RADIO TEST REPORT

Test Report No. : 10282424H-A-R1

Applicant	:	**Tokyo Communication Equipment MFG Co.,ltd.**
Type of Equipment	:	**Multichannel R/W Module, Antenna**
Model No.	:	**PC-1160002 (Multichannel R/W Module)** **PC-1040013 (Antenna)**
Test regulation	:	**FCC Part 15 Subpart C: 2014**
FCC ID	:	**2ACJJPC1160002**
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 10282424H-A. 10282424H-A is replaced with this report.

Date of test: April 20 to May 16, 2014

Representative test engineer:
H. Kukita
Hiroshi Kukita
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

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REVISION HISTORY

Original Test Report No.: 10282424H-A

Revision	Test report No.	Date	Page revised	Contents
- (Original)	10282424H-A	May 12, 2014	-	-
1	10282424H-A-R1	May 19, 2014	P.1	Correction of Date of test
1	10282424H-A-R1	May 19, 2014	P.8	1) Correction of Frequency Tolerance: Voltage. 2) Deletion of following sentence; The test was performed in the specification of voltage range.
1	10282424H-A-R1	May 19, 2014	P.9	Addition of Ferrite Core information
1	10282424H-A-R1	May 19, 2014	P.27	1) Addition of Date and Temperature/ Humidity. 2) Correction of data of Frequency Tolerance. 3) Addition of calculating formula

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SECTION 1: Customer information

Company Name	:	Tokyo Communication Equipment MFG Co.,ltd.
Address	:	3-8-13 takanawa minato-ku,tokyo,108-0074 Japan
Telephone Number	:	+81-3-3447-2421
Facsimile Number	:	+81-3-3447-0426
Contact Person	:	Masaya Mikami

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

2.1 Identification of E.U.T.

Type of Equipment	:	Multichannel R/W Module, Antenna
Model No.	:	PC-1160002 (Multichannel R/W Module) PC-1040013 (Antenna)
Serial No.	:	Refer to Section 4, Clause 4.2
Receipt Date of Sample	:	April 15, 2014
Country of Mass-production	:	Japan
Condition of EUT	:	Production model
Modification of EUT	:	No Modification by the test lab

2.2 Product Description

General Specification

Clock frequency(ies) in the system	:	13.56MHz

Radio Specification

Radio Type	:	Transceiver
Frequency of Operation	:	13.56MHz
Modulation	:	ASK
Power Supply (inner)	:	DC 5.0V
Antenna type	:	Coil anntena
Antenna Gain	:	-66.5dBi
Operating Temperature	:	-20 deg. C to +70 deg. C

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification	:	FCC Part 15 Subpart C: 2014, final revised on March 6, 2014 and effective April 7, 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

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] 10.7dB 13.56000MHz, N [AV] 1.0dB 13.56000MHz, N	Complied	-
	<IC>RSS-Gen 7.2.2	<IC>RSS-Gen 7.2.2			
Electric Field Strength of Fundamental Emission	ANSI C63.4:2003 13. Measurement of intentional radiators	Section 15.225(a)	60.0dB, 13.56000MHz, QP, 45deg.	Complied	Radiated
	<IC> RSS-Gen 4.8, 4.11	<IC>RSS-210 A2.6			
Spectrum Mask	ANSI C63.4:2003 13. Measurement of intentional radiators	Section 15.225(b)(c)	41.4dB, 13.55300MHz, QP, 45deg.	Complied	Radiated
	<IC>RSS-Gen 4.9, 4.11	<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)	0.8dB 40.680MHz, Vertical, QP	Complied	Radiated
	<IC>RSS-Gen 4.9, 4.11	<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 4.7	<IC> RSS-210 A2.6			
Note: UL Japan, Inc.'s EMI Work Procedures No. 13-EM-W0420 and 13-EM-W0422					

FCC 15.31 (e)
This EUT provides stable voltage (DC3.3V) constantly to RF Module regardless of input voltage. Therefore, this EUT complies with the requirement.

FCC Part 15.203/212 Antenna requirement
The EUT has a unique coupling/antenna connector. Therefore the equipment complies with the requirement of 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

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 report meets the limits unless the uncertainty is taken into consideration.

Radiated emission test (3m)

[Electric Field Strength of Fundamental Emission and Spectrum Mask]

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

[Electric Field Strength of Spurious Emission]

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

3.5 Test Location

UL Japan, Inc. Ise HQ EMC Lab. *NVLAP Lab. code: 200572-0
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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) 13.56MHz Mod on	The EUT Transmits and Receives at the same time and there is no receiving mode only.
*Power setting: 200mW Firmware: PC-1160002 V1.15 Any condition under the normal use do not exceed the condition of setting. In addition, end users cannot change the settings of the output power of the product. The EUT Transmits and Receives at the same time and there is no receiving mode. The EUT has eight antenna connectors (CN4 to CN11), however available connectors are only CN4 and CN5. CN4 and CN5 does not have concurrent transmission. Therefore the test was performed in worst condition.	

Test Item	Operating mode*
Conducted emission	Tx Mod on,with Tag / without Tag / CN4
Electric Field Strength of Fundamental Emission	Tx Mod on,with Tag / without Tag / CN4
Spectrum Mask	Tx Mod on,with Tag / without Tag / CN4
20dB Bandwidth	Tx Mod on / CN4
Electric Field Strength of Spurious Emission	Tx Mod on,with Tag / without Tag / CN4
Frequency Tolerance	Tx Mod on / CN4

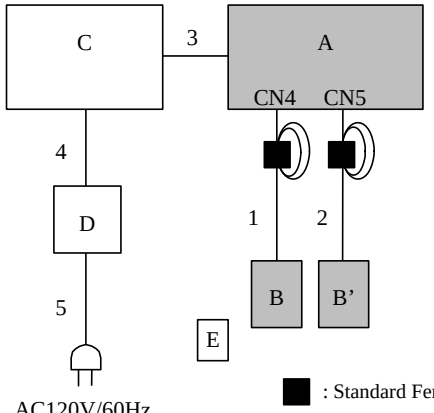
Justification: The system was configured in typical fashion (as a customer would normally use it) for testing.

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

Frequency Tolerance:

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

4.2 Configuration and peripherals



*Refer to " PRODUCT & DELIVERY HARDWARE SPECIFICATION " of application document for attachment location.

* 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	Multichannel R/W Module	PC-1160002	001	Tokyo Communication Equipment MFG Co.,ltd.	EUT *1)
B	Antenna	PC-1040013	S-00001	Tokyo Communication Equipment MFG Co.,ltd.	EUT
B'	Antenna	PC-1040013	S-00002	Tokyo Communication Equipment MFG Co.,ltd.	EUT
C	Laptop PC	FMV-R8290	R0401505	FUJITSU	-
D	AC Adapter	FMV-AC327	CP413402-01	FUJITSU	-
E	RFID Tag	-	-	Tokyo Communication Equipment MFG Co.,ltd.	*2)

List of cables used

No.	Name	Length (m)	Shield		Remark
			Cable	Connector	
1	Antenna Cable	0.2	Unshielded	Unshielded	-
		0.6			
		1.5	Shielded	Shielded	
2	Antenna Cable	0.2	Unshielded	Unshielded	-
		0.6			
		1.5	Shielded	Shielded	
3	USB Cable	1.4	Shielded	Shielded	-
4	DC Cable	1.3	Unshielded	Unshielded	-
5	AC Cable	1.0	Unshielded	Unshielded	-

*1) At the time of the test on Antenna termination of conducted emission, CN4 was terminated
*2) The minimum distance of the tag and the antenna is 1.4 cm.

SECTION 5: Conducted emission

5.1 Operating environment

Test place : No.2 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.
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., 45deg., 90deg., and 135 deg.) 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	PK	AV
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 x log (3m/300m) = -80dB
*2) Distance Factor: 40 x log (3m/30m) = -40dB

- The carrier level and noise levels were confirmed at each position of X, Y and Z axes of EUT (Antenna and Module) 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

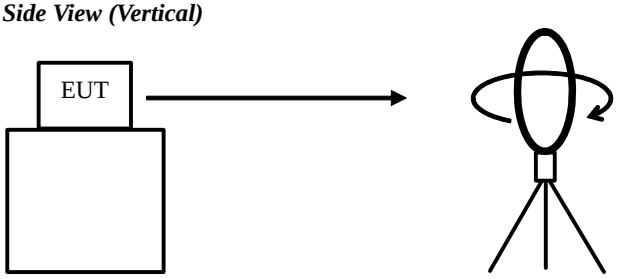
SECTION 7: Other test

Test	Span	RBW	VBW	Sweep	Detector	Trace	Instrument used
20dB Bandwidth	100kHz	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 *1)	Max Hold *1)	Spectrum Analyzer
Frequency Tolerance	-	-	-	-	-	-	Frequency counter
*1) The measurement was performed with Peak detector, Max Hold since the duty cycle was not 100%.							

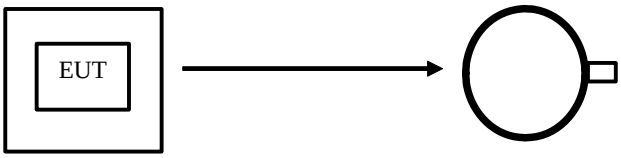
Test data : APPENDIX
Test result : Pass

Figure 1: Direction of the Loop Antenna

Side View (Vertical)

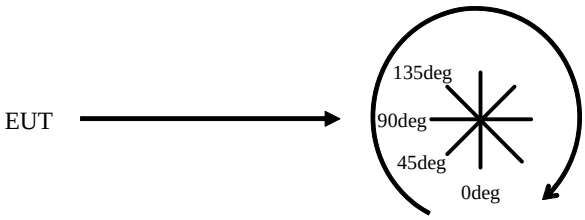


Top View (Horizontal)



Antenna was not rotated.

Top View (Vertical)



Front side: 0 deg.
Forward direction: clockwise

APPENDIX 1: Data of EMI test

Conducted emission

Cable length 0.2m

DATA OF CONDUCTED EMISSION TEST

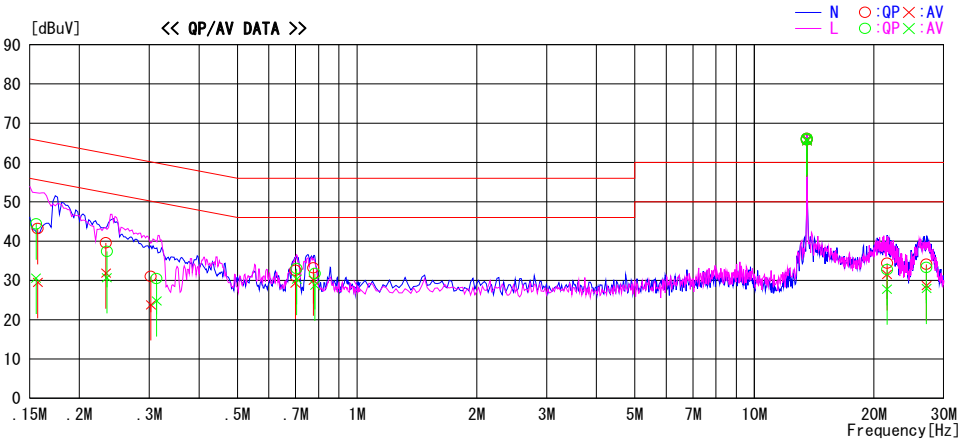
UL Japan, Inc. ISE HQ EMC Lab. No.2 Semi Anechoic Chamber
Date : 2014/05/01

Report No. : 10282424H

Temp./Humi. : 20deg. C / 52% RH
Engineer : Hiroshi Kukita

Mode / Remarks : Tx 13.56MHz Cable Length 0.2m without Tag

LIMIT : FCC15.207 QP
FCC15.207 AV



Frequency	Reading Level QP	Reading Level AV	Corr. Factor	Results QP	Results AV	Limit QP	Limit AV	Margin QP	Margin AV	Phase	Comment
[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
0.15556	31.2	17.4	13.2	44.4	30.6	65.7	55.7	21.3	25.1	L	
0.15708	30.0	16.3	13.2	43.2	29.5	65.6	55.6	22.4	26.1	N	
0.23320	26.4	18.7	13.2	39.6	31.9	62.3	52.3	22.7	20.4	N	
0.23460	24.2	17.5	13.2	37.4	30.7	62.3	52.3	24.9	21.6	L	
0.30260	17.8	10.6	13.2	31.0	23.8	60.2	50.2	29.2	26.4	N	
0.31280	17.3	11.6	13.2	30.5	24.8	59.9	49.9	29.4	25.1	L	
0.69920	19.3	16.0	13.3	32.6	29.3	56.0	46.0	23.4	16.7	N	
0.70504	19.7	17.0	13.3	33.0	30.3	56.0	46.0	23.0	15.7	L	
0.77697	19.8	16.7	13.4	33.2	30.1	56.0	46.0	22.8	15.9	N	
0.78346	18.3	15.4	13.4	31.7	28.8	56.0	46.0	24.3	17.2	L	
13.56000	51.3	51.1	14.8	66.1	65.9	60.0	50.0	-	-	N	
13.56000	51.3	51.1	14.8	66.1	65.9	60.0	50.0	-	-	L	
13.56000	51.0	50.7	14.8	65.8	65.5	60.0	50.0	-	-	L	with Tag
13.56000	50.9	50.7	14.8	65.7	65.5	60.0	50.0	-	-	N	with Tag
21.58100	17.5	12.6	15.2	32.7	27.8	60.0	50.0	27.3	22.2	L	
21.57810	19.2	16.3	15.2	34.4	31.5	60.0	50.0	25.6	18.5	N	
27.12000	17.8	12.5	15.5	33.3	28.0	60.0	50.0	26.7	22.0	L	
27.12000	18.6	13.2	15.5	34.1	28.7	60.0	50.0	25.9	21.3	N	

CHART:WITH FACTOR,Peak hold data. CALCULATION:RESULT=READING+C.F(LISN LOSS + ATT LOSS + CABLE LOSS)
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

Cable length 0.6m

DATA OF CONDUCTED EMISSION TEST

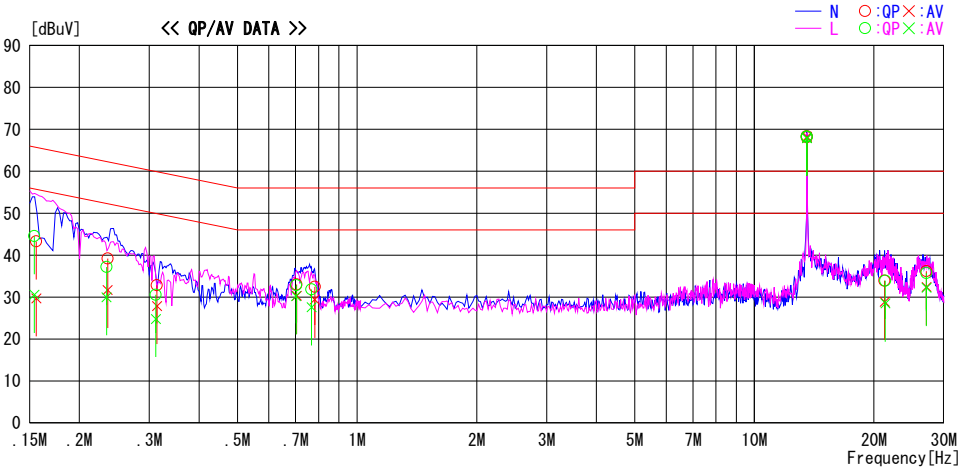
UL Japan, Inc. ISE HQ EMC Lab. No.2 Semi Anechoic Chamber
Date : 2014/05/01

Report No. : 10282424H

Temp./Humi. : 20deg. C / 52% RH
Engineer : Hiroshi Kukita

Mode / Remarks : Tx 13.56MHz Cable Length 0.6m without 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]		
0.15402	31.4	17.4	13.2	44.6	30.6	65.8	55.8	21.2	25.2	L	
0.15578	30.1	16.5	13.2	43.3	29.7	65.7	55.7	22.4	26.0	N	
0.23412	24.0	16.8	13.2	37.2	30.0	62.3	52.3	25.1	22.3	L	
0.23560	26.0	18.5	13.2	39.2	31.7	62.2	52.2	23.0	20.5	N	
0.31160	17.4	11.6	13.2	30.6	24.8	59.9	49.9	29.3	25.1	L	
0.31365	19.6	14.7	13.2	32.8	27.9	59.9	49.9	27.1	22.0	N	
0.70245	19.5	16.9	13.3	32.8	30.2	56.0	46.0	23.2	15.8	L	
0.70480	19.7	17.0	13.3	33.0	30.3	56.0	46.0	23.0	15.7	N	
0.76810	18.4	14.2	13.4	31.8	27.6	56.0	46.0	24.2	18.4	L	
0.78252	19.1	16.0	13.4	32.5	29.4	56.0	46.0	23.5	16.6	N	
13.56000	53.6	53.4	14.8	68.4	68.2	60.0	50.0	-	-	N	
13.56000	53.5	53.2	14.8	68.3	68.0	60.0	50.0	-	-	L	
13.56000	53.3	53.2	14.8	68.1	68.0	60.0	50.0	-	-	N	with Tag
13.56000	53.4	53.1	14.8	68.2	67.9	60.0	50.0	-	-	L	with Tag
21.27770	18.7	13.7	15.2	33.9	28.9	60.0	50.0	26.1	21.1	N	
21.37320	18.7	13.3	15.2	33.9	28.5	60.0	50.0	26.1	21.5	L	
27.12000	20.7	16.9	15.5	36.2	32.4	60.0	50.0	23.8	17.6	N	
27.12000	20.2	16.7	15.5	35.7	32.2	60.0	50.0	24.3	17.8	L	

CHART:WITH FACTOR,Peak hold data. CALCULATION:RESULT=READING+C.F(LISN LOSS + ATT LOSS + CABLE LOSS)
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

Cable length 1.5m

DATA OF CONDUCTED EMISSION TEST

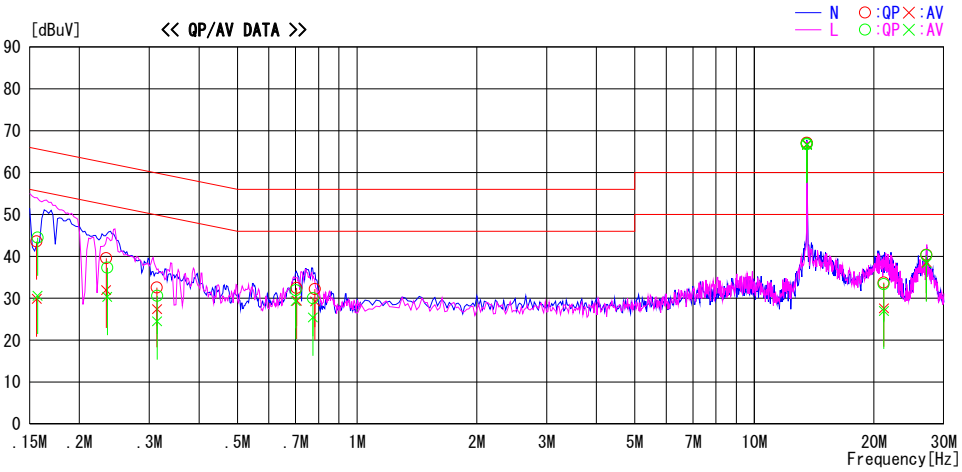
UL Japan, Inc. ISE HQ EMC Lab. No.2 Semi Anechoic Chamber
Date : 2014/05/01

Report No. : 10282424H

Temp./Humi. : 20deg. C / 52% RH
Engineer : Hiroshi Kukita

Mode / Remarks : Tx 13.56MHz Cable Length 1.5m without 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]		
0.15620	30.4	16.7	13.2	43.6	29.9	65.7	55.7	22.1	25.8	N	
0.15696	31.3	17.4	13.2	44.5	30.6	65.6	55.6	21.1	25.0	L	
0.23364	26.4	18.8	13.2	39.6	32.0	62.3	52.3	22.7	20.3	N	
0.23502	24.1	17.1	13.2	37.3	30.3	62.3	52.3	25.0	22.0	L	
0.31362	19.4	14.2	13.2	32.6	27.4	59.9	49.9	27.3	22.5	N	
0.31380	17.4	11.3	13.2	30.6	24.5	59.9	49.9	29.3	25.4	L	
0.70060	18.6	16.0	13.3	31.9	29.3	56.0	46.0	24.1	16.7	L	
0.70460	19.2	16.1	13.3	32.5	29.4	56.0	46.0	23.5	16.6	N	
0.77390	16.6	12.0	13.4	30.0	25.4	56.0	46.0	26.0	20.6	L	
0.78310	18.8	15.8	13.4	32.2	29.2	56.0	46.0	23.8	16.8	N	
13.56000	52.3	52.0	14.8	67.1	66.8	60.0	50.0	-	-	N	
13.56000	52.1	51.9	14.8	66.9	66.7	60.0	50.0	-	-	L	
13.56000	52.2	51.9	14.8	67.0	66.7	60.0	50.0	-	-	N	with Tag
13.56000	51.9	51.8	14.8	66.7	66.6	60.0	50.0	-	-	L	with Tag
21.17940	18.5	12.4	15.2	33.7	27.6	60.0	50.0	26.3	22.4	N	
21.17980	18.2	11.8	15.2	33.4	27.0	60.0	50.0	26.6	23.0	L	
27.12000	24.9	23.1	15.5	40.4	38.6	60.0	50.0	19.6	11.4	N	
27.12000	24.8	22.8	15.5	40.3	38.3	60.0	50.0	19.7	11.7	L	

CHART:WITH FACTOR,Peak hold data. CALCULATION:RESULT=READING+C.F(LISN LOSS + ATT LOSS + CABLE LOSS)
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

Antenna termination

DATA OF CONDUCTED EMISSION TEST

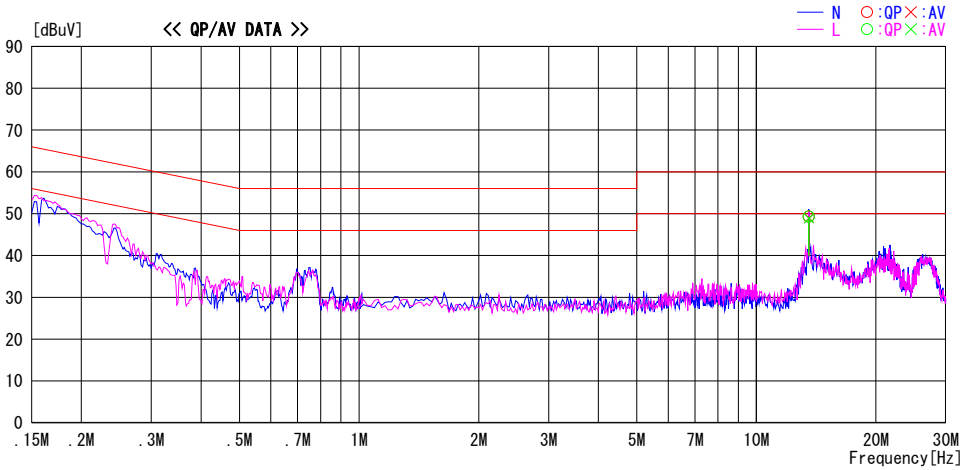
UL Japan, Inc. ISE HQ EMC Lab. No.2 Semi Anechoic Chamber
Date : 2014/05/01

Report No. : 10282424H

Temp./Humi. : 20deg. C / 52% RH
Engineer : Hiroshi Kukita

Mode / Remarks : Tx 13.56MHz Antenna termination

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]		
13.56000	34.5	34.2	14.8	49.3	49.0	60.0	50.0	10.7	1.0	N	
13.56000	34.4	34.1	14.8	49.2	48.9	60.0	50.0	10.8	1.1	L	

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

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Fundamental emission and Spectrum Mask

Cable length 0.2m

DATA OF RADIATED EMISSION TEST

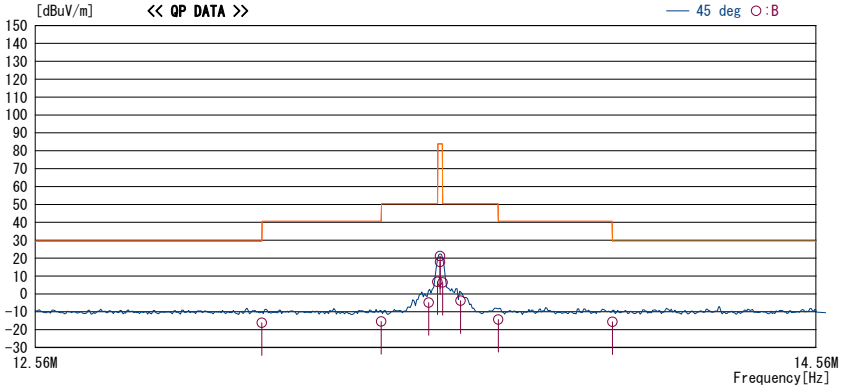
UL Japan, Inc. Ise HQ EMC Lab. No.2 Semi Anechoic Chamber
Date : 2014/05/04

Report No. : 10282424H

Temp. / Humi. : 20deg. C / 42% RH
Engineer : Hiroshi Kukita

Mode / Remarks : Tx 13.56MHz Cable Length 0.2m,without Tag,

LIMIT : FCC15_225_AVQP, 9-90kHz:AV, 110-490kHz:AV, other:QP
FCC15_225_PKQP, 9-90kHz:PK, 110-490kHz:PK, 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	29.1	QP	19.7	-32.9	32.1	-16.2	29.5	45.7	45	B	183	
13.41000	29.9	QP	19.7	-32.9	32.1	-15.4	40.5	55.9	45	B	183	
13.53100	40.4	QP	19.7	-32.9	32.1	-4.9	50.4	55.3	45	B	183	
13.55300	52.0	QP	19.7	-32.9	32.1	6.7	50.4	43.7	45	B	183	
13.56000	63.1	QP	19.7	-32.9	32.1	17.8	83.9	66.1	45	B	183	with Tag
13.56000	66.5	QP	19.7	-32.9	32.1	21.2	83.9	62.7	45	B	183	
13.56700	51.7	QP	19.7	-32.9	32.1	6.4	50.4	44.0	45	B	183	
13.61300	41.5	QP	19.7	-32.9	32.1	-3.8	50.4	54.2	45	B	183	
13.71000	31.0	QP	19.7	-32.9	32.1	-14.3	40.5	54.8	45	B	183	
14.01000	29.6	QP	19.7	-32.9	32.1	-15.7	29.5	45.2	45	B	183	

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

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]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
45	13.56000	QP	66.5	19.7	7.1	32.1	61.2	-	-	Fundamental

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

Fundamental emission and Spectrum Mask

Cable length 0.6m

DATA OF RADIATED EMISSION TEST

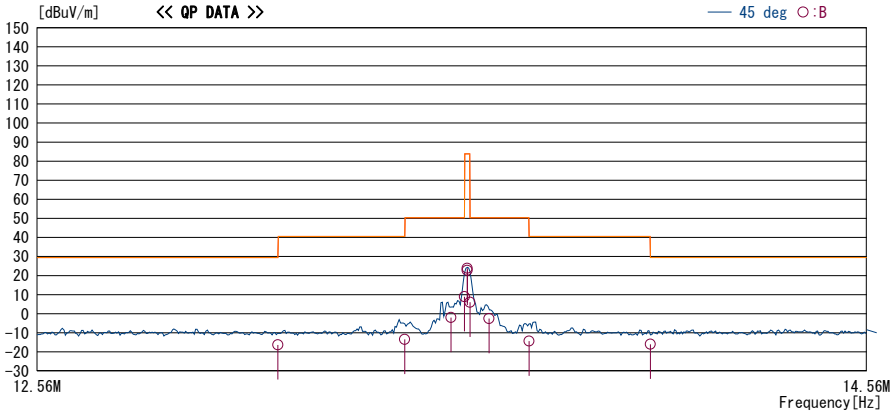
UL Japan, Inc. Ise HQ EMC Lab. No.2 Semi Anechoic Chamber
Date : 2014/05/04

Report No. : 10282424H

Temp. / Humi. : 20deg. C / 42% RH
Engineer : Hiroshi Kukita

Mode / Remarks : Tx 13.56MHz Cable Length 0.6m,without Tag,

LIMIT : FCC15_225_AVQP, 9-90kHz:AV, 110-490kHz:AV, other:QP
FCC15_225_PKQP, 9-90kHz:PK, 110-490kHz:PK, 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	29.0	QP	19.7	-32.9	32.1	-16.3	29.5	45.8	45	B	148	
13.41000	31.8	QP	19.7	-32.9	32.1	-13.5	40.5	54.0	45	B	148	
13.52100	43.3	QP	19.7	-32.9	32.1	-2.0	50.4	52.4	45	B	148	
13.55300	54.3	QP	19.7	-32.9	32.1	9.0	50.4	41.4	45	B	148	
13.56000	69.2	QP	19.7	-32.9	32.1	23.9	83.9	60.0	45	B	148	
13.56000	68.1	QP	19.7	-32.9	32.1	22.8	83.9	61.1	45	B	148	with Tag
13.56700	51.4	QP	19.7	-32.9	32.1	6.1	50.4	44.3	45	B	148	
13.61308	42.7	QP	19.7	-32.9	32.1	-2.6	50.4	53.0	45	B	148	
13.71000	30.9	QP	19.7	-32.9	32.1	-14.4	40.5	54.9	45	B	148	
14.01000	29.4	QP	19.7	-32.9	32.1	-15.9	29.5	45.4	45	B	148	

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

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]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
45	13.56000	QP	69.2	19.7	7.1	32.1	63.9	-	-	Fundamental

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

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Fundamental emission and Spectrum Mask

Cable length 1.5m

DATA OF RADIATED EMISSION TEST

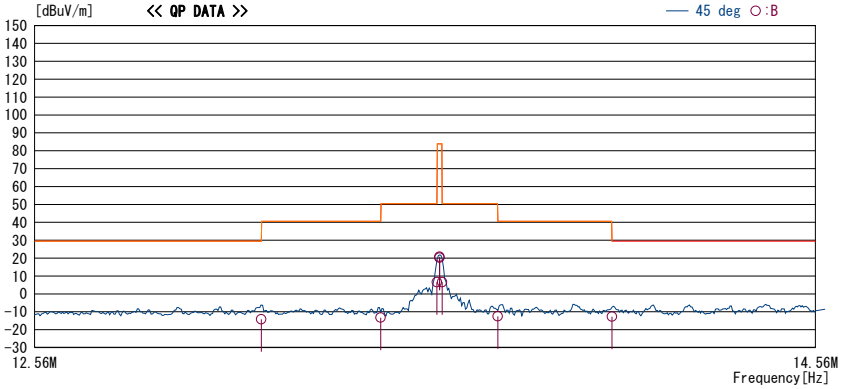
UL Japan, Inc. Ise HQ EMC Lab. No.2 Semi Anechoic Chamber
Date : 2014/04/20

Report No. : 10282424H

Temp. / Humi. : 20deg. C / 37% RH
Engineer : Tomohisa Nakagawa

Mode / Remarks : Tx 13.56MHz_Cable Length 1.5m without Tag

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	31.2	QP	19.7	-32.9	32.1	-14.1	29.5	43.6	45	B	115	
13.41000	32.1	QP	19.7	-32.9	32.1	-13.2	40.5	53.7	45	B	115	
13.55300	51.8	QP	19.7	-32.9	32.1	6.5	50.4	43.9	45	B	115	
13.56000	66.1	QP	19.7	-32.9	32.1	20.8	83.9	63.1	45	B	115	
13.56000	65.5	QP	19.7	-32.9	32.1	20.2	83.9	63.7	45	B	115	with Tag
13.56700	51.8	QP	19.7	-32.9	32.1	6.5	50.4	43.9	45	B	115	
13.71000	32.8	QP	19.7	-32.9	32.1	-12.5	40.5	53.0	45	B	115	
14.01000	32.7	QP	19.7	-32.9	32.1	-12.6	29.5	42.1	45	B	115	

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

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
45	13.56000	QP	66.1	19.7	7.1	32.1	-	60.8	-	-	Fundamental

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

Spurious emission

Cable length 0.2m

DATA OF RADIATED EMISSION TEST

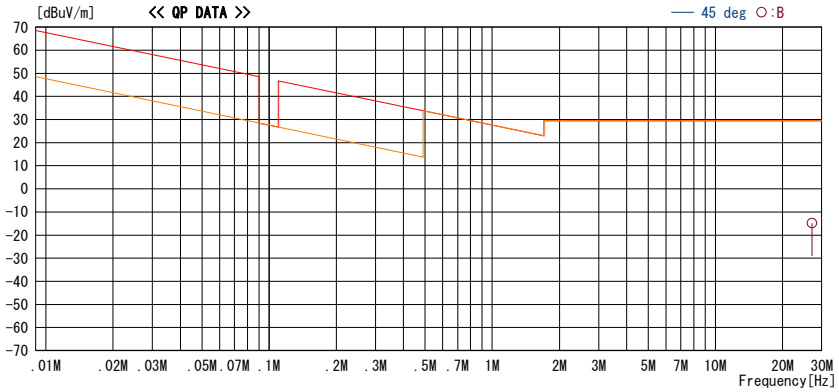
UL Japan, Inc. Ise HQ EMC Lab. No.2 Semi Anechoic Chamber
Date : 2014/05/04

Report No. : 10282424H

Temp./ Humi. : 20deg. C / 42% RH
Engineer : Hiroshi Kukita

Mode / Remarks : Tx 13.56MHz Cable Length 0.2m, without Tag

LIMIT : FCC15.209(a), 9-90kHz:PK, 110-490kHz:PK, other:QP
FCC15.209(a), 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
27.12000	29.0	QP	20.7	-32.5	32.1	-14.9	29.5	44.4	45	B	347	

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

Spurious emission

Cable length 0.2m

DATA OF RADIATED EMISSION TEST

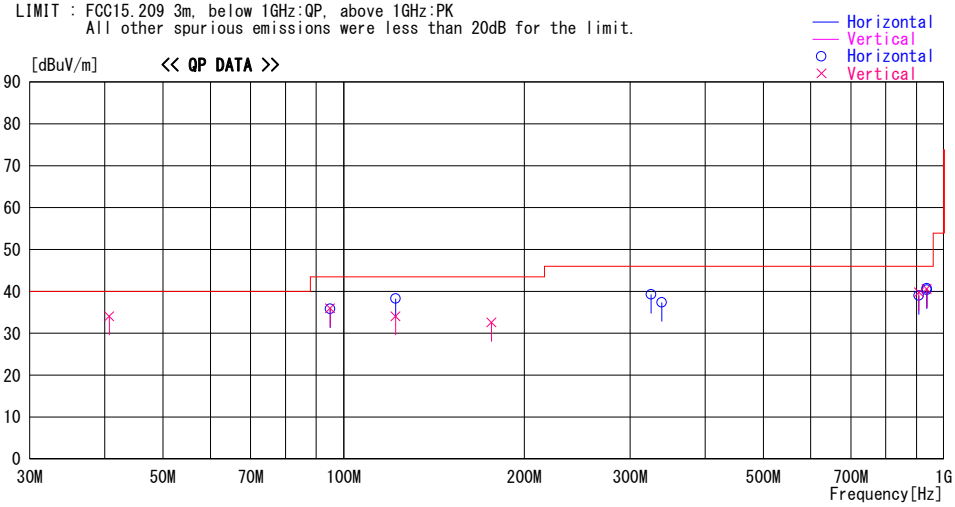
UL Japan, Inc. Ise HQ EMC Lab. No.1 Semi Anechoic Chamber
Date : 2014/04/30

Report No. : 10282424H

Temp./Humi. : 20deg. C / 52% RH
Engineer : Hiroshi Kukita

Mode / Remarks : Tx 13.56MHz Cable Length 0.2m with Tag

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	Comment
[MHz]	[dBuV]		[dB/m]	[dB]	[dBuV/m]	[Deg]	[cm]		[dBuV/m]	[dB]	
40.680	51.3	QP	14.0	-31.2	34.1	80	100	Vert.	40.0	5.9	
94.918	57.3	QP	9.2	-30.5	36.0	244	100	Vert.	43.5	7.5	
94.932	57.1	QP	9.2	-30.5	35.8	180	334	Hori.	43.5	7.7	
122.039	55.4	QP	13.1	-30.2	38.3	142	292	Hori.	43.5	5.2	
122.041	51.2	QP	13.1	-30.2	34.1	60	100	Vert.	43.5	9.4	
176.277	46.3	QP	16.0	-29.7	32.6	102	100	Vert.	43.5	10.9	
325.440	52.1	QP	15.1	-27.9	39.3	38	100	Hori.	46.0	6.7	
338.998	49.7	QP	15.5	-27.8	37.4	255	100	Hori.	46.0	8.6	
908.518	40.5	QP	22.2	-23.7	39.0	233	100	Hori.	46.0	7.0	
908.520	41.3	QP	22.2	-23.7	39.8	5	135	Vert.	46.0	6.2	
935.637	41.7	QP	22.5	-23.5	40.7	42	100	Hori.	46.0	5.3	
935.637	41.4	QP	22.5	-23.5	40.4	42	100	Hori.	46.0	5.6	without tag
935.638	41.6	QP	22.5	-23.5	40.6	9	142	Vert.	46.0	5.4	

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

Spurious emission

Cable length 0.6m

DATA OF RADIATED EMISSION TEST

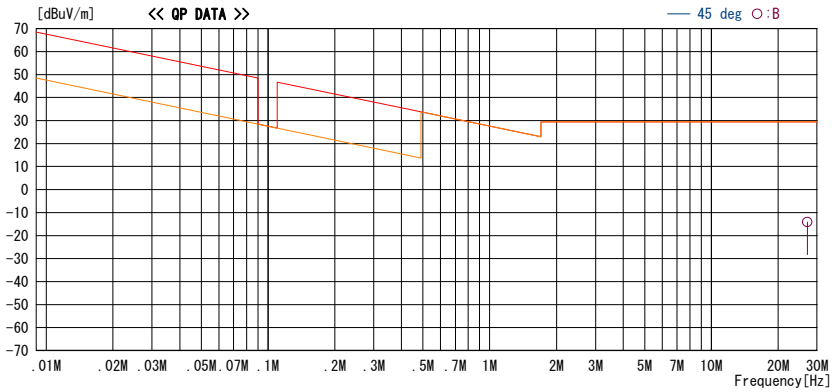
UL Japan, Inc. Ise HQ EMC Lab. No.2 Semi Anechoic Chamber
Date : 2014/05/04

Report No. : 10282424H

Temp./ Humi. : 20deg. C / 42% RH
Engineer : Hiroshi Kukita

Mode / Remarks : Tx 13.56MHz Cable Length 0.6m,with Tag,

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	29.8	QP	20.7	-32.5	32.1	-14.1	29.5	43.6	45	B	133	

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

Spurious emission

Cable length 0.6m

DATA OF RADIATED EMISSION TEST

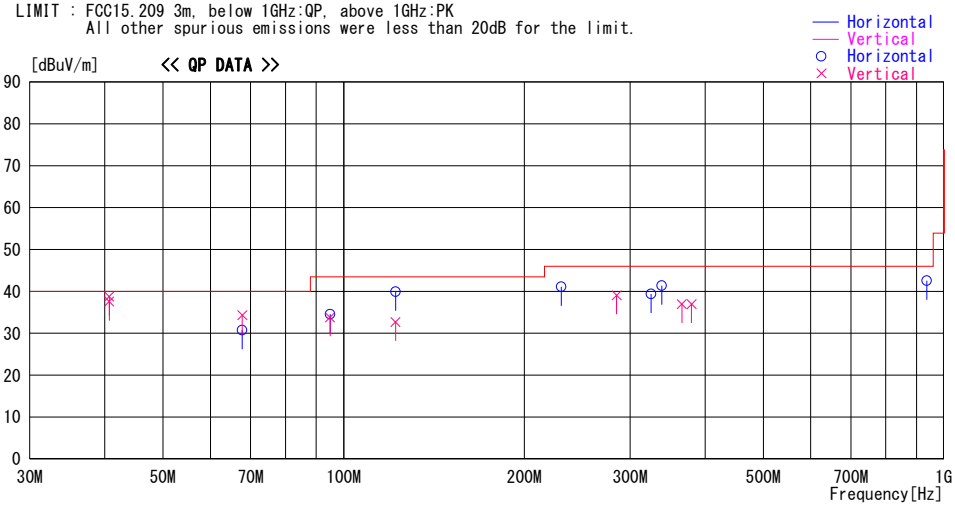
UL Japan, Inc. Ise HQ EMC Lab. No.1 Semi Anechoic Chamber
Date : 2014/04/30

Report No. : 10282424H

Temp./Humi. : 20deg. C / 52% RH
Engineer : Hiroshi Kukita

Mode / Remarks : Tx 13.56MHz Cable Length 0.6m with Tag

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	Comment
[MHz]	[dBuV]		[dB/m]	[dB]	[dBuV/m]	[Deg]	[cm]		[dBuV/m]	[dB]	
40.680	56.0	QP	14.0	-31.2	38.8	125	100	Vert.	40.0	1.2	
40.680	54.8	QP	14.0	-31.2	37.6	125	100	Vert.	40.0	2.4	without Tag
67.800	58.2	QP	6.9	-30.8	34.3	108	100	Vert.	40.0	5.7	
67.800	54.6	QP	6.9	-30.8	30.7	178	269	Hori.	40.0	9.3	
94.920	55.1	QP	9.2	-30.5	33.8	249	100	Vert.	43.5	9.7	
94.921	55.9	QP	9.2	-30.5	34.6	172	313	Hori.	43.5	8.9	
122.038	57.0	QP	13.1	-30.2	39.9	156	259	Hori.	43.5	3.6	
122.040	49.8	QP	13.1	-30.2	32.7	77	100	Vert.	43.5	10.8	
230.520	53.4	QP	16.9	-29.2	41.1	197	155	Hori.	46.0	4.9	
284.760	48.4	QP	19.0	-28.3	39.1	202	100	Vert.	46.0	6.9	
325.439	52.2	QP	15.1	-27.9	39.4	226	100	Hori.	46.0	6.6	
339.000	53.7	QP	15.5	-27.8	41.4	225	100	Hori.	46.0	4.6	
365.932	48.2	QP	16.3	-27.5	37.0	0	170	Vert.	46.0	9.0	
379.680	47.8	QP	16.6	-27.4	37.0	166	379	Vert.	46.0	9.0	
935.639	43.6	QP	22.5	-23.5	42.6	210	100	Hori.	46.0	3.4	

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

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Spurious emission

Cable length 1.5m

DATA OF RADIATED EMISSION TEST

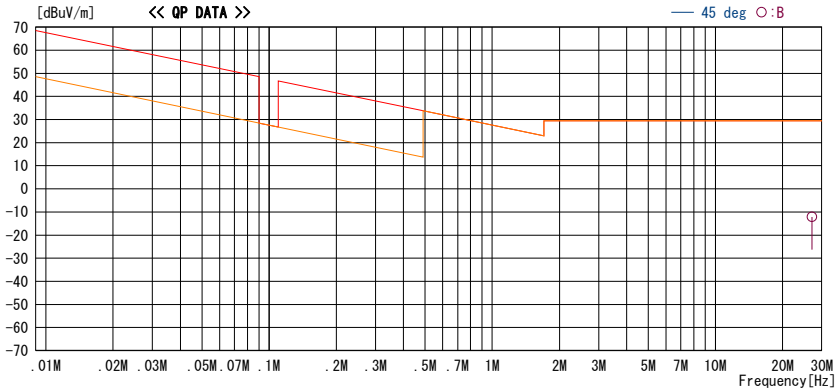
UL Japan, Inc. Ise HQ EMC Lab. No.2 Semi Anechoic Chamber
Date : 2014/05/04

Report No. : 10282424H

Temp./ Humi. : 20deg. C / 42% RH
Engineer : Hiroshi Kukita

Mode / Remarks : Tx 13.56MHz Cable Length 1.5m with Tag

LIMIT : FCC15.209(a), 9-90kHz:PK, 110-490kHz:PK, other:QP
FCC15.209(a), 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
27.12000	31.8	QP	20.7	-32.5	32.1	-12.1	29.5	41.6	45	B	22	

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

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Spurious emission

Cable length 1.5m

DATA OF RADIATED EMISSION TEST

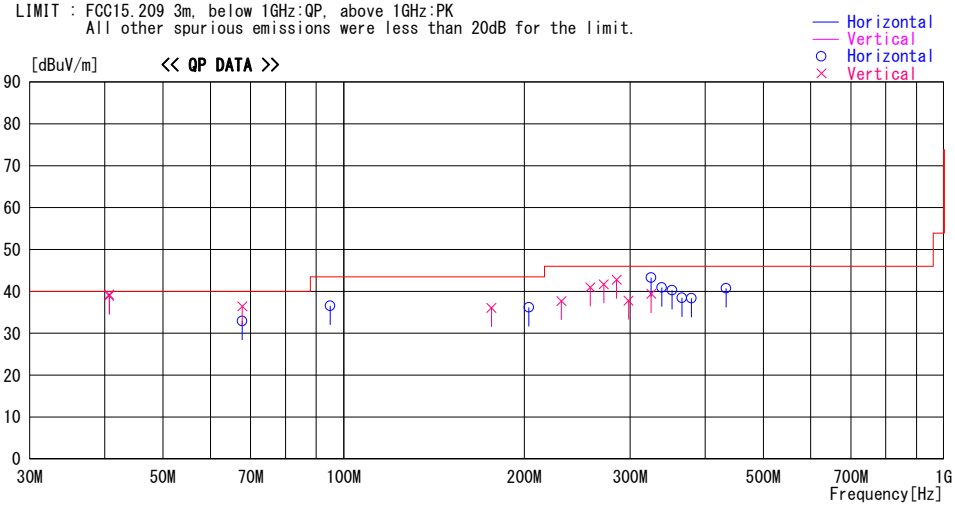
UL Japan, Inc. Ise HQ EMC Lab. No.1 Semi Anechoic Chamber
Date : 2014/04/30

Report No. : 10282424H

Temp./Humi. : 20deg. C / 52% RH
Engineer : Hiroshi Kukita

Mode / Remarks : Tx 13.56MHz Cable Length 1.5m 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 Factor [dB/m]	Loss& Gain [dB]	Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
40.680	56.4	QP	14.0	-31.2	39.2	128	100	Vert.	40.0	0.8	
40.680	56.2	QP	14.0	-31.2	39.0	128	100	Vert.	40.0	1.0	without tag
67.799	60.3	QP	6.9	-30.8	36.4	98	100	Vert.	40.0	3.6	
67.799	56.8	QP	6.9	-30.8	32.9	172	283	Hori.	40.0	7.1	
94.919	57.9	QP	9.2	-30.5	36.6	165	208	Hori.	43.5	6.9	
176.279	49.8	QP	16.0	-29.7	36.1	115	100	Vert.	43.5	7.4	
203.400	49.3	QP	16.4	-29.5	36.2	173	163	Hori.	43.5	7.3	
230.520	50.0	QP	16.9	-29.2	37.7	332	100	Vert.	46.0	8.3	
257.631	52.1	QP	17.6	-28.7	41.0	208	100	Vert.	46.0	5.0	
271.198	51.9	QP	18.3	-28.5	41.7	197	100	Vert.	46.0	4.3	
284.760	52.1	QP	19.0	-28.3	42.8	348	100	Vert.	46.0	3.2	
298.319	46.3	QP	19.7	-28.2	37.8	209	100	Vert.	46.0	8.2	
325.439	56.1	QP	15.1	-27.9	43.3	155	155	Hori.	46.0	2.7	
325.439	52.2	QP	15.1	-27.9	39.4	0	200	Vert.	46.0	6.6	
338.999	53.2	QP	15.5	-27.8	40.9	233	100	Hori.	46.0	5.1	
352.560	52.0	QP	15.9	-27.6	40.3	204	100	Hori.	46.0	5.7	
366.118	49.7	QP	16.3	-27.5	38.5	186	100	Hori.	46.0	7.5	
379.679	49.2	QP	16.6	-27.4	38.4	181	100	Hori.	46.0	7.6	
433.919	50.0	QP	17.5	-26.8	40.7	202	100	Hori.	46.0	5.3	

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

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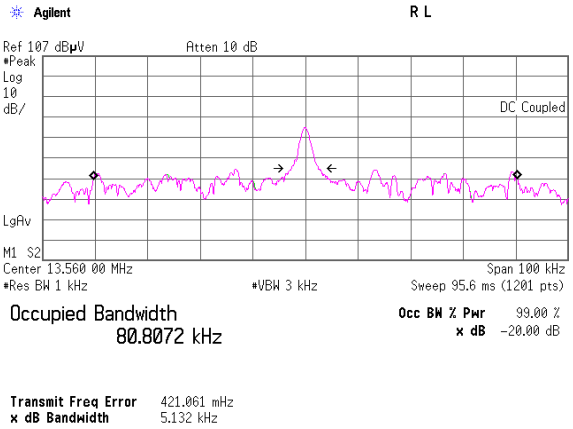
20dB Bandwidth and 99% Occupied Bandwidth

Test place	Ise HQ EMC Lab. No.2 Semi Anechoic Chamber
Report No.	10282424H
Date	04/20/2014
Temperature/ Humidity	20 deg.C / 37% RH
Engineer	Tomohisa Nakagawa
Mode	Tx Mod on

FREQ [MHz]	20dB Bandwidth [kHz]	99% Occupied Bandwidth [kHz]
13.56	5.13	80.81



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Frequency Tolerance

Test place	Ise HQ EMC Lab. No.11 measurement room	
Report No.	10282424H	
Date	05/02/2014	05/16/2014
Temperature/ Humidity	24 deg. C / 43% RH	23 deg. C / 41% RH
Engineer	Hiroshi Kukita	Hiroshi Kukita
Mode	Tx Mod on	

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	13.55995930	-0.00004070	-3.00	100.00	97.00
		on 2min.	13.55995567	-0.00004433	-3.27	100.00	96.73
		on 5min.	13.55995207	-0.00004793	-3.53	100.00	96.47
		on 10min.	13.55995207	-0.00004793	-3.53	100.00	96.47
	5V	Power on	13.55998062	-0.00001938	-1.43	100.00	98.57
		on 2min.	13.55996666	-0.00003334	-2.46	100.00	97.54
		on 5min.	13.55994572	-0.00005428	-4.00	100.00	96.00
		on 10min.	13.55991083	-0.00008917	-6.58	100.00	93.42
	5.75V	Power on	13.55994961	-0.00005039	-3.72	100.00	96.28
		on 2min.	13.55994246	-0.00005754	-4.24	100.00	95.76
		on 5min.	13.55994106	-0.00005894	-4.35	100.00	95.65
		on 10min.	13.55993959	-0.00006041	-4.46	100.00	95.54
50deg.C.	5V	Power on	13.55991393	-0.00008607	-6.35	100.00	93.65
		on 2min.	13.55990218	-0.00009782	-7.21	100.00	92.79
		on 5min.	13.55988455	-0.00011545	-8.51	100.00	91.49
		on 10min.	13.55985517	-0.00014483	-10.68	100.00	89.32
40deg.C.		Power on	13.55991288	-0.00008713	-6.43	100.00	93.57
		on 2min.	13.55912805	-0.00087195	-64.30	100.00	35.70
		on 5min.	13.55979508	-0.00020492	-15.11	100.00	84.89
		on 10min.	13.55976208	-0.00023792	-17.55	100.00	82.45
30deg.C.		Power on	13.55998592	-0.00001408	-1.04	100.00	98.96
		on 2min.	13.55998066	-0.00001934	-1.43	100.00	98.57
		on 5min.	13.55997277	-0.00002723	-2.01	100.00	97.99
		on 10min.	13.55995961	-0.00004039	-2.98	100.00	97.02
20deg.C.		Power on	13.56001041	0.00001041	0.77	100.00	99.23
		on 2min.	13.55991070	-0.00008930	-6.59	100.00	93.41
		on 5min.	13.55976114	-0.00023887	-17.62	100.00	82.38
		on 10min.	13.55951186	-0.00048814	-36.00	100.00	64.00
10deg.C.		Power on	13.56002740	0.00002740	2.02	100.00	97.98
		on 2min.	13.56001450	0.00001450	1.07	100.00	98.93
		on 5min.	13.55999515	-0.00000485	-0.36	100.00	99.64
		on 10min.	13.55996290	-0.00003710	-2.74	100.00	97.26
0deg.C.		Power on	13.56004209	0.00004209	3.10	100.00	96.90
		on 2min.	13.56003916	0.00003916	2.89	100.00	97.11
		on 5min.	13.56003476	0.00003476	2.56	100.00	97.44
		on 10min.	13.56002743	0.00002743	2.02	100.00	97.98
-10deg.C.		Power on	13.56003120	0.00003120	2.30	100.00	97.70
		on 2min.	13.56004152	0.00004152	3.06	100.00	96.94
		on 5min.	13.56005701	0.00005701	4.20	100.00	95.80
		on 10min.	13.56008281	0.00008281	6.11	100.00	93.89
-20deg.C		Power on	13.55998925	-0.00001075	-0.79	100.00	99.21
		on 2min.	13.56000494	0.00000494	0.36	100.00	99.64
		on 5min.	13.56002848	0.00002847	2.10	100.00	97.90
		on 10min.	13.56006771	0.00006770	4.99	100.00	95.01
-30deg.C		Power on	13.55994872	-0.00005128	-3.78	100.00	96.22
		on 2min.	13.55997898	-0.00002103	-1.55	100.00	98.45
		on 5min.	13.56002435	0.00002435	1.80	100.00	98.20
		on 10min.	13.56009998	0.00009998	7.37	100.00	92.63

Freq error＝Measured freq(MHz)-13.56(MHz)
Result=Freq error(MHz)/13.56(MHz)*10ˆ6
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

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
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	2014/02/20 * 12
MJM-21	Measure	KOMELON	KMC-36	-	RE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE/CE	-
MTR-09	EMI Test Receiver	Rohde & Schwarz	ESU26	100412	RE	2013/06/07 * 12
KBA-05	Biconical Antenna	Schwarzbeck	BBA9106	2513	RE	2013/11/24 * 12
KLA-04	Logperiodic Antenna	Schwarzbeck	USLP9143	361	RE	2013/11/24 * 12
MAT-08	Attenuator(6dB)	Weinschel Corp	2	BK7971	RE	2013/11/26 * 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	2014/02/17 * 12
MAEC-02	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-06902	RE/CE	2013/06/30 * 12
MOS-22	Thermo-Hygrometer	Custom	CTH-201	0003	RE/CE	2014/02/20 * 12
MJM-14	Measure	KOMELON	KMC-36	-	RE/CE	-
MSA-04	Spectrum Analyzer	Agilent	E4448A	US44300523	RE/CE	2013/11/25 * 12
MTR-03	Test Receiver	Rohde & Schwarz	ESCI	100300	RE/CE	2013/06/11 * 12
MLS-06	LISN(AMN)	Schwarzbeck	NSLK8127	8127363	CE(EUT)	2014/01/27 * 12
MCC-13	Coaxial Cable	Fujikura	3D-2W(12m)/ 5D-2W(5m)/ 5D-2W(0.8m)/ 5D-2W(1m)	-	CE	2014/02/20 * 12
MAT-65	Attenuator(13dB)	JFW Industries, Inc.	50FP-013H2 N	-	CE	2014/01/29 * 12
MOS-19	Thermo-Hygrometer	Custom	CTH-201	0001	FT	2013/12/17 * 12
MCH-06	Temperature and Humidity Chamber	Tabai Espec	PL-1KT	14007630	FT	2014/04/23 * 12
MLPA-01	Loop Antenna	Rohde & Schwarz	HFH2-Z2	100017	RE	2013/10/30 * 12
MCC-143	Coaxial Cable	UL Japan	-	-	RE	2013/07/22 * 12
MPA-14	Pre Amplifier	SONOMA INSTRUMENT	310	260833	RE	2014/03/14 * 12
MAT-07	Attenuator(6dB)	Weinschel Corp	2	BK7970	RE	2013/11/26 * 12
MCC-13	Coaxial Cable	Fujikura	3D-2W(12m)/5D-2W(5m)/5D-2W(0.8m)/5D-2W(1m)	-	RE	2014/02/20 * 12
MLPA-06	Loop Antenna	UL Japan	-	-	FT	Pre Check

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