

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. : 444-59005
SERIAL No. : -
FCC ID : RPARFMHL00

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

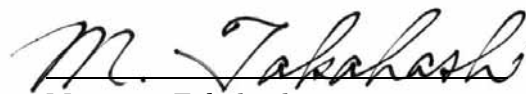
TEST RESULTS : **Passed**

DATE OF TEST : August 23, 2006 – September 1, 2006

This report must not be used by the client to
claim product endorsement by NVLAP or
NIST or any agency of the U.S. Government.



NVLAP LAB CODE:200192-0



Masanori Takahashi

Director

Japan Quality Assurance Organization
Safety & EMC Center

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

- 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.

Table of Contents

Documentation	Page
1 Test Regulation	3
2 Test Location	3
3 Recognition of Test Laboratory	3
4 Description of the Equipment Under Test	4
5 Test Condition	5-7
6 Preliminary Test and Test-Setup	8-13
7 Equipment Under Test Modification	14
8 Responsible Party	14
9 Deviation from Standard	14
10 Test Results	15-17
11 Summary	18
12 Operating Condition	19
13 Test Configuration	20
14 Equipment Under Test Arrangement (Drawings)	21
15 Equipment Under Test Arrangements (Photographs)	22-26

Appendix A : Test Data

A.1 Conducted Disturbance at the Mains Ports (Section 15.207)	27-28
A.2 Radiated Emissions (Section 15.225(a)(b)(C))	29
A.3.1 Radiated Emissions 0.009MHz – 30 MHz (Section 15.225(d))	30
A.3.2 Radiated Emissions 30MHz – 1000 MHz (Section 15.225(d))	31-32
A.3.3 Radiated Emissions above 1GHz(Section 15.225(d))	Not Applicable
A.4 Frequency Stability (Section 15.225(e))	33
A.5 Occupied Bandwidth	34
A.6 Conducted Disturbance at the Mains Ports for Receiver (Section 15.107(a))	Not Applicable
A.7.1 Radiated Emissions for Receiver 30MHz – 1000 MHz(Section 15.109(a))	Not Applicable
A.7.2 Radiated Emissions above 1GHz (Section 15.109(a))	Not Applicable

Appendix B : Test Instruments

Test Instruments	35-38
------------------	-------

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 recognized
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, 2008)
NVLAP Lab Code:200192-0 (Effective through : June 30, 2007)
BSMI Recognition Number:
SL2-IN-E-6004, SL2-IS-E-6004, SL2-A1-E-6004 (Effective through : September 22, 2008)

VCCI Registration Number:
R-004, R-824, R-828, C-003, C-005, C-859, C-860, C-864 (Effective through : April 3, 2008)
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 24, 2007)

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. | : | 444-59005 |
| 4 | Serial No. | : | - |
| 5 | Product Type | : | Prototype |
| 6 | Date of Manufacture | : | - |
| 7 | Power Rating | : | 5 VDC (*) |
| 8 | EUT Grounding | : | None |
| 9 | Received Date of EUT | : | August 23, 2006 |
| 10 | Frequency generated
and/or used in the EUT | : | 13.56 MHz |
| 11 | Highest Frequencies | : | 13.56 MHz
(Section 15.225)
Operation within the band 13.110 – 14.010 MHz |
- (*)The EUT Power is supplied from the Printer.

5 Test Condition

5.1 Conducted Disturbance at the Mains Ports (Section 15.207)

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	☒ OS-1 ☐ OS-2 ☐ AC-1 ☐ SR-A ☐ SR-B ☐ SR-C
Test Receiver	☐ R-3 ☒ R-4 ☐ R-5
Cable	☐ CB-3 ☒ CB-4 ☐ CB-5
Network (for EUT)	☐ L-1 ☒ L-2 ☐ L-3 ☐ L-4 ☐ L-5 ☐ L-6 ☐ L-7 ☐ L-8 ☐ L-9 ☐ L-10 ☐ L-11 ☐ L-12 ☐ L-13
Network (for AE)	☐ L-1 ☐ L-2 ☐ L-3 ☐ L-4 ☐ L-5 ☐ L-6 ☐ L-7 ☐ L-8 ☐ L-9
Pulse Limiter	☐ PL-3 ☒ PL-4 ☐ PL-5
Termination	☐ TM-1 ☐ TM-2

5.2 Radiated Emissions (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	☒ OS-1 ☐ OS-2 ☐ AC-1 ☐ SR-A ☐ SR-B ☐ SR-C
Test Receiver	☐ R-1 ☐ R-2 ☐ R-3 ☒ R-4 ☐ R-5 ☐ S-1 ☐ R-3 ☐ R-4
Cable	☐ CB-3 ☐ CB-4 ☐ CB-5 ☐ CB-3 ☐ CB-4 ☐ CB-5 ☐ CS-1 ☐ CS-2 ☐ CS-3 ☐ CS-4 ☐ CS-5
Pre-Amplifier	☐ PA-1 ☐ PA-2 ☐ PA-3
Antenna	☐ AB-1 ☐ AB-2 ☐ AB-3 ☐ AD-1 ☐ AD-2 ☐ AD-3 ☐ AL-1 ☐ AL-2 ☐ AL-3 ☐ AL-4 ☐ AL-5 ☐ AD-4 ☒ AL-0

5.3.1 Radiated Emissions 0.009MHz – 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 B)
Test Site	☒ OS-1 ☐ OS-2 ☐ AC-1
Test Receiver	☐ R-3 ☒ R-4 ☐ R-5
Antenna	☒ AL-0

5.3.2 Radiated Emissions 30MHz – 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 B)
Test Site	☒ OS-1 ☐ OS-2 ☐ AC-1
Test Receiver	☒ R-1 ☐ R-2 ☐ R-3 ☐ R-5 ☐ S-1 ☐ S-4
Cable	☒ CN-1 ☐ CN-2 ☐ CN-3
Antenna	☒ AB-1 ☐ AB-2 ☐ AB-3 ☐ AD-1 ☐ AD-2 ☐ AD-3 ☒ AL-1 ☐ AL-2 ☐ AL-3 ☐ AL-4 ☐ AL-5 ☐ AD-4

5.3 Radiated Emissions above 1GHz(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 B)
Test Site	☐ OS-1 ☐ OS-2 ☐ AC-1
Test Receiver	☐ R-3 ☐ R-5 ☐ S-1 ☐ S-3 ☐ S-4
Cable	☐ CS-1 ☐ CS-2 ☐ CS-3 ☐ CS-4 ☐ CS-5
Antenna	☐ AL-1 ☐ AL-2 ☐ AL-3 ☐ AL-4 ☐ AL-5
Pre-Amplifier	☐ PA-1 ☐ PA-2 ☐ PA-3

5.4 Frequency Stability (Section 15.225(e))

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	☐ R-1 ☐ R-2 ☐ R-3 ☐ R-4 ☐ R-5 ☐ S-1 ☐ R-3 ☐ R-4
Cable	☐ CB-3 ☐ CB-4 ☐ CB-5 ☐ CB-3 ☐ CB-4 ☐ CB-5 ☐ CS-1 ☐ CS-2 ☐ CS-3 ☐ CS-4 ☐ CS-5 ☐ CN-0
Oven	☒ OV-1
Frequency Counter	☒ FC-1
Antenna	☐ AB-1 ☐ AB-2 ☐ AB-3 ☐ AD-1 ☐ AD-2 ☐ AD-3 ☐ AL-1 ☐ AL-2 ☐ AL-3 ☐ AL-4 ☐ AL-5 ☐ AD-4 ☐ 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)
Test Site	☒ OS-1 ☐ OS-2 ☐ AC-1 ☐ SR-A ☐ SR-B ☐ SR-C
Test Receiver	☐ R-1 ☐ R-2 ☐ R-3 ☐ R-4 ☐ R-5 ☐ S-1 ☒ S-3 ☐ S-4
Cable	☐ CB-3 ☐ CB-4 ☐ CB-5 ☐ CB-3 ☐ CB-4 ☐ CB-5 ☐ CS-1 ☐ CS-2 ☐ CS-3 ☐ CS-4 ☐ CS-5 ☐ CN-0
Pre-Amplifier	☐ PA-1 ☐ PA-2 ☐ PA-3
Antenna	☐ AB-1 ☐ AB-2 ☐ AB-3 ☐ AD-1 ☐ AD-2 ☐ AD-3 ☐ AL-1 ☐ AL-2 ☐ AL-3 ☐ AL-4 ☐ AL-5 ☐ AD-4 ☒ AL-0

6 Preliminary Test and Test Setup

6.1 Conducted Disturbance at the Mains Ports

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

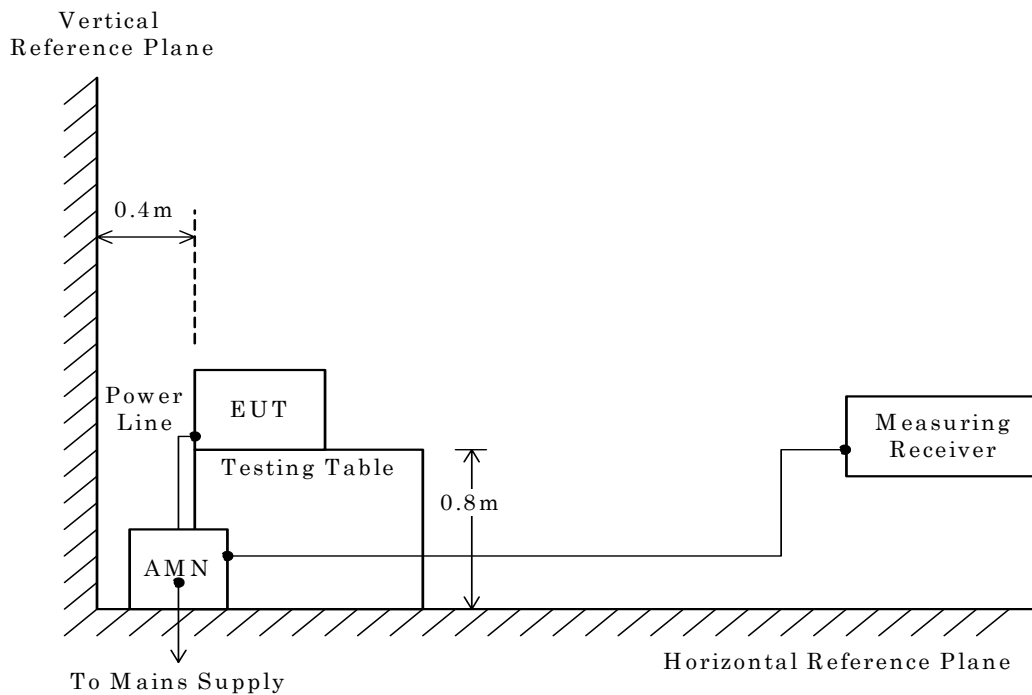
The preliminary conducted disturbance at the mains ports measurements were carried out.

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.

- Side View -



* AMN : Artificial Mains Network

6.2 Radiated Emissions 0.009 MHz - 30 MHz

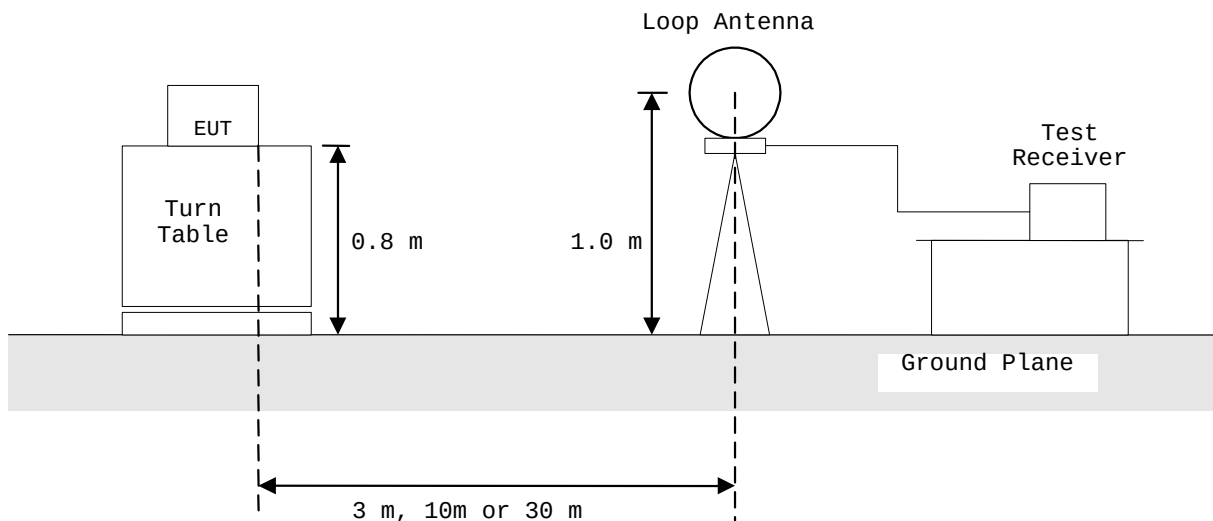
The test was based on ANSI C63.4-2003.

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 Emissions 30MHz – 1000 MHz

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

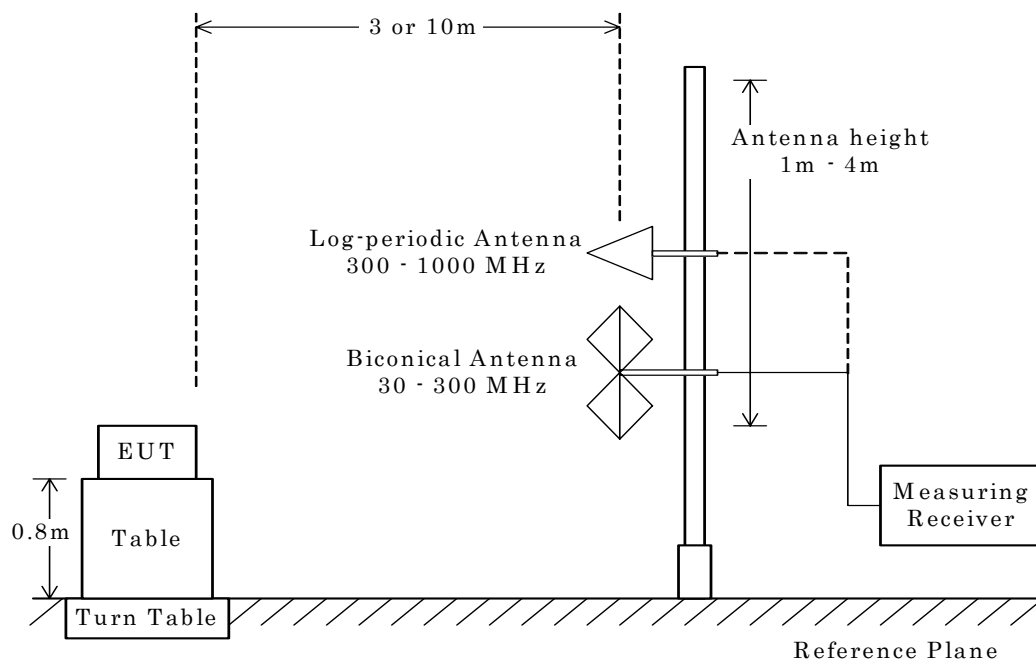
The preliminary radiated disturbance measurements were carried out.

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 -



6.4 Radiated Emissions above 1 GHz

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

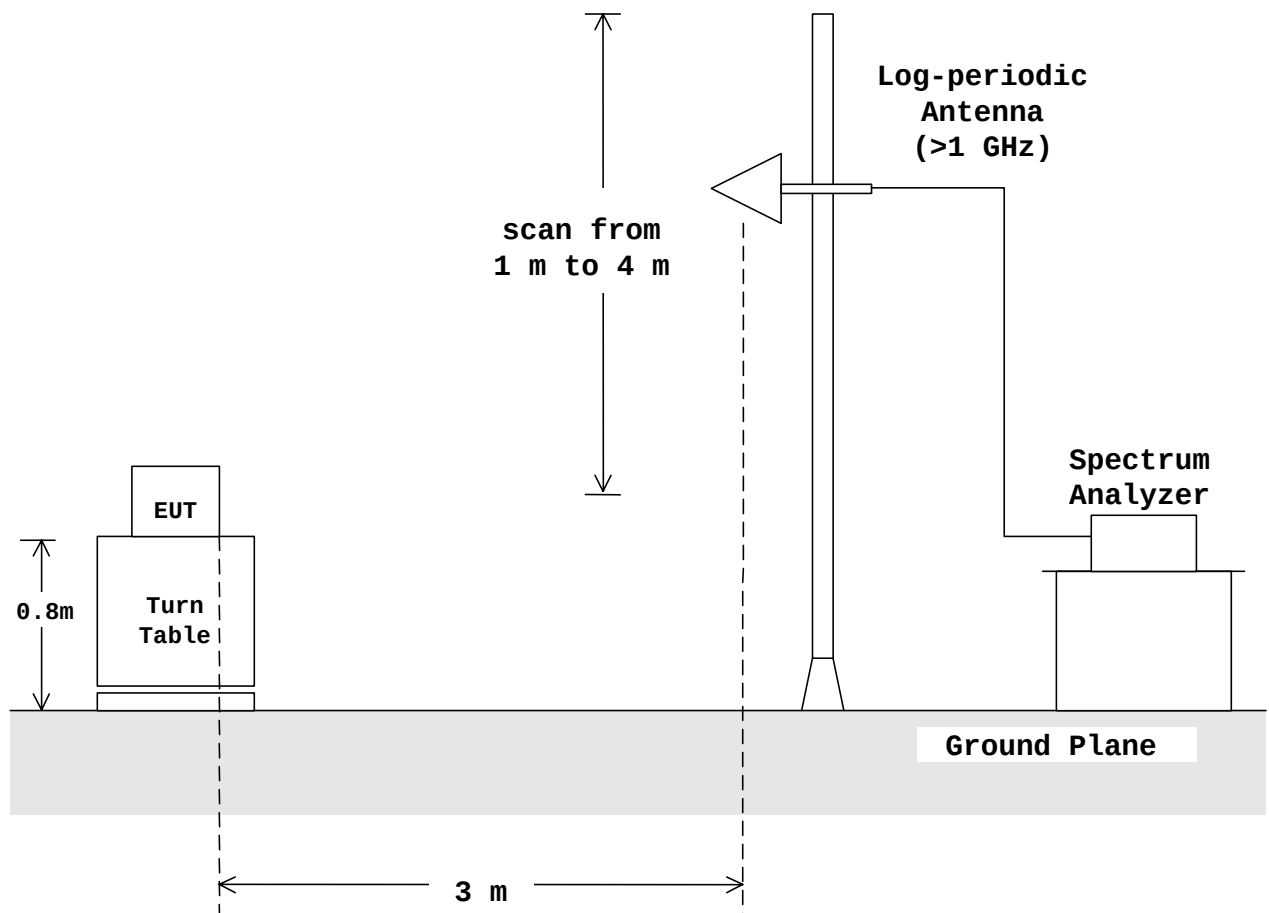
The preliminary radiated emissions measurements were carried out.

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 -

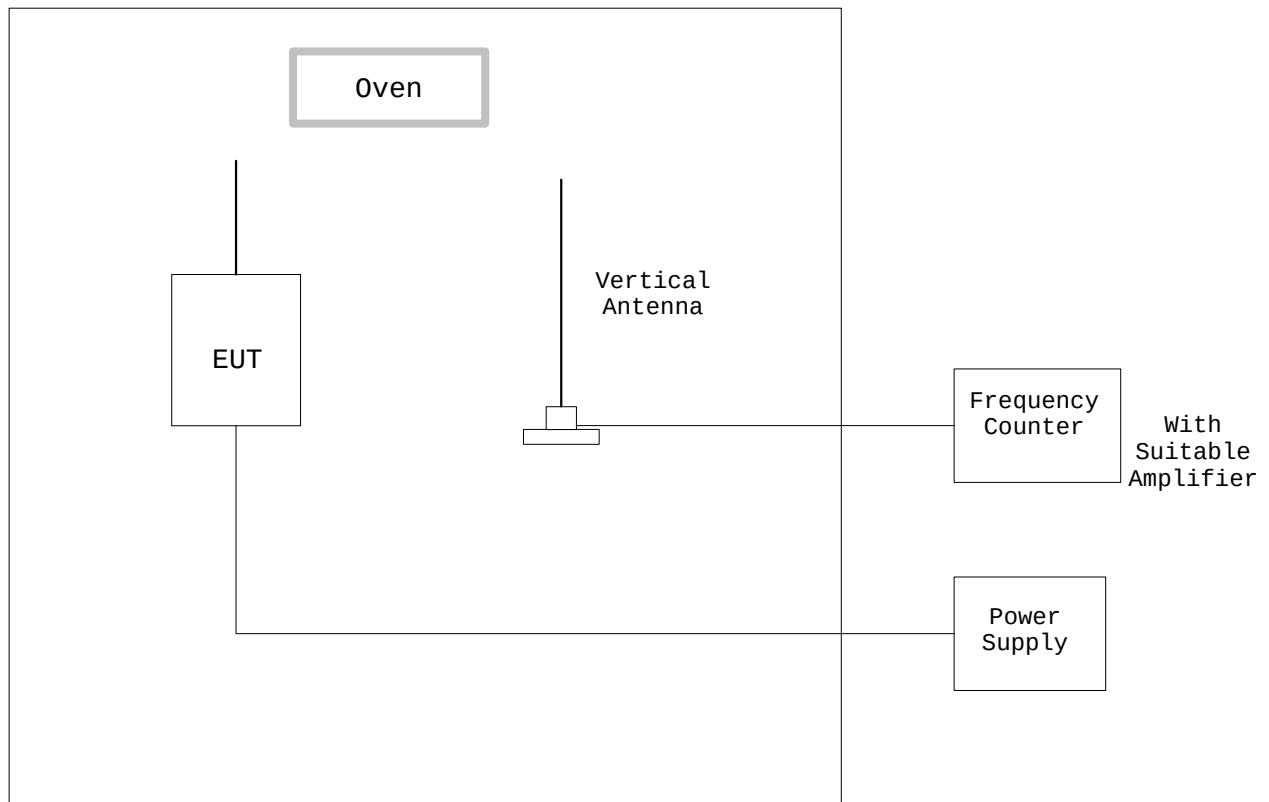


6.5 Frequency Stability

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

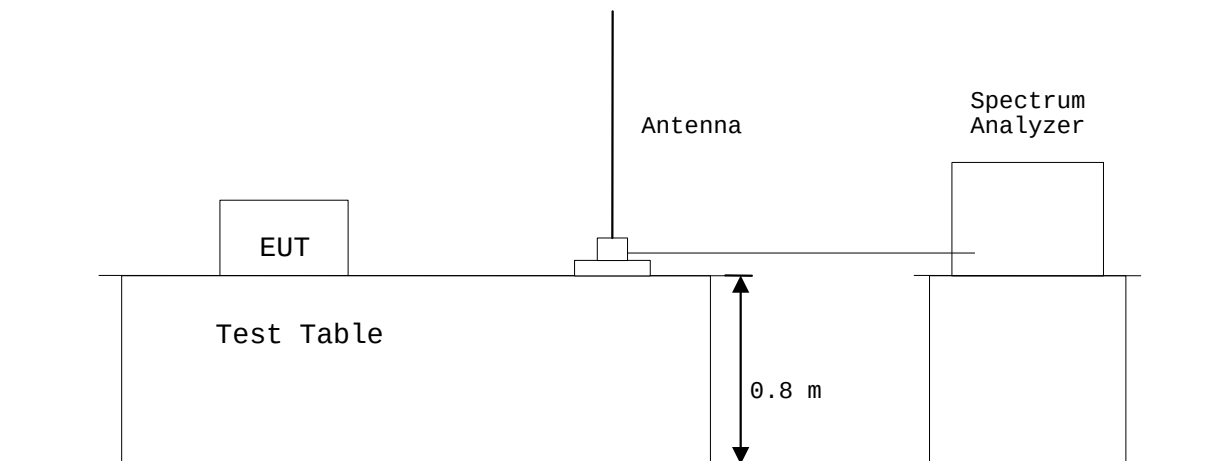
The frequency stability measurements were carried out. By using frequency counter with suitable RF amplifier, the carrier frequency of the transmitter under test was measured with a temperature variation of -20°C to $+50^{\circ}\text{C}$ at the normal supply voltage, and if required, with a variation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



6.6 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.



10 Test Results**10.1 Conducted Disturbance at the Mains Ports (Section 15.207)**

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

☒-Passed ☐-Failed ☐-Not judged

Min. Limit Margin (QP)	<u>16.0</u>	dB	at	<u>13.56</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

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>75.3</u>	dB	at	<u>13.56</u>	MHz
Max. Limit Exceeding	<u>N/A</u>	dB	at	<u>N/A</u>	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 5.2 dB at 69.3 MHz

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

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 : _____

10.6 Conducted Emissions at the Mains Ports for Receiver (Section 15.107(a))The requirements are ☐-Applicable [☐-Tested ☐-Not tested by applicant request.]☒-Not Applicable☐-Passed ☐-Failed ☐-Not judgedMin. Limit Margin N/A dB at N/A MHzMax. Limit Exceeding N/A dB at N/A MHz

Remarks : 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.

10.7 Radiated Emissions (Section 15.109(a))The requirements are ☐-Applicable [☐-Tested ☐-Not tested by applicant request.]☒-Not Applicable☐-Passed ☐-Failed ☐-Not judgedMin. Limit Margin N/A dB at N/A MHzMax. Limit Exceeding N/A dB at N/A MHz

Remarks : 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.

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.

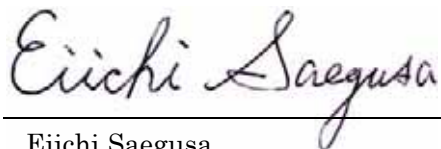
Test Results :

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:



Eiichi Saegusa

Manager

TSURU EMC Branch

EMC Engineering Department

Tested by:



Kazuyuki Makimoto

Engineer

TSURU EMC Branch

EMC Engineering Department

12 Operating Condition

Power Supply Voltage : 5.0VDC

The EUT was operated with the printer.(Input: 120VAC 60Hz, Output: 5.0VDC)

Operation Mode :

The tests have been carried out under continuous transmission/ Reception Mode.

13 Test Configuration

The equipment under test consists of :

Sign	Item	Manufacturer	Model No.	Serial No.	FCC ID
A	RFID Reader/Writer	RISO KAGAKU CORPORATION	444-59005	---	RPARFMHL00
B	Antenna O-shape Antenna ×4	RISO KAGAKU CORPORATION	444-59006	---	Not Applicable (DoC)

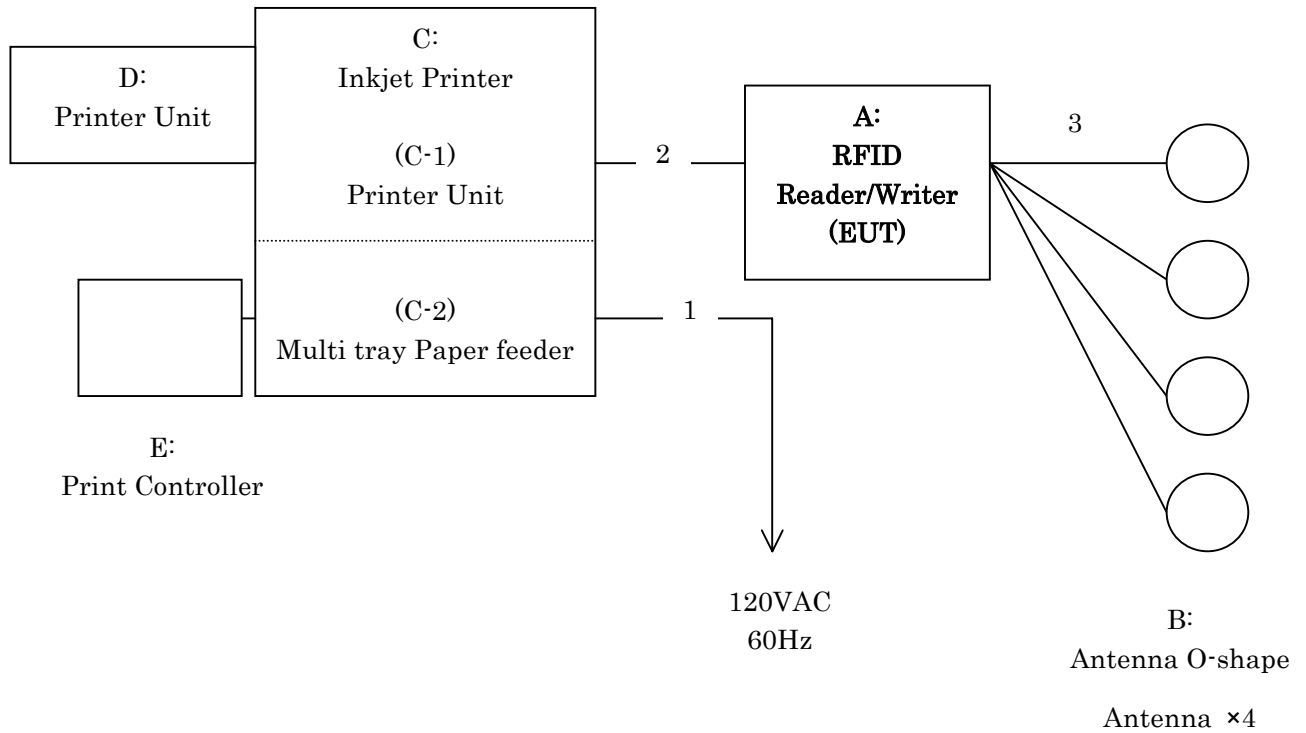
The auxiliary equipment used for testing :

Sign	Item	Manufacturer	Model No.	Serial No.	FCC ID
C	Inkjet Printer	---	HC5500T	---	Not Applicable (DoC)
C-1	Printer Unit	OLYMPUS CORPORATION	HC5500	---	Not Applicable (DoC)
C-2	Multi tray Paper feeder	RISO KAGAKU CORPORATION	HC Multi Tray Paper Feeder	---	Not Applicable (DoC)
D	Auto Control Stacking Tray	RISO KAGAKU CORPORATION	Auto-Control Stacking Tray	97533180	Not Applicable (DoC)
E	Print Controller	RISO KAGAKU CORPORATION	PS7R-9000	3800011	Not Applicable (DoC)

Type of Cable:

No.	Description	Identification (Manu. etc.)	Connector Shielded	Cable Shielded	Ferrite Core	Length (m)
1	AC Cable	None	No	No	No	3.3
2	Signal Cable	None	Yes	Yes	Yes	1.0
3	Antenna Cable	None	Yes	Yes	Yes	0.5

14 Equipment Under Test Arrangement (Drawings)



15 Equipment Under Test Arrangement (Photographs)

15.1 Conducted Disturbance at the Mains Ports

- Side View -



- Side View -



Photograph present configuration with maximum emission

15.2 Radiated Disturbance

- Front View -



- Rear View -



Photograph present configuration with maximum emission

15.2 Radiated Disturbance

- Zoom UP View -

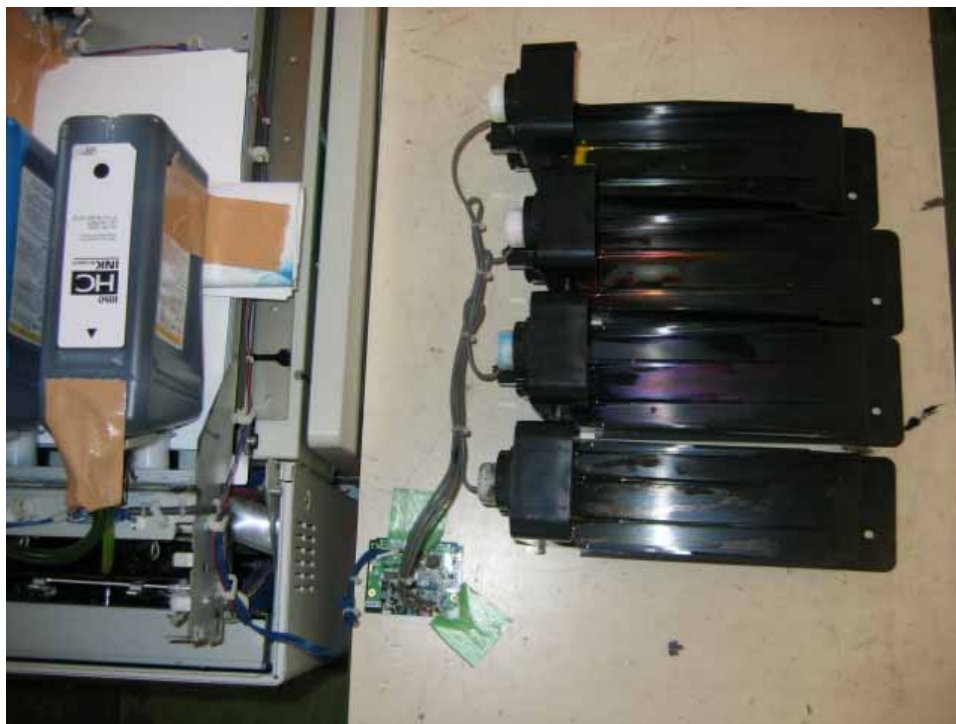


- Zoom UP View -



Radiated Disturbance

- Zoom UP View -

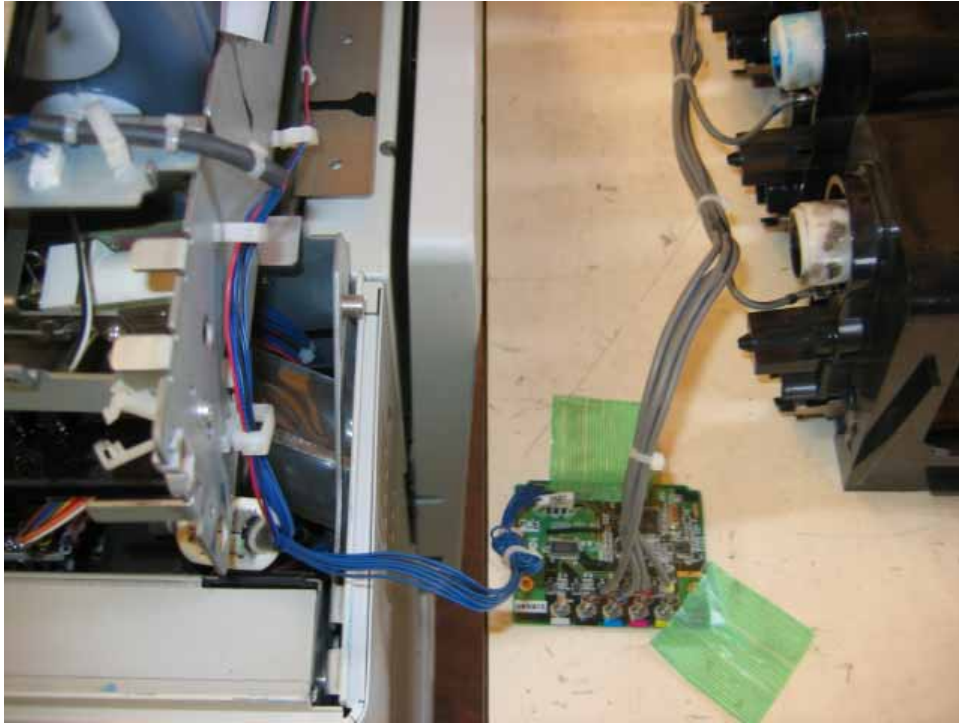


- Zoom UP View -

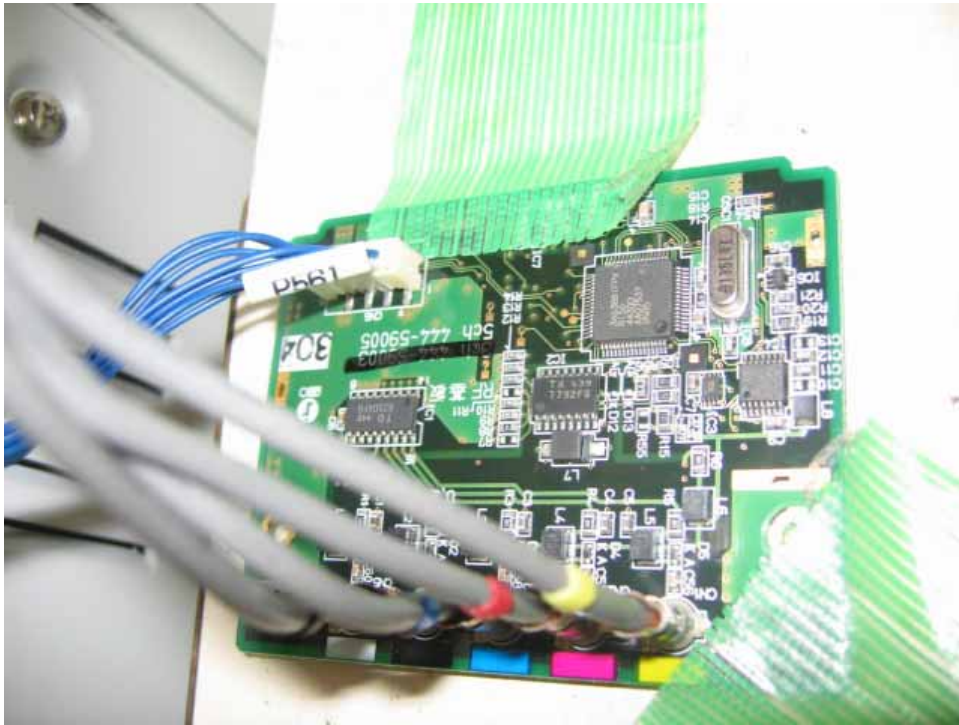


Radiated Disturbance

- Zoom UP View -



- Zoom UP View -



Appendix A: Test Data

A.1 Conducted Disturbance at the Mains Ports (Section 15.207)

Date : August 23, 2006

Temp. : 29°C Humi.: 40% Atmo.: 953hPa

Frequency (MHz)	AMN Factor (dB)	Meter Reading (dBμV)				Limits (dBμV)		Emission Level (dBμV)		Margin (dB)		Comment
		V-A		V-B		Q.P	AVE	Q.P	AVE	Q.P	AVE	
		Q.P	AVE	Q.P	AVE							
0.15	0.6	18.4	-	18.0	-	66.0	56.0	19.0	-	47.0	-	
0.25	0.4	27.2	-	27.0	-	61.8	51.8	27.6	-	34.2	-	
0.31	0.4	18.4	-	18.3	-	60.0	50.0	18.8	-	41.2	-	
0.42	0.3	15.8	-	21.5	-	57.4	47.4	21.8	-	35.6	-	
0.87	0.2	< 10.0	-	< 10.0	-	56.0	46.0	< 10.2	-	> 45.8	-	
1.61	0.2	< 10.0	-	< 10.0	-	56.0	46.0	< 10.2	-	> 45.8	-	
3.36	0.2	< 10.0	-	< 10.0	-	56.0	46.0	< 10.2	-	> 45.8	-	
5.00	0.2	< 10.0	-	< 10.0	-	56.0	46.0	< 10.2	-	> 45.8	-	
10.00	0.3	< 10.0	-	< 10.0	-	60.0	50.0	< 10.3	-	> 49.7	-	
13.56	0.4	43.6	-	43.5	-	60.0	50.0	44.0	-	16.0	-	
20.00	0.5	< 10.0	-	< 10.0	-	60.0	50.0	< 10.5	-	> 49.5	-	
27.12	0.7	< 10.0	-	< 10.0	-	60.0	50.0	< 10.7	-	> 49.3	-	

Notes: 1) Test Location : Open Site No.1

2) The spectrum was checked from 0.15 MHz to 30 MHz

3) AMN(Artificial Mains Network) factor includes the cable loss for 5 meter.

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

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

6) The symbol of "-" means "Not applicable".

7) V-A : One end & Ground V-B : The other end & Ground

8) Q.P : Quasi-Peak Detector AVE : Average Detector

9) A sample calculation was made at 0.15 MHz

Amn + Mr = 0.6 + 18.4 = 19.0 dBμV

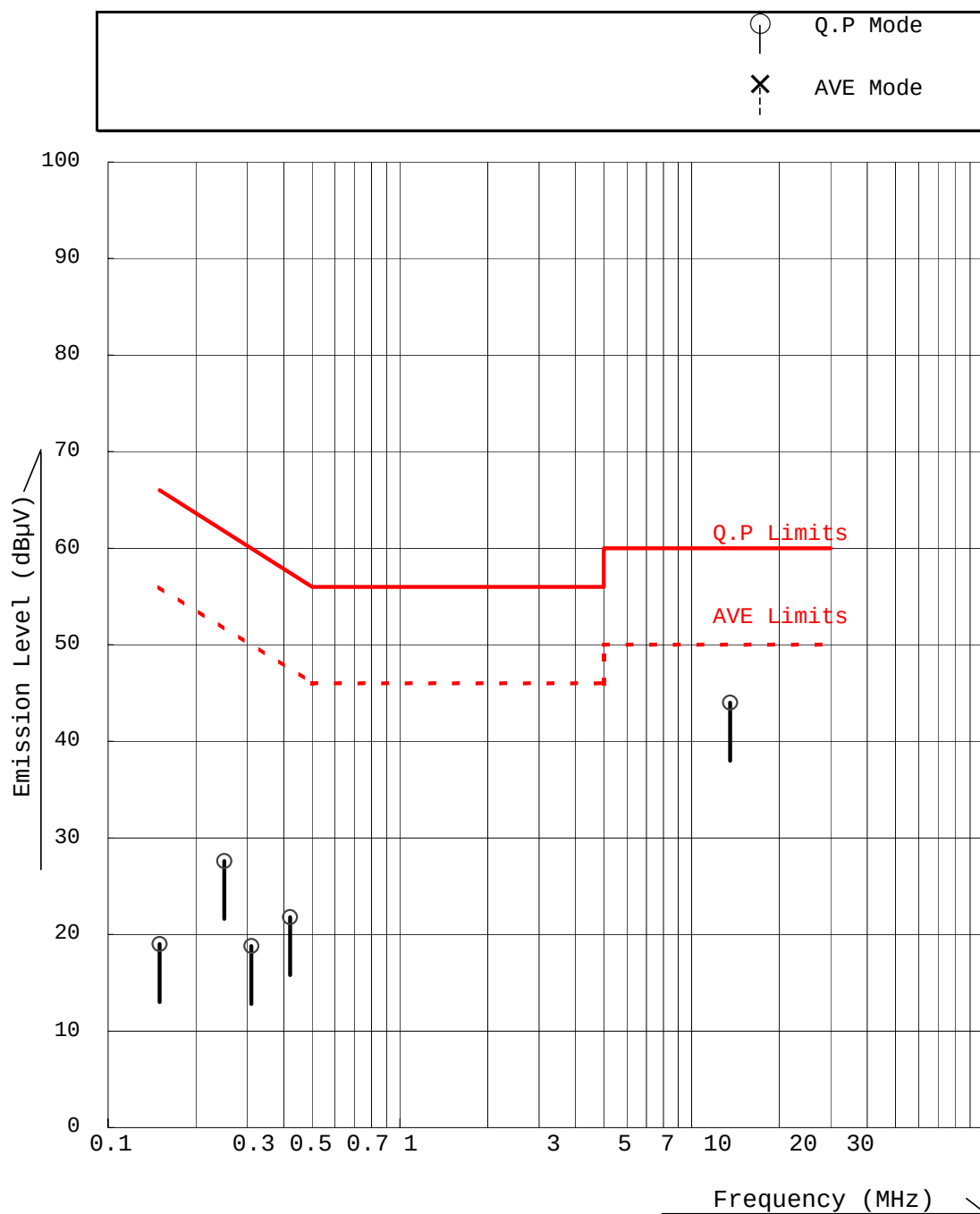
Amn : AMN Factor Mr : Meter Reading

10) Setting of measuring instrument :

Detector Function : CISPR Quasi-Peak / Average

IF Bandwidth : 9 kHz / 10 kHz (0.15 MHz - 30 MHz)

Graph Date : Conducted Disturbance at the Mains Ports (Section 15.207)



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

Date : August 23, 2006
 Temp. : 29°C Humi.: 40% Atmo.: 953hPa

Frequency (MHz)	Antenna Factor (dB/m)	Meter Reading at 10 m (dBμV/m)	Limits (dBμV/m)	Specified Distance (m)	Extrapolated Emission Level (dBμV/m)	Margin (dB)
13.560	-	27.8	84.0	30	8.7	75.3
27.120	-	< 22.9	29.5	30	< 3.8	> 25.7

Note

- 1) Test Location : Open Site 1
- 2) Test Distance : 10m
- 3) The symbol of "<" means "or less".
- 4) The symbol of ">" means "more than".
- 5) The measuring field strength was extrapolated to distance 30meters, by using the square of an inverse linear distance extrapolation factor (40 dB/decade).

A sample calculation was made at 13.56 MHz(Fundamental)
 Extrapolated Emission Level =
 Meter Reading(Measuring Distance) – Extrapolated Value(Extrapolated Specified Distance)
 $27.8(\text{dB}\mu\text{V/m}) - 20\log_{10}((30 / 10)^2) = 27.8 - 19.1 = 8.7 (\text{dB}\mu\text{V/m})$

- 6) Setting the detector of measuring instrument :
 The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector.

A.3 Radiated Emissions

A.3.1 Radiated Emissions 0.009MHz – 30 MHz (Section 15.225(d))

Date : January 23, 2006

Temp. : 29°C Humi.: 40% Atmo.: 953hPa

Frequency	Antenna Factor	Meter Reading	Limits	Specified Distance	Extrapolated Emission Level	Margin
(MHz)	(dB/m)	(dBμV)	(dBμV/m)	(m)	(dBμV/m)	(dB)
0.009	-	< 22.5	108.5	300	< -36.6	> 145.1
0.020	-	< 20.4	101.6	300	< -38.7	> 140.3
0.030	-	< 19.9	98.1	300	< -39.2	> 137.3
0.050	-	< 19.5	93.6	300	< -39.6	> 133.2
0.070	-	< 19.4	90.7	300	< -39.7	> 130.4
0.100	-	< 19.4	87.6	300	< -39.7	> 127.3
0.200	-	< 19.3	81.6	300	< -39.8	> 121.3
0.300	-	< 19.3	78.1	300	< -39.8	> 117.8
0.490	-	< 19.3	93.8	30	< 0.2	> 93.6
0.700	-	< 19.3	90.7	30	< 0.2	> 90.5
1.000	-	< 19.3	87.6	30	< 0.2	> 87.4
1.705	-	< 19.8	29.5	30	< 0.7	> 28.9
2.000	-	< 19.6	29.5	30	< 0.5	> 29.0
3.000	-	< 19.8	29.5	30	< 0.7	> 28.8
5.000	-	< 19.8	29.5	30	< 0.7	> 28.8
7.000	-	< 19.7	29.5	30	< 0.6	> 29.0
13.000	-	< 20.3	29.5	30	< 1.2	> 28.3
16.000	-	< 21.0	29.5	30	< 1.9	> 27.6
20.000	-	< 21.9	29.5	30	< 2.8	> 26.7
25.000	-	< 22.7	29.5	30	< 3.6	> 25.9
30.000	-	< 23.0	29.5	30	< 3.9	> 25.6

Note

- 1) Test Location : Open Site 1
- 2) Test Distance : 10m
- 3) The symbol of "<" means "or less".
- 4) The symbol of ">" means "more than".
- 5) The measuring field strength was extrapolated to distance 30meters, by using the square of an inverse linear distance extrapolation factor (40 dB/decade).

A sample calculation was made at 0.009 MHz

Meter Reading(Measuring Distance) – Extrapolated Value(Extrapolated Specified Distance)

$$22.5(\text{dB}\mu\text{V/m}) - 20\log_{10}((300 / 10)^2) = 22.5 - 59.1 = -36.6(\text{dB}\mu\text{V/m})$$

- 6) Setting the detector of measuring instrument :

The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

A.3.2 Radiated Emissions 30MHz – 1000 MHz (Section 15.225(d))

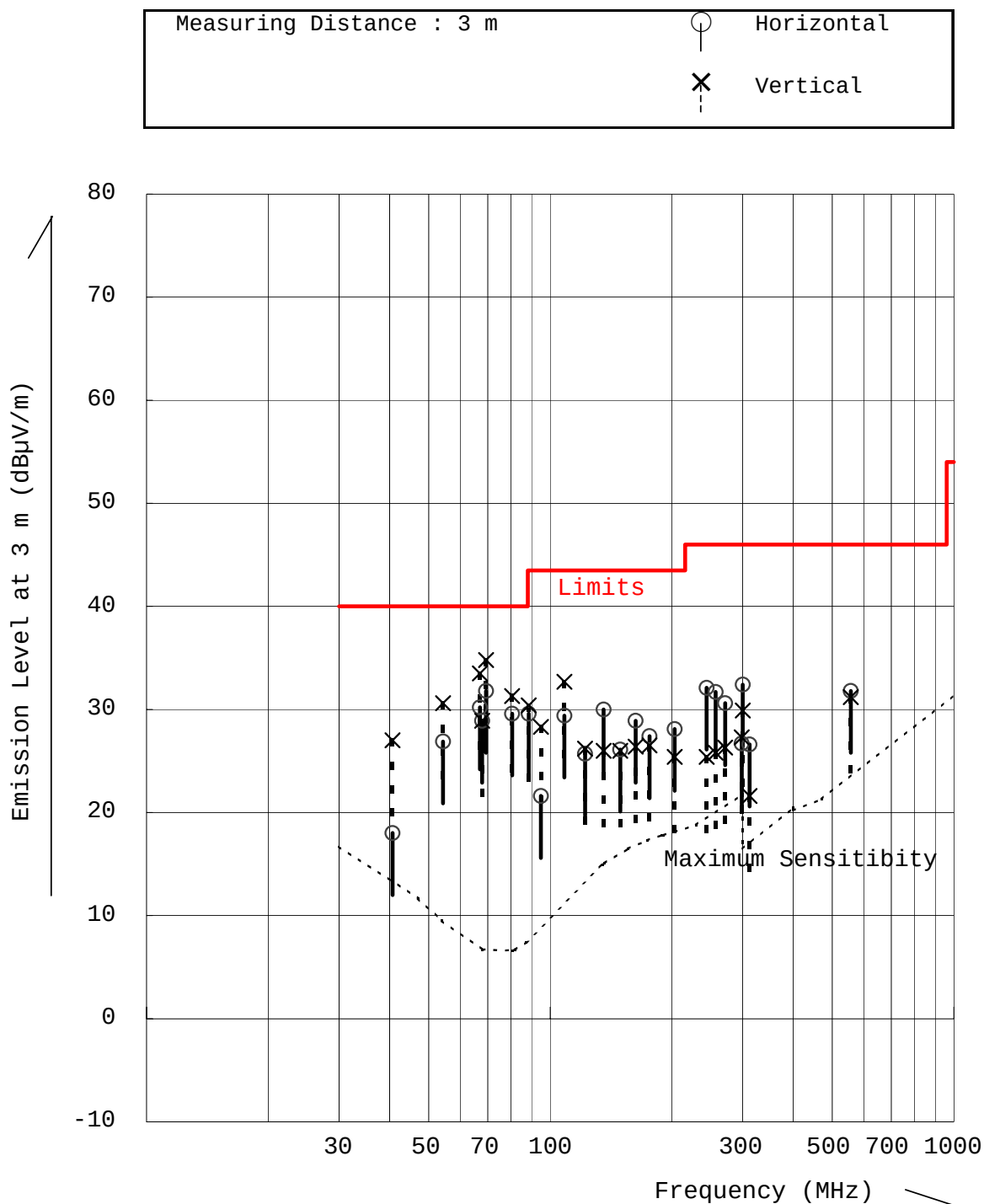
Date : August 23, 2006

Temp. : 29°C Humi.: 40% Atmo.: 953hPa

Frequency (MHz)	Antenna Factor (dB/m)	Meter Reading (dBμV)		Limits (dBμV/m)	Emission Level (dBμV/m)		Margin (dB)		Comment
		Horiz.	Ver.		Horiz.	Ver.	Horiz.	Ver.	
40.7	16.0	2.0	11.0	40.0	18.0	27.0	22.0	13.0	
54.2	11.4	15.5	19.2	40.0	26.9	30.6	13.1	9.4	
67.0	8.8	21.4	24.7	40.0	30.2	33.5	9.8	6.5	
67.8	8.7	20.2	20.2	40.0	28.9	28.9	11.1	11.1	
69.3	8.6	23.2	26.2	40.0	31.8	34.8	8.2	5.2	
80.5	8.6	21.0	22.7	40.0	29.6	31.3	10.4	8.7	
88.5	9.7	19.9	20.7	43.5	29.6	30.4	13.9	13.1	
94.9	11.2	10.4	17.1	43.5	21.6	28.3	21.9	15.2	
108.4	13.9	15.5	18.8	43.5	29.4	32.7	14.1	10.8	
122.0	15.7	10.0	10.5	43.5	25.7	26.2	17.8	17.3	
135.6	17.0	13.0	9.0	43.5	30.0	26.0	13.5	17.5	
149.2	18.1	8.0	7.9	43.5	26.1	26.0	17.4	17.5	
162.7	18.9	10.0	7.5	43.5	28.9	26.4	14.6	17.1	
176.3	19.4	8.0	7.1	43.5	27.4	26.5	16.1	17.0	
203.4	20.1	8.0	5.3	43.5	28.1	25.4	15.4	18.1	
244.1	21.2	10.9	4.2	46.0	32.1	25.4	13.9	20.6	
257.2	21.7	10.0	4.1	46.0	31.7	25.8	14.3	20.2	
271.2	22.3	8.3	4.0	46.0	30.6	26.3	15.4	19.7	
298.3	23.7	3.0	3.6	46.0	26.7	27.3	19.3	18.7	
300.0	23.8	8.6	6.1	46.0	32.4	29.9	13.6	16.1	
311.8	18.6	8.0	3.0	46.0	26.6	21.6	19.4	24.4	
556.0	25.2	6.6	6.0	46.0	31.8	31.2	14.2	14.8	
1000.0	33.4	< -2.0	< -2.0	54.0	< 31.4	< 31.4	> 22.6	> 22.6	

- Notes:
- 1) Test Location : Open Site No.1
 - 2) Test Distance : 3 m
 - 3) The spectrum was checked from 30 MHz to 1000 MHz.
 - 4) Antenna factor includes the cable loss for 58 meter.
 - 5) The symbol of "<" means "or less".
 - 6) The symbol of ">" means "more than".
 - 7) A sample calculation was made at 40.7 MHz
 $Af + Mr = 16.0 + 11.0 = 27.0 \text{ dBuV/m}$
Af : Antenna Factor Mr : Meter Reading
 - 8) Setting of measuring instrument :
Detector Function : CISPR Quasi-Peak
IF Bandwidth : 120 kHz

Graph Date : Radiated Emissions 30MHz – 1000 MHz (Section 15.225(d))



A.3.3 Radiated Emissions above 1GHz(Section 15.225(d))

Not applicable.

A.4 Frequency Stability (Section 15.225(e))

Testing Date : August 30, 2006

Temperature : 25 (°C) Humidity : 55(%)

Operating Frequency:13.56MHz

Ambient Temperature (°C)	Frequency with time elapse (%)			
	0 minute	2 minutes	5 minutes	10 minutes
-20	0.000077	0.000151	0.000079	0.000073
50	0.000073	0.000073	0.000073	0.000073

Testing Date : September 1, 2006

Temperature : 25 (°C) Humidity : 55(%)

Primary Supply Voltage at 20°C (V)	Frequency with time elapse (%)			
	0 minute	2 minutes	5 minutes	10 minutes
102	0.000080	0.000080	0.000079	0.000080
120	0.000080	0.000080	0.000080	0.000080
138	0.000079	0.000080	0.000080	0.000080

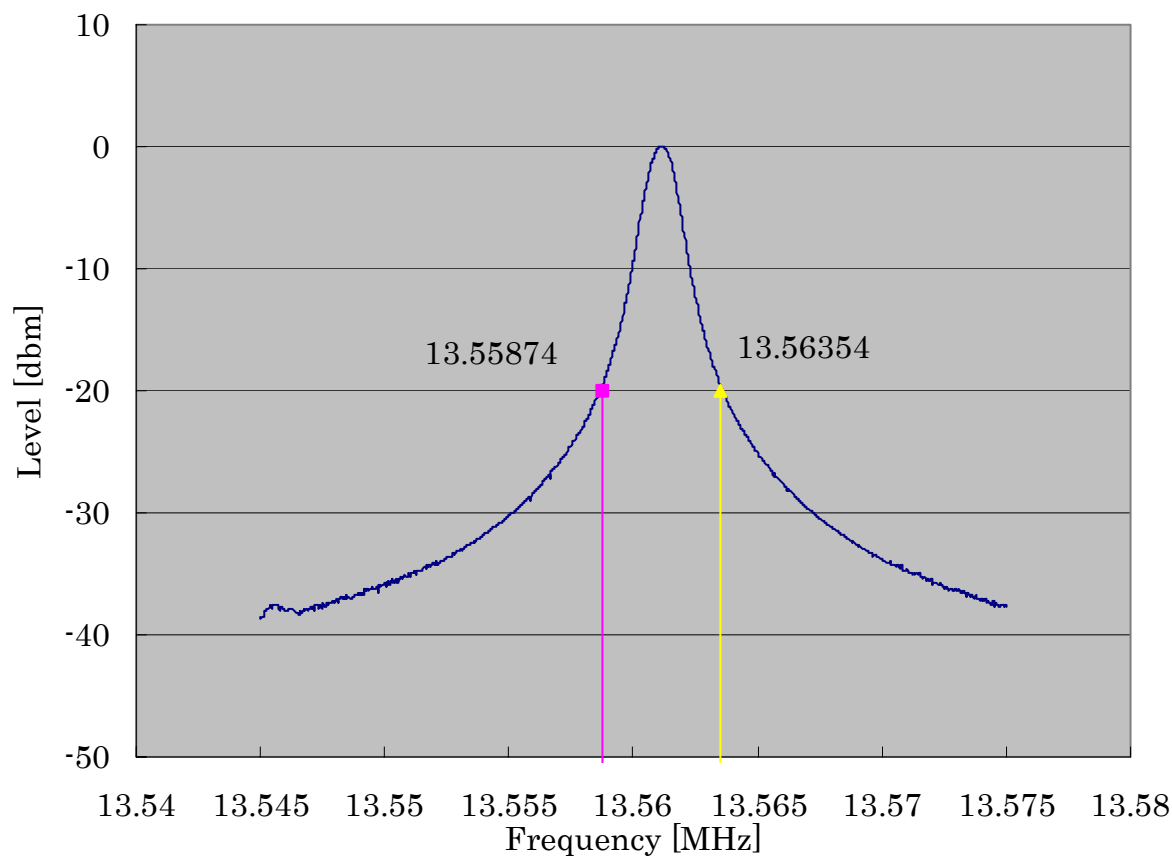
Specified Limit +/-0.01%

A.5 Occupied Bandwidth

Testing Date : September 1, 2006

Temperature : 25 (°C) Humidity : 55(%)

RBW:1kHz VBW:1kHz SWP:100ms ATT:10dB



Appendix B: Test Instruments

Sign	Type	Model No.	Manufacturer	Serial No.	Last Cal.	Interval
OP-1	Open Site	-	Toshiba	-	2006/5	1 Year
OP-2	Open Site	-	Toshiba	-	2006/5	1 Year
AC-1	Anechoic Chamber (L)	-	TDK	-	2006/5	1 Year
AC-2	Anechoic Chamber (S)	-	TDK	-	2006/5	1 Year
SR-A	Shielded Room	-	TDK	-	-	-
SR-B	Shielded Room	-	TDK	-	-	-
SR-C	Shielded Room	-	TDK	-	-	-
R-1	Test Receiver	ESVS10	Rohde & Schwarz	84231/004	2006/3	1 Year
R-2	Test Receiver	ESVS10	Rohde & Schwarz	843744/018	2006/7	1 Year
R-3	Test Receiver	ESI7	Rohde & Schwarz	100059	2005/11	1 Year
R-4	Test Receiver	ESHS30	Rohde & Schwarz	842053/001	2006/2	1 Year
R-5	Test Receiver	ESCS30	Rohde & Schwarz	100203	2006/2	1 Year
S-1	Spectrum Analyzer	R3361C	Advantest	71720774	2006/4	1 Year
S-3	Spectrum Analyzer	U3751	Advantest	160100139	2006/3	1 Year
S-4	Spectrum Analyzer	8563E	Hewlett Packard	3221A00201	2006/4	1 Year
CB-3	RF Cable	3D-2W	Fujikura	-	2006/5	1 Year
CB-4	RF Cable	3D-2W	Fujikura	-	2006/5	1 Year
CB-5	RF Cable	3D-2W	Fujikura	-	2006/5	1 Year
CN-1	RF Cable	20D/5D-2W	Fujikura	-	2006/5	1 Year
CN-2	RF Cable	20D/5D-2W	Fujikura	-	2006/5	1 Year
CN-3	RF Cable	20D/5D-2W	Fujikura	-	2006/5	1 Year
CS-1	RF Cable	SUCOFLEX 104	Suhner	121947/4	2006/5	1 Year
CS-2	RF Cable	SUCOFLEX 104	Suhner	35687/4	2006/5	1 Year
CS-3	RF Cable	SUCOFLEX 104	Suhner	39934/4	2006/5	1 Year
CS-4	RF Cable	SUCOFLEX 104	Suhner	52053/4	2006/5	1 Year
CS-5	RF Cable	SUCOFLEX 104	Suhner	52146/4	2006/5	1 Year
L-1	AMN	KNW-407	Kyoritsu Corp.	8-833-5	2005/9	1 Year
L-2	AMN	KNW-407	Kyoritsu Corp.	8-680-14	2005/9	1 Year
L-3	AMN	KNW-407	Kyoritsu Corp.	8-757-1	2006/6	1 Year
L-4	AMN	KNW-242	Kyoritsu Corp.	8-755-1	2006/6	1 Year
L-5	AMN	KNW-242C	Kyoritsu Corp.	8-837-14	2006/6	1 Year
L-6	AMN	KNW-243C	Kyoritsu Corp.	8-692-5	2005/9	1 Year
L-7	AMN	KNW-243C	Kyoritsu Corp.	8-831-3	2006/6	1 Year
L-8	AMN	KNW-243C	Kyoritsu Corp.	8-831-4	2006/6	1 Year
L-9	AMN	KNW-244C	Kyoritsu Corp.	8-1373-3	2005/9	1 Year
L-10	ISN	ENY41	Rohde & Schwarz	0830663/046	2006/3	1 Year
L-11	ISN	ENY22	Rohde & Schwarz	0830661/029	2006/3	1 Year
L-12	ISN	FCC-TLISN-T2-02	FCC	20234	2005/11	1 Year
L-13	ISN	FCC-TLISN-T4-02	FCC	20235	2005/11	1 Year
L-14	High Impedance Probe	KNW-410	Kyoritsu Corp.	8-876-3	2005/8	1 Year
PL-3	Pulse Limiter	ESH3-Z2	Rohde & Schwarz	-	2005/11	1 Year
PL-4	Pulse Limiter	ESH3-Z2	Rohde & Schwarz	-	2006/2	1 Year
PL-5	Pulse Limiter	ESH3-Z2	Rohde & Schwarz	-	2006/2	1 Year
TM-1	50ohm Termination	BNC-P-1.5	TDC	-	2006/3	1 Year
TM-2	50ohm Termination	-	Y&R	-	2006/3	1 Year

AL-0	Loop Antenna	HFH2-Z2	Rohde & Schwarz	879284/14	2005/8	1 Year
AB-1	Biconical Antenna	BBA9106	Schwarzbeck	VHA91031741	2006/5	1 Year
AB-2	Biconical Antenna	BBA9106	Schwarzbeck	VHA91031516	2006/5	1 Year
AB-3	Biconical Antenna	BBA9106	Schwarzbeck	VHA11905516	2006/5	1 Year
AL-1	Log-Periodic Antenna	UHALP9107	Schwarzbeck	9107915	2006/5	1 Year
AL-2	Log-Periodic Antenna	UHALP9107	Schwarzbeck	1357	2006/5	1 Year
AL-3	Log-Periodic Antenna	UHALP9108	Schwarzbeck	0278	2006/5	1 Year
AL-4	Log-Periodic Antenna	USLP9143	Schwarzbeck	140	2006/6	1 Year
AL-5	Log-Periodic Antenna	94612-1	Eaton	97062301	2006/4	1 Year
AH-5	Horn Antenna	12-12	Scientific Atlanta	770	2006/5	1 Year
AD-1	Dipole Antenna	KBA-511A	Kyoritsu Corp.	0-195-5	2005/8	1 Year
AD-2	Dipole Antenna	KBA-511A	Kyoritsu Corp.	0-228-13	2005/8	1 Year
AD-3	Dipole Antenna	KBA-611	Kyoritsu Corp.	0-196-8	2005/8	1 Year
AD-4	Dipole Antenna	KBA-611	Kyoritsu Corp.	0-230-6	2005/8	1 Year
CL-1	Absorbing Clamp	MDS21	Rohde & Schwarz	894245/002	2006/6	1 Year
PA-1	Pre-Amplifier	WJ-6811-513	Watkins Johnson	0288	2006/5	1 Year
PA-2	Pre-Amplifier	WJ-6682-824	Watkins Johnson	0052	2006/5	1 Year
PA-3	Pre-Amplifier	WJ-6870-506	Watkins Johnson	0018	2006/5	1 Year
HC-1	Harmonic Current Analysis System	PM3000A	Voltech Instruments LTD.	3144	2006/4	1 Year
RN-1	Reference Impedance Network	4151	NF ELECTRONIC INSTRUMENTS	3168114151011	2006/4	1 Year
AP-1	AC Power Supplies (3-Phase 36kVA)	Power Station 4400 Series	NF ELECTRONIC INSTRUMENTS	-	2006/5	1 Year
AP-2	AC Power Supplies (1-Phase 10kVA)	Power Station 4400 Series	NF ELECTRONIC INSTRUMENTS	-	2006/5	1 Year
AP-3	AC Power Supplies (1-Phase 4kVA)	ES2000S / ES2000B	NF ELECTRONIC INSTRUMENTS	428978 / 429689	2006/5	1 Year
OV-1	Oven	-	Ohnishi	-	2006/5	1 Year
FC-1	Frequency Counter	53131A	Hewlett Packard	3546A11807	2006/5	1 Year

2-1	ESD Tester	ESD3000	EMC PARTNER	092	2006/5	1 Year
2-2	ESD Tester	PESD 1600	HAEFELY	H604071	2005/12	1 Year
2-3	ESD Tester	PESD 1610	HAEFELY	H204507	2005/10	1 Year
3-1	Signal Generator	SMT 02	Rohde & Schwarz	51400044	2006/7	1 Year
3-2	Signal Generator	83732B	Hewlett Packard	US37101411	2005/10	1 Year
3-3	Function Generator	1941	NF	328730	2005/10	1 Year
3-4	RF Power Amplifier	R7100LC	RF Power Labs	081195-2	2006/5	1 Year
3-5	RF Power Amplifier	500A100M1	Amplifier Research	19671	2006/5	1 Year
3-6	RF Power Amplifier	200W1000M2A	Amplifier Research	19572	2006/5	1 Year
3-7	RF Power Amplifier	50S1G4	Amplifier Research	24616	2006/5	1 Year
3-8	Biconical Antenna	3109	EMCO	9607-3014	2006/5	1 Year
3-9	Biconical Antenna	AT-2	E.S Factory	001	2006/5	1 Year
3-10	Log-Periodic Antenna	3144	EMCO	9701-1032	2006/5	1 Year
3-11	Log-Periodic Antenna	AT5080	Amplifier Research	322092	2006/7	1 Year
3-12	Horn Antenna	AT4002A	Amplifier Research	26532	2006/5	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	2006/5	1 Year
3-16	Field Probe	FP2000	Amplifier Research	22646	2005/9	1 Year
3-17	Field Probe	FP5080	Amplifier Research	25212	2005/8	1 Year
3-18	Field Probe	FP6001	Amplifier Research	303557	2005/10	1 Year
3-19	Power Meter	4421	Bird	2919	2006/7	1 Year
3-20	Power Head	4022	Bird	6147	2006/7	1 Year
3-21	Power Meter	PM2002	Amplifier Research	25774	2006/7	1 Year
3-22	Power Head	PH2000	Amplifier Research	26413	2006/7	1 Year
3-23	Power Head	PH2000	Amplifier Research	26414	2006/7	1 Year
3-24	Dual Coupler	DC2600	Amplifier Research	19734	2006/7	1 Year
3-25	Dual Coupler	DC6080	Amplifier Research	302555	2006/7	1 Year
3-26	Dual Coupler	DC7144	Amplifier Research	26463	2006/7	1 Year
4-1	Immunity Tester	TRA2000	EMC PARTNER	659	2006/7	1 Year
4-2	EFT/B Generator	PEFT-Junior	HAEFELY	083818-13	2006/5	1 Year
4-3	EFT/B Generator	FNS-AXII B50	Noise Laboratory	FNS0620431	2006/6	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	2005/10	1 Year
5-2	Coupling Filter	FP-SURGE 100M	HAEFELY	149163	2005/11	1 Year
5-3	Coupling Network	IP6.2	HAEFELY	083811-10	2005/11	1 Year
5-4	Decoupling Network	DEC1A	HAEFELY	083793-08	2005/11	1 Year
5-5	Pruefpistole	AP 300	HAEFELY	081 438	2005/11	1 Year
6-1	Signal Generator	PSG1000B	W.K. Electronics	000234	2006/7	1 Year
6-2	RF Power Amplifier	75A250	Amplifier Research	19502	2005/8	1 Year
6-3	RF Power Amplifier	75A250	Amplifier Research	26255	2005/8	1 Year
6-4	6dB Attenuator	8343-060	Bird	2054	2005/8	1 Year
6-5	6dB Attenuator	65-6-33	Weinschel	LW166	2005/8	1 Year
6-6	CDN	FCC-801-M1-16	FCC	50	2006/5	1 Year
6-7	CDN	FCC-801-M1-25A	FCC	04001	2006/6	1 Year
6-8	CDN	FCC-801-M2-25	FCC	59	2006/5	1 Year
6-9	CDN	FCC-801-M2-25A	FCC	03023	2006/6	1 Year
6-10	CDN	FCC-801-M2-25A	FCC	03024	2006/6	1 Year
6-11	CDN	FCC-801-M3-25	FCC	137	2006/5	1 Year
6-12	CDN	FCC-801-M3-25A	FCC	05021	2006/6	1 Year
6-13	CDN	FCC-801-M3-25A	FCC	99133	2006/6	1 Year
6-14	CDN	FCC-801-M4-25	FCC	21	2006/5	1 Year
6-15	CDN	FCC-801-M4-50	FCC	9806	2006/5	1 Year
6-16	CDN	FCC-801-C1	FCC	79	2006/6	1 Year
6-17	CDN	FCC-801-T2	FCC	77	2006/6	1 Year
6-18	CDN	FCC-801-T4	FCC	81	2006/6	1 Year
6-19	CDN	FCC-801-T8	FCC	9956	2006/6	1 Year
6-20	150-50 Ohms Adaptor	FCC-801-150-50	FCC	638	2006/6	1 Year
6-21	150-50 Ohms Adaptor	FCC-801-150-50	FCC	639	2006/6	1 Year
6-22	EM Clamp	F-203I	FCC	220	2005/8	1 Year
6-23	Decoupling Clamp	F-203I-DCN	FCC	105	-	-
6-24	Bulk Current Injection Clamp	F-120-2	FCC	53	2005/8	1 Year



JQA File No. : 441-60489(R)

Model No. : 444-59005

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

Issue Date: September 4, 2006

FCC ID: RPARFMHL00

Page 38 of 38

8-1	Interference Tester	LFP6.1	HAEFELY	083374-03	2006/5	1 Year
8-2	Magnetic Field Tester	MFG100.1	HAEFELY	080136-06	2006/5	1 Year
11-1	Voltage Dip Tester	PLINE1610	HAEFELY	148709	2006/4	1 Year
11-2	3 Phase Extension	PLS1630	HAEFELY	149685	2006/4	1 Year