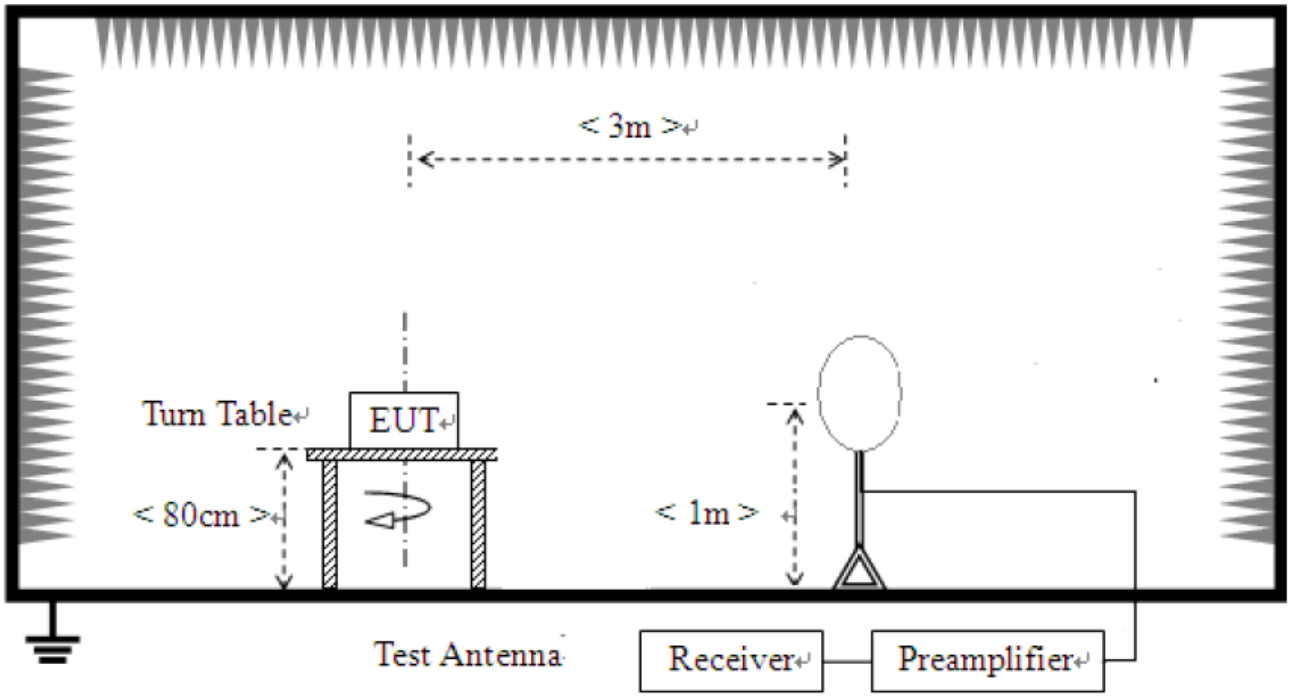
The occupied bandwidth or the "99% emission bandwidth" is defined as the frequency range between two points, one above and the other below the carrier frequency, within which 99% of the total transmitted power of the fundamental transmitted emission is contained. The occupied bandwidth shall be reported 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



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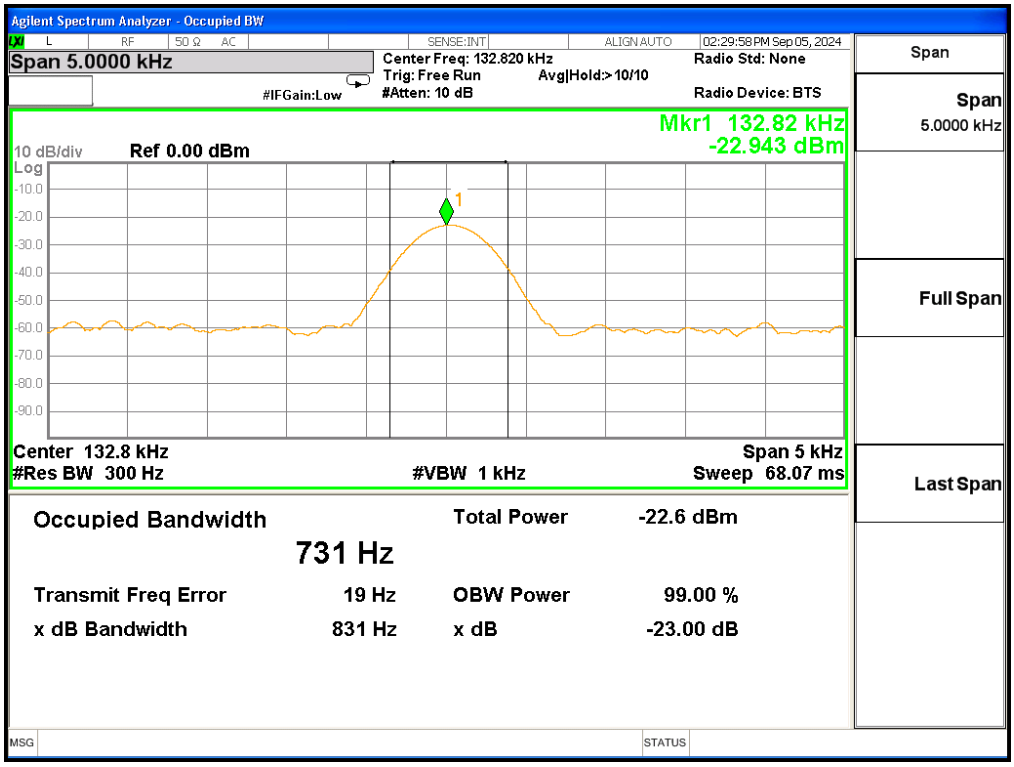
Test results

Emission Bandwidth	Result	Limit
23 dB Bandwidth	831 Hz	N/A
99 % Bandwidth	731 Hz	N/A

Emission Bandwidth Plot 23dB Bandwidth



Remark :

1. The measured frequency is 132.8 kHz.(Operationg Frequency : 125.0 kHz)

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.

ISED Requirement

RSS-Gen includes the general field strength limits of unwanted emissions, where applicable, for transmitters and receivers operating in accordance with the provisions specified in this standard.
Unless otherwise indicated, unwanted emissions of transmitters and receivers are permitted to fall within the restricted frequency bands listed in RSS-Gen and the TV bands 54-72 MHz, 76-88 MHz, 174-216 MHz and 470-602 MHz; however, fundamental emissions are prohibited in these bands, except where equipment operation is permitted in the applicable RSS.

Transmitters whose wanted and unwanted emissions fall within the general field strength limits specified in RSS-Gen may operate licence-exempt in any of the frequency bands, other than the restricted frequency bands listed in RSS-Gen and the TV bands 54-72 MHz, 76-88 MHz, 174-216 MHz and 470-602 MHz, and shall be certified under RSS-210. Under no circumstances shall the level of any unwanted emissions exceed the level of the fundamental emissions.

Test Location

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

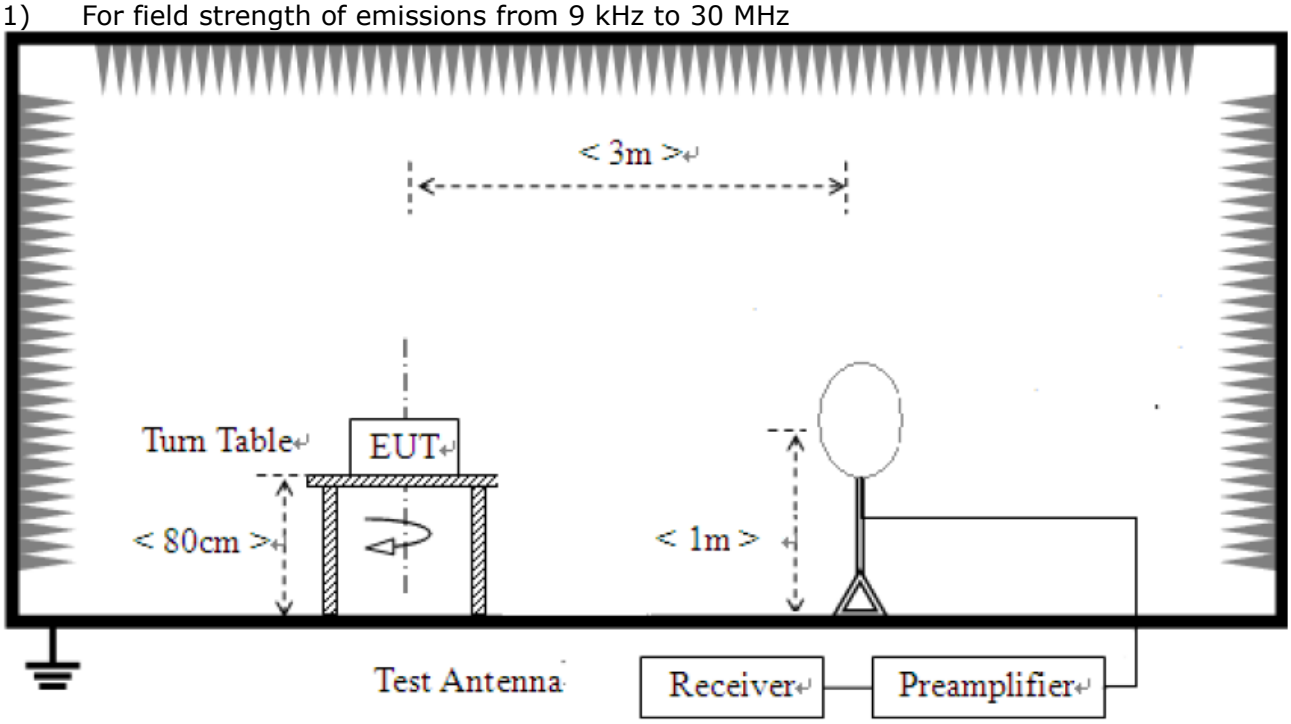
Test Procedures

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.

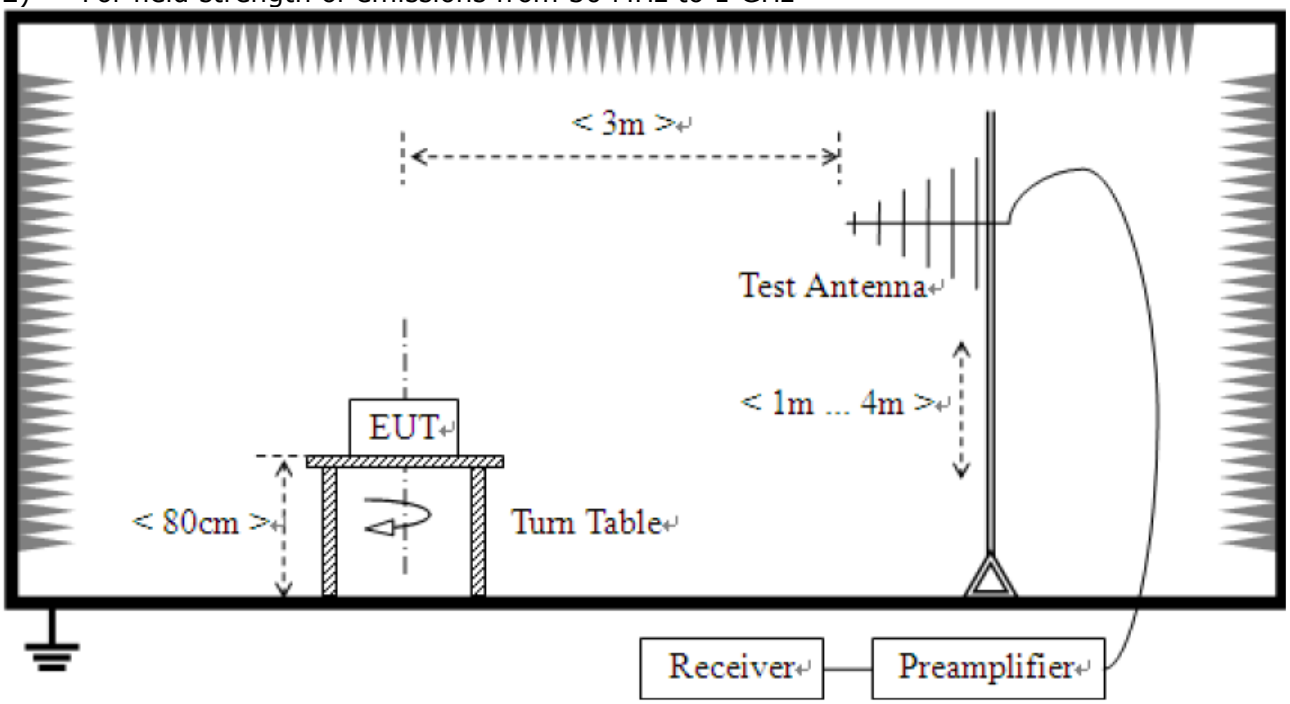
Measuring instrument Settings	
Frequency Range	9 kHz – 1 000 MHz
RBW	200 Hz (9 kHz – 150 kHz) 9 kHz (150 kHz – 30 MHz) 120 kHz (30 MHz – 1 000 MHz)
VBW	≥ RBW
Sweep time	auto couple
Detector function	CISPR quasi-peak(below 1 000 MHz)

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



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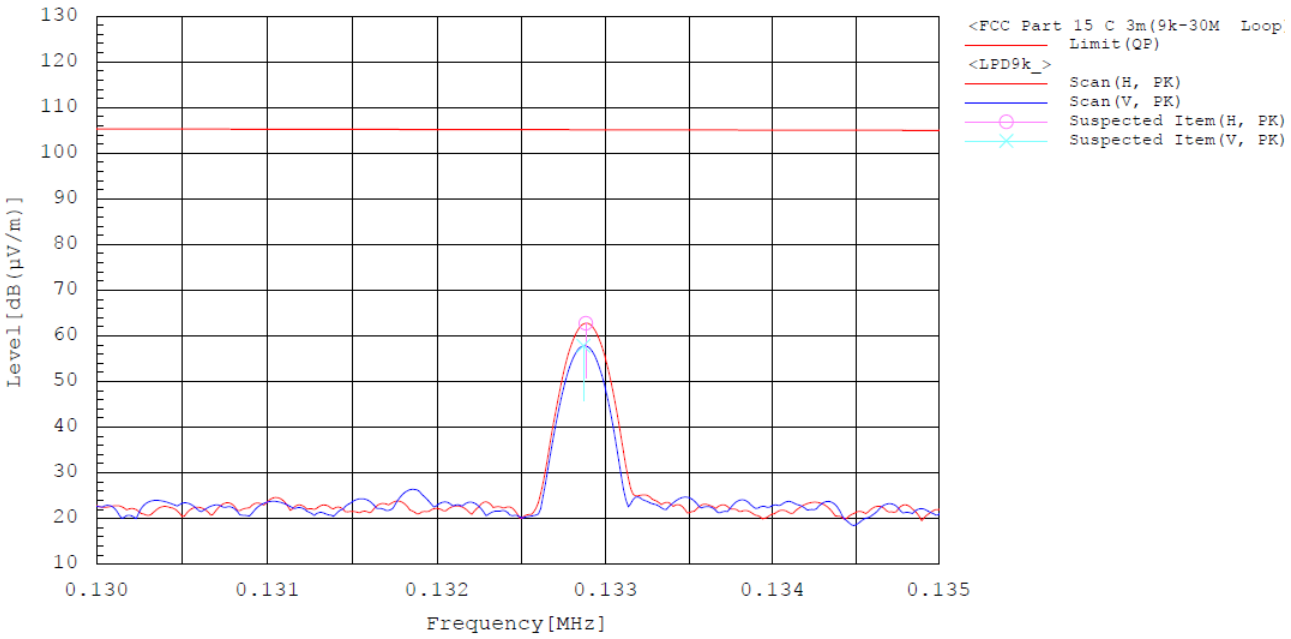
Test results

1) Radiated emissions of fundamental frequency

The requirements are:
☒ Complies



Frequency [MHz]	Reading [dBuV]	c.f [dB/m]	Result [dBuV/m]	Limit [dBuV/m]	Margin[dB]	Remark
0.132	38.0	24.8	62.8	105.1	47.3	

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.

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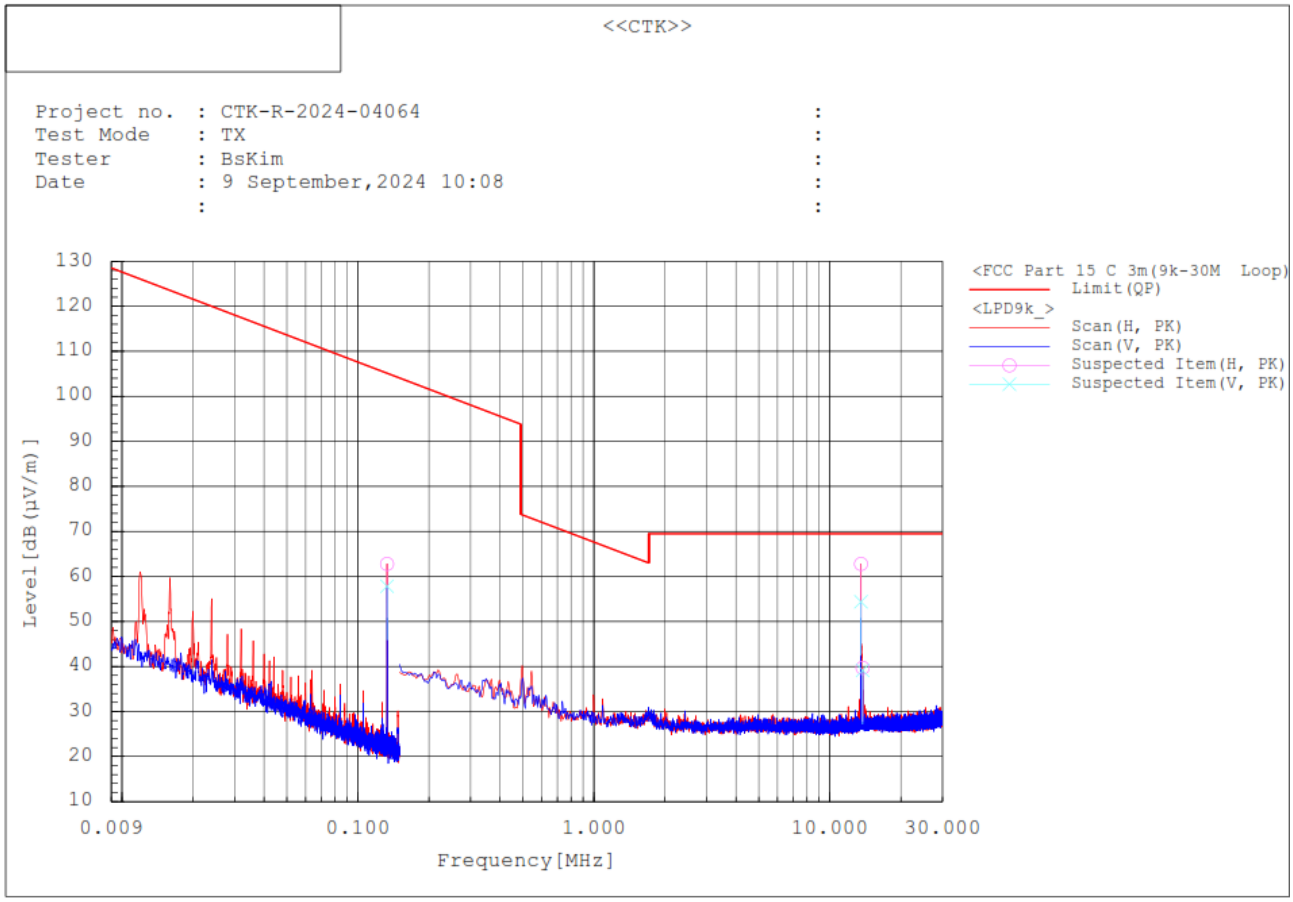
2) Radiated emissions in the frequency range of 9 kHz to 30 MHz

The requirements are:
☒ Complies



Spectrum Selection

No.	Frequency [MHz]	Pol	Reading PK [dB(μV)]	c.f [dB(1/m)]	Result PK [dB(μV/m)]	Limit QP [dB(μV/m)]	Margin QP-PK [dB]	Height [cm]	Angle [deg]	Remark
1	0.133	V	33.0	24.8	57.8	105.1	47.3	100.0	75.4	
2	0.133	H	38.0	24.8	62.8	105.1	42.3	100.0	345.7	
3	13.559	H	36.7	26.1	62.8	69.5	6.7	100.0	355.7	
4	13.559	V	28.3	26.1	54.4	69.5	15.1	100.0	65.4	

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.
4. For the transmitter, frequencies of 13.56 MHz and 125 kHz were used. Tested while two signals were being transmitted.

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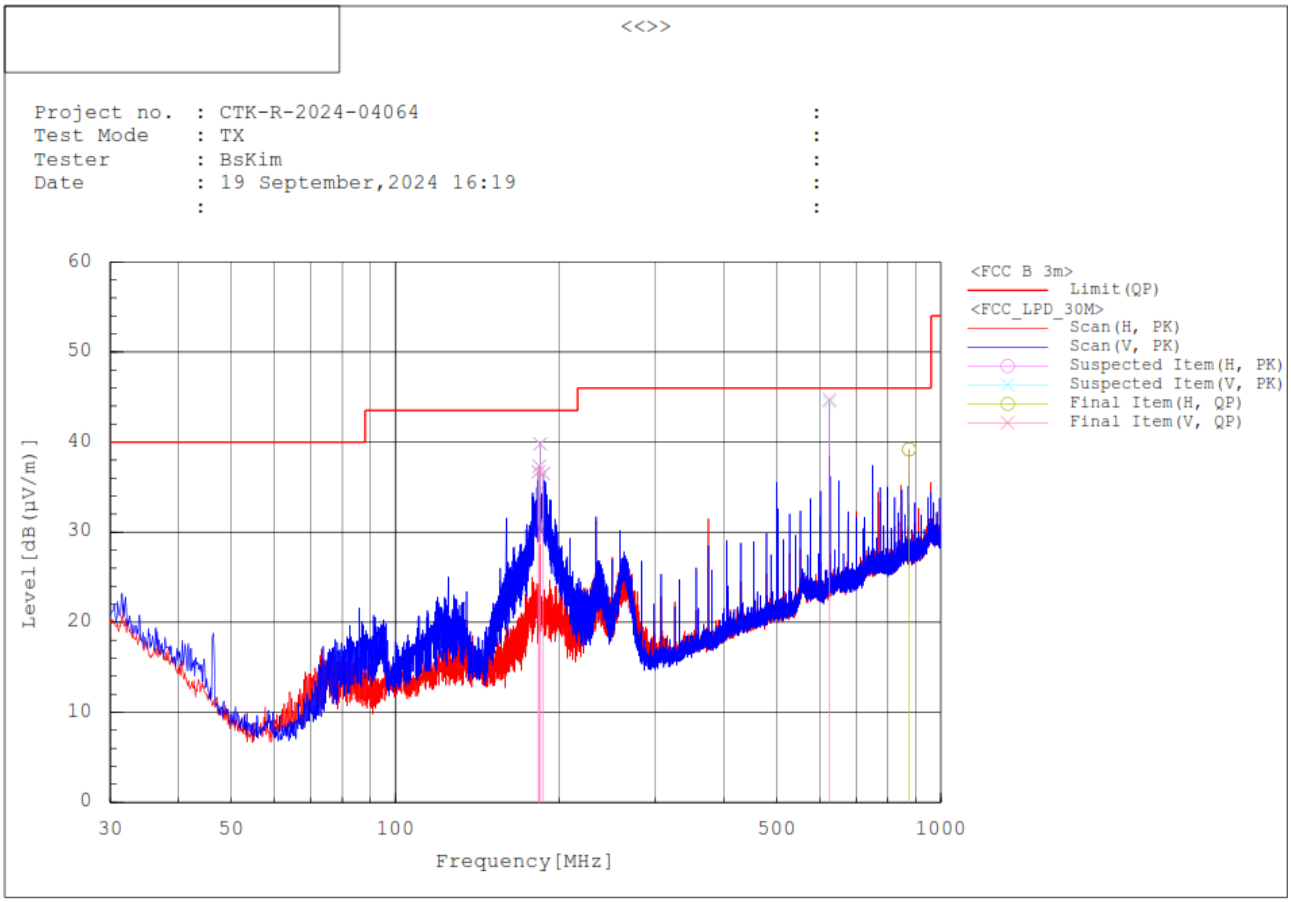
3) Radiated emissions in the frequency range of 30 MHz to 1 000 MHz

The requirements are:
☒ Complies



Final Result

No.	Frequency [MHz]	Pol	Reading QP [dB(μV)]	c.f [dB(1/m)]	Result QP [dB(μV/m)]	Limit QP [dB(μV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]
1	182.969	V	51.9	-15.2	36.7	43.5	6.8	100.0	70.1
2	183.551	V	52.5	-15.2	37.3	43.5	6.2	100.0	203.5
3	184.327	V	55.0	-15.2	39.8	43.5	3.7	100.0	192.7
4	186.849	V	51.8	-15.3	36.5	43.5	7.0	100.0	114.7
5	625.095	V	46.8	-2.1	44.7	46.0	1.3	100.0	2.4
6	875.064	H	36.3	2.9	39.2	46.0	6.8	299.9	182.6

Remark :
1. Result = Reading + c.f(Correction factor)
2. Correction factor = Antenna factor + Cable loss + 6 dB attenuator – Amp. Gain
3. For the transmitter, frequencies of 13.56 MHz and 125 kHz were used. Tested while two signals were being transmitted.
4. The test result in peak detector is less than quasi-peak limit.

4.3 AC Conducted Emissions

A radio apparatus that is designed to be connected to the public utility (AC) power line shall ensure that the radio frequency voltage, which is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz-30 MHz, shall not exceed the limits.

Frequency Range of Measurement
150 kHz to 30 MHz

Instrument Settings
IF Band Width: 9 kHz

Test Procedures

ANSI C63.10-2013 - Section 6.2.2

The EUT was placed on a non-metallic table 0.8m above the metallic, grounded floor and 0.4m from the reference ground plane wall. The distance to other metallic surfaces was at least 0.8m.
Amplitude measurements were performed with a quasi-peak detector and an average detector.

Limit
- 15.207(a)

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

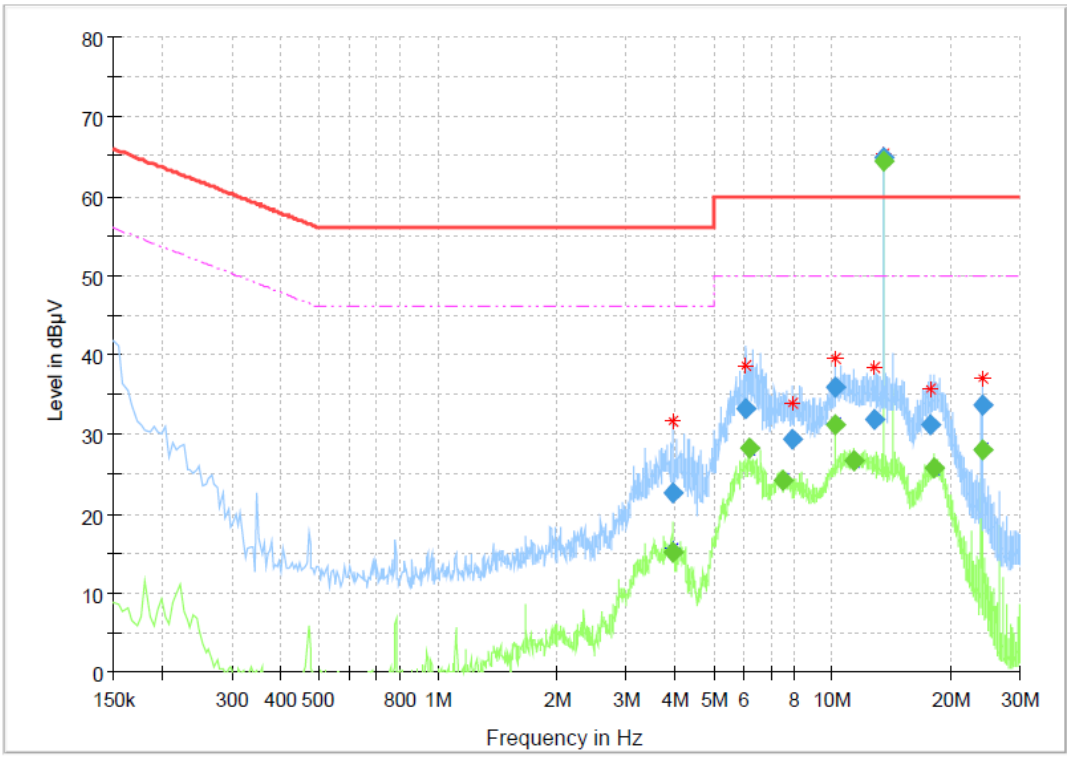
* The level decreases linearly with the logarithm of the frequency.
** A linear average detector is required.

Test Results

The requirements are:
☒ Complies

Test Data

[DC 24 V, LINE & NEUTRAL]

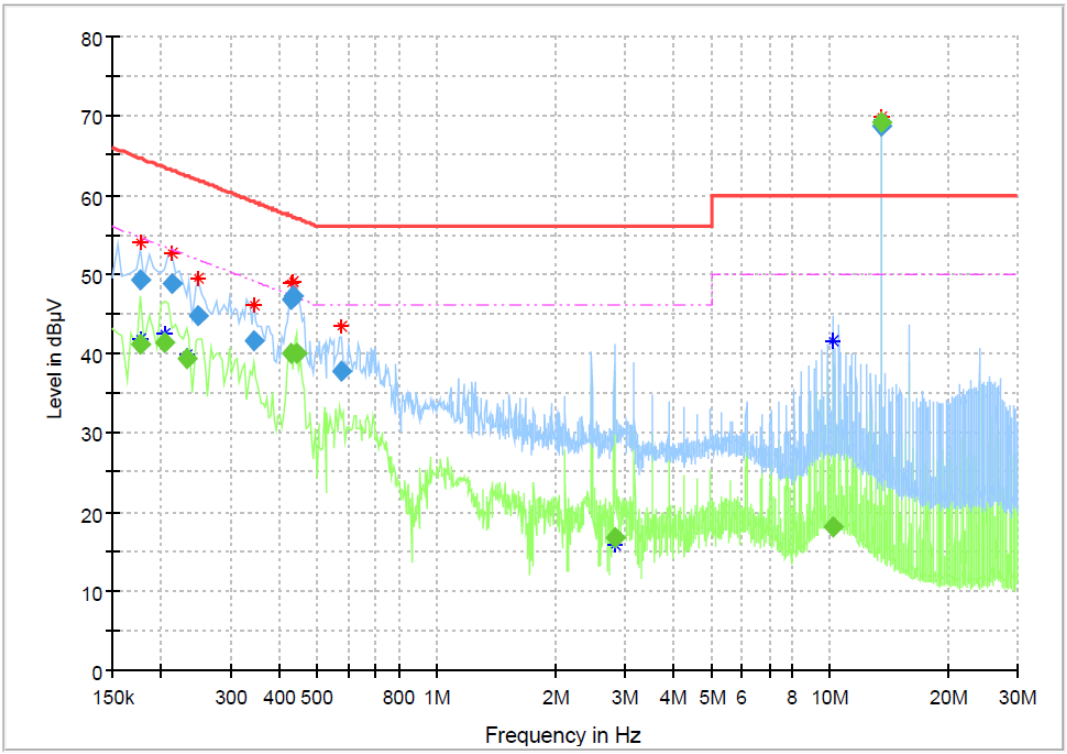


Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
3.934500	---	15.25	46.00	30.75	15000.0	9.000	N	ON	9.7
3.939000	22.68	---	56.00	33.32	15000.0	9.000	L1	ON	9.6
6.072000	33.12	---	60.00	26.88	15000.0	9.000	N	ON	10.0
6.144000	---	28.20	50.00	21.80	15000.0	9.000	N	ON	10.0
7.530000	---	24.25	50.00	25.75	15000.0	9.000	N	ON	9.9
7.953000	29.49	---	60.00	30.51	15000.0	9.000	N	ON	9.9
10.239000	---	31.21	50.00	18.79	15000.0	9.000	L1	ON	9.8
10.239000	35.91	---	60.00	24.09	15000.0	9.000	L1	ON	9.8
11.328000	---	26.74	50.00	23.26	15000.0	9.000	N	ON	9.9
12.835500	31.94	---	60.00	28.06	15000.0	9.000	N	ON	9.9
13.560000	64.84	---	60.00	-4.84	15000.0	9.000	N	ON	9.9
13.560000	---	64.33	50.00	-14.34	15000.0	9.000	N	ON	9.9
17.772000	31.26	---	60.00	28.74	15000.0	9.000	N	ON	10.0
18.199500	---	25.83	50.00	24.17	15000.0	9.000	N	ON	10.0
24.000000	---	27.92	50.00	22.08	15000.0	9.000	N	ON	10.0
24.000000	33.68	---	60.00	26.32	15000.0	9.000	N	ON	10.0

* The frequency 13.56 MHz is the Fundamental signal.

[PoE, LINE & NEUTRAL]



Final Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.177000	---	41.09	54.63	13.54	15000.0	9.000	L1	ON	10.0
0.177000	49.31	---	64.63	15.32	15000.0	9.000	L1	ON	10.0
0.204000	---	41.31	53.45	12.13	15000.0	9.000	L1	ON	9.9
0.213000	48.71	---	63.09	14.38	15000.0	9.000	L1	ON	9.9
0.231000	---	39.43	52.41	12.99	15000.0	9.000	L1	ON	9.8
0.249000	44.71	---	61.79	17.08	15000.0	9.000	L1	ON	9.7
0.343500	41.56	---	59.12	17.55	15000.0	9.000	L1	ON	9.9
0.429000	---	39.95	47.27	7.32	15000.0	9.000	L1	ON	9.9
0.429000	46.72	---	57.27	10.55	15000.0	9.000	L1	ON	9.9
0.433500	47.31	---	57.19	9.88	15000.0	9.000	L1	ON	9.9
0.442500	---	40.11	47.02	6.90	15000.0	9.000	N	ON	10.0
0.573000	37.75	---	56.00	18.25	15000.0	9.000	L1	ON	9.9
2.836500	---	16.71	46.00	29.29	15000.0	9.000	L1	ON	9.6
10.239000	---	18.17	50.00	31.83	15000.0	9.000	N	ON	9.9
13.560000	---	69.18	50.00	-19.18	15000.0	9.000	N	ON	9.9
13.560000	68.65	---	60.00	-8.65	15000.0	9.000	N	ON	9.9

* The frequency 13.56 MHz is the Fundamental signal.

APPENDIX A – Test Equipment Used For Tests

	Name of Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	Signal Analyzer	Agilent	N9020A	MY50510324	2023-12-05	2024-12-05
2	Signal Generator	Rohde & Schwarz	SMB100A	175528	2024-03-21	2025-03-21
3	EMI TEST RECEIVER	Rohde & Schwarz	ESW44	102039	2024-04-29	2025-04-29
4	Bilog Antenna	TESEQ	CBL6111D	60654	2023-08-21	2025-08-21
5	Active Loop Antenna	SCHWARZBECK	FMZB 1513	1513-125	2024-04-15	2026-04-15
6	Attenuator	PASTERNACK	PE7AP006-06	L20210504000 023	2024-07-31	2025-07-31
7	Attenuator	NONE	6dB	190557	2023-09-25	2024-09-25
8	AMPLIFIER	SONOMA	310N	411011	2024-07-31	2025-07-31
9	Dual-Tracking DC Power Supply	Topward Electric Instruments Co.,Ltd.	6303D	711196	2024-03-20	2025-03-20
10	DC POWER SUPPLY	HP	E3632A	MY40009327	2024-03-20	2025-03-20
11	EMI Test Receiver	R&S	ESR3	102826	2024-04-29	2025-04-29
12	LISN	R&S	ENV216	101236	2023-10-31	2024-10-31

No.	Cable	Manufacturer	Model No.	Serial No.	Check Date
1	RF Cable(conducted)	Junkosha Inc.	MWX221	2008S240	2024-08-27
2	RF Cable (Line Conducted)	Canare Corporation	L-5D2W	N/A	2024-03-05
3	RF Cable (9kHz-1GHz Radiated)	Canare Corporation	L-5D2W	N/A	2024-03-05
4	RF Cable (9kHz-1GHz Radiated)	HUBER+SUHNER	SUCOFLEX 104	MY27558/4	2024-03-05

-END-