RF TEST REPORT

Test Equipment	:	Mobile Card Reader
Model Name	:	SR20NB
FCC ID	:	OYUSR20NB
Date of receipt	:	2024-01-05
Test Duration	:	2024-02-15 ~ 2024-02-19
Date of issue	:	2024-02-22

Applicant : IDTECK CO., Ltd.
4F, 61, Samjak-ro 171beon-gil, Bucheon-si
Gyeonggi-do, Repubilc of Korea

Test Laboratory : Lab-T, Inc.
2182-42 Baegok-daero, Mohyeon-eup, Cheoin-gu
Yongin-si, Gyeonggi-do 17036, Republic of Korea

Test Specification	:	FCC Part 15 Subpart C 15.225
Test Result	:	Pass

The above equipment was tested by Lab-T Testing Laboratory for compliance with the requirements of FCC Rules and Regulations.
The test results presented in this test report are limited only to the sample supplied by applicant and the use of this test report is inhibited other than its purpose.
This test report shall not be reproduced except in full, without the written approval of Lab-T, Inc

Tested by:
Engineer
NamHyoung Kwon

Reviewed by:
Technical Manager
SangHoon Yu

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1. Revision History

Test Report No.	Date	Description
TRRFCC24-0008	2024-02-22	Initial issue

2. Information

2.1 Applicant Information

Applicant Name	IDTECK CO., Ltd.
Address	4F, 61, Samjak-ro 171beon-gil, Bucheon-si, Gyeonggi-do, Repubilc of Korea
Telephone No.	+82-2-2659-0055
Person in charge	Byung-Dong Kang / Private Sector, Corporation
Manufacturer	IDTECK CO., Ltd.
Address	4F, 61, 171beon-gil, Samjak-ro, Bucheon-si, Gyeonggi-do, Repubilc of Korea

2.2 Test Laboratory Information

Corporate Name	Lab-T, Inc.
Representative	Duke (JongYoung) Kim
Address	2182-42 Baegok-daero, Mohyeon-eup, Cheoin-gu, Yongin-si, Gyeonggi-do 17036 Republic of Korea
Telephone	+82-31-322-6767
Fax	+82-31-322-6768
E-mail	info@lab-t.net
FCC Designation No.	KR0159
FCC Registration No.	133186
IC Site Registration No.	22000

2.3 Test Site

Test Site	Used	Address
Building L	☒	2182-40 Baegok-daero, Mohyeon-eup, Cheoin-gu, Yongin-si, Gyeonggi-do 17036, Republic of Korea
Building T	☒	2182-42 Baegok-daero, Mohyeon-eup, Cheoin-gu, Yongin-si, Gyeonggi-do 17036, Republic of Korea
Building A	☐	2182-44 Baegok-daero, Mohyeon-eup, Cheoin-gu, Yongin-si, Gyeonggi-do 17036, Republic of Korea

3. Information about Test Equipment

3.1 Equipment Information

Equipment Type	Mobile Card Reader
Model Name	SR20NB
Frequency Range	13.56 MHz
Modulation Type	ASK
Power Supply	DC 12 V
S/W Version	1.0.0.
H/W Version	1.0.0.

Note 1 : The above EUT information was declared by the manufacturer.

3.2 Antenna Information

Type	Model No.	Gain	Note.
Loop antenna	TWR-20N_ANT V2.0	-	-

3.3 Test Frequency

Test Mode	Test Frequency[MHz]
ASK	13.56

3.4 Tested Companion Device Information

Type	Manufacturer	Model	Note.
-	-	-	-

4. Test Report

4.1 Summary

FCC Part 15			
FCC Rule	Parameter	Clause	Status
Transmitter Requirements			
15.203	Antenna Requirement	5.8	C
15.215(c)	20 dB Bandwidth	6.9.2	C
15.225(e)	Frequency Tolerance of Carrier Signal	6.8	C
15.225(a) 15.225(b) 15.225(c) 15.225(d) 15.205(a) 15.209(a)	In-band Fundamental Emission, In-band and Out-band Spurious Emission	6.3 6.4 6.5	C
15.207(a)	Conducted Emissions	6.2	N/A Note 2

Note 1 : C = Comply N/C = Not Comply N/T = Not Tested N/A = Not Applicable
Note 2 : The device only uses DC power, so it was not tested

* The general test methods used to test this device is ANSI C63.10:2020

4.2 Measurement Uncertainty

Mesurement Items	Expanded Uncertainty	
99% Occupied Bandwidth	6.80 kHz	(The confidence level is about 95 %, *k*=2)
Frequency Error	5.81 kHz	(The confidence level is about 95 %, *k*=2)
Radiated Spurious Emissions (30 MHz under)	4.06 dB	(The confidence level is about 95 %, *k*=2)
Radiated Spurious Emissions (30 MHz ~ 1 GHz)	4.84 dB	(The confidence level is about 95 %, *k*=2)
Conducted Emission	2.52 dB	(The confidence level is about 95 %, *k*=2)

4.3 Transmitter Requirements

4.3.1 20 dB Bandwidth

4.3.1.1 Regulation

Accoding to §15.215(c) 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. In the case of intentional radiators operating under the provisions of subpart E, the emission bandwidth may span across multiple contiguous frequency bands identified in that subpart. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

4.3.1.2 Measurement Procedure

These test measurement settings are specified in section 6.9.2 of ANSI C63.10-2020

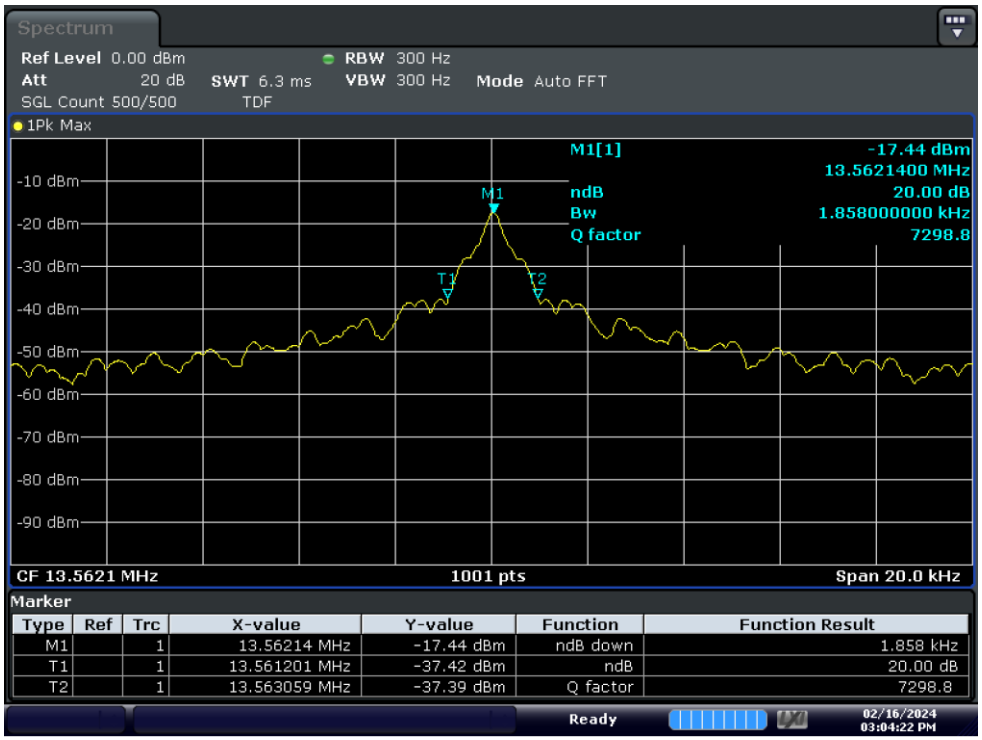
4.3.1.3 Result

Comply (Measurement data : Refer to the next page)

4.3.1.4 Measurement Data

Test mode : ASK

Frequency [MHz]	Result [kHz]	Lowest Frequency [MHz]	Highest Frequency [MHz]
13.56	1.858 0	13.561 2	13.563 1



4.3.2 Frequency Tolerance of Carrier Signal

4.3.2.1 Regulation

According to §15.225(e) The frequency tolerance of the carrier signal shall be maintained within ±0.01% of the operating frequency over a temperature variation of −20 degrees to + 50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

4.3.2.2 Measurement Procedure

These test measurement settings are specified in section 6.8.1 and 6.8.2 of ANSI C63.10-2020

4.3.2.3 Result

Comply (Measurement data : Refer to the next page)

4.3.2.4 Measurement Data

Test mode : 0 min

Nominal Frequency[Note 1] [MHz]	Temp [℃]	Lowest Frequency [MHz]	Highest Frequency [MHz]	Center Frequency [Hz]	Tolerance [%]
13.562 1	-20	13.561 301	13.563 079	13 562 190	0.000 664
	-10	13.561 301	13.563 079	13 562 190	0.000 664
	0	13.561 201	13.563 199	13 562 200	0.000 737
	10	13.561 121	13.563 239	13 562 180	0.000 590
	20	13.561 081	13.563 139	13 562 110	0.000 074
	30	13.561 101	13.563 179	13 562 140	0.000 295
	40	13.561 041	13.563 139	13 562 090	-0.000 074
	50	13.561 041	13.563 139	13 562 090	-0.000 074
	Voltage[%][Note 2]				
	85	13.561 021	13.563 259	13 562 140	0.000 295
	115	13.561 121	13.563 179	13 562 150	0.000 369

Note 1 : The center frequency measured at room temperature and rated voltage was declared as the Nominal frequency, and then the frequency stability was tested.
Note 2 : This test was measured at room temperature of +20 degrees

Test mode : 2 min

Nominal Frequency[Note 1] [MHz]	Temp [℃]	Lowest Frequency [MHz]	Highest Frequency [MHz]	Center Frequency [Hz]	Tolerance [%]
13.562 1	-20	13.561 301	13.563 079	13 562 190	0.000 664
	-10	13.561 241	13.563 119	13 562 180	0.000 590
	0	13.561 141	13.563 259	13 562 200	0.000 737
	10	13.561 261	13.563 119	13 562 190	0.000 664
	20	13.561 081	13.563 199	13 562 140	0.000 295
	30	13.561 041	13.563 239	13 562 140	0.000 295
	40	13.561 052	13.563 139	13 562 096	-0.000 033
	50	13.561 047	13.563 120	13 562 084	-0.000 122

Note 1 : The center frequency measured at room temperature and rated voltage was declared as the Nominal frequency, and then the frequency stability was tested.

Test mode : 5 min

Nominal Frequency[Note 1] [MHz]	Temp [℃]	Lowest Frequency [MHz]	Highest Frequency [MHz]	Center Frequency [Hz]	Tolerance [%]
13.562 1	-20	13.561 301	13.563 099	13 562 200	0.000 737
	-10	13.561 301	13.563 079	13 562 190	0.000 664
	0	13.561 301	13.563 119	13 562 210	0.000 811
	10	13.561 121	13.563 239	13 562 180	0.000 590
	20	13.561 141	13.563 079	13 562 110	0.000 074
	30	13.561 061	13.563 199	13 562 130	0.000 221
	40	13.561 041	13.563 139	13 562 090	-0.000 074
	50	13.561 041	13.563 141	13 562 091	-0.000 066

Note 1 : The center frequency measured at room temperature and rated voltage was declared as the Nominal frequency, and then the frequency stability was tested

Test mode : 10 min

Nominal Frequency[Note 1] [MHz]	Temp [℃]	Lowest Frequency [MHz]	Highest Frequency [MHz]	Center Frequency [Hz]	Tolerance [%]
13.562 1	-20	13.561 301	13.563 079	13 562 190	0.000 664
	-10	13.561 301	13.563 079	13 562 190	0.000 664
	0	13.561 281	13.563 119	13 562 200	0.000 737
	10	13.561 121	13.563 239	13 562 180	0.000 590
	20	13.561 021	13.563 259	13 562 140	0.000 295
	30	13.561 001	13.563 239	13 562 120	0.000 147
	40	13.561 037	13.563 139	13 562 088	-0.000 088
	50	13.561 041	13.563 130	13 562 086	-0.000 107

Note 1 : The center frequency measured at room temperature and rated voltage was declared as the Nominal frequency, and then the frequency stability was tested

4.3.3 In-band Fundamental Emission, In-band and Out-band Spurious Emission

4.3.3.1 Regulation

According to §15.225(a),(b),(c),(d) (a) The field strength of any emissions within the band 13.553-13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.

(b) Within the bands 13.410-13.553 MHz and 13.567-13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.
(c) Within the bands 13.110-13.410 MHz and 13.710-14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.
(d) The field strength of any emissions appearing outside of the 13.110-14.010 MHz band shall not exceed the general radiated emission limits in §15.209.

According to §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 [microvolts/meter]	Measurement Distance [meters]
0.009 - 0.490	2 400/F[kHz]	300
0.490 - 1.705	24 000/F[kHz]	30
1.705 - 30.0	30	30
30 - 88	100**	3
88 - 216	150**	3
216 - 960	200**	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shallnot be located in the frequency bands 54–72 MHz, 76–88 MHz, 174–216 MHz or 470–806 MHz. However, operation within these frequency bands is permItted under other sections of this part, e.g., §§15.231 and 15.241.

4.3.3.2 Measurement Procedure

1) The preliminary and final rdiated measurements were performed to determine the frequency producing the maximum emissions in at a 10m anechoic chamber. The EUT was tested at a distance 3 meters.

2) The EUT was placed on the top of the 0.8-meter height, 1 × 1.5 meter non-metallic table. To find the maximum emission levels, the height of a measuring antenna was changed and the turntable was rotated 360°.

3) The antenna polarization was also changed from vertical to horizontal. The spectrum was scanned from 9 kHz to 30 MHz using the loop antenna, and from 30 to 1 000 MHz using the TRILOG broadband antenna.

4) Each frequency found during preliminary measurements was re-examined and investigated. The test-receiver system was set up to average, peak, and quasi-peak detector function with specified bandwidth.

Note 1 : The resolution bandwidth of test receiver/spectrum analyzer is 200 Hz for Quasi-peak detection (QP) at frequency below 150 kHz.
Note 2 : The resolution bandwidth of test receiver/spectrum analyzer is 9 kHz for Quasi-peak detection (QP) at frequency 150 kHz to 30 MHz
Note 3 : The resolution bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) at frequency below 1 GHz.
Note 4 : The video bandwidth of test receiver/spectrum analyzer is three times as much as resolution bandwidth

4.3.3.3 Result

Comply (Measurement data : Refer to the next page)

4.3.3.4 Measurement Data

Test mode : 9 kHz ~ 30 MHz

Frequency [MHz]	Detector	Note 1	Pol. [V/H]	Reading [dBµV]	Ant Factor [dB]	Cable Loss [dB]	Result at 3m [dBµV/m]	Result at 30m [dBµV/m]	Limit at 30m [dBµV/m]	Margin [dB]
13.562 1	QP	F	H	25.30	10.70	0.70	36.70	-3.30	84.00	87.30
13.562 1	QP	F	V	20.40	10.70	0.70	31.80	-8.20	84.00	92.20
Spurious	Not detected	S	-	-	-	-	-	-	-	-

Frequency [MHz]	Detector	Note 1	Pol. [V/H]	Reading [dBµV]	Ant Factor [dB]	Cable Loss [dB]	Result at 3m [dBµV/m]	Result at 300m [dBµV/m]	Limit at 300m [dBµV/m]	Margin [dB]
Spurious	Not detected	S	-	-	-	-	-	-	-	-

Note 1 : "F" : Fundamental, "S" : Spurious
Note 2 : Result : Reading + Ant factor + Cable loss
Note 3 : According to §15.31 (f)(2);
Result at 30m[dBµV/m] = Result at 3m[dBµV/m] - 40*log(30/3)[dBµV/m]
Result at 300m[dBµV/m] = Result at 3m[dBµV/m] - 40*log(300/3)[dBµV/m]
Note 4 : Not detected means peak measurement did not take place because it is more than 20dB difference in the limit

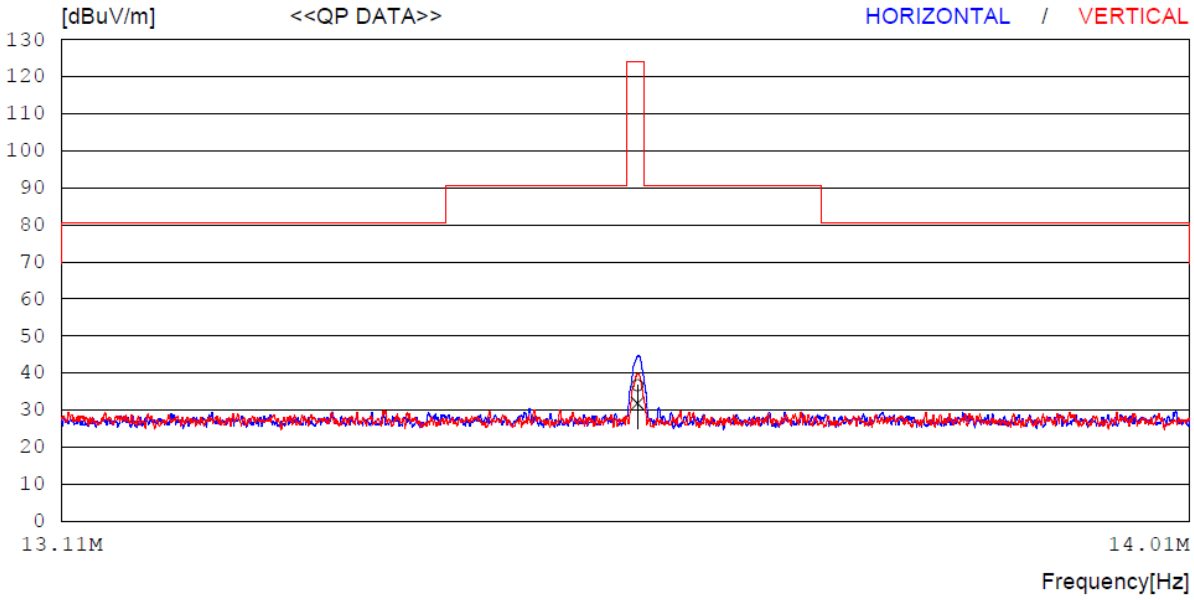
Test mode : 30 MHz ~ 1 GHz

Frequency [MHz]	Detector	Note 1	Pol. [V/H]	Reading [dBµV]	Ant Factor [dB]	Loss [dB]	Result [dBµV/m]	Limit [dBµV/m]	Margin [dB]
135.057	QP	S	H	49.60	18.40	-28.10	39.90	43.50	3.60
135.142	QP	S	V	47.40	18.40	-28.10	37.70	43.50	5.80
188.884	QP	S	H	48.40	16.80	-27.70	37.50	43.50	6.00
284.824	QP	S	V	46.50	19.00	-26.90	38.60	46.00	7.40
387.155	QP	S	V	42.70	21.40	-26.70	37.40	46.00	8.60
461.155	QP	S	H	41.00	23.20	-26.50	37.70	46.00	8.30

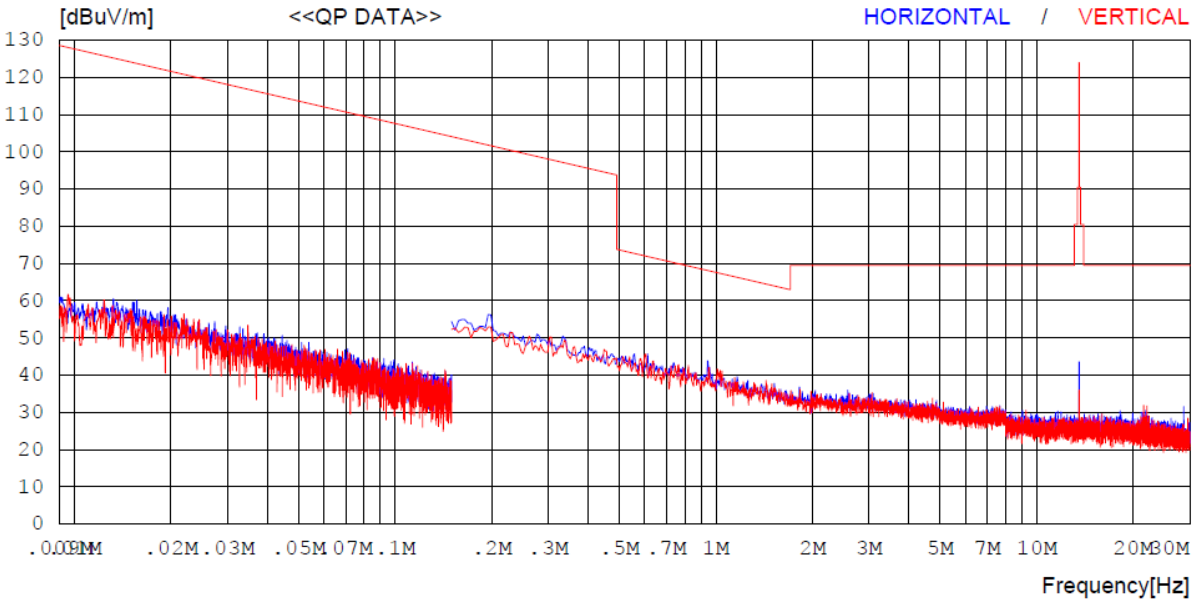
Note 1 : Loss : Cable loss - Amp gain
Note 2 : Result : Reading + Ant factor + Loss

4.3.3.5 Measurement Plot

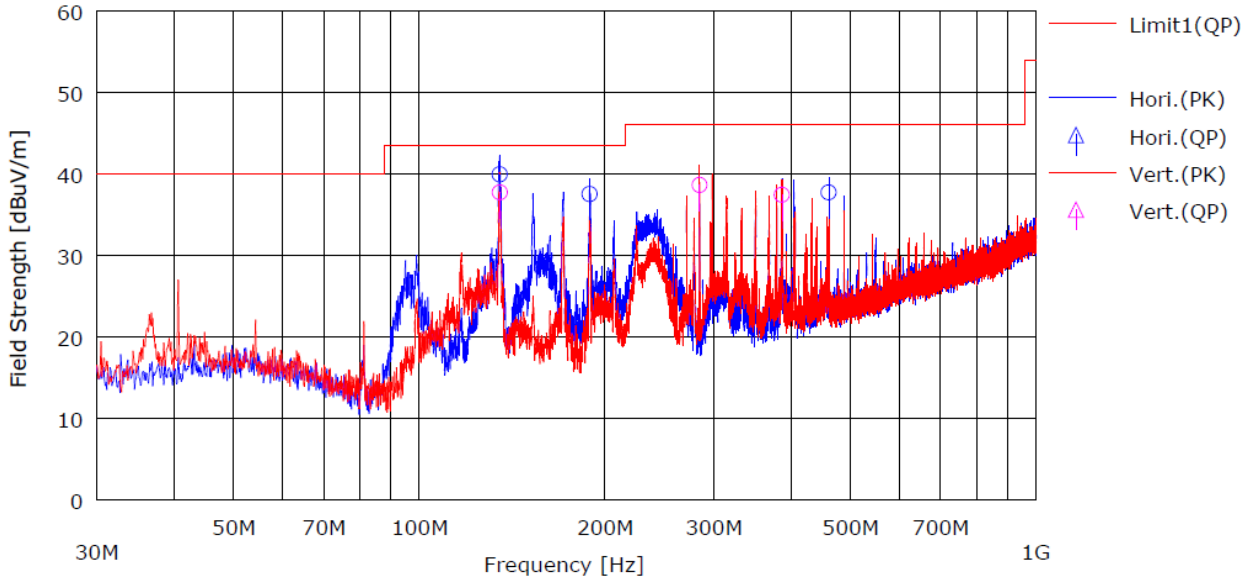
Test mode : 9 kHz ~ 30 MHz_In-band Fundamental, Spurious Emission



Test mode : 9 kHz ~ 30 MHz_Out-band Spurious Emission



Test mode : 30 MHz ~ 1 GHz



4.3.4 Conducted Emission

4.3.4.1 Regulation

According to §15.207(a), 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 μH/50 Ω 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 of emission [MHz]	Conducted Limit[dBμV]	
	Qausi-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.

According to §15.107(a), for unintentional device, except for Class A digital devices, line conducted emission limits are the same as the above table.

4.3.4.2 Measurement Procedure

1) The EUT was placed on a wooden table of size, 1 m by 1.5 m, raised 80 cm in which is located 40 cm away from the vertical wall and 1.5 m away from the side wall of the shielded room.

2) Each current-carrying conductor of the EUT power cord was individually connected through a 50 Ω/50 μH LISN, which is an input transducer to a Spectrum Analyzer or an EMI/Field Intensity Meter, to the input power source.

3) Exploratory measurements were made to identify the frequency of the emission that had the highest amplitude relative to the limit by operating the EUT in a range of typical modes of operation, cable position, and with a typical system equipment configuration and arrangement. Based on the exploratory tests of the EUT, the one EUT cable configuration and arrangement and mode of operation that had produced the emission with the highest amplitude relative to the limit was selected for the final measurement.

4) The final test on all current-carrying conductors of all of the power cords to the equipment that comprises the EUT (but not the cords associated with other non-EUT equipment is the system) was then performed over the frequency range of 0.15 MHz to 30 MHz.

5) The measurements were made with the detector set to PEAK amplitude within a bandwidth of 10 kHz or to QUASIPEAK and AVERAGE within a bandwidth of 9 kHz. The EUT was in transmitting mode during the measurements.

4.3.4.3 Result

Not Applicable (The device only uses DC power, so it was not tested)

APPENDIX I

TEST EQUIPMENT USED FOR TESTS

To facilitate inclusion on each page of the test equipment used for related tests, each item of test equipment.

Equipment	Manufacturer	Model	Serial No.	Cal. Date (yy.mm.dd)	Next Cal.Date (yy.mm.dd)
FSV Signal Analyzer	ROHDE&SCHWARZ	FSV30	103370	2023-10-11	2024-10-11
Dynamic Measurement DC Source	HP	66332A	US37471465	2024-01-04	2025-01-04
HUMIDITY/TEMP DATA RECORDER	LUTRON	MHB-382SD	79735	2023-04-19	2024-04-19
Digital MultiMeter	HP	34401A	US36025428	2024-01-04	2025-01-04
Signal Generator	ROHDE&SCHWARZ	SMB100A	178384	2023-10-11	2024-10-11
Temp & Humi Test Chamber	SJ SCIENCE	SJ-TH-S50	170719	2023-04-13	2024-04-13
EMI Test Receiver	ROHDE&SCHWARZ	ESU40	100445	2023-09-05	2024-09-05
Active Loop H-Field	ETS	6502	00150598	2023-06-27	2025-06-27
BiLog Antenna	Schwarzbeck	VULB9168	00821	2023-03-29	2024-03-29
Attenuator	JFW	50F-006	6 dB-3	2023-04-13	2024-04-13
PREAMPLIFIER	TSJ	MLA-10k01-b01-27	1870367	2023-04-13	2024-04-13
Antenna Mast	Innco	MA4640-XPET-0800	578	-	-
Controller	TOKIN	5909L	141909L-1	-	-
Controller	Innco	CO3000	40040217	-	-
Turn Table	TOKIN	5983-1.5	-	-	-