RADIO TEST REPORT

Test Report No. : 31DE0263-HO-02-A

Applicant	:	**Fuji Heavy Industries Ltd.**
Type of Equipment	:	**Smart LF Oscillator**
Model No.	:	**SSPLF03**
FCC ID	:	**Y8PSSPLF03**
Test regulation	:	**FCC Part 15 Subpart C 2010** **Section 15.207, Section 15.209**
Test Result	:	**Complied**

1. This test report shall not be reproduced in full or partial, without the written approval of UL Japan, Inc.
2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with above regulation.
4. The test results in this report are traceable to the national or international standards.
5. This test report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

Date of test: January 12 and 13, 2011

Representative test engineer:

Motoya Imura
Engineer of WiSE Japan, UL Verification Service

Approved by :

Shinya Watanabe
Leader of WiSE Japan, UL Verification Service

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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SECTION 1: Customer information

Company Name	:	Fuji Heavy Industries Ltd.
Address	:	1-7-2, Nishishinjuku, Shinjuku, Tokyo, 160-8316 Japan
Contact Person	:	Takashi Nishida

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

2.1 Identification of E.U.T.

Type of Equipment	:	Smart LF Oscillator
Model No.	:	SSPLF03
Serial No.	:	Refer to Section 4, Clause 4.2
Rating	:	DC12.0V (Max 0.5A)
Receipt Date of Sample	:	January 11, 2011
Country of Mass-production	:	Japan
Condition of EUT	:	Production 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

Smart LF Oscillator, model: SSPLF03 is a transmitter that is installed in a motor vehicle and is used as part of Smart System.

Radio Specification

Radio Type	:	Transmitter
Frequency of Operation	:	134.2kHz
Modulation	:	ASK
Method of Frequency Genenration	:	Crystal
Antenna type	:	Coil Antenna
Duty Cycle	:	up to 100 %

Smart LF Oscillator (model: SSPLF03) consists of the following parts:

- Computer Assy, Smart Key (ECU)
- Door Antenna
- Trunk Antenna
- Room Antenna / Luggage Antenna

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification	:	FCC Part15 Subpart C: 2010, final revised on December 6, 2010 and effective January 5, 2011
Title	:	FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators Section 15.207 Conducted Emission Section 15.209 Radiated emission limits, general requirements

FCC 15.31 (e)

The stable voltage (DC2.3 to 6.2V*) is constantly provided to RF Part through the regulator regardless of voltage fluctuation of car battery(DC12V). Therefore, this EUT complies with the requirement.
*The regulated voltage value differs depending on connected LF antennas.

FCC Part 15.203 Antenna requirement

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

3.2 Procedures and results

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst margin	Results
1	Conducted Emission	<FCC> ANSI C63.4:2003 7. AC powerline conducted emission measurements <IC> RSS-Gen 7.2.4	<FCC> Section 15.207 <IC> RSS-Gen 7.2.4	-	N/A *1)	N/A	N/A
2	Electric Field Strength of Fundamental Emission	<FCC> ANSI C63.4:2003 13. Measurement of intentional radiators <IC> RSS-Gen 4.8, 4.11	<FCC> Section 15.209 <IC> RSS-210 2.5.1 RSS-Gen 7.2.5	Radiated	N/A	21.7dB 0.13420MHz, AV, 0deg. (Door Antenna)	Complied
3	Electric Field Strength of Spurious Emission	<FCC> ANSI C63.4:2003 13. Measurement of intentional radiators <IC> RSS-Gen 4.9, 4.11	<FCC> Section 15.209 <IC> RSS-210 2.5.1 RSS-Gen 7.2.5	Radiated	N/A	12.9dB 0.67100MHz, QP, (Door Antenna)	Complied
4	-26dB Bandwidth	<FCC> ANSI C63.4:2003 13. Measurement of intentional radiators <IC> -	<FCC> Reference data <IC> -	Radiated	N/A	N/A	N/A

Note: UL Japan, Inc.'s EMI Work Procedures No.QPM05 and QPM15.
*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.	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)	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	3.5dB	5.1dB	5.2dB	4.8dB	5.1dB	4.4dB	4.3dB
No.2	4.0dB	5.1dB	5.2dB	4.8dB	5.0dB	4.3dB	4.2dB
No.3	4.2dB	4.7dB	5.2dB	4.8dB	5.0dB	4.5dB	4.2dB
No.4	4.0dB	5.0dB	5.1dB	4.8dB	5.0dB	5.1dB	4.2dB

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

Radiated emission test(3m)
The data listed in this test report has enough margin, more than the site margin.

3.5 Test Location

UL Japan, Inc. Head Office EMC Lab. *NVLAP Lab. code: 200572-0
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN
Telephone : +81 596 24 8116 Facsimile : +81 596 24 8124

	FCC Registration Number	IC Registration Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Other rooms
No.1 semi-anechoic chamber	313583	2973C-1	19.2 x 11.2 x 7.7m	7.0 x 6.0m	No.1 Power source room
No.2 semi-anechoic chamber	655103	2973C-2	7.5 x 5.8 x 5.2m	4.0 x 4.0m	-
No.3 semi-anechoic chamber	148738	2973C-3	12.0 x 8.5 x 5.9m	6.8 x 5.75m	No.3 Preparation room
No.3 shielded room	-	-	4.0 x 6.0 x 2.7m	N/A	-
No.4 semi-anechoic chamber	134570	2973C-4	12.0 x 8.5 x 5.9m	6.8 x 5.75m	No.4 Preparation room
No.4 shielded room	-	-	4.0 x 6.0 x 2.7m	N/A	-
No.5 semi-anechoic chamber	-	-	6.0 x 6.0 x 3.9m	6.0 x 6.0m	-
No.6 shielded room	-	-	4.0 x 4.5 x 2.7m	4.75 x 5.4 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 4.5 x 2.8m	2.0 x 2.0m	-
No.10 measurement room	-	-	2.6 x 2.8 x 2.5m	2.4 x 2.4m	-
No.11 measurement room	-	-	3.1 x 3.4 x 3.0m	2.4 x 3.4m	-

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

3.6 Test set up, Data of EMI, and Test instruments

Refer to APPENDIX 1 to 3.

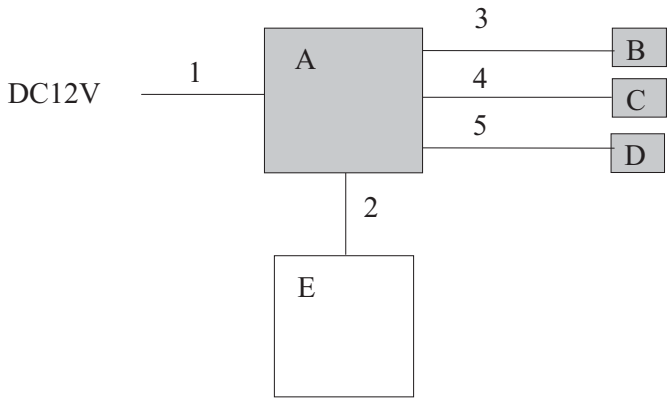
SECTION 4: Operation of E.U.T. during testing

4.1 Operating Modes

The mode is used : 1) Transmitting mode (Tx) 134.2kHz (Door Antenna, Trunk Antenna, Room Antenna / Luggage Antenna, Maximum Output)
2) Transmitting mode (Tx) 134.2kHz (Room Antenna / Luggage Antenna only, Minimum Output)
* LF output power is controlled by Component Assy, Smart Key.

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

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	Remark
A	Computer Assy, Smart Key (ECU)	-	001	-	EUT
B	Door Antenna	-	001	-	EUT
C	Room Antenna / Luggage Antenna	-	001	-	EUT
D	Trunk Antenna	-	001	-	EUT
E	Jig Box	-	-	-	-

List of cables used

No.	Name	Length (m)	Shield		Remark
			Cable	Connector	
1	DC Cable	2.8	Unshielded	Unshielded	-
2	ECU Cable	2.0	Unshielded	Unshielded	-
3	Door Ant Cable	2.0	Unshielded	Unshielded	-
4	Room Ant / Luggage Ant Cable	2.0	Unshielded	Unshielded	-
5	Trunk Ant Cable	2.0	Unshielded	Unshielded	-

SECTION 5: Radiated emission (Fundamental and Spurious Emission)

Test Procedure
The Radiated Electric Field Strength intensity has been measured on No 2 and 4 semi anechoic chambers with a ground plane and at a distance of 3m.

Frequency : From 9kHz to 30MHz at distance 3m
The EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.
The measurements were performed for vertical polarization (antenna angle: 0deg., 45deg., 90deg., 135deg and 180deg.)
and horizontal polarization.
*Refer to Figure 1 about Direction of the Loop Antenna.

Frequency : From 30MHz to 1GHz at distance 3m
The measuring antenna height varied between 1 and 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.
The measurements were performed for both vertical and horizontal antenna polarization.

Measurements were performed with a QP, PK, and AV detector.
The radiated emission measurements were made with the following detector function of the test receiver (below 1GHz).

	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
Detector Type	PK/AV	QP	PK/AV	QP	QP
IF Bandwidth	200Hz	200Hz	9kHz	9kHz	120kHz

- The carrier level (or, noise levels) was (or were) measured at each position of all three axes X, Y and Z, and the position that has the maximum noise was determined.
With the position, the noise levels of all the frequencies were measured.

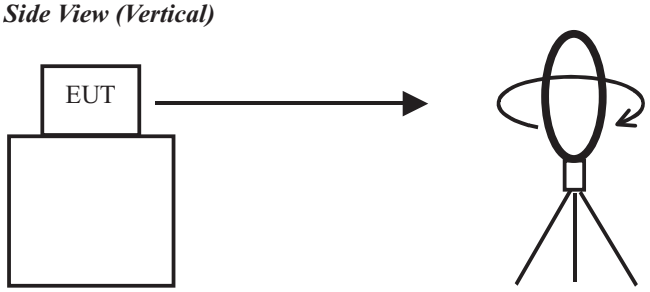
* Part 15 Section 15.31 (f)(2) (9kHz-30MHz)
[Limit at 3m]=[Limit at 300m]-40 x log (3[m]/300[m])
[Limit at 3m]=[Limit at 30m]-40 x log (3[m]/30[m])

Test data : APPENDIX 2
Test result : Pass

Date: January 12 and 13, 2011 Test engineer: Satofumi Matsuyama

Figure 1: Direction of the Loop Antenna

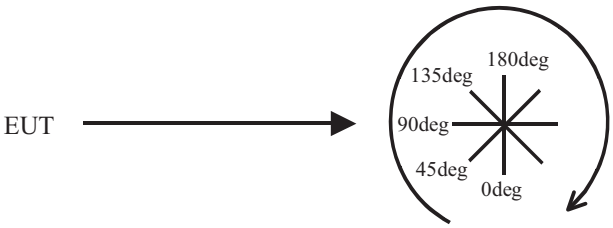
Side View (Vertical)



Top View (Horizontal)

Antenna was not rotated.

Top View (Vertical)



Front side: 0 deg.
Forward direction: clockwise

SECTION 6: -26dB Bandwidth

Test Procedure

The measurement was performed in the antenna height to gain the maximum of Electric field strength.

Test data : **APPENDIX 2**
Test result : **Pass**

SECTION 7: 99% Occupied Bandwidth

Test Procedure

The measurement was performed in the antenna height to gain the maximum of Electric field strength.

Test data : **APPENDIX 2**
Test result : **Pass**

APPENDIX 1: Photographs of test setup

Radiated emission

Door Antenna

Photo 1

Photo 2

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Radiated emission

Trunk Antenna

Photo 1

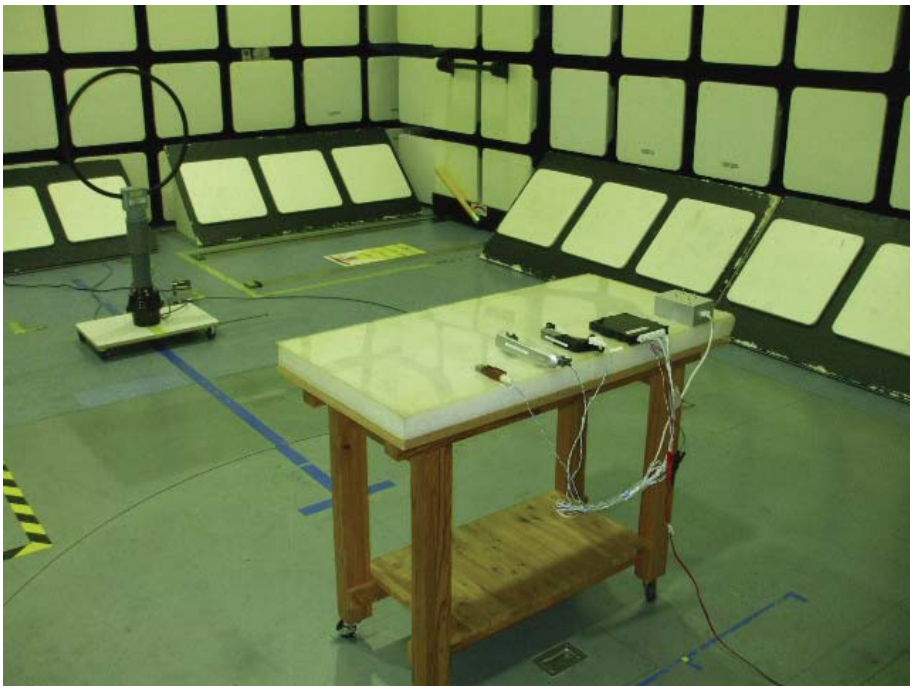

Photo 2

Radiated emission

Room Antenna / Luggage Antenna

Photo 1

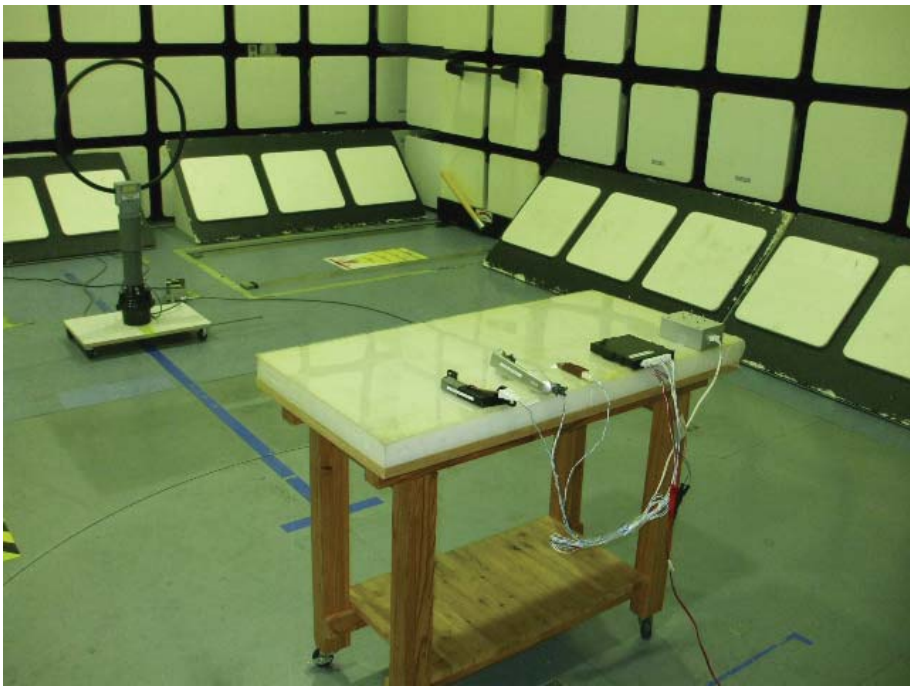

Photo 2

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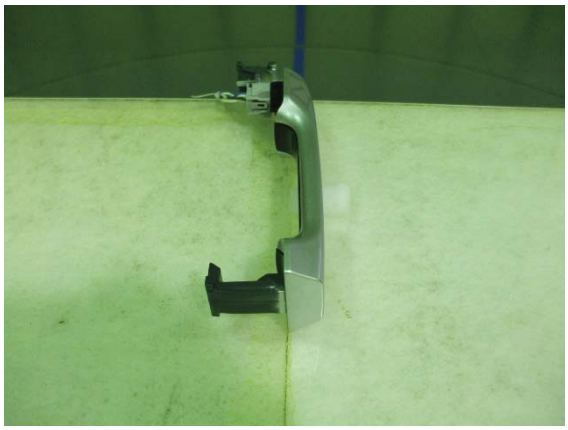
Worst Case Position

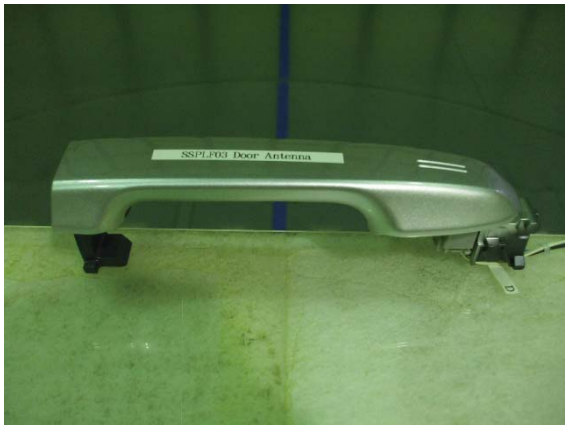
Door Antenna
Below 30MHz:X-axis
Above 30MHz(Hori:X-axis /Vert:X-axis)

X-axis



Y-axis

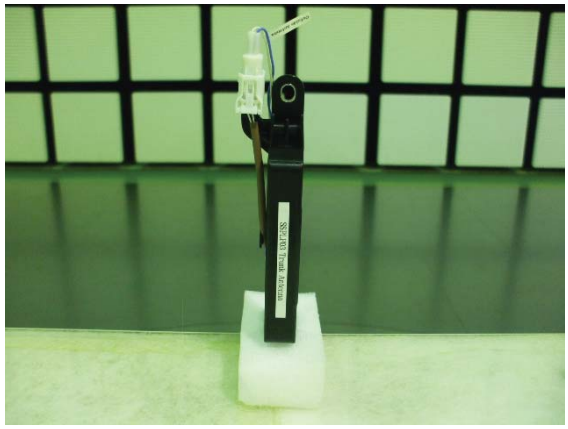
Z-axis



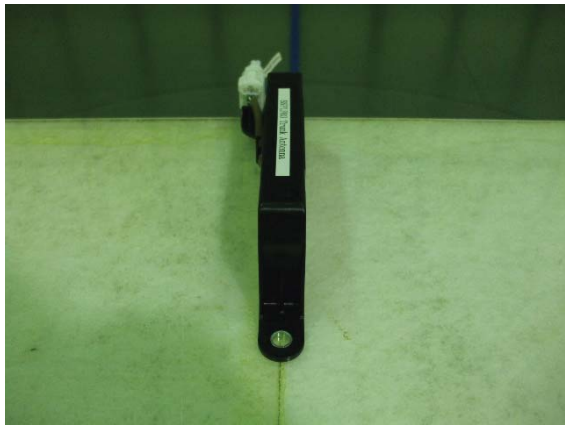
Trunk Antenna
Below 30MHz:X-axis
Above 30MHz(Hori:X-axis /Vert:X-axis)

X-axis

Y-axis



Z-axis



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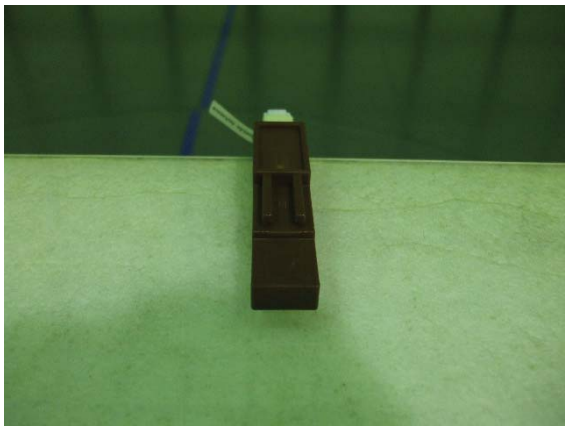
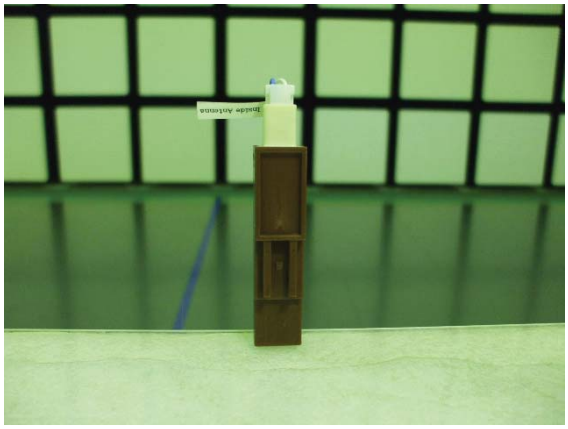
Worst Case Position

Room Antenna / Luggage Antenna
Below 30MHz:X-axis
Above 30MHz(Hori:Z-axis /Vert:Y-axis)

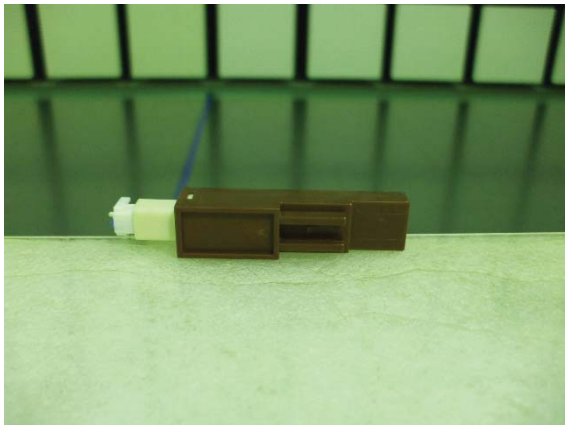
X-axis



Y-axis

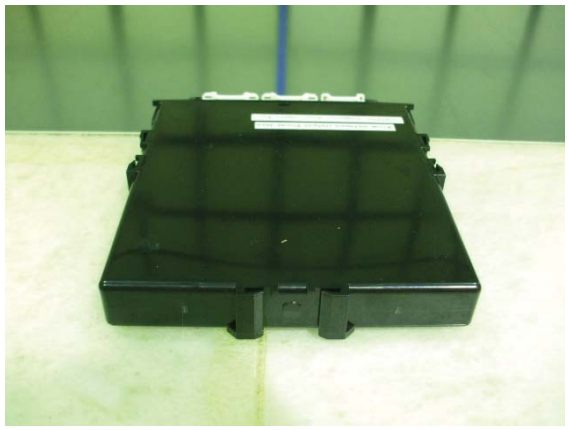


Z-axis



ECU
Below 30MHz:X-axis
Above 30MHz(Hori:X-axis /Vert:X-axis)

X-axis



Y-axis

Z-axis

APPENDIX 2: Data of EMI test

Radiated Emission below 30MHz (Fundamental and Spurious Emission)

Door Antenna

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DATA OF RADIATED EMISSION TEST

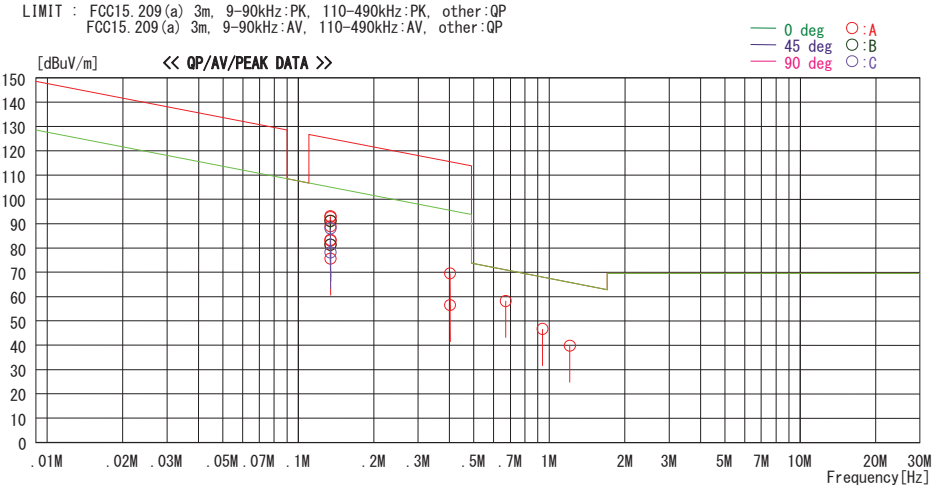
UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber
Date : 2011/01/12

Report No. : 31DE0263-HO-02

Temp./ Humi. : 23deg. C / 32%
Engineer : Satofumi Matsuyama

Mode / Remarks : Tx 134.2kHz Modulation ON Door Antenna Worst-axis(Ant:X-axis, ECU:X-axis)

LIMIT : FCC15.209(a) 3m, 9-90kHz:PK, 110-490kHz:PK, other:QP
FCC15.209(a) 3m, 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]	
0.13420	99.2	PEAK	19.9	6.1	32.1	93.1	125.0	31.9	0	A	0	Worst
0.13420	89.4	AV	19.9	6.1	32.1	83.3	105.0	21.7	0	A	0	Worst
0.13420	97.2	PEAK	19.9	6.1	32.1	91.1	125.0	33.9	45	B	329	
0.13420	87.5	AV	19.9	6.1	32.1	81.4	105.0	23.6	45	B	329	
0.13420	94.1	PEAK	19.9	6.1	32.1	88.0	125.0	37.0	90	C	288	
0.13420	84.3	AV	19.9	6.1	32.1	78.2	105.0	26.8	90	C	288	
0.13420	97.3	PEAK	19.9	6.1	32.1	91.2	125.0	33.8	135	A	22	
0.13420	87.5	AV	19.9	6.1	32.1	81.4	105.0	23.6	135	A	22	
0.13420	98.9	PEAK	19.9	6.1	32.1	92.8	125.0	32.2	180	A	0	
0.13420	89.1	AV	19.9	6.1	32.1	83.0	105.0	22.0	180	A	0	
0.13420	95.0	PEAK	19.9	6.1	32.1	88.9	125.0	36.1	135	A	26	Loop:Hori
0.13420	81.7	AV	19.9	6.1	32.1	75.6	105.0	29.4	135	A	26	Loop:Hori
0.40260	76.1	PEAK	19.5	6.1	32.1	69.6	115.5	45.9	0	A	0	
0.40260	63.0	AV	19.5	6.1	32.1	56.5	95.5	39.0	0	A	0	
0.67100	64.7	QP	19.4	6.2	32.1	58.2	71.1	12.9	0	A	0	
0.93940	53.1	QP	19.4	6.2	32.0	46.7	68.1	21.4	0	A	0	
1.20780	46.2	QP	19.4	6.2	32.0	39.8	65.9	26.1	0	A	0	

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

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

Radiated Emission below 30MHz (Fundamental and Spurious Emission)

Trunk Antenna

-

DATA OF RADIATED EMISSION TEST

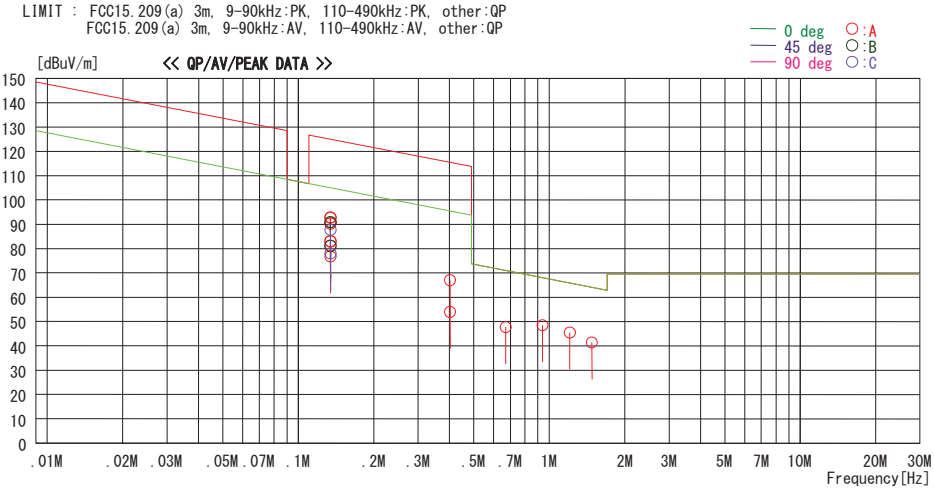
UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber
Date : 2011/01/12

Report No. : 31DE0263-HO-02

Temp./ Humi. : 23deg. C / 32%
Engineer : Satofumi Matsuyama

Mode / Remarks : Tx 134.2kHz Modulation ON Trunk Antenna Worst-axis(Ant:X-axis, ECU:X-axis)

LIMIT : FCC15.209(a) 3m, 9-90kHz:PK, 110-490kHz:PK, other:QP
FCC15.209(a) 3m, 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
0.13420	99.0	PEAK	19.9	6.1	32.1	92.9	125.0	32.1	0	A	0	Worst
0.13420	89.2	AV	19.9	6.1	32.1	83.1	105.0	21.9	0	A	0	Worst
0.13420	97.0	PEAK	19.9	6.1	32.1	90.9	125.0	34.1	45	B	324	
0.13420	87.2	AV	19.9	6.1	32.1	81.1	105.0	23.9	45	B	324	
0.13420	93.9	PEAK	19.9	6.1	32.1	87.8	125.0	37.2	90	C	275	
0.13420	84.2	AV	19.9	6.1	32.1	78.1	105.0	26.9	90	C	275	
0.13420	97.0	PEAK	19.9	6.1	32.1	90.9	125.0	34.1	135	A	33	
0.13420	87.4	AV	19.9	6.1	32.1	81.3	105.0	23.7	135	A	33	
0.13420	98.8	PEAK	19.9	6.1	32.1	92.7	125.0	32.3	180	A	0	
0.13420	89.0	AV	19.9	6.1	32.1	82.9	105.0	22.1	180	A	0	
0.13420	96.4	PEAK	19.9	6.1	32.1	90.3	125.0	34.7	90	A	0	Loop:Hori
0.13420	83.0	AV	19.9	6.1	32.1	76.9	105.0	28.1	90	A	0	Loop:Hori
0.40260	73.5	PEAK	19.5	6.1	32.1	67.0	115.5	48.5	0	A	0	
0.40260	60.4	AV	19.5	6.1	32.1	53.9	95.5	41.6	0	A	0	
0.67100	54.2	QP	19.4	6.2	32.1	47.7	71.1	23.4	0	A	0	
0.93940	54.9	QP	19.4	6.2	32.0	48.5	68.1	19.6	0	A	0	
1.20780	51.8	QP	19.4	6.2	32.0	45.4	65.9	20.5	0	A	0	
1.47620	47.7	QP	19.4	6.3	32.0	41.4	64.2	22.8	0	A	0	

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

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

Radiated Emission below 30MHz (Fundamental and Spurious Emission)

Room Antenna / Luggage Antenna Maximum Output

-

DATA OF RADIATED EMISSION TEST

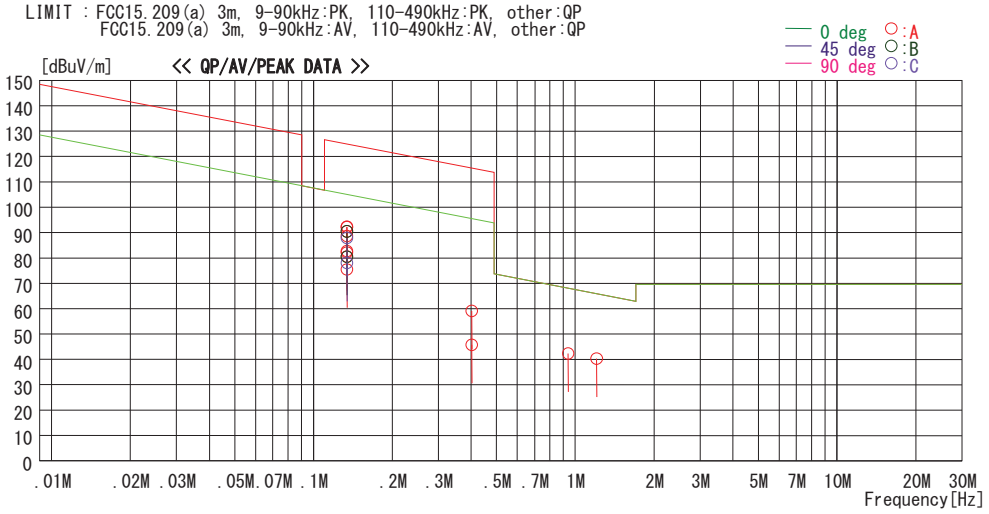
UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber
Date : 2011/01/12

Report No. : 31DE0263-HO-02

Temp./ Humi. : 23deg. C / 32%
Engineer : Satofumi Matsuyama

Mode / Remarks: Tx 134.2kHz Modulation ON Room Antenna / Luggage Antenna Worst-axis (Ant:X-axis, ECU:X-axis)

LIMIT : FCC15.209(a) 3m, 9-90kHz:PK, 110-490kHz:PK, other:QP
FCC15.209(a) 3m, 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
0.13420	98.4	PEAK	19.9	6.1	32.1	92.3	125.0	32.7	0	A	0	Worst
0.13420	88.8	AV	19.9	6.1	32.1	82.7	105.0	22.3	0	A	0	Worst
0.13420	96.5	PEAK	19.9	6.1	32.1	90.4	125.0	34.6	45	B	325	
0.13420	86.5	AV	19.9	6.1	32.1	80.4	105.0	24.6	45	B	325	
0.13420	94.0	PEAK	19.9	6.1	32.1	87.9	125.0	37.1	90	C	275	
0.13420	84.1	AV	19.9	6.1	32.1	78.0	105.0	27.0	90	C	275	
0.13420	96.5	PEAK	19.9	6.1	32.1	90.4	125.0	34.6	135	A	33	
0.13420	86.7	AV	19.9	6.1	32.1	80.6	105.0	24.4	135	A	33	
0.13420	98.2	PEAK	19.9	6.1	32.1	92.1	125.0	32.9	180	A	0	
0.13420	88.2	AV	19.9	6.1	32.1	82.1	105.0	22.9	180	A	0	
0.13420	94.7	PEAK	19.9	6.1	32.1	88.6	125.0	36.4	180	A	0	Loop:Hori
0.13420	81.6	AV	19.9	6.1	32.1	75.5	105.0	29.5	180	A	0	Loop:Hori
0.40260	65.6	PEAK	19.5	6.1	32.1	59.1	115.5	56.4	0	A	0	
0.40260	52.3	AV	19.5	6.1	32.1	45.8	95.5	49.7	0	A	0	
0.93940	48.7	QP	19.4	6.2	32.0	42.3	68.1	25.8	0	A	0	
1.20780	46.7	QP	19.4	6.2	32.0	40.3	65.9	25.6	0	A	0	

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

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

Radiated Emission below 30MHz (Fundamental and Spurious Emission)

Room Antenna / Luggage Antenna Minimum Output

DATA OF RADIATED EMISSION TEST

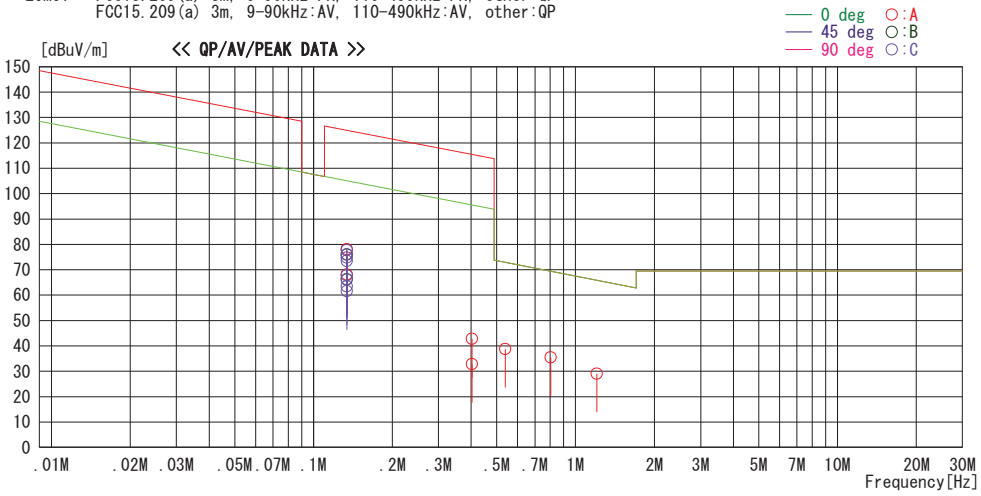
UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber
Date : 2011/01/12

Report No. : 31DE0263-HO-02

Temp./ Humi. : 23deg. C / 32%
Engineer : Motoya Imura

Mode / Remarks : Tx 134.2kHz Modulation ON Room Antenna Worst-axis(Ant:X-axis, ECU:X-axis) Mini

LIMIT : FCC15.209(a) 3m, 9-90kHz:PK, 110-490kHz:PK, other:QP
FCC15.209(a) 3m, 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
0.13420	84.1	PEAK	19.9	6.1	32.1	78.0	125.0	47.0	0	A	0	worst
0.13420	74.3	AV	19.9	6.1	32.1	68.2	105.0	36.8	0	A	0	
0.13420	82.1	PEAK	19.9	6.1	32.1	76.0	125.0	49.0	45	B	338	
0.13420	72.3	AV	19.9	6.1	32.1	66.2	105.0	38.8	45	B	338	
0.13420	79.6	PEAK	19.9	6.1	32.1	73.5	125.0	51.5	90	C	269	
0.13420	69.6	AV	19.9	6.1	32.1	63.5	105.0	41.5	90	C	269	
0.13420	82.2	PEAK	19.9	6.1	32.1	76.1	125.0	48.9	135	C	222	
0.13420	72.2	AV	19.9	6.1	32.1	66.1	105.0	38.9	135	C	222	
0.13420	83.8	PEAK	19.9	6.1	32.1	77.7	125.0	47.3	180	C	359	
0.13420	73.8	AV	19.9	6.1	32.1	67.7	105.0	37.3	180	C	359	
0.13420	80.9	PEAK	19.9	6.1	32.1	74.8	125.0	50.2	180	C	358	Hori
0.13420	67.6	AV	19.9	6.1	32.1	61.5	105.0	43.5	180	C	358	Hori
0.40260	49.2	PEAK	19.5	6.1	32.1	42.7	115.5	72.8	0	A	0	
0.40260	39.4	AV	19.5	6.1	32.1	32.9	95.5	62.6	0	A	0	
0.53976	45.3	QP	19.5	6.1	32.1	38.8	73.0	34.2	0	A	0	
0.80520	41.9	QP	19.4	6.2	32.0	35.5	69.5	34.0	0	A	0	
1.20784	35.5	QP	19.4	6.2	32.0	29.1	65.9	36.8	0	A	0	

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

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

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Radiated Emission above 30MHz (Spurious Emission)

Door Antenna

DATA OF RADIATED EMISSION TEST

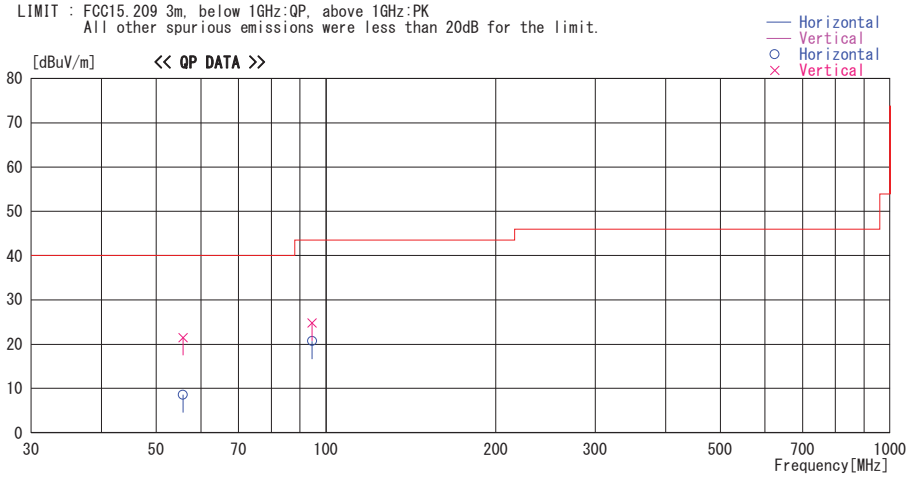
UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2011/01/13

Report No. : 31DE0263-HO-02

Temp. / Humi. : 20deg.C / 25%
Engineer : Satofumi Matsuyama

Mode / Remarks : Tx 134.2kHz Modulation ON Door Antenna Worst-axis (Ant Hor:X-axis / Ver:X-axis, ECU Hor:X-axis / Ver: X-axis)

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
55.824	36.5	QP	9.5	-24.5	21.5	337	100	Vert.	40.0	18.5	
55.791	23.6	QP	9.5	-24.5	8.6	112	300	Hori.	40.0	31.4	
94.474	35.5	QP	9.3	-24.1	20.7	353	300	Hori.	43.5	22.8	
94.478	39.6	QP	9.3	-24.1	24.8	264	100	Vert.	43.5	18.7	

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

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

Radiated Emission above 30MHz (Spurious Emission)

Trunk Antenna

DATA OF RADIATED EMISSION TEST

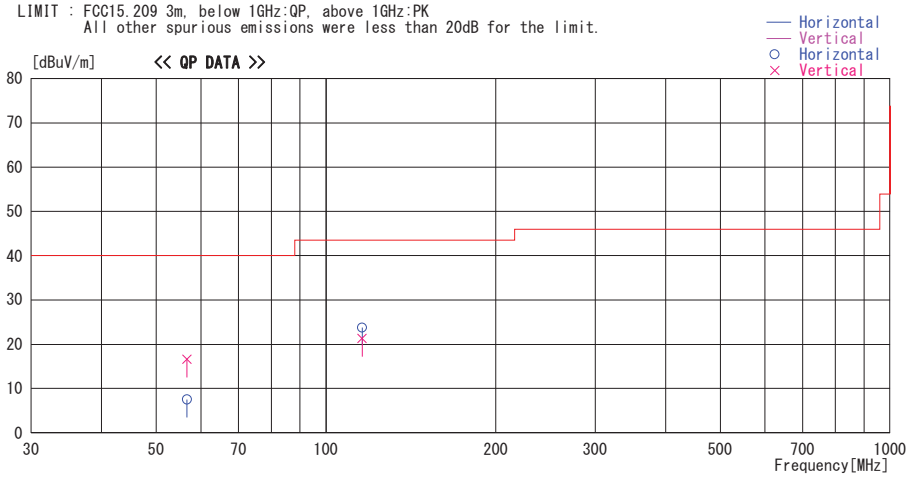
UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2011/01/13

Report No. : 31DE0263-HO-02

Temp. / Humi. : 20deg.C / 25%
Engineer : Satofumi Matsuyama

Mode / Remarks : Tx 134.2kHz Modulation ON Trunk Antenna Worst-axis (Ant Hor:X-axis / Ver:X-axis, ECU Hor:X-axis / Ver: X-axis)

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
56.677	31.9	QP	9.3	-24.6	16.6	252	100	Vert.	40.0	23.4	
56.678	22.8	QP	9.3	-24.6	7.5	18	300	Hori.	40.0	32.5	
115.949	32.7	QP	12.5	-23.9	21.3	272	100	Vert.	43.5	22.2	
115.948	35.2	QP	12.5	-23.9	23.8	2	300	Hori.	43.5	19.7	

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

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

Radiated Emission above 30MHz (Spurious Emission)

Room Antenna / Luggage Antenna Maximum Output

DATA OF RADIATED EMISSION TEST

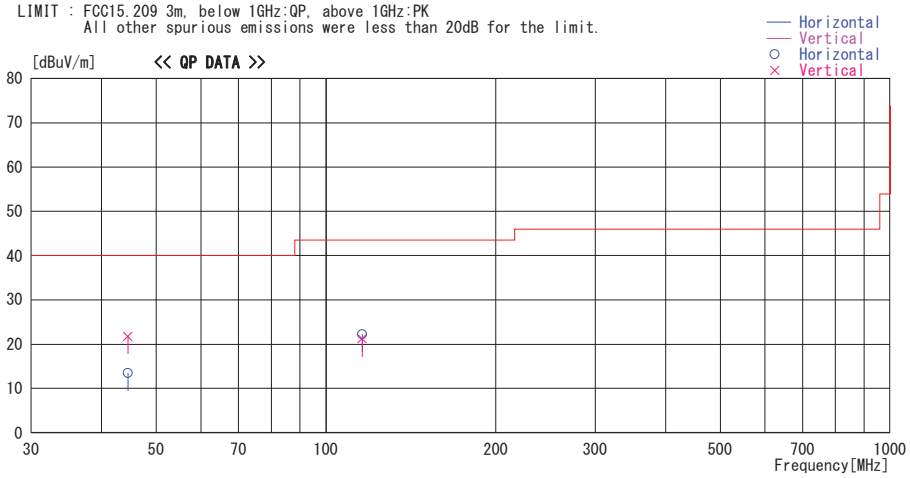
UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2011/01/13

Report No. : 31DE0263-HO-02

Temp. / Humi. : 20deg.C / 25%
Engineer : Satofumi Matsuyama

Mode / Remarks : Tx 134.2kHz Modulation ON Room Antenna Worst-axis(Ant Hor:Z-axis / Ver:Y-axis, ECU Hor:X-axis / Ver: X-axis)

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]	
44.548	33.9	QP	12.6	-24.7	21.8	62	100	Vert.	40.0	18.2	
44.580	25.7	QP	12.5	-24.7	13.5	338	362	Hori.	40.0	26.5	
115.956	33.6	QP	12.5	-23.9	22.2	1	300	Hori.	43.5	21.3	
115.955	32.6	QP	12.5	-23.9	21.2	270	100	Vert.	43.5	22.3	

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

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

Radiated Emission above 30MHz (Spurious Emission)

Room Antenna / Luggage Antenna Minimum Output

DATA OF RADIATED EMISSION TEST

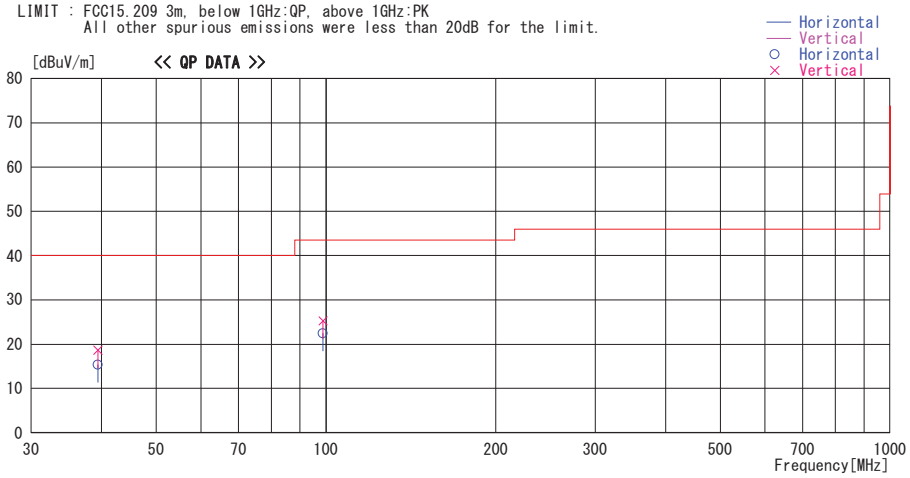
UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2011/01/13

Report No. : 31DE0263-HO-02

Temp. / Humi. : 20deg.C / 25%
Engineer : Satofumi Matsuyama

Mode / Remarks : Tx 134.2kHz Modulation ON Room Antenna Worst-axis(Ant Hor:Z-axis / Ver:Y-axis, ECU Hor:X-axis / Ver: X-axis) Power Mini

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]	
39.440	25.5	QP	14.8	-24.9	15.4	349	300	Hori.	40.0	24.6	
39.441	28.7	QP	14.8	-24.9	18.6	77	100	Vert.	40.0	21.4	
98.774	36.5	QP	10.1	-24.1	22.5	199	300	Hori.	43.5	21.0	
98.775	39.3	QP	10.1	-24.1	25.3	279	100	Vert.	43.5	18.2	

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

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

-26dB Bandwidth and 99% Occupied Bandwidth

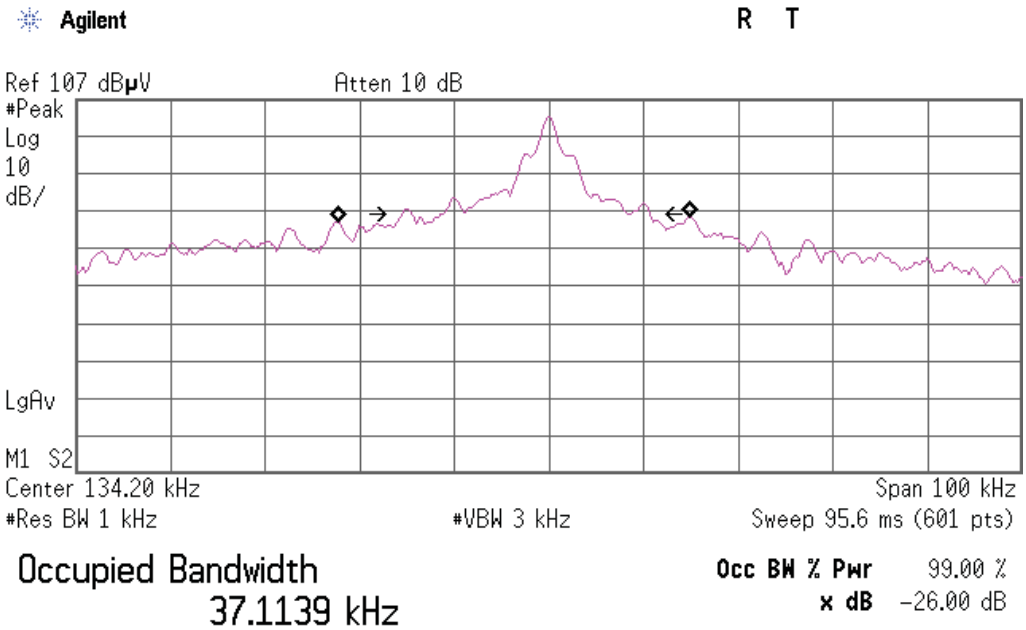
Door Antenna

Head Office EMC Lab. No.2 Semi Anechoic Chamber

REPORT NO : 31DE0263-HO-02

TEST DISTANCE : 3m
DATE : 01/12/2011
POWER : DC 12.0V
TEMPERATURE : 22 deg.C
MODE : Tx
HUMIDITY : 32 %
: Door Antenna
Engineer : Motoya Imura

FREQ [kHz]	-26dB Bandwidth [kHz]	99% Occupied Bandwidth [kHz]
134.2	26.141	37.114



Transmit Freq Error −3.756 kHz
Occupied Bandwidth 26.141 kHz

-26dB Bandwidth and 99% Occupied Bandwidth

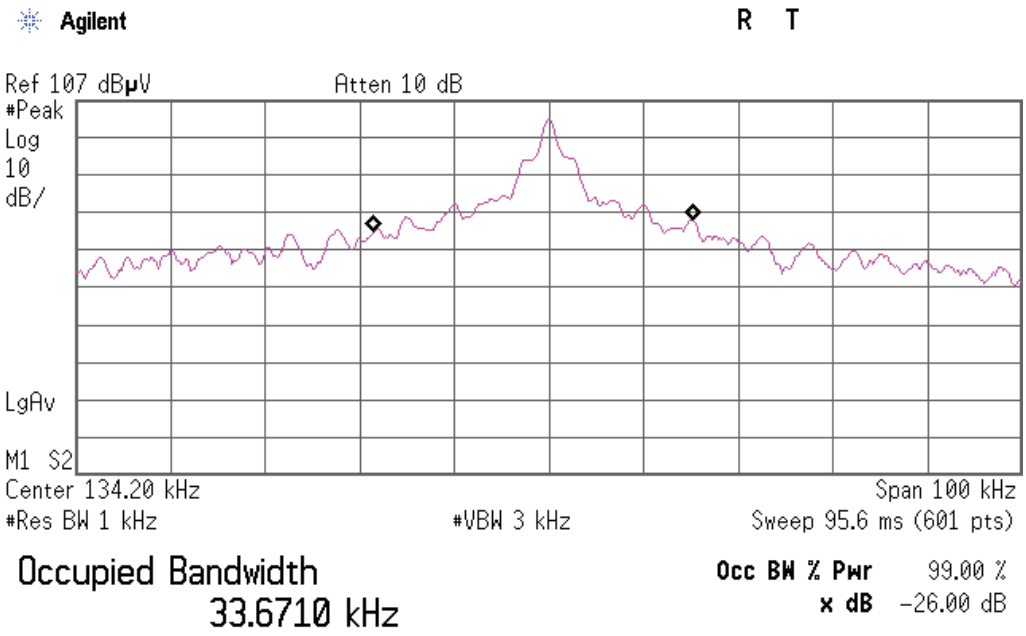
Trunk Antenna

Head Office EMC Lab. No.2 Semi Anechoic Chamber

REPORT NO : 31DE0263-HO-02

TEST DISTANCE : 3m
DATE : 01/12/2011
POWER : DC 12.0V
TEMPERATURE : 22 deg.C
MODE : Tx
HUMIDITY : 32 %
: Trunk Antenna
Engineer : Motoya Imura

FREQ [kHz]	-26dB Bandwidth [kHz]	99% Occupied Bandwidth [kHz]
134.2	21.919	33.671



-26dB Bandwidth and 99% Occupied Bandwidth

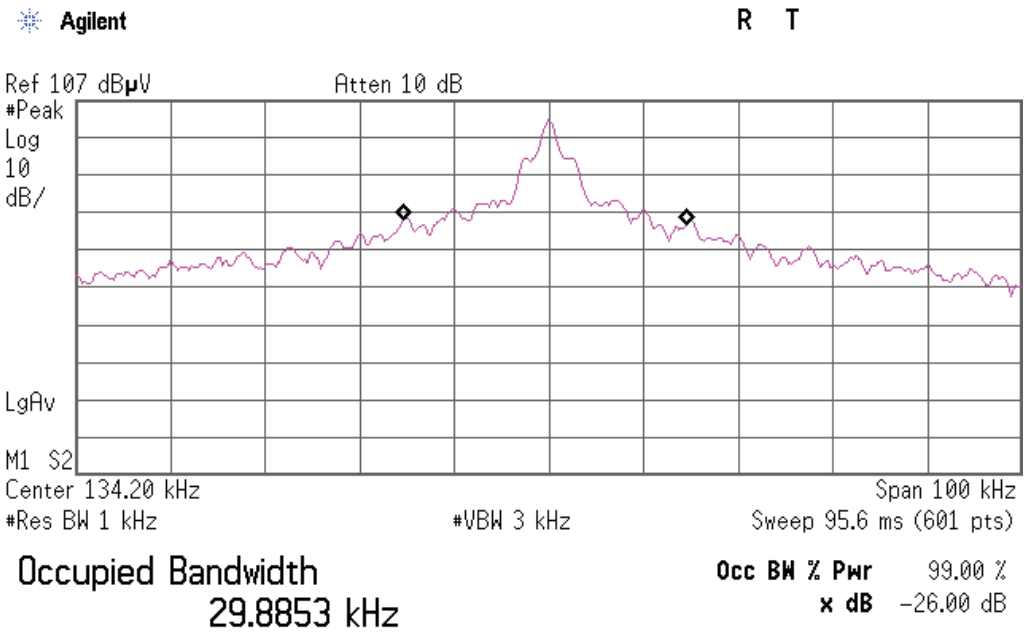
Room Antenna / Luggage Antenna

Head Office EMC Lab. No.2 Semi Anechoic Chamber

REPORT NO : 31DE0263-HO-02

TEST DISTANCE : 3m
DATE : 01/12/2011
POWER : DC 12.0V
TEMPERATURE : 22 deg.C
MODE : Tx
HUMIDITY : 32 %
: Room Antenna / Luggage Antenna
Engineer : Motoya Imura

FREQ [kHz]	-26dB Bandwidth [kHz]	99% Occupied Bandwidth [kHz]
134.2	21.551	29.885



APPENDIX 3: Test instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MAEC-02	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-06902	RE	2010/09/01 * 12
MOS-22	Thermo-Hygrometer	Custom	CTH-201	0003	RE	2010/02/09 * 12
MJM-05	Measure	PROMART	SEN1955	-	RE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE	-
MSA-03	Spectrum Analyzer	Agilent	E4448A	MY44020357	RE	2010/11/30 * 12
MTR-03	Test Receiver	Rohde & Schwarz	ESCI	100300	RE	2010/04/19 * 12
MLPA-01	Loop Antenna	Rohde & Schwarz	HFH2-Z2	100017	RE	2010/10/15 * 12
MCC-13	Coaxial Cable	Fujikura	3D-2W(12m)/5D-2W(5m)/5D-2W(0.8m)/5D-2W(1m)	-	RE	2010/02/22 * 12
MCC-30	Coaxial cable	UL Japan	-	-	RE	2010/07/20 * 12
MPA-14	Pre Amplifier	SONOMA INSTRUMENT	310	260833	RE	2010/03/05 * 12
MAT-07	Attenuator(6dB)	Weinschel Corp	2	BK7970	RE	2010/11/05 * 12
MAEC-04	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE	2010/02/02 * 12
MOS-15	Thermo-Hygrometer	Custom	CTH-180	-	RE	2010/02/09 * 12
MJM-07	Measure	PROMART	SEN1955	-	RE	-
MSA-05	Spectrum Analyzer	Advantest	R3273	160400285	RE	2010/11/18 * 12
MTR-07	Test Receiver	Rohde & Schwarz	ESCI	100635	RE	2010/10/27 * 12
MBA-05	Biconical Antenna	Schwarzbeck	BBA9106	1302	RE	2010/10/11 * 12
MLA-08	Logperiodic Antenna	Schwarzbeck	UKLP9140-A	N/A	RE	2010/10/11 * 12
MCC-50	Coaxial cable	UL Japan	-	-	RE	2010/03/18 * 12
MAT-51	Attenuator(6dB)	Weinschel	2	AS3557	RE	2010/01/20 * 12

The expiration date of the calibration is the end of the expired month.
All equipment is calibrated with traceable calibrations. Each calibration 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: Spurious emission