

# TEST REPORT FROM RFI GLOBAL SERVICES LTD

Test of: PROXIMITY Vandal Proof Reader

To: FCC Part 15.207 and Part 15.209: 2009 Subpart B

**Test Report Serial No:**  
RFI-RPT-RP78562JD01A

**This Test Report Is Issued Under The Authority  
Of Scott D'Adamo, Operations Manager Global  
Approvals:**



<b>Checked By:</b>	Ian Watch
<b>Signature:</b>	
<b>Date of Issue:</b>	09 August 2010

This report is issued in Adobe Acrobat portable document format (PDF). It is only a valid copy of the report if it is being viewed in PDF format with the following security options not allowed: Changing the document, Selecting text and graphics, Adding or changing notes and form fields.

This report may not be reproduced other than in full, except with the prior written approval of RFI Global Services Ltd. The results in this report apply only to the sample(s) tested.

This page has been left intentionally blank.

**Table of Contents**

1. Customer Information .....	4
2. Summary of Testing .....	5
3. Equipment Under Test (EUT) .....	6
4. Operation and Monitoring of the EUT during Testing .....	7
5. Measurements, Examinations and Derived Results .....	8
6. Measurement Uncertainty .....	14
Appendix 1. Test Equipment Used.....	15

## **1. Customer Information**

<b>Company Name:</b>	Paxton Ltd
<b>Address:</b>	Paxton House Home Farm Brighton Sussex BN1 9HU United Kingdom

## 2. Summary of Testing

### 2.1. General Information

<b>Specification Reference:</b>	47CFR15.207 and 47CFR15.209
<b>Specification Title:</b>	Code of Federal Regulations Volume 47 (Telecommunications) 2009: Part 15 Subpart B (Radio Frequency Devices) - Sections 15.207 and 15.209
<b>Site Registration:</b>	209735
<b>Location of Testing:</b>	RFI Global Services Ltd, Wade Road, Basingstoke, Hampshire, RG24 8AH, England
<b>Test Dates:</b>	22 July 2010

### 2.2. Summary of Test Results

FCC Reference (47CFR)	Measurement	Result
Part 15.207	Transmitter AC Conducted Spurious Emissions	✓
Part 15.209	Transmitter Fundamental Field Strength	✓
Part 15.209	Transmitter Radiated Spurious Emissions	✓
Part 2.1049	Transmitter 20 dB Bandwidth	✓

**Key to Results**

✓ = Complied   ✘ = Did not comply

### 2.3. Methods and Procedures

<b>Reference:</b>	ANSI C63.10 (2009)
<b>Title:</b>	American National Standard for Testing Unlicensed Wireless Devices

### 2.4. Deviations from the Test Specification

For the measurements contained within this test report, there were no deviations from, additions to, or exclusions from the test specification identified above.

### **3. Equipment Under Test (EUT)**

#### **3.1. Identification of Equipment Under Test (EUT)**

<b>Description:</b>	Proximity reader for access control
<b>Brand Name:</b>	PROXIMITY vandal proof reader
<b>Model Name or Number:</b>	568-855-US
<b>Serial Number:</b>	None stated
<b>Hardware Version Number:</b>	z-vr30 rev 2, ppc-gvp rev B
<b>Software Version Number:</b>	None stated
<b>FCC ID Number:</b>	USEZ99UV30

#### **3.2. Description of EUT**

The equipment under test was a vandal proof proximity reader. It has functionality for reading tokens and uses a simultaneous transmit and receive frequency of 125 kHz.

#### **3.3. Modifications Incorporated in the EUT**

No modifications were applied to the EUT during testing.

#### **3.4. Additional Information Related to Testing**

<b>Tested Technology:</b>	Short Range Device	
<b>Type of Equipment</b>	Transceiver	
<b>Intended Operating Environment:</b>	Commercial / Light industry / Heavy industry	
<b>Highest Internally Generated Clock or Oscillator Frequency:</b>	16 MHz	
<b>Channel Spacing:</b>	Single channel device	
<b>Power Supply Requirement:</b>	Nominal	12 V DC
<b>Transmit Frequency Range:</b>	125 kHz	
<b>Receive Frequency Range:</b>	125 kHz	

#### **3.5. Support Equipment**

The following support equipment was used to exercise the EUT during testing:

<b>Description:</b>	Net2 1 door ACU with 2A PSU cabinet
<b>Brand Name:</b>	Net2 1 door ACU with 2A PSU in plastic cabinet
<b>Model Name or Number:</b>	411-501
<b>Serial Number:</b>	None stated
<b>Cable Length and Type:</b>	None stated
<b>Connected to Port:</b>	Power / data

## **4. Operation and Monitoring of the EUT during Testing**

### **4.1. Operating Modes**

The EUT was tested in the following operating mode(s):

- Constantly transmitting.

### **4.2. Configuration and Peripherals**

The EUT was tested in the following configuration(s):

- Connected to a Paxton Access Net2 1 door ACU with 2A PSU in plastic cabinet. This provided power and data connection to the EUT.
- AC conducted emissions were performed with the EUT connected to the ACU and the ACU connected to a 120 VAC 60 Hz supply through a LISN.

## **5. Measurements, Examinations and Derived Results**

### **5.1. General Comments**

Measurement uncertainties are evaluated in accordance with current best practice. Our reported expanded uncertainties are based on standard uncertainties, which are multiplied by an appropriate coverage factor to provide a statistical confidence level of approximately 95%. Please refer to *Section 6. Measurement Uncertainty* for details.

## 5.2. Test Results

### 5.2.1. Transmitter AC Conducted Spurious Emissions

#### Test Summary:

FCC Part:	15.207
Test Method Used:	As detailed in ANSI C63.10 Section 6.2 and relevant annexes

#### Environmental Conditions:

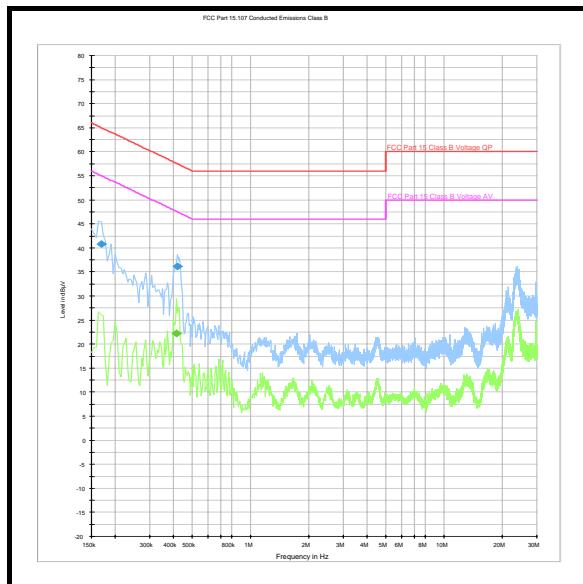
Temperature Range (°C):	31
Relative Humidity Range (%):	35

#### Results: Quasi Peak Detector Measurements

Frequency (MHz)	Line	Quasi-peak Level (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Result
0.168000	Neutral	40.8	65.1	24.3	Complied
0.415500	Live	36.2	57.5	21.3	Complied

#### Results: Average Detector Measurements

Frequency (MHz)	Line	Average Level (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Result
0.411000	Neutral	22.3	47.6	25.3	Complied



Note: This plot is a pre-scan and for indication purposes only. For final measurements, see accompanying tables.

**5.2.2. Transmitter Fundamental Field Strength****Test Summary:**

<b>FCC Part:</b>	FCC 15.209
<b>Test Method Used:</b>	As detailed in ANSI C63.10 Section 6.4 and relevant annexes

**Environmental Conditions:**

<b>Temperature Range (°C):</b>	27
<b>Relative Humidity Range (%):</b>	36

**Results:**

Frequency (MHz)	Antenna Polarity	Quasi-peak Level (dB $\mu$ V/m)	Limit at 300m (dB $\mu$ V/m)	Margin (dB)	Result
0.125	90° to EUT	-32.2	19.2	51.4	Complied

**Note(s):**

1. Limits below 30 MHz are specified at a test distance of 30 metres, whilst below 0.49 MHz they are specified at a test distance of 300 metres. However, as specified by FCC Section 15.31 (f)(2), measurements may be performed at a closer distance and the measured level corrected to the specified measurement distance by using the square of an inverse linear distance extrapolation factor (40 dB/decade).
2. A transducer factor on the measuring instrument was used to extrapolate the results at 3 metres to the required test distance.
3. Final measurements were made using a quasi-peak detector.

### **5.2.3. Transmitter Radiated Spurious Emissions**

#### **Test Summary:**

<b>FCC Part:</b>	15.209
<b>Test Method Used:</b>	As detailed in ANSI C63.10 (2009) Section 6 and relevant annexes
<b>Frequency Range:</b>	9 kHz to 1000 MHz

#### **Environmental Conditions:**

<b>Temperature (°C):</b>	27 to 29
<b>Relative Humidity (%):</b>	35 to 36

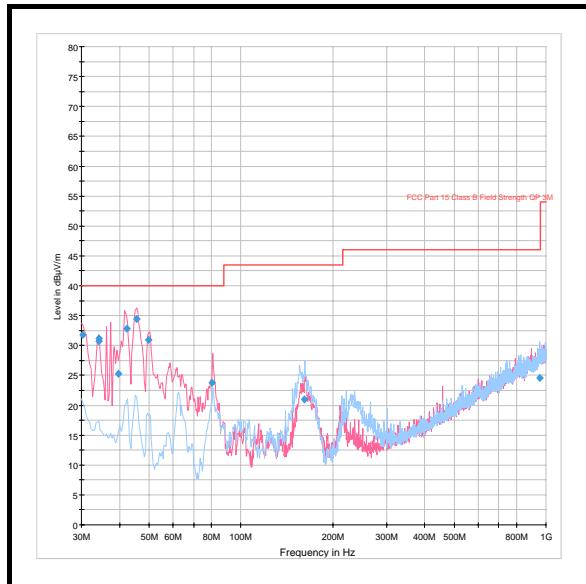
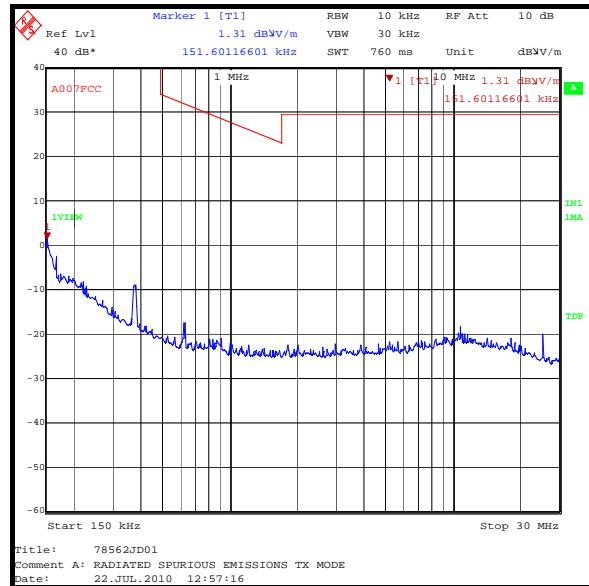
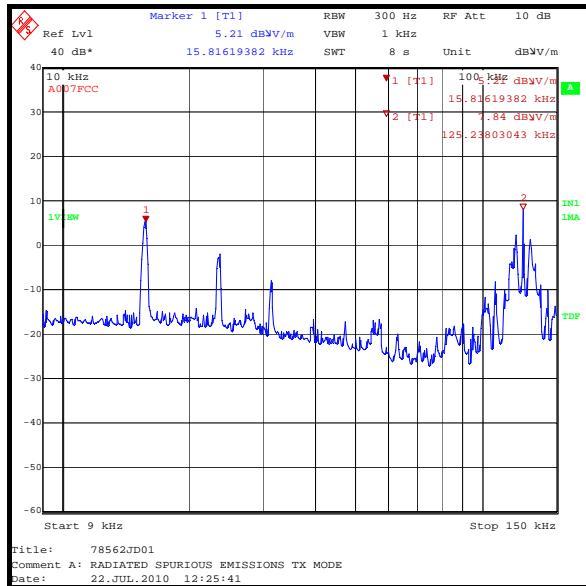
#### **Results: Electric Field Strength Measurements**

Frequency (MHz)	Antenna Polarity	Quasi-peak Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
30.344	Vertical	31.8	40.0	8.2	Complied
34.207	Vertical	30.8	40.0	9.2	Complied
34.238	Vertical	31.1	40.0	8.9	Complied
39.749	Vertical	25.3	40.0	14.7	Complied
42.247	Vertical	32.9	40.0	7.1	Complied
45.409	Vertical	34.4	40.0	5.6	Complied
49.742	Vertical	31.0	40.0	9.0	Complied
80.402	Vertical	23.8	40.0	16.2	Complied
161.682	Horizontal	21.0	43.5	22.5	Complied
952.016	Horizontal	24.6	46.0	21.4	Complied

#### **Note(s):**

1. Limits below 30 MHz are specified at a test distance of 30 metres, whilst below 0.49 MHz they are specified at a test distance of 300 metres. However, as specified by FCC Section 15.31 (f)(2), measurements may be performed at a closer distance and the measured level corrected to the specified measurement distance by using the square of an inverse linear distance extrapolation factor (40 dB/decade).
2. A transducer factor on the measuring instrument was used to extrapolate the results at 3 metres to the required test distance.
3. The test antennas were rotated during the test to maximise any emissions. The highest levels were recorded.
4. The carrier is shown on the 9 kHz to 150 kHz pre-scan plot at approximately 125 kHz. All other emissions on this plot were investigated and were found to radiate from the test site turntable motor.
5. Final measurements were made using a quasi-peak detector.

## Transmitter Radiated Spurious Emissions (continued)



Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

### **5.2.4. Transmitter 20 dB Bandwidth**

#### **Test Summary:**

<b>FCC Part:</b>	2.1049
<b>Test Method Used:</b>	As detailed in ANSI C63.10 Section 6.9.1 and relevant annexes (see note below)

#### **Environmental Conditions:**

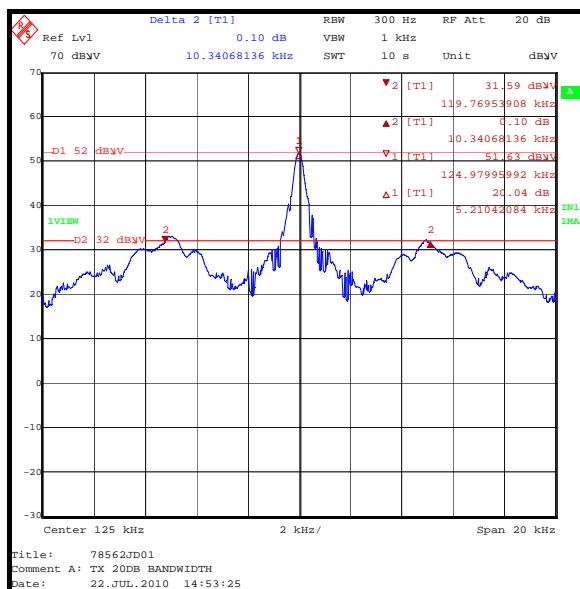
<b>Temperature (°C):</b>	27
<b>Relative Humidity (%):</b>	36

#### **Results:**

Frequency (kHz)	20 dB Bandwidth (kHz)
125.0	10.341

#### **Note(s):**

1. There is no allocated frequency band of operation. The levels at the -20 dB points remain below the emission limit at the nearest restricted band edges of 110 kHz and 495 kHz.



## **6. Measurement Uncertainty**

No measurement or test can ever be perfect and the imperfections give rise to error of measurement in the results. Consequently the result of a measurement is only an approximation to the value of the measurand (the specific quantity subject to measurement) and is only complete when accompanied by a statement of the uncertainty of the approximation.

The expression of uncertainty of a measurement result allows realistic comparison of results with reference values and limits given in specifications and standards.

The uncertainty of the result may need to be taken into account when interpreting the measurement results.

The reported expanded uncertainties below are based on a standard uncertainty multiplied by an appropriate coverage factor such that a confidence level of approximately 95% is maintained. For the purposes of this document "approximately" is interpreted as meaning "effectively" or "for most practical purposes".

Measurement Type	Range	Confidence Level (%)	Calculated Uncertainty
AC Conducted Spurious Emissions	0.15 MHz to 30 MHz	95%	±3.25 dB
Radiated Spurious Emissions	9 kHz to 30 MHz	95%	±3.53 dB
Radiated Spurious Emissions	30 MHz to 1000 MHz	95%	±2.94 dB
20 dB Bandwidth	9 kHz to 30 MHz	95%	±0.92 ppm

The methods used to calculate the above uncertainties are in line with those recommended within the various measurement specifications. Where measurement specifications do not include guidelines for the evaluation of measurement uncertainty the published guidance of the appropriate accreditation body is followed.

## Appendix 1. Test Equipment Used

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
A1829	Pulse Limiter	Rhode & Schwarz	ESH3-Z2	100671	25 Oct 2010	12
A1834	Attenuator	Hewlett Packard	8491B	10444	30 Jun 2011	12
A649	Single Phase LISN	Rohde & Schwarz	ESH3-Z5	825562/008	16 Mar 2011	12
G0543	Amplifier	Sonoma	310N	230801	30 Jun 2011	12
K0001	5m Semi-Anechoic Chamber	Rainford EMC	N/A	N/A	25 Apr 2011	12
A553	Bi-Log antenna	Chase EMC	CBL6111A	1593	16 Mar 2011	12
L1001	ESU26	Rhode & Schwarz	ESU26	100239	28 Jan 2011	12
M1273	Test Receiver	Rhode & Schwarz	ESIB 26	100275	08 Apr 2011	12
M1568	Magnetic Loop	Rohde & Schwarz	HFH2-Z2	879284/2	14 Jan 2011	12

**NB** In accordance with UKAS requirements all the measurement equipment is on a calibration schedule.