FCC TEST REPORT

Job No.	**: GPEM2208000395EC**
Applicant	**: BEATSNINE INC.**
Equipment Under Test (EUT) :	
Product Name	**: Beatsgear dongle**
Model Name	**: bgear-DI100**
FCC Authorization Type	**: Certification**
Applied Standards	**: FCC Part 15 Subpart B, Class B** **ANSI C63.4a:2017**
FCC ID	**: 2AYWB-BGEAR-DI100**
Date of Receipt	**: August 23, 2022**
Date of Test	**: September 20, 2022**
Date of Issue	**: October 6, 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-EMC000877	Initial

1. General Information

1.1 Client Information

Applicant	BEATSNINE INC.
Applicant Address	A-1701, 1, Jeongjail-ro, Bundang-gu, Seongnam-si, Gyeonggi-do, Republic of Korea
Manufacturer	BEATSNINE INC.
Manufacturer Address	A-1701, 1, Jeongjail-ro, Bundang-gu, Seongnam-si, Gyeonggi-do, 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
- Dongtan Laboratory	12, Dongtansandan 10-gil, Hwaseong-si, Gyeonggi-do, 18487, Republic of Korea
FCC Registration No.	KR0150
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e-mail	Julia.Choi@sgs.com

1.3 General Information of E.U.T.

Classification	Specification
Product Name	Beatsgear dongle
Model Name	bgear-DI100
Serial No.	-
EMI Classification	Class B
Test Voltage	AC 120 V, 60 ㎐
Rated Power	DC 5 V
Internal Clock Frequency	12 ㎒
Wireless Frequency	Transmission : 2 402 ㎒ ~ 2 480 ㎒ Reception : 2 402 ㎒ ~ 2 480 ㎒
H/W Version	0.92
S/W Version	1.0
Port Type	Aux port(Input), C port(Input)
Function	The EUT received the audio signal. Then the EUT communicated wirelessly the audio signal with Bluetooth LE.

1.4 Operating Modes and Conditions

Operating mode	Operating Condition
Bluetooth LE idle + Charging	The Bluetooth LE idle state with Bluetooth Headset while being charged.

1.5 Peripheral Equipments

Description	Model	Serial No.	Manufacturer	Note.
Travel adapter	EP-TA12KWK	RT4K226EV/B-E	RFTECH THAI NGUYEN CO.,LTD	-
Bluetooth Headset	WH-CH710N	-	SONY	-
Aux to Aux Cable	-	-	-	-
C type USB Cable	-	-	-	Used core (ZCAT 1325-0530, TDK)
Mobile Phone	BE2013	-	Oneplus	-

1.6 Cable List

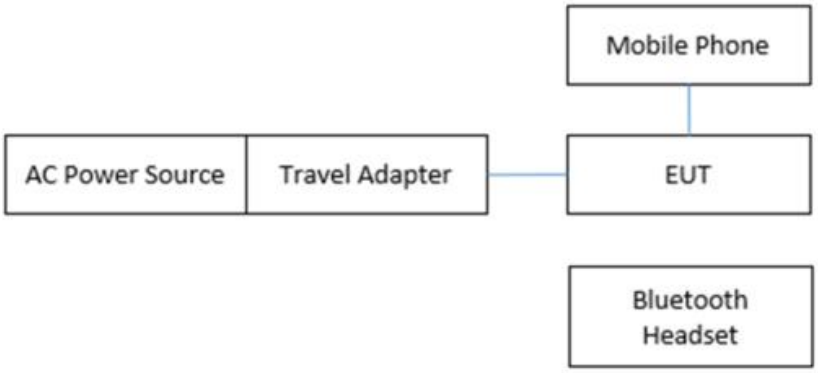
Start		END		Cable Spec.		Used core
Name	I/O Port	Name	I/O Port	Length (m)	Shield	
AC Power Source	-	Travel Adapter	AC IN	-	-	-
EUT	C-Type		A-Type	2.0	Unshielded	1 EA
	Aux Type	Mobile Phone	Aux Type	0.9	Unshielded	-

1.7 System Configurations

Description	Model	Serial No.	Manufacturer	Note
Main Board	MUSIC-DONGLE-I_V0.92	-	BEATSNINE	-
Wireless Module	ESP32-A1S	2974	-	-
Battery	DTP403040	-	-	China

1.8 Test System Layout

Test System Layout



1.9 Modifications/Notes

- There was no modified item during the test.

1.10 Applicable Standards for Testing

Standards	Status	Deviation
FCC Part 15 : Subpart B ANSI C63.4a:2017	Applicable	No Deviation

1.11 Summary of Test Results

Test Item	Standards	Results
Conducted Emission	FCC Part 15 Subpart B Section 15.107 ANSI C63.4a:2017	Complied
Radiated Emission	FCC Part 15 Subpart B Section 15.109 ANSI C63.4a:2017	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 ANSI C63.4a:2017	Complied
Radiated Emission	FCC Part 15 Subpart B Section 15.109 ANSI C63.4a:2017	Complied

2.2 Test Method and Limits

2.2.1 Test Method

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

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

2.2.2 Test Limits

-Conducted Emission Limits

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

-Radiated Emission Limits below 1 ㎓

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

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

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

Note : The limits of class A equipment is extrapolated using an extrapolation factor of 20 ㏈/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 ㎒ to 30 ㎒) 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
- Dongtan Lab.: EMC32(V10.40.00) 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

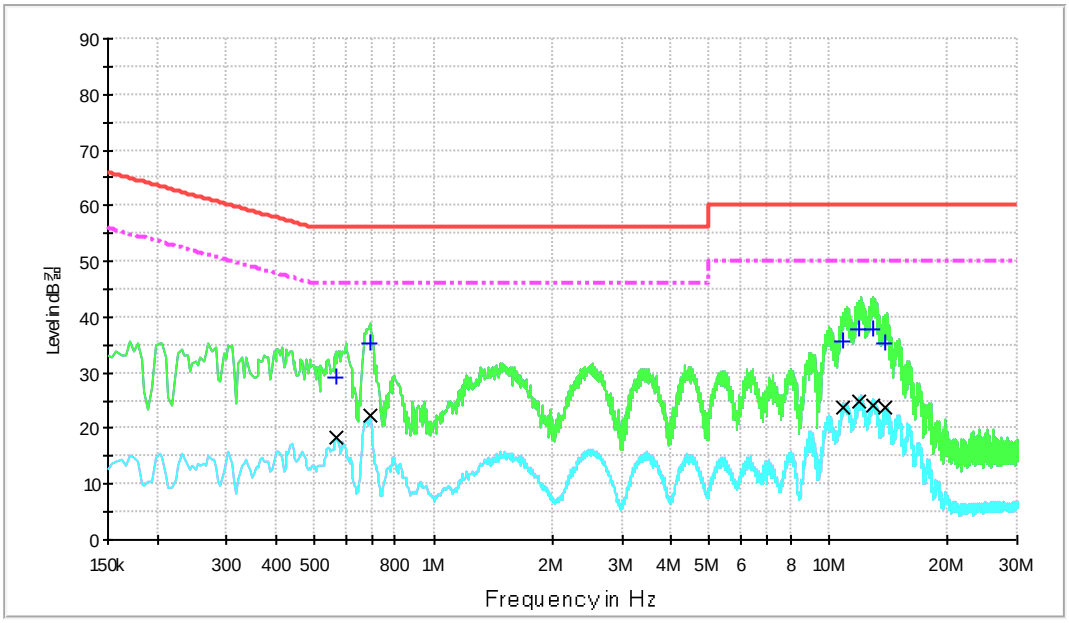
2.3.2 Test Site

Shield Room in Gunpo Laboratory

2.3.3 Environment Conditions

Temperature	(Minimum 22.7, Maximum 22.9) ℃
Humidity	(Minimum 49.0, Maximum 49.0) % R.H.
Atmospheric Pressure	(Minimum 102.2, Maximum 102.2) ㎪
Test Date	September 20, 2022

2.3.4 Test Results

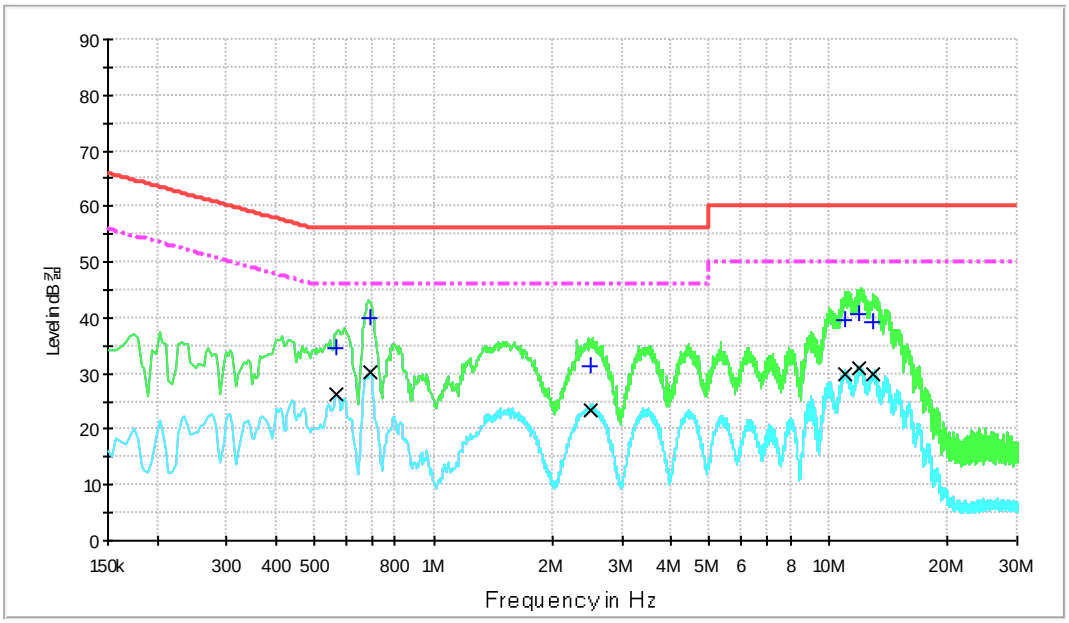


Limit and Margin-QP

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµV)
0.566 000	29.1	9.000	Off	L1	9.8	26.9	56.0
0.690 000	35.2	9.000	Off	L1	9.8	20.8	56.0
10.874 000	35.6	9.000	Off	L1	10.3	24.4	60.0
11.950 000	37.9	9.000	Off	L1	10.3	22.1	60.0
12.906 000	37.9	9.000	Off	L1	10.4	22.1	60.0
13.922 000	35.4	9.000	Off	L1	10.4	24.6	60.0

Limit and Margin-CAV

Frequency (MHz)	CAverage (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - CAV (dB)	Limit - CAV (dBµV)
0.566 000	18.2	9.000	Off	L1	9.8	27.8	46.0
0.690 000	22.2	9.000	Off	L1	9.8	23.8	46.0
10.874 000	23.7	9.000	Off	L1	10.3	26.3	50.0
11.950 000	24.8	9.000	Off	L1	10.3	25.2	50.0
12.906 000	24.2	9.000	Off	L1	10.4	25.8	50.0
13.922 000	23.6	9.000	Off	L1	10.4	26.4	50.0



Limit and Margin-QP

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµV)
0.566 000	34.6	9.000	Off	N	9.9	21.4	56.0
0.694 000	40.1	9.000	Off	N	9.9	15.9	56.0
2.494 000	31.3	9.000	Off	N	9.9	24.7	56.0
10.970 000	39.6	9.000	Off	N	10.4	20.4	60.0
11.982 000	40.7	9.000	Off	N	10.4	19.3	60.0
12.882 000	39.3	9.000	Off	N	10.5	20.7	60.0

Limit and Margin-CAV

Frequency (MHz)	CAverage (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - CAV (dB)	Limit - CAV (dBµV)
0.566 000	26.4	9.000	Off	N	9.9	19.6	46.0
0.694 000	30.3	9.000	Off	N	9.9	15.7	46.0
2.494 000	23.6	9.000	Off	N	9.9	22.4	46.0
10.970 000	29.8	9.000	Off	N	10.4	20.2	50.0
11.982 000	30.9	9.000	Off	N	10.4	19.1	50.0
12.882 000	29.9	9.000	Off	N	10.5	20.1	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 ㎒ to 13 ㎓) 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 ㎓.

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(V10.40.10) from R&S
- Gunpo Lab.: EP5RE(V5.3.70) from TOYO
- Dongtan Lab.: EMC32(V10.40.10) from R&S

2.4.1 Test Equipments

Equipment	Model	Manufacturer	Serial No	Cal Due. Date
Horn Antenna	HF906	R & S	100326	2023.02.18
Signal Conditioning Unit	SCU 18	R & S	10117	2023.06.13
Test Receiver	ESU26	R & S	100109	2023.01.18
Hybrid Antenna	VULB9163	SCHWARZBECK	01126	2023.02.07
Amplifier	8447F	HP	2944A03909	2023.08.04

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

Below 1 ㎓

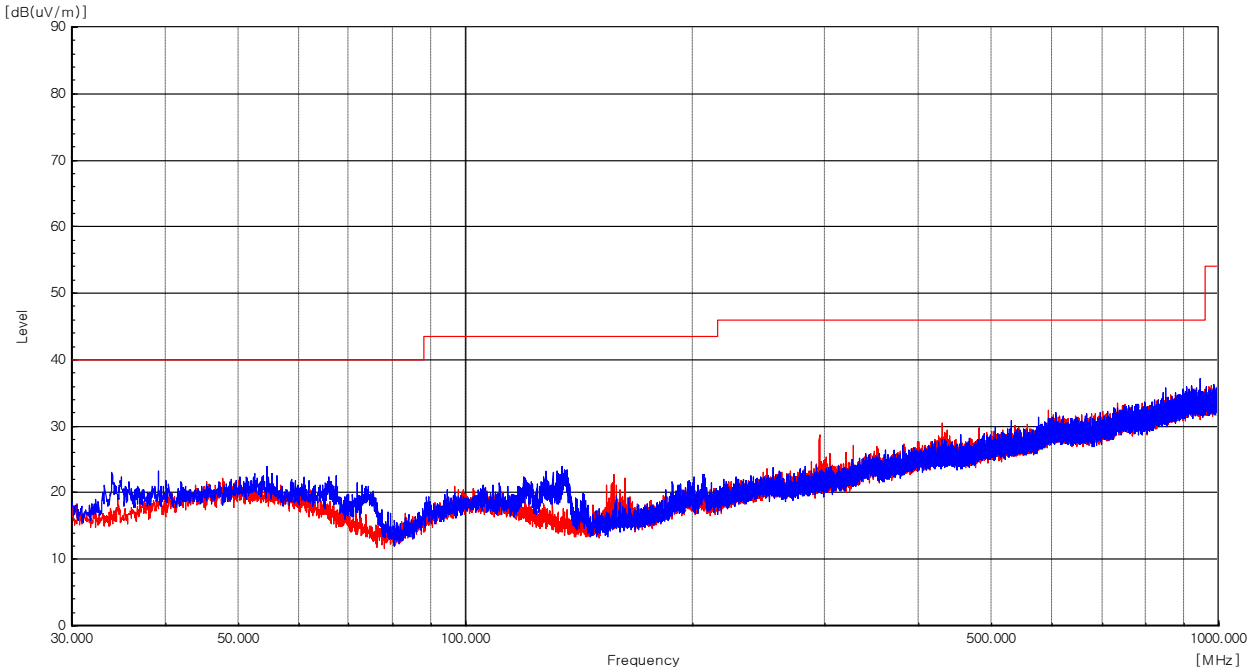
Temperature	(Minimum 24.1, Maximum 24.4) ℃
Humidity	(Minimum 48.0, Maximum 48.0) % R.H.
Atmospheric Pressure	(Minimum 102.2, Maximum 102.2) ㎪
Test Date	September 20, 2022

Above 1 ㎓

Temperature	(Minimum 24.2, Maximum 24.4) ℃
Humidity	(Minimum 47.0, Maximum 48.0) % R.H.
Atmospheric Pressure	(Minimum 102.2, Maximum 102.2) ㎪
Test Date	September 20, 2022

2.4.4 Test Results

Below 1 ㎓ (3 m method)

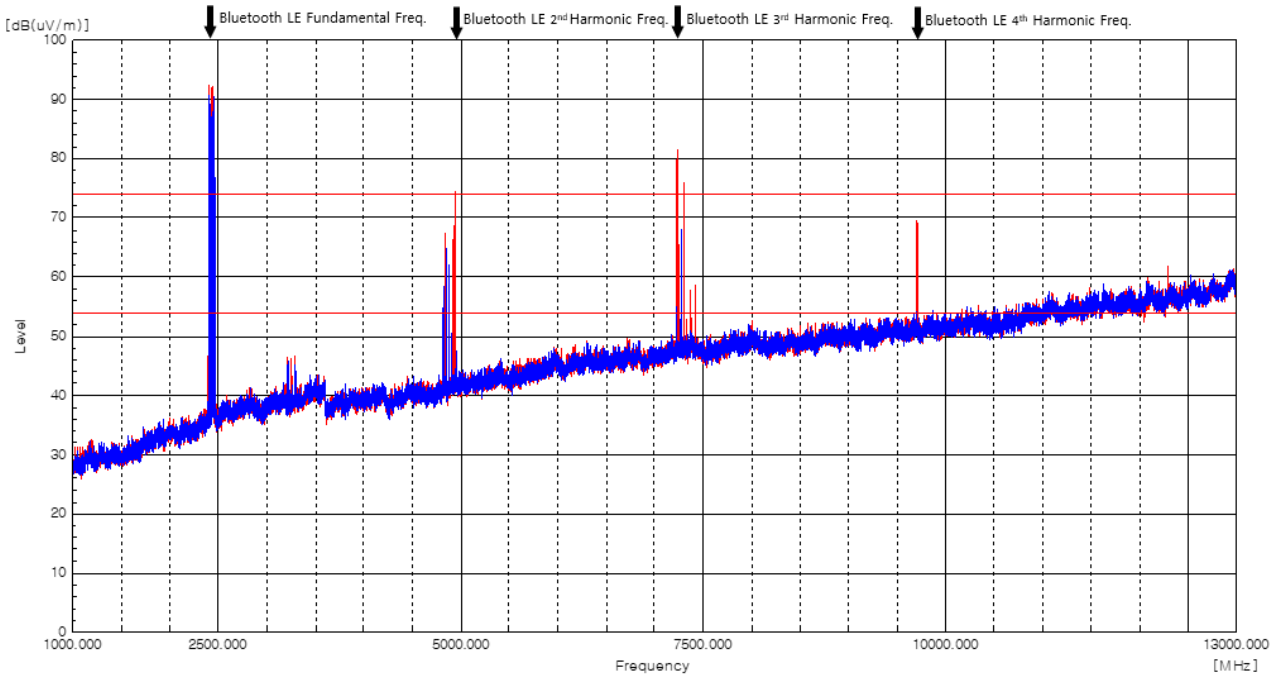


Freq. (㎒)	Reading (dBμV)	Pol. (H/V)	A (°)	H (㎝)	AF (dB/m)	CL (dB)	Amp. (dB)	F/S (dBμV/m)	Limit (dBμV/m)	Margin (dB)
54.49	31.00	V	155	100	19.35	1.82	28.20	23.97	40.00	16.03
65.77	25.40	H	246	100	16.77	1.96	28.20	15.93	40.00	24.07
134.19	35.30	V	190	150	14.18	2.54	28.13	23.89	43.50	19.61
157.31	33.80	H	163	100	14.30	2.70	28.07	22.73	43.50	20.77
943.82	31.60	V	263	100	28.12	6.10	28.61	37.21	46.00	8.79
976.68	30.20	H	186	100	28.20	6.22	28.55	36.07	54.00	17.93

Measurement Uncertainty : See Appendix A

Note:
- AF = Antenna Factor
- CL = Cable Loss
- F/S = Field Strength
- Pol.(H) = Horizontal
- Pol.(V) = Vertical
- Amp. = Amplifier Gain
- Margin = Limit – F/S
- F/S = Level + AF + CL – Amp.
- A: Angle
- H: Height

- Above 1 ㎓ (3 m method)



Freq.	Level (dBμV)		Pol.	A	H	AF	CL	Amp.	CF	F/S	Limit	Margin
(㎒)	Peak	C-AV	(H/V)	(°)	(㎝)	(dB)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
1 720.50	43.90	-	V	250	100	26.12	9.08	45.34	0.00	33.76	74.00	40.24
1 720.50	-	30.80	V	250	100	26.12	9.08	45.34	0.00	20.66	54.00	33.34
1 907.00	43.40	-	H	319	100	27.34	9.72	45.30	0.00	35.16	74.00	38.84
1 907.00	-	30.80	H	319	100	27.34	9.72	45.30	0.00	22.56	54.00	31.44
3 226.50	50.50	-	V	227	100	30.52	12.11	45.23	0.00	47.90	74.00	26.10
3 226.50	-	29.20	V	227	100	30.52	12.11	45.23	0.00	26.60	54.00	27.40
3 290.50	48.00	-	H	133	100	30.24	12.31	45.29	0.00	45.26	74.00	28.74
3 290.50	-	29.10	H	133	100	30.24	12.31	45.29	0.00	26.36	54.00	27.64
12 294.50	41.30	-	H	133	100	38.49	26.22	45.06	0.00	60.95	74.00	13.05
12 294.50	-	28.20	H	133	100	38.49	26.22	45.06	0.00	47.85	54.00	6.15
12 311.50	41.80	-	V	227	100	38.40	26.78	45.05	0.00	61.93	74.00	12.07
12 311.50	-	28.20	V	227	100	38.40	26.78	45.05	0.00	48.33	54.00	5.67

Measurement Uncertainty: See the Appendix A

Note:
- AF = Antenna Factor
- CL = Cable Loss
- F/S = Field Strength
- Pol.(H) = Horizontal
- Pol.(V) = Vertical
- Amp. = Amplifier Gain
- Margin = Limit – F/S
- F/S = Level + AF + CL – Amp.
- A: Angle
- H: Height

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)

- Dongtan Laboratory

Test Method		Measurement Uncertainty	
Conducted Emission		ENV216	3.4 dB (The confidential level is 95 %, *k*=2)
		ESH2-Z5	3.1 dB (The confidential level is 95 %, *k*=2)
		ESH3-Z6	3.1 dB (The confidential level is 95 %, *k*=2)
		NNLK8129	3.1 dB (The confidential level is 95 %, *k*=2)
Conducted Emission - Signal		ISN T800	5.4 dB (The confidential level is 95 %, *k*=2)
		ISN ST08	5.4 dB (The confidential level is 95 %, *k*=2)
		ISN S751	5.6 dB (The confidential level is 95 %, *k*=2)
Discontinuous		3.1 dB (The confidential level is 95 %, *k*=2)	
disturbance Power		3.0 dB (The confidential level is 95 %, *k*=2)	
Radiated Emission	9 kHz ~30 MHz (Triple Loop Ant)	2.7 dB (The confidential level is 95 %, *k*=2)	
	9 kHz ~30 MHz	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	Horizontal	4.7 dB (The confidential level is 95 %, *k*=2)
		Vertical	4.7 dB (The confidential level is 95 %, *k*=2)
	1 GHz ~ 18 GHz	Horizontal	4.0 dB (The confidential level is 95 %, *k*=2)
		Vertical	4.0 dB (The confidential level is 95 %, *k*=2)

- End of Test Report -