



RADIO TEST REPORT

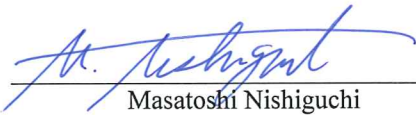
Test Report No. : 10474097H-A-R1

Applicant : Mitsubishi Electric Corporation Kyoto Works
Type of Equipment : Digital Color Printer
Model No. : CP-W5000DW,
CP-W5000DW-**
(suffix *= A to Z or 0 to 9 or blank and stands for
customers and optional power cord)
Test regulation : FCC Part 15 Subpart C: 2014
FCC ID : BGBCP-W5000DW
Test Result : Complied

1. This test report shall not be reproduced in full or partial, without the written approval of UL Japan, Inc.
2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with above regulation.
4. The test results in this report are traceable to the national or international standards.
5. This test report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.
6. This report is a revised version of 10474097H-A. 10474097H-A is replaced with this report.

Date of test: January 16 to 26, 2014

**Representative test
engineer:**


Masatoshi Nishiguchi
Engineer
Consumer Technology Division

Approved by:


Takayuki Shimada
Engineer
Consumer Technology Division



NVLAP LAB CODE: 200572-0

This laboratory is accredited by the NVLAP LAB CODE 200572-0, U.S.A. The tests reported herein have been performed in accordance with its terms of accreditation.
*As for the range of Accreditation in NVLAP, you may refer to the WEB address,
<http://www.ul.com/japan/jpn/pages/services/emc/about/mark1/index.jsp#nvlap>

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4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

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Facsimile : +81 596 24 8124

13-EM-F0429

REVISION HISTORY

Original Test Report No.: 10474097H-A

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SECTION 1: Customer information

Company Name : Mitsubishi Electric Corporation Kyoto Works
Address : 1 Zusho, Baba, Nagaokakyo City, Kyoto, 617-8550, Japan
Telephone Number : +81-75-958-3249
Facsimile Number : +81-75-958-3709
Contact Person : Tatsuya Egawa

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

2.1 Identification of E.U.T.

Type of Equipment : Digital Color Printer
Model No. : CP-W5000DW,
CP-W5000DW-**
(suffix *= A to Z or 0 to 9 or blank and stands for customers and optional power cord)
Serial No. : Refer to Clause 4.2
Rating : AC 100-240V, 50/60Hz
Receipt Date of Sample : January 14, 2014
Country of Mass-production : Malaysia
Condition of EUT : Production prototype
(Not for Sale: This sample is equivalent to mass-produced items.)
Modification of EUT : No Modification by the test lab

2.2 Product Description

General Specification

Clock frequency(ies) in the system : 2.0GHz (max.)

Radio Specification

Radio Type : Transceiver
Frequency of Operation : 13.56MHz
Modulation : ASK
Bandwidth : 140kHz
Power Supply (radio part input) : DC 5.0V
Antenna Type : Loop coil
Antenna Connector Type : Board to wire connector
Method of Frequency Generation : Quartz Crystal

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SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart C: 2014, final revised on May 1, 2014 and effective June 2, 2014

Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators
Section 15.207 Conducted limits
Section 15.225 : Operation within the band 13.110-14.010MHz

* The revision on May 1, 2014 does not affect the test specification applied to the EUT.

* The EUT complies with FCC Part 15 Subpart B: 2014, final revised on May 1, 2014 and effective June 2, 2014.

3.2 Procedures and results

Item	Test Procedure	Specification	Worst margin	Results	Remarks
Conducted emission	ANSI C63.4:2003 7. AC powerline conducted emission measurements <IC>RSS-Gen 7.2.2	Section 15.207 ----- <IC>RSS-Gen 7.2.2	[QP] 6.3dB, 10.05000MHz, N [AV] 4.2dB, 13.56000MHz, L	Complied	-
Electric Field Strength of Fundamental Emission	ANSI C63.4:2003 13. Measurement of intentional radiators <IC> RSS-Gen 4.8, 4.11	Section 15.225(a) ----- <IC>RSS-210 A2.6	80.6dB 13.56000MHz, 0deg.	Complied	Radiated
Spectrum Mask	ANSI C63.4:2003 13. Measurement of intentional radiators <IC>RSS-Gen 4.9, 4.11	Section 15.225(b)(c) ----- <IC> RSS-210 A2.6	45.1dB 13.11000MHz 0deg.	Complied	Radiated
20dB Bandwidth	ANSI C63.4:2003 13. Measurement of intentional radiators <IC> - *	Section15.215(c) ----- <IC> - *	See data	Complied	Radiated
Electric Field Strength of Spurious Emission	ANSI C63.4:2003 13. Measurement of intentional radiators <IC>RSS-Gen 4.9, 4.11	Section15.209, Section 15.225 (d) ----- <IC>RSS-210 A2.6	9.6dB 62.061MHz, Vertical	Complied	Radiated
Frequency Tolerance	ANSI C63.4:2003 13. Measurement of intentional radiators <IC>RSS-Gen 4.7	Section15.225(e) ----- <IC> RSS-210 A2.6	See data	Complied	Radiated

Note: UL Japan, Inc.'s EMI Work Procedures No. 13-EM-W0420 and 13-EM-W0422

FCC 15.31 (e)

This EUT provides stable voltage(DC5.0V) constantly to RF Module regardless of input voltage. Therefore, this EUT complies with the requirement.

FCC Part 15.203 Antenna requirement

It is impossible for end users to replace the antenna, because the antenna is mounted inside of the EUT. Therefore, the equipment complies with the antenna requirement of Section 15.203.

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3.3 Addition to standard

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst margin	Results
1	99% Occupied Band Width	RSS-Gen 4.6.1	RSS-Gen 4.6.1	Radiated	N/A	N/A	N/A

Other than above, no addition, exclusion nor deviation has been made from the standard.

3.4 Uncertainty

The following uncertainties have been calculated to provide a confidence level of 95% using a coverage factor k=2.

Test room (semi-anechoic chamber)	Conducted emission (+dB)
	150kHz-30MHz
No.1	3.5dB
No.2	3.5dB
No.3	3.6dB
No.4	3.5dB

Test room (semi-anechoic chamber)	Radiated emission						
	(3m*)(+dB)				(1m*)(+dB)		(0.5m*)(+dB)
	9kHz -30MHz	30MHz -300MHz	300MHz -1GHz	1GHz -10GHz	10GHz -18GHz	18GHz -26.5GHz	26.5GHz -40GHz
No.1	4.0dB	5.1dB	5.0dB	5.1dB	6.0dB	4.9dB	4.3dB
No.2	3.9dB	5.2dB	5.0dB	4.9dB	5.9dB	4.7dB	4.2dB
No.3	4.3dB	5.1dB	5.2dB	5.2dB	6.0dB	4.8dB	4.2dB
No.4	4.6dB	5.2dB	5.0dB	5.2dB	6.0dB	5.7dB	4.2dB

*3m/1m/0.5m = Measurement distance

Frequency counter (+)	
Normal condition	Extreme condition
7×10^{-6}	9×10^{-6}

Conducted emission test

The data listed in this test report has enough margin, more than the site margin.

Radiated emission test

The data listed in this test report has enough margin, more than the site margin.

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3.5 Test Location

UL Japan, Inc. Ise EMC Lab. *NVLAP Lab. code: 200572-0
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN
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	IC Registration Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Other rooms
No.1 semi-anechoic chamber	2973C-1	19.2 x 11.2 x 7.7m	7.0 x 6.0m	No.1 Power source room
No.2 semi-anechoic chamber	2973C-2	7.5 x 5.8 x 5.2m	4.0 x 4.0m	-
No.3 semi-anechoic chamber	2973C-3	12.0 x 8.5 x 5.9m	6.8 x 5.75m	No.3 Preparation room
No.3 shielded room	-	4.0 x 6.0 x 2.7m	N/A	-
No.4 semi-anechoic chamber	2973C-4	12.0 x 8.5 x 5.9m	6.8 x 5.75m	No.4 Preparation room
No.4 shielded room	-	4.0 x 6.0 x 2.7m	N/A	-
No.5 semi-anechoic chamber	-	6.0 x 6.0 x 3.9m	6.0 x 6.0m	-
No.6 shielded room	-	4.0 x 4.5 x 2.7m	4.0 x 4.5 m	-
No.6 measurement room	-	4.75 x 5.4 x 3.0m	4.75 x 4.15 m	-
No.7 shielded room	-	4.7 x 7.5 x 2.7m	4.7 x 7.5m	-
No.8 measurement room	-	3.1 x 5.0 x 2.7m	N/A	-
No.9 measurement room	-	8.8 x 4.6 x 2.8m	2.4 x 2.4m	-
No.11 measurement room	-	6.2 x 4.7 x 3.0m	4.8 x 4.6m	-

* Size of vertical conducting plane (for Conducted Emission test) : 2.0 x 2.0m for No.1, No.2, No.3, and No.4 semi-anechoic chambers and No.3 and No.4 shielded rooms.

3.6 Test set up, Data of EMI, and Test instruments

Refer to APPENDIX.

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

4.1 Operating Modes

The mode is used :

Mode	Remarks*
Transmitting mode (Tx) 13.56MHz Mod on	The EUT Transmits and Receives at the same time and there is no receiving mode.
Any condition under the normal use do not exceed the condition of setting. In addition, end users cannot change the settings of the output power of the product.	

Test Item	Operating mode*
Electric Field Strength of Fundamental Emission	Tx Mod on
Spectrum Mask	Tx Mod on
20dB Bandwidth	Tx Mod on
Electric Field Strength of Spurious Emission	Tx Mod on
Frequency Tolerance	Tx Mod on

* After the comparison of the test data between with Tag and without Tag, the tests were performed with Tag which was the worst case.

Justification: The system was configured in typical fashion (as a customer would normally use it) for testing.

Frequency Tolerance:

Temperature : -30deg.C to +50deg.C Step 10deg.C

Voltage : Normal Voltage AC 120V

Maximum Voltage AC 138V, Minimum Voltage AC 102V (AC 120V $\pm$ 15%)

*This EUT provides stable voltage(DC 5.0V) constantly to RF Part regardless of input voltage

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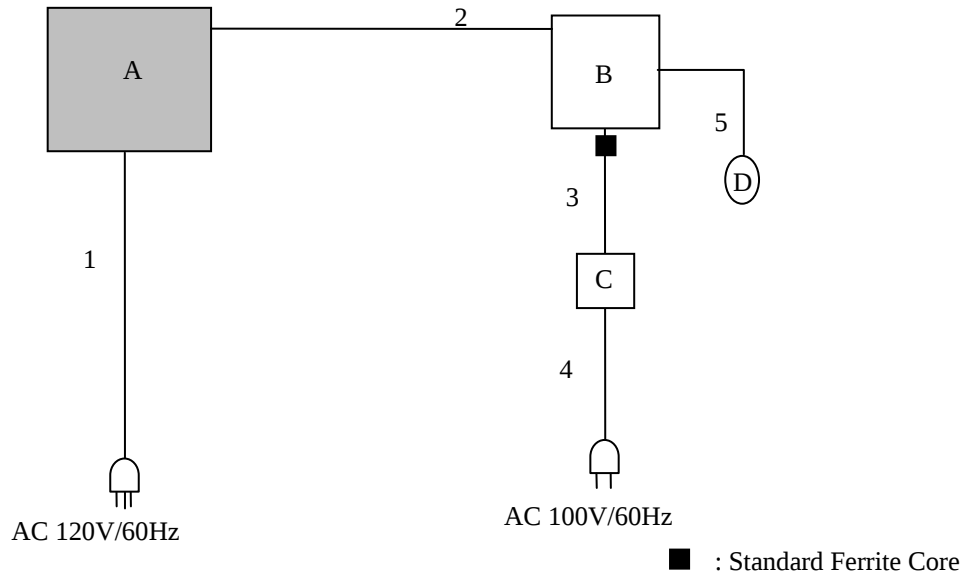
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4.2 Configuration and peripherals



* Cabling and setup were taken into consideration and test data was taken under worse case conditions.

Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remark
A	Digital Color Printer	CP-W5000DW	MK138M	Mitsubishi Electric Corporation Kyoto Works	EUT
B	Personal Computer	CF-W5	7HKSA86870	Panasonic	-
C	AC Adapter	CF-AA6282A M1	6282AM1076 19146A	Panasonic	-
D	Mouse	M-LY2ULBU	0X000841	ELECOM	-

List of cables used

No.	Name	Length (m)	Shield		Remark
			Cable	Connector	
1	AC Cable	1.8	Unshielded	Unshielded	-
2	USB Cable	3.0	Shielded	Shielded	-
3	DC Cable	1.5	Unshielded	Unshielded	-
4	AC Cable	0.9	Unshielded	Unshielded	-
5	Mouse Cable	1.5	Shielded	Shielded	-

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SECTION 5: Conducted emission

5.1 Operating environment

Test place	: No.1 semi anechoic chamber
Temperature	: See data
Humidity	: See data

5.2 Test configuration

EUT was placed on a urethane platform of nominal size, 1.0m by 1.5m, raised 0.8m above the conducting ground plane. The rear of tabletop was located 40cm to the vertical conducting plane. The rear of EUT and its peripherals was aligned and flushed with rear of tabletop. All other surfaces of tabletop were at least 80cm from any other grounded conducting surface. EUT was located 80cm from LISN/AMN and excess AC cable was bundled in center. I/O cables that were connected to the peripherals were bundled in center. They were folded back and forth forming a bundle 30cm to 40cm long and were hanged at a 40cm height to the ground plane. Each EUT current-carrying power lead, except the ground (safety) lead, was individually connected through a LISN/ an AMN to the input power source. All unused 50ohm connectors of the LISN/ AMN were resistively terminated in 50ohm when not connected to the measuring equipment.

The AC Mains Terminal Continuous disturbance Voltage has been measured with the EUT on a horizontal conducting plane 4.0 x 4.0m and a vertical conducting plane 2.0 x 2.0m in a semi Anechoic Chamber.

Photographs of the set up are shown in APPENDIX 3.

5.3 Test conditions

Frequency range	: 0.15MHz-30MHz
EUT position	: Table top
EUT operation mode	: Transmitting mode

5.4 Test procedure

The AC Mains Terminal Continuous disturbance Voltage had been measured with the EUT in the semi Anechoic Chamber.

The EUT was connected to a Line Impedance Stabilization Network (LISN)/ Artificial Mains Network (AMN).

An overview sweep with peak detection has been performed.

The measurements had been performed with a quasi-peak detector and if required, with an average detector.

The conducted emission measurements were made with the following detector function of the test receiver.

Detector Type	: QP and CISPR AV
IF Bandwidth	: 9kHz

5.5 Test result

Summary of the test results : Pass

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SECTION 6: Radiated emission (Fundamental, Spurious Emission and Spectrum Mask)

Test Procedure

EUT was placed on a urethane platform of nominal size, 1.0m by 1.5m, raised 0.8m above the conducting ground plane. The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with a ground plane. The height of the measuring antenna varied between 1 and 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field strength. The measurements were performed for both vertical (angle of loop antenna: 0deg., 45deg., 90deg., 135 deg. and 180deg.) and horizontal antenna polarization with the Test Receiver, or the Spectrum Analyzer. The measurements were made with the following detector function of the test receiver and the Spectrum analyzer (in linear mode). The test was made with the detector (RBW/VBW) in the following table. When using Spectrum analyzer, the test was made with adjusting span to zero by using peak hold.

Test Antennas are used as below;

Frequency	Below 30MHz	30MHz to 300MHz	300MHz to 1GHz	Above 1GHz
Antenna Type	Loop	Biconical	Logperiodic	Horn

Frequency	From 9kHz to 90kHz and From 110kHz to 150kHz	From 90kHz to 110kHz	From 150kHz to 490kHz	From 490kHz to 30MHz	From 30MHz to 1GHz	Above 1GHz	
Instrument used	Test Receiver					Test Receiver	
Detector	PK/AV	QP	PK/AV	QP	QP	PK	AV
IF Bandwidth	200Hz	200Hz	9kHz	9kHz	120kHz	BW: 1MHz	BW: 1MHz
Test Distance	3m *1)	3m *1)	3m *1)	3m *2)	3m	3m	3m

*1) Distance Factor: $40 \times \log (3\text{m}/300\text{m}) = -80\text{dB}$

*2) Distance Factor: $40 \times \log (3\text{m}/30\text{m}) = -40\text{dB}$

Although these tests were performed other than open field test site, adequate comparison measurements were confirmed against 30 m open field test site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 937606.

Measurement range : 0.009M-10GHz
Test data : APPENDIX
Test result : Pass

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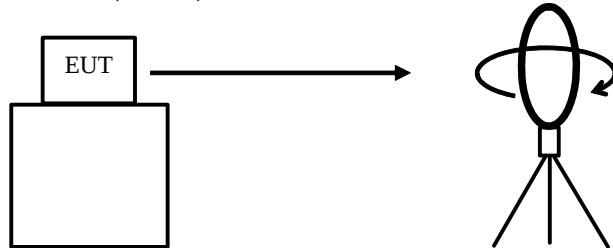
SECTION 7: Other test

Test	Span	RBW	VBW	Sweep	Detector	Trace	Instrument used
20dB Bandwidth	300kHz	3kHz	10kHz	Auto	Peak	Max Hold	Spectrum Analyzer
99% Occupied Bandwidth	Enough width to display 20dB Bandwidth	1 to 3% of Span	Three times of RBW	Auto	Peak *1)	Max Hold *1)	Spectrum Analyzer
Frequency Tolerance	-	-	-	-	-	-	Frequency counter
*1) The measurement was performed with Peak detector, Max Hold since the duty cycle was not 100%.							

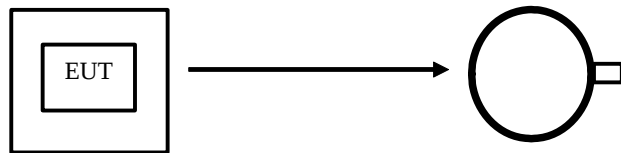
Test data : APPENDIX
Test result : Pass

Figure 1: Direction of the Loop Antenna

Side View (Vertical)

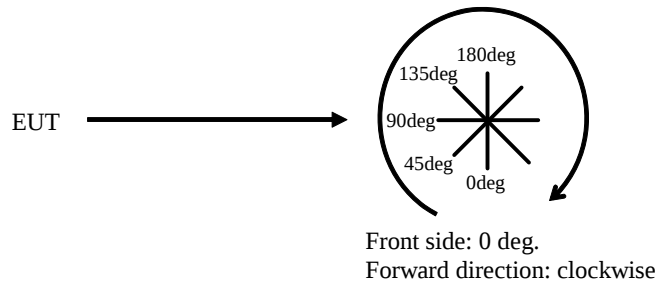


Top View (Horizontal)



Antenna was not rotated.

Top View (Vertical)



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APPENDIX 1: Data of EMI test

Conducted emission

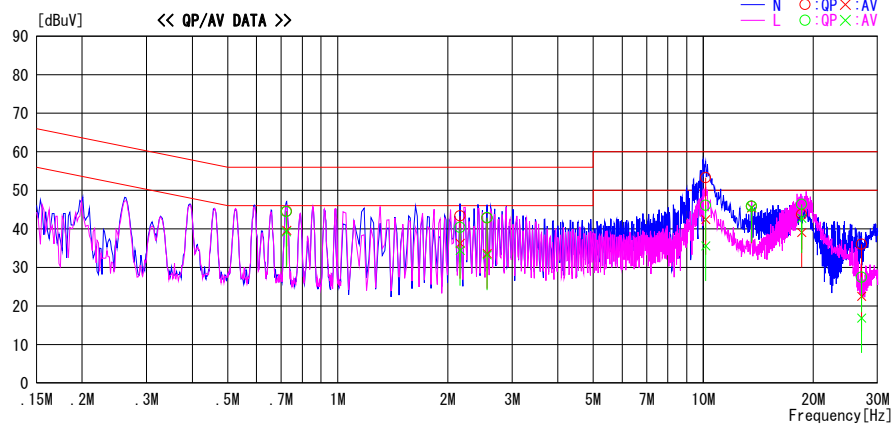
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Ise EMC Lab. No.1 Semi Anechoic Chamber
Date : 2014/01/20

Report No. : 10474097H
Power : AC 120V / 60Hz
Temp./Humi. : 21deg. C / 35% RH
Engineer : Tsubasa Takayama

Mode / Remarks : Tx 13.56MHz (Without Tag) Mod on

LIMIT : FCC15.207 QP
FCC15.207 AV



Frequency [MHz]	Reading Level		Corr. Factor	Results		Limit		Margin		Phase	Comment
	QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]		
0.72361	31.1	25.8	13.4	44.5	39.2	56.0	46.0	11.5	6.8	L	
0.72535	31.2	26.2	13.4	44.6	39.6	56.0	46.0	11.4	6.4	N	
2.16146	29.8	22.6	13.6	43.4	36.2	56.0	46.0	12.6	9.8	N	
2.16146	26.8	20.8	13.6	40.4	34.4	56.0	46.0	15.6	11.6	L	
2.56134	29.2	20.0	13.6	42.8	33.6	56.0	46.0	13.2	12.4	N	
2.56134	29.3	19.6	13.6	42.9	33.2	56.0	46.0	13.1	12.8	L	
10.15090	38.8	27.9	14.5	53.3	42.4	60.0	50.0	6.7	7.6	N	
10.15090	31.6	21.1	14.5	46.1	35.6	60.0	50.0	13.9	14.4	L	
13.56000	31.0	30.7	14.9	45.9	45.6	60.0	50.0	14.1	4.4	L	
13.56000	30.9	30.5	14.9	45.8	45.4	60.0	50.0	14.2	4.6	N	
18.58875	31.2	27.6	15.2	46.4	42.8	60.0	50.0	13.6	7.2	L	
18.58875	28.5	23.9	15.2	43.7	39.1	60.0	50.0	16.3	10.9	N	
27.12000	20.3	6.8	15.7	36.0	22.5	60.0	50.0	24.0	27.5	N	
27.12000	11.8	1.2	15.7	27.5	16.9	60.0	50.0	32.5	33.1	L	

CHART:WITH FACTOR, Peak hold data. CALCULATION:RESULT=READING+C.F.(LISN + CABLE + ATTEN.)
Except for the above table : adequate margin data below the limits.

*The limit is rounded down to one decimal place.

*The test result is rounded off to one or two decimal places, so some differences might be observed.

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Conducted emission

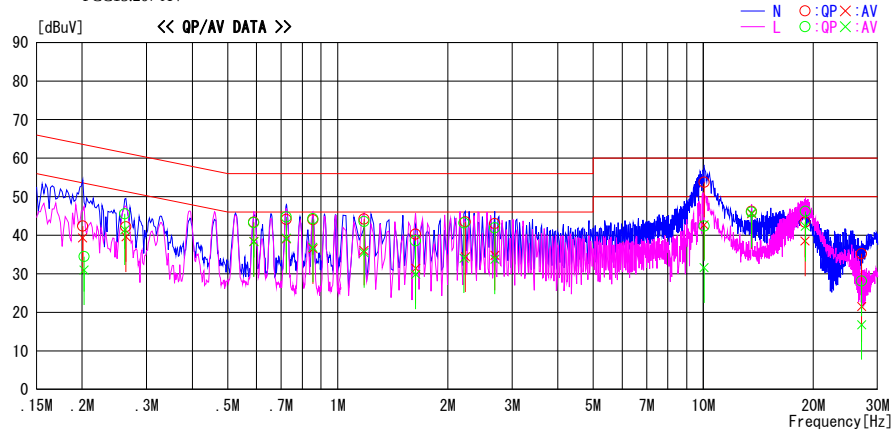
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Ise EMC Lab. No.1 Semi Anechoic Chamber
Date : 2014/01/20

Report No. : 10474097H
Power : AC 120V / 60Hz
Temp./Humi. : 21deg. C / 35% RH
Engineer : Tsubasa Takayama

Mode / Remarks : Tx 13.56MHz (With Tag)

LIMIT : FCC15.207 QP
FCC15.207 AV



Frequency [MHz]	Reading Level		Corr. Factor [dB]	Results		Limit		Margin		Phase	Comment
	QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]		
0.20056	29.1	26.0	13.3	42.4	39.3	63.6	53.6	21.2	14.3	N	
0.20230	21.2	17.7	13.3	34.5	31.0	63.5	53.5	29.0	22.5	L	
0.26158	32.3	28.1	13.3	45.6	41.4	61.4	51.4	15.8	10.0	L	
0.26333	28.9	26.3	13.3	42.2	39.6	61.3	51.3	19.1	11.7	N	
0.58936	30.1	25.1	13.3	43.4	38.4	56.0	46.0	12.6	7.6	N	
0.58936	30.0	25.0	13.3	43.3	38.3	56.0	46.0	12.7	7.7	L	
0.72361	30.7	25.7	13.4	44.1	39.1	56.0	46.0	11.9	6.9	N	
0.72361	31.3	25.8	13.4	44.7	39.2	56.0	46.0	11.3	6.8	L	
0.85437	30.9	23.5	13.4	44.3	36.9	56.0	46.0	11.7	9.1	L	
0.85612	30.6	23.1	13.4	44.0	36.5	56.0	46.0	12.0	9.5	N	
1.17994	30.8	22.7	13.4	44.2	36.1	56.0	46.0	11.8	9.9	N	
1.17994	30.2	22.1	13.4	43.6	35.5	56.0	46.0	12.4	10.5	L	
1.63435	26.8	17.9	13.5	40.3	31.4	56.0	46.0	15.7	14.6	N	
1.63435	25.1	16.4	13.5	38.6	29.9	56.0	46.0	17.4	16.1	L	
2.21599	29.6	20.5	13.6	43.2	34.1	56.0	46.0	12.8	11.9	L	
2.23417	29.9	20.8	13.6	43.5	34.4	56.0	46.0	12.5	11.6	N	
2.68857	29.4	21.2	13.6	43.0	34.8	56.0	46.0	13.0	11.2	N	
2.68857	28.3	20.2	13.6	41.9	33.8	56.0	46.0	14.1	12.2	L	
10.05000	39.2	28.2	14.5	53.7	42.7	60.0	50.0	6.3	7.3	N	
10.05000	27.9	17.1	14.5	42.4	31.6	60.0	50.0	17.6	18.4	L	
13.56000	31.1	30.9	14.9	46.0	45.8	60.0	50.0	14.0	4.2	L	
13.56000	31.3	30.7	14.9	46.2	45.6	60.0	50.0	13.8	4.4	N	
18.99055	28.1	23.2	15.3	43.4	38.5	60.0	50.0	16.6	11.5	N	
19.03073	30.9	27.0	15.3	46.2	42.3	60.0	50.0	13.8	7.7	L	
27.12000	19.5	5.8	15.7	35.2	21.5	60.0	50.0	24.8	28.5	N	
27.12000	12.4	1.1	15.7	28.1	16.8	60.0	50.0	31.9	33.2	L	

CHART: WITH FACTOR, Peak hold data. CALCULATION: RESULT=READING+C.F.(LISN + CABLE + ATTEN.)
Except for the above table : adequate margin data below the limits.

*The limit is rounded down to one decimal place.

*The test result is rounded off to one or two decimal places, so some differences might be observed.

UL Japan, Inc.

Ise EMC Lab.

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Fundamental emission and Spectrum Mask

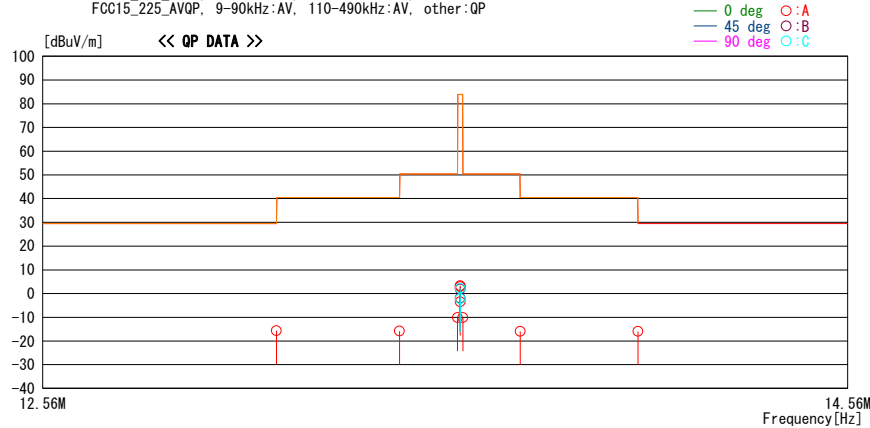
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Ise EMC Lab. No.1 Semi Anechoic Chamber
Date : 2014/01/16

Report No. : 10474097H
Power : AC120V / 60Hz
Temp. / Humi. : 21deg. C / 35% RH
Engineer : Katsunori Okai

Mode / Remarks : Transmitting mode(13.56MHz) (with Tag)

LIMIT : FCC15_225_PKQP, 9-90kHz:PK, 110-490kHz:PK, other:QP
FCC15_225_AVQP, 9-90kHz:AV, 110-490kHz:AV, other:QP



Freq.	Reading	DET	Ant. Fac	Loss	Gain	Result	Limit	Margin	Antenna	Table	Comment
[MHz]	[dBuV]		[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[deg]	[deg]	
13.11000	29.5	QP	19.7	-32.7	32.1	-15.6	29.5	45.1	0	A	8
13.41000	29.3	QP	19.7	-32.7	32.1	-15.8	40.5	56.3	0	A	8
13.55300	35.0	QP	19.7	-32.7	32.1	-10.1	50.4	60.5	0	A	8
13.56000	43.1	QP	19.7	-32.7	32.1	-2.0	83.9	85.9	135	B	86
13.56000	47.3	QP	19.7	-32.7	32.1	2.2	83.9	81.7	180	C	12
13.56000	41.6	QP	19.7	-32.7	32.1	-3.5	83.9	87.4	0	A	0 Loop Hori
13.56000	48.0	QP	19.7	-32.7	32.1	2.9	83.9	81.0	0	A	8 without Tag
13.56000	48.4	QP	19.7	-32.7	32.1	3.3	83.9	80.6	0	A	8 with Tag
13.56000	47.0	QP	19.7	-32.7	32.1	1.9	83.9	82.0	45	B	0
13.56000	42.9	QP	19.7	-32.7	32.1	-2.2	83.9	86.1	90	C	323
13.56700	34.9	QP	19.7	-32.7	32.1	-10.2	50.4	60.6	0	A	8
13.71000	29.2	QP	19.7	-32.7	32.1	-15.9	40.5	56.4	0	A	8
14.01000	29.2	QP	19.7	-32.7	32.1	-15.9	29.5	45.4	0	A	8

CHART: WITH FACTOR, ANT TYPE: LOOP Except for the data below : adequate margin data below the limits.
CALCULATION : RESULT = READING + ANT FACTOR + LOSS (CABLE + ATTEN. + D.FACTOR) - GAIN(AMP.)

*The limit is rounded down to one decimal place.

*The test result is rounded off to one or two decimal places, so some differences might be observed.

Result of the fundamental emission at 3m without Distance factor

Ant Deg [deg]	Frequency	Detector	Reading	Ant Factor	Loss	Gain	Duty Factor	Result	Limit	Margin	Remark
	[MHz]		[dBuV]	[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
0	13.56000	QP	48.4	19.7	7.3	32.1	-	43.3	-	-	Fundamental

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter) - Gain(Amplifier)

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Ise EMC Lab.

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Spurious emission

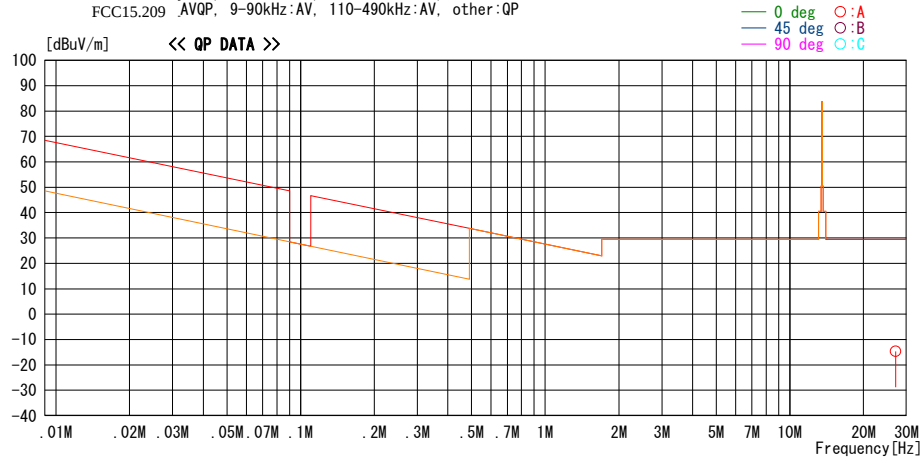
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Ise EMC Lab. No.1 Semi Anechoic Chamber
Date : 2014/01/16

Report No. : 10474097H
Power : AC120V / 60Hz
Temp./ Humi. : 21deg. C / 35% RH
Engineer : Katsunori Okai

Mode / Remarks : Transmitting mode (13.56MHz) (with Tag)

LIMIT : FCC15.209 PKQP, 9-90kHz:PK, 110-490kHz:PK, other:QP
FCC15.209 AVQP, 9-90kHz:AV, 110-490kHz:AV, other:QP



Freq.	Reading	DET	Ant. Fac	Loss	Gain	Result	Limit	Margin	Antenna	Table	Comment
[MHz]	[dBuV]		[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[deg]	[deg]	
27.12000	29.0	QP	20.7	-32.2	32.2	-14.7	29.5	44.2	0	A	0

CHART: WITH FACTOR, ANT TYPE: LOOP Except for the data below : adequate margin data below the limits.
CALCULATION : RESULT = READING + ANT FACTOR + LOSS (CABLE + ATTEN. + D.FACTOR) - GAIN(AMP.)

*All other spurious emissions were less than 20dB for the limit.

*The limit is rounded down to one decimal place.

*The test result is rounded off to one or two decimal places, so some differences might be observed.

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Spurious emission

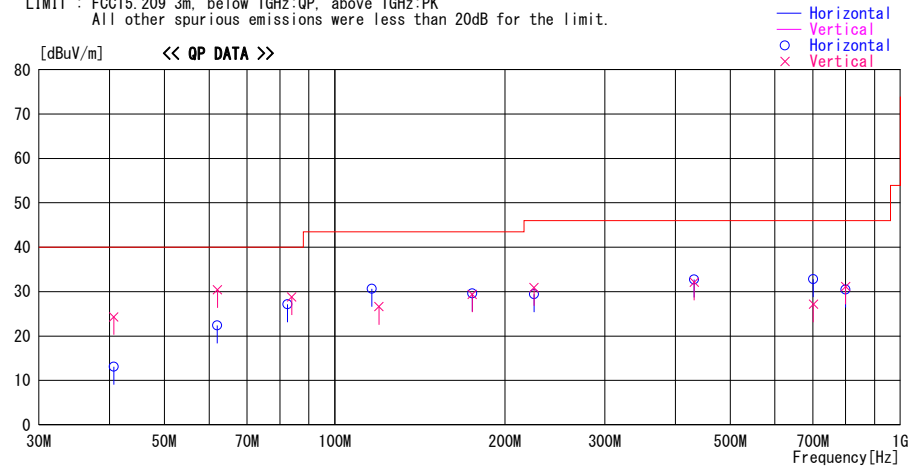
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Ise EMC Lab. No.1 Semi Anechoic Chamber
Date : 2014/01/16

Report No. : 10474097H
Power : AC120V / 60Hz
Temp./Humi. : 21deg. C / 35% RH
Engineer : Katsunori Okai

Mode / Remarks : Transmitting mode(13.56MHz)(with Tag)

LIMIT : FCC15.209 3m, below 1GHz:QP, above 1GHz:PK
All other spurious emissions were less than 20dB for the limit.



Frequency	Reading	DET	Antenna Factor	Loss & Gain	Level	Angle	Height	Polar.	Limit	Margin	Comment
[MHz]	[dBuV]		[dB/m]	[dB]	[dBuV/m]	[Deg]	[cm]		[dBuV/m]	[dB]	
40.680	30.3	QP	14.0	-31.2	13.1	0	300	Hori.	40.0	26.9	
40.680	41.5	QP	14.0	-31.2	24.3	238	100	Vert.	40.0	15.7	
61.992	45.6	QP	7.6	-30.8	22.4	0	305	Hori.	40.0	17.6	
62.061	53.6	QP	7.6	-30.8	30.4	106	100	Vert.	40.0	9.6	
82.485	50.8	QP	6.9	-30.5	27.2	105	300	Hori.	40.0	12.8	
83.947	52.1	QP	7.2	-30.5	28.8	106	100	Vert.	40.0	11.2	
116.394	48.4	QP	12.4	-30.2	30.6	66	285	Hori.	43.5	12.9	
119.696	44.0	QP	12.8	-30.2	26.6	213	100	Vert.	43.5	16.9	
174.999	43.1	QP	16.0	-29.7	29.4	352	100	Vert.	43.5	14.1	
175.000	43.3	QP	16.0	-29.7	29.6	315	100	Hori.	43.5	13.9	
224.999	43.2	QP	16.8	-29.1	30.9	348	100	Vert.	46.0	15.1	
225.001	41.7	QP	16.8	-29.1	29.4	267	100	Hori.	46.0	16.6	
432.011	41.6	QP	17.5	-27.0	32.1	9	190	Vert.	46.0	13.9	
432.012	42.2	QP	17.5	-27.0	32.7	15	100	Hori.	46.0	13.3	
701.521	32.0	QP	20.3	-25.1	27.2	193	100	Vert.	46.0	18.8	
701.522	37.6	QP	20.3	-25.1	32.8	193	118	Hori.	46.0	13.2	
799.998	32.8	QP	22.0	-24.3	30.5	351	128	Hori.	46.0	15.5	
799.999	33.5	QP	22.0	-24.3	31.2	0	100	Vert.	46.0	14.8	

*1: These are not radio noises.

CHART:WITH FACTOR ANT TYPE: -30MHz:LOOP, 30-300MHz:BICONICAL, 300MHz-1000MHz:LOGPERIODIC, 1000MHz-:HORN
CALCULATION:RESULT = READING + ANT FACTOR + LOSS(CABLE+ATTEN.) - GAIN(AMP)

*The limit is rounded down to one decimal place.

*The test result is rounded off to one or two decimal places, so some differences might be observed.

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Spurious emission

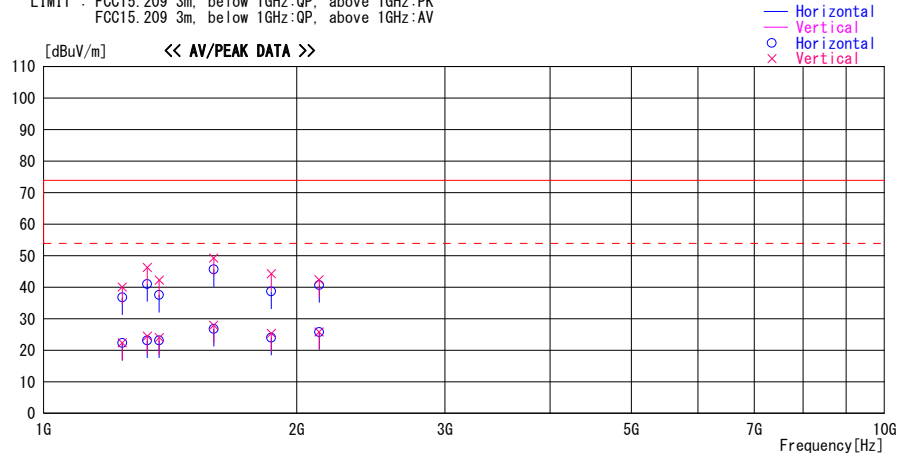
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Ise EMC Lab. No.1 Semi Anechoic Chamber
Date : 2014/01/20

Report No. : 10474097H
Power : AC120V / 60Hz
Temp./Humi. : 22deg. C / 32% RH
Engineer : Tsubasa Takayama

Mode / Remarks : Tx 13.56MHz mode(with Tag)

LIMIT : FCC15.209 3m, below 1GHz:QP, above 1GHz:PK
FCC15.209 3m, below 1GHz:QP, above 1GHz:AV



Frequency	Reading	DET	Antenna		Level	Angle	Height	Polar.	Limit	Margin	Comment
			Factor	Gain							
[MHz]	[dBuV]		[dB/m]	[dB]	[dBuV/m]	[Deg]	[cm]		[dBuV/m]	[dB]	
1240.483	47.9	PK	24.1	-35.2	36.8	31	123	Hori.	73.9	37.1	*1
1240.483	33.5	PK	24.1	-35.2	22.4	31	123	Hori.	73.9	51.5	
1328.660	51.9	PK	24.3	-35.2	41.0	21	111	Hori.	73.9	32.9	
1328.660	34.0	PK	24.3	-35.2	23.1	21	111	Hori.	73.9	50.8	
1240.483	51.2	PK	24.1	-35.2	40.1	21	112	Vert.	73.9	33.8	
1240.483	33.5	AV	24.1	-35.2	22.4	21	112	Vert.	53.9	31.5	
1328.660	57.2	PK	24.3	-35.2	46.3	192	108	Vert.	73.9	27.6	
1328.660	35.4	AV	24.3	-35.2	24.5	192	108	Vert.	53.9	29.4	
1372.749	48.1	PK	24.5	-35.0	37.6	112	112	Hori.	73.9	36.3	
1372.749	33.6	PK	24.5	-35.0	23.1	112	112	Hori.	73.9	50.8	
1372.749	34.6	AV	24.5	-35.0	24.1	168	109	Vert.	53.9	29.8	
1372.749	52.8	PK	24.5	-35.0	42.3	168	109	Vert.	73.9	31.6	
1593.192	55.5	PK	24.9	-34.7	45.7	9	103	Hori.	73.9	28.2	
1593.192	36.6	PK	24.9	-34.7	26.8	9	103	Hori.	73.9	47.1	
1593.192	59.1	PK	24.9	-34.7	49.3	345	102	Vert.	73.9	24.6	
1593.192	37.8	AV	24.9	-34.7	28.0	345	102	Vert.	53.9	25.9	
1865.740	47.8	PK	25.3	-34.4	38.7	161	103	Hori.	73.9	35.2	
1865.740	33.1	PK	25.3	-34.4	24.0	161	103	Hori.	73.9	49.9	
1865.740	34.5	AV	25.3	-34.4	25.4	331	111	Vert.	53.9	28.5	
1865.740	53.4	PK	25.3	-34.4	44.3	331	111	Vert.	73.9	29.6	
2126.263	34.5	AV	25.7	-34.3	25.9	51	104	Vert.	53.9	28.0	
2126.263	51.0	PK	25.7	-34.3	42.4	51	104	Vert.	73.9	31.5	
2126.263	49.3	PK	25.7	-34.3	40.7	354	107	Hori.	73.9	33.2	
2126.263	34.4	PK	25.7	-34.3	25.8	354	107	Hori.	73.9	48.1	

*1: These are not radio noises.

CHART: WITH FACTOR ANT TYPE: ~30MHz: LOOP 30~300MHz: BICONICAL 300MHz~1000MHz: LOGPERIODIC 1000MHz~: HORN
CALCULATION: RESULT = READING + ANT FACTOR + LOSS&GAIN (CABLE + ATTEN - GAIN(AMP))

*The limit is rounded down to one decimal place.

*The test result is rounded off to one or two decimal places, so some differences might be observed.

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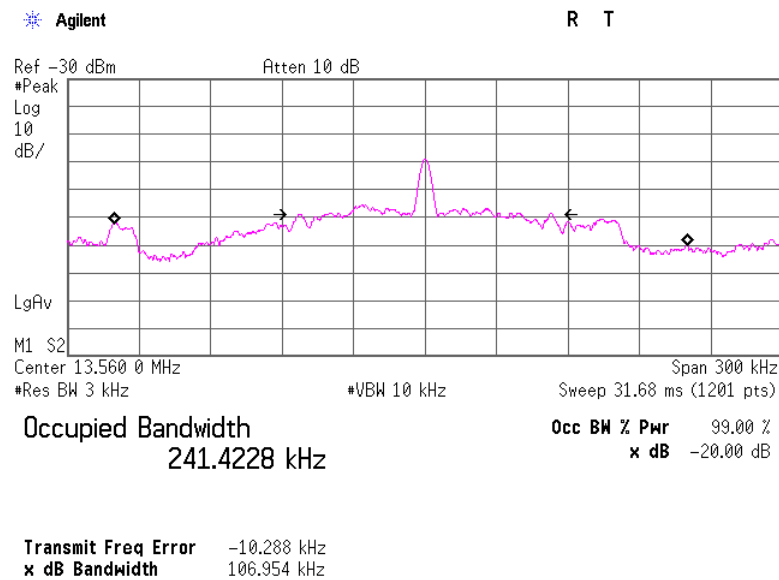
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

20dB Bandwidth and 99% Occupied Bandwidth

Test place : Ise EMC Lab. No.6 Measurement Room
Report No. : 10474097H
Date : 01/26/2014
Temperature/ Humidity : 20 deg. C / 50% RH
Engineer : Masatoshi Nishiguchi
Mode : Tx 13.56MHz Mod on

FREQ [MHz]	20dB Bandwidth [kHz]	99% Occupied Bandwidth [kHz]
13.56	106.95	241.42



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4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

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Frequency Tolerance

Test place : Ise EMC Lab. No.6 Measurement Room
Report No. : 10474097H
Date : 01/26/2014
Temperature/ Humidity : 20 deg. C / 50% RH
Engineer : Masatoshi Nishiguchi
Mode : Tx 13.56MHz Mod on

Test Condition deg.C Volts		Test Timing	Measured freq [MHz]	Freq error [MHz]	Result [ppm]	Limit (+/- 0.01%) [+/- ppm]	Margin [ppm]
20deg.C	138V	Power on	13.560086	0.000086	6.35	100.00	93.65
		on 2min.	13.560084	0.000084	6.17	100.00	93.83
		on 5min.	13.560083	0.000083	6.15	100.00	93.85
		on 10min.	13.560083	0.000083	6.10	100.00	93.90
	120V	Power on	13.560087	0.000087	6.40	100.00	93.60
		on 2min.	13.560084	0.000084	6.21	100.00	93.79
		on 5min.	13.560084	0.000084	6.17	100.00	93.83
		on 10min.	13.560084	0.000084	6.18	100.00	93.82
	102V	Power on	13.560084	0.000084	6.22	100.00	93.78
		on 2min.	13.560082	0.000082	6.03	100.00	93.97
		on 5min.	13.560081	0.000081	5.98	100.00	94.02
		on 10min.	13.560081	0.000081	5.94	100.00	94.06
50deg.C. 40deg.C. 30deg.C. 20deg.C. 10deg.C. 0deg.C. -10deg.C. -20deg.C. -30deg.C.	120V	Power on	13.560045	0.000045	3.29	100.00	96.71
		on 2min.	13.560044	0.000044	3.26	100.00	96.74
		on 5min.	13.560044	0.000044	3.26	100.00	96.74
		on 10min.	13.560044	0.000044	3.28	100.00	96.72
		Power on	13.560054	0.000054	4.00	100.00	96.00
		on 2min.	13.560052	0.000052	3.85	100.00	96.15
		on 5min.	13.560052	0.000052	3.81	100.00	96.19
		on 10min.	13.560051	0.000051	3.80	100.00	96.20
		Power on	13.560071	0.000071	5.20	100.00	94.80
		on 2min.	13.560068	0.000068	4.99	100.00	95.01
		on 5min.	13.560067	0.000067	4.94	100.00	95.06
		on 10min.	13.560067	0.000067	4.93	100.00	95.07
		Power on	13.560087	0.000087	6.40	100.00	93.60
		on 2min.	13.560084	0.000084	6.21	100.00	93.79
		on 5min.	13.560084	0.000084	6.17	100.00	93.83
		on 10min.	13.560084	0.000084	6.18	100.00	93.82
		Power on	13.560095	0.000095	6.99	100.00	93.01
		on 2min.	13.560093	0.000093	6.87	100.00	93.13
		on 5min.	13.560093	0.000093	6.84	100.00	93.16
		on 10min.	13.560093	0.000093	6.84	100.00	93.16
		Power on	13.560093	0.000093	6.83	100.00	93.17
		on 2min.	13.560094	0.000094	6.93	100.00	93.07
		on 5min.	13.560094	0.000094	6.95	100.00	93.05
		on 10min.	13.560094	0.000094	6.94	100.00	93.06
		Power on	13.560069	0.000069	5.07	100.00	94.93
		on 2min.	13.560075	0.000075	5.51	100.00	94.49
		on 5min.	13.560075	0.000075	5.51	100.00	94.49
		on 10min.	13.560074	0.000074	5.47	100.00	94.53
		Power on	13.560015	0.000015	1.11	100.00	98.89
		on 2min.	13.560025	0.000025	1.84	100.00	98.16
		on 5min.	13.560027	0.000027	1.96	100.00	98.04
		on 10min.	13.560027	0.000027	1.96	100.00	98.04
		Power on	13.559916	-0.000084	-6.18	100.00	93.82
		on 2min.	13.559936	-0.000064	-4.70	100.00	95.30
		on 5min.	13.559939	-0.000061	-4.52	100.00	95.48
		on 10min.	13.559936	-0.000064	-4.70	100.00	95.30

Limit : 13.56 13.56 MHz +/-0.01 % (+/- 100ppm) = +/- 0.001356 MHz

*The test was begun from 50 deg.C and the temperature was lowered each 10 deg.C.

APPENDIX 2: Test instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MAEC-01	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 10m	DA-06881	RE	2013/08/01 * 12
MOS-27	Thermo-Hygrometer	CUSTOM	CTH-201	A08Q26	RE	2013/02/26 * 12
MJM-21	Measure	KOMELON	KMC-36	-	RE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE	-
MTR-09	EMI Test Receiver	Rohde & Schwarz	ESU26	100412	RE	2013/06/07 * 12
MLPA-01	Loop Antenna	Rohde & Schwarz	HFH2-Z2	100017	RE	2013/10/30 * 12
MCC-143	Coaxial Cable	UL Japan	-	-	RE	2013/07/22 * 12
MCC-03	Coaxial Cable	Fujikura/Suhner/TSJ	5D-2W(20m)/ 3D-2W(7.5m)/ RG400u(1.5m)/ RFM-E421(Switcher)	-/ 01068(Switcher)	RE	2013/09/12 * 12
MPA-14	Pre Amplifier	SONOMA INSTRUMENT	310	260833	RE	2013/03/12 * 12
MAT-08	Attenuator(6dB)	Weinschel Corp	2	BK7971	RE	2013/11/26 * 12
KBA-05	Biconical Antenna	Schwarzbeck	BBA9106	2513	RE	2013/11/24 * 12
KLA-04	Logperiodic Antenna	Schwarzbeck	USLP9143	361	RE	2013/11/24 * 12
MCC-02	Coaxial Cable	Suhner/storm/ Agilent/TSJ	-	-	RE	2013/09/12 * 12
MPA-19	Pre Amplifier	MITEQ	MLA-10K01-B01-35	1237616	RE	2013/02/07 * 12
MOS-14	Thermo-Hygrometer	Custom	CTH-201	-	RE, FT	2013/02/26 * 12
MSA-03	Spectrum Analyzer	Agilent	E4448A	MY44020357	RE, FT	2013/11/15 * 12
MLPA-06	Loop Antenna	UL Japan	-	-	RE, FT	Pre Check
MCH-04	Temperature and Humidity Chamber	Tabai Espec	PL-2KP	14015723	RE	2013/08/23 * 12
MAEC-01	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 10m	DA-06881	CE	2013/08/01 * 12
MOS-27	Thermo-Hygrometer	CUSTOM	CTH-201	A08Q26	CE	2013/02/26 * 12
MJM-21	Measure	KOMELON	KMC-36	-	CE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	CE	-
MTR-09	EMI Test Receiver	Rohde & Schwarz	ESU26	100412	CE	2013/06/07 * 12
MLS-02	LISN(AMN)	Schwarzbeck	NSLK8127	8127383	CE(EUT)	2013/07/11 * 12
MLS-03	LISN(AMN)	Schwarzbeck	NSLK8127	8127384	CE(AE)	2013/03/18 * 12
MTA-28	Terminator	TME	CT-01	-	CE	2013/11/26 * 12
MCC-03	Coaxial Cable	Fujikura/Suhner/TSJ	5D-2W(20m)/ 3D-2W(7.5m)/ RG400u(1.5m)/ RFM-E421(Switcher)	-/ 01068(Switcher)	CE	2013/09/12 * 12
MAT-64	Attenuator(13dB)	JFW Industries, Inc.	50FP-013H2 N	-	CE	2013/01/09 * 12

The expiration date of the calibration is the end of the expired month.

All equipment is calibrated with valid calibrations. Each measurement data is traceable to the national or international standards.

As for some calibrations performed after the tested dates, those test equipment have been controlled by means of an unbroken chains of calibrations.

Test Item: CE: Conducted Emission
RE: Radiated Emission
FT: Frequency Tolerance

UL Japan, Inc.

Ise EMC Lab.

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124