EMI TEST REPORT

Test Report No. : 32LE0142-HO-01-R1

Applicant	:	**DENSO CORPORATION**
Type of Equipment	:	**Remote Keyless Entry System and TPMS (Receiver)**
Model No.	:	**23AAG**
FCC ID	:	**HYQ23AAG**
Test standard	:	**FCC Part 15 Subpart B: 2012**
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 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 32LE0142-HO-01. 32LE0142-HO-01 is replaced with this report.

Date of test: July 17 and 27, 2012

Representative test engineer: K. Kawamura
Keisuke Kawamura
Engineer of WiSE Japan,
UL Verification Service

Approved by: T. Hatakeda
Takahiro Hatakeda
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

UL Japan, Inc.
Head Office EMC Lab.
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Facsimile : +81 596 24 8124

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SECTION 1: Customer information

Company Name	:	DENSO CORPORATION
Address	:	1-1 Showa-cho, Kariya-shi, Aichi-ken, 448-8661 Japan
Telephone Number	:	+81-566-61-7086
Facsimile Number	:	+81-566-25-4792
Contact Person	:	Nobuya Watabe

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

2.1 Identification of E.U.T.

Type of Equipment	:	Remote Keyless Entry System and TPMS (Receiver)
Model No.	:	23AAG
Serial No.	:	Refer to Section 4, Clause 4.2
Receipt Date of Sample	:	July 14, 2012
Country of Mass-production	:	Japan
Condition of EUT	:	Engineering prototype (Not for Sale: This sample is not mass-produced items.)
Modification of EUT	:	No Modification by the test lab

2.2 Product Description

Model No: 23AAG (referred to as the EUT in this report) is the Remote Keyless Entry System and TPMS (Receiver). 23AAG has 6 variations. For details of variations, see "Technical document for Type Approval".

Feature of EUT	:	<RKES mode> RKE system is mainly used for locking or unlocking the doors of the vehicle. The transmitter sends a radio wave signal through ANT1 or ANT2 while the button is pushed. The receiver becomes active in response to the signal from the transmitter. <TPMS mode> Tire Pressure Monitoring System is used for monitoring and indicating information of air pressure in vehicle's tires. Transmitter sends receiver the data that are information of air pressure in vehicle's tire through ANT1 or ANT2. The data also include temperature, battery voltage and identity code of transmitter. The receiver judges the data. If the data of air pressure and others are not normal condition, the receiver sends signal to a warning lamp. Then, the warning lamp warns drivers.
Frequency of Operation	:	RKES(CH1): 315.10MHz RKES(CH2): 314.35MHz TPMS: 314.98MHz
Oscillator Frequency	:	25.2MHz (Crystal)
Type of modulation	:	RKES: FSK (F1D) TPMS: FSK (F1D)
Type of receiver	:	Super-heterodyne
Intermediate frequency	:	10.9MHz
Operating voltage (inner)	:	DC 12.0V
Antenna type	:	ANT1: Internal Antenna (Inverse F Antenna / Inverse L Antenna) ANT2: External Antenna

<Note>
RKES: Remote Keyless Entry System
TPMS: Tire Pressure Monitoring System
Hereinafter, "RKES" and "TPMS" are used in this document.

SECTION 3: Test specification, procedures & results

3.1 Test specification

Test Specification : FCC Part 15 Subpart B: 2012, final revised on May 17, 2012 and effective June 18, 2012

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	**FCC:**Part 15 Subpart B 15.107(a)	N/A *1)	N/A	N/A
	IC: RSS-Gen 7.2.4	**IC:** RSS-Gen 7.2.4			
Radiated emission	**FCC:** ANSI C63.4: 2003 8. Radiated emission measurements	**FCC:** Part 15 Subpart B 15.109(a)	N/A	16.9dB 606.900MHz Vertical, QP	Complied
	IC: RSS-Gen 4.10	**IC:** RSS-Gen 6.1			
Antenna Terminal	**FCC:** ANSI C63.4: 2003 12. Measurement of unintentional radiators other than ITE	**FCC:** Part 15 Subpart B 15.111(a)	N/A	28.1dB 1216.310MHz Horizontal, PK	Complied
	IC: RSS-Gen 4.10	**IC:** RSS-Gen 6.2 *2)			

*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.
*2) Above 1GHz, the severer limit of Part 15 Subpart B 15.111(a) was applied for the test.

3.3 Addition to standard

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	4.3dB	5.0dB	5.1dB	4.9dB	5.8dB	4.4dB	4.3dB
No.2	4.3dB	5.2dB	5.1dB	5.0dB	5.7dB	4.3dB	4.2dB
No.3	4.6dB	5.0dB	5.1dB	5.0dB	5.7dB	4.5dB	4.2dB
No.4	4.8dB	5.2dB	5.0dB	5.0dB	5.7dB	5.2dB	4.2dB

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

Antenna terminal conducted emission and Power density (±dB)			**Antenna terminal conducted emission (±dB)**	
Below 1GHz	1GHz-3GHz	3GHz-18GHz	18GHz-26.5GHz	26.5GHz-40GHz
1.0dB	1.1dB	2.7dB	3.2dB	3.3dB

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.

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

4.1 Operating modes

The mode used:

1. RKES Receiving mode (315.10MHz, 314.35MHz) *a)

   *a) Electronic Key was operated manually by a test engineer and the test was performed with the EUT receiving 314.35MHz and 315.10MHz and tuning was confirmed to be locked by checking that LED of checker bench was lighted.

2. TPMS Receiving mode (314.98MHz) *b)

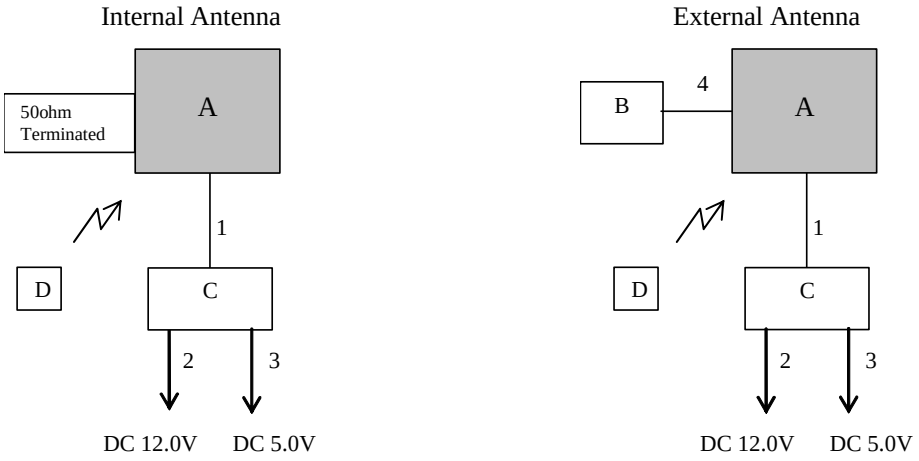
   *b) Tuning was confirmed to be locked on each mode by checking local oscillator frequency to be stable.

Among Variation No.1 to 36,

- the difference due to feeding point of the internal antenna was confirmed with Variation No. 3, 9, 15, and 21.
- the difference due to internal antenna type was confirmed with Variation No. 9 and 27.
- regarding external antenna and Automatic Location System, variants with the external antenna port and the system mounted were tested, which were the worst condition for EMI.
- for external antenna, antenna conducted and radiated emission tests were performed with Variation No. 9 (for RKES Receiving mode) and No. 5 (for TPMS Receiving mode), because in TPMS receiving, the antenna is fixed internally for Variation No. 9 [*1)] and externally for Variation No. 5 [*2)].
  [*1)] See TYPE 1 of “Variation owing to ANTENNA SWITCHING” in “Theory of Operation” and “Block Diagram”.
  [*2)] See TYPE 2 of “Variation owing to ANTENNA SWITCHING” in “Theory of Operation” and “Block Diagram”.

As a result, enough margin for the limit was observed.

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	Remote Keyless Entry System and TPMS (Receiver)	23AAG	003 (for Variation No.9)	DENSO CORPORATION	EUT (*Variation No.9 and 5)
			002 (for Variation No.5)		
			001 (for Variation No.3) Reference data		
			004 (for Variation No.15) Reference data		
			005 (for Variation No.21) Reference data		
			006 (for Variation No.27) Reference data		
B	External Antenna	-	001	DENSO CORPORATION	-
C	Checker	-	1004816-02-02	DENSO CORPORATION	-
D	Electronic key	-	-	DENSO CORPORATION	-

List of cables used

No.	Name	Length (m)	Shield		Remark
			Cable	Connector	
1	DC and Signal Cable	1.2	Unshielded	Unshielded	-
2	DC Cable	2.0	Unshielded	Unshielded	-
3	DC Cable	2.0	Unshielded	Unshielded	-
4	Antenna Cable	0.3	Shielded	Shielded	-

<Note>
* "Variation number" shows the number of the Sample Variations List in the application materials.

SECTION 5: Radiated Emission

5.1 Operating environment

Test place : No. 1 , 2 and 4 semi anechoic chamber
Temperature : See data
Humidity : See data

5.2 Test configuration

EUT was placed on a urethane platform of nominal size, 0.5m by 1.0m, raised 0.8m above the conducting ground plane.
The EUT was set on the edge of the tabletop.
Test was made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna was varied in height above the conducting ground plane to obtain the maximum signal strength.
Photographs of the set up are shown in Appendix 1.

5.3 Test conditions

Frequency range : 30MHz-300MHz (Biconical antenna) / 300MHz-1000MHz (Logperiodic antenna)
1000MHz-2000MHz (Horn antenna)
Test distance : 3m
EUT position : Table top
EUT operation mode : See Clause 4.1

5.4 Test procedure

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 intensity.
The measurements were performed for both vertical and horizontal antenna polarization with the Test Receiver, or the Spectrum Analyzer.
The radiated emission measurements were made with the following detector function of the test receiver and the Spectrum analyzer.

Frequency	Below 1GHz	Above 1GHz
Instrument used	Test Receiver	Spectrum Analyzer
IF Bandwidth	QP: BW 120kHz	PK: RBW:1MHz/VBW: 3MHz AV *1): RBW:1MHz/VBW:10Hz

*1) When using Spectrum analyzer, the test was made with adjusting span to zero by using peak hold.

The noise levels were confirmed at each position of X, Y and Z axes of EUT to see the position of maximum noise, and the test was made at representative X-axis since no difference was found among each position.

5.5 Test result

Summary of the test results: Pass

Date: July 17, 2012 Test engineer: Keisuke Kawamura and Hiroshi Kukita
July 18 and 19, 2012 Hiroshi Kukita
July 25, 2012 Shinya Watanabe

SECTION 6: Antenna Terminal

6.1 Operating environment

Test place : No. 4 semi anechoic chamber
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.
Photographs of the set up are shown in Appendix 3.

6.3 Test conditions

Frequency range : 30MHz-1000MHz / 1000MHz-2000MHz
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 *1)
IF Bandwidth	PK: RBW:100kHz/VBW: 300kHz	PK: RBW:1MHz/VBW: 3MHz

*1) The Spectrum Analyzer was used in 3dB resolution bandwidth.

6.5 Test result

Summary of the test results: Pass

Date: July 27, 2012 Test engineer: Tomohisa Nakagawa

APPENDIX 1: Data of EMI test

Radiated Emission

(RKES(315.10MHz): Below 1GHz / Variation No.9 / ANT1)

DATA OF RADIATED EMISSION TEST

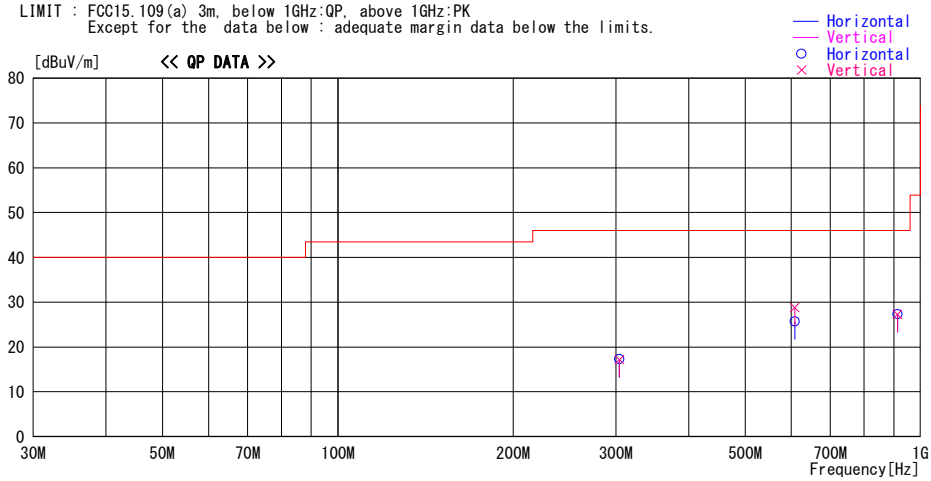
UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber
Date : 2012/07/17

Report No. : 32LE0142-HO-01

Temp./Humi. : 25deg. C / 69% RH
Engineer : Keisuke Kawamura

Mode / Remarks : RKES 315.1MHz(Ch1) Int Ant. Worst-axis(Hor:X / Ver:X)

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 Factor	Loss& Gain	Level	Angle	Height	Polar.	Limit	Margin	Comment
[MHz]	[dBuV]		[dB/m]	[dB]	[dBuV/m]	[Deg]	[cm]		[dBuV/m]	[dB]	
304.200	21.6	QP	14.5	-18.9	17.2	0	100	Vert.	46.0	28.8	
304.200	21.7	QP	14.5	-18.9	17.3	0	100	Hori.	46.0	28.7	
608.400	27.5	QP	19.8	-18.5	28.8	197	100	Vert.	46.0	17.2	
608.400	24.4	QP	19.8	-18.5	25.7	211	100	Hori.	46.0	20.3	
912.600	21.6	QP	22.3	-16.6	27.3	0	100	Hori.	46.0	18.7	
912.600	21.6	QP	22.3	-16.6	27.3	0	100	Vert.	46.0	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

(RKES(315.10MHz): Above 1GHz / Variation No.9 / ANT1)

DATA OF RADIATED EMISSION TEST

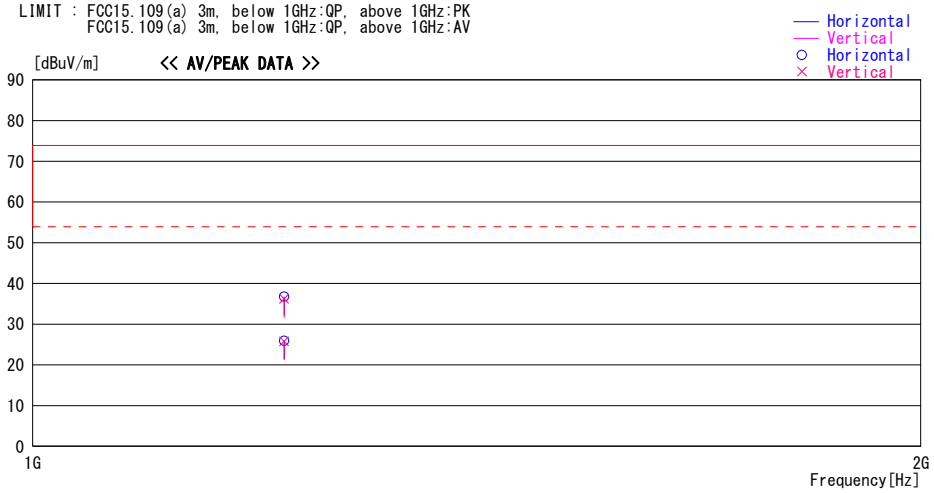
UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2012/07/25

Report No. : 32LE0142-HO-01

Temp./Humi. : 23deg. C / 75% RH
Engineer : Shinya Watanabe

Mode / Remarks : RKES 315.1MHz(Ch1) Int Ant. Worst-axis(Hor:X / Ver:X)

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 Factor [dB/m]	Loss& Gain [dB]	Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
1216.800	44.7	PK	24.5	-32.5	36.7	0	100	Hori.	73.9	37.2	
1216.800	44.2	PK	24.5	-32.5	36.2	0	100	Vert.	73.9	37.7	
1216.800	33.9	AV	24.5	-32.5	25.9	0	100	Hori.	53.9	28.0	
1216.800	33.8	AV	24.5	-32.5	25.8	0	100	Vert.	53.9	28.1	

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

(RKES(314.35MHz): Below 1GHz / Variation No.9 / ANT1)

DATA OF RADIATED EMISSION TEST

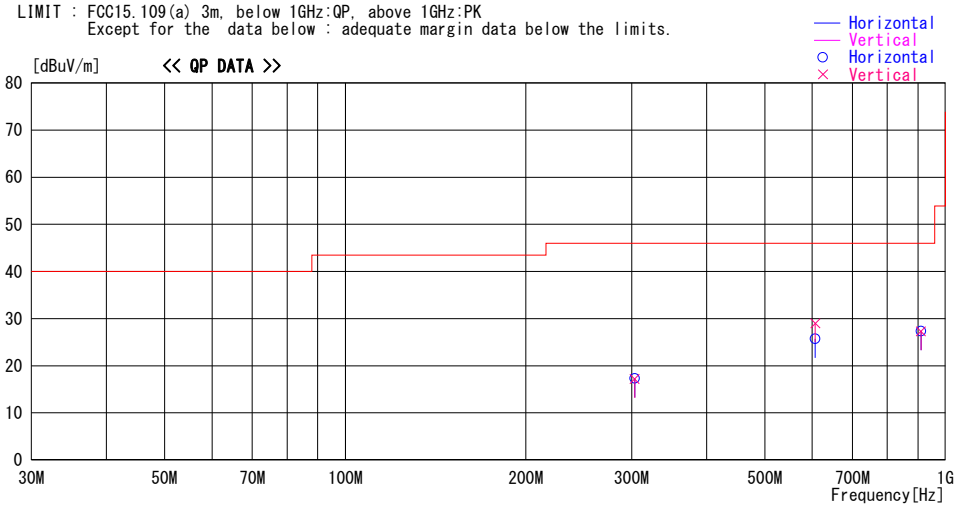
UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber
Date : 2012/07/17

Report No. : 32LE0142-HO-01

Temp./Humi. : 25deg. C / 69% RH
Engineer : Keisuke Kawamura

Mode / Remarks : RKES 314.35MHz(Ch2) Int Ant. Worst-axis(Hor:X / Ver:X)

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 Factor	Loss& Gain	Level	Angle	Height	Polar.	Limit	Margin	Comment
[MHz]	[dBuV]		[dB/m]	[dB]	[dBuV/m]	[Deg]	[cm]		[dBuV/m]	[dB]	
303.450	21.6	QP	14.5	-18.9	17.2	0	100	Vert.	46.0	28.8	
303.450	21.7	QP	14.5	-18.9	17.3	0	100	Hori.	46.0	28.7	
606.900	27.8	QP	19.8	-18.6	29.0	189	100	Vert.	46.0	17.0	
606.900	24.5	QP	19.8	-18.6	25.7	210	100	Hori.	46.0	20.3	
910.350	21.6	QP	22.3	-16.6	27.3	0	100	Hori.	46.0	18.7	
910.350	21.6	QP	22.3	-16.6	27.3	0	100	Vert.	46.0	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.
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Radiated Emission

(RKES(314.35MHz): Avobe 1GHz / Variation No.9 / ANT1)

DATA OF RADIATED EMISSION TEST

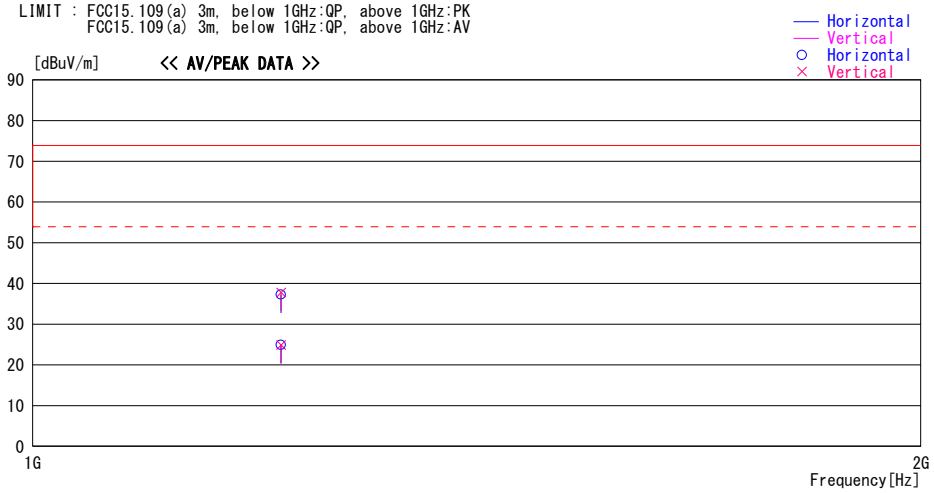
UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2012/07/25

Report No. : 32LE0142-HO-01

Temp./Humi. : 23deg. C / 75% RH
Engineer : Shinya Watanabe

Mode / Remarks : RKES 314.35MHz(Ch2) Int Ant. Worst-axis(Hor:X / Ver:X)

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 Factor [dB/m]	Loss& Gain [dB]	Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
1213.800	45.2	PK	24.5	-32.5	37.2	0	100	Hori.	73.9	36.7	
1213.800	45.8	PK	24.5	-32.5	37.8	0	100	Vert.	73.9	36.1	
1213.800	32.9	AV	24.5	-32.5	24.9	0	100	Hori.	53.9	29.0	
1213.800	32.9	AV	24.5	-32.5	24.9	0	100	Vert.	53.9	29.0	

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

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

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Radiated Emission
(TPMS: Below 1GHz / Variation No.9 / ANT1)

DATA OF RADIATED EMISSION TEST

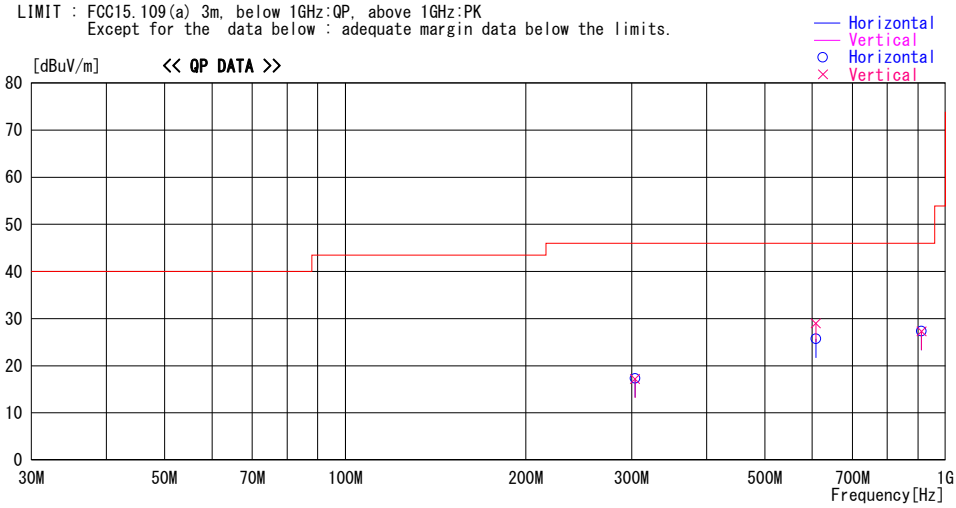
UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber
Date : 2012/07/17

Report No. : 32LE0142-HO-01

Temp./Humi. : 25deg. C / 69% RH
Engineer : Keisuke Kawamura

Mode / Remarks : TPMS 314.98MHz Int Ant. Worst-axis(Hor:X / Ver:X)

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 Factor	Loss& Gain	Level	Angle	Height	Polar.	Limit	Margin	Comment
[MHz]	[dBuV]		[dB/m]	[dB]	[dBuV/m]	[Deg]	[cm]		[dBuV/m]	[dB]	
304.080	21.6	QP	14.5	-18.9	17.2	0	100	Vert.	46.0	28.8	
304.080	21.7	QP	14.5	-18.9	17.3	0	100	Hori.	46.0	28.7	
608.160	27.7	QP	19.8	-18.5	29.0	196	100	Vert.	46.0	17.0	
608.160	24.4	QP	19.8	-18.5	25.7	205	100	Hori.	46.0	20.3	
912.240	21.6	QP	22.3	-16.6	27.3	0	100	Hori.	46.0	18.7	
912.240	21.6	QP	22.3	-16.6	27.3	0	100	Vert.	46.0	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.

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Radiated Emission

(TPMS: Above 1GHz / Variation No.9 / ANT1)

DATA OF RADIATED EMISSION TEST

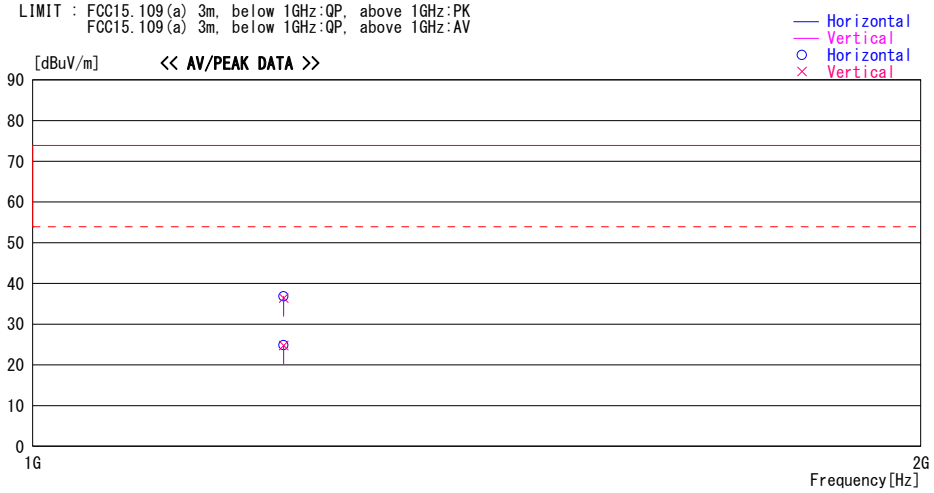
UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2012/07/25

Report No. : 32LE0142-HO-01

Temp./Humi. : 23deg. C / 75% RH
Engineer : Shinya Watanabe

Mode / Remarks : TPMS 314.98MHz Int Ant. Worst-axis(Hor:X / Ver:X)

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 Factor [dB/m]	Loss& Gain [dB]	Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
1216.320	44.8	PK	24.5	-32.5	36.8	0	100	Hori.	73.9	37.1	
1216.320	44.4	PK	24.5	-32.5	36.4	0	100	Vert.	73.9	37.5	
1216.320	32.8	AV	24.5	-32.5	24.8	0	100	Hori.	53.9	29.1	
1216.320	32.8	AV	24.5	-32.5	24.8	0	100	Vert.	53.9	29.1	

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

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

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Radiated Emission

(RKES(315.10MHz): Below 1GHz / Variation No.9 / ANT2)

DATA OF RADIATED EMISSION TEST

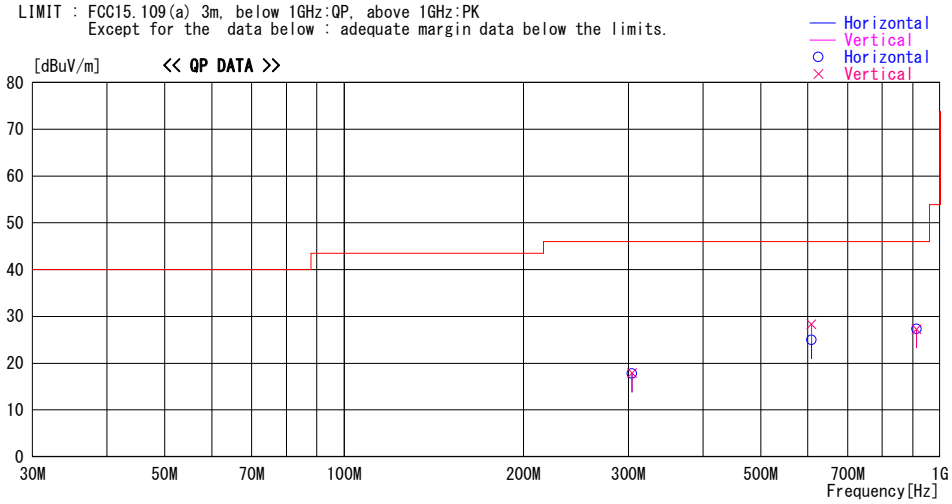
UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber
Date : 2012/07/18

Report No. : 32LE0142-HO-01

Temp./Humi. : 24deg. C / 68% RH
Engineer : Hiroshi Kukita

Mode / Remarks : RKES 315.1MHz(Ch1) EXT Ant. Worst-axis(Hor:X / Ver:X)

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 Factor	Loss& Gain	Level	Angle	Height	Polar.	Limit	Margin	Comment
[MHz]	[dBuV]		[dB/m]	[dB]	[dBuV/m]	[Deg]	[cm]		[dBuV/m]	[dB]	
304.200	22.2	QP	14.5	-18.9	17.8	117	100	Hori.	46.0	28.2	
304.200	22.3	QP	14.5	-18.9	17.9	246	100	Vert.	46.0	28.1	
608.400	23.7	QP	19.8	-18.5	25.0	223	100	Hori.	46.0	21.0	
608.400	27.0	QP	19.8	-18.5	28.3	102	100	Vert.	46.0	17.7	
912.600	21.6	QP	22.3	-16.6	27.3	311	100	Hori.	46.0	18.7	
912.600	21.6	QP	22.3	-16.6	27.3	301	100	Vert.	46.0	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

(RKES(315.10MHz): Above 1GHz / Variation No.9 / ANT2)

DATA OF RADIATED EMISSION TEST

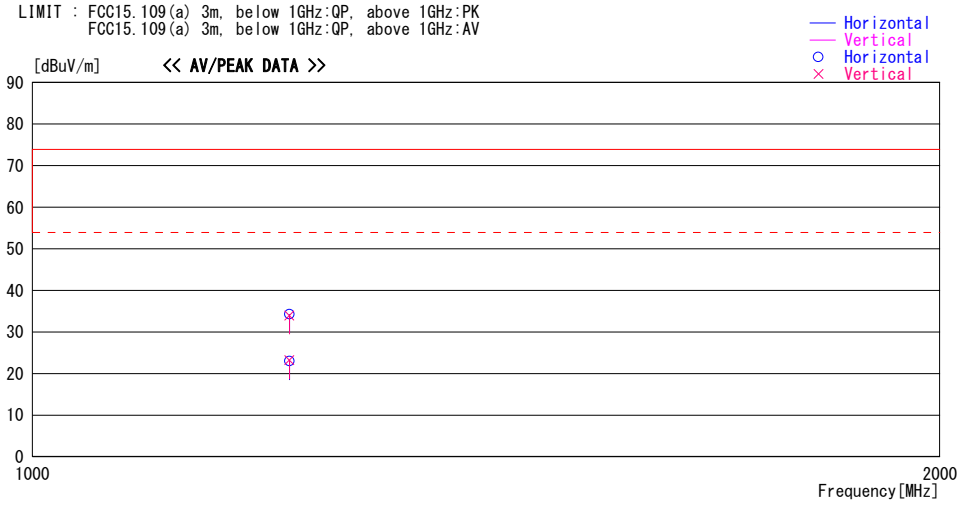
UL Japan, Inc. Head Office EMC Lab. No.1 Semi Anechoic Chamber
Date : 2012/07/19

Report No. : 32LE0142-HO-01

Temp./Humi. : 23deg. C / 63% RH
Engineer : Hiroshi Kukita

Mode / Remarks : RKES 315.1MHz(Ch1) EXT Ant. Worst-axis(Hor:X / Ver:X)

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 Factor	Loss& Gain	Level	Angle	Height	Polar.	Limit	Margin	Comment
[MHz]	[dBuV]		[dB/m]	[dB]	[dBuV/m]	[Deg]	[cm]		[dBuV/m]	[dB]	
1216.800	45.1	PK	24.6	-35.4	34.3	33	100	Hori.	73.9	39.6	
1216.800	33.8	AV	24.6	-35.4	23.0	33	100	Hori.	53.9	30.9	
1216.800	44.8	PK	24.6	-35.4	34.0	134	100	Vert.	73.9	39.9	
1216.800	34.0	AV	24.6	-35.4	23.2	134	100	Vert.	53.9	30.7	

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.

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Radiated Emission

(RKES(314.35MHz): Below 1GHz / Variation No.9 / ANT2)

DATA OF RADIATED EMISSION TEST

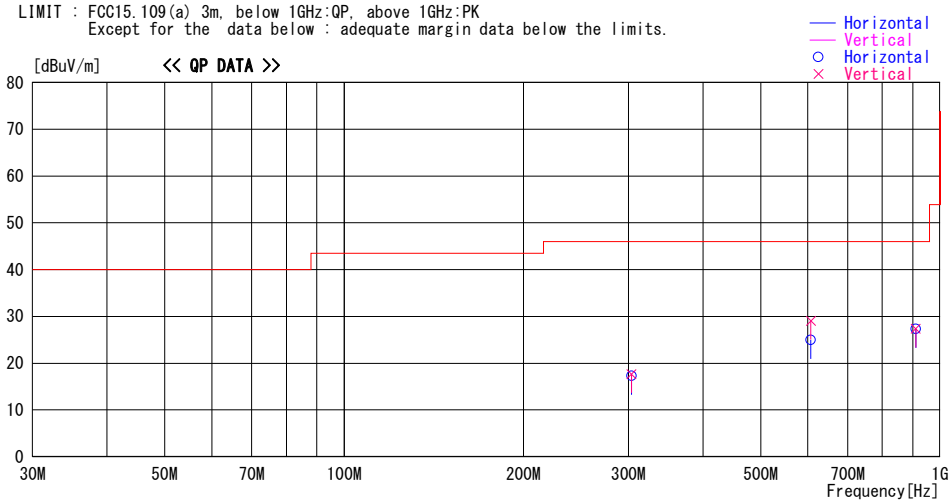
UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber
Date : 2012/07/18

Report No. : 32LE0142-HO-01

Temp./Humi. : 24deg. C / 68% RH
Engineer : Hiroshi Kukita

Mode / Remarks : RKES 314.35MHz(Ch2) EXT Ant. Worst-axis(Hor:X / Ver:X)

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 Factor	Loss& Gain	Level	Angle	Height	Polar.	Limit	Margin	Comment
[MHz]	[dBuV]		[dB/m]	[dB]	[dBuV/m]	[Deg]	[cm]		[dBuV/m]	[dB]	
303.450	21.7	QP	14.5	-18.9	17.3	89	100	Hori.	46.0	28.7	
303.450	22.1	QP	14.5	-18.9	17.7	241	100	Vert.	46.0	28.3	
606.900	23.8	QP	19.8	-18.6	25.0	134	100	Hori.	46.0	21.0	
606.900	27.9	QP	19.8	-18.6	29.1	133	100	Vert.	46.0	16.9	
910.350	21.6	QP	22.3	-16.6	27.3	80	100	Hori.	46.0	18.7	
910.350	21.7	QP	22.3	-16.6	27.4	309	100	Vert.	46.0	18.6	

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

(RKES(314.35MHz): Above 1GHz / Variation No.9 / ANT2)

DATA OF RADIATED EMISSION TEST

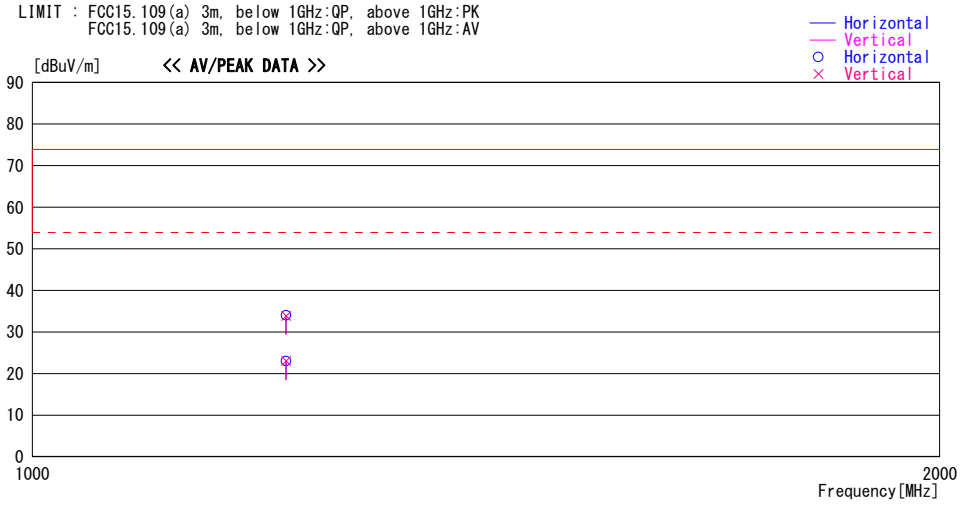
UL Japan, Inc. Head Office EMC Lab. No.1 Semi Anechoic Chamber
Date : 2012/07/19

Report No. : 32LE0142-HO-01

Temp./Humi. : 23deg. C / 63% RH
Engineer : Hiroshi Kukita

Mode / Remarks : RKES 314.35MHz(Ch2) EXT Ant. Worst-axis(Hor:X / Ver:X)

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 Factor	Loss& Gain	Level	Angle	Height	Polar.	Limit	Margin	Comment
[MHz]	[dBuV]		[dB/m]	[dB]	[dBuV/m]	[Deg]	[cm]		[dBuV/m]	[dB]	
1213.800	44.9	PK	24.5	-35.4	34.0	351	100	Hori.	73.9	39.9	
1213.800	33.9	AV	24.5	-35.4	23.0	351	100	Hori.	53.9	30.9	
1213.800	44.8	PK	24.5	-35.4	33.9	67	100	Vert.	73.9	40.0	
1213.800	34.0	AV	24.5	-35.4	23.1	67	100	Vert.	53.9	30.8	

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

(TPMS: Below 1GHz / Variation No.5 / ANT2)

DATA OF RADIATED EMISSION TEST

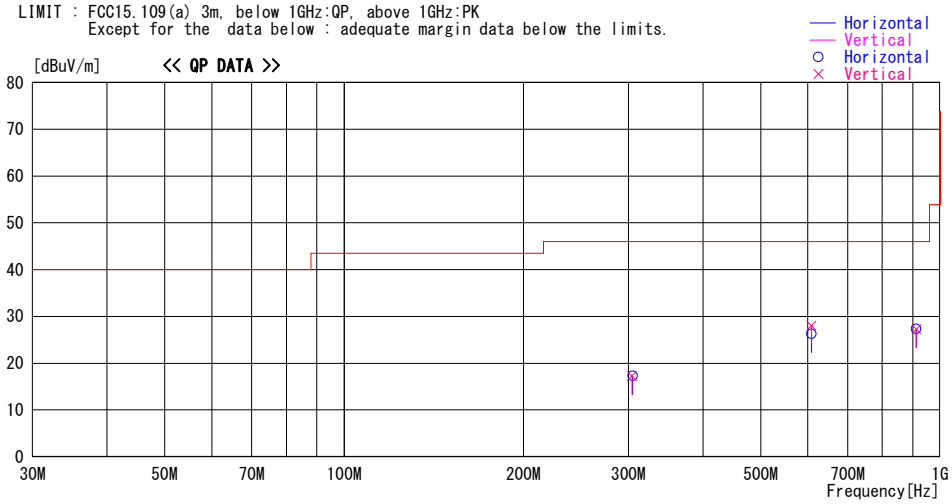
UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber
Date : 2012/07/17

Report No. : 32LE0142-HO-01

Temp./Humi. : 24deg. C / 68% RH
Engineer : Hiroshi Kukita

Mode / Remarks : TPMS 314.98MHz EXT Ant. Worst-axis(Hor:X / Ver:X)

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 Factor	Loss& Gain	Level	Angle	Height	Polar.	Limit	Margin	Comment
[MHz]	[dBuV]		[dB/m]	[dB]	[dBuV/m]	[Deg]	[cm]		[dBuV/m]	[dB]	
304.080	21.7	QP	14.5	-18.9	17.3	246	100	Vert.	46.0	28.7	
304.800	21.6	QP	14.5	-18.8	17.3	117	100	Hori.	46.0	28.7	
608.160	25.0	QP	19.8	-18.5	26.3	223	100	Hori.	46.0	19.7	
608.160	26.7	QP	19.8	-18.5	28.0	102	100	Vert.	46.0	18.0	
912.240	21.6	QP	22.3	-16.6	27.3	311	100	Hori.	46.0	18.7	
912.240	21.6	QP	22.3	-16.6	27.3	301	100	Vert.	46.0	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.

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Radiated Emission

(TPMS: Above 1GHz / Variation No.5 / ANT2)

DATA OF RADIATED EMISSION TEST

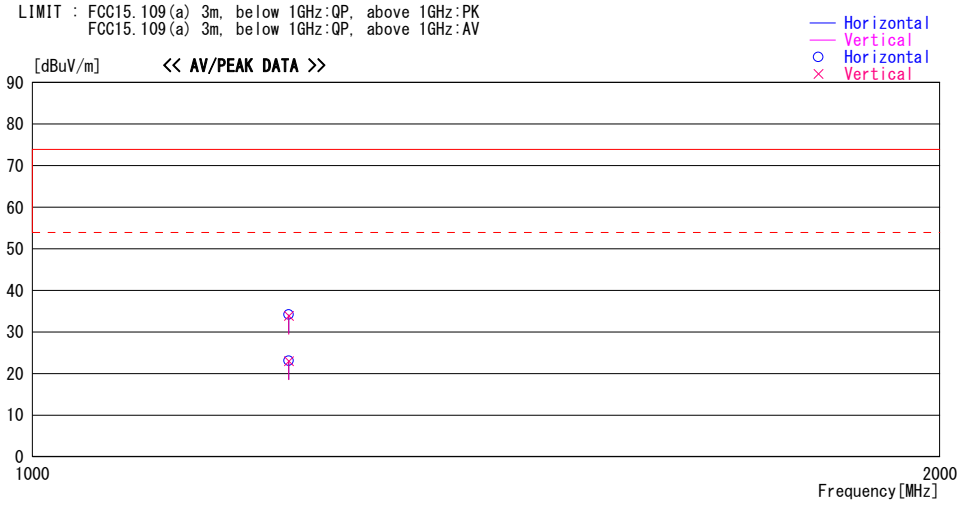
UL Japan, Inc. Head Office EMC Lab. No.1 Semi Anechoic Chamber
Date : 2012/07/19

Report No. : 32LE0142-HO-01

Temp./Humi. : 23deg. C / 63% RH
Engineer : Hiroshi Kukita

Mode / Remarks : TPMS 314.98MHz EXT Ant. Worst-axis(Hor:X / Ver:X)

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 Factor [dB/m]	Loss& Gain [dB]	Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
1216.320	45.1	PK	24.5	-35.4	34.2	1	100	Hori.	73.9	39.7	
1216.320	34.0	AV	24.5	-35.4	23.1	1	100	Hori.	53.9	30.8	
1216.320	44.8	PK	24.5	-35.4	33.9	12	100	Vert.	73.9	40.0	
1216.320	33.9	AV	24.5	-35.4	23.0	12	100	Vert.	53.9	30.9	

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

(RKES(315.10MHz): Below 1GHz / Variation No.3 / ANT1[Reference data])

DATA OF RADIATED EMISSION TEST

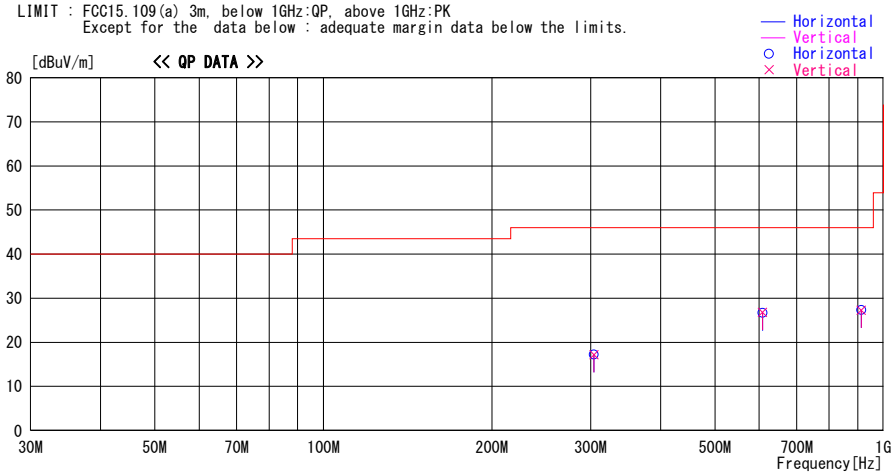
UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber
Date : 2012/07/17

eport No. : 32LE0142-HO-01

emp./Humi. : 25deg. C / 69% RH
ngineer : Keisuke Kawamura

Mode / Remarks : RKES 315.10MHz(Ch1) Int Ant. Worst-axis(Hor:X / Ver:X)

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 Factor [dB/m]	Loss& Gain [dB]	Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
304.200	21.6	QP	14.5	-18.9	17.2	0	100	Hori.	46.0	28.8	
304.200	21.6	QP	14.5	-18.9	17.2	0	100	Vert.	46.0	28.8	
608.400	25.4	QP	19.8	-18.5	26.7	79	100	Hori.	46.0	19.3	
608.400	25.5	QP	19.8	-18.5	26.8	263	100	Vert.	46.0	19.2	
912.600	21.6	QP	22.3	-16.6	27.3	0	100	Hori.	46.0	18.7	
912.600	21.6	QP	22.3	-16.6	27.3	0	100	Vert.	46.0	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

(RKES(315.10MHz): Above 1GHz / Variation No.3 / ANT1[Reference data])

DATA OF RADIATED EMISSION TEST

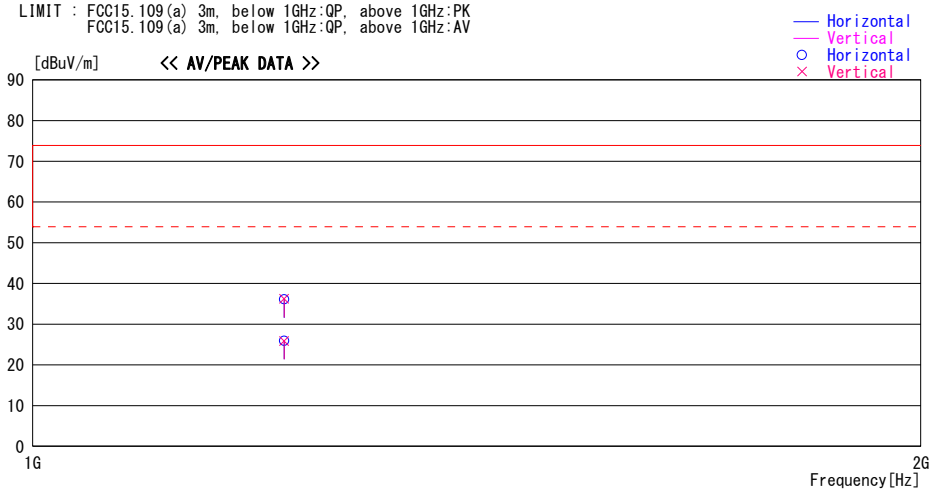
UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2012/07/25

Report No. : 32LE0142-HO-01

Temp./Humi. : 23deg. C / 75% RH
Engineer : Shinya Watanabe

Mode / Remarks : RKES 315.1MHz(Ch1) Int Ant. Worst-axis(Hor:X / Ver:X)

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 Factor [dB/m]	Loss& Gain [dB]	Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
1216.800	44.1	PK	24.5	-32.5	36.1	0	100	Hori.	73.9	37.8	
1216.800	44.2	PK	24.5	-32.5	36.2	0	100	Vert.	73.9	37.7	
1216.800	33.9	AV	24.5	-32.5	25.9	0	100	Hori.	53.9	28.0	
1216.800	33.9	AV	24.5	-32.5	25.9	0	100	Vert.	53.9	28.0	

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

(RKES(314.35MHz): Below 1GHz / Variation No.3 / ANT1[Reference data])

DATA OF RADIATED EMISSION TEST

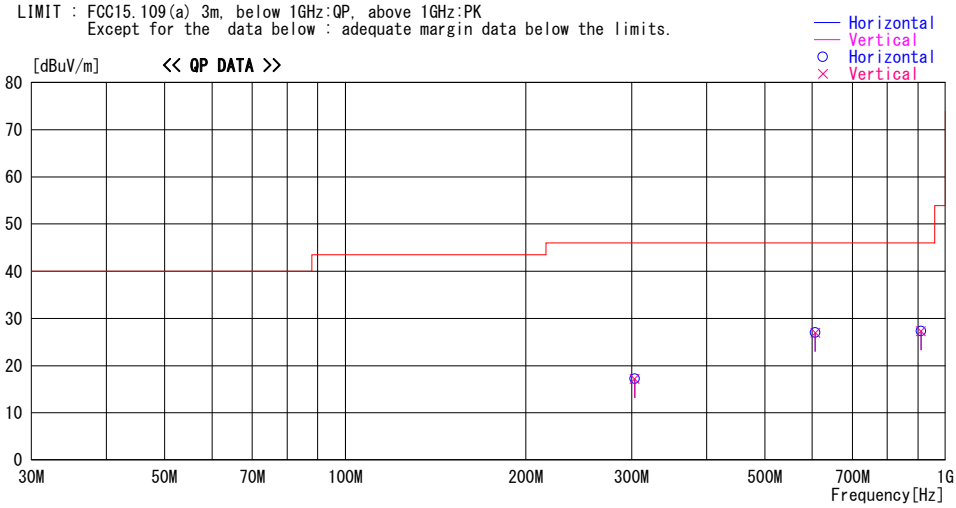
UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber
Date : 2012/07/17

Report No. : 32LE0142-HO-01

Temp./Humi. : 25deg. C / 69% RH
Engineer : Keisuke Kawamura

Mode / Remarks : RKES 314.35MHz(Ch2) Int Ant. Worst-axis(Hor:X / Ver:X)

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 Factor	Loss& Gain	Level	Angle	Height	Polar.	Limit	Margin	Comment
[MHz]	[dBuV]		[dB/m]	[dB]	[dBuV/m]	[Deg]	[cm]		[dBuV/m]	[dB]	
303.450	21.6	QP	14.5	-18.9	17.2	0	100	Hori.	46.0	28.8	
303.450	21.6	QP	14.5	-18.9	17.2	0	100	Vert.	46.0	28.8	
606.900	25.8	QP	19.8	-18.6	27.0	71	100	Hori.	46.0	19.0	
606.900	25.8	QP	19.8	-18.6	27.0	266	100	Vert.	46.0	19.0	
910.350	21.6	QP	22.3	-16.6	27.3	0	100	Hori.	46.0	18.7	
910.350	21.6	QP	22.3	-16.6	27.3	0	100	Vert.	46.0	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

(RKES(314.35MHz): Above 1GHz / Variation No.3 / ANT1[Reference data])

DATA OF RADIATED EMISSION TEST

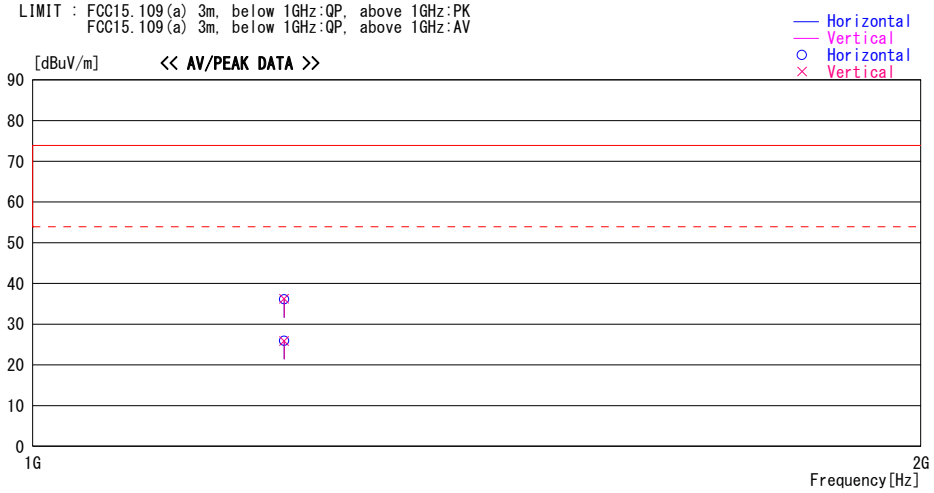
UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2012/07/25

Report No. : 32LE0142-HO-01

Temp./Humi. : 23deg. C / 75% RH
Engineer : Shinya Watanabe

Mode / Remarks : RKES 315.1MHz(Ch1) Int Ant. Worst-axis(Hor:X / Ver:X)

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 Factor [dB/m]	Loss& Gain [dB]	Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
1216.800	44.1	PK	24.5	-32.5	36.1	0	100	Hori.	73.9	37.8	
1216.800	44.2	PK	24.5	-32.5	36.2	0	100	Vert.	73.9	37.7	
1216.800	33.9	AV	24.5	-32.5	25.9	0	100	Hori.	53.9	28.0	
1216.800	33.9	AV	24.5	-32.5	25.9	0	100	Vert.	53.9	28.0	

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

(TPMS: Below 1GHz / Variation No.3 / ANT1[Reference data])

DATA OF RADIATED EMISSION TEST

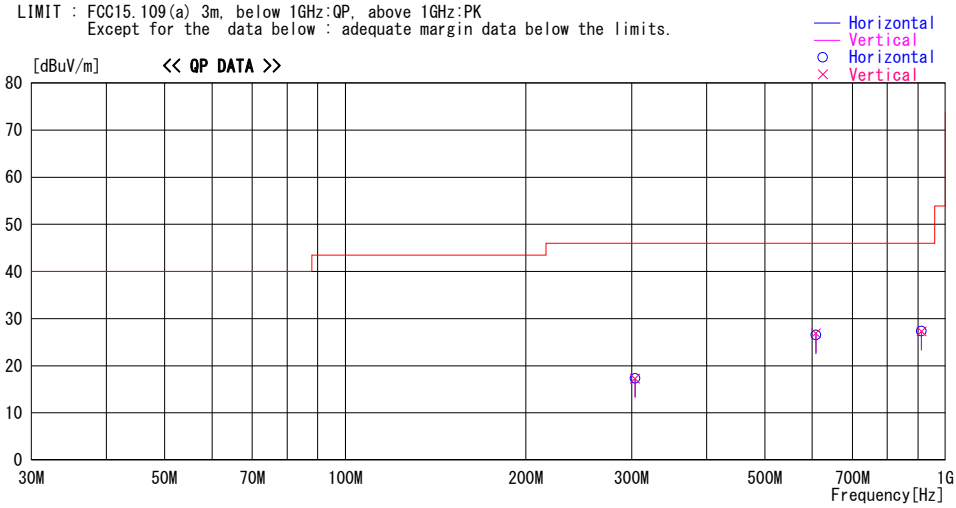
UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber
Date : 2012/07/17

Report No. : 32LE0142-HO-01

Temp./Humi. : 25deg. C / 69% RH
Engineer : Keisuke Kawamura

Mode / Remarks : TPMS 314.98MHz Int Ant. Worst-axis(Hor:X / Ver:X)

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 Factor [dB/m]	Loss& Gain [dB]	Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
304.080	21.7	QP	14.5	-18.9	17.3	0	100	Hori.	46.0	28.7	
304.080	21.7	QP	14.5	-18.9	17.3	0	100	Vert.	46.0	28.7	
608.160	25.2	QP	19.8	-18.5	26.5	71	100	Hori.	46.0	19.5	
608.160	25.6	QP	19.8	-18.5	26.9	261	100	Vert.	46.0	19.1	
912.240	21.6	QP	22.3	-16.6	27.3	0	100	Hori.	46.0	18.7	
912.240	21.6	QP	22.3	-16.6	27.3	0	100	Vert.	46.0	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.

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Radiated Emission

(TPMS: Above 1GHz / Variation No.3 / ANT1[Reference data])

DATA OF RADIATED EMISSION TEST

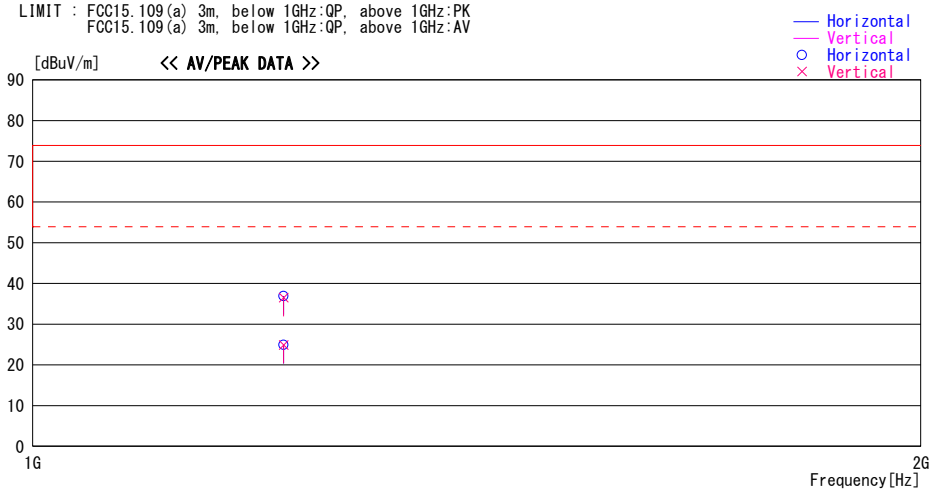
UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2012/07/25

Report No. : 32LE0142-HO-01

Temp./Humi. : 23deg. C / 75% RH
Engineer : Shinya Watanabe

Mode / Remarks : TPMS 314.98MHz Int Ant. Worst-axis(Hor:X / Ver:X)

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 Factor [dB/m]	Loss& Gain [dB]	Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
1216.320	45.0	PK	24.5	-32.5	37.0	0	100	Hori.	73.9	37.0	
1216.320	44.5	PK	24.5	-32.5	36.5	0	100	Vert.	73.9	37.4	
1216.320	32.9	AV	24.5	-32.5	24.9	0	100	Hori.	53.9	29.0	
1216.320	32.9	AV	24.5	-32.5	24.9	0	100	Vert.	53.9	29.0	

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

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

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Radiated Emission

(RKES(315.10MHz): Below 1GHz / Variation No.15 / ANT1 [Reference data])

DATA OF RADIATED EMISSION TEST

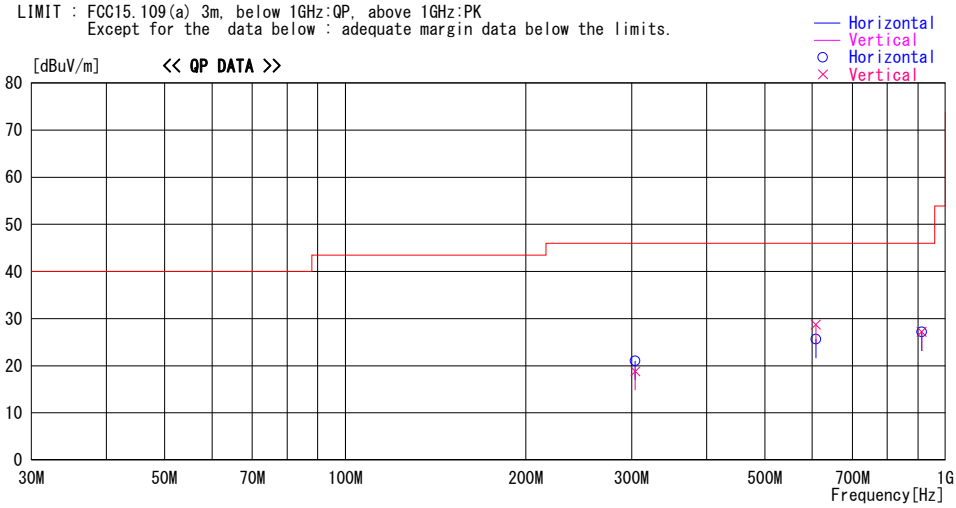
UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber
Date : 2012/07/17

Report No. : 32LE0142-HO-01

Temp./Humi. : 25deg. C / 69% RH
Engineer : Keisuke Kawamura

Mode / Remarks : RKES 315.1MHz(ch1) Int Ant. Worst-axis(Hor:X / Ver:X)

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 Factor [dB/m]	Loss& Gain [dB]	Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
304.200	25.4	QP	14.5	-18.9	21.0	152	100	Hori.	46.0	25.0	
304.200	23.2	QP	14.5	-18.9	18.8	310	100	Vert.	46.0	27.2	
608.400	24.3	QP	19.8	-18.5	25.6	202	100	Hori.	46.0	20.4	
608.400	27.4	QP	19.8	-18.5	28.7	189	100	Vert.	46.0	17.3	
912.600	21.5	QP	22.3	-16.6	27.2	0	100	Hori.	46.0	18.8	
912.600	21.5	QP	22.3	-16.6	27.2	0	100	Vert.	46.0	18.8	

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

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

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Radiated Emission

(RKES(315.10MHz): Above 1GHz / Variation No.15 / ANT1 [Reference data])

DATA OF RADIATED EMISSION TEST

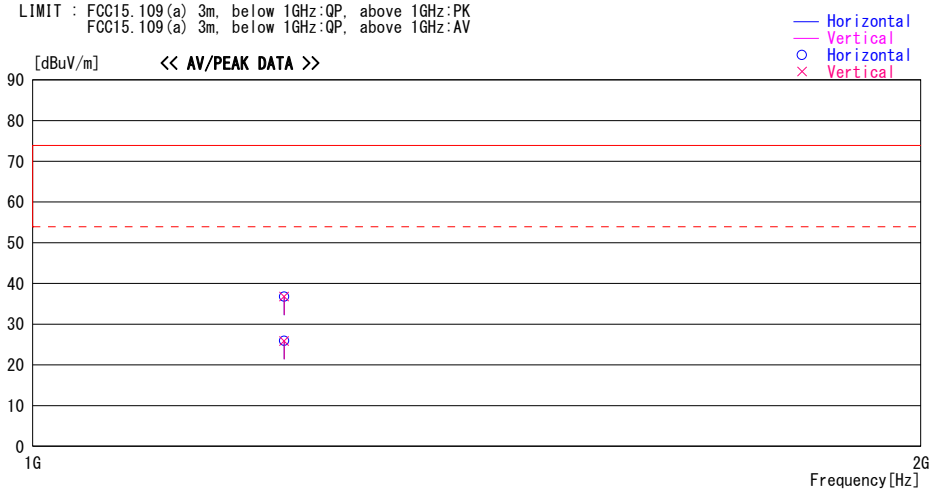
UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2012/07/25

Report No. : 32LE0142-HO-01

Temp./Humi. : 23deg. C / 75% RH
Engineer : Shinya Watanabe

Mode / Remarks : RKES 315.1MHz(Ch1) Int Ant. Worst-axis(Hor:X / Ver:X)

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 Factor	Loss& Gain	Level	Angle	Height	Polar.	Limit	Margin	Comment
[MHz]	[dBuV]		[dB/m]	[dB]	[dBuV/m]	[Deg]	[cm]		[dBuV/m]	[dB]	
1216.800	44.7	PK	24.5	-32.5	36.7	0	100	Hori.	73.9	37.2	
1216.800	44.8	PK	24.5	-32.5	36.8	0	100	Vert.	73.9	37.1	
1216.800	33.9	AV	24.5	-32.5	25.9	0	100	Hori.	53.9	28.0	
1216.800	33.9	AV	24.5	-32.5	25.9	0	100	Vert.	53.9	28.0	

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

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

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Radiated Emission

(RKES(314.35MHz): Below 1GHz / Variation No.15 / ANT1 [Reference data])

DATA OF RADIATED EMISSION TEST

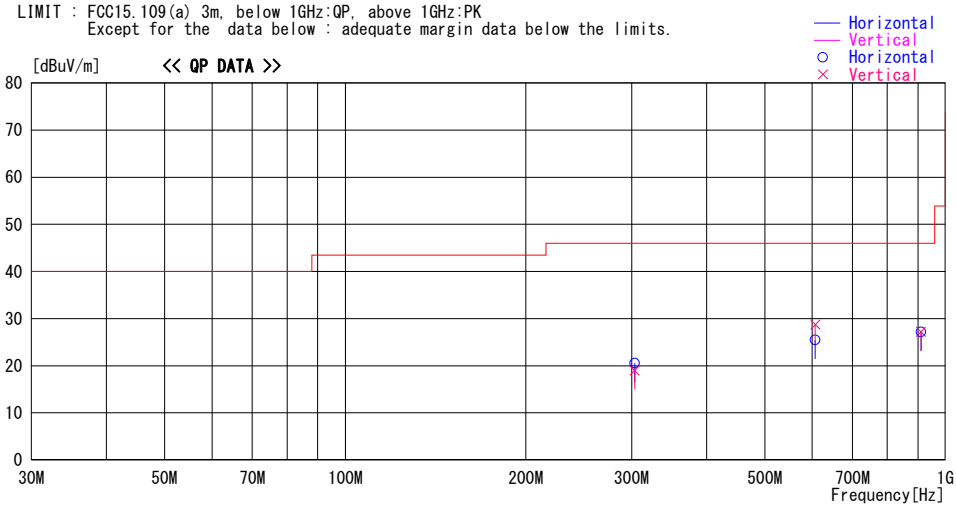
UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber
Date : 2012/07/17

Report No. : 32LE0142-HO-01

Temp./Humi. : 25deg. C / 69% RH
Engineer : Keisuke Kawamura

Mode / Remarks : RKES 314.35MHz(ch2) Int Ant. Worst-axis(Hor:X / Ver:X)

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 Factor	Loss& Gain	Level	Angle	Height	Polar.	Limit	Margin	Comment
[MHz]	[dBuV]		[dB/m]	[dB]	[dBuV/m]	[Deg]	[cm]		[dBuV/m]	[dB]	
303.450	24.9	QP	14.5	-18.9	20.5	165	100	Hori.	46.0	25.5	
303.450	23.4	QP	14.5	-18.9	19.0	294	100	Vert.	46.0	27.0	
606.900	24.3	QP	19.8	-18.6	25.5	200	100	Hori.	46.0	20.5	
606.900	27.5	QP	19.8	-18.6	28.7	194	100	Vert.	46.0	17.3	
910.350	21.5	QP	22.3	-16.6	27.2	0	100	Hori.	46.0	18.8	
910.350	21.5	QP	22.3	-16.6	27.2	0	100	Vert.	46.0	18.8	

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

(RKES(314.35MHz): Above 1GHz / Variation No.15 / ANT1 [Reference data])

DATA OF RADIATED EMISSION TEST

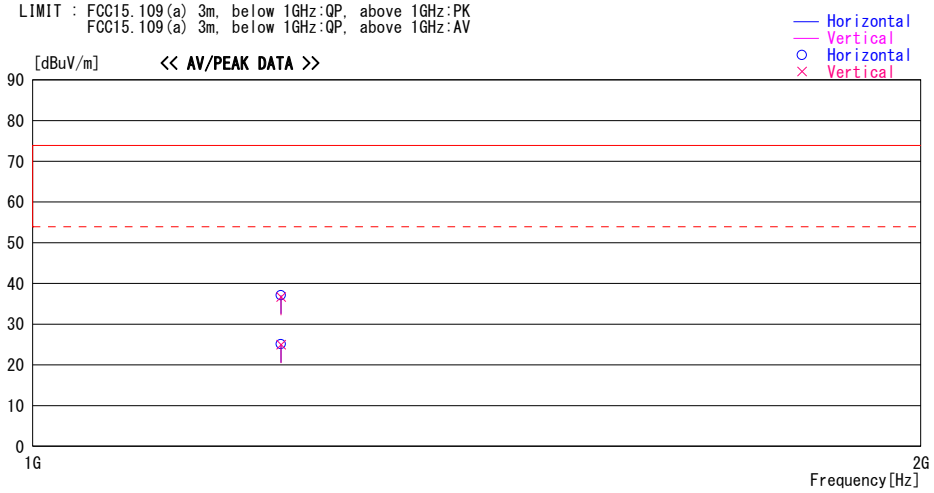
UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2012/07/25

Report No. : 32LE0142-HO-01

Temp./Humi. : 23deg. C / 75% RH
Engineer : Shinya Watanabe

Mode / Remarks : RKES 314.35MHz(Ch2) Int Ant. Worst-axis(Hor:X / Ver:X)

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 Factor [dB/m]	Loss& Gain [dB]	Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
1213.800	45.1	PK	24.5	-32.5	37.1	0	100	Hori.	73.9	36.8	
1213.800	44.7	PK	24.5	-32.5	36.7	0	100	Vert.	73.9	37.2	
1213.800	33.1	AV	24.5	-32.5	25.1	0	100	Hori.	53.9	28.8	
1213.800	33.0	AV	24.5	-32.5	25.0	0	100	Vert.	53.9	28.9	

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.
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Radiated Emission

(TPMS: Below 1GHz / Variation No.15 / ANT1 [Reference data])

DATA OF RADIATED EMISSION TEST

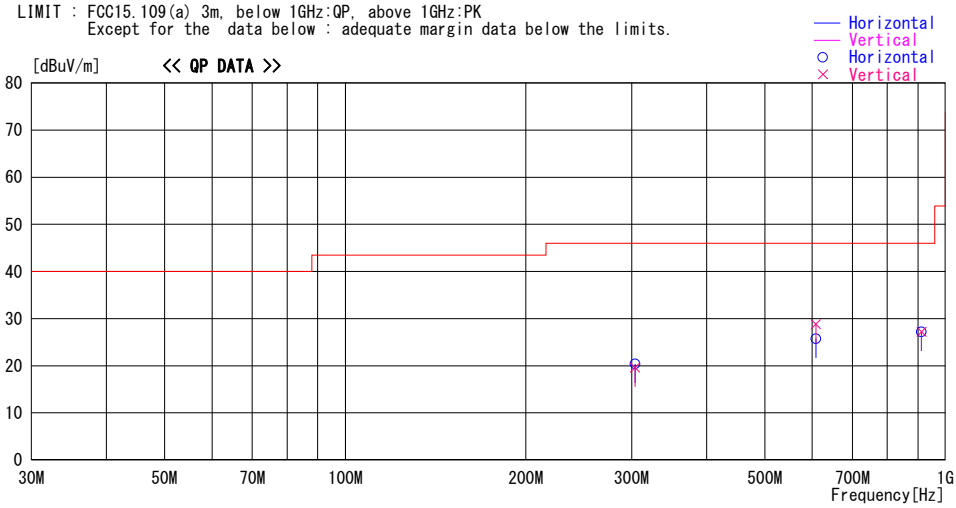
UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber
Date : 2012/07/17

Report No. : 32LE0142-HO-01

Temp./Humi. : 25deg. C / 69% RH
Engineer : Keisuke Kawamura

Mode / Remarks : TPMS 314.98MHz Int Ant. Worst-axis(Hor:X / Ver:X)

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 Factor	Loss& Gain	Level	Angle	Height	Polar.	Limit	Margin	Comment
[MHz]	[dBuV]		[dB/m]	[dB]	[dBuV/m]	[Deg]	[cm]		[dBuV/m]	[dB]	
304.080	24.8	QP	14.5	-18.9	20.4	6	112	Hori.	46.0	25.6	
304.080	24.0	QP	14.5	-18.9	19.6	295	100	Vert.	46.0	26.4	
608.160	24.4	QP	19.8	-18.5	25.7	208	100	Hori.	46.0	20.3	
608.160	27.5	QP	19.8	-18.5	28.8	190	100	Vert.	46.0	17.2	
912.240	21.5	QP	22.3	-16.6	27.2	0	100	Hori.	46.0	18.8	
912.240	21.5	QP	22.3	-16.6	27.2	0	100	Vert.	46.0	18.8	

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

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

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Radiated Emission

(TPMS: Above 1GHz / Variation No.15 / ANT1 [Reference data])

DATA OF RADIATED EMISSION TEST

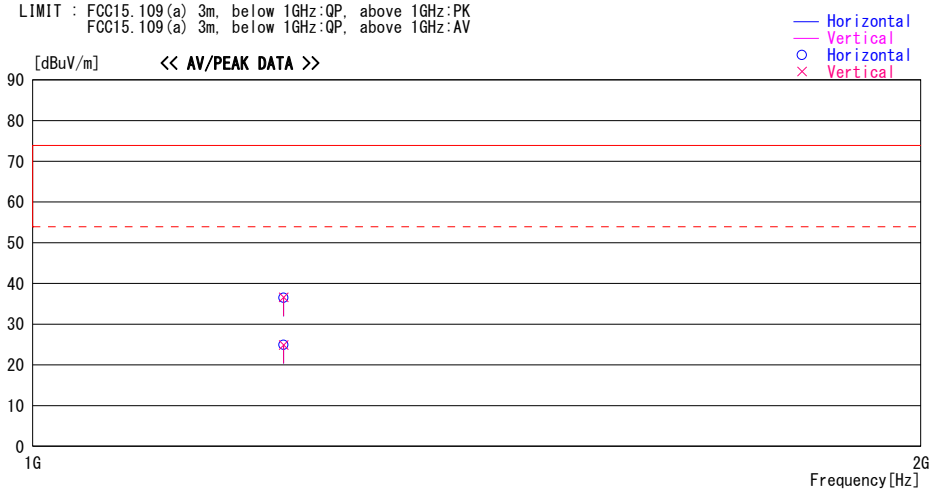
UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2012/07/25

Report No. : 32LE0142-HO-01

Temp./Humi. : 23deg. C / 75% RH
Engineer : Shinya Watanabe

Mode / Remarks : TPMS 314.98MHz Int Ant. Worst-axis(Hor:X / Ver:X)

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 Factor [dB/m]	Loss& Gain [dB]	Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
1216.320	44.5	PK	24.5	-32.5	36.5	0	100	Hori.	73.9	37.4	
1216.320	44.6	PK	24.5	-32.5	36.6	0	100	Vert.	73.9	37.3	
1216.320	32.9	AV	24.5	-32.5	24.9	0	100	Hori.	53.9	29.0	
1216.320	32.9	AV	24.5	-32.5	24.9	0	100	Vert.	53.9	29.0	

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

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

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Radiated Emission

(RKES(315.10MHz): Below 1GHz / Variation No.21 / ANT1 [Reference data])

DATA OF RADIATED EMISSION TEST

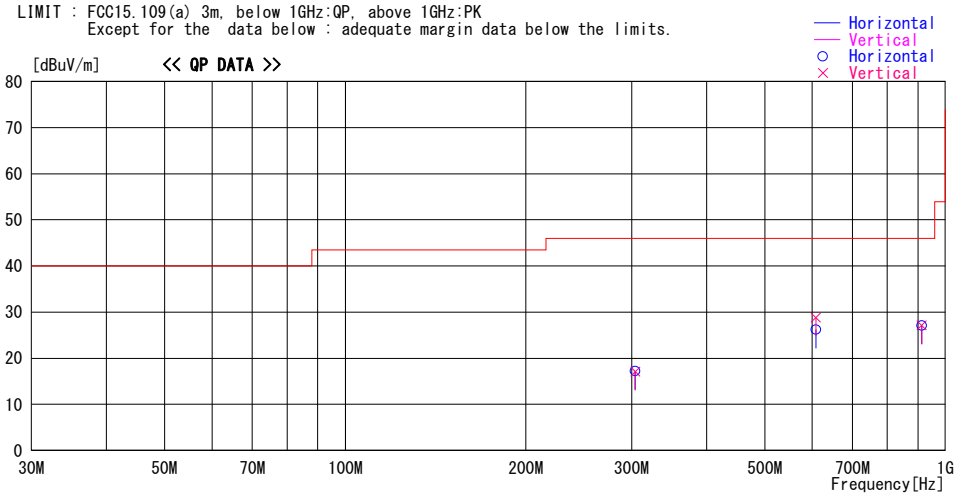
UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber
Date : 2012/07/17

Report No. : 32LE0142-HO-01

Temp./Humi. : 25deg. C / 69% RH
Engineer : Keisuke Kawamura

Mode / Remarks : RKES 315.1MHz(ch1) Int Ant. Worst-axis(Hor:X / Ver:X)

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 Factor	Loss& Gain	Level	Angle	Height	Polar.	Limit	Margin	Comment
[MHz]	[dBuV]		[dB/m]	[dB]	[dBuV/m]	[Deg]	[cm]		[dBuV/m]	[dB]	
304.200	21.6	QP	14.5	-18.9	17.2	0	100	Hori.	46.0	28.8	
304.200	21.5	QP	14.5	-18.9	17.1	0	100	Vert.	46.0	28.9	
608.400	27.5	QP	19.8	-18.5	28.8	193	100	Vert.	46.0	17.2	
608.400	24.9	QP	19.8	-18.5	26.2	216	140	Hori.	46.0	19.8	
912.600	21.4	QP	22.3	-16.6	27.1	0	100	Vert.	46.0	18.9	
912.600	21.4	QP	22.3	-16.6	27.1	0	100	Hori.	46.0	18.9	

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

(RKES(315.10MHz): Above 1GHz / Variation No.21 / ANT1 [Reference data])

DATA OF RADIATED EMISSION TEST

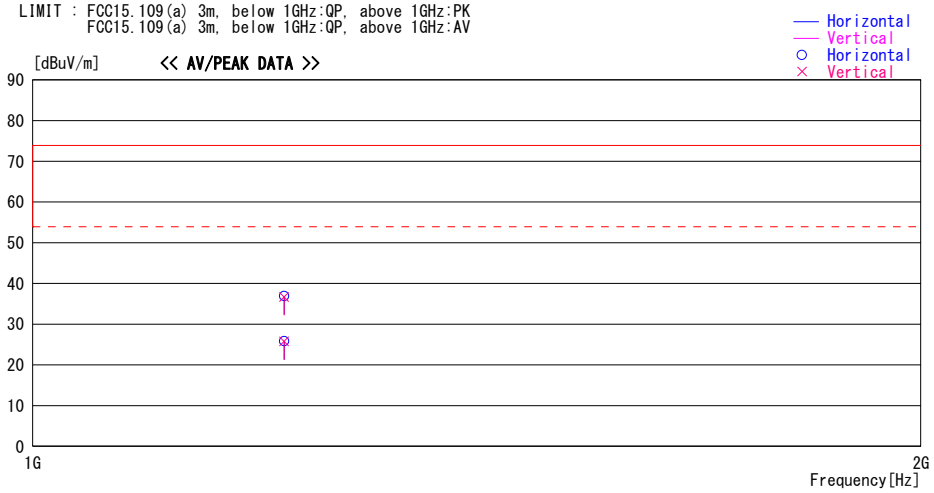
UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2012/07/25

Report No. : 32LE0142-HO-01

Temp./Humi. : 23deg. C / 75% RH
Engineer : Shinya Watanabe

Mode / Remarks : RKES 315.1MHz(Ch1) Int Ant. Worst-axis(Hor:X / Ver:X)

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 Factor [dB/m]	Loss& Gain [dB]	Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
1216.800	44.9	PK	24.5	-32.5	36.9	0	100	Hori.	73.9	37.0	
1216.800	44.7	PK	24.5	-32.5	36.7	0	100	Vert.	73.9	37.2	
1216.800	33.8	AV	24.5	-32.5	25.8	0	100	Hori.	53.9	28.1	
1216.800	33.8	AV	24.5	-32.5	25.8	0	100	Vert.	53.9	28.1	

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

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

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Radiated Emission

(RKES(314.35MHz): Below 1GHz / Variation No.21 / ANT1 [Reference data])

DATA OF RADIATED EMISSION TEST

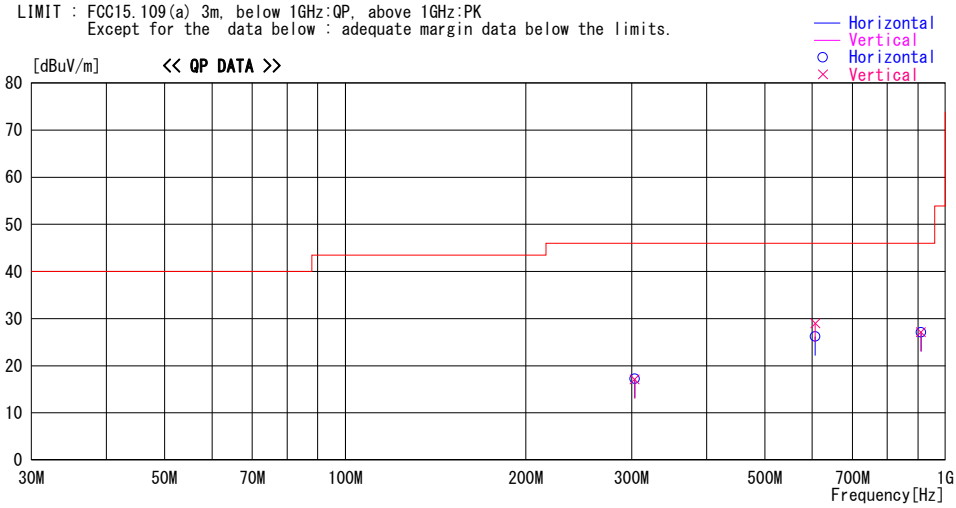
UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber
Date : 2012/07/17

Report No. : 32LE0142-HO-01

Temp./Humi. : 25deg. C / 69% RH
Engineer : Keisuke Kawamura

Mode / Remarks : RKES 314.35MHz(ch2) Int Ant. Worst-axis(Hor:X / Ver:X)

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 Factor [dB/m]	Loss& Gain [dB]	Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
303.450	21.6	QP	14.5	-18.9	17.2	0	100	Hori.	46.0	28.8	
303.450	21.5	QP	14.5	-18.9	17.1	0	100	Vert.	46.0	28.9	
606.900	27.8	QP	19.8	-18.6	29.0	190	100	Vert.	46.0	17.0	
606.900	25.0	QP	19.8	-18.6	26.2	214	152	Hori.	46.0	19.8	
910.350	21.4	QP	22.3	-16.6	27.1	0	100	Vert.	46.0	18.9	
910.350	21.4	QP	22.3	-16.6	27.1	0	100	Hori.	46.0	18.9	

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

(RKES(314.35MHz): Above 1GHz / Variation No.21 / ANT1 [Reference data])

DATA OF RADIATED EMISSION TEST

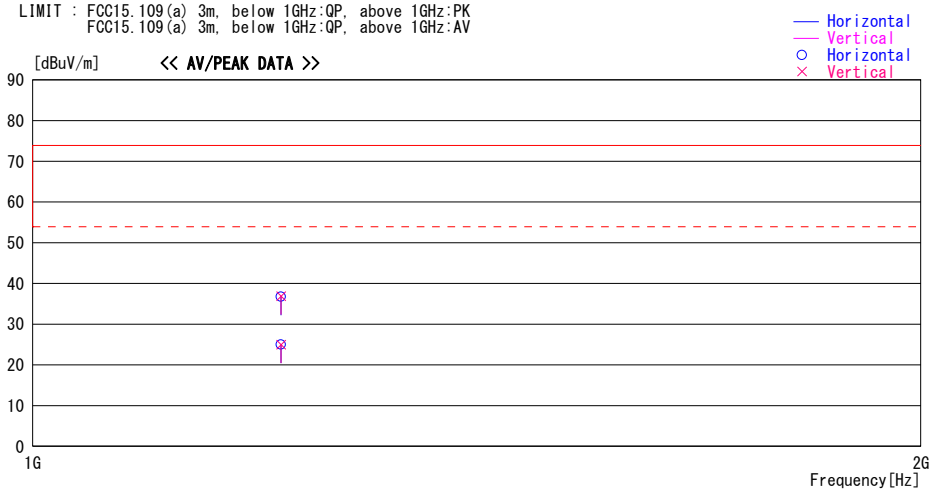
UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2012/07/25

Report No. : 32LE0142-HO-01

Temp./Humi. : 23deg. C / 75% RH
Engineer : Shinya Watanabe

Mode / Remarks : RKES 314.35MHz(Ch2) Int Ant. Worst-axis(Hor:X / Ver:X)

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 Factor [dB/m]	Loss& Gain [dB]	Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
1213.800	44.7	PK	24.5	-32.5	36.7	0	100	Hori.	73.9	37.2	
1213.800	44.9	PK	24.5	-32.5	36.9	0	100	Vert.	73.9	37.0	
1213.800	33.0	AV	24.5	-32.5	25.0	0	100	Hori.	53.9	28.9	
1213.800	33.0	AV	24.5	-32.5	25.0	0	100	Vert.	53.9	28.9	

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

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

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Radiated Emission

(TPMS: Below 1GHz / Variation No.21 / ANT1 [Reference data])

DATA OF RADIATED EMISSION TEST

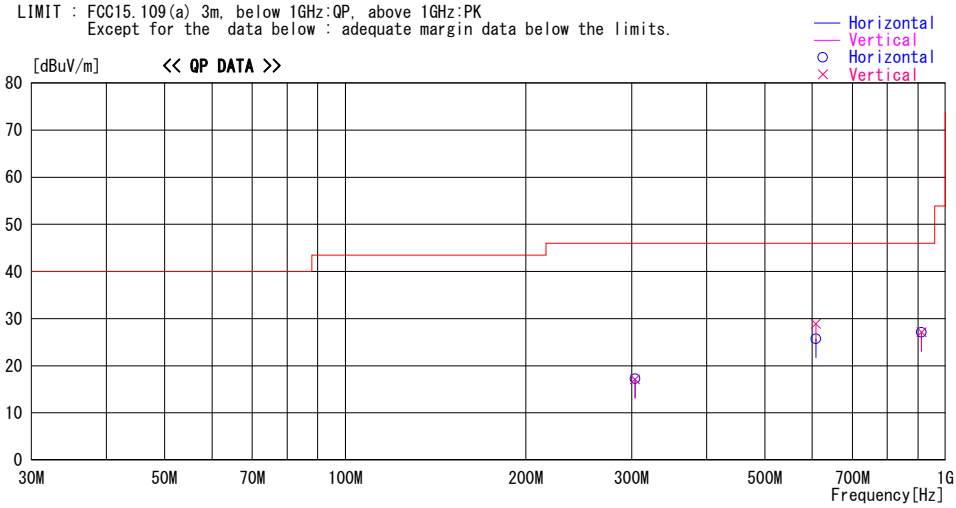
UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber
Date : 2012/07/17

Report No. : 32LE0142-HO-01

Temp./Humi. : 25deg. C / 69% RH
Engineer : Keisuke Kawamura

Mode / Remarks : TPMS 314.98MHz Int Ant. Worst-axis(Hor:X / Ver:X)

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 Factor	Loss& Gain	Level	Angle	Height	Polar.	Limit	Margin	Comment
[MHz]	[dBuV]		[dB/m]	[dB]	[dBuV/m]	[Deg]	[cm]		[dBuV/m]	[dB]	
304.080	21.6	QP	14.5	-18.9	17.2	0	100	Hori.	46.0	28.8	
304.080	21.5	QP	14.5	-18.9	17.1	0	100	Vert.	46.0	28.9	
608.160	27.6	QP	19.8	-18.5	28.9	187	100	Vert.	46.0	17.1	
608.160	24.4	QP	19.8	-18.5	25.7	207	100	Hori.	46.0	20.3	
912.240	21.4	QP	22.3	-16.6	27.1	0	100	Vert.	46.0	18.9	
912.240	21.4	QP	22.3	-16.6	27.1	0	100	Hori.	46.0	18.9	

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

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

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Radiated Emission

(TPMS: Above 1GHz / Variation No.21 / ANT1 [Reference data])

DATA OF RADIATED EMISSION TEST

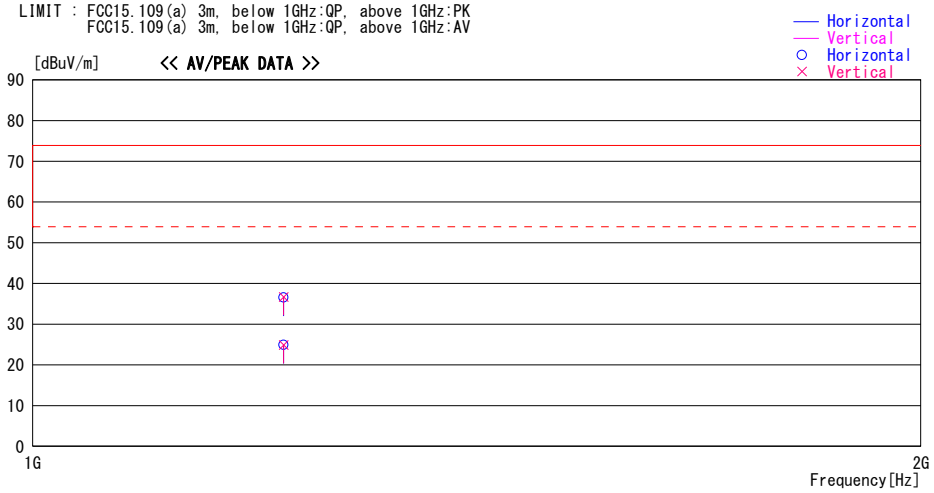
UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2012/07/25

Report No. : 32LE0142-HO-01

Temp./Humi. : 23deg. C / 75% RH
Engineer : Shinya Watanabe

Mode / Remarks : TPMS 314.98MHz Int Ant. Worst-axis(Hor:X / Ver:X)

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 Factor [dB/m]	Loss& Gain [dB]	Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
1216.320	44.6	PK	24.5	-32.5	36.6	0	100	Hori.	73.9	37.3	
1216.320	44.7	PK	24.5	-32.5	36.7	0	100	Vert.	73.9	37.2	
1216.320	32.9	AV	24.5	-32.5	24.9	0	100	Hori.	53.9	29.0	
1216.320	32.9	AV	24.5	-32.5	24.9	0	100	Vert.	53.9	29.0	

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

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

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Radiated Emission

(RKES(315.10MHz): Below 1GHz / Variation No.27 / ANT1 [Reference data])

DATA OF RADIATED EMISSION TEST

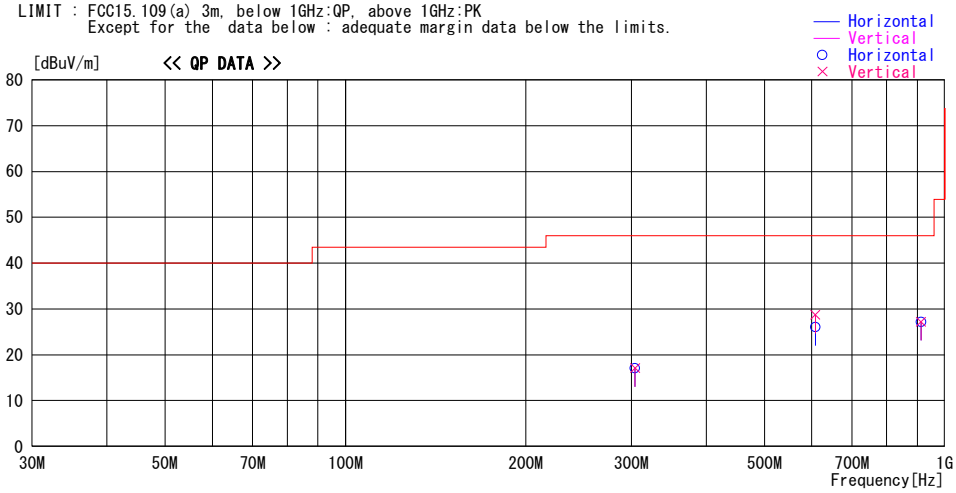
UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber
Date : 2012/07/17

Report No. : 32LE0142-HO-01

Temp./Humi. : 25deg. C / 69% RH
Engineer : Keisuke Kawamura

Mode / Remarks : RKES 315.1MHz Int Ant. Worst-axis(Hor:X / Ver:X)

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 Factor	Loss& Gain	Level	Angle	Height	Polar.	Limit	Margin	Comment
[MHz]	[dBuV]		[dB/m]	[dB]	[dBuV/m]	[Deg]	[cm]		[dBuV/m]	[dB]	
304.200	21.5	QP	14.5	-18.9	17.1	0	100	Hori.	46.0	28.9	
304.200	21.5	QP	14.5	-18.9	17.1	0	100	Vert.	46.0	28.9	
608.400	27.4	QP	19.8	-18.5	28.7	184	100	Vert.	46.0	17.3	
608.400	24.7	QP	19.8	-18.5	26.0	201	100	Hori.	46.0	20.0	
912.600	21.5	QP	22.3	-16.6	27.2	0	100	Hori.	46.0	18.8	
912.600	21.5	QP	22.3	-16.6	27.2	0	100	Vert.	46.0	18.8	

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

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

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Radiated Emission

(RKES(315.10MHz): Above 1GHz / Variation No.27 / ANT1 [Reference data])

DATA OF RADIATED EMISSION TEST

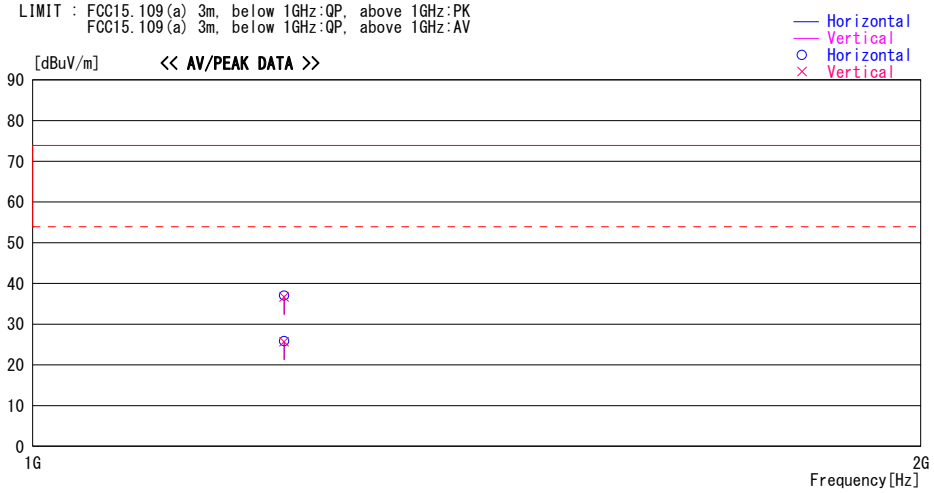
UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2012/07/25

Report No. : 32LE0142-HO-01

Temp./Humi. : 23deg. C / 75% RH
Engineer : Shinya Watanabe

Mode / Remarks : RKES 315.1MHz(Ch1) Int Ant. Worst-axis(Hor:X / Ver:X)

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 Factor [dB/m]	Loss& Gain [dB]	Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
1216.800	45.0	PK	24.5	-32.5	37.0	0	100	Hori.	73.9	36.9	
1216.800	44.7	PK	24.5	-32.5	36.7	0	100	Vert.	73.9	37.2	
1216.800	33.8	AV	24.5	-32.5	25.8	0	100	Hori.	53.9	28.1	
1216.800	33.7	AV	24.5	-32.5	25.7	0	100	Vert.	53.9	28.2	

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.

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Radiated Emission

(RKES(314.35MHz): Below 1GHz / Variation No.27 / ANT1 [Reference data])

DATA OF RADIATED EMISSION TEST

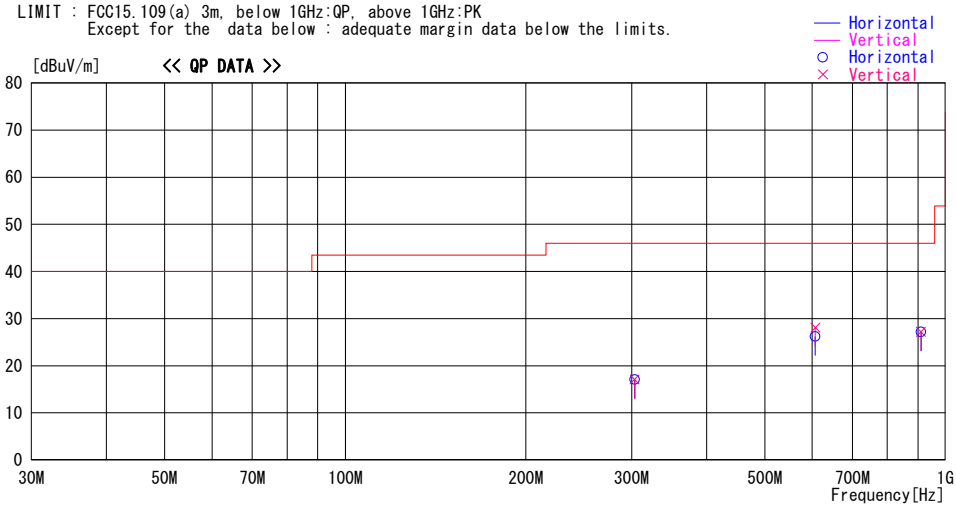
UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber
Date : 2012/07/17

Report No. : 32LE0142-HO-01

Temp./Humi. : 25deg. C / 69% RH
Engineer : Keisuke Kawamura

Mode / Remarks : RKES 314.35MHz(ch2) Int Ant. Worst-axis(Hor:X / Ver:X)

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 Factor	Loss& Gain	Level	Angle	Height	Polar.	Limit	Margin	Comment
[MHz]	[dBuV]		[dB/m]	[dB]	[dBuV/m]	[Deg]	[cm]		[dBuV/m]	[dB]	
303.450	21.5	QP	14.5	-18.9	17.1	0	100	Hori.	46.0	28.9	
303.450	21.5	QP	14.5	-18.9	17.1	0	100	Vert.	46.0	28.9	
606.900	26.9	QP	19.8	-18.6	28.1	183	100	Vert.	46.0	17.9	
606.900	25.0	QP	19.8	-18.6	26.2	219	131	Hori.	46.0	19.8	
910.350	21.5	QP	22.3	-16.6	27.2	0	100	Hori.	46.0	18.8	
910.350	21.5	QP	22.3	-16.6	27.2	0	100	Vert.	46.0	18.8	

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

(RKES(314.35MHz): Above 1GHz / Variation No.27 / ANT1 [Reference data])

DATA OF RADIATED EMISSION TEST

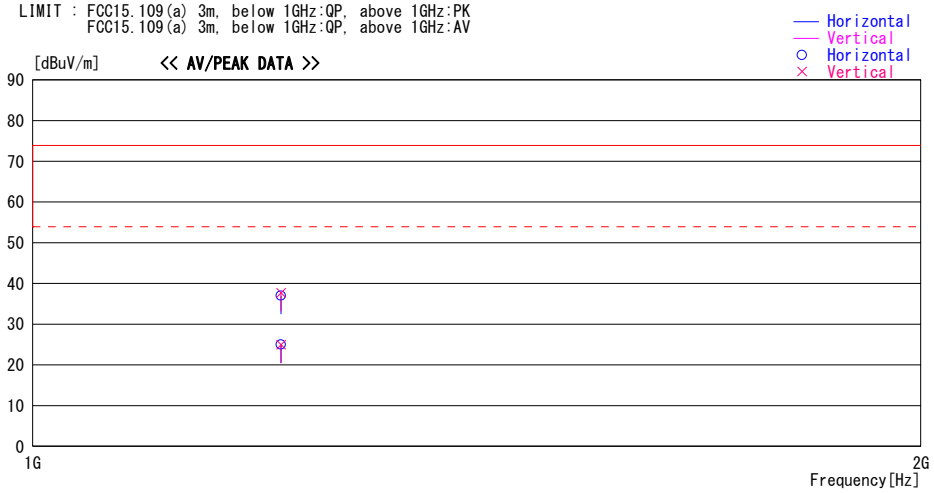
UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2012/07/25

Report No. : 32LE0142-HO-01

Temp./Humi. : 23deg. C / 75% RH
Engineer : Shinya Watanabe

Mode / Remarks : RKES 314.35MHz(Ch2) Int Ant. Worst-axis(Hor:X / Ver:X)

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 Factor	Loss& Gain	Level	Angle	Height	Polar.	Limit	Margin
[MHz]	[dBuV]		[dB/m]	[dB]	[dBuV/m]	[Deg]	[cm]		[dBuV/m]	[dB]
1213.800	45.0	PK	24.5	-32.5	37.0	0	100	Hori.	73.9	36.9
1213.800	45.7	PK	24.5	-32.5	37.7	0	100	Vert.	73.9	36.2
1213.800	33.0	AV	24.5	-32.5	25.0	0	100	Hori.	53.9	28.9
1213.800	33.0	AV	24.5	-32.5	25.0	0	100	Vert.	53.9	28.9

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

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

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Radiated Emission

(TPMS: Below 1GHz / Variation No.27 / ANT1 [Reference data])

DATA OF RADIATED EMISSION TEST

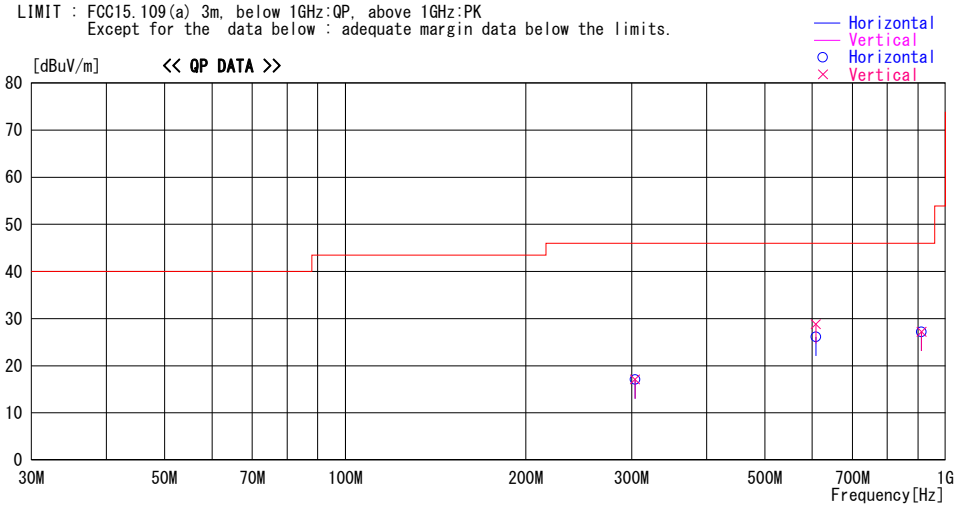
UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber
Date : 2012/07/17

Report No. : 32LE0142-HO-01

Temp./Humi. : 25deg. C / 69% RH
Engineer : Keisuke Kawamura

Mode / Remarks : TPMS 314.98MHz Int Ant. Worst-axis(Hor:X / Ver:X)

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 Factor	Loss& Gain	Level	Angle	Height	Polar.	Limit	Margin	Comment
[MHz]	[dBuV]		[dB/m]	[dB]	[dBuV/m]	[Deg]	[cm]		[dBuV/m]	[dB]	
304.080	21.5	QP	14.5	-18.9	17.1	0	100	Hori.	46.0	28.9	
304.080	21.5	QP	14.5	-18.9	17.1	0	100	Vert.	46.0	28.9	
608.160	27.5	QP	19.8	-18.5	28.8	194	100	Vert.	46.0	17.2	
608.160	24.8	QP	19.8	-18.5	26.1	201	100	Hori.	46.0	19.9	
912.240	21.5	QP	22.3	-16.6	27.2	0	100	Hori.	46.0	18.8	
912.240	21.5	QP	22.3	-16.6	27.2	0	100	Vert.	46.0	18.8	

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

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

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Radiated Emission

(TPMS: Above 1GHz / Variation No.27 / ANT1 [Reference data])

DATA OF RADIATED EMISSION TEST

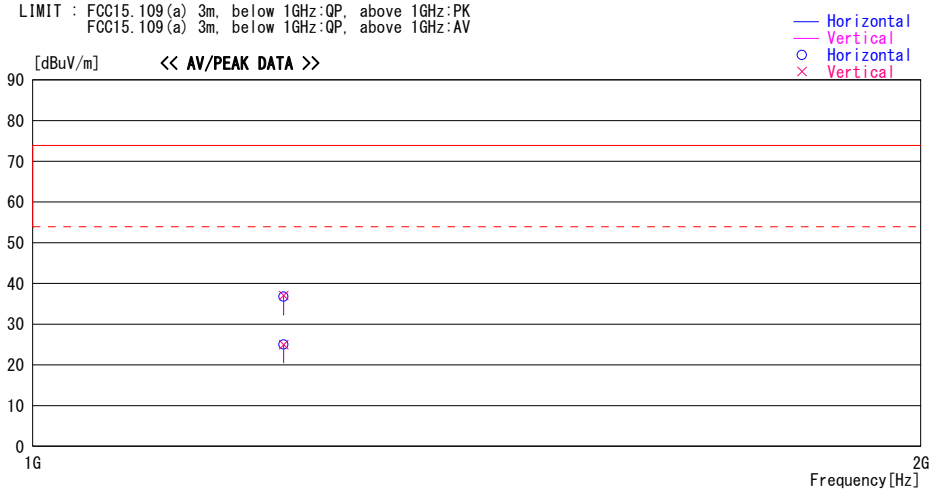
UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2012/07/25

Report No. : 32LE0142-HO-01

Temp./Humi. : 23deg. C / 75% RH
Engineer : Shinya Watanabe

Mode / Remarks : TPMS 314.98MHz Int Ant. Worst-axis(Hor:X / Ver:X)

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 Factor	Loss& Gain	Level	Angle	Height	Polar.	Limit	Margin
[MHz]	[dBuV]		[dB/m]	[dB]	[dBuV/m]	[Deg]	[cm]		[dBuV/m]	[dB]
1216.320	44.7	PK	24.5	-32.5	36.7	0	100	Hori.	73.9	37.2
1216.320	45.1	PK	24.5	-32.5	37.1	0	100	Vert.	73.9	36.8
1216.320	33.0	AV	24.5	-32.5	25.0	0	100	Hori.	53.9	28.9
1216.320	33.0	AV	24.5	-32.5	25.0	0	100	Vert.	53.9	28.9

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.

Antenna Terminal Conducted Emission

(RKES(315.10MHz): Below 1GHz / Variation No.9)

DATA OF RADIATED EMISSION TEST

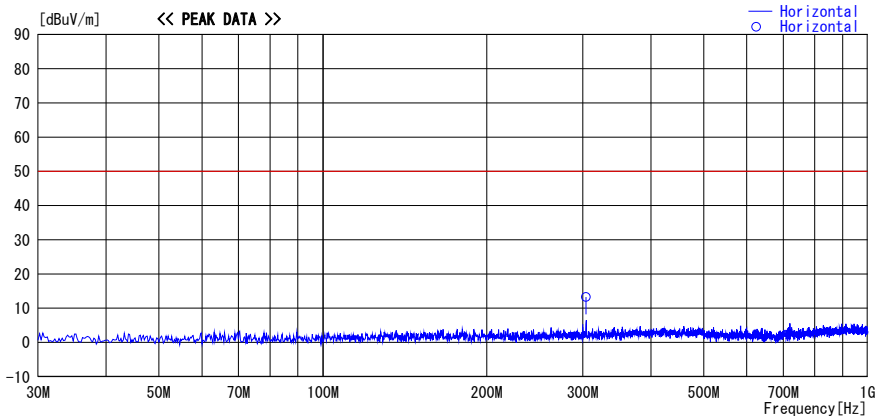
UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2012/07/27

Report No. : 32LE0142-HO-01

Temp./Humi. : 22deg. C / 58% RH
Engineer : Tomohisa Nakagawa

Mode / Remarks : RKES 315.10MHz

LIMIT : FCC15.111 Antenna terminal measurement
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]	[Deg]	[cm]		[dBuV]	[dB]	
304.200	39.1	PK	-	-25.9	13.2	0	100	Hori.	50.0	36.8	

CALCULATION: RESULT = READING + 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.

Antenna Terminal Conducted Emission

(RKES(315.10MHz): Above 1GHz / Variation No.9)

DATA OF RADIATED EMISSION TEST

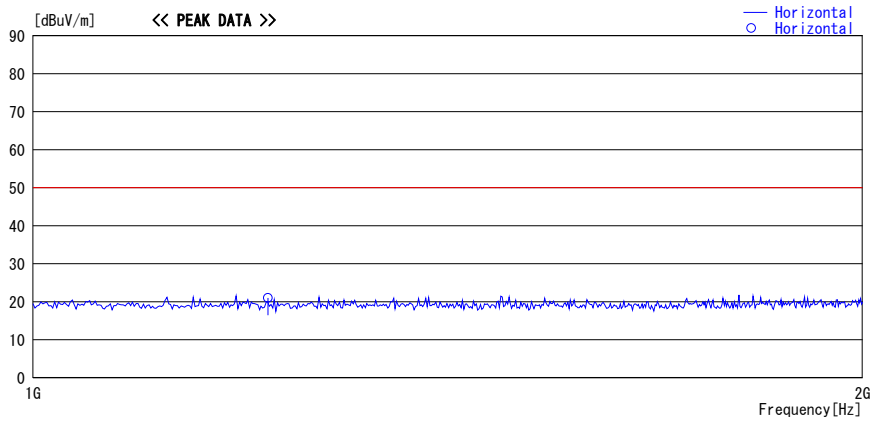
UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2012/07/27

Report No. : 32LE0142-HO-01

Temp./Humi. : 22deg. C / 58% RH
Engineer : Tomohisa Nakagawa

Mode / Remarks : RKES 315.10MHz

LIMIT : FCC15.111 Antenna terminal measurement
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]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV]	Margin [dB]	Comment
1216.800	44.2	PK	-	-23.2	21.0	0	100	Hori.	50.0	29.0	

CALCULATION: RESULT = READING + 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.

Antenna Terminal Conducted Emission

(RKES(314.35MHz): Below 1GHz / Variation No.9)

DATA OF RADIATED EMISSION TEST

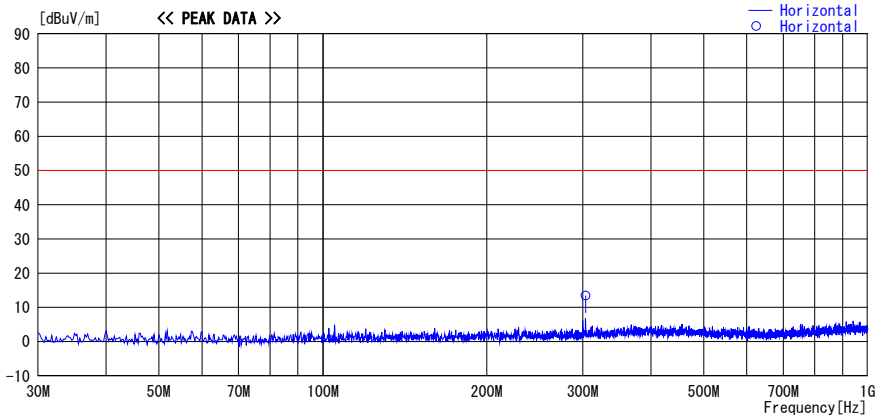
UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2012/07/27

Report No. : 32LE0142-HO-01

Temp./Humi. : 22deg. C / 58% RH
Engineer : Tomohisa Nakagawa

Mode / Remarks : RKES 314.35MHz

LIMIT : FCC15.111 Antenna terminal measurement
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]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV]	Margin [dB]	Comment
303.450	39.3	PK	-	-25.9	13.4	0	100	Hori.	50.0	36.6	

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

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

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Antenna Terminal Conducted Emission

(RKES(314.35MHz): Above 1GHz / Variation No.9)

DATA OF RADIATED EMISSION TEST

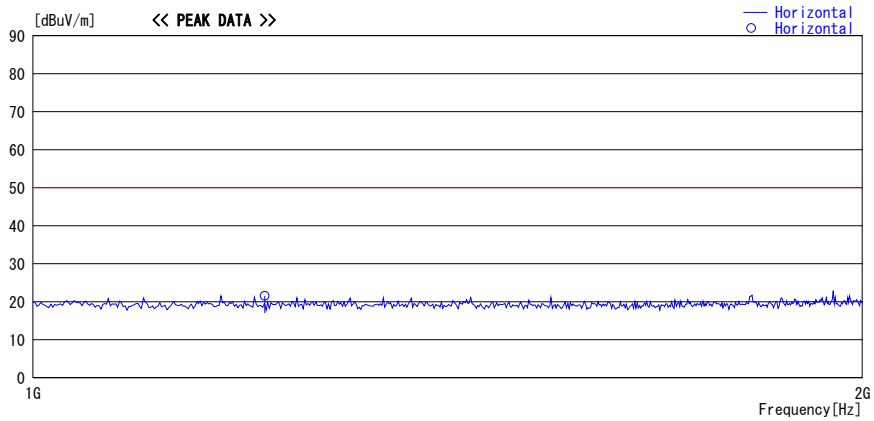
UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2012/07/27

Report No. : 32LE0142-HO-01

Temp./Humi. : 22deg. C / 58% RH
Engineer : Tomohisa Nakagawa

Mode / Remarks : RKES 314.35MHz

LIMIT : FCC15.111 Antenna terminal measurement
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]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV]	Margin [dB]	Comment
1213.800	44.8	PK	-	-23.2	21.6	0	100	Hori.	50.0	28.4	

CALCULATION: RESULT = READING + 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.

Antenna Terminal Conducted Emission

(TPMS: Below 1GHz / Variation No.5)

DATA OF RADIATED EMISSION TEST

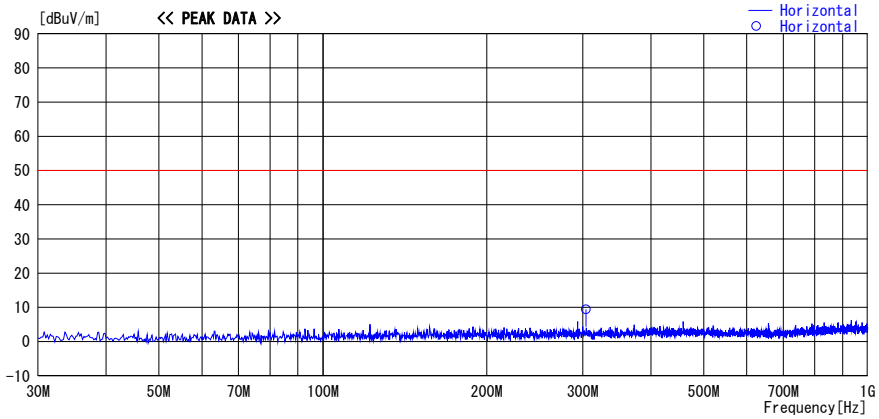
UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2012/07/27

Report No. : 32LE0142-HO-01

Temp./Humi. : 22deg. C / 58% RH
Engineer : Tomohisa Nakagawa

Mode / Remarks : TPMS 314.98MHz

LIMIT : FCC15.111 Antenna terminal measurement
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]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV]	Margin [dB]	Comment
304.080	35.3	PK	-	-25.9	9.4	0	100	Hori.	50.0	40.6	

CALCULATION: RESULT = READING + 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.

Antenna Terminal Conducted Emission

(TPMS: Below 1GHz / Variation No.5)

DATA OF RADIATED EMISSION TEST

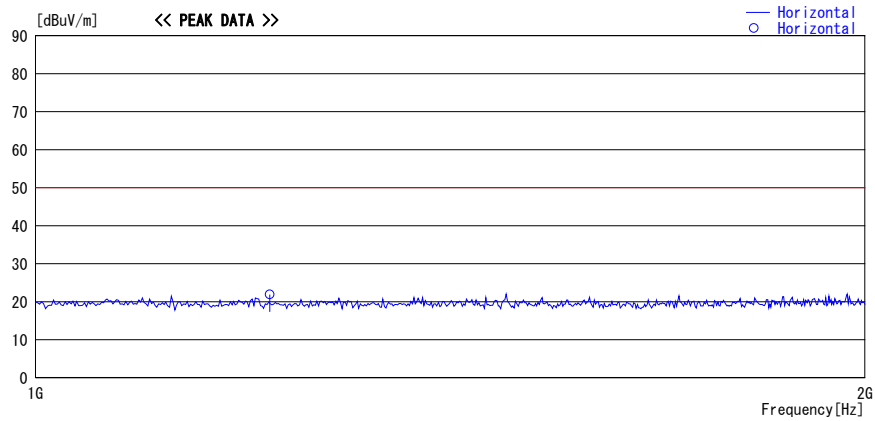
UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2012/07/27

Report No. : 32LE0142-HO-01

Temp./Humi. : 22deg. C / 58% RH
Engineer : Tomohisa Nakagawa

Mode / Remarks : TPMS 314.98MHz

LIMIT : FCC15.111 Antenna terminal measurement
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]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV]	Margin [dB]	Comment
1216.310	45.1	PK	-	-23.2	21.9	0	100	Hori.	50.0	28.1	

CALCULATION: RESULT = READING + 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.

APPENDIX 2: 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	2012/06/29 * 12
MOS-22	Thermo-Hygrometer	Custom	CTH-201	0003	RE	2012/02/06 * 12
MJM-14	Measure	KOMELON	KMC-36	-	RE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE	-
MSA-04	Spectrum Analyzer	Agilent	E4448A	US44300523	RE	2012/04/06 * 12
MTR-03	Test Receiver	Rohde & Schwarz	ESCI	100300	RE	2012/04/03 * 12
MBA-02	Biconical Antenna	Schwarzbeck	BBA9106	VHA91032008	RE	2011/10/23 * 12
MLA-02	Logperiodic Antenna	Schwarzbeck	USLP9143	201	RE	2011/10/23 * 12
MCC-12	Coaxial Cable	Fujikura/Agilent	-	-	RE	2012/02/16 * 12
MAT-07	Attenuator(6dB)	Weinschel Corp	2	BK7970	RE	2011/11/02 * 12
MPA-09	Pre Amplifier	Agilent	8447D	2944A10845	RE	2011/09/26 * 12
MAEC-01	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 10m	DA-06881	RE	2011/07/10 * 12
MOS-27	Thermo-Hygrometer	CUSTOM	CTH-201	A08Q26	RE	2012/02/08 * 12
MJM-01	Measure	KDS	ES19-55	-	RE	-
MHA-05	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	253	RE	2012/06/27 * 12
MCC-134	Microwave Cable	HUBER+SUHNER	SUCOFLEX104	336167/4(1m) / 340641(5m)	RE	2011/09/07 * 12
MPA-01	Pre Amplifier	Agilent	8449B	3008A01671	RE	2012/02/28 * 12
MAEC-04	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE/AT	2012/02/29 * 12
MOS-13	Thermo-Hygrometer	Custom	CTH-180	-	RE/AT	2012/02/06 * 12
MJM-09	Measure	KDS	E19-55	-	RE/AT	-
MHA-21	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	9120D-557	RE	2011/08/11 * 12
MCC-141	Microwave Cable	Junkosha	MWX221	1203S212(1m) / 1204S062(5m)	RE	2012/04/23 * 12
MPA-12	MicroWave System Amplifier	Agilent	83017A	MY39500780	RE/AT	2012/03/28 * 12
MSA-03	Spectrum Analyzer	Agilent	E4448A	MY44020357	RE/AT	2011/11/23 * 12
MCC-64	Coaxial Cable	UL Japan	-	-	AT	2012/03/22 * 12
MCC-66	Microwave Cable 1G-40GHz	Suhner	SUCOFLEX102	28636/2	AT	2012/04/25 * 12
MAT-23	Attenuator(10dB) 1-18GHz	Orient Microwave	BX10-0476-00	-	AT	2012/03/27 * 12
AT-38	Attenuator	Anritsu	MP721B	6200961025	AT	2011/12/08 * 12
MPA-14	Pre Amplifier	SONOMA INSTRUMENT	310	260833	AT	2012/03/05 * 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