

Electromagnetic Compatibility

Test of: Mullion Designer Reader

Model Number: PR001

Applicant: PAC International

Test Type: Compliance

Test Specification: FCC CFR47 October 1 2003, parts
15.209 (below 30MHz), 15.207, and
15.109 Class A (above 30MHz)

SGS Serial Number: DUR41974A/3/EMC/CL/04

Date of Receipt: 10th May 2004

Date of Test(s): 17th May to 15th July 2004

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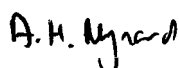
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Test Engineer

C. Levy


Authorised Signatory

A. Reynard
Technical Manager

CONTENTS

Page Number

1	Client Information	3
2.	Details Of Test Laboratory.....	3
3.	Equipment Under Test (EUT).....	4
3.1	<i>Identification Of EUT.....</i>	4
4.	Test Specification, Methods and Procedures	4
4.1	<i>Test Specification(s)</i>	4
4.2	<i>Purpose Of Test.....</i>	4
4.3	<i>Methods and Procedures.....</i>	5
5.	Deviations or Exclusions from the Test Specifications	6
6.	Operation of the EUT During Testing / Configuration and Peripherals	7
6.1	<i>Operation of EUT during testing.....</i>	7
6.2	<i>Configuration and Peripherals</i>	7
7.	Test Results	7
7.1	<i>General Comments</i>	7
7.2	<i>Modifications Made to the EUT</i>	7
7.3	<i>Summary of Test Results.....</i>	8
7.4	Radiated Emissions Test Results.....	9
7.5	Conducted Emissions Test Results.....	14

1. Client Information

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Contact Person:	Paul Lucas
Telephone:	0161 406 3577
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2. Details Of Test Laboratory

Company Name:	SGS UK Ltd.
UKAS Accreditation Number:	1116
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3. Equipment Under Test (EUT)

3.1 Identification Of EUT

Model Number:	PR001
Unique Identifier:	Not Supplied
Description of EUT:	Mullion Designer Reader 134 kHz intentional radiator and Class A digital device
Internal Clock Frequencies:	1.33 MHz highest clock frequency
Supply Voltage:	120 V 60 Hz via controller
Ports present:	Input cable
Accessories Supplied:	Controller, as supplied by client

4. Test Specification, Methods and Procedures

4.1 Test Specification(s)

Specification(s)	Title
FCC CFR 47 : October 2003 Parts 15.207, 15.209 (below 30MHz) and 15.109 (above 30MHz)	Code Of Federal Regulations

4.2 Purpose Of Test

To perform the relevant tests and assess the product for compliance with the above specifications.

4.3 Methods and Procedures

The standards listed on the previous page refer to the following tests: -

CFR 47 Clause	Test
15.209	Radiated Emissions (Below 30MHz)
15.109 Class A	Radiated Emissions (Above 30MHz)
15.207	Conducted 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 during the EMC tests.

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	Radiated Emissions (below 30MHz)	Complied
15.109 Class A	Radiated Emissions (above 30MHz)	Complied
15.207	Conducted Emissions	Complied

Result

In the configuration tested, the EUT complies with the requirements of Clauses 15.209, 15.109 and 15.207 of CFR 47 : October 2003.

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

7.4 Radiated Emissions Test Results

CFR Clause	15.209 15.109 Class A (above 30MHz)
Frequency Range	9 kHz – 1000 MHz

Operating Mode

The compliance test was performed without a card on the reader whilst connected to the controller.

Test Results

Note: The tables indicate the compliance measurement when the measurements are performed on the open area test site.

Note: Measurements above the 10th harmonic of the fundamental carrier (134 kHz) were assessed against the general radiated emission limits applicable to the incorporated digital device (15.109). The Class A digital device limits were used.

Quasi Peak Measurements 9 kHz-30 MHz

Frequency (MHz)	Quasi Peak Measurement (dB μ V/m)	Measurement distance* (m)	Limit (dB μ V/m)
0.1341	4.78	300	25.1
7.3400	-13.29	30	29.54
28.000	-13.34	30	29.54

The test was performed at 3m and the measurements were corrected using an extrapolation factor of 40dB/decade.

Quasi Peak Measurements 30 – 1000 MHz

Frequency (MHz)	Quasi-Peak Measurement (dBμV/m)	Measurement distance* (m)	Antenna Polarity (Horizontal/Vertical)	Limit (dBμV/m)
35.173	26.0	10	Horizontal	39.0
55.298	27.0	10	Horizontal	39.0
64.492	30.9	10	Horizontal	39.0
73.716	31.1	10	Horizontal	39.0
82.936	32.9	10	Horizontal	43.5
92.170	35.1	10	Horizontal	43.5
101.370	36.4	10	Horizontal	43.5
122.518	31.0	10	Horizontal	43.5
132.167	27.6	10	Horizontal	43.5
150.673	23.6	10	Horizontal	43.5
165.902	28.1	10	Horizontal	43.5
180.797	23.6	10	Horizontal	43.5
202.762	40.1	10	Horizontal	43.5
206.000	34.4	10	Horizontal	43.5
230.409	29.1	10	Horizontal	46.4
239.647	35.1	10	Horizontal	46.4
248.853	35.3	10	Horizontal	46.4
277.748	36.7	10	Horizontal	46.4
350.254	23.7	10	Horizontal	46.4
368.688	26.8	10	Horizontal	46.4
405.530	27.6	10	Horizontal	46.4
626.782	22.6	10	Horizontal	46.4

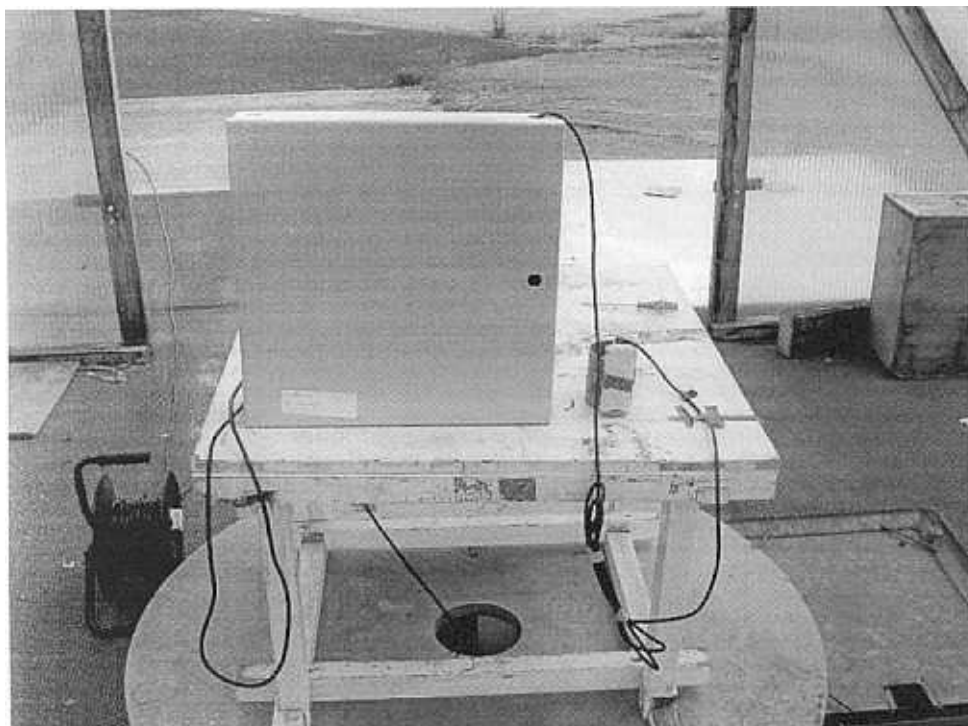
* The test was performed at 3m and the measurements were corrected using an extrapolation factor of 20dB/decade.

Quasi Peak Measurements 30 – 1000 MHz

Frequency (MHz)	Quasi-Peak Measurement (dBμV)	Measurement distance* (m)	Antenna Polarity (Horizontal/Vertical)	Limit (dBμV)
34.378	20.8	10	Vertical	39.0
55.280	17.3	10	Vertical	39.0
64.503	21.7	10	Vertical	39.0
73.714	25.1	10	Vertical	39.0
82.934	25.6	10	Vertical	39.0
92.175	31.7	10	Vertical	43.5
101.375	34.2	10	Vertical	43.5
119.858	30.8	10	Vertical	43.5
138.936	27.3	10	Vertical	43.5
147.473	28.8	10	Vertical	43.5
165.890	34.7	10	Vertical	43.5
202.780	40.8	10	Vertical	43.5
248.848	34.7	10	Vertical	46.4
359.464	26.9	10	Vertical	46.4
368.684	26.7	10	Vertical	46.4
405.550	30.7	10	Vertical	46.4
442.416	27.1	10	Vertical	46.4
488.524	24.4	10	Vertical	46.4

* The test was performed at 3m and the measurements were corrected using an extrapolation factor of 20dB/decade.

Radiated Emissions Test Configuration



Radiated Emissions Environmental Conditions

Power Supply (to controller)	120 V 60 Hz (controller supply)
Temperature	20°C
Relative Humidity	42%
Barometric Pressure	1008mb

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	Calibration Interval
Biconical Antenna	EMCO 3109	28/3/3	2 Years
Log Periodic Antenna	EMCO 3146	27/3/3	2 Years
Antenna	EMCO 6502	23/4/3	2 Years
Spectrum Analyser	Anritsu MS2613B	15/8/04	1 Year
Hewlett Packard Receiver System	HP8573B	15/8/04	1 Year

7.5 Conducted Emissions Test Results

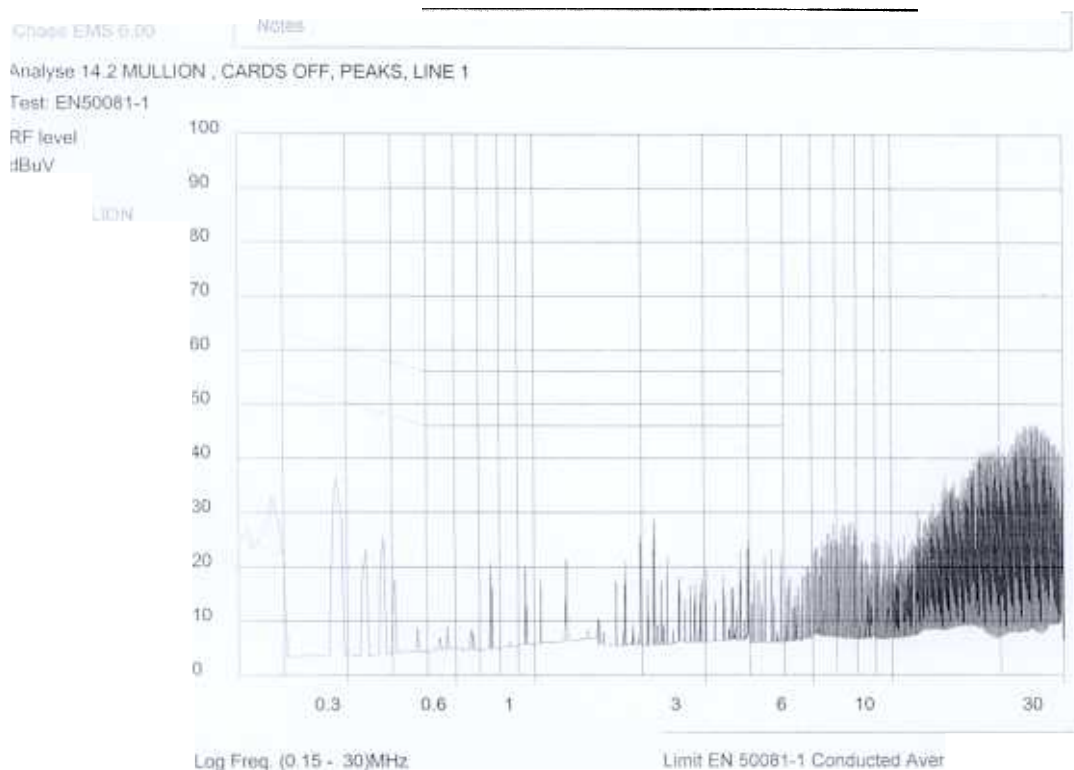
CFR 47 Clause:	15.207
Frequency Range	0.15 – 30 MHz.

Operating Mode

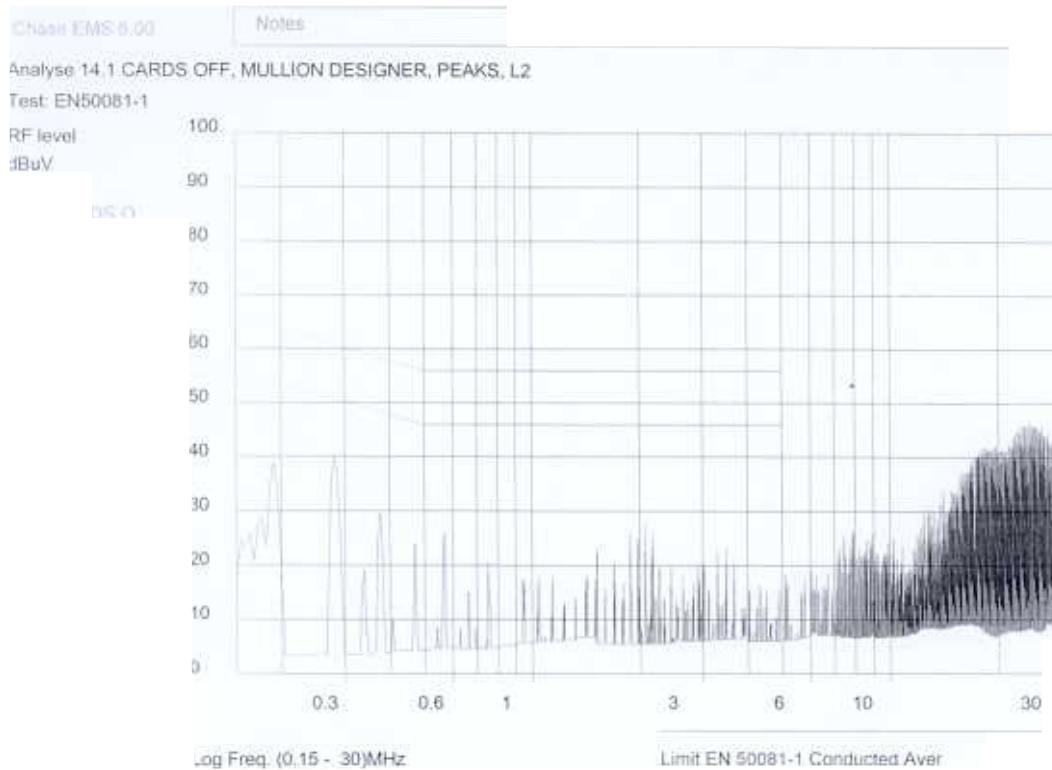
The compliance test was performed without a card on the reader whilst connected to the controller.

Test Results

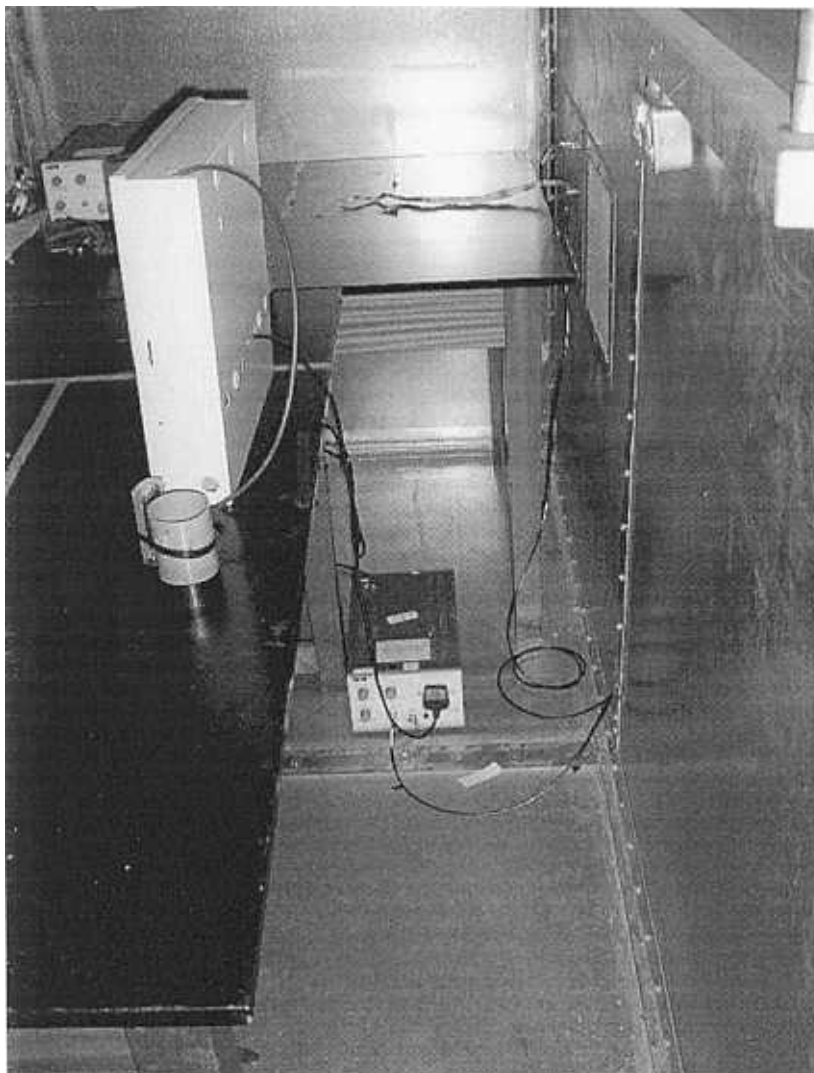
Live Terminal Worst Case Emissions



Neutral Terminal Worst Case Emissions



Conducted Emissions Test Configuration



Conducted Emissions Environmental Conditions

Power Supply (to controller)	120V 60Hz
Temperature	23°C
Relative Humidity	36%
Barometric Pressure	1008mb

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	Calibration Interval
LISN (50Ω)	Thurlby Thandar TTi 1600	2/7/04	1 Year
Chase Receiver	LHR7000	14/4/04	1 Year
Software	Version 6.00b	N/A	N/A
SGS Screened Room	-	N/A	N/A