

FCC EVALUATION REPORT FOR CERTIFICATION

Applicant: LG Electronics Inc.**170, Sungsanpaechong-ro, Seongsan-gu,
Changwon-si, Gyeongsangnam-do, 642-711, Korea.****Attn: Kwang-Mu Son / Senior Research Engineer****Date of Issue: Feb. 19, 2016****Order Number: GETEC-C1-16-108****Test Report Number: GETEC-E3-16-009****Test Site: GUMI UNIVERSITY EMC CENTER****FCC Registration Number: (269701)****FCC ID. : BEJQ172NYA****Applicant : LG Electronics Inc.**

Rule Part(s)	: FCC Part 18
Equipment Class	: Industrial, Scientific, and Medical equipment
EUT Type	: Microwave Oven
Type of Authority	: Certification
Model Name	: MQ1724ASDL, UPMC3084ST
Trade Name	: LG or GE

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 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 best 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,
Seung-Chul Lee, Senior Engineer
GUMI UNIVERSITY EMC CENTER**Reviewed by,**
Jae-Hoon Jeong, Technical Manager
GUMI UNIVERSITY EMC CENTER



CONTENTS

1. GENERAL INFORMATION	4
2. INTRODUCTION	5
3. PRODUCT INFORMATION	6
3.1 DESCRIPTION OF EUT.....	6
3.2 SUPPORT EQUIPMENT / CABLES USED	7
3.3 MODIFICATION ITEM(S).....	7
4. DESCRIPTION OF TESTS.....	8
4.1 TEST CONDITION.....	8
4.2 CONDUCTED EMISSION	9
4.3 RADIATED EMISSION.....	10
5. CONDUCTED EMISSION.....	11
5.1 OPERATING ENVIRONMENT	11
5.2 TEST SET-UP	11
5.3 MEASUREMENT UNCERTAINTY.....	11
5.4 LIMIT	12
5.5 TEST EQUIPMENT USED.....	12
5.6 TEST DATA FOR CONDUCTED EMISSION	12
6. RADIATED EMISSION	14
6.1 OPERATING ENVIRONMENT	14
6.2 TEST SET-UP	14
6.3 MEASUREMENT UNCERTAINTY.....	14
6.4 LIMIT	15
6.5 TEST EQUIPMENT USED.....	15
6.6 TEST DATA FOR RADIATED EMISSION	15
7. INPUT POWER.....	18
7.1 OPERATING ENVIRONMENT	18
7.2 TEST SET-UP	18
7.3 TEST EQUIPMENT USED.....	18
7.4 TEST DATA FOR INPUT POWER	18
8. RF POWER OUTPUT MEASUREMENT ACCORDING TO MP-5	19
8.1 OPERATING ENVIRONMENT	19
8.2 TEST SET-UP	19
8.3 TEST EQUIPMENT USED.....	19
8.4 TEST DATA FOR RF POWER OUTPUT MEASUREMENT ACCORDING TO MP-5	19
9. FREQUENCY MEASUREMENT	20
9.1 OPERATING ENVIRONMENT	20
9.2 TEST EQUIPMENT USED.....	20
9.3 TEST DATA FOR FREQUENCY MEASUREMENT	20
10. POWER DENSITY SAFETY CHECK	23
10.1 TEST SET-UP	23
10.2 TEST EQUIPMENT USED.....	23
10.3 TEST DATA FOR POWER DENSITY SAFETY CHECK.....	23



11. SAMPLE CALCULATIONS	24
11.1 EXAMPLE 1 :	24
11.2 EXAMPLE 2 :	24
12. RECOMMENDATION & CONCLUSION.....	25





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 INC.

Applicant Address: 170, Sungsanpaechong-ro, Seongsan-gu, Changwon-si,
Gyeongsangnam-di, 642-711, Korea

Manufacturer: LG ELECTRONICS INC. KITCHEN PACKAGE DIVISION

Manufacturer Address: 170, Sungsanpaechong-ro, Seongsan-gu, Changwon-si,
Gyeongsangnam-di, 642-711, Korea

Contact Person: Kwang-Mu Son / Senior Research Engineer

Telephone Number: +82-55-260-3966

● FCC ID	BEJQ172NYA
● EUT Type	Microwave Oven
● Equipment Class	Industrial, Scientific, and Medical equipment
● Model Name	MQ1724ASDL, UPMC3084ST
● Trade Name	LG or GE
● Serial Number	Prototype
● Rule Part(s)	FCC Part 18
● Type of Authority	Certification
● Test Procedure(s)	MP-5 (1986)
● Dates of Test	Feb. 16, 2016 ~ Feb. 18, 2016
● Place of Test	GUMI UNIVERSITY EMC CENTER (FCC Test Firm Registration Number: 269701) 37 Yaeun-ro, Gumi-si, Gyeongsangbuk-do, 730-711, Republic of Korea.
● Test Report Number	GETEC-E3-16-009
● Date of Issue	Feb. 19, 2016

EUT Type: Microwave Oven

FCC ID.: BEJQ172NYA





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 INC. Microwave Oven (Model Name: MQ1724ASDL, UPMC3084ST)**

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

The site address is 37 Yaeun-ro, Gumi-si, Gyeongsangbuk-do, 730-711, 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 (2009)

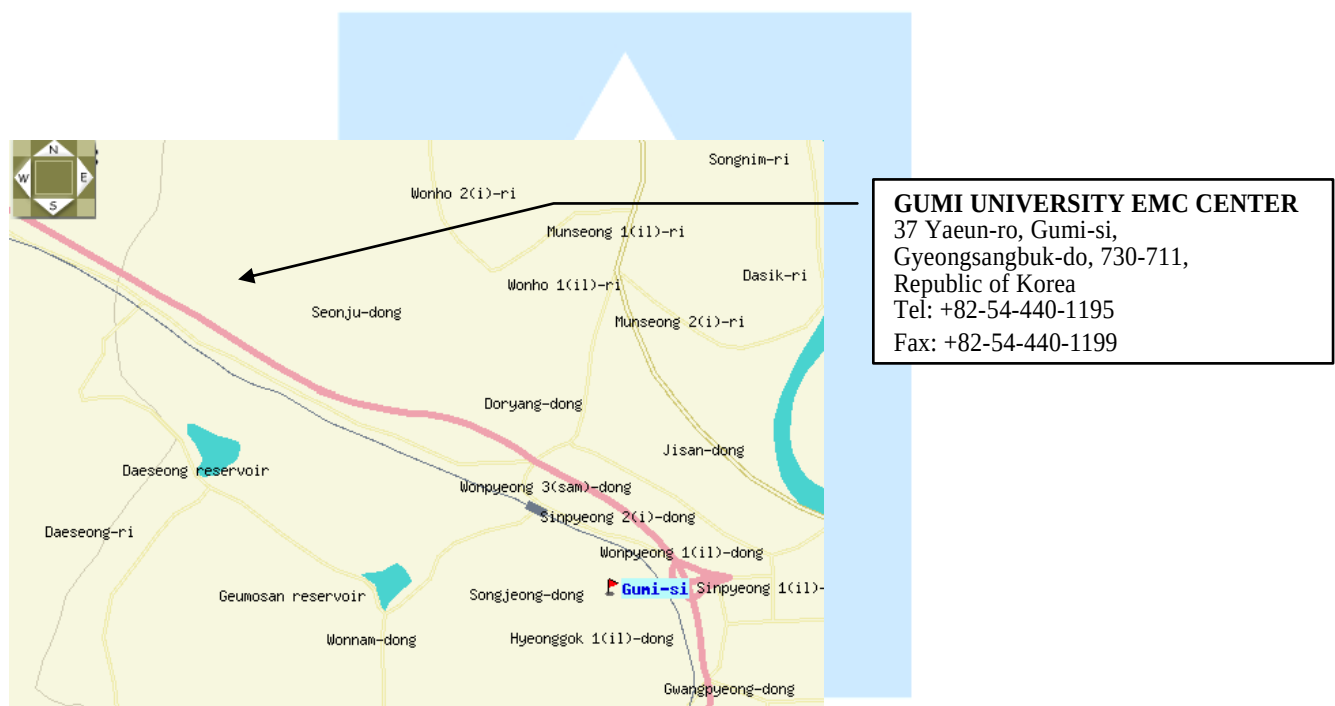


Fig 1. The map above shows the Gumi UNIVERSITY in vicinity area.



3. Product Information

3.1 Description of EUT

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

Microwave Oven (Model Name: MQ1724ASDL, UPMC3084ST¹⁾ FCC ID.: BEJQ172NYA

Type of product	Microwave Oven
Model Name	MQ1724ASDL, UPMC3084ST ¹⁾
Power Supply	AC 120 V, 60 Hz
Rated power consumption Microwave mode	1 650 W
Rated RF power output	950 W
Rated current Microwave mode	14 A
Overall Dimensions(inch)	29-3/4 x 15-7/8 x 15-5/8 (W x H x D)
Oven Cavity Dimensions(inch)	21-5/8 x 9-3/4 x 14-1/4 (W x H x D)
Cavity volume	1.7 Cu.ft.
Magnetron	2M246
Mode of Stirrer	Turntabel
Frequency range	2 450 MHz $\pm$ 50 MHz

1) UPMC3084ST: Buyer model name



3.2 Support Equipment / Cables used

3.2.1 Used Support Equipment

Description	Manufacturer	Model Name	S/N & FCC ID.
Microwave Oven	LG ELECTRONICS INC.	MQ1724ASDL, UPMC3084ST	S/N: None FCC ID.: BEJQ172NYA

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.
-	-	-	-

3.2.3 Used Cable(s)

Cable Name	Condition	Description
Power cable	Connected to the EUT and AC power source	1.00 m Unshielded

3.3 Modification Item(s)

- None



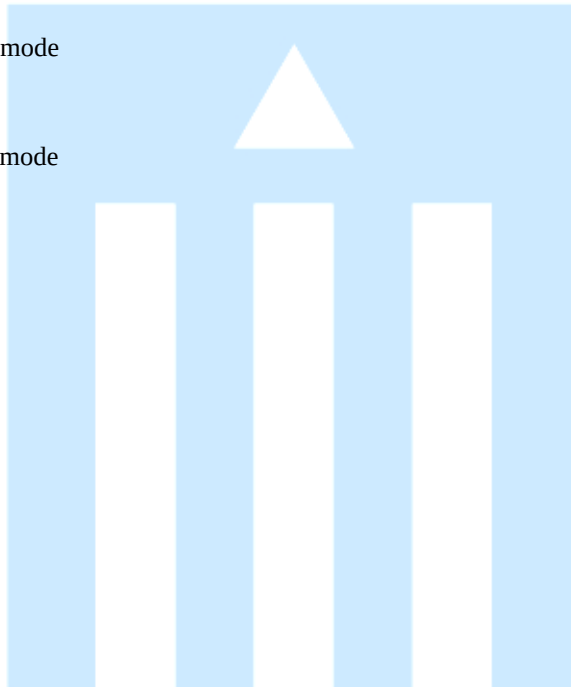
4. Description of tests

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
 - **Radiated Emission**
 - Continuous RF output mode





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.

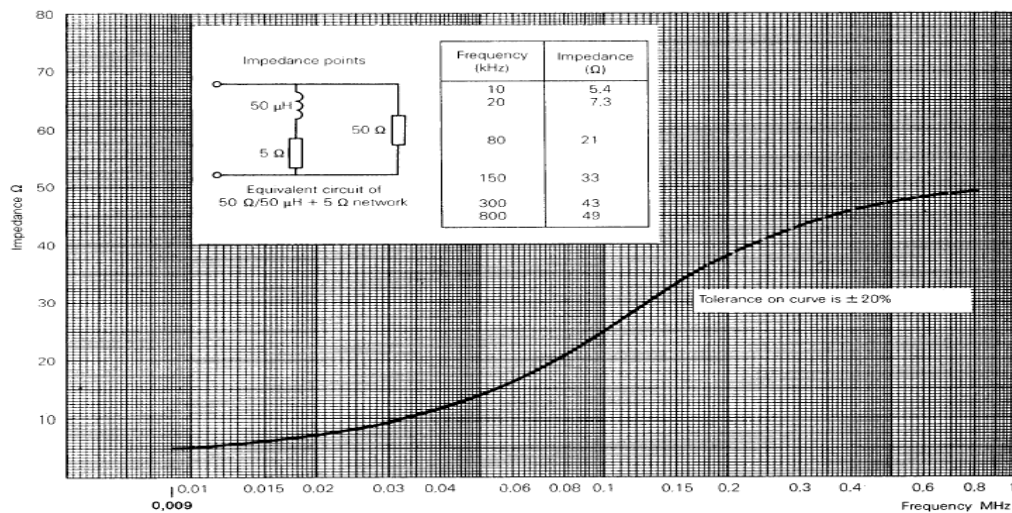


Fig 2. Impedance of LISN



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.

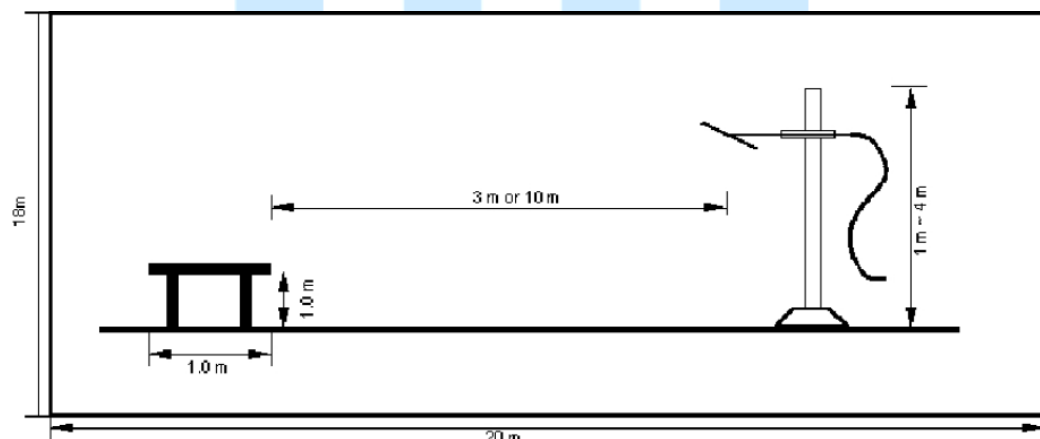


Fig 3. Dimensions of test site (Below 1 GHz)

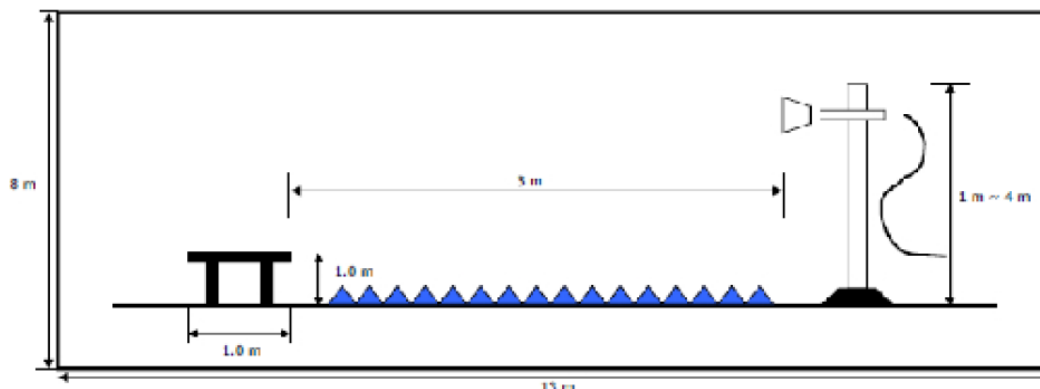


Fig 4. Dimensions of test site (Above 1 GHz)



5. Conducted Emission

5.1 Operating Environment

Temperature : 17.5 °C
Relative Humidity : 26.3 % R.H.

5.2 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.

5.3 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)	3.94 dB	Confidence level of approximately 95 % ($k = 2$)
Conducted emission (150 kHz ~ 30 MHz)	3.43 dB	Confidence level of approximately 95 % ($k = 2$)



5.4 Limit

RFI Conducted	FCC Limit(dBμV/m) Class B	
Freq. Range	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.		

5.5 Test Equipment used

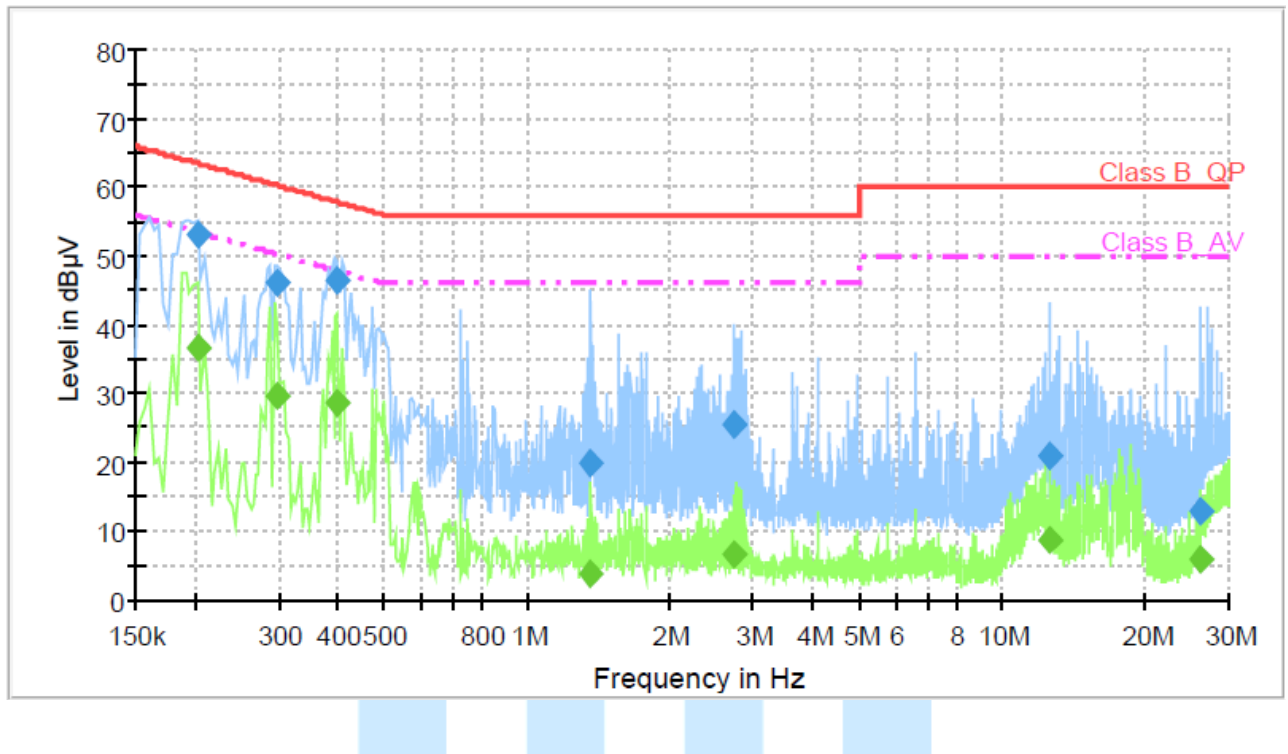
Model Name	Manufacturer	Description	Serial Number	Due to Calibration
■ - ESCI	Rohde & Schwarz	EMI Test Receiver	100237	Apr. 23, 2016
■ - ENV216 (EUT)	Rohde & Schwarz	LISN	100173	Apr. 23, 2016
□ - ENV216 (A.E)	Rohde & Schwarz	LISN	100172	Apr. 23, 2016
□ - ISN T8	TESEQ.GmbH	ISN	24568	Apr. 27, 2016

5.6 Test data for Conducted Emission

- Test Date : Feb. 18, 2016
- Resolution Bandwidth : 9 kHz
- Frequency Range : 0.15 MHz ~ 30 MHz
- Line : L1: Live, N: Neutral



- Operating condition: Continuous RF output mode



Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.202238	52.9	100.0	9.000	Off	L1	9.7	10.6	63.5	
0.299250	46.0	100.0	9.000	Off	L1	9.7	14.2	60.3	
0.399994	46.3	100.0	9.000	Off	L1	9.7	11.5	57.9	
1.366388	19.9	100.0	9.000	Off	L1	9.7	36.1	56.0	
2.743219	25.4	100.0	9.000	Off	N	9.8	30.6	56.0	
12.582525	20.8	100.0	9.000	Off	N	10.0	39.2	60.0	
26.112038	12.9	100.0	9.000	Off	N	10.3	47.1	60.0	

Final Result 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.202238	36.8	100.0	9.000	Off	L1	9.7	16.8	53.5	
0.299250	29.8	100.0	9.000	Off	L1	9.7	20.5	50.3	
0.399994	28.7	100.0	9.000	Off	L1	9.7	19.1	47.9	
1.366388	3.7	100.0	9.000	Off	L1	9.7	42.3	46.0	
2.743219	6.7	100.0	9.000	Off	N	9.8	39.3	46.0	
12.582525	8.6	100.0	9.000	Off	N	10.0	41.4	50.0	
26.112038	5.8	100.0	9.000	Off	N	10.3	44.2	50.0	

< Fig 5. Graph of continuous disturbance >



6. Radiated Emission

6.1 Operating Environment

Temperature : 15.1 °C
Relative Humidity : 41.1 % R.H.

6.2 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.

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(3 m Anechoic Chamber)	Uncertainty	Remark
Radiated emission (30 MHz ~ 300 MHz, 3 m, Vertical)	4.66 dB	Confidence level of approximately 95 % ($k = 2$)
Radiated emission (30 MHz ~ 300 MHz, 3 m, Horizontal)	4.65 dB	Confidence level of approximately 95 % ($k = 2$)
Radiated emission (300 MHz ~ 1 000 MHz, 3 m, Vertical)	4.91 dB	Confidence level of approximately 95 % ($k = 2$)
Radiated emission (300 MHz ~ 1 000 MHz, 3 m, Horizontal)	4.88 dB	Confidence level of approximately 95 % ($k = 2$)
Radiated emission (1 000 MHz ~ 6 000 MHz, 3 m)	5.32 dB	Confidence level of approximately 95 % ($k = 2$)
Radiated emission (1 000 MHz ~ 18 000 MHz, 3 m)	5.45 dB	Confidence level of approximately 95 % ($k = 2$)
Test Items(10 m Anechoic Chamber)	Uncertainty	Remark
Radiated emission (30 MHz ~ 300 MHz, 3 m, Vertical)	3.93 dB	Confidence level of approximately 95 % ($k = 2$)
Radiated emission (30 MHz ~ 300 MHz, 3 m, Horizontal)	3.95 dB	Confidence level of approximately 95 % ($k = 2$)
Radiated emission (300 MHz ~ 1 000 MHz, 3 m, Vertical)	4.09 dB	Confidence level of approximately 95 % ($k = 2$)
Radiated emission (300 MHz ~ 1 000 MHz, 3 m, Horizontal)	4.06 dB	Confidence level of approximately 95 % ($k = 2$)



6.4 Limit

Frequency (MHz)	FCC Limit @ 3 m. dB μ V/m	CISPR Limit @ 10 m. dB μ V/m
30 ~ 1 000	70.79	60.33
Above 1 000	70.79	60.33

6.5 Test Equipment used

Model Name	Manufacturer	Description	Serial Number	Due to Calibration
■ - ESIB26	Rohde & Schwarz	EMI Test Receiver	830482/010	Apr. 23, 2016
□ - VULB9160	Schwarzbeck	Broad Band Test Antenna	3193	Mar. 25, 2016
■ - BBHA9120D	Schwarzbeck	Horn ANT	207	Mar. 06, 2016
■ - 3160-09	ETS LINDGREN	Horn ANT	218457	Feb. 11, 2017
■ - MCU066	matur GmbH	Position Controller	1390306	N/A
■ - TT2.5SI	matur GmbH	Turntable	1390307	N/A
■ - AM 4.0	matur GmbH	Antenna Mast	1390308	N/A
■ - AFS 44 00101800-25-10P-44	MITEQ	Preamplifier	1258943	Jan. 05, 2017
■ - SCU-F1826-G47-BZ42-CSS(F)	Rohde & Schwarz	Preamplifier	10003	Jan. 12, 2017
■ - ESR7	Rohde & Schwarz	EMI Test Receiver	101382	Aug. 26, 2016
■ - VULB9160	Schwarzbeck	Broad Band Test Antenna	3376	Apr. 21, 2016
■ - 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

6.6 Test data for Radiated Emission

- Test Date : Feb. 17, 2016 ~ Feb. 18, 2016
- Measurement Distance : 3 m, 10 m
- Note : -

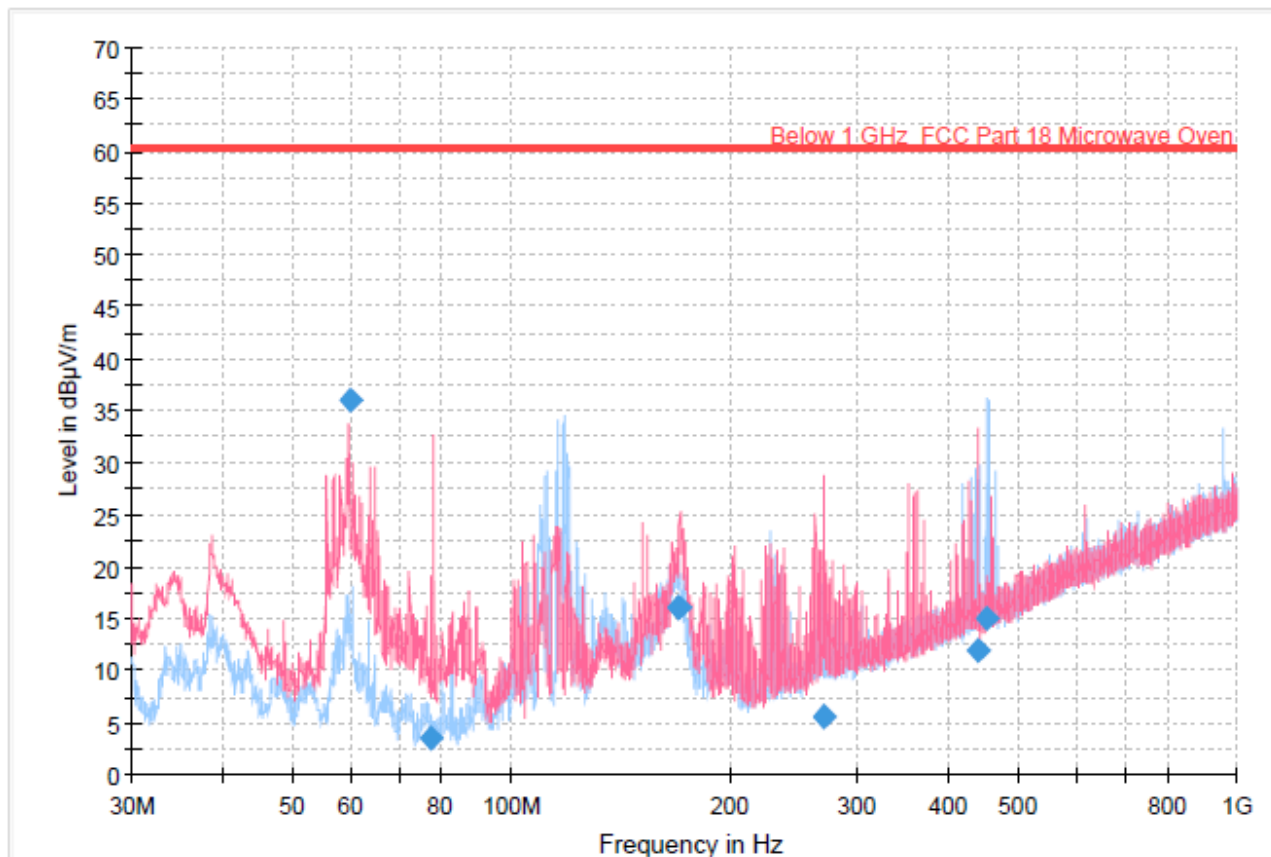
- Measurement

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



-, 30 MHz ~ 1 GHz

▪ Operating condition: Continuous RF output mode



Final Result

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
59.926	36.12	60.33	24.21	100.0	120.000	99.9	V	89.0	-12.6
77.762	3.43	60.33	56.90	100.0	120.000	125.0	V	222.0	-15.0
170.503	15.96	60.33	35.18	100.0	120.000	125.0	V	359.0	-10.6
170.503	15.96	60.33	44.37	100.0	120.000	125.0	V	359.0	-10.6
268.750	5.54	60.33	54.79	100.0	120.000	99.8	V	66.0	-9.5
439.219	11.85	60.33	48.48	100.0	120.000	400.0	V	189.0	-4.3
452.194	15.00	60.33	45.33	100.0	120.000	107.8	H	68.0	-4.0

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



-. 1 GHz ~ 26 GHz

Freq. [GHz]	Corr. [dB]	Pol.	Load [mL]	Load Location	Reading [dBμV]	Limit [dBμV/m]	Margin [dB]
2.386	33.72	V	700	Rt. Front	21.85	70.79	15.22
2.394	33.75	H	300	Center	33.52	70.79	3.52
8.380	8.20	H	300	Center	57.33	70.79	5.26
8.410	8.28	V	300	Center	53.02	70.79	9.49
19.667	9.33	V	300	Rt. Front	53.32	70.79	8.14
19.683	9.35	H	300	Rt. Front	49.79	70.79	11.65

Notes:

- 1) Corr. = Ant. Factor + Cable Loss + Amp.
- 2) 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.
- 3) Load for all other measurements: 700 mL of water, with the beaker located in the center of the oven.
- 4) The tests were made with average detector for frequency range of 1 GHz to 26 GHz.



7. Input Power

7.1 Operating Environment

Temperature : 21.2 °C
Relative Humidity : 23.5 % R.H.

7.2 Test Set-up

Test input power was measured using Wattmeter. A 275 mL water load in a polypropylene beaker is placed in the center of the oven. The 275 mL water was chosen for its compatibility with UL procedure to determine input ratings. The oven was operated at the rated input and full output power for 6 minutes.

7.3 Test Equipment used

Model Name	Manufacturer	Description	Serial Number	Due to Calibration
■ - 360AMX	Pacific	AC power source	0438	N/A
■ - PM6000	Voltech	Power analyzer	100006700132	Mar. 09, 2016

7.4 Test data for Input Power

-. Test Date : Feb. 17, 2016
-. Test condition : Continuous RF output mode (Load: 275 mL)
-. Measurement

Mode	Input Voltage	Current [A]	Power Consumption [W]	Manufacturer Rating [A]
Microwave	AC 120 V, 60 Hz	13.8	1 453.8	14.0



8. RF Power Output Measurement according to MP-5

8.1 Operating Environment

Temperature : 21.3 °C
Relative Humidity : 23.1 % R.H.

8.2 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

8.3 Test Equipment used

Model Name	Manufacturer	Description	Serial Number	Due to Calibration
■ - 360AMX	Pacific	AC power source	0438	N/A
■ - PM6000	Voltech	Power analyzer	100006700132	Mar. 09, 2016

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

-. Test Date : Feb. 17, 2016
-. 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	12.8 °C	40.3 °C	120 Sec

$$\text{Power [W]} = \frac{4.187 \times 1\,000 \times 27.5}{120}$$

Power [W] = 959.5 Watts



9. Frequency Measurement

9.1 Operating Environment

Temperature : 20.2 °C
Relative Humidity : 26.3 % R.H.

9.2 Test Equipment used

Model Name	Manufacturer	Description	Serial Number	Due to Calibration
■ - ESIB26	Rohde & Schwarz	EMI Test Receiver	830482/010	Apr. 23, 2016
□ - VULB9160	Schwarzbeck	Broad Band Test Antenna	3193	Mar. 25, 2016
■ - BBHA9120D	Schwarzbeck	Horn ANT	207	Mar. 06, 2016
■ - MCU066	matur GmbH	Position Controller	1390306	N/A
■ - TT2.5SI	matur GmbH	Turntable	1390307	N/A
■ - AM 4.0	matur GmbH	Antenna Mast	1390308	N/A
■ - AFS 44 00101800-25-10P-44	MITEQ	Preamplifier	1258943	Jan. 05, 2017

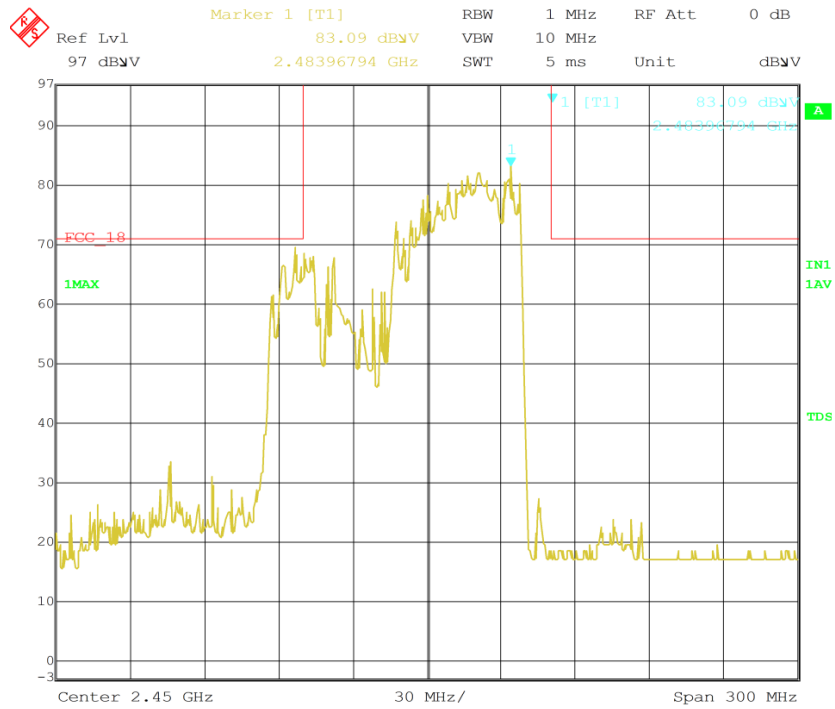
9.3 Test data for Frequency Measurement

9.3.1 Line Voltage Variation Test

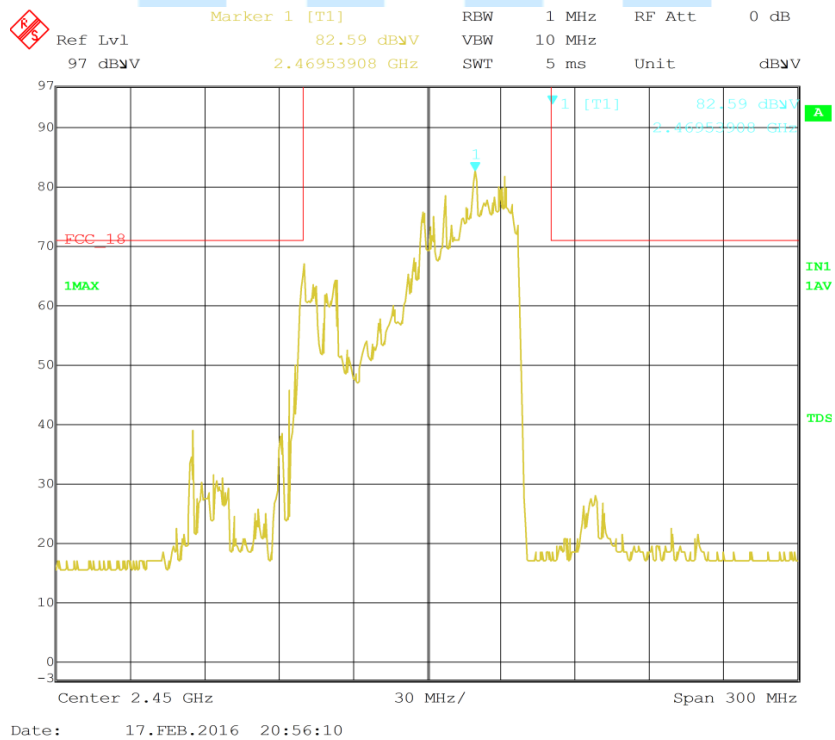
- Test Date : Feb. 17, 2016
- Test condition : Continuous RF output mode
- Test Voltage : AC 96 V, 60 Hz and AC 150 V, 60 Hz
- Load : 1 000 mL
- Fundamental Frequency : 2 450 MHz
- Limit : $2.4 \text{ GHz} < f < 2.5 \text{ GHz}$
- Measurement : Maximum Frequency Observed – 2.469 GHz
Minimum Frequency Observed – 2.483 GHz

9.3.2 Load Variation Test

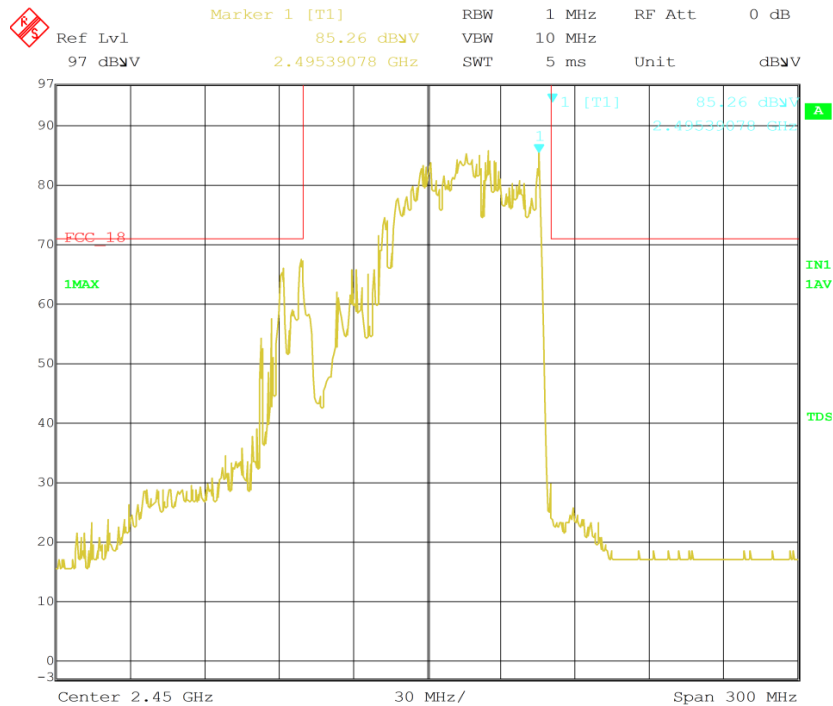
- Test Date : Feb. 17, 2016
- Test condition : Continuous RF output mode
- Test Voltage : AC 120 V, 60 Hz
- Initial Load : 1 000 mL
- Final Load : 200 mL
- Fundamental Frequency : 2 450 MHz
- Limit : $2.4 \text{ GHz} < f < 2.5 \text{ GHz}$
- Measurement : Maximum Frequency Observed – 2.465 GHz
Minimum Frequency Observed – 2.495 GHz



< Fig 7. Frequency Measurements (Maximum Frequency Observed: 2.483 GHz) >

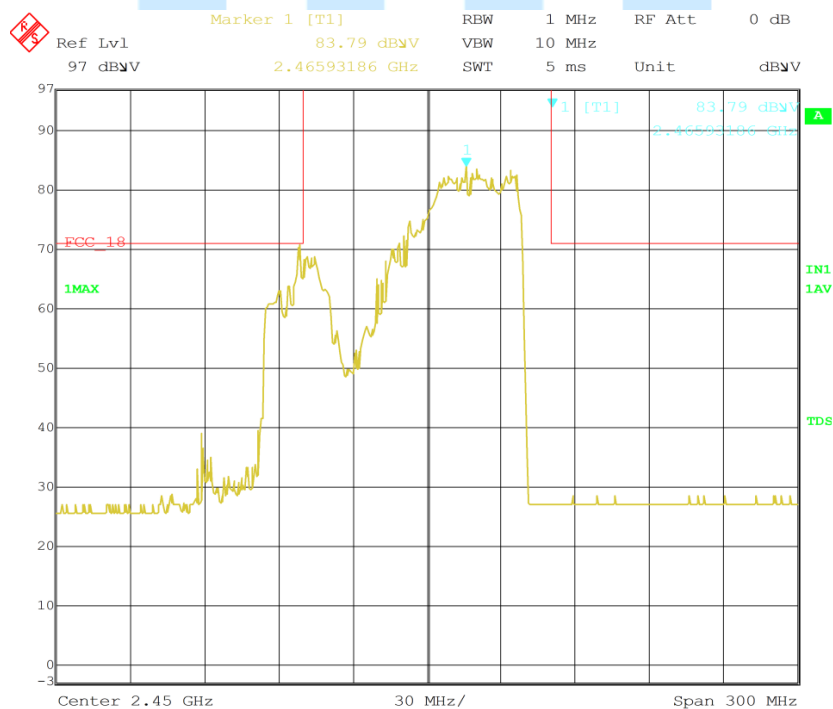


< Fig 8. Frequency Measurements (Minimum Frequency Observed: 2.469 GHz) >



Date: 17.FEB.2016 20:21:14

< Fig 9. Frequency Measurements (Maximum Frequency Observed: 2.495 GHz) >



Date: 17.FEB.2016 20:10:33

< Fig 10. Frequency Measurements (Minimum Frequency Observed: 2.465 GHz) >



10. Power Density Safety Check

10.1 Test Set-up

The power density was checked to ensure that the power is not greater than 1.0 mW/cm^2 at any location of the oven. The 1.0 mW/cm^2 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 and did not exceed the specified limits.

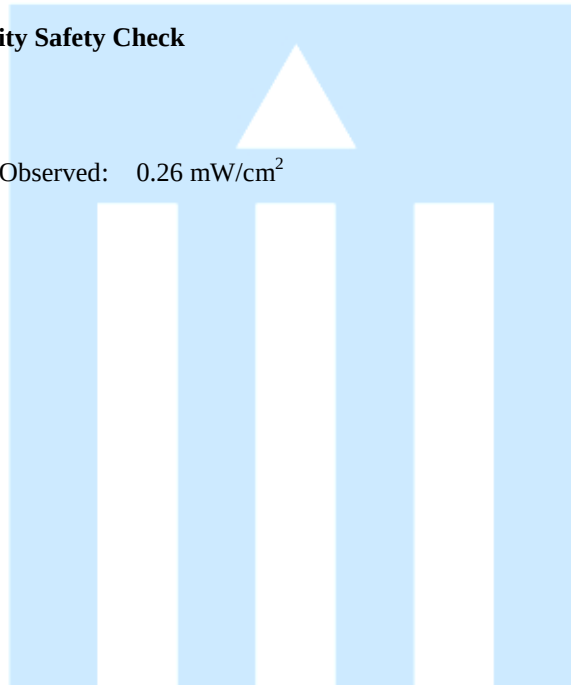
10.2 Test Equipment used

Model Name	Manufacturer	Description	Serial Number	Due to Calibration
■ - Holaday	ETS LINDGREN	Microwave Survey Meter	FJZ431 HA	Jul. 30 2017

10.3 Test data for Power Density Safety Check

-. Measurement

Maximum Leakage Microwave Observed: 0.26 mW/cm^2





11. Sample Calculations

$$\begin{aligned} \text{dB}\mu\text{V} &= 20 \text{ Log}_{10}(\mu\text{V}/\text{m}) \\ \text{dB}\mu\text{V} &= \text{dBm} + 107 \\ \mu\text{V} &= 10^{(\text{dB}\mu\text{V}/20)} \end{aligned}$$

11.1 Example 1 :

■ 20.3 MHz

Class B Limit	= 250 μV = 48 dB μV
Reading	= 39.2 dB μV
$10^{(39.2\text{dB}\mu\text{V}/20)}$	= 91.2 μV
Margin	= 48 dB μV - 39.2 dB μV
	= 8.8 dB

11.2 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 dB μV
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



12. Recommendation & Conclusion

The data collected shows that the **LG ELECTRONICS INC. Microwave Oven (Model Name: MQ1724ASDL, UPMC3084ST)** was complies with §18.305, 18.307, 18.309 and 18.311 of the FCC Rules.

- The end -

