



Test report No. : 10759120Y-A-R5  
Page : 1 of 17  
FCC ID : OUCGFM-H001  
Issued date : May 18, 2015  
Revised date : July 7, 2015

# EMI TEST REPORT

**Test Report No. : 10759120Y-A-R5**

**Applicant:** OMRON Automotive Electronics Co. Ltd.  
**Type of Equipment:** WIRELESS CHARGER  
**Model No.:** GFM-H001  
**FCC ID:** OUCGFM-H001  
**Test regulation:** FCC Part 18:2002  
**Test result:** Complied

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the limits of the above regulation.
4. The test results in this test report are traceable to the national or international standards.
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6. The opinions and the interpretations to the result of the description in this report are outside scopes where UL Japan has been accredited.
7. This test report covers EMC technical requirements. It does not cover administrative issues such as Manual or non-EMC test related Requirements. (if applicable)
8. This report is a revised version of 10759120Y-A-R4. 10759120Y-A-R4 is replaced with this report.

**Date of test:**

April 22 and July 1, 2015

**Representative  
test engineer:**

Hiroyuki Furutaka

Engineer

Consumer Technology Division

**Approved by:**

Takashi Nakazawa

Manager

Consumer Technology Division



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

**UL Japan, Inc.**  
**Yokowa EMC Lab.**

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13-EM-F0429

# REVISION HISTORY

## Original Test Report No.: 10759120Y-A

Revision	Test report No.	Date	Page revised	Contents
- (Original)	10759120Y-A	May 18, 2015	-	-
1	10759120Y-A-R1	June 16, 2015	All pages	Addition of FCC ID.
2	10759120Y-A-R2	June 30, 2015	P. 4	Addition of Rated Output Power.
2	10759120Y-A-R2	June 30, 2015	P.11, 12	Correction of formula for calculation and recalculation by corrected formula.
2	10759120Y-A-R2	June 30, 2015	P.11, 12	Correction of sentence for 30m Reading
2	10759120Y-A-R2	June 30, 2015	P.12	Correction of Extrapolation factor.
3	10759120Y-A-R3	July 2, 2015	P. 13, 15	Correction of formula of CALCULATION (Result) and Extrapolation Factor. And, correction of Extrapolation Factor.
3	10759120Y-A-R3	July 2, 2015	P.1, 8, 9, 12, 14, 16, 17	Addition of items about radiated emission (frequency range from 30 MHz to 400 MHz).
4	10759120Y-A-R4	July 6, 2015	P. 4	Addition of clock frequency.
4	10759120Y-A-R4	July 6, 2015	P. 5	Addition of note for Radiated emission.
5	10759120Y-A-R5	July 7, 2015	P. 9	Addition of sentence for KDB 937606.

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## **Section 1: Customer information**

Company Name : OMRON Automotive Electronics Co. Ltd.  
Brand Name : OMRON  
Address : 3-19-15 Motoimaizumi Utsunomiya, Tochigi-ken, 321-0954 Japan  
Telephone Number : +81 28 634 6802  
Facsimile Number : +81 28 634 6804  
Contact Person : Takayuki Kamijima

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

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

Type of equipment : WIRELESS CHARGER  
Trade name : OMRON  
Model No. : GFM-H001  
Serial No. : 2  
Rating : DC 12 V  
Country of Mass-production : Japan  
Condition of EUT : Production prototype  
(Not for Sale: This sample is equivalent to mass-produced items.)  
Size : 133 x 176 x 32 (Width x Length x Height (mm))  
Modification of EUT : No modification by the test lab.  
Receipt Date of Sample : April 21, 2015

### **2.2 Product description**

Model: GFM-H001 (referred to as the EUT in this report) is a wireless charger in vehicle.  
The clock frequencies used in the EUT: 8 MHz, 20 MHz

Operating Frequency : 111 kHz, 114.5 kHz  
Rated Output Power : 20 W

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### **Section 3: Test specification, procedures and results**

#### **3.1 Test Specification**

Test Specification : FCC Part 18 2002  
Title : FCC 47CFR Part18 Industrial, scientific, and medical equipment

#### **3.2 Procedures & results**

<b>Item</b>	<b>Test Procedure &amp; Limits</b>	<b>Deviation</b>	<b>Worst margin</b>	<b>Result</b>
Radiated emission	Section 18.305 FCC/OST MP-5	N/A *1)	5.6 dB (1.66304 MHz, 45 deg.)	Complied
Conducted emission	Section 18.307 FCC/OST MP-5	N/A *2)	N/A	N/A

\*Note: UL Japan, Inc.'s EMI Work Procedure 13-EM-W0420 and 13-EM-W0424.

\*1) Measurements were limited up to 400 MHz since the highest frequency of internal source of the EUT is 20 MHz.

\*2) 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 Confirmation**

**UL Japan, Inc. hereby confirms that E.U.T., in the configuration tested, complies with the specifications FCC Part 18:2002.**

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### 3.5 Uncertainty

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

(Test date: April 22, 2015)		Open area test site			Shielded room			
		No.1	No.2	No.3	No.1	No.2	No.3	No.7
		(±)	(±)	(±)	(±)	(±)	(±)	(±)
<b>Radiated disturbance</b>								
3 m	9 kHz - 30 MHz	3.4 dB	4.4 dB	3.7 dB	-	-	-	-

(Test date: July 1, 2015)		Open area test site			Shielded room			
		No.1	No.2	No.3	No.1	No.2	No.3	No.7
		(±)	(±)	(±)	(±)	(±)	(±)	(±)
<b>Radiated disturbance</b>								
3 m	30 MHz - 300 MHz	4.9 dB	5.1 dB	5.0 dB	-	-	-	-
	300 MHz - 1000 MHz	5.1 dB	5.2 dB	5.2 dB	-	-	-	-
	1 GHz - 18 GHz	5.1 dB	5.4 dB	5.8 dB	-	-	-	-
10 m	9 kHz - 30 MHz	3.2 dB	4.0 dB	3.3 dB	-	-	-	-
	30 MHz - 300 MHz	4.9 dB	5.1 dB	5.0 dB	-	-	-	-
	300 MHz - 1000 MHz	5.1 dB	5.1 dB	5.2 dB	-	-	-	-
	1 GHz - 18 GHz	5.0 dB	5.3 dB	5.7 dB	-	-	-	-

#### Radiated emission test

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

### 3.6 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 open area test site	2973A-1	-	40 x 20	-
No.2 open area test site	2973A-2	-	20 x 18	-
No.3 open area test site	2973A-3	-	20 x 18	-
No.1 shielded room	-	5.5 x 6.4 x 2.7	5.5 x 6.4	-
No.2 shielded room	-	4.5 x 3.6 x 2.7	4.5 x 3.6	-
No.3 shielded room	-	3.6 x 7.2 x 2.4	3.6 x 7.2	-
No.4 shielded room	-	5.5 x 5.0 x 2.4	4.35 x 3.35	-
No.5 shielded room	-	5.5 x 4.3 x 2.5	5.54 x 3.0	-
No.6 shielded room	-	5.2 x 3.2 x 2.9	5.2 x 3.2	-
No.7 shielded room	-	9.3 x 3.4 x 2.7	9.3 x 3.4	-
No.1 EMS lab. (Full-anechoic chamber)	-	5.0 x 8.0 x 3.5	-	-
No.2 EMS lab. (Full-anechoic chamber)	-	4.0 x 7.0 x 3.5	-	-

### 3.7 Test setup, Data of EMI & Test instruments

Refer to Appendix 1 to 3.

#### **UL Japan, Inc. Yokowa EMC Lab.**

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

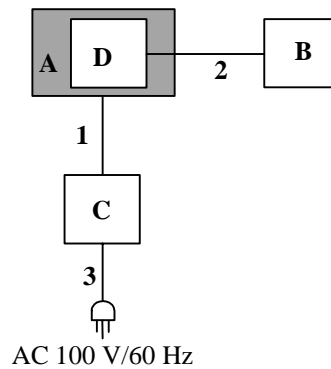
### 4.1 Operating modes

The EUT exercise program used during testing was designed to exercise the various system components in a manner similar to typical use.

Test sequence is used: Charging (Operating Frequency: 111 kHz , 114.5 kHz)

Justification: The system was configured in typical fashion (as a customer 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.

#### Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remark
A	WIRELESS CHARGER	GFM-H001	2	OMRON Automotive Electronics Co. Ltd.	EUT
B	Dummy Load	-	-	-	-
C	DC Power Supply	PAD55-20L	10041675	Kikusui	-
D	Wireless Receiver	HPA764 REV C	bp51013BEVM-764	Texas Instruments	-

#### List of cables used

No.	Name	Length (m)	Cable Shield	Connector Shield	Remark
1	DC Cable	1.3	Unshielded	Unshielded	-
2	DC Cable	0.12	Unshielded	Unshielded	-
3	AC Cable	3.0	Unshielded	Unshielded	3 wire

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## **Section 5: Radiated emission**

### **5.1 Operating environment**

This test was carried out in open area test site.

Temperature : See data

Humidity : See data

### **5.2 Test configuration**

#### **Below 30 MHz**

EUT was placed on a table which was consisted by wooden, polyethylene foam and polycarbonate of nominal size, 1 m by 2 m raised 1m above the conducting ground plane.

The rear of EUT and its peripherals was aligned and flushed with rear of tabletop.

Test was made with the antenna positioned in 0 deg., 45 deg., 90 deg., 135 deg. and Horizontal position.

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.

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

#### **Above 30 MHz**

EUT was placed on a table which was consisted by wooden, polyethylene foam and polycarbonate of nominal size, 1 m by 2 m raised 1.0 m above the conducting ground plane.

The rear of EUT and its peripherals was aligned and flushed with rear of tabletop.

The measurements were performed for vertical or horizontal antenna polarization or both as necessary. 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.

### **5.3 Test conditions**

Frequency range : 0.009 MHz - 400 MHz

Test distance : 3 m, 30 m (0.009 MHz - 30 MHz)

3 m, 10 m (30 MHz - 400 MHz)

EUT position : Table top



#### 5.4 Test procedure

The Radiated Electric Field Strength intensity has been measured on an open test site with a ground plane at a distance of 3 m\*.

\* Measuring distance

- The boundary of the EUT is defined by an imaginary straight-line periphery describing a simple geometric configuration encompassing the EUT.
- The boundary of the EUT is defined by an imaginary circular periphery.
- This test report use worse case for the setup.

Pre check measurements were performed in shielded room with a search coil at 9 kHz - 400 MHz to distinguish disturbances of EUT from the ambient noise.

##### Below 30 MHz

The height of antenna was fixed in 2 m.

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

The measurements were performed in 0 deg., 45 deg., 90 deg., 135 deg. and Horizontal with the test receiver.

Maximum electric field intensity was confirmed with the measurements at distances of 3 m and 30 m.

The electric field intensity at a distance of 300 m was calculated from the measurement results at distances of 3 m and 30 m.

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

##### Above 30 MHz

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

The measurements were performed for vertical or horizontal antenna polarization or both as necessary.

Maximum electric field intensity was confirmed with the measurements at distances of 3 m and 10 m.

The electric field intensity at a distance of 300 m was calculated from the measurement results at distances of 3 m and 10 m.

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

Frequency	9 kHz - 150 kHz	150 kHz - 30 MHz	30 MHz - 400 MHz
Instrument used	Test Receiver		
IF Bandwidth	AV: 200 Hz	AV: 9 kHz	AV: 120 kHz

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 open area test site (with ground plane). 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.

#### 5.5 Results

Summary of the test results: Pass

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### UL Japan, Inc. Yokowa EMC Lab.

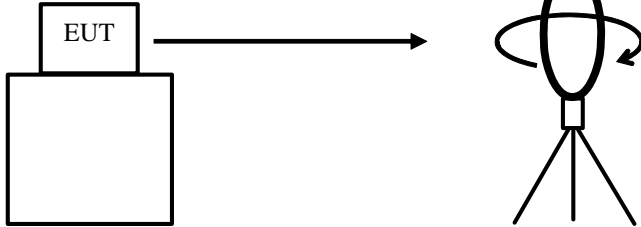
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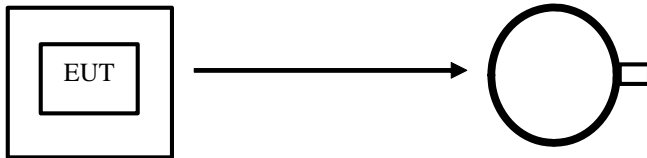
Facsimile: +81 596 39 0232

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

*Side View (Vertical)*

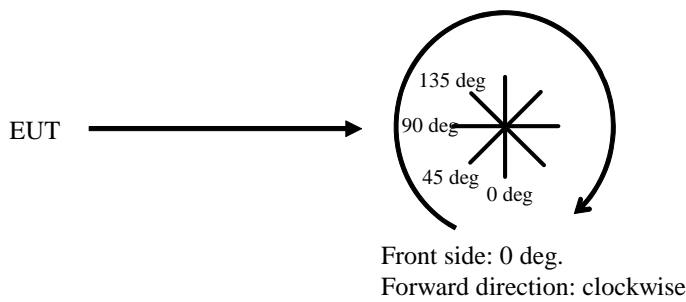


.....  
*Top View (Horizontal)*



Antenna was not rotated.

.....  
*Top View (Vertical)*



**Data of Radiated Emission**UL Japan, Inc.  
Yokowa EMC Lab.  
No.1 Open area test siteReport No : 10759120Y-A-R5  
Regulation : FCC Part18Data : 04/22/2015  
Temperature : 24deg.C.  
Humidity : 37% RH  
Engineer : Hiroyuki.FurutakaPower : DC 12V  
Mode : 1.Charging  
Remark : Operating Frequency : 111kHz  
Detector : Average

FREQ [MHz]	Reading (3m) [dBμV]	Reading (30m) [dBμV]	ANT Factor [dB/m]	AMP gain [dB]	Atten + Cable loss [dB]	Extrapolation Factor [dB]	Result (300 m) [dBμV/m]	Limit (300 m) [dBμV/m]	Margin [dB]	Antenna [deg]
0.11086	87.5	47.3	20.7	29.7	6.0	-80.4	4.1	23.5	19.4	0
0.11086	87.3	NS	20.7	29.7	6.0	-80.4	3.9	23.5	19.6	45
0.11086	83.5	NS	20.7	29.7	6.0	-80.4	0.1	23.5	23.4	90
0.11086	87.0	NS	20.7	29.7	6.0	-80.4	3.6	23.5	19.9	135
0.11086	83.0	NS	20.7	29.7	6.0	-80.4	-0.4	23.5	23.9	Horizontal
0.2224	53.4	34.0	20.6	29.5	6.1	-38.8	11.8	23.5	11.7	0
0.2224	52.4	NS	20.6	29.5	6.1	-38.8	10.8	23.5	12.7	45
0.2224	51.0	NS	20.6	29.5	6.1	-38.8	9.4	23.5	14.1	90
0.2224	52.0	NS	20.6	29.5	6.1	-38.8	10.4	23.5	13.1	135
0.2224	47.7	NS	20.6	29.5	6.1	-38.8	6.1	23.5	17.4	Horizontal
0.33258	57.6	34.0	20.6	29.4	6.1	-47.2	7.7	23.5	15.8	0
0.33258	56.5	NS	20.6	29.4	6.1	-47.2	6.6	23.5	16.9	45
0.33258	55.2	NS	20.6	29.4	6.1	-47.2	5.3	25.5	20.2	90
0.33258	55.0	NS	20.6	29.4	6.1	-47.2	5.1	23.5	18.4	135
0.33258	55.1	NS	20.6	29.4	6.1	-47.2	5.2	23.5	18.3	Horizontal
1.66304	29.3	24.5	20.5	29.1	6.4	-9.6	17.5	23.5	6.0	0
1.66304	29.7	NS	20.5	29.1	6.4	-9.6	17.9	23.5	5.6	45
1.66304	28.0	NS	20.5	29.1	6.4	-9.6	16.2	23.5	7.3	90
1.66304	27.6	NS	20.5	29.1	6.4	-9.6	15.8	23.5	7.7	135
1.66304	26.4	NS	20.5	29.1	6.4	-9.6	14.6	23.5	8.9	Horizontal
1.88488	26.9	21.4	20.4	29.1	6.5	-11.0	13.7	23.5	9.8	0
1.88488	26.1	NS	20.4	29.1	6.5	-11.0	12.9	23.5	10.6	45
1.88488	24.5	NS	20.4	29.1	6.5	-11.0	11.3	23.5	12.2	90
1.88488	23.5	NS	20.4	29.1	6.5	-11.0	10.3	23.5	13.2	135
1.88488	24.6	NS	20.4	29.1	6.5	-11.0	11.4	23.5	12.1	Horizontal
2.54963	30.0	21.0	20.4	29.1	6.6	-18.0	9.9	23.5	13.6	0
2.54963	29.2	NS	20.4	29.1	6.6	-18.0	9.1	23.5	14.4	45
2.54963	28.7	NS	20.4	29.1	6.6	-18.0	8.6	23.5	14.9	90
2.54963	28.0	NS	20.4	29.1	6.6	-18.0	7.9	23.5	15.6	135
2.54963	27.2	NS	20.4	29.1	6.6	-18.0	7.1	23.5	16.4	Horizontal

CALCULATION(Result) : Reading + ANT Factor + Cable loss + Atten loss + Extrapolation Factor - AMP gain

Extrapolation Factor = decade \* Log (Test distance(3m) / Separate distance(300m))

decade = (30m reading - 3m reading) / (log 3m - log 30m)

NS : Non-Signal

Except for the above table : adequate margin data below the limits.

30m Reading of Extrapolation Factor is used the value of 0 deg.

Worst direction of EUT was decided by test result performed on test distance at 3m, and test distance at 30m was performed worst direction.

## Data of Radiated Emission

UL Japan, Inc.  
 Yokowa EMC Lab.  
 No.3 Open area test site

Report No : 10759120Y-A-R5  
 Regulation : FCC Part18

Data : 07/01/2015  
 Temperature : 24deg.C.  
 Humidity : 60% RH  
 Engineer : Hiroyuki.Furutaka

Power : DC 12V  
 Mode : 1.Charging  
 Remark : Operating Frequency : 111kHz  
 Detector : Average

FREQ [MHz]	Reading (3m) [dBμV]	Reading (10m) [dBμV]	ANT Factor [dB/m]	AMP gain [dB]	Atten + Cable loss [dB]	Extrapolation Factor [dB]	Result (300 m) [dBμV/m]	Limit (300 m) [dBμV/m]	Margin [dB]	Antenna Polarization
58.824	17.2	16.7	8.2	28.1	7.4	-1.9	2.8	23.5	20.7	Horizontal
60.000	18.2	17.1	7.8	28.1	7.4	-4.2	1.1	23.5	22.4	Horizontal
73.980	17.3	16.9	6.3	28.1	7.6	-1.5	1.6	23.5	21.9	Horizontal
100.995	18.3	16.5	10.4	28.2	7.8	-6.8	1.5	23.5	22.0	Horizontal
105.700	17.6	16.5	11.1	28.2	7.9	-4.2	4.2	23.5	19.3	Horizontal
151.821	19.4	16.4	15.1	27.9	8.3	-11.4	3.5	23.5	20.0	Horizontal
306.750	16.3	15.4	15.9	27.9	6.4	-3.4	7.3	23.5	16.2	Horizontal
58.824	27.2	19.1	8.2	28.1	7.4	-30.9	-16.2	23.5	39.7	Vertical
59.982	36.1	18.8	7.8	28.1	7.4	-66.1	-42.9	23.5	66.4	Vertical
73.940	22.5	18.1	6.3	28.1	7.6	-16.8	-8.5	23.5	32.0	Vertical
100.995	22.7	17.4	10.4	28.2	7.8	-20.2	-7.5	23.5	31.0	Vertical
105.700	23.5	19.5	11.1	28.2	7.9	-15.2	-0.9	23.5	24.4	Vertical
160.755	19.4	16.0	15.6	27.9	8.4	-13.0	2.5	23.5	21.0	Vertical
306.740	15.8	15.3	15.9	27.9	6.4	-1.9	8.3	23.5	15.2	Vertical

CALCULATION(Result) : Reading + ANT Factor + Cable loss + Atten loss + Extrapolation Factor - AMP gain  
 Extrapolation Factor = decade \* Log (Test distance(3m) / Separate distance(300m))  
 decade = (10m reading - 3m reading) / (log 3m - log 10m)

Except for the above table : adequate margin data below the limits.

## Data of Radiated Emission

UL Japan, Inc.  
 Yokowa EMC Lab.  
 No.1 Open area test site

Report No : 10759120Y-A-R5  
 Regulation : FCC Part18

Data : 04/22/2015  
 Temperature : 24deg.C.  
 Humidity : 37% RH  
 Engineer : Hiroyuki Furutaka

Power : DC 12V  
 Mode : Charging  
 Remark : Operating Frequency : 114.5kHz  
 Detector : Average

FREQ [MHz]	Reading (3m) [dBμV]	Reading (30m) [dBμV]	ANT Factor [dB/m]	AMP gain [dB]	Atten + Cable loss [dB]	Extrapolation Factor [dB]	Result (300 m) [dBμV/m]	Limit (300 m) [dBμV/m]	Margin [dB]	Antenna [deg]
0.11441	84.6	51.6	20.7	29.7	6.0	-66.0	15.6	23.5	7.9	0
0.11441	82.8	NS	20.7	29.7	6.0	-66.0	13.8	23.5	9.7	45
0.11441	80.0	NS	20.7	29.7	6.0	-66.0	11.0	23.5	12.5	90
0.11441	81.0	NS	20.7	29.7	6.0	-66.0	12.0	23.5	11.5	135
0.11441	83.0	NS	20.7	29.7	6.0	-66.0	14.0	23.5	9.5	Horizontal
0.22897	47.4	32.0	20.6	29.5	6.1	-30.8	13.8	23.5	9.7	0
0.22897	47.0	NS	20.6	29.5	6.1	-30.8	13.4	23.5	10.1	45
0.22897	46.8	NS	20.6	29.5	6.1	-30.8	13.2	23.5	10.3	90
0.22897	47.1	NS	20.6	29.5	6.1	-30.8	13.5	23.5	10.0	135
0.22897	43.0	NS	20.6	29.5	6.1	-30.8	9.4	23.5	14.1	Horizontal
0.34327	56.3	35.8	20.6	29.4	6.1	-41.0	12.6	23.5	10.9	0
0.34327	55.0	NS	20.6	29.4	6.1	-41.0	11.3	23.5	12.2	45
0.34327	53.3	NS	20.6	29.4	6.1	-41.0	9.6	25.5	15.9	90
0.34327	54.5	NS	20.6	29.4	6.1	-41.0	10.8	23.5	12.7	135
0.34327	53.7	NS	20.6	29.4	6.1	-41.0	10.0	23.5	13.5	Horizontal
0.57211	47.0	31.4	20.5	29.2	6.2	-31.2	13.3	23.5	10.2	0
0.57211	46.5	NS	20.5	29.2	6.2	-31.2	12.8	23.5	10.7	45
0.57211	46.0	NS	20.5	29.2	6.2	-31.2	12.3	23.5	11.2	90
0.57211	45.5	NS	20.5	29.2	6.2	-31.2	11.8	23.5	11.7	135
0.57211	43.1	NS	20.5	29.2	6.2	-31.2	9.4	23.5	14.1	Horizontal
1.94497	26.6	21.0	20.4	29.1	6.5	-11.2	13.2	23.5	10.3	0
1.94497	25.5	NS	20.4	29.1	6.5	-11.2	12.1	23.5	11.4	45
1.94497	24.0	NS	20.4	29.1	6.5	-11.2	10.6	23.5	12.9	90
1.94497	25.0	NS	20.4	29.1	6.5	-11.2	11.6	23.5	11.9	135
1.94497	24.5	NS	20.4	29.1	6.5	-11.2	11.1	23.5	12.4	Horizontal
2.17389	27.0	21.4	20.4	29.1	6.5	-11.2	13.6	23.5	9.9	0
2.17389	25.8	NS	20.4	29.1	6.5	-11.2	12.4	23.5	11.1	45
2.17389	25.3	NS	20.4	29.1	6.5	-11.2	11.9	23.5	11.6	90
2.17389	26.5	NS	20.4	29.1	6.5	-11.2	13.1	23.5	10.4	135
2.17389	24.0	NS	20.4	29.1	6.5	-11.2	10.6	23.5	12.9	Horizontal

CALCULATION(Result) : 3m Reading + ANT Factor + Cable loss + Atten loss + Extrapolation Factor - AMP gain  
 Extrapolation Factor = decade \* Log (Test distance(3m) / Separate distance(300m))  
 decade = (30m reading - 3m reading) / (log 3m - log 30m)

NS : Non-Signal

Except for the above table : adequate margin data below the limits.

30m Reading of Extrapolation Factor is used the value of 0 deg.

Worst direction of EUT was decided by test result performed on test distance at 3m, and test distance at 30m was performed worst direction.

## Data of Radiated Emission

UL Japan, Inc.  
 Yokowa EMC Lab.  
 No.3 Open area test site

Report No : 10759120Y-A-R5  
 Regulation : FCC Part18

Data : 07/01/2015  
 Temperature : 24deg.C.  
 Humidity : 60% RH  
 Engineer : Hiroyuki.Furutaka

Power : DC 12V  
 Mode : 1.Charging  
 Remark : Operating Frequency : 114.5kHz  
 Detector : Average

FREQ [MHz]	Reading (3m) [dBμV]	Reading (10m) [dBμV]	ANT Factor [dB/m]	AMP gain [dB]	Atten + Cable loss [dB]	Extrapolation Factor [dB]	Result (300 m) [dBμV/m]	Limit (300 m) [dBμV/m]	Margin [dB]	Antenna Polarization
58.824	17.4	16.7	8.2	28.1	7.4	-2.6	2.3	23.5	21.2	Horizontal
60.000	17.6	17.0	7.8	28.1	7.4	-2.2	2.5	23.5	21.0	Horizontal
73.980	18.1	17.0	6.3	28.1	7.6	-4.2	-0.3	23.5	23.8	Horizontal
105.700	17.5	16.5	11.1	28.2	7.9	-3.8	4.5	23.5	19.0	Horizontal
110.000	17.3	16.5	11.7	28.1	7.9	-3.0	5.8	23.5	17.7	Horizontal
150.710	19.6	16.3	15.1	27.9	8.3	-12.6	2.5	23.5	21.0	Horizontal
306.740	16.7	15.5	15.9	27.9	6.4	-4.5	6.6	23.5	16.9	Horizontal
58.720	26.7	18.9	8.2	28.1	7.4	-29.8	-15.6	23.5	39.1	Vertical
59.982	35.1	21.2	7.8	28.1	7.4	-53.1	-30.9	23.5	54.4	Vertical
73.220	23.0	18.9	6.3	28.1	7.5	-15.6	-6.9	23.5	30.4	Vertical
101.470	22.4	17.3	10.4	28.2	7.8	-19.5	-7.1	23.5	30.6	Vertical
105.560	24.4	19.4	11	28.2	7.9	-19.1	-4.0	23.5	27.5	Vertical
160.710	18.5	15.9	15.6	27.9	8.4	-9.9	4.7	23.5	18.8	Vertical
305.740	15.7	15.2	15.8	27.9	6.4	-1.9	8.1	23.5	15.4	Vertical

CALCULATION(Result) : 3m Reading + ANT Factor + Cable loss + Atten loss + Extrapolation Factor - AMP gain

Extrapolation Factor = decade \* Log (Test distance(3m) / Separate distance(300m))

decade = (10m reading - 3m reading) / (log 3m - log 10m)

Except for the above table : adequate margin data below the limits.

Test Report No : 10759120Y-A-R5

**Appendix 3  
 Test Instruments**

**EMI test equipment**

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
APSPA06	Spectrum Analyzer	Advantest	R3265A	55060177	RE	2015/04/17 * 12
TR-11	EMI Test Receiver	Rohde & Schwarz	ESU-8	100181/008	RE	2014/09/23 * 12
APANT08	Loop Antenna	Rohde & Schwarz	HFH2-Z2	842906/011	RE	2014/10/04 * 12
APPRA04	Pre Amplifier	Advantest	R14601	73120037	RE	2015/06/10 * 12
AT-40	Attenuator	Anritsu	MP721B	6201150481	RE	2014/10/06 * 12
CC-30M	Yokowa No.1 open coaxial(0.009-1000MHz)	UL Japan	CC-11,CC-12,CC-14,CC-15,CC-16,SW-11,SW-12,CC-17	YO0102	RE	2014/10/08 * 12
YOATS-01(NSA)	Open area test site	JSE	3m、10m、30m	1	RE	2015/04/06 * 12
OS-03	Digital Humidity Indicator	SATO	PC-5000TRH-II	04A05	RE	2015/03/05 * 12
DM-01	Tester	SANWA	PC500	7019221	RE	2015/06/11 * 12
YJM-12	Measure	Rubber KOMBE	GW-3H99W	-	RE	-
SC-01	Search Coil	UL Japan	-	-	RE	-
COTS-YW-EMI-TSJ	EMI measurement program	TSJ	TEPTO-DV	-	RE	-
AF-01	Pre Amplifier	Hewlett Packard	8447D	2443A04060	RE	2015/03/28 * 12
AT-26	Attenuator	Anritsu	MP721A	6200543689	RE	2014/07/24 * 12
AT-09	Attenuator	Anritsu	MP721B	M03235	RE	2014/08/11 * 12
BA-12	Biconical Antenna	Schwarzbeck	BBA9106	VHA91032273	RE	2015/03/13 * 12
LA-07	Logperiodic Antenna	Schwarzbeck	UKLP9140-A	N/A	RE	2015/06/17 * 12
SA-06	Spectrum Analyzer	Advantest	R3273	110501566	RE	2015/01/14 * 12
TR-10	Test Receiver	Rohde & Schwarz	ESCI	100768	RE	2014/09/18 * 12
CC-30RC	Yokowa No.3 open coaxial(0.01-1000MHz)	Suhner	CC-31,CC-32,CC-34,CC-35,CC-36,CC-37,SW-31,SW-32	YO0301	RE	2015/02/05 * 12
YOATS-03(NSA)	Open area test site	JSE	3m、10m	3	RE	2015/05/09 * 12
DM-03	Tester	SANWA	PC500	7019229	RE	2015/06/11 * 12
OS-07	Digital Humidity Indicator	SATO	PC-5000TRH- II	05A06	RE	2015/01/13 * 12
YJM-05	Measure	PROMART	EN1955	-	RE	-
SC-03	Search Coil	UL Japan	-	-	RE	-

The expiration date of the calibration is the end of the expired month .  
 As for some calibrations performed after the tested dates , those test equipment have been controlled by means of an unbroken chains of calibrations .

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

Test Item :  
 RE: Radiated emission

End of Report