

# Conducted Emission

UL Japan, Inc. Shonan EMC Lab. No.3 Shielded Room  
Date : 2010/06/29

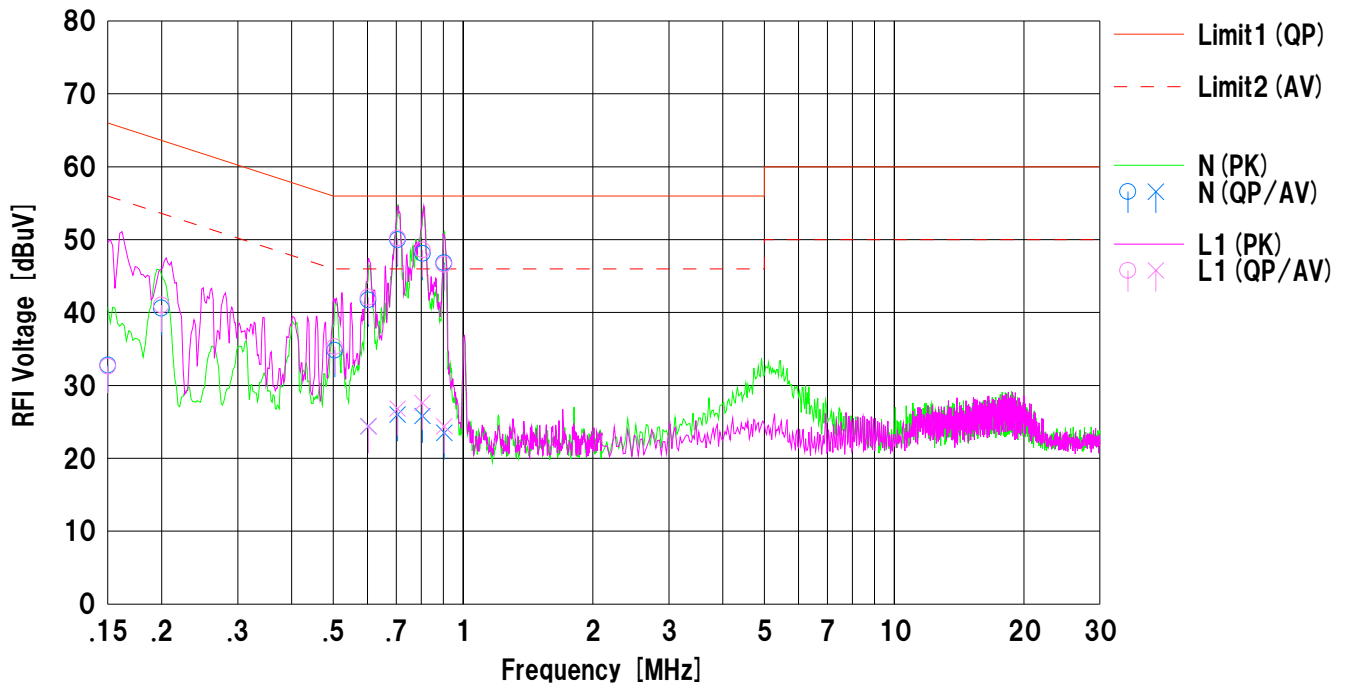
Company : RICOH COMPANY LTD.  
Kind of E.U.T. : Color Copier  
Model No. : Aficio MP C5501  
Serial No. : V9610100004

Mode : Transmitting (13.56MHz)  
Report No. : 30IE0112-SH-01-A  
Power : AC120V/60Hz  
Temp./Humi. : 25deg.C. / 51%

Remarks : Module Ch3:Y

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	18.9	---	13.9	32.8	---	66.0	56.0	33.2	---	N	
2	0.19965	27.7	---	12.9	40.6	---	63.6	53.6	23.0	---	N	
3	0.50353	22.2	---	12.6	34.8	---	56.0	46.0	21.2	---	N	
4	0.60267	29.1	11.8	12.6	41.7	24.4	56.0	46.0	14.3	21.6	N	
5	0.70442	37.4	13.4	12.6	50.0	26.0	56.0	46.0	6.0	20.0	N	
6	0.80500	35.5	13.2	12.6	48.1	25.8	56.0	46.0	7.9	20.2	N	
7	0.90377	34.2	10.9	12.6	46.8	23.5	56.0	46.0	9.2	22.5	N	
8	0.15000	18.7	---	13.9	32.6	---	66.0	56.0	33.4	---	L1	
9	0.19965	28.1	---	12.9	41.0	---	63.6	53.6	22.6	---	L1	
10	0.50353	22.7	---	12.6	35.3	---	56.0	46.0	20.7	---	L1	
11	0.60267	29.5	11.8	12.6	42.1	24.4	56.0	46.0	13.9	21.6	L1	
12	0.70442	37.6	14.2	12.6	50.2	26.8	56.0	46.0	5.8	19.2	L1	
13	0.80500	36.0	15.0	12.6	48.6	27.6	56.0	46.0	7.4	18.4	L1	
14	0.90377	34.0	11.8	12.6	46.6	24.4	56.0	46.0	9.4	21.6	L1	

Calculation:Result [dBuV] =Reading [dBuV] +C.Fac (LISN+Cable+Highpass Filter+ATT) [dB]

# Data of Field Strength and Outside Filed Strength: FCC15.225(a)(b)(c)

UL Japan, Inc.  
Shonan No3 Semi-Anechoic Chamber

Company : RICOH COMPANY LTD.	Report No. : 30IE0112-SH-01-A
Equipment : Color Copier	Regulation : FCC Part15 SupartC 15.225
Model : Aficio MP C5501	Test Distance : 3m
Sample No. : V9610100004	Date : 2010/6/21
Power : AC120V/60Hz	Temperature : 26deg.C
Mode : Transmitting (13.56MHz)	Humidity : 62%
Remarks : Vertical polarization (antenna angle) of the worst case: 0deg	

ENGINEER : Hikaru Shirasawa

## Field strength

No.	FREQ [MHz]	T/R Reading		ANT Factor	LOSS [dB]	AMP GAIN [dB]	RESULT		LIMIT (3m) [dBuV/m]	MARGIN	
		Hor [dBuV]	Ver [dBuV]				Hor [dBuV/m]	Ver [dBuV/m]		Hor [dB]	Ver [dB]
1	13.560	42.7	48.9	19.7	6.3	32.2	36.5	42.7	124.0	87.5	81.3

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

Field strength of 13.553MHz to 13.567MHz Limit(3m) = 84dBuV/m + 40log 30m/3m  
= 124dBuV/m (FCC15.225(a))

## Outside Field strength

No.	FREQ [MHz]	T/R Reading		ANT Factor	LOSS [dB]	AMP GAIN [dB]	RESULT		LIMIT (3m) [dBuV/m]	MARGIN	
		Hor [dBuV]	Ver [dBuV]				Hor [dBuV/m]	Ver [dBuV/m]		Hor [dB]	Ver [dB]
1	13.110	33.5	33.6	19.7	6.3	32.2	27.3	27.4	69.5	42.2	42.1
2	13.410	33.2	33.5	19.7	6.3	32.2	27.0	27.3	80.5	53.5	53.2
3	13.553	34.1	38.2	19.7	6.3	32.2	27.9	32.0	90.5	62.6	58.5
4	13.567	33.9	37.2	19.7	6.3	32.2	27.7	31.0	90.5	62.8	59.5
5	13.710	33.5	33.5	19.6	6.3	32.2	27.2	27.2	80.5	53.3	53.3
6	14.010	33.3	33.8	19.6	6.3	32.2	27.0	27.5	69.5	42.5	42.0

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

### Outside filed strength frequencies

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

### Limits (3m)

- 13.410MHz to 13.553MHz and 13.567MHz to 13.710MHz :  $50.5\text{dBuV/m} + 40\log 30\text{m}/3\text{m} = 90.5\text{dBuV/m}$  (FCC15.225(b))
- 13.110MHz to 14.010MHz and 13.710MHz to 14.010MHz :  $40.5\text{dBuV/m} + 40\log 30\text{m}/3\text{m} = 80.5\text{dBuV/m}$  (15.225(c))
- Below 13.110MHz and Above 14.010MHz :  $29.5\text{dBuV/m} + 40\log 30\text{m}/3\text{m} = 69.5\text{dBuV/m}$  (FCC15.225(d)and FCC15.209)

# DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Shonan EMC Lab. No.3 Semi-Anechoic Chamber  
Date : 2010/06/21

Company : RICOH COMPANY LTD.  
Kind of E.U.T. : Color Copier  
Model No. : Aficio MP C5501  
Serial No. : V9610100004

Mode : Transmitting (13.56MHz)  
Report No. : 30IE0112-SH-01-A  
Power : AC120V/60Hz  
Temp./Humi. : 26deg.C. / 62%

Remarks : Module Ch3:Y Vert:0deg

Limit1 : FCC15.225 3m, 9-90kHz:AV, 110-490kHz:AV, other:QP

Tested by : Hikaru Shirasawa

<< QP DATA >>

No.	Freq. [MHz]	Reading	Ant.Fac [dB/m]	Loss [dB]	Gain [dB]	Result	Limit	Margin	Antenna	Table	Comment
		<QP> [dBuV]				<QP> [dBuV/m]	<QP> [dBuV/m]	<QP> [dB]		[deg]	
1	27.12000	33.2	21.1	6.5	32.2	28.6	69.5	40.9	Vert	85	
2	27.12000	32.8	21.1	6.5	32.2	28.2	69.5	41.3	Hori	105	

Calculation:Result [dBuV/m] =Reading [dBuV] +Ant.Fac [dB/m] +Loss (Cable+ATT) [dB] -Gain (AMP) [dB]  
Ant.Type=LOOP:Loop Antenna

# DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Shonan EMC Lab. No.3 Semi-Anechoic Chamber  
Date : 2010/06/21

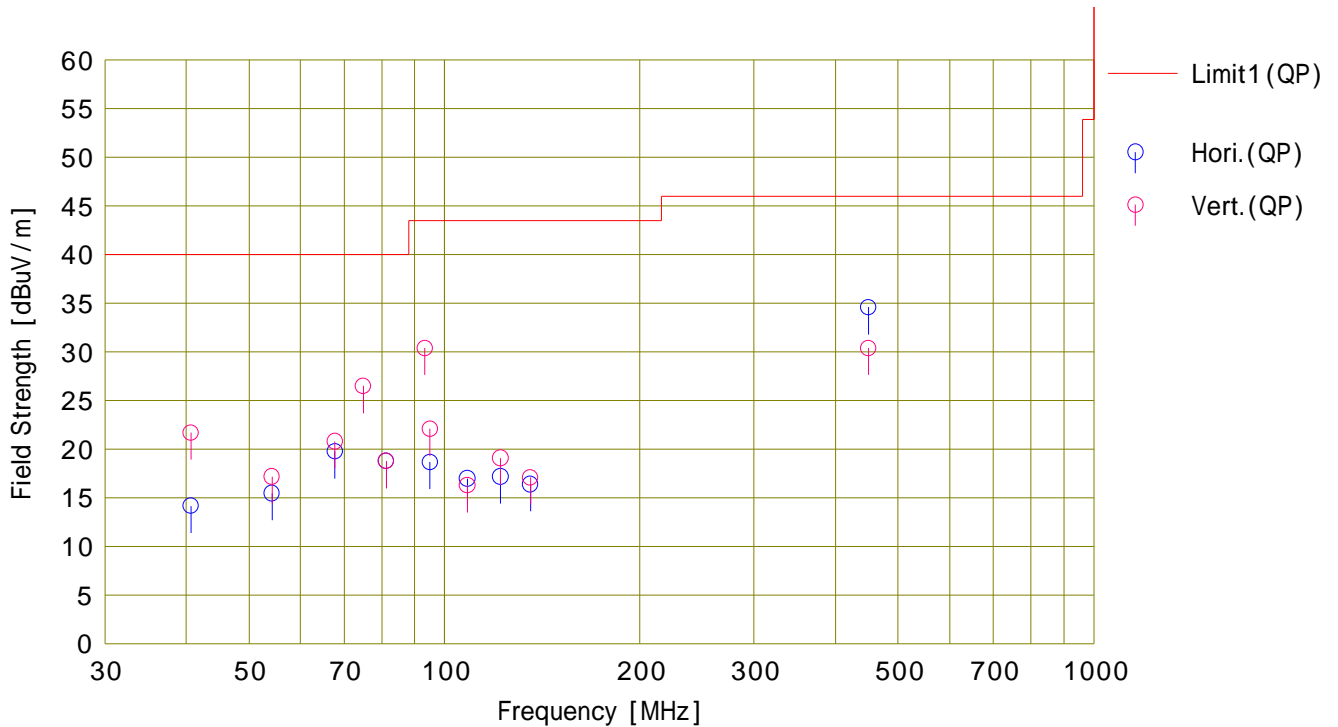
Company : RICOH COMPANY LTD.  
Kind of E.U.T. : Color Copier  
Model No. : Aficio MP C5501  
Serial No. : V9610100004

Mode : Transmitting(13.56MHz)  
Report No. : 30IE0112-SH-01-A  
Power : AC120V/60Hz  
Temp./Humi. : 26deg.C. / 62%

Remarks : Module Ch3:Y

Limit1 : FCC15.209 3m, below 1GHz:QP, above 1GHz:PK

Engineer : Hikaru Shirasawa



No.	Freq. [MHz]	Reading	Ant.Fac [dB/m]	Loss [dB]	Gain [dB]	Result	Limit	Margin	Pola. [H/V]	Height [cm]	Angle [deg]	Ant. Type	Comment
		<QP> [dBuV]				<QP> [dBuV/m]	<QP> [dB]						
1	40.680	25.2	14.4	6.7	32.1	14.2	40.0	25.8	Hori.	400	64	BC	
2	54.240	31.1	9.7	6.8	32.1	15.5	40.0	24.5	Hori.	384	282	BC	
3	67.800	38.3	6.7	6.9	32.1	19.8	40.0	20.2	Hori.	400	16	BC	
4	81.360	37.2	6.7	7.0	32.1	18.8	40.0	21.2	Hori.	223	311	BC	
5	94.920	34.4	9.2	7.2	32.1	18.7	43.5	24.8	Hori.	198	276	BC	
6	108.480	30.2	11.6	7.3	32.1	17.0	43.5	26.5	Hori.	278	144	BC	
7	122.040	28.4	13.5	7.4	32.1	17.2	43.5	26.3	Hori.	280	260	BC	
8	135.600	26.7	14.3	7.5	32.1	16.4	43.5	27.1	Hori.	229	222	BC	
9	449.860	40.5	16.9	9.1	31.9	34.6	46.0	11.4	Hori.	100	142	LP	
10	40.680	32.7	14.4	6.7	32.1	21.7	40.0	18.3	Vert.	100	96	BC	
11	54.240	32.8	9.7	6.8	32.1	17.2	40.0	22.8	Vert.	100	101	BC	
12	67.800	39.3	6.7	6.9	32.1	20.8	40.0	19.2	Vert.	100	199	BC	
13	74.971	45.1	6.5	7.0	32.1	26.5	40.0	13.5	Vert.	100	240	BC	
14	81.360	37.2	6.7	7.0	32.1	18.8	40.0	21.2	Vert.	100	275	BC	
15	93.269	46.6	8.8	7.1	32.1	30.4	43.5	13.1	Vert.	100	282	BC	
16	94.920	37.8	9.2	7.2	32.1	22.1	43.5	21.4	Vert.	129	198	BC	
17	108.480	29.5	11.6	7.3	32.1	16.3	43.5	27.2	Vert.	100	93	BC	
18	122.040	30.3	13.5	7.4	32.1	19.1	43.5	24.4	Vert.	100	265	BC	
19	135.600	27.4	14.3	7.5	32.1	17.1	43.5	26.4	Vert.	100	276	BC	
20	449.860	36.3	16.9	9.1	31.9	30.4	46.0	15.6	Vert.	119	293	LP	

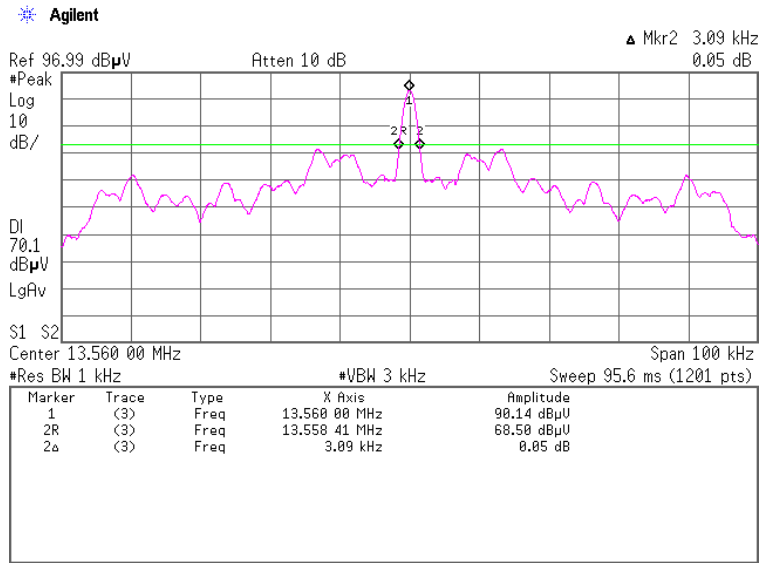
Calculation: Result [dBuV/m] = Reading [dBuV] + Ant.Fac [dB/m] + Loss (Cable+ATT) [dB] - Gain (PreAMP) [dB]  
Ant.Type=BC:Biconical Antenna, LP:Logperiodic Antenna

## 20dB bandwidth & Occupied bandwidth (99%): FCC 15.215(c)

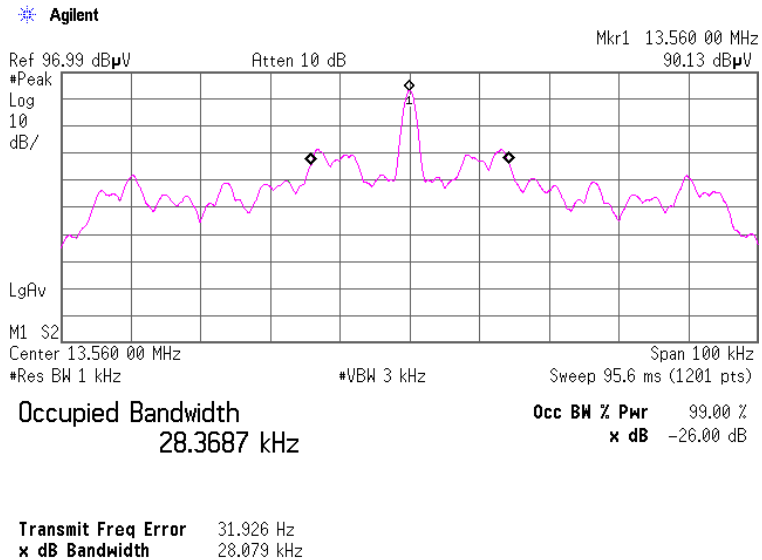
**COMPANY** : RiCOH COMPANY LTD.  
**Equipment** : Color Copier  
**MODEL NUMBER**: Aficio MP C5501  
**SERIAL NUMBER**: V9610100004  
**POWER** : DC5V

**UL Japan. Inc. Shonan No5 Shield room**  
**REPORT No.** : 30IE0112-SH-01-A  
**REGULATION** : FCC Part15SubpartC 215(c)  
**DATE** : 2010/06/30  
**TEMP./HUMI** : 26°C/67%  
**TEST MODE** : Transmitting(13.56MHz)  
**ENGINEER** : Tatsuya Arai

### 20dB Bandwidth: 3.09kHz



### OBW(99%): 28.3687kHz



## Data of Frequency Tolerance: FCC 15.225(e)

UL Japan, Inc.  
Shonan No5 Shield room

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Company : RICOH COMPANY LTD.	Report No. : 30IE0112-SH-01-A
Equipment : Color Copier	Regulation : FCC Part15 SupartC 15.225 (e)
Model : Aficio MP C5501	
Sample No. : V9610100004	Date : 2010/06/30
Power : DC5V	Temperature : 26deg.C
Mode : Transmitting (13.56MHz)	Humidity : 67%

ENGINEER : Tatsuya Arai

### Temperature Variation: -30deg.C

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (MHz)	Frequency tolerance (%)	Limit (%)
startup	13.56	13.560069	0.0000690	0.00051	0.01
after 2minutes	13.56	13.560074	0.0000740	0.00055	0.01
after 5minutes	13.56	13.560074	0.0000740	0.00055	0.01
after 10minutes	13.56	13.560073	0.0000730	0.00054	0.01

### Temperature Variation: -20deg.C

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (MHz)	Frequency tolerance (%)	Limit (%)
startup	13.56	13.560124	0.0001240	0.00091	0.01
after 2minutes	13.56	13.560127	0.0001270	0.00094	0.01
after 5minutes	13.56	13.560127	0.0001270	0.00094	0.01
after 10minutes	13.56	13.560127	0.0001270	0.00094	0.01

### Temperature Variation: -10deg.C

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (MHz)	Frequency tolerance (%)	Limit (%)
startup	13.56	13.560141	0.0001410	0.00104	0.01
after 2minutes	13.56	13.560140	0.0001400	0.00103	0.01
after 5minutes	13.56	13.560140	0.0001400	0.00103	0.01
after 10minutes	13.56	13.560140	0.0001400	0.00103	0.01

### Temperature Variation: 0deg.C

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (MHz)	Frequency tolerance (%)	Limit (%)
startup	13.56	13.560126	0.0001260	0.00093	0.01
after 2minutes	13.56	13.560123	0.0001230	0.00091	0.01
after 5minutes	13.56	13.560124	0.0001240	0.00091	0.01
after 10minutes	13.56	13.560123	0.0001230	0.00091	0.01

**Temperature Variation: 10deg.C**

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (MHz)	Frequency tolerance (%)	Limit (%)
startup	13.56	13.560084	0.0000840	0.00062	0.01
after 2minutes	13.56	13.560080	0.0000800	0.00059	0.01
after 5minutes	13.56	13.560080	0.0000800	0.00059	0.01
after 10minutes	13.56	13.560080	0.0000800	0.00059	0.01

**Temperature Variation: 20deg.C**

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (MHz)	Frequency tolerance (%)	Limit (%)
startup	13.56	13.560031	0.0000310	0.00023	0.01
after 2minutes	13.56	13.560027	0.0000270	0.00020	0.01
after 5minutes	13.56	13.560026	0.0000260	0.00019	0.01
after 10minutes	13.56	13.560026	0.0000260	0.00019	0.01

**Temperature Variation: 30deg.C**

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (MHz)	Frequency tolerance (%)	Limit (%)
startup	13.56	13.559973	-0.0000270	-0.00020	0.01
after 2minutes	13.56	13.559968	-0.0000320	-0.00024	0.01
after 5minutes	13.56	13.559967	-0.0000330	-0.00024	0.01
after 10minutes	13.56	13.559966	-0.0000340	-0.00025	0.01

**Temperature Variation: 40deg.C**

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (MHz)	Frequency tolerance (%)	Limit (%)
startup	13.56	13.559910	-0.0000900	-0.00066	0.01
after 2minutes	13.56	13.559906	-0.0000940	-0.00069	0.01
after 5minutes	13.56	13.559906	-0.0000940	-0.00069	0.01
after 10minutes	13.56	13.559906	-0.0000940	-0.00069	0.01

**Temperature Variation: 50deg.C**

Test Conditions	Original Frequency (MHz)	Mesure Frequency (MHz)	Frequency Error (MHz)	Frequency tolerance (%)	Limit (%)
startup	13.56	13.559857	-0.0001430	-0.00105	0.01
after 2minutes	13.56	13.559853	-0.0001470	-0.00108	0.01
after 5minutes	13.56	13.559853	-0.0001470	-0.00108	0.01
after 10minutes	13.56	13.559853	-0.0001470	-0.00108	0.01

## Data of Frequency Tolerance: FCC 15.225(e)

UL Japan, Inc.  
Shonan No5 Shield room

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Company : RICOH COMPANY LTD.  
Equipment : Color Copier  
Model : Aficio MP C5501  
Sample No. : V9610100004  
Power : DC5V  
Mode : Transmitting (13.56MHz)

Report No. : 30IE0112-SH-01-A  
Regulation : FCC Part15 SupartC 15.225 (e)

Date : 2010/06/30  
Temperature : 26deg.C  
Humidity : 67%

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	13.560031	0.0000310	0.00023	0.01
after 2minutes	13.56	13.560028	0.0000280	0.00021	0.01
after 5minutes	13.56	13.560028	0.0000280	0.00021	0.01
after 10minutes	13.56	13.560028	0.0000280	0.00021	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	13.560030	0.0000300	0.00022	0.01
after 2minutes	13.56	13.560025	0.0000250	0.00018	0.01
after 5minutes	13.56	13.560024	0.0000240	0.00018	0.01
after 10minutes	13.56	13.560024	0.0000240	0.00018	0.01



### APPENDIX 3 Test Instruments

#### EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SAF-03	Pre Amplifier	SONOMA	310N	290213	RE	2010/02/06 * 12
SAT6-03	Attenuator	JFW	50HF-006N	-	RE	2010/02/06 * 12
SBA-03	Biconical Antenna	Schwarzbeck	BBA9106	91032666	RE	2010/03/22 * 12
SCC-C1/C2/C3/C4/C5/C10/SRSE-03	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-271(RF Selector)	RE	2010/04/02 * 12
SLA-03	Logperiodic Antenna	Schwarzbeck	UHALP9108A	UHALP 9108-A0901	RE	2010/03/22 * 12
SOS-05	Humidity Indicator	A&D	AD-5681	4062518	RE	2010/02/09 * 12
STR-03	Test Receiver	Rohde & Schwarz	ESI40	100054/040	RE	2010/04/12 * 24
SJM-07	Measure	PROMART	SEN1935	-	RE/CE	-
SAEC-03(NSA)	Semi-Anechoic Chamber	TDK	SAEC-03(NSA)	3	RE	2009/09/18 * 12
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV	-	RE/CE	-
SLP-02	Loop Antenna	Rohde & Schwarz	HFH2-Z2	100218	RE	2009/10/06 * 12
SLS-06	LISN	Schwarzbeck	NSLK8126	8126440	CE	2010/03/29 * 12
SAT3-06	Attenuator	JFW	50HF-003N	-	CE	2010/02/06 * 12
SHF-01	Highpass Filter	Rohde & Schwarz	EZ-25	100021	CE	2010/03/29 * 12
SSA-01	Spectrum Analyzer	Agilent	N9010A-526	MY48031482	CE	2010/04/05 * 12
STR-05	Test Receiver	Rohde & Schwarz	ESHS20	827129/007	CE	2009/11/13 * 12
SLS-05	LISN	Rohde & Schwarz	ENV216	100516	CE	2010/02/19 * 12
STM-07	Terminator	TME	CT-01 BP	-	CE	2010/01/08 * 12
SOS-06	Humidity Indicator	A&D	AD-5681	4062118	CE	2010/02/17 * 12
SSA-03	Spectrum Analyzer	Agilent	E4448A	MY48250152	BW	2009/06/09 * 24
SFC-01	Microwave Counter	Agilent	53151A	US40511493	FT	2010/02/18 * 12
SCH-01	Temperature and Humidity Chamber	Espec	PL-1KT	14020837	FT	2010/04/24 * 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 traceable calibrations . Each calibration is traceable to the national or international standards .

Test Item :

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

## 1.model difference specification

Model (RICOH)	Print speed/minutes
Aficio MP C3001 Aficio MP C3001G	30
Aficio MP C3501 Aficio MP C3501G	35
Aficio MP C4501 Aficio MP C4501G	45
Aficio MP C5501 Aficio MP C5501G	55

The model difference is a print speed.

As for the difference between Aficio MP Cxxxx and Aficio MP CxxxxG, the production factory is different.

## 2.model name by brand

Model (RICOH)	Brand name	OEM model
Aficio MP C3001	Lanier	LD630C
	Savin	C9130
Aficio MP C3001G	Lanier	LD630CG
	Savin	C9130G
Aficio MP C3501	Lanier	LD635C
	Savin	C9135
Aficio MP C3501G	Lanier	LD635CG
	Savin	C9135G
Aficio MP C4501	Lanier	LD645C
	Savin	C9145
Aficio MP C4501G	Lanier	LD645CG
	Savin	C9145G
Aficio MP C5501	Lanier	LD655C
	Savin	C9155
Aficio MP C5501G	Lanier	LD655CG
	Savin	C9155G