

FCC TEST REPORT

Job No. : GPEM2103000133EH

Applicant Name : PLUTO Solution Inc.

Equipment Under Test (EUT) :

Product Name : S-IoT Hub

Model Name : OPM-1300

FCC Authorization Type : Certification

Applied Standards : FCC Part 15 Subpart B, Class A

ANSI C63.4a:2017

Date of Receipt : February 8, 2021

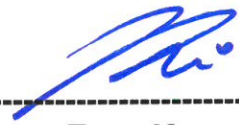
Date of Test : May 18, 2021 ~ June 9, 2021

Date of Issue : August 23, 2021

Test Results : Complied

Tested by

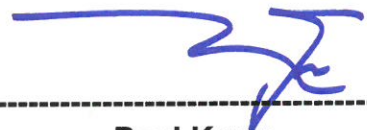
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Tony Kwon

Reviewed by

:



Paul Kang

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-EMH001395	Initial
1	F690501-RF-EMH001395-1	Modified model description.
2	F690501-RF-EMH001395-2	-Added measurement data mode description -Added measurement distance information -Added used RF cable information
3	F690501-RF-EMH001395-3	Revision for 2.3.1 Test Equipments and 2.4.1 Test Equipments (Add Cal Due. date)

1. General Information

1.1 Client Information

Applicant	PLUTO Solution Inc.
Applicant Address	B-1122, Kumkang Penterium IT Tower, 282, Hagui-ro, Dongan-gu, Anyang-si, Gyeonggi-do, Republic of Korea
Manufacturer	PLUTO Solution Inc.
Manufacturer Address	B-1122, Kumkang Penterium IT Tower, 282, Hagui-ro, Dongan-gu, Anyang-si, Gyeonggi-do, Republic of Korea

1.2 Test Laboratory

Name and Address	SGS Korea Co., Ltd.
- Giheung 1 Laboratory	35, Giheungdanji-ro 121beon-gil, Giheung-gu, Yongin-si, Gyeonggi-do, Republic of Korea
- Giheung 2 Laboratory	23, Giheungdanji-ro 24beon-gil, Giheung-gu, Yongin-si, Gyeonggi-do, Republic of Korea
FCC Registration No.	KR0150
IC Registration No.	7837B
Phone	+ 82 31 548 0710
Fax	+ 82 31 548 0719
e-mail	julia.choi@sgs.com

1.3 General Information of E.U.T.

Classification	Specification
Product Name	S-IoT Hub
Model Name	OPM-1300
Model Description	Product features, PCB pattern and all parts are the same. The difference is that the case changes according to the installation environment. -sample #1 : Exterior case open type -sample #2 : Exterior case close type
Serial No.	None
Test Power	AC 120 V, 60 Hz
Internal Clock Frequency	Min : 32.768 MHz , Max : 5 805 MHz
IoT Module	•4-core ARM® Cortex®-A53 •1 GB RAM, 8 GB flash (eMMC)
Wireless	Wi-Fi 802.11ac (2.4 GHz / 5 GHz)
Ethernet	Realtek RTL8211E-VB-CG 10/100/1000M (Under Lan Port)
Sensor	6-axis acceleration sensor MPU-6500 (Max 1 kHz Sampling)
ADC	16-bit 8 channel AD Converter (-10 V ~ + 10 V, Max 2 kHz Sampling)
Power	DC 24 V, 2 A Connection Connector : Molex 1722561002 part
Function	•6-axis acceleration sensor up to 1 kHz sampling data acquisition •8-channel 16-bit ADC data acquisition (up to 2 kHz) •2-axis angle calculation function •Defect standard setting and defect data collection •OHT controller / Stocker controller communication •Diagnostic server / DS IoT server communication •S/W update
Port	•Micro SD Card Slot •Analog Input •Eth0, Eth1 •Power •RS232 (Not used) •UART, ADB (Debug Port)
Operating temperature	(0 ~ 70) °C
Weight	121.6 g
Size	88 * 92 * 30 (mm)

1.4 Operating Modes and Conditions

Operating mode	Operating Condition
1) Operating	The EUT operated by being powered through an AC/DC adapter, collecting data, and the collected data being monitored by a notebook computer. The measurements were tested according to the case(two types close/open) of the product.

1.5 Peripheral Equipments

Description	Model	Serial No.	Manufacturer
Communication board	PhidgetAnalog	493601	-
AC/DC adapter1	GM130-2400500-F	B2101091037	Foshan Shunde Guanyuda Power
Router	A1004ns	-	ipTIME
AC/DC adapter2	KT10W120100KOD	-	KUANTEN
Notebook	80WK	PF0VSX62	LENOVO
Notebook adapter	ADL135NLC3A	5A10J75112	LENOVO
Micro SD card	-	-	-

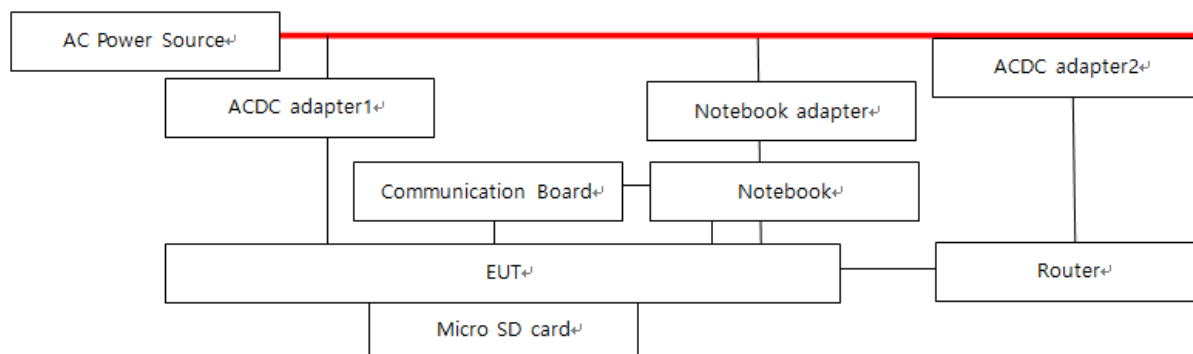
1.6 Cable List

Start		END		Cable Spec.		Used core
Name	I/O Port	Name	I/O Port	Length (m)	Shield	
EUT	Micro SD card slot	Micro SD card	-	-	-	-
	UART	Notebook	USB	1.5	Unshield	1 EA
	Eth 0		LAN	2.0	Unshield	-
	Eth 1	Router	LAN	2.5	Unshield	-
	Power	AC/DC adapter1	-	1.5	Unshield	-
	Analog Input	Communication board	16 Pin connector	0.3	Unshield	5 EA
Communication board	Micro 5pin connector	Notebook	USB	0.8	Unshield	1 EA
Notebook	DC IN	Notebook adapter	-	1.5	Unshield	1 EA
Router	DC IN	AC/DC adapter2	-	2.0	Unshield	-
AC Power Source	-	Notebook adapter	AC IN	1.0	Unshield	-
	-	AC/DC adapter2	AC IN	-	-	-

1.7 System Configurations

Description	Model	Serial No.	Manufacturer	Note
Main board	OHT ADC_X_X_iSOLATE V1.1.0	-	-	-
Sub board1	OHT HUB_MX8MM_STF745_EXTEND V1.2.1	-	-	-
Sub board2	DART-MX8M-MINI V1.1	-	-	-
Antenna board	Molex 2.4 GHz / 5 GHz Combo	47950XXXX	-	-
Ferrite core	ZCAT2132-1130	-	TDK	2EA
Power Cable	-	-	-	-

1.8 Test System Layout



1.9 Modifications/Note

- There was no modified item during the test.

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 (3 m method)
Above 1 GHz	54.0	74.0	Class B (3 m method)

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 1Lab.. : EMC32(V10.40.10) from R&S
- Giheung 2Lab.. : EMC32(V10.40.00) from R&S

2.3.1 Test Equipments

Equipment	Model	Manufacturer	Serial No	Cal Due. Date
EMI TEST RECEIVER	ESU26	R&S	100493	2021.08.25
ARTIFICIAL MAIN NETWORK	ESH2-Z5	R&S	100303	2021.08.22
PULSE LIMITER	ESH3-Z2	R&S	100283	2021.08.22
2-LINE V-NETWORK	ENV216	R&S	101120	2022.02.01
RF Cable	EMH-1Lab-CE-01	-	-	2021.07.21

2.3.2 Test Site

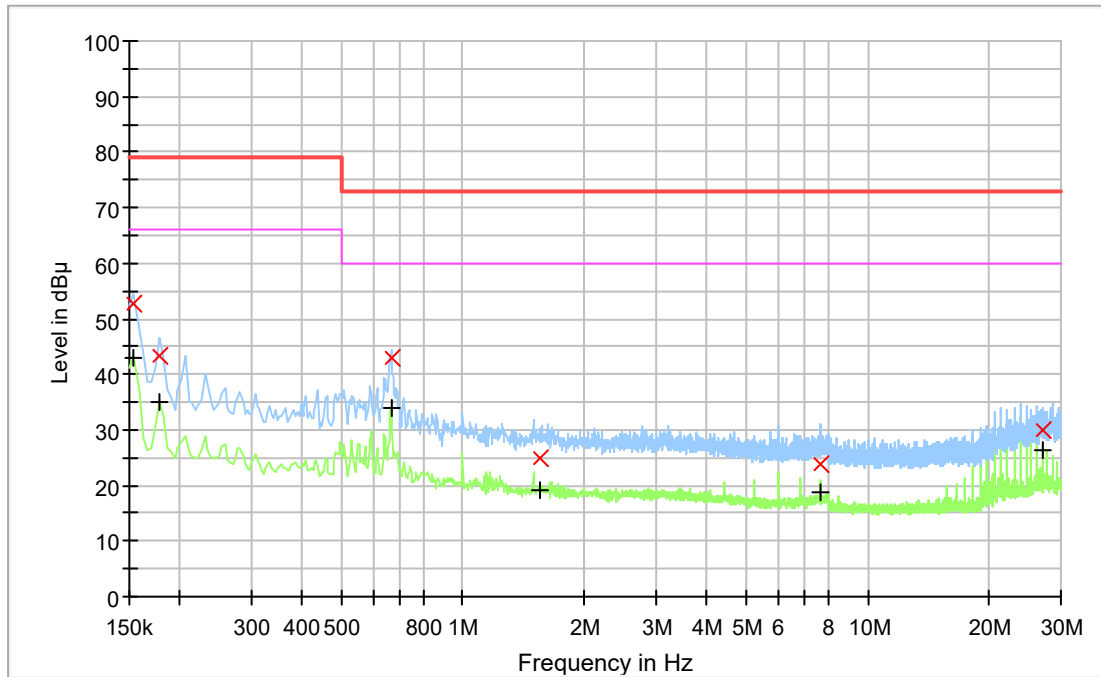
Shield Room in Giheung 1 Laboratory

2.3.3 Environment Conditions

Temperature	(Minimum 21.1, Maximum 22.0)℃
Humidity	(Minimum 41.0, Maximum 43.0)%R.H..
Atmospheric Pressure	(Minimum 100.1, Maximum 100.1)kPa
Test Date	May 18, 2021

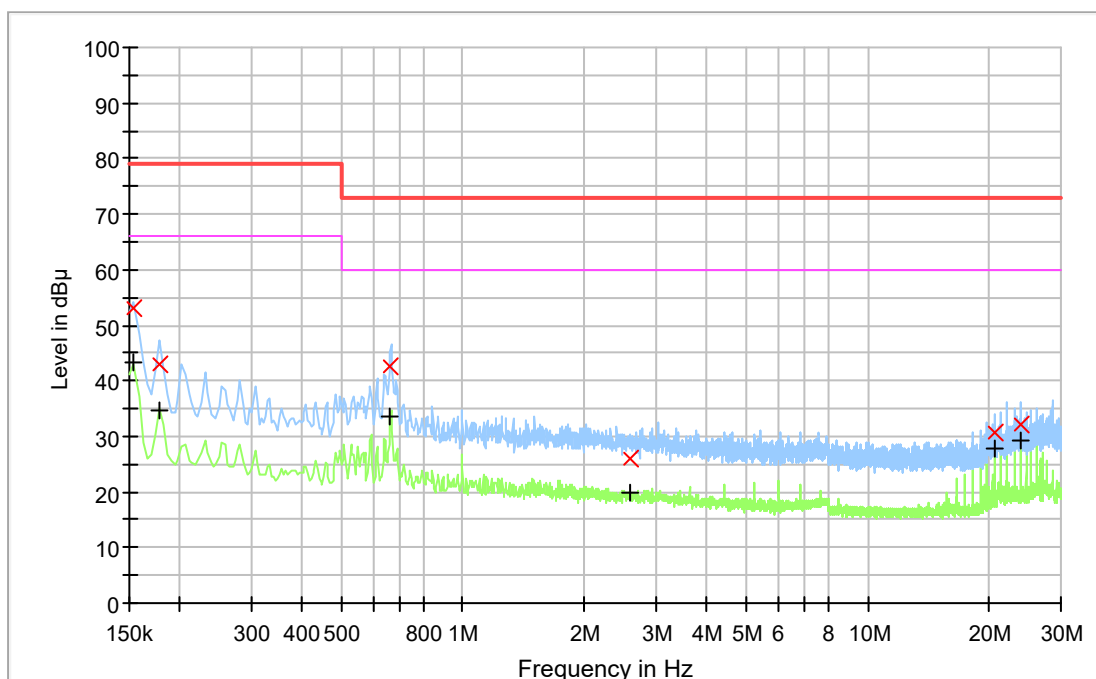
2.3.4 Test Results

- Sample #1(Exterior case open type)



Final Result

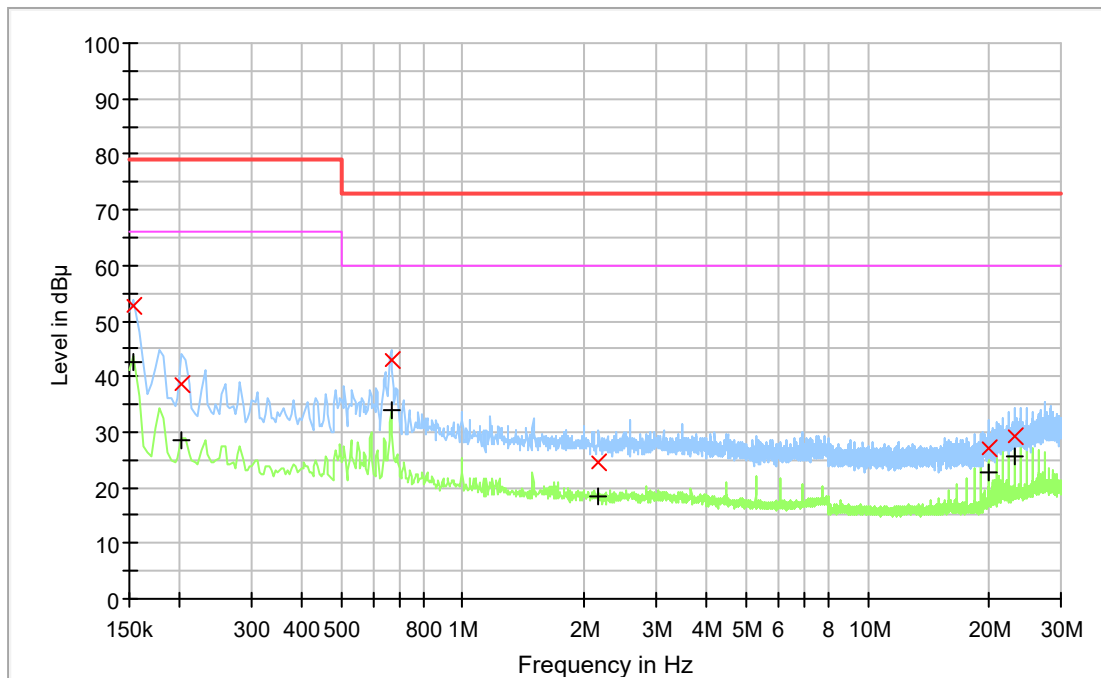
Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.154	52.83	---	79.00	26.17	15 000.0	9.000	L1	ON	19.7
0.154	---	42.94	66.00	23.06	15 000.0	9.000	L1	ON	19.7
0.178	43.49	---	79.00	35.51	15 000.0	9.000	L1	ON	19.7
0.178	---	34.97	66.00	31.03	15 000.0	9.000	L1	ON	19.7
0.666	43.08	---	73.00	29.92	15 000.0	9.000	L1	ON	19.8
0.666	---	33.86	60.00	26.14	15 000.0	9.000	L1	ON	19.8
1.542	24.90	---	73.00	48.10	15 000.0	9.000	L1	ON	19.7
1.542	---	19.27	60.00	40.73	15 000.0	9.000	L1	ON	19.7
7.662	23.74	---	73.00	49.26	15 000.0	9.000	L1	ON	19.8
7.662	---	18.63	60.00	41.37	15 000.0	9.000	L1	ON	19.8
27.006	30.02	---	73.00	42.98	15 000.0	9.000	L1	ON	20.0
27.006	---	26.24	60.00	33.76	15 000.0	9.000	L1	ON	20.0



Final Result

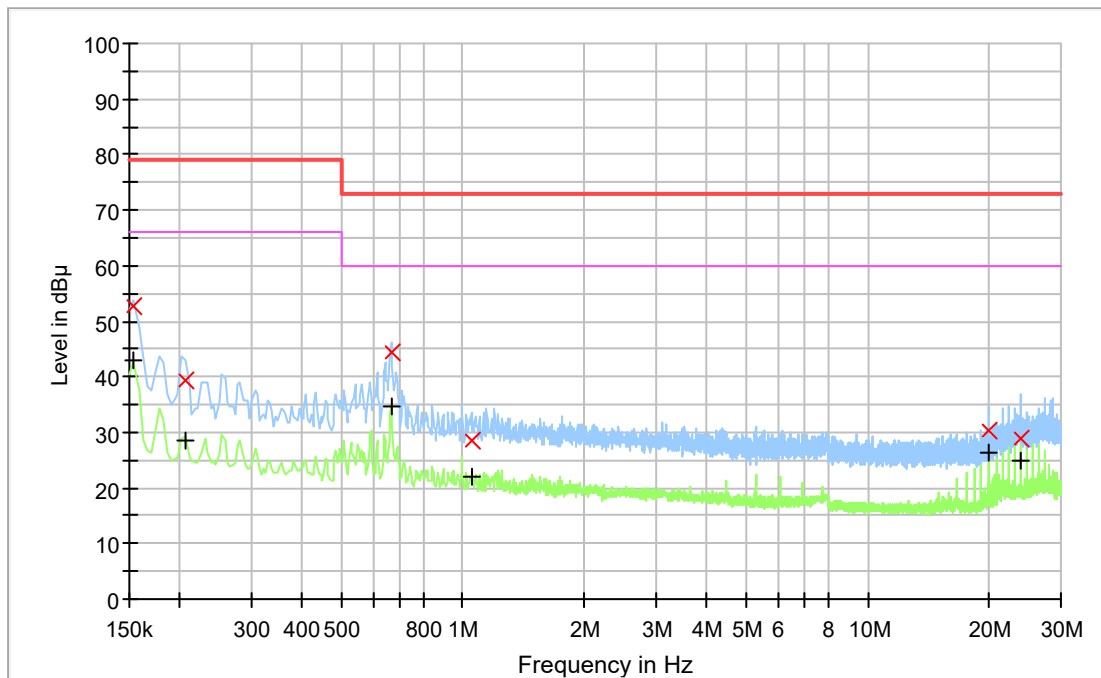
Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.154	53.01	---	79.00	25.99	15 000.0	9.000	N	ON	19.7
0.154	---	43.26	66.00	22.74	15 000.0	9.000	N	ON	19.7
0.178	43.00	---	79.00	36.00	15 000.0	9.000	N	ON	19.7
0.178	---	34.80	66.00	31.20	15 000.0	9.000	N	ON	19.7
0.662	42.48	---	73.00	30.52	15 000.0	9.000	N	ON	19.8
0.662	---	33.43	60.00	26.57	15 000.0	9.000	N	ON	19.8
2.594	26.01	---	73.00	46.99	15 000.0	9.000	N	ON	19.7
2.594	---	19.78	60.00	40.22	15 000.0	9.000	N	ON	19.7
20.554	30.84	---	73.00	42.16	15 000.0	9.000	N	ON	20.1
20.554	---	27.72	60.00	32.28	15 000.0	9.000	N	ON	20.1
23.778	32.13	---	73.00	40.87	15 000.0	9.000	N	ON	20.1
23.778	---	29.33	60.00	30.67	15 000.0	9.000	N	ON	20.1

● Sample #2(Exterior case close type)



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.154	52.88	---	79.00	26.12	15 000.0	9.000	L1	ON	19.7
0.154	---	42.76	66.00	23.24	15 000.0	9.000	L1	ON	19.7
0.202	38.47	---	79.00	40.53	15 000.0	9.000	L1	ON	19.8
0.202	---	28.54	66.00	37.46	15 000.0	9.000	L1	ON	19.8
0.666	43.02	---	73.00	29.98	15 000.0	9.000	L1	ON	19.8
0.666	---	34.05	60.00	25.95	15 000.0	9.000	L1	ON	19.8
2.170	24.43	---	73.00	48.57	15 000.0	9.000	L1	ON	19.7
2.170	---	18.55	60.00	41.45	15 000.0	9.000	L1	ON	19.7
19.926	26.92	---	73.00	46.08	15 000.0	9.000	L1	ON	20.0
19.926	---	22.72	60.00	37.28	15 000.0	9.000	L1	ON	20.0
23.178	29.29	---	73.00	43.71	15 000.0	9.000	L1	ON	20.0
23.178	---	25.76	60.00	34.24	15 000.0	9.000	L1	ON	20.0



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.154	52.78	---	79.00	26.22	15 000.0	9.000	N	ON	19.7
0.154	---	43.05	66.00	22.95	15 000.0	9.000	N	ON	19.7
0.206	39.31	---	79.00	39.69	15 000.0	9.000	N	ON	19.8
0.206	---	28.67	66.00	37.33	15 000.0	9.000	N	ON	19.8
0.666	44.34	---	73.00	28.66	15 000.0	9.000	N	ON	19.8
0.666	---	34.78	60.00	25.22	15 000.0	9.000	N	ON	19.8
1.050	28.44	---	73.00	44.56	15 000.0	9.000	N	ON	19.7
1.050	---	21.85	60.00	38.15	15 000.0	9.000	N	ON	19.7
19.922	30.28	---	73.00	42.72	15 000.0	9.000	N	ON	20.1
19.922	---	26.19	60.00	33.81	15 000.0	9.000	N	ON	20.1
23.990	28.86	---	73.00	44.14	15 000.0	9.000	N	ON	20.1
23.990	---	24.88	60.00	35.12	15 000.0	9.000	N	ON	20.1

Measurement Uncertainty : See Appendix A

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

• Margin = Limit – Quasi Peak or CAverage

• Corr. = LISN Factor + Cable loss + Pulse Limiter Factor

Ex) In case

Freq ; 0.5 MHz, level ; 30 dB(μV), CL ; 0.2 dB, LISN ; 9.5 dB, P/L: 9.8 dB

Result = Level + CL + LISN + P/L

= 30 + 0.2 + 9.5 + 9.8

= 49.5

Margin = Limit – Result

= 79 - 49.5

= 29.5

2.4 Radiated Emission

The initial preliminary exploratory scans were performed over the measuring frequency range (30 kHz to 40 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, Peak and CISPR-Average detector above 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 1Lab. : EMC32(V9.26.01) from R&S

-Giheung 2Lab. : EMC32(V10.40.10) from R&S

2.4.1 Test Equipments

Equipment	Model	Manufacturer	Serial No	Cal Due. Date
EMI TEST RECEIVER	ESU40	R&S	100075	2021.08.18
EMI TEST RECEIVER	ESU26	R&S	100570	2022.02.24
Hybrid ANTENNA	VULB 9162	SCHWARZBECK	186	2021.07.09
Double Ridged Horn Antenna	HF907	R&S	102578	2022.04.15
Double Ridged Horn Antenna	BBHA9170	SCHWARZBECK	BBHA9170540	2022.11.26
PREAMPLIFIER	AM-1431	MITEQ	1336160	2022.05.24
Microwave Preamplifier	PAM-118A	Com-Power	551074	2021.10.13
RF Cable	EMH-2Lab-RE-01	-	-	2021.07.27
RF Cable	EMH-2Lab-RE-06	-	-	2021.07.27
RF Cable	EMH-2Lab-RE-07	-	-	2021.07.27
RF Cable	EMH-1Lab-RE-02	HUBER+SHUNER	-	2021.07.21
RF Cable	EMH-1Lab-RE-03	-	-	2021.07.21
RF Cable	EMH-1Lab-RE-04	-	-	2021.07.21

2.4.2 Test Site

10m SEMI-ANECHOIC CHAMBER in Giheung 1 Laboratory

3m SEMI-ANECHOIC CHAMBER in Giheung 2 Laboratory

2.4.3 Environment Conditions

①Below 1 GHz (10 m method)

Temperature	(Minimum 22.2, Maximum 22.7)°C
Humidity	(Minimum 54.0, Maximum 56.0)%R.H..
Atmospheric Pressure	(Minimum 101.0, Maximum 101.0)kPa
Test Date	June 9, 2021

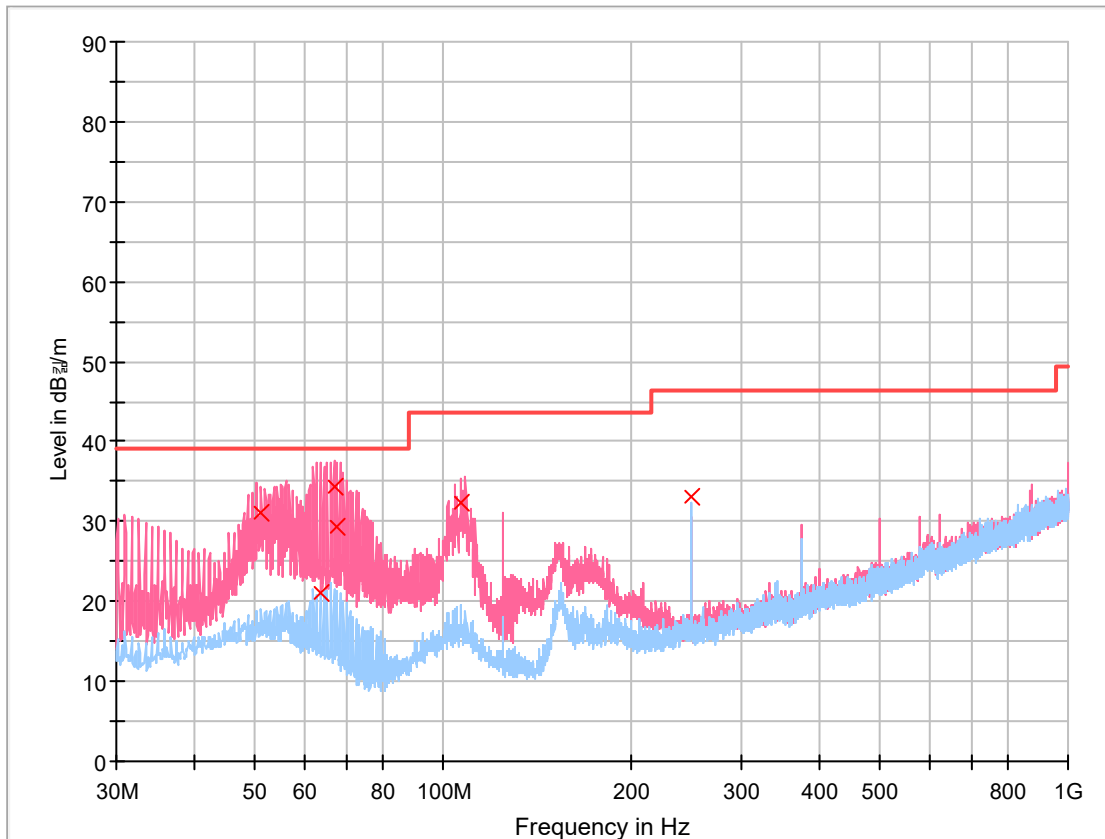
②Above 1 GHz (3 m method)

Temperature	(Minimum 23.2, Maximum 23.7)°C
Humidity	(Minimum 52.0, Maximum 54.0)%R.H..
Atmospheric Pressure	(Minimum 100.9, Maximum 100.9)kPa
Test Date	June 9, 2021

2.4.4 Test Results

Below 1 GHz (10 m method)

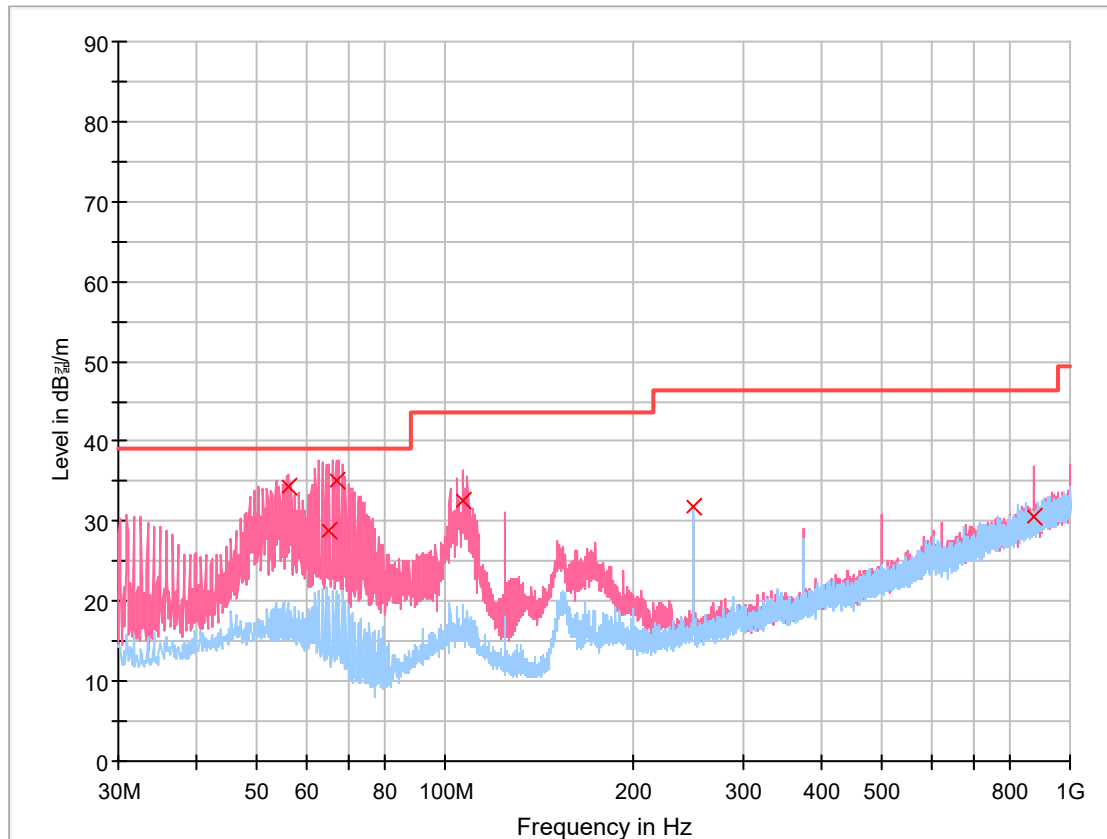
- Sample #1(Exterior case open type)



Final Result

Frequency (MHz)	QuasiPeak dBμV/m	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
51.146	31.11	39.10	7.99	15 000.0	120.000	100.0	V	166.0	-16.5
63.562	21.03	39.10	18.07	15 000.0	120.000	100.0	V	210.0	-18.6
66.860	34.46	39.10	4.64	15 000.0	120.000	200.0	V	174.0	-19.6
67.636	29.35	39.10	9.75	15 000.0	120.000	200.0	V	196.0	-19.8
106.630	32.44	43.52	11.08	15 000.0	120.000	200.0	V	310.0	-18.0
249.996	33.05	46.50	13.45	15 000.0	120.000	400.0	H	50.0	-16.2

- Sample #2(Exterior case close type)



Final Result

Frequency (MHz)	QuasiPeak dBμV/m	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
55.996	34.26	39.10	4.84	15 000.0	120.000	100.0	V	0.0	-16.9
65.211	28.87	39.10	10.23	15 000.0	120.000	200.0	V	181.0	-19.1
66.860	35.03	39.10	4.07	15 000.0	120.000	200.0	V	203.0	-19.6
106.630	32.58	43.52	10.94	15 000.0	120.000	100.0	V	93.0	-18.0
249.996	31.88	46.50	14.62	15 000.0	120.000	400.0	H	15.0	-16.2
875.064	30.64	46.50	15.86	15 000.0	120.000	100.0	V	238.0	-2.1

Measurement Uncertainty : See Appendix A

Note : ● POL H = Horizontal

● Margin = Limit – Quasi Peak

● POL V = Vertical

● Corr. = Antenna Factor + Cable loss – Amplifier Gain

Ex) In case

Freq ; 100 MHz, level ; 30 dB(μV/m), AF ; 10 dB/m, CL ; 4 dB, Amp ; 25 dB

Result = Level + AF + CL – Amp

= 30 + 10 + 4 - 25

= 19

Margin = Limit – Result

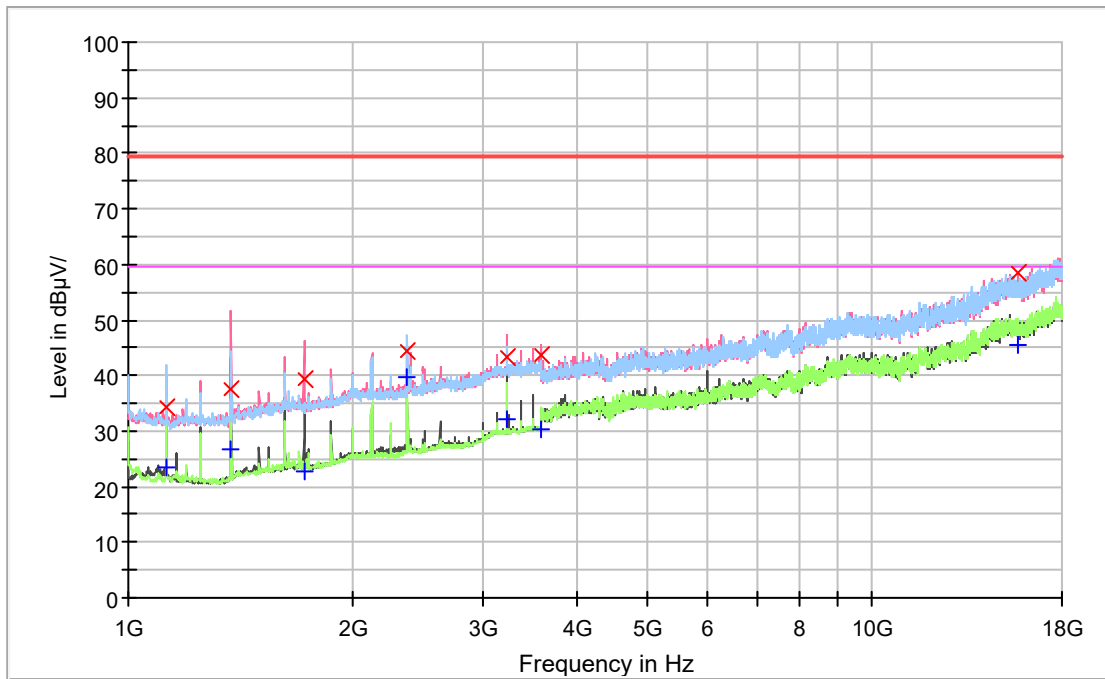
= 43.5 – 19

= 24.5

Above 1 GHz(3 m method)

[1 GHz ~ 18 GHz]

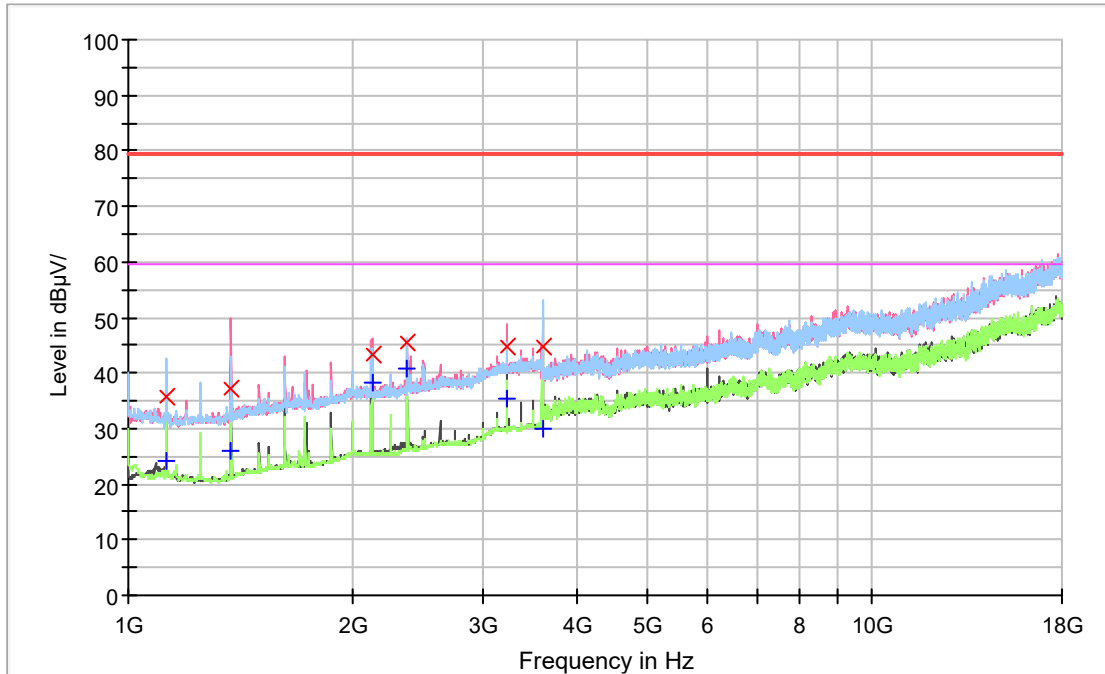
- Sample #1(Exterior case open type)



Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1 124.100	34.46	---	79.50	45.04	15 000.0	1 000.000	100.0	H	307.0	-14.1
1 124.100	---	23.53	59.50	35.97	15 000.0	1 000.000	100.0	H	307.0	-14.1
1 374.000	---	26.72	59.50	32.78	15 000.0	1 000.000	200.0	V	282.0	-13.5
1 374.000	37.68	---	79.50	41.82	15 000.0	1 000.000	200.0	V	282.0	-13.5
1 722.500	39.49	---	79.50	40.01	15 000.0	1 000.000	300.0	V	102.0	-11.3
1 722.500	---	22.62	59.50	36.88	15 000.0	1 000.000	300.0	V	102.0	-11.3
2 375.300	---	39.54	59.50	19.96	15 000.0	1 000.000	100.0	H	184.0	-8.9
2 375.300	44.51	---	79.50	34.99	15 000.0	1 000.000	100.0	H	184.0	-8.9
3 228.700	43.38	---	79.50	36.12	15 000.0	1 000.000	100.0	V	102.0	-5.8
3 228.700	---	32.31	59.50	27.19	15 000.0	1 000.000	100.0	V	102.0	-5.8
3 595.900	43.67	---	79.50	35.83	15 000.0	1 000.000	100.0	V	16.0	-4.8
3 595.900	---	30.17	59.50	29.33	15 000.0	1 000.000	100.0	V	16.0	-4.8
15 701.600	---	45.50	59.50	14.00	15 000.0	1 000.000	400.0	V	265.0	13.1
15 701.600	58.43	---	79.50	21.07	15 000.0	1 000.000	400.0	V	265.0	13.1

- Sample #2(Exterior case close type)

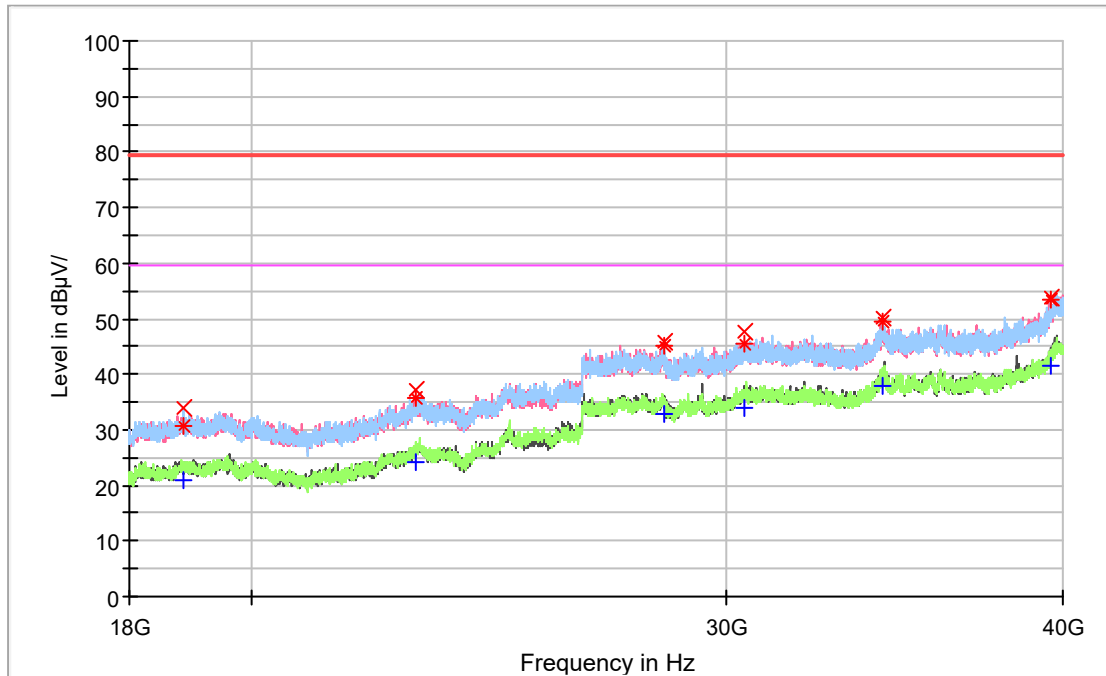


Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1 124.100	---	24.19	59.50	35.31	15 000.0	1 000.000	100.0	H	182.0	-14.1
1 124.100	35.69	---	79.50	43.81	15 000.0	1 000.000	100.0	H	182.0	-14.1
1 374.000	37.26	---	79.50	42.24	15 000.0	1 000.000	200.0	V	289.0	-13.5
1 374.000	---	25.98	59.50	33.52	15 000.0	1 000.000	200.0	V	289.0	-13.5
2 125.400	43.39	---	79.50	36.11	15 000.0	1 000.000	300.0	V	352.0	-9.5
2 125.400	---	38.26	59.50	21.24	15 000.0	1 000.000	300.0	V	352.0	-9.5
2 375.300	---	40.73	59.50	18.77	15 000.0	1 000.000	300.0	V	352.0	-8.9
2 375.300	45.52	---	79.50	33.98	15 000.0	1 000.000	300.0	V	352.0	-8.9
3 228.700	44.62	---	79.50	34.88	15 000.0	1 000.000	200.0	V	113.0	-5.8
3 228.700	---	35.53	59.50	23.97	15 000.0	1 000.000	200.0	V	113.0	-5.8
3 604.400	44.75	---	79.50	34.75	15 000.0	1 000.000	400.0	H	276.0	-4.8
3 604.400	---	29.95	59.50	29.55	15 000.0	1 000.000	400.0	H	276.0	-4.8

[18 GHz ~ 40 GHz]

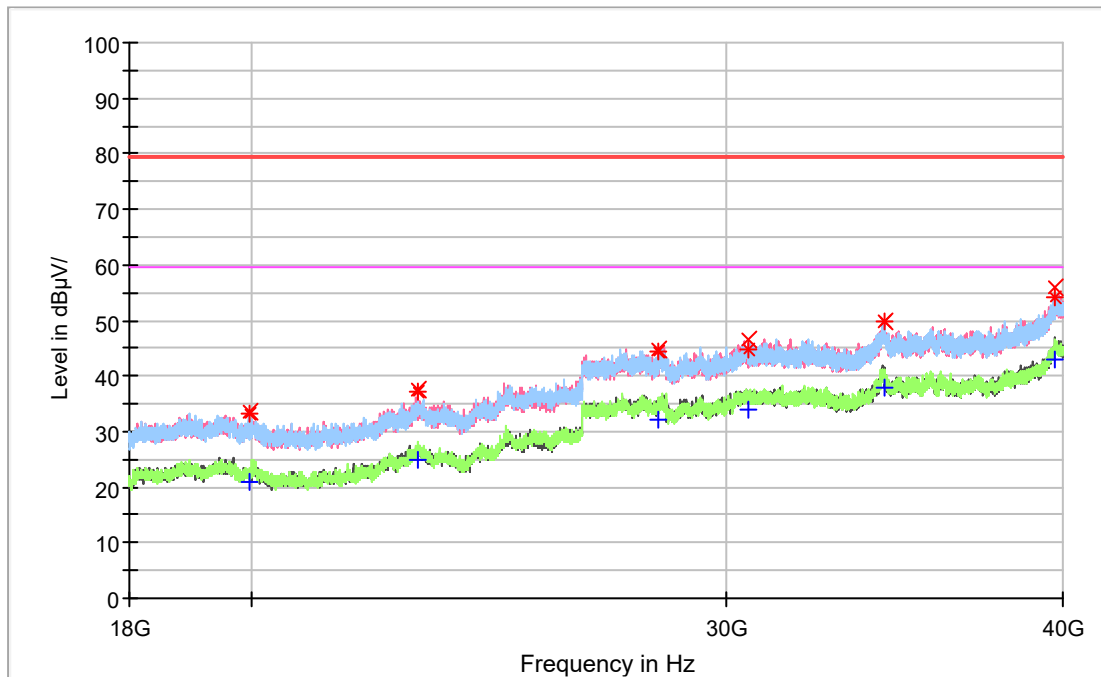
- Sample #1(Exterior case open type)



Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
18 866.800	---	21.09	59.50	38.41	15 000.0	1 000.000	100.0	V	0.0	-8.8
18 866.800	33.97	---	79.50	45.53	15 000.0	1 000.000	100.0	V	0.0	-8.8
23 002.800	---	24.32	59.50	35.18	15 000.0	1 000.000	100.0	V	21.0	-6.0
23 002.800	37.15	---	79.50	42.35	15 000.0	1 000.000	100.0	V	21.0	-6.0
28 443.400	---	32.69	59.50	26.81	15 000.0	1 000.000	100.0	H	0.0	-2.5
28 443.400	45.95	---	79.50	33.55	15 000.0	1 000.000	100.0	H	0.0	-2.5
30 452.000	---	34.02	59.50	25.48	15 000.0	1 000.000	100.0	V	47.0	-0.9
30 452.000	47.78	---	79.50	31.72	15 000.0	1 000.000	100.0	V	47.0	-0.9
34 266.800	50.23	---	79.50	29.27	15 000.0	1 000.000	100.0	V	217.0	0.6
34 266.800	---	37.75	59.50	21.75	15 000.0	1 000.000	100.0	V	217.0	0.6
39 586.400	53.81	---	79.50	25.69	15 000.0	1 000.000	100.0	H	159.0	4.6
39 586.400	---	41.38	59.50	18.12	15 000.0	1 000.000	100.0	H	159.0	4.6

- Sample #2(Exterior case close type)



Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
19 933.800	33.67	---	79.50	45.83	15 000.0	1 000.000	100.0	H	53.0	-8.5
19 933.800	---	20.84	59.50	38.66	15 000.0	1 000.000	100.0	H	53.0	-8.5
23 049.000	37.50	---	79.50	42.00	15 000.0	1 000.000	100.0	V	295.0	-6.1
23 049.000	---	24.75	59.50	34.75	15 000.0	1 000.000	100.0	V	295.0	-6.1
28 309.200	44.59	---	79.50	34.91	15 000.0	1 000.000	100.0	V	325.0	-2.8
28 309.200	---	32.09	59.50	27.41	15 000.0	1 000.000	100.0	V	325.0	-2.8
30 562.000	46.63	---	79.50	32.87	15 000.0	1 000.000	100.0	H	218.0	-0.7
30 562.000	---	33.92	59.50	25.58	15 000.0	1 000.000	100.0	H	218.0	-0.7
34 315.200	---	37.78	59.50	21.72	15 000.0	1 000.000	100.0	V	200.0	0.7
34 315.200	49.92	---	79.50	29.58	15 000.0	1 000.000	100.0	V	200.0	0.7
39 753.600	---	43.11	59.50	16.39	15 000.0	1 000.000	100.0	H	80.0	5.7
39 753.600	56.00	---	79.50	23.50	15 000.0	1 000.000	100.0	H	80.0	5.7

Measurement Uncertainty : See Appendix A

Note : ● POL H = Horizontal

● Margin = Limit – Quasi Peak

● POL V = Vertical

● Corr. = Antenna Factor + Cable loss – Amplifier Gain

Ex) In case

Freq ; 100 MHz, level ; 30 dB(μV/m), AF ; 10 dB/m, CL ; 4 dB, Amp ; 25 dB

Result = Level + AF + CL – Amp

= 30 + 10 + 4 - 25

= 19

Margin = Limit – Result

= 43.5 – 19

= 24.5

Appendix A : Measurement Uncertainty

- Giheung 1 Laboratory

Test Method		Measurement Uncertainty	
Conducted Emission		ENV216	3.70 dB (The confidential level is 95 %, k=2)
		ESH2-Z5	3.58 dB (The confidential level is 95 %, k=2)
		ESH3-Z6	3.54 dB (The confidential level is 95 %, k=2)
Conducted Emission - Signal		ISN T800	5.12 dB (The confidential level is 95 %, k=2)
		ISNT8-Cat6	5.14 dB (The confidential level is 95 %, k=2)
		ISN S751	5.20 dB (The confidential level is 95 %, k=2)
Radiated Emission	9 kHz ~30 MHz (3m chamber)	Horizontal	3.64 dB (The confidential level is 95 %, k=2)
		Vertical	3.64 dB (The confidential level is 95 %, k=2)
	30 MHz ~ 1 000 MHz (10m chamber)	Horizontal	4.26 dB (The confidential level is 95 %, k=2)
		Vertical	4.39 dB (The confidential level is 95 %, k=2)
	1 GHz ~ 18 GHz (3m chamber)	Horizontal	3.59 dB (The confidential level is 95 %, k=2)
		Vertical	3.59 dB (The confidential level is 95 %, k=2)
Radiated Immunity Test		0.86 dB (The confidential level is 95 %, k=2)	
Conducted Immunity Test		2.23 dB (The confidential level is 95 %, k=2)	
Magnetic Field		5.78 dB (The confidential level is 95 %, k=2)	

- Giheung 2 Laboratory

Test Method		Measurement Uncertainty	
Conducted Emission		ENV216	3.54 dB (The confidential level is 95 %, k=2)
		ESH2-Z5	3.53 dB (The confidential level is 95 %, k=2)
		ESH3-Z6	3.49 dB (The confidential level is 95 %, k=2)
Conducted Emission - Signal		ISN T800	5.03 dB (The confidential level is 95 %, k=2)
		ISNT8-Cat6	5.15 dB (The confidential level is 95 %, k=2)
		ISN S751	5.15 dB (The confidential level is 95 %, k=2)
Discontinuous		3.02 dB (The confidential level is 95 %, k=2)	
Disturbance Power		3.66 dB (The confidential level is 95 %, k=2)	
Radiated Emission	9 kHz ~30 MHz (3m chamber)	Horizontal	3.84 dB (The confidential level is 95 %, k=2)
		Vertical	3.84 dB (The confidential level is 95 %, k=2)
	30 MHz ~ 1 000 MHz (10m chamber)	Horizontal	5.18 dB (The confidential level is 95 %, k=2)
		Vertical	5.32 dB (The confidential level is 95 %, k=2)
	1 GHz ~ 18 GHz (3m chamber)	Horizontal	3.62 dB (The confidential level is 95 %, k=2)
		Vertical	3.67 dB (The confidential level is 95 %, k=2)
Radiated Immunity Test		1.47 dB (The confidential level is 95 %, k=2)	
Conducted Immunity Test		2.23 dB (The confidential level is 95 %, k=2)	
Magnetic Field		5.78 dB (The confidential level is 95 %, k=2)	

- End of Test Report -