

EMC Test Report



Test report file No. : S16122-F

Date of issue: 30 March, 2017

Type : Commercial Induction Cooktop

Model : KY-MK3500

Serial No. : 00009

EUT received : 17 March, 2017

Applicant : Panasonic Appliances Company of America
Kitchen Appliances Certification Liaison

Address : 1701 Golf Road Suite 3-106 Rolling Meadows, IL 60008

Manufacturer : Panasonic Corporation
Appliances Company Kitchen Appliances Business Division

Address : 1-5-1 Takatsukadai, Nishi-ku, Kobe City 651-2271, Japan

Test results according to the
standard(s) at page 3 :



Compliance



Non-compliance

This test report with appendix consists of 20 pages.

This test result only responds to the tested sample.

It is not allowed to copy this test report even partly without the allowance of the test laboratory.

	Title	Signer
Tested by :	Test engineer	 Masaki Yamanaka
Reviewed :	Manager, Quality System Representative and Responsible engineer	 Satoshi Arita
Approved by :	Laboratory Director, EMC Test Laboratory	 Tsutomu Inada

A) DOCUMENTATION

DIRECTORY

A) DOCUMENTATION	2
DIRECTORY	2
TEST STANDARD(S)	3
TEST LABORATORY	4
ENVIRONMENTAL CONDITIONS	4
POWER SUPPLY SYSTEM UTILIZED	4
STATEMENT OF TRACEABILITY AND MEASUREMENT UNCERTAINTY	4
SHORT DESCRIPTION OF THE EQUIPMENT UNDERTEST (EUT)	4
DEVIATION FROM THE STANDARDS	4
DEFINITIONS FOR SYMBOLS USED IN THIS TEST REPORT	4
B) TEST CONDITIONS AND RESULTS	5
Conducted Emissions (Mains Port)	5
Radiated Emissions (Below 1 GHz : Magnetic Field)	6
EQUIPMENT UNDER TEST	7
BLOCK DIAGRAM OF THE EQUIPMENT UNDER TEST (EUT)	9
SUMMARY	10
CONSTRUCTIONAL DATAFORM FOR EMC-TESTING	11
C) Appendix	12
Appendix A : Test Data	12
Appendix B : Test Equipment List	18
Appendix C : Photo of the Test Set-up	19

This test report contains only the results of a single investigation carried out on the product submitted. It is not a generally valid judgement by the EMC Test Laboratory of Panasonic Corporation Product Analysis Center regarding the properties of similar products taken from current production. It does not apply to all the EMC Test Laboratory of Panasonic Corporation Product Analysis Center specifications applicable to the tested products.

This test report may only be passed to a third party in its complete wording including this preamble and the date of issue. Any publication or reproduction require the prior written approval of the EMC Test Laboratory of Panasonic Corporation Product Analysis Center.

TEST STANDARD(S)

The tests were performed according to the following standard(s) :

- ☒ - FCC Rules and Regulations Part18 Subpart C - Technical Standards
- ☒ - FCC / OST MP-5 (1986) - Test Procedure.

Deviations from, additions to the test method from the standard: No deviation

TEST LABORATORY

Laboratory Name : EMC Test Laboratory, Product Analysis Center,
Panasonic Corporation

Corporation : Panasonic Corporation

JAB Code : RTL02730

Sasayama Site
Address : 231-1 Yashiro, Sasayama City, Hyogo 669-2356, Japan
TEL : +81(79) 552-5681
FAX : +81(79) 552-5682

E-mail : inada.tsutomu@jp.panasonic.com

ENVIRONMENTAL CONDITIONS

Temperature, Humidity and Atmospheric pressure : refer to Test Conditions and Result

POWER SUPPLY SYSTEM UTILIZED

Power supply system : AC 208 V / 60 Hz / 1 phase
: AC 240 V / 60 Hz / 1 phase

STATEMENT OF TRACEABILITY AND MEASUREMENT UNCERTAINTY

The data and results referenced in this document are true and accurate. The test results are traceable to the national or international standards. The reader is cautioned that there may be measurement uncertainty within the calibration limits of the equipment and facilities that can account for a nominal measurement uncertainty of each test remarks. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

SHORT DESCRIPTION OF THE EQUIPMENT UNDERTEST (EUT)

This product is a commercial cooking appliances.
It is equipped with an induction heater for heating the pan was placed on top.

DEVIATION FROM THE STANDARDS

Deviations from or additions to the test method: No deviation or addition

DEFINITIONS FOR SYMBOLS USED IN THIS TEST REPORT

- ☒ - Check box indicates that the listed condition, standard or equipment was applicable for this test report.
- ☐ - Blank box indicates that the listed condition, standard or equipment was not applicable for this test report.

B) TEST CONDITIONS AND RESULTS

Conducted Emissions (Mains Port)

The measurement of the conducted emissions (interference voltage) at the mains ports in the frequency range of 9 kHz- 30 MHz were performed.

☒ - Test applicable

Test terminals :

- ☒ - Mains terminals
☐ - Discontinuous disturbance

Site location :

☒ - Sasayama EMC Site

Test location :

☒ - Multi Test Room

Test mains port :

- ☒ - AC
☐ - DC

Used test instruments and test accessories are shown in appendix B

All used test-instruments as well as the test-accessories are calibrated regularly.

Result :

The requirements are: **MET** ☒ **NOT MET** ☐

Min. limit margin 9.6 dB at 10.8555 MHz

Max. limit exceeding dB at MHz

Remarks : -Temperature: 20 °C, Humidity: 51 %, Atmospheric pressure: 980 hPa

(17 March, 2017)

-Results of the mains port tests are shown in appendix A.

-The minimum margin was found with Ave. detector receiver on VA Phase (Neutral Phase) at 208 V 60 Hz.

-Measurement uncertainty = 3.43 dB

Radiated Emissions (Below 1 GHz : Magnetic Field)

The measurement of the radiated emissions (magnetic field)

in the frequency range of 9 kHz- 30 MHz were performed in horizontal and vertical antenna polarization.

☒ - Test applicable

Site location :

☒ - Sasayama EMC Site

Test location :

☒ - Reference Open Area Test Site

Test distance :

☐ - 3 meters

☐ - 10 meters

☒ - 30 meters

Used test instruments and test accessories are shown in appendix B

All used test-instruments as well as the test-accessories are calibrated regularly.

Result :

The requirements are: MET ☒

NOT MET ☐

Min. limit margin 9.2 dB at 0.024 MHz

Max. limit exceeding dB at MHz

Remarks : -Temperature: 16 °C, Humidity: 35 %, Atmospheric pressure: 988 hPa

(23 March, 2017)

-Results of the radiated emission tests are shown in appendix A.

-The minimum margin was found with X axis antenna polarization at 240 V 60 Hz.

-Measurement uncertainty = 2.38 dB

EQUIPMENT UNDER TEST

Operation - mode of the EUT :

The equipment under test was operated during the measurement under following conditions:

☒ Power mode

Modification of the EUT : The test laboratory did not modify the EUT during the test.

Following peripheral devices and interface cables were connected during the measurement:

< EUT >

No.	Device	Model	Serial No.	Manufacturer	Date of manufacture	EUT condition
A	Commercial Induction Cooktop	KY-MK3500	00009	Panasonic	October, 2016	Pre

[Pre] = Pre Production, [Pro] = Production

No.	Device	Equipment authorization	FCC ID
A	Commercial Induction Cooktop	Certification	ACLAPZC93

< Details of ports >

No.	Name of port	Connection	Status of lines	Analog / Digital	Remarks
①	AC IN	EUT / AC	Passive	Analog	-

Note :

-The status of lines shows direction of signals on the EUT; "active" is "OUT" and "passive" is "IN".

< AC Power Cable >

No.	Name of cable	Cable type	Pin	Length (m)	Shielded	Ferrite quantity	Ground line
	Manufacturer / Type						
1	POWER CORD	e	3	1.80	Unshielded	None	Yes
	TA HSING Electric Wire & Cable Co.,Ltd / ZN01AC93						

Note :

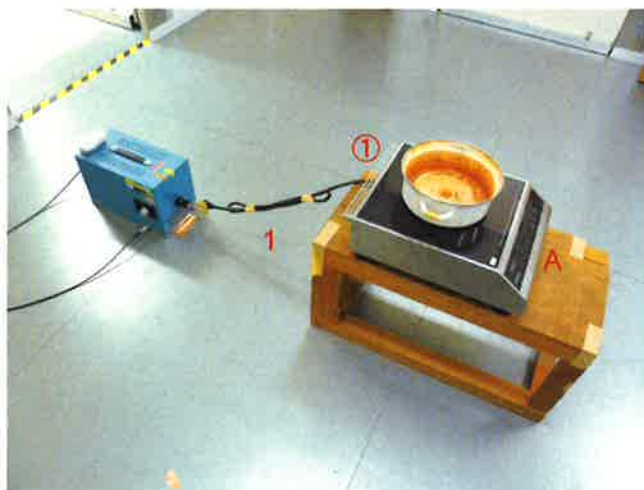
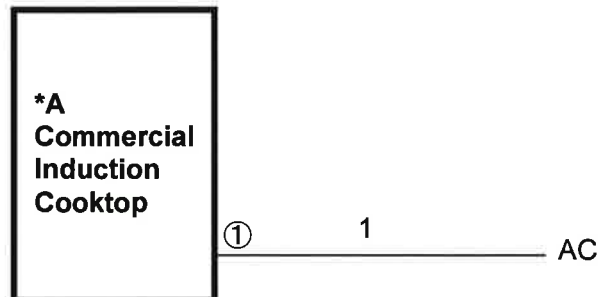
-Explanation of the abbreviations of the cable type and ferrite is shown in the table titled "characters of the cable type and ferrite".

Characters of the cable type and ferrite :

Character	Cable type and Ferrite
a	Enclosed cable
b	Available accessory (exclusive cable)
c	Commercially available cable (with no designation)
d	Commercially available cable. (The selection and mounting procedure of the cable is designated in the instruction manual.)
e	Fixed cable
f	Enclosed ferrite (Setting up method of the ferrite is designated in the instruction manual.)
g	Commercially available ferrite. (The selection and setting up method of the ferrite is designated in the instruction manual.)
h	Fixed ferrite (Already fixed)

BLOCK DIAGRAM OF THE EQUIPMENT UNDER TEST (EUT)

*: EUT



SUMMARY

General remarks :

Emission tests were all good results.

Final judgment :

The requirements according to the technical standard(s) and tested operation modes are

- ☒ **MET**
☐ **NOT MET**

The equipment under test

- ☒ **Fulfills** the general approval requirements cited on page 3.
☐ **Does not fulfill** the general approval requirements cited on page 3.

Testing Start Date : 17 March, 2017

Testing End Date : 23 March, 2017

CONSTRUCTIONAL DATAFORM FOR EMC-TESTING

Applicant : Panasonic Appliances Company of America
Kitchen Appliances Certification Liaison

Address : 1701 Golf Road Suite 3-106 Rolling Meadows, IL 60008

Manufacturer : Panasonic Corporation
Appliances Company Kitchen Appliances Business Division

Address : 1-5-1 Takatsukadai, Nishi-ku, Kobe City 651-2271, Japan

Factory : Panasonic Corporation
Appliances Company Kitchen Appliances Business Division

Address : 1-5-1 Takatsukadai, Nishi-ku, Kobe City 651-2271, Japan

Type	: Commercial Induction Cooktop	Rated voltage	: 208 V / 60Hz 230V – 240 V / 60Hz
Model	: KY-MK3500	Rated input power	: 3000 W / 208 V 3500 W / 230V – 240 V
Serial No	: 00009	Protection class	: Class I

Configuration of equipment:

Commercial Induction Cooktop : KY-MK3500

Source of interference & internal frequencies:

Source	frequency
Micro computer	: 40 MHz / 32 MHz
PFC	: 70 kHz
Inveter for Induction heating	: 23 kHz - 85 kHz
	:

Noise suppression components:

None.

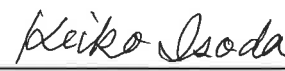
Measures for electromagnetic shielding:

None.

Place of issue : Hyogo Japan

Date : 16 March, 2017

Seal and signature of applicant :


Keiko Isoda

Section of the signer :

IH CookTop Engineering Department

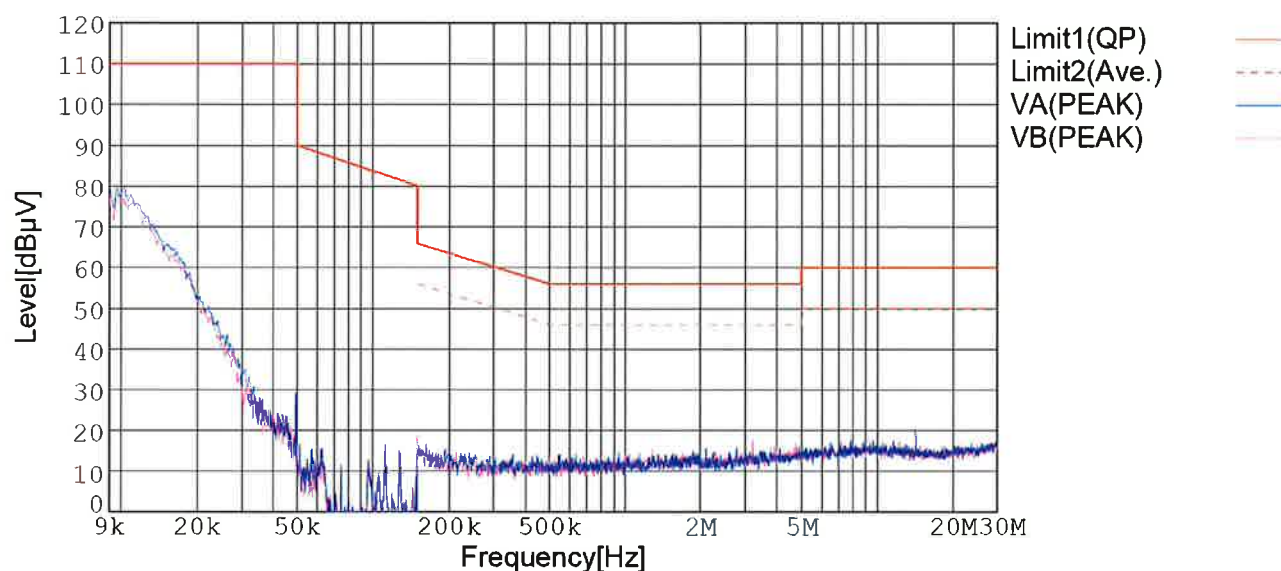
C) Appendix

Appendix A : Test Data

Conducted Emissions (Mains Port)

Conducted Emissions

Model Name	:		Temp.	:	20deg.C
Model No.	:		Humi.	:	51%
Serial No.	:		Pressure	:	980hPa
Operator	:	N.Nakai	Test Equip.	:	ESR-3
Bands	:	7	Date	:	2017/3/17 13:15
Detector	:	PEAK	Comment	:	Floor Noise
Line Mode	:	VA/VB			
Limit1:	[FCC Part 18] cooking/ultrasonic (QP)				
Limit2:	[FCC Part 18] cooking/ultrasonic (Ave.)				



*VA = Neutral Phase, VB = Line Phase

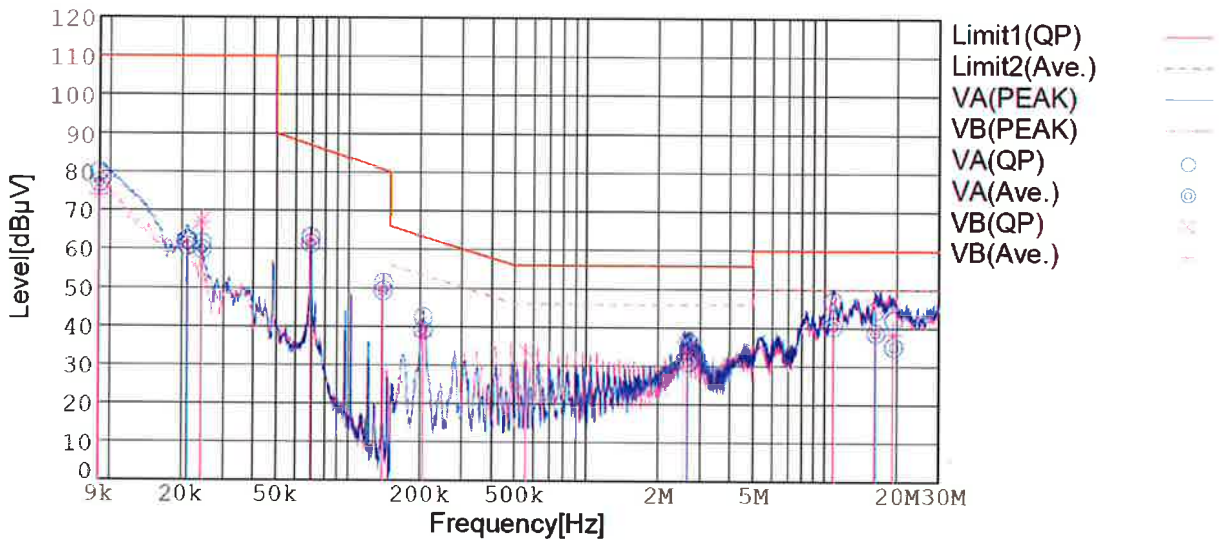
Conducted Emissions

Model Name : Commercial Induction Cooktop
 Model No. : KY-MK3500
 Serial No. : 00009
 Operator : N.Nakai
 Points : 20
 Detector : PEAK
 Line Mode : VA/VB

Temp. : 20deg.C
 Humi. : 51%
 Pressure : 980hPa
 Test Equip. : ESR-3
 Date : 2017/3/17 13:26
 Comment : Fe 208V 60Hz

Limit1: [FCC Part 18] cooking/ultrasonic (QP)

Limit2: [FCC Part 18] cooking/ultrasonic (Ave.)



Frequency [MHz]	Meter Reading (QP) [dBμV]	Meter Reading (Ave.) [dBμV]	Factor [dB]	Level (QP) [dBμV]	Level (Ave.) [dBμV]	Line	Limit (QP) [dBμV]	Limit (Ave.) [dBμV]	Margin (QP) [dB]	Margin (Ave.) [dB]
0.0090	63.8	61.1	16.1	79.9	77.2	VA	110.0	—	30.1	—
0.0211	50.9	49.3	11.5	62.4	60.8	VA	110.0	—	47.6	—
0.0243	50.5	48.7	11.1	61.6	59.8	VA	110.0	—	48.4	—
0.0696	52.7	51.0	10.4	63.1	61.4	VA	87.0	—	23.9	—
0.1392	41.1	38.9	10.3	51.4	49.2	VA	80.7	—	29.3	—
0.2062	32.1	28.8	10.3	42.4	39.1	VA	63.4	53.4	21.0	14.3
2.6677	25.9	20.6	10.4	36.3	31.0	VA	56.0	46.0	19.7	15.0
10.8555	36.1	29.6	10.8	46.9	40.4	VA	60.0	50.0	13.1	9.6
16.3522	33.6	27.7	11.0	44.6	38.7	VA	60.0	50.0	15.4	11.3
19.4000	31.0	24.0	11.1	42.1	35.1	VA	60.0	50.0	17.9	14.9
0.0090	60.6	58.1	15.9	76.5	74.0	VB	110.0	—	33.5	—
0.0243	56.3	55.8	11.0	67.3	66.8	VB	110.0	—	42.7	—
0.0696	53.0	51.1	10.3	63.3	61.4	VB	87.0	—	23.7	—
0.1392	41.1	39.2	10.3	51.4	49.5	VB	80.7	—	29.3	—
0.2062	30.0	27.3	10.2	40.2	37.5	VB	63.4	53.4	23.2	15.9
0.5573	23.7	19.8	10.2	33.9	30.0	VB	56.0	46.0	22.1	16.0
2.5755	24.2	19.8	10.3	34.5	30.1	VB	56.0	46.0	21.5	15.9
10.9455	36.1	29.6	10.6	46.7	40.2	VB	60.0	50.0	13.3	9.8
16.2800	34.8	28.7	10.7	45.5	39.4	VB	60.0	50.0	14.5	10.6
19.4117	33.8	27.5	10.8	44.6	38.3	VB	60.0	50.0	15.4	11.7

*VA = Neutral Phase, VB = Line Phase

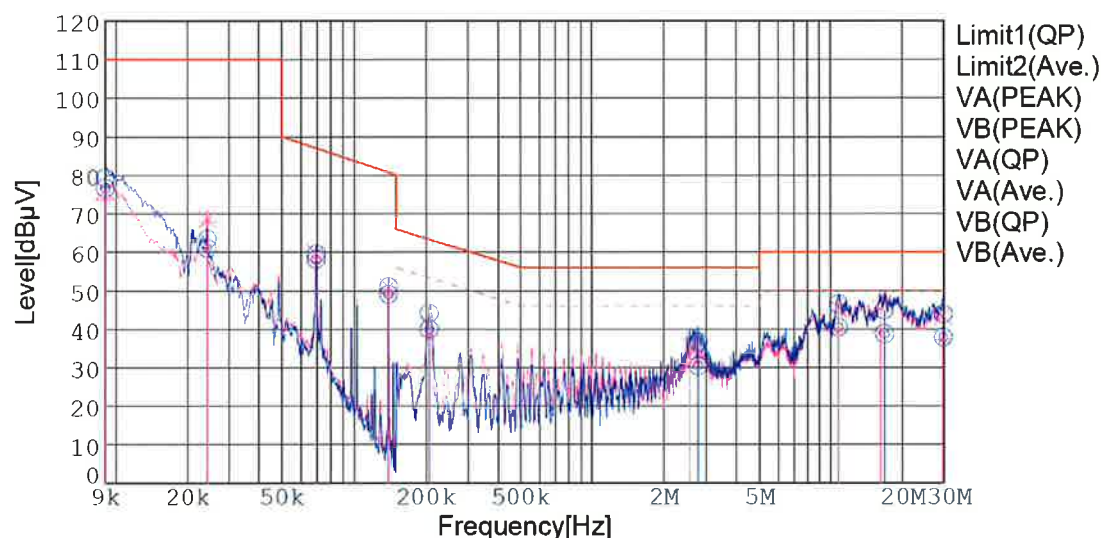
Conducted Emissions

Model Name : Commercial Induction Cooktop
 Model No. : KY-MK3500
 Serial No. : 00009
 Operator : N.Nakai
 Points : 18
 Detector : PEAK
 Line Mode : VA/VB

Temp. : 20deg.C
 Humi. : 51%
 Pressure : 980hPa
 Test Equip. : ESR-3
 Date : 2017/3/17 14:09
 Comment : Fe 240V 60Hz

Limit1: [FCC Part 18] cooking/ultrasonic (QP)

Limit2: [FCC Part 18] cooking/ultrasonic (Ave.)



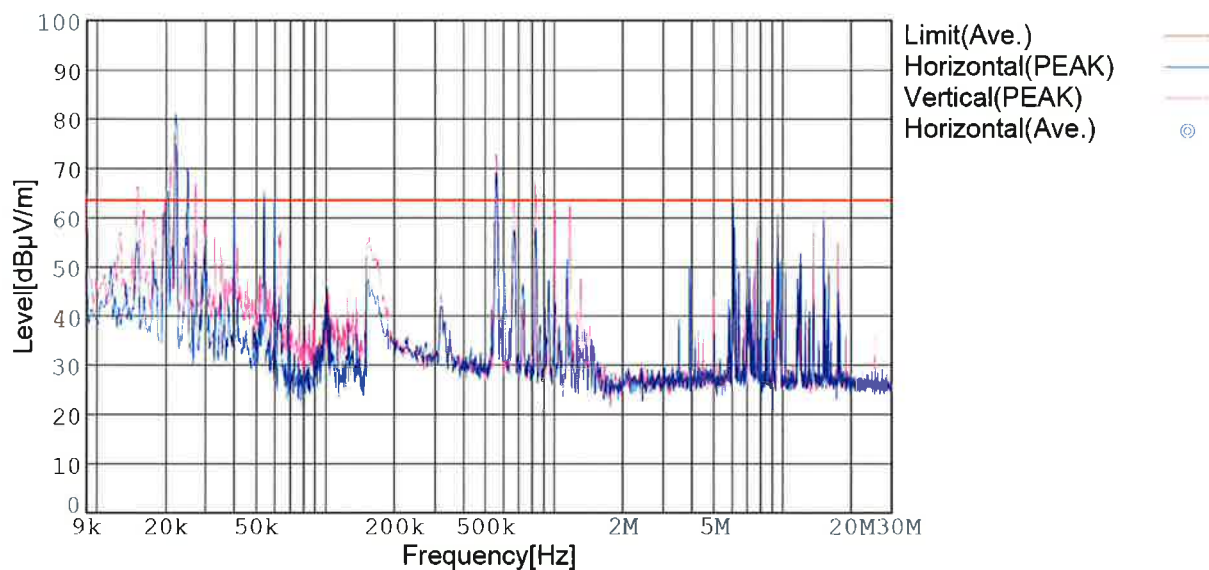
Frequency [MHz]	Meter Reading (QP) [dBμV]	Meter Reading (Ave.) [dBμV]	Factor [dB]	Level (QP) [dBμV]	Level (Ave.) [dBμV]	Line	Limit (QP) [dBμV]	Limit (Ave.) [dBμV]	Margin (QP) [dB]	Margin (Ave.) [dB]
0.0090	63.2	60.5	16.1	79.3	76.6	VA	110.0	—	30.7	—
0.0243	52.3	49.9	11.1	63.4	61.0	VA	110.0	—	46.6	—
0.0697	49.1	47.7	10.4	59.5	58.1	VA	87.0	—	27.5	—
0.1392	40.8	38.8	10.3	51.1	49.1	VA	80.7	—	29.6	—
0.2062	33.9	29.7	10.3	44.2	40.0	VA	63.4	53.4	19.2	13.4
2.7847	26.2	20.0	10.4	36.6	30.4	VA	56.0	46.0	19.4	15.6
10.7813	35.8	29.7	10.8	46.6	40.5	VA	60.0	50.0	13.4	9.5
16.8382	33.9	27.7	11.1	45.0	38.8	VA	60.0	50.0	15.0	11.2
29.7352	32.4	26.4	11.5	43.9	37.9	VA	60.0	50.0	16.1	12.1
0.0090	60.0	57.6	15.9	75.9	73.5	VB	110.0	—	34.1	—
0.0243	57.6	56.9	11.0	68.6	67.9	VB	110.0	—	41.4	—
0.0696	49.4	47.8	10.3	59.7	58.1	VB	87.0	—	27.3	—
0.1392	40.7	39.1	10.3	51.0	49.4	VB	80.7	—	29.7	—
0.2062	31.3	28.2	10.2	41.5	38.4	VB	63.4	53.4	21.9	15.0
2.5732	25.4	20.8	10.3	35.7	31.1	VB	56.0	46.0	20.3	14.9
10.8105	34.8	28.7	10.6	45.4	39.3	VB	60.0	50.0	14.6	10.7
16.2802	34.5	28.6	10.7	45.2	39.3	VB	60.0	50.0	14.8	10.7
29.7465	32.3	26.1	11.1	43.4	37.2	VB	60.0	50.0	16.6	12.8

*VA = Neutral Phase, VB = Line Phase

Radiated Emissions (Below 1 GHz : Magnetic Field)

Radiated Emissions

Model Name	:		Temp.	:	16deg.C
Model No.	:		Humi.	:	35%
Serial No.	:		Pressure	:	988hPa
Operator	:	N.Nakai	Test Equip.	:	ESU-8
Points	:	2	Date	:	2017/3/23 9:51
Detector	:	PEAK/Ave.	Comment	:	Floor Noise
Polarization	:	Horizontal			
Limit: [FCC Part18] AV (<90k)<30m>					

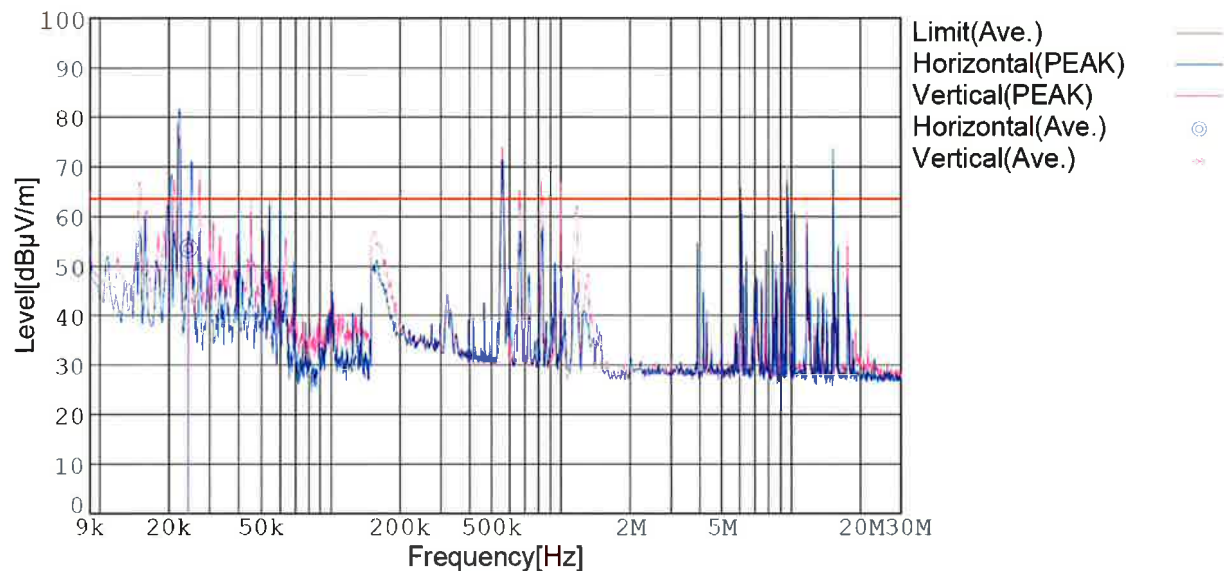


*Hori. = X Axis, Vert. = Y Axis

Radiated Emissions

Model Name : Commercial Induction Cooktop
Model No. : KY-MK3500
Serial No. : 00009
Operator : N.Nakai
Points : 2
Detector : PEAK
Polarization : Hori. & Vert.
Limit: [FCC Part18] AV (<90k)<30m>

Temp. : 16deg.C
Humi. : 35%
Pressure : 988hPa
Test Equip. : ESU-8
Date : 2017/3/23 10:47
Comment : Fe 208V 60Hz



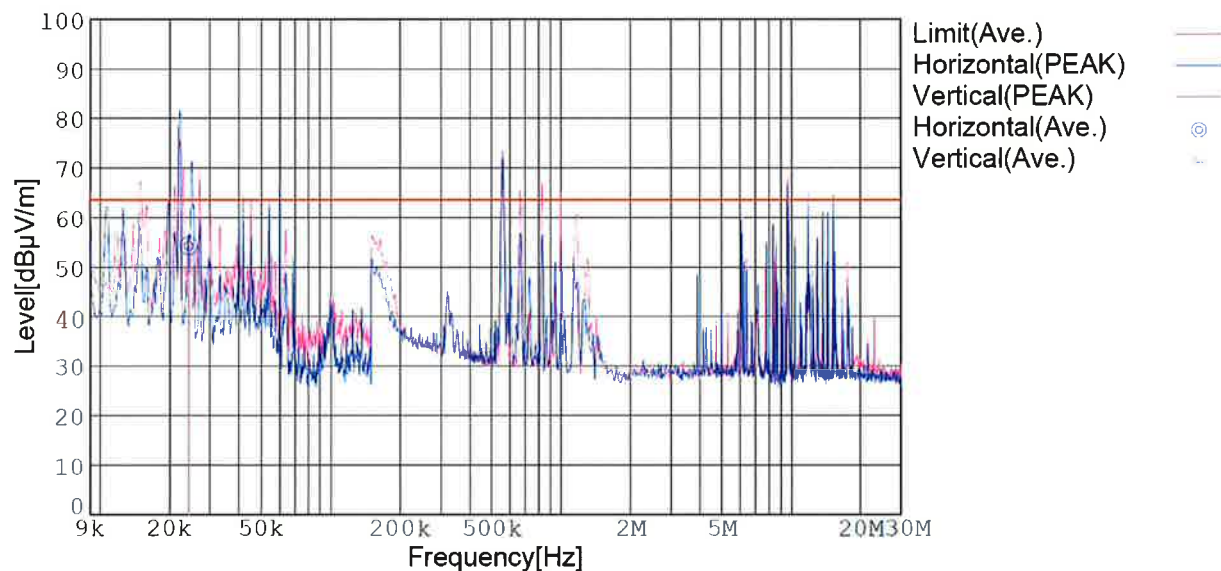
Frequency[MHz]	Meter Reading (Ave.) [dBμV]	Factor[dB]	Level (Ave.) [dBμV/m]	Angle[°]	Height [cm]	Polar.	Limit [dBμV/m]	Margin[dB]
0.024	32.6	21.0	53.6	191	200	Hori.	63.5	9.9
0.024	27.2	21.0	48.2	73	200	Vert.	63.5	15.3

*Hori. = X Axis, Vert. = Y Axis

Radiated Emissions

Model Name : Commercial Induction Cooktop
Model No. : KY-MK3500
Serial No. : 00009
Operator : N.Nakai
Points : 2
Detector : PEAK
Polarization : Hori. & Vert.
Limit: [FCC Part18] AV (<90k)<30m>

Temp. : 16deg.C
Humi. : 35%
Pressure : 988hPa
Test Equip. : ESU-8
Date : 2017/3/23 11:17
Comment : Fe 240V 60Hz



Frequency[MHz]	Meter Reading (Ave.) [dBμV]	Factor[dB]	Level (Ave.) [dBμV/m]	Angle[°]	Height [cm]	Polar.	Limit [dBμV/m]	Margin[dB]
0.024	33.3	21.0	54.3	199	200	Hori.	63.5	9.2
0.024	28.1	21.0	49.1	85	200	Vert.	63.5	14.4

*Hori. = X Axis, Vert. = Y Axis

Appendix B : Test Equipment List

Conducted Emissions (AC Power Port)

Test equipment list used to perform the conducted emissions (AC Power Port).

Device	Model No.	Serial. No.	Reg. No.	Frequency range	Last Cal.	Next Cal.
EMI test receiver	Rohde & Schwarz ESR3	102141	RCV1087	9 kHz – 3.6 GHz	10 February, 2017	28 February, 2018
Line impedance stabilization network	Kyoritsu Technology KNW-242C	8-1312-5	AMN0426	9 kHz – 30 MHz	17 January, 2017	31 January, 2018

Device	Model No.	Version	Reg. No.
Software	VITEC Co., Ltd. EMI96	E26	S-SW004-1

Radiated Emissions (Magnetic Field)

Test equipment list used to perform the radiated emissions (magnetic field 9 kHz – 30 MHz).

Device	Model No.	Serial. No.	Reg. No.	Frequency range	Last Cal.	Next Cal.
EMI test receiver	Rohde & Schwarz ESU8	100068	RCV0726	9 kHz - 8 GHz	26 February, 2017	28 February, 2018
Loop antenna	Rohde & Schwarz HFH2-Z2	871398/33	ANT0851	9 kHz – 30 MHz	10 September, 2016	30 September, 2017

Device	Model No.	Version	Reg. No.
Software	VITEC Co., Ltd. EMI96	E26	S-SW001-1

Appendix C : Photo of the Test Set-up

Conducted Emissions (Mains Port)

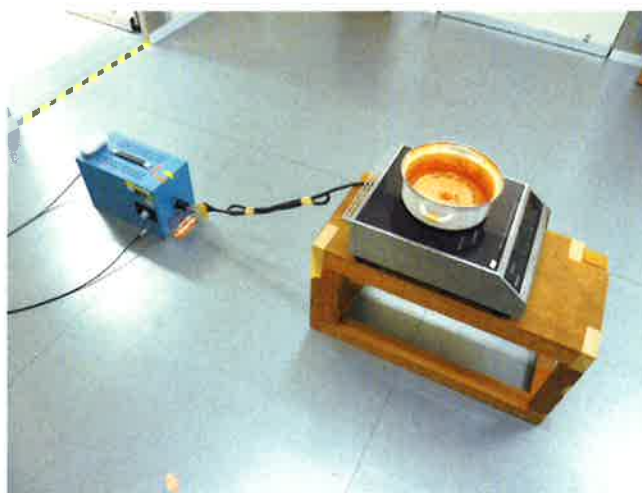
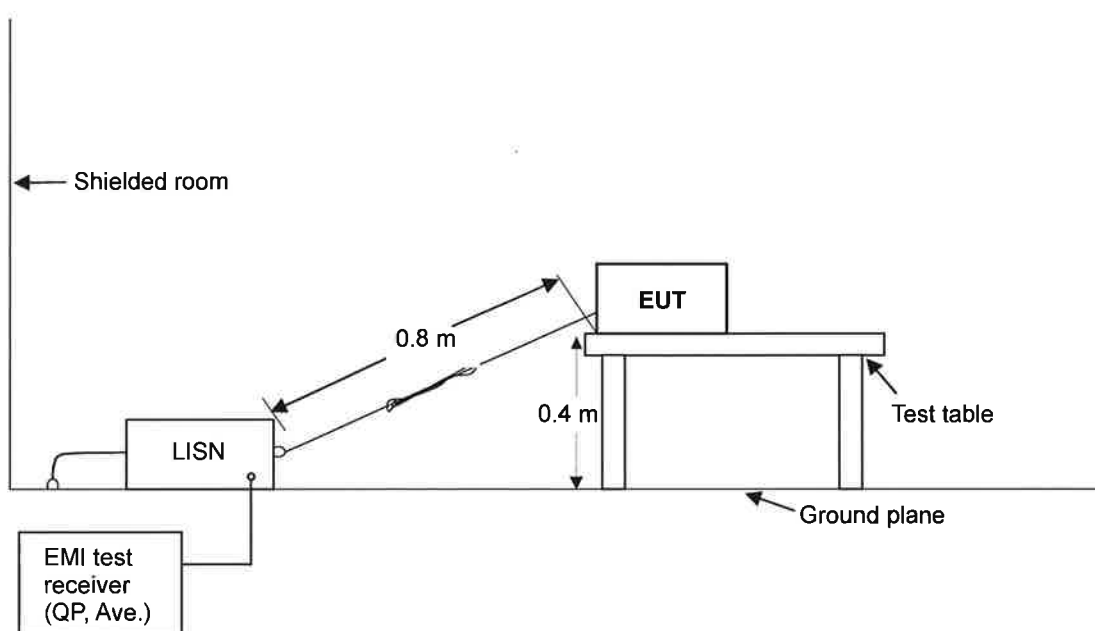
The measurements of the conducted emissions (interference voltage) at the mains ports were performed in a shielded enclosure with peripherals placed on a nonconductive table, 0.4 m high over a metal floor.

The EUT was located more than 0.8 m away from the shielded enclosure wall and was plugged into the LISN.

Pre-check: AC power line conducted emission levels (Peak value) were measured by means of spectrum analyzer to identify the frequency of the emission that had the highest amplitude relative to the limit by operating the EUT in a range of typical modes of operation .

Final measurement: Emission levels (QP and Ave. value) were measured by means of the test receiver referring the result of Pre-check. EUT operation mode was selected for maximum emission. Maximized emission levels were recorded.

Drawing:



Radiated Emissions (Below 1 GHz : Magnetic Field)

The EUT was placed on a 1.0 m high nonconductive turntable.

The turntable was separated from the antenna by a distance of 30 m.

The operation mode was selected for maximum emission.

Pre-check: Radiated emission levels (Peak value) which have small margin for the regulation were measured by means of spectrum analyzer changing loop antenna set (2 m) and table rotation (0 - 360 degree). Care should be taken to assure that readings are not taken nulls.

Loop antenna was turning 0 to 90 degrees.

Final measurement: Emission levels (Ave. value) were measured by means of the test receiver referring the result of Pre-check.

The emission level from the EUT were maximized changing conditions; Turn table rotation.

Drawing :

