



EMI TEST REPORT

Test Report No. : 10064275H

Applicant : DENSO CORPORATION
Type of Equipment : Remote Keyless Entry System and TPMS (Receiver)
Model No. : 23AAN
FCC ID : HYQ23AAN
Test regulation : FCC Part 15 Subpart B: 2013
Test Result : Complied

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the limits of the above regulation.
4. The test results in this test report are traceable to the national or international standards.
5. This test report must not be used by the customer to claim product certification, approval, or endorsement by any agency of the Federal Government.
6. The opinions and the interpretations to the result of the description in this report are outside scopes where UL Japan has been accredited.

Date of test: October 25 to November 6, 2013

Representative test engineer:

Shinya Watanabe
Engineer of WiSE Japan,
UL Verification Service

Approved by:

Masanori Nishiyama
Manager of WiSE Japan,
UL Verification Service



JAB
Testing
RTL02610

- The testing in which "Non-accreditation" is displayed is outside the accreditation scopes in UL Japan.
 There is no testing item of "Non-accreditation".

UL Japan, Inc.

Head Office EMC Lab.

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

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13-EM-F0429

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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 : +81-566-20-3953
Facsimile Number : +81-566-25-4792
Contact Person : MASASHI URABE

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. : 23AAN
Serial No. : Refer to Section 4, Clause 4.2
Receipt Date of Sample : October 23, 2013
Country of Mass-production : Japan, United States of America
Condition of EUT : Engineering prototype
(Not for Sale: This sample is equivalent to mass-produced items.)
Modification of EUT : No Modification by the test lab

2.2 Product description

Model No: 23AAN (referred to as the EUT in this report) is Remote Keyless Entry System and TPMS (Receiver). 23AAN has 5 variations. For details of variations, see "Theory of Operation". Hereinafter, Remote Keyless Entry System is called "RKES" in this report.

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 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.

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.

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Type of receiving system : Super-heterodyne
Frequency of Operation : RKES (CH1): 314.35 MHz
RKES (CH2): 312.10 MHz
TPMS: 314.98 MHz
Oscillator Frequency : 21.948717MHz (Crystal)
Type of Modulation : RKES: FSK (F1D)
TPMS: FSK (F1D)
Power Supply : DC12.0V
Antenna Type : Internal antenna (Inverse F antenna / Inverse L antenna)

Note:

RKES: Remote Keyless Entry System
TPMS: Tire Pressure Monitoring System

FCC15.111(b)

The receiving antenna of this EUT is installed inside the EUT and cannot be removed (permanently attached).
Therefore, Radiated emission test was performed.

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SECTION 3: Test specification, procedures & results

3.1 Test specification

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

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

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

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 IC: ICES-003 4.1	Class B	N/A *1)	N/A	N/A
Radiated emission	FCC: ANSI C63.4: 2003 8. Radiated emission measurements IC: ICES-003 4.1	Class B	N/A	20.5dB 32.100MHz Vertical, QP	Complied

*Note: UL Japan, Inc's EMI Work Procedure 13-EM-W0420.
*1) The test is not applicable since the EUT is not the device that is designed to be connected to the public utility (AC) power line.

3.3 Addition to standard

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

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	4.0dB	5.1dB	5.0dB	5.1dB	6.0dB	4.9dB	4.3dB
No.2	3.9dB	5.2dB	5.0dB	4.9dB	5.9dB	4.7dB	4.2dB
No.3	4.3dB	5.1dB	5.2dB	5.2dB	6.0dB	4.8dB	4.2dB
No.4	4.6dB	5.2dB	5.0dB	5.2dB	6.0dB	5.7dB	4.2dB

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

Radiated emission test(3m)

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

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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 8999 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	-	-	8.8 x 4.6 x 2.8m	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 Data of EMI, Test instruments, and Test set up

Refer to APPENDIX.

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

4.1 Operating modes

The mode used: 1. RKES Receiving mode (314.35MHz)
2. RKES Receiving mode (312.10MHz)
3. TPMS Receiving mode (314.98MHz)

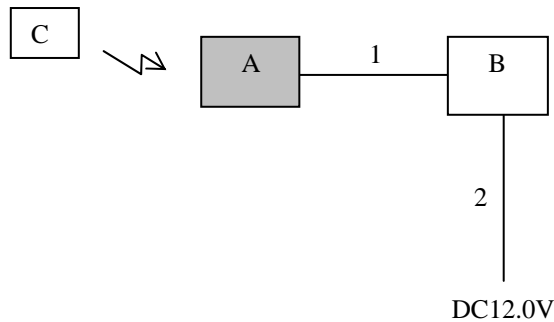
Variation No. 1 was tested as the EUT in this test report, because it has the highest emission level compared to the other representative variants (Variation No. 2, 3, 4, and 5) of the table in "Theory of Operation".

Among Variation No.1 to 5,

- the difference due to the internal antenna type was confirmed with Variation No. 1, 2, 3, 4, and 5.

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.

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Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Remote Keyless Entry System and TPMS (Receiver)	23AAN	1 (Variation No. 1) *1)	DENSO CORPORATION	Only serial No. 1 was EUT. Serial No. 2 to 5 were tested just for reference. For details, see "Theory of Operation."
			2 (Variation No. 2) *1) Reference data		
			3 (Variation No. 3) *1) Reference data		
			4 (Variation No. 4) *1) Reference data		
			5 (Variation No. 5) *1) Reference data		
B	TPMS-RKE/ SMART Check bench	-	-	DENSO CORPORATION	-
C	RKE Transmitter	-	-	DENSO CORPORATION	-

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	Signal Cable	1.2	Unshielded	Unshielded	-
2	DC Cable	1.5	Unshielded	Unshielded	-

***1) Variations owing to antenna matching (Inverse F Antenna Type)** *See "Theory of Operation" for details.
TYPE2 which was used for the tests has 306 "Capacitor 0.5pF" and 307"Capacitor 4pF". TYPE 4 which was used for the tests has 308"Capacitor 5pF"and 309"Nothing".
The result of Radiated emission test was mainly from characteristics of Local Oscillator.
If the range of 306, 307, 308 and 309 becomes "Capacitor 0.5 - 100pF", or "Inductor 1 - 100nH", there is no influence on the result of Radiated emission test.

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SECTION 5: Radiated Emission

5.1 Operating environment

Test place : No.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, 1.0m by 1.5m, 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 3.

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 the position that has the maximum noise.

5.5 Test result

Summary of the test results: Pass

Date: October 25 and 29, 2013
November 6, 2013

Test engineer: Shinya Watanabe
Masatoshi Nishiguchi

UL Japan, Inc.

Head Office EMC Lab.

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APPENDIX 1: Data of EMI test

Radiated Emission
Variation No. 1
(Below 1GHz)

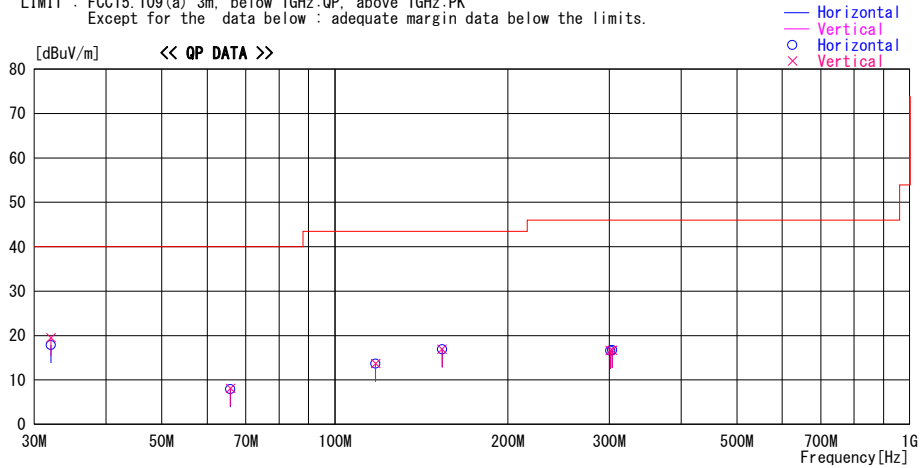
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber
Date : 2013/10/25

Report No. : 10064275H
Temp./Humi. : 23deg. C / 64% RH
Engineer : Shinya Watanabe

Mode / Remarks : RKES Receiving mode (312.1MHz, 314.35MHz)MHz WorstAxis(Hori:X, Vert: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		Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]
			Factor [dB/m]	Loss& Gain [dB]						
32.100	22.4	QP	17.4	-21.9	17.9	0	300	Hori.	40.0	22.1
32.100	24.0	QP	17.4	-21.9	19.5	0	100	Vert.	40.0	20.5
65.846	22.6	QP	6.7	-21.4	7.9	3	300	Hori.	40.0	32.1
65.846	22.8	QP	6.7	-21.4	8.1	6	100	Vert.	40.0	31.9
117.700	22.1	QP	12.4	-20.8	13.7	0	300	Hori.	43.5	29.8
117.700	22.1	QP	12.4	-20.8	13.7	0	100	Vert.	43.5	29.8
153.641	22.1	QP	15.1	-20.3	16.9	0	300	Hori.	43.5	26.6
153.641	22.1	QP	15.1	-20.3	16.9	0	100	Vert.	43.5	26.6
301.400	21.3	QP	14.2	-18.9	16.6	0	100	Hori.	46.0	29.4
301.400	21.3	QP	14.2	-18.9	16.6	0	100	Vert.	46.0	29.4
303.650	21.3	QP	14.3	-18.9	16.7	0	100	Hori.	46.0	29.3
303.650	21.3	QP	14.3	-18.9	16.7	0	100	Vert.	46.0	29.3

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
Variation No. 1
(Above 1GHz)

DATA OF RADIATED EMISSION TEST

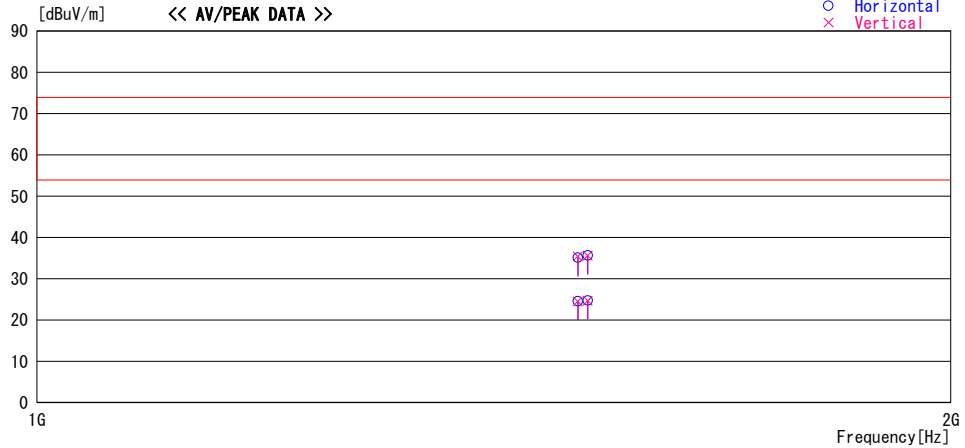
UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber
Date : 2013/11/06

Report No. : 10064275H
Temp./Humi. : 20deg. C / 41% RH
Engineer : Masatoshi Nishiguchi

Mode / Remarks : RKES Receiving mode (312.1MHz, 314.35MHz)MHz WorstAxis(Hori:X , Vert:X)

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

— Horizontal
— Vertical
○ Horizontal
× Vertical



Frequency [MHz]	Reading [dBuV]	DET	Antenna	Loss&	Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
			Factor [dB/m]	Gain [dB]							
1507.000	42.8	PK	25.0	-32.7	35.1	0	100	Hori.	73.9	38.8	NS
1507.000	43.1	PK	25.0	-32.7	35.4	0	100	Vert.	73.9	38.5	NS
1507.000	32.3	AV	25.0	-32.7	24.6	0	100	Hori.	53.9	29.3	NS
1507.000	32.3	AV	25.0	-32.7	24.6	0	100	Vert.	53.9	29.4	NS
1518.250	32.4	AV	25.1	-32.7	24.8	0	100	Hori.	53.9	29.2	NS
1518.250	43.3	PK	25.1	-32.7	35.7	0	100	Hori.	73.9	38.3	NS
1518.250	43.2	PK	25.1	-32.7	35.6	0	100	Vert.	73.9	38.3	NS
1518.250	32.3	AV	25.1	-32.7	24.7	0	100	Vert.	53.9	29.2	NS

*NS = No signal detected

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

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Radiated Emission
Variation No. 1
(Below 1GHz)

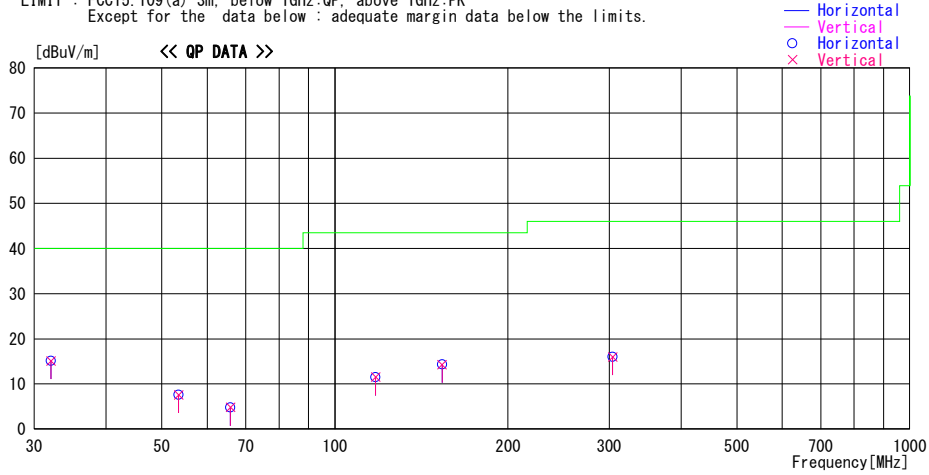
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2013/10/29

Report No. : 10064275H
Temp./Humi. : 22deg. C / 51% RH
Engineer : Shinya Watanabe

Mode / Remarks : TPMS Receiving mode 314.98MHz WorstAxis(Hori:X , Vert: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		Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit	
			Factor [dB/m]	Loss& Gain [dB]					[dBuV/m]	[dB]
32.100	22.6	QP	17.6	-25.1	15.1	241	300	Hori.	40.0	24.9
32.100	22.6	QP	17.6	-25.1	15.1	358	100	Vert.	40.0	24.9
53.500	22.3	QP	10.0	-24.7	7.6	241	300	Hori.	40.0	32.4
53.500	22.3	QP	10.0	-24.7	7.6	358	100	Vert.	40.0	32.4
65.846	22.3	QP	6.9	-24.4	4.8	241	300	Hori.	40.0	35.2
65.846	22.3	QP	6.9	-24.4	4.8	358	100	Vert.	40.0	35.2
117.700	22.1	QP	13.0	-23.6	11.5	241	300	Hori.	43.5	32.0
117.700	22.1	QP	13.0	-23.6	11.5	358	100	Vert.	43.5	32.0
153.641	22.2	QP	15.3	-23.2	14.3	241	300	Hori.	43.5	29.2
153.641	22.2	QP	15.3	-23.2	14.3	358	100	Vert.	43.5	29.2
304.280	21.7	QP	16.4	-22.1	16.0	320	100	Hori.	46.0	30.0
304.280	21.7	QP	16.4	-22.1	16.0	300	100	Vert.	46.0	30.0

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)

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

Radiated Emission
Variation No. 1
(Above 1GHz)

DATA OF RADIATED EMISSION TEST

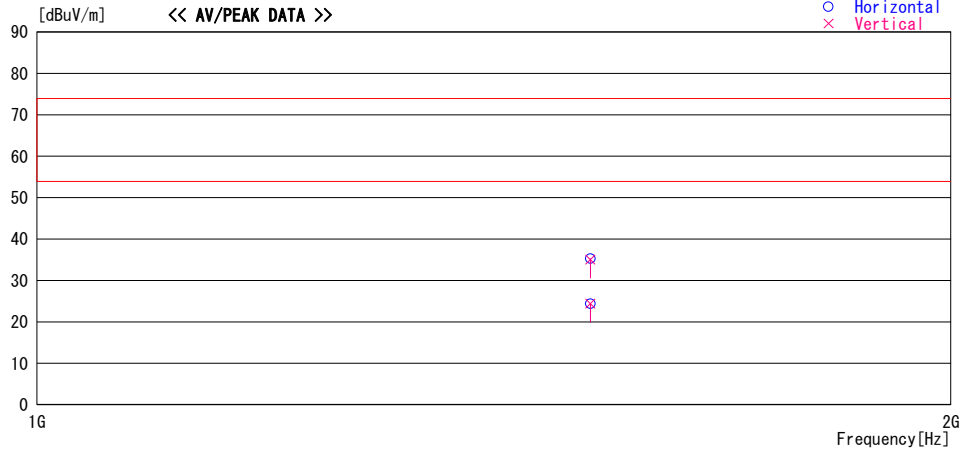
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Engineer : Masatoshi Nishiguchi

Mode / Remarks : TPMS Receiving mode 314.98MHz WorstAxis(Hori:X , Vert:X)

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

— Horizontal
— Vertical
○ Horizontal
× Vertical



Frequency [MHz]	Reading [dBuV]	DET	Antenna	Loss&	Level	Angle	Height	Polar.	Limit	Margin	Comment
			Factor	Gain							
			[dB/m]	[dB]	[dBuV/m]	[Deg]	[cm]		[dBuV/m]	[dB]	
1521.400	42.9	PK	25.1	-32.7	35.3	0	100	Hori.	73.9	38.6	NS
1521.400	42.7	PK	25.1	-32.7	35.1	0	100	Vert.	73.9	38.8	NS
1521.400	32.0	AV	25.1	-32.7	24.4	0	100	Hori.	53.9	29.5	NS
1521.400	32.0	AV	25.1	-32.7	24.4	0	100	Vert.	53.9	29.5	NS

*NS = No signal detected

CHART: WITH FACTOR ANT TYPE: -30MHz: LOOP, 30-300MHz: BICONICAL, 300MHz-1000MHz: LOGPERIODIC, 1000MHz-: HORN
CALCULATION: RESULT = READING + ANT FACTOR + LOSS (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
Variation No. 2
(Reference data: Below 1GHz)

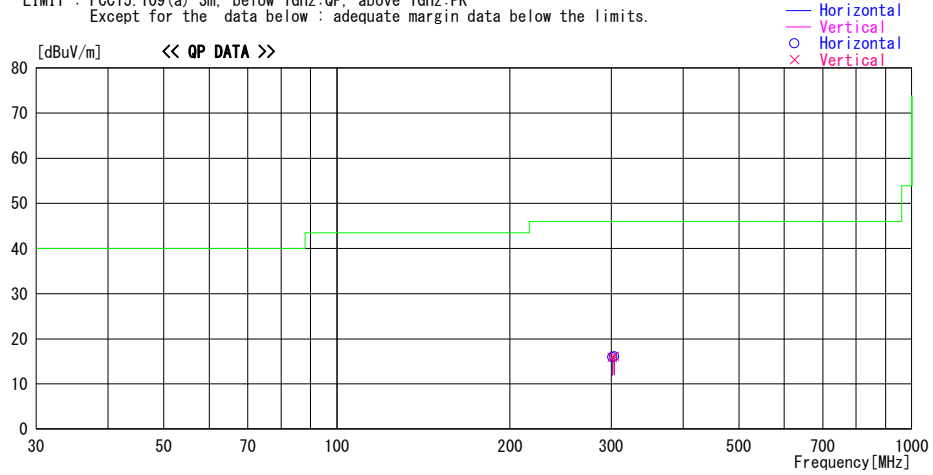
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2013/10/29

Report No. : 10064275H
Temp./Humi. : 22deg. C / 51% RH
Engineer : Shinya Watanabe

Mode / Remarks : RKES Receiving mode (312.1MHz, 314.35MHz)MHz Axis(Hori:X , Vert: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		Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit	
			Factor [dB/m]	Loss& Gain [dB]					[dBuV/m]	[dB]
301.400	21.7	QP	16.3	-22.1	15.9	0	100	Hori.	46.0	30.1
301.400	21.7	QP	16.3	-22.1	15.9	0	100	Vert.	46.0	30.1
303.650	21.8	QP	16.4	-22.1	16.1	0	100	Hori.	46.0	29.9
303.650	21.8	QP	16.4	-22.1	16.1	0	100	Vert.	46.0	29.9

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
Variation No. 2
(Reference data: Above 1GHz)

DATA OF RADIATED EMISSION TEST

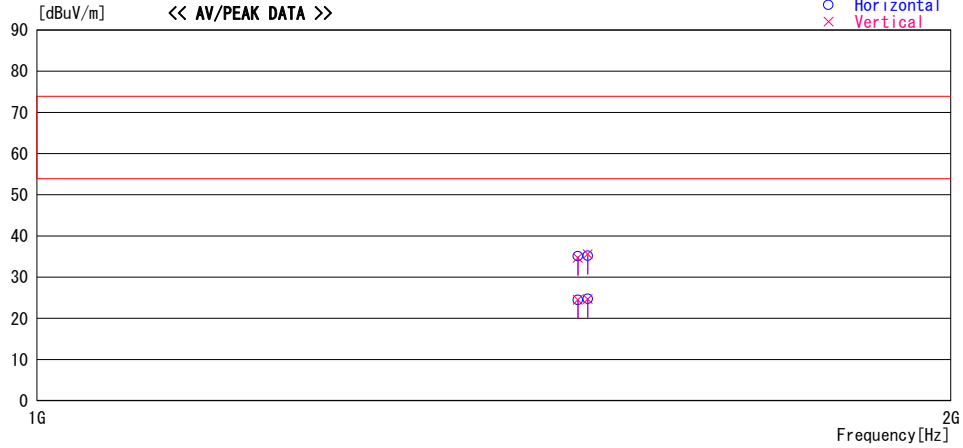
UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber
Date : 2013/11/06

Report No. : 10064275H
Temp./Humi. : 20deg. C / 41% RH
Engineer : Masatoshi Nishiguchi

Mode / Remarks : RKES Receiving mode (312.1MHz, 314.35MHz)MHz WorstAxis(Hori:X , Vert:X)

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

— Horizontal
— Vertical
○ Horizontal
× Vertical



Frequency [MHz]	Reading [dBuV]	DET	Antenna		Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
			Factor [dB/m]	Loss& Gain [dB]							
1507.000	42.8	PK	25.0	-32.7	35.1	0	100	Hori.	73.9	38.8	NS
1507.000	42.4	PK	25.0	-32.7	34.7	0	100	Vert.	73.9	39.2	NS
1507.000	32.2	AV	25.0	-32.7	24.5	0	100	Hori.	53.9	29.4	NS
1507.000	32.2	AV	25.0	-32.7	24.5	0	100	Vert.	53.9	29.4	NS
1518.250	32.3	AV	25.1	-32.7	24.7	0	100	Hori.	53.9	29.2	NS
1518.250	42.8	PK	25.1	-32.7	35.2	0	100	Hori.	73.9	38.7	NS
1518.250	43.2	PK	25.1	-32.7	35.6	0	100	Vert.	73.9	38.3	NS
1518.250	32.3	AV	25.1	-32.7	24.7	0	100	Vert.	53.9	29.2	NS

*NS = No signal detected

CHART:WITH FACTOR ANT TYPE: -30MHz:LOOP, 30-300MHz:BICONICAL, 300MHz-1000MHz:LOGPERIODIC, 1000MHz-:HORN
CALCULATION:RESULT = READING + ANT FACTOR + LOSS(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
Variation No. 2
(Reference data: Below 1GHz)

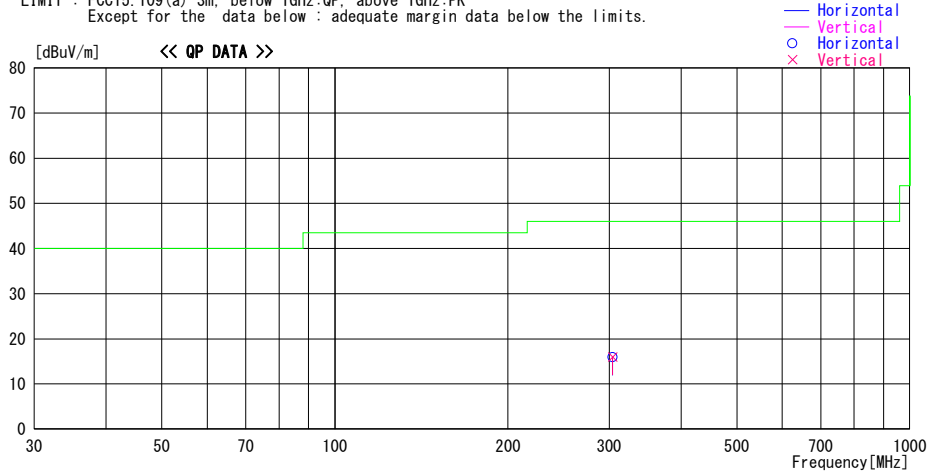
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2013/10/29

Report No. : 10064275H
Temp./Humi. : 22deg. C / 51% RH
Engineer : Shinya Watanabe

Mode / Remarks : TPMS Receiving mode 314.98MHz Axis(Hori:X , Vert: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		Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit	
			Factor [dB/m]	Loss& Gain [dB]					[dBuV/m]	[dB]
304.280	21.6	QP	16.4	-22.1	15.9	320	100	Hori.	46.0	30.1
304.280	21.7	QP	16.4	-22.1	16.0	300	100	Vert.	46.0	30.0

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
Variation No. 2
(Reference data: Above 1GHz)

DATA OF RADIATED EMISSION TEST

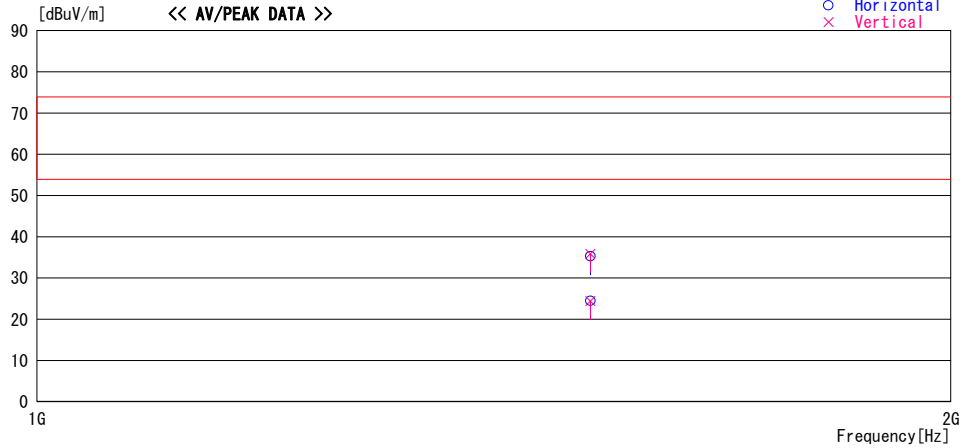
UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber
Date : 2013/11/06

Report No. : 10064275H
Temp./Humi. : 20deg. C / 41% RH
Engineer : Masatoshi Nishiguchi

Mode / Remarks : TPMS Receiving mode 314.98MHz WorstAxis(Hori:X , Vert:X)

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

— Horizontal
— Vertical
○ Horizontal
× Vertical



Frequency [MHz]	Reading [dBuV]	DET	Antenna	Loss&	Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit	Margin	Comment
			Factor [dB/m]	Gain [dB]					[dBuV/m]	[dB]	
1521.400	42.9	PK	25.1	-32.7	35.3	0	100	Hori.	73.9	38.6	NS
1521.400	43.5	PK	25.1	-32.7	35.9	0	100	Vert.	73.9	38.0	NS
1521.400	32.1	AV	25.1	-32.7	24.5	0	100	Hori.	53.9	29.5	NS
1521.400	32.0	AV	25.1	-32.7	24.4	0	100	Vert.	53.9	29.5	NS

*NS = No signal detected

CHART:WITH FACTOR ANT TYPE: -30MHz:LOOP, 30-300MHz:BICONICAL, 300MHz-1000MHz:LOGPERIODIC, 1000MHz-:HORN
CALCULATION:RESULT = READING + ANT FACTOR + LOSS(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
Variation No. 3
(Reference data: Below 1GHz)

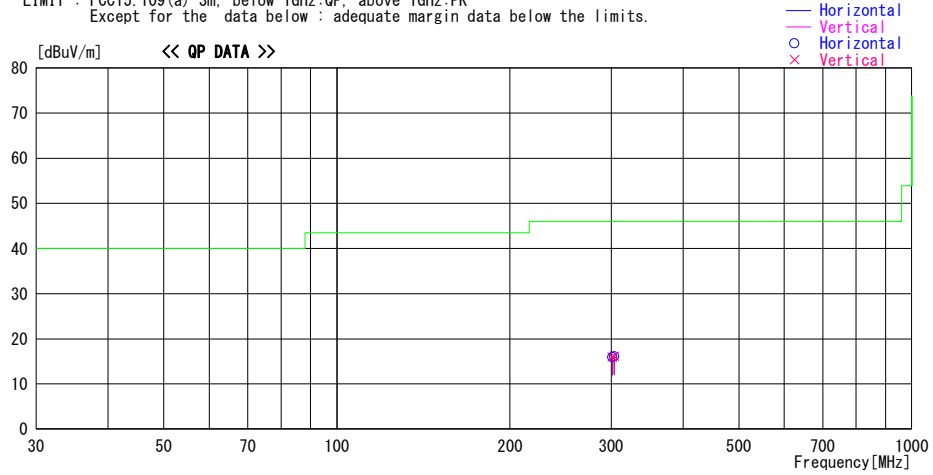
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2013/10/29

Report No. : 10064275H
Temp./Humi. : 22deg. C / 51% RH
Engineer : Shinya Watanabe

Mode / Remarks : RKES Receiving mode (312.1MHz, 314.35MHz)MHz Axis(Hori:X , Vert: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		Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit		Margin [dB]
			Factor [dB/m]	Loss& Gain [dB]					[dBuV/m]	[dB]	
301.400	21.7	QP	16.3	-22.1	15.9	0	100	Hori.	46.0	30.1	
301.400	21.8	QP	16.3	-22.1	16.0	0	100	Vert.	46.0	30.0	
303.650	21.8	QP	16.4	-22.1	16.1	0	100	Hori.	46.0	29.9	
303.650	21.8	QP	16.4	-22.1	16.1	0	100	Vert.	46.0	29.9	

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
Variation No. 3
(Reference data: Above 1GHz)

DATA OF RADIATED EMISSION TEST

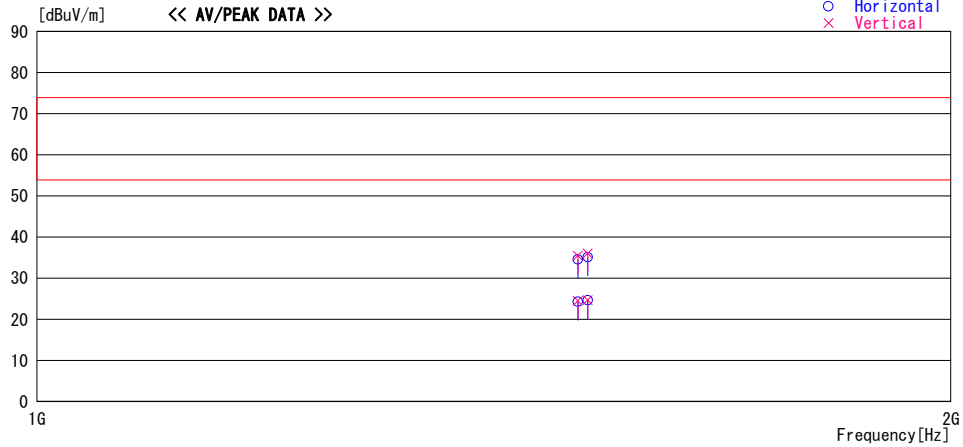
UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber
Date : 2013/11/06

Report No. : 10064275H
Temp./Humi. : 20deg. C / 41% RH
Engineer : Masatoshi Nishiguchi

Mode / Remarks : RKES Receiving mode (312.1MHz, 314.35MHz)MHz WorstAxis(Hori:X , Vert:X)

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

— Horizontal
— Vertical
○ Horizontal
× Vertical



Frequency [MHz]	Reading [dBuV]	DET	Antenna		Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
			Factor [dB/m]	Loss & Gain [dB]							
1507.000	42.2	PK	25.0	-32.7	34.5	0	100	Hori.	73.9	39.4	NS
1507.000	43.2	PK	25.0	-32.7	35.5	0	100	Vert.	73.9	38.4	NS
1507.000	32.0	AV	25.0	-32.7	24.3	0	100	Hori.	53.9	29.6	NS
1507.000	32.2	AV	25.0	-32.7	24.5	0	100	Vert.	53.9	29.4	NS
1518.250	32.3	AV	25.1	-32.7	24.7	0	100	Hori.	53.9	29.2	NS
1518.250	42.7	PK	25.1	-32.7	35.1	0	100	Hori.	73.9	38.8	NS
1518.250	43.7	PK	25.1	-32.7	36.1	0	100	Vert.	73.9	37.8	NS
1518.250	32.3	AV	25.1	-32.7	24.7	0	100	Vert.	53.9	29.2	NS

*NS = No signal detected

CHART:WITH FACTOR ANT TYPE: -30MHz:LOOP, 30-300MHz:BICONICAL, 300MHz-1000MHz:LOGPERIODIC, 1000MHz:-:HORN
CALCULATION:RESULT = READING + ANT FACTOR + LOSS (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
Variation No. 3
 (Reference data: Below 1GHz)

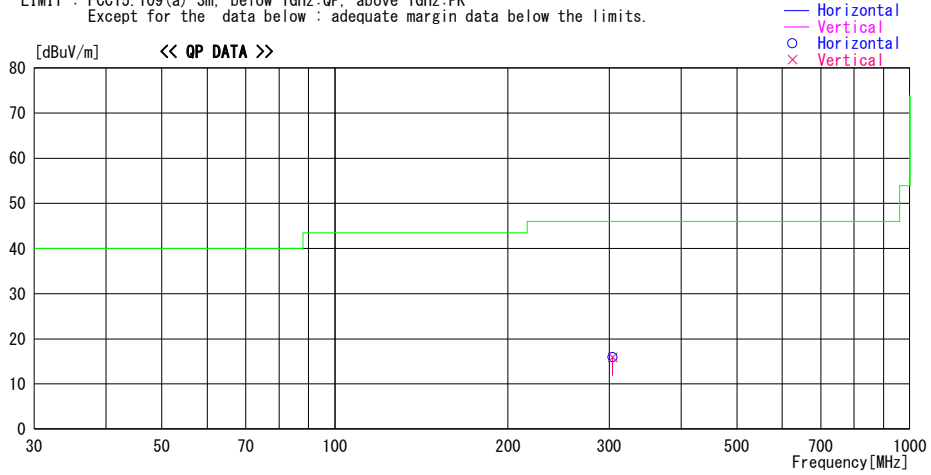
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
 Date : 2013/10/29

Report No. : 10064275H
 Temp./Humi. : 22deg. C / 51% RH
 Engineer : Shinya Watanabe

Mode / Remarks : TPMS Receiving mode 314.98MHz Axis(Hori:X , Vert: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		Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit	
			Factor [dB/m]	Loss& Gain [dB]					[dBuV/m]	[dB]
304.280	21.6	QP	16.4	-22.1	15.9	354	100	Hori.	46.0	30.1
304.280	21.6	QP	16.4	-22.1	15.9	172	100	Vert.	46.0	30.1

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
Variation No. 3
(Reference data: Above 1GHz)

DATA OF RADIATED EMISSION TEST

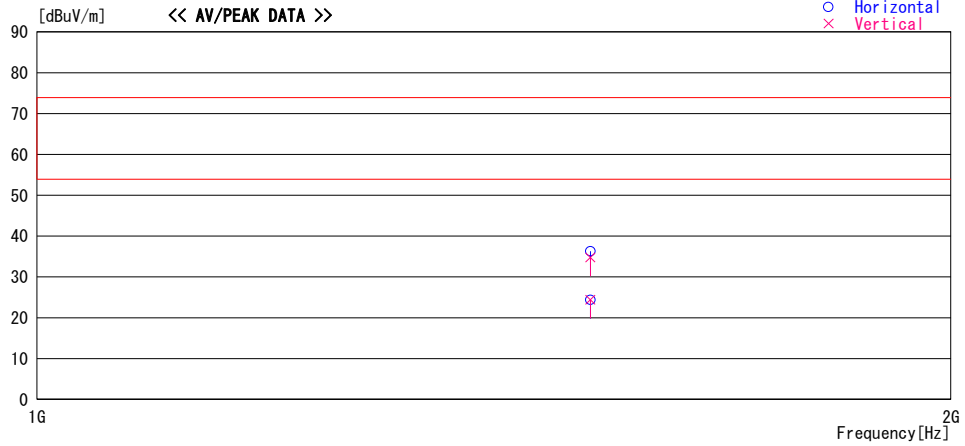
UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber
Date : 2013/11/06

Report No. : 10064275H
Temp./Humi. : 20deg. C / 41% RH
Engineer : Masatoshi Nishiguchi

Mode / Remarks : TPMS Receiving mode 314.98MHz WorstAxis(Hori:X , Vert:X)

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

— Horizontal
— Vertical
○ Horizontal
× Vertical



Frequency [MHz]	Reading [dBuV]	DET	Antenna		Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
			Factor [dB/m]	Loss& Gain [dB]							
1521.400	43.9	PK	25.1	-32.7	36.3	0	100	Hori.	73.9	37.6	NS
1521.400	42.3	PK	25.1	-32.7	34.7	0	100	Vert.	73.9	39.2	NS
1521.400	32.0	AV	25.1	-32.7	24.4	0	100	Hori.	53.9	29.5	NS
1521.400	32.0	AV	25.1	-32.7	24.4	0	100	Vert.	53.9	29.5	NS

*NS = No signal detected

CHART:WITH FACTOR ANT TYPE: -30MHz:LOOP, 30-300MHz:BICONICAL, 300MHz-1000MHz:LOGPERIODIC, 1000MHz:-HORN
CALCULATION:RESULT = READING + ANT FACTOR + LOSS(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
Variation No. 4
(Reference data: Below 1GHz)

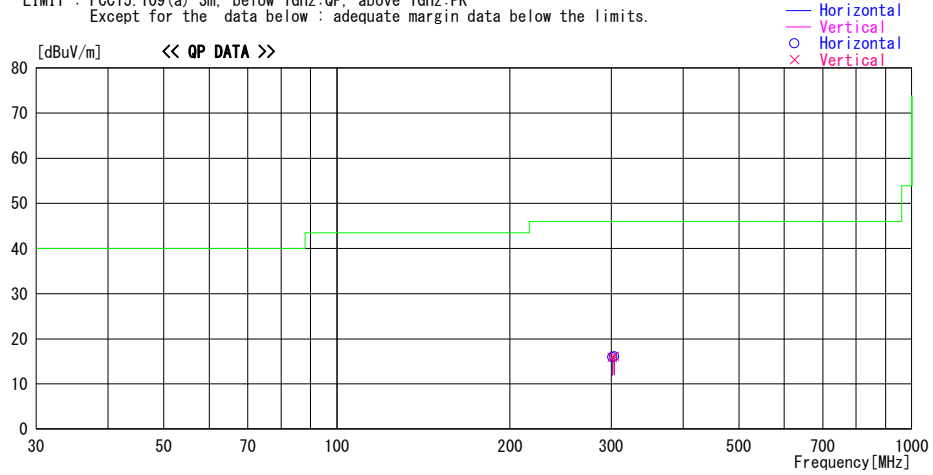
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2013/10/29

Report No. : 10064275H
Temp./Humi. : 22deg. C / 51% RH
Engineer : Shinya Watanabe

Mode / Remarks : RKES Receiving mode (312.1MHz, 314.35MHz)MHz Axis(Hori:X , Vert: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		Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit	
			Factor [dB/m]	Loss& Gain [dB]					[dBuV/m]	[dB]
301.400	21.7	QP	16.3	-22.1	15.9	0	100	Hori.	46.0	30.1
301.400	21.7	QP	16.3	-22.1	15.9	0	100	Vert.	46.0	30.1
303.650	21.8	QP	16.4	-22.1	16.1	0	100	Hori.	46.0	29.9
303.650	21.8	QP	16.4	-22.1	16.1	0	100	Vert.	46.0	29.9

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
Variation No. 4
(Reference data: Above 1GHz)

DATA OF RADIATED EMISSION TEST

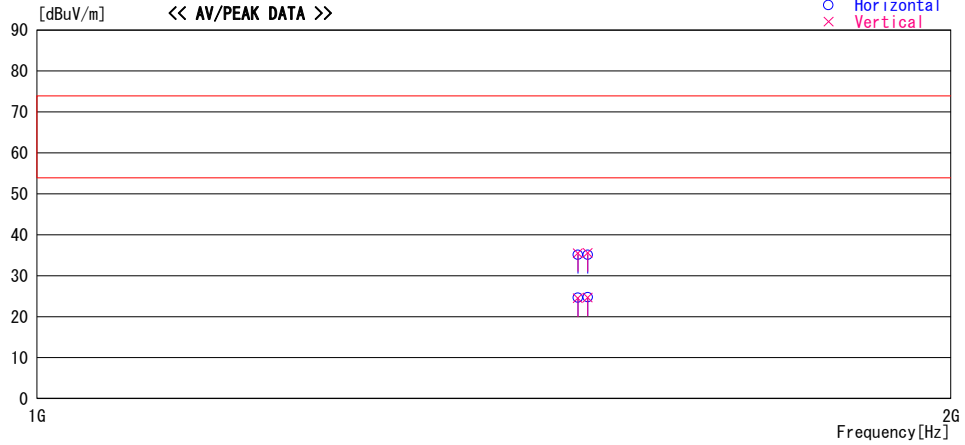
UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber
Date : 2013/11/06

Report No. : 10064275H
Temp./Humi. : 20deg. C / 41% RH
Engineer : Masatoshi Nishiguchi

Mode / Remarks : RKES Receiving mode (312.1MHz, 314.35MHz)MHz WorstAxis(Hori:X , Vert:X)

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

— Horizontal
— Vertical
○ Horizontal
× Vertical



Frequency [MHz]	Reading [dBuV]	DET	Antenna		Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
			Factor [dB/m]	Loss& Gain [dB]							
1507.000	42.8	PK	25.0	-32.7	35.1	0	100	Hori.	73.9	38.8	NS
1507.000	43.2	PK	25.0	-32.7	35.5	0	100	Vert.	73.9	38.4	NS
1507.000	32.3	AV	25.0	-32.7	24.6	0	100	Hori.	53.9	29.3	NS
1507.000	32.2	AV	25.0	-32.7	24.5	0	100	Vert.	53.9	29.4	NS
1518.250	32.4	AV	25.1	-32.7	24.8	0	100	Hori.	53.9	29.1	NS
1518.250	42.7	PK	25.1	-32.7	35.1	0	100	Hori.	73.9	38.8	NS
1518.250	43.2	PK	25.1	-32.7	35.6	0	100	Vert.	73.9	38.3	NS
1518.250	32.3	AV	25.1	-32.7	24.7	0	100	Vert.	53.9	29.2	NS

*NS = No signal detected

CHART:WITH FACTOR ANT TYPE: -30MHz:LOOP, 30-300MHz:BICONICAL, 300MHz-1000MHz:LOGPERIODIC, 1000MHz--:HORN
CALCULATION:RESULT = READING + ANT FACTOR + LOSS(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
Variation No. 4
(Reference data: Below 1GHz)

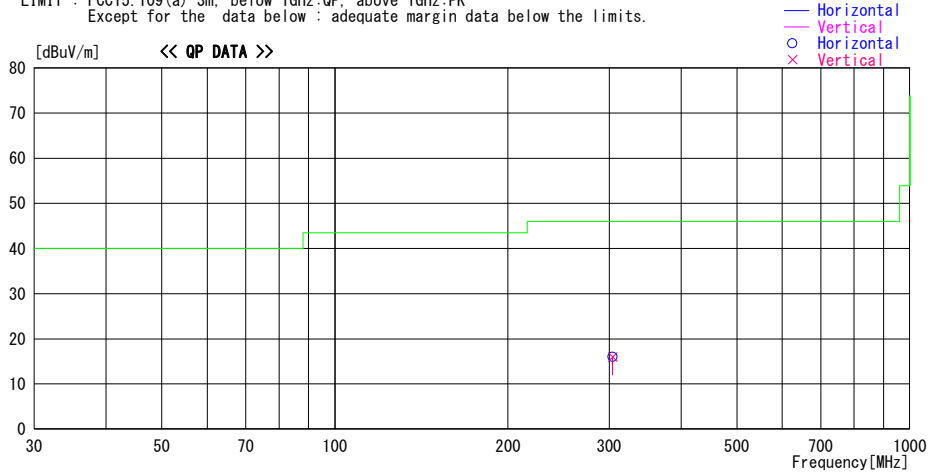
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2013/10/29

Report No. : 10064275H
Temp./Humi. : 22deg. C / 51% RH
Engineer : Shinya Watanabe

Mode / Remarks : TPMS Receiving mode 314.98MHz Axis(Hori:X , Vert: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		Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit	
			Factor [dB/m]	Loss& Gain [dB]					[dBuV/m]	[dB]
304.280	21.7	QP	16.4	-22.1	16.0	354	100	Hori.	46.0	30.0
304.280	21.7	QP	16.4	-22.1	16.0	172	100	Vert.	46.0	30.0

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
Variation No. 4
(Reference data: Above 1GHz)

DATA OF RADIATED EMISSION TEST

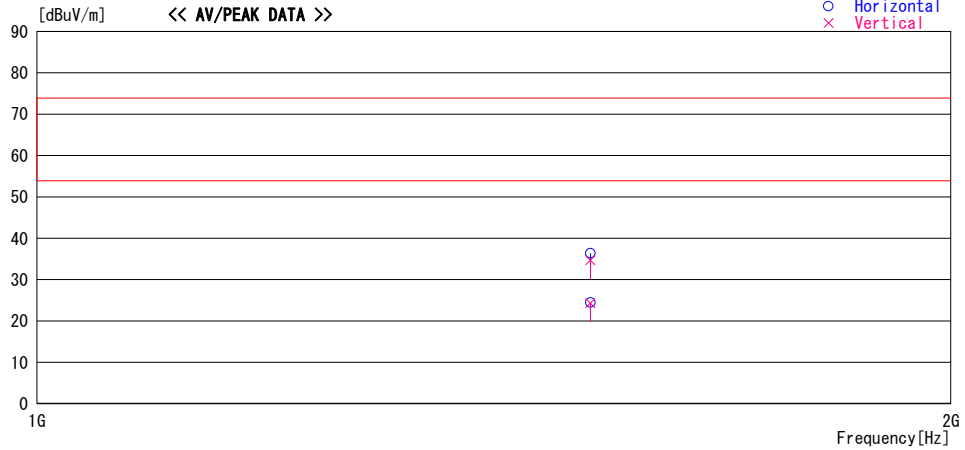
UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber
Date : 2013/11/06

Report No. : 10064275H
Temp./Humi. : 20deg. C / 41% RH
Engineer : Masatoshi Nishiguchi

Mode / Remarks : TPMS Receiving mode 314.98MHz WorstAxis(Hori:X , Vert:X)

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

— Horizontal
— Vertical
○ Horizontal
× Vertical



Frequency [MHz]	Reading [dBuV]	DET	Antenna	Loss&	Level	Angle	Height	Polar.	Limit	Margin	Comment
			Factor [dB/m]	Gain [dB]							
1521.400	43.9	PK	25.1	-32.7	36.3	0	100	Hori.	73.9	37.6	NS
1521.400	42.3	PK	25.1	-32.7	34.7	0	100	Vert.	73.9	39.2	NS
1521.400	32.1	AV	25.1	-32.7	24.5	0	100	Hori.	53.9	29.4	NS
1521.400	31.9	AV	25.1	-32.7	24.3	0	100	Vert.	53.9	29.6	NS

*NS = No signal detected

CHART:WITH FACTOR ANT TYPE: -30MHz:LOOP, 30-300MHz:BICONICAL, 300MHz-1000MHz:LOGPERIODIC, 1000MHz-:HORN
CALCULATION:RESULT = READING + ANT FACTOR + LOSS(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
Variation No. 5
(Reference data: Below 1GHz)

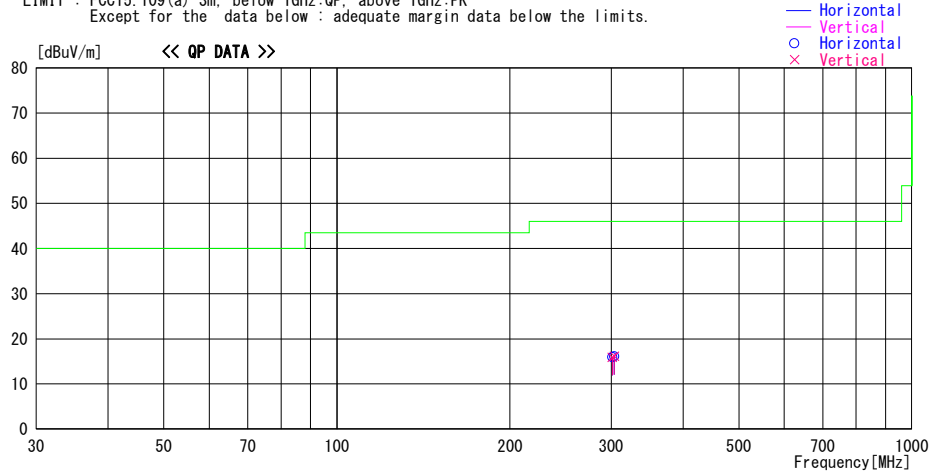
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2013/10/29

Report No. : 10064275H
Temp./Humi. : 22deg. C / 51% RH
Engineer : Shinya Watanabe

Mode / Remarks : RKES Receiving mode (312.1MHz, 314.35MHz)MHz Axis(Hori:X , Vert: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		Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit	
			Factor [dB/m]	Loss& Gain [dB]					[dBuV/m]	[dB]
301.400	21.7	QP	16.3	-22.1	15.9	0	100	Hori.	46.0	30.1
301.400	21.7	QP	16.3	-22.1	15.9	0	100	Vert.	46.0	30.1
303.650	21.8	QP	16.4	-22.1	16.1	0	100	Hori.	46.0	29.9
303.650	21.8	QP	16.4	-22.1	16.1	0	100	Vert.	46.0	29.9

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
Variation No. 5
(Reference data: Above 1GHz)

DATA OF RADIATED EMISSION TEST

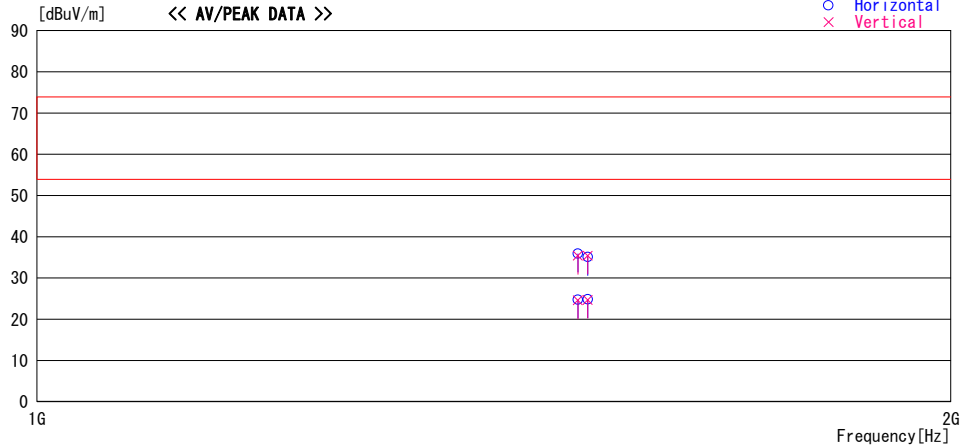
UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber
Date : 2013/11/06

Report No. : 10064275H
Temp./Humi. : 20deg. C / 41% RH
Engineer : Masatoshi Nishiguchi

Mode / Remarks : RKES Receiving mode (312.1MHz, 314.35MHz)MHz WorstAxis(Hori:X , Vert:X)

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

— Horizontal
— Vertical
○ Horizontal
× Vertical



Frequency [MHz]	Reading [dBuV]	DET	Antenna		Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
			Factor [dB/m]	Loss & Gain [dB]							
1507.000	43.6	PK	25.0	-32.7	35.9	0	100	Hori.	73.9	38.0	NS
1507.000	43.1	PK	25.0	-32.7	35.4	0	100	Vert.	73.9	38.5	NS
1507.000	32.4	AV	25.0	-32.7	24.7	0	100	Hori.	53.9	29.2	NS
1507.000	32.3	AV	25.0	-32.7	24.6	0	100	Vert.	53.9	29.3	NS
1518.250	32.4	AV	25.1	-32.7	24.8	0	100	Hori.	53.9	29.1	NS
1518.250	42.7	PK	25.1	-32.7	35.1	0	100	Hori.	73.9	38.8	NS
1518.250	43.0	PK	25.1	-32.7	35.4	0	100	Vert.	73.9	38.5	NS
1518.250	32.3	AV	25.1	-32.7	24.7	0	100	Vert.	53.9	29.2	NS

*NS = No signal detected

CHART:WITH FACTOR ANT TYPE: -30MHz:LOOP, 30-300MHz:BICONICAL, 300MHz-1000MHz:LOGPERIODIC, 1000MHz-:HORN
CALCULATION:RESULT = READING + ANT FACTOR + LOSS(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
Variation No. 5
(Reference data: Below 1GHz)

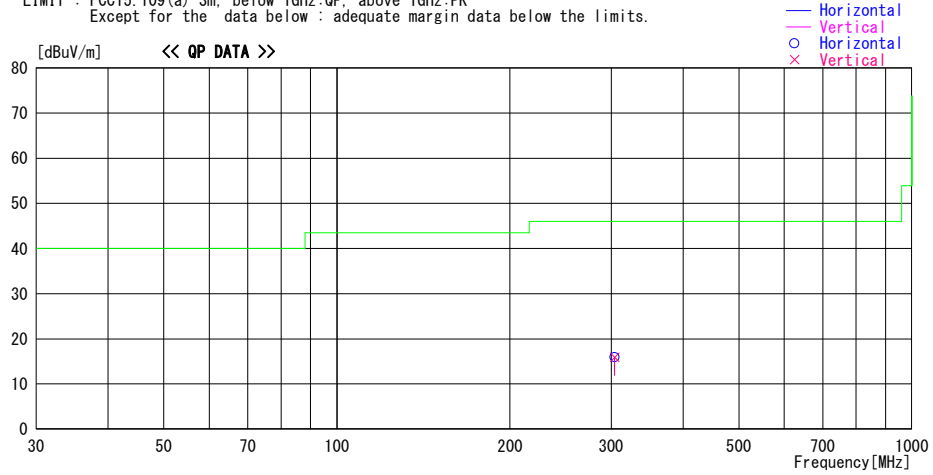
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2013/10/29

Report No. : 10064275H
Temp./Humi. : 22deg. C / 51% RH
Engineer : Shinya Watanabe

Mode / Remark TPMS Receiving mode(314.98MHz). 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		Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit	
			Factor [dB/m]	Loss& Gain [dB]					[dBuV/m]	[dB]
304.280	21.6	QP	16.4	-22.1	15.9	354	100	Hori.	46.0	30.1
304.280	21.6	QP	16.4	-22.1	15.9	172	100	Vert.	46.0	30.1

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
Variation No. 5
(Reference data: Above 1GHz)

DATA OF RADIATED EMISSION TEST

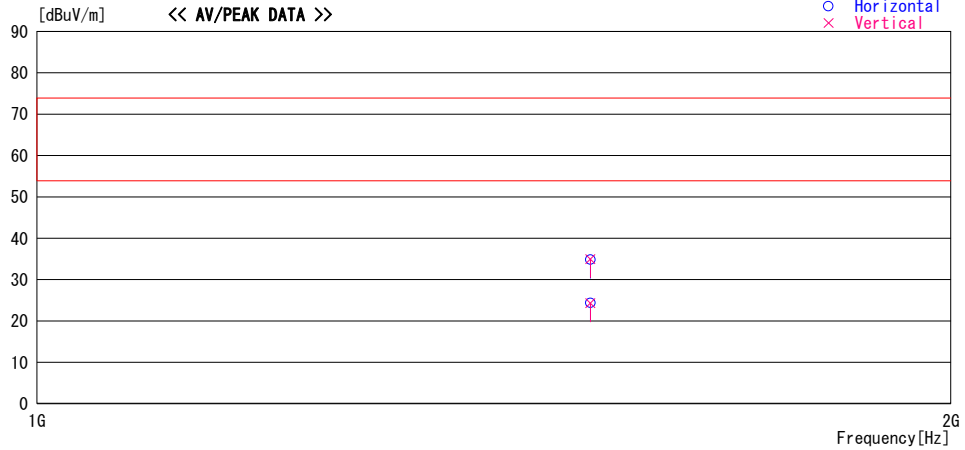
UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber
Date : 2013/11/06

Report No. : 10064275H
Temp./Humi. : 20deg. C / 41% RH
Engineer : Masatoshi Nishiguchi

Mode / Remarks : TPMS Receiving mode 314.98MHz WorstAxis(Hori:X , Vert:X)

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

— Horizontal
— Vertical
○ Horizontal
× Vertical



Frequency [MHz]	Reading [dBuV]	DET	Antenna	Loss&	Level	Angle	Height	Polar.	Limit	Margin	Comment
			Factor [dB/m]	Gain [dB]							
1521.400	42.4	PK	25.1	-32.7	34.8	0	100	Hori.	73.9	39.1	NS
1521.400	42.6	PK	25.1	-32.7	35.0	0	100	Vert.	73.9	38.9	NS
1521.400	32.0	AV	25.1	-32.7	24.4	0	100	Hori.	53.9	29.5	NS
1521.400	31.9	AV	25.1	-32.7	24.3	0	100	Vert.	53.9	29.6	NS

*NS = No signal detected

CHART:WITH FACTOR ANT TYPE: -30MHz:LOOP, 30-300MHz:BICONICAL, 300MHz-1000MHz:LOGPERIODIC, 1000MHz-:HORN
CALCULATION:RESULT = READING + ANT FACTOR + LOSS(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	2013/06/30 * 12
MOS-22	Thermo-Hygrometer	Custom	CTH-201	0003	RE	2013/02/26 * 12
MJM-14	Measure	KOMELON	KMC-36	-	RE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE	-
MTR-03	Test Receiver	Rohde & Schwarz	ESCI	100300	RE	2013/06/11 * 12
MBA-02	Biconical Antenna	Schwarzbeck	BBA9106	VHA91032008	RE	2013/10/13 * 12
MLA-02	Logperiodic Antenna	Schwarzbeck	USLP9143	201	RE	2013/10/13 * 12
MCC-12	Coaxial Cable	Fujikura/Agilent	-	-	RE	2013/02/06 * 12
MAT-07	Attenuator(6dB)	Weinschel Corp	2	BK7970	RE	2012/11/06 * 12
MPA-09	Pre Amplifier	Agilent	8447D	2944A10845	RE	2013/09/12 * 12
MAEC-04	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE	2013/02/28 * 12
MOS-15	Thermo-Hygrometer	Custom	CTH-180	-	RE	2013/02/26 * 12
MJM-09	Measure	KDS	E19-55	-	RE	-
MTR-07	Test Receiver	Rohde & Schwarz	ESCI	100635	RE	2013/04/10 * 12
MBA-05	Biconical Antenna	Schwarzbeck	BBA9106	1302	RE	2012/11/18 * 12
MLA-08	Logperiodic Antenna	Schwarzbeck	UKLP9140-A	N/A	RE	2012/11/18 * 12
MCC-50	Coaxial Cable	UL Japan	-	-	RE	2013/06/18 * 12
MAT-68	Attenuator	Anritsu	MP721B	6200961025	RE	2012/11/21 * 12
MPA-14	Pre Amplifier	SONOMA INSTRUMENT	310	260833	RE	2013/03/12 * 12
MRENT-112	Spectrum Analyzer	Agilent	E4440A	MY48250080	RE	2013/10/04 * 12
MHA-06	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	254	RE	2013/02/15 * 12
MPA-10	Pre Amplifier	Agilent	8449B	3008A02142	RE	2013/01/10 * 12
MCC-54	Microwave Cable	Suhner	SUCOFLEX101	2873(1m) / 2876(5m)	RE	2013/03/19 * 12

The expiration date of the calibration is the end of the expired month.

All equipment is calibrated with valid calibrations. Each measurement data is traceable to the national or international standards.

As for some calibrations performed after the tested dates, those test equipment have been controlled by means of an unbroken chains of calibrations.

Test Item:

RE: Radiated emission

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