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International Electrical Approvals

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Electromagnetic Compatibility

Test of: RF Card Entry System

Model Numbers: Refer to page 5

Applicant: PAC International Ltd

Test Type: Compliance

Test Specification: FCC CFR47, parts 15.107/15.207 and 15.109.

Test Result: Complied

SGS Serial Number: DUR 24094.3/EMC/LS/02

Date of Receipt: 14th June 2002

Date of Test(s): 18th June 2002 – 24th June 2002

Date of Issue: 23rd December 2002

Issue Number: 2

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

Address: 1 Park Gate Close,
Bredbury,
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

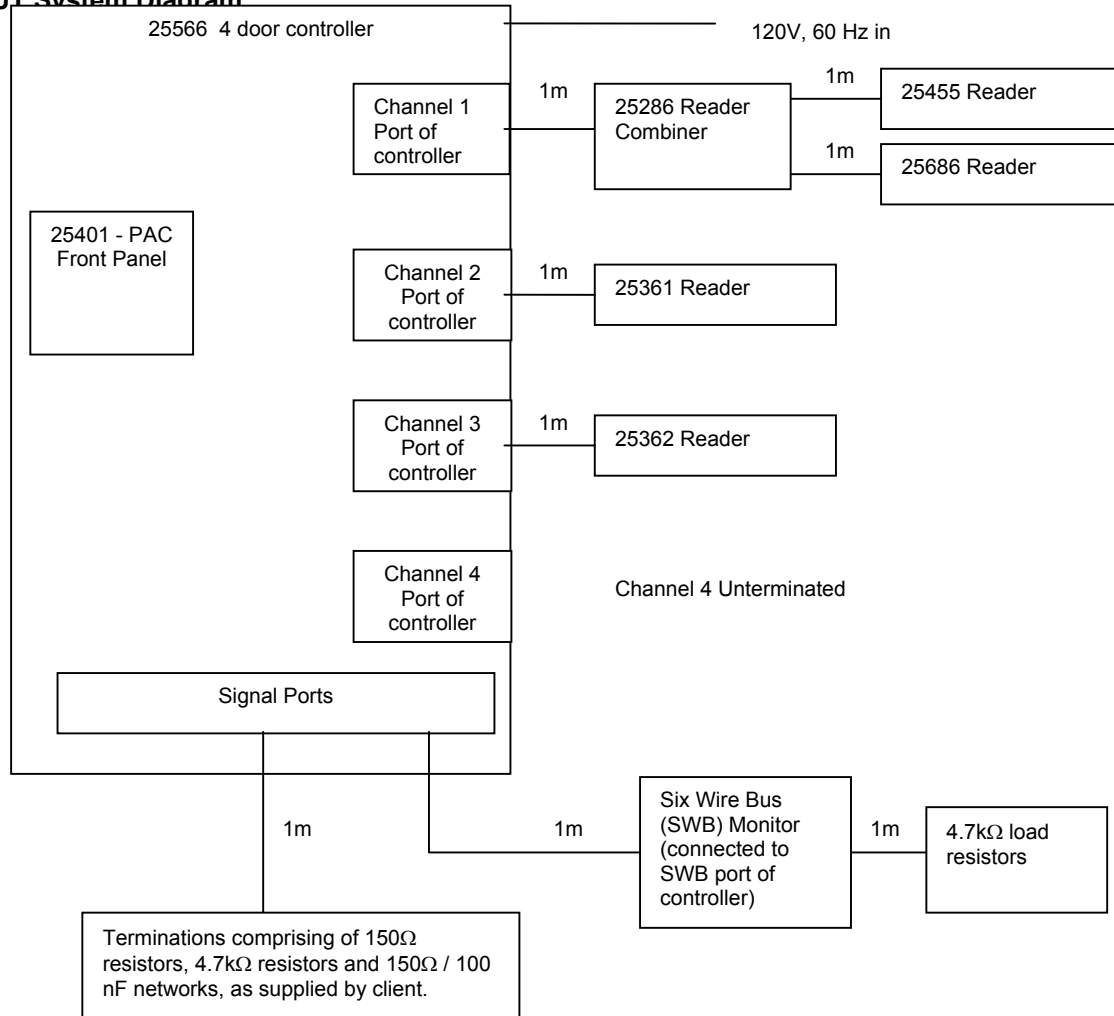
Facsimile: 0191 377 2020

3. Equipment Under Test (EUT)

3.1 Identification Of EUT

Model Numbers:	Refer to page 5 for details of individual components of the system.
Unique Identifier:	Refer to page 5.
Description of EUT:	RF Card Entry System
Internal Clock Frequencies:	Refer to Page 5.
Supply Voltage:	120V ac to controller (Note: all other PAC parts obtain their power via the controller).
Classification: (Intentional/Unintentional)	Refer to page 5.

EUT System Diagram



NOTE: The controller is support equipment (it is not being tested). It is submitted only to allow us to perform the Conducted and Radiated emissions tests on the other units.

Component Model No.	Serial No.	Description	Intentional/ Unintentional Radiator?	Highest Frequency Generated/Used
25566	None	4 door controller	Unintentional	<108 MHz
25401	None	Card Reader	Intentional and Unintentional	614 kHz
25286	1851728	Reader Combiner	Unintentional	<108 MHz
25010	1888815	SWB Monitor	Unintentional	<108 MHz
25455	1951674	Card Reader	Intentional and Unintentional	614 kHz
25686	1951642	Card Reader	Intentional and Unintentional	614 kHz
25361	S0078637	Card Reader	Intentional and Unintentional	11.0592 MHz
25362	S0078642	Card Reader	Intentional and Unintentional	11.0592 MHz

Note: Highest frequencies declared by the client.

4. Test Specification, Methods and Procedures

4.1 Test Specification(s)

Specification(s)	Title
FCC CFR 47 : October 1999 Parts 15.107/15.207 and 15.109.	Code Of Federal Regulations

4.2 Purpose Of Test

To assess the product for compliance with the tests detailed above only, as requested by the client.

4.3 Methods and Procedures

The standard listed above refers to the following tests: -

CFR 47 Clause	Test
15.107/15.207	Conducted Emissions (Intentional and Unintentional Radiators)
15.109	Radiated Emissions (Intentional and Unintentional Radiators)

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 configuration is shown on page 5 of this report.

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
15.107/15.207	Conducted Emissions	Complied
15.109	Radiated Emissions	Complied

Result

In the configuration tested, the EUT complies with the requirements of clauses 15.107/15.207 and 15.109 of CFR 47 : October 1999.

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

7.4 Conducted Emissions Test Results – (15.107/15.207)

CFR 47 Clause:	15.107 / 15.207
Limits:	CISPR 22, Class B (As specified in FCC document FCC 02-157 (ET Docket No. 98-80), adopted May 23 rd 2002).
Frequency Range	0.15 – 30 MHz

Operating Mode

The compliance test was performed without authorised cards presented to any RF card readers.

NOTE: Measurements were made on the AC mains of the controller.

Test Method

As per ANSI 63.4 : 1992

Measurement detector details: Quasi-Peak, 9 kHz bandwidth

Test Results

NOTE: The test results shown have automatically been corrected to account for LISN attenuation and cable loss, via measurement software.

Live Terminal Worst Case Emissions

Chase EMS 6.00

Notes

Analyse 1.3 TOKENS OFF, QPKS, L1

Test: (3) EN 55022 CLASS B: QUASI-PEAKS

RF level

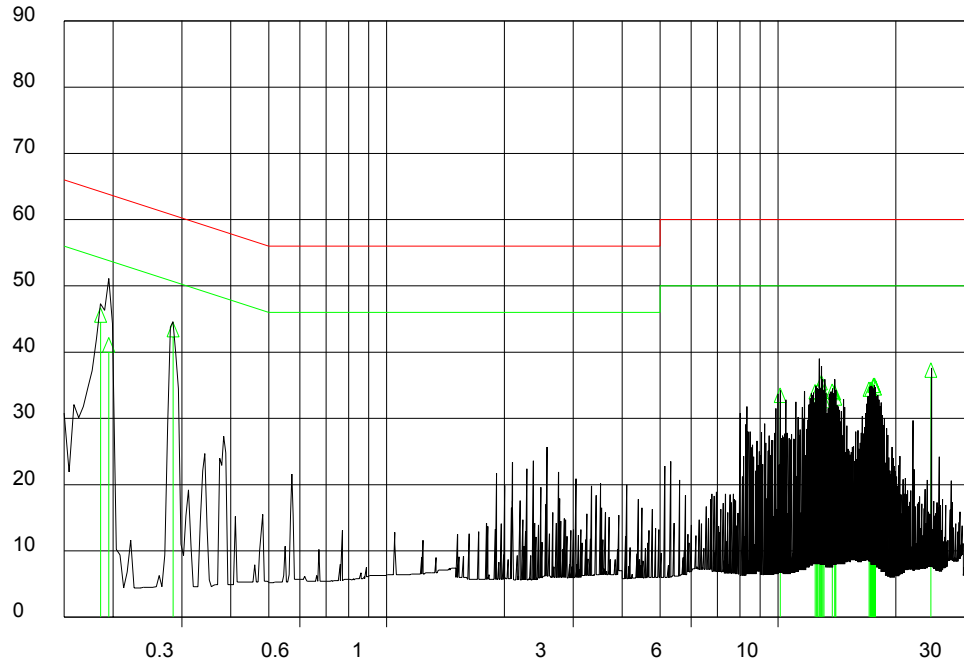
dBuV

1.3 TOKENS O

Quasi-peak

1.2 TOKENS O

Peak



Log Freq. (0.15 - 30)MHz

Limit EN 55022 Class B Conducte

Frequency (MHz)	Quasi Peak Measurement (dBμV)	Quasi-Peak Limit (dBμV)	Average Limit (dBμV)
0.186	46.7	64.2	54.2
0.195	42.2	63.8	53.8
0.285	44.5	60.7	50.7
12.435	35.1	60	50
12.624	35.2	60	50
12.907	36.5	60	50
13.002	35.2	60	50
13.762	35.2	60	50
17.083	35.5	60	50
17.560	36.1	60	50
17.655	36.1	60	50
24.580	38.4	60	50

NOTE: Average measurements not performed since Quasi-Peak measurements are below the Average limit.

Neutral Terminal Worst Case Emissions

Chase EMS 6.00

Notes

Analyse 1.5 TOKENS OFF, QPKS, L2

Test: (7) EN55022 CLASS A : QUASI-PEAKS

RF level

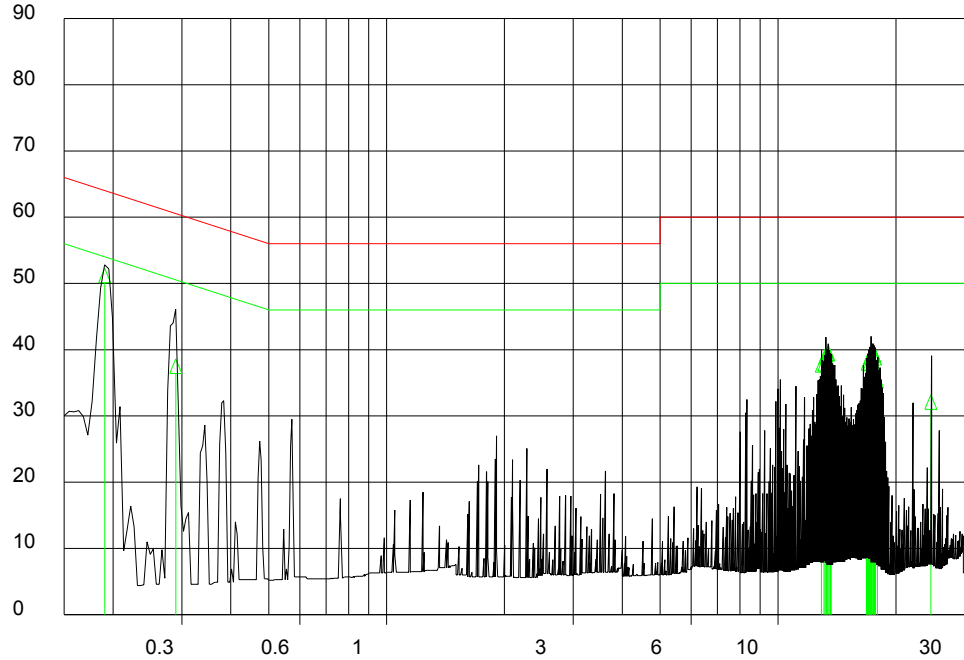
dBuV

1.5 TOKENS O

Quasi-peak

1.4 TOKENS O

Peak



Log Freq. (0.15 - 30)MHz

Limit EN 55022 Class B Conductive

Frequency (MHz)	Quasi Peak Measurement (dBμV)	Quasi Peak Limit (dBμV)	Quasi Peak Limit (dBμV)
0.190	52.0	64	54
0.289	39.4	60.6	50.6
11.062	39.6	60	50
11.985	39.2	60	50
11.998	34.2	60	50
12.007	29.2	60	50
12.291	40.4	60	50
16.845	25.9	60	50
17.124	38.0	60	50
17.223	32.4	60	50
22.128	34.6	60	50
24.585	36.3	60	50

NOTE: Average measurements not performed since Quasi-Peak measurements are below the Average limit.

Conducted Emissions Test Configuration



Conducted Emissions Environmental Conditions

Power Supply (to controller)	120V AC, 60Hz
Temperature	13.5°C
Relative Humidity	51%
Barometric Pressure	963mb

Conducted Emissions Measurement Uncertainties

Frequency	± 200kHz
Amplitude	± 3.0dB

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

Test Equipment Used

Equipment Type	Model Number	Last Calibration Date
LISN (50Ω)	Thurlby Thandar TTi 1600	Jan 02
Chase Receiver	LHR7000	Sep 01
Software	Version 6.00b	-
SGS Screened Room	-	-
Spectrum Analyser	HP8563E	Nov 00
Check Equip.	PLC 1C	-

7.5 Radiated Emissions Test Results – 15.109

CFR Clause	15.109
Limits	Class B
Frequency Range	30-1000 MHz

Operating Mode

The compliance test was performed with authorised cards presented to all RF card readers with the controller door open.

NOTE: The controller was placed close to the ground plane during the test, since the controller is usually remotely located and is not being tested.

Test Results

Frequency MHz	Quasi-Peak Measurement @3m (dB μ V/m)	Quasi-Peak Limit @3m (dB μ V/m)	Antenna Polarity
46.067	35.9	40	Vertical
79.864	37.0	40	Vertical
110.589	34.4	43.5	Vertical
129.018	41.1	43.5	Vertical
130.869	36.3	43.5	Vertical
147.467	37.8	43.5	Vertical
184.338	42.8	43.5	Vertical
235.581	32.6	46	Vertical

NOTE 1: The test results shown have automatically been corrected to account for Antenna factors, pre-amplifier gain and cable losses, via measurement software.

NOTE 2: Vertical antenna polarity was worst case for all emissions, hence results for horizontal antenna polarity were not recorded.

Test Method

As per ANSI 63.4 : 1992

Measurements performed at a test distance of 3m.

Measurement detector details: Quasi-Peak, 120 kHz bandwidth

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

Power Supply (to controller)	120V AC, 60 Hz
Temperature	13.5°C
Relative Humidity	51%
Barometric Pressure	963mb

Radiated Emissions Measurement Uncertainties

Frequency	± 200kHz
Amplitude	± 4.6dB

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

Test Equipment Used

Equipment Type	Model Number	Last Calibration Date
Receiver System	HP 8573B	Nov 01
Biconical Antenna	EMCO 3110	Nov 00
Log Periodic Antenna	EMCO 3146	Aug 01
Pre-amplifier	ZHL 1042J	Jan 02
Check Equip.	York CNE III	-
Software	Open Site HP85879	-