



EMI TEST REPORT

Test Report No. : 11013344H-A-R2

Applicant : TOKAI RIKA CO., LTD.
Type of Equipment : RECEIVER
Model No. : BG3KW
FCC ID : MOZBG3KW
Test regulation : FCC Part 15 Subpart B: 2015
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 the limits of the above regulation.
4. The test results in this test 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 EMC technical requirements. It does not cover administrative issues such as Manual or non-EMC test related Requirements. (if applicable)
7. This report is a revised version of 11013344H-R1. 11013344H-R1 is replaced with this report.

Date of test: October 18 to 21, 2015

Representative test engineer:

Shinya Watanabe
Engineer
Consumer Technology Division

Approved by:

Motoya Imura
Engineer
Consumer Technology Division



NVLAP LAB CODE: 200572-0

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Telephone : +81 596 24 8999

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13-EM-F0429

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SECTION 1: Customer information

Company Name : TOKAI RIKA CO., LTD.
Address : 3-260 Toyota, Oguchi-cho, Niwa-gun, Aichi 480-0195, Japan
Telephone Number : +81-587-95-0093
Facsimile Number : +81-587-95-5471
Contact Person : Hiroki Unno

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

2.1 Identification of E.U.T.

Type of Equipment : RECEIVER
Model No. : BG3KW
Serial No. : Refer to Section 4, Clause 4.2
Receipt Date of Sample : October 9, 2015
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

Model No: BG3KW (referred to as the EUT in this report) is the RECEIVER which has two modes: Smart Key System mode and Tire Pressure Monitoring System (TPMS) mode.

These two modes are switched by signals from Electronic Control Unit (ECU).

Model No. BG3KW has variant models. Refer to Section 4, Clause 4.1 for details.

Feature of EUT:

< Smart Key System mode >

Smart Key System is mainly used for locking/unlocking doors of a vehicle.

RECEIVER receives radio wave signals from Electronic Key, and sends demodulated signals to ECU.

<TPMS mode >

RECEIVER receives radio wave signals from Transmitters on vehicle tires. The signals include information on levels of air pressure/temperature in the vehicle tires and the identity code of Transmitters.

When RECEIVER diagnoses the tire(s) as malfunction, RECEIVER sends a warning signal.

Type of receiving system : Super-heterodyne
Frequency of Operation * : Smart (CH1): 314.35 MHz
Smart (CH2): 312.10 MHz
TPMS: 314.98 MHz
Oscillator Frequency : 30.32 MHz (RF-IC), 20.03 MHz (CPU)
Local Oscillalized Frequency : Smart (CH1): 1884.42 MHz
Smart (CH2): 1870.92 MHz
TPMS: 1888.20 MHz
Type of Modulation : FSK
Power Supply : DC 12.0 V
Antenna Type : ANT1: External antenna
ANT2: Internal antenna

* Note: These channels do not work together at a time. When one channel receives a signal, the other two receive no signals.

*Smart: Smart Key System, TPMS: Tire Pressure Monitoring System

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SECTION 3: Test specification, procedures & results

3.1 Test specification

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

Title : FCC 47CFR Part15 Radio Frequency Device
 Subpart B Unintentional Radiators

3.2 Procedures and results

Item	Test Procedure	Limits	Deviation	Worst margin	Result
Conducted emission	FCC: ANSI C63.4: 2003 7. AC powerline conducted emission measurements	Part 15 Subpart B 15.107(a)	N/A *1)	N/A	N/A
Radiated emission	FCC: ANSI C63.4: 2003 8. Radiated emission measurements	Part 15 Subpart B 15.109(a)	N/A	20.6 dB 800.00 MHz Vertical, QP	Complied
Antenna Terminal	FCC: ANSI C63.4: 2003 12. Measurement of unintentional radiators other than ITE	Part 15 Subpart B 15.111	N/A	29.2 dB 1870.920 MHz PK	Complied

*Note: UL Japan, Inc's EMI Work Procedure 13-EM-W0420.

*1) The test is not applicable since the EUT is not the device that is designed to be connected to the public utility (AC) power line.

3.3 Addition to standard

No addition, exclusion nor deviation has been made from the standard.

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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)	Radiated emission						
	(3 m*)(+dB)			(1 m*)(+dB)		(0.5 m*)(+dB)	
	9 kHz - 30 MHz	30 MHz - 300 MHz	300 MHz - 1 GHz	1 GHz - 10 GHz	10 GHz - 18 GHz	18 GHz - 26.5 GHz	26.5 GHz - 40 GHz
No.1	4.3 dB	5.1 dB	6.2 dB	5.5 dB	5.8 dB	5.8 dB	4.3 dB
No.2	4.2 dB	5.1 dB	6.2 dB	5.4 dB	5.7 dB	5.9 dB	5.6 dB
No.3	4.4 dB	5.1 dB	6.3 dB	5.2 dB	5.5 dB	5.8 dB	5.5 dB
No.4	4.7 dB	5.3 dB	6.3 dB	5.3 dB	5.7 dB	5.9 dB	5.5 dB

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

Antenna terminal conducted emission and Power density (+dB)			Antenna terminal conducted emission (+dB)	
Below 1 GHz	1 GHz - 3 GHz	3 GHz - 18 GHz	18 GHz - 26.5 GHz	26.5 GHz- 40 GHz
1.4 dB	1.7 dB	2.8 dB	2.8 dB	2.9 dB

Radiated emission test(3m)

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

3.5 Test Location

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	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	-	8.8 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 data, Test instruments, and Test set up

Refer to APPENDIX.

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

4.1 Operating modes

The mode used:

- 1) TPMS Receiving (314.98MHz) mode
- 2) Smart CH1 IntAnt Receiving (314.35MHz) mode
- 3) Smart CH1 ExtAnt Receiving (314.35MHz) mode
- 4) Smart CH2 IntAnt Receiving (312.10MHz) mode
- 5) Smart CH2 ExtAnt Receiving (312.10MHz) mode
- 6) TPMS Receiving (314.98MHz) mode
- 7) Smart CH1 Receiving (314.35MHz) mode
- 8) Smart CH2 Receiving (312.10MHz) mode

*The test signal level was confirmed to be sufficient to stabilize the local oscillator of the EUT.

EUT is provided with or without external antenna.
The test was performed representatively with external antenna.

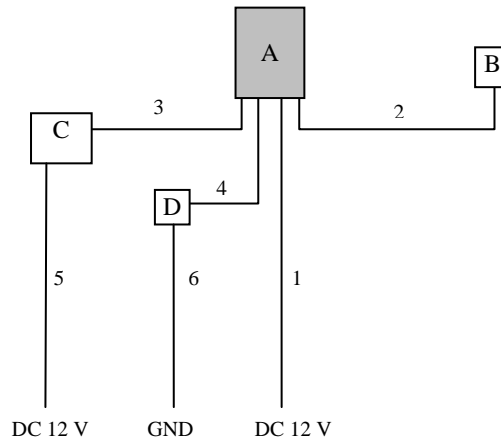
Requirement	Test Mode
Radiated Emission	1), 2), 3), 4), 5), 6), 7), 8)
Antenna Terminal	3), 5), 6), 7), 8)

*Used for S/N: #1 for mode: 1) to 5).
Used for S/N: #3 for mode: 6) to 8).

	Variation model	Antenna-switching function*	Two-antenna Coupling mounting function*	Antenna-matching Switching mounting function*	CAN communication
Tested Model	#1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Variant model	#2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tested Model	#3	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Variant model	#4	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Variant model	#5	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Variant model	#6	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Variant model	#7	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Variant model	#8	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Variant model	#9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Variant model	#10	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

* Refer to "Theory of Operation" for these functions.

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	RECEIVER	BG3KW	#1 #3	TOKAI RIKA CO., LTD.	EUT
B	External Antenna	-	-	TOKAI RIKA CO., LTD.	-
C	SW BOX	-	-	TOKAI RIKA CO., LTD.	-
D	CAN Terminator	-	-	TOKAI RIKA CO., LTD.	-

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	DC Cable	3.0	Unshielded	Unshielded	-
2	Antenna Cable	2.0	Unshielded	Unshielded	-
3	Signal Cable	2.0	Unshielded	Unshielded	-
4	Signal Cable	2.0	UnShielded	UnShielded	-
5	DC Cable	3.0	UnShielded	UnShielded	-
6	GND Cable	3.0	UnShielded	UnShielded	-

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SECTION 6: Antenna Terminal

6.1 Operating environment

Test place : No.7 shielded room
Temperature : See data
Humidity : See data

6.2 Test configuration

EUT was placed on a wooden table of nominal size, 0.5m by 1.0m, raised 0.8m from the ground.

6.3 Test conditions

Frequency range : 30 MHz - 1000 MHz / 1000 MHz - 10000 MHz
Test distance : N/A
EUT position : Table top
EUT operation mode : See Clause 4.1

6.4 Test procedure

The Antenna Terminal was measured with a spectrum analyzer connected to the antenna port.

Frequency	Below 1GHz	Above 1GHz
Instrument used	Spectrum Analyzer	Spectrum Analyzer
IF Bandwidth	PK: RBW:100kHz/VBW: 100kHz	PK: RBW:1MHz/VBW: 3MHz

6.5 Test result

Summary of the test results: Pass

Date: October 21, 2015

Test engineer: Shinya Watanabe

UL Japan, Inc.

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

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APPENDIX 1: Test data

Radiated Emission
(Below 1GHz)

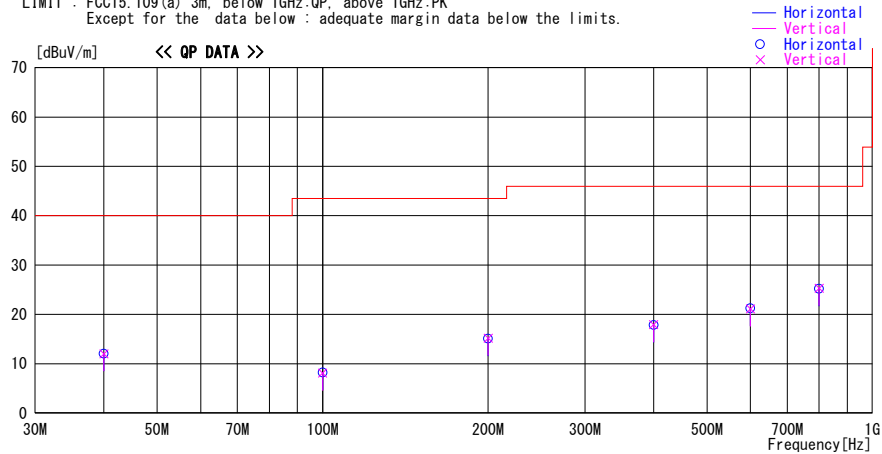
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
Date : 2015/10/18

Report No. : 11013344H
 Temp./Humi. : 21deg. C / 59% RH
 Engineer : Satofumi Matsuyama

Mode / Remarks : 1) (Refer to Section 4, Clause 4.1)

LIMIT : FCC15.109 (a) 3m, below 1GHz:QP, above 1GHz:PK
 Except for the data below : adequate margin data below the limits.



Frequency	Reading	DET	Antenna		Level	Angle	Height	Polar.	Limit	Margin	Comment
			Factor	Loss& Gain							
[MHz]	[dBuV]		[dB/m]	[dB]	[dBuV/m]	[Deg]	[cm]		[dBuV/m]	[dB]	
40.000	22.5	QP	14.5	-25.0	12.0	0	100	Vert.	40.0	28.0	No Signal
40.000	22.5	QP	14.5	-25.0	12.0	0	300	Hori.	40.0	28.0	No Signal
100.000	22.4	QP	10.1	-24.3	8.2	0	300	Hori.	43.5	35.3	No Signal
100.000	22.3	QP	10.1	-24.3	8.1	0	100	Vert.	43.5	35.4	No Signal
200.000	21.7	QP	16.5	-23.1	15.1	0	300	Hori.	43.5	28.4	No Signal
200.000	21.8	QP	16.5	-23.1	15.2	0	100	Vert.	43.5	28.3	No Signal
400.000	21.7	QP	17.6	-21.4	17.9	0	200	Vert.	46.0	28.1	No Signal
400.000	21.6	QP	17.6	-21.4	17.8	0	200	Hori.	46.0	28.2	No Signal
600.000	21.9	QP	19.5	-20.3	21.1	0	200	Vert.	46.0	24.9	No Signal
600.000	22.0	QP	19.5	-20.3	21.2	0	200	Hori.	46.0	24.8	No Signal
800.000	21.8	QP	22.2	-18.7	25.3	0	200	Vert.	46.0	20.7	No Signal
800.000	21.7	QP	22.2	-18.7	25.2	0	200	Hori.	46.0	20.8	No Signal

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))

*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.

Radiated Emission
(Above 1GHz)

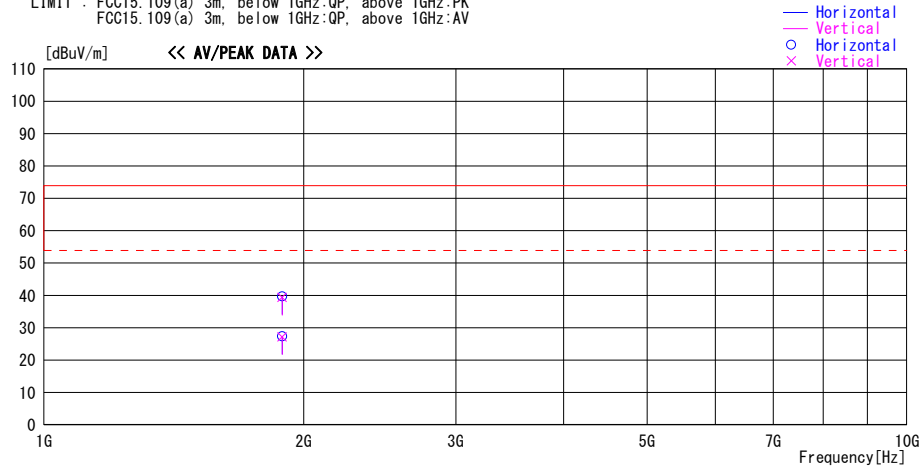
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
Date : 2015/10/19

Report No : 11013344H
Temp./Humi. : 22deg. C / 53% RH
Engineer : Shinya Watanabe

Mode / Remarks : 1) (Refer to Section 4, Clause 4.1)

LIMIT : FCC15.109(a) 3m, below 1GHz:QP, above 1GHz:PK
FCC15.109(a) 3m, below 1GHz:QP, above 1GHz:AV



Frequency [MHz]	Reading [dBuV]	DET	Antenna	Loss & Gain	Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit	Margin	Comment
			Factor [dB/m]	Gain [dB]					[dBuV/m]	[dB]	
1888.200	43.6	PK	26.3	-30.2	39.7	0	100	Hori.	73.9	34.2	NS
1888.200	43.3	PK	26.3	-30.2	39.4	0	100	Vert.	73.9	34.5	NS
1888.200	31.2	AV	26.3	-30.2	27.3	0	100	Hori.	53.9	26.6	NS
1888.200	31.1	AV	26.3	-30.2	27.2	0	100	Vert.	53.9	26.7	NS

NS: No signal detected

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))

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Radiated Emission
(Below 1GHz)

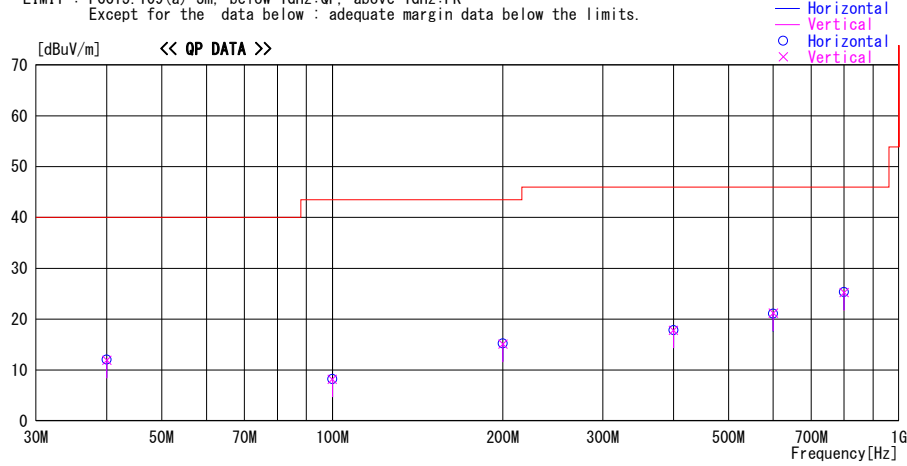
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Engineer : Satofumi Matsuyama

Mode / Remarks : 2) (Refer to Section 4, Clause 4.1)

LIMIT : FCC15.109(a) 3m, below 1GHz:QP, above 1GHz:PK
Except for the data below : adequate margin data below the limits.



Frequency [MHz]	Reading [dBuV]	DET	Antenna		Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
			Factor [dB/m]	Loss & Gain [dB]							
40.000	22.4	QP	14.5	-25.0	11.9	0	100	Vert.	40.0	28.1	No Signal
40.000	22.5	QP	14.5	-25.0	12.0	0	300	Hori.	40.0	28.0	No Signal
100.000	22.4	QP	10.1	-24.3	8.2	0	300	Hori.	43.5	35.3	No Signal
100.000	22.4	QP	10.1	-24.3	8.2	0	100	Vert.	43.5	35.3	No Signal
200.000	21.8	QP	16.5	-23.1	15.2	0	300	Hori.	43.5	28.3	No Signal
200.000	21.7	QP	16.5	-23.1	15.1	0	100	Vert.	43.5	28.4	No Signal
400.000	21.6	QP	17.6	-21.4	17.8	0	200	Vert.	46.0	28.2	No Signal
400.000	21.6	QP	17.6	-21.4	17.8	0	200	Hori.	46.0	28.2	No Signal
600.000	22.0	QP	19.5	-20.3	21.2	0	200	Vert.	46.0	24.8	No Signal
600.000	21.9	QP	19.5	-20.3	21.1	0	200	Hori.	46.0	24.9	No Signal
800.000	21.7	QP	22.2	-18.7	25.2	0	200	Vert.	46.0	20.8	No Signal
800.000	21.8	QP	22.2	-18.7	25.3	0	200	Hori.	46.0	20.7	No Signal

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))

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Radiated Emission (Above 1GHz)

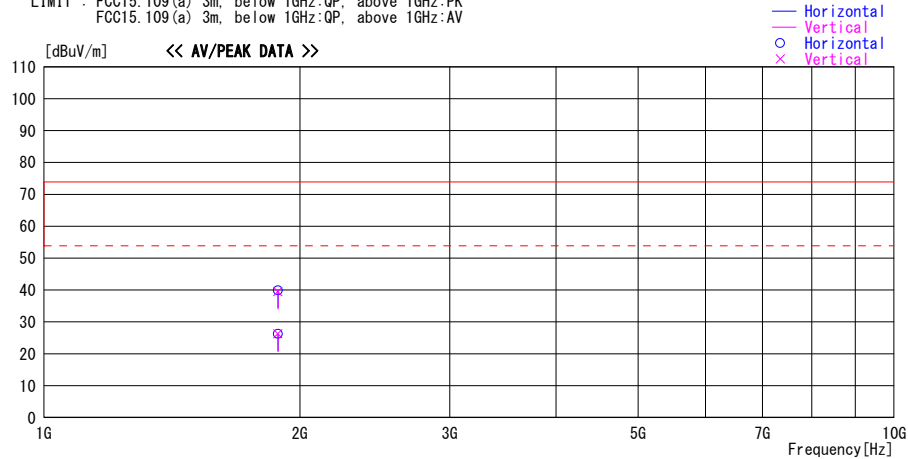
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 Engineer : Shinya Watanabe

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LIMIT : FCC15.109(a) 3m, below 1GHz:QP, above 1GHz:PK
 FCC15.109(a) 3m, below 1GHz:QP, above 1GHz:AV



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]							
1884.420	43.8	PK	26.3	-30.2	39.9	0	100	Hori.	73.9	34.0	NS
1884.420	43.4	PK	26.3	-30.2	39.5	0	100	Vert.	73.9	34.4	NS
1884.420	30.1	AV	26.3	-30.2	26.2	0	100	Hori.	53.9	27.7	NS
1884.420	30.2	AV	26.3	-30.2	26.3	0	100	Vert.	53.9	27.6	NS

NS: No signal detected

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))

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Radiated Emission
(Below 1GHz)

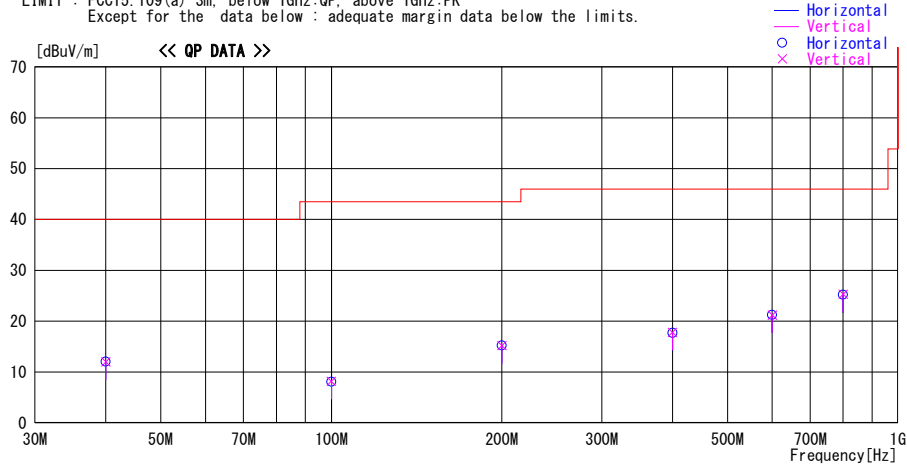
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Engineer : Satofumi Matsuyama

Mode / Remarks : 3) (Refer to Section 4, Clause 4.1)

LIMIT : FCC15.109(a) 3m, below 1GHz:QP, above 1GHz:PK
Except for the data below : adequate margin data below the limits.



Frequency [MHz]	Reading [dBuV]	DET	Antenna	Loss&	Level	Angle	Height	Polar.	Limit	Margin	Comment
			Factor	Gain							
			[dB/m]	[dB]	[dBuV/m]	[Deg]	[cm]		[dBuV/m]	[dB]	
40.000	22.5	QP	14.5	-25.0	12.0	0	100	Vert.	40.0	28.0	No Signal
40.000	22.5	QP	14.5	-25.0	12.0	0	300	Hori.	40.0	28.0	No Signal
100.000	22.3	QP	10.1	-24.3	8.1	0	300	Hori.	43.5	35.4	No Signal
100.000	22.4	QP	10.1	-24.3	8.2	0	100	Vert.	43.5	35.3	No Signal
200.000	21.8	QP	16.5	-23.1	15.2	0	300	Hori.	43.5	28.3	No Signal
200.000	21.8	QP	16.5	-23.1	15.2	0	100	Vert.	43.5	28.3	No Signal
400.000	21.6	QP	17.6	-21.4	17.8	0	200	Vert.	46.0	28.2	No Signal
400.000	21.5	QP	17.6	-21.4	17.7	0	200	Hori.	46.0	28.3	No Signal
600.000	22.0	QP	19.5	-20.3	21.2	0	200	Vert.	46.0	24.8	No Signal
600.000	22.0	QP	19.5	-20.3	21.2	0	200	Hori.	46.0	24.8	No Signal
800.000	21.8	QP	22.2	-18.7	25.3	0	200	Vert.	46.0	20.7	No Signal
800.000	21.7	QP	22.2	-18.7	25.2	0	200	Hori.	46.0	20.8	No Signal

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))

*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.

Radiated Emission (Above 1GHz)

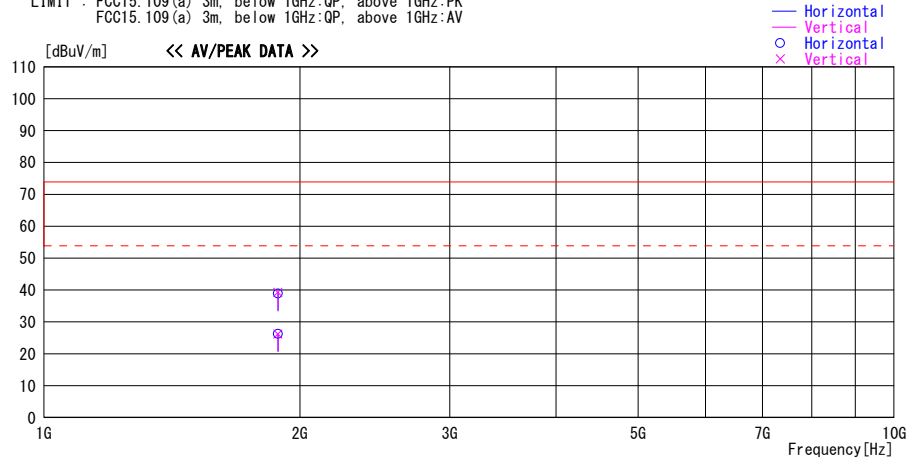
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
 Date : 2015/10/19

Report No. : 11013344H
 Temp./Humi. : 22deg. C / 53% RH
 Engineer : Shinya Watanabe

Mode / Remarks : 3) (Refer to Section 4, Clause 4.1)

LIMIT : FCC15.109(a) 3m, below 1GHz:QP, above 1GHz:PK
 FCC15.109(a) 3m, below 1GHz:QP, above 1GHz:AV



Frequency [MHz]	Reading [dBuV]	DET	Antenna	Loss&	Level	Angle	Height	Polar.	Limit	Margin	Comment
			Factor	Gain							
			[dB/m]	[dB]	[dBuV/m]	[Deg]	[cm]		[dBuV/m]	[dB]	
1884.420	42.8	PK	26.3	-30.2	38.9	0	100	Hori.	73.9	35.0	NS
1884.420	43.2	PK	26.3	-30.2	39.3	0	100	Vert.	73.9	34.6	NS
1884.420	30.1	AV	26.3	-30.2	26.2	0	100	Hori.	53.9	27.7	NS
1884.420	30.1	AV	26.3	-30.2	26.2	0	100	Vert.	53.9	27.7	NS

NS: No signal detected

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))

*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.
Ise EMC Lab.

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

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Radiated Emission
(Below 1GHz)

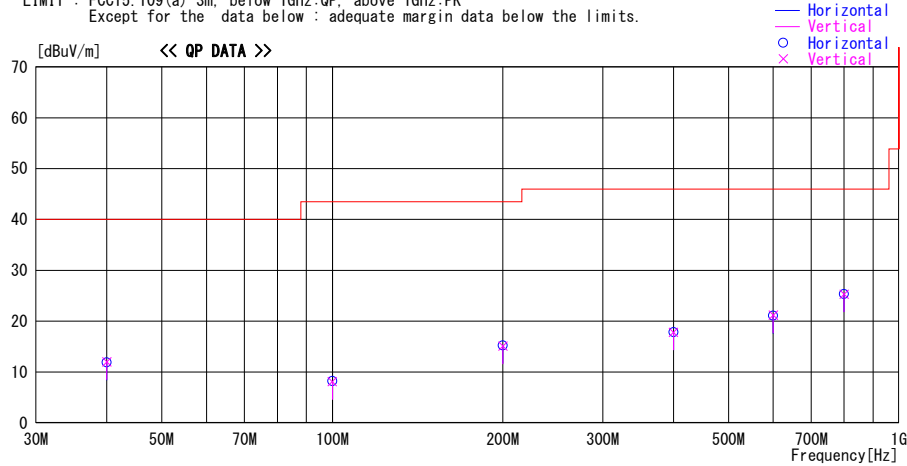
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
Date : 2015/10/18

Report No. : 11013344H
Temp./Humi. : 21deg. C / 59% RH
Engineer : Satofumi Matsuyama

Mode / Remarks : 4) (Refer to Section 4, Clause 4.1)

LIMIT : FCC15.109(a) 3m, below 1GHz:QP, above 1GHz:PK
Except for the data below : adequate margin data below the limits.



Frequency [MHz]	Reading [dBuV]	DET	Antenna		Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
			Factor [dB/m]	Loss & Gain [dB]							
40.000	22.5	QP	14.5	-25.0	12.0	0	100	Vert.	40.0	28.0	No Signal
40.000	22.4	QP	14.5	-25.0	11.9	0	300	Hori.	40.0	28.1	No Signal
100.000	22.4	QP	10.1	-24.3	8.2	0	300	Hori.	43.5	35.3	No Signal
100.000	22.3	QP	10.1	-24.3	8.1	0	100	Vert.	43.5	35.4	No Signal
200.000	21.8	QP	16.5	-23.1	15.2	0	300	Hori.	43.5	28.3	No Signal
200.000	21.7	QP	16.5	-23.1	15.1	0	100	Vert.	43.5	28.4	No Signal
400.000	21.6	QP	17.6	-21.4	17.8	0	200	Vert.	46.0	28.2	No Signal
400.000	21.6	QP	17.6	-21.4	17.8	0	200	Hori.	46.0	28.2	No Signal
600.000	22.0	QP	19.5	-20.3	21.2	0	200	Vert.	46.0	24.8	No Signal
600.000	21.9	QP	19.5	-20.3	21.1	0	200	Hori.	46.0	24.9	No Signal
800.000	21.8	QP	22.2	-18.7	25.3	0	200	Vert.	46.0	20.7	No Signal
800.000	21.8	QP	22.2	-18.7	25.3	0	200	Hori.	46.0	20.7	No Signal

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))

*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.

Radiated Emission
 (Above 1GHz)

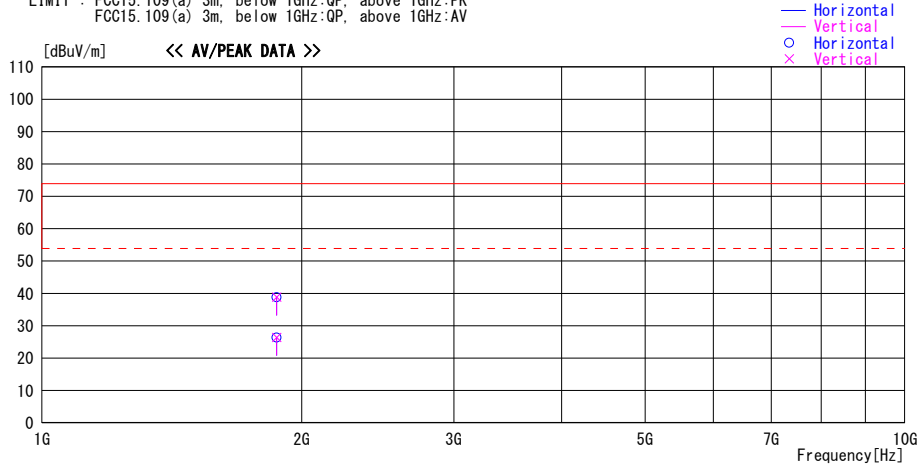
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
 Date : 2015/10/19

Report No. : 11013344H
 Temp./Humi. : 22deg. C / 53% RH
 Engineer : Shinya Watanabe

Mode / Remarks : 4) (Refer to Section 4, Clause 4.1)

LIMIT : FCC15.109(a) 3m, below 1GHz:QP, above 1GHz:PK
 FCC15.109(a) 3m, below 1GHz:QP, above 1GHz:AV



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]							
1870.920	42.8	PK	26.3	-30.3	38.8	0	100	Hori.	73.9	35.1	NS
1870.920	42.8	PK	26.3	-30.3	38.8	0	100	Vert.	73.9	35.1	NS
1870.920	30.4	AV	26.3	-30.3	26.4	0	100	Hori.	53.9	27.5	NS
1870.920	30.4	AV	26.3	-30.3	26.4	0	100	Vert.	53.9	27.5	NS

NS: No signal detected

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))

*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.

Radiated Emission
(Below 1GHz)

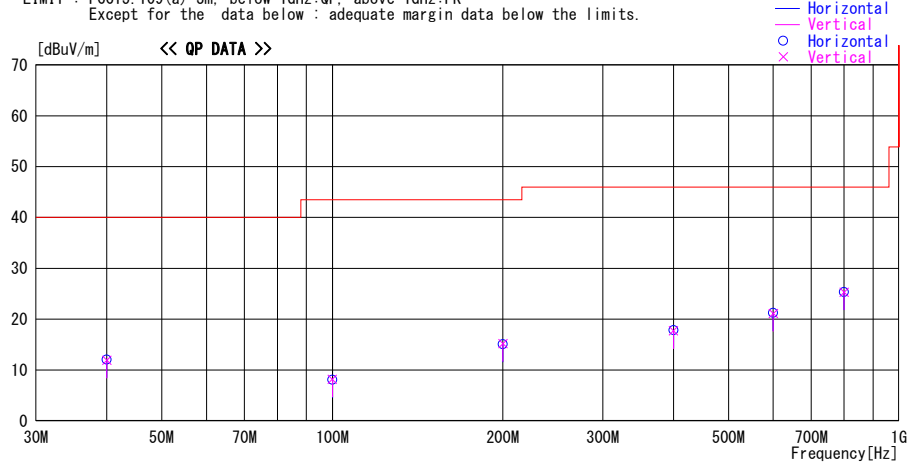
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
Date : 2015/10/18

Report No. : 11013344H
Temp./Humi. : 21deg. C / 59% RH
Engineer : Satofumi Matsuyama

Mode / Remarks : 5) (Refer to Section 4, Clause 4.1)

LIMIT : FCC15.109(a) 3m, below 1GHz:QP, above 1GHz:PK
Except for the data below : adequate margin data below the limits.



Frequency [MHz]	Reading [dBuV]	DET	Antenna		Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
			Factor [dB/m]	Loss & Gain [dB]							
40.000	22.4	QP	14.5	-25.0	11.9	0	100	Vert.	40.0	28.1	No Signal
40.000	22.5	QP	14.5	-25.0	12.0	0	300	Hori.	40.0	28.0	No Signal
100.000	22.3	QP	10.1	-24.3	8.1	0	300	Hori.	43.5	35.4	No Signal
100.000	22.4	QP	10.1	-24.3	8.2	0	100	Vert.	43.5	35.3	No Signal
200.000	21.7	QP	16.5	-23.1	15.1	0	300	Hori.	43.5	28.4	No Signal
200.000	21.8	QP	16.5	-23.1	15.2	0	100	Vert.	43.5	28.3	No Signal
400.000	21.5	QP	17.6	-21.4	17.7	0	200	Vert.	46.0	28.3	No Signal
400.000	21.6	QP	17.6	-21.4	17.8	0	200	Hori.	46.0	28.2	No Signal
600.000	21.9	QP	19.5	-20.3	21.1	0	200	Vert.	46.0	24.9	No Signal
600.000	22.0	QP	19.5	-20.3	21.2	0	200	Hori.	46.0	24.8	No Signal
800.000	21.8	QP	22.2	-18.7	25.3	0	200	Vert.	46.0	20.7	No Signal
800.000	21.8	QP	22.2	-18.7	25.3	0	200	Hori.	46.0	20.7	No Signal

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))

*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.

Radiated Emission (Above 1GHz)

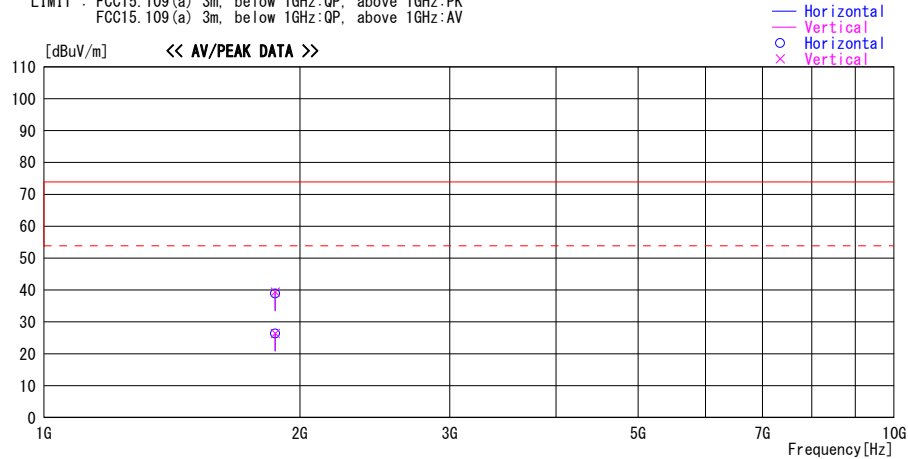
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
 Date : 2015/10/19

Report No. : 11013344H
 Temp./Humi. : 22deg. C / 53% RH
 Engineer : Shinya Watanabe

Mode / Remarks : 5) (Refer to Section 4, Clause 4.1)

LIMIT : FCC15.109(a) 3m, below 1GHz:QP, above 1GHz:PK
 FCC15.109(a) 3m, below 1GHz:QP, above 1GHz:AV



Frequency [MHz]	Reading [dBuV]	DET	Antenna	Loss &	Level	Angle	Height	Polar.	Limit	Margin	Comment
			Factor	Gain							
			[dB/m]	[dB]	[dBuV/m]	[Deg]	[cm]		[dBuV/m]	[dB]	
1870.920	42.9	PK	26.3	-30.3	38.9	0	100	Hori.	73.9	35.0	NS
1870.920	43.4	PK	26.3	-30.3	39.4	0	100	Vert.	73.9	34.5	NS
1870.920	30.4	AV	26.3	-30.3	26.4	0	100	Hori.	53.9	27.5	NS
1870.920	30.4	AV	26.3	-30.3	26.4	0	100	Vert.	53.9	27.5	NS

NS: No signal detected

CALCULATION: RESULT = READING + ANT FACTOR + LOSS & GAIN(CABLE+ATTEN. - GAIN (AMP)) Hz--:HORN
 CALCULATION : RESULT = READING + ANT FACTOR + LOSS & GAIN(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.

Radiated Emission
 (Below 1GHz)

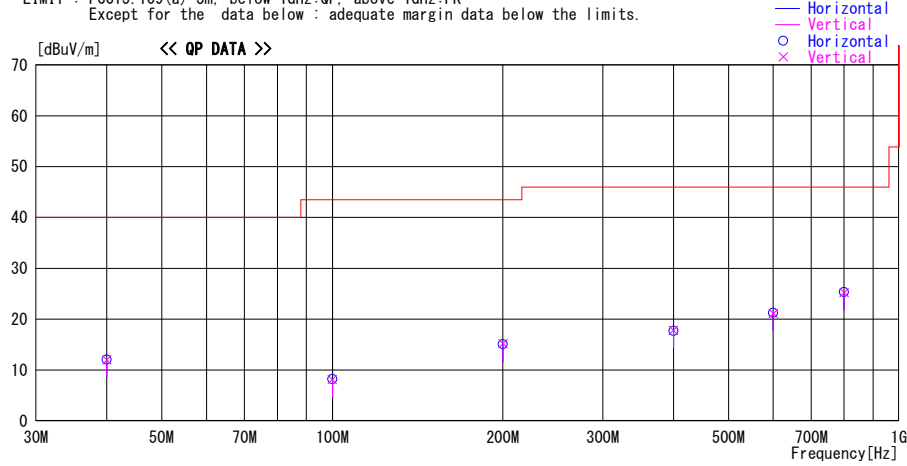
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
 Date : 2015/10/18

Report No. : 11013344H
 Temp./Humi. : 21deg. C / 59% RH
 Engineer : Satofumi Matsuyama

Mode / Remarks : 6) (Refer to Section 4, Clause 4.1)

LIMIT : FCC15.109(a) 3m, below 1GHz:QP, above 1GHz:PK
 Except for the data below : adequate margin data below the limits.



Frequency [MHz]	Reading [dBuV]	DET	Antenna		Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
			Factor [dB/m]	Loss & Gain [dB]							
40.000	22.5	QP	14.5	-25.0	12.0	0	100	Vert.	40.0	28.0	No Signal
40.000	22.5	QP	14.5	-25.0	12.0	0	300	Hori.	40.0	28.0	No Signal
100.000	22.4	QP	10.1	-24.3	8.2	0	300	Hori.	43.5	35.3	No Signal
100.000	22.3	QP	10.1	-24.3	8.1	0	100	Vert.	43.5	35.4	No Signal
200.000	21.7	QP	16.5	-23.1	15.1	0	300	Hori.	43.5	28.4	No Signal
200.000	21.8	QP	16.5	-23.1	15.2	0	100	Vert.	43.5	28.3	No Signal
400.000	21.6	QP	17.6	-21.4	17.8	0	200	Vert.	46.0	28.2	No Signal
400.000	21.5	QP	17.6	-21.4	17.7	0	200	Hori.	46.0	28.3	No Signal
600.000	21.9	QP	19.5	-20.3	21.1	0	200	Vert.	46.0	24.9	No Signal
600.000	22.0	QP	19.5	-20.3	21.2	0	200	Hori.	46.0	24.8	No Signal
800.000	21.7	QP	22.2	-18.7	25.2	0	200	Vert.	46.0	20.8	No Signal
800.000	21.8	QP	22.2	-18.7	25.3	0	200	Hori.	46.0	20.7	No Signal

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))

*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.

Radiated Emission
 (Above 1GHz)

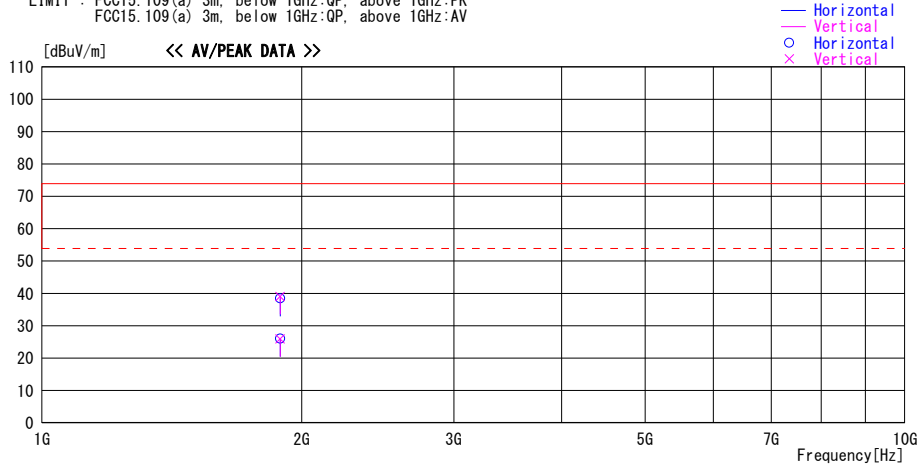
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
 Date : 2015/10/19

Report No. : 11013344H
 Temp./Humi. : 22deg. C / 53% RH
 Engineer : Shinya Watanabe

Mode / Remarks : 6) (Refer to Section 4, Clause 4.1)

LIMIT : FCC15.109(a) 3m, below 1GHz:QP, above 1GHz:PK
 FCC15.109(a) 3m, below 1GHz:QP, above 1GHz:AV



Frequency	Reading	DET	Antenna	Loss & Gain	Level	Angle	Height	Polar.	Limit	Margin	Comment
			Factor	Gain					[dBuV/m]	[dB]	
[MHz]	[dBuV]		[dB/m]	[dB]	[dBuV/m]	[Deg]	[cm]		[dBuV/m]	[dB]	
1888.200	42.4	PK	26.3	-30.2	38.5	0	100	Hori.	73.9	35.4	NS
1888.200	43.0	PK	26.3	-30.2	39.1	0	100	Vert.	73.9	34.8	NS
1888.200	29.9	AV	26.3	-30.2	26.0	0	100	Hori.	53.9	27.9	NS
1888.200	29.9	AV	26.3	-30.2	26.0	0	100	Vert.	53.9	27.9	NS

NS: No signal detected

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))

*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.

Radiated Emission
(Below 1GHz)

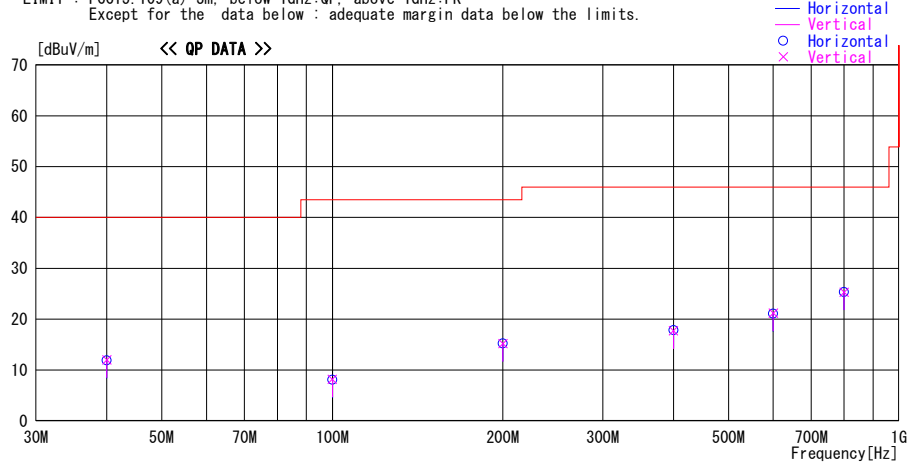
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
Date : 2015/10/18

Report No. : 11013344H
Temp./Humi. : 21deg. C / 59% RH
Engineer : Satofumi Matsuyama

Mode / Remarks : 7) (Refer to Section 4, Clause 4.1)

LIMIT : FCC15.109(a) 3m, below 1GHz:QP, above 1GHz:PK
Except for the data below : adequate margin data below the limits.



Frequency [MHz]	Reading [dBuV]	DET	Antenna		Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
			Factor [dB/m]	Loss & Gain [dB]							
40.000	22.5	QP	14.5	-25.0	12.0	0	100	Vert.	40.0	28.0	No Signal
40.000	22.4	QP	14.5	-25.0	11.9	0	300	Hori.	40.0	28.1	No Signal
100.000	22.3	QP	10.1	-24.3	8.1	0	300	Hori.	43.5	35.4	No Signal
100.000	22.4	QP	10.1	-24.3	8.2	0	100	Vert.	43.5	35.3	No Signal
200.000	21.8	QP	16.5	-23.1	15.2	0	300	Hori.	43.5	28.3	No Signal
200.000	21.8	QP	16.5	-23.1	15.2	0	100	Vert.	43.5	28.3	No Signal
400.000	21.5	QP	17.6	-21.4	17.7	0	200	Vert.	46.0	28.3	No Signal
400.000	21.6	QP	17.6	-21.4	17.8	0	200	Hori.	46.0	28.2	No Signal
600.000	22.0	QP	19.5	-20.3	21.2	0	200	Vert.	46.0	24.8	No Signal
600.000	21.9	QP	19.5	-20.3	21.1	0	200	Hori.	46.0	24.9	No Signal
800.000	21.8	QP	22.2	-18.7	25.3	0	200	Vert.	46.0	20.7	No Signal
800.000	21.8	QP	22.2	-18.7	25.3	0	200	Hori.	46.0	20.7	No Signal

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))

*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.

Radiated Emission
 (Above 1GHz)

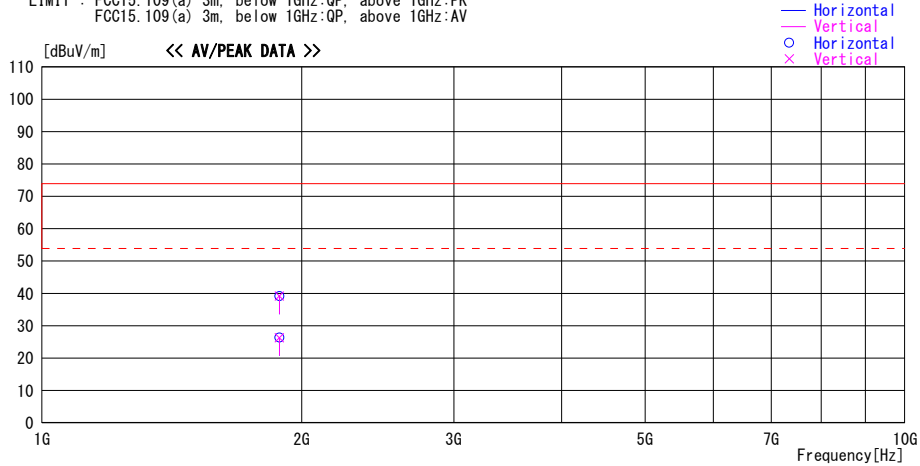
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
 Date : 2015/10/19

Report No. : 11013344H
 Temp./Humi. : 22deg. C / 53% RH
 Engineer : Shinya Watanabe

Mode / Remarks : 7) (Refer to Section 4, Clause 4.1)

LIMIT : FCC15.109(a) 3m, below 1GHz:QP, above 1GHz:PK
 FCC15.109(a) 3m, below 1GHz:QP, above 1GHz:AV



Frequency [MHz]	Reading [dBuV]	DET	Antenna	Loss & Gain	Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
			Factor [dB/m]	Gain [dB]							
1884.420	43.0	PK	26.3	-30.2	39.1	0	100	Hori.	73.9	34.8	NS
1884.420	43.1	PK	26.3	-30.2	39.2	0	100	Vert.	73.9	34.7	NS
1884.420	30.2	AV	26.3	-30.2	26.3	0	100	Hori.	53.9	27.6	NS
1884.420	30.2	AV	26.3	-30.2	26.3	0	100	Vert.	53.9	27.6	NS

NS: No signal detected

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))

*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.

Radiated Emission
(Below 1GHz)

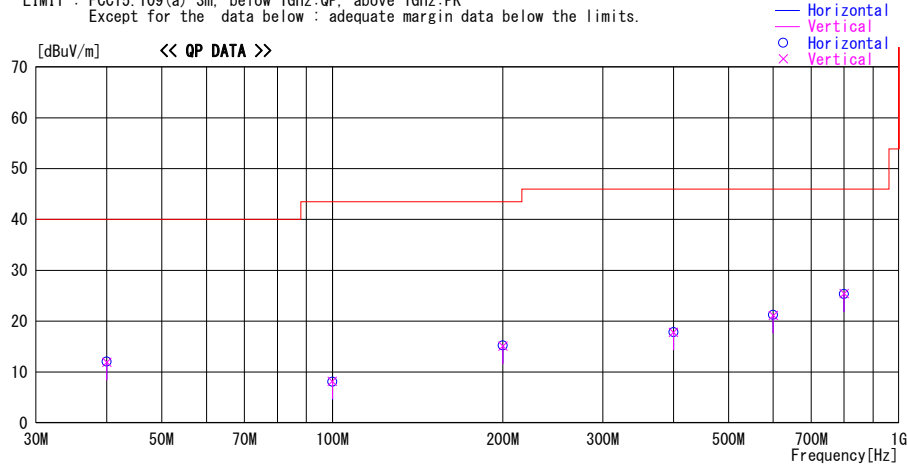
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
Date : 2015/10/18

Report No. : 11013344H
Temp./Humi. : 21deg. C / 59% RH
Engineer : Satofumi Matsuyama

Mode / Remarks : 8) (Refer to Section 4, Clause 4.1)

LIMIT : FCC15.109(a) 3m, below 1GHz:QP, above 1GHz:PK
Except for the data below : adequate margin data below the limits.



Frequency [MHz]	Reading [dBuV]	DET	Antenna		Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
			Factor [dB/m]	Loss & Gain [dB]							
40.000	22.4	QP	14.5	-25.0	11.9	0	100	Vert.	40.0	28.1	No Signal
40.000	22.5	QP	14.5	-25.0	12.0	0	300	Hori.	40.0	28.0	No Signal
100.000	22.3	QP	10.1	-24.3	8.1	0	300	Hori.	43.5	35.4	No Signal
100.000	22.4	QP	10.1	-24.3	8.2	0	100	Vert.	43.5	35.3	No Signal
200.000	21.8	QP	16.5	-23.1	15.2	0	300	Hori.	43.5	28.3	No Signal
200.000	21.7	QP	16.5	-23.1	15.1	0	100	Vert.	43.5	28.4	No Signal
400.000	21.6	QP	17.6	-21.4	17.8	0	200	Vert.	46.0	28.2	No Signal
400.000	21.6	QP	17.6	-21.4	17.8	0	200	Hori.	46.0	28.2	No Signal
600.000	21.9	QP	19.5	-20.3	21.1	0	200	Vert.	46.0	24.9	No Signal
600.000	22.0	QP	19.5	-20.3	21.2	0	200	Hori.	46.0	24.8	No Signal
800.000	21.9	QP	22.2	-18.7	25.4	0	200	Vert.	46.0	20.6	No Signal
800.000	21.8	QP	22.2	-18.7	25.3	0	200	Hori.	46.0	20.7	No Signal

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))

*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.

Radiated Emission
 (Above 1GHz)

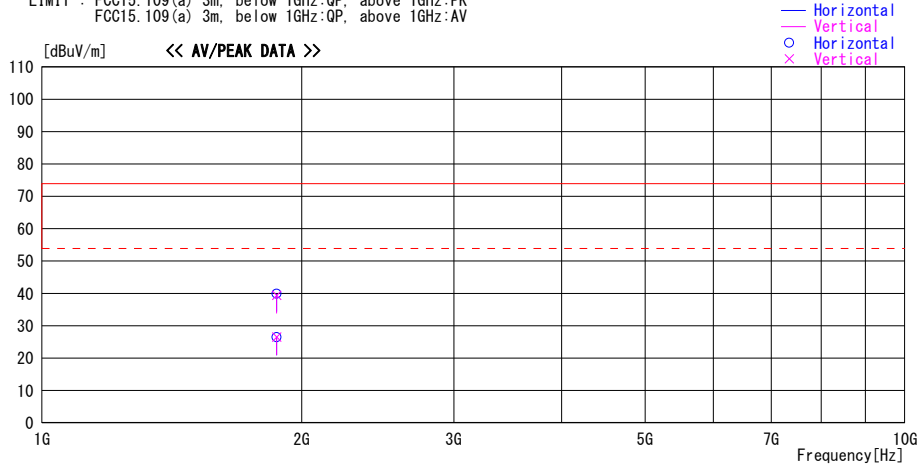
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
 Date : 2015/10/19

Report No. : 11013344H
 Temp./Humi. : 22deg. C / 53% RH
 Engineer : Shinya Watanabe

Mode / Remarks : 8) (Refer to Section 4, Clause 4.1)

LIMIT : FCC15.109(a) 3m, below 1GHz:QP, above 1GHz:PK
 FCC15.109(a) 3m, below 1GHz:QP, above 1GHz:AV



Frequency [MHz]	Reading [dBuV]	DET	Antenna	Loss & Gain	Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
			Factor [dB/m]	Gain [dB]							
1870.920	43.9	PK	26.3	-30.3	39.9	0	100	Hori.	73.9	34.0	NS
1870.920	43.4	PK	26.3	-30.3	39.4	0	100	Vert.	73.9	34.5	NS
1870.920	30.5	AV	26.3	-30.3	26.5	0	100	Hori.	53.9	27.4	NS
1870.920	30.5	AV	26.3	-30.3	26.5	0	100	Vert.	53.9	27.4	NS

NS: No signal detected

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))

*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.

Antenna Terminal Conducted Emission (Below 1GHz)

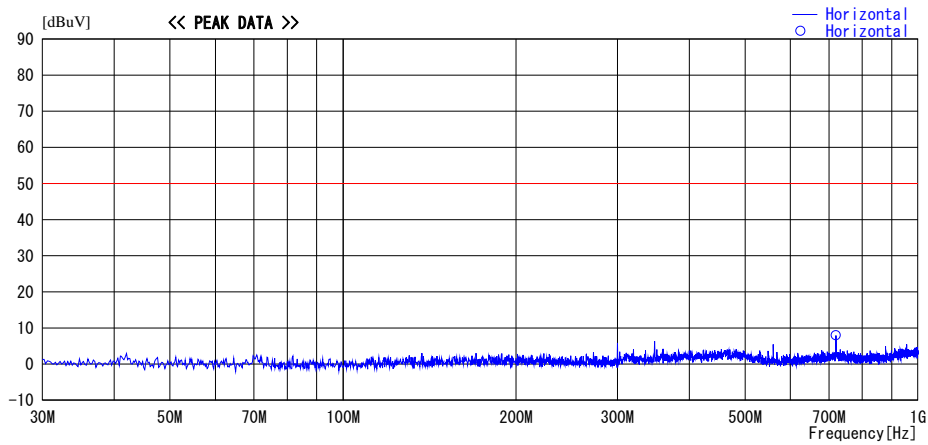
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Ise EMC Lab. No.7 shielded room
 Date : 2015/10/21

Report No. : 11013344H
 Temp./Humi. : 23deg. C / 51% RH
 Engineer : Shinya Watanabe

Mode / Remarks : 3) (Refer to Section 4, Clause 4.1)

LIMIT : FCC15.111 Antenna terminal measurement
 All other spurious emissions were less than 20dB for the limit.



Frequency [MHz]	Reading [dBuV]	DET	Antenna	Loss&	Level [dBuV]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
			Factor [dB/m]	Gain [dB]					
720.000	29.8	PK	0.0	-21.8	8.0	-	50.0	42.0	

CALCULATION: RESULT = READING + LOSS & GAIN(CABLE+ATTEN. - GAIN (AMP))

UL Japan, Inc.
Ise EMC Lab.

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

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Antenna Terminal Conducted Emission
 (Above 1GHz)

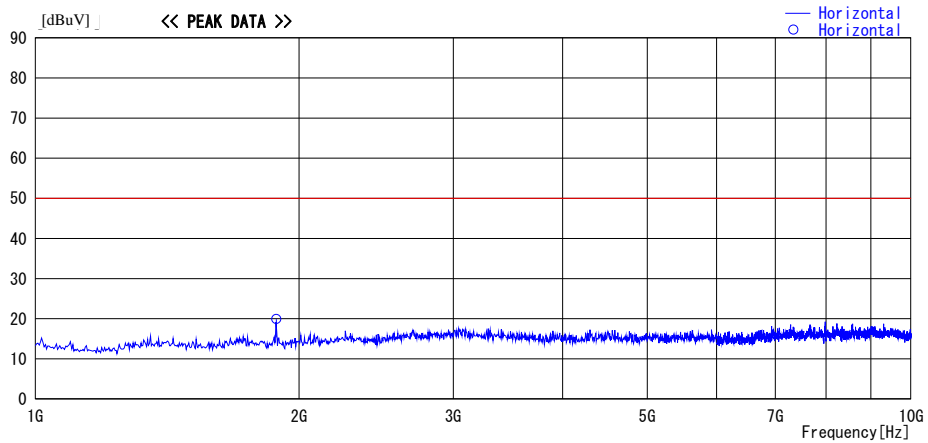
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Ise EMC Lab. No.7 shielded room
 Date : 2015/10/21

Report No. : 11013344H
 Temp./Humi. : 23deg. C / 51% RH
 Engineer : Shinya Watanabe

Mode / Remarks : 3) (Refer to Section 4, Clause 4.1)

LIMIT : FCC15.111 Antenna terminal measurement
 All other spurious emissions were less than 20dB for the limit.



Frequency [MHz]	Reading [dBuV]	DET	Antenna	Loss&	Level [dBuV]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
			Factor [dB/m]	Gain [dB]					
1884.420	41.3	PK	0.0	-21.4	19.9	-	50.0	30.1	

CALCULATION: RESULT = READING + LOSS & GAIN(CABLE+ATTEN. - GAIN (AMP))

Antenna Terminal Conducted Emission
 (Below 1GHz)

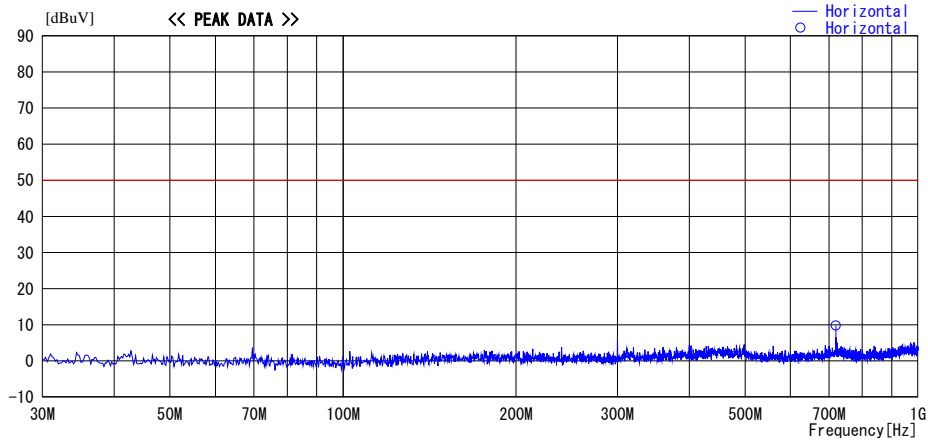
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Ise EMC Lab. No.7 shielded room
 Date : 2015/10/21

Report No. : 11013344H
 Temp./Humi. : 23deg. C / 51% RH
 Engineer : Shinya Watanabe

Mode / Remarks : 5) (Refer to Section 4, Clause 4.1)

LIMIT : FCC15.111 Antenna terminal measurement
 All other spurious emissions were less than 20dB for the limit.



Frequency [MHz]	Reading [dBuV]	DET	Antenna	Loss&	Level [dBuV]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
			Factor [dB/m]	Gain [dB]					
720.000	31.6	PK	0.0	-21.8	9.8	-	50.0	40.2	

CALCULATION: RESULT = READING + LOSS & GAIN(CABLE+ATTEN. - GAIN (AMP))

Antenna Terminal Conducted Emission
 (Above 1GHz)

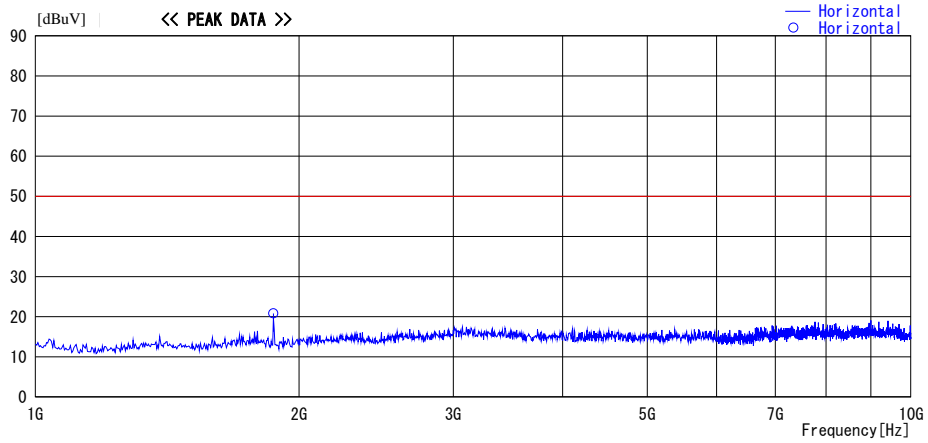
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Ise EMC Lab. No.7 shielded room
 Date : 2015/10/21

Report No. : 11013344H
 Temp./Humi. : 23deg. C / 51% RH
 Engineer : Shinya Watanabe

Mode / Remarks : 5) (Refer to Section 4, Clause 4.1)

LIMIT : FCC15.111 Antenna terminal measurement
 All other spurious emissions were less than 20dB for the limit.



Frequency [MHz]	Reading [dBuV]	DET	Antenna	Loss&	Level [dBuV]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
			Factor [dB/m]	Gain [dB]					
1870.920	42.3	PK	0.0	-21.5	20.8	-	50.0	29.2	

CALCULATION: RESULT = READING + LOSS & GAIN(CABLE+ATTEN. - GAIN (AMP))

Antenna Terminal Conducted Emission
 (Below 1GHz)

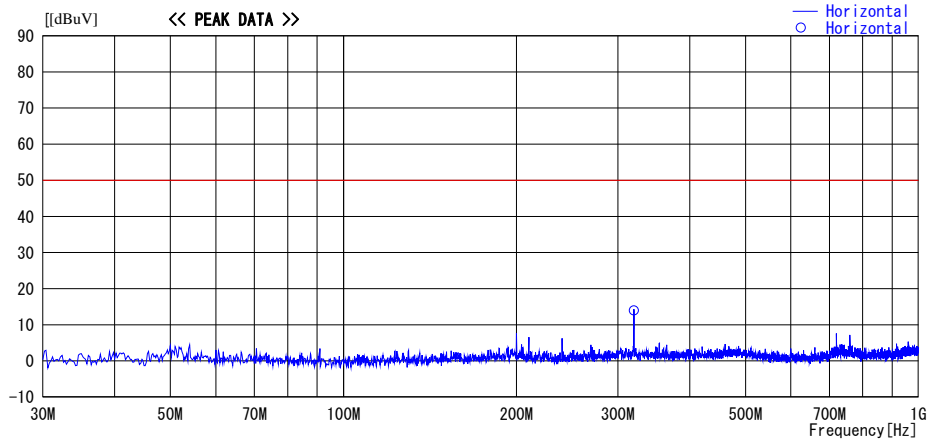
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Ise EMC Lab. No.7 shielded room
 Date : 2015/10/21

Report No. : 11013344H
 Temp./Humi. : 23deg. C / 51% RH
 Engineer : Shinya Watanabe

Mode / Remarks : 6) (Refer to Section 4, Clause 4.1)

LIMIT : FCC15.111 Antenna terminal measurement
 All other spurious emissions were less than 20dB for the limit.



Frequency [MHz]	Reading [dBuV]	DET	Antenna	Loss&	Level [dBuV]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
			Factor [dB/m]	Gain [dB]					
320.000	35.7	PK	0.0	-21.7	14.0	-	50.0	36.0	

CALCULATION: RESULT = READING + LOSS & GAIN(CABLE+ATTEN. - GAIN (AMP))

Antenna Terminal Conducted Emission (Above 1GHz)

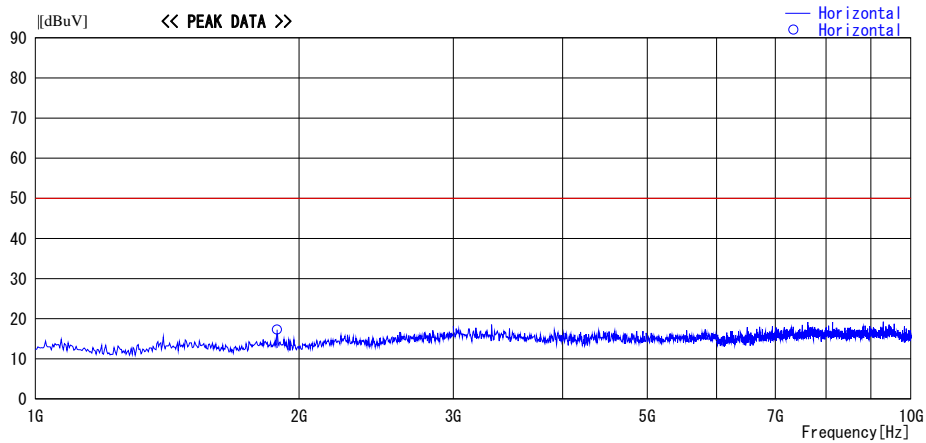
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Ise EMC Lab. No.7 shielded room
 Date : 2015/10/21

Report No. : 11013344H
 Temp./Humi. : 23deg. C / 51% RH
 Engineer : Shinya Watanabe

Mode / Remarks : 6) (Refer to Section 4, Clause 4.1)

LIMIT : FCC15.111 Antenna terminal measurement
 All other spurious emissions were less than 20dB for the limit.



Frequency [MHz]	Reading [dBuV]	DET	Antenna	Loss&	Level [dBuV]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
			Factor [dB/m]	Gain [dB]					
1888.200	38.7	PK	0.0	-21.4	17.3	-	50.0	32.7	

CALCULATION: RESULT = READING + LOSS & GAIN(CABLE+ATTEN. - GAIN (AMP))

Antenna Terminal Conducted Emission (Below 1GHz)

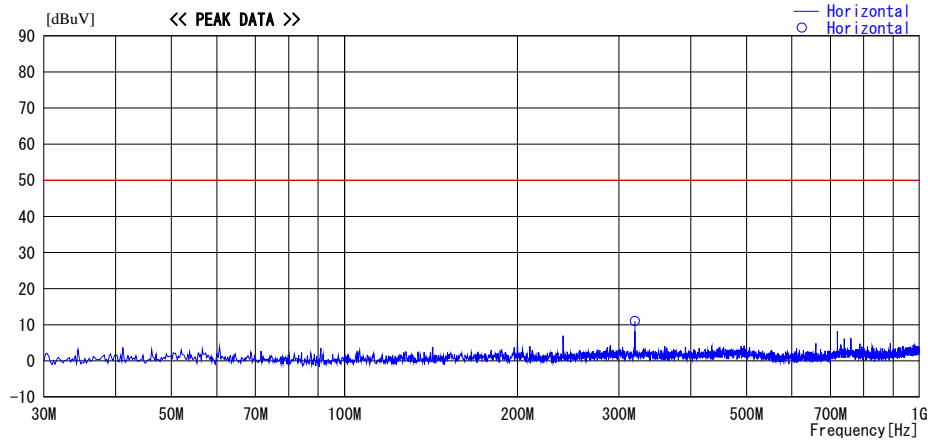
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Ise EMC Lab. No.7 shielded room
 Date : 2015/10/21

Report No. : 11013344H
 Temp./Humi. : 23deg. C / 51% RH
 Engineer : Shinya Watanabe

Mode / Remarks : 7) (Refer to Section 4, Clause 4.1)

LIMIT : FCC15.111 Antenna terminal measurement
 All other spurious emissions were less than 20dB for the limit.



Frequency [MHz]	Reading [dBuV]	DET	Antenna	Loss&	Level [dBuV]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
			Factor [dB/m]	Gain [dB]					
320.000	32.7	PK	0.0	-21.7	11.0	-	50.0	39.0	

CALCULATION: RESULT = READING + LOSS & GAIN(CABLE+ATTEN. - GAIN (AMP))

Antenna Terminal Conducted Emission (Above 1GHz)

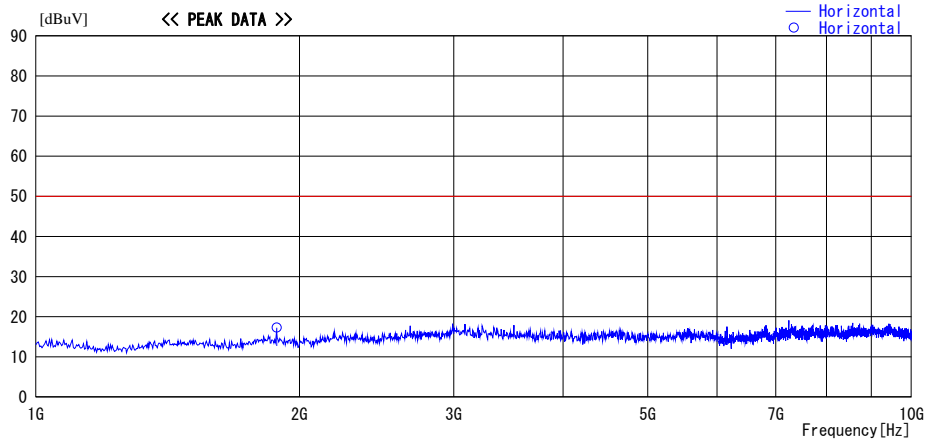
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Ise EMC Lab. No.7 shielded room
 Date : 2015/10/21

Report No. : 11013344H
 Temp./Humi. : 23deg. C / 51% RH
 Engineer : Shinya Watanabe

Mode / Remarks : 7) (Refer to Section 4, Clause 4.1)

LIMIT : FCC15.111 Antenna terminal measurement
 All other spurious emissions were less than 20dB for the limit.



Frequency [MHz]	Reading [dBuV]	DET	Antenna	Loss&	Level [dBuV]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
			Factor [dB/m]	Gain [dB]					
1884.420	38.7	PK	0.0	-21.4	17.3	-	50.0	32.7	

CALCULATION: RESULT = READING + LOSS & GAIN(CABLE+ATTEN. - GAIN (AMP))

UL Japan, Inc.
Ise EMC Lab.

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

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Antenna Terminal Conducted Emission (Below 1GHz)

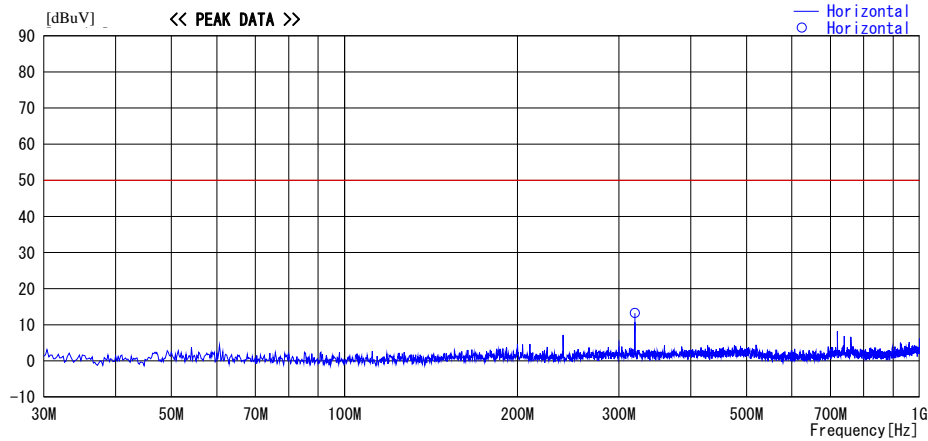
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Ise EMC Lab. No.7 shielded room
 Date : 2015/10/21

Report No. : 11013344H
 Temp./Humi. : 23deg. C / 51% RH
 Engineer : Shinya Watanabe

Mode / Remarks : 8) (Refer to Section 4, Clause 4.1)

LIMIT : FCC15.111 Antenna terminal measurement
 All other spurious emissions were less than 20dB for the limit.



Frequency [MHz]	Reading [dBuV]	DET	Antenna	Loss&	Level [dBuV]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
			Factor [dB/m]	Gain [dB]					
320.000	34.9	PK	0.0	-21.7	13.2	-	50.0	36.8	

CALCULATION: RESULT = READING + LOSS & GAIN(CABLE+ATTEN. - GAIN (AMP))

Antenna Terminal Conducted Emission (Above 1GHz)

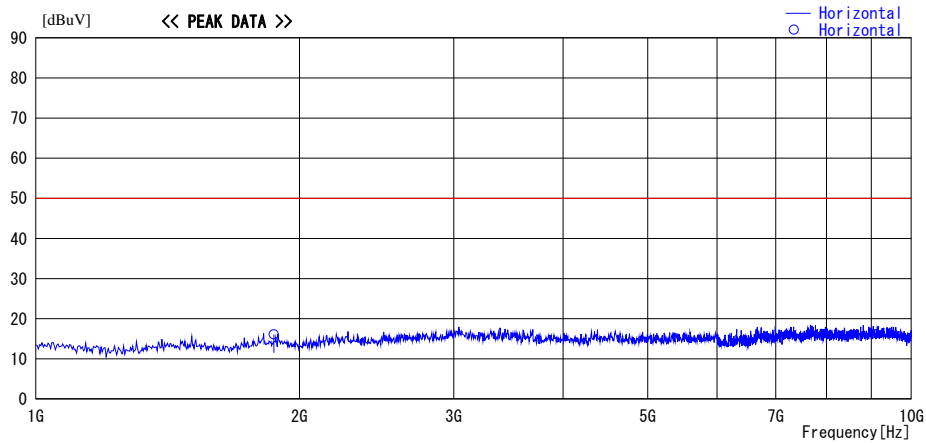
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Ise EMC Lab. No.7 shielded room
 Date : 2015/10/21

Report No. : 11013344H
 Temp./Humi. : 23deg. C / 51% RH
 Engineer : Shinya Watanabe

Mode / Remarks : 8) (Refer to Section 4, Clause 4.1)

LIMIT : FCC15.111 Antenna terminal measurement
 All other spurious emissions were less than 20dB for the limit.



Frequency [MHz]	Reading [dBuV]	DET	Antenna	Loss&	Level [dBuV]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
			Factor [dB/m]	Gain [dB]					
1870.920	37.6	PK	0.0	-21.5	16.1	-	50.0	33.9	

CALCULATION: RESULT = READING + LOSS & GAIN(CABLE+ATTEN. - GAIN (AMP))

UL Japan, Inc.
Ise EMC Lab.

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

APPENDIX 2: Test instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MAEC-03	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE	2015/10/01 * 12
MOS-13	Thermo-Hygrometer	Custom	CTH-180	1301	RE	2015/01/13 * 12
MJM-16	Measure	KOMELON	KMC-36	-	RE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE/AT	-
MSA-14	Spectrum Analyzer	Agilent	E4440A	MY48250080	RE	2015/10/07 * 12
MBA-03	Biconical Antenna	Schwarzbeck	BBA9106	1915	RE	2014/10/18 * 12
MLA-03	Logperiodic Antenna	Schwarzbeck	USLP9143	174	RE	2014/10/18 * 12
MCC-51	Coaxial cable	UL Japan	-	-	RE	2015/07/13 * 12
MAT-70	Attenuator(6dB)	Agilent	8491A-006	MY52460153	RE	2015/04/08 * 12
MPA-13	Pre Amplifier	SONOMA INSTRUMENT	310	260834	RE	2015/03/10 * 12
MMM-08	DIGITAL HiTESTER	Hioki	3805	051201197	RE	2015/01/16 * 12
MHA-20	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	258	RE	2015/05/18 * 12
MCC-167	Microwave Cable	Junkosha	MWX221	1404S374(1m) / 1405S074(5m)	RE	2015/05/21 * 12
MPA-11	MicroWave System Amplifier	Agilent	83017A	MY39500779	RE	2015/03/19 * 12
MOS-34	Thermo-Hygrometer	Custom	CTH-201	3401	AT	2015/01/13 * 12
MRENT-126	Spectrum Analyzer	KEYSIGHT	E4440A	MY46185516	AT	2015/07/31 * 12
MAT-10	Attenuator(10dB)	Weinschel Corp	2	BL1173	AT	2014/11/19 * 12
MCC-38	Coaxial Cable	UL Japan	-	-	AT	2014/12/02 * 12
MPA-14	Pre Amplifier	SONOMA INSTRUMENT	310	260833	AT	2015/03/09 * 12
MAT-25	Attenuator(10dB)(above 1GHz)	Agilent	8493C	71642	AT	2015/06/18 * 12
MCC-66	Microwave Cable 1G-40GHz	Suhner	SUCOFLEX102	28636/2	AT	2015/04/02 * 12
MPA-11	MicroWave System Amplifier	Agilent	83017A	MY39500779	AT	2015/03/19 * 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:

RE: Radiated emission

AT: Antenna Terminal

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