EMI TEST REPORT

Test Report No. : 10438535H-R1

Applicant	:	**DENSO CORPORATION**
Type of Equipment	:	**Remote Keyless Entry System and TPMS (Receiver)**
Model No.	:	**23AAT**
FCC ID	:	**HYQ23AAT**
Test regulation	:	**FCC Part 15 Subpart B: 2014**
Test Result	:	**Complied**

1. This test report shall not be reproduced in full or partial, without the written approval of UL Japan, Inc.
2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the limits of the above regulation.
4. The test results in this test report are traceable to the national or international standards.
5. This test report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.
6. This report is a revised version of 10438535H. 10438535H is replaced with this report.

Date of test: August 22 to September 5, 2014

Representative test engineer:
Masatoshi Nishiguchi
Engineer
Consumer Technology Division

Approved by:
Motoya Imura
Engineer
Consumer Technology Division

NVLAP LAB CODE: 200572-0

This laboratory is accredited by the NVLAP LAB CODE 200572-0, U.S.A. The tests reported herein have been performed in accordance with its terms of accreditation.
*As for the range of Accreditation in NVLAP, you may refer to the WEB address,
http://www.ul.com/japan/jpn/pages/services/emc/about/mark1/index.jsp#nvlap

REVISION HISTORY

Original Test Report No.: 10438535H

Revision	Test report No.	Date	Page revised	Contents
- (Original)	10438535H	September 25, 2014	-	-
1	10438535H-R1	September 30, 2014	P.8	Correction of description about internal antenna receiving mode and external receiving mode in Clause 4.1.
1	10438535H-R1	September 30, 2014	P.8	Correction of description about variation in Clause 4.1.
1	10438535H-R1	September 30, 2014	P.9	Addition of Serial number “001 (Variation No. 3)”
1	10438535H-R1	September 30, 2014	P.18 to 29	Correction of variation No. of external antenna

UL Japan, Inc.
Ise EMC Lab.
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN
Telephone : +81 596 24 8999
Facsimile : +81 596 24 8124

CONTENTS **PAGE**

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	:	+81-566-25-4837
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.	:	23AAT
Serial No.	:	Refer to Section 4, Clause 4.2
Receipt Date of Sample	:	August 8, 2014
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: 23AAT (referred to as the EUT in this report) is the Remote Keyless Entry System and TPMS (Receiver). 23AAT has 15 variations. For details of variations, see “Theory of Operation”.

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 informs air pressure in vehicle’s tire to the receiver.
The data also includes the information of temperature, battery voltage and identity code of transmitter.
The receiver judges the data, and if the data of air pressure and others is not in a normal condition, the receiver sends signal to a warning lamp.
Then, the warning lamp warns drivers.

Type of receiving system	:	Super-heterodyne
Frequency of Operation	:	RKES (CH1): 315.10 MHz RKES (CH2): 314.35 MHz TPMS: 314.98 MHz
Oscillator Frequency	:	25.2 MHz (Crystal)
Type of Modulation	:	RKES: FSK (F1D) TPMS: FSK (F1D)
Power Supply	:	DC12.0V
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

SECTION 3: Test specification, procedures & results

3.1 Test specification

Test specification : FCC Part 15 Subpart B: 2014, final revised on May 1, 2014 and effective June 2, 2014

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 **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	14.3dB 608.160MHz Vertical, QP	Complied
Antenna Terminal	**FCC:** ANSI C63.4: 2003 12. Measurement of unintentional radiators other than ITE **IC:** RSS-Gen 4.10	Receiver	N/A	31.7 dB 606.900MHz	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.

3.5 Test Location

UL Japan, Inc. Ise 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

	IC Registration Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Other rooms
No.1 semi-anechoic chamber	2973C-1	19.2 x 11.2 x 7.7m	7.0 x 6.0m	No.1 Power source room
No.2 semi-anechoic chamber	2973C-2	7.5 x 5.8 x 5.2m	4.0 x 4.0m	-
No.3 semi-anechoic chamber	2973C-3	12.0 x 8.5 x 5.9m	6.8 x 5.75m	No.3 Preparation room
No.3 shielded room	-	4.0 x 6.0 x 2.7m	N/A	-
No.4 semi-anechoic chamber	2973C-4	12.0 x 8.5 x 5.9m	6.8 x 5.75m	No.4 Preparation room
No.4 shielded room	-	4.0 x 6.0 x 2.7m	N/A	-
No.5 semi-anechoic chamber	-	6.0 x 6.0 x 3.9m	6.0 x 6.0m	-
No.6 shielded room	-	4.0 x 4.5 x 2.7m	4.0 x 4.5 m	-
No.6 measurement room	-	4.75 x 5.4 x 3.0m	4.75 x 4.15 m	-
No.7 shielded room	-	4.7 x 7.5 x 2.7m	4.7 x 7.5m	-
No.8 measurement room	-	3.1 x 5.0 x 2.7m	N/A	-
No.9 measurement room	-	8.8 x 4.6 x 2.8m	2.4 x 2.4m	-
No.11 measurement room	-	6.2 x 4.7 x 3.0m	4.8 x 4.6m	-

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

3.6 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 (315.10MHz)
2. RKES Receiving mode (314.35MHz)
3. TPMS Receiving mode (314.98MHz)

* Refer to the table in "Theory of Operation_Variation_23AAT" for test mode.

Regarding RKES Receiving mode (315.10MHz / 314.35MHz), internal antenna receiving was tested with Variation No. 2, because Variation No. 2 had the highest emission level compared to the other representative variants (Variation No. 5, 8, 11, and 14) of the table in "Theory of Operation".

Regarding TPMS Receiving mode (314.98MHz), internal antenna receiving was tested with Variation No. 2 which was the worst-variation of RKES Receiving mode.

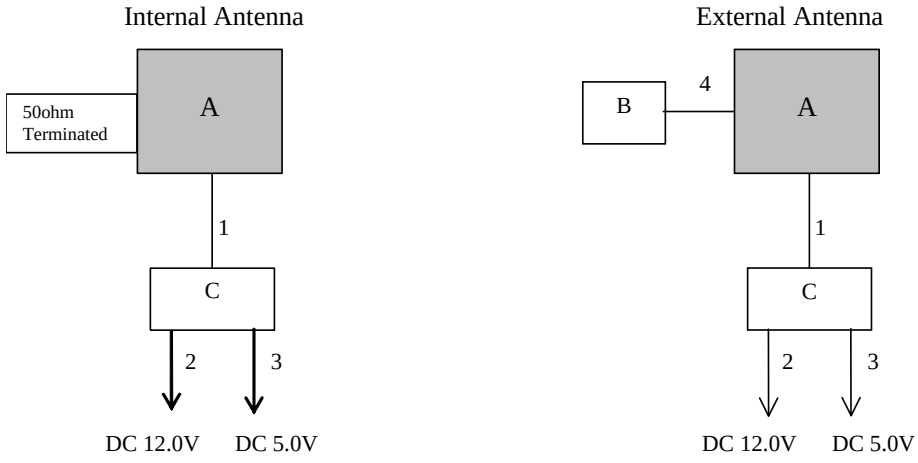
Also, external antenna receiving (Test mode 1, 2, 3) was tested with Variation No. 3 as representative, because there was no difference in circuit construction by variations.

Among Variation No.1 to 15,

- the difference due to the feeding point and antenna variation of the internal antenna was confirmed with Variation No. 2, 3, 5, 8, 11, and 14.
- regarding External antenna, variants with External antenna were tested, which were the worst condition for EMI.

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	Remarks
A	Remote Keyless Entry System and TPMS (Receiver)	23AAT	001 (Variation No. 2) *1)	DENSO CORPORATION	EUT
			001 (Variation No. 3)		
			002 (Variation No. 5)		
			003 (Variation No. 8)		
			004 (Variation No. 11)		
			005 (Variation No. 14)		
B	External Antenna	-	0572	DENSO CORPORATION	-
C	Checker	-	3	DENSO CORPORATION	-

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	Signal Cable	1.2	Unshielded	Unshielded	-
2	DC Cable	1.1	Unshielded	Unshielded	-
3	DC Cable	1.5	Unshielded	Unshielded	-
4	Antenna Cable	1.0	Shielded	Shielded	-

***1) Variations owing to antenna matching (Inverse F Antenna Type**) *See “Theory of Operation” for details.
TYPE1 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 C203, C204, 308 and 309 becomes “Capacitor 0.1 - 1000pF”, or “Inductor 1 - 100nH”, there is no influence on the result of Radiated emission test.

SECTION 5: Radiated Emission

5.1 Operating environment

Test place : No.3 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 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.
The radiated emission measurements were made with the following detector function of the Test Receiver.

Frequency	Below 1GHz	Above 1GHz
Instrument used	Test Receiver	Test Receiver
IF Bandwidth	QP: BW 120kHz	PK: BW 1MHz, CISPR AV: BW 1MHz

- 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: August 22, 2014 Test engineer: Shinya Watanabe
August 29, 2014 Masatoshi Nishiguchi
September 1, 2014 Keisuke Kawamura

SECTION 6: Antenna Terminal

6.1 Operating environment

Test place : No.4 Measurement room
Temperature : See data
Humidity : See data

6.2 Test configuration

EUT was placed on a wooden table of nominal size, 0.5m by 1.0m, raised 0.8m from the ground.
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
IF Bandwidth	PK: RBW:100kHz/VBW: 100kHz	PK: RBW:1MHz/VBW: 3MHz

6.5 Test result

Summary of the test results: Pass

Date: September 5, 2014 Test engineer: Masatoshi Nishiguchi

APPENDIX 1: Data of EMI test

Radiated Emission

RKES (315.10MHz) Variation No. 2 Internal Antenna
(Below 1GHz)

DATA OF RADIATED EMISSION TEST

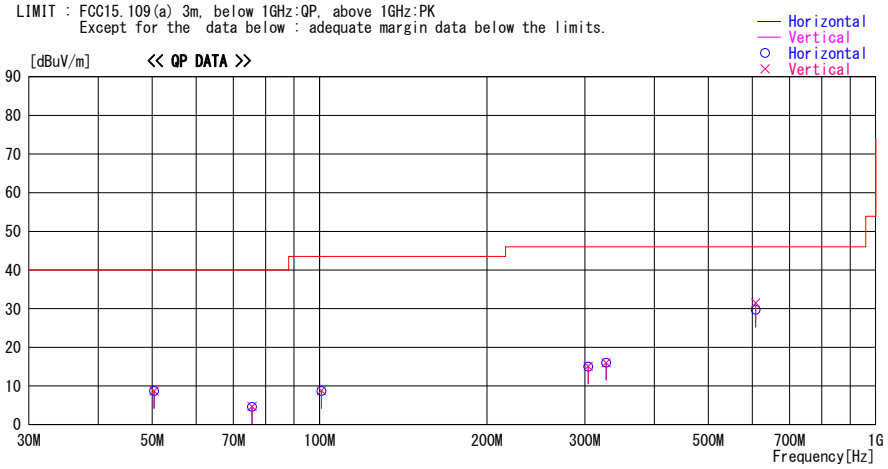
UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
Date : 2014/08/29

Report No. : 10438535H

Temp./Humi. : 23deg. C / 68% RH
Engineer : Masatoshi Nishiguchi

Mode / Remarks : RKES Rx 315.10MHz ANT1 WorstAxis (Hori:Z , Vert:Y-Axis)

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
50.400	22.7	QP	10.8	-24.8	8.7	0	100	Vert.	40.0	31.3	
50.400	22.7	QP	10.8	-24.8	8.7	0	300	Hori.	40.0	31.3	
75.600	22.6	QP	6.4	-24.4	4.6	0	300	Hori.	40.0	35.4	
75.600	22.7	QP	6.4	-24.4	4.7	0	100	Vert.	40.0	35.3	
100.800	22.7	QP	10.2	-24.1	8.8	0	100	Vert.	43.5	34.7	
100.800	22.6	QP	10.2	-24.1	8.7	0	300	Hori.	43.5	34.8	
304.200	22.7	QP	14.3	-21.9	15.1	0	100	Vert.	46.0	30.9	
304.200	22.6	QP	14.3	-21.9	15.0	0	100	Hori.	46.0	31.0	
327.600	22.6	QP	15.2	-21.8	16.0	0	100	Vert.	46.0	30.0	
327.600	22.6	QP	15.2	-21.8	16.0	0	100	Hori.	46.0	30.0	
608.400	32.0	QP	19.6	-20.1	31.5	21	171	Vert.	46.0	14.5	
608.400	30.2	QP	19.6	-20.1	29.7	225	153	Hori.	46.0	16.3	

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

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

Radiated Emission

RKES (315.10MHz) Variation No. 2 Internal Antenna
(Above 1GHz)

DATA OF RADIATED EMISSION TEST

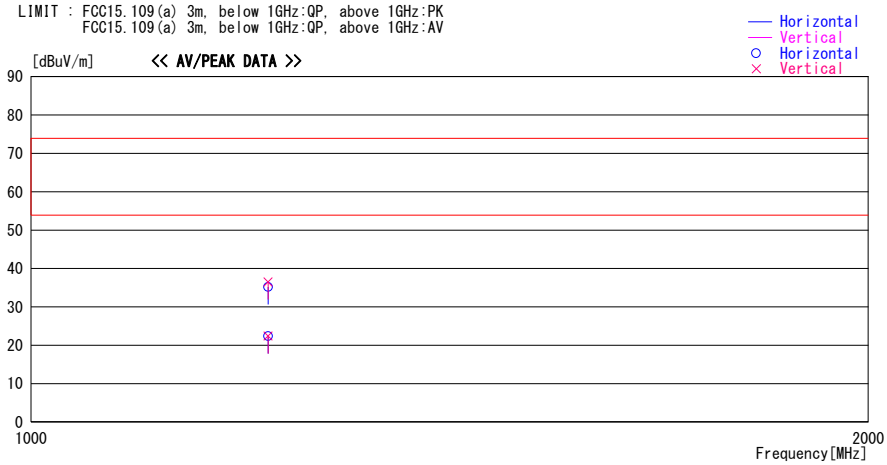
UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
Date : 2014/09/01

Report No. : 10438535H

Temp./Humi. : 23deg. C / 63% RH
Engineer : Keisuke Kawamura

Mode / Remarks : RKES Rx 315.10MHz ANT1 WorstAxis (Hori:Z , Vert:Y-Axis)

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	44.8	PK	24.6	-32.9	36.5	0	100	Vert.	73.9	37.4	
1216.800	43.5	PK	24.6	-32.9	35.2	0	100	Hori.	73.9	38.7	
1216.800	30.7	AV	24.6	-32.9	22.4	0	100	Vert.	53.9	31.5	
1216.800	30.7	AV	24.6	-32.9	22.4	0	100	Hori.	53.9	31.5	

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

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

Radiated Emission

RKES (314.35MHz) Variation No. 2 Internal Antenna
(Below 1GHz)

DATA OF RADIATED EMISSION TEST

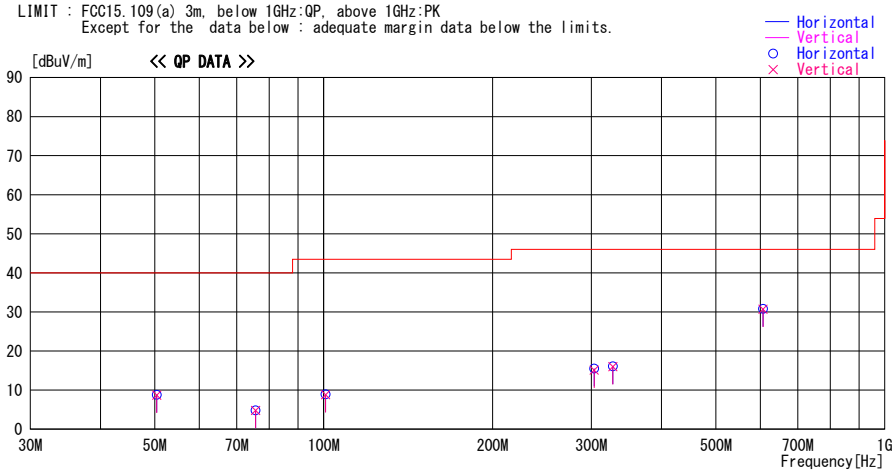
UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
Date : 2014/08/29

Report No. : 10438535H

Temp./Humi. : 23deg. C / 68% RH
Engineer : Masatoshi Nishiguchi

Mode / Remarks : RKES Rx 314.35MHz ANT1 WorstAxis (Hori:Z , Vert:Y-Axis)

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
50.400	22.8	QP	10.8	-24.8	8.8	0	300	Hori.	40.0	31.2	
50.400	22.7	QP	10.8	-24.8	8.7	0	100	Vert.	40.0	31.3	
75.600	22.8	QP	6.4	-24.4	4.8	0	100	Vert.	40.0	35.2	
75.600	22.8	QP	6.4	-24.4	4.8	0	300	Hori.	40.0	35.2	
100.800	22.7	QP	10.2	-24.1	8.8	0	100	Vert.	43.5	34.7	
100.800	22.8	QP	10.2	-24.1	8.9	0	300	Hori.	43.5	34.6	
303.450	22.7	QP	14.3	-21.9	15.1	0	100	Vert.	46.0	30.9	
303.450	23.1	QP	14.3	-21.9	15.5	0	100	Hori.	46.0	30.5	
327.600	22.6	QP	15.2	-21.8	16.0	0	100	Vert.	46.0	30.0	
327.600	22.7	QP	15.2	-21.8	16.1	0	100	Hori.	46.0	29.9	
606.900	31.2	QP	19.6	-20.1	30.7	163	100	Vert.	46.0	15.3	
606.900	31.3	QP	19.6	-20.1	30.8	194	149	Hori.	46.0	15.2	

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

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

Radiated Emission

RKES (314.35MHz) Variation No. 2 Internal Antenna
(Above 1GHz)

DATA OF RADIATED EMISSION TEST

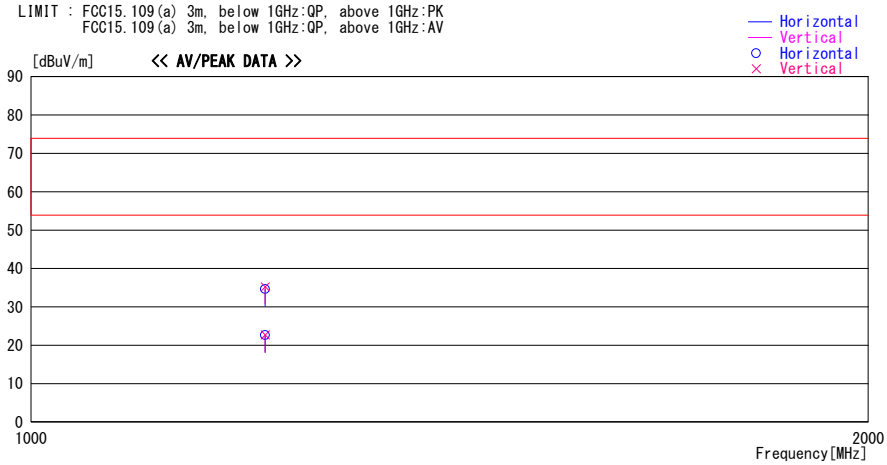
UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
Date : 2014/09/01

Report No. : 10438535H

Temp./Humi. : 23deg. C / 63% RH
Engineer : Keisuke Kawamura

Mode / Remarks : RKES Rx 314.35MHz ANT1 WorstAxis (Hori:Z , Vert:Y-Axis)

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	43.6	PK	24.6	-32.9	35.3	0	100	Vert.	73.9	38.6	
1213.800	42.9	PK	24.6	-32.9	34.6	0	100	Hori.	73.9	39.3	
1213.800	31.0	AV	24.6	-32.9	22.7	0	100	Vert.	53.9	31.2	
1213.800	31.0	AV	24.6	-32.9	22.7	0	100	Hori.	53.9	31.2	

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

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

Radiated Emission

TPMS (314.98MHz) Variation No. 2 Internal Antenna
(Below 1GHz)

DATA OF RADIATED EMISSION TEST

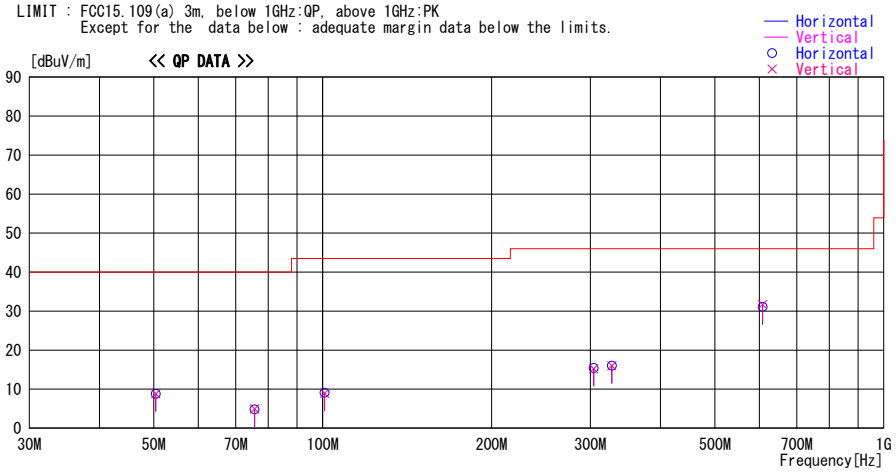
UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
Date : 2014/08/29

Report No. : 10438535H

Temp./Humi. : 23deg. C / 68% RH
Engineer : Masatoshi Nishiguchi

Mode / Remarks : TPMS Rx 314.98MHz ANT1 WorstAxis (Hori:Z , Vert:Y-Axis)

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]	
50.400	22.8	QP	10.8	-24.8	8.8	0	100	Vert.	40.0	31.2	
50.400	22.8	QP	10.8	-24.8	8.8	359	300	Hori.	40.0	31.2	
75.600	22.9	QP	6.4	-24.4	4.9	319	100	Vert.	40.0	35.1	
75.600	22.8	QP	6.4	-24.4	4.8	0	300	Hori.	40.0	35.2	
100.800	23.0	QP	10.2	-24.1	9.1	359	300	Hori.	43.5	34.4	
100.800	22.8	QP	10.2	-24.1	8.9	82	100	Vert.	43.5	34.6	
304.080	22.8	QP	14.3	-21.9	15.2	0	100	Vert.	46.0	30.8	
304.080	23.0	QP	14.3	-21.9	15.4	0	100	Hori.	46.0	30.6	
327.600	22.6	QP	15.2	-21.8	16.0	0	100	Vert.	46.0	30.0	
327.600	22.6	QP	15.2	-21.8	16.0	0	100	Hori.	46.0	30.0	
608.160	32.2	QP	19.6	-20.1	31.7	168	100	Vert.	46.0	14.3	
608.160	31.6	QP	19.6	-20.1	31.1	176	151	Hori.	46.0	14.9	

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

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

UL Japan, Inc.
Ise EMC Lab.
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN
Telephone : +81 596 24 8999
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Radiated Emission

TPMS (314.98MHz) Variation No. 2 Internal Antenna
(Above 1GHz)

DATA OF RADIATED EMISSION TEST

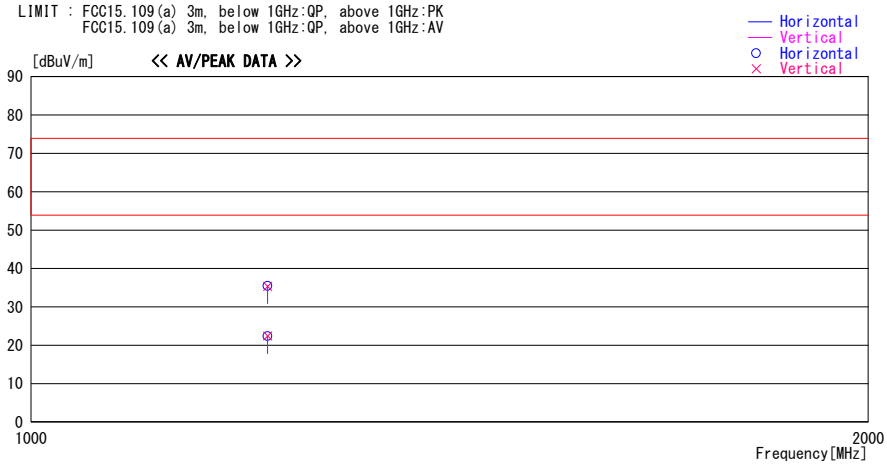
UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
Date : 2014/09/01

Report No. : 10438535H

Temp./Humi. : 23deg. C / 63% RH
Engineer : Keisuke Kawamura

Mode / Remarks : TPMS Rx 314.98MHz ANT1 WorstAxis (Hori:Z , Vert:Y-Axis)

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	43.6	PK	24.6	-32.9	35.3	0	100	Vert.	73.9	38.6	
1216.320	43.7	PK	24.6	-32.9	35.4	0	100	Hori.	73.9	38.5	
1216.320	30.7	AV	24.6	-32.9	22.4	0	100	Vert.	53.9	31.5	
1216.320	30.7	AV	24.6	-32.9	22.4	0	100	Hori.	53.9	31.5	

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

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

Radiated Emission

RKES (315.10MHz) Variation No. 3 External Antenna
(Below 1GHz)

DATA OF RADIATED EMISSION TEST

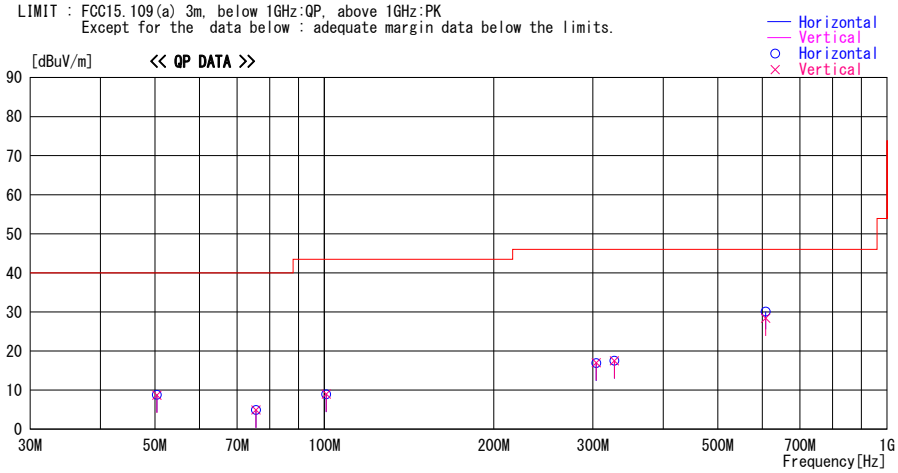
UL Japan, Inc. Ise EMC Lab. No.4 Semi Anechoic Chamber
Date : 2014/08/22

Report No. : 10438535H

Temp./Humi. : 24deg. C / 70% RH
Engineer : Shinya Watanabe

Mode / Remarks : RKES Rx 315.10MHz ANT2 Worst-Axis(Hori:Z / Vert:Y), Ext-Ant(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 Factor [dB/m]	Loss& Gain [dB]	Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
50.400	22.5	QP	10.8	-24.6	8.7	0	100	Vert.	40.0	31.3	
50.400	22.6	QP	10.8	-24.6	8.8	0	300	Hori.	40.0	31.2	
75.600	22.7	QP	6.5	-24.3	4.9	0	300	Hori.	40.0	35.1	
75.600	22.7	QP	6.5	-24.3	4.9	0	100	Vert.	40.0	35.1	
100.800	22.6	QP	10.3	-24.0	8.9	0	300	Hori.	43.5	34.6	
100.800	22.7	QP	10.3	-24.0	9.0	0	100	Vert.	43.5	34.5	
304.200	22.6	QP	16.3	-22.0	16.9	0	100	Hori.	46.0	29.1	
304.200	22.7	QP	16.3	-22.0	17.0	0	100	Vert.	46.0	29.0	
327.600	22.7	QP	16.6	-21.8	17.5	0	100	Hori.	46.0	28.5	
327.600	22.7	QP	16.6	-21.8	17.5	0	100	Vert.	46.0	28.5	
608.400	30.2	QP	20.3	-20.4	30.1	252	171	Hori.	46.0	15.9	
608.400	28.5	QP	20.3	-20.4	28.4	21	174	Vert.	46.0	17.6	

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

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

Radiated Emission

RKES (315.10MHz) Variation No. 3 External Antenna
(Above 1GHz)

DATA OF RADIATED EMISSION TEST

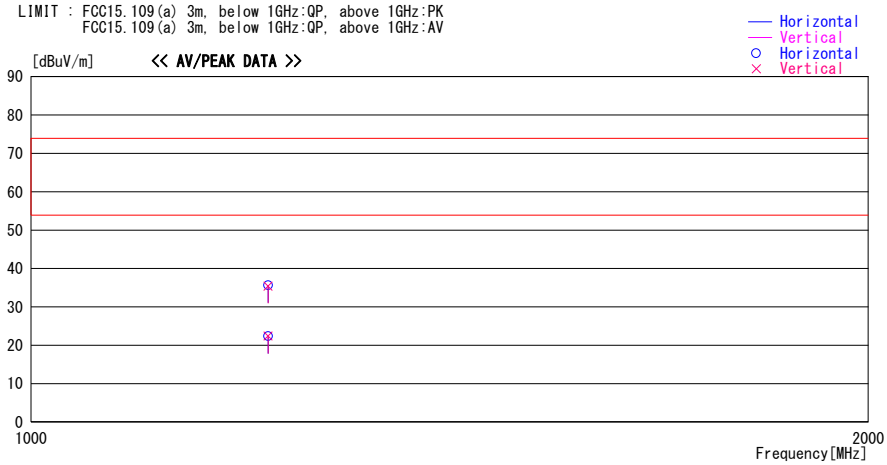
UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
Date : 2014/09/01

Report No. : 10438535H

Temp./Humi. : 23deg. C / 63% RH
Engineer : Keisuke Kawamura

Mode / Remarks : RKES Rx 315.10MHz ANT2 Worst-Axis(Hori:Z / Vert:Y), Ext-Ant(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



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	43.7	PK	24.6	-32.9	35.4	0	100	Vert.	73.9	38.5	
1216.800	44.0	PK	24.6	-32.9	35.7	0	100	Hori.	73.9	38.3	
1216.800	30.7	AV	24.6	-32.9	22.4	0	100	Vert.	53.9	31.5	
1216.800	30.7	AV	24.6	-32.9	22.4	0	100	Hori.	53.9	31.5	

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

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

Radiated Emission

RKES (314.35MHz) Variation No. 3 External Antenna
(Below 1GHz)

DATA OF RADIATED EMISSION TEST

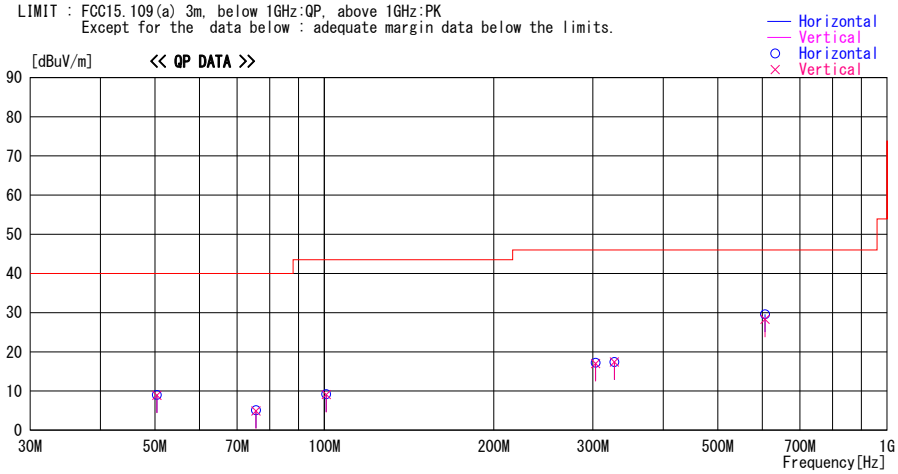
UL Japan, Inc. Ise EMC Lab. No.4 Semi Anechoic Chamber
Date : 2014/08/22

Report No. : 10438535H

Temp./Humi. : 24deg. C / 70% RH
Engineer : Shinya Watanabe

Mode / Remarks : RKES Rx 314.35MHz ANT2 Worst-Axis(Hori:Z / Vert:Y), Ext-Ant(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 Factor [dB/m]	Loss& Gain [dB]	Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
50.400	22.8	QP	10.8	-24.6	9.0	0	300	Hori.	40.0	31.0	
50.400	22.7	QP	10.8	-24.6	8.9	0	100	Vert.	40.0	31.1	
75.600	22.7	QP	6.5	-24.3	4.9	0	100	Vert.	40.0	35.1	
75.600	22.9	QP	6.5	-24.3	5.1	0	300	Hori.	40.0	34.9	
100.800	22.9	QP	10.3	-24.0	9.2	0	300	Hori.	43.5	34.3	
100.800	22.8	QP	10.3	-24.0	9.1	0	100	Vert.	43.5	34.4	
303.450	22.9	QP	16.3	-22.0	17.2	0	100	Hori.	46.0	28.8	
303.450	22.7	QP	16.3	-22.0	17.0	0	100	Vert.	46.0	29.0	
327.600	22.6	QP	16.6	-21.8	17.4	0	100	Hori.	46.0	28.6	
327.600	22.6	QP	16.6	-21.8	17.4	0	100	Vert.	46.0	28.6	
606.900	29.8	QP	20.2	-20.4	29.6	269	168	Hori.	46.0	16.4	
606.900	28.5	QP	20.2	-20.4	28.3	30	180	Vert.	46.0	17.7	

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

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

Radiated Emission

RKES (314.35MHz) Variation No. 3 External Antenna
(Above 1GHz)

DATA OF RADIATED EMISSION TEST

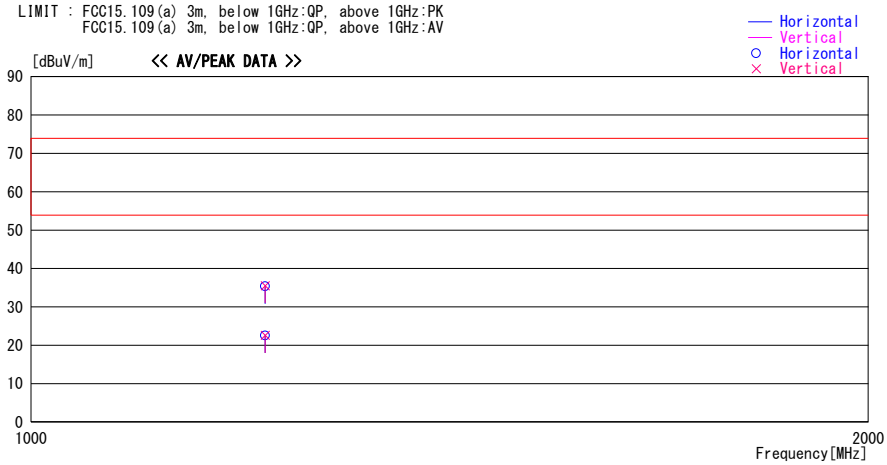
UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
Date : 2014/09/01

Report No. : 10438535H

Temp./Humi. : 23deg. C / 63% RH
Engineer : Keisuke Kawamura

Mode / Remarks : RKES Rx 314.35MHz ANT2 Worst-Axis(Hori:Z / Vert:Y), Ext-Ant(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



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	43.8	PK	24.6	-32.9	35.5	0	100	Vert.	73.9	38.4	
1213.800	43.6	PK	24.6	-32.9	35.3	0	100	Hori.	73.9	38.6	
1213.800	30.9	AV	24.6	-32.9	22.6	0	100	Vert.	53.9	31.3	
1213.800	30.8	AV	24.6	-32.9	22.5	0	100	Hori.	53.9	31.4	

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

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

Radiated Emission

TPMS (314.98MHz) Variation No. 3 External Antenna
(Below 1GHz)

DATA OF RADIATED EMISSION TEST

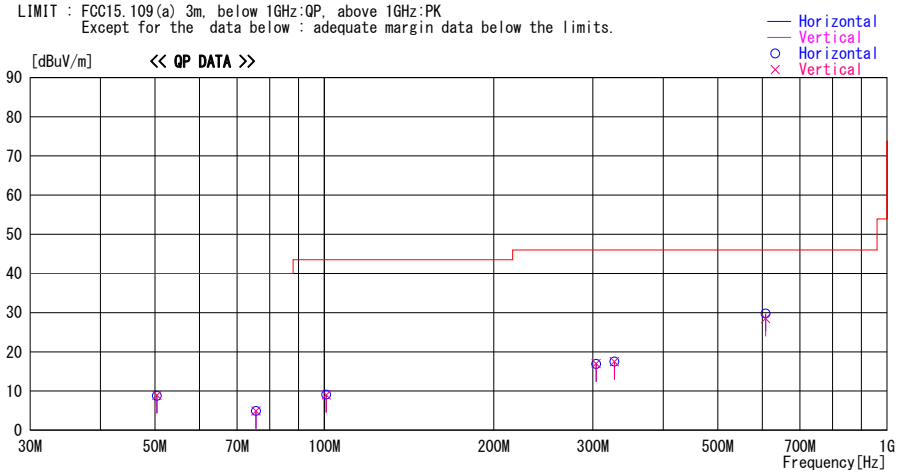
UL Japan, Inc. Ise EMC Lab. No.4 Semi Anechoic Chamber
Date : 2014/08/22

Report No. : 10438535H

Temp./Humi. : 24deg. C / 70% RH
Engineer : Shinya Watanabe

Mode / Remarks : TPMS Rx 314.98MHz ANT2 Worst-Axis(Hori:Z / Vert:Y), Ext-Ant(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 Factor [dB/m]	Loss& Gain [dB]	Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
50.400	22.6	QP	10.8	-24.6	8.8	0	300	Hori.	40.0	31.2	
50.400	22.7	QP	10.8	-24.6	8.9	0	100	Vert.	40.0	31.1	
75.600	22.7	QP	6.5	-24.3	4.9	0	100	Vert.	40.0	35.1	
75.600	22.7	QP	6.5	-24.3	4.9	0	300	Hori.	40.0	35.1	
100.800	22.8	QP	10.3	-24.0	9.1	0	300	Hori.	43.5	34.4	
100.800	22.7	QP	10.3	-24.0	9.0	0	100	Vert.	43.5	34.5	
304.080	22.6	QP	16.3	-22.0	16.9	0	100	Hori.	46.0	29.1	
304.080	22.7	QP	16.3	-22.0	17.0	0	100	Vert.	46.0	29.0	
327.600	22.7	QP	16.6	-21.8	17.5	0	100	Hori.	46.0	28.5	
327.600	22.7	QP	16.6	-21.8	17.5	0	100	Vert.	46.0	28.5	
608.160	30.0	QP	20.2	-20.4	29.8	245	175	Hori.	46.0	16.2	
608.160	28.7	QP	20.2	-20.4	28.5	28	166	Vert.	46.0	17.5	

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

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

Radiated Emission

TPMS (314.98MHz) Variation No. 3 External Antenna
(Above 1GHz)

DATA OF RADIATED EMISSION TEST

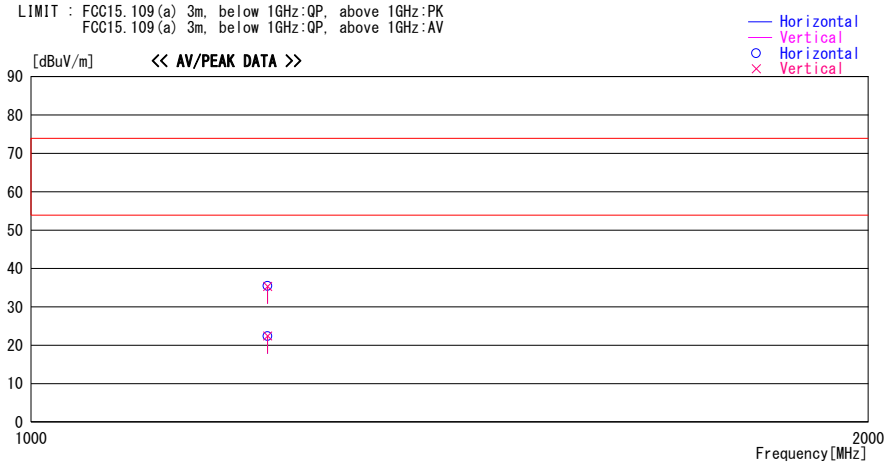
UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
Date : 2014/09/01

Report No. : 10438535H

Temp./Humi. : 23deg. C / 63% RH
Engineer : Keisuke Kawamura

Mode / Remarks : TPMS Rx 314.98MHz ANT2 Worst-Axis(Hori:Z / Vert:Y), Ext-Ant(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



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	43.6	PK	24.6	-32.9	35.3	0	100	Vert.	73.9	38.6	
1216.320	43.7	PK	24.6	-32.9	35.4	0	100	Hori.	73.9	38.5	
1216.320	30.7	AV	24.6	-32.9	22.4	0	100	Vert.	53.9	31.5	
1216.320	30.7	AV	24.6	-32.9	22.4	0	100	Hori.	53.9	31.5	

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

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

Antenna Terminal Conducted Emission

RKES (315.10MHz) Variation No. 3 External Antenna
(Below 1GHz)

DATA OF RADIATED EMISSION TEST

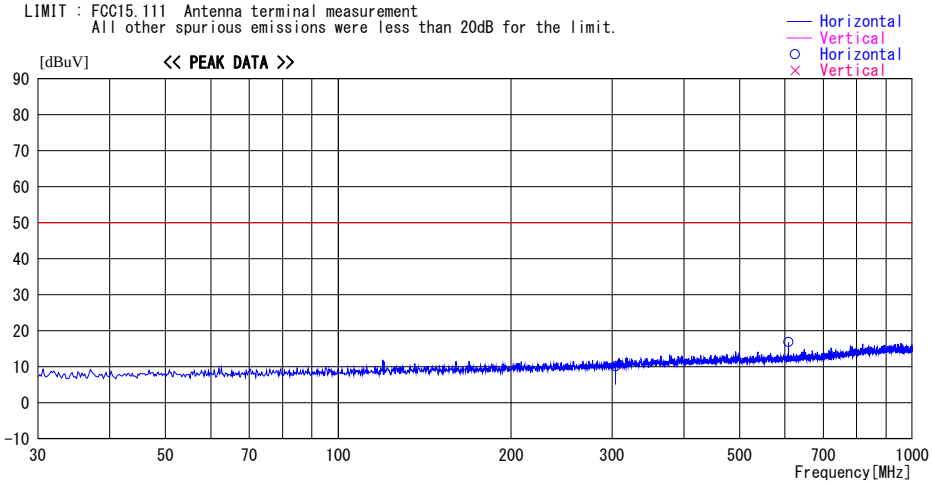
UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2014/09/05

Report No. : 10438535H

Temp./Humi. : 23deg. C / 62% RH
Engineer : Masatoshi Nishiguchi

Mode / Remarks : RKES Rx 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]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
304.200	28.1	PK	0.0	-18.0	10.1	Hori.	50.0	39.9	
608.400	33.2	PK	0.0	-16.3	16.9	Hori.	50.0	33.1	

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

Antenna Terminal Conducted Emission

RKES (315.10MHz) Variation No. 3 External Antenna
(Above 1GHz)

DATA OF RADIATED EMISSION TEST

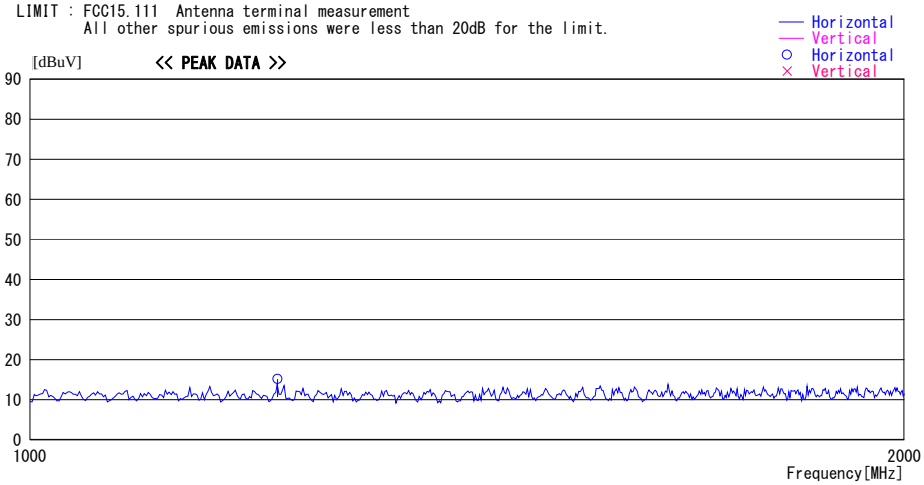
UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2014/09/05

Report No. : 10438535H

Temp./Humi. : 23deg. C / 62% RH
Engineer : Masatoshi Nishiguchi

Mode / Remarks : RKES Rx 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]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
1216.800	48.0	PK	0.0	-32.8	15.2	Hori.	50.0	34.8	

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

Antenna Terminal Conducted Emission

RKES (314.35MHz) Variation No. 3 External Antenna
(Below 1GHz)

DATA OF RADIATED EMISSION TEST

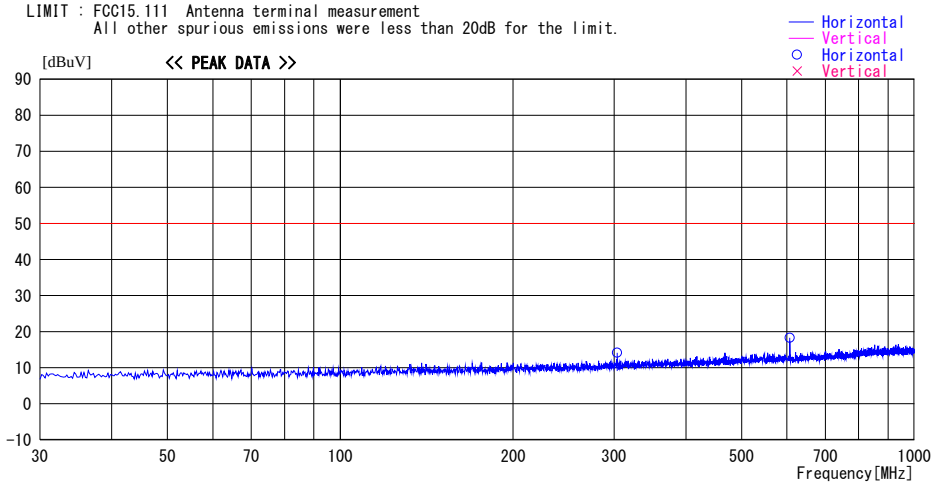
UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2014/09/05

Report No. : 10438535H

Temp./Humi. : 23deg. C / 62% RH
Engineer : Masatoshi Nishiguchi

Mode / Remarks : RKES Rx 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]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
303.450	32.2	PK	0.0	-18.0	14.2	Hori.	50.0	35.8	
606.900	34.6	PK	0.0	-16.3	18.3	Hori.	50.0	31.7	

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

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Antenna Terminal Conducted Emission

RKES (314.35MHz) Variation No. 3 External Antenna
(Above 1GHz)

DATA OF RADIATED EMISSION TEST

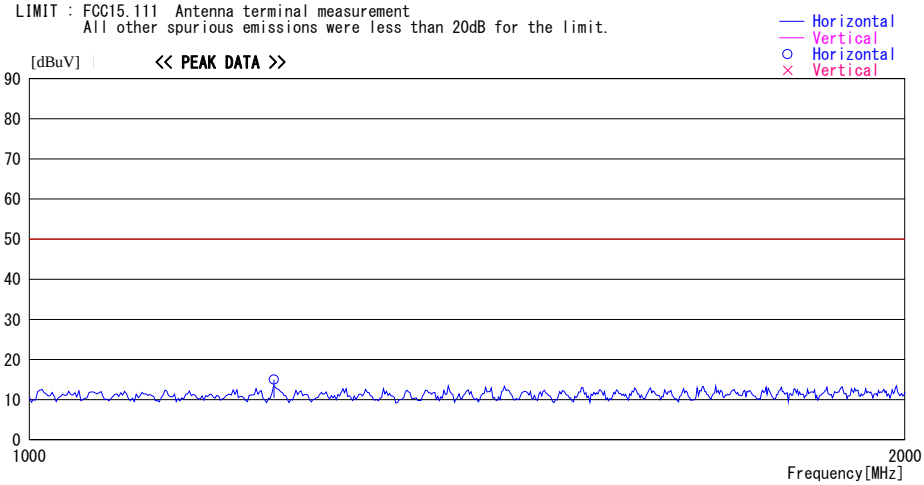
UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2014/09/05

Report No. : 10438535H

Temp./Humi. : 23deg. C / 62% RH
Engineer : Masatoshi Nishiguchi

Mode / Remarks : RKES Rx 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]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
1213.800	47.8	PK	0.0	-32.8	15.0	Hori.	50.0	35.0	

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

Antenna Terminal Conducted Emission

TPMS (314.98MHz) Variation No. 3 External Antenna
(Below 1GHz)

DATA OF RADIATED EMISSION TEST

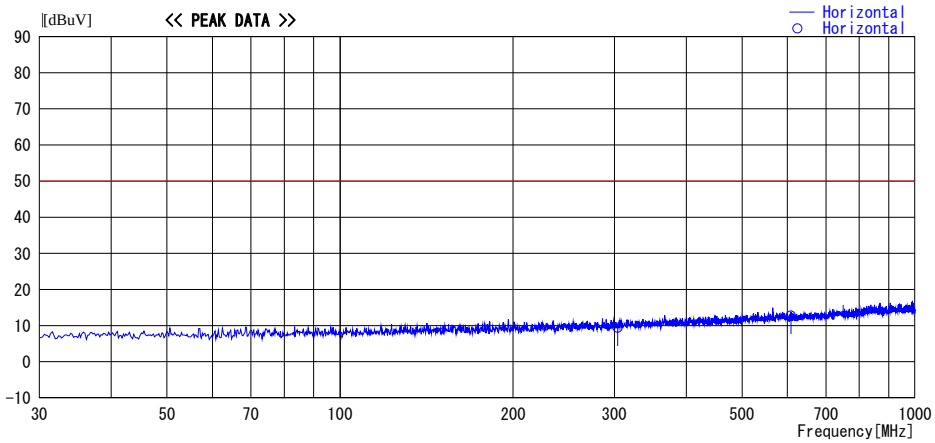
UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2014/09/05

Report No. : 10438535H

Temp./Humi. : 23deg. C / 62% RH
Engineer : Masatoshi Nishiguchi

Mode / Remarks : TPMS Rx 314.98MHz

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	Polar.	Limit	Margin	Comment
[MHz]	[dBuV]		[dB/m]	[dB]	[dBuV]		[dBuV/m]	[dB]	
304.080	27.4	PK	0.0	-18.0	9.4	Hori.	50.0	40.6	
608.160	29.0	PK	0.0	-16.3	12.7	Hori.	50.0	37.3	

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

Antenna Terminal Conducted Emission

TPMS (314.98MHz) Variation No. 3 External Antenna
(Above 1GHz)

DATA OF RADIATED EMISSION TEST

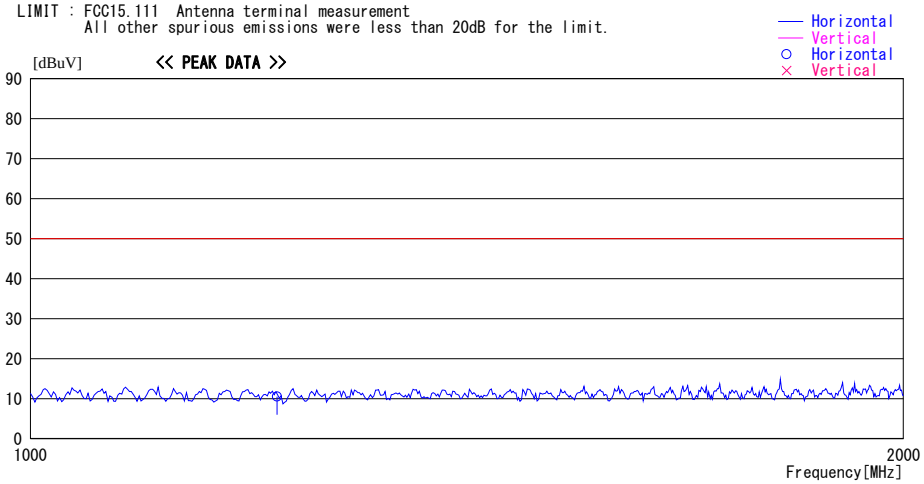
UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2014/09/05

Report No. : 10438535H

Temp./Humi. : 23deg. C / 62% RH
Engineer : Masatoshi Nishiguchi

Mode / Remarks : TPMS Rx 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]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
1216.320	43.4	PK	0.0	-32.8	10.6	Hori.	50.0	39.4	

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

Radiated Emission (Reference data)

RKES (315.10MHz) Variation No. 5 Internal Antenna

(Below 1GHz)

DATA OF RADIATED EMISSION TEST

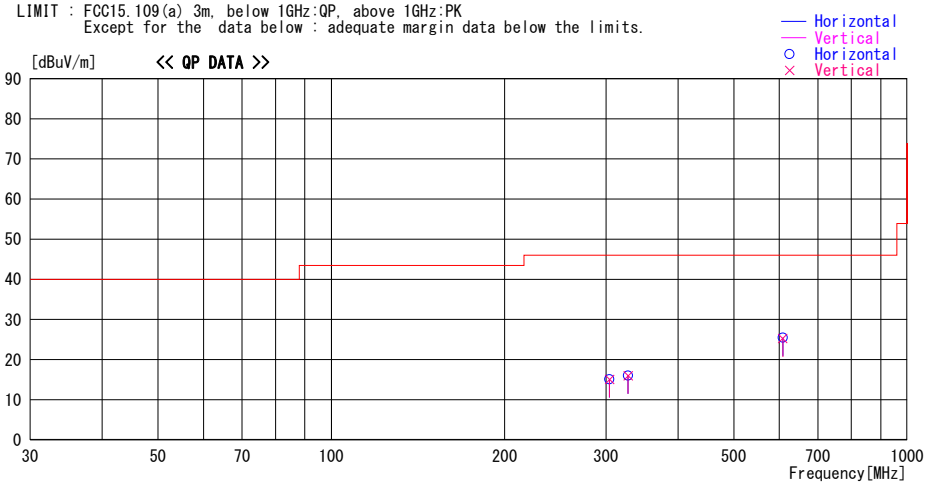
UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
Date : 2014/08/29

Report No. : 10438535H

Temp./Humi. : 23deg. C / 68% RH
Engineer : Masatoshi Nishiguchi

Mode / Remarks : RKES Rx 315.10MHz ANT1 WorstAxis (Hori:Z , Vert:Y-Axis)

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	22.7	QP	14.3	-21.9	15.1	0	100	Hori.	46.0	30.9	
304.200	22.7	QP	14.3	-21.9	15.1	0	100	Vert.	46.0	30.9	
327.600	22.6	QP	15.2	-21.8	16.0	0	100	Hori.	46.0	30.0	
327.600	22.6	QP	15.2	-21.8	16.0	0	100	Vert.	46.0	30.0	
608.400	26.0	QP	19.6	-20.1	25.5	321	149	Hori.	46.0	20.5	
608.400	25.7	QP	19.6	-20.1	25.2	21	100	Vert.	46.0	20.8	

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

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

Radiated Emission (Reference data)

RKES (315.10MHz) Variation No. 5 Internal Antenna

(Above 1GHz)

DATA OF RADIATED EMISSION TEST

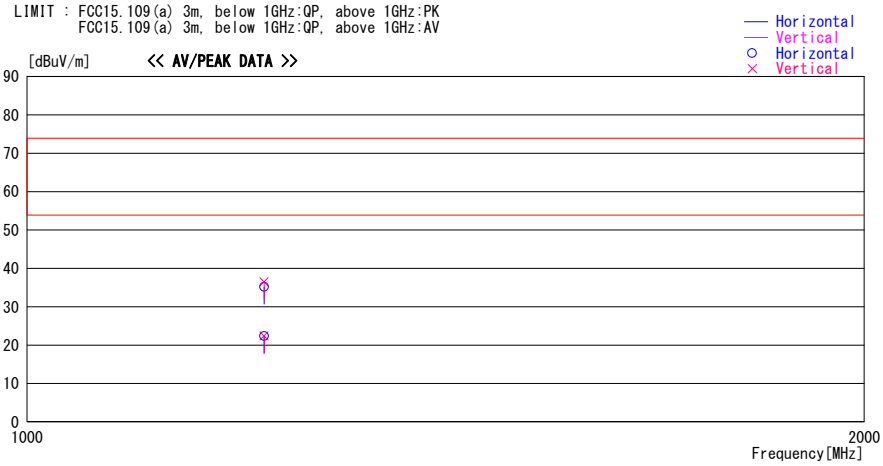
UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
Date : 2014/09/01

Report No. : 10438535H

Temp./Humi. : 23deg. C / 63% RH
Engineer : Keisuke Kawamura

Mode / Remarks : RKES Rx 315.10MHz Int-Ant Worst-Axis (Hori: Z / Vert: Y)

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	44.8	PK	24.6	-32.9	36.5	0	100	Vert.	73.9	37.4	
1216.800	43.5	PK	24.6	-32.9	35.2	0	100	Hori.	73.9	38.7	
1216.800	30.7	AV	24.6	-32.9	22.4	0	100	Vert.	53.9	31.5	
1216.800	30.7	AV	24.6	-32.9	22.4	0	100	Hori.	53.9	31.5	

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

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

Radiated Emission (Reference data)

RKES (314.35MHz) Variation No. 5 Internal Antenna

(Below 1GHz)

DATA OF RADIATED EMISSION TEST

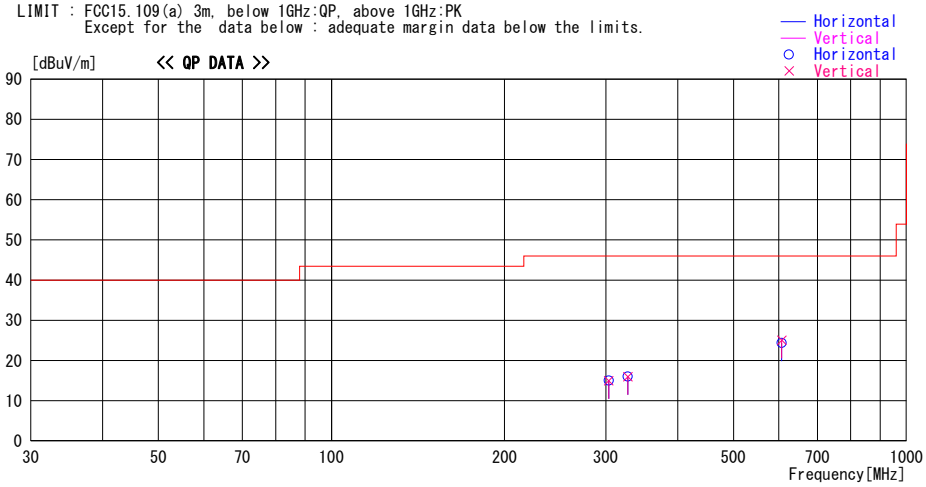
UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
Date : 2014/08/29

Report No. : 10438535H

Temp./Humi. : 23deg. C / 68% RH
Engineer : Masatoshi Nishiguchi

Mode / Remarks : RKES Rx 314.35MHz ANT1 WorstAxis (Hori:Z , Vert:Y-Axis)

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	22.6	QP	14.3	-21.9	15.0	0	100	Hori.	46.0	31.0	
303.450	22.6	QP	14.3	-21.9	15.0	0	100	Vert.	46.0	31.0	
327.600	22.6	QP	15.2	-21.8	16.0	0	100	Hori.	46.0	30.0	
327.600	22.6	QP	15.2	-21.8	16.0	0	100	Vert.	46.0	30.0	
606.900	24.9	QP	19.6	-20.1	24.4	359	280	Hori.	46.0	21.6	
606.900	25.6	QP	19.6	-20.1	25.1	18	100	Vert.	46.0	20.9	

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

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

Radiated Emission (Reference data)

RKES (314.35MHz) Variation No. 5 Internal Antenna

(Above 1GHz)

DATA OF RADIATED EMISSION TEST

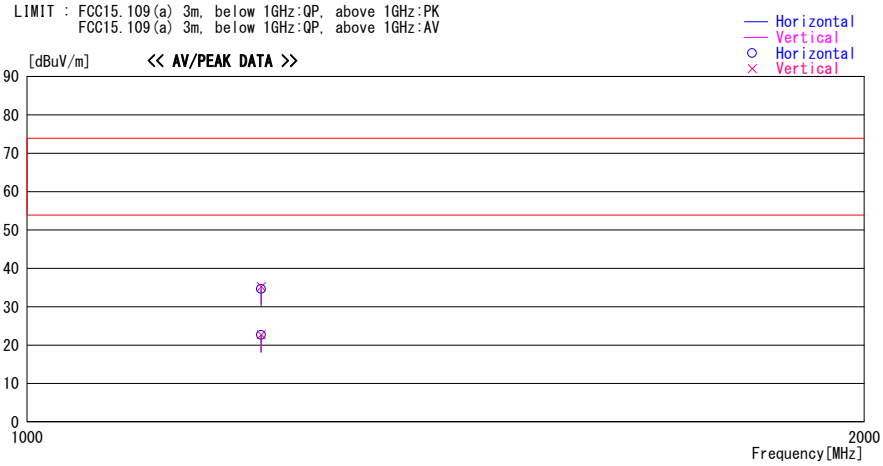
UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
Date : 2014/09/01

Report No. : 10438535H

Temp./Humi. : 23deg. C / 63% RH
Engineer : Keisuke Kawamura

Mode / Remarks : RKES Rx 314.35MHz Int-Ant Worst-Axis (Hori: Z / Vert: Y)

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	43.6	PK	24.6	-32.9	35.3	0	100	Vert.	73.9	38.6	
1213.800	42.9	PK	24.6	-32.9	34.6	0	100	Hori.	73.9	39.3	
1213.800	31.0	AV	24.6	-32.9	22.7	0	100	Vert.	53.9	31.2	
1213.800	31.0	AV	24.6	-32.9	22.7	0	100	Hori.	53.9	31.2	

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

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

Radiated Emission (Reference data)

RKES (315.10MHz) Variation No. 8 Internal Antenna

(Below 1GHz)

DATA OF RADIATED EMISSION TEST

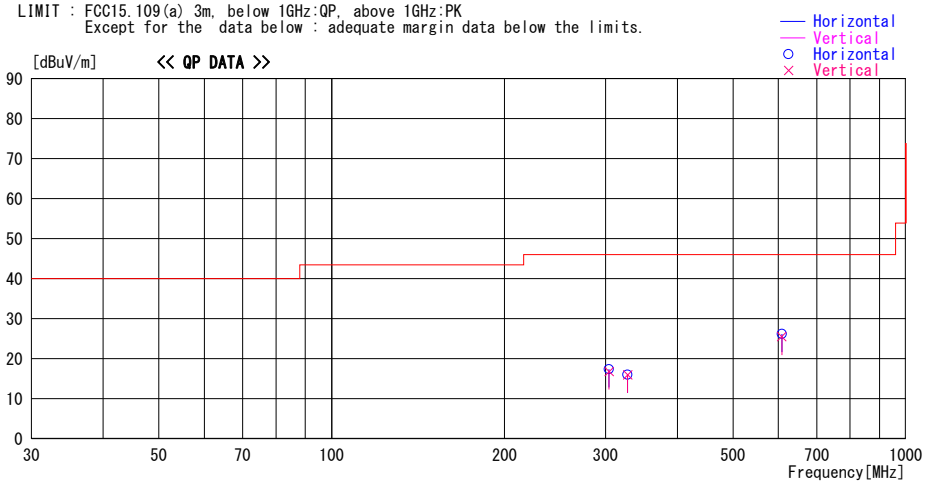
UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
Date : 2014/08/29

Report No. : 10438535H

Temp./Humi. : 23deg. C / 68% RH
Engineer : Masatoshi Nishiguchi

Mode / Remarks : RKES Rx 315.10MHz ANT1 WorstAxis (Hori:Z , Vert:Y-Axis)

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	25.0	QP	14.3	-21.9	17.4	202	100	Hori.	46.0	28.6	
304.200	24.4	QP	14.3	-21.9	16.8	0	286	Vert.	46.0	29.2	
327.600	22.6	QP	15.2	-21.8	16.0	0	100	Hori.	46.0	30.0	
327.600	22.6	QP	15.2	-21.8	16.0	0	100	Vert.	46.0	30.0	
608.400	26.7	QP	19.6	-20.1	26.2	317	140	Hori.	46.0	19.8	
608.400	26.0	QP	19.6	-20.1	25.5	13	100	Vert.	46.0	20.5	

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

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

Radiated Emission (Reference data)

RKES (315.10MHz) Variation No. 8 Internal Antenna

(Above 1GHz)

DATA OF RADIATED EMISSION TEST

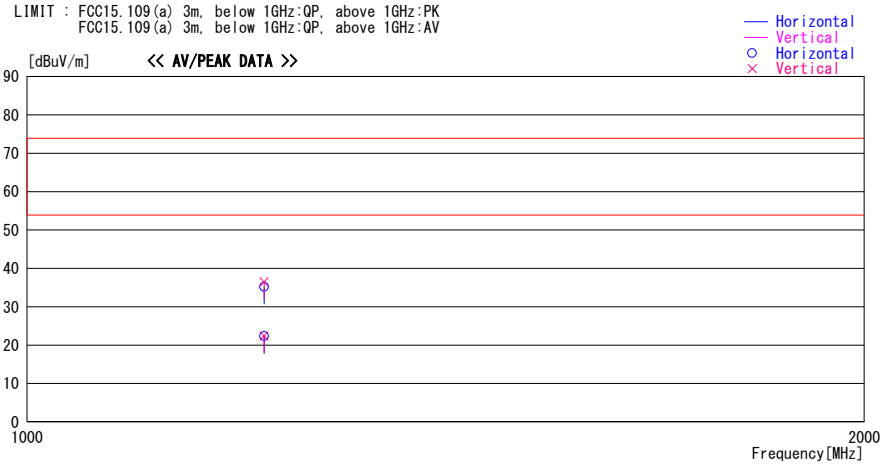
UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
Date : 2014/09/01

Report No. : 10438535H

Temp./Humi. : 23deg. C / 63% RH
Engineer : Keisuke Kawamura

Mode / Remarks : RKES Rx 315.10MHz Int-Ant Worst-Axis (Hori: Z / Vert: Y)

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	44.8	PK	24.6	-32.9	36.5	0	100	Vert.	73.9	37.4	
1216.800	43.5	PK	24.6	-32.9	35.2	0	100	Hori.	73.9	38.7	
1216.800	30.7	AV	24.6	-32.9	22.4	0	100	Vert.	53.9	31.5	
1216.800	30.7	AV	24.6	-32.9	22.4	0	100	Hori.	53.9	31.5	

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

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

Radiated Emission (Reference data)

RKES (314.35MHz) Variation No. 8 Internal Antenna

(Below 1GHz)

DATA OF RADIATED EMISSION TEST

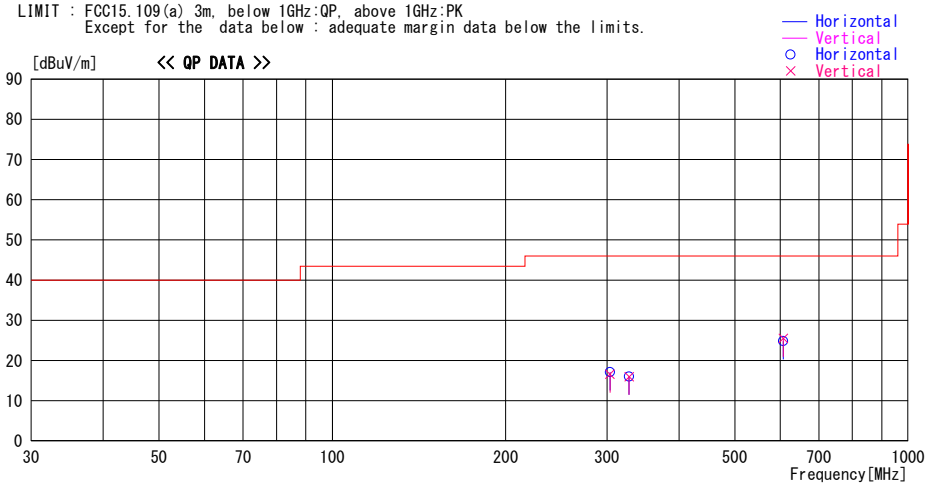
UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
Date : 2014/08/29

Report No. : 10438535H

Temp./Humi. : 23deg. C / 68% RH
Engineer : Masatoshi Nishiguchi

Mode / Remarks : RKES Rx 314.35MHz ANT1 WorstAxis (Hori:Z , Vert:Y-Axis)

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	24.7	QP	14.3	-21.9	17.1	194	100	Hori.	46.0	28.9	
303.450	24.2	QP	14.3	-21.9	16.6	354	310	Vert.	46.0	29.4	
327.600	22.6	QP	15.2	-21.8	16.0	0	100	Hori.	46.0	30.0	
327.600	22.6	QP	15.2	-21.8	16.0	0	100	Vert.	46.0	30.0	
606.900	25.3	QP	19.6	-20.1	24.8	0	262	Hori.	46.0	21.2	
606.900	26.0	QP	19.6	-20.1	25.5	0	100	Vert.	46.0	20.5	

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

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

Radiated Emission (Reference data)

RKES (314.35MHz) Variation No. 8 Internal Antenna

(Above 1GHz)

DATA OF RADIATED EMISSION TEST

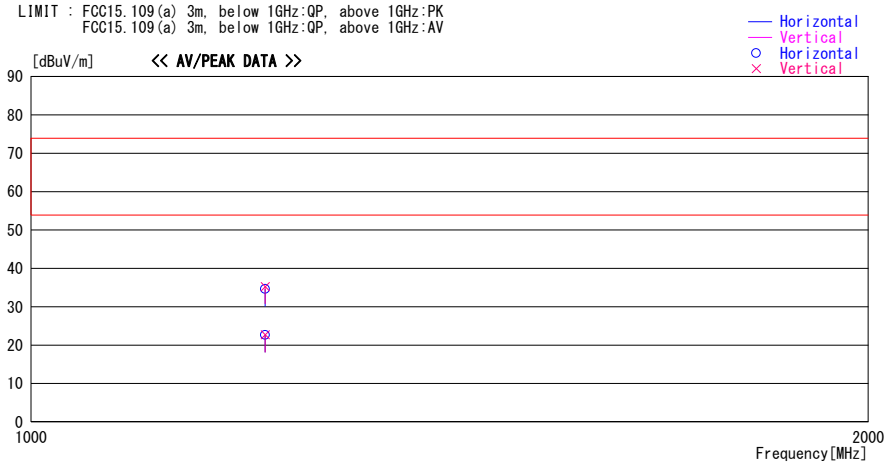
UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
Date : 2014/09/01

Report No. : 10438535H

Temp./Humi. : 23deg. C / 63% RH
Engineer : Keisuke Kawamura

Mode / Remarks : RKES Rx 314.35MHz Int-Ant Worst-Axis (Hori: Z / Vert: Y)

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	43.6	PK	24.6	-32.9	35.3	0	100	Vert.	73.9	38.6	
1213.800	42.9	PK	24.6	-32.9	34.6	0	100	Hori.	73.9	39.3	
1213.800	31.0	AV	24.6	-32.9	22.7	0	100	Vert.	53.9	31.2	
1213.800	31.0	AV	24.6	-32.9	22.7	0	100	Hori.	53.9	31.2	

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

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

Radiated Emission (Reference data)

RKES (315.10MHz) Variation No. 11 Internal Antenna

(Below 1GHz)

DATA OF RADIATED EMISSION TEST

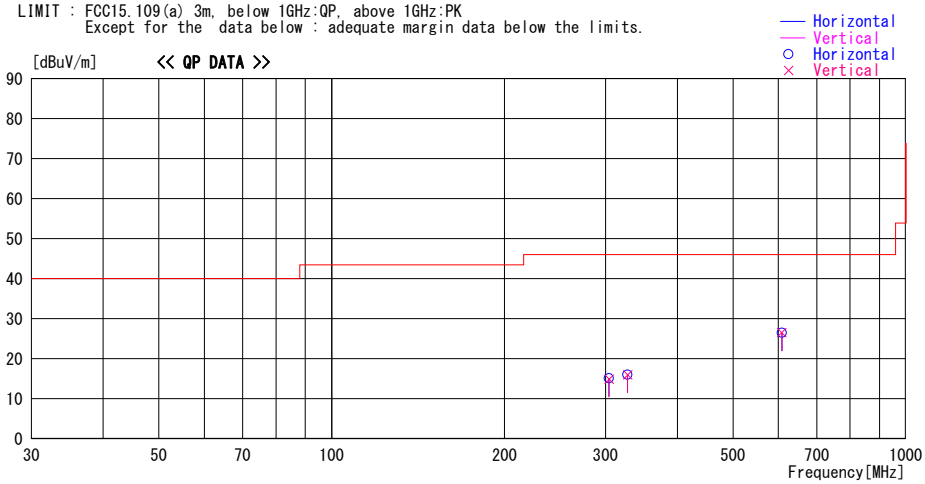
UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
Date : 2014/08/29

Report No. : 10438535H

Temp./Humi. : 23deg. C / 68% RH
Engineer : Masatoshi Nishiguchi

Mode / Remarks : RKES Rx 315.10MHz ANT1 WorstAxis (Hori:Z , Vert:Y-Axis)

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	22.5	QP	14.3	-21.9	14.9	0	100	Vert.	46.0	31.1	
304.200	22.7	QP	14.3	-21.9	15.1	0	100	Hori.	46.0	30.9	
327.600	22.6	QP	15.2	-21.8	16.0	0	100	Hori.	46.0	30.0	
327.600	22.6	QP	15.2	-21.8	16.0	0	100	Vert.	46.0	30.0	
608.400	27.0	QP	19.6	-20.1	26.5	319	151	Hori.	46.0	19.5	
608.400	27.0	QP	19.6	-20.1	26.5	15	100	Vert.	46.0	19.5	

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

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

Radiated Emission (Reference data)

RKES (315.10MHz) Variation No. 11 Internal Antenna

(Above 1GHz)

DATA OF RADIATED EMISSION TEST

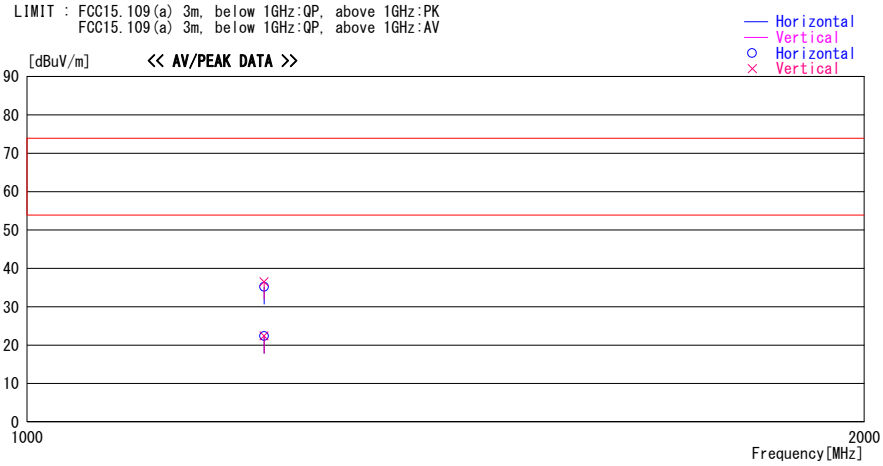
UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
Date : 2014/09/01

Report No. : 10438535H

Temp./Humi. : 23deg. C / 63% RH
Engineer : Keisuke Kawamura

Mode / Remarks : RKES Rx 315.10MHz Int-Ant Worst-Axis (Hori: Z / Vert: Y)

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	44.8	PK	24.6	-32.9	36.5	0	100	Vert.	73.9	37.4	
1216.800	43.5	PK	24.6	-32.9	35.2	0	100	Hori.	73.9	38.7	
1216.800	30.7	AV	24.6	-32.9	22.4	0	100	Vert.	53.9	31.5	
1216.800	30.7	AV	24.6	-32.9	22.4	0	100	Hori.	53.9	31.5	

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

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

Radiated Emission (Reference data)

RKES (314.35MHz) Variation No. 11 Internal Antenna

(Below 1GHz)

DATA OF RADIATED EMISSION TEST

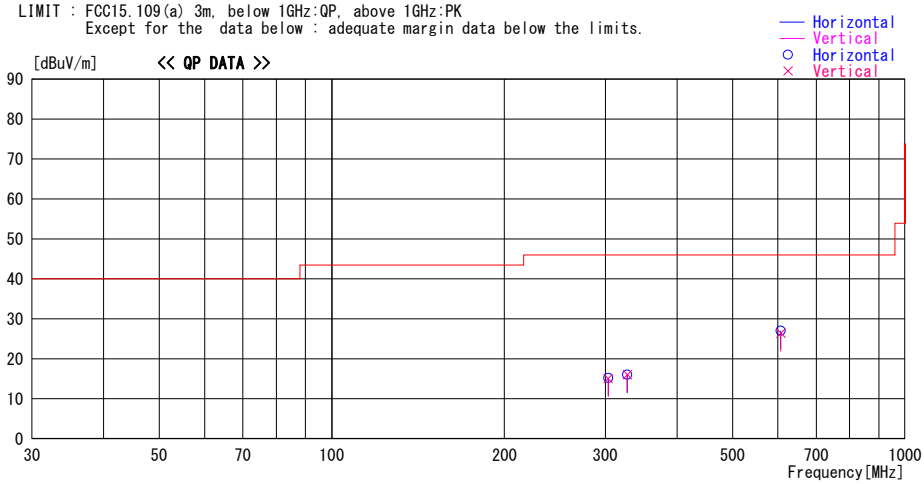
UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
Date : 2014/08/29

Report No. : 10438535H

Temp./Humi. : 23deg. C / 68% RH
Engineer : Masatoshi Nishiguchi

Mode / Remarks : RKES Rx 314.35MHz ANT1 WorstAxis (Hori:Z , Vert:Y-Axis)

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	22.7	QP	14.3	-21.9	15.1	0	100	Vert.	46.0	30.9	
303.450	22.8	QP	14.3	-21.9	15.2	0	100	Hori.	46.0	30.8	
327.600	22.6	QP	15.2	-21.8	16.0	0	100	Hori.	46.0	30.0	
327.600	22.7	QP	15.2	-21.8	16.1	0	100	Vert.	46.0	29.9	
606.900	27.5	QP	19.6	-20.1	27.0	322	153	Hori.	46.0	19.0	
606.900	26.9	QP	19.6	-20.1	26.4	16	100	Vert.	46.0	19.6	

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

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

Radiated Emission (Reference data)

RKES (314.35MHz) Variation No. 11 Internal Antenna
(Above 1GHz)

DATA OF RADIATED EMISSION TEST

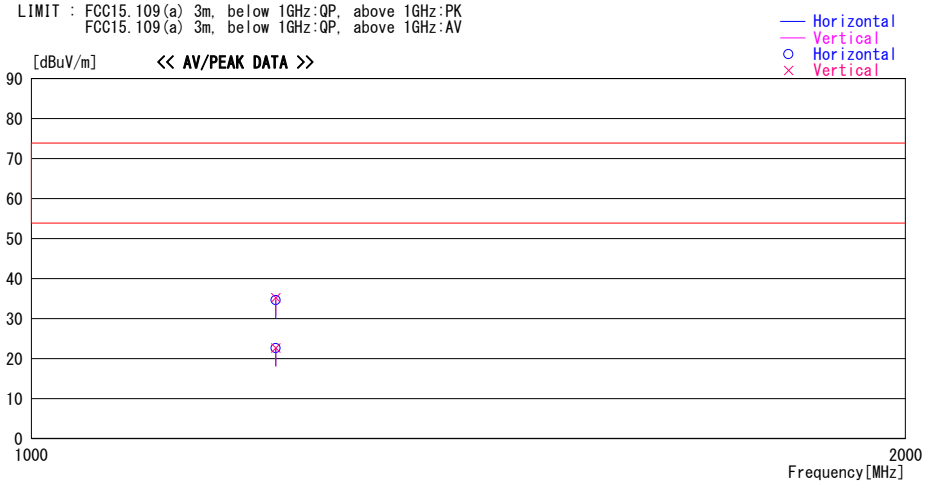
UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
Date : 2014/09/01

Report No. : 10438535H

Temp./Humi. : 23deg. C / 63% RH
Engineer : Keisuke Kawamura

Mode / Remarks : RKES Rx 314.35MHz Int-Ant Worst-Axis (Hori: Z / Vert: Y)

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	43.6	PK	24.6	-32.9	35.3	0	100	Vert.	73.9	38.6	
1213.800	42.9	PK	24.6	-32.9	34.6	0	100	Hori.	73.9	39.3	
1213.800	31.0	AV	24.6	-32.9	22.7	0	100	Vert.	53.9	31.2	
1213.800	31.0	AV	24.6	-32.9	22.7	0	100	Hori.	53.9	31.2	

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

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

Radiated Emission (Reference data)

RKES (315.10MHz) Variation No. 14 Internal Antenna

(Below 1GHz)

DATA OF RADIATED EMISSION TEST

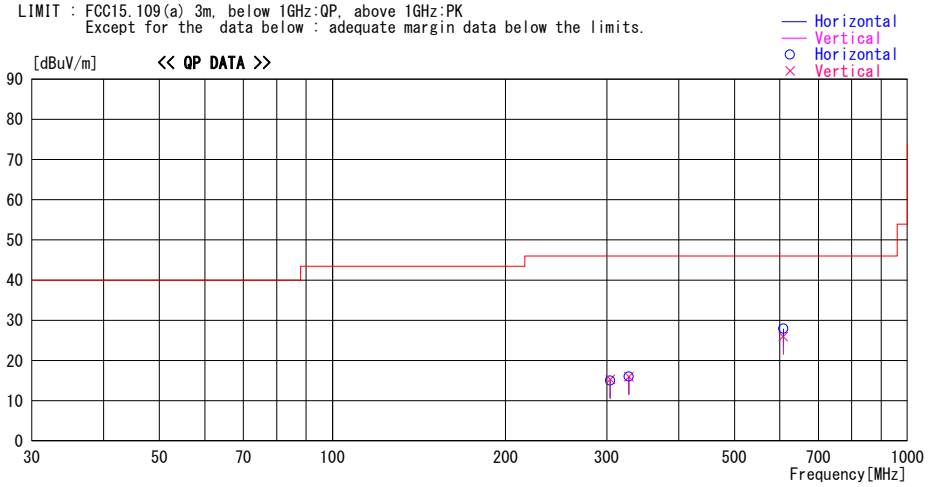
UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
Date : 2014/08/29

Report No. : 10438535H

Temp./Humi. : 23deg. C / 68% RH
Engineer : Masatoshi Nishiguchi

Mode / Remarks : RKES Rx 315.10MHz ANT1 WorstAxis (Hori:Z , Vert:Y-Axis)

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	22.9	QP	14.3	-21.9	15.3	0	100	Vert.	46.0	30.7	
304.200	22.6	QP	14.3	-21.9	15.0	0	100	Hori.	46.0	31.0	
327.600	22.6	QP	15.2	-21.8	16.0	0	100	Vert.	46.0	30.0	
327.600	22.6	QP	15.2	-21.8	16.0	0	100	Hori.	46.0	30.0	
608.400	26.5	QP	19.6	-20.1	26.0	15	100	Vert.	46.0	20.0	
608.400	28.4	QP	19.6	-20.1	27.9	317	149	Hori.	46.0	18.1	

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

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

Radiated Emission (Reference data)

RKES (315.10MHz) Variation No. 14 Internal Antenna

(Above 1GHz)

DATA OF RADIATED EMISSION TEST

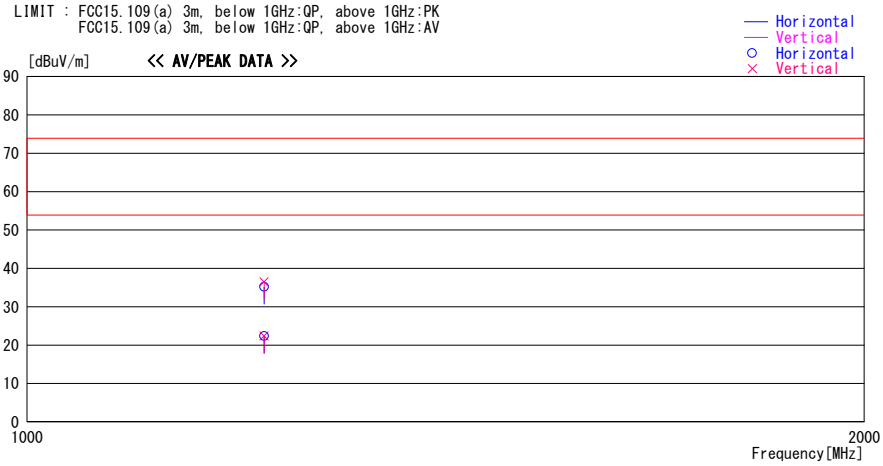
UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
Date : 2014/09/01

Report No. : 10438535H

Temp./Humi. : 23deg. C / 63% RH
Engineer : Keisuke Kawamura

Mode / Remarks : RKES Rx 315.10MHz Int-Ant Worst-Axis (Hori: Z / Vert: Y)

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	44.8	PK	24.6	-32.9	36.5	0	100	Vert.	73.9	37.4	
1216.800	43.5	PK	24.6	-32.9	35.2	0	100	Hori.	73.9	38.7	
1216.800	30.7	AV	24.6	-32.9	22.4	0	100	Vert.	53.9	31.5	
1216.800	30.7	AV	24.6	-32.9	22.4	0	100	Hori.	53.9	31.5	

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

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

Radiated Emission (Reference data)

RKES (314.35MHz) Variation No. 14 Internal Antenna

(Below 1GHz)

DATA OF RADIATED EMISSION TEST

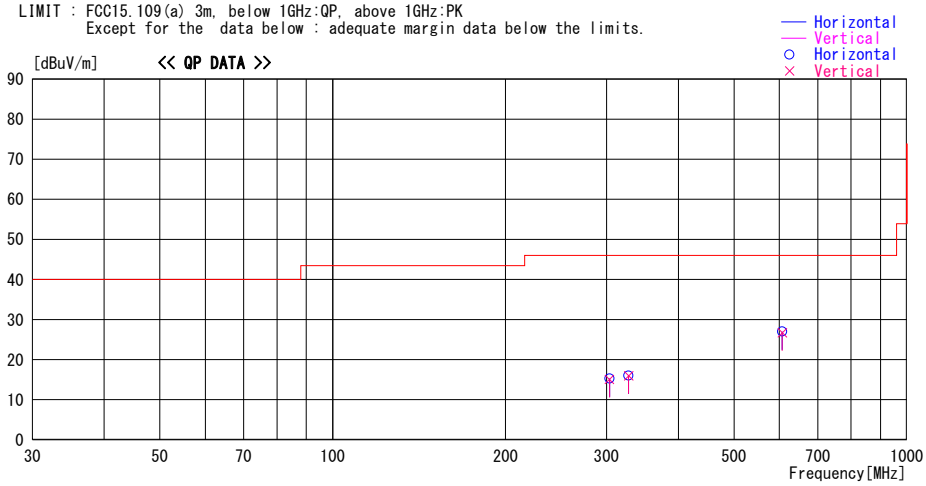
UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
Date : 2014/08/29

Report No. : 10438535H

Temp./Humi. : 23deg. C / 68% RH
Engineer : Masatoshi Nishiguchi

Mode / Remarks : RKES Rx 314.35MHz ANT1 WorstAxis (Hori:Z , Vert:Y-Axis)

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	22.7	QP	14.3	-21.9	15.1	0	100	Vert.	46.0	30.9	
303.450	22.9	QP	14.3	-21.9	15.3	0	100	Hori.	46.0	30.7	
327.600	22.6	QP	15.2	-21.8	16.0	0	100	Vert.	46.0	30.0	
327.600	22.6	QP	15.2	-21.8	16.0	0	100	Hori.	46.0	30.0	
606.900	27.2	QP	19.6	-20.1	26.7	15	100	Vert.	46.0	19.3	
606.900	27.5	QP	19.6	-20.1	27.0	318	150	Hori.	46.0	19.0	

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

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

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Telephone : +81 596 24 8999
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Radiated Emission (Reference data)

RKES (314.35MHz) Variation No. 14 Internal Antenna

(Above 1GHz)

DATA OF RADIATED EMISSION TEST

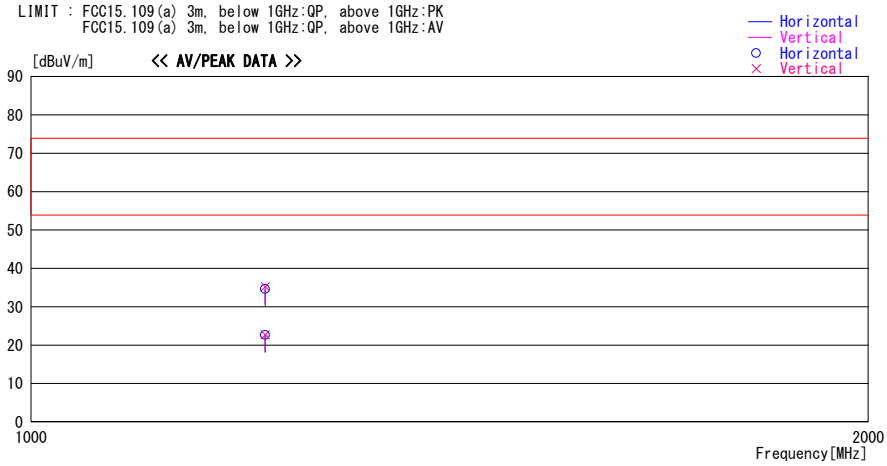
UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
Date : 2014/09/01

Report No. : 10438535H

Temp./Humi. : 23deg. C / 63% RH
Engineer : Keisuke Kawamura

Mode / Remarks : RKES Rx 314.35MHz Int-Ant Worst-Axis (Hori: Z / Vert: Y)

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	43.6	PK	24.6	-32.9	35.3	0	100	Vert.	73.9	38.6	
1213.800	42.9	PK	24.6	-32.9	34.6	0	100	Hori.	73.9	39.3	
1213.800	31.0	AV	24.6	-32.9	22.7	0	100	Vert.	53.9	31.2	
1213.800	31.0	AV	24.6	-32.9	22.7	0	100	Hori.	53.9	31.2	

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

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

APPENDIX 2: Test instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MAEC-04	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE/AT	2014/02/28 * 12
MOS-15	Thermo-Hygrometer	Custom	CTH-180	1501	RE/AT	2014/02/20 * 12
MJM-22	Measure	ASKUL	-	-	RE/AT	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE/AT	-
MTR-01	Test Receiver	Rohde & Schwarz	ESI40	100084	RE	2013/11/12 * 12
MBA-05	Biconical Antenna	Schwarzbeck	BBA9106	1302	RE	2013/11/24 * 12
MLA-08	Logperiodic Antenna	Schwarzbeck	UKLP9140-A	N/A	RE	2013/11/24 * 12
MCC-50	Coaxial Cable	UL Japan	-	-	RE/AT	2014/06/02 * 12
MAT-68	Attenuator	Anritsu	MP721B	6200961025	RE	2013/11/26 * 12
MPA-14	Pre Amplifier	SONOMA INSTRUMENT	310	260833	RE/AT	2014/03/14 * 12
MAEC-03	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE	2014/02/27 * 12
MOS-13	Thermo-Hygrometer	Custom	CTH-180	1301	RE	2014/02/20 * 12
MJM-16	Measure	KOMELON	KMC-36	-	RE	-
MBA-03	Biconical Antenna	Schwarzbeck	BBA9106	1915	RE	2013/10/13 * 12
MLA-03	Logperiodic Antenna	Schwarzbeck	USLP9143	174	RE	2013/10/13 * 12
MCC-51	Coaxial cable	UL Japan	-	-	RE	2014/07/14 * 12
MAT-70	Attenuator(6dB)	Agilent	8491A-006	MY52460153	RE	2014/04/14 * 12
MPA-13	Pre Amplifier	SONOMA INSTRUMENT	310	260834	RE	2014/03/14 * 12
MHA-20	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	258	RE	2014/05/26 * 12
MCC-167	Microwave Cable	Junkosha	MWX221	1404S374(1m) / 1405S074(5m)	RE	2014/05/26 * 12
MPA-11	MicroWave System Amplifier	Agilent	83017A	MY39500779	RE	2014/03/24 * 12
MSA-03	Spectrum Analyzer	Agilent	E4448A	MY44020357	AT	2014/04/08 * 12
MCC-141	Microwave Cable	Junkosha	MWX221	1305S002R(1m) / 1405S146(5m)	AT	2014/06/11 * 12
MPA-12	MicroWave System Amplifier	Agilent	83017A	MY39500780	AT	2014/03/11 * 12
MAT-10	Attenuator(10dB)	Weinschel Corp	2	BL1173	AT	2013/11/26 * 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