



# EMI TEST REPORT

Test Report No. : 13741990H-B-R1

**Applicant** : TOKAI RIKA CO., LTD.

**Type of EUT** : Receiver

**Model Number of EUT** : FK2LG

**FCC ID** : MOZFK2LG

**Test regulation** : FCC Part 15 Subpart B: 2021

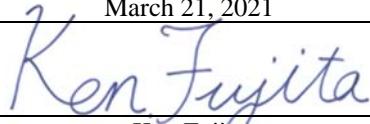
**Test Result** : Complied (Refer to SECTION 3)

1. This test report shall not be reproduced in full or partial, without the written approval of UL Japan, Inc.
2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the limits of the above regulation.
4. The test results in this test 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 the A2LA accreditation body.
6. This test report covers EMC technical requirements. It does not cover administrative issues such as Manual or non-EMC test related Requirements. (if applicable)
7. The all test items in this test report are conducted by UL Japan, Inc. Ise EMC Lab.
8. The opinions and the interpretations to the result of the description in this report are outside scopes where UL Japan has been accredited.
9. The information provided from the customer for this report is identified in SECTION 1.
10. This report is a revised version of 13741990H-B. 13741990H-B is replaced with this report.

**Date of test:**

March 21, 2021

**Representative test engineer:**

  
Ken Fujita

Ken Fujita  
Engineer

**Approved by:**

  
Shinichi Miyazono

Shinichi Miyazono  
Engineer



CERTIFICATE 5107.02

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.**

**Ise EMC Lab.**

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

## **REVISION HISTORY**

### **Original Test Report No.: 13741990H-B**

Revision	Test report No.	Date	Page revised	Contents
- (Original)	13741990H-B	May 20, 2021	-	-
1	13741990H-B-R1	July 12, 2021	P.5	Correction about the difference description between GK2LG and FK2LG.
1	13741990H-B-R1	July 12, 2021	P.9	Correction of the block diagram, list, and note sentence of Clause 4.2.

## Reference: Abbreviations (Including words undescribed in this report)

AAN	Asymmetric Artificial Network	ILAC	International Laboratory Accreditation Conference
AC	Alternating Current	ISED	Innovation, Science and Economic Development Canada
AM	Amplitude Modulation	ISN	Impedance Stabilization Network
AMN	Artificial Mains Network	ISO	International Organization for Standardization
Amp, AMP	Amplifier	JAB	Japan Accreditation Board
ANSI	American National Standards Institute	LAN	Local Area Network
Ant, ANT	Antenna	LCL	Longitudinal Conversion Loss
AP	Access Point	LIMS	Laboratory Information Management System
ASK	Amplitude Shift Keying	LISN	Line Impedance Stabilization Network
Atten., ATT	Attenuator	MRA	Mutual Recognition Arrangement
AV	Average	N/A	Not Applicable
BPSK	Binary Phase-Shift Keying	NIST	National Institute of Standards and Technology
BR	Bluetooth Basic Rate	NS	No signal detect.
BT	Bluetooth	NSA	Normalized Site Attenuation
BT LE	Bluetooth Low Energy	NVLAP	National Voluntary Laboratory Accreditation Program
BW	BandWidth	OBW	Occupied Band Width
C.F	Correction Factor	OFDM	Orthogonal Frequency Division Multiplexing
Cal Int	Calibration Interval	PK	Peak
CAV	CISPR AV	PLT	long-term flicker severity
CCK	Complementary Code Keying	POHC(A)	Partial Odd Harmonic Current
CDN	Coupling Decoupling Network	Pol., Pola.	Polarization
Ch., CH	Channel	PR-ASK	Phase Reversal ASK
CISPR	Comité International Special des Perturbations Radioélectriques	Pst	short-term flicker severity
Corr.	Correction	QAM	Quadrature Amplitude Modulation
CPE	Customer premise equipment	QP	Quasi-Peak
CW	Continuous Wave	QPSK	Quadri-Phase Shift Keying
DBPSK	Differential BPSK	r.m.s., RMS	Root Mean Square
DC	Direct Current	RBW	Resolution Band Width
DET	Detector	RE	Radio Equipment
D-factor	Distance factor	REV	Reverse
Dmax	maximum absolute voltage change during an observation period	RF	Radio Frequency
DQPSK	Differential QPSK	RFID	Radio Frequency Identifier
DSSS	Direct Sequence Spread Spectrum	RSS	Radio Standards Specifications
EDR	Enhanced Data Rate	Rx	Receiving
e.i.r.p., EIRP	Equivalent Isotropically Radiated Power	SINAD	Ratio of (Signal + Noise + Distortion) to (Noise + Distortion)
EM clamp	Electromagnetic clamp	S/N	Signal to Noise ratio
EMC	ElectroMagnetic Compatibility	SA, S/A	Spectrum Analyzer
EMI	ElectroMagnetic Interference	SG	Signal Generator
EMS	ElectroMagnetic Susceptibility	SVSWR	Site-Voltage Standing Wave Ratio
EN	European Norm	THC(A)	Total Harmonic Current
e.r.p., ERP	Effective Radiated Power	THD(%)	Total Harmonic Distortion
EU	European Union	TR	Test Receiver
EUT	Equipment Under Test	Tx	Transmitting
Fac.	Factor	VBW	Video BandWidth
FCC	Federal Communications Commission	Vert.	Vertical
FHSS	Frequency Hopping Spread Spectrum	WLAN	Wireless LAN
FM	Frequency Modulation	xDSL	Generic term for all types of DSL technology (DSL: Digital Subscriber Line)
Freq.	Frequency		
FSK	Frequency Shift Keying		
Fund	Fundamental		
FWD	Forward		
GFSK	Gaussian Frequency-Shift Keying		
GNSS	Global Navigation Satellite System		
GPS	Global Positioning System		
Hori.	Horizontal		
ICES	Interference-Causing Equipment Standard		
I/O	Input/Output		
IEC	International Electrotechnical Commission		
IEEE	Institute of Electrical and Electronics Engineers		
IF	Intermediate Frequency		

**UL Japan, Inc.**

**Ise EMC Lab.**

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

<b>CONTENTS</b>	<b>PAGE</b>
<b>SECTION 1: Customer information .....</b>	<b>5</b>
<b>SECTION 2: Equipment under test (EUT).....</b>	<b>5</b>
<b>SECTION 3: Test specification, procedures &amp; results .....</b>	<b>6</b>
<b>SECTION 4: Operation of EUT during testing.....</b>	<b>9</b>
<b>SECTION 5: Radiated Emission.....</b>	<b>10</b>
<b>APPENDIX 1: Test data .....</b>	<b>12</b>
Radiated Emission .....	12
Spot-check test for Radiated Emission .....	14
<b>APPENDIX 2: Test instruments .....</b>	<b>16</b>
<b>APPENDIX 3: Photographs of test setup .....</b>	<b>17</b>
Radiated Emission .....	17
Worst Case Position (Horizontal: X-axis / Vertical: Xaxis) .....	19

## **SECTION 1: Customer information**

Company Name : TOKAI RIKA CO., LTD.  
Address : 3-260 Toyota, Oguchi-cho, Niwa-gun, Aichi 480-0195, Japan 480-0195  
Telephone Number : +81-587-95-0093  
Facsimile Number : +81-587-95-5471  
Contact Person : Hiroki Unno

The information provided from the customer is as follows;

- Applicant, Type of EUT, Model Number of EUT, FCC ID on the cover and other relevant pages

- Operating/Test Mode(s) (Mode(s)) on all the relevant pages

- SECTION 1: Customer information

- SECTION 2: Equipment under test (EUT) other than the Receipt Date

- SECTION 4: Operation of EUT during testing

\* The laboratory is exempted from liability of any test results affected from the above information in SECTION 2 and 4.

## **SECTION 2: Equipment under test (EUT)**

### **2.1 Identification of EUT**

Type : Receiver  
Model Number : FK2LG  
Serial Number : Refer to SECTION 4.2  
Rating : DC 12.0 V  
Receipt Date : March 17, 2021  
Condition : Production prototype  
(Not for Sale: This sample is equivalent to mass-produced items.)  
Modification : No Modification by the test lab

### **2.2 Product Description**

Model: FK2LG (referred to as the EUT in this report) is a Receiver.

### **Radio Specification**

Feature of EUT:

Clock frequency(ies) in the system : 30.32 MHz  
Frequency of Operation : 312.15 MHz  
Local Oscillator Frequency : 311.873 MHz  
Type of Modulation : ASK  
Type of receiving system : Super-heterodyne  
Antenna Type : Internal antenna (Independent antenna)  
Operating temperature range : -30 deg. C to +80 deg. C

\*Model No. GK2LG and FK2LG are completely identical in EMC characteristics.; except for the number of terminals.  
The test was performed with Model No. GK2LG (FCC ID: MOZGK2LG) as representative, and the spot-check  
test was performed with Model No. FK2LG.

---

**UL Japan, Inc.**

**Ise EMC Lab.**

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

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

#### **3.1 Test Specification**

Test Specification : FCC Part 15 Subpart B  
 FCC Part 15 final revised on May 3, 2021 and effective July 2, 2021  
 Title : FCC 47CFR Part15 Radio Frequency Device  
 Subpart B Unintentional Radiators

\* The revision does not affect the test result conducted before its effective date.

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

Item	Test Procedure	Limits	Deviation	Worst margin	Result	Remarks				
Conducted emission	<b>FCC: ANSI C63.4: 2014 + C63.4a: 2017</b> 7. AC power - line conducted emission measurements	<b>FCC:Part 15 Subpart B 15.107(a)</b>	N/A	N/A	N/A	*1)				
	<b>ISED: RSS-Gen 7.1</b>	<b>ISED: RSS-Gen 7.2</b>								
Radiated emission	<b>FCC: ANSI C63.4: 2014 + C63.4a: 2017</b> 8. Radiated emission measurements	<b>FCC: Part 15 Subpart B 15.109(a)</b>	N/A	29.04 dB 1559.365 MHz, Horizontal, AV	Complied a)	-				
	<b>ISED: RSS-Gen 7.1</b>	<b>ISED: RSS-Gen 7.3</b>								
Antenna Terminal	<b>FCC: ANSI C63.4: 2014 + C63.4a: 2017</b> 12. Measurement of unintentional radiators other than ITE	<b>FCC: Part 15 Subpart B 15.111(a)</b>	N/A	N/A	N/A	*2)				
	<b>ISED: - RSS-Gen 7.1</b>	<b>ISED: RSS-Gen 7.4</b>								
*Note: UL Japan, Inc's EMI Work Procedure 13-EM-W0420. *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. *2) The receiving antenna (of this EUT) is installed inside the EUT and cannot be removed (permanently attached). Therefore, Radiated emission test was performed.										
a) Refer to APPENDIX 1 (data of Radiated Emission) Symbols: Complied The data of this test item has enough margin, more than the measurement uncertainty. Complied# The data of this test item meets the limits unless the measurement uncertainty is taken into consideration.										

#### **3.3 Addition to standard**

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

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

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN  
 Telephone : +81 596 24 8999  
 Facsimile : +81 596 24 8124

### 3.4 Uncertainty

There is no applicable rule of uncertainty in this applied standard. Therefore, the results are derived depending on whether or not laboratory uncertainty is applied.

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

#### Radiated emission

Measurement distance	Frequency range	Uncertainty (+/-)
3 m	30 MHz to 200 MHz (Horizontal)	4.8 dB
	(Vertical)	5.0 dB
	200 MHz to 1000 MHz (Horizontal)	5.2 dB
	(Vertical)	6.3 dB
10 m	30 MHz to 200 MHz (Horizontal)	4.8 dB
	(Vertical)	4.8 dB
	200 MHz to 1000 MHz (Horizontal)	5.0 dB
	(Vertical)	5.0 dB
3 m	1 GHz to 6 GHz	4.9 dB
	6 GHz to 18 GHz	5.2 dB
1 m	10 GHz to 26.5 GHz	5.5 dB
	26.5 GHz to 40 GHz	5.5 dB
0.5 m	26.5 GHz to 40 GHz	5.5 dB
10 m	1 GHz to 18 GHz	5.2 dB

---

**UL Japan, Inc.**

**Ise EMC Lab.**

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

### 3.5 Test Location

UL Japan, Inc. Ise EMC Lab.  
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN  
Telephone: +81 596 24 8999, Facsimile: +81 596 24 8124  
\* A2LA Certificate Number: 5107.02 / FCC Test Firm Registration Number: 199967  
ISED Lab Company Number: 2973C / CAB identifier: JP0002

Test site	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Other rooms	Maximum measurement distance
No.1 semi-anechoic chamber	19.2 x 11.2 x 7.7	7.0 x 6.0	No.1 Power source room	10 m
No.2 semi-anechoic chamber	7.5 x 5.8 x 5.2	4.0 x 4.0	-	3 m
No.3 semi-anechoic chamber	12.0 x 8.5 x 5.9	6.8 x 5.75	No.3 Preparation room	3 m
No.3 shielded room	4.0 x 6.0 x 2.7	N/A	-	-
No.4 semi-anechoic chamber	12.0 x 8.5 x 5.9	6.8 x 5.75	No.4 Preparation room	3 m
No.4 shielded room	4.0 x 6.0 x 2.7	N/A	-	-
No.5 semi-anechoic chamber	6.0 x 6.0 x 3.9	6.0 x 6.0	-	-
No.5 measurement room	6.4 x 6.4 x 3.0	6.4 x 6.4	-	-
No.6 shielded room	4.0 x 4.5 x 2.7	4.0 x 4.5	-	-
No.6 measurement room	4.75 x 5.4 x 3.0	4.75 x 4.15	-	-
No.7 shielded room	4.7 x 7.5 x 2.7	4.7 x 7.5	-	-
No.8 measurement room	3.1 x 5.0 x 2.7	3.1 x 5.0	-	-
No.9 measurement room	8.8 x 4.6 x 2.8	2.4 x 2.4	-	-
No.11 measurement room	6.2 x 4.7 x 3.0	4.8 x 4.6	-	-

\* Size of vertical conducting plane (for Conducted Emission test) : 2.0 m x 2.0 m 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.

---

## UL Japan, Inc. Ise EMC Lab.

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN  
Telephone : +81 596 24 8999  
Facsimile : +81 596 24 8124

## SECTION 4: Operation of EUT during testing

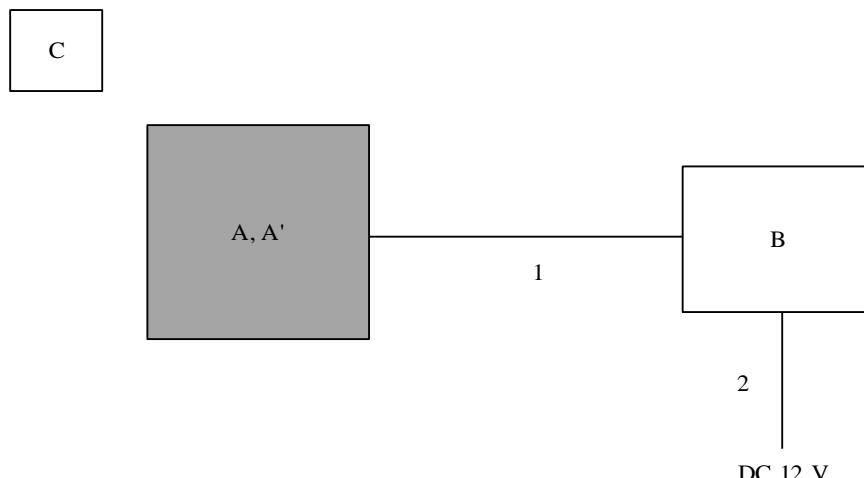
### 4.1 Operating Mode(s)

Mode	Remarks
Receiving mode	-
* EUT was set by the software as follows: Software: HN_036A_kls_110.hex Version 110	

\*The test signal level was confirmed to be sufficient to stabilize the local oscillator of the EUT.

\* It was confirmed by using checker that the EUT receives the signal from the transmitter (pair of EUT).

### 4.2 Configuration and peripherals



\* Cabling and setup(s) were taken into consideration and test data was taken under worse case conditions.  
 \* Item No. A includes Receiver Antenna.

### Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Receiver	GK2LG	7	TOKAI RIKA CO., LTD.	EUT *1)
A'	Receiver	FK2LG	8	TOKAI RIKA CO., LTD.	EUT *2)
B	Jig	-	-	TOKAI RIKA CO., LTD.	-
C	Key	-	-	TOKAI RIKA CO., LTD.	-

\*1) Used for all tests except for spot check test.

\*2) Used for spot-check test only.

### List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	Signal Cable	2.5	Unshielded	Unshielded	-
2	DC Cable	1.0	Unshielded	Unshielded	-

**UL Japan, Inc.**

**Ise EMC Lab.**

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

## **SECTION 5: Radiated Emission**

### **5.1. Operating environment**

Test place : No.4 semi anechoic chamber  
Temperature : See data  
Humidity : See data

### **5.2. Test configuration**

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

The EUT was set on the edge of the tabletop.

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

Photographs of the set up are shown in Appendix 3.

### **5.3. Test conditions**

Frequency range : 30 MHz - 200 MHz (Biconical antenna) / 200 MHz - 1000 MHz (Logperiodic antenna)  
1000 MHz - 2000 MHz (Horn antenna)  
Test distance : 3 m  
EUT position : Table top  
EUT operation mode : See Clause 4.1

### **5.4. Test procedure**

The height of the measuring antenna varied between 1 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 both vertical and horizontal antenna polarization with the Test Receiver.

The radiated emission measurements were made with the following detector function of the Test Receiver.

For above 1 GHz, test antenna was aimed at the EUT for receiving the maximum signal and always kept within the illumination area of the 3 dB beamwidth of the antenna.

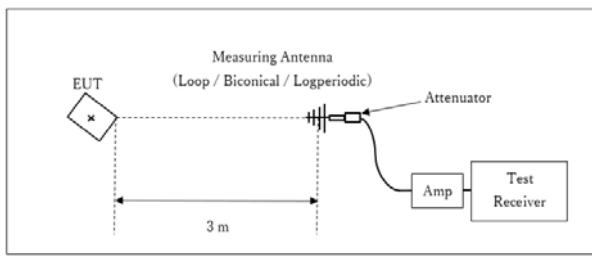
Frequency	Below 1GHz	Above 1GHz *1)
Instrument used	Test Receiver	Test Receiver
IF Bandwidth	QP: BW 120 kHz	PK: BW 1 MHz, CISPR AV: BW 1 MHz

\*1) The measurement data was adjusted to a 3 m distance using the following Distance Factor.

Distance Factor: See Figure 2.

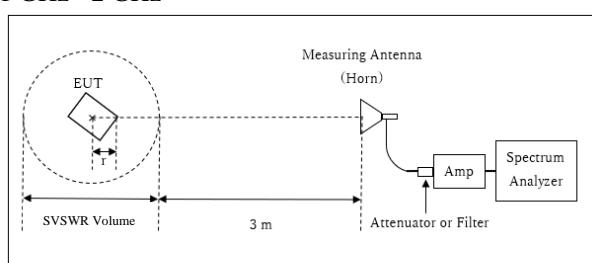
## Figure 2: Test Setup

Below 1 GHz



Test Distance: 3 m

1 GHz - 2 GHz



Distance Factor:  $20 \times \log (3.9 \text{ m}^*/3.0 \text{ m}) = 2.28 \text{ dB}$   
 \* Test Distance:  $(3 + \text{SVSWR Volume}/2) - r = 3.9 \text{ m}$

SVSWR Volume: 2 m  
 (SVSWR Volume has been calibrated based on CISPR 16-1-4.)  
 $r = 0.1 \text{ m}$

- The 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.

### 5.5. Test result

Summary of the test results: Pass

The limit is rounded down to one decimal place.

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

Date: March 21, 2021

Test engineer: Ken Fujita

**UL Japan, Inc.**

**Ise EMC Lab.**

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8999

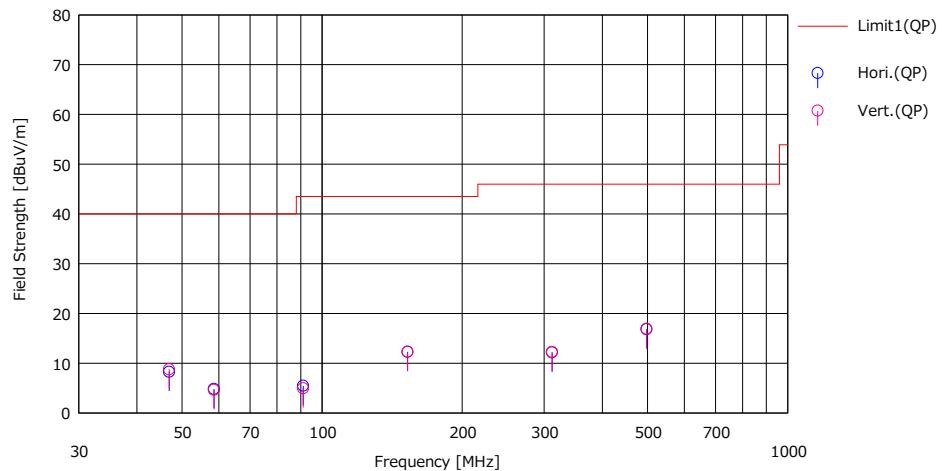
Facsimile : +81 596 24 8124

## APPENDIX 1: Test data

### Radiated Emission < Model No. GK2LG >

Report No. 13741990H  
 Test place Ise EMC Lab.  
 Semi Anechoic Chamber No.4  
 Date March 21, 2021  
 Temperature / Humidity 23 deg. C / 43 % RH  
 Engineer Ken Fujita  
 (Below 1 GHz)  
 Mode Mode 1

Limit : FCC\_Part 15 Subpart B(15.109)\_ClassB



No.	Freq. [MHz]	Reading (QP) [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result (QP) [dBuV/m]	Limit (QP) [dBuV/m]	Margin [dB]	Pda. [H/V]	Height [cm]	Angle [deg]	Ant. Type	Comment
1	46.949	20.50	12.31	7.42	31.97	8.26	40.00	31.74	Hori.	300	303	BA	
2	58.599	21.00	8.19	7.59	31.96	4.82	40.00	35.18	Hori.	300	320	BA	
3	91.104	20.70	8.69	7.98	31.93	5.44	43.50	38.06	Hori.	300	217	BA	
4	152.632	20.40	15.14	8.59	31.86	12.27	43.50	31.23	Hori.	300	348	BA	
5	311.873	20.30	13.82	9.79	31.76	12.15	46.00	33.85	Hori.	132	74	LA23	
6	497.904	20.10	17.66	10.91	31.87	16.80	46.00	29.20	Hori.	123	349	LA23	
7	46.949	21.00	12.31	7.42	31.97	8.76	40.00	31.24	Vert.	100	304	BA	
8	58.599	20.80	8.19	7.59	31.96	4.62	40.00	35.38	Vert.	100	0	BA	
9	91.104	20.20	8.69	7.98	31.93	4.94	43.50	38.56	Vert.	100	0	BA	
10	152.632	20.40	15.14	8.59	31.86	12.27	43.50	31.23	Vert.	100	6	BA	
11	311.873	20.40	13.82	9.79	31.76	12.25	46.00	33.75	Vert.	112	197	LA23	
12	497.904	20.20	17.66	10.91	31.87	16.90	46.00	29.10	Vert.	116	229	LA23	

#### CHART: WITH FACTOR

ANT TYPE: - 30 MHz: LOOP, 30 MHz - 200 MHz: BICONICAL, 200 MHz - 1000 MHz: LOGPERIODIC, 1000 MHz :- HORN

CALCULATION: RESULT = READING + ANT FACTOR + LOSS(CABLE + ATT) - GAIN(AMP)

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

**UL Japan, Inc.**

**Ise EMC Lab.**

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

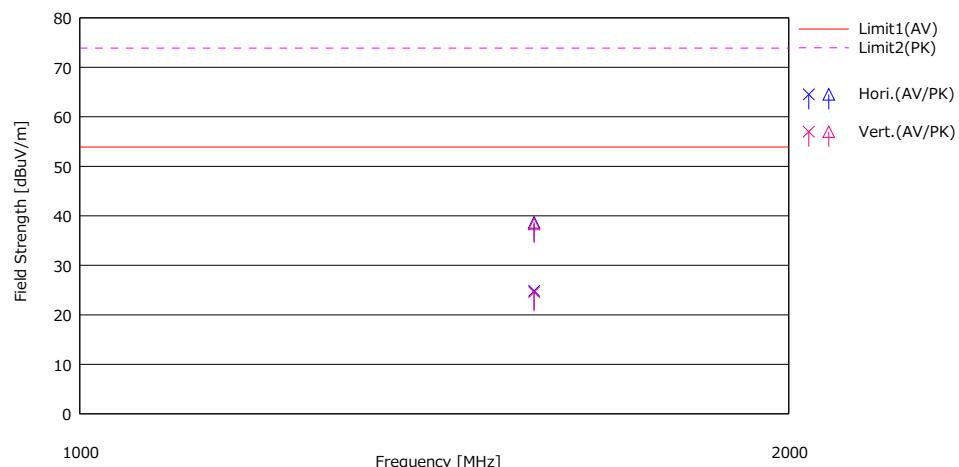
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

**Radiated Emission**  
 < Model No. GK2LG >

Report No. 13741990H  
 Test place Ise EMC Lab.  
 Semi Anechoic Chamber No.4  
 Date March 21, 2021  
 Temperature / Humidity 23 deg. C / 43 % RH  
 Engineer Ken Fujita  
 (Above 1 GHz)  
 Mode Mode 1

Limit : FCC15.109(a) 3m, below 1GHz:QP, above 1GHz:PK



No.	Freq. [MHz]	Reading		Ant.Fac. [dBuV]	Loss [dB]	Gain [dB]	Result		Limit		Margin		Pola. [H/V]	Height [cm]	Angle [deg]	Ant. Type	Comment
		(AV) [dBuV]	(PK) [dBuV]				(AV) [dBuV/m]	(PK) [dBuV/m]	(AV) [dBuV/m]	(PK) [dBuV/m]	(AV) [dB]	(PK) [dB]					
1	1559.365	28.80	42.60	24.88	4.37	33.19	24.86	38.66	53.90	73.90	29.04	35.24	Hori.	100	0	H21	
2	1559.365	28.50	42.30	24.88	4.37	33.19	24.56	38.36	53.90	73.90	29.34	35.54	Vert.	100	0	H21	

CHART: WITH FACTOR

ANT TYPE: - 30 MHz: LOOP, 30 MHz - 200 MHz: BICONICAL, 200 MHz - 1000 MHz: LOGPERIODIC, 1000 MHz - : HORN

CALCULATION: RESULT = READING + ANT FACTOR + LOSS(CABLE + D-factor) - GAIN(AMP)

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

**UL Japan, Inc.**

**Ise EMC Lab.**

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8999

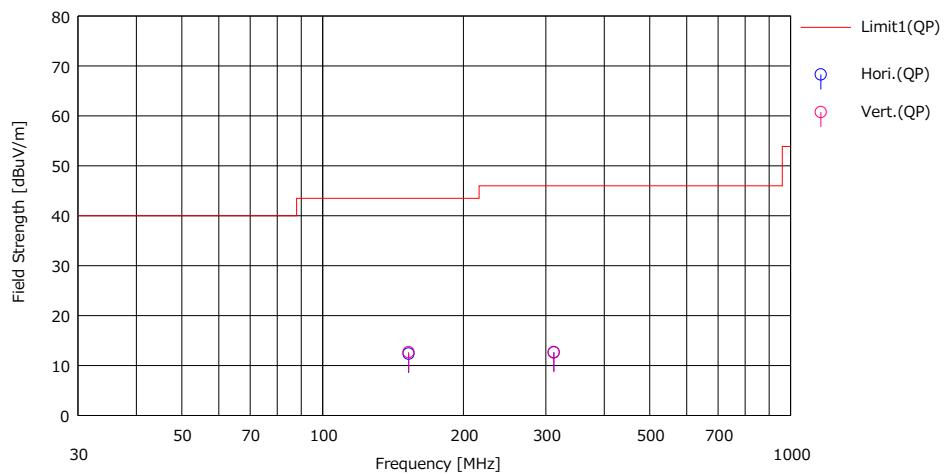
Facsimile : +81 596 24 8124

## Spot-check test for Radiated Emission

< Model No. FK2LG >

Report No. 13741990H  
 Test place Ise EMC Lab.  
 Semi Anechoic Chamber No.4  
 Date March 21, 2021  
 Temperature / Humidity 23 deg. C / 43 % RH  
 Engineer Ken Fujita  
 (Below 1 GHz)  
 Mode Mode 1

Limit : FCC\_Part 15 Subpart B(15.109)\_Class B



No.	Freq. [MHz]	Reading (QP)		Ant.Fac [dB/m]	Loss [dB]	Gain [dB]	Result (QP)	Limit (QP)	Margin (QP)	Polt.	Height [cm]	Angle [deg]	Ant. Type	Comment
		Field Strength [dBuV/m]	Ant.Fac [dB/m]											
1	152.632	20.30	15.05	8.45	31.40	12.40	43.50	31.1	33.3	Hori.	227	332	BA	
2	311.873	20.50	13.82	9.64	31.26	12.70	46.00	33.3	76	Hori.	132	76	LA23	
3	152.632	20.60	15.05	8.45	31.40	12.70	43.50	30.8	100	Vert.	100	12	BA	
4	311.873	20.40	13.82	9.64	31.26	12.60	46.00	33.4	112	Vert.	112	187	LA23	

### CHART: WITH FACTOR

ANT TYPE: - 30 MHz: LOOP, 30 MHz - 200 MHz: BICONICAL, 200 MHz - 1000 MHz: LOGPERIODIC, 1000 MHz - HORN  
 CALCULATION: RESULT = READING + ANT FACTOR + LOSS(CABLE + ATT) - GAIN(AMP)

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

**UL Japan, Inc.**

**Ise EMC Lab.**

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8999

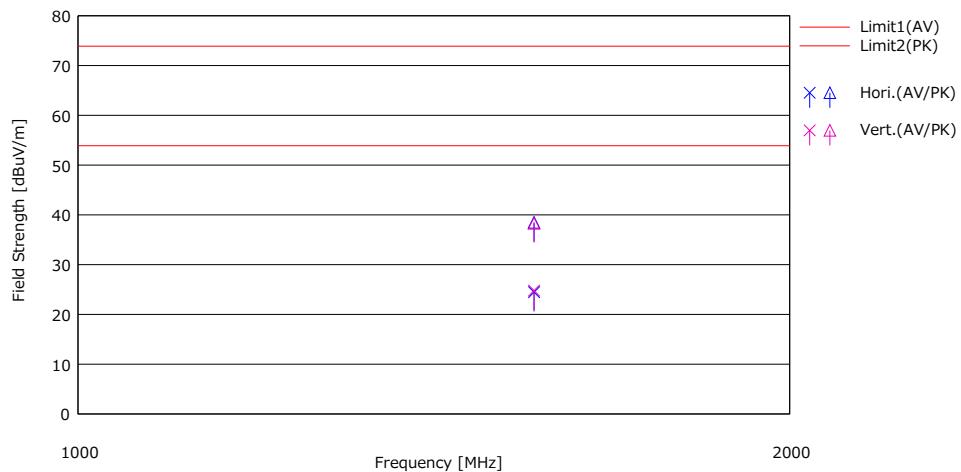
Facsimile : +81 596 24 8124

## Spot-check test for Radiated Emission

< Model No. FK2LG >

Report No. 13741990H  
 Test place Ise EMC Lab.  
 Semi Anechoic Chamber No.4  
 Date March 21, 2021  
 Temperature / Humidity 23 deg. C / 43 % RH  
 Engineer Ken Fujita  
 (Above 1 GHz)  
 Mode Mode 1

Limit : FCC\_Part 15 Subpart B(15.109)\_Class B



No.	Freq. [MHz]	Reading		Ant.Fac	Loss	Gdn	Result		Limit		Margin		Polo.	Height [cm]	Angle [deg]	Ant. Type	Comment
		⟨AV⟩ [dBuV]	⟨PK⟩ [dBuV]				⟨AV⟩ [dB]	⟨PK⟩ [dB]	⟨AV⟩ [dBuV/m]	⟨PK⟩ [dBuV/m]	⟨AV⟩ [dBuV/m]	⟨PK⟩ [dBuV/m]					
		[MHz]	[dBuV]				[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dBuV/m]					
1	1559.365	28.20	42.20	24.98	4.37	33.06	24.49	38.49	53.90	73.90	29.4	35.4	Hori.	100	0	H21	
2	1559.365	28.50	42.00	24.98	4.37	33.06	24.79	38.29	53.90	73.90	29.1	35.6	Vert.	100	0	H21	

### CHART: WITH FACTOR

ANT TYPE: - 30 MHz: LOOP, 30 MHz - 200 MHz: BICONICAL, 200 MHz - 1000 MHz: LOGPERIODIC, 1000 MHz :- HORN  
 CALCULATION: RESULT = READING + ANT FACTOR + LOSS(CABLE + D-factor) - GAIN(AMP)

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

**UL Japan, Inc.**

**Ise EMC Lab.**

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

## APPENDIX 2: Test instruments

### Test equipment

Test Item	Local ID	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
RE	MAEC-04	142011	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	05/25/2020	24
RE	MOS-15	141562	Thermo-Hygrometer	CUSTOM	CTH-180	1501	01/15/2021	12
RE	MMM-10	141545	DIGITAL HiTESTER	HIOKI	3805	51201148	01/07/2021	12
RE	MJM-29	142230	Measure	KOMELON	KMC-36	-	-	-
RE	COTS-MEMI-02	178648	EMI measurement program	TSJ (Techno Science Japan)	TEPTO-DV	-	-	-
RE	MAEC-04-SVSWR	142017	Semi Anechoic Chamber(SVSWR)	TDK	Semi Anechoic Chamber 3m	DA-10005	04/04/2019	24
RE	MAT-34	141331	Attenuator(6dB)	TME	UFA-01	-	02/02/2021	12
RE	MBA-05	141425	Biconical Antenna	Schwarzbeck	BBA9106	1302	08/31/2020	12
RE	MCC-50	141397	Coaxial Cable	UL Japan	-	-	11/06/2020	12
RE	MLA-23	141267	Logperiodic Antenna (200-1000MHz)	Schwarzbeck	VUSLP9111B	911B-192	09/02/2020	12
RE	MPA-14	141583	Pre Amplifier	SONOMA INSTRUMENT	11/5/1900	260833	02/03/2021	12
RE	MTR-03	141942	Test Receiver	Rohde & Schwarz	ESCI	100300	08/18/2020	12
RE	MHA-21	141508	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	9120D-557	05/22/2020	12
RE	MPA-12	141581	MicroWave System Amplifier	AGILENT	83017A	650	10/19/2020	12
RE	MCC-246	199563	Microwave Cable	HUBER+SUNER	SF126E/11PC35/11 PC35/1000M,5000M	537061/126E / 537072/126E	06/11/2020	12

\*Hyphens for Last Calibration 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.

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

**UL Japan, Inc.**

**Ise EMC Lab.**

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124