



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

Test report file number : E01DR-064

Applicant : OMNITRONIC IND.

Address : 2Fl. DongIl B/D, #40 Guro5-Dong, Guro-Gu, Seoul, Korea

Manufacturer : OMNITRONIC IND.

Address : 2Fl. DongIl B/D, #40 Guro5-Dong, Guro-Gu, Seoul, Korea

Type of Equipment : REMOTE KEYLESS ENTRY SYSTEM

FCC ID : P43BCA2002

Model / Type No. : PG-3500

Serial number : N/A

Total page of Report : 15 pages (including this page)

Date of Incoming : November 29, 2001

Date of issuing : December 23, 2001

SUMMARY

The equipment complies with the regulation; FCC PART 15 SUBPART C §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.

Prepared by:

G. W. Lee/ Ass. Chief Engineer
EMC Dept.
ONETECH Corp.

Reviewed by:

Y. K. Kwon/ Chief Engineer
EMC Dept.
ONETECH Corp.

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1. VERIFICATION OF COMPLIANCE

APPLICANT : OMNITRONIC IND.
ADDRESS : 2Fl. DongIl B/D, #40 Guro5-Dong, Guro-Gu, Seoul, Korea
CONTACT PERSON : John Kim / President
TELEPHONE NO : 82-2-584-8618
FCC ID : P43BCA2002
MODEL NO/NAME : PG-3500
SERIAL NUMBER : N/A
DATE : December 23, 2001

DEVICE TYPE	REMOTE KEYLESS ENTRY SYSTEM - INTENTIONAL RADIATOR
E.U.T. DESCRIPTION	RF REMOTE KEYLESS ENTRY SYSTEM FOR VEHICLE - TRANSCEIVER
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 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.

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2. GENERAL INFORMATION

2.1 Product Description

The OMNITRONIC IND., Model PG-3500 (referred to as the EUT in this report) is a transceiver that it controls locking and unlocking the door and the trunk opening of a vehicle by wireless remote controller. The product specification described herein was obtained from product data sheet or user's manual.

CHASSIS TYPE	Plastic
TX/RX FREQUENCY	433.92MHz
TRANSMISSION TIME PER 1 CYCLE	50 ms
INTERMIT TIME PER 1 CYCLE	40 ms
INTERMITTENTLY CONTINUOUS TIME	Max. 3.5 s
MODULATION SCHEME	AM
LIST OF EACH OSC. OR CRY. FREQ.(FREQ.>=1MHz)	433.92 MHz, 4MHz
ANTENNA TYPE	Helicon Type
RATED SUPPLY VOLTAGE	DC 12V
NUMBER OF LAYERS	RF Board: 2 Layers, Control Board: 2 Layers

* Remark: This equipment automatically deactivates the transmitter within not more than 4 second of being released.

Model Differences:

- No other model differences have been mentioned

2.2 Related Submittal(s) / Grant(s)

- None

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2.3 Test System Details

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

2.4 Test Methodology

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 12, 1999. (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
RF BOARD	OMNITRONIC IND.	N/A	N/A
CONTROL BOARD	OMNITRONIC IND.	N/A	N/A

3.2 EUT exercise Software

To get a maximum radiated emission from the EUT at Transmitter mode, the selector switch on the EUT was positioned “ON” to transmit the signal.

Also, for getting maximum emission from the EUT at Receiver mode, the selector switch on the EUT was positioned “OFF” to receive the signal. The signal generator set to transmit at 433.92 MHz and the EUT receives the signal.

3.3 Equipment Modifications

None

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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 C63.4/1992 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 plot is taken at 20kHz/division frequency span, 10kHz resolution bandwidth and 10dB/division logarithmic display from an 8568B spectrum analyzer.

Antenna Power Conduction Test:

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

3.5 Antenna Requirement

According to the § 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.

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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 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)
RX Mode	
TX Mode	X

**5. FINAL RESULT OF MEASURMENT****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	: <u>48 %</u>	Temperature : <u>12°C</u>
Limits apply to	: <u>FCC CFR 47, PART 15, SUBPART C, SECTION 15.231(b)</u>	
Type of Test	: <u>Intentional Radiator</u>	
Result	: <u>PASSED BY -1.07 dB</u>	

EUT	: REMOTE KEYLESS ENTRY SYSTEM	Date: December 18, 2001
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)
433.86	61.1	Peak	H	16.13	2.50	79.73	80.8	-1.07
433.86	56.4	Average	H	16.13	2.50	75.03	80.8	-5.77

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

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5.3 Spurious Emission Test

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

Humidity Level	: <u>48 %</u>	Temperature : <u>12°C</u>
Limits apply to	: <u>FCC CFR 47, PART 15, SUBPART C, SECTION 15.231(b)</u>	
Type of Test	: <u>Intentional Radiator</u>	
Result	: <u>PASSED BY -1.90dB at 867.68 MHz</u>	

EUT	: REMOTE KEYLESS ENTRY SYSTEM	Date: December 18, 2001
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)
867.68	32.10	Peak	H	22.57	4.25	58.92	60.82	-1.90
867.68	26.5	Average	H	22.57	4.25	53.32	60.82	-7.50
1301.46	12.6	Peak	H	25.75	5.72	44.07	60.82	-16.75
1735.30	12.7	Peak	H	30.05	6.20	48.95	60.82	-11.87

It was not observed any emissions from the EUT up to 5GHz.

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

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5.4 Radiated Emission Test for Receiver Mode

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

Humidity Level	: <u>48 %</u>	Temperature : <u>12°C</u>
Limits apply to	: <u>FCC CFR 47, PART 15, SUBPART B</u>	
Type of Test	: <u>Un-Intentional Radiator</u>	
Result	: <u>PASSED BY -2.52dB at 423.33 MHz</u>	

EUT	: REMOTE KEYLESS ENTRY SYSTEM	Date: December 18, 2001
Operating Condition	: RX 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)
266.60	17.0	Peak	H	12.60	1.87	31.47	46.00	-14.53
344.80	16.8	Peak	H	14.52	2.25	33.57	46.00	-12.43
357.00	16.5	Peak	H	14.66	2.31	33.47	46.00	-12.53
423.33	25.1	Peak	H	15.90	2.48	43.48	46.00	-2.52
462.40	11.9	Peak	H	16.77	2.57	31.24	46.00	-14.76
846.62	17.3	Peak	H	22.32	3.84	43.46	46.00	-2.54

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

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5.5 Bandwidth of the operating frequency

Humidity Level	: <u>49 %</u>	Temperature : <u>20°C</u>
Limits apply to	: <u>FCC CFR 47, PART 15, SUBPART C, SECTION 15.231 (c)</u>	
Type of Test	: <u>Intentional Radiator</u>	
Result	: <u>PASSED</u>	

EUT	: REMOTE KEYLESS ENTRY SYSTEM	Date: December 18, 2001
Operating Condition	: TX mode	
Minimum Resolution		
Bandwidth	: 10 kHz	

Carrier Freq. (MHz)	Bandwidth of the emission. (kHz)	Limit (kHz)	Remark
433.92	58.8	108.48	<u>The point 20dB down from</u> <u>the modulated carrier</u>

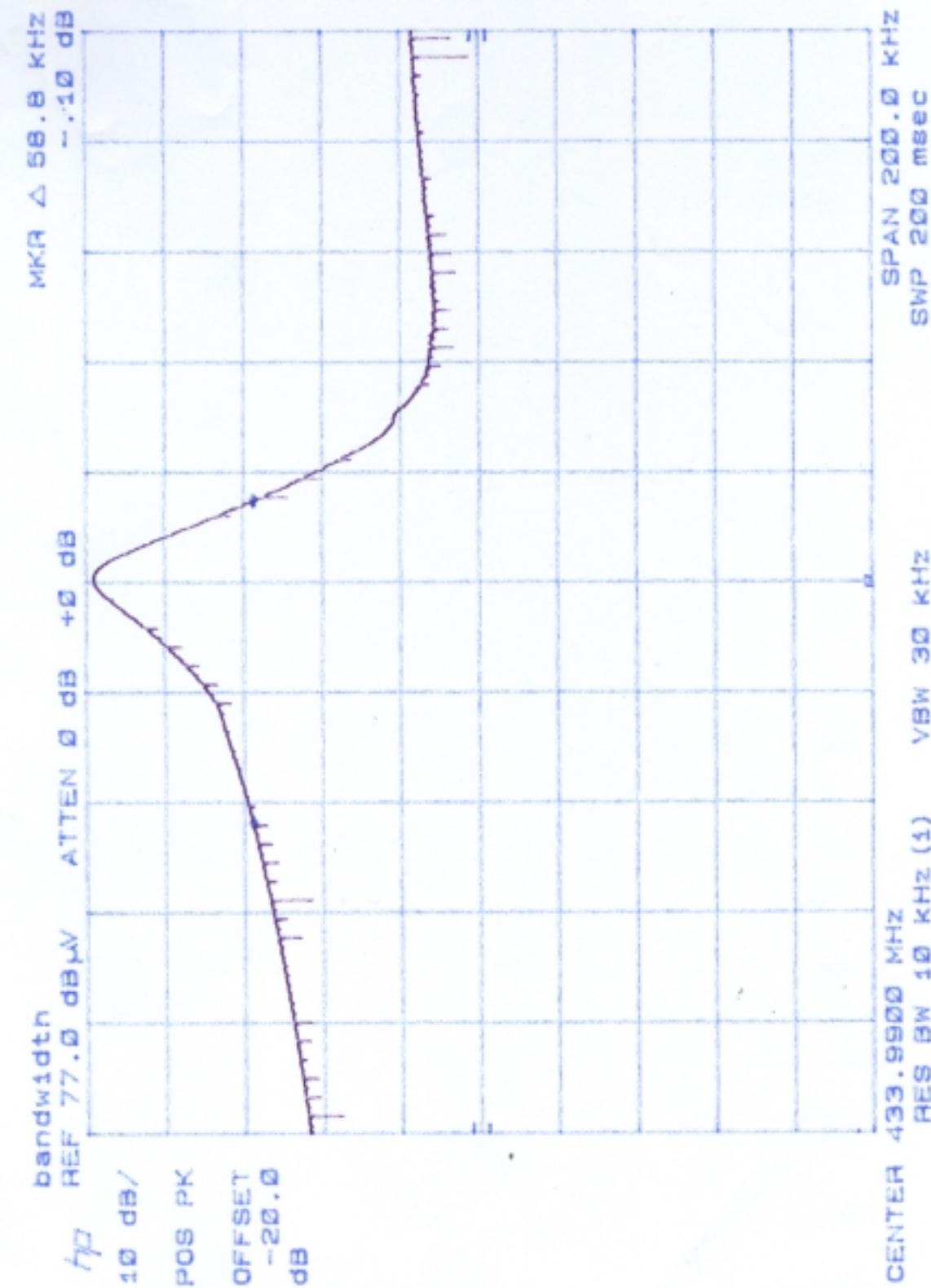
Remark: Please refer to Plotted Data #1.



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Plotted Data #1.

document property name.



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)



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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	SEP/00	12MONTH	■
2.	Test receiver	R/S	ESHS10	834467/007	APRIL/00	12MONTH	
3.	Spectrum analyzer	HP	8568B	3026A0226	SEP/00	12MONTH	■
4.	RF preselector	HP	85685A	3107A01264	SEP/00	12MONTH	■
5.	Quasi-Peak Adapter	HP	85650A	3107A01542	SEP/00	12MONTH	■
6.	Dipole Antenna	EMCO	3121C	9107-745	JUN/00	12MONTH	
7.	Biconical antenna	EMCO	3104C	9109-4441 9109-4443 9109-4444	MAR/00	12MONTH	■
8.	Log Periodic antenna	EMCO	3146	9109-3213 9109-3214 9109-3217	MAR/00	12MONTH	■
10.	Horn Antenna	EMCO	3115	9509-4563	MAR/00	12MONTH	■
11.	LISN	EMCO	3825/2	9109-1867 9109-1869	FEB/00	12MONTH	
12.	RF Amplifier	HP	8447F	3113A04554	JUN/00	N/A	
13.	Spectrum Analyzer	HP	8561E	3350A00546	SEP/00	12MONTH	■
14.	Spectrum Analyzer	HP	8591A	3131A02312	APR/00	12MONTH	
15.	Computer System Hard disk drive	HP	98581C 9153C	98543A CMC762Z9153	N/A N/A	N/A N/A	■ ■
16.	Plotter	HP	7475A	30052 22986	N/A	N/A	■
17.	Position Controller	EMCO	1090	9107-1038	N/A	N/A	■
18.	Turn Table	EMCO	1080-1.21	9109-1576	N/A	N/A	■
19.	Antenna Master	EMCO	1070-1	9109-1624	N/A	N/A	■