

TEST REPORT

Applicant : Sharp Corporation Quality and Environmental Promotion Unit
Head of Quality Promotion Div.

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

Products : Microwave Oven

Model No. : R-21LTF

Serial No. : A47390

FCC ID : APYDMR0158

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

Test Results : **Passed**

Date of Test : April 16, 2018 ~ May 8, 2018



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

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- 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) Ltd.
64 Moo 5, Tambol Bangsamak, Amphur Bangpakong
Chachoengsao Province, Thailand
2. Products : Microwave Oven
3. Model No. : R-21LTF
4. Serial No. : A47390
5. Product Type : Prototype
6. Date of Manufacture : February, 2018
7. Power Rating : 120VAC60Hz, Input:14A
8. Rated RF Power Output : 1000 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 : April 16, 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)

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)

IC Registration No. : 2079E-3, 2079E-4 (Expiry date : June 26, 2020)

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-21LTF	A47390	APYDMR0158

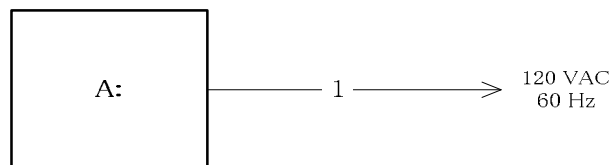
The auxiliary equipment used for testing :

None

Type of Cable:

No.	Description	Identification (Manu. etc.)	Connector Shielded	Cable Shielded	Ferrite Core	Length (m)
1	AC Power Cable	--	--	No	No	1.35

6.2 Test Arrangement (Drawings)



6.3 Operating Condition

Power Supply Voltage : 120VAC 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	: 1000 ml
ISM frequency measurement	: 1000 ml
Conducted powerline measurement	: 1000 ml
Radiated emission measurement	: 700 ml

For measurement of radiation on 2nd and 3rd harmonic, two loads, one of 700 ml and the other of 300 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. 2M303H(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

Power Output (calorimetric method) 846.0 watts

Field Strength Limit 32.5 $\mu\text{V/m}$ at 300 meters

AC Power Input 1608 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(08011090)	YOKOGAWA	2019/04/02
Stopwatch	S321-4000	280698(Q47097356)	SEIKO	2018/08/08
Thermometer	245501	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 Date: April 23, 2018

Temp.: 25 °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: 1000W

Load(water): 1000ml

Time: 42sec $T = \frac{4.2 \times Load(ml) \times 10}{RFPower}$

	t_1 (before test)		t_2 (after test)	$t_2 - t_1$	RF Power**
1st	10.0°C	→	18.9°C	8.9°C	890.0W
2nd	9.7°C	→	18.1°C	8.4°C	840.0W
3rd	10.2°C	→	18.6°C	8.4°C	840.0W
4th	9.6°C	→	17.8°C	8.2°C	820.0W
5th	9.8°C	→	18.2°C	8.4°C	840.0W

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

Results of Average RF Power: 846.0W

The limit of the radiated emission at 300m : $25\sqrt{846/500}[\mu V/m]=32.5[\mu V/m]$
 $25\sqrt{846/500}[\mu V/m]=30.2[dB(\mu V/m)]$

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 : AC120V/60Hz,14A

Measured Input Power : AC120V60Hz 14.01A, 1608W

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	2018/11/09
Horn Antenna	91889-2	560 (C-40-2)	EATON	2018/06/18
Attenuator	2-10	BA6214 (D-79)	Weinschel	2018/11/30
RF Cable	SF104	267415/4 (C-68)	HUBER+SUHNER	2019/01/15

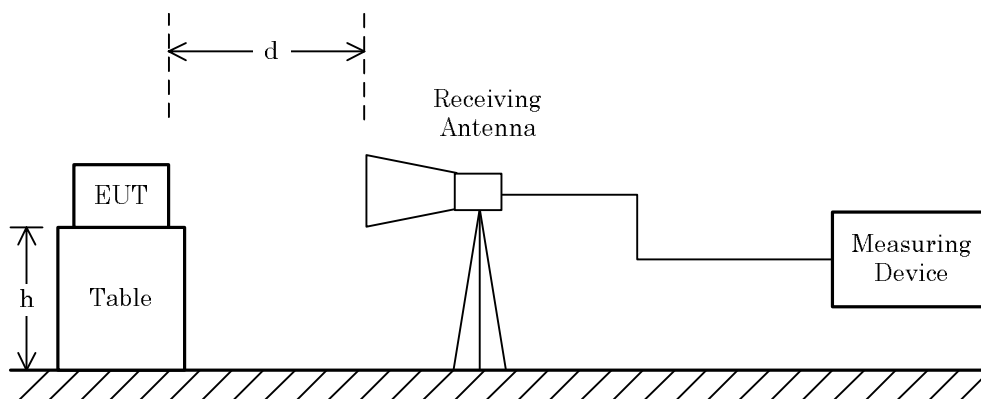
NOTE : The calibration interval of the above test instruments is 12 months.

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 : May 8, 2018

Temp. : 22°C Humi. : 61 %

1) Variation in Operating Frequency with Time

Power Supply : 120VAC 60Hz

The END time was 20 minutes. The load after 20 minutes was approx 800ml.

Time	Peak Frequency [MHz]	Remarks
1 minute since START	2469.80	A
1 minute till END	2461.08	A

The results were within 2450MHz±50MHz.

2) Deviation in Operating Frequency with power supply volatage

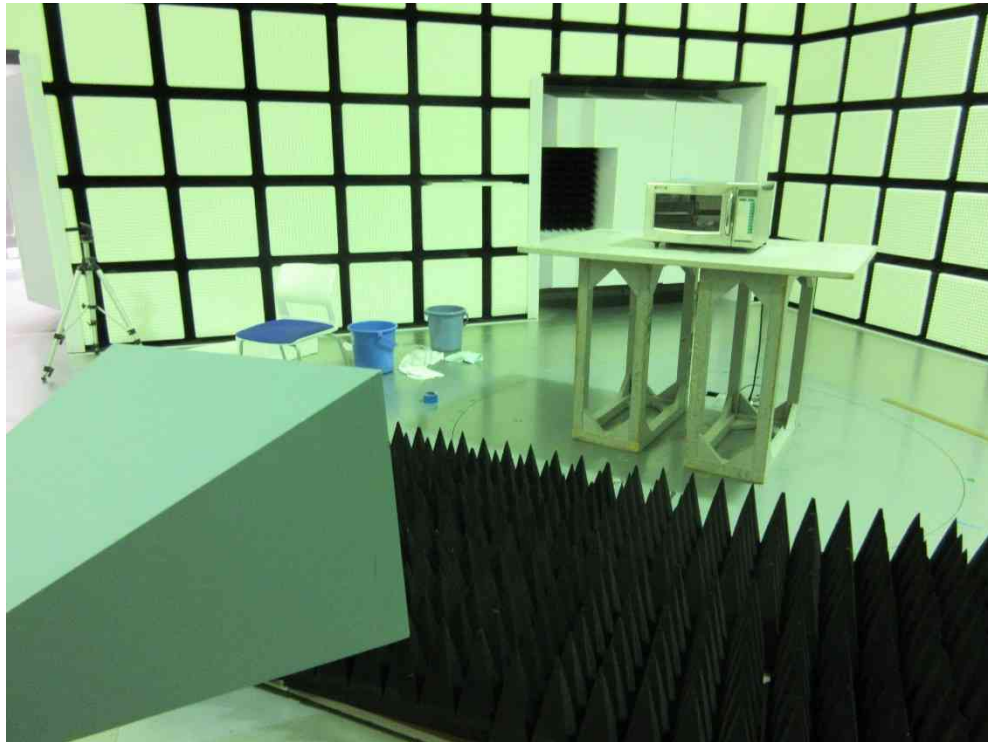
Power Supply Voltage and time	Peak Frequency [MHz]	Remarks
96V(80%)1 minute since START	2459.02	A
150V(125%)30 seconds since START	2475.88	A

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 (Quasi-Peak) 9.1 dB at 0.821 MHz

Uncertainty of Measurement Results ± 2.6 dB(2σ)

Remarks : _____

7.3.2 Test Instruments

Shielded Room S1				
Type	Model	Serial No. (ID)	Manufacturer	Cal. Due
Test Receiver	ESCI	100453 (A-42)	Rohde & Schwarz	2018/12/04
AMN (main)	KNW-407FR	8-2019-1 (D-103)	Kyoritsu	2018/10/22
RF Cable	RG223/U	--- (H-34)	HUBER+SUHNER	2018/05/31

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

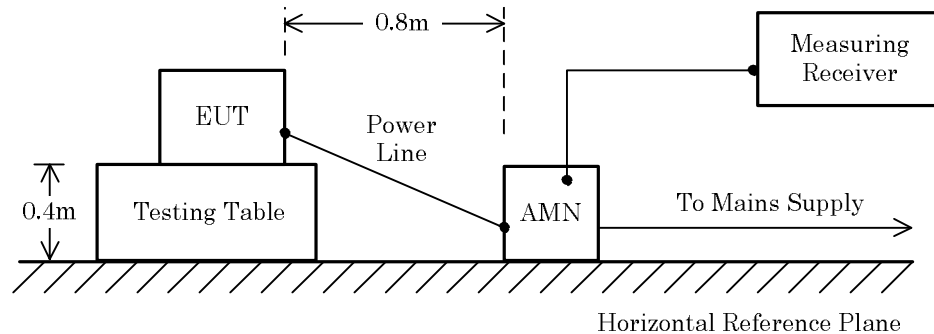
7.3.3 Test Method and Test Setup (Diagrammatic illustration)

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

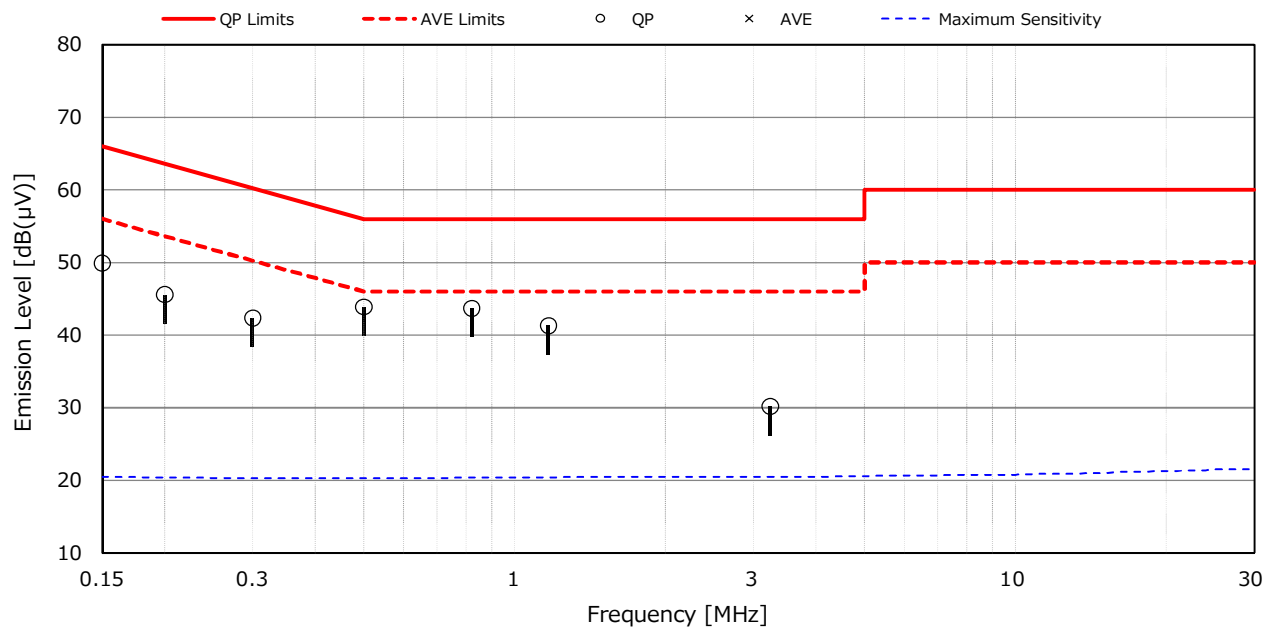
Test voltage : 120VAC 60Hz

Test Date: April 16, 2018

Temp.: 21 °C, RH: 44 %, Atm.: 1004 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	10.5	39.4	--	66.0	56.0	49.9	--	+ 16.1	--	-
0.2000	10.4	35.2	--	63.6	53.6	45.6	--	+ 18.0	--	-
0.3000	10.3	32.1	--	60.2	50.2	42.4	--	+ 17.8	--	-
0.5000	10.3	33.6	< 10.0	56.0	46.0	43.9	< 20.3	+ 12.1	> + 25.7	-
0.8210	10.4	33.3	< 10.0	56.0	46.0	43.7	< 20.4	+ 12.3	> + 25.6	-
1.1680	10.5	30.8	--	56.0	46.0	41.3	--	+ 14.7	--	-
3.2400	10.5	19.7	--	56.0	46.0	30.2	--	+ 25.8	--	-



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 "or less".
- 4) The symbol of ">" means "more than".
- 5) The symbol of "--" means "not applicable".
- 6) Calculated result as the worst point shown on underline :
 Factor + Reading (QP) = 10.3 + 33.6 = 43.9 dB(μV) at 0.5000 MHz
- 7) QP : Quasi-Peak detector, AVE : Average detector
- 8) Bandwidth : 9 kHz (150 kHz - 30 MHz)

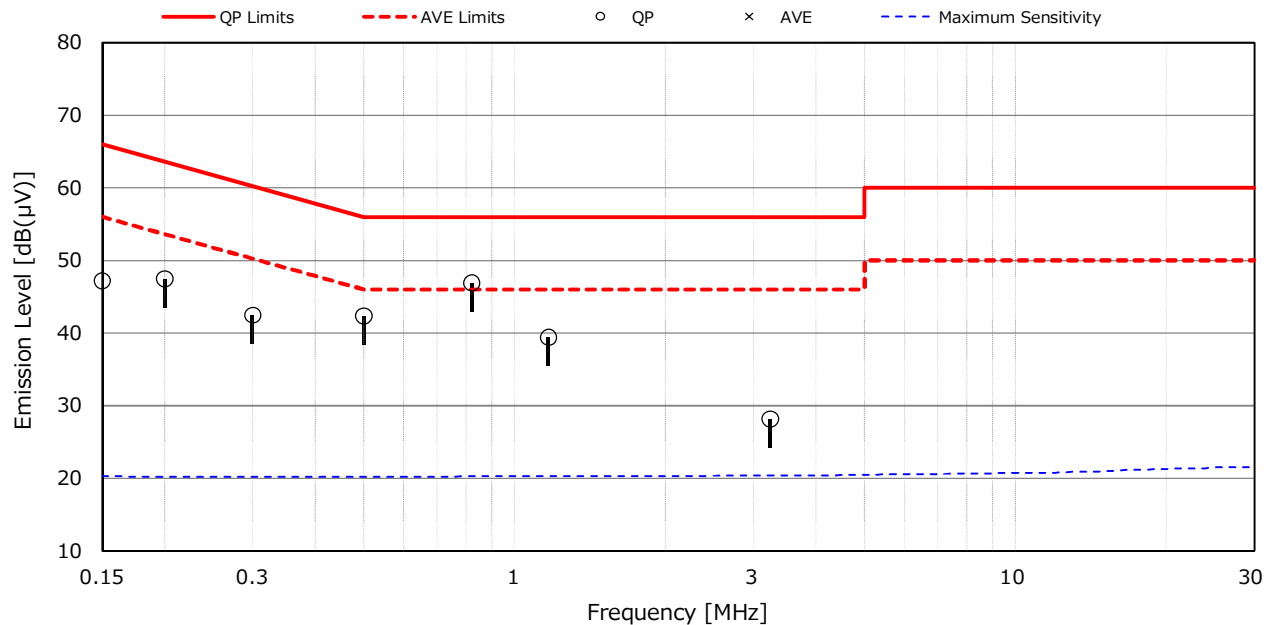
Test voltage : 120VAC 60Hz

Test Date: April 16, 2018

Temp.: 21 °C, RH: 44 %, Atm.: 1004 hPa

Measured phase : L2

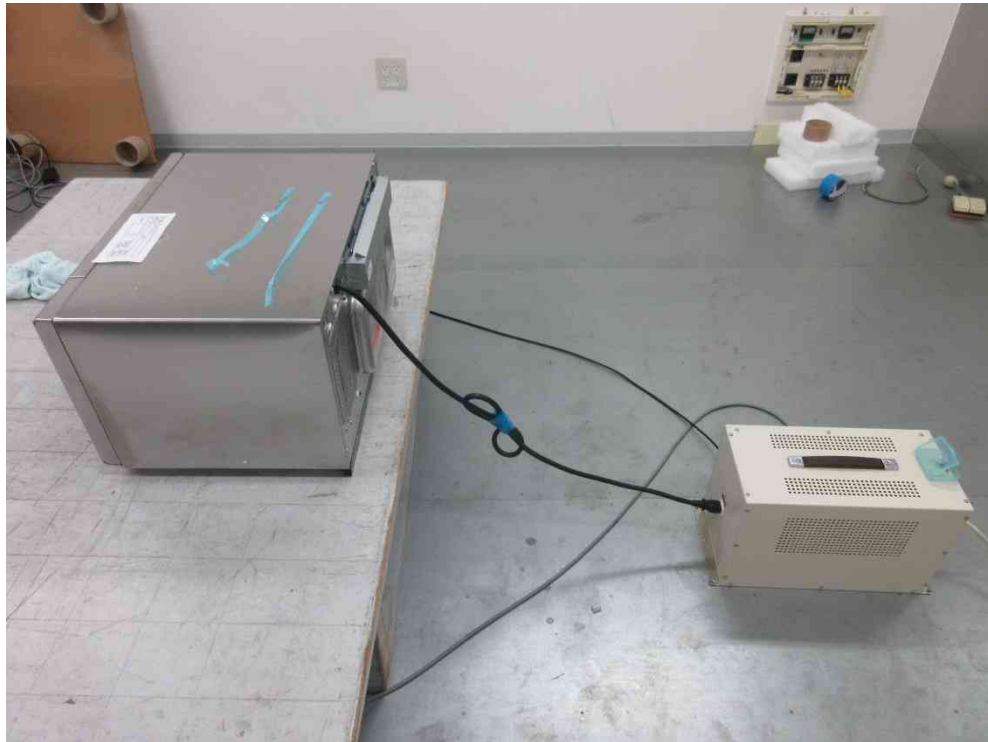
Frequency [MHz]	Factor [dB]	Readings [dB(μV)]		Limits [dB(μV)]		Results [dB(μV)]		Margin [dB]		Remarks
		QP	AVE	QP	AVE	QP	AVE	QP	AVE	
0.1500	10.3	36.9	--	66.0	56.0	47.2	--	+ 18.8	--	-
0.2000	10.2	37.3	--	63.6	53.6	47.5	--	+ 16.1	--	-
0.3000	10.2	32.3	--	60.2	50.2	42.5	--	+ 17.7	--	-
0.5000	10.2	32.2	< 10.0	56.0	46.0	42.4	< 20.2	+ 13.6	> + 25.8	-
0.8210	10.3	36.6	< 10.0	56.0	46.0	46.9	< 20.3	+ 9.1	> + 25.7	-
1.1680	10.3	29.1	--	56.0	46.0	39.4	--	+ 16.6	--	-
3.2400	10.4	17.8	--	56.0	46.0	28.2	--	+ 27.8	--	-



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 "or less".
- 4) The symbol of ">" means "more than".
- 5) The symbol of "--" means "not applicable".
- 6) Calculated result as the worst point shown on underline :
 Factor + Reading (QP) = 10.3 + 36.6 = 46.9 dB(μV) at 0.8210 MHz
- 7) QP : Quasi-Peak detector, AVE : Average detector
- 8) Bandwidth : 9 kHz (150 kHz - 30 MHz)

7.3.5 Test Setup (Photographs)



– Side View –



– 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 $25 \times \text{SQRT}(846\text{W}/500\text{W}) \mu\text{V/m} (=30.2 \text{ dB}\mu\text{V/m})$ 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	2019/01/15
Loop Antenna	HFH2-Z2	860605/030 (C-3)	Rohde & Schwarz	2018/08/01
RF Cable	S 10162 B-11 etc.	--- (H-3)	HUBER+SUHNER	2019/04/01
RF Cable	RG213/U	--- (H-29)	HUBER+SUHNER	2018/08/01

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

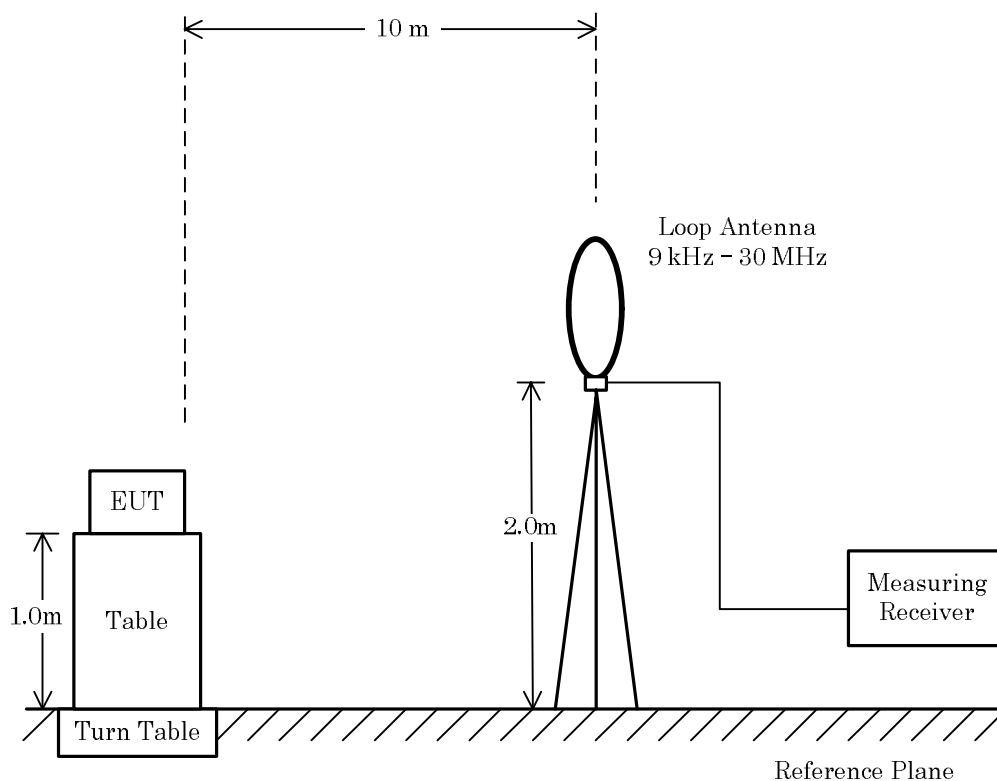
7.4.3 Test Method and Test Setup (Diagrammatic illustration)

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)

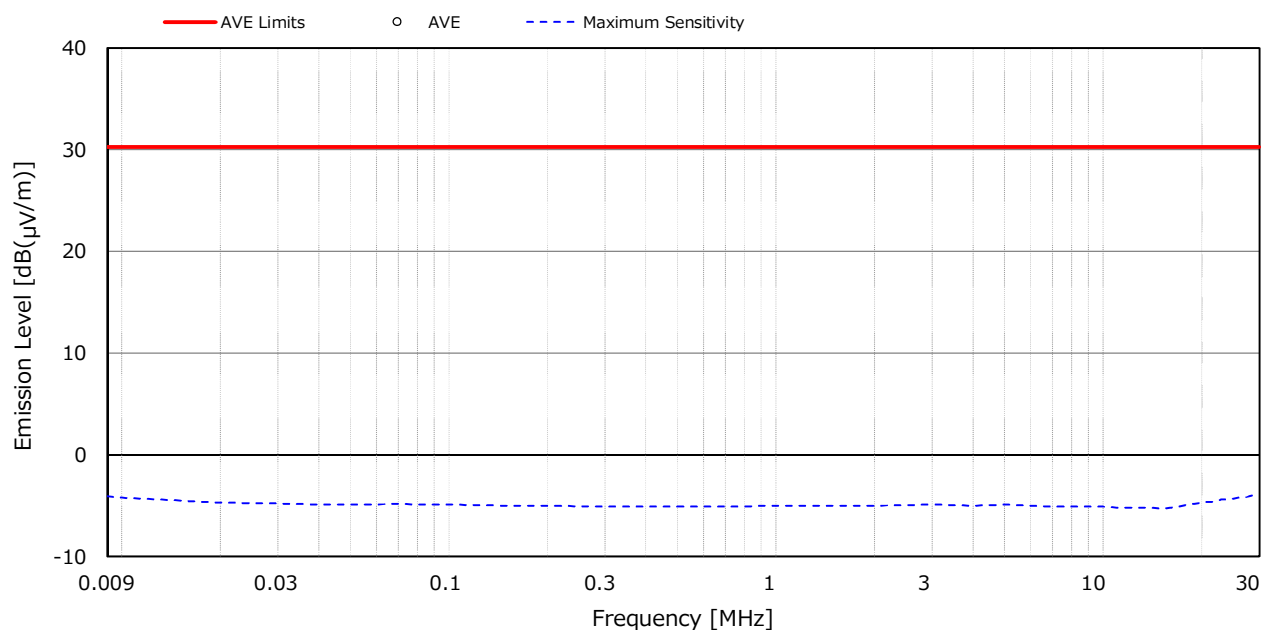


7.4.4 Test Data

Test voltage : 120VAC 60Hz

Test Date: April 18, 2018

Temp.: 21 °C, RH: 56 %, Atm.: 1000 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) >15.0 dB at -- 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 $25 \times \text{SQRT}(846\text{W}/500\text{W}) \mu\text{V/m}$ (=30.2 dBμV/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	2019/01/15
Hybrid Antenna	CBL6111D	30644 (C-71)	TESEQ	2018/11/28
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.

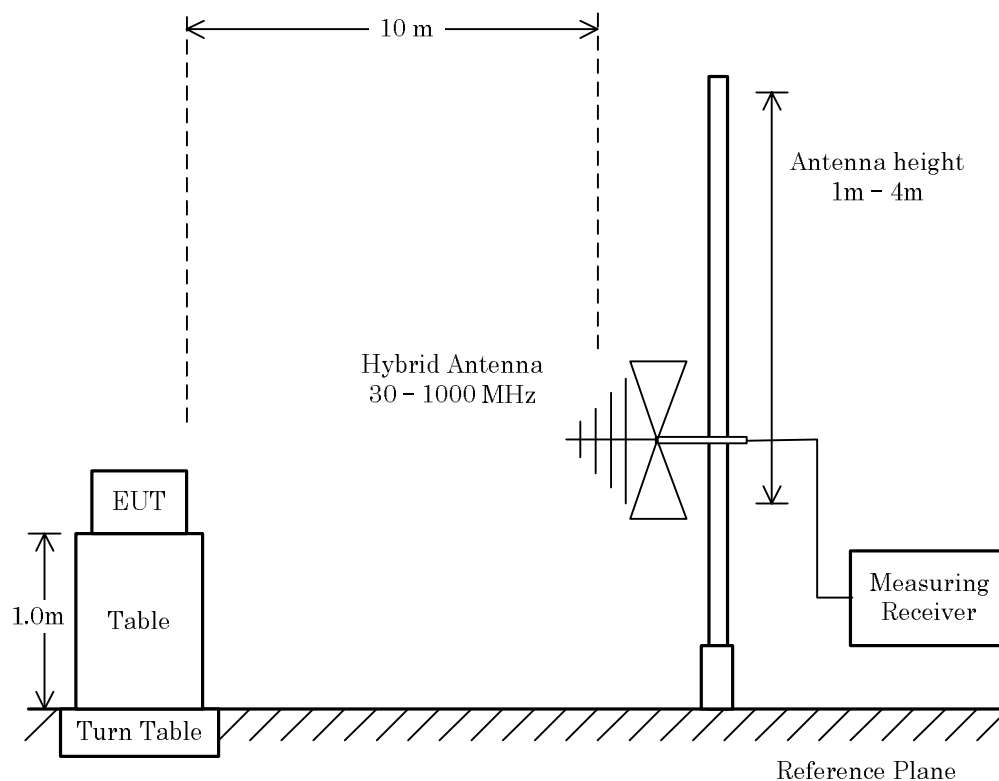
7.5.3 Test Method and Test Setup (Diagrammatic illustration)

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)



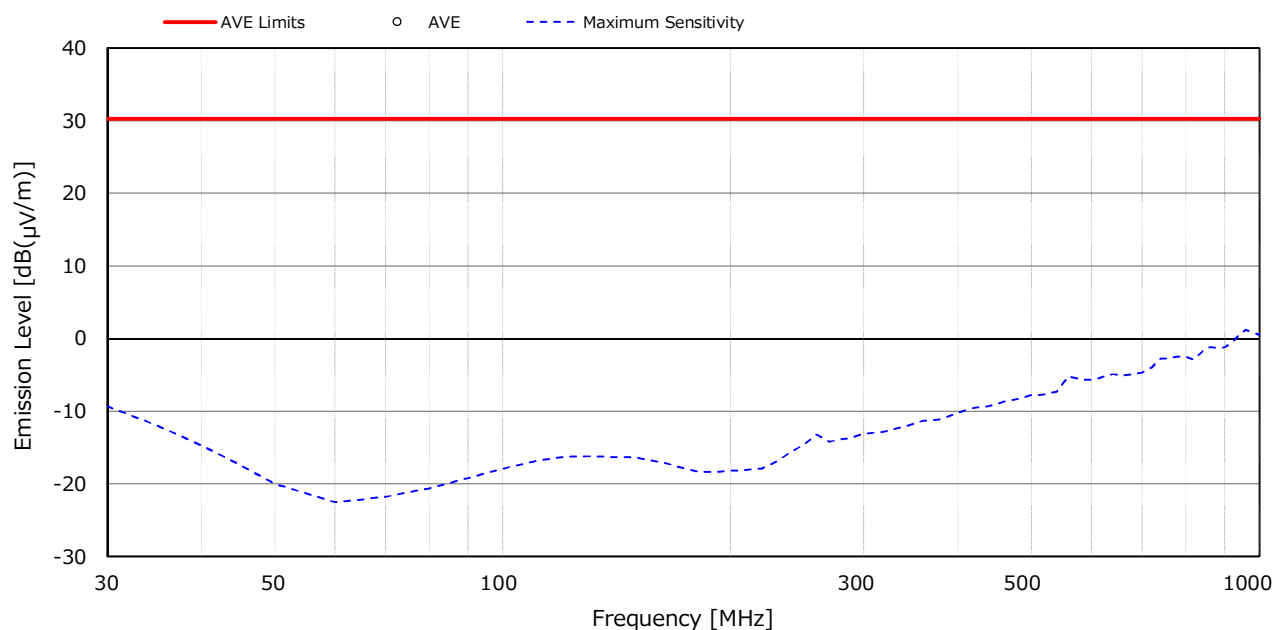
7.5.4 Test Data

Test voltage : 120VAC 60Hz

Test Date: April 18, 2018

Antenna polarization : Horizontal

Temp.: 21 °C, RH: 56 %, Atm.: 1000 hPa



NOTES

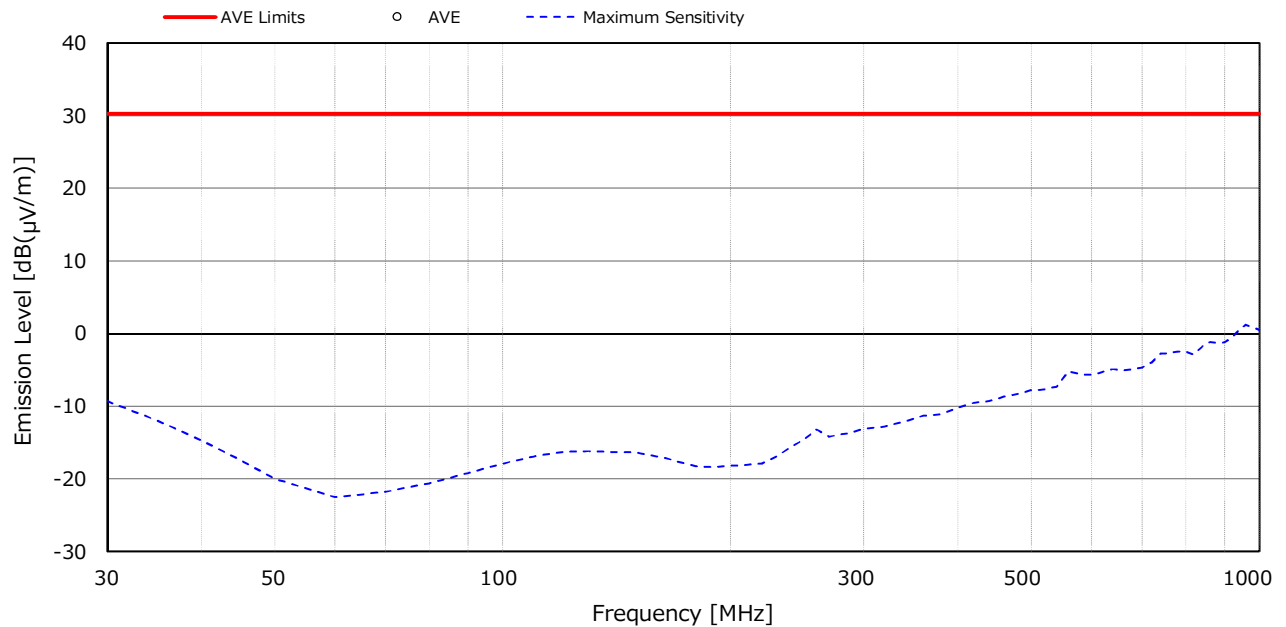
- 1) Measurement Distance : 10 m (Specified Distance : 300 m)
- 2) The spectrum was checked from 30 MHz to 1000 MHz.
- 3) AVE : Average detector
- 4) Bandwidth : 120 kHz (30 MHz - 1000 MHz)
- 5) All emission levels were below the noise floor, or more than 15 dB below the applied limits.

Test voltage : 120VAC 60Hz

Test Date: April 18, 2018

Temp.: 21 °C, RH: 56 %, Atm.: 1000 hPa

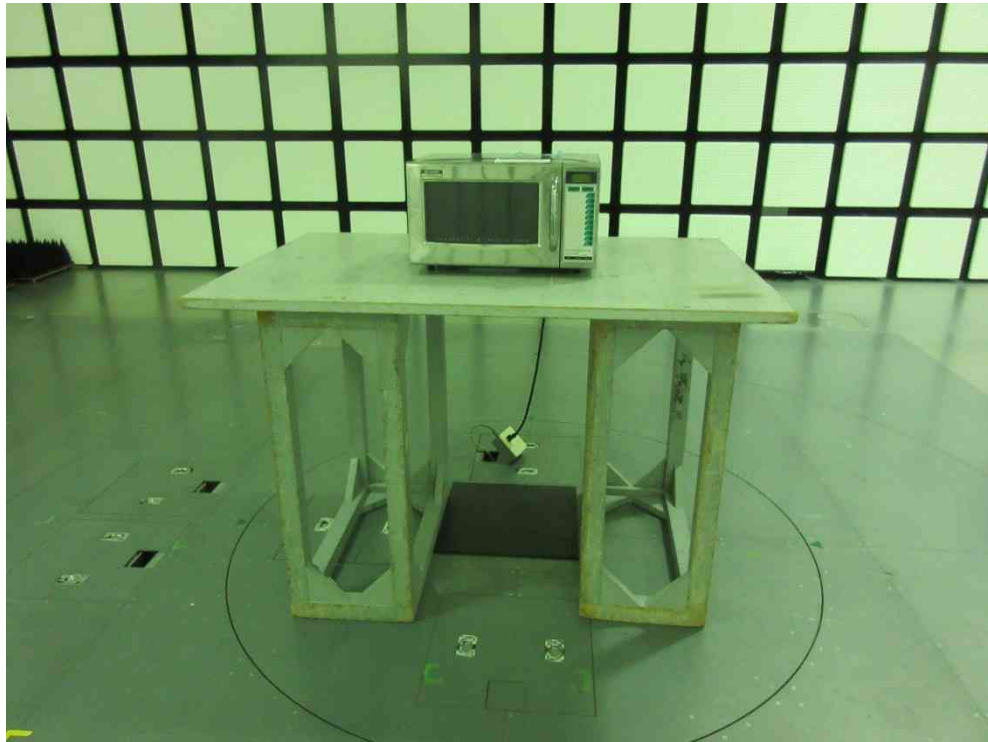
Antenna polarization : Vertical



NOTES

- 1) Measurement Distance : 10 m (Specified Distance : 300 m)
- 2) The spectrum was checked from 30 MHz to 1000 MHz.
- 3) AVE : Average detector
- 4) Bandwidth : 120 kHz (30 MHz - 1000 MHz)
- 5) All emission levels were below the noise floor, or more than 15 dB below the applied limits.

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) 3.3 dB at 2696.2 MHz

Uncertainty of Measurement Results
1 GHz – 6 GHz ± 4.7 dB(2σ)
6 GHz – 18 GHz ± 4.6 dB(2σ)
18 GHz – 40 GHz ± 5.5 dB(2σ)

Test Distance 3 m

Remarks : Field strength limit is calculated $25 \times \text{SQRT}(846\text{W}/500\text{W}) \mu\text{V/m} (=30.2 \text{ dB}\mu\text{V/m})$ at 300 m) and the emission levels are calculated using 20dB/decade as attenuation factor. The measurement result is within the range of measurement uncertainty.

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	2018/11/09
Horn Antenna	91888-2	560 (C-40-1)	EATON	2018/06/18
Horn Antenna	91889-2	560 (C-40-2)	EATON	2018/06/18
Horn Antenna	3160-04	9903-1053 (C-55)	EMCO	2018/06/19
Horn Antenna	3160-05	9902-1061 (C-56)	EMCO	2018/06/19
Horn Antenna	3160-06	9712-1045 (C-57)	EMCO	2018/06/19
Horn Antenna	3160-07	9902-1113 (C-58)	EMCO	2018/06/19
Horn Antenna	3160-08	9904-1099 (C-59)	EMCO	2018/06/19
Horn Antenna	3160-09	9808-1117 (C-48)	EMCO	2018/06/21
Pre-Amplifier	WJ-6882-824	0048 (A-21)	Watkins Johnson	2019/01/10
Pre-Amplifier	DBL-0618N515	001 9830 (A-33)	DBS Microwave	2019/01/10
Pre-Amplifier	RP1826G-45H	RP140121-11 (A-53)	EMCS	2018/06/21
Attenuator	54A-10	W5713 (D-29)	Weinschel	2018/08/14
Attenuator	2-10	BA6214 (D-79)	Weinschel	2018/11/30
RF Cable	SF104	37210/4 (C-40-14)	HUBER+SUHNER	2019/01/15
RF Cable	SF102EA	3041/2EA (C-69)	HUBER+SUHNER	2019/01/10
RF Cable	SF104	267415/4 (C-68)	HUBER+SUHNER	2019/01/15

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

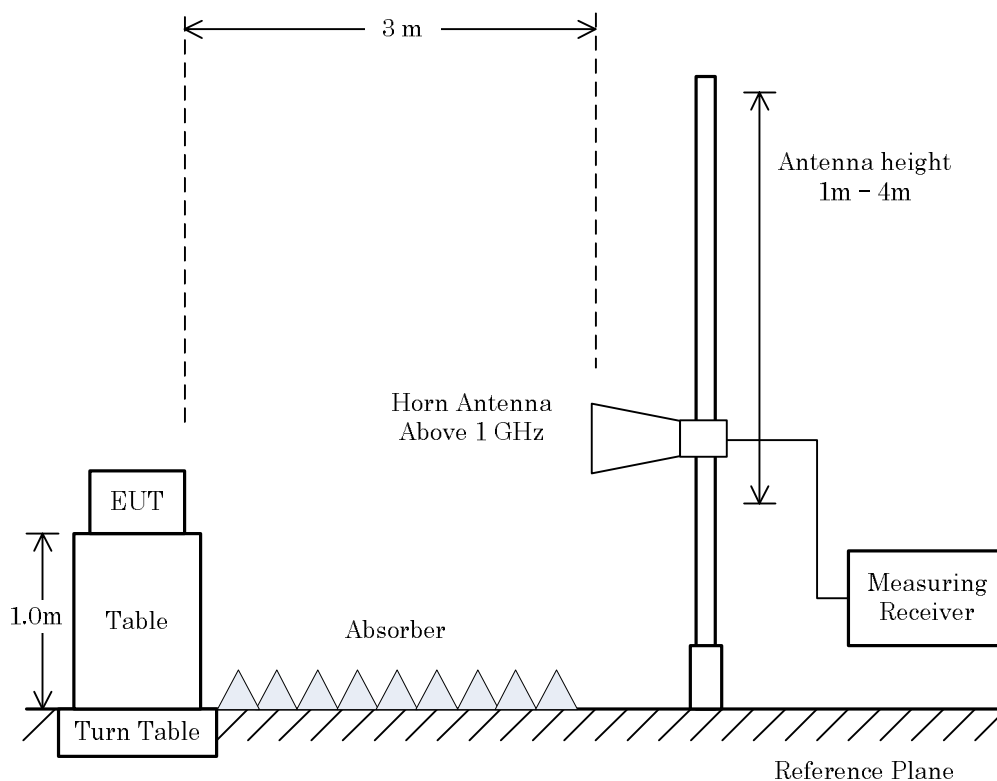
7.6.3 Test Method and Test Setup (Diagrammatic illustration)

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)

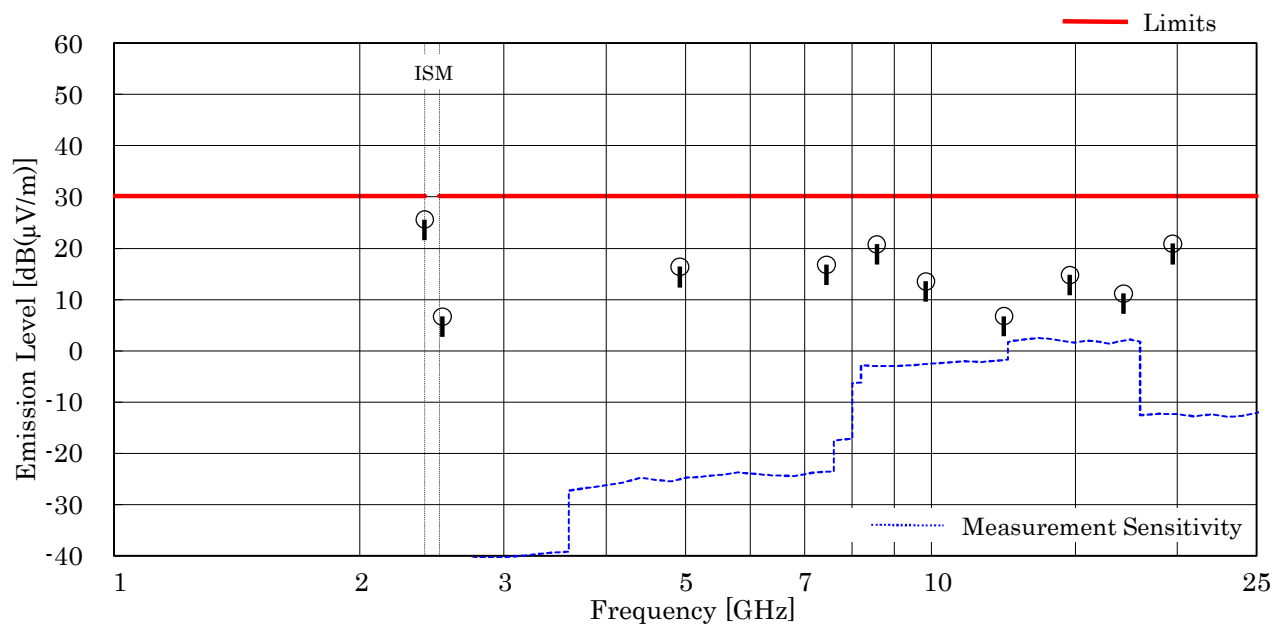


7.6.4 Test Data

Test voltage : 120VAC 60Hz
Test condition : Centerr 700ml
Antenna Pole : Horizontal

Test Date: April 7, 2018
Temp.: 20 °C, Humi: 55 %

Frequency [MHz]	Antenna Factor [dB(1/m)]	Corr. Factor [dB]	Meter Readings at 3 m [dB(μV)]	Limits at 300 m [dB(μV/m)]	Results at 300 m [dB(μV/m)]	Margin [dB]	Remarks
2397.6	21.2	10.7	33.7	30.2	25.6	+ 4.6	-
2521.3	21.0	10.7	15.0	30.2	6.7	+23.5	-
4921.3	27.2	-31.2	60.4	30.2	16.4	+13.8	-
7441.6	29.8	-29.4	56.4	30.2	16.8	+13.4	-
8570.8	33.3	-26.7	54.2	30.2	20.8	+ 9.4	-
9844.8	33.4	-26.4	46.6	30.2	13.6	+16.6	-
12269.0	33.6	-25.8	39.0	30.2	6.8	+23.4	-
14767.1	37.2	-25.8	43.4	30.2	14.8	+15.4	-
17179.4	37.8	-26.0	39.4	30.2	11.2	+19.0	-
19720.0	40.5	-42.6	63.0	30.2	20.9	+ 9.3	-



NOTES

- Test Distance : 3 m (Specified Distance : 300 m)
- The spectrum was checked from 1 GHz to 24.5 GHz (10th harmonic of the operating frequency).
- The correction factor is composed of cable loss, pad attenuation and/or amplifier gain.
- The symbol of "<" means "or less".
- The symbol of ">" means "more than".
- Calculated result at 2397.6 MHz, as the worst point shown on underline:
 Antenna Factor + Correction Factor + Meter Reading = 21.2 + 10.7 + 33.7 = 65.6 dB(μV/m)
 Result at 300 m = -40.0 + 65.6 = 25.6 dB(μV/m) = 19.1 μV/m (Conversion Factor : 20dB/decade)
 Antenna Height : 115 cm, Turntable Angle : 16 °
- Spectrum analyzer setting(s) :
 Average : Resolution Bandwidth = 1 MHz, Video Bandwidth = 10 Hz, Sweep Time = AUTO

Test voltage : 120VAC 60Hz

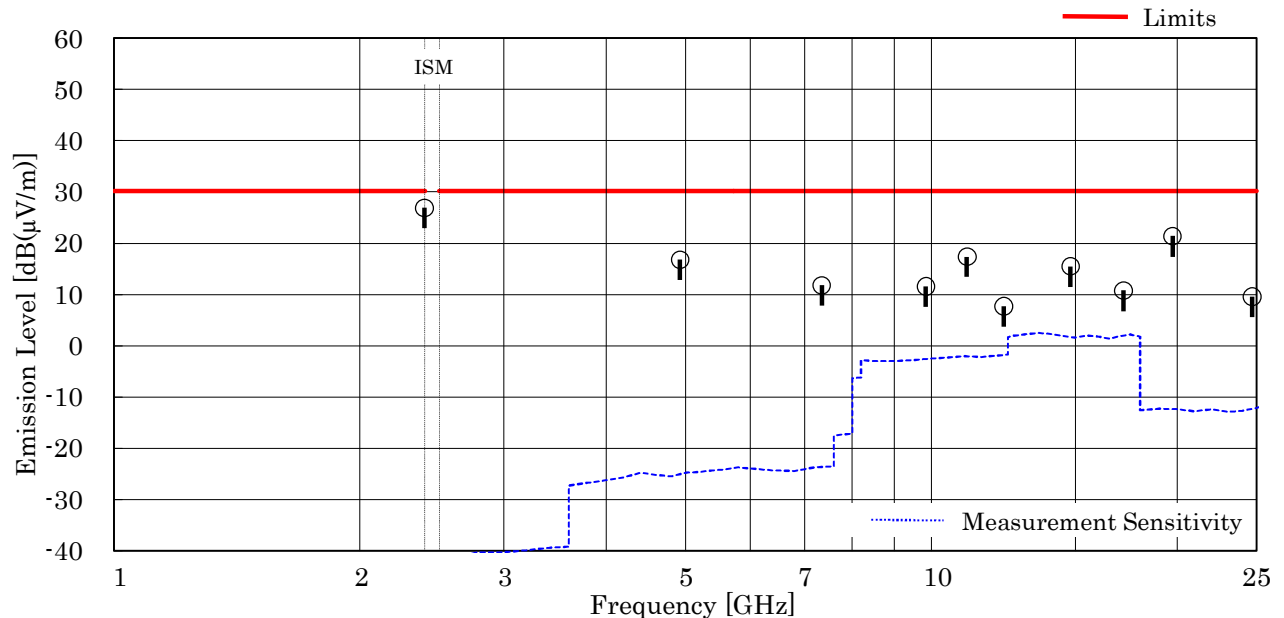
Test Date: April 7, 2018

Test condition : Centerr 700ml

Temp.: 20 °C, Humi: 55 %

Antenna Pole : Vertical

Frequency [MHz]	Antenna Factor [dB(1/m)]	Corr. Factor [dB]	Meter Readings at 3 m [dB(μV)]	Limits at 300 m [dB(μV/m)]	Results at 300 m [dB(μV/m)]	Margin [dB]	Remarks
2396.2	21.2	10.7	35.0	30.2	26.9	+ 3.3	-
4923.3	27.2	-31.2	60.8	30.2	16.8	+13.4	-
7341.8	29.9	-29.5	51.4	30.2	11.8	+18.4	-
9846.2	33.4	-26.4	44.6	30.2	11.6	+18.6	-
11055.2	33.5	-25.8	49.7	30.2	17.4	+12.8	-
12261.1	33.6	-25.8	39.9	30.2	7.7	+22.5	-
14786.4	37.2	-25.8	44.1	30.2	15.5	+14.7	-
17179.0	37.8	-26.0	39.0	30.2	10.8	+19.4	-
19714.9	40.5	-42.6	63.5	30.2	21.4	+ 8.8	-
24679.4	40.5	-42.9	52.0	30.2	9.6	+20.6	-



NOTES

1. Test Distance : 3 m (Specified Distance : 300 m)
2. The spectrum was checked from 1 GHz to 24.5 GHz (10th harmonic of the operating frequency).
3. The correction factor is composed of cable loss, pad attenuation and/or amplifier gain.
4. The symbol of "<" means "or less".
5. The symbol of ">" means "more than".
6. Calculated result at 2396.2 MHz, as the worst point shown on underline:
 $\text{Antenna Factor} + \text{Correction Factor} + \text{Meter Reading} = 21.2 + 10.7 + 35.0 = 66.9 \text{ dB}(\mu\text{V/m})$
 $\text{Result at 300 m} = -40.0 + 66.9 = 26.9 \text{ dB}(\mu\text{V/m}) = 22.1 \mu\text{V/m}$ (Conversion Factor : 20dB/decade)
 Antenna Height : 115 cm, Turntable Angle : 0°
7. Spectrum analyzer setting(s) :
 Average : Resolution Bandwidth = 1 MHz, Video Bandwidth = 10 Hz, Sweep Time = AUTO

Test voltage : 120VAC 60Hz

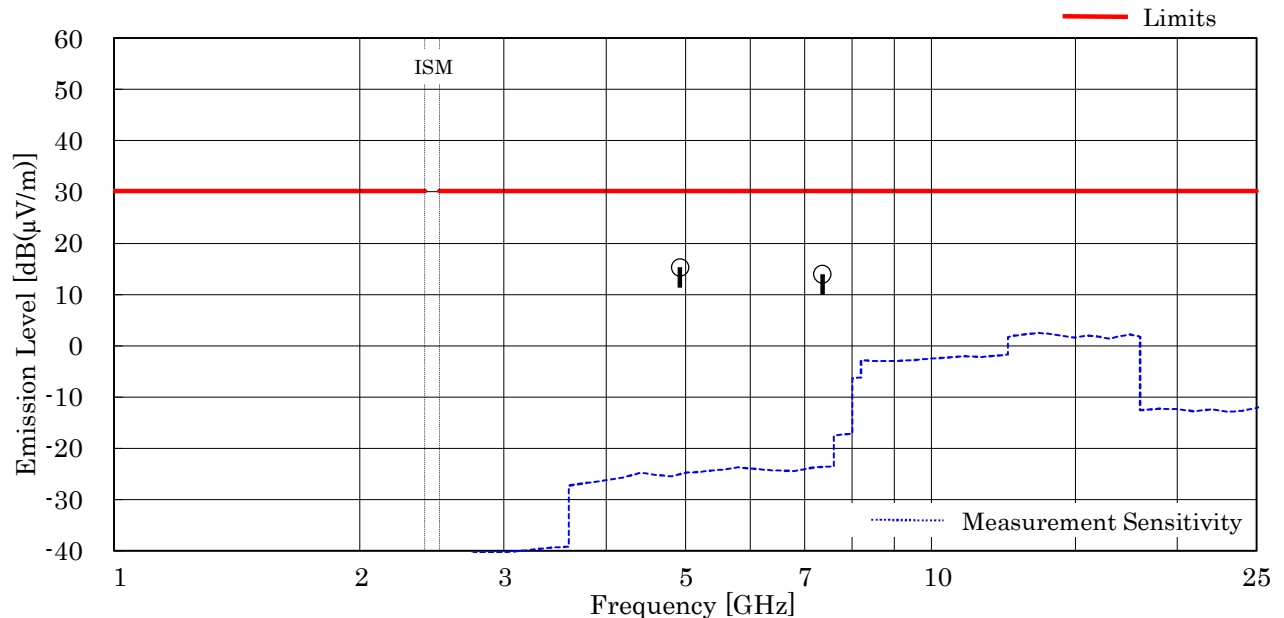
Test Date: April 7, 2018

Test condition : Centerr 300ml

Temp.: 20 °C, Humi: 55 %

Antenna Pole : Horizontal

Frequency [MHz]	Antenna Factor [dB(1/m)]	Corr. Factor [dB]	Meter Readings at 3 m [dB(μV)]	Limits at 300 m [dB(μV/m)]	Results at 300 m [dB(μV/m)]	Margin [dB]	Remarks
4926.3	27.2	-31.2	59.3	30.2	15.3	+14.9	-
7352.4	29.9	-29.5	53.6	30.2	14.0	+16.2	-



NOTES

1. Test Distance : 3 m (Specified Distance : 300 m)
2. The spectrum was checked from 1 GHz to 24.5 GHz (10th harmonic of the operating frequency).
3. The correction factor is composed of cable loss, pad attenuation and/or amplifier gain.
4. The symbol of "<" means "or less".
5. The symbol of ">" means "more than".
6. Calculated result at 4926.3 MHz, as the worst point shown on underline:

$$\text{Antenna Factor} + \text{Correction Factor} + \text{Meter Reading} = 27.2 + (-31.2) + 59.3 = 55.3 \text{ dB}(\mu\text{V/m})$$

$$\text{Result at 300 m} = -40.0 + 55.3 = 15.3 \text{ dB}(\mu\text{V/m}) = 5.8 \mu\text{V/m} \text{ (Conversion Factor : 20dB/decade)}$$

$$\text{Antenna Height : 115 cm, Turntable Angle : 14}^\circ$$
7. Spectrum analyzer setting(s) :
 Average : Resolution Bandwidth = 1 MHz, Video Bandwidth = 10 Hz, Sweep Time = AUTO

Test voltage : 120VAC 60Hz

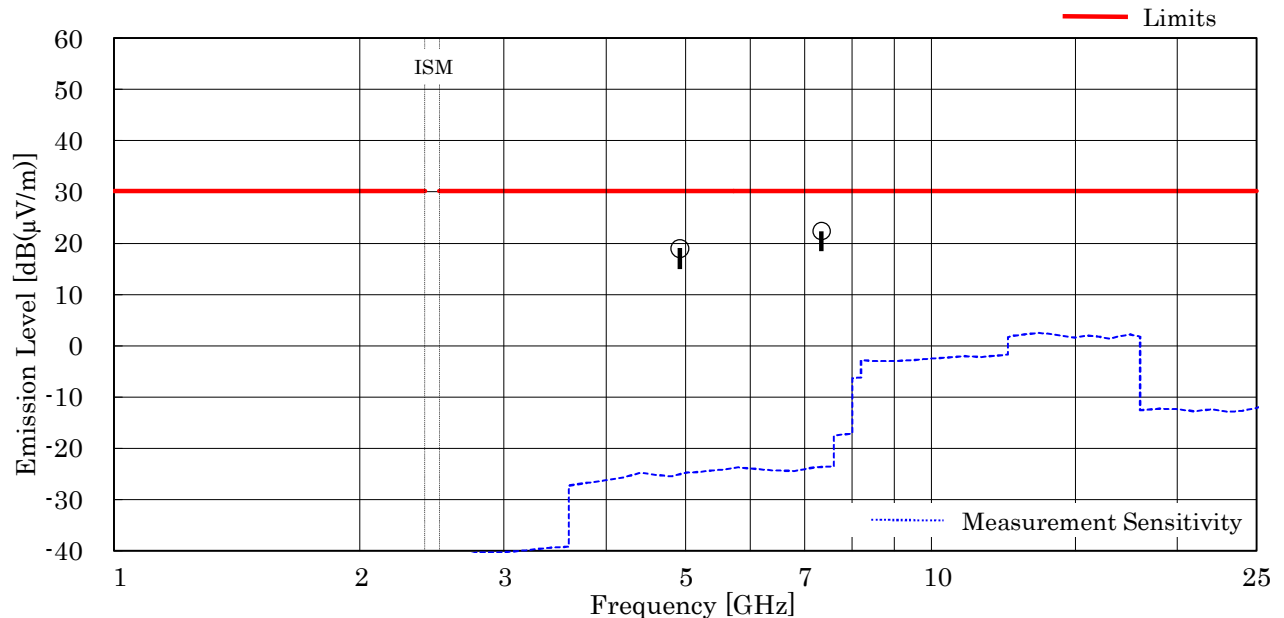
Test condition : Centerr 300ml

Antenna Pole : Vertical

Test Date: April 7, 2018

Temp.: 20 °C, Humi: 55 %

Frequency [MHz]	Antenna Factor [dB(1/m)]	Corr. Factor [dB]	Meter Readings at 3 m [dB(μV)]	Limits at 300 m [dB(μV/m)]	Results at 300 m [dB(μV/m)]	Margin [dB]	Remarks
4922.1	27.2	-31.2	63.0	30.2	19.0	+11.2	-
7333.8	29.9	-29.5	62.0	30.2	22.4	+ 7.8	-



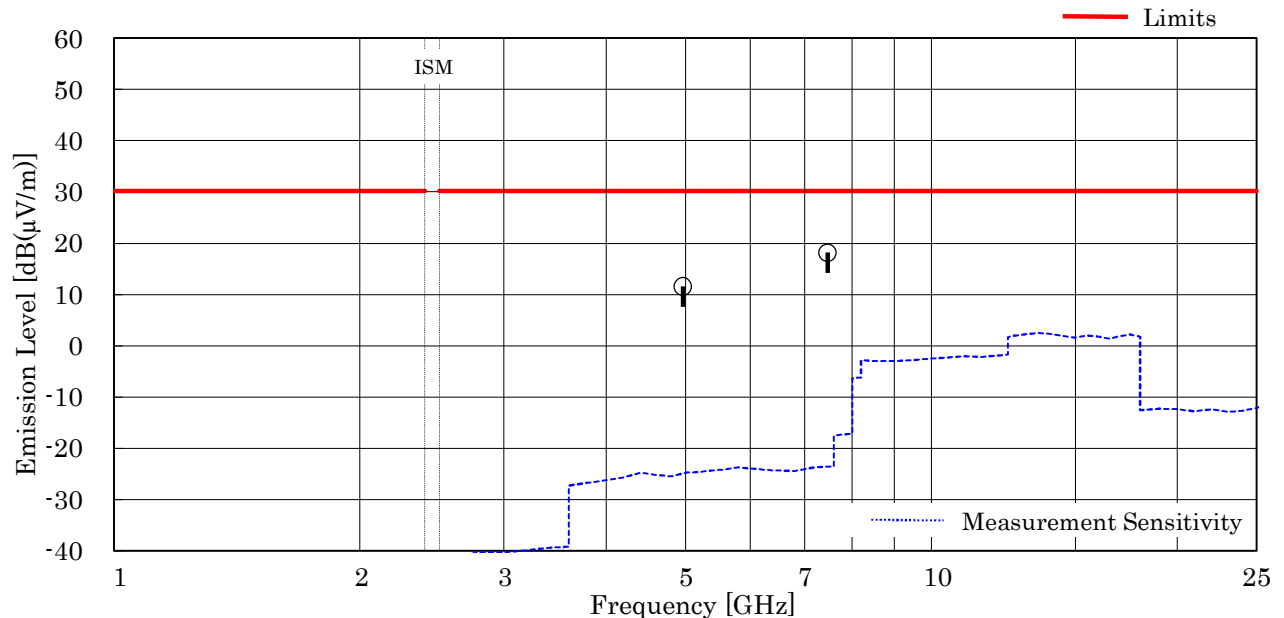
NOTES

1. Test Distance : 3 m (Specified Distance : 300 m)
2. The spectrum was checked from 1 GHz to 24.5 GHz (10th harmonic of the operating frequency).
3. The correction factor is composed of cable loss, pad attenuation and/or amplifier gain.
4. The symbol of "<" means "or less".
5. The symbol of ">" means "more than".
6. Calculated result at 7333.8 MHz, as the worst point shown on underline:
 $\text{Antenna Factor} + \text{Correction Factor} + \text{Meter Reading} = 29.9 + (-29.5) + 62.0 = 62.4 \text{ dB}(\mu\text{V/m})$
 $\text{Result at 300 m} = -40.0 + 62.4 = 22.4 \text{ dB}(\mu\text{V/m}) = 13.2 \mu\text{V/m}$ (Conversion Factor : 20dB/decade)
 Antenna Height : 115 cm, Turntable Angle : 24 °
7. Spectrum analyzer setting(s) :
 Average : Resolution Bandwidth = 1 MHz, Video Bandwidth = 10 Hz, Sweep Time = AUTO

Test voltage : 120VAC 60Hz
Test condition : Right Front Corner 700ml
Antenna Pole : Horizontal

Test Date: April 7, 2018
Temp.: 20 °C, Humi: 55 %

Frequency [MHz]	Antenna Factor [dB(1/m)]	Corr. Factor [dB]	Meter Readings at 3 m [dB(μV)]	Limits at 300 m [dB(μV/m)]	Results at 300 m [dB(μV/m)]	Margin [dB]	Remarks
4962.7	27.2	-31.1	55.5	30.2	11.6	+18.6	-
7462.2	29.8	-29.4	57.8	30.2	18.2	+12.0	-



NOTES

1. Test Distance : 3 m (Specified Distance : 300 m)
2. The spectrum was checked from 1 GHz to 24.5 GHz (10th harmonic of the operating frequency).
3. The correction factor is composed of cable loss, pad attenuation and/or amplifier gain.
4. The symbol of “<” means “or less”.
5. The symbol of “>” means “more than”.
6. Calculated result at 7462.2 MHz, as the worst point shown on underline:
 Antenna Factor + Correction Factor + Meter Reading = 29.8 + (-29.4) + 57.8 = 58.2 dB(μV/m)
 Result at 300 m = -40.0 + 58.2 = 18.2 dB(μV/m) = 8.1 μV/m (Conversion Factor : 20dB/decade)
 Antenna Height : 115 cm, Turntable Angle : 2 °
7. Spectrum analyzer setting(s) :
 Average : Resolution Bandwidth = 1 MHz, Video Bandwidth = 10 Hz, Sweep Time = AUTO

Test voltage : 120VAC 60Hz

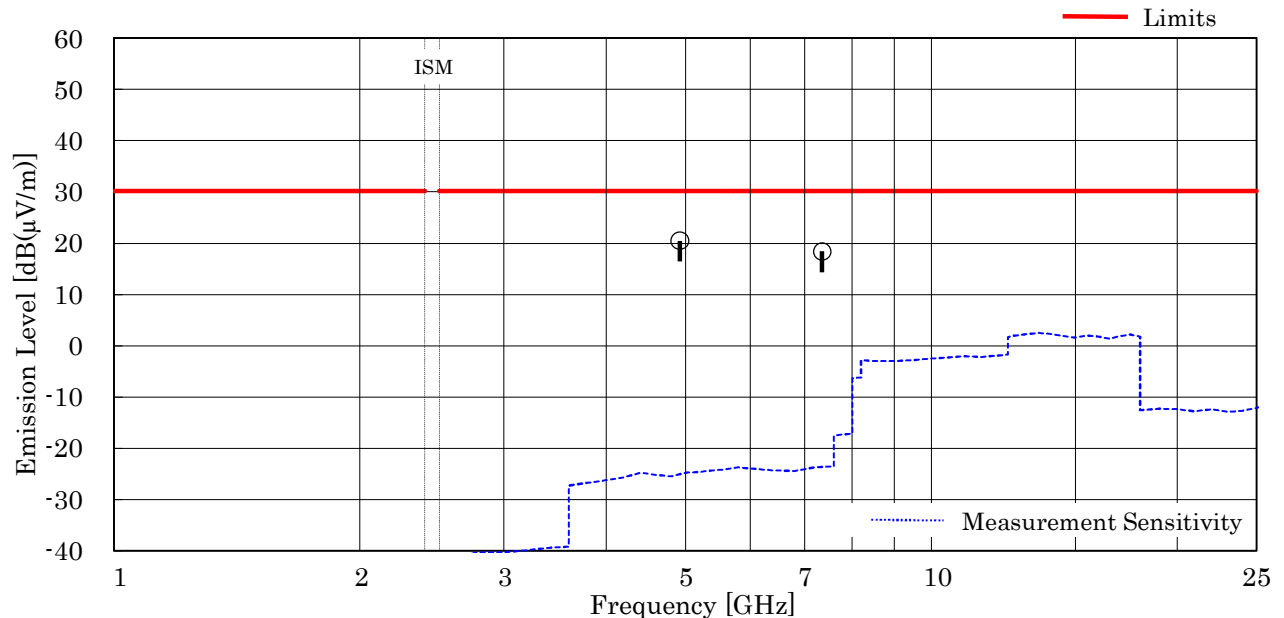
Test Date: April 7, 2018

Test condition : Right Front Corner 700ml

Temp.: 20 °C, Humi: 55 %

Antenna Pole : Vertical

Frequency [MHz]	Antenna Factor [dB(1/m)]	Corr. Factor [dB]	Meter Readings at 3 m [dB(μV)]	Limits at 300 m [dB(μV/m)]	Results at 300 m [dB(μV/m)]	Margin [dB]	Remarks
4921.9	27.2	-31.2	64.5	30.2	20.5	+ 9.7	-
7348.2	29.9	-29.5	58.0	30.2	18.4	+11.8	-



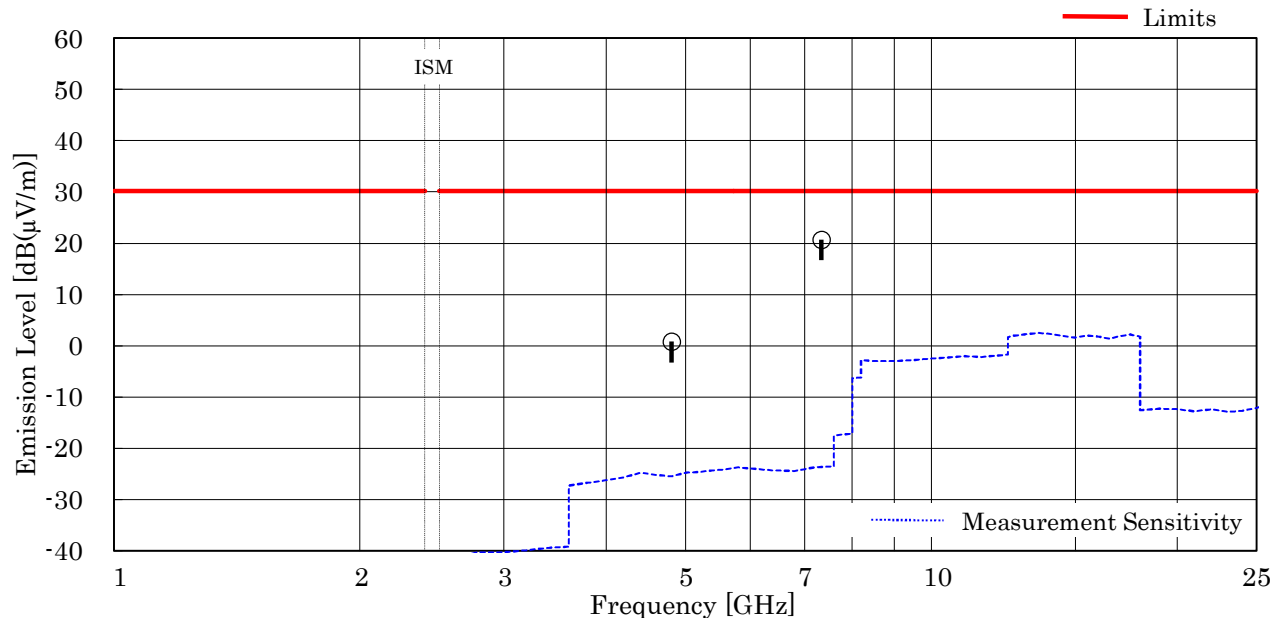
NOTES

1. Test Distance : 3 m (Specified Distance : 300 m)
2. The spectrum was checked from 1 GHz to 24.5 GHz (10th harmonic of the operating frequency).
3. The correction factor is composed of cable loss, pad attenuation and/or amplifier gain.
4. The symbol of "<" means "or less".
5. The symbol of ">" means "more than".
6. Calculated result at 4921.9 MHz, as the worst point shown on underline:
 $\text{Antenna Factor} + \text{Correction Factor} + \text{Meter Reading} = 27.2 + (-31.2) + 64.5 = 60.5 \text{ dB}(\mu\text{V/m})$
 $\text{Result at 300 m} = -40.0 + 60.5 = 20.5 \text{ dB}(\mu\text{V/m}) = 10.6 \mu\text{V/m}$ (Conversion Factor : 20dB/decade)
 Antenna Height : 115 cm, Turntable Angle : 23 °
7. Spectrum analyzer setting(s) :
 Average : Resolution Bandwidth = 1 MHz, Video Bandwidth = 10 Hz, Sweep Time = AUTO

Test voltage : 120VAC 60Hz
Test condition : Right Front Corner 300ml
Antenna Pole : Horizontal

Test Date: April 7, 2018
Temp.: 20 °C, Humi: 55 %

Frequency [MHz]	Antenna Factor [dB(1/m)]	Corr. Factor [dB]	Meter Readings at 3 m [dB(μV)]	Limits at 300 m [dB(μV/m)]	Results at 300 m [dB(μV/m)]	Margin [dB]	Remarks
4809.8	27.3	-31.0	44.5	30.2	0.8	+29.4	-
7339.4	29.9	-29.5	60.3	30.2	20.7	+ 9.5	-



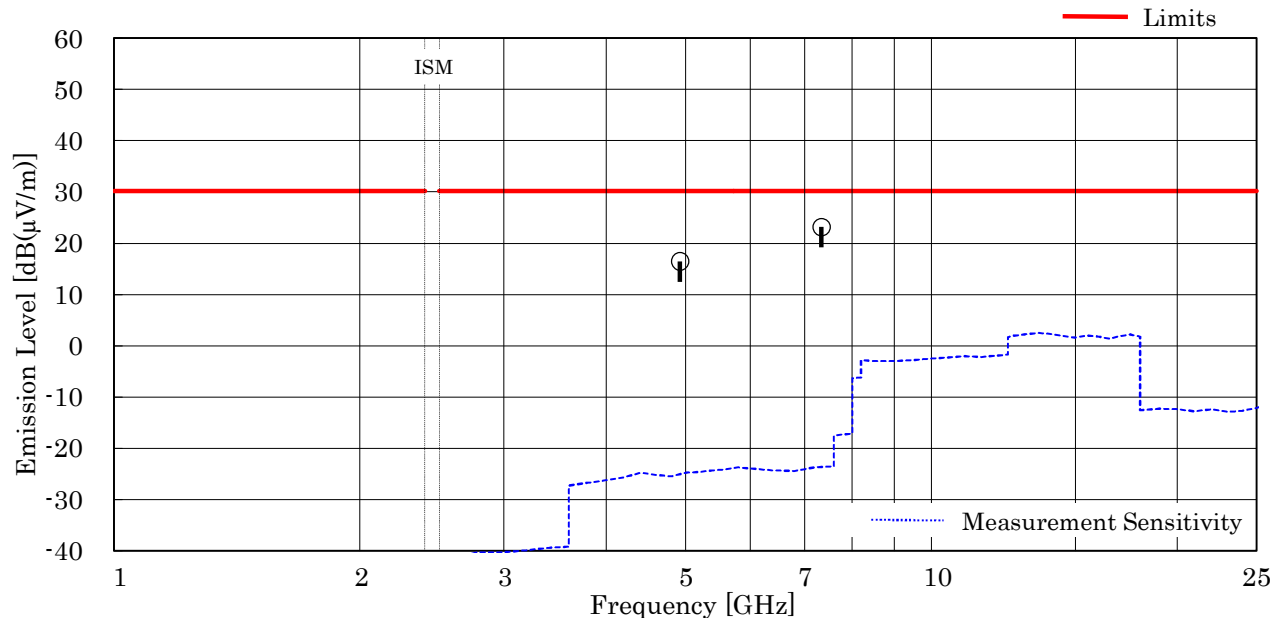
NOTES

1. Test Distance : 3 m (Specified Distance : 300 m)
2. The spectrum was checked from 1 GHz to 24.5 GHz (10th harmonic of the operating frequency).
3. The correction factor is composed of cable loss, pad attenuation and/or amplifier gain.
4. The symbol of "<" means "or less".
5. The symbol of ">" means "more than".
6. Calculated result at 7339.4 MHz, as the worst point shown on underline:
 Antenna Factor + Correction Factor + Meter Reading = 29.9 + (-29.5) + 60.3 = 60.7 dB(μV/m)
 Result at 300 m = -40.0 + 60.7 = 20.7 dB(μV/m) = 10.8 μV/m (Conversion Factor : 20dB/decade)
 Antenna Height : 115 cm, Turntable Angle : 23 °
7. Spectrum analyzer setting(s) :
 Average : Resolution Bandwidth = 1 MHz, Video Bandwidth = 10 Hz, Sweep Time = AUTO

Test voltage : 120VAC 60Hz
Test condition : Right Front Corner 300ml
Antenna Pole : Vertical

Test Date: April 7, 2018
Temp.: 20 °C, Humi: 55 %

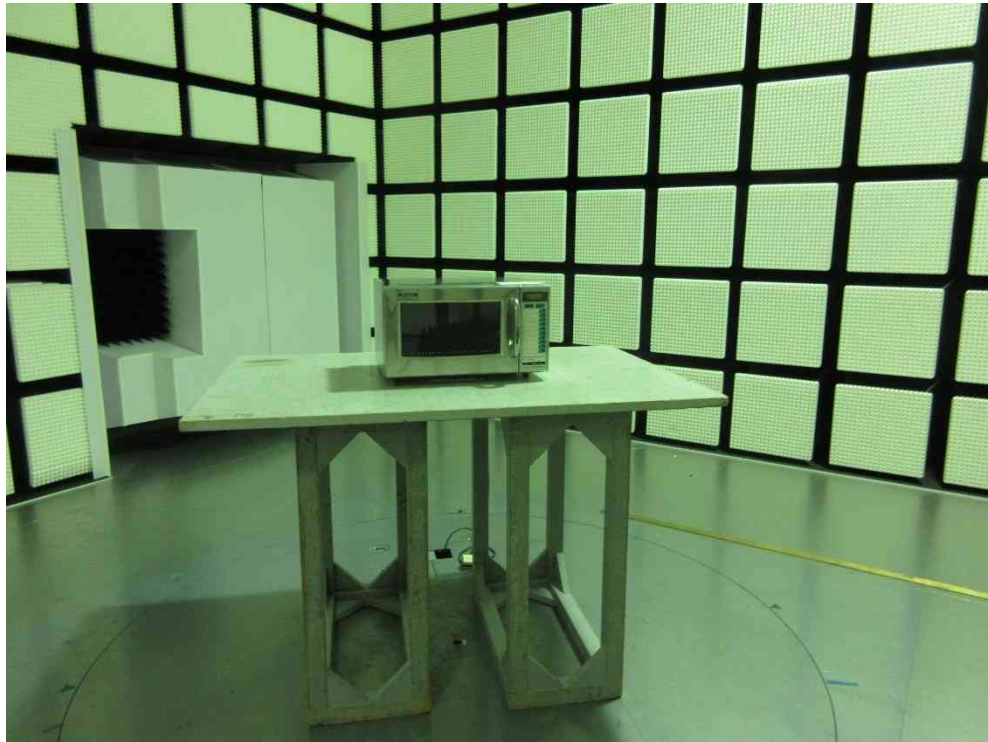
Frequency [MHz]	Antenna Factor [dB(1/m)]	Corr. Factor [dB]	Meter Readings at 3 m [dB(μV)]	Limits at 300 m [dB(μV/m)]	Results at 300 m [dB(μV/m)]	Margin [dB]	Remarks
4925.8	27.2	-31.2	60.5	30.2	16.5	+13.7	-
7335.8	29.9	-29.5	62.8	30.2	23.2	+ 7.0	-



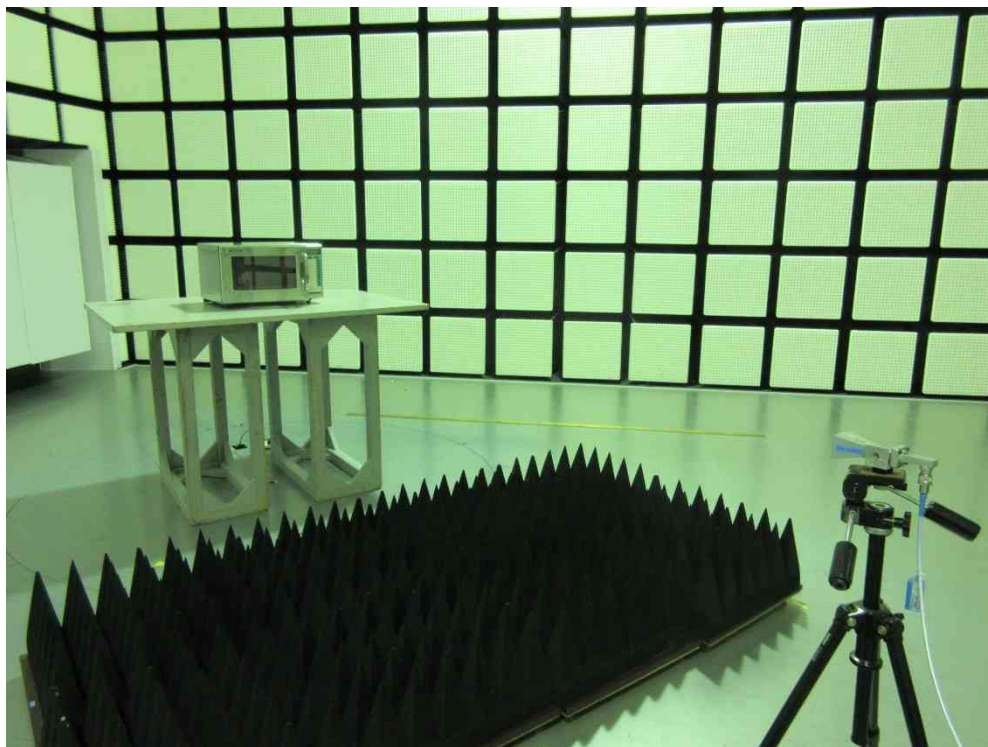
NOTES

1. Test Distance : 3 m (Specified Distance : 300 m)
2. The spectrum was checked from 1 GHz to 24.5 GHz (10th harmonic of the operating frequency).
3. The correction factor is composed of cable loss, pad attenuation and/or amplifier gain.
4. The symbol of “<” means “or less”.
5. The symbol of “>” means “more than”.
6. Calculated result at 7335.8 MHz, as the worst point shown on underline:
 Antenna Factor + Correction Factor + Meter Reading = 29.9 + (-29.5) + 62.8 = 63.2 dB(μV/m)
 Result at 300 m = -40.0 + 63.2 = 23.2 dB(μV/m) = 14.5 μV/m (Conversion Factor : 20dB/decade)
 Antenna Height : 115 cm, Turntable Angle : 19 °
7. Spectrum analyzer setting(s) :
 Average : Resolution Bandwidth = 1 MHz, Video Bandwidth = 10 Hz, Sweep Time = AUTO

7.6.5 Test Setup (Photographs)



– Front View –



– Rear View –

Photograph present configuration with maximum emission