RADIO TEST REPORT

Test Report No.: 32DE0060-SH-01-A

Applicant	:	**Honda Lock Mfg. Co., Ltd.**
Type of Equipment	:	**Transmitter of Keyless Entry**
Model No.	:	**HLIK-1TA**
Test regulation	:	**FCC Part 15 Subpart C: 2011**
FCC ID	:	**MLBHLIK-1TA**
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.

Date of test: November 10 and 14, 2011

Representative test engineer:

Makoto Hosaka
Engineer of WiSE Japan,
UL Verification Service

Approved by :

Go Ishiwata
Manager of WiSE Japan,
UL Verification Service

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

JAB Testing RTL02610

UL Japan, Inc.
SHONAN EMC LAB.
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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.	:	HLIK-1TA
Serial No.	:	Refer to Clause 4.2
Rating	:	DC3.0V
Receipt Date of Sample	:	November 9 and 12, 2011
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: HLIK-1TA (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.

3 Test Specification, Procedures and Results

3.1 Test specification

Test specification : FCC Part 15 Subpart C: 2011, final revised on July 8, 2011 and effective August 8, 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	**FCC:** Section 15.207	N/A	N/A*1)	-
	IC: RSS-Gen 7.2.4	**IC:** RSS-Gen 7.2.4			
Automatically Deactivate	**FCC:** ANSI C63.4:2003 13. Measurement of intentional radiators	**FCC:** Section 15.231(a)(1)	N/A	Complied	Radiated
	IC: -	**IC:** RSS-210 A1.1.1			
Electric Field Strength of Fundamental Emission	**FCC:** ANSI C63.4:2003 13. Measurement of intentional radiators	**FCC:** Section 15.231(b)	2.3dB 313.815MHz Horizontal	Complied	Radiated
	IC: RSS-Gen 4.8	**IC:** RSS-210 A1.1.2			
Electric Field Strength of Spurious Emission	**FCC:** ANSI C63.4:2003 13. Measurement of intentional radiators	**FCC:** Section 15.205 Section 15.209 Section 15.231(b)	2.0dB 1569.392MHz Horizontal	Complied	Radiated
	IC: RSS-Gen 4.9	**IC:** RSS-210 A1.1.2, 2.5.1 RSS-Gen 7.2.2 RSS-Gen 7.2.5			
-20dB Bandwidth	**FCC:** ANSI C63.4:2003 13. Measurement of intentional radiators	**FCC:** Section 15.231(c)	N/A	Complied	Radiated
	IC: RSS-Gen 4.6.3	**IC:** RSS-Gen 4.6.3			
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.

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*1/SR*2 (±)	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

UL Japan, Inc. Shonan EMC Lab.
1-22-3, Megumigaoka, Hiratsuka-shi, Kanagawa-ken 259-1220 JAPAN
Telephone number : +81 463 50 6400
Facsimile number : +81 463 50 6401
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
☒ No.1 Semi-anechoic chamber	697847	2973D-1	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
☒ No.2 Semi-anechoic chamber	697847	2973D-2	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
☐ No.3 Semi-anechoic chamber	697847	2973D-3	12.7 x 7.7 x 5.35	12.7 x 7.7	5m
☐ No.4 Full-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	-

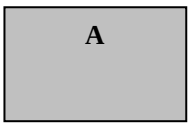
4 System Test Configuration

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	HLIK-1TA	0991G11A 13A0E00858	Honda Lock Mfg. Co., Ltd.	EUT

*1) Test of Automatically deactivate: 13A0E00858, Other test: 0991G11A

5 Automatically Deactivate

5.1 Operating environment

The test was carried out in No.1 shielded room.

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 2 anechoic chamber.

6.2 Test configuration

EUT was placed on a urethane platform of nominal size, 1.5m by 1.0m, 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

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.

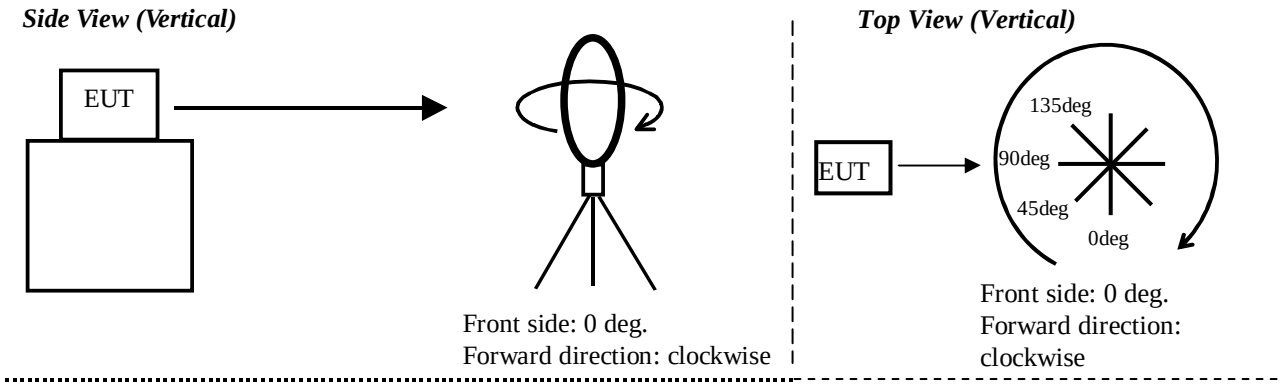
	Below 1GHz	Above 1GHz
Horizontal	X	X
Vertical	Z	Z

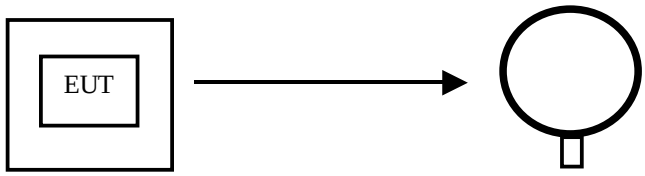
6.4 Results

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

Figure 1. Antenna angle

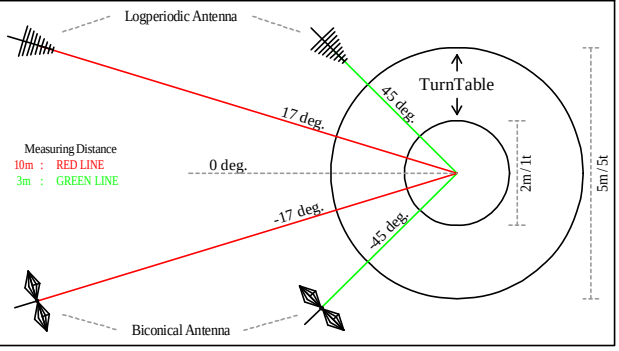
Direction of the Loop Antenna



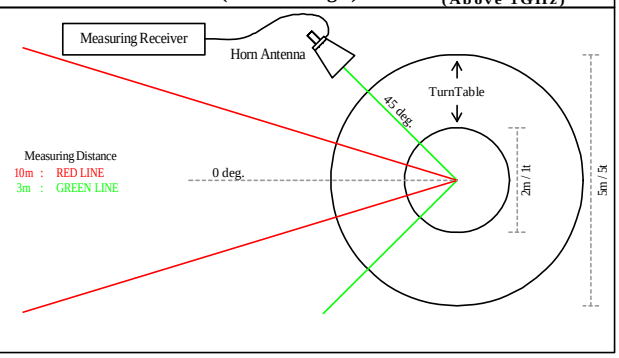


Antenna was not rotated.

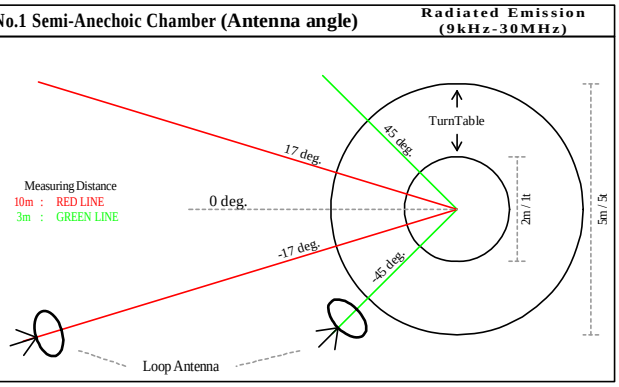
No.2 Semi-Anechoic Chamber (Antenna angle) — **Radiated Emission (30MHz-1000MHz)**



No.2 Semi-Anechoic Chamber (Antenna angle) — **Radiated Emission (Above 1GHz)**



No.1 Semi-Anechoic Chamber (Antenna angle) — **Radiated Emission (9kHz-30MHz)**



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7 Bandwidth

7.1 Operating environment

The test was carried out in No.1 shielded room.

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

APPENDIX 1: Test Data

APPENDIX 2: Test instruments

APPENDIX 3: Photographs of test setup

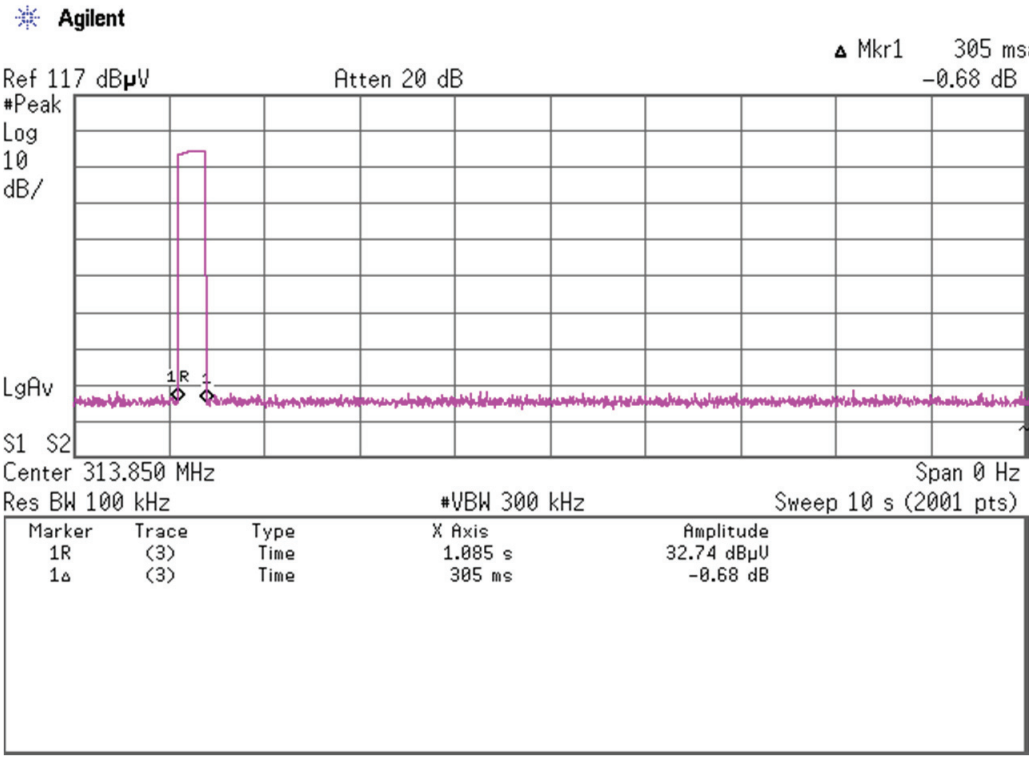
Automatically deactivate: FCC 15.231(a)(1)

UL Japan, Inc.
SHONAN EMC Lab. No.1 Shielded room
Report No. : 32DE0060-SH-01-A

Company	: Honda Lock Mfg. Co., Ltd.		
Equipment	: Transmitter of Keyless Entry	Regulation	: FCC Part15C Section 15.231(a)(1)
Model	: HLIK-1TA	Test Distance	: -
Sample No.	: 13A0E00858	Date	: 2011/11/14
Power	: DC 3.0V (Battery)	Temperature	: 25deg.C
Mode	: Normal use mode	Humidity	: 47%

ENGINEER : Makoto Hosaka

Time of Transmitting [sec]	Limit [sec]	Result
0.305	5	PASS



Radiated Emission (Electric Field Strength of Fundamental and Spurious Emission)

UL Japan, Inc.
SHONAN EMC Lab. No.2 Semi-Anechoic Chamber
Report No. : 32DE0060-SH-01-A

Company : Honda Lock Mfg. Co., Ltd.
Equipment : Transmitter of Keyless System
Model : HLIK-1TA
Sample No. : 0991G11A
Power : DC 3.0V (Battery)
Mode : Transmitting (313.85MHz)

Regulation : FCC Part15C Section 15.231(b), 15.209
Test Distance : 3m
Date : 2011/11/10
Temperature : 24deg.C
Humidity : 46%RH

ENGINEER : Makoto Hosaka

Peak with Duty factor

Frequency	Reading [dBuV]		Ant Factor	Loss	Gain	Duty Factor	Result [dBuV/m]		Limit	Margin [dB]		Remark
[MHz]	Hor	Ver	[dB/m]	[dB]	[dB]	[dB]	Hor	Ver	[dBuV/m]	Hor	Ver	
313.815	88.9	85.7	14.0	7.0	31.7	-5.0	73.2	70.0	75.5	2.3	5.5	Carrier
627.626	38.2	34.3	19.8	8.7	31.6	-5.0	30.1	26.2	55.5	25.4	29.3	Outside
941.451	33.6	32.6	23.0	10.2	30.6	-5.0	31.2	30.2	55.5	24.3	25.3	Outside
1569.392	67.3	-	25.1	2.9	38.4	-5.0	51.9	-	53.9	2.0	-	Inside
2511.050	58.2	57.8	27.6	3.8	37.6	-5.0	47.0	46.6	55.5	8.5	8.9	Outside
2824.976	58.8	58.2	28.2	4.0	37.8	-5.0	48.2	47.6	53.9	5.7	6.3	Inside
3138.395	61.3	60.5	28.7	4.2	37.9	-5.0	51.3	50.5	55.5	4.2	5.0	Outside

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter) - Gain(Amprifier) + Duty factor (Refer to Duty factor data sheet)

Peak

Frequency	Reading [dBuV]		Ant Factor	Loss	Gain	Duty Factor	Result [dBuV/m]		Limit	Margin [dB]		Remark Inside or Outside
[MHz]	Hor	Ver	[dB/m]	[dB]	[dB]	[dB]	Hor	Ver	[dBuV/m]	Hor	Ver	of Restricted Bands
313.815	88.9	85.7	14.0	7.0	31.7	-	78.2	75.0	95.5	17.3	20.5	Carrier
627.626	38.2	34.3	19.8	8.7	31.6	-	35.1	31.2	75.5	40.4	44.3	Outside
941.451	33.6	32.6	23.0	10.2	30.6	-	36.2	35.2	75.5	39.3	40.3	Outside
1569.392	67.3	-	25.1	2.9	38.4	-	56.9	-	73.9	17.0	-	Inside
2511.050	58.2	57.8	27.6	3.8	37.6	-	52.0	51.6	75.5	23.5	23.9	Outside
2824.976	58.8	58.2	28.2	4.0	37.8	-	53.2	52.6	73.9	20.7	21.3	Inside
3138.395	61.3	60.5	28.7	4.2	37.9	-	56.3	55.5	75.5	19.2	20.0	Outside

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter) - Gain(Amprifier)

REMARKS
ANTENNA TYPE: 30-300MHz Biconical / 300-1000MHz Logperiodic / 1-3.5GHz DRG Horn
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).

Duty Cycle (Fundamental)

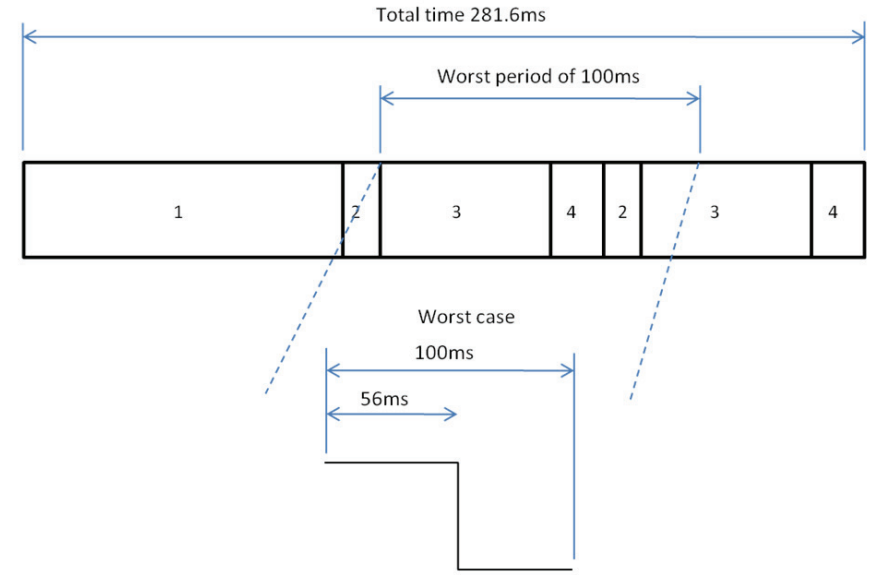
UL Japan, Inc.
SHONAN EMC Lab.
Report No. : 32DE0060-SH-01-A

Company : Honda Lock Mfg. Co., Ltd.
Equipment : Transmitter of Keyless Entry
Model : HLIK-1TA

Regulation : FCC Part15C Section 15.231(b), 15.35(c)

ON time [msec]	Cycle [msec]	Duty (On time /	Duty [dB]
56	100	0.56	-5.04

*Duty = 20log (On time / Cycle)



1: Preamble	163.2ms	Duty cycle 0.5
2: Header	3.2ms	Duty cycle 0.5
3: ID code + Function code	51.2ms	Duty cycle 0.5655 (The worst value that fluctuates)
4: Interval	4.8ms	Duty cycle 0.5

Worst case Duty cycle
8ms*0.5 + 92*0.5655 = 56

20dB Bandwidth: FCC 15.231(c) and 99% Occupied Bandwidth

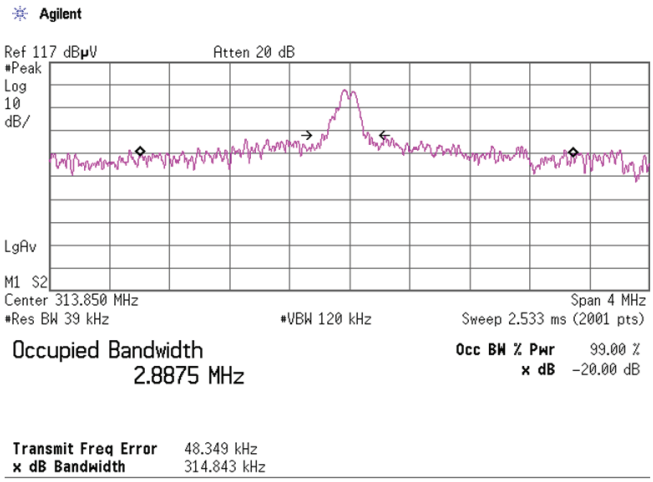
UL Japan, Inc.
SHONAN EMC Lab. No.1 Shielded room
Report No. : 32DE0060-SH-01-A

Company	: Honda Lock Mfg. Co., Ltd.		
Equipment	: Transmitter of Keyless Entry	Regulation	: FCC Part15C Section 15.231(c)
Model	: HLIK-1TA	Test Distance	: -
Sample No.	: 0991G11A	Date	: 2011/11/14
Power	: DC 3.0V (Battery)	Temperature	: 25deg.C
Mode	: Transmitting (313.85MHz)	Humidity	: 47%

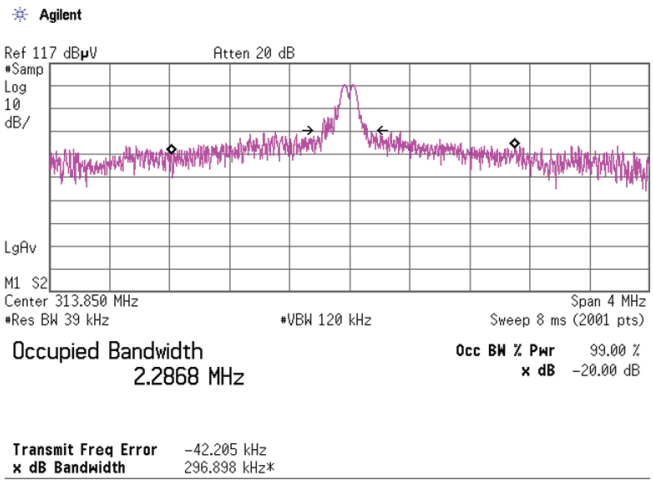
ENGINEER : Makoto Hosaka

Bandwidth Limit : fundamental Frequency 313.85 X 0.25%= 784.625 kHz

20dB [kHz]	Bandwidth Limit [kHz]	Result
314.843	784.625	PASS



99% Occupied Bandwidth [kHz]
2286.8



APPENDIX 2
Test Instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SAF-02	Pre Amplifier	SONOMA	310N	290212	RE	2011/02/17 * 12
SAT6-02	Attenuator	JFW	50HF-006N	-	RE	2011/02/17 * 12
SAT3-02	Attenuator	JFW	50HF-003N	-	RE	2011/02/17 * 12
SBA-02	Biconical Antenna	Schwarzbeck	BBA9106	91032665	RE	2011/09/10 * 12
SCC-B1/B3/B5/B7/B8/B13/SRSE-02	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-270(RF Selector)	RE	2011/04/28 * 12
SCC-B2/B4/B6/B7/B8/B13/SRSE-02	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-270(RF Selector)	RE	2011/04/28 * 12
SLA-02	Logperiodic Antenna	Schwarzbeck	UHALP9108A	UHALP 9108-A 0893	RE	2011/09/10 * 12
SOS-03	Humidity Indicator	A&D	AD-5681	4063325	RE	2011/02/23 * 12
STR-02	Test Receiver	Rohde & Schwarz	ESCI	100575	RE	2011/08/04 * 12
SJM-02	Measure	KOMELON	KMC-36	-	RE	-
SAEC-02(NSA)	Semi-Anechoic Chamber	TDK	SAEC-02(NSA)	2	RE	2011/09/25 * 12
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE,RFI,MF)	-	RE	-
SAF-05	Pre Amplifier	TOYO Corporation	TPA0118-36	1440490	RE	2011/03/23 * 12
SCC-G02	Coaxial Cable	Suhner	SUCOFLEX 104A	46498/4A	RE	2011/04/28 * 12
SCC-G22	Coaxial Cable	Suhner	SUCOFLEX 104	296199/4	RE	2011/05/27 * 12
SHA-02	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-726	RE	2011/08/28 * 12
SSA-01	Spectrum Analyzer	Agilent	N9010A-526	MY48031482	RE	2011/04/20 * 12
SFL-01	Highpass Filter	MICRO-TRONICS	HPM50115	001	RE	2010/12/15 * 12
SAF-01	Pre Amplifier	SONOMA	310N	290211	RE	2011/02/17 * 12
SAT6-07	Attenuator	JFW	50HF-006N	-	RE	2011/02/17 * 12
SCC-A2/A4/A6/A7/A8/A13/SRSE-01	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-269(RF Selector)	RE	2011/04/28 * 12
SOS-01	Humidity Indicator	A&D	AD-5681	4062555	RE	2011/02/23 * 12
STR-01	Test Receiver	Rohde & Schwarz	ESU40	100093	RE	2011/10/22 * 12
SJM-12	Measure	PROMART	SEN1935	-	RE	-
SLP-02	Loop Antenna	Rohde & Schwarz	HFH2-Z2	100218	RE	2011/10/19 * 12
KSA-08	Spectrum Analyzer	Agilent	E4446A	MY46180525	Other	2011/02/02 * 12
SSP-01	Sarch Probe	Nisshin Electric	NSP-01	-	Other	-
SOS-02	Humidity Indicator	A&D	AD-5681	4063343	Other	2011/03/02 * 12

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,
Other: Automatically Deactivate , -20dB Bandwidth and Occupied Bandwidth