



# RADIO TEST REPORT

**Test Report No.: 32EE0044-SH-01-A-R1**

**Applicant** : Honda Lock Mfg. Co., Ltd.  
**Type of Equipment** : Transmitter of Keyless Entry  
**Model No.** : HLIK6-1T  
**Test regulation** : FCC Part 15 Subpart C: 2011  
**FCC ID** : MLBHLIK6-1T  
**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 report is a revised version of 32EE0044-SH-01-A. 32EE0044-SH-01-A is replaced with this report.

**Date of test:** December 28, 2011 – January 26, 2012

**Representative test engineer:**

Kenichi Adachi  
Engineer of WiSE Japan,  
UL Verification Service

**Approved by :**

Go Ishiwata  
Manager of WiSE Japan,  
UL Verification Service

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## 1 Customer Information

Company Name : Honda Lock Mfg. Co., Ltd.  
Address : 3700,Shimonaka Sadowara-Cho,Miyazaki-Shi Miyazaki Pref., 880-0293 Japan  
Telephone Number : +81 50-3757-5619  
Contact Person : Mitsunori Suyama

## 2 Equipment under test (E.U.T.)

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

Type of Equipment : Transmitter of Keyless Entry  
Model No. : HLIK6-1T  
Serial No. : Refer to Clause 4.2  
Rating : DC3.0V  
Receipt Date of Sample : December 26, 2012  
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: HLIK6-1T (referred to as the EUT in this report) is a Transmitter of Keyless Entry.

Equipment type : Transmitter  
Frequency of operation : 313.85MHz  
Type of modulation : FSK  
Mode of Operation : Simplex  
Power Control : No  
Antenna type : Loop Antenna

#### \*FCC Part15.31 (e)

The test was performed with the New Battery (DC3.0V) and the stable voltage was supplied to the EUT during the tests. Therefore, the EUT complies with the requirement.

#### \*FCC Part15.203

It is impossible for end users to replace the antenna, because the antenna is mounted inside of the EUT. Therefore, the equipment complies with the antenna requirement of Section 15.203.

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### 3 Test Specification, Procedures and Results

#### 3.1 Test specification

Test specification : FCC Part 15 Subpart C 2011, final revised on November 21, 2011 and effective December 21, 2011

Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators  
Section 15.209 Radiated emission limits, general requirements  
Section 15.231 Periodic operation in the band 40.66 - 40.70 MHz and above 70 MHz

#### 3.2 Procedures & Results

Item	Test Procedure	Specification	Worst margin	Results	Remarks
Conducted emission	FCC: ANSI C63.4:2003 7. AC powerline conducted emission measurements IC: RSS-Gen 7.2.4	FCC: Section 15.207 ----- IC: RSS-Gen 7.2.4	N/A	N/A*1)	-
Automatically Deactivate	FCC: ANSI C63.4:2003 13. Measurement of intentional radiators IC: -	FCC: Section 15.231(a)(1) ----- IC: RSS-210 A1.1.1	N/A	Complied	Radiated
Electric Field Strength of Fundamental Emission	FCC: ANSI C63.4:2003 13. Measurement of intentional radiators IC: RSS-Gen 4.8	FCC: Section 15.231(b) ----- IC: RSS-210 A1.1.2	0.4dB 313.850MHz Horizontal	Complied	Radiated
Electric Field Strength of Spurious Emission	FCC: ANSI C63.4:2003 13. Measurement of intentional radiators IC: RSS-Gen 4.9	FCC: Section 15.205 Section 15.209 Section 15.231(b) ----- IC: RSS-210 A1.1.2, 2.5.1 RSS-Gen 7.2.2 RSS-Gen 7.2.5	5.9dB 3138.500MHz Horizontal	Complied	Radiated
-20dB Bandwidth	FCC: ANSI C63.4:2003 13. Measurement of intentional radiators IC: RSS-Gen 4.6.3	FCC: Section 15.231(c) ----- IC: RSS-Gen 4.6.3	N/A	Complied	Radiated

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 does not have AC Mains.

#### 3.3 Addition to standard

Item	Test Procedure	Specification	Remarks	Worst Margin	Results
Occupied Bandwidth (99%)	RSS-Gen 4.6.1	RSS-210 A1.1.3 RSS-Gen 4.6.1	Radiated	-	N/A

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

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### 3.4 Uncertainty

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

Item	Frequency range	No.1 SAC <sup>*1</sup> /SR <sup>*2</sup> (±)	No.2 SAC/SR (±)	No.3 SAC/SR (±)
Radiated emission (Measurement distance: 3m)	9kHz-30MHz	3.7 dB	3.7 dB	3.6 dB
	30MHz-300MHz	4.9 dB	5.1 dB	5.0 dB
	300MHz-1GHz	5.0 dB	5.2 dB	5.0 dB
	1GHz-18GHz	4.8 dB	4.8 dB	4.9 dB

\*1: SAC=Semi-Anechoic Chamber

\*2: SR= Shielded Room is applied besides radiated emission

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

Bandwidth Measurement uncertainty for this test was: (±) 5.4%

### 3.5 Test Location

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JAB Accreditation No. : RTL02610

	FCC Registration No.	IC Registration No.	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Maximum measurement distance
<input checked="" type="checkbox"/> No.1 Semi-anechoic chamber	697847	2973D-1	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
<input type="checkbox"/> No.2 Semi-anechoic chamber	697847	2973D-2	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
<input checked="" type="checkbox"/> No.3 Semi-anechoic chamber	697847	2973D-3	12.7 x 7.7 x 5.35	12.7 x 7.7	5m
<input type="checkbox"/> No.4 Full-anechoic chamber	-	-	8.1 x 5.1 x 3.55	8.1 x 5.1	-
<input type="checkbox"/> No.1 shielded room	-	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
<input type="checkbox"/> No.2 shielded room	-	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
<input type="checkbox"/> No.3 shielded room	-	-	6.3 x 4.7 x 2.7	6.3 x 4.7	-
<input type="checkbox"/> No.4 shielded room	-	-	4.4 x 4.7 x 2.7	4.4 x 4.7	-
<input type="checkbox"/> No.5 shielded room	-	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
<input type="checkbox"/> No.6 shielded room	-	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-

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## 4 System Test Configuration

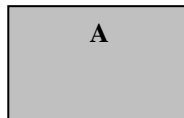
### 4.1 Justification

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

Test item	Operating mode	Tested frequency
Automatically deactivate	Normal use mode	313.85MHz
Other test	Transmitting (FSK) *1)	313.85MHz

\* The system was configured in typical fashion (as a customer would normally use it) for testing.  
\*1) The software of this mode is the same as one of normal product, except that EUT continues to transmit when transmitter button is being pressed (For Normal use mode, EUT stops to transmit in a given time, even if transceiver button is being pressed.)  
End users cannot change the settings of the output power of the product.

### 4.2 Configuration of Tested System



\* Cabling and setup were taken into consideration and test data was taken under worse case conditions.

#### Description of EUT

No.	Item	Model number	Serial number *1)	Manufacturer	Remarks
A	Transmitter of Keyless Entry	HLLIK6-1T	1, 2	Honda Lock Mfg. Co., Ltd.	EUT

\*1) Test of Automatically deactivate: 1, Other test: 2

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## **5 Automatically Deactivate**

### **5.1 Operating environment**

The test was carried out in No.3 Semi-Anechoic chamber.

### **5.2 Test procedure**

The time was measured with a spectrum analyzer and a search coil placed by the EUT.

Limit: A manually transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

### **5.3 Results**

Summary of the test results : Pass

## 6 Radiated Emissions (Fundamental & Spurious)

### 6.1 Operating environment

The test was carried out in No.1 and No.3 Semi-Anechoic chamber.

### 6.2 Test configuration

EUT was placed on a urethane platform of nominal size, 0.5m by 0.5m, raised 80cm above the conducting ground plane. A drawing of the set up is shown in the photos of Appendix 1.

### 6.3 Test conditions

Frequency range : 9kHz – 3.5GHz  
Test distance : 3m  
EUT operation mode : Transmitting

Frequency: From 9kHz to 30MHz at distance 3m

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., and 135 deg.) and horizontal polarization. Drawing of the antenna direction is shown in Figure 1.

Frequency: From 30MHz to 3.5GHz at distance 3m

The measuring antenna height was 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.

Measurements were performed with peak detector.

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

#### Test Antennas are used as below;

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

#### <9kHz to 30MHz>

	9kHz to 90kHz & 110kHz to 150kHz	90kHz to 110kHz	150kHz to 490kHz	490kHz to 30MHz
Detector Type	PK/AV	QP	PK/AV	QP
IF Bandwidth	200Hz	200Hz	9kHz	9kHz

\* FCC Part 15 Section 15.31 (f)(2) (9kHz-30MHz)

9kHz – 490kHz [Limit at 3m]= [Limit at 300m]-40log (3[m]/300[m])

490kHz – 30MHz [Limit at 3m]= [Limit at 30m]-40log (3[m]/30[m])

#### <30MHz to 4GHz>

	30MHz to 1GHz	Above 1GHz
Detector Type	Peak and Peak with Duty factor	Peak and Peak with Duty factor
IF Bandwidth	120kHz	RBW 1MHz, VBW:3MHz

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The equipment was previously checked at each position of three axes X, Y and Z. The position in which the maximum noise occurred was chosen to put into measurement. See the table below and photographs. With the position, the noise levels of all the frequencies were measured.

	Below 1GHz	Above 1GHz
Horizontal	X	Y
Vertical	X	Y

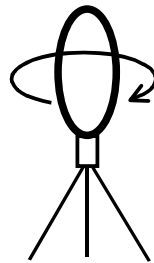
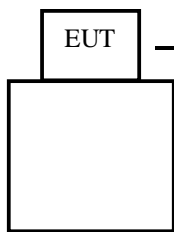
#### 6.4 Results

Summary of the test results : Pass \*No noise was detected below 30MHz.

**Figure 1. Antenna angle**

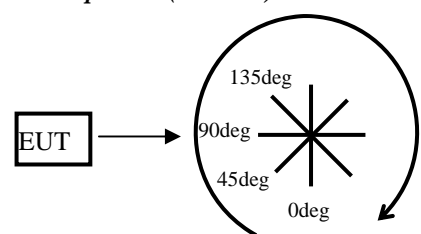
#### Direction of the Loop Antenna

*Side View (Vertical)*



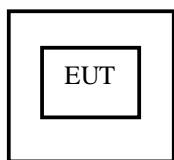
Front side: 0 deg.  
Forward direction: clockwise

*Top View (Vertical)*



Front side: 0 deg.  
Forward direction: clockwise

*Top View (Horizontal)*



Antenna was not rotated.

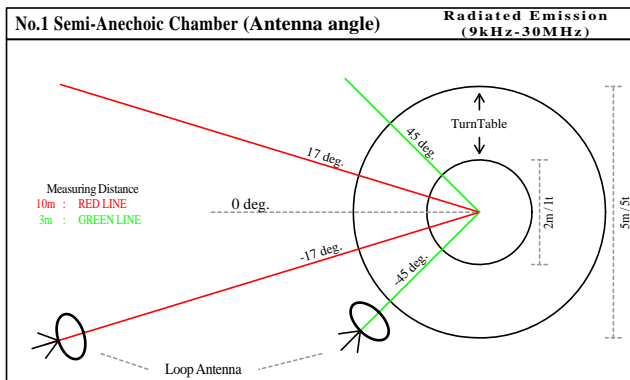
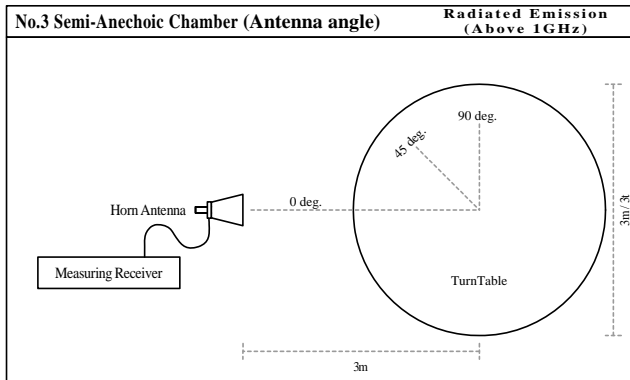
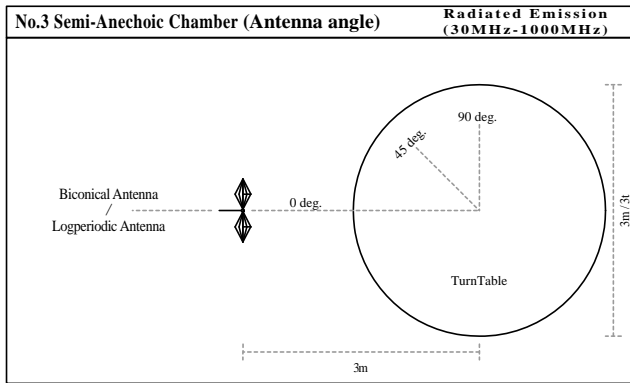
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## **7 Bandwidth**

### **7.1 Operating environment**

The test was carried out in No.3 Semi-Anechoic chamber.

### **7.2 Test procedure**

The bandwidth was measured with a spectrum analyzer and a search coil placed by the EUT.

### **7.3 Results**

Summary of the test results:        Pass

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### **APPENDIX 1: Test Data**

Page 13 : Automatically Deactivate

Page 14 - 15 : Radiated Emission

14 : Fundamental and Spurious emission

15 : Duty Cycle

Page 16 : -20dB Bandwidth and Occupied Bandwidth

### **APPENDIX 2: Test instruments**

Page 17 : Test instruments

### **APPENDIX 3: Photographs of test setup**

Page 18 : Radiated emission

Page 19 : Pre-check of the worst position