

TEST REPORT

Applicant : SHARP CORPORATION
Quality and Environmental Promotion Unit

Address : 1 Takumi-cho, Sakai-ku, Sakai City, Osaka 590-8522, Japan

Products : Microwave Oven

Model No. : R-CD2200M

Serial No. : 11683

FCC ID : APYDMR0168

Test Standard : FCC Rules and Regulations Title 47 CFR Part 18

Test Results : **Passed**

Date of Test : December 2, 2018 ~ January 8, 2019



A handwritten signature in black ink, likely belonging to Kousei Shibata.

Kousei Shibata
Manager
Japan Quality Assurance Organization
KITA-KANSAI Testing Center
SAITO EMC Branch
7-3-10, Saito-asagi, Ibaraki-shi, Osaka 567-0085, Japan

- The test results in this test report was made by using the measuring instruments which are traceable to national standards of measurement in accordance with ISO/IEC 17025.
- The applicable standard, testing condition and testing method which were used for the tests are based on the request of the applicant.
- The test results presented in this report relate only to the offered test sample.
- The contents of this test report cannot be used for the purposes, such as advertisement for consumers.
- This test report shall not be reproduced except in full without the written approval of JQA.
- VLAC does not approve, certify or warrant the product by this test report.

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DEFINITIONS FOR ABBREVIATION AND SYMBOLS USED IN THIS TEST REPORT

EUT : Equipment Under Test

EMC : Electromagnetic Compatibility

AE : Associated Equipment

EMI : Electromagnetic Interference

N/A : Not Applicable

EMS : Electromagnetic Susceptibility

N/T : Not Tested

☒ - indicates that the listed condition, standard or equipment is applicable for this report.

☐ - indicates that the listed condition, standard or equipment is not applicable for this report.

1 Description of the Equipment Under Test

- | | |
|--------------------------|---|
| 1. Manufacturer | : SHARP APPLIANCES (THAILAND) LIMITED
64 Moo 5, Tambol Bangsamak, Amphur Bangpakong
Chachoengsao Province, Thailand |
| 2. Products | : Microwave Oven |
| 3. Model No. | : R-CD2200M |
| 4. Serial No. | : 11683 |
| 5. Product Type | : Prototype |
| 6. Date of Manufacture | : April, 2018 |
| 7. Power Rating | : 208/230VAC60Hz, Input:3.2kW |
| 8. Rated RF Power Output | : 2200 W |
| 9. EUT Grounding | : Grounded at the plug end of the power line |
| 10. Type of Device | : Consumer ISM equipment |
| 11. EUT Authorization | : Certification |
| 12. Operating Frequency | : 2450 MHz(ISM frequency) |
| 13. Received Date of EUT | : November 28, 2018 |

2 Summary of Test Results

Applied Standard : FCC Rules and Regulations Title 47 CFR Part 18
Industrial, Scientific, and Medical Equipment

The EUT described in clause 1 was tested according to the applied standard shown above.

Details of the test configuration is shown in clause 6.

The conclusion for the test items of which are required by the applied standard is indicated under the test result.

☒ - The test result was **passed** for the test requirements of the applied standard.

☐ - The test result was **failed** for the test requirements of the applied standard.

☐ - The test result was **not judged** the test requirements of the applied standard.

In the approval of test results,

- Determining compliance with the limits in this report was based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
- No deviations were employed from the applied standard.
- No modifications were conducted by JQA to achieve compliance to the limitations.

Reviewed by:



Yasuhisa Sakai
Manager
JQA KITA-KANSAI Testing Center
SAITO EMC Branch

Tested by:



Shigeru Kinoshita
Assistant Manager
JQA KITA-KANSAI Testing Center
SAITO EMC Branch

3 Test Procedure

The tests documented in this report were performed in accordance with FCC/OET MP-5 (1986).

4 Test Location

Japan Quality Assurance Organization (JQA)
KITA-KANSAI Testing Center
7-7, Ishimaru, 1-chome, Minoh-shi, Osaka, 562-0027, Japan
SAITO EMC Branch
7-3-10, Saito-asagi, Ibaraki-shi, Osaka 567-0085, Japan

5 Recognition of Test Laboratory

JQA KITA-KANSAI Testing Center SAITO EMC Branch is accredited under ISO/IEC 17025 by following accreditation bodies and the test facility is registered by the following bodies.

VLAC Accreditation No. : VLAC-001-2 (Expiry date : March 30, 2020)
VCCI Registration No. : A-0002 (Expiry date : March 30, 2020)
FCC Accreditation No. : JP5008 (Expiry date : March 30, 2020)
IC Registration No. : 2079E-3, 2079E-4 (Expiry date : June 26, 2020)
BSMI Registration No. : SL2-IS-E-6006, SL2-IN-E-6006, SL2-R1/R2-E-6006, SL2-A1-E-6006
(Expiry date : September 14, 2019)
CNAS Accreditation No. : L8352 (Expiry date : February 19, 2019)

Accredited as conformity assessment body for Japan electrical appliances and material law by METI.
(Expiry date : February 22, 2019)

6 Description of Test Setup

6.1 Test Configuration

The equipment under test (EUT) consists of :

	Item	Manufacturer	Model No.	Serial No.	FCC ID
A	Microwave Oven	Sharp Appliances (Thailand) Ltd.	R-CD2200M	11683	APYDMR0168

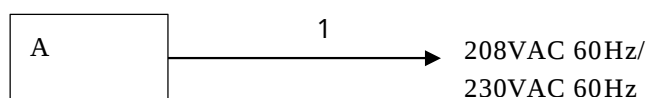
The auxiliary equipment used for testing :

None

Type of Cable:

No.	Description	Identification (Manu. etc.)	Connector Shielded	Cable Shielded	Ferrite Core	Length (m)
1	AC Power Cable	--	--	No	No	1.4

6.2 Test Arrangement (Drawings)



6.3 Operating Condition

Power Supply Voltage : 208VAC 60Hz / 230VAC 60Hz

Operation Mode

The EUT is tested with the dummy load located in the center of the oven.

The load consists of a quantity of tap water in a beaker, which is as follows.

Power output measurement	: 2500 ml
ISM frequency measurement	: 2500 ml
Conducted powerline measurement	: 1000 ml
Radiated emission measurement	: 1750 ml

For measurement of radiation on 2nd and 3rd harmonic, two loads, one of 1750 ml and the other of 750 ml, of water are used. Each load is tested both with the beaker located in the center of the oven and with it in the right front corner.

Type of Magnetron

Type No. 2M303K(L) , manufactured by Toshiba

Clock Frequency

Magnetron	: 2450 MHz
LSI	: 4 MHz

7 Test Requirements

7.1 Power Output

For the requirements, ☒ - Applicable [☒ - Tested. ☐ - Not tested by applicant request.]
☐ - Not Applicable

7.1.1 Test Results

1) 208VAC60Hz

Power Output (calorimetric method) 1881.3 watts

Field Strength Limit 48.5 $\mu\text{V/m}$ at 300 meters

AC Power Input 3185.0 watts

2) 230VAC60Hz

Power Output (calorimetric method) 1914.5 watts

Field Strength Limit 48.9 $\mu\text{V/m}$ at 300 meters

AC Power Input 3373.0 watts

Remarks : Field strength may not exceed 10 $\mu\text{V/m}$ at 1600 meters.

7.1.2 Test Instruments

KITA-KANSAI Testing Center 3 rd Floor Testing Room				
Type	Model	Serial No. (ID)	Manufacturer	Cal. Due
Digital Power Meter	2533-21	48AU0260(Q8011090)	YOKOGAWA	2019/04/02
Stopwatch	3214000	8N5502(Q47097355)	SEIKO	2019/08/17
Thermometer	245506	74JJ0064(Q47097361)	YOKOGAWA	2019/04/03

NOTE : The calibration interval of the above test instruments is 12 months.

7.1.3 Test Procedure

The power output is measured by the calorimetric method, computing from the observed temperature rise of the load over a period of time. The measured value of power output is used to determine the allowable out-of-band field strength.

7.1.4 Test Data

Test Voltage : 208VAC60Hz

Test Date: December 3, 2018

Temp.: 30 °C, Humi: 60 %

The power output was measured by the calorimetric method, computing the power output from the observed temperature rise of the load over a period of time.

Rated RF Power: 2200W

Load(water): 2500ml (500ml × 5)

Time: 48sec $T = \frac{4.2 \times \text{Load}(ml) \times 10}{\text{RF Power}}$

	t_1 (before test)		t_2 (after test)	$t_2 - t_1$	RF Power**
1st	10.4°C	→	19.1°C	8.7°C	
	10.8°C	→	20.8°C	10.0°C	
	10.4°C	→	18.6°C	8.2°C	
	9.8°C	→	18.5°C	8.7°C	
	9.4°C	→	17.8°C	8.4°C	
Average				8.80°C	1925.0W
2nd	10.5°C	→	19.0°C	8.5°C	
	10.2°C	→	18.0°C	7.8°C	
	9.4°C	→	17.9°C	8.5°C	
	10.4°C	→	18.6°C	8.2°C	
	10.5°C	→	19.5°C	9.0°C	
Average				8.40°C	1837.5W
3rd	9.8°C	→	17.2°C	7.4°C	
	10.0°C	→	19.0°C	9.0°C	
	9.8°C	→	18.4°C	8.6°C	
	10.6°C	→	19.7°C	9.1°C	
	10.8°C	→	20.0°C	9.2°C	
Average				8.66°C	1894.4W
4th	9.8°C	→	18.1°C	8.3°C	
	10.5°C	→	19.4°C	8.9°C	
	10.3°C	→	19.3°C	9.0°C	
	9.5°C	→	17.4°C	7.9°C	
	10.7°C	→	20.0°C	9.3°C	
Average				8.68°C	1898.8W
5th	9.0°C	→	17.2°C	8.2°C	
	9.1°C	→	16.3°C	7.2°C	
	9.1°C	→	18.3°C	9.2°C	
	9.9°C	→	18.7°C	8.8°C	
	10.1°C	→	19.0°C	8.9°C	
Average				8.46°C	1850.6W

$$**\text{RF Power} = \frac{4.2 \times \text{Load}(ml) \times (t_2 - t_1)}{T}$$

Results of Average RF Power: 1881.3W

The limit of the radiated emission at 300m : $25\sqrt{1881.3/500}[\mu\text{V/m}] = 48.5[\mu\text{V/m}]$ $25\sqrt{1881.3/500}[\mu\text{V/m}] = 33.7[\text{dB}(\mu\text{V/m})]$

The AC power input to the oven is measured to determine if the oven is operating in accordance with the manufacturer's specifications.

Rated Power Supply: AC208V/60Hz, 3200W

Measured Input Power : AC208V60Hz 15.978A, 3185W

Test Voltage : 230VAC60Hz

Test Date: December 3, 2018

Temp.: 30 °C, Humi: 60 %

The power output was measured by the calorimetric method, computing the power output from the observed temperature rise of the load over a period of time.

Rated RF Power: 2200W

Load(water): 2500ml (500ml× 5)

Time: 48sec $T = \frac{4.2 \times \text{Load(ml)} \times 10}{\text{RFPower}}$

	t_1 (before test)	t_2 (after test)	$t_2 - t_1$	RF Power**
1st	9.7°C	→ 18.1°C	8.4°C	
	10.1°C	→ 20.0°C	9.9°C	
	9.7°C	→ 18.8°C	9.1°C	
	9.8°C	→ 17.6°C	7.8°C	
	10.0°C	→ 19.7°C	9.7°C	
Average			8.98°C	1964.4W
2nd	10.3°C	→ 18.3°C	8.0°C	
	10.3°C	→ 19.7°C	9.4°C	
	10.3°C	→ 19.3°C	9.0°C	
	10.8°C	→ 17.6°C	6.8°C	
	10.5°C	→ 21.5°C	11.0°C	
Average			8.84°C	1933.8W
3rd	9.2°C	→ 17.2°C	8.0°C	
	9.3°C	→ 18.8°C	9.5°C	
	9.6°C	→ 18.6°C	9.0°C	
	9.7°C	→ 17.0°C	7.3°C	
	9.8°C	→ 20.3°C	10.5°C	
Average			8.86°C	1938.1W
4th	9.9°C	→ 18.2°C	8.3°C	
	9.8°C	→ 18.6°C	8.8°C	
	9.8°C	→ 19.6°C	9.8°C	
	9.8°C	→ 17.7°C	7.9°C	
	10.1°C	→ 18.6°C	8.5°C	
Average			8.66°C	1894.4W
5th	10.2°C	→ 18.8°C	8.6°C	
	10.3°C	→ 19.2°C	8.9°C	
	10.2°C	→ 19.7°C	9.5°C	
	9.8°C	→ 17.0°C	7.2°C	
	9.5°C	→ 17.4°C	7.9°C	
Average			8.42°C	1841.9W

$$**\text{RFPower} = \frac{4.2 \times \text{Load(ml)} \times (t_2 - t_1)}{T}$$

Results of Average RF Power: 1914.5W

The limit of the radiated emission at 300m : $25\sqrt{1914.5/500}[\mu\text{V/m}] = 48.9[\mu\text{V/m}]$
 $25\sqrt{1914.5/500}[\mu\text{V/m}] = 33.8[\text{dB}(\mu\text{V/m})]$

The AC power input to the oven is measured to determine if the oven is operating in accordance with the manufacturer's specifications.

Rated Power Supply: AC230V/60Hz, 3200W

Measured Input Power : AC230V60Hz 15.481A, 3373W

7.2 ISM Frequency

For the requirements, ☒ - Applicable [☒ - Tested. ☐ - Not tested by applicant request.]
☐ - Not Applicable

7.2.1 Test Results

For the standard, ☒ - Passed ☐ - Failed ☐ - Not judged

Remarks : _____

7.2.2 Test Instruments

Anechoic Chamber A2				
Type	Model	Serial No. (ID)	Manufacturer	Cal. Due
Test Receiver	ESU 26	100170 (A-6)	Rohde & Schwarz	2019/11/08
Horn Antenna	91889-2	568 (C-41-2)	EATON	2019/06/14
Attenuator	2-10	BA6214 (D-79)	Weinschel	2019/12/06
RF Cable	SF104	267415/4 (C-68)	HUBER+SUHNER	2019/12/18

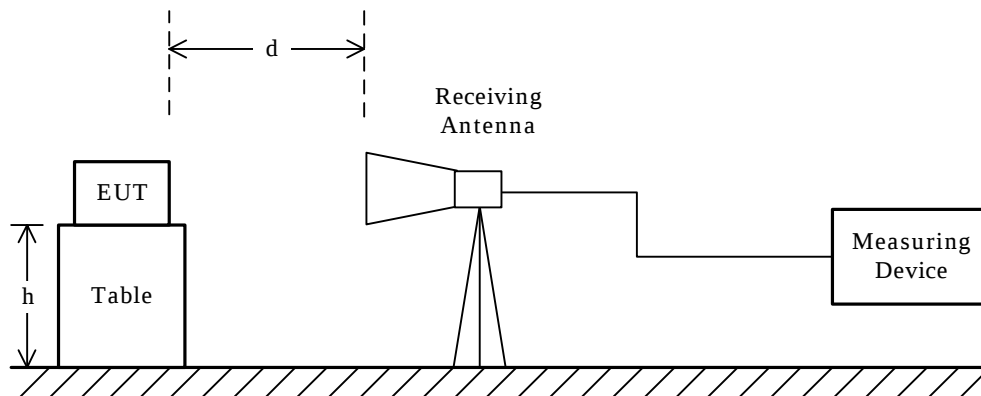
NOTE : The calibration interval of the above test instruments is 12 months.

7.2.3 Test Method and Test Setup (Diagrammatic illustration)

For the EUT was operated with a fundamental frequency in one of the designated band listed in International Telecommunication Union for use as ISM frequencies, the frequency was checked with measuring equipment.

The variation of frequency with time, starting with the EUT and load at the room temperature and continuing until the load quantity has been reduced by evaporation to approximately 20 % of the original quantity. This test is made with nominal rated ac supply voltage.

The variation of frequency for line voltage variation from 80 % to 125 % of nominal rated voltage, starting from the EUT warm from at least 10 minutes use, with the load at room temperature at the beginning of the test.



NOTE

d : Arbitrary distance

h : Arbitrary height

7.2.4 Test Data

Test Date : January 8, 2019

Temp. : 27°C Humi. :30 %

1) Variation in Operating Frequency with Time

Power Supply : 208VAC 60Hz

The END time was 20 minutes. The load after 20 minutes was approx 1050ml.

Time	Peak Frequency [MHz]	Remarks
1 minute since START	2470.20	A
1 minute till END	2465.58	A

The results were within 2450MHz±50MHz.

Power Supply : 230VAC 60Hz

The END time was 20 minutes. The load after 20 minutes was approx 1050ml.

Time	Peak Frequency [MHz]	Remarks
1 minute since START	2466.52	A
1 minute till END	2469.10	A

The results were within 2450MHz±50MHz.

2) Deviation in Operating Frequency with power supply voltage

Power Supply Voltage and time	Peak Frequency [MHz]	Remarks
189.2V, 1 minute since START	2467.00	A

The operation at power supply voltage 166.4(208*0.8)V is impossible. The lowest operating one is 189.2V.

263.3V, 30 seconds since START	2467.24	A
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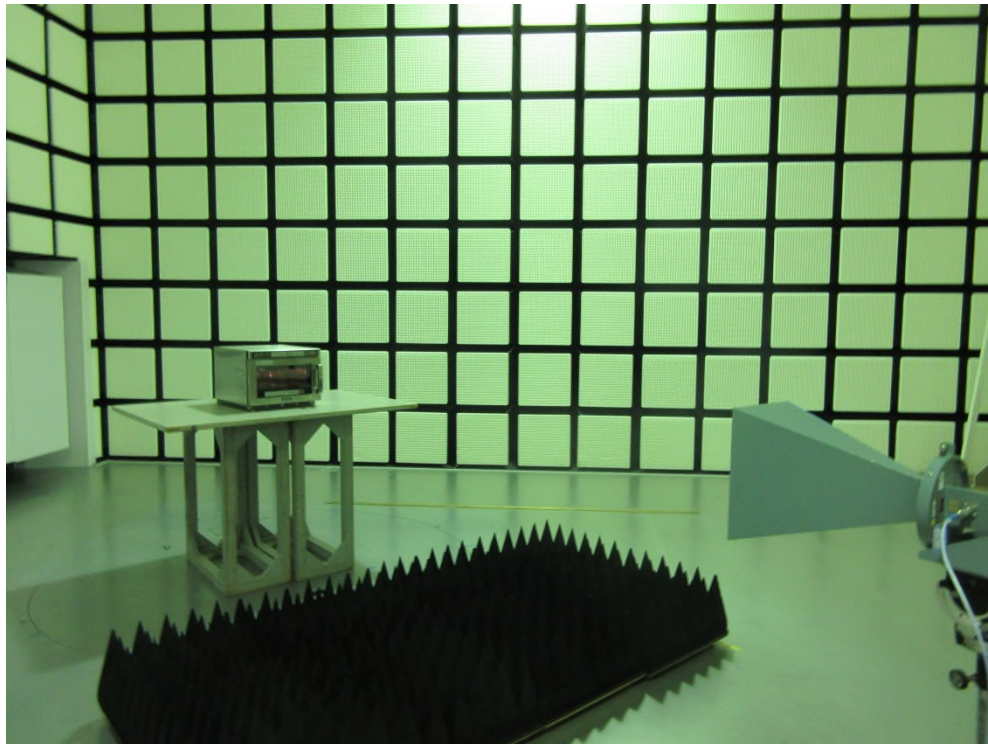
The operation at power supply voltage 287.5(230*1.25)V is impossible. The highest operating one is 263.3V.

The results were within 2450MHz±50MHz.

Remarks

	Detector Function	RES B.W.	V.B.W.	Sweep Time	Span
A	Peak	1 MHz	1 MHz	AUTO	200 MHz

7.2.5 Test Setup (Photographs)



7.3 AC Powerline Conducted Emission

For the requirements, ☒ - Applicable [☒ - Tested. ☐ - Not tested by applicant request.]
☐ - Not Applicable

7.3.1 Test Results

For the standard, ☒ - Passed ☐ - Failed ☐ - Not judged

Min. Limit Margin (Average) 9.2 dB at 0.3000 MHz

Uncertainty of Measurement Results ± 2.6 dB(2 σ)

Remarks : _____

7.3.2 Test Instruments

Measurement Room M2				
Type	Model	Serial No. (ID)	Manufacturer	Cal. Due
Test Receiver	ESU 26	100170 (A-6)	Rohde & Schwarz	2019/11/08
AMN (main)	KNW-408	8-947-5 (D-14)	Kyoritsu	2019/10/25
RF Cable	RG223/U	--- (H-34)	HUBER+SUHNER	2019/06/06

NOTE : The calibration interval of the above test instruments is 12 months.

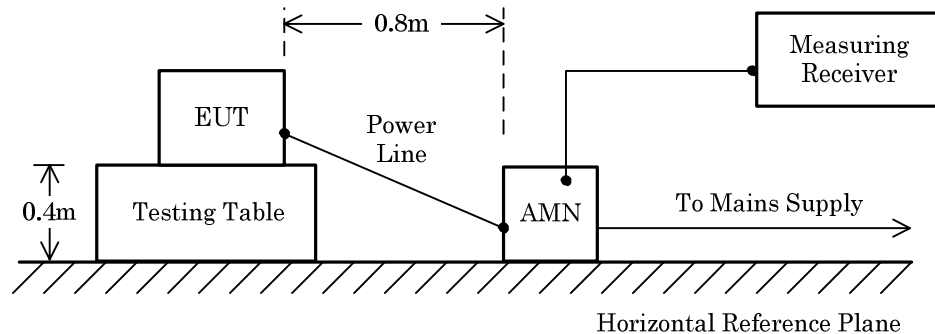
7.3.3 Test Method and Test Setup (Diagrammatic illustration)

The preliminary tests were performed using the scan mode of test receiver or spectrum analyzer to observe the emissions characteristics of the EUT.

The EUT configuration, cable configuration and mode of operation were determined for producing the maximum level of emissions.

This configurations was used for final tests.

(Reference divisional instruction No. G703649)



NOTE

AMN : Artificial Mains Network

7.3.4 Test Data

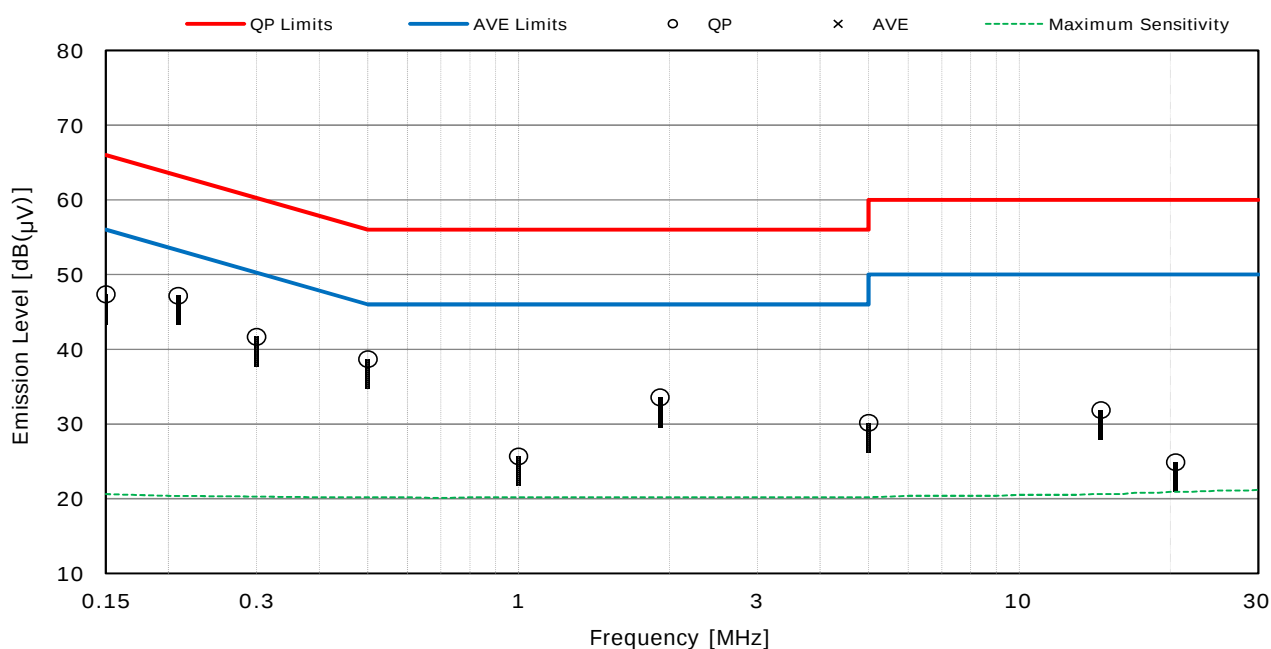
Test voltage : 208VAC 60Hz

Test Date: December 10, 2018

Temp.: 17 °C, RH: 40 %, Atm.: 1013 hPa

Measured phase : L1

Frequency [MHz]	Factor [dB]	Readings [dB(μV)]		Limits [dB(μV)]		Results [dB(μV)]		Margin [dB]		Remarks
		QP	AVE	QP	AVE	QP	AVE	QP	AVE	
0.1500	10.6	36.8	--	66.0	56.0	47.4	--	+ 18.6	--	-
0.2090	10.4	36.8	--	63.2	53.2	47.2	--	+ 16.0	--	-
0.3000	10.3	31.4	--	60.2	50.2	41.7	--	+ 18.5	--	-
0.5000	10.2	28.5	--	56.0	46.0	38.7	--	+ 17.3	--	-
1.0000	10.2	15.5	--	56.0	46.0	25.7	--	+ 30.3	--	-
1.9170	10.2	23.4	--	56.0	46.0	33.6	--	+ 22.4	--	-
5.0000	10.2	20.0	--	56.0	46.0	30.2	--	+ 25.8	--	-
14.5430	10.6	21.3	--	60.0	50.0	31.9	--	+ 28.1	--	-
20.5050	10.9	14.0	--	60.0	50.0	24.9	--	+ 35.1	--	-



NOTES

- 1) The spectrum was checked from 150 kHz to 30 MHz.
- 2) The factor includes the AMN voltage division factor and the cable loss.
- 3) The symbol of "--" means "not applicable".
- 4) Calculated result as the worst point shown on underline :
Factor + Reading (QP) = 10.4 + 36.8 = 47.2 dB(μV) at 0.2090 MHz
- 5) QP : Quasi-Peak detector, AVE : Average detector
- 6) Bandwidth : 9 kHz (150 kHz - 30 MHz)

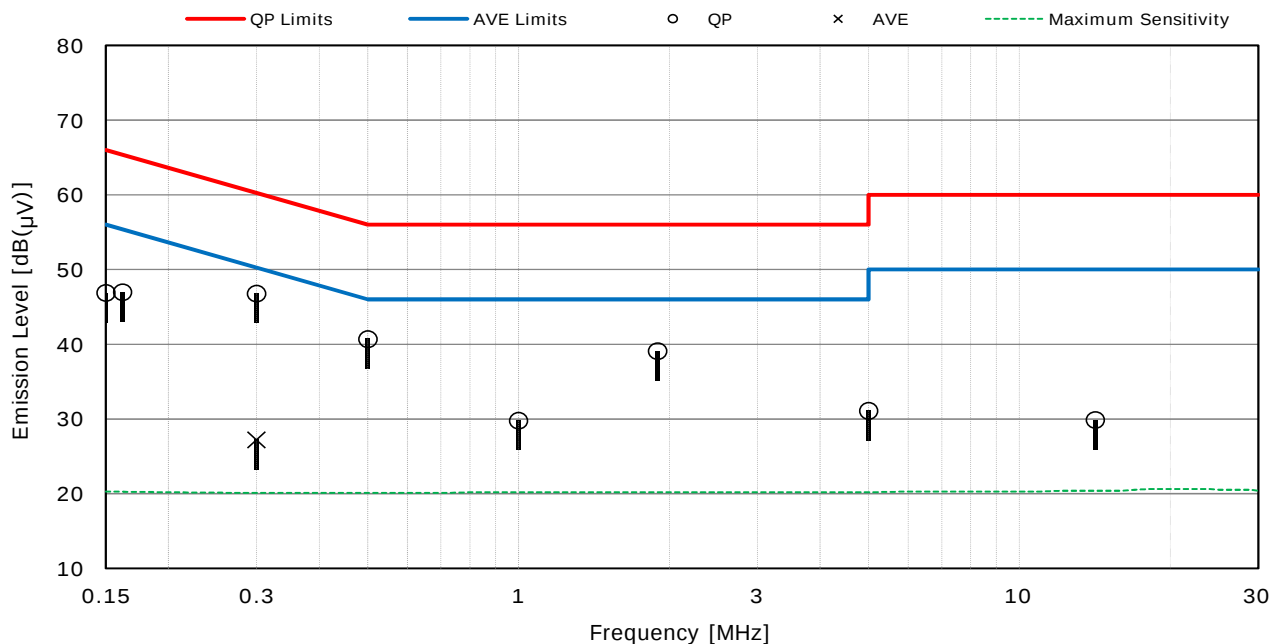
Test voltage : 208VAC 60Hz

Test Date: December 10, 2018

Temp.: 17 °C, RH: 40 %, Atm.: 1013 hPa

Measured phase : L2

Frequency [MHz]	Factor [dB]	Readings [dB(μV)]		Limits [dB(μV)]		Results [dB(μV)]		Margin [dB]		Remarks
		QP	AVE	QP	AVE	QP	AVE	QP	AVE	
0.1500	10.3	36.6	--	66.0	56.0	46.9	--	+ 19.1	--	-
0.1620	10.3	36.7	--	65.4	55.4	47.0	--	+ 18.4	--	-
0.3000	10.1	36.7	17.1	60.2	50.2	46.8	27.2	+ 13.4	+ 23.0	-
0.5000	10.1	30.6	--	56.0	46.0	40.7	--	+ 15.3	--	-
1.0000	10.2	19.6	--	56.0	46.0	29.8	--	+ 26.2	--	-
1.8960	10.2	28.9	--	56.0	46.0	39.1	--	+ 16.9	--	-
5.0000	10.2	20.9	--	56.0	46.0	31.1	--	+ 24.9	--	-
14.1757	10.4	19.5	--	60.0	50.0	29.9	--	+ 30.1	--	-



NOTES

- 1) The spectrum was checked from 150 kHz to 30 MHz.
- 2) The factor includes the AMN voltage division factor and the cable loss.
- 3) The symbol of "--" means "not applicable".
- 4) Calculated result as the worst point shown on underline :
Factor + Reading (QP) = 10.1 + 36.7 = 46.8 dB(μV) at 0.3000 MHz
- 5) QP : Quasi-Peak detector, AVE : Average detector
- 6) Bandwidth : 9 kHz (150 kHz - 30 MHz)

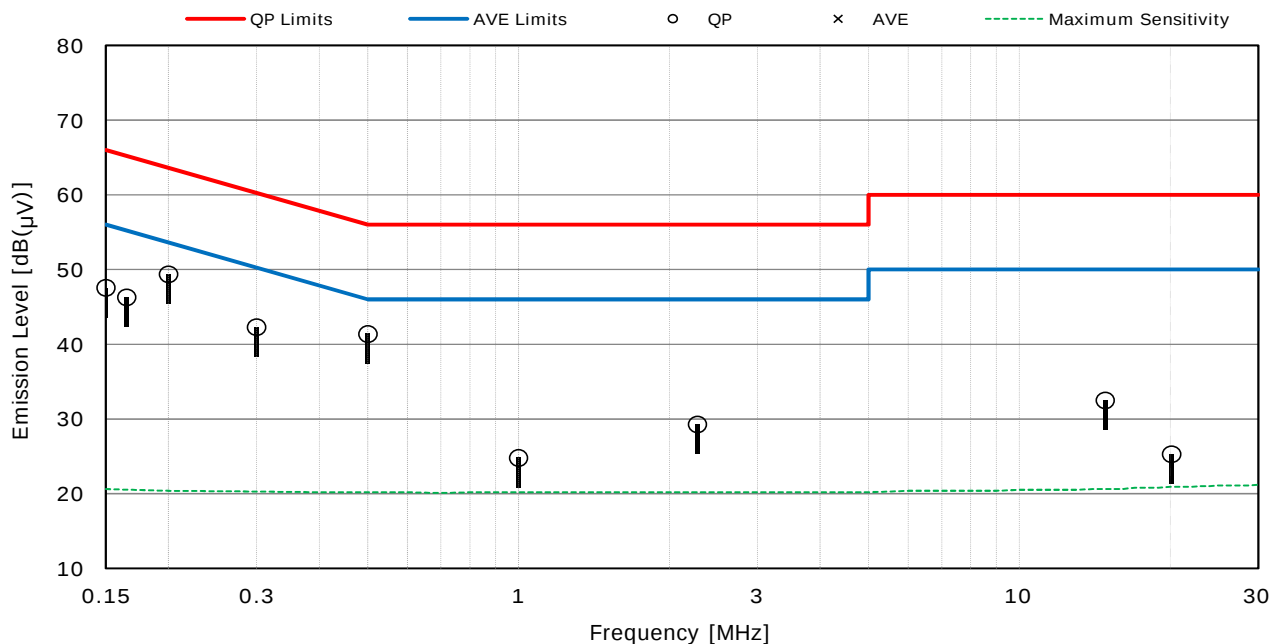
Test voltage : 230VAC 60Hz

Test Date: December 10, 2018

Temp.: 17 °C, RH: 40 %, Atm.: 1013 hPa

Measured phase : L1

Frequency [MHz]	Factor [dB]	Readings [dB(μV)]		Limits [dB(μV)]		Results [dB(μV)]		Margin [dB]		Remarks
		QP	AVE	QP	AVE	QP	AVE	QP	AVE	
0.1500	10.6	37.0	--	66.0	56.0	47.6	--	+ 18.4	--	-
0.1650	10.5	35.8	--	65.2	55.2	46.3	--	+ 18.9	--	-
0.2000	10.4	39.0	--	63.6	53.6	49.4	--	+ 14.2	--	-
0.3000	10.3	32.0	--	60.2	50.2	42.3	--	+ 17.9	--	-
0.5000	10.2	31.2	--	56.0	46.0	41.4	--	+ 14.6	--	-
1.0000	10.2	14.6	--	56.0	46.0	24.8	--	+ 31.2	--	-
2.2770	10.2	19.1	--	56.0	46.0	29.3	--	+ 26.7	--	-
14.8325	10.6	21.9	--	60.0	50.0	32.5	--	+ 27.5	--	-
20.1325	10.9	14.4	--	60.0	50.0	25.3	--	+ 34.7	--	-



NOTES

- 1) The spectrum was checked from 150 kHz to 30 MHz.
- 2) The factor includes the AMN voltage division factor and the cable loss.
- 3) The symbol of "--" means "not applicable".
- 4) Calculated result as the worst point shown on underline :
Factor + Reading (QP) = 10.4 + 39.0 = 49.4 dB(μV) at 0.2000 MHz
- 5) QP : Quasi-Peak detector, AVE : Average detector
- 6) Bandwidth : 9 kHz (150 kHz - 30 MHz)

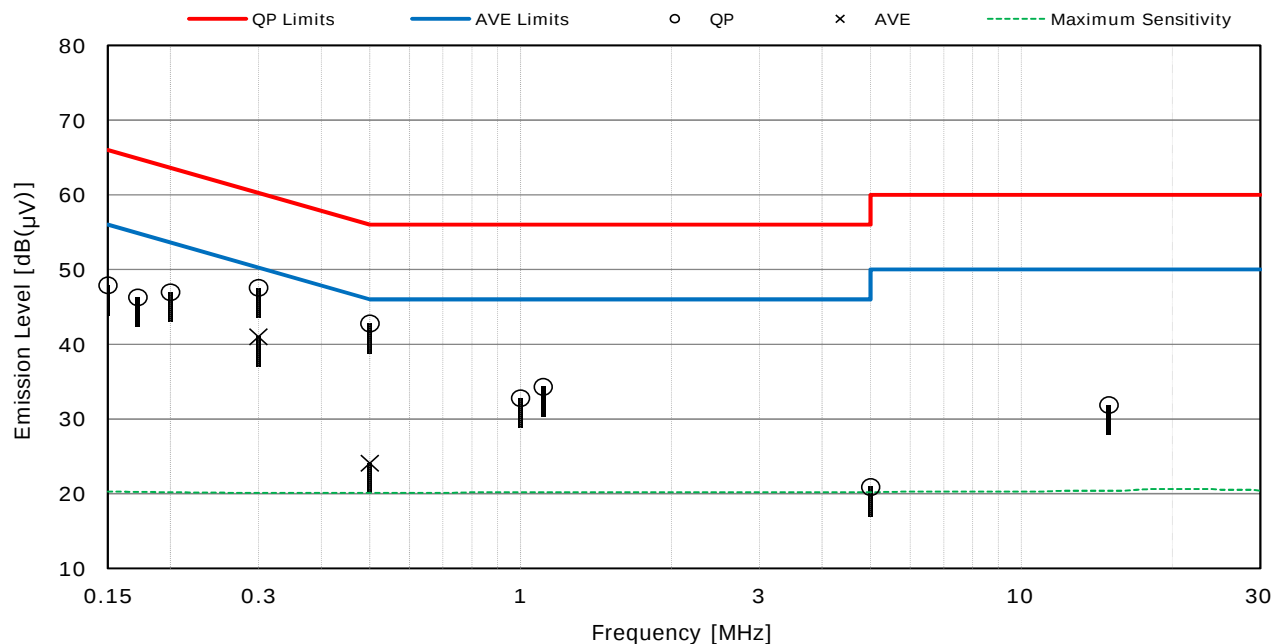
Test voltage : 230VAC 60Hz

Test Date: December 10, 2018

Temp.: 17 °C, RH: 40 %, Atm.: 1013 hPa

Measured phase : L2

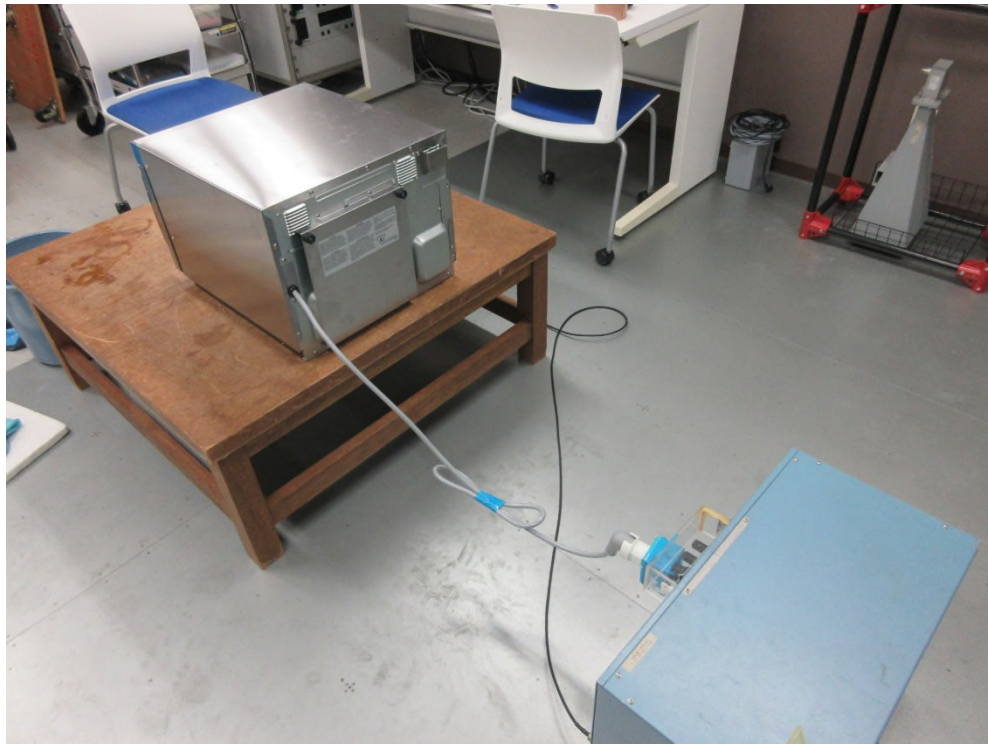
Frequency [MHz]	Factor [dB]	Readings [dB(μV)]		Limits [dB(μV)]		Results [dB(μV)]		Margin [dB]		Remarks
		QP	AVE	QP	AVE	QP	AVE	QP	AVE	
0.1500	10.3	37.6	--	66.0	56.0	47.9	--	+ 18.1	--	-
0.1720	10.2	36.1	--	64.9	54.9	46.3	--	+ 18.6	--	-
0.2000	10.2	36.8	--	63.6	53.6	47.0	--	+ 16.6	--	-
0.3000	10.1	37.5	30.9	60.2	50.2	47.6	41.0	+ 12.6	+ 9.2	-
0.5000	10.1	32.7	14.0	56.0	46.0	42.8	24.1	+ 13.2	+ 21.9	-
1.0000	10.2	22.6	--	56.0	46.0	32.8	--	+ 23.2	--	-
1.1100	10.2	24.1	--	56.0	46.0	34.3	--	+ 21.7	--	-
5.0000	10.2	10.7	--	56.0	46.0	20.9	--	+ 35.1	--	-
14.9575	10.4	21.5	--	60.0	50.0	31.9	--	+ 28.1	--	-



NOTES

- 1) The spectrum was checked from 150 kHz to 30 MHz.
- 2) The factor includes the AMN voltage division factor and the cable loss.
- 3) The symbol of "--" means "not applicable".
- 4) Calculated result as the worst point shown on underline :
Factor + Reading (AVE) = 10.1 + 30.9 = 41.0 dB(μV) at 0.3000 MHz
- 5) QP : Quasi-Peak detector, AVE : Average detector
- 6) Bandwidth : 9 kHz (150 kHz - 30 MHz)

7.3.5 Test Setup (Photographs)



– Rear View –

Photograph present configuration with maximum emission

7.4 Radiated Emission 9 kHz – 30 MHz

For the requirements, ☒ - Applicable [☒ - Tested. ☐ - Not tested by applicant request.]
☐ - Not Applicable

7.4.1 Test Results

For the standard, ☒ - Passed ☐ - Failed ☐ - Not judged

Min. Limit Margin (Average) >15.0 dB at -- MHz

Uncertainty of Measurement Results ± 3.0 dB(2σ)

Test Distance 10 m

Remarks : Field strength limit is calculated $208V:25 \times \text{SQRT}(1881.3W/500W) \mu V/m (=33.7 \text{ dB}\mu V/m)$ at 300 m, $230V:25 \times \text{SQRT}(1941.5W/500W) \mu V/m (=33.8 \text{ dB}\mu V/m)$ at 300 m) and the emission levels are calculated using 20dB/decade as attenuation factor.

7.4.2 Test Instruments

Anechoic Chamber A1				
Type	Model	Serial No. (ID)	Manufacturer	Cal. Due
Test Receiver	ESCI 7	100811 (A-8)	Rohde & Schwarz	2019/10/23
Loop Antenna	HFH2-Z2	860605/030 (C-3)	Rohde & Schwarz	2019/08/02
RF Cable	S 10162 B-11 etc.	--- (H-3)	HUBER+SUHNER	2019/04/01
RF Cable	RG213/U	--- (H-29)	HUBER+SUHNER	2019/08/02

NOTE : The calibration interval of the above test instruments is 12 months.

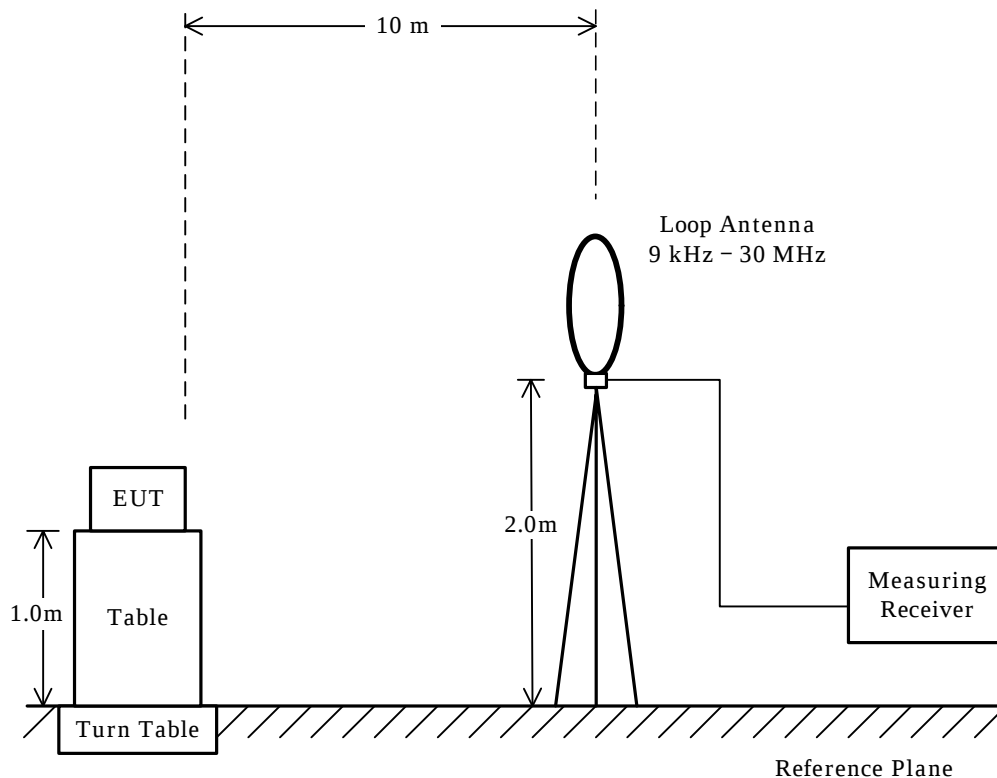
7.4.3 Test Method and Test Setup (Diagrammatic illustration)

The preliminary tests were performed at the measurement distance that specified for compliance to determine the emission characteristics of the EUT.

The EUT configuration, cable configuration and mode of operation were determined for producing the maximum level of emissions.

This configurations was used for the final tests.

(Reference divisional instruction No. G703649)

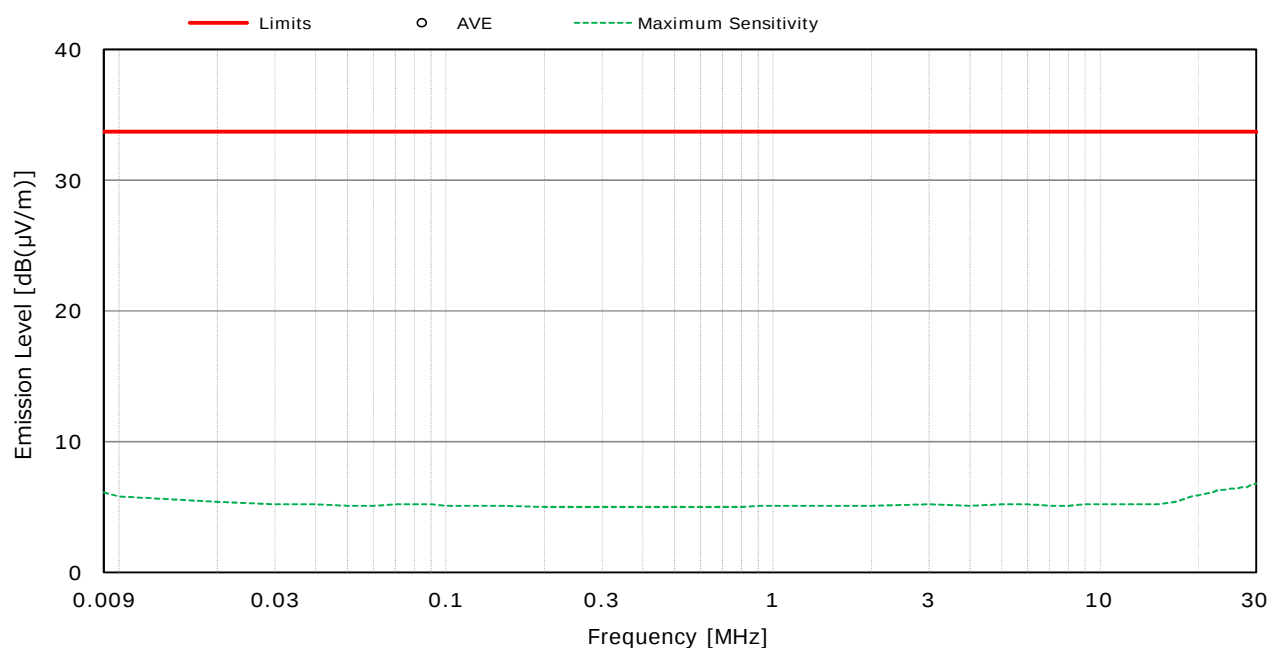


7.4.4 Test Data

Test voltage : 208VAC 60Hz

Test Date: December 19, 2018

Temp.: 15 °C, RH: 35 %, Atm.: 1013 hPa



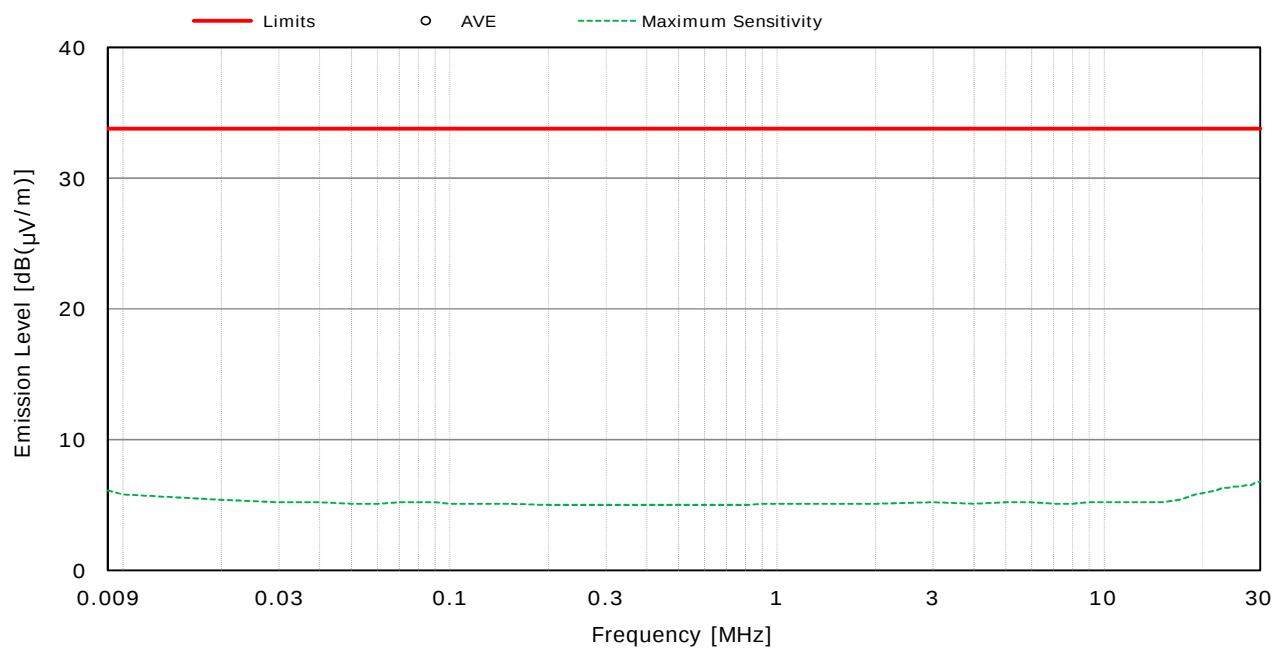
NOTES

- 1) Measurement Distance : 10 m (Specified Distance : 300 m)
- 2) The spectrum was checked from 9 kHz to 30 MHz.
- 3) AVE : Average detector
- 4) Bandwidth : 200 Hz (9 kHz - 150 kHz), 9 kHz (150 kHz - 30 MHz)
- 5) All emission levels were below the noise floor, or more than 15 dB below the applied limits.

Test voltage : 230VAC 60Hz

Test Date: December 19, 2018

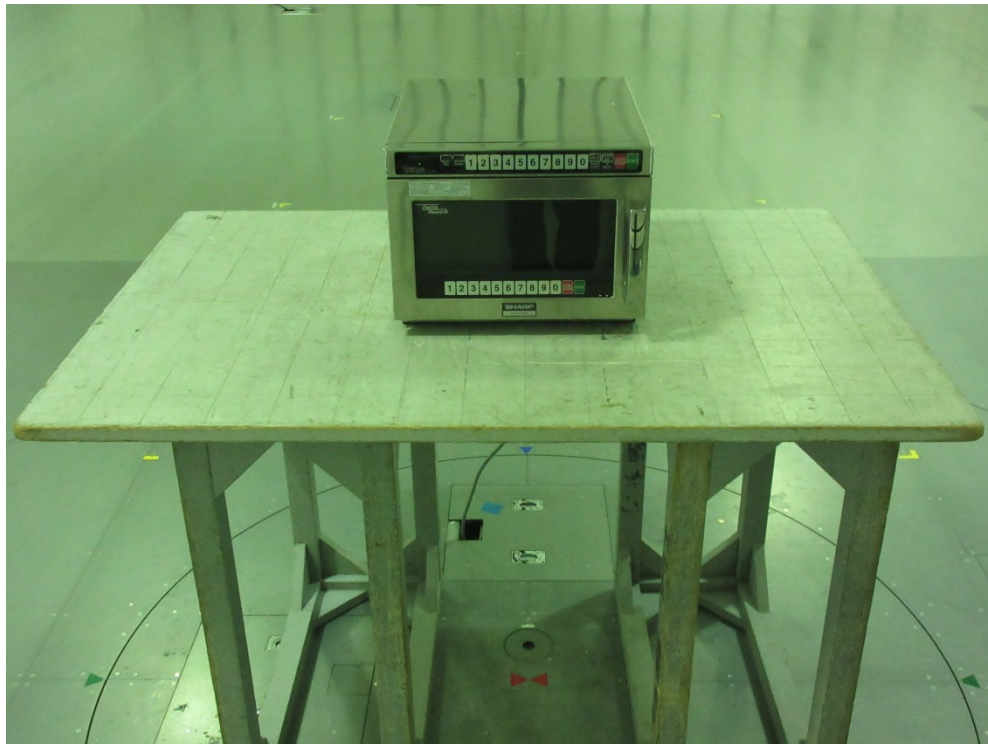
Temp.: 15 °C, RH: 35 %, Atm.: 1013 hPa



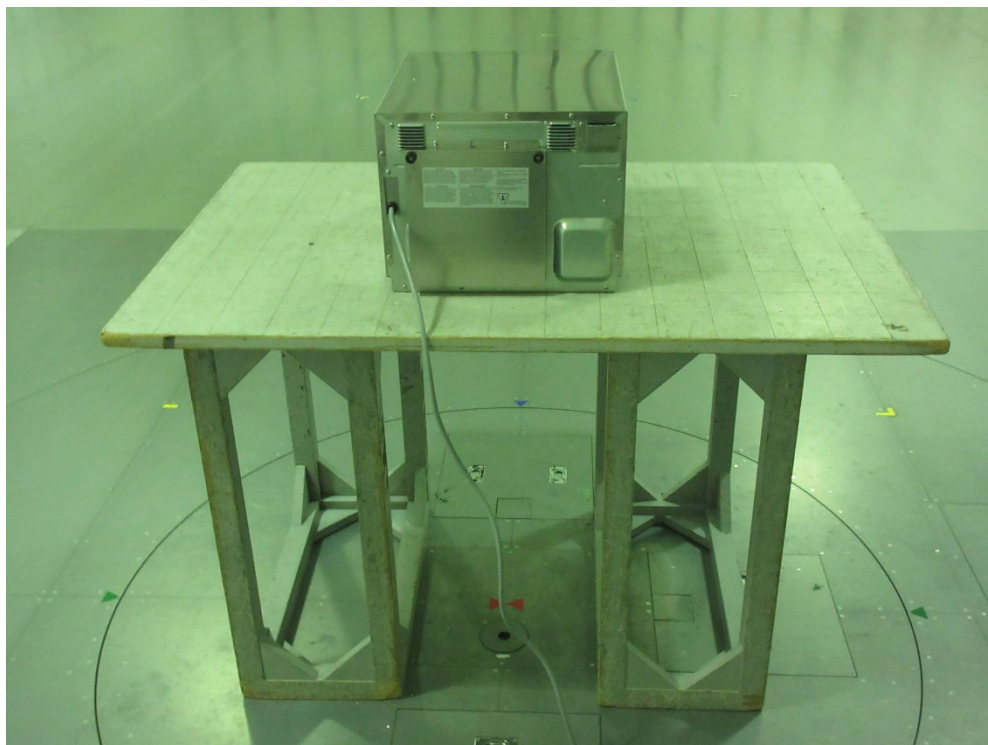
NOTES

- 1) Measurement Distance : 10 m (Specified Distance : 300 m)
- 2) The spectrum was checked from 9 kHz to 30 MHz.
- 3) AVE : Average detector
- 4) Bandwidth : 200 Hz (9 kHz - 150 kHz), 9 kHz (150 kHz - 30 MHz)
- 5) All emission levels were below the noise floor, or more than 15 dB below the applied limits.

7.4.5 Test Setup (Photographs)



– Front View –



– Rear View –

Photograph present configuration with maximum emission

7.5 Radiated Emission 30 MHz – 1000 MHz

For the requirements, ☒ - Applicable [☒ - Tested. ☐ - Not tested by applicant request.]
☐ - Not Applicable

7.5.1 Test Results

For the standard, ☒ - Passed ☐ - Failed ☐ - Not judged

Min. Limit Margin (Average) 47.2 dB at 107.420 MHz

Uncertainty of Measurement Results
 30 MHz – 200 MHz ± 4.2 dB(2σ)
 200 MHz – 1000 MHz ± 3.7 dB(2σ)

Test Distance 10 m

Remarks : Field strength limit is calculated $208V:25 \times \text{SQRT}(1881.3W/500W) \mu V/m (=33.7 \text{ dB}\mu V/m)$ at 300 m, $230V:25 \times \text{SQRT}(1941.5W/500W) \mu V/m (=33.8 \text{ dB}\mu V/m)$ at 300 m) and the emission levels are calculated using 20dB/decade as attenuation factor.

7.5.2 Test Instruments

Anechoic Chamber A1				
Type	Model	Serial No. (ID)	Manufacturer	Cal. Due
Test Receiver	ESCI 7	100811 (A-8)	Rohde & Schwarz	2019/10/23
Hybrid Antenna	CBL6111D	30644 (C-71)	TESEQ	2019/11/26
Pre-Amplifier	310N	304572 (A-16)	SONOMA	2019/04/01
RF Cable	S 10162 B-11 etc.	--- (H-3)	HUBER+SUHNER	2019/04/01

NOTE : The calibration interval of the above test instruments is 12 months.

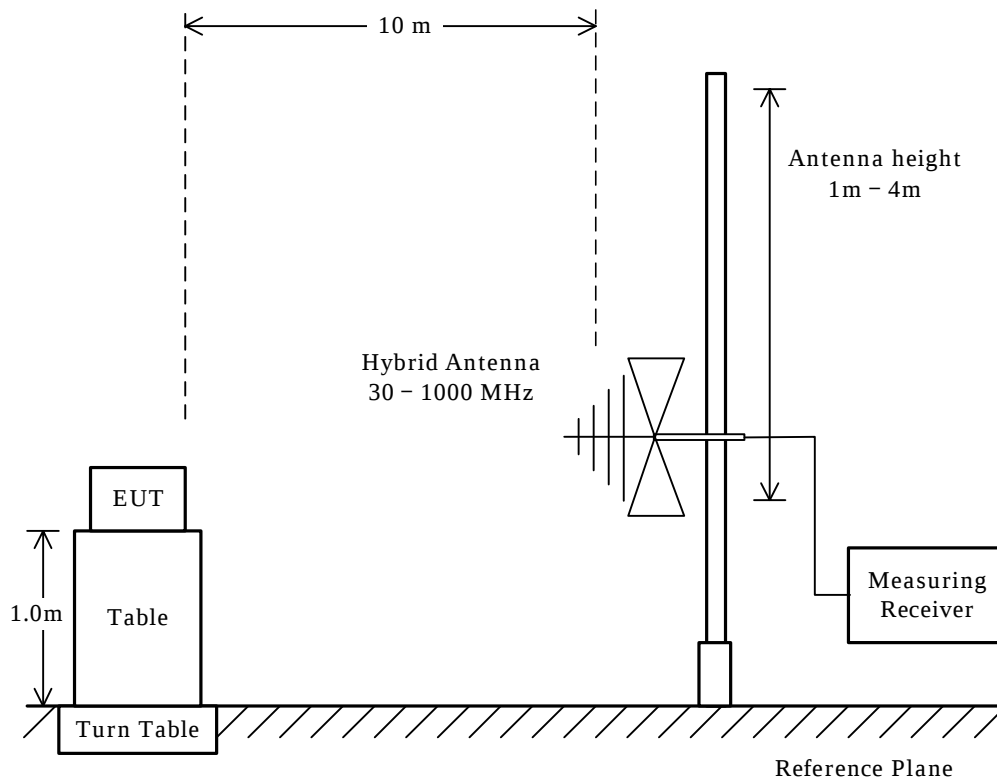
7.5.3 Test Method and Test Setup (Diagrammatic illustration)

The preliminary tests were performed at the measurement distance that specified for compliance to determine the emission characteristics of the EUT.

The EUT configuration, cable configuration and mode of operation were determined for producing the maximum level of emissions.

This configurations was used for the final tests.

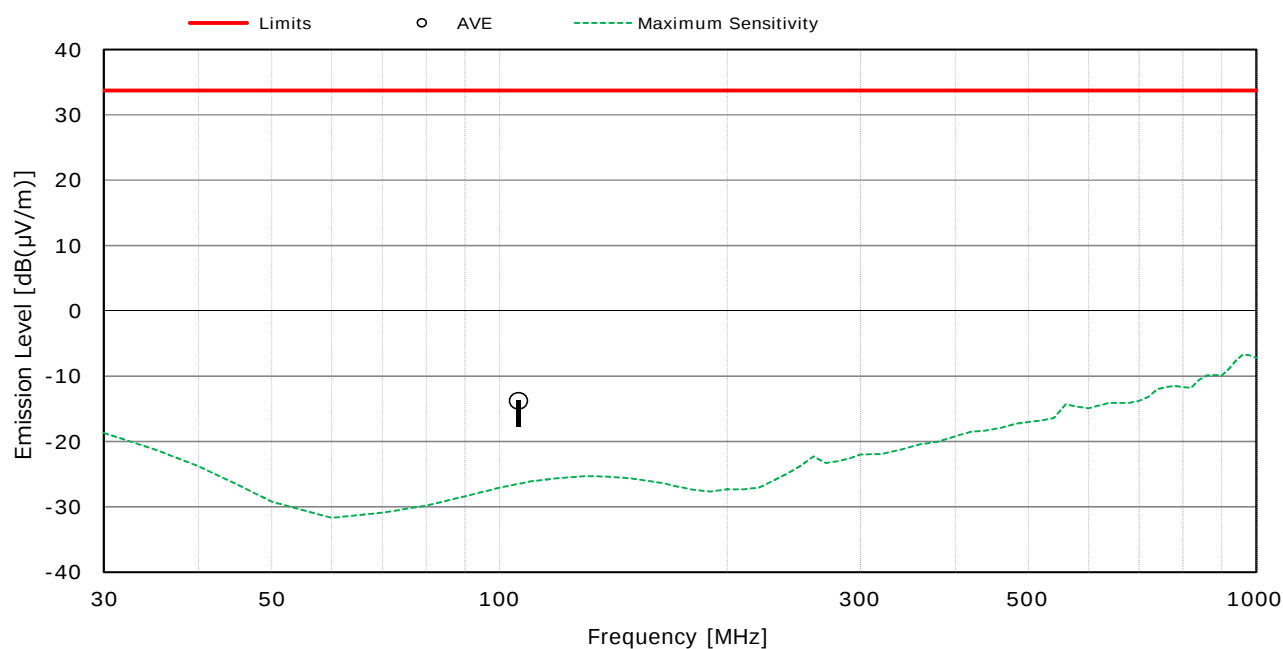
(Reference divisional instruction No. G703649)



7.5.4 Test Data

Test voltage : 208VAC 60HzTest Date: December 19, 2018Temp.: 15 °C, RH: 35 %, Atm.: 1013 hPaAntenna polarization : Horizontal

Frequency	Factor	Readings	Limits	Results	Margin	Remarks
[MHz]	[dB]	[dB(μV)]	[dB(μV/m)]	[dB(μV/m)]	[dB]	
105.870	-46.5	32.7	33.7	-13.8	+ 47.5	-



NOTES

- 1) Measurement Distance : 10 m (Specified Distance : 300 m)
- 2) The spectrum was checked from 30 MHz to 1000 MHz.
- 3) The factor includes the antenna factor, the cable loss and the distance conversion.
- 4) Calculated result as the worst point shown on underline :
Factor + Reading (AVE) = $-46.5 + 32.7 = -13.8$ dB(μV) at 105.870 MHz
- 5) AVE : Average detector
- 6) Bandwidth : 120 kHz (30 MHz - 1000 MHz)

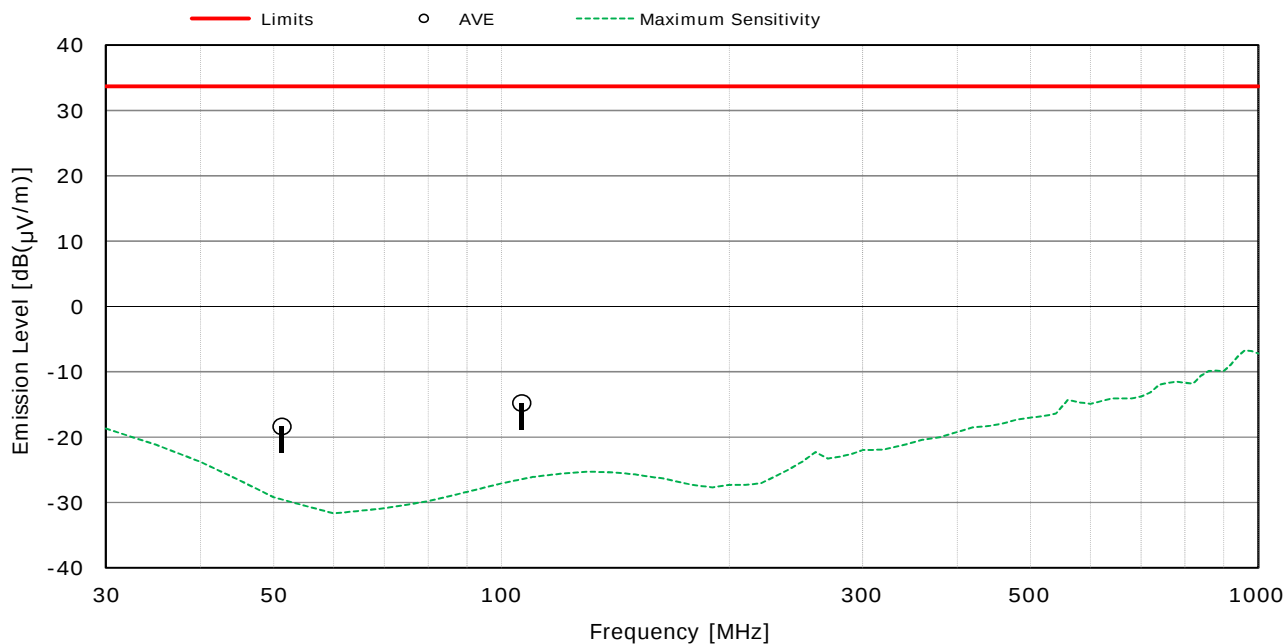
Test voltage : 208VAC 60Hz

Test Date: December 19, 2018

Temp.: 15 °C, RH: 35 %, Atm.: 1013 hPa

Antenna polarization : Vertical

Frequency	Factor	Readings	Limits	Results	Margin	Remarks
[MHz]	[dB]	[dB(μV)]	[dB(μV/m)]	[dB(μV/m)]	[dB]	
51.240	-49.7	31.3	33.7	-18.4	+ 52.1	-
106.319	-46.4	31.6	33.7	-14.8	+ 48.5	-



NOTES

- 1) Measurement Distance : 10 m (Specified Distance : 300 m)
- 2) The spectrum was checked from 30 MHz to 1000 MHz.
- 3) The factor includes the antenna factor, the cable loss and the distance conversion.
- 4) Calculated result as the worst point shown on underline :
Factor + Reading (AVE) = -46.4 + 31.6 = -14.8 dB(μV) at 106.319 MHz
- 5) AVE : Average detector
- 6) Bandwidth : 120 kHz (30 MHz - 1000 MHz)

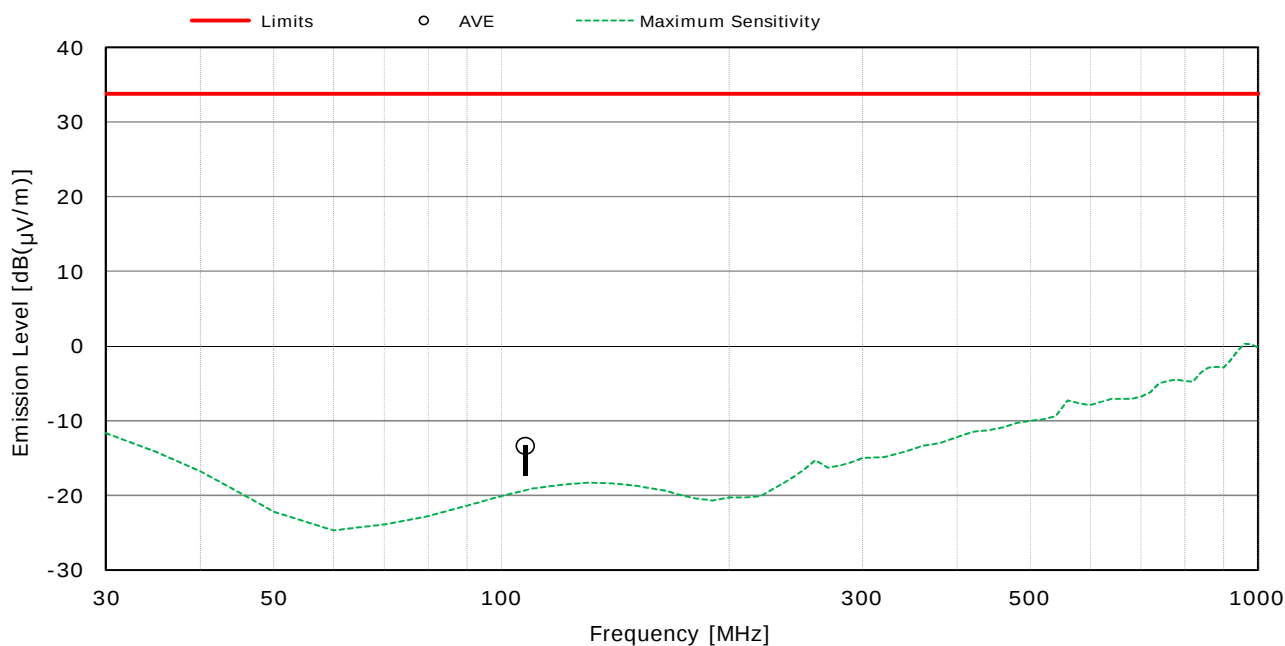
Test voltage : 230VAC 60Hz

Test Date: December 19, 2018

Temp.: 15 °C, RH: 35 %, Atm.: 1013 hPa

Antenna polarization : Horizontal

Frequency	Factor	Readings	Limits	Results	Margin	Remarks
[MHz]	[dB]	[dB(μV)]	[dB(μV/m)]	[dB(μV/m)]	[dB]	
107.420	-46.3	32.9	33.8	-13.4	+ 47.2	-



NOTES

- 1) Measurement Distance : 10 m (Specified Distance : 300 m)
- 2) The spectrum was checked from 30 MHz to 1000 MHz.
- 3) The factor includes the antenna factor, the cable loss and the distance conversion.
- 4) Calculated result as the worst point shown on underline :
Factor + Reading (AVE) = -46.3 + 32.9 = -13.4 dB(μV) at 107.420 MHz
- 5) AVE : Average detector
- 6) Bandwidth : 120 kHz (30 MHz - 1000 MHz)

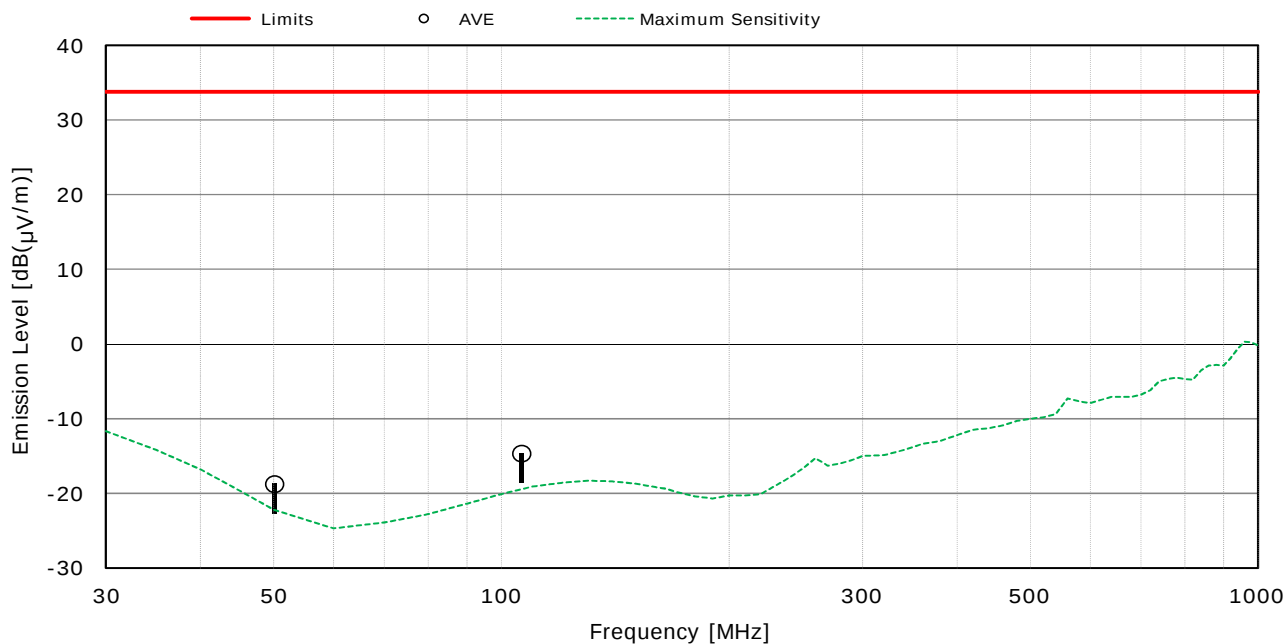
Test voltage : 230VAC 60Hz

Test Date: December 19, 2018

Temp.: 15 °C, RH: 35 %, Atm.: 1013 hPa

Antenna polarization : Vertical

Frequency	Factor	Readings	Limits	Results	Margin	Remarks
[MHz]	[dB]	[dB(μV)]	[dB(μV/m)]	[dB(μV/m)]	[dB]	
50.138	-49.3	30.5	33.8	-18.8	+ 52.6	-
106.358	-46.4	31.7	33.8	-14.7	+ 48.5	-



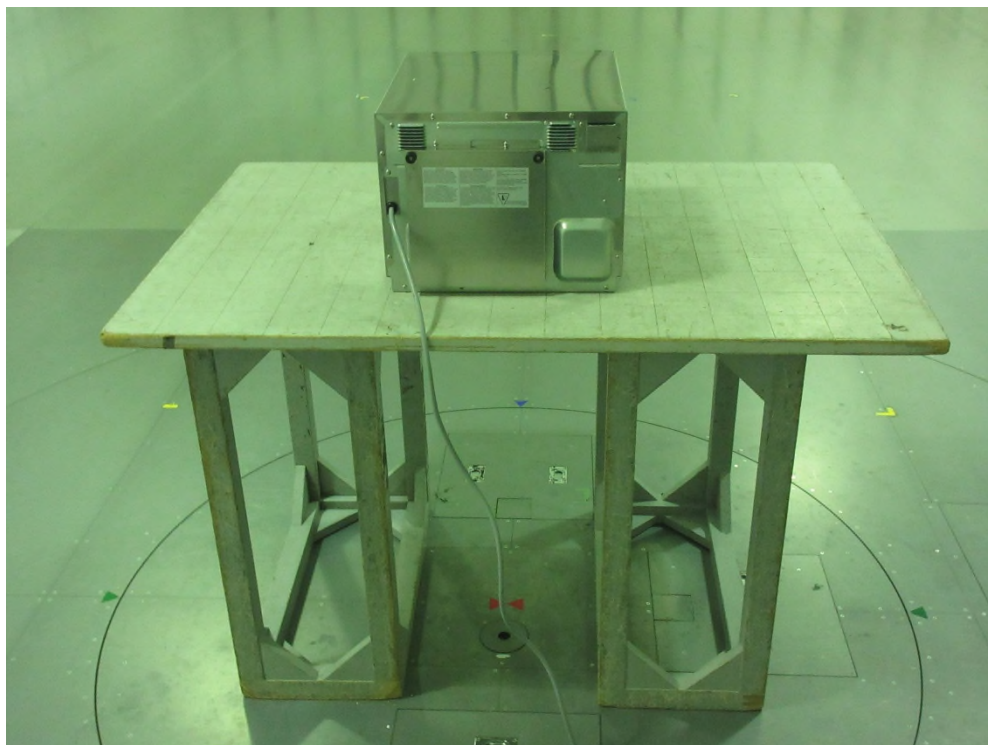
NOTES

- 1) Measurement Distance : 10 m (Specified Distance : 300 m)
- 2) The spectrum was checked from 30 MHz to 1000 MHz.
- 3) The factor includes the antenna factor, the cable loss and the distance conversion.
- 4) Calculated result as the worst point shown on underline :
Factor + Reading (AVE) = -46.4 + 31.7 = -14.7 dB(μV) at 106.358 MHz
- 5) AVE : Average detector
- 6) Bandwidth : 120 kHz (30 MHz - 1000 MHz)

7.5.5 Test Setup (Photographs)



– Front View –



– Rear View –

Photograph present configuration with maximum emission

7.6 Radiated Emission 1 GHz – 25 GHz

For the requirements, ☒ - Applicable [☒ - Tested. ☐ - Not tested by applicant request.]

☐ - Not Applicable

7.6.1 Test Results

For the standard, ☒ - Passed ☐ - Failed ☐ - Not judged

Min. Limit Margin (Average) 3.1 dB at 4920.56 MHz

Uncertainty of Measurement Results

1 GHz – 6 GHz	<u>± 4.7</u>	dB(2σ)
6 GHz – 18 GHz	<u>± 4.6</u>	dB(2σ)
18 GHz – 40 GHz	<u>± 5.5</u>	dB(2σ)

Test Distance 3 m

Remarks : The measurement result is within the range of measurement uncertainty.
Field strength limit is calculated $208V:25\sqrt{1881.3W/500W}\mu V/m(=33.7\text{ dB}\mu V/m)$
at 300 m, $230V:25\sqrt{1941.5W/500W}\mu V/m(=33.8\text{ dB}\mu V/m)$ at 300 m)and the
emission levels are calculated using 20dB/decade as attenuation factor.

7.6.2 Test Instruments

Anechoic Chamber A2				
Type	Model	Serial No. (ID)	Manufacturer	Cal. Due
Test Receiver	ESU 26	100170 (A-6)	Rohde & Schwarz	2019/11/08
Horn Antenna	91888-2	562 (C-41-1)	EATON	2019/06/14
Horn Antenna	91889-2	568 (C-41-2)	EATON	2019/06/14
Horn Antenna	3160-04	9903-1053 (C-55)	EMCO	2019/06/14
Horn Antenna	3160-05	9902-1061 (C-56)	EMCO	2019/06/14
Horn Antenna	3160-06	9712-1045 (C-57)	EMCO	2019/06/14
Horn Antenna	3160-07	9902-1113 (C-58)	EMCO	2019/06/14
Horn Antenna	3160-08	9904-1099 (C-59)	EMCO	2019/06/14
Horn Antenna	3160-09	9808-1117 (C-48)	EMCO	2019/06/24
Pre-Amplifier	RP058G-42	RP120905-11 (A-11)	EMCS	2019/04/01
Pre-Amplifier	DBL-0618N515	001 9830 (A-33)	DBS Microwave	2019/12/18
Pre-Amplifier	TPA0118-36	1010 (A-37)	TOYO	2019/05/20
Pre-Amplifier	RP1826G-45H	RP140121-11 (A-53)	EMCS	2019/06/24
Attenuator	2-10	BA6214 (D-79)	Weinschel	2019/12/06
RF Cable	SF104	37210/4 (C-40-14)	HUBER+SUHNER	2019/12/18
RF Cable	SF104	267415/4 (C-68)	HUBER+SUHNER	2019/12/18
RF Cable	SF102EA	3041/2EA (C-69)	HUBER+SUHNER	2019/12/18
Band Rejection Filter	BRM50701	029 (D-93)	MICRO-TRONICS	2019/02/06

NOTE : The calibration interval of the above test instruments is 12 months.

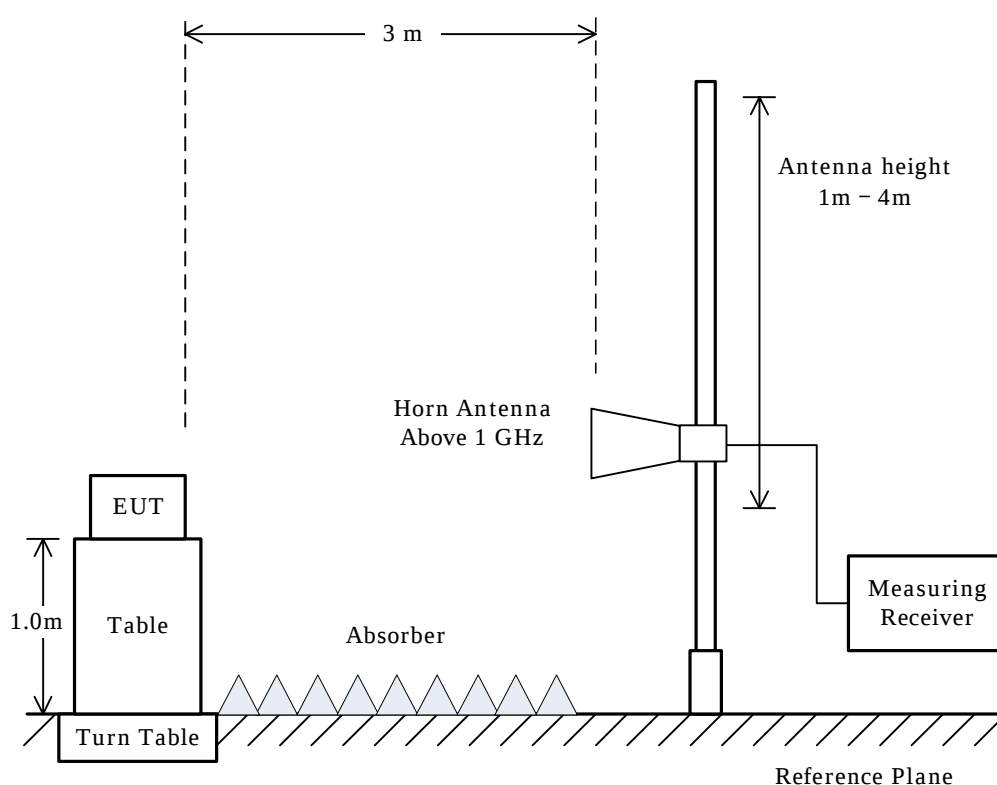
7.6.3 Test Method and Test Setup (Diagrammatic illustration)

The preliminary tests were performed at the measurement distance that specified for compliance to determine the emission characteristics of the EUT.

The EUT configuration, cable configuration and mode of operation were determined for producing the maximum level of emissions.

This configurations was used for the final tests.

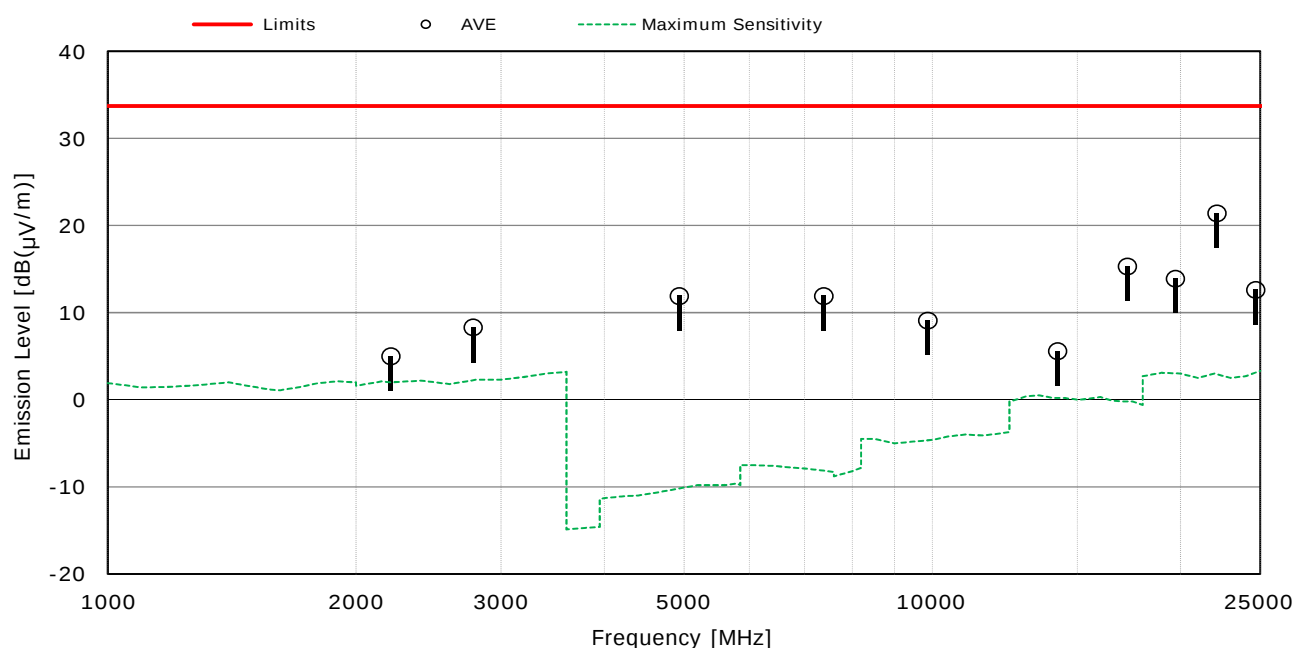
(Reference divisional instruction No. G703649)



7.6.4 Test Data

Test voltage : 208VAC 60HzTest condition : Center 1750mlAntenna polarization : HorizontalTest Date: January 8, 2019Temp.: 15 °C, RH: 40 %, Atm.: 1003 hPa

Frequency	Factor	Readings	Limits	Results	Margin	Remarks
[MHz]	[dB]	[dB(μV)]	[dB(μV/m)]	[dB(μV/m)]	[dB]	
2205.00	- 8.0	13.0	33.7	5.0	+ 28.7	-
2774.00	- 7.7	16.0	33.7	8.3	+ 25.4	-
4931.60	-38.1	50.0	33.7	11.9	+ 21.8	-
7385.61	-36.1	48.0	33.7	11.9	+ 21.8	-
9871.48	-32.5	41.6	33.7	9.1	+ 24.6	-
14196.30	-27.9	33.5	33.7	5.6	+ 28.1	-
17244.50	-28.1	43.4	33.7	15.3	+ 18.4	-
19719.13	-41.8	55.7	33.7	13.9	+ 19.8	-
22153.70	-42.0	63.4	33.7	21.4	+ 12.3	-
24675.11	-42.1	54.7	33.7	12.6	+ 21.1	-



NOTES

- 1) Measurement Distance : 3 m (Specified Distance : 300 m)
- 2) The spectrum was checked from 1 GHz to 25 GHz.
- 3) The factor includes the antenna factor, the pre-amplifier gain, the cable loss and the distance conversion.
- 4) Calculated result as the worst point shown on underline :
Factor + Reading (AVE) = -42.0 + 63.4 = 21.4 dB(μV) at 22153.70 MHz
Antenna Height : 117 cm, Turntable Rotation Position : 20 °
- 5) AVE : Average detector
- 6) Bandwidth : 1 MHz (1 GHz - 25 GHz)

Test voltage : 208VAC 60Hz

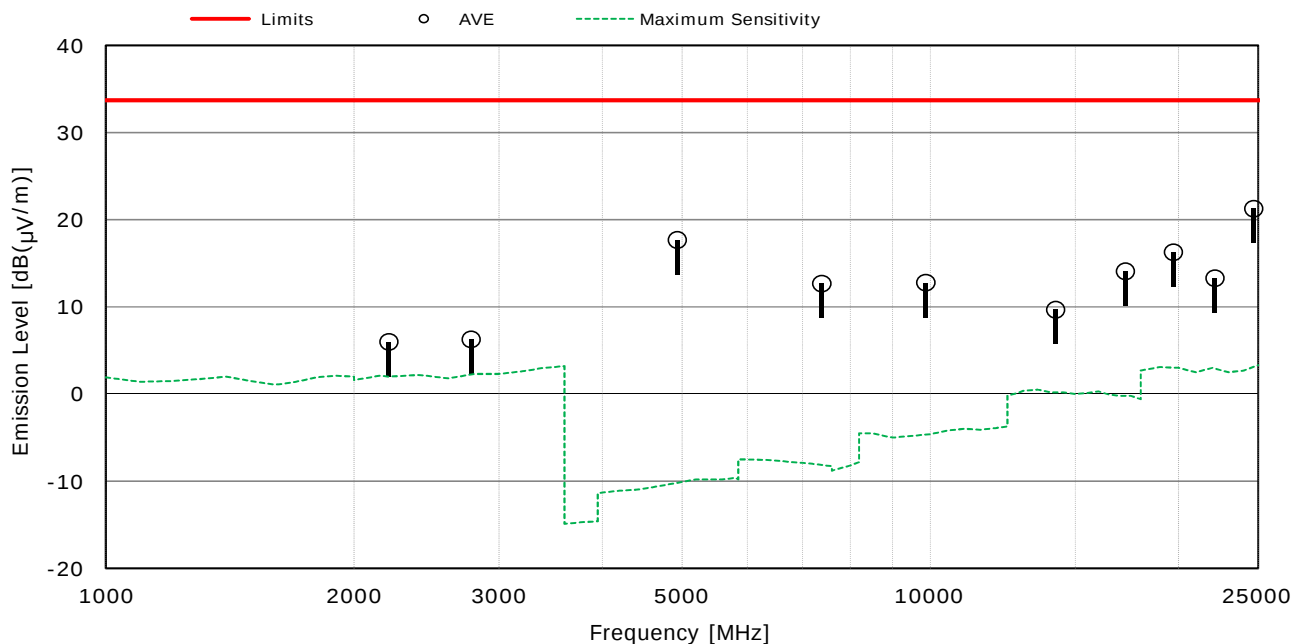
Test condition : Center 1750ml

Antenna polarization : Vertical

Test Date: January 8, 2019

Temp.: 15 °C, RH: 40 %, Atm.: 1003 hPa

Frequency	Factor	Readings	Limits	Results	Margin	Remarks
[MHz]	[dB]	[dB(μV)]	[dB(μV/m)]	[dB(μV/m)]	[dB]	
2205.00	- 8.0	14.0	33.7	6.0	+ 27.7	-
2774.00	- 7.7	14.0	33.7	6.3	+ 27.4	-
4931.61	-38.1	55.8	33.7	17.7	+ 16.0	-
7385.61	-36.1	48.8	33.7	12.7	+ 21.0	-
9871.48	-32.5	45.3	33.7	12.8	+ 20.9	-
14196.30	-27.9	37.6	33.7	9.7	+ 24.0	-
17244.50	-28.1	42.2	33.7	14.1	+ 19.6	-
19719.13	-41.8	58.1	33.7	16.3	+ 17.4	-
22153.70	-42.0	55.3	33.7	13.3	+ 20.4	-
24675.11	-42.1	63.4	33.7	21.3	+ 12.4	-



NOTES

- 1) Measurement Distance : 3 m (Specified Distance : 300 m)
- 2) The spectrum was checked from 1 GHz to 25 GHz.
- 3) The factor includes the antenna factor, the pre-amplifier gain, the cable loss and the distance conversion.
- 4) Calculated result as the worst point shown on underline :
Factor + Reading (AVE) = -42.1 + 63.4 = 21.3 dB(μV) at 24675.11 MHz
Antenna Height : 117 cm, Turntable Rotation Position : 227 °
- 5) AVE : Average detector
- 6) Bandwidth : 1 MHz (1 GHz - 25 GHz)

Test voltage : 208VAC 60Hz

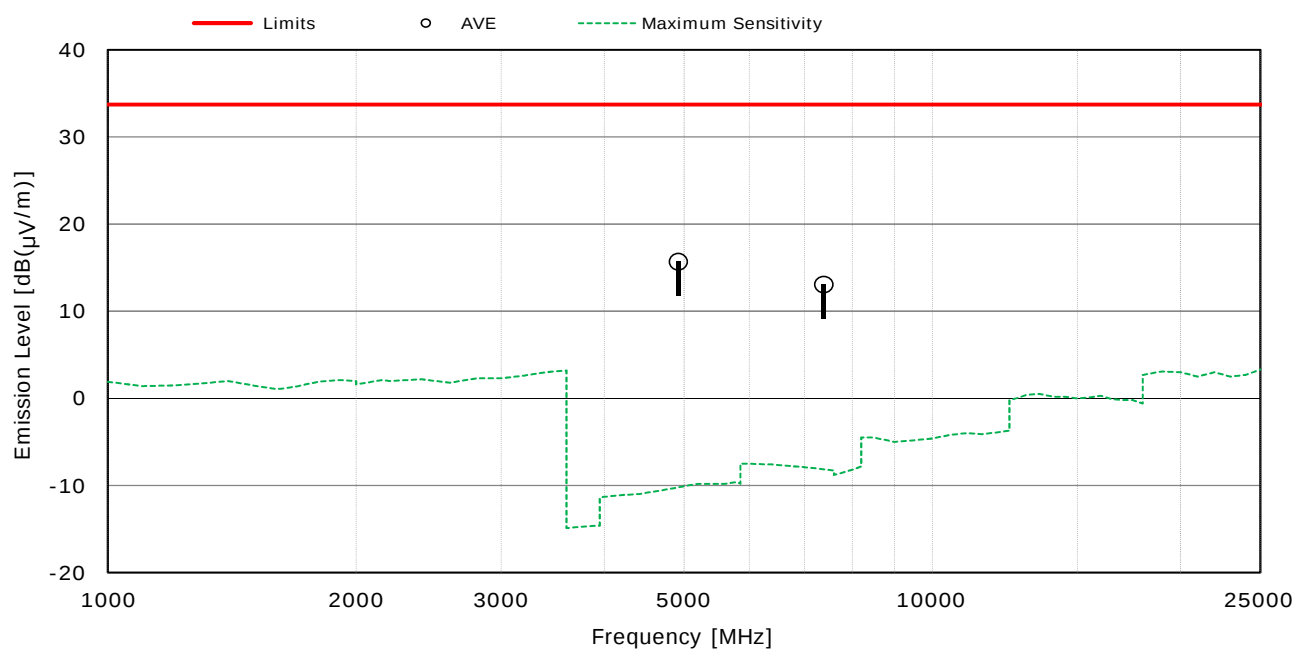
Test condition : Center 750ml

Antenna polarization : Horizontal

Test Date: January 7, 2019

Temp.: 16 °C, RH: 41 %, Atm.: 1005 hPa

Frequency	Factor	Readings	Limits	Results	Margin	Remarks
[MHz]	[dB]	[dB(μV)]	[dB(μV/m)]	[dB(μV/m)]	[dB]	
4916.92	-38.1	53.8	33.7	15.7	+ 18.0	-
7381.92	-36.1	49.2	33.7	13.1	+ 20.6	-



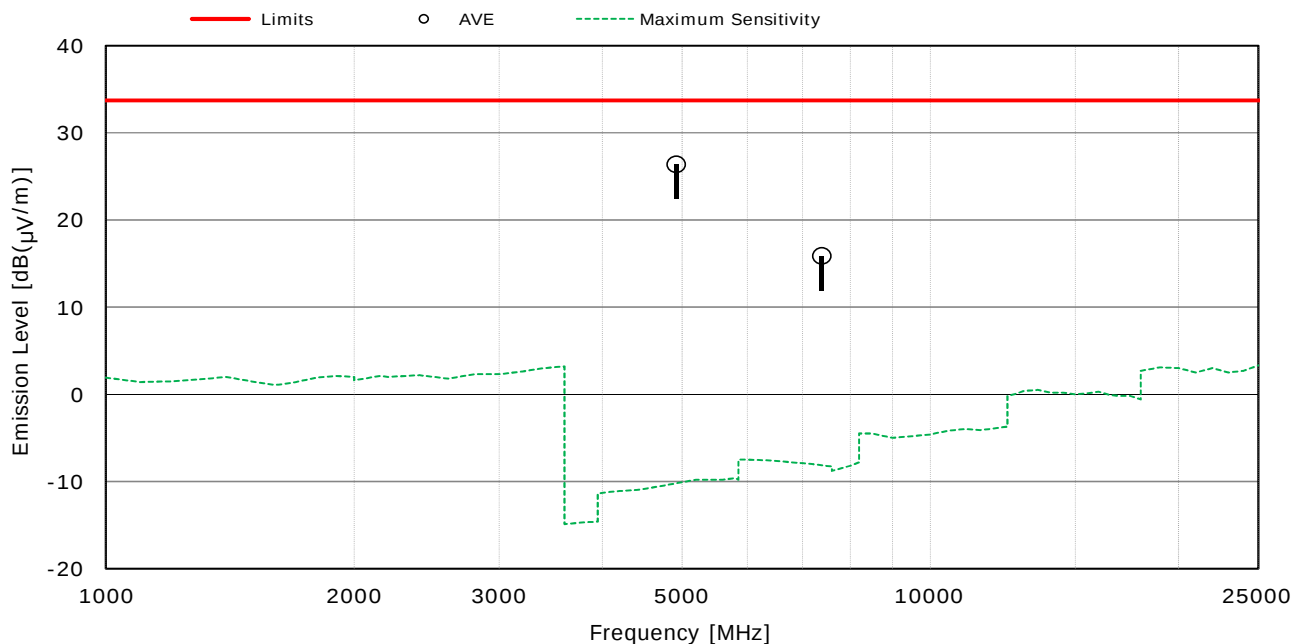
NOTES

- 1) Measurement Distance : 3 m (Specified Distance : 300 m)
- 2) The spectrum was checked from 1 GHz to 25 GHz.
- 3) The factor includes the antenna factor, the pre-amplifier gain, the cable loss and the distance conversion.
- 4) Calculated result as the worst point shown on underline :
Factor + Reading (AVE) = -38.1 + 53.8 = 15.7 dB(μV) at 4916.92 MHz
Antenna Height : 117 cm, Turntable Rotation Position : 24 °
- 5) AVE : Average detector
- 6) Bandwidth : 1 MHz (1 GHz - 25 GHz)

Test voltage : 208VAC 60Hz
Test condition : Center 750m
Antenna polarization : Vertical

Test Date: January 7, 2019
Temp.: 16 °C, RH: 41 %, Atm.: 1005 hPa

Frequency	Factor	Readings	Limits	Results	Margin	Remarks
[MHz]	[dB]	[dB(μV)]	[dB(μV/m)]	[dB(μV/m)]	[dB]	
4916.92	-38.1	64.5	33.7	26.4	+ 7.3	-
7381.92	-36.1	52.0	33.7	15.9	+ 17.8	-



NOTES

- 1) Measurement Distance : 3 m (Specified Distance : 300 m)
- 2) The spectrum was checked from 1 GHz to 25 GHz.
- 3) The factor includes the antenna factor, the pre-amplifier gain, the cable loss and the distance conversion.
- 4) Calculated result as the worst point shown on underline :
Factor + Reading (AVE) = -38.1 + 64.5 = 26.4 dB(μV) at 4916.92 MHz
Antenna Height : 117 cm, Turntable Rotation Position : 323 °
- 5) AVE : Average detector
- 6) Bandwidth : 1 MHz (1 GHz - 25 GHz)

Test voltage : 208VAC 60Hz

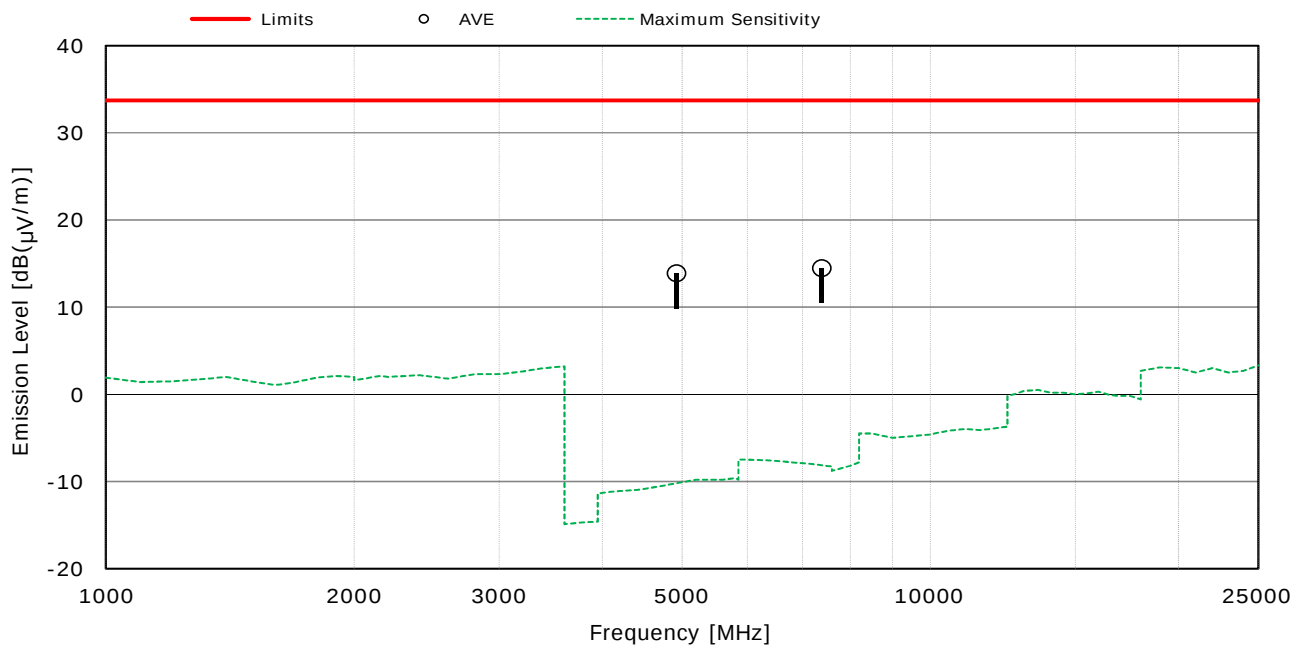
Test condition : Front Right Corner 1750ml

Antenna polarization : Horizontal

Test Date: January 7, 2019

Temp.: 16 °C, RH: 41 %, Atm.: 1005 hPa

Frequency	Factor	Readings	Limits	Results	Margin	Remarks
[MHz]	[dB]	[dB(μV)]	[dB(μV/m)]	[dB(μV/m)]	[dB]	
4919.60	-38.1	52.0	33.7	13.9	+ 19.8	-
7384.47	-36.1	50.6	33.7	14.5	+ 19.2	-



NOTES

- 1) Measurement Distance : 3 m (Specified Distance : 300 m)
- 2) The spectrum was checked from 1 GHz to 25 GHz.
- 3) The factor includes the antenna factor, the pre-amplifier gain, the cable loss and the distance conversion.
- 4) Calculated result as the worst point shown on underline :
Factor + Reading (AVE) = -36.1 + 50.6 = 14.5 dB(μV) at 7384.47 MHz
Antenna Height : 117 cm, Turntable Rotation Position : 110 °
- 5) AVE : Average detector
- 6) Bandwidth : 1 MHz (1 GHz - 25 GHz)

Test voltage : 208VAC 60Hz

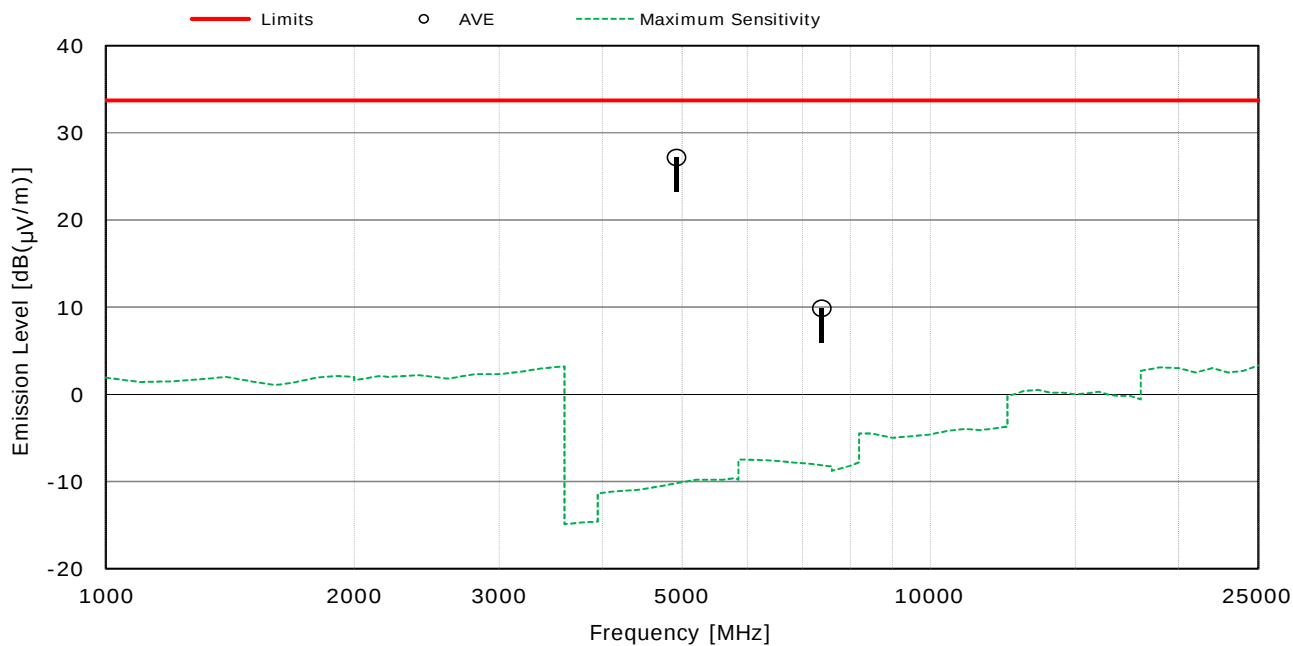
Test condition : Front Right Corner 1750ml

Antenna polarization : Vertical

Test Date: January 7, 2019

Temp.: 16 °C, RH: 41 %, Atm.: 1005 hPa

Frequency	Factor	Readings	Limits	Results	Margin	Remarks
[MHz]	[dB]	[dB(μV)]	[dB(μV/m)]	[dB(μV/m)]	[dB]	
4919.60	-38.1	65.3	33.7	27.2	+ 6.5	-
7384.47	-36.1	46.0	33.7	9.9	+ 23.8	-



NOTES

- 1) Measurement Distance : 3 m (Specified Distance : 300 m)
- 2) The spectrum was checked from 1 GHz to 25 GHz.
- 3) The factor includes the antenna factor, the pre-amplifier gain, the cable loss and the distance conversion.
- 4) Calculated result as the worst point shown on underline :
Factor + Reading (AVE) = -38.1 + 65.3 = 27.2 dB(μV) at 4919.60 MHz
Antenna Height : 117 cm, Turntable Rotation Position : 356 °
- 5) AVE : Average detector
- 6) Bandwidth : 1 MHz (1 GHz - 25 GHz)

Test voltage : 208VAC 60Hz

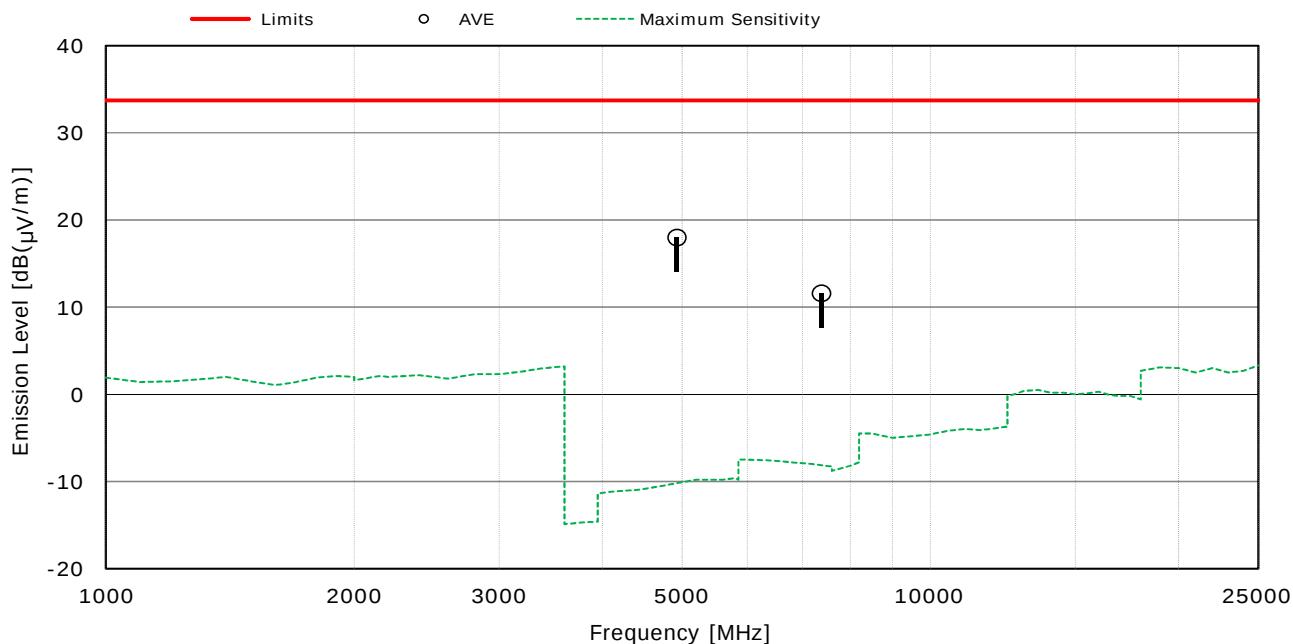
Test condition : Front Right Corner 750ml

Antenna polarization : Horizontal

Test Date: January 7, 2019

Temp.: 16 °C, RH: 41 %, Atm.: 1005 hPa

Frequency	Factor	Readings	Limits	Results	Margin	Remarks
[MHz]	[dB]	[dB(μ V)]	[dB(μ V/m)]	[dB(μ V/m)]	[dB]	
4927.46	-38.1	56.1	33.7	18.0	+ 15.7	-
7377.10	-36.1	47.7	33.7	11.6	+ 22.1	-



NOTES

- 1) Measurement Distance : 3 m (Specified Distance : 300 m)
- 2) The spectrum was checked from 1 GHz to 25 GHz.
- 3) The factor includes the antenna factor, the pre-amplifier gain, the cable loss and the distance conversion.
- 4) Calculated result as the worst point shown on underline :
Factor + Reading (AVE) = -38.1 + 56.1 = 18.0 dB(μ V) at 4927.46 MHz
Antenna Height : 117 cm, Turntable Rotation Position : 19 °
- 5) AVE : Average detector
- 6) Bandwidth : 1 MHz (1 GHz - 25 GHz)

Test voltage : 208VAC 60Hz

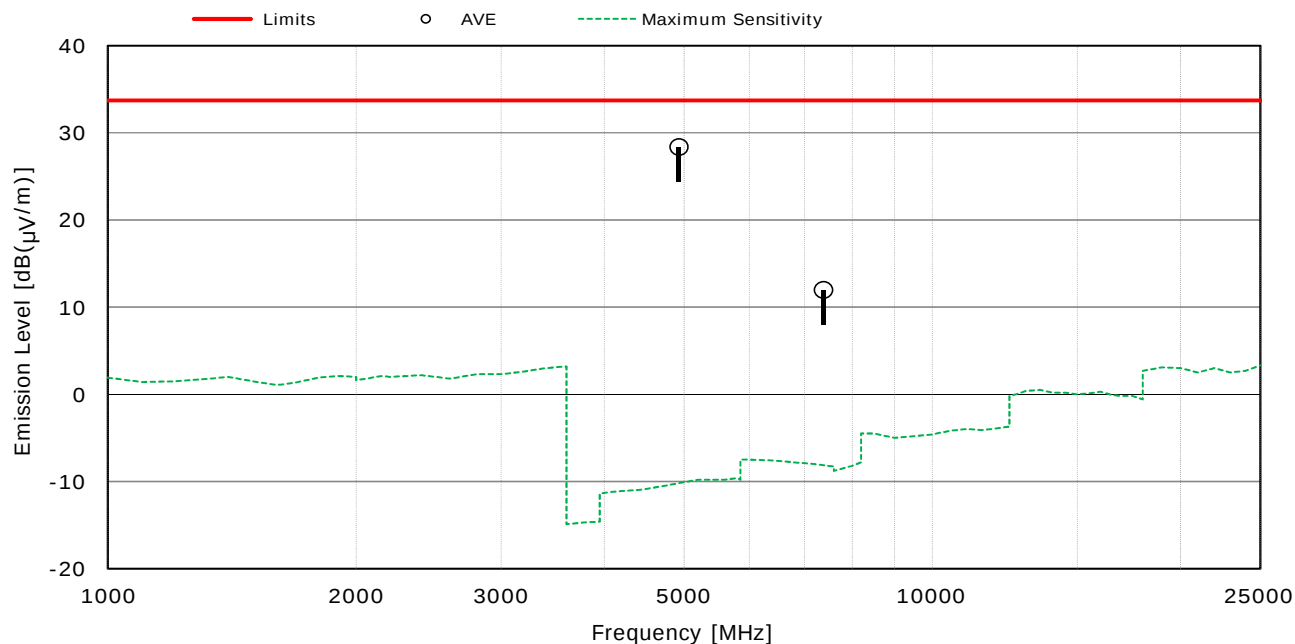
Test condition : Front Right Corner 750ml

Antenna polarization : Vertical

Test Date: January 7, 2019

Temp.: 16 °C, RH: 41 %, Atm.: 1005 hPa

Frequency	Factor	Readings	Limits	Results	Margin	Remarks
[MHz]	[dB]	[dB(μV)]	[dB(μV/m)]	[dB(μV/m)]	[dB]	
4927.46	-38.1	66.5	33.7	28.4	+ 5.3	-
7377.10	-36.1	48.1	33.7	12.0	+ 21.7	-



NOTES

- 1) Measurement Distance : 3 m (Specified Distance : 300 m)
- 2) The spectrum was checked from 1 GHz to 25 GHz.
- 3) The factor includes the antenna factor, the pre-amplifier gain, the cable loss and the distance conversion.
- 4) Calculated result as the worst point shown on underline :
Factor + Reading (AVE) = -38.1 + 66.5 = 28.4 dB(μV) at 4927.46 MHz
Antenna Height : 117 cm, Turntable Rotation Position : 317 °
- 5) AVE : Average detector
- 6) Bandwidth : 1 MHz (1 GHz - 25 GHz)

Test voltage : 230VAC 60Hz

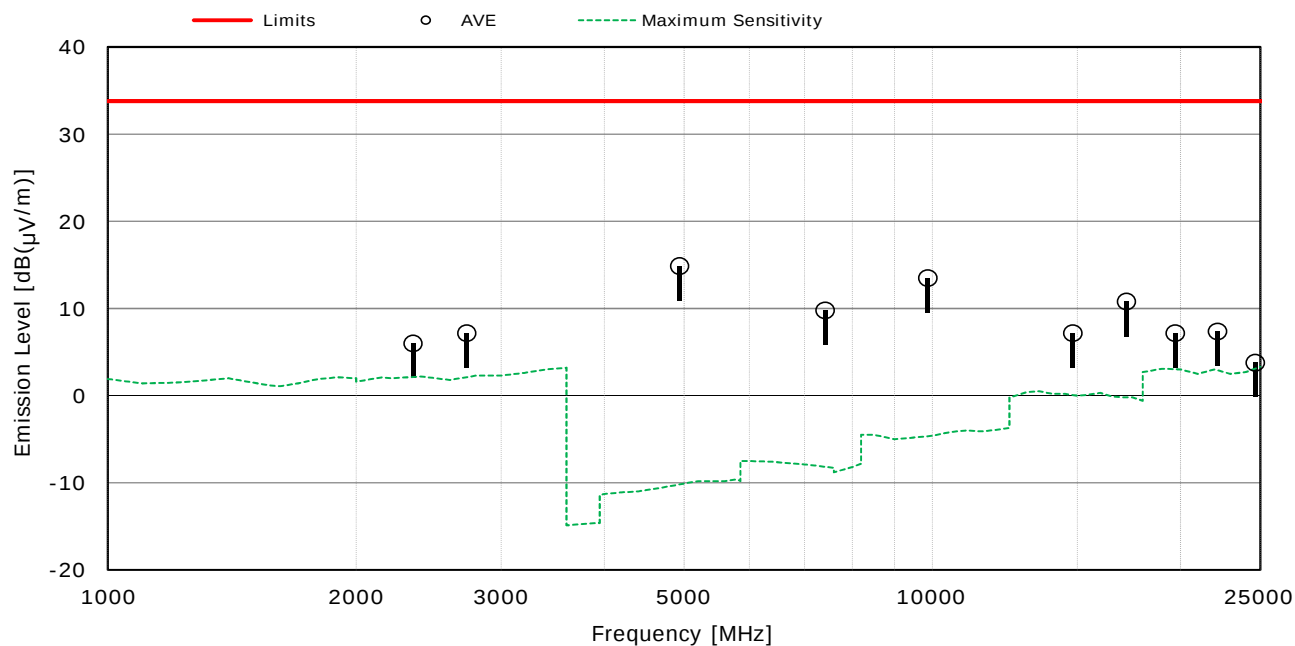
Test condition : Center 1750ml

Antenna polarization : Horizontal

Test Date: January 8, 2019

Temp.: 15 °C, RH: 40 %, Atm.: 1003 hPa

Frequency	Factor	Readings	Limits	Results	Margin	Remarks
[MHz]	[dB]	[dB(μV)]	[dB(μV/m)]	[dB(μV/m)]	[dB]	
2344.00	- 8.0	14.0	33.8	6.0	+ 27.8	-
2723.30	- 7.8	15.0	33.8	7.2	+ 26.6	-
4935.99	-38.1	53.0	33.8	14.9	+ 18.9	-
7410.02	-36.0	45.8	33.8	9.8	+ 24.0	-
9871.70	-32.5	46.0	33.8	13.5	+ 20.3	-
14804.63	-27.8	35.0	33.8	7.2	+ 26.6	-
17196.93	-28.2	39.0	33.8	10.8	+ 23.0	-
19709.27	-41.8	49.0	33.8	7.2	+ 26.6	-
22176.74	-42.0	49.4	33.8	7.4	+ 26.4	-
24640.33	-42.1	45.9	33.8	3.8	+ 30.0	-



NOTES

- 1) Measurement Distance : 3 m (Specified Distance : 300 m)
- 2) The spectrum was checked from 1 GHz to 25 GHz.
- 3) The factor includes the antenna factor, the pre-amplifier gain, the cable loss and the distance conversion.
- 4) Calculated result as the worst point shown on underline :
Factor + Reading (AVE) = -38.1 + 53.0 = 14.9 dB(μV) at 4935.99 MHz
Antenna Height : 117 cm, Turntable Rotation Position : 25 °
- 5) AVE : Average detector
- 6) Bandwidth : 1 MHz (1 GHz - 25 GHz)

Test voltage : 230VAC 60Hz

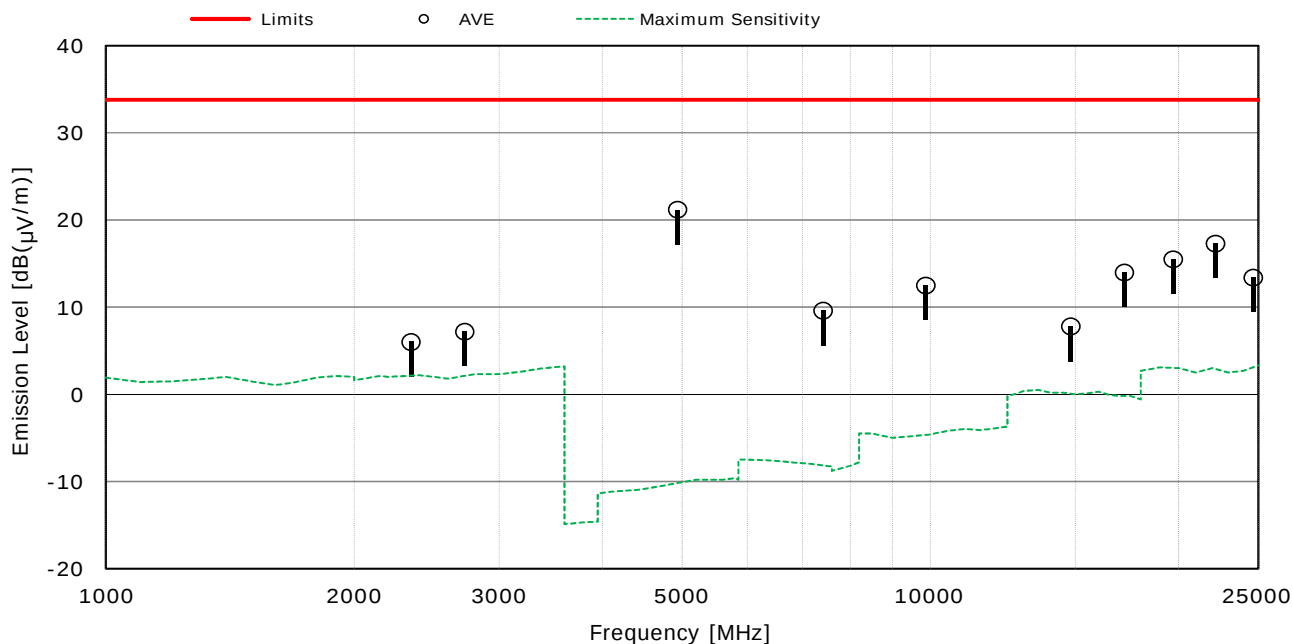
Test condition : Center 1750ml

Antenna polarization : Vertical

Test Date: January 8, 2019

Temp.: 15 °C, RH: 40 %, Atm.: 1003 hPa

Frequency	Factor	Readings	Limits	Results	Margin	Remarks
[MHz]	[dB]	[dB(μV)]	[dB(μV/m)]	[dB(μV/m)]	[dB]	
2344.00	- 8.0	14.0	33.8	6.0	+ 27.8	-
2723.30	- 7.8	15.0	33.8	7.2	+ 26.6	-
4935.99	-38.1	59.3	33.8	21.2	+ 12.6	-
7410.02	-36.0	45.6	33.8	9.6	+ 24.2	-
9871.70	-32.5	45.0	33.8	12.5	+ 21.3	-
14804.63	-27.8	35.6	33.8	7.8	+ 26.0	-
17196.93	-28.2	42.2	33.8	14.0	+ 19.8	-
19709.27	-41.8	57.3	33.8	15.5	+ 18.3	-
22176.74	-42.0	59.3	33.8	17.3	+ 16.5	-
24640.33	-42.1	55.5	33.8	13.4	+ 20.4	-



NOTES

- 1) Measurement Distance : 3 m (Specified Distance : 300 m)
- 2) The spectrum was checked from 1 GHz to 25 GHz.
- 3) The factor includes the antenna factor, the pre-amplifier gain, the cable loss and the distance conversion.
- 4) Calculated result as the worst point shown on underline :
Factor + Reading (AVE) = -38.1 + 59.3 = 21.2 dB(μV) at 4935.99 MHz
Antenna Height : 117 cm, Turntable Rotation Position : 353 °
- 5) AVE : Average detector
- 6) Bandwidth : 1 MHz (1 GHz - 25 GHz)

Test voltage : 230VAC 60Hz

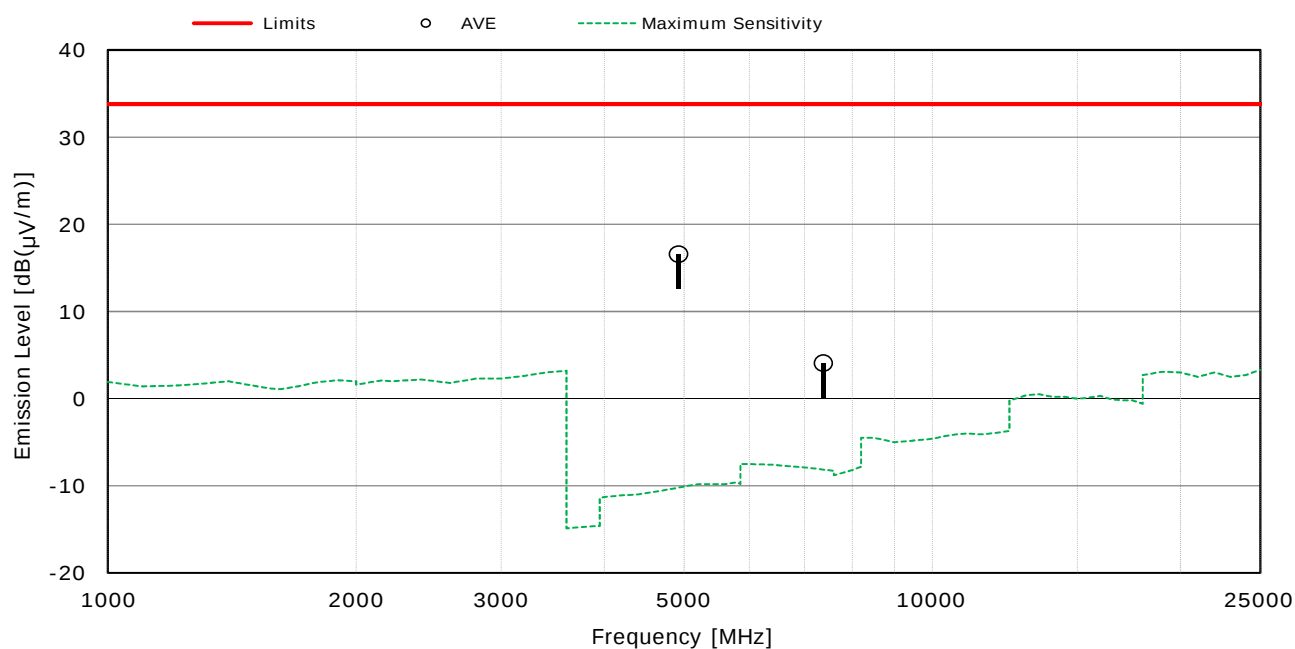
Test condition : Center 750ml

Antenna polarization : Horizontal

Test Date: January 7, 2019

Temp.: 16 °C, RH: 41 %, Atm.: 1005 hPa

Frequency	Factor	Readings	Limits	Results	Margin	Remarks
[MHz]	[dB]	[dB(μV)]	[dB(μV/m)]	[dB(μV/m)]	[dB]	
4920.56	-38.1	54.7	33.8	16.6	+ 17.2	-
7374.28	-36.1	40.2	33.8	4.1	+ 29.7	-



NOTES

- 1) Measurement Distance : 3 m (Specified Distance : 300 m)
- 2) The spectrum was checked from 1 GHz to 25 GHz.
- 3) The factor includes the antenna factor, the pre-amplifier gain, the cable loss and the distance conversion.
- 4) Calculated result as the worst point shown on underline :
Factor + Reading (AVE) = $-38.1 + 54.7 = 16.6$ dB(μV) at 4920.56 MHz
Antenna Height : 117 cm, Turntable Rotation Position : 22 °
- 5) AVE : Average detector
- 6) Bandwidth : 1 MHz (1 GHz - 25 GHz)

Test voltage : 2230VAC 60Hz

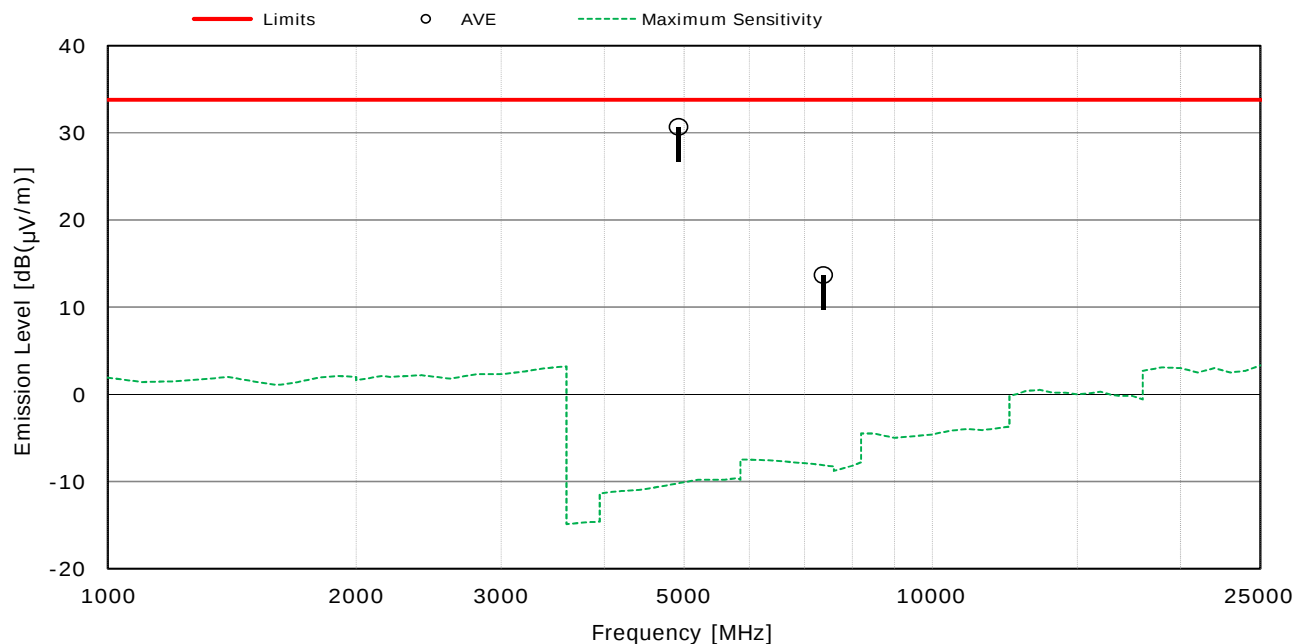
Test condition : Center 750ml

Antenna polarization : Vertical

Test Date: January 7, 2019

Temp.: 16 °C, RH: 41 %, Atm.: 1005 hPa

Frequency	Factor	Readings	Limits	Results	Margin	Remarks
[MHz]	[dB]	[dB(μV)]	[dB(μV/m)]	[dB(μV/m)]	[dB]	
4920.56	-38.1	68.8	33.8	30.7	+ 3.1	-
7374.80	-36.1	49.8	33.8	13.7	+ 20.1	-



NOTES

- 1) Measurement Distance : 3 m (Specified Distance : 300 m)
- 2) The spectrum was checked from 1 GHz to 25 GHz.
- 3) The factor includes the antenna factor, the pre-amplifier gain, the cable loss and the distance conversion.
- 4) Calculated result as the worst point shown on underline :
Factor + Reading (AVE) = -38.1 + 68.8 = 30.7 dB(μV) at 4920.56 MHz
Antenna Height : 117 cm, Turntable Rotation Position : 342 °
- 5) AVE : Average detector
- 6) Bandwidth : 1 MHz (1 GHz - 25 GHz)

Test voltage : 230VAC 60Hz

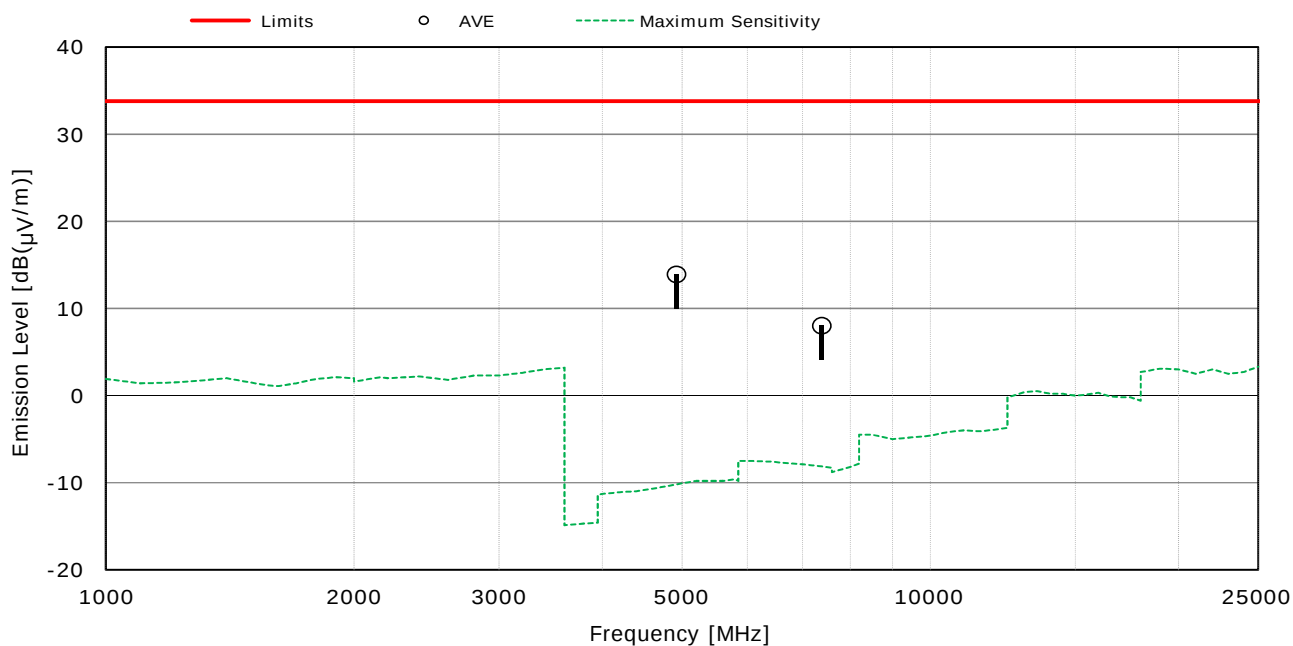
Test Date: January 7, 2019

Test condition : Front Right Corner 1750ml

Temp.: 16 °C, RH: 41 %, Atm.: 1005 hPa

Antenna polarization : Horizontal

Frequency	Factor	Readings	Limits	Results	Margin	Remarks
[MHz]	[dB]	[dB(μV)]	[dB(μV/m)]	[dB(μV/m)]	[dB]	
4921.71	-38.1	52.0	33.8	13.9	+ 19.9	-
7386.02	-36.1	44.1	33.8	8.0	+ 25.8	-



NOTES

- 1) Measurement Distance : 3 m (Specified Distance : 300 m)
- 2) The spectrum was checked from 1 GHz to 25 GHz.
- 3) The factor includes the antenna factor, the pre-amplifier gain, the cable loss and the distance conversion.
- 4) Calculated result as the worst point shown on underline :
Factor + Reading (AVE) = -38.1 + 52.0 = 13.9 dB(μV) at 4921.71 MHz
Antenna Height : 117 cm, Turntable Rotation Position : 27 °
- 5) AVE : Average detector
- 6) Bandwidth : 1 MHz (1 GHz - 25 GHz)

Test voltage : 230VAC 60Hz

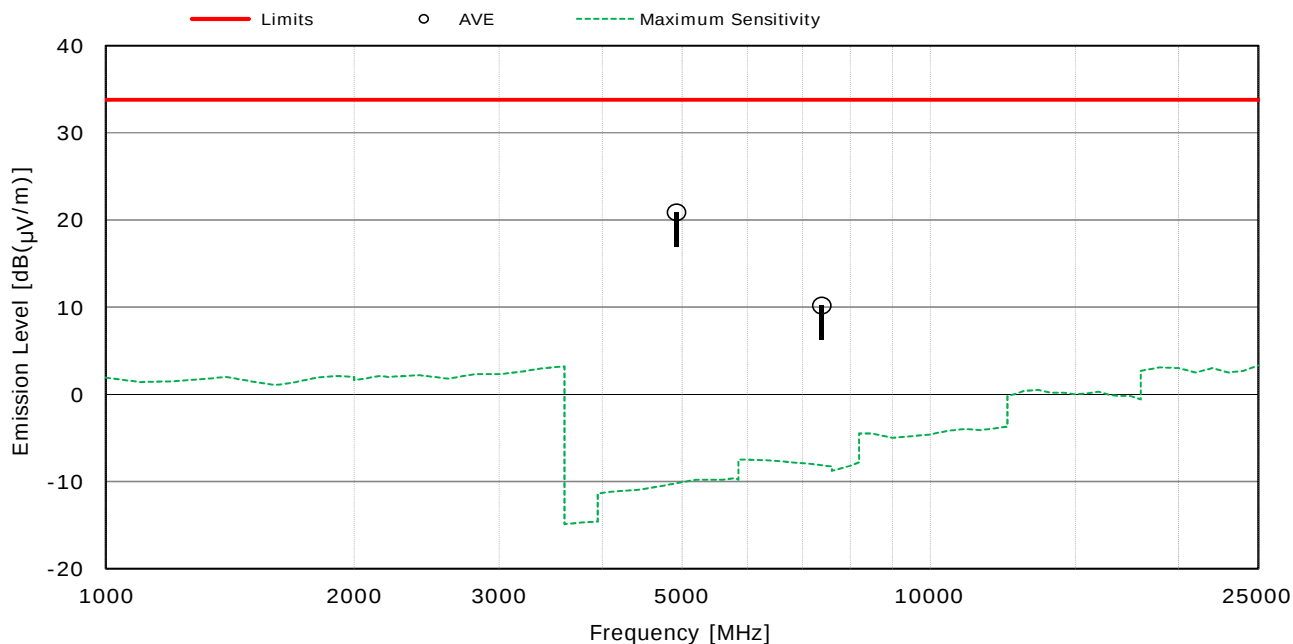
Test condition : Front Right Corner 1750ml

Antenna polarization : Vertical

Test Date: January 7, 2019

Temp.: 16 °C, RH: 41 %, Atm.: 1005 hPa

Frequency	Factor	Readings	Limits	Results	Margin	Remarks
[MHz]	[dB]	[dB(μ V)]	[dB(μ V/m)]	[dB(μ V/m)]	[dB]	
4921.71	-38.1	59.0	33.8	20.9	+ 12.9	-
7386.02	-36.1	46.3	33.8	10.2	+ 23.6	-



NOTES

- 1) Measurement Distance : 3 m (Specified Distance : 300 m)
- 2) The spectrum was checked from 1 GHz to 25 GHz.
- 3) The factor includes the antenna factor, the pre-amplifier gain, the cable loss and the distance conversion.
- 4) Calculated result as the worst point shown on underline :
Factor + Reading (AVE) = -38.1 + 59.0 = 20.9 dB(μ V) at 4921.71 MHz
Antenna Height : 117 cm, Turntable Rotation Position : 351 °
- 5) AVE : Average detector
- 6) Bandwidth : 1 MHz (1 GHz - 25 GHz)

Test voltage : 230VAC 60Hz

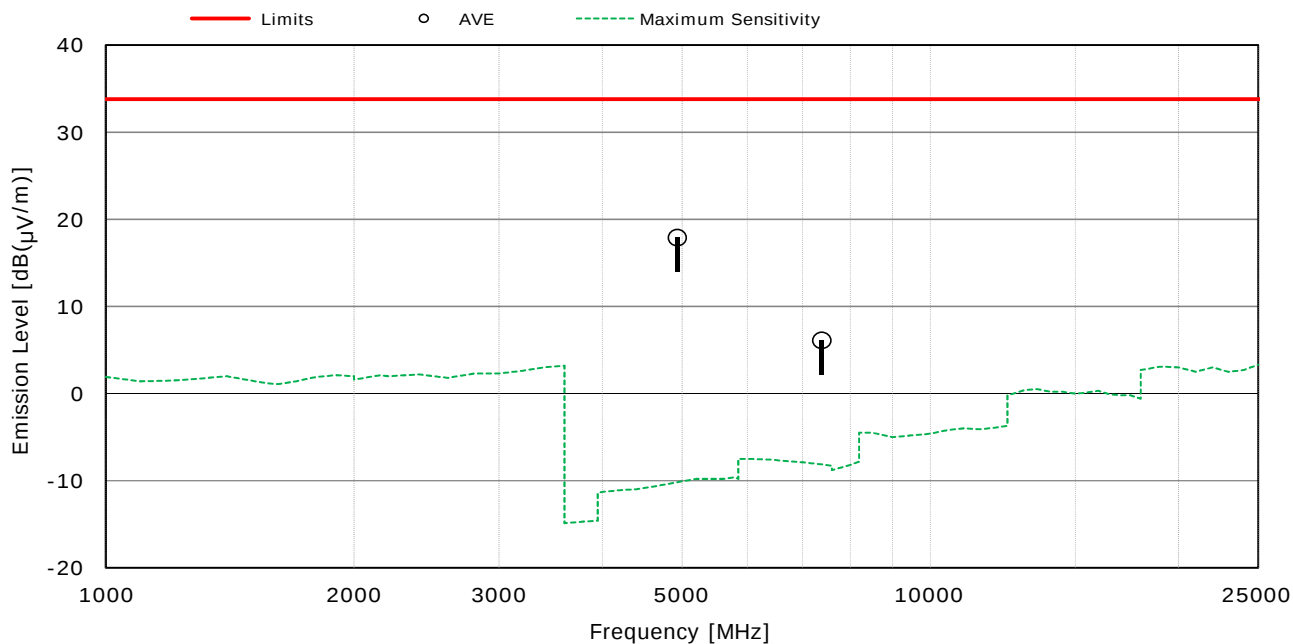
Test condition : Front Right Corner 750ml

Antenna polarization : Horizontal

Test Date: January 7, 2019

Temp.: 16 °C, RH: 41 %, Atm.: 1005 hPa

Frequency	Factor	Readings	Limits	Results	Margin	Remarks
[MHz]	[dB]	[dB(μV)]	[dB(μV/m)]	[dB(μV/m)]	[dB]	
4932.86	-38.1	56.0	33.8	17.9	+ 15.9	-
7384.80	-36.1	42.2	33.8	6.1	+ 27.7	-



NOTES

- 1) Measurement Distance : 3 m (Specified Distance : 300 m)
- 2) The spectrum was checked from 1 GHz to 25 GHz.
- 3) The factor includes the antenna factor, the pre-amplifier gain, the cable loss and the distance conversion.
- 4) Calculated result as the worst point shown on underline :
Factor + Reading (AVE) = -38.1 + 56.0 = 17.9 dB(μV) at 4932.86 MHz
Antenna Height : 117 cm, Turntable Rotation Position : 13 °
- 5) AVE : Average detector
- 6) Bandwidth : 1 MHz (1 GHz - 25 GHz)

Test voltage : 230VAC 60Hz

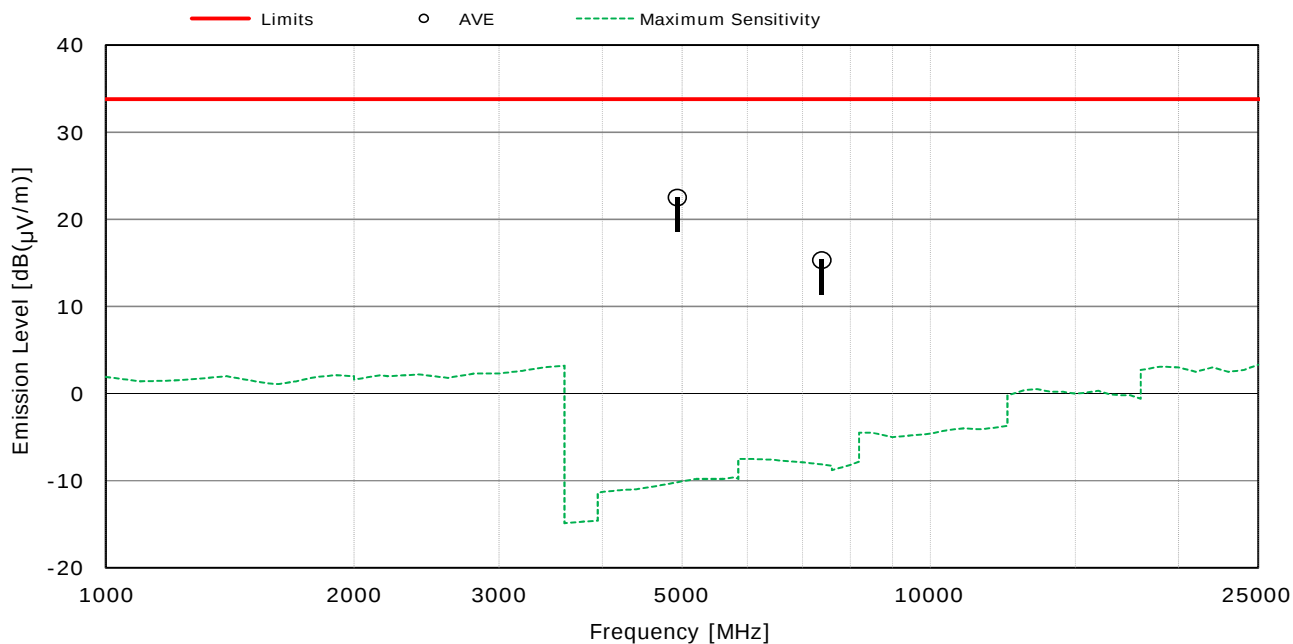
Test condition : Front Right Corner 750ml

Antenna polarization : Vertical

Test Date: January 7, 2019

Temp.: 16 °C, RH: 41 %, Atm.: 1005 hPa

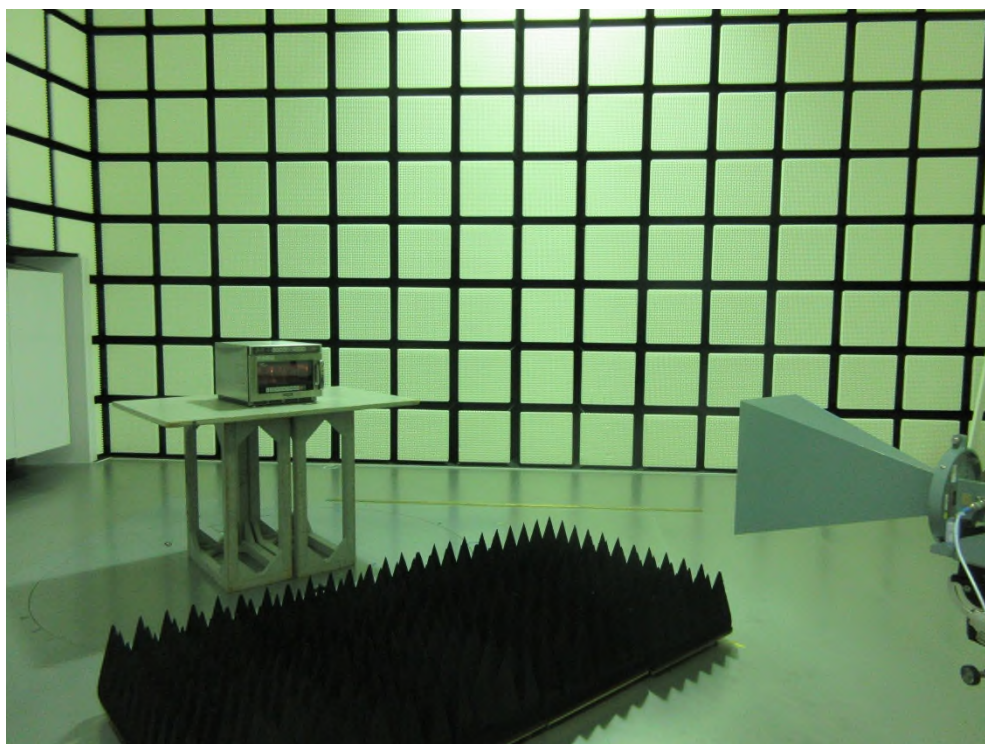
Frequency	Factor	Readings	Limits	Results	Margin	Remarks
[MHz]	[dB]	[dB(μV)]	[dB(μV/m)]	[dB(μV/m)]	[dB]	
4932.86	-38.1	60.6	33.8	22.5	+ 11.3	-
7384.80	-36.1	51.4	33.8	15.3	+ 18.5	-



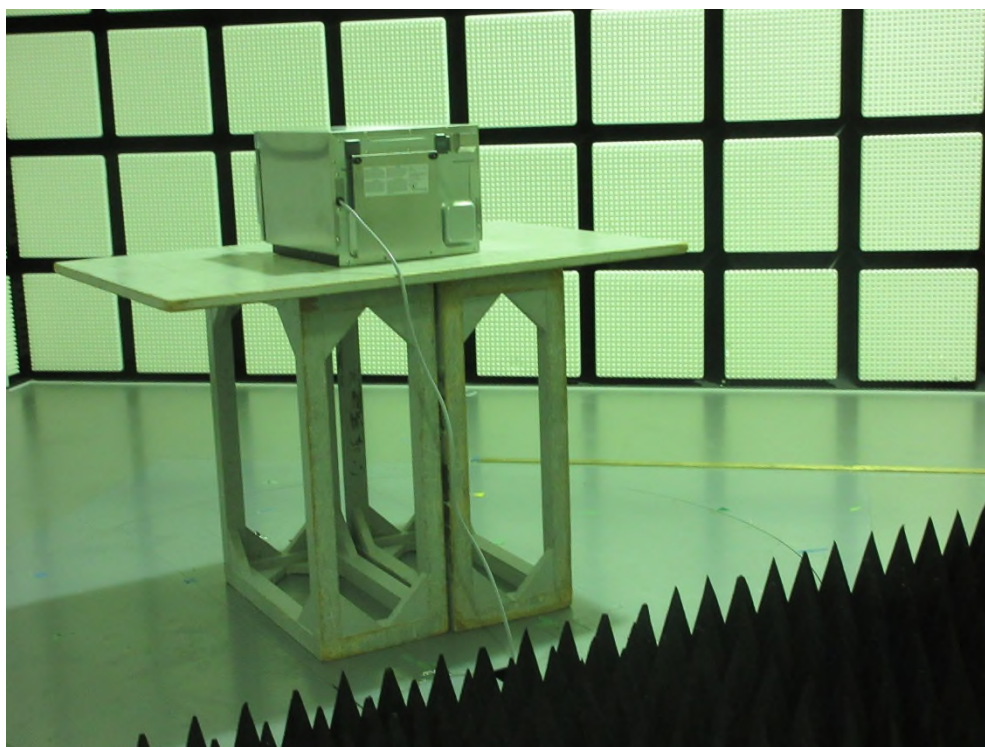
NOTES

- 1) Measurement Distance : 3 m (Specified Distance : 300 m)
- 2) The spectrum was checked from 1 GHz to 25 GHz.
- 3) The factor includes the antenna factor, the pre-amplifier gain, the cable loss and the distance conversion.
- 4) Calculated result as the worst point shown on underline :
Factor + Reading (AVE) = -38.1 + 60.6 = 22.5 dB(μV) at 4932.86 MHz
Antenna Height : 117 cm, Turntable Rotation Position : 3 °
- 5) AVE : Average detector
- 6) Bandwidth : 1 MHz (1 GHz - 25 GHz)

7.6.5 Test Setup (Photographs)



– View(1) –



– View(2) –

Photograph present configuration with maximum emission