Nemko Korea Co., Ltd.

155 & 159, Osan-Ro, Mohyeon-Myeon, Cheoin-Gu, Yongin-Si, Gyeonggi-Do 16885 KOREA, REPUBLIC OF
TEL : + 82 31 330 1700   FAX : + 82 31 322 2332

FCC EVALUATION REPORT FOR CERTIFICATION

Applicant :

Dongbu Daewoo Electronics Corporation
(Cheongcheon-dong), 12, Bupyeongbuk-ro
236 beon-gil, Bupyeong-gu, Incheon,
Korea, Republic of
Attn : Mr. Byung-Seok, Kim

Dates of Issue : November 16, 2016
Test Report No. : NK-16-E-0750
Test Site : Nemko Korea Co., Ltd.
EMC site, Korea

FCC ID	**C5F7NF1DMO100N**
Trade Mark	**DAEWOO**
Contact Person	**Dongbu Daewoo Electronics Corporation** **(Cheongcheon-dong), 12, Bupyeongbuk-ro** **236 beon-gil, Bupyeong-gu, Incheon, Korea, Republic of** **Mr. Byung-Seok, Kim** **Telephone No. : + 82 32 510 7919**

Applied Standard :	FCC Part 18 & Part 2
Classification :	Consumer ISM equipment
EUT Type :	Microwave Oven

The device bearing the Trade Mark and FCC ID specified above has been shown to comply 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 and 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.

Nov. 16, 2016
Tested By : Hyojung Lee
Engineer

Nov. 16, 2016
Reviewed By : Changsoo Choi
Technical Manager

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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 the technical rules and regulations of the Federal Communications Commission under FCC part 18.

Responsible Party :	Dongbu Daewoo Electronics Corporation
Contact Person :	Mr. Byung-Seok, Kim Tel No.: + 82 32 510 7919
Manufacturer :	Dongbu Daewoo Electronics Corporation (Cheongcheon-dong), 12, Bupyeongbuk-ro 236 beon-gil, Bupyeong-gu, Incheon, Korea, Republic of
Factory :	Dongbu Daewoo Microwave Ovens (Tianjin) Co., Ltd. NO. 34, CHANGHWA STREET, DAGANG DEVELOPMENT AREA, BINHAI NEW DISTRICT, TIANJIN, 300270 CHINA

- FCC ID: C5F7NF1DMO100N
- Model: KOR-1D**
  Note 1) First "*" : 0 ~ 9 or A ~ Z (Enclosure design difference)
  Note 2) Second "*" : 0 ~9 (mechanical type) or A ~ Z (electronic type)
- Trade Mark: DAEWOO
- EUT Type: Microwave Oven
- Applied Standard: FCC Part 18 & Part 2
- Test Procedure(s): MP-5:1986
- Dates of Test: November 02, 2016 to November 14, 2016
- Place of Tests: Nemko Korea Co., Ltd. EMC Site
- Test Report No.: NK-16-E-0750

INTRODUCTION

The measurement procedure described in MP5:1986 for Methods of Measurement of radiated, powerline conducted radio noise, frequency and power output was used in determining emissions emanating from **Dongbu Daewoo Electronics Corporation.**
FCC ID : **C5F7NF1DMO100N, Microwave Oven.**

These measurement tests were conducted at ***Nemko Korea Co., Ltd. EMC Laboratory***.
The site address is 155 & 159, Osan-Ro, Mohyeon-Myeon, Cheoin-Gu, Yongin-Si, Gyeonggi-Do 16885 KOREA, REPUBLIC OF
The area of Nemko Korea Corporation Ltd. EMC Test Site is located in a mountain area at 80 kilometers (48 miles) southeast and Incheon International Airport (Incheon Airport), 30 kilometers (18 miles) south-southeast from central Seoul.

The Nemko Korea Co., Ltd. has been accredited as a Conformity Assessment Body (CAB).

Nemko Korea Co., Ltd.
155 & 159, Osan-Ro, Mohyeon-Myeon,
Cheoin-Gu, Yongin-Si, Gyeonggi-Do
16885 KOREA, REPUBLIC OF
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Fig. 1. The map above shows the Seoul in Korea vicinity area.
The map also shows Nemko Korea Corporation Ltd. EMC Lab and Incheon Airport.

EUT INFORMATION

EUT Information

Intended use	Household
Type of appliance	Counter-top Type
Rated voltage & frequency	a.c. 120 V, 60 ㎐ Single Phase
Rated power output	1 000 W
Rated power consumption	1 500 W
Magnetron	RM269 (Dongbu Daewoo Electronics)

Component List

Item	Model	Manufacturer	Serial Number
Line Filter	DWLF-M17 YL	Dongbu Daewoo Electronics	N/A
H.V.CAPACITOR	N/A	BiCai	N/A
Control Board	M363-2	Dongbu Daewoo Electronics	40303-0086800-00
Magnetron	RM269	Dongbu Daewoo Electronics	N/A
Trans	DYAS10A0-1DA A	DIGITAL POWER COMMUNICATIONS CO., LTD.	N/A

DESCRIPTION OF TESTS

Radiation Hazard

A 700 mℓ water load was placed in the center of the oven.
The power setting was set to maximum power.
While the oven was operating, the Microwave Survey Meter probe was moved slowly around the door seams to check for leakage.

Input Power Measurement

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.
Input power and current were measured using a Power Analyzer.
Manufacturers to determine their input ratings commonly use this procedure.

Output Power Measurement

The Caloric Method was used to determine maximum output power.
The initial temperature of a 1000 mℓ water load was measured. The water load was placed in the center of the oven. The oven was operated at maximum output power for 47 seconds. Then the temperature of the water re-measured.

Frequency Measurements

Following the above test, after operating the oven long enough to assure that stable operating temperature were obtained, the operating frequency was monitored as the input voltage was varied between 80 percent to 125 percent of the nominal rating.
And the load quantity was reduced by evaporation to approximately 20 % of the original quantity with nominal rating.

DESCRIPTION OF TESTS

Conducted Emissions

The Line conducted emission test facility is located inside a 4 x 7 x 2.5 m shielded enclosure.
It is manufactured by EM engineering. The shielding effectiveness of the shielded room is in accordance with MIL-STD-285 or NSA 65-6.
A 1 m x 1.5 m wooden table 0.8 m height is placed 0.4 m away from the vertical wall and 0.5 m away from the side of wall of the shielded room Rohde & Schwarz (ESH2-Z5) of the 50 ohm / 50 uH Line Impedance Stabilization Network(LISN) is bonded to the shielded room.
The EUT is powered from the Rohde & Schwarz (ESH2-Z5) LISN.
Power to the LISN s are filtered by high-current high insertion loss power line filters.
The purpose of filter is to attenuate ambient signal interference and this filter is also bonded to shielded enclosure. All electrical cables are shielded by tinned copper zipper tubing with inner diameter of 1 / 2 ”.
If d.c. power device, power will be derived from the source power supply it normally will be powered from and this supply lines will be connected to the LISNs,
All interconnecting cables more than 1 m were shortened by non-inductive bundling (serpentine fashion) to a 1 m length.
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 spectrum analyzer to determine the frequency producing the maximum EME from the EUT. The spectrum was scanned from 150 ㎑ to 30 ㎒ with 20 ㎳ sweep time.
The frequency producing the maximum level was re-examined using the EMI test receiver. (Rohde & Schwarz ESCI).
The detector functions were set to quasi-peak mode & average mode.
The bandwidth of receiver was set to 9 ㎑. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each EME emission.
Each emission was maximized by; switching power lines; varying the mode of operation or resolution; clock or data exchange speed; scrolling H pattern to the EUT and of support equipment, and powering the monitor from the floor mounted outlet box and computer aux a.c. outlet, if applicable; whichever determined the worst case emission.
Each EME reported was calibrated using the R&S signal generator.

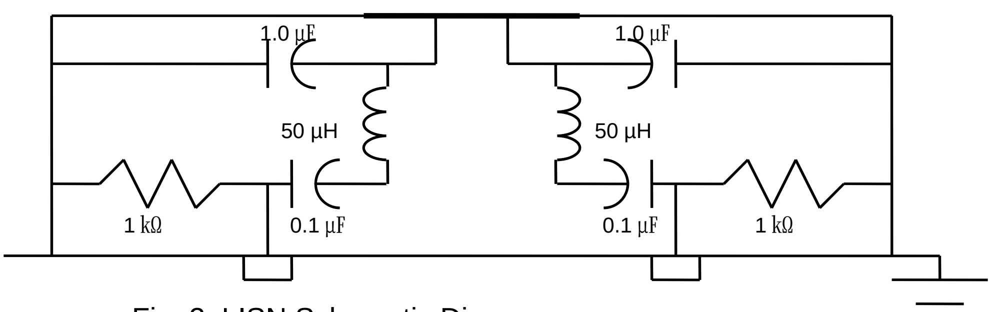


Fig. 2. LISN Schematic Diagram

DESCRIPTION OF TESTS

Radiated Emissions

Measurement were made indoors at 10 m & 3 m using antenna, signal conditioning unit and EMI test receiver to determine the frequency producing the maximum EME.
Appropriate precaution was taken to ensure that all EME from the EUT were maximized and investigated. The Technology configuration, clock speed, mode of operation or video resolution, turntable azimuth with respect to the antenna was note for each frequency found.
The spectrum was scanned from 0.15 ㎒ to 30 ㎒ using Loop Antenna (R&S/HFH2-Z2) and from 30 ㎒ to 1000 ㎒ using TRILOG Broadband Test Antenna (Schwarzbeck, VULB 9163).
Above 1 ㎓, Double Ridged Broadband Horn antenna (Schwarzbeck, BBHA 9120 D) was used.
Final Measurements were made indoors at 3 m using Loop Antenna (R&S/HFH2-Z2) for measurement from 0.15 to 30 ㎒ with RBW 9 ㎑ & VBW 9 ㎑ and made indoor at 10 m using TRILOG Broadband Test Antenna (Schwarzbeck, VULB 9163) for measurement from 30 ㎒ to 1000 ㎒ with RBW 100 ㎑ & VBW 100 ㎑ and made indoors at 3 m using Double Ridged Broadband Horn antenna (Schwarzbeck, BBHA 9120 D) for measurement from 1 ㎓ to 18 ㎓ with RBW 1 ㎒ & VBW 10 ㎐.
The detector function were set to quasi peak mode and the bandwidth of the receiver were set to 9 ㎑, 100 ㎑ and peak mode 1 ㎒ depending on the frequency or type of signal.
The Double Ridged Broadband Horn antenna was tuned to the frequency found during preliminary radiated measurements.
The EUT support equipment and interconnecting cables were re-configured to the setup producing the maximum emission for the frequency and were placed on top of a 0.8 m high non- metallic 1.0 X 1.5 meter table.
The EUT, support equipment and interconnecting cables were re-arranged and manipulated to maximize each EME emission.
The EUT is rotated about its vertical axis on the turntable, and the polarization and height of the receiving antenna are varied to obtain the highest field strength on the particular frequency under observation.
Each EME reported was calibrated using the R/S signal generator.

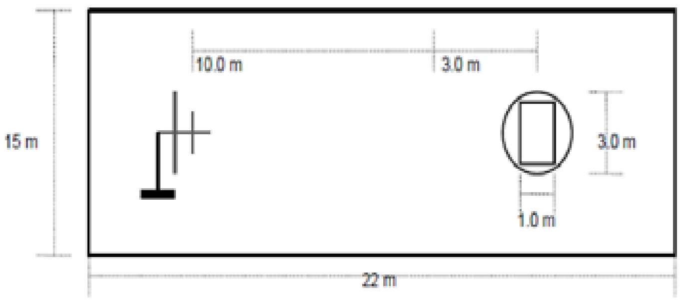


Fig. 3. Dimensions of 10 semi anechoic chamber

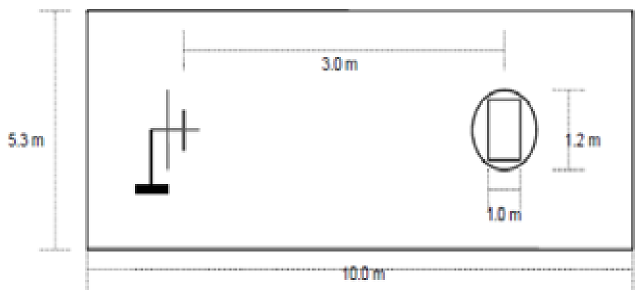


Fig. 4. Dimensions of 3 m full anechoic chamber

TEST DATA

Radiation Hazard

Probe Location	Maximum Leakage [mW/Cm2]	Limit [mW/Cm2]
A	0.05	1.00
B	0.03	1.00
C	0.05	1.00
D	0.02	1.00
All others	0.02	1.00

Input Power Measurement

Operation mode	P rated (W)	P (W)	dP (%)	Required dP (%)
Power Input	1 500	1 496	0.26	+ 15 %

Output Power Measurement

Mass of the water [g]	Mass of the container [g]	Ambient temperature [℃]	Initial temperature [℃]	Final temperature [℃]	Heating time [s]	Power output [W]
1000	400	24.6	10	19.8	42	952

Formula :

$$P = \frac{4.187 \times m_w (T_1 - T_0) + 0.55 \times m_c (T_1 - T_A)}{t}$$

NOTE :

P is the microwave power output (W)

m_w is the mass of the water (g)

m_c is the mass of the container (g)

T_A is the ambient temperature (℃)

T_0 is the initial temperature of the water (℃)

T_1 is the final temperature of the water (℃)

t is the heating time (s), excluding the magnetron filament heating-up time.

Tested by : ***Hyojung Lee***

TEST DATA

Frequency measurements

▶Frequency vs Line Voltage Variation Test

[Room Temperature : 20.0 ℃]

Line Voltage Variation (a.c. V)	*)Pole	Frequency [㎒]	Allowed Tolerance for the ISM Band
96 (80 %)	H	Lower : 2 435.0	Lower : 2 400 ㎒ Upper : 2 500 ㎒
	H	Upper : 2 472.2	
	V	Lower : 2 433.2	
	V	Upper : 2 469.2	
108 (90 %)	H	Lower : 2 447.0	
	H	Upper : 2 466.8	
	V	Lower : 2 435.0	
	V	Upper : 2 474.0	
120 (100 %)	H	Lower : 2 450.6	
	H	Upper : 2 471.0	
	V	Lower : 2 430.2	
	V	Upper : 2 472.8	
132 (110 %)	H	Lower : 2 439.2	
	H	Upper : 2 478.8	
	V	Lower : 2 455.4	
	V	Upper : 2 474.0	
150 (125 %)	H	Lower : 2 435.0	
	H	Upper : 2 469.8	
	V	Lower : 2 451.2	
	V	Upper : 2 468.6	

NOTE :

1. ****Pol.   H = Horizontal   V = Vertical***
2. ***Initial load : 1 000 ㎖ of water in the beaker.***
3. ***Line voltage varied from 80 % to 125 %.***
4. ***ISM Frequency : 2 450 ㎒, Tolerance : ± 50 ㎒***

RESULT :   Pass

Tested by : ***Hyojung Lee***

TEST DATA

▶Frequency vs Load Variation Test

[Room Temperature : 20.0 ℃]

Volume of water (㎖)	*)Pole	Frequency [㎒]	Allowed Tolerance for the ISM Band
200	H	Lower : 2 430.8	Lower : 2 400 ㎒ Upper : 2 500 ㎒
	H	Upper : 2 473.4	
	V	Lower : 2 447.0	
	V	Upper : 2 472.2	
400	H	Lower : 2 434.4	
	H	Upper : 2 465.6	
	V	Lower : 2 449.4	
	V	Upper : 2 468.6	
600	H	Lower : 2 434.4	
	H	Upper : 2 476.4	
	V	Lower : 2 430.2	
	V	Upper : 2 472.2	
800	H	Lower : 2 433.8	
	H	Upper : 2 471.6	
	V	Lower : 2 442.8	
	V	Upper : 2 469.2	
1000	H	Lower : 2 450.6	
	H	Upper : 2 471.0	
	V	Lower : 2 430.2	
	V	Upper : 2 472.8	

NOTE :

1. *Pol.   H = Horizontal, V = Vertical

2. The water load was varied between 200 ㎖ to 1 000 ㎖.

3. Frequency was measured by using nominal voltage (a.c. 120 V).

4. ISM Frequency : 2 450 ㎒, Tolerance : ± 50 ㎒

RESULT :   Pass

Tested by : ***Hyojung Lee***

TEST DATA

Conducted Emissions

FCC ID : C5F7NF1DMO100N

[Room Temperature : 20.4 ℃]

EMI Auto Test(1) 1 / 2

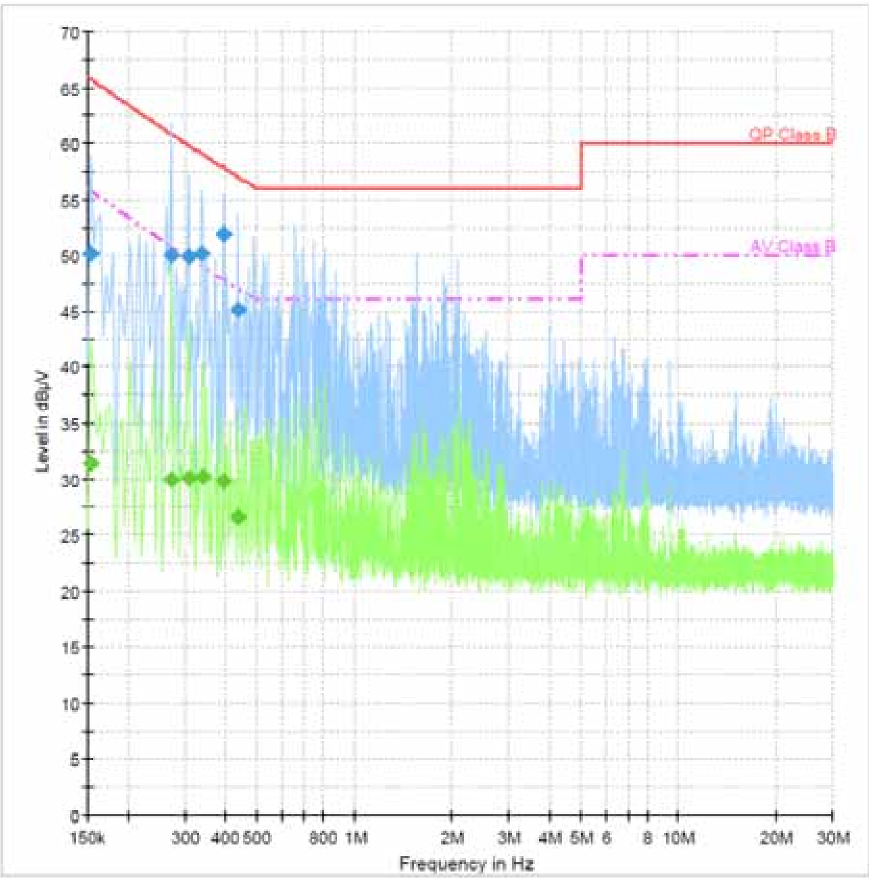
Test Report

Common Information

Test Site:	Nemko Korea (NK-16-E-0750)
Test Description:	Conducted emission
Test Standard:	FCC Part 18
Environment Conditions:	a.c. 120 V, 60 Hz
Operator Name:	Lee Hyo Jung
Mode:	Microwave

2.EMI Auto Test_4-Line Voltage LISN

2.EMI Auto Test_4-Line Voltage LISN



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Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.153731	50.1	15000.0	9.000	GND	N	10.3	15.7	65.8	
0.273131	50.0	15000.0	9.000	GND	N	10.3	10.8	60.8	
0.306712	49.9	15000.0	9.000	GND	N	10.3	9.9	59.9	
0.336562	50.2	15000.0	9.000	GND	N	10.3	8.9	59.1	
0.392531	51.9	15000.0	9.000	GND	N	10.3	6.0	57.9	
0.437306	45.1	15000.0	9.000	GND	N	10.3	12.0	57.0	

Final Result 2

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.153731	31.4	15000.0	9.000	GND	N	10.3	24.4	55.8	
0.273131	29.9	15000.0	9.000	GND	N	10.3	20.9	50.8	
0.306712	30.0	15000.0	9.000	GND	N	10.3	19.8	49.8	
0.340294	30.2	15000.0	9.000	GND	N	10.3	18.8	49.0	
0.392531	29.8	15000.0	9.000	GND	N	10.3	18.1	47.9	
0.437306	26.6	15000.0	9.000	GND	N	10.3	20.4	47.0	

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NOTES:

1. Measurements using quasi-peak mode & average mode.
2. If no frequencies are specified in the tables, no measurement for quasi-peak or average was necessary.
3. Line : L = Line , N = Neutral
4. The limit for consumer device is on the FCC Part section 18.307(b).

Tested by : ***Hyojung Lee***

TEST DATA

Radiated Emissions (150 ㎑ to 30 ㎒)

FCC ID : C5F7NF1DMO100N

[Room Temperature : 18.5 ℃]

EMI Auto Test(1) 1 / 2

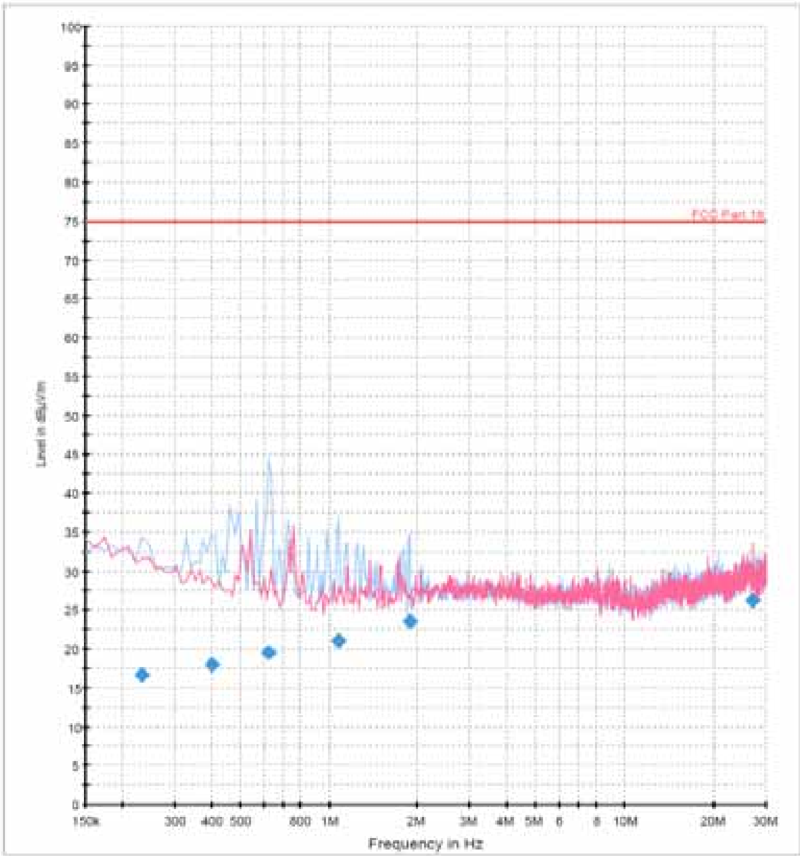
Test Report

Common Information

Test Description :	Radiated Emission(NK-16-E-0750)
Test Site :	Nemko 10 m Chamber
Test Standard :	FCC Part 18
Environment Conditions :	a.c. 120 V, 60 Hz
Operator Name :	Lee Hyo Jung
Mode:	Microwave loop

LOOP-Microwave(150 kHz-30 MHz)_final

LOOP-Microwave(150 kHz-30 MHz)_final



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EMI Auto Test(1) 2 / 2

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
0.233580	16.7	15000.0	9.000	H	85.0	-23.2	58.2	74.9
0.400740	18.0	15000.0	9.000	H	31.0	-23.4	56.9	74.9
0.627600	19.5	15000.0	9.000	H	180.0	-23.4	55.4	74.9
1.081320	21.1	15000.0	9.000	H	0.0	-23.3	53.8	74.9
1.869360	23.6	15000.0	9.000	H	211.0	-23.3	51.3	74.9
27.170220	26.2	15000.0	9.000	V	289.0	-14.0	48.7	74.9

(continuation of the "Final Result 1" table from column 9 ...)

Frequency (MHz)	Comment
0.233580	
0.400740	
0.627600	
1.081320	
1.869360	
27.170220	

11/11/2016

<Radiated Measurements at 3 meters >

NOTES:

1. *Pol. H = Horizontal V = Vertical

2. **AF + CL + Amp. = Antenna Factor + Cable Loss + Amplifier.

3. Distance Correction factor : 20 * log (300 / 3) = 40 dBuV/m

4. The limit at 300 meters is 20 * log (25 * SQRT (RF Power / 500))

5. All other emissions were measured while a 700 ㎖ load was placed in the center of the oven.

6. The limit for consumer device is on the FCC Part section 18.305.

Tested by : **Hyojung Lee**

TEST DATA

Radiated Emissions (30 ㎒ to 1 ㎓)

FCC ID : C5F7NF1DMO100N

[Room Temperature : 18.0 ℃]

EMI Auto Test(1) 1 / 2

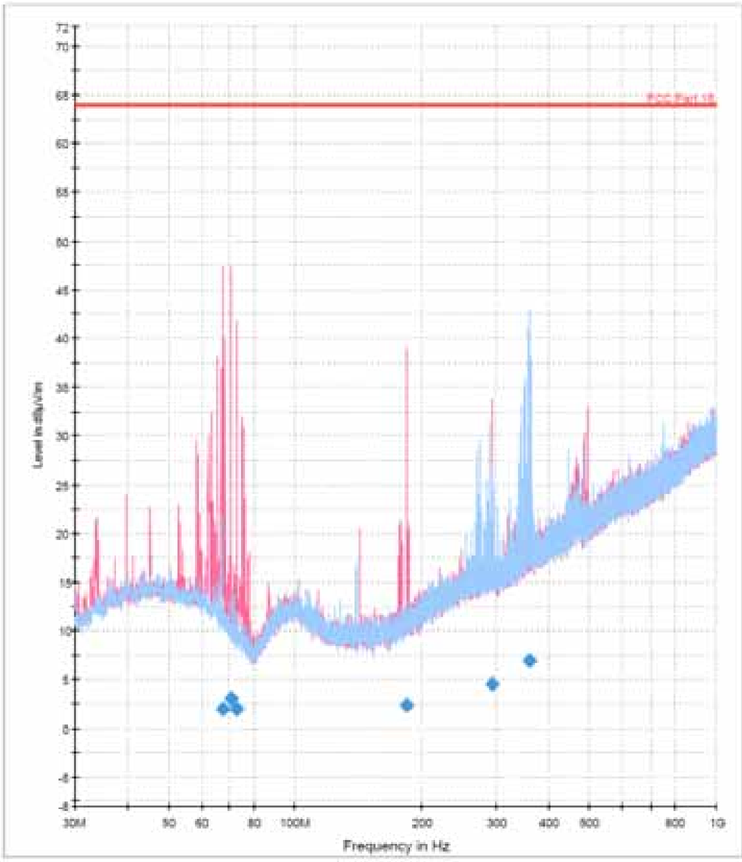
Test Report

Common Information

Test Description:	Radiated Emission(NK-16-E-0750)
Test Site:	Nemko 10 m Chamber
Test Standard:	FCC Part 18
Environment Conditions:	a.c. 120 V, 60 Hz
Operator Name:	Lee Hyo Jung
Mode:	Microwave

1. Electric Field Strength (30M-1GHz)_final

1. Electric Field Strength (30M-1GHz)_final



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EMI Auto Test(1) 2 / 2

Final Result 1

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
67.199500	2.0	15000.0	120.000	370.0	V	193.0	-24.7	62.0	64.0
70.594500	3.0	15000.0	120.000	370.0	V	133.0	-25.8	61.0	64.0
72.486000	2.0	15000.0	120.000	370.0	V	133.0	-26.2	62.0	64.0
184.133000	2.3	15000.0	120.000	100.0	V	20.0	-24.0	61.7	64.0
294.713000	4.5	15000.0	120.000	400.0	V	208.0	-18.7	59.5	64.0
361.449000	6.9	15000.0	120.000	190.0	H	82.0	-16.2	57.1	64.0

(continuation of the "Final Result 1" table from column 10 ...)

Frequency (MHz)	Comment
67.199500	
70.594500	
72.486000	
184.133000	
294.713000	
361.449000	

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<Radiated Measurements at 10 meters>

NOTES:

1. *Pol. H = Horizontal V = Vertical

2. **AF + CL + Amp. = Antenna Factor + Cable Loss + Amplifier.

3. Distance Correction factor : 20 * log (300/10) 29.5 dB μV/m

4. The limit at 300 meters is 20 * log (25 * SQRT (RF Power/500))

5. All other emissions were measured while a 700 ㎖ load was placed in the center of the oven.

6. The limit for consumer device is on the FCC Part section 18.305.

Tested by : ***Hyojung Lee***

TEST DATA

Radiated Emissions (Above 1 ㎓)

FCC ID : C5F7NF1DMO100N

[Room Temperature : 20.0 ℃]

Frequency	Pol*	Antenna Heights	Turntable Angles	Reading Level	Total Loss**	Result at 3 m		K	Results at 300 m	Limits at 300 m
(MHz)	(H/V)	(cm)	(˚)	(dBμV)	(dB)	(dBμV/m)	(㎶/m)		(㎶/m)	(㎶/m)
2 345.98	H	130	330	13.2	32.6	45.8	195.0	0.005	1.0	34.5
4 931.17	V	130	0	47.2	8.4	55.6	602.6	0.01	6.0	34.5
9 860.06	H	160	0	39.1	18	57.1	716.1	0.01	7.2	34.5
10 210.71	V	190	120	31.5	18.6	50.1	319.9	0.01	3.2	34.5
14 801.26	H	160	90	39.6	24.3	63.9	1566.8	0.01	15.7	34.5
17 559.37	H	130	0	33.1	29.6	62.7	1364.6	0.01	13.6	34.5

<Radiated Measurements at 3 meters>

NOTES:

1. * Pol. H =Horizontal V=Vertical

2. ** Total Loss = Antenna Factor + Cables Loss + Amplifier + HPF (High Pass Filter)

3. Field Strength (at 300 m) (uV/m) = $K * 10^{\text{[Fieldstrength at 3 m (dBuV/m) / 20]}}$

4. The limit at 300 meters is 25 * SQRT (RF Power/500)

5. Load for measurement of radiation on second and third harmonic : Two loads, one of 700 ㎖ and the other of 300 ㎖, 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.

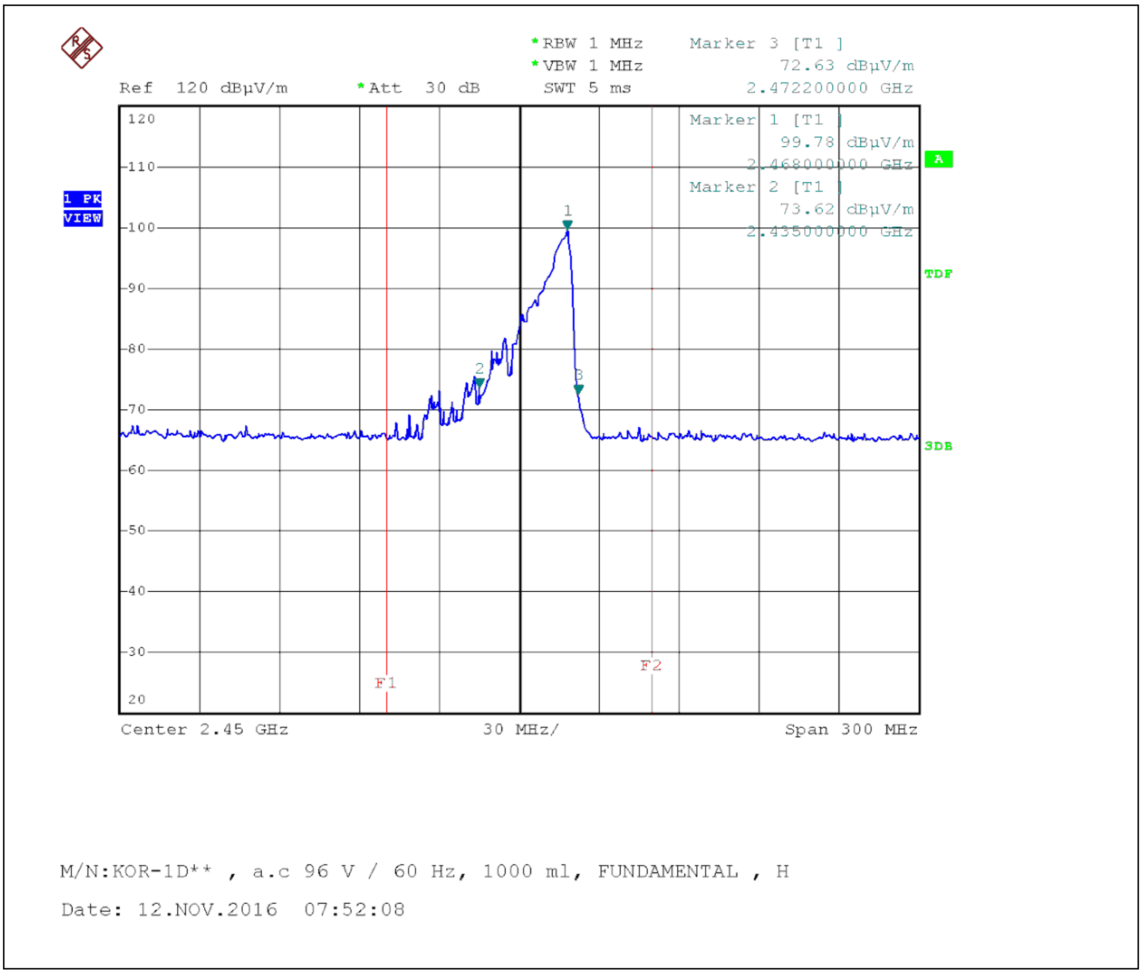
6. The test was performed at peak detector mode with average.

7. The limit for consumer device is on the FCC Part section 18.305.

Tested by : ***Hyojung Lee***

PLOTS OF EMISSIONS

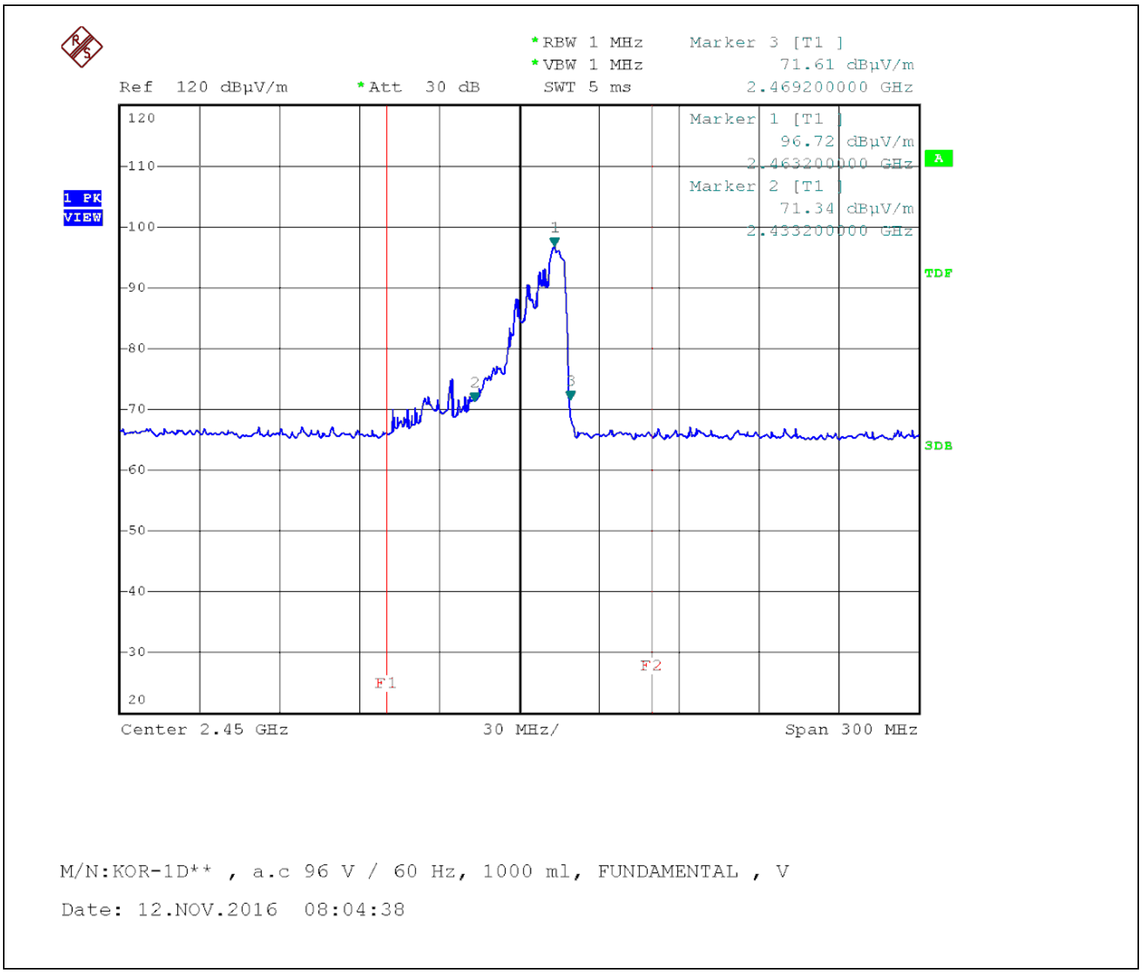
- ***Frequency vs Line Voltage Variation Test***



Horizontal (96 V, 1000 mℓ)

PLOTS OF EMISSIONS

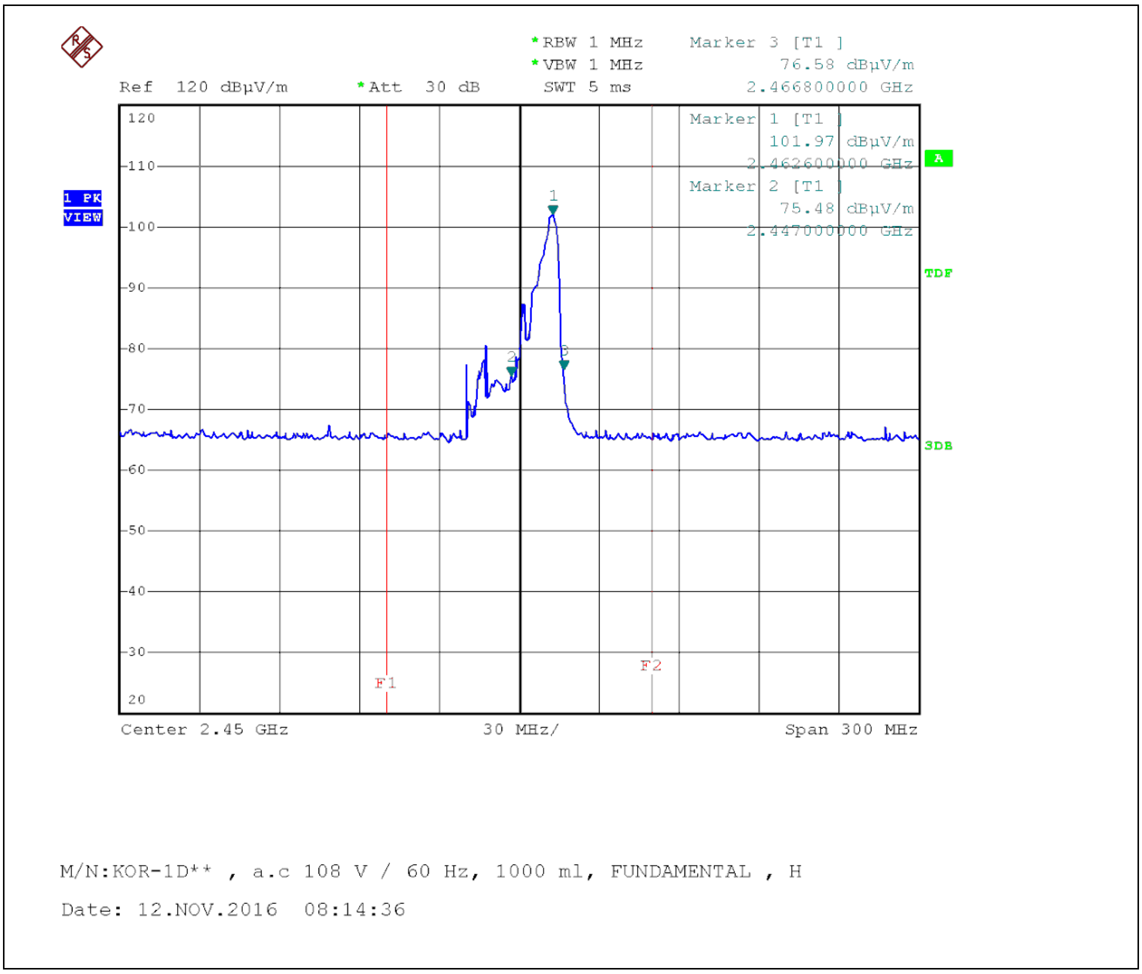
- ***Frequency vs Line Voltage Variation Test***



Vertical (96 V, 1000 mℓ)

PLOTS OF EMISSIONS

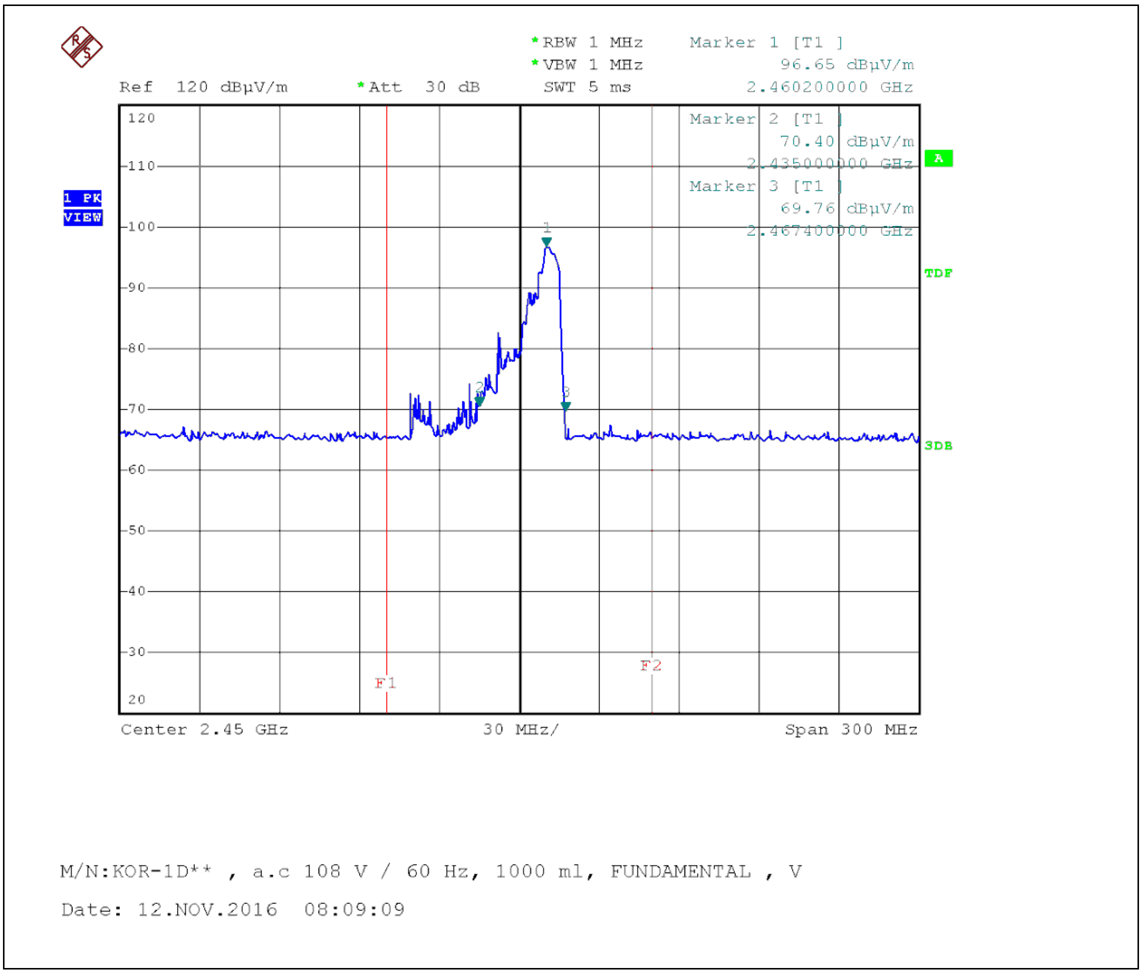
- ***Frequency vs Line Voltage Variation Test***



Horizontal (108 V, 1000 mℓ)

PLOTS OF EMISSIONS

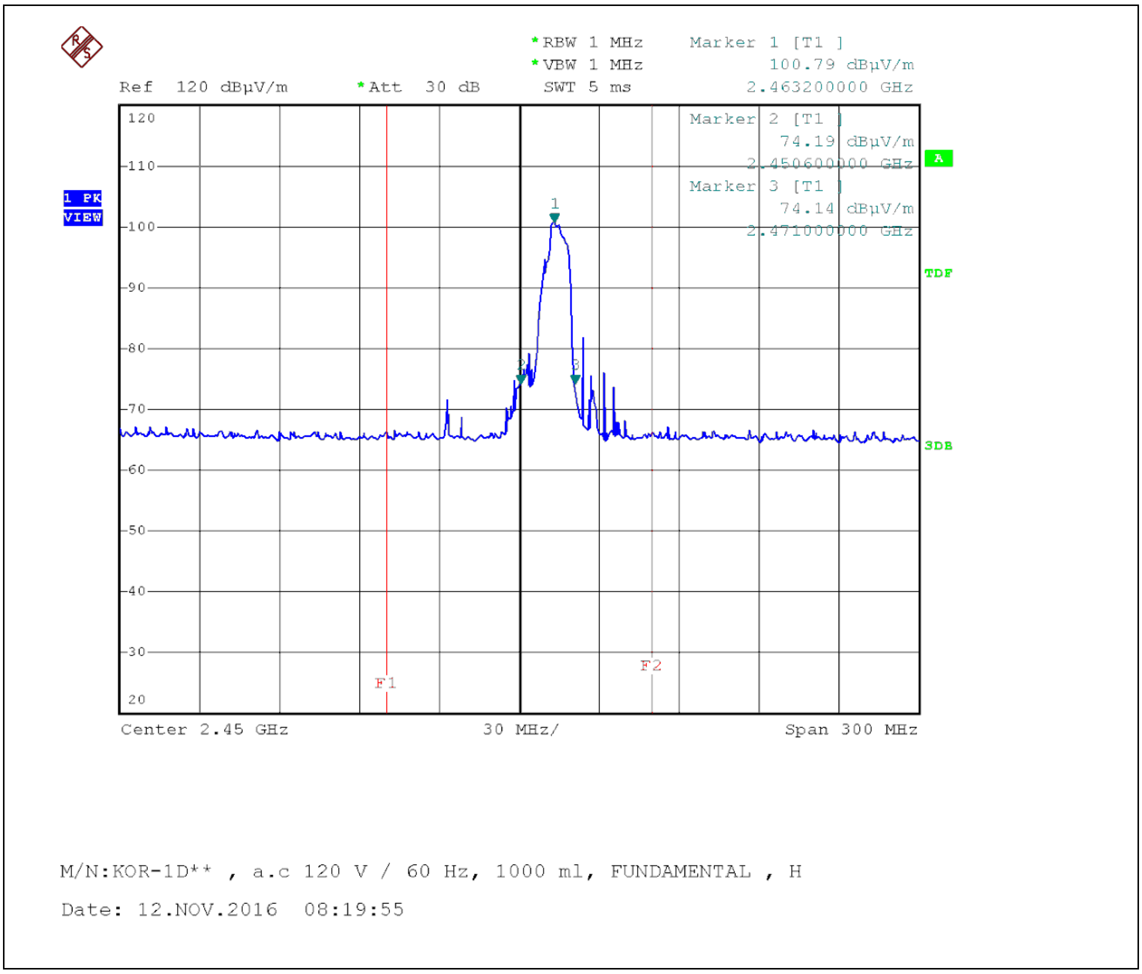
- ***Frequency vs Line Voltage Variation Test***



Vertical (108 V, 1000 ㎖)

PLOTS OF EMISSIONS

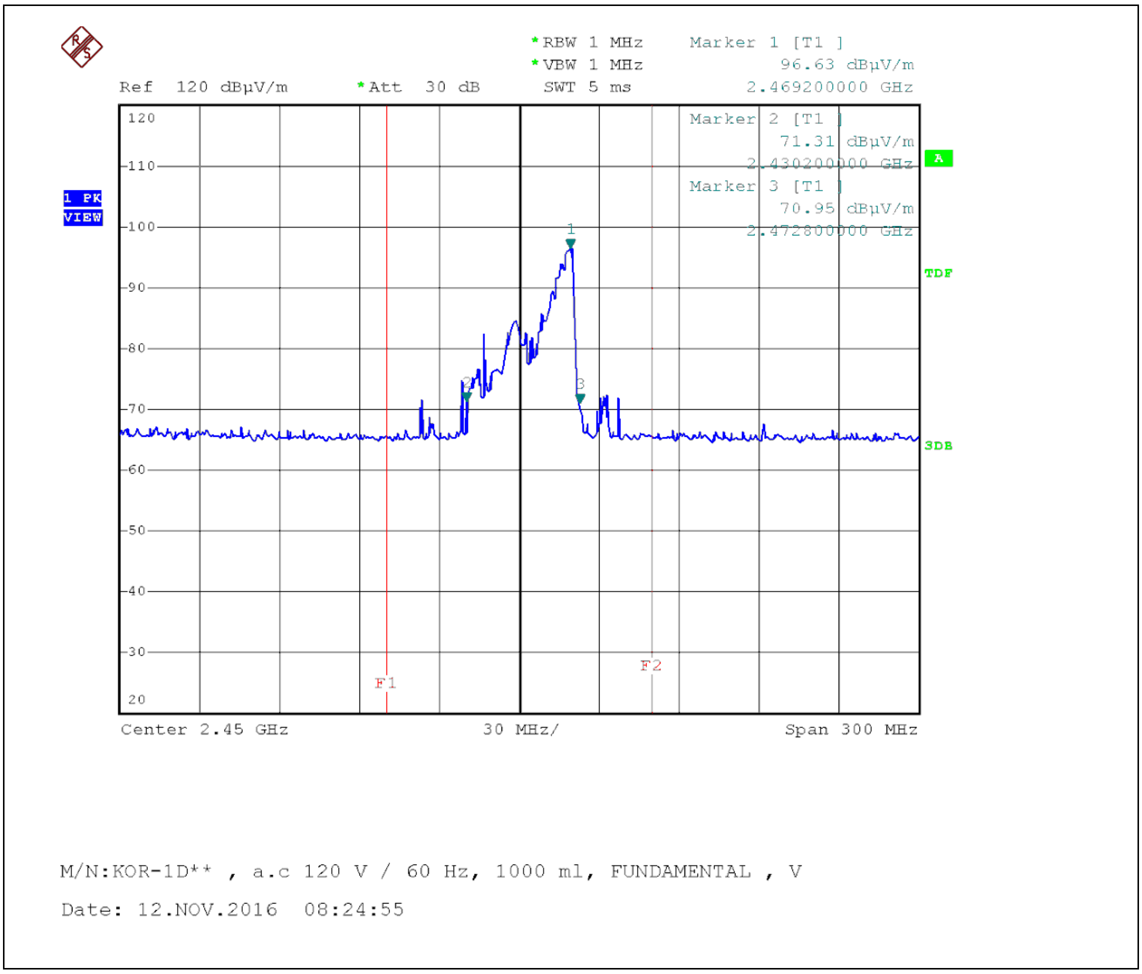
- ***Frequency vs Line Voltage Variation Test***



Horizontal (120 V, 1000 ㎖)

PLOTS OF EMISSIONS

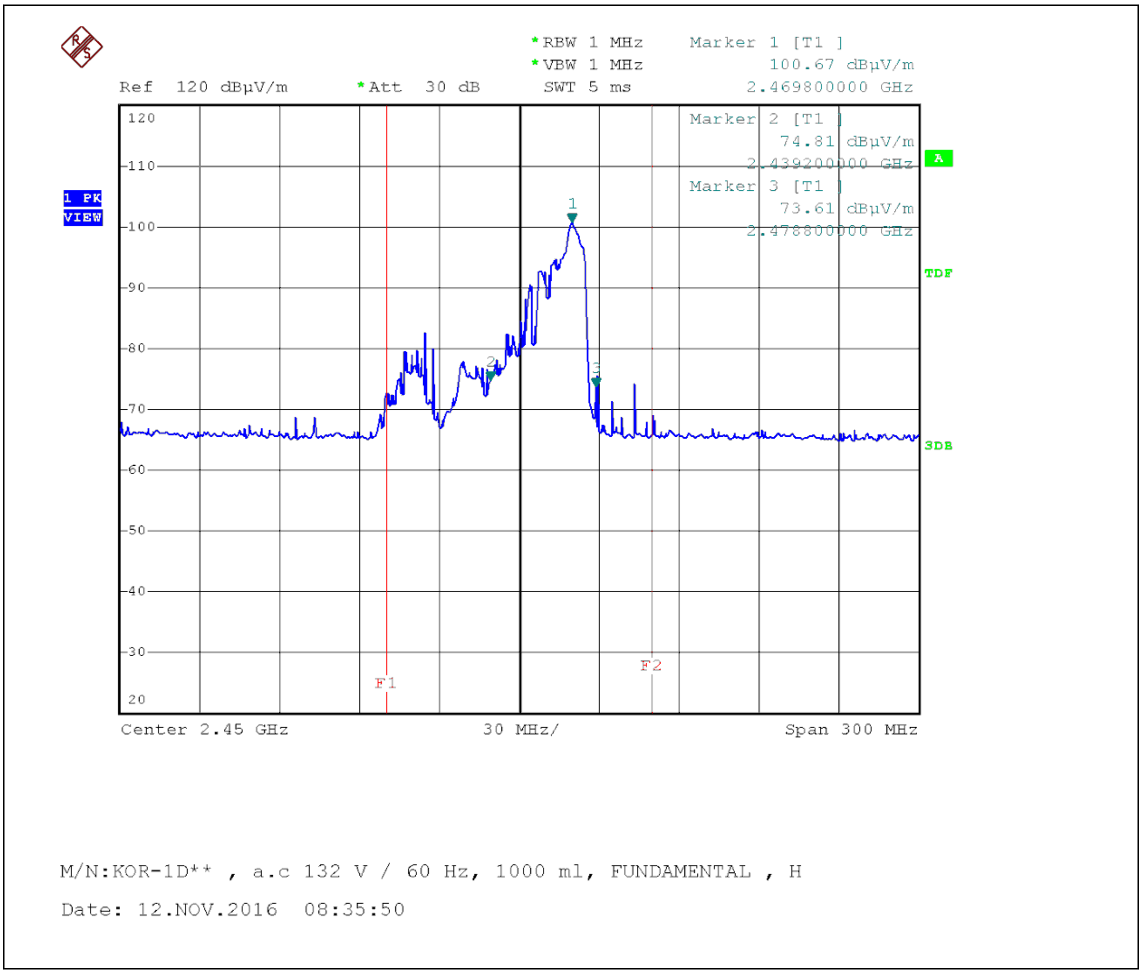
- ***Frequency vs Line Voltage Variation Test***



Vertical (120 V, 1000 ㎖)

PLOTS OF EMISSIONS

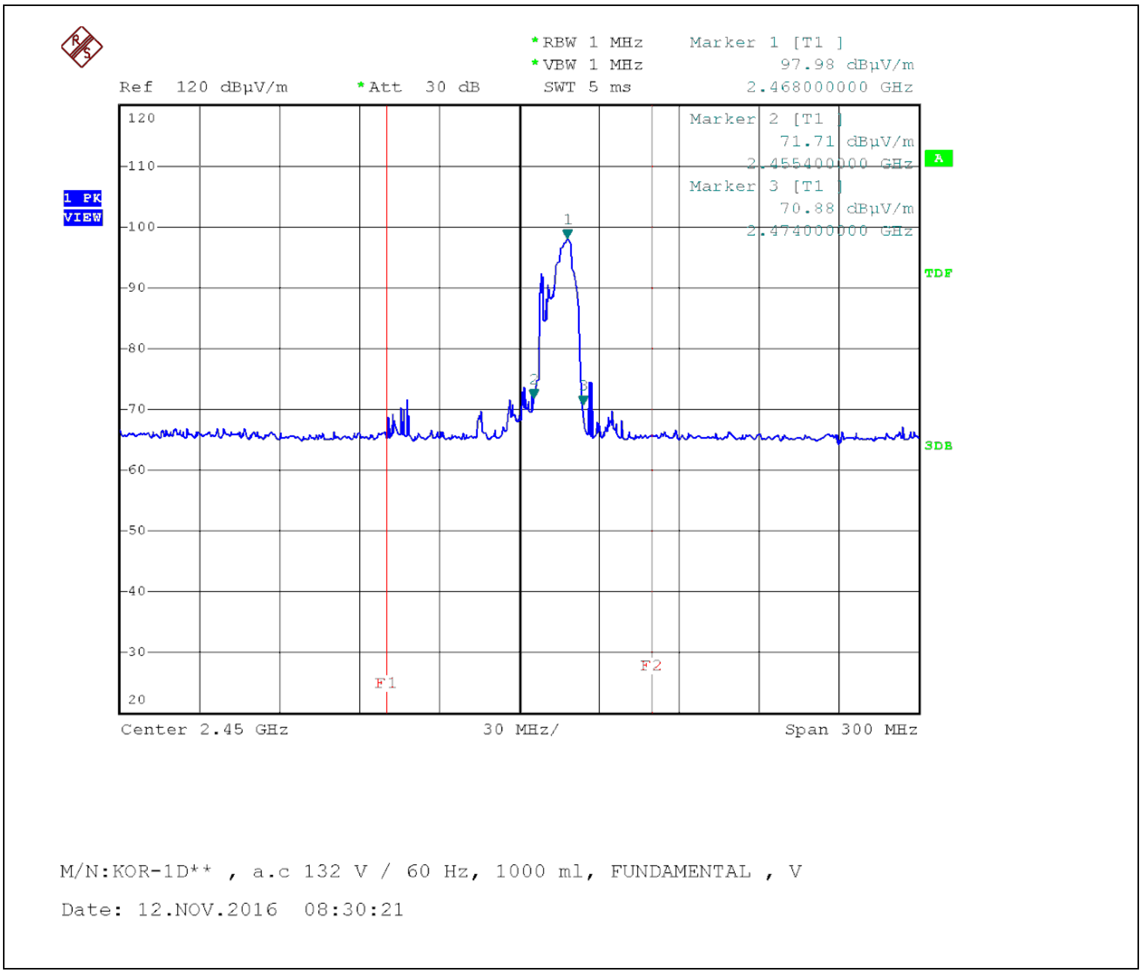
- ***Frequency vs Line Voltage Variation Test***



Horizontal (132 V, 1000 ㎖)

PLOTS OF EMISSIONS

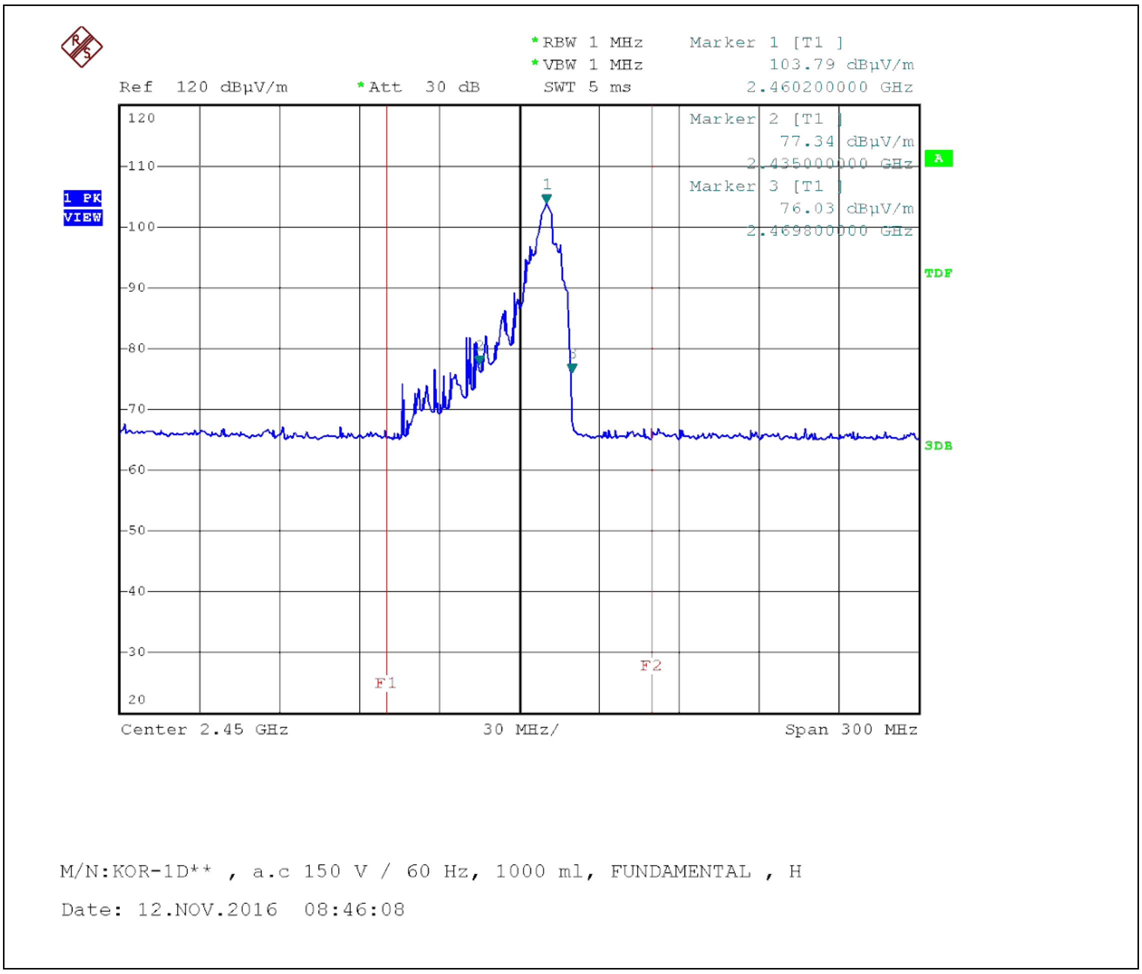
- ***Frequency vs Line Voltage Variation Test***



Vertical (132 V, 1000 mℓ)

PLOTS OF EMISSIONS

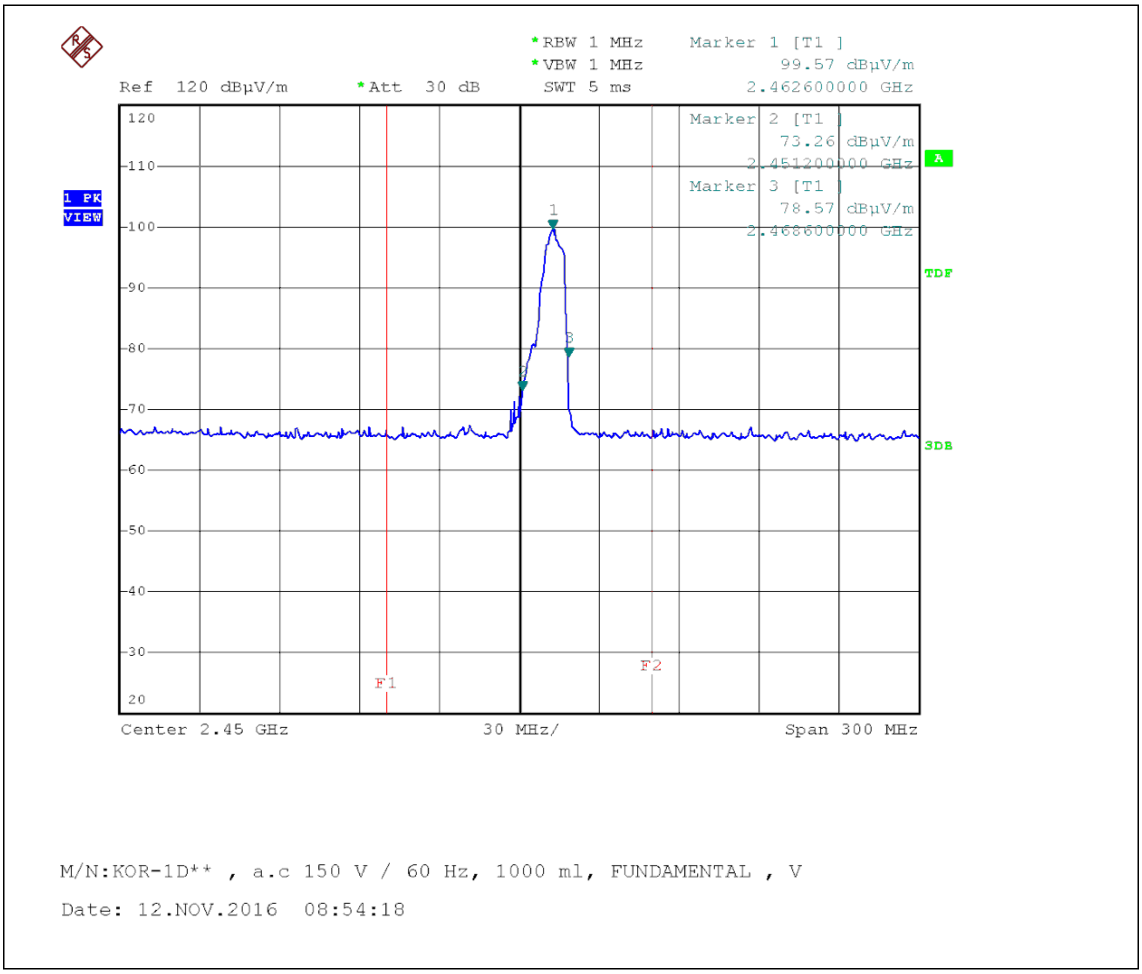
- ***Frequency vs Line Voltage Variation Test***



Horizontal (150 V, 1000 ㎖)

PLOTS OF EMISSIONS

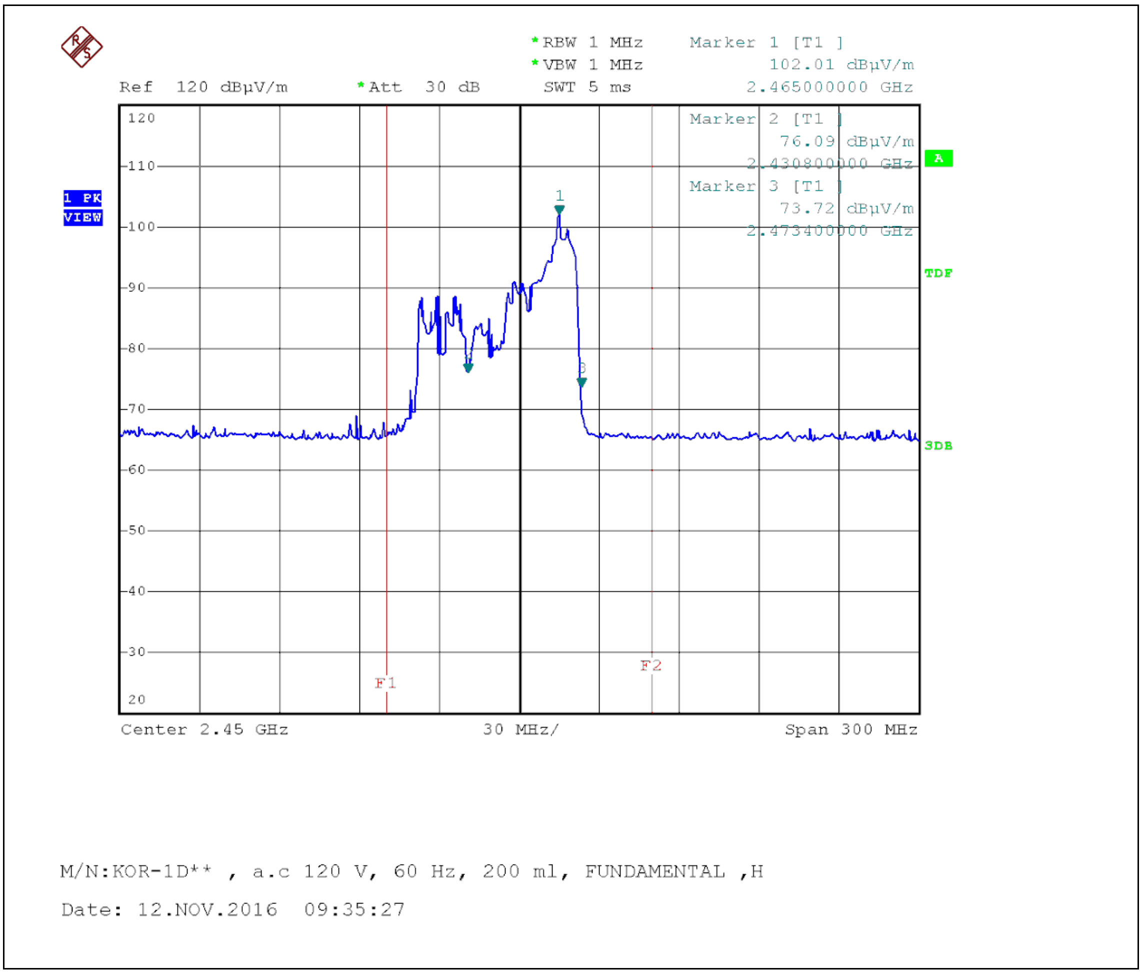
- ***Frequency vs Line Voltage Variation Test***



Vertical (150 V, 1000 ㎖)

PLOTS OF EMISSIONS

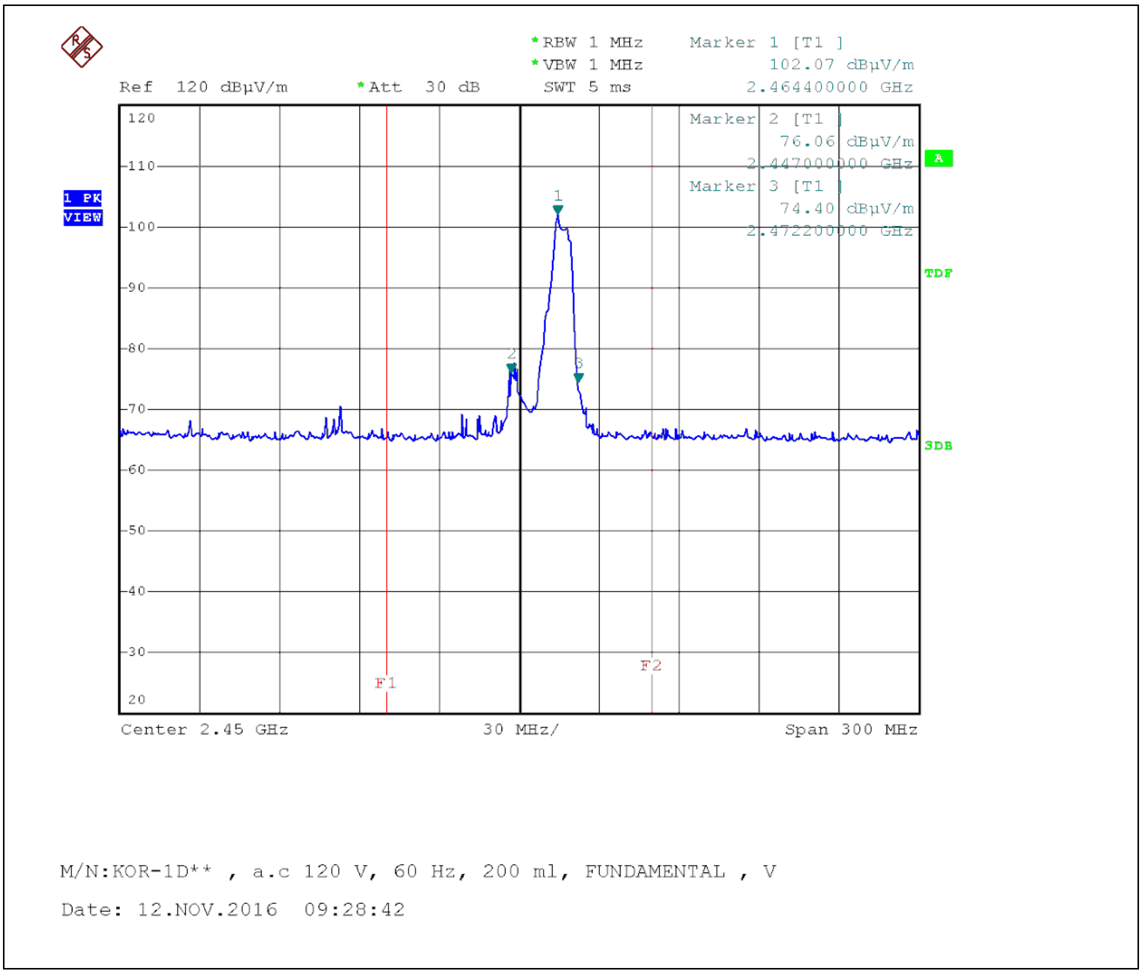
- ***Frequency vs Load Variation Test***



Horizontal (120 V, 200 mℓ)

PLOTS OF EMISSIONS

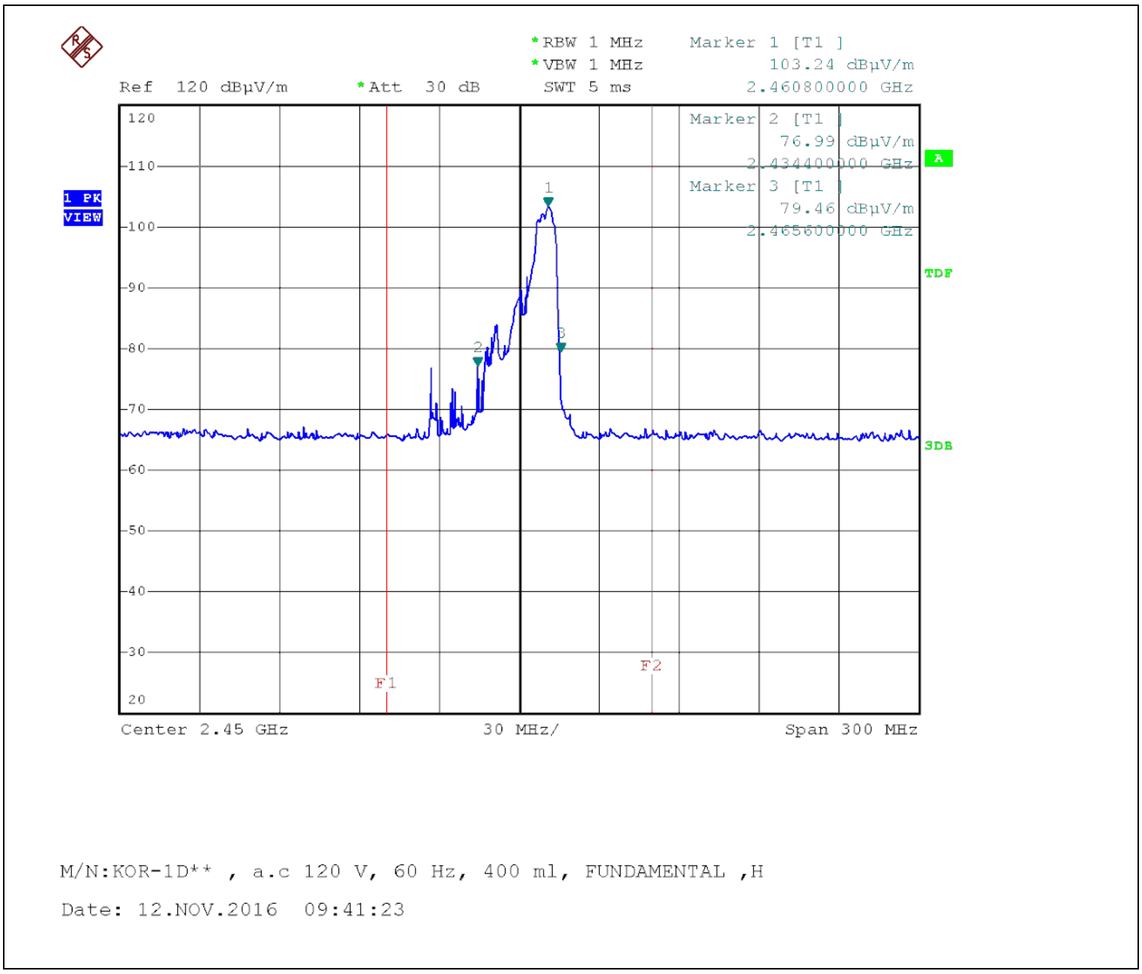
- ***Frequency vs Load Variation Test***



Vertical (120 V, 200 mℓ)

PLOTS OF EMISSIONS

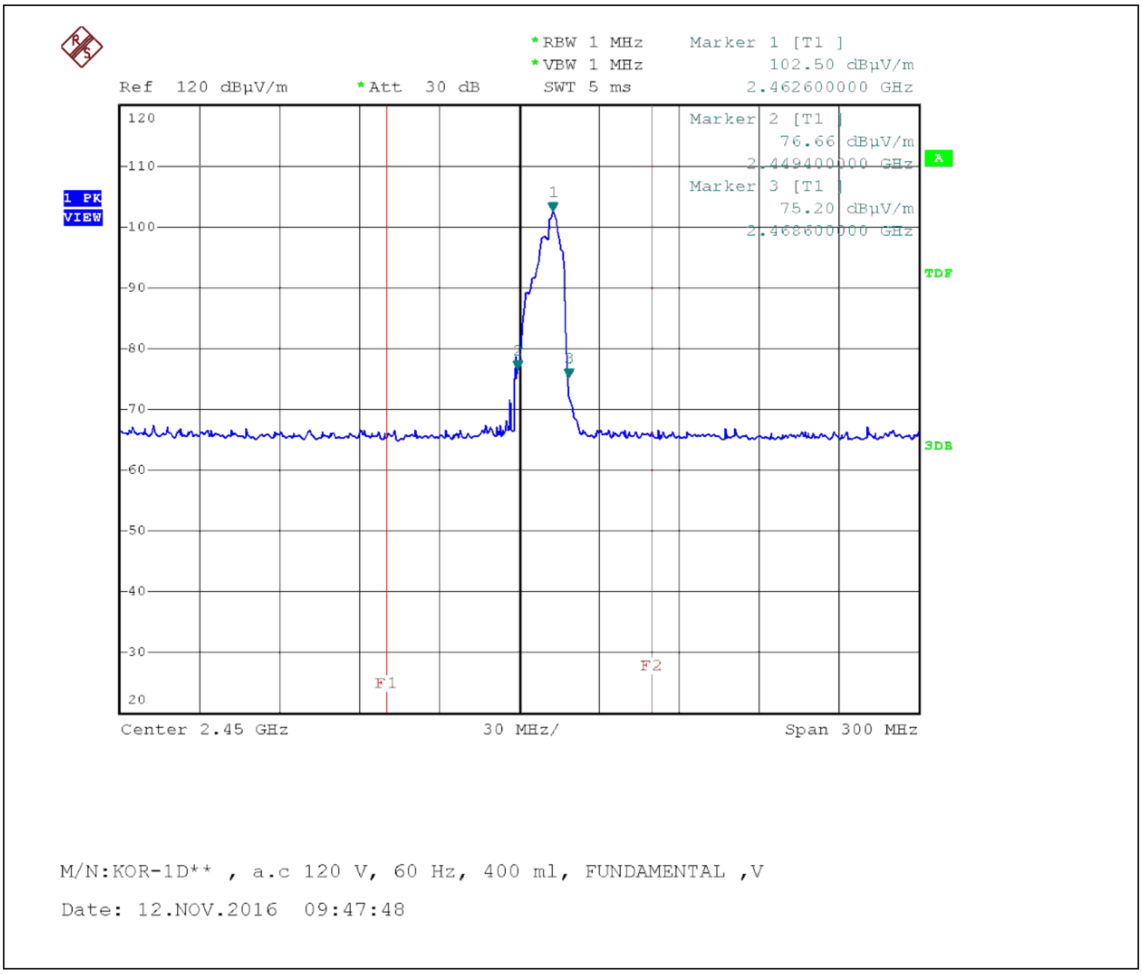
- ***Frequency vs Load Variation Test***



Horizontal (120 V, 400 mℓ)

PLOTS OF EMISSIONS

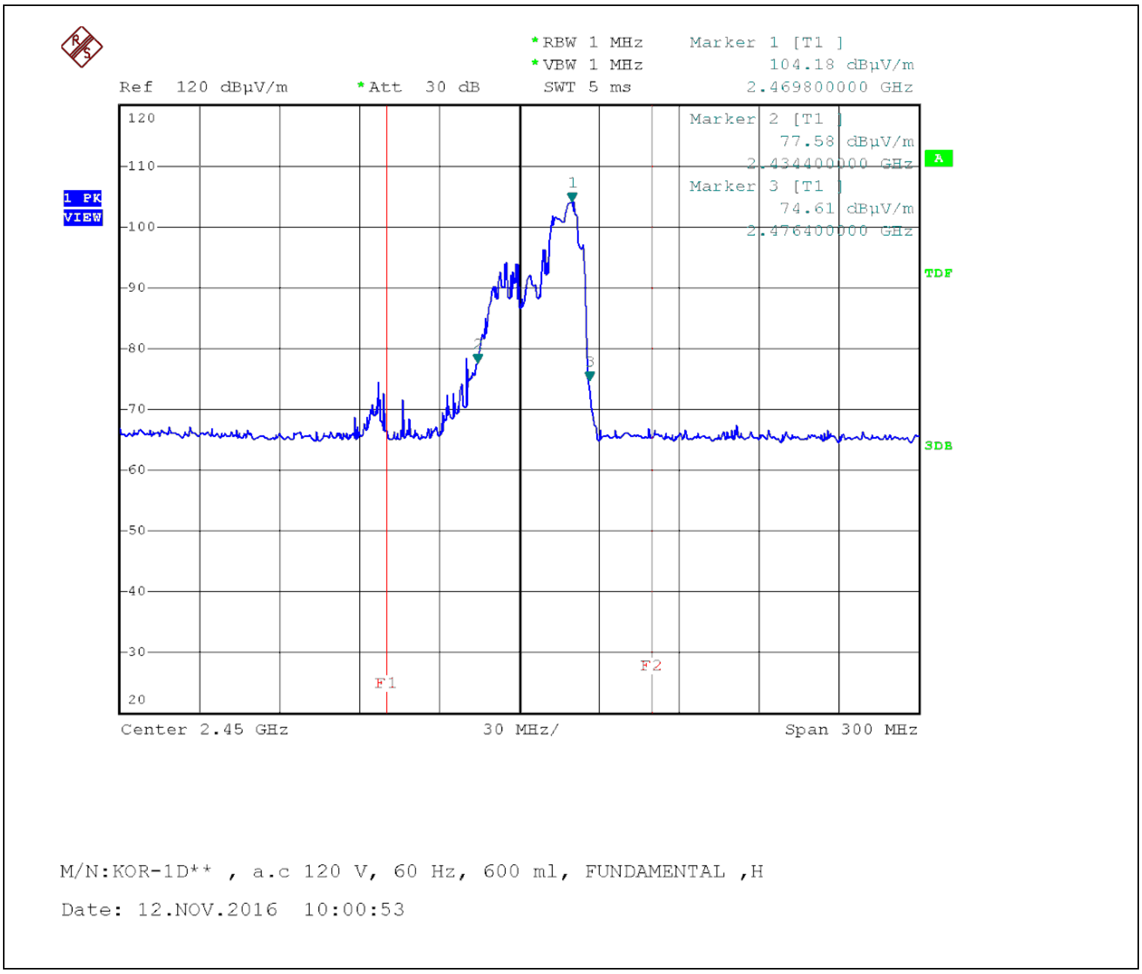
- ***Frequency vs Load Variation Test***



Vertical (120 V, 400 mℓ)

PLOTS OF EMISSIONS

- ***Frequency vs Load Variation Test***



Horizontal (120 V, 600 mℓ)

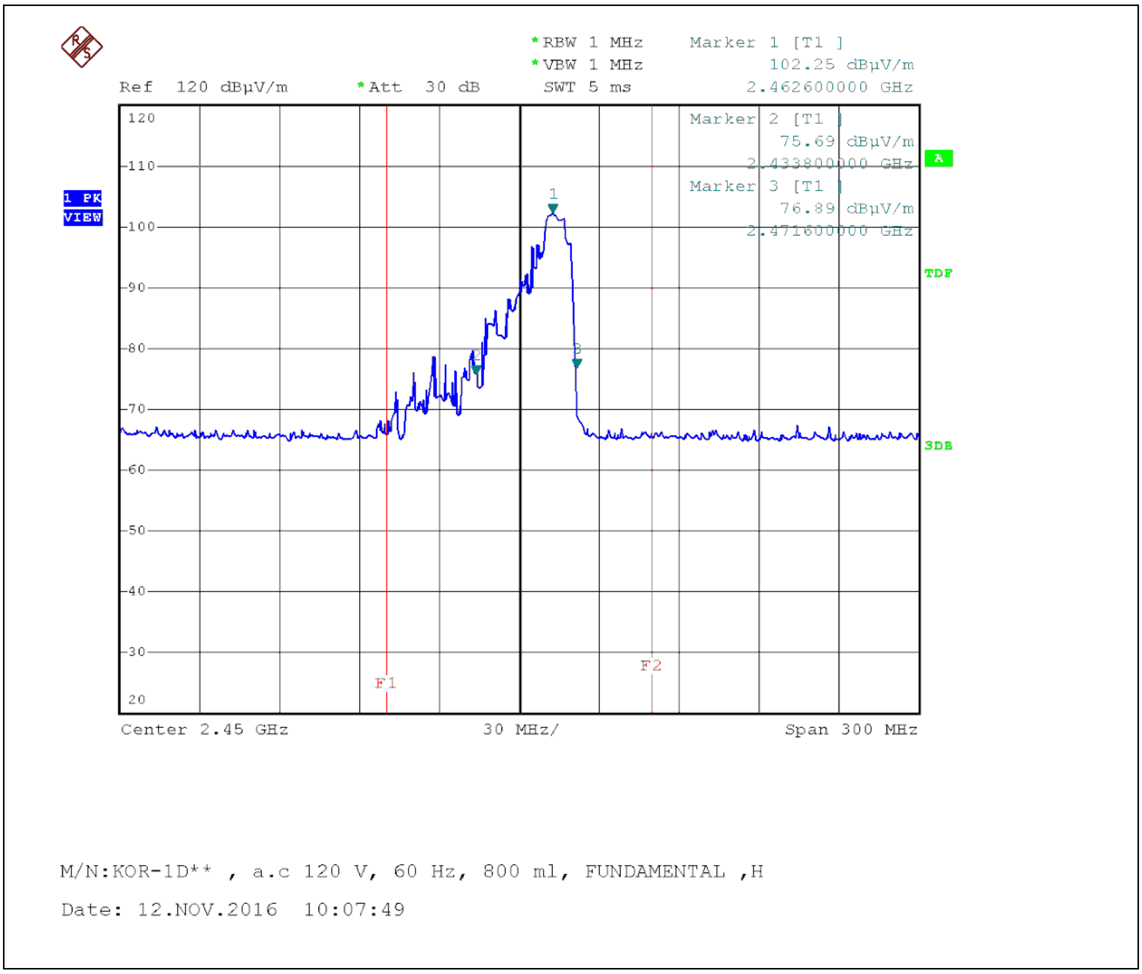
PLOTS OF EMISSIONS

- ***Frequency vs Load Variation Test***

Vertical (120 V, 600 ㎖)

PLOTS OF EMISSIONS

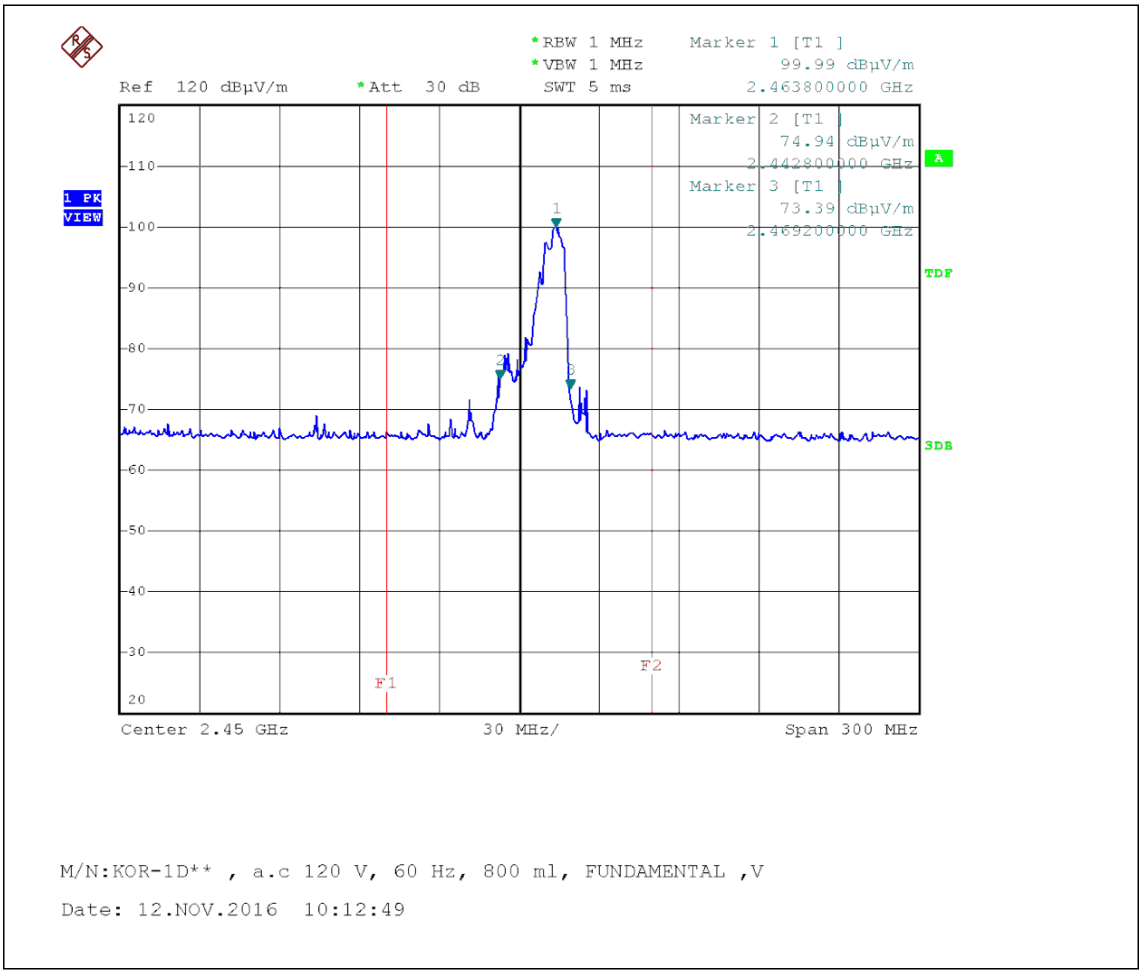
- ***Frequency vs Load Variation Test***



Horizontal (120 V, 800 ㎖)

PLOTS OF EMISSIONS

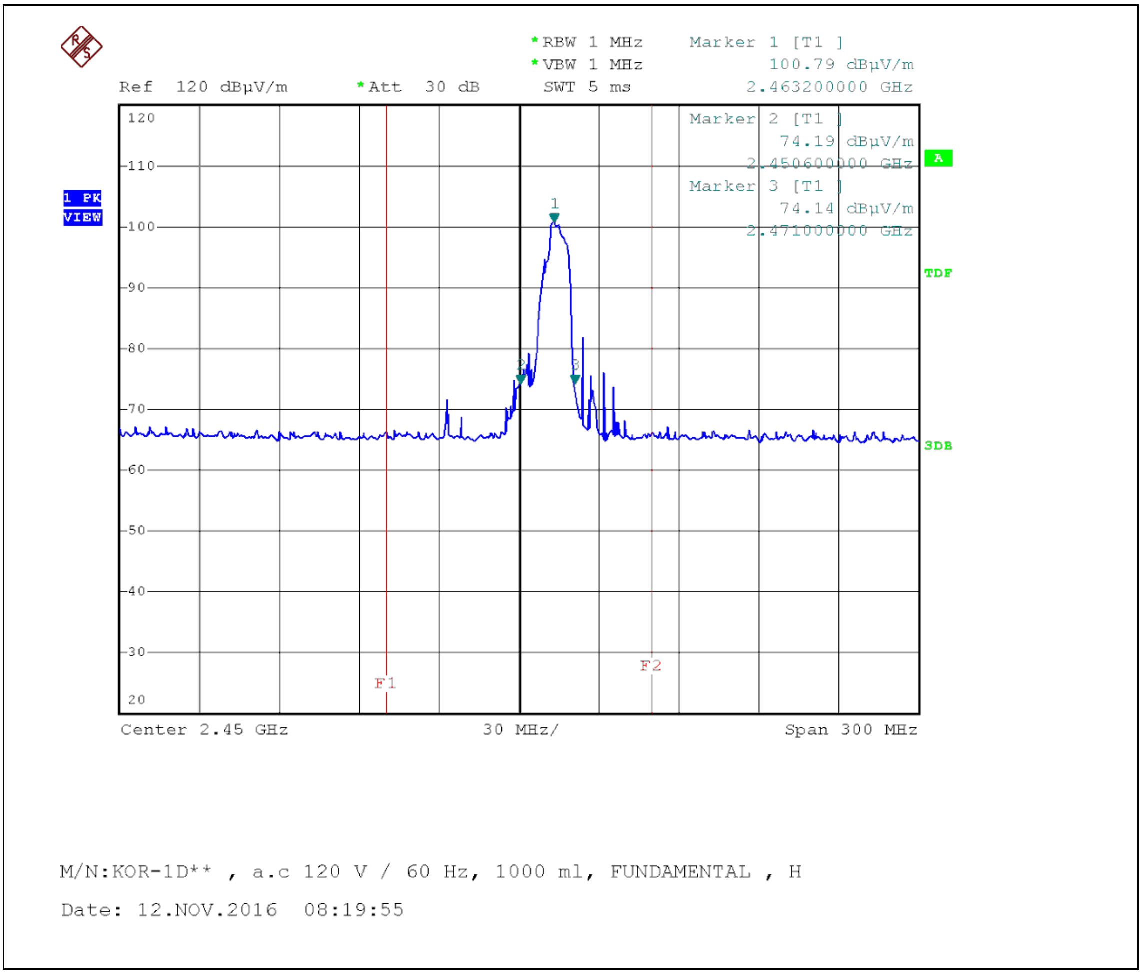
- ***Frequency vs Load Variation Test***



Vertical (120 V, 800 ㎖)

PLOTS OF EMISSIONS

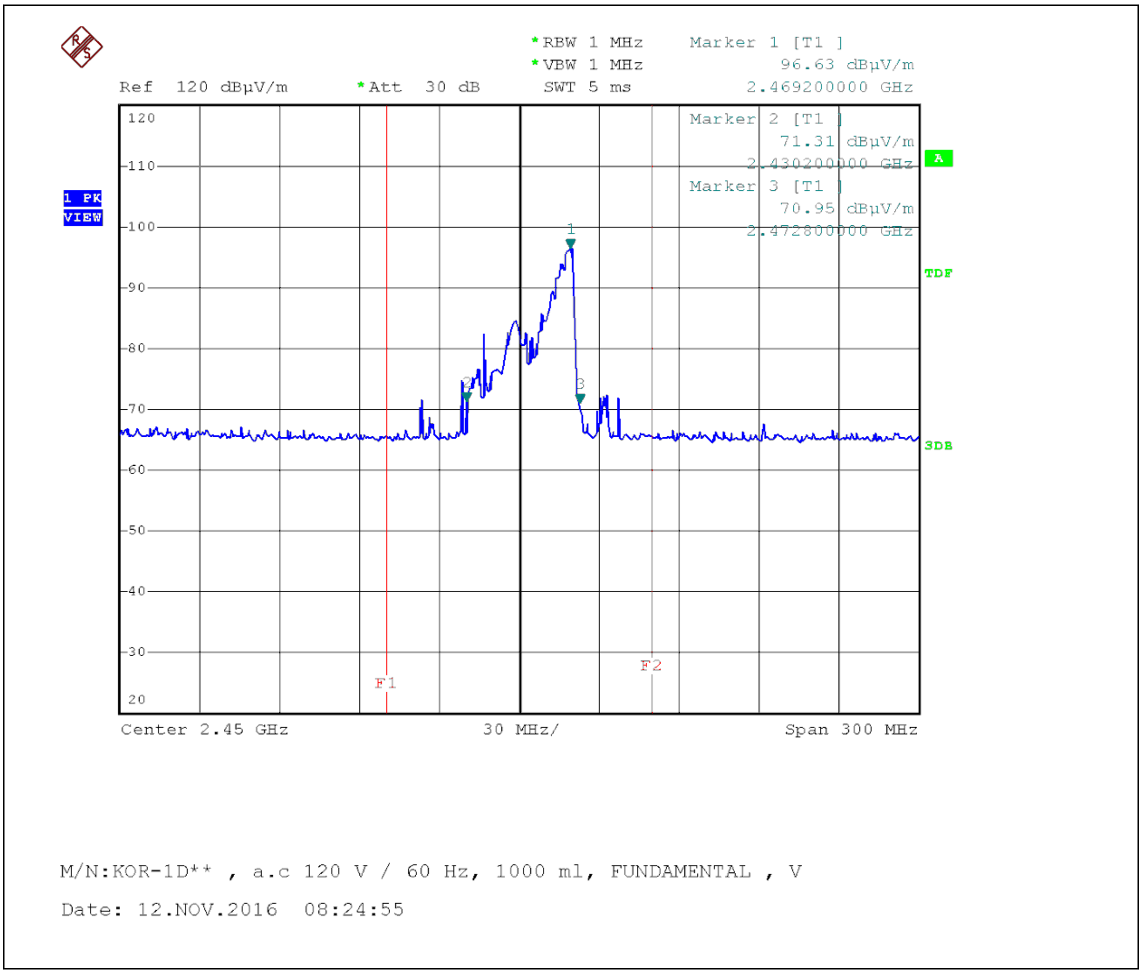
- ***Frequency vs Load Variation Test***



Horizontal (120 V, 1000 ㎖)

PLOTS OF EMISSIONS

- ***Frequency vs Load Variation Test***



Vertical (120 V, 1000 ㎖)

ACCURACY OF MEASUREMENT

The Measurement Uncertainties stated were calculated in accordance with the requirements of measurement uncertainty contained in CISPR 16-4-2 with the confidence level of 95 %

1. Conducted Uncertainty Calculation

Source of Uncertainty	X_i	Uncertainty of X_i		Coverage factor k	$u(X_i)$ (dB)	C_i	$C_i\,u(X_i)$ (dB)
		Value (dB)	Probability Distribution				
Measurement System Repeatability	R_S	0.10	normal 1	1.00	0.10	1	0.10
Receiver reading	R_i	± 0.02	normal 2	2.00	0.01	1	0.01
Attenuation AMN - Receiver	L_C	± 0.10	rectangular	$\sqrt{3}$	0.06	1	0.06
AMN Voltage division factor	L_{AMN}	± 0.09	normal 2	2.00	0.05	1	0.05
Sine wave voltage	dV_{SW}	± 0.17	normal 2	2.00	0.09	1	0.09
Pulse amplitude response	dV_{PA}	± 0.92	normal 2	2.00	0.50	1	0.50
Pulse repetition rate response	dV_{PR}	± 0.35	normal 2	2.00	0.18	1	0.18
Noise floor proximity	$dVNF$	± 0.00	rectangular	$\sqrt{3}$	0.00	1	0.00
AMN Impedance	dZ	± 2.00	normal 2	2.00	1.00	1	1.00
Mismatch	M	+ 0.81 - 0.89	U-Shaped	$\sqrt{3}$	0.60	1	0.60
Remark	Using 50 Ω / 50 uH AMN						
Combined Standard Uncertainty	Normal			u_c = 1.29 dB			
Expended Uncertainty U	Normal (k = 2)			U = 2.6 dB (CL is 95 %)			

2. Radiation Uncertainty Calculation (Below 1 ㎓)

Source of Uncertainty	Xi	Uncertainty of Xi		Coverage factor k	u(Xi) (dB)	Ci	Ci u(Xi) (dB)
		Value (dB)	Probability Distribution				
Measurement System Repeatability	RS	0.67	normal 1	1.00	0.67	1	0.67
Receiver reading	Ri	± 0.02	normal 2	2.00	0.01	1	0.01
Sine wave voltage	dVsw	± 0.17	normal 2	2.00	0.09	1	0.09
Pulse amplitude response	dVpa	± 0.92	normal 2	2.00	0.46	1	0.46
Pulse repetition rate response	dVpr	± 0.35	normal 2	2.00	0.18	1	0.18
Noise floor proximity	dVnf	± 0.50	normal 2	2.00	0.25	1	0.25
Antenna Factor Calibration	A_F	± 2.00	rectangular	$\sqrt{3}$	1.15	1	1.15
Cable Loss	C_L	± 1.00	normal 2	2.00	0.50	1	0.50
Antenna Directivity	A_D	± 0.00	rectangular	$\sqrt{3}$	0.00	1	0.00
Antenna Factor Height Dependence	A_H	± 2.00	rectangular	$\sqrt{3}$	1.15	1	1.15
Antenna Phase Centre Variation	A_P	± 0.20	rectangular	$\sqrt{3}$	0.12	1	0.12
Antenna Factor Frequency Interpolation	A_i	± 0.25	rectangular	$\sqrt{3}$	0.14	1	0.14
Site Imperfections	S_i	± 4.00	triangular	$\sqrt{6}$	1.63	1	1.63
Measurement Distance Variation	D_V	± 0.60	rectangular	$\sqrt{3}$	0.35	1	0.35
Antenna Balance	D_{bal}	± 0.90	rectangular	$\sqrt{3}$	0.52	1	0.52
Cross Polarization	D_{Cross}	± 0.00	rectangular	$\sqrt{3}$	0.00	1	0.00
Mismatch	M	+ 0.98 - 1.11	U-Shaped	$\sqrt{2}$	0.74	1	0.74
EUT Volume Diameter	Vd	0.33	normal 1	1.00	0.33	1	0.11
Combined Standard Uncertainty	Normal			uc = 2.72 dB			
Expended Uncertainty U	Normal (k = 2)			5.4 dB (CL is 95 %)			

3. Radiation Uncertainty Calculation (Above 1 ㎓)

Source of Uncertainty	***Xi***	**Uncertainty of *Xi***		**Coverage factor *k***	***u(Xi)* (dB)**	***Ci***	***Ci u(Xi)* (dB)**
		Value (dB)	**Probability Distribution**				
Measurement System Repeatability	*RS*	0.21	normal 1	1.00	0.21	1	0.21
Receiver Reading	*Ri*	± 0.02	normal 2	2	0.01	1	0.01
Attenuation (antenna-receiver)	a_c	± 0.30	normal 2	2	0.15	1	0.15
Preamplifier gain	*Gp*	± 0.21	normal 2	2	0.11	1	0.11
Receiver Sine Wave	*dVsw*	± 0.17	normal 2	2	0.09	1	0.09
Instability of preamp gain	*dGp*	± 1.2	rectangular	$\sqrt{3}$	0.70	1	0.70
Noise Floor Proximity	*dVnf*	± 0.70	rectangular	$\sqrt{3}$	0.40	1	0.40
Antenna Factor Calibration	*AF*	± 1.00	normal 2	2	0.50	1	0.50
Directivity difference	*DFadir*	± 1.00	rectangular	$\sqrt{3}$	0.58	1	0.58
Phase Centre location	*AP*	± 0.30	rectangular	$\sqrt{3}$	0.17	1	0.17
Antenna Factor Frequency Interpolation	*Ai*	± 0.30	rectangular	$\sqrt{3}$	0.17	1	0.17
Site Imperfections	*Si*	± 6.00	triangular	$\sqrt{6}$	2.45	1	2.45
Effect of setup table material	*dANT*	± 1.21	rectangular	$\sqrt{3}$	0.70	1	0.70
Separation distance	*dD*	± 0.50	rectangular	$\sqrt{3}$	0.29	1	0.29
Cross Polarization	*DCross*	± 0.00	rectangular	$\sqrt{3}$	0.00	1	0.00
Table height	*dh*	± 0.00	normal 2	2	0.00	1	0.00
Mismatch (antenna-Preamplifier)	*M*	+ 1.30 - 1.50	U-Shaped	$\sqrt{2}$	1.00	1	1.00
Mismatch (preamplifier-antenna)	*M*	+ 1.20 - 1.40	U-Shaped	$\sqrt{2}$	0.92	1	0.92
Combined Standard Uncertainty	Normal			*uc* = 6.26 dB			
Expended Uncertainty U	Normal (*k* = 2)			*U* = ± 6.3 dB (CL is 95 %)			

LIST OF TEST EQUIPMENT

No.	Instrument	Manufacturer	Model	Serial No.	Due to Calibration	Calibration Interval
1	Microwave survey meter	ETS Lindgren	1501	00033549	Feb.15 2017	2 year
2	LOOP ANTENNA	R&S	HFH2-Z2	N/A	Feb. 22 2018	2 years
3	EMI Test Receiver	R&S	ESCI	101041	Apr. 04 2017	1 year
4	Software	R&S	EMC32	Version 8.53.0	-	-
5	Artificial Mains Network	R&S	ESH2-Z5	100273	Apr. 04 2017	1 year
6	ATTENUATOR	FAIRVIEW	SA3N5W-10	N/A	Apr. 04 2017	1 year
7	EMI Test Receiver	R&S	ESU 40	100202	Apr. 04 2017	1 year
8	Software	R&S	EMC32	Version 8.53.0	-	-
9	TRILOG Broadband Test Antenna	SCHWARZBECK	VULB 9163	9163-423	Nov. 04 2017	2 year
10	ATTENUATOR	FAIRVIEW	SA3N5W-06	N/A	Apr. 04 2017	1 year
11	Controller	innco systems GmbH	CO2000-G	CO2000/562/ 23890210/L	N/A	N/A
12	Open Switch and Control Unit	R&S	OSP-120	100015	N/A	N/A
13	Antenna Mast (Left)	innco systems GmbH	MA4000-EP	N/A	N/A	N/A
14	Turn Table	innco systems GmbH	DT3000-3T	N/A	N/A	N/A
15	Signal Conditioning Unit	R&S	SCU 01	10030	Apr. 04 2017	1 year
16	Signal Conditioning Unit	Rohde & Schwarz	SCU 18	10065	Apr. 04 2017	1 year
17	DOUBLE RIDGED HORN ANTENNA	SCHWARZBECK	HF907	100197	Jun. 11 2017	2 year

APPENDIX A – SAMPLE LABEL

Labeling Requirements

The sample label shown shall be *permanently affixed* at a conspicuous location on the device and be readily visible to the user at the time of purchase.

- **FCC ID Location of EUT**

APPENDIX B – PHOTOGRAPHS OF TEST SET-UP

The **Conducted Test Picture** and **Radiated Test Picture** and show the worst-case configuration and cable placement.

- **Radiation hazard Test Picture**

- **Frequency measurement Test Picture**

- **Conducted Test Picture (Front)**

- **Conducted Test Picture (Side)**

- **Radiated Test Picture : 0.15 ㎒ ~ 30 ㎒ (Front)**

- **Radiated Test Picture : 0.15 ㎒ ~ 30 ㎒ (Rear)**

- **Radiated Test Picture : 30 ㎒ ~ 1 ㎓ (Front)**

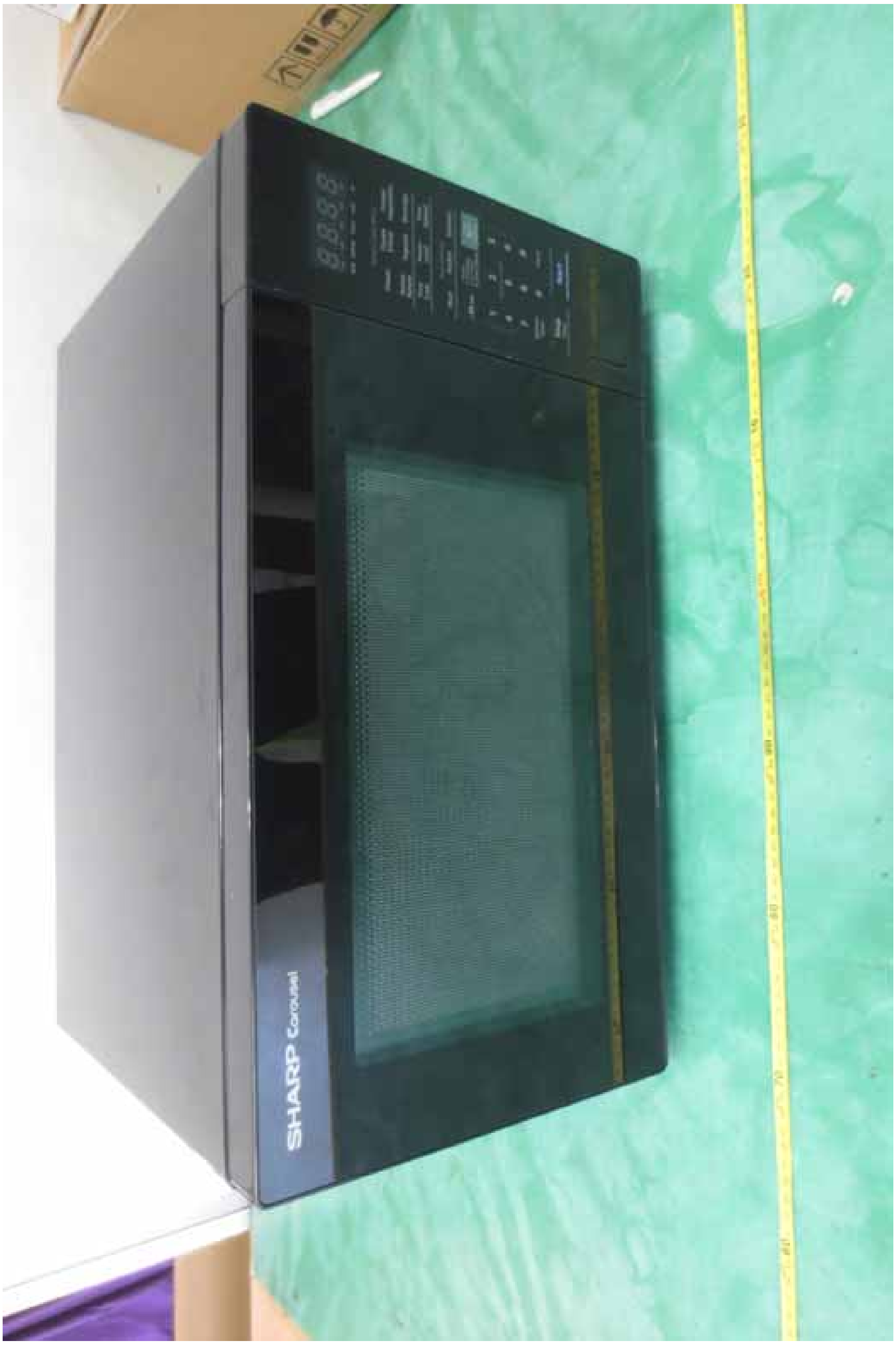
- **Radiated Test Picture : 30 ㎒ ~ 1 ㎓ (Rear)**

- **Radiated Test Picture : 1 ㎓ ~ 18 ㎓ (Front)**

- **Radiated Test Picture : 1 ㎓ ~ 18 ㎓ (Rear)**

APPENDIX C – EUT PHOTOGRAPHS

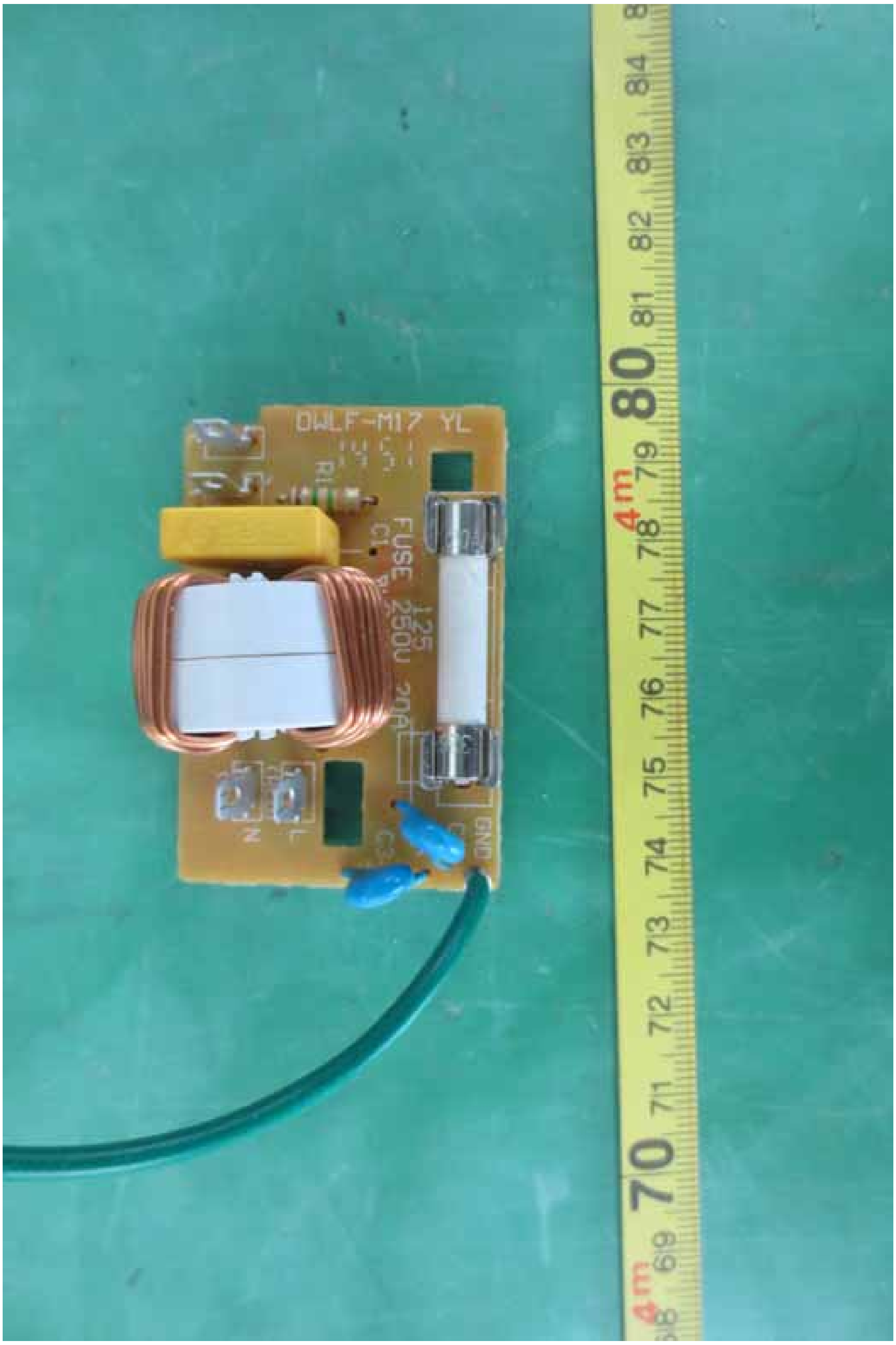
▶**Front View of EUT**



▶Rear View of EUT

▶**Inside View of EUT**

▶ **Front View of Line Filter**



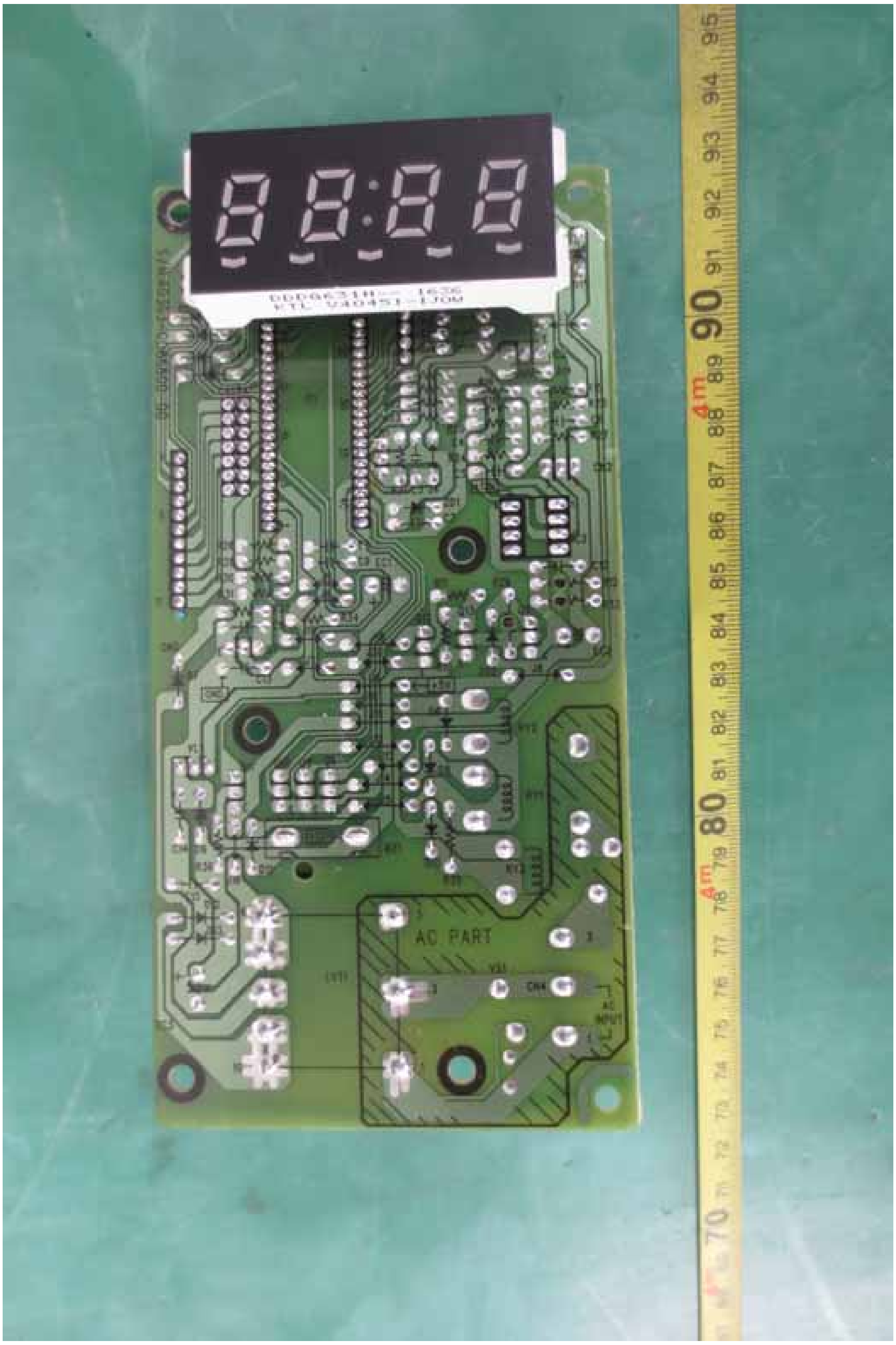
▶ Rear View of Line Filter

▶Front View of H.V.CAPACITOR

▶Rear View of H.V.CAPACITOR

▶**Front View of Control Board**

▶Rear View of Control Board



▶**Front View of Magnetron**

▶ Front View of Trans

APPENDIX D – SCHEMATIC DIAGRAM

APPENDIX E – USER'S MANUAL

APPENDIX F – BLOCK DIAGRAM