

AUCKLAND LABORATORY

Test Report No N98325/1

Report date: 09 February 1998

TEST REPORT

Bosch VIM 016 Immobilizer

tested to the Specification

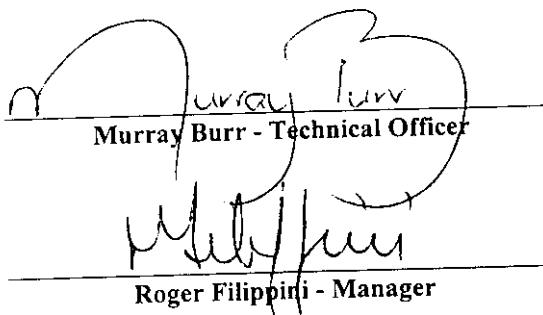
47 Code of Federal Regulations Ch. 1 (1996)

Part 15 - Radio Frequency Devices

for

EMC Services Pty Ltd

This Test Report is issued with the authority of:


Murray Burr - Technical Officer
Roger Filippini - Manager



All tests reported
herein have been
performed in accordance
with the laboratory's
scope of accreditation

Ministry of Commerce - Auckland Laboratory

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1. STATEMENT OF COMPLIANCE

The **Bosch VIM 016 Immobilizer** complies with 47 CFR Part 15 Subpart C - 1996 when the methods, as described in ANSI C63.4 - 1992, are applied.

2. RESULTS SUMMARY

The results from testing the sample **Bosch VIM 016 Immobilizer** are summarised in the following table:

| Set Up | Frequency Range | Results |
|------------------------------|------------------------------------|--------------------------------------|
| Field Strength at 300 metres | Fundamental and Spurious Emissions | Complies. Nil emissions observed. |
| Frequency | Fundamental | Complies. |
| Power Supply Details | | 12 V dc power supply. |

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3. CLIENT INFORMATION

| | |
|---------------------|----------------------|
| Company Name | EMC Services Pty Ltd |
| Address | PO Box 218 |
| | Epping |
| City | NSW 2121 |
| Country | Australia |
| Contact | Mr Ray Garrett |

4. DESCRIPTION OF TEST SAMPLE

| | |
|--------------------------|-------------|
| Brand Name | Bosch |
| Model Number | VIM 016 |
| Product | Immobilizer |
| Manufacturer | Unknown |
| Country of Origin | Australia |
| Serial Number | 76918 |

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5. MEASUREMENT STANDARD, METHODS AND PROCEDURES**Standard**

The sample was tested in accordance with 47 CFR Part 15 Subpart C - 1996.

Methods and Procedures

The measurement methods and procedures as described in ANSI C63.4 - 1992 were used.

5.1 Description Of Radiated Emissions Test Method

Radiated emissions testing was carried out over the frequency range of 100 kHz to 4000 kHz. Testing of the Device Under Test (DUT) for radiated emissions was carried out at the laboratory's open area test site - located at Dakota Lane, Ardmore Aerodrome, Auckland, New Zealand (Note: Site conforms to the requirements of CISPR 16, Part 1, Clause 16, and ANSI C63.4 - 1992.)

Before testing is carried out, a check of all connecting cables and antennas is carried out.

The device is placed on the test table top which is a total of 1.5 m above the test site ground plane. Measurements of the radiated field were initially made with the antenna located at a 10 m horizontal distance from the boundary of the devices under test to determine whether any significant emissions could be detected. If no emissions were detected between 0.009 and 1000 MHz at this distance, then measurements over a distance of 300 m between 0.009 and 1000 MHz and over a distance of 30 m between 0.490 and 30 MHz are not carried out.

Initially at 10 m, a measuring receiver using a Quasi-Peak detector was used. At 300 m, an average detector was used; however, no signal could be detected.

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Testing is carried out in the various modes in which the device operates. Any external cables are orientated for the worst case emissions level.

When an emission is located, it is positively identified and its maximum level is found by rotating the automated turntable, and by varying the antenna height with an automated antenna tower. The emission is measured in both vertical and horizontal antenna polarisations.

During the test, a number of ambient emissions were identified (list of which can be provided upon request). A number of methods were employed to ensure that emissions from the DUT were not masked by these emissions. This included, where applicable, internally inspecting the device before carrying out the test and determining the operating frequencies.

Where a predicted emission cannot be detected due to an ambient emission, various techniques are used to resolve the emission. This includes:

- Moving the test antenna closer.
- Rotating the device.

The emission level is automatically determined in field strength by the receiver taking the following into consideration:

$$\text{Level (dB}\mu\text{V/m)} = \text{Receiver Reading (dB}\mu\text{V)} + \text{Antenna Factor (dB)} + \text{Coax Loss (dB)}$$

Measurement uncertainty with a confidence interval of 95% is:

- Free radiation tests (100 kHz - 30 MHz) ± 4.8 dB

5.2 Device Under Test Configuration

The device was powered from a 12 V dc power supply.

The device was tested in the following mode(s): transmit.

The device was attached to an ignition barrel.

The device was positioned 1.5m above the ground plane.

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6. TEST EQUIPMENT USED

| Instrument | Manufacturer | Model | Serial No | Asset Ref |
|----------------------|-----------------|-----------------|------------|-----------|
| Measurement Receiver | Rohde & Schwarz | ESHS 10 | 828404/005 | RFS 3728 |
| Aerial Controller | EMCO | 1090 | 9112-1062 | RFS 3710 |
| DC Power Supply | Harrison | 6296A | | E1266 |
| Loop Antenna | Schwarzbeck | FMZ 1514 | | RFS 3602 |
| Measuring Receiver | Schwarzbeck | FSME 1515 | | |
| Magnetic Loops | Schwarzbeck | 0.15 - 30.0 MHz | | |

7. ACCREDITATIONS

The tests were carried out in accordance with the terms of the Ministry of Commerce, Laboratory Services' International Accreditation New Zealand (TELARC) Accreditation to the New Zealand Code of Laboratory Management Practice incorporating ISO Guide 25: 1990 and ISO 9002: 1987, and FCC Site Listing; FCC Ref: 31040/SIT 1300F2 dated March 21, 1997.

All measurement equipment has been calibrated in accordance with the terms of the Ministry of Commerce, Laboratory Services' International Accreditation New Zealand (TELARC) Accreditation to the New Zealand Code of Laboratory Management Practice incorporating ISO Guide 25: 1990 and ISO 9002: 1994.

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8. RESULTS

Free Radiation Measurements (0.120 MHz - 30 MHz)

| Freq kHz | Level dB μ V | Recheck dB | Transducer Factor | Total dB μ V/m | LIMIT dB μ V/m | Margin | Result |
|--|---------------------|---------------|-------------------|-----------------------|-----------------------|--------|-----------|
| <u>At 10 m</u> | | | | | | | |
| <i>Fundamental</i> | | | | | | | |
| 125.0000 | 25.0 | 23.5 | | 48.5 | 49.2 | -0.7 | Uncertain |
| <i>Harmonics</i> | | | | | | | |
| 250.0000 | - | - | - | 49.2 | - | - | Pass |
| 375.0000 | - | - | - | 49.2 | - | - | Pass |
| 500.0000 | - | - | - | 49.2 | - | - | Pass |
| 625.0000 | - | - | - | 49.2 | - | - | Pass |
| 750.0000 | - | - | - | 49.2 | - | - | Pass |
| 875.0000 | - | - | - | 49.2 | - | - | Pass |
| 1000.0000 | - | - | - | 49.2 | - | - | Pass |
| No other significant emissions observed. | | | | | | | |
| <u>At 300 m</u> | | | | | | | |
| <i>Fundamental</i> | | | | | | | |
| 125.0000 | - | - | - | 19.2 | - | - | Pass |