



RADIO TEST REPORT

Test Report No.: 10312699S-C

Applicant : Ricoh Company, Ltd.
Type of Equipment : Multi-Function Printer
Model No. : Pro C7110SX
FCC ID : BBP-RFTAU02
Test regulation : FCC Part15 Subpart C: 2014
Test result : Complied

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Date of test: May 9 to 23, 2014

Tested by: M. Hosaka
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Engineer
Consumer Technology Division

Approved by : I. Isozaki
Ichiro Isozaki
Leader
Consumer Technology Division



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 There is no testing item of "Non-accreditation".

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13-EM-F0429

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SECTION 1: Customer information

Company Name : Ricoh Company, Ltd.
Brand Name : RICOH
Address : 810 Shimoimaizumi, Ebina-shi, Kanagawa, 243-0460 Japan
Telephone Number : +81-50-3814-5604
Facsimile Number : +81-3-6893-1409
Contact Person : Hiroyuki Kuroda

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

2.1 Identification of E.U.T.

Type of Equipment : Multi-Function Printer
Model Number : Pro C7110SX
Serial Number : Refer to clause 4.2
Rating : AC208-240V, 50/ 60Hz
Country of Mass-production : U.S.A., Japan
Condition of EUT : Production prototype
(Not for Sale: This sample is equivalent to mass-produced items.)
Receipt Date of Sample : May 7, 2014
Modification of EUT : No modification by the test lab.

2.2 Variation of the family model(s)

- Pro C7110SX (Tested model)
- Pro C7100SX
- Pro C7110X
- Pro C7100X

The difference of these models is as follows.

Model	Scanner Unit (Scanner & Copy Function)	Copy Speed	Print Speed
Pro C7100SX	Equipped	80 ppm	80 ppm
Pro C7110SX	Equipped	90 ppm	90 ppm
Pro C7100X	Not Equipped	None	80 ppm
Pro C7110X	Not Equipped	None	90 ppm

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2.3 Product description

Model: Pro C7110SX (referred to as the EUT in this report) is a Multi-Function Printer.

The EUT is the color digital copy machine with high speed and high endurance, which is available also for a printer and a scanner.

General Features

1. The machine fits seamlessly into high volume production environments with its optimum reliability, sophisticated finishing and professional software solutions.
2. The machine employs advanced 4 or 5-tandem drums system and image transfer belt technology to ensure dependability in even the most demanding environments.
3. The machine offers the choice of a number of finishing options including stapling, booklet making and online punching.
4. Scan- to-email and Scan-to-folder allow efficient distribution of scanned files and documents.

<Radio part>

Radio Type	:	Transceiver
Frequency of Operation	:	13.56MHz
Modulation	:	ASK 100%
Power Supply (inner)	:	DC 5.0V
Antenna type	:	Print pattern antenna
ITU code	:	A1D
Operating Temperature	:	+10 to +32 deg C.

FCC 15.31 (e)

Host device provides the radio block with stable power supply, and the power is not changed when voltage of the printer is varied. Therefore, this EUT complies with the requirement.

FCC 15.203

The antenna is not removable from the EUT. Therefore, the equipment complies with the requirement.

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The clock frequency used in EUT:

Highest Frequency:

Kind of equipment	Model name	Operates Frequency	Remarks
Multi-function Printer	Pro C7110SX	3000MHz	HDD I/F

Frequency list:

Derived Frequency	Description of Use	Remarks
1860.00MHz	Controller CPU	
800.00MHz	Controller DDR3	
2500.00MHz	PCI-Express	
480.00MHz	Controller USB-Host	
14.32MHz	Controller PCH	
33.30MHz	PCI	
133.30MHz	Controller ASIC	
3000.00MHz	HDD I/F	
50.00MHz	Controller SD_I/F	
1500.00MHz	Controller NAND	
480.00MHz	Controller USB_Device	
125.00MHz	Controller GigaEther	
192MHz	Engine Controller CPU	
132.71MHz	Engine Controller ASIC	
13.56MHz	RFID CPU	
31.25MHz	Operation Panel NAND FLASH	
34.60MHz	Operation Panel LCD CLK	
200.00MHz	Operation Panel DDR3	
800.00MHz	Operation Panel CPU Core	
48.00MHz	Operation Panel SD Card Clock	
240.00MHz	Operation Panel USB Clock	
8.00MHz	Operation Panel Microcomputer	
90.00MHz	Image Controller ASIC	
200MHz	Image Controller ASIC	
33.33MHz	Image Controller ASIC	
375MHz	SerDES	
533.33MHz	Image Controller DDR3	
26.453MHz	CCD CLK	
16.00MHz	CIS CLK	
60.00MHz	LVDS CLK	
45.9375MHz	LVDS CLK	
29.4912MHz	ADF Controller CPU	
265.4208MHz	ADF Controller ASIC	
1061.6832MHz	ADF Controller ASIC	
20MHz	LD Controller Microcomputer	
25MHz	LD Controller ASIC	
56.43MHz	LD Controller CLK	
96MHz	Media Identification CPU	
48MHz	Media Identification USB	

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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 15.209 Radiated emission limits, general requirements
Section 15.215 Additional provisions to the general radiated emission limitations
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. Refer to the test report: 10312699S-B.

3.2 Procedures & Results

Item	Test Procedure	Specification	Remarks	Deviation	Worst Margin	Results
Conducted emission	ANSI C63.4:2009 7. AC powerline conducted emission measurements	FCC 15.207	-	N/A	6.4dB Freq.: 0.19960MHz Detector: Quasi-Peak Phase: N Line: Main	Complied
Electric field strength of Fundamental emission	ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.225 (a)	Radiated	N/A	70.6dB Polarization: Vertical	Complied
Electric field strength of Spurious emission (within the 13.110-14.010MHz band)	ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.225 (b)(c)	Radiated	N/A	45.6dB Freq.: 13.110MHz Polarization: Vertical	Complied
Electric field strength of Spurious emission (outside of the 13.110-14.010MHz band)	ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.209 FCC 15.225 (d)	Radiated	N/A	3.8dB Freq.: 625.02MHz Polarization: Vertical	Complied
20dB bandwidth	ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.215 (c)	Radiated	N/A	-	-
Frequency tolerance	ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.225 (e)	Radiated	N/A	-	Complied

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

3.3 Addition to standard

Item	Test Procedure	Specification	Remarks	Worst Margin	Results
Occupied Bandwidth (99%)	ANSI C63.4:2009 13. Measurement of intentional radiators, RSS-Gen 4.6.1	RSS-Gen 4.6.1	Radiated	-	-

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

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

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3.4 Uncertainty

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

Item	Frequency range	No.1 SAC ^{*1} /SR ^{*2} (±)	No.2 SAC/SR (±)	No.3 SAC/SR (±)
Conducted emission (AC Mains) AMN/LISN	150kHz-30MHz	3.6 dB	3.6 dB	3.5 dB
Radiated emission (Measurement distance: 3m)	9kHz-30MHz	3.7 dB	3.7 dB	3.6 dB
	30MHz-300MHz	4.9 dB	5.1 dB	4.9 dB
	300MHz-1GHz	5.0 dB	5.2 dB	4.9 dB

*1: SAC=Semi-Anechoic Chamber

*2: SR= Shielded Room is applied besides radiated emission

Conducted emission test

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

Radiated emission test

The data listed in this report meets the limits unless the uncertainty is taken into consideration.

Frequency tolerance

Frequency (Normal condition) Measurement uncertainty for this test was: (±) 7.9×10^{-8} .

Frequency (Extreme condition) Measurement uncertainty for this test was: (±) 7.9×10^{-8} .

Other tests

Bandwidth Measurement uncertainty for this test was: (±) 5.4%

3.5 Test location

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JAB Accreditation No. : RTL02610

	FCC Registration No.	IC Registration No.	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Maximum measuremen t distance
<input type="checkbox"/> No.1 Semi-anechoic chamber	697847	2973D-1	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
<input checked="" type="checkbox"/> No.2 Semi-anechoic chamber	697847	2973D-2	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
<input type="checkbox"/> No.3 Semi-anechoic chamber	697847	2973D-3	12.7 x 7.7 x 5.35	12.7 x 7.7	5m
<input type="checkbox"/> No.4 Semi-anechoic chamber	-	-	8.1 x 5.1 x 3.55	8.1 x 5.1	-
<input type="checkbox"/> No.1 shielded room	-	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
<input type="checkbox"/> No.2 shielded room	-	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
<input type="checkbox"/> No.3 shielded room	-	-	6.3 x 4.7 x 2.7	6.3 x 4.7	-
<input type="checkbox"/> No.4 shielded room	-	-	4.4 x 4.7 x 2.7	4.4 x 4.7	-
<input checked="" type="checkbox"/> No.5 shielded room	-	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
<input type="checkbox"/> No.6 shielded room	-	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
<input type="checkbox"/> No.1 Measurement room	-	-	2.55 x 4.1 x 2.5	-	-

3.6 Test setup, Data of test & Test instruments

Refer to APPENDIX 1 to 3.

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

4.1 Operating mode

The EUT exercise program used during testing was designed to exercise the various system components in a manner similar to typical use.

Test item	Operating mode	Tested frequency
All items except for Frequency tolerances	Transmitting (ASK), 26byte Mirror modulation from lower bit -> AM modulation 0x00, 0x00, 0xB3, 0x75, 0xB0, 0x00, 0x00, 0x80, 0x01, 0xff, 0xfe, 0x01, 0x23, 0x45, 0x67, 0x0B, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, CRC, CRC	13.56MHz
Frequency tolerances	Transmitting Unmodulated	13.56MHz

Software for testing: D1945405 Ver. 0.43:05

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

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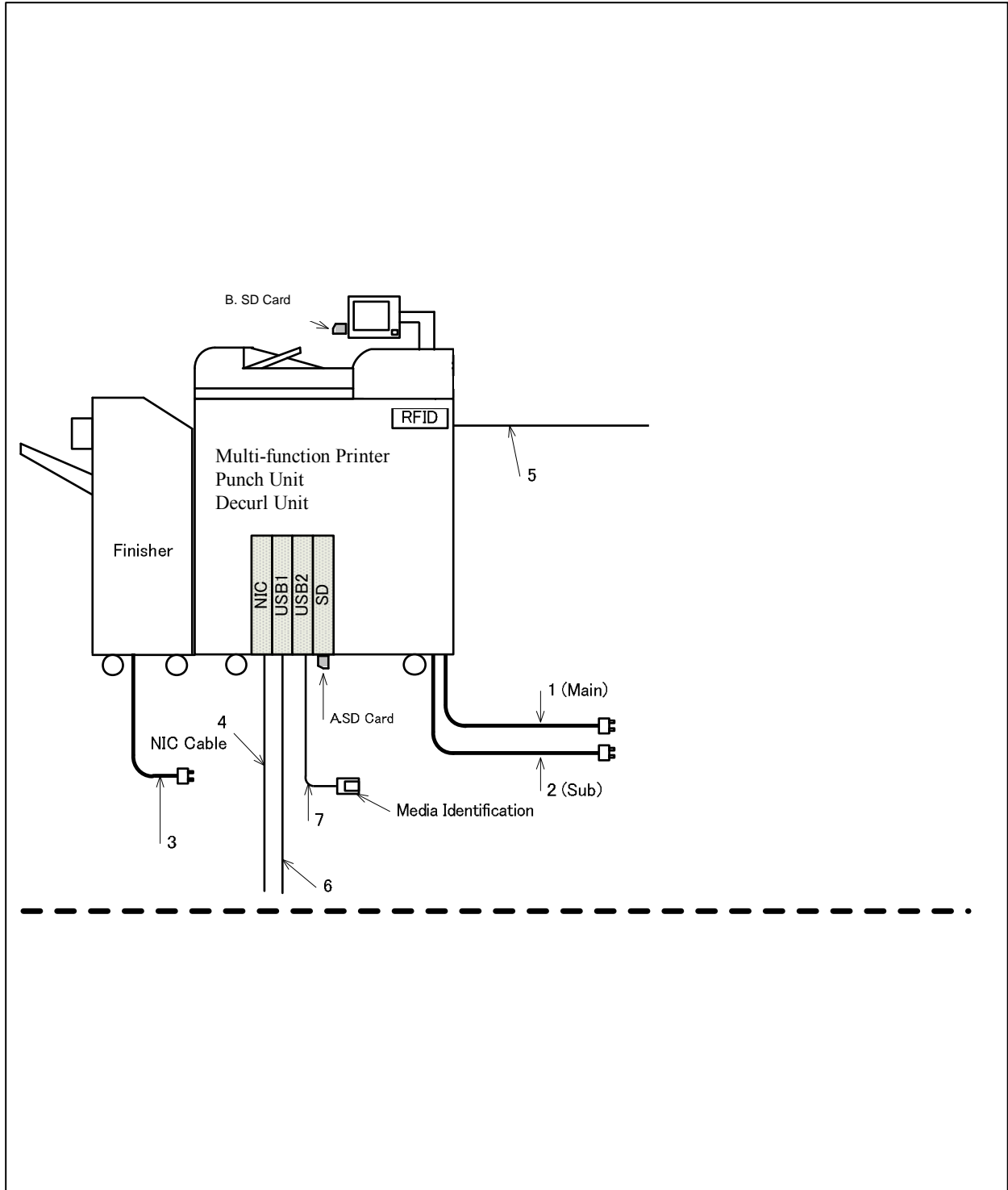
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4.2 Configuration and peripherals



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

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Description of EUT

Kind of equipment	Manufacture / Code	Model name	Serial number	Remarks
Multi-function Printer	RICOH/D204-57	Pro C7110SX	V0000000001	AC240V/60Hz

* RFID module is installed in the Multi-function Printer.

Auxiliary equipment

Item	Kind of equipment	Manufacturer	Model name	Serial number	Remarks
-	Finisher	RICOH (Code: D734-17)	Booklet Finisher SR5060	E844E420033	AC120V/60Hz
-	Punch Unit	RICOH (Code: D449-17)	Punch Unit PU5020 NA	2703126	for SR5060
-	Media Identification	RICOH (Code: D3AK-00)	Media Identification Unit Type S3	MOS000001	—
-	Decurl Unit	RICOH (Code: D3A4-17)	Decurl Unit DU5040	G404F400002	—
A	SD Card	Transcend	TA512MSD80	436271057	To Color Copier
B	SD Card	Panasonic	RP-SD256BJ1A	SU6HC073298	To Color Copier

List of cables used

Item	Cable Name	Manufacturer	Length (m)	Shielding (Cable)	Connector	Remarks
1	Power Cable	RICOH	4.0	No	Plastic	AC240V/60Hz Lower side of the machine
2	Power Cable	RICOH	4.0	No	Plastic	AC240V/60Hz Upper side of the machine
3	Power Cable	RICOH	2.5	No	Plastic	AC120V/60Hz
4	NIC Cable	-	3.0	No	Plastic	
5	External Controller Cable1	RICOH	12.0	Yes	Metal	
6	External Controller Cable2	RICOH	5.0	Yes	Metal	
7	USB (Media Identification)	RICOH	1.5	Yes	Metal	

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SECTION 5: Conducted emission

5.1 Operating environment

The test was carried out in a semi-anechoic chamber.

Temperature : Refer to APPENDIX 1.
Humidity : Refer to APPENDIX 1.

5.2 Test configuration

EUT was placed on a carpet for insulation above the ground plane. EUT was set up typical spacing for the other equipment. EUT was located 80cm from LISN and excess AC cable was bundled in center. I/O cables that were connected to the peripherals were bundled in center. I/O cables that were connected to the peripherals were bundled in center. They were folded back and for the forming a bundle 30cm to 40cm long.

Each EUT current-carrying power lead, except the ground (safety) lead, was individually connected through a LISN to the input power source. All unused 50Ω connectors of the LISN were resistively terminated in 50Ω when not connected to the measuring equipment.

Photographs of the set up are shown in Appendix 3.

5.3 Test conditions

Frequency range : 0.15 - 30MHz
EUT position : Floor standing

5.4 Test procedure

The AC Mains Terminal Continuous disturbance Voltage had been measured with the EUT within a semi-anechoic chamber. The EUT was connected to a Line Impedance Stabilization Network (LISN).

An overview sweep with peak detection has been performed.

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

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

Detection Type : Quasi-Peak/ CISPR-Average
IF Bandwidth : 9kHz

5.5 Results

Summary of the test results : Pass

Refer to APPENDIX 1.

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SECTION 6: Radiated emission (Fundamental and Spurious emission)

6.1 Operating environment

The test was carried out in a semi-anechoic chamber.

Temperature : Refer to APPENDIX 1.
Humidity : Refer to APPENDIX 1.

6.2 Test configuration

EUT was placed on a carpet for insulation above the ground plane. EUT was set up typical spacing for the other equipment. Photographs of the set up are shown in Appendix 3.

6.3 Test conditions

Frequency range : 9kHz - 1GHz
Test distance : 3m
EUT position : Floor standing

6.4 Test procedure

The Radiated Electric Field Strength intensity has been measured with a ground plane and at a distance of 3m
Frequency: From 9kHz to 30MHz at distance 3m

The EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.

The measurements were performed for vertical polarization (antenna angle: 0deg.to 360deg.) and horizontal polarization. Drawing of the antenna direction is shown in Figure 1.

Frequency: From 30MHz to 1GHz at distance 3m (Refer to Figure 2).

The measuring antenna height was varied between 1 and 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.

The measurements were performed for both vertical and horizontal antenna polarization.

Measurements were performed with QP, PK, and AV detector.

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

	9kHz to 90kHz & 110kHz to 150kHz	90kHz to 110kHz	150kHz to 490kHz	490kHz to 30MHz	30MHz to 1GHz
Detector Type	PK/AV	QP	PK/AV	QP	QP
IF Bandwidth	200Hz	200Hz	9kHz	9kHz	120kHz
Measuring antenna	Loop antenna				Biconical (30-299.99MHz) Logperiodic (300MHz-1GHz)

* FCC 15.31 (f)(2) (9kHz-30MHz)

9kHz – 490kHz [Limit at 3m]= [Limit at 300m]-40log (3[m]/300[m])

490kHz – 30MHz [Limit at 3m]= [Limit at 30m]-40log (3[m]/30[m])

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6.5 Results

Summary of the test results : Pass

Refer to APPENDIX 1.

Figure 1. Direction of the Loop Antenna

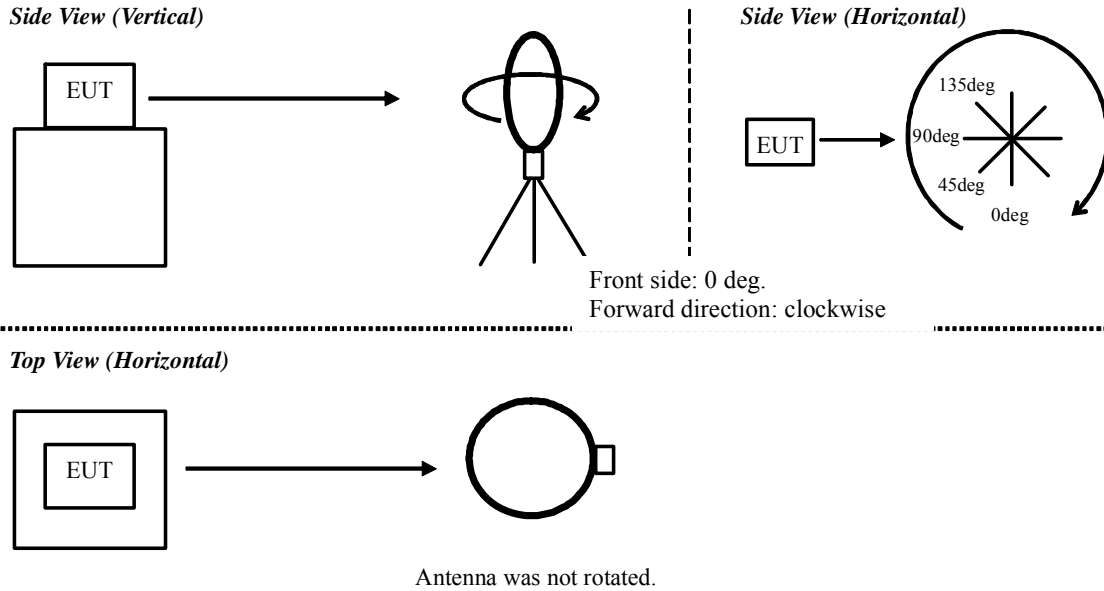
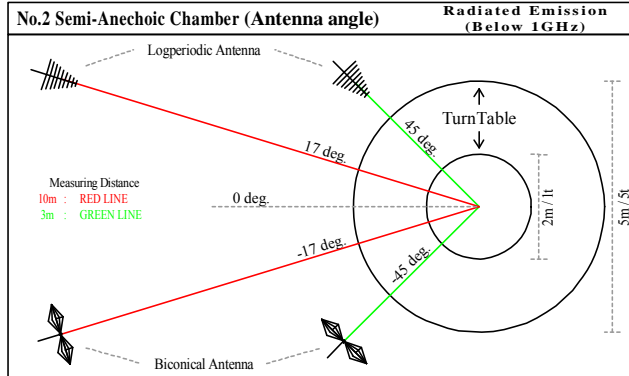


Figure 2. Antenna angle



SECTION 7: 20dB bandwidth & Occupied bandwidth (99%)

Test procedure

The test was measured with a spectrum analyzer using a test fixture.

Results

Summary of the test results: Pass

Refer to APPENDIX 1.

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SECTION 8: Frequency tolerances

Test procedure

The test was measured with a spectrum analyzer using a test fixture.
The temperature test was started after the temperature stabilization time of 30 minutes.
The test was begun from 50 deg.C and the temperature was lowered each 10 deg.C.

Results

Summary of the test results: Pass
Refer to APPENDIX 1.

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Contents of APPENDIXES

APPENDIX 1: Data of Radio tests

Conducted emission
Radiated emission
Frequency tolerance
Bandwidth

APPENDIX 2: Test instruments

Test instruments

APPENDIX 3: Photographs of test setup

Conducted emission
Radiated emission

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DATA OF CONDUCTED EMISSION TEST

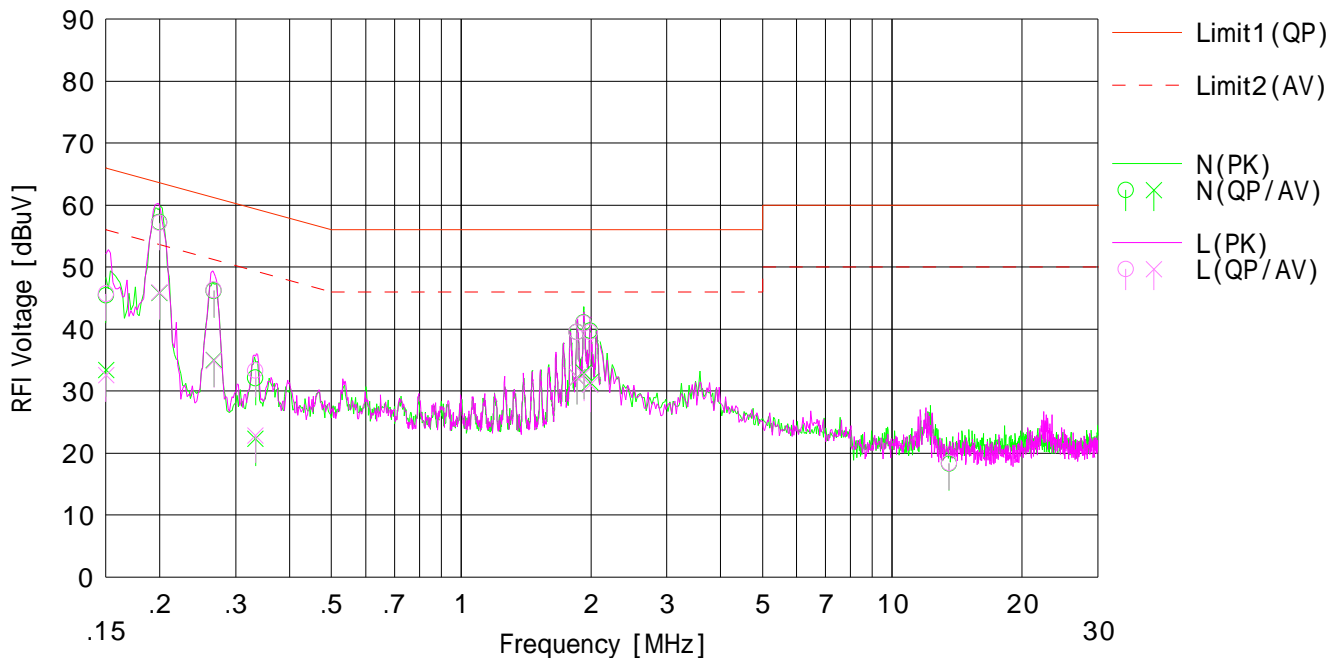
UL Japan, Inc. Shonan EMC Lab. No.2 Semi - Anechoic Chamber
Date : 2014/05/23

Company : RICOH COMPANY, LTD
Kind of EUT : Multi Function Printer
Model No. : Pro C7110SX
Serial No. : V0000000001
Remarks : Main

Mode : Transmitting
Order No. : 10312699S
Power : AC240V / 60Hz
Temp./Humi. : 22deg.C / 55%RH

Limit1 : FCC 15C(15.207) QP
Limit2 : FCC 15C(15.207) AV

Engineer : Makoto Hosaka



No.	Freq. [MHz]	Reading		C.Fac [dB]	Results		Limit		Margin		Phase	Comment
		<QP> [dBuV]	<AV> [dBuV]		<QP> [dBuV]	<AV> [dBuV]	<QP> [dBuV]	<AV> [dBuV]	<QP> [dB]	<AV> [dB]		
1	0.15000	31.5	19.5	13.9	45.4	33.4	66.0	56.0	20.6	22.6	N	
2	0.19960	44.3	32.9	12.9	57.2	45.8	63.6	53.6	6.4	7.8	N	
3	0.26700	33.3	22.1	12.9	46.2	35.0	61.2	51.2	15.0	16.2	N	
4	0.33320	19.3	9.5	12.8	32.1	22.3	59.3	49.3	27.2	27.0	N	
5	1.85862	26.6	19.3	12.9	39.5	32.2	56.0	46.0	16.5	13.8	N	
6	1.92588	28.2	20.1	12.9	41.1	33.0	56.0	46.0	14.9	13.0	N	
7	1.99230	26.8	18.5	12.9	39.7	31.4	56.0	46.0	16.3	14.6	N	
8	13.56000	4.6	---	13.7	18.3	---	60.0	50.0	41.7	---	N	
9	0.15000	31.8	18.7	13.9	45.7	32.6	66.0	56.0	20.3	23.4	L	
10	0.19960	44.2	33.0	12.9	57.1	45.9	63.6	53.6	6.5	7.7	L	
11	0.26700	33.4	22.0	12.9	46.3	34.9	61.2	51.2	14.9	16.3	L	
12	0.33320	20.5	10.0	12.8	33.3	22.8	59.3	49.3	26.0	26.5	L	
13	1.85862	26.6	19.3	12.9	39.5	32.2	56.0	46.0	16.5	13.8	L	
14	1.92588	28.0	19.8	12.9	40.9	32.7	56.0	46.0	15.1	13.3	L	
15	1.99230	26.6	18.1	12.9	39.5	31.0	56.0	46.0	16.5	15.0	L	
16	13.56000	4.7	---	13.7	18.4	---	60.0	50.0	41.6	---	L	

DATA OF CONDUCTED EMISSION TEST

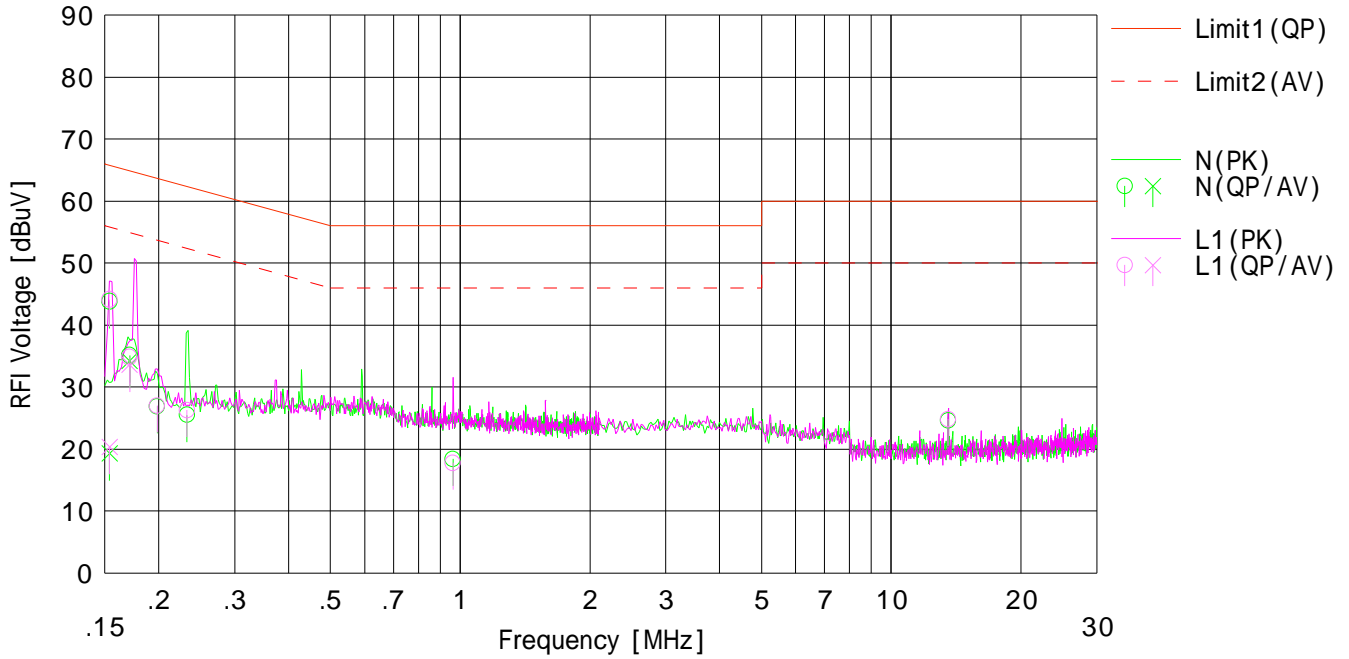
UL Japan, Inc. Shonan EMC Lab. No.2 Semi-Anechoic Chamber
Date : 2014/05/23

Company : RICOH COMPANY, LTD
 Kind of EUT : Multi Function Printer
 Model No. : Pro C7110SX
 Serial No. : V0000000001
 Remarks : Sub

Mode : Transmitting
 Order No. : 10312699S
 Power : AC240V / 60Hz
 Temp./Humi. : 22deg.C / 55%RH

Limit1 : FCC 15C(15.207) QP
 Limit2 : FCC 15C(15.207) AV

Engineer : Makoto Hosaka



No.	Freq. [MHz]	Reading		C.Fac [dB]	Results		Limit		Margin		Phase	Comment
		<QP> [dBuV]	<AV> [dBuV]		<QP> [dBuV]	<AV> [dBuV]	<QP> [dBuV]	<AV> [dBuV]	<QP> [dB]	<AV> [dB]		
1	0.15370	30.0	5.5	13.8	43.8	19.3	65.7	55.7	21.9	36.4	N	
2	0.17133	21.6	20.7	13.5	35.1	34.2	64.8	54.8	29.7	20.6	N	
3	0.19820	14.0	---	12.9	26.9	---	63.6	53.6	36.7	---	N	
4	0.23261	12.6	---	12.9	25.5	---	62.3	52.3	36.8	---	N	
5	0.96330	5.6	---	12.8	18.4	---	56.0	46.0	37.6	---	N	
6	13.56000	10.9	---	13.7	24.6	---	60.0	50.0	35.4	---	N	
7	0.15370	30.3	6.5	13.8	44.1	20.3	65.7	55.7	21.6	35.4	L1	
8	0.17133	21.3	20.1	13.5	34.8	33.6	64.8	54.8	30.0	21.2	L1	
9	0.19820	14.1	---	12.9	27.0	---	63.6	53.6	36.6	---	L1	
10	0.23261	13.4	---	12.9	26.3	---	62.3	52.3	36.0	---	L1	
11	0.96330	5.0	---	12.8	17.8	---	56.0	46.0	38.2	---	L1	
12	13.56000	11.1	---	13.7	24.8	---	60.0	50.0	35.2	---	L1	

Data of Electric field strength of Fundamental emission and Spurious emission within the band: FCC15.225(a)(b)(c)

UL Japan, Inc.
Shonan EMC Lab., No.2 Semi-Anechoic Chamber

Company: RICOH COMPANY, LTD
Equipment: Multi Function Printer
Model: Pro C7110SX
Sample No.: V000000001
Power: AC240V/60Hz
Mode: Transmitting 13.56MHz

Regulation: FCC Part15 SubpartC 15.225
Test Distance: 3m
Date: May 10, 2014
Temperature: 22 deg.C
Humidity: 42 %RH
ENGINEER: Tatsuya Arai

Remarks: : Vertical polarization (antenna angle) of the worst case: 0deg

Fundamental emission

No.	FREQ [MHz]	Test Receiver Reading		Antenna Factor [dB/m]	LOSS [dB]	AMP GAIN [dB]	Distance factor [dB]	RESULT		LIMIT (30m) [dBuV/m]	MARGIN	
		Hor [dBuV]	Ver [dBuV]					Hor [dBuV/m]	Ver [dBuV/m]		Hor [dB]	Ver [dB]
1	13.560	58.1	59.8	19.0	6.4	31.9	-40.0	11.6	13.3	83.9	72.3	70.6

Calculation: Result[dBuV/m]=Reading[dBuV]+Ant.Fac[dB/m]+Loss(Cable+ATT)[dB]-Gain(AMP)[dB]+Distance factor[dB]

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

Limits (30m)

• 13.553MHz to 13.567MHz : 83.9dBuV/m (FCC 15.225(a))

*worst carrier and spurious level @ 3m

	Hor	Ver
carrier	51.6	53.3
spurious	39.2	42.2

[dBuV/m]

Spurious emission within the band

No.	FREQ [MHz]	Test Receiver Reading		Antenna Factor [dB/m]	LOSS [dB]	AMP GAIN [dB]	Distance factor [dB]	RESULT		LIMIT (30m) [dBuV/m]	MARGIN	
		Hor [dBuV]	Ver [dBuV]					Hor [dBuV/m]	Ver [dBuV/m]		Hor [dB]	Ver [dB]
1	13.110	30.2	30.3	19.1	6.4	31.9	-40.0	-16.2	-16.1	29.5	45.7	45.6
2	13.410	30.3	30.3	19.0	6.4	31.9	-40.0	-16.2	-16.2	40.5	56.7	56.7
3	13.553	44.2	45.7	19.0	6.4	31.9	-40.0	-2.3	-0.8	50.4	52.7	51.2
4	13.567	43.8	45.1	19.0	6.4	31.9	-40.0	-2.7	-1.4	50.4	53.1	51.8
5	13.710	30.3	30.3	19.0	6.4	31.9	-40.0	-16.2	-16.2	40.5	56.7	56.7
6	14.010	30.3	30.3	18.9	6.5	31.9	-40.0	-16.2	-16.2	29.5	45.7	45.7

Calculation: Result[dBuV/m]=Reading[dBuV]+Ant.Fac[dB/m]+Loss(Cable+ATT)[dB]-Gain(AMP)[dB]+Distance factor[dB]

Outside filed strength frequencies

- $F_c \pm 7\text{kHz}$: 13.553MHz to 13.567MHz
 - $F_c \pm 150\text{kHz}$: 13.410MHz to 13.710MHz
 - $F_c \pm 450\text{kHz}$: 13.110MHz to 14.010MHz
- $F_c = 13.56\text{MHz}$

Limits (30m)

- 13.410MHz to 13.553MHz and 13.567MHz to 13.710MHz : 50.4dBuV/m (FCC 15.225(b))
- 13.110MHz to 13.410MHz and 13.710MHz to 14.010MHz : 40.5dBuV/m (FCC 15.225(c))
- Below 13.110MHz and Above 14.010MHz : 29.5dBuV/m (FCC 15.225(d) and FCC 15.209)

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Radiated Emission

UL Japan, Inc.

Shonan EMC Lab. No.2 Semi Anechoic Chamber

Company: RICOH COMPANY, LTD
 Equipment: Multi Function Printer
 Model: Pro C7110SX
 Sample No.: V000000001
 Power: AC240V/60Hz
 Mode: Transmitting 13.56MHz

Regulation: FCC Part15 SubpartC 15.225
 Test Distance 3m
 Date: May 10, 2014
 Temperature: 22 deg.C
 Humidity: 42 %RH
 ENGINEER: Tatsuya Arai

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg.]	Remark	
Hori.	27.12	QP	30.3	19.8	-33.3	31.9	-15.1	29.5	44.6	-	102	Limit: 30m	
Hori.	40.68	QP	30.3	14.1	7.0	31.9	19.5	40.0	20.5	262	359	Limit: 3m	
Hori.	54.24	QP	27.2	9.4	7.2	31.9	11.9	40.0	28.1	349	8		
Hori.	67.80	QP	33.2	6.7	7.1	31.9	15.1	40.0	24.9	293	285		
Hori.	81.36	QP	34.0	6.6	8.0	31.9	16.7	40.0	23.3	249	282		
Hori.	94.92	QP	33.9	9.2	8.0	31.9	19.2	43.5	24.3	339	294		
Hori.	106.28	QP	48.5	11.1	7.9	31.9	35.6	43.5	7.9	305	275		
Hori.	108.48	QP	30.4	11.4	7.9	31.9	17.8	43.5	25.7	170	12		
Hori.	122.04	QP	33.1	13.2	7.9	31.9	22.3	43.5	21.2	372	81		
Hori.	135.60	QP	31.0	14.2	8.2	31.8	21.6	43.5	21.9	244	221		
Hori.	412.47	QP	44.5	16.3	7.2	31.7	36.3	46.0	9.7	100	166		
Hori.	625.01	QP	39.7	19.3	8.3	31.7	35.6	46.0	10.4	126	107		
Hori.	875.02	QP	38.9	21.9	9.4	31.0	39.2	46.0	6.8	176	174		
Vert.	27.12	QP	30.5	19.8	-33.3	31.9	-14.9	29.5	44.4	-	68		Limit: 30m
Vert.	40.68	QP	32.2	14.1	7.0	31.9	21.4	40.0	18.6	100	254		Limit: 3m
Vert.	54.24	QP	34.2	9.4	7.2	31.9	18.9	40.0	21.1	100	332		
Vert.	67.80	QP	35.6	6.7	7.1	31.9	17.5	40.0	22.5	100	3		
Vert.	81.36	QP	37.9	6.6	8.0	31.9	20.6	40.0	19.4	100	23		
Vert.	94.92	QP	40.9	9.2	8.0	31.9	26.2	43.5	17.3	100	348		
Vert.	106.28	QP	47.9	11.1	7.9	31.9	35.0	43.5	8.5	100	106		
Vert.	108.48	QP	34.0	11.4	7.9	31.9	21.4	43.5	22.1	100	352		
Vert.	122.04	QP	37.1	13.2	7.9	31.9	26.3	43.5	17.2	100	147		
Vert.	135.60	QP	34.1	14.2	8.2	31.8	24.7	43.5	18.8	100	131		
Vert.	412.46	QP	44.8	16.3	7.2	31.7	36.6	46.0	9.4	124	19		
Vert.	625.02	QP	46.3	19.3	8.3	31.7	42.2	46.0	3.8	114	129		
Vert.	875.02	QP	37.8	21.9	9.4	31.0	38.1	46.0	7.9	100	189		

Result (Below 30MHz) = Reading + Ant Factor + Loss (Cable+Attenuator+Distance factor) - Gain(Amplifier)

*Distance factor: $40 \times \log(3m/30m) = -40$ dB

Result (Above 30MHz) = Reading + Ant Factor + Loss (Cable+Attenuator) - Gain(Amplifier)

*Other frequency noises omitted in this report were not seen or have enough margin (more than 20dB).

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Data of Frequency Tolerance: FCC 15.225(e)

UL Japan, Inc.
Shonan EMC Lab. No.5 Shielded Room

Company: RICOH COMPANY, LTD
Equipment: Multi Function Printer
Model: Pro C7110SX
Sample No.: V000000001
Power: DC 5V (RFID Module)
Mode: Transmitting 13.56MHz

Regulation: FCC Part15 SubpartC 15.225
Date: May 9, 2014
Temperature: 25 deg.C
Humidity: 48 %RH
ENGINEER: Tatsuya Arai

Temperature Variation: 50deg.C

Test Conditions	Original Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (MHz)	Frequency Tolerance (%)	Limit (%)
startup	13.56	13.559909	-0.000091	-0.00067	0.01
after 2minutes	13.56	13.559910	-0.000090	-0.00066	0.01
after 5minutes	13.56	13.559909	-0.000091	-0.00067	0.01
after 10minutes	13.56	13.559909	-0.000091	-0.00067	0.01

Temperature Variation: 40deg.C

Test Conditions	Original Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (MHz)	Frequency Tolerance (%)	Limit (%)
startup	13.56	13.559906	-0.000094	-0.00069	0.01
after 2minutes	13.56	13.559907	-0.000093	-0.00069	0.01
after 5minutes	13.56	13.559907	-0.000093	-0.00069	0.01
after 10minutes	13.56	13.559907	-0.000093	-0.00069	0.01

Temperature Variation: 30deg.C

Test Conditions	Original Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (MHz)	Frequency Tolerance (%)	Limit (%)
startup	13.56	13.559912	-0.000088	-0.00065	0.01
after 2minutes	13.56	13.559911	-0.000089	-0.00066	0.01
after 5minutes	13.56	13.559912	-0.000088	-0.00065	0.01
after 10minutes	13.56	13.559912	-0.000088	-0.00065	0.01

Temperature Variation: 20deg.C

Test Conditions	Original Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (MHz)	Frequency Tolerance (%)	Limit (%)
startup	13.56	13.559918	-0.000082	-0.00060	0.01
after 2minutes	13.56	13.559918	-0.000082	-0.00060	0.01
after 5minutes	13.56	13.559918	-0.000082	-0.00060	0.01
after 10minutes	13.56	13.559918	-0.000082	-0.00060	0.01

Data of Frequency Tolerance: FCC 15.225(e)

UL Japan, Inc.

Shonan EMC Lab. No.5 Shielded Room

Company: RICOH COMPANY, LTD
 Equipment: Multi Function Printer
 Model: Pro C7110SX
 Sample No.: V000000001
 Power: DC 5V (RFID Module)
 Mode: Transmitting 13.56MHz

Regulation: FCC Part15 SubpartC 15.225
 Date: May 9, 2014
 Temperature: 25 deg.C
 Humidity: 48 %RH
 ENGINEER: Tatsuya Arai

Temperature Variation: 10deg.C

Test Conditions	Original Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (MHz)	Frequency Tolerance (%)	Limit (%)
startup	13.56	13.559914	-0.000086	-0.00063	0.01
after 2minutes	13.56	13.559915	-0.000085	-0.00063	0.01
after 5minutes	13.56	13.559916	-0.000084	-0.00062	0.01
after 10minutes	13.56	13.559915	-0.000085	-0.00063	0.01

Temperature Variation: 0deg.C

Test Conditions	Original Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (MHz)	Frequency Tolerance (%)	Limit (%)
startup	13.56	13.559891	-0.000109	-0.00080	0.01
after 2minutes	13.56	13.559893	-0.000107	-0.00079	0.01
after 5minutes	13.56	13.559894	-0.000106	-0.00078	0.01
after 10minutes	13.56	13.559894	-0.000106	-0.00078	0.01

Temperature Variation: -10deg.C

Test Conditions	Original Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (MHz)	Frequency Tolerance (%)	Limit (%)
startup	13.56	13.559848	-0.000152	-0.00112	0.01
after 2minutes	13.56	13.559850	-0.000150	-0.00111	0.01
after 5minutes	13.56	13.559852	-0.000148	-0.00109	0.01
after 10minutes	13.56	13.559852	-0.000148	-0.00109	0.01

Temperature Variation: -20deg.C

Test Conditions	Original Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (MHz)	Frequency Tolerance (%)	Limit (%)
startup	13.56	13.559761	-0.000239	-0.00176	0.01
after 2minutes	13.56	13.559765	-0.000235	-0.00173	0.01
after 5minutes	13.56	13.559768	-0.000232	-0.00171	0.01
after 10minutes	13.56	13.559771	-0.000229	-0.00169	0.01

Temperature Variation: -30deg.C

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (MHz)	Frequency Tolerance (%)	Limit (%)
startup	13.56	13.559654	-0.000346	-0.00255	0.01
after 2minutes	13.56	13.559661	-0.000339	-0.00250	0.01
after 5minutes	13.56	13.559661	-0.000339	-0.00250	0.01
after 10minutes	13.56	13.559661	-0.000339	-0.00250	0.01

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Data of Frequency Tolerance: FCC 15.225(e)

UL Japan, Inc.
Shonan EMC Lab. No.5 Shielded Room

Company: RICOH COMPANY, LTD
Equipment: Multi Function Printer
Model: Pro C7110SX
Sample No.: V0000000001
Power: DC 5V (RFID Module)
Mode: Transmitting 13.56MHz

Regulation: FCC Part15 SubpartC 15.225
Date: May 9, 2014
Temperature: 25 deg.C
Humidity: 48 %RH
ENGINEER: Tatsuya Arai

Input Voltage:DC4.25V (85%)

Temperature Variation: 20deg.C

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (MHz)	Frequency Tolerance (%)	Limit (%)
startup	13.56	13.559935	-0.000065	-0.00048	0.01
after 2minutes	13.56	13.559935	-0.000065	-0.00048	0.01
after 5minutes	13.56	13.559934	-0.000066	-0.00049	0.01
after 10minutes	13.56	13.559934	-0.000066	-0.00049	0.01

Input Voltage:DC5.75V (115%)

Temperature Variation: 20deg.C

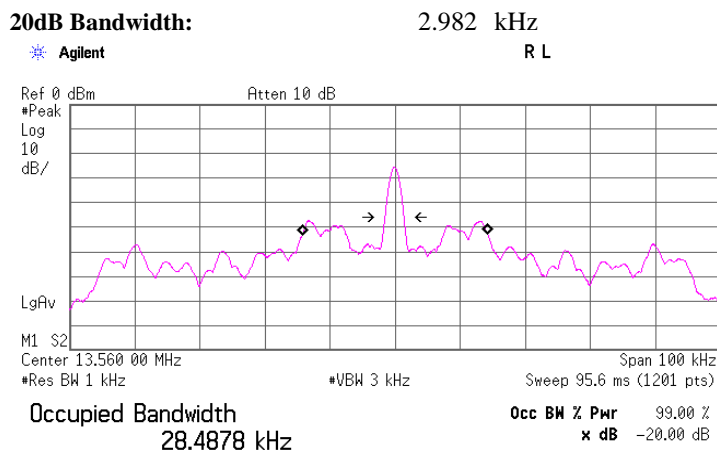
Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (MHz)	Frequency Tolerance (%)	Limit (%)
startup	13.56	13.559935	-0.000065	-0.00048	0.01
after 2minutes	13.56	13.559934	-0.000066	-0.00049	0.01
after 5minutes	13.56	13.559934	-0.000066	-0.00049	0.01
after 10minutes	13.56	13.559933	-0.000067	-0.00049	0.01

20dB bandwidth & 99% Occupied bandwidth: FCC 15.215 / RSS-Gen

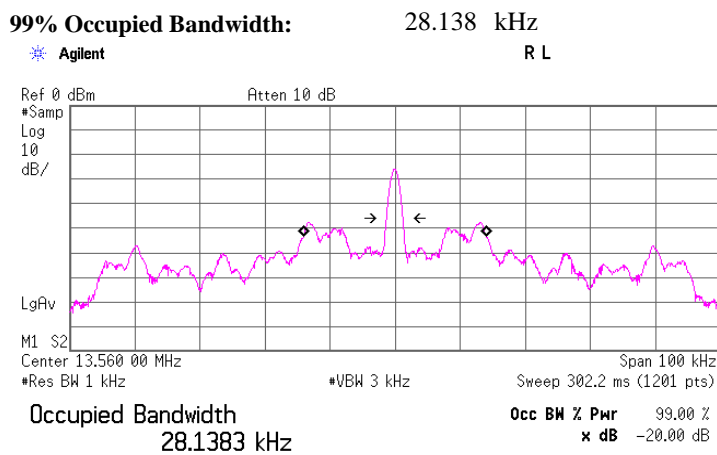
UL Japan, Inc.
Shonan EMC Lab. No.5 Shielded Room

Company: RICOH COMPANY, LTD
Equipment: Multi Function Printer
Model: Pro C7110SX
Sample No.: V0000000001
Power: DC 5V (RFID Module)
Mode: Transmitting 13.56MHz

Regulation: FCC Part15 Subpart C 15.215
Date: May 9, 2014
Temperature: 25 deg.C
Humidity: 48 %RH
ENGINEER: Tatsuya Arai



Transmit Freq Error 18.144 Hz
Occupied Bandwidth 2.982 kHz



Transmit Freq Error -11.742 Hz
Occupied Bandwidth 2.592 kHz*

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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)
SFC-01	Microwave Counter	Agilent	53151A	US40511493	FT	2014/04/01 * 12
SCH-01	Temperature and Humidity Chamber	Espec	PL-1KT	14020837	FT	2014/04/15 * 12
SSA-03	Spectrum Analyzer	Agilent	E4448A	MY48250152	BW	2014/02/03 * 12
SSCA-01	Search coil	LANGER	RF-R 400-1	02-0634	FT/BW	Pre Check
SOS-09	Humidity Indicator	A&D	AD-5681	4061484	FT/BW	2014/03/07 * 12
SAF-02	Pre Amplifier	SONOMA	310N	290212	RE	2014/02/17 * 12
SAT6-02	Attenuator	JFW	50HF-006N	-	RE	2014/02/17 * 12
KAT3-11	Attenuator	JFW IND. INC.	50HF-003N	-	RE	2013/08/19 * 12
SBA-02	Biconical Antenna	Schwarzbeck	BBA9106	91032665	RE	2013/11/24 * 12
SCC-B1/B3/B5/B7/B8/B13/SRSE-02	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-270(RF Selector)	RE	2014/04/25 * 12
SCC-B2/B4/B6/B7/B8/B13/SRSE-02	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-270(RF Selector)	RE	2014/04/25 * 12
SLA-02	Logperiodic Antenna	Schwarzbeck	UHALP9108A	UHALP 9108-A 0893	RE	2013/11/24 * 12
SOS-03	Humidity Indicator	A&D	AD-5681	4063325	RE/CE	2014/02/21 * 12
STR-07	Test Receiver	Rohde & Schwarz	ESU26	100484	RE/CE	2014/02/18 * 12
SJM-14	Measure	ASKUL	-	-	RE/CE	-
SAEC-02(NSA)	Semi-Anechoic Chamber	TDK	SAEC-02(NSA)	2	RE	2013/07/06 * 12
COTS-SEMI-1	EMI Software	TJSJ	TEPTO-DV(RE,CE,RFI,MF)	-	RE/CE	-
SLP-02	Loop Antenna	Rohde & Schwarz	HFH2-Z2	100218	RE	2013/11/08 * 12
SAT6-07	Attenuator	JFW	50HF-006N	-	RE	2014/02/17 * 12
SCC-B9/B10/B11/B13/SRSE-02	Coaxial Cable&RF Selector	Suhner/Fujikura/Suhner/Suhner/TOYO	RG223U/12DSFA/141PE/NS4906	-/0901-270(RF Selector)	CE	2014/04/25 * 12
SLS-07	LISN	Schwarzbeck	NSLK8126	8126441	CE(EUT)	2014/05/16 * 12
SLS-06	LISN	Schwarzbeck	NSLK8126	8126440	CE(EUT)	2014/04/16 * 12
SLS-01	LISN	Rohde & Schwarz	ENV216	100511	CE	2014/02/14 * 12
SAT3-06	Attenuator	JFW	50HF-003N	-	CE	2014/02/17 * 12
STM-03	Terminator	TME	CT-01 BP	-	CE	2013/12/26 * 12
STM-04	Terminator	TME	CT-01 BP	-	CE	2013/12/26 * 12
SHF-02	Highpass Filter	Rohde & Schwarz	EZ-25	100022	CE	2014/03/11 * 12
SCC-02	Coaxial Cable	Fujikura	5D2W	-	CE	2014/01/07 * 12

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

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

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

Test Item :

CE: Conducted emission,
RE: Radiated emission,
BW: Bandwidth,
FT: Frequency tolerance