



# EMI TEST REPORT

**Test Report No. : 12519284H-A-R1**

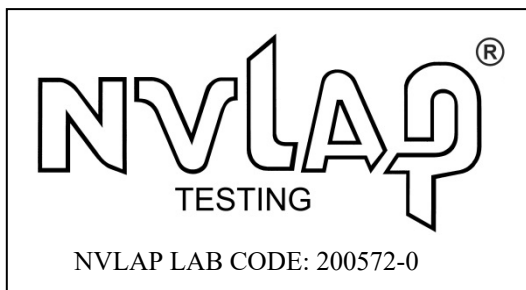
**Applicant** : Mitsubishi Electric Corporation Kyoto works  
**Type of Equipment** : LED UNIT  
**Model No.** : VS-15NP180F  
**FCC ID** : 2APT9DWVS-15NP180  
**Test regulation** : FCC Part 15 Subpart B: 2018 Class A  
**Test Result** : Complied

1. This test report shall not be reproduced in full or partial, without the written approval of UL Japan, Inc.
2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the above regulation.
4. The test results in this report are traceable to the national or international standards.
5. This test report covers EMC technical requirements. It does not cover administrative issues such as Manual or non-EMC test related Requirements. (if applicable)
6. The all test items in this test report are conducted by UL Japan, Inc. Ise EMC Lab.
7. This test report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.
8. This report is a revised version of 12519284H-A. 12519284H-A is replaced with this report.

**Date of test:** October 18 to 21, 2018

**Representative test engineer:** Ken Fujita  
Ken Fujita  
Engineer  
Consumer Technology Division

**Approved by:** S. Matsuyama  
Satofumi Matsuyama  
Engineer  
Consumer Technology Division



This laboratory is accredited by the NVLAP LAB CODE 200572-0, U.S.A. The tests reported herein have been performed in accordance with its terms of accreditation. \*As for the range of Accreditation in NVLAP, you may refer to the WEB address, [http://japan.ul.com/resources/emc\\_accredited/](http://japan.ul.com/resources/emc_accredited/)

- The testing in which "Non-accreditation" is displayed is outside the accreditation scopes in UL Japan.  
 There is no testing item of "Non-accreditation".

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## **SECTION 1: Customer information**

Company Name : Mitsubishi Electric Corporation Kyoto works  
Address : 1 Zusho Baba Nagaokakyo Kyoto 617-8550 Japan  
Telephone Number : +81-75-958-3120  
Facsimile Number : +81-75-958-3728  
Contact Person : Haruo Kobayashi

## **SECTION 2: Equipment under test (E.U.T.)**

### **2.1 Identification of E.U.T.**

Type of Equipment : LED UNIT  
Model No. : VS-15NP180F  
Serial No. : Refer to Section 4, Clause 4.2  
Rating : AC 100 V - 120 V, 50 / 60 Hz  
AC 220 V - 240 V, 50 / 60 Hz  
Receipt Date of Sample : October 16, 2018  
Country of Mass-production : Japan  
Condition of EUT : Production prototype  
(Not for Sale: This sample is equivalent to mass-produced items.)  
Modification of EUT : No Modification by the test lab

### **2.2 Product Description**

Model: VS-15NP180F (referred to as the EUT in this report) is a LED UNIT.

Feature of EUT:

Clock frequency(ies) in the system : 148.5 MHz (max.)

There are four models in the LED UNITS, VS-15NP180F, VS-15NP180R, VS-15NP180F1, VS-15NP180R1.  
They have only minor mechanical difference that does not affect the EMC performance.

Under such condition, the EMC performance has been evaluated with the representative model, VS-15NP180F.

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### **SECTION 3: Test specification, procedures & results**

#### **3.1 Test specification**

Test Specification : FCC Part 15 Subpart B  
FCC Part 15 final revised on March 12, 2018 and effective April 11, 2018

Title : FCC 47CFR Part15 Radio Frequency Device  
Subpart B Unintentional Radiators

#### **3.2 Procedures and results**

Item	Test Procedure	Limits	Deviation	Worst margin	Result
Conducted emission	ANSI C63.4: 2014 7. AC power - line conducted emission measurements	Class A	N/A	[QP] 20.6 dB 0.19629 MHz, N, Mode 1 [AV] 11.4 dB 0.19629 MHz, N, Mode 1	Complied
Radiated emission	ANSI C63.4: 2014 8. Radiated emission measurements	Class A	N/A	5.7 dB 498.197 MHz, Horizontal, Mode1	Complied
*Note: UL Japan, Inc's EMI Work Procedure 13-EM-W0420.					
Symbols: Complied The data of this test item has enough margin, more than the measurement uncertainty. Complied# The data of this test item meets the limits unless the measurement uncertainty is taken into consideration.					

#### **3.3 Addition to standard**

No addition, exclusion nor deviation has been made from the standard.

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### 3.4 Uncertainty

The following uncertainties have been calculated to provide a confidence level of 95 % using a coverage factor  $k = 2$ .

#### Conducted emission

using Item	Frequency range	Uncertainty (+/-)
AMN (LISN)	0.009 MHz to 0.15 MHz	3.8 dB
	0.15 MHz to 30 MHz	3.4 dB

#### Radiated emission

Measurement distance	Frequency range	Uncertainty (+/-)	
10 m	30 MHz to 200 MHz	(Horizontal)	4.8 dB
		(Vertical)	4.9 dB
	200 MHz to 1000 MHz	(Horizontal)	5.0 dB
		(Vertical)	5.0 dB
10 m	1 GHz to 18 GHz	5.2 dB	

### 3.5 Test Location

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NVLAP Lab. code: 200572-0 / FCC Test Firm Registration Number: 199967

Test site	IC Registration Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Other rooms	Maximum measurement distance
No.1 semi-anechoic chamber	2973C-1	19.2 x 11.2 x 7.7	7.0 x 6.0	No.1 Power source room	10 m
No.2 semi-anechoic chamber	2973C-2	7.5 x 5.8 x 5.2	4.0 x 4.0	-	3 m
No.3 semi-anechoic chamber	2973C-3	12.0 x 8.5 x 5.9	6.8 x 5.75	No.3 Preparation room	3 m
No.3 shielded room	-	4.0 x 6.0 x 2.7	N/A	-	-
No.4 semi-anechoic chamber	2973C-4	12.0 x 8.5 x 5.9	6.8 x 5.75	No.4 Preparation room	3 m
No.4 shielded room	-	4.0 x 6.0 x 2.7	N/A	-	-
No.5 semi-anechoic chamber	-	6.0 x 6.0 x 3.9	6.0 x 6.0	-	-
No.6 shielded room	-	4.0 x 4.5 x 2.7	4.0 x 4.5	-	-
No.6 measurement room	-	4.75 x 5.4 x 3.0	4.75 x 4.15	-	-
No.7 shielded room	-	4.7 x 7.5 x 2.7	4.7 x 7.5	-	-
No.8 measurement room	-	3.1 x 5.0 x 2.7	N/A	-	-
No.9 measurement room	-	8.8 x 4.6 x 2.8	2.4 x 2.4	-	-
No.11 measurement room	-	6.2 x 4.7 x 3.0	4.8 x 4.6	-	-

\* Size of vertical conducting plane (for Conducted Emission test) : 2.0 m x 2.0 m for No.1, No.2, No.3, and No.4 semi-anechoic chambers and No.3 and No.4 shielded rooms.

### 3.6 Test data, Test instruments, and Test set up

Refer to APPENDIX.

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## **SECTION 4: Operation of E.U.T. during testing**

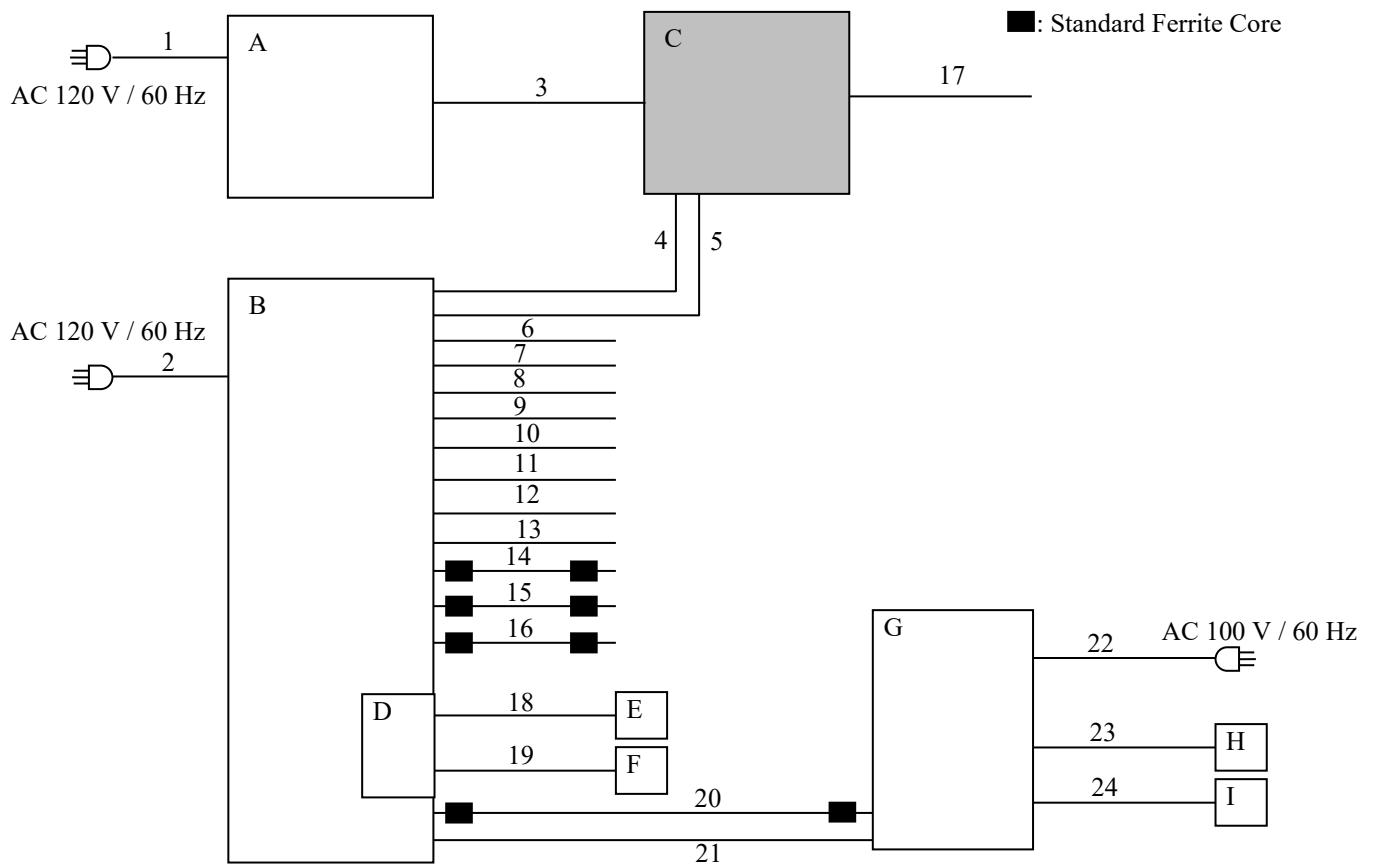
### **4.1 Operating modes**

The mode(s) : 1. DVI Input 1  
2. Standby

Justification : The system was configured in typical fashion (as a user would normally use it) for testing.

\* Each test was performed with mode 1 or 2 which had the worst result on pre-check.

### **4.2 Configuration and peripherals**



\*Cabling and setup were taken into consideration and test data was taken under worse case conditions.

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**Description of EUT and Support equipment**

No.	Item	Model number	Serial number	Manufacturer	Remark
A	ADAPTER	S-NP18ACS	0000009	Mitsubishi Electric Corporation Kyoto works	-
B	CONTROL UNIT	VC-NP1000	6001047	Mitsubishi Electric Corporation Kyoto works	-
C	LED UNIT	VS-15NP180F	01M0011	Mitsubishi Electric Corporation Kyoto works	EUT
D	OPS PC	DS280GB1701E-T	KSE0090252	ADVANTECH CO LTD	-
E	Keyboard	KU-1156	BDMJA0CGA	Hewlett-Packard Company	-
F	Mouse	265988-007	F5320B0N3WJ0066	Hewlett-Packard Company	-
G	PC	EW315AV	JPA74805VW	Hewlett-Packard Company	-
H	Keyboard	KB-0316	BC3480CGAV5354	Hewlett-Packard Company	-
I	Mouse	334684-003	F93AA0AN3V301BB	Hewlett-Packard Company	-

**List of cables used**

No.	Name	Length (m)	Shield		Remark
			Cable	Connector	
1	AC Power Cable	2.9	Unshielded	Unshielded	3 wires
2	AC Power Cable	2.9	Unshielded	Unshielded	3 wires
3	AC Power Cable	0.8	Unshielded	Unshielded	3 wires
4	LAN Cable	2.0	Shielded	Shielded	-
5	LAN Cable	2.0	Shielded	Shielded	-
6	LAN Cable	2.0	Shielded	Shielded	-
7	LAN Cable	2.0	Shielded	Shielded	-
8	LAN Cable	2.0	Shielded	Shielded	-
9	LAN Cable	2.0	Shielded	Shielded	-
10	LAN Cable	2.0	Shielded	Shielded	-
11	LAN Cable	2.0	Shielded	Shielded	-
12	LAN Cable	2.0	Shielded	Shielded	-
13	LAN Cable	2.0	Shielded	Shielded	-
14	Control Cable	2.9	Shielded	Shielded	-
15	Control Cable	2.9	Shielded	Shielded	-
16	DVI Cable	1.9	Shielded	Shielded	-
17	AC Power Cable	0.8	Unshielded	Unshielded	3 wires
18	Keyboard Cable	1.7	Shielded	Shielded	-
19	Mouse Cable	1.8	Shielded	Shielded	-
20	DVI Cable	1.9	Shielded	Shielded	-
21	LAN Cable	1.9	Unshielded	Unshielded	-
22	AC Power Cable	1.9	Unshielded	Unshielded	3 wires
23	Keyboard Cable	1.7	Shielded	Shielded	-
24	Mouse Cable	1.7	Shielded	Shielded	-

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## **SECTION 5: Conducted Emission**

### **5.1 Operating environment**

Test place: No.4 semi anechoic chamber  
Temperature: See data  
Humidity: See data

### **5.2 Test configuration**

EUT was placed on a urethane platform of nominal size, 1.0 m by 1.5 m, raised 0.8 m above the conducting ground plane. The rear of tabletop was located 40 cm to the vertical conducting plane. The rear of EUT and its peripherals was aligned and flushed with rear of tabletop. All other surfaces of tabletop were at least 80 cm from any other grounded conducting surface. EUT was located 80 cm from the LISN/AMN and excess AC cable was bundled in center. I/O cables that were connected to the other peripherals were bundled in center. They were folded back and forth forming a bundle 30 cm to 40 cm long and were hanged at a 40 cm height to the ground plane. Each EUT current-carrying power lead, except the ground (safety) lead, was individually connected through a LISN/AMN to the input power source. All unused 50 ohm connectors of the LISN/AMN were resistivity terminated in 50 ohm when not connected to the measuring equipment. Photographs of the set up are shown in Appendix 3.

Frequency range : 0.15 MHz - 30 MHz  
EUT position : Table top  
EUT operation mode : See Clause 4.1

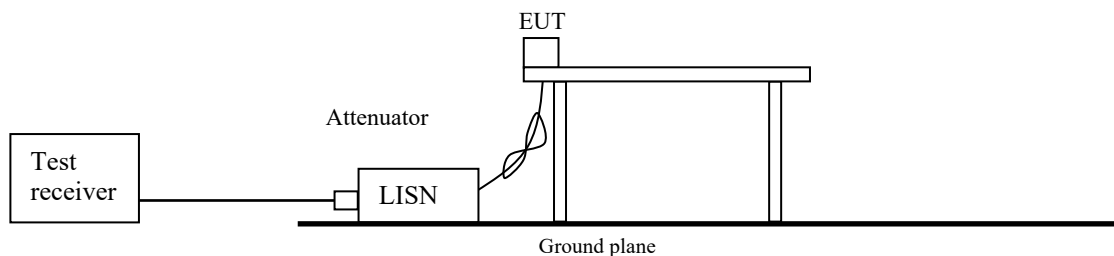
### **5.3 Test procedure**

The AC Mains Terminal Continuous disturbance Voltage has been measured with the EUT within a semi anechoic chamber. The EUT was connected to a Line Impedance Stabilization Network (LISN)/ Artificial Mains network (AMN). An overview sweep with peak detection has been performed. The measurements have been performed with a quasi-peak detector and if required, with an average detector.

The conducted emission measurements were made with the following detector function of the test receiver.

Detector Type : Quasi-Peak and CISPR AV  
IF Bandwidth : 9 kHz

**Figure 1: Test Setup**



### **5.4 Test result**

Summary of the test results: Pass

\*The test result is rounded off to one or two decimal places, so some differences might be observed.

Date: October 20, 2018

Test engineer: Ken Fujita

**UL Japan, Inc.**

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## **SECTION 6: Radiated Emission**

### **6.1 Operating environment**

Test place: No.1 and No. 4 semi anechoic chamber  
Temperature: See data  
Humidity: See data

### **6.2 Test configuration**

EUT was placed on a urethane platform of nominal size, 1.0 m by 1.5 m, raised 0.8 m above the conducting ground plane. The EUT was set on the edge of the tabletop. Test was made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna was varied in height above the conducting ground plane to obtain the maximum signal strength. Photographs of the set up are shown in Appendix 3.

### **6.3 Test conditions**

Frequency range : 30 MHz - 200 MHz (Biconical antenna) / 200 MHz - 1000 MHz (Logperiodic antenna)  
1000 MHz - 2000 MHz (Horn antenna)  
Test distance : 10 m  
EUT position : Table top  
EUT operation mode : See Clause 4.1

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## 6.4 Test procedure

The height of the measuring antenna varied between 1 and 4 m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.

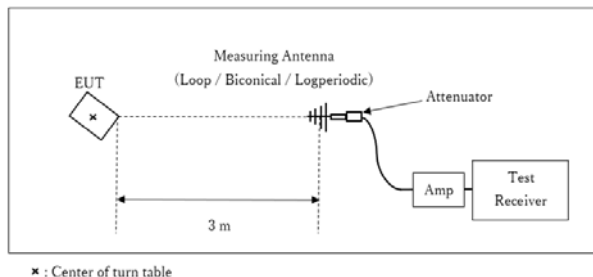
The measurements were performed for both vertical and horizontal antenna polarization with the Test Receiver.

The radiated emission measurements were made with the following detector function of the Test Receiver.

Frequency	Below 1GHz	Above 1GHz *1)
Instrument used	Test Receiver	Test Receiver
IF Bandwidth	QP: BW 120 kHz	PK: BW 1 MHz, CISPR AV: BW 1 MHz

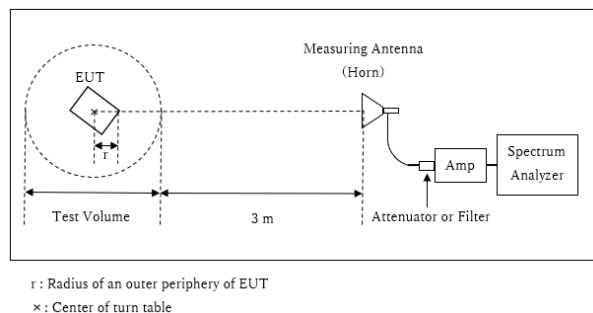
**Figure 2: Test Setup**

Below 1 GHz



Test Distance: 10 m

1 GHz - 2 GHz



\*1) Distance Factor:  $20 \times \log(3.6 \text{ m} / 10.0 \text{ m}) = -8.87 \text{ dB}$

\* Test Distance:  $(3 + \text{Test Volume} / 2) - r = 3.6 \text{ m}$

Test Volume : 2.0 m

(Test Volume has been calibrated based on CISPR 16-1-4.)  
 $r = 0.4 \text{ m}$

The test was made on EUT at the normal use position.

## 6.5 Test result

Summary of the test results: Pass

\*The limit is rounded down to one decimal place.

\*The test result is rounded off to one or two decimal places, so some differences might be observed.

Date: October 18, 2018

Test engineer: Koji Yamamoto (Above 1 GHz)

Date: October 19, 2018

Test engineer: Masaya Minami (Below 1 GHz)

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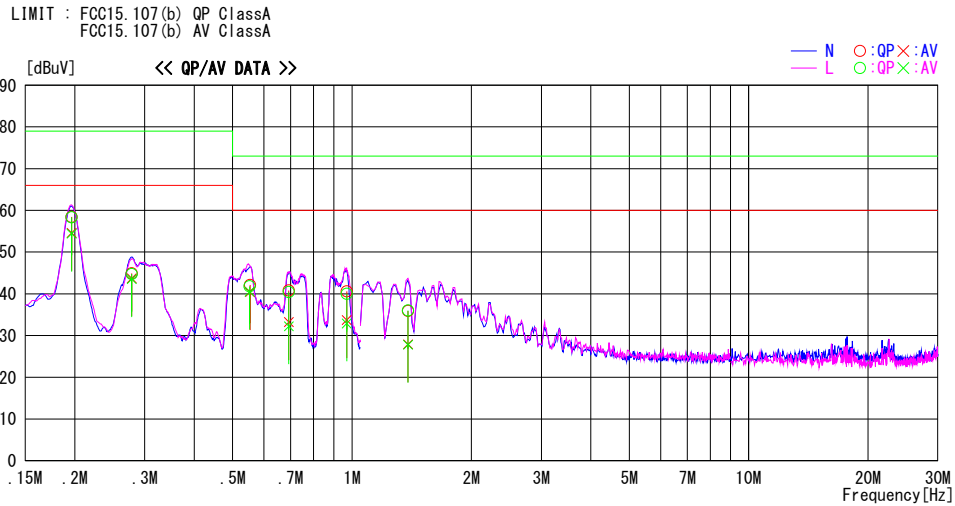
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**APPENDIX 1: Test data**

**Conducted Emission**

Report No. 12519284H  
Test place Ise EMC Lab.  
Semi Anechoic Chamber No.4  
Date October 20, 2018  
Temperature / Humidity 20 deg. C / 43 % RH  
Engineer Ken Fujita  
Mode Mode 1

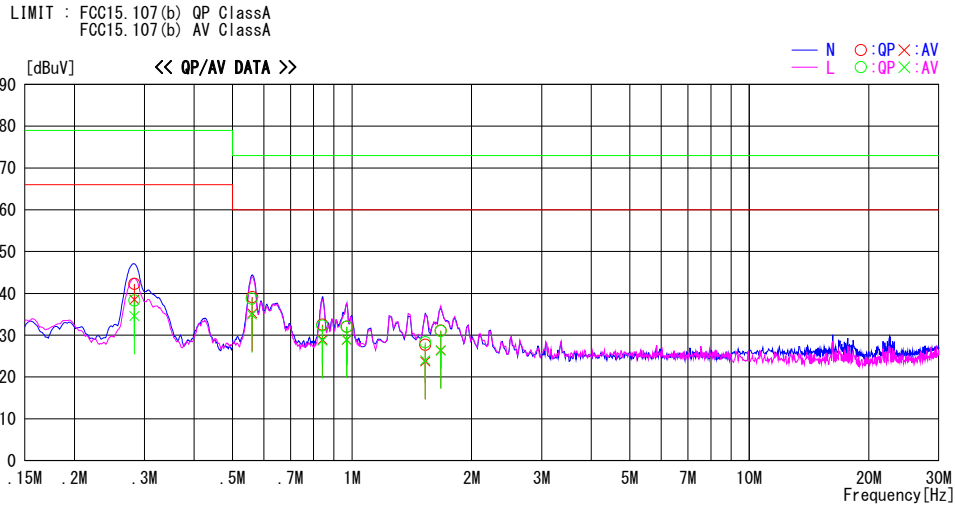


Frequency [MHz]	Reading Level		Corr. Factor	Results		Limit		Margin		Phase	Comment
	QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]		
0.19629	44.9	41.1	13.5	58.4	54.6	79.0	66.0	20.6	11.4	N	
0.27836	31.4	30.2	13.5	44.9	43.7	79.0	66.0	34.1	22.3	N	
0.55291	28.6	26.9	13.5	42.1	40.4	73.0	60.0	30.9	19.6	N	
0.69289	27.2	19.6	13.6	40.8	33.2	73.0	60.0	32.2	26.8	N	
0.96954	27.0	20.1	13.6	40.6	33.7	73.0	60.0	32.4	26.3	N	
1.38457	22.3	14.3	13.6	35.9	27.9	73.0	60.0	37.1	32.1	N	
0.19629	44.8	40.9	13.5	58.3	54.4	79.0	66.0	20.7	11.6	L	
0.27836	31.2	30.0	13.5	44.7	43.5	79.0	66.0	34.3	22.5	L	
0.55180	28.3	27.0	13.5	41.8	40.5	73.0	60.0	31.2	19.5	L	
0.69289	26.8	18.6	13.6	40.4	32.2	73.0	60.0	32.6	27.8	L	
0.96954	26.4	19.3	13.6	40.0	32.9	73.0	60.0	33.0	27.1	L	
1.38457	22.4	14.2	13.6	36.0	27.8	73.0	60.0	37.0	32.2	L	

CHART: WITH FACTOR Peak hold data. CALCULATION : RESULT = READING + C.F (LISN + CABLE + ATT)  
Except for the above table: adequate margin data below the limits.

## Conducted Emission

Report No. 12519284H  
Test place Ise EMC Lab.  
Semi Anechoic Chamber No.4  
Date October 20, 2018  
Temperature / Humidity 20 deg. C / 43 % RH  
Engineer Ken Fujita  
Mode Mode 2



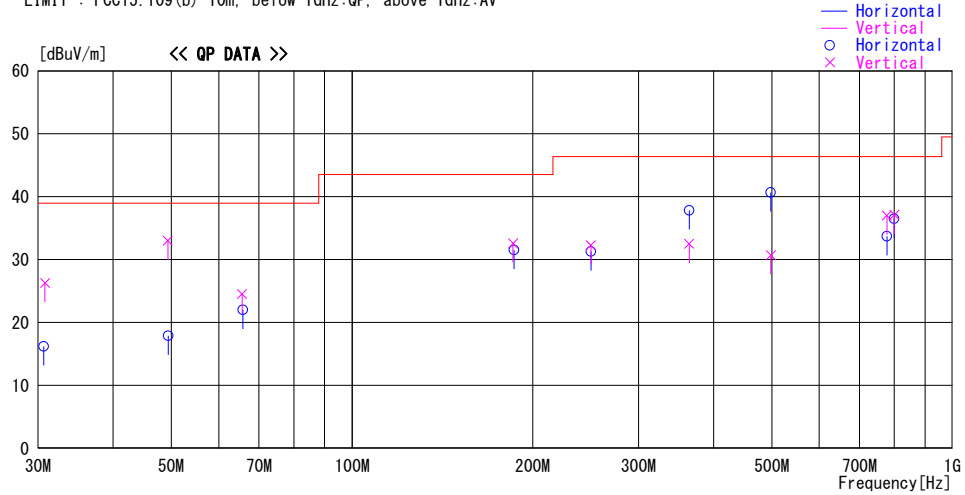
Frequency [MHz]	Reading Level		Corr. Factor	Results		Limit		Margin		Phase	Comment
	QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]		
0.28327	28.8	25.0	13.5	42.3	38.5	79.0	66.0	36.7	27.5	N	
0.56062	25.6	21.7	13.5	39.1	35.2	73.0	60.0	33.9	24.8	N	
0.84279	18.9	15.3	13.6	32.5	28.9	73.0	60.0	40.5	31.1	N	
0.96954	18.4	15.3	13.6	32.0	28.9	73.0	60.0	41.0	31.1	N	
1.52796	14.1	10.1	13.6	27.7	23.7	73.0	60.0	45.3	36.3	N	
1.67134	17.5	12.8	13.6	31.1	26.4	73.0	60.0	41.9	33.6	N	
0.28327	24.8	21.1	13.5	38.3	34.6	79.0	66.0	40.7	31.4	L	
0.55952	25.2	21.4	13.5	38.7	34.9	73.0	60.0	34.3	25.1	L	
0.84169	18.7	15.1	13.6	32.3	28.7	73.0	60.0	40.7	31.3	L	
0.96844	18.4	15.3	13.6	32.0	28.9	73.0	60.0	41.0	31.1	L	
1.52796	14.7	10.4	13.6	28.3	24.0	73.0	60.0	44.7	36.0	L	
1.67134	17.4	12.7	13.6	31.0	26.3	73.0	60.0	42.0	33.7	L	

CHART: WITH FACTOR Peak hold data. CALCULATION : RESULT = READING + C.F (LISN + CABLE + ATT)  
Except for the above table: adequate margin data below the limits.

## Radiated Emission

Report No. 12519284H  
Test place Ise EMC Lab.  
Semi Anechoic Chamber No.1  
Date October 19, 2018  
Temperature / Humidity 20 deg. C / 61 % RH  
Engineer Masaya Minami  
(Below 1 GHz)  
Mode Mode 1

LIMIT : FCC15.109(b) 10m, below 1GHz:QP, above 1GHz:AV



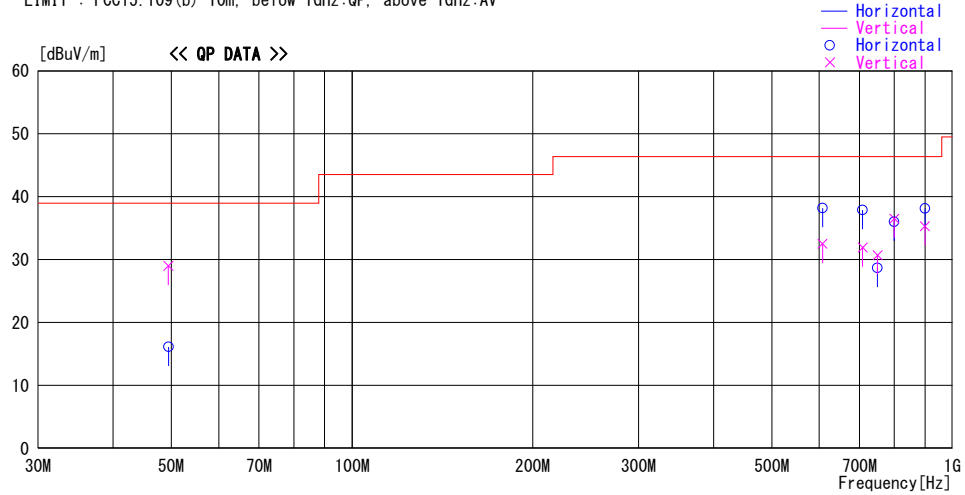
Frequency [MHz]	Reading [dBuV]	DET	Antenna	Loss&	Level	Angle	Height	Polar.	Limit	Margin	Comment
			Factor	Gain							
			[dB/m]	[dB]	[dBuV/m]	[Deg]	[cm]		[dBuV/m]	[dB]	
30.681	30.0	QP	17.8	-31.6	16.2	359	400	Hori.	39.0	22.8	
30.811	40.1	QP	17.8	-31.6	26.3	350	100	Vert.	39.0	12.7	
49.348	53.0	QP	11.2	-31.2	33.0	351	100	Vert.	39.0	6.0	
49.419	37.9	QP	11.2	-31.2	17.9	78	400	Hori.	39.0	21.1	
65.600	48.8	QP	6.6	-30.9	24.5	0	100	Vert.	39.0	14.5	
65.772	46.3	QP	6.6	-30.9	22.0	86	400	Hori.	39.0	17.0	
185.440	45.8	QP	16.2	-29.4	32.6	72	100	Vert.	43.5	10.9	
186.102	44.6	QP	16.3	-29.4	31.5	116	300	Hori.	43.5	12.0	
250.000	48.3	QP	11.7	-28.7	31.3	266	200	Hori.	46.4	15.1	
250.009	49.3	QP	11.7	-28.7	32.3	75	120	Vert.	46.4	14.1	
364.314	44.9	QP	15.0	-27.4	32.5	354	315	Vert.	46.4	13.9	
364.604	50.2	QP	15.0	-27.4	37.8	346	179	Hori.	46.4	8.6	
498.197	49.1	QP	18.0	-26.4	40.7	171	161	Hori.	46.4	5.7	
498.197	39.1	QP	18.0	-26.4	30.7	0	200	Vert.	46.4	15.7	
777.462	40.7	QP	20.5	-24.2	37.0	166	216	Vert.	46.4	9.4	
777.462	37.4	QP	20.5	-24.2	33.7	247	156	Hori.	46.4	12.7	
800.000	40.4	QP	20.8	-24.1	37.1	161	191	Vert.	46.4	9.3	
800.000	39.8	QP	20.8	-24.1	36.5	230	154	Hori.	46.4	9.9	

CHART: WITH FACTOR ANT TYPE: -30MHZ: LOOP, 30-200MHZ: BICONICAL, 200-1000MHZ: LOGPERIODIC, 1000MHZ-: HORN  
CALCULATION: RESULT = READING + ANT FACTOR + LOSS & GAIN (CABLE + ATT - GAIN(AMP))

## Radiated Emission

Report No. 12519284H  
Test place Ise EMC Lab.  
Semi Anechoic Chamber No.1  
Date October 19, 2018  
Temperature / Humidity 20 deg. C / 61 % RH  
Engineer Masaya Minami  
(Below 1 GHz)  
Mode Mode 2

LIMIT : FCC15.109(b) 10m, below 1GHz:QP, above 1GHz:AV



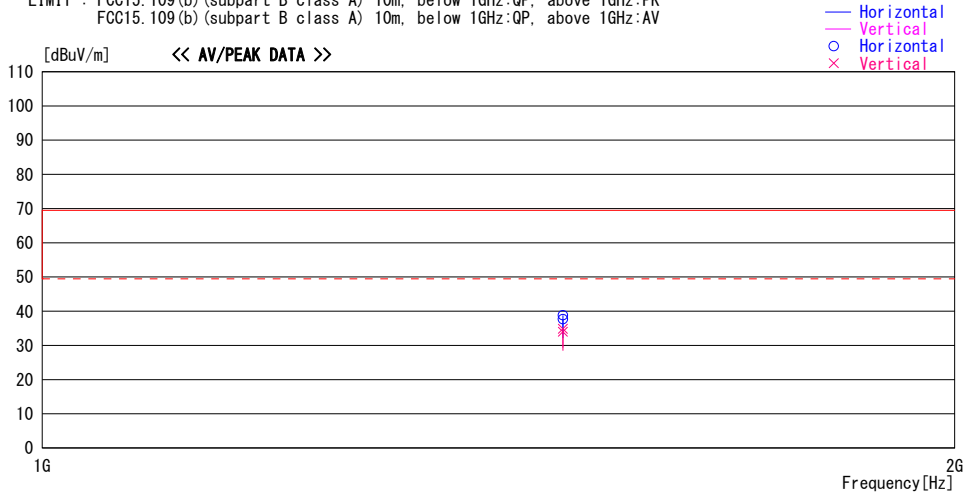
Frequency [MHz]	Reading [dBuV]	DET	Antenna		Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
			Factor [dB/m]	Loss & Gain [dB]							
49.464	36.1	QP	11.2	-31.2	16.1	212	400	Hori.	39.0	22.9	
49.442	49.0	QP	11.2	-31.2	29.0	244	100	Vert.	39.0	10.0	
607.504	44.1	QP	19.5	-25.4	38.2	229	167	Hori.	46.4	8.2	
607.480	38.4	QP	19.5	-25.4	32.5	189	117	Vert.	46.4	13.9	
708.731	42.7	QP	19.9	-24.7	37.9	189	167	Hori.	46.4	8.5	
708.721	36.7	QP	19.9	-24.7	31.9	79	245	Vert.	46.4	14.5	
750.000	35.0	QP	20.1	-24.4	30.7	173	243	Vert.	46.4	15.7	
750.000	33.0	QP	20.1	-24.4	28.7	172	151	Hori.	46.4	17.7	
800.000	39.8	QP	20.8	-24.1	36.5	178	189	Vert.	46.4	9.9	
800.000	39.3	QP	20.8	-24.1	36.0	219	138	Hori.	46.4	10.4	
900.000	36.8	QP	21.9	-23.4	35.3	171	155	Vert.	46.4	11.1	
900.000	39.6	QP	21.9	-23.4	38.1	129	117	Hori.	46.4	8.3	

CHART: WITH FACTOR ANT TYPE: -30MHZ: LOOP, 30-200MHZ: BICONICAL, 200-1000MHZ: LOGPERIODIC, 1000MHZ-: HORN  
CALCULATION: RESULT = READING + ANT FACTOR + LOSS & GAIN (CABLE + ATT - GAIN(AMP))

## Radiated emission

Report No. 12519284H  
Test place Ise EMC Lab.  
Semi Anechoic Chamber No.4  
Date October 18, 2018  
Temperature / Humidity 23 deg. C / 45 % RH  
Engineer Koji Yamamoto  
(Above 1 GHz)  
Mode Mode 1

LIMIT : FCC15.109 (b) (subpart B class A) 10m, below 1GHz:QP, above 1GHz:PK  
FCC15.109 (b) (subpart B class A) 10m, below 1GHz:QP, above 1GHz:AV



Frequency [MHz]	Reading [dBuV]	DET	Antenna	Loss&	Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
			Factor [dB/m]	Gain [dB]							
1485.002	53.6	PK	25.4	-40.2	38.8	190	120	Hori.	69.5	30.7	
1485.002	49.7	PK	25.4	-40.2	34.9	27	120	Vert.	69.5	34.6	
1485.002	52.5	AV	25.4	-40.2	37.7	190	120	Hori.	49.5	11.8	
1485.002	48.8	AV	25.4	-40.2	34.0	27	120	Vert.	49.5	15.5	

CHART: WITH FACTOR

ANT TYPE: - 30 MHz: LOOP, 30 MHz - 200 MHz: BICONICAL, 200 MHz - 1000 MHz: LOGPERIODIC, 1000 MHz -: HORN  
CALCULATION: RESULT = READING + ANT FACTOR + LOSS & GAIN (CABLE - GAIN(AMP) + D-factor)

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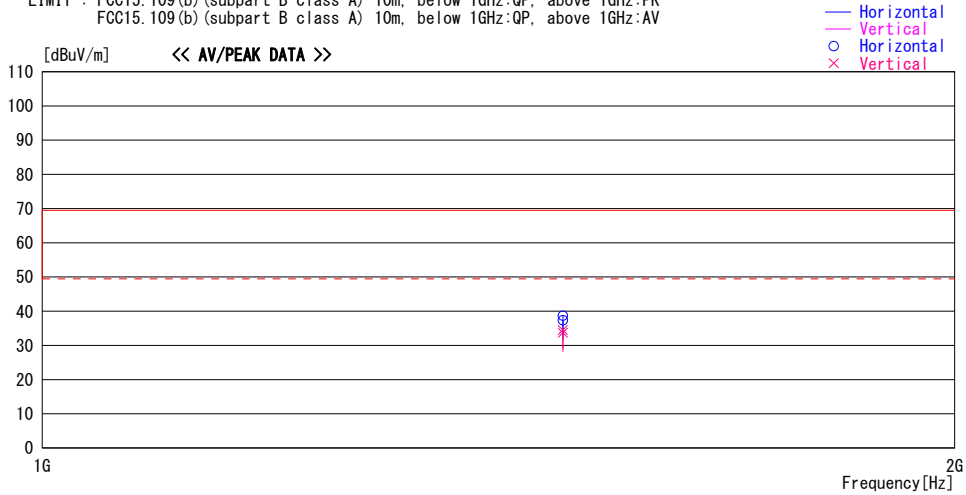
Facsimile : +81 596 24 8124



### Radiated emission

Report No. 12519284H  
Test place Ise EMC Lab.  
Semi Anechoic Chamber No.4  
Date October 18, 2018  
Temperature / Humidity 23 deg. C / 45 % RH  
Engineer Koji Yamamoto  
(Above 1 GHz)  
Mode Mode 2

LIMIT : FCC15.109 (b) (subpart B class A) 10m, below 1GHz:QP, above 1GHz:PK  
FCC15.109 (b) (subpart B class A) 10m, below 1GHz:QP, above 1GHz:AV



Frequency [MHz]	Reading [dBuV]	DET	Antenna	Loss&	Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
			Factor [dB/m]	Gain [dB]							
1485.002	53.5	PK	25.4	-40.2	38.7	190	120	Hori.	69.5	30.8	
1485.002	49.3	PK	25.4	-40.2	34.5	27	120	Vert.	69.5	35.0	
1485.002	52.1	AV	25.4	-40.2	37.3	190	120	Hori.	49.5	12.2	
1485.002	48.5	AV	25.4	-40.2	33.7	27	120	Vert.	49.5	15.8	

CHART: WITH FACTOR

ANT TYPE: - 30 MHz: LOOP, 30 MHz - 200 MHz: BICONICAL, 200 MHz - 1000 MHz: LOGPERIODIC, 1000 MHz -: HORN  
CALCULATION: RESULT = READING + ANT FACTOR + LOSS & GAIN (CABLE - GAIN(AMP) + D-factor)

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## APPENDIX 2: Test instruments

### EMI test equipment

Test Item	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Calibration Due Date	Cal Int
CE/RE	142227	Measure	KOMELON	KMC-36	-	-	-	-
CE/RE	141545	DIGITAL HiTESTER	HIOKI	3805	51201148	01/09/2018	01/31/2019	12
CE	141217	Coaxial cable	Fujikura/Suhner/TSJ	5D-2W(10m)/ SFM141(5m)/ 421-010(1m)/ sucoform141-PE(1m)/ RFM-E121 (Switcher)	-/04178	06/13/2018	06/30/2019	12
CE	141248	Attenuator	JFW Industries, Inc.	50FP-013H2 N	-	12/19/2017	12/31/2018	12
CE	141935	Terminator	TME	CT-01BP	-	12/11/2017	12/31/2018	12
CE	141354	LISN	KYORITSU	KNW-407	8-1851-4	12/12/2017	12/31/2018	12
CE	141353	LISN	KYORITSU	KNW-407	8-1851-3	12/12/2017	12/31/2018	12
CE	141358	LISN(AMN)	Schwarzbeck	NSLK8127	8127-730	07/25/2018	07/31/2019	12
CE/RE	141951	EMI Test Receiver	Rohde & Schwarz	ESR26	101408	01/30/2018	01/31/2019	12
CE/RE	141152	EMI measurement program	TSJ	TEPTO-DV	-	-	-	-
CE/RE	141562	Thermo-Hygrometer	CUSTOM	CTH-180	1501	01/24/2018	01/31/2019	12
CE/RE	142011	AC4_Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	06/28/2018	06/30/2020	24
RE	141412	Microwave Cable	Junkosha	MWX221	1305S002R(1m) / 1405S146(5m)	06/14/2018	06/30/2019	12
RE	141581	MicroWave System Amplifier	AGILENT	83017A	650	10/04/2018	10/31/2019	12
RE	141508	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	9120D-557	06/08/2018	06/30/2019	12
RE	142226	Measure	KOMELON	KMC-36	-	-	-	-
RE	141950	EMI Test Receiver	Rohde & Schwarz	ESU26	100412	06/15/2018	06/30/2019	12
RE	141264	Logperiodic Antenna (200-1000MHz)	Schwarzbeck	VUSLP9111B	911B-189	06/01/2018	06/30/2019	12
RE	141585	Pre Amplifier	MITEQ	MLA-10K01-B01-35	1237616	02/19/2018	02/27/2019	12
RE	141998	AC1_Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 10m	DA-06881	06/18/2018	06/30/2020	24
RE	141566	Thermo-Hygrometer	CUSTOM	CTH-201	A08Q26	01/24/2018	01/31/2019	12
RE	141213	Attenuator(6dB)	Weinschel Corp	2	BK7971	11/14/2017	11/30/2018	12
RE	141530	Digital Tester	Fluke Corporation	FLUKE 26-3	78030621	08/21/2018	08/31/2019	12
RE	141350	Coaxial Cable	Suhner/storm/Agilent/TSJ	-	-	06/04/2018	06/30/2019	12
RE	141198	Biconical Antenna	Schwarzbeck	BBA9106	2513	06/01/2018	06/30/2019	12

\*Hyphens for Last Calibration Date, Calibration Due Date and Cal Int are instruments that Calibration is not required (e.g. software), or instruments checked in advance before use.

The expiration date of the calibration is the end of the expired month.

All equipment is calibrated with valid calibrations. Each measurement data is traceable to the national or international standards.

As for some calibrations performed after the tested dates, those test equipment have been controlled by means of an unbroken chains of calibrations.

Test item:

CE: Conducted emission

RE: Radiated emission

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