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## ***Electromagnetic Compatibility***

**Test of:** RF Card Entry Reader

**Model Number:** 25455

**Applicant:** PAC International Ltd

**Test Type:** Compliance

**Test Specification:** FCC CFR47, part 15.209  
(up-to 30 MHz) only.

**Test Result:** Complied

**SGS Serial Number:** DUR 24094.6/EMC/LS/02

**Date of Receipt:** 14<sup>th</sup> June 2002

**Date of Test(s):** 20<sup>th</sup> June 2002

**Date of Issue:** 10<sup>th</sup> January 2003

**Issue Number:** 3

*This report refers only to the sample submitted for test.*

This report shall not be reproduced except in full without the written approval of the testing laboratory.

***Test Engineer***

L.Steel

***Authorised Signatory***

A. Reynard  
Technical Manager

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**1. Client Information**

**Company Name:** PAC International Ltd

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Stockport,  
SK6 2SZ.

**Contact Person:** Shaun Byrne

**Telephone:** 0161 406 3400

**Facsimile:** 0161 430 8658

**2. Details Of Test Laboratory**

**Company Name:** SGS International Electrical Approvals

**UKAS Accreditation Number:** 1116

**Address:** South Industrial Estate,  
Bowburn,  
Co. Durham,  
DH6 5AD.

**Contact Persons:** Mr Alan Reynard

**Telephone:** 0191 377 2000

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### 3. Equipment Under Test (EUT)

#### 3.1 Identification Of EUT

|                                                  |                                                                   |
|--------------------------------------------------|-------------------------------------------------------------------|
| <b>Model Number:</b>                             | 25455                                                             |
| <b>Unique Identifier:</b>                        | 1975748                                                           |
| <b>Description of EUT:</b>                       | RF Card Entry Reader                                              |
| <b>Internal Clock Frequencies:<br/>(Maximum)</b> | 614 kHz                                                           |
| <b>Supply Voltage:</b>                           | 18V DC from a Controller<br>(Controller supply = 120 V AC, 60 Hz) |
| <b>Classification:</b>                           | Intentional and Unintentional Radiator                            |
| <b>Accessories Supplied:</b>                     | 2100 Controller                                                   |

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#### 4. Test Specification, Methods and Procedures

##### 4.1 Test Specification(s)

| Specification(s)                              | Title                       |
|-----------------------------------------------|-----------------------------|
| FCC CFR 47 : October 1999<br>Part 15.209 only | Code Of Federal Regulations |

##### 4.2 Purpose Of Test

To perform the radiated emissions test to the above specification in the frequency range 9 kHz to 30 MHz only, as requested by the client.

##### 4.3 Methods and Procedures

The standard listed above refers to the following tests: -

| CFR 47 Clause | Test               |
|---------------|--------------------|
| 15.209        | Radiated Emissions |

## **5. Deviations or Exclusions from the Test Specifications**

There were no deviations from the test specifications.

## **6. Operation of the EUT During Testing / Configuration and Peripherals**

### **6.1 Operation of EUT during testing.**

Refer to individual test results sections for details of EUT operation during testing.

### **6.2 Configuration and Peripherals**

The EUT was connected to a controller, (Manufacturer: PAC International, Model No: 25566, Serial No: Not supplied) in order to provide power to the EUT. The controller front panel was disconnected during the tests since this is an intentional transmitter also, which operates at the same frequency as the EUT.

The controller had its ports terminated as follows:

- i) relay ports – 1m leads attached with 150 ohm terminating resistors
  - ii) Tamper/Override, six wire bus port, printer RS232 port – 1m leads attached with 150 ohm resistors in series with a 100 nF capacitors as terminations
-

## 7. Test Results

### 7.1 General Comments

The test methods used are referred to in the individual test results sections of this test report.

### 7.2 Modifications Made to the EUT

No modifications were made to the EUT during the testing process.

### 7.3 Summary of Test Results

| CFR 47 Clause            | Test               | Result   |
|--------------------------|--------------------|----------|
| 15.209<br>(Up-to 30 MHz) | Radiated Emissions | Complied |

#### Result

In the configuration tested, the EUT complies with the requirements of Clause 15.209 of CFR 47 : October 1999, up-to a frequency of 30 MHz.

Full details of all tests can be found in the test results section of this report.

**7.4 Radiated Emissions Test Results – 15.209**

|                        |                 |
|------------------------|-----------------|
| <b>CFR Clause</b>      | 15.209          |
| <b>Frequency Range</b> | 9 kHz to 30 MHz |

**Operating Mode**

The compliance test was performed with an authorised card presented to the reader.

**Test Results****Peak Measurements**

| Frequency<br>MHz | Corrected Peak<br>Measurement**<br>(dB $\mu$ V/m) | Limit<br>(dB $\mu$ V/m) | Measurement<br>Distance<br>(metres) |
|------------------|---------------------------------------------------|-------------------------|-------------------------------------|
| *0.154           | -11.05                                            | 23.85                   | 300                                 |
| 0.311            | -40.26                                            | 17.74                   | 300                                 |
| 0.462            | -38.59                                            | 14.31                   | 300                                 |
| 0.770            | 4.22                                              | 29.87                   | 30                                  |
| 0.922            | -4.42                                             | 28.30                   | 30                                  |
| 1.544            | -10.08                                            | 23.83                   | 30                                  |
| 1.696            | -9.86                                             | 23.01                   | 30                                  |
| 1.852            | -10.08                                            | 29.54                   | 30                                  |
| 2.000            | -10.18                                            | 29.54                   | 30                                  |
| 2.160            | -8.20                                             | 29.54                   | 30                                  |
| 2.312            | -9.14                                             | 29.54                   | 30                                  |
| 2.928            | -11.35                                            | 29.54                   | 30                                  |
| 3.850            | -10.06                                            | 29.54                   | 30                                  |

\*Indicates EUT carrier frequency. The supply voltage to the controller was varied between 85% and 115% to maximise the carrier level.

**Test Method**

As per ANSI 63.4 : 1992

Measurements performed at a test distance of 1m and extrapolated to correct distance of 300m and 30m respectively, using a factor of 40 dB/decade, hence a correction factor of -99.08 for 300m and -59.08 for 30m was used. The corrected levels are shown above.

Measurement detector details: Peak Detector, 300 Hz bandwidth where  $F < 150\text{kHz}$ , 10 kHz bandwidth where  $F \geq 150\text{ kHz}$



**Radiated Emissions Test Configuration****Radiated Emissions Environmental Conditions**

|                                     |                |
|-------------------------------------|----------------|
| <b>Power Supply (to controller)</b> | 120V AC, 60 Hz |
| <b>Temperature</b>                  | 13°C           |
| <b>Relative Humidity</b>            | 59%            |
| <b>Barometric Pressure</b>          | 976mb          |

**Radiated Emissions Measurement Uncertainties**

|                   |          |
|-------------------|----------|
| <b>Frequency</b>  | ± 200kHz |
| <b>7Amplitude</b> | ± 4.6dB  |

The uncertainties stated are calculated in accordance with the requirements of UKAS with a confidence level of 95%.

**Test Equipment Used**

| <b>Equipment Type</b> | <b>Model Number</b> | <b>Last Calibration Date</b> |
|-----------------------|---------------------|------------------------------|
| Loop Antenna          | EMCO 6502           | Dec 00                       |
| Spectrum Analyser     | HP8563E             | Nov 00                       |