REPORT ON

FCC CFR 47 Parts 15C:2009, Part 2:2009, Testing of the Delphi Electronics (Suzhou) Co, Ltd. Immobilizer Gen2-09

COMMERCIAL-IN-CONFIDENCE

FCC ID: YEG0001IM

Doc Number 57010031 Report 02 Issue 01 **May 2010**

Product Service

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COMMERCIAL-IN-CONFIDENCE

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PREPARED FOR

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DATED

2010-5-6

ENGINEERING STATEMENT

The measurements shown in this report were made in accordance with the procedures described on test pages. All reported testing was carried out on a sample equipment to demonstrate limited compliance with FCC CFR 47 Parts 15C_2009, Part 2_2009. The sample tested was found to comply with the requirements defined in the applied rules.

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SECTION 1

REPORT SUMMARY

FCC CFR 47 Parts 15C:2009, Part 2:2009, Testing of the Delphi Electronics (Suzhou) Co, Ltd. Immobilizer Gen2-09

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1.1 STATUS

Equipment Under Test	Immobilizer
Objective	To undertake measurements to determine the Equipment Under Test's (EUT's) compliance with the specification.
Name and Address of Client	Delphi Electronics (Suzhou) Co, Ltd.
Type	Gen2-09
Serial Number(s)	NA
Declared Variants	None
FCC ID Number	YEG0001IM
Test Specification/Issue/Date	FCC CFR 47 Parts 15C:2009, Part 2:2009.
Number of Items Tested	One
Start of Test **Finish of Test**	19th April 2010 20th April 2010
Related Documents	ANSI C63.4: 2009

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1.2 INTRODUCTION

The information contained within this report is intended to show the sample compliance with the requirements of FCC CFR 47 Parts 15C:2009, Part 2:2009.

1.2.1 Declaration of Build Status

MAIN EUT	
MANUFACTURER	Delphi Electronics (Suzhou) Co, Ltd.
PRODUCT NAME	Immobilizer
TYPE	Gen2-09
Modulation Type	AM
SERIAL NUMBER	Engineering sample
OPERATING RANGE	125 KHz
COUNTRY OF ORIGIN	China
FCC ID	YEG0001IM
POWER SUPPLY	The EUT was powered by vehicle of DC 12V

The above EUT information is declared by the manufacturer, for the detailed features description please refer to the manufacturer's specification or user manual.

1.3 BRIEF SUMMARY OF RESULTS

A brief summary of the tests carried out is shown as below.

Section	FCC Specification	Requirements Description	Result	Comments
2.1	Part 15.19	Labelling requirements	Pass	
2.2	Part 15.203	Antenna requirement	Pass	
2.3	Part 15.204.	External radio frequency power amplifiers and antenna modifications	Pass	
2.4	Part 15.205	Restricted bands of operation	Pass	
2.5	Part 15.207	Conducted limits	-----	NA
2.6	Part 15.209	Radiated emission limits---Below 30MHz	Pass	
2.7	Part 15.209	Radiated emission limits---Above 30MHz	Pass	
2.8	Part 2.202	Occupied Bandwidth	Pass	
2.9	Part 2.1091	Radiofrequency radiation exposure evaluation	-----	NA

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1.4 GENERAL INFORMATION

1.4.1 Information about the Testing Laboratory

Company Name:	Jiangsu TÜV Product service Ltd. Beijing Branch
Address:	9th, Landmark Tower 2, No.8 North Dongsanhuan Road, Beijing 100004, P.R. China
Contact:	Chen Jie
Telephone No.:	86 10 - 65906186
Fax No.:	86 10 - 65906182
Email:	jie.chen@tuv-sud.cn

1.4.2 Applicant Details

Company Name:	Delphi Electronics (Suzhou) Co, Ltd.
Address:	123, Chang Yang Street, Suzhou Industrial Park, Suzhou, China

1.4.3 Manufacture Details

Company Name:	Delphi Electronics (Suzhou) Co, Ltd.
Address:	123, Chang Yang Street, Suzhou Industrial Park, Suzhou, China

1.4.4 Technical Description

The Equipment Under Test (EUT) was a short range device which is working in 125 KHz using for protects the car against theft using an electronic engine locking device, thus the engine cannot be started.

1.4.5 Test Environment

Environment	Temperature(℃)	Humidity (%)	Atmospheric Pressure(mbar)
Ambient	+23	42	1020
Normal Supply Voltage (V DC)	12.0		

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1.4.6 Reference Specification

The EUT is an electronic immobilizer protects the car against theft using an electronic engine locking device, thus the engine cannot be started.operating in frequency 125 KHz, according to the specifications from the manufacturer, and it should comply with the requirement of following standards:

FCC CFR 47 Parts 15C:2009, Part 2:2009,

All tests have been performed and recorded as per the above standard.

1.4.7 Test Configuration

The EUT was set to transmit continuous for testing.

1.5 TEST CONDITIONS

The EUT was set-up simulating a typical user installation at the Test Laboratory, as listed in Section 1.2 and tested in accordance with the applicable specification.

For all tests, the EUT was powered by DC power supply with12 V.

1.6 DEVIATIONS FROM THE STANDARD

Not Applicable

1.7 MODIFICATION RECORD

Not Applicable

1.8 ALTERNATIVE TEST SITE

Testing has been performed under the following site accreditations:

FCC Registration No.612767

The State Radio Spectrum Monitoring and Testing Centre
No.80 Beilishi Road Xicheng District Beijing, China

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SECTION 2

TEST RESULTS

FCC CFR 47 Parts 15C:2009, Part 2:2009, Testing of Delphi Electronics (Suzhou) Co, Ltd.
Immobilizer Gen2-09

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2.1 LABELLING REQUIREMENTS

The devices shall bear the following statement in a conspicuous location on the device:

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

From the attached users manual it can be seen that this statement has been located in it.

2.2 ANTENNA REQUIREMENTS

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section.

From the attached photographs it can be seen that the device has a specified integral antenna which would be classed as being unique.

2.3 EXTERNAL RADIO FREQUENCY POWER AMPLIFIERS AND ANTENNA MODIFICATIONS

No person shall use, manufacture, sell or lease, offer for sale or lease (including advertising for sale or lease), or import, ship, or distribute for the purpose of selling or leasing, any external radio frequency power amplifier or amplifier kit intended for use with an intentional radiator.

From the attached photographs it can be seen that it is not possible to attach an external power amplifier to this transmitter.

2.4 RESTRICTED BANDS OF OPERATION

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	
13.36 - 13.41			

The EUT is operating on 125 KHz, this falls between the restricted bands of 0.090 - 0.110 MHz and 0.495 - 0.505 MHz.

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2.5 CONDUCTED LIMITS

Frequency of Emission (MHz)	Conducted Limit (dBµV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

For this intentional radiator that is not designed to be connected to the public utility (AC) power line, so this requirement is not applicable.

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2.6 RADIATED EMISSION LIMITS --- BELOW 30MHz

An intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (Microvolts/meter)	Measurement Distance (Meters)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30

2.6.1 Test Procedure

The test set-up was made in accordance to the general provisions of ANSI C63.4-2009.

1. The Equipment Under Test (EUT) was set up on a non-conductive table in the semi-anechoic chamber with transmitting mode. Measurements were made while the EUT was being powered from a DC power supply of 12V.

2. The test was performed at the distance of 1 m between the EUT and the loop antenna, since there is no signal at the distance of 3m.

3. During the test, the loop antenna shall be at height of 1 meter, and the turntable shall be rotated from 0 to 360 degrees for detecting the maximum of radiated signal level.

4. The spectrum analyser connects to receiving antenna outside the chamber, and set for RMS detector mode between 125-490 KHz; RBW=300 Hz and VBW=1 KHz, and QP detector mode between 490-30 MHz; max hold trace mode; RBW=10 KHz and VBW=30 KHz.

2.6.2 Test Result

Frequency	Level@1m	Limit@1m	Limit@300m	Margin	Result
KHz	dB µV/m	dB µV/m	dB µV/m	dB	
125	44.16	124.7	25.7	80.54	Pass
250	24.71	118.64	19.64	93.93	Pass
375	22.82	115.24	16.24	92.42	Pass
Frequency	**Level@1m**	**Limit@1m**	**Limit@30m**	**Margin**	**Result**
KHz	**dB µV/m**	**dB µV/m**	**dB µV/m**	**dB**	
500	17.33	92.62	33.62	75.29	Pass
625	21.10	90.69	31.69	69.59	Pass
750	13.98	89.10	30.10	75.12	Pass
875	18.46	87.76	28.76	69.3	Pass
1000	16.59	86.60	27.60	70.01	Pass
1125	18.69	85.58	26.58	66.89	Pass
1250	15.45	84.67	25.67	69.22	Pass

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2.7 RADIATED EMISSION LIMITS --- ABOVE 30MHz

An intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (Microvolts/meter)	Measurement Distance (Meters)
30 - 88	100 **	3
88 – 216	150 **	3
216 - 960	200 **	3
Above 960	500	3

2.7.1 Test Procedure

The test set-up was made in accordance to the general provisions of ANSI C63.4-2003.

1. The Equipment Under Test (EUT) was set up on a non-conductive table in the fully-anechoic chamber with transmitting mode. Measurements were made while the EUT was being powered from a DC power supply of 12V.

2. The turntable was rotated by 360 degrees to detect the position of highest radiation, the broad band bi-log receiving antenna was placed 3meters far away from the turntable.

3. The receiving antenna was fixed on the same height with the EUT to find each suspected emission of both horizontal and vertical polarization.

4. The spectrum analyser connect to receiving antenna outside the chamber, and set for QP detector mode; max hold trace mode; RBW=100 KHz and VBW=300 KHz.

5. The data of cable loss, antenna factor and amplifier gain has been calibrated in full testing frequency range before the testing.

2.7.2 Test Result

Frequency	Antenna Polarization	Level@3m	Limit@3m	Margin	Result
MHz	(V/H)	dB µV/m	dB µV/m	dB	
35.94	H	22.7	40	17.3	Pass
45.37	V	22.8	40	17.2	Pass
109.34	V	23.3	43.5	20.2	Pass
291.48	H	25.7	46	20.3	Pass
543.24	V	26.1	46	19.9	Pass
925.13	V	27.5	46	18.5	Pass

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2.8 OCCUPIED BANDWIDTH

Occupied bandwidth is measured as the 99% emission bandwidth. The frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission.

2.8.1 Test Procedure

1. Connect EUT's antenna terminal to the spectrum analyser via a low loss cable with transmitting mode. Measurements were made while the EUT was being powered from a DC power supply of 12V.

2. Adjust the centre frequency of the spectrum analyser on the frequency be measured, and set for peak detector mode; max hold trace mode RBW=300 Hz and VBW=1 KHz.

3. The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts. Use the marker-to-peak function to set the marker to the peak of the emission.

4. Use the OBW function to measure 99%emission bandwidth, record the occupied bandwidth value.

2.8.2 Test Result

Frequency	Occupied bandwidth
KHz	KHz
125	1.98

2.9 RADIO FREQUENCY RADIATION EXPOSURE EVALUATIONS

For purposes of this evaluation, mobile device and portable device is required.

A mobile device is defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 centimeters is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons.

In this context, the term ''fixed location'' means that the device is physically secured at one location and is not able to be easily moved to another location.

According to the FCC part 2, section 2.1091 descriptions above, the EUT is not applicable for this requirement because it is physically secured at one location.

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SECTION 3

TEST EQUIPMENT

FCC CFR 47 Parts 15C:2009, Part 2:2009, Testing of Delphi Electronics (Suzhou) Co, Ltd.
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3.1 TEST EQUIPMENT

Instrument	Manufacturer	Type No	TE Number	Calibration Date
Test Receiver	Rohde & Schwarz	ESI 40	100015	Aug. 2009
Spectrum Analyzer	Agilent	8562A	3043A05575	Oct. 2009
DC power supply	Agilent	E4356A	7083A03864	Oct. 2009
Loop antenna	Rohde & Schwarz	HFH2-Z2	882965	Aug. 2009
Broad band bi-log antenna	Rohde & Schwarz	HL562	100016	Aug. 2009
Turn Table	FRANKONIA	PS2000	--	Aug. 2009
Antenna Master	FRANKONIA	MA260	--	Aug. 2009
Semi-Anechoic Chamber	FRANKONIA	10 m	--	Aug. 2009
Fully-Anechoic Chamber	FRANKONIA	3 m	--	Aug. 2009

3.2 MEASUREMENT UNCERTAINTY

Measurement	Uncertainty
Radio Frequency	± 1.1×10^{-6}
All emissions, conducted	± 1.02dB
All emissions, radiated	± 3.90dB
Temperature	± 0.7℃
Humidity	± 2.5%
DC and low frequency voltage	± 0.4%

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SECTION 4

DISCLAIMERS AND COPYRIGHT

FCC CFR 47 Parts 15C:2009, Part 2:2009, Testing of Delphi Electronics (Suzhou) Co, Ltd.
Immobilizer Gen2-09

4.1 DISCLAIMERS AND COPYRIGHT

This report relates only to the actual item/items tested.

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