



EMI TEST REPORT

Test Report No. : 25LE0014-YK-1

Applicant : RICOH CO., LTD.
Type of Equipment : Full Color MFP
Model No. : Aficio MP C3000 (Aficio MP C2500)
FCC ID : BBP-RFAT001
Test Standard : FCC Part15 Subpart C,
Section 15.207, Section 15.225: 2005
Test Result : Complied

1. This test report shall not be reproduced except in full, without the written approval of UL Apex Co., Ltd.
2. The results in this report apply only to the sample tested.
3. This equipment is in compliance with above regulation. We hereby certify that the data contain a true representation of the EMC profile.
4. The test results in this test report are traceable to the national or international standards.

Date of test: August 8, 9 10 and 11, 2005

Tested by: 
Toyokazu Imamura

Approved by: 
Osamu Watatani
Site Manager of Yamakita EMC Lab.

UL Apex Co., Ltd.

YAMAKITA EMC LAB.

907 Kawanishi, Yamakita-machi, Ashigarakami-gun, Kanagawa-ken, 258-0124 JAPAN

Telephone: +81 465 77 1011

Facsimile: +81 465 77 2112

MF060b (01.06.05)

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1 Applicant Information

Company Name : RICOH CO., LTD.
Address : 3-6, Naka-magome 1-chome, Ohta-ku, Tokyo-to, 143-8555 JAPAN
Telephone Number : +81-46-292-6870
Facsimile Number : +81-46-231-9183
Contact Person : Shinji Okada

2 Product Description

Type of Equipment : Full Color MFP
Model No. : Aficio MP C3000 (Aficio MP C2500)
Serial No. : 0123
Rating : AC120±10%V, 50/60Hz
Country of Manufacture : China
Receipt Date of Sample : July 11, 2005
Condition of EUT : Production prototype
(Not for Sale: This sample is equivalent to mass-produced items.)

Model: Aficio MP C3000 / Aficio MP C2500 (referred to as the EUT in this report) is a Full Color MFP.
The difference between Model: Aficio MP C3000 and Model: Aficio MP C2500 is printing speed.

Aficio MP C3000: 30 pages per minute

Aficio MP C2500: 25 pages per minute

The clock frequency used in EUT: 13.56MHz (RFID module), 685.9MHz

Equipment type : Transceiver
Frequency of operation : 13.56 MHz
Type of modulation : ASK 100%
Antenna type : Print pattern antenna
Antenna connector type : None
Mode of operation : Duplex
Emission Designation : A1D
Operation temperature range: 10 ~ 32 deg. C.

*FCC Part15.31 (e)

Host device (Full Color MFP) provides the RFID Module with stable power supply, and the power is not changed when voltage of the Full Color MFP is varied. Therefore, the equipment complies power supply regulation.

*FCC Part15.203

The EUT complies with the requirement. When it is put up for sale, one of the antennas is attached and the antenna is with a unique coupling to the intentional radiator.

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3 Test Specification, Procedures and Results

3.1 Test specification

Test specification : FCC Part15 Subpart C: 2005
Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators
Section 15.207 Conducted limits: 2005
Section 15.225 : Operation within the band 13.110-14.010MHz

3.2 Procedures & Results

Item	Test Procedure	Specification	Remarks	Deviation	Worst Margin	Results
Conducted Emission	ANSI C63.4: 2003 7. AC powerline conducted emission measurements	Section 15.207	-	N/A	14.3dB (0.2026MHz, N, AV)	Complied
Electric Field Strength of Fundamental Emission	ANSI C63.4: 2003 13. Measurement of intentional radiators	Section 15.225 (a)	Radiated	N/A	81.4dB (Horizontal)	Complied
Electric Field Strength of Outside the Allocated bands	ANSI C63.4: 2003 13. Measurement of intentional radiators	Section 15.225 (b) (c)	Radiated	N/A	38.40dB (14.010MHz, Horizontal)	Complied
Electric Field Strength of Spurious Emission	ANSI C63.4: 2003 13. Measurement of intentional radiators	Section15.209, Section 15.225 (d)	Radiated	N/A	4.8dB (64.04MHz, Vertical)	Complied
20dB Bandwidth	ANSI C63.4: 2003 13. Measurement of intentional radiators	Section15.215(c)	Radiated	N/A	-	Complied
Frequency Tolerance	ANSI C63.4: 2003 13. Measurement of intentional radiators	Section15.225 (e)	Radiated	Excluded *1	-	Complied

Note: UL Apex's EMI Work Procedures No.QPM05.

*1) Voltage variation: Excluded

It is confirmed the RFID module is provided the regulated stable power and there is no fluctuation.
Because of the stable voltage, test of frequency tolerance by voltage variation was not performed.

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

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3.3 Uncertainty

Conducted emission

The measurement uncertainty (with 95% confidence level) for this test is ± 1.3 dB.

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

Radiated emission

The measurement uncertainty (with a 95% confidence level) for this test using Loop antenna is ± 2.1 dB.

The measurement uncertainty (with 95% confidence level) for this test using Biconical antenna is ± 4.8 dB.

The measurement uncertainty (with 95% confidence level) for this test using Logperiodic antenna is ± 5.2 dB.

The measurement uncertainty (with 95% confidence level) for this test using Horn antenna is ± 6.6 dB.

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

3.4 Test Location

UL Apex Co., Ltd. Yamakita EMC Lab.

907, Kawanishi, Yamakita-machi, Ashigarakami-gun, Kanagawa-ken 258-0124 JAPAN

Telephone number : +81 465 77 1011

Facsimile number : +81 465 77 2112

NVLAP Lab. code : 200441-0

No. 1 test site has been fully described in a report submitted to FCC office, and accepted on September 20, 2002 (Registration No.: 95486).

IC Registration No. : IC3489A

No. 2 test site has been fully described in a report submitted to FCC office, and accepted on April 4, 2005 (Registration No.: 466226).

IC Registration No. : IC3489A-2

No. 1 anechoic chamber has been fully described in a report submitted to FCC office, and accepted on November 8, 2002 (Registration No.: 95967).

IC Registration No. : IC3489A-B

Test room	Width x Depth x Height (m)	Test room	Width x Depth x Height (m)
No.1 shielded room	8.0 x 5.0 x 2.5	No.1 EMS lab.	10.0 x 7.5 x 5.7
No.2 shielded room	5.0 x 4.0 x 2.5	(Semi-anechoic chamber)	
No.3 shielded room	4.0 x 5.0 x 2.7		

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4 System Test Configuration

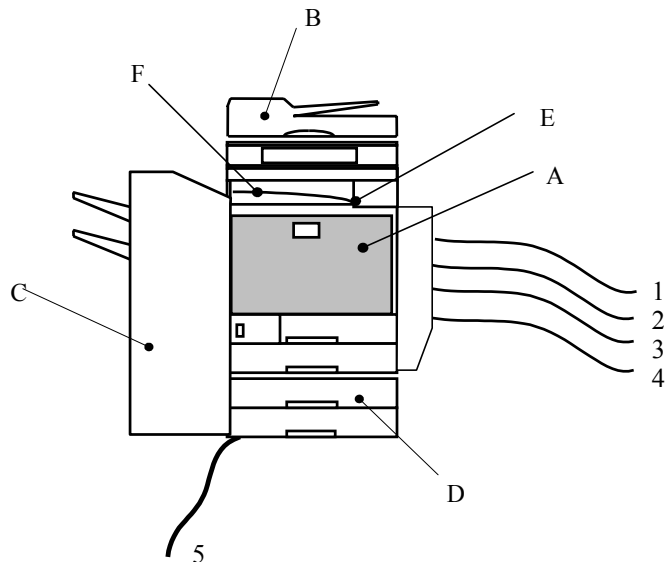
4.1 Justification

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

Operation: Transmitting (13.56MHz)

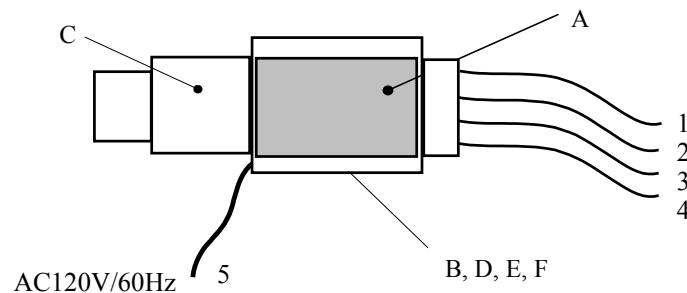
4.2 Configuration of Tested System

Front View



AC120V/60Hz

Top View



AC120V/60Hz

* Test data was taken under worse case conditions.

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Description of EUT and support equipment

No.	Item	Model number	Serial number	Manufacturer	FCC ID (Remark)
A	Full Color MFP	Aficio MP C3000 (Aficio MP C2500)	0123	RICOH	BBP-RFAT001 (EUT)
B	Document Feeder	DF 3000	10102	RICOH	-
C	Booklet Finisher	SR 3000	0010047	RICOH	-
D	Paper Bank	PB 3000	B80000	RICOH	-
E	Bridge Unit	BU 3000	B22700	RICOH	-
F	1 Bin Tray	BN 3000	0181855	RICOH	-

* RFID modules are installed in the Full Color MFP, Aficio MP C3000 (Aficio MP C2500).

List of cables used

No.	Name	Length (m)	Shield	Back-shell material	Remark
1	100BASE-Tx cable	3.0	Unshielded	Polyvinyl chloride	-
2	USB cable	2.5	Shielded	Polyvinyl chloride	-
3	USB cable	1.0	Shielded	Polyvinyl chloride	-
4	Centro cable	1.5	Shielded	Polyvinyl chloride	-
5	Power cable	3.0	Unshielded	Polyvinyl chloride	-

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5 Conducted Emissions

5.1 Operating environment

The test was carried out in No.1 anechoic chamber.

Temperature : See test data
Humidity : See test data

5.2 Test configuration

EUT was placed on a platform of nominal size, 1.0m by 1.0m, raised 10cm above the conducting 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.

A drawing of the set up is shown in the photos of Appendix 1.

5.3 Test conditions

Frequency range : 0.15 - 30MHz
EUT position : Floor standing
EUT operation mode : Transmitting

5.4 Test procedure

The EUT was connected to a LISN (AMN).

An overview sweep with peak detection has been performed.

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

Detector: QP/AV
IF Bandwidth: 9kHz

5.5 Results

Summary of the test results : Pass
Test data : APPENDIX 2 Page 17 to 19

Date : August 10, 2005 Test engineer : Toyokazu Imamura

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6 Radiated Emissions (Fundamental, Spurious and Outside the Allocated bands)

6.1 Operating environment

The test was carried out in No.1 anechoic chamber.

Temperature : See test data
Humidity : See test data

6.2 Test configuration

EUT was placed on a non-metallic pallet of nominal size, 1.0m by 1.0m, raised 10cm above the conducting ground plane. RFID module was set at a height of 1.0m from the reference ground plane.
A drawing of the set up is shown in the photos of Appendix 1.

6.3 Test conditions

Frequency range : 9kHz - 1GHz
EUT position : Floor standing
EUT operation mode : Transmitting

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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 each antenna angle 0deg., 45deg. and 90deg.

Frequency: From 30MHz to 1GHz at distance 3m

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.

	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
Detector Type	PK/AV	QP	PK/AV	QP	QP
IF Bandwidth	200Hz	200Hz	10kHz	10kHz	120kHz

* Spectrum Analyzer: RBW = VBW = 1MHz

* Part 15 Section 15.31 (f)(2) (9kHz-30MHz)

9kHz – 490kHz [Limit at 10m] = [Limit at 300m] - 40log (10[m]/300[m])

490kHz – 30MHz [Limit at 10m] = [Limit at 30m] - 40log (10[m]/30[m])

Four RFID modules which have the same specification are mounted in the equipment and they don't have simultaneous transmitting function. They were previously checked and the one in which the maximum emission occurred was chosen to put into measurement. See the photograph in page 16.

RFID Module	CH 0, CH 1, CH 2, CH 3
Worst case	CH 3

6.5 Results

Summary of the test results : Pass

Date : August 8, 9 and 11, 2005

Test data:

Test engineer :

APPENDIX 2 Page 20 to 22

Toyokazu Imamura

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7 20dB Bandwidth

Test Procedure

The measurement was performed in the antenna height to gain the maximum of Electric field strength.

Summary of the test results: Pass
Date: August 9, 2005

Test data: APPENDIX 2 Page 23
Test engineer : Toyokazu Imamura

8 Frequency Tolerance

Test Procedure

The measurement was performed in the antenna height to gain the maximum of Electric field strength.

Voltage variation: N/A

It is confirmed the RFID module is provided the regulated stable power and there is no fluctuation.

Summary of the test results: Pass
Date: August 9, 2005

Test data: APPENDIX 2 Page 24
Test engineer : Toyokazu Imamura

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APPENDIX 1: Photographs of test setup

Page 13 : Conducted emission
Page 14 - 15 : Radiated emission
Page 16 : RF module

APPENDIX 2: Test Data

Page 17 - 19 : Conducted Emission
Page 20 - 22 : Radiated Emission
20 : Fundamental and Outside the Allocated bands
21-22 : Spurious emission
Page 23 : 20dB Bandwidth
Page 24 : Frequency Tolerance

APPENDIX 3: Test instruments

Page 25 : Test instruments

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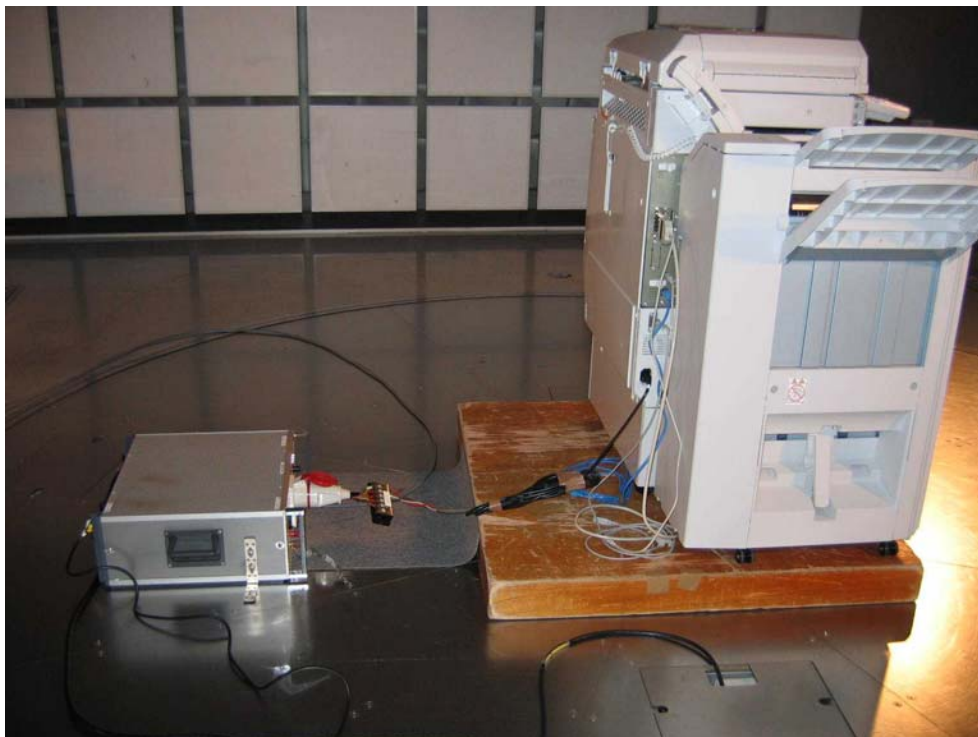
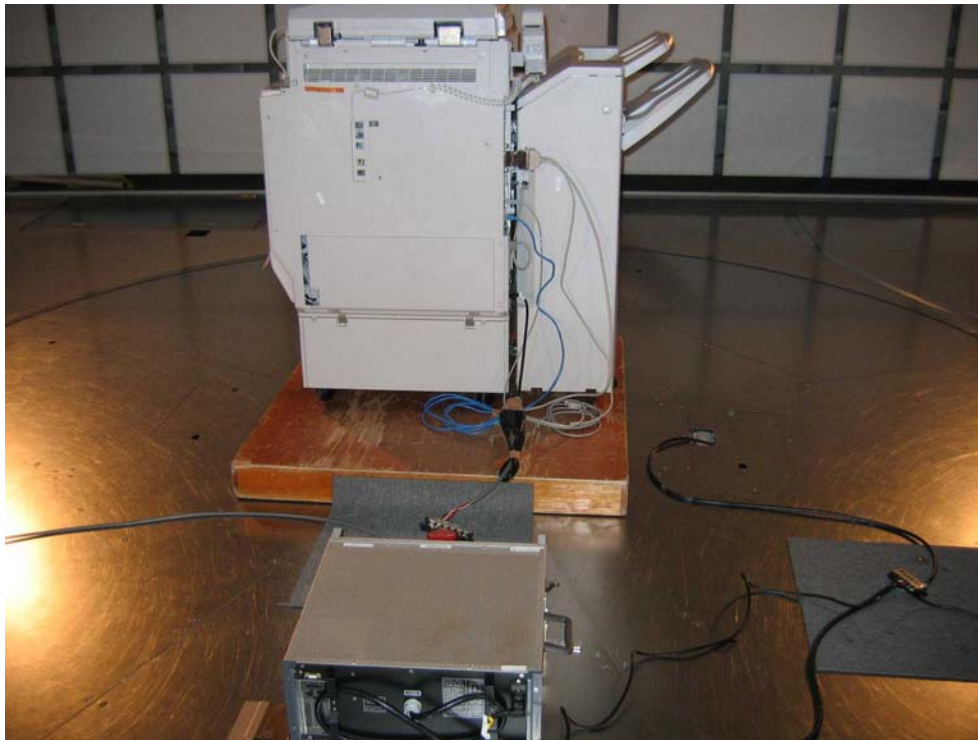
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Conducted emission



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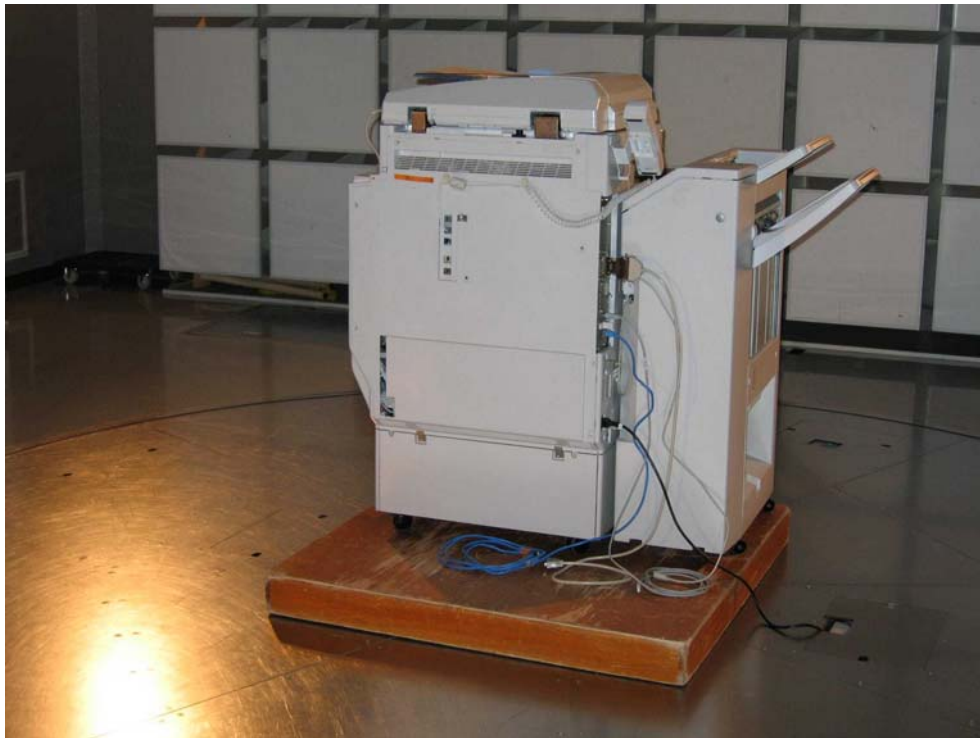
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Radiated emission (9kHz-30MHz)



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Radiated emission (30-1000MHz)



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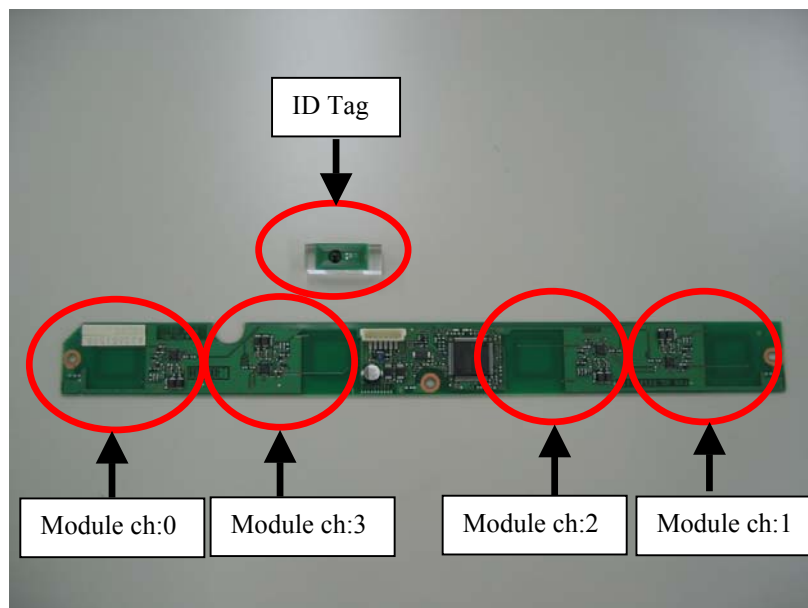
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RFID module



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MF060b (01.06.05)

DATA OF CONDUCTION TEST

UL Apex Co.,Ltd.

YAMAKITA No.1 ANECHOIC CHAMBER

Report No. : 25LE0014-YK - 1

Applicant : RICOH CO., LTD.
Kind of Equipment : Full Color MFP
Model No. : Aficio MP C3000
Serial No. : 0123
Power : AC120V/60Hz
Mode : Transmitting (13.56MHz)
Remarks :
Date : 8/10/2005
Phase : Single Phase
Temperature : 21 °C Engineer : Toyokazu Imamura
Humidity : 58 %
Regulation : FCC Part15C § 15.207. (CISPR Pub. 22)

No.	FREQ. [MHz]	READING (N)		READING (L1)		LISN FACTOR [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT		LIMITS		MARGIN	
		QP [dB μV]	AV [dB μV]	QP [dB μV]	AV [dB μV]				QP [dB]	AV [dB μV]	QP [dB μV]	AV [dB μV]	QP [dB]	AV [dB]
1.	0.1500	26.7	-	22.4	-	0.1	0.1	0.0	26.9	-	66.0	56.0	39.1	-
2.	0.2026	43.0	39.0	44.3	38.8	0.1	0.1	0.0	44.5	39.2	63.5	53.5	19.0	14.3
3.	0.3006	28.2	-	27.0	-	0.1	0.1	0.0	28.4	-	60.2	50.2	31.8	-
4.	7.7419	33.2	-	32.9	-	0.3	0.4	0.0	33.9	-	60.0	50.0	26.1	-
5.	8.6500	22.9	-	35.9	-	0.3	0.4	0.0	36.6	-	60.0	50.0	23.4	-
6.	13.5772	20.8	-	33.6	-	0.6	0.5	0.0	34.7	-	60.0	50.0	25.3	-

CALCULATION: READING + LISN FACTOR + CABLE LOSS + ATTEN.

■ LISN: KLS-01 (NSLK8126) ■ COAXIAL CABLE: KCC-33/34
■ EMI RECEIVER: APRCV05 (ESS)

DATA OF CONDUCTION TEST

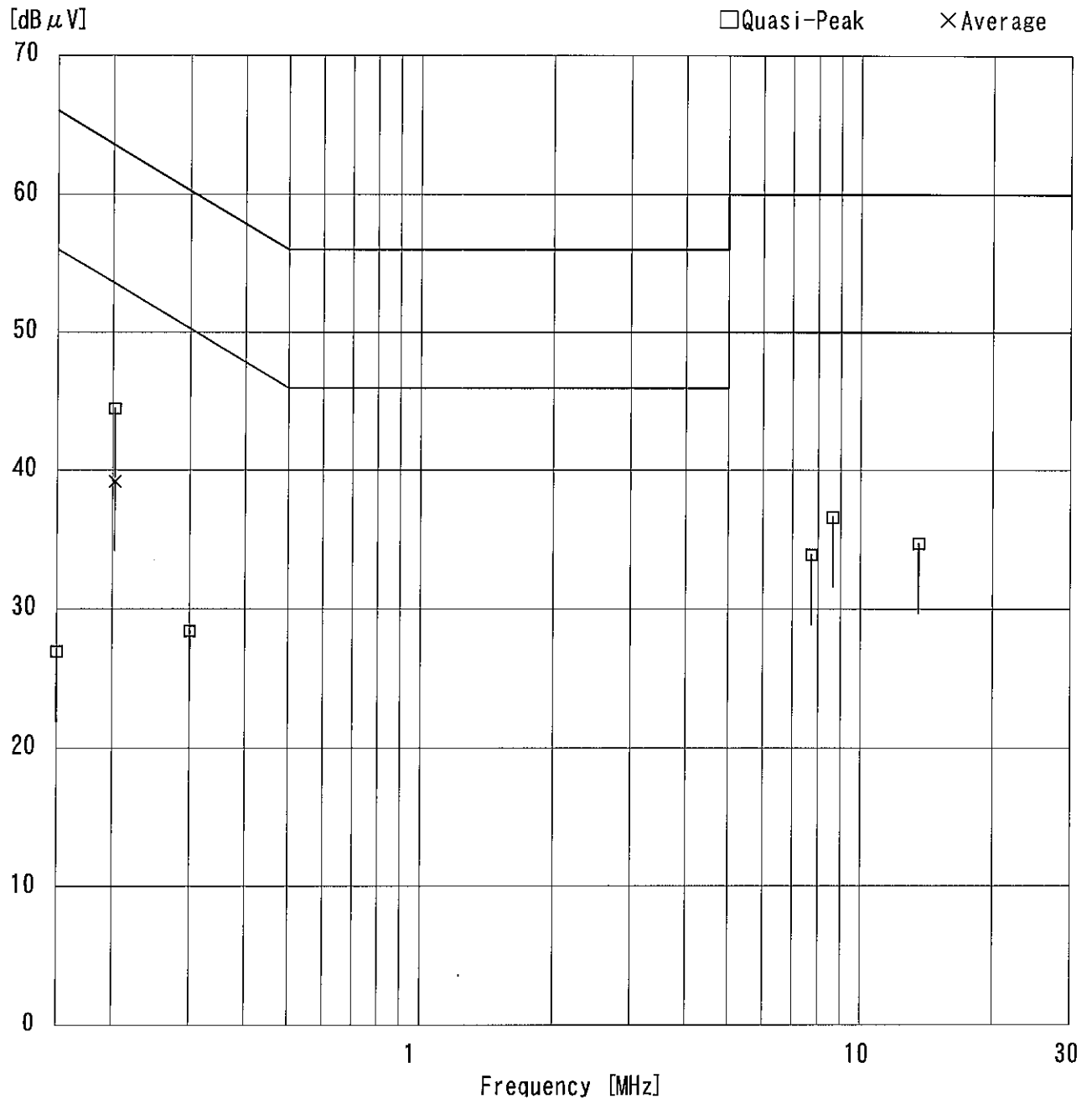
UL Apex Co.,Ltd.

YAMAKITA No.1 ANECHOIC CHAMBER

Report No. : 25LE0014-YK - 1

Applicant : RICOH CO., LTD.
Kind of Equipment : Full Color MFP
Model No. : Aficio MP C3000
Serial No. : 0123
Power : AC120V/60Hz
Mode : Transmitting (13.56MHz)
Remarks :
Date : 8/10/2005
Phase : Single Phase
Temperature : 21 °C
Humidity : 58 %
Regulation : FCC Part15C § 15.207. (CISPR Pub. 22)

Engineer : Toyokazu Imamura



DATA OF CONDUCTION TEST CHART

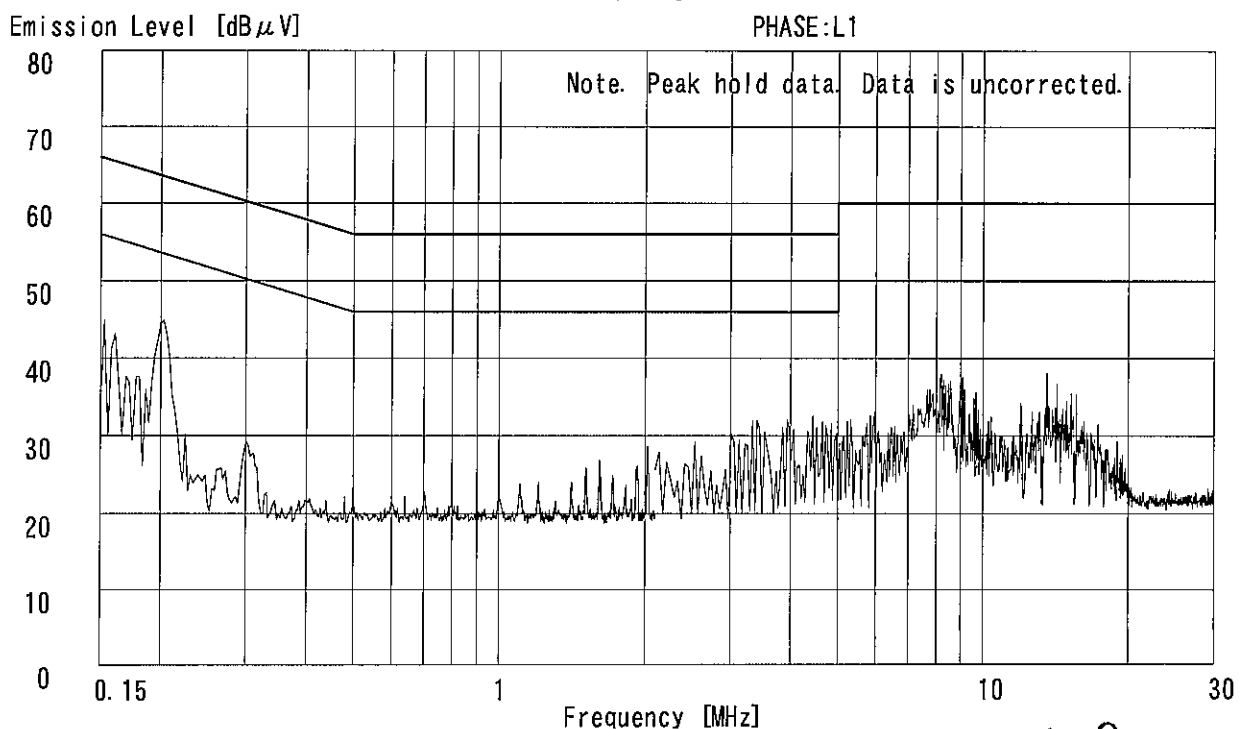
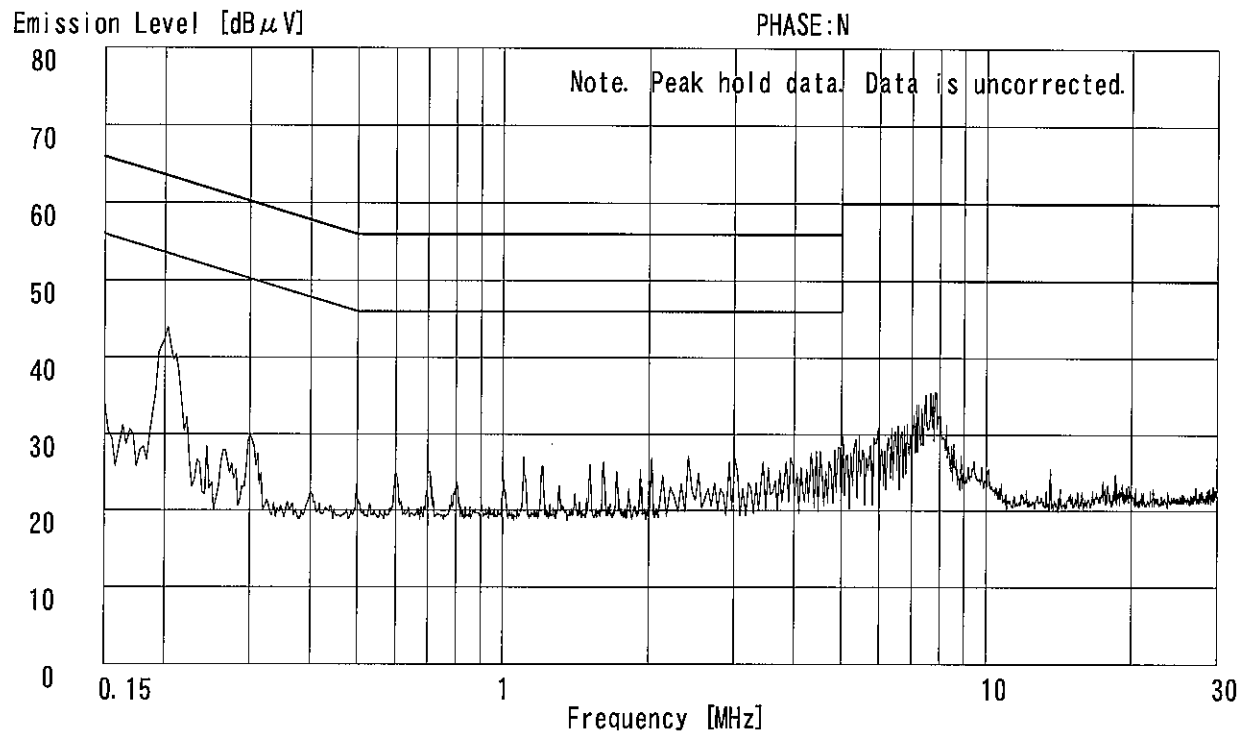
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Kind of Equipment : Full Color MFP
Model No. : Aficio MP C3000
Serial No. : 0123
Power : AC120V/60Hz
Mode : Transmitting (13.56MHz)
Remarks :
Date : 8/10/2005
Phase : Single Phase
Temperature : 21 °C
Humidity : 58 %
Regulation 1 : FCC Part15C § 15.207. (CISPR Pub. 22)
Regulation 2 : None

Engineer : Toyokazu Imamura



Data of Field Strength and Outside Field Strength: FCC15.225

UL Apex Co.,Ltd.
YAMAKITA No1 Anechoic Chamber

Company : RICOH CO.,LTD.
Equipment : Full Color MFP
Model : Aficio MP C3000
Sample No. : 0123
FCC ID : BBP-RFAT001
Power : AC120V/60Hz
Mode : Transmitting (13.56MHz)

Report No. : 25LE0014-YK-1
Regulation : FCC Part15 SupartC 15.225
Test Distance : 3m
Date : 2005/8/11
Temperature : 24deg.C
Humidity : 48%
Remarks : Module ch:3

ENGINEER : Toyokazu Imamura

Field strength

No.	FREQ [MHz]	T/R Reading		ANT Factor [dB]	ATTEN [dB]	CABLE 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	50.9	45.1	19.6	0.0	0.7	28.6	42.6	36.8	124.0	81.4	87.2

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 [dB]	ATTEN [dB]	CABLE 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	39.3	35.2	19.6	0.0	0.7	28.6	31.0	26.9	69.5	38.50	42.60
2	13.410	39.0	35.2	19.6	0.0	0.7	28.6	30.7	26.9	80.5	49.80	53.60
3	13.553	40.3	36.4	19.6	0.0	0.7	28.6	32.0	28.1	90.5	58.50	62.40
4	13.567	39.6	35.1	19.6	0.0	0.7	28.6	31.3	26.8	90.5	59.20	63.70
5	13.710	38.9	35.2	19.7	0.0	0.7	28.6	30.7	27.0	80.5	49.80	53.50
6	14.010	39.3	35.3	19.7	0.0	0.7	28.6	31.1	27.1	69.5	38.40	42.40

Outside field strength frequencies

- Field strength band $F_c \pm 7\text{kHz}$: 13.553MHz to 13.567MHz
 - Outside field strength $F_c \pm 150\text{kHz}$: 13.410MHz to 13.710MHz
 - Outside field 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 : 50.5dBuV/m + 40log30m/3m = 90.5dBuV/m (FCC15.225(b))
- 13.110MHz to 14.010MHz and 13.710MHz to 14.010MHz : 40.5dBuV/m + 40log30m/3m = 80.5dBuV/m (15.225(c))
- Below 13.110MHz and Above 14.010MHz : 29.5dBuV/m + 40log30m/3m = 69.5dBuV/m (FCC15.225(d)and FCC15.209)

DATA OF RADIATION TEST

UL Apex Co.,Ltd.

Yamakita No.1 Anechoic Chamber

Report No. : 25LE0014-YK - 1

Applicant : RICOH CO., LTD.
 Kind of Equipment : Full Color MFP
 Model No. : Aficio MP C3000
 Serial No. : 0123
 Power : AC120V/60Hz
 Mode : Transmitting (13.56MHz)
 Remarks : Module ch:3
 Date : 8/8/2005
 Test Distance : 3 m
 Temperature : 21 °C
 Humidity : 49 %
 Regulation : FCC Part15C § 15.209 9KHz-30MHz (3m)

Engineer : Toyokazu Imamura

No.	FREQ. [MHz]	ANT TYPE	READING		ANT FACTOR [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT		LIMITS [dB μV/m]	MARGIN	
			HOR [dB μV]	VER [dB μV]					HOR [dB μV/m]	VER [dB μV/m]		HOR [dB]	VER [dB]
1.	27.12	BB	31.2	31.1	20.9	27.6	1.0	0.0	25.5	25.4	69.5	44.0	44.1

CALCULATION: READING + ANT. FACTOR + CABLE LOSS - AMP. GAIN + ATTEN.

■ ANTENNA: KLP-01 (HFH2-Z2) 0.15-30MHz

■ AMP: KAF-05 (8447D) ■ RECEIVER: APRCV05 (ESS) ■ KCC-30_31_32_34 (RE)

DATA OF RADIATION TEST

UL Apex Co.,Ltd.

Yamakita No.1 Anechoic Chamber

Report No. : 25LE0014-YK - 1

Applicant : RICOH CO.,LTD.
Kind of Equipment : Full Color MFP
Model No. : Aficio MP C3000
Serial No. : 0123
Power : AC120V/60Hz
Mode : Transmitting (13.56MHz)
Remarks :
Date : 8/9/2005
Test Distance : 3 m
Temperature : 23 °C
Humidity : 65 %
Regulation : FCC Part15C § 15.209

Engineer : Toyokazu Imamura

No.	FREQ. [MHz]	ANT TYPE	READING		ANT FACTOR [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT		LIMITS [dB μV/m]	MARGIN	
			HOR [dB μV]	VER [dB μV]					HOR [dB μV/m]	VER [dB μV/m]		HOR [dB]	VER [dB]
1.	40.68	BB	21.4	23.5	13.4	27.5	1.2	6.0	14.5	16.6	40.0	25.5	23.4
2.	54.24	BB	23.3	31.9	9.2	27.7	1.5	6.0	12.3	20.9	40.0	27.7	19.1
3.	64.04	BB	42.6	48.0	7.3	27.7	1.6	6.0	29.8	35.2	40.0	10.2	4.8
4.	67.80	BB	35.8	36.5	6.9	27.6	1.6	6.0	22.7	23.4	40.0	17.3	16.6
5.	81.36	BB	27.0	24.2	6.6	27.6	1.8	6.0	13.8	11.0	40.0	26.2	29.0
6.	94.92	BB	34.0	33.3	8.8	27.5	2.0	6.0	23.3	22.6	43.5	20.2	20.9
7.	108.48	BB	25.0	27.1	10.5	27.5	2.1	6.0	16.1	18.2	43.5	27.4	25.3
8.	122.04	BB	25.9	26.4	12.1	27.5	2.3	6.0	18.8	19.3	43.5	24.7	24.2
9.	135.60	BB	26.6	25.0	13.1	27.3	2.4	6.0	20.8	19.2	43.5	22.7	24.3
10.	344.07	BB	37.3	32.5	15.4	27.0	4.0	6.0	35.7	30.9	46.0	10.3	15.1

CALCULATION: READING + ANT. FACTOR + CABLE LOSS - AMP. GAIN + ATTEN.

■ ANTENNA: KBA-03 (BBA9106) 30-299MHz/KLA-03 (USLP9143) 300-1000MHz

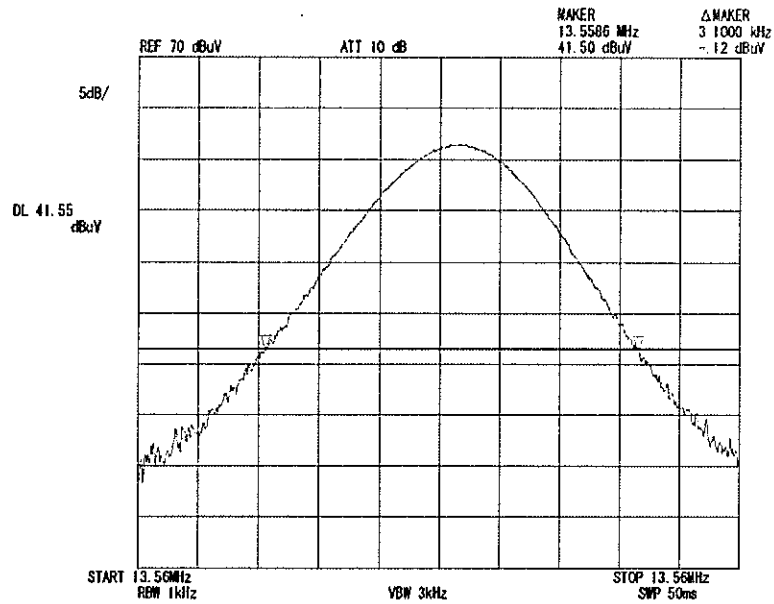
■ AMP: KAF-05 (8447D) ■ RECEIVER: APRCV05 (ESS) ■ KCC-30_31_32_34 (RE)

20dB Bandwidth: FCC 15.215(c)

COMPANY : RICOH CO.,LTD.
EQUIPMENT : Full Color MFP
MODEL NUMBER: Aficio MP C3000
SERIAL NUMBER: 0123
FCC ID : BBP-RFAT001
POWER : AC120V/60Hz
Remarks : Module ch:3

UL Apex Co.,Ltd. Yamakita No.1 Anechoic Chamber
REPORT NO : 25LE0014-YK-1
REGULATION : Fcc Part15SubpartC 215(c)
DATE : 2005/8/9
TEMP/HUMI : 21°C/58%
TEST MODE : Transmitting
ENGINEER : Toyokazu Imamura

20dB Bandwidth:3.10kHz(OBW(99%): 3.22kHz)



Data of Frequency Torerance: FCC 15.225(e)

UL Apex Co.,Ltd.

YAMAKITA No4 Shield room

Company : RICOH CO.,LTD.

Equipment : Full Color MFP

Model : Aficio MP C3000

Sample No. : 0123

FCC ID : BBP-RFAT001

Power : AC120V/60Hz

Mode : Transmitting (13.56MHz)

Report No. : 23LE0014-YK = 1

Regulation : FCC Part15 SupartC 15.225 (e)

Test Distance : 3m

Date : 2005/08/9

Temperature : 21deg.C

Humidity : 58%

Remarks : Module ch:3

ENGINEER : Toyokazu Imamura

Temperature Variation: -20deg.C

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (kHz)	Frequency torerance (%)	Limit (%)
startup	13.56	13.559807	-0.0001930	-0.00142	0.01
after 2minutes	13.56	13.559812	-0.0001880	-0.00139	0.01
after 5minutes	13.56	13.559812	-0.0001880	-0.00139	0.01
after 10minutes	13.56	13.559821	-0.0001790	-0.00132	0.01

Temperature Variation: 20deg.C

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (kHz)	Frequency torerance (%)	Limit (%)
startup	13.56	13.559967	-0.0000330	-0.00024	0.01
after 2minutes	13.56	13.559967	-0.0000330	-0.00024	0.01
after 5minutes	13.56	13.559968	-0.0000320	-0.00024	0.01
after 10minutes	13.56	13.559968	-0.0000320	-0.00024	0.01

Temperature Variation: 50deg.C

Test Conditions	Original Frequency (MHz)	Mesure Frequency (MHz)	Frequency Error (kHz)	Frequency torerance (%)	Limit (%)
startup	13.56	13.559984	-0.0000160	-0.00012	0.01
after 2minutes	13.56	13.559984	-0.0000160	-0.00012	0.01
after 5minutes	13.56	13.559985	-0.0000150	-0.00011	0.01
after 10minutes	13.56	13.559985	-0.0000150	-0.00011	0.01

Test Report No :25LE0014-YK-1

APPENDIX 3 Test Instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No.	Test Item	Calibration Date * Interval (month)
KAEC-01(NSA)	Anechoic Chamber	JSE	Semi 3m	RE/BW	2005/09/03 * 12
KAF-05	Pre Amplifier	Agilent	8447D	RE/BW	2005/05/11 * 12
KAT6-01	Attenuator	INMET	18N-6dB	RE	2005/04/07 * 12
KCC-30/31/32 /34	Coaxial Cable	Fujikura/Suhner	5D-2W/S04272B	RE/BW	2005/06/02 * 12
KCC-A3	Coaxial Cable	Fujikura	5D-2W	FT	2005/06/03 * 12
KCC-B1	Coaxial Cable	Fujikura/Suhner	5D-2W	FT	2005/06/14 * 12
KFC-01	Microwave Counter	Advantest	R5373	RE	2005/03/29 * 12
KLA-03	Logperiodic Antenna	Schwarzbeck	USLP9143	RE	2005/01/29 * 12
KLP-01	Loop Antenna	Rohde & Schwarz	HFH2-Z2	RE/BW	2005/06/17 * 12
KLS-01	LISN(AMN)	Schwarzbeck	NSLK8126	CE	2005/05/10 * 12
KSA-01	Spectrum Analyzer	Advantest	R3365	RE/BW	2005/07/06 * 12
KSA-04	Spectrum Analyzer	Advantest	R3271A	CE/RE	2004/09/15 * 12
APANT14	Biconical Antenna	Schwarzbeck	VHA9103/BBA9106	RE	2005/05/16 * 12
KCH-01	Temperature and Humidity Chamber	Tabai Spec	PL-1KT	FT	2004/12/24 * 12
APRCV05	Test Receiver	Rohde & Schwarz	ESS	CE/RE	2005/07/11 * 12
KCC-33/34	Coaxial Cable	Fujikura/Suhner	5D-2W/S04272B	CE	2005/01/06 * 12
KTR-01	Test Receiver	Rohde & Schwarz	ESI40	CE/RE	2005/08/05 * 12

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: 20dB bandwidth,
FT: Frequency tolerance