

EMISSION TEST REPORT

Test Report No. : 19L0015-02

Applicant: HONDA LOCK MFG. CO., LTD.

Type of Equipment: Immobilizer System

Model No.: HIS-5

Test standard: FCC Part 15 Subpart C
IC RSS-210 (Issue No. 2)
*IC RSS-210 (Issue No. 2) is based upon FCC Part 15.

Test Result: Complies

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The results in this report apply only to the sample tested.

Date of test: December 15, 1999

Tested by: _____

Naoki Sakamoto

Approved by: _____

Kazutoyo Nakanishi
Group Leader of EMC section

Issued date: January 18, 2000

Testing Laboratory

A-pex International Co., Ltd.

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1 GENERAL INFORMATION

APPLICANT : HONDA LOCK MFG. CO., LTD.

ADDRESS(ES) OF ASSEMBLY PLANT(S) : a) Honda lock Mfg. Co., Ltd.
3700 Oaza Shimonaka, Sadowara-cho,
Miyazaki Pref. 880-0293, Japan
: b) f+g magamos Sicherheitselektronik
GmbH
Wiehlpuhl 4
D-51766 Engelskirchen Germany
: c) Delphi Automotive Systems, Ltd.
McAllen Trade Zone No. 12
6901 S.33rd St.. Building T
McAllen, Texas 78503 USA

*We refer to the EUT which was manufactured in Japan on this test report, but this model will be produced in USA and Germany too.

Manufacturer declares that these models are the same performance and EMC properties.

REGULATION(S) : FCC Part 15 Subpart C

MODEL NUMBER : HIS-5

SERIAL NUMBER : N/A

KIND OF EQUIPMENT : Immobilizer System

TESTED DATE : December 15, 1999

REPORT FILE NUMBER : 19L0015-02

TEST SITE : A-PEX Yokowa NO.3 Open Test Site

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1.1 Tested Methodology

Radiated testing were performed according to the procedures in FCC/ANSI C63.4(1992).
Radiated testing was performed at a distance of 3 meters from the antenna to EUT .

1.2 Test Facility

The open area site measurement facility used to collect the radiated data is located on 108, Yokowa-cho, Ise-shi, Mie-ken, 516-1106 Japan.
This site has been fully described in a report dated August 1, 1997 submitted to FCC office, and accepted in a letter dated September 16, 1997 (31040/SIT 1300F2) and accepted by Industry Canada on February 19, 1998 (IC2973-3).

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2 PRODUCT DESCRIPTION

2.1 Product Description

When the engine key in which a transponder chip has been built is inserted into the key cylinder, the amplifier starts generating a radio frequency field by use of its coiled antenna.

The coiled antenna of the amplifier receives the key ID code from the transponder chip built in the engine key and the amplifier transmits the key ID code to the engine management system.

This technical description is as follows:

- Operating voltage range of the amplifier : 6.0 to 16.0 V
- Operating temperature range : 40 to 85 Degree
- Frequency (transmitting) : 125 kHz
- Frequency (receiving) : 125 kHz
- Modulation : ASK
- Transmission time per 1 cycle : 135 msec
- Power supply : 12 VDC

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2.2 Tested System Details

The FCC IDs for all equipment, plus description of all cables used in the tested system are:

Model	FCC ID	Description	Cable description	Backshell Material
(1) HONDA LOCK MFG. CO., LTD. M/N: HIS-5 S/N: N/A (EUT)	MLB HIS-5	Immobilizer System	Unshielded I/F Cable	P.V.C.
(2) HONDA LOCK MFG. CO., LTD. M/N: N/A S/N: N/A	-	Transponder	-	-
(3) HONDA LOCK MFG. CO., LTD. M/N: S5A S/N: N/A		Immobilizer System Checker	Unshielded DC Power Cable	P.V.C.
(4) YUASA M/N: 50B24L S/N: N/A	-	Car Battery	-	-

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3 SYSTEM TEST CONFIGURATION

3.1 Justification

The measurement was performed with the system configuration shown in Figure 3.2.
The running mode was taken as the EUT operation mode.

3.2 Test Procedure

3.2 Tabletop Equipment Radiated Emissions

EUT was placed on a platform of nominal size, 1m by 1.5m, raised 80cm above the conducting ground plane.
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. Transmitter was tested 3 orthogonal positions(horizontal, vertical and 360 degree perimeter).

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Figure3.3 Configuration of Tested System

(1) 10 KHz - 30 MHz

The measurement for 10 KHz - 30 MHz was performed to check the dispatching message for immobilizer.

(2) 30 MHz - 1 GHz

The measurement for 30 MHz - 1 GHz was performed to check the digital system except immobilize.

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4 RADIATED MEASUREMENT PHOTOS

Figure 4.1 Radiated Measurement Photos

Front View

Rear View

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4.2 Measurement Uncertainty

Radiated Emission Test

The measurement uncertainty (with a 95% confidence level) for this test was $\pm 3.3\text{dB}$.

The data listed in this test report has enough margin, more than 3.3dB.

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5 RADIATED EMISSION DATA

5.1 Radiated Emission Data

The minimum margin to the limit is as follows :

* 10KHz - 30MHz

Frequency (MHz)	Receiver Reading (dBuV)	Correction Factor (dBuV)	Field Strength (dBuV/m)	Limit (dBuV/m)	Margin (dBuV)
0.125	81.7	-2.2	79.5	105.7	26.2

*Extrapolation factor 40dB / decade (Section 15.31 (f) (2)) for Section 15.209

* 30MHz - 1GHz

Frequency (MHz)	Receiver Reading (dBuV)	Correction Factor (dBuV)	Field Strength (dBuV/m)	Limit (dBuV/m)	Margin (dBuV)
40.01	26.9	-7.6	19.3	40.0	20.7

- * All readings are QP mode. (except 110 - 490 kHz, the data for this band is taken by AV mode)
- * The spurious was not perceived regarding to the frequency above 1GHz.

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5.2 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor, Cable Factor and Antenna Pad, and subtracting the Amplifier Gain from the measured reading. The sample calculation is as follows :

$$FS = RA + AF + CF + AT - AG$$

where FS = Field Strength
RA = Receiver Reading
AF = Antenna Factor
CF = Cable Factor
AT = Antenna Pad
AG = Amplifier Gain

Assume a receiver reading of 81.7/26.9dBuV is obtained. The antenna Factor of 19.6/14.4 dB, Cable Factor of 0.2/1.8dB and Antenna Pad of 6.0dB is added. The Amplifier Gain of 28.0/29.8dB is subtracted, giving a field strength of 79.5/19.3 dBuV/m.

*** 10KHz - 30MHz**

$$FS = 81.7 + 19.6 + 0.2 + 6.0 - 28.0 = 79.5 \text{ dBuV/m}$$

*** 30MHz - 1GHz**

$$FS = 26.9 + 14.4 + 1.8 + 6.0 - 29.8 = 19.3 \text{ dBuV/m}$$

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6 TEST EQUIPMENT USED

<u>NAME</u>	<u>MANUFACTURER</u>	<u>MODEL</u>	<u>Control No.</u>	<u>Calibrated Until</u>
Pre Amplifier	Hewlett Puckered	8447D	AF1	May 16, 2000
Biconical Antenna	Schwarzbeck	BBA9106	BA5	June 18, 2000
Logperiodic Antenna	Schwarzbeck	UHALP9108A	LA5	August 8, 2000
Logperiodic Antenna	Schwarzbeck	UKLP9140-ALA7		April 30, 2000
Loop Antenna	Rohde & Schwarz	HFH2-Z2	LP1	November 3, 2000
Spectrum Analyzer	Hewlett Packard	8567A	SA4	May 16, 2000
Test Receiver	Rohde & Schwarz	ESHS-10	TR5	April 18, 2000
Test Receiver	Rohde & Schwarz	ESVS-10	TR6	April 20, 2000

indicates EMI Test Equipment used.

All measurement equipment is traceable to national standard

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APPENDIX

Test Data

Radiated Emission Test (Magnetic Field Test) for 10KHz - 30MHz	<u>A 1 - A 4</u>
Radiated Emission Test for 30MHz - 1GHz	<u>A 5 - A 6</u>

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