KEC ELECTRONIC INDUSTRY DEVELOPMENT CENTER
TEST REPORT

Report Number : A-003-11-A Date of Issue: 21 June 2011

FCC Rules and Regulations Part 15 Subpart B Unintentional Radiators

This test report is to certify that the device was tested according to the requirements of the above and these results met the specifications of requirements.
The results of this report should not be construed to imply compliance of devices other than the sample tested.
Without the laboratory approval by the documents, this report should not be copied in part.

1. Applicant

Company Name	: INTELLIGENT SYSTEMS CO.,LTD.
Mailing Address	: 60 Kamitakamatsu-cho Fukuine Higashiyama-ku Kyoto-shi Kyoto-fu 605-0983 Japan

2. Identification of Tested Device

Type of Device	: Personal Computer and Peripherals
FCC ID	: Not Applicable
Device Name	: IS-CTR-DEBUGGER
Model Number	: SRX-ISJ
Serial Number	: 2100045-1
Trade Name	: INTELLIGENT SYSTEMS CO.,LTD.
Type of Test	: ☒ Production ☐ Pre-production ☐ Prototype

3. Test Items and Procedure

☒ AC Power Line Conducted Emission Measurement
☒ Radiated Emission Measurement

Above all tests were performed under: ANSI C63.4-2003
☒ without deviation, ☐ with deviation (details are found inside of this report)

4. Date of Test

Receipt of Test Sample	: 2 June 2011
Condition of Test Sample	: ☒ Damage is not found on the set.
	☐ Damage is found on the set. (Details are described in this report)
Test Completed on	: 17 June 2011

Test Engineer(s)

N. Norimoto

Naoki Norimoto

ilac-MRA VLAC Lab Accreditation VLAC-005

Approved by Ikuya Minematsu / Assistant Group Manager

Table of Contents

1. LABORATORY ACCREDITATION AND MEASUREMENT UNCERTAINTY

1.1. Laboratory Accreditation

KEC is accredited by the Voluntary EMC Laboratory Accreditation Center Inc. (VLAC) for the specific scope of accreditation under Lab Code: VLAC-005.
When the test report concerns with the VLAC accreditation test, the first page of the test report is signed by VLAC Approved Signatory accompanied by the VLAC logo.
The report must not be used by the client to claim product endorsement by VLAC or any agency of the U.S. Government.

1.2. Measurement Uncertainty

The result of a measurement is only an approximation or estimate of the value of a specific quantity. And thus the measurand is complete only when a statement of uncertainty is given.
KEC quotes Measurement Uncertainty (U) as follows.

Measurement of Conducted Disturbance	
Mains Ports	: +3.1/-3.7 dB
Telecommunication Ports ISN method	: +2.8/-3.4 dB
Telecommunication Ports Current Probe method	: +2.3/-2.8 dB
Telecommunication Ports 150Ω load voltage method	: +2.3/-2.8 dB
Lead Terminals and Additional Terminals	: +2.1/-2.6 dB
Measurement of Disturbance Power	: +2.6/-3.5 dB
Measurement of Radiated Disturbance	
Frequency Range (9 kHz – 30 MHz)	: +3.6/-4.2 dB
Frequency Range (30 MHz – 1000 MHz)	: +4.2/-4.8 dB
Frequency Range (1 GHz – 6 GHz)	: +4.5/-5.9 dB
Frequency Range (6 GHz – 26.5 GHz)	: +5.4/-5.7 dB
Harmonic Currents Emissions	: +0.5/-0.5 dB
Voltage Changes, Voltage Fluctuations and Flicker	: +0.7/-0.7 dB

Above values are calculated as Expanded Uncertainty (k=2 [95%]).

[Note]
If the measured result is below the specification limit and a margin is less than the above measurement uncertainty, it is impossible to determine compliance at a level of confidence of 95%. However, the measured result indicates high probability that the tested device complies with the specification limit.

2. CERTIFICATION OF THE COMPLIANCE

This test report is to certify that the tested device properly complies with the requirements of FCC Rules and Regulations Part 15 Subpart B Unintentional Radiators.

3. GENERAL INFORMATION

3.1. Product Description

(1) Technical Specifications

· The module consists of radios 802.11b/g.	: FCC ID: EW4DWMW028, IC: 4250A-DWMW028
· 802.11b at 1/2Mbps supports NDS series.	: The two radios cannot transmit at the same time.
· 802.11b/g supports Nintendo Wii.	: The two radios cannot transmit at the same time.

(2) Maximum Oscillators Frequency

· TARGET CPU	: 268MHz

(3) Tx and Rx Frequency range

· 802.11b/g	: 2400-2483.5MHz

(4) Software Version

· Check Program for IS-CTR SERIES	: 1.0.1105.3100
· Full Operation Program	: 0408a_Camera_015

(5) Firmware Version : 0.15.7

(6) Interface and Provide Terminal

· Audio jack (stereo output)	
· Cable connector	: Connect for IS-CTR-BOX or Card Adapter
· SD Card slot	
· AC adapter connector	
· USB connector	
· Cable connector (for Green)	: Connect for CTR for EMULATOR
· Game Card slot	: Connect for Flash Card
· EXT connector	: Connect for Debug controller

(7) Rated Power Supply : AC 120V ~ 230V, 50/60Hz (Test for AC 120V, 60Hz)

3.2. Description for Equipment Authorization

(1) Category	: ☒ Class A ☐ Class B
(2) Reference Rule and Specification	: FCC Rule Part 15 ☐ Section 15.107 (a) ☒ Section 15.107 (b) ☐ Section 15.109 (a) and (c) ☒ Section 15.109 (b) and (c) ☐ Section 15.109 (g)
(3) Kind of Equipment Authorization	: ☐ DoC ☐ Certification ☒ Verification
(4) Upper Frequency of Radiated Emission Measurement Range	: ☐ 1GHz ☒ 2GHz ☐ 5GHz ☐ 5th harmonic of the highest frequency or 40GHz, whichever is lower.

3.3. Test Facility

All tests described in this report were performed by:

Name: KEC Electronic Industry Development Center
Testing Division
Address: 3-2-2, Hikari-dai, Seika-cho, Soraku-gun, Kyoto 619-0237 Japan

Anechoic Chamber	☐ No.1	☐ No.3	☒ No.10	☐ No.11	☐ No.12
Shielded Room	☐ No.1	☐ No.9	☒ No.10		

These test facilities have been filed with the FCC under the criteria of ANSI C63.4-2003.
The KEC has been accredited by the VLAC (Lab. Code: VLAC-005) based on ISO/IEC 17025.

4. TESTED SYSTEM

4.1. Test Mode

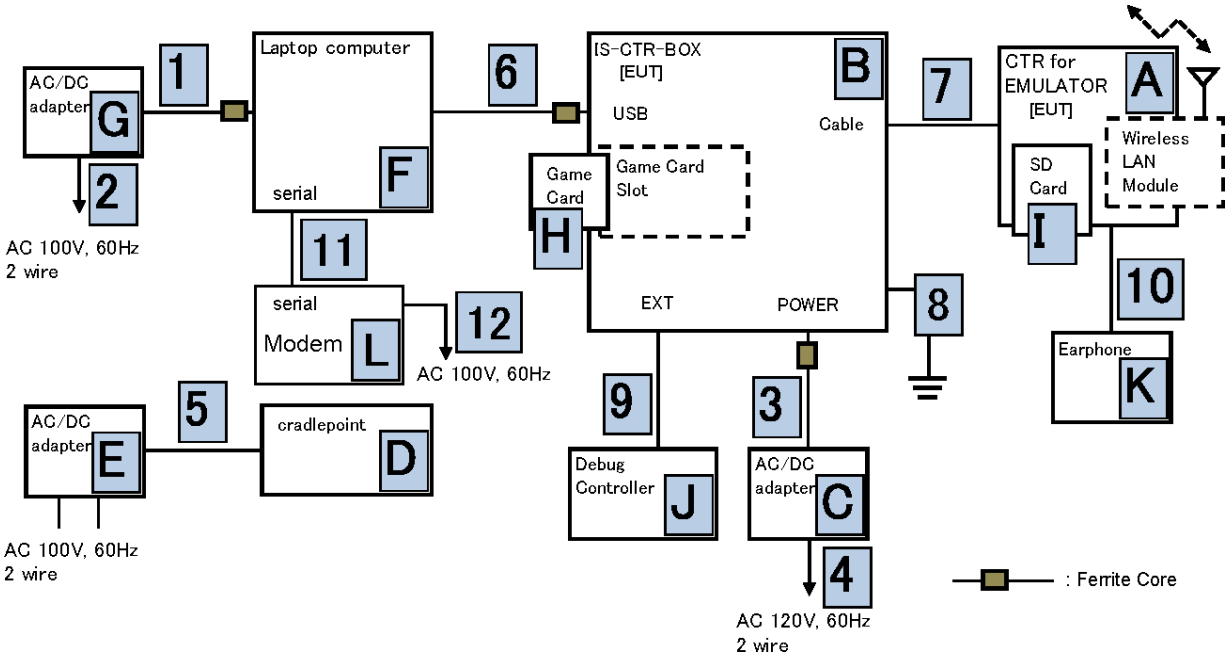
Mode No.	Test Mode
1	Full operation and Echo request For "CTR for EMULATOR" · Echo request (by communication via "cradlepoint"), and showing communication status · Transmitting data on the infrared, and showing communication status · Reading data from "SD card", and showing status · Showing a shot in 3D camera · Output sound · Accepting input button, and showing buttons · Accepting input from Touch Panel, and showing touch location · Accepting input from Gyro, and showing status · Accepting input from Accelerometer, and showing status · Accepting input from microphone, and showing diagram · Acquiring a built-in lithium battery status, and showing · Acquiring the status of the RTC (Real Time Clock), and showing For "IS-CTR-BOX" · Reading/Writing for Internal memory, and display status on "Laptop computer" · Communicate with card bus, and display status on "Laptop computer" · Communicate with the "CTR for EMULATOR", and display status on "Laptop computer" · USB communicate with PC, and display status on "Laptop computer"

[Note]
Running counter on the computer monitor
Running counter on the CTR for EMULATOR's LCD Screen
Yellow LED blinking on the side of CTR for EMULATOR (Echo request)

4.2. Characterization and condition of EUT System

☒ normal, ☐ not normal (that is)

4.3. Block Diagram of EUT System



4.4. List of EUT System

No.	Device Name	Model No.	Serial No.	Trade Name	Note
A	CTR for EMULATOR	SRX-ISJ	2100045-1	INTELLIGENT SYSTEMS CO.,LTD.	EUT
B	IS-CTR-BOX	SRX-ISJ	2100045-1	INTELLIGENT SYSTEMS CO.,LTD.	EUT
C	AC adapter for IS-CTR-BOX	RVL-002(USA)	-	Nintendo	
D	cradlepoint	PHS300	003044045031	-	
E	AC adapter for cradlepoint	Au-79D6u	J08091901R 2008 Sep	-	
F	Laptop computer	CF-19DC1AXS	7GKSA56169	Panasonic	
G	AC adapter for Laptop computer	CF-AA1632A M1	1632AM10750892 0C	Panasonic	
H	Game Card	IS-C021	-	Nintendo	
I	SD Card	8281BB 2G 07SS1	259778 9039	Transcend	
J	Debug Controller	RVL-005(-05)	-	Nintendo	
K	Earphone	-	-	-	
L	Modem	T1200-SD2	S87369400	OMNITEL	

4.5. List of Cables

No.	Cable Name	Shielded (Y/N)	Length (m)	Note	
1	DC cable for Laptop computer AC adapter	N	1.3	with ferrite core (1-turn×1)	(1)
2	AC cable For Laptop computer AC adapter	N	0.8	-	(4)
3	DC cable for IS-CTR-BOX AC adapter	N	1.0	with ferrite core (2-turn×1)	(1)
4	AC cable for IS-CTR-BOX AC adapter	N	1.6	-	(1),(4)
5	DC cable for cradlepoint AC adapter	N	1.8	-	(1)
6	USB cable for IS-CTR-BOX	Y	1.5	with ferrite core (3-turn×1)	(2)
7	Connect cable for CTR for EMULATOR	Y	0.7	-	(2)
8	Earth cable	N	1.5	-	-
9	Debug Controller cable	Y	0.8	-	(1)
10	Earphone cable	N	1.1	-	(1)
11	Serial cable	Y	2.0	-	
12	AC cable	N	1.9	-	(1)

[Note]
(1): Undetachable cable type
(2): Accessories cable of EUT
(3): 3-wires type, earth plug is grounded.
(4): 2-wires type

5. AC POWER LINE CONDUCTED EMISSION MEASUREMENT

5.1. Test Procedure

(1) Configure the EUT System in accordance with ANSI C63.4-2003 section 7.
See also the block diagram and the photographs of EUT System configuration in this report.
(2) Connect the EUT's AC power cord to one Line Impedance Stabilization Network (LISN).
(3) Any other power cord of other equipment is connected to a LISN different from the LISN used for the EUT.
(4) Warm up the EUT System.
(5) Activate the EUT System and run the software prepared for the test, if necessary.
(6) Connect the spectrum analyzer (*1) to the measuring port of the LISN for the EUT, using a calibrated coaxial cable.
(7) To find out an EUT System condition, which produces the maximum emission, the configuration of EUT System, the position of the cables, and the operation mode, are changed under normal usage of the EUT.
(8) The spectrums are scanned from 150kHz to 30MHz and collect the six highest emissions minimum on the spectrum analyzer relative to the limits in the whole range.
(9) The test receiver (*2) is connected to the LISN for the EUT, and the six highest emissions minimum recorded above are measured.

[Note]
(*1) Spectrum Analyzer Set Up Conditions
Frequency range : 150kHz – 30MHz
Resolution bandwidth : 10kHz
Video bandwidth : 1MHz
Detector function : Peak mode
(*2) Test Receiver Set Up Conditions
Detector function : Quasi – Peak / Average (if necessary)
IF bandwidth : 10kHz

5.2. Test Results

Measurement with the Quasi-peak (Q-Peak) Detector

Measured Frequency (MHz)	LISN Factor (dB)	Meter Reading		Maximum RF Voltage (dBμV)	Limit		Margin for Limit (dB)
		Va (dBμV)	Vb (dBμV)		Q-Peak (dBμV)	Average (dBμV)	
0.173	14.3	38.4	38.8	53.1	79.0	66.0	25.9
0.230	14.1	34.2	34.6	48.7	79.0	66.0	30.3
0.344	14.1	27.8	28.2	42.3	79.0	66.0	36.7
0.518	14.2	19.6	20.1	34.3	73.0	60.0	38.7
7.076	14.3	21.4	21.0	35.7	73.0	60.0	37.3
8.460	14.4	20.7	20.6	35.1	73.0	60.0	37.9

Measurement with the Average Detector

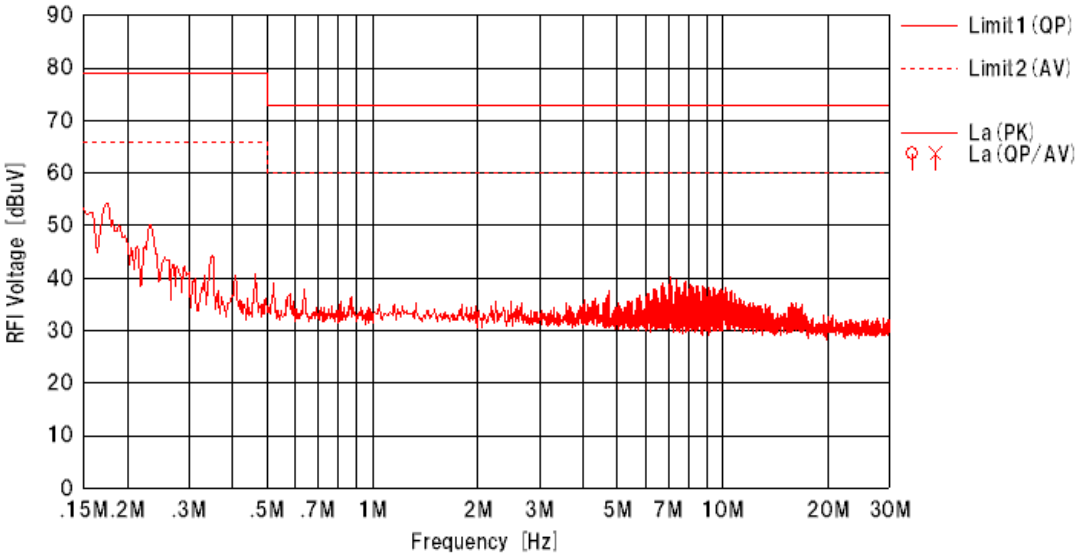
Measured Frequency (MHz)	LISN Factor (dB)	Meter Reading		Maximum RF Voltage (dBμV)	Limit	Margin for Limit (dB)
		Va (dBμV)	Vb (dBμV)		Average (dBμV)	
0.173	14.3	34.8	34.8	49.1	66.0	16.9
0.230	14.1	30.4	30.7	44.8	66.0	21.2
0.344	14.1	25.1	25.5	39.6	66.0	26.4
0.518	14.2	17.8	18.5	32.7	60.0	27.3
7.076	14.3	20.1	20.2	34.5	60.0	25.5
8.460	14.4	19.7	19.2	34.1	60.0	25.9

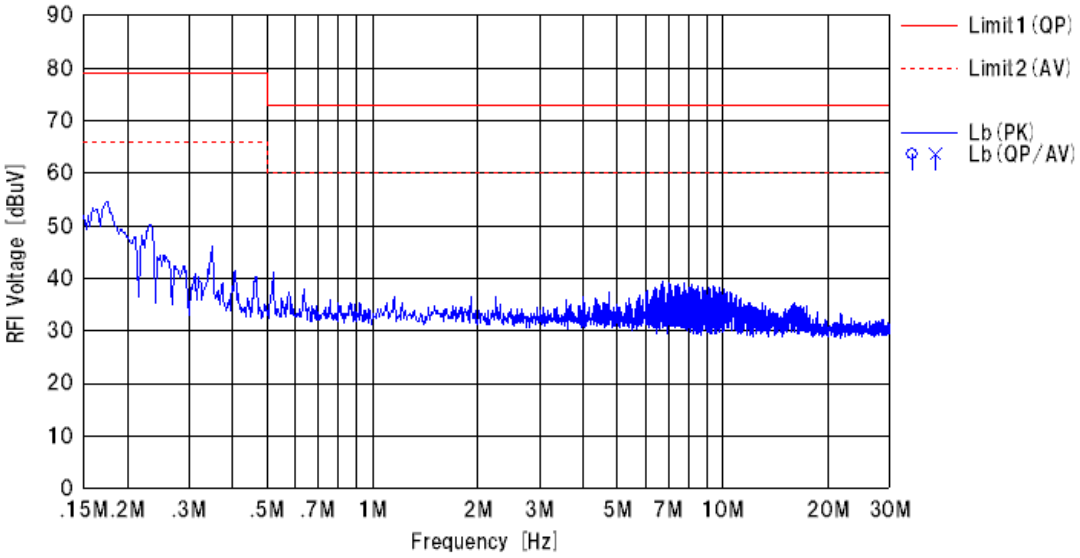
[Note]
LISN Factor includes the cable loss and attenuator loss.

[Calculation method]
Maximum RF Voltage (dBμV)
= Meter Reading (at maximum level of Va or Vb) (dBμV) + LISN Factor (dB)

Tested Date	Environment	
	Temperature	Humidity
3 June 2011	26 °C	40 %

Test Results in Graph

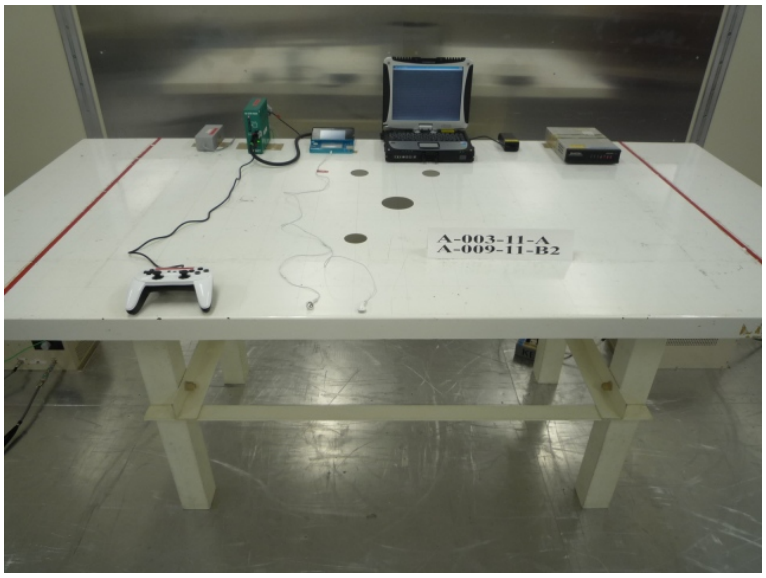


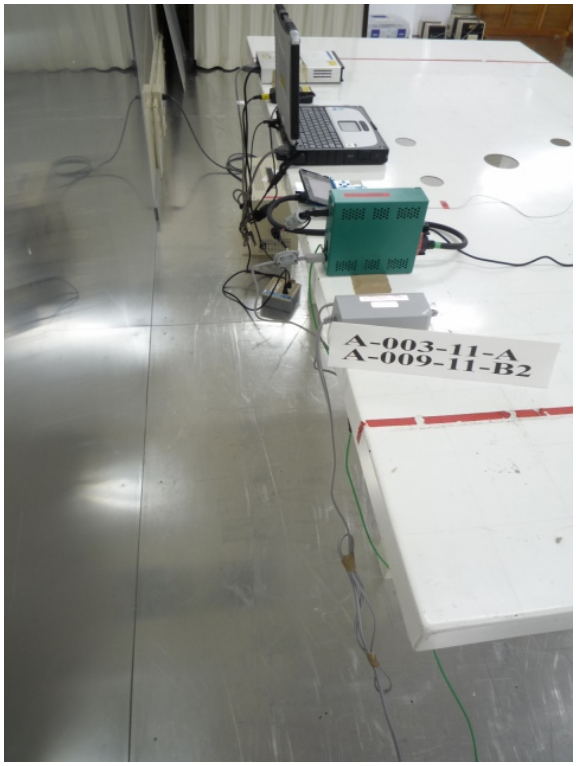


[Note]

This spectrum chart is the result of exploratory conducted emission measurement by using the spectrum analyzer. The result of Final conducted emission measurement is shown in the table of previous page.

5.3. Photographs of EUT System Configuration





6. RADIATED EMISSION MEASUREMENT

6.1. Test Procedure

(1) Configure the EUT System in accordance with ANSI C63.4-2003 section 8.
See also the block diagram and the photographs of EUT System configuration in this report.
(2) If the EUT system is connected to a public power network, all power cords for the EUT System are connected the receptacle on the turntable.
(3) Warm up the EUT System.
(4) Activate the EUT System and run the prepared software for the test, if necessary.
(5) To find out the emissions of the EUT System, preliminary radiated measurement are performed at a closer distance than that specified for final radiated measurement using the spectrum analyzer (*1) and the broad band antenna.
In the frequency above 1GHz, it is performed using the spectrum analyzer (*2) and the horn antenna.
(6) To find out an EUT System condition, which produces the maximum emission, the configuration of EUT System, the position of the cables, and the operation mode, are changed under normal usage of the EUT.
(7) The spectrums are scanned from 30MHz to the upper frequency of measurement range, and collect the six highest emissions minimum on the spectrum analyzer relative to the limits in the whole range.
(8) In final compliance test, the six highest emissions minimum, recorded above, are measured at the specified distance using the broad band antenna or the tuned dipole antenna and the test receiver (*3).
In the frequency above 1GHz, the measurements are performed by the horn antenna and
☐ the test receiver (*4).
☒ the spectrum analyzer (*5) with pre-amplifier.

[Note]

(*1) Spectrum Analyzer Set Up Conditions

Frequency range	: 30 – 1000MHz
Resolution bandwidth	: 100kHz
Detector function	: Peak mode

(*2) Spectrum Analyzer Set Up Conditions (Peak detector Measurement)

Frequency range	: 1GHz – Upper frequency of measurement range
Resolution bandwidth	: 1MHz
Video bandwidth	: 1MHz
Attenuator	: 10dB
Detector function	: Peak mode

(*3) Test Receiver Set Up Conditions

Detector function	: Quasi – Peak
IF bandwidth	: 120kHz

(*4) Test Receiver Set Up Conditions

Detector function	: Average
IF bandwidth	: 1MHz

(*5) Spectrum Analyzer Set Up Conditions (Average detector Measurement)

Frequency range	: 1GHz – Upper frequency of measurement range
Resolution bandwidth	: 1MHz
Video bandwidth	: 10Hz or 30Hz
Attenuator	: 10dB
Y axis	: Linear

6.2. Test Results

Measured Frequency (MHz)	Antenna Factor (dB/m)	Meter Reading Horizontal Polarization (dBμV)	Meter Reading Vertical Polarization (dBμV)	Ant. Height and Turn Table Angle at maximum level of Horizontal or Vertical Height (m)	Ant. Height and Turn Table Angle at maximum level of Horizontal or Vertical Angle (°)	Maximum Field Strength (dBμV/m)	Limit (dBμV/m)	Margin for Limit (dB)
223.42	-18.3	47.3	43.3	3.55	357	29.0	46.4	17.4
268.10	-16.1	48.8	42.9	3.20	150	32.7	46.4	13.7
479.98	-9.7	40.9	36.5	2.13	132	31.2	46.4	15.2
851.53	-2.7	35.7	36.2	2.46	282	33.5	46.4	12.9
938.33	-1.4	38.9	37.0	1.00	191	37.5	46.4	8.9
957.40	-1.3	31.3	32.0	1.99	289	30.7	46.4	15.7
Measurement with the Peak Detector								
1072.46	-9.1	46.8	48.3	1.70	74	39.2	69.5	30.3
1206.43	-8.5	48.4	47.5	1.00	344	39.9	69.5	29.6
1477.72	-8.0	48.9	45.9	1.25	165	40.9	69.5	28.6
Measurement with the Average Detector								
1072.45	-9.1	<35.0	35.7	1.70	74	26.6	49.5	22.9
1206.43	-8.5	40.2	36.3	1.00	344	31.7	49.5	17.8
1477.90	-8.0	36.0	<35.0	1.25	165	28.0	49.5	21.5

[Note]

(1) Antenna Factor includes the cable loss, attenuator loss and pre-amplifier gain.
Above 1000MHz, the antenna factor includes the cable loss and pre-amplifier gain.

(2) * mark in Measured Frequency : Measured with the tuned dipole antenna.
no mark in Measured Frequency : Measured with the broadband antenna.

(3) Turntable Angle: defined as 0° when EUT system on the Turn Table faces to the receiving antenna, and the Angle increases when turned clockwise.

(4) Upper Frequency : ☐ 1GHz ☒ 2GHz ☐ 5GHz ☐ 5th harmonic of the highest frequency
The emissions were checked to the upper frequency, and the lower emissions than the listed emissions in the above tables were omitted.

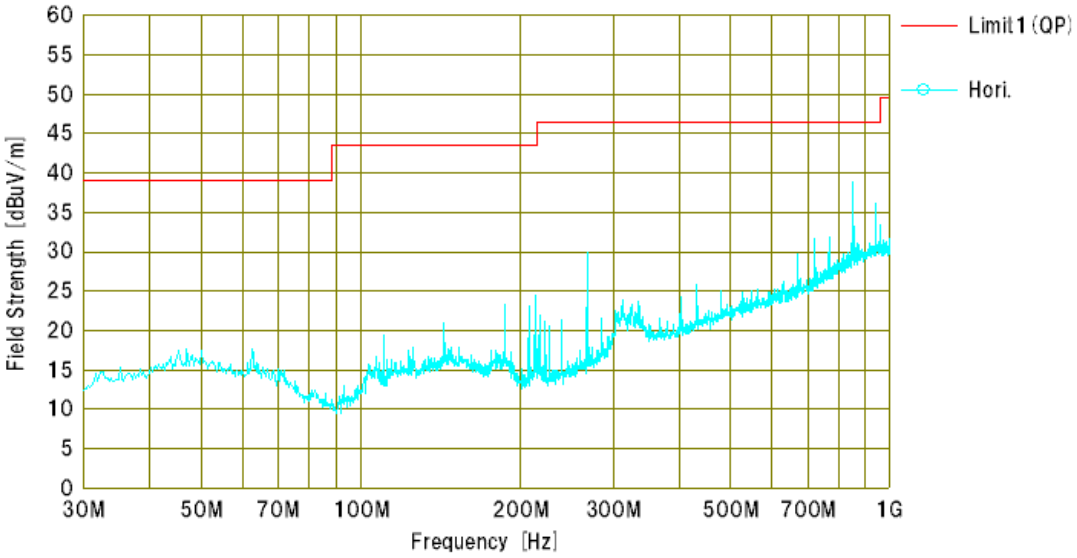
(5) Measurement Distance : <below 1GHz> ☐ 3m ☒ 10m
<above 1GHz> 3m

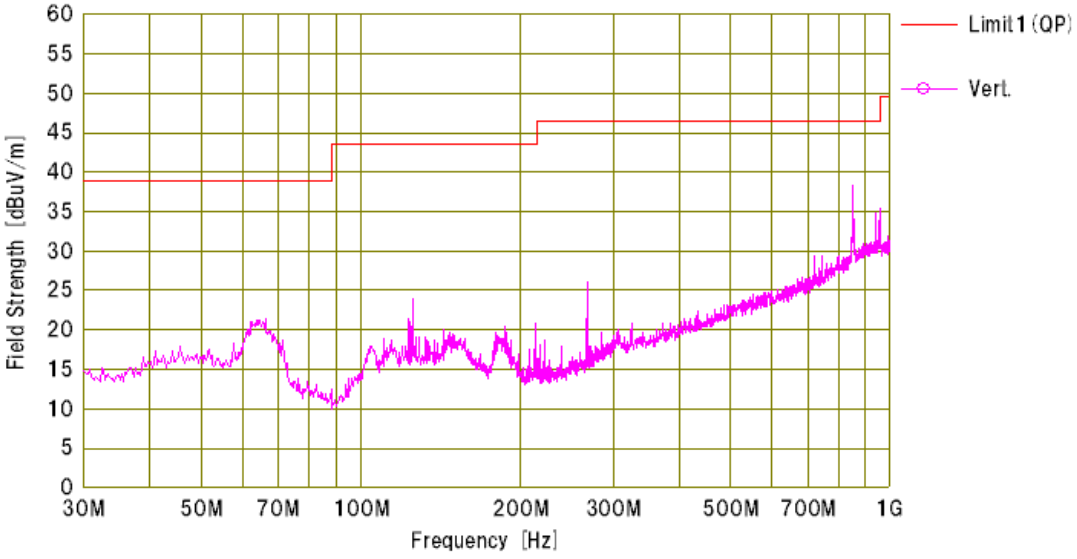
[Calculation method]

Maximum Field Strength (dBμV/m)
= Meter Reading (at maximum level of Horizontal or Vertical) (dBμV) + Antenna Factor (dB/m)

Tested Date	Environment	
	Temperature	Humidity
17 June 2011	22 °C	60 %

Test data in Graph (below 1GHz)

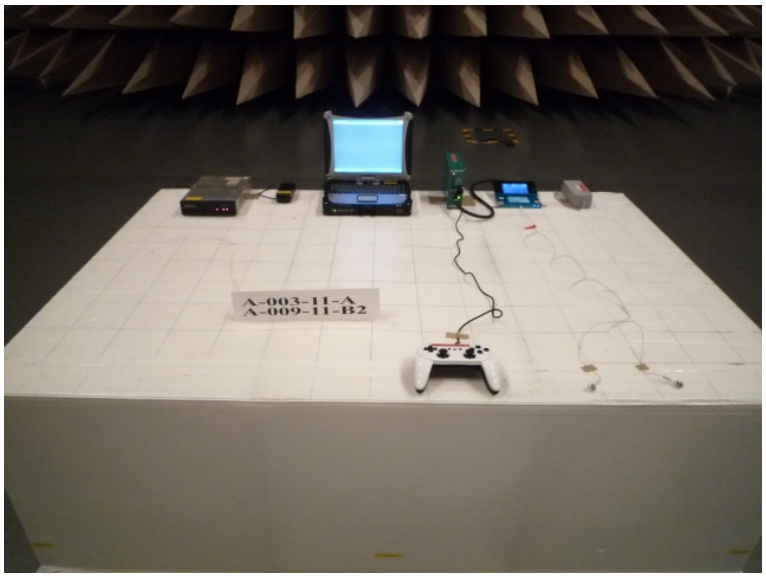


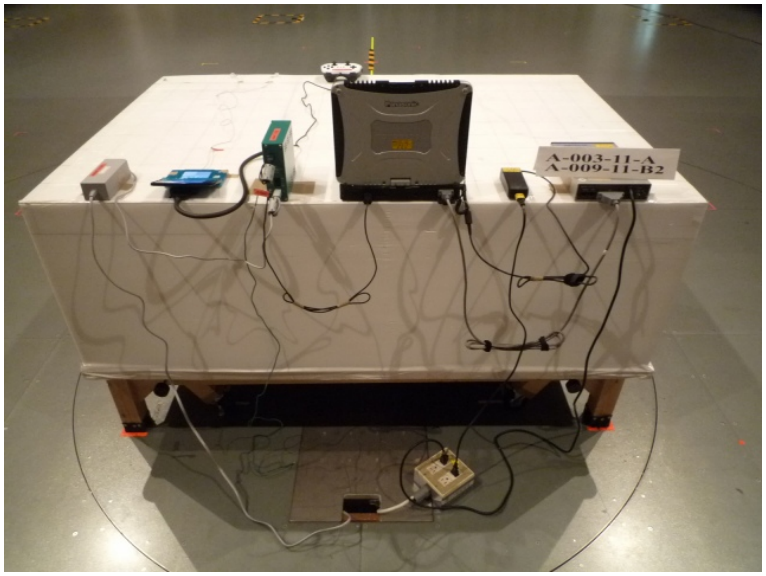


[Note]

This spectrum chart is the result of exploratory radiated emission measurement by using the spectrum analyzer. The result of Final radiated emission measurement is shown in the table of previous page.

6.3. Photographs of EUT System Configuration





7. USED TEST EQUIPMENT AND CALIBRATION STATUS

· AC Power Line Conducted Emission Measurement

KEC No.	Equipment	Manufacturer	Model No.	Last Cal.	Next Cal.
AT-124	Fixed Attenuator	Kyoritsu	KPD-401	2010/09	2011/09
FL-209	LISN	Kyoritsu	KNW-407	2010/09	2011/09
FL-210	LISN	Kyoritsu	KNW-242C	2010/09	2011/09
FL-210-1	50Ω Terminator	JFW	50T-001-BNC	2010/09	2011/09
FS-087	Test Receiver	ROHDE & SCHWARZ	ESHS10	2011/01	2012/01
MM-301	RF Relay Matrix Unit	TSJ	RFM-E221	2010/09	2011/09
SA-057	Spectrum Analyzer	Agilent	E4403B	2010/10	2011/10

· Radiated Emission Measurement

KEC No.	Equipment	Manufacturer	Model No.	Last Cal.	Next Cal.
AM-094	Pre-Amplifier	MITEQ	MLA-10K01-B01-35	2011/03	2012/03
AN-311	Tri-Log Antenna	Schwarzbeck	VULB9168	2011/03	2012/03
AT-113	Fixed Attenuator	JFW	50HF-003N	2011/03	2012/03
FS-082	Test Receiver	ROHDE & SCHWARZ	ESVS10	2010/12	2011/12
MM-300	RF Relay Matrix Unit	TSJ	RFM-E421	2011/03	2012/03
AM-053	Pre-Amplifier	HP	8449B	2011/03	2012/03
AN-163	Double Ridged Guide Antenna	Electro-Metrics	RGA-60	2011/02	2012/02
SA-060	Spectrum Analyzar	Agilent	N9010N	2010/06	2011/06
FL-174	Band Eliminate Filter	MICRO-TRONICS	BRM12294	2011/01	2012/01

Note : We check the performance, before using this device.

The overall program of calibration and verification of equipment is designed and operated so as to ensure that measurements made by KEC are traceable to national standards of measurement or equivalent abroad.