



# **RADIO TEST REPORT**

**Test Report No. : 32BE0279-HO-01-A-R1**

**Applicant** : DENSO CORPORATION  
**Type of Equipment** : Electronic Key  
**Model No.** : 14AGX  
**Test regulation** : FCC Part 15 Subpart C: 2011  
**FCC ID** : HYQ14AGX  
**Test Result** : Complied

1. This test report shall not be reproduced in full or partial, without the written approval of UL Japan, Inc.
2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with above regulation.
4. The test results in this report are traceable to the national or international standards.
5. This test report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.
6. This report is a revised version of 32BE0279-HO-01-A. 32BE0279-HO-01-A is replaced with this report.

**Date of test:** October 18 to 21, 2011

**Representative test engineer:**

Kazuya Yoshioka  
Engineer of WiSE Japan,  
UL Verification Service

**Approved by:**

Shinya Watanabe  
Leader of WiSE Japan,  
UL Verification Service



NVLAP LAB CODE: 200572-0

This laboratory is accredited by the NVLAP LAB CODE 200572-0, U.S.A. The tests reported herein have been performed in accordance with its terms of accreditation.  
\*As for the range of Accreditation in NVLAP, you may refer to the WEB address,  
<http://www.ul.com/japan/jpn/pages/services/emc/about/ma rk1/index.jsp#nvlap>

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13-EM-F0429

<b>CONTENTS</b>	<b>PAGE</b>
<b>SECTION 1: Customer information .....</b>	<b>3</b>
<b>SECTION 2: Equipment under test (E.U.T.).....</b>	<b>3</b>
<b>SECTION 3: Test specification, procedures &amp; results.....</b>	<b>4</b>
<b>SECTION 4: Operation of E.U.T. during testing.....</b>	<b>7</b>
<b>SECTION 5: Radiated emission (Electric Field Strength of Fundamental and Spurious Emission) .....</b>	<b>8</b>
<b>SECTION 6: Automatically deactivate .....</b>	<b>10</b>
<b>SECTION 7: -20dB and 99% Occupied Bandwidth .....</b>	<b>10</b>
<b>APPENDIX 1: Data of EMI test .....</b>	<b>11</b>
Automatically deactivate.....	11
Radiated Emission (Electric Field Strength of Fundamental and Spurious Emission).....	12
-20dB Occupied Bandwidth.....	13
99% Occupied Bandwidth .....	14
Duty Cycle .....	15
<b>APPENDIX 2: Test Instruments.....</b>	<b>19</b>
<b>APPENDIX 3: Photographs of test setup.....</b>	<b>21</b>
Radiated emission .....	21
Worst case position .....	22

## **SECTION 1: Customer information**

Company Name : DENSO CORPORATION  
Address : 1-1, Showa-cho, Kariya-city, Aichi-ken, 448-8661 Japan  
Telephone Number : +81-566-20-3957  
Facsimile Number : +81-566-25-4837  
Contact Person : TAKAYUKI AONO

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

### **2.1 Identification of E.U.T.**

Type of Equipment : Electronic Key  
Model No. : 14AGX  
Serial No. : Refer to Clause 4.2  
Rating : DC 3.0V  
Receipt Date of Sample : October 6, 2011  
Country of Mass-production : Japan / United States of America  
Condition of EUT : Engineer 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**

#### **General Specification**

Clock frequency in the system : 8MHz

#### **Radio Specification**

Frequency of Operation : 314.35MHz  
Receiving frequency : 134.2kHz  
Oscillator frequency : 314.35MHz SAW resonator  
Modulation : FSK / F1D  
Power Supply (radio part input) : Nominal supply voltage: DC 3.0V (One lithium battery)  
Antenna type : Built-in type (Fixed)

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## **SECTION 3: Test specification, procedures & results**

### **3.1 Test Specification**

Test Specification : FCC Part 15 Subpart C: 2011, final revised on July 8, 2011 and effective August 8, 2011

Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators  
Section 15.231 Periodic operation in the band 40.66 - 40.70MHz  
and above 70MHz

### **3.2 Procedures and results**

Item	Test Procedure	Specification	Worst margin	Results	Remarks
Conducted emission	FCC: ANSI C63.4:2003 7. AC power line conducted emission measurements IC: RSS-Gen 7.2.4	FCC: Section 15.207 IC: RSS-Gen 7.2.4	N/A	N/A*1)	-
Automatically Deactivate	FCC: ANSI C63.4:2003 13. Measurement of intentional radiators IC: -	FCC: Section 15.231(a)(1) IC: RSS-210 A1.1.1	N/A	Complied	Radiated
Electric Field Strength of Fundamental Emission	FCC: ANSI C63.4:2003 13. Measurement of intentional radiators IC: RSS-Gen 4.8	FCC: Section 15.231(b) IC: RSS-210 A1.1.2	9.4 dB 314.35MHz Horizontal PK with Duty factor	Complied	Radiated
Electric Field Strength of Spurious Emission	FCC: ANSI C63.4:2003 13. Measurement of intentional radiators IC: RSS-Gen 4.9	FCC: Section 15.205 Section 15.209 Section 15.231(b) IC: RSS-210 A1.1.2, 2.5.1 RSS-Gen 7.2.5	15.3dB 2514.800MHz Horizontal PK with Duty factor	Complied	Radiated
-20dB Bandwidth	FCC: ANSI C63.4:2003 13. Measurement of intentional radiators IC: -	FCC: Section 15.231(c) IC: Reference data	N/A	Complied	Radiated
Receiver Spurious Emissions	FCC: ANSI C63.4:2003 12. Measurement of unintentional radiators other than ITE IC: RSS-Gen 4.10	FCC: Section 15.109(a) Section 15.209 IC: RSS-Gen 6 RSS-210 2.3	34.6dB 80.000MHz Horizontal, QP Vertical, QP	Complied	Radiated

Note: UL Japan, Inc.'s EMI Work Procedures No. 13-EM-W0420 and 13-EM-W0422.

\*1) The test is not applicable since the EUT does not have AC Mains.

#### **FCC 15.31 (e)**

This test was performed with the New Battery (DC 3.0V) and the constant voltage was supplied to the EUT during the tests. Therefore, the EUT complies with the requirement.

#### **FCC Part 15.203 Antenna requirement**

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

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### 3.3 Addition to standard

Item	Test Procedure	Specification	Worst margin	Results	Remarks
99% Occupied Bandwidth	IC: RSS-Gen 4.6.1	IC: RSS-Gen 4.6.1	N/A	N/A	Radiated

Other than above, no addition, exclusion nor deviation has been made from the standard.

### 3.4 Uncertainty

#### EMI

The following uncertainties have been calculated to provide a confidence level of 95% using a coverage factor k=2.

Test room (semi-anechoic chamber)	Radiated emission						
	(3m*)(+dB)				(1m*)(+dB)		(0.5m*)(+dB)
	9kHz -30MHz	30MHz -300MHz	300MHz -1GHz	1GHz -10GHz	10GHz -18GHz	18GHz -26.5GHz	26.5GHz -40GHz
No.1	4.2dB	5.0dB	5.1dB	5.6dB	5.9dB	4.4dB	4.3dB
No.2	4.1dB	5.2dB	5.1dB	5.7dB	5.8dB	4.3dB	4.2dB
No.3	4.5dB	5.0dB	5.2dB	5.7dB	5.8dB	4.5dB	4.2dB
No.4	4.7dB	5.2dB	5.2dB	5.7dB	5.8dB	5.1dB	4.2dB

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

#### Radiated emission test(3m)

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

### 3.5 Test Location

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	FCC Registration Number	IC Registration Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Other rooms
No.1 semi-anechoic chamber	313583	2973C-1	19.2 x 11.2 x 7.7m	7.0 x 6.0m	No.1 Power source room
No.2 semi-anechoic chamber	655103	2973C-2	7.5 x 5.8 x 5.2m	4.0 x 4.0m	-
No.3 semi-anechoic chamber	148738	2973C-3	12.0 x 8.5 x 5.9m	6.8 x 5.75m	No.3 Preparation room
No.3 shielded room	-	-	4.0 x 6.0 x 2.7m	N/A	-
No.4 semi-anechoic chamber	134570	2973C-4	12.0 x 8.5 x 5.9m	6.8 x 5.75m	No.4 Preparation room
No.4 shielded room	-	-	4.0 x 6.0 x 2.7m	N/A	-
No.5 semi-anechoic chamber	-	-	6.0 x 6.0 x 3.9m	6.0 x 6.0m	-
No.6 shielded room	-	-	4.0 x 4.5 x 2.7m	4.75 x 5.4 m	-
No.6 measurement room	-	-	4.75 x 5.4 x 3.0m	4.75 x 4.15 m	-
No.7 shielded room	-	-	4.7 x 7.5 x 2.7m	4.7 x 7.5m	-
No.8 measurement room	-	-	3.1 x 5.0 x 2.7m	N/A	-
No.9 measurement room	-	-	8.0 x 4.5 x 2.8m	2.0 x 2.0m	-
No.10 measurement room	-	-	2.6 x 2.8 x 2.5m	2.4 x 2.4m	-
No.11 measurement room	-	-	3.1 x 3.4 x 3.0m	2.4 x 3.4m	-

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

### 3.6 Test set up, Data of EMI, Test instruments.

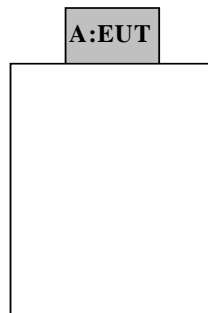
Refer to APPENDIX.

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

### **4.1 Operating Modes**

Test Item*	Mode
Automatically Deactivate	Normal use mode
Electric Field Strength of Fundamental Emission Electric Field Strength of Spurious Emission -20dB & 99% Occupied Bandwidth Duty Cycle	Transmitting mode (Tx) *1)
Spurious Emission	Transmitting mode (Tx) *1) Receiving mode(Rx) *2)
<p>*The software of this mode is the same as one of normal product, except that EUT continues to transmit when transmitter button is being pressed (For Normal use mode, EUT stops to transmit in a given time, even if transmitter button is being pressed.)  End users cannot change the settings of the output power of the product.  *1) This mode was performed with a switch pushed by a nonconductive Jig  *2) Before the test, EUT was confirmed to be set to 134.2kHz receiving mode and it functioned normally. (Even if EUT was set to receiving mode, it did not receive the signal during the test because there was no counter device.)</p>	

### **4.2 Configuration and peripherals**



\* Test data was taken under worse case conditions.

#### **Description of EUT**

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Electronic Key	14AGX	001	DENSO CORPORATION	EUT

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## **SECTION 5: Radiated emission (Electric Field Strength of Fundamental and Spurious Emission)**

### **Test Procedure and conditions**

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 center of the tabletop.

Test was made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna was varied in height above the conducting ground plane to obtain the maximum signal strength.

Photographs of the set up are shown in Appendix 1.

### **[Transmitting mode]**

The Radiated Electric Field Strength has been measured on Semi anechoic chamber with a ground plane and at a distance of 3m.

Frequency : From 9kHz to 30MHz at distance 3m

The EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.

The measurements were performed for vertical polarization (antenna angle: 0deg., and 90deg.).

\*Refer to Figure 1 about Direction of the Loop Antenna.

Frequency : From 30MHz to 3.2GHz at distance 3m

The measuring antenna height was varied between 1 and 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field strength.

The measurements were performed for both vertical and horizontal antenna polarization.

The radiated emission measurements were made with the following detector function of the test receiver/spectrum analyzer.

### **Test Antennas are used as below;**

Frequency	Below 30MHz	30MHz to 300MHz	300MHz to 1GHz	Above 1GHz
Antenna Type	Loop	Biconical	Logperiodic	Horn

	From 9kHz to 90kHz and From 110kHz to 150kHz	From 90kHz to 110kHz	From 150kHz to 490kHz	From 490kHz to 30MHz	Below or equal to 1GHz	Above 1GHz *1)
Detector Type	PK/AV	QP	PK/AV	QP	Peak and Peak with Duty factor	Peak and Peak with Duty factor
IF Bandwidth	200Hz	200Hz	9kHz	9kHz	120kHz	PK: S/A:RBW 1MHz, VBW:3MHz

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

This EUT has two modes which mechanical key is inserted or not. The worst case was confirmed with and without mechanical key, as a result, the test with mechanical key was the worst case. Therefore the test with mechanical key was performed only.

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#### [Receiving mode]

The Radiated Electric Field Strength has been measured on Semi anechoic chamber with a ground plane and at a distance of 3m.

Frequency : From 9kHz to 30MHz at distance 3m

The EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.

The measurements were performed for vertical polarization (antenna angle: 0deg., and 90deg.).

\*Refer to Figure 1 about Direction of the Loop Antenna.

Frequency : From 30MHz to 1GHz at distance 3m

The measuring antenna height varied between 1 and 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.

The measurements were performed for both vertical and horizontal antenna polarization.

Measurements were performed with a QP, PK, and AV detector.

The radiated emission measurements were made with the following detector function of the test receiver below 1GHz..

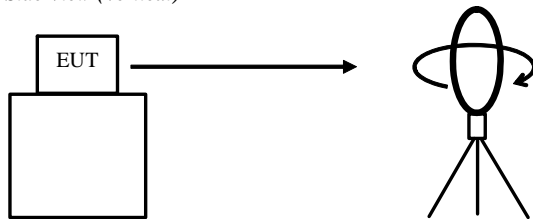
	From 9kHz to 90kHz and From 110kHz to 150kHz	From 90kHz to 110kHz	From 150kHz to 490kHz	From 490kHz to 30MHz	From 30MHz to 1GHz
Detector Type	PK/AV	QP	PK/AV	QP	QP
IF Bandwidth	200Hz	200Hz	9kHz	9kHz	120kHz

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

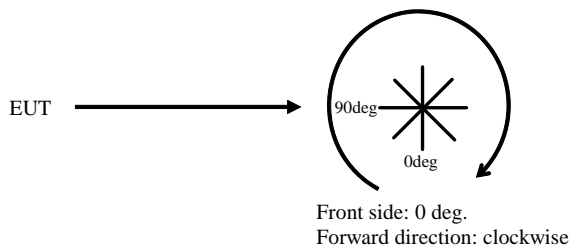
Measurement range : 9kHz-3.2GHz (Transmitting)  
9kHz-1GHz (Receiving)  
Test data : APPENDIX  
Test result : Pass

**Figure 1: Direction of the Loop Antenna**

*Side View (Vertical)*



*Top View (Vertical)*



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## **SECTION 6: Automatically deactivate**

### **Test Procedure**

The measurement was performed with Electric field strength using a spectrum analyzer.

Test data : APPENDIX  
Test result : Pass

## **SECTION 7: -20dB and 99% Occupied Bandwidth**

### **Test Procedure**

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

Test	Span	RBW	VBW	Sweep	Detector	Trace	Instrument used
20dB Bandwidth	200kHz	10kHz	30kHz	Auto	Peak	Max Hold	Spectrum Analyzer
99% Occupied Bandwidth	Enough width to display 20dB Bandwidth	1 % of Span	Three times of RBW	Auto	Peak *1)	Max Hold *1)	Spectrum Analyzer
*1) The measurement was performed with Peak detector, Max Hold since the duty cycle was not 100%.							

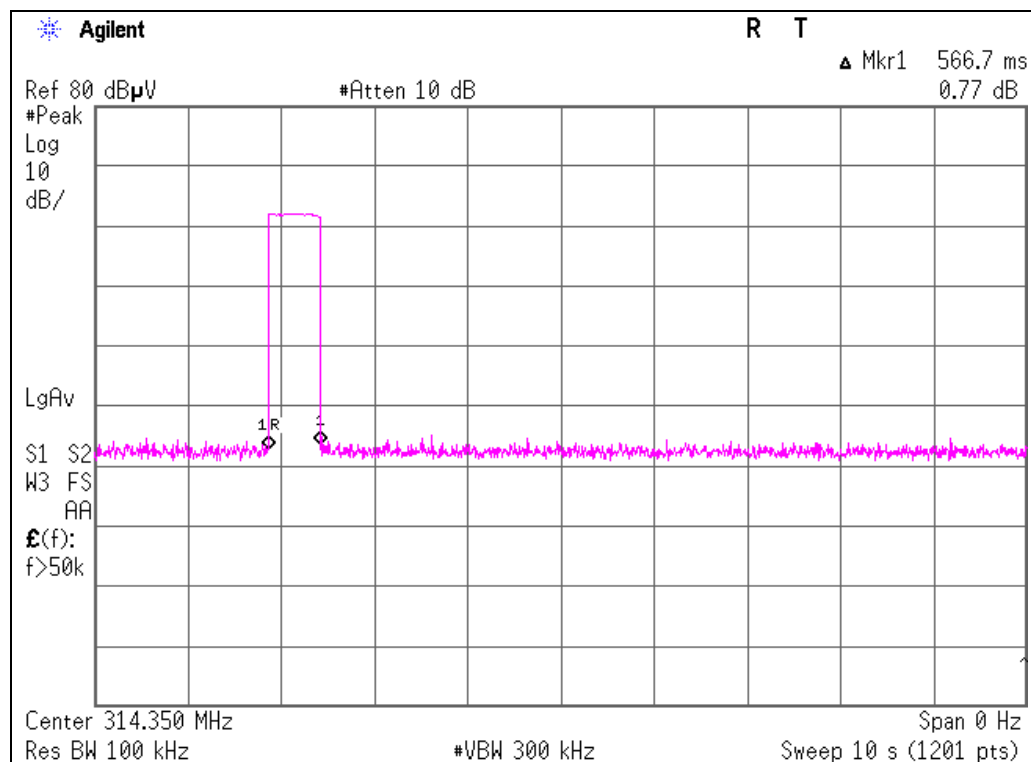
Test data : APPENDIX  
Test result : Pass

## APPENDIX 1: Data of EMI test

### Automatically deactivate

Test place	Head Office EMC Lab. No.4 Semi Anechoic Chamber
Report No.	32BE0279-HO-01
Date	10/20/2011
Temperature/ Humidity	25 deg.C / 43% RH
Engineer	Kazuya Yoshioka
Mode	Normal use mode

Time of Transmitting [sec]	Limit [sec]	Result
0.567	5.000	Pass



## Radiated Emission (Electric Field Strength of Fundamental and Spurious Emission)

Test place Head Office EMC Lab. No.3 and No.4 Semi Anechoic Chamber  
Report No. 32BE0279-HO-01  
Date 10/18/2011 10/20/2011  
Temperature/ Humidity 26 deg.C / 47% RH 25 deg.C / 43% RH  
Engineer Satofumi Matsuyama Kazuya Yoshioka  
Below 1MHz Above 1GHz  
Mode Transmitting mode

### PK

Frequency [MHz]	Detector	Reading [dBuV]		Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]		Limit [dBuV/m]	Margin [dB]		Remark Inside or Outside of Restricted Bands
		Hor	Ver					Hor	Ver		Hor	Ver	
314.350	PK	77.7	73.6	15.6	10.1	32.0	-	71.4	67.3	95.5	24.1	28.2	Carrier
628.700	PK	32.3	33.4	19.7	12.0	31.9	-	32.1	33.2	75.5	43.4	42.3	Outside
943.050	PK	30.3	30.7	22.7	13.6	30.9	-	35.7	36.1	75.5	39.8	39.4	Outside
1257.400	PK	44.3	43.9	24.6	1.8	34.0	-	36.7	36.3	75.5	38.8	39.2	Outside
1571.750	PK	43.9	44.7	25.4	2.0	33.2	-	38.1	38.9	73.9	35.8	35.0	Inside
1886.100	PK	41.7	42.6	26.0	2.2	32.6	-	37.3	38.2	75.5	38.2	37.3	Outside
2200.450	PK	42.7	42.9	27.2	2.4	32.3	-	40.0	40.2	73.9	33.9	33.7	Inside
2514.800	PK	46.5	45.7	28.6	2.6	32.2	-	45.5	44.7	75.5	30.0	30.8	Outside
2829.150	PK	42.9	42.8	28.6	2.7	32.0	-	42.2	42.1	73.9	31.7	31.8	Inside
3143.500	PK	42.2	42.2	28.7	2.9	31.9	-	41.9	41.9	75.5	33.6	33.6	Outside

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter) - Gain(Amplifier)

### PK with Duty factor

Frequency [MHz]	Detector	Reading [dBuV]		Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]		Limit [dBuV/m]	Margin [dB]		Remark
		Hor	Ver					Hor	Ver		Hor	Ver	
314.350	PK	77.7	73.6	15.6	10.1	32.0	-5.3	66.1	62.0	75.5	9.4	13.5	Carrier
628.700	PK	32.3	33.4	19.7	12.0	31.9	-5.3	26.8	27.9	55.5	28.7	27.6	Outside
943.050	PK	30.3	30.7	22.7	13.6	30.9	-5.3	30.4	30.8	55.5	25.1	24.7	Outside
1257.400	PK	44.3	43.9	24.6	1.8	34.0	-5.3	31.4	31.0	55.5	24.1	24.5	Outside
1571.750	PK	43.9	44.7	25.4	2.0	33.2	-5.3	32.8	33.6	53.9	21.1	20.3	Inside
1886.100	PK	41.7	42.6	26.0	2.2	32.6	-5.3	32.0	32.9	55.5	23.5	22.6	Outside
2200.450	PK	42.7	42.9	27.2	2.4	32.3	-5.3	34.7	34.9	53.9	19.2	19.0	Inside
2514.800	PK	46.5	45.7	28.6	2.6	32.2	-5.3	40.2	39.4	55.5	15.3	16.1	Outside
2829.150	PK	42.9	42.8	28.6	2.7	32.0	-5.3	36.9	36.8	53.9	17.0	17.1	Inside
3143.500	PK	42.2	42.2	28.7	2.9	31.9	-5.3	36.6	36.6	55.5	18.9	18.9	Outside

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter) - Gain(Amplifier) + Duty factor (Refer to Duty factor data sheet)

\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).

\* The test above 1GHz was performed with PK detect. Average emission measurements were calculated with PK detect and Duty cycle factor.

\* Duty Factor was calculated with the assumption of the worst condition in 100msec.

\* The noise measured with PK detect was pulse emission.

\* No signal detected at 9kHz - 30MHz.

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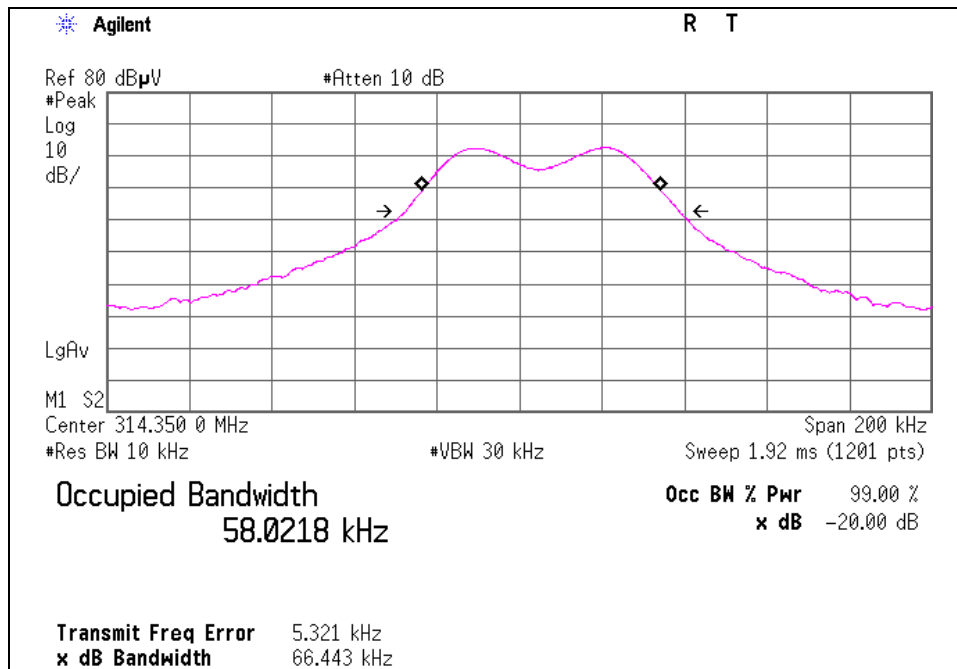
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### -20dB Bandwidth

Test place	Head Office EMC Lab. No.4 Semi Anechoic Chamber
Report No.	32BE0279-HO-01
Date	10/20/2011
Temperature/ Humidity	25 deg.C / 43% RH
Engineer	Kazuya Yoshioka
Mode	Transmitting mode

Bandwidth Limit : Fundamental Frequency     **314.35** MHz x 0.25% =    785.88    kHz

-20dB Bandwidth [kHz]	Bandwidth Limit [kHz]	Result
66.44	785.88	Pass



\*RBW was set at 1 to 5% of Bandwidth Limit (785.88kHz) (RBW=10kHz).

Span was set at 2 to 3.5 times Occupied Bandwidth (Span=200kHz), because this equipment is a narrowband equipment.

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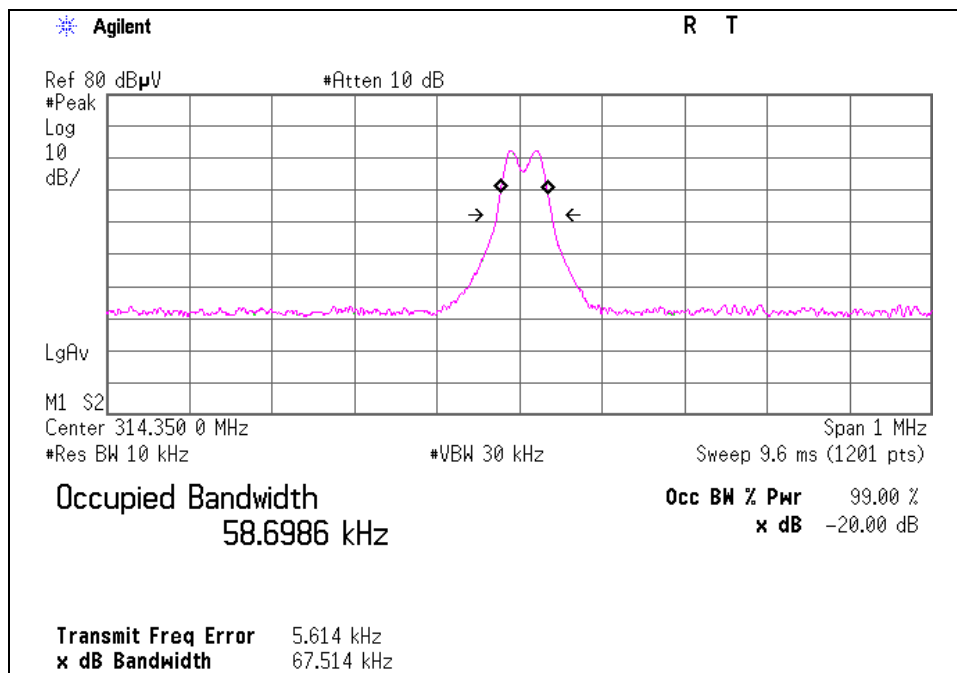
Facsimile : +81 596 24 8124

### 99% Occupied Bandwidth

Test place Head Office EMC Lab. No.4 Semi Anechoic Chamber  
Report No. 32BE0279-HO-01  
Date 10/20/2011  
Temperature/ Humidity 25 deg.C / 43% RH  
Engineer Kazuya Yoshioka  
Mode Transmitting mode

Bandwidth Limit : Fundamental Frequency  $314.35 \text{ MHz} \times 0.25\% = 785.88 \text{ kHz}$

99% Occupied Bandwidth [kHz]	Bandwidth Limit [kHz]	Result
58.70	785.88	Pass



### Duty Cycle

Test place Head Office EMC Lab. No.3 Semi Anechoic Chamber  
Report No. 32BE0279-HO-01  
Date 10/18/2011  
Temperature/ Humidity 26 deg.C / 47% RH  
Engineer Satofumi Matsuyama  
Mode Transmitting mode

Type	Times	ON time(One pulse) [ms]	ON time(in 100ms) [ms]
A	14	1.467	20.54
B	44	0.775	34.10

\*1)ON time(in 100ms) = Times \* ON time(One pulse)

\*2)The train of pulses was exceeding 100msec, and that sampled 100msec was the worst case against the pulse train

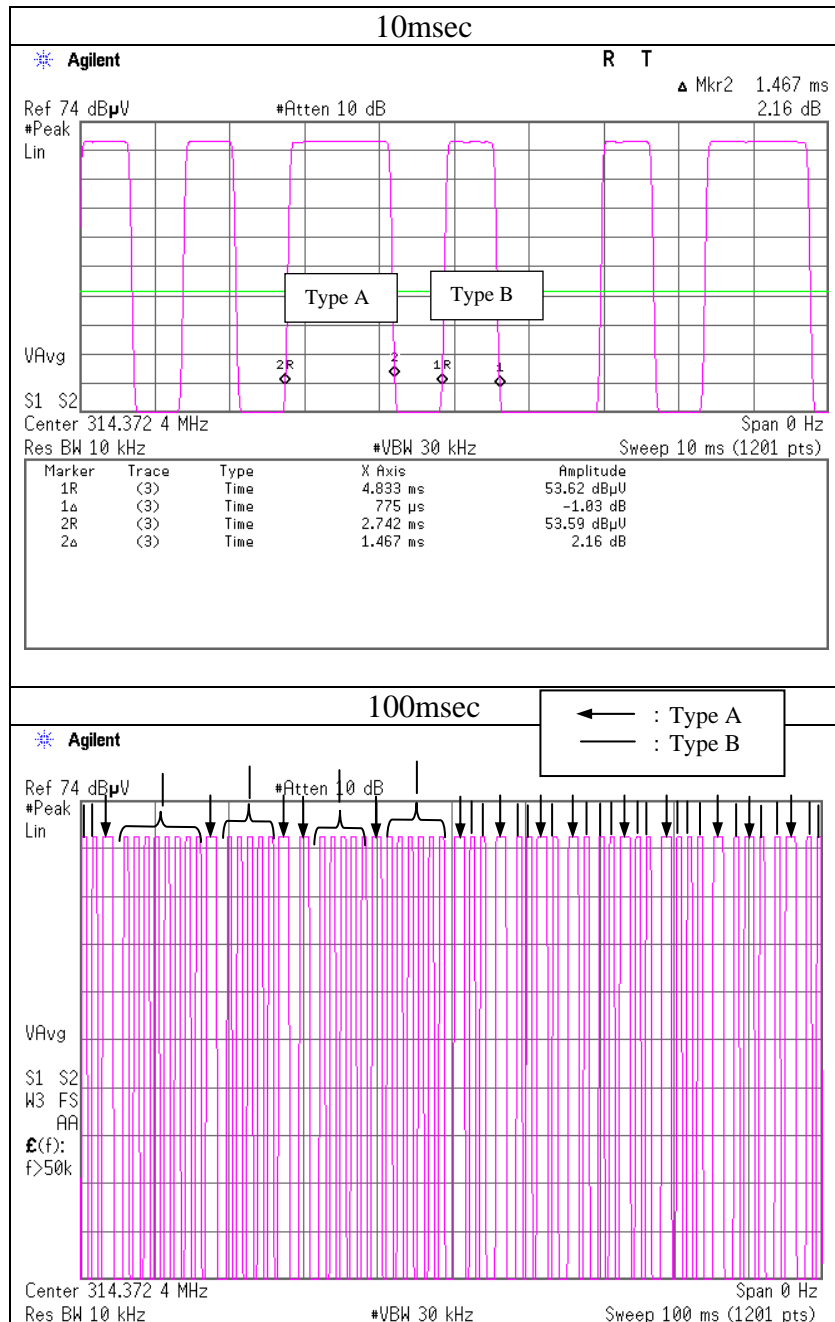
#### **(Total)**

ON time [ms]	Cycle [ms]	Duty (On time/Cycle)	Duty [dB]
54.64	100.00	0.55	-5.3

\*3)ON time = Type A's ON time (in 100ms) + Type B's ON time (in 100ms)

\*4)Duty =  $20\log_{10}(\text{ON time/Cycle})$

## Duty Cycle





## Radiated Emission

### DATA OF RADIATED EMISSION TEST

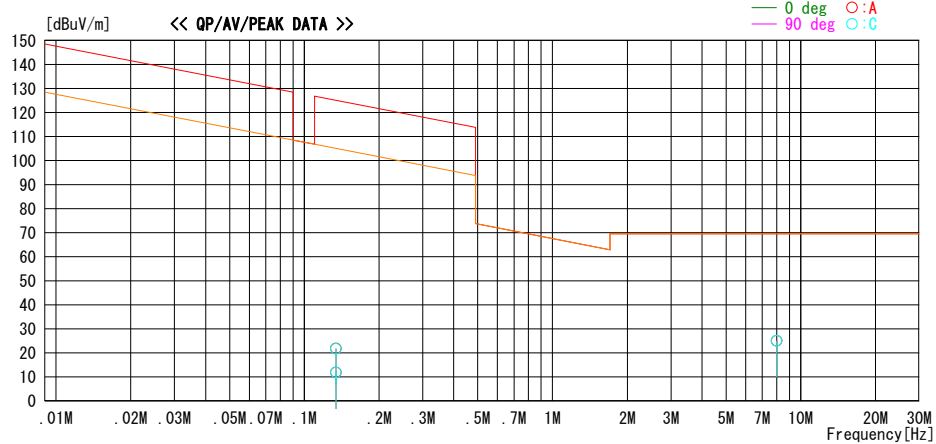
UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber  
Date : 2011/10/21

Report No. : 32BE0279-HO-01

Temp. / Humi. : 22deg. C / 51% RH  
Engineer : Hiroshi Kukita

Mode / Remarks : Receiving mode(134.2kHz), With Mechanical Key, X-axis

LIMIT : FCC15.209(a) 3m, 9-90kHz:PK, 110-490kHz:PK, other:QP  
FCC15.209(a) 3m, 9-90kHz:AV, 110-490kHz:AV, other:QP



Freq.	Reading	DET	Ant. Fac	Loss	Gain	Result	Limit	Margin	Antenna	Table	Comment
[MHz]	[dBuV]		[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[deg]	[deg]	
0.13420	27.0	PEAK	20.8	6.1	32.2	21.7	125.1	103.4	90	C	327
0.13420	27.2	PEAK	20.8	6.1	32.2	21.9	125.1	103.2	0	A	344
0.13420	17.1	AV	20.8	6.1	32.2	11.8	105.1	93.3	0	A	344
0.13420	17.2	AV	20.8	6.1	32.2	11.9	105.1	93.2	90	C	327
8.00000	28.1	QP	22.4	6.7	32.2	25.0	69.5	44.5	0	A	344
8.00000	28.1	QP	22.4	6.7	32.2	25.0	69.5	44.5	90	C	327

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

## Radiated Emission

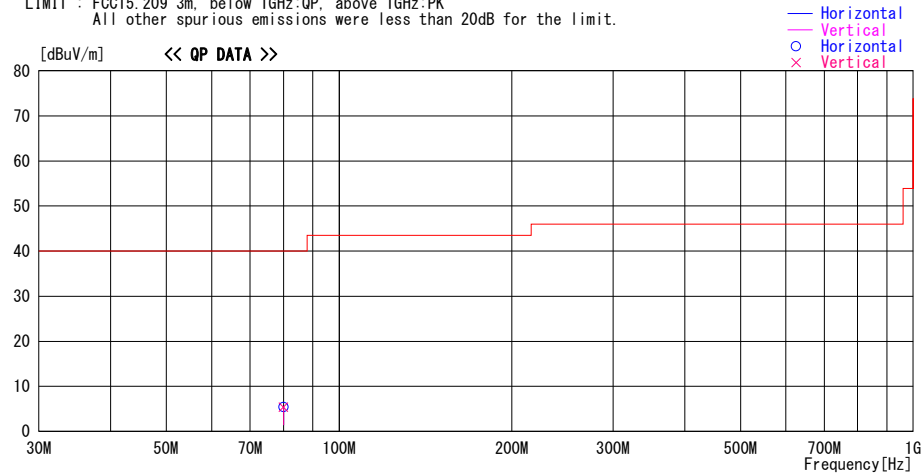
### DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber  
Date : 2011/10/21

Report No. : 32BE0279-HO-01  
Temp./Humi. : 25deg. C / 43% RH  
Engineer : Kazuya Yoshioka

Mode / Remarks : Receiving mode(134.2kHz)

LIMIT : FCC15.209 3m, below 1GHz:QP, above 1GHz:PK  
All other spurious emissions were less than 20dB for the limit.



Frequency	Reading	DET	Antenna	Loss&	Level	Angle	Height	Polar.	Limit	Margin	Comment
			Factor	Gain							
[MHz]	[dBuV]		[dB/m]	[dB]	[dBuV/m]	[Deg]	[cm]		[dBuV/m]	[dB]	
80.000	23.2	QP	6.6	-24.4	5.4	359	300	Hori.	40.0	34.6	
80.000	23.2	QP	6.6	-24.4	5.4	359	100	Vert.	40.0	34.6	

CHART:WITH FACTOR ANT TYPE: -30MHz:LOOP, 30-300MHz:BICONICAL, 300MHz-1000MHz:LOGPERIODIC, 1000MHz-:HORN  
CALCULATION:RESULT = READING + ANT FACTOR + LOSS (CABLE+ATTEN.) - GAIN (AMP)  
NS : No signal detected

## **APPENDIX 2:Test Instruments**

### **EMI test equipment**

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MAEC-03	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE	2011/02/22 * 12
MOS-13	Thermo-Hygrometer	Custom	CTH-180	-	RE	2011/02/23 * 12
MJM-06	Measure	PROMART	SEN1955	-	RE	
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE	-
MSA-10	Spectrum Analyzer	Agilent	E4448A	MY46180655	RE	2011/02/15 * 12
MTR-08	Test Receiver	Rohde & Schwarz	ESCI	100767	RE	2011/08/11 * 12
MBA-03	Biconical Antenna	Schwarzbeck	BBA9106	1915	RE	2010/10/11 * 12
MLA-03	Logperiodic Antenna	Schwarzbeck	USLP9143	174	RE	2010/10/11 * 12
MCC-51	Coaxial cable	UL Japan	-	-	RE	2011/07/15 * 12
MAT-09	Attenuator(6dB)	Weinschel Corp	2	BK7973	RE	2010/11/05 * 12
MPA-13	Pre Amplifier	SONOMA INSTRUMENT	310	260834	RE	2011/03/04 * 12
MAEC-02	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-06902	RE	2011/06/21 * 12
MOS-22	Thermo-Hygrometer	Custom	CTH-201	0003	RE	2011/02/23 * 12
MJM-14	Measure	KOMELON	KMC-36	-	RE	-
MTR-03	Test Receiver	Rohde & Schwarz	ESCI	100300	RE / CE	2011/04/15 * 12
MSA-04	Spectrum Analyzer	Agilent	E4448A	US44300523	RE	2011/04/08 * 12
LP-01	Loop Antenna	Rohde & Schwarz	HFH2-Z2	829425/014	RE	2010/12/08 * 12
MCC-13	Coaxial Cable	Fujikura	3D-2W(12m)/5D-2W(5m)/5D-2W(0.8m)/5D-2W(1m)	-	RE	2011/02/18 * 12
MCC-30	Coaxial cable	UL Japan	-	-	RE	2011/07/28 * 12
MAT-07	Attenuator(6dB)	Weinschel Corp	2	BK7970	RE	2010/11/05 * 12
MAEC-04	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE	2011/03/01 * 12
MOS-15	Thermo-Hygrometer	Custom	CTH-180	-	RE	2011/02/23 * 12
MJM-07	Measure	PROMART	SEN1955	-	RE	-
MSA-03	Spectrum Analyzer	Agilent	E4448A	MY44020357	RE	2010/11/30 * 12
MTR-07	Test Receiver	Rohde & Schwarz	ESCI	100635	RE	2010/10/27 * 12
MBA-05	Biconical Antenna	Schwarzbeck	BBA9106	1302	RE	2011/08/17 * 12
MLA-08	Logperiodic Antenna	Schwarzbeck	UKLP9140-A	N/A	RE	2011/08/17 * 12
MCC-50	Coaxial Cable	UL Japan	-	-	RE	2011/03/25 * 12
MAT-51	Attenuator(6dB)	Weinschel	2	AS3557	RE	2011/01/14 * 12
MPA-14	Pre Amplifier	SONOMA INSTRUMENT	310	260833	RE	2011/03/04 * 12
MHA-21	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	9120D-557	RE	2011/08/11 * 12
MCC-56	Microwave Cable	Suhner	SUCOFLEX104	270875/4(1m) / 284655(5m)	RE	2011/03/02 * 12
MPA-12	MicroWave System Amplifier	Agilent	83017A	MY39500780	RE	2011/03/10 * 12

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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, 99% Occupied Bandwidth, -20dB bandwidth , Automatically deactivate and Duty cycle tests

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