

LG Electronics Inc.

Home Appliance Company, EMC Center

391-2, Ga Eum Jeong – Dong, Seongsan – Gu, Changwon City, Gyeong Nam
641-711, KOREA
Tel: + 82 55 260 3966, Fax: +82 55 268 4530

CERTIFICATION OF COMPLIANCE

Date of Issue: February 24, 2014

Test Report No: 14-EMUS-0062

Test Site: LG Electronics Changwon EMC Center

Applicant:	LG Electronics Inc.
Regulation:	FCC Part 18 – ISM Consumer Device
Test Procedure:	MP-5: 1985
Equipment Class:	Industrial, Scientific, and Medical equipment
EUT Type:	Microwave oven
Magnetron Type:	2M246 (LG)
Brand Name(s):	LG
Model No.:	MZ1693GSML (Buyer model No.: 191D7830G002)
FCC ID:	BEJX169NV

This device has been verified to comply with the applicable requirements in the FCC Part 18 and was tested in accordance with the measurement procedures specified in MP-5: 1985.

I assure full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.



Kim Dae Woong / Chief Research Engineer
Home Appliance Company,
EMC Center
LG Electronics Inc.

REPORT FOR A MICROWAVE OVEN

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

EUT Type:	Microwave oven
Model No.:	MZ1693GSML (Buyer model No.: LMV1831ST)
FCC ID:	BEJX169NV
Rule Part:	FCC Part 18
Test Procedure:	MP-5: 1985
Date of Test:	November 27, 2013 – February 24, 2014
Date of Issue:	February 24, 2014
Test Result:	Pass

EMC Center authorizes the above-named applicant to reproduce this report provided it is reproduced in its entirety.

EMC Center reports apply only to the specific sample(s) tested under stated test conditions. It is the manufacturer's responsibilities to assure that additional production unit of this model are manufactured with identical electrical and mechanical components.

This report is the confidential property of the client. As a mutual protection to our clients, the public and ourselves, extracts from the test report shall not be reproduced except in full without our written approval.

This report must not be used by the client to claim product endorsement by any agency of the U.S. Government.

The EMC Center facilities has been placed on file and the name of our organization added to the FCC's list for the FCC Part 15 and 18 of the Commission's Rules under Registration Number 93197.

Tested by:



Kim Tae Yul / Research Engineer
Home Appliance Company,
EMC Center
LG Electronics Inc.

Reviewed by:



Son Kwang Mu / Chief Research Engineer
Home Appliance Company,
EMC Center
LG Electronics Inc.

CONTENTS

	Page
1. CLIENT INFORMATION	3
2. EQUIPMENT UNDER TEST (EUT).....	3
3. TEST SITE.....	4
4. CALIBRATIONS OF MEASURING INSTRUMENT	4
5. DESCRIPTION OF TEST CONDITION	4
5.1 POWER LINE CONDUCTED EMISSION MEASUREMENTS	4
5.2 RADIATED EMISSIONS MEASUREMENT.....	5
6. MEASURING INSTRUMENT	9
7. TEST DATA.....	10
7.1 INPUT POWER.....	10
7.2 RF POWER OUTPUT MEASUREMENT ACCORDING TO MP-5.....	10
7.3 FREQUENCY MEASUREMENTS	11
7.4 POWER DENSITY SAFETY CHECK	12
7.5 CONDUCTED EMISSIONS (SECTION 18.307)	12
7.6 RADIATED EMISSIONS (SECTION 18.305).....	13
APPENDIX A. TEST PLOT.....	14
APPENDIX B. TEST PHOTOS	18

1. CLIENT INFORMATION

The EUT has been tested by request of:

Company: 1. LG Electronics Inc. Kitchen Package Division
(Manufacturer) 170, Sungsanpaechongro, Seongsan-gu, Changwon-si,
Gyeongsangnam-do, 642-711, Korea
2. LG Electronics Tianjin Appliance Co., Ltd.
Xing Dian Road, Bei Chen Distr., Tianjin 300402,
People's Republic of China
Name of contact: Mi Ran Park
Telephone: +82-55-260-3463
Fax: +82-55-268-4783

2. EQUIPMENT UNDER TEST (EUT)

EUT is the LG Electronics Inc. Microwave Oven as followings:

Equipment: Microwave oven
Model: MZ1693GSML (Buyer model No.: 191D7830G002)
Brand name: LG
Serial number: N/A
Magnetron: 2M246 by LG
RF Frequency: 2,450 ± 50 MHz
RF Power Output (MP-5): 635 W
Power Consumption
Microwave Mode: 1600 W
Rated Input Voltage: 120 V~, 60 Hz
Rated Input Current
Microwave Mode: 13.5 A
Cavity Volume: 1.6 Cu.ft
Oven Type: Over the range / Household
Mode Stirrer: Turntable and Stirrer
Power Cord: Shielded
Outer Dimensions (inch) 29.7 (W) * 18.4 (H) * 21.4 (D)

EMI suppression device(s) installed in production: See schematics (Appendix C & E)

EMI suppression device(s) added and/or modified during test: None

3. TEST SITE

Measurement of radiated emissions from EUT was made at semi-anechoic chamber that has been in compliance with Federal Communications Commissions (FCC) requirements of clause 2.948 according to ANSI C63.4-2001 on April 20, 2012.

4. CALIBRATIONS OF MEASURING INSTRUMENT

All measurement was made with instruments calibrated according to the recommendation by manufacturer. Measurement of radiated emissions and power line conducted emissions were made with instruments conforming to American National Standard Specification, ANSI C63.4-2001. The calibration of measuring instrument, including any accessories that may affect test results, was performed according to the recommendation by manufacturer.

5. DESCRIPTION OF TEST CONDITION

5.1 Power line conducted emission measurements

Power line conducted emission measurements were based on the std. MP-5:1985.

5.1.1 Shielded enclosure

The measurement for power-line emissions from EUT was made in shielded enclosure that provides sufficient shielding effectiveness enough not to affect test results.

5.1.2 Detector function selection and bandwidth

During conducted emission measurement, a radio noise meter that has a quasi-peak detector with 10 kHz IF bandwidth of 6 dB was utilized.

5.1.3 Frequency range to be scanned

For conducted emissions measurement, frequency range of 150 kHz to 30 MHz included was investigated.

5.1.4 Unit of measurement

Test results for conducted emissions are reported in micro-volt.

5.1.5 Line impedance stabilization network (LISN)

A LISN with characteristics that conform to the requirements of MP-5:1985 was used for the measurement of conducted power-line radio noise; (50 micro-henries / 50 ohms). Chassis and earth-points for grounding of the LISN were earth-grounded.

5.1.6 Test conditions and configuration of EUT

The EUT was configured and operated in all modes of operation so as to find the maximum enumeration of emissions from EUT.

The EUT has designed to use the public AC lines with rated AC voltage as specified in owner's manual and Installation's manual of EUT and filtered to meet the requirement.

AC power was supplied to the EUT through LISN with characteristics described in 5.1.5 of part I of this report.

The EUT was placed on a 1 m×1.5 m×40 cm high wooden table which is placed on the earth-grounded conducting surface larger than 2 square meter. The vertical conducting surface was replaced with horizontal ground plane. Length of the power lead in excess of 80 cm horizontally separating the EUT from LISN was folded back-and-forth form at the center of the power cord not exceeding 40 cm in length.

The EUT was operated with a load of 1000 ml water initially at 20 ± 5 °C placed at the center of the load-carrying surface.

Each type of accessory provided by manufacturer or typically used and support equipment were connected to the EUT during measurement to the typical usage and applicable as nearly as practicable.

5.1.7 Measurement uncertainty

The measurement uncertainty describes the overall uncertainty of the given measured value during the operation of the EUT in the above-mentioned way.

The measurement uncertainty was calculated in accordance with NAMAS NIS 81:

“The treatment of uncertainty in EMC measurement.”
For calculated uncertainty of each item, refer the next page.

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

5.2 Radiated emissions measurement

5.2.1 Test site

Measurement was made in semi-anechoic chamber as described at Clause 3 in this report.

5.2.2 Detector function selection and bandwidth

In radiated emissions measurement, field strength meter that has quasi-peak and average detector was used. The bandwidth of the detector of instrument is 120 kHz for frequency range of 30 MHz – 1,000 MHz, and 1 MHz for frequency range of 1 GHz to 26 GHz. Emissions be measured are detected in average mode.

5.2.3 Unit of measurement

Test results of radiated emissions measurement are reported in microvolts per meter at the specific distance. Using the unit of dBμV on the test instrument, the indication unit was converted to field strength unit of μV/m as following method;

$$F / S = 10^{(R+AF+CF)/20} (\mu V/m)$$

here,

F / S: Field Strength in μV/m, R: Meter Reading Level in dB(μV),

AF: Antenna Factor in dB/m

CF: Conversion Factor

* 30 MHz ~ 1 GHz: CF = CL

* Above 1 GHz: CF = CL – PG + FL + AL

CL: Cable Loss (dB)

FL: Filter Loss (dB)

PG: Preamplifier Gain (dB)

AL: Attenuator Loss (dB)

5.2.4 Antennas

Measurements were made using calibrated biconical antenna in range of 30 MHz to 300 MHz, log-periodic antenna in range of 300 MHz to 1,000 MHz and horn antenna in range of 1 to 26 GHz to determine the emission characteristics of the EUT. Measurements were also made for both horizontal and vertical polarization.

The horizontal distance between the receiving antenna and the closest periphery of the EUT was 3 meters for horn antenna and 10 meters for biconical and log-periodic antenna.

5.2.5 Frequency range to be scanned

For radiated emissions measurements, the spectrum in the range of 30 to 1,000 MHz and above, if found, was investigated.

5.2.6 Test conditions and configuration of EUT

The EUT was configured and operated in all modes of operation so as to find the maximum RF energy generated from EUT.

The power was furnished with rated (normal) AC 120 volts, as specified in the Owner's manual of EUT. The EUT was placed on a 1 m high non-metallic table. The turntable containing the system was rotated and the antenna height was varied 4 m to find the maximum RF energy detected from EUT.

Each type of accessory provided by manufacturer or typically used and support equipment were connected to the EUT during measurement to the typical usage and applicable as nearly as practicable.

5.2.7 Measurement uncertainty

The measurement uncertainty describes the overall uncertainty of the given measured value during the operation of the EUT in mentioned above way.

The measurement uncertainty was calculated in accordance with NAMAS NIS 81: "The treatment of uncertainty in EMC measurement."

For calculated uncertainty of each item, refer the next page.

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

< Fundamental Frequency Uncertainty (2,450 MHz) >

Symbol	Contribution	Value (dB)		Probability Distribution	Divisor	Standard Uncertainty	Standard Uncertainty Squared
						Horn Antenna (Value / Divisor)	
			3 m			3 m	
V ₁	Ambient signals				1	0.00	0.0
V ₂	Antenna factor calibration	Expanded Uncertainty	0.69	normal (k = 2)	2	0.35	0.1
V ₃	Cable loss calibration	Expanded Uncertainty	1.0	normal (k = 2)	2	0.50	0.3
V ₄	Receiver specification	Tolerance	1.0	rectangular	1.732	0.58	0.3
V ₅	Measurement distance variation	Tolerance	0.5	rectangular	1.732	0.29	0.1
V ₆	Site imperfections	Tolerance	1.0	rectangular	1.732	0.58	0.3
V ₇	Mismatch Receiver VRC: $J_1 = 0.33$ Antenna VRC: $J_g = 0.20$ Uncertainty limits $20\text{Log}(1 \pm J_1 J_g)$	Tolerance	1.0	rectangular	1.732	0.58	0.3
V ₈	System repeatability (previous assessment of $s(q_k)$ from 5 repeats, 1 reading on EUT Repeatability of EUT*		0.5	Std Deviation	1	0.50	0.3
	Combined standard uncertainty $u_c(y)$		1.30	normal			
	Expanded uncertainty U		2.61	normal (k = 2)			

$$u_c(y) = \sqrt{\left(\frac{0.0}{1}\right)^2 + \left(\frac{0.7}{2}\right)^2 + \left(\frac{1.0}{2}\right)^2 + \frac{1.0^2 + 0.5^2 + 1.0^2}{3} + \frac{1^2 + 0.5^2}{2}}$$

The level of confidence will be approximately 95%. (The coverage factor: k=2)

$$U = 2 u_c(y) = 2 \times 1.30 = \pm 2.6 \text{ dB}$$

< Radiated Emission Uncertainty (Above 1 GHz) >

Symbol	Contribution	Value (dB)		Probability Distribution	Divisor	Standard Uncertainty	Standard Uncertainty Squared
						Horn Antenna (Value / Divisor)	
			3 m			3 m	
V ₁	Ambient signals		3 m	-	1	0.00	0.0
V ₂	Antenna factor calibration #1	Expanded Uncertainty	0.69	normal (k = 2)	2	0.35	0.1
V ₃	Antenna factor calibration #2	Expanded Uncertainty	0.69	normal (k = 2)	2	0.35	0.1
V ₄	Cable loss calibration	Expanded Uncertainty	1.0	normal (k = 2)	2	0.50	0.3
V ₅	Receiver specification	Tolerance	1.0	rectangular	1.732	0.58	0.3
V ₆	Highpass filter	Tolerance	0.23	rectangular	2	0.12	0.0
V ₇	Measurement distance variation	Tolerance	0.5	rectangular	1.732	0.29	0.1
V ₈	Site imperfections	Tolerance	1.0	rectangular	2	0.50	0.3
V ₉	Mismatch Receiver VRC: $\xi_i = 0.09$ Antenna VRC: $\xi_g = 0.2$ Uncertainty limits $20\text{Log}(1\pm \xi_i \xi_g)$	Tolerance	0.15	U-shaped	1.414	0.11	0.0
V ₁₀	System repeatability (previous assessment of $s(q_k)$ from 5 repeats, 1 reading on EUT Repeatability of EUT*		0.5	Std Deviation	1	0.50	0.3
	Combined standard uncertainty $u_c(y)$		1.20	normal			
	Expanded uncertainty U		2.39	normal (k = 2)			

$$u_c(y) = \sqrt{\left(\frac{0.0}{1}\right)^2 + \left(\frac{0.7}{2}\right)^2 + \left(\frac{0.7}{2}\right)^2 + \left(\frac{1.0}{2}\right)^2 + \frac{1.0^2}{3} + \left(\frac{0.23}{2}\right)^2 + \frac{0.5^2}{3} + \left(\frac{1.0}{2}\right)^2 + \frac{0.15^2}{2} + 0.5^2}$$

The level of confidence will be approximately 95%. (The coverage factor: k=2)

$$U = 2 u_c(y) = 2 \times 1.20 = \pm 2.4 \text{ dB}$$

< Electric Field Strength Uncertainty (30 MHz – 1 GHz) >

Symbol	Contribution	Value (dB)		Probability Distribution	Divisor	Standard Uncertainty	Standard Uncertainty Squared
			10 m			UltraLog Antenna (Value / Divisor) 10 m	
V ₁	Ambient signals			Std Deviation	1	0.00	0.0
V ₂	Antenna factor calibration	Tolerance	0.7	rectangular	2	0.35	0.1
V ₃	Cable loss calibration	Expanded Uncertainty	1.0	normal (k = 2)	2	0.50	0.3
V ₄	Receiver specification	Tolerance	1.0	rectangular	1.732	0.58	0.3
V ₅	Antenna directivity	Tolerance	1.0	rectangular	1.732	0.58	0.3
V ₆	Antenna factor variation with height	Tolerance	2.0	rectangular	1.732	1.15	1.3
V ₇	Antenna phase center variation	Tolerance	0.5	rectangular	1.732	0.3	0.1
V ₈	Antenna factor frequency interpolation	Tolerance	0.25	rectangular	1.732	0.14	0.0
V ₉	Measurement distance variation	Tolerance	0.5	rectangular	1.732	0.29	0.1
V ₁₀	Site imperfections	Tolerance	1.0	normal	2	0.50	0.3
V ₁₁	Mismatch Receiver VRC: (_i = 0.09 Antenna VRC: (_g = 0.33 Uncertainty limits 20Log(1± (_i (_g)	Tolerance	0.25	U-shaped	1.414	0.18	0.0
V ₁₂	System repeatability (previous assessment of s(q _k) from 5 repeats, 1 reading on EUT Repeatability of EUT*		0.5	Std Deviation	1	0.50	0.3
	Combined standard uncertainty u _c (y)		1.76	normal	2		
	Expanded uncertainty U		3.51	normal (k = 2)	2		

$$u_c(y) = \sqrt{\left(\frac{0.0}{1}\right)^2 + \left(\frac{0.7}{2}\right)^2 + \left(\frac{1.0}{2}\right)^2 + \frac{1.0^2 + 1.0^2 + 2.0^2 + 0.5^2 + 0.25^2 + 0.5^2}{3} + \left(\frac{1.0}{2}\right)^2 + \frac{0.25^2}{2} + 0.5^2}$$

The level of confidence will be approximately 95%. (The coverage factor: k=2)

$$U = 2 u_c(y) = 2 \times 1.76 = \pm 3.5 \text{ dB}$$

< Line Conducted Uncertainty >

Symbol	Contribution	Value (dB)		Probability Distribution	Divisor	Standard Uncertainty (dB)	Standard Uncertainty Squared
						150 kHz - 30 MHz (Value / Divisor)	
V ₁	Receiver specification	Tolerance	1.0	rectangular	1.732	0.58	0.3
V ₂	LISN coupling specification	Tolerance	1.0	rectangular	1.732	0.58	0.3
V ₃	Cable and input attenuator calibration	Expanded Uncertainty	1	normal (k = 2)	2	0.50	0.3
V ₄	Mismatch Receiver VRC: $\hat{\Gamma}_i = 0.09$ LISN VRC: $\hat{\Gamma}_g = 1.0$ Uncertainty limits 20Log (1± $\hat{\Gamma}_i$ $\hat{\Gamma}_g$)	Tolerance	0.75	U-shaped	1.414	0.53	0.281
V ₅	System repeatability (previous assessment of s(q _k) from 10 repeats, 1 reading on EUT)		0.50	standard deviation	1	0.50	0.25
	Combined standard uncertainty u _c (y)		1.20	normal			
	Expanded uncertainty U		2.41	normal (k = 2)			

$$u_c(y) = \sqrt{\frac{1.0^2 + 1.0^2}{3} + \left(\frac{1.0}{2}\right)^2 + \frac{0.75^2}{2} + 0.50^2} = 1.2$$

The level of confidence will be approximately 95%. (The coverage factor: k=2)

$$U = 2 u_c(y) = 2 \times 1.20 = \pm 2.40 \text{ dB}$$

6. MEASURING INSTRUMENT

Instrument	Model	Cal. Due date	Serial No.	Control No.
Accessory Kit	-	-	7044/45-002	99-IRE-16
Microwave Amp	8449B	10/22/2014	3008A01821	02-IRE-33
Horn Antenna	RGA-180 (Electro Metrics)	08/01/2015	2517	99-IRE-22
	RGA-60 (Electro Metrics)	09/11/2014	6104	99-IRE-21
Antenna Master	2070-2 (EMKO)	-	9903-2231	99-IRE-23
Ultra Log Antenna	HL562 (Chase)	08/07/2015	830547/007	99-IRE-26
High Pass Filter	11SH10-4500/ X1800-010	10/22/2014	2	99-IRE-07
EMI Receiver	ESI26 (R&S)	10/22/2014	835336/008	00-IRE-30
	ESU26 (R&S)	10/22/2014	100164	08-IRE-36
LISN	ESH2-Z5 (R&S)	04/01/2014	100081	03-2ICE-03
Microwave Cable	Sucoflex 104	-	125484/4	-
Microwave Cable	Sucoflex 106	-	13417/6	-
Microwave Cable	Sucoflex 106	-	13419/6	-
Microwave Cable	Sucoflex 106	-	13418/6	-
Microwave Cable	Sucoflex 104	-	125483/4	-
Microwave Cable	Sucoflex 104	-	12548/4	-
Microwave Cable	Sucoflex 106	-	13416/6	-
Microwave Cable	Sucoflex 106	-	13416/6	-
Microwave Cable	Sucoflex 104PE	-	46894/4PE	-
Microwave Cable	Sucoflex 104PE	-	46895/PE	-
Semi Anechoic Chamber	YES INC.	-	-	99-CFA-01
Shield Screen Room	YES INC.	-	-	99-CFA-02
Digital Power Meter	WT110 (Yokogawa)	04/18/2014	12VB14689L	99-IAC-03
Microwave Survey Meter	Holaday	10/01/2014	-	FJZ394HA

7. TEST DATA

7.1 Input Power

The 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.

1) Magnetron type: 2M246 by LG

<u>Mode</u>	<u>Input Voltage</u>	<u>Current [A]</u>	<u>Power Consumption</u> [W]	<u>Manufacturer</u> <u>Rating [A]</u>
Microwave	120 Vac, 60 Hz	15.5	1600	13.5

7.2 RF Power Output Measurement according to MP-5.

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.

1) Magnetron type: 2M246 by LG

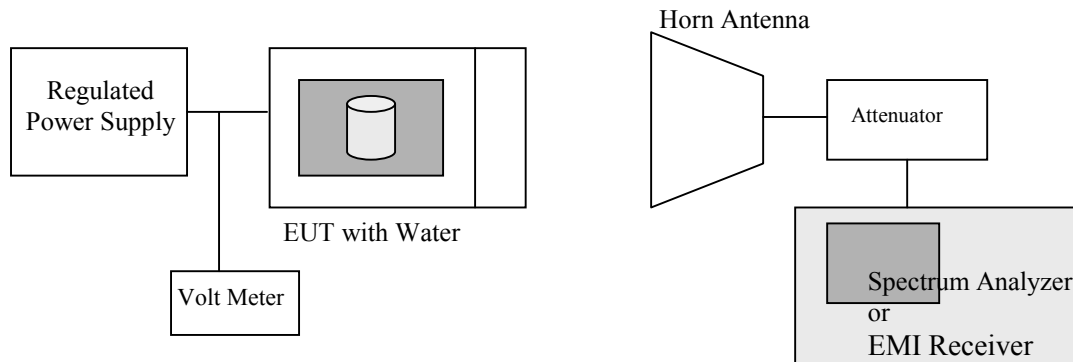
$$\text{Power [W]} = \frac{(4.187 \text{ Joules/Cal}) * (\text{Volume in ml}) * (\text{Temperature Rise})}{\text{Time in Seconds}}$$

<u>Quantity of Water</u>	<u>Starting Temperature</u>	<u>Final Temperature</u>	<u>Elapsed Time</u>
1,000 ml	21.4 °C	39.6 °C	120 Sec

$$\text{Power [W]} = \frac{4.187 * 1,000 * 18.2}{120}$$

$$\text{Power [W]} = 635.0 \text{ Watts}$$

7.3 Frequency measurements



1) Magnetron type: 2M246 by LG

(1) Frequency vs Line Voltage Variation Test

Variation of line voltage from 80 % (96 V) to 125 % (150 V)

Load: 1,000 ml

Fundamental Frequency: 2,450 MHz

Limit: $2.4 \text{ GHz} < f < 2.5 \text{ GHz}$

Maximum Frequency Observed: 2,455 MHz

Minimum Frequency Observed: 2,453 MHz

Result: Pass

(2) Frequency vs Load Variation Test

Frequency was measured at the rated input voltage (AC 120 V).

Initial Load: 1,000 ml

Final Load: 200 ml

Fundamental Frequency: 2,450 MHz

Limit: $2.4 \text{ GHz} < f < 2.5 \text{ GHz}$

Maximum Frequency Observed: 2,460 MHz

Minimum Frequency Observed: 2,438 MHz

Result: Pass

7.4 Power Density Safety Check

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.

1) Magnetron type: 2M246 by LG

Maximum Leakage Microwave Observed: 0.31 mW/cm^2

Result: **Pass**

7.5 Conducted emissions (Section 18.307)

Conducted emission was measured at a frequency range 150 kHz to 30 MHz. The Power Line disturbance voltage was measured with the equipment under test (EUT) in a shielded room. The EUT was connected to a line impedance stabilization network (LISN) placed on the floor. The EUT was placed on a non-metallic table 0.4 m above the metallic, grounded floor. The distance to other metallic surfaces was at least 0.4 m.

The line conducted emission measurement procedure and test configuration is based on MP-5:1985.

Amplitude measurements were performed with a quasi-peak detector and, if required, with an average detector.

Below data are the highest levels in Microwave mode.

An overview sweep performed with peak detector is included in the APPENDIX A (Test Plot).

1) Magnetron type: 2M246 by LG

Frequency [MHz]	Quasi-Peak			Average			Result
	Disturbance Level [dBuV]	Permitted Limit [dBuV]	Margin [dB]	Disturbance Level [dBuV]	Permitted Limit [dBuV]	Margin [dB]	
0.330	40.5	59.5	-19.0	22.0	49.5	-27.5	PASS
0.334	38.4	59.4	-21.0	20.3	49.4	-29.1	PASS
2.722	36.7	56.0	-19.3	14.9	46.0	-31.1	PASS
15.858	43.3	60.0	-16.7	37.6	50.0	-12.4	PASS
15.938	42.5	60.0	-17.5	37.2	50.0	-12.8	PASS

Remark:

1. "<<" means that disturbance level is lower than 20 dB below the limit.
2. The measured disturbance level includes all related factor. (LISN Insertion loss and Cable loss).

7.6 Radiated emissions (Section 18.305)

Radiated emission was measured at a frequency range 30 MHz to 26 GHz. The EUT was supported by a 1 m high wood table, measurement above 1 GHz and below 1 GHz.

Radiated emission measurement in frequency range 1 GHz to 26 GHz was made inside an anechoic chamber at 3 m to determine the emission characteristics of EUT. The EUT is configured and operated in a manner, which produces the maximum emission in a typical configuration. Final measurements were made outdoor in control room at 3-meter test method.

1) Magnetron type: 2M246 by LG

Test distance: 3 m

Freq. [GHz]	Ant. Factor [dB]	Amp. [dB]	Cable Loss [dB]	Load [ml]	Load Location	Meter Reading [dBuV]	Field Strength @ 3 m [dBuV/m]	Field Strength @ 3 m [uV/m]	Field Strength @ 300 m [uV/m]	FCC Limit @ 300 m [uV/m]	Result
2.312	27.2	N/A	0.72	700	Center	7.8	35.7	61.0	0.6	28.2	PASS
2.548	27.8	N/A	0.71	700	Center	6.4	34.9	55.6	0.6	28.2	PASS
4.923	31.5	35.2	0.90	700	Center	55.6	52.8	436.5	4.4	28.2	PASS
4.922	31.5	35.2	0.90	700	Rt. Front	47.1	44.3	164.1	1.6	28.2	PASS
4.886	31.4	35.2	0.90	300	Center	42.4	39.5	94.4	0.9	28.2	PASS
4.899	31.4	35.2	0.90	300	Rt. Front	48.7	45.8	195.0	1.9	28.2	PASS
7.378	36.3	35.8	1.27	700	Center	32.3	34.1	50.7	0.5	28.2	PASS
7.412	36.4	35.8	1.29	700	Rt. Front	31.9	33.8	49.0	0.5	28.2	PASS
7.255	36.0	35.9	1.19	300	Center	31.9	33.2	45.7	0.5	28.2	PASS
7.397	36.4	35.8	1.28	300	Rt. Front	31.4	33.3	46.2	0.5	28.2	PASS
8.598	37.3	35.9	1.73	700	Center	50.1	53.2	457.1	4.6	28.2	PASS
8.603	37.3	35.9	1.73	700	Rt. Front	48.7	51.8	389.0	3.9	28.2	PASS
9.812	37.8	36.2	1.91	700	Center	32.6	36.1	63.8	0.6	28.2	PASS
#####	39.3	35.7	1.40	300	Center	32.4	37.4	74.1	0.7	28.2	PASS
#####	41.9	34.6	1.55	300	Rt. Front	36.0	44.8	173.8	1.7	28.9	PASS

Other frequencies: No detected.

For measurement of 30 MHz – 1,000 MHz, refer to APPENDIX A (Test Plot).

Result: Pass

$$* \text{ Limit (at 300 m) } = 25 * (\text{RF Power}/500)^{1/2} [\mu\text{V/m}]$$

$$* \text{ Field Strength below 1,000 MHz (at 300 m) } [\mu\text{V/m}] = 10^{[(\text{Field strength at 10m(dBuV/m)}-29.5)/20]}$$

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

NOTES:

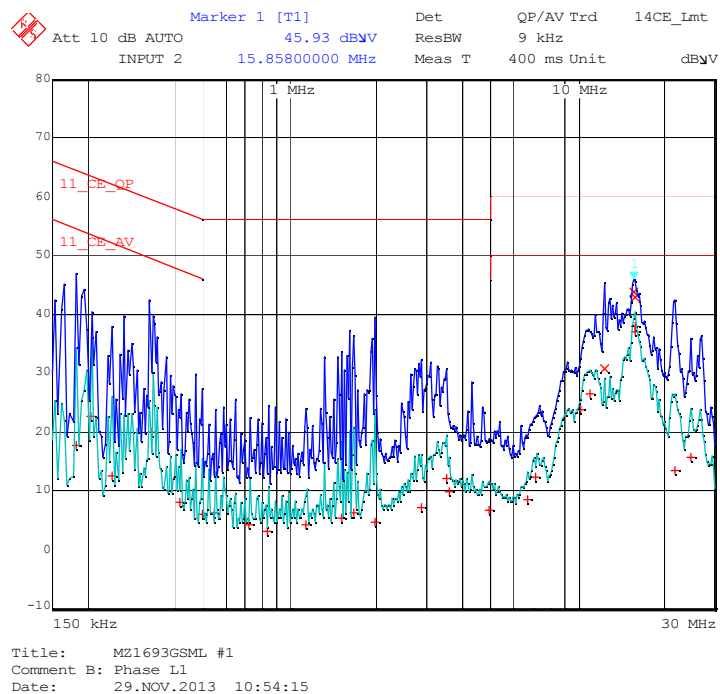
1. Two representative modes (full power and defrost) of operation were investigated.
2. A glass beaker was used as the container and the test was made with a shelf in its initial normal position.
3. Load for measurement of radiation on second and third harmonic: Two loads, one of 700 and the other of 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.
4. Load for all other measurements: 700 ml of water, with the beaker located in the center of the oven
5. All other emissions are non-significant.
6. The tests were made with average detector for frequency range of 30 MHz to 26 GHz.

APPENDIX A. Test Plot

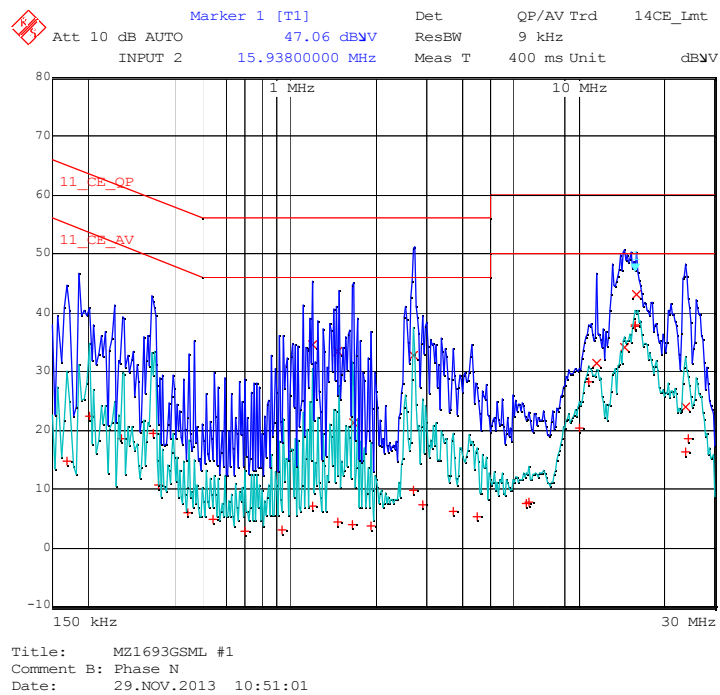
◆ 150 kHz ~ 30 MHz (Magnetron type: 2M246 by LG)

- Operating Mode: Maximum RF Power Output
- Detect Mode: Quasi-Peak(x)/Average(+), Scan Mode: Peak

<Phase: L1>



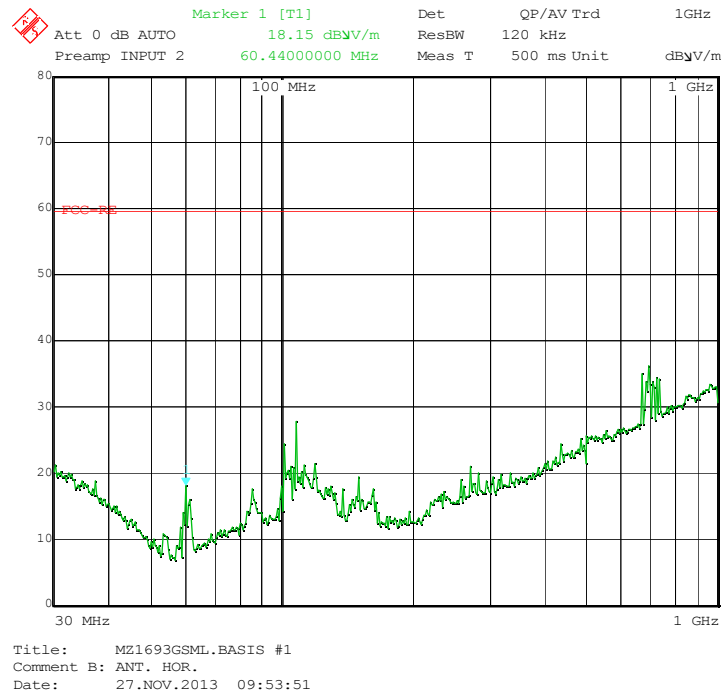
<Phase: N>



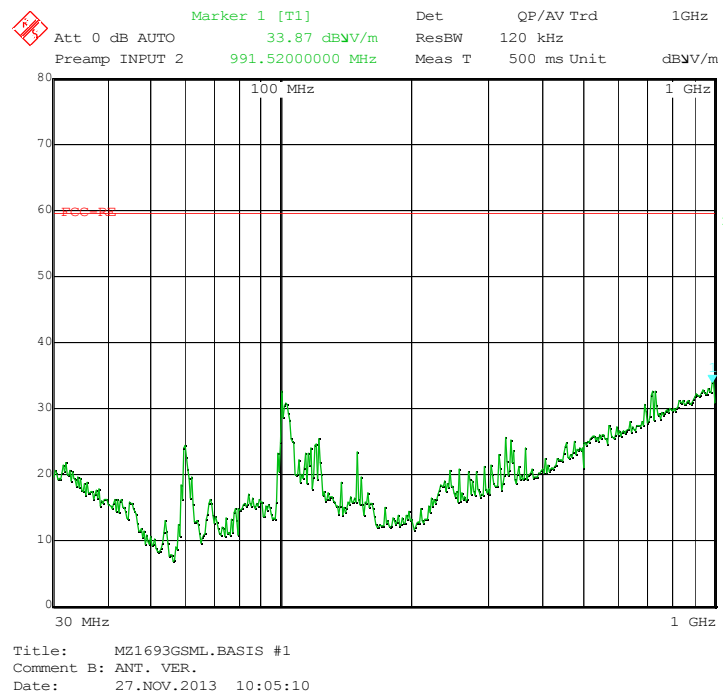
◆ 30 MHz ~ 1000 MHz (Magnetron type: 2M246 by LG)

- Operating Mode: Maximum RF Power Output
- Detect Mode: Average, Scan Mode: Peak
- Measurement Distance: 10 meters

<Antenna Polarization: Horizontal>



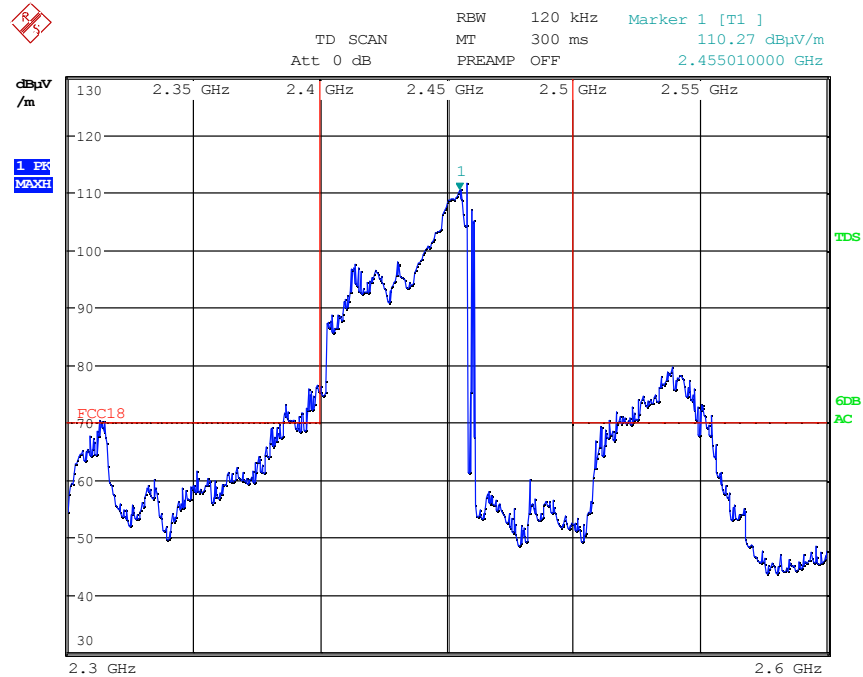
<Antenna Polarization: Vertical>



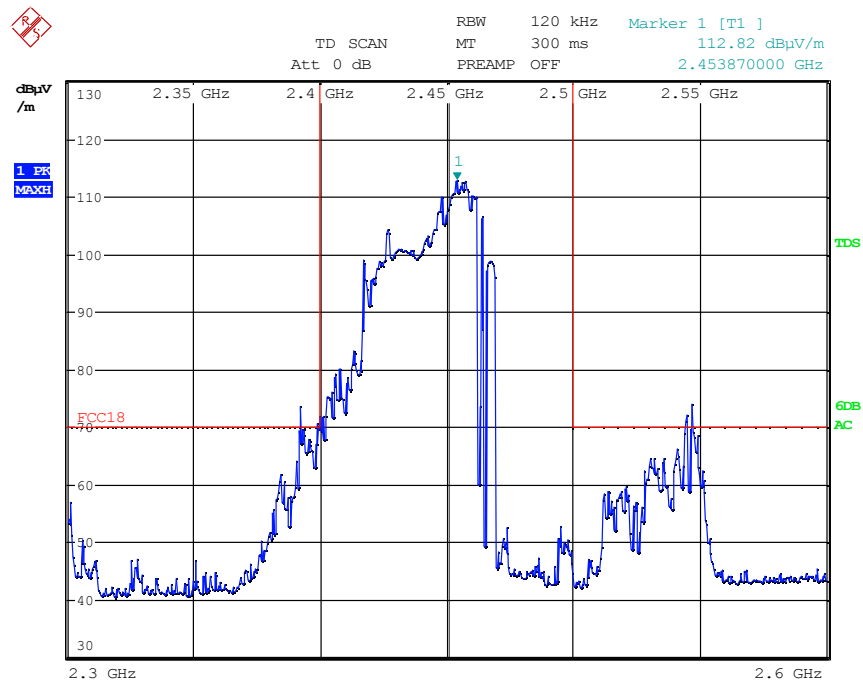
◆ Voltage Variation (Magnetron type: 2M246 by LG)

- Detect Mode: Average, Scan Mode: Peak

<Maximum Frequency Observed: 2,455 MHz>



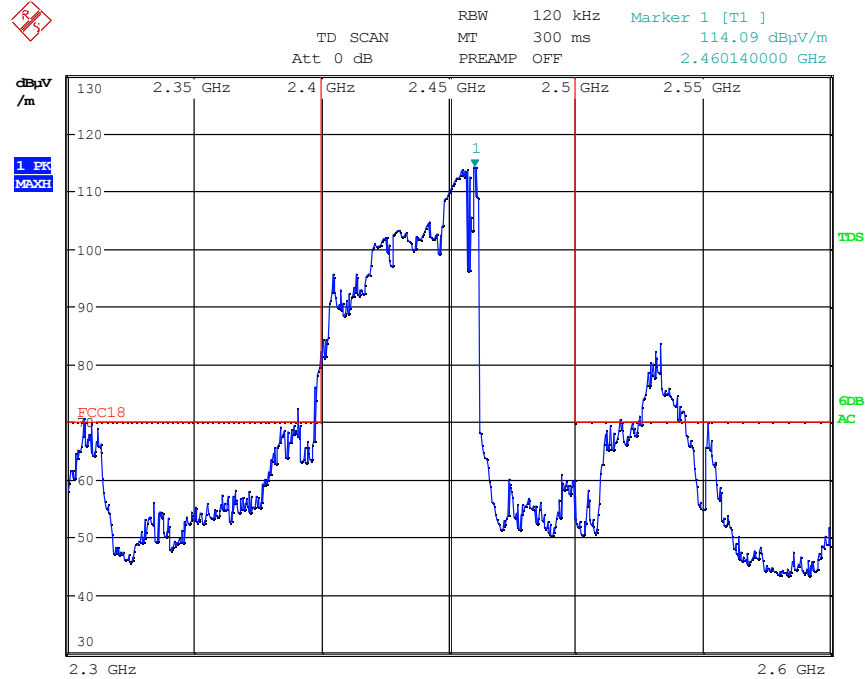
<Minimum Frequency Observed: 2,453 MHz>



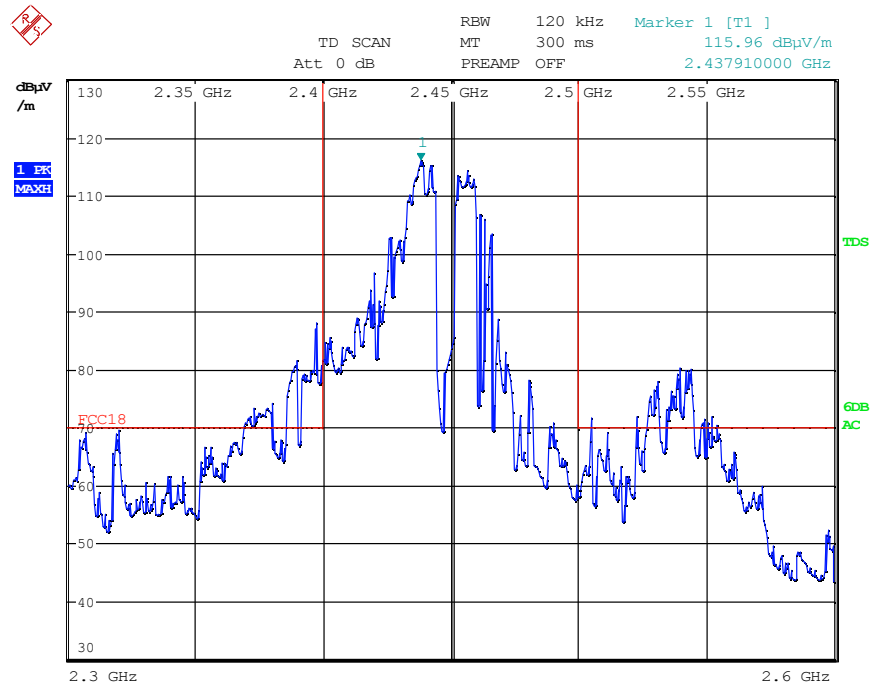
◆Load Variation (Magnetron type: 2M246 by LG)

- Detect Mode: Average, Scan Mode: Peak

<Maximum Frequency Observed: 2,460 MHz >



< Minimum Frequency Observed: 2,438 MHz >



APPENDIX B. Test Photos

Test photos show the worst case configuration and cable placement with a minimum margin to the specifications.

- Conducted Emission



- Radiated Emission

