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# ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR SINGLE SUPERHETERODYNE RECEIVER

**Test report file number** : E025R-022

**Applicant** : OMRON AUTOMATIVE ELECTRONICS KOREA CO., LTD.

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

**Manufacturer** : OMRON AUTOMATIVE ELECTRONICS KOREA CO., LTD.

**Address** : 272-2, Kyeruk-Ri, Miyang-Myon, Ansong-City, Kyongki-Do, 456-840, Korea

**Type of Equipment** : REMOTE CONTROL SECURITY RECEIVER

**FCC ID** : OSLOKA-601R

**Model / Type No.** : OKA-601R

**Serial number** : N/A

**Total page of Report** : 10 pages (including this page)

**Date of Incoming** : April 22, 2002

**Date of issuing** : May 14, 2002

## SUMMARY

The equipment complies with the regulation; FCC PART 15 SUBPART B §15.101

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 AUTOMATIVE ELECTRONICS KOREA CO., LTD.  
 - . ADDRESS : 481-2, Kasan-Dong, Kumchun-Gu, Seoul 153-023 Korea  
 - . CONTACT PERSON : Mr. K. Y. Jang / Section Manager  
 - . TELEPHONE NO : +82-2-8505-747  
 - . FCC ID : OSLOKA-601R  
 - . MODEL NO/NAME : OKA-601R  
 - . SERIAL NUMBER : N/A  
 - . DATE : May 14, 2002

DEVICE TYPE	UNINTENTIONAL RADIATOR
E.U.T. DESCRIPTION	REMOTE CONTROL SECURITY RECEIVER - SINGLE SUPERHETERODYNE RECEIVER
THIS REPORT CONCERNS	ORIGINAL GRANT
MEASUREMENT PROCEDURES	ANSI C63.4/1992
TYPE OF EQUIPMENT TESTED	PRE-PRODUCTION
KIND OF EQUIPMENT AUTHORIZATION REQUESTED	CERTIFICATION
EQUIPMENT WILL BE OPERATED UNDER FCC RULES PART(S)	FCC PART 15 §15.101
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.

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## 2. GENERAL INFORMATION

### 2.1 Product Description

The OMRON AUTOMOTIVE ELECTRONICS KOREA CO., LTD., Model OKA-601R (referred to as the EUT in this report) is a receiver that is fixed inside the vehicle and receives the signal from the transmitter, Model: OKA-221T, FCC ID: OSLOKA-221T, which was manufactured by above applicant and then decide locking and unlocking the door and alarm siren. The product specification described herein was obtained from product data sheet or user's manual.

CHASSIS TYPE		Plastic
RECEIVING FREQUENCY		307.9 MHz
RF RECEIVER MODULE	TYPE	WMF-R13 by Mitsumi Elec.
	LOCAL CLOCK FREQ.	318.6 MHz
	FREQUENCY GENERATION	Crystal Resonator
	MODULATION SCHEME	FM (Single Superheterodyne)
	CARRIER DETECT SENSITIVITY	11 dBuVemf
USED CPU		MB89636 by Fujitsu
LIST OF EACH OSC. OR CRY. FREQ. (FREQ.>=1MHz)		63.72 MHz on RF receiver module 10 MHz on Main Board
OPERATING VOLTAGE/CURRENT		DC 12V, 50mA
NUMBER OF LAYERS		2 LAYERS

### Model Differences:

-. No other model differences have been mentioned.

### 2.2 Related Submittal(s) / Grant(s)

Original submittal only.

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### 2.3 Test System Details

The EUT was tested with the following all equipment used in the tested systems are:

Model	Manufacturer	FCC ID	Description	Connected to
OKA-601R	OMRON AUTOMATIVE ELECTRONICS KOREA CO., LTD.	OSLOKA-601R	RECEIVER	BATTERY
N/A	OMRON AUTOMATIVE ELECTRONICS KOREA CO., LTD.	N/A	Door Unlock Check Unit with a battery	EUT
8657A	HP	N/A	Signal Generator	N/A

### 2.4 Test Methodology

Both conducted and radiated testing was performed according to the procedures in ANSI C63.4/1992. Radiated testing was performed at a distance of 3 meters from EUT to the antenna.

### 2.5 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)

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### 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 AUTOMATIVE ELECTRONICS KOREA CO., LTD.	XD-ETACS	N/A

#### 3.2 EUT exercise Software

Set the signal generator to transmit at 307.9MHz and then the EUT receives the signal.

Used battery for the EUT was fully charged.

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

#### 3.3 Equipment Modifications

-. None

#### 3.4 Configuration of Test System

Line Conducted Emission Test:

It is not need to test this requirement, because the power of the EUT supplies from a car battery.

Radiated Emission Test:

Preliminary radiated emissions tests were conducted using the procedure in ANSI C63.4/1992, 8.3.1.1 to determine the worse operating conditions. Final radiated emission tests were conducted at 3 meters open area test site.

Coherent Test:

During Radiated Emission Tests, H.P. signal generator model no: 8657A was used to radiate an unmodulated CW signal to EUT at 318.5 MHz in order to cohere the individual components of the characteristic broadband emissions from EUT.

Antenna Power Conduction Test:

This equipment was only with a permanently attached antenna, so the radiated emission measurement was performed with the antenna attached.

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#### 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 car 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)
RX mode	X

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## 5. FINAL RESULT OF MEASUREMENT

Preliminary test was done in normal operation mode. And the final measurement was selected for the maximized emission level.

### 5.1 Radiated Emission Test

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

Humidity Level : 49 % Temperature : 18 °C  
 Limits apply to : FCC CFR 47, PART 15, SUBPART B (Section: 15.109)  
 Type of Test : Unintentional Radiator  
 Result : PASSED BY -12.75 dB at 955.80 MHz

EUT : REMOTE CONTROL SECURITY RECEIVER Date: April 24, 2002  
 Operating Condition : RX mode  
 Detector : CISPR Quasi-Peak (6 dB Bandwidth: 120 kHz)  
 Distance : 3 Meter

Radiated Emission		Ant	Correction Factors		Total	FCC LIMIT	
Freq. (MHz)	Amp. (dBuV)	Pol.	Ant. (dBuV/m)	Cable (dB)	Amp. (dBuV/m)	Limit (dBuV/m)	Margin (Db)
301.00	5.30	H	14.77	2.01	22.08	46.00	-23.92
315.00	5.90	H	14.84	2.09	22.83	46.00	-23.17
318.60	15.60	H	14.85	2.11	32.56	46.00	-13.44
320.92	5.30	H	14.86	2.13	22.29	46.00	-23.71
334.60	8.10	H	15.39	2.20	25.69	46.00	-20.31
637.20	6.20	H	19.35	3.04	28.59	46.00	-17.41
955.80	6.00	H	23.14	4.11	33.25	46.00	-12.75
Other frequencies are more than 30dB below the limit up to 2GHz.							

Radiated Emission Tabulated Data



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**ONETECH**

Testing & Evaluation Lab.

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**Tested by: Young-Min, Choi / Project Engineer**

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## 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)

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= Corrected Reading (dBuV/meter)

- Specification Limit (dBuV/meter)

= dB Relative to Spec (+/- dB)

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**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	OCT/01	12MONTH	■
2.	Test receiver	R/S	ESHS 10	834467/007	APR/02	12MONTH	■
3.	Spectrum analyzer	HP	8568B	3109A05456	APR/02	12MONTH	■
4.	RF preselector	HP	85685A	3107A01264	APR/02	12MONTH	■
5.	Quasi-Peak Adapter	HP	85650A	3107A01542	APR/02	12MONTH	■
6.	Biconical antenna	EMCO	3104C	9109-4441 9109-4443 9109-4444	APR/02	12MONTH	■
7.	Log Periodic antenna	EMCO	3146	9109-3213 9109-3214 9109-3217	APR/02	12MONTH	■
8.	LISN	EMCO	3825/2	9109-1867 9109-1869	JUL/01	12MONTH	■
9.	Computer System	HP	98581C	98543A	N/A	N/A	■
	Hard disk drive		9153C	CMC762Z9153	N/A	N/A	■
10.	Position Controller	EMCO	1090	9107-1038	N/A	N/A	■
11.	Turn Table	EMCO	1080-1.21	9109-1576	N/A	N/A	■
12.	Antenna Master	EMCO	1070-1	9109-1624	N/A	N/A	■