RADIO TEST REPORT

Test Report No. : 10610722H-A

Applicant	:	**Buffalo Inc.**
Type of Equipment	:	**MiniStation**
Model No.	:	**HD-PZNU3**
Test regulation	:	**FCC Part 15 Subpart C: 2014**
FCC ID	:	**FDI000000027**
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: December 25, 2014 to January 12, 2015

Representative test engineer:

Shinichi Miyazono
Engineer
Consumer Technology Division

Approved by:

Takayuki Shimada
Engineer
Consumer Technology Division

NVLAP LAB CODE: 200572-0

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://www.ul.com/japan/jpn/pages/services/emc/about/mark1/index.jsp#nvlap

REVISION HISTORY

Original Test Report No.: 10610722H-A

Revision	Test report No.	Date	Page revised	Contents
- (Original)	10610722H-A	January 21, 2015	-	-

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

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SECTION 1: Customer information

Company Name	:	Buffalo Inc.
Address	:	AKAMONDORI Bldg., 30-20, Ohsu 3-chome, Naka-ku, Nagoya 460-8315 Japan
Telephone Number	:	+81-50-5830-8892
Facsimile Number	:	+81-50-5830-8871
Contact Person	:	Atsushi Hanada

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

2.1 Identification of E.U.T.

Type of Equipment	:	MiniStation
Model No.	:	HD-PZNU3
Serial No.	:	Refer to Section 4, Clause 4.2
Rating	:	DC 5.0V
Receipt Date of Sample	:	December 18, 2014
Condition of EUT	:	Engineering prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Modification of EUT	:	No Modification by the test lab

2.2 Product Description

General Specification

Clock frequency(ies) in the system	:	2.5GHz (max)

Radio Specification

Radio Type	:	Transceiver
Frequency of Operation	:	13.56MHz
Modulation	:	ASK
Power Supply (inner)	:	DC 3.3V
Antenna type	:	Printed Antenna
Antenna Gain	:	-56.2dBi
Operating Temperature	:	+5 deg. C to +35 deg. C

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification	:	FCC Part 15 Subpart C: 2014, final revised on December 23, 2014
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

* The EUT complies with FCC Part 15 Subpart B: 2014, final revised on December 23, 2014.

3.2 Procedures and results

Item	Test Procedure	Specification	Worst margin	Results	Remarks
Conducted emission	ANSI C63.4:2003 7. AC powerline conducted emission measurements	Section 15.207	[QP]13.4dB 0.16220MHz, N [AV]11.6dB 0.53928MHz, N	Complied	-
	<IC>RSS-Gen 8.8	<IC>RSS-Gen 8.8			
Electric Field Strength of Fundamental Emission	ANSI C63.4:2003 13. Measurement of intentional radiators	Section 15.225(a)	70.8dB, 13.56000MHz, QP, 0deg.	Complied	Radiated
	<IC> RSS-Gen 6.4, 6.12	<IC>RSS-210 A2.6			
Spectrum Mask	ANSI C63.4:2003 13. Measurement of intentional radiators	Section 15.225(b)(c)	45.8dB, 13.11000MHz, QP, 0deg.	Complied	Radiated
	<IC>RSS-Gen 6.4, 6.13	<IC> RSS-210 A2.6			
20dB Bandwidth	ANSI C63.4:2003 13. Measurement of intentional radiators	Section15.215(c)	See data	Complied	Radiated
	<IC> -	<IC> -			
Electric Field Strength of Spurious Emission	ANSI C63.4:2003 13. Measurement of intentional radiators	Section15.209, Section 15.225 (d)	1.2dB 403.989MHz, Horizontal, QP	Complied	Radiated
	<IC>RSS-Gen 6.4, 6.13	<IC>RSS-210 A2.6			
Frequency Tolerance	ANSI C63.4:2003 13. Measurement of intentional radiators	Section15.225(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					

FCC Part 15.31 (e)
This EUT provides stable voltage (DC 3.3V) constantly to RF part regardless of input voltage. Therefore, this EUT complies with the requirement.

FCC Part 15.203 Antenna requirement
It is impossible for end users to replace the antenna, because the antenna is mounted inside of the EUT. Therefore, the equipment complies with the antenna requirement of Section 15.203.

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.

Test room (semi-anechoic chamber)	Conducted emission (±dB)
	150kHz-30MHz
No.1	3.5dB
No.2	3.5dB
No.3	3.6dB
No.4	3.5dB

Test room (semi-anechoic chamber)	Radiated emission						
	(3m*)(±dB)				(1m*)(±dB)		(0.5m*)(±dB)
	9kHz -30MHz	30MHz -300MHz	300MHz -1GHz	1GHz -10GHz	10GHz -18GHz	18GHz -26.5GHz	26.5GHz -40GHz
No.1	4.0dB	5.1dB	5.0dB	5.1dB	6.0dB	4.9dB	4.3dB
No.2	3.9dB	5.2dB	5.0dB	4.9dB	5.9dB	4.7dB	4.2dB
No.3	4.3dB	5.1dB	5.2dB	5.2dB	6.0dB	4.8dB	4.2dB
No.4	4.6dB	5.2dB	5.0dB	5.2dB	6.0dB	5.7dB	4.2dB

*3m/1m/0.5m = Measurement distance

Frequency counter (±)	
Normal condition	Extreme condition
7×10^{-6}	9×10^{-6}

Conducted emission test

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

Radiated emission test (3m)

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

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, Data of EMI, and Test instruments

Refer to APPENDIX.

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

4.1 Operating Modes

The mode is used :

Mode	Remarks*
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. The EUT Transmits and Receives at the same time and there is no receiving mode.	

Test Item	Operating mode*
Conducted emission	Tx Mod on,with Tag (Type A, Type B, FeliCa)
Electric Field Strength of Fundamental Emission	Tx Mod on,with Tag (Type A, Type B, FeliCa)
Spectrum Mask	Tx Mod on,with Tag (Type A, Type B, FeliCa)
20dB Bandwidth	Tx Mod on,with Tag (Type A, Type B, FeliCa)
99% Occupied Bandwidth	Tx Mod on,with Tag (Type A, Type B, FeliCa)
Electric Field Strength of Spurious Emission	Tx Mod on,with Tag (Type A, Type B, FeliCa)
Frequency Tolerance	Tx Mod off

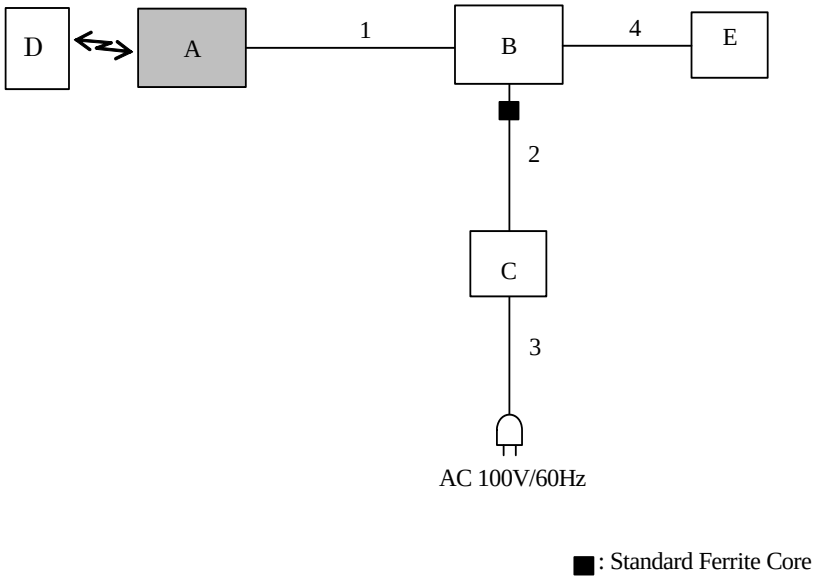
* After the comparison of the test data between with Tag and without Tag, the tests were performed with the worst case.

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

Frequency Tolerance:

Temperature : -30deg. C to +50deg. C Step 10deg. C
Voltage : Normal Voltage DC 5V
Maximum Voltage DC 5.75V, Minimum Voltage DC 4.25V (DC 5V ±15%)
*This EUT provides stable voltage (DC 3.3V) constantly to RF Part regardless of input voltage

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	MiniStation	HD-PZNU3	001	Buffalo Inc.	EUT
B	Laptop PC	20B7-S0DW08	PB-03DVNE	Lenovo	-
C	AC Adapter	ADLX65NCC2A	11S36200284ZZ1 0046S4HF	Lenovo	-
D	Tag	FeliCa Lites	Sample 3	Hitachi Maxell	-
		Type A	-	-	-
		Type B	-	-	-
E	Mouse	0W7751	520026409	DELL	-

List of cables used

No.	Name	Length (m)	Shield		Remark
			Cable	Connector	
1	USB Cable	0.7	Shielded	Shielded	-
2	DC Cable	1.8	Unshielded	Unshielded	-
3	AC Cable	0.9	Unshielded	Unshielded	-
4	USB Cable	1.8	Shielded	Shielded	-

SECTION 5: Conducted emission

5.1 Operating environment

Test place : No.1 semi anechoic chamber
Temperature : See data
Humidity : See data

5.2 Test configuration

EUT was placed on a urethane platform of nominal size, 1.0m by 1.5m, raised 0.8m above the conducting ground plane. The rear of tabletop was located 40cm to the vertical conducting plane. The rear of EUT and its peripherals was aligned and flushed with rear of tabletop. All other surfaces of tabletop were at least 80cm from any other grounded conducting surface. EUT was located 80cm from LISN/AMN and excess AC cable was bundled in center. I/O cables that were connected to the peripherals were bundled in center. They were folded back and forth forming a bundle 30cm to 40cm long and were hanged at a 40cm height to the ground plane. Each EUT current-carrying power lead, except the ground (safety) lead, was individually connected through a LISN/ an AMN to the input power source. All unused 50ohm connectors of the LISN/ AMN were resistively terminated in 50ohm when not connected to the measuring equipment.
The AC Mains Terminal Continuous disturbance Voltage has been measured with the EUT on a horizontal conducting plane 4.0 x 4.0m and a vertical conducting plane 2.0 x 2.0m in a semi Anechoic Chamber.
Photographs of the set up are shown in Appendix 3.

5.3 Test conditions

Frequency range : 0.15MHz-30MHz
EUT position : Table top
EUT operation mode : See Clause 4.1

5.4 Test procedure

The AC Mains Terminal Continuous disturbance Voltage had been measured with the EUT in the semi Anechoic Chamber.
The EUT was connected to a Line Impedance Stabilization Network (LISN)/ Artificial Mains Network (AMN).
An overview sweep with peak detection has been performed.
The measurements had been performed with a quasi-peak detector and if required, with an average detector.
The conducted emission measurements were made with the following detector function of the test receiver.
Detector Type : QP and CISPR AV
IF Bandwidth : 9kHz

5.5 Test result

Summary of the test results : Pass

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

Test Procedure

EUT was placed on a urethane platform of nominal size, 1.0m by 1.5m, raised 0.8m above the conducting ground plane. The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with a ground plane.

Frequency : From 9kHz to 30MHz
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: 0deg.) and horizontal polarization.
*Refer to Figure 1 about Direction of the Loop Antenna.

Frequency : From 30MHz to 1GHz
The measuring antenna height varied between 1 and 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.
The measurements were performed for both vertical and horizontal antenna polarization.

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

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

*1) Distance Factor: 40 x log (3m/300m) = -80dB
*2) Distance Factor: 40 x log (3m/30m) = -40dB

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.

- 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 : 9kHz-1GHz
Test data : APPENDIX 1
Test result : Pass

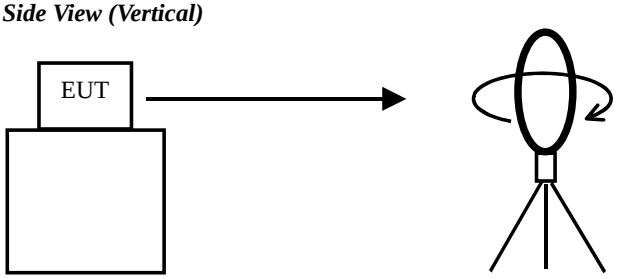
SECTION 7: Other test

Test	Span	RBW	VBW	Sweep	Detector	Trace	Instrument used
20dB Bandwidth	100kHz	1kHz	3kHz	Auto	Peak	Max Hold	Spectrum Analyzer
99% Occupied Bandwidth	Enough width to display 20dB Bandwidth	1 to 3% of Span	Three times of RBW	Auto	Peak	Max Hold *1)	Spectrum Analyzer
Frequency Tolerance	-	-	-	-	-	-	Frequency counter
*1) The measurement was performed with Max Hold since the duty cycle was not 100%.							

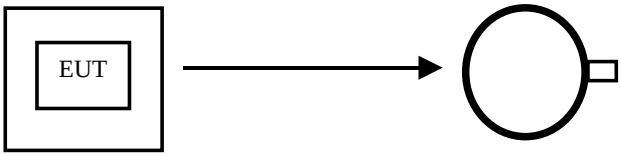
Test data : APPENDIX
Test result : Pass

Figure 1: Direction of the Loop Antenna

Side View (Vertical)

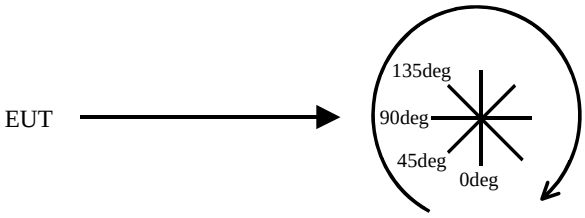


Top View (Horizontal)



Antenna was not rotated.

Top View (Vertical)



Front side: 0 deg.
Forward direction: clockwise

APPENDIX 1: Data of EMI test

Conducted emission

Type A

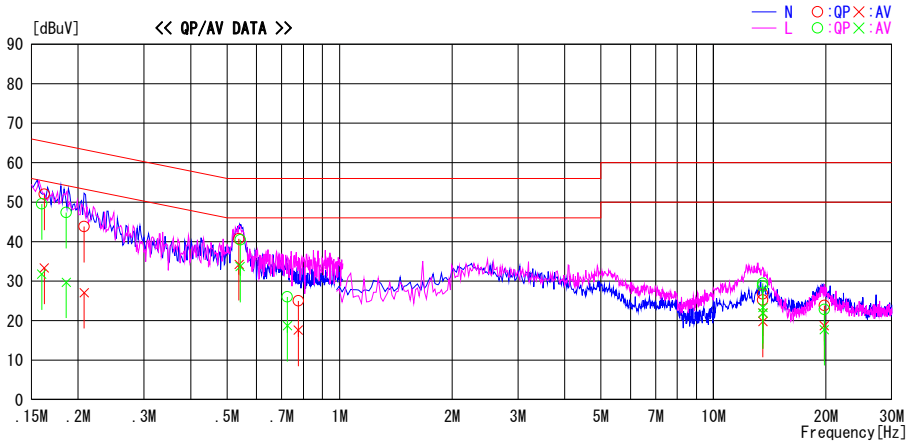
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Ise EMC Lab. No.1 Semi Anechoic Chamber
Date : 2015/01/09

Report No. : 10610722H
Power : AC 120V / 60Hz
Temp./Humi. : 22deg. C / 31% RH
Engineer : Keisuke Kawamura

Mode / Remarks : Tx 13.56MHz MOD On with TypeA Tag

LIMIT : FCC15.207 QP
FCC15.207 AV



Frequency	Reading Level		Corr.	Results		Limit		Margin		Phase	Comment
	QP	AV	Factor	QP	AV	QP	AV	QP	AV		
[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
0.15975	36.4	18.6	13.2	49.6	31.8	65.5	55.5	15.9	23.7	L	
0.16220	38.8	20.1	13.2	52.0	33.3	65.4	55.4	13.4	22.1	N	
0.18590	34.2	16.5	13.2	47.4	29.7	64.2	54.2	16.8	24.5	L	
0.20754	30.5	13.8	13.3	43.8	27.1	63.3	53.3	19.5	26.2	N	
0.54229	27.2	20.4	13.3	40.5	33.7	56.0	46.0	15.5	12.3	L	
0.53851	27.4	20.9	13.3	40.7	34.2	56.0	46.0	15.3	11.8	N	
0.77591	11.6	4.2	13.4	25.0	17.6	56.0	46.0	31.0	28.4	N	
0.72510	12.6	5.3	13.4	26.0	18.7	56.0	46.0	30.0	27.3	L	
13.56000	12.0	7.3	14.7	26.7	22.0	60.0	50.0	33.3	28.0	N	
13.56000	14.8	8.6	14.7	29.5	23.3	60.0	50.0	30.5	26.7	L	
13.56000	10.5	5.1	14.7	25.2	19.8	60.0	50.0	34.8	30.2	N	Without Tag
13.56000	14.0	7.2	14.7	28.7	21.9	60.0	50.0	31.3	28.1	L	Without Tag
19.79415	8.7	3.6	15.1	23.8	18.7	60.0	50.0	36.2	31.3	N	
19.79415	7.7	2.6	15.1	22.8	17.7	60.0	50.0	37.2	32.3	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.

*The test result is rounded off to one or two decimal places, so some differences might be observed.

Conducted emission

Type B

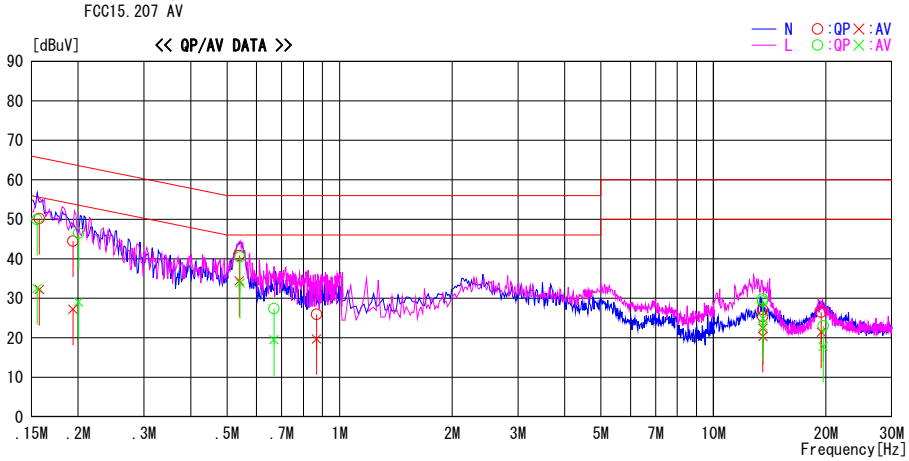
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Ise EMC Lab. No.1 Semi Anechoic Chamber
Date : 2015/01/09

Report No. : 10610722H
Power : AC 120V / 60Hz
Temp./Humi. : 22deg. C / 31% RH
Engineer : Keisuke Kawamura

Mode / Remarks : Tx 13.56MHz MOD On with TypeB Tag

LIMIT : FCC15.207 QP
FCC15.207 AV



Frequency	Reading Level		Corr.	Results		Limit		Margin		Phase	Comment
	QP	AV	Factor	QP	AV	QP	AV	QP	AV		
[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
0.15523	36.7	19.3	13.2	49.9	32.5	65.7	55.7	15.8	23.2	L	
0.15744	37.0	19.0	13.2	50.2	32.2	65.6	55.6	15.4	23.4	N	
0.19360	31.3	14.0	13.2	44.5	27.2	63.9	53.9	19.4	26.7	N	
0.20056	33.2	15.8	13.3	46.5	29.1	63.6	53.6	17.1	24.5	L	
0.53928	27.5	21.1	13.3	40.8	34.4	56.0	46.0	15.2	11.6	N	
0.54185	27.2	20.6	13.3	40.5	33.9	56.0	46.0	15.5	12.1	L	
0.86830	12.5	6.3	13.4	25.9	19.7	56.0	46.0	30.1	26.3	N	
0.66775	14.0	6.1	13.4	27.4	19.5	56.0	46.0	28.6	26.5	L	
13.56000	12.4	7.7	14.7	27.1	22.4	60.0	50.0	32.9	27.6	N	
13.56000	10.7	5.6	14.7	25.4	20.3	60.0	50.0	34.6	29.7	N	Without Tag
13.56000	15.1	10.2	14.7	29.8	24.9	60.0	50.0	30.2	25.1	L	
13.56000	14.6	8.3	14.7	29.3	23.0	60.0	50.0	30.7	27.0	L	Without Tag
19.43521	11.4	6.3	15.1	26.5	21.4	60.0	50.0	33.5	28.6	N	
19.67361	7.9	2.7	15.1	23.0	17.8	60.0	50.0	37.0	32.2	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.

*The test result is rounded off to one or two decimal places, so some differences might be observed.

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Conducted emission

FeliCa

DATA OF CONDUCTED EMISSION TEST

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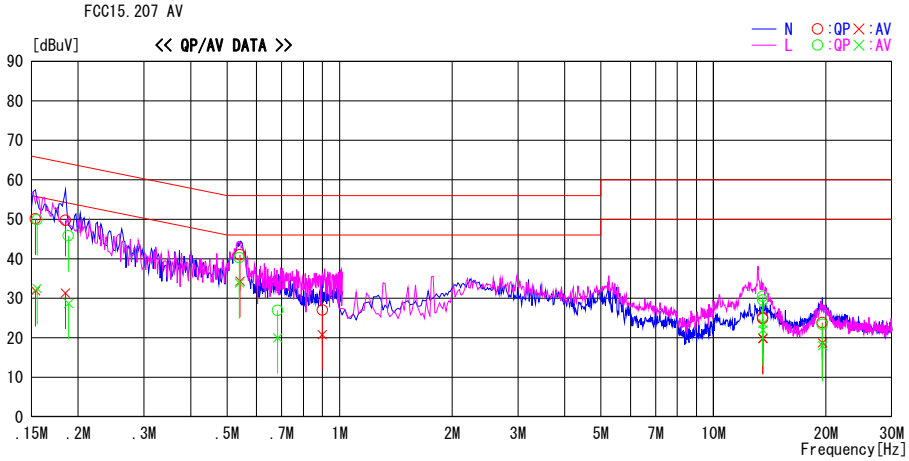

Frequency	Reading Level		Corr.	Results		Limit		Margin		Phase	Comment
	QP	AV	Factor	QP	AV	QP	AV	QP	AV		
[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
0.15365	36.9	18.7	13.2	50.1	31.9	65.8	55.8	15.7	23.9	N	
0.15523	36.7	19.3	13.2	49.9	32.5	65.7	55.7	15.8	23.2	L	
0.18487	36.5	18.1	13.2	49.7	31.3	64.3	54.3	14.6	23.0	N	
0.18836	32.6	15.5	13.2	45.8	28.7	64.1	54.1	18.3	25.4	L	
0.54180	27.7	21.0	13.3	41.0	34.3	56.0	46.0	15.0	11.7	N	
0.53941	27.0	20.6	13.3	40.3	33.9	56.0	46.0	15.7	12.1	L	
0.68363	13.5	6.6	13.4	26.9	20.0	56.0	46.0	29.1	26.0	L	
0.89970	13.6	7.4	13.4	27.0	20.8	56.0	46.0	29.0	25.2	N	
13.56000	15.8	8.9	14.7	30.5	23.6	60.0	50.0	29.5	26.4	L	
13.56000	14.9	7.3	14.7	29.6	22.0	60.0	50.0	30.4	28.0	L	Without Tag
13.56000	10.4	5.2	14.7	25.1	19.9	60.0	50.0	34.9	30.1	N	
13.56000	10.1	5.1	14.7	24.8	19.8	60.0	50.0	35.2	30.2	N	Without Tag
19.55307	8.7	3.6	15.1	23.8	18.7	60.0	50.0	36.2	31.3	N	
19.55307	8.3	2.9	15.1	23.4	18.0	60.0	50.0	36.6	32.0	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.

*The test result is rounded off to one or two decimal places, so some differences might be observed.

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Fundamental emission and Spectrum Mask

Type A

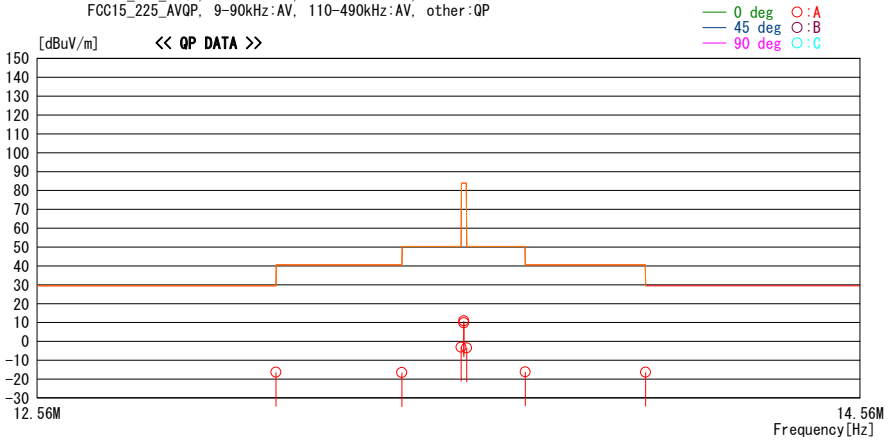
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
Date : 2015/01/12

Report No. : 10610722H
Power : DC 5.0V
Temp. / Humi. : 23deg. C / 30% RH
Engineer : Shinichi Miyazono

Mode / Remarks : Tx 13.56MHz with type A Mod ON Worst-Axis: Z

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 [deg]	Comment
13.11000	29.9	QP	19.5	-33.5	32.2	-16.3	29.5	45.8	0	A	355	
13.41000	29.8	QP	19.4	-33.5	32.2	-16.5	40.5	57.0	0	A	355	
13.55300	43.2	QP	19.4	-33.5	32.2	-3.1	50.4	53.5	0	A	355	
13.56000	56.1	QP	19.4	-33.4	32.2	9.9	83.9	74.0	0	A	355	Without Tag
13.56000	57.1	QP	19.4	-33.4	32.2	10.9	83.9	73.0	0	A	355	
13.56700	42.8	QP	19.4	-33.4	32.2	-3.4	50.4	53.8	0	A	355	
13.71000	30.1	QP	19.4	-33.4	32.2	-16.1	40.5	56.6	0	A	355	
14.01000	29.9	QP	19.3	-33.4	32.2	-16.4	29.5	45.9	0	A	355	

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

Result of the fundamental emission at 3m 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	57.1	19.4	6.5	32.2	-	50.8	-	-	Fundamental

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

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Fundamental emission and Spectrum Mask

Type B

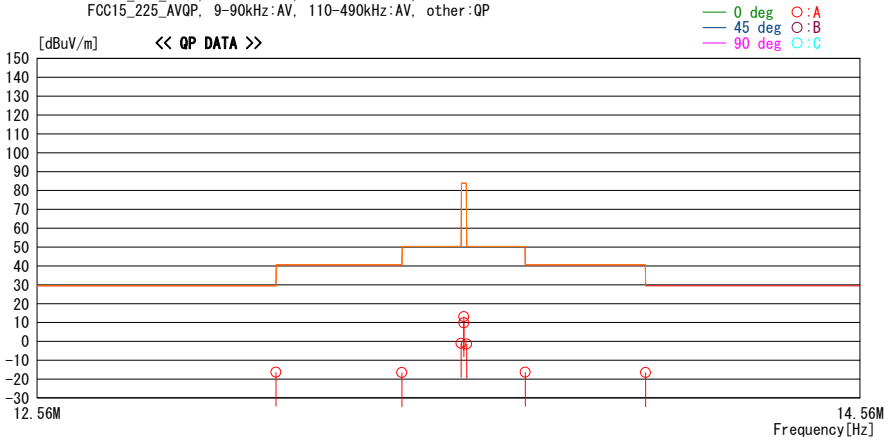
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
Date : 2015/01/12

Report No. : 10610722H
Power : DC 5.0V
Temp. / Humi. : 23deg. C / 30% RH
Engineer : Shinichi Miyazono

Mode / Remarks : Tx 13.56MHz with type B Mod ON Worst-Axis: Z

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 [deg]	Comment
13.11000	29.8	QP	19.5	-33.5	32.2	-16.4	29.5	45.9	0	A	355	
13.41000	29.8	QP	19.4	-33.5	32.2	-16.5	40.5	57.0	0	A	355	
13.55300	45.2	QP	19.4	-33.5	32.2	-1.1	50.4	51.5	0	A	355	
13.56000	59.3	QP	19.4	-33.4	32.2	13.1	83.9	70.8	0	A	355	
13.56000	56.1	QP	19.4	-33.4	32.2	9.9	83.9	74.0	0	A	355	Without Tag
13.56700	44.8	QP	19.4	-33.4	32.2	-1.4	50.4	51.8	0	A	355	
13.71000	29.9	QP	19.4	-33.4	32.2	-16.3	40.5	56.8	0	A	355	
14.01000	29.8	QP	19.3	-33.4	32.2	-16.5	29.5	46.0	0	A	355	

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

Result of the fundamental emission at 3m 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	59.3	19.4	6.5	32.2	-	53.0	-	-	Fundamental

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

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Fundamental emission and Spectrum Mask

FeliCa

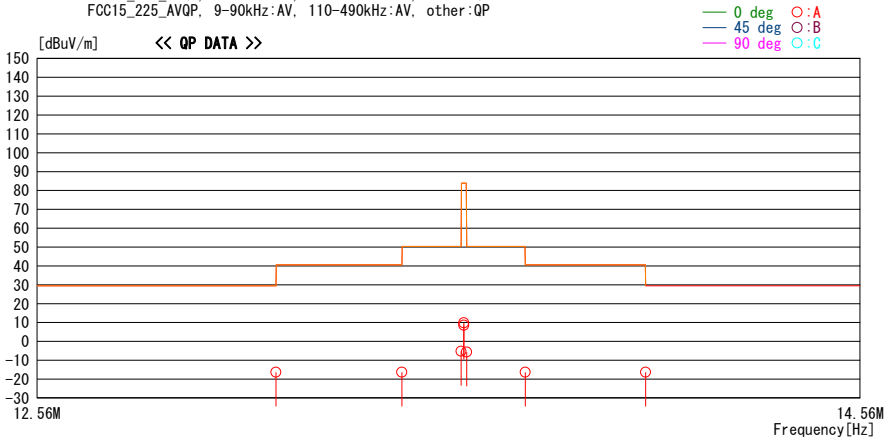
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
Date : 2015/01/12

Report No. : 10610722H
Power : DC 5.0V
Temp. / Humi. : 23deg. C / 30% RH
Engineer : Shinichi Miyazono

Mode / Remarks : Tx 13.56MHz with Felica Mod ON Worst-Axis: Z

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 [deg]	Comment
13.11000	29.8	QP	19.5	-33.5	32.2	-16.4	29.5	45.9	0	A	355	
13.41000	30.0	QP	19.4	-33.5	32.2	-16.3	40.5	56.8	0	A	355	
13.55300	41.0	QP	19.4	-33.5	32.2	-5.3	50.4	55.7	0	A	355	
13.56000	56.1	QP	19.4	-33.4	32.2	9.9	83.9	74.0	0	A	355	Without Tag
13.56000	54.8	QP	19.4	-33.4	32.2	8.6	83.9	75.3	0	A	355	
13.56700	40.6	QP	19.4	-33.4	32.2	-5.6	50.4	56.0	0	A	355	
13.71000	29.9	QP	19.4	-33.4	32.2	-16.3	40.5	56.8	0	A	355	
14.01000	29.9	QP	19.3	-33.4	32.2	-16.4	29.5	45.9	0	A	355	

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

Result of the fundamental emission at 3m 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	54.8	19.4	6.5	32.2	-	48.5	-	-	Fundamental

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

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Spurious emission
Type A

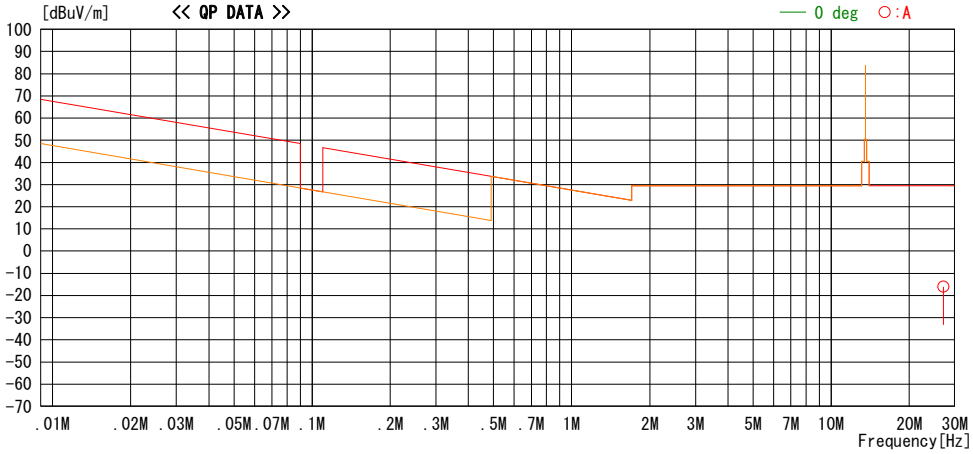
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
Date : 2015/01/12

Report No. : 10610722H
Power : DC 5.0V
Temp./ Humi. : 23deg. C / 30% RH
Engineer : Shinichi Miyazono

Mode / Remarks : Tx 13.56MHz with Type A Mod ON Worst-Axis: Z

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
[MHz]	[dBuV]		[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[deg]		[deg]
27.12000	29.6	QP	19.7	-33.2	32.2	-16.1	29.5	45.6	0	A	0

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

Spurious emission
Type B

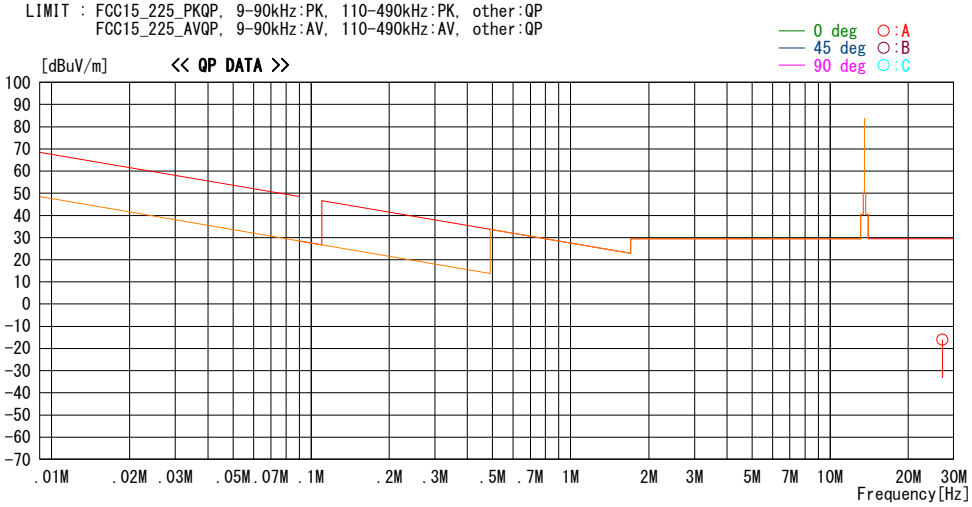
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
Date : 2015/01/12

Report No. : 10610722H
Power : DC 5.0V
Temp./ Humi. : 23deg. C / 30% RH
Engineer : Shinichi Miyazono

Mode / Remarks : Tx 13.56MHz with Type B Mod ON Worst-Axis: Z

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
[MHz]	[dBuV]		[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[deg]		[deg]
27.12000	29.7	QP	19.7	-33.2	32.2	-16.0	29.5	45.5	0	A	0

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

Spurious emission
FeliCa

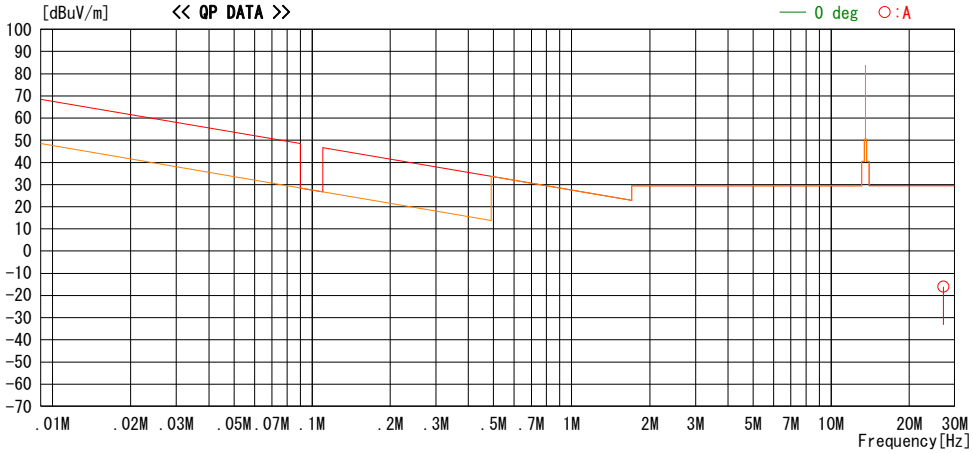
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
Date : 2015/01/12

Report No. : 10610722H
Power : DC 5.0V
Temp./ Humi. : 23deg. C / 30% RH
Engineer : Shinichi Miyazono

Mode / Remarks : Tx 13.56MHz with Felica Mod ON Worst-Axis: Z

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	29.6	QP	19.7	-33.2	32.2	-16.1	29.5	45.6	0	A	0	

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

Spurious emission

Type A

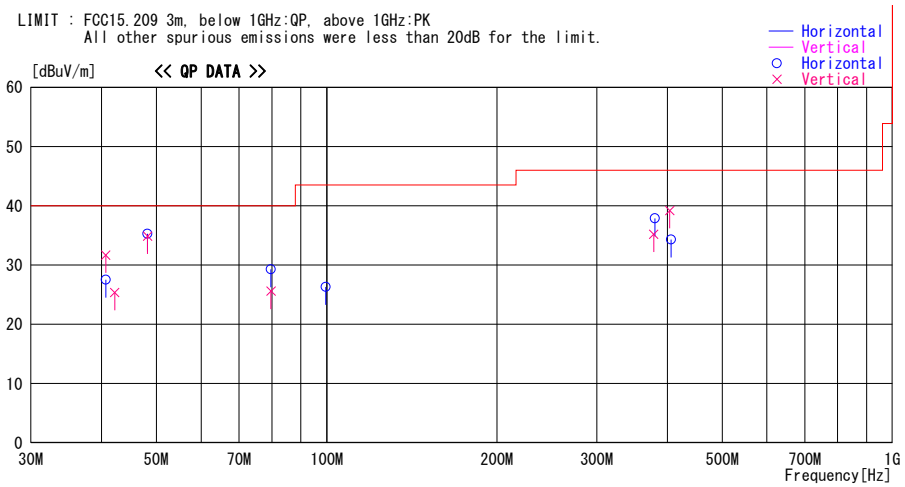
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Ise EMC Lab. No.1 Semi Anechoic Chamber
Date : 2015/01/08

Report No. : 10610722H
Power : AC 120V / 60Hz
Temp./Humi. : 22deg. C / 31% RH
Engineer : Keisuke Kawamura

Mode / Remarks : Tx 13.56MHz MOD On with TypeA Tag Worst Axis(Hori:Z Vert:Z)

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



Frequency	Reading	DET	Antenna Factor	Loss& Gain	Level	Angle	Height	Polar.	Limit	Margin
[MHz]	[dBuV]		[dB/m]	[dB]	[dBuV/m]	[Deg]	[cm]		[dBuV/m]	[dB]
40.680	44.5	QP	14.2	-31.2	27.5	179	228	Hori.	40.0	12.5
40.680	48.7	QP	14.2	-31.2	31.7	92	100	Vert.	40.0	8.3
42.192	43.0	QP	13.6	-31.2	25.4	136	100	Vert.	40.0	14.6
48.234	54.7	QP	11.3	-31.1	34.9	148	100	Vert.	40.0	5.1
48.233	55.1	QP	11.3	-31.1	35.3	278	277	Hori.	40.0	4.7
79.719	50.0	QP	6.3	-30.7	25.6	224	100	Vert.	40.0	14.4
79.700	53.7	QP	6.3	-30.7	29.3	207	247	Hori.	40.0	10.7
99.627	46.8	QP	9.9	-30.4	26.3	0	190	Hori.	43.5	17.2
378.557	45.7	QP	16.9	-27.4	35.2	0	100	Vert.	46.0	10.8
379.960	48.4	QP	16.9	-27.4	37.9	307	100	Hori.	46.0	8.1
406.239	43.9	QP	17.5	-27.1	34.3	288	100	Hori.	46.0	11.7
403.949	48.8	QP	17.5	-27.1	39.2	0	100	Vert.	46.0	6.8

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

Spurious emission

Type B

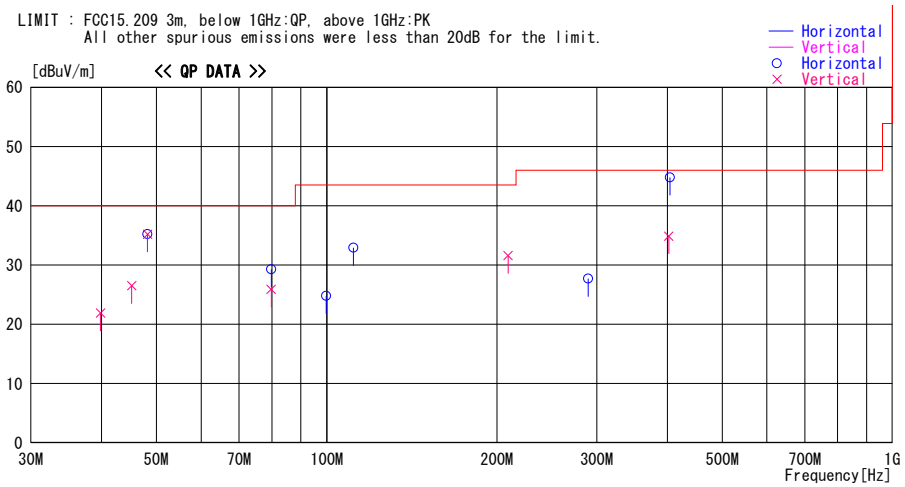
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Ise EMC Lab. No.1 Semi Anechoic Chamber
Date : 2015/01/08

Report No. : 10610722H
Power : AC 120V / 60Hz
Temp./Humi. : 22deg. C / 31% RH
Engineer : Keisuke Kawamura

Mode / Remarks : Tx 13.56MHz MOD On with TypeB Tag Worst Axis(Hori:Z Vert:Z)

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



Frequency	Reading	DET	Antenna Factor	Loss& Gain	Level	Angle	Height	Polar.	Limit	Margin
[MHz]	[dBuV]		[dB/m]	[dB]	[dBuV/m]	[Deg]	[cm]		[dBuV/m]	[dB]
39.848	38.6	QP	14.5	-31.2	21.9	153	100	Vert.	40.0	18.1
45.217	45.2	QP	12.4	-31.1	26.5	124	100	Vert.	40.0	13.5
48.225	55.0	QP	11.3	-31.1	35.2	274	271	Hori.	40.0	4.8
48.225	55.0	QP	11.3	-31.1	35.2	113	100	Vert.	40.0	4.8
79.780	53.7	QP	6.3	-30.7	29.3	193	255	Hori.	40.0	10.7
79.780	50.3	QP	6.3	-30.7	25.9	274	100	Vert.	40.0	14.1
99.800	45.3	QP	9.9	-30.4	24.8	198	178	Hori.	43.5	18.7
111.531	51.5	QP	11.6	-30.2	32.9	359	268	Hori.	43.5	10.6
209.098	44.5	QP	16.6	-29.5	31.6	279	165	Vert.	43.5	11.9
289.718	36.7	QP	19.2	-28.2	27.7	165	287	Hori.	46.0	18.3
402.405	44.5	QP	17.5	-27.1	34.9	0	100	Vert.	46.0	11.1
403.989	54.4	QP	17.5	-27.1	44.8	238	100	Hori.	46.0	1.2

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

Spurious emission

FeliCa

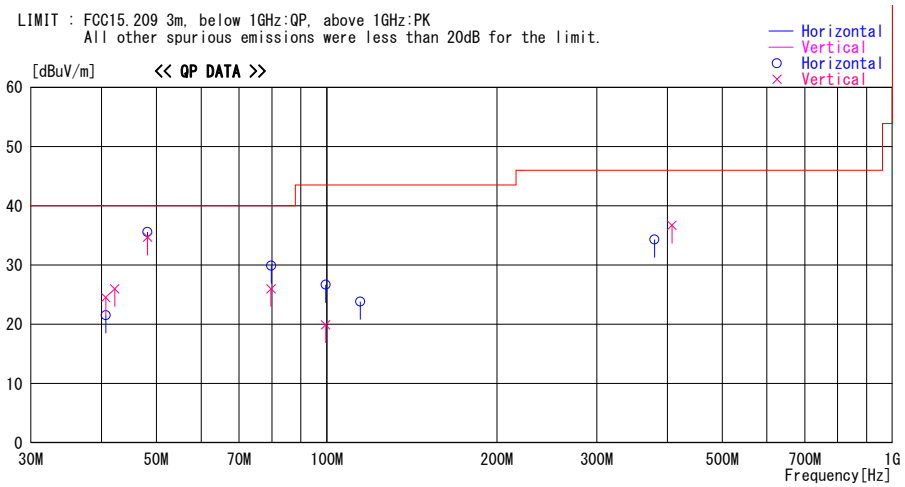
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Ise EMC Lab. No.1 Semi Anechoic Chamber
Date : 2015/01/08

Report No. : 10610722H
Power : AC 120V / 60Hz
Temp./Humi. : 22deg. C / 31% RH
Engineer : Keisuke Kawamura

Mode / Remarks : Tx 13.56MHz MOD On with Felica Tag Worst Axis(Hori:Z Vert:Z)

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



Frequency	Reading	DET	Antenna Factor	Loss& Gain	Level	Angle	Height	Polar.	Limit	Margin
[MHz]	[dBuV]		[dB/m]	[dB]	[dBuV/m]	[Deg]	[cm]		[dBuV/m]	[dB]
40.680	38.5	QP	14.2	-31.2	21.5	175	272	Hori.	40.0	18.5
40.680	41.5	QP	14.2	-31.2	24.5	79	100	Vert.	40.0	15.5
42.204	43.6	QP	13.6	-31.2	26.0	136	100	Vert.	40.0	14.0
48.231	54.5	QP	11.3	-31.1	34.7	141	100	Vert.	40.0	5.3
48.236	55.4	QP	11.3	-31.1	35.6	278	276	Hori.	40.0	4.4
79.707	50.4	QP	6.3	-30.7	26.0	234	100	Vert.	40.0	14.0
79.780	54.3	QP	6.3	-30.7	29.9	208	245	Hori.	40.0	10.1
99.634	47.2	QP	9.9	-30.4	26.7	0	190	Hori.	43.5	16.8
99.599	40.5	QP	9.8	-30.4	19.9	106	133	Vert.	43.5	23.6
114.569	42.0	QP	12.1	-30.3	23.8	346	167	Hori.	43.5	19.7
379.866	44.8	QP	16.9	-27.4	34.3	298	100	Hori.	46.0	11.7
407.800	46.3	QP	17.5	-27.1	36.7	0	100	Vert.	46.0	9.3

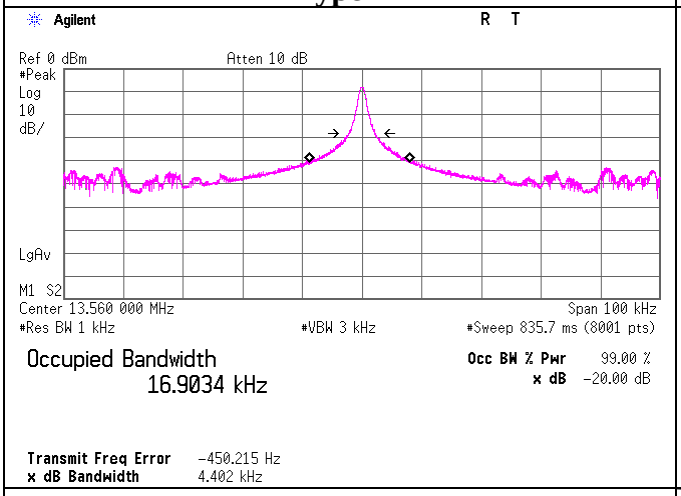
CHART:WITH FACTOR ANT TYPE: -30MHz:LOOP, 30-300MHz:BICONICAL, 300MHz-1000MHz:LOGPERIODIC, 1000MHz-:HORN
CALCULATION:RESULT = READING + ANT FACTOR + LOSS & GAIN (CABLE +ATTEN - GAIN(AMP))

20dB Bandwidth and 99% Occupied Bandwidth

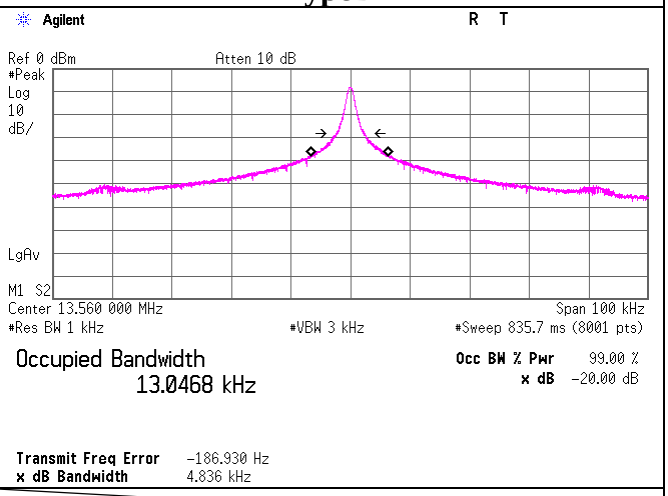
Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No.	10610722H
Date	01/12/2015
Temperature/ Humidity	23 deg. C / 30% RH
Engineer	Shinichi Miyazono
Mode	Tx Mod on with Tag

Mode	FREQ [MHz]	20dB Bandwidth [kHz]	99% Occupied Bandwidth [kHz]
Type A	13.56	4.40	16.90
Type B	13.56	4.84	13.05
Felica	13.56	4.70	11.68

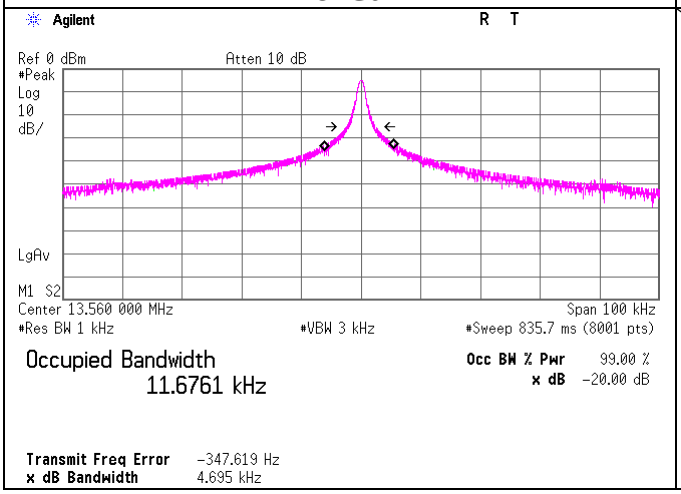
TypeA



TypeB



FeliCa



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

Frequency Tolerance

Test place	Ise EMC Lab. No.6 measurement room
Report No.	10610722H
Date	12/25/2014
Temperature/ Humidity	23deg.C/ 43% RH
Engineer	Takumi Shimada
Mode	Tx Mod on

Test condition		Tested	Measured	Frequency	Result		Limit
Temp.	Voltage	timing	frequency	error			
[deg. C]	[V]		[MHz]	[MHz]	[%]	[ppm]	[+/- %]
50	5	Power on	13.559892	-0.000108	-0.00080	-8.0	0.01
		+ 2 min.	13.559700	-0.000300	-0.00221	-22.1	0.01
		+ 5 min.	13.559641	-0.000359	-0.00265	-26.5	0.01
		+ 10 min.	13.559891	-0.000109	-0.00081	-8.1	0.01
40	5	Power on	13.559695	-0.000305	-0.00225	-22.5	0.01
		+ 2 min.	13.559921	-0.000079	-0.00058	-5.8	0.01
		+ 5 min.	13.559891	-0.000109	-0.00081	-8.1	0.01
		+ 10 min.	13.559921	-0.000079	-0.00058	-5.8	0.01
30	5	Power on	13.559709	-0.000291	-0.00214	-21.4	0.01
		+ 2 min.	13.559783	-0.000217	-0.00160	-16.0	0.01
		+ 5 min.	13.559963	-0.000037	-0.00028	-2.8	0.01
		+ 10 min.	13.559932	-0.000068	-0.00050	-5.0	0.01
20	5	Power on	13.560015	0.000015	0.00011	1.1	0.01
		+ 2 min.	13.559720	-0.000280	-0.00207	-20.7	0.01
		+ 5 min.	13.559850	-0.000150	-0.00111	-11.1	0.01
		+ 10 min.	13.560010	0.000010	0.00007	0.7	0.01
20	4.25	Power on	13.560014	0.000014	0.00010	1.0	0.01
	(5V -15%)	+ 2 min.	13.560009	0.000009	0.00007	0.7	0.01
		+ 5 min.	13.560009	0.000009	0.00007	0.7	0.01
		+ 10 min.	13.560009	0.000009	0.00007	0.7	0.01
20	5.75	Power on	13.559952	-0.000048	-0.00036	-3.6	0.01
	(5V +15%)	+ 2 min.	13.560009	0.000009	0.00007	0.7	0.01
		+ 5 min.	13.559899	-0.000101	-0.00075	-7.5	0.01
		+ 10 min.	13.560009	0.000009	0.00007	0.7	0.01
10	5	Power on	13.560037	0.000037	0.00027	2.7	0.01
		+ 2 min.	13.560032	0.000032	0.00023	2.3	0.01
		+ 5 min.	13.559811	-0.000189	-0.00139	-13.9	0.01
		+ 10 min.	13.560031	0.000031	0.00023	2.3	0.01
0	5	Power on	13.560058	0.000058	0.00043	4.3	0.01
		+ 2 min.	13.560056	0.000056	0.00041	4.1	0.01
		+ 5 min.	13.560066	0.000066	0.00049	4.9	0.01
		+ 10 min.	13.560100	0.000100	0.00074	7.4	0.01
-10	5	Power on	13.559997	-0.000003	-0.00002	-0.2	0.01
		+ 2 min.	13.560053	0.000053	0.00039	3.9	0.01
		+ 5 min.	13.560054	0.000054	0.00040	4.0	0.01
		+ 10 min.	13.559793	-0.000207	-0.00153	-15.3	0.01
-20	5	Power on	13.560016	0.000016	0.00012	1.2	0.01
		+ 2 min.	13.559844	-0.000156	-0.00115	-11.5	0.01
		+ 5 min.	13.560194	0.000194	0.00143	14.3	0.01
		+ 10 min.	13.560024	0.000024	0.00018	1.8	0.01
-30	5	Power on	13.559943	-0.000057	-0.00042	-4.2	0.01
		+ 2 min.	13.559517	-0.000483	-0.00356	-35.6	0.01
		+ 5 min.	13.559959	-0.000041	-0.00030	-3.0	0.01
		+ 10 min.	13.559960	-0.000040	-0.00030	-3.0	0.01

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

*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)
MSA-15	Spectrum Analyzer	Agilent	E4440A	MY46187105	RE	2014/11/11 * 12
MAT-22	Attenuator(10dB) 1-18GHz	Orient Microwave	BX10-0476-00	-	RE	2014/03/13 * 12
MLPA-07	Loop Antenna	UL Japan	-	-	RE	Pre Check
MCH-04	Temperature and Humidity Chamber	Tabai Espec	PL-2KP	14015723	RE	2014/08/06 * 12
MOS-14	Thermo-Hygrometer	Custom	CTH-201	1401	RE	2014/02/20 * 12
MAEC-01	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 10m	DA-06881	RE/CE	2014/09/01 * 12
MOS-27	Thermo-Hygrometer	CUSTOM	CTH-201	A08Q26	RE/CE	2014/02/20 * 12
MJM-21	Measure	KOMELON	KMC-36	-	RE/CE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE/CE	-
MTR-09	EMI Test Receiver	Rohde & Schwarz	ESU26	100412	RE/CE	2014/06/06 * 12
KBA-05	Biconical Antenna	Schwarzbeck	BBA9106	2513	RE	2014/11/22 * 12
KLA-04	Logperiodic Antenna	Schwarzbeck	USLP9143	361	RE	2014/11/22 * 12
MAT-08	Attenuator(6dB)	Weinschel Corp	2	BK7971	RE	2014/11/20 * 12
MCC-02	Coaxial Cable	Suhner/storm/Agilent/TSJ	-	-	RE	2014/09/12 * 12
MPA-19	Pre Amplifier	MITEQ	MLA-10K01-B01-35	1237616	RE	2014/02/17 * 12
MLS-25	LISN(AMN)	Schwarzbeck	NSLK8127	8127-731	CE(EUT)	2014/07/09 * 12
MCC-03	Coaxial Cable	Fujikura/Suhner/TSJ	5D-2W(20m)/3D-2W(7.5m)/RG400u(1.5m)/RFM-E421(Switcher)	-/01068(Switcher)	CE	2014/09/12 * 12
MAT-64	Attenuator(13dB)	JFW Industries, Inc.	50FP-013H2 N	-	CE	2014/01/29 * 12
MAEC-03	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE	2014/02/27 * 12
MOS-13	Thermo-Hygrometer	Custom	CTH-180	1301	RE	2014/02/20 * 12
MJM-16	Measure	KOMELON	KMC-36	-	RE	-
MSA-04	Spectrum Analyzer	Agilent	E4448A	US44300523	RE	2014/11/12 * 12
MTR-08	Test Receiver	Rohde & Schwarz	ESCI	100767	RE	2014/08/19 * 12
MLPA-01	Loop Antenna	Rohde & Schwarz	HFH2-Z2	100017	RE	2014/10/04 * 12
MCC-112	Coaxial cable	Fujikura/Suhner/TSJ	5D-2W(10m)/SFM141(3m)/sucoform141-PE(1m)/421-010(1.5m)/RFM-E321(Switcher)	-/00640	RE	2014/07/14 * 12
MCC-143	Coaxial Cable	UL Japan	-	-	RE	2014/07/28 * 12
MPA-13	Pre Amplifier	SONOMA INSTRUMENT	310	260834	RE	2014/03/14 * 12
MAT-70	Attenuator(6dB)	Agilent	8491A-006	MY52460153	RE	2014/04/14 * 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