



Test report No. : 10618697H-A-R1  
Page : 1 of 18  
Issued date : May 15, 2015  
Revised date : June 8, 2015  
FCC ID : 2AD4RTRC-SS310

## RADIO TEST REPORT

**Test Report No. : 10618697H-A-R1**

**Applicant** : Tokai Rika Create Corporation

**Type of Equipment** : CONTROLLER, ID KEY

**Model No.** : 7861-93-7164

**FCC ID** : 2AD4RTRC-SS310

**Test regulation** : FCC Part 15 Subpart C: 2015

**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 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 test report covers Radio technical requirements. It does not cover administrative issues such as Manual or non-Radio test related Requirements. (if applicable)
7. This report is a revised version of 10618697H-A. 10618697H-A is replaced with this report.

**Date of test:** April 4 and 5, 2015

**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>

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13-EM-F0429

## **REVISION HISTORY**

## Original Test Report No.: 10618697H-A

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## **SECTION 1: Customer information**

### [Applicant]

Company Name : Tokai Rika Create Corporation  
Address : 2-3-10 Aoi, Higashi-ku, Nagoya, Aichi 461-0004, Japan  
Telephone Number : +81-52-934-2111  
Facsimile Number : +81-52-934-2101  
Contact Person : YOSHIMI NORO

### [Manufacturer]

Company Name : NEC Platforms, Ltd.\*  
Address : 6-1 Asahi-cho, Shiroishi, Miyagi, 989-0294 JAPAN  
Telephone Number : +81-224-25-1354  
Facsimile Number : +81-224-25-1285  
Contact Person : Yuji Iino

### \*Remarks:

Tokai Rika Create Corporation designates NEC Platforms, Ltd. as manufacturer of the product (CONTROLLER ID KEY).

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

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

Type of Equipment : CONTROLLER ID KEY  
Model No. : 7861-93-7164  
Serial No. : Refer to Section 4, Clause 4.2  
Rating : DC12V/24V (common use)  
Receipt Date of Sample : March 23, 2015  
Country of Mass-production : Japan  
Condition of EUT : Production prototype  
(Not for Sale: This sample is equivalent to mass-produced items.)  
Modification of EUT : No Modification by the test lab

### **2.2 Product Description**

Model number: 7861-93-7164 is a ID Key System to compose an antitheft system in the CONTROLLER ID KEY.

### **Radio Specification**

Radio Type : Transmitter  
Frequency of Operation : 134.2kHz  
Modulation : ASK  
Method of Frequency Generation : Crystal  
Antenna type : ID Receiving antenna  
  
Radio Type : Receiver  
Frequency of Operation : 123.2kHz, 134.2kHz  
Modulation : FSK

\* The test of receiver part was performed separately from this test report, and the conformability is confirmed.

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

#### **3.1 Test Specification**

Test Specification : FCC Part 15 Subpart C: 2015, final revised on January 21, 2015  
 Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators  
 Section 15.207 Conducted Emission  
 Section 15.209 Radiated emission limits, general requirements

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

This test was performed with the New Battery (DC 12V/24V) and the constant voltage was supplied to this EUT during the tests. Therefore, this 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 vehicle. Therefore, the equipment complies with the antenna requirement of Section 15.203.

#### **3.2 Procedures and results**

| No. | Item  | Test Procedure   | Specification   | Remarks  | Deviation | Worst margin                        | Results  |
|-----|---|--|---|----------|-----------|-------------------------------------|----------|
| 1   | Conducted Emission                                    | <FCC><br>ANSI C63.4:2009<br>7. AC powerline<br>conducted emission<br>measurements<br><IC><br>RSS-Gen 8.8 | <FCC><br>Section 15.207<br><IC><br>RSS-Gen 8.8                  | -        | N/A *1)   | N/A                                 | N/A      |
| 2   | Electric Field Strength<br>of Fundamental<br>Emission | <FCC><br>ANSI C63.4:2009<br>13. Measurement of<br>intentional radiators<br><IC><br>RSS-Gen 6.4, 6.12     | <FCC><br>Section 15.209<br><IC><br>RSS-210 2.5.1<br>RSS-Gen 8.9 | Radiated | N/A       | 29.9dB<br>0.13420MHz<br>0 deg. AV   | Complied |
| 3   | Electric Field Strength<br>of Spurious Emission       | <FCC><br>ANSI C63.4:2009<br>13. Measurement of<br>intentional radiators<br><IC><br>RSS-Gen 6.4, 6.13     | <FCC><br>Section 15.209<br><IC><br>RSS-210 2.5.1<br>RSS-Gen 8.9 | Radiated | N/A       | 0.5dB<br>35.771MHz,<br>Vertical, QP | Complied |
| 4   | -26dB Bandwidth                                       | <FCC><br>ANSI C63.4:2009<br>13. Measurement of<br>intentional radiators<br><IC><br>-                     | <FCC><br>Reference data<br><IC><br>-                            | Radiated | N/A       | N/A                                 | N/A      |

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 is not the device that is designed to be connected to the public utility (AC) power line.

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### 3.3 Addition to standard

| No. | Item                    | Test Procedure | Specification | Remarks  | Deviation | Worst margin | Results |
|-----|-------------------------|----------------|---------------|----------|-----------|--------------|---------|
| 1   | 99% Occupied Band Width | RSS-Gen 6.6    | -             | Radiated | N/A       | N/A          | N/A     |

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

### 3.4 Uncertainty

#### EMI

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

| Test room<br>(semi-anechoic<br>chamber) | Radiated emission |                 |                |                 |                   |                   |       |
|---|-------------------|-----------------|----------------|-----------------|-------------------|-------------------|-------|
|   | (3m*)(+dB)        |                 |                | (1m*)(+dB)      |                   | (0.5m*)(+dB)      |       |
| 9kHz<br>-30MHz                          | 30MHz<br>-300MHz  | 300MHz<br>-1GHz | 1GHz<br>-10GHz | 10GHz<br>-18GHz | 18GHz<br>-26.5GHz | 26.5GHz<br>-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)

[Electric Field Strength of Fundamental Emission]

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

#### [Electric Field Strength of Spurious Emission]

The data listed in this report meets the limits unless the uncertainty is taken into consideration.

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### 3.5 Test Location

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|                            | 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      | -                      | 8.0 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 Test data, Test instruments, and Test set up

Refer to APPENDIX.

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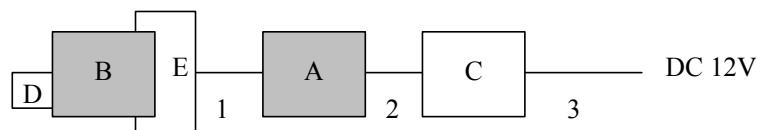
## SECTION 4: Operation of E.U.T. during testing

### 4.1 Operating Modes

| Test mode                    | Remarks |
|------------------------------|---------|
| Continuous Transmitting mode | -       |

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

### 4.2 Configuration and peripherals



- \* Cabling and setup were taken into consideration and test data was taken under worse case conditions.
- \* After the test results of the input voltage DC 12V and DC 24V were compared, the test was made at representative DC 12V since no difference was found among input voltage.
- \* The communication state with the CONTROLLER, ID KEY and the Key with Transponder was also confirmed simultaneously.

#### Description of EUT and Support equipment

| No. | Item                 | Model number | Serial number | Manufacturer        | Remarks |
|-----|----------------------|--------------|---------------|---------------------|---------|
| A   | CONTROLLER, ID KEY   | 7861-93-7164 | 43            | NEC Platforms, Ltd. | EUT     |
| B   | ID Receiving antenna | 7861-93-7140 | 001           | NEC Platforms, Ltd. | EUT     |
| C   | Jig                  | -            | -             | -                   | -       |
| D   | Key with Transponder | 7861-93-7110 | 001           | -                   | -       |
| E   | Key Cylinder         | -            | -             | -                   | -       |

#### List of cables used

| No. | Name          | Length (m) | Shield     |            | Remark |
|-----|---------------|------------|------------|------------|--------|
|     |               |            | Cable      | Connector  |        |
| 1   | Antenna Cable | 0.4        | Unshielded | Unshielded | -      |
| 2   | Signal Cable  | 1.8        | Unshielded | Unshielded | -      |
| 3   | DC Cable      | 1.7        | Unshielded | Unshielded | -      |

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## **SECTION 5: Radiated emission (Fundamental and Spurious Emission)**

### **Test Procedure**

EUT was placed on a urethane platform of nominal size, 0.5m by 1.0m, raised 0.8m above the conducting ground plane. The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with a ground plane.

Frequency : From 9kHz to 30MHz

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

The measurements were performed for vertical polarization (antenna angle: 0deg., 45deg., 90deg., 135 deg., and 180deg.) and horizontal polarization.

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

Frequency : From 30MHz to 1GHz

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.

The test was made with the detector (RBW/VBW) in the following table.

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

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

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

| Frequency       | 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 | Above 1GHz             |
|-----------------|--|----------------------|-----------------------|----------------------|--------------------|------------------------|
| Instrument used | Test Receiver                                |                      |                       |                      |                    | Spectrum Analyzer      |
| Detector        | PK/AV  | QP                   | PK/AV                 | QP                   | QP                 | PK AV                  |
| IF Bandwidth    | 200Hz  | 200Hz                | 9kHz                  | 9kHz                 | 120kHz             | RBW: 1MHz<br>VBW: 3MHz |
| Test Distance   | 3m *1)                                       | 3m *1)               | 3m *1)                | 3m *2)               | 3m                 | 3m 3m                  |

\*1) Distance Factor:  $40 \times \log(3m/300m) = -80dB$

\*2) Distance Factor:  $40 \times \log(3m/30m) = -40dB$

Although these tests were performed other than open field test site, adequate comparison measurements were confirmed against 30 m open field test site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 937606.

These tests were performed in semi anechoic chamber. Therefore the measured level of emissions may be higher than if measurements were made without a ground plane.

However test results were confirmed to pass against standard limit.

- The carrier level and 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.

- This EUT has two modes which a key with transponder is inserted or not. The worst case was confirmed insert and not insert a key with transponder, as a result, the test not insert a key with transponder was the worst case. Therefore the test not insert a key with transponder was performed only.

- This EUT has two modes which it has key cylinder or does not have a key cylinder. Although the level was confirmed at each mode, no difference was found between each mode.

The test results and limit are rounded off to one decimal place, so some differences might be observed.

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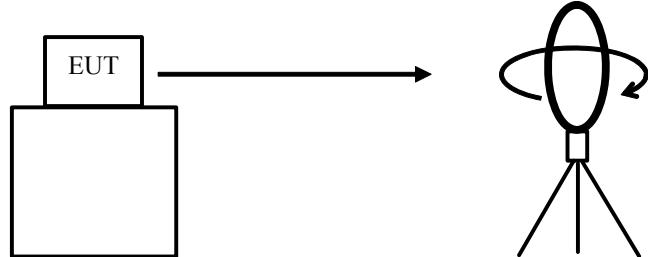
Facsimile : +81 596 24 8124

Measurement range : 9kHz-1GHz  
Test data : APPENDIX 1  
Test result : Pass

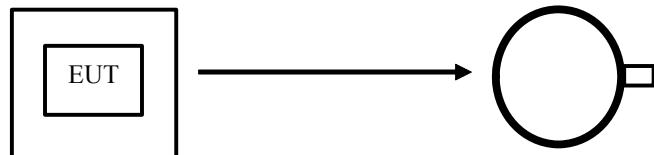
Date: April 4 and 5, 2015 Test engineer: Masatoshi Nishiguchi

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

*Side View (Vertical)*

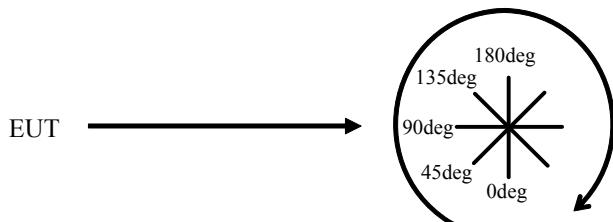


*Top View (Horizontal)*



Antenna was not rotated.

*Top View (Vertical)*



Front side: 0 deg.  
Forward direction: clockwise

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## **SECTION 6: -26dB Bandwidth**

### **Test Procedure**

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

| <b>Test</b>     | <b>Span</b> | <b>RBW</b> | <b>VBW</b> | <b>Sweep</b> | <b>Detector</b> | <b>Trace</b> | <b>Instrument used</b> |
|-----------------|-------------|------------|------------|--------------|-----------------|--------------|------------------------|
| -26dB Bandwidth | 100kHz      | 1kHz       | 3.3kHz     | Auto         | Peak            | Max Hold     | Spectrum Analyzer      |

**Test data** : APPENDIX 1  
**Test result** : Pass

## **SECTION 7: 99% Occupied Bandwidth**

### **Test Procedure**

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

| <b>Test</b>            | <b>Span</b>                            | <b>RBW</b>  | <b>VBW</b>         | <b>Sweep</b> | <b>Detector</b> | <b>Trace</b> | <b>Instrument used</b> |
|------------------------|--|-------------|--------------------|--------------|-----------------|--------------|------------------------|
| 99% Occupied Bandwidth | Enough width to display 20dB Bandwidth | 1 % of Span | Three times of RBW | Auto         | Peak            | Max Hold     | Spectrum Analyzer      |

Peak hold was applied as Worst-case measurement.

**Test data** : APPENDIX 1  
**Test result** : Pass

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## APPENDIX 1: Test data

### Radiated Emission below 30MHz (Fundamental and Spurious Emission)

Test place Ise EMC Lab. No.1 Semi Anechoic Chamber  
 Order No. 10618697H  
 Date 04/05/2015  
 Temperature/ Humidity 23 deg. C / 51% RH  
 Engineer Masatoshi Nishiguchi  
 Mode Tx 134.2kHz

#### PK or QP

| Ant Deg [deg] | 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      |
|---------------|-----------------|----------|----------------|-------------------|-----------|-----------|------------------|-----------------|----------------|-------------|-------------|
| 0             | 0.13420         | PK       | 81.8           | 19.6              | -74.0     | 32.3      | -                | -4.9            | 45.0           | 49.9        | Fundamental |
| 0             | 0.26840         | PK       | 43.0           | 19.6              | -73.9     | 32.2      | -                | -43.5           | 39.0           | 82.5        |             |
| 0             | 0.40260         | PK       | 46.1           | 19.6              | -73.9     | 32.2      | -                | -40.4           | 35.5           | 75.9        |             |
| 0             | 0.53680         | QP       | 33.0           | 19.5              | -33.9     | 32.2      | -                | -13.6           | 33.0           | 46.6        |             |
| 0             | 0.67100         | QP       | 32.2           | 19.5              | -33.8     | 32.2      | -                | -14.3           | 31.1           | 45.4        |             |
| 0             | 0.80520         | QP       | 31.5           | 19.5              | -33.8     | 32.2      | -                | -15.0           | 29.5           | 44.5        |             |
| 0             | 0.93940         | QP       | 33.1           | 19.5              | -33.8     | 32.2      | -                | -13.4           | 28.1           | 41.5        |             |
| 0             | 1.07360         | QP       | 31.2           | 19.5              | -33.8     | 32.2      | -                | -15.3           | 26.9           | 42.2        |             |
| 0             | 1.20780         | QP       | 32.5           | 19.5              | -33.7     | 32.2      | -                | -13.9           | 25.9           | 39.8        |             |
| 0             | 1.34200         | QP       | 30.9           | 19.5              | -33.7     | 32.2      | -                | -15.5           | 25.0           | 40.5        |             |

Result = Reading + Ant Factor + Loss (Cable + Attenuator + Filter + D.Factor) - Gain(Amprifier)

#### PK with Duty factor

| Ant Deg [deg] | 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 |
|---------------|-----------------|----------|----------------|-------------------|-----------|-----------|------------------|-----------------|----------------|-------------|--------|
| 0             | 0.13420         | AV       | 81.8           | 19.6              | -74.0     | 32.3      | 0.0              | -4.9            | 25.0           | 29.9        |        |
| 0             | 0.26840         | AV       | 43.0           | 19.6              | -73.9     | 32.2      | 0.0              | -43.5           | 19.0           | 62.5        |        |
| 0             | 0.40260         | AV       | 46.1           | 19.6              | -73.9     | 32.2      | 0.0              | -40.4           | 15.5           | 55.9        |        |

Result = Reading + Ant Factor + Loss (Cable + Attenuator + Filter + D.Factor) - Gain(Amprifier) + Duty factor \*

\* Since the peak emission result satisfied the average limit, duty factor was omitted.

Although Duty of this product was 100% or less, the result of AV (PK with Duty factor) was calculated by applying Duty 100% as worst.

#### Result of the fundamental emission at 3m without Distance factor

#### PK or QP

| Ant Deg [deg] | 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      |
|---------------|-----------------|----------|----------------|-------------------|-----------|-----------|------------------|-----------------|----------------|-------------|-------------|
| 0             | 0.13420         | PK       | 81.8           | 19.6              | 6.0       | 32.3      | -                | 75.1            | -              | -           | Fundamental |

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

\* All spurious emissions lower than this result.

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

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## Radiated Emission above 30MHz (Spurious Emission)

### DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Ise EMC Lab. No. 2 Semi Anechoic Chamber

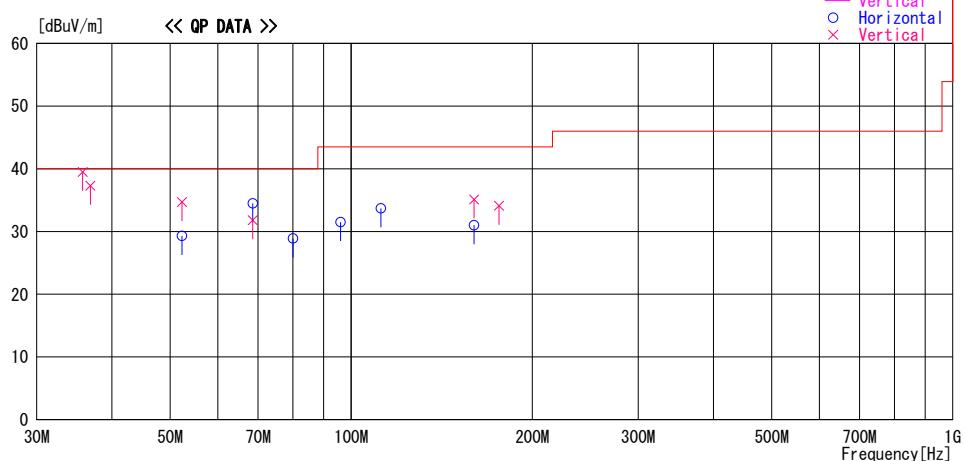
Date : 2015/04/04

Report No. : 10618697H

Temp./Humi. : 19deg. C / 39% RH  
 Engineer : Masatoshi Nishiguchi

Mode / Remarks : Tx 134.2kHz Worst-axis(Ant Hori:X Vert:Y ECU Hori:Y Vert:Y)

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



| Frequency<br>[MHz] | Reading<br>[dBuV] | DET | Antenna          | Loss&<br>Gain | Level<br>[dBuV/m] | Angle<br>[Deg] | Height<br>[cm] | Polar. | Limit<br>[dBuV/m] | Margin<br>[dB] | Comment |
|--------------------|-------------------|-----|------------------|---------------|-------------------|----------------|----------------|--------|-------------------|----------------|---------|
|                    |                   |     | Factor<br>[dB/m] | [dB]          |                   |                |                |        |                   |                |         |
| 35.771             | 45.6              | QP  | 15.6             | -21.7         | 39.5              | 0              | 100            | Vert.  | 40.0              | 0.5            |         |
| 36.848             | 43.7              | QP  | 15.3             | -21.7         | 37.3              | 69             | 100            | Vert.  | 40.0              | 2.7            |         |
| 52.316             | 40.8              | QP  | 10.0             | -21.5         | 29.3              | 163            | 369            | Hori.  | 40.0              | 10.7           |         |
| 52.315             | 46.2              | QP  | 10.0             | -21.5         | 34.7              | 77             | 100            | Vert.  | 40.0              | 5.3            |         |
| 68.583             | 49.1              | QP  | 6.6              | -21.2         | 34.5              | 359            | 400            | Hori.  | 40.0              | 5.5            |         |
| 68.579             | 46.4              | QP  | 6.6              | -21.2         | 31.8              | 105            | 100            | Vert.  | 40.0              | 8.2            |         |
| 80.012             | 43.7              | QP  | 6.3              | -21.1         | 28.9              | 140            | 174            | Hori.  | 40.0              | 11.1           |         |
| 96.008             | 43.1              | QP  | 9.3              | -20.9         | 31.5              | 165            | 300            | Hori.  | 43.5              | 12.0           |         |
| 112.012            | 42.6              | QP  | 11.8             | -20.7         | 33.7              | 312            | 274            | Hori.  | 43.5              | 9.8            |         |
| 160.015            | 35.7              | QP  | 15.4             | -20.1         | 31.0              | 152            | 267            | Hori.  | 43.5              | 12.5           |         |
| 160.023            | 39.8              | QP  | 15.4             | -20.1         | 35.1              | 258            | 100            | Vert.  | 43.5              | 8.4            |         |
| 176.027            | 37.9              | QP  | 16.2             | -20.0         | 34.1              | 116            | 100            | Vert.  | 43.5              | 9.4            |         |

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

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

**UL Japan, Inc.**

**Ise EMC Lab.**

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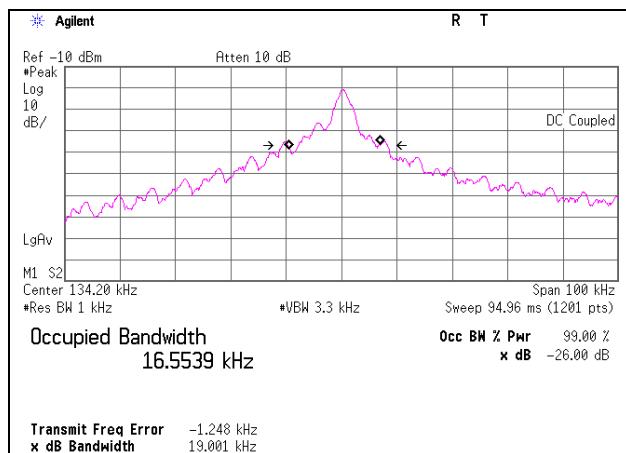
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### **-26dB Bandwidth and 99% Occupied Bandwidth**

Test place Ise EMC Lab. No.1 Semi Anechoic Chamber  
Order No. 10618697H  
Date 04/05/2015  
Temperature/ Humidity 23 deg. C / 51% RH  
Engineer Masatoshi Nishiguchi  
Mode Tx 134.2kHz

| Mode        | Frequency<br>[kHz] | -26dB<br>Bandwidth<br>[kHz] | 99% Occupied<br>Bandwidth<br>[kHz] |
|-------------|--------------------|-----------------------------|------------------------------------|
| Tx 134.2kHz | 134.2              | 19.001                      | 16.5539                            |



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## APPENDIX 2: Test instruments

### EMI test equipment

| Control No. | Instrument                 | Manufacturer        | Model No   | Serial No             | Test Item | Calibration Date *<br>Interval(month) |
|-------------|----------------------------|---------------------|--|-----------------------|-----------|---------------------------------------|
| MAEC-02     | Semi Anechoic Chamber(NSA) | TDK                 | Semi Anechoic Chamber 3m   | DA-06902              | RE        | 2014/06/25 * 12                       |
| MOS-22      | Thermo-Hygrometer          | Custom              | CTH-201  | 0003                  | RE        | 2015/01/13 * 12                       |
| MJM-14      | Measure                    | KOMELON             | KMC-36   | -                     | RE        | -                                     |
| COTS-MEMI   | EMI measurement program    | TSJ                 | TEPTO-DV   | -                     | RE        | -                                     |
| MRENT-116   | Spectrum Analyzer          | Agilent             | E4440A   | MY46187620            | RE        | 2015/03/09 * 12                       |
| MTR-03      | Test Receiver              | Rohde & Schwarz     | ESCI   | 100300                | RE        | 2014/06/03 * 12                       |
| MBA-02      | Biconical Antenna          | Schwarzbeck         | BBA9106  | VHA91032008           | RE        | 2014/10/18 * 12                       |
| MLA-04      | Logperiodic Antenna        | Rohde & Schwarz     | ESLP9145   | 1                     | RE        | Pre Check                             |
| MCC-12      | Coaxial Cable              | Fujikura/Agilent    | -  | -                     | RE        | 2015/02/06 * 12                       |
| MAT-07      | Attenuator(6dB)            | Weinschel Corp      | 2  | BK7970                | RE        | 2014/11/11 * 12                       |
| MPA-09      | Pre Amplifier              | Agilent             | 8447D  | 2944A10845            | RE        | 2014/09/26 * 12                       |
| MAEC-01     | Semi Anechoic Chamber(NSA) | TDK                 | Semi Anechoic Chamber 10m  | DA-06881              | RE        | 2014/09/01 * 12                       |
| MOS-27      | Thermo-Hygrometer          | CUSTOM              | CTH-201  | A08Q26                | RE        | 2015/01/13 * 12                       |
| MJM-21      | Measure                    | KOMELON             | KMC-36   | -                     | RE        | -                                     |
| MTR-09      | EMI Test Receiver          | Rohde & Schwarz     | ESU26  | 100412                | RE        | 2014/06/06 * 12                       |
| MLPA-01     | Loop Antenna               | Rohde & Schwarz     | HFH2-Z2  | 100017                | RE        | 2014/10/04 * 12                       |
| MCC-143     | Coaxial Cable              | UL Japan            | -  | -                     | RE        | 2014/07/28 * 12                       |
| MCC-03      | Coaxial Cable              | Fujikura/Suhner/TSJ | 5D-2W(20m)/<br>3D-2W(7.5m)/<br>RG400u(1.5m)<br>/RFM-E421(Switcher) | -/01068<br>(Switcher) | RE        | 2014/09/12 * 12                       |
| MPA-13      | Pre Amplifier              | SONOMA INSTRUMENT   | 310  | 260834                | RE        | 2015/03/10 * 12                       |
| MAT-08      | Attenuator(6dB)            | Weinschel Corp      | 2  | BK7971                | RE        | 2014/11/20 * 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: Spurious emission**

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