



# **RADIO TEST REPORT**

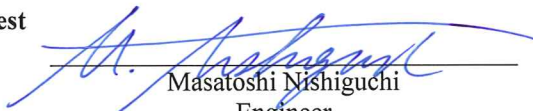
**Test Report No. : 10618697H-A-R1**

**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

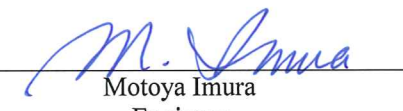
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6. This test report covers Radio technical requirements. It does not cover administrative issues such as Manual or non-Radio test related Requirements. (if applicable)
7. This report is a revised version of 10618697H-A. 10618697H-A is replaced with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

### **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> ANSI C63.4:2009 7. AC powerline conducted emission measurements <IC> RSS-Gen 8.8	<FCC> Section 15.207 <IC> RSS-Gen 8.8	-	N/A *1)	N/A	N/A
2	Electric Field Strength of Fundamental Emission	<FCC> ANSI C63.4:2009 13. Measurement of intentional radiators <IC> RSS-Gen 6.4, 6.12	<FCC> Section 15.209 <IC> RSS-210 2.5.1 RSS-Gen 8.9	Radiated	N/A	29.9dB 0.13420MHz 0 deg. AV	Complied
3	Electric Field Strength of Spurious Emission	<FCC> ANSI C63.4:2009 13. Measurement of intentional radiators <IC> RSS-Gen 6.4, 6.13	<FCC> Section 15.209 <IC> RSS-210 2.5.1 RSS-Gen 8.9	Radiated	N/A	0.5dB 35.771MHz, Vertical, QP	Complied
4	-26dB Bandwidth	<FCC> ANSI C63.4:2009 13. Measurement of intentional radiators <IC> -	<FCC> Reference data <IC> -	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 (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)

[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.

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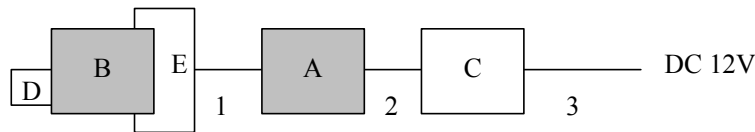
## SECTION 4: Operation of E.U.T. during testing

### 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 VBW: 3MHz	RBW: 1MHz VBW: 10Hz
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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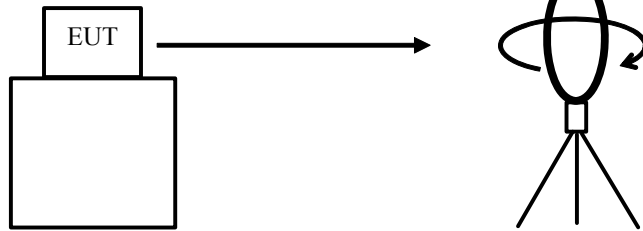
Facsimile : +81 596 24 8124

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

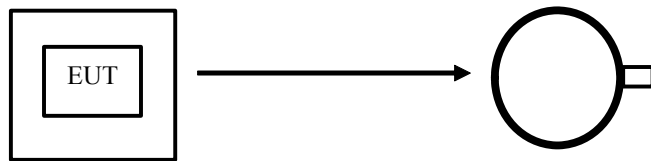
Date: April 4 and 5, 2015 Test engineer: Masatoshi Nishiguchi

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

*Side View (Vertical)*

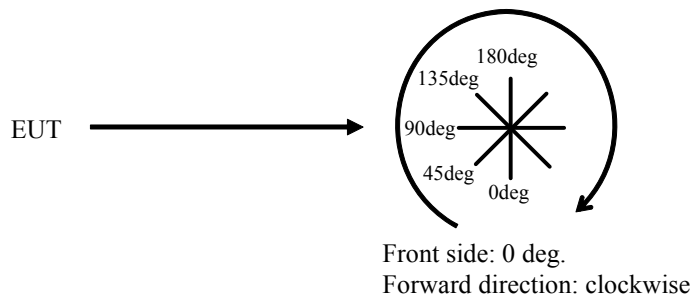


*Top View (Horizontal)*



Antenna was not rotated.

*Top View (Vertical)*



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

Test	Span	RBW	VBW	Sweep	Detector	Trace	Instrument used
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

## 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(Amplifier)

#### 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(Amplifier) + 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(Amplifier)

\* 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.

## Radiated Emission above 30MHz (Spurious Emission)

### DATA OF RADIATED EMISSION TEST

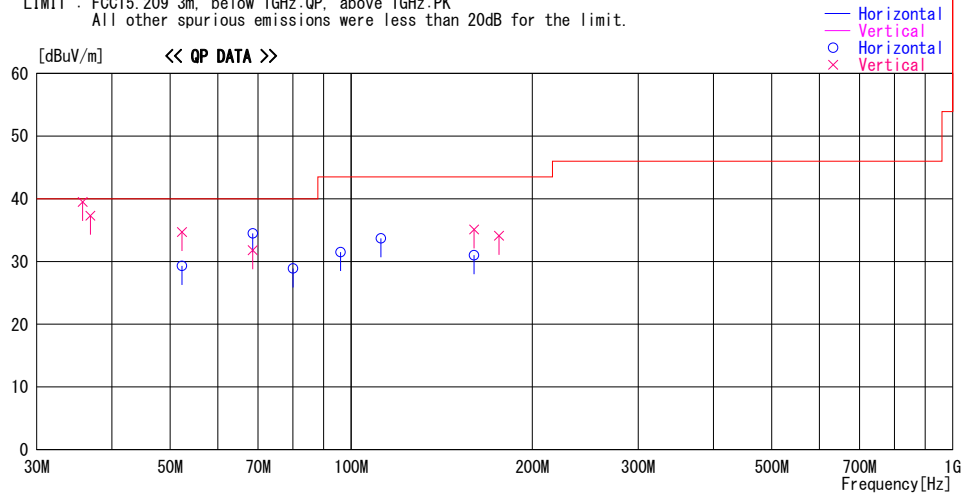
UL Japan, Inc. Ise EMC Lab. No.2 Semi Anechoic Chamber  
Date : 2015/04/04

Report No. : 10618697H

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

Mode / Remarks : Tx 134.2kHz Worst-axis(Ant Hori:X Vert:X 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	Reading	DET	Antenna		Level	Angle	Height	Polar.	Limit	Margin	Comment
			Factor	Loss& Gain							
[MHz]	[dBuV]		[dB/m]	[dB]	[dBuV/m]	[Deg]	[cm]		[dBuV/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.

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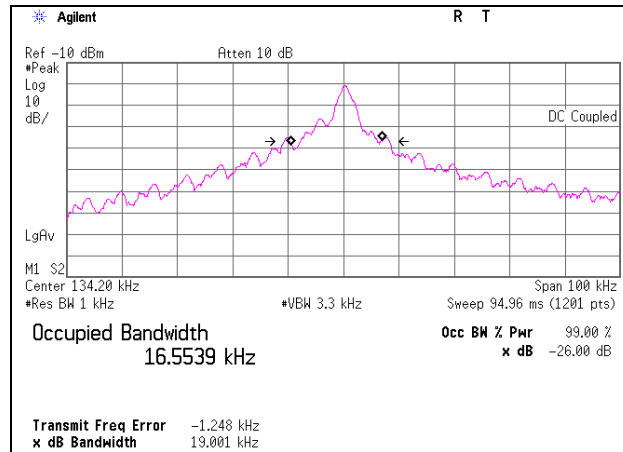
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### -26dB Bandwidth and 99% Occupied Bandwidth

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 [kHz]	-26dB Bandwidth [kHz]	99% Occupied Bandwidth [kHz]
Tx 134.2kHz	134.2	19.001	16.5539



## **APPENDIX 2: Test instruments**

### **EMI test equipment**

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MAEC-02	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-06902	RE	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)/ 3D-2W(7.5m)/ RG400u(1.5m) /RFM-E421(Switcher)	-/01068 (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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