JQA File No.: 441-70603
Issued Date: October 16, 2007

TEST REPORT

APPLICANT	:	KATSURAGAWA ELECTRIC CO., LTD
ADDRESS	:	21-1, SHIMOMARUKO 4-CHOME OHTAKU, TOKYO 146-8585, JAPAN
PRODUCTS	:	RFID Reader & Writer
MODEL No.	:	ARW13T-RF01
SERIAL No.	:	-
FCC ID	:	VP8－K115
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	:	September 19, 2007 – October 4, 2007

This report must not 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

M. Takahashi

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

- 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

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, 2008)
NVLAP Lab Code:200192-0 (Effective through : June 30, 2008)
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 (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 22, 2010)

4 Description of the Equipment Under Test

1	Manufacturer	:	KATSURAGAWA ELECTRIC CO., LTD 21-1, SHIMOMARUKO 4-CHOME OHTAKU, TOKYO 146-8585, JAPAN
2	Products	:	RFID Reader & Writer
3	Model No.	:	ARW13T-RF01
4	Serial No.	:	-
5	Product Type	:	Pre-Production
6	Date of Manufacture	:	-
7	Power Rating	:	5.0VDC * The EUT was operated with the printer. (Input: 200, 220-240VAC 50Hz、 Output: 5.0Vdc)
8	EUT Grounding	:	None
9	Received Date of EUT	:	September 18, 2007
10	Operating Frequency	:	13.56MHz(Section 15.225) Operation within the band 13.110 – 14.010 MHz
11	Modulation	:	FSK
12	Antenna type	:	Fixed using
13	Temperature Range	:	0 ~ 50 degree

5 Test Condition

5.1 Conducted Emissions 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
Test Receiver	☐ R-1 ☐ R-2 ☒ R-3 ☐ R-4 ☐ R-5
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 ☒ 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
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 ☒ 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
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
	☐ AL-0

5.3.3 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
Cable	☐ CS-1 ☐ CS-2
Antenna	☐ AL-1 ☐ AL-2 ☐ AL-3 ☐ AL-4 ☐ AL-5 ☐ AL-6
Pre-Amplifier	☐ PA-1 ☐ PA-2 ☐ PA-3 ☐ PA-5

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 ☐ S-3
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 :

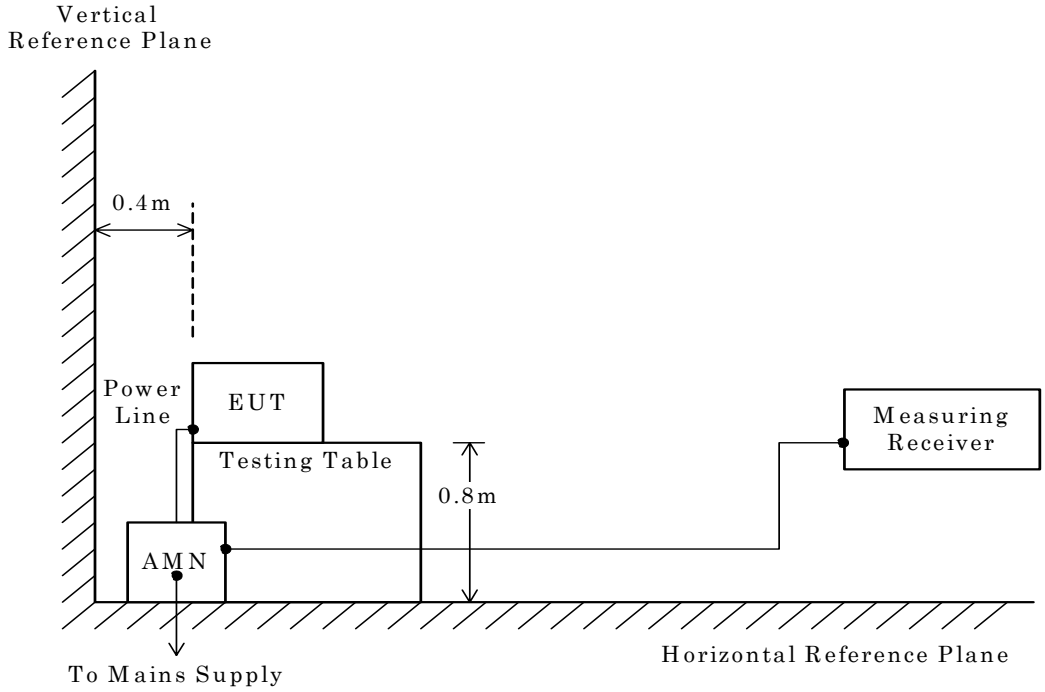
Type	Number of test site & instruments (Refer to Appendix B)
Test Receiver	☐ R-1 ☐ R-2 ☐ R-3 ☐ R-4 ☐ R-5 ☐ S-1 ☐ S-3 ☒ 13
Cable	☐ CB-3 ☐ CB-4 ☐ CB-5 ☐ CB-3 ☐ CB-4 ☐ CB-5 ☐ CS-1 ☐ CS-2 ☐ CB-3 ☐ CB-4 ☐ CB-5
Oven	☐ OV-1
Pre-Amplifier	☐ PA-1 ☐ PA-2 ☐ PA-3
Antenna	☐ AB-1 ☐ AB-2 ☐ AB-3 ☐ AD-1 ☐ AD-2 ☐ AD-3 ☐ 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.

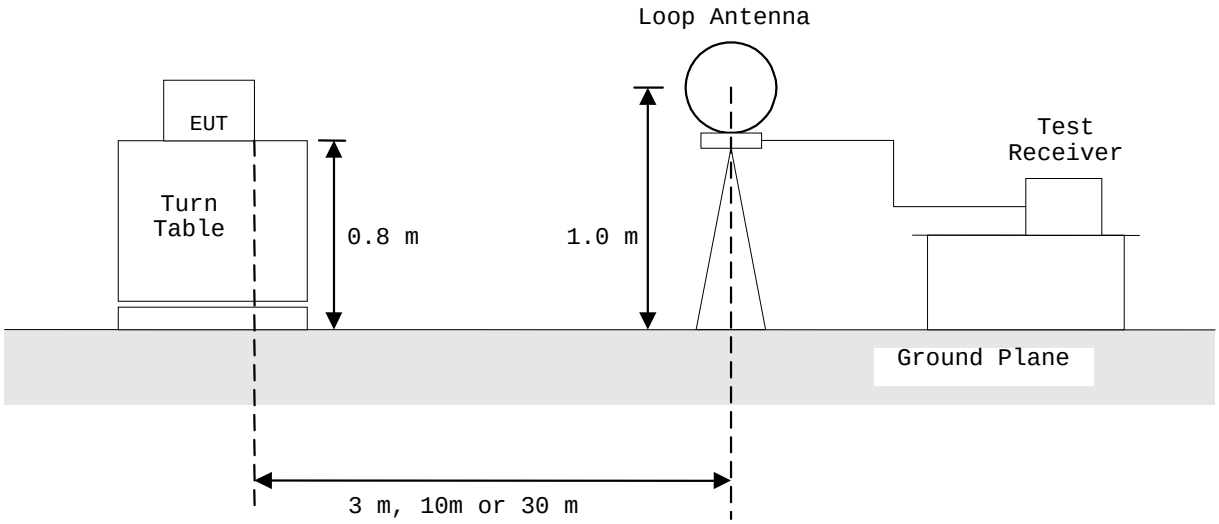
- Side View -



* AMN : Artificial Mains Network

6.2 Radiated Emissions 0.009 MHz - 30 MHz

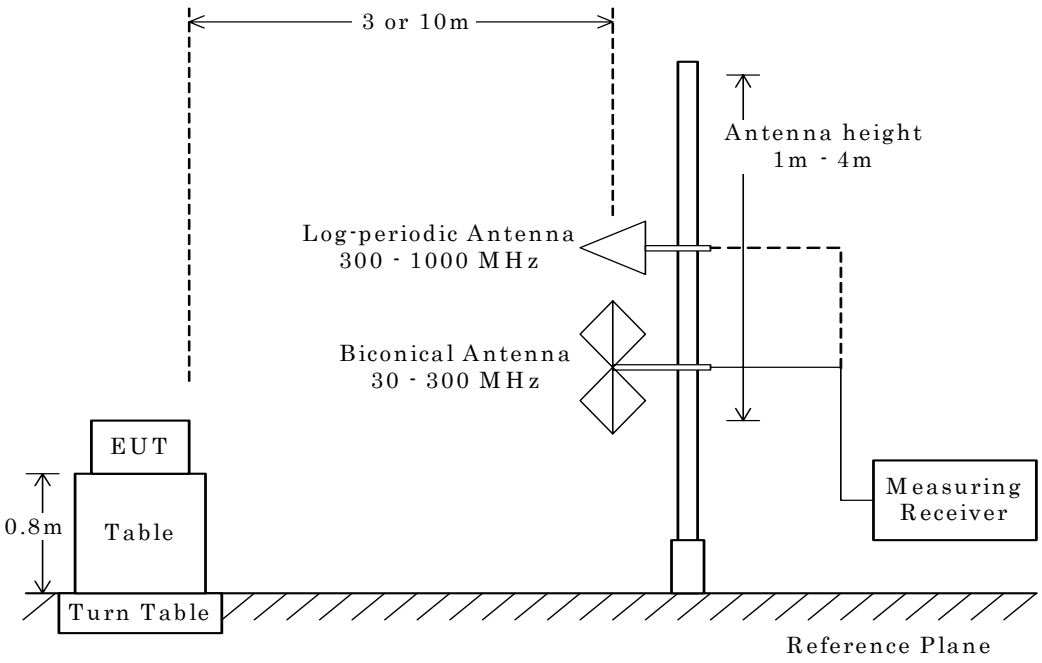
The test was based on ANSI C63.4-2003.
The preliminary radiated disturbance measurements were carried out.
The preliminary radiated disturbance measurements were performed at the measurement distance that specified for compliance to determine the emission characteristics of the EUT.
The EUT configuration, 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.

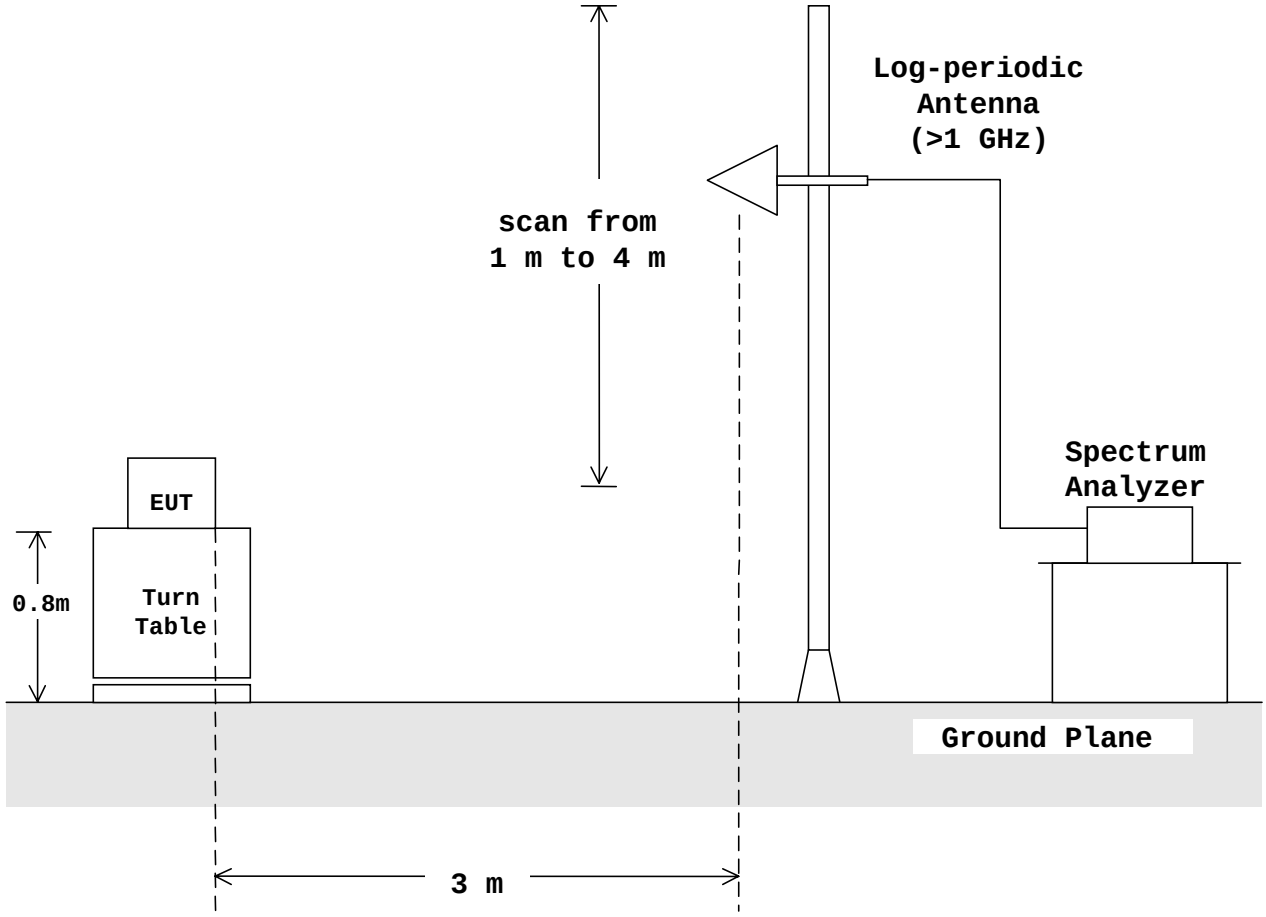
- Side View -



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.

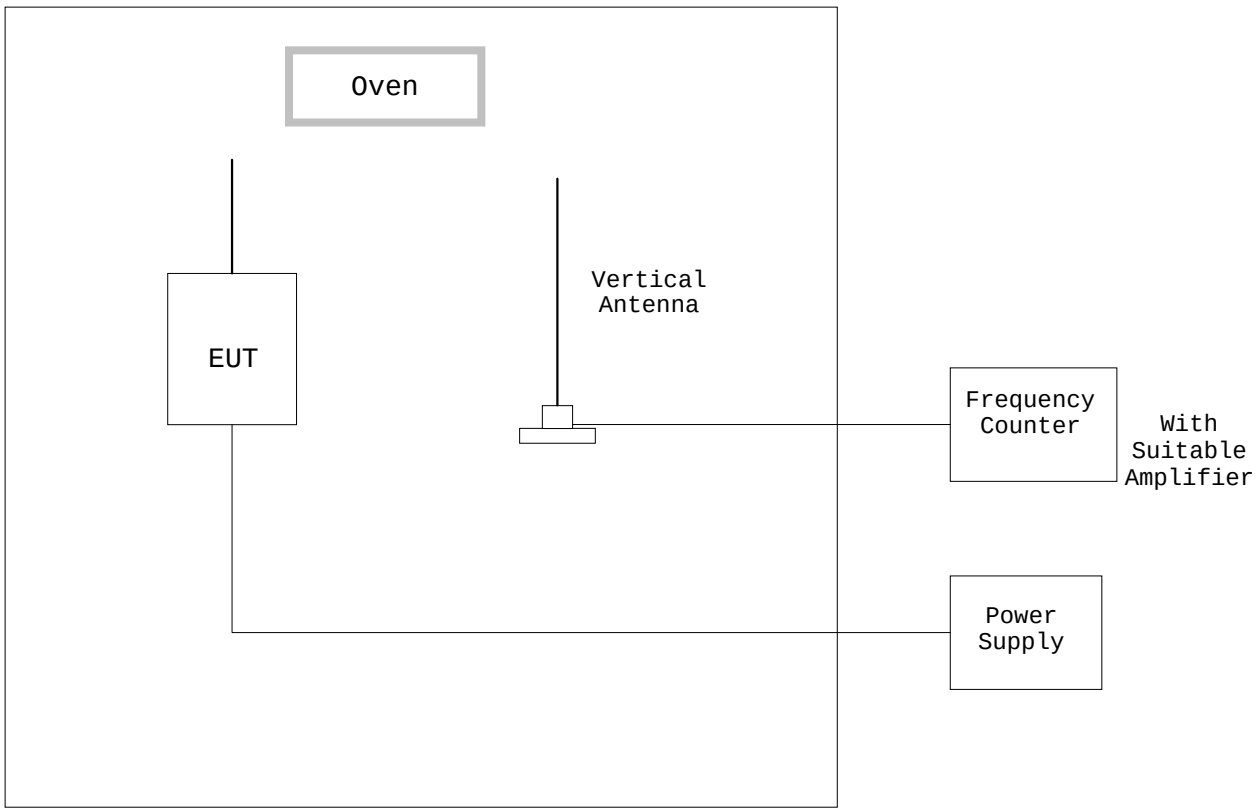
- Side View -



6.5 Frequency Stability

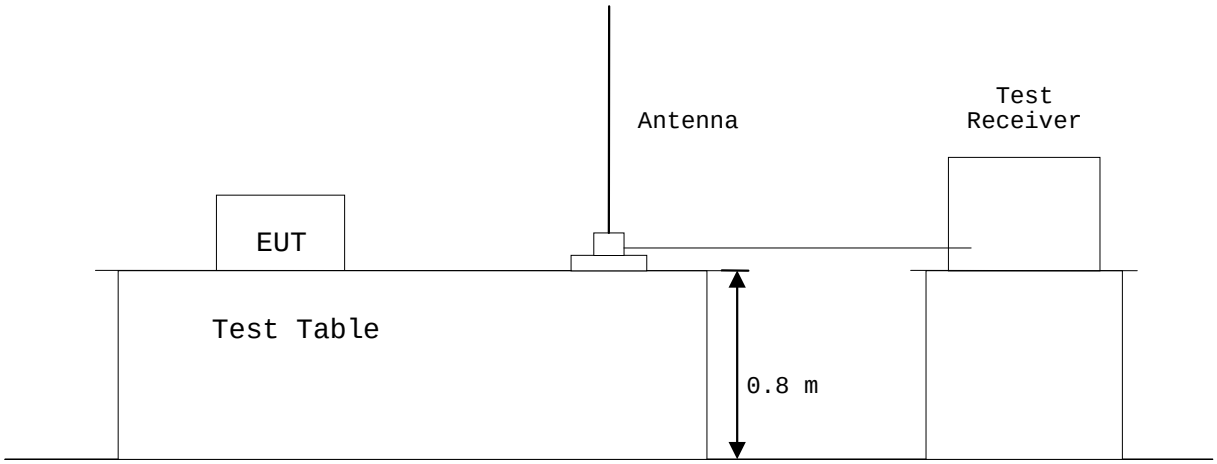
The test was based on ANSI C63.4-2003.

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 0°C to +50°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°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 test receiver(spectrum analyzer mode) 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 a test receiver 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 Conducted Emissions 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)	9.8	dB	at	0.64	MHz
Min. Limit Margin (AVE)	17.5	dB	at	0.64	MHz
Max. Limit Exceeding	N/A	dB	at	N/A	MHz
Uncertainty of measurement results	± 2.6	dB(2σ)			

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	93.8	dB	at	13.56	MHz
Max. Limit Exceeding	N/A	dB	at	N/A	MHz
Uncertainty of measurement results	± 1.9	dB(2σ)			

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	9.9	dB	at	786.5	MHz
Max. Limit Exceeding	N/A	dB	at	N/A	MHz

Uncertainty of measurement results

3 meters	0.009-30 MHz	± 1.9	dB(2σ)
	30- 300 MHz	± 4.5	dB(2σ)
	300-1000 MHz	± 4.6	dB(2σ)
	1 - 18 GHz	± 3.7	dB(2σ)
10 meters	0.009-30 MHz	± 1.9	dB(2σ)
	30- 300 MHz	± 4.5	dB(2σ)
	300-1000 MHz	± 4.5	dB(2σ)
	1 - 18 GHz	± 3.7	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 :

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 judged

Min. Limit Margin N/A dB at N/A MHz

Max. 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 judged

Min. Limit Margin N/A dB at N/A MHz

Max. 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:

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 : 5.0VDC

* The EUT was operated with the printer.
(Input: 230VAC 60Hz、 Output: 5.0Vdc)

Operation Mode

Transmitting

The Test 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	KATSURAGAWA ELECTRIC CO., LTD	ARW13T-RF01	-	VP8－K115

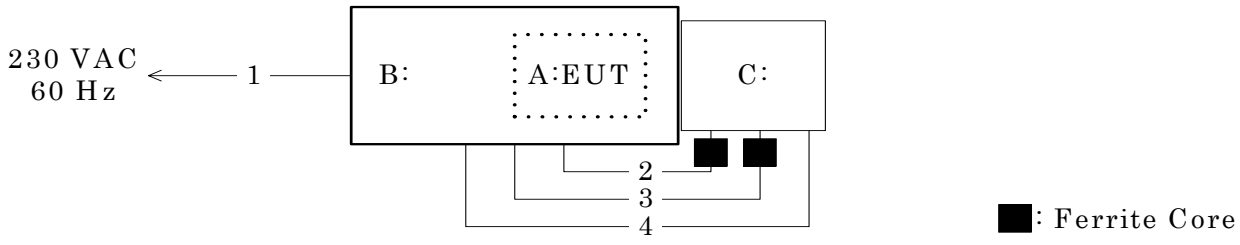
The auxiliary equipment used for testing :

Sign	Item	Manufacturer	Model No.	Serial No.	FCC ID
B	DIGITAL PRINTER	KATSURAGAWA ELECTRIC CO., LTD	K-115(KIP9000)	Z0700002	N/A(DoC)
C	IPS (PC)	Micro star international	Hetis 945	75S0101689	N/A(DoC)

Type of Cable:

No.	Description	Identification (Manu. etc.)	Connector Shielded	Cable Shielded	Ferrite Core	Length (m)
1	AC Power Cable	-	No	No	No	4.5
2	AC Power Cable(IPS)	-	No	No	Yes	0.8
3	USB Cable	-	Yes	Yes	Yes	0.5
4	Interface Cable(IF8)	-	Yes	Yes	No	0.5

14 Equipment Under Test Arrangement (Drawings)



15 Equipment Under Test Arrangement (Photographs)

15.1 Conducted Emissions at the Mains Ports

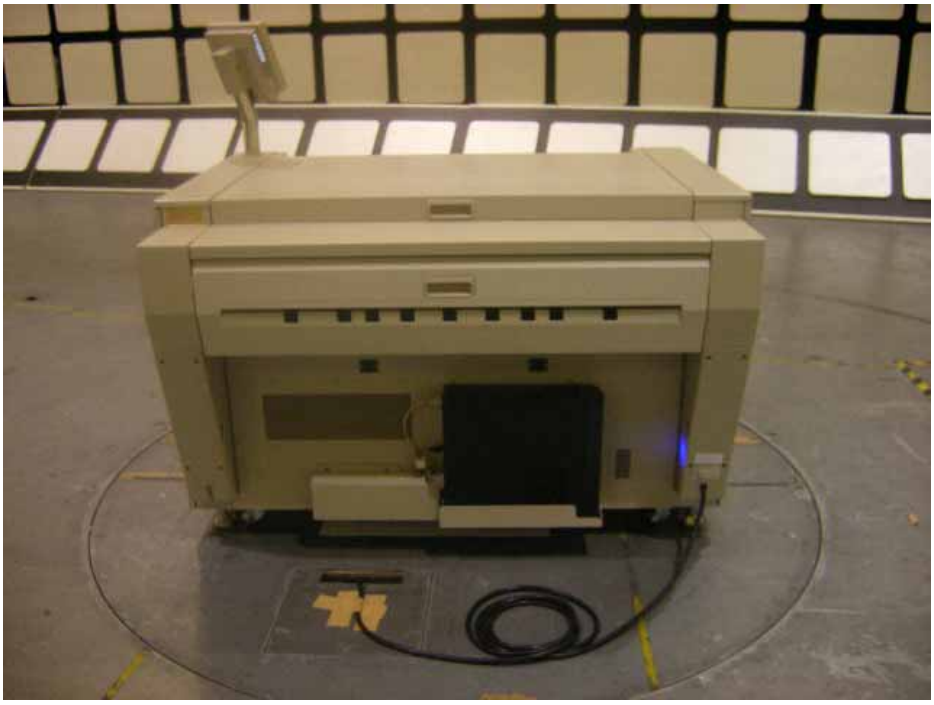
- Front View -

- Rear View -

Photograph present configuration with maximum emission

15.2 Radiated Emissions

- Front View -



- Rear View -

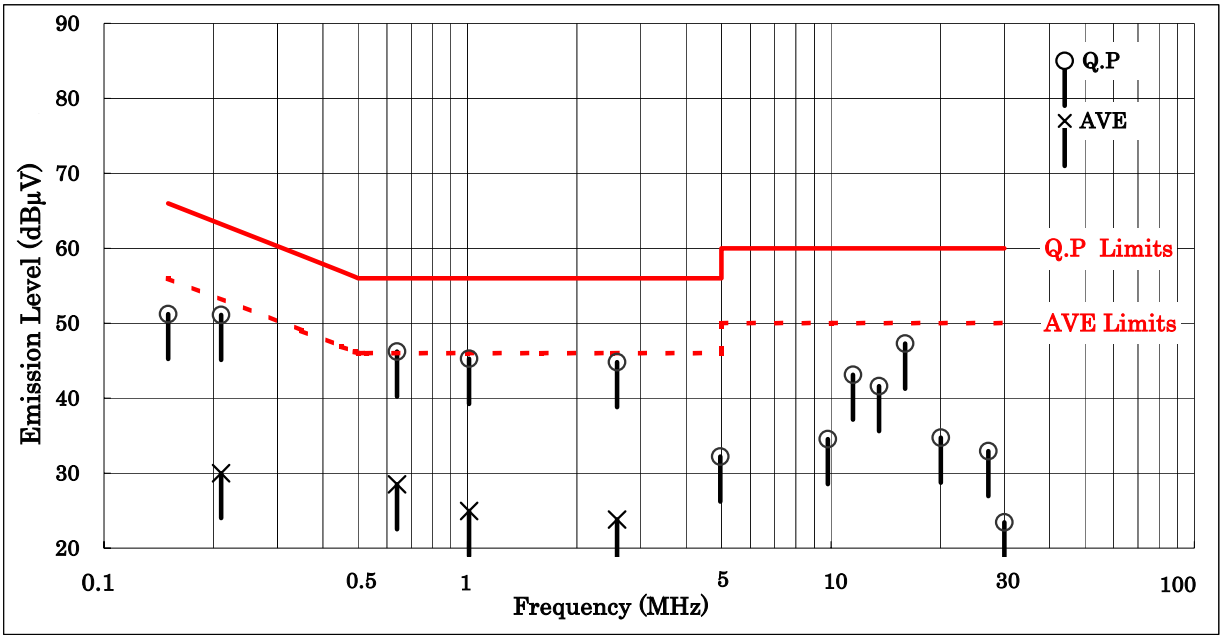
Photograph present configuration with maximum emission

Appendix A: Test Data

A.1 Conducted Emissions at the Mains Ports

Date: September 19, 2007
Temp : 21℃ Humi : 59% Atom : 956hPa

Frequency	AMN	Meter Reading (dBμV)				Limits		Max. Emission Level		Margin	
	Factor	V-A		V-B		(dBμV)		(dBμV)		(dB)	
(MHz)	(dB)	Q.P	AVE	Q.P	AVE	Q.P	AVE	Q.P	AVE	Q.P	AVE
0.15	0.1	51.1	-	50.1	-	66.0	56.0	51.2	-	14.8	-
0.21	0.1	51.0	29.9	40.2	29.5	63.2	53.2	51.1	30.0	12.1	23.2
0.64	0.1	45.9	28.3	46.1	28.4	56.0	46.0	46.2	28.5	9.8	17.5
1.01	0.1	45.0	24.8	45.1	24.5	56.0	46.0	45.2	24.9	10.8	21.1
2.58	0.2	44.3	23.5	44.6	23.6	56.0	46.0	44.8	23.8	11.2	22.2
4.96	0.3	31.9	-	29.8	-	56.0	46.0	32.2	-	23.8	-
9.80	0.5	34.0	-	33.8	-	60.0	50.0	34.5	-	25.5	-
11.50	0.6	40.6	-	42.5	-	60.0	50.0	43.1	-	16.9	-
13.56	0.7	38.1	-	40.9	-	60.0	50.0	41.6	-	18.4	-
15.99	0.8	42.9	-	46.5	-	60.0	50.0	47.3	-	12.7	-
20.06	0.8	33.9	-	33.2	-	60.0	50.0	34.7	-	25.3	-
27.12	0.8	32.2	-	30.0	-	60.0	50.0	33.0	-	27.0	-
30.00	0.6	22.8	-	22.7	-	60.0	50.0	23.4	-	36.6	-



Notes: 1) The testing location : Anechoic Chamber No.1
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
(AMN Factor) + (Meter Reading) = 0.1 + 51.1 = 51.2 dBμV

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

Date: September 20, 2007
Temp : 23℃ Humi : 62% Atom : 963hPa

Frequency (MHz)	Antenna Factor (dB)	Meter Reading/ at 3m (dBμV) Q.P	Limits/ 30m (dBμV) Q.P	Field Strength/ 30m (dBμV) Q.P	Margin (dB) Q.P
13.56	-	30.2	84.0	-9.8	93.8
27.12	-	< 30.0	29.5	< -10.0	> 39.5

Notes: 1) The testing location : Anechoic Chamber No.1 Distance : 3m

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: 29.7 dBmV/m – $20\log_{10}((30/3)^2)$= 30.2 – 40 = -9.8 dBmV/m at 30 meters

Limits for fundamental(§15.225(a)) = $20\log_{10}(15848)$ = 84.0 dBmV/m

Harmonic : 30 dBmV/m – $20\log_{10}((30/10)^2)$= 30 – 19.1 = 10.9 dBmV/m at 30 meters

Limits for (§15.225(d)) = $20\log_{10}(30)$ = 29.5 dBmV/m

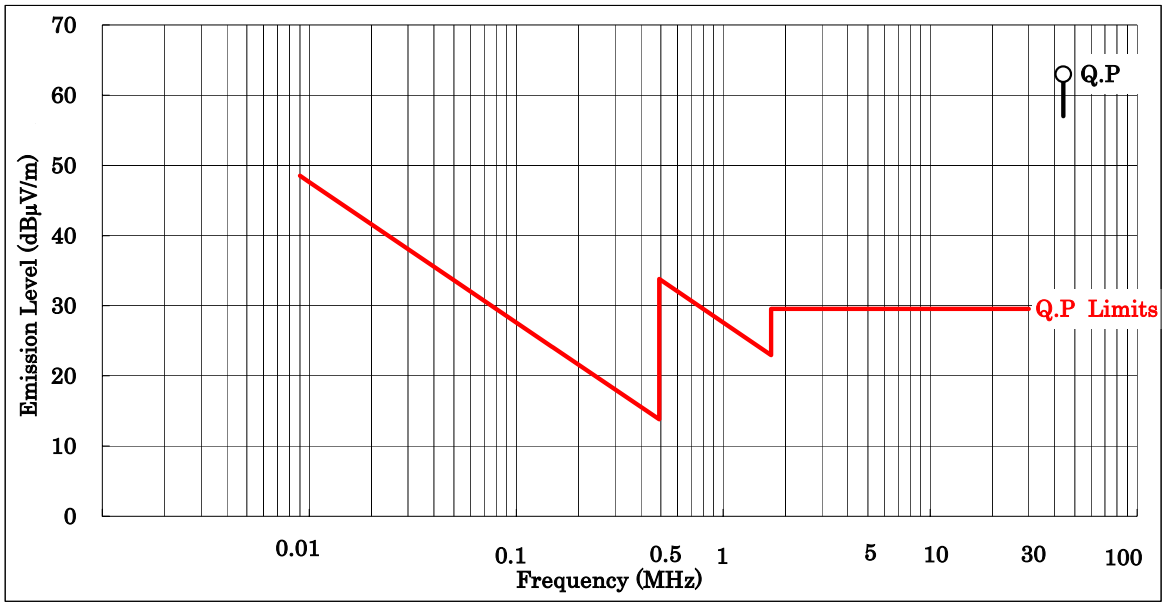
8) The spectrum was checked from 0.009 MHz to 30 MHz.

A.3 Radiated Emissions

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

Date: September 20, 2007
Temp : 23℃ Humi : 62% Atom : 963hPa

Frequency (MHz)	Antenna Factor (dB)	Meter Reading at 10m (dBμV) Q.P	Limits (dBμV) Q.P	Specified Distance (m)	Extrapolated Emission Level (dBμV) Q.P	Margin (dB) Q.P
0.009	-	< 35.0	48.5	300.0	< -24.1	> 72.6
0.01	-	< 35.0	47.6	300.0	< -24.1	> 71.7
0.02	-	< 35.0	41.6	300.0	< -24.1	> 65.7
0.03	-	< 35.0	38.1	300.0	< -24.1	> 62.1
0.05	-	< 35.0	33.6	300.0	< -24.1	> 57.7
0.07	-	< 35.0	30.7	300.0	< -24.1	> 54.8
0.10	-	< 35.0	27.6	300.0	< -24.1	> 51.7
0.20	-	< 35.0	21.6	300.0	< -24.1	> 45.7
0.30	-	< 35.0	18.1	300.0	< -24.1	> 42.1
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
20.00	-	< 35.0	29.5	30.0	< 15.9	> 13.6
30.00	-	< 35.0	29.5	30.0	< 15.9	> 13.6

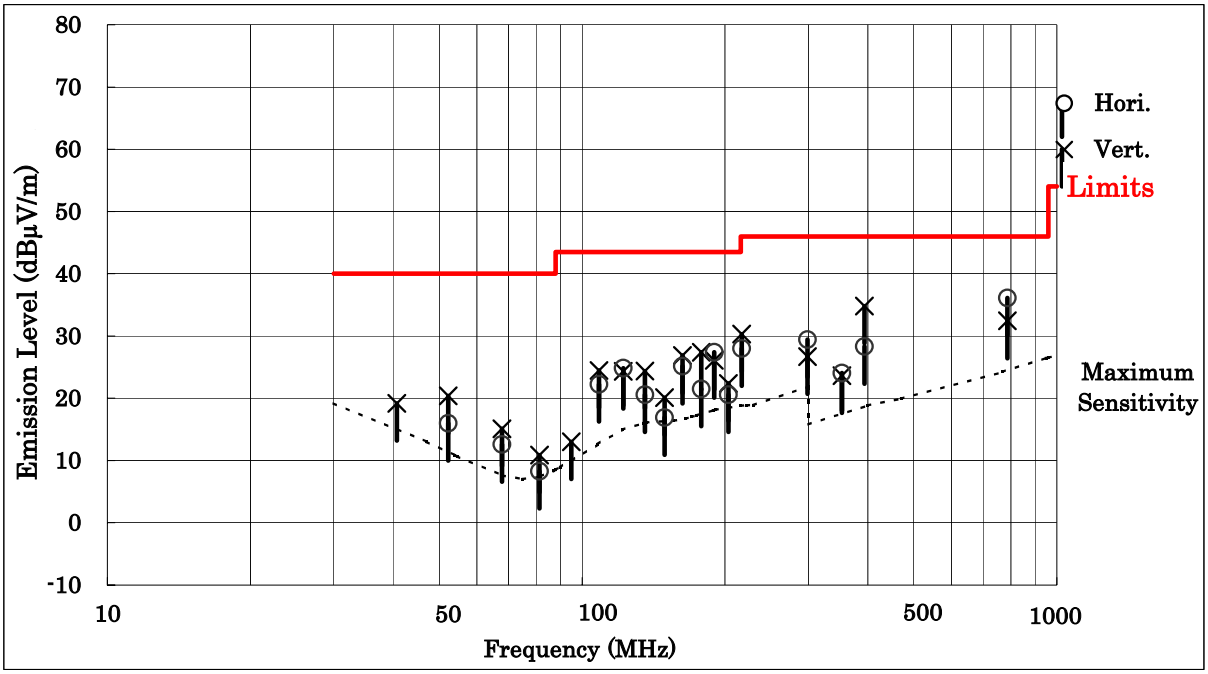


Notes: 1) The testing location : Anechoic Chamber No.1 Distance : 10 m
2) The symbol of "<" means "or less".
3) The symbol of ">" means "more than".
4) The symbol of "-" means "Zero", because the used test receiver calculated and displayed in the Meter Reading including the Correction Factor(Antenna and cable loss) directly
5) A sample calculation was made at 0.009 MHz
35 dBμV/m (at 10m distance) =>35 - $20\log_{10}((300/10)^2)$ = -24.1BμV/m (at 300m 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)

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

Date: September 20, 2007
Temp : 23℃ Humi : 62% Atom : 963hPa

Frequency (MHz)	Antenna Factor (dB/m)	Meter Reading (dBμV) Hori.	Meter Reading (dBμV) Vert.	Limits (dBμV) Q.P	Emission Level (dBμV/m) Hori.	Emission Level (dBμV/m) Vert.	Margin (dB) Hori.	Margin (dB) Vert.
40.7	15.1	< 0.0	4.1	40.0	< 15.1	19.2	> 24.9	20.8
52.2	11.3	4.7	9.1	40.0	16.0	20.4	24.0	19.6
67.8	7.5	5.1	7.6	40.0	12.6	15.1	27.4	24.9
81.4	7.3	1.0	3.6	40.0	8.3	10.9	31.7	29.1
94.9	9.9	< 0.0	3.1	43.5	< 9.9	13.0	> 33.6	30.5
108.5	12.6	9.7	11.9	43.5	22.3	24.5	21.2	19.0
122.0	14.8	10.0	9.5	43.5	24.8	24.3	18.7	19.2
135.6	15.9	4.7	8.5	43.5	20.6	24.4	22.9	19.1
149.2	16.1	0.8	4.0	43.5	16.9	20.1	26.6	23.4
162.7	16.4	8.8	10.5	43.5	25.2	26.9	18.3	16.6
178.3	17.3	4.2	10.1	43.5	21.5	27.4	22.0	16.1
189.8	17.9	9.5	8.2	43.5	27.4	26.1	16.1	17.4
203.4	18.4	2.2	4.0	43.5	20.6	22.4	22.9	21.1
217.0	18.6	9.4	11.7	46.0	28.0	30.3	18.0	15.7
298.3	21.4	8.0	5.3	46.0	29.4	26.7	16.6	19.3
352.6	17.2	6.8	6.4	46.0	24.0	23.6	22.0	22.4
393.2	18.3	10.0	16.5	46.0	28.3	34.8	17.7	11.2
786.5	23.7	12.4	8.7	46.0	36.1	32.4	9.9	13.6



Notes: 1) The testing location : Anechoic Chamber No.1 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) The symbol of "<" means "or less".
6) The symbol of ">" means "more than".
7) A sample calculation was made at 40.7 MHz
(Antenna Factor) + (Meter Reading) = 15.1 + 4.1 = 19.2 dBμV

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

Not applicable.

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

Testing Date : October 3, 2007

Temperature (°C)	Primary Supply Voltage (V)	Frequency (MHz)			
		0 minute later	2 minutes later	5 minutes	10 minutes
0	170	13.56027823	13.56028532	13.56028557	13.56028507
	230	13.56027645	13.56028614	13.56028545	13.56028558
	276	13.56027046	13.56028576	13.56028499	13.56028514
20	170	13.56029011	13.56029071	13.56029047	13.56029059
	230	13.56029024	13.56029087	13.56029067	13.56029050
	276	13.56029055	13.56029067	13.56029013	13.56029071
50	170	13.56027534	13.56027829	13.56027874	13.56027712
	230	13.56027568	13.56027916	13.56027906	13.56027874
	276	13.56027338	13.56027865	13.56027856	13.56027851

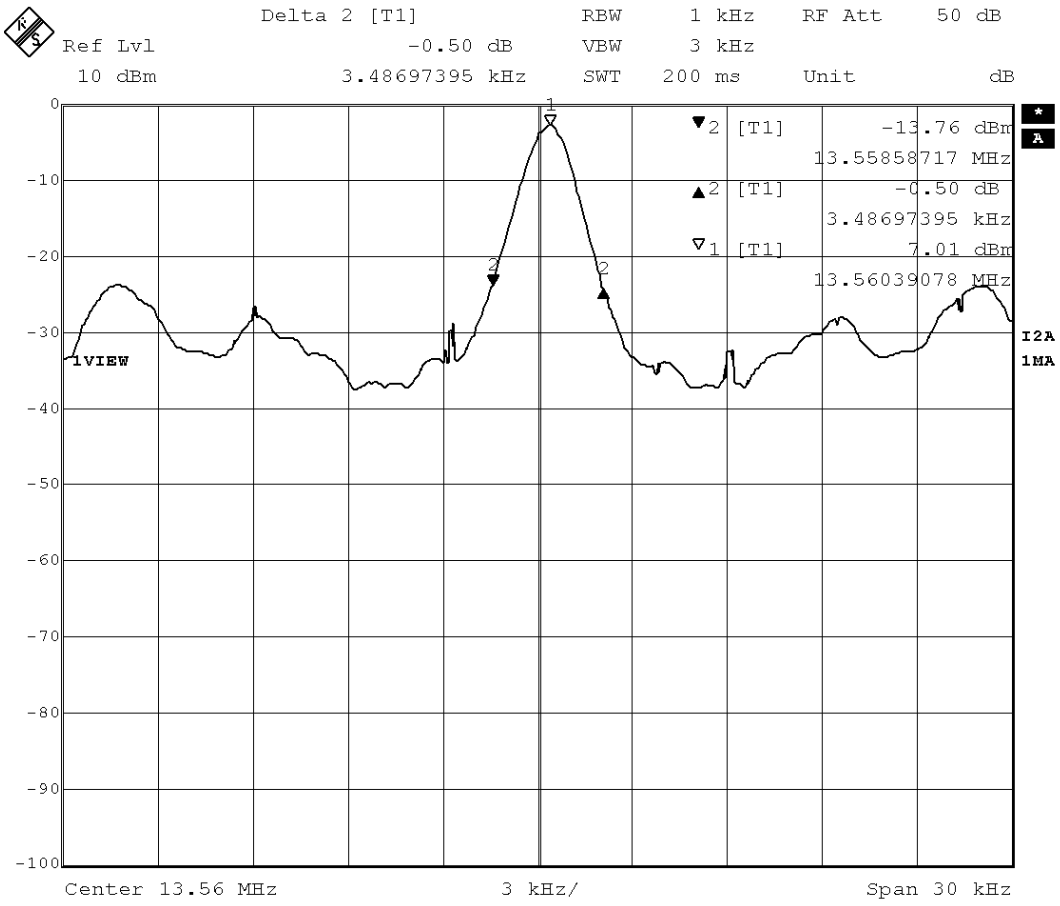
Operating Frequency:13.56MHz

Temperature (°C)	Primary Supply Voltage (V)	Frequency with time elapse (%)			
		0 minute later	2 minutes later	5 minutes	10 minutes
0	170	0.00205184	0.00210413	0.00210597	0.00210229
	230	0.00203872	0.00211018	0.00210509	0.00210605
	276	0.00199454	0.00210737	0.00210170	0.00210280
20	170	0.00213945	0.00214388	0.00214211	0.00214299
	230	0.00214041	0.00214506	0.00214358	0.00214233
	276	0.00214270	0.00214358	0.00213960	0.00214388
50	170	0.00203053	0.00205229	0.00205560	0.00204366
	230	0.00203304	0.00205870	0.00205796	0.00205560
	276	0.00201608	0.00205494	0.00205428	0.00205391

Specified Limit +/-0.01%

A.5 Occupied Bandwidth

Testing Date : October 4, 2007
Ambient Temperature : 20(°C) Humidity : 55(%)



Appendix B: Test Instruments

Sign	Type	Model No.	Manufacturer	Serial No.	Last Cal.	Interval
OP-1	Open Site	-	Toshiba	-	2007/5	1 Year
OP-2	Open Site	-	Toshiba	-	2007/5	1 Year
AC-1	Anechoic Chamber (L)	-	TDK	-	2007/5	1 Year
AC-2	Anechoic Chamber (S)	-	TDK	-	2007/5	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	2007/3	1 Year
R-2	Test Receiver	ESVS10	Rohde & Schwarz	843744/018	2007/6	1 Year
R-3	Test Receiver	ESIB7	Rohde & Schwarz	100059/007	2006/11	1 Year
R-4	Test Receiver	ESHS30	Rohde & Schwarz	842053/001	2007/2	1 Year
R-5	Test Receiver	ESCS30	Rohde & Schwarz	100203	2007/2	1 Year
13	Test Receiver	ESIB26	Rohde & Schwarz	100043	2007/8	1 Year
S-1	Spectrum Analyzer	R3361C	Advantest	71720774	2007/4	1 Year
S-3	Spectrum Analyzer	U3751	Advantest	160100139	2007/3	1 Year
S-4	Spectrum Analyzer	8563E	Hewllet Packard	3221A00201	2007/4	1 Year
S-5	Spectrum Analyzer	U3751	Advantest	170500170	2007/6	1 Year
CB-3	RF Cable	3D-2W	Fujikura	-	2007/5	1 Year
CB-4	RF Cable	3D-2W	Fujikura	-	2007/5	1 Year
CB-5	RF Cable	3D-2W	Fujikura	-	2007/5	1 Year
CN-1	RF Cable	20D/5D-2W	Fujikura	-	2007/7	1 Year
CN-2	RF Cable	20D/5D-2W	Fujikura	-	2007/7	1 Year
CN-3	RF Cable	20D/5D-2W	Fujikura	-	2007/7	1 Year
CS-1	RF Cable	SUCOFLEX 104P	Huber+Suhner	27290/4P	2006/11	1 Year
CS-2	RF Cable	SUCOFLEX 104P	Huber+Suhner	27289/4P	2006/11	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	2007/6	1 Year
L-4	AMN	KNW-242	Kyoritsu Corp.	8-755-1	2007/6	1 Year
L-5	AMN	KNW-242C	Kyoritsu Corp.	8-837-14	2007/6	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	2007/6	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	2006/11	1 Year
L-11	ISN	FCC-TLISN-T4-02	FCC	20235	2006/11	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	2006/10	1 Year
PL-3	Pulse Limiter	ESH3-Z2	Rohde & Schwarz	-	2006/11	1 Year
PL-4	Pulse Limiter	ESH3-Z2	Rohde & Schwarz	-	2007/2	1 Year
PL-5	Pulse Limiter	ESH3-Z2	Rohde & Schwarz	-	2007/2	1 Year
TM-1	50ohm Termination	BNC-P-1.5	TDC	-	2007/3	1 Year
TM-2	50ohm Termination	-	Y&R	-	2007/3	1 Year
AL-0	Loop Antenna	HFH2-Z2	Rohde & Schwarz	879284/14	2007/8	1 Year
AT-1	Triple Loop Antenna	HXYZ9170	Schwarzbeck	9170-138	2007/7	1 Year
AT-2	Trilog Broardband	VULB9160	Schwarzbeck	9160-3251	2007/9	1 Year

	Antenna					
AB-1	Biconical Antenna	BBA9106	Schwarzbeck	91031741	2007/8	1 Year
AB-2	Biconical Antenna	BBA9106	Schwarzbeck	91031516	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	2007/6	1 Year
AL-5	Log-Periodic Antenna	94612-1	Eaton	97062301	2007/4	1 Year
AL-6	Log-Periodic Antenna	ESLP9145	Schwarzbeck	9145-216	2007/3	1 Year
AH-5	Horn Antenna	12-12	Scientific Atlanta	741	2007/5	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	2007/6	1 Year
PA-1	Pre-Amplifier	WJ-6811-513	Watkins Johnson	0288	2007/2	1 Year
PA-2	Pre-Amplifier	WJ-6682-824	Watkins Johnson	0052	2007/2	1 Year
PA-3	Pre-Amplifier	WJ-6870-506	Watkins Johnson	0018	2007/2	1 Year
PA-5	Pre-Amplifier	AMF-4D-005080-18-13P	MITEQ, INC.	1218917	2006/11	1 Year
HC-1	Harmonic Current Analysis System	PM3000A	Voltech Instruments LTD.	3144	2007/5	1 Year
RN-1	Reference Impedance Network	4151	NF ELECTRONIC INSTRUMENTS	3168114151011	2007/4	1 Year
AP-1	AC Power Supplies (1-Phase 4kVA)	ES2000S / ES2000B	NF ELECTRONIC INSTRUMENTS	428978 / 429689	2007/4	1 Year
2-1	ESD Tester	ESD3000	EMC PARTNER	092	2007/5	1 Year
2-2	ESD Tester	PESD 1610	HAEFELY	H204507	2007/9	1 Year
3-1	Signal Generator	SMT 02	Rohde & Schwarz	838616/021	2007/7	1 Year
3-2	Signal Generator	83732B	Hewlett Packard	US37101411	2006/10	1 Year
3-3	Function Generator	1941	NF	328730	2006/10	1 Year
3-4	RF Power Amplifier	R7100LC	RF Power Labs	081195-2	2007/5	1 Year
3-5	RF Power Amplifier	500A100M1	Amplifier Research	19671	2007/5	1 Year
3-6	RF Power Amplifier	200W1000M2A	Amplifier Research	19572	2007/5	1 Year
3-7	RF Power Amplifier	50S1G4	Amplifier Research	24616	2007/5	1 Year
3-8	Biconical Antenna	3109	EMCO	9607-3014	2007/5	1 Year
3-9	Biconical Antenna	AT-2	E.S Factory	001	2007/5	1 Year
3-10	Log-Periodic Antenna	3144	EMCO	9701-1032	2007/5	1 Year
3-11	Log-Periodic Antenna	AT5080	Amplifier Research	322092	2007/5	1 Year
3-12	Horn Antenna	AT4002A	Amplifier Research	26532	2007/5	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	2007/5	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	2006/10	1 Year
3-19	Power Meter	4421	Bird	2919	2007/7	1 Year

3-20	Power Head	4022	Bird	6147	2007/7	1 Year
3-21	Power Meter	PM2002	Amplifier Research	25774	2007/7	1 Year
3-22	Power Head	PH2000	Amplifier Research	26413	2007/7	1 Year
3-23	Power Head	PH2000	Amplifier Research	26414	2007/7	1 Year
3-24	Dual Coupler	DC2600	Amplifier Research	19734	2007/7	1 Year
3-25	Dual Coupler	DC6080	Amplifier Research	302555	2007/7	1 Year
3-26	Dual Coupler	DC7144	Amplifier Research	26463	2007/7	1 Year
3-27	Signal Generator	SML 03	Rohde & Schwarz	103413	2007/9	1 Year
3-28	Field Probe	FP6001	Amplifier Research	00064158	2007/9	1 Year
3-29	Power Meter	NRT	Rohde & Schwarz	103116	2007/7	1 Year
3-30	Power Head	NRT-Z44	Rohde & Schwarz	102682	2007/7	1 Year
4-1	Immunity Tester	TRA2000	EMC PARTNER	659	2007/8	1 Year
4-2	EFT/B Generator	PEFT-Junior	HAEFELY	083818-13	2007/5	1 Year
4-3	EFT/B Generator	FNS-AXII B50	Noise Laboratory	FNS0620431	2007/6	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	2006/11	1 Year
5-2	Coupling Filter	FP-SURGE 100M	HAEFELY	149163	2006/11	1 Year
5-3	Coupling Network	IP6.2	HAEFELY	083811-10	2006/11	1 Year
5-4	Decoupling Network	DEC1A	HAEFELY	083793-08	2006/11	1 Year
5-5	Pruefpistole	AP 300	HAEFELY	081 438	2006/11	1 Year
6-1	Signal Generator	PSG1000B	W.K. Electronics	000234	2007/6	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	2007/5	1 Year
6-7	CDN	FCC-801-M1-25A	FCC	04001	2007/6	1 Year
6-8	CDN	FCC-801-M2-25	FCC	59	2007/5	1 Year
6-9	CDN	FCC-801-M2-25A	FCC	03023	2007/6	1 Year
6-10	CDN	FCC-801-M2-25A	FCC	03024	2007/6	1 Year
6-11	CDN	FCC-801-M3-25	FCC	137	2007/5	1 Year
6-12	CDN	FCC-801-M3-25A	FCC	05021	2007/6	1 Year
6-13	CDN	FCC-801-M3-25A	FCC	99133	2007/6	1 Year
6-14	CDN	FCC-801-M4-25	FCC	21	2007/5	1 Year
6-15	CDN	FCC-801-M4-50	FCC	9806	2007/4	1 Year
6-16	CDN	FCC-801-C1	FCC	79	2007/6	1 Year
6-17	CDN	FCC-801-T2	FCC	77	2007/6	1 Year
6-18	CDN	FCC-801-T4	FCC	81	2007/6	1 Year
6-19	CDN	FCC-801-T8	FCC	9956	2007/7	1 Year
6-20	150-50 Ohms Adaptor	FCC-801-150-50	FCC	638	2007/7	1 Year
6-21	150-50 Ohms Adaptor	FCC-801-150-50	FCC	639	2007/7	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
8-1	Interference Tester	LFP6.1	HAEFELY	083374-03	2007/5	1 Year
8-2	Magnetic Field Tester	MFG100.1	HAEFELY	080136-06	2007/5	1 Year
8-3	Field Coil	FC-1	ES Factory	001	2007/6	1 Year

8-4	Large Coil	L2X1.6	ES Factory	001	2007/3	1 Year
11-1	Voltage Dip Tester	PLINE1610	HAEFELY	148709	2007/4	1 Year
11-2	3 Phase Extension	PLS1630	HAEFELY	149685	2007/4	1 Year
11-3	External Variac Network	VAR-EXT1000	EMC PARTNER	046	2007/1	1 Year
OV-1	Oven	-	Ohnishi	-	-	-
FC-1	Frequency Counter	53131A	Hewlett Packard	3546A11807	2007/5	1 Year
PM-1	Power Meter	436A	Hewlett Packard	1725A01930	2007/4	1 Year
PS-1	Power Sensor	8482A	Hewlett Packard	1551A01013	2007/4	1 Year
PS-2	Power Sensor	8485A	Hewlett Packard	2942A08969	2007/4	1 Year
DP-1	DC Power Supply	6628A	Hewlett Packard	3224A00284	2007/6	1 Year