

FCC 47 CFR PART 18

TEST REPORT

Test Report No. : OT-247-RED-087
Reception No. : 2407002314
Applicant : LG Electronics USA, Inc.
Address : 111 Sylvan Avenue, North Building, Englewood Cliffs, New Jersey, 07632, United States
Manufacturer : LG Electronics USA, Inc.
Address : 170, Seongsanpaechong-ro, Seongsan-gu, Changwon-si, Gyeongsangnam-do 51533 Korea
Type of Equipment : HOUSEHOLD ELECTRIC OVEN
Model Name : WCEZ6428S
Multiple Model Name : PT9900SWSS, PT9900SW1SS
FCC ID. : BEJD1724NAGT
Serial number : N/A
Total page of Report : 33 pages (including this page)
Date of Incoming : July 08, 2024
Test Period : July 24, 2024 ~ July 25, 2024
Date of Issuing : July 25, 2024

SUMMARY

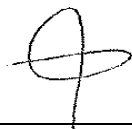
The equipment complies with the requirement of **FCC CFR 47 PART 18**.

This test report contains only the results of a single test of the sample supplied for the examination.

It is not a general valid assessment of the features of the respective products of the mass-production.

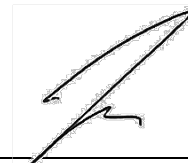
This report is not correlated with the "KS Q ISO/IEC 17025 and KOLAS accreditation" of Korean Laboratory Accreditation Scheme.

Reviewed by:



Sun-Teak, Oh / Senior Project Engineer
 EMC Testing Div.
 ONETECH Corp.

Approved by:



Seung-Hyun, Park / Deputy Chief Engineer
 EMC Testing Div.
 ONETECH Corp.

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Revision History

Rev. No.	Issued Report No.	Issued Date	Revisions	Section Affected
0	OT-247-RED-087	July 25, 2024	Initial Issue	All

* Please contact us (e-mail: info@onetech.co.kr) for verification of this test report.

1. VERIFICATION OF COMPLIANCE

APPLICANT	LG Electronics USA, Inc. 111 Sylvan Avenue, North Building, Englewood Cliffs, New Jersey, 07632, United States
MANUFACTURER	LG Electronics USA, Inc. 170, Seongsanpaechong-ro, Seongsan-gu, Changwon-si, Gyeongsangnam-do 51533 Korea
FACTORY	LG Electronics USA, Inc. 170, Seongsanpaechong-ro, Seongsan-gu, Changwon-si, Gyeongsangnam-do 51533 Korea LG Electronics Tianjin Appliances Co., Ltd (063637) No.9 Jin Wei Road, Beichen District 300402 Tianjin PEOPLE'S REPUBLIC OF CHINA LG Electronics Reynosa S.A. de C.V. Avenida Industrias 180, Fraccionamiento Industrial PIMSA Ote. 66603 Apodaca, Nuevo Leon, MEXICO

E.U.T. DESCRIPTION	HOUSEHOLD ELECTRIC OVEN
MEASUREMENT PROCEDURES	MP-5: 1986
TYPE OF EQUIPMENT TESTED	Pre-Production
KIND OF EQUIPMENT AUTHORIZATION REQUESTED	Certification
STANDARDS	FCC Part 18, Section 18.311
MODIFICATIONS ON THE EQUIPMENT TO ACHIEVE COMPLIANCE	None
FINAL TEST WAS CONDUCTED ON	10 m semi anechoic chamber

ONETECH Corp. tested the above equipment in accordance with the requirements set forth in the above standard. The test results show that equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

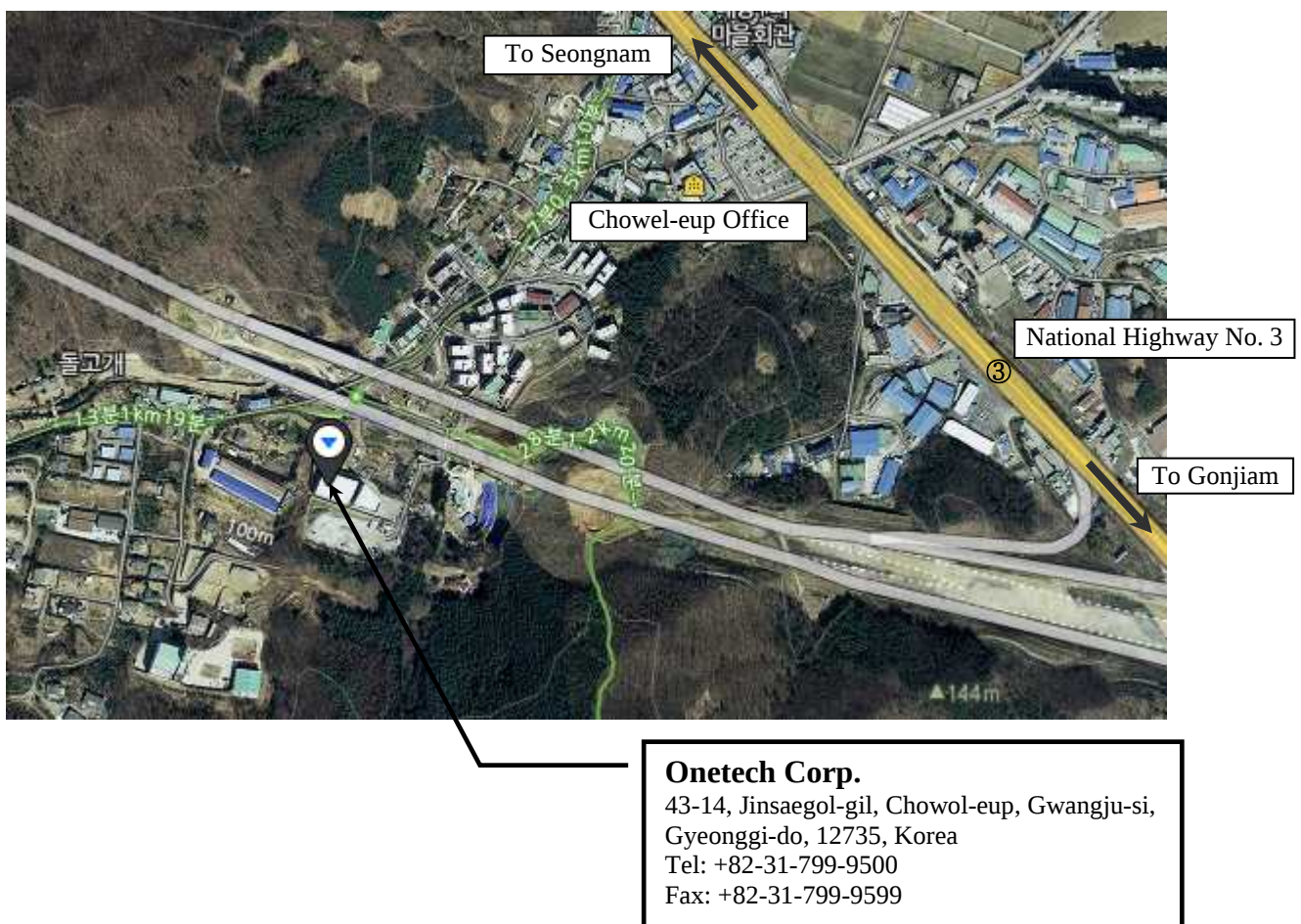
2. TEST FACILITY

The Onetech Corp. has been designated to perform equipment testing in compliance with ISO/IEC 17025 by Radio Research Agency as accreditation body. The Onetech Corp. is accredited for measuring devices subject to Declaration of Conformity (DOC) under Parts 15 & 18 as a Conformity Assessment Body (CAB) with designation number KR0013.

These measurement tests were conducted at Onetech Corp.

The 10 m semi anechoic chamber and conducted measurement facilities are located at

- 1) 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea.
- 2) 12-5, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea.



3. PRODUCT INFORMATION

3.1 Description of EUT

The LG Electronics USA, Inc., Model WCEZ6428S (referred to as the EUT in this report) is a HOUSEHOLD ELECTRIC OVEN.

Product specification described herein was obtained from product data sheet or user's manual.

CHASSIS TYPE	Metal & Plastic
LIST OF EACH OSC. or CRY. FREQ. (FREQ. $\geq$ 1 MHz)	Frequency: 2 400 ~ 2 500 MHz Output Watts: 950 W
NUMBER OF PCB LAYERS	-
P. C. Board name	-
ELECTRICAL RATING	120/240 V, 7.8 kW Or 120/208 V, 6.2 kW/ 60 Hz * microwave and oven
EXTERNAL CONNECTOR	AC IN

3.2 Model Differences

- . WCEZ6428S: Basic model
- . PT9900SWSS, PT9900SW1SS is buyer model name of WCEZ6428S.

3.3 Support Equipment

The model numbers for all the equipment that were used in the tested system is:

Description	Model	Manufacturer	Connected to
HOUSEHOLD ELECTRIC OVEN (EUT)	WCEZ6428S	LG Electronics USA, Inc.	-
Beaker	N/A	N/A	-

3.4 System Configuration

DEVICE TYPE	MODEL/PART NUMBER	MANUFACTURER
HOUSEHOLD ELECTRIC OVEN	WCEZ6428S	LG Electronics USA, Inc.

3.5 System Configuration

Ports Name	Shielded	Ferrite Bead	Metal Shell	Length (m)	Connected to
AC IN	N	N	N	1.5	LISN

3.6 Equipment Modifications

-. None

3.7 Information of Measurement Software

	Chamber name	Software name	Software version
☐ -	Conducted Emission #1	Noise Terminal Voltage Measurement	2.00.0180
☐ -	Conducted Emission #2	EMC32	10.60.10
☒ -	Conducted Emission #3	Noise Terminal Voltage Measurement	2.00.0178
☐ -	Radiated Emission 10 m SAC 1	Radiated Emission Measurement	2.00.0201
☒ -	Radiated Emission 10 m SAC 2*	Radiated Emission Measurement	2.00.0202
☐ -	Radiated Emission 3 m SAC	Radiated Emission Measurement	2.00.0202

*) Measurement distance: 10 m, 3 m

4. DESCRIPTION OF TESTS

4.1 Test Methodology

Both conducted and radiated testing was performed according to the procedures in MP-5: 1986.

Radiated testing was performed at a distance of 10 m from EUT to the antenna.

4.2 Test Condition

The test conditions of the noted test mode(s) in this test report are;

-. Test Voltage / Frequency:

1) AC 208/240 V / 60 Hz

Test Mode		Operating States
1	Microwave mode	After AC power was applied to the EUT, the test was performed by observing the microwave mode operation status through the EUT. Load for power output measurement: 1000 milliliters of water in the beaker located in the center of the oven. Load for all other measurements: 700 milliliters of water, with the beaker located in the center of the oven.

4.3 Conducted Emission

The EUT was placed on non-conductive support 0.1 m above a reference ground plane (RGP) and were put into operation according to the specified operating mode.

The power of EUT is fed through a $50\ \Omega / 50\ \mu\text{H} + 5\ \Omega$ LISN and all support equipment is powered from another LISN. Powers to the LISN are filtered by high-current high insertion loss power line filter.

Sufficient time for EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition.

The RF output of the LISN was connected to the EMI test receiver.

Exploratory measurements were conducted to identify the highest emission by operating the EUT in a range of typical modes of operation, cable positions, system configuration and arrangement.

Based on exploratory measurements, the final measurements were conducted at the worst test conditions.

Exploratory measurements were scanned using Peak mode of EMI Test receiver from 9 kHz to 30 MHz with 20 ms sweep time. The final measurements were measured with Quasi-Peak and CISPR Average mode.

4.4 Radiated Emission

Exploratory Radiated measurements were conducted at the 10 m semi anechoic chamber in order to identify the highest emission by operating the EUT in a range of typical modes of operation, cable positions, system configuration and arrangement.

Based on exploratory measurements, the final measurements were conducted at the worst test conditions.

Final measurements were made at 10 m semi anechoic chamber that complies with CISPR 16/MP-5.

Exploratory measurements were scanned using Peak mode of EMI Test receiver and final measurements were measured with Quasi-Peak mode .

The system was rotated 360°, and the antenna was varied in height between 1.0 m and 4.0 m in order to determine the maximum emission levels. This procedure was performed for both horizontal and vertical polarization of the receiving antenna.

5. FINAL RESULT OF MEASUREMENT

Exploratory measurement was done in normal operation mode. And the final measurement was selected for the maximized emission level.

5.1 Conducted Emission Test

5.1.1 Operating Environment

Temperature : 23.8 °C
Relative humidity : 46.3 % R.H.

5.1.2 Test Setup

The EUT and all local support equipment were placed on non-conductive support 0.1 m above a reference ground plane . The power of EUT was fed through a 50 Ω / 50 μ H + 5 Ω LISN. The ground plane was electrically bonded to the reference ground system and all power lines were filtered from ambient.

5.1.3 Measurement uncertainty

Conducted emission, quasi-peak detection : 1.6 dB
Conducted emission, CISPR-average detection : 1.6 dB

Measurement uncertainty is calculated in accordance with CISPR 16-4-2. The measurement uncertainty is given with a confidence of 95 % with the coverage factor, $k = 2$.

5.1.4 Limit

(A) All other part 18 consumer devices:		
Frequency of Emission (MHz)	Conducted Limit (dB μ V)	
	Quasi-peak	CISPR Average
0.15-0.5	66 to 56*	56 to 46*
0.5 ~ 5	56	46
5 ~ 30	60	50
Note		
(1) The tighter limit applies at the band edges.		
(2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.		

5.1.5 Test Equipment used

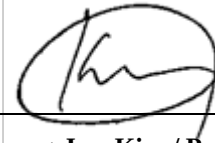
Model Number	Manufacturer	Description	Serial Number	Last Cal. (Interval)
■ - ESCI	Rohde & Schwarz	Test Receiver	101420	Mar. 05, 2024 (1Y)
■ - LT32C/10	Afj Instruments	LISN	32032039322	Mar. 05 2024 (1Y)
□ 3825/2	EMCO	AMN	9109-1867	Mar. 05, 2024 (1Y)
■ - VTSD 9561-F	Schwarzbeck	Pulse Limiter	01365	Nov. 23, 2023 (1Y)

All test equipment used is calibrated on a regular basis.

5.1.6 Test Data

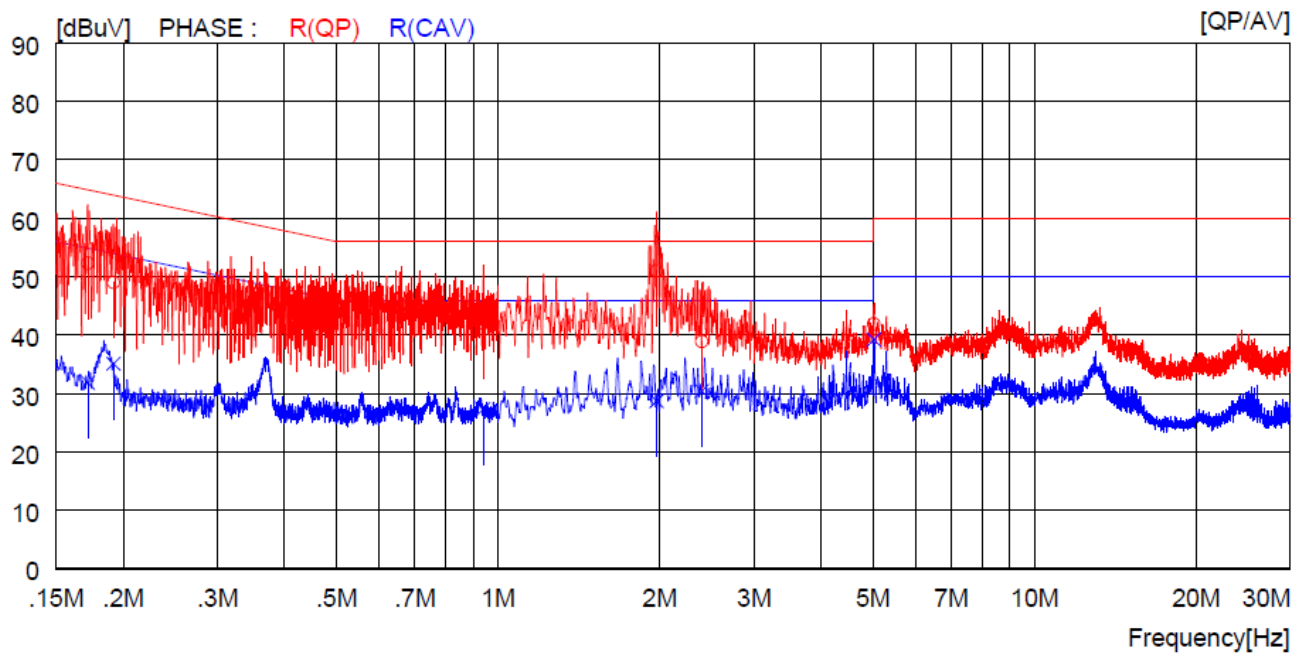
5.1.6.1 Operating Condition: AC 208 / 60 Hz

-. Test Result : Pass



Tested by: Young-Jae, Kim / Project Engineer

Microwave mode			
Frequency range	: 150 kHz ~ 30 MHz	Test Date	: July 24, 2024
Resolution bandwidth	: 9 kHz	Tested Line	: R

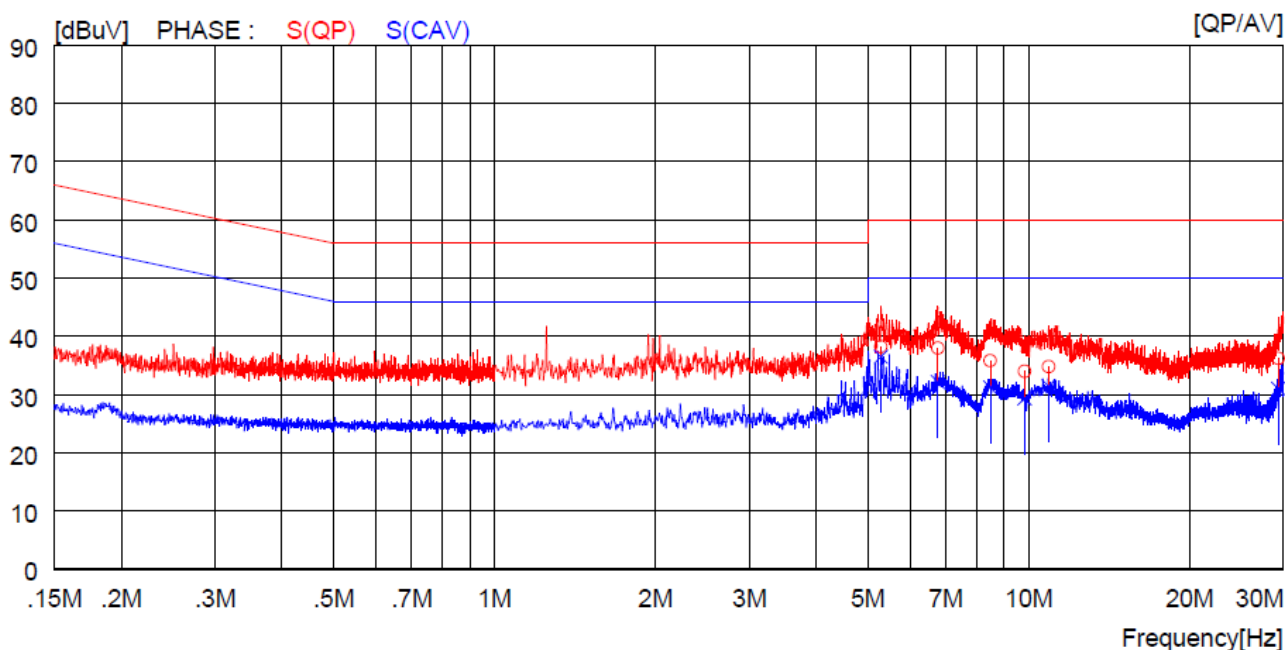


NO	FREQ [MHz]	READING		C. FACTOR [dB]	RESULT		LIMIT		MARGIN		PHASE
		QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	
1	1.97600	29.5	----	21.5	51.0	----	56.0	----	5.0	----	R (QP)
2	0.17200	30.8	----	21.5	52.3	----	64.9	----	12.6	----	R (QP)
3	0.19200	27.5	----	21.5	49.0	----	63.9	----	14.9	----	R (QP)
4	0.93900	20.5	----	21.5	42.0	----	56.0	----	14.0	----	R (QP)
5	2.40000	17.4	----	21.5	38.9	----	56.0	----	17.1	----	R (QP)
6	5.02000	20.4	----	21.5	41.9	----	60.0	----	18.1	----	R (QP)
7	1.97600	----	7.2	21.5	----	28.7	----	46.0	----	17.3	R (CAV)
8	0.17200	----	10.3	21.5	----	31.8	----	54.9	----	23.1	R (CAV)
9	0.19200	----	13.6	21.5	----	35.1	----	53.9	----	18.8	R (CAV)
10	0.93900	----	5.8	21.5	----	27.3	----	46.0	----	18.7	R (CAV)
11	2.40000	----	8.9	21.5	----	30.4	----	46.0	----	15.6	R (CAV)
12	5.02000	----	17.7	21.5	----	39.2	----	50.0	----	10.8	R (CAV)

Remark: Margin (dB) = Limit – Level (Result)

The result level in above table is included the transducer factor that means insertion loss (AMN), cable loss and attenuator.

Microwave mode			
Frequency range	: 150 kHz ~ 30 MHz	Test Date	: July 24, 2024
Resolution bandwidth	: 9 kHz	Tested Line	: S

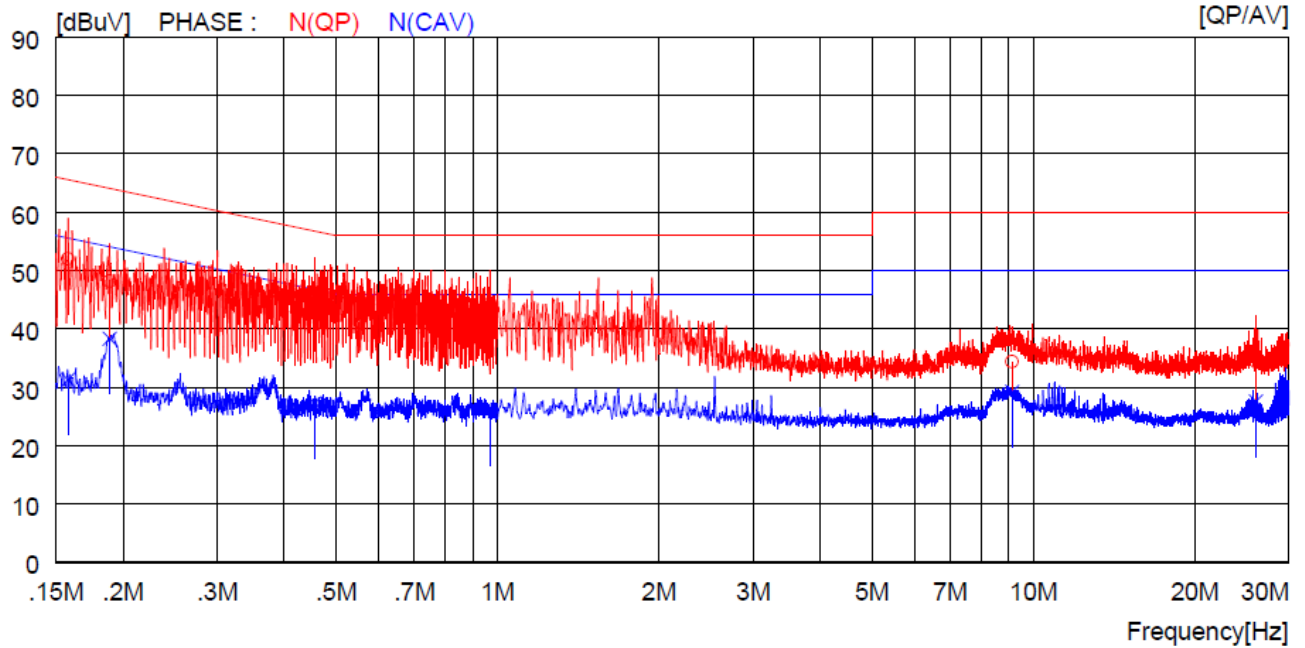


NO	FREQ [MHz]	READING		C. FACTOR [dB]	RESULT		LIMIT		MARGIN		PHASE
		QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	
1	5.29500	16.7	----	21.5	38.2	----	60.0	----	21.8	----	S (QP)
2	6.76500	16.5	----	21.5	38.0	----	60.0	----	22.0	----	S (QP)
3	8.48500	14.3	----	21.5	35.8	----	60.0	----	24.2	----	S (QP)
4	9.83500	12.5	----	21.5	34.0	----	60.0	----	26.0	----	S (QP)
5	10.91000	13.3	----	21.5	34.8	----	60.0	----	25.2	----	S (QP)
6	29.37000	14.9	----	21.3	36.2	----	60.0	----	23.8	----	S (QP)
7	5.29500	----	15.0	21.5	----	36.5	----	50.0	----	13.5	S (CAV)
8	6.76500	----	10.6	21.5	----	32.1	----	50.0	----	17.9	S (CAV)
9	8.48500	----	9.7	21.5	----	31.2	----	50.0	----	18.8	S (CAV)
10	9.83500	----	7.8	21.5	----	29.3	----	50.0	----	20.7	S (CAV)
11	10.91000	----	9.9	21.5	----	31.4	----	50.0	----	18.6	S (CAV)
12	29.37000	----	9.7	21.3	----	31.0	----	50.0	----	19.0	S (CAV)

Remark: Margin (dB) = Limit – Level (Result)

The result level in above table is included the transducer factor that means insertion loss (AMN), cable loss and attenuator.

Microwave mode			
Frequency range	: 150 kHz ~ 30 MHz	Test Date	: July 24, 2024
Resolution bandwidth	: 9 kHz	Tested Line	: N



NO	FREQ [MHz]	READING		C. FACTOR [dB]	RESULT		LIMIT		MARGIN		PHASE
		QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	
1	0.15800	30.5	----	21.5	52.0	----	65.6	----	13.6	----	N (QP)
2	0.18900	26.7	----	21.5	48.2	----	64.1	----	15.9	----	N (QP)
3	0.45600	24.7	----	21.5	46.2	----	56.8	----	10.6	----	N (QP)
4	0.96900	22.7	----	21.5	44.2	----	56.0	----	11.8	----	N (QP)
5	9.14000	12.9	----	21.5	34.4	----	60.0	----	25.6	----	N (QP)
6	26.03000	13.0	----	21.4	34.4	----	60.0	----	25.6	----	N (QP)
7	0.15800	----	9.8	21.5	----	31.3	----	55.6	----	24.3	N (CAV)
8	0.18900	----	16.8	21.5	----	38.3	----	54.1	----	15.8	N (CAV)
9	0.45600	----	5.8	21.5	----	27.3	----	46.8	----	19.5	N (CAV)
10	0.96900	----	4.5	21.5	----	26.0	----	46.0	----	20.0	N (CAV)
11	9.14000	----	7.7	21.5	----	29.2	----	50.0	----	20.8	N (CAV)
12	26.03000	----	6.2	21.4	----	27.6	----	50.0	----	22.4	N (CAV)

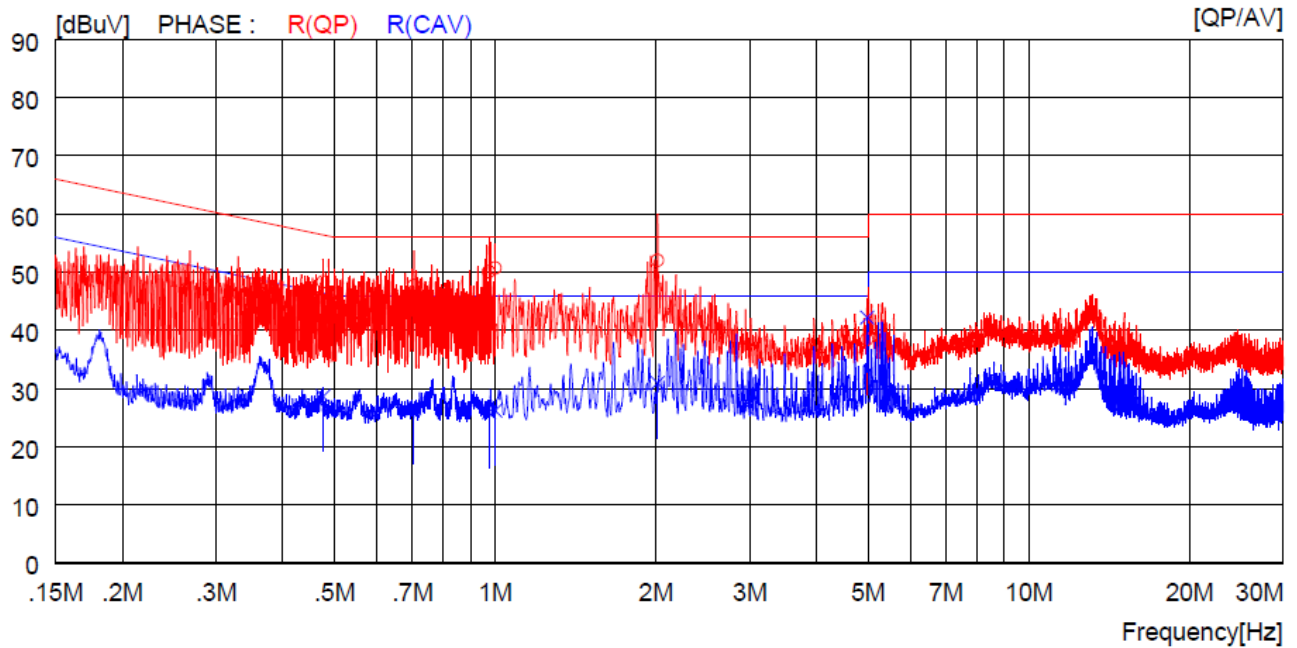
Remark: Margin (dB) = Limit – Level (Result)

The result level in above table is included the transducer factor that means insertion loss (AMN), cable loss and attenuator.

5.1.6.2 Operating Condition: AC 240 V / 60 Hz

-. Test Result : Pass

Microwave mode			
Frequency range	: 150 kHz ~ 30 MHz	Test Date	: July 24, 2024
Resolution bandwidth	: 9 kHz	Tested Line	: R

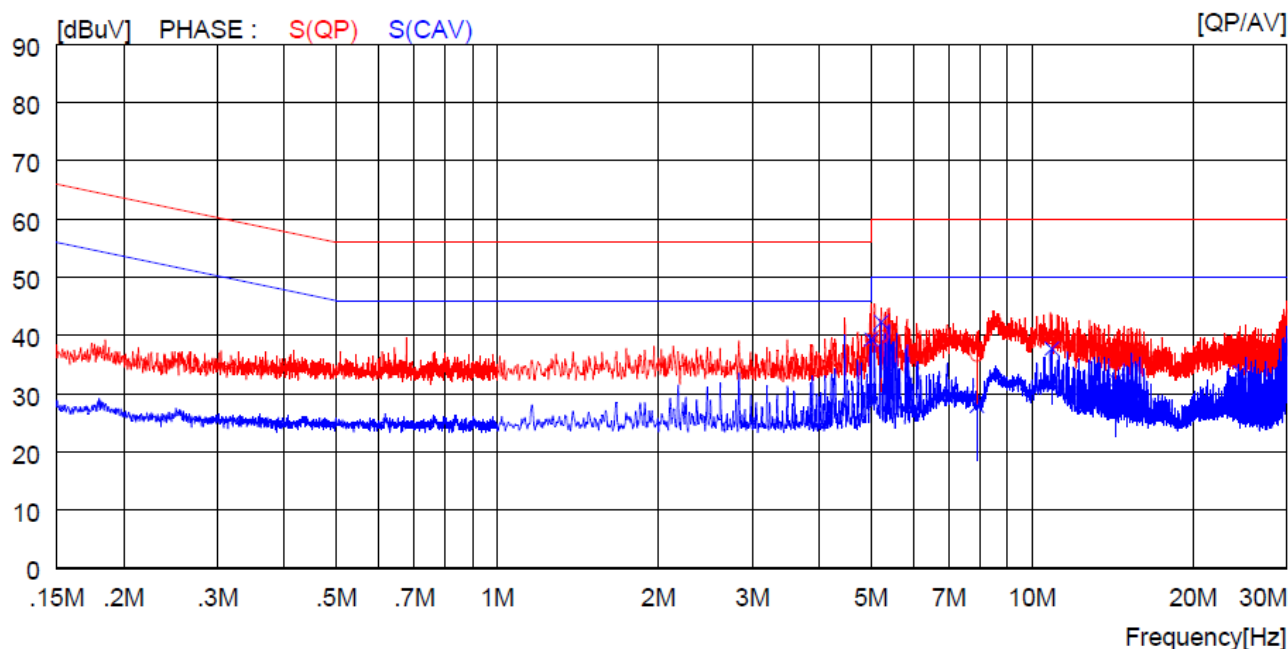


NO	FREQ [MHz]	READING		C. FACTOR [dB]	RESULT		LIMIT		MARGIN		PHASE
		QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	
1	0.47600	26.8	----	21.5	48.3	----	56.4	----	8.1	----	R (QP)
2	0.70500	26.2	----	21.5	47.7	----	56.0	----	8.3	----	R (QP)
3	0.97400	28.6	----	21.5	50.1	----	56.0	----	5.9	----	R (QP)
4	1.00000	29.2	----	21.5	50.7	----	56.0	----	5.3	----	R (QP)
5	2.01600	30.5	----	21.5	52.0	----	56.0	----	4.0	----	R (QP)
6	4.98000	16.9	----	21.5	38.4	----	56.0	----	17.6	----	R (QP)
7	0.47600	----	7.1	21.5	----	28.6	----	46.4	----	17.8	R (CAV)
8	0.70500	----	5.1	21.5	----	26.6	----	46.0	----	19.4	R (CAV)
9	0.97400	----	4.4	21.5	----	25.9	----	46.0	----	20.1	R (CAV)
10	1.00000	----	4.7	21.5	----	26.2	----	46.0	----	19.8	R (CAV)
11	2.01600	----	9.4	21.5	----	30.9	----	46.0	----	15.1	R (CAV)
12	4.98000	----	20.7	21.5	----	42.2	----	46.0	----	3.8	R (CAV)

Remark: Margin (dB) = Limit – Level (Result)

The result level in above table is included the transducer factor that means insertion loss (AMN), cable loss and attenuator.

Microwave mode			
Frequency range	: 150 kHz ~ 30 MHz	Test Date	: July 24, 2024
Resolution bandwidth	: 9 kHz	Tested Line	: S

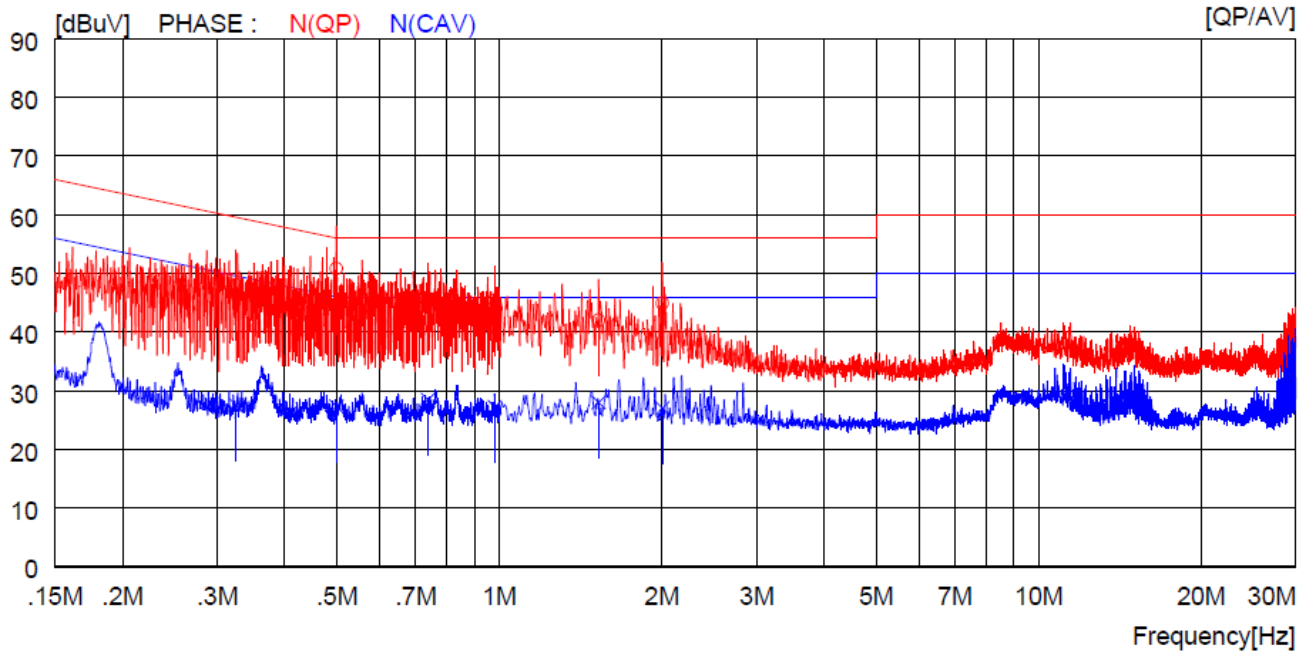


NO	FREQ [MHz]	READING		C.FACTOR [dB]	RESULT		LIMIT		MARGIN		PHASE
		QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	
1	5.01000	17.9	----	21.5	39.4	----	60.0	----	20.6	----	S (QP)
2	5.23000	18.3	----	21.5	39.8	----	60.0	----	20.2	----	S (QP)
3	7.90000	15.1	----	21.5	36.6	----	60.0	----	23.4	----	S (QP)
4	10.90000	18.1	----	21.5	39.6	----	60.0	----	20.4	----	S (QP)
5	14.35000	13.9	----	21.4	35.3	----	60.0	----	24.7	----	S (QP)
6	24.52000	16.3	----	21.3	37.6	----	60.0	----	22.4	----	S (QP)
7	5.01000	----	17.8	21.5	----	39.3	----	50.0	----	10.7	S (CAV)
8	5.23000	----	20.8	21.5	----	42.3	----	50.0	----	7.7	S (CAV)
9	7.90000	----	6.4	21.5	----	27.9	----	50.0	----	22.1	S (CAV)
10	10.90000	----	16.2	21.5	----	37.7	----	50.0	----	12.3	S (CAV)
11	14.35000	----	10.8	21.4	----	32.2	----	50.0	----	17.8	S (CAV)
12	24.52000	----	12.3	21.3	----	33.6	----	50.0	----	16.4	S (CAV)

Remark: Margin (dB) = Limit – Level (Result)

The result level in above table is included the transducer factor that means insertion loss (AMN), cable loss and attenuator.

Microwave mode			
Frequency range	: 150 kHz ~ 30 MHz	Test Date	: July 24, 2024
Resolution bandwidth	: 9 kHz	Tested Line	: N



NO	FREQ [MHz]	READING		C. FACTOR [dB]	RESULT		LIMIT		MARGIN		PHASE
		QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	
1	0.32500	26.5	----	21.5	48.0	----	59.6	----	11.6	----	N (QP)
2	0.49900	29.3	----	21.5	50.8	----	56.0	----	5.2	----	N (QP)
3	0.73800	24.1	----	21.5	45.6	----	56.0	----	10.4	----	N (QP)
4	0.98100	23.9	----	21.5	45.4	----	56.0	----	10.6	----	N (QP)
5	1.52800	20.5	----	21.5	42.0	----	56.0	----	14.0	----	N (QP)
6	2.00800	23.4	----	21.5	44.9	----	56.0	----	11.1	----	N (QP)
7	0.32500	----	6.0	21.5	----	27.5	----	49.6	----	22.1	N (CAV)
8	0.49900	----	5.8	21.5	----	27.3	----	46.0	----	18.7	N (CAV)
9	0.73800	----	6.9	21.5	----	28.4	----	46.0	----	17.6	N (CAV)
10	0.98100	----	5.7	21.5	----	27.2	----	46.0	----	18.8	N (CAV)
11	1.52800	----	6.5	21.5	----	28.0	----	46.0	----	18.0	N (CAV)
12	2.00800	----	5.5	21.5	----	27.0	----	46.0	----	19.0	N (CAV)

Remark: Margin (dB) = Limit – Level (Result)

The result level in above table is included the transducer factor that means insertion loss (AMN), cable loss and attenuator.

5.2 Radiated Emission Test

5.2.1 Operating Environment

Temperature : 24.1 °C
Relative humidity : 48.5 % R.H.

5.2.2 Test Setup

The radiated emissions measurements were on the 10 m semi anechoic chamber. The EUT and all local support equipment were placed on non-conductive support 0.1 m above a reference ground plane.

The frequency spectrum of 9 kHz to 30 MHz, 30 MHz to 1 000 MHz, 1 GHz to 25 GHz was scanned and the maximum emission level of each frequency was recorded. The maximum emission level was determined by rotating the system 360° and changing the height of the antenna between 1.0m and 4.0m, and the height of the loop antenna was set to 2m. This procedure was performed for both horizontal and vertical polarization of the receiving antenna.

5.2.3 Measurement uncertainty

Radiated emission electric field intensity, 9 kHz ~ 30 MHz : 4.7dB

Radiated emission electric field intensity, 30 MHz ~ 1 000 MHz : 4.7dB

Radiated emission electric field intensity, 1 000 MHz ~ 6 000 MHz : 6.1dB

Radiated emission electric field intensity, 6 000 MHz ~ 25 000 MHz : 6.1 dB

Measurement uncertainty is calculated in accordance with CISPR 16-4-2. The measurement uncertainty is given with a confidence of 95 % with the coverage factor, $k = 2$.

5.2.4 Limit

Equipment	Operating frequency	RF Power generated by equipment (watts)	Field strength limit (uV/m)	Distance (meters)
Any type unless otherwise specified (miscellaneous)	Any ISM frequency	Below 500 500 or more	25 25 × SQRT(power/500)	300 300 ¹⁾
	Any non-ISM frequency	Below 500 500 or more	15 15 × SQRT(power/500)	300 300 ¹⁾
1) Field strength may not exceed 10 μV/m at 1600 meters. Consumer equipment operating below 1000 MHz is not permitted the increase in field strength otherwise permitted here for power over 500 watts.				

Note 1: Limit $3m(dB\mu V/m) = 20\log(25 \times \text{SQRT}(\text{power}/500))(dB\mu V/m) + 40\log(300m/3m)$ (Below 30 MHz)

$$= 29.5(dB\mu V/m) + 80.0(dB\mu V/m) = 109.5(dB\mu V/m)$$

Note 2: Limit $3m(dB\mu V/m) = 20\log(25 \times \text{SQRT}(\text{power}/500))(dB\mu V/m) + 20\log(300m/3m)$ (Above 30 MHz)

$$= 29.5(dB\mu V/m) + 40.0(dB\mu V/m) = 69.5(dB\mu V/m)$$

ISM frequency	Tolerance
6.78 MHz	± 15.0 kHz
13.56 MHz	± 7.0 kHz
27.12 MHz	± 163.0 kHz
40.68 MHz	± 20.0 kHz
915 MHz	± 13.0 MHz
2450 MHz	± 50.0 MHz
5800 MHz	± 75.0 MHz
24.125 GHz	± 125.0 MHz
61.25 GHz	± 250.0 MHz
122.50 GHz	± 500.0 MHz
245.00 GHz	± 1.0 GHz

5.2.5 Test Equipment used

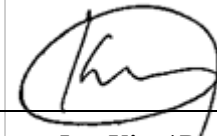
	Model Number	Manufacturer	Description	Serial Number	Last Cal. (Interval)
■ -	ESW 44	Rohde & Schwarz	EMI Test Receiver	101851	Mar. 06, 2024 (1Y)
■ -	VULB9163	Schwarzbeck	Trilog Broadband Antenna	9163-225	Sep. 14, 2022 (2Y)
■ -	8447D	Hewlett Packard	Amplifier	2944A07777	Mar. 06, 2024 (1Y)
■ -	CO3000	Innco Systems GmbH	Controller	CO3000/1015	N/A
■ -	DT5000	Innco Systems GmbH	Turn Table	N/A	N/A
■ -	MA4000-EP	Innco Systems GmbH	Antenna Master	MA4000/508	N/A
■ -	HLA 6121	TESEQ	Loop Antenna	50841	Apr. 27, 2024 (2Y)
■ -	MA-4640-XPET	Innco Systems GmbH	Antenna Master	MA4640/592/40700517	N/A
■ -	3115	ETS-LINDGREN	Horn Antenna	34823	Aug. 14, 2023 (1Y)
■ -	SAS-574	A.H. System	Horn Antenna	676	Oct. 19, 2023 (1Y)
■ -	PAM-118A	Com-Power	Preamplifier	18040081	Oct. 16, 2023 (1Y)
■ -	PAM-840A	Com-Power	Preamplifier	461339	Oct. 16, 2023 (1Y)
■ -	WT-A3882-R10	Microwave	Cavity Band Rejection Filter	WT22040502-1	Jan. 16, 2024 (1Y)

All test equipment used is calibrated on a regular basis.

5.2.6 Test Data

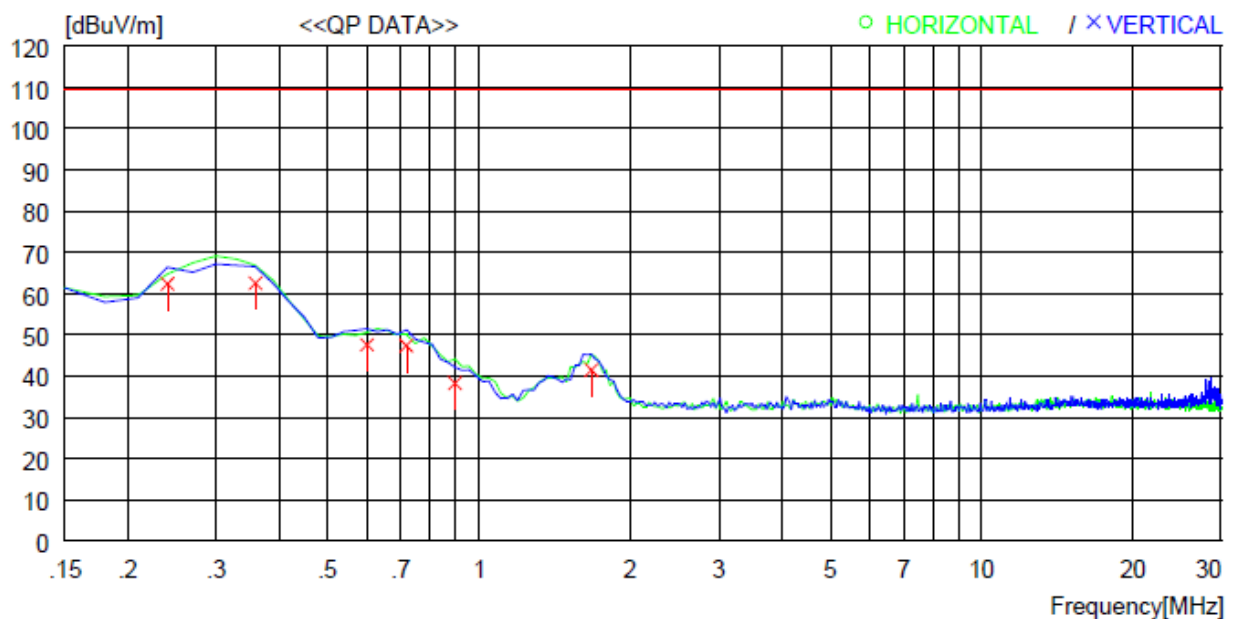
5.2.6.1 Operating Condition: AC 208 V / 60 Hz

-. Test Result : Pass



Tested by: Young-Jae, Kim / Project Engineer

Microwave mode			
Frequency range	: 150 kHz ~ 30 MHz	Test Date	: July 24, 2024
Resolution bandwidth	: 9 kHz	Measurement distance	: 3 m
Detector Mode	: Quasi Peak		



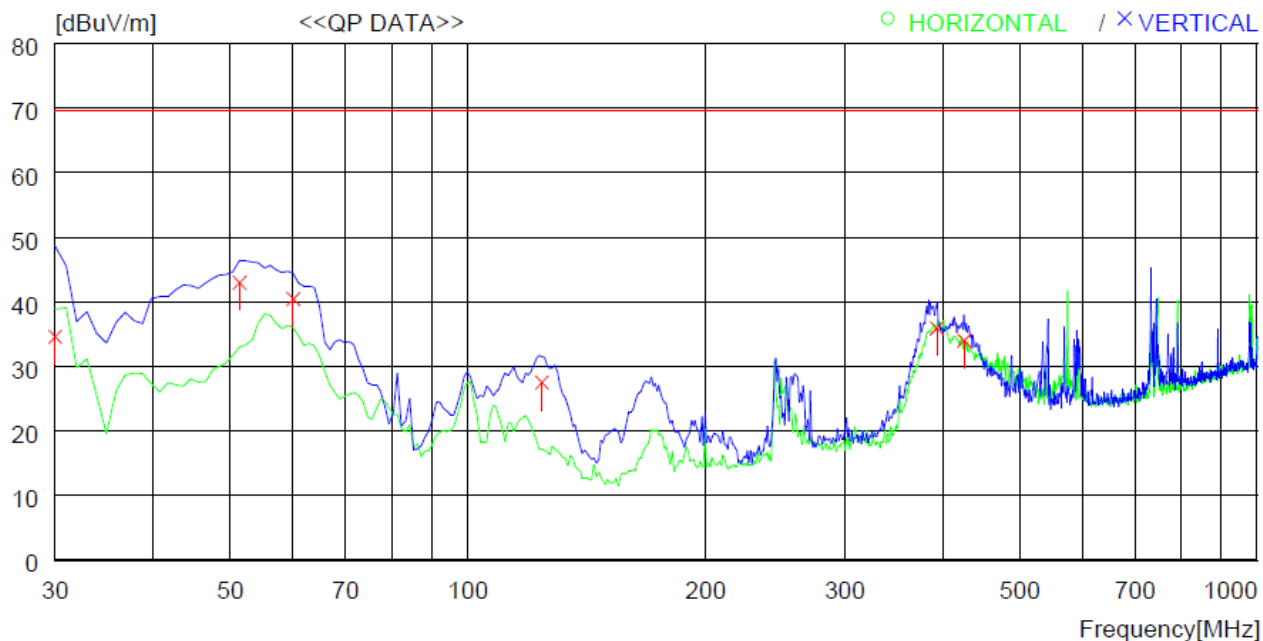
No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Vertical -----										
1	0.240	42.1	20.0	0.3	0.0	62.4	109.5	47.1	100	300
2	0.359	42.2	19.9	0.4	0.0	62.5	109.5	47.0	100	0
3	0.598	27.1	20.0	0.5	0.0	47.6	109.5	61.9	100	21
4	0.717	26.8	20.0	0.5	0.0	47.3	109.5	62.2	100	0
5	0.896	17.6	20.0	0.6	0.0	38.2	109.5	71.3	100	21
6	1.672	20.9	19.9	0.6	0.0	41.4	109.5	68.1	100	275

Remark: Margin (dB) = Limit – Result

Result = Reading Quasi-Peak + Antenna Factor + Loss – Gain

Loss and Gain in above table means Cable Loss and Pre-amplifier gain.

Microwave mode			
Frequency range	: 30 MHz ~ 1 000 MHz	Test Date	: July 24, 2024
Resolution bandwidth	: 120 kHz	Measurement distance	: 3 m
Detector Mode	: Quasi-Peak		



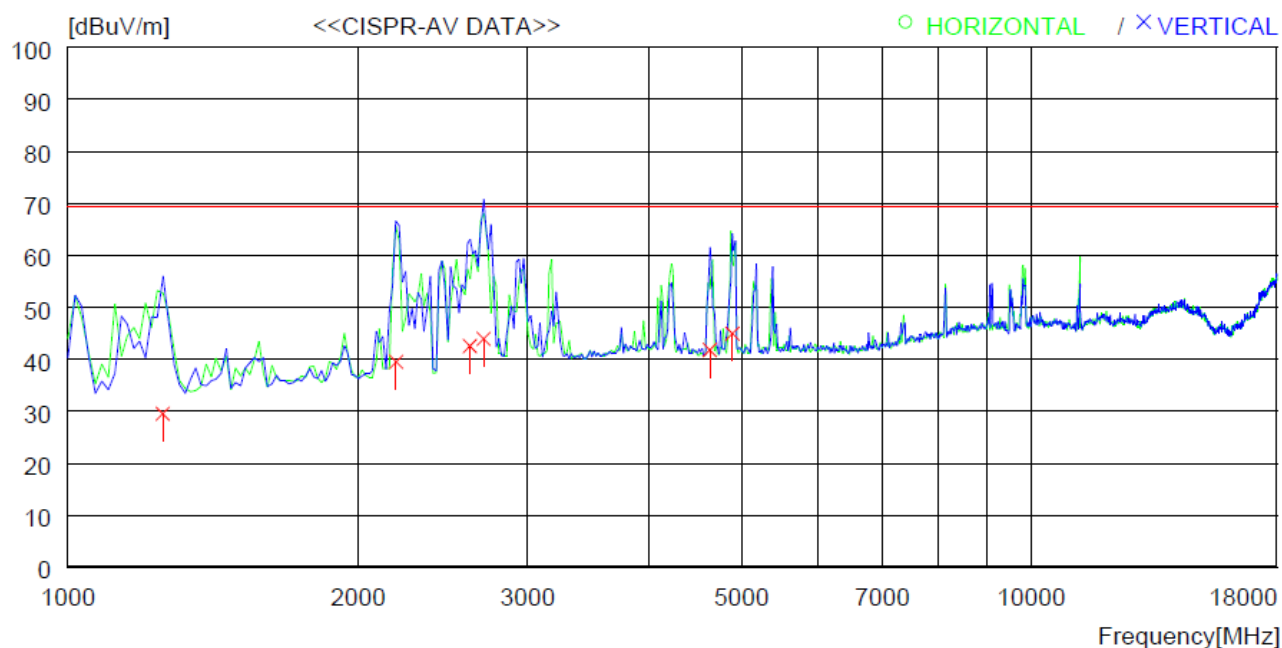
No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA TABLE [cm]	TABLE [DEG]
----- Vertical -----										
1	30.000	48.2	12.2	2.5	28.3	34.6	69.5	34.9	100	353
2	51.340	54.2	13.8	3.2	28.2	43.0	69.5	26.5	100	359
3	60.070	52.1	13.2	3.4	28.2	40.5	69.5	29.0	100	359
4	124.090	41.0	9.7	4.7	27.9	27.5	69.5	42.0	100	38
5	392.780	39.2	15.8	8.9	28.0	35.9	69.5	33.6	100	38
6	424.791	36.6	16.3	9.2	28.1	34.0	69.5	35.5	200	35

Remark: Margin (dB) = Limit – Result

Result = Reading Quasi-Peak + Antenna Factor + Loss – Gain

Loss and Gain in above table means Cable Loss and Pre-amplifier gain.

Microwave mode			
Frequency range	: 1 GHz ~ 18 GHz	Test Date	: July 24, 2024
Resolution bandwidth	: 1 MHz	Measurement distance	: 3 m
Detector Mode	: CISPR-Average		



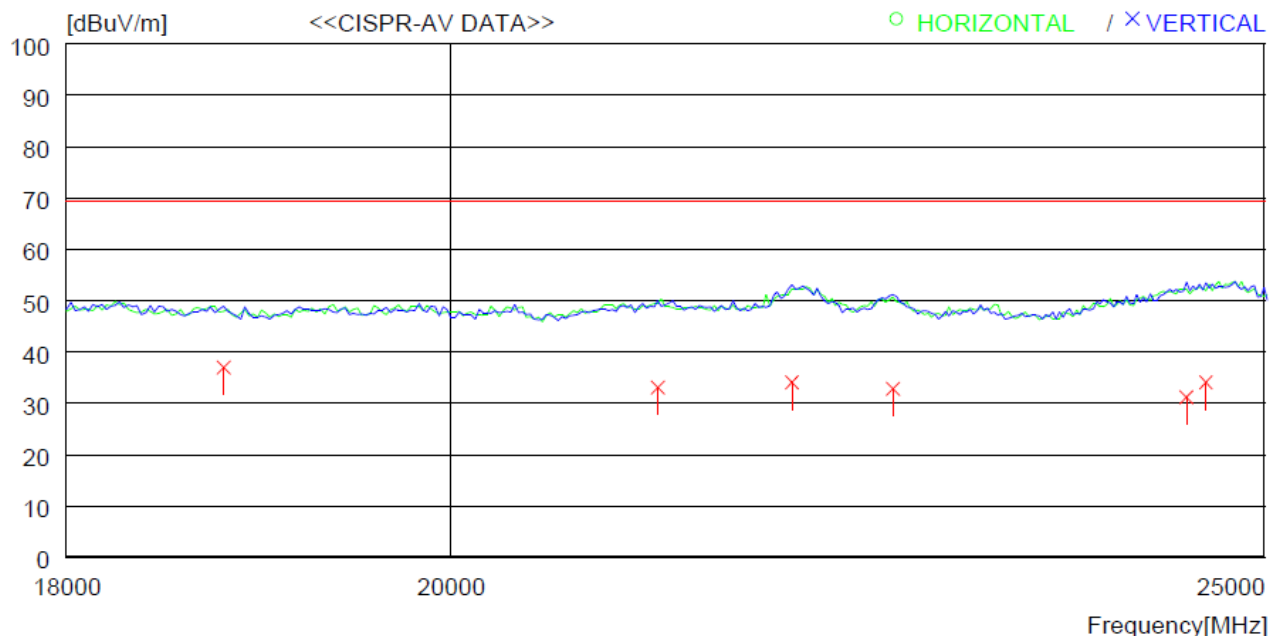
No.	FREQ	READING	ANT	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE
	[MHz]	AV	FACTOR							
		[dBuV]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[DEG]
----- Vertical -----										
1	1255.240	42.5	24.7	1.5	39.2	29.5	69.5	40.0	100	150
2	2190.480	49.2	27.8	2.1	39.6	39.5	69.5	30.0	100	0
3	2615.186	51.2	28.8	2.2	39.7	42.5	69.5	27.0	100	140
4	2700.584	52.3	29.0	2.3	39.7	43.9	69.5	25.6	100	0
5	4638.985	46.2	32.7	3.1	40.2	41.8	69.5	27.7	100	119
6	4893.445	48.8	33.1	3.2	40.2	44.9	69.5	24.6	100	150

Remark: Margin (dB) = Limit – Result

Result = Reading CISPR-Average + Antenna Factor + Loss – Gain

Loss and Gain in above table means Cable Loss and Pre-amplifier gain.

Microwave mode			
Frequency range	: 18 GHz ~ 25 GHz	Test Date	: July 24, 2024
Resolution bandwidth	: 1 MHz	Measurement distance	: 3 m
Detector Mode	: CISPR-Average		



No.	FREQ	READING	ANT	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE
	[MHz]	[dBuV]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[DEG]
----- Vertical -----										
1	18792.230	26.2	40.3	10.3	39.9	36.9	69.5	32.6	100	134
2	21168.480	22.3	40.3	11.9	41.5	33.0	69.5	36.5	100	245
3	21960.330	24.2	40.3	11.5	42.0	34.0	69.5	35.5	100	237
4	22576.180	23.8	40.1	11.0	42.1	32.8	69.5	36.7	100	303
5	24468.450	21.1	40.2	11.8	42.0	31.1	69.5	38.4	100	278
6	24600.150	24.0	40.2	11.8	42.0	34.0	69.5	35.5	100	303

Remark: Margin (dB) = Limit – Result

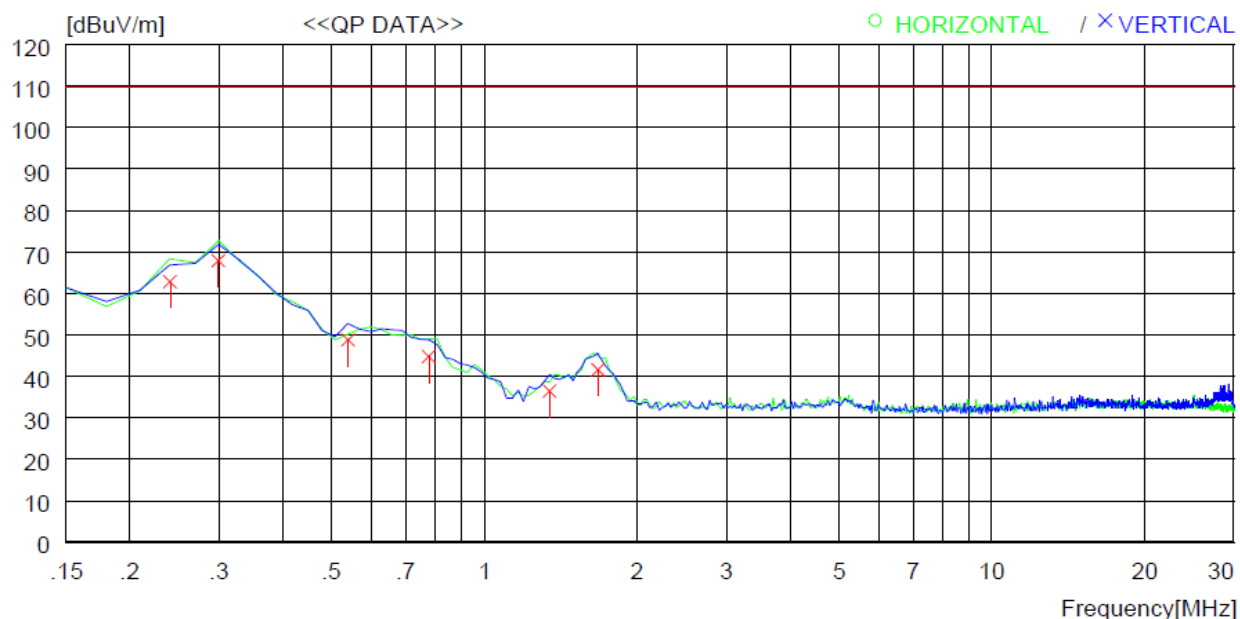
Result = Reading CISPR-Average + Antenna Factor + Loss – Gain

Loss and Gain in above table means Cable Loss and Pre-amplifier gain.

5.2.6.2 Operating Condition: AC 240 V / 60 Hz

-. Test Result : Pass

Microwave mode			
Frequency range	: 150 kHz ~ 30 MHz	Test Date	: July 24, 2024
Resolution bandwidth	: 9 kHz	Measurement distance	: 3 m
Detector Mode	: Quasi-Peak		



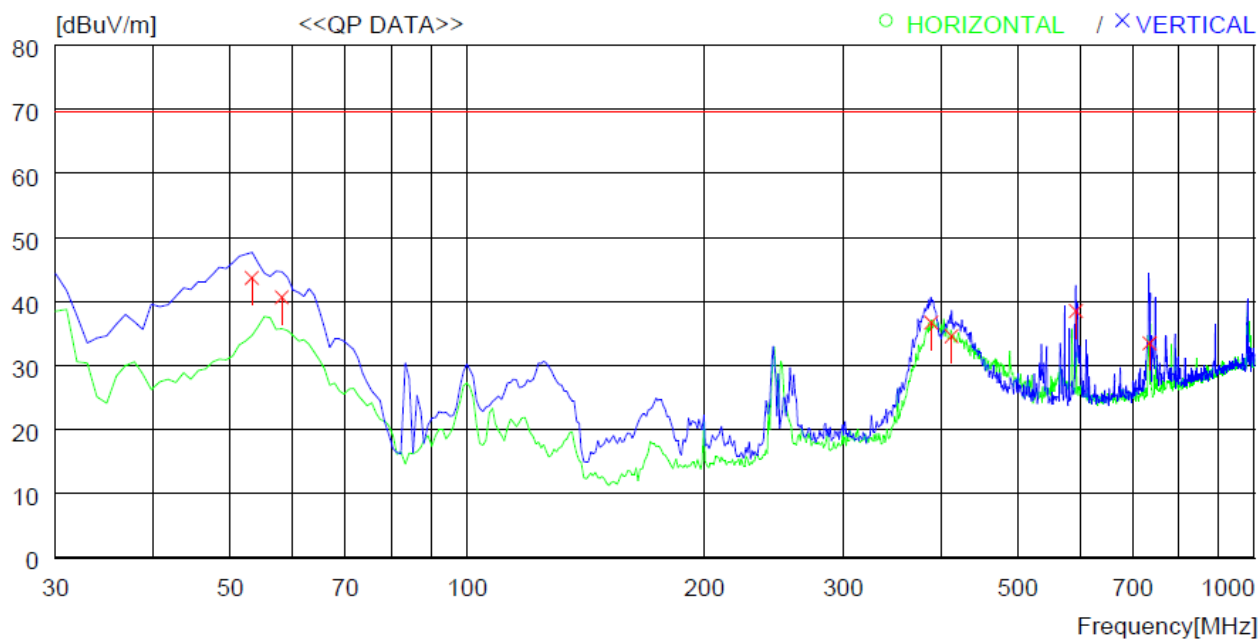
No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Vertical -----										
1	0.240	42.5	20.0	0.3	0.0	62.8	109.5	46.7	100	102
2	0.299	47.6	19.9	0.4	0.0	67.9	109.5	41.6	100	153
3	0.538	28.3	20.0	0.5	0.0	48.8	109.5	60.7	100	0
4	0.777	24.2	20.0	0.6	0.0	44.8	109.5	64.7	100	0
5	1.344	15.9	20.0	0.6	0.0	36.5	109.5	73.0	100	108
6	1.672	21.1	19.9	0.6	0.0	41.6	109.5	67.9	100	118

Remark: Margin (dB) = Limit – Result

Result = Reading Quasi-Peak + Antenna Factor + Loss – Gain

Loss and Gain in above table means Cable Loss and Pre-amplifier gain.

Microwave mode			
Frequency range	: 30 MHz ~ 1 000 MHz	Test Date	: July 24, 2024
Resolution bandwidth	: 120 kHz	Measurement distance	: 3 m
Detector Mode	: Quasi-Peak		



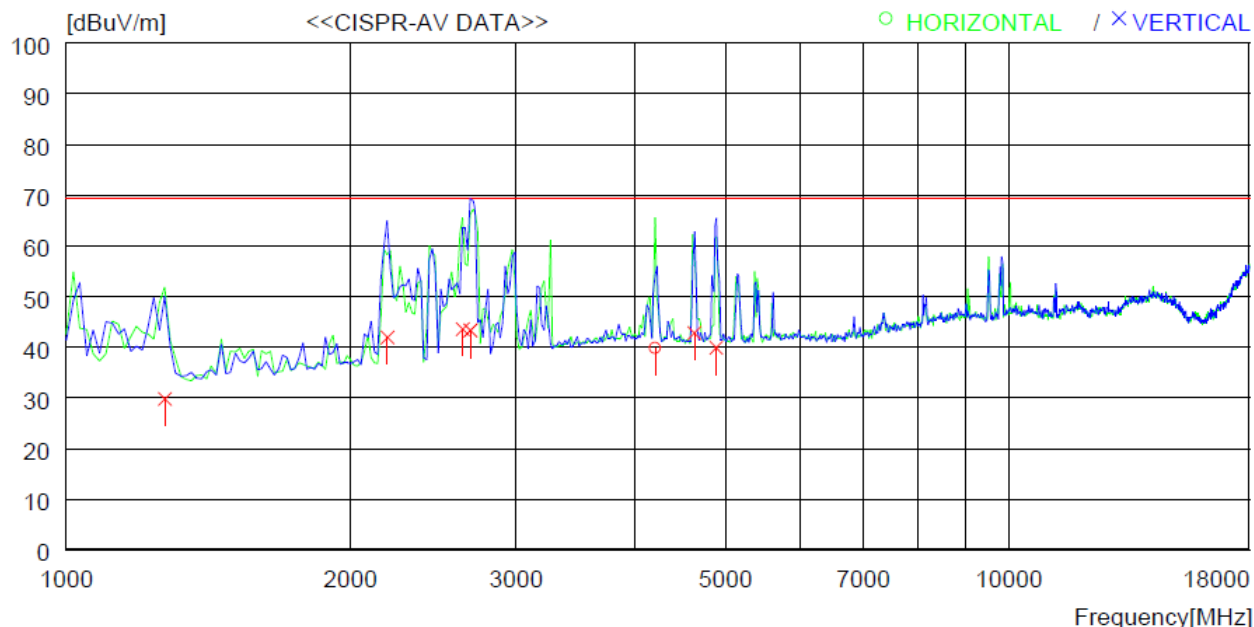
No.	FREQ	READING	ANT	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE
	[MHz]	QP	FACTOR	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[DEG]
----- Vertical -----										
1	53.280	55.0	13.7	3.2	28.2	43.7	69.5	25.8	100	5
2	58.130	52.2	13.3	3.4	28.2	40.7	69.5	28.8	100	359
3	387.930	40.1	15.7	8.8	27.9	36.7	69.5	32.8	100	40
4	412.181	37.4	16.2	9.1	28.1	34.6	69.5	34.9	200	18
5	592.598	36.6	19.0	11.4	28.5	38.5	69.5	31.0	100	0
6	735.184	29.5	19.9	12.3	28.2	33.5	69.5	36.0	100	0

Remark: Margin (dB) = Limit – Result

Result = Reading Quasi-Peak + Antenna Factor + Loss – Gain

Loss and Gain in above table means Cable Loss and Pre-amplifier gain.

Microwave mode			
Frequency range	: 1 GHz ~ 18 GHz	Test Date	: July 24, 2024
Resolution bandwidth	: 1 MHz	Measurement distance	: 3 m
Detector Mode	: CISPR-Average		



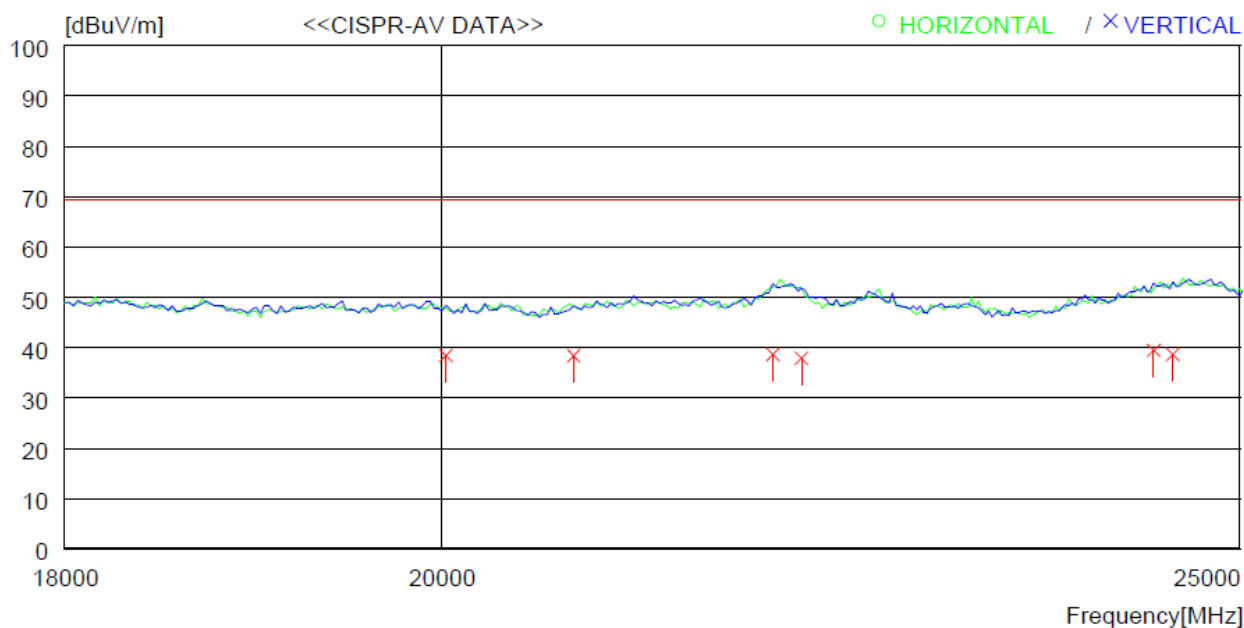
No.	FREQ	READING	ANT	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE
	[MHz]	AV	FACTOR	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[DEG]
---- Horizontal ----										
1	4213.323	44.5	32.5	2.9	40.1	39.8	69.5	29.7	100	149
---- Vertical ----										
2	1272.323	42.8	24.7	1.5	39.2	29.8	69.5	39.7	100	359
3	2190.425	51.6	27.8	2.1	39.6	41.9	69.5	27.6	100	359
4	2632.538	52.2	28.8	2.2	39.7	43.5	69.5	26.0	100	359
5	2683.470	51.7	29.0	2.2	39.7	43.2	69.5	26.3	100	116
6	4638.020	47.2	32.6	3.1	40.2	42.7	69.5	26.8	100	151
7	4893.115	43.8	33.1	3.2	40.2	39.9	69.5	29.6	100	359

Remark: Margin (dB) = Limit – Result

Result = Reading CISPR-Average + Antenna Factor + Loss – Gain

Loss and Gain in above table means Cable Loss and Pre-amplifier gain.

Microwave mode			
Frequency range	: 18 GHz ~ 25 GHz	Test Date	: July 24, 2024
Resolution bandwidth	: 1 MHz	Measurement distance	: 3 m
Detector Mode	: CISPR-Average		



No.	FREQ	READING	ANT	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE
	[MHz]	[dBuV]	FACTOR	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[DEG]
---- Vertical ----										
1	20024.240	28.1	40.3	11.0	41.0	38.4	69.5	31.1	100	342
2	20750.350	27.9	40.3	11.5	41.4	38.3	69.5	31.2	100	342
3	21938.420	28.9	40.3	11.4	42.0	38.6	69.5	30.9	100	282
4	22114.550	28.1	40.3	11.4	42.0	37.8	69.5	31.7	100	342
5	24402.240	29.4	40.2	11.8	42.0	39.4	69.5	30.1	100	241
6	24534.180	28.6	40.2	11.8	42.0	38.6	69.5	30.9	100	138

Remark: Margin (dB) = Limit – Result

Result = Reading CISPR-Average + Antenna Factor + Loss – Gain

Loss and Gain in above table means Cable Loss and Pre-amplifier gain.

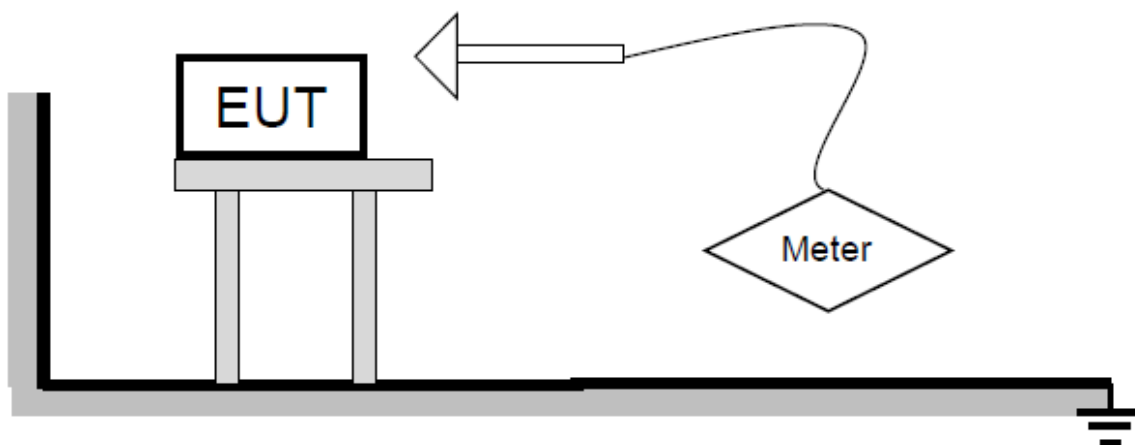
5.3 Radiation Hazard

5.3.1 Operating Environment

Temperature : 23.7 °C
Relative humidity : 51.3 % R.H.

5.3.2 Test Setup

The EUT was set-up according to the FCC MP-5 and FCC Part 18 for Radiation Hazard Measurement. The measurement was using a microwave leakage meter to measure the Radiation leakage in the as-received condition with the oven door closed. A 1000ml water load in a beaker was located in the center of the oven and the Multi-Microwave Oven was set to maximum power. While the oven operating, the microwave meter will check the leakage and then record the maximum leakage.



5.3.3 Limit

Maximum Emission, mW/cm ²
1.0

5.3.4 Test Data

Conditon	Maximum Emission, mW/cm ²
A	0.16
B	0.11
C	0.19
D	0.12
E	0.13
F	0.17
G	0.15
M. UNCERTAINTY	0.0002

5.4 Operating Frequency

5.4.1 Operating Environment

Temperature : 23.8 °C
Relative humidity : 46.3 % R.H.

5.4.2 Test Setup

-. FREQUENCY FOR NORMAL VOLTAGE

The operating frequency was measured using a spectrum analyzer. Starting with the EUT at room temperature, a 1000mL water load was placed in the center of the oven and the oven was operated at maximum output power. The fundamental operating frequency was monitored until the water load was reduced to 20 percent of the original load.

-. FREQUENCY FOR LINE VOLTAGE

The EUT was operated / warmed by at least 10 minutes of use with a 1000 mL water load at room temperature at the beginning of the test. Then the operating frequency was monitored as the input voltage was varied between 80 and 125 percent of the nominal rating.

5.4.3 Limit

ISM frequency	Tolerance
6.78 MHz	±15.0 kHz
13.56 MHz	±7.0 kHz
27.12 MHz	±163.0 kHz
40.68 MHz	±20.0 kHz
915 MHz	±13.0 MHz
2,450 MHz	±50.0 MHz
5,800 MHz	±75.0 MHz
24,125 MHz	±125.0 MHz
61.25 GHz	±250.0 MHz
122.50 GHz	±500.0 MHz
245.00 GHz	±1.0 GHz

5.4.4 Test Data

Item	START Frequency (MHz)	STOP Frequency (MHz)	Detector
FREQUENCY FOR NORMAL VOLTAGE	2400.0	2500.0	Peak
FREQUENCY LINE NORMAL VOLTAGE	2401.2	2465.3	Peak

5.5 RF Output Power Measurement

5.5.1 Operating Environment

Temperature : 24.3 °C
Relative humidity : 52.4 % R.H.

5.5.2 Test Procedure

Formula :

$$P = \frac{4.2 \times m_w (T_2 - T_1) + 0.9 \times m_c (T_2 - T_0)}{t}$$

NOTE :

P is the microwave power output, in watts

m_w is the mass of the water, in grams

m_c is the mass of the container, in grams

T₀ is the ambient temperature, in degrees Celsius

T₁ is the initial temperature of the water, in degrees Celsius

T₂ is the final temperature of the water, in degrees Celsius

t is the heating time, in seconds, excluding the magnetron filament heating-up time.

5.5.3 Test Data

Mass of water (g)	Mass of the container (g)	Ambient temperature (°C)	Initial temperature (°C)	Final temperature (°C)	Heating time (s)	Power output (watts)	Power input (watts)	Limit (watts)
1000	872	25.6	19.0	37.2	120	712.8	1635	1650

* only microwave

6. SAMPLE CALCULATIONS

$$\text{dB}\mu\text{V} = 20 \text{ Log}_{10} (\mu\text{V})$$

$$\text{Margin} = \text{Limit} - \text{Result}$$

-. Example 1: 4.98000 MHz

Limit	= 46.0 dB μ V (CISPR-Average)
Reading	= 20.7 dB μ V
Correction Factor	= Cable Loss + Pulse Limiter
	= 21.5 dB
Total	= 42.2 dB μ V
Margin	= 46.0 dB μ V – 42.2 dB μ V
	= 3.8 dB

-. Example 2: 4893.445 MHz

Limit	= 69.5 dB μ V/m (CISPR-Average)
Reading	= 48.8 dB μ V
Correction Factor	= Antenna Factor (33.1 dB/m) + Cable Loss (3.2 dB) - Amp. Gain (40.2 dB)
	= -3.9 dB
Total	= 44.9 dB μ V/m
Margin	= 69.5 dB μ V/m – 44.9 dB μ V/m
	= 24.6 dB