



Test report No. : 10332222H-B-R2
Page : 1 of 21
FCC ID : TLGD08C0
IC Number : 5278A-D08C1
Issued date : June 25, 2014
Revised date : July 3, 2014

RADIO TEST REPORT

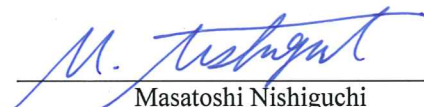
Test Report No. : 10332222H-B-R2

Applicant : CITIZEN SYSTEMS JAPAN CO., LTD.
Type of Equipment : DIGITAL PHOTO PRINTER
Model No. : DS-621
Test regulation : FCC Part 15 Subpart C: 2014
RSS-Gen Issue 3: 2010 +A1: January 2012
RSS-210 Issue 8: December 2010
FCC ID : TLGD08C0
IC Number : 5278A-D08C1
Test Result : **Complied**

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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 10332222H-B-R1. 10332222H-B-R1 is replaced with this report.

Date of test: May 19 to 21, 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.
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<http://www.ul.com/japan/jpn/pages/services/emc/about/mark1/index.jsp#nvlap>

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13-EM-F0429

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SECTION 1: Customer information

Company Name	:	CITIZEN SYSTEMS JAPAN CO., LTD.
Address	:	7572 Matsuomyo, Iida-shi, Nagano, 395-8577, Japan
Telephone Number	:	+81-265-21-1501
Facsimile Number	:	+81-265-21-1502
Contact Person	:	Masao Yoshizawa

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

2.1 Identification of E.U.T.

Type of Equipment	:	DIGITAL PHOTO PRINTER
Model No.	:	DS-621
Serial No.	:	Refer to Section 4, Clause 4.2
Receipt Date of Sample	:	May 16, 2014
Country of Mass-production	:	Japan
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

Model No: DS-621 (referred to as the EUT in this report) is the DIGITAL PHOTO PRINTER.

Variant models:

US: CX02, CX20, DP-DS620, DS-621(EUT)

Canada: DP-DS620, DS-621 (EUT)

The difference between variant models is only color. Radio and EMC specifications are the same.

Therefore, tests were performed on DS-621 as representative.

Feature of EUT:

Clock frequency(ies) in the system: 480MHz (max.)

Radio Specification

Radio Type	:	Transceiver
Frequency of Operation	:	13.56MHz
Modulation	:	ASK
Power Supply (inner)	:	DC 5V
Antenna type	:	Integral
Antenna Gain	:	-58.91dBi
Operating Temperature	:	+5 deg. C to +40 deg. C

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SECTION 3: Test specification, procedures & results

3.1 Test Specification

- Test Specification/Title : FCC Part 15 Subpart C: 2014, final revised on March 6, 2014 and effective April 7, 2014
: 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
- Test Specification/Title : RSS-Gen Issue 3: 2010 +A1: January 2012
General Requirements and Information for the Certification of
Radio Apparatus.
- Test Specification/Title : RSS-210 Issue 8: December 2010
: Licence-exempt Radio Apparatus (All Frequency Bands):
Category I Equipment.

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] 11.8dB, 17.46371MHz, N [AV] 9.6dB, 0.16703MHz, N/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	81.5dB, 13.56000MHz, QP, 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	44.7dB, 14.01000MHz, QP, 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	6.4dB 49.747MHz, QP, 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
99% Occupied Bandwidth	RSS-Gen 4.6.1	RSS-Gen 4.6.1	N/A	N/A	Radiated

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

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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.

3.3 Addition to standard

No addition, exclusion nor deviation has been made from the standard.

3.4 Uncertainty

EMI

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 (3m)

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

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3.5 Test Location

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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	-	8.0 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)	The EUT Transmits and Receives at the same time and there is no receiving mode.
The EUT was operated in a manner similar to typical use during the tests.	

Test Item	Operating mode*
Conducted Emission	Tx Mod on, with Tag
Electric Field Strength of Fundamental Emission	Tx Mod on, without Tag
Spectrum Mask	Tx Mod on, without Tag
20dB Bandwidth	Tx Mod on, with Tag
Electric Field Strength of Spurious Emission	Tx Mod on, without Tag
Frequency Tolerance	Tx Mod on, with Tag

* After the comparison of the test data between with Tag and without Tag, the tests were performed with the worst case. This is because EUT can also transmit radio signal without Tag to check whether or not Tag is present.

Justification: The system was configured in typical fashion (as a user 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

*This EUT provides stable voltage(DC 5V) constantly to RF Part regardless of input voltage

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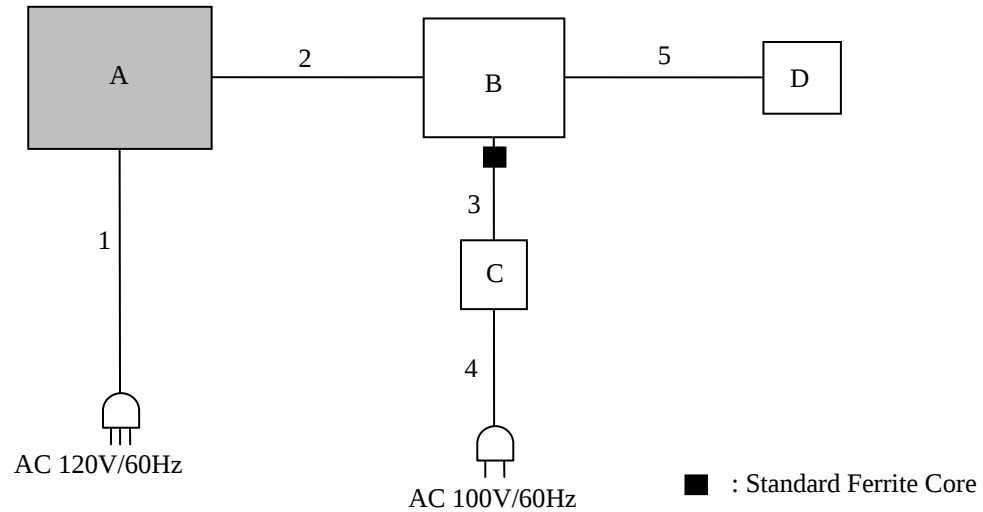
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4.2 Configuration and peripherals



*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 PHOTO PRINTER	DS-621	CS-No009	CITIZEN SYSTEMS JAPAN CO., LTD.	EUT
B	Laptop PC	1952-D65	L3-DM301	lenovo	-
C	AC Adaptor	92P1156	11S92P1156Z1ZDXN0991HM	lenovo	-
D	Mouse	M-UB48	LZE02650788	Logitech	-

List of cables used

No.	Name	Length (m)	Shield		Remark
			Cable	Connector	
1	AC Cable	1.8	Unshielded	Unshielded	-
2	USB Cable	2.0	Shielded	Shielded	-
3	DC Cable	1.8	Unshielded	Unshielded	-
4	AC Cable	1.0	Unshielded	Unshielded	-
5	USB Cable	0.7	Shielded	Shielded	-

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SECTION 5: Conducted emission

5.1 Operating environment

Test place	: No.4 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	: Continuous Transmitting

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., and 135 deg.) 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					Spectrum Analyzer	
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: $40 \times \log (3\text{m}/30\text{m}) = -40\text{dB}$

Measurement range : 0.009M-1GHz
 Test data : APPENDIX
 Test result : Pass

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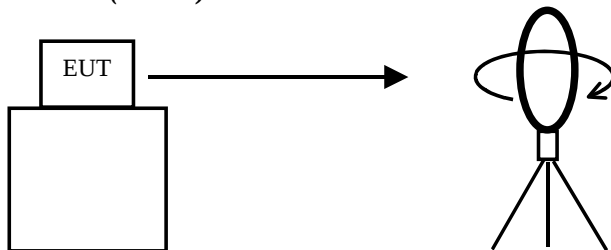
SECTION 7: Other test

Test	Span	RBW	VBW	Sweep	Detector	Trace	Instrument used
20dB Bandwidth	100kHz	1kHz	3kHz	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%.							

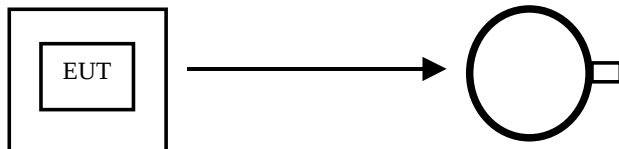
Test data : APPENDIX
Test result : Pass

Figure 1: Direction of the Loop Antenna

Side View (Vertical)

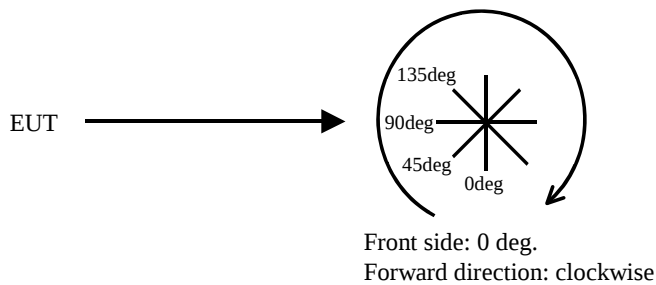


Top View (Horizontal)



Antenna was not rotated.

Top View (Vertical)



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APPENDIX 1: Data of EMI test

Conducted emission

DATA OF CONDUCTED EMISSION TEST

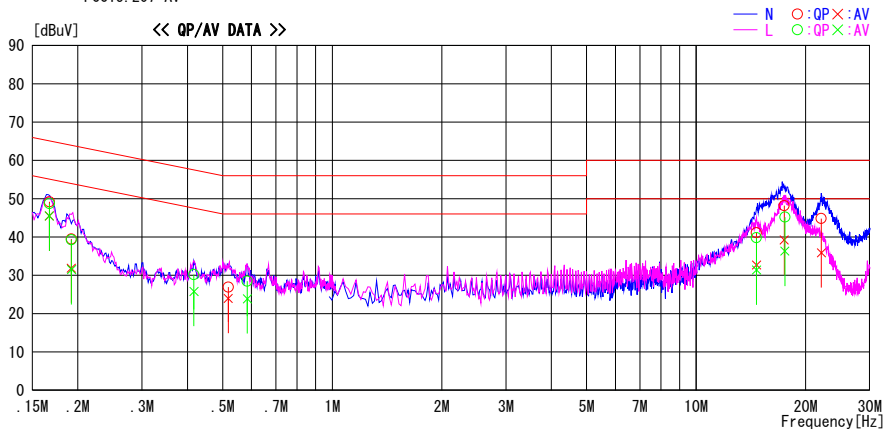
UL Japan, Inc. Ise EMC Lab. No.4 Semi Anechoic Chamber
Date : 2014/05/19

Report No. : 10332222H

Temp./Humi. : 23deg. C / 44% RH
Engineer : Keisuke Kawamura

Mode / Remarks : Tx 13.56MHz

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]		
0.16703	35.9	32.2	13.3	49.2	45.5	65.1	55.1	15.9	9.6	N	
0.19191	26.2	18.6	13.3	39.5	31.9	64.0	54.0	24.5	22.1	N	
0.51788	13.5	10.6	13.4	26.9	24.0	56.0	46.0	29.1	22.0	N	
14.65108	26.6	18.2	14.5	41.1	32.7	60.0	50.0	18.9	17.3	N	
17.46371	33.5	24.5	14.7	48.2	39.2	60.0	50.0	11.8	10.8	N	
22.08442	29.9	21.0	14.9	44.8	35.9	60.0	50.0	15.2	14.1	N	
0.16703	35.4	32.2	13.3	48.7	45.5	65.1	55.1	16.4	9.6	L	
0.19213	26.0	18.2	13.3	39.3	31.5	63.9	53.9	24.6	22.4	L	
0.41671	16.9	12.5	13.3	30.2	25.8	57.5	47.5	27.3	21.7	L	
0.58413	15.1	10.5	13.4	28.5	23.9	56.0	46.0	27.5	22.1	L	
14.65108	25.3	16.9	14.5	39.8	31.4	60.0	50.0	20.2	18.6	L	
17.53712	30.5	21.6	14.7	45.2	36.3	60.0	50.0	14.8	13.7	L	

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

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

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Fundamental emission and Spectrum Mask

DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Ise EMC lab. No.4 Semi Anechoic Chamber

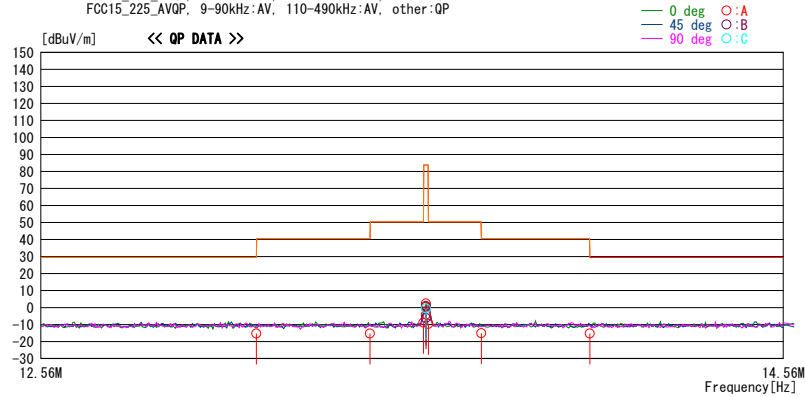
Date: May 19, 2014

Report No. : 10332222H

Temp. / Humi. : 24 deg. C / 58% RH
Engineer : Hiroshi Kukita

Mode / Remarks : Tx 13.56MHz, without 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	30.4	QP	19.7	-33.3	32.1	-15.3	29.5	44.8	0	A	60
13.41000	30.3	QP	19.7	-33.2	32.1	-15.3	40.5	55.8	0	A	60
13.55300	36.8	QP	19.7	-33.2	32.1	-8.8	50.4	59.2	0	A	60
13.56000	39.4	QP	19.7	-33.2	32.1	-6.2	83.9	90.1	45	B	43
13.56000	41.4	QP	19.7	-33.2	32.1	-4.2	83.9	88.1	0	A	60
13.56000	46.6	QP	19.7	-33.2	32.1	1.0	83.9	82.9	45	B	43
13.56000	45.0	QP	19.7	-33.2	32.1	-0.6	83.9	84.5	90	C	351
13.56000	48.0	QP	19.7	-33.2	32.1	2.4	83.9	81.5	0	A	60
13.56000	45.9	QP	19.7	-33.2	32.1	0.3	83.9	83.6	135	A	336
13.56700	36.0	QP	19.7	-33.2	32.1	-9.6	50.4	60.0	0	A	60
13.71000	30.5	QP	19.7	-33.2	32.1	-15.1	40.5	55.6	0	A	60
14.01000	30.4	QP	19.7	-33.2	32.1	-15.2	29.5	44.7	0	A	60

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.)

Result of the fundamental emission at 3m without Distance factor

QP

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	48.0	19.7	6.8	32.1	-	42.4	-	-	Fundamental

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

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Spurious emission

DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Ise EMC Lab. No.4 Semi Anechoic Chamber

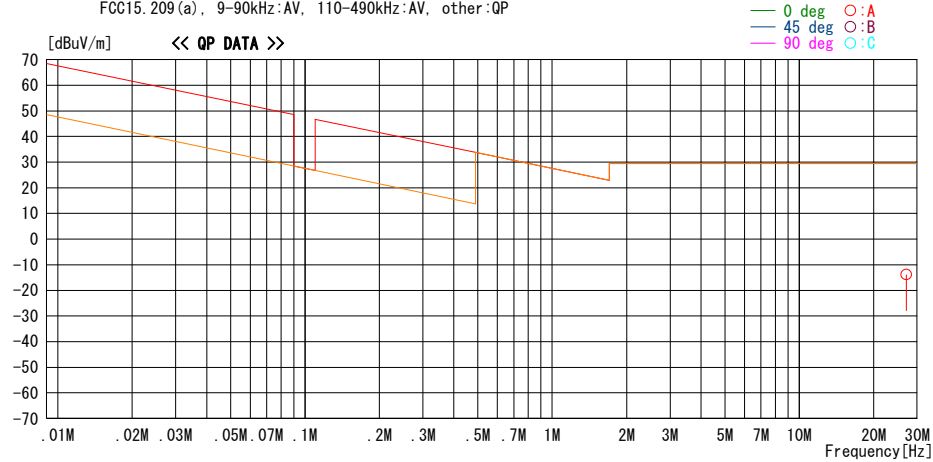
Date: May 19, 2014

Report No. : 10332222H

Temp. / Humi. : 24 deg. C / 58% RH
Engineer : Hiroshi Kukita

Mode / Remarks : Tx 13.56MHz, without Tag

LIMIT : FCC15.209(a), 9-90kHz:PK, 110-490kHz:PK, other:QP
FCC15.209(a), 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	30.4	QP	20.7	-32.9	32.1	-13.9	29.5	43.4	0	A	60

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.)

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Spurious emission

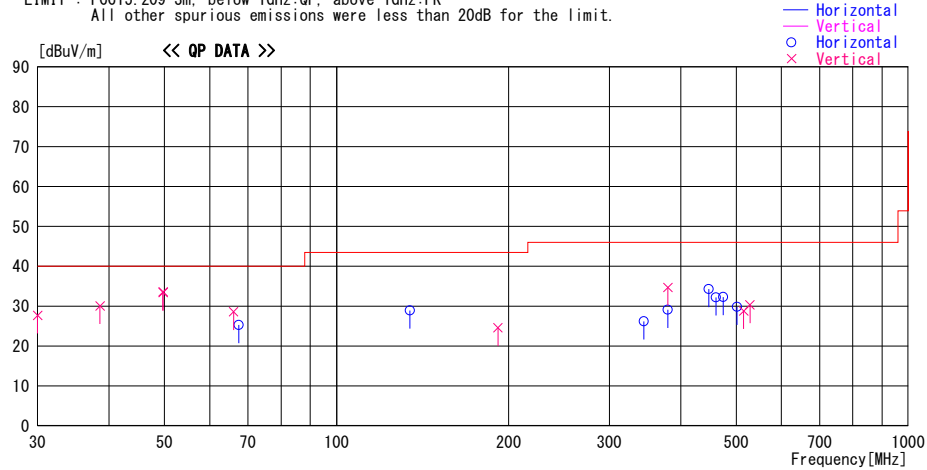
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Ise EMC lab. No.4 Semi Anechoic Chamber
Date : 2014/05/19

Report No. : 10332222H
Temp./Humi. : 24 deg. C / 58% RH
Engineer : Hiroshi Kukita

Mode / Remarks : Tx 13.56MHz, without Tag

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



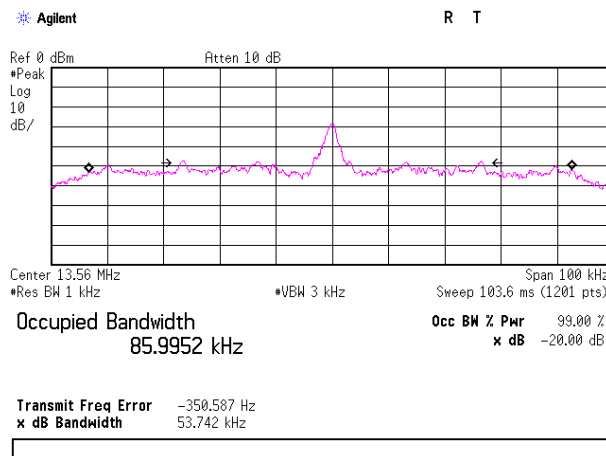
Frequency	Reading	DET	Antenna	Loss&	Level	Angle	Height	Polar.	Limit	Margin	Comment
[MHz]	[dBuV]		Factor	Gain	[dBuV/m]	[Deg]	[cm]		[dBuV/m]	[dB]	
30.000	35.3	QP	17.4	-25.0	27.7	3	100	Vert.	40.0	12.3	
38.561	39.9	QP	15.1	-24.9	30.1	0	100	Vert.	40.0	9.9	
49.747	47.3	QP	11.0	-24.7	33.6	339	100	Vert.	40.0	6.4	
49.747	47.1	QP	11.0	-24.7	33.4	339	100	Vert.	40.0	6.6	with Tag
66.066	45.9	QP	7.1	-24.4	28.6	1	100	Vert.	40.0	11.4	
67.507	42.8	QP	6.9	-24.4	25.3	101	312	Hori.	40.0	14.7	
134.493	38.3	QP	14.1	-23.5	28.9	297	344	Hori.	43.5	14.6	
191.579	31.2	QP	16.4	-23.0	24.6	286	100	Vert.	43.5	18.9	
344.992	31.0	QP	16.9	-21.7	26.2	352	242	Hori.	46.0	19.8	
379.678	33.3	QP	17.3	-21.5	29.1	247	237	Hori.	46.0	16.9	
379.680	38.9	QP	17.3	-21.5	34.7	6	129	Vert.	46.0	11.3	
447.496	37.0	QP	18.4	-21.1	34.3	347	176	Hori.	46.0	11.7	
461.040	34.7	QP	18.6	-21.1	32.2	0	185	Hori.	46.0	13.8	
474.599	34.5	QP	18.8	-21.0	32.3	0	178	Hori.	46.0	13.7	
502.003	31.4	QP	19.2	-20.8	29.8	342	166	Hori.	46.0	16.2	
515.280	30.2	QP	19.3	-20.7	28.8	1	100	Vert.	46.0	17.2	
528.842	31.5	QP	19.5	-20.7	30.3	0	100	Vert.	46.0	15.7	

CHART:WITH FACTOR ANT TYPE: -30MHz:LOOP, 30-300MHz:R1CONICAL, 300MHz-1000MHz:LOGPERIODIC, 1000MHz:-HORN
CALCULATION: RESULT = READING + ANT FACTOR + LOSS & GAIN(CABLE + ATTEN - GAIN(AMP.))

20dB Bandwidth and 99% Occupied Bandwidth

Test place	Ise EMC Lab. No.6 measurement room
Report No.	10332222H
Date	05/21/2014
Temperature/ Humidity	23 deg.C / 55% RH
Engineer	Masatoshi Nishiguchi
Mode	Tx Mod on with Tag

FREQ [MHz]	20dB Bandwidth [kHz]	99% Occupied Bandwidth [kHz]
13.56	53.74	86.00



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Frequency Tolerance

Test place : Ise EMC Lab. No.6 measurement room
Report No. : 10332222H
Date : 05/21/2014
Temperature/ Humidity : 23 deg.C / 55% RH
Engineer : Masatoshi Nishiguchi
Mode : Tx Mod on with Tag

Test Condition deg.C Volts		Test Timing	Measured freq [MHz]	Freq error [MHz]	Result [ppm]	Limit (± 0.01%) [± ppm]	Margin [ppm]
20deg.C	102V	Power on	13.56008111	0.00008111	5.98	100.00	94.02
		on 2min.	13.56006874	0.00006874	5.07	100.00	94.93
		on 5min.	13.56006239	0.00006239	4.60	100.00	95.40
		on 10min.	13.56005955	0.00005955	4.39	100.00	95.61
	120V	Power on	13.56006465	0.00006465	4.77	100.00	95.23
		on 2min.	13.56004660	0.00004660	3.44	100.00	96.56
		on 5min.	13.56004233	0.00004233	3.12	100.00	96.88
		on 10min.	13.56003897	0.00003897	2.87	100.00	97.13
	138V	Power on	13.56006506	0.00006506	4.80	100.00	95.20
		on 2min.	13.56006019	0.00006019	4.44	100.00	95.56
		on 5min.	13.56005587	0.00005587	4.12	100.00	95.88
		on 10min.	13.56005183	0.00005183	3.82	100.00	96.18
50deg.C.		Power on	13.56000777	0.00000777	0.57	100.00	99.43
		on 2min.	13.55999910	-0.00000090	-0.07	100.00	99.93
		on 5min.	13.55999522	-0.00000478	-0.35	100.00	99.65
		on 10min.	13.55999511	-0.00000489	-0.36	100.00	99.64
40deg.C.		Power on	13.56001123	0.00001123	0.83	100.00	99.17
		on 2min.	13.56000420	0.00000420	0.31	100.00	99.69
		on 5min.	13.56000145	0.00000145	0.11	100.00	99.89
		on 10min.	13.55999900	-0.00000100	-0.07	100.00	99.93
30deg.C.		Power on	13.56003211	0.00003211	2.37	100.00	97.63
		on 2min.	13.56002578	0.00002578	1.90	100.00	98.10
		on 5min.	13.56001406	0.00001406	1.04	100.00	98.96
		on 10min.	13.56001336	0.00001336	0.99	100.00	99.01
20deg.C.		Power on	13.56006465	0.00006465	4.77	100.00	95.23
		on 2min.	13.56004660	0.00004660	3.44	100.00	96.56
		on 5min.	13.56004233	0.00004233	3.12	100.00	96.88
		on 10min.	13.56003897	0.00003897	2.87	100.00	97.13
10deg.C.		Power on	13.56006880	0.00006880	5.07	100.00	94.93
		on 2min.	13.56005569	0.00005569	4.11	100.00	95.89
		on 5min.	13.56005342	0.00005342	3.94	100.00	96.06
		on 10min.	13.56005219	0.00005219	3.85	100.00	96.15
0deg.C.		Power on	13.56008643	0.00008643	6.37	100.00	93.63
		on 2min.	13.56007911	0.00007911	5.83	100.00	94.17
		on 5min.	13.56007635	0.00007635	5.63	100.00	94.37
		on 10min.	13.56007422	0.00007422	5.47	100.00	94.53
-10deg.C.		Power on	13.56008754	0.00008754	6.46	100.00	93.54
		on 2min.	13.56008711	0.00008711	6.42	100.00	93.58
		on 5min.	13.56008655	0.00008655	6.38	100.00	93.62
		on 10min.	13.56008580	0.00008580	6.33	100.00	93.67
-20deg.C.		Power on	13.56006745	0.00006745	4.97	100.00	95.03
		on 2min.	13.56008344	0.00008344	6.15	100.00	93.85
		on 5min.	13.56008563	0.00008563	6.31	100.00	93.69
		on 10min.	13.56008623	0.00008623	6.36	100.00	93.64
-30deg.C.		Power on	13.56000690	0.00000690	0.51	100.00	99.49
		on 2min.	13.56005119	0.00005119	3.78	100.00	96.22
		on 5min.	13.56005924	0.00005924	4.37	100.00	95.63
		on 10min.	13.56006108	0.00006108	4.50	100.00	95.50

Freq error = Measured freq(MHz)-13.56(MHz)

Result = Freq error(MHz)/13.56(MHz)*10⁶

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.

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APPENDIX 2: Test instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MAEC-04	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE/CE	2014/02/28 * 12
MOS-15	Thermo-Hygrometer	Custom	CTH-180	1501	RE/CE	2014/02/20 * 12
MJM-09	Measure	KDS	E19-55	-	RE/CE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE/CE	-
MTR-01	Test Receiver	Rohde & Schwarz	ESI40	100084	RE	2013/11/12 * 12
MBA-05	Biconical Antenna	Schwarzbeck	BBA9106	1302	RE	2013/11/24 * 12
MLA-08	Logperiodic Antenna	Schwarzbeck	UKLP9140-A	N/A	RE	2013/11/24 * 12
MCC-50	Coaxial Cable	UL Japan	-	-	RE	2013/06/18 * 12
MAT-68	Attenuator	Anritsu	MP721B	6200961025	RE	2013/11/26 * 12
MPA-14	Pre Amplifier	SONOMA INSTRUMENT	310	260833	RE	2014/03/14 * 12
MLPA-01	Loop Antenna	Rohde & Schwarz	HFH2-Z2	100017	RE	2013/10/30 * 12
MCC-113	Coaxial cable	Fujikura/Suhner/TSJ	5D-2W(10m)/ SFM141(5m)/ 421-010(1m)/ sucoform141-PE(1m)/ RFM-E121(Switcher)	-/04178	RE/CE	2013/07/23 * 12
MCC-143	Coaxial Cable	UL Japan	-	-	RE	2013/07/22 * 12
MLS-06	LISN(AMN)	Schwarzbeck	NSLK8127	8127363	CE(AE)	2014/01/27 * 12
MLS-07	LISN(AMN)	Schwarzbeck	NSLK8127	8127364	CE(EUT)	2014/01/27 * 12
MTA-31	Terminator	TME	CT-01	-	CE	2014/01/20 * 12
MAT-67	Attenuator	JFW Industries, Inc.	50FP-013H2 N	-	CE	2014/01/29 * 12
MTR-09	EMI Test Receiver	Rohde & Schwarz	ESU26	100412	CE	2013/06/07 * 12
MCH-04	Temperature and Humidity Chamber	Tabai Espec	PL-2KP	14015723	FT	2013/08/23 * 12
MPA-09	Pre Amplifier	Agilent	8447D	2944A10845	FT/RE	2013/09/12 * 12
MSA-06	Spectrum Analyzer	Agilent	E4407B	MY45107638	FT/RE	2014/04/02 * 12
MOS-14	Thermo-Hygrometer	Custom	CTH-201	1401	FT/RE	2014/02/20 * 12
MLPA-03	Loop Antenna	UL Japan	-	-	FT/RE	Pre Check
MCC-64	Coaxial Cable	UL Japan	-	-	FT/RE	2014/03/28 * 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

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