RADIO TEST REPORT

Test Report No.: 11008659S-A

Applicant	:	**ART Finex Co., Ltd.**
Type of Equipment	:	**13.56 MHz RFID Reader/Writer Module**
Model No.	:	**ASI4000R2X**
FCC ID	:	**2AF4P-LL**
Test regulation	:	**FCC Part15 Subpart C: 2015**
Test result	:	**Complied**

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the limits of the above regulation.
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6. The opinions and the interpretations to the result of the description in this report are outside scopes where UL Japan has been accredited.
7. This test report covers Radio technical requirements. It does not cover administrative issues such as Manual or non-Radio test related Requirements. (if applicable)

Date of test: June 18 to August 17, 2015

Representative test engineer:

Yosuke Ishikawa
Engineer
Consumer Technology Division

Approved by :

Toyokazu Imamura
Leader
Consumer Technology Division

RTL02610

☐ The testing in which "Non-accreditation" is displayed is outside the accreditation scopes in UL Japan.
☒ There is no testing item of "Non-accreditation".

UL Japan, Inc.
Shonan EMC Lab.
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REVISION HISTORY

Original Test Report No.: 11008659S-A

Revision	Test report No.	Date	Page revised	Contents
- (Original)	11008659S-A	October 23, 2015	-	-
1	11008659S-A	November 19, 2015	1, 4, 10-11, 17-29, 31-32	Correction of Type of equipment

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SECTION 1: Customer information

Company Name	:	ART Finex Co., Ltd.
Address	:	6-1-33 Kamikoubata-cho, Sabae-shi, Fukui-ken, 916-0037 Japan
Telephone Number	:	+81-778-54-8085
Facsimile Number	:	+81-778-54-8092
Contact Person	:	Akio Yamamoto

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

2.1 Identification of E.U.T.

Type of equipment	:	13.56 MHz RFID Reader/Writer Module
Model No.	:	ASI4000R2X
Serial No.	:	Refer to 4.2.
Rating	:	DC 3.3 V
Country of Mass-production	:	Japan
Condition of EUT	:	Production model
Receipt Date of Sample	:	June 18, 2015

2.2 Product description

Model: ASI4000R2X (referred to as the EUT in this report) is a 13.56 MHz RFID Reader/Writer Module.

Clock frequency(ies) in the system : 13.56 MHz

Radio part:

Equipment type	:	Transceiver
Frequency of operation	:	13.56 MHz
Type of modulation	:	ASK
Antenna type	:	Loop
Antenna connector type	:	None
ITU code	:	A1D

FCC 15.31 (e)
The stable voltage (DC 3.3 V) is provided to the EUT from the host device. Therefore, this EUT complies with the requirement.

FCC 15.203 / 212
The antenna is not removable from the EUT. Therefore the EUT complies with the requirement.

SECTION 3: Test specification, procedures & results

3.1 Test specification

Test specification	:	FCC Part 15 Subpart C: 2015, final revised on September 8, 2015
Title	:	FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators Section 15.207 Conducted limits Section 15.209 Radiated emission limits, general requirements Section 15.215 Additional provisions to the general radiated emission limitations Section 15.225 Operation within the band 13.110-14.010MHz

* The revision on September 8, 2015 does not affect the test specification applied to the EUT.

3.2 Procedures & Results

Item	Test Procedure	Specification	Remarks	Deviation	Worst Margin	Results
Conducted emission	ANSI C63.4:2014 7. AC powerline conducted emission measurements	FCC 15.207	-	N/A	[Module alone] 4.3 dB, Freq.: 27.12000 MHz, Phase: N, Transmitting (ISO15693)with tag [Module built-in] 13.5 dB, Freq.: 0.18286 MHz, Phase: L1, Transmitting without tag	Complied
Electric field strength of Fundamental emission	ANSI C63.4:2014 13. Measurement of intentional radiators	FCC 15.225 (a)	Radiated	N/A	[Module alone] 63.7 dB, Polarization: Vertical, Transmitting (FeliCa) without tag [Module built-in] 82.3 dB, Polarization: Vertical, Transmitting with tag	Complied
Electric field strength of Spurious emission (within the 13.110-14.010MHz band)	ANSI C63.4:2014 13. Measurement of intentional radiators	FCC 15.225 (b)(c)	Radiated	N/A	[Module alone] 43.5 dB, Freq.: 13.771 MHz, Polarization: Vertical, Transmitting (FeliCa) without tag [Module built-in] 46.4 dB, Freq.: 14.010 MHz, Polarization: Vertical, Transmitting with tag	Complied
Electric field strength of Spurious emission (outside of the 13.110-14.010MHz band)	ANSI C63.4:2014 13. Measurement of intentional radiators	FCC 15.209 FCC 15.225 (d)	Radiated	N/A	[Module alone] 3.9 dB, Freq.: 66.420 MHz, Polarization: Vertical, Transmitting (ISO15693)without tag [Module built-in] 6.5 dB, Freq.: 94.920 MHz, Polarization: Vertical, Transmitting with tag	Complied
20dB bandwidth	ANSI C63.4:2014 13. Measurement of intentional radiators	FCC 15.215 (c)	Radiated	N/A	-	-
Frequency tolerance	ANSI C63.4:2014 13. Measurement of intentional radiators	FCC 15.225 (e)	Radiated	N/A	-	Complied
Note: UL Japan's Work Procedures No. 13-EM-W0420 and 13-EM-W0422						

3.3 Addition to standard

Item	Test Procedure	Specification	Remarks	Worst Margin	Results
Occupied Bandwidth (99%)	ANSI C63.4:2014 13. Measurement of intentional radiators, RSS-Gen 6.6	-	Radiated	-	-
Note: UL Japan's Work Procedures No. 13-EM-W0420 and 13-EM-W0422					

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

3.4 Uncertainty

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

Item	Frequency range	No.1 SAC[*1]/SR[*2] (±)	No.2 SAC/SR (±)	No.3 SAC/SR (±)	No.4/5/6/8 SR[*1] (±)
Conducted emission (AC Mains) AMN/LISN	150 kHz-30 MHz	3.6 dB	3.4 dB	3.4 dB	3.4 dB
Radiated emission (Measurement distance: 3 m)	9 kHz-30 MHz	3.7 dB	3.5 dB	3.5 dB	-
	30 MHz-300 MHz	4.9 dB	4.9 dB	4.7 dB	-
	300 MHz-1 GHz	5.0 dB	5.0 dB	4.8 dB	-

*1: SAC=Semi-Anechoic Chamber
*2: SR= Shielded Room is applied besides radiated emission

Conducted emission

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

Radiated emission

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

Other tests

Frequency (Normal condition) Measurement uncertainty for this test was: (±) 7.9 x 10^-8.
Frequency (Extreme condition) Measurement uncertainty for this test was: (±) 7.9 x 10^-8.
Bandwidth Measurement uncertainty for this test was: (±) 0.66%
Temperature uncertainty for this test was: (±) 0.95deg.C
Voltage uncertainty for this test was: (±) 0.24%

3.5 Test location

UL Japan, Inc. Shonan EMC Lab.
1-22-3, Megumigaoka, Hiratsuka-shi, Kanagawa-ken 259-1220 JAPAN
Telephone number : +81 463 50 6400
Facsimile number : +81 463 50 6401
JAB Accreditation No. : RTL02610

	IC Registration No.	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Maximum measurement distance
☒ No.1 Semi-anechoic chamber	2973D-1	20.6 x 11.3 x 7.65	20.6 x 11.3	10 m
☐ No.2 Semi-anechoic chamber	2973D-2	20.6 x 11.3 x 7.65	20.6 x 11.3	10 m
☒ No.3 Semi-anechoic chamber	2973D-3	12.7 x 7.7 x 5.35	12.7 x 7.7	5 m
☐ No.4 Semi-anechoic chamber	-	8.1 x 5.1 x 3.55	8.1 x 5.1	-
☐ No.1 shielded room	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
☐ No.2 shielded room	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
☐ No.3 shielded room	-	6.3 x 4.7 x 2.7	6.3 x 4.7	-
☐ No.4 shielded room	-	4.4 x 4.7 x 2.7	4.4 x 4.7	-
☒ No.5 shielded room	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
☐ No.6 shielded room	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
☐ No.1 Measurement room	-	2.55 x 4.1 x 2.5	-	-

3.6 Test setup, Data of test & Test instruments

Refer to APPENDIX 1 to 3.

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

4.1 Operating mode

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

Test item	Operating mode	Tested frequency
All items	Transmitting	13.56 MHz

Software for testing [Module alone]: ASI Series Program Ver. 2.0.2.6
Software for testing [Module built-in]: Ver.3.20

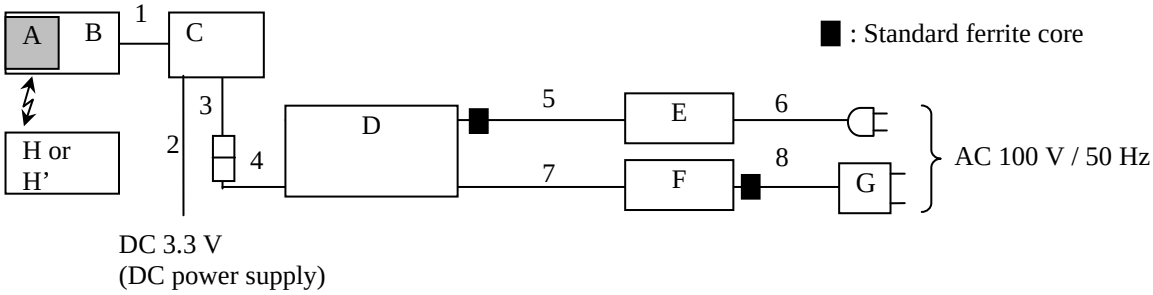
The carrier level and noise levels were confirmed with and without Card, and the test was made with the condition that has the maximum noise.
Combinations of the worst case:

Conducted emission	Radiated emission (Carrier)	Radiated emission (Below 30 MHz)	Radiated emission (Above 30 MHz)
With Card (ISO 15693 type)	Without Card (FeliCa type)	With Card (FeliCa type)	Without Card (ISO 15693 type)

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

4.2 Configuration and peripherals

[Module alone]



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

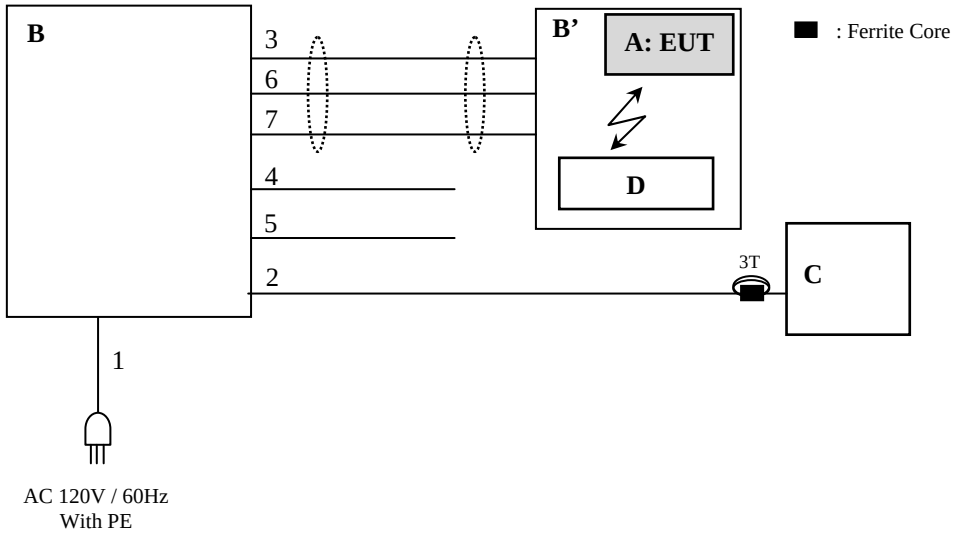
Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	13.56 MHz RFID Reader/Writer Module	ASI4000R2X	RXF510021	ART Finex	EUT
B	13.56 MHz RFID Reader/Writer Module	ASI4000BS1	-	ART Finex	Only for mounting connector (No ground and signal pattern)
C	Serial I/F Board	ASK3571	-	ART Finex	-
D	Laptop PC	E1Q57PA#ABJ	5CB3310KHW	HP	-
E	AC Adaptor	PPP009L-E	3453442403	HP	-
F	3.5" External Hard Drive	TS15TSJ35U	49470 0005	Transcend	-
G	AC Adaptor	WA-24E12	149063338-ABA	Asian Power Devices Inc.	-
H	Tag	-	-	-	ISO 15693 type
H'	Tag	RC-S888	-	SONY	FeliCa type

List of cables used

No.	Item	Length (m)	Shield (Cable)	Shield (Connector)	Remarks
1	ASC-PH6-200-PH4(A)	0.2	Unshielded	Unshielded	-
2	DC	1.7	Unshielded	Unshielded	-
3	RS-232C	1.8	Unshielded	Unshielded	-
4	LE-US232B USB	1.0	Shielded	Shielded	-
5	DC	1.8	Unshielded	Unshielded	-
6	AC	1.8	Unshielded	Unshielded	-
7	e-SATA	1.0	Shielded	Shielded	-
8	DC	1.8	Unshielded	Unshielded	

[Module built-in]



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

Description of EUT and support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	13.56 MHz RFID Reader/Writer Module	ASI4000R2X	RXF510030	ART Finex	EUT
B	Label Printer	DPS-5600M	14101392	Teraoka Seiko	-
B'	Label Printer	DPS-5600M	14101392	Teraoka Seiko	-
C	Scale	DPS-4600	02000TS1	Teraoka Seiko	-
D	Label Roll with RFID Tag	-	-	Teraoka Seiko	-

List of cables used

No.	Item	Length (m)	Shield (Cable)	Shield (Connector)	Remarks
1	AC	2.0	Unshielded	Unshielded	-
2	Signal	1.1	Unshielded	Unshielded	-
3	LAN(LABELLER 1)	1.1	Unshielded	Unshielded	-
4	LAN(LABELLER 2)	1.5	Unshielded	Unshielded	-
5	LAN(CONSOLE)	1.5	Unshielded	Unshielded	-
6	Signal(LABELLER)	1.1	Unshielded	Unshielded	-
7	FG	2.5	Unshielded	Unshielded	-

SECTION 5: Conducted emission

5.1 Operating environment

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

5.2 Test configuration

EUT was placed on a platform of nominal size, 1.0 m by 1.5 m, raised 0.8 m above the conducting ground plane.
The table is made of Styrofoam and covered with polyvinyl chloride. That has very low permittivity.
The rear of tabletop was located 40 cm to the vertical conducting plane. The rear of peripheral was aligned and was flushed with rear of tabletop. All other surfaces of tabletop were at least 80 cm from any other grounded conducting surface. EUT was located 80 cm from LISN. Each EUT current-carrying power lead, except the ground (safety) lead, was individually connected through a LISN to the input power source. All unused 50ohm connectors of the LISN were resistively terminated in 50 ohm when not connected to the measuring equipment.
Photographs of the set up are shown in APPENDIX 3.

5.3 Test conditions

Frequency range : 0.15 MHz - 30 MHz
EUT position : Table top

5.4 Test procedure

[Module built-in]
The AC Mains Terminal Continuous disturbance Voltage had been measured with the EUT within a Shielded room.
The EUT was connected to a Line Impedance Stabilization Network (LISN). An overview sweep with peak detection has been performed.
The measurements had been performed with a quasi-peak detector and if required, a CISPR average detector.
The conducted emission measurements were made with the following detection of the test receiver.

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

[Module alone]
The AC Mains Terminal Continuous disturbance Voltage had been measured with the EUT via DC power source within a Shielded room. The EUT via DC power source was connected to a Line Impedance Stabilization Network (LISN). An overview sweep with peak detection has been performed.
The measurements had been performed with a quasi-peak detector and if required, a CISPR average detector.
The conducted emission measurements were made with the following detection of the test receiver.
Detection Type : Quasi-Peak/ CISPR Average
IF Bandwidth: 9kHz

5.5 Results

Summary of the test results : Pass
Refer to APPENDIX 1

SECTION 6: Radiated emission (Fundamental and Spurious emission)

6.1 Operating environment

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

6.2 Test configuration

EUT was placed on a platform of nominal size, 1.0 m by 1.5 m, raised 0.8 m above the conducting ground plane.
The table is made of Styrofoam and covered with polyvinyl chloride. That has very low permittivity.
Photographs of the set up are shown in Appendix 1.

6.3 Test conditions

Frequency range : 9 kHz - 1 GHz
Test distance : 3 m
EUT position : Table top

6.4 Test procedure

The Radiated Electric Field Strength intensity has been measured on a semi-anechoic chamber with a ground plane at a distance of 3 m.
Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against 30 m open are test site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 937606. These tests were performed in semi anechoic chamber. Therefore the measured level of emissions may be higher than if measurements were made without a ground plane. However test results were confirmed to pass against standard limit.

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

The EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.
The measurements were performed for vertical polarization (antenna angle: 0 deg.to 360 deg.) and horizontal polarization. Drawing of the antenna direction is shown in Figure 1.

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

The measuring antenna height was varied between 1 and 4 m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.
The measurements were performed for both vertical and horizontal antenna polarization.

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

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

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

* FCC 15.31 (f)(2) (9 kHz-30 MHz)
9 kHz – 490 kHz [Limit at 3 m]= [Limit at 300 m]-40 log (3 [m]/300 [m])
490 kHz – 30 MHz [Limit at 3 m]= [Limit at 30 m]-40 log (3 [m]/30 [m])

The carrier level and noise levels were confirmed at each position of X, Y and Z axes of EUT to see the position of maximum noise, and the test was made at the position that has the maximum noise.

6.5 Results

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

Refer to APPENDIX 1.

Figure 1. Direction of the Loop Antenna

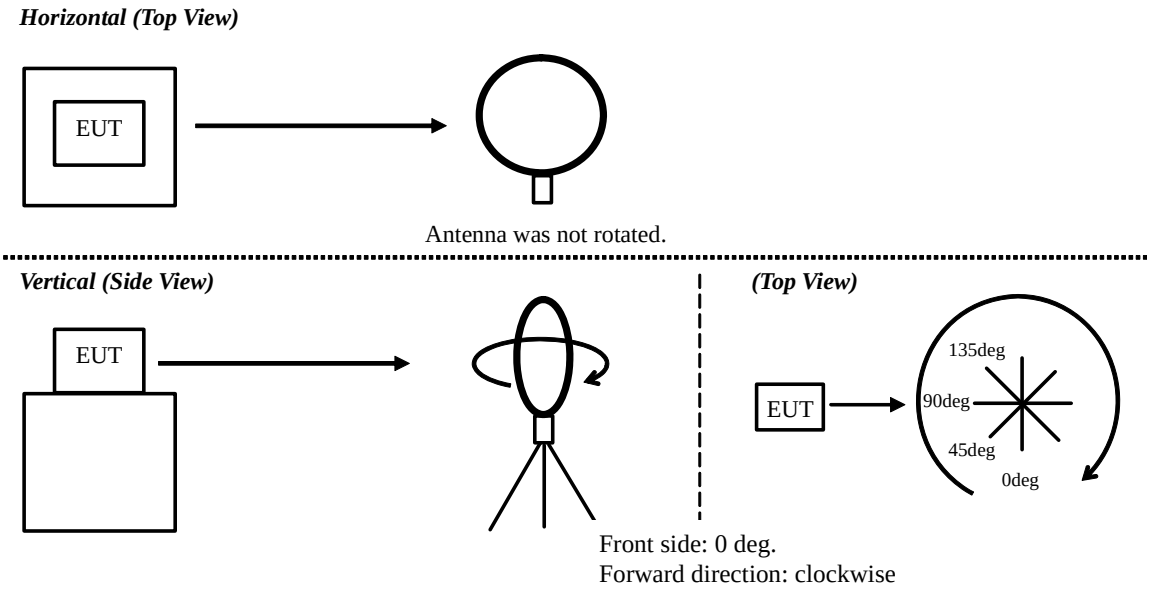
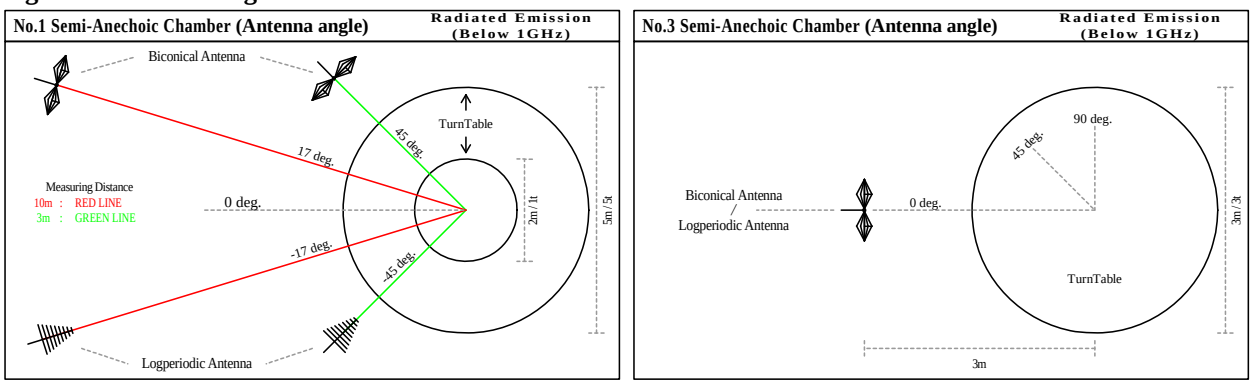


Figure 2. Antenna angle



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

Test procedure

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

Results

Refer to APPENDIX 1.

SECTION 8: Frequency tolerances

Test procedure

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

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

Contents of APPENDIXES

APPENDIX 1: Data of Radio tests

Conducted emission
Radiated emission
Frequency tolerance
Bandwidth

APPENDIX 2: Test instruments

Test instruments

APPENDIX 3: Photographs of test setup

Conducted emission
Radiated emission
Pre-check of the worst case
Card used for the test as representative

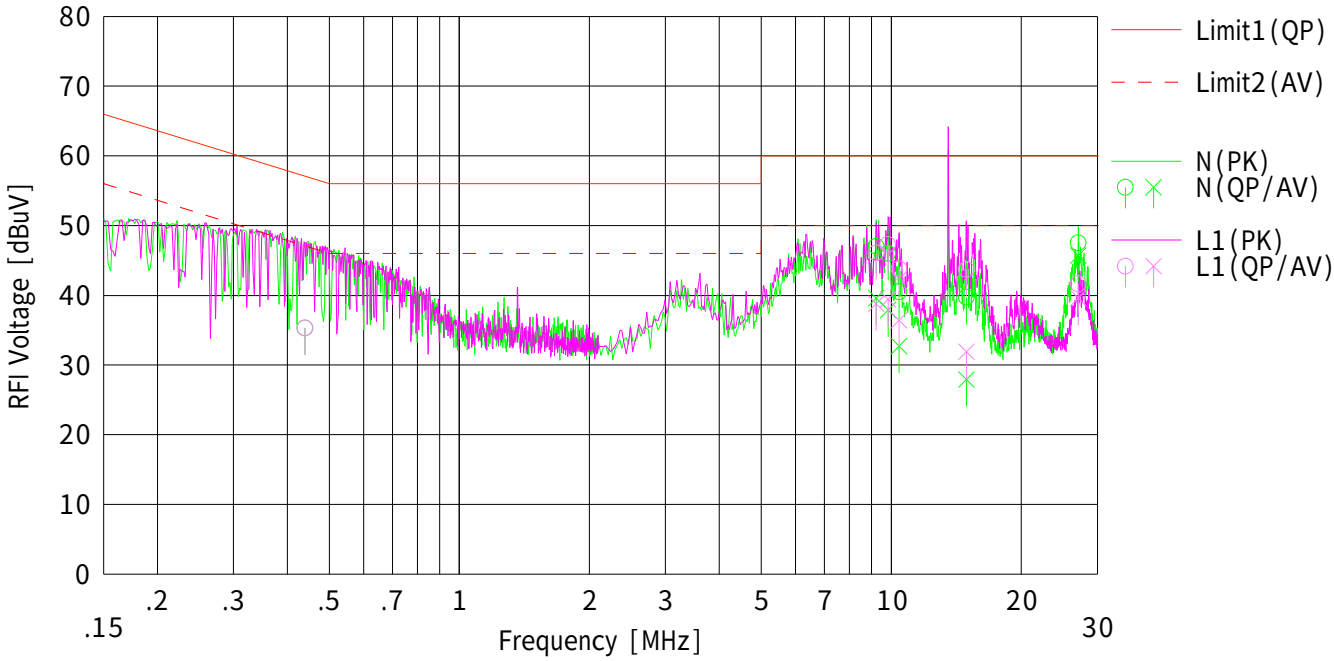
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
Date : 2015/06/18

Company	**: ART Finex Co.,Ltd.**	Mode	: Transmitting(ISO15693)
Kind of EUT	**: 13.56 MHz RFID Reader/Writer Module**	Order No.	: 10768227S
Model No.	**: ASI4000R2X**	Power	: **AC120V / 60Hz**
Serial No.	**: RXF510021**	Temp./Humi.	: 26 deg.C. / 56 %RH
Remarks	**: [Module alone]With Tag**		

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

Engineer : Wataru Kojima



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	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.43931	22.7	---	12.6	35.3	---	57.0	47.0	21.7	---	N	
2	9.24120	34.0	26.6	13.0	47.0	39.6	60.0	50.0	13.0	10.4	N	
3	9.83120	32.9	24.8	13.1	46.0	37.9	60.0	50.0	14.0	12.1	N	
4	10.42280	27.3	19.5	13.2	40.5	32.7	60.0	50.0	19.5	17.3	N	
5	14.92800	26.3	14.5	13.4	39.7	27.9	60.0	50.0	20.3	22.1	N	
6	27.12000	33.6	31.8	13.9	47.5	45.7	60.0	50.0	12.5	4.3	N	
7	0.43931	22.7	---	12.6	35.3	---	57.0	47.0	21.7	---	L1	
8	9.24200	33.1	25.8	13.0	46.1	38.8	60.0	50.0	13.9	11.2	L1	
9	9.83290	34.2	26.3	13.1	47.3	39.4	60.0	50.0	12.7	10.6	L1	
10	10.42495	30.6	23.2	13.2	43.8	36.4	60.0	50.0	16.2	13.6	L1	
11	14.92800	30.3	18.5	13.4	43.7	31.9	60.0	50.0	16.3	18.1	L1	
12	27.12000	27.7	25.7	13.9	41.6	39.6	60.0	50.0	18.4	10.4	L1	

Calculation:Result[dBuV]=Reading[dBuV]+C.Fac(LISN+Cable+ATT)[dB]
LISN: SLS-03

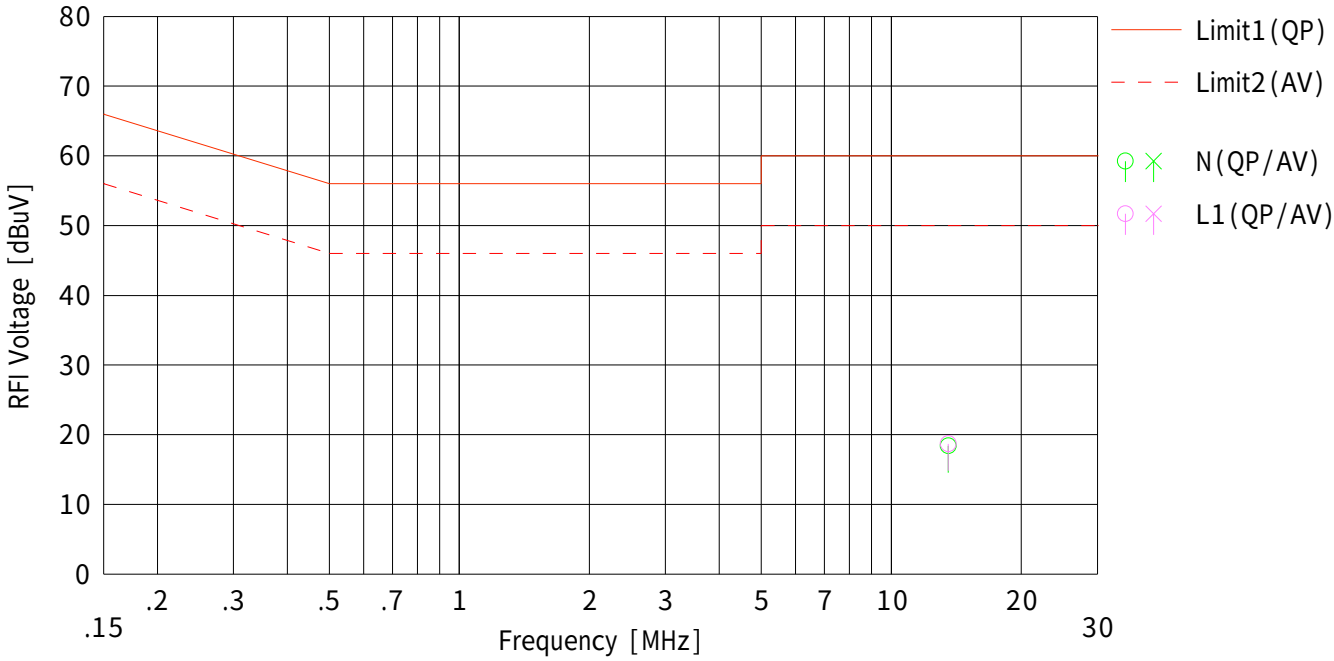
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
Date : 2015/06/18

Company	**: ART Finex Co.,Ltd.**	Mode	: Transmitting(ISO15693)
Kind of EUT	**: 13.56 MHz RFID Reader/Writer Module**	Order No.	: 10768227S
Model No.	**: ASI4000R2X**	Power	: **AC120V / 60Hz**
Serial No.	**: RXF510021**	Temp./Humi.	: 26 deg.C. / 56 %RH
Remarks	**: [Module alone]With Tag, Antenna terminated**		

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

Engineer : Wataru Kojima



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	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	13.56000	5.2	---	13.2	18.4	---	60.0	50.0	41.6	---	N	
2	13.56000	5.5	---	13.2	18.7	---	60.0	50.0	41.3	---	L1	

Calculation:Result[dBuV]=Reading[dBuV]+C.Fac(LISN+Cable+ATT)[dB]
LISN: SLS-03

DATA OF CONDUCTED EMISSION TEST

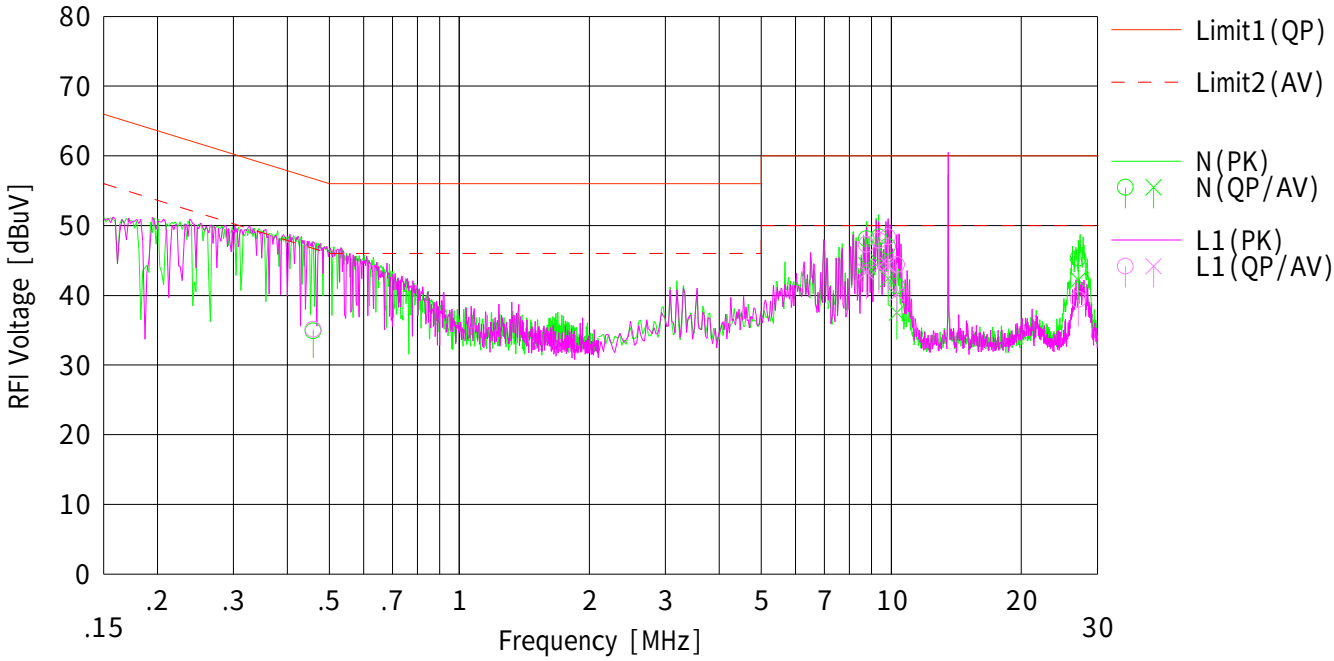
UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
Date : 2015/06/18

Company : **ART Finex Co.,Ltd.**
Kind of EUT : **13.56 MHz RFID Reader/Writer Module**
Model No. : **ASI4000R2X**
Serial No. : **RXF510021**
Remarks : **[Module alone]Without Tag**

Mode : Transmitting(ISO15693)
Order No. : 10768227S
Power : **AC120V / 60Hz**
Temp./Humi. : 26 deg.C. / 56 %RH

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

Engineer : Wataru Kojima



No.	Freq.	Reading <QP>	Reading <AV>	C.Fac	Results <QP>	Results <AV>	Limit <QP>	Limit <AV>	Margin <QP>	Margin <AV>	Phase	Comment
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.45903	22.3	- - -	12.6	34.9	- - -	56.7	46.7	21.8	- - -	N	
2	8.76730	35.1	31.3	13.0	48.1	44.3	60.0	50.0	11.9	5.7	N	
3	9.35985	35.3	31.6	13.1	48.4	44.7	60.0	50.0	11.6	5.3	N	
4	9.83060	33.9	29.3	13.1	47.0	42.4	60.0	50.0	13.0	7.6	N	
5	10.30785	28.2	24.4	13.1	41.3	37.5	60.0	50.0	18.7	12.5	N	
6	27.12000	31.4	28.3	13.9	45.3	42.2	60.0	50.0	14.7	7.8	N	
7	0.45903	22.5	- - -	12.6	35.1	- - -	56.7	46.7	21.6	- - -	L1	
8	8.76630	34.3	30.3	13.0	47.3	43.3	60.0	50.0	12.7	6.7	L1	
9	9.35960	34.8	31.0	13.1	47.9	44.1	60.0	50.0	12.1	5.9	L1	
10	9.83280	35.3	31.2	13.1	48.4	44.3	60.0	50.0	11.6	5.7	L1	
11	10.30660	31.3	27.1	13.1	44.4	40.2	60.0	50.0	15.6	9.8	L1	
12	27.12000	25.5	- - -	13.9	39.4	- - -	60.0	50.0	20.6	- - -	L1	

Calculation:Result[dBuV]=Reading[dBuV]+C.Fac(LISN+Cable+ATT)[dB]
LISN: SLS-03

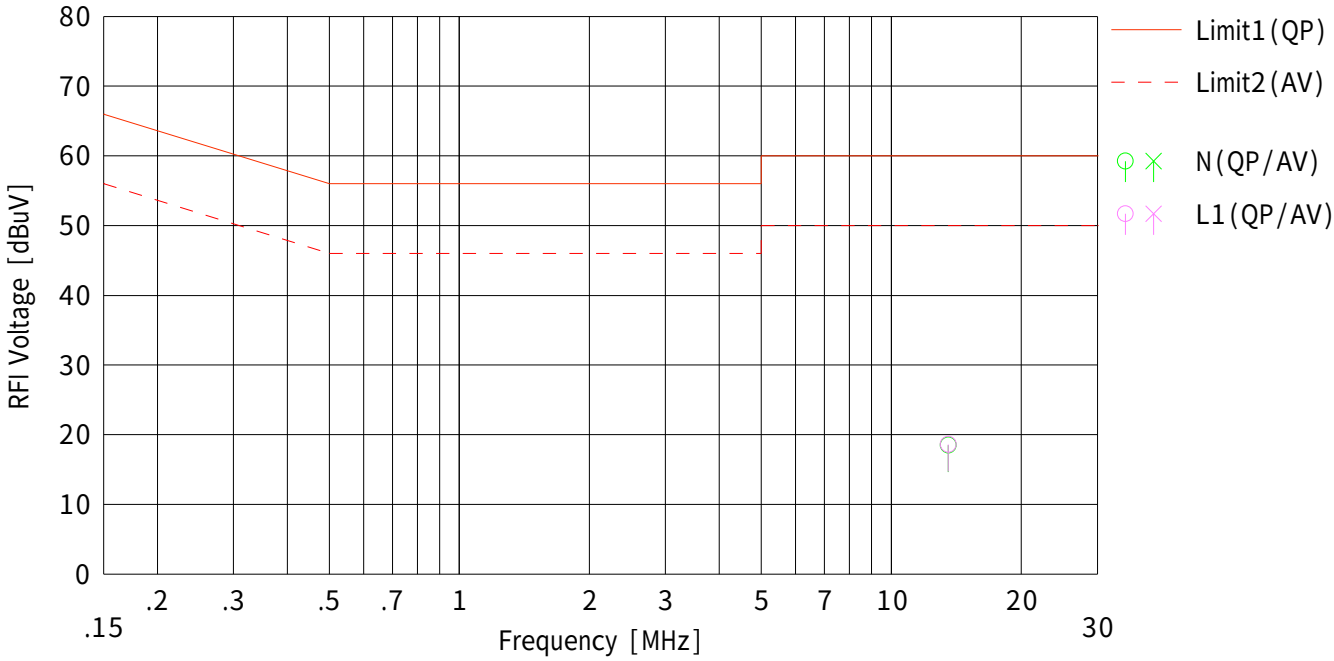
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
Date : 2015/06/18

Company	**: ART Finex Co.,Ltd.**	Mode	: Transmitting(ISO15693)
Kind of EUT	**: 13.56 MHz RFID Reader/Writer Module**	Order No.	: 10768227S
Model No.	**: ASI4000R2X**	Power	: **AC120V / 60Hz**
Serial No.	**: RXF510021**	Temp./Humi.	: 26 deg.C. / 56 %RH
Remarks	**: [Module alone]Without Tag, Antenna terminated**		

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

Engineer : Wataru Kojima



No.	Freq.	Reading <QP>	Reading <AV>	C.Fac	Results <QP>	Results <AV>	Limit <QP>	Limit <AV>	Margin <QP>	Margin <AV>	Phase	Comment
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	13.56000	5.3	---	13.2	18.5	---	60.0	50.0	41.5	---	N	
2	13.56000	5.4	---	13.2	18.6	---	60.0	50.0	41.4	---	L1	

Calculation:Result[dBuV]=Reading[dBuV]+C.Fac(LISN+Cable+ATT)[dB]
LISN: SLS-03

DATA OF CONDUCTED EMISSION TEST

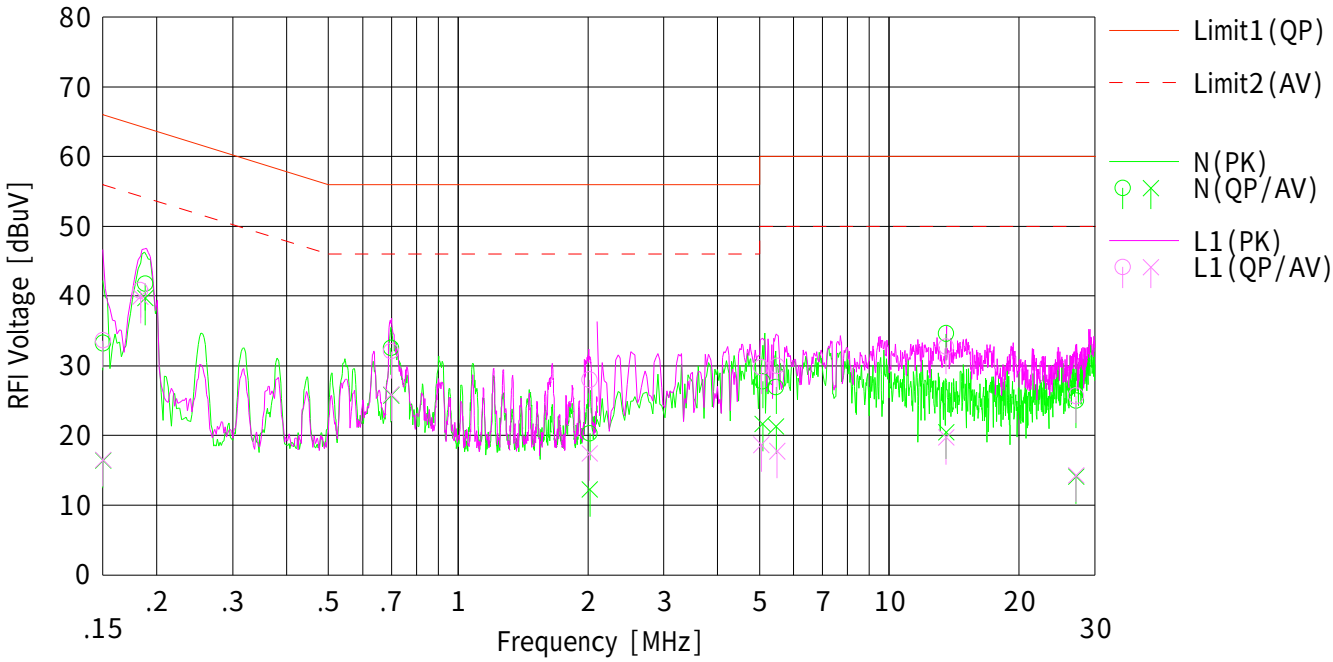
UL Japan,Inc. Shonan EMC Lab. No.3 Shielded Room
Date : 2015/08/17

Company : **ART Finex Co.,Ltd.**
Kind of EUT : **13.56 MHz RFID Reader/Writer Module**
Model No. : **ASI4000R2X (Host: DPS-5600M)**
Serial No. : **RXF510030 (Host: 14101392)**
Remarks : **[Module built-in]With Tag**

Mode : Transmitting with Tag
Order No. : 10768227S
Power : AC 120 V / 60 Hz
Temp./Humi. : 27 deg.C. / 51 %RH

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

Engineer : Yosuke Ishikawa



No.	Freq.	Reading <QP>	Reading <AV>	C.Fac	Results <QP>	Results <AV>	Limit <QP>	Limit <AV>	Margin <QP>	Margin <AV>	Phase	Comment
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.15000	20.88	4.03	12.35	33.23	16.38	66.00	56.00	32.7	39.6	N	
2	0.18792	29.42	27.34	12.35	41.77	39.69	64.13	54.13	22.3	14.4	N	
3	0.69973	20.18	13.34	12.40	32.58	25.74	56.00	46.00	23.4	20.2	N	
4	2.02310	7.79	-0.28	12.49	20.28	12.21	56.00	46.00	35.7	33.7	N	
5	5.08781	15.12	8.98	12.66	27.78	21.64	60.00	50.00	32.2	28.3	N	
6	5.47051	14.25	8.57	12.68	26.93	21.25	60.00	50.00	33.0	28.7	N	
7	13.56000	21.59	7.47	13.01	34.60	20.48	60.00	50.00	25.4	29.5	N	
8	27.12000	11.44	0.58	13.50	24.94	14.08	60.00	50.00	35.0	35.9	N	
9	0.15000	21.27	4.15	12.35	33.62	16.50	66.00	56.00	32.3	39.5	L1	
10	0.18338	28.42	27.57	12.35	40.77	39.92	64.33	54.33	23.5	14.4	L1	
11	0.70025	19.65	13.49	12.40	32.05	25.89	56.00	46.00	23.9	20.1	L1	
12	2.01711	15.48	4.89	12.49	27.97	17.38	56.00	46.00	28.0	28.6	L1	
13	5.05899	17.14	5.98	12.66	29.80	18.64	60.00	50.00	30.2	31.3	L1	
14	5.49613	17.28	5.05	12.68	29.96	17.73	60.00	50.00	30.0	32.2	L1	
15	13.56000	19.67	6.70	13.01	32.68	19.71	60.00	50.00	27.3	30.2	L1	
16	27.12000	12.16	0.78	13.50	25.66	14.28	60.00	50.00	34.3	35.7	L1	

Calculation:Result[dBuV]=Reading[dBuV]+C.Fac(ISN+Cable)[dB]
LISN: SLS-05

DATA OF CONDUCTED EMISSION TEST

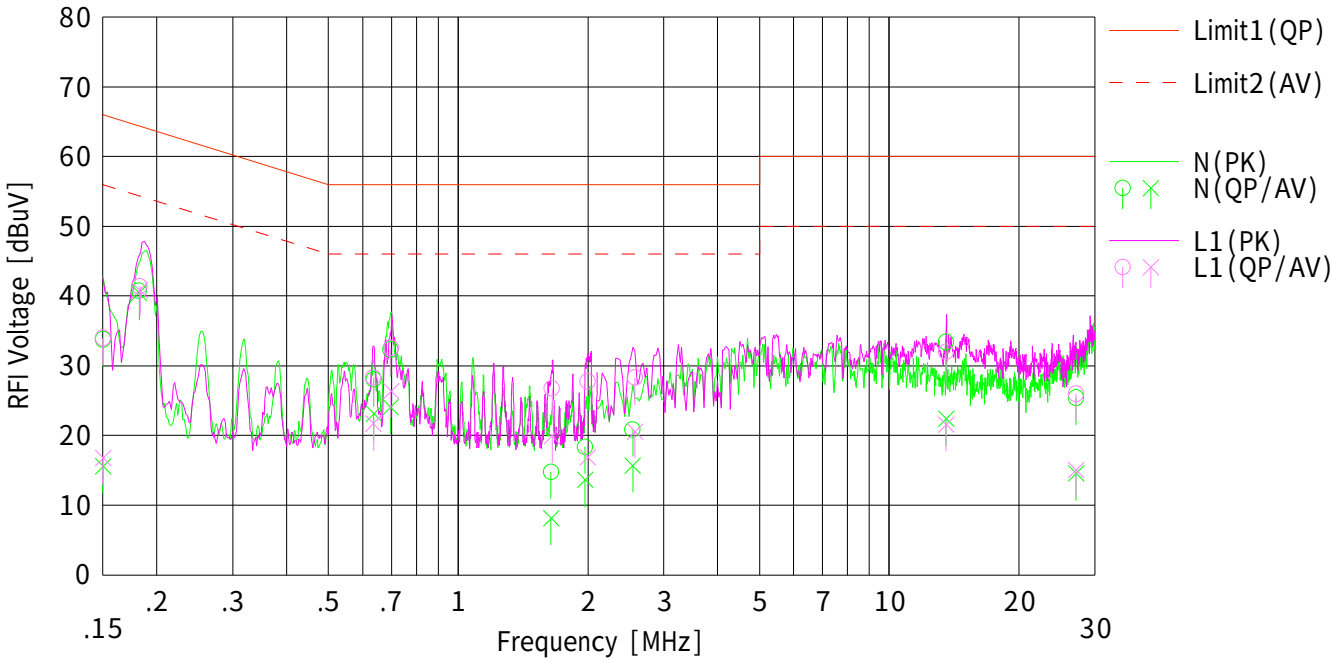
UL Japan,Inc. Shonan EMC Lab. No.3 Shielded Room
Date : 2015/08/17

Company : **ART Finex Co.,Ltd.**
Kind of EUT : **13.56 MHz RFID Reader/Writer Module**
Model No. : **ASI4000R2X (Host: DPS-5600M)**
Serial No. : **RXF510030 (Host: 14101392)**
Remarks : **[Module built-in]Without Tag**

Mode : Transmitting without Tag
Order No. : 10768227S
Power : AC 120 V / 60 Hz
Temp./Humi. : 27 deg.C. / 51 %RH

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

Engineer : Yosuke Ishikawa



No.	Freq.	Reading <QP>	Reading <AV>	C.Fac	Results <QP>	Results <AV>	Limit <QP>	Limit <AV>	Margin <QP>	Margin <AV>	Phase	Comment
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.15000	21.41	3.24	12.35	33.76	15.59	66.00	56.00	32.2	40.4	N	
2	0.18211	28.34	28.08	12.35	40.69	40.43	64.39	54.39	23.7	13.9	N	
3	0.63725	15.57	10.70	12.41	27.98	23.11	56.00	46.00	28.0	22.8	N	
4	0.69719	19.88	11.65	12.40	32.28	24.05	56.00	46.00	23.7	21.9	N	
5	1.64540	2.30	-4.36	12.47	14.77	8.11	56.00	46.00	41.2	37.8	N	
6	1.97122	5.84	1.12	12.49	18.33	13.61	56.00	46.00	37.6	32.3	N	
7	2.54435	8.32	3.15	12.52	20.84	15.67	56.00	46.00	35.1	30.3	N	
8	13.56000	20.38	9.34	13.01	33.39	22.35	60.00	50.00	26.6	27.6	N	
9	27.12000	11.89	1.03	13.50	25.39	14.53	60.00	50.00	34.6	35.4	N	
10	0.15000	21.60	4.41	12.35	33.95	16.76	66.00	56.00	32.0	39.2	L1	
11	0.18286	29.02	28.47	12.35	41.37	40.82	64.35	54.35	22.9	13.5	L1	
12	0.63651	15.89	9.28	12.41	28.30	21.69	56.00	46.00	27.7	24.3	L1	
13	0.69968	20.11	13.97	12.40	32.51	26.37	56.00	46.00	23.4	19.6	L1	
14	1.65281	14.25	7.44	12.47	26.72	19.91	56.00	46.00	29.2	26.0	L1	
15	1.99920	15.27	4.34	12.49	27.76	16.83	56.00	46.00	28.2	29.1	L1	
16	2.57365	15.73	8.04	12.52	28.25	20.56	56.00	46.00	27.7	25.4	L1	
17	13.56000	18.94	8.56	13.01	31.95	21.57	60.00	50.00	28.0	28.4	L1	
18	27.12000	12.43	1.55	13.50	25.93	15.05	60.00	50.00	34.0	34.9	L1	

Calculation:Result[dBuV]=Reading[dBuV]+C.Fac(ISN+Cable)[dB]
LISN: SLS-05

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

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

Company:	ART Finex Co.,Ltd.	Regulation:	FCC Part15 Subpart C 15.225
Equipment:	13.56 MHz RFID Reader/Writer Module	Test Distance:	3m
Model:	ASI4000R2X	Date:	June 29, 2015
Sample No.:	RXF510021	Temperature:	24 deg.C
Power:	DC 3.3 V	Humidity:	58 %RH
Mode:	Transmitting 13.56 MHz	ENGINEER:	Wataru Kojima

Remarks: : FeliCa without Tag (Axis:Hor_Y / Ver_Y) , Vertical polarization (antenna angle) of the worst case: 0deg

Fundamental emission

No.	FREQ	Test Receiver Reading		Antenna Factor	Loss	AMP GAIN	Distance factor	RESULT		LIMIT (30m)	MARGIN	
		Hor	Ver					Hor	Ver		Hor	Ver
	[MHz]	[dBuV]	[dBuV]	[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]
1	13.560	58.8	66.9	18.6	6.5	31.8	-40.0	12.1	20.2	83.9	71.8	63.7

Calculation:Result[dBuV/m]=Reading[dBuV]+Ant.Fac[dB/m]+Loss(Cable+ATT)[dB]-Gain(AMP)[dB]+Distance factor[dB]
Distance factor: 40 x log (3m/30m) = -40 dB
Limits (30m)
・13.553MHz to 13.567MHz : 83.9dBuV/m (FCC 15.225(a))

Spurious emission within the band

No.	FREQ	Test Receiver Reading		Antenna Factor	Loss	AMP GAIN	Distance factor	RESULT		LIMIT (30m)	MARGIN	
		Hor	Ver					Hor	Ver		Hor	Ver
	[MHz]	[dBuV]	[dBuV]	[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]
1	13.110	30.2	29.9	18.6	6.5	31.8	-40.0	-16.5	-16.8	29.5	46.0	46.3
2	13.348	31.8	38.9	18.6	6.5	31.8	-40.0	-14.9	-7.8	40.5	55.4	48.3
3	13.410	30.3	30.8	18.6	6.5	31.8	-40.0	-16.4	-15.9	40.5	56.9	56.4
4	13.417	30.4	32.3	18.6	6.5	31.8	-40.0	-16.3	-14.4	50.4	66.7	64.8
5	13.553	45.2	53.1	18.6	6.5	31.8	-40.0	-1.5	6.4	50.4	51.9	44.0
6	13.567	44.2	52.2	18.6	6.5	31.8	-40.0	-2.5	5.5	50.4	52.9	44.9
7	13.703	31.0	35.6	18.6	6.5	31.8	-40.0	-15.7	-11.1	50.4	66.1	61.5
8	13.710	30.4	32.5	18.6	6.5	31.8	-40.0	-16.3	-14.2	40.5	56.8	54.7
9	13.771	33.5	43.7	18.6	6.5	31.8	-40.0	-13.2	-3.0	40.5	53.7	43.5
10	14.010	30.2	30.2	18.6	6.5	31.8	-40.0	-16.5	-16.5	29.5	46.0	46.0

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

Outside filed strength frequencies
・Fc±7kHz:13.553MHz to 13.567MHz
・Fc±150kHz:13.410MHz to 13.710MHz
・Fc±450kHz:13.110MHz to 14.010MHz
Fc = 13.56MHz

Limits (30m)
・13.410MHz to 13.553MHz and 13.567MHz to 13.710MHz : 50.4dBuV/m (FCC 15.225(b))
・13.110MHz to 13.410MHz and 13.710MHz to 14.010MHz : 40.5dBuV/m (FCC 15.225(c))
・Below 13.110MHz and Above 14.010MHz : 29.5dBuV/m (FCC 15.225(d)and FCC 15.209)

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

UL Japan, Inc.
Shonan EMC Lab., No.3 Semi Anechoic Chamber

Company:	ART Finex Co.,Ltd.	Regulation:	FCC Part15 Subpart C 15.225
Equipment:	13.56 MHz RFID Reader/Writer Module	Test Distance:	3m
Model:	ASI4000R2X(Host:DPS-5600M)	Date:	August 18, 2015
Sample No.:	RXF510030(Host:14101392)	Temperature:	26 deg.C
Power:	DC3.3V (Host:AC120 V, 60 Hz)	Humidity:	55 %RH
Mode:	Transmitting 13.56MHz	ENGINEER:	Yosuke Ishikawa

Remarks: : Monitor degree : Max, with Tag
[Module built-in]Transmitting 13.56 MHz

Fundamental emission

No.	FREQ	Test Receiver Reading		Antenna Factor	Loss	AMP GAIN	Distance factor	RESULT		LIMIT (30m)	MARGIN	
		Hor	Ver					Hor	Ver		Hor	Ver
	[MHz]	[dBuV]	[dBuV]	[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]
1	13.560	41.1	49.0	18.6	6.3	32.2	-40.0	-6.3	1.6	83.9	90.2	82.3

Calculation:Result[dBuV/m]=Reading[dBuV]+Ant.Fac[dB/m]+Loss(Cable+ATT)[dB]-Gain(AMP)[dB]+Distance factor[dB]
Distance factor: 40 x log (3m/30m) = -40 dB
Limits (30m)
・13.553MHz to 13.567MHz : 83.9dBuV/m (FCC 15.225(a))

Spurious emission within the band

No.	FREQ	Test Receiver Reading		Antenna Factor	Loss	AMP GAIN	Distance factor	RESULT		LIMIT (30m)	MARGIN	
		Hor	Ver					Hor	Ver		Hor	Ver
	[MHz]	[dBuV]	[dBuV]	[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]
1	13.110	30.2	30.3	18.6	6.3	32.2	-40.0	-17.1	-17.0	29.5	46.6	46.5
2	13.348	30.2	30.5	18.6	6.3	32.2	-40.0	-17.1	-16.79	40.5	57.6	57.3
3	13.410	30.2	30.5	18.6	6.3	32.2	-40.0	-17.1	-16.85	40.5	57.6	57.4
4	13.417	30.3	30.3	18.6	6.3	32.2	-40.0	-17.1	-17.06	50.4	67.5	67.5
5	13.553	30.6	35.4	18.6	6.3	32.2	-40.0	-16.7	-11.9	50.4	67.1	62.3
6	13.567	30.6	35.0	18.6	6.3	32.2	-40.0	-16.8	-12.38	50.4	67.2	62.8
7	13.703	30.2	30.5	18.6	6.3	32.2	-40.0	-17.2	-16.9	50.4	67.6	67.3
8	13.710	30.2	30.5	18.6	6.3	32.2	-40.0	-17.2	-16.8	40.5	57.7	57.3
9	13.771	30.2	30.9	18.5	6.3	32.2	-40.0	-17.2	-16.47	40.5	57.7	57.0
10	14.010	30.2	30.5	18.5	6.3	32.2	-40.0	-17.1	-16.87	29.5	46.6	46.4

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

Outside filed strength frequencies
・Fc±7kHz:13.553MHz to 13.567MHz
・Fc±150kHz:13.410MHz to 13.710MHz
・Fc±450kHz:13.110MHz to 14.010MHz
Fc = 13.56MHz

Limits (30m)
・13.410MHz to 13.553MHz and 13.567MHz to 13.710MHz : 50.4dBuV/m (FCC 15.225(b))
・13.110MHz to 13.410MHz and 13.710MHz to 14.010MHz : 40.5dBuV/m (FCC 15.225(c))
・Below 13.110MHz and Above 14.010MHz : 29.5dBuV/m (FCC 15.225(d)and FCC 15.209)

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Radiated Emission

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

Company:	ART Finex Co.,Ltd.	Regulation:	FCC Part15 Subpart C 15.225
Equipment:	13.56 MHz RFID Reader/Writer Module	Test Distance:	3m
Model:	ASI4000R2X	Date:	June 29, 2015
Sample No.:	RXF510021	Temperature:	24 deg.C
Power:	DC 3.3 V	Humidity:	58 %RH
Mode:	Transmitting 13.56 MHz	ENGINEER:	Wataru Kojima
EUT axis:	Below 30MHz(Horizontal Y-axis, Vertical Y-axis), FeliCa, with Tag		
	Above 30MHz(Horizontal: X-axis, Vertical: X-axis), ISO15693, without Tag		
Remarks:			

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	0.56	QP	56.2	19.4	5.9	31.9	-40.0	9.6	29.5	19.9	-	76	* Limit: 30m
Hori.	0.71	QP	56.8	19.4	5.9	31.9	-40.0	10.2	29.5	19.3	-	48	* Limit: 30m
Hori.	0.91	QP	48.8	19.4	6.0	31.9	-40.0	2.3	29.5	27.2	-	64	* Limit: 30m
Hori.	27.12	QP	30.2	19.4	6.8	31.8	-40.0	-15.4	29.5	44.9	-	12	* Limit: 30m
Hori.	230.52	QP	33.7	16.8	9.4	31.7	0.0	28.2	46.0	17.8	219	180	
Hori.	379.68	QP	38.8	15.9	7.0	31.8	0.0	29.9	46.0	16.1	100	142	
Vert.	0.56	QP	57.4	19.4	5.9	31.9	-40.0	10.8	29.5	18.7	-	59	* Limit: 30m
Vert.	0.72	QP	58.7	19.4	5.9	31.9	-40.0	12.1	29.5	17.4	-	36	* Limit: 30m
Vert.	27.12	QP	34.2	19.4	6.4	31.8	-40.0	-11.8	29.5	41.3	-	110	* Limit: 30m
Vert.	32.34	QP	41.7	16.8	7.1	31.8	0.0	33.8	40.0	6.2	100	134	
Vert.	33.23	QP	40.7	16.6	7.2	31.8	0.0	32.7	40.0	7.3	100	162	
Vert.	38.64	QP	42.2	14.9	7.3	31.8	0.0	32.6	40.0	7.4	100	174	
Vert.	63.38	QP	52.3	7.3	7.6	31.8	0.0	35.4	40.0	4.6	100	176	
Vert.	66.42	QP	53.4	6.8	7.7	31.8	0.0	36.1	40.0	**3.9**	100	212	
Vert.	66.63	QP	52.7	6.8	7.7	31.8	0.0	35.4	40.0	4.6	100	212	
Vert.	379.68	QP	36.0	15.9	7.0	31.8	0.0	27.1	46.0	18.9	140	210	

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

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

* Carrier level (Result at 3m): Hor= 52.1dBuV/m, Ver= 60.2 dBuV/m

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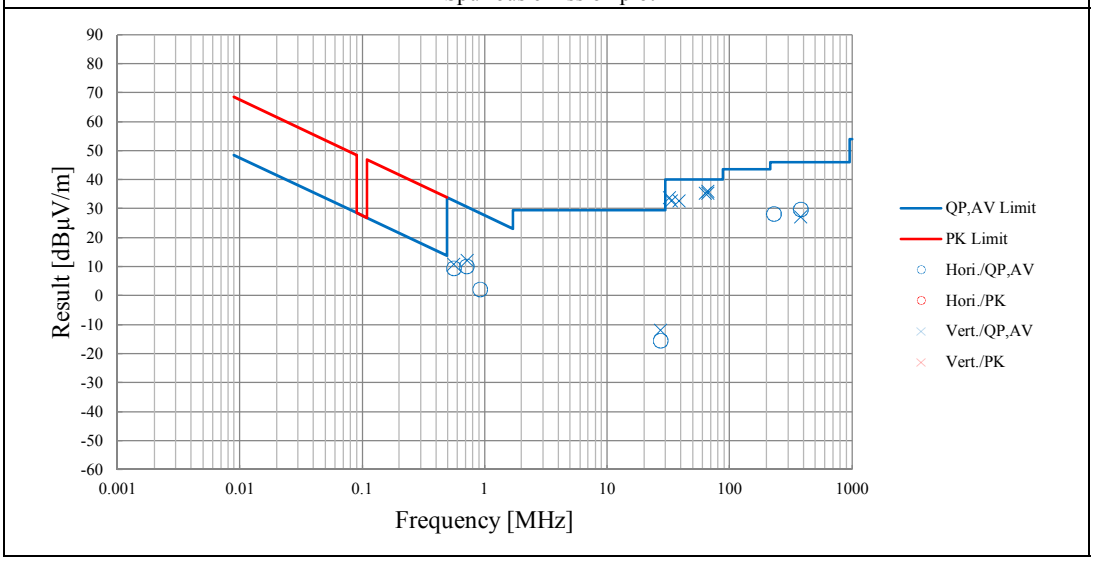
Radiated Emission (Worst mode plot)

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

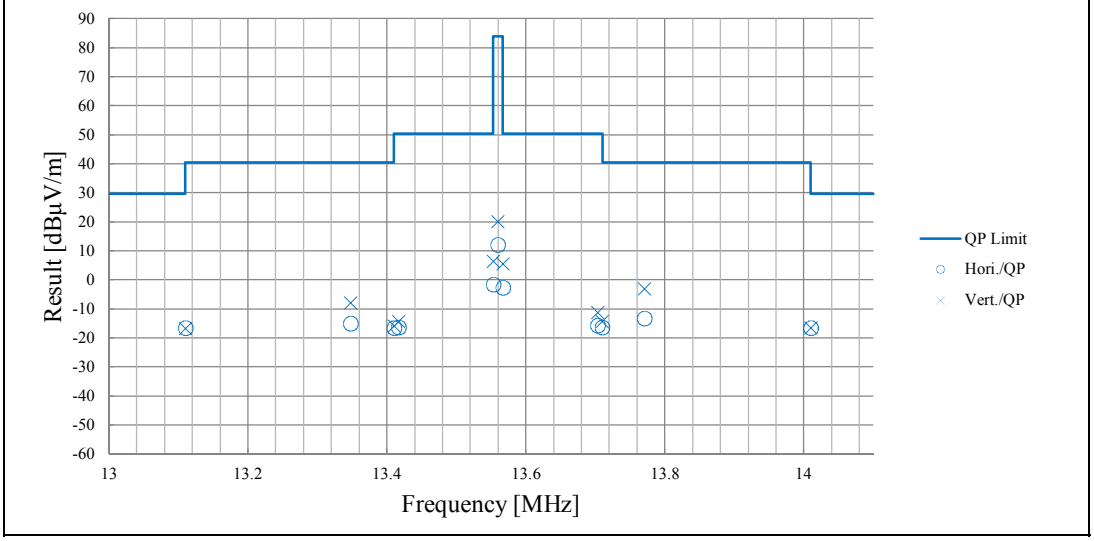
Company:	ART Finex Co.,Ltd.	Regulation:	FCC Part15 Subpart C 15.225
Equipment:	13.56 MHz RFID Reader/Writer Module	Test Distance:	3m
Model:	ASI4000R2X	Date:	June 29, 2015
Sample No.:	RXF510021	Temperature:	24 deg.C
Power:	DC 3.3 V	Humidity:	58 %RH
Mode:	Transmitting 13.56 MHz	ENGINEER:	Wataru Kojima

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

Spurious emission plot



Within band plot



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Radiated Emission

UL Japan, Inc.
Shonan EMC Lab. No.3 Semi Anechoic Chamber

Company:	ART Finex Co.,Ltd.	Regulation:	FCC Part15 Subpart C 15.225
Equipment:	13.56 MHz RFID Reader/Writer Module	Test Distance:	3m
Model:	ASI4000R2X (Host:DPS-5600M)	Date:	August 18, 2015
Sample No.:	RXF510030(Host:14101392)	Temperature:	26 deg.C
Power:	DC3.3V (Host: AC120 V, 60 Hz)	Humidity:	55 %RH
Mode:	[Module built-in]Transmitting 13.56 MHz	ENGINEER:	Yosuke Ishikawa
EUT axis:	Below 30MHz(Monitor degree : Max, with Tag)		
	Above 30MHz(Monitor degree : Min, with Tag)		

Remarks:

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	0.18527	AV	46.30	19.41	5.87	32.20	-80.00	-40.62	22.2	62.8	-	336	* Limit: 300 m
Hori.	0.18527	PK	50.93	19.41	5.87	32.20	-80.00	-35.99	42.2	78.2	-	336	* Limit: 300 m
Hori.	0.68725	QP	35.21	19.38	5.91	32.19	-40.00	-11.69	30.8	42.5	-	318	* Limit: 30 m
Hori.	27.120	QP	29.66	19.39	6.52	32.15	-40.00	-16.58	29.5	46.1	-	0	* Limit: 30 m
Hori.	40.680	QP	26.11	14.15	6.87	32.14	0.00	14.99	40.0	25.0	305	279	
Hori.	54.240	QP	26.97	9.36	7.02	32.14	0.00	11.21	40.0	28.8	396	322	
Hori.	67.800	QP	35.54	6.62	7.15	32.13	0.00	17.18	40.0	22.8	301	255	
Hori.	81.360	QP	42.18	6.54	7.27	32.12	0.00	23.87	40.0	16.1	240	1	
Hori.	94.920	QP	47.43	9.07	7.39	32.11	0.00	31.78	43.5	11.7	196	336	
Hori.	108.480	QP	44.99	11.24	7.50	32.10	0.00	31.63	43.5	11.9	160	284	
Hori.	122.040	QP	36.48	13.00	7.59	32.09	0.00	24.98	43.5	18.5	336	227	
Hori.	135.600	QP	35.74	14.02	7.69	32.07	0.00	25.38	43.5	18.1	232	246	
Hori.	149.160	QP	41.40	14.72	7.78	32.06	0.00	31.84	43.5	11.7	128	358	
Hori.	162.720	QP	39.55	15.28	7.87	32.05	0.00	30.65	43.5	12.9	110	234	
Vert.	0.18216	AV	57.95	19.41	5.87	32.20	-80.00	-28.97	22.3	51.3	-	327	* Limit: 300 m
Vert.	0.18216	PK	60.81	19.41	5.87	32.20	-80.00	-26.11	42.3	68.5	-	327	* Limit: 300 m
Vert.	0.69846	QP	49.07	19.38	5.91	32.19	-40.00	2.17	30.7	28.5	-	333	* Limit: 30 m
Vert.	1.07910	QP	49.28	19.38	5.93	32.19	-40.00	2.40	26.9	24.5	-	351	* Limit: 30 m
Vert.	27.120	QP	29.94	19.39	6.52	32.15	-40.00	-16.30	29.5	45.8	-	0	* Limit: 30 m
Vert.	40.680	QP	35.49	14.15	6.87	32.14	0.00	24.37	40.0	15.6	100	112	
Vert.	54.240	QP	29.23	9.36	7.02	32.14	0.00	13.47	40.0	26.5	100	317	
Vert.	67.800	QP	41.43	6.62	7.15	32.13	0.00	23.07	40.0	16.9	100	210	
Vert.	81.360	QP	47.80	6.54	7.27	32.12	0.00	29.49	40.0	10.5	100	238	
Vert.	94.920	QP	52.68	9.07	7.39	32.11	0.00	37.03	43.5	**6.5**	100	352	
Vert.	108.480	QP	42.49	11.24	7.50	32.10	0.00	29.13	43.5	14.4	100	193	
Vert.	122.040	QP	37.43	13.00	7.59	32.09	0.00	25.93	43.5	17.6	100	226	
Vert.	135.600	QP	35.38	14.02	7.69	32.07	0.00	25.02	43.5	18.5	100	26	
Vert.	149.160	QP	38.84	14.72	7.78	32.06	0.00	29.28	43.5	14.2	100	49	
Vert.	162.720	QP	37.16	15.28	7.87	32.05	0.00	28.26	43.5	15.2	100	150	

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

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

* Carrier level (Result at 3m): Hor= 33.7 dBuV/m, Ver= 41.6 dBuV/m

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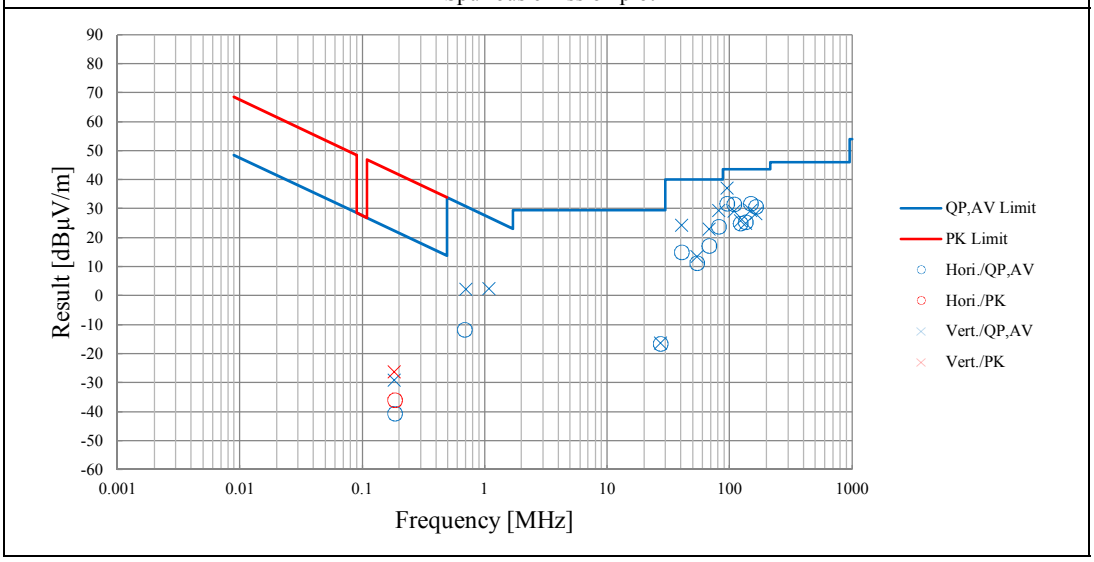
Radiated Emission (Worst mode plot)

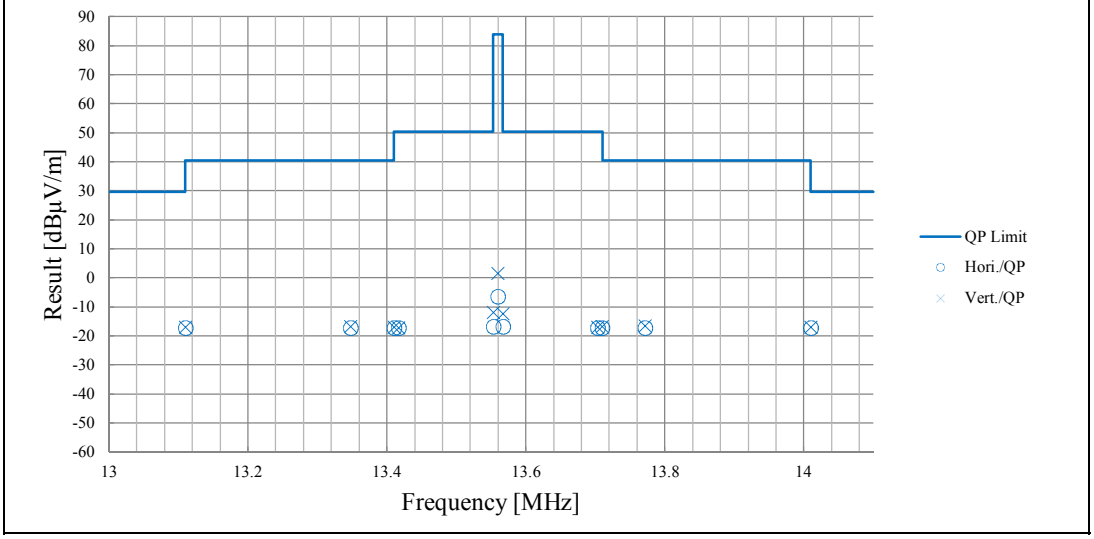
UL Japan, Inc.
Shonan EMC Lab. No.3 Semi Anechoic Chamber

Company:	ART Finex Co.,Ltd.	Regulation:	FCC Part15 Subpart C 15.225
Equipment:	13.56 MHz RFID Reader/Writer Module	Test Distance:	3m
Model:	ASI4000R2X (Host:DPS-5600M)	Date:	August 18, 2015
Sample No.:	RXF510030(Host:14101392)	Temperature:	26 deg.C
Power:	DC3.3V (Host: AC120 V, 60 Hz)	Humidity:	55 %RH
Mode:	[Module built-in]Transmitting 13.56 MHz	ENGINEER:	Yosuke Ishikawa
EUT axis:	Below 30MHz(Monitor degree : Max, with Tag) Above 30MHz(Monitor degree : Min, with Tag)		
Remarks:	These plots data contains sufficient number to show the trend of characteristic features for EUT.		

Spurious emission plot



Within band plot



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Data of Frequency Tolerance

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

Company	ART Finex Co.,Ltd.		
Equipment	13.56 MHz RFID Reader/Writer Module	Regulation	FCC Part15 Subpart C 15.225 (e)
Model	ASI4000R2X	Date	June 19, 2015
Serial No.	RXF510021	Temperature	26 deg.C
Power	DC 3.3 V	Humidity	52 %RH
Mode	[Module alone]Transmitting 13.56 MHz	ENGINEER	Shinichi Takano

Temperature Variation: -20deg.C

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (MHz)	Frequency torerance (%)	Limit (%)
startup	13.56	13.559809	-0.000191	-0.00141	0.010
after 2minutes	13.56	13.559848	-0.000152	-0.00112	0.010
after 5minutes	13.56	13.559848	-0.000152	-0.00112	0.010
after 10minutes	13.56	13.559848	-0.000152	-0.00112	0.010

Temperature Variation: -10deg.C

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (MHz)	Frequency torerance (%)	Limit (%)
startup	13.56	13.559879	-0.000121	-0.00089	0.010
after 2minutes	13.56	13.559900	-0.000100	-0.00074	0.010
after 5minutes	13.56	13.559900	-0.000100	-0.00074	0.010
after 10minutes	13.56	13.559900	-0.000100	-0.00074	0.010

Temperature Variation: 0deg.C

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (MHz)	Frequency torerance (%)	Limit (%)
startup	13.56	13.559915	-0.000085	-0.00063	0.010
after 2minutes	13.56	13.559926	-0.000074	-0.00055	0.010
after 5minutes	13.56	13.559926	-0.000074	-0.00055	0.010
after 10minutes	13.56	13.559926	-0.000074	-0.00055	0.010

Temperature Variation: 10deg.C

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (MHz)	Frequency torerance (%)	Limit (%)
startup	13.56	13.559929	-0.000071	-0.00052	0.010
after 2minutes	13.56	13.559930	-0.000070	-0.00052	0.010
after 5minutes	13.56	13.559930	-0.000070	-0.00052	0.010
after 10minutes	13.56	13.559931	-0.000069	-0.00051	0.010

Temperature Variation: 20deg.C

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (MHz)	Frequency torerance (%)	Limit (%)
startup	13.56	13.559927	-0.000073	-0.00054	0.010
after 2minutes	13.56	13.559923	-0.000077	-0.00057	0.010
after 5minutes	13.56	13.559923	-0.000077	-0.00057	0.010
after 10minutes	13.56	13.559923	-0.000077	-0.00057	0.010

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Data of Frequency Tolerance

Temperature Variation: 30deg.C

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (MHz)	Frequency torerance (%)	Limit (%)
startup	13.56	13.559915	-0.000085	-0.00063	0.010
after 2minutes	13.56	13.559909	-0.000091	-0.00067	0.010
after 5minutes	13.56	13.559908	-0.000092	-0.00068	0.010
after 10minutes	13.56	13.559909	-0.000091	-0.00067	0.010

Temperature Variation: 40deg.C

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (MHz)	Frequency torerance (%)	Limit (%)
startup	13.56	13.559901	-0.000099	-0.00073	0.010
after 2minutes	13.56	13.559897	-0.000103	-0.00076	0.010
after 5minutes	13.56	13.559896	-0.000104	-0.00077	0.010
after 10minutes	13.56	13.559896	-0.000104	-0.00077	0.010

Temperature Variation: 50deg.C

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (MHz)	Frequency torerance (%)	Limit (%)
startup	13.56	13.559893	-0.000107	-0.00079	0.010
after 2minutes	13.56	13.559894	-0.000106	-0.00078	0.010
after 5minutes	13.56	13.559894	-0.000106	-0.00078	0.010
after 10minutes	13.56	13.559894	-0.000106	-0.00078	0.010

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Data of Frequency Tolerance

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

Company	ART Finex Co.,Ltd.		
Equipment	13.56 MHz RFID Reader/Writer Module	Regulation	FCC Part15 Subpart C 15.225 (e)
Model	ASI4000R2X	Date	June 19, 2015
Serial No.	RXF510021	Temperature	26 deg.C
Power	DC 3.3 V	Humidity	52 %RH
Mode	[Module alone]Transmitting 13.56 MHz	ENGINEER	Shinichi Takano

Voltage Variation: DC 2.805 V
Temperature Variation: 20deg.C

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (MHz)	Frequency torerance (%)	Limit (%)
startup	13.56	13.559927	-0.000073	-0.00054	0.010
after 2minutes	13.56	13.559925	-0.000075	-0.00055	0.010
after 5minutes	13.56	13.559925	-0.000075	-0.00055	0.010
after 10minutes	13.56	13.559925	-0.000075	-0.00055	0.010

Voltage Variation: DC 3.795 V
Temperature Variation: 20deg.C

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (MHz)	Frequency torerance (%)	Limit (%)
startup	13.56	13.559926	-0.000074	-0.00055	0.010
after 2minutes	13.56	13.559920	-0.000080	-0.00059	0.010
after 5minutes	13.56	13.559920	-0.000080	-0.00059	0.010
after 10minutes	13.56	13.559920	-0.000080	-0.00059	0.010

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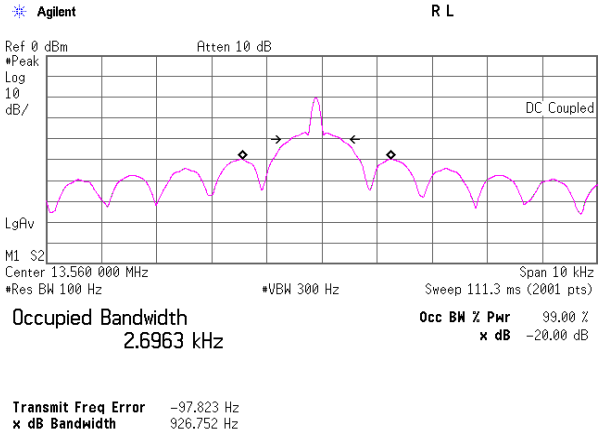
20dB bandwidth & 99% Occupied bandwidth: FCC 15.215 / RSS-Gen

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

Company:	ART Finex Co.,Ltd.	Regulation:	FCC Part15 Subpart C 15.215
Equipment:	13.56 MHz RFID Reader/Writer Module		
Model:	ASI4000R2X	Date:	June 19, 2015
Sample No.:	RXF510021	Temperature:	26 deg.C
Power:	DC 3.3 V	Humidity:	52 %RH
Mode:	Transmitting 13.56 MHz	ENGINEER:	Shinichi Takano

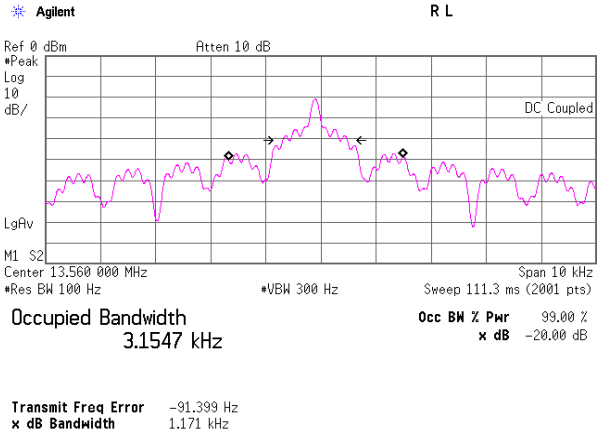
Felica without Tag

20dB Bandwidth: 0.927 kHz
99% Occupied Bandwidth: 2.696 kHz



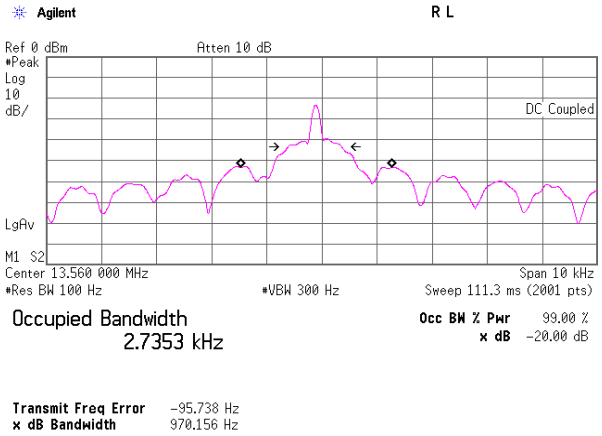
ISO15693 without Tag

20dB Bandwidth: 1.171 kHz
99% Occupied Bandwidth: 3.155 kHz



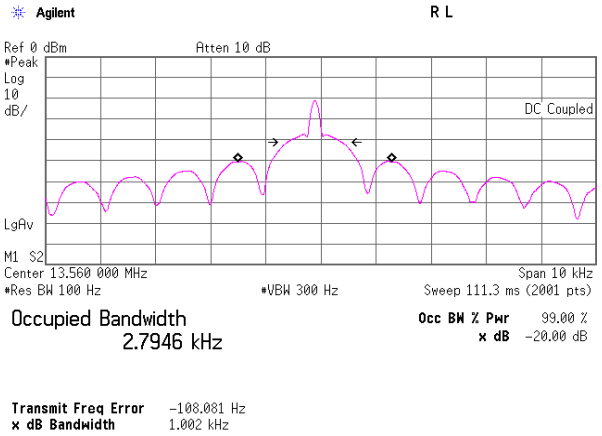
Felica with Tag

20dB Bandwidth: 0.970 kHz
99% Occupied Bandwidth: 2.735 kHz



ISO15693 with Tag

20dB Bandwidth: 1.002 kHz
99% Occupied Bandwidth: 2.795 kHz



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APPENDIX 2
Test Instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SSA-03	Spectrum Analyzer	Agilent	E4448A	MY48250152	TF	2015/02/24 * 12
SSCA-01	Search coil	LANGER	RF-R 400-1	02-0634	TF	Pre Check
SCH-01	Temperature and Humidity Chamber	Espec	PL-1KT	14020837	TF	2015/04/22 * 12
STF-01	Test Fixture	-	-	-	TF	-
SOS-09	Humidity Indicator	A&D	AD-5681	4061484	TF,CE	2014/12/24 * 12
SLS-03	LISN	Rohde & Schwarz	ENV216	100513	CE	2015/02/25 * 12
SLS-04	LISN	Rohde & Schwarz	ENV216	100514	CE	2015/02/25 * 12
SCC-05	Coaxial Cable	Fujikura	5D2W	-	CE	2015/04/17 * 12
STR-02	Test Receiver	Rohde & Schwarz	ESCI	100575	CE	2014/09/16 * 12
SAT3-06	Attenuator	JFW	50HF-003N	-	CE	2015/02/18 * 12
STM-12	Terminator	TME	CT-01 BP	-	CE	2014/12/19 * 12
SJM-17	Measure	ASKUL	-	-	CE	-
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE, RFI,MF)	-	CE,RE	-
SAF-01	Pre Amplifier	SONOMA	310N	290211	RE	2015/02/18 * 12
KAT6-04	Attenuator	INMET	18N-6dB	-	RE	2014/12/19 * 12
SAT3-09	Attenuator	JFW	50HF-003N	-	RE	2014/09/02 * 12
SBA-01	Biconical Antenna	Schwarzbeck	BBA9106	91032664	RE	2014/10/18 * 12
SCC-A1/A3/A5 /A7/A8/A13/S RSE-01	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/14 1PE/141PE/141PE /141PE/NS4906	-/0901-269(RF Selector)	RE	2015/04/17 * 12
SCC-A2/A4/A6 /A7/A8/A13/S RSE-01	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/14 1PE/141PE/141PE /141PE/NS4906	-/0901-269(RF Selector)	RE	2015/04/17 * 12
SLA-01	Logperiodic Antenna	Schwarzbeck	UHALP9108A	UHALP 9108-A 0888	RE	2014/10/18 * 12
SOS-01	Humidity Indicator	A&D	AD-5681	4062555	RE	2014/10/30 * 12
STR-01	Test Receiver	Rohde & Schwarz	ESU40	100093	RE	2014/11/11 * 12
SJM-13	Measure	ASKUL	-	-	RE	-
SAEC-01(NSA)	Semi-Anechoic Chamber	TDK	SAEC-01(NSA)	1	RE	2014/07/09 * 12
SAT6-07	Attenuator	JFW	50HF-006N	-	RE	2015/02/18 * 12
SLP-02	Loop Antenna	Rohde & Schwarz	HFH2-Z2	100218	RE	2014/11/30 * 12

The expiration date of the calibration is the end of the expired month .
As for some calibrations performed after the tested dates , those test equipment have been controlled by means of an unbroken chains of calibrations .

All equipment is calibrated with valid calibrations . Each measurement data is traceable to the national or international standards .
Test Item :
CE: Conducted emission,
RE: Radiated emission,
TF: Test Fixture

APPENDIX 2
Test Instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SCC-C9/C10/ SRSE-03	Coaxial Cable&RF Selector	Suhner/Suhner/TOYO	RG223U/141PE/N S4906	-/0901-271(RF Selector)	CE	2015/04/17 * 12
SLS-05	LISN	Rohde & Schwarz	ENV216	100516	CE	2015/02/24 * 12
SAT3-06	Attenuator	JFW	50HF-003N	-	CE	2015/02/18 * 12
SOS-06	Humidity Indicator	A&D	AD-5681	4062118	CE	2014/12/24 * 12
STM-05	Terminator	TME	CT-01 BP	-	CE	2014/12/19 * 12
STR-06	Test Receiver	Rohde & Schwarz	ESCI	101259	CE, RE	2015/03/24 * 12
SJM-15	Measure	ASKUL	-	-	CE, RE	-
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE, RFI,MF)	-	CE, RE	-
SAEC-03(NSA)	Semi-Anechoic Chamber	TDK	SAEC-03(NSA)	3	RE	2015/07/16 * 12
SBA-03	Biconical Antenna	Schwarzbeck	BBA9106	91032666	RE	2014/10/18 * 12
SLA-03	Logperiodic Antenna	Schwarzbeck	UHALP9108A	UHALP 9108-A 0901	RE	2014/10/18 * 12
SAT6-08	Attenuator	HIROSE ELECTRIC CO.,LTD.	AT-406(40)	-	RE	2014/08/27 * 12
SCC-C1/C2/C 3/C4/C5/C10/ SRSE-03	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhne r/Suhner/Suhner/Suhn er/TOYO	8D2W/12DSFA/14 1PE/141PE/141PE /141PE/NS4906	-/0901-271(RF Selector)	RE	2015/04/17 * 12
SAF-03	Pre Amplifier	SONOMA	310N	290213	RE	2015/02/18 * 12
SOS-05	Humidity Indicator	A&D	AD-5681	4062518	RE	2014/10/30 * 12

The expiration date of the calibration is the end of the expired month .
As for some calibrations performed after the tested dates , those test equipment have been controlled by means of an unbroken chains of calibrations .

All equipment is calibrated with valid calibrations . Each measurement data is traceable to the national or international standards .
Test Item :
CE: Conducted emission ,
RE: Radiated emission ,