



EMI TEST REPORT

Test Report No. : 32EE0260-YW-01-B-R2

Applicant: Hitachi, Ltd.,
Information & Telecommunication Systems Company

Type of Equipment: USB Finger Vein Biometric Authentication Unit

Model No.: PC-KCS50

FCC ID: ZQDPCKCSS50

Test regulation: FCC Part 15 Subpart B:2011 Class B
ICES-003 Issue No. 4 Class B

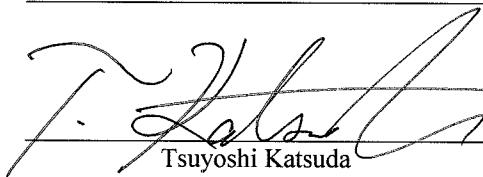
Test result: Complied

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. The test was performed in accordance with FCC regulation, as an alternative arrangement of ICES-003.
8. This report is a revised version of 32EE0260-YW-01-B-R1. 32EE0260-YW-01-B-R1 is replaced with this report.

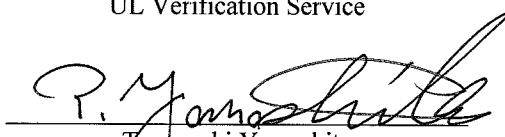
Date of test:

January 10, 2012

**Representative
test engineer:**


Tsuyoshi Katsuda
Engineer of WiSE Japan,
UL Verification Service

Approved by:


Tomoyuki Yamashita
Manager of WiSE Japan,
UL Verification Service

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.
Yokawa EMC Lab.**

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

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13-EM-F0429

CONTENTS

	PAGE
Section 1 : Customer information	3
Section 2 : Equipment under test (E.U.T.)	3
Section 3 : Test specification, procedures and results	4
Section 4 : Operation of E.U.T. during testing	6
Section 5 : Conducted emission	8
Section 6 : Radiated emission	9
Appendix 1 : Photographs of test setup	10
Appendix 2 : Data of EMI test	12
Conducted emission	
Radiated emission	
Appendix 3 : Test Instruments	21
Appendix 4 : Label and label location	-
Appendix 5 : Declaration of conformity	-

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Section 1 : Customer information

Company Name : Hitachi, Ltd., Information & Telecommunication Systems Company
Brand Name : Hitachi, Ltd.
Address : Hitachi System Plaza Shinkawasaki 890 Kashimada, Saiwai, Kawasaki, Kanagawa, 212-8567 JAPAN
Telephone Number : +81 44 549 1728
Facsimile Number : +81 44 549 1127
Contact Person : Takashi Maruyama

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

2.1 Identification of E.U.T.

Type of equipment : USB Finger Vein Biometric Authentication Unit
Trade name : Hitachi, Ltd.
Model No. : PC-KCS50
Serial No. : Z000002
Rating : DC 5.0 V / 0.5 A
Country of Mass-production : Japan
Condition of EUT : Engineering prototype
(Not for Sale: This sample is equivalent to mass-produced items.)
Size : 52 x 64 x 17 (Width x Length x Height (mm): exclusive of projection)
Modification of EUT : No modification by the test lab.
Receipt Date of Sample : December 29, 2011

2.2 Product description

Model: PC-KCS50 (referred to as the EUT in this report) is a USB Finger Vein Biometric Authentication Unit.
The clock frequencies used in the EUT: 48 MHz (Xtal), 144 MHz

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Section 3 : Test specification, procedures and results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart B:2011, final revised on November 21, 2011 and effective December 21, 2011

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

Test Specification : * ICES-003 Issue No. 4

Title : Spectrum Management Interference-Causing Equipment Standard

Digital Apparatus

* The test was performed in accordance with FCC regulation, as an alternative arrangement.

3.2 Procedures & results

Item	Test Procedure	Limits	Deviation	Worst margin	Result
Conducted emission	ANSI C63.4:2003 7. AC powerline conducted emission measurements	Class B	N/A	10.5 dB (5.3421 MHz, AV, L1)	Complied
Radiated emission	ANSI C63.4:2003 8. Radiated emission measurements	Class B	N/A *1)	12.1 dB (180.00 MHz, Horizontal)	Complied

*1) Measurements were limited up to 2 GHz since the highest frequency of internal source of the EUT is between 108 MHz and 500 MHz.

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 Part15 Subpart B:2011 Class B and ICES-003 Issue No. 4 Class B.

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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	4.0 dB	-	-	4.0 dB	3.9 dB	3.9 dB
	150 kHz - 30 MHz	3.6 dB	-	-	3.6 dB	3.6 dB	3.6 dB
Radiated disturbance							
3 m	9 kHz - 30 MHz	3.4 dB	3.8 dB	3.6 dB	-	-	-
	30 MHz - 300 MHz	4.9 dB	5.0 dB	4.9 dB	-	-	-
	300 MHz - 1000 MHz	5.0 dB	5.1 dB	5.0 dB	-	-	-
	1 GHz - 18 GHz	5.6 dB	5.8 dB	5.5 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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	FCC Registration Number	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	90412	2973A-1	-	40 x 18	-
No.2 open area test site	90411	2973A-2	-	20 x 18	-
No.3 open area test site	90412	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.

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

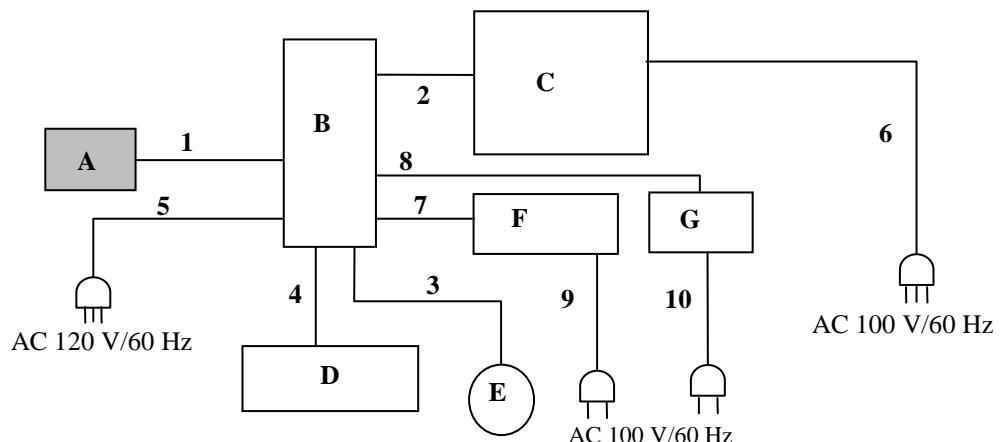
4.1 Operating modes

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. Running mode

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.

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Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	FCC ID	Remark
A	USB Finger Vein Biometric Authentication Unit	PC-KCS50	Z000002	Hitachi, Ltd., Information & Telecommunication Systems Company	ZQDPC KCS50	EUT
B	PC	Compaq 8000 AU245AV	JPA03509D9	Hewlett Packard	DoC	-
C	LCD Monitor	HSTND-2571-T	CNT052F12X	Hewlett Packard	DoC	-
D	Mouse	0XN967	G1G00W8R	DELL	DoC	-
E	Keyboard	505060-291	CD04703979	Hewlett Packard	DoC	-
F	Printer	PIXUS560i	-	Canon	DoC	-
G	Modem	TO-703B	4C04302	Panasonic	N/A	-

List of cables used

No.	Name	Length (m)	Cable Shield	Connector Shield	Remark
1	USB Cable	0.8	Shielded	Shielded	*1)
2	RGB Cable	1.5	Shielded	Shielded	-
3	Mouse Cable	1.8	Shielded	Shielded	-
4	Keyboard Cable	1.8	Shielded	Shielded	-
5	AC Power Cable	1.6	Unshielded	Unshielded	3 wire
6	AC Power Cable	1.8	Unshielded	Unshielded	3 wire
7	Printer Cable	1.6	Shielded	Shielded	-
8	RS-232C Cable	2.0	Shielded	Shielded	-
9	AC Power Cable	1.6	Unshielded	Unshielded	2 wire
10	AC Power Cable	1.8	Unshielded	Unshielded	2 wire

*1) This cable is supplied with EUT.

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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, 1m by 1.8m raised 80cm 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 80cm from any other grounded conducting surface.

EUT was located 80cm 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 40cm 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 50ohm 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 - 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 / AV

IF Band width : 9 kHz / 9 kHz

5.5 Results

Summary of the test results: Pass

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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 2m raised 80cm 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 40cm 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 - 2000 MHz

Test distance : 3m

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 3m. Pre check measurements were performed in shielded room with a search coil at 30-2000MHz to distinguish disturbances of EUT from the ambient noise.

Measurements were performed with quasi-peak detector.

The measuring antenna height was varied between 1 and 4m 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.

	<u>30-1000 MHz (Test receiver)</u>	<u>1000-2000 MHz (Spectrum analyzer) *2)</u>
Detector Type:	: QP	: AV *1) PK
IF Band width:	: 120 kHz	: RBW 1MHz/ VBW 10 Hz RBW 1MHz/ VBW 3 MHz

*1) When using Spectrum analyzer, the test was made with adjusting span to zero by using peak hold.

*2) The measurement was conducted at 3 dB bandwidth.

6.5 Results

Summary of the test results: Pass

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Data of Conducted Disturbance Test

UL Japan, Inc.
 YOKOWA No.2 Shielded room
 Report No. : 32EE0260-YW-01-B-R2

Power : DC5.0V/0.5A (PC:AC120V/60Hz)
 Mode : Running Mode
 Remarks : -
 Date : 1/10/2012
 Phase : Single Phase
 Temperature : 21 °C Engineer : Tsuyoshi Katsuda
 Humidity : 38 %
 Limit : FCC Part15B CLASS B (CISPR)

No.	FREQ. [MHz]	READING (N)		READING (L1)		LISN FACTOR [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT		LIMITS		MARGIN	
		QP [dB μ V]	AV	QP [dB μ V]	AV				QP [dB μ V]	AV	QP [dB μ V]	AV	QP [dB μ V]	AV
1.	0.1600	15.0	-	15.3	-	10.2	0.1	0.0	25.6	-	65.5	55.5	39.9	-
2.	0.2039	17.9	-	17.2	-	10.2	0.1	0.0	28.2	-	63.5	53.5	35.3	-
3.	4.8618	32.0	24.3	31.8	24.4	10.3	0.4	0.0	42.7	35.1	56.0	46.0	13.3	10.9
4.	5.1274	33.1	26.7	33.4	26.4	10.3	0.4	0.0	44.1	37.4	60.0	50.0	15.9	12.6
5.	5.3421	35.4	28.7	35.4	28.8	10.3	0.4	0.0	46.1	39.5	60.0	50.0	13.9	10.5
6.	18.3526	28.7	-	28.6	-	10.3	0.7	0.0	39.7	-	60.0	50.0	20.3	-

CALCULATION: READING + LISN FACTOR + CABLE LOSS + ATTEN.

Except for the above table: adequate margin data below the limits.
 LS-12 LISN N Phase with Adapter_HP Off(2011-10-20).LIS

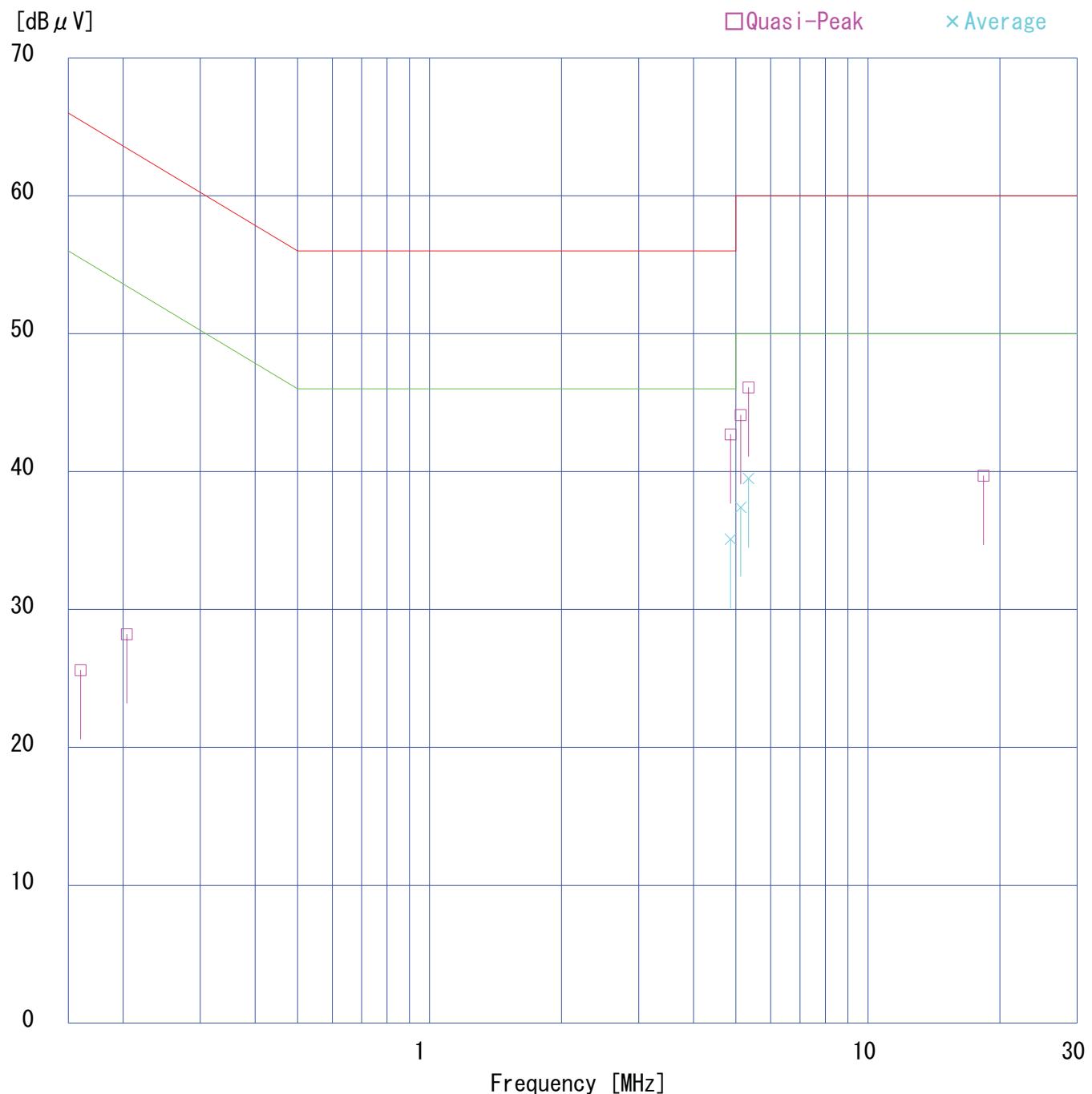
Data of Conducted Disturbance Test

UL Japan, Inc.

YOKOWA No.2 Shielded room

Report No. : 32EE0260-YW-01-B-R2

Power : DC5.0V/0.5A (PC: A120V/60Hz)
 Mode : Running Mode
 Remarks : -
 Date : 1/10/2012
 Phase : Single Phase
 Temperature : 21 °C
 Humidity : 38 %
 Limit : Engineer : Tsuyoshi Katsuda
 Limit : FCC Part15B CLASS B (CISPR)



Data of Conducted Disturbance Test

Page 14 of 21

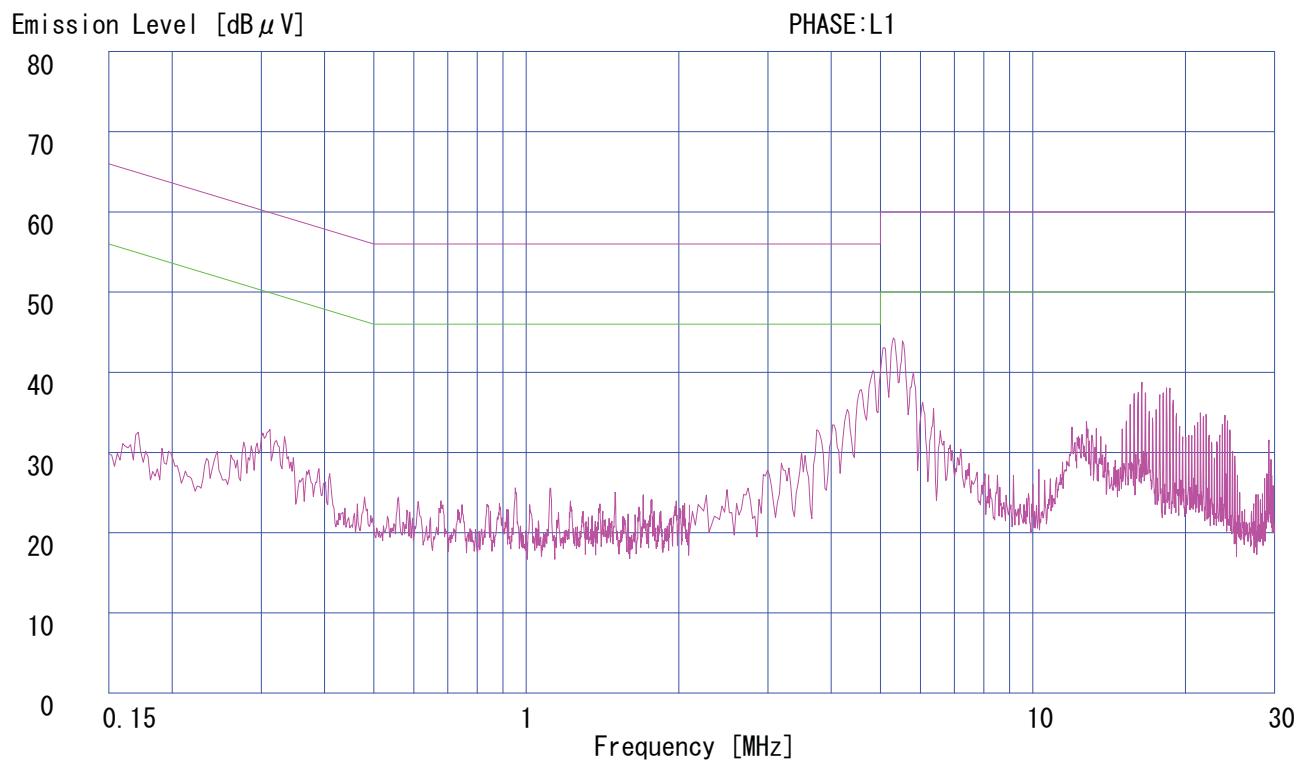
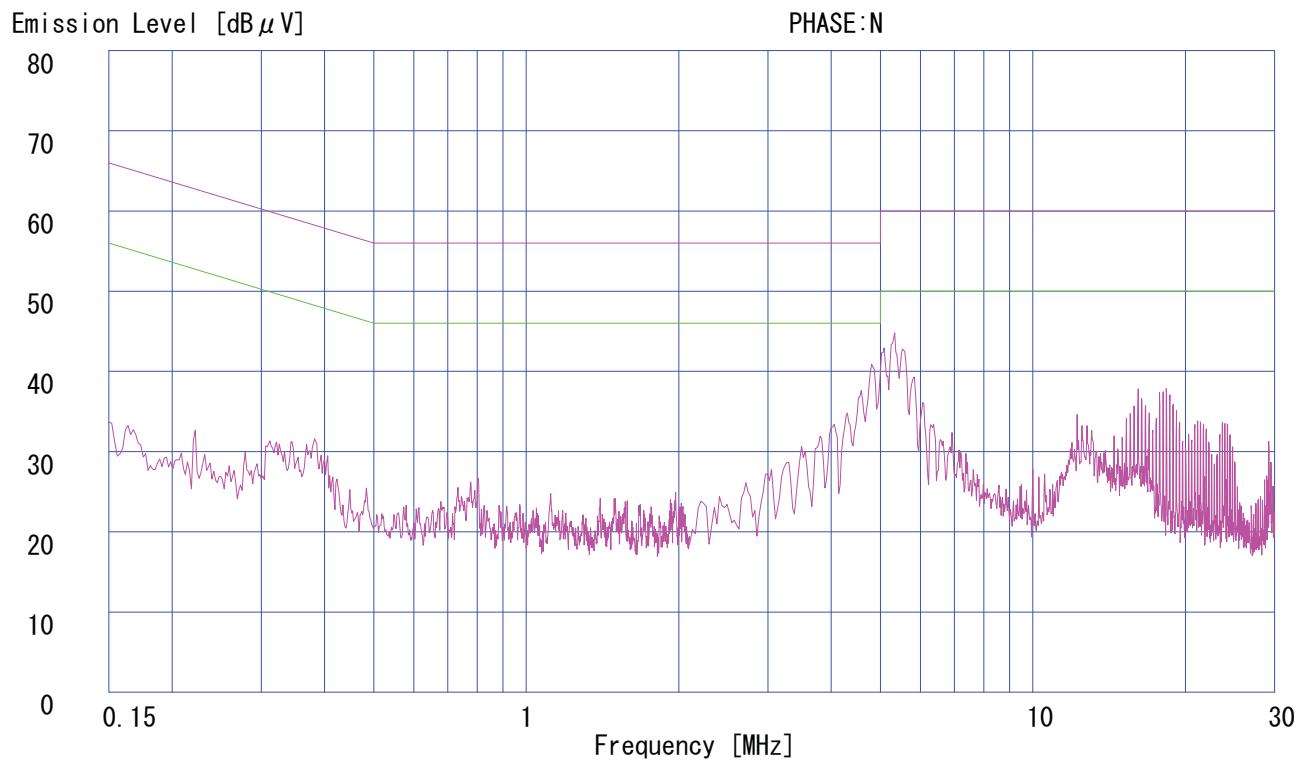
UL Japan, Inc.

YOKOWA No.2 Shielded room

Report No. : 32EE0260-YW-01-B-R2

Power	:	DC5.0V/0.5A (PC:A120V/60Hz)
Mode	:	Running Mode
Remarks	:	-
Date	:	1/10/2012
Phase	:	Single Phase
Temperature	:	21 °C
Humidity	:	38 %
Limit 1	:	FCC Part15B CLASS B(CISPR)
Limit 2	:	None

Engineer : Tsuyoshi Katsuda



Data of Radiated Disturbance Test

UL Japan, Inc.

YOKOWA No.2 Open area test site

Report No. : 32EE0260-YW-01-B-R2

Power : DC5.0V/0.5A (PC:AC120V/60Hz)
 Mode : Running Mode
 Remarks : -
 Date : 1/10/2012
 Test Distance : 3 m
 Temperature : 18 °C
 Humidity : 40 %
 Limit : FCC Part15B CLASS B

No.	FREQ. [MHz]	ANT TYPE	READING		ANT FACTOR [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT		LIMITS		MARGIN	
			HOR [dB μ V]	VER [dB μ V]					HOR [dB μ V/m]	VER [dB μ V/m]	HOR [dB]	VER [dB]	HOR [dB]	VER [dB]
1.	68.04	BB	42.3	--	6.9	29.8	1.5	5.9	26.8	--	40.0	13.2	**	
2.	83.60	BB	39.0	--	7.0	29.8	1.7	6.0	23.9	--	40.0	16.1	**	
3.	180.00	BB	36.5	32.5	16.1	29.8	2.6	6.0	31.4	27.4	43.5	12.1	16.1	
4.	204.01	BB	--	29.0	17.4	29.8	2.8	6.0	--	25.4	43.5	**	18.1	
5.	480.00	BB	35.0	36.0	19.6	30.5	4.8	2.8	31.7	32.7	46.0	14.3	13.3	
6.	720.00	BB	24.4	26.3	21.1	30.2	6.8	2.8	24.9	26.8	46.0	21.1	19.2	
7.	816.02	BB	30.0	30.5	21.7	29.8	7.7	2.8	32.4	32.9	46.0	13.6	13.1	
8.	912.03	BB	28.0	25.2	22.4	29.2	7.7	2.8	31.7	28.9	46.0	14.3	17.1	

CALCULATION: READING + ANT. FACTOR + CABLE LOSS - AMP. GAIN + ATTEN.

Except for the above table : adequate margin data below the limits.

ANT TYPE : 30-299.99MHz Biconical, 300.00-1000MHz Logperiodic

** : enough margin compared to another polarized wave data.

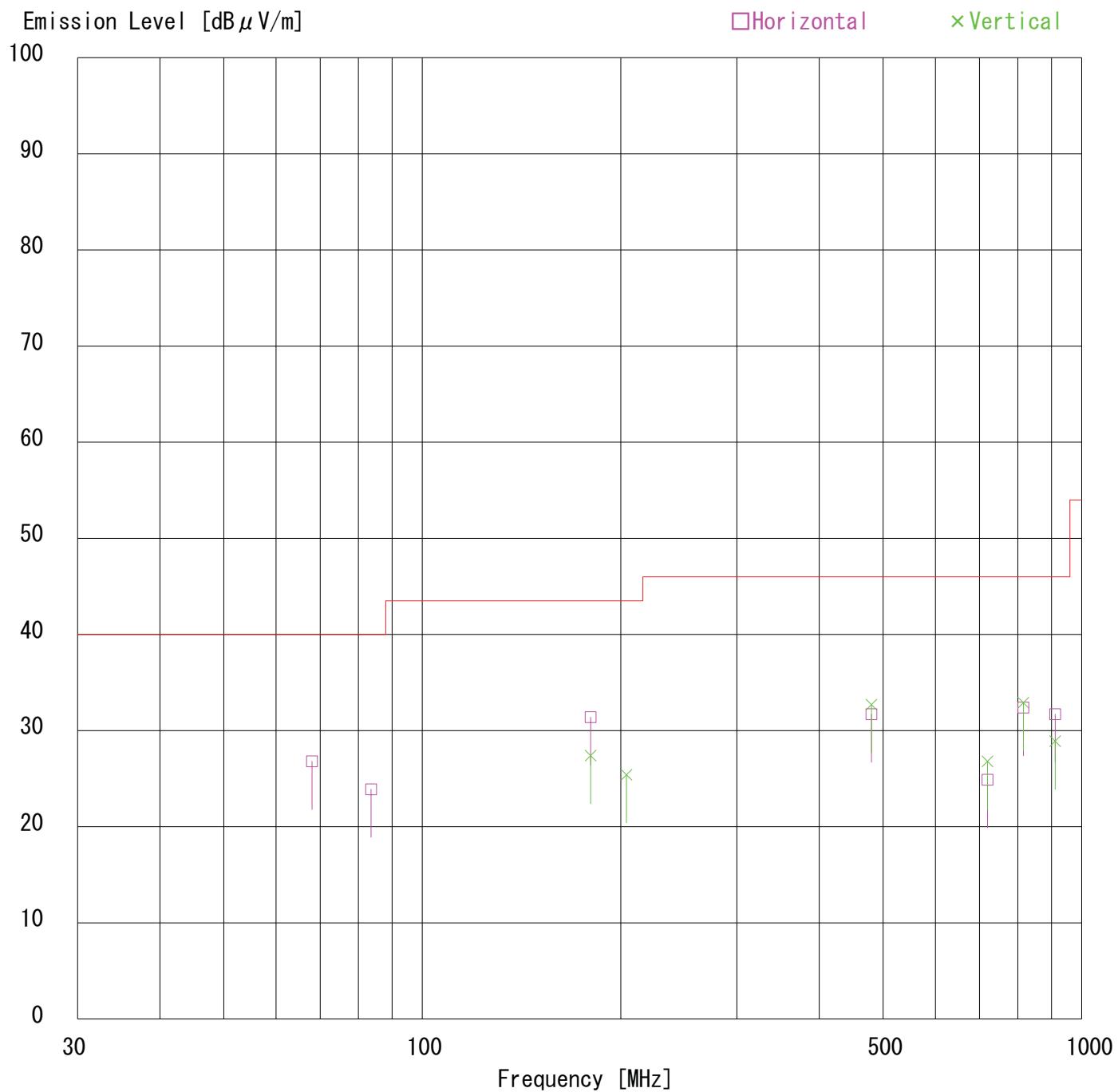
Data of Radiated Disturbance Test

UL Japan, Inc.

YOKOWA No.2 Open area test site

Report No. : 32EE0260-YW-01-B-R2

Power : DC5.0V/0.5A (PC:AC120V/60Hz)
 Mode : Running Mode
 Remarks : -
 Date : 1/10/2012
 Test Distance : 3 m
 Temperature : 18 °C Engineer : Tsuyoshi Katsuda
 Humidity : 40 %
 Limit : FCC Part15B CLASS B



Data of Radiated Disturbance Test

UL Japan, Inc.

YOKOWA No.2 Open area test site

Report No. : 32EE0260-YW-01-B-R2

No.	FREQ. [MHz]	ANT TYPE	READING		ANT FACTOR [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT		LIMITS [dB μV/m]	MARGIN HOR [dB]	
			HOR [dB μV]	VER [dB μV]					HOR [dB μV/m]	VER [dB μV/m]		HOR [dB μV/m]	VER [dB μV/m]
1.	1160.00	BB	40.3	42.0	24.2	37.4	2.7	0.0	29.8	31.5	54.0	24.2	22.5
2.	1200.00	BB	40.7	41.8	24.2	37.3	2.7	0.0	30.3	31.4	54.0	23.7	22.6
3.	1620.00	BB	39.9	41.3	24.7	36.8	3.3	0.0	31.1	32.5	54.0	22.9	21.5

CALCULATION: READING + ANT. FACTOR + CABLE LOSS - AMP. GAIN + ATTEN.
 Except for the above table : adequate margin data below the limits.

ANT TYPE : 1GHz-2GHz Horn

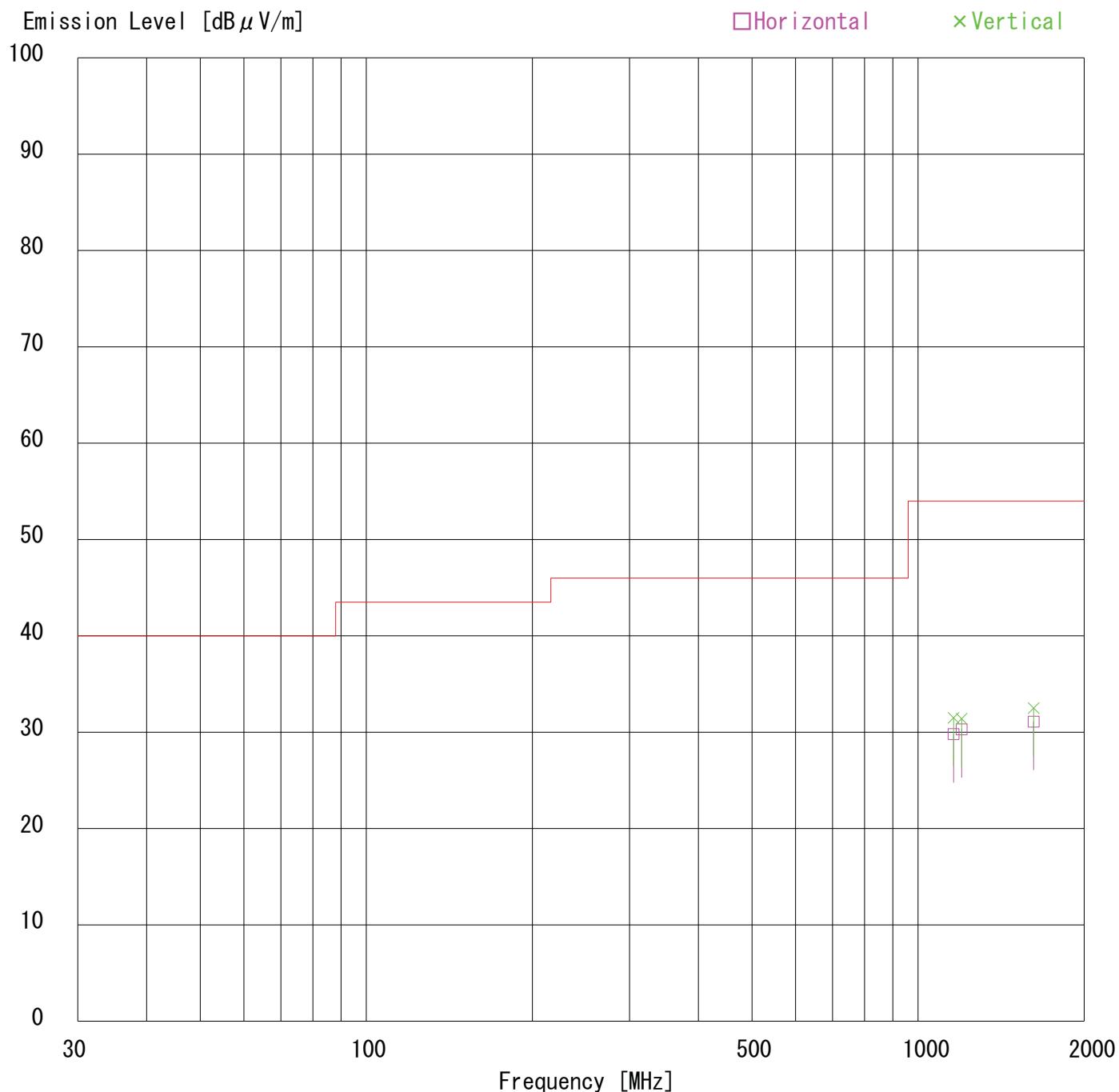
Data of Radiated Disturbance Test

UL Japan, Inc.

YOKOWA No.2 Open area test site

Report No. : 32EE0260-YW-01-B-R2

Power : DC5.0V/0.5A (PC:AC120V/60Hz)
 Mode : Running Mode
 Remarks : -
 Date : 1/10/2012
 Test Distance : 3 m
 Temperature : 18 °C Engineer : Tsuyoshi Katsuda
 Humidity : 39 %
 Limit : FCC Part15B CLASS B (Average Limit / Upper 1GHz)



Data of Radiated Disturbance Test

UL Japan, Inc.

YOKOWA No.2 Open area test site

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Power : DC5.0V/0.5A (PC:AC120V/60Hz)
Mode : Running Mode
Remarks : -
Date : 1/10/2012
Test Distance : 3 m
Temperature : 18 °C Engineer : Tsuyoshi Katsuda
Humidity : 39 %
Limit : FCC Part15B CLASS B (Peak Limit / Upper 1GHz)

No.	FREQ. [MHz]	ANT TYPE	READING		ANT FACTOR [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT		LIMITS [dB μ V/m]	MARGIN	
			HOR [dB μ V]	VER [dB μ V]					HOR [dB μ V/m]	VER [dB μ V/m]		HOR [dB]	VER [dB]
1.	1160.00	BB	45.6	51.6	24.2	37.4	2.7	0.0	35.1	41.1	74.0	38.9	32.9
2.	1200.00	BB	53.6	57.1	24.2	37.3	2.7	0.0	43.2	46.7	74.0	30.8	27.3
3.	1620.00	BB	47.5	49.8	24.7	36.8	3.3	0.0	38.7	41.0	74.0	35.3	33.0

CALCULATION: READING + ANT. FACTOR + CABLE LOSS - AMP. GAIN + ATTEN.
 Except for the above table : adequate margin data below the limits.

ANT TYPE : 1GHz-2GHz Horn

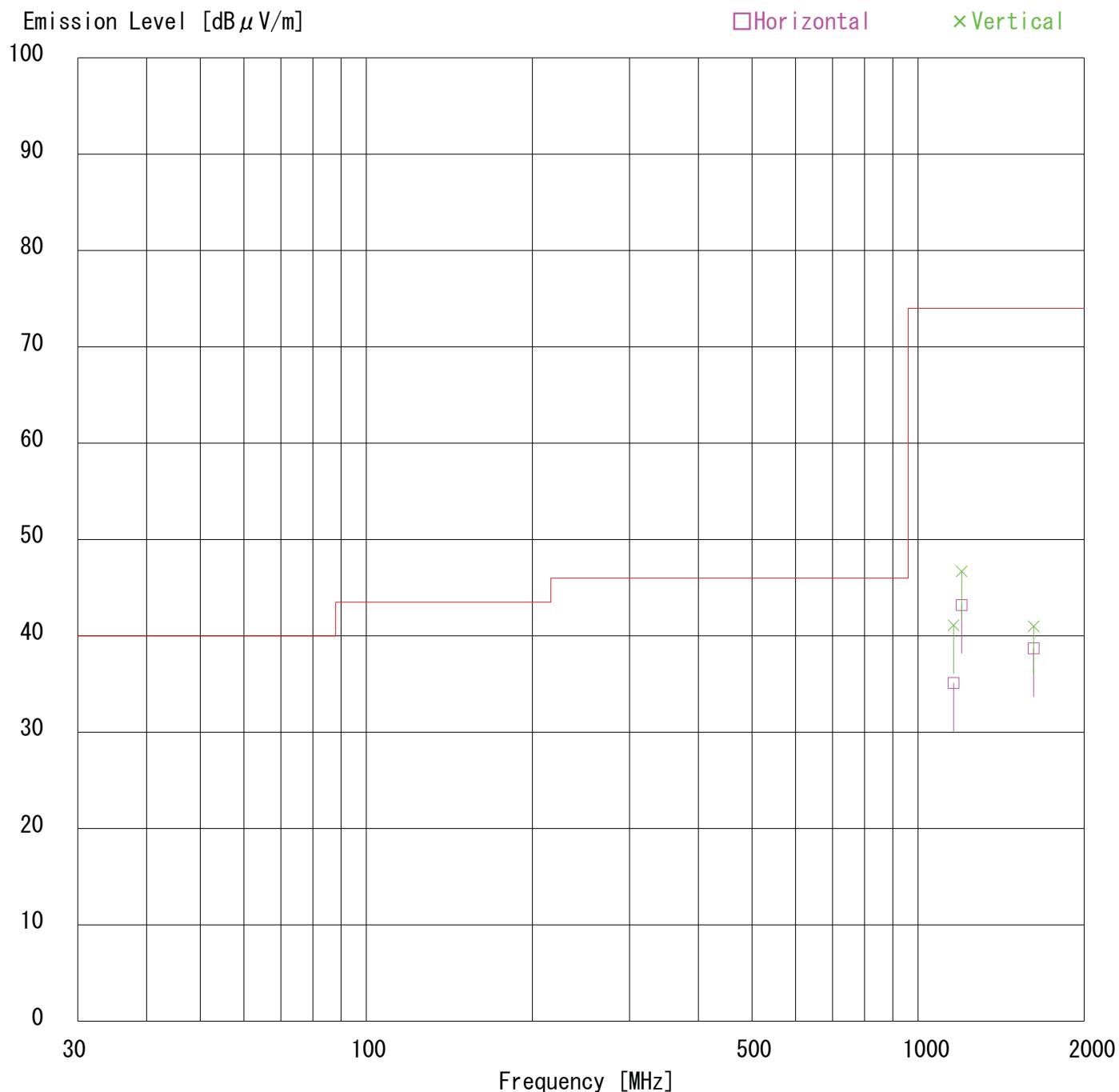
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 Humidity : 39 %
 Limit : FCC Part15B CLASS B (Peak Limit / Upper 1GHz)



Appendix 3
Test Instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SA-11	Spectrum Analyzer	Advantest	R3273	110301212	CE, RE	2011/03/31 * 12
AF-03	Pre Amplifier	Anritsu	MH648A	M97457	RE	2011/03/17 * 12
APATT12	Attenuator	Anritsu	MP721B	M48667	RE	2011/06/07 * 12
AT-02	Attenuator	Anritsu	MP721A	6200239014	RE	2011/07/27 * 12
BA-04	Biconical Antenna	Schwarzbeck	BBA9106	1521	RE	2011/11/23 * 12
KLA-05	Logperiodic Antenna	Schwarzbeck	USLP9143	362	RE	2011/11/23 * 12
MTR-06	Test Receiver	Rohde & Schwarz	ESCS30	830245/011	CE, RE	2011/06/28 * 12
CC-20RC	Yokowa No.2 open coaxial(0.01-1000MHz)	UL Japan	CC-21,CC-22,CC-23,CC-24,CC-25,C-26,CC-27,SW-21,SW-22	Y00201	RE	2011/05/03 * 12
YOATS-02(NSA)	Open area test site	JSE	3m, 10m	2	RE	2011/05/03 * 12
CUST-YW-RE	Software for Radiated Emission	ULJ	-	-	RE	-
LS-12	LISN (AMN)	Rohde & Schwarz	ENV216	101055	CE(EUT)	2011/10/20 * 12
CC-2S	Yokowa No.2 shield coaxial(0.01MHz-1000MHz)	UL Japan	CC-25,CC-27,CC-28,CC-29,SW-21,S-22	YS0201	CE	2011/06/10 * 12
CUST-YW-CE	Software for Conducted Emission	ULJ	-	-	CE	-
OS-10	Digital Humidity Indicator	SATO	PC-5000TRH	B-10	RE	2010/04/21 * 24
OS-15	Digital Humidity Indicator	SATO	PC-5000TRH	B-15	CE	2010/04/21 * 24
DM-02	Tester	SANWA	PC500	7019227	CE, RE	2011/06/06 * 12
YJM-11	Measure	Rubber KOMBE	GW-3H99W	-	CE, RE	-
SC-02	Search Coil	UL Japan	-	-	RE	-
AF-04	Pre Amplifier	Hewlett Packard	8449B	3008A01207	RE	2011/07/21 * 12
HA-07	Broad-Band Horn Antenna	Schwarzbeck	BBHA 9120 D	9120D-684	RE	2011/10/22 * 12
CC-C3	Microwave Cable	Suhner	-	-	RE	2011/09/06 * 12
LS-09	LISN(AMN)	Schwarzbeck	NNLK8129	8129136	CE	2011/03/15 * 12
TA-14	Terminator	Radiall	R404111000	-	CE	2011/06/07 * 12

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