

**ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT  
CERTIFICATION TO FCC PART 15 REQUIREMENTS**

*for*

**INTENTIONAL RADIATOR**

**303 MHz CAR ALARM TRANSMITTER**

**MODEL NO: FW-06**

**FCC ID NO: OB8FW-06**

**REPORT NO: 98T0049-1**

**ISSUE DATE: NOVEMBER 20, 1998**

*Prepared for*  
**FREE-WAY AUTOMOBILE INDUSTRIAL INC.**  
**1FL, 169, SEC. 6, CHUNG HSIAO EAST ROAD**  
**TAIPEI, TAIWAN**  
**R.O.C.**

*Prepared by*  
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**TEST DATA**

- Maximum Modulation Percentage Plot
- Emission Bandwidth Plot
- Radiated Emission Worksheet for Peak Measurement
- Radiated Emission Worksheet for Average Measurement

**1. VERIFICATION OF COMPLIANCE**

COMPANY NAME : FREE-WAY AUTOMOIBLE INDUSTRIAL INC.  
1FL, 169, SEC. 6, CHUNG HSIAO E. ROAD  
TAIPEI, TAIWAN, R.O.C.

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EUT DESCRIPTION : 303 MHz CAR ALARM TRANSMITTER

MODEL NAME/NUMBER : FW-06

FCC ID : OB8FW-06

DATE TESTED : NOVEMBER 20, 1998

REPORT NUMBER : 98T0049-1

TYPE OF EQUIPMENT	SECURITY EQUIPMENT (INTENTIONAL RADIATOR)
EQUIPMENT TYPE	303 MHz CAR ALARM TRANSMITTER
MEASUREMENT PROCEDURE	ANSI 63.4 / 1992
LIMIT TYPE	CERTIFICATION
FCC RULE	CFR 47, PART 15

The above equipment was tested by Compliance Engineering Services, Inc. for compliance with the requirements set forth in CFR 47, PART 15. This said equipment in the configuration described in this report shows that maximum emission levels emanating from equipment are within the compliance requirements.



MIKE C.I. KUO / VICE PRESIDENT  
COMPLIANCE ENGINEERING SERVICES, INC.

**2 Product Description**

Fundamental Frequency	303 MHz
Power Source	Battery
Transmitting Time	Periodic $\leq$ 5 seconds
Modulation Type	AM
Associated Receiver	FREE-WAY / Model FAI-920

#### H **Test Facility**

The 3/10/30 meter open area test site and conducted measurement facility used to collect the radiated data is located at 561F Monterey Road, Morgan Hill, California, U.S.A. A detailed description of the test facility was submitted to the Commission on May 27, 1994.

#### H **Measurement Standards**

The site is constructed and calibrated in conformance with the requirements of ANSI C63.4/1992.

#### H **Test Methodology**

For an intentional radiator, the spectrum shall be investigated from the lowest radio frequency signal generated in the device, without going below 9 KHz, up to at least the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower. (CFR 47 Section 15.33)

#### H **Measurement Equipment Used**

Manufacturer	Model Number	Description	Cal Due Date
H.P.	8568A	Spectrum Analyzer (100Hz - 1.5GHz)	02/99
H.P.	8566B	Spectrum Analyzer (100Hz - 22GHz)	09/99
EMCO	3146	Antenna (200-1000 MHz)	10/99

H.P.	8447D	Preamplifier (0.1 - 1300 MHz)	09/99
ARA	DRG-18/A	Antenna(1 - 18GHZ)	12/99
H.P.	8449B	Preamplifier (1-26.5GHZ)	03/99

## 7 POWERLINE RFI LIMIT

CONNECTED TO AC POWER LINE	SECTION 15.207
CARRIER CURRENT SYSTEM IN THE FREQUENCY RANGE OF 450 kHz TO 30 MHz	SECTION 15.205 AND SECTION 15.209, 15.221, 15.223, 15.225 OR 15.227, AS APPROPRIATE.
BATTERY POWER	NO REQUIRED.

## 8 RADIATED EMISSION LIMITS

GENERAL REQUIREMENTS	SECTION 15.209.
RESTRICTED BANDS OF OPERATION	SECTION 15.205
PERIODIC OPERATION IN THE BAND 40.66 -40.70 MHz AND ABOVE 70 MHz.	SECTION 15.231

**9. SYSTEM TEST CONFIGURATION**

The system was configured for testing in a typical fashion (as a customer would normally use it). Remote control unit was placed on a wooden table. Buttons were pressed by using a tape to activate the operation. Please refer to the following photograph for actual setup.



Radiated Open Site Test Set-up

**10. Test Procedure**

1. The EUT was placed on a wooden table on the outdoor ground plane. The search antenna was placed 3 ft from the EUT. The EUT antenna was mounted vertically as per normal installation.
2. The turntable was slowly rotated to locate the direction of maximum emission at each emission falling in the restricted bands of 15.205. The EUT was moved throughout the XY, XZ, and YZ planes to maximize emissions received by the search antenna.
3. Once maximum direction was determined, the search antenna was raised and lowered in both vertical and horizontal polarizations. The maximum readings so obtained are recorded in the data listed below.

**11 Equipment Modifications**

To achieve compliance to FCC Section 15.231 technical limits, the following change(s) were made during compliance testing:

Mod.#1	Added 3.3 k $\Omega$ to C <sub>VAR1</sub> capacitor in parallel.
Mod.#2	Added 150 $\Omega$ resistor to Q1/E and ground.
Mod.#3	Replaced R2 (47K) by 270K resistor.

## 12. TEST RESULT

Powerline RFI Class B	Eut	Radiated Emission Limits	Eut
SECTION 15.207		SECTION 15.209	x
SECTION 15.205, 15.209, 15.221, 15.223, x 15.225 OR 15.227		SECTION 15.205	
BATTERY POWER	x	SECTION 15.231 (b)	x
		SECTION 15.231 (e)	

### 12.1 Maximum Modulation Percentage (M%)

#### CALCULATION:

$$\text{Average Reading} = \text{Peak Reading (dBuV/m)} \times 20 \log^{(M\%)}$$

In order to determine possible Maximum Modulation percentage, alternations are made to the EUT. We measured:

$$\begin{aligned} \text{WHERE} T \text{ (1 period)} &= 100 \text{ mS} \\ t_1 + t_2 + t_3 + \dots + t_n &= 44 \text{ mS} \end{aligned}$$

$$\begin{aligned} M\% &= ((t_1 + t_2 + t_3 + \dots + t_n) / T) \times 100\% \\ &= 44\% \end{aligned}$$

Maximum Modulation Percentage	44 %
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### 12.2 The Emissions Bandwidth

The bandwidth of the emissions were investigated per 15.231(c)

Center Frequency	Measured	Limits
303 MHz	218KHz <	303MHz x 0.25% = 757.5KHz