RADIO TEST REPORT

Test Report No. : 30IE0135-SH-02-B

Applicant	:	**Honda Lock Mfg. Co., Ltd.**
Type of Equipment	:	**Engine start stop switch with immobilizer**
Model No.	:	**HLBUS-1**
FCC ID	:	**MLBHLBUS-1**
Test regulation	:	**FCC Part 15 Subpart C 2010** **Section 15.207, Section 15.209**
Test Result	:	**Complied**

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 above regulation.
4. The test results in this 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 any agency of the Federal Government.
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: May 17 to 19, 2010

Tested by: M. Hosaka

Makoto Hosaka
Engineer of EMC Service

Approved by: T. Ishiwata

Go Ishiwata
Assistant Manager of EMC 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.
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN
Telephone: +81 463 50 6400
Facsimile: +81 463 50 6401

CONTENTS **PAGE**

SECTION 1: Customer information

Company Name	:	Honda Lock Mfg. Co., Ltd.
Address	:	535-14 Oaza-Ishizue, Takanezawamachi, Shioya-Gun, Tochigi, 329-1225 Japan
Telephone Number	:	+81-50-3757-5619
Facsimile Number	:	+81-28-680-1045
Contact Person	:	Mitsunori Suyama

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

2.1 Identification of E.U.T.

Type of Equipment	:	Engine start stop switch with immobilizer
Model No.	:	HLBUS-1
Serial No.	:	Refer to Clause 4.2
Rating	:	DC12.0V
Receipt Date of Sample	:	May 17, 2010
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 No: HLBUS-1 (referred to as the EUT in this report) is Engine start stop switch with immobilizer.

General Specification

Clock frequencies in the system	:	4MHz

Radio Specification

Equipment Type	:	Transceiver
Frequency of Operation	:	125kHz
Type of modulation	:	ASK
Mode of Operation	:	Simplex
Antenna Type	:	Loop Antenna
Operating temperature range	:	-40deg.C. to +85deg.C.

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification	:	FCC Part15 Subpart C: 2010, final revised on January 22, 2010 and effective March 1, 2010
Title	:	FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators Section 15.207 Conducted Emission Section 15.209 Radiated emission limits, general requirements

The EUT complies with FCC Part 15 Subpart B: 2010.

FCC 15.31 (e)
Since the car battery is not considered what EUT provides stable voltage, this EUT is regulated by internal voltage (DC 5.0V). Therefore, this EUT complies with the requirement.

FCC Part 15.203 Antenna requirement
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.

3.2 Procedures and results

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst margin	Results
1	Conducted Emission	<FCC> ANSI C63.4:2003 7. AC powerline conducted emission measurements <IC> RSS-Gen 7.2.2	<FCC> Section 15.207 <IC> RSS-Gen 7.2.2	-	N/A *1)	N/A	N/A
2	Electric Field Strength of Fundamental Emission	<FCC> ANSI C63.4:2003 13. Measurement of intentional radiators <IC> RSS-Gen 4.8, 4.11	<FCC> Section 15.209 <IC> RSS-210 2.6, 2.7	Radiated	N/A	23.4dB 0.12497kHz 0 deg. AV (Ant-Max)	Complied
3	Electric Field Strength of Spurious Emission	<FCC> ANSI C63.4:2003 13. Measurement of intentional radiators <IC> RSS-Gen 4.9, 4.11	<FCC> Section 15.209 <IC> RSS-210 2.6, 2.7	Radiated	N/A	12.6dB 41.754MHz, QP, Vertical	Complied
4	-26dB Bandwidth	<FCC> ANSI C63.4:2003 13. Measurement of intentional radiators <IC> -	<FCC> Reference data <IC> -	Radiated	N/A	N/A	N/A

Note: UL Japan, Inc.'s EMI Work Procedures No.QPM05 and QPM15.
*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.

3.3 Addition to standard

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst margin	Results
1	99% Occupied Band Width	RSS-Gen 4.6.1	RSS-Gen 4.6.1	Radiated	N/A	N/A	N/A

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

3.4 Uncertainty

EMI
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	3.4 dB	2.7 dB	3.4 dB
	30MHz-300MHz	4.6 dB	4.5 dB	4.9 dB
	300MHz-1GHz	4.5 dB	4.6 dB	5.1 dB
	1GHz-18GHz	3.9 dB	3.9 dB	4.0 dB
	18GHz-26.5GHz	4.4 dB	4.4 dB	4.4 dB

*1: SAC=Semi-Anechoic Chamber
*2: SR= Shielded Room is applied besides radiated emission

Radiated emission test(3m)
The data listed in this test report has enough margin, more than the site margin.

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

No.1/ No.2/ No.3 anechoic chamber has been fully described in a report submitted to FCC office, and accepted on April 17, 2009 (Registration No.: 697847).
IC Registration No. : 2973D-1 (No1 anechoic chamber)
2973D-2 (No2 anechoic chamber)
2973D-3 (No3 anechoic chamber)

Test room	Width x Depth x Height (m)
No.1 Semi-anechoic chamber	20.6 x 11.3 x 7.65 Maximum measurement distance: 10m
No.2 Semi-anechoic chamber	20.6 x 11.3 x 7.65 Maximum measurement distance: 10m
No.3 Semi-anechoic chamber	12.7 x 7.7 x 5.35 Maximum measurement distance: 5m
No.4 Semi-anechoic chamber	8.1 x 5.1 x 3.55

Test room	Width x Depth x Height (m)
No.1 Shielded room	6.8 x 4.1 x 2.7
No.2 Shielded room	6.8 x 4.1 x 2.7
No.3 Shielded room	6.3 x 4.7 x 2.7
No.4 Shielded room	4.4 x 4.7 x 2.7
No.5 Shielded room	7.8 x 6.4 x 2.7
No.6 Shielded room	7.8 x 6.4 x 2.7

3.6 Test set up, Data of EMI, and Test instruments

Refer to APPENDIX 1 to 3.

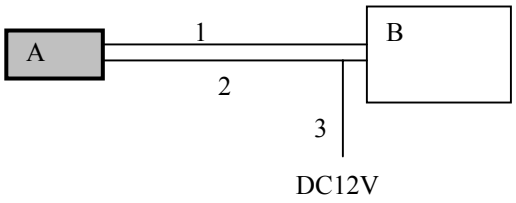
SECTION 4: Operation of E.U.T. during testing

4.1 Operating Modes

The mode is used : Transmitting mode

*Setting to continuous transmitting mode by updating the firmware of EUT
Power settings: Fixed (The setting is not controlled by the software and it is equivalent to that of mass-produced items.)
Above setting of software is the worst case.
Any conditions under the normal use do not exceed the condition of setting.

4.2 Configuration and peripherals



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

Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remark
A	Engine start stop switch with immobilizer	HLBUS-1	382	Honda Lock Mfg. Co., Ltd.	EUT
B	Back Up Unit	HLBUS-1B	#1	Honda Lock Mfg. Co., Ltd.	-

List of cables used

No.	Name	Length (m)	Shield		Remark
			Cable	Connector	
1	Signal Cable (Vcont, SCLK, Din/Dout)	1.5	Unshielded	Unshielded	-
2	DC Cable	1.5	Unshielded	Unshielded	-
3	DC Cable	0.3	Unshielded	Unshielded	-

SECTION 5: Radiated emission (Fundamental and Spurious Emission)

Test Procedure
The Radiated Electric Field Strength intensity has been measured on No 2 semi anechoic chamber with a ground plane and at a distance of 3m.

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 and horizontal polarization.
*Refer to Figure 1 about Direction of the Loop Antenna.

Frequency : From 30MHz to 1GHz at distance 3m
The measuring antenna height 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 a QP, PK, and AV detector.
The radiated emission measurements were made with the following detector function of the test receiver.

	From 9kHz to 90kHz and From 110kHz to 150kHz	From 90kHz to 110kHz	From 150kHz to 490kHz	From 490kHz to 30MHz	From 30MHz to 1GHz
Detector Type	PK/AV	QP	PK/AV	QP	QP
IF Bandwidth	200Hz	200Hz	9kHz	9kHz	120kHz

- The carrier level (or, noise levels) was (or were) measured at each position of all three axes X, Y and Z, and the position that has the maximum noise was determined.
With the position, the noise levels of all the frequencies were measured.

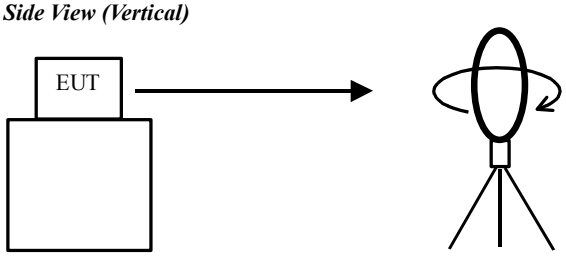
* Part 15 Section 15.31 (f)(2) (9kHz-30MHz)
[Limit at 3m]=[Limit at 300m]-40 x log (3[m]/300[m])
[Limit at 3m]=[Limit at 30m]-40 x log (3[m]/30[m])

Test data : APPENDIX 2
Test result : Pass

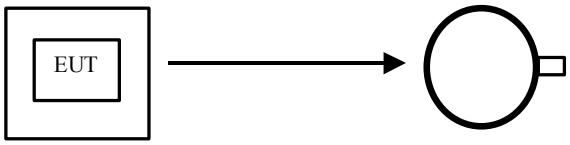
Date: May 17 and 18, 2010 Test engineer: Makoto Hosaka

Figure 1: Direction of the Loop Antenna

Side View (Vertical)

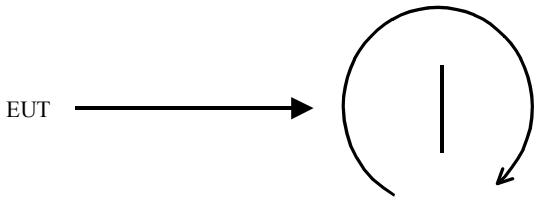


Top View (Horizontal)

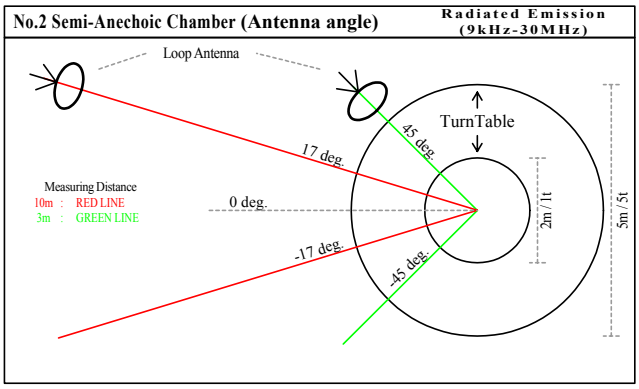


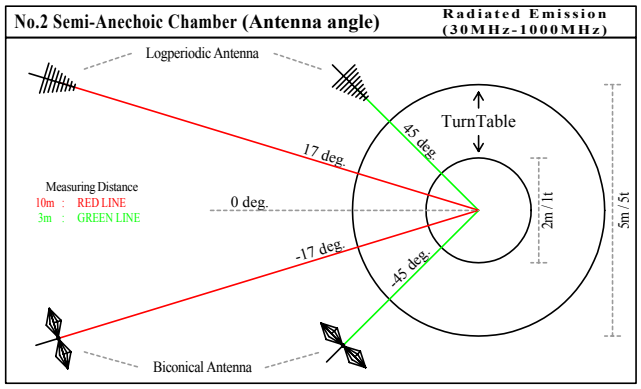
Antenna was not rotated.

Top View (Vertical)



Front side: 0 deg.
Forward direction: clockwise





SECTION 6: -26dB Bandwidth

Test Procedure

The measurement was performed in the antenna height to gain the maximum of Electric field strength.

Test data **: APPENDIX 2**
Test result **: Pass**

SECTION 7: 99% Occupied Bandwidth

Test Procedure

The measurement was performed in the antenna height to gain the maximum of Electric field strength.

Test data **: APPENDIX 2**
Test result **: Pass**