



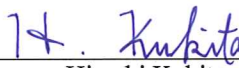
RADIO TEST REPORT

Test Report No. : 10062667H-B-R2

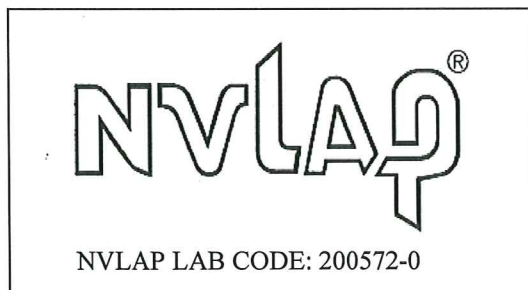
Applicant : DENSO WAVE INCORPORATED
Type of Equipment : Contactless IC card reader/writer
Model No. : PR-700UDM
Test regulation : FCC Part 15 Subpart C: 2013
FCC ID : PZWPR700UDM
Test Result : Complied

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with 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 report is a revised version of 10062667H-B-R1. 10062667H-B-R1 is replaced with this report.

Date of test: October 9 to December 3, 2013

Representative test engineer: 
Hiroshi Kukita
Engineer of WiSE Japan,
UL Verification Service

Approved by: 
Masanori Nishiyama
Manager of WiSE Japan,
UL Verification Service



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>

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SECTION 1: Customer information

Company Name : DENSO WAVE INCORPORATED
Address : 1 Yoshiike, Kusagi, Agui-cho, Chita-gun, Aichi, 470-2297, Japan
Telephone Number : +81-569-49-5095
Facsimile Number : +81-569-49-5488
Contact Person : Hideki Hokimoto

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

2.1 Identification of E.U.T.

Type of Equipment : Contactless IC card reader/writer
Model No. : PR-700UDM
Serial No. : Refer to Section 4, Clause 4.2
Receipt Date of Sample : September 30, 2013
Country of Mass-production : Japan
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

The PR-700UDM reader/writer, which is easy to plug in to your host computer with a USB cable, is an IC card reader/writer capable of reading contactless IC cards.

Clock frequency(ies) in the system : CPU: 16 MHz (48MHz MAX), RF: 27.12 MHz

Radio Specification

Equipment Type : Transceiver
Frequency of Operation : 13.56MHz
Type of Modulation : Amplitude Modulate
Antenna Type : loop antenna
Antenna Connector Type : fixed
Power Supply (inner) : DC4.1V, DC3.3V

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SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart C: 2013, final revised on September 30, 2013 and effective October 30, 2013

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 revision on September 30, 2013 does not affect the test specification applied to the EUT.

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 <IC>RSS-Gen 7.2.2	Section 15.207 ----- <IC>RSS-Gen 7.2.2	[QP] 8.9dB 13.77229MHz, N [AV] 6.7dB 0.84103MHz, L	Complied	-
Electric Field Strength of Fundamental Emission	ANSI C63.4:2003 13. Measurement of intentional radiators <IC> RSS-Gen 4.8, 4.11	Section 15.225(a) ----- <IC>RSS-210 A2.6	44.4dB, 13.56000MHz, QP, 0deg.	Complied	Radiated
Spectrum Mask	ANSI C63.4:2003 13. Measurement of intentional radiators <IC>RSS-Gen 4.9, 4.11	Section 15.225(b)(c) ----- <IC> RSS-210 A2.6	26.9dB, 13.55300MHz, QP, 0deg.	Complied	Radiated
20dB Bandwidth	ANSI C63.4:2003 13. Measurement of intentional radiators <IC> -	Section15.215(c) ----- <IC> -	See data	Complied	Radiated
Electric Field Strength of Spurious Emission	ANSI C63.4:2003 13. Measurement of intentional radiators <IC>RSS-Gen 4.9, 4.11	Section15.209, Section 15.225 (d) ----- <IC>RSS-210 A2.6	0.4dB 40.678MHz, Vertical, QP	Complied	Radiated
Frequency Tolerance	ANSI C63.4:2003 13. Measurement of intentional radiators <IC>RSS-Gen 4.7	Section15.225(e) ----- <IC> RSS-210 A2.6	See data	Complied	Radiated

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

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FCC 15.31 (e)

This EUT provides stable voltage(DC 5V) 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 4.6.1	RSS-Gen 4.6.1	Radiated	N/A	N/A	N/A

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.

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

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

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3.5 Test Location

UL Japan, Inc. Head Office EMC Lab. *NVLAP Lab. code: 200572-0
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	FCC Registration Number	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	313583	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	655103	2973C-2	7.5 x 5.8 x 5.2m	4.0 x 4.0m	-
No.3 semi-anechoic chamber	148738	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	134570	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	2.4 x 3.4m	-

* 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.

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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.
Standby	-
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*
Electric Field Strength of Fundamental Emission	Tx Mod on, with Tag / without Tag
Spectrum Mask	Tx Mod on, with Tag / without Tag
20dB Bandwidth	Tx Mod on, with Tag / without Tag
Electric Field Strength of Spurious Emission	Tx Mod on, with Tag / without Tag, Standby
Frequency Tolerance	Tx Mod on, with Tag

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

Frequency Tolerance:

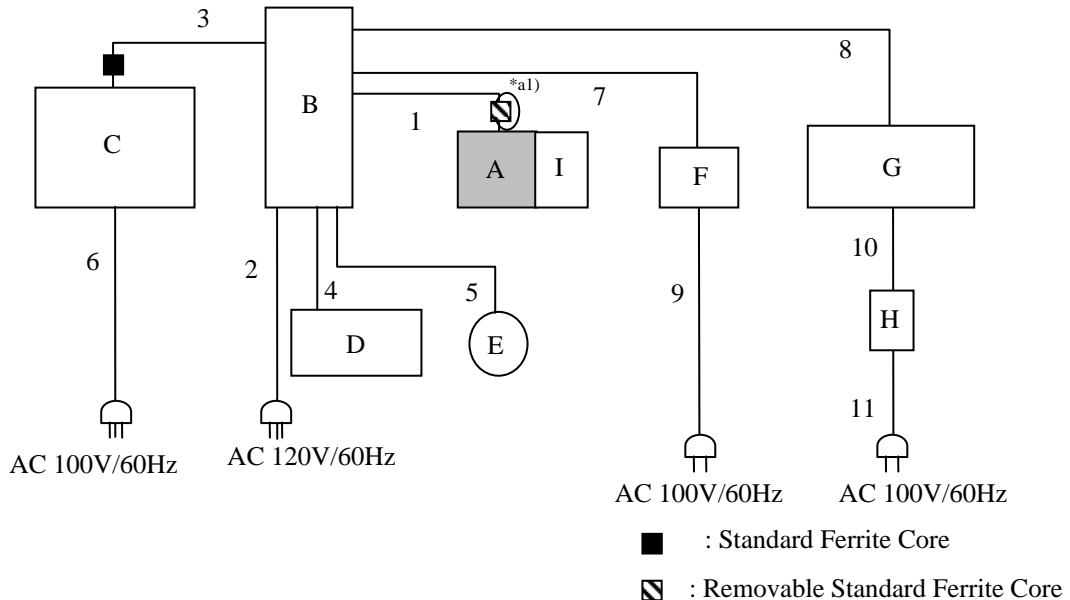
Temperature : -30deg.C to +50deg.C Step 10deg.C

Voltage : Normal Voltage DC 5V

Maximum Voltage DC 5.75V, Minimum Voltage DC 4.25V (DC 5V ±15%)

*This EUT provides stable voltage(DC 5V) 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.

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Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Contactless IC Card reader/writer	PR-700UDM	28	DENSO WAVE INCORPORATED	EUT
B	Personal Computer	OPTIPLEX GX260	3F9N71X	DELL	-
C	Display	E152FPb	CN-0N1545-46633-41U-1MVT	DELL	-
D	Keyboard	SK-8110	CN-07N247-38842-33A-8E57	DELL	-
E	Mouse	1.3A PS/2 Compatible	X06-08477	DELL	-
F	HUB	LSM10/100-8W/H	6434864314556	BUFFALO INC.	-
G	Printer	HP Business Inkjet 1200	TH6234401Q	Hewlett Packard	-
H	AC Adapter	0957-2171	E151BU01YW02L	Hewlett Packard	-
I	RFID Tag	-	-	-	-

List of cables used

No.	Name	Length (m)	Shield		Remark
			Cable	Connector	
1	USB Cable	1.2	Shielded	Shielded	-
2	AC Cable	2.0	Unshielded	Unshielded	-
3	Display Cable	1.5	Shielded	Shielded	-
4	KeyboardCable	2.1	Shielded	Shielded	-
5	Mouse Cable	2.5	Shielded	Shielded	-
6	AC Cable	2.5	Unshielded	Unshielded	-
7	RS-232C Cable	2.5	Shielded	Shielded	-
8	Printer Cable	2.0	Shielded	Shielded	-
9	AC Cable	1.0	Unshielded	Unshielded	-
10	DC Cable	1.6	Unshielded	Unshielded	-
11	AC Cable	1.0	Unshielded	Unshielded	-

<Notes for removable standard Ferrite core>

*a1) Model No. USB-4 (Manufacturer: KG), 4cm from Item A, 2 turns

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SECTION 5: Conducted emission

5.1 Operating environment

Test place : No.4 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 : Transmitting mode with Tag
Transmitting mode without Tag
Standby

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

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

Test Procedure

EUT was placed on a urethane platform of nominal size, 0.5m by 1.0m, 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. The height of the measuring antenna varied between 1 and 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field strength. The measurements were performed for both vertical (angle of loop antenna: 0deg.) and horizontal antenna polarization with the Test Receiver, or the Spectrum Analyzer. The measurements were made with the following detector function of the test receiver and the Spectrum analyzer (in linear mode). 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	Above 1GHz
Antenna Type	Loop	Biconical	Logperiodic	Horn

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	Above 1GHz	
Instrument used	Test Receiver					Spectrum Analyzer	
Detector	PK/AV	QP	PK/AV	QP	QP		
IF Bandwidth	200Hz	200Hz	9kHz	9kHz	120kHz	RBW: 1MHz VBW: 3MHz	RBW: 1MHz VBW: 10Hz
Test Distance	3m *1)	3m *1)	3m *1)	3m *2)	3m	3m	3m

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

- 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.

Measurement range : 0.009M-1GHz
Test data : APPENDIX
Test result : Pass

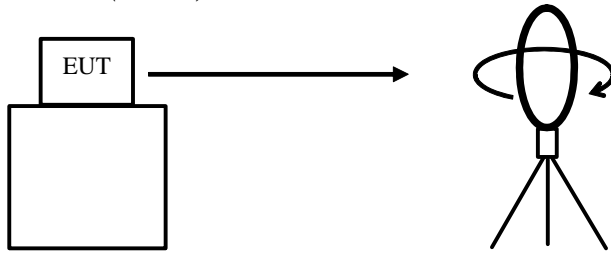
SECTION 7: Other test

Test	Span	RBW	VBW	Sweep	Detector	Trace	Instrument used
20dB Bandwidth	100kHz	3kHz	10kHz	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	Spectrum Analyzer
Frequency Tolerance	-	-	-	-	-	-	Frequency counter

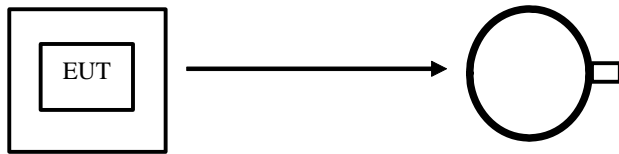
Test data : APPENDIX
Test result : Pass

Figure 1: Direction of the Loop Antenna

Side View (Vertical)

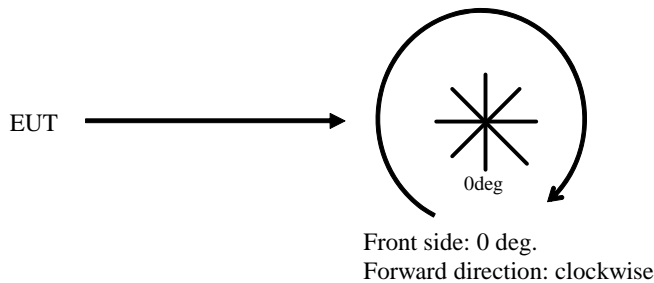


Top View (Horizontal)



Antenna was not rotated.

Top View (Vertical)



APPENDIX 1: Data of EMI test

Conducted emission
 (Transmitting mode: with Tag)

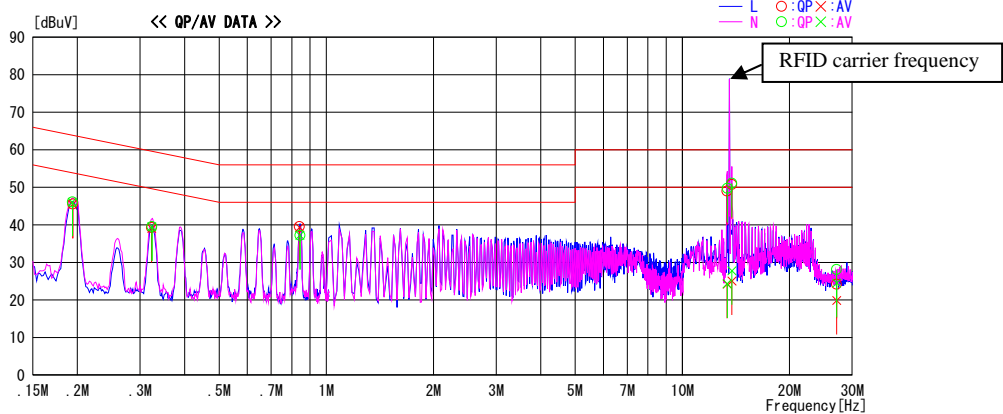
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No. 4 Semi Anechoic Chamber
 Date : 2013/10/17

Report No. : 10062667H
 Power : AC 120V / 60Hz
 Temp./Humi. : 22deg. C / 59% RH
 Engineer : Hiroshi Kukita

Mode / Remarks : Transmitting mode with Tag

LIMIT : FCC15.207 QP
 FCC15.207 AV



Frequency [MHz]	Reading Level		Corr. Factor	Results		Limit		Margin		Phase	Comment
	QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]		
0.19412	32.3	32.2	13.3	45.6	45.5	63.9	53.9	18.3	8.4	L	
0.32347	26.0	25.8	13.3	39.3	39.1	59.6	49.6	20.3	10.5	L	
0.84103	26.2	25.9	13.4	39.6	39.3	56.0	46.0	16.4	6.7	L	
13.34880	34.5	9.7	14.5	49.0	24.2	60.0	50.0	11.0	25.8	L	
13.77160	36.2	10.6	14.5	50.7	25.1	60.0	50.0	9.3	24.9	L	
27.12000	9.2	4.9	15.0	24.2	19.9	60.0	50.0	35.8	30.1	L	
0.19359	32.8	32.8	13.3	46.1	46.1	63.9	53.9	17.8	7.8	N	
0.32374	26.3	26.2	13.3	39.6	39.5	59.6	49.6	20.0	10.1	N	
0.84391	23.8	23.8	13.4	37.2	37.2	56.0	46.0	18.8	8.8	N	
13.36532	35.2	9.8	14.5	49.7	24.3	60.0	50.0	10.3	25.7	N	
13.77229	36.6	13.3	14.5	51.1	27.8	60.0	50.0	8.9	22.2	N	
27.12000	13.1	9.5	15.0	28.1	24.5	60.0	50.0	31.9	25.5	N	

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

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

Conducted emission
(Transmitting mode: without Tag)

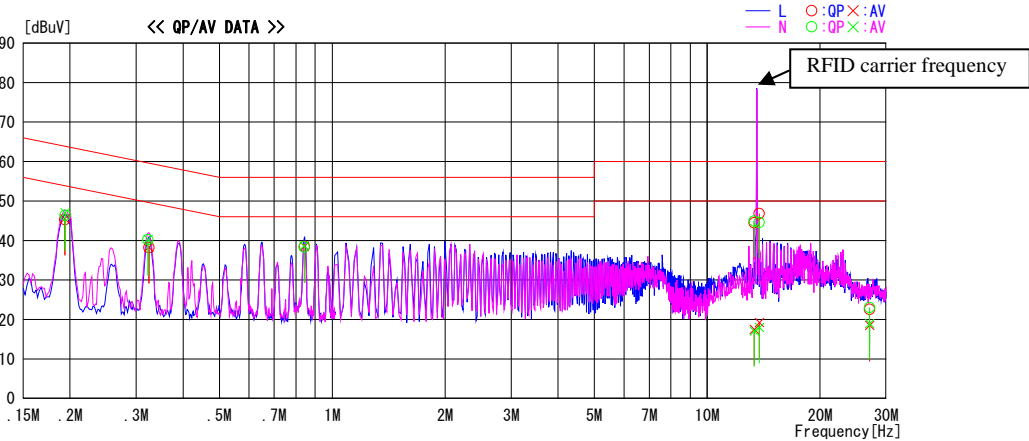
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No. 4 Semi Anechoic Chamber
Date : 2013/10/17

Report No. : 10062667H
Power : AC 120V / 60Hz
Temp./Humi. : 22deg. C / 59% RH
Engineer : Hiroshi Kukita

Mode / Remarks : Transmitting mode without Tag

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]		
0.19359	32.0	32.2	13.3	45.3	45.5	63.9	53.9	18.6	8.4	L	
0.32435	24.9	25.0	13.3	38.2	38.3	59.6	49.6	21.4	11.3	L	
0.84391	25.1	25.1	13.4	38.5	38.5	56.0	46.0	17.5	7.5	L	
13.35031	30.0	3.0	14.5	44.5	17.5	60.0	50.0	15.5	32.5	L	
13.77271	32.3	4.7	14.5	46.8	19.2	60.0	50.0	13.2	30.8	L	
27.12000	7.6	3.5	15.0	22.6	18.5	60.0	50.0	37.4	31.5	L	
0.19409	33.1	33.8	13.3	46.4	47.1	63.9	53.9	17.5	6.8	N	
0.32261	26.9	27.0	13.3	40.2	40.3	59.6	49.6	19.4	9.3	N	
0.84217	25.0	25.3	13.4	38.4	38.7	56.0	46.0	17.6	7.3	N	
13.34882	30.4	2.6	14.5	44.9	17.1	60.0	50.0	15.1	32.9	N	
13.76810	30.1	3.5	14.5	44.6	18.0	60.0	50.0	15.4	32.0	N	
27.12000	8.0	4.0	15.0	23.0	19.0	60.0	50.0	37.0	31.0	N	

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

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

Conducted emission
 (Standby)

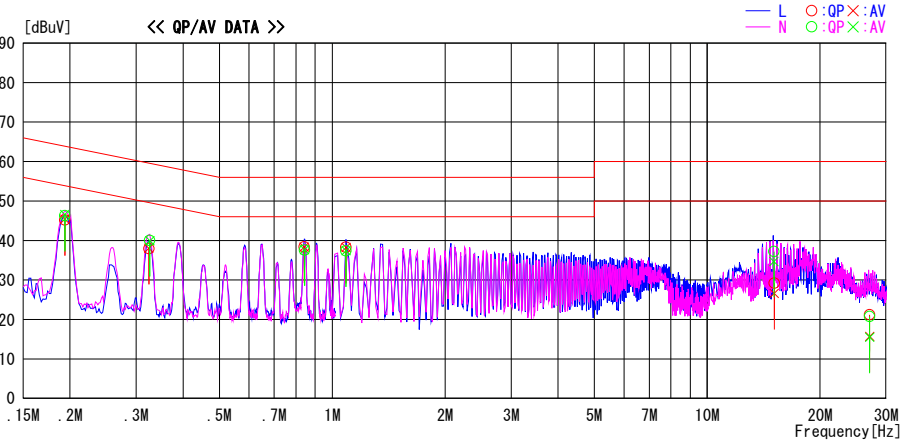
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No. 4 Semi Anechoic Chamber
 Date : 2013/10/17

Report No. : 10062667H
 Power : AC 120V / 60Hz
 Temp./Humi. : 22deg. C / 59% RH
 Engineer : Hiroshi Kukita

Mode / Remarks : Standby

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]		
0.19359	31.9	32.1	13.3	45.2	45.4	63.9	53.9	18.7	8.5	L	
0.32435	24.6	24.8	13.3	37.9	38.1	59.6	49.6	21.7	11.5	L	
0.84217	25.0	24.9	13.4	38.4	38.3	56.0	46.0	17.6	7.7	L	
1.08906	24.9	24.8	13.4	38.3	38.2	56.0	46.0	17.7	7.8	L	
15.09307	14.6	12.0	14.6	29.2	26.6	60.0	50.0	30.8	23.4	L	
27.12000	6.2	0.7	15.0	21.2	15.7	60.0	50.0	38.8	34.3	L	
0.19359	33.0	33.3	13.3	46.3	46.6	63.9	53.9	17.6	7.3	N	
0.32609	26.7	26.7	13.3	40.0	40.0	59.6	49.6	19.6	9.6	N	
0.84391	24.2	24.3	13.4	37.6	37.7	56.0	46.0	18.4	8.3	N	
1.08906	24.0	24.0	13.4	37.4	37.4	56.0	46.0	18.6	8.6	N	
15.05289	22.6	20.1	14.6	37.2	34.7	60.0	50.0	22.8	15.3	N	
27.12000	5.7	0.5	15.0	20.7	15.5	60.0	50.0	39.3	34.5	N	

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

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

Conducted emission
 (Transmitting mode: Terminated)

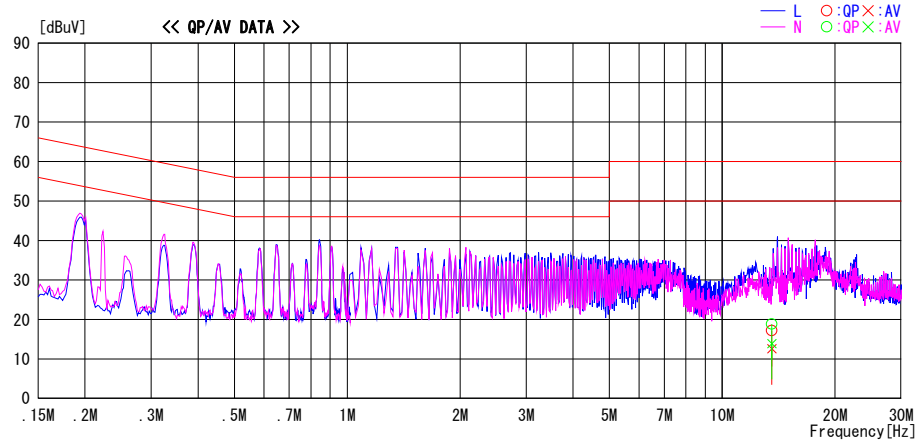
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No. 4 Semi Anechoic Chamber
 Date : 2013/10/17

Report No. : 10062667H
 Power : AC 120V / 60Hz
 Temp./Humi. : 22deg. C / 59% RH
 Engineer : Hiroshi Kukita

Mode / Remarks : Transmitting mode: Terminated

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]		
13.56000	2.7	-1.9	14.5	17.2	12.6	60.0	50.0	42.8	37.4	L	terminated
13.56000	4.3	-0.6	14.5	18.8	13.9	60.0	50.0	41.2	36.1	N	terminated

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

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

Fundamental emission and Spectrum Mask

(Pre check)
(Transmitting mode: with Tag)

DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No. 4 Semi Anechoic Chamber
Date : 2013/10/16

Report No. : 10062667H
Power : AC 120V / 60Hz
Temp. / Humi. : 22deg. C / 51% RH
Engineer : Hiroshi Kukita

Mode / Remarks : Transmitting mode with Tag

, worst axis:Y axis

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]	
13.56000	80.1	QP	19.3	-33.2	32.1	34.1	83.9	49.8	0		328 X
13.56000	85.2	QP	19.3	-33.2	32.1	39.2	83.9	44.7	45		231 X
13.56000	84.8	QP	19.3	-33.2	32.1	38.8	83.9	45.1	90		302 X
13.56000	85.4	QP	19.3	-33.2	32.1	39.4	83.9	44.5	0		171 Y*
13.56000	83.2	QP	19.3	-33.2	32.1	37.2	83.9	46.7	0		221 Z
13.56000	85.1	QP	19.3	-33.2	32.1	39.1	83.9	44.8	45		292 Y
13.56000	84.2	QP	19.3	-33.2	32.1	38.2	83.9	45.7	45		154 Z
13.56000	84.9	QP	19.3	-33.2	32.1	38.9	83.9	45.0	90		243 Y
13.56000	84.1	QP	19.3	-33.2	32.1	38.1	83.9	45.8	90		296 Z
13.56000	84.4	QP	19.3	-33.2	32.1	38.4	83.9	45.5	135		248 X
13.56000	85.0	QP	19.3	-33.2	32.1	39.0	83.9	44.9	135		242 Y
13.56000	84.5	QP	19.3	-33.2	32.1	38.5	83.9	45.4	135		198 Z
13.56000	75.6	QP	19.3	-33.2	32.1	29.6	83.9	54.3	45		265 X, Hor i
13.56000	72.5	QP	19.3	-33.2	32.1	26.5	83.9	57.4	45		188 Y, Hor i
13.56000	71.5	QP	19.3	-33.2	32.1	25.5	83.9	58.4	45		166 Z, Hor i

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. + D.FACTOR) - GAIN(AMP.)

*The limit is rounded down to one decimal place.

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

UL Japan, Inc.

Head Office EMC Lab.

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Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Fundamental emission and Spectrum Mask
 (Transmitting mode: with Tag)

DATA OF RADIATED EMISSION TEST

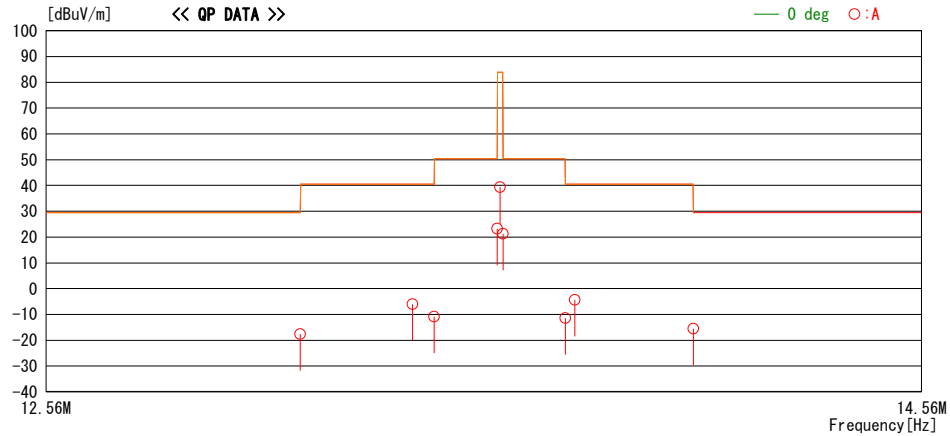
UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
 Date : 2013/12/03

Report No. : 10062667H
 Temp. / Humi. : 22deg. C / 51% RH
 Engineer : Hiroshi Kukita

Mode / Remarks : Transmitting mode with Tag

..... worst axis:Y axis

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	28.0	QP	19.7	-33.3	32.1	-17.7	29.5	47.2	188	188	
13.36090	39.5	QP	19.7	-33.2	32.1	-6.1	40.5	46.6	188	188	
13.41000	34.8	QP	19.7	-33.2	32.1	-10.8	40.5	51.3	188	188	
13.55300	68.9	QP	19.7	-33.2	32.1	23.3	50.4	27.1	188	188	
13.56000	85.0	QP	19.7	-33.2	32.1	39.4	83.9	44.5	188	188	
13.56700	66.9	QP	19.7	-33.2	32.1	21.3	50.4	29.1	188	188	
13.71000	34.2	QP	19.7	-33.2	32.1	-11.4	40.5	51.9	188	188	
13.73220	41.2	QP	19.7	-33.2	32.1	-4.4	40.5	44.9	188	188	
14.01000	30.1	QP	19.7	-33.2	32.1	-15.5	29.5	45.0	188	188	

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. + D.FACTOR) - GAIN(AMP.)

*The limit is rounded down to one decimal place.

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

Spurious emission
 (Transmitting mode: with Tag)

DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
 Date : 2013/10/16

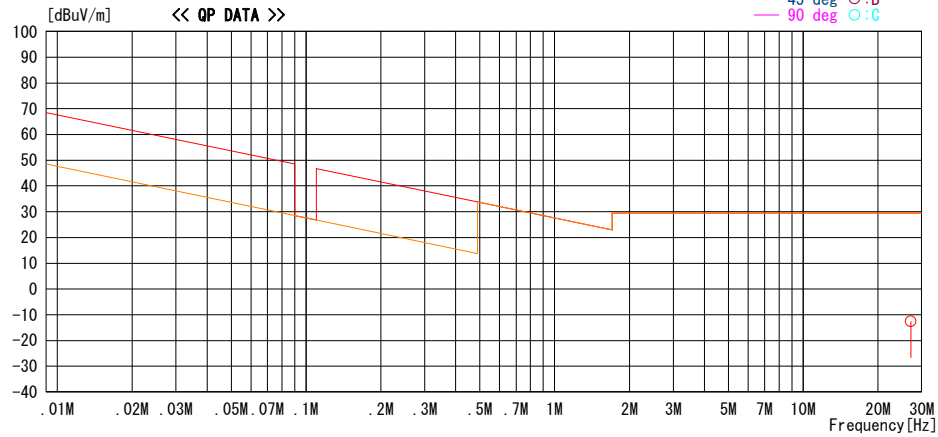
Report No. : 10062667H
 Temp. / Humi. : 22deg. C / 51% RH
 Engineer : Hiroshi Kukita

Mode / Remarks Transmitting mode with Tag

worst axis:Y axis

LIMIT : FCC15.209(a), 9-90kHz:PK, 110-490kHz:PK, other:QP
 FCC15.209(a), 9-90kHz:AV, 110-490kHz:AV, other:QP

— 0 deg ○:A
 — 45 deg ○:B
 — 90 deg ○:C



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	31.7	QP	20.9	-32.9	32.2	-12.5	29.5	42.0	0	171	

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. + D.FACTOR) - GAIN(AMP.)

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

Fundamental emission and Spectrum Mask
 (Transmitting mode: without Tag)

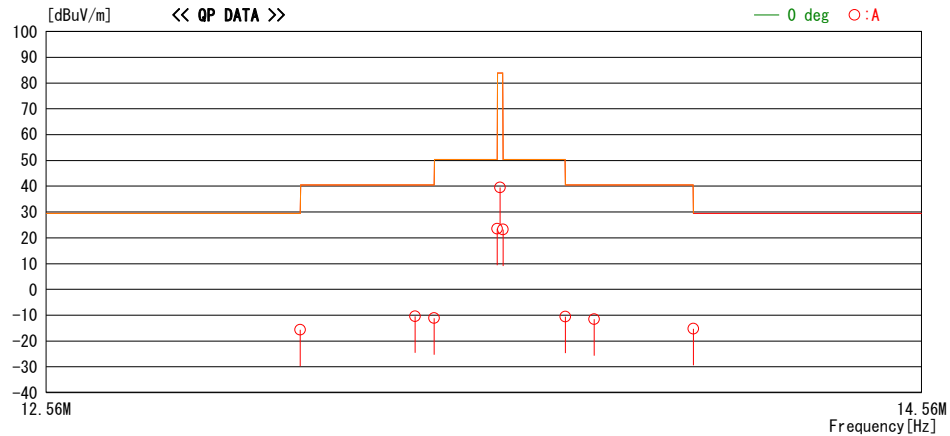
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No. 4 Semi Anechoic Chamber
 Date : 2013/12/03

Report No. : 10062667H
 Temp. / Humi. : 22deg. C / 51% RH
 Engineer : Hiroshi Kukita

Mode / Remarks : Transmitting mode without Tag worst axis:Y axis

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	30.1	QP	19.7	-33.3	32.1	-15.6	29.5	45.1	0	188	
13.36700	35.2	QP	19.7	-33.2	32.1	-10.4	40.5	50.9	0	188	
13.41000	34.5	QP	19.7	-33.2	32.1	-11.1	40.5	51.6	0	188	
13.55300	69.1	QP	19.7	-33.2	32.1	23.5	50.4	26.9	0	188	
13.56000	85.1	QP	19.7	-33.2	32.1	39.5	83.9	44.4	0	188	
13.56700	68.8	QP	19.7	-33.2	32.1	23.2	50.4	27.2	0	188	
13.71000	35.1	QP	19.7	-33.2	32.1	-10.5	40.5	51.0	0	188	
13.77711	34.0	QP	19.7	-33.2	32.1	-11.6	40.5	52.1	0	188	
14.01000	30.4	QP	19.7	-33.2	32.1	-15.2	29.5	44.7	0	188	

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. + D.FACTOR) - GAIN(AMP.)

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

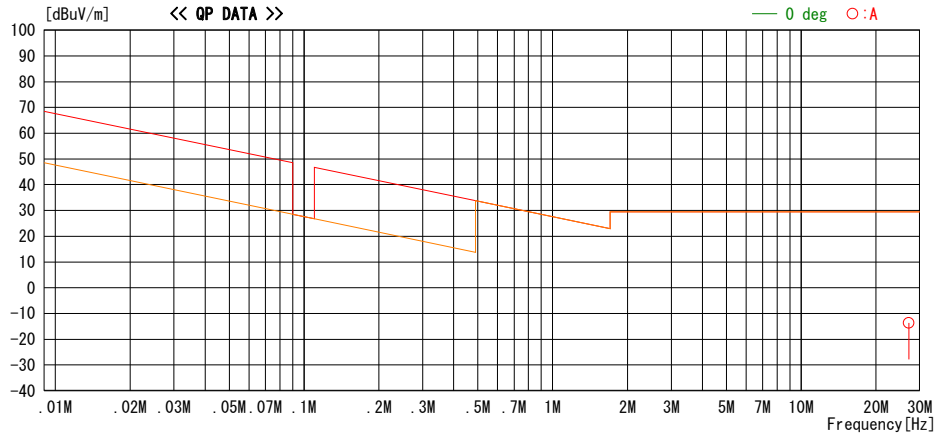
Spurious emission
 (Transmitting mode: without Tag)

DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No. 4 Semi Anechoic Chamber
 Date : 2013/10/16

Report No. : 10062667H
 Temp. / Humi. : 22deg. C / 51% RH
 Engineer : Hiroshi Kukita
 Mode / Remarks : Transmitting mode without Tag
 worst axis: Y axis

LIMIT : FCC15.209(a), 9-90kHz:PK, 110-490kHz:PK, other:QP
 FCC15.209(a), 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	30.5	QP	20.9	-32.9	32.2	-13.7	29.5	43.2	0	171	

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. + D.FACTOR) - GAIN(AMP.)

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

Spurious emission
(Standby)

DATA OF RADIATED EMISSION TEST

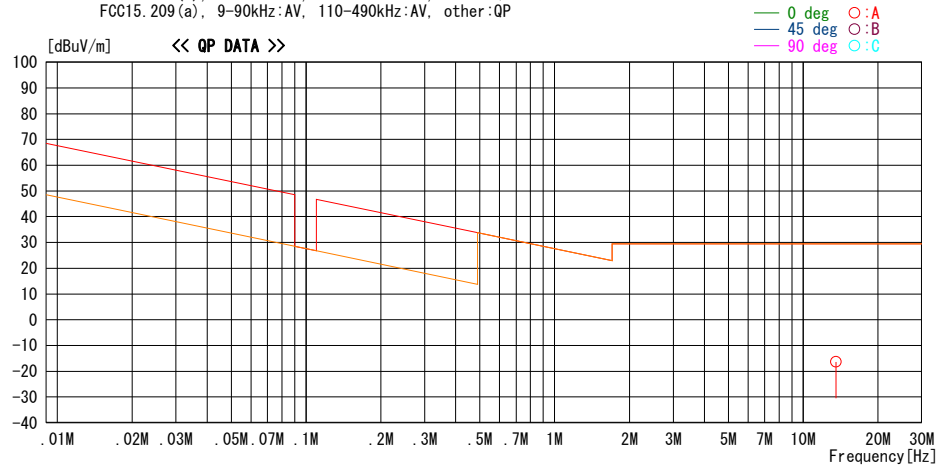
UL Japan, Inc. Head Office EMC Lab. No. 4 Semi Anechoic Chamber
Date : 2013/10/17

Report No. : 10062667H
 Power : AC 120V / 60Hz
 Temp. / Humi. : 22deg. C / 51% RH
 Engineer : Hiroshi Kukita

Mode / Remarks : Standby

, worst axis:Y axis

LIMIT : FCC15.209(a), 9-90kHz:PK, 110-490kHz:PK, other:QP
 FCC15.209(a), 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]	
13.56000	29.7	QP	19.3	-33.2	32.1	-16.3	29.5	45.8	0	171	

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. + D.FACTOR) - GAIN(AMP.)

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

Spurious emission
(Transmitting mode: with Tag)

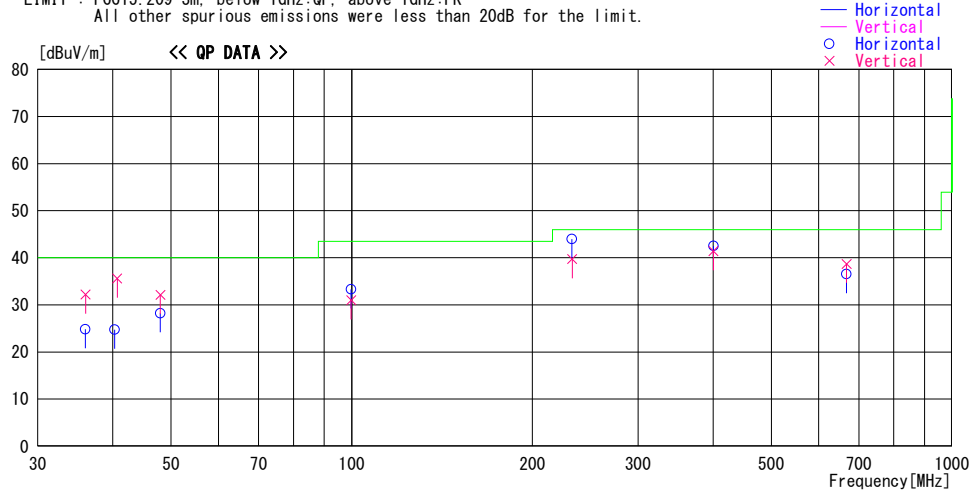
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2013/10/16

Report No. : 10062667H
Power : AC 120V / 60Hz
Temp./Humi. : 22deg. C / 51% RH
Engineer : Hiroshi Kukita

Mode / Remarks : Transmitting mode with Tag

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]							
36.020	33.5	QP	16.3	-25.0	24.8	90	293	Hori.	40.0	15.2	
36.046	40.9	QP	16.3	-25.0	32.2	20	100	Vert.	40.0	7.8	
40.681	46.0	QP	14.5	-24.9	35.6	241	100	Vert.	40.0	4.4	
40.281	35.0	QP	14.6	-24.9	24.7	114	400	Hori.	40.0	15.3	
48.035	41.1	QP	11.9	-24.8	28.2	111	400	Hori.	40.0	11.8	
48.020	45.0	QP	11.9	-24.8	32.1	4	100	Vert.	40.0	7.9	
99.732	46.7	QP	10.5	-23.9	33.3	272	182	Hori.	43.5	10.2	
99.800	44.4	QP	10.5	-23.9	31.0	351	100	Vert.	43.5	12.5	
232.950	44.7	QP	17.5	-22.5	39.7	299	100	Vert.	46.0	6.3	
232.810	49.0	QP	17.5	-22.5	44.0	267	100	Hori.	46.0	2.0	
400.566	45.0	QP	17.8	-21.4	41.4	253	100	Vert.	46.0	4.6	
400.566	46.1	QP	17.8	-21.4	42.5	68	100	Hori.	46.0	3.5	
667.612	35.0	QP	21.6	-20.1	36.5	311	100	Hori.	46.0	9.5	
667.610	37.2	QP	21.6	-20.1	38.7	307	100	Vert.	46.0	7.3	

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

*The limit is rounded down to one decimal place.

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

Spurious emission
 (Transmitting tag: without Tag)

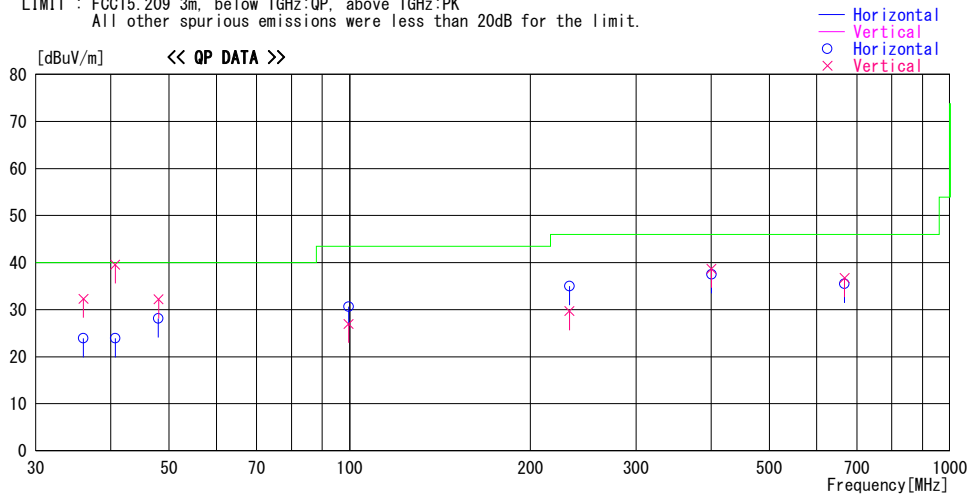
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
 Date : 2013/10/16

Report No. : 10062667H
 Power : AC 120V / 60Hz
 Temp./Humi. : 22deg. C / 51% RH
 Engineer : Hiroshi Kukita

Mode / Remarks : Transmitting mode without Tag

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	Loss&	Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
			Factor [dB/m]	Gain [dB]							
36.020	32.6	QP	16.3	-25.0	23.9	286	400	Hori.	40.0	16.1	
36.024	41.0	QP	16.3	-25.0	32.3	11	100	Vert.	40.0	7.7	
40.678	50.0	QP	14.5	-24.9	39.6	22	100	Vert.	40.0	0.4	
40.681	34.3	QP	14.5	-24.9	23.9	117	400	Hori.	40.0	16.1	
47.996	41.0	QP	11.9	-24.8	28.1	110	400	Hori.	40.0	11.9	
48.048	45.1	QP	11.9	-24.8	32.2	12	100	Vert.	40.0	7.8	
99.664	44.0	QP	10.5	-23.9	30.6	295	197	Hori.	43.5	12.9	
99.604	40.4	QP	10.5	-23.9	27.0	202	100	Vert.	43.5	16.5	
232.410	34.7	QP	17.5	-22.5	29.7	299	100	Vert.	46.0	16.3	
232.450	40.0	QP	17.5	-22.5	35.0	265	100	Hori.	46.0	11.0	
400.569	42.3	QP	17.8	-21.4	38.7	221	100	Vert.	46.0	7.3	
400.569	41.1	QP	17.8	-21.4	37.5	166	145	Hori.	46.0	8.5	
667.612	34.0	QP	21.6	-20.1	35.5	314	100	Hori.	46.0	10.5	
667.614	35.2	QP	21.6	-20.1	36.7	296	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 (CABLE+ATTEN.) - GAIN (AMP)

*The limit is rounded down to one decimal place.

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

Spurious emission
(Standby)

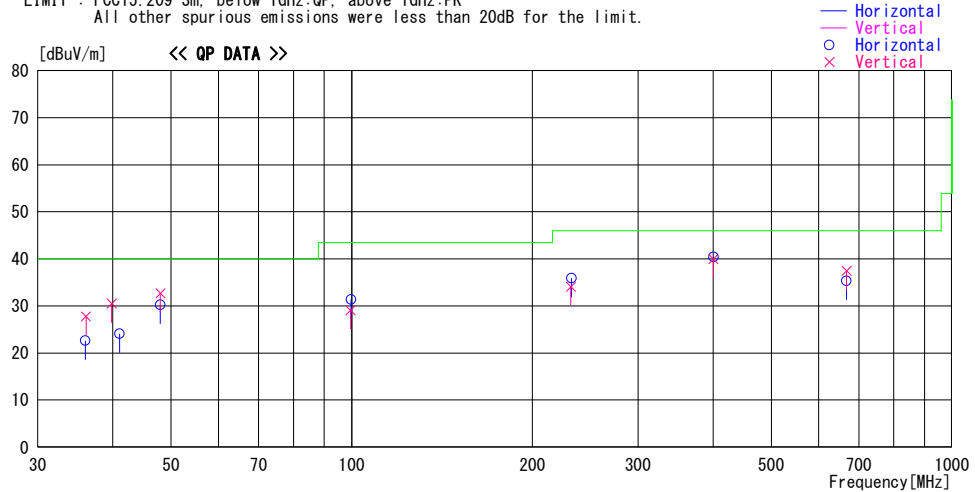
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2013/10/16

Report No. : 10062667H
Power : AC 120V / 60Hz
Temp./Humi. : 22deg. C / 51% RH
Engineer : Hiroshi Kukita

Mode / Remarks : Standby

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	Loss&	Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
			Factor [dB/m]	Gain [dB]							
36.005	31.3	QP	16.3	-25.0	22.6	305	400	Hori.	40.0	17.4	
36.100	36.6	QP	16.2	-25.0	27.8	231	100	Vert.	40.0	12.2	
39.828	40.7	QP	14.8	-25.0	30.5	33	100	Vert.	40.0	9.5	
41.086	34.6	QP	14.4	-24.9	24.1	130	400	Hori.	40.0	15.9	
47.976	43.1	QP	11.9	-24.8	30.2	167	400	Hori.	40.0	9.8	
48.028	45.6	QP	11.9	-24.8	32.7	18	100	Vert.	40.0	7.3	
99.824	44.8	QP	10.5	-23.9	31.4	272	197	Hori.	43.5	12.1	
99.604	42.5	QP	10.5	-23.9	29.1	204	100	Vert.	43.5	14.4	
231.836	39.1	QP	17.5	-22.5	34.1	291	100	Vert.	46.0	11.9	
232.310	40.9	QP	17.5	-22.5	35.9	289	100	Hori.	46.0	10.1	
400.564	43.6	QP	17.8	-21.4	40.0	232	100	Vert.	46.0	6.0	
400.569	44.0	QP	17.8	-21.4	40.4	169	145	Hori.	46.0	5.6	
667.611	33.8	QP	21.6	-20.1	35.3	314	100	Hori.	46.0	10.7	
667.614	36.0	QP	21.6	-20.1	37.5	288	100	Vert.	46.0	8.5	

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

*The limit is rounded down to one decimal place.

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

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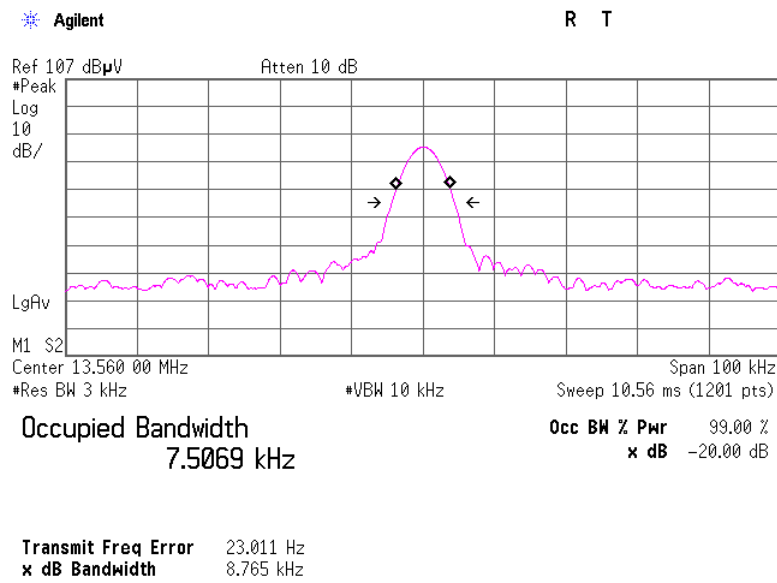
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

20dB Bandwidth and 99% Occupied Bandwidth

Test place	Head Office EMC Lab. No.4 Semi Anechoic Chamber
Report No.	10062667H
Date	10/16/2013
Temperature/ Humidity	22 deg.C / 51% RH
Engineer	Hiroshi Kukita
Mode	Transmitting mode with Tag

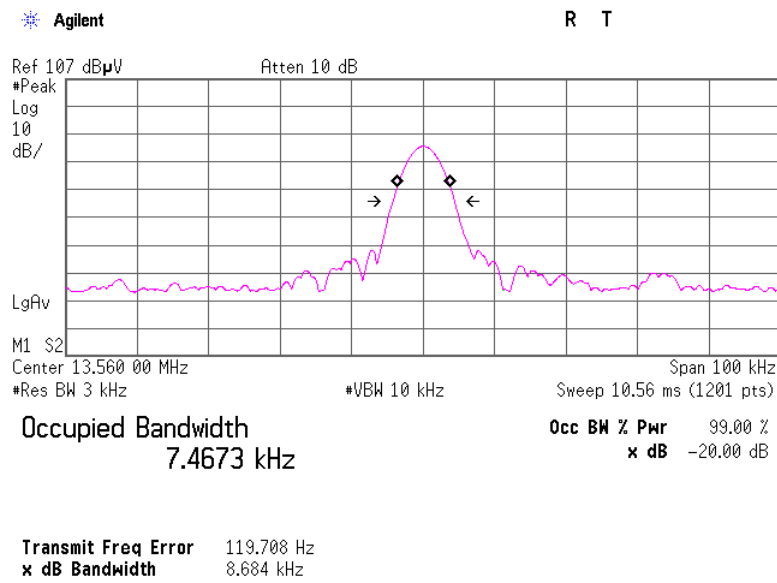
FREQ [MHz]	20dB Bandwidth [kHz]	99% Occupied Bandwidth [kHz]
13.56	8.77	7.51



20dB Bandwidth and 99% Occupied Bandwidth

Test place	Head Office EMC Lab. No.4 Semi Anechoic Chamber
Report No.	10062667H
Date	10/16/2013
Temperature/ Humidity	22 deg.C / 51% RH
Engineer	Hiroshi Kukita
Mode	Transmitting mode Felica without Tag

FREQ [MHz]	20dB Bandwidth [kHz]	99% Occupied Bandwidth [kHz]
13.56	8.68	7.47



Frequency Tolerance

Test place : Head Office EMC Lab. No.6 measurement room
Report No. : 10062667H
Date : 10/09/2013
Temperature/ Humidity : 24 deg.C/ 57% RH
Engineer : Masatoshi Nishiguchi
Mode : Tx Mod on with Tag

Test Condition deg.C	Volts	Test Timing	Measured freq [MHz]	Freq error [MHz]	Result [ppm]	Limit (+/- 0.01%) [+/- ppm]	Margin [ppm]
20deg.C	4.25V	Power on	13.56004343	0.00004342	3.20	100.00	96.80
		on 2min.	13.56004155	0.00004155	3.06	100.00	96.94
		on 5min.	13.56003974	0.00003974	2.93	100.00	97.07
		on 10min.	13.56003793	0.00003793	2.80	100.00	97.20
	5V	Power on	13.56004145	0.00004145	3.06	100.00	96.94
		on 2min.	13.56003747	0.00003747	2.76	100.00	97.24
		on 5min.	13.56003503	0.00003503	2.58	100.00	97.42
		on 10min.	13.56003485	0.00003485	2.57	100.00	97.43
	5.75V	Power on	13.56003834	0.00003834	2.83	100.00	97.17
		on 2min.	13.56003594	0.00003594	2.65	100.00	97.35
		on 5min.	13.56003536	0.00003536	2.61	100.00	97.39
		on 10min.	13.56003532	0.00003532	2.60	100.00	97.40
50deg.C.	5V	Power on	13.56003822	0.00003822	2.82	100.00	97.18
on 2min.		13.56007125	0.00007125	5.25	100.00	94.75	
on 5min.		13.56007241	0.00007241	5.34	100.00	94.66	
on 10min.		13.56008497	0.00008497	6.27	100.00	93.73	
40deg.C.		Power on	13.56003416	0.00003416	2.52	100.00	97.48
on 2min.		13.56003760	0.00003760	2.77	100.00	97.23	
on 5min.		13.56004464	0.00004464	3.29	100.00	96.71	
on 10min.		13.56005090	0.00005090	3.75	100.00	96.25	
30deg.C.		Power on	13.56003955	0.00003955	2.92	100.00	97.08
on 2min.		13.56003473	0.00003473	2.56	100.00	97.44	
on 5min.		13.56003534	0.00003534	2.61	100.00	97.39	
on 10min.		13.56003616	0.00003616	2.67	100.00	97.33	
20deg.C.		Power on	13.56004145	0.00004145	3.06	100.00	96.94
on 2min.		13.56003747	0.00003747	2.76	100.00	97.24	
on 5min.		13.56003503	0.00003503	2.58	100.00	97.42	
on 10min.		13.56003485	0.00003485	2.57	100.00	97.43	
10deg.C.		Power on	13.56004616	0.00004616	3.40	100.00	96.60
on 2min.		13.56004585	0.00004585	3.38	100.00	96.62	
on 5min.		13.56004235	0.00004235	3.12	100.00	96.88	
on 10min.		13.56004227	0.00004227	3.12	100.00	96.88	
0deg.C.		Power on	13.56002818	0.00002818	2.08	100.00	97.92
on 2min.		13.56004472	0.00004472	3.30	100.00	96.70	
on 5min.		13.56004583	0.00004583	3.38	100.00	96.62	
on 10min.		13.56004561	0.00004561	3.36	100.00	96.64	
-10deg.C.	Power on	13.56003345	0.00003345	2.47	100.00	97.53	
on 2min.	13.56003053	0.00003053	2.25	100.00	97.75		
on 5min.	13.56004275	0.00004275	3.15	100.00	96.85		
on 10min.	13.56004376	0.00004376	3.23	100.00	96.77		
-20deg.C.	Power on	13.56006850	0.00006850	5.05	100.00	94.95	
on 2min.	13.56002184	0.00002184	1.61	100.00	98.39		
on 5min.	13.56090264	0.00090264	66.57	100.00	33.43		
on 10min.	13.55960656	-0.00039344	-29.01	100.00	70.99		
-30deg.C	Power on	13.55958243	-0.00041757	-30.79	100.00	69.21	
	on 2min.	13.56010719	0.00010718	7.90	100.00	92.10	
	on 5min.	13.56008803	0.00008803	6.49	100.00	93.51	
	on 10min.	13.56004045	0.00004045	2.98	100.00	97.02	

Limit : 13.56 13.56 MHz +/-0.01 % (+/- 100ppm) = +/- 0.001356 MHz

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

APPENDIX 2: Test instruments

EMI test equipment (Tested on October 9 to 17, 2013)

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	2013/02/28 * 12
MOS-15	Thermo-Hygrometer	Custom	CTH-180	-	RE/CE	2013/02/26 * 12
MJM-09	Measure	KDS	E19-55	-	RE/CE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE/CE	-
MSA-04	Spectrum Analyzer	Agilent	E4448A	US44300523	RE/CE	2013/04/03 * 12
MTR-07	Test Receiver	Rohde & Schwarz	ESCI	100635	RE/CE	2013/04/10 * 12
MBA-05	Biconical Antenna	Schwarzbeck	BBA9106	1302	RE	2012/11/18 * 12
MLA-08	Logperiodic Antenna	Schwarzbeck	UKLP9140-A	N/A	RE	2012/10/18 * 12
MCC-50	Coaxial Cable	UL Japan	-	-	RE	2013/06/18 * 12
MAT-68	Attenuator	Anritsu	MP721B	6200961025	RE	2012/11/21 * 12
MPA-14	Pre Amplifier	SONOMA INSTRUMENT	310	260833	RE	2013/03/12 * 12
MLPA-01	Loop Antenna	Rohde & Schwarz	HFH2-Z2	100017	RE	2012/10/12 * 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	2013/07/23 * 12
MCC-143	Coaxial Cable	UL Japan	-	-	RE	2013/07/22 * 12
MLS-06	LISN(AMN)	Schwarzbeck	NSLK8127	8127363	CE	2013/01/07 * 12
MLS-07	LISN(AMN)	Schwarzbeck	NSLK8127	8127364	CE(EUT)	2013/01/07 * 12
MTA-31	Terminator	TME	CT-01	-	CE	2013/01/21 * 12
MAT-67	Attenuator	JFW Industries, Inc.	50FP-013H2 N	-	CE	2013/01/09 * 12
MAEC-01	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 10m	DA-06881	RE	2013/08/01 * 12
MOS-27	Thermo-Hygrometer	CUSTOM	CTH-201	A08Q26	RE	2013/02/26 * 12
MJM-01	Measure	KDS	ES19-55	-	RE	-
MTR-09	EMI Test Receiver	Rohde & Schwarz	ESU26	100412	RE	2013/06/07 * 12
KBA-05	Biconical Antenna	Schwarzbeck	BBA9106	2513	RE	2012/11/18 * 12
KLA-04	Logperiodic Antenna	Schwarzbeck	USLP9143	361	RE	2012/11/18 * 12
MAT-08	Attenuator(6dB)	Weinschel Corp	2	BK7971	RE	2012/11/06 * 12
MCC-02	Coaxial Cable	Suhner/storm/Agilent/TSJ	-	-	RE	2013/09/12 * 12
MPA-19	Pre Amplifier	MITEQ	MLA-10K01-B01-35	1237616	RE	2013/02/07 * 12
MOS-14	Thermo-Hygrometer	Custom	CTH-201	-	FT	2013/02/26 * 12
MFC-01	Microwave Counter	Advantest	R5373	120100309	FT	2013/08/07 * 12
MLPA-06	Loop Antenna	UL Japan	-	-	FT	Pre Check
MCH-04	Temperature and Humidity Chamber	Tabai Espec	PL-2KP	14015723	FT	2013/08/23 * 12

EMI test equipment (Tested on December 3, 2013)

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	2013/02/28 * 12
MOS-15	Thermo-Hygrometer	Custom	CTH-180	-	RE	2013/02/26 * 12
MJM-09	Measure	KDS	E19-55	-	RE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE	-
MSA-05	Spectrum Analyzer	Advantest	R3273	160400285	RE	2013/11/08 * 12
MTR-01	Test Receiver	Rohde & Schwarz	ESI40	100084	RE	2013/11/12 * 12
MLPA-01	Loop Antenna	Rohde & Schwarz	HFH2-Z2	100017	RE	2013/10/30 * 12
MCC-113	Coaxial cable	Fujikura/Suhner/TSJ	5D-2W(10m)/SFM141(5m)/ 421-010(1m)/sucoform141-PE(1m)/ RFM-E121(Switcher)	-/04178	RE	2013/07/23 * 12
MCC-143	Coaxial Cable	UL Japan	-	-	RE	2013/07/22 * 12
MPA-14	Pre Amplifier	SONOMA INSTRUMENT	310	260833	RE	2013/03/12 * 12
MAT-68	Attenuator	Anritsu	MP721B	6200961025	RE	2013/11/26 * 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

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