



Test report No. : 11426404Y-B-R1  
Page : 1 of 26  
Issued date : October 14, 2016  
FCC ID : ZQDPCKCM50

# **EMI TEST REPORT**

**Test Report No. : 11426404Y-B-R1**

**Applicant:** Hitachi, Ltd. IoT & Cloud Services Business Division  
**Type of Equipment:** Portable Biometric Reader  
**Model No.:** PC-KCM50  
**FCC ID** ZQDPCKCM50  
**Test regulation:** FCC Part 15 Subpart B:2016 Class B  
ICES-003 Issue 6 Class B (SMSE-015-16)  
**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 limits of the above regulation.
4. The test results in this test report are traceable to the national or international standards.
5. This test report must not be used by the customer to claim product certification, approval, or endorsement by any agency of the Federal Government.
6. The opinions and the interpretations to the result of the description in this report are outside scopes where UL Japan has been accredited.
7. This test report covers EMC technical requirements. It does not cover administrative issues such as Manual or non-EMC test related Requirements. (if applicable)
8. This report is a revised version of 11426404Y-B. 11426404Y-B is replaced with this report.

**Date of test:**

September 12 and 13, 2016

**Representative  
test engineer:**

  
Toshifumi Yonoshige  
Engineer

Consumer Technology Division

**Approved by:**

  
Masamichi Ishii  
Manager

Consumer Technology Division



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

**UL Japan, Inc.**

**Yokowa EMC Lab.**

108 Yokowa-cho, Ise-shi, Mie-ken, 516-1106 JAPAN

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## **Section 1: Customer information**

Company Name : Hitachi, Ltd. IoT & Cloud Services Business Division  
Brand Name : HITACHI  
Address : Omori Bellport D Bldg.,26-3, Minami Oi 6-chome, Shinagawa-ku,  
Tokyo, 140-0013 Japan  
Telephone Number : +81 3 5471 2265  
Facsimile Number : +81 3 5471 2582  
Contact Person : Keiji Kitane

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

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

Type of equipment : Portable Biometric Reader  
Trade name : HITACHI  
Model No. : PC-KCM50  
Serial No. : No.40  
Rating : DC 5 V, 500 mA  
Country of Mass-production : Japan  
Condition of EUT : Engineering prototype  
(Not for Sale: This sample is equivalent to mass-produced items.)  
Size : 55 x 91 x 18 (Width x Depth x Height (mm))  
Modification of EUT : No modification by the test lab.  
Receipt Date of Sample : September 12, 2016

## 2.2 Product description

Model: PC-KCM50 (referred to as the EUT in this report) is a Portable Biometric Reader.

Feature of EUT:

Clock frequency(ies) in the system	:	168 MHz, 24 MHz
Radio Type	:	Transceiver
Frequency of Operation	:	2402 MHz - 2480 MHz
Modulation	:	GFSK
Power Supply (radio part input)	:	DC 3.3 V / 1.35 V
Antenna type	:	Internal Antenna
Antenna Gain	:	+ 1.7 dBi
Clock frequency (Maximum)	:	26 MHz

### **Section 3: Test specification, procedures and results**

#### **3.1 Test Specification**

Test Specification : FCC Part 15 Subpart B  
FCC Part 15 final revised on April 6, 2016.  
Title : FCC 47CFR Part15 Radio Frequency Device  
Subpart B Unintentional Radiators

Test Specification : ICES-003 Issue 6 (SMSE-015-16)  
Title : Spectrum Management and Telecommunications  
Interference-Causing Equipment Standard  
Information Technology Equipment (Including Digital Apparatus) –  
Limits and Methods of Measurement

#### **3.2 Procedures & results**

Item	Test Procedure	Limits	Deviation	Worst margin	Result
Conducted emission	ANSI C63.4: 2014 7. AC powerline conducted emission measurements	Class B	N/A	18.6 dB (0.16572 MHz, QP, L)	Complied
Radiated emission	ANSI C63.4: 2014 8. Radiated emission measurements	Class B	N/A	14.3 dB (300.001 MHz, Horizontal) (323.999 MHz, Horizontal) (732.001 MHz, Horizontal)	Complied
*1) Measurements were limited up to 12.5 GHz since the EUT has a Bluetooth module of highest operation frequency of 2.48 GHz. Test was performed consider this frequency. Note: UL Japan's EMI Work Procedures No. 13-EM-W0420					

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

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

#### **3.4 Confirmation**

**UL Japan, Inc. hereby confirms that E.U.T., in the configuration tested, complies with the specifications FCC Part 15 Subpart B:2016 Class B and ICES-003 Issue 6 Class B (SMSE-015-16).**

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### 3.5 Uncertainty

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

	Open area test site			Shielded room			
	No.1	No.2	No.3	No.1	No.2	No.3	No.7
	(±)	(±)	(±)	(±)	(±)	(±)	(±)
Conducted disturbance							
LISN (AMN)	9 kHz - 150 kHz	3.0 dB					
	150 kHz - 30 MHz	2.5 dB					
Radiated disturbance							
3 m	9 kHz - 30 MHz	3.6 dB	4.1 dB	5.0 dB	-	-	-
	30 MHz - 200 MHz (Horizontal)	4.5 dB	4.6 dB	4.6 dB	-	-	-
	30 MHz - 200 MHz (Vertical)	4.7 dB	4.8 dB	4.8 dB	-	-	-
	200 MHz - 1000 MHz (Horizontal)	5.0 dB	5.2 dB	5.2 dB	-	-	-
	200 MHz - 1000 MHz (Vertical)	6.1 dB	5.8 dB	5.8 dB	-	-	-
	1 GHz - 6 GHz	5.2 dB			-	-	-
	6 GHz - 18 GHz	5.4 dB			-	-	-

#### Conducted emission test

The data listed in this test report has enough margin, more than the site margin.

#### Radiated emission test

The data listed in this test report has enough margin, more than the site margin.

### 3.6 Test Location

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	IC Registration Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Other rooms
No.1 open area test site	2973A-1	-	40 x 20	-
No.2 open area test site	2973A-2	-	20 x 18	-
No.3 open area test site	2973A-3	-	20 x 18	-
No.1 shielded room	-	5.5 x 6.4 x 2.7	5.5 x 6.4	-
No.2 shielded room	-	4.5 x 3.6 x 2.7	4.5 x 3.6	-
No.3 shielded room	-	3.6 x 7.2 x 2.4	3.6 x 7.2	-
No.4 shielded room	-	5.5 x 5.0 x 2.4	4.35 x 3.35	-
No.5 shielded room	-	5.5 x 4.3 x 2.5	5.54 x 3.0	-
No.6 shielded room	-	5.2 x 3.2 x 2.9	5.2 x 3.2	-
No.7 shielded room	-	9.3 x 3.4 x 2.7	9.3 x 3.4	-
No.1 EMS lab. (Full-anechoic chamber)	-	5.0 x 8.0 x 3.5	-	-
No.2 EMS lab. (Full-anechoic chamber)	-	4.0 x 7.0 x 3.5	-	-

### 3.7 Test setup, Data of EMI & Test instruments

Refer to Appendix 1 to 3.

#### UL Japan, Inc. Yokowa EMC Lab.

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## Section 4: Operation of E.U.T. during testing

### 4.1 Operating modes

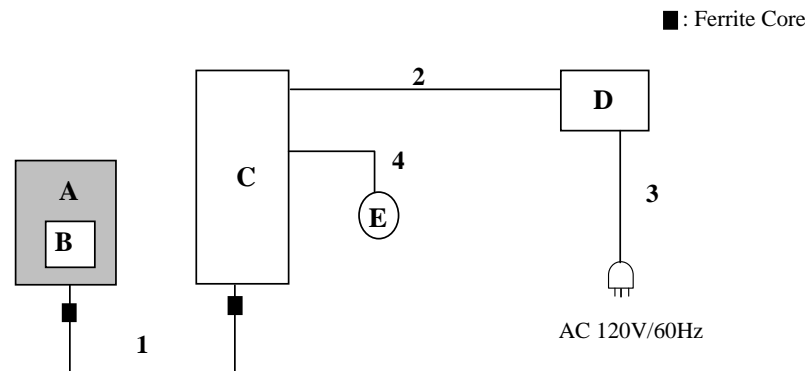
The EUT exercise program used during testing was designed to exercise the various system components in a manner similar to typical use.

Test sequence is used:

1. USB Communication
2. Standby

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

### 4.2 Configuration and peripherals



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

#### Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	FCC ID	Remark
A	Portable Biometric Reader	PC-KCM50	No.40	Hitachi, Ltd. IoT & Cloud Services Business Division	ZQDPCKCM50	EUT
B	Scale Jig	-	-	Hitachi, Ltd. IoT & Cloud Services Business Division	N/A	-
C	Laptop PC	HSTNN-115C-5	JPA5471LQL	HP Inc	DoC	-
D	AC Adapter	PA-1650-32HY	WECJN0A3U9HO3Z	HP Inc	DoC	-
E	Mouse	MSU1175	3C193C4415B	Lenovo Corporation	DoC	-

#### List of cables used

No.	Name	Length (m)	Cable Shield	Connector Shield	Remark
1	USB Cable	1.0	Shielded	Shielded	-
2	DC Power Cable	1.7	Unshielded	Unshielded	-
3	AC Power Cable	0.9	Unshielded	Unshielded	3 wire
4	Mouse Cable	1.8	Shielded	Shielded	-

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## **Section 5: Conducted emission**

### **5.1 Operating environment**

The test was carried out in shielded room.

Temperature : See data  
Humidity : See data

### **5.2 Test configuration**

EUT was placed on a wooden platform of nominal size, 1 m by 1.8 m raised 80 cm above the conducting ground plane. The rear of tabletop was located 40cm 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 and excess AC cable was bundled in center. I/O cables that were connected to the peripherals were bundled in center. They were folded back and forth forming a bundle 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 to the input power source. All unused 50 ohm connectors of the LISN were resistively terminated in 50 ohm when not connected to the measuring equipment.

Photographs of the set up are shown in Appendix 1.

### **5.3 Test conditions**

Frequency range : 0.15 MHz - 30 MHz  
EUT position : Table top

### **5.4 Test procedure**

The AC Mains Terminal Continuous disturbance Voltage had been measured with the EUT in shielded room. The EUT was connected to a Line Impedance Stabilization Network (LISN).

An overview sweep with peak detection has been performed.

The measurements had 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 : QP / CAV  
IF Band width : 9 kHz / 9 kHz

### **5.5 Results**

Summary of the test results: Pass

## **Section 6: Radiated emission**

### **6.1 Operating environment**

This test was carried out in open area test site.

Temperature : See data

Humidity : See data

### **6.2 Test configuration**

EUT was placed on a table which was consisted by wooden, polyethylene foam and polycarbonate of nominal size, 1m by 2 m raised 80 cm above the conducting ground plane.

The rear of EUT and its peripherals was aligned and flushed with rear of tabletop.

I/O cables that were connected to the peripherals were bundled in center. They were folded back and forth forming a bundle and were hanged 40 cm height to the ground plane. The measurements were performed for vertical or horizontal antenna polarization or both as necessary. 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 1.

### **6.3 Test conditions**

Frequency range : 30 MHz - 12500 MHz

Test distance : 3 m

EUT position : Table top

### **6.4 Test procedure**

The Radiated Electric Field Strength intensity has been measured on an open test site with a ground plane at a distance of 3 m\*.

\* Measuring distance

☐ The boundary of the EUT is defined by an imaginary straight-line periphery describing a simple geometric configuration encompassing the EUT.

☒ The boundary of the EUT is defined by an imaginary circular periphery.

☐ This test report use worse case for the setup.

Pre check measurements were performed in shielded room with a search coil at 30 MHz - 12500 MHz to distinguish disturbances of EUT from the ambient noise.

Measurements were performed with quasi-peak detector, average detector and peak detector.

The measuring antenna height was varied between 1 m 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 vertical or horizontal antenna polarization or both as necessary.

The radiated emission measurements were made with the following detector function of the test receiver and spectrum analyzer.

Frequency : 30 MHz-1000 MHz 1000 MHz-12500 MHz \*1)  
Instrument used : Test Receiver Test Receiver  
Detector Type : QP AV PK  
IF Band width : 120 kHz RBW 1 MHz RBW 1 MHz

\*1) The measurement data was adjusted to a 3 m distance using the following Distance Factor.

Distance factor:  $20 \log (\text{Actual distance}/3 \text{ m})$

Distance factor and actual distance are shown in Appendix 2.

## 6.5 Results

Summary of the test results: Pass

DATA OF CONDUCTED DISTURBANCE TEST

UL Japan, Inc. Yokowa EMC Lab. No.1 Shielded room  
Date : 09/13/2016

Report No. : 11426404Y-B-R1  
Power : DC 5V (PC AC120V/60Hz)  
Temp./Humi. : 22 deg.C / 51 % RH  
Engineer : Toshifumi Yoneshige

Mode / Remarks : 1.USB Communication / LS-11 LISN N Phase with Adapter\_HP OFF (2015-11-25)

LIMIT : FCC Part 15 B CLASS B (QP)  
FCC Part 15 B CLASS B (AV)

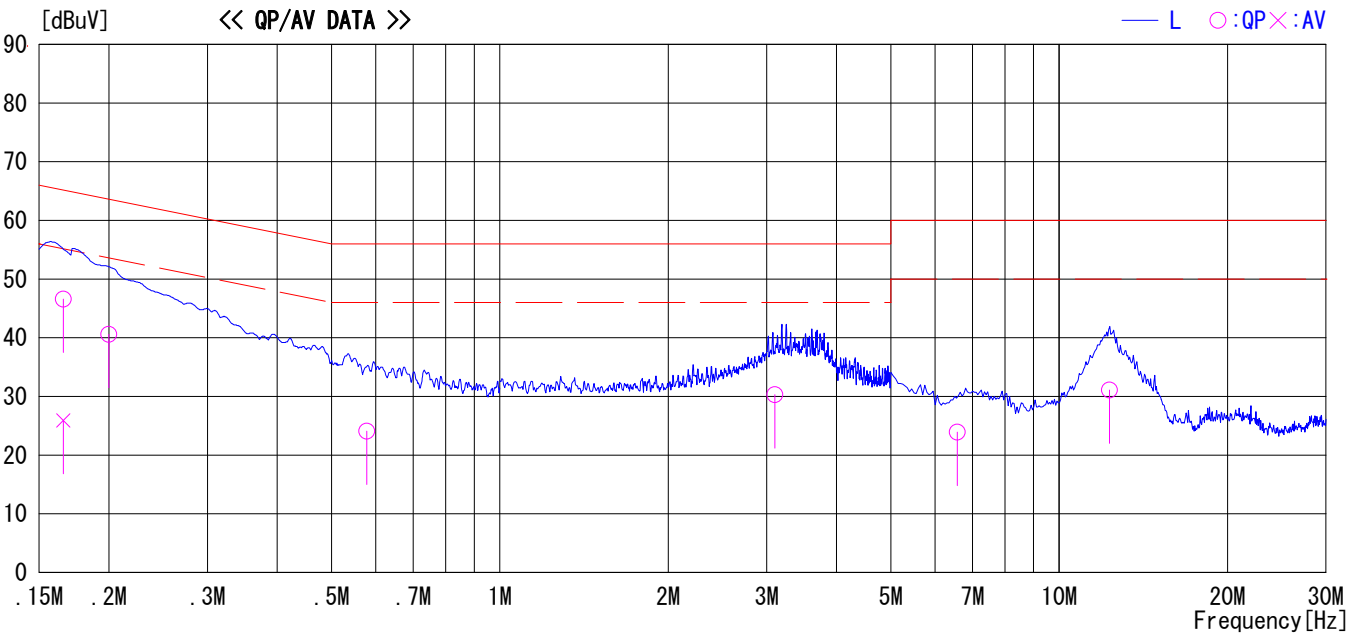
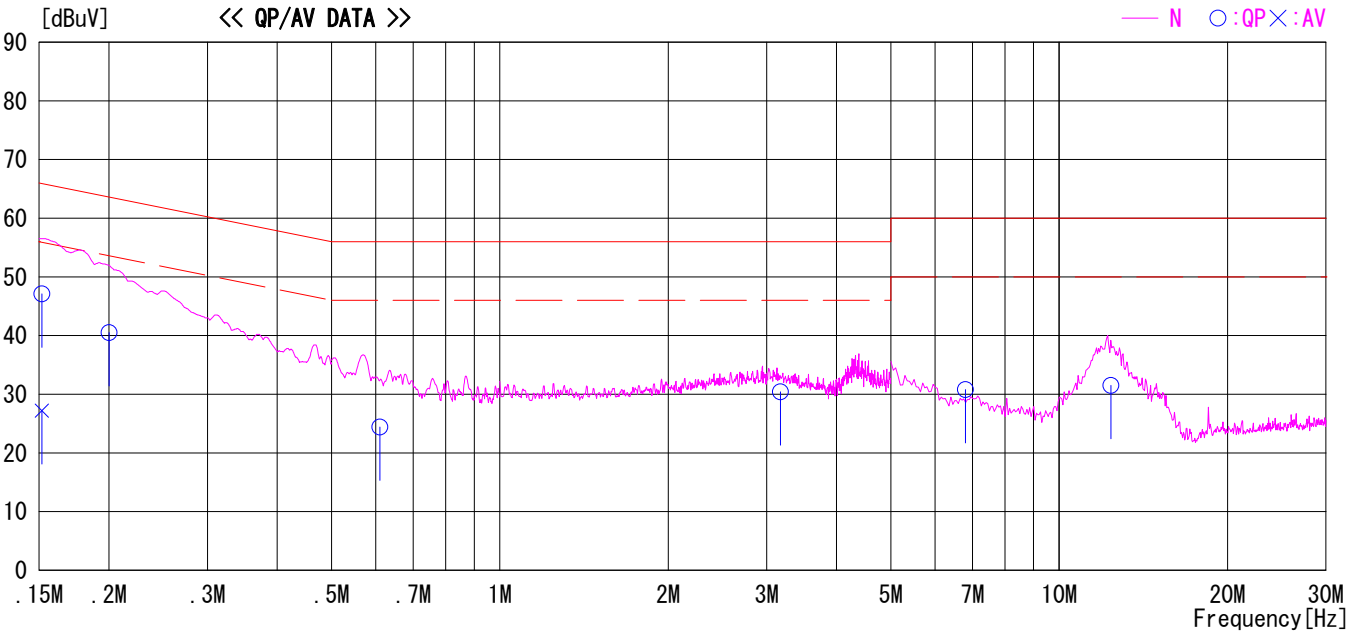


CHART:WITH FACTOR, Peak hold data. Except for the above table: adequate margin data below the limits.  
CALCULATION:RESULT[dBuV]=READING[dBuV]+C. F (LOSS) [dB] (LISN(or ISN or Probe)+CABLE+ATTEN(Except LS-11, 12, 13))

# DATA OF CONDUCTED DISTURBANCE TEST

UL Japan, Inc. Yokowa EMC Lab. No.1 Shielded room  
 Date : 09/13/2016

Report No. : 11426404Y-B-R1  
 Power : DC 5V (PC AC120V/60Hz)  
 Temp./Humi. : 22 deg.C / 51 % RH  
 Engineer : Toshifumi Yoneshige

Mode / Remarks : 1.USB Communication / LS-11 LISN N Phase with Adapter\_HP OFF (2015-11-25)

LIMIT : FCC Part 15 B CLASS B (QP)  
 FCC Part 15 B CLASS B (AV)

Frequency	Reading Level		Corr.	Results		Limit		Margin		Phase
	QP	AV	Factor	QP	AV	QP	AV	QP	AV	
[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]	
0.15175	37.4	17.5	9.7	47.1	27.2	65.9	55.9	18.8	28.7	N
0.20025	30.8	----	9.7	40.5	----	63.6	----	23.1	----	N
0.61032	14.5	----	9.9	24.4	----	56.0	----	31.6	----	N
3.17568	20.3	----	10.1	30.4	----	56.0	----	25.6	----	N
6.80103	20.4	----	10.4	30.8	----	60.0	----	29.2	----	N
12.37501	20.7	----	10.8	31.5	----	60.0	----	28.5	----	N
0.16572	36.8	16.1	9.8	46.6	25.9	65.2	55.2	18.6	29.3	L
0.19986	30.9	----	9.7	40.6	----	63.6	----	23.0	----	L
0.57831	14.2	----	9.9	24.1	----	56.0	----	31.9	----	L
3.10391	20.2	----	10.1	30.3	----	56.0	----	25.7	----	L
6.57222	13.5	----	10.4	23.9	----	60.0	----	36.1	----	L
12.30501	20.3	----	10.8	31.1	----	60.0	----	28.9	----	L

CHART:WITH FACTOR, Peak hold data. Except for the above table: adequate margin data below the limits.  
 CALCULATION: RESULT[dBuV]=READING[dBuV]+C. F (LOSS) [dB] (LISN(or ISN or Probe)+CABLE+ATTEN(Except LS-11, 12, 13))

# DATA OF CONDUCTED DISTURBANCE TEST

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Issued date: October 14, 2016

FCC ID: ZQDPCKCM5

UL Japan, Inc. Yokowa EMC Lab. No.1 Shielded room

Date : 09/13/2016

Report No. : 11426404Y-B-R1  
Power : DC 5V (PC AC120V/60Hz)  
Temp./Humi. : 22 deg.C / 51 % RH  
Engineer : Toshifumi Yoneshige

Mode / Remarks : 2.Standby / LS-11 LISN N Phase with Adapter\_HP OFF (2015-11-25)

LIMIT : FCC Part 15 B CLASS B (QP)  
FCC Part 15 B CLASS B (AV)

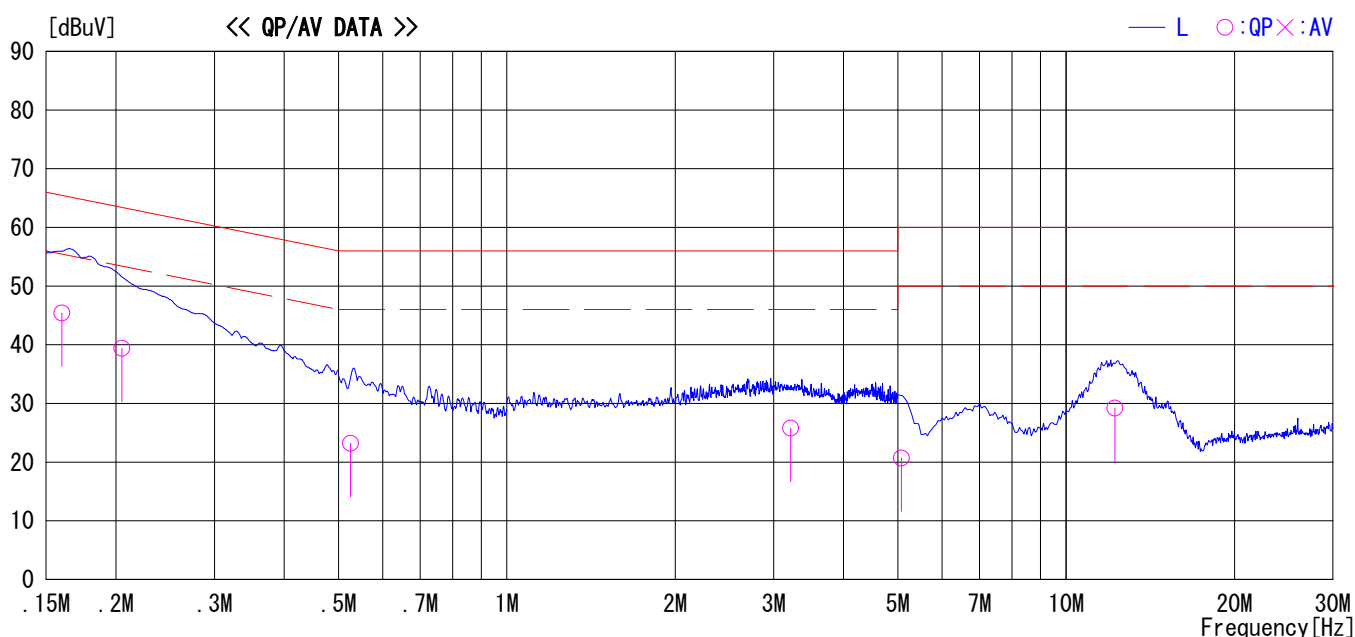
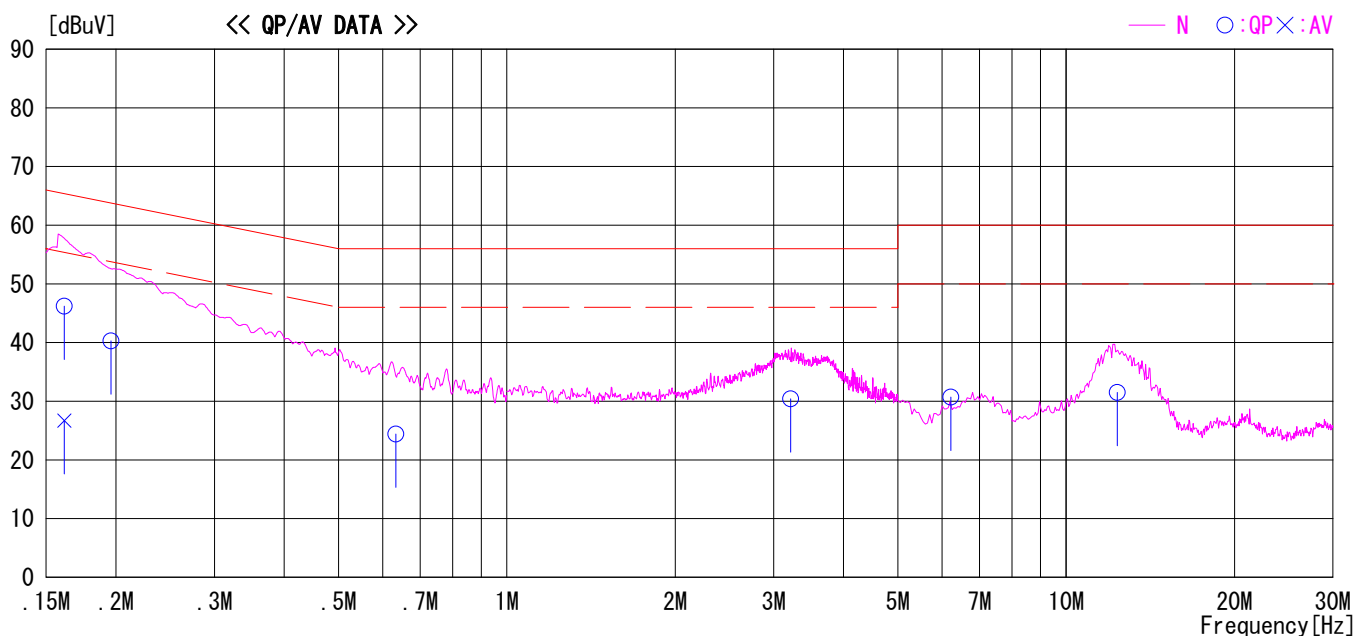


CHART:WITH FACTOR, Peak hold data. Except for the above table: adequate margin data below the limits.  
CALCULATION: RESULT [dBuV]=READING [dBuV]+C. F (LOSS) [dB] (LISN(or ISN or Probe)+CABLE+ATTEN(Except LS-11, 12, 13))

# DATA OF CONDUCTED DISTURBANCE TEST

UL Japan, Inc. Yokowa EMC Lab. No.1 Shielded room  
 Date : 09/13/2016

Report No. : 11426404Y-B-R1  
 Power : DC 5V (PC AC120V/60Hz)  
 Temp./Humi. : 22 deg.C / 51 % RH  
 Engineer : Toshifumi Yoneshige

Mode / Remarks : 2.Standby / LS-11 LISN N Phase with Adapter\_HP OFF (2015-11-25)

LIMIT : FCC Part 15 B CLASS B (QP)  
 FCC Part 15 B CLASS B (AV)

Frequency	Reading Level		Corr.	Results		Limit		Margin		Phase
	QP	AV	Factor	QP	AV	QP	AV	QP	AV	
[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]	
0.16171	36.4	16.9	9.8	46.2	26.7	65.4	55.4	19.2	28.7	N
0.19596	30.6	----	9.7	40.3	----	63.8	----	23.5	----	N
0.63321	14.5	----	9.9	24.4	----	56.0	----	31.6	----	N
3.21771	20.3	----	10.1	30.4	----	56.0	----	25.6	----	N
6.22014	20.3	----	10.4	30.7	----	60.0	----	29.3	----	N
12.34498	20.7	----	10.8	31.5	----	60.0	----	28.5	----	N
0.16013	35.6	----	9.8	45.4	----	65.5	----	20.1	----	L
0.20500	29.7	----	9.7	39.4	----	63.4	----	24.0	----	L
0.52540	13.3	----	9.9	23.2	----	56.0	----	32.8	----	L
3.21564	15.7	----	10.1	25.8	----	56.0	----	30.2	----	L
5.07501	10.3	----	10.4	20.7	----	60.0	----	39.3	----	L
12.21996	18.4	----	10.8	29.2	----	60.0	----	30.8	----	L

CHART:WITH FACTOR, Peak hold data. Except for the above table: adequate margin data below the limits.  
 CALCULATION: RESULT[dBuV]=READING[dBuV]+C. F (LOSS) [dB] (LISN(or ISN or Probe)+CABLE+ATTEN(Except LS-11, 12, 13))

# DATA OF RADIATED DISTURBANCE TEST

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Issued date: October 14, 2016

FCC ID: ZQDPCKCM5

UL Japan, Inc. Yokowa EMC Lab. No.1 Open area test site

Date : 09/12/2016

Report No. : 11426404Y-B-R1  
Power : DC 5V (PC AC120V/60Hz)  
Temp./Humi. : 23 deg.C / 55 % RH  
Engineer : Toshifumi Yoneshige

Mode / Remarks : 1.USB Communication

LIMIT : FCC Part 15B CLASS B (3m)

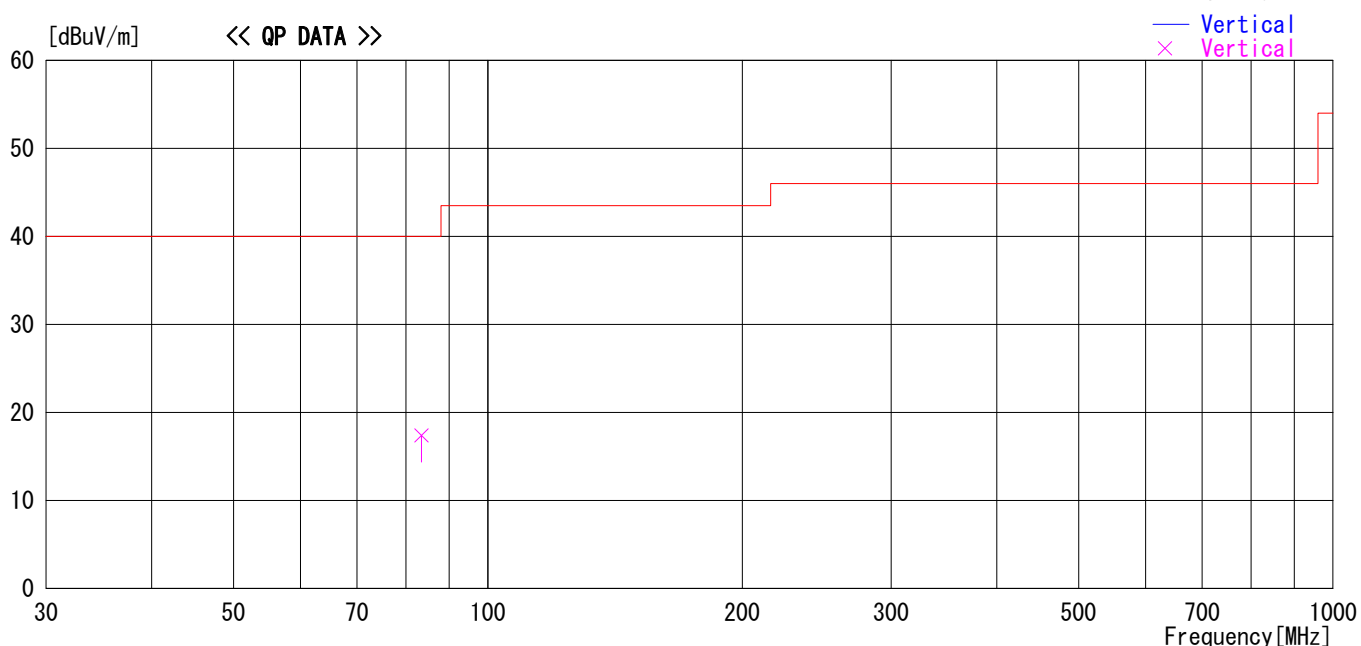
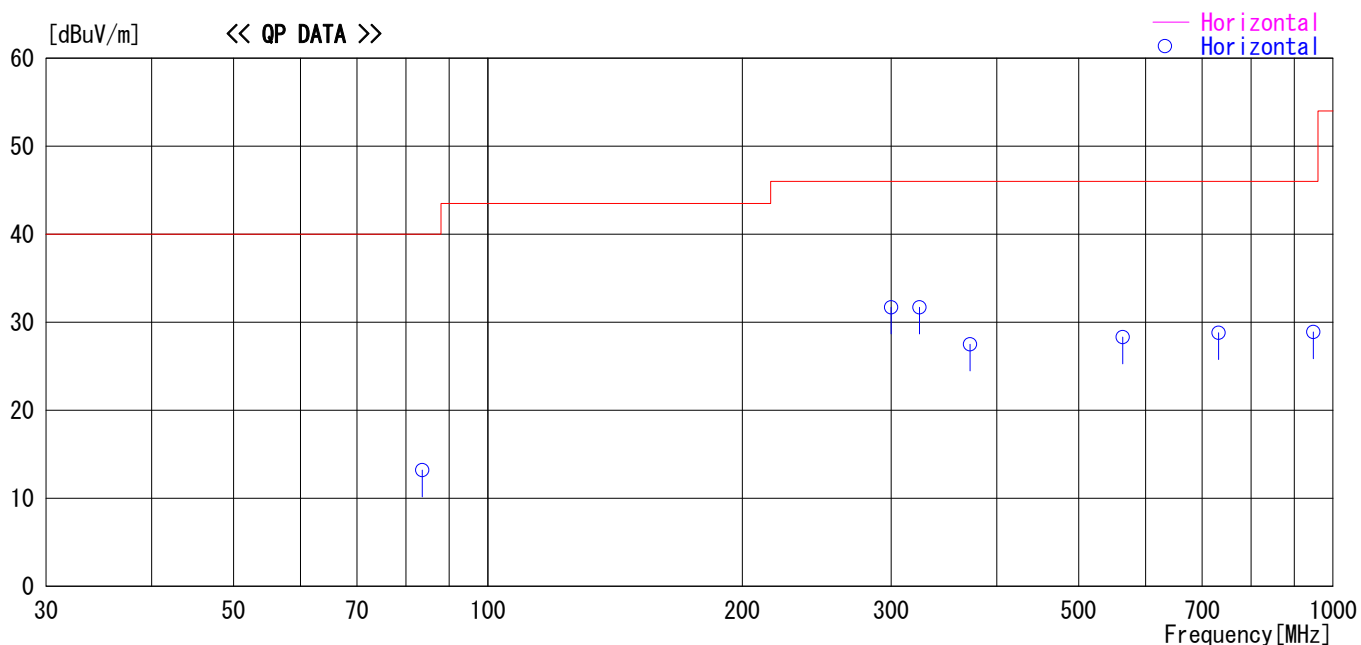


CHART:WITH FACTOR ANT TYPE: -30MHz:LOOP, 30-199.99MHz:BICONICAL, 200MHz-1000MHz:LOGPERIODIC, 1000MHz-:HORN  
CALCULATION:RESULT = READING + ANT FACTOR + LOSS (CABLE+ATTEN. (ATTEN: Below 1GHz only)) - GAIN (AMP) + ANSI C63.5\_ΔAF



# DATA OF RADIATED DISTURBANCE TEST

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FCC ID: ZQDPCKCM5

UL Japan, Inc. Yokowa EMC Lab. No.1 Open area test site

Date : 09/12/2016

Report No. : 11426404Y-B-R1  
Power : DC 5V (PC AC120V/60Hz)  
Temp./Humi. : 23 deg.C / 55 % RH  
Engineer : Toshifumi Yoneshige

Mode / Remarks : 1.USB Communication

LIMIT : FCC Part 15B CLASS B (3m)

Frequency	Reading	DET	Antenna	Loss&	Level	Polar.	Limit	Margin
[MHz]	[dBuV]		Factor	Gain			[dBuV/m]	[dB]
83.443	31.6	QP	7.0	-21.2	17.4	Vert.	40.0	22.6
83.603	27.4	QP	7.0	-21.2	13.2	Hori.	40.0	26.8
300.001	40.2	QP	13.8	-22.3	31.7	Hori.	46.0	14.3
323.999	39.5	QP	14.3	-22.1	31.7	Hori.	46.0	14.3
371.996	34.0	QP	15.3	-21.8	27.5	Hori.	46.0	18.5
564.000	30.0	QP	18.8	-20.5	28.3	Hori.	46.0	17.7
732.006	27.8	QP	20.0	-19.0	28.8	Hori.	46.0	17.2
948.000	23.7	QP	22.0	-16.8	28.9	Hori.	46.0	17.1

CHART:WITH FACTOR ANT TYPE: -30MHz:LOOP, 30-199.99MHz:BICONICAL, 200MHz-1000MHz:LOGPERIODIC, 1000MHz:-HORN  
CALCULATION:RESULT = READING + ANT FACTOR + LOSS (CABLE+ATTEN. (ATTEN: Below 1GHz only)) - GAIN (AMP) + ANSI C63.5\_ΔAF

# DATA OF RADIATED DISTURBANCE TEST

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Issued date: October 14, 2016

FCC ID: ZQDPCKCM5

UL Japan, Inc. Yokowa EMC Lab. No.1 Open area test site

Date : 09/12/2016

Report No. : 11426404Y-B-R1  
Power : DC 5V (PC AC120V/60Hz)  
Temp./Humi. : 23 deg.C / 55 % RH  
Engineer : Toshifumi Yoneshige

Mode / Remarks : 1.USB Communication

LIMIT : FCC Part 15B CLASS B (PK, 3m)  
FCC Part 15B CLASS B (AV, 3m)

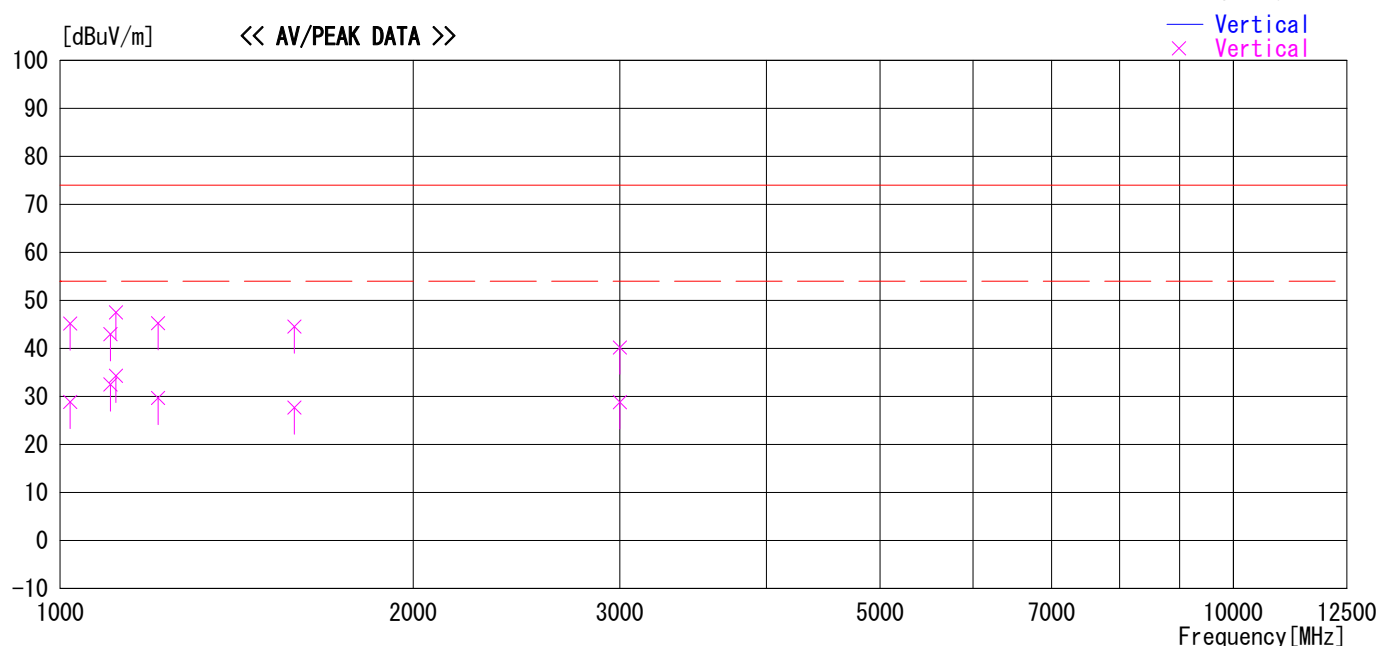
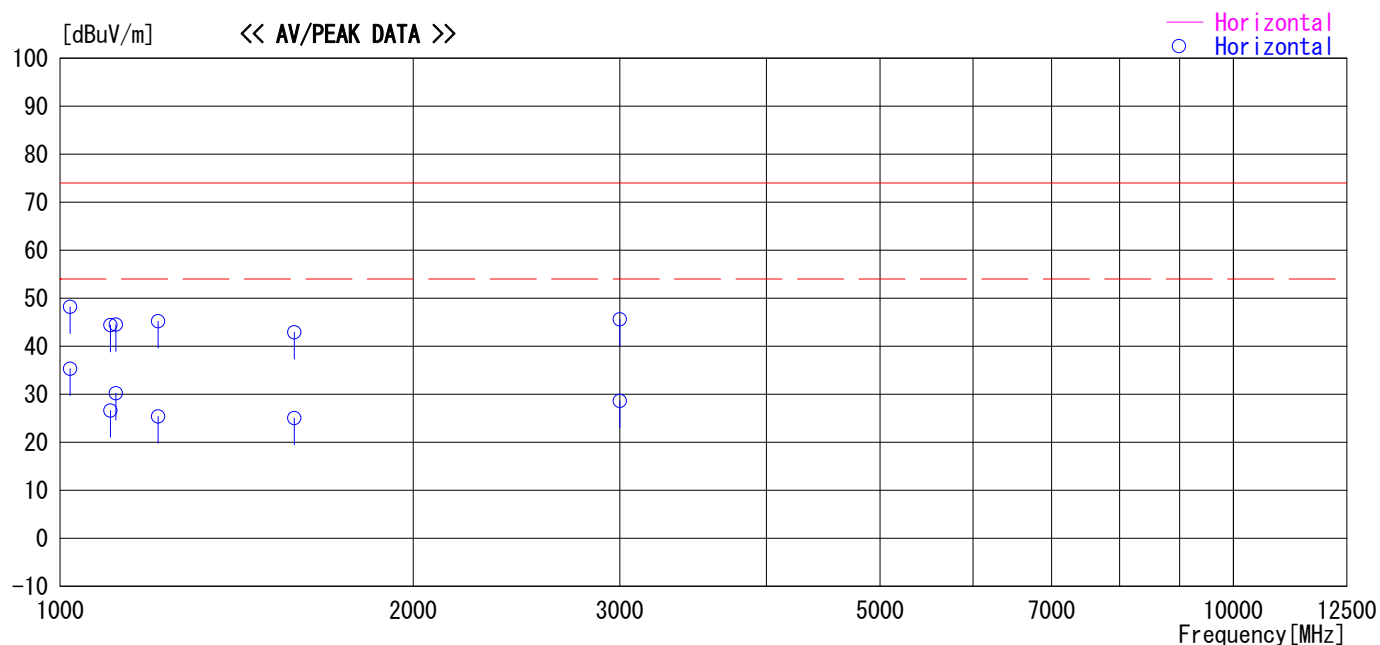


CHART:WITH FACTOR ANT TYPE: -30MHz:LOOP, 30-199.99MHz:BICONICAL, 200MHz-1000MHz:LOGPERIODIC, 1000MHz-:HORN  
CALCULATION:RESULT = READING + ANT FACTOR + LOSS (CABLE+DISTANCE FACTOR) - GAIN(AMP). Actual distance: 4.00m.

# DATA OF RADIATED DISTURBANCE TEST

UL Japan, Inc. Yokowa EMC Lab. No.1 Open area test site  
 Date : 09/12/2016

Report No. : 11426404Y-B-R1  
 Power : DC 5V (PC AC120V/60Hz)  
 Temp./Humi. : 23 deg. C / 55 % RH  
 Engineer : Toshifumi Yoneshige

Mode / Remarks : 1.USB Communication

LIMIT : FCC Part 15B CLASS B (PK, 3m)  
 FCC Part 15B CLASS B (AV, 3m)

Frequency	Reading	DET	Antenna Factor	Loss& Gain	Level	Polar.	Limit	Margin
[MHz]	[dBuV]		[dB/m]	[dB]	[dBuV/m]		[dBuV/m]	[dB]
1020.002	54.7	PK	22.8	-32.3	45.2	Vert.	74.0	28.8
1020.002	38.4	AV	22.8	-32.3	28.9	Vert.	54.0	25.1
1020.003	57.7	PK	22.8	-32.3	48.2	Hori.	74.0	25.8
1020.003	44.8	AV	22.8	-32.3	35.3	Hori.	54.0	18.7
1104.001	53.7	PK	22.9	-32.2	44.4	Hori.	74.0	29.6
1104.001	35.9	AV	22.9	-32.2	26.6	Hori.	54.0	27.4
1104.005	52.3	PK	22.9	-32.2	43.0	Vert.	74.0	31.0
1104.005	41.8	AV	22.9	-32.2	32.5	Vert.	54.0	21.5
1116.000	53.7	PK	22.9	-32.1	44.5	Hori.	74.0	29.5
1116.000	39.4	AV	22.9	-32.1	30.2	Hori.	54.0	23.8
1116.003	56.7	PK	22.9	-32.1	47.5	Vert.	74.0	26.5
1116.003	43.5	AV	22.9	-32.1	34.3	Vert.	54.0	19.7
1212.001	54.1	PK	23.0	-31.9	45.2	Hori.	74.0	28.8
1212.001	34.3	AV	23.0	-31.9	25.4	Hori.	54.0	28.6
1212.001	54.2	PK	23.0	-31.9	45.3	Vert.	74.0	28.8
1212.001	38.6	AV	23.0	-31.9	29.7	Vert.	54.0	24.3
1584.003	50.5	PK	23.6	-31.2	42.9	Hori.	74.0	31.1
1584.003	32.6	AV	23.6	-31.2	25.0	Hori.	54.0	29.0
1584.003	52.2	PK	23.6	-31.2	44.6	Vert.	74.0	29.5
1584.003	35.3	AV	23.6	-31.2	27.7	Vert.	54.0	26.3
3000.000	48.3	PK	27.2	-29.9	45.6	Hori.	74.0	28.4
3000.000	31.3	AV	27.2	-29.9	28.6	Hori.	54.0	25.4
3000.001	42.9	PK	27.2	-29.9	40.2	Vert.	74.0	33.8
3000.001	31.5	AV	27.2	-29.9	28.8	Vert.	54.0	25.2

# DATA OF RADIATED DISTURBANCE TEST

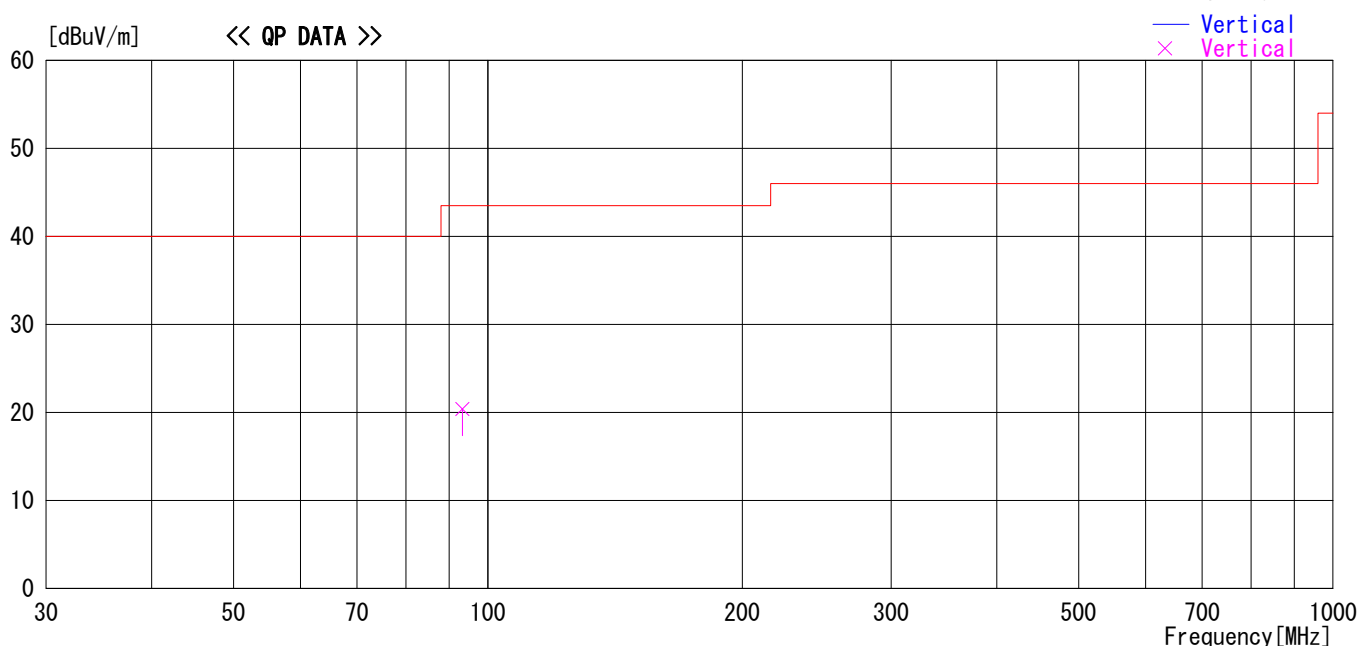
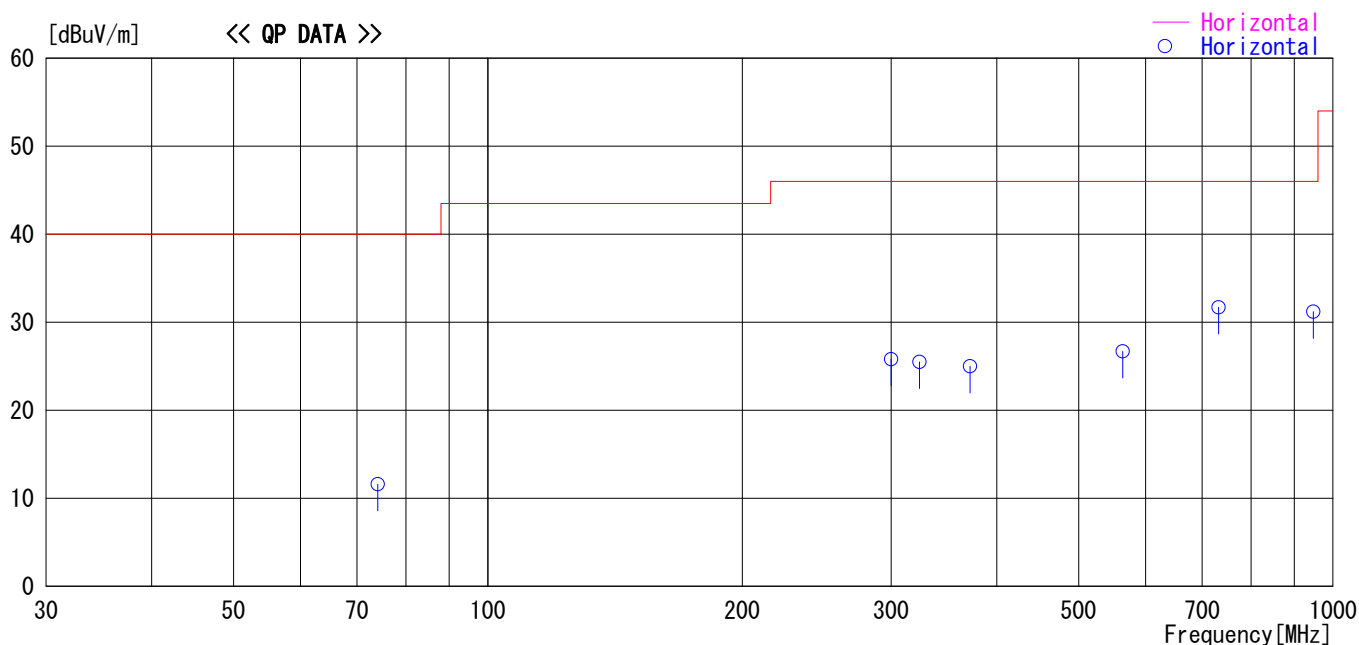
UL Japan, Inc. Yokowa EMC Lab. No.1 Open area test site

Date : 09/12/2016

Report No. : 11426404Y-B-R1  
 Power : DC 5V (PC AC120V/60Hz)  
 Temp./Humi. : 23 deg. C / 55 % RH  
 Engineer : Toshifumi Yoneshige

Mode / Remarks : 2. Standby

LIMIT : FCC Part 15B CLASS B (3m)



# DATA OF RADIATED DISTURBANCE TEST

Page 21 of 26  
 Issued date: October 14, 2016  
 FCC ID: ZQDPCKCM5

UL Japan, Inc. Yokowa EMC Lab. No.1 Open area test site  
 Date : 09/12/2016

Report No. : 11426404Y-B-R1  
 Power : DC 5V (PC AC120V/60Hz)  
 Temp./Humi. : 23 deg.C / 55 % RH  
 Engineer : Toshifumi Yoneshige

Mode / Remarks : 2.Standby

LIMIT : FCC Part 15B CLASS B (3m)

Frequency	Reading	DET	Antenna	Loss&	Level	Polar.	Limit	Margin
[MHz]	[dBuV]		Factor	Gain			[dBuV/m]	[dB]
74.088	26.8	QP	6.5	-21.7	11.6	Hori.	40.0	28.4
93.266	32.8	QP	8.7	-21.1	20.4	Vert.	43.5	23.1
300.000	34.3	QP	13.8	-22.3	25.8	Hori.	46.0	20.2
324.002	33.3	QP	14.3	-22.1	25.5	Hori.	46.0	20.5
372.001	31.5	QP	15.3	-21.8	25.0	Hori.	46.0	21.0
563.998	28.4	QP	18.8	-20.5	26.7	Hori.	46.0	19.3
732.001	30.7	QP	20.0	-19.0	31.7	Hori.	46.0	14.3
948.001	26.0	QP	22.0	-16.8	31.2	Hori.	46.0	14.8

CHART:WITH FACTOR ANT TYPE: -30MHz:LOOP, 30-199.99MHz:BICONICAL, 200MHz-1000MHz:LOGPERIODIC, 1000MHz:-HORN  
 CALCULATION:RESULT = READING + ANT FACTOR + LOSS (CABLE+ATTEN. (ATTEN: Below 1GHz only)) - GAIN (AMP) + ANSI C63.5\_ΔAF

# DATA OF RADIATED DISTURBANCE TEST

Page 22 of 26

Issued date: October 14, 2016

FCC ID: ZQDPCKCM5

UL Japan, Inc. Yokowa EMC Lab. No.1 Open area test site

Date : 09/12/2016

Report No. : 11426404Y-B-R1  
Power : DC 5V (PC AC120V/60Hz)  
Temp./Humi. : 23 deg.C / 55 % RH  
Engineer : Toshifumi Yoneshige

Mode / Remarks : 2. Standby

LIMIT : FCC Part 15B CLASS B (PK, 3m)  
FCC Part 15B CLASS B (AV, 3m)

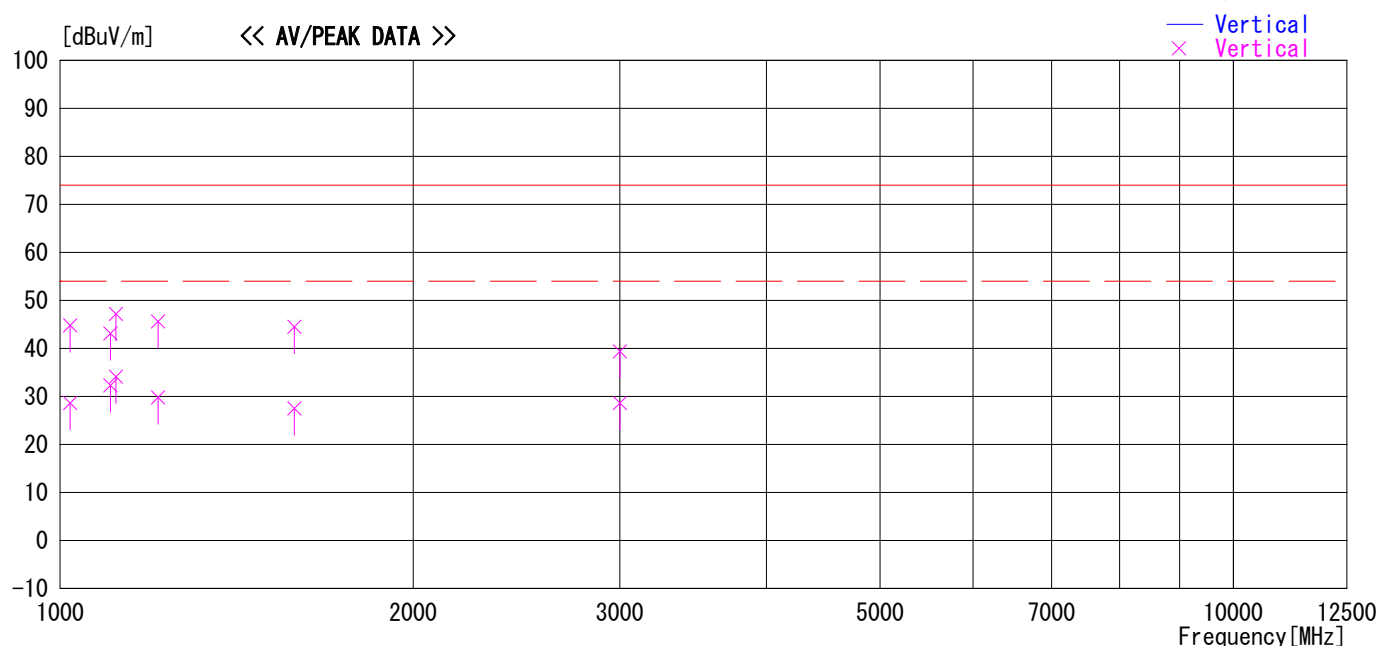
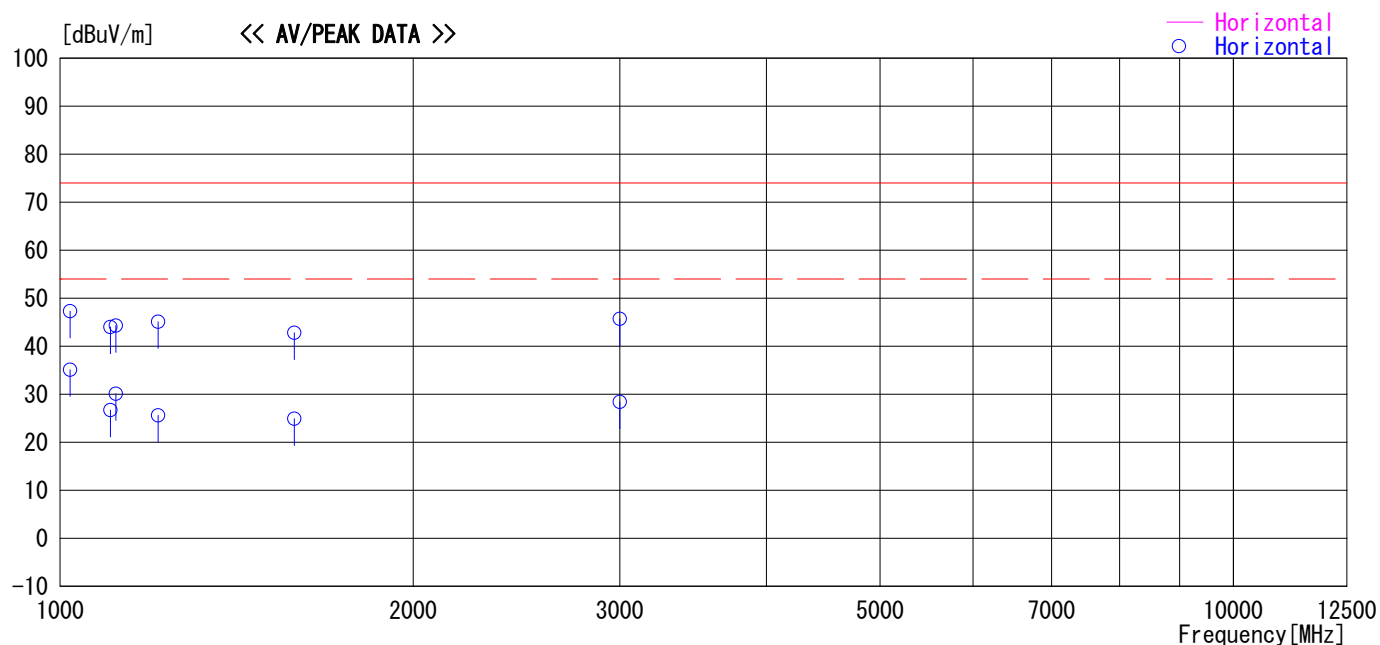


CHART:WITH FACTOR ANT TYPE: -30MHz:LOOP, 30-199.99MHz:BICONICAL, 200MHz-1000MHz:LOGPERIODIC, 1000MHz-:HORN  
CALCULATION:RESULT = READING + ANT FACTOR + LOSS (CABLE+DISTANCE FACTOR) - GAIN(AMP). Actual distance: 4.00m.

# DATA OF RADIATED DISTURBANCE TEST

UL Japan, Inc. Yokowa EMC Lab. No.1 Open area test site  
 Date : 09/12/2016

Report No. : 11426404Y-B-R1  
 Power : DC 5V (PC AC120V/60Hz)  
 Temp./Humi. : 23 deg. C / 55 % RH  
 Engineer : Toshifumi Yoneshige

Mode / Remarks : 2. Standby

LIMIT : FCC Part 15B CLASS B (PK, 3m)  
 FCC Part 15B CLASS B (AV, 3m)

Frequency	Reading	DET	Antenna Factor	Loss& Gain	Level	Polar.	Limit	Margin
[MHz]	[dBuV]		[dB/m]	[dB]	[dBuV/m]		[dBuV/m]	[dB]
1019.999	54.3	PK	22.8	-32.3	44.8	Vert.	74.0	29.2
1019.999	38.1	AV	22.8	-32.3	28.6	Vert.	54.0	25.4
1020.004	56.8	PK	22.8	-32.3	47.3	Hori.	74.0	26.7
1020.004	44.6	AV	22.8	-32.3	35.1	Hori.	54.0	18.9
1104.002	53.3	PK	22.9	-32.2	44.0	Hori.	74.0	30.0
1104.002	36.0	AV	22.9	-32.2	26.7	Hori.	54.0	27.3
1104.003	52.4	PK	22.9	-32.2	43.1	Vert.	74.0	30.9
1104.003	41.6	AV	22.9	-32.2	32.3	Vert.	54.0	21.7
1116.001	56.4	PK	22.9	-32.1	47.2	Vert.	74.0	26.8
1116.001	43.3	AV	22.9	-32.1	34.1	Vert.	54.0	19.9
1116.002	53.5	PK	22.9	-32.1	44.3	Hori.	74.0	29.7
1116.002	39.3	AV	22.9	-32.1	30.1	Hori.	54.0	23.9
1212.000	54.0	PK	23.0	-31.9	45.1	Hori.	74.0	28.9
1212.000	34.5	AV	23.0	-31.9	25.6	Hori.	54.0	28.4
1212.002	54.5	PK	23.0	-31.9	45.6	Vert.	74.0	28.4
1212.002	38.7	AV	23.0	-31.9	29.8	Vert.	54.0	24.2
1584.003	50.4	PK	23.6	-31.2	42.8	Hori.	74.0	31.2
1584.003	32.5	AV	23.6	-31.2	24.9	Hori.	54.0	29.1
1584.004	52.1	PK	23.6	-31.2	44.5	Vert.	74.0	29.5
1584.004	35.1	AV	23.6	-31.2	27.5	Vert.	54.0	26.5
3000.001	48.4	PK	27.2	-29.9	45.7	Hori.	74.0	28.3
3000.001	31.1	AV	27.2	-29.9	28.4	Hori.	54.0	25.6
3000.002	42.1	PK	27.2	-29.9	39.4	Vert.	74.0	34.6
3000.002	31.3	AV	27.2	-29.9	28.6	Vert.	54.0	25.4

Test Report No : 11426404Y-B-R1

## APPENDIX 2 Test Instruments

### EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
RT-62	EMI Test Receiver	Rohde & Schwarz	ESW26	101277	RE, CE	2016/08/19 * 12
AF-02	Pre Amplifier	Anritsu	MH648A	M89645	RE	2016/03/21 * 12
AT-30	Attenuator	Anritsu	MP721B	6200749339	RE	2016/07/10 * 12
AT-25	Attenuator	Anritsu	MP721A	6200543685	RE	2016/07/10 * 12
BA-10	Biconical Antenna	Schwarzbeck	BBA9106	VHA 91032553	RE	2015/11/16 * 12
LA-14	Logperiodic Antenna	Schwarzbeck	VUSLP9111B	184	RE	2016/02/16 * 12
CC-10RC	Yokowa No.1 open coaxial(0.1-1000MHz)	TSJ	CC-11,CC-12,CC-14,CC-15,CC-16,C C-17,SW-11,SW-12	SUCOFLEX104 G	RE	2016/07/29 * 12
YOATS-01(NSA )	Open area test site	JSE	3m, 10m, 30m	1	RE	2016/04/02 * 12
LS-11	LISN (AMN)	Rohde & Schwarz	ENV216	101054	CE(EUT)	2015/11/25 * 12
TA-15	Terminator	Radiall	R404111000	-	CE	2016/06/07 * 12
CC-1S	Yokowa No.1 shield coaxial(0.009MHz-1000 MHz)	UL Japan	CC-14,CC-15,CC-16,CC-18,CC-19,S W-11,SW-12	YS0101	CE	2015/10/19 * 12
OS-03	Digital Humidity Indicator	SATO	PC-5000TRH-II	04A05	RE	2016/03/17 * 12
OS-05	Digital Humidity Indicator	SATO	PC-5000TRH	B-05	CE	2016/04/19 * 12
DM-01	Tester	SANWA	PC500	7019221	RE, CE	2016/06/13 * 12
YJM-16	Measure	-	-	-	RE, CE	-
SC-01	Search Coil	UL Japan	-	-	RE	-
COTS-YW-EMI -TSJ	EMI measurement program	TSJ	TEPTO-DV	-	RE, CE	-
AF-04	Pre Amplifier	Hewlett Packard	8449B	3008A01207	RE	2016/07/04 * 12
HA-06	Broad-Band Horn Antenna	Schwarzbeck	BBHA 9120 D	9120D-683	RE	2016/06/24 * 12
CC-C13	Microwave Cable	Junkosha INC.	NWX315-1000NMS NMS/NWX315-020 0NMSNMS/	NOV-17-15-00 2/1511-024	RE	2016/01/26 * 12
YOATS-01(SVS WR)	Open area test site	JSE	3m,10m	1	RE	2016/03/25 * 12
YAJ-01	Antenna Tilt Jig	Intelligent System Engineering Co., Ltd	Antenna Tilt Jig	T-0004	RE	Pre Check

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

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

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

Test Item :

CE: Conducted emission ,

RE: Radiated emission ,