Nemko Korea Co., Ltd.
155 & 159, Osan-Ro, Mohyeon-Myeon, Cheoin-Gu, Yongin-Si, Gyeonggi-Do 449-852 KOREA, REPUBLIC OF
TEL : + 82 31 330 1700 FAX : + 82 31 322 2332

FCC EVALUATION REPORT FOR CERTIFICATION

Applicant :

Samsung Electronics Co., Ltd.
129, Samsung-ro, Yeongtong-gu, Suwon-si,
Gyeonggi-do, 443-742 Korea, Republic of
Attn : Mr. Gilryeong Koh

Dates of Issue : June 25, 2014
Test Report No. : NK-14-E-364
Test Site : Nemko Korea Co., Ltd.
EMC site, Korea

FCC ID	***A3LMG11H2020***
Brand Name	***SAMSUNG***
Contact Person	**Samsung Electronics Co., Ltd.** **129, Samsung-ro, Yeongtong-gu, Suwon-si,** **Gyeonggi-do, 443-742 Korea, Republic of** **Mr. Gilryeong Koh** **Telephone No. : + 82 31 200 6849**

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

The device bearing the brand name 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.

June 25, 2014
Tested By : Hyojung Lee
Engineer

Deokha Ryu June 25. 2014
Reviewed By : Deokha Ryu
Technical Manager

TABLE OF CONTENTS

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 :	Samsung Electronics Co., Ltd.
Contact Person :	Mr. Gilryeong Koh Tel No.: + 82 31 200 6849
Manufacturer :	Samsung Electronics Co., Ltd. 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-742 Korea, Republic of
Factory :	1) Samsung Electronics (M) Sdn. Bhd Lot 2, Lebuh 2, North Klang Straits, Area 21, Industrial Park, 42000 Port Klang, Selangor Malaysia 2) Thai Samsung Electronics Co., Ltd. 313 Moo 1 Sukhaphiban 8 Rd, Striracha Industry Park T.Bung A. Sriracha Chonburi Thailand 20230

- FCC ID: A3LMG11H2020
- Model: MG11H2020CT
- Brand Name: SAMSUNG
- EUT Type: Microwave Oven
- Applied Standard: FCC Part 18 & Part 2
- Test Procedure(s): MP-5:1986
- Dates of Test: April 18, 2014 to May 21, 2014
- Place of Tests: Nemko Korea Co., Ltd. EMC Site
- Test Report No.: NK-14-E-364

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 **Samsung Electronics Co., Ltd.**
FCC ID : **A3LMG11H2020, 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 449-852 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.
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 on 2009.

Nemko Korea Co., Ltd.
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Cheoin-Gu, Yongin-Si, Gyeonggi-Do
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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

Electric Rating :	a.c. 120 V, 60 Hz
Clock :	8 MHz
Magnetron Type :	OM-75P (Samsung)
Operating Frequency :	2450 MHz ± 50 MHz

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 700ml 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 42 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 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 kHz to 30 MHz with 20 ms 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 kHz. 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.

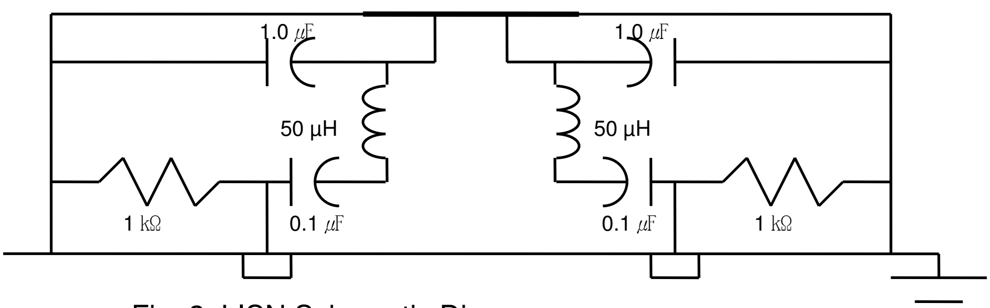


Fig. 2. LISN Schematic Diagram

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 MHz using Loop Antenna (R&S/HFH2-Z2) and from 30 to 1000 MHz using TRILOG Broadband Test Antenna (Schwarzbeck, VULB 9163). Above 1 GHz, 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 MHz with RBW 9 kHz & VBW 9 kHz and made indoor at 10 m using TRILOG Broadband Test Antenna (Schwarzbeck, VULB 9163) for measurement from 30 MHz to 1000 MHz with RBW 100 kHz & VBW 100 kHz and made indoors at 3 m using Double Ridged Broadband Horn antenna (Schwarzbeck, BBHA 9120 D) for measurement from 1 GHz to 18 GHz with RBW 1 MHz & VBW 10 Hz.
The detector function were set to CISPR quasi peak mode and the bandwidth of the receiver were set to 9 kHz, 100 kHz and peak mode 1 MHz 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.

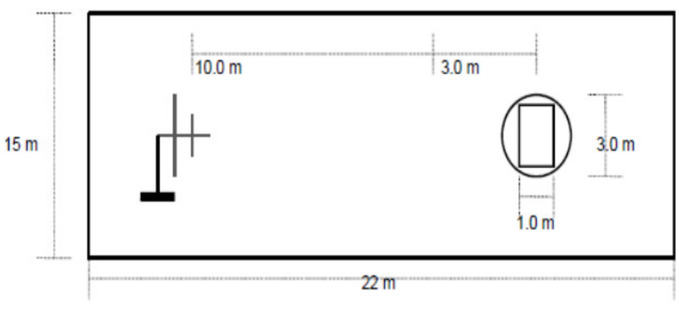


Fig. 3. Dimensions of 10 semi anechoic chamber

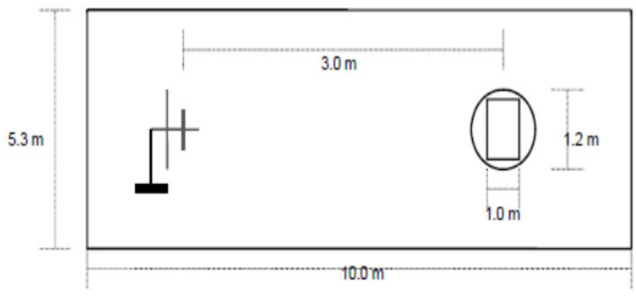


Fig. 4. Dimensions of 3 m full anechoic chamber

TEST DATA

Radiation Hazard

Probe Location	Maximum Leakage [mW/Cm2]	Limit [mW/Cm2]
A	0.20	1.00
B	0.10	1.00
C	0.05	1.00
All others	0.03	1.00

Input Power Measurement

Operation mode	P rated (W)	P (W)	dP (%)	Required dP (%)
Power Input	1600	1557.8	-2.63	+ 15 %

RF Output Power Measurement

[Test 1]

Mass of the water [g]	Mass of the container [g]	Ambient temperature [℃]	Initial temperature [℃]	Final temperature [℃]	Heating time [s]	Power output [watts]
1000	414	23.5	10	20.3	42	1009

[Test 2]

Mass of the water [g]	Mass of the container [g]	Ambient temperature [℃]	Initial temperature [℃]	Final temperature [℃]	Heating time [s]	Power output [watts]
1000	414	23.2	10	20.1	42	990

[Test 3]

Mass of the water [g]	Mass of the container [g]	Ambient temperature [℃]	Initial temperature [℃]	Final temperature [℃]	Heating time [s]	Power output [watts]
1000	414	23.1	10	20.2	42	1001

Power output of mean value	1000 W

Formula :

$$P = \frac{4.187 \times m_w (T_2 - T_1) + 0.55 \times m_c (T_2 - T_0)}{t}$$

NOTE :

P **is the microwave power output, in watts**

m_w **is the mass of the water, in grams**

m_c **is the mass of the container, in grams**

T_0 **is the ambient temperature, in degrees Celsius**

T_1 **is the initial temperature of the water, in degrees Celsius**

T_2 **is the final temperature of the water, in degrees Celsius**

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

Tested by : ***Hyojung Lee***

TEST DATA

Operating Frequency measurements

▶ **Frequency vs Line Voltage Variation Test**

[Room Temperature : 22.0 ℃]

Line Voltage Variation (a.c. V)	*)Pole	Frequency [MHz]	Allowed Tolerance for the ISM Band
96	H	Lower : 2410.4	Lower : 2400 MHz Upper : 2500 MHz
	H	Upper : 2483.6	
	V	Lower : 2414.0	
	V	Upper : 2477.6	
108	H	Lower : 2412.8	
	H	Upper : 2481.8	
	V	Lower : 2411.6	
	V	Upper : 2483.0	
120	H	Lower : 2412.2	
	H	Upper : 2484.8	
	V	Lower : 2409.2	
	V	Upper : 2486.0	
132	H	Lower : 2415.8	
	H	Upper : 2477.0	
	V	Lower : 2413.4	
	V	Upper : 2485.4	
150	H	Lower : 2412.8	
	H	Upper : 2479.4	
	V	Lower : 2411.0	
	V	Upper : 2481.2	

NOTE :

1. ****Pol. H = Horizontal V = Vertical***
2. ***Initial load : 1000 ml of water in the beaker.***
3. ***Line voltage varied from a.c. 96 V to a.c. 150 V.***
4. ***ISM Frequency : 2450 MHz, Tolerance : ± 50 MHz***

RESULT : Pass

Tested by : ***Hyojung Lee***

TEST DATA

▶Frequency vs Load Variation Test

[Room Temperature : 22.0 ℃]

Volume of water (ml)	*)Pole	Frequency [MHz]	Allowed Tolerance for the ISM Band
200	H	Lower : 2423.0	Lower : 2400 MHz Upper : 2500 MHz
	H	Upper : 2482.4	
	V	Lower : 2417.0	
	V	Upper : 2490.2	
400	H	Lower : 2417.0	
	H	Upper : 2483.6	
	V	Lower : 2418.8	
	V	Upper : 2483.6	
600	H	Lower : 2436.8	
	H	Upper : 2489.0	
	V	Lower : 2413.4	
	V	Upper : 2483.0	
800	H	Lower : 2418.2	
	H	Upper : 2488.4	
	V	Lower : 2414.6	
	V	Upper : 2485.4	
1000	H	Lower : 2409.2	
	H	Upper : 2487.2	
	V	Lower : 2411.6	
	V	Upper : 2486.0	

NOTE :

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

2. **The water load was varied between 200 ml to 1000 ml.**

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

4. ISM Frequency : 2450 MHz, Tolerance : ± 50 MHz

RESULT : Pass

Tested by : ***Hyojung Lee***

TEST DATA

Conducted Emissions

FCC ID : A3LMG11H2020

[Room Temperature : 23.0 ℃]

Test 1 / 2

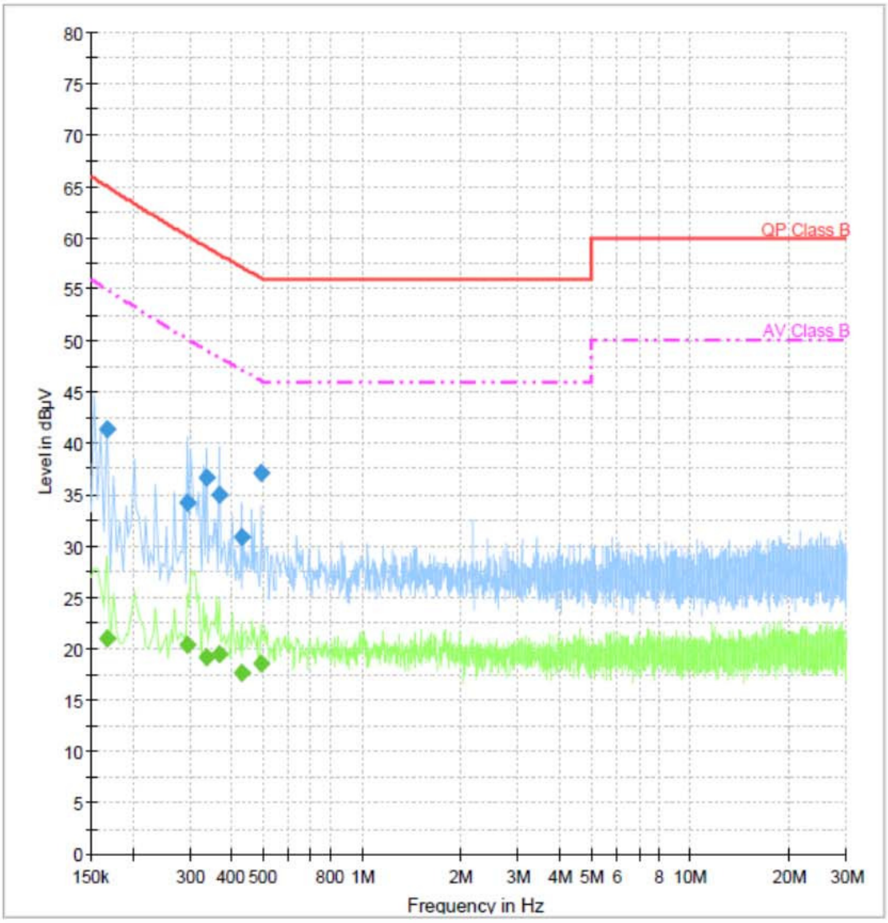
Test Report

Common Information

Test Description:	Nemko Korea(NK-14-E-364)
Test Site:	Conducted emission
Test Standard:	FCC Part 18
Environment Conditions:	a.c. 120 V, 60 Hz
Operator Name:	Lee Hyo Jung
Comment:	MODEL : MG11H2020CT

2.EMI Auto Test_4-Line Voltage LISN

2.EMI Auto Test_4-Line Voltage LISN



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Test 2 / 2

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.168656	41.4	15000.0	9.000	GND	N	0.1	23.6	65.0	
0.295519	34.2	15000.0	9.000	GND	L1	0.1	26.0	60.2	
0.336562	36.7	15000.0	9.000	GND	L1	0.1	22.4	59.1	
0.370144	35.0	15000.0	9.000	GND	N	0.1	23.3	58.3	
0.429844	30.9	15000.0	9.000	GND	L1	0.1	26.3	57.2	
0.497006	37.1	15000.0	9.000	GND	N	0.1	19.0	56.0	

Final Result 2

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.168656	21.0	15000.0	9.000	GND	N	0.1	34.0	54.9	
0.295519	20.4	15000.0	9.000	GND	L1	0.1	29.7	50.1	
0.336562	19.1	15000.0	9.000	GND	L1	0.1	30.0	49.1	
0.370144	19.5	15000.0	9.000	GND	L1	0.1	28.8	48.3	
0.429844	17.6	15000.0	9.000	GND	N	0.1	29.6	47.2	
0.497006	18.6	15000.0	9.000	GND	N	0.1	27.5	46.0	

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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 kHz to 30 MHz)

FCC ID : A3LMG11H2020

[Room Temperature : 23.0 ℃]

Test 1 / 1

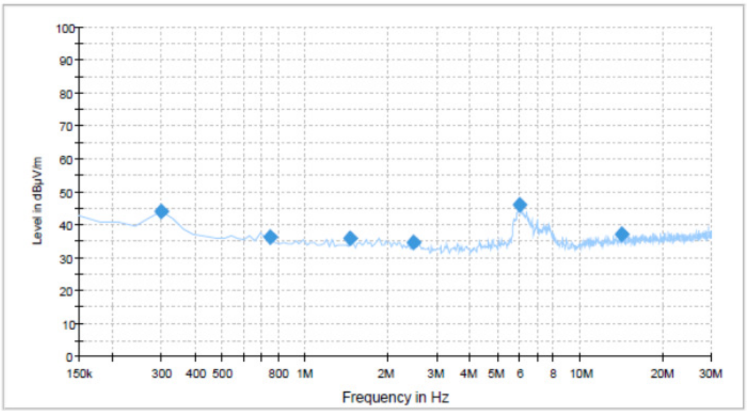
Test Report

Common Information

Test Description:	Radiated Emission (NK-14-E-364)
Test Site:	Nemko 3 m Chamber
Test Standard:	FCC Part 18
Environment Conditions:	a.c. 120 V , 60 Hz (Horizontal)
Operator Name:	Lee Hyo Jung
Comment:	MODEL : MG11H2020CT

6. Electric Field Strength (9K-30M)

6. Electric Field Strength (9K-30M)



Final Result 1

Frequency (MHz)	MaxPeak-MaxHold (dBµV/m)	Polarization	Azimuth (deg)	Corr. (dB)	Comment
0.299250	44.1	H	300.0	-6.5	
0.747000	36.1	H	300.0	-6.5	
1.463400	36.1	H	135.0	-6.5	
2.478300	34.8	H	15.0	-6.5	
6.060300	46.2	H	285.0	-6.4	
14.149650	37.0	H	315.0	-4.2	

5/9/2014 10:05:25

<Radiated Measurements at 3 meters, Horizontal>

Test 1 / 1

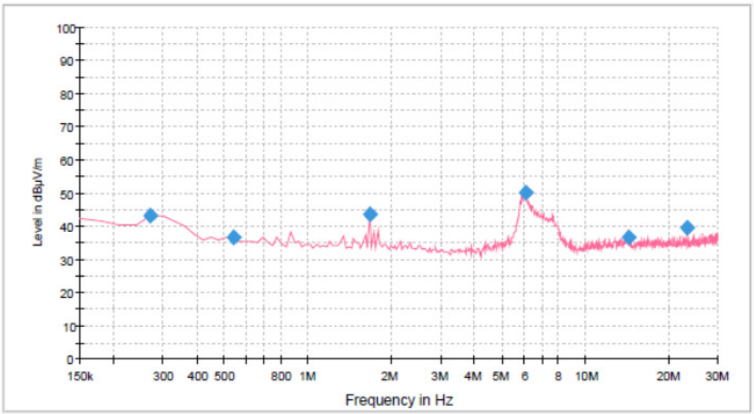
Test Report

Common Information

Test Description:	Radiated Emission (NK-14-E-364)
Test Site:	Nemko 3 m Chamber
Test Standard:	FCC Part 18
Environment Conditions:	a.c. 120 V , 60 Hz (Vertical)
Operator Name:	Lee Hyo Jung
Comment:	MODEL : MG11H2020CT

6. Electric Field Strength (9K-30M)

6. Electric Field Strength (9K-30M)



Final Result 1

Frequency (MHz)	MaxPeak-MaxHold (dBµV/m)	Polarization	Azimuth (deg)	Corr. (dB)	Comment
0.269400	43.3	V	150.0	-6.5	
0.538050	36.9	V	255.0	-6.5	
1.672350	43.6	V	240.0	-6.5	
6.090150	50.3	V	45.0	-6.4	
14.388450	36.7	V	75.0	-4.1	
23.194200	39.5	V	330.0	1.6	

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<Radiated Measurements at 3 meters, Vertical>

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 ml 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 MHz to 1 GHz)

FCC ID : A3LMG11H2020

[Room Temperature : 23.0 ℃]

Test 1 / 2

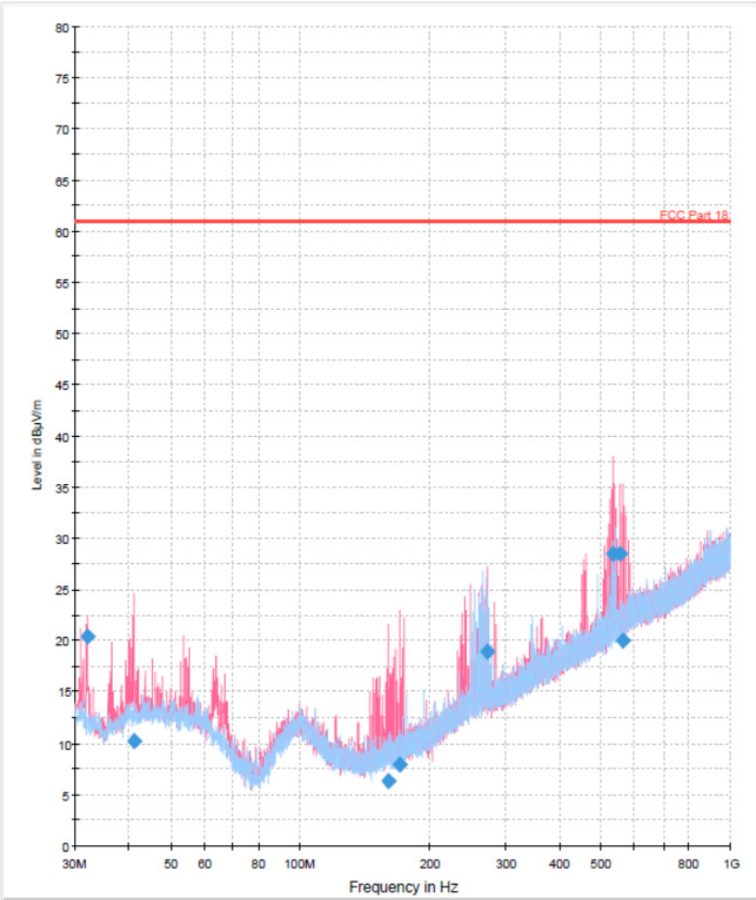
Test Report

Common Information

Test Description:	Radiated Emission(NK-14-E-364)
Test Site:	Nemko 10m Chamber
Test Standard:	FCC Part 18
Environment Conditions:	a.c 120 V, 60 Hz
Operator Name:	Lee Hyo Jung
Comment:	MODEL : MG11H2020CT

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

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



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Test 2 / 2

Final Result 1

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)
32.134000	20.4	15000.0	120.000	130.0	V	56.0	-23.0	40.1
41.106500	10.2	15000.0	120.000	116.0	V	59.0	-22.5	50.3
160.465000	6.3	15000.0	120.000	100.0	V	12.0	-26.5	54.2
170.989500	8.0	15000.0	120.000	119.0	V	108.0	-25.9	52.5
271.966500	19.0	15000.0	120.000	225.0	V	289.0	-20.3	41.5
535.661000	28.5	15000.0	120.000	330.0	V	177.0	-12.2	32.0
556.128000	28.5	15000.0	120.000	321.0	V	19.0	-11.5	32.0
562.627000	20.1	15000.0	120.000	198.0	V	43.0	-11.3	40.4

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

Frequency (MHz)	Limit (dBµV/m)	Comment
32.134000	60.5	
41.106500	60.5	
160.465000	60.5	
170.989500	60.5	
271.966500	60.5	
535.661000	60.5	
556.128000	60.5	
562.627000	60.5	

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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 ml 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 GHz)

FCC ID : A3LMG11H2020

[Room Temperature : 24.0 ℃]

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)	(μV/m)		(μV/m)	(μV/m)
2393.20	V	160	300	12.2	32.0	44.2	162.18	0.006	1.0	35.4
4566.70	H	130	0	33.5	3.3	36.8	69.183	0.009	0.6	35.4
5401.50	V	130	90	31.3	5.3	36.6	67.608	0.01	0.7	35.4
6116.51	H	160	0	31	6.7	37.7	76.736	0.01	0.8	35.4
7437.86	V	190	330	35	12.3	47.3	231.74	0.01	2.3	35.4
9146.02	V	160	168	36.6	14.7	51.3	367.28	0.01	3.7	35.4
9896.00	H	190	0	32.7	17.4	50.1	319.89	0.01	3.2	35.4

<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 [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 ml 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.

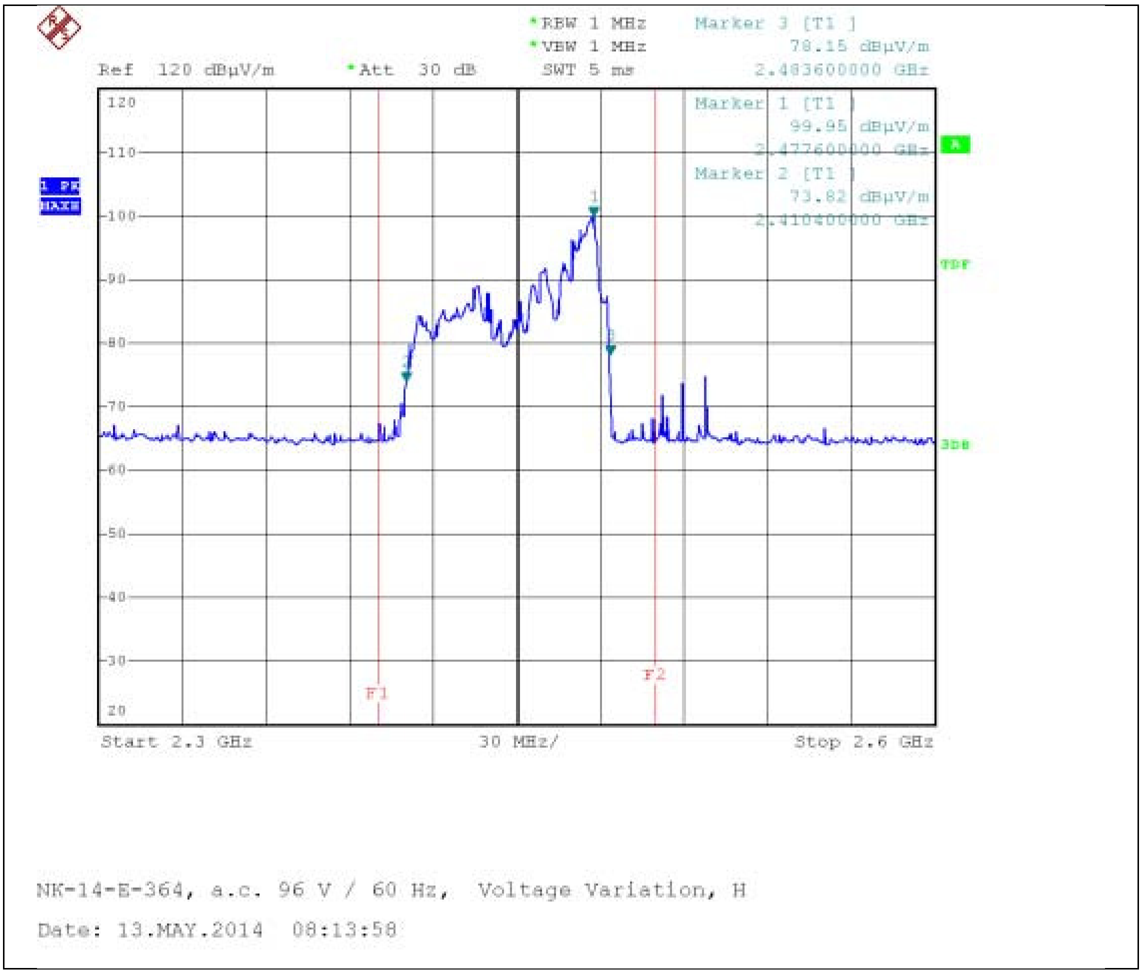
6. The test was performed at peak detector mode with average.

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

Tested by : ***Hyojung Lee***

PLOTS OF EMISSIONS

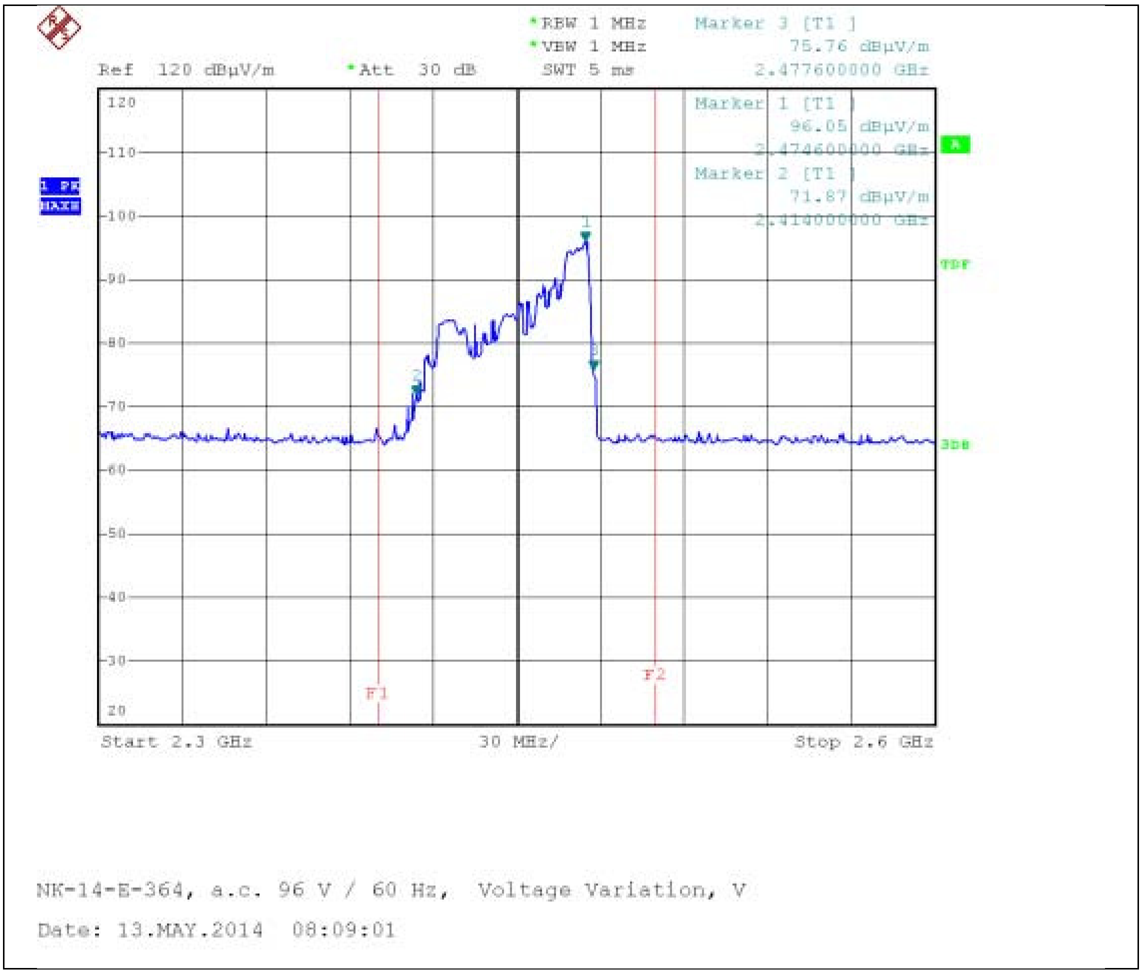
- ***Frequency vs Line Voltage Variation Test***



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 ml)

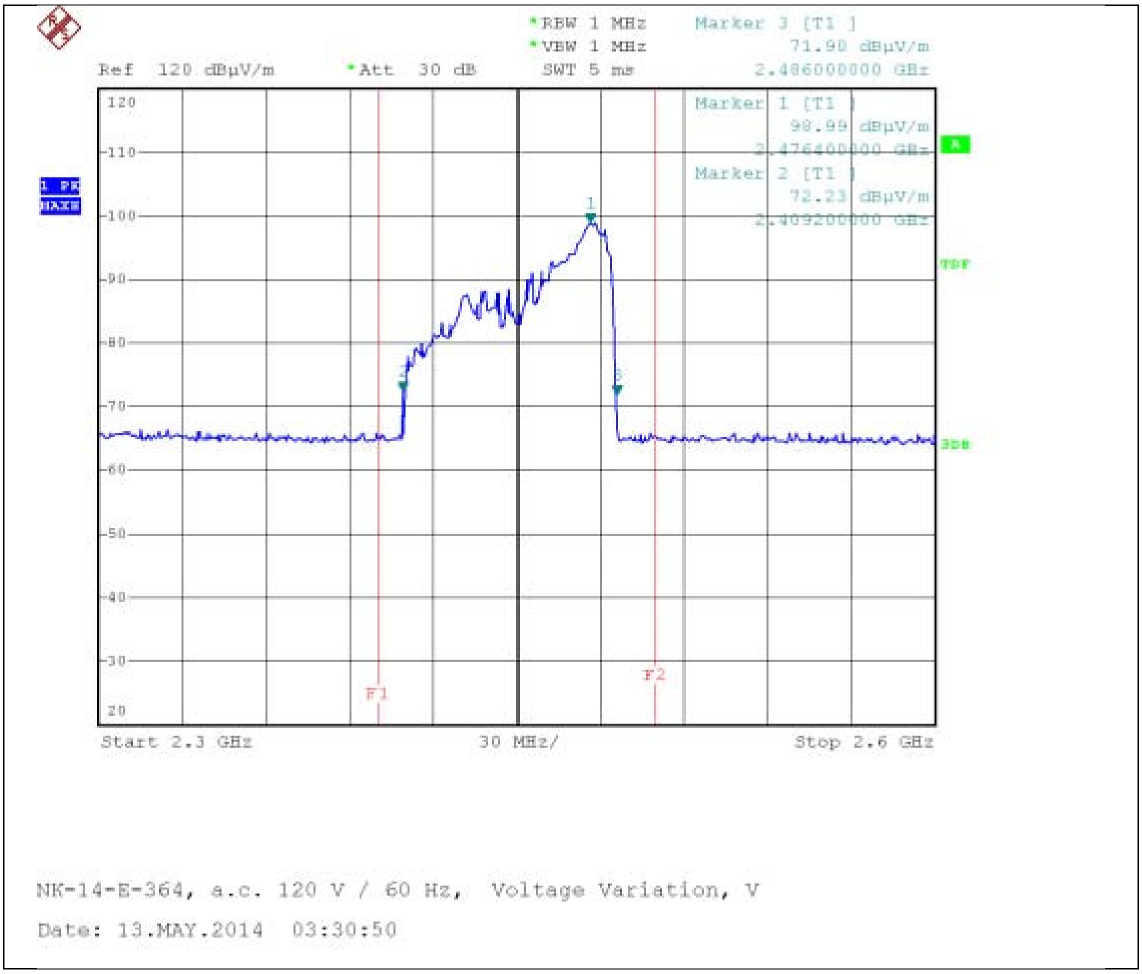
PLOTS OF EMISSIONS

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

Horizontal (120 V, 1000 ml)

PLOTS OF EMISSIONS

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



Vertical (120 V, 1000 ml)

PLOTS OF EMISSIONS

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

Horizontal (132 V, 1000 ml)

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 ml)

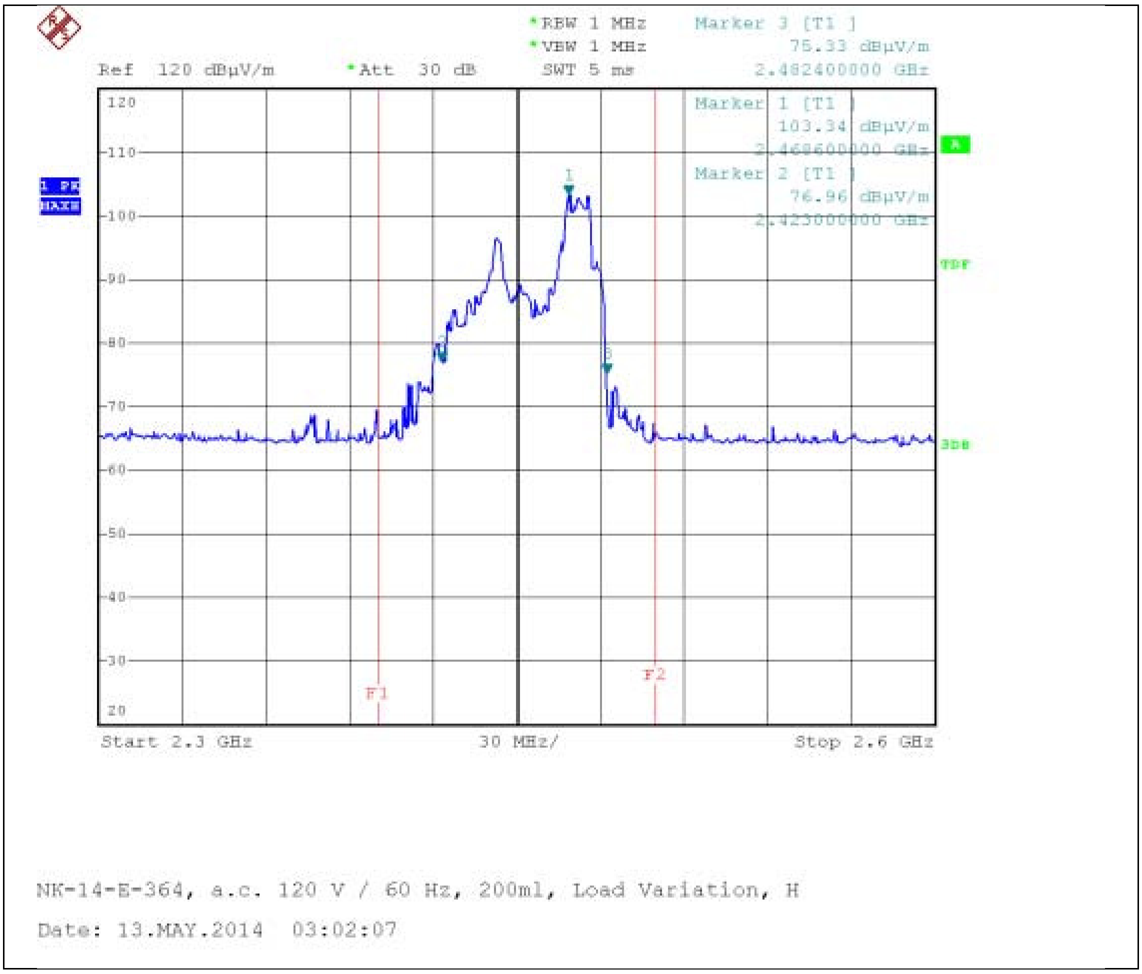
PLOTS OF EMISSIONS

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

Vertical (150 V, 1000 ml)

PLOTS OF EMISSIONS

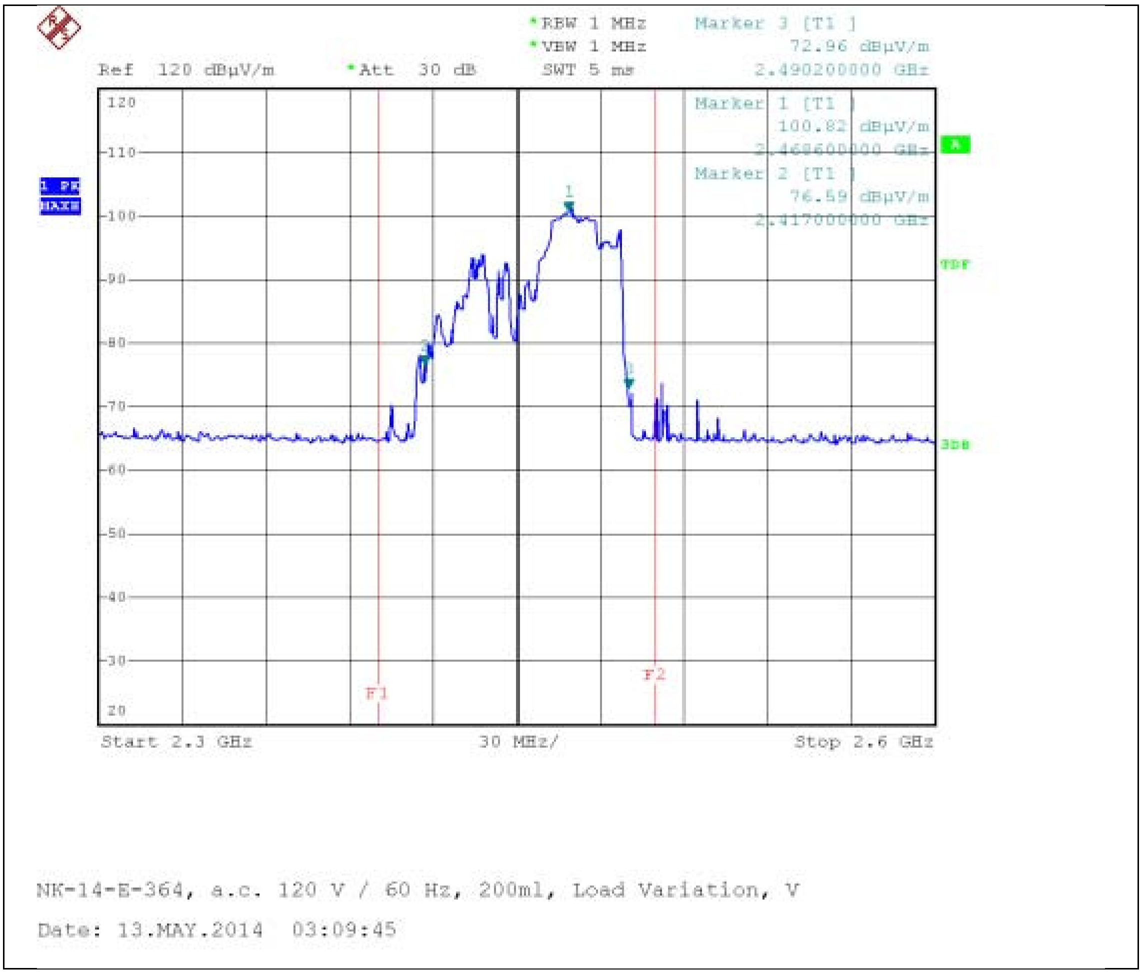
- ***Frequency vs Load Variation Test***



Horizontal (120 V, 200 ml)

PLOTS OF EMISSIONS

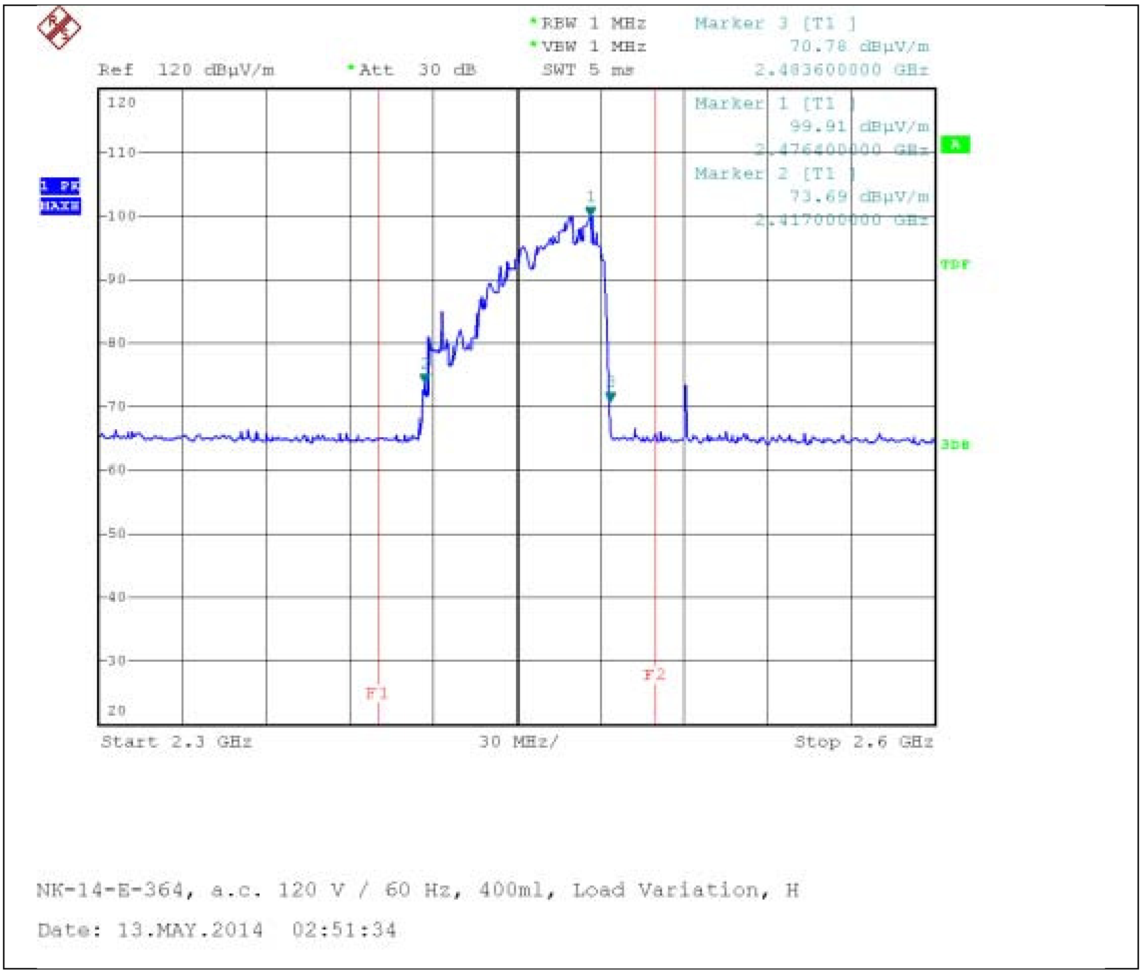
- ***Frequency vs Load Variation Test***



Vertical (120 V, 200 ml)

PLOTS OF EMISSIONS

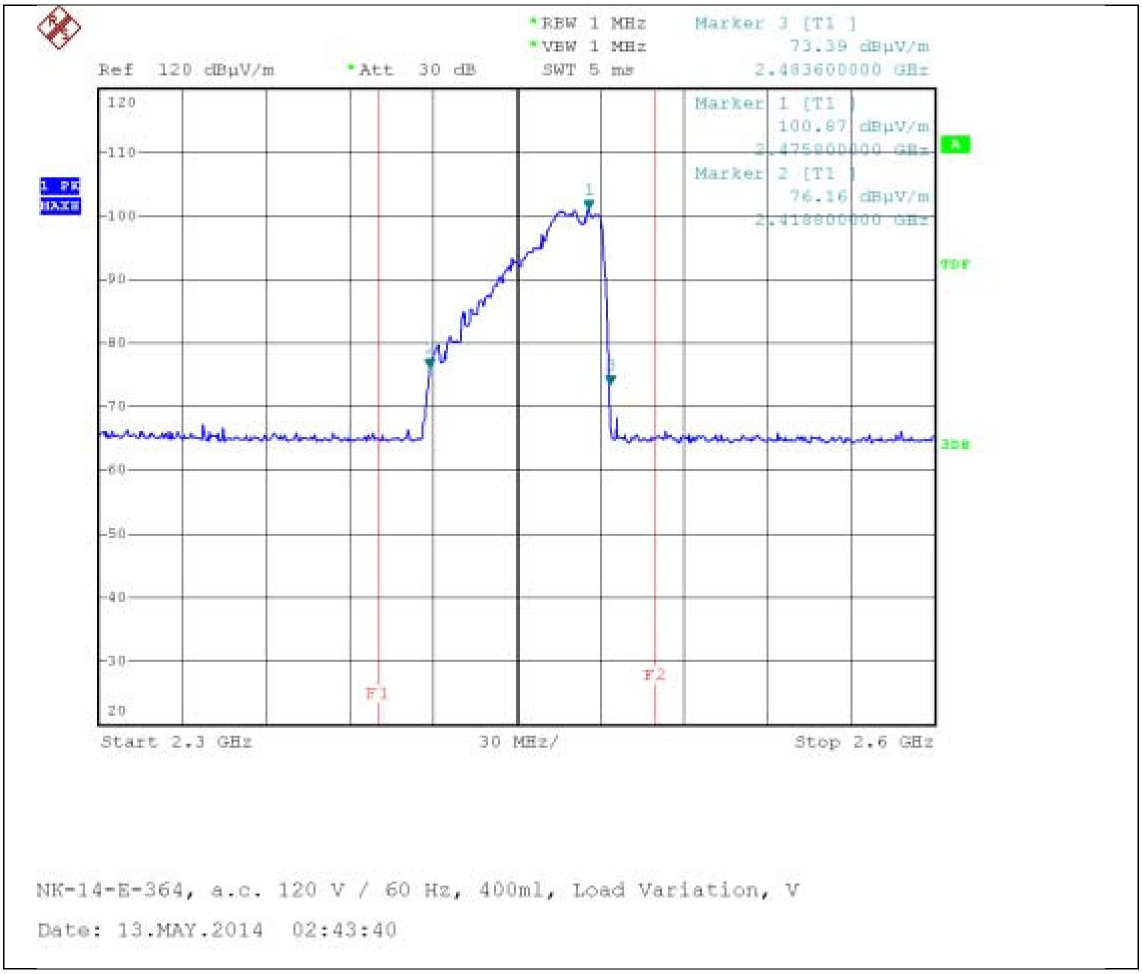
- ***Frequency vs Load Variation Test***



Horizontal (120 V, 400 ml)

PLOTS OF EMISSIONS

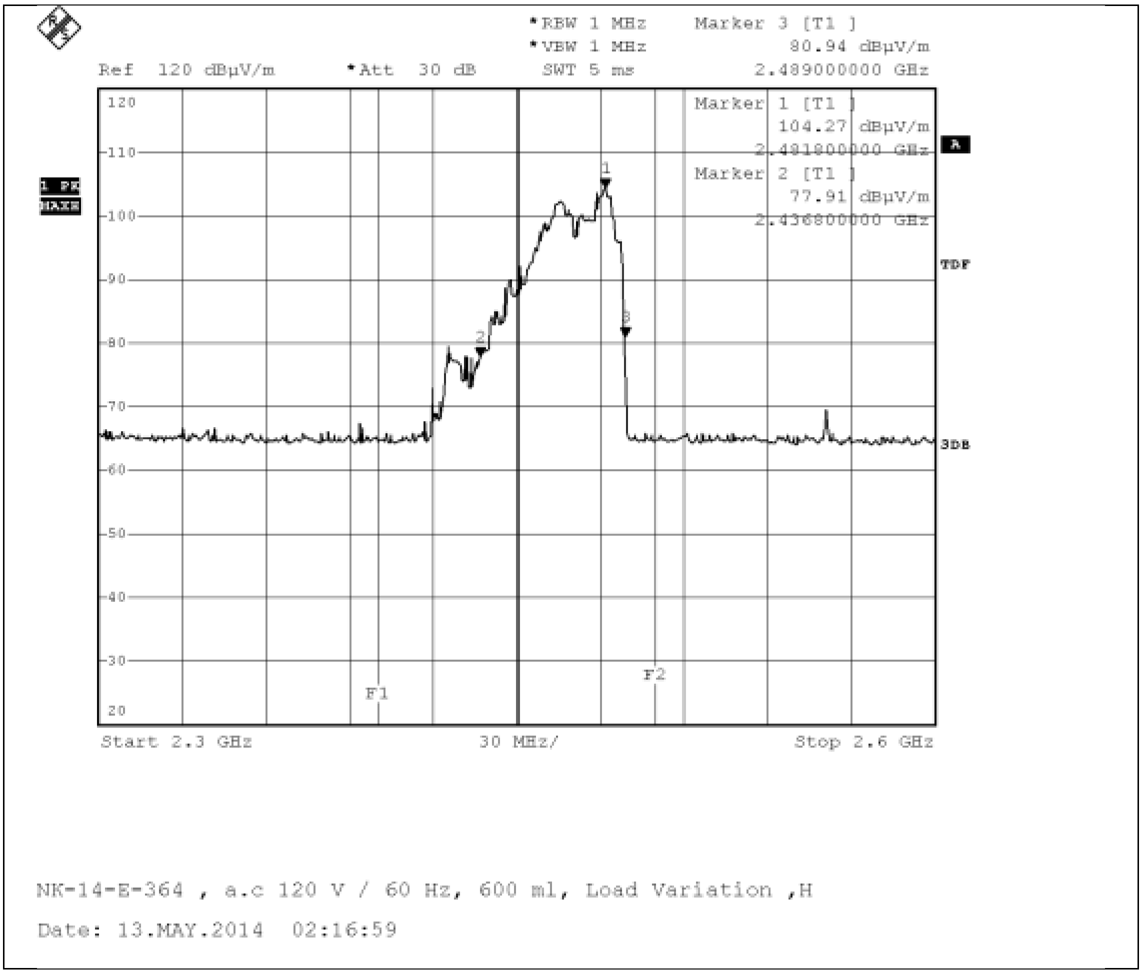
- ***Frequency vs Load Variation Test***



Vertical (120 V, 400 ml)

PLOTS OF EMISSIONS

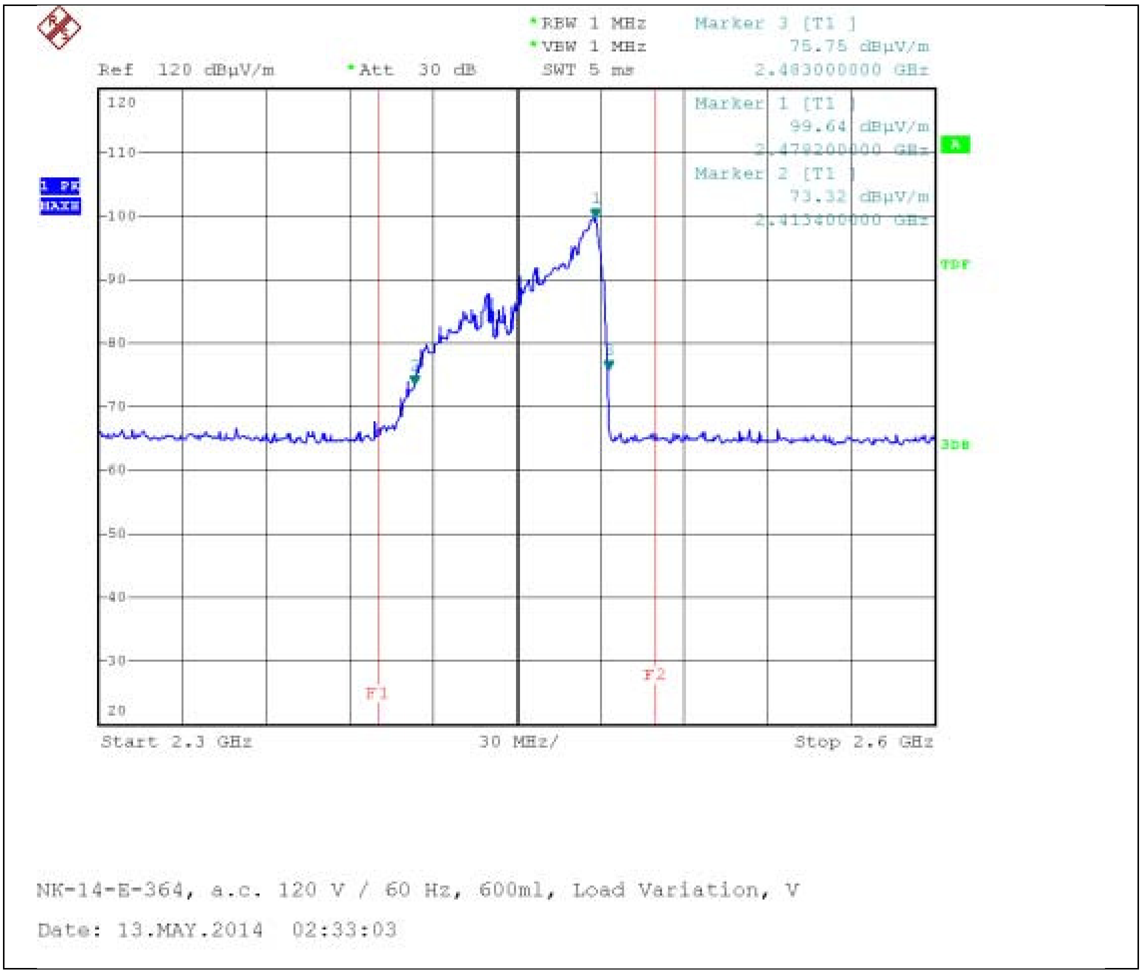
- ***Frequency vs Load Variation Test***



Horizontal (120 V, 600 ml)

PLOTS OF EMISSIONS

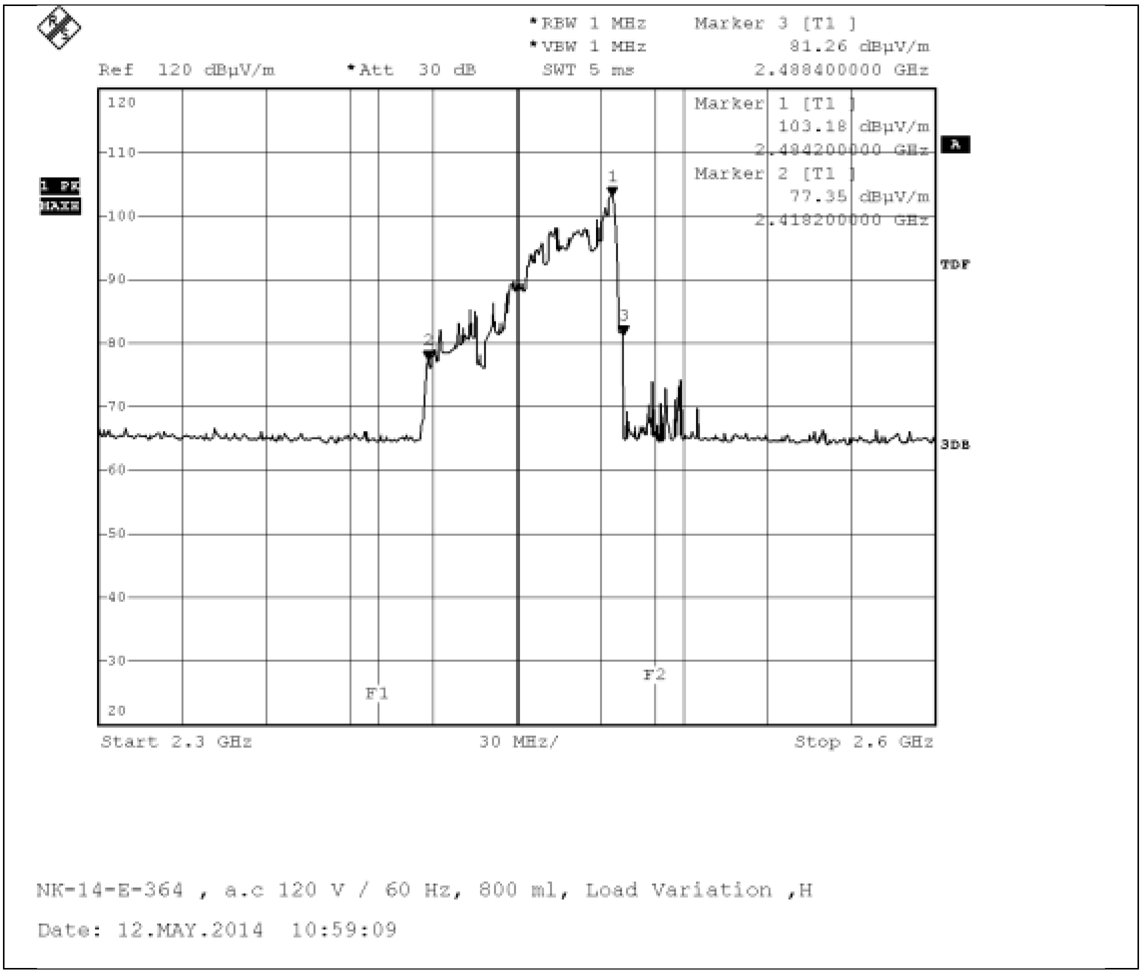
- ***Frequency vs Load Variation Test***



Vertical (120 V, 600 ml)

PLOTS OF EMISSIONS

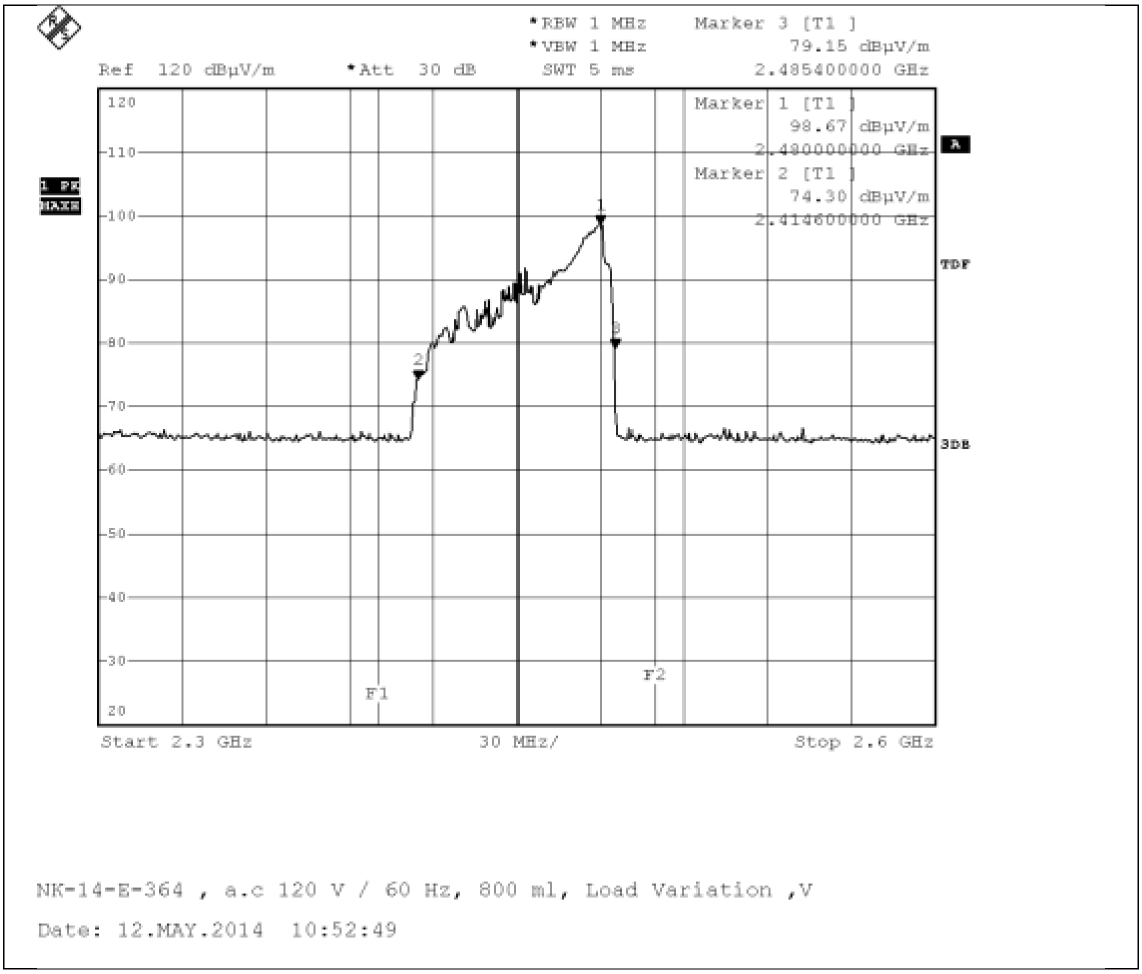
- ***Frequency vs Load Variation Test***



Horizontal (120 V, 800 ml)

PLOTS OF EMISSIONS

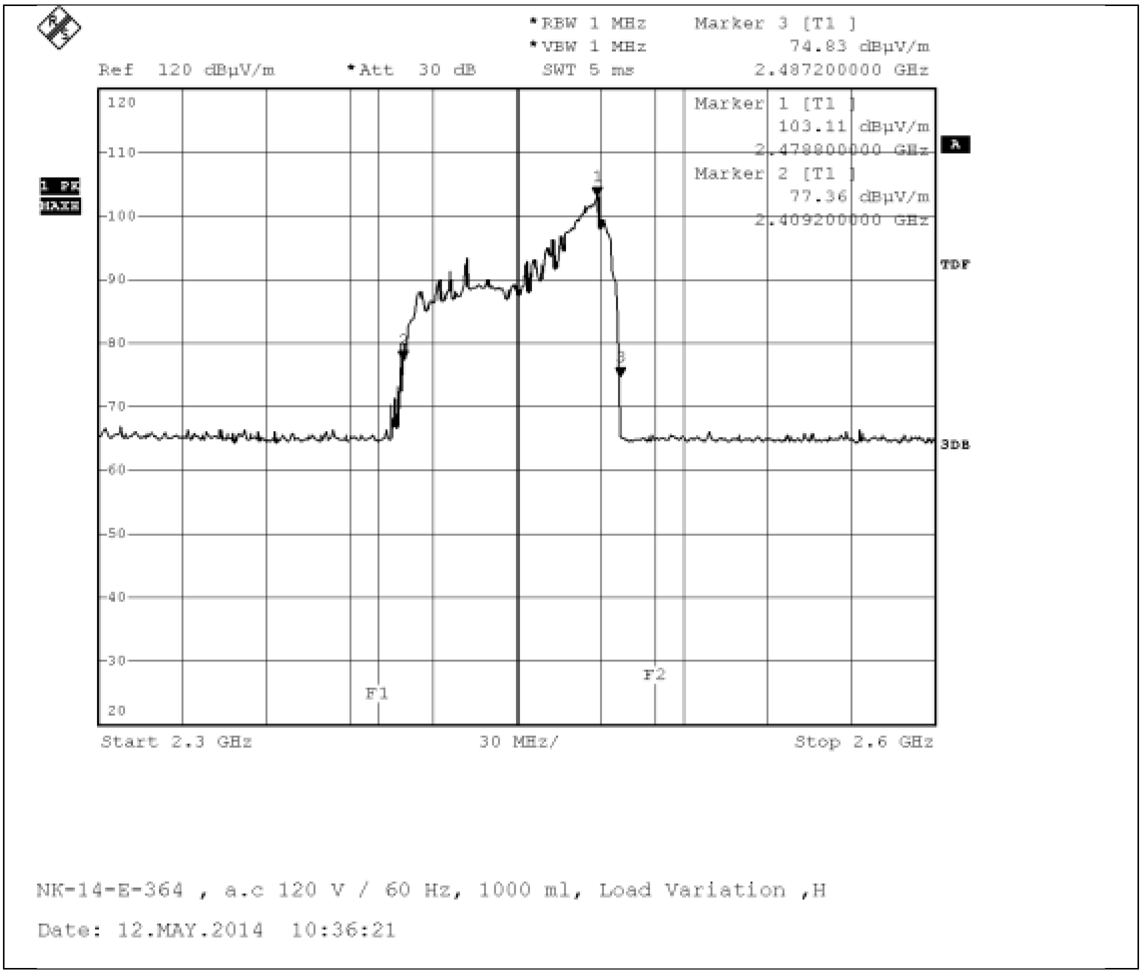
- ***Frequency vs Load Variation Test***



Vertical (120 V, 800 ml)

PLOTS OF EMISSIONS

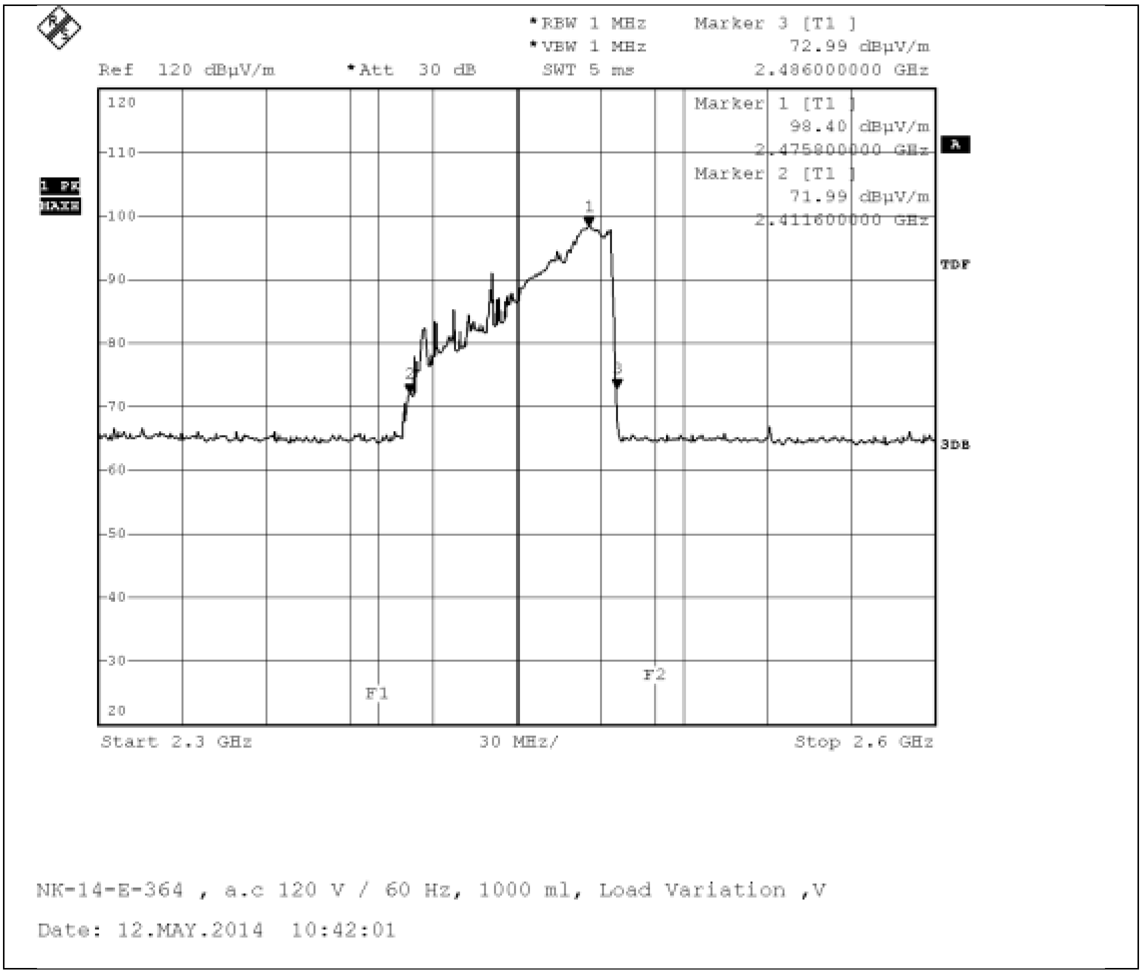
- ***Frequency vs Load Variation Test***



Horizontal (120 V, 1000 ml)

PLOTS OF EMISSIONS

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



Vertical (120 V, 1000 ml)

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	*Xi*	Uncertainty of *Xi*		Coverage factor *k*	*u(Xi)* (dB)	*Ci*	*Ci u(Xi)* (dB)
		Value (dB)	Probability Distribution				
Measurement System Repeatability	R_S	0.07	normal 1	1.00	0.07	1	0.07
Receiver reading	Ri	± 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	+ 0.80 − 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 GHz)

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*	0.11	normal 1	1.00	0.11	1	0.11
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
Combined Standard Uncertainty	Normal			u_c = 2.62 dB			
Expended Uncertainty U	Normal (*k* = 2)			5.2 dB (CL is 95 %)			

3. Radiation Uncertainty Calculation (Above 1 GHz)

Source of Uncertainty	*Xi*	Uncertainty of *Xi* Value (dB)	Uncertainty of *Xi* Probability Distribution	Coverage factor *k*	*u(Xi)* (dB)	*Ci*	*Ci u(Xi)* (dB)
Measurement System Repeatability	RS	0.08	normal 1	1.00	0.08	1	0.08
Receiver Reading	Ri	± 0.02	normal 2	2	0.01	1	0.01
Attenuation (antenna-receiver)	ac	± 0.40	normal 2	2	0.20	1	0.20
Preamplifier gain	Gp	± 0.11	normal 2	2	0.06	1	0.06
Receiver Sine Wave	dVsw	± 0.12	normal 2	2	0.06	1	0.06
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	± 1.50	normal 2	2	0.75	1	0.75
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	± 3.00	triangular	$\sqrt{6}$	1.22	1	1.22
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* = 2.36 dB			
Expended Uncertainty U	Normal (*k* = 2)			*U* = 4.7 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	Mar.05 2015	1 year
2	SPECTRUM ANALYZER	R&S	FSL3	101732	Apr. 03 2015	1 year
3	LOOP ANTENNA	R&S	HFH2-Z2	N/A	Feb. 13 2016	2 years
4	EMI Test Receiver	R&S	ESCI	101041	Apr. 02 2015	1 year
5	Software	R&S	EMC32	Version 8.53.0	-	-
6	Artificial Mains Network	R&S	ESH2-Z5	100273	Apr. 03 2015	1 year
7	EMI Test Receiver	R&S	ESU 40	100202	Apr. 03 2015	1 year
8	Software	R&S	EMC32	Version 8.53.0	-	-
9	TRILOG Broadband Test Antenna	SCHWARZBECK	VULB 9163	9163-423	June 21 2015	2 year
10	ATTENUATOR	FAIRVIEW	SA3N5W-06	N/A	Apr. 04 2015	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. 03 2015	1 year
16	SIGNAL ANALYZER	Rohde & Schwarz	FSV	102302	Jan. 09 2015	1 year
17	Pre Amplifier	HP	8449B	3008A00107	Jan. 09 2015	1 year
18	Double Ridged Broadband Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-474	Aug. 13 2014	2 year
19	Open Switch And Control Unit	R&S	OSP-120	100081	N/A	N/A
20	Turn Table	Innco systems Gmbh	DS 1200 S	N/A	N/A	N/A
21	Antenna Mast	R&S	MA 4000	N/A	N/A	N/A

APPENDIX D – SCHEMATIC DIAGRAM

APPENDIX E – USER'S MANUAL

APPENDIX F – BLOCK DIAGRAM