

EVALUATION REPORT

for Certification of Conformity

Applicant: LG Electronics USA.

111 Sylvan Avenue,

Englewood Cliffs New Jersey United States 07632,

Attn: Sung Soo Kim / Director

Date of Issue: Dec. 02, 2021

Order Number: GETEC-C1-21-668

Test Report Number: GETEC-E3-21-054

Test Site: GUMI UNIVERSITY EMC CENTER

CAB Designation Number: KR0033

FCC ID. : BEJD1724NAD

Applicant : LG Electronics USA.

Test Method	: FCC/OET MP-5
Equipment Class	: Industrial, Scientific, and Medical equipment
EUT Type	: Household Electric Oven
Type of Authority	: Certification
Model Name	: WCES6428F
Trade Name	: LG

This equipment has been shown to be in compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in FCC/OET MP-5 (1986)

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the vest of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

Tested by,



Sang Hyun Park, Senior Engineer
GUMI UNIVERSITY EMC CENTER

Reviewed by,



Hyoung Seop Kim, Technical Manager
GUMI UNIVERSITY EMC CENTER



Revision History

Date	Report No.	Comment	Note.
2021-12-02	GETEC-E3-21-054	Initial	





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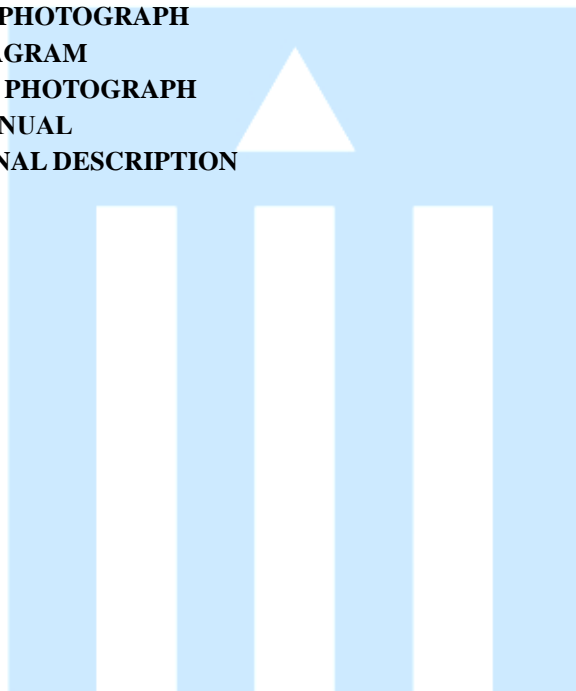
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Scope: Measurement and determination of electromagnetic emissions (EME) of radio frequency devices including intentional and / or unintentional radiators for compliance with technical rules and regulations of the Federal Communications Commission.

1. General Information

Applicant: LG Electronics USA.

**Applicant Address: 111 Sylan Avenue,
Englewood Cliffs New Jersey United States 07632**

Manufacturer: LG Electronics Inc.

**Manufacturer Address: 170, Sungsanpaechong-ro, Seongsan-gu, Changwon-si,
Gyeongsangnam-di, 51533, Korea**

Contact Person: Sung Yun Ye / Senior Research Engineer

Telephone Number: +82-55-260-3966

● FCC ID	BEJD1724NAD
● EUT Type	Household Electric Oven
● Equipment Class	Industrial, Scientific, and Medical equipment
● Model Name	WCES6428F
● Trade Name	LG
● Serial Number	Prototype
● Rule Part(s)	FCC Part 18
● Type of Authority	Certification
● Test Procedure(s)	MP-5 (1986)
● Dates of Test	Nov. 19, 2021 ~ Nov. 25, 2021
● Place of Test	GUMI UNIVERSITY EMC CENTER (FCC Test Firm Registration Number: 269701) 37 Yaeun-ro, Gumi-si, Gyeongsangbuk-do, 39213, Republic of Korea.
● Test Report Number	GETEC-E3-21-054
● Date of Issue	Dec. 02, 2021



2. Introduction

The measurement procedure described in FCC methods of measurements of radio noise emissions from industrial, scientific, and medical equipment (MP-5: 1986) was used in determining radiated and conducted emissions emanating from **LG Electronics USA. Household Electric Oven (Model Name: WCES6428F)**

These measurement tests were conducted at **GUMI UNIVERSITY EMC CENTER**

The site address is 37 Yaeun-ro, Gumi-si, Gyeongsangbuk-do, 39213, Republic of Korea.

This test site is one of the highest point of Gumi UNIVERSITY at about 200 km away from Seoul city and 40 km away from Daegu city. It is located in the valley surrounded by mountains in all directions where ambient radio signal conditions are quiet and a favorable area to measure the radio frequency interference on open field test site for the computing and ISM devices manufactures. The detailed description of the measurement facility was found to be in compliance with the requirements of §2.948 according to ANSI C63.4 (2014)

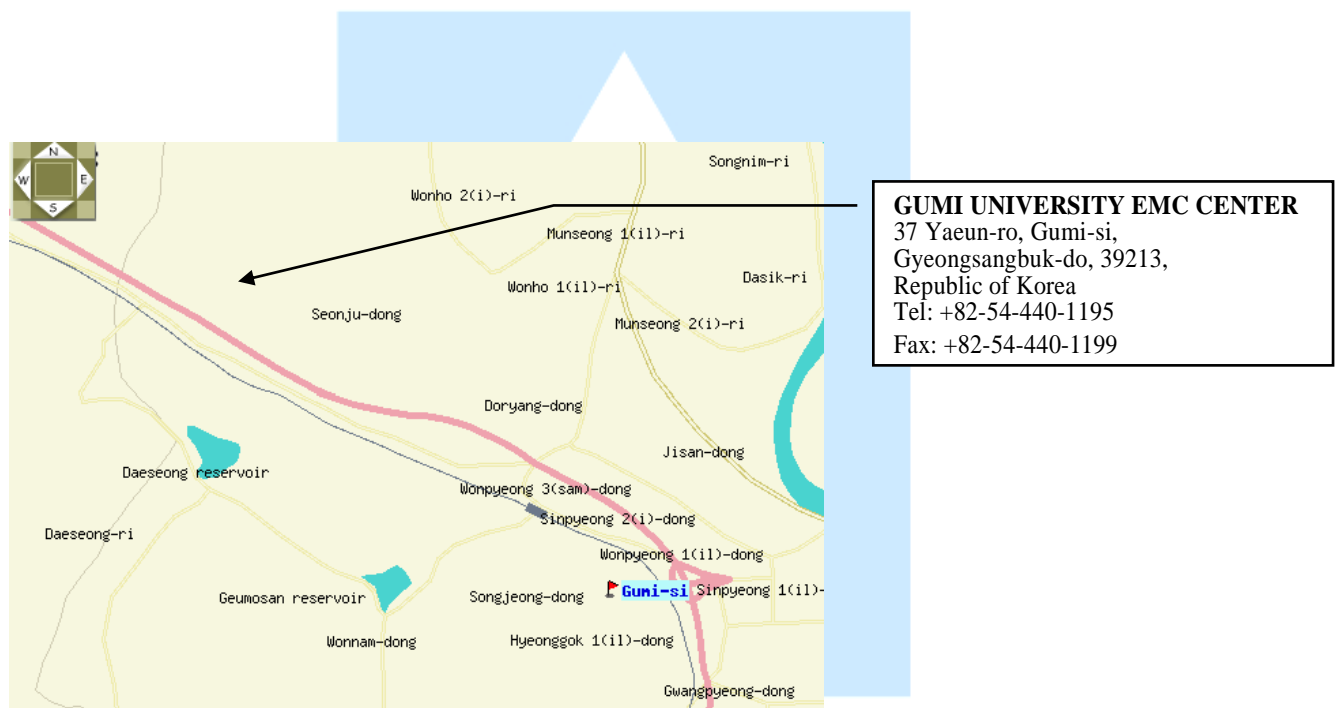


Fig 1. The map above shows the Gumi UNIVERSITY in vicinity area.



3. Product Information

3.1 Description of EUT

The Equipment under Test (EUT) is the **LG Electronics USA.**

Household Electric Oven (Model Name: WCES6428F) FCC ID.: BEJD1724NAD

1	Equipment Class	ISM Consumer Device, Part 18
2	Equipment name	Household Electric Oven
3	Trade name	LG
4	Model number	WCES6428F
5	Manufacturer	LG Electronics Inc. 170, Seongsanpaechong-Ro, Seongsan-Gu, Changwon-Si, Gyeongsangnam-Do, 51533, Korea
6	FCC ID	BEJD1724NAD
7	Serial number & Manufacturer data	Proto type, not provided yet
8	Date of original grant	NA
9	Rated RF power output	975 W
10	Rated power consumption Microwave mode	1650 W
11	Rated current Microwave mode	14 A
12	Overall dimensions (inch)	29-3/4 x 43 7/8 x 24 7/15 (W x H x D)
13	Cavity dimensions (inch)	Upper MWO 12-11/15 x 8-5/14 x 17-5/16 (W x H x D) Lower Oven 24-10/19 x 17 7/11 x 19 2/15 (W x H x D)
14	Cavity volume	Upper MWO 1.7 cu.ft , Lower Oven 4.7cu.ft
15	Magnetron	2M246
16	Mode of Stirrer	Turntable
17	Measurement facility	LG
18	Frequency range in MHz	2450 ±50 MHz





3.2 Support Equipment / Cables used

3.2.1 Used Support Equipment

Description	Manufacturer	Model Name	S/N & FCC ID.
None	-	-	S/N: - FCC ID.: -

See "Appendix D – Test Setup Photographs" for actual system test set-up

3.2.2 System configuration

Description	Manufacturer	Model Name	S/N & FCC ID.
WLAN module	LG Electronics Inc.	LCW-009	S/N: - FCC ID.: BEJ-LCW009

3.2.3 Used Cable(s)

Cable Name	Condition	Description
Power cable	Connected to the EUT and AC power source	1.80 m Unshielded

3.3 Modification Item(s)

- None



4. Description of tests

4.1 Test Condition

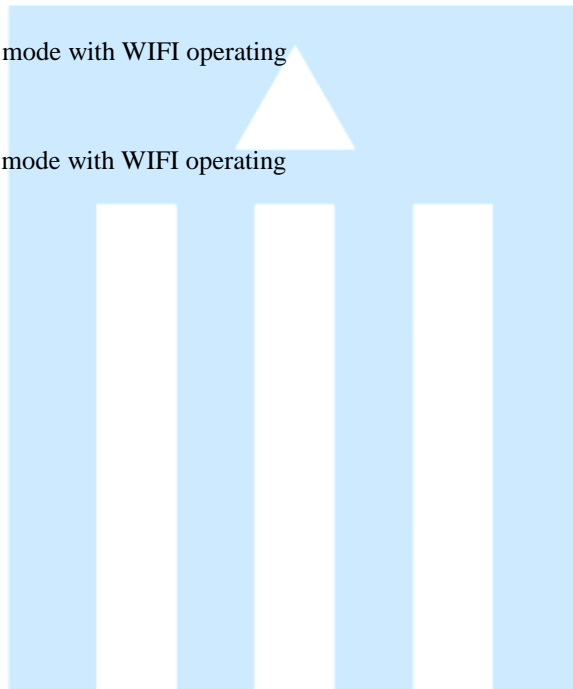
The EUT was operated at maximum (continuous) RF output power. The loads consisted of water in a glass beaker in the amounts specified in the test procedure.

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

- Test Voltage / Frequency : AC 120 V / 60 Hz

- Test Mode(s)
 - **Conducted Emission**
 - Continuous RF output mode with WIFI operating

 - **Radiated Emission**
 - Continuous RF output mode with WIFI operating





4.2 Conducted Emission

The Line conducted emission test facility is inside a 4 m × 8 m × 2.5 m shielded enclosure. (FCC Test Firm Registration No.: 269701)

The EUT was placed on a non-conducting 1.0 m by 1.5 m table, which is 0.4 m in height and 0.8 m away from the vertical wall of the shielded enclosure.

The EUT is powered from the Rohde & Schwarz LISN (ENV216) and the support equipment is powered from the Rohde & Schwarz LISN (ENV216). 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 (Rohde & Schwarz, ESCI).

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 150 kHz to 30 MHz with 20 ms sweep time. The final measurements were measured with Quasi-Peak and Average mode.

The bandwidth of EMI Test Receiver was set to 9 kHz. Interface cables were connected to the available interface ports of the test unit. Excess cable lengths were bundled at center with 30 cm ~ 40 cm.

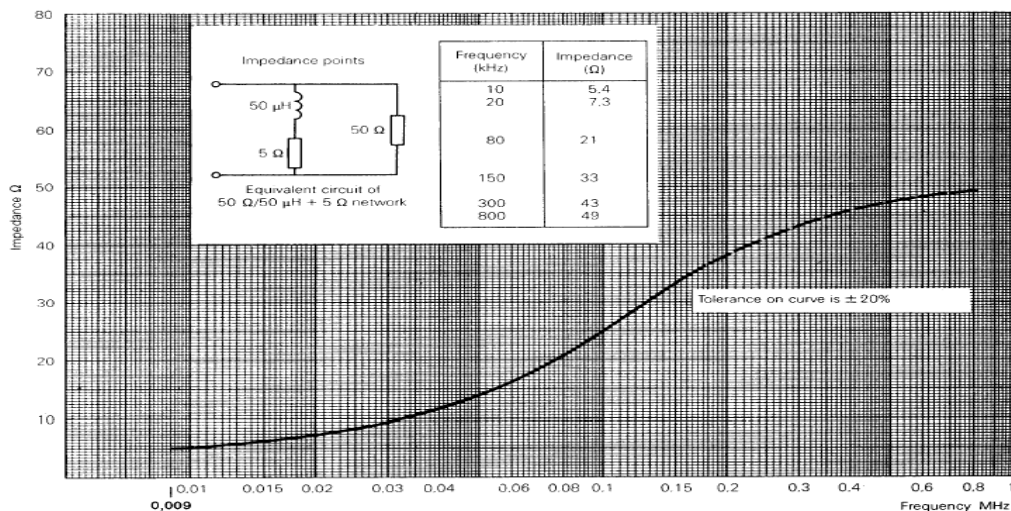


Fig 2. Impedance of LISN



4.3 Radiated Emission

Exploratory Radiated measurements were conducted at the 3 m or 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 of below 1 GHz were made at 3 m or 10 m Chamber (FCC Test Firm Registration No.: 269701) or Open area test site (FCC Test Firm Registration No.: 269701) that complies with CISPR 16

Above 1 GHz final measurements were conducted at the 3m Chamber (FCC Test Firm Registration No.: 269701) only.

For measurements above 1GHz, the bottom side of 3 m chamber was installed with absorbers in order to meet SVSWR Limit.

Exploratory measurements were scanned using Peak mode of EMI Test receiver and final measurements were measured with Quasi-Peak mode (Below 1 GHz) and Average mode (Above 1 GHz).

The measurements were performed by rotating the EUT 360° and adjusting the receive antenna height from 1.0 m to 4.0 m. All frequencies were investigated in both horizontal and vertical antenna polarity.

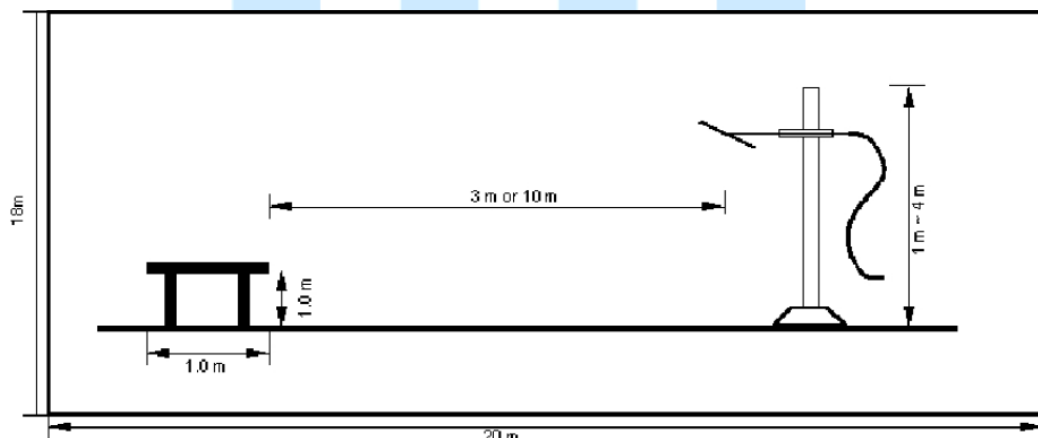


Fig 3. Dimensions of test site (Below 1 GHz)

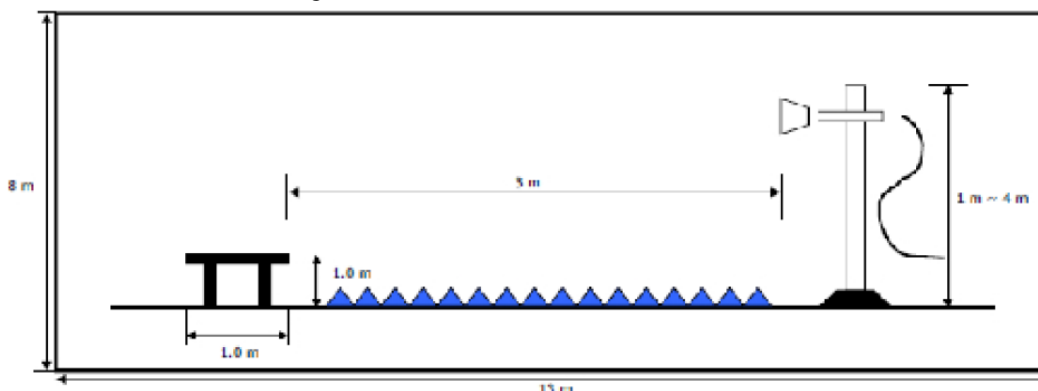
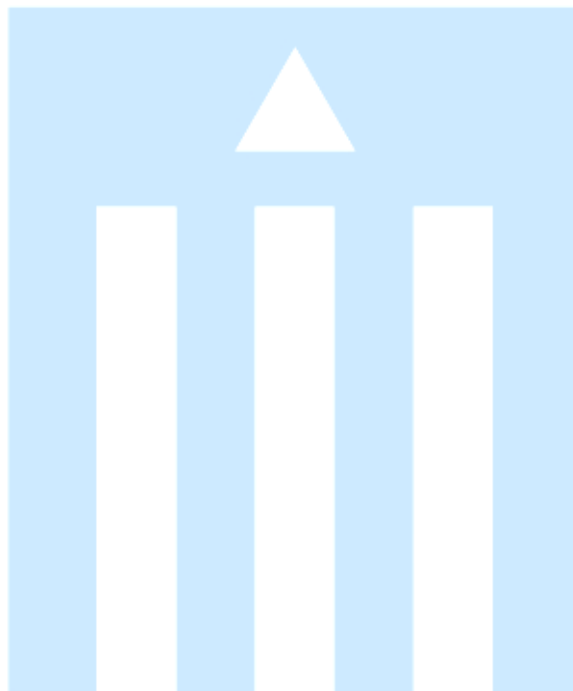


Fig 4. Dimensions of test site (Above 1 GHz)



5. Summary of Test Results

FCC Part Section(s)	Test Description	Test Result
§18.305	Radiated Emission	Pass
§18.307	Conducted Emission	Pass





6. Conducted Emission

6.1 Operating Environment

Temperature : 24.0 °C
Relative Humidity : 39.2 % R.H.
Air Pressure : 100.4 kPa

6.2 Test Set-up

The conducted emission measurements were performed in the shielded room.

The EUT was placed on wooden table, 0.4 m heights above the floor, 0.8 m from the reference ground plane (GRP) wall and 0.8 m from AMN & ISN.

AMN is bonded on horizontal reference ground plane.

The ground plane, which was electrically bonded to the shield room, ground system and all power lines entering the shield room, were filtered.

6.3 Measurement Uncertainty

The measurement uncertainty was calculated in accordance with ISO "Guide to the expression of uncertainty in measurement."

The measurement uncertainty was given with a confidence of 95 %.

Test Items	Uncertainty	Remark
Conducted emission (9 kHz ~ 150 kHz)	3.69 dB	Confidence level of approximately 95 % ($k = 2$)
Conducted emission (150 kHz ~ 30 MHz)	3.32 dB	Confidence level of approximately 95 % ($k = 2$)

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2.

The listed uncertainties are the worst case uncertainty for the entire range of measurement. please note that the uncertainty values are provided for informational purposes only are not used in determining the PASS/FAIL results



6.4 Limit

RFI Conducted	FCC Limit(dB μ V/m) Class B	
	Quasi-Peak	Average
150 kHz ~ 0.5 MHz	66 ~ 56*	56 ~ 46*
0.5 MHz ~ 5 MHz	56	46
5 MHz ~ 30 MHz	60	50

*Limits decreases linearly with the logarithm of frequency.

6.5 Test Equipment used

Model Name	Manufacturer	Description	Serial Number	Calibration Date
■ - ESCI	Rohde & Schwarz	EMI Test Receiver	100237	Apr. 08, 2021
□ - ENV216	Rohde & Schwarz	LISN	100172	Apr. 07, 2021
□ - ENV216	Rohde & Schwarz	LISN	100173	Apr. 07, 2021
■ - ESH2-Z5	Rohde & Schwarz	LISN	829991/009	Apr. 08, 2021
■ - VTSD 9561-D	SCHWARZBECK	Pulse Limiter	32	Apr. 08, 2021
■ - EMC 32	Rohde & Schwarz	Software	Ver.8.53	N/A

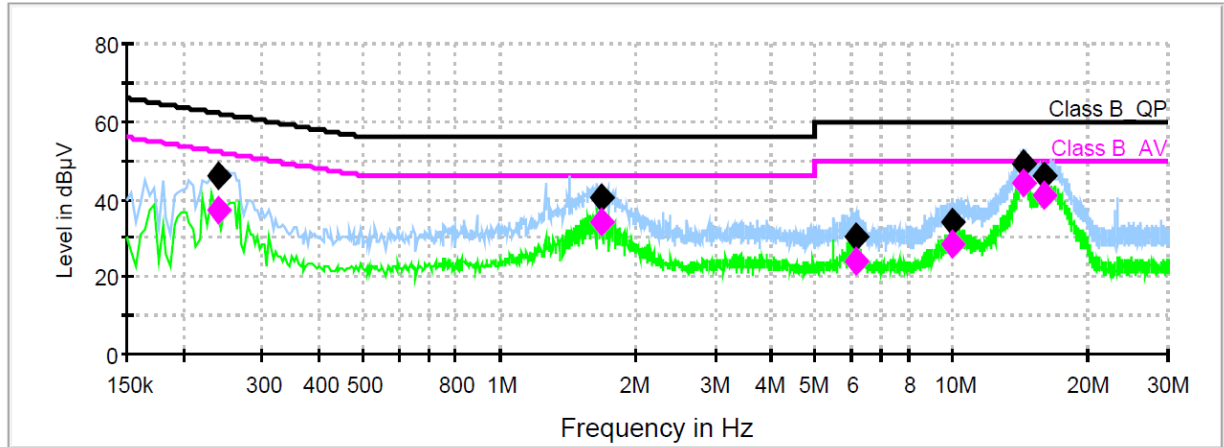
6.6 Test data for Conducted Emission

- Test Date : Nov. 22, 2021
- Resolution Bandwidth : 9 kHz
- Frequency Range : 0.15 MHz ~ 30 MHz
- Line : L1: Live, N: Neutral





Operating condition: Continuous RF output mode



— Class B_QP — Class B_AV — Preview Result 1-PK+
— Preview Result 2-AVG ◆ Final Result 1-QPK ◆ Final Result 2-CAV

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.238085	46.2	1000.0	9.000	GND	L1	20.4	15.9	62.2	
1.673749	40.4	1000.0	9.000	GND	L1	20.6	15.6	56.0	
6.150533	30.3	1000.0	9.000	GND	L1	20.7	29.7	60.0	
10.071732	34.2	1000.0	9.000	GND	L1	20.7	25.8	60.0	
14.322424	49.4	1000.0	9.000	GND	N	20.7	10.6	60.0	
15.990263	45.7	1000.0	9.000	GND	L1	20.8	14.3	60.0	

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.238085	37.1	1000.0	9.000	GND	L1	20.4	15.0	52.2	
1.673749	33.9	1000.0	9.000	GND	L1	20.6	12.1	46.0	
6.150533	24.2	1000.0	9.000	GND	L1	20.7	25.8	50.0	
10.071732	28.5	1000.0	9.000	GND	L1	20.7	21.5	50.0	
14.322424	43.9	1000.0	9.000	GND	N	20.7	6.1	50.0	
15.990263	41.2	1000.0	9.000	GND	L1	20.8	8.8	50.0	

< Fig 5. Graph of continuous disturbance >





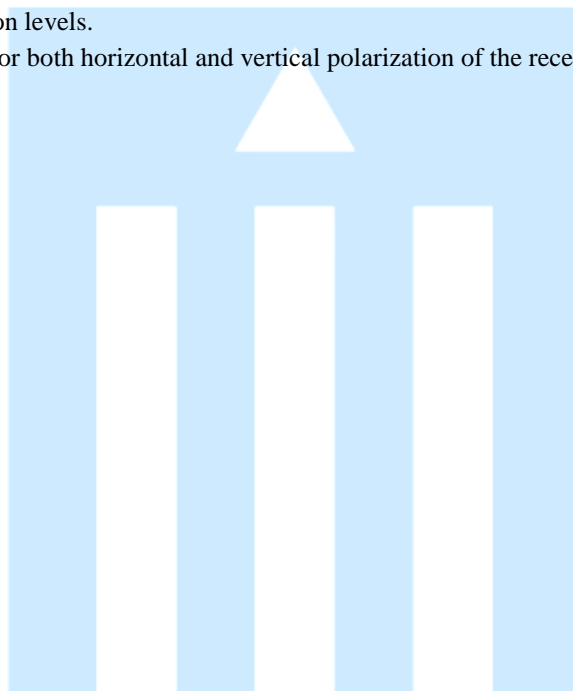
7. Radiated Emission

7.1 Operating Environment

Temperature : 22.1 °C
Relative Humidity : 41.4 % R.H.
Air Pressure : 100.4 kPa

7.2 Test Set-up

A preliminary and final measurement was at 3 m & 10 m anechoic chamber.
The EUT was placed on a non-conductive turntable approximately 1.0 m above the ground plane.
The turntable with EUT 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.





7.3 Measurement Uncertainty

The measurement uncertainty was calculated in accordance with ISO “Guide to the expression of uncertainty in measurement”.

The measurement uncertainty was given with a confidence of 95 %.

Test Items(3 m Anechoic Chamber)	Uncertainty	Remark
Radiated emission (30 MHz ~ 300 MHz, 3 m, Vertical)	4.78 dB	Confidence level of approximately 95 % ($k = 2$)
Radiated emission (30 MHz ~ 300 MHz, 3 m, Horizontal)	4.77 dB	Confidence level of approximately 95 % ($k = 2$)
Radiated emission (300 MHz ~ 1 000 MHz, 3 m, Vertical)	6.20 dB	Confidence level of approximately 95 % ($k = 2$)
Radiated emission (300 MHz ~ 1 000 MHz, 3 m, Horizontal)	5.12 dB	Confidence level of approximately 95 % ($k = 2$)
Radiated emission (1 000 MHz ~ 6 000 MHz, 3 m)	4.56 dB	Confidence level of approximately 95 % ($k = 2$)
Radiated emission (6 000 MHz ~ 18 000 MHz, 3 m)	4.88 dB	Confidence level of approximately 95 % ($k = 2$)
Radiated emission (18 000 MHz ~ 26 000 MHz, 3 m)	5.03 dB	Confidence level of approximately 95 % ($k = 2$)
Test Items(10 m Anechoic Chamber)	Uncertainty	Remark
Radiated emission (30 MHz ~ 300 MHz, 10 m, Vertical)	4.77 dB	Confidence level of approximately 95 % ($k = 2$)
Radiated emission (30 MHz ~ 300 MHz, 10 m, Horizontal)	4.79 dB	Confidence level of approximately 95 % ($k = 2$)
Radiated emission (300 MHz ~ 1 000 MHz, 10 m, Vertical)	4.91 dB	Confidence level of approximately 95 % ($k = 2$)
Radiated emission (300 MHz ~ 1 000 MHz, 10 m, Horizontal)	4.90 dB	Confidence level of approximately 95 % ($k = 2$)
Radiated emission (1 000 MHz ~ 6 000 MHz, 3 m)	4.64 dB	Confidence level of approximately 95 % ($k = 2$)
Radiated emission (6 000 MHz ~ 18 000 MHz, 3 m)	4.95 dB	Confidence level of approximately 95 % ($k = 2$)

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2.

The listed uncertainties are the worst case uncertainty for the entire range of measurement. please note that the uncertainty values are provided for informational purposes only are not used in determining the PASS/FAIL results





7.4 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 $25 \times \text{SQRT}(\text{power}/500)$	300 ¹ 300
	Any non-ISM frequency	Below 500 500 or more	15 $15 \times \text{SQRT}(\text{power}/500)$	300 ¹ 300
Industrial heaters and RF stabilized arc welders	On or below 5,725 MHz Above 5,725 MHz	Any Any	10 (²)	1,600 (²)
Medical diathermy	Any ISM frequency	Any	25	300
	Any non-ISM frequency	Any	15	300
Ultrasonic	Below 490 kHz	Below 500 500 or more	$2,400/F(\text{kHz})$ $2,400/F(\text{kHz}) \times \text{SQRT}(\text{power}/500)$	300 ³ 300
	490 to 1,600 kHz Above 1,600 kHz	Any Any	$24,000/F(\text{kHz})$ 15	30 30
Induction cooking ranges	Below 90 kHz	Any	1,500	⁴ 30
	On or above 90 kHz	Any	300	⁴ 30

Notes:

- * Limit (at 300 m) = $25 * (\text{RF Power}/500)^{1/2} [\mu\text{V}/\text{m}]$
- * Field Strength below 1,000 MHz (at 300 m) $[\mu\text{V}/\text{m}] = 10^{[(\text{Field strength at } 10\text{m}(\text{dBuV}/\text{m}) - 29.5)/20]}$
- * Field Strength above 1,000 MHz (at 300 m) $[\mu\text{V}/\text{m}] = K * 10^{[(\text{Field strength at } 3\text{m}(\text{dBuV}/\text{m})/20]}$





7.5 Test Equipment used

Model Name	Manufacturer	Description	Serial Number	Calibration Date
□ - ESIB26	Rohde & Schwarz	EMI Test Receiver	830482/010	Apr. 08, 2021
■ - ESU40	Rohde & Schwarz	EMI Test Receiver	100266	Apr. 08, 2021
■ - BBHA9120D	Schwarzbeck	Horn ANT	207	Sep. 15, 2021
■ - BBHA 9170	Schwarzbeck	Horn ANT	770	Nov. 16, 2021
■ - MCU066	maturu GmbH	Position Controller	1390306	N/A
■ - CO3000	Innco system GmbH	Position Controller	CO3000/1084/4 2760218/P	N/A
■ - TT2.5SI	maturu GmbH	Turntable	1390307	N/A
■ - MA4640-XP-ET	HD GmbH	Antenna Mast	MA4640/558	N/A
■ - TK-PA18H	Testek	Low Noise Amplifier	180001-L	Apr. 09, 2021
■ - TK-PA1840H	Testek	Preamplifier	170007-L	Apr. 09, 2021
■ - WHKX3.0/18G-10SS	WAINWRIGHT INSTRUMENTS	High pass filter	SN31	Apr. 07, 2021
■ - EMC 32	Rohde & Schwarz	Software	Ver 10.40.10	N/A
■ - ESR7	Rohde & Schwarz	EMI Test Receiver	101382	Apr. 08, 2021
■ - VULB9160	Schwarzbeck	Broad Band Test Antenna	3099	Oct. 12, 2021
■ - TK-PA06S	Testek	Low Noise Amplifier	170038-L	Apr. 09, 2021
■ - CO3000	Innco system GmbH	Position Controller	CO03000/779/ 33050314/L	N/A
■ - DT3000	Innco system GmbH	Turntable	1280314	N/A
■ - MA4000-EP	Innco system GmbH	Antenna Mast	4420314	N/A
□ - 310N	Sonoma instrument	amplifier	1871164	Apr. 09, 2021
■ - EMC 32	Rohde & Schwarz	Software	Ver 10.50.10	N/A

6.6 Test data for Radiated Emission

- Test Date : Nov. 22, 2021 ~ Nov. 25, 2021
- Measurement Distance : 3 m, 10 m
- Note : -

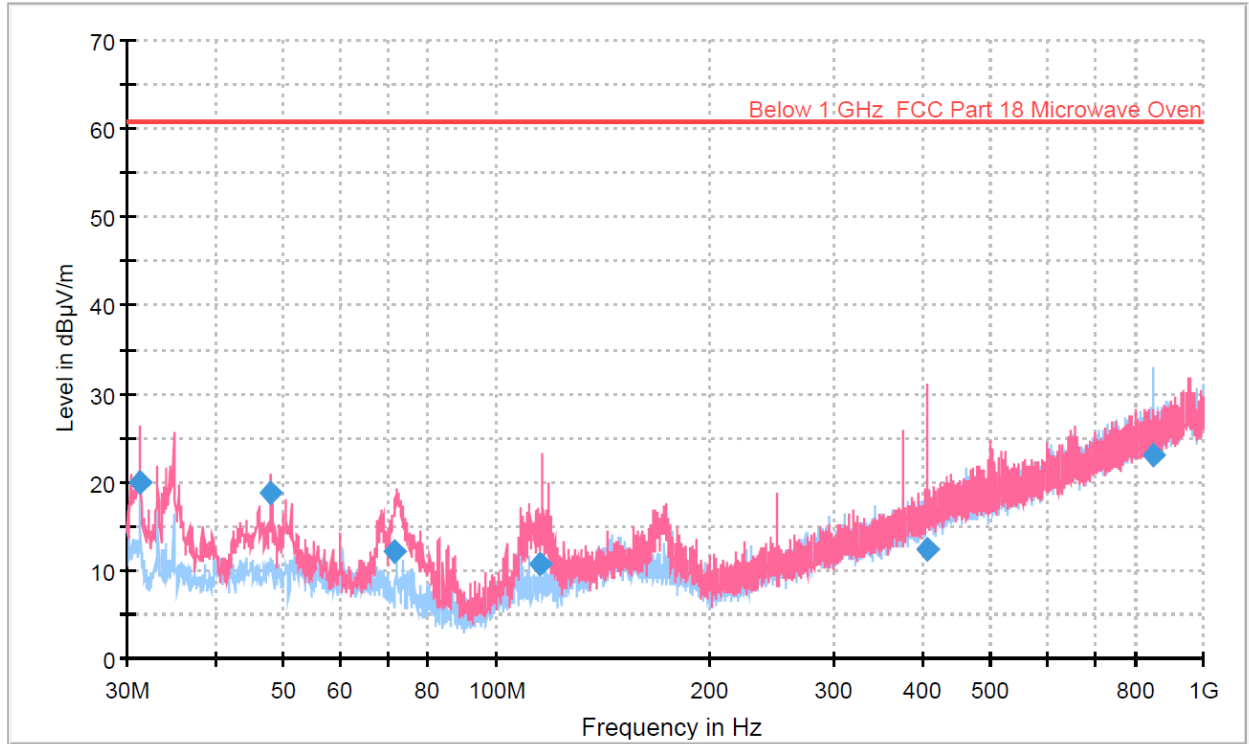
- Measurement

Frequency range	30 MHz ~ 1 GHz @ 10 m	Above 1 GHz @ 3m
Detector mode	Quasi peak	Peak / Average
Resolution bandwidth	120 kHz	1 MHz





- 30 MHz ~ 1 GHz



— Preview Result 1H-AVG — Preview Result 1V-AVG
— Below 1 GHz_FCC Part 18 Microwave Oven ◆ Final_Result AVG

Final Result

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
31.349	19.99	60.72	40.74	1000.0	120.000	100.0	V	193.0	-28
48.000	18.83	60.72	41.89	1000.0	120.000	100.0	V	58.0	-28
71.732	12.08	60.72	48.64	1000.0	120.000	395.0	V	180.0	-30
115.346	10.77	60.72	49.95	1000.0	120.000	220.0	V	118.0	-29
407.059	12.45	60.72	48.27	1000.0	120.000	249.0	V	328.0	-20
846.781	23.12	60.72	37.60	1000.0	120.000	246.0	H	114.0	-8

< Fig 6. Radiated emission result (30 MHz ~ 1 000 MHz) >





-. 1 GHz ~ 26 GHz

Freq [GHz]	Pol.	Load [mL]	Load Location	Reading [dB μ V]	Limit [dB μ V/m] @ 3m	Margin [dB]	Height (CM)	Azimuth	Corr (dB/m)
2.397	V	700	Front	66.96	71.18	4.22	110	0	-21.37
2.397	H	300	Center	66.94	71.18	4.24	100	50	-21.37
8.384	V	300	Center	66.99	71.18	4.19	150	330	0.78
8.384	V	700	Center	65.33	71.18	5.85	130	300	0.78
19.539	H	300	Front	64.45	71.18	6.73	100	60	16.21
19.702	H	300	Center	65.17	71.18	6.01	120	120	17.83

Notes:

- 1) Load for measurement of radiation on second and third harmonic: Two loads, one of 700 and the other of 300 mL, of water were used. Each load was tested both with the beaker located in the center of the oven and with it in the corner.
- 2) Load for all other measurements: 700 mL of water, with the beaker located in the center of the oven.
- 3) The tests were made with average detector for frequency range of 1 GHz to 26 GHz.



8. Input Power

8.1 Operating Environment

Temperature : 25.1 °C
 Relative Humidity : 36.7 % R.H.
 Air Pressure : 101.3 kPa

8.2 Test Set-up

Input power and current were measured using a power analyzer.
 A 700 ml water load was placed in the center of the oven and the oven set to maximum power.
 A 700 ml water load was chosen for its compatibility.
 Manufacturers to determine their input ratings commonly use the procedure.

8.3 Test Equipment used

Model Name	Manufacturer	Description	Serial Number	Calibration Date
■ - 360AMX	Pacific	AC power source	0438	Apr. 09, 2021
■ - PPA5511	N4L	Precision Power analyzer	162-05554	Apr. 19, 2021
■ - IEC555	VOLTECH	Impedance Network	5016	Apr. 20, 2021

7.4 Test data for Input Power

- Test Date : Nov. 19, 2021
 - Test condition : Continuous RF output mode (Load: 700 mL)
 - Measurement

Mode	Input Voltage	Current [A]	Power Consumption [W]	Manufacturer Rating [A]
Microwave	AC 120 V, 60 Hz	15.682	1 754.9	14.0





9. RF Power Output Measurement according to MP-5

9.1 Operating Environment

Temperature : 25.1 °C
 Relative Humidity : 36.7 % R.H.
 Air Pressure : 101.3 kPa

9.2 Test Set-up

The Calorimetric Method was used to determine maximum output power. A 1 000 mL water load was placed in the center of the oven. A mercury thermometer was used to measure temperature rise. The test method was described in MP-5

9.3 Test Equipment used

Model Name	Manufacturer	Description	Serial Number	Calibration Date
■ - 360AMX	Pacific	AC power source	0438	Apr. 09, 2021
■ - PPA5511	N4L	Precision Power analyzer	162-05554	Apr. 19, 2021
■ - IEC555	VOLTECH	Impedance Network	5016	Apr. 20, 2021

9.4 Test data for RF Power Output Measurement according to MP-5

- Test Date : Nov. 19, 2021
- Test condition : Continuous RF output mode (Load: 1 000 mL)
- Measurement

$$\text{Power [W]} = \frac{(4.187 \text{ Joules/Cal}) \times (\text{Volume in mL}) \times (\text{Temperature Rise})}{\text{Time in Seconds}}$$

Quantity of Water	Starting Temperature	Final Temperature	Elapsed Time
1 000 mL	17.4 °C	47.5 °C	120 Sec

$$\text{Power [W]} = \frac{4.187 \times 1\,000 \times 30.1}{120}$$

$$\text{Power [W]} = 1\,050.2 \text{ Watts}$$





10. Frequency Measurement

10.1 Operating Environment

Temperature : 23.5 °C
 Relative Humidity : 46.9 % R.H.
 Air Pressure : 101.4 kPa

10.2 Test Equipment used

Model Name	Manufacturer	Description	Serial Number	Calibration Date
□ - ESIB26	Rohde & Schwarz	EMI Test Receiver	830482/010	Apr. 08, 2021
■ - ESU40	Rohde & Schwarz	EMI Test Receiver	100266	Apr. 08, 2021
■ - BBHA9120D	Schwarzbeck	Horn ANT	207	Sep. 15, 2021
■ - MCU066	maturu GmbH	Position Controller	1390306	N/A
■ - TT2.5SI	maturu GmbH	Turntable	1390307	N/A
■ - MA4640-XP-ET	HD GmbH	Antenna Mast	MA4640/558	N/A
■ - TK-PA18H	Testek	Low Noise Amplifier	180001-L	Apr. 09, 2021
■ - CO3000	Innco system GmbH	Position Controller	CO3000/1084/4 2760218/P	N/A

10.3 Test data for Frequency Measurement

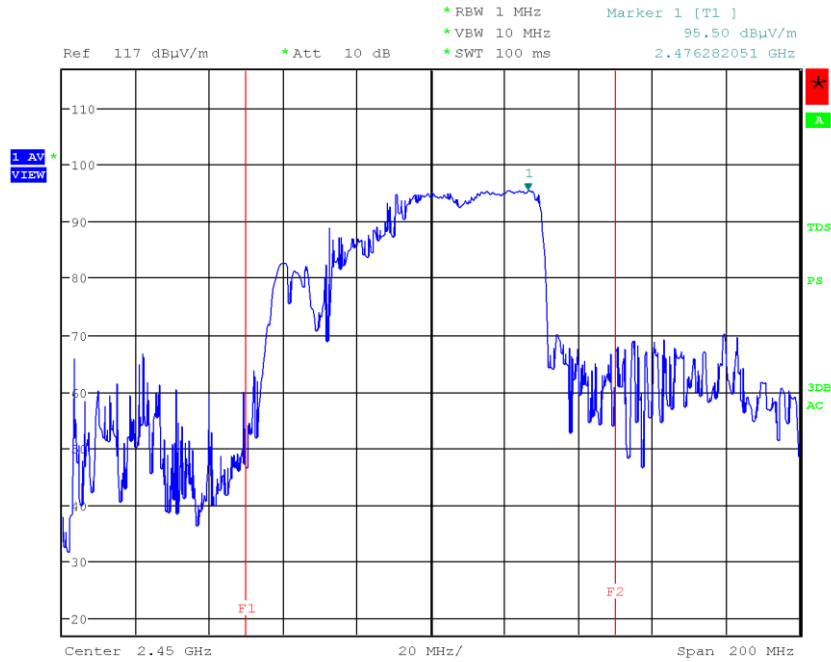
10.3.1 Line Voltage Variation Test

- Test Date : Nov. 22, 2021
 - Test condition : Continuous RF output mode
 - Test Voltage : AC 96 V, 60 Hz to AC 150 V, 60 Hz
 - Load : 1 000 mL
 - Fundamental Frequency : 2 450 MHz
 - Limit : 2.4 GHz < f < 2.5 GHz
 - Measurement : Maximum Frequency Observed – 2. 476 GHz
 Minimum Frequency Observed – 2.463 GHz

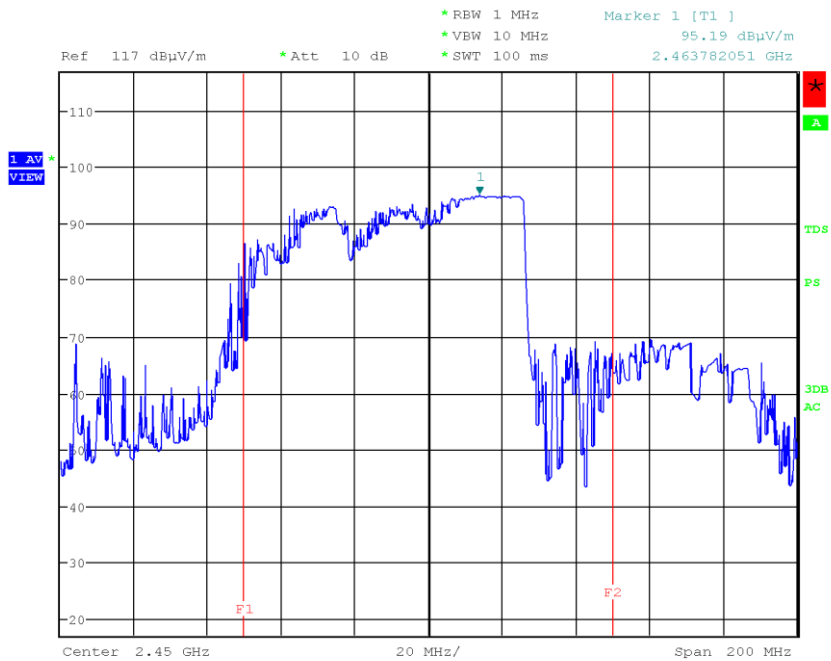
Voltage variation (a.c. V)	Pol	Frequency (MHz)	Allowed Tolerance for the ISM Band
96	H	2 471	Lower : 2 400 MHz Upper : 2 500 MHz
	V	2 472	
108	H	2 473	
	V	2 463	
120	H	2 469	
	V	2 476	
132	H	2 471	
	V	2 471	
150	H	2 474	
	V	2 476	

Note * Pol. H= Horizontal, V=Vertical





< Fig 7. Frequency Measurements _ Voltage (Maximum Frequency Observed: 2.476 GHz) >



< Fig 8. Frequency Measurements _ Voltage (Minimum Frequency Observed: 2.463 GHz) >





10.3.2 Load Variation Test

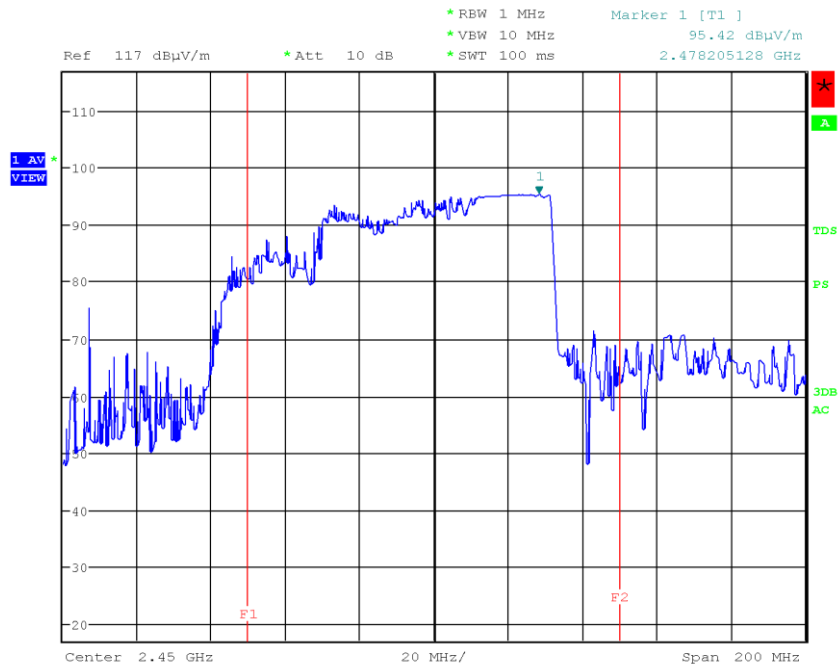
- Test Date : Nov. 22, 2021
- Test condition : Continuous RF output mode
- Test Voltage : AC 120 V, 60 Hz
- Initial Load : 1 000 mL
- Final Load : 200 mL
- Fundamental Frequency : 2 450 MHz
- Limit : 2.4 GHz < f < 2.5 GHz
- Measurement : Maximum Frequency Observed – 2.478 GHz
 Minimum Frequency Observed – 2.469 GHz

Volume of water (ml)	Pol	Frequency (MHz)	Allowed Tolerance for the ISM Band
200	H	2 472	Lower : 2 400 MHz Upper : 2 500 MHz
	V	2 469	
400	H	2 475	
	V	2 473	
600	H	2 476	
	V	2 474	
800	H	2 476	
	V	2 475	
1 000	H	2 472	
	V	2 478	

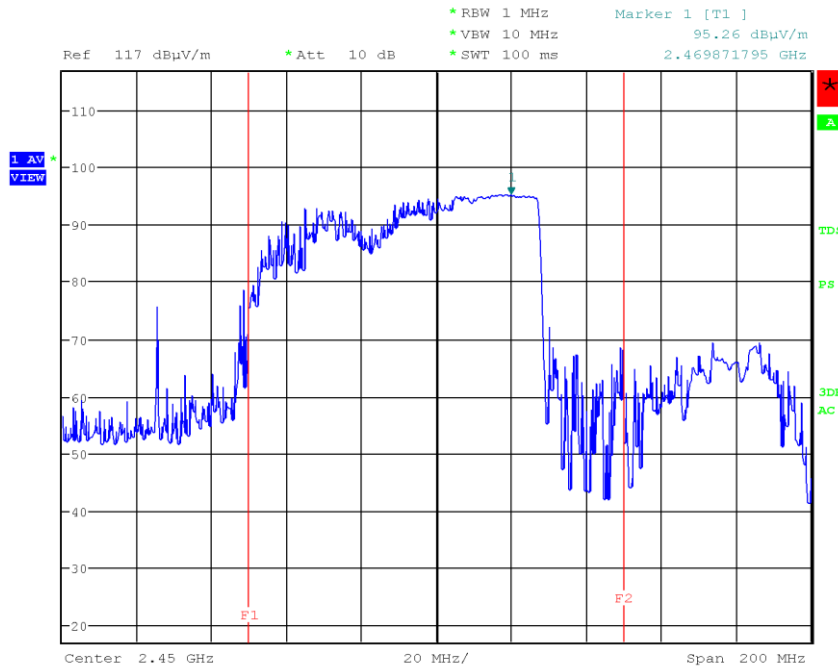
Note

* Pol. H= Horizontal, V=Vertical





< Fig 9. Frequency Measurements _Load (Maximum Frequency Observed: 2.478 GHz) >



< Fig 10. Frequency Measurements _Load (Minimum Frequency Observed: 2.469 GHz) >



11. Power Density Safety Check

11.1 Test Set-up

The power density was checked to ensure that the power is not greater than 1.0 mW/cm² at any location of the oven. The 1.0 mW/cm² is in accordance with CDRH and UL923 standard.

A microwave survey meter was placed on all sides, door and viewing, bottom, top and rear. The leakage microwave did not exceed the specified limits.

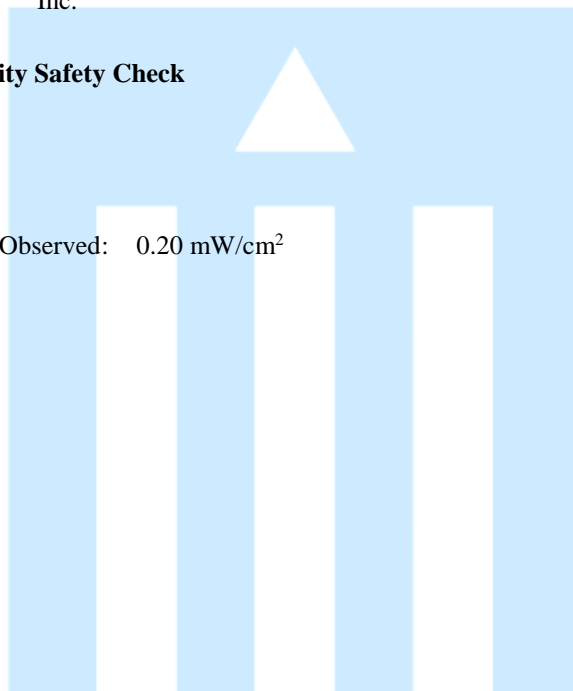
11.2 Test Equipment used

Model Name	Manufacturer	Description	Serial Number	Calibration Date
■ - FJZ431HA	Holiday Industries Inc.	Microwave Survey Meter -		Apr. 12, 2021

11.3 Test data for Power Density Safety Check

- Test date: Nov. 19, 2021
- Measurement

Maximum Leakage Microwave Observed: 0.20 mW/cm²





12. Sample Calculations

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

$$\text{dB}\mu\text{V} = \text{dBm} + 107$$

$$\mu\text{V} = 10^{(\text{dB}\mu\text{V}/20)}$$

12.1 Example 1 :

■ 20.3 MHz

Class B Limit	= 250 μV = 48 dBμV
Reading	= 39.2 dBμV
10^(39.2dBμV/20)	= 91.2 μV
Margin	= 48 dBμV - 39.2 dBμV
	= 8.8 dB

12.2 Example 2 :

■ 66.7 MHz

Class B Limit	= 100 $\mu\text{V}/\text{m}$ = 40.0 dB$\mu\text{V}/\text{m}$
Reading	= 31.0 dBμV
Antenna Factor + Cable Loss	= 5.8 dB
Total	= 36.8 dB$\mu\text{V}/\text{m}$
Margin	= 40.0 dB$\mu\text{V}/\text{m}$ - 36.8 dB$\mu\text{V}/\text{m}$
	= 3.2 dB

13. Recommendation & Conclusion

The data collected shows that the **LG Electronics USA. Household Electric Oven(Model Name: WCES6428F)** was complies with §18.305, 18.307, 18.309 and 18.311 of the FCC Rules.

- The end -

