

TEST REPORT

APPLICANT : RISO KAGAKU CORPORATION

ADDRESS : 127-7 Taninosawa, Fukuda, Ami-machi, Inashiki-gun, Ibaraki-ken 300-1156, Japan

PRODUCTS : RF-Module(RFID Tag Reader/Writer)

MODEL No. : 050-34901

SERIAL No. : -

FCC ID : RPARFR6

TEST STANDARD : CFR 47 FCC Rules and Regulations Part 15 Subpart A and C

TEST LOCATION : Japan Quality Assurance Organization
Safety & EMC Center
EMC Engineering Department, TSURU EMC Branch
2096, Ohata, Tsuru-shi, Yamanashi-ken 402-0045, Japan

TEST RESULTS : Passed

DATE OF TEST : July 28, 2008 – August 1, 2008



Masanori Takahashi

Manager

Japan Quality Assurance Organization

Safety & EMC Center

EMC Engineering Department, TSURU EMC Branch
2096, Ohata, Tsuru-shi, Yamanashi-ken 402-0045, Japan

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claim product endorsement by NVLAP or
NIST or any agency of the U.S. Government.



NVLAP LAB CODE 200192-0

- The measurement values stated in Test Report was made with traceable to National Institute of Advanced Industrial Science and Technology (AIST) of Japan and National Institute of Information and Communications Technology (NICT) of Japan.
- The applicable standard, testing condition and testing method which were used for the tests are based on the request of the applicant.
- The test results presented in this report relate only to the offered test sample.
- The contents of this test report cannot be used for the purposes, such as advertisement for consumers.
- This test report shall not be reproduced except in full without the written approval of JQA.

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Definitions for Abbreviation and Symbols Used In This Test Report

“EUT” means Equipment Under the Test.

“AE” means Associated Equipment.

“N/A” means that Not Applicable.

“N/T” means that Not Tested.

-indicates that the listed condition, standard or equipment is applicable for this report.

-indicates that the listed condition, standard or equipment is not applicable for this report.

Documentation

1 Test Regulation

Applied Standard : CFR 47 FCC Rules and Regulations Part 15 Subpart A and C

Test procedure : ANSI C63.4-2003

2 Test Location

Japan Quality Assurance Organization
Safety & EMC Center
EMC Engineering Department, TSURU EMC Branch
2096, Ohata, Tsuru-shi, Yamanashi-ken 402-0045, JAPAN

3 Recognition of Test Laboratory

Japan Quality Assurance Organization, Safety & EMC Center
EMC Engineering Department, TSURU EMC Branch is accredited
under ISO/IEC 17025 by following accreditation bodies and the test facility of Testing
Division is accredited by the following bodies .

VLAC Code: VLAC-001-4 (Effective through : April 3, 2010)

NVLAP Lab Code:200192-0 (Effective through : June 30, 2009)

BSMI Recognition Number:

SL2-IN-E-6004, SL2-IS-E-6004, SL2-A1-E-6004 (Effective through : September 14, 2010)

VCCI Registration Number:

R-004, R-824, R-828, C-003, C-005, C-859, C-860, C-864, C-3085,
T-1420, T-1421, T-1422, T-1423, T-1424, T-1425 (Effective through : April 3, 2010)

FCC Registration Number : 342182 (Date of Listing : March 30, 2005)

IC Registration Number : 4126-1, 4126-2, 4126-3 (Effective through : August 29, 2008)

Accredited as conformity assessment body for Japan electrical appliances and material law
by METI. (Effective through : February 22, 2010)

4 Description of the Equipment Under Test

1 Manufacturer : RISO KAGAKU CORPORATION
127-7 Taninosawa, Fukuda, Ami-machi, Inashiki-gun,
Ibaraki-ken 300-1156, Japan

2 Products : RF-Module(RFID Tag Reader/ Writer)

3 Model No. : 050-34901

4 Serial No. : -

5 Product Type : Prototype

6 Date of Manufacture : -

7 Power Rating : 5.0VDC
* The EUT was operated with the DC Power Supply.
(Input: 120VAC 60Hz, Output: 5.0VDC)

8 EUT Grounding : None

10 EUT Authorization : Certification

11 EUT Highest Frequency
Used/Generated : 13.56MHz(Section 15.225)
Operation within the band 13.110 – 14.010 MHz

12 Modulation : ASK(10%)

13 Antenna type : Fixed using

14 Temperature Range : 0 ~ 40 degree

15 Received Date of EUT : July 28, 2008

5 Test Condition**5.1 AC Powerline Conducted Emission**

The requirements are -Applicable [-Tested -Not tested by applicant request.]
-Not Applicable

Used test site & instruments :

Type	Number of test site & instruments (Refer to Appendix C)					
Test Site	<input type="checkbox"/> OS-1	<input type="checkbox"/> OS-2	<input type="checkbox"/> AC-1	<input checked="" type="checkbox"/> SR-A	<input type="checkbox"/> SR-B	<input type="checkbox"/> SR-C
Test Receiver	<input type="checkbox"/> R-3	<input type="checkbox"/> R-4	<input checked="" type="checkbox"/> R-5			
Cable	<input type="checkbox"/> CB-3	<input checked="" type="checkbox"/> CB-4	<input type="checkbox"/> CB-5			
Network (for EUT)	<input type="checkbox"/> L-1	<input checked="" type="checkbox"/> L-2	<input type="checkbox"/> L-3	<input type="checkbox"/> L-4	<input type="checkbox"/> L-5	<input type="checkbox"/> L-6
	<input type="checkbox"/> L-7	<input type="checkbox"/> L-8	<input type="checkbox"/> L-9	<input type="checkbox"/> L-10	<input type="checkbox"/> L-11	<input type="checkbox"/> L-12
			<input type="checkbox"/> L-13			
Network (for AE)	<input type="checkbox"/> L-1	<input type="checkbox"/> L-2	<input type="checkbox"/> L-3	<input type="checkbox"/> L-4	<input type="checkbox"/> L-5	<input type="checkbox"/> L-6
	<input type="checkbox"/> L-7	<input type="checkbox"/> L-8	<input type="checkbox"/> L-9			
Pulse Limiter	<input type="checkbox"/> PL-3	<input type="checkbox"/> PL-4	<input checked="" type="checkbox"/> PL-5			
Termination	<input type="checkbox"/> TM-1	<input type="checkbox"/> TM-2				

5.2 Radiated Emissions 0.009 MHz - 30 MHz (Section 15.225(a)(b)(c))

The requirements are -Applicable [-Tested -Not tested by applicant request.]
-Not Applicable

Used test site & instruments :

Type	Number of test site & instruments (Refer to Appendix B)					
Test Site	<input type="checkbox"/> OS-1	<input checked="" type="checkbox"/> OS-2	<input type="checkbox"/> AC-1			
Test Receiver	<input type="checkbox"/> R-1	<input type="checkbox"/> R-2	<input type="checkbox"/> R-3	<input type="checkbox"/> R-4	<input checked="" type="checkbox"/> R-5	
Antenna	<input type="checkbox"/> AB-1	<input type="checkbox"/> AB-2	<input type="checkbox"/> AB-3	<input type="checkbox"/> AD-1	<input type="checkbox"/> AD-2	<input type="checkbox"/> AD-3
	<input type="checkbox"/> AL-1	<input type="checkbox"/> AL-2	<input type="checkbox"/> AL-3	<input type="checkbox"/> AL-4	<input type="checkbox"/> AL-5	<input type="checkbox"/> AD-4
			<input checked="" type="checkbox"/> AL-0			

5.3.1 Radiated Emission 0.009 MHz - 30 MHz(Section 15.225(d))

The requirements are -Applicable [-Tested -Not tested by applicant request.]
-Not Applicable

Used test site & instruments :

Type	Number of test site & instruments (Refer to Appendix C)					
Test Site	<input type="checkbox"/> OS-1	<input checked="" type="checkbox"/> OS-2	<input type="checkbox"/> AC-1			
Test Receiver	<input type="checkbox"/> R-4	<input checked="" type="checkbox"/> R-5	<input type="checkbox"/> S-1			
Antenna	<input type="checkbox"/> AB-1	<input type="checkbox"/> AB-2	<input type="checkbox"/> AB-3	<input type="checkbox"/> AD-1	<input type="checkbox"/> AD-2	<input type="checkbox"/> AD-3
	<input type="checkbox"/> AL-1	<input type="checkbox"/> AL-2	<input type="checkbox"/> AL-3	<input type="checkbox"/> AL-4	<input type="checkbox"/> AL-5	<input type="checkbox"/> AD-4
	<input checked="" type="checkbox"/> AL-0					

5.3.2 Radiated Emission 30 MHz - 1000 MHz(Section 15.225(d))

The requirements are -Applicable [-Tested -Not tested by applicant request.]
-Not Applicable

Used test site & instruments :

Type	Number of test site & instruments (Refer to Appendix C)					
Test Site	<input type="checkbox"/> OS-1	<input checked="" type="checkbox"/> OS-2	<input type="checkbox"/> AC-1			
Test Receiver	<input type="checkbox"/> R-1	<input checked="" type="checkbox"/> R-2	<input type="checkbox"/> R-3	<input type="checkbox"/> R-5	<input type="checkbox"/> S-1	<input type="checkbox"/> S-4
Cable	<input type="checkbox"/> CN-1	<input checked="" type="checkbox"/> CN-2	<input type="checkbox"/> CN-3			
Antenna	<input type="checkbox"/> AB-1	<input checked="" type="checkbox"/> AB-2	<input type="checkbox"/> AB-3	<input type="checkbox"/> AD-1	<input type="checkbox"/> AD-2	<input type="checkbox"/> AD-3
	<input type="checkbox"/> AL-1	<input checked="" type="checkbox"/> AL-2	<input type="checkbox"/> AL-3	<input type="checkbox"/> AL-4	<input type="checkbox"/> AL-5	<input type="checkbox"/> AD-4

5.3.3 Radiated Emission above 1 GHz(Section 15.225(d))

The requirements are -Applicable [-Tested -Not tested by applicant request.]
-Not Applicable

Used test site & instruments :

Type	Number of test site & instruments (Refer to Appendix C)					
Test Site	<input type="checkbox"/> OS-1	<input type="checkbox"/> OS-2	<input type="checkbox"/> AC-1			
Test Receiver	<input type="checkbox"/> R-3	<input type="checkbox"/> R-5	<input type="checkbox"/> S-1	<input type="checkbox"/> S-3	<input type="checkbox"/> S-4	
Cable	<input type="checkbox"/> CS-1	<input type="checkbox"/> CS-2				
Antenna	<input type="checkbox"/> AL-1	<input type="checkbox"/> AL-2	<input type="checkbox"/> AL-3	<input type="checkbox"/> AL-4	<input type="checkbox"/> AL-5	
Pre-Amplifier	<input type="checkbox"/> PA-1	<input type="checkbox"/> PA-2	<input type="checkbox"/> PA-3	<input type="checkbox"/> PA-5		

5.4 Frequency Stability

The requirements are -Applicable [-Tested -Not tested by applicant request.]
-Not Applicable

Instruments :

Type	Number of test site & instruments (Refer to Appendix B)					
Test Receiver	<input type="checkbox"/> R-1	<input type="checkbox"/> R-2	<input type="checkbox"/> R-3	<input type="checkbox"/> R-4	<input type="checkbox"/> R-5	<input type="checkbox"/> S-1
	<input type="checkbox"/> S-3	<input checked="" type="checkbox"/> 13				
Cable	<input type="checkbox"/> CB-3	<input type="checkbox"/> CB-4	<input type="checkbox"/> CB-5	<input type="checkbox"/> CB-3	<input type="checkbox"/> CB-4	<input type="checkbox"/> CB-5
	<input type="checkbox"/> CS-1	<input type="checkbox"/> CS-2	<input type="checkbox"/> CS-3	<input type="checkbox"/> CS-4	<input type="checkbox"/> CS-5	<input type="checkbox"/> CN-0
Oven	<input checked="" type="checkbox"/> OV-1					
Frequency Counter	<input checked="" type="checkbox"/> FC-1					
Antenna	<input type="checkbox"/> AB-1	<input type="checkbox"/> AB-2	<input type="checkbox"/> AB-3	<input type="checkbox"/> AD-1	<input type="checkbox"/> AD-2	<input type="checkbox"/> AD-3
	<input type="checkbox"/> AL-1	<input type="checkbox"/> AL-2	<input type="checkbox"/> AL-3	<input type="checkbox"/> AL-4	<input type="checkbox"/> AL-5	<input type="checkbox"/> AD-4
			<input type="checkbox"/> AL-0			

5.5 Occupied Bandwidth

The requirements are -Applicable [-Tested -Not tested by applicant request.]
-Not Applicable

Used test site & instruments :

Type	Number of test site & instruments (Refer to Appendix B)					
Oven	<input type="checkbox"/> OV-1					
Test Receiver	<input type="checkbox"/> R-1	<input type="checkbox"/> R-2	<input type="checkbox"/> R-3	<input type="checkbox"/> R-4	<input type="checkbox"/> R-5	<input type="checkbox"/> S-1
	<input type="checkbox"/> S-3	<input checked="" type="checkbox"/> 13				
Cable	<input type="checkbox"/> CB-3	<input type="checkbox"/> CB-4	<input type="checkbox"/> CB-5	<input type="checkbox"/> CB-3	<input type="checkbox"/> CB-4	<input type="checkbox"/> CB-5
	<input type="checkbox"/> CS-1	<input type="checkbox"/> CS-2	<input type="checkbox"/> CB-3	<input type="checkbox"/> CB-4	<input type="checkbox"/> CB-5	
Pre-Amplifier	<input type="checkbox"/> PA-1	<input type="checkbox"/> PA-2	<input type="checkbox"/> PA-3			
Antenna	<input type="checkbox"/> AB-1	<input type="checkbox"/> AB-2	<input type="checkbox"/> AB-3	<input type="checkbox"/> AD-1	<input type="checkbox"/> AD-2	<input type="checkbox"/> AD-3
	<input type="checkbox"/> AL-1	<input type="checkbox"/> AL-2	<input type="checkbox"/> AL-3	<input type="checkbox"/> AL-4	<input type="checkbox"/> AL-5	<input type="checkbox"/> AD-4
			<input type="checkbox"/> AL-0			

6 Preliminary Test and Test Setup

6.1 AC Powerline Conducted Emission

The test was based on ANSI C63.4-2003.

The preliminary conducted disturbance at the mains ports measurements were carried out.

The preliminary conducted disturbance at the mains ports were performed using the spectrum analyzer to observe the emissions characteristics of the EUT.

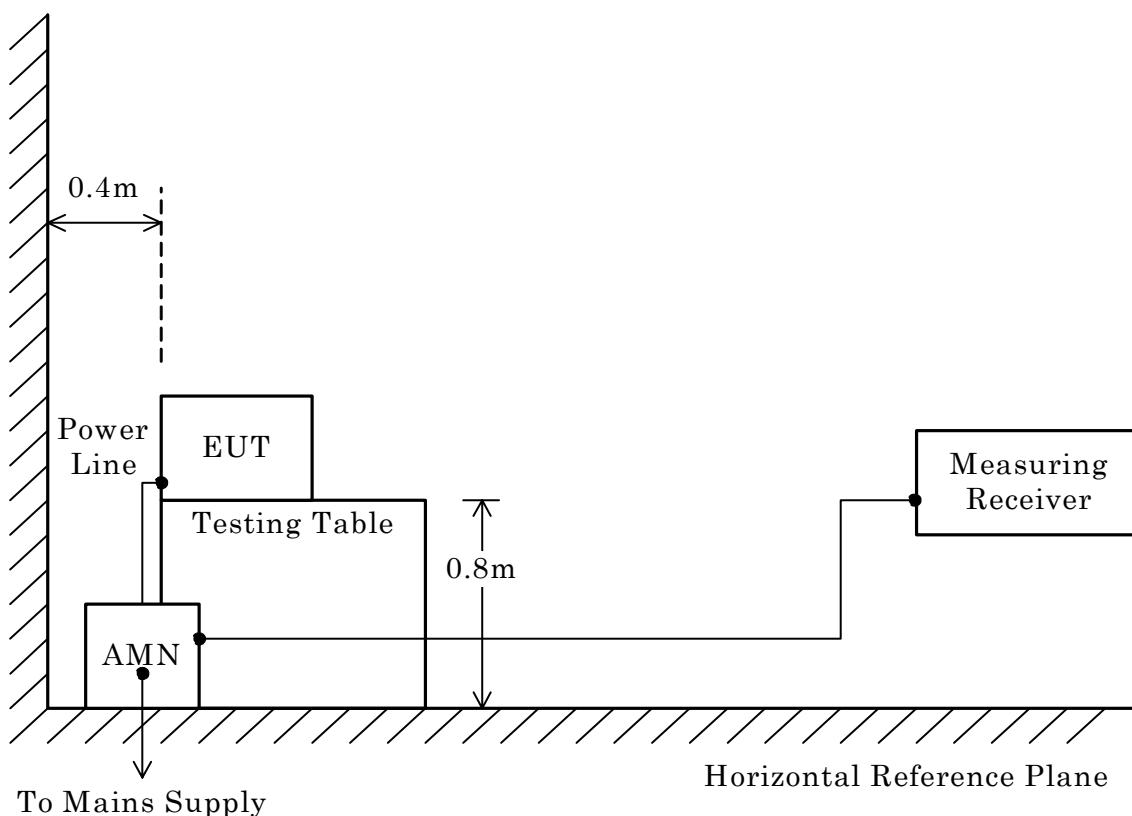
The EUT configuration, cable configuration and mode of operation were determined for producing the maximum level of emissions.

This configurations was used for final conducted disturbance at the mains ports measurements.

At within the transmitter's fundamental emission band(13.560MHz), it was retested with a dummy load, according to FCC publication Number:174176.

- Side View -

Vertical
Reference Plane



* AMN : Artificial Mains Network

6.2 Radiated Emissions 0.009 MHz - 30 MHz

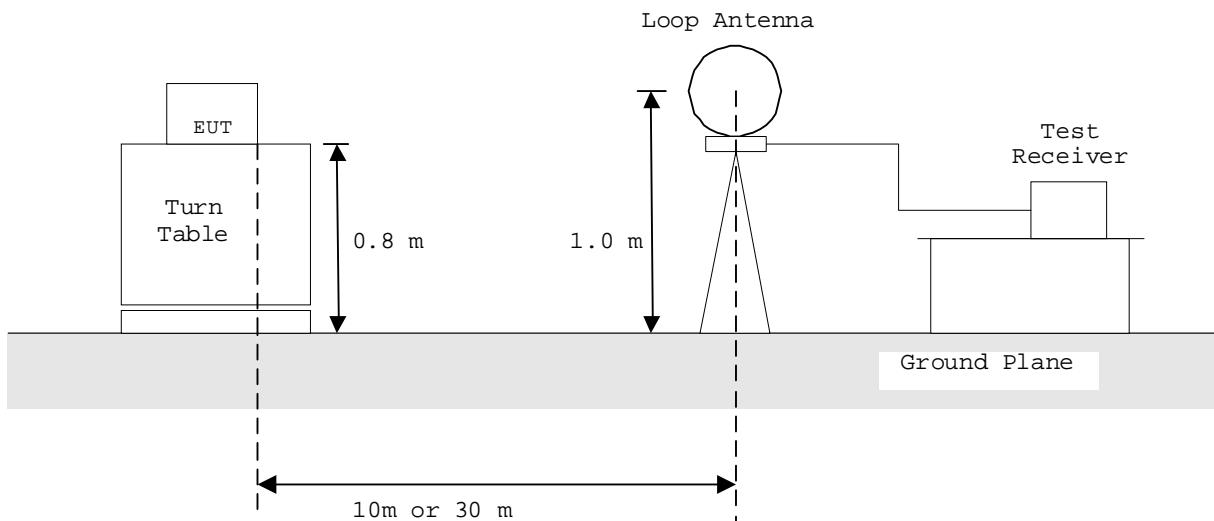
The test was based on ANSI C63.4-2003.

The preliminary radiated disturbance measurements were carried out.

The preliminary radiated disturbance measurements were performed at the measurement distance that specified for compliance to determine the emission characteristics of the EUT.

The EUT configuration, cable configuration and mode of operation were determined for producing the maximum level of emissions.

This configurations was used for the final radiated disturbance measurements.



6.3 Radiated Emission

6.3.1 Radiated Emission 0.009 MHz - 30 MHz

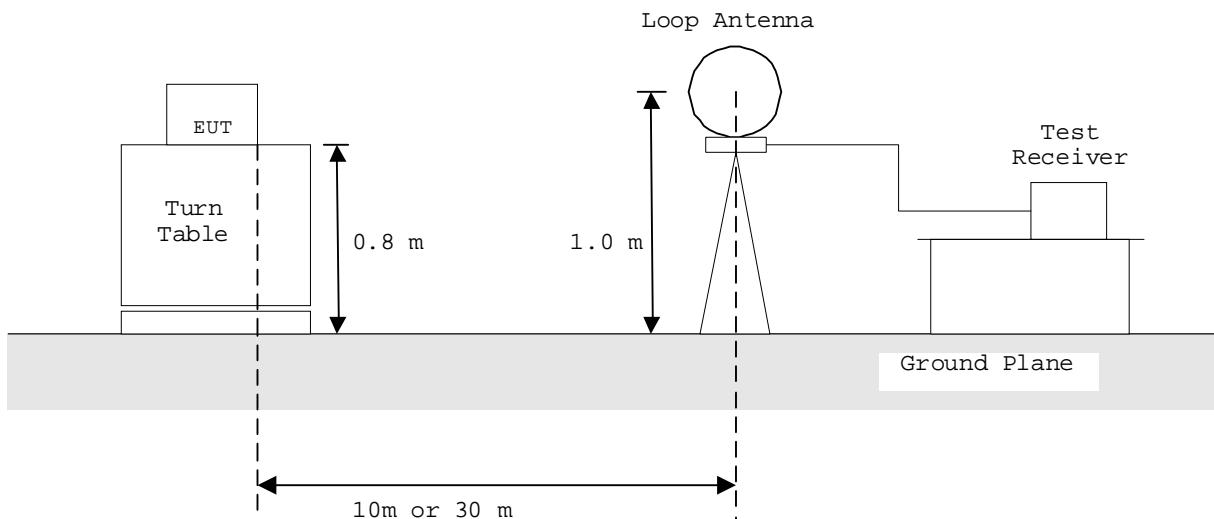
The test was based on ANSI C63.4-2003.

The preliminary radiated disturbance measurements were carried out.

The preliminary radiated disturbance measurements were performed at the measurement distance that specified for compliance to determine the emission characteristics of the EUT.

The EUT configuration, cable configuration and mode of operation were determined for producing the maximum level of emissions.

This configurations was used for the final radiated disturbance measurements.



6.3.2 Radiated Emission 30 MHz - 1000 MHz

The test was based on ANSI C63.4-2003.

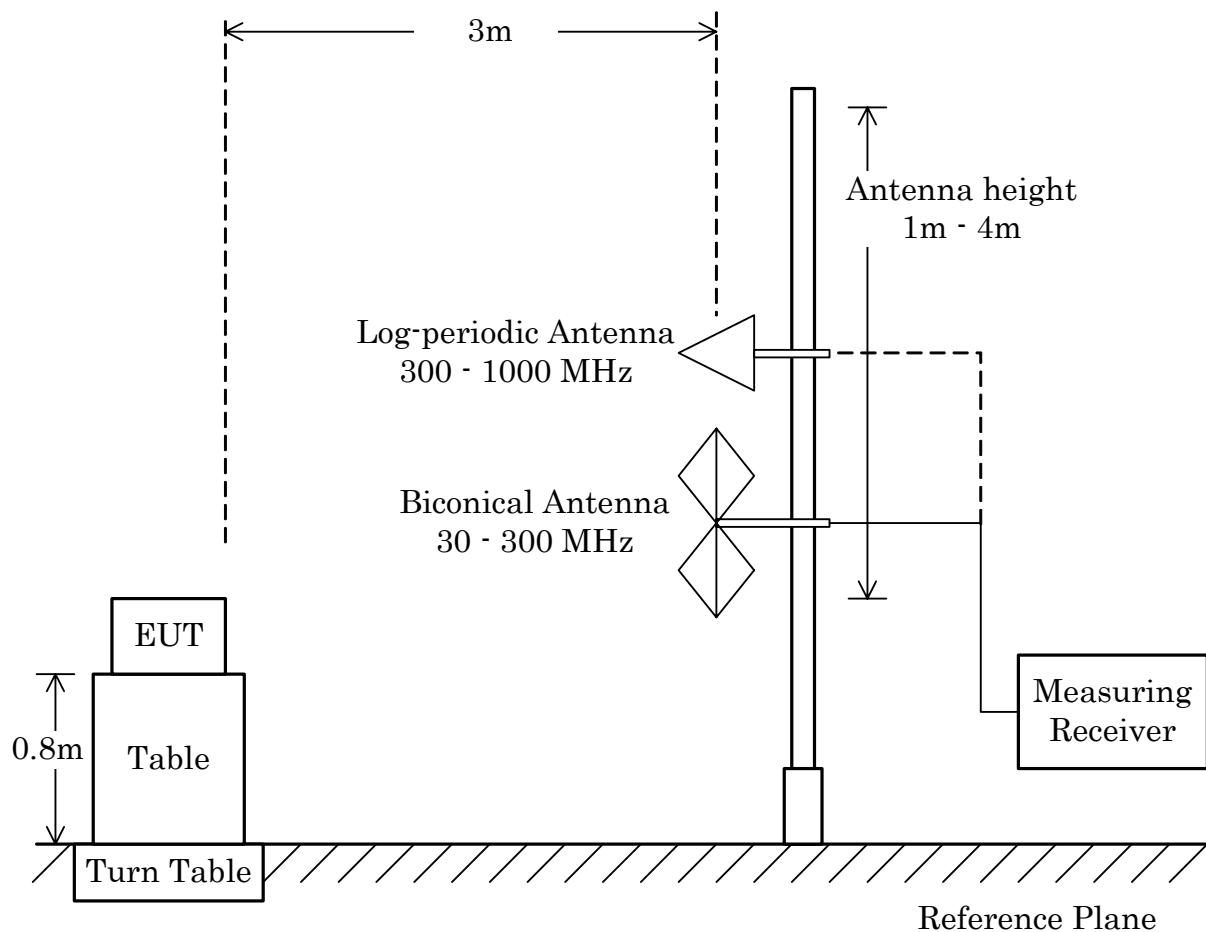
The preliminary radiated disturbance measurements were carried out.

The preliminary radiated disturbance measurements were performed at the measurement distance that specified for compliance to determine the emission characteristics of the EUT.

The EUT configuration, cable configuration and mode of operation were determined for producing the maximum level of emissions.

This configurations was used for the final radiated disturbance measurements.

- Side View -



6.3.3 Radiated Emission above 1 GHz

The test was based on ANSI C63.4-2003.

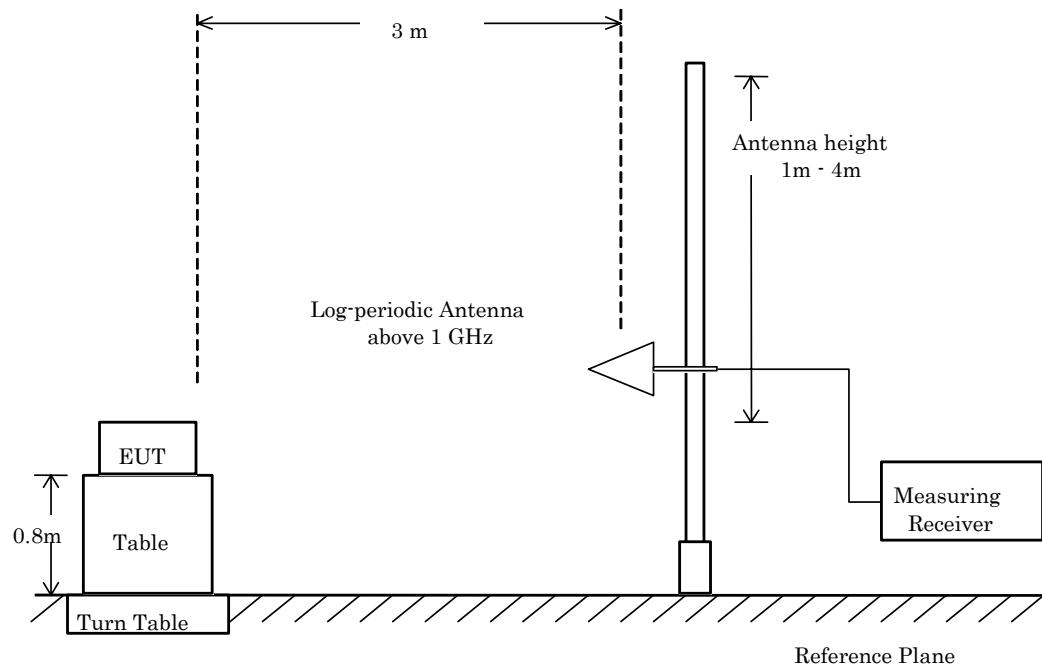
The preliminary radiated emissions measurements were carried out.

The preliminary radiated emissions measurements were performed at the measurement distance that specified for compliance to determine the emission characteristics of the EUT.

The EUT configuration, cable configuration and mode of operation were determined for producing the maximum level of emissions.

This configurations was used for the final radiated emissions measurements.

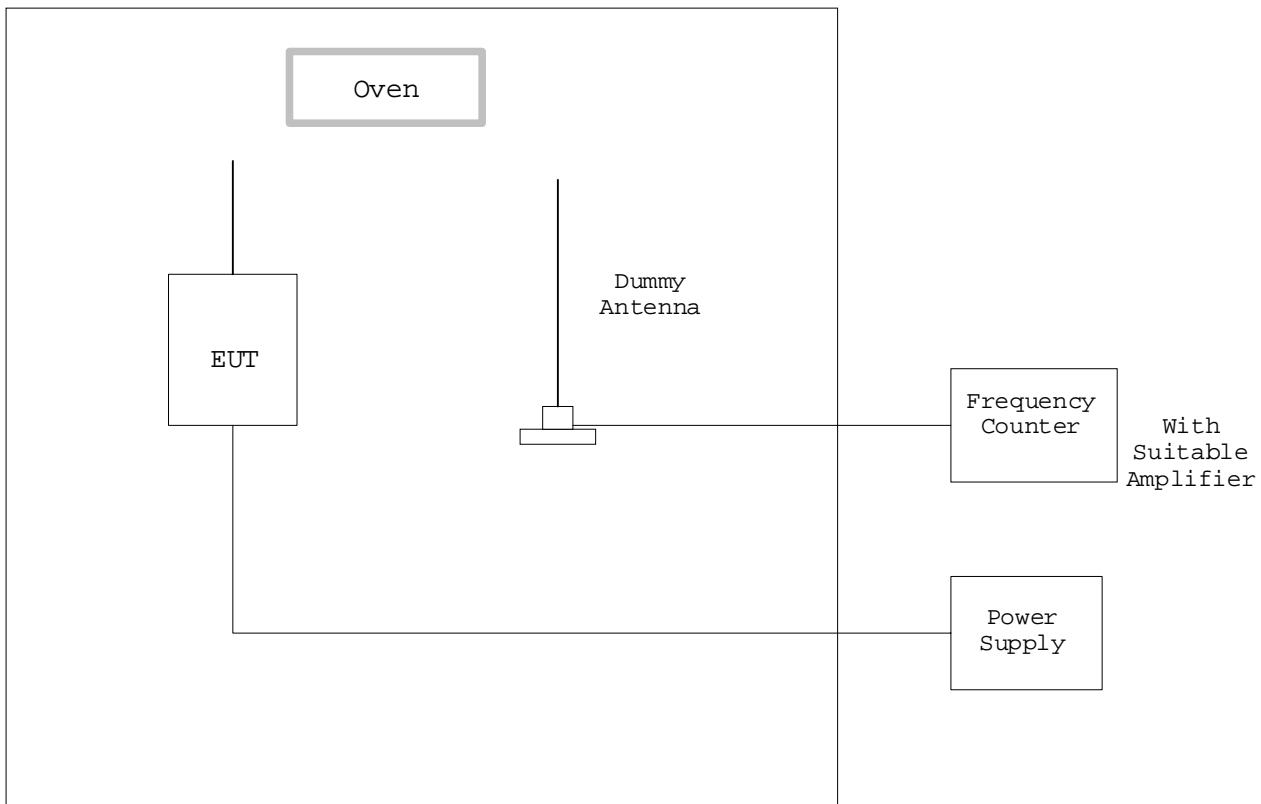
- Side View -



6.4 Frequency Stability

The test was based on ANSI C63.4-2003.

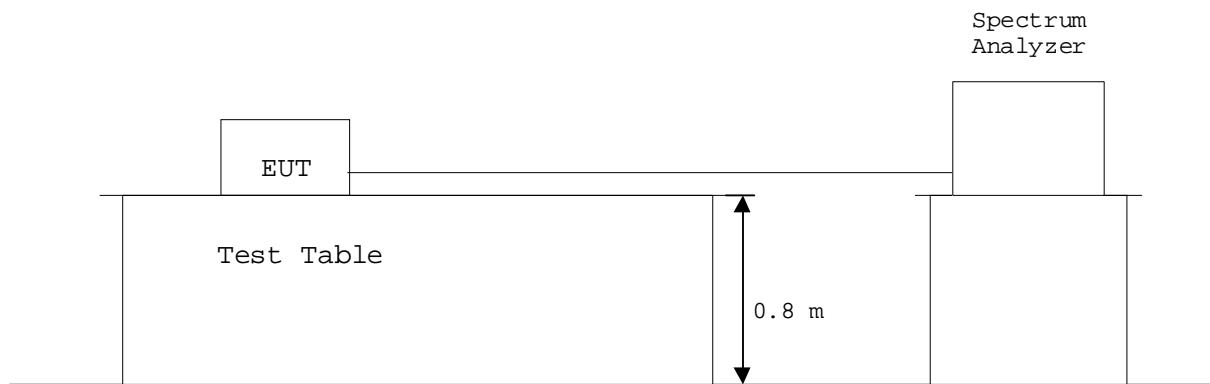
The frequency stability measurements were carried out. By using frequency counter with suitable RF amplifier, the carrier frequency of the transmitter under test was measured with a temperature variation of -20°C to $+50^{\circ}\text{C}$ at the normal supply voltage, and if required, with a variation in the primary voltage from 85 % to 115 % the rated supply voltage at the temperature of $+20^{\circ}\text{C}$. These measurements were carried out after allowing sufficient time (approximately 1 hour) for the temperature of the chamber to stabilize.



6.5 Occupied Bandwidth

According to description of ANSI C63.4-2003 sec.13.1.7, the occupied bandwidth measurements were carried out. By using a spectrum analyzer with a vertical antenna for picking up the signal, the measurements of the emission were made under the transmitting modes of the EUT.

The resolution bandwidth of spectrum analyzer was set to the value specified in sec.13.1.7.



7 Equipment Under Test Modification

-No modifications were conducted by JQA to achieve compliance to the limitations.
-To achieve compliance to the limitations, the following changes were made by JQA during the compliance test.

The modifications will be implemented in all production models of this equipment.

Applicant : Not Applicable
Date : Not Applicable
Typed Name : Not Applicable Signatory: Not Applicable
Position : Not Applicable

8 Responsible Party**Responsible Party of Test Item (Product)**

Responsible Party :

Contact Person :

Signatory

9 Deviation from Standard

-No deviations from the standard described in clause 1.
-The following deviations were employed from the standard described in clause 1.

10 Test Results**10.1 AC Powerline Conducted Emission**

The requirements are -Applicable [-Tested -Not tested by applicant request.]
-Not Applicable

-Passed -Failed -Not judged

Min. Limit Margin (QP)	<u>16.8</u>	dB	at	<u>27.12</u>	MHz
Min. Limit Margin (AVE)	<u>N/A</u>	dB	at	<u>N/A</u>	MHz
Max. Limit Exceeding	<u>N/A</u>	dB	at	<u>N/A</u>	MHz
Uncertainty of measurement results	<u>± 2.6</u>	dB(2o)			MHz

Remarks : _____

10.2 Radiated Emissions (Section 15.225(a)(b)(C))

The requirements are -Applicable [-Tested -Not tested by applicant request.]
-Not Applicable

-Passed -Failed -Not judged

Min. Limit Margin	<u>35.8</u>	dB	at	<u>13.553</u>	MHz
Max. Limit Exceeding	<u>N/A</u>	dB	at	<u>N/A</u>	MHz
Uncertainty of measurement results	<u>± 1.9</u>	dB(2o)			MHz

Remarks : _____

10.3 Radiated Emissions (Section 15.225(d))

The requirements are -Applicable [-Tested -Not tested by applicant request.]
-Not Applicable

-Passed -Failed -Not judged

Min. Limit Margin 4.6 dB at 81.36 MHz

Max. Limit Exceeding N/A dB at N/A MHz

Uncertainty of measurement results

<input checked="" type="checkbox"/> - 3 meters	0.009-30	MHz	<u>± 1.9</u>	dB(2σ)
	30- 300	MHz	<u>± 4.5</u>	dB(2σ)
	300-1000	MHz	<u>± 4.6</u>	dB(2σ)
	1 - 18	GHz	<u>± 3.7</u>	dB(2σ)

Remarks :

10.4 Frequency Stability (Section 15.225(e))

The requirements are -Applicable [-Tested -Not tested by applicant request.]
-Not Applicable

-Passed -Failed -Not judged

Remarks : _____

10.5 Occupied Bandwidth

The requirements are -Applicable [-Tested -Not tested by applicant request.]
-Not Applicable

-Passed -Failed -Not judged

Remarks : _____

11 Summary

General Remarks :

The EUT was tested according to the requirements of
CFR 47 FCC Rules and Regulations Part 15.

under the test configuration, as shown in clause 11 to 13.

The conclusion for the test items of which are required by the applied regulation is indicated
under the test results.

Determining compliance with the limits in this report was based on the results of the
compliance measurement, not taking into account measurement instrumentation uncertainty.

Test Results :

The “as received” sample;

- fulfill the test requirements of the regulation mentioned on clause 1.
- doesn't fulfill the test requirements of the regulation mentioned on clause 1.

Reviewed by:



Masanori Takahashi
Manager
TSURU EMC Branch
EMC Engineering Department

Tested by:



Kazuyuki Makimoto
Assistant Manager
TSURU EMC Branch
EMC Engineering Department

12 Operating Condition

Power Supply Voltage : 120VAC 60Hz

* The EUT was operated with DC Power Supply.(Output: 5.0Vdc)

Operation Mode

Transmitting: The Test have been carried out under continuous transmission/Reception Mode.

* The transceiver is used in combination with permanently co-located transmitter continuously transmitting, and it start to TX/RX at the time of the power is on simultaneously. Therefore this requirement could not be measured under RX or Standby mode.

13 Test Configuration

The equipment under test consists of :

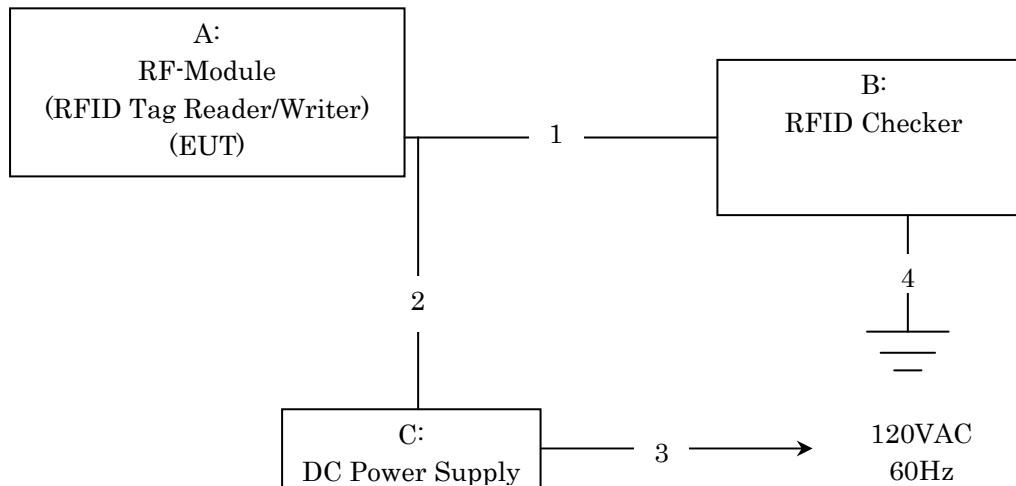
Sign	Item	Manufacturer	Model No.	Serial No.	FCC ID
A	RF-Module(RFID Tag Reader/Writer)	RISO KAGAKU CORPORATION	050-34901	-	RPARFR6

The auxiliary equipment used for testing :

Sign	Item	Manufacturer	Model No.	Serial No.	FCC ID
B	RFID Checker	RISO KAGAKU CORPORATION	-	-	N/A
C	DC Power Supply	KENWOOD	PA18-3A	-	N/A

Type of Cable:

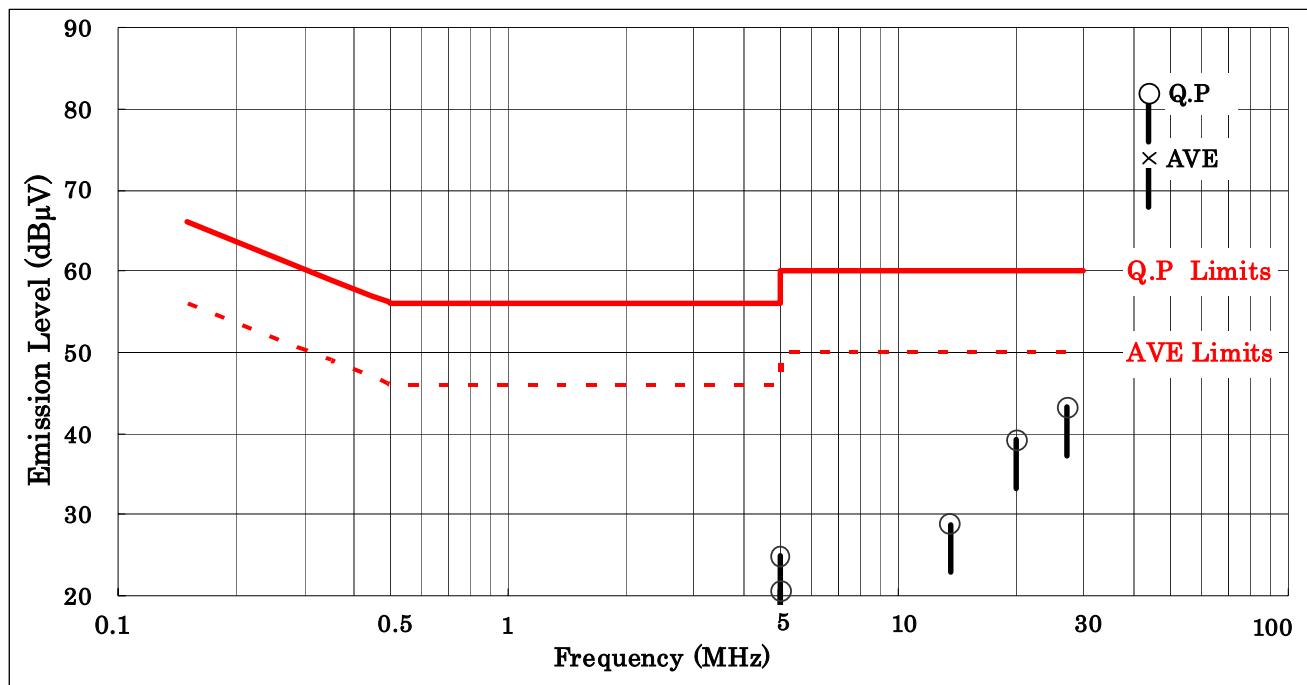
No.	Description	Identification (Manu. etc.)	Connector	Cable Shielded	Ferrite Core	Length (m)
1	Controller Cable	None	No	No	No	1.1
2	DC Cable	None	No	No	No	1.9
3	AC Cable	None	No	No	No	1.8
4	Ground Cable	None	No	No	No	2.4

14 Equipment Under Test Arrangement (Drawings)

Appendix A: Test Data
A.1 AC Powerline Conducted Emission

 Date : July 28, 2008
 Temp : 28 Humi : 65% Atom : 950hPa

Frequency (MHz)	AMN Factor (dB)	Meter Reading (dB μ V)				Limits (dB μ V)		Max. Emission Level (dB μ V)		Margin (dB)	
		V-A		V-B		Q.P	AVE	Q.P	AVE	Q.P	AVE
0.15	0.4	< 20.0	-	< 20.0	-	66.0	56.0	< 20.4	-	> 45.6	-
0.20	0.3	< 20.0	-	< 20.0	-	63.6	53.6	< 20.3	-	> 43.3	-
0.50	0.2	< 20.0	-	< 20.0	-	56.0	46.0	< 20.2	-	> 35.8	-
4.97	0.3	22.6	-	24.6	-	56.0	46.0	24.9	-	31.1	-
5.00	0.3	< 20.0	-	20.2	-	56.0	46.0	20.5	-	35.5	-
13.56	0.5	28.3	-	27.6	-	60.0	50.0	28.8	-	31.2	-
20.15	0.6	38.6	-	37.6	-	60.0	50.0	39.2	-	20.8	-
27.12	0.6	42.6	-	41.2	-	60.0	50.0	43.2	-	16.8	-



Notes:

- 1) The testing location : Shielded Room A
- 2) The spectrum was checked from 0.15 MHz to 30 MHz
- 3) AMN(Artificial Mains Network) factor includes the cable loss.
- 4) V-A : One end & Ground V-B : The other end & Ground
- 5) Q.P : Quasi-Peak Detector AVE : Average Detector
- 6) The symbol of "<" means "or less".
- 7) The symbol of ">" means "more than".
- 8) The symbol of "-" means "Not applicable".
- 9) A sample calculation was made at 0.15 MHz

$$(\text{AMN Factor}) + (\text{Meter Reading}) = 0.4 + 20.0 = 20.4 \text{ dB}\mu\text{V}$$

A.2 Radiated Emission (Section 15.225(a)(b)(C))

Frequency (MHz)	Antenna Factor (dB)	Meter Reading/		Limits/ Q.P	Field Strength/		Margin (dB) Q.P
		10m (dB μ V)	30m (dB μ V)		30m (dB μ V)	30m (dB μ V)	
		Q.P	Q.P		Q.P	Q.P	
13.110	-	< 30.0	29.5		< 10.9	> 10.9	> 18.6
13.410	-	< 30.0	40.5		< 10.9	> 10.9	> 29.6
13.553	-	33.8	50.5		14.7	11.6	35.8
13.560	-	46.1	84.0		27.0	11.6	57.0
13.567	-	30.7	50.5		11.6	11.6	38.9
13.710	-	< 30.0	40.5		< 10.9	> 10.9	> 29.6
13.410	-	< 30.0	29.5		< 10.9	> 10.9	> 18.6

Notes: 1) The testing location : Open Site No.2 Distance : 10 m

2) Q.P : Quasi-Peak Detector (IF Band width : 9 kHz)

3) The symbol of "<" means "or less".

4) The symbol of ">" means "more than".

5) The symbol of "-" means "Zero", because the used test receiver calculated and displayed in the Meter Reading including the Correction Factor(Antenna and cable loss) directly .

6) The testing loop antenna was rotated at the vertical and horizontal axis to maximize received emissions. The above Meter Reading was maximum emissions level.

7) Calculation :

For fundamental, the measured field strength was extrapolated to distance 30 meters, using the formula that field strength varies as the inverse distance square (40 dB per decade of distance).

Fundamental(13.560MHz): $46.1 \text{ dB}\mu\text{V/m} - 20\log_{10}((30/10)^2) = 46.1 - 19.1 = 27 \text{ dB}\mu\text{V/m}$ at 30 meters

Limits for 13.553-13.567MHz (§15.225(a)) = $20\log_{10}(15848) = 84.0 \text{ dB}\mu\text{V/m}$

Limits for 13.410-13.553 MHz (§15.225(b)) = $20\log_{10}(334) = 50.5 \text{ dB}\mu\text{V/m}$

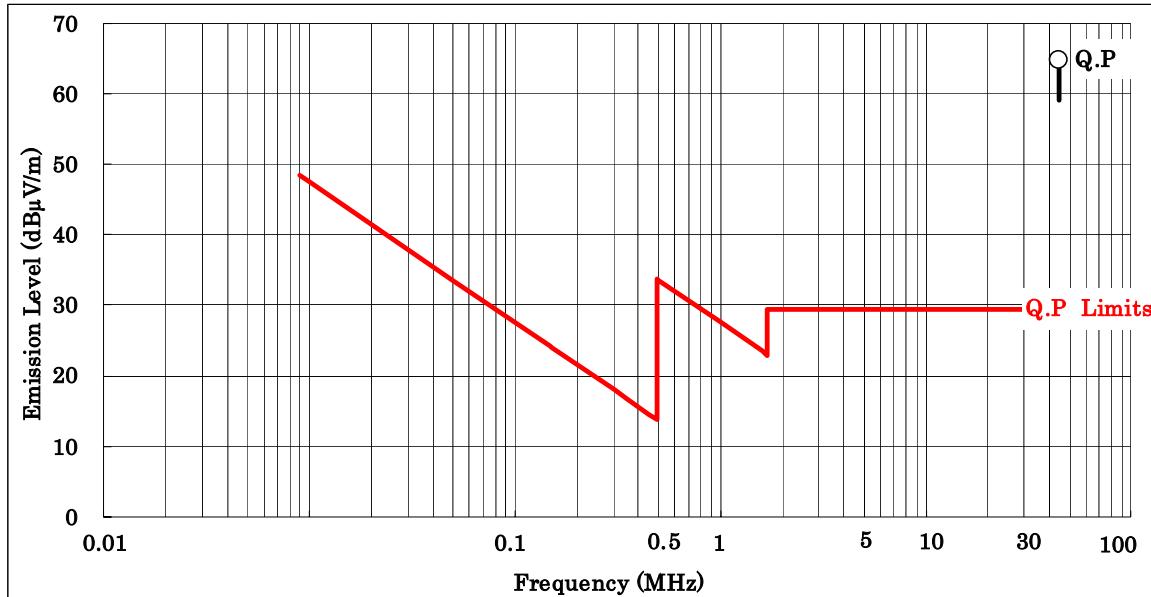
Limits for 13.110-13.410MHz (§15.225(c)) = $20\log_{10}(106) = 40.5 \text{ dB}\mu\text{V/m}$

Limits for except for 13.110-13.410MHz(§15.225(d)) = $20\log_{10}(30) = 29.5 \text{ dB}\mu\text{V/m}$

A.3. Radiated Emission**A.3.1 Radiated Emission (0.009 MHz - 30 MHz)**

Date : July 28, 2008
 Temp : 28 Humi : 65% Atom : 950hPa

Frequency (MHz)	Antenna Factor (dB)	Meter Reading (dB μ V) Q.P	Limits (dB μ V) Q.P	Specified Distance (m)	Extrapolated		Margin (dB) Q.P
					Emission Level (dB μ V) Q.P	Margin (dB) Q.P	
0.009	-	< 60.0	48.5	300.0	< 0.9	> 47.6	
0.01	-	< 60.0	47.6	300.0	< 0.9	> 46.7	
0.02	-	< 60.0	41.6	300.0	< 0.9	> 40.7	
0.03	-	< 60.0	38.1	300.0	< 0.9	> 37.1	
0.05	-	< 60.0	33.6	300.0	< 0.9	> 32.7	
0.07	-	< 60.0	30.7	300.0	< 0.9	> 29.8	
0.10	-	< 60.0	27.6	300.0	< 0.9	> 26.7	
0.20	-	< 60.0	21.6	300.0	< 0.9	> 20.7	
0.30	-	< 60.0	18.1	300.0	< 0.9	> 17.1	
0.50	-	< 35.0	33.6	30.0	< 15.9	> 17.7	
1.00	-	< 35.0	27.6	30.0	< 15.9	> 11.7	
2.00	-	< 35.0	29.5	30.0	< 15.9	> 13.6	
3.00	-	< 35.0	29.5	30.0	< 15.9	> 13.6	
5.00	-	< 35.0	29.5	30.0	< 15.9	> 13.6	
10.00	-	< 35.0	29.5	30.0	< 15.9	> 13.6	
27.12	-	< 35.0	29.5	30.0	< 15.9	> 13.6	
30.00	-	< 35.0	29.5	30.0	< 15.9	> 13.6	



Notes:

- 1) The testing location : Open Site No.2 Distance : 10 m
- 2) The symbol of "<" means "or less".
- 3) The symbol of ">" means "more than".
- 4) The symbol of "-" means "Zero", because the used test receiver calculated and displayed in the Meter Reading including the Correction Factor(Antenna and cable loss) directly
- 5) A sample calculation was made at 0.009 MHz

$$60 \text{ dB}\mu\text{V/m} (\text{at } 10\text{m distance}) \Rightarrow 60 - 20\log_{10}((300/10)^2) = 0.9 \text{ dB}\mu\text{V/m} (\text{at } 300\text{m distance})$$
- 6) Setting of measuring instrument :
 Quasi-Peak Detector, IF Bandwidth: 9 kHz or 200Hz (9 kHz - 90 kHz, 110-490kHz)
 Average Detector, IF Bandwidth: 9 kHz or 200Hz (except for 9 kHz - 90 kHz, 110-490kHz)
- 7) The spectrum was checked from 0.009 MHz to 30 MHz.

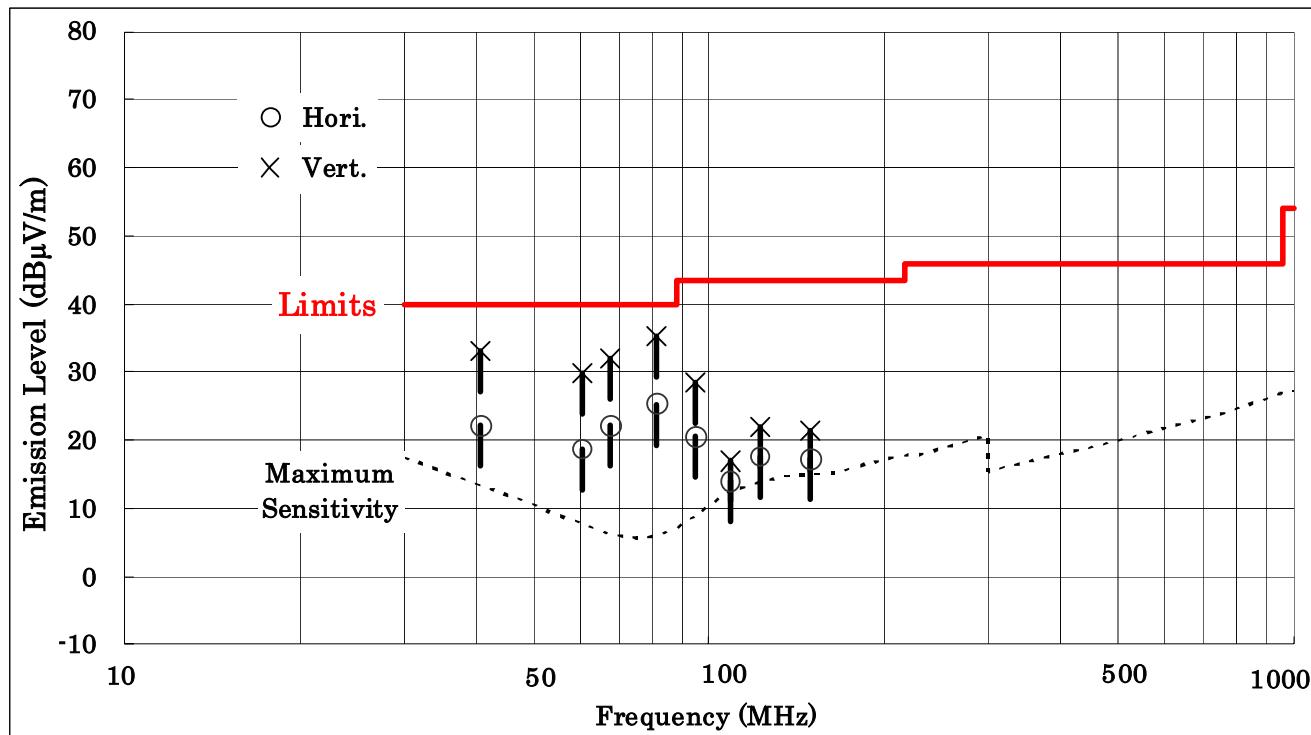
A.3.2 Radiated Emission 30 MHz - 1000 MHz

Date : July 28, 2008

Temp : 28

Humi : 65% Atom : 950hPa

Frequency (MHz)	Antenna Factor (dB/m)	Meter Reading (dB μ V)		Limits (dB μ V) Q.P	Emission Level (dB μ V/m)		Margin (dB)	
		Hori.	Vert.		Hori.	Vert.	Hori.	Vert.
40.68	15.7	6.4	17.5	40.0	22.1	33.2	17.9	6.8
60.45	9.8	8.9	19.9	40.0	18.7	29.7	21.3	10.3
67.80	8.4	13.7	23.6	40.0	22.1	32.0	17.9	8.0
81.36	8.3	17.0	27.1	40.0	25.3	35.4	14.7	4.6
94.92	11.2	9.4	17.4	43.5	20.6	28.6	22.9	14.9
108.58	14.9	-0.8	2.0	43.5	14.1	16.9	29.4	26.6
122.00	16.2	1.5	5.8	43.5	17.7	22.0	25.8	21.5
149.16	17.5	-0.2	4.0	43.5	17.3	21.5	26.2	22.0



Notes:

- 1) The testing location : Open Site No.2 Distance : 3 m
- 2) The spectrum was checked from 30 MHz to 1000 MHz.
- 3) Antenna factor includes the cable loss.
- 4) Hori. : Horizontal polarization Vert. : Vertical polarization
- 5) Q.P: Quasi-Peak Detector
- 6) The symbol of "<" means "or less", ">" means "more than".
- 7) A sample calculation was made at 40.7 MHz

$$(\text{Antenna Factor}) + (\text{Meter Reading}) = 15.7 + 17.5 = 33.2 \text{ dB}\mu\text{V}$$

A.3.3 Radiated Emission above 1 GHz

Not applicable

A.4 Frequency Stability

Testing Date : August 1, 2008

Temperature (°C)	Primary Supply Voltage (V)	Frequency (MHz)			
		0 minute later	2 minutes later	5 minutes later	10 minutes later
-20	102	13.55997751	13.55997689	13.55997703	13.55997756
	120	13.56000542	13.55998002	13.55997702	13.55997901
	138	13.55999568	13.55995675	13.55995649	13.55995651
20	102	13.56002753	13.56002749	13.5600275	13.56002735
	120	13.56003326	13.56002879	13.56002735	13.56002734
	138	13.56002748	13.5600271	13.56002714	13.56002725
50	102	13.55996078	13.55996163	13.55996178	13.55997616
	120	13.55995831	13.55995503	13.55995383	13.55995405
	138	13.55996161	13.55996103	13.55996115	13.559961

Operating Frequency:13.56MHz

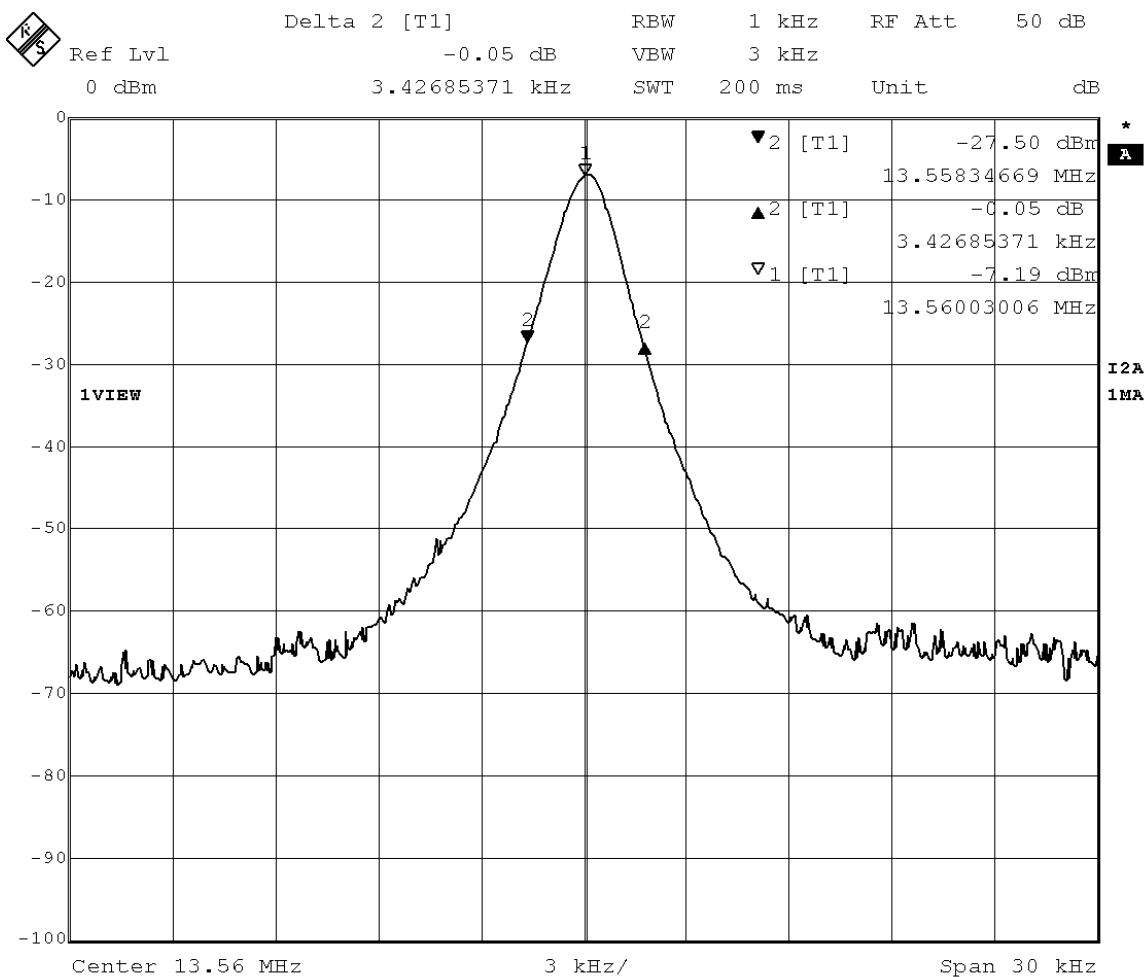
Temperature (°C)	Primary Supply Voltage (V)	Frequency with time elapse (%)			
		0 minute later	2 minutes later	5 minutes later	10 minutes later
-20	102	0.0000017	0.0000017	0.0000017	0.0000017
	120	0.0000004	0.0000015	0.0000017	0.0000015
	138	0.0000003	0.0000032	0.0000032	0.0000032
20	102	0.0000020	0.0000020	0.0000020	0.0000020
	120	0.0000025	0.0000021	0.0000020	0.0000020
	138	0.0000020	0.0000020	0.0000020	0.0000020
50	102	0.0000029	0.0000028	0.0000028	0.0000018
	120	0.0000031	0.0000033	0.0000034	0.0000034
	138	0.0000028	0.0000029	0.0000029	0.0000029

Specified Limit +/-0.01%

A.5 Occupied Bandwidth

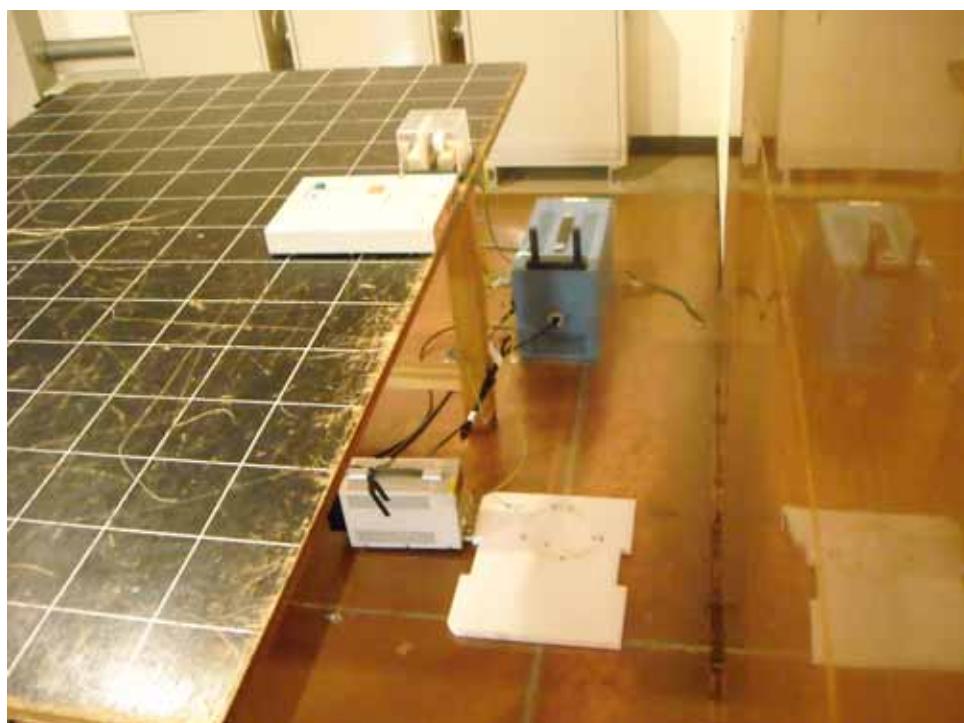
Testing Date : August 1, 2008

Ambient Temperature : 23 (°C) Humidity : 40(%)



Appendix B : Test Arrangement (Photographs)**B.1 AC Powerline Conducted Emission**

- Front View -



- Side View -

* The EUT was rotated all axis(X-axis, Y- axis, Z-axis),this photograph present configuration with maximum emission.

B.2 Radiated Emissions

- Front View -



- Rear View -

* The EUT was rotated all axis(X-axis, Y- axis, Z-axis),this photograph present configuration with maximum emission.

Appendix C: Test Instruments

Sign	Type	Model No.	Manufacturer	Serial No.	Last Cal.	Interval
OS-1	Open Site	-	Toshiba	-	2008/5	1 Year
OS-2	Open Site	-	Toshiba	-	2008/5	1 Year
AC-1	Anechoic Chamber (L)	-	TDK	-	2008/5	1 Year
AC-2	Anechoic Chamber (S)	-	TDK	-	2007/11	1 Year
SR-A	Shielded Room	-	TDK	-	-	-
SR-B	Shielded Room	-	TDK	-	-	-
SR-C	Shielded Room	-	TDK	-	-	-
TR-1	Tested Room	-	-	-	-	-
R-1	Test Receiver	ESVS10	Rohde & Schwarz	849231/004	2008/3	1 Year
R-2	Test Receiver	ESVS10	Rohde & Schwarz	843744/018	2008/6	1 Year
R-3	Test Receiver	ESI7	Rohde & Schwarz	100059/007	2007/11	1 Year
R-4	Test Receiver	ESHS30	Rohde & Schwarz	842053/001	2008/2	1 Year
R-5	Test Receiver	ESCS30	Rohde & Schwarz	100203	2008/5	1 Year
S-3	Spectrum Analyzer	U3751	Advantest	160100139	2008/3	1 Year
S-4	Spectrum Analyzer	8563E	Hewlett Packard	3221A00201	2008/4	1 Year
S-5	Spectrum Analyzer	U3751	Advantest	170500170	2008/5	1 Year
CB-3	RF Cable	3D-2W	Fujikura	-	2008/5	1 Year
CB-4	RF Cable	3D-2W	Fujikura	-	2008/5	1 Year
CB-5	RF Cable	3D-2W	Fujikura	-	2008/5	1 Year
CN-1	RF Cable	20D/5D-2W	Fujikura	-	2008/5	1 Year
CN-2	RF Cable	20D/5D-2W	Fujikura	-	2008/5	1 Year
CN-3	RF Cable	20D/5D-2W	Fujikura	-	2008/5	1 Year
CS-1	RF Cable	SUCOFLEX 104P	Huber+Suhner	27290/4P	2008/2	1 Year
CS-2	RF Cable	SUCOFLEX 104P	Huber+Suhner	27289/4P	2008/2	1 Year
L-1	AMN	KNW-407	Kyoritsu Corp.	8-833-5	2007/9	1 Year
L-2	AMN	KNW-407	Kyoritsu Corp.	8-680-14	2007/9	1 Year
L-3	AMN	KNW-407	Kyoritsu Corp.	8-757-1	2008/6	1 Year
L-4	AMN	KNW-242	Kyoritsu Corp.	8-755-1	2008/6	1 Year
L-5	AMN	KNW-242C	Kyoritsu Corp.	8-837-14	2008/6	1 Year
L-6	AMN	KNW-243C	Kyoritsu Corp.	8-692-5	2007/9	1 Year
L-7	AMN	KNW-243C	Kyoritsu Corp.	8-831-3	2008/6	1 Year
L-9	AMN	KNW-244C	Kyoritsu Corp.	8-1373-3	2007/8	1 Year
L-10	ISN	FCC-TLISN-T2-02	FCC	20234	2007/11	1 Year
L-11	ISN	FCC-TLISN-T4-02	FCC	20235	2007/11	1 Year
L-12	High Impedance Probe	KNW-410	Kyoritsu Corp.	8-876-3	2007/8	1 Year
L-13	Artificial Hand	K-9003	Kyoritsu Corp.	7-1639-4	2007/10	1 Year
PL-3	Pulse Limiter	ESH3-Z2	Rohde & Schwarz	-	2007/11	1 Year
PL-4	Pulse Limiter	ESH3-Z2	Rohde & Schwarz	-	2008/2	1 Year
PL-5	Pulse Limiter	ESH3-Z2	Rohde & Schwarz	-	2008/5	1 Year
TM-1	50ohm Termination	BNC-P-1.5	TDC	-	2008/3	1 Year
TM-2	50ohm Termination	-	Y&R	-	2008/3	1 Year
AL-0	Loop Antenna	HFH2-Z2	Rohde & Schwarz	879284/14	2008/5	1 Year
AT-1	Triple Loop Antenna	HXYZ9170	Schwarzbeck	9170-138	2008/7	1 Year
AT-2	Trilog Broadband Antenna	VULB9160	Schwarzbeck	9160-3251	2007/9	1 Year
AB-1	Biconical Antenna	BBA9106	Schwarzbeck	91031741	2007/8	1 Year
AB-2	Biconical Antenna	BBA9106	Schwarzbeck	91032349	2007/9	1 Year
AB-3	Biconical Antenna	BBA9106	Schwarzbeck	VHA11905516	2007/9	1 Year

AL-1	Log-Periodic Antenna	UHALP9108-A	Schwarzbeck	0678	2007/8	1 Year
AL-2	Log-Periodic Antenna	UHALP9108-A	Schwarzbeck	0679	2007/9	1 Year
AL-3	Log-Periodic Antenna	UHALP9108-A	Schwarzbeck	0278	2007/9	1 Year
AL-4	Log-Periodic Antenna	USLP9143	Schwarzbeck	140	2008/6	1 Year
AL-5	Log-Periodic Antenna	94612-1	Eaton	97062301	2008/4	1 Year
AL-6	Log-Periodic Antenna	ESLP9145	Schwarzbeck	9145-216	2008/3	1 Year
AH-5	Horn Antenna	12-12	Scientific Atlanta	741	2008/5	1 Year
AD-1	Dipole Antenna	KBA-511A	Kyoritsu Corp.	0-195-5	2007/8	1 Year
AD-2	Dipole Antenna	KBA-511A	Kyoritsu Corp.	0-228-13	2007/8	1 Year
AD-3	Dipole Antenna	KBA-611	Kyoritsu Corp.	0-196-8	2007/8	1 Year
AD-4	Dipole Antenna	KBA-611	Kyoritsu Corp.	0-230-6	2007/8	1 Year
CL-1	Absorbing Clamp	MDS21	Rohde & Schwarz	894245/002	2008/5	1 Year
PA-1	Pre-Amplifier	WJ-6811-513	Watkins Johnson	0288	2008/2	1 Year
PA-2	Pre-Amplifier	WJ-6682-824	Watkins Johnson	0052	2008/2	1 Year
PA-3	Pre-Amplifier	WJ-6870-506	Watkins Johnson	0018	2008/2	1 Year
PA-5	Pre-Amplifier	AMF-4D-005080-18-13P	MITEQ, INC.	1218917	2007/11	1 Year
HC-1	Harmonic Current Analysis System	PM3000A	Voltech	3144	2007/8	1 Year
RN-1	Reference Impedance Network	4151	NF ELECTRONIC INSTRUMENTS	3168114151011	2008/5	1 Year
HF-1	Harmonic/Flicker Analyzer	KHA3000	KIKUSUI ELECTRONICS CORPORATION	NB001642	2008/5	1 Year
2-1	ESD Tester	ESD3000	EMC PARTNER	092	2008/5	1 Year
2-2	ESD Tester	PESD 1610	HAEFELY	H204507	2007/9	1 Year
3-1	Signal Generator	SMT 02	Rohde & Schwarz	838616/021	2008/5	1 Year
3-2	Signal Generator	83732B	Hewlett Packard	US37101411	2007/10	1 Year
3-3	Function Generator	1941	NF	328730	2007/10	1 Year
3-5	RF Power Amplifier	500A100M1	Amplifier Research	19671	2007/11	1 Year
3-6	RF Power Amplifier	200W1000M2A	Amplifier Research	19572	2007/11	1 Year
3-7	RF Power Amplifier	60S1G3M1	Amplifier Research	0325545	2007/11	1 Year
3-8	Biconical Antenna	3109	EMCO	9607-3014	2007/11	1 Year
3-10	Log-Periodic Antenna	3144	EMCO	9701-1032	2008/5	1 Year
3-11	Log-Periodic Antenna	AT5080	Amplifier Research	322092	2007/11	1 Year
3-12	Horn Antenna	AT4002A	Amplifier Research	0325039	2007/11	1 Year
3-13	Field Monitor	FM2000	Amplifier Research	19166	-	1 Year
3-14	Field Monitor	FM5004	Amplifier Research	25843	-	1 Year
3-15	Field Probe	FP2000	Amplifier Research	18767	2008/5	1 Year
3-16	Field Probe	FP2000	Amplifier Research	22646	2007/8	1 Year
3-17	Field Probe	FP5080	Amplifier Research	25212	2007/8	1 Year
3-18	Field Probe	FP6001	Amplifier Research	303557	2007/10	1 Year
3-19	Power Meter	4421	Bird	2919	2008/7	1 Year
3-20	Power Head	4022	Bird	6147	2008/7	1 Year
3-21	Power Meter	PM2002	Amplifier Research	25774	2008/7	1 Year
3-22	Power Head	PH2000	Amplifier Research	26413	2008/7	1 Year
3-23	Power Head	PH2000	Amplifier Research	26414	2008/7	1 Year
3-24	Dual Coupler	DC2600	Amplifier Research	19734	2008/7	1 Year
3-25	Dual Coupler	DC6080	Amplifier Research	302555	2008/7	1 Year
3-26	Dual Coupler	DC7144	Amplifier Research	26463	2008/7	1 Year
3-27	Signal Generator	SML 03	Rohde & Schwarz	103413	2007/9	1 Year

3-28	Field Probe	FP6001	ETS LINDGREN	00064158	2007/9	1 Year
3-29	Power Meter	NRT	Rohde & Schwarz	103116	2007/9	1 Year
3-30	Power Head	NRT-Z44	Rohde & Schwarz	102682	2007/9	1 Year
4-1	Immunity Tester	TRA2000	EMC PARTNER	659	2008/7	1 Year
4-2	EFT/B Generator	PEFT-Junior	HAEFELY	083818-13	2008/5	1 Year
4-3	EFT/B Generator	FNS-AXII B50	Noise Laboratory	FNS0620431	2008/5	1 Year
4-4	Coupling Clamp	IP4	HAEFELY	-	-	-
4-5	Coupling Clamp	15-00001A	Noise Laboratory	-	-	-
5-1	Surge Tester	PSURGE4.1	HAEFELY	083665-08	2007/11	1 Year
5-2	Coupling Filter	FP-SURGE 100M	HAEFELY	149163	2007/11	1 Year
5-3	Coupling Network	IP6.2	HAEFELY	083811-10	2007/11	1 Year
5-4	Decoupling Network	DEC1A	HAEFELY	083793-08	2007/11	1 Year
5-5	Pruefpistole	AP 300	HAEFELY	081 438	2007/11	1 Year
6-1	Signal Generator	PSG1000B	W.K. Electronics	000234	2008/6	1 Year
6-2	RF Power Amplifier	75A250	Amplifier Research	19502	2007/8	1 Year
6-3	RF Power Amplifier	75A250	Amplifier Research	26255	2007/8	1 Year
6-4	6dB Attenuator	8343-060	Bird	2054	2007/8	1 Year
6-5	6dB Attenuator	65-6-33	Weinschel	LW166	2007/8	1 Year
6-6	CDN	FCC-801-M1-16	FCC	50	2008/5	1 Year
6-7	CDN	FCC-801-M1-25A	FCC	04001	2008/5	1 Year
6-8	CDN	FCC-801-M2-25	FCC	59	2008/5	1 Year
6-9	CDN	FCC-801-M2-25A	FCC	03023	2008/5	1 Year
6-10	CDN	FCC-801-M2-25A	FCC	03024	2008/6	1 Year
6-11	CDN	FCC-801-M3-25	FCC	137	2008/5	1 Year
6-12	CDN	FCC-801-M3-25A	FCC	05021	2008/5	1 Year
6-13	CDN	FCC-801-M3-25A	FCC	99133	2008/6	1 Year
6-14	CDN	FCC-801-M4-25	FCC	21	2008/5	1 Year
6-15	CDN	FCC-801-M4-50	FCC	9806	2008/4	1 Year
6-16	CDN	FCC-801-C1	FCC	79	2008/5	1 Year
6-17	CDN	FCC-801-T2	FCC	77	2008/5	1 Year
6-18	CDN	FCC-801-T4	FCC	81	2008/6	1 Year
6-19	CDN	FCC-801-T8	FCC	9956	2008/6	1 Year
6-20	150-50 Ohms Adaptor	FCC-801-150-50	FCC	638	2008/6	1 Year
6-21	150-50 Ohms Adaptor	FCC-801-150-50	FCC	639	2008/6	1 Year
6-22	EM Clamp	F-203I	FCC	220	2007/8	1 Year
6-23	Decoupling Clamp	F-203I-DCN	FCC	105	-	-
6-24	Bulk Current Injection Clamp	F-120-2	FCC	53	2007/8	1 Year
6-25	CDN	FCC-801-M3-25A	FCC	08008	2008/6	1 Year
8-1	Interference Tester	LFP6.1	HAEFELY	083374-03	2008/3	1 Year
8-2	Magnetic Field Tester	MFG100.1	HAEFELY	080136-06	2008/3	1 Year
8-3	Field Coil	FC-1	ES Factory	001	2008/6	1 Year
8-4	Large Coil	L2X1.6	ES Factory	001	2008/3	1 Year
11-1	Voltage Dip Tester	PLINE1610	HAEFELY	148709	2008/4	1 Year
11-2	3 Phase Extension	PLS1630	HAEFELY	149685	2008/4	1 Year
11-3	External Variac Network	VAR-EXT1000	EMC PARTNER	046	2007/12	1 Year
13	Test Receiver	ESIB26	Rohde & Schwarz	100043	2007/8	1 Year
OV-1	Oven	-	Ohnishi	-	-	-
FC-1	Frequency Counter	53131A	Hewlett Packard	3546A11807	2008/5	1 Year
PM-1	Power Meter	436A	Hewlett Packard	1725A01930	2008/4	1 Year

PS-1	Power Sensor	8482A	Hewlett Packard	1551A01013	2008/4	1 Year
PS-2	Power Sensor	8485A	Hewlett Packard	2942A08969	2008/4	1 Year
DP-1	DC Power Supply	6628A	Hewlett Packard	3224A00284	2008/6	1 Year