TEST REPORT

KCTL Inc. 65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea TEL: 82-31-285-0894 FAX: 82-505-299-8311 www.kctl.co.kr	Report No.: KR22-SRF0063 Page (1) of (15)	eurofins | KCTL

1. Client

- Name : DT Systems Inc
- Address : 2872 Wallnut Hill Lane, Dallas, Tx 75229, United States
- Date of Receipt : 2022-04-01

2. Use of Report : Certification

3. Name of Product / Model : Dog Training / DOGDirector700

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

5. FCC ID : M8YDOG700

6. Date of Test : 2022-04-07

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

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

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

Affirmation	Tested by Name : Euijung Kim (Signature)	Technical Manager Name : Heesu Ahn (Signature)

2022-05-03

KCTL Inc.

REPORT REVISION HISTORY

Date	Revision	Page No
2022-05-03	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	:	DT Systems Inc
Address	:	2872 Wallnut Hill Lane, Dallas, Tx 75229, United States
Manufacturer	:	EUNKI ELECTRONIC CO,LTD.
Address	:	80 Jomaru-ro 385gil, Bucheon-city, Gyeonggi-do, 14558, Chunui-Techno Tower Room #812, Korea
Laboratory	:	KCTL Inc.
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	:	Dog Training
Model	:	DOGDirector700
Derivative Model	:	DD700, FFH700, CC700
Modulation technique	:	FSK
Number of channels	:	1 ch
Frequency range	:	27.095 ㎒
Power source	:	DC 9 Ⅴ
Antenna specification	:	Dipole antenna
Antenna gain	:	N/A
Software version	:	V2.00
Hardware version	:	V1.1
Test device serial No.	:	N/A
Operation temperature	:	-20 ℃ ~ 50 ℃

2.1. Information about derivative model

The difference between basic model and derivative models is:

The basic model is DOGDirector700, and simplified derivation based on model name of each buyers.
The variant models are DD700, FFH700, CC700. 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	Derivative model	Difference
Dog Training	DOGDirector700	O	-	-
	DD700	-	O	Simplified derivation
	FFH700	-	O	Simplified derivation
	CC700	-	O	Simplified derivation

2.2. Frequency/channel operations

This device contains the following capabilities:
NFC

Ch.	Frequency (㎒)
01	27.095

Table 2.2.1. NFC

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 dipole antennas with unique antenna connector.
  (Refer to "External photos_DOGDirector700" 4~5 page)

4. Summary of tests

FCC Part section(s)	Parameter	Test Condition	Test results
15.227 15.209	Radiated Emission	Radiated	Pass
15.215(c)	20 dB Bandwidth	Conducted	Pass
15.207(a)	AC Conducted emissions		NA(note2)

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. The conducted limits are not required for devices which only employ battery power for operation.
3. 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.
4. 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
5. 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.

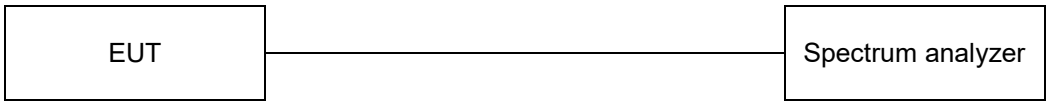
All measurement uncertainty values are shown with a coverage factor of k=2 to indicated a 95 % level of confidence. The measurement data shown herein meets of exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and thus, can be compared directly to specified limits to determine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

Parameter	Expanded uncertainty (±)	
Radiated spurious emissions	9 ㎑ ~ 30 ㎒	2.4 dB
	30 ㎒ ~ 1 000 ㎒	2.3 dB
Conducted emissions	9 ㎑ ~ 150 ㎑	1.6 dB
	150 ㎑ ~ 30 ㎒	1.7 dB

6. Test results

6.1. 20 dB 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

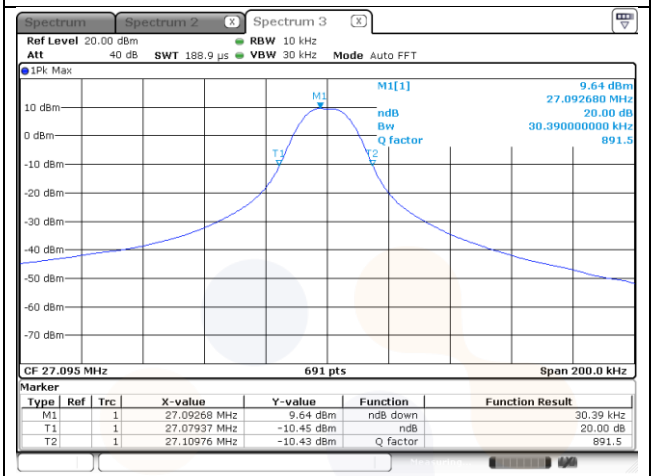
Test settings

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

Test results

Frequency [㎒]	20 ㏈ Bandwidth [㎒]		Limit [㎒]	20 ㏈ Bandwidth [㎑]
27.095	Lowest Frequency	27.079 37	26.960 00	30.39
	Highest Frequency	27.109 76	27.280 00	

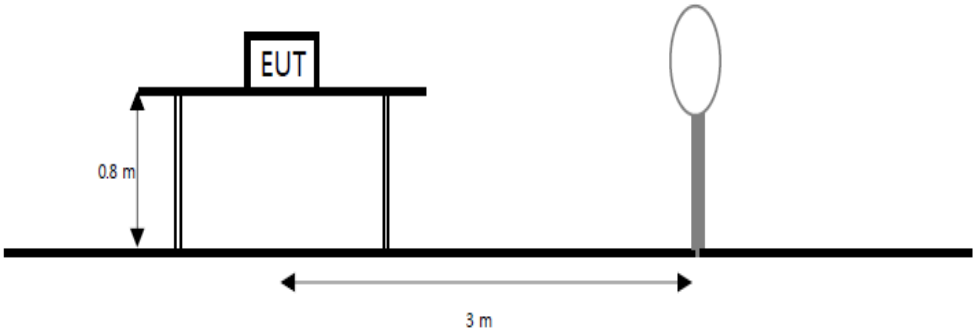
20 ㏈ Bandwidth



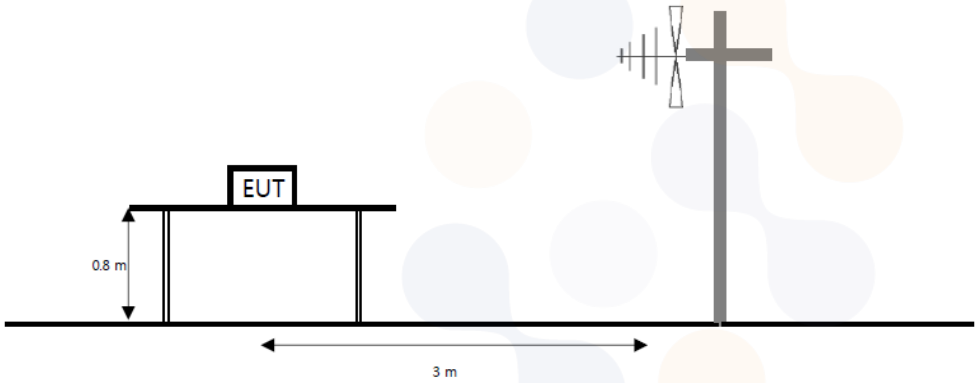
6.2. Radiated spurious emissions

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 = 40log(D_m/Ds)
   f ≥30 ㎒, extrapolation factor of 20 ㏈/decade of distance. F_d = 20log(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. Below 30 ㎒ frequency range, all orientations about parallel, perpendicular, and ground-parallel were investigated then reported and the worse orientations of Face-on and Face-off were set for final test.
8. Face-on = Parallel, Face-off = Perpendicular
9. 1) means restricted band
10. 2) means band edge

Test results for fundamental
15.227 (a) 26.96-27.28 ㎒

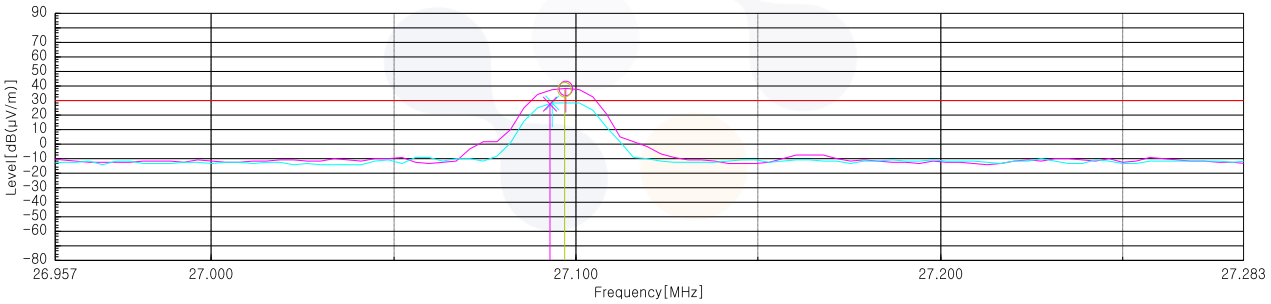
[Face-on]

Frequency	Reading	Antenna Factor	Amp. + Cable	Distance Factor	Result	Limit	Margin
(㎒)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data							
27.10	88.20	20.51	-30.51	40.00	38.20	100.00	61.80
Average data							
27.10	87.00	20.51	-30.51	40.00	37.00	80.00	43.00

[Face-off]

Frequency	Reading	Antenna Factor	Amp. + Cable	Distance Factor	Result	Limit	Margin
(㎒)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data							
27.09	78.10	20.51	-30.51	40.00	28.10	100.00	71.90
Average data							
27.09	77.30	20.51	-30.51	40.00	27.30	80.00	52.70

Face-on/Face-off



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

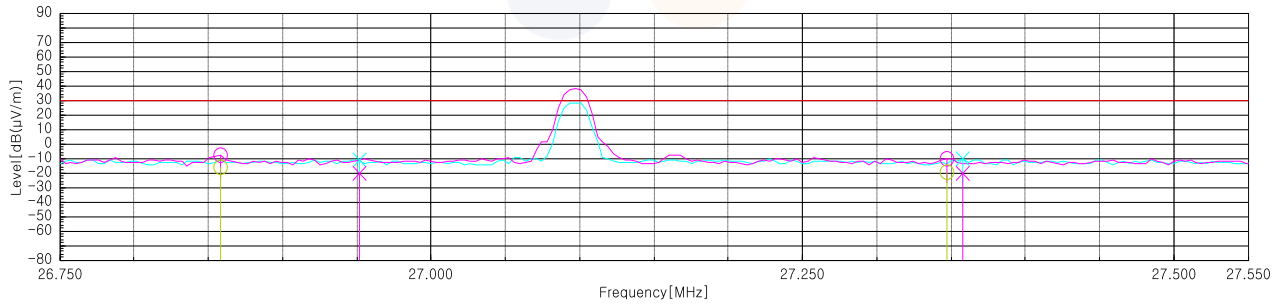
[Face-on]

Frequency	Reading	Antenna Factor	Amp. + Cable	Distance Factor	Result	Limit	Margin
(㎒)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Quasi peak data							
24.52	58.30	20.78	-30.61	40.00	8.47	29.50	21.03
25.81	54.10	20.69	-30.52	40.00	4.27	29.50	25.23
26.86[2)]	33.10	20.54	-30.52	40.00	-16.88	29.50	46.38
27.35[2)]	30.10	20.47	-30.49	40.00	-19.92	29.50	49.42
29.68	44.10	20.14	-30.41	40.00	-6.17	29.50	35.67

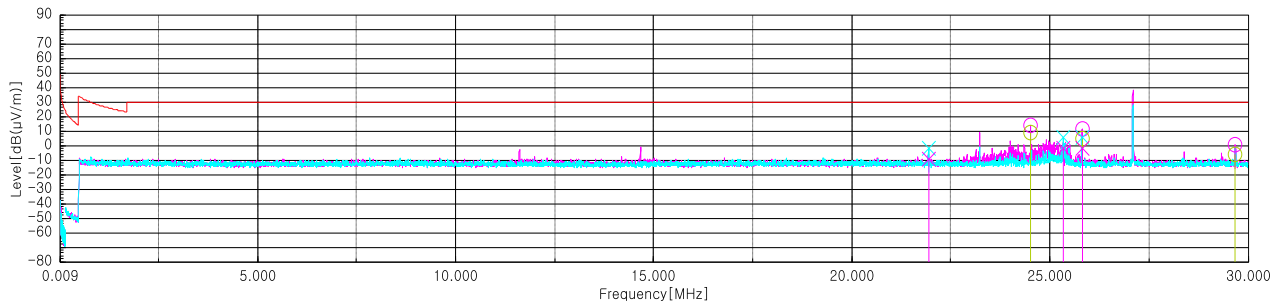
[Face-off]

Frequency	Reading	Antenna Factor	Amp. + Cable	Distance Factor	Result	Limit	Margin
(㎒)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Quasi peak data							
21.94	40.10	20.68	-30.69	40.00	-9.91	29.50	39.41
25.34	47.70	20.75	-30.55	40.00	-2.10	29.50	31.60
25.81	47.80	20.69	-30.52	40.00	-2.03	29.50	31.53
26.95[2)]	29.20	20.53	-30.52	40.00	-20.79	29.50	50.29
27.36[2)]	29.80	20.47	-30.49	40.00	-20.22	29.50	49.72

Face-on/Face-off (Band edge)



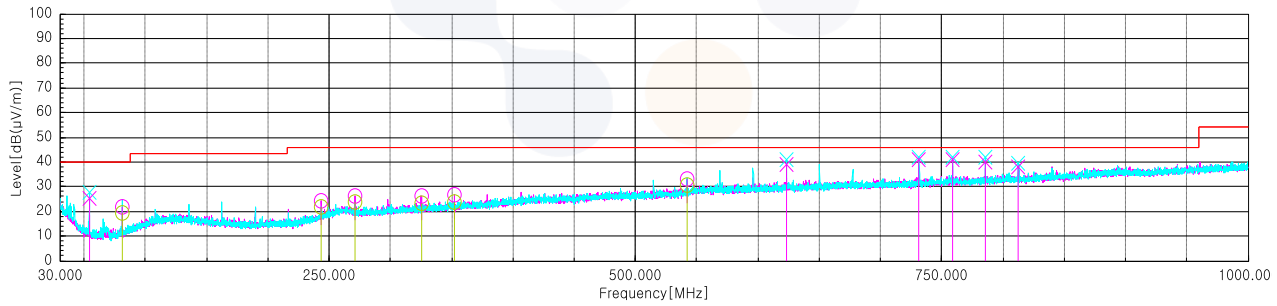
Face-on/Face-off



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

Frequency	Pol.	Reading	Antenna Factor	Amp. + Cable	Distance Factor	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Quasi peak data								
54.13	V	42.20	12.79	-29.82	-	25.17	40.00	14.83
81.29	H	35.30	13.16	-29.14	-	19.32	40.00	20.68
243.76[1)]	H	30.40	17.63	-26.48	-	21.55	46.00	24.45
270.92[1)]	H	30.70	18.84	-26.18	-	23.36	46.00	22.64
325.12[1)]	H	29.10	19.50	-25.49	-	23.11	46.00	22.89
352.16	H	28.50	20.34	-25.09	-	23.75	46.00	22.25
541.92	H	29.40	23.95	-23.14	-	30.21	46.00	15.79
623.16	V	36.10	24.64	-22.36	-	38.38	46.00	7.62
731.55	V	36.70	25.23	-21.39	-	40.54	46.00	5.46
758.71	V	36.00	25.63	-21.16	-	40.47	46.00	5.53
785.75	V	35.10	25.63	-20.86	-	39.87	46.00	6.13
812.79	V	32.30	25.84	-20.59	-	37.55	46.00	8.45

Horizontal/Vertical



7. Measurement equipment

Equipment Name	Manufacturer	Model No.	Serial No.	Next Cal. Date
Spectrum Analyzer	R&S	FSV40	100989	22.12.21
EMI TEST RECEIVER	R&S	ESCI7	100732	23.01.19
Bi-Log Antenna	TESEQ	CBL 6112D	55545	23.01.14
Amplifier	SONOMA INSTRUMENT	310N	284608	22.08.19
LOOP Antenna	R&S	HFH2-Z2	100355	22.08.21
Antenna Mast	Innco Systems	MA4000-EP	303	N/A
Turn Table	Innco Systems	CO3000	1175/45850319/P	N/A
Vector Signal Generator	R&S	SMBV100A	257566	22.07.09
Signal Generator	R&S	SMB100A	176206	23.01.19

End of test report