verify No.291682587038

TEST REPORT

Eurofins KCTL Co.,Ltd. 65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea TEL: 82-70-5008-1021 FAX: 82-505-299-8311 www.kctl.co.kr	Report No.: KR24-SRF0122 Page (1) of (16)	eurofins | KCTL

1. Client

- Name : EUNKI ELECTRONIC CO,LTD
- Address : 80 Jomaru-ro 385gil, Bucheon-city, Gyeonggi-do, 14558, Chunui-Techno Tower Room #812, Korea
- Date of Receipt : 2024-04-22

2. Use of Report : Certification

3. Name of Product / Model : Electric Dog Training Collar / SPR5100

4. Manufacturer / Country of Origin : EUNKI ELECTRONIC CO,LTD. / Korea

5. FCC ID : 2BG29SPR5100

7. Date of Test : 2024-05-14 to 2024-07-05

8. Location of Test : ■ Permanent Testing Lab ☐ On Site Testing
(Address:65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea)

9. Test method used : FCC Part 15 Subpart C, 15.227

10. Test Result : Refer to the test result in the test report

	Tested by	Technical Manager
Affirmation	Name : Taeung Um (Signature)	Name : Harim Lee (Signature)

2024-07-30

Eurofins KCTL Co.,Ltd.

REPORT REVISION HISTORY

Date	Revision	Page No
2024-07-30	Originally issued	-

General remarks for test reports

Statement concerning the uncertainty of the measurement systems used for the tests

(may be required by the product standard or client)

☐ **Internal procedure used for type testing through which traceability of the measuring uncertainty has been established:**

Procedure number, issue date and title:

Calculations leading to the reported values are on file with the testing laboratory that conducted the testing.

☒ **Statement not required by the standard or client used for type testing**

CONTENTS

1. General information

Client	:	EUNKI ELECTRONIC CO,LTD
Address	:	80 Jomaru-ro 385gil, Bucheon-city, Gyeonggi-do, 14558, Chunui-Techno Tower Room #812, Korea
Manufacturer	:	EUNKI ELECTRONIC CO,LTD.
Address	:	80 Jomaru-ro 385gil, Bucheon-city, Gyeonggi-do, 14558, Chunui-Techno Tower Room #812, Korea
Laboratory	:	Eurofins KCTL Co.,Ltd.
Address	:	65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea
Accreditations	:	FCC Site Designation No: KR0040, FCC Site Registration No: 687132
		VCCI Registration No. : R-20080, G-20078, C-20059, T-20056
		CAB Identifier: KR0040
		ISED Number: 8035A
		KOLAS No.: KT231

2. Device information

Equipment under test	:	Electric Dog Training Collar
Model	:	SPR5100
Derivative Model	:	SPR5200, SPR5300
Modulation technique	:	FSK
Frequency range	:	27.145 ㎒
Power source	:	DC 7.4 Ⅴ
Antenna specification	:	Dipole antenna
Software version	:	V2.01
Hardware version	:	V1.0
Test device serial No.	:	N/A
Operation temperature	:	-20 ℃ ~ 50 ℃

2.1. Information about derivation model

The difference between basic model and derivative models is:

The basic model is SPR5100, and simplified derivation based on model name of each buyers.
The variant models are SPR5200, SPR5300. The H/W version and PCB design are same. And the other thing is the same.
The difference description between models is shown in the table below.

Product name	Model name	Basic model	Variant model	Difference
Electric Dog Training Collar	SPR5100	O	-	-
	SPR5200	-	O	simplified derivation
	SPR5300	-	O	Simplified derivation

*Variant models : simplified derivation based on model name of each buyers.

2.2. Frequency/channel operations

This device contains the following capabilities:

Ch.	Frequency (㎒)
01	27.145

3. Antenna requirement

Requirement of FCC part section 15.203:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

- The transmitters use Unique antenna with unique antenna connector.
  (Refer to " External photos_SPR5100" 4 page)

4. Summary of tests

FCC Part section(s)	Parameter	Test mode	Test results
15.227 15.209	Radiated Emission	Radiated	Pass
15.215(c)	20 dB Bandwidth	Conducted	Pass
15.207(a)	AC Conducted emissions		Pass

Notes:

1. All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.
2. These tests were performed other than open field site, adequate comparison measurements were confirmed against 30 m open field site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 414788.
3. The fundamental of the EUT was investigated in three orthogonal orientations X, Y and Z. It was determined that **X** orientation was worst-case orientation. Therefore, all final radiated testing was performed with the EUT in **X** orientation
4. The test procedure(s) in this report were performed in accordance as following.
   - ANSI C63.10-2013

5. Measurement uncertainty

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.10-2013.

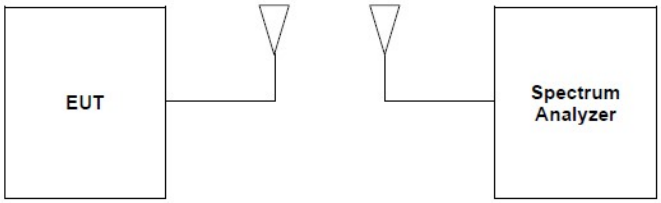
All measurement uncertainty values are shown with a coverage factor of k=2 to indicated a 95 % level of confidence. The measurement data shown herein meets of exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and thus, can be compared directly to specified limits to determine compliance.

Parameter	Expanded uncertainty (±)	
Radiated spurious emissions	9 kHz ~ 30 MHz	2.3 dB
	30 MHz ~ 1 000 MHz	2.5 dB
Conducted emissions	150 kHz ~ 30 MHz	2.8 dB

6. Test results

6.1. 20dB Bandwidth

Test setup



Limit

According 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.

Test procedure

ANSI C63.10 - Section 6.9.2

Test settings

The spectrum analyzer connected receive antenna and the EUT placed on near the receive antenna. The RBW is set to 10 kHz. The VBW is set to 3 times the RBW. The sweep time is coupled.

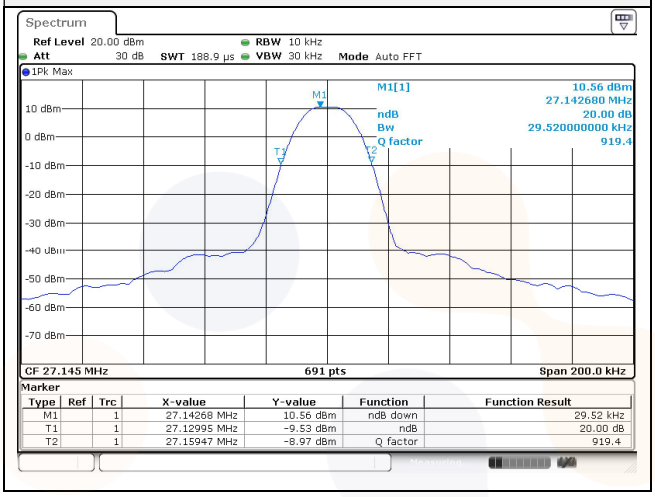
Test results

Frequency (㎒)	20㏈ Bandwidth (㎑)	Limit
27.145	29.52	Reporting purpose only

Test Plots

20㏈ Bandwidth

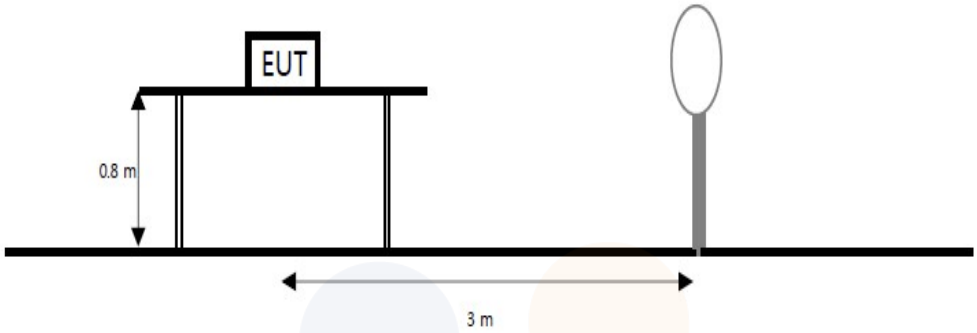
27.145 ㎒



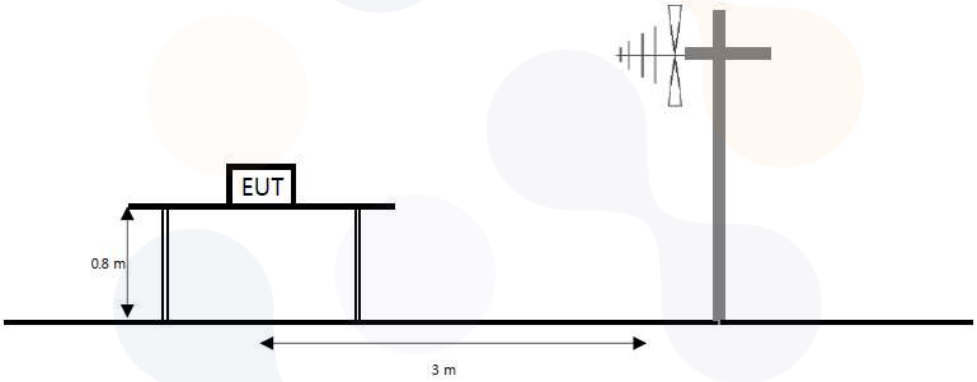
6.2. Field Strength of Fundamental and Spurious Emission

Test setup

The diagram below shows the test setup that is utilized to make the measurements for emission from 9 ㎑ to 30 ㎒ Emissions



The diagram below shows the test setup that is utilized to make the measurements for emission from 30 ㎒ to 1 ㎓ emissions.



Limit

15.227 (a) The field strength of any emission within this band shall not exceed 10,000 microvolts/meter at 3 meters. The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in § 15.35 for limiting peak emissions apply.

15.227 (b) The field strength of any emissions which appear outside of this band shall not exceed the general radiated emission limits in § 15.209.

Frequency (㎒)	Field Strength (㎶/m)	Measurement distance (meters)
0.009-0.490	2400/F(㎑)	300
0.490-1.705	24000/F(㎑)	30
1.705-30.0	30(29.54 ㏈㎶/m)	30
30.0-88.0	100(40 ㏈㎶/m)	3
88-216	150(43.5 ㏈㎶/m)	3
216-960	200 (46 ㏈㎶/m)	3
Above 960	500 (53.98 ㏈㎶/m)	3

Test procedure

ANSI C63.10-2013 - Section 6.4, 6.5

Test settings

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = as specified in table
3. VBW ≥ 3 x RBW
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

Table. RBW as a function of frequency

Frequency	RBW
9 ㎑ to 150 ㎑	200 ㎐ to 300 ㎐
0.15 ㎒ to 30 ㎒	9 ㎑ to 10 ㎑
30 ㎒ to 1 000 ㎒	100 ㎑ to 120 ㎑
> 1 000 ㎒	1 ㎒

Notes:

1. *f* <30 ㎒, extrapolation factor of 40 ㏈/decade of distance. $F_d = 40\log(D_m/Ds)$
   f ≥30 ㎒, extrapolation factor of 20 ㏈/decade of distance. $F_d = 20\log(D_m/Ds)$
   Where:
   F_d= Distance factor in ㏈
   D_m= Measurement distance in meters
   D_s= Specification distance in meters
2. Measurements were performed at 3m and the data was extrapolated to the specified measurement distance of 30m using the square of an inverse linear distance extrapolation factor (40 ㏈/decade) as specified in § 15.31(f)(2). Extrapolation Factor = 40 log10(30/3) = 40 ㏈.
3. Factors(㏈) = Antenna factor(㏈/m) + Cable loss(㏈) + or Amp. gain(㏈) + or F_d(㏈)
4. Result = Reading + Cable loss + Amp gain + Ant. factor - Distance factor
5. The worst-case emissions are reported however emissions whose levels were not within 20 ㏈ of respective limits were not reported.
6. All measurements were recorded using a spectrum analyzer employing a quasi-peak detector.
7. [1)] means restricted band
8. [2)] means band edge

Test results for fundamental
15.227 (a) 27.96-27.28 ㎒

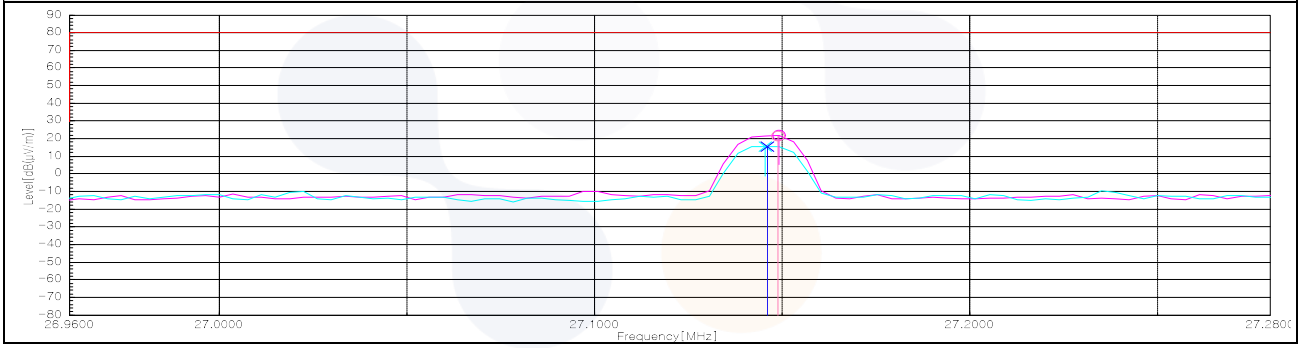
[Horizontal]

Frequency	Reading	Detector	Ant. Factor	Amp. + Cable	Distance factor	Result	Limit
(㎒)	(dB(㎶))	Mode	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))
Peak data							
27.15	72.90	PK	20.91	-32.20	40.00	21.61	100.00
Average data							
27.15	72.70	AV	20.91	-32.20	40.00	21.41	80.00

[Vertical]

Frequency	Reading	Detector	Ant. Factor	Amp. + Cable	Distance factor	Result	Limit
(㎒)	(dB(㎶))	Mode	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))
Peak data							
27.15	66.90	PK	20.91	-32.20	40.00	15.61	100.00
Average data							
27.15	66.60	AV	20.91	-32.20	40.00	15.31	80.00

Horizontal/Vertical



Test results (9 ㎑ to 30 ㎒)
15.227 (b),15.209 0.009-30 ㎒

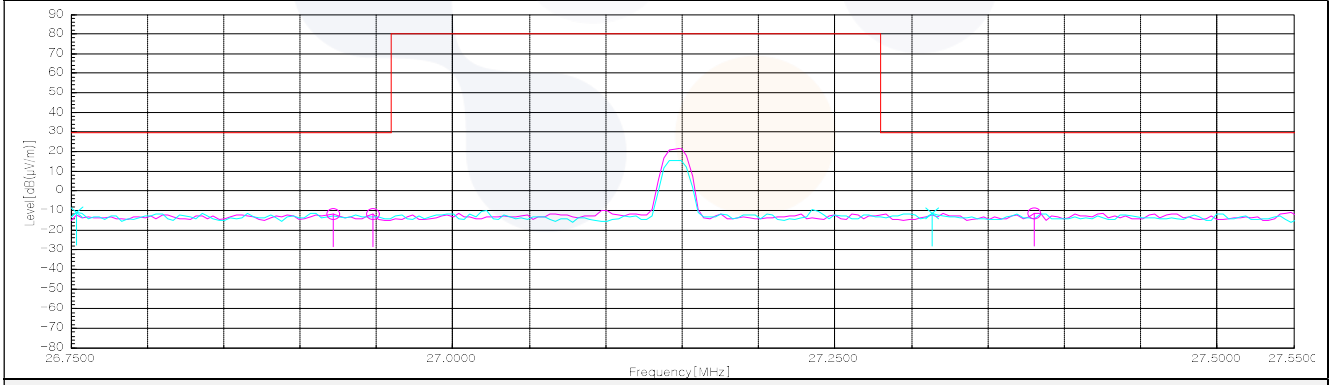
[Horizontal]

Frequency	Reading	Detector	Ant. Factor	Amp. + Cable	Distance factor	Result	Limit	Margin
(㎒)	(dB(㎶))	Mode	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Quasi peak data								
18.16	37.70	QP	20.79	-32.21	40.00	-13.72	29.50	43.22
28.06	37.10	QP	20.75	-32.17	40.00	-14.32	29.50	43.82
26.95[2)]	36.50	QP	20.95	-32.20	40.00	-14.75	29.50	44.25
27.38[2)]	37.20	QP	20.87	-32.19	40.00	-14.12	29.50	43.62

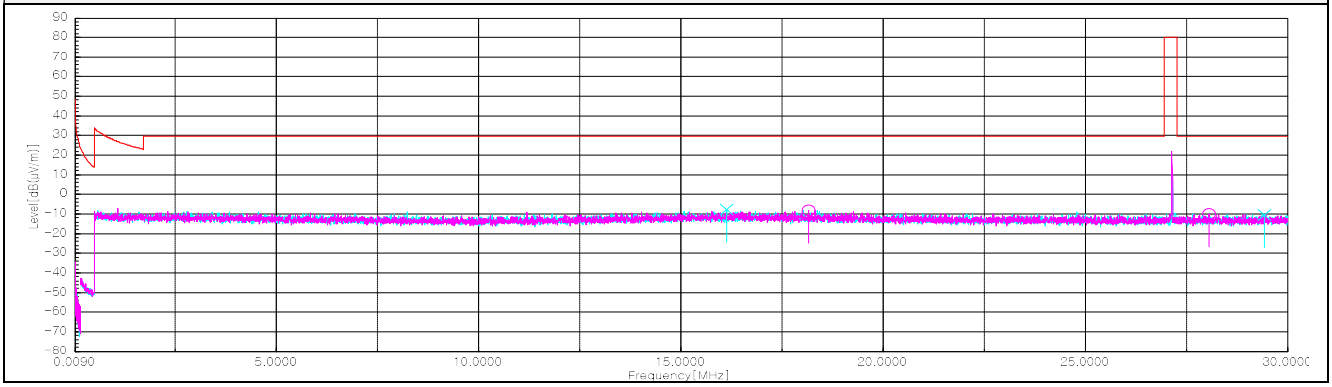
[Vertical]

Frequency	Reading	Detector	Ant. Factor	Amp. + Cable	Distance factor	Result	Limit	Margin
(㎒)	(dB(㎶))	Mode	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Quasi peak data								
16.14	38.10	QP	20.67	-32.20	40.00	-13.43	29.50	42.93
29.43	37.50	QP	20.50	-32.02	40.00	-14.02	29.50	43.52
26.75[2)]	37.00	QP	20.98	-32.20	40.00	-14.22	29.50	43.72
27.31[2)]	36.60	QP	20.88	-32.19	40.00	-14.71	29.50	44.21

Horizontal/Vertical (Band edge)



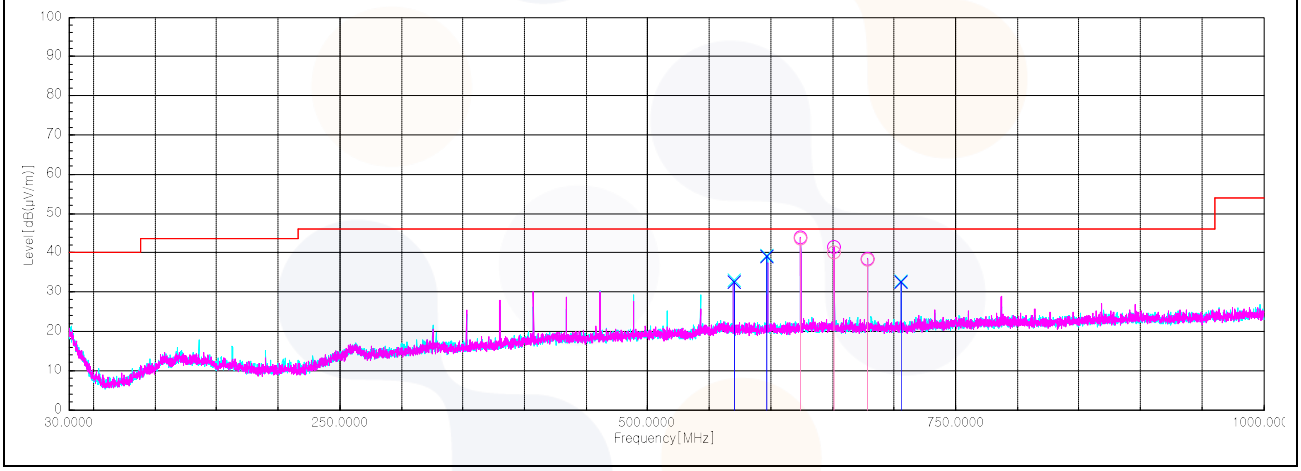
Horizontal/Vertical



Test results (Below 1 000 ㎒)
15.227 (b),15.209 30-1 000 ㎒

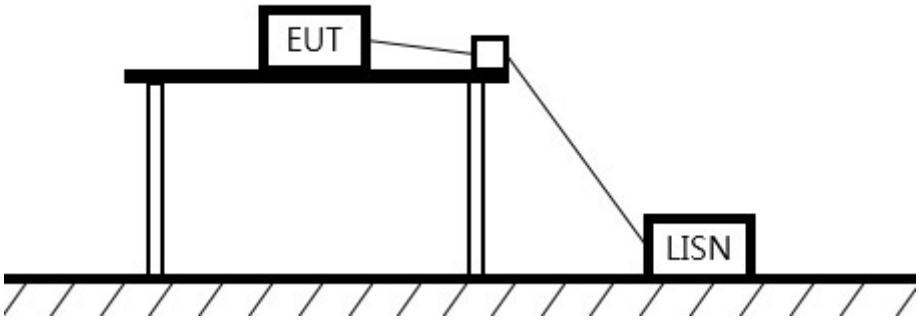
Frequency	Pol.	Reading	Ant. Factor	Amp. + Cable	Distance factor	Result	Limit	Margin
(㎒)	[V/H]	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Quasi peak data								
570.05	V	38.50	24.70	-30.71	-	32.49	46.00	13.51
597.09	V	44.70	24.60	-30.36	-	38.94	46.00	7.06
624.25	H	49.50	24.70	-30.60	-	43.60	46.00	2.40
651.41	H	45.60	24.90	-30.35	-	40.15	46.00	5.85
678.57	H	43.70	24.90	-30.36	-	38.24	46.00	7.76
705.73	V	38.00	24.80	-30.26	-	32.54	46.00	13.46

Horizontal/Vertical



6.3. AC Conducted emission

Test setup



Limit

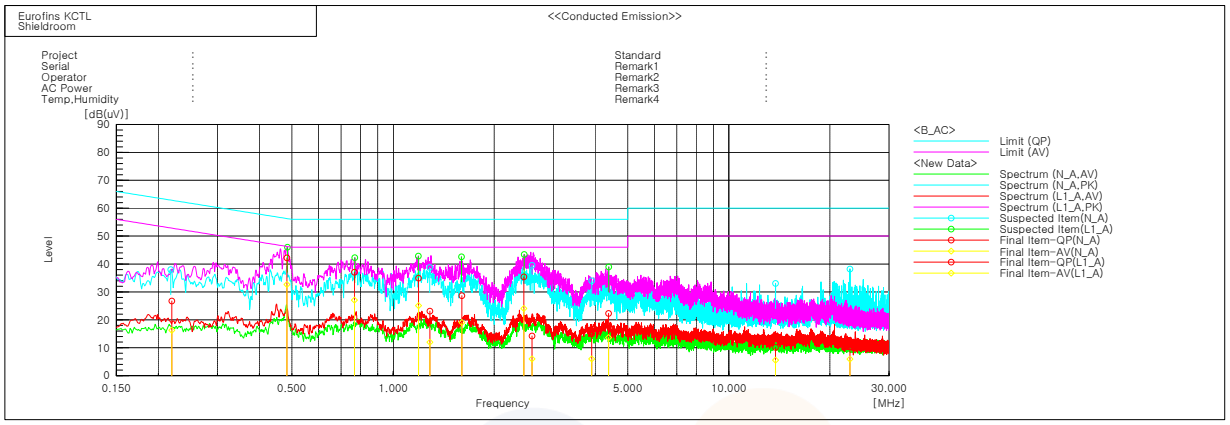
According to 15.207(a) and RSS-Gen(8.8), for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 ㎑ to 30 ㎒, shall not exceed the limits in the following table, as measured using a 50uH/50 ohm line impedance stabilization network (LISN). Compliance with the provision of this paragraph shall on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower applies at the boundary between the frequencies ranges.

Frequency of Emission (㎒)	Conducted limit (dB㎶/m)	
	Quasi-peak	Average
0.15 – 0.50	66 - 56*	56 - 46*
0.50 – 5.00	56	46
5.00 – 30.0	60	50

Measurement procedure

1. The EUT was placed on a wooden table of size, 1 m by 1.5 m, raised 80 ㎝ in which is located 40 ㎝ away from the vertical wall and 1.5m away from the side wall of the shielded room.
2. Each current-carrying conductor of the EUT power cord was individually connected through a 50Ω/50μH 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 ㎒ to 30 ㎒.
5. The measurements were made with the detector set to peak amplitude within a bandwidth of 10 ㎑ or to quasi-peak and average within a bandwidth of 9 ㎑. The EUT was in transmitting mode during the measurements.

Test results



Final Result

--- N_A Phase ---

No.	Frequency [MHz]	Reading QP [dB(uV)]	Reading CAV [dB(uV)]	c.f [dB]	Result QP [dB(uV)]	Result CAV [dB(uV)]	Limit QP [dB(uV)]	Limit AV [dB(uV)]	Margin QP [dB]	Margin CAV [dB]
1	0.21942	16.6	6.2	10.1	26.7	16.3	62.8	52.8	36.1	36.5
2	1.2867	13.1	2.0	10.0	23.1	12.0	56.0	46.0	32.9	34.0
3	2.59238	4.2	-4.0	10.0	14.2	6.0	56.0	46.0	41.8	40.0
4	3.90728	4.9	-4.0	10.0	14.9	6.0	56.0	46.0	41.1	40.0
5	13.77017	-0.8	-5.4	10.9	10.1	5.5	60.0	50.0	49.9	44.5
6	22.94632	-0.8	-5.3	11.2	10.4	5.9	60.0	50.0	49.6	44.1

--- L1_A Phase ---

No.	Frequency [MHz]	Reading QP [dB(uV)]	Reading CAV [dB(uV)]	c.f [dB]	Result QP [dB(uV)]	Result CAV [dB(uV)]	Limit QP [dB(uV)]	Limit AV [dB(uV)]	Margin QP [dB]	Margin CAV [dB]
1	0.48312	31.9	22.4	10.3	42.2	32.7	56.3	46.3	14.1	13.6
2	0.76687	26.9	16.9	10.1	37.0	27.0	56.0	46.0	19.0	19.0
3	1.19146	24.8	15.0	10.1	34.9	25.1	56.0	46.0	21.1	20.9
4	1.60368	18.7	9.0	10.0	28.7	19.0	56.0	46.0	27.3	27.0
5	2.45266	25.4	14.0	10.0	35.4	24.0	56.0	46.0	20.6	22.0
6	4.38412	12.3	3.6	10.0	22.3	13.6	56.0	46.0	33.7	32.4

7. Measurement equipment

Equipment Name	Manufacturer	Model No.	Serial No.	Next Cal. Date
Spectrum Analyzer	R&S	FSV40	100988	25.05.27
PSA Spectrum Analyzer	Agilent	E4440A	MY44303500	25.07.02*
Amplifier	SONOMA INSTRUMENT	310N	421910	24.10.12
Bilog Antenna	Teseq GmbH	CBL 6112D	61521	24.11.17
Loop Antenna	R&S	HFH2-Z2	100355	26.06.25
Signal Generator	R&S	SMB100A	176206	25.01.18
Vector Signal Generator	R&S	SMBV100A	257566	25.07.01
EMI TEST RECEIVER	R&S	ESCI3	101428	24.08.18
TWO-LINE V - NETWORK	R&S	ENV216	101584	25.03.27
Controller	INNCO SYSTEMS	CO3000	1442/54370322/P	-
Antenna Mast	INNCO SYSTEMS	MA4640-XP-ET	AM002	-
Turn Device	INNCO SYSTEMS	DS1200-S-1t	0002	-

* Tests related to this equipment were progressed after the calibration was completed.

End of test report