EMI TEST REPORT

Test Report No. : 26FE0133-YK-F1

Applicant	:	**SATO CORPORATION**
Type of Equipment	:	**RFID Reader/Writer Module**
Model No.	:	**Mercury 4e**
FCC ID	:	**MMFRWMTM1**
Test Standard	:	**FCC Part15 Subpart C,** **Section 15.207, Section 15.209, Section 15.247: 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: February 16, 17 and 28, 2006

Tested by: M. Hosaka
Makoto Hosaka

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

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1 Applicant Information

Company Name : SATO CORPORATION

Brand Name : SATO CORPORATION

Address : 1-207 Onari-cho, Omiya-ku, Saitama-shi, Saitama-ken, 330-0852 JAPAN

Telephone Number : +81 48 663 8118

Facsimile Number : +81 48 651 6662

Contact Person : Yukio Nagashima

2 Product Description

Type of Equipment : RFID Reader/Writer Module

Model No. : Mercury 4e

Serial No. : 05434E00E008

Rating : DC5.3V, 2.5A

Country of Manufacture : U.S.A

Receipt Date of Sample : February 3, 2006

Condition of EUT : Production model

Clock frequency		16MHz, 20MHz
Equipment type		Transceiver
Frequency band	Lower limit	902.990MHz
	Upper limit	927.186MHz
Channel spacing		470kHz/CH
Type of Modulation		FHSS
Antenna type		Miniature dipole
Antenna connector type		MMCX
Antenna gain		-5dBi
Antenna cable loss		0.675dB
Mode of Operation		Duplex
ITU code		A1D
Power supply (Inner)		DC 5.3V ±5%
Operating temperature range		0 to +55 deg.C.

FCC Part15.31 (e)
Host device provides the module with stable power supply (DC 1.28 and 3.3 V), therefore the equipment complies power supply regulation.

FCC Part15.203 Antenna requirement
The equipment and its antenna comply with this requirement. Since this antenna is connected with unique connector and installed in the end product (Printer), it cannot be replaced by end users.

3 Test Specification, Procedures and Results

3.1 Test specification

Test specification : FCC Part15 Subpart C: 2006
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 15.247 Operation within the bands 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz

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	6.6dB (0.2116MHz, L1, AV, Tx 902.990MHz)	Complied
Carrier Frequency Separation	ANSI C63.4:2003 13. Measurement of intentional radiators	Section15.247 (a)(1)	Conducted	N/A	*See data.	Complied
20dB Bandwidth	ANSI C63.4:2003 13. Measurement of intentional radiators	Section15.247 (a)(1)	Conducted	N/A		Complied
Number of Hopping Frequency	ANSI C63.4:2003 13. Measurement of intentional radiators	Section15.247 (a)(1)(iii)	Conducted	N/A		Complied
Dwell Time	ANSI C63.4:2003 13.Measurement of intentional radiators	Section15.247 (a)(1)(iii)	Conducted	N/A		Complied
Maximum Peak Output Power	ANSI C63.4:2003 13. Measurement of intentional radiators	Section15.247 (b)(1)	Conducted	N/A		Complied
Spurious Emission	ANSI C63.4:2003 13. Measurement of intentional radiators	Section15.209 Section15.247(d)	Conducted / Radiated	N/A	5.4dB (959.24MHz, Horizontal, Tx 902.990MHz)	Complied

The measurements also referred to FCC Public Notice DA 00-705 "Guidance on Measurement for Frequency Hopping Spread Spectrum Systems".

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

3.3 Uncertainty

Conducted emission
The measurement uncertainty (with 95% confidence level) for this test is ±2.7dB.
The data listed in this test report has enough margin, more than site margin.

Antenna port conducted test
The measurement uncertainty (with 95% confidence level) for this test is ±0.4dB.

Spurious emission test (Radiated)
The measurement uncertainty (with 95% confidence level) for this test using Biconical antenna is ±4.5dB.
The measurement uncertainty (with 95% confidence level) for this test using Logperiodic antenna is ±4.3dB.
The measurement uncertainty (with 95% confidence level) for this test using Horn antenna is ±5.2dB.
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 August 26, 2005 (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 2, 2005 (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. (Semi-anechoic chamber)	10.0 x 7.5 x 5.7
No.2 shielded room	5.0 x 4.0 x 2.5		
No.3 shielded room	4.0 x 5.0 x 2.7		

4 System Test Configuration

4.1 Justification

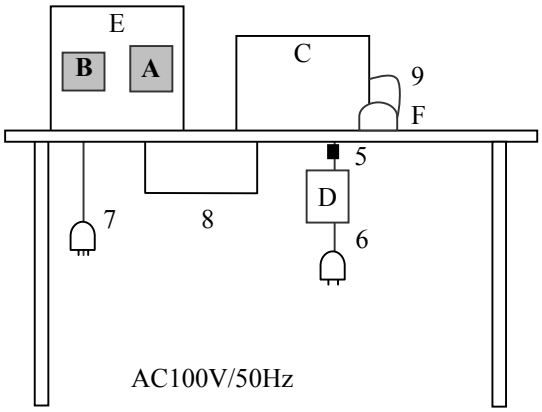
The system was configured in typical fashion (as a customer would normally use it) for testing.

Test mode: Transmitting mode (Packet size: DH5)
- Low channel : 902.990MHz
- Middle channel : 915.120MHz
- High channel : 927.186MHz
- Hopping

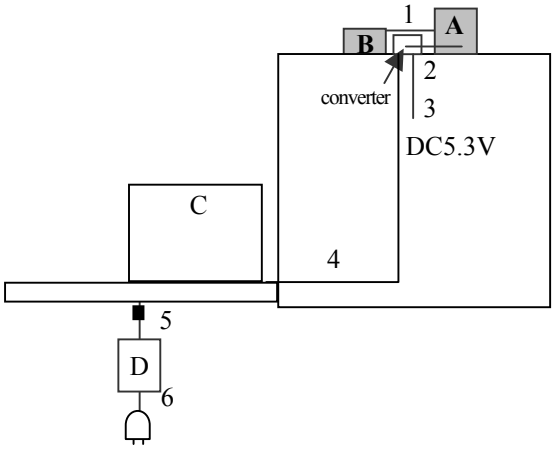
4.2 Configuration of Tested System

■: Ferrite core (Standard attachment of PC)

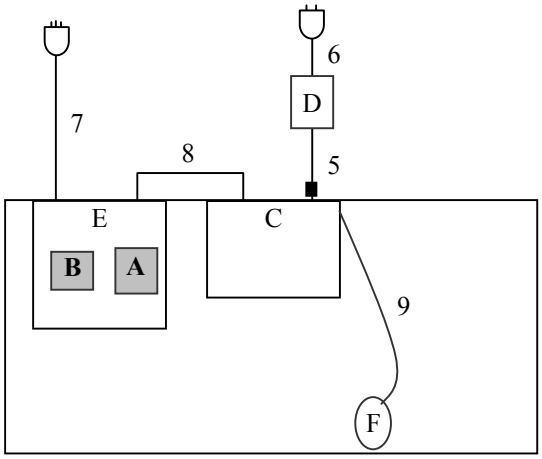
Front View (Conducted emission)



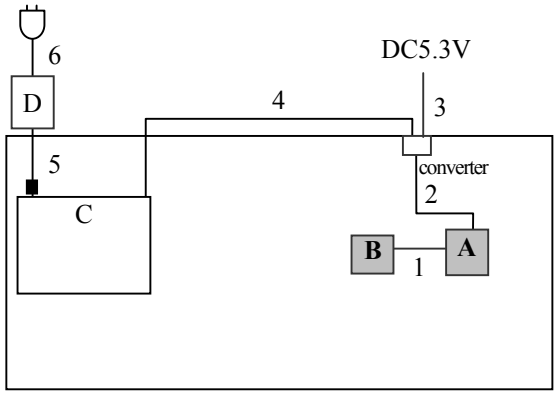
Front View (Radiated emission)



Top View (Conducted emission)



Front View (Radiated emission)



* Test data was taken under worse case conditions.

Description of EUT and support equipment

No.	Item	Model number	Serial number	Manufacturer	FCC ID (Remarks)
A	RFID Reader/Writer Module	Mercury 4e	05434E00E008	ThingMagic	MMFRWMTM1 (EUT)
B	Antenna	Miniature Dipole	-	ThingMagic	-
C	Personal Computer	PC-VA20CWAAAA23	89000251A	NEC	-
D	AC Adapter	ADP52	89015185G	NEC	-
E	Barcode Printer	CL408e	47590002	SATO	(Host device)
F	Mouse	ITE 78CJ	-	Microsoft	-

* DC Power Supply (Model No.: PAN55-20A) was used for DC 5.3V input.

List of cables used

No.	Name	Length (m)	Shield	Remark
1	Antenna cable	0.45	Shielded	-
2	Cable for Converter	0.4	Unshielded	-
3	DC cable	0.7	Unshielded	-
4	Serial cable	2.0	Shielded	-
5	DC cable	1.9	Unshielded	-
6	AC cable	1.8	Unshielded	-
7	AC cable	2.9	Unshielded	-
8	RS232C cable	1.5	Shielded	-
9	Mouse cable	1.9	Shielded	-

5 Conducted Emissions

5.1 Operating environment

The test was carried out in No.1 shielded room.

5.2 Test configuration

EUT was placed on a platform of nominal size, 1m by 1.8m, raised 80cm above the conducting ground plane.
The rear of tabletop was located 40cm to the vertical conducting plane. The rear of EUT's host device (Printer), including peripherals was aligned and flushed with rear of tabletop. All other surfaces of tabletop were at least 80cm from any other grounded conducting surface. EUT was located 80cm from a Line Impedance Stabilization Network (LISN) and excess AC cable was bundled in center. I/O cable were connected to the peripherals were bundled in center. They were folded back and forth forming a bundle 30cm to 40cm long and were hanged at a 40cm height to the ground plane.

5.3 Test conditions

Frequency range : 0.15 - 30MHz
EUT operation mode : Transmitting

5.4 Test procedure

The EUT's host device 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 15 to 19

Date : February 28, 2006 Test engineer : Makoto Hosaka

6 Carrier Frequency Separation

Test Procedure
The carrier frequency separation was measured with a spectrum analyzer connected to the antenna port.

Summary of the test results: Pass | Test data: APPENDIX 2 Page 20
Date: February 17, 2006 | Test engineer : Makoto Hosaka

7 20dB Bandwidth

Test Procedure
The bandwidth was measured with a spectrum analyzer connected to the antenna port.

Summary of the test results: Pass | Test data: APPENDIX 2 Page 21
Date: February 17, 2006 | Test engineer : Makoto Hosaka

8 Number of Hopping Frequency

Test Procedure
The Number of Hopping Frequency was measured with a spectrum analyzer connected to the antenna port.

Summary of the test results: Pass | Test data: APPENDIX 2 Page 22
Date: February 17, 2006 | Test engineer : Makoto Hosaka

9 Dwell Time

Test Procedure
The Dwell time was measured with a spectrum analyzer connected to the antenna port.

Summary of the test results: Pass | Test data: APPENDIX 2 Page 23 - 28
Date: February 17, 2006 | Test engineer : Makoto Hosaka

10 Maximum Peak Output Power

Test Procedure
The Maximum Peak Output Power was measured with a power meter connected to the antenna port.

Summary of the test results: Pass | Test data: APPENDIX 2 Page 29
Date: February 17, 2006 | Test engineer : Makoto Hosaka

11 Out of Band Emissions (Antenna Port Conducted)

Test Procedure
The Out of Band Emissions was measured with a spectrum analyzer connected to the antenna port.

Summary of the test results: Pass | Test data: APPENDIX 2 Page 30 - 35
Date: February 17, 2006 | Test engineer : Makoto Hosaka

12 Out of Band Emissions (Radiated)

12.1 Operating environment

The test was carried out in an open site.

12.2 Test configuration

EUT was placed on a platform of nominal size, 0.5m by 0.5m, raised 80cm above the conducting ground plane.
A drawing of the set up is shown in the photos of Appendix 1.

12.3 Test conditions

Frequency range : 30MHz - 10GHz
Test distance : 3m
EUT operation mode : Transmitting

12.4 Test procedure

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

In any 100kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator confirmed 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on a radiated measurement.

It was confirmed that spurious emission frequencies are 20dB or more lower than fundamental waves. These spurious emission frequencies are not the restricted band regulated in 15.205 (a). Refer to the data in page 45-50.

Measurements were performed with QP, PK, and AV detector.
The radiated emission measurements were made with the following detector function of the test receiver.
When using Spectrum analyzer, the test was made with adjusting span to zero by using peak hold.

Frequency	Below 1GHz	Above 1GHz
Instrument used	Test Receiver	Spectrum Analyzer
Detector IF Bandwidth	QP: BW 120kHz	PK: RBW: 1MHz/VBW: 1MHz AV: RBW: 1MHz/VBW: 10Hz

The equipment and its antenna were previously checked at each position of three axes X, Y and Z. Firstly, the antenna was fixed in Y-axis and position of the module was changed, then the module was fixed in the worst-case position and the antenna was searched for the worst position. The position in which the maximum noise occurred was chosen to put into measurement. See the table below and photographs in page 14. With the position, the noise levels of all the frequencies were measured.

Combinations of the worst case

	30-1000MHz		1-10GHz	
	Module	Antenna	Module	Antenna
Horizontal	Z	Y	X	X
Vertical	Z	Z	X	X

12.5 Results

Summary of the test results : Pass
Test data : APPENDIX 2 Page 36 - 50

Date: February 16, 2006 Test engineer : Makoto Hosaka

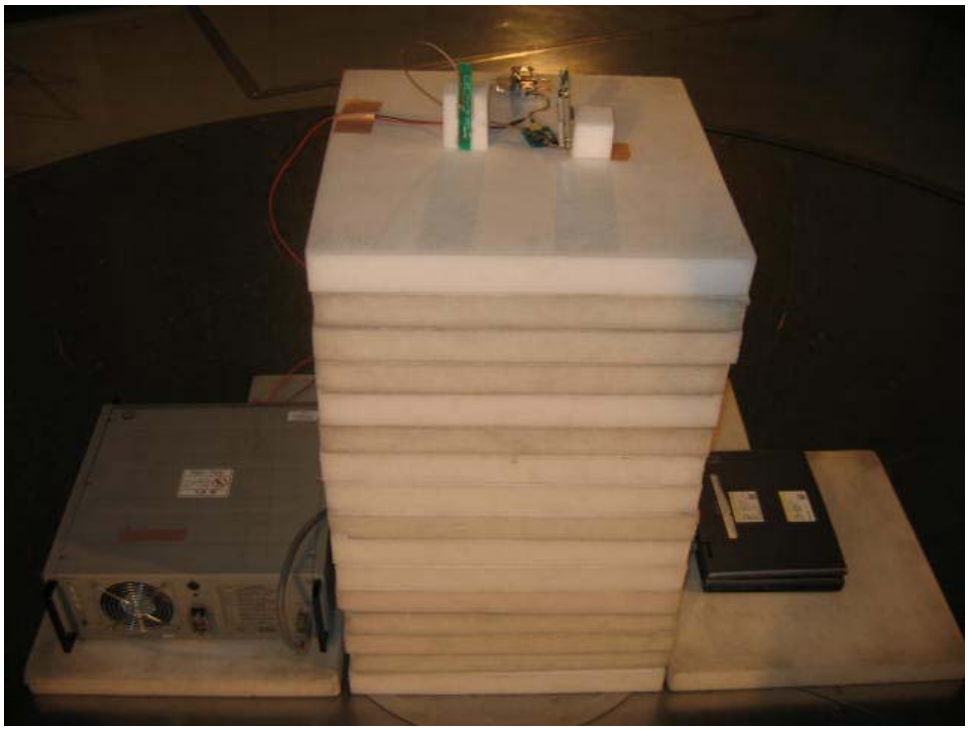
APPENDIX 1: Photographs of test setup

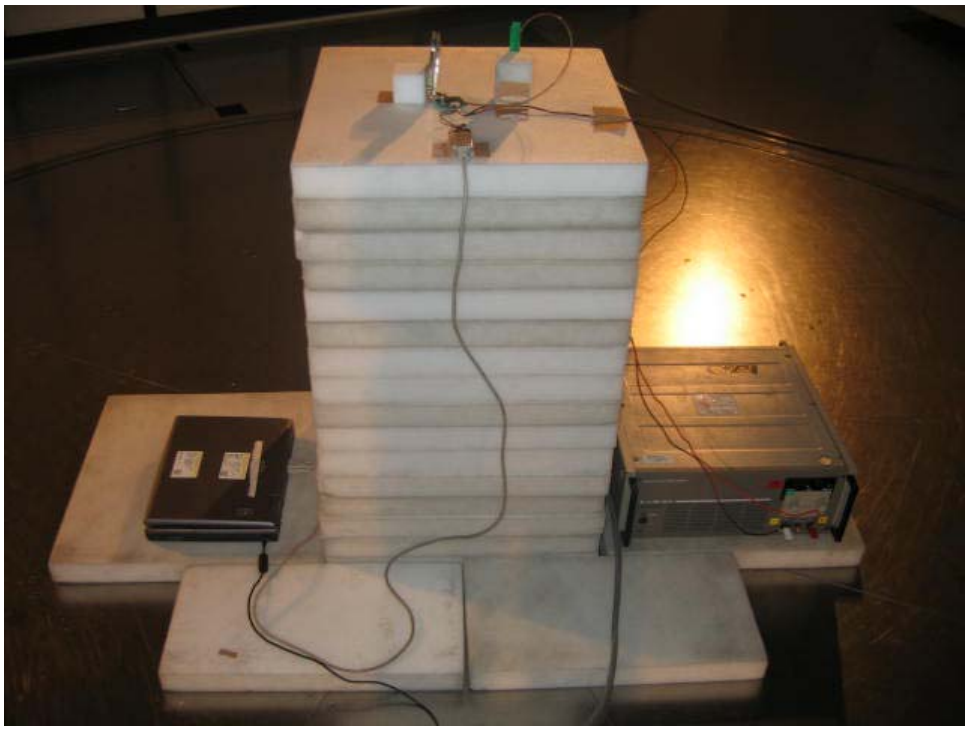
APPENDIX 2: Test Data

APPENDIX 3: Test instruments

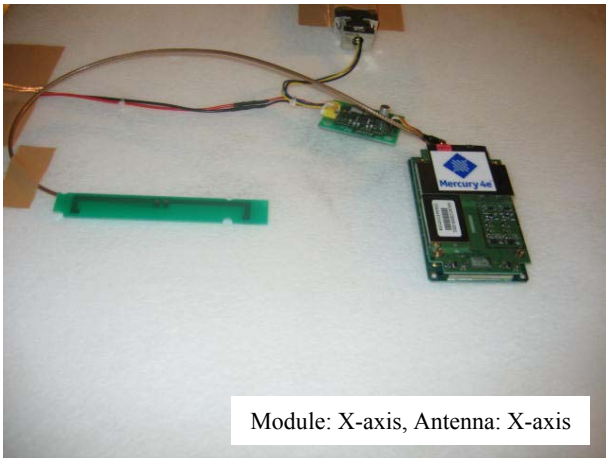
Conducted emission

Radiated emission

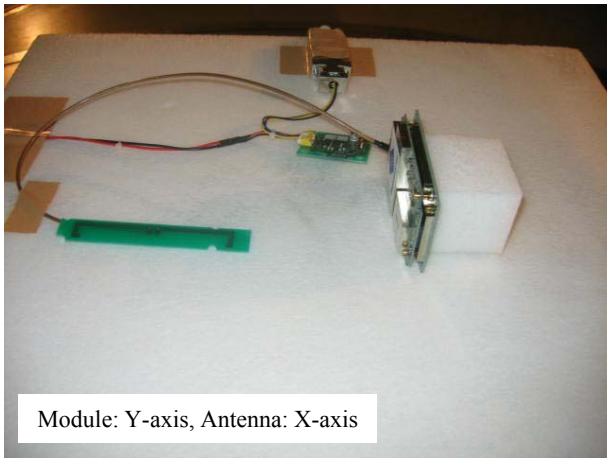


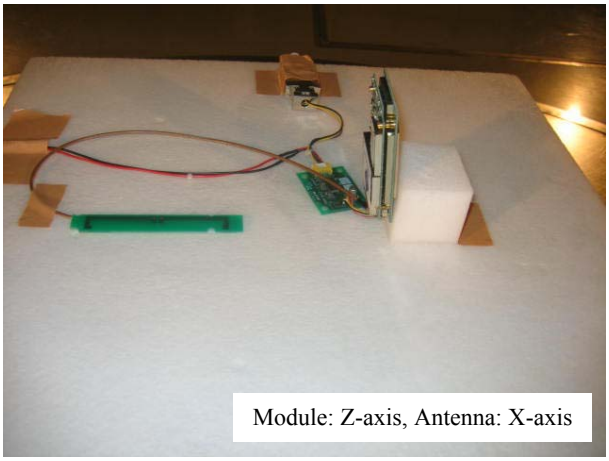


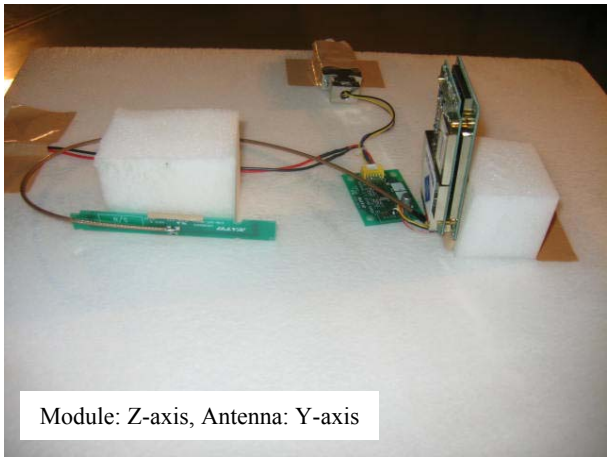
Pre check of worse-case position

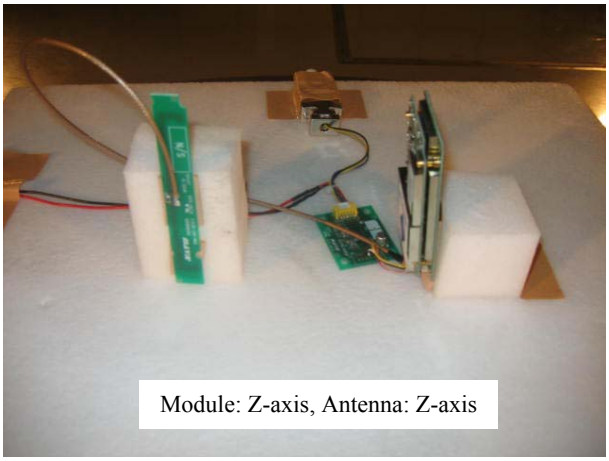


Module: X-axis, Antenna: X-axis


Module: Y-axis, Antenna: X-axis


Module: Z-axis, Antenna: X-axis


Module: Z-axis, Antenna: Y-axis


Module: Z-axis, Antenna: Z-axis

DATA OF CONDUCTION TEST

UL Apex Co.,Ltd.
YAMAKITA No.1 SHIELD ROOM
Report No. : 26FE0133-YK

Applicant	: SATO CORPORATION		
Kind of Equipment	: RFID Reader/Writer Module		
Model No.	: Mercury 4e		
Serial No.	: 05434E00E008		
Power	: AC120V/60Hz		
Mode	: Transmitting (902.990MHz)		
Remarks	:		
Date	: 2/28/2006		
Phase	: Single Phase		
Temperature	: 24 ℃	Engineer	: Makoto Hosaka
Humidity	: 44 %		
Regulation	: FCC Part15C §15.207. (CISPR Pub.22)		

No.	FREQ.	READING (N)		READING (L1)		LISN	CABLE	ATTEN.	RESULT		LIMITS		MARGIN	
		QP	AV	QP	AV	FACTOR	LOSS		QP	AV	QP	AV	QP	AV
	[MHz]	[dBμV]		[dBμV]		[dB]	[dB]	[dB]	[dB]		[dBμV]		[dB]	
1.	0.1500	33.8	-	35.4	-	0.1	0.1	0.0	35.6	-	66.0	56.0	30.4	-
2.	0.2116	45.9	45.7	46.4	46.3	0.1	0.1	0.0	46.6	46.5	63.1	53.1	16.5	6.6
3.	0.2810	40.0	39.9	41.5	41.4	0.1	0.1	0.0	41.7	41.6	60.8	50.8	19.1	9.2
4.	1.5444	32.1	-	26.6	-	0.1	0.3	0.0	32.5	-	56.0	46.0	23.5	-
5.	5.7602	41.6	31.3	43.1	36.6	0.2	0.7	0.0	44.0	37.5	60.0	50.0	16.0	12.5
6.	6.8097	40.2	30.6	41.6	35.7	0.2	0.8	0.0	42.6	36.7	60.0	50.0	17.4	13.3
7.	18.4006	36.3	32.6	44.0	41.1	0.4	1.6	0.0	46.0	43.1	60.0	50.0	14.0	6.9

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

■LISN :KLS-02 (NSLK8127) ■COAXIAL CABLE:KCC-14/15/16/18
■PULSE LIMTTER:KPL-01 (PL01) ■EMI RECEIVER:KTR-02 (ESCS30)

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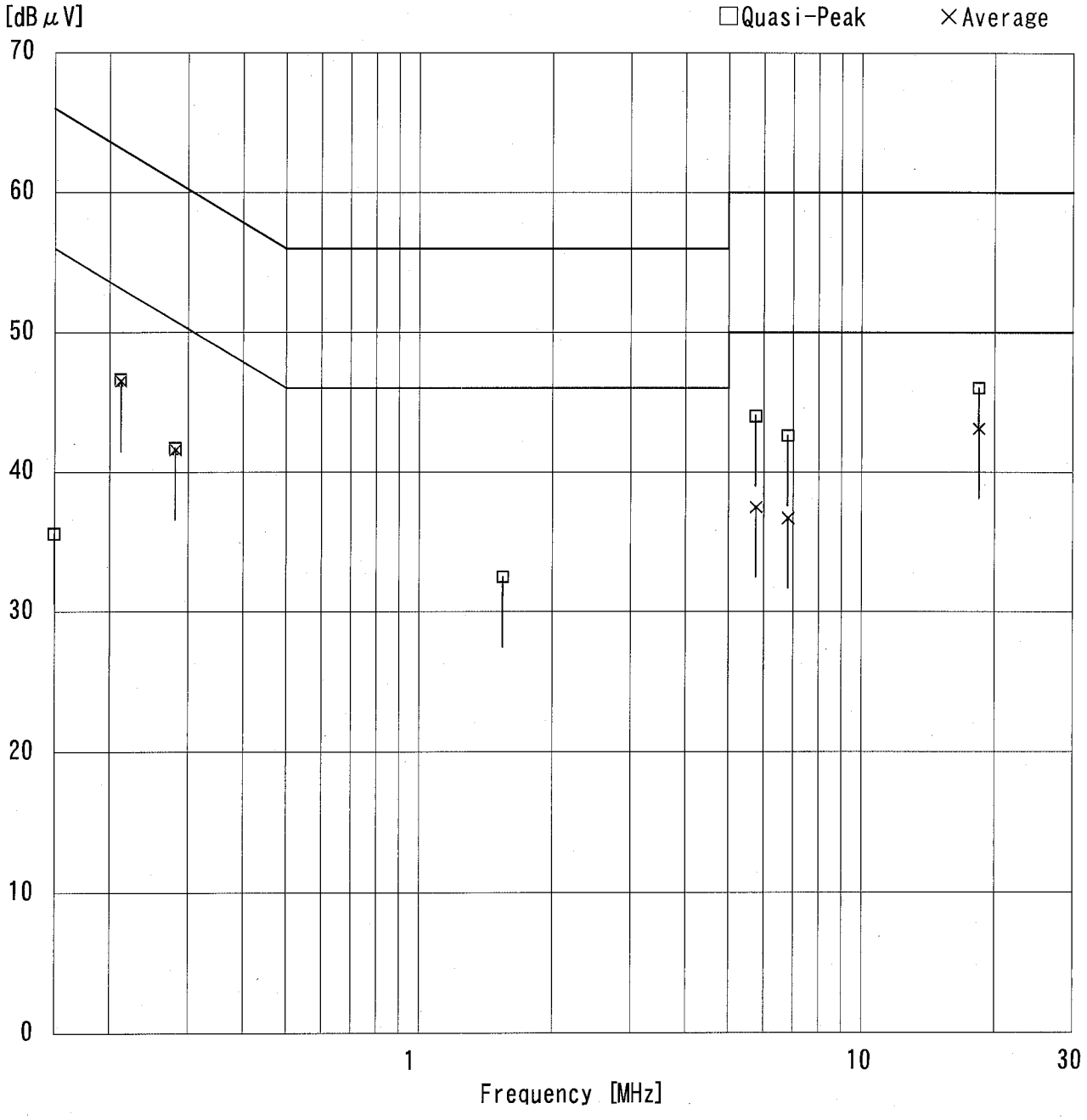

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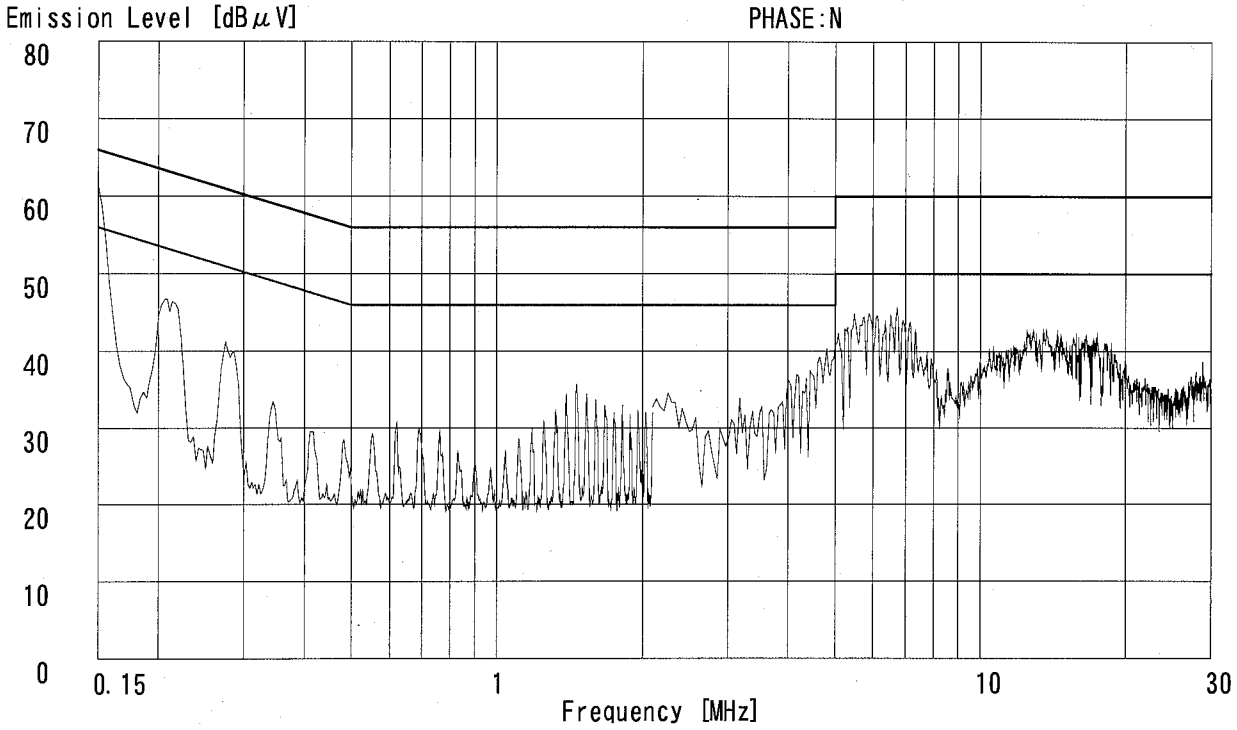
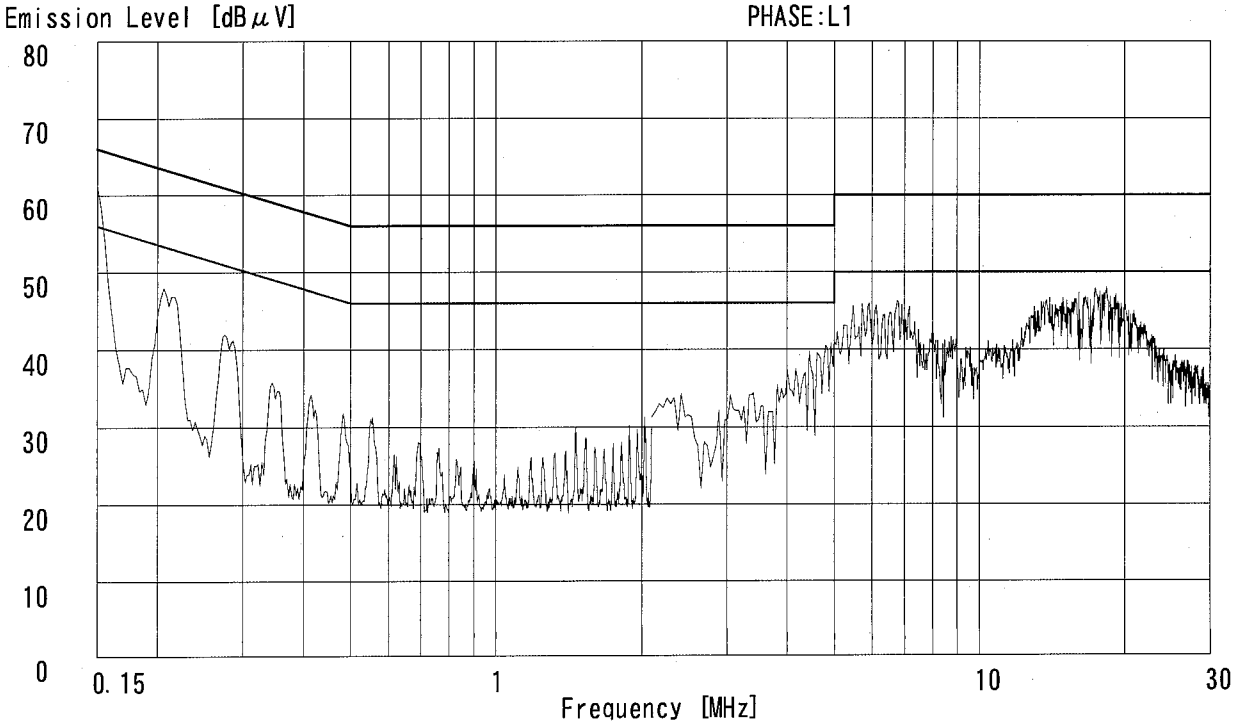
Mode	: Transmitting (902.990MHz)		
Remarks	:		
Date	: 2/28/2006		
Phase	: Single Phase		
Temperature	: 24 ℃	Engineer	: Makoto Hosaka
Humidity	: 44 %		
Regulation 1	: FCC Part15C §15.207. (CISPR Pub.22)		
Regulation 2	: None		





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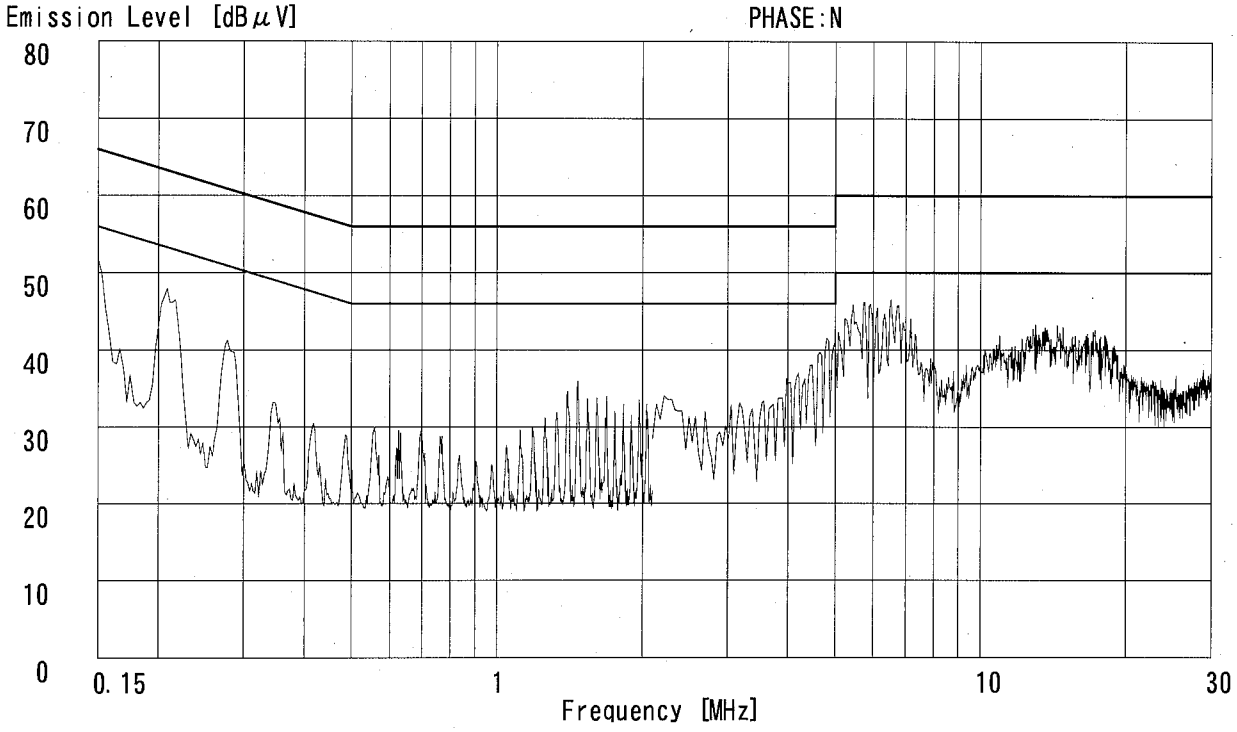
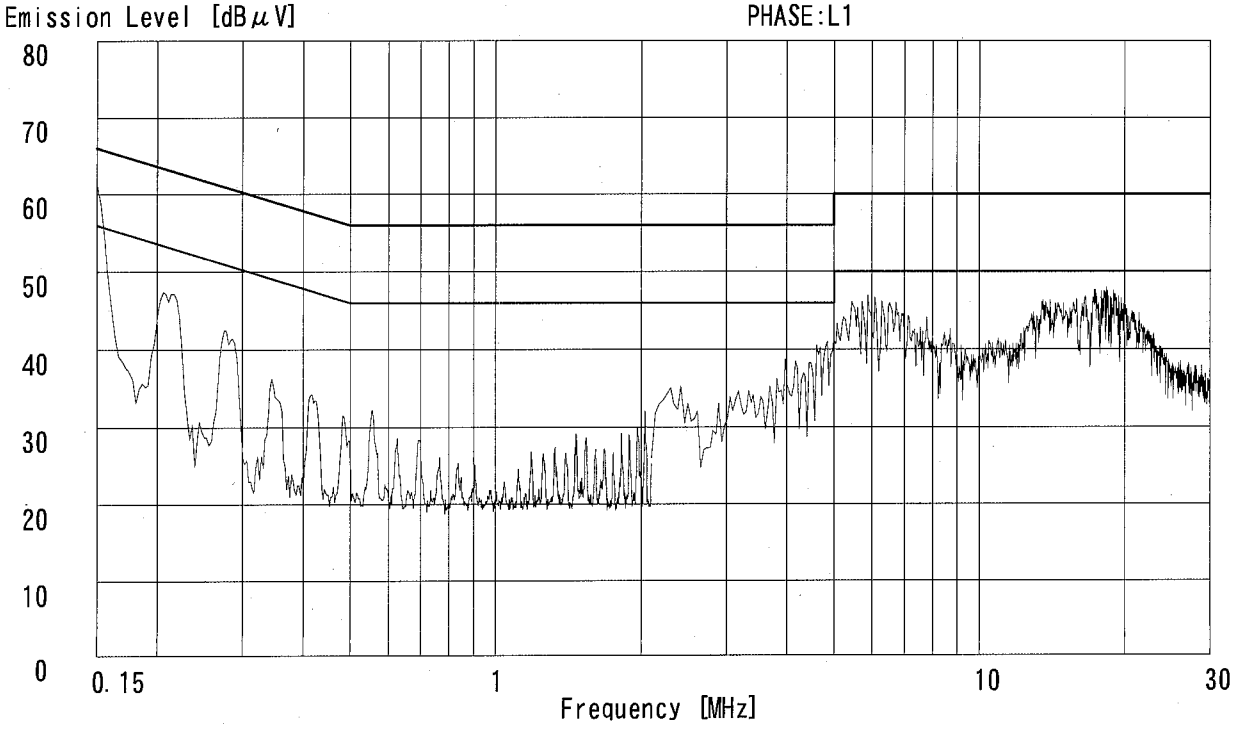
Humidity	: 44 %		
Regulation 1	: FCC Part15C §15.207. (CISPR Pub.22)		
Regulation 2	: None		





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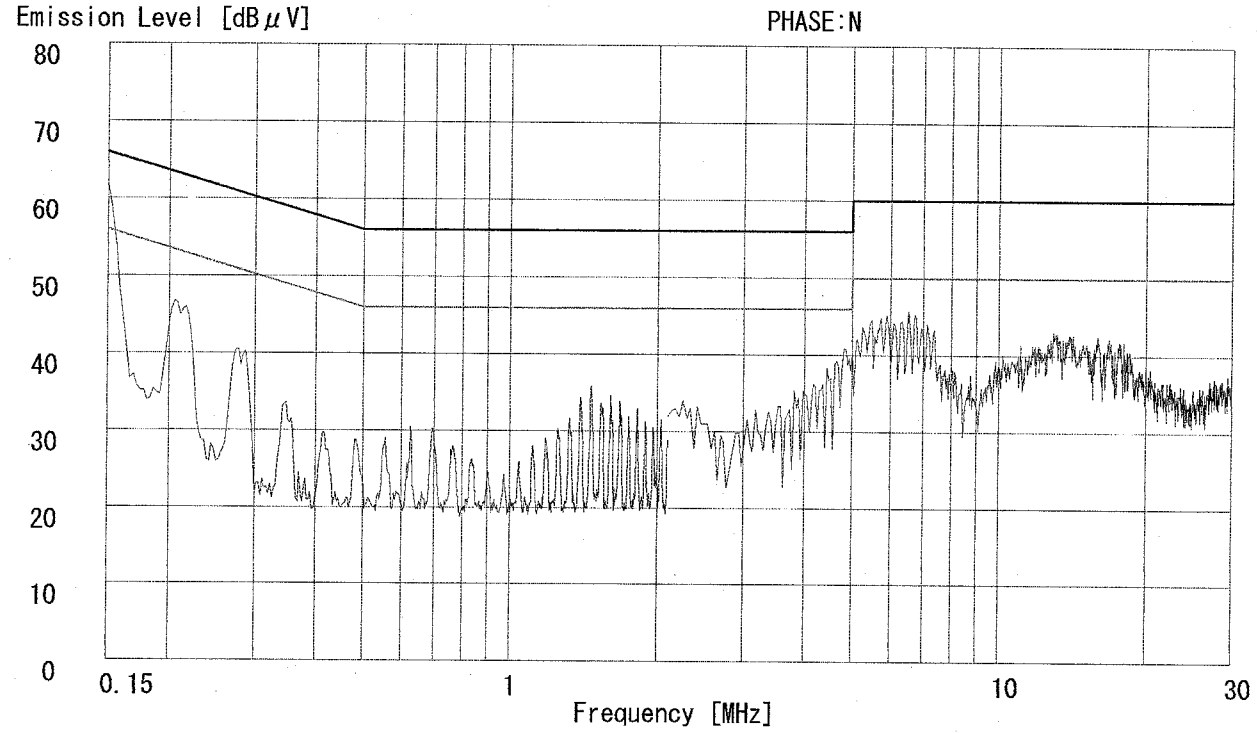
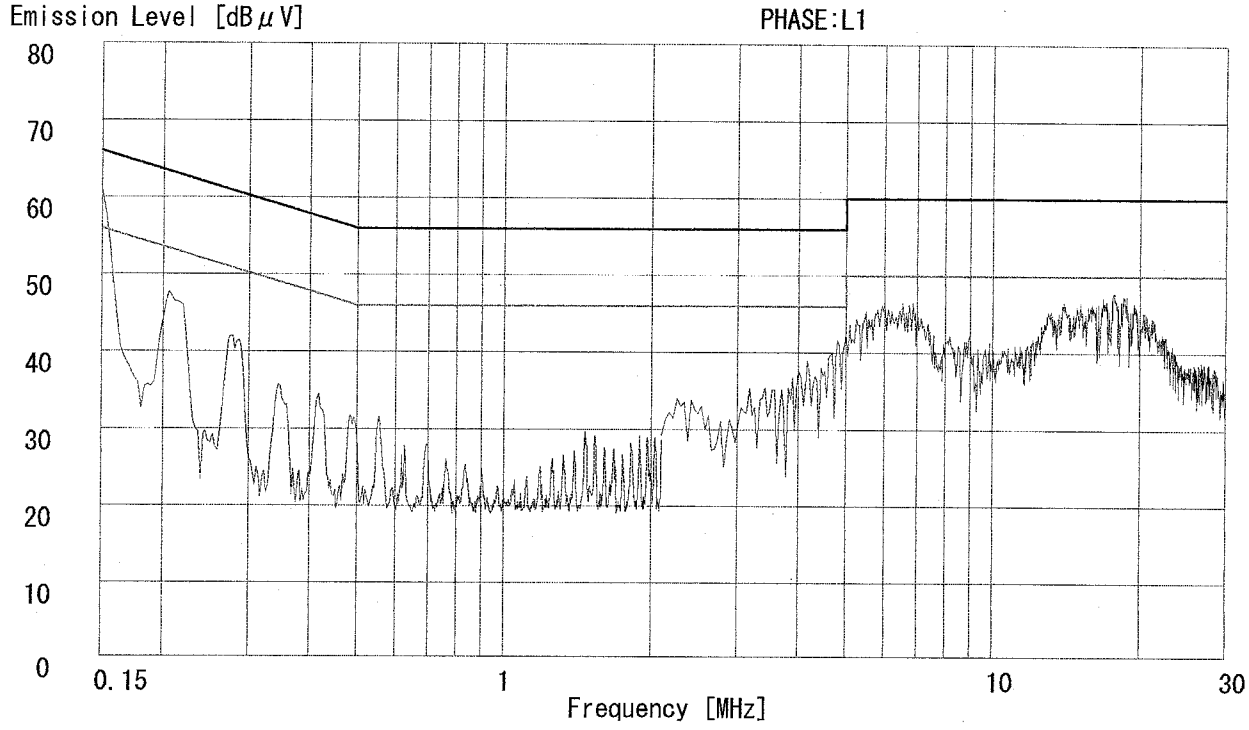
Serial No.	: 05434E00E008		
Power	: AC120V/60Hz		
Mode	: Transmitting (927.186MHz)		
Remarks	:		
Date	: 2/28/2006		
Phase	: Single Phase		
Temperature	: 24 ℃	Engineer	: Makoto Hosaka
Humidity	: 44 %		
Regulation 1	: FCC Part15C §15.207.(CISPR Pub.22)		
Regulation 2	: None		



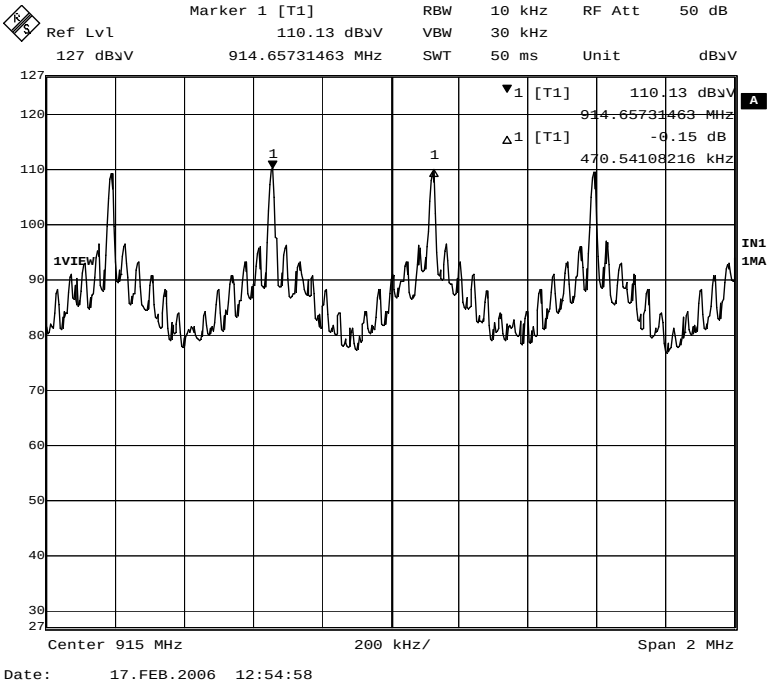


Channel Separation: FCC 15.247(a)(1)

UL Apex Co.,Ltd. Yamakita No.2 Shielded Room

COMPANY	**: SATO CORPORATION**	**REPORT NO**	**: 26FE0133-YK-F1**
EQUIPMENT	**: RFID Reader/Writer Module**	**REGULATION**	**: Fcc Part15SubpartC 247(a)(1)**
MODEL NUMBER	**: Mercury 4e**	**DATE**	**: 2006/2/17**
SERIAL NUMBER	**: 05434E00E008**	**TEMP./HUMI**	**: 25deg.C./38%**
FCC ID	**: MMFRWMTM1**	**TEST MODE**	**: Transmitting**
POWER	**: DC5.3V**	**ENGINEER**	**: Makoto Hosaka**

1. Hopping:470.54kHz

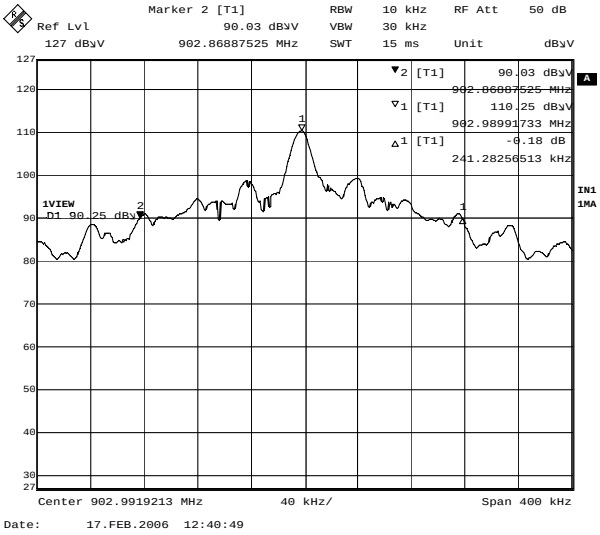


20dB Bandwidth: FCC 15.247(a)(1)

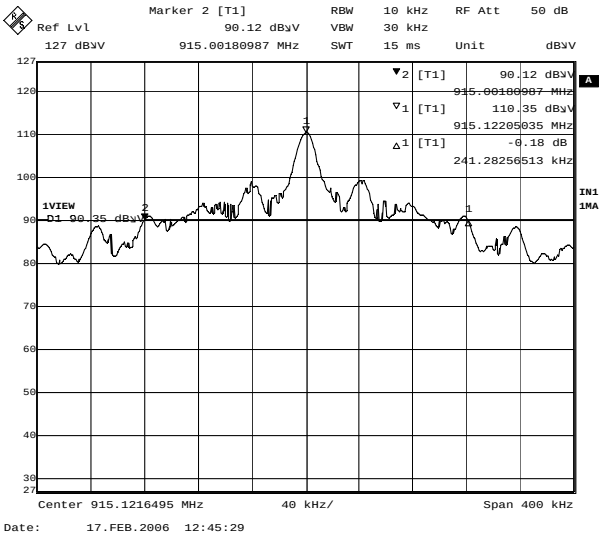
UL Apex Co.,Ltd. Yamakita No.2 Shielded Room

COMPANY	**: SATO CORPORATION**	**REPORT NO**	**: 26FE0133-YK-F1**
EQUIPMENT	**: RFID Reader/Writer Module**	**REGULATION**	**: Fcc Part15SubpartC 247(a)(1)**
MODEL NUMBER	**: Mercury 4e**	**DATE**	**: 2006/2/17**
SERIAL NUMBER	**: 05434E00E008**	**TEMP./HUMI**	**: 25deg.C./38%**
FCC ID	**: MMFRWMTM1**	**TEST MODE**	**: Transmitting (Hopping off)**
POWER	**: DC5.3V**	**ENGINEER**	**: Makoto Hosaka**

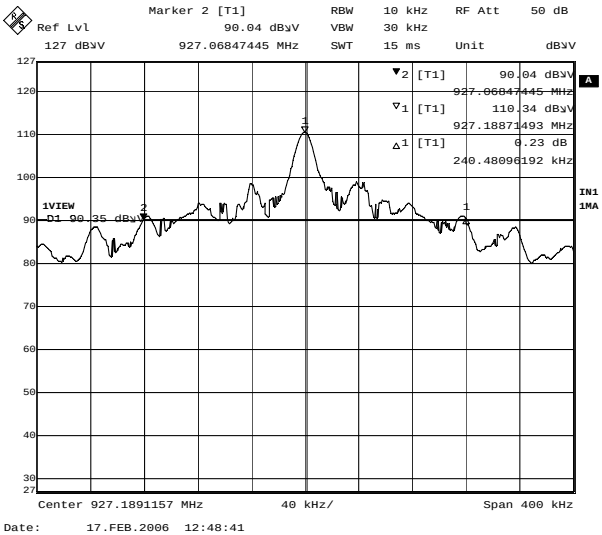
1. ch : 902.99MHz/20dB Bandwidth:241.28kHz



2. ch : 915.12MHz/20dB Bandwidth:241.28kHz



3. ch : 927.186MHz/20dB Bandwidth:240.48kHz



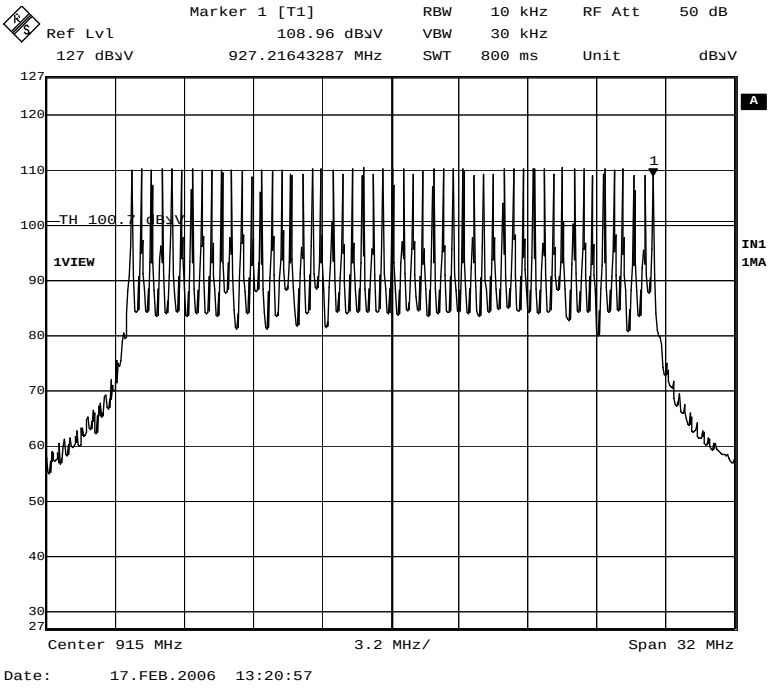
Channel Utilization: FCC 15.247(a)(1)(i)

UL Apex Co.,Ltd. Yamakita No.2 Shielded Room

COMPANY	**: SATO CORPORATION**	**REPORT NO**	**: 26FE0133-YK-F1**
EQUIPMENT	**: RFID Reader/Writer Module**	**REGULATION**	**: Fcc Part15SubpartC 247(a)(1)(i)**
MODEL NUMBER	**: Mercury 4e**	**DATE**	**: 2006/2/17**
SERIAL NUMBER	**: 05434E00E008**	**TEMP./HUMI**	**: 25deg.C./38%**
FCC ID	**: MMFRWMTM1**	**TEST MODE**	**: Transmitting**
POWER	**: DC5.3V**	**ENGINEER**	**: Makoto Hosaka**

Hopping: 53ch

1.



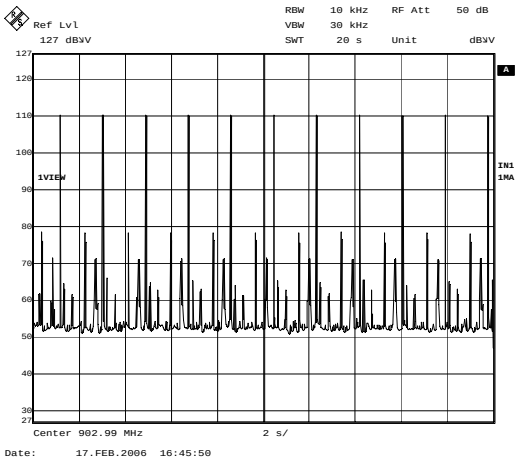
Dwell Time: FCC 15.247(a)(1)(i)

UL Apex Co.,Ltd. Yamakita No.2 Shielded Room

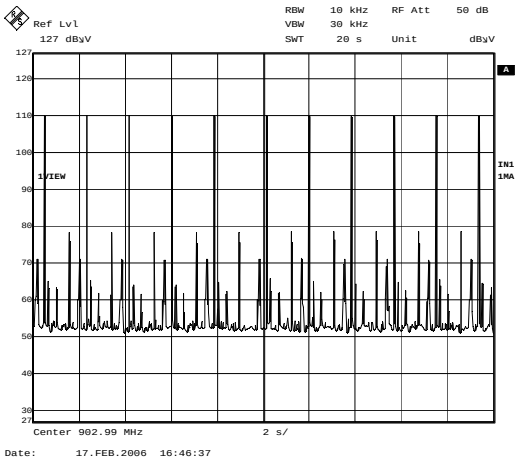
COMPANY	**: SATO CORPORATION**	**REPORT NO**	**: 26FE0133-YK-F1**
EQUIPMENT	**: RFID Reader/Writer Module**	**REGULATION**	**: Fcc Part15SubpartC 247(a)(1)(i)**
MODEL NUMBER	**: Mercury 4e**	**DATE**	**: 2006/2/17**
SERIAL NUMBER	**: 05434E00E008**	**TEMP./HUMI**	**: 25deg.C./38%**
FCC ID	**: MMFRWMTM1**	**TEST MODE**	**: Transmitting**
POWER	**: DC5.3V**	**ENGINEER**	**: Makoto Hosaka**

Hopping: 902.99MHz

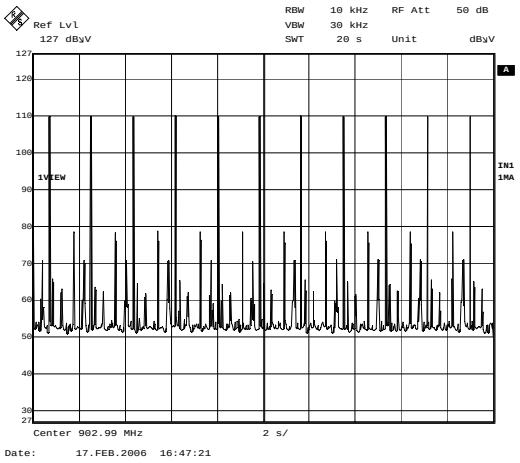
Count 1



Count 2



Count 3

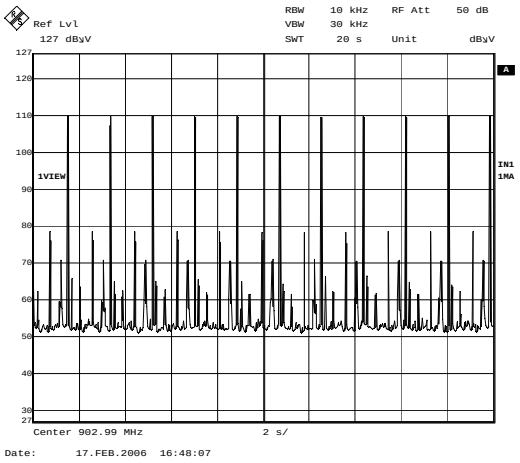


Dwell Time: FCC 15.247(a)(1)(i)

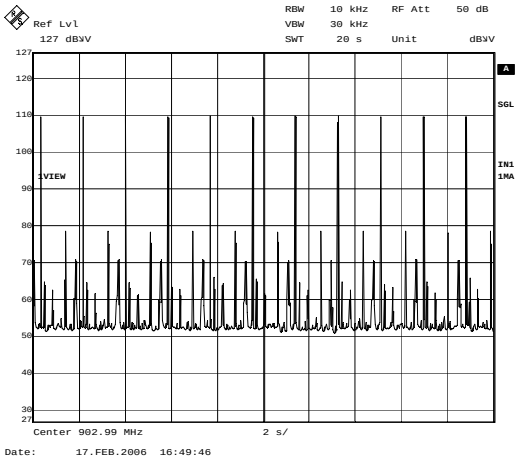
UL Apex Co.,Ltd. Yamakita No.2 Shielded Room

COMPANY	: SATO CORPORATION	REPORT NO	: 26FE0133-YK-F1
EQUIPMENT	: RFID Reader/Writer Module	REGULATION	: Fcc Part15SubpartC 247(a)(1)(i)
MODEL NUMBER	: Mercury 4e	DATE	: 2006/2/17
SERIAL NUMBER	: 05434E00E008	TEMP./HUMI	: 25deg.C./38%
FCC ID	: MMFRWMTM1	TEST MODE	: Transmitting
POWER	: DC5.3V	ENGINEER	: Makoto Hosaka

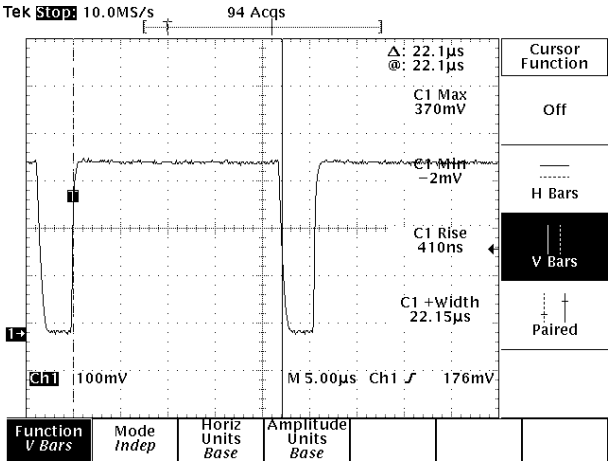
Count 4



Count 5



Duty cycle(Hopping)



Dwell time = (Count 1 + Count 2 + Count 3 + Count 4 + Count5) / 5 * Ton

= (11 + 11 + 11 + 11 + 11) / 5 * (22.1×10^{-3})**[ms]**

= 0.2431 [ms]

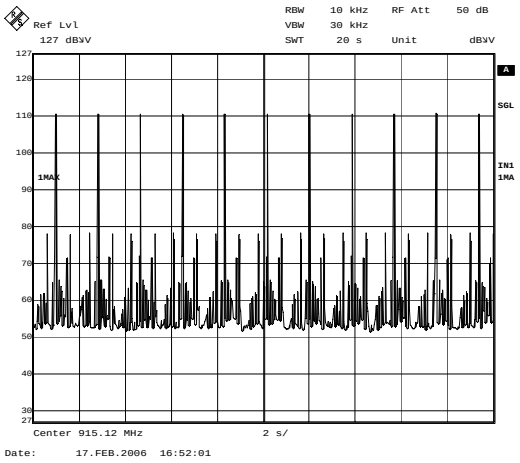
Dwell Time: FCC 15.247(a)(1)(i)

UL Apex Co.,Ltd. Yamakita No.2 Shielded Room

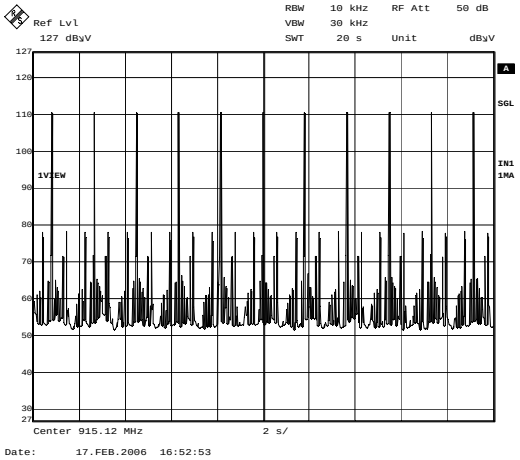
COMPANY	**: SATO CORPORATION**	**REPORT NO**	**: 26FE0133-YK-F1**
EQUIPMENT	**: RFID Reader/Writer Module**	**REGULATION**	**: Fcc Part15SubpartC 247(a)(1)(i)**
MODEL NUMBER	**: Mercury 4e**	**DATE**	**: 2006/2/17**
SERIAL NUMBER	**: 05434E00E008**	**TEMP./HUMI**	**: 25deg.C./38%**
FCC ID	**: MMFRWMTM1**	**TEST MODE**	**: Transmitting**
POWER	**: DC5.3V**	**ENGINEER**	**: Makoto Hosaka**

Hopping: 915.12MHz

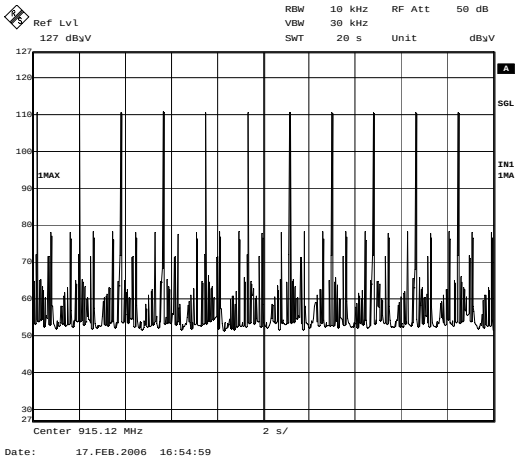
Count 1



Count 2



Count 3

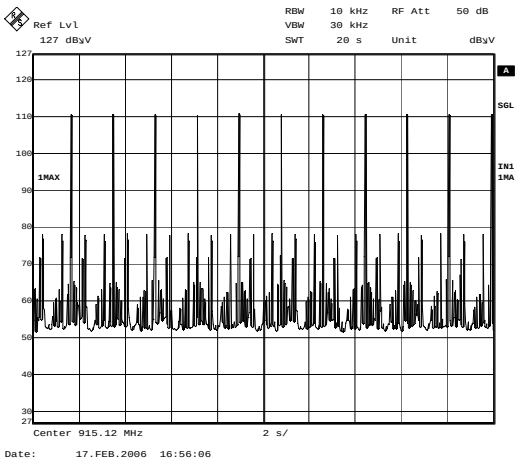


Dwell Time: FCC 15.247(a)(1)(i)

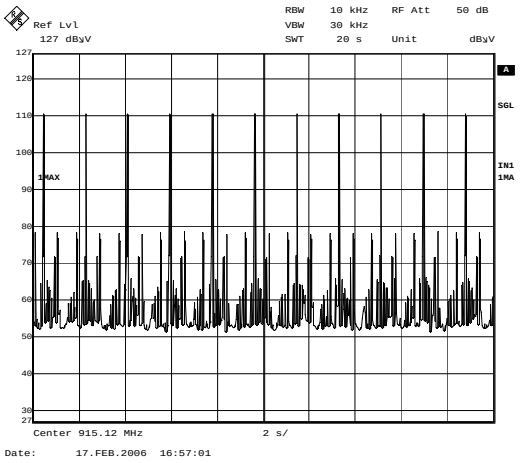
UL Apex Co.,Ltd. Yamakita No.2 Shielded Room

COMPANY	: SATO CORPORATION	REPORT NO	: 26FE0133-YK-F1
EQUIPMENT	: RFID Reader/Writer Module	REGULATION	: Fcc Part15SubpartC 247(a)(1)(i)
MODEL NUMBER	: Mercury 4e	DATE	: 2006/2/17
SERIAL NUMBER	: 05434E00E008	TEMP./HUMI	: 25deg.C./38%
FCC ID	: MMFRWMTM1	TEST MODE	: Transmitting
POWER	: DC5.3V	ENGINEER	: Makoto Hosaka

Count 4



Count 5



Dwell time = (Count 1 + Count 2 + Count 3 + Count 4 + Count5) / 5 * Ton

= (11 + 11 + 11 + 11 + 11) / 5 * (22.1×10^{-3} **)[ms]**

= 0.2431 [ms]

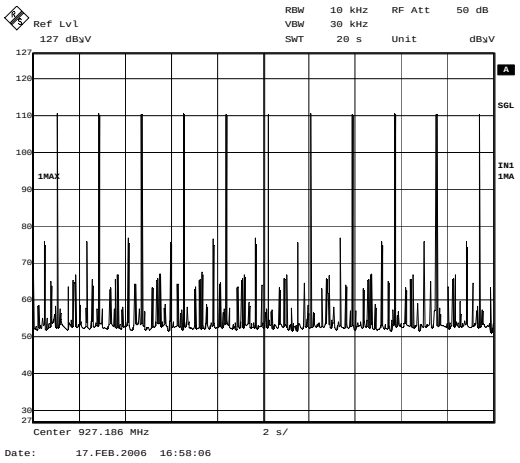
Dwell Time: FCC 15.247(a)(1)(i)

UL Apex Co.,Ltd. Yamakita No.2 Shielded Room

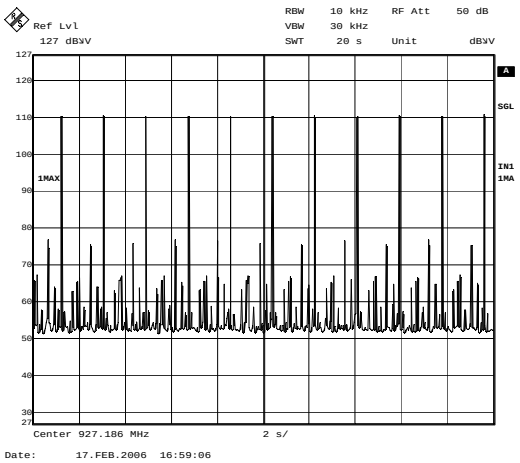
COMPANY	**: SATO CORPORATION**	**REPORT NO**	**: 26FE0133-YK-F1**
EQUIPMENT	**: RFID Reader/Writer Module**	**REGULATION**	**: Fcc Part15SubpartC 247(a)(1)(i)**
MODEL NUMBER	**: Mercury 4e**	**DATE**	**: 2006/2/17**
SERIAL NUMBER	**: 05434E00E008**	**TEMP./HUMI**	**: 25deg.C./38%**
FCC ID	**: MMFRWMTM1**	**TEST MODE**	**: Transmitting**
POWER	**: DC5.3V**	**ENGINEER**	**: Makoto Hosaka**

Hopping: 927.186MHz

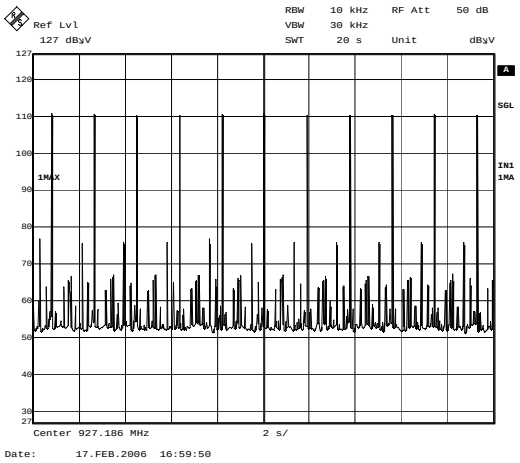
Count 1



Count 2



Count 3

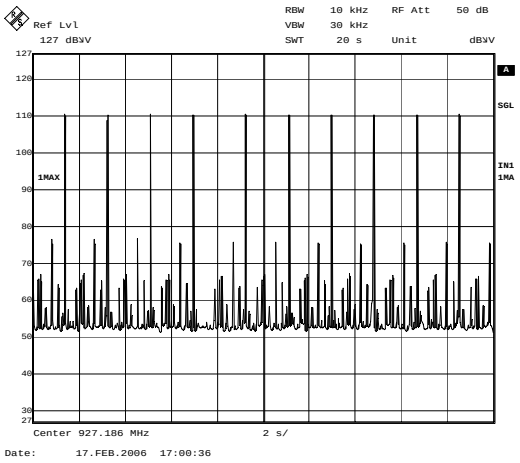


Dwell Time: FCC 15.247(a)(1)(i)

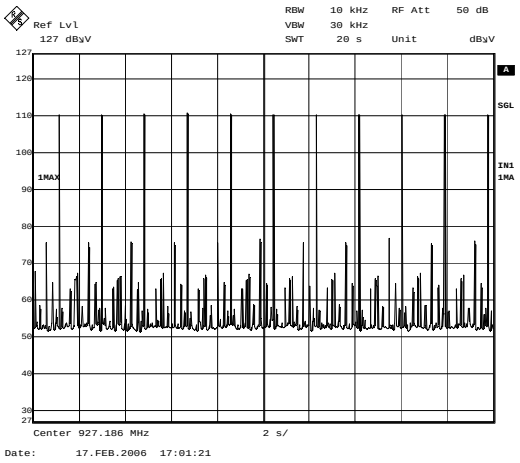
UL Apex Co.,Ltd. Yamakita No.2 Shielded Room

COMPANY	: SATO CORPORATION	REPORT NO	: 26FE0133-YK-F1
EQUIPMENT	: RFID Reader/Writer Module	REGULATION	: Fcc Part15SubpartC 247(a)(1)(i)
MODEL NUMBER	: Mercury 4e	DATE	: 2006/2/17
SERIAL NUMBER	: 05434E00E008	TEMP./HUMI	: 25deg.C./38%
FCC ID	: MMFRWMTM1	TEST MODE	: Transmitting
POWER	: DC5.3V	ENGINEER	: Makoto Hosaka

Count 4



Count 5



Dwell time = (Count 1 + Count 2 + Count 3 + Count 4 + Count5) / 5 * Ton

= (11 + 11 + 11 + 10 + 11) / 5 * (22.1×10^{-3} **)[ms]**

= 0.23868 [ms]

Maximum Peak Conducted Output Power

UL Apex Co.,Ltd
YAMAKITA No.2 Shielded Room

COMPANY : SATO CORPORATION
EQUIPMENT : RFID Reader/Writer Module
MODEL NUMBE : Mercury 4e
SERIAL NUMBE : 05434E00E008
FCC ID : MMFRWMTM1
POWER : DC5.3V
TEST MODE : Transmitting

REPORT NO : 26FE0133-YK-F1
REGULATION : Fcc Part15SubpartC 247(b)(2)
DATE : 2006/2/17
TEMP./HUMI : 25deg.C./38%

ENGINEER : Makoto Hosaka

CH	FREQ [GHz]	P/M Reading [dBm]	Cable+Attenuator Loss [dB]	Results [dBm]	Limit (1W) [dBm]	MARGIN [dB]
Low	902.99	3.90	20.58	24.48	30.0	5.53
Mid	915.12	3.90	20.58	24.48	30.0	5.53
High	927.19	3.90	20.68	24.58	30.0	5.43
Hopping	-	4.06	20.56	24.62	30.0	5.39

Limit: 1W=30dBm
Cable loss: KCC-D7+KAT10-S1+KAT10-S2+Client's cable
P/M: Power Meter

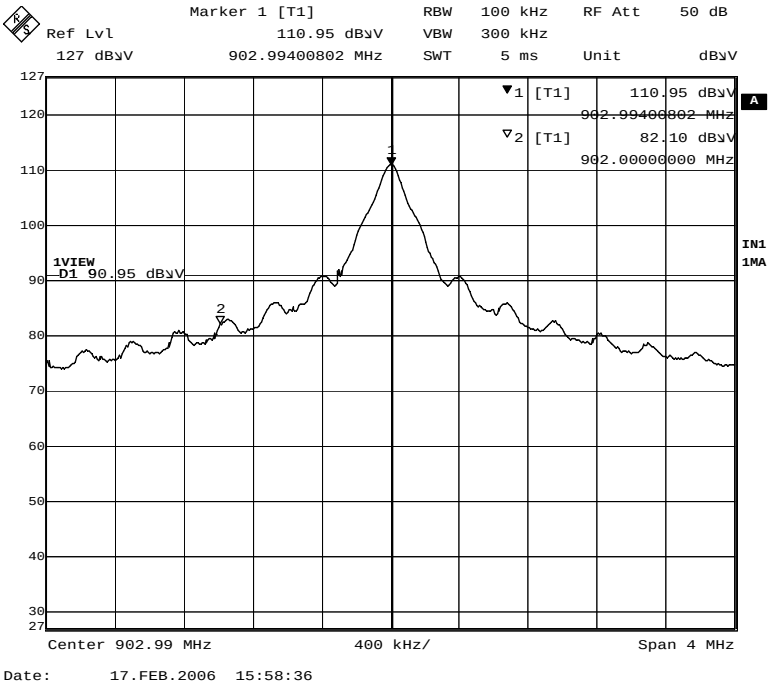
Out of Band Emission(Antenna Terminal Conducted): FCC 15.247(d)

UL Apex Co.,Ltd. Yamakita No.2 Shielded Room

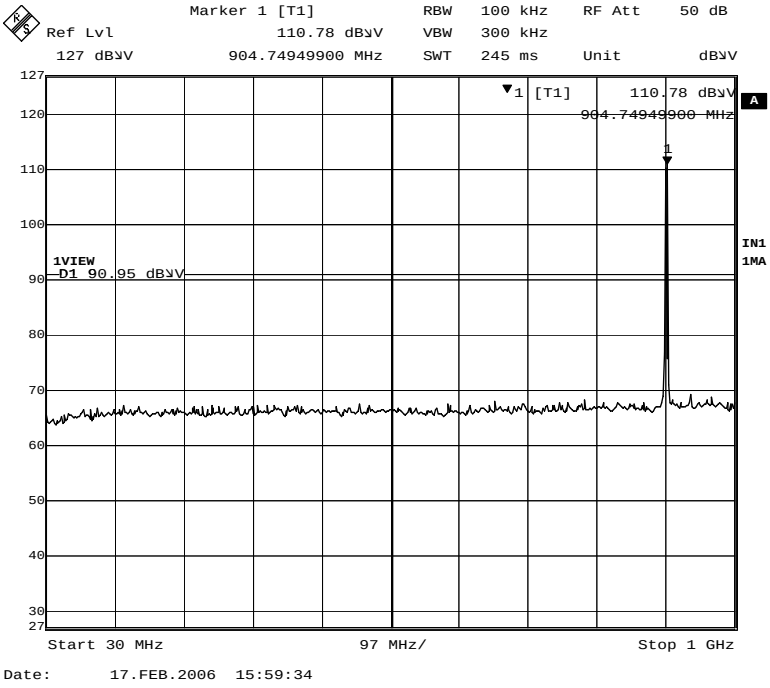
COMPANY	**: SATO CORPORATION**	**REPORT NO**	**: 26FE0133-YK-F1**
EQUIPMENT	**: RFID Reader/Writer Module**	**REGULATION**	**: Fcc Part15SubpartC 247(d)**
MODEL NUMBER	**: Mercury 4e**	**DATE**	**: 2006/2/17**
SERIAL NUMBER	**: 05434E00E008**	**TEMP./HUMI**	**: 25deg.C./38%**
FCC ID	**: MMFRWMTM1**	**TEST MODE**	**: Transmitting (Hopping off)**
POWER	**: DC5.3V**	**ENGINEER**	**: Makoto Hosaka**

Ch:902.99MHz

1.



2.

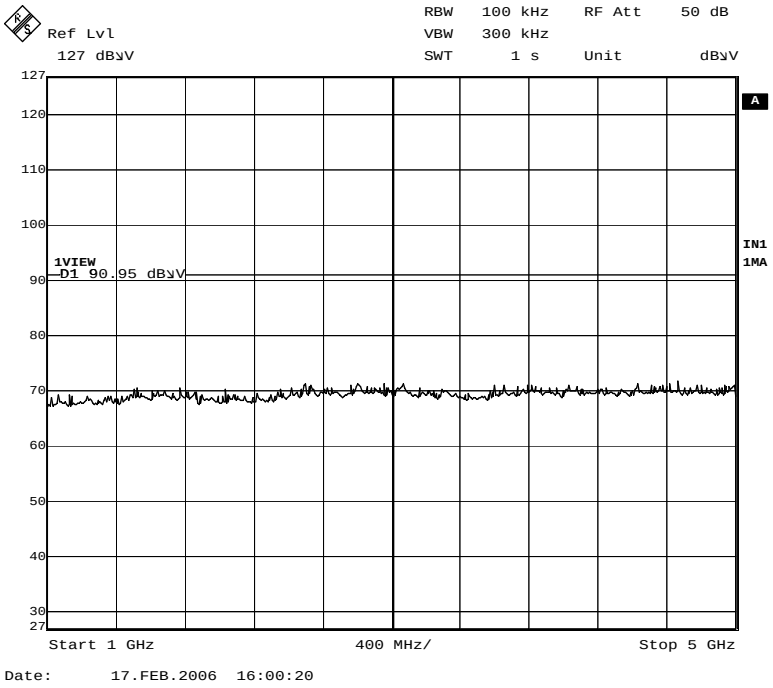


Out of Band Emission(Antenna Terminal Conducted): FCC 15.247(d)

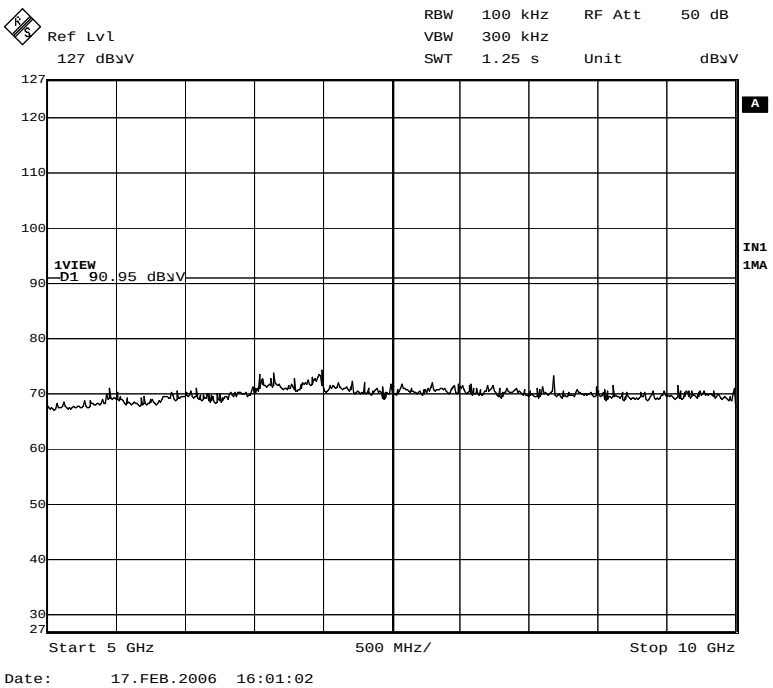
UL Apex Co.,Ltd. Yamakita No.2 Shielded Room

COMPANY	**: SATO CORPORATION**	**REPORT NO**	**: 26FE0133-YK-F1**
EQUIPMENT	**: RFID Reader/Writer Module**	**REGULATION**	**: Fcc Part15SubpartC 247(d)**
MODEL NUMBER	**: Mercury 4e**	**DATE**	**: 2006/2/17**
SERIAL NUMBER	**: 05434E00E008**	**TEMP./HUMI**	**: 25deg.C./38%**
FCC ID	**: MMFRWMTM1**	**TEST MODE**	**: Transmitting (Hopping off)**
POWER	**: DC5.3V**	**ENGINEER**	**: Makoto Hosaka**

3.



4.



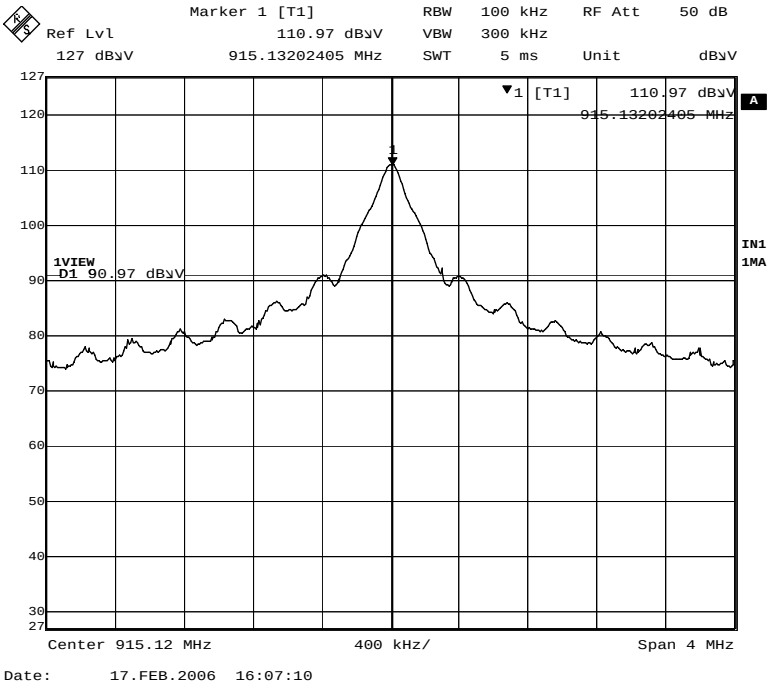
Out of Band Emission(Antenna Terminal Conducted): FCC 15.247(d)

UL Apex Co.,Ltd. Yamakita No.2 Shielded Room

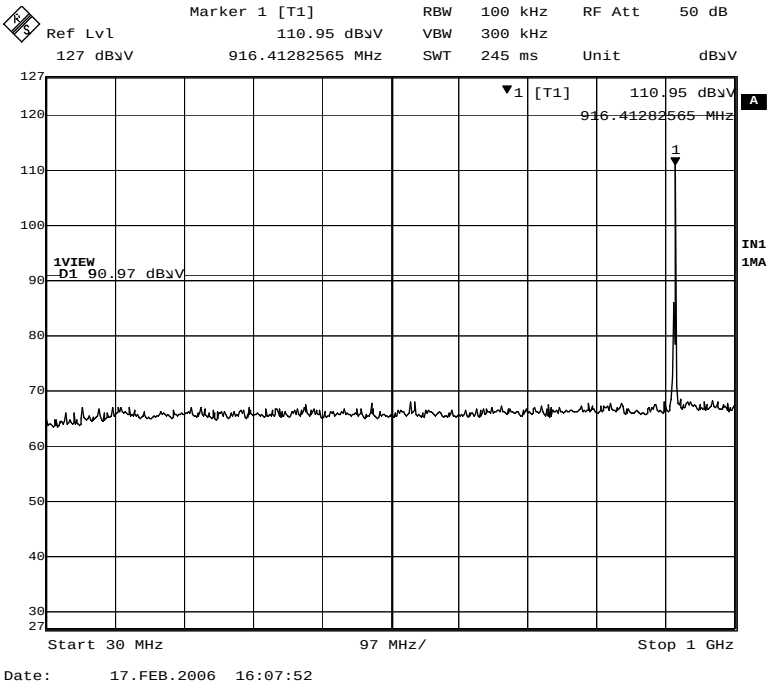
COMPANY	**: SATO CORPORATION**	**REPORT NO**	**: 26FE0133-YK-F1**
EQUIPMENT	**: RFID Reader/Writer Module**	**REGULATION**	**: Fcc Part15SubpartC 247(d)**
MODEL NUMBER	**: Mercury 4e**	**DATE**	**: 2006/2/17**
SERIAL NUMBER	**: 05434E00E008**	**TEMP./HUMI**	**: 25deg.C./38%**
FCC ID	**: MMFRWMTM1**	**TEST MODE**	**: Transmitting (Hopping off)**
POWER	**: DC5.3V**	**ENGINEER**	**: Makoto Hosaka**

Ch:915.12MHz

1.



2.

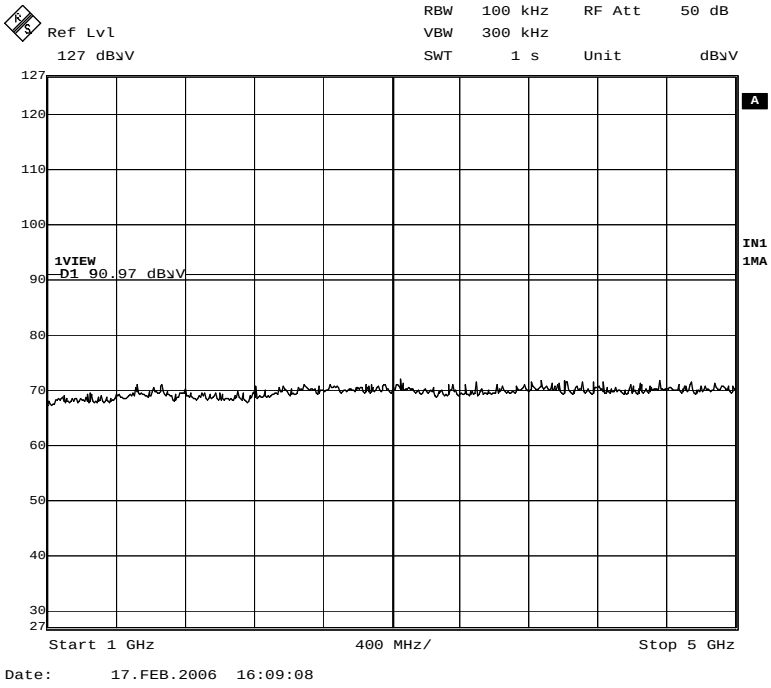


Out of Band Emission(Antenna Terminal Conducted): FCC 15.247(d)

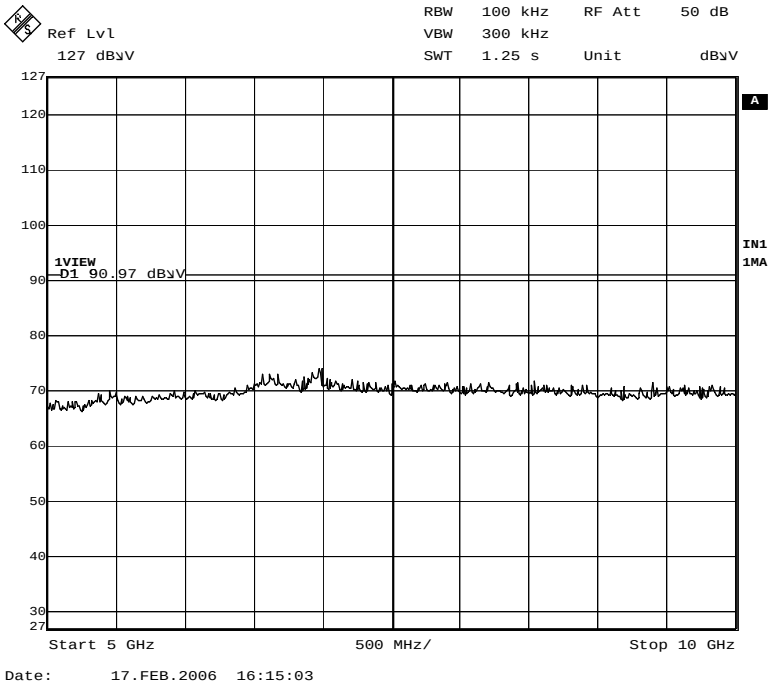
UL Apex Co.,Ltd. Yamakita No.2 Shielded Room

COMPANY	: SATO CORPORATION	REPORT NO	: 26FE0133-YK-F1
EQUIPMENT	: RFID Reader/Writer Module	REGULATION	: Fcc Part15SubpartC 247(d)
MODEL NUMBER	: Mercury 4e	DATE	: 2006/2/17
SERIAL NUMBER	: 05434E00E008	TEMP./HUMI	: 25deg.C./38%
FCC ID	: MMFRWMTM1	TEST MODE	: Transmitting (Hopping off)
POWER	: DC5.3V	ENGINEER	: Makoto Hosaka

3.



4.



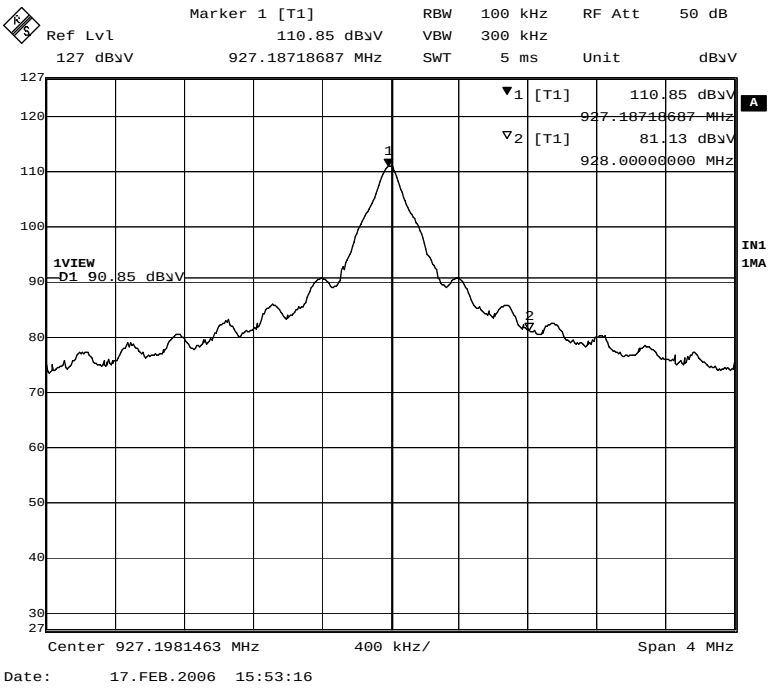
Out of Band Emission(Antenna Terminal Conducted): FCC 15.247(d)

UL Apex Co.,Ltd. Yamakita No.2 Shielded Room

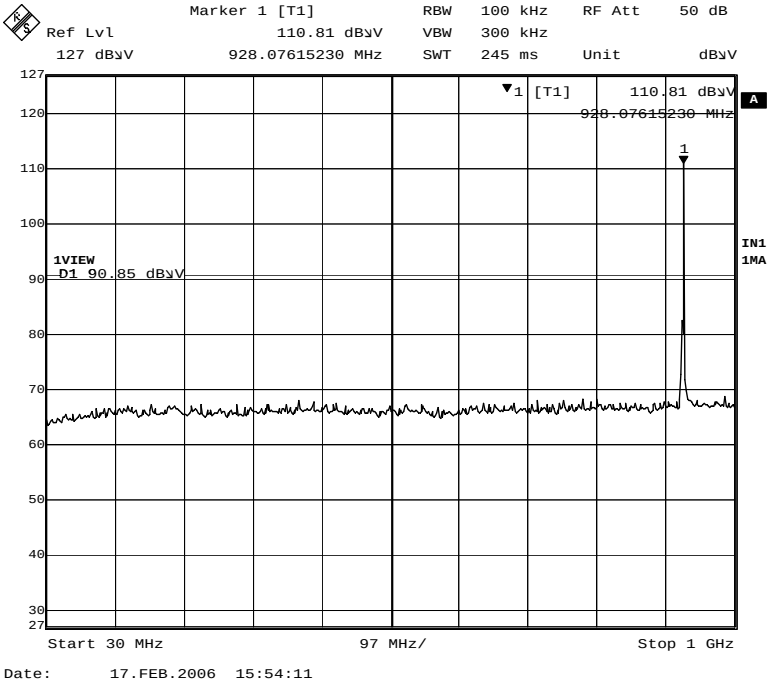
COMPANY	**: SATO CORPORATION**	**REPORT NO**	**: 26FE0133-YK-F1**
EQUIPMENT	**: RFID Reader/Writer Module**	**REGULATION**	**: Fcc Part15SubpartC 247(d)**
MODEL NUMBER	**: Mercury 4e**	**DATE**	**: 2006/2/17**
SERIAL NUMBER	**: 05434E00E008**	**TEMP./HUMI**	**: 25deg.C./38%**
FCC ID	**: MMFRWMTM1**	**TEST MODE**	**: Transmitting (Hopping off)**
POWER	**: DC5.3V**	**ENGINEER**	**: Makoto Hosaka**

Ch11:927.186MHz

1.



2.

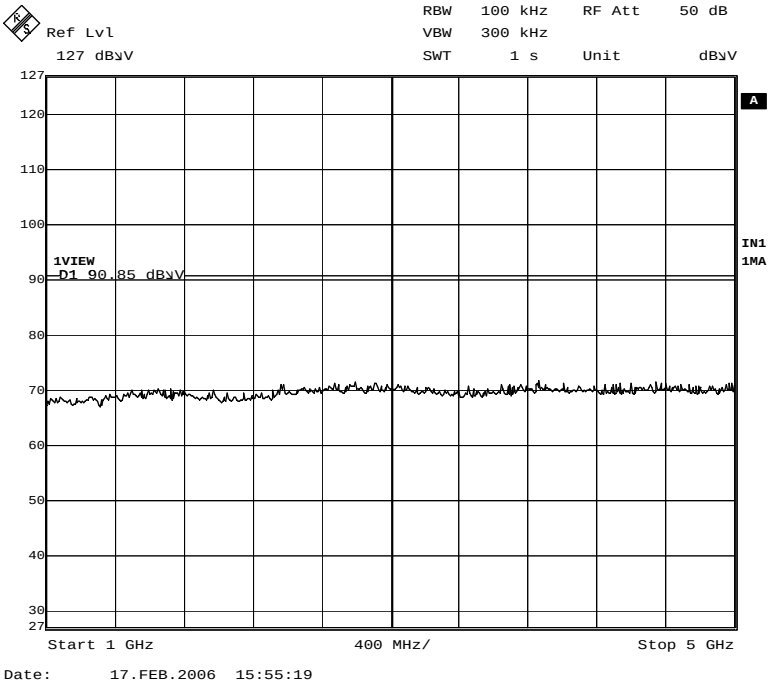


Out of Band Emission(Antenna Terminal Conducted): FCC 15.247(d)

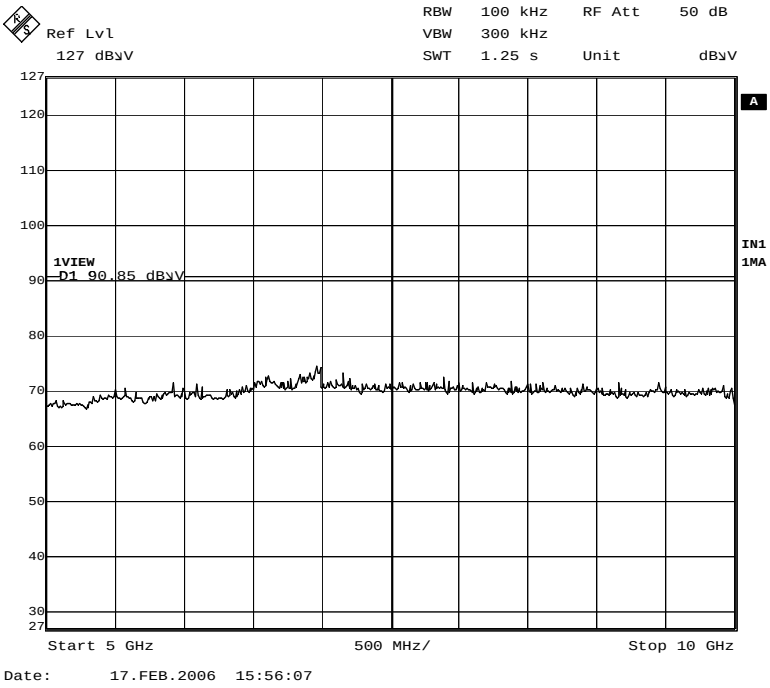
UL Apex Co.,Ltd. Yamakita No.2 Shielded Room

COMPANY	**: SATO CORPORATION**	**REPORT NO**	**: 26FE0133-YK-F1**
EQUIPMENT	**: RFID Reader/Writer Module**	**REGULATION**	**: Fcc Part15SubpartC 247(d)**
MODEL NUMBER	**: Mercury 4e**	**DATE**	**: 2006/2/17**
SERIAL NUMBER	**: 05434E00E008**	**TEMP./HUMI**	**: 25deg.C./38%**
FCC ID	**: MMFRWMTM1**	**TEST MODE**	**: Transmitting (Hopping off)**
POWER	**: DC5.3V**	**ENGINEER**	**: Makoto Hosaka**

3.



4.



DATA OF RADIATION TEST

UL Apex Co.,Ltd.
YAMAKITA No.1 ANECHOIC CHAMBER
Report No.: 26FE0133-YK

Applicant	:	SATO CORPORATION	
Kind of Equipment	:	RFID Reader/Writer Module	
Model No.	:	Mercury 4e	
Serial No.	:	05434E00E008	
Power	:	DC5.3V	
Mode	:	Transmitting (902.990MHz)	
Remarks	:		
Date	:	2/16/2006	
Test Distance	:	3 m	
Temperature	:	24 ℃	Engineer : Makoto Hosaka
Humidity	:	43 %	
Regulation	:	FCC Part15C §15.209	

No.	FREQ. [MHz]	ANT TYPE	READING HOR [dBμV]	READING VER [dBμV]	ANT FACTOR [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT HOR [dBμV/m]	RESULT VER [dBμV/m]	LIMITS [dBμV/m]	MARGIN HOR [dB]	MARGIN VER [dB]
1.	66.65	BB	28.4	45.2	8.0	27.6	1.6	6.0	16.4	33.2	40.0	23.6	6.8
2.	133.29	BB	30.0	31.1	14.2	27.3	2.4	6.0	25.3	26.4	43.5	18.2	17.1
3.	199.92	BB	31.6	34.3	17.1	27.0	2.9	6.0	30.6	33.3	43.5	12.9	10.2
4.	300.00	BB	37.1	37.8	14.8	27.0	3.7	6.0	34.6	35.3	46.0	11.4	10.7
5.	399.84	BB	27.5	31.9	18.0	27.3	4.9	6.0	29.1	33.5	46.0	16.9	12.5
6.	614.00	BB	21.4	21.7	19.7	28.1	5.4	6.0	24.4	24.7	46.0	21.6	21.3
7.	959.24	BB	31.7	29.9	23.4	27.4	6.9	6.0	40.6	38.8	46.0	5.4	7.2

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

■ANTENNA:KBA-03(BBA9106)30-299.99MHz/KLA-03(USLP9143)300-1000MHz
■AMP:KAF-05(8447D) ■RECEIVER:KTR-01(ESI40) ■CABLE:KCC-30/31/32/34

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DATA OF RADIATION TEST

UL Apex Co.,Ltd.
YAMAKITA No.1 ANECHOIC CHAMBER
Report No.: 26FE0133-YK

Applicant : SATO CORPORATION
Kind of Equipment : RFID Reader/Writer Module
Model No. : Mercury 4e
Serial No. : 05434E00E008
Power : DC5.3V
Mode : Transmitting (902.990MHz)
Remarks : PK RBW:1MHz, VBW:1MHz
Date : 2/16/2006
Test Distance : 3 m
Temperature : 24 ℃ Engineer : Makoto Hosaka
Humidity : 43 %
Regulation : FCC Part15C §15.209(PK Detection)1-26GHz:3m/26-40GHz:1m

No.	FREQ. [MHz]	ANT TYPE	READING HOR [dBμV]	READING VER [dBμV]	ANT FACTOR [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT HOR [dBμV/m]	RESULT VER [dBμV/m]	LIMITS [dBμV/m]	MARGIN HOR [dB]	MARGIN VER [dB]
1.	2708.97	BB	48.5	46.5	29.4	37.1	5.6	0.0	46.4	44.4	74.0	27.6	29.6
2.	3611.96	BB	42.6	42.7	30.5	36.9	6.2	0.0	42.4	42.5	74.0	31.6	31.5
3.	4514.95	BB	41.8	43.2	32.1	36.6	7.0	0.0	44.3	45.7	74.0	29.7	28.3
4.	5417.94	BB	41.2	42.3	34.2	36.5	7.3	0.0	46.2	47.3	74.0	27.8	26.7
5.	6320.93	BB	41.2	43.1	35.4	36.7	8.5	0.0	48.4	50.3	74.0	25.6	23.7
6.	7223.92	BB	42.2	41.6	36.4	36.8	7.9	0.0	49.7	49.1	74.0	24.3	24.9
7.	8126.91	BB	38.3	39.2	37.1	36.9	9.0	0.0	47.5	48.4	74.0	26.5	25.6
8.	9029.90	BB	39.3	40.4	37.4	37.1	10.0	0.0	49.6	50.7	74.0	24.4	23.3

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

■ANTENNA:KHA-02(1-18GHz)
■AMP:KAF-02(8449B) ■SPECTRUM ANALYZER:KSA-04 ■CABLE:KCC-D14/D15

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DATA OF RADIATION TEST

UL Apex Co.,Ltd.
YAMAKITA No.1 ANECHOIC CHAMBER
Report No.: 26FE0133-YK

Applicant	: SATO CORPORATION		
Kind of Equipment	: RFID Reader/Writer Module		
Model No.	: Mercury 4e		
Serial No.	: 05434E00E008		
Power	: DC5.3V		
Mode	: Transmitting (902.990MHz)		
Remarks	: AV RBW:1MHz, VBW:10Hz		
Date	: 2/16/2006		
Test Distance	: 3 m		
Temperature	: 24 ℃	Engineer	: Makoto Hosaka
Humidity	: 43 %		
Regulation	: FCC Part15C §15.209(AV Detection) 1-26GHz:3m/26-40GHz:1m		

No.	FREQ. [MHz]	ANT TYPE	READING HOR [dBμV]	READING VER [dBμV]	ANT FACTOR [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT HOR [dBμV/m]	RESULT VER [dBμV/m]	LIMITS [dBμV/m]	MARGIN HOR [dB]	MARGIN VER [dB]
1.	2708.97	BB	41.5	38.1	29.4	37.1	5.6	0.0	39.4	36.0	54.0	14.6	18.0
2.	3611.96	BB	32.1	32.3	30.5	36.9	6.2	0.0	31.9	32.1	54.0	22.1	21.9
3.	4514.95	BB	31.6	34.2	32.1	36.6	7.0	0.0	34.1	36.7	54.0	19.9	17.3
4.	5417.94	BB	31.6	32.7	34.2	36.5	7.3	0.0	36.6	37.7	54.0	17.4	16.3
5.	6320.93	BB	31.5	34.7	35.4	36.7	8.5	0.0	38.7	41.9	54.0	15.3	12.1
6.	7223.92	BB	32.1	32.1	36.4	36.8	7.9	0.0	39.6	39.6	54.0	14.4	14.4
7.	8126.91	BB	28.5	28.8	37.1	36.9	9.0	0.0	37.7	38.0	54.0	16.3	16.0
8.	9029.90	BB	29.6	30.0	37.4	37.1	10.0	0.0	39.9	40.3	54.0	14.1	13.7

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

■ANTENNA:KHA-02(1-18GHz)
■AMP:KAF-02(8449B) ■SPECTRUM ANALYZER:KSA-04 ■CABLE:KCC-D14/D15

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DATA OF RADIATION TEST

UL Apex Co.,Ltd.
YAMAKITA No.1 ANECHOIC CHAMBER
Report No.: 26FE0133-YK

Applicant	: SATO CORPORATION		
Kind of Equipment	: RFID Reader/Writer Module		
Model No.	: Mercury 4e		
Serial No.	: 05434E00E008		
Power	: DC5.3V		
Mode	: Transmitting (915.120MHz)		
Remarks	:		
Date	: 2/16/2006		
Test Distance	: 3 m		
Temperature	: 24 ℃	Engineer	: Makoto Hosaka
Humidity	: 43 %		
Regulation	: FCC Part15C §15.209		

No.	FREQ. [MHz]	ANT TYPE	READING HOR [dBμV]	READING VER [dBμV]	ANT FACTOR [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT HOR [dBμV/m]	RESULT VER [dBμV/m]	LIMITS [dBμV/m]	MARGIN HOR [dB]	MARGIN VER [dB]
1.	66.64	BB	28.5	44.7	8.0	27.6	1.6	6.0	16.5	32.7	40.0	23.5	7.3
2.	133.29	BB	31.3	33.0	14.2	27.3	2.4	6.0	26.6	28.3	43.5	16.9	15.2
3.	199.93	BB	34.9	38.7	17.1	27.0	2.9	6.0	33.9	37.7	43.5	9.6	5.8
4.	300.00	BB	36.8	38.2	14.8	27.0	3.7	6.0	34.3	35.7	46.0	11.7	10.3
5.	399.84	BB	24.8	32.4	18.0	27.3	4.9	6.0	26.4	34.0	46.0	19.6	12.0
6.	971.38	BB	31.8	29.2	23.7	27.5	7.0	6.0	41.0	38.4	54.0	13.0	15.6

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

■ANTENNA:KBA-03(BBA9106)30-299.99MHz/KLA-03(USLP9143)300-1000MHz
■AMP:KAF-05(8447D) ■RECEIVER:KTR-01(ESI40) ■CABLE:KCC-30/31/32/34

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DATA OF RADIATION TEST

UL Apex Co.,Ltd.
YAMAKITA No.1 ANECHOIC CHAMBER
Report No.: 26FE0133-YK

Applicant	:	SATO CORPORATION	
Kind of Equipment	:	RFID Reader/Writer Module	
Model No.	:	Mercury 4e	
Serial No.	:	05434E00E008	
Power	:	DC5.3V	
Mode	:	Transmitting (915.120MHz)	
Remarks	:	PK RBW:1MHz, VBW:1MHz	
Date	:	2/16/2006	
Test Distance	:	3 m	
Temperature	:	24 ℃	Engineer : Makoto Hosaka
Humidity	:	43 %	
Regulation	:	FCC Part15C §15.209(PK Detection)1-26GHz:3m/26-40GHz:1m	

No.	FREQ. [MHz]	ANT TYPE	READING HOR [dBμV]	READING VER [dBμV]	ANT FACTOR [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT HOR [dBμV/m]	RESULT VER [dBμV/m]	LIMITS [dBμV/m]	MARGIN HOR [dB]	MARGIN VER [dB]
1.	2745.36	BB	48.9	46.0	29.5	37.2	5.7	0.0	46.9	44.0	74.0	27.1	30.0
2.	3660.48	BB	44.9	43.6	30.7	36.8	6.2	0.0	45.0	43.7	74.0	29.0	30.3
3.	4575.60	BB	41.5	42.5	32.3	36.6	7.0	0.0	44.2	45.2	74.0	29.8	28.8
4.	5490.72	BB	42.2	43.0	34.3	36.5	7.4	0.0	47.4	48.2	74.0	26.6	25.8
5.	6405.84	BB	41.7	42.7	35.7	36.7	8.5	0.0	49.2	50.2	74.0	24.8	23.8
6.	7320.96	BB	41.8	42.1	36.6	36.8	8.3	0.0	49.9	50.2	74.0	24.1	23.8
7.	8236.08	BB	41.3	40.8	37.2	36.8	9.1	0.0	50.8	50.3	74.0	23.2	23.7
8.	9151.20	BB	41.3	41.3	37.6	37.1	9.9	0.0	51.7	51.7	74.0	22.3	22.3

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

■ANTENNA:KHA-02(1-18GHz)
■AMP:KAF-02(8449B) ■SPECTRUM ANALYZER:KSA-04 ■CABLE:KCC-D14/D15

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DATA OF RADIATION TEST

UL Apex Co.,Ltd.
YAMAKITA No.1 ANECHOIC CHAMBER
Report No.: 26FE0133-YK

Applicant	:	SATO CORPORATION	
Kind of Equipment	:	RFID Reader/Writer Module	
Model No.	:	Mercury 4e	
Serial No.	:	05434E00E008	
Power	:	DC5.3V	
Mode	:	Transmitting (915.120MHz)	
Remarks	:	AV RBW:1MHz, VBW:10Hz	
Date	:	2/16/2006	
Test Distance	:	3 m	
Temperature	:	24 ℃	Engineer : Makoto Hosaka
Humidity	:	43 %	
Regulation	:	FCC Part15C §15.209(AV Detection)1-26GHz:3m/26-40GHz:1m	

No.	FREQ. [MHz]	ANT TYPE	READING HOR [dBμV]	READING VER [dBμV]	ANT FACTOR [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT HOR [dBμV/m]	RESULT VER [dBμV/m]	LIMITS [dBμV/m]	MARGIN HOR [dB]	MARGIN VER [dB]
1.	2745.36	BB	41.8	38.3	29.5	37.2	5.7	0.0	39.8	36.3	54.0	14.2	17.7
2.	3660.48	BB	35.5	33.6	30.7	36.8	6.2	0.0	35.6	33.7	54.0	18.4	20.3
3.	4575.60	BB	32.0	33.2	32.3	36.6	7.0	0.0	34.7	35.9	54.0	19.3	18.1
4.	5490.72	BB	31.1	33.5	34.3	36.5	7.4	0.0	36.3	38.7	54.0	17.7	15.3
5.	6405.84	BB	31.7	33.5	35.7	36.7	8.5	0.0	39.2	41.0	54.0	14.8	13.0
6.	7320.96	BB	32.2	32.2	36.6	36.8	8.3	0.0	40.3	40.3	54.0	13.7	13.7
7.	8236.08	BB	30.9	30.7	37.2	36.8	9.1	0.0	40.4	40.2	54.0	13.6	13.8
8.	9151.20	BB	31.7	31.9	37.6	37.1	9.9	0.0	42.1	42.3	54.0	11.9	11.7

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

■ANTENNA:KHA-02(1-18GHz)
■AMP:KAF-02(8449B) ■SPECTRUM ANALYZER:KSA-04 ■CABLE:KCC-D14/D15

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DATA OF RADIATION TEST

UL Apex Co.,Ltd.
YAMAKITA No.1 ANECHOIC CHAMBER
Report No.: 26FE0133-YK

Applicant	:	SATO CORPORATION	
Kind of Equipment	:	RFID Reader/Writer Module	
Model No.	:	Mercury 4e	
Serial No.	:	05434E00E008	
Power	:	DC5.3V	
Mode	:	Transmitting (927.186MHz)	
Remarks	:		
Date	:	2/16/2006	
Test Distance	:	3 m	
Temperature	:	24 ℃	Engineer : Makoto Hosaka
Humidity	:	43 %	
Regulation	:	FCC Part15C §15.209	

No.	FREQ. [MHz]	ANT TYPE	READING HOR [dBμV]	READING VER [dBμV]	ANT FACTOR [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT HOR [dBμV/m]	RESULT VER [dBμV/m]	LIMITS [dBμV/m]	MARGIN HOR [dB]	MARGIN VER [dB]
1.	66.64	BB	28.7	43.4	8.0	27.6	1.6	6.0	16.7	31.4	40.0	23.3	8.6
2.	133.29	BB	31.6	33.7	14.2	27.3	2.4	6.0	26.9	29.0	43.5	16.6	14.5
3.	199.93	BB	30.9	35.2	17.1	27.0	2.9	6.0	29.9	34.2	43.5	13.6	9.3
4.	300.00	BB	36.8	38.1	14.8	27.0	3.7	6.0	34.3	35.6	46.0	11.7	10.4
5.	399.84	BB	27.2	33.1	18.0	27.3	4.9	6.0	28.8	34.7	46.0	17.2	11.3
6.	960.00	BB	22.5	23.0	23.5	27.4	6.9	6.0	31.5	32.0	46.0	14.5	14.0
7.	983.44	BB	32.0	31.8	23.9	27.5	7.0	6.0	41.4	41.2	54.0	12.6	12.8

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

■ANTENNA:KBA-03(BBA9106)30-299.99MHz/KLA-03(USLP9143)300-1000MHz
■AMP:KAF-05(8447D) ■RECEIVER:KTR-01(ESI40) ■CABLE:KCC-30/31/32/34

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DATA OF RADIATION TEST

UL Apex Co.,Ltd.
YAMAKITA No.1 ANECHOIC CHAMBER
Report No.: 26FE0133-YK

Applicant	:	SATO CORPORATION	
Kind of Equipment	:	RFID Reader/Writer Module	
Model No.	:	Mercury 4e	
Serial No.	:	05434E00E008	
Power	:	DC5.3V	
Mode	:	Transmitting (927.186MHz)	
Remarks	:	PK RBW:1MHz, VBW:1MHz	
Date	:	2/16/2006	
Test Distance	:	3 m	
Temperature	:	24 ℃	Engineer : Makoto Hosaka
Humidity	:	43 %	
Regulation	:	FCC Part15C §15.209(PK Detection)1-26GHz:3m/26-40GHz:1m	

No.	FREQ. [MHz]	ANT TYPE	READING HOR [dBμV]	READING VER [dBμV]	ANT FACTOR [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT HOR [dBμV/m]	RESULT VER [dBμV/m]	LIMITS [dBμV/m]	MARGIN HOR [dB]	MARGIN VER [dB]
1.	2781.56	BB	48.0	48.7	29.6	37.2	5.7	0.0	46.1	46.8	74.0	27.9	27.2
2.	3708.74	BB	43.9	43.7	30.9	36.8	6.2	0.0	44.2	44.0	74.0	29.8	30.0
3.	4635.93	BB	41.5	43.2	32.5	36.6	7.0	0.0	44.4	46.1	74.0	29.6	27.9
4.	5563.12	BB	41.9	44.1	34.3	36.5	7.5	0.0	47.2	49.4	74.0	26.8	24.6
5.	6490.30	BB	40.8	41.4	35.9	36.7	8.5	0.0	48.5	49.1	74.0	25.5	24.9
6.	7417.49	BB	41.0	41.9	36.8	36.8	8.6	0.0	49.6	50.5	74.0	24.4	23.5
7.	8344.67	BB	40.7	41.8	37.3	36.8	9.3	0.0	50.5	51.6	74.0	23.5	22.4
8.	9271.86	BB	42.2	41.8	37.8	37.1	9.8	0.0	52.7	52.3	74.0	21.3	21.7

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

■ANTENNA:KHA-02(1-18GHz)
■AMP:KAF-02(8449B) ■SPECTRUM ANALYZER:KSA-04 ■CABLE:KCC-D14/D15

DATA OF RADIATION TEST

UL Apex Co.,Ltd.
YAMAKITA No.1 ANECHOIC CHAMBER
Report No.: 26FE0133-YK

Applicant : SATO CORPORATION
Kind of Equipment : RFID Reader/Writer Module
Model No. : Mercury 4e
Serial No. : 05434E00E008
Power : DC5.3V
Mode : Transmitting (927.186MHz)
Remarks : AV RBW:1MHz, VBW:10Hz
Date : 2/16/2006
Test Distance : 3 m
Temperature : 24 ℃ Engineer : Makoto Hosaka
Humidity : 43 %
Regulation : FCC Part15C §15.209(AV Detection) 1-26GHz:3m/26-40GHz:1m

No.	FREQ. [MHz]	ANT TYPE	READING HOR [dBμV]	READING VER [dBμV]	ANT FACTOR [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT HOR [dBμV/m]	RESULT VER [dBμV/m]	LIMITS [dBμV/m]	MARGIN HOR [dB]	MARGIN VER [dB]
1.	2781.56	BB	41.8	42.3	29.6	37.2	5.7	0.0	39.9	40.4	54.0	14.1	13.6
2.	3708.74	BB	33.7	34.4	30.9	36.8	6.2	0.0	34.0	34.7	54.0	20.0	19.3
3.	4635.93	BB	32.0	32.8	32.5	36.6	7.0	0.0	34.9	35.7	54.0	19.1	18.3
4.	5563.12	BB	31.2	35.4	34.3	36.5	7.5	0.0	36.5	40.7	54.0	17.5	13.3
5.	6490.30	BB	31.0	31.5	35.9	36.7	8.5	0.0	38.7	39.2	54.0	15.3	14.8
6.	7417.49	BB	31.8	32.1	36.8	36.8	8.6	0.0	40.4	40.7	54.0	13.6	13.3
7.	8344.67	BB	30.6	31.5	37.3	36.8	9.3	0.0	40.4	41.3	54.0	13.6	12.7
8.	9271.86	BB	31.7	31.4	37.8	37.1	9.8	0.0	42.2	41.9	54.0	11.8	12.1

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

■ANTENNA:KHA-02(1-18GHz)
■AMP:KAF-02(8449B) ■SPECTRUM ANALYZER:KSA-04 ■CABLE:KCC-D14/D15

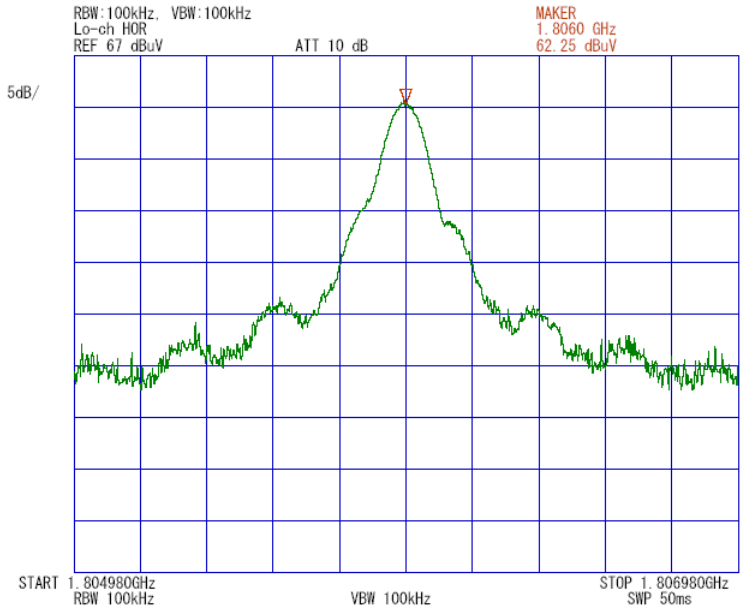
Out of Band Emission(Radiated): FCC 15.247(d)

UL Apex Co.,Ltd. Yamakita No.2 Shielded Room

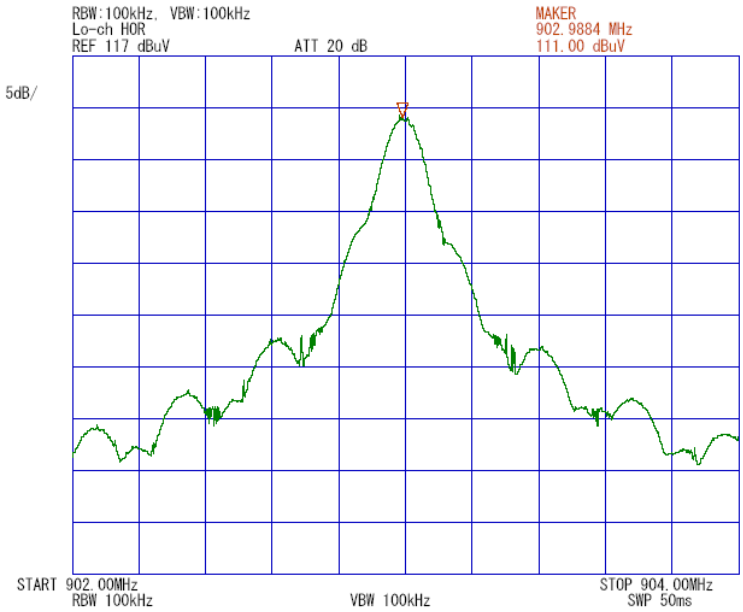
COMPANY	: SATO CORPORATION	REPORT NO	: 26FE0133-YK-F1
EQUIPMENT	: RFID Reader/Writer Module	REGULATION	: Fcc Part15SubpartC 247(d)
MODEL NUMBER	: Mercury 4e	DATE	: 2006/2/16
SERIAL NUMBER	: 05434E00E008	TEMP./HUMI	: 24deg.C./43%
FCC ID	: MMFRWMTM1	TEST MODE	: Transmitting (Hopping off)
POWER	: DC5.3V	ENGINEER	: Makoto Hosaka

Ch:902.99MHz

1. Spurious emission (1806.0MHz- Horizontal)



2. Fundamental(902.99MHz-Horizontal)

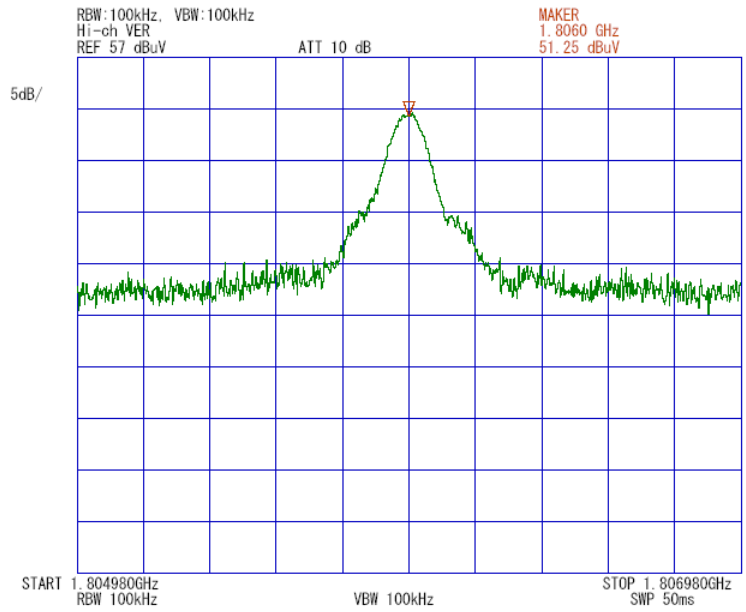


Out of Band Emission(Radiated): FCC 15.247(d)

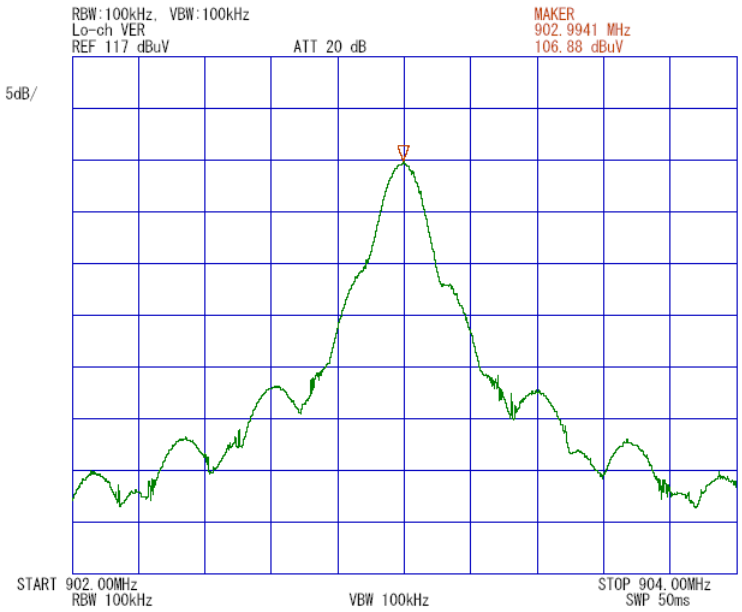
UL Apex Co.,Ltd. Yamakita No.2 Shielded Room

COMPANY	: SATO CORPORATION	REPORT NO	: 26FE0133-YK-F1
EQUIPMENT	: RFID Reader/Writer Module	REGULATION	: Fcc Part15SubpartC 247(d)
MODEL NUMBER	: Mercury 4e	DATE	: 2006/2/16
SERIAL NUMBER	: 05434E00E008	TEMP./HUMI	: 24deg.C./43%
FCC ID	: MMFRWMTM1	TEST MODE	: Transmitting (Hopping off)
POWER	: DC5.3V	ENGINEER	: Makoto Hosaka

3. Spurious emission(1806.0MHz- Vertical)



4. Fundamental(902.99MHz-Vertical)



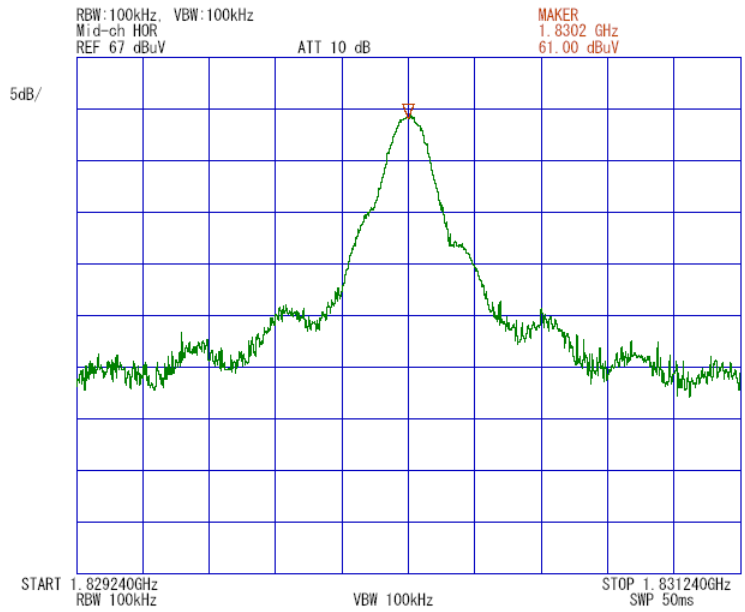
Out of Band Emission(Radiated): FCC 15.247(d)

UL Apex Co.,Ltd. Yamakita No.2 Shielded Room

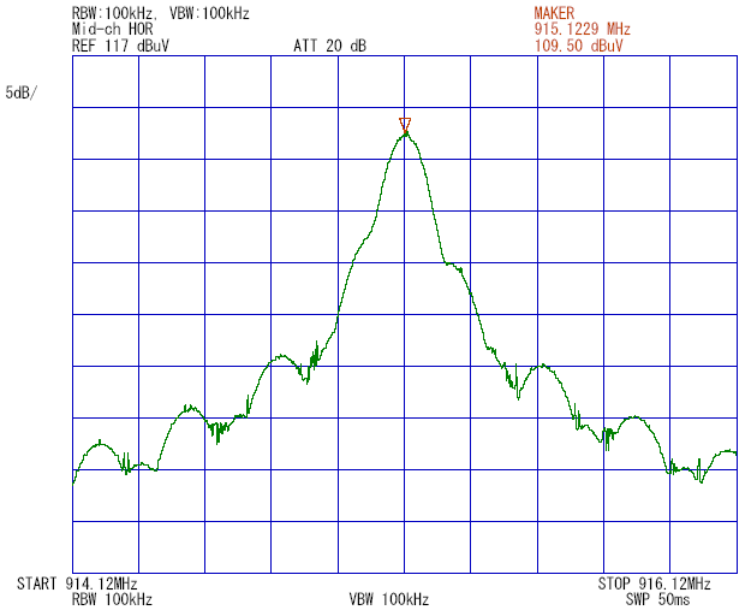
COMPANY	: SATO CORPORATION	REPORT NO	: 26FE0133-YK-F1
EQUIPMENT	: RFID Reader/Writer Module	REGULATION	: Fcc Part15SubpartC 247(d)
MODEL NUMBER	: Mercury 4e	DATE	: 2006/2/16
SERIAL NUMBER	: 05434E00E008	TEMP./HUMI	: 24deg.C./43%
FCC ID	: MMFRWMTM1	TEST MODE	: Transmitting (Hopping off)
POWER	: DC5.3V	ENGINEER	: Makoto Hosaka

Ch:915.12MHz

1. Spurious emission(1830.2MHz- Horizontal)



2. Fundamental(915.12MHz-Horizontal)

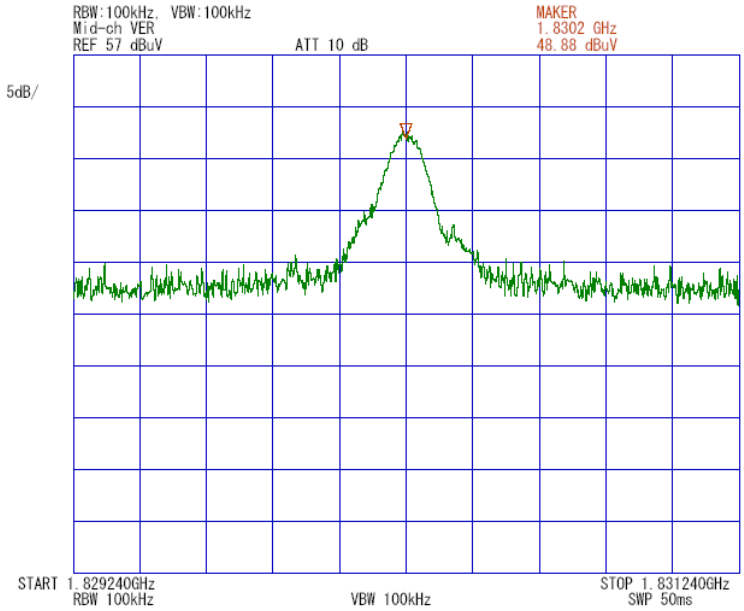


Out of Band Emission(Radiated): FCC 15.247(d)

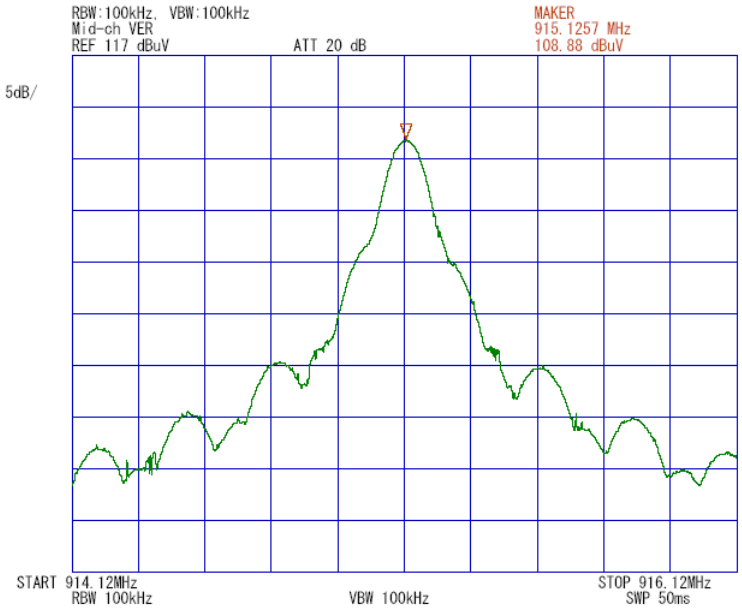
UL Apex Co.,Ltd. Yamakita No.2 Shielded Room

COMPANY	: SATO CORPORATION	REPORT NO	: 26FE0133-YK-F1
EQUIPMENT	: RFID Reader/Writer Module	REGULATION	: Fcc Part15SubpartC 247(d)
MODEL NUMBER	: Mercury 4e	DATE	: 2006/2/16
SERIAL NUMBER	: 05434E00E008	TEMP./HUMI	: 24deg.C./43%
FCC ID	: MMFRWMTM1	TEST MODE	: Transmitting (Hopping off)
POWER	: DC5.3V	ENGINEER	: Makoto Hosaka

3. Spurious emission(1830.2MHz- Vertical)



4. Fundamental(915.12MHz-Vertical)



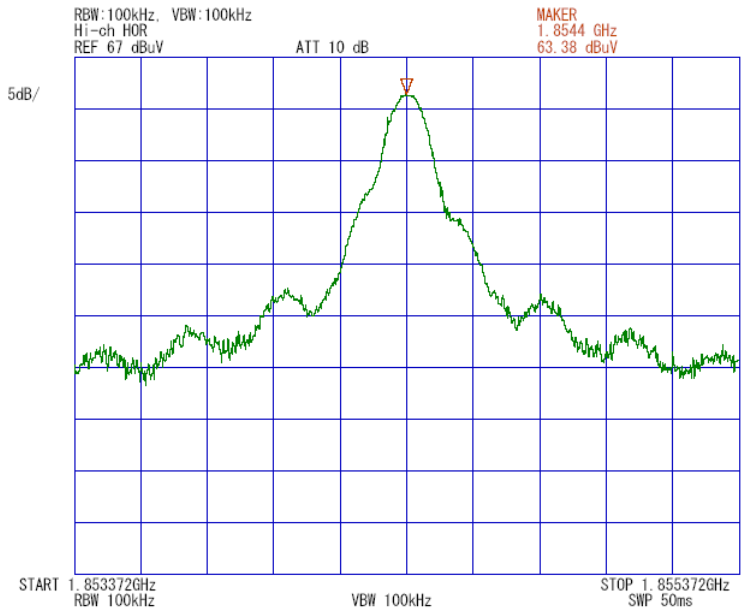
Out of Band Emission(Radiated): FCC 15.247(d)

UL Apex Co.,Ltd. Yamakita No.2 Shielded Room

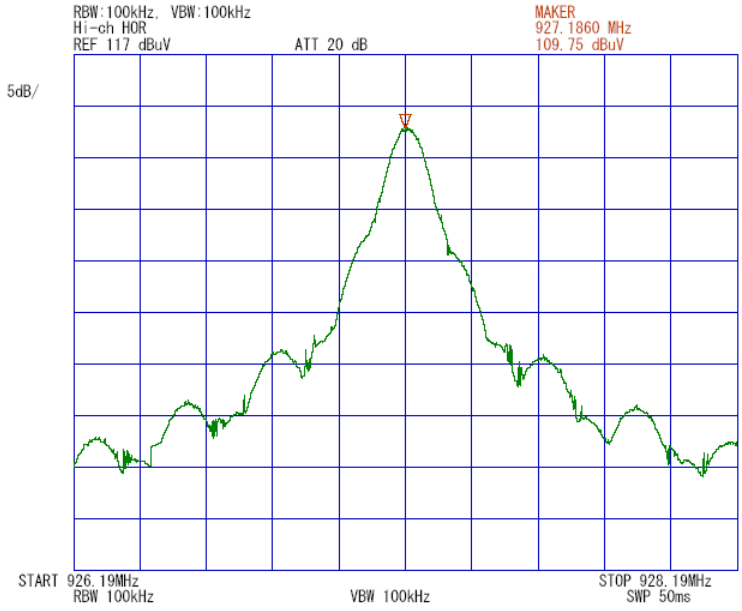
COMPANY	: SATO CORPORATION	REPORT NO	: 26FE0133-YK-F1
EQUIPMENT	: RFID Reader/Writer Module	REGULATION	: Fcc Part15SubpartC 247(d)
MODEL NUMBER	: Mercury 4e	DATE	: 2006/2/16
SERIAL NUMBER	: 05434E00E008	TEMP./HUMI	: 24deg.C./43%
FCC ID	: MMFRWMTM1	TEST MODE	: Transmitting (Hopping off)
POWER	: DC5.3V	ENGINEER	: Makoto Hosaka

Ch11:927.186MHz

1. Spurious emission(1854.4MHz- Horizontal)



2. Fundamental(927.186MHz-Horizontal)

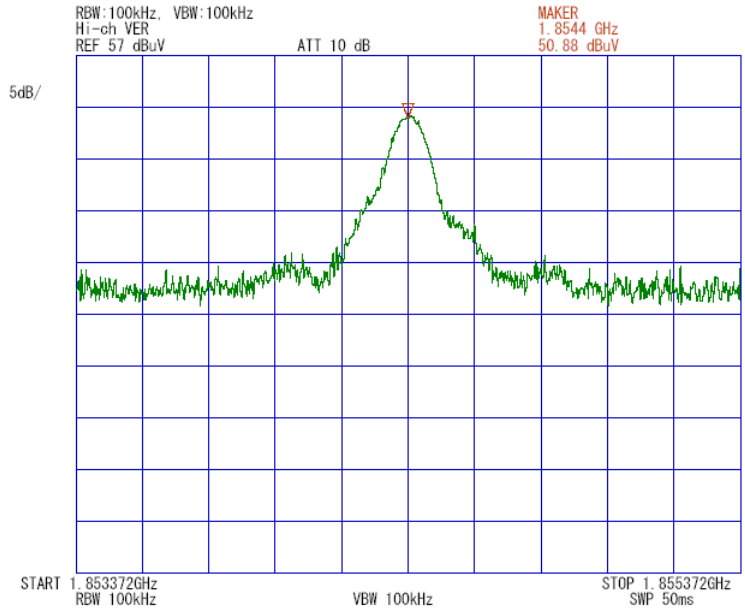


Out of Band Emission(Radiated): FCC 15.247(d)

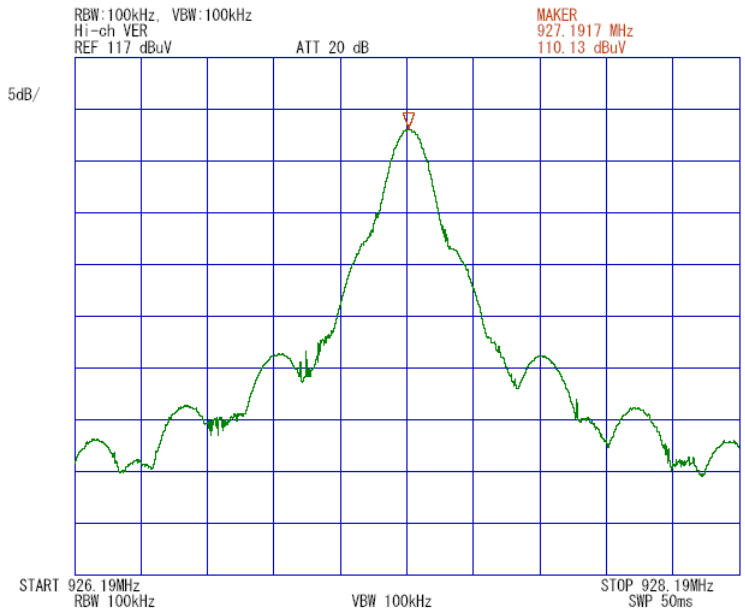
UL Apex Co.,Ltd. Yamakita No.2 Shielded Room

COMPANY	: SATO CORPORATION	REPORT NO	: 26FE0133-YK-F1
EQUIPMENT	: RFID Reader/Writer Module	REGULATION	: Fcc Part15SubpartC 247(d)
MODEL NUMBER	: Mercury 4e	DATE	: 2006/2/16
SERIAL NUMBER	: 05434E00E008	TEMP./HUMI	: 24deg.C./43%
FCC ID	: MMFRWMTM1	TEST MODE	: Transmitting (Hopping off)
POWER	: DC5.3V	ENGINEER	: Makoto Hosaka

3. Spurious emission(1854.4MHz- Vertical)



4. Fundamental(927.186MHz-Vertical)

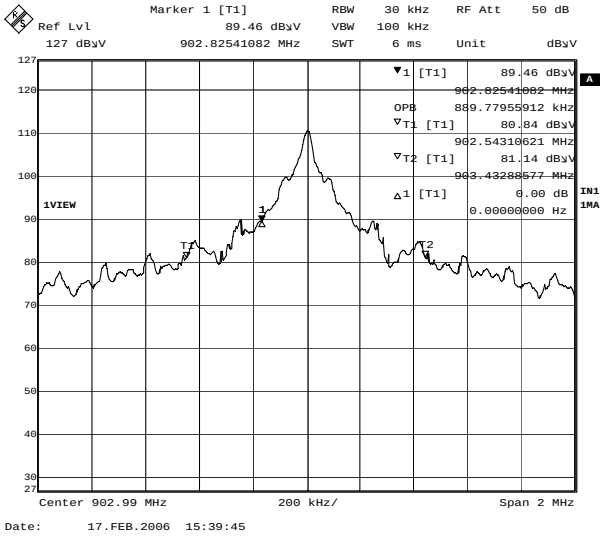


Occupied Bandwidth(99%)

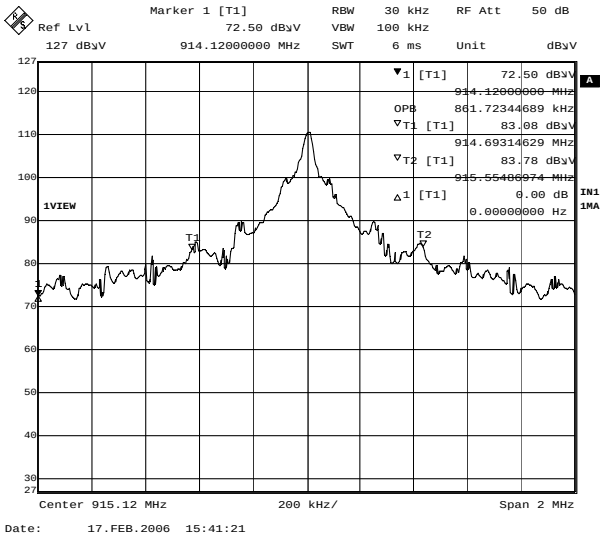
UL Apex Co.,Ltd. Yamakita No.2 Shielded Room

COMPANY	**: SATO CORPORATION**	**REPORT NO**	**: 26FE0133-YK-F1**
EQUIPMENT	**: RFID Reader/Writer Module**		
MODEL NUMBER	**: Mercury 4e**	**DATE**	**: 2006/2/17**
SERIAL NUMBER	**: 05434E00E008**	**TEMP./HUMI**	**: 25deg.C./38%**
FCC ID	**: MMFRWMTM1**	**TEST MODE**	**: Transmitting**
POWER	**: DC5.3V**	**ENGINEER**	**: Makoto Hosaka**

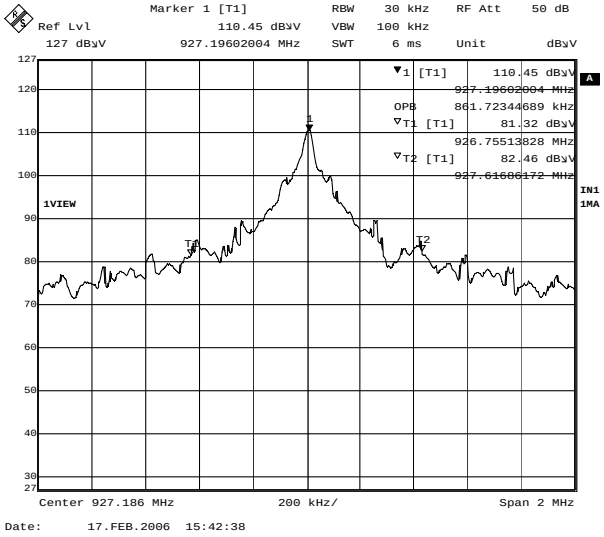
1. ch : 902.990MHz/Occupied Bandwidth:869.78kHz



2. ch : 915.120MHz/Occupied Bandwidth:861.72kHz



3. ch : 927.186MHz/Occupied Bandwidth:861.72kHz

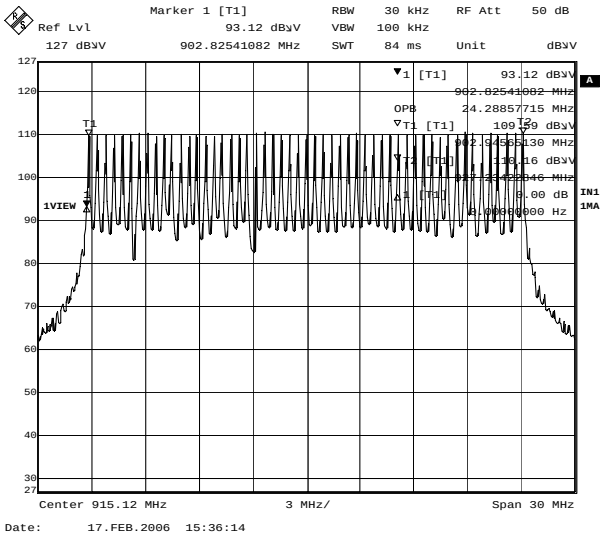


Occupied Bandwidth(99%)

UL Apex Co.,Ltd. Yamakita No.2 Shielded Room

COMPANY	**: SATO CORPORATION**	**REPORT NO**	**: 26FE0133-YK-F1**
EQUIPMENT	**: RFID Reader/Writer Module**		
MODEL NUMBER	**: Mercury 4e**	**DATE**	**: 2006/2/17**
SERIAL NUMBER	**: 05434E00E008**	**TEMP./HUMI**	**: 25deg.C./38%**
FCC ID	**: MMFRWMTM1**	**TEST MODE**	**: Transmitting**
POWER	**: DC5.3V**	**ENGINEER**	**: Makoto Hosaka**

4. Hopping/Occupied Bandwidth:24.29MHz



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	2005/09/03 * 12
KAF-02	Pre Amplifier	Hewlett Packard	8449B	RE	2005/04/28 * 12
KAF-05	Pre Amplifier	Agilent	8447D	RE	2005/05/11 * 12
KAT10-S1	Attenuator	Agilent	8449D 010	RE	2005/04/12 * 12
KAT10-S2	Attenuator	Agilent	8490D 010	RE	2005/11/10 * 12
KAT6-01	Attenuator	INMET	18N-6dB	RE	2005/04/07 * 12
KBA-03	Biconical Antenna	Schwarzbeck	BBA9106	RE	2006/01/17 * 12
KCC-14/15/16 /18/KPL-01	Coaxial Cable/Pulse Limitter	Fujikura/Suhner/PMM	5D-2W/8D-2W/S042 72B/S04272B/PL01	CE	2005/06/14 * 12
KCC-30/31/32 /34	Coaxial Cable	Fujikura/Suhner	5D-2W/S04272B	RE	2005/12/22 * 12
KCC-D7	Coaxial Cable	Advantest	A01002	AT	2005/04/12 * 12
KCC-D14/D15	Coaxial cable	Suhner	SUCOFLEX 104	RE	2005/12/28 * 12
KDT-01	Coaxial Crystal Detector	Agilent	8473C	AT	Pre Check
KHA-01	Horn Antenna	A.H.Systems	SAS-200/571	RE	2005/08/20 * 12
KLA-03	Logperiodic Antenna	Schwarzbeck	USLP9143	RE	2006/01/17 * 12
KLS-01	LISN(AMN)	Schwarzbeck	NSLK8126	CE	2005/05/10 * 12
KLS-02	LISN(AMN)	Schwarzbeck	NSLK8127	CE (EUT)	2005/10/12 * 12
KSA-01	Spectrum Analyzer	Advantest	R3365	CE	2005/07/06 * 12
KSA-04	Spectrum Analyzer	Advantest	R3271A	RE	2005/09/13 * 12
KTM-01	Terminator	TME	CT-01BP	CE	2005/04/07 * 12
KTR-01	Test Receiver	Rohde & Schwarz	ESI40	RE/AT	2005/08/05 * 12
KTR-02	Test Receiver	Rohde & Schwarz	ESCS30	CE	2005/11/10 * 12
KFL-07	High Pass Filter	K&L MICROWAVE	11SH10-2000/U8000 -0/0	RE	2005/04/12 * 12
KST-09	Digitizing Oscilloscope	Tektronix	TDS420A	AT	2005/08/31 * 12

All equipment is calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

Test Item:

- **CE: Conducted Emission**
- **RE: Out of Band Emission (Radiated)**
- **AT: Antenna terminal conducted test**
  - **1: Carrier Frequency Separation**
  - **2: 20dB Bandwidth**
  - **3: Number of Hopping Frequency**
  - **4: Dwell Time**
  - **5: Maximum Peak Output Power**
  - **6: Out of Band Emission (Conducted)**