



# RADIO TEST REPORT

**Test Report No. : 11121470H-A**

**Applicant** : PANASONIC CORPORATION OF NORTH AMERICA

**Type of Equipment** : RFID MODULE

**Model No.** : RI14A

**Test regulation** : FCC Part 15 Subpart C: 2015

**FCC ID** : ACJ9TGRI14A

**Test Result** : Complied

1. This test report shall not be reproduced in full or partial, without the written approval of UL Japan, Inc.
2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with above regulation.
4. The test results in this report are traceable to the national or international standards.
5. This test report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.
6. This test report covers Radio technical requirements. It does not cover administrative issues such as Manual or non-Radio test related Requirements. (if applicable)

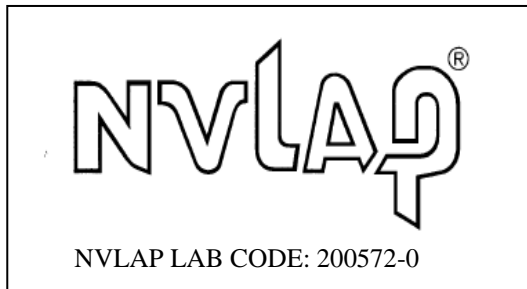
**Date of test:** January 12 to 18, 2016

**Representative test engineer:** J. Matsui

Tomoki Matsui  
Engineer  
Consumer Technology Division

**Approved by:** T. Hatakeda

Takahiro Hatakeda  
Leader  
Consumer Technology Division



This laboratory is accredited by the NVLAP LAB CODE 200572-0, U.S.A. The tests reported herein have been performed in accordance with its terms of accreditation.  
\*As for the range of Accreditation in NVLAP, you may refer to the WEB address,  
[http://japan.ul.com/resources/emc\\_accredited/](http://japan.ul.com/resources/emc_accredited/)

**UL Japan, Inc.**  
**Ise EMC Lab.**

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN  
Telephone : +81 596 24 8999  
Facsimile : +81 596 24 8124



<b>CONTENTS</b>	<b>PAGE</b>
<b>SECTION 1: Customer information</b> .....	<b>4</b>
<b>SECTION 2: Equipment under test (E.U.T.)</b> .....	<b>4</b>
<b>SECTION 3: Test specification, procedures &amp; results</b> .....	<b>5</b>
<b>SECTION 4: Operation of E.U.T. during testing</b> .....	<b>8</b>
<b>SECTION 5: Conducted emission</b> .....	<b>10</b>
<b>SECTION 6: Radiated emission (Fundamental , Spurious Emission and Spectrum Mask)</b> .....	<b>11</b>
<b>SECTION 7: Other test</b> .....	<b>12</b>
<b>APPENDIX 1: Test data</b> .....	<b>13</b>
Conducted emission .....	13
Fundamental emission and Spectrum Mask.....	15
Spurious emission .....	19
20dB Bandwidth and 99% Occupied Bandwidth.....	23
Frequency Tolerance .....	25
<b>APPENDIX 2: Test instruments</b> .....	<b>26</b>
<b>APPENDIX 3: Photographs of test setup</b> .....	<b>27</b>
Conducted emission .....	27
Radiated emission .....	28
Worst Case Position.....	29

---

**UL Japan, Inc.**

**Ise EMC Lab.**

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

## **SECTION 1: Customer information**

Company Name : PANASONIC CORPORATION OF  
NORTH AMERICA  
Address : Two Riverfront Plaza, 9th Floor Newark, NEW JERSEY, 07102-5940,  
USA

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

### **2.1 Identification of E.U.T.**

Type of Equipment : RFID MODULE  
Model No. : RI14A  
Serial No. : Refer to Section 4, Clause 4.2  
Receipt Date of Sample : January 8, 2016  
Modification of EUT : No Modification by the test lab

### **2.2 Product Description**

The EUT is an RFID module that is embedded inside Panasonic Tablet Computer model FZ-Q1. The radio module is manufactured by NXP.

### **Radio Specification**

Radio Type : Transceiver  
Frequency of Operation : 13.56 MHz  
Modulation : ASK

---

## **UL Japan, Inc.**

### **Ise EMC Lab.**

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

### SECTION 3: Test specification, procedures & results

#### 3.1 Test Specification

Test Specification : FCC Part 15 Subpart C: 2015, final revised on November 23, 2015  
\*Some parts are effective on and after December 17, 2015 or December 23, 2015.  
The revision does not affect the test specification applied to the EUT.

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

#### 3.2 Procedures and results

Item	Test Procedure	Specification	Worst margin	Results	Remarks
Conducted emission	ANSI C63.10:2013 6 Standard test methods	Section 15.207	<b>QP</b> 15.9 dB, 13.56000 MHz, N.	Complied	-
	<IC>RSS-Gen 8.8	<IC>RSS-Gen 8.8	<b>AV</b> 6.1 dB, 13.56000MHz, N.		
Electric Field Strength of Fundamental Emission	ANSI C63.10:2013 6 Standard test methods	Section 15.225(a)	65.3 dB, 13.56000 MHz, QP, 0 deg.	Complied	Radiated
	<IC> RSS-Gen 6.4, 6.12	<IC>RSS-210 A2.6			
Spectrum Mask	ANSI C63.10:2013 6 Standard test methods	Section 15.225(b)(c)	43.8 dB, 13.55300 MHz, QP, 0 deg.	Complied	Radiated
	<IC>RSS-Gen 6.4, 6.13	<IC> RSS-210 A2.6			
20dB Bandwidth	ANSI C63.10:2013 6 Standard test methods	Section15.215(c)	See data	Complied	Radiated
	<IC> -	<IC> -			
Electric Field Strength of Spurious Emission	ANSI C63.10:2013 6 Standard test methods	Section 15.209, Section 15.225 (d)	10.2 dB, 40.680 MHz, Vertical, QP.	Complied	Radiated
	<IC>RSS-Gen 6.4, 6.13	<IC>RSS-210 A2.6			
Frequency Tolerance	ANSI C63.10:2013 6 Standard test methods	Section 15.225(e)	See data	Complied	Radiated
	<IC>RSS-Gen 6.11, 8.11	<IC> RSS-210 A2.6			

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

**UL Japan, Inc.**

**Ise EMC Lab.**

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

### 3.3 Addition to standard

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst margin	Results
1	99 % Occupied Band Width	RSS-Gen 6.6	-	Radiated	N/A	N/A	N/A

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

### 3.4 Uncertainty

#### EMI

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

Frequency range	Conducted emission using AMN(LISN) (+dB)
0.009 – 0.15MHz	3.5 dB
0.15 – 30MHz	2.9 dB

Polarity	Radiated emission (Below 1GHz)			
	(3 m*)(+dB)		(10 m*)(+dB)	
	30 – 300 MHz	300 – 1000MHz	30 – 300 MHz	300 – 1000MHz
Horizontal	4.8 dB	5.2 dB	4.8 dB	5.0 dB
Vertical	4.5 dB	5.9 dB	4.8 dB	5.1 dB

Radiated emission				
(3 m*)(+dB)		(1 m*)(+dB)	(0.5 m*)(+dB)	(10 m*)(+dB)
1 – 6GHz	6 – 18GHz	10 – 26.5 GHz	26.5 – 40GHz	1 -18 GHz
5.1 dB	5.3 dB	5.1 dB	5.1 dB	5.3 dB

Frequency counter (+)	
Normal condition	Extreme condition
$7 \times 10^{-6}$	$9 \times 10^{-6}$

#### Conducted emission test

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

#### Radiated emission test (3 m)

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

**UL Japan, Inc.**

**Ise EMC Lab.**

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

### 3.5 Test Location

UL Japan, Inc. Ise EMC Lab. \*NVLAP Lab. code: 200572-0  
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN  
Telephone : +81 596 24 8999 Facsimile : +81 596 24 8124

	IC Registration Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Other rooms
No.1 semi-anechoic chamber	2973C-1	19.2 x 11.2 x 7.7m	7.0 x 6.0m	No.1 Power source room
No.2 semi-anechoic chamber	2973C-2	7.5 x 5.8 x 5.2m	4.0 x 4.0m	-
No.3 semi-anechoic chamber	2973C-3	12.0 x 8.5 x 5.9m	6.8 x 5.75m	No.3 Preparation room
No.3 shielded room	-	4.0 x 6.0 x 2.7m	N/A	-
No.4 semi-anechoic chamber	2973C-4	12.0 x 8.5 x 5.9m	6.8 x 5.75m	No.4 Preparation room
No.4 shielded room	-	4.0 x 6.0 x 2.7m	N/A	-
No.5 semi-anechoic chamber	-	6.0 x 6.0 x 3.9m	6.0 x 6.0m	-
No.6 shielded room	-	4.0 x 4.5 x 2.7m	4.0 x 4.5 m	-
No.6 measurement room	-	4.75 x 5.4 x 3.0m	4.75 x 4.15 m	-
No.7 shielded room	-	4.7 x 7.5 x 2.7m	4.7 x 7.5m	-
No.8 measurement room	-	3.1 x 5.0 x 2.7m	N/A	-
No.9 measurement room	-	8.0 x 4.6 x 2.8m	2.4 x 2.4m	-
No.11 measurement room	-	6.2 x 4.7 x 3.0m	4.8 x 4.6m	-

\* Size of vertical conducting plane (for Conducted Emission test): 2.0 x 2.0m for No.1, No.2, No.3, and No.4 semi-anechoic chambers and No.3 and No.4 shielded rooms.

### 3.6 Test set up, Test data, and Test instruments

Refer to APPENDIX.

## UL Japan, Inc. Ise EMC Lab.

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN  
Telephone : +81 596 24 8999  
Facsimile : +81 596 24 8124

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

### **4.1 Operating Modes**

The mode is used :

<b>Mode</b>	<b>Remarks*</b>
Transmitting mode (Tx)	The EUT Transmits and Receives at the same time and there is no receiving mode.
The EUT was operated in a manner similar to typical use during the tests. *Power of the EUT was set by the software as follows; Software: EMVco_loopback.exe	

<b>Test Item</b>	<b>Operating mode</b>
Conducted emission *1)	Tx with Tag (Type A) Tx without Tag (Type B)
Electric Field Strength of Fundamental Emission	Tx Mod on,with / without Tag (Type A, Type B)
Spectrum Mask	Tx Mod on,with / without Tag (Type A, Type B)
20 dB Bandwidth	Tx Mod on,with Tag (Type A, Type B)
99 % OccupiedBandwidth	Tx Mod on,with Tag (Type A, Type B)
Electric Field Strength of Spurious Emission	Tx Mod on,with Tag (Type A) Tx Mod on,with Tag (Type B)
Frequency Tolerance	Tx CW, Tag

\*1) After the comparison of the test data between with Tag and without Tag, the tests were performed with the worst case.

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

Frequency Tolerance:

Temperature : -20 deg. C to +50 deg. C Step 10 deg. C  
Voltage : Normal Voltage AC 120 V  
Maximum Voltage AC 138 V, Minimum Voltage AC 102 V (AC 120 V ±15 %)

**UL Japan, Inc.**

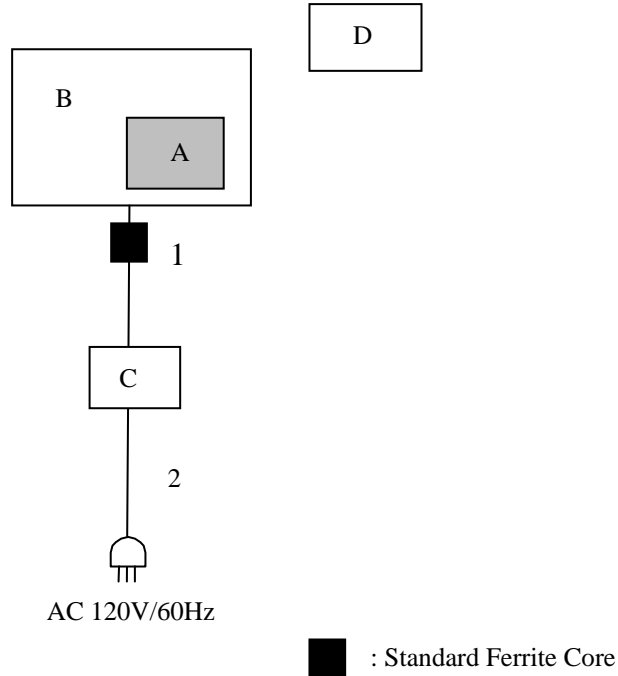
**Ise EMC Lab.**

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

## 4.2 Configuration and peripherals



\* 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	RFID MODULE	RI14A	*1)	Panasonic Corporation	EUT
B	Tablet Computer	FZ-Q1	5LDSA00039	Panasonic Corporation	-
C	AC Adaptor	CF-AA6373AM3	6373AM315907144C	Panasonic Corporation	-
D	RFID Tag(TYPE A)	-	-	-	-
	RFID Tag(TYPE B)	-	-	-	-

\*1) This item is controlled with Item No.B.

### List of cables used

No.	Name	Length (m)	Shield		Remark
			Cable	Connector	
1	DC Cable	1.0	Unshielded	Unshielded	-
2	AC Cable	1.9	Unshielded	Unshielded	-

**UL Japan, Inc.**

**Ise EMC Lab.**

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

## **SECTION 5: Conducted emission**

### **Test Procedure and conditions**

EUT was placed on a urethane platform of nominal size, 0.5 m by 1.0 m, raised 0.8 m above the conducting ground plane. The rear of tabletop was located 40 cm to the vertical conducting plane. The rear of EUT, including peripherals aligned and 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 a Line Impedance Stabilization Network (LISN)/ Artificial mains Network (AMN) and excess AC cable was bundled in center.

#### For the tests on EUT with other peripherals (as a whole system)

I/O cables that were connected to the peripherals were bundled in center. They were folded back and forth forming a bundle 30 cm to 40 cm long and were hanged at a 40 cm height to the ground plane. All unused 50 ohm connectors of the LISN (AMN) were resistivity terminated in 50 ohm when not connected to the measuring equipment.

The AC Mains Terminal Continuous disturbance Voltage has been measured with the EUT in a Semi Anechoic Chamber. The EUT was connected to a LISN (AMN).  
An overview sweep with peak detection has been performed.

The test results and limit are rounded off to one decimal place, so some differences might be observed.

**Detector** : QP and CISPR AV  
**Measurement range** : 0.15 MHz - 30 MHz  
**Test data** : APPENDIX  
**Test result** : Pass

---

### **UL Japan, Inc.**

#### **Ise EMC Lab.**

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

**SECTION 6: Radiated emission (Fundamental , Spurious Emission and Spectrum Mask)**

Test Procedure

EUT was placed on a urethane platform of nominal size, 0.5 m by 1.0 m, raised 0.8 m above the conducting ground plane. The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with a ground plane.

Frequency: From 9 kHz to 30 MHz

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., 45 deg., 90 deg., 135 deg., and 180 deg.) and horizontal polarization.

\*Refer to Figure 1 about Direction of the Loop Antenna.

Frequency: From 30 MHz to 1 GHz

The measuring antenna height 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.

The test was made with the detector (RBW/VBW) in the following table.

When using Spectrum analyzer, the test was made with adjusting span to zero by using peak hold.

**Test Antennas are used as below;**

Frequency	Below 30 MHz	30 MHz to 300 MHz	300 MHz to 1 GHz
Antenna Type	Loop	Biconical	Logperiodic

Frequency	From 9 kHz to 90 kHz and From 110 kHz to 150 kHz	From 90 kHz to 110 kHz	From 150 kHz to 490 kHz	From 490 kHz to 30 MHz	From 30 MHz to 1 GHz
Instrument used	Test Receiver				
Detector	PK / AV	QP	PK / AV	QP	QP
IF Bandwidth	200 Hz	200 Hz	9 kHz	9 kHz	120 kHz
Test Distance	3 m *1)	3 m *1)	3 m *1)	3 m *2)	3 m

\*1) Distance Factor:  $40 \times \log(3 \text{ m} / 300 \text{ m}) = -80 \text{ dB}$

\*2) Distance Factor:  $40 \times \log(3 \text{ m} / 30 \text{ m}) = -40 \text{ dB}$

Although these tests were performed other than open field test site, adequate comparison measurements were confirmed against 30 m open field 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 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.

The test results and limit are rounded off to one decimal place, so some differences might be observed.

**Measurement range : 9 kHz - 1 GHz**  
**Test data : APPENDIX 1**  
**Test result : Pass**

**UL Japan, Inc.**

**Ise EMC Lab.**

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

**SECTION 7: Other test**

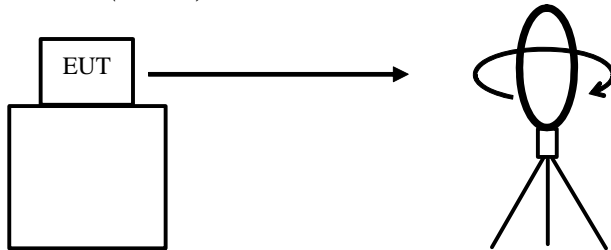
Test	Span	RBW	VBW	Sweep	Detector	Trace	Instrument used
20 dB Bandwidth	300 kHz	3 kHz	10 kHz	Auto	Peak	Max Hold	Spectrum Analyzer
99 % Occupied Bandwidth	Enough width to display emission skirts	1 to 5 % of OBW	Three times of RBW	Auto	Peak hold *1)	Max Hold	Spectrum Analyzer
Frequency Tolerance	-	-	-	-	-	-	Frequency counter

\*1) Peak hold was applied as Worst-case measurement.

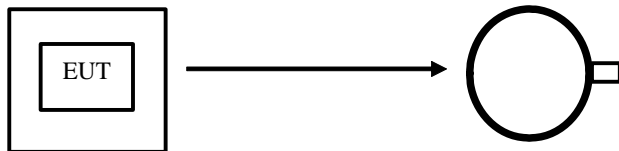
Test data : APPENDIX  
Test result : Pass

**Figure 1: Direction of the Loop Antenna**

*Side View (Vertical)*

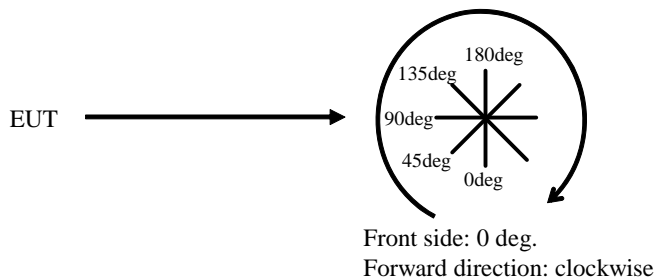


*Top View (Horizontal)*



Antenna was not rotated.

*Top View (Vertical)*



**APPENDIX 1: Test data**

**Conducted emission**

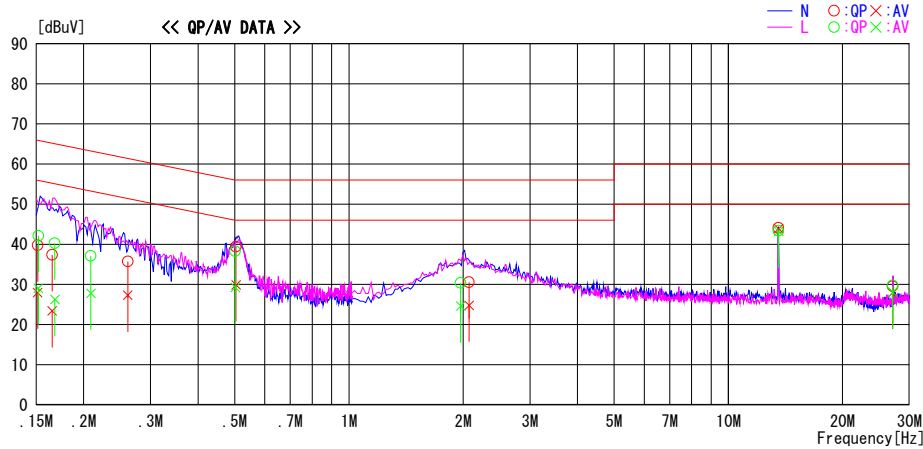
**DATA OF CONDUCTED EMISSION TEST**

UL Japan, Inc. Ise EMC Lab. No.4 Semi Anechoic Chamber  
Date : 2016/01/12

Report No. : 11121470H  
Temp./Humi. : 22deg. C / 30% RH  
Engineer : Tomoki Matsui

Mode / Remarks : Tx 13.56MHz with Tag Type A

LIMIT : FCC15.207 QP  
FCC15.207 AV



Frequency [MHz]	Reading Level		Corr. Factor [dB]	Results		Limit		Margin		Phase	Comment
	QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]		
0.15127	26.3	14.6	13.4	39.7	28.0	65.9	55.9	26.2	27.9	N	
0.15188	28.7	15.7	13.4	42.1	29.1	65.9	55.9	23.8	26.8	L	
0.16523	24.0	10.0	13.4	37.4	23.4	65.2	55.2	27.8	31.8	N	
0.16792	26.9	12.8	13.4	40.3	26.2	65.1	55.1	24.8	28.9	L	
0.20902	23.7	14.4	13.4	37.1	27.8	63.2	53.2	26.1	25.4	L	
0.26132	22.3	13.9	13.4	35.7	27.3	61.4	51.4	25.7	24.1	N	
0.50160	24.9	15.8	13.4	38.3	29.2	56.0	46.0	17.7	16.8	L	
0.50381	26.0	16.5	13.4	39.4	29.9	56.0	46.0	16.6	16.1	N	
1.96979	16.9	11.1	13.5	30.4	24.6	56.0	46.0	25.6	21.4	L	
2.07223	17.0	11.2	13.6	30.6	24.8	56.0	46.0	25.4	21.2	N	
13.56000	29.8	29.6	14.3	44.1	43.9	60.0	50.0	15.9	6.1	N	Carrier
13.56000	29.1	28.9	14.3	43.4	43.2	60.0	50.0	16.6	6.8	L	Carrier
27.12000	14.9	13.3	14.8	29.7	28.1	60.0	50.0	30.3	21.9	L	
27.12000	14.8	13.2	14.8	29.6	28.0	60.0	50.0	30.4	22.0	N	

CHART : WITH FACTOR. Peak hold data. CALCULATION : RESULT = READING + C.F (LISN + ATTN. + CABLE)  
Except for the above table : adequate margin data below the limits.

## Conducted emission

### DATA OF CONDUCTED EMISSION TEST

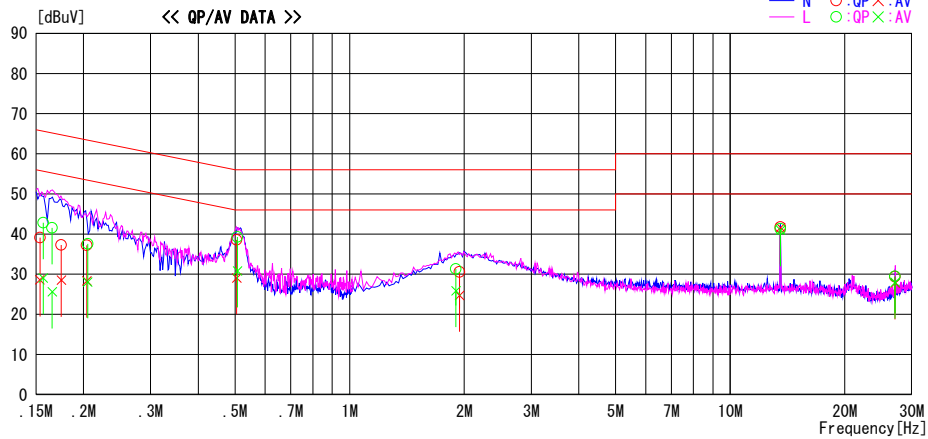
UL Japan, Inc. Ise EMC Lab. No.4 Semi Anechoic Chamber  
Date : 2016/01/12

Report No. : 11121470H

Temp./Humi. : 22deg. C / 30% RH  
Engineer : Tomoki Matsui

Mode / Remarks : Tx 13.56MHz without Tag Type B

LIMIT : FCC15.207 QP  
FCC15.207 AV



Frequency [MHz]	Reading Level		Corr. Factor [dB]	Results		Limit		Margin		Phase	Comment
	QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]		
0.15364	25.7	15.2	13.4	39.1	28.6	65.8	55.8	26.7	27.2	N	
0.15661	29.4	15.7	13.4	42.8	29.1	65.6	55.6	22.8	26.5	L	
0.16537	28.2	12.2	13.4	41.6	25.6	65.2	55.2	23.6	29.6	L	
0.17474	23.9	15.1	13.4	37.3	28.5	64.7	54.7	27.4	26.2	N	
0.20401	23.8	14.9	13.4	37.2	28.3	63.4	53.4	26.2	25.1	N	
0.20501	24.2	14.7	13.4	37.6	28.1	63.4	53.4	25.8	25.3	L	
0.50493	25.2	15.7	13.4	38.6	29.1	56.0	46.0	17.4	16.9	N	
0.50731	25.9	17.4	13.4	39.3	30.8	56.0	46.0	16.7	15.2	L	
1.90180	17.8	12.4	13.5	31.3	25.9	56.0	46.0	24.7	20.1	L	
1.94423	17.1	11.2	13.5	30.6	24.7	56.0	46.0	25.4	21.3	N	
13.56000	27.4	27.3	14.3	41.7	41.6	60.0	50.0	18.3	8.4	N	Carrier
13.56000	27.0	26.7	14.3	41.3	41.0	60.0	50.0	18.7	9.0	L	Carrier
27.12000	14.6	13.0	14.8	29.4	27.8	60.0	50.0	30.6	22.2	N	
27.12000	14.7	13.2	14.8	29.5	28.0	60.0	50.0	30.5	22.0	L	

CHART : WITH FACTOR. Peak hold data. CALCULATION : RESULT = READING + C.F (LISN + ATTEN. + CABLE)  
Except for the above table : adequate margin data below the limits.

## Fundamental emission and Spectrum Mask

### DATA OF RADIATED EMISSION TEST

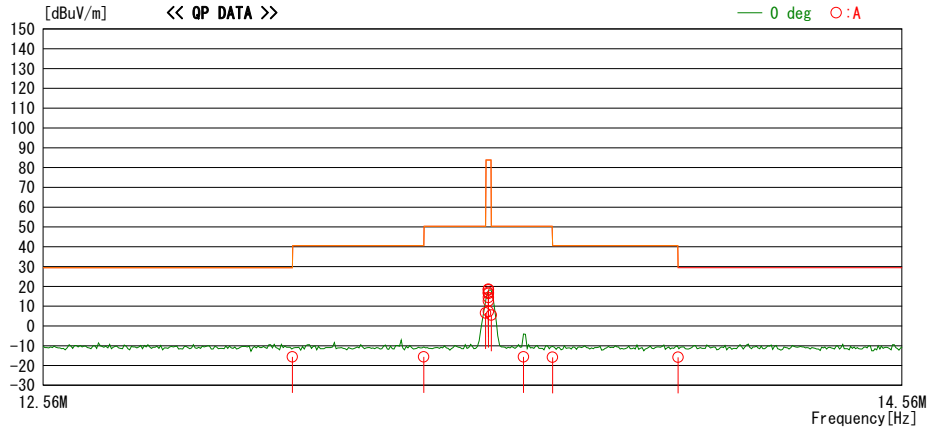
UL Japan, Inc. Ise EMC Lab. No.4 Semi Anechoic Chamber  
Date : 2016/01/12

Report No. : 11121470H

Temp. / Humi. : 26deg. C / 30% RH  
Engineer : Tomoki Matsui

Mode / Remarks : Tx 13.56MHz Without Tag Type A Worst-Axis X

LIMIT : FCC15\_225\_PKQP, 9-90kHz:PK, 110-490kHz:PK, other:QP  
FCC15\_225\_AVQP, 9-90kHz:AV, 110-490kHz:AV, other:QP



Freq.	Reading	DET	Ant. Fac	Loss	Gain	Result	Limit	Margin	Antenna	Table	Comment
[MHz]	[dBuV]		[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[deg]	[deg]	
13.11000	30.4	QP	19.2	-33.2	32.1	-15.7	29.5	45.2	0	A	181
13.41000	30.4	QP	19.2	-33.2	32.1	-15.7	40.5	56.2	0	A	181
13.55300	52.7	QP	19.2	-33.2	32.1	6.6	50.4	43.8	0	A	181
13.56000	58.6	QP	19.2	-33.2	32.1	12.5	83.9	71.4	0	A	181 with Tag
13.56000	53.4	QP	19.2	-33.2	32.1	7.3	83.9	76.6	0	A	209 ANT Hor i
13.56000	64.7	QP	19.2	-33.2	32.1	18.6	83.9	65.3	0	A	181 *#Worst
13.56000	63.0	QP	19.2	-33.2	32.1	16.9	83.9	67.0	45	A	173
13.56000	60.4	QP	19.2	-33.2	32.1	14.3	83.9	69.6	90	A	104
13.56000	62.5	QP	19.2	-33.2	32.1	16.4	83.9	67.5	135	A	20
13.56000	64.3	QP	19.2	-33.2	32.1	18.2	83.9	65.7	180	A	178
13.56700	51.6	QP	19.2	-33.2	32.1	5.5	50.4	44.9	0	A	181
13.64224	30.5	QP	19.2	-33.2	32.1	-15.6	50.4	66.0	0	A	181
13.71000	30.3	QP	19.2	-33.2	32.1	-15.8	40.5	56.3	0	A	181
14.01000	30.3	QP	19.2	-33.2	32.1	-15.8	29.5	45.3	0	A	181

CHART: WITH FACTOR, ANT TYPE: LOOP. Except for the data below: adequate margin data below the limits.  
CALCULATION: RESULT = READING + ANT FACTOR + LOSS (CABLE + ATTEN) - GAIN (AMP)

#### Result of the fundamental emission at 3 m without Distance factor

QP

Ant Deg [deg]	Frequency	Detector	Reading	Ant Factor	Loss	Gain	Duty Factor	Result	Limit	Margin	Remark
	[MHz]		[dBuV]	[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
0	13.56000	QP	64.7	19.2	6.8	32.1	-	58.6	-	-	Fundamental

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter) - Gain(Amplifier)

**UL Japan, Inc.**  
**Ise EMC Lab.**

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

## Fundamental emission and Spectrum Mask

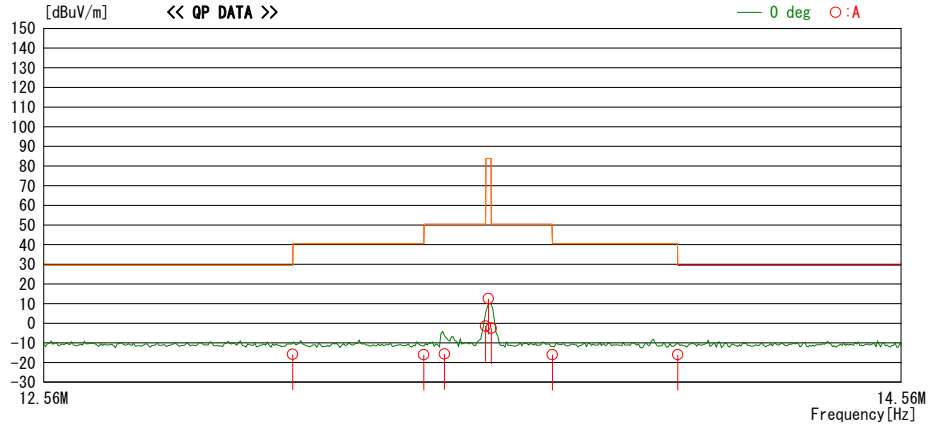
### DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Ise EMC Lab. No.4 Semi Anechoic Chamber  
Date : 2016/01/12

Report No. : 11121470H  
Temp. / Humi. : 26deg. C / 30% RH  
Engineer : Tomoki Matsui

Mode / Remarks : Tx 13.56MHz With Tag Type A Worst-Axis X

LIMIT : FCC15\_225\_PKQP, 9-90kHz:PK, 110-490kHz:PK, other:QP  
FCC15\_225\_AVQP, 9-90kHz:AV, 110-490kHz:AV, other:QP



Freq. [MHz]	Reading [dBuV]	DET	Ant. Fac [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Antenna [deg]	Table		Comment
13.11000	30.3	QP	19.2	-33.2	32.1	-15.8	29.5	45.3	0	A	181	
13.41000	30.2	QP	19.2	-33.2	32.1	-15.9	40.5	56.4	0	A	181	
13.45771	30.4	QP	19.2	-33.2	32.1	-15.7	50.4	66.1	0	A	352	
13.55300	44.6	QP	19.2	-33.2	32.1	-1.5	50.4	51.9	0	A	181	
13.56000	58.6	QP	19.2	-33.2	32.1	12.5	83.9	71.4	0	A	181	
13.56700	43.5	QP	19.2	-33.2	32.1	-2.6	50.4	53.0	0	A	181	
13.71000	30.2	QP	19.2	-33.2	32.1	-15.9	40.5	56.4	0	A	181	
14.01000	30.2	QP	19.2	-33.2	32.1	-15.9	29.5	45.4	0	A	181	

CHART: WITH FACTOR, ANT TYPE: LOOP Except for the data below : adequate margin data below the limits.  
CALCULATION : RESULT = READING + ANT FACTOR + LOSS(CABLE + ATTEN) - GAIN(AMP)

#### Result of the fundamental emission at 3 m without Distance factor

QP

Ant Deg [deg]	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
0	13.56000	QP	58.6	19.2	6.8	32.1	-	52.5	-	-	Fundamental

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter) - Gain(Amplifier)

**UL Japan, Inc.**  
**Ise EMC Lab.**

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

## Fundamental emission and Spectrum Mask

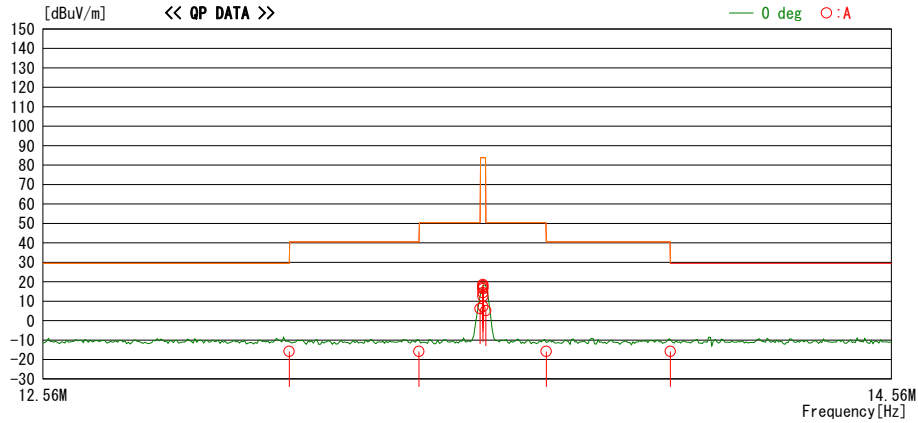
### DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Ise EMC Lab. No.4 Semi Anechoic Chamber  
Date : 2016/01/12

Report No. : 11121470H  
Temp./ Humi. : 26deg. C / 30% RH  
Engineer : Tomoki Matsui

Mode / Remarks : Tx 13.56MHz Without Tag Type B Worst-Axis X

LIMIT : FCC15\_225\_PKQP, 9-90kHz:PK, 110-490kHz:PK, other:QP  
FCC15\_225\_AVQP, 9-90kHz:AV, 110-490kHz:AV, other:QP



Freq.	Reading	DET	Ant. Fac	Loss	Gain	Result	Limit	Margin	Antenna	Table	Comment
[MHz]	[dBuV]		[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[deg]	[deg]	
13.11000	30.3	QP	19.2	-33.2	32.1	-15.8	29.5	45.3	0	A	210
13.41000	30.3	QP	19.2	-33.2	32.1	-15.8	40.5	56.3	0	A	210
13.55300	52.3	QP	19.2	-33.2	32.1	6.2	50.4	44.2	0	A	210
13.56000	53.4	QP	19.2	-33.2	32.1	7.3	83.9	76.6	0	A	152
13.56000	58.7	QP	19.2	-33.2	32.1	12.6	83.9	71.3	0	A	174
13.56000	64.6	QP	19.2	-33.2	32.1	18.5	83.9	65.4	0	A	210
13.56000	63.3	QP	19.2	-33.2	32.1	17.2	83.9	66.7	45	A	151
13.56000	60.4	QP	19.2	-33.2	32.1	14.3	83.9	69.6	90	A	112
13.56000	62.4	QP	19.2	-33.2	32.1	16.3	83.9	67.6	135	A	8
13.56000	64.2	QP	19.2	-33.2	32.1	18.1	83.9	65.8	180	A	210
13.56700	51.2	QP	19.2	-33.2	32.1	5.1	50.4	45.3	0	A	210
13.71000	30.3	QP	19.2	-33.2	32.1	-15.8	40.5	56.3	0	A	210
14.01000	30.3	QP	19.2	-33.2	32.1	-15.8	29.5	45.3	0	A	210

CHART: WITH FACTOR, ANT TYPE: LOOP Except for the data below : adequate margin data below the limits.  
CALCULATION : RESULT = READING + ANT FACTOR + LOSS (CABLE + ATTEN) - GAIN (AMP)

#### Result of the fundamental emission at 3 m without Distance factor

QP

Ant Deg [deg]	Frequency	Detector	Reading	Ant Factor	Loss	Gain	Duty Factor	Result	Limit	Margin	Remark
	[MHz]		[dBuV]	[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
0	13.56000	QP	64.6	19.2	6.8	32.1	-	58.5	-	-	Fundamental

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter) - Gain(Amplifier)

**UL Japan, Inc.**  
**Ise EMC Lab.**

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

## Fundamental emission and Spectrum Mask

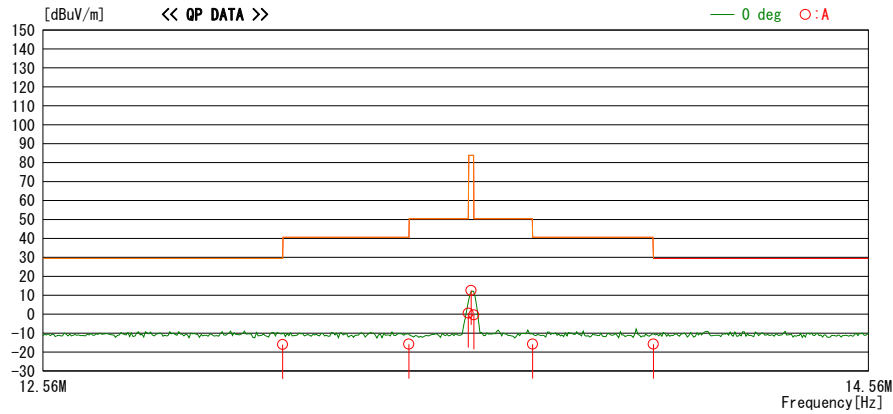
### DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Ise EMC Lab. No.4 Semi Anechoic Chamber  
Date : 2016/01/12

Report No. : 11121470H  
Temp. / Humi. : 26deg. C / 30% RH  
Engineer : Tomoki Matsui

Mode / Remarks : Tx 13.56MHz With Tag Type B Worst-Axis X

LIMIT : FCC15\_225\_PKQP, 9-90kHz:PK, 110-490kHz:PK, other:QP  
FCC15\_225\_AVQP, 9-90kHz:AV, 110-490kHz:AV, other:QP



Freq. [MHz]	Reading [dBuV]	DET	Ant. Fac [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Antenna [deg]	Table	Comment
										[deg]	
13.11000	30.2	QP	19.2	-33.2	32.1	-15.9	29.5	45.4	0	A	174
13.41000	30.3	QP	19.2	-33.2	32.1	-15.8	40.5	56.3	0	A	174
13.55300	46.7	QP	19.2	-33.2	32.1	0.6	50.4	49.8	0	A	174
13.56000	58.7	QP	19.2	-33.2	32.1	12.6	83.9	71.3	0	A	174
13.56700	45.7	QP	19.2	-33.2	32.1	-0.4	50.4	50.8	0	A	174
13.71000	30.3	QP	19.2	-33.2	32.1	-15.8	40.5	56.3	0	A	174
14.01000	30.3	QP	19.2	-33.2	32.1	-15.8	29.5	45.3	0	A	174

CHART: WITH FACTOR , ANT TYPE: LOOP Except for the data below : adequate margin data below the limits.  
CALCULATION : RESULT = READING + ANT FACTOR + LOSS (CABLE + ATTEN) - GAIN (AMP)

#### Result of the fundamental emission at 3 m without Distance factor

QP

Ant Deg [deg]	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
0	13.56000	QP	58.7	19.2	6.8	32.1	-	52.6	-	-	Fundamental

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter) - Gain(Amplifier)

**UL Japan, Inc.**

**Ise EMC Lab.**

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

**Spurious emission**

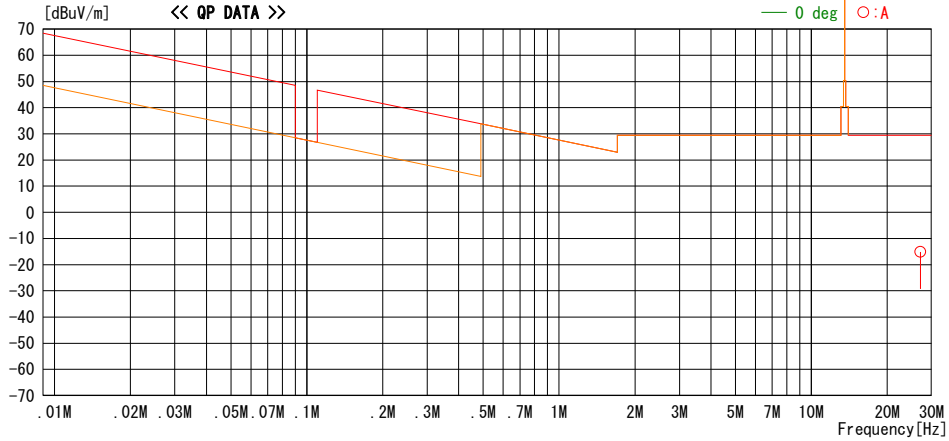
**DATA OF RADIATED EMISSION TEST**

UL Japan, Inc. Ise EMC Lab. No. 4 Semi Anechoic Chamber  
Date : 2016/01/12

Report No. : 11121470H  
 Temp./ Humi. : 26deg. C / 30% RH  
 Engineer : Tomoki Matsui

Mode / Remarks : Tx 13.56MHz With Tag Type A Worst-Axis X

LIMIT : FCC15\_225\_PKQP, 9-90kHz:PK, 110-490kHz:PK, other:QP  
 FCC15\_225\_AVQP, 9-90kHz:AV, 110-490kHz:AV, other:QP



Freq.	Reading	DET	Ant. Fac	Loss	Gain	Result	Limit	Margin	Antenna	Table	Comment
[MHz]	[dBuV]		[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[deg]	[deg]	
27.12000	30.7	QP	19.2	-32.9	32.1	-15.1	29.5	44.6	0	A	359

CHART: WITH FACTOR, ANT TYPE: LOOP Except for the data below : adequate margin data below the limits.  
 CALCULATION : RESULT = READING + ANT FACTOR + LOSS (CABLE + ATTEN) - GAIN (AMP)

## Spurious emission

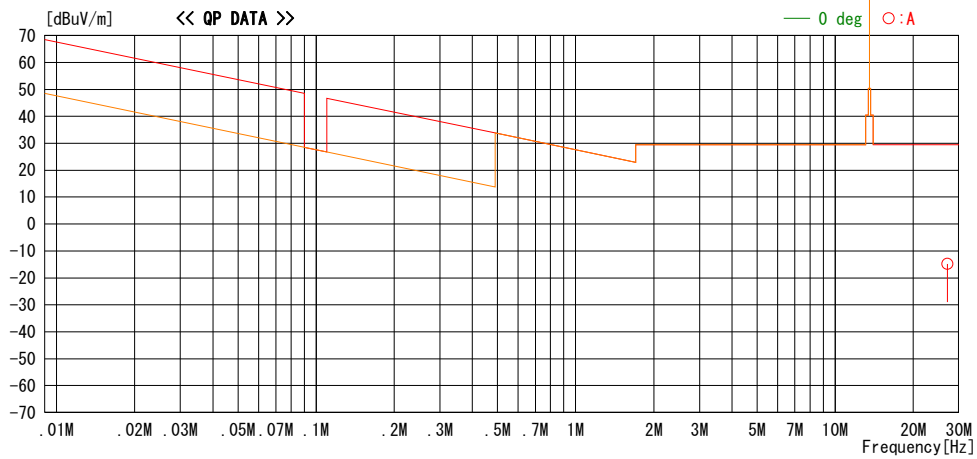
### DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Ise EMC Lab. No.4 Semi Anechoic Chamber  
 Date : 2016/01/12

Report No. : 11121470H  
 Temp./ Humi. : 26deg. C / 30% RH  
 Engineer : Tomoki Matsui

Mode / Remarks : Tx 13.56MHz With Tag Type B Worst-Axis X

LIMIT : FCC15\_225\_PKQP, 9-90kHz:PK, 110-490kHz:PK, other:QP  
 FCC15\_225\_AVQP, 9-90kHz:AV, 110-490kHz:AV, other:QP



Freq. [MHz]	Reading [dBuV]	DET	Ant. Fac	Loss	Gain	Result	Limit	Margin	Antenna	Table	Comment
			[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[deg]	[deg]	
27.12000	30.9	QP	19.2	-32.9	32.1	-14.9	29.5	44.4	0	A	359

CHART: WITH FACTOR , ANT TYPE: LOOP Except for the data below : adequate margin data below the limits.  
 CALCULATION : RESULT = READING + ANT FACTOR + LOSS (CABLE + ATTEN) - GAIN (AMP)

**UL Japan, Inc.**  
**Ise EMC Lab.**

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

**Spurious emission**

**DATA OF RADIATED EMISSION TEST**

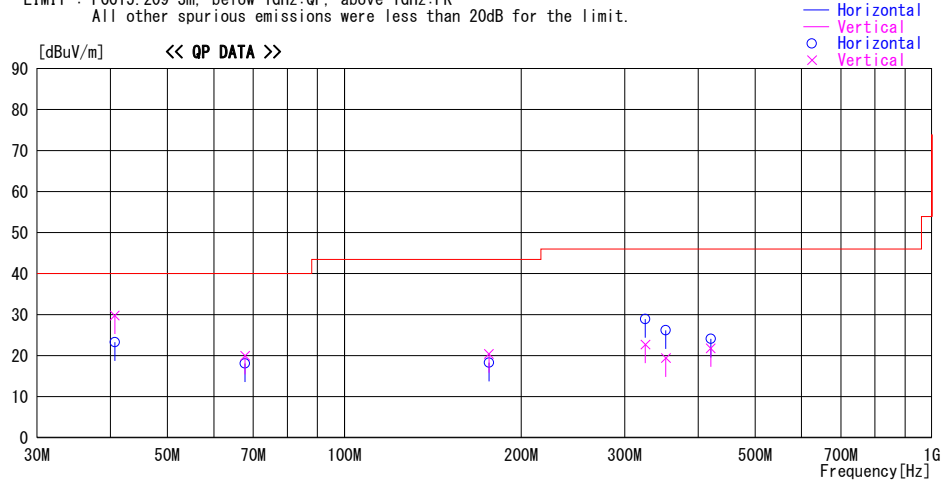
UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber  
Date : 2016/01/18

Report No. : 11121470H

Temp./Humi. : 23deg. C. / 38% RH  
Engineer : Takumi Shimada

Mode / Remarks : Tx 13.56MHz With Tag Type A Wort axis (Hor:Z, Ver:Z)

LIMIT : FCC15.209 3m, below 1GHz:QP, above 1GHz:PK  
All other spurious emissions were less than 20dB for the limit.



Frequency [MHz]	Reading [dBuV]	DET	Antenna		Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
			Factor [dB/m]	Loss& Gain [dB]							
40.680	34.6	QP	13.7	-25.0	23.3	348	190	Hori.	40.0	16.7	
40.680	41.1	QP	13.7	-25.0	29.8	261	100	Vert.	40.0	10.2	
67.800	36.6	QP	6.0	-24.5	18.1	333	291	Hori.	40.0	21.9	
67.800	38.5	QP	6.0	-24.5	20.0	252	100	Vert.	40.0	20.0	
176.280	27.8	QP	16.0	-23.4	20.4	164	100	Vert.	43.5	23.1	
176.280	25.7	QP	16.0	-23.4	18.3	196	100	Hori.	43.5	25.2	
325.440	29.3	QP	15.3	-21.9	22.7	357	164	Vert.	46.0	23.3	
325.440	35.5	QP	15.3	-21.9	28.9	147	100	Hori.	46.0	17.1	
352.560	31.8	QP	16.1	-21.7	26.2	5	100	Hori.	46.0	19.8	
352.560	25.0	QP	16.1	-21.7	19.4	52	156	Vert.	46.0	26.6	
420.360	27.9	QP	17.5	-21.3	24.1	346	100	Hori.	46.0	21.9	
420.360	25.6	QP	17.5	-21.3	21.8	115	143	Vert.	46.0	24.2	

CHART: WITH FACTOR ANT TYPE: -30MHz: LOOP, 30-300MHz: BICONICAL, 300MHz-1000MHz: LOGPERIODIC, 1000MHz-: HORN  
CALCULATION : RESULT = READING + ANT FACTOR + LOSS & GAIN(CABLE + FILTER - GAIN(AMP))

## Spurious emission

### DATA OF RADIATED EMISSION TEST

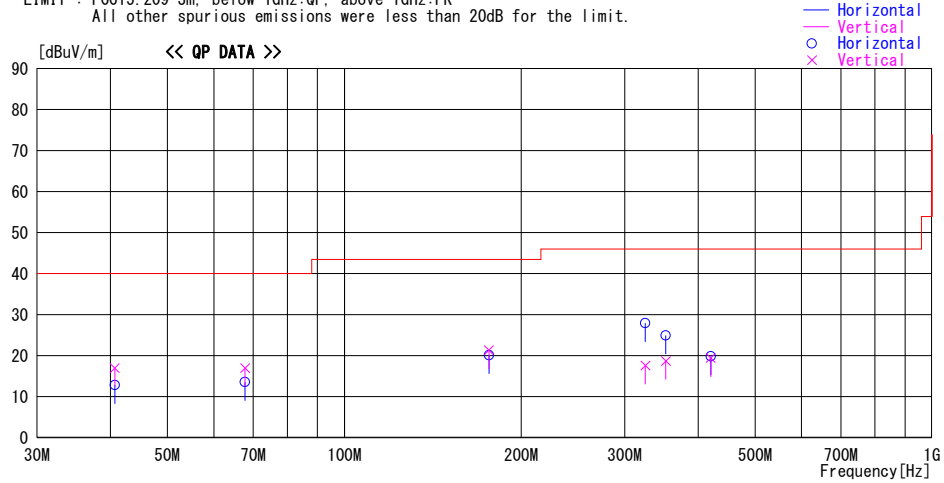
UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber  
Date : 2016/01/18

Report No. : 11121470H

Temp./Humi. : 23deg. C. / 38% RH  
Engineer : Takumi Shimada

Mode / Remarks : Tx 13.56MHz With Tag Type B Wort axis (Hor:Z, Ver:Z)

LIMIT : FCC15.209 3m, below 1GHz:QP, above 1GHz:PK  
All other spurious emissions were less than 20dB for the limit.



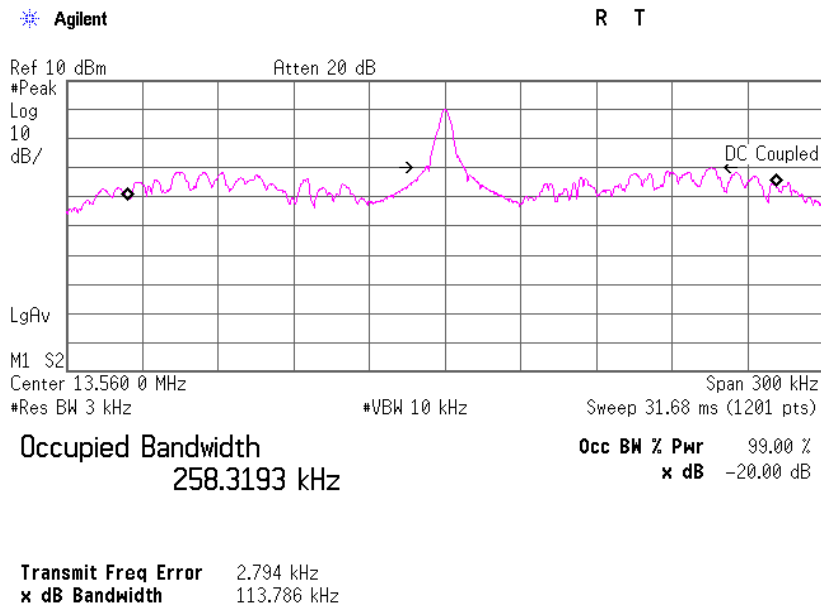
Frequency [MHz]	Reading [dBuV]	DET	Antenna		Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
			Factor [dB/m]	Loss& Gain [dB]							
40.680	24.1	QP	13.7	-25.0	12.8	329	267	Hori.	40.0	27.2	
40.680	28.3	QP	13.7	-25.0	17.0	346	100	Vert.	40.0	23.0	
67.800	32.1	QP	6.0	-24.5	13.6	330	268	Hori.	40.0	26.4	
67.800	35.5	QP	6.0	-24.5	17.0	89	100	Vert.	40.0	23.0	
176.280	28.7	QP	16.0	-23.4	21.3	172	100	Vert.	43.5	22.2	
176.280	27.5	QP	16.0	-23.4	20.1	8	184	Hori.	43.5	23.4	
325.440	24.2	QP	15.3	-21.9	17.6	141	154	Vert.	46.0	28.4	
325.440	34.5	QP	15.3	-21.9	27.9	132	100	Hori.	46.0	18.1	
352.560	30.5	QP	16.1	-21.7	24.9	0	100	Hori.	46.0	21.1	
352.560	24.3	QP	16.1	-21.7	18.7	73	139	Vert.	46.0	27.3	
420.360	23.6	QP	17.5	-21.3	19.8	0	100	Hori.	46.0	26.2	
420.360	23.2	QP	17.5	-21.3	19.4	330	133	Vert.	46.0	26.6	

CHART: WITH FACTOR ANT TYPE: -30MHz: LOOP, 30-300MHz: BICONICAL, 300MHz-1000MHz: LOGPERIODIC, 1000MHz-: HORN  
CALCULATION : RESULT = READING + ANT FACTOR + LOSS & GAIN(CABLE + FILTER - GAIN(AMP))

### 20dB Bandwidth and 99% Occupied Bandwidth

Test place	Ise EMC Lab. No.6 measurement room
Report No.	11121470H
Date	01/18/2016
Temperature/ Humidity	23 deg. C / 41 % RH
Engineer	Yutaka Yoshida
Mode	Tx Mod on with Tag(Type A)

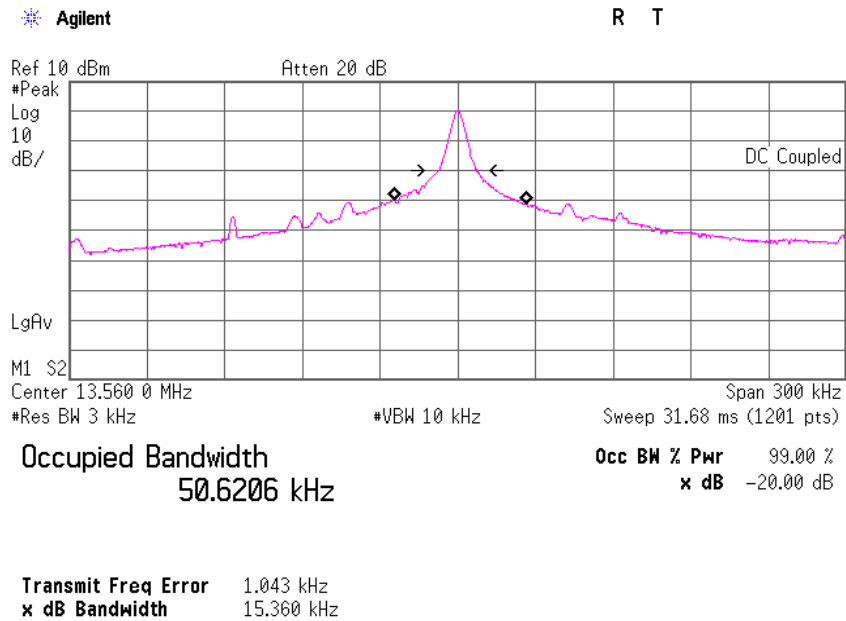
FREQ [MHz]	20dB Bandwidth [kHz]	99% Occupied Bandwidth [kHz]
13.56	113.79	258.32



### 20dB Bandwidth and 99% Occupied Bandwidth

Test place	Ise EMC Lab. No.6 measurement room
Report No.	11121470H
Date	01/18/2016
Temperature/ Humidity	23 deg. C / 41 % RH
Engineer	Yutaka Yoshida
Mode	Tx Mod on with Tag(Type B)

FREQ [MHz]	20dB Bandwidth [kHz]	99% Occupied Bandwidth [kHz]
13.56	15.36	50.62



## Frequency Tolerance

Test place : Ise EMC Lab. No.6 measurement room  
Report No. : 11121470H  
Date : 01/18/2016  
Temperature/ Humidity : 23 deg. C / 41 % RH  
Engineer : Yutaka Yoshida  
Mode : Tx CW

Test condition		Tested timing	Measured frequency [MHz]	Frequency error [MHz]	Result		Limit [+/- %]
Temp. [deg. C]	Voltage [V]				[%]	[ppm]	
50	120	Power on	13.559893	-0.000107	-0.00079	-7.9	0.01
		+ 2 min.	13.559887	-0.000113	-0.00084	-8.4	0.01
		+ 5 min.	13.559886	-0.000114	-0.00084	-8.4	0.01
		+ 10 min.	13.559886	-0.000114	-0.00084	-8.4	0.01
40	120	Power on	13.559914	-0.000086	-0.00063	-6.3	0.01
		+ 2 min.	13.559908	-0.000092	-0.00068	-6.8	0.01
		+ 5 min.	13.559906	-0.000094	-0.00069	-6.9	0.01
		+ 10 min.	13.559900	-0.000100	-0.00074	-7.4	0.01
30	120	Power on	13.559932	-0.000068	-0.00050	-5.0	0.01
		+ 2 min.	13.559929	-0.000071	-0.00052	-5.2	0.01
		+ 5 min.	13.559924	-0.000076	-0.00056	-5.6	0.01
		+ 10 min.	13.559920	-0.000081	-0.00059	-5.9	0.01
20	120	Power on	13.559967	-0.000033	-0.00024	-2.4	0.01
		+ 2 min.	13.559956	-0.000044	-0.00033	-3.3	0.01
		+ 5 min.	13.559950	-0.000050	-0.00037	-3.7	0.01
		+ 10 min.	13.559944	-0.000056	-0.00041	-4.1	0.01
20	102 (120V -15%)	Power on	13.559942	-0.000058	-0.00042	-4.2	0.01
		+ 2 min.	13.559939	-0.000061	-0.00045	-4.5	0.01
		+ 5 min.	13.559938	-0.000062	-0.00046	-4.6	0.01
		+ 10 min.	13.559937	-0.000063	-0.00046	-4.6	0.01
20	138 (120V +15%)	Power on	13.559938	-0.000062	-0.00046	-4.6	0.01
		+ 2 min.	13.559933	-0.000067	-0.00049	-4.9	0.01
		+ 5 min.	13.559933	-0.000067	-0.00049	-4.9	0.01
		+ 10 min.	13.559933	-0.000067	-0.00049	-4.9	0.01
10	120	Power on	13.560009	0.000009	0.00007	0.7	0.01
		+ 2 min.	13.560001	0.000001	0.00000	0.0	0.01
		+ 5 min.	13.559990	-0.000010	-0.00008	-0.8	0.01
		+ 10 min.	13.559981	-0.000019	-0.00014	-1.4	0.01
0	120	Power on	13.559992	-0.000008	-0.00006	-0.6	0.01
		+ 2 min.	13.559991	-0.000009	-0.00007	-0.7	0.01
		+ 5 min.	13.559993	-0.000007	-0.00005	-0.5	0.01
		+ 10 min.	13.559995	-0.000005	-0.00003	-0.3	0.01
-10	120	Power on	13.560009	0.000009	0.00007	0.7	0.01
		+ 2 min.	13.560007	0.000007	0.00005	0.5	0.01
		+ 5 min.	13.560010	0.000010	0.00007	0.7	0.01
		+ 10 min.	13.560010	0.000010	0.00007	0.7	0.01
-20	120	Power on	13.560013	0.000013	0.00010	1.0	0.01
		+ 2 min.	13.560013	0.000012	0.00009	0.9	0.01
		+ 5 min.	13.560013	0.000013	0.00009	0.9	0.01
		+ 10 min.	13.560013	0.000013	0.00010	1.0	0.01

Calculation formula: Frequency error = Measured frequency - Tested frequency  
Result [%] = Frequency error / Tested frequency \* 100

Tested frequency: 13.56 MHz  
Limit (+/-): 0.01 % (+/- 100ppm)

\*The test was begun from 50 deg.C and the temperature was lowered each 10 deg.C.

## APPENDIX 2: Test instruments

### EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MAEC-04	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE/CE	2015/10/02 * 12
MOS-15	Thermo-Hygrometer	Custom	CTH-180	1501	RE/CE	2015/01/13 * 12
MJM-26	Measure	KOMELON	KMC-36	-	RE/CE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE/CE	-
MTR-01	Test Receiver	Rohde & Schwarz	ESI40	100084	RE/CE	2015/11/28 * 12
MLPA-01	Loop Antenna	Rohde & Schwarz	HFH2-Z2	100017	RE	2015/10/24 * 12
MCC-113	Coaxial cable	Fujikura/Suhner/TSJ	5D-2W(10m)/SFM141(5m)/421-010(1m)/sucoform141-PE(1m)/RFM-E121(Switcher)	-/04178	RE/CE	2015/07/02 * 12
MCC-143	Coaxial Cable	UL Japan	-	-	RE	2015/06/24 * 12
MPA-14	Pre Amplifier	SONOMA INSTRUMENT	310	260833	RE	2015/03/09 * 12
MAT-68	Attenuator	Anritsu	MP721B	6200961025	RE	2015/11/12 * 12
MMM-10	DIGITAL HiTESTER	Hioki	3805	051201148	RE	2015/01/16 * 12
MLS-26	LISN(AMN)	Schwarzbeck	NSLK8127	8127-732	CE(EUT)	2015/07/17 * 12
MAT-67	Attenuator	JFW Industries, Inc.	50FP-013H2 N	-	CE	2016/01/14 * 12
MFC-01	Microwave Counter	Advantest	R5373	120100309	FT	2015/08/14 * 12
MCH-04	Temperature and Humidity Chamber	Tabai Espec	PL-2KP	14015723	FT	2015/08/02 * 12
MOS-14	Thermo-Hygrometer	Custom	CTH-201	1401	FT/BW	2015/01/13 * 12
MMM-11	Digital HiTESTER	Hioki	3805	060100600	FT/BW	2015/05/20 * 12
MPSU-11	Power Supply	NF	ES1000S	9071787	FT/BW	Pre Check
MLPA-07	Loop Antenna	UL Japan	-	-	FT/BW	Pre Check
MSA-15	Spectrum Analyzer	Agilent	E4440A	MY46187105	FT/BW	2015/11/11 * 12
MSW-09	Stopwatch	RS	694	-	FT	Pre Check
MAEC-03	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE	2015/10/01 * 12
MOS-13	Thermo-Hygrometer	Custom	CTH-180	1301	RE	2015/01/13 * 12
MJM-16	Measure	KOMELON	KMC-36	-	RE	-
MSA-03	Spectrum Analyzer	Agilent	E4448A	MY44020357	RE	2015/05/18 * 12
MTR-08	Test Receiver	Rohde & Schwarz	ESCI	100767	RE	2015/09/02 * 12
MBA-03	Biconical Antenna	Schwarzbeck	BBA9106	1915	RE	2015/10/11 * 12
MLA-03	Logperiodic Antenna	Schwarzbeck	USLP9143	174	RE	2015/10/11 * 12
MCC-51	Coaxial cable	UL Japan	-	-	RE	2015/07/13 * 12
MAT-70	Attenuator(6dB)	Agilent	8491A-006	MY52460153	RE	2015/04/08 * 12
MPA-13	Pre Amplifier	SONOMA INSTRUMENT	310	260834	RE	2015/03/10 * 12
MMM-08	DIGITAL HiTESTER	Hioki	3805	051201197	RE	2016/01/13 * 12

The expiration date of the calibration is the end of the expired month.

All equipment is calibrated with valid calibrations. Each measurement data is traceable to the national or international standards.

As for some calibrations performed after the tested dates, those test equipment have been controlled by means of an unbroken chains of calibrations.

Test Item: CE: Conducted Emission  
RE: Radiated Emission  
FT: Frequency Tolerance  
BW: 20dB Bandwidth, 99% Occupied Bandwidth

### UL Japan, Inc.

#### Ise EMC Lab.

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN  
Telephone : +81 596 24 8999  
Facsimile : +81 596 24 8124