



RADIO TEST REPORT

Test Report No.: 11835012S-H-R2

Applicant : Ricoh Company, Ltd.
Type of Equipment : Color Copier
Model No. : Pro C7210SX
FCC ID : BBP-RFTAU03
Test regulation : FCC Part 15 Subpart C: 2017
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 the limits of the above regulation.
4. The test results in this test report are traceable to the national or international standards.
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6. The opinions and the interpretations to the result of the description in this report are outside scopes where UL Japan has been accredited.
7. This test report covers Radio technical requirements.
It does not cover administrative issues such as Manual or non-Radio test related Requirements. (if applicable)
8. This report is a revised version of 11835012S-H-R1. 11835012S-H-R1 is replaced with this report.

Date of test: July 11 to August 2, 2017

Representative test engineer:

Hiroyuki Morikawa

Engineer

Consumer Technology Division

Approved by :

Ichiro Isozaki

Manager

Consumer Technology Division



- ☐ The testing in which "Non-accreditation" is displayed is outside the accreditation scopes in UL Japan.
☒ 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 : 2-7-1 Izumi, Ebina-shi, Kanagawa, 243-0460 Japan
Telephone Number : +81-46-249-8146
Facsimile Number : +81-3-3778-8609
Contact Person : Naohito Yazaki

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

2.1 Identification of E.U.T.

Type of Equipment : Color Copier
Model No. : Pro C7210SX
Serial No. : Refer to Section 4, Clause 4.2
Rating : AC 208 V - 240 V, 50 Hz / 60 Hz
Receipt Date of Sample : June 26, 2017
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 Variation of the family model(s)

- Pro C7200SX
- Pro C7210SX (Tested model)
- Pro C7200X
- Pro C7210X

The difference of these models is as follows.

Model	Scanner Unit (Scanner & Copy Function)	Copy Speed	Print Speed
Pro C7200SX	Equipped	85 ppm	85 ppm
Pro C7210SX	Equipped	95 ppm	95 ppm
Pro C7200X	Not Equipped	None	85 ppm
Pro C7210X	Not Equipped	None	95 ppm

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2.3 Product description

Model: Pro C7210SX (referred to as the EUT in this report) is a Color Copier.

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>

Equipment type	:	Transceiver
Frequency of operation	:	13.56 MHz
Type of modulation	:	ASK
ITU code	:	A1D
Power Supply (inner)	:	DC 5.0 V
Antenna type	:	Print pattern antenna

The clock frequency used in EUT:

Frequency	Derived Frequency	Description of Use	Remarks
13.56 MHz	13.56 MHz	RFID CPU	

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SECTION 3: Test specification, procedures & results

3.1 Test specification

Test specification : FCC Part 15 Subpart C
FCC Part 15 final revised on September 20, 2017 and effective October 20, 2017
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 13.110-14.010 MHz

* All the revisions made after testing date do not affect the test specification applied to the EUT.

3.2 Procedures & Results

Item	Test Procedure	Specification	Remarks	Deviation	Worst Margin	Results
Conducted emission	ANSI C63.10:2013 6 Standard test methods <IC>RSS-Gen 8.8	FCC 15.207 ----- <IC> RSS-Gen 8.8	-	N/A	3.4 dB Freq.: 4.49700 MHz Detection: AV Phase: L1 Line: Main	Complied
Electric field strength of Fundamental emission	ANSI C63.10:2013 6 Standard test methods <IC>RSS-Gen 6.4, 6.12	FCC 15.225 (a) ----- <IC> RSS-210 B.6	Radiated	N/A	83.4 dB Polarization: Horizontal	Complied
Electric field strength of Spurious emission (within the 13.110-14.010 MHz band)	ANSI C63.10:2013 6 Standard test methods <IC>RSS-Gen 6.4, 6.13	FCC 15.225 (b)(c) ----- <IC> RSS-210 B.6	Radiated	N/A	45.7 dB Freq.: 13.110 MHz Polarization: Horizontal & Vertical, Freq.: 14.010 MHz Polarization: Horizontal	Complied
Electric field strength of Spurious emission (outside of the 13.110-14.010 MHz band)	ANSI C63.10:2013 6 Standard test methods <IC>RSS-Gen 6.4, 6.13	FCC 15.209 FCC 15.225 (d) ----- <IC> RSS-210 B.6	Radiated	N/A	9.6 dB Freq.: 569.521 MHz Polarization: Horizontal	Complied
20dB bandwidth	ANSI C63.10:2013 6 Standard test methods <IC> -	FCC 15.215 (c) ----- <IC> -	Radiated	N/A	-	-
Frequency tolerance	ANSI C63.10:2013 6 Standard test methods <IC> RSS-Gen 6.11, 8.11	FCC 15.225 (e) ----- <IC> RSS-210 B.6	Radiated	N/A	-	Complied

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

FCC Part 15.31 (e)

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

FCC Part 15.203

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

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3.3 Addition to standard

Item	Test Procedure	Specification	Remarks	Worst Margin	Results
Occupied Bandwidth (99 %)	RSS-Gen 6.6	-	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.

3.4 Uncertainty

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

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Item	Frequency range	Uncertainty (+/-)				
		No. 1 SAC / SR	No. 2 SAC / SR	No. 3 SAC / SR	No. 4 SAC / SR	No. 5,6,8 SR
Conducted emission (AC Mains) LISN	150 kHz-30 MHz	2.6 dB	2.5 dB	2.6 dB	2.5 dB	2.5 dB
Radiated emission (Measurement distance: 3 m)	9 kHz-30 MHz	3.1 dB	3.1 dB	3.1 dB	-	-
	30 MHz-200 MHz	4.6 dB	4.4 dB	4.6 dB	-	-
	200 MHz-1 GHz	5.8 dB	5.7 dB	5.8 dB	-	-
	1 GHz-13 GHz	4.9 dB	4.9 dB	4.9 dB	-	-

SAC=Semi-Anechoic Chamber

SR= Shielded Room is applied besides radiated emission

Antenna terminal test	Uncertainty (+/-)
Power Measurement above 1 GHz (Average Detector)_SPM-06	0.72 dB
Power Measurement above 1 GHz (Peak Detector)_SPM-06	0.85 dB
Power Measurement above 1 GHz (Average Detector)_SPM-07	0.74 dB
Power Measurement above 1 GHz (Peak Detector)_SPM-07	0.91 dB
Spurious emission (Conducted) below 1GHz	1.6 dB
Spurious emission (Conducted) 1 GHz-3 GHz	1.3 dB
Spurious emission (Conducted) 3 GHz-18 GHz	2.2 dB
Spurious emission (Conducted) 18 GHz-26.5 GHz	2.3 dB
Spurious emission (Conducted) 26.5 GHz-40 GHz	2.4 dB
Bandwidth Measurement	1.01 %
Duty cycle and Time Measurement	0.012 %

Conducted emission

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

Radiated emission

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

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3.5 Test location

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JAB Accreditation No. RTL02610

Test site	IC Registration Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Maximum measurement distance
No.1 Semi-anechoic chamber	2973D-1	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
No.2 Semi-anechoic chamber	2973D-2	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
No.3 Semi-anechoic chamber	2973D-3	12.7 x 7.7 x 5.35	12.7 x 7.7	5m
No.4 Semi-anechoic chamber	-	8.1 x 5.1 x 3.55	8.1 x 5.1	-
No.1 Shielded room	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
No.2 Shielded room	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
No.3 Shielded room	-	6.3 x 4.7 x 2.7	6.3 x 4.7	-
No.4 Shielded room	-	4.4 x 4.7 x 2.7	4.4 x 4.7	-
No.5 Shielded room	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
No.6 Shielded room	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
No.8 shielded room	-	3.45 x 5.5 x 2.4	3.45 x 5.5	-
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

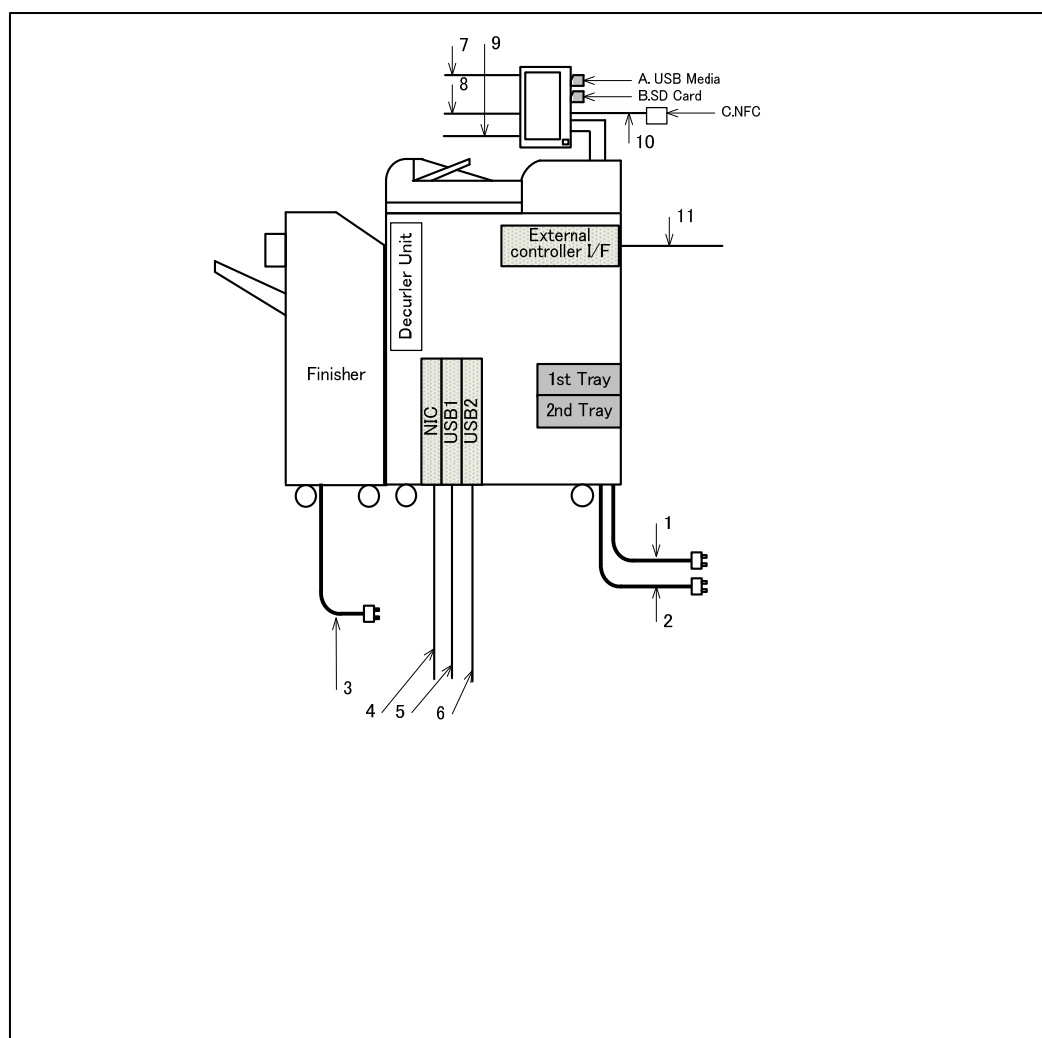
The EUT exercise program used during testing was designed to exercise the various system components in a manner similar to typical use.

Test item	Operating mode	Tested frequency
All items except for Frequency tolerances	Transmitting (ASK), 26 byte 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, CRC, CRC	13.56 MHz
Frequency tolerances	Transmitting Unmodulated	13.56 MHz

Software for testing: System/Copy Ver. 0.26.1, Engine Ver. 0.36.03

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

4.2 Configuration and peripherals



* 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
Color Copier	RICOH/D0AM-17	Pro C7210SX	C887F6C0001	AC 240 V/60 Hz

* RFID module is installed in the Color Copier.

Auxiliary equipment

Item	Kind of equipment	Manufacturer	Model name	Serial number	Remarks
-	Finisher	RICOH (Code: D734-27)	Booklet Finisher SR5060	3Q71110062	AC 120 V/60 Hz
A	USB memory	TOSHIBA	U2P-008GT	1101BB1029K2JM1	To Color Copier
B	SD Card	TOSHIBA	EXCERIA	SU016GCEAH31402 WK6689C	To Color Copier
C	NFC	RICOH	TR63036	TR00001161	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	AC 240 V/60 Hz
2	Power Cable	RICOH	4.0	No	Plastic	AC 240 V/60 Hz
3	Power Cable	RICOH	2.5	No	Plastic	AC 120 V/60 Hz
4	LAN Cable	ELECOM	3.0	No	Plastic	PC-Printer
5	USB Cable	-	2.0	Yes	Plastic	
6	USB Cable	-	1.8	Yes	Plastic	
7	USB Cable	-	1.8	Yes	Plastic	
8	USB Cable	-	1.8	Yes	Plastic	
9	USB Cable	-	1.8	Yes	Plastic	
10	USB Cable	-	0.8	Yes	Plastic	
11	LAN Cable	-	1.0	Yes	Plastic	

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SECTION 5: Conducted emission

5.1 Operating environment

Test place : See test data (APPENDIX 1)
Temperature : See test data (APPENDIX 1)
Humidity : See test data (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 80 cm 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 30 cm to 40 cm 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 50 Ω connectors of the LISN were resistively terminated in 50 Ω 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 MHz - 30 MHz
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 : 9 kHz

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

Test place : See test data (APPENDIX 1)
Temperature : See test data (APPENDIX 1)
Humidity : See test data (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 1.

6.3 Test conditions

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

6.4 Test procedure

The Radiated Electric Field Strength intensity has been measured on a semi-anechoic chamber with a ground plane at a distance of 3 m.

Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against 30 m open area 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 414788. These tests were performed in semi anechoic chamber. Therefore the measured level of emissions may be higher than if measurements were made without a ground plane. However test results were confirmed to pass against standard limit.

The Radiated Electric Field Strength intensity has been measured with a ground plane and at a distance of 3 m

Frequency: From 9 kHz to 30 MHz at distance 3 m

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: 0 deg.to 360 deg.) and horizontal polarization. Drawing of the antenna direction is shown in Figure 1.

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

The measuring antenna height was varied between 1 and 4 m 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.

	9 kHz to 90 kHz & 110 kHz to 150 kHz	90 kHz to 110 kHz	150 kHz to 490 kHz	490 kHz to 30 MHz	30 MHz to 1 GHz
Detector Type	PK/AV	QP	PK/AV	QP	QP
IF Bandwidth	200 Hz	200 Hz	9 kHz	9 kHz	120 kHz
Measuring antenna	Loop antenna				Biconical (30 MHz-199.99 MHz) Logperiodic (200 MHz-1 GHz)

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

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

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

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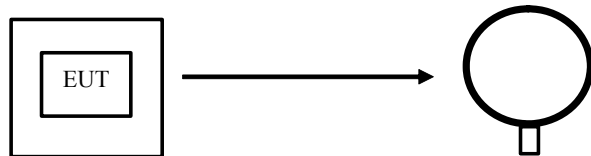
6.5 Results

Summary of the test results : Pass
No spurious emissions exceeded the fundamental emission level.

Refer to APPENDIX 1.

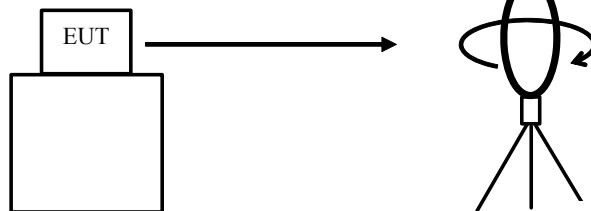
Figure 1. Direction of the Loop Antenna

Horizontal (Top View)

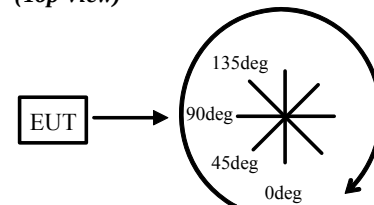


Antenna was not rotated.

Vertical (Side View)

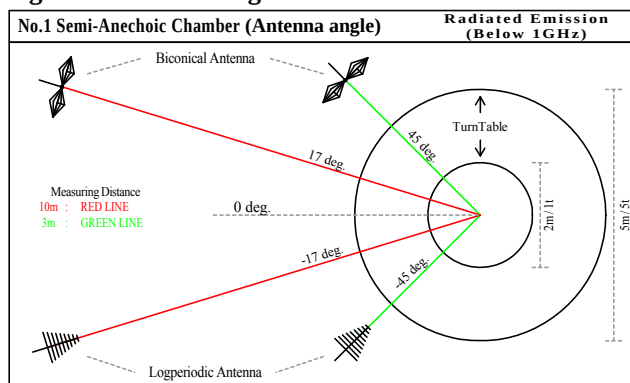


(Top View)



Front side: 0 deg.
Forward direction: clockwise

Figure 2. Antenna angle



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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.

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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DATA OF CONDUCTED EMISSION TEST

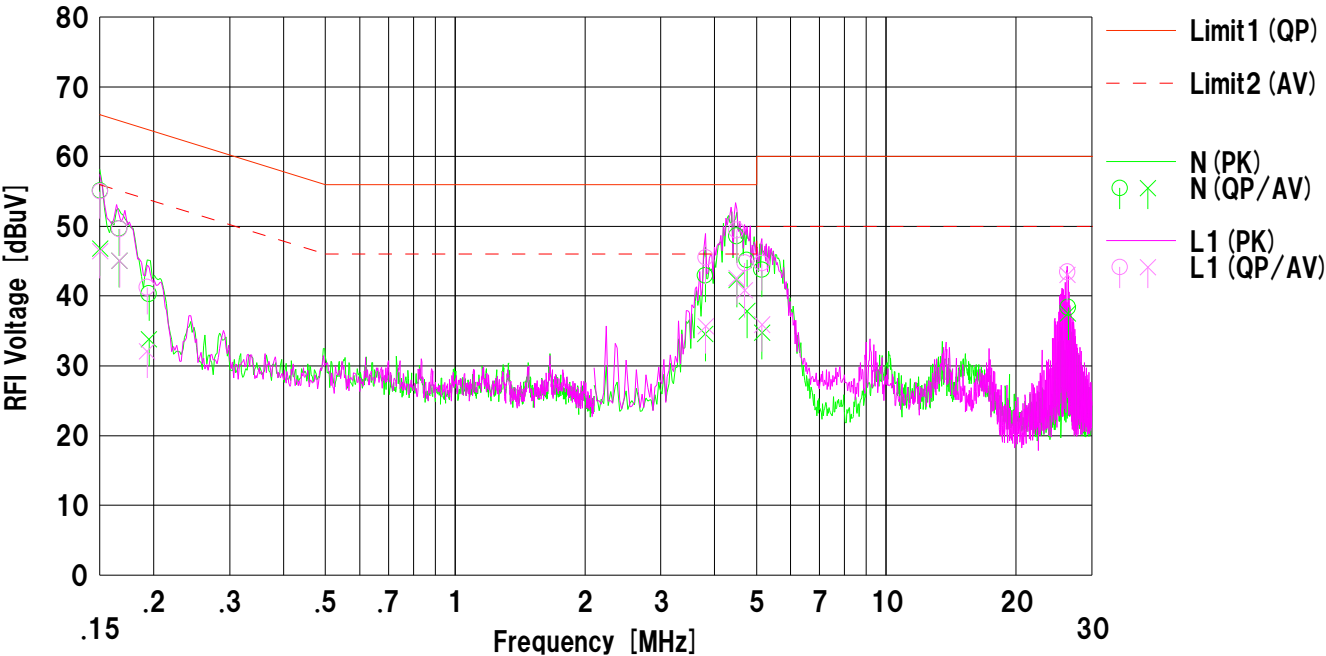
UL Japan,Inc. Shonan EMC Lab. No.1 Semi-Anechoic Chamber
Date : 2017/08/02

Company : RICOH COMPANY,LTD.
Kind of EUT : Color Copier
Model No. : Pro C7210SX
Serial No. : Refer to Section 4.2
Remarks : Main

Mode : Transmitting
Order No. : 11835012S
Power : AC 240 V / 60 Hz
Temp./Humi. : 24 deg.C / 61 %RH

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

Engineer : Takahiro Suzuki



No.	Freq. [MHz]	Reading		C.Fac [dB]	Results		Limit		Margin		Phase	Comment
		<QP>	<AV>		<QP>	<AV>	<QP>	<AV>	<QP>	<AV>		
		[dBuV]	[dBuV]		[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.15000	41.34	33.02	13.78	55.12	46.80	66.00	56.00	10.8	9.2	N	
2	0.16625	36.23	31.64	13.43	49.66	45.07	65.15	55.15	15.4	10.0	N	
3	0.19512	27.50	21.03	12.82	40.32	33.85	63.82	53.82	23.5	19.9	N	
4	3.80869	30.13	21.72	12.84	42.97	34.56	56.00	46.00	13.0	11.4	N	
5	4.49660	35.70	29.37	12.91	48.61	42.28	56.00	46.00	7.3	3.7	N	
6	4.75542	32.27	24.91	12.93	45.20	37.84	56.00	46.00	10.8	8.1	N	
7	5.14725	30.81	21.81	12.97	43.78	34.78	60.00	50.00	16.2	15.2	N	
8	26.44172	23.91	23.05	14.48	38.39	37.53	60.00	50.00	21.6	12.4	N	
9	0.15000	41.22	32.65	13.78	55.00	46.43	66.00	56.00	11.0	9.5	L1	
10	0.16664	36.20	31.65	13.42	49.62	45.07	65.13	55.13	15.5	10.0	L1	
11	0.19295	28.39	19.23	12.86	41.25	32.09	63.91	53.91	22.6	21.8	L1	
12	3.81106	32.71	22.82	12.84	45.55	35.66	56.00	46.00	10.4	10.3	L1	
13	4.49700	36.53	29.68	12.91	49.44	42.59	56.00	46.00	6.5	3.4	L1	
14	4.69768	31.82	27.87	12.93	44.75	40.80	56.00	46.00	11.2	5.2	L1	
15	5.14842	31.71	22.93	12.97	44.68	35.90	60.00	50.00	15.3	14.1	L1	
16	26.31156	29.00	28.57	14.46	43.46	43.03	60.00	50.00	16.5	6.9	L1	

DATA OF CONDUCTED EMISSION TEST

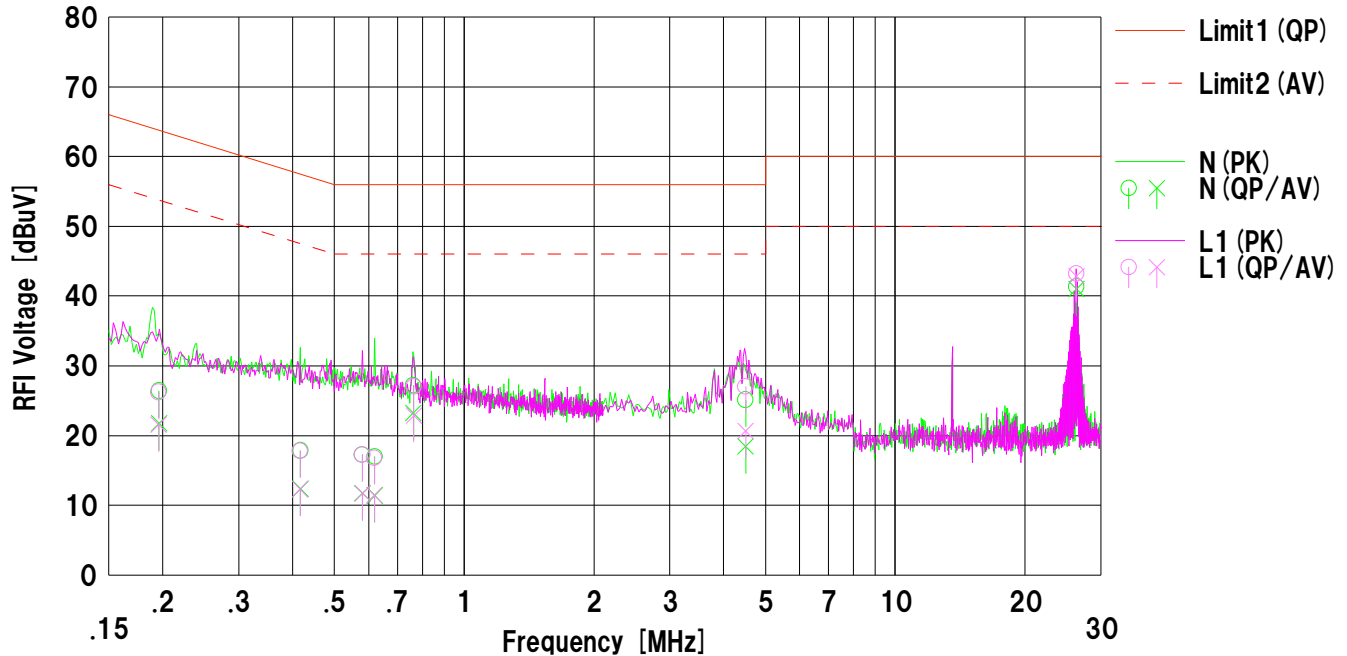
UL Japan,Inc. Shonan EMC Lab. No.1 Semi-Anechoic Chamber
Date : 2017/08/02

Company : RICOH COMPANY,LTD.
Kind of EUT : Color Copier
Model No. : Pro C7210SX
Serial No. : Refer to Section 4.2
Remarks : Sub

Mode : Transmitting
Order No. : 11835012S
Power : AC 240 V / 60 Hz
Temp./Humi. : 24 deg.C / 61 %RH

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

Engineer : Takahiro Suzuki



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	0.19599	13.60	8.94	12.82	26.42	21.76	63.78	53.78	37.3	32.0	N	
2	0.41748	5.26	-0.21	12.60	17.86	12.39	57.50	47.50	39.6	35.1	N	
3	0.58062	4.67	-0.88	12.57	17.24	11.69	56.00	46.00	38.7	34.3	N	
4	0.62054	4.42	-1.16	12.57	16.99	11.41	56.00	46.00	39.0	34.5	N	
5	0.76322	14.64	10.62	12.58	27.22	23.20	56.00	46.00	28.7	22.8	N	
6	4.49952	12.20	5.51	12.92	25.12	18.43	56.00	46.00	30.8	27.5	N	
7	26.30879	26.89	26.53	14.45	41.34	40.98	60.00	50.00	18.6	9.0	N	
8	0.19548	13.40	8.73	12.83	26.23	21.56	63.80	53.80	37.5	32.2	L1	
9	0.41634	5.23	-0.29	12.60	17.83	12.31	57.52	47.52	39.6	35.2	L1	
10	0.58133	4.70	-0.83	12.57	17.27	11.74	56.00	46.00	38.7	34.2	L1	
11	0.61928	4.23	-1.11	12.57	16.80	11.46	56.00	46.00	39.2	34.5	L1	
12	0.76444	14.46	10.30	12.58	27.04	22.88	56.00	46.00	28.9	23.1	L1	
13	4.49808	14.11	7.72	12.92	27.03	20.64	56.00	46.00	28.9	25.3	L1	
14	26.30764	28.76	28.41	14.45	43.21	42.86	60.00	50.00	16.7	7.1	L1	

Calculation: Result [dBuV] = Reading [dBuV] + C.Fac (LISN (AMN) + Cable + HighPassFilter) [dB]
LISN (AMN) = SLS-08

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.1 Semi Anechoic Chamber

Company: RICOH COMPANY,LTD.
Equipment: Color Copier
Model: Pro C7210SX
Sample No.: Refer to Section 4.2
Power: AC 240 V / 60 Hz
Mode: Transmitting 13.56 MHz

Regulation: FCC Part15 Subpart C 15.225
Test Distance: 3 m
Date: July 11, 2017
Temperature: 24 deg.C
Humidity: 66 %RH
ENGINEER: Tatsuya Arai

Remarks: : Vertical polarization (antenna angle) of the worst case: 45deg

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	46.8	45.9	18.9	6.7	31.8	-40.0	0.5	-0.4	83.9	83.4	84.3

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))

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	30.0	30.0	19.0	6.7	31.8	-40.0	-16.2	-16.2	29.5	45.7	45.7
2	13.410	30.1	30.0	18.9	6.7	31.8	-40.0	-16.2	-16.25	40.5	56.7	56.8
3	13.553	34.5	33.7	18.9	6.7	31.8	-40.0	-11.8	-12.6	50.4	62.2	63.0
4	13.567	34.3	33.5	18.9	6.7	31.8	-40.0	-12.0	-12.8	50.4	62.4	63.2
5	13.710	30.1	30.1	18.8	6.7	31.8	-40.0	-16.2	-16.19	40.5	56.7	56.7
6	14.010	30.2	30.1	18.8	6.7	31.8	-40.0	-16.2	-16.29	29.5	45.7	45.8

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

Outside filed strength frequencies

• Fc±7 kHz: 13.553 MHz to 13.567 MHz

• Fc±150 kHz: 13.410 MHz to 13.710 MHz

• Fc±450 kHz: 13.110 MHz to 14.010 MHz

Fc = 13.56 MHz

Limits (30 m)

• 13.410 MHz to 13.553 MHz and 13.567 MHz to 13.710 MHz : 50.4 dBuV/m (FCC 15.225(b))

• 13.110 MHz to 13.410 MHz and 13.710 MHz to 14.010 MHz : 40.5 dBuV/m (FCC 15.225(c))

• Below 13.110 MHz and Above 14.010 MHz : 29.5 dBuV/m (FCC 15.225(d)and FCC 15.209)

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Radiated Emission

UL Japan, Inc.

Shonan EMC Lab. No.1 Semi Anechoic Chamber

Company: RICOH COMPANY,LTD.
 Equipment: Color Copier
 Model: Pro C7210SX
 Sample No.: Refer to Section 4.2
 Power: AC 240 V / 60 Hz
 Mode: Transmitting 13.56 MHz

Regulation: FCC Part15 Subpart C 15.225
 Test Distance: 3 m
 Date: July 11, 2017
 Temperature: 24 deg.C
 Humidity: 66 %RH
 ENGINEER: Tatsuya Arai

Remarks:

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	27.12	QP	30.4	18.6	7.0	31.8	-40.0	-15.8	29.5	45.3	-	8	* Limit: 30m
Hori.	40.680	QP	28.1	14.2	7.3	31.8	0.0	17.7	40.0	22.3	220	77	
Hori.	54.240	QP	31.2	9.6	7.4	31.8	0.0	16.4	40.0	23.7	334	15	
Hori.	67.800	QP	32.4	6.7	7.4	31.8	0.0	14.6	40.0	25.4	289	27	
Hori.	81.360	QP	30.8	6.5	8.4	31.8	0.0	13.9	40.0	26.1	400	353	
Hori.	94.92	QP	30.7	9.1	8.3	31.8	0.0	16.4	43.5	27.2	331	172	
Hori.	108.480	QP	34.9	11.4	8.2	31.8	0.0	22.6	43.5	20.9	274	145	
Hori.	122.040	QP	29.9	13.2	8.2	31.8	0.0	19.5	43.5	24.0	272	296	
Hori.	135.600	QP	31.8	14.1	8.5	31.8	0.0	22.6	43.5	20.9	231	322	
Hori.	569.521	QP	41.2	18.7	8.5	32.0	0.0	36.4	46.0	9.6	100	35	
Hori.	750.01	QP	37.3	20.3	9.3	32.0	0.0	34.9	46.0	11.1	115	53	
Vert.	27.12	QP	31.2	18.6	7.0	31.8	-40.0	-15.1	29.5	44.6	-	281	* Limit: 30m
Vert.	40.680	QP	29.2	14.2	7.3	31.8	0.0	18.8	40.0	21.2	100	288	
Vert.	54.240	QP	35.6	9.6	7.4	31.8	0.0	20.8	40.0	19.2	100	255	
Vert.	67.800	QP	36.3	6.7	7.4	31.8	0.0	18.6	40.0	21.4	100	291	
Vert.	81.361	QP	35.5	6.5	8.4	31.8	0.0	18.6	40.0	21.4	136	242	
Vert.	94.920	QP	36.9	9.1	8.3	31.8	0.0	22.5	43.5	21.0	100	224	
Vert.	108.480	QP	42.1	11.4	8.2	31.8	0.0	29.8	43.5	13.7	100	238	
Vert.	122.04	QP	34.4	13.2	8.2	31.8	0.0	24.0	43.5	19.5	100	218	
Vert.	135.60	QP	34.2	14.1	8.5	31.8	0.0	25.0	43.5	18.5	100	238	
Vert.	550.00	QP	34.8	18.4	8.4	32.0	0.0	29.6	46.0	16.4	100	151	

Result = Reading + Ant Factor + Loss (Cable+ATT+ΔAF(above 30MHz)) - Gain(Amplifier) + Distance factor(below 30MHz)

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

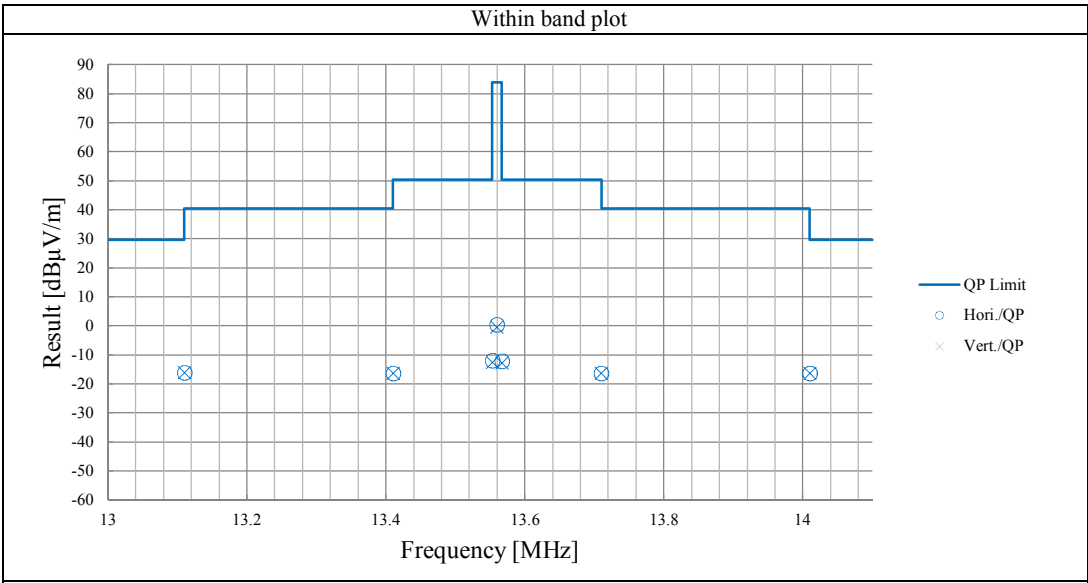
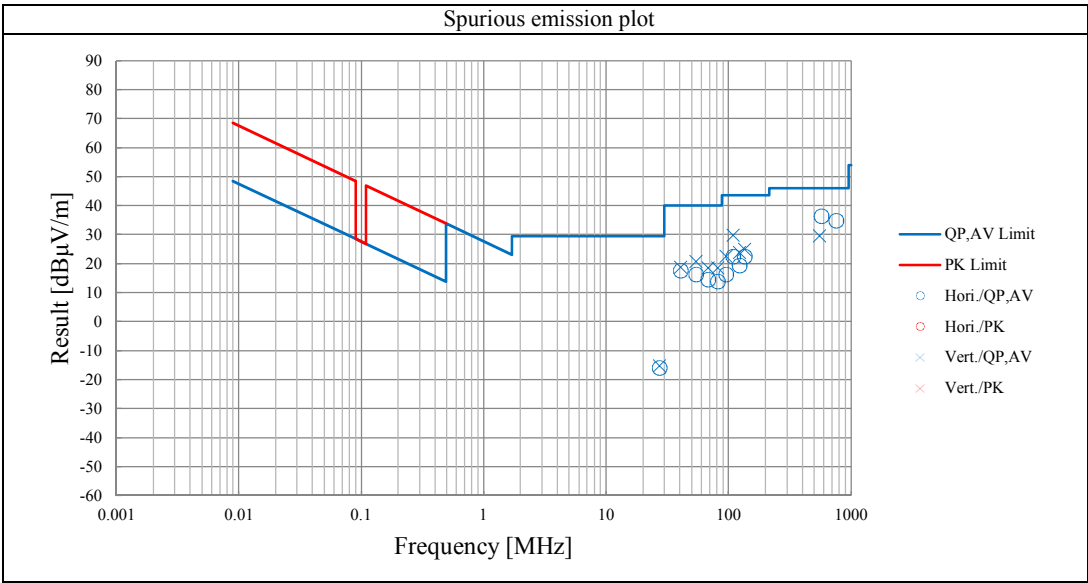
* Carrier level (Result at 3m): Hor= 40.5dBuV/m, Ver= 39.6 dBuV/m

Radiated Emission (Worst mode plot)

UL Japan, Inc.
Shonan EMC Lab. No.1 Semi Anechoic Chamber

Company:	RICOH COMPANY,LTD.	Regulation:	FCC Part15 Subpart C 15.225
Equipment:	Color Copier	Test Distance:	3 m
Model:	Pro C7210SX	Date:	July 11, 2017
Sample No.:	Refer to Section 4.2	Temperature:	24 deg.C
Power:	AC 240 V / 60 Hz	Humidity:	66 %RH
Mode:	Transmitting 13.56 MHz	ENGINEER:	Tatsuya Arai

Remarks: These plots data contains sufficient number to show the trend of characteristic features for EUT.



Data of Frequency Tolerance

UL Japan, Inc.

Shonan EMC Lab. No.5 Shielded room

Company RICOH COMPANY,LTD.
 Equipment Color Copier
 Model Pro C7210SX
 Serial No. Refer to Section 4.2
 Power DC 5V
 Mode Transmitting 13.56 MHz

Regulation FCC Part15 Subpart C 15.225 (e)
 Date July 19, 2017
 Temperature 24 deg.C
 Humidity 42 %RH
 ENGINEER Hiroyuki Morikawa

Temperature Variation: -20deg.C

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (MHz)	Frequency tolerance (%)	Limit (%)
startup	13.56	13.559776	-0.000224	-0.00165	0.010
after 2minutes	13.56	13.559784	-0.000216	-0.00159	0.010
after 5minutes	13.56	13.559784	-0.000216	-0.00159	0.010
after 10minutes	13.56	13.559784	-0.000216	-0.00159	0.010

Temperature Variation: -10deg.C

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (MHz)	Frequency tolerance (%)	Limit (%)
startup	13.56	13.559851	-0.000149	-0.00110	0.010
after 2minutes	13.56	13.559855	-0.000145	-0.00107	0.010
after 5minutes	13.56	13.559855	-0.000145	-0.00107	0.010
after 10minutes	13.56	13.559855	-0.000145	-0.00107	0.010

Temperature Variation: 0deg.C

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (MHz)	Frequency tolerance (%)	Limit (%)
startup	13.56	13.559884	-0.000116	-0.00086	0.010
after 2minutes	13.56	13.559886	-0.000114	-0.00084	0.010
after 5minutes	13.56	13.559886	-0.000114	-0.00084	0.010
after 10minutes	13.56	13.559886	-0.000114	-0.00084	0.010

Temperature Variation: 10deg.C

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (MHz)	Frequency tolerance (%)	Limit (%)
startup	13.56	13.559894	-0.000106	-0.00078	0.010
after 2minutes	13.56	13.559894	-0.000106	-0.00078	0.010
after 5minutes	13.56	13.559894	-0.000106	-0.00078	0.010
after 10minutes	13.56	13.559894	-0.000106	-0.00078	0.010

Temperature Variation: 20deg.C

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (MHz)	Frequency tolerance (%)	Limit (%)
startup	13.56	13.559883	-0.000117	-0.00086	0.010
after 2minutes	13.56	13.559883	-0.000117	-0.00086	0.010
after 5minutes	13.56	13.559883	-0.000117	-0.00086	0.010
after 10minutes	13.56	13.559883	-0.000117	-0.00086	0.010

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Data of Frequency Tolerance

Temperature Variation: 30deg.C

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (MHz)	Frequency tolerance (%)	Limit (%)
startup	13.56	13.559864	-0.000136	-0.00100	0.010
after 2minutes	13.56	13.559864	-0.000136	-0.00100	0.010
after 5minutes	13.56	13.559864	-0.000136	-0.00100	0.010
after 10minutes	13.56	13.559864	-0.000136	-0.00100	0.010

Temperature Variation: 40deg.C

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (MHz)	Frequency tolerance (%)	Limit (%)
startup	13.56	13.559847	-0.000153	-0.00113	0.010
after 2minutes	13.56	13.559847	-0.000153	-0.00113	0.010
after 5minutes	13.56	13.559847	-0.000153	-0.00113	0.010
after 10minutes	13.56	13.559847	-0.000153	-0.00113	0.010

Temperature Variation: 50deg.C

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (MHz)	Frequency tolerance (%)	Limit (%)
startup	13.56	13.559837	-0.000163	-0.00120	0.010
after 2minutes	13.56	13.559837	-0.000163	-0.00120	0.010
after 5minutes	13.56	13.559837	-0.000163	-0.00120	0.010
after 10minutes	13.56	13.559837	-0.000163	-0.00120	0.010

Data of Frequency Tolerance

UL Japan, Inc.

Shonan EMC Lab. No.5 Shielded room

Company RICOH COMPANY,LTD.

Equipment Color Copier

Model Pro C7210SX

Serial No. Refer to Section 4.2

Power DC 5V

Mode Transmitting 13.56 MHz

Regulation FCC Part15 Subpart C 15.225 (e)

Date July 19, 2017

Temperature 24 deg.C

Humidity 42 %RH

ENGINEER Hiroyuki Morikawa

Voltage Variation: DC 4.25 V**Temperature Variation: 20deg.C**

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (MHz)	Frequency tolerance (%)	Limit (%)
startup	13.56	13.559883	-0.000117	-0.00086	0.010
after 2minutes	13.56	13.559883	-0.000117	-0.00086	0.010
after 5minutes	13.56	13.559883	-0.000117	-0.00086	0.010
after 10minutes	13.56	13.559883	-0.000117	-0.00086	0.010

Voltage Variation: DC 5.75 V**Temperature Variation: 20deg.C**

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (MHz)	Frequency tolerance (%)	Limit (%)
startup	13.56	13.559883	-0.000117	-0.00086	0.010
after 2minutes	13.56	13.559883	-0.000117	-0.00086	0.010
after 5minutes	13.56	13.559883	-0.000117	-0.00086	0.010
after 10minutes	13.56	13.559883	-0.000117	-0.00086	0.010

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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: Color Copier
Model: Pro C7210SX
Sample No.: Refer to Section 4.2
Power: AC 240 V / 60 Hz
Mode: Transmitting 13.56 MHz

Regulation: FCC Part15 Subpart C 15.215

Date: July 19, 2017

Temperature: 24 deg.C

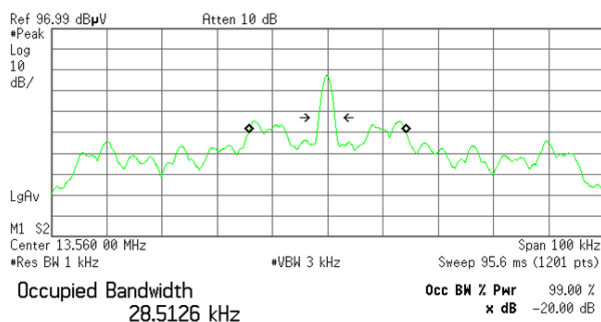
Humidity: 42 %RH

ENGINEER: Hiroyuki Morikawa

20dB Bandwidth: 2.986 kHz

* Agilent

R T

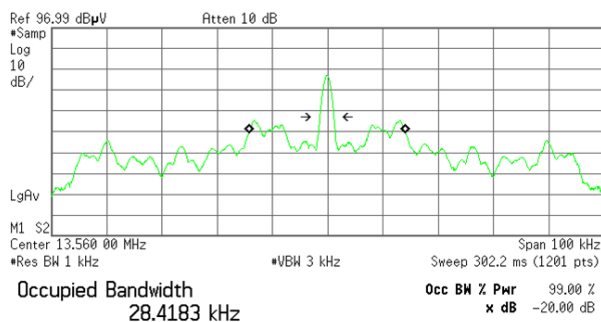


Transmit Freq Error -38.555 Hz
x dB Bandwidth 2.986 kHz

99% Occupied Bandwidth: 28.418 kHz

* Agilent

R T



Transmit Freq Error -70.651 Hz
x dB Bandwidth 2.609 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)
SAF-01	Pre Amplifier	SONOMA	310N	290211	RE	2017/02/09 * 12
KAT6-04	Attenuator	INMET	18N-6dB	-	RE	2016/12/15 * 12
SAT3-09	Attenuator	JFW	50HF-003N	-	RE	2016/08/04 * 12
SBA-01	Biconical Antenna	Schwarzbeck	BBA9106	91032664	RE	2016/10/15 * 12
SCC-A1/A3/A5/A7/A8/A13/SRSE-01	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-269(RF Selector)	RE	2017/04/07 * 12
SCC-A2/A4/A6/A7/A8/A13/SRSE-01	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-269(RF Selector)	RE	2017/04/07 * 12
SLA-05	Logperiodic Antenna	Schwarzbeck	VUSLP9111B	193	RE	2017/01/05 * 12
SOS-01	Humidity Indicator	A&D	AD-5681	4062555	RE, CE	2016/10/12 * 12
STR-01	Test Receiver	Rohde & Schwarz	ESU40	100093	RE, CE	2017/04/12 * 12
KJM-09	Measure	KOMELON	KMC-36	-	RE, CE	-
SAEC-01(NSA)	Semi-Anechoic Chamber	TDK	SAEC-01(NSA)	1	RE	2017/06/09 * 12
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE, RFLMF)	-	RE, CE	-
STS-01	Digital Hitester	Hioki	3805-50	080997812	RE, CE	2016/10/17 * 12
SLP-02	Loop Antenna	Rohde & Schwarz	HFH2-Z2	100218	RE	2016/10/28 * 12
SAT6-12	Attenuator	HIROSE ELECTRIC CO.,LTD.	AT-406(40)	-	RE	2016/08/04 * 12
SSA-02	Spectrum Analyzer	Agilent	E4448A	MY48250106	TF	2017/03/07 * 12
SFC-01	Microwave Counter	Agilent	53151A	US40511493	TF	2017/06/20 * 12
SSCA-01	Search coil	LANGER	RF-R 400-1	02-0634	TF	Pre Check
SCH-01	Temperature and Humidity Chamber	Espec	PL-1KT	14020837	TF	2017/04/17 * 12
SOS-09	Humidity Indicator	A&D	AD-5681	4061484	TF	2016/12/13 * 12
KTS-07	Digital Tester	SANWA	PC500	7019232	TF	2016/10/17 * 12
SCC-A9/A10/A11/A13/SRSE-01	Coaxial Cable&RF Selector	Suhner/Fujikura/Suhner/Suhner/TOYO	RG223U/12DSFA/141PE/NS4906	-/0901-269(RF Selector)	CE	2017/04/07 * 12
SLS-01	LISN	Rohde & Schwarz	ENV216	100511	CE	2017/02/10 * 12
SLS-07	LISN	Schwarzbeck	NSLK8126	8126441	CE	2017/06/29 * 12
SLS-08	LISN	Schwarzbeck	NSLK8126	8126442	CE	2016/10/14 * 12
SHF-01	Highpass Filter	Rohde & Schwarz	EZ-25	100021	CE	2017/03/16 * 12
SCC-09	Coaxial Cable	Fujikura	5D-2W	-	CE	2017/01/10 * 12
SAT3-10	Attenuator	JFW	50HF-003N	-	CE	2016/08/04 * 12
STM-10	Terminator	TME	CT-01 BP	-	CE	2016/12/15 * 12
STM-14	Terminator	TME	CT-01 BP	-	CE	2016/12/15 * 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 ,
 TF: Test Fixture