



# EMI TEST REPORT

**Test Report No. : 11932443S-A-R3**

**Applicant** : CASIO COMPUTER CO., LTD.  
**Type of Equipment** : Watch Charger  
**Model No.** : JDK-GX7  
**FCC ID** : BBQ3452  
**Test regulation** : FCC Part 18: 2017  
**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 above regulation.
4. The test results in this report are traceable to the national or international standards.
5. The opinions and the interpretations to the result of the description in this report are outside scopes where UL Japan has been accredited.
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 11932443S-A-R2. 11932443S-A-R2 is replaced with this report.

**Date of test:** November 19 to December 4, 2017

**Representative test engineer:**

Kenichi Adachi  
Engineer  
Consumer Technology Division

**Approved by:**

Akio Hayashi  
Leader  
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.**  
**Shonan EMC Lab.**

1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN  
Telephone : +81 463 50 6400  
Facsimile : +81 463 50 6401

13-EM-F0429

## REVISION HISTORY

**Original Test Report No.: 11932443S-A**

[illegible]

**Shonan EMC Lab.**

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

<b>CONTENTS</b>	<b>PAGE</b>
<b>SECTION 1: Customer information.....</b>	<b>4</b>
<b>SECTION 2: Equipment under test (E.U.T.).....</b>	<b>4</b>
<b>SECTION 3: Test specification, procedures &amp; results.....</b>	<b>5</b>
<b>SECTION 4: Operation of E.U.T. during testing.....</b>	<b>10</b>
<b>SECTION 5: Conducted Emission.....</b>	<b>11</b>
<b>SECTION 6: Radiated Spurious Emission .....</b>	<b>12</b>
<b>SECTION 7: MPE Limit [KDB 680106 D01 Section 3.3 (FCC1.1310)] .....</b>	<b>16</b>
<b>APPENDIX 1: Test data .....</b>	<b>17</b>
Conducted Emission .....	17
Radiated Emission (FCC Part 18) .....	19
Radiated Emission (KDB680106).....	23
RF Exposure (KDB680106).....	25
<b>APPENDIX 2: Test instruments .....</b>	<b>26</b>
<b>APPENDIX 3: Photographs of test setup .....</b>	<b>27</b>
Conducted Emission .....	27
Radiated Emission.....	29
Pre-check of Worst Case Position.....	31
RF Exposure.....	32

## **SECTION 1: Customer information**

Company Name	:	CASIO COMPUTER CO., LTD.
Address	:	2-1, Sakaecho 3 chome, Hamura-shi, Tokyo 205-8555 Japan
Telephone Number	:	+81-42-579-7282
Facsimile Number	:	+81-42-579-7702
Contact Person	:	Hiroaki Suzuki

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

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

Type of Equipment	:	Watch Charger
Model No.	:	JDK-GX7
Serial No.	:	Refer to Section 4, Clause 4.2
Rating	:	DC 5 V (from USB interface)
Receipt Date of Sample	:	October 19, 2017
Country of Mass-production	:	Japan
Condition of EUT	:	Engineering prototype
		(Not for Sale: This sample is equivalent to mass-produced items.)
Modification of EUT	:	No Modification by the test lab

### **2.2 Product Description**

Model: JDK-GX7 (referred to as the EUT in this report) is a Watch Charger.

### **Radio Specification**

Radio Type	:	Transceiver
Frequency of Operation	:	150 kHz to 186.2 kHz
Modulation	:	None
Power Supply (radio part input)	:	DC 5.0 V
Rated output power (wireless)	:	0.9 W

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Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

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

#### **3.1 Test Specification**

Test Specification : FCC Part 18  
FCC Part 18 final revised on November 2, 2017

Title : FCC 47CFR Part18 Industrial, scientific, and medical equipment

Purpose of test : Confirmation of compliance for FCC Part 18 and KDB 680106 D01 RF Exposure  
Wireless Charging Apps.

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Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

### 3.2 Procedures and results

[FCC Part 18]

Item	Test Procedure & Limits	Deviation	Worst margin	Result
Radiated emission	Section 18.305, FCC/OST MP-5	N/A *1)	10.41 dB (Av, 67.974MHz, Vert., with dummy watch)	Complied
Conducted emission	Section 18.307, FCC/OST MP-5	N/A	13.7 dB (QP, 0.16047 MHz, L1, with dummy watch)	Complied
*Note: UL Japan, Inc.'s EMI Work Procedure 13-EM-W0420 and 13-EM-W0424. *1) The measurements were limited up to 1 GHz, since in this EUT is used the IC (TB6865AFG) is used frequency is 20 MHz and 80 MHz.				

[KDB 680106]

Item	Test Procedure	Limits	Deviation	Worst Margin	Result
MPE Limit	KDB 680106 D01	Table 1(B)	N/A	Refer to section.6	Complied

\*These tests were performed without any deviations from test procedure.

**Table 1—Limits for Maximum Permissible Exposure (MPE)**

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm <sup>2</sup> )	Averaging time (minutes)
<b>(A) Limits for Occupational/Controlled Exposures</b>				
0.3 - 3.0	614	1.63	*(100)	6
3.0 - 30	1842/f	4.89/f	*(900/f <sup>2</sup> )	6
30 - 300	61.4	0.163	1.0	6
300 - 1500			f/300	6
1500 - 100,000			5	6
<b>(B) Limits for General Population/Uncontrolled Exposure</b>				
0.3 - 1.34	<b>614</b>	<b>1.63</b>	*(100)	30
1.34 - 30	824/f	2.19/f	*(180/f <sup>2</sup> )	30
30 - 300	27.5	0.073	0.2	30
300 - 1500			f/1500	30
1500 - 100,000			1.0	30

f = frequency in MHz

\* = Plane-wave equivalent power density

Note 1 to Table 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

Note 2 to Table 1: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

Test limit was applied to the test limit of 100 kHz - 300 kHz based on FCC rule Section 1.1310, according to KDB 680106 D01 RF Exposure Wireless Charging Apps Clause 3.3).

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1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN  
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KDB 680106 D01 RF Exposure Wireless Charging Apps requires following contents in order to exclude RF exposure evaluation.

- a) Power transfer frequency is less than 1 MHz
- b) Output power from each primary coil is less than 5 watts
- c) The transfer system includes only single primary and secondary coils. This includes charging systems that may have multiple primary coils and clients that are able to detect and allow coupling only between individual pairs of coils
- d) Client device is inserted in or placed directly in contact with the transmitter
- e) The maximum coupling surface area of the transmit (charging) device is between 60 cm<sup>2</sup> and 400 cm<sup>2</sup>.
- f) Aggregate leakage fields at 10 cm surrounding the device from all simultaneous transmitting coils are demonstrated to be less than 30 % of the MPE limit.

Also, Test data used Exposure Level Tester is complied KDB 680106 D01 RF Exposure Wireless Charging Apps Clause 3.3).

### **3.3 Addition to standard**

No addition, exclusion nor deviation has been made from the standard.

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### 3.4 Uncertainty

#### EMI

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

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Item	Frequency range	Uncertainty (+/-)				
		No. 1 SAC / SR	No. 2 SAC / SR	No. 3 SAC / SR	No. 4 SAC / SR	No. 5,6,8 SR
Conducted emission (AC Mains) LISN	150 kHz-30 MHz	2.5 dB	2.5 dB	2.5 dB	2.6 dB	2.6 dB
Radiated emission (Measurement distance: 3 m)	9 kHz-30 MHz	3.2 dB	3.2 dB	3.3 dB	-	-
	30 MHz-200 MHz	4.3 dB	4.3 dB	4.3 dB	-	-
	200 MHz-1 GHz	5.9 dB	5.9 dB	5.9 dB	-	-
	1 GHz-6 GHz	4.7 dB	4.7 dB	4.7 dB	-	-
	6 GHz-18 GHz	5.3 dB	5.3 dB	5.3 dB	-	-
	18 GHz-40 GHz	5.6 dB	5.6 dB	5.6 dB	-	-
Radiated emission (Measurement distance: 1 m)	1 GHz-18 GHz	5.6 dB	5.6 dB	5.6 dB	-	-
	18 GHz-40 GHz	5.9 dB	5.9 dB	5.9 dB	-	-

SAC=Semi-Anechoic Chamber

SR= Shielded Room is applied besides radiated emission

Antenna terminal test	Uncertainty (+/-)
Power Measurement above 1 GHz (Average Detector)_SPM-06	0.48 dB
Power Measurement above 1 GHz (Peak Detector)_SPM-06	0.66 dB
Power Measurement above 1 GHz (Average Detector)_SPM-07	0.47 dB
Power Measurement above 1 GHz (Peak Detector)_SPM-07	0.64 dB
Spurious emission (Conducted) below 1GHz	1.8 dB
Spurious emission (Conducted) 1 GHz-3 GHz	1.7 dB
Spurious emission (Conducted) 3 GHz-18 GHz	2.5 dB
Spurious emission (Conducted) 18 GHz-26.5 GHz	2.5 dB
Spurious emission (Conducted) 26.5 GHz-40 GHz	2.7 dB
Bandwidth Measurement	1.01 %
Duty cycle and Time Measurement	0.012 %

#### Conducted Emission test

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

#### Radiated emission test

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

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**Shonan EMC Lab.**

1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401



### 3.5 Test Location

UL Japan, Inc. Shonan EMC Lab.  
1-22-3, Megumigaoka, Hiratsuka-shi, Kanagawa-ken 259-1220 JAPAN  
Telephone: +81 463 50 6400, Facsimile: +81 463 50 6401  
JAB Accreditation No. RTL02610  
FCC Test Firm Registration Number: 839876

Test site	IC Registration Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Maximum measurement distance
No.1 Semi-anechoic chamber	2973D-1	20.6 x 11.3 x 7.65	20.6 x 11.3	10 m
No.2 Semi-anechoic chamber	2973D-2	20.6 x 11.3 x 7.65	20.6 x 11.3	10 m
No.3 Semi-anechoic chamber	2973D-3	12.7 x 7.7 x 5.35	12.7 x 7.7	5 m
No.4 Semi-anechoic chamber	-	8.1 x 5.1 x 3.55	8.1 x 5.1	-
No.1 Shielded room	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
No.2 Shielded room	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
No.3 Shielded room	-	6.3 x 4.7 x 2.7	6.3 x 4.7	-
No.4 Shielded room	-	4.4 x 4.7 x 2.7	4.4 x 4.7	-
No.5 Shielded room	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
No.6 Shielded room	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
No.8 shielded room	-	3.45 x 5.5 x 2.4	3.45 x 5.5	-
No.1 Measurement room	-	2.55 x 4.1 x 2.5	-	-

### 3.6 Test data, Test instruments, and Test set up

Refer to APPENDIX.

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

### **4.1 Operating Mode(s)**

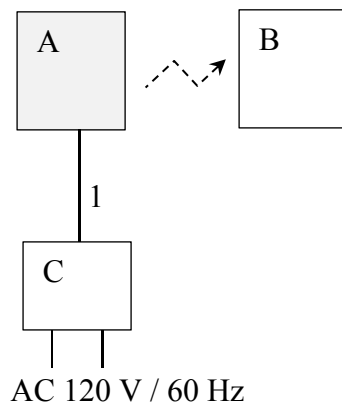
The EUT exercise program used during testing was designed to exercise the various system components in a manner similar to typical use.

Test sequence is used: Wireless Charging (185.2 kHz \*1) ) \*1) Frequency on the maximum load charging.

The test was on the worse cases with dummy watch and without dummy watch.

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(s) were taken into consideration and test data was taken under worse case conditions.

#### **Description of EUT and Support equipment**

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Watch Charger	JDK-GX7	88	CASIO COMPUTER CO., LTD.	EUT
B	Dummy watch	GPR-B1000	33	CASIO COMPUTER CO., LTD.	
C	AC adapter	AD-C54UJ	170615	CASIO COMPUTER CO., LTD.	

#### **List of cables used**

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	DC	1.0	Unshielded	Unshielded	-

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**Shonan EMC Lab.**

1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

## **SECTION 5: Conducted Emission**

### **Operating environment**

This test was carried out in shielded room.

Temperature : See data

Humidity : See data

### **Test Procedure and conditions**

EUT was placed on a polystyrene platform of nominal size, 1.0 m by 1.5 m, raised 0.8 m above the conducting ground plane.

The rear of tabletop was located 40 cm to the vertical conducting plane. The rear of EUT, including peripherals aligned and flushed with rear of tabletop. All other surfaces of tabletop were at least 80 cm from any other grounded conducting surface. EUT was located 80 cm from a Line Impedance Stabilization Network (LISN) / Artificial mains Network (AMN) and excess AC cable was bundled in center.

#### **1) For the tests on EUT with other peripherals (as a whole system)**

I/O cables that were connected to the peripherals were bundled in center. They were folded back and forth forming a bundle 30 cm to 40 cm long and were hanged at a 40 cm height to the ground plane. All unused 50 ohm connectors of the LISN (AMN) were resistivity terminated in 50 ohm when not connected to the measuring equipment.

#### **2) For the tests on EUT itself (as a standalone equipment)**

Each EUT current-carrying power lead, except the ground (safety) lead, was individually connected through a LISN / (AMN) to the input power source.

The AC Mains Terminal Continuous disturbance Voltage has been measured with the EUT via AC adapter in a Shielded room.

The EUT via AC adapter was connected to a LISN (AMN).

An overview sweep with peak detection has been performed.

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

<b>Detector</b>	<b>: QP and CISPR AV</b>
<b>Measurement range</b>	<b>: 0.15 MHz - 30 MHz</b>
<b>Test data</b>	<b>: APPENDIX</b>
<b>Test result</b>	<b>: Pass</b>

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1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

## **SECTION 6: Radiated Spurious Emission**

### **Operating environment**

This test was carried out in semi-anechoic chamber.

Temperature : See data

Humidity : See data

### **Test configuration**

#### **Below 30 MHz**

EUT was placed on a polystyrene platform of nominal size, 0.5 m by 0.5 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.

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 3.

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

#### **Above 30 MHz**

EUT was placed on a polystyrene platform of nominal size, 0.5 m by 0.5 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 3.

### **Test conditions**

Frequency range : 0.009 MHz - 1000 MHz

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

3 m (30 MHz - 1000 MHz)

EUT position : Table top

## Test procedure

The Radiated Electric Field Strength intensity has been measured on semi-anechoic chamber 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.

### 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 5 m.

The electric field intensity at a distance of 300 m was calculated from the measurement results at distances of 3 m and 5 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 5 m.

The electric field intensity at a distance of 300 m was calculated from the measurement results at distances of 3 m and 5 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 - 1000 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 414788.

These tests were performed in semi-anechoic chamber (with ground plane). Therefore the measured level of emissions may be higher than if measurements were made open area test site without a ground plane.

However test results were confirmed to pass against standard limit.

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**Shonan EMC Lab.**

1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

## Results

Summary of the test results: Pass

### 30 % of MPE limit for frequency range 185.2 kHz is 0.489 (A/m) and 184.2(V/m).

(Refer to table 2 in section 3.2,  $0.489 \text{ A/m} = 1.63 \text{ A/m} \times 0.30$ ,  $184.2 \text{ V/m} = 614 \times 0.30$ , (Refer to KDB 680106 D01 section 5 2) f) )

In order to investigate whether it can exclude detailed RF exposure evaluation, this test is compared with 30% Limit. )

Frequency	Electric field strength *1)	Tested distance	Separate distance	Extrapolation factor	Electric field strength at separate distance	Magnetic field strength at separate distance		Limit	Margin
[MHz]	[dBuV/m]	[m]	[m]	[dB]	[dBuV/m]	[dBuA/m]	[A/m]	[A/m]	[dB]
0.18521	65.11	3	0.1	70.44	135.55	84.02	0.016	0.489	29.76

Frequency	Electric field strength *1)	Tested distance	Separate distance	Extrapolation factor	Electric field strength at separate distance		Limit	Margin
[MHz]	[dBuV/m]	[m]	[m]	[dB]	[dBuV/m]	[V/m]	[V/m]	[dB]
0.18521	65.11	3	0.1	70.44	135.55	5.991	184.2	29.8

Extrapolation factor = decade \* log (Test distance / Separate distance)

decade = (5 m Reading - 3 m Reading) / (log 3 m - log 5 m)

\* 5 m Reading is 61.12 dBuV, 3 m Reading is 71.70 dBuV @ 185.21 kHz. \*2)

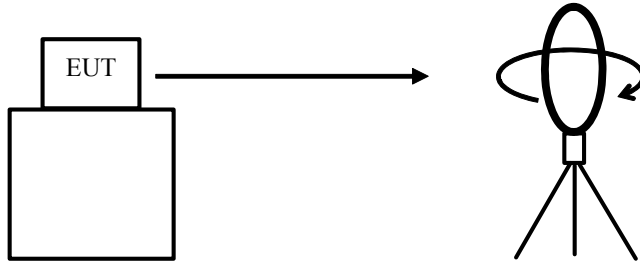
Electric field strength at separate distance = Electric field strength + Extrapolation factor

\*1) This value is max of the Result in Appendix 1.

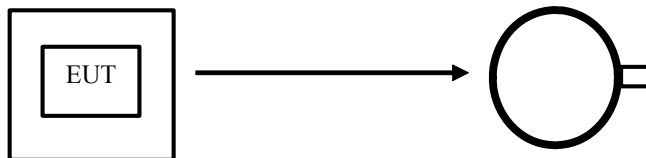
\*2) This value is max of the Reading in Appendix 1.

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

*Side View (Vertical)*

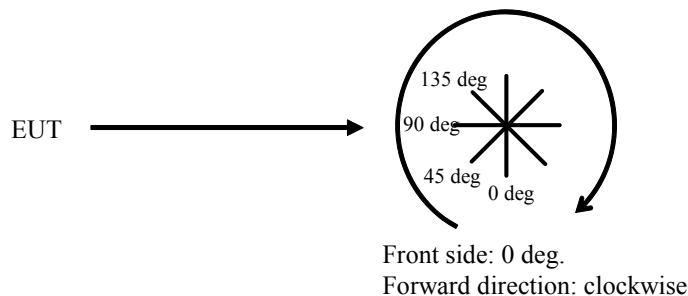


*Top View (Horizontal)*



Antenna was not rotated.

*Top View (Vertical)*



- 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.

Antenna polarization	Frequency	
	Below 30 MHz	Above 30 MHz
Horizontal	Z	Z
Vertical	Z	Z

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**Shonan EMC Lab.**

1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

## **SECTION 7: MPE Limit [KDB 680106 D01 Section 3.3 (FCC1.1310)]**

### **Operating environment**

This test was carried out in semi-anechoic chamber.

Temperature : See data

Humidity : See data

### **Test configuration**

The EUT was placed on a non-metallic of 0.8 m above the reference ground plane.

Worst position is shown in the photos in Appendix 3.

### **Test conditions**

EUT position : Table top

### **Test procedure**

The test of the weighted result has been performed using time domain evaluation.

Sensor locations : Around 10 cm

### **Results**

Summary of the test results : Complied



## APPENDIX 1: Test data

### Conducted Emission DATA OF CONDUCTED EMISSION TEST

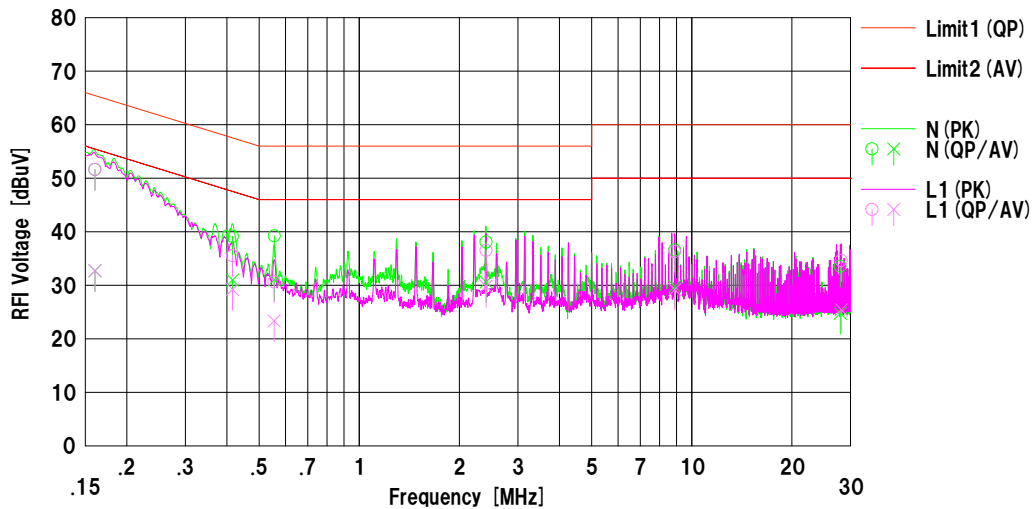
UL Japan, Inc. Shonan EMC Lab. No.3 Semi-Anechoic Chamber  
Date : 2017/12/04

Company : CASIO COMPUTER CO., LTD  
Kind of EUT : Watch Charger  
Model No. : JDK-GX7  
Serial No. : 88  
Remarks : -

Mode : Wireless Charging with watch  
Order No. : 11932443S  
Power : DC 5 V (with AC adapter AC 120 V)  
Temp./Humi. : 24 deg.C / 34 %RH

Limit1 : FCC18 QP  
Limit2 : FCC18 AV

Engineer : Kenichi Adachi



No.	Freq. [MHz]	Reading		C.Fac [dB]	Results		Limit		Margin		Phase	Comment
		<QP> [dBuV]	<AV> [dBuV]		<QP> [dBuV]	<AV> [dBuV]	<QP> [dBuV]	<AV> [dBuV]	<QP> [dB]	<AV> [dB]		
1	0.16047	39.10	20.20	12.51	51.61	32.71	65.44	55.44	13.8	22.7	N	
2	0.41579	26.58	18.44	12.54	39.12	30.98	57.53	47.53	18.4	16.5	N	
3	0.55563	26.67	18.46	12.56	39.23	31.02	56.00	46.00	16.7	14.9	N	
4	2.40816	25.33	17.86	12.75	38.08	30.61	56.00	46.00	17.9	15.3	N	
5	8.89236	22.95	16.12	13.64	36.59	29.76	60.00	50.00	23.4	20.2	N	
6	27.97221	18.36	9.59	15.18	33.54	24.77	60.00	50.00	26.4	25.2	N	
7	0.16047	39.14	20.21	12.51	51.65	32.72	65.44	55.44	13.7	22.7	L1	
8	0.41579	22.97	16.68	12.54	35.51	29.22	57.53	47.53	22.0	18.3	L1	
9	0.55448	18.05	10.79	12.56	30.61	23.35	56.00	46.00	25.3	22.6	L1	
10	2.40801	23.77	17.04	12.75	36.52	29.79	56.00	46.00	19.4	16.2	L1	
11	8.89111	22.64	15.56	13.64	36.28	29.20	60.00	50.00	23.7	20.8	L1	
12	28.15640	19.44	10.24	15.19	34.63	25.43	60.00	50.00	25.3	24.5	L1	

Calculation: Result [dBuV] = Reading [dBuV] + C.Fac (LISN (AMN) + Cable + ATT) [dB]  
LISN: SLS-02 + Extension cable

UL Japan, Inc.  
Shonan EMC Lab.

1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN  
Telephone : +81 463 50 6400  
Facsimile : +81 463 50 6401

## Conducted Emission DATA OF CONDUCTED EMISSION TEST

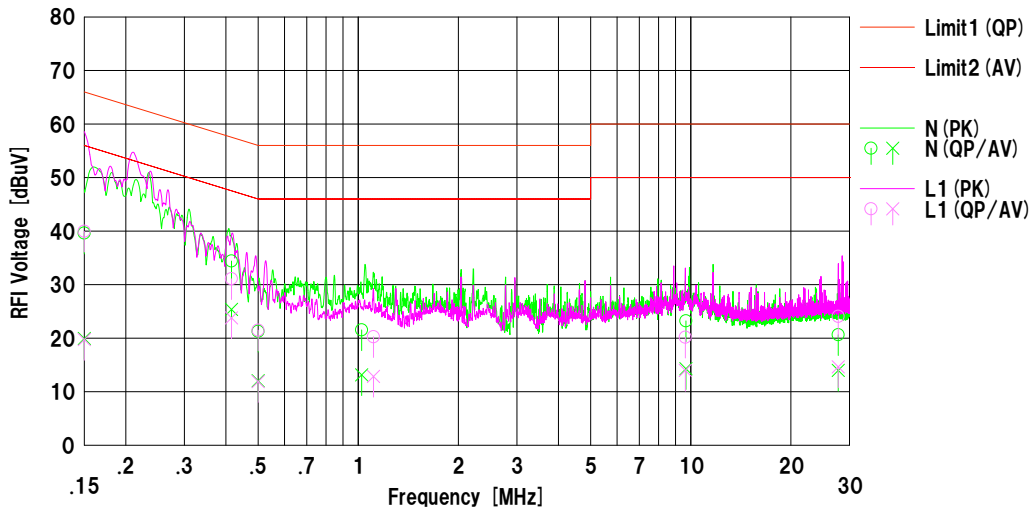
UL Japan, Inc. Shonan EMC Lab. No.3 Semi-Anechoic Chamber  
Date : 2017/12/04

Company : CASIO COMPUTER CO., LTD  
Kind of EUT : Watch Charger  
Model No. : JDK-GX7  
Serial No. : 88  
Remarks : -

Mode : Wireless Charging without watch  
Order No. : 11932443S  
Power : DC 5 V (with AC adapter AC 120 V)  
Temp./Humi. : 24 deg.C / 34 %RH

Limit1 : FCC18 QP  
Limit2 : FCC18 AV

Engineer : Kenichi Adachi



No.	Freq. [MHz]	Reading		C.Fac [dB]	Results		Limit		Margin		Phase	Comment
		<QP> [dBuV]	<AV> [dBuV]		<QP> [dBuV]	<AV> [dBuV]	<QP> [dBuV]	<AV> [dBuV]	<QP> [dB]	<AV> [dB]		
1	0.15001	27.12	7.41	12.52	39.64	19.93	66.00	56.00	26.3	36.0	N	
2	0.41567	21.86	12.84	12.54	34.40	25.38	57.53	47.53	23.1	22.1	N	
3	0.50001	8.72	-0.52	12.56	21.28	12.04	56.00	46.00	34.7	33.9	N	
4	1.02357	8.93	0.54	12.61	21.54	13.15	56.00	46.00	34.4	32.8	N	
5	9.67111	9.47	0.52	13.76	23.23	14.28	60.00	50.00	36.7	35.7	N	
6	27.77523	5.47	-1.20	15.17	20.64	13.97	60.00	50.00	39.3	36.0	N	
7	0.15001	27.44	7.22	12.52	39.96	19.74	66.00	56.00	26.0	36.2	L1	
8	0.41567	18.57	11.24	12.54	31.11	23.78	57.53	47.53	26.4	23.7	L1	
9	0.50001	8.93	-0.67	12.56	21.49	11.89	56.00	46.00	34.5	34.1	L1	
10	1.11125	7.64	0.24	12.62	20.26	12.86	56.00	46.00	35.7	33.1	L1	
11	9.62679	6.42	0.22	13.75	20.17	13.97	60.00	50.00	39.8	36.0	L1	
12	27.77523	8.91	-0.54	15.17	24.08	14.63	60.00	50.00	35.9	35.3	L1	

Calculation: Result [dBuV] = Reading [dBuV] + C.Fac (LISN (AMN) + Cable + ATT) [dB]  
LISN: SLS-02 + Extension cable

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Facsimile : +81 463 50 6401

## Radiated Emission (FCC Part 18)

Test place	UL Japan, Inc. Shonan EMC Lab.	No.3 Semi-Anechoic Chamber
Date	November 26, 2017	
Temperature / Humidity	24 deg.C , 33 %RH	
Engineer	Kenichi Adachi	
Model No.	JDK-GX7	
Serial No.	88	
Mode	Wireless Charging with watch	
	EUT worst axis: Z	

Freq. [MHz]	Reading Av (3 m) [dBuV]	Reading Av (5 m) [dBuV]	Antenna factor [dB/m]	Atten, cable loss [dB]	Pre AMP gain [dB]	Extrapolation factor [dB]	Result (300 m) [dBuV/m]	Limit (300 m) [dBuV/m]	Margin [dB]	Antenna angle [deg]	Table angle [deg]
0.18521	71.70	61.12	19.51	6.06	32.16	-95.38	-30.27	23.52	53.79	0	0
0.18521	71.27	-	19.51	6.06	32.16	-95.38	-30.70	23.52	54.22	45	334
0.18521	69.55	-	19.51	6.06	32.16	-95.38	-32.42	23.52	55.94	90	268
0.18521	71.23	-	19.51	6.06	32.16	-95.38	-30.74	23.52	54.26	135	214
0.18521	71.36	-	19.51	6.06	32.16	-95.38	-30.61	23.52	54.13	horizontal	0
0.37041	59.14	48.86	19.47	6.08	32.16	-92.68	-40.15	23.52	63.67	0	0
0.37041	58.73	-	19.47	6.08	32.16	-92.68	-40.56	23.52	64.08	45	334
0.37041	57.04	-	19.47	6.08	32.16	-92.68	-42.25	23.52	65.77	90	268
0.37042	58.44	-	19.47	6.08	32.16	-92.68	-40.85	23.52	64.37	135	214
0.37042	58.47	-	19.47	6.08	32.16	-92.68	-40.82	23.52	64.34	horizontal	0
0.55566	50.01	39.53	19.46	6.09	32.16	-94.48	-51.08	23.52	74.60	0	0
0.55566	49.57	-	19.46	6.09	32.16	-94.48	-51.52	23.52	75.04	45	334
0.55566	47.89	-	19.46	6.09	32.16	-94.48	-53.20	23.52	76.72	90	268
0.55562	49.02	-	19.46	6.09	32.16	-94.48	-52.07	23.52	75.59	135	214
0.55562	49.04	-	19.46	6.09	32.16	-94.48	-52.05	23.52	75.57	horizontal	0
1.11137	32.34	26.54	19.48	6.14	32.16	-52.29	<b>-26.49</b>	23.52	<b>50.01</b>	0	0
1.11137	31.62	-	19.48	6.14	32.16	-52.29	-27.21	23.52	50.73	45	334
1.11137	30.22	-	19.48	6.14	32.16	-52.29	-28.61	23.52	52.13	90	268
1.11121	31.44	-	19.48	6.14	32.16	-52.29	-27.39	23.52	50.91	135	214
1.11121	31.78	-	19.48	6.14	32.16	-52.29	-27.05	23.52	50.57	horizontal	0

Calculation:

Result (300 m) [dBuV/m] = Reading Av (3 m) [dBuV] + Antenna factor [dB/m] + Atten, cable loss [dB] -Pre AMP gain [dB] + Extrapolation  
Extrapolation factor [dB] = ( Reading Av (5 m) [dBuV] -Reading Av (3 m) [dBuV] ) / ( log ( 3 / 5 ) ) x ( log ( 3 / 300 ) )

## Radiated Emission (FCC Part 18)

Test place	UL Japan, Inc. Shonan EMC Lab.	No.3 Semi-Anechoic Chamber
Date	November 26, 2017	
Temperature / Humidity	24 deg.C , 33 %RH	
Engineer	Kenichi Adachi	
Model No.	JDK-GX7	
Serial No.	88	
Mode	Wireless Charging without watch	
	EUT worst axis: Z	

Freq. [MHz]	Reading Av (3 m) [dBuV]	Reading Av (5 m) [dBuV]	Antenna factor [dB/m]	Atten, cable loss [dB]	Pre AMP gain [dB]	Extrapolation factor [dB]	Result (300 m) [dBuV/m]	Limit (300 m) [dBuV/m]	Margin [dB]	Antenna angle [deg]	Table angle [deg]
0.18521	65.78	55.22	19.51	6.06	32.16	-95.20	-36.01	23.52	59.53	0	0
0.18521	64.27	-	19.51	6.06	32.16	-95.20	-37.52	23.52	61.04	45	317
0.18521	63.54	-	19.51	6.06	32.16	-95.20	-38.25	23.52	61.77	90	252
0.18521	64.54	-	19.51	6.06	32.16	-95.20	-37.25	23.52	60.77	135	233
0.18521	65.68	-	19.51	6.06	32.16	-95.20	-36.11	23.52	59.63	horizontal	0
0.37030	52.11	41.86	19.47	6.08	32.16	-92.41	-46.91	23.52	70.43	0	0
0.37030	51.22	-	19.47	6.08	32.16	-92.41	-47.80	23.52	71.32	45	317
0.37030	50.44	-	19.47	6.08	32.16	-92.41	-48.58	23.52	72.10	90	252
0.37041	51.42	-	19.47	6.08	32.16	-92.41	-47.60	23.52	71.12	135	233
0.37041	52.43	-	19.47	6.08	32.16	-92.41	-46.59	23.52	70.11	horizontal	0
0.55548	43.23	32.71	19.46	6.09	32.16	-94.84	-58.22	23.52	81.74	0	0
0.55548	41.95	-	19.46	6.09	32.16	-94.84	-59.50	23.52	83.02	45	317
0.55548	35.25	-	19.46	6.09	32.16	-94.84	-66.20	23.52	89.72	90	252
0.55564	42.04	-	19.46	6.09	32.16	-94.84	-59.41	23.52	82.93	135	233
0.55564	43.86	-	19.46	6.09	32.16	-94.84	-57.59	23.52	81.11	horizontal	0
1.11108	32.65	26.85	19.48	6.14	32.16	-52.29	-26.18	23.52	49.70	0	0
1.11108	32.26	-	19.48	6.14	32.16	-52.29	-26.57	23.52	50.09	45	317
1.11108	31.97	-	19.48	6.14	32.16	-52.29	-26.86	23.52	50.38	90	252
1.11147	32.11	-	19.48	6.14	32.16	-52.29	-26.72	23.52	50.24	135	233
1.11147	32.86	-	19.48	6.14	32.16	-52.29	<b>-25.97</b>	23.52	<b>49.49</b>	horizontal	0

Calculation:

Result (300 m) [dBuV/m] = Reading Av (3 m) [dBuV] + Antenna factor [dB/m] + Atten, cable loss [dB] -Pre AMP gain [dB] + Extrapolation  
Extrapolation factor [dB] = ( Reading Av (5 m) [dBuV] -Reading Av (3 m) [dBuV] ) / ( log ( 3 / 5 ) ) x ( log ( 3 / 300 ) )

## Radiated Emission (FCC Part 18)

Test place : UL Japan, Inc. Shonan EMC Lab. No.3 Semi-Anechoic Chamber  
Date : December 3, 2017  
Temperature / Humidity : 23 deg.C , 38 %RH  
Engineer : Kenichi Adachi  
Model No. : JDK-GX7  
Serial No. : 88  
Mode : Wireless Charging with watch  
EUT worst axis: H: Z, V: Z

Freq. [MHz]	Reading Av (3 m) [dBuV]	Reading Av (5 m) [dBuV]	Antenna factor [dB/m]	Atten, cable loss [dB]	Pre AMP gain [dB]	Extrapolation factor [dB]	Result (300 m) [dBuV/m]	Limit (300 m) [dBuV/m]	Margin [dB]	Pola. [H/V]	Antenna height [cm]
40.563	18.47	15.97	14.05	6.88	32.12	-22.54	-15.26	23.52	38.78	Hori.	159
46.302	21.33	15.62	11.87	6.95	32.12	-51.48	-43.45	23.52	66.97	Hori.	215
54.643	18.64	15.37	9.36	7.03	32.12	-29.48	-26.57	23.52	50.09	Hori.	337
67.974	25.56	19.97	6.53	7.17	32.11	-50.39	-43.24	23.52	66.77	Hori.	302
92.791	23.84	18.56	8.68	7.39	32.09	-47.60	-39.78	23.52	63.30	Hori.	194
212.432	22.05	18.47	11.47	8.22	31.98	-32.27	-22.51	23.52	46.04	Hori.	271
40.563	40.89	37.29	14.05	6.88	32.12	-32.45	-2.75	23.52	26.28	Vert.	100
46.302	44.33	39.12	11.87	6.95	32.12	-46.97	-15.94	23.52	39.46	Vert.	100
54.643	46.02	38.91	9.36	7.03	32.12	-64.10	-33.81	23.52	57.33	Vert.	100
67.974	46.94	45.23	6.53	7.17	32.11	-15.42	<b>13.11</b>	23.52	<b>10.41</b>	Vert.	100
92.791	46.84	44.60	8.68	7.39	32.09	-20.19	10.63	23.52	12.90	Vert.	100
212.432	33.02	31.12	11.47	8.22	31.98	-17.13	3.60	23.52	19.92	Vert.	242

Calculation:

Result (300 m) [dBuV/m] = Reading Av (3 m) [dBuV] + Antenna factor [dB/m] + Atten, cable loss [dB] -Pre AMP gain [dB] + Extrapolation  
Extrapolation factor [dB] = ( Reading Av (5 m) [dBuV] -Reading Av (3 m) [dBuV] ) / (log ( 3 / 5 ) ) x ( log ( 3 / 300 ) )

## Radiated Emission (FCC Part 18)

Test place : UL Japan, Inc. Shonan EMC Lab. No.3 Semi-Anechoic Chamber  
Date : December 3, 2017  
Temperature / Humidity : 23 deg.C , 38 %RH  
Engineer : Kenichi Adachi  
Model No. : JDK-GX7  
Serial No. : 88  
Mode : Wireless Charging without watch  
EUT worst axis: H: Z, V: Z

Freq. [MHz]	Reading Av (3 m) [dBuV]	Reading Av (5 m) [dBuV]	Antenna factor [dB/m]	Atten, cable loss [dB]	Pre AMP gain [dB]	Extrapolation factor [dB]	Result (300 m) [dBuV/m]	Limit (300 m) [dBuV/m]	Margin [dB]	Pola. [H/V]	Antenna height [cm]
56.657	15.79	15.71	8.77	7.05	32.11	-0.72	-1.22	23.52	24.74	Hori.	212
67.951	15.65	15.45	6.53	7.17	32.11	-1.80	-4.56	23.52	28.08	Hori.	298
92.772	16.56	15.88	8.68	7.39	32.09	-6.13	-5.59	23.52	29.11	Hori.	192
199.842	14.86	14.84	16.23	8.15	31.99	-0.18	7.07	23.52	16.45	Hori.	100
211.476	16.05	15.24	11.46	8.22	31.98	-7.30	-3.55	23.52	27.07	Hori.	244
56.657	28.57	25.04	8.77	7.05	32.11	-31.82	-19.54	23.52	43.07	Vert.	100
67.951	32.14	28.92	6.53	7.17	32.11	-29.03	-15.30	23.52	38.82	Vert.	100
92.763	29.56	27.41	8.68	7.39	32.09	-19.38	-5.84	23.52	29.36	Vert.	100
199.842	14.84	14.83	16.23	8.15	31.99	-0.09	<b>7.14</b>	23.52	<b>16.38</b>	Vert.	100
204.051	17.94	17.42	11.42	8.17	31.99	-4.69	0.85	23.52	22.67	Vert.	100

Calculation:

Result (300 m) [dBuV/m] = Reading Av (3 m) [dBuV] + Antenna factor [dB/m] + Atten, cable loss [dB] -Pre AMP gain [dB] + Extrapolation  
Extrapolation factor [dB] = ( Reading Av (5 m) [dBuV] -Reading Av (3 m) [dBuV] ) / (log ( 3 / 5 ) ) x ( log ( 3 / 300 ) )

### Radiated Emission (KDB680106)

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi-Anechoic Chamber  
Date November 26, 2017  
Temperature / Humidity 24 deg.C , 33 %RH  
Engineer Kenichi Adachi  
Model No. JDK-GX7  
Serial No. 88  
Mode Wireless Charging with watch  
EUT worst axis: Z

Freq. [MHz]	Reading Av (3 m) [dBuV]	Reading Av (5 m) [dBuV]	Antenna factor [dB/m]	Atten, cable loss [dB]	Pre AMP gain [dB]	Result (3 m) [dBuV/m]	Antenna angle [deg]	Table angle [deg]
0.18521	71.70	61.12	19.51	6.06	32.16	<b>65.11</b>	0	0
0.18521	71.27	-	19.51	6.06	32.16	64.68	45	334
0.18521	69.55	-	19.51	6.06	32.16	62.96	90	268
0.18521	71.23	-	19.51	6.06	32.16	64.64	135	214
0.18521	71.36	-	19.51	6.06	32.16	64.77	horizontal	0
0.37041	59.14	48.86	19.47	6.08	32.16	52.53	0	0
0.37041	58.73	-	19.47	6.08	32.16	52.12	45	334
0.37041	57.04	-	19.47	6.08	32.16	50.43	90	268
0.37042	58.44	-	19.47	6.08	32.16	51.83	135	214
0.37042	58.47	-	19.47	6.08	32.16	51.86	horizontal	0
0.55566	50.01	39.53	19.46	6.09	32.16	43.40	0	0
0.55566	49.57	-	19.46	6.09	32.16	42.96	45	334
0.55566	47.89	-	19.46	6.09	32.16	41.28	90	268
0.55562	49.02	-	19.46	6.09	32.16	42.41	135	214
0.55562	49.04	-	19.46	6.09	32.16	42.43	horizontal	0
1.11137	32.34	26.54	19.48	6.14	32.16	25.80	0	0
1.11137	31.62	-	19.48	6.14	32.16	25.08	45	334
1.11137	30.22	-	19.48	6.14	32.16	23.68	90	268
1.11121	31.44	-	19.48	6.14	32.16	24.90	135	214
1.11121	31.78	-	19.48	6.14	32.16	25.24	horizontal	0

Calculation:

Result (3 m) [dBuV/m] = Reading Av (3 m) [dBuV] + Antenna factor [dB/m] + Atten, cable loss [dB] -Pre AMP gain [dB]

## Radiated Emission (KDB680106)

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi-Anechoic Chamber  
Date November 26, 2017  
Temperature / Humidity 24 deg.C , 33 %RH  
Engineer Kenichi Adachi  
Model No. JDK-GX7  
Serial No. 88  
Mode Wireless Charging without watch  
EUT worst axis: Z

Freq. [MHz]	Reading Av (3 m) [dBuV]	Reading Av (5 m) [dBuV]	Antenna factor [dB/m]	Atten, cable loss [dB]	Pre AMP gain [dB]	Result (3 m) [dBuV/m]	Antenna angle [deg]	Table angle [deg]
0.18521	65.78	55.24	19.51	6.06	32.16	<b>59.19</b>	0	0
0.18521	64.27	-	19.51	6.06	32.16	57.68	45	317
0.18521	63.54	-	19.51	6.06	32.16	56.95	90	252
0.18521	64.54	-	19.51	6.06	32.16	57.95	135	233
0.18521	65.68	-	19.51	6.06	32.16	59.09	horizontal	0
0.37030	52.11	41.85	19.47	6.08	32.16	45.50	0	0
0.37030	51.22	-	19.47	6.08	32.16	44.61	45	317
0.37030	50.44	-	19.47	6.08	32.16	43.83	90	252
0.37041	51.42	-	19.47	6.08	32.16	44.81	135	233
0.37041	52.43	-	19.47	6.08	32.16	45.82	horizontal	0
0.55548	43.23	32.74	19.46	6.09	32.16	36.62	0	0
0.55548	41.95	-	19.46	6.09	32.16	35.34	45	317
0.55548	35.25	-	19.46	6.09	32.16	28.64	90	252
0.55564	42.04	-	19.46	6.09	32.16	35.43	135	233
0.55564	43.86	-	19.46	6.09	32.16	37.25	horizontal	0
1.11108	32.65	26.83	19.48	6.14	32.16	26.11	0	0
1.11108	32.26	-	19.48	6.14	32.16	25.72	45	317
1.11108	31.97	-	19.48	6.14	32.16	25.43	90	252
1.11147	32.11	-	19.48	6.14	32.16	25.57	135	233
1.11147	32.86	-	19.48	6.14	32.16	26.32	horizontal	0

Calculation:

Result (3 m) [dBuV/m] = Reading Av (3 m) [dBuV] + Antenna factor [dB/m] + Atten, cable loss [dB] -Pre AMP gain [dB]



## **RF Exposure (KDB680106)**

Test place : Shonan EMC Lab. No.3 Semi Anechoic Chamber  
Date : November 19, 2017  
Temperature/ Humidity : 20 deg.C./ 50 %RH  
Engineer : Kazutaka Takeyama

### **(E-Field) with watch (worst position value \*\*)**

Distance	Electric field strength (Reading)	Limit	Result
[cm]	[V/m]	[V/m]	[OK or NG]
10	1.86	614.00	OK

( \*\* position is front, rear, left, right, top, bottom)

### **(H-Field) with watch (worst position value \*\*)**

Distance	Magnetic Density (Reading)	Magnetic field strength*	Limit	Result
[cm]	[uT]	[A/m]	[A/m]	[OK or NG]
10	0.759	0.604	1.630	OK

Test result of Magnetic density:

12.144 % = Magnetic Density (Reading) x 100 [%] / 6.25 \*  
(Limit < 30 %, \* 6.25 is refer to IEC / EN 62233 Annex B Table B.

Calculating formula:

\*Magnetic field strength [A/m] = ( Magnetic density (Reading) [uT] x  $10^{-6}$  ) / (  $4\pi \times 10^{-7}$  ) [H/m]

Ambient:

(E-Field): 0.14 V/m  
(H-Field): 0.129 uT (0.103 A/m)

**UL Japan, Inc.**

**Shonan EMC Lab.**

1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

## APPENDIX 2: Test instruments

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SAEC-03(NSA)	Semi-Anechoic Chamber	TDK	SAEC-03(NSA)	3	RE, EMF	2017/06/11 * 12
SAEC-ALL	Semi-Anechoic Chamber(ME)	TDK	Semi-Anechoic Chamber 3m/10m	1, 2, 3	RE	2016/12/28 * 24
SLP-02	Loop Antenna	Rohde & Schwarz	HFH2-Z2	100218	RE	2017/10/16 * 12
SBA-03	Biconical Antenna	Schwarzbeck	BBA9106	91032666	RE	2017/10/02 * 12
SLA-07	Logperiodic Antenna	Schwarzbeck	VUSLP9111B	196	RE	2017/01/26 * 12
SAT6-08	Attenuator	HIROSE ELECTRIC CO.,LTD.	AT-406(40)	-	RE	2017/08/24 * 12
SCC-C1/C2/C3/C4/C5/C10/SRSE-03	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-271(RF Selector)	RE	2017/04/07 * 12
SAF-03	Pre Amplifier	SONOMA	310N	290213	RE	2017/02/09 * 12
STR-06	Test Receiver	Rohde & Schwarz	ESCI	101259	RE	2017/03/23 * 12
STR-08	Test Receiver	Rohde & Schwarz	ESW44	101581	RE, CE	2017/11/24 * 12
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE,RFI,MF)	-	RE, CE	-
SOS-05	Humidity Indicator	A&D	AD-5681	4062518	RE	2017/10/30 * 12
SJM-02	Measure	KOMELON	KMC-36	-	RE, CE, EMF	-
STS-03	Digital Hitester	Hioki	3805-50	080997823	RE, CE, EMF	2017/10/16 * 12
SCC-C9/C10/SRSE-03	Coaxial Cable&RF Selector	Suhner/Suhner/TOYO	RG223U/141PE/NS4906	-/0901-271(RF Selector)	CE	2017/04/07 * 12
SLS-02	LISN	Rohde & Schwarz	ENV216	100512	CE	2017/02/10 * 12
SAT3-07	Attenuator	JFW	50HF-003N	-	CE	2017/09/08 * 12
SOS-06	Humidity Indicator	A&D	AD-5681	4062118	CE	2016/12/13 * 12
SMM-01	Exposure Level Tester	Narda	ELT-400	M-0183	EMF	2017/04/19 * 12
SMA-01	Magnetic Field Probe 100cm <sup>2</sup>	Narda	ELT-400	M-0180	EMF	2017/04/19 * 12
SEF-01	Broadband Field Meter	Narda	NBM-520	C-0520	EMF	2015/10/15 * 36
SEF-05	Probe EF0391(E-Field)	Narda	EF0391	2402/01	EMF	2015/10/15 * 36
SOS-06	Humidity Indicator	A&D	AD-5681	4062118	EMF	2016/12/13 * 12

\*Hyphens for Calibration Due Date and Cal Int (month) are instruments that Calibration is not required (e.g. software), or instruments checked in advance before use.

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: CE: Conducted Emission test

RE: Radiated Emission test

EMF: Electric, Magnetic and Electromagnetic fields

**UL Japan, Inc.**

**Shonan EMC Lab.**

1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401