TEST REPORT

KES Co., Ltd.
#3002, #3503, #3701, 40, Simin-daero365beon-gil,
Dongan-gu, Anyang-si, Gyeonggi-do, 14057,
Republic of Korea
Tel : +82-31-425-6200, Fax : +82-31-425-6200

1. Client

Applicant : RFengine Co., Ltd.

Applicant Address : 1-618, Cheongju Techno S-Tower, 530 Jikji-daero, Heungdeok-gu, Cheongju-si, Chungbuk-do

2. Sample Description

Product name : 13.56MHz RFID READER

Model/Type No. : HFR-4AM

Variant Model : -

Manufacturer : RFengine Co., Ltd.

Manufacturer Address : 1-618, Cheongju Techno S-Tower, 530 Jikji-daero, Heungdeok-gu, Cheongju-si, Chungbuk-do

3. FCC ID : 2BDL2HFR4AM
IC ID : 31937-HFR4AM

4. Date of Receipt : Dec. 06 2023

5. Test date : Jan. 19, 2024

6. Date of Issue : Feb. 02, 2024

7. Test Results : In Compliance

Tested by

[김민성]2024/02/02

Min Seong, Kim
EMC Test Engineer

Reviewed by

[이동일]2024/02/02

Dong Il, Lee
EMC Technical Manager

REPORT REVISION HISTORY

Date	Test Report No.	Revision History
Feb. 02, 2024	EM-234105	Issued

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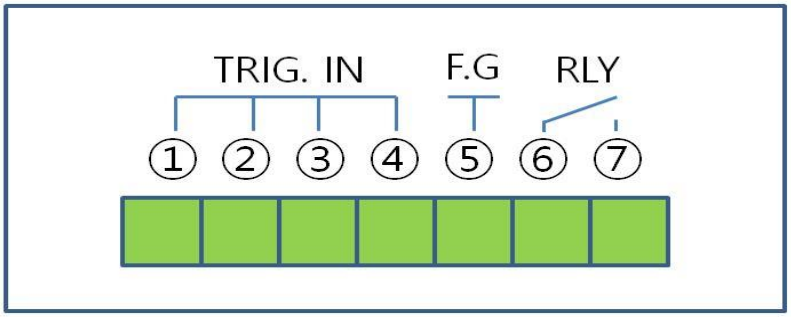
1.0 General Product Description

Main Specifications of EUT are:

- Electrical specifications

Division	Standard	Remarks
CPU	W7100A	
RF Frequency	13.56MHz	
Tag Interface	ISO 15693	
Communication	TCP/IP	
	RS-232C	
Input Power	DC+5V , 2A	
Firmware Upgrade	Through TCP/IP & RS-232C Port	
Port	ANT1 , ANT2 , ANT3 , ANT4	
	LAN , RS-232C , Terminal Block	
Display	6-LED (Red, Red, Red, Red, Green, Green) (ANT 1~4, Read & Write, Power)	
Terminal Block	4-TIN : Trigger Signal Input(12~24VDC) 1-F.G. : Frame Ground 1-RLY : Relay Output(0~24VDC)	
Sound	Buzzer	On / Off
Antenna	External Antenna	
Operation Temp.	-10 ~ +50 ℃	
Dimension	145(/167)(W)*95(D)*24(H)mm	
Weight	395g	

● Terminal Block Specifications



▣ Trigger Signal Input (① ② ③ ④)

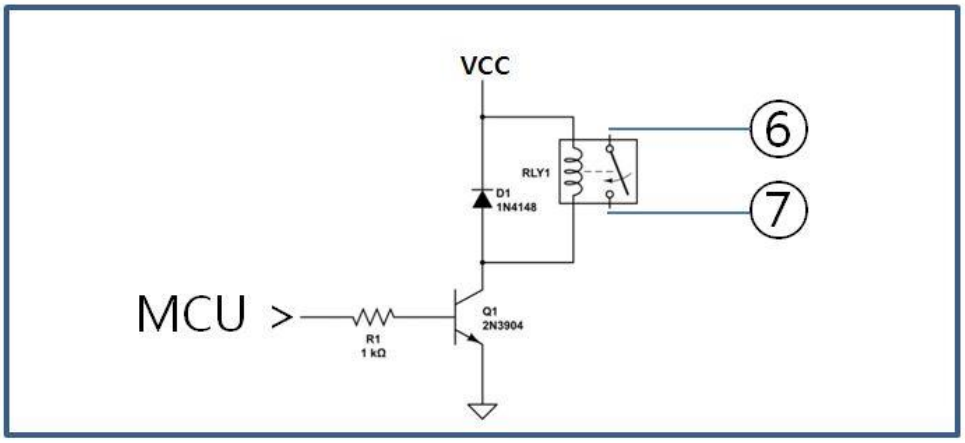
- Inputs 4 Trigger signals.
- Input voltage range: 12 ~ 24VDC (Example: PLC synchronous signal).

▣ Frame Ground (⑤)

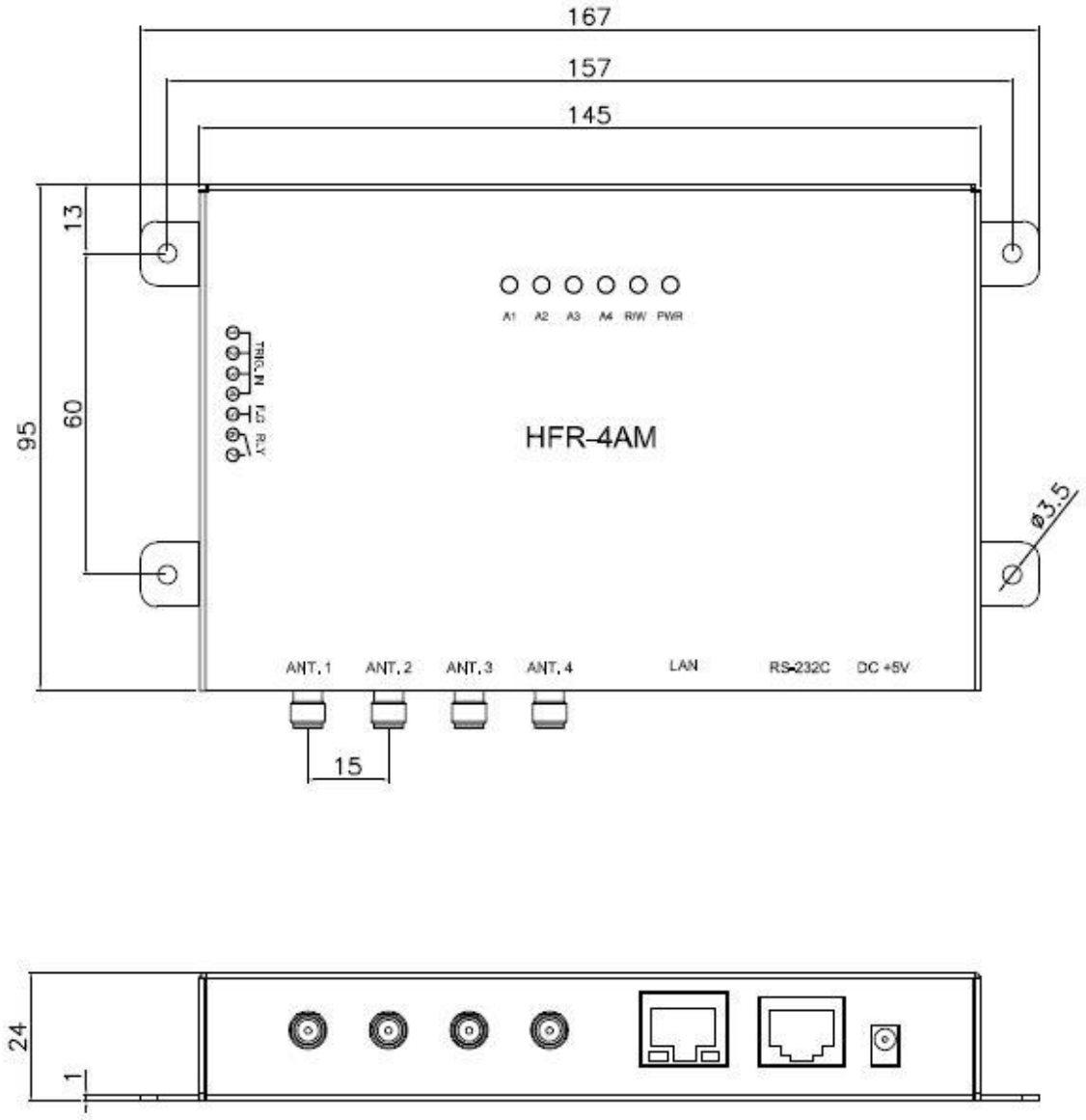
- Ground frame ground.

▣ Relay Output (⑥ ⑦)

- Turn on / off the contact of Realy by signal output of MCU.
- The initial state is Open (Off).
- Turn on / off the external circuit connected to the reader.
- Relay Contact Ratings : Max. 2A @24VDC



- Mechanical specifications



< Mechanical specifications of HFR-4AM >

1.1 Test Voltage & Frequency

Unless indicated otherwise on the individual data sheet or test results, the test voltage and frequency was as indicated below.

☒ AC 120 V, 60 ㎐(DC Adapter Input Power)

1.2 Variant Model Differences

Not applicable

1.3 Device Modifications

Not applicable

1.4 Equipment Under Test

Description	Model Number	Serial Number	Manufacturer	Remarks
13.56MHz RFID READER	HFR-4AM	-	RFengine Co., Ltd.	EUT
AC/DC Adapter	PG122-0502000UD	-	Shenzhen Perfect Gallant Tec Co.,Ltd.	-
RFID Antenna	HFA-13S	-	RFengine Co., Ltd.	4 EA

1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
RFID Tag	-	-	-	4 EA
Terminal Jig	-	-	-	-
Terminal Jig Adapter	GST40A12	-	SuZhou MEAN WELL Technology Co., Ltd.	-
Desktop PC	DB400T2A	-	Comwins Co., Ltd.	-
Monitor	S24E370DL	0NTWHTPH200179Y	Samsung Electronics Co., Ltd.	S24E370DL
Monitor Adapter	A16-140P1A	ZL6PS64929301A110	Chicony Power Technology (Suzhou) Co., Ltd.	A16-140P1A
Keyboard	ST-600	-	CAN TECHNOLOGY CO., LTD	-
Mouse	XM-1600	-	Intech Electronics Corp.	-

1.6 External I/O Cabling

■ Serial Mode, TCP/IP Mode

Start		END		Cable Spec.	
Description	**I/O Port**	**Description**	**I/O Port**	**Length**	**Shield**
13.56MHz RFID READER (EUT)	DC Jack	AC/DC Adapter (EUT)	Line-Out (DC Jack)	1.0	U
	SMA_1~4	RFID Antenna_1~4 (EUT)	SMA	5.0	U
	Terminal Block (7 Pin)	Terminal Jig	7 Pin	-	-
	Serial (RS-232C)	Desktop PC	RS-232C	0.8	S
	TCP/IP (RJ-45)		RJ-45	4.0	U
Terminal Jig	DC Jack	Terminal Jig Adapter	Line-Out (DC Jack)	1.0	U
Desktop PC	HDMI	Monitor	HDMI	2.0	S
	USB Type-A	Keyboard	Line-Out (USB Type-A)	1.6	U
	USB Type-A	Mouse	Line-Out (USB Type-A)	1.4	U
Monitor	DC Jack	Monitor Adapter	Line-Out (DC Jack)	2.0	U

* Unshielded = U, Shielded = S

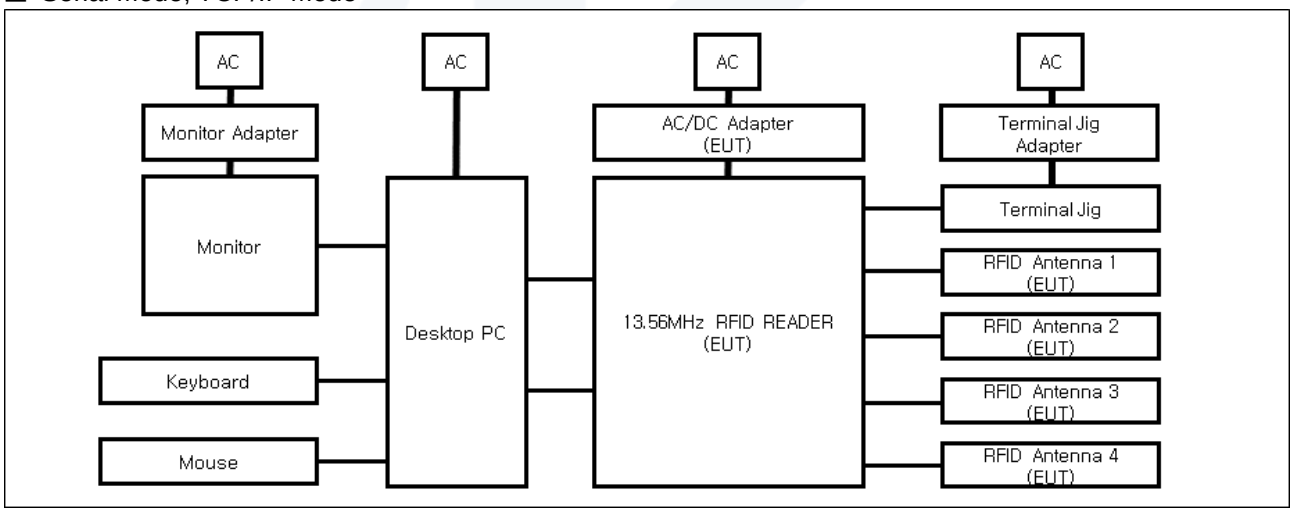
1.7 EUT Operating Mode(s)

Test mode	Normal operating	Test Voltages
Serial	- Connect EUT and Desktop PC via Serial (RS-232C) using Applicant support program(HFR-4AM DEMO) and check RFID operation.	AC 120 V, 60 Hz
TCP/IP	- Connect EUT and Desktop PC via TCP/IP(RJ-45) using Applicant support program(HFR-4AM DEMO) and check RFID operation.	

EUT Test operating S/W		
Name	**Version**	**Manufacture Company**
HFR-4AM DEMO	-	RFengine Co., Ltd.

1.8 Configuration

■ Serial Mode, TCP/IP Mode



1.9 Remarks when standards applied

N/A

1.10 Calibration Details of Equipment Used for Measurement

Test equipment and test accessories are calibrated on regular basis. The maximum time between calibrations is one year or what is recommended by the manufacturer, whichever is less.

1.11 Test Facility

The measurement facility is located at 473-21, Gayeo-ro, Yeoju-si, Gyeonggi-do, 12658, Korea, Republic of. The sites are constructed in conformance with the requirements of ANSI C63.4a-2017 and CISPR 16-1-4:2019

1.12 Measurement Procedure

- Conducted Emissions

The conducted emission levels were measured on each current-carrying line with the spectrum analyzer operating in the CISPR quasi-peak mode (or peak mode if applicable). The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. If the conducted emission exceed the average limit with the instrument set to the quasi-peak mode, the measurements are made in the average mode. The emission spectrum was scanned from 150 ㎑ to 30 ㎒. The highest emission amplitudes relative to the appropriate limits were measured and have been recorded. Quasi-peak readings are distinguished with a "QP".

- Radiated Electric Field Emissions

The test was done at a SEMI ANECHOIC CHAMBER with quasi-peak detector. The final test data was measured using a Quasi-Peak detector below 1㎓ at 10 m or 3 m distance and a Peak and Average detector above 1 ㎓ at 3 m distance. Test was proceeded worst case test mode and cable configuration.
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.

Measurement procedures was In accordance with ANSI C63.4-2014 7.3.3, 7.3.4, 8.3.1.1, 8.3.1.2, 8.3.2.1, 8.3.2.2

1.13 Laboratory Accreditations and Listings

Country	Agency	Scope of Accreditation	Logo
KOREA	**RRA**	EMI (3 m & 10 m Semi-Anechoic Chamber and conducted test site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	KR0100
International	**KOLAS**	EMI (3 m & 10 m Semi-Anechoic Chamber and conducted test site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	KT489
USA	**FCC**	3 m & 10 m Semi-Anechoic Chamber Conducted test site to perform FCC Part 15/18 measurements.	KR0100
Canada	**ISED**	3 m & 10 m Semi-Anechoic Chamber and Conducted test site	23298
JAPAN	**VCCI**	EMI (3 m & 10 m Semi-Anechoic Chamber and conducted test site)	C-20136, T-20137, R-20181, G-20176
Europe	**TÜV SÜD**	EMI (3 m & 10 m Semi-Anechoic Chamber and conducted test site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	CARAT 001633 0004

2.0 Test Regulations

The emissions tests were performed according to following regulations:

☒ **47 CFR Part 15, Subpart B**

☐ CISPR 22:2009 +A1:2010	☐ Class A	☐ Class B
☒ ANSI C63.4a-2017	☐ Class A	☒ Class B

☒ **IC Regulation ICES-003 Issue 7**

☐ CAN/CSA-CISPR 32:17	☐ Class A	☐ Class B
☒ ANSI C63.4a-2017	☐ Class A	☒ Class B

2.1 Conducted Emissions at Mains Power Ports

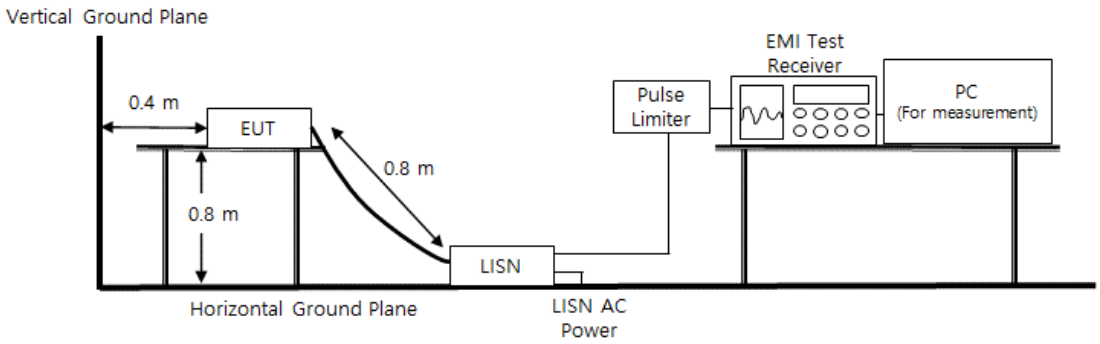
Test Date
Jan. 19, 2024

Test Location
Electro wave Shieldroom #6

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due	calibration interval
☒	EMI Test S/W	EMC32	R & S	9.12.00	-	-
☒	EMI TEST RECEIVER	ESR3	R & S	101783	11, 08, 2024	1 Year
☒	LISN	ENV216	R & S	101787	11, 08, 2024	1 Year
☒	LISN	ESH2-Z5	R & S	100450	11, 08, 2024	1 Year
☒	PULSE LIMITER	ESH3-Z2	R & S	101915	11, 08, 2024	1 Year

Diagram of test setup



Test Conditions

Temperature:	(23,3 ± 0,1) ℃
Relative Humidity:	(46,0 ± 0,2) % R.H.

Frequency Range of Measurement

150 ㎑ to 30 ㎒

Instrument Settings

IF Band Width: 9 ㎑

Test Results

The requirements are:

☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks

See Appendix A for test data.

2.2 Radiated Electric Field Emissions(Below 1 ㎓)

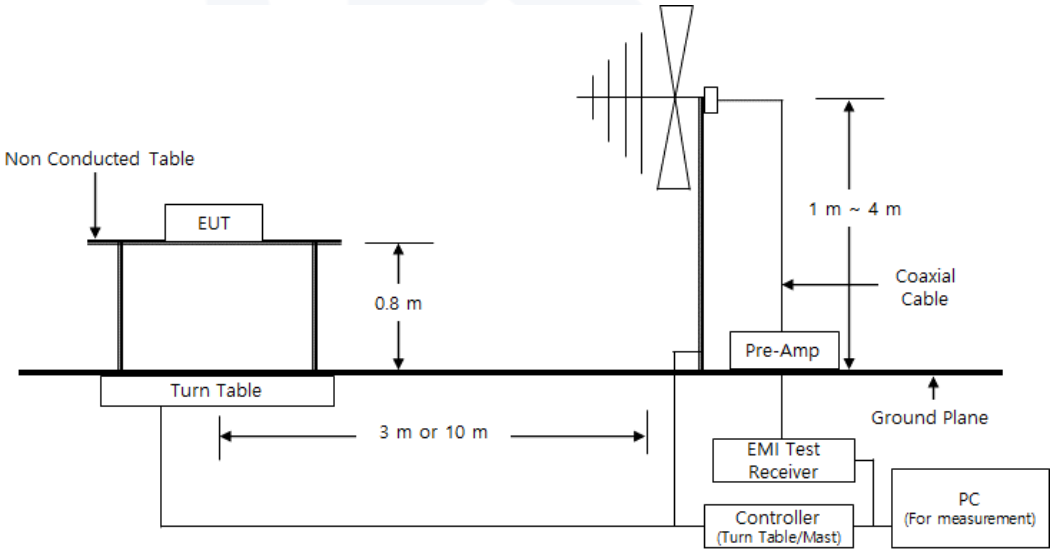
Test Date
Jan. 19, 2024

Test Location
☐ OPEN AREA TEST SITE #2 ☒ SEMI ANECHOIC CHAMBER #4(10m)

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due	calibration interval
☒	EMI Test S/W	EP5/RE	TOYO Corporation	6.0.0	-	-
☒	EMI TEST RECEIVER	ESU26	R & S	100551	03, 21, 2024	1 Year
☒	AMPLIFIER	SCU 01	R & S	100603	11, 08, 2024	1 Year
☒	TRILOG-BROADBAND ANTENNA	VULB9163	Schwarzbeck	715	11, 17, 2024	2 Year
☒	ATTENUATOR	8491A	HP	32173	03, 03, 2024	1 Year

Diagram of test setup



Test Conditions

Temperature:	(23,0 ± 0,2) ℃
Relative Humidity:	(46,4 ± 0,3) % R.H.

Frequency Range of Measurement

30 ㎒ to 1 ㎓

Instrument Settings

IF Band Width: 120 ㎑

Test Results

The requirements are:

☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks

- See Appendix A for test data.
- Divided into FCC and IC, applied.

2.3 Radiated Electric Field Emissions(Above 1 ㎓)

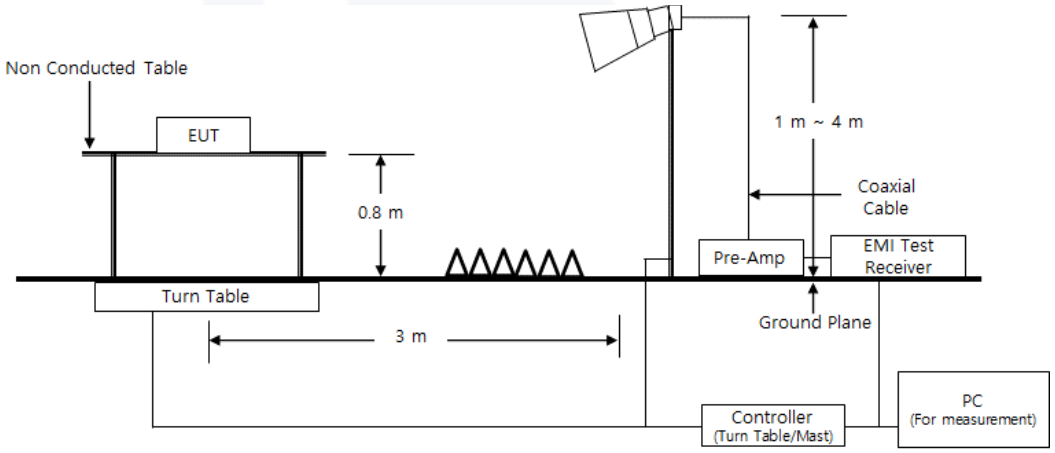
Test Date
Jan. 19, 2024

Test Location
SEMI ANECHOIC CHAMBER #5

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due	calibration interval
☒	EMI Test S/W	ES10/RE	TOYO Corporation	2022.01.000	-	-
☒	EMI TEST RECEIVER	ESU26	Rohde & Schwarz	100552	03, 21, 2024	1 Year
☒	HORN ANTENNA	BBHA 9120D	SCHWARZBECK	9120D-1802	11, 03, 2024	1 Year
☒	PREAMPLIFIER	8449B	HP	3008A00538	05, 31, 2024	1 Year
☒	ATTENUATOR	8491B	HP	23094	03, 21, 2024	1 Year

Diagram of test setup



Test Conditions

Temperature: (22,0 ± 0,1) ℃
Relative Humidity: (45,9 ± 0,3) % R.H.

Frequency Range of Measurement

1 ㎓ to 5 ㎓

Instrument Settings

IF Band Width: 1 ㎒

Test Results

The requirements are:

☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks

- See Appendix A for test data.
- The Average of the test data is the cispr average result.

APPENDIX A – TEST DATA

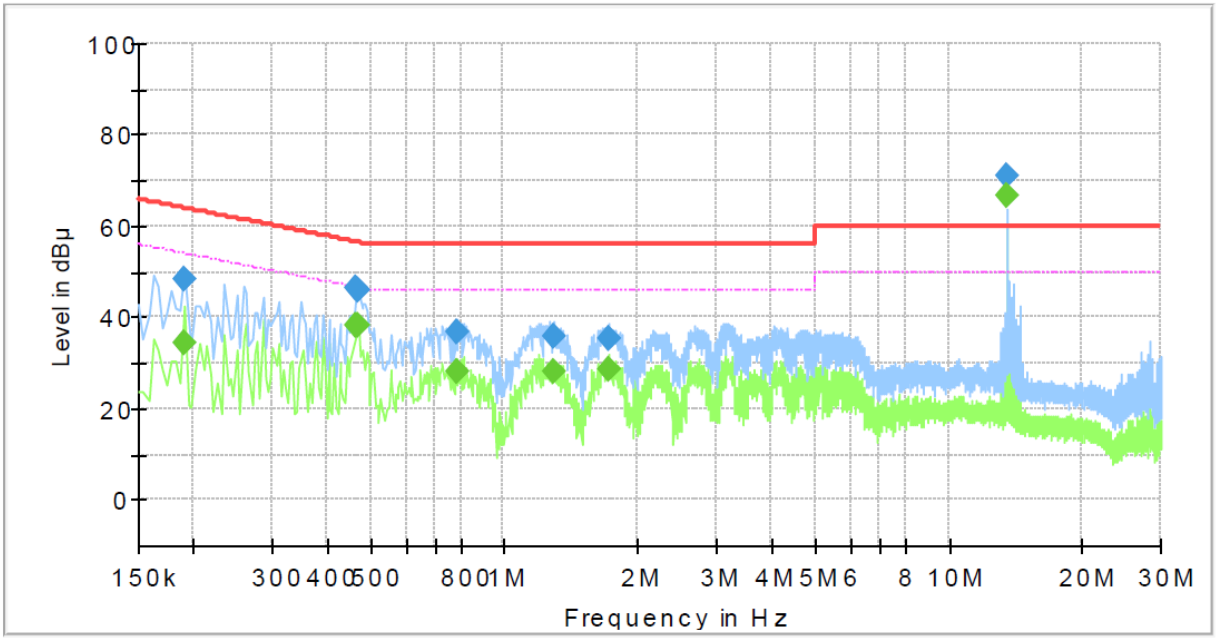
Conducted Emissions at Mains Power Ports

■ Serial Mode

HOT LINE

Common Information

Test Description:	Conducted Emission
Model No.:	HFR-4AM
Phase:	L1
Mode:	Serial
Operator Name:	KES



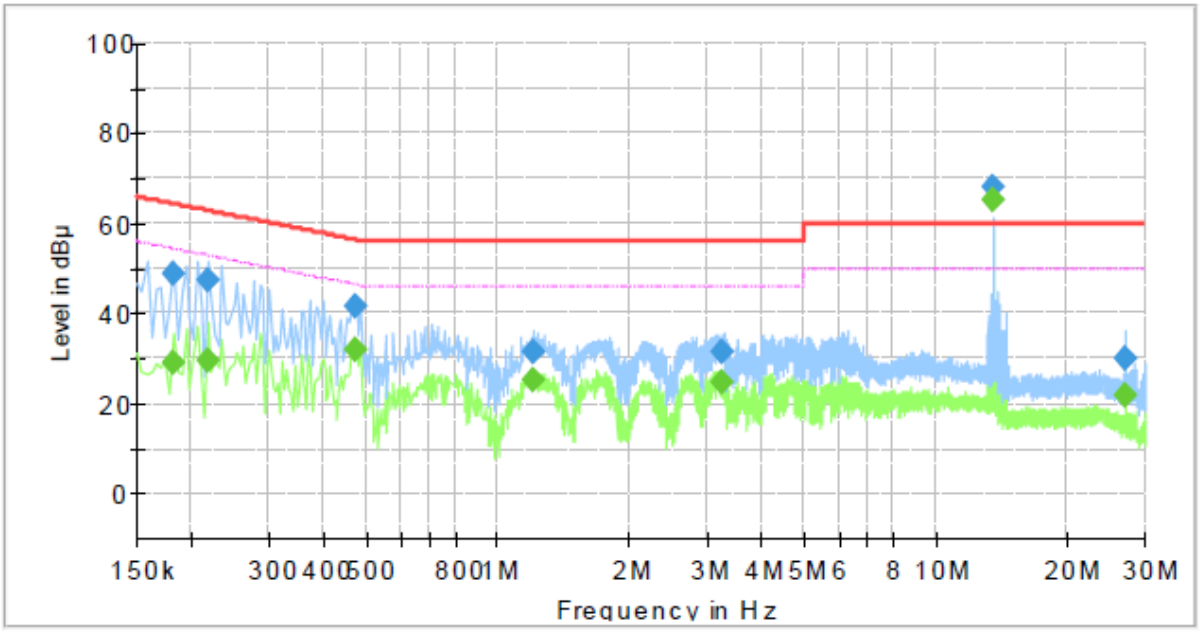
Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.190000	---	34.32	54.04	19.72	1000.0	9.000	L1	19.5
0.190000	48.16	---	64.04	15.88	1000.0	9.000	L1	19.5
0.466000	---	38.13	46.58	8.45	1000.0	9.000	L1	19.6
0.466000	46.46	---	56.58	10.12	1000.0	9.000	L1	19.6
0.470000	---	38.20	46.51	8.31	1000.0	9.000	L1	19.6
0.470000	46.02	---	56.51	10.49	1000.0	9.000	L1	19.6
0.786000	---	28.15	46.00	17.85	1000.0	9.000	L1	19.6
0.786000	36.63	---	56.00	19.37	1000.0	9.000	L1	19.6
1.286000	---	28.13	46.00	17.87	1000.0	9.000	L1	19.6
1.286000	35.68	---	56.00	20.32	1000.0	9.000	L1	19.6
1.718000	---	28.55	46.00	17.45	1000.0	9.000	L1	19.7
1.718000	35.42	---	56.00	20.58	1000.0	9.000	L1	19.7
13.562000	---	66.50	50.00	-16.50	1000.0	9.000	L1	20.6
13.562000	70.84	---	60.00	-10.84	1000.0	9.000	L1	20.6

NEUTRAL LINE

Common Information

Test Description:	Conducted Emission
Model No.:	HFR-4AM
Phase:	N
Mode:	Serial
Operator Name:	KES



Final_Result

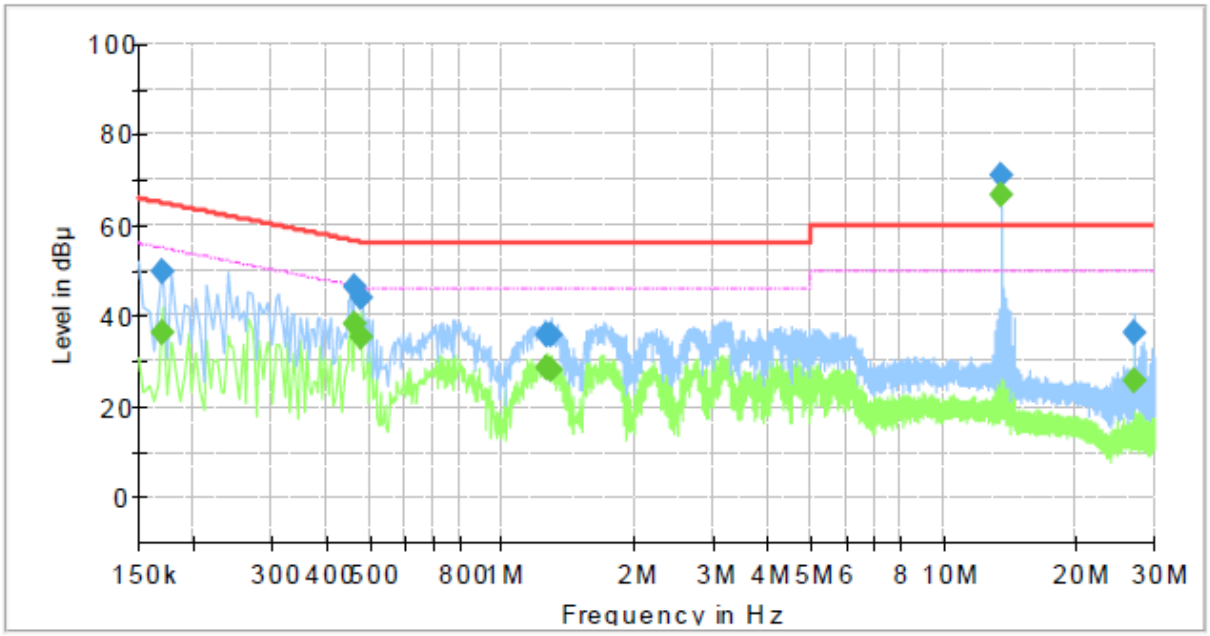
Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.182000	---	29.27	54.39	25.12	1000.0	9.000	N	19.5
0.182000	48.93	---	64.39	15.46	1000.0	9.000	N	19.5
0.218000	---	29.60	52.89	23.29	1000.0	9.000	N	19.5
0.218000	47.50	---	62.89	15.39	1000.0	9.000	N	19.5
0.474000	---	32.21	46.44	14.23	1000.0	9.000	N	19.6
0.474000	41.40	---	56.44	15.04	1000.0	9.000	N	19.6
1.206000	---	25.17	46.00	20.83	1000.0	9.000	N	19.6
1.206000	31.56	---	56.00	24.44	1000.0	9.000	N	19.6
3.258000	---	24.67	46.00	21.33	1000.0	9.000	N	19.8
3.258000	31.29	---	56.00	24.71	1000.0	9.000	N	19.8
13.562000	---	65.18	50.00	-15.18	1000.0	9.000	N	20.6
13.562000	68.18	---	60.00	-8.18	1000.0	9.000	N	20.6
27.126000	---	21.78	50.00	28.22	1000.0	9.000	N	21.3
27.126000	29.87	---	60.00	30.13	1000.0	9.000	N	21.3

■ TCP/IP Mode

HOT LINE

Common Information

Test Description:	Conducted Emission
Model No.:	HFR-4AM
Phase:	L1
Mode:	TCP, IP
Operator Name:	KES



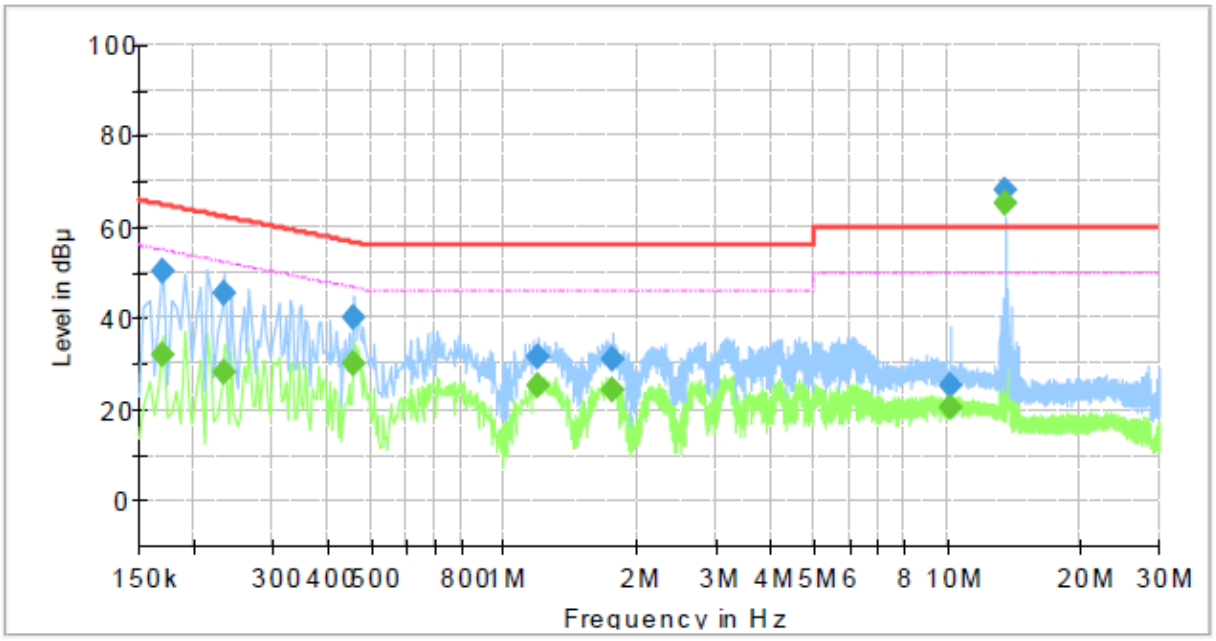
Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.170000	---	36.11	54.96	18.85	1000.0	9.000	L1	19.5
0.170000	49.85	---	64.96	15.11	1000.0	9.000	L1	19.5
0.466000	---	38.31	46.58	8.27	1000.0	9.000	L1	19.6
0.466000	46.49	---	56.58	10.09	1000.0	9.000	L1	19.6
0.478000	---	35.55	46.37	10.82	1000.0	9.000	L1	19.6
0.478000	44.18	---	56.37	12.19	1000.0	9.000	L1	19.6
1.270000	---	28.54	46.00	17.46	1000.0	9.000	L1	19.6
1.270000	35.98	---	56.00	20.02	1000.0	9.000	L1	19.6
1.294000	---	28.10	46.00	17.90	1000.0	9.000	L1	19.6
1.294000	35.69	---	56.00	20.31	1000.0	9.000	L1	19.6
13.562000	---	66.55	50.00	-16.55	1000.0	9.000	L1	20.6
13.562000	70.87	---	60.00	-10.87	1000.0	9.000	L1	20.6
27.122000	---	25.51	50.00	24.49	1000.0	9.000	L1	21.2
27.122000	36.24	---	60.00	23.76	1000.0	9.000	L1	21.2

NEUTRAL LINE

Common Information

Test Description:	Conducted Emission
Model No.:	HFR-4AM
Phase:	N
Mode:	TCP, IP
Operator Name:	KES



Final_Result

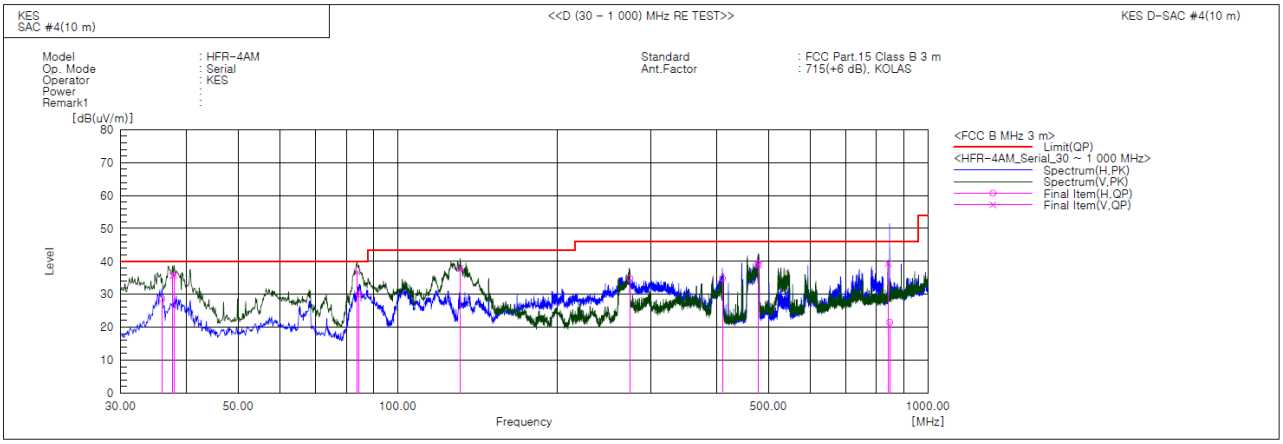
Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.170000	---	31.74	54.96	23.22	1000.0	9.000	N	19.5
0.170000	50.42	---	64.96	14.54	1000.0	9.000	N	19.5
0.234000	---	27.89	52.31	24.42	1000.0	9.000	N	19.5
0.234000	45.25	---	62.31	17.06	1000.0	9.000	N	19.5
0.458000	---	30.26	46.73	16.47	1000.0	9.000	N	19.6
0.458000	40.32	---	56.73	16.41	1000.0	9.000	N	19.6
1.198000	---	25.03	46.00	20.97	1000.0	9.000	N	19.6
1.198000	31.54	---	56.00	24.46	1000.0	9.000	N	19.6
1.762000	---	24.48	46.00	21.52	1000.0	9.000	N	19.7
1.762000	30.86	---	56.00	25.14	1000.0	9.000	N	19.7
10.178000	---	20.61	50.00	29.39	1000.0	9.000	N	20.4
10.178000	25.16	---	60.00	34.84	1000.0	9.000	N	20.4
13.562000	---	65.29	50.00	-15.29	1000.0	9.000	N	20.6
13.562000	68.35	---	60.00	-8.35	1000.0	9.000	N	20.6

♦ Calculation
QuasiPeak[dBuV] / CAverage [dBuV] = Reading Value[dBuV] + Corr. [dB]
QuasiPeak / CAverage : The Final Value
Reading Value : Not shown in the table.
Corr. : Correction values (LISN FACTOR + (Cable Loss + Pulse Limiter FACTOR))

Radiated Electric Field Emissions(Below 1 ㎓)

■ Serial Mode

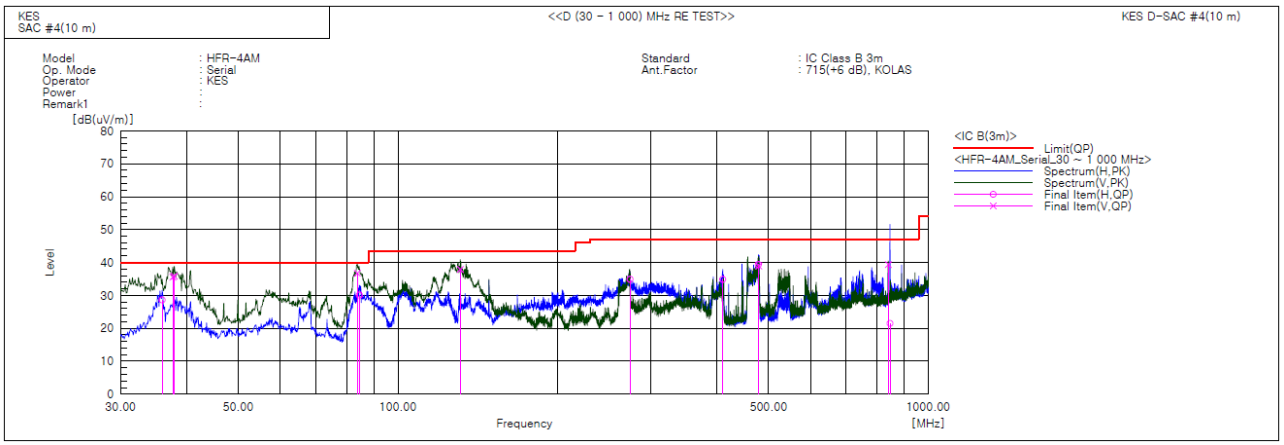
- 47 CFR Part 15, Subpart B



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]	Remark
1	35.941	H	53.4	-24.8	28.6	40.0	11.4	247.0	180.0	
2	37.639	V	59.8	-24.2	35.6	40.0	4.4	100.0	297.0	
3	37.881	V	59.9	-24.1	35.8	40.0	4.2	100.0	259.0	
4	83.835	V	64.1	-27.3	36.8	40.0	3.2	146.0	304.0	
5	84.563	H	57.2	-27.1	30.1	40.0	9.9	228.0	289.0	
6	131.123	V	63.6	-25.7	37.9	43.5	5.6	100.0	83.0	
7	273.955	H	54.2	-19.3	34.9	46.0	11.1	100.0	9.0	
8	409.634	H	49.9	-15.0	34.9	46.0	11.1	400.0	334.0	
9	478.383	H	52.5	-13.1	39.4	46.0	6.6	387.0	187.0	
10	478.989	V	52.0	-13.1	38.9	46.0	7.1	156.0	151.0	
11	840.799	V	45.6	-6.2	39.4	46.0	6.6	100.0	58.0	
12	846.861	H	27.5	-6.0	21.5	46.0	24.5	344.0	300.0	

- IC Regulation ICES-003 Issue 7

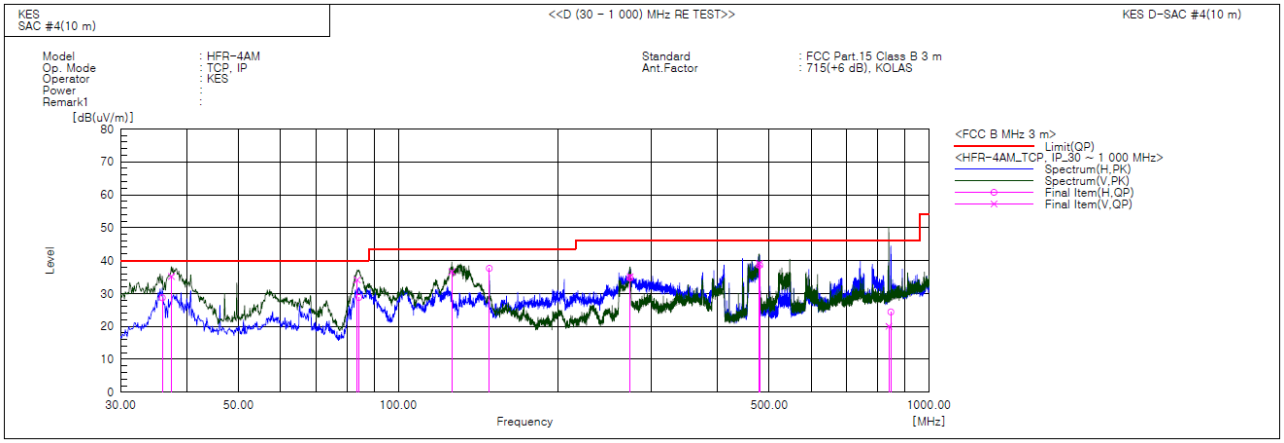


Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]	Remark
1	35.941	H	53.4	-24.8	28.6	40.0	11.4	247.0	180.0	
2	37.639	V	59.8	-24.2	35.6	40.0	4.4	100.0	297.0	
3	37.881	V	59.9	-24.1	35.8	40.0	4.2	100.0	259.0	
4	83.835	V	64.1	-27.3	36.8	40.0	3.2	146.0	304.0	
5	84.563	H	57.2	-27.1	30.1	40.0	9.9	228.0	289.0	
6	131.123	V	63.6	-25.7	37.9	43.5	5.6	100.0	83.0	
7	273.955	H	54.2	-19.3	34.9	47.0	12.1	100.0	9.0	
8	409.634	H	49.9	-15.0	34.9	47.0	12.1	400.0	334.0	
9	478.383	H	52.5	-13.1	39.4	47.0	7.6	387.0	187.0	
10	478.989	V	52.0	-13.1	38.9	47.0	8.1	156.0	151.0	
11	840.799	V	45.6	-6.2	39.4	47.0	7.6	100.0	58.0	
12	846.861	H	27.5	-6.0	21.5	47.0	25.5	344.0	300.0	

■ TCP/IP Mode

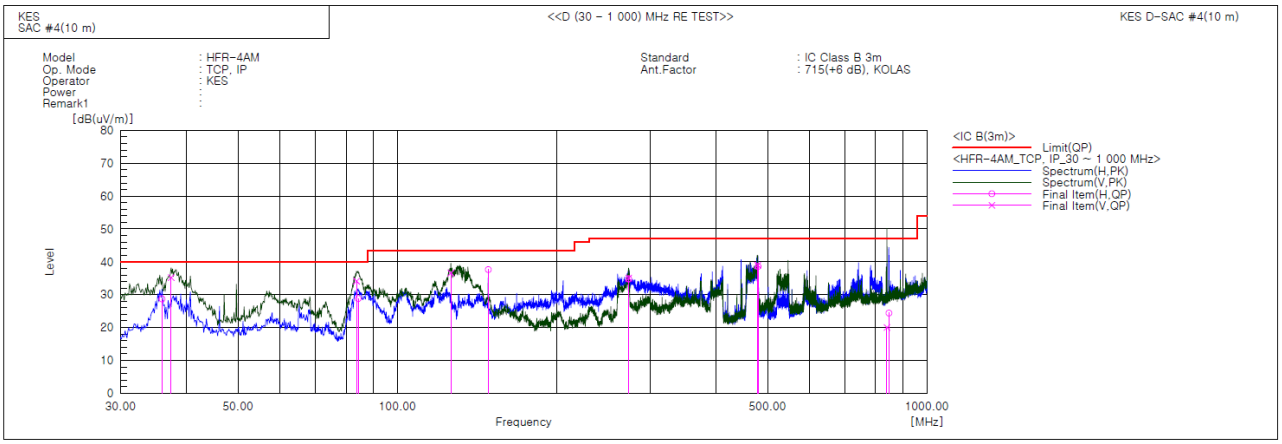
- 47 CFR Part 15, Subpart B



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]	Remark
1	35.941	H	53.5	-24.8	28.7	40.0	11.3	229.0	167.0	
2	37.396	V	59.5	-24.3	35.2	40.0	4.8	185.0	197.0	
3	83.714	V	61.5	-27.4	34.1	40.0	5.9	164.0	320.0	
4	84.320	H	56.0	-27.2	28.8	40.0	11.2	283.0	253.0	
5	126.151	V	61.9	-25.3	36.6	43.5	6.9	148.0	79.0	
6	148.461	H	63.5	-25.9	37.6	43.5	5.9	338.0	23.0	
7	273.349	V	54.4	-19.3	35.1	46.0	10.9	154.0	16.0	
8	273.349	H	54.1	-19.3	34.8	46.0	11.2	143.0	172.0	
9	479.110	V	52.1	-13.1	39.0	46.0	7.0	100.0	215.0	
10	479.838	H	51.6	-13.0	38.6	46.0	7.4	189.0	138.0	
11	840.435	V	26.2	-6.2	20.0	46.0	26.0	146.0	286.0	
12	847.710	H	30.4	-6.0	24.4	46.0	21.6	225.0	253.0	

- IC Regulation ICES-003 Issue 7



Final Result

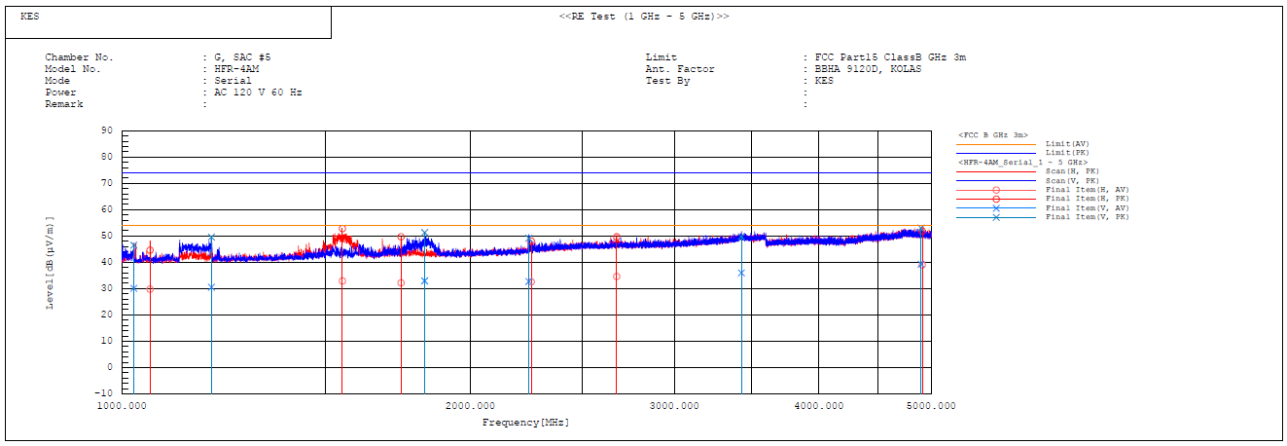
No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]	Remark
1	35.941	H	53.5	-24.8	28.7	40.0	11.3	229.0	167.0	
2	37.396	V	59.5	-24.3	35.2	40.0	4.8	185.0	197.0	
3	83.714	V	61.5	-27.4	34.1	40.0	5.9	164.0	320.0	
4	84.320	H	56.0	-27.2	28.8	40.0	11.2	283.0	253.0	
5	126.151	V	61.9	-25.3	36.6	43.5	6.9	148.0	79.0	
6	148.461	H	63.5	-25.9	37.6	43.5	5.9	338.0	23.0	
7	273.349	V	54.4	-19.3	35.1	47.0	11.9	154.0	16.0	
8	273.349	H	54.1	-19.3	34.8	47.0	12.2	143.0	172.0	
9	479.110	V	52.1	-13.1	39.0	47.0	8.0	100.0	215.0	
10	479.838	H	51.6	-13.0	38.6	47.0	8.4	189.0	138.0	
11	840.435	V	26.2	-6.2	20.0	47.0	27.0	146.0	286.0	
12	847.710	H	30.4	-6.0	24.4	47.0	22.6	225.0	253.0	

♦ Calculation
Result(QP) [dB(μV/m)] = (Reading(QP)[dB(μV)] + c.f[dB(1/m)]
Margin(QP)[dB] = Limit[dB(μV/m)] - Result(QP) [dB(μV/m)]
Reading(QP) : Reading value, Result(QP) : Reading value + Factor value
Limit(QP) : Limit value, c.f : (ANT Factor + Cable Loss - Preamp Factor), Margin: Margin value

Radiated Electric Field Emissions(Above 1 ㎓)

■ Serial Mode

- (1 ~ 5) ㎓

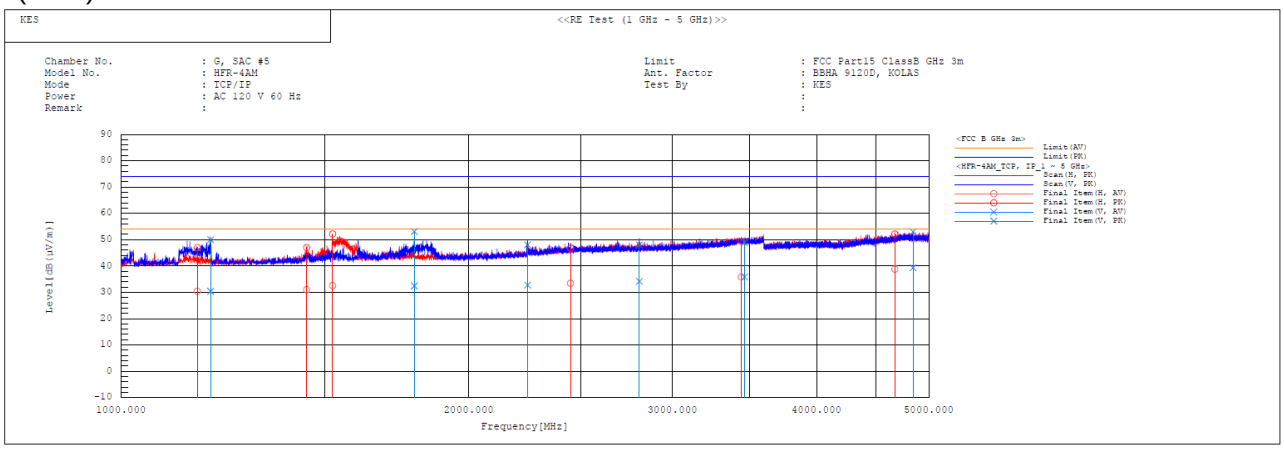


Final Result

No.	Frequency [MHz]	Pol	Reading AV [dB(μV)]	Reading PK [dB(μV)]	c.f [dB(1/m)]	Result AV [dB(μV/m)]	Result PK [dB(μV/m)]	Limit AV [dB(μV/m)]	Limit PK [dB(μV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [deg]	Remark
1	1024.618	V	32.0	48.4	-1.9	30.1	46.5	54.0	74.0	23.9	27.5	100.0	352.8	
2	1058.190	H	31.5	46.3	-1.7	29.8	44.6	54.0	74.0	24.2	29.4	201.0	37.4	
3	1195.426	V	31.4	50.5	-0.9	30.5	49.6	54.0	74.0	23.5	24.4	100.0	312.8	
4	1550.872	H	32.1	52.0	0.8	32.9	52.8	54.0	74.0	21.1	21.2	192.0	339.6	
5	1742.779	H	30.6	48.1	1.6	32.2	49.7	54.0	74.0	21.8	24.3	188.0	358.6	
6	1826.942	V	31.0	49.4	1.9	32.9	51.3	54.0	74.0	21.1	22.7	154.0	6.1	
7	2247.064	V	29.1	45.5	3.6	32.7	49.1	54.0	74.0	21.3	24.9	151.0	309.2	
8	2258.048	H	28.9	44.4	3.7	32.6	48.1	54.0	74.0	21.4	25.9	192.0	22.5	
9	2676.222	H	29.4	44.5	5.2	34.6	49.7	54.0	74.0	19.4	24.3	246.0	355.2	
10	3429.372	V	29.1	42.9	6.9	36.0	49.8	54.0	74.0	18.0	24.2	189.0	0.8	
11	4902.396	V	27.3	41.0	12.0	39.3	53.0	54.0	74.0	14.7	21.0	176.0	236.7	
12	4913.669	H	26.9	39.8	12.1	39.0	51.9	54.0	74.0	15.0	22.1	272.0	260.0	

■ TCP/IP Mode

- (1 ~ 5) GHz



Final Result

No.	Frequency [MHz]	Pol	Reading AV [dB(μV)]	Reading PK [dB(μV)]	c.f [dB(1/m)]	Result AV [dB(μV/m)]	Result PK [dB(μV/m)]	Limit AV [dB(μV/m)]	Limit PK [dB(μV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [deg]	Remark
1	1163.901	H	31.5	48.1	-1.1	30.4	47.0	54.0	74.0	23.6	27.0	145.0	328.2	
2	1195.581	V	31.3	50.9	-0.9	30.4	50.0	54.0	74.0	23.6	24.0	100.0	310.4	
3	1447.550	H	30.7	46.7	0.3	31.0	47.0	54.0	74.0	23.0	27.0	242.0	286.5	
4	1524.243	H	31.9	51.5	0.7	32.6	52.2	54.0	74.0	21.4	21.8	174.0	39.2	
5	1793.649	V	30.6	51.3	1.8	32.4	53.1	54.0	74.0	21.6	20.9	154.0	359.3	
6	2248.053	V	29.1	44.5	3.6	32.7	48.1	54.0	74.0	21.3	25.9	105.0	312.8	
7	2448.440	H	28.9	42.3	4.5	33.4	46.8	54.0	74.0	20.6	27.2	161.0	325.8	
8	2809.343	V	28.5	42.4	5.6	34.1	48.0	54.0	74.0	19.9	26.0	100.0	13.8	
9	3442.189	H	28.9	42.4	6.9	35.8	49.3	54.0	74.0	18.2	24.7	400.0	268.5	
10	3463.227	V	28.9	42.0	6.9	35.8	48.9	54.0	74.0	18.2	25.1	155.0	53.0	
11	4673.566	H	27.9	41.3	10.9	38.8	52.2	54.0	74.0	15.2	21.8	282.0	320.4	
12	4845.959	V	27.5	41.2	11.8	39.3	53.0	54.0	74.0	14.7	21.0	100.0	275.6	

♦ Calculation

Result(PK/CAV) [dB(μV/m)] = (Reading(PK/CAV)[dB(μV)] + c.f[dB(1/m)]

Margin(PK/CAV)[dB] = Limit[dB(μV/m)] - Result(PK/CAV) [dB(μV/m)]

Reading(PK/CAV) : Reading value, Result(PK/CAV) : Reading value + Factor value

Limit(QP) : Limit value, c.f : (ANT Factor + Cable Loss - Preamp Factor), Margin: Margin value