

FCC TEST REPORT

Job No. : GPEM2205000192EC
Applicant : Dogtra Co., Ltd.
Equipment Under Test (EUT) :
 Product Name : DOG TRAINING DEVICE
 Model Name : 2702T&B
 Alt. Model Name : 2700T&B, T&B DUAL, STB BEEP COLLAR
FCC Authorization Type : Certification
Applied Standards : FCC Part 15 Subpart B, Class B
 ANSI C63.4a:2017
FCC ID : SWN-TD30UR
Date of Receipt : April 11, 2022
Date of Test : May 16, 2022 ~ May 20, 2022
Date of Issue : June 10, 2022
Test Results : Complied

Tested by :

Kevin Jo

Reviewed by :

Julia Choi

This test report does not assure KOLAS accreditation.

- 1) The results of this test report are effective only to the items tested.
- 2) The SGS Korea is not responsible for the sampling, the results of this test report apply to the sample as received.

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Revision History

Revision	Report number	Description
0	F690501-RF-EMC000655	Initial

1. General Information

1.1 Client Information

Applicant	Dogtra Co., Ltd.
Applicant Address	35, Namdongdong-ro 33beon-gil, Namdong-gu, Incheon, Republic of Korea
Manufacturer	Dogtra Co., Ltd.
Manufacturer Address	35, Namdongdong-ro 33beon-gil, Namdong-gu, Incheon, Republic of Korea

1.2 Test Laboratory

Name and Address	SGS Korea Co., Ltd.
- Giheung Laboratory	35, Giheungdanji-ro 121beon-gil, Giheung-gu, Yongin-si, Gyeonggi-do, Republic of Korea
- Gunpo Laboratory	4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, 15807, Republic of Korea
FCC Registration No.	KR0150
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1.3 General Information of E.U.T.

Classification	Specification
Product Name	DOG TRAINING DEVICE
Model Name	2702T&B
Alt. Model Name	2700T&B, T&B DUAL, STB BEEP COLLAR
Model Differences	- 2700T&B : No circuit difference with 2702T&B. 2702T&B is two of the EUT in box for sale, 2700T&B is one of the EUT in box for sale. - T&B DUAL : No receiver circuit difference but transmitter has a difference with 2702T&B. - STB BEEP COLLAR : No circuit difference with 2702T&B. STB BEEP COLLAR is the receiver only in box for sale.
Serial No.	-
EMI Classification	Class B
Test Voltage	AC 120 V, 60 Hz
Rated Power	DC 10 V, 1.5 A
Internal Clock Frequency	27.145 MHz
H/W Version	RevNTC
S/W Version	2700TB_RxRev10
Function	Dogs Remote Training and Beeper Collar

1.4 Operating Modes and Conditions

Operating mode	Operating Condition
1) Receiving Mode	Receiving the signal from 2702T&B(Transmitter)
2) Charging Mode	Charged state by AC/DC Adapter.

1.5 Peripheral Equipments

Description	Model	Serial No.	Manufacturer	Note.
DOG TRAINING DEVICE	2702T&B(Transmitter)	-	Dogtra Co., Ltd.	Transmitter

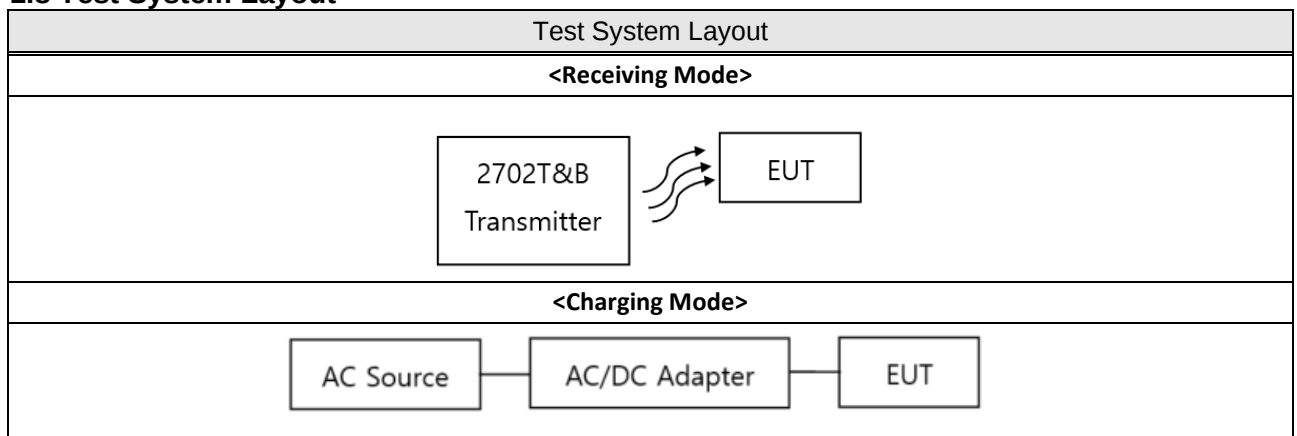
1.6 Cable List

Start		END		Cable Spec.		Used core
Name	I/O Port	Name	I/O Port	Length (m)	Shield	
<Receiving Mode>						
2702T&B (Transmitter)	-	EUT	-	-	-	-
<Charging Mode>						
AC Source	AC OUT	AC/DC Adpater	AC IN	-	-	-
AC/DC Adpater	DC OUT	EUT	DC IN	1.4	Unshield	-

1.7 System Configurations

Description	Model	Serial No.	Manufacturer	Note
AC/DC Adapter	MKC-1001500S	-	Merryking	-
19mm Trans	-	-	-	-
Battery	AE562438P6H	-	AEenergy	-
EP13 Trans	-	-	-	-
PCB	2700T&B_RX_NTC Rev1.0	-	-	-
Piezo	-	-	-	-

1.8 Test System Layout



1.9 Modifications/Notes

1.10 Applicable Standards for Testing

Standards	Status	Deviation
FCC Part 15 : Subpart B	Applicable	No Deviation

1.11 Summary of Test Results

Test Item	Standards	Results
Conducted Emission	FCC Part 15 Subpart B Section 15.107	Complied
Radiated Emission	FCC Part 15 Subpart B Section 15.109	Complied

Note : Test methods of all test items are performed according to the basic standards in this table.

EMISSION

2.1 Test Results

Test Items	Standards	Test Results
Conducted Emission	FCC Part 15 Subpart B Section 15.107	Complied
Radiated Emission	FCC Part 15 Subpart B Section 15.109	Complied

2.2 Test Method and Limits

2.2.1 Test Method

Test Items	Measuring Frequency Range	RBW	Measuring Distance
Conducted Emission	0.15 MHz ~ 30 MHz	9 kHz	-
Radiated Emission	30 MHz ~ 1 GHz	120 kHz	10 m & 3 m
	Above 1 GHz	1 MHz	3 m

Note : 10 m method of radiated emission measurement is only applied to Class A equipment over the frequency range of 30 MHz ~ 1 GHz. Except this, 3 m method is applied to Class B equipment over the frequency range of 30 MHz ~ 1 GHz and Class A and Class B equipment above 1 GHz.

2.2.2 Test Limits

-Conducted Emission Limits

Frequency Range	Limits(dB μ V)		Class
	Quasi-peak	Average	
0.15 MHz ~ 0.5 MHz	79	66	Class A
0.5 MHz ~ 30 MHz	73	60	
0.15 MHz ~ 0.5 MHz	66 to 56	56 to 46	Class B
0.5 MHz ~ 5 MHz	56	46	
5 MHz ~ 30 MHz	60	50	

Note : The lower limit shall apply at the transition frequencies. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

-Radiated Emission Limits below 1 GHz

Frequency Range	Limits(dB μ V/m)	Class
	Quasi-peak	
30 MHz ~ 88 MHz	39.0	Class A (10 m method)
88 MHz ~ 216 MHz	43.5	
216 MHz ~ 960 MHz	46.4	
960 MHz ~ 1 GHz	49.5	
30 MHz ~ 88 MHz	40.0	Class B (3 m method)
88 MHz ~ 216 MHz	43.5	
216 MHz ~ 960 MHz	46.0	
960 MHz ~ 1 GHz	54.0	

-Radiated Emission Limits above 1 GHz (3 m method)

Frequency Range	Limits(dB μ V/m)		Class
	Average	Peak	
Above 1 GHz	59.5	79.5	Class A
Above 1 GHz	54.0	74.0	Class B

Note : The limits of class A equipment is extrapolated using an extrapolation factor of 20 dB/decade because it was measured at 3 m distance not 10 m distance.

2.3 Conducted Disturbance

The initial preliminary exploratory scans were performed over the measuring frequency range(0.15 MHz to 30 MHz) using a max hold mode incorporating a Peak detector and CISPR-Average detector and using the EMI measuring software. The final test data was measured using a Quasi-Peak detector and CISPR-Average detector.

Note. Measuring software

- Giheung Lab. : EMC32(V10.40.10) from R&S
- Gunpo Lab.: EMC32(V V8.52.0) from R&S

2.3.1 Test Equipments

Equipment	Model	Manufacturer	Serial No	Cal Due. Date
Two-Line V-Network	ENV216	R & S	100190	2023.05.13
Test Receiver	ESCI 7	R & S	100911	2023.02.23

2.3.2 Test Site

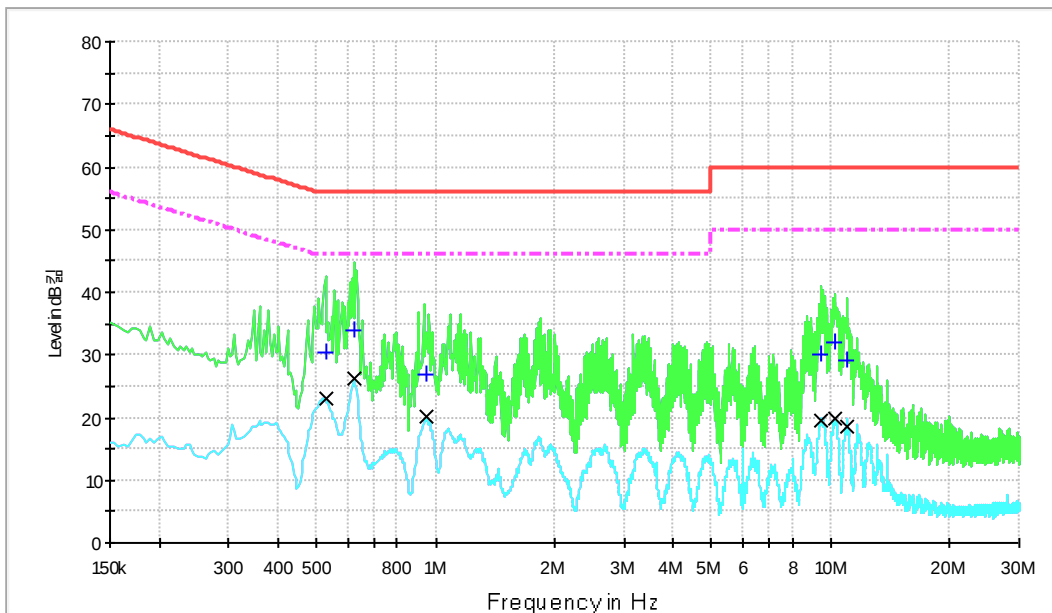
Shield Room in Gunpo Laboratory

2.3.3 Environment Conditions

Temperature	(Minimum 22.4, Maximum 22.6) °C
Humidity	(Minimum 44.0, Maximum 45.0) % R.H.
Atmospheric Pressure	(Minimum 100.3, Maximum 100.3) kPa
Test Date	May 20, 2022

2.3.4 Test Results

- Test Mode: Charging Mode

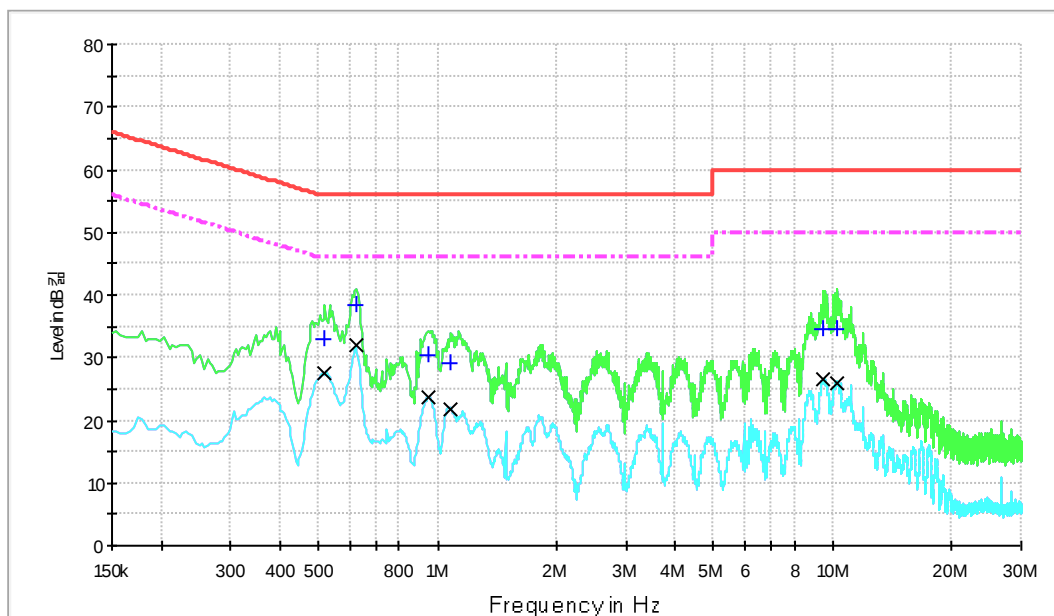


Limit and Margin-QP

Frequency (MHz)	QuasiPeak (dB μ V)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dB μ V)
0.526 000	30.4	9.000	Off	L1	9.8	25.6	56.0
0.622 000	33.8	9.000	Off	L1	9.8	22.2	56.0
0.950 000	27.0	9.000	Off	L1	9.8	29.0	56.0
9.462 000	30.2	9.000	Off	L1	10.2	29.8	60.0
10.262 000	32.2	9.000	Off	L1	10.2	27.8	60.0
10.954 000	29.2	9.000	Off	L1	10.3	30.8	60.0

Limit and Margin-CAV

Frequency (MHz)	CAverage (dB μ V)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - CAV (dB)	Limit - CAV (dB μ V)
0.526 000	23.1	9.000	Off	L1	9.8	22.9	46.0
0.622 000	26.2	9.000	Off	L1	9.8	19.8	46.0
0.950 000	20.0	9.000	Off	L1	9.8	26.0	46.0
9.462 000	19.7	9.000	Off	L1	10.2	30.4	50.0
10.262 000	19.7	9.000	Off	L1	10.2	30.3	50.0
10.954 000	18.6	9.000	Off	L1	10.3	31.4	50.0



Limit and Margin-QP

Frequency (MHz)	QuasiPeak (dB μ V)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dB μ V)
0.514 000	32.9	9.000	Off	N	9.9	23.1	56.0
0.622 000	38.5	9.000	Off	N	9.9	17.5	56.0
0.946 000	30.3	9.000	Off	N	9.9	25.7	56.0
1.082 000	29.0	9.000	Off	N	9.9	27.0	56.0
9.494 000	34.5	9.000	Off	N	10.3	25.5	60.0
10.246 000	34.5	9.000	Off	N	10.3	25.5	60.0

Limit and Margin-CAV

Frequency (MHz)	CAverage (dB μ V)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - CAV (dB)	Limit - CAV (dB μ V)
0.514 000	27.5	9.000	Off	N	9.9	18.5	46.0
0.622 000	31.9	9.000	Off	N	9.9	14.1	46.0
0.946 000	23.7	9.000	Off	N	9.9	22.3	46.0
1.082 000	21.6	9.000	Off	N	9.9	24.4	46.0
9.494 000	26.5	9.000	Off	N	10.3	23.5	50.0
10.246 000	26.0	9.000	Off	N	10.3	24.0	50.0

Measurement Uncertainty : See Appendix A

Note1 : • Line (L1) : Hot • Line (N) : Neutral

• Margin = Limit – Quasi Peak or CAverage

• Corr. = LISN Factor + Cable loss

2.4 Radiated Emission

The initial preliminary exploratory scans were performed over the measuring frequency range (30 MHz to 1 GHz) using a max hold mode incorporating a Peak detector by using the EMI measuring software. The final test data was measured using a Quasi-Peak detector below 1 GHz.

Measurements were made with the antenna positioned in both the horizontal and vertical planes of polarization. The antenna height was varied from 1 m to 4 m and the EUT was rotated 360° to find the maximum emitting point for each frequency.

Note. Measuring software

-Giheung Lab.: EMC32(V9.26.01) from R&S

-Gunpo Lab.: EP5RE(V5.3.70) from TOYO

2.4.1 Test Equipments

Equipment	Model	Manufacturer	Serial No	Cal Due. Date
Test Receiver	ESU26	R & S	100109	2023.01.18
Hybrid Antenna	VULB9163	SCHWARZBECK	01126	2023.02.07
Amplifier	8447F	HP	2944A03909	2022.08.06

Note: The calibration period of every equipment is 1 year.

2.4.2 Test Site

3 m SEMI-ANECHOIC CHAMBER in Gunpo Laboratory

2.4.3 Environment Conditions

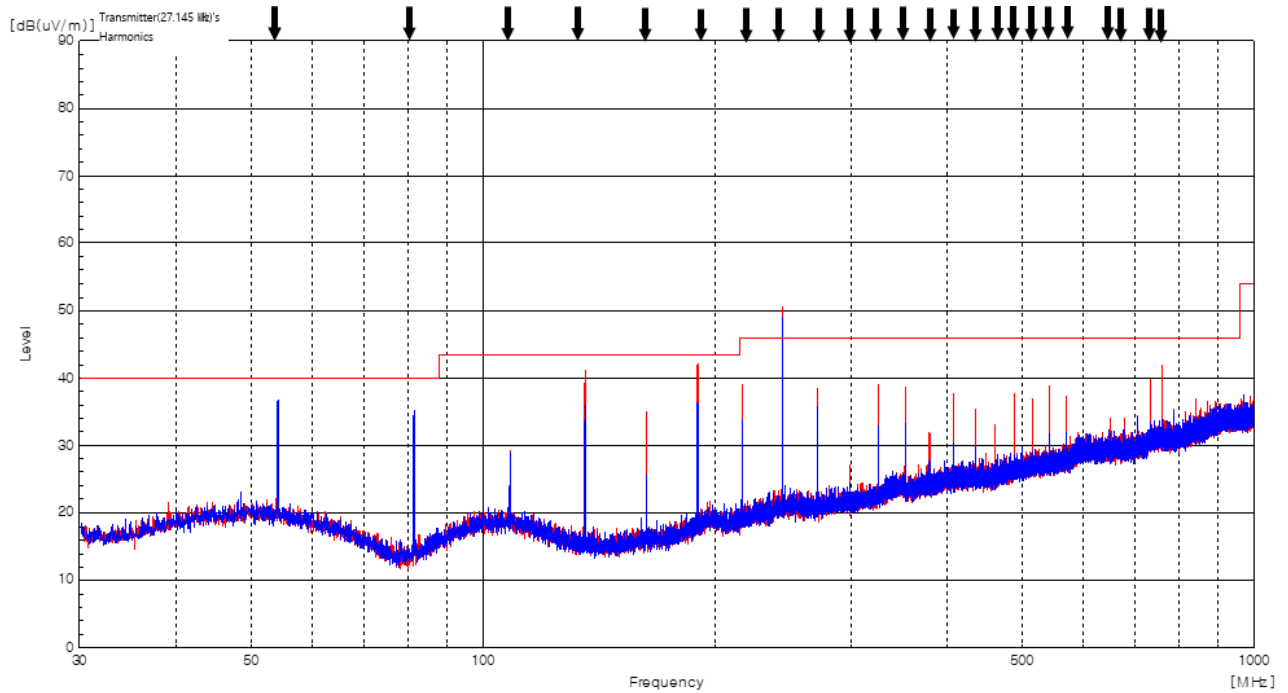
① Below 1 GHz

Temperature	(Minimum 21.2, Maximum 21.5) °C
Humidity	(Minimum 38.0, Maximum 38.0) % R.H.
Atmospheric Pressure	(Minimum 100.7, Maximum 100.7) kPa
Test Date	May 16, 2022

2.4.4 Test Results

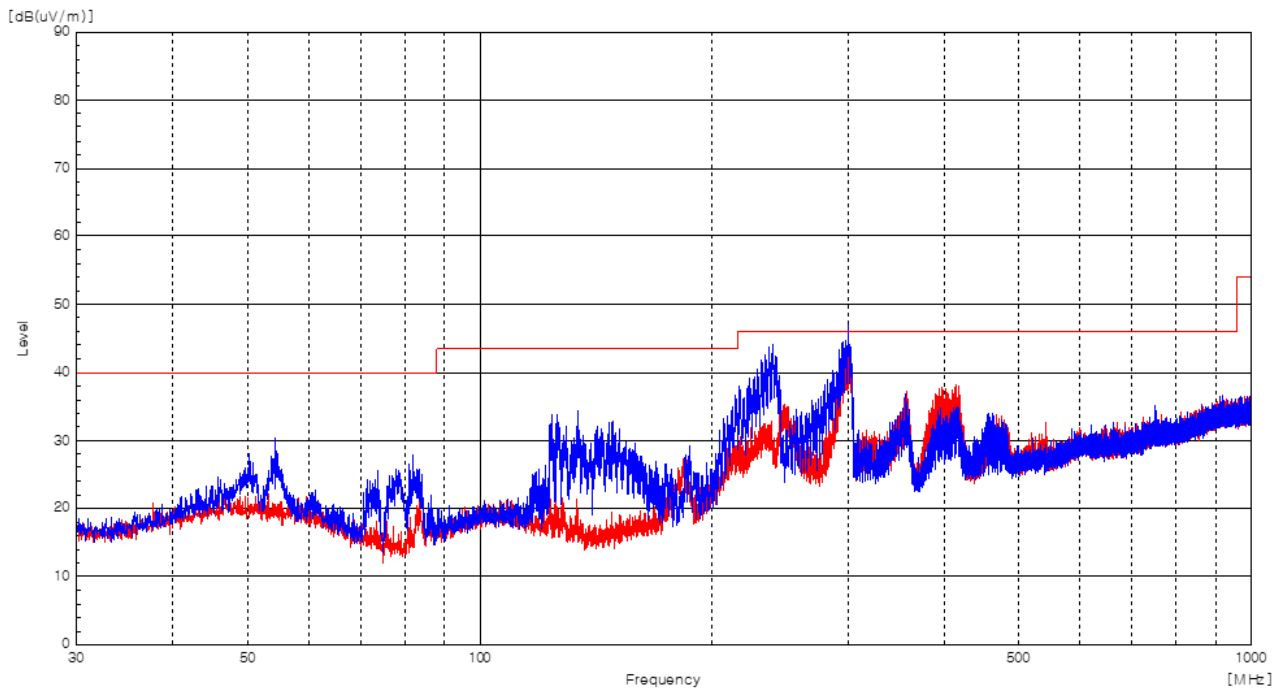
① Below 1 GHz (10 m method)

- Test Mode: Receiving Mode



Freq. (MHz)	Reading (dBμV)	Pol. (H/V)	A (°)	H (cm)	AF (dB/m)	CL (dB)	Amp. (dB)	F/S (dBμV/m)	Limit (dBμV/m)	Margin (dB)
48.51	29.90	V	177	100	19.70	1.72	28.19	23.13	40.00	16.87
52.55	28.90	H	217	100	19.54	1.79	28.19	22.04	40.00	17.96
101.46	28.80	V	99	100	17.80	2.22	28.10	20.72	43.50	22.78
249.38	28.50	H	358	100	18.48	3.28	27.65	22.61	46.00	23.39
930.73	26.40	V	2	100	28.29	6.10	28.44	32.35	46.00	13.65
955.02	26.30	H	59	100	28.00	6.25	28.39	32.16	46.00	13.84

- Test Mode: Charging Mode



Freq. (MHz)	Reading (dBμV)	Pol. (H/V)	A (°)	H (cm)	AF (dB/m)	CL (dB)	Amp. (dB)	F/S (dBμV/m)	Limit (dBμV/m)	Margin (dB)
133.99	42.70	V	79	100	14.20	2.54	28.03	31.41	43.50	12.09
240.37	48.20	V	30	100	18.11	3.29	27.68	41.92	46.00	4.08
247.50	39.00	H	359	100	18.40	3.28	27.66	33.02	46.00	12.98
300.02	49.10	V	75	100	19.10	3.52	27.50	44.22	46.00	1.78
300.63	45.90	H	180	100	19.11	3.52	27.50	41.03	46.00	4.97
414.32	38.20	H	46	100	21.89	4.16	28.11	36.14	46.00	9.86

Measurement Uncertainty : See Appendix A

Note: ● AF = Antenna Factor

● Pol.(H) = Horizontal

● Margin = Limit – F/S

● A: Angle

● CL = Cable Loss

● Pol.(V) = Vertical

● F/S = Level + AF + CL – Amp.

● H: Height

● F/S = Field Strength

● Amp. = Amplifier Gain

Appendix A : Measurement Uncertainty

- Giheung Laboratory

Test Method		Measurement Uncertainty	
Conducted Emission	ENV216	3.5 dB	(The confidential level is 95 %, $k=2$)
	ESH2-Z5	3.2 dB	(The confidential level is 95 %, $k=2$)
	ESH3-Z6	3.2 dB	(The confidential level is 95 %, $k=2$)
	NNLK8129	3.2 dB	(The confidential level is 95 %, $k=2$)
Conducted Emission - Signal	ISN T800	5.6 dB	(The confidential level is 95 %, $k=2$)
	ISNT8-Cat6	5.4 dB	(The confidential level is 95 %, $k=2$)
	ISN S751	5.6 dB	(The confidential level is 95 %, $k=2$)
Discontinuous		3.4 dB	(The confidential level is 95 %, $k=2$)
Disturbance Voltage at Antenna Terminal		2.0 dB	(The confidential level is 95 %, $k=2$)
Radiated Emission	9 kHz ~30 MHz (3m chamber)	Horizontal	3.4 dB (The confidential level is 95 %, $k=2$)
		Vertical	3.4 dB (The confidential level is 95 %, $k=2$)
	30 MHz ~ 1 000 MHz (10m chamber)	Horizontal	4.4 dB (The confidential level is 95 %, $k=2$)
		Vertical	4.6 dB (The confidential level is 95 %, $k=2$)
	1 GHz ~ 18 GHz (3m chamber)	Horizontal	4.0 dB (The confidential level is 95 %, $k=2$)
		Vertical	4.0 dB (The confidential level is 95 %, $k=2$)

- Gunpo Laboratory

Test Method		Measurement Uncertainty	
Conducted Emission	ENV216	3.4 dB	(The confidential level is 95 %, $k=2$)
	ESH2-Z5	3.2 dB	(The confidential level is 95 %, $k=2$)
	ESH3-Z6	3.4 dB	(The confidential level is 95 %, $k=2$)
Conducted Emission - Signal	ISN T800	5.6 dB	(The confidential level is 95 %, $k=2$)
	ISNT8-Cat6	5.6 dB	(The confidential level is 95 %, $k=2$)
	ISN S751	7.3 dB	(The confidential level is 95 %, $k=2$)
Disturbance Voltage at Antenna Terminal		2.4 dB	(The confidential level is 95 %, $k=2$)
Radiated Emission	9 kHz ~30 MHz (3 m chamber)	Horizontal	3.3 dB (The confidential level is 95 %, $k=2$)
		Vertical	3.3 dB (The confidential level is 95 %, $k=2$)
	30 MHz ~ 1 000 MHz (3 m chamber)	Horizontal	4.8 dB (The confidential level is 95 %, $k=2$)
		Vertical	5.2 dB (The confidential level is 95 %, $k=2$)
	1 GHz ~ 18 GHz (3 m chamber)	Horizontal	3.9 dB (The confidential level is 95 %, $k=2$)
		Vertical	4.0 dB (The confidential level is 95 %, $k=2$)

- End of Test Report -