



ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR LOW-POWER, NON-LICENSED TRANSMITTER

Test report file number : E03DR-094

Applicant : OMRON AUTOMOTIVE ELECTRONICS KOREA CO., LTD.

Address : 481-2, Kasan-Dong, Kumchun-Gu, Seoul, 153-023 Korea

Manufacturer : OMRON AUTOMOTIVE ELECTRONICS KOREA CO., LTD.

Address : 481-2, Kasan-Dong, Kumchun-Gu, Seoul, 153-023 Korea

Type of Equipment : REMOTE KEYLESS ENTRY SYSTEM

FCC ID : OSLOKA-110T

Model Name : OKA-110T

Multiple Model Name : N/A

Serial number : N/A

Total page of Report : 12 pages (including this page)

Date of Incoming : November 25, 2003

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SUMMARY

The equipment complies with the requirements of FCC CFR 47 PART 15 SUBPART C, SECTION 15.231.

This test report contains only the result of a single test of the sample supplied for the examination. It is not a general valid assessment of the features of the respective products of the mass-production.

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1. VERIFICATION OF COMPLIANCE

- APPLICANT : OMRON AUTOMOTIVE ELECTRONICS KOREA CO., LTD.
- ADDRESS : 481-2, Kasan-Dong, Kumchun-Gu, Seoul, 153-023 Korea
- CONTACT PERSON : Mr. Youngje, Seo / Section Manager
- TELEPHONE NO : +82-2-850-5743
- FCC ID : OSLOKA-110T
- MODEL NO/NAME : OKA-110T
- SERIAL NUMBER : N/A
- DATE : December 31, 2003

DEVICE TYPE	REMOTE KEYLESS ENTRY SYSTEM - INTENTIONAL RADIATOR
E.U.T. DESCRIPTION	RF REMOTE KEYLESS ENTRY SYSTEM FOR VEHICLE - TRANSMITTER
THIS REPORT CONCERNS	ORIGINAL GRANT
MEASUREMENT PROCEDURES	ANSI C63.4: 2001
TYPE OF EQUIPMENT TESTED	PRE-PRODUCTION
KIND OF EQUIPMENT AUTHORIZATION REQUESTED	CERTIFICATION
EQUIPMENT WILL BE OPERATED UNDER FCC RULES PART(S)	FCC PART 15 SUBPART C, 15.231
MODIFICATIONS ON THE EQUIPMENT TO ACHIEVE COMPLIANCE	No
FINAL TEST WAS CONDUCTED ON	3 METER OPEN AREA TEST SITE

The above equipment was tested by ONETECH Corp. for compliance with the requirement set forth in the FCC Rules and Regulations. This said equipment in the configuration described in this report, shows the maximum emission levels emanating from equipment are within the compliance requirements.



2. GENERAL INFORMATION

2.1 Product Description

The OMRON AUTOMOTIVE ELECTRONICS KOREA CO., LTD., Model OKA-110T(referred to as the EUT in this report) is a transmitter that it controls locking and unlocking the door of a vehicle and alarm the horn by wireless remote controller. The associated receiver is manufactured by Omron Automotive Electronics Korea Co., Ltd, Model No: OKA-110R, FCC ID: OSLOKA-110R. The product specification described herein was obtained from product data sheet or user's manual.

CHASSIS TYPE	Non-Metal
TX FREQUENCY	313.85 MHz
MODULATION	FSK
LIST OF EACH OSC. OR CRY. FREQ.(FREQ.>=1MHz)	9.807813 MHz
ANTENNA TYPE	Built-in on the PCB in the EUT
TRANSMISSION TIME	Not longer than 1 sec
RATED SUPPLY VOLTAGE	DC 3V, 5mA (Lithium Battery)
NUMBER OF LAYERS	2 LAYERS
FUNCTION OF BUTTON	Doors Lock, Doors Unlock, PANIC

Remark: This equipment automatically deactivates the transmitter within not more than 1 second of being released.

2.2 Model Differences:

The difference(s) compared to the EUT is as follows: none

2.3 Related Submittal(s) / Grant(s)

-. None

2.4 Test System Details

The EUT was tested with the following all equipment used in the tested systems are: none

2.5 Test Methodology

Radiated testing was performed according to the procedures in ANSI C63.4: 2001. Radiated testing was performed at a distance of 3 meters from EUT to the antenna.

2.6 Test Facility

The open area test site and conducted measurement facilities are located on at 426-1 Daessangryung-Ri, Chowol-Myun, Kwangju-Kun, Kyunggi-Do 464-080 Korea. Description details of test facilities were submitted to the Commission on January 18, 2002. (Registration Number: 92819)



3. SYSTEM TEST CONFIGURATION

3.1 Justification

This device was configured for testing in a typical way as a normal customer is supposed to be used. During the test, the following components were installed inside of the EUT.

DEVICE TYPE	MANUFACTURER	MODEL/PART NUMBER	FCC ID
MAIN BOARD	OMRON AUTOMOTIVE ELECTRONICS KOREA CO., LTD.	NF EC/US	N/A

3.2 EUT exercise Software

To get a maximum radiated emission from the EUT, the button on the EUT was continuously pressed to transmit the signal. During the testing, the battery of the EUT was changed with a new battery.

3.3 Equipment Modifications

- None

3.4 Configuration of Test System

Line Conducted Test: It needs not to test this requirement, because the EUT supplies from a DC battery.

Radiated Emission Test: Preliminary radiated emissions test were conducted using the procedure in ANSI C63.4: 2001 8.3.1.1 and 13.1.4.1 to determine the worse operating conditions. Final radiated emission tests were conducted at 3meter open area test site.

The turntable was rotated through 360 degrees and the EUT was tested by positioned three orthogonal planes to obtain the highest reading on the field strength meter. Once maximum reading was determined, the search antenna was raised and lowered in both vertical and horizontal polarization.

Occupied Bandwidth Measurement:

This measurement is performed with the antenna located close enough to give a full-scale deflection of the modulated carrier on the spectrum analyzer. The picture is taken at 50kHz/division frequency span, 10kHz resolution bandwidth and 10dB/division logarithmic display from an 8566B spectrum analyzer.



3.5 Antenna Requirement

For intentional device, according to §15.203, 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.

Antenna Construction:

The transmitter antenna of the EUT is built-in on the PCB in the EUT, no consideration of replacement by the user.

4. PRELIMINARY TEST

4.1 AC Power line Conducted Emissions Tests

During Preliminary Tests, the following operating mode was investigated

Operation Mode	The Worse operating condition (Please check one only)
N/A	N/A
It is not need to test this requirement, because the power of the EUT is supplied from a DC battery.	

4.2 Radiated Emissions Tests

During Preliminary Tests, the following operating modes were investigated

Operation Mode	The Worse operating condition (Please check one only)
TX mode	X



5. FINAL RESULT OF MEASUREMENT

5.1 Field Strength of the Carrier Test

The following table shows the highest levels of radiated emissions on both polarizations of horizontal and vertical.

Humidity Level : 48 % Temperature : 16 °C
 Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.231(b)
 Type of Test : Intentional Radiator
 Result : PASSED BY -6.02 dB

EUT : REMOTE KEYLESS ENTRY SYSTEM Date: November 27, 2003
 Operating Condition : TX mode
 Distance : 3 Meter

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Carrier Freq. (MHz)	Amp. (dBuV)	Detect Mode	Pol.	Ant. (dBuV/m)	Cable (dB)	Amp. (dBuV/m)	Limit (dBuV/m)	Margin (dB)
313.85	54.40	Peak	H	13.58	1.55	69.53	75.55	-6.02

Remark: To get a maximum emission level from the EUT, the EUT was moved throughout the XY, XZ, and YZ planes.

Tested by: In-Sub, Youn / Test Engineer



5.2 Spurious Emission Test

The following table shows the highest levels of radiated emissions on both polarizations of horizontal and vertical.

Humidity Level : 48 % Temperature : 16 °C
 Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.231(b)
 Type of Test : Intentional Radiator
 Result : PASSED BY -6.66dB at 1255.25 MHz

EUT : REMOTE KEYLESS ENTRY SYSTEM Date: November 27, 2003
 Operating Condition : TX mode
 Distance : 3 Meter

Radiated Emissions			Ant	Correction Factors		Total(dBuV/m)	FCC Limit(dBuV/m)	
Freq. (MHz)	Amp. (dBuV)	Detect Mode	Pol.	Ant. (dBuV/m)	Cable (dB)	Peak	Limit	Margin(dB)
627.68	6.80	Peak	V	19.43	2.36	28.59	55.55	-26.96
941.53	14.50	Peak	H	22.45	3.87	40.82	55.55	-14.73
1255.25	18.80	Peak	H	25.20	4.89	48.89	55.55	-6.66
1569.05	13.10	Peak	H	27.06	5.79	45.95	55.55	-9.60
1883.25	9.80	Peak	H	29.23	6.21	45.24	55.55	-10.31
2196.95	9.10	Peak	H	30.81	7.76	47.67	55.55	-7.88
-								
Other spurious frequencies were not found up to 3138.5 MHz.								

Remark: To get a maximum emission level from the EUT, the EUT was moved throughout the XY, XZ, and YZ planes.

Tested by: In-Sub, Youn / Test Engineer



5.3 Bandwidth of the operating frequency

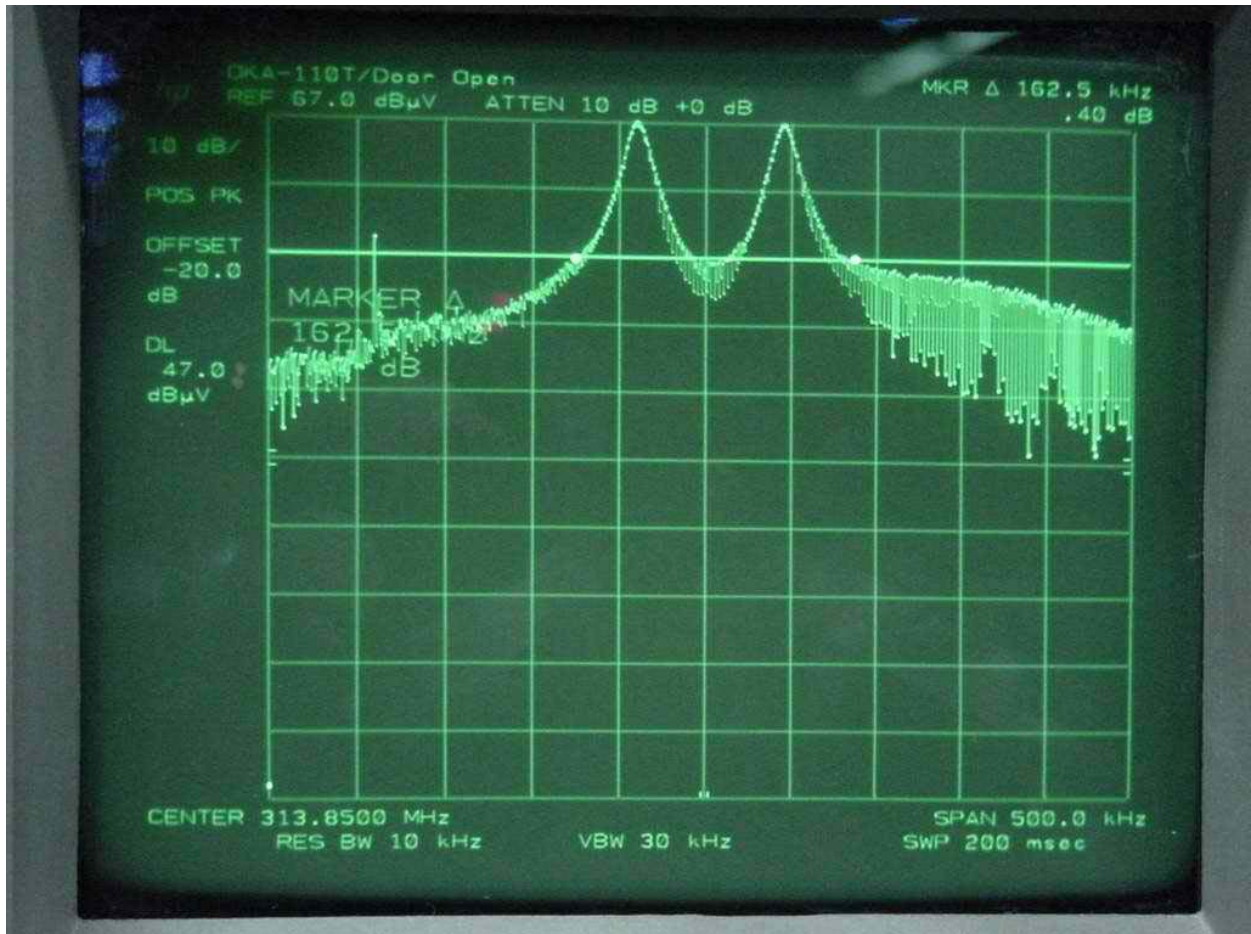
Humidity Level : 51 % Temperature : 19 °C
 Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.231 (c)
 Type of Test : Intentional Radiator
 Result : PASSED

EUT : REMOTE KEYLESS ENTRY SYSTEM Date: November 27, 2003
 Operating Condition : TX mode
 Minimum Resolution
 Bandwidth : 10 kHz

Carrier Freq. (MHz)	Bandwidth of the emission. (kHz)	Limit (0.25% of the Carrier Freq.) (kHz)	Remark
313.85	162.5	784.62	<u>The point 20dB down from the modulated carrier</u>

Remark: Please refer to image data for test data in next page.

Tested by: In-Sub, Youn / Test Engineer





6. FIELD STRENGTH CALCULATION

Meter readings are compared to the specification limit correcting for antenna and cable losses

+ Meter reading (dBuV)

+ Cable Loss (dB)

+ Antenna Factor (Loss) (dB/meter)

= Corrected Reading (dBuV/meter)

- Specification Limit (dBuV/meter)

= dB Relative to Spec (+/- dB)

**7. LIST OF TEST EQUIPMENT**

No.	EQUIPMENTS	MFR.	MODEL	SER. NO.	LAST CAL	DUE CAL	USE
1.	Test receiver	R/S	ESVS 10	827864/005	DEC/03	12MONTH	■
2.	Test receiver	R/S	ESHS 10	834467/007	APR/03	12MONTH	
3.	Spectrum analyzer	HP	8566B	3407A08547	AUG/03	12MONTH	■
4.	Spectrum analyzer	HP	8568B	3109A05456	MAY/03	12MONTH	■
5.	RF preselector	HP	85685A	3107A01264	MAY/03	12MONTH	■
6.	Quasi-Peak Adapter	HP	85650A	3107A01542	MAY/03	12MONTH	■
7.	TRILOG Broadband Antenna	Schwarzbeck	VULB9163	VULB9163 166	FEB/03	12MONTH	■
8.	Biconical antenna	EMCO	3104C	9109-4443	MAY/03	12MONTH	■
				9109-4444	JUL/03	12MONTH	
		Schwarzbeck	VHA9103	91031852	AUG/02	12MONTH	
9.	Log Periodic antenna	EMCO	3146	9109-3213	AUG/02	12MONTH	■
				9109-3214	JUL/03	12MONTH	
				9109-3217	MAY/03	12MONTH	
		Schwarzbeck	9108-A(494)	62281001	AUG/02	12MONTH	
10.	LISN	EMCO	3825/2	9109-1867	AUG/03	12MONTH	
				9109-1869	OCT/03	12MONTH	
11.	Position Controller	EMCO	1090	9107-1038	N/A	N/A	■
12.	Turn Table	EMCO	1080-1.21	9109-1576	N/A	N/A	■
13.	Antenna Master	EMCO	1070-1	9109-1624	N/A	N/A	■