



EMI TEST REPORT

Test Report No. : 12478809H-C-R1

Applicant : Mitsubishi Electric Corporation Kyoto Works
Type of Equipment : Digital Color Printer
Model No. : CP-M1E
FCC ID : 2APT9KSPCP-M1
Test regulation : FCC Part 15 Subpart B: 2018 Class A
ICES-003 Issue 6: 2016 + Amendment 1: 2017 Class A
Test Result : Complied

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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 12478809H-C. 12478809H-C is replaced with this report.

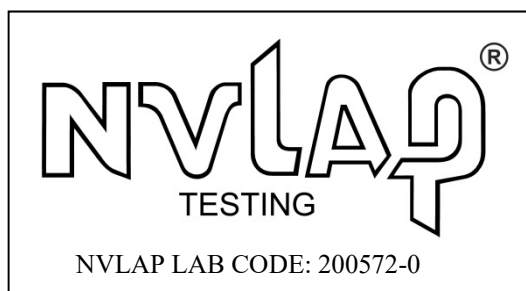
Date of test: November 2 and 18, 2018

Representative test engineer:


Shuichi Ohyama
Engineer
Consumer Technology Division

Approved by:


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/

- ☐ The testing in which "Non-accreditation" is displayed is outside the accreditation scopes in UL Japan.
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13-EM-F0429

REVISION HISTORY

Original Test Report No.: 12478809H-C

[illegible]

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SECTION 1: Customer information

Company Name	:	Mitsubishi Electric Corporation Kyoto Works
Address	:	1 Zusho Baba Nagaokakyo-city Kyoto, 617-8550 Japan
Telephone Number	:	+81-75-958-3249
Facsimile Number	:	+81-75-958-3709
Contact Person	:	Terauchi Shuhei

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

2.1 Identification of E.U.T.

Type of Equipment	:	Digital Color Printer
Model No.	:	CP-M1E
Serial No.	:	Refer to Section 4, Clause 4.2
Rating	:	AC 100 V to 240 V, 50 / 60 Hz
Receipt Date of Sample	:	October 25, 2018
Country of Mass-production	:	Malaysia
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: CP-M1E (referred to as the EUT in this report) is a Digital Color Printer.

Radio Specification

Radio Type	:	Transceiver
Frequency of Operation	:	13.56 MHz
Modulation	:	ASK
Antenna type	:	Pattern Antenna
Clock frequency	:	CPU core: 600 MHz (Internal PLL 2.0 GHz (max)), DDR3: 400 MHz, RFID: 13.56 MHz, FPGA: 60 MHz / 120 MHz

<Variant model>

Model: CP-M1E has variant model: CP-M1A.

The difference of the these models is power code (shape of plug for destination) only.

These differences cause no influence to radio specification.

There was no degradation of EMC characteristic.

They are identical in electronic characteristics.

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

Test specification : ICES-003 Issue 6: 2016 + Amendment 1: 2017
Title : Spectrum Management and Telecommunications
Interference-Causing Equipment Standard
Information Technology Equipment (Including Digital Apparatus) –
Limits and Methods of Measurement

3.2 Procedures and results

Item	Test Procedure	Limits	Deviation	Worst margin	Result
Conducted emission	FCC: ANSI C63.4: 2014 7. AC power - line conducted emission measurements	Class A	N/A	[QP] 18.5 dB 18.58875 MHz, L	Complied
	IC: ICES-003 Issue 6: 2016 + Amendment 1: 2017			[AV] 8.4 dB 13.56000 MHz, L	
Radiated emission	FCC: ANSI C63.4: 2014 8. Radiated emission measurements	Class A	N/A	6.8 dB 39.538 MHz, Vertical, QP	Complied
	IC: ICES-003 Issue 6: 2016 + Amendment 1: 2017				
*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.

3.4 Uncertainty

EMI

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

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

Polarity	Radiated emission (Below 1 GHz)			
	(3 m*)(+/-)		(10 m*)(+/-)	
	30 MHz to 200 MHz	200 MHz to 1000 MHz	30 MHz to 200 MHz	200 MHz to 1000 MHz
Horizontal	4.8 dB	5.2 dB	4.8 dB	5.0 dB
Vertical	5.0 dB	6.3 dB	4.9 dB	5.0 dB

Radiated emission (Above 1 GHz)				
(3 m*)(+/-)		(1 m*)(+/-)		(10 m*)(+/-)
1 GHz to 6 GHz	6 GHz to 18 GHz	10 GHz to 26.5 GHz	26.5 GHz to 40 GHz	1 GHz to 18 GHz
5.0 dB	5.3 dB	5.8 dB	5.8 dB	5.2 dB

* Measurement distance

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

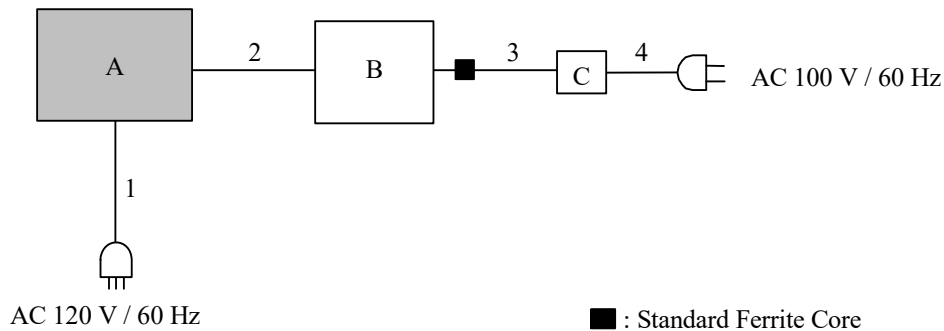
Refer to APPENDIX.

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

4.1 Operating Mode(s)

Mode	Remarks
1) Printing + RFID Communication mode	-
2) Ready + RFID Standby mode	

4.2 Configuration and peripherals



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

*Item No. A includes Receiver Antenna.

Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remark
A	Digital Color Printer	CP-M1E	M007	Mitsubishi Electric Corporation Kyoto Works	EUT
B	Laptop PC	CF-N8	0CKSA09265	Panasonic	-
C	AC Adapter	CF-AA6372BM6	6372BM610X10953E	Panasonic	-

List of cables used

No.	Name	Length (m)	Shield		Remark
			Cable	Connector	
1	AC Cable	1.8	Unshielded	Unshielded	-
2	USB Cable	1.5	Shielded	Shielded	-
3	DC Cable	1.0	Unshielded	Unshielded	-
4	AC Cable	0.9	Unshielded	Unshielded	-

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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

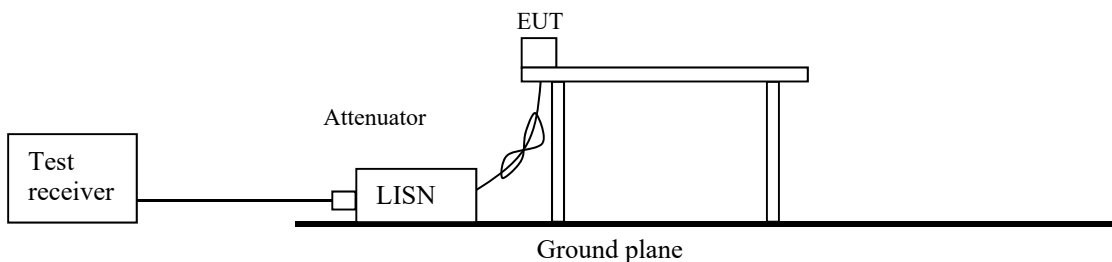
5.3 Test procedure

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

[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: November 2, 2018

Test engineer: Masaya Minami

UL Japan, Inc.

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SECTION 6: Radiated Emission

6.1 Operating environment

Test place : No.1 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 - 10000 MHz (Horn antenna)
Test distance : 10 m (30 MHz - 1000 MHz) / 3 m (1000 MHz - 10000 MHz)
EUT position : Table top
EUT operation mode : See Clause 4.1

6.4 Test procedure

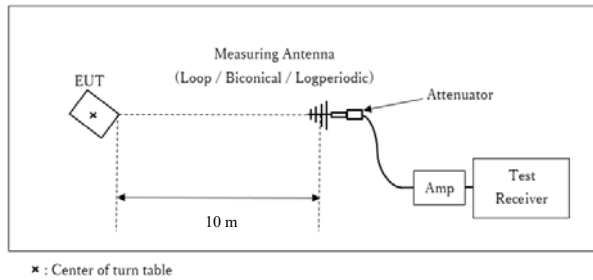
The height of the measuring antenna varied between 1 and 4 m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.

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.

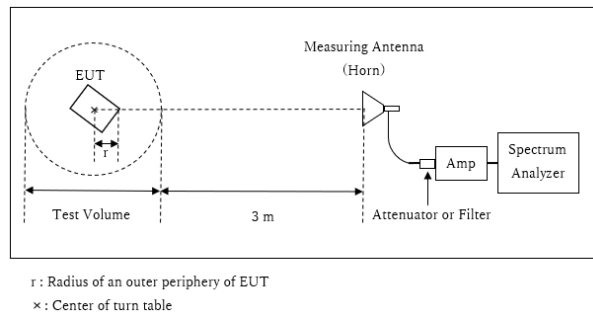
Frequency	Below 1GHz	Above 1GHz
Instrument used	Test Receiver	Test Receiver
IF Bandwidth	QP: BW 120 kHz	PK: BW 1 MHz, CISPR AV: BW 1 MHz

[Test Setup]
Below 1 GHz



Test Distance: 10 m

1 GHz - 10 GHz



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 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: November 18, 2018

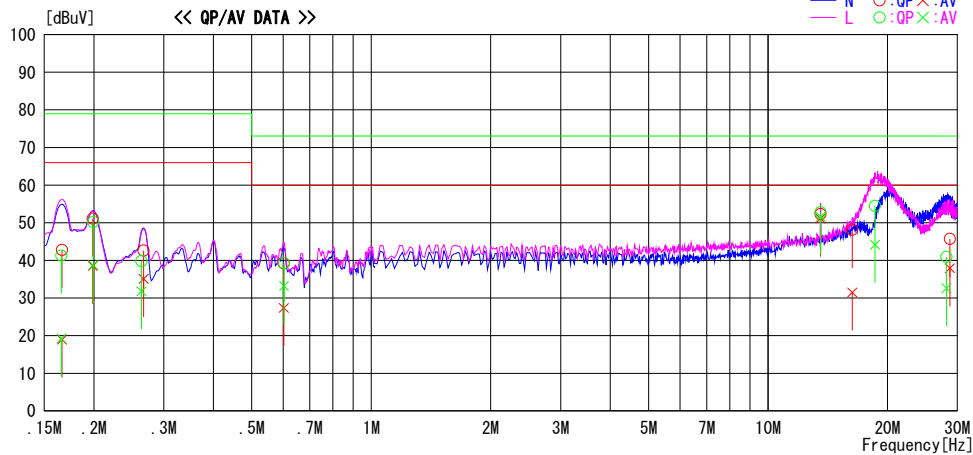
Test engineer: Shuichi Ohyama

APPENDIX 1: Test data

Conducted Emission

Report No. 12478809H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.4
Date November 2, 2018
Temperature / Humidity 21 deg. C / 36 % RH
Engineer Masaya Minami
Mode Mode 1

LIMIT : FCC15.107(b) QP ClassA
FCC15.107(b) AV ClassA



Frequency	Reading Level		Corr.	Results		Limit		Margin		Phase
	QP	AV		QP	AV	QP	AV	QP	AV	
[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]	
0.16629	29.3	5.5	13.5	42.8	19.0	79.0	66.0	36.2	47.0	N
0.19882	37.6	25.0	13.5	51.1	38.5	79.0	66.0	27.9	27.5	N
0.26681	29.1	21.6	13.5	42.6	35.1	79.0	66.0	36.4	30.9	N
0.60208	25.6	13.8	13.6	39.2	27.4	73.0	60.0	33.8	32.6	N
13.56000	38.0	36.8	14.3	52.3	51.1	73.0	60.0	20.7	8.9	N
16.29610	33.7	17.1	14.4	48.1	31.5	73.0	60.0	24.9	28.5	N
28.71310	30.8	23.0	14.9	45.7	37.9	73.0	60.0	27.3	22.1	N
0.16569	27.8	5.8	13.5	41.3	19.3	79.0	66.0	37.7	46.7	L
0.19928	36.7	25.2	13.5	50.2	38.7	79.0	66.0	28.8	27.3	L
0.26361	26.3	18.3	13.5	39.8	31.8	79.0	66.0	39.2	34.2	L
0.60276	25.7	19.6	13.6	39.3	33.2	73.0	60.0	33.7	26.8	L
13.56000	38.5	37.3	14.3	52.8	51.6	73.0	60.0	20.2	8.4	L
18.58875	40.0	29.7	14.5	54.5	44.2	73.0	60.0	18.5	15.8	L
28.13990	26.1	17.8	14.8	40.9	32.6	73.0	60.0	32.1	27.4	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.

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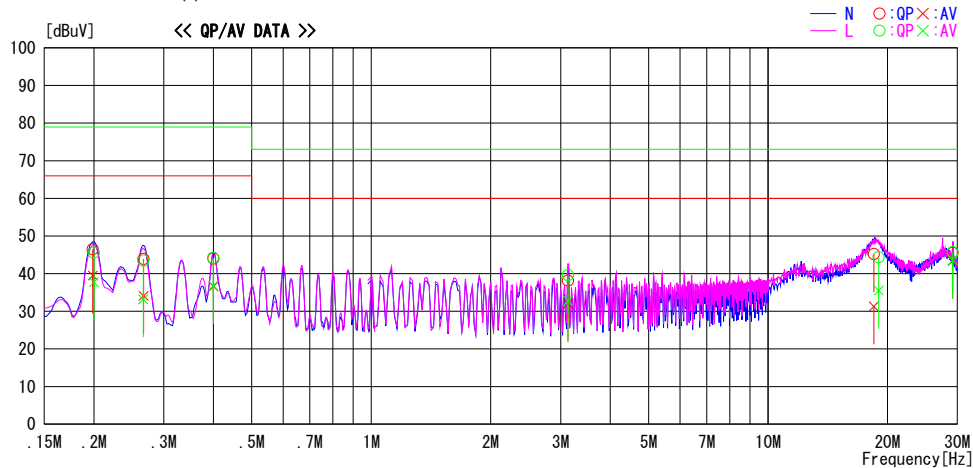
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Conducted Emission

Report No. 12478809H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.4
Date November 2, 2018
Temperature / Humidity 21 deg. C / 36 % RH
Engineer Masaya Minami
Mode Mode 2

LIMIT : FCC15.107(b) QP ClassA
FCC15.107(b) AV ClassA



Frequency [MHz]	Reading Level		Corr. Factor	Results		Limit		Margin		Phase
	QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]	
0.19882	33.0	26.0	13.5	46.5	39.5	79.0	66.0	32.5	26.5	N
0.26700	30.4	20.6	13.5	43.9	34.1	79.0	66.0	35.1	31.9	N
0.40021	30.5	23.1	13.5	44.0	36.6	79.0	66.0	35.0	29.4	N
3.13414	24.4	18.3	13.7	38.1	32.0	73.0	60.0	34.9	28.0	N
18.45823	30.7	16.8	14.5	45.2	31.3	73.0	60.0	27.8	28.7	N
29.19110	30.6	28.5	14.9	45.5	43.4	73.0	60.0	27.5	16.6	N
0.20008	32.1	24.2	13.5	45.6	37.7	79.0	66.0	33.4	28.3	L
0.26632	30.0	19.7	13.5	43.5	33.2	79.0	66.0	35.6	32.8	L
0.39988	30.7	23.3	13.5	44.2	36.8	79.0	66.0	34.8	29.2	L
3.13430	25.9	19.1	13.7	39.6	32.8	73.0	60.0	33.4	27.2	L
18.99251	29.9	21.0	14.5	44.4	35.5	73.0	60.0	28.6	24.5	L
29.18984	30.8	28.6	14.9	45.7	43.5	73.0	60.0	27.3	16.5	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.

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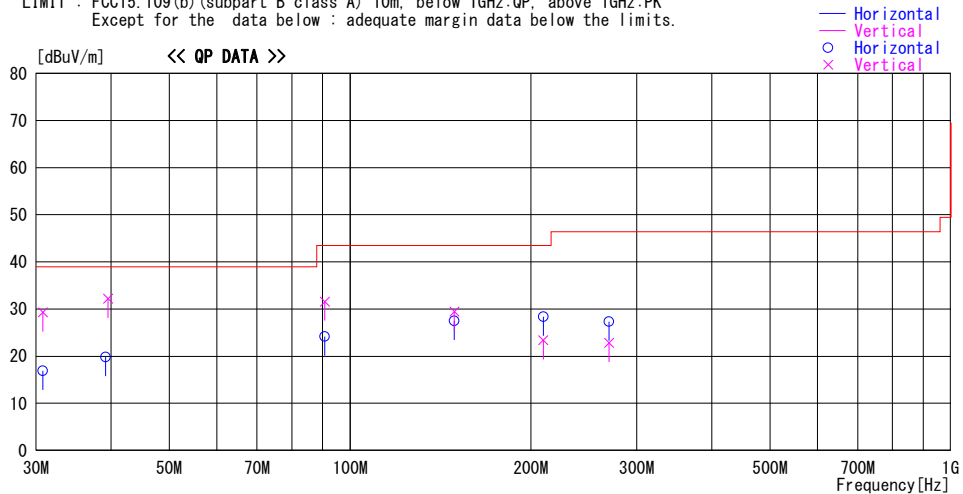
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Radiated emission

Report No. 12478809H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.1
Date November 18, 2018
Temperature / Humidity 23 deg. C / 46 % RH
Engineer Shuichi Ohyama
(Below 1 GHz)
Mode Mode 1

LIMIT : FCC15.109(b) (subpart B class A) 10m, below 1GHz:QP, above 1GHz:PK
Except for the data below : adequate margin data below the limits.



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]							
30.812	30.7	QP	17.8	-31.6	16.9	359	400	Hori.	39.0	22.1	
30.812	43.1	QP	17.8	-31.6	29.3	75	100	Vert.	39.0	9.7	
39.538	48.9	QP	14.7	-31.4	32.2	62	100	Vert.	39.0	6.8	
39.198	36.4	QP	14.8	-31.4	19.8	132	400	Hori.	39.0	19.2	
90.797	46.3	QP	8.4	-30.5	24.2	253	400	Hori.	43.5	19.3	
90.797	53.7	QP	8.4	-30.5	31.6	177	100	Vert.	43.5	11.9	
149.192	42.4	QP	14.9	-29.8	27.5	89	400	Hori.	43.5	16.0	
149.192	44.4	QP	14.9	-29.8	29.5	192	100	Vert.	43.5	14.0	
209.838	46.6	QP	11.0	-29.2	28.4	0	254	Hori.	43.5	15.1	
209.838	41.6	QP	11.0	-29.2	23.4	78	100	Vert.	43.5	20.1	
269.836	43.2	QP	12.6	-28.5	27.3	0	182	Hori.	46.4	19.1	
269.836	38.7	QP	12.6	-28.5	22.8	338	100	Vert.	46.4	23.6	

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 + ATT - GAIN(AMP))

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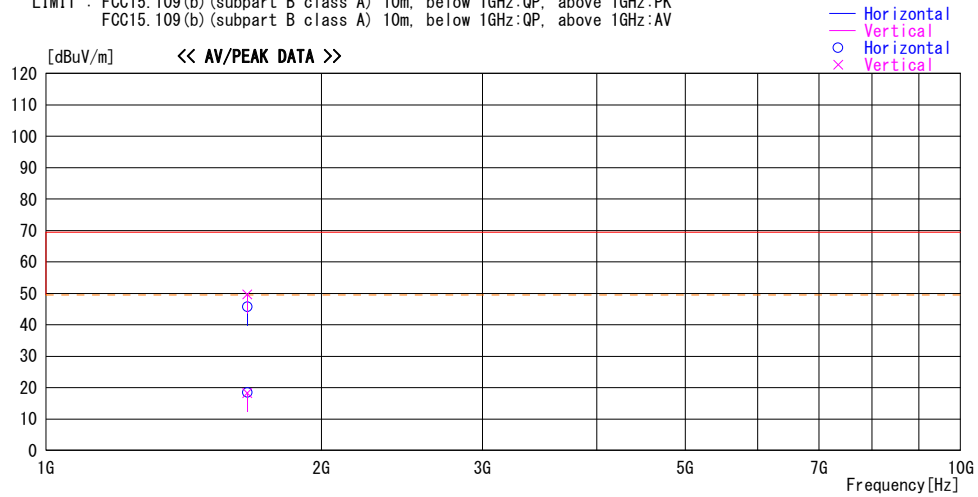
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Radiated emission

Report No. 12478809H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.1
Date November 18, 2018
Temperature / Humidity 23 deg. C / 46 % RH
Engineer Shuichi Ohyama
(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	Margin	Comment
			Factor [dB/m]	Gain [dB]					[dBuV/m]	[dB]	
1659.897	63.9	PK	25.4	-43.6	45.7	256	118	Hori.	69.5	23.8	
1659.897	36.7	AV	25.4	-43.6	18.5	256	118	Hori.	49.5	31.0	
1659.897	67.8	PK	25.4	-43.6	49.6	340	100	Vert.	69.5	19.9	
1659.897	36.5	AV	25.4	-43.6	18.3	340	100	Vert.	49.5	31.2	

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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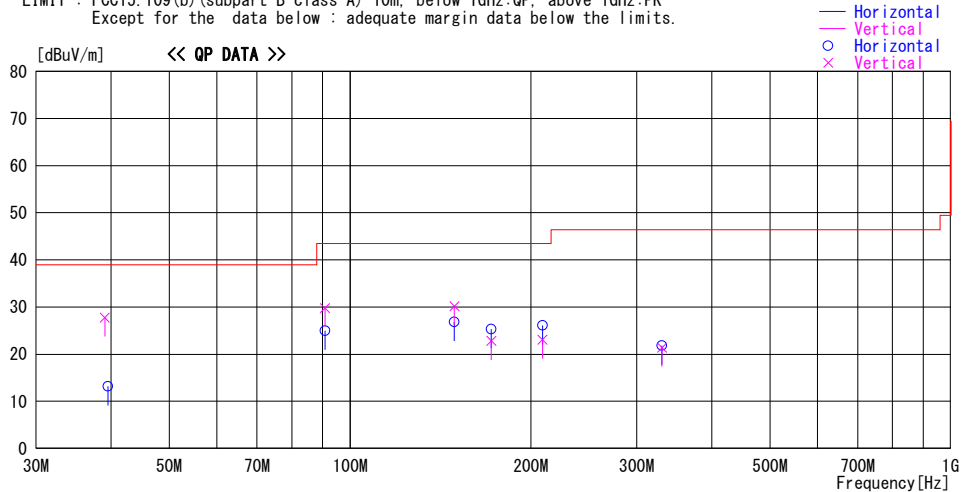
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Radiated emission

Report No. 12478809H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.1
Date November 18, 2018
Temperature / Humidity 23 deg. C / 46 % RH
Engineer Shuichi Ohyama
(Below 1 GHz)
Mode Mode 2

LIMIT : FCC15.109(b) (subpart B class A) 10m, below 1GHz:QP, above 1GHz:PK
Except for the data below : adequate margin data below the limits.



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]							
39.048	44.3	QP	14.9	-31.4	27.8	117	100	Vert.	39.0	11.2	
39.539	29.9	QP	14.7	-31.4	13.2	359	400	Hori.	39.0	25.8	
90.816	51.9	QP	8.4	-30.5	29.8	155	100	Vert.	43.5	13.7	
90.816	47.1	QP	8.4	-30.5	25.0	287	400	Hori.	43.5	18.5	
149.185	41.7	QP	14.9	-29.8	26.8	93	400	Hori.	43.5	16.7	
149.185	45.1	QP	14.9	-29.8	30.2	173	100	Vert.	43.5	13.3	
171.898	39.0	QP	15.9	-29.6	25.3	70	400	Hori.	43.5	18.2	
171.898	36.5	QP	15.9	-29.6	22.8	0	100	Vert.	43.5	20.7	
209.189	41.3	QP	11.0	-29.2	23.1	0	100	Vert.	43.5	20.4	
209.189	44.3	QP	11.0	-29.2	26.1	19	284	Hori.	43.5	17.4	
330.492	34.7	QP	14.5	-27.8	21.4	357	100	Vert.	46.4	25.0	
330.492	35.1	QP	14.5	-27.8	21.8	104	182	Hori.	46.4	24.6	

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 + ATT - GAIN(AMP))

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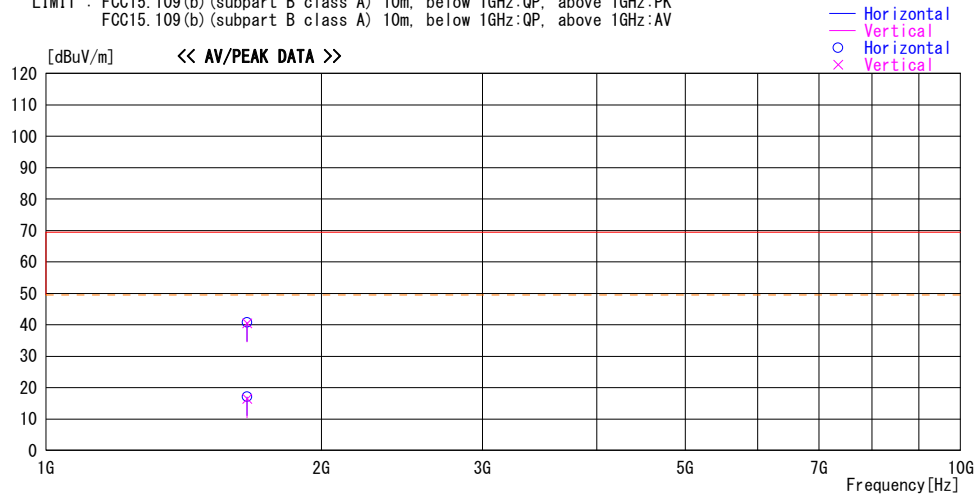
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Radiated emission

Report No. 12478809H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.1
Date November 18, 2018
Temperature / Humidity 23 deg. C / 46 % RH
Engineer Shuichi Ohyama
(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	Margin	Comment
			Factor [dB/m]	Gain [dB]					[dBuV/m]	[dB]	
1659.062	59.0	PK	25.4	-43.6	40.8	44	100	Hori.	69.5	28.7	
1659.062	35.3	AV	25.4	-43.6	17.1	44	100	Hori.	49.5	32.4	
1659.062	58.7	PK	25.4	-43.6	40.5	90	100	Vert.	69.5	29.0	
1659.062	34.6	AV	25.4	-43.6	16.4	90	100	Vert.	49.5	33.1	

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

Test Instruments

Test Item	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Calibration Due Date	Cal Int
CE	141562	Thermo-Hygrometer	CUSTOM	CTH-180	1501	1/24/2018	1/31/2019	12
CE	141935	Terminator	TME	CT-01BP	-	12/11/2017	12/31/2018	12
CE	142011	AC4 Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	6/28/2018	6/30/2020	24
CE	141358	LISN(AMN)	Schwarzbeck	NSLK8127	8127-730	7/25/2018	7/31/2019	12
CE	141357	LISN(AMN)	Schwarzbeck	NSLK8127	8127-729	7/24/2018	7/31/2019	12
CE/RE	141152	EMI measurement program	TSJ	TEPTO-DV	-	-	-	-
CE	141951	EMI Test Receiver	Rohde & Schwarz	ESR26	101408	1/30/2018	1/31/2019	12
CE	141545	DIGITAL HiTESTER	HIOKI	3805	51201148	1/9/2018	1/31/2019	12
CE	141217	Coaxial cable	Fujikura/Suhner/TSJ	5D-2W/SFM14 1/421-010/sucoform141-P	-/04178	6/13/2018	6/30/2019	12
CE	141248	Attenuator	JFW Industries, Inc.	50FP-013H2 N	-	12/19/2017	12/31/2018	12
CE	142227	Measure	KOMELON	KMC-36	-	-	-	-
RE	141198	Biconical Antenna	Schwarzbeck	BBA9106	2513	6/1/2018	6/30/2019	12
RE	141350	Coaxial Cable	Suhner/storm/Agilent/TSJ	-	-	6/4/2018	6/30/2019	12
RE	141213	Attenuator(6dB)	Weinschel Corp	2	BK7971	11/5/2018	11/30/2019	12
RE	141576	Pre Amplifier	AGILENT	8449B	3008A01671	2/16/2018	2/28/2019	12
RE	141393	Microwave Cable	Junkosha	MWX221	1604S254(1 m) / 1608S088(5 m)	8/8/2018	8/31/2019	12
RE	141511	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	253	6/4/2018	6/30/2019	12
RE	141994	AC1_Semi Anechoic Chamber(SVSWR)	TDK	Semi Anechoic Chamber 10m	DA-06881	4/4/2018	4/30/2019	12
RE	141566	Thermo-Hygrometer	CUSTOM	CTH-201	A08Q26	1/24/2018	1/31/2019	12
RE	141998	AC1_Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 10m	DA-06881	6/18/2018	6/30/2020	24
RE	141585	Pre Amplifier	MITEQ	MLA-10K01-B 01-35	1237616	2/19/2018	2/28/2019	12
RE	141264	Logperiodic Antenna(200-1000 MHz)	Schwarzbeck	VUSLP9111B	911B-189	6/1/2018	6/30/2019	12
RE	141950	EMI Test Receiver	Rohde & Schwarz	ESU26	100412	6/15/2018	6/30/2019	12
RE	141530	Digital Tester	Fluke Corporation	FLUKE 26-3	78030621	8/21/2018	8/31/2019	12
RE	142226	Measure	KOMELON	KMC-36	-	-	-	-

*Hyphens for Last Calibration Date, Calibration Due Date and Cal Int (month) 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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