

**TEST REPORT  
FROM  
RFI GLOBAL SERVICES LTD**

Test of: Paxton Access Ltd  
Net2 Access Control System

To: FCC Part 15.107, 15.109, 15.207 and 15.209

**Test Report Serial No:**  
RFI/RPTE2/RP49090JD05A

**Supersedes Test Report Serial No:**  
RFI/RPTE1/RP49090JD05A

This Test Report Is Issued Under The Authority  
Of Michael Derby, Radio Performance Group Leader:



**Tested By: Petr Hajek**



**Checked By: Michael Derby**



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**Test Dates: 21 March 2007 to 02 April 2007**

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## **1. Client Information**

<b>Company Name:</b>	Paxton Access Ltd
<b>Address:</b>	Paxton House Home Farm Brighton BN1 9HU United Kingdom
<b>Contact Name:</b>	Mr B Glass

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

The following information (with the exception of the Date of Receipt) has been supplied by the client:

### **2.1. Description of EUT**

The equipment under test is Access Control Equipment.

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

<b>Description:</b>	Proximity Reader
<b>Brand Name:</b>	Proximity P75 Compact Reader
<b>Model Name or Number:</b>	Z99-uc75
<b>Serial Number:</b>	552481
<b>Hardware Version Number:</b>	z-pc75 Rev. 6, ppc-mc75 Rev. D
<b>FCC ID Number</b>	USE323110
<b>Country of Manufacture:</b>	UK
<b>Date of Receipt:</b>	21 March 2007

<b>Description:</b>	Proximity Reader
<b>Brand Name:</b>	Proximity P50 Compact Reader
<b>Model Name or Number:</b>	Z99-uc50
<b>Serial Number:</b>	600328
<b>Hardware Version Number:</b>	z-pc50 Rev. 4, ppc-pc50 Rev. D
<b>FCC ID Number</b>	USE323110
<b>Country of Manufacture:</b>	UK
<b>Date of Receipt:</b>	21 March 2007

<b>Description:</b>	Proximity Reader
<b>Brand Name:</b>	Proximity P38 Compact Reader
<b>Model Name or Number:</b>	Z99-uc38
<b>Serial Number:</b>	598426
<b>Hardware Version Number:</b>	z-pc38 Rev. 3, ppc-pc38 Rev. A
<b>FCC ID Number</b>	USE323110
<b>Country of Manufacture:</b>	UK
<b>Date of Receipt:</b>	21 March 2007

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**Identification of Equipment Under Test (EUT) (Continued)**

<b>Description:</b>	Keypad
<b>Brand Name:</b>	Touchlock K75 Compact Keypad
<b>Model Name or Number:</b>	Z99-kc75
<b>Serial Number:</b>	None Stated
<b>Hardware Version Number:</b>	z-kc75 rev. 6, ppc-mc75 Rev. D
<b>Country of Manufacture:</b>	UK
<b>Date of Receipt:</b>	21 March 2007

<b>Description:</b>	Exit Button
<b>Brand Name:</b>	E75 Exit Button with Screw Connector
<b>Model Name or Number:</b>	Z99-ex75b
<b>Serial Number:</b>	None Stated
<b>Hardware Version Number:</b>	z-eb75 Rev.3, ppc-eb75 Rev. C
<b>Country of Manufacture:</b>	UK
<b>Date of Receipt:</b>	21 March 2007

**2.3. Accessories**

No accessories were supplied with the EUT.

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## **2.4. Support Equipment**

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

<b>Description:</b>	Exit Button
<b>Brand Name:</b>	E75 with Cable
<b>Model Name or Number:</b>	None Stated
<b>Serial Number:</b>	None Stated
<b>Cable Length and Type:</b>	0.5m, 2 Core
<b>Connected to Port:</b>	PSU

<b>Description:</b>	Power Supply Unit (PSU 1) <i>Note 1</i>
<b>Brand Name:</b>	1A PSU
<b>Model Name or Number:</b>	998-241-US
<b>Serial Number:</b>	None Stated
<b>Cable Length and Type:</b>	2m, Mains Power Cable
<b>Connected to Port:</b>	PSU Input

<b>Description:</b>	Power Supply Unit (PSU 1) <i>Note 2</i>
<b>Brand Name:</b>	1A PSU
<b>Model Name or Number:</b>	998-241-US
<b>Serial Number:</b>	None Stated
<b>Cable Length and Type:</b>	2m, Mains Power Cable
<b>Connected to Port:</b>	PSU Input

*Note 1: Two power supply units were supplied for testing of AC Conducted Emissions.*

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

During the course of testing the EUT was not modified.

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## 2.6. Additional Information Related to Testing

Power Supply Requirement:	DC Supply of 12 VDC	
Intended Operating Environment:	Residential, Commercial, Light Industry, Heavy Industry	
Equipment Category:	Short Range Device	
Type of Unit:	Transceiver, Base Station (Fixed Use)	
Transmitter Output Power	< 1 nW	
Transmit Frequency Range:	0.125 MHz	
Transmit Channels Tested:	<b>Channel ID</b>	<b>Channel Frequency (MHz)</b>
	Single Channel	0.125 MHz
Receive Frequency Range:	0.125 MHz	
Receive Channels Tested:	<b>Channel ID</b>	<b>Channel Frequency (MHz)</b>
	Single Channel	0.125 MHz
Highest Unintentionally Generated Frequency:	16 MHz	
Highest Fundamental Frequency:	0.125 MHz	
Occupied Bandwidth:	0.611 kHz	

## 2.7. Port Identification

Port	Description	Type / Length
1	Compact Keypad\Reader Cable	Signal (6 core) / 2m
2	AC Mains to PSU	Mains (2 core) / 2m
3	DC Power Cable to Exit Button	DC (2 core) / < 1m



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### **3. Test Specification, Methods and Procedures**

#### **3.1. Test Specifications**

Reference:	FCC Part 15 Subpart B: 2006 (Sections 15.209).
Title:	Code of Federal Regulations, Part 15 (47CFR15) Radio Frequency Devices.

#### **3.2. Methods and Procedures**

The methods and procedures used were as detailed in:

ANSI C63.2 (1987)

Title: American National Standard for Instrumentation - Electromagnetic noise and field strength.

ANSI C63.4 (2001)

Title: American National Standard Methods of Measurement of Electromagnetic Emissions from Low Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

ANSI C63.5 (1988)

Title: American National Standard for the Calibration of antennas used for Radiated Emission measurements in Electromagnetic Interference (EMI) control.

ANSI C63.7 (1988)

Title: American National Standard Guide for Construction of Open Area Test Sites for performing Radiated Emission Measurements.

CISPR 16-1: (1999)

Title: Specification For Radio Disturbance and Immunity Measuring Apparatus and Methods. Part 1: Radio Disturbance and Immunity Measuring Apparatus.

#### **3.3. Definition of Measurement Equipment**

The measurement equipment used complied with the requirements of the standards referenced in the Methods & Procedures section above. Appendix 1 contains a list of the test equipment used.

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#### **4. Deviations from the Test Specification**

There were no deviations from the test specification.

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## **5. Operation of the EUT during Testing**

### **5.1. Operating Modes**

The EUT was tested in the following operating modes, unless otherwise stated:

Transmit mode – 125 kHz continuous transmit.

Receive mode – transmitters were disconnected.

### **5.2. Configuration and Peripherals**

The EUT was tested in the following configuration:

Fully exercised with exit buttons, LEDs etc.

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## **6. Summary of Test Results**

<b>Range of Measurements</b>	<b>Section Reference</b>	<b>Port Type</b>	<b>Compliance Status</b>
Receiver AC Mains Conducted Emissions (150 kHz to 30 MHz)	Section 15.107	AC Mains	Complied
Receiver Radiated Spurious Emissions	Section 15.109	Enclosure	Complied
Transmitter AC Mains Conducted Emissions (150 kHz to 30 MHz)	Section 15.207	AC Mains	Complied
Transmitter Radiated Spurious Emissions	Section 15.209	Enclosure	Complied

### **6.1. Location of Tests**

All the measurements described in this report were performed at the premises of RFI Global Services Ltd, Ewhurst Park, Ramsdell, Basingstoke, Hampshire, RG26 5RQ, England.

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

### **7.1. General Comments**

This section contains test results only.

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 8 for details of measurement uncertainties.

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## **7.2. Test Results**

### **7.2.1. Receiver Radiated Spurious Emissions: Section 15.109**

#### **Electric Field Strength Measurements (Frequency Range: 30 MHz to 1000 MHz)**

The EUT was configured for radiated emissions testing, as described in Section 9 of this report.

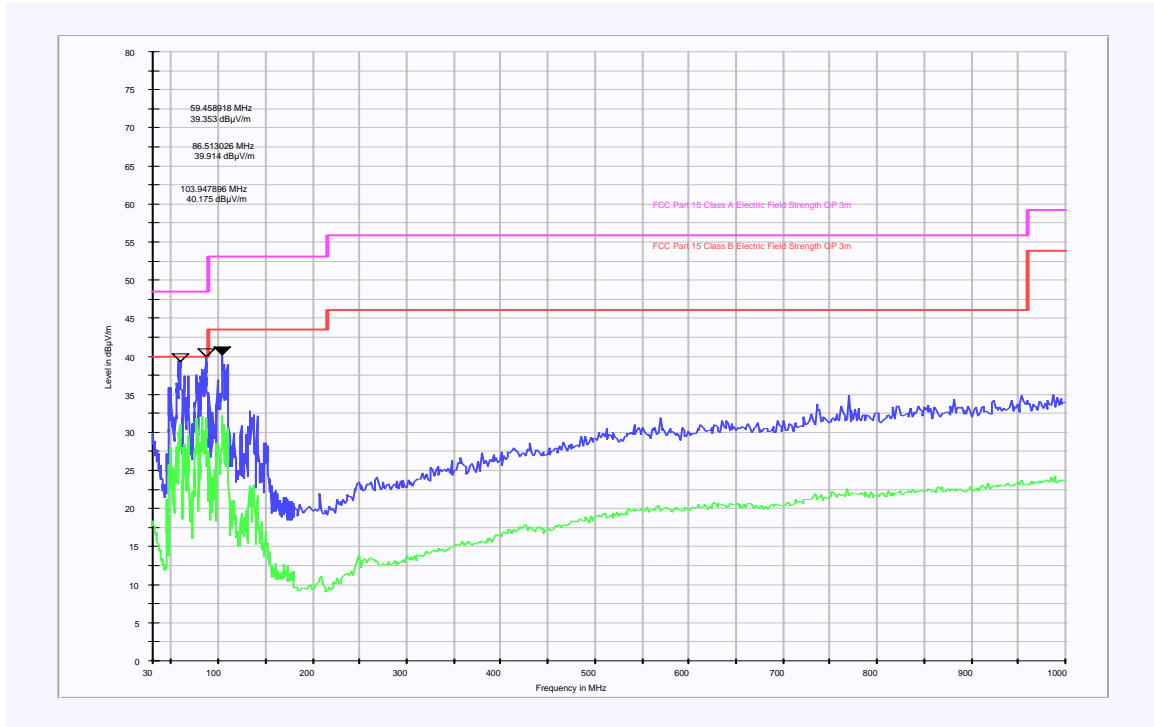
Tests were performed to identify the maximum receiver or standby radiated emission levels.

#### **Results:**

<b>Frequency (MHz)</b>	<b>Antenna Polarity</b>	<b>Level (dB<math>\mu</math>V/m)</b>	<b>Limit (dB<math>\mu</math>V/m)</b>	<b>Margin (dB)</b>	<b>Result</b>
63.538	Vertical	19.0	40.0	21.0	Complied
81.319	Vertical	24.2	40.0	15.8	Complied
98.929	Vertical	31.3	43.5	12.2	Complied

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**Receiver Radiated Spurious Emissions: Section 15.109 (Continued)**



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

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### **7.2.2. Transmitter and Receiver AC Mains Conducted Emissions: Sections 15.107 and 15.207**

#### **PSU 1**

The EUT was configured for AC conducted emissions measurements, as described in Section 9 of this report.

Tests were performed to identify the maximum emission levels on the AC mains line of the EUT.

#### **Results:**

#### **Quasi-Peak Detector Measurements on Live and Neutral Lines**

Frequency (MHz)	Line	Quasi Peak (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Result
0.150000	Neutral	56.8	66.0	9.2	Complied
0.194000	Neutral	58.8	63.9	5.1	Complied
0.198000	Neutral	54.0	63.7	9.7	Complied
0.242000	Live	48.5	62.0	13.5	Complied
0.290000	Live	49.9	60.5	10.6	Complied
0.294000	Live	46.9	60.4	13.5	Complied
0.334000	Live	40.6	59.4	18.8	Complied
0.390000	Live	42.1	58.1	16.0	Complied
0.486000	Live	40.1	56.2	16.1	Complied
26.250000	Live	40.1	60.0	19.9	Complied

#### **Average Detector Measurements on Live and Neutral Lines**

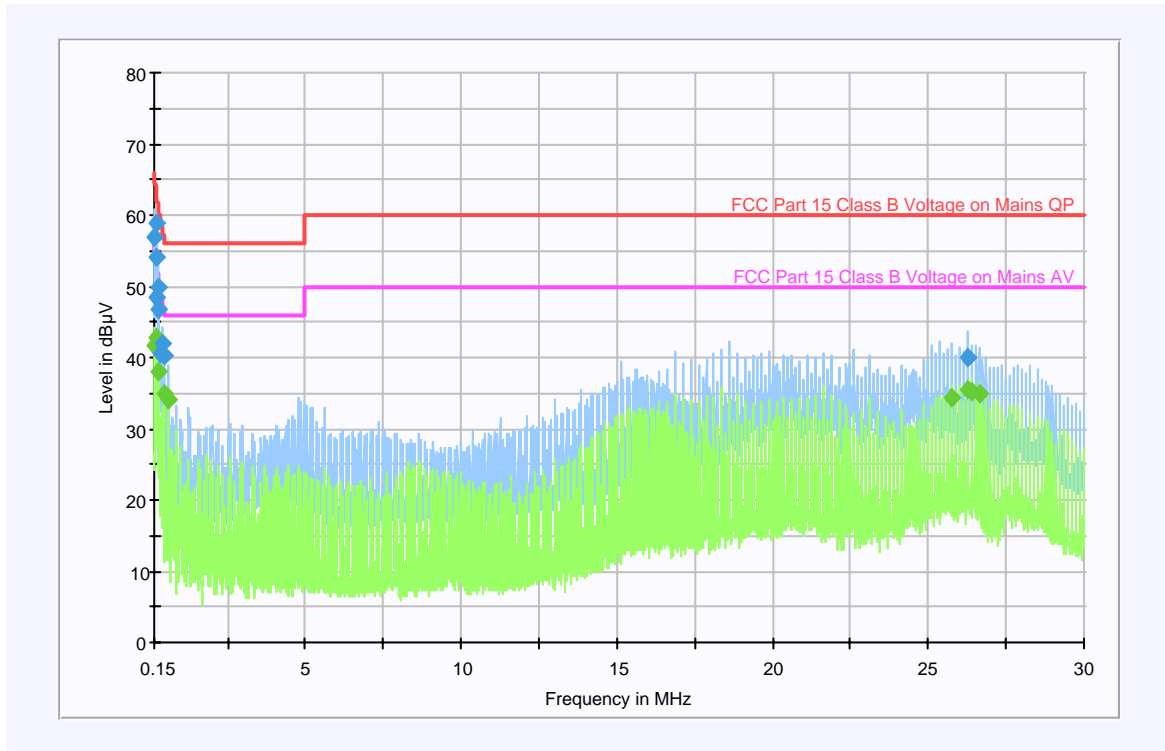
Frequency (MHz)	Line	Level (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Result
0.150000	Neutral	41.8	56.0	14.2	Complied
0.194000	Live	42.9	53.9	11.0	Complied
0.234000	Neutral	41.8	52.3	10.5	Complied
0.290000	Live	38.1	50.5	12.4	Complied
0.486000	Live	35.0	46.2	11.2	Complied
0.582000	Live	34.0	46.0	12.0	Complied
25.750000	Live	34.4	50.0	15.6	Complied
26.250000	Live	35.4	50.0	14.6	Complied
26.374000	Live	35.2	50.0	14.8	Complied
26.626000	Live	34.9	50.0	15.1	Complied



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**Transmitter and Receiver AC Mains Conducted Emissions: Sections 15.107 and 15.207**  
**(Continued)**



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

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### 7.2.3. Transmitter and Receiver AC Mains Conducted Emissions: Sections 15.107 and 15.207

#### PSU 2

The EUT was configured for AC conducted emissions measurements, as described in Section 9 of this report.

Tests were performed to identify the maximum emission levels on the AC mains line of the EUT.

#### Results:

#### Quasi-Peak Detector Measurements on Live and Neutral Lines

Frequency (MHz)	Line	Quasi Peak (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Result
0.250000	Neutral	47.2	61.8	14.6	Complied
22.126000	Live	43.9	60.0	16.1	Complied
22.378000	Live	42.8	60.0	17.2	Complied
22.626000	Live	46.8	60.0	13.2	Complied
22.750000	Live	44.1	60.0	15.9	Complied
22.874000	Live	47.1	60.0	12.9	Complied
23.122000	Live	44.2	60.0	15.8	Complied
23.378000	Live	43.3	60.0	16.7	Complied
23.626000	Live	43.7	60.0	16.3	Complied
23.878000	Live	39.6	60.0	20.4	Complied

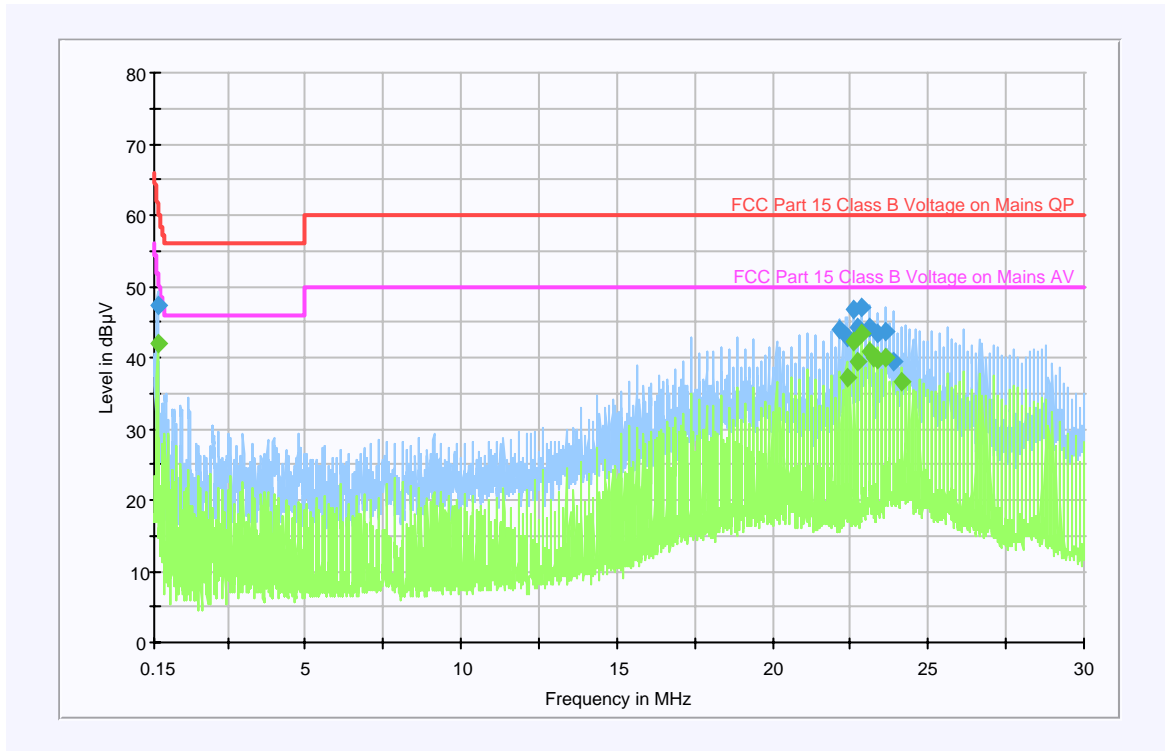
#### Average Detector Measurements on Live and Neutral Lines

Frequency (MHz)	Line	Level (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Result
0.250000	Neutral	42.0	51.8	9.8	Complied
22.378000	Neutral	37.1	50.0	12.9	Complied
22.626000	Live	42.3	50.0	7.7	Complied
22.750000	Live	39.4	50.0	10.6	Complied
22.874000	Live	43.3	50.0	6.7	Complied
23.122000	Live	40.9	50.0	9.1	Complied
23.250000	Live	40.0	50.0	10.0	Complied
23.378000	Live	39.8	50.0	10.2	Complied
23.626000	Live	39.9	50.0	10.1	Complied
24.126000	Live	36.5	50.0	13.5	Complied

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**Transmitter and Receiver AC Mains Conducted Emissions: Sections 15.107 and 15.207 (Continued)**



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

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#### **7.2.4. Transmitter Radiated Spurious Emissions: Section 15.209**

##### **Electric Field Strength Measurements (Frequency Range: 0.009 MHz to 30 MHz)**

The EUT was configured for radiated emissions testing, as described in Section 9 of this report.

Tests were performed to identify the maximum radiated spurious emission levels.

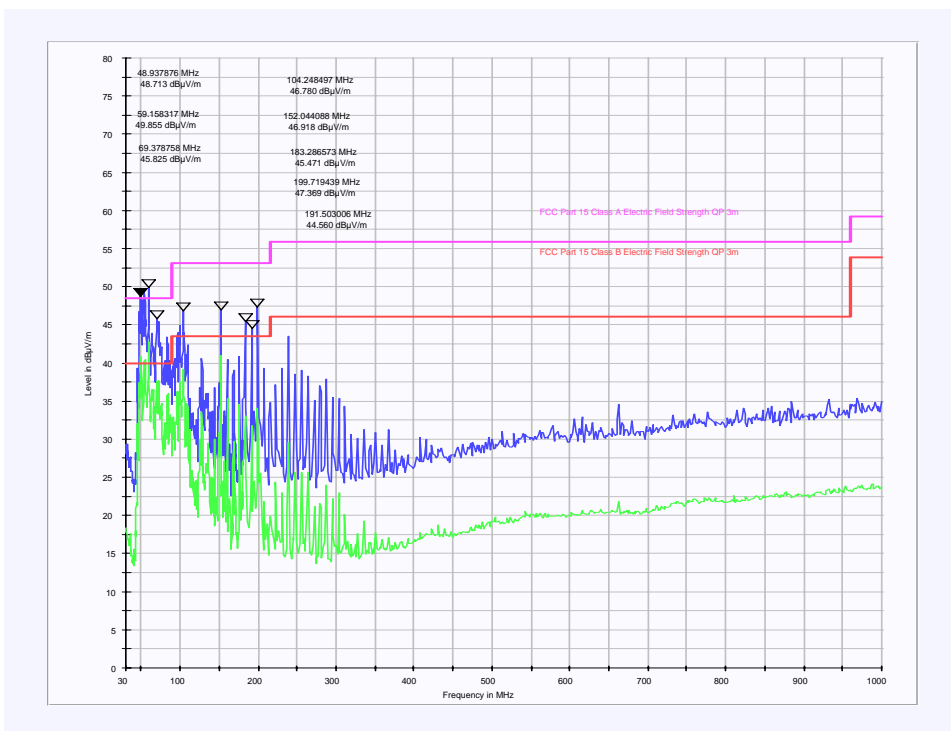
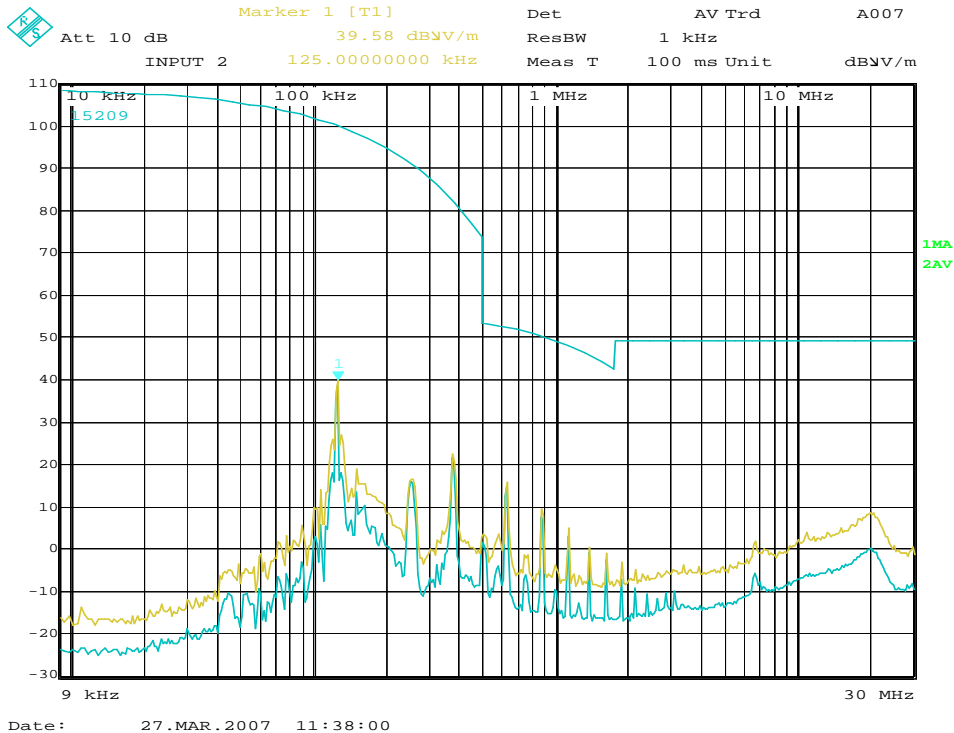
Limits below 30 MHz are specified at a test distance of 30 metres, whilst below 0.49 MHz they are specified at a test distance of 300 metres. However as specified by section 15.31 (f)(2), measurements may be performed at a closer distance, and the measured level corrected to the specified measurement distance by using the square of an inverse linear distance extrapolation factor (40 dB/decade).

##### **Results:**

Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Measurement Distance (m)	Margin (dB)	Result
0.125	Open	39.6	84.7	10.0	45.1	Complied
49.027	Vertical	23.2	40.0	3.0	16.8	Complied
59.508	Horizontal	29.1	40.0	3.0	10.9	Complied
73.498	Horizontal	28.1	40.0	3.0	11.9	Complied
151.969	Horizontal	30.5	43.5	3.0	13.0	Complied
183.967	Horizontal	32.8	43.5	3.0	10.7	Complied
199.880	Horizontal	27.8	43.5	3.0	15.7	Complied
192.141	Horizontal	31.7	43.5	3.0	11.8	Complied

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**Transmitter Radiated Spurious Emissions: Section 15.209 (Continued)**



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

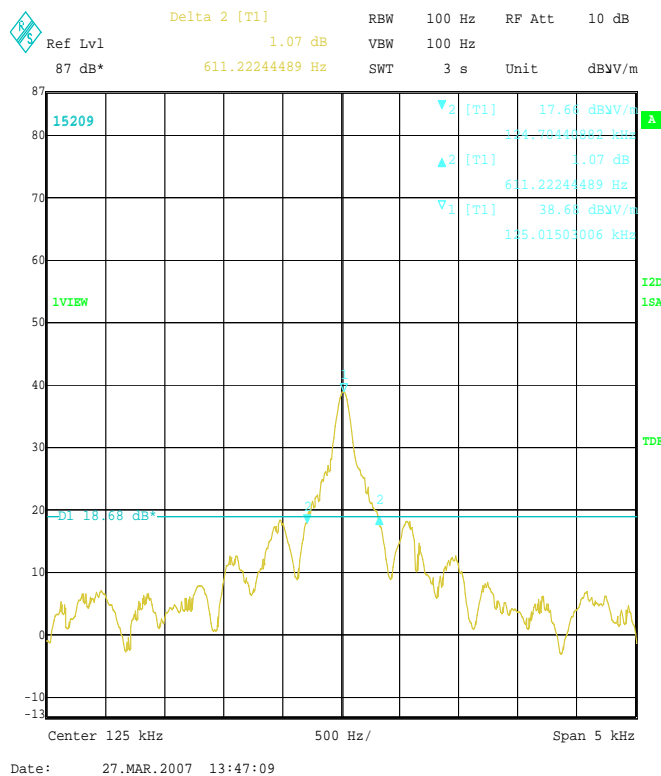
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**7.2.5. Transmitter Occupied Bandwidth: Section 2.1049**

The EUT was configured for transmitter 20 dB bandwidth testing, as described in Section 9 of this report. Tests were performed to identify the 20 dB bandwidth.

**Results:**

Channel	Frequency (MHz)	Resolution Bandwidth (kHz)	Video Bandwidth (kHz)	Occupied Bandwidth (kHz)
Single Channel	0.125	0.1	0.1	0.611



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## **8. 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 Emissions	9 kHz to 30 MHz	95%	+/- 3.53 dB
Radiated Emissions	30 MHz to 1000 MHz	95%	+/- 5.26 dB
Occupied Bandwidth	N/A	95%	+/- 0.12 %

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.

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## **9. Measurement Methods**

### **9.1. AC Mains Conducted Emissions**

AC mains conducted emissions measurements were performed in accordance with the standard, against appropriate limits for each detector function.

The test was performed in a shielded enclosure with the equipment arranged as detailed in the standard on a wooden bench using the floor of the screened enclosure as the ground reference plane. The EUT was powered with 110V 60 Hz AC mains supplied via a Line Impedance Stabilisation Network (LISN).

Initial measurements in the form of swept scans covering the entire measurement band were performed in order to identify frequencies on which the EUT was generating interference. In order to minimise the time taken for these swept measurements, a Peak detector was used in conjunction with the appropriate detector IF measuring bandwidths (see table below). Repetitive scans were performed to allow for emissions with low repetition rates, and the duty cycle of the EUT. The test configuration was the same for the initial scans as for the final measurements.

Following the initial scans, a graph was produced giving an overview of the emissions from the EUT plotted against the appropriate specification limit. A tolerance line was set 6 dB below the specification limit and levels above the tolerance line were re-tested (at individual frequencies) using the appropriate detector function.

The test equipment settings for conducted emissions measurements were as follows:

<b>Receiver Function</b>	<b>Initial Scan</b>	<b>Final Measurements</b>
Detector Type:	Peak	Quasi-Peak (CISPR)/Average
Mode:	Max Hold	Not applicable
Bandwidth:	10 kHz	9 kHz
Amplitude Range:	60 dB	20 dB
Measurement Time:	Not applicable	> 1 s
Observation Time:	Not applicable	> 15 s
Step Size:	Continuous sweep	Not applicable
Sweep Time:	Coupled	Not applicable



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## **9.2. Receiver Radiated Emissions**

Radiated emissions measurements were performed in accordance with the standard, against appropriate limits for each detector function.

Initial pre-scans covering the entire measurement band from the lowest generated frequency declared up to the upper frequency detailed in Section 15.33(b) were performed within a screened chamber in order to identify frequencies on which the EUT was generating interference. This determined the frequencies from the EUT, which required further examination. In order to minimise the time taken for the swept measurements, a peak detector was used in conjunction with the appropriate detector measuring bandwidth (see table below). Repetitive scans were performed to allow for emissions with low repetition rates, and for the duty cycle of the EUT.

The initial scans were performed using an antenna height of 1.5 m and a measurement distance of 3 m. A limit line was set to the specification limit. Levels within 20 dB of this limit were measured where possible, on occasion; the receiver noise floor came within the 20 dB boundary. On these occasions, the system noise floor may have been recorded.

An open area test site using the appropriate test distance and measuring receiver with a Quasi-Peak detector was used for measurements below 1000 MHz, for measurements above 1000 MHz average and peak detectors were used.

For the final measurements the EUT was arranged on a non-conducting turn table on a standard test site compliant with ANSI C63.4 – 2001 Clause 5.4.

On the open area test site, at each frequency where a signal was found, the levels were maximised by initially rotating the turntable through 360° and then varying the antenna height between 1 m and 4 m in the horizontal polarisation. At this point, any signals found to be between the limit and a level 6 dB below it were further maximised by changing the configuration of the EUT, e.g. re-routing cables to peripherals and moving peripherals with respect to the EUT. The procedure was repeated for the vertical polarisation.

The final field strength was determined as the indicated level in dB $\mu$ V plus cable loss and antenna factor.

The test equipment settings for radiated emissions measurements were as follows:

<b>Receiver Function</b>	<b>Initial Scan</b>	<b>Final Measurements Below 1 GHz</b>	<b>Final Measurements Above 1 GHz</b>
Detector Type:	Peak	Quasi-Peak (CISPR)	Peak/Average
Mode:	Max Hold	Not applicable	Not applicable
Bandwidth:	(120 kHz < 1 GHz) (1 MHz > 1 GHz)	120 kHz	1 MHz
Amplitude Range:	100 dB	100 dB	100 dB
Step Size:	Continuous sweep	Not applicable	Not applicable
Sweep Time:	Coupled	Not applicable	Not applicable

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### **9.3. Transmitter 20 dB Bandwidth**

The EUT and spectrum analyser was configured for transmitter radiated emissions measurements.

To determine the occupied bandwidth, a resolution bandwidth of 10 kHz was used, which is greater than 1% of the 20 dB bandwidth. A video bandwidth of a least the same value was used. The analyser was set for a maximum hold scan to capture the profile of the signal. The peak level was then determined and set as the 0 dB reference point. A reference line was drawn 20 dB below this 0 dB reference point. The bandwidth was determined at the points where the 20 dB reference crossed the profile of the emission.

Test of: Paxton Access Ltd  
Net2 Access Control System  
To: FCC Part 15.107, 15.109, 15.207 and 15.209

### Appendix 1. Test Equipment Used

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval
A004	Single phase LISN	Rohde & Schwarz	ESH3-Z5	890 604/027	05 Apr 2006	12
A007	10 kHz to 30 MHz H-Field Antenna	Rohde & Schwarz	HFH2-Z2	880 458/020	14 Feb 2007	12
A1037	Green Bilog Antenna	Chase EMC Ltd	CBL6112B	2413	20 Sep 2006	12
A1069	Single Phase LISN	Rohde & Schwarz	ESH3-Z5	837469/012	09 Feb 2007	12
A1830	N-Type Pulse Limiter	Rhode & Schwarz	ESH3-Z2	100668	01 Jan 2007	12
A553	Bi-log Antenna	Chase	CBL6111A	1593	01 Nov 2006	12
C1268	7.5m BNC Coaxial Cable	Rosenberger	FA210A007500 8080	49356-1	08 Jan 2007	12
C151	Cable	Rosenberger	UFA210A-1-1181-70x70	None	Calibrate Before Use	-
C160	Cables	Rosenberger	UFA210A-1-1181-70x70	None	Calibrate Before Use	-
C341	Cable	Andrews	None	None	Calibrate Before Use	-
C348	Cable	Rosenberger	UFA210A-1-1181-70x70	2993	Calibrate Before Use	-
C363	Cable	Rosenberger	RG142	None	Calibrate Before Use	-
C464	EZM Spectrum Monitor	Rohde & Schwarz	EZM	873 952/006	Not calibrated	-
M023	ESVP Receiver	Rohde & Schwarz	ESVP	872 991/027	10 Apr 2006	12
M024	EZM Spectrum Monitor	Rohde & Schwarz	EZM	873 952/006	Calibrate Before Use	-
M1263	EMI Test Receiver	Rohde & Schwarz	ESIB7	100265	25 Jan 2007	12
S201	3m & 10m OATS	RFI	1	-	18 Jul 2006	12
S212	Emissions Screened Room	RFI	12	-	Not calibrated	-

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

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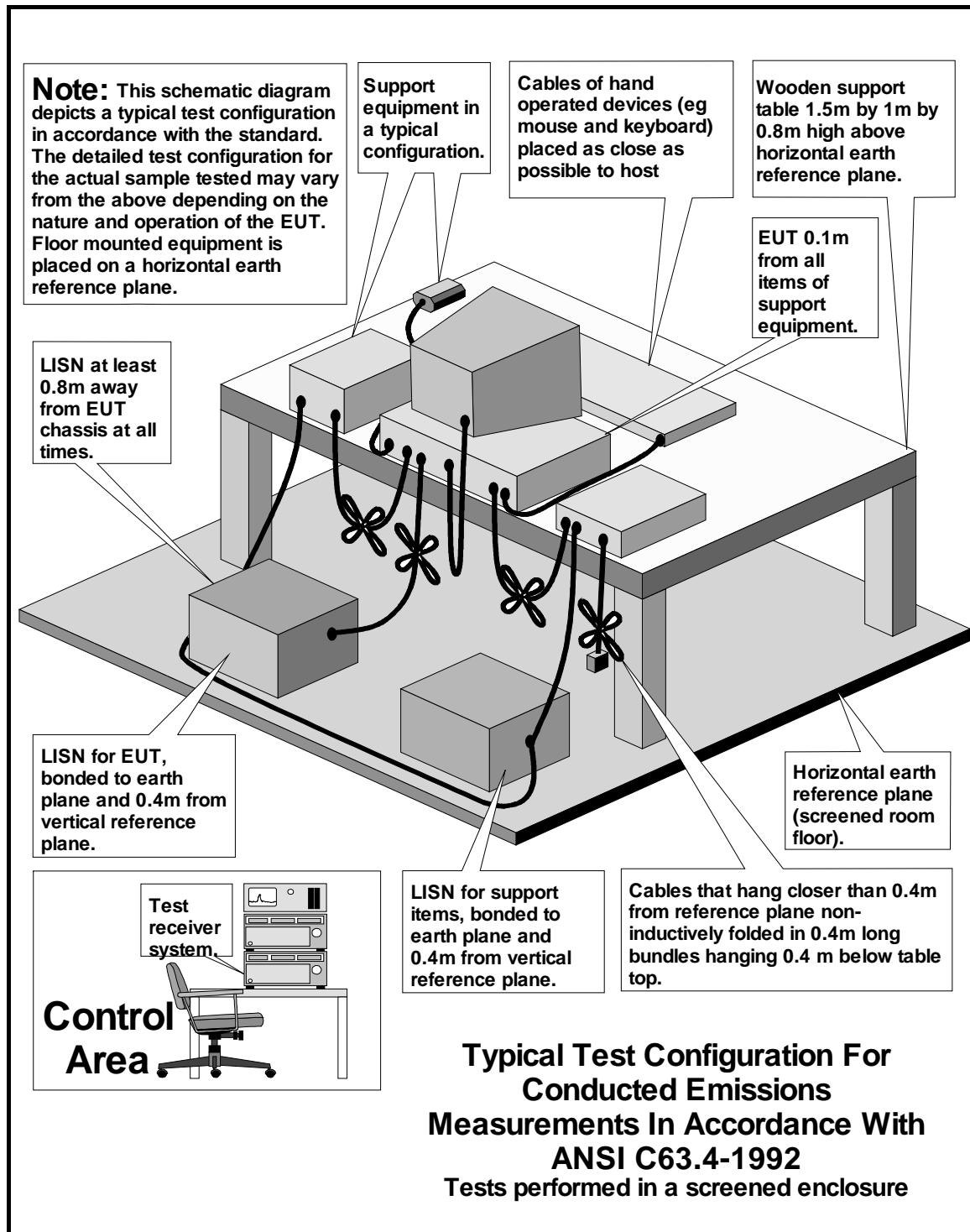
## **Appendix 2. Test Configuration Drawings**

This appendix contains the following drawings:

<b>Drawing Reference Number</b>	<b>Title</b>
DRG\49090JD05\EMICON	Test configuration for measurement of conducted emissions.
DRG\49090JD05\EMIRAD	Test configuration for measurement of radiated emissions.

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DRG\49090JD05\EMICON



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DRG\49090JD05\EMIRAD

