



**TEST REPORT
FROM
RFI GLOBAL SERVICES LTD**

Test of: Proximity P50 Mifare CSN Reader / 353-467

To: FCC Part 15.225: 2008 Subpart C

Test Report Serial No:
RFI/RPT1/RP74714JD06A

This Test Report Is Issued Under The Authority Of Brian Watson, Operations Director:		
Checked By:	A. HENRIQUES	
Signature:		
Date of Issue:	08 July 2009	

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1. Customer Information







Company Name:	Paxton Access Ltd
Address:	Paxton House Home Farm Brighton Sussex BN1 9HU

2. Summary of Testing

2.1. General Information

Specification Reference:	47CFR15.225
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications) 2008: Part 15 Subpart C (Radio Frequency Devices) - Section 15.225
Specification Reference:	47CFR15.107 and 47CFR15.109
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications) 2008: Part 15 Subpart B (Radio Frequency Devices) - Sections 15.107 and 15.109
Site Registration:	209735
Location of Testing:	RFI Global Services Ltd, Wade Road, Basingstoke, Hampshire, RG24 8AH.
Test Dates:	12 June 2009 to 16 June 2009

2.2. Summary of Test Results

FCC Reference (47CFR)	Measurement	Port Type	Result
Part 15.207(a)	Transmitter AC Conducted Spurious Emissions	AC Mains	
Part 15.225(a)(b)(c)(d)	Transmitter Fundamental Field Strength	Antenna	
Part 15.209(a), 15.225(d)	Transmitter Radiated Spurious Emissions	Antenna	
Part 15.209(a) 15.225(c)(d)	Transmitter Band Edge Radiated Emissions	Antenna	
Part 2.1049	Transmitter 20 dB Bandwidth	Antenna	
Part 15.225(e)	Transmitter Frequency Stability (Temperature & Voltage Variation)	Antenna	

Key to Results

 = Complied  = Did not comply

2.3. Methods and Procedures

Reference:	ANSI C63.4 (2003)
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.

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)

Brand / Model Name:	Proximity P50 Mifare CSN Reader
Model Number:	353-467
Serial Number:	None Stated
Hardware Version Number:	z-df50 rev3, ppc-df50 rev C
Software Version Number:	None Stated
FCC ID Number:	USE353467

3.2. Description of EUT

The equipment under test was a proximity reader for access control. It has dual frequency functionality for reading tokens with 125 kHz and 13.56 MHz carrier frequencies.

3.3. Modifications Incorporated in the EUT

No modifications were applied to the EUT during testing.

3.4. Additional Information Related to Testing

Tested Technology:	RFID	
Modulation Type:	Amplitude Modulation	
Transmit Frequency:	13.56 MHz	
Power Supply Requirement:	Nominal	12 V
	Minimum	8 V
	Maximum	14 V
Tested Temperature:	Minimum	-20°C
	Maximum	+50°C

3.5. Support Equipment

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

Description:	Net2 1 door ACU with 2A PSU in plastic cabinet
Brand Name:	Paxton Access
Model Name or Number:	411-501
Serial Number:	None Stated

Description:	ID card
Brand Name:	Paxton Access
Model Name or Number:	13.56 MHz
Serial Number:	None Stated

4. Operation and Monitoring of the EUT during Testing

4.1. Operating Modes

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

- Transceive mode

The reader has only one mode of operation (Load Modulation) as it is constantly transmitting and receiving when in operation. It does not have a dedicated 'receive only' mode.

4.2. Configuration and Peripherals

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

- Connected via a 5 meter multicore cable to a Net2 ACU reader port contained inside a 2A PSU cabinet. The ACU was powered by the same power supply. The input to the 2A PSU was connected to a 120 V AC 60 Hz supply.
- AC conducted emissions were performed with the EUT connected to the Net2 ACU and the Net2 ACU mains cable connected to a LISN. The LISN was connected to a 120VAC 60 Hz mains supply.
- A 13.56 MHz tag was presented to the EUT in order to enable the transmitter. The EUT constantly transmitted at maximum power with a modulated carrier.
- The 125 kHz carrier was disabled for the duration of the tests.

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(a)
Test Method Used:	As detailed in ANSI C63.4 Section 7 and relevant annexes

Environmental Conditions:

Temperature (°C):	21
Relative Humidity (%):	42

Results: Quasi Peak Detector Measurements

Frequency (MHz)	Line	Quasi Peak Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
See Note 1					

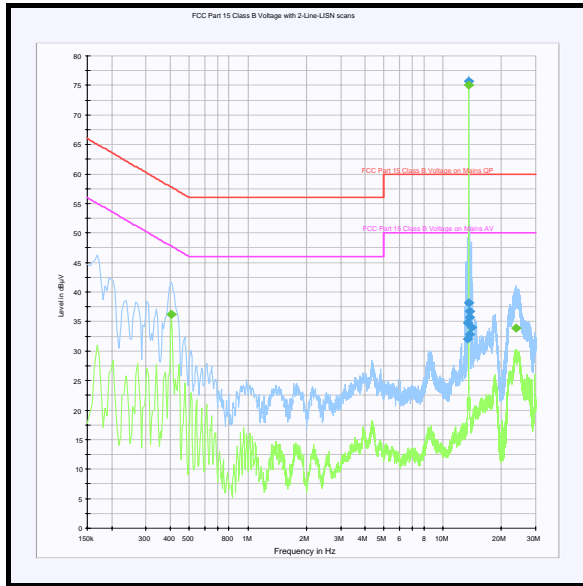
Results: Average Detector Measurements

Frequency (MHz)	Line	Average Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.406500	Neutral	36.2	50.0	11.5	Complied
23.73900	Neutral	33.8	50.0	16.2	Complied

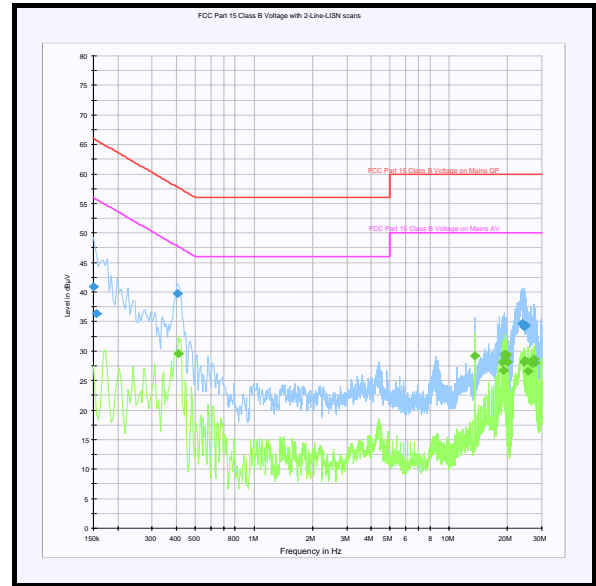
Note(s):

1. All emissions were investigated and emissions using Quasi Peak detector were found to be at least 20 dB below the specified limit.
2. Tests were performed on a sample with a permanent antenna connection and results taken for emissions outside the transmitter's fundamental emission band. Tests were then reperformed on a second sample fitted with a suitable dummy load in accordance with FCC KDB 174176 to determine compliance with the Section 15.207 limits within the transmitter's fundamental emission band.
3. When retesting was performed with the dummy load fitted it was determined that all emissions within the transmitter's fundamental emission band were greater than 20 dB below the appropriate limit.

Transmitter AC Conducted Spurious Emissions (continued)



Permanent antenna connected



Dummy Load fitted in place of permanent antenna

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

5.2.2. Transmitter Fundamental Field Strength

Test Summary:

FCC Part:	15.225 (a)(b)(c)(d)
Test Method Used:	As detailed in ANSI C63.4 Section 8 and relevant annexes

Environmental Conditions:

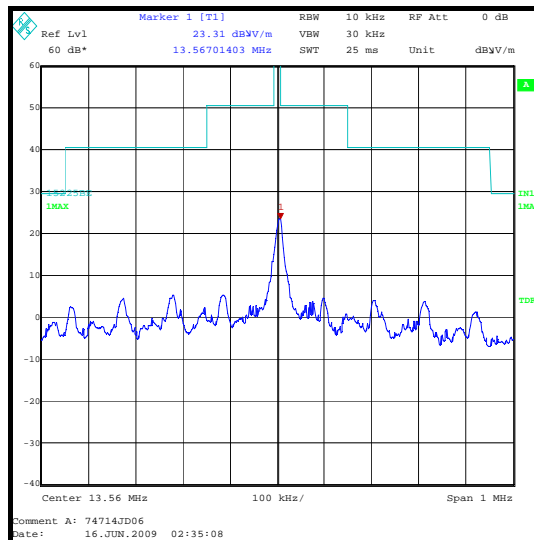
Temperature (°C):	26
Relative Humidity (%):	33

Results:

Frequency (MHz)	Antenna Polarity	Q-P Level (dBμV/m)	Limit at 30 m (dBμV/m)	Margin (dB)	Result
13.56	90° to EUT	23.3	84.0	60.7	Complied

Note(s):

1. Measurements were performed at 3 metres and results extrapolated to 30 metres.
2. The limit is specified at a test distance of 30 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 making the measurements at a minimum of two distances on at least one radial to determine the proper extrapolation factor.



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

5.2.3. Transmitter Radiated Spurious Emissions**Test Summary:**

FCC Part:	15.209 (a), 15.225(d)
Test Method Used:	As detailed in ANSI C63.4 Section 8 and relevant annexes
Frequency Range:	9 kHz to 1GHz

Environmental Conditions:

Temperature (°C):	24
Relative Humidity (%):	30

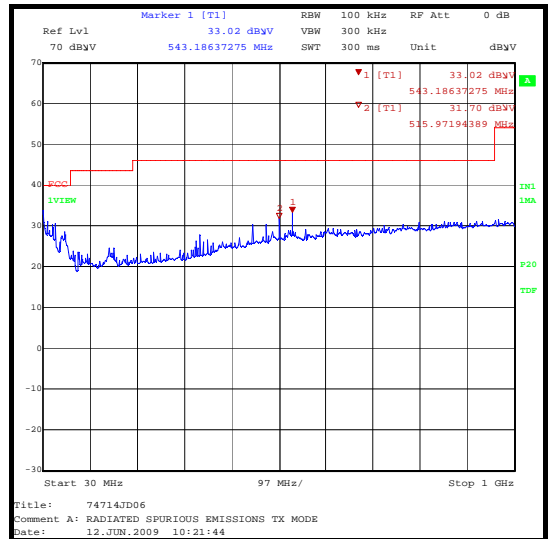
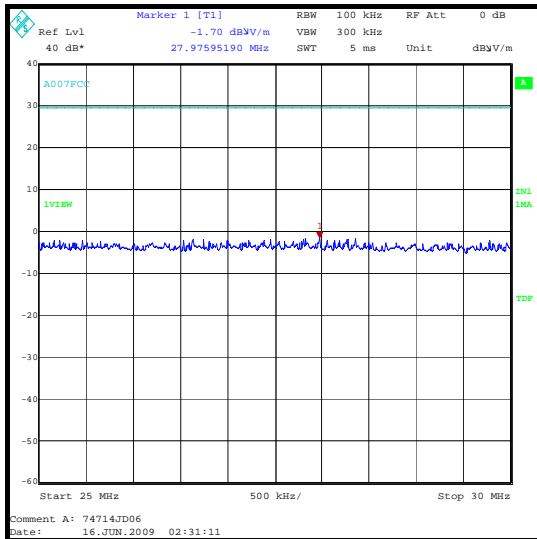
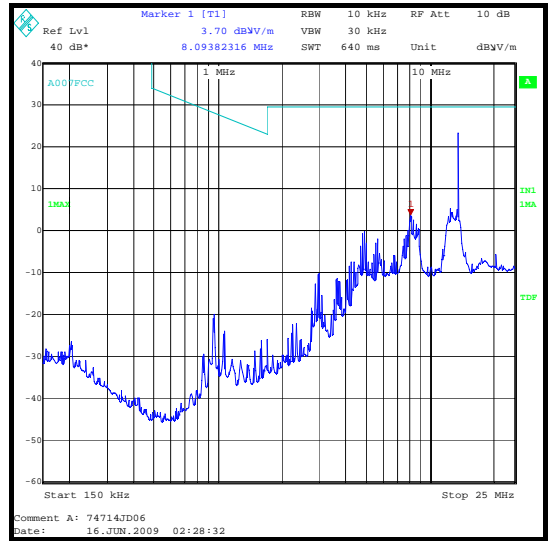
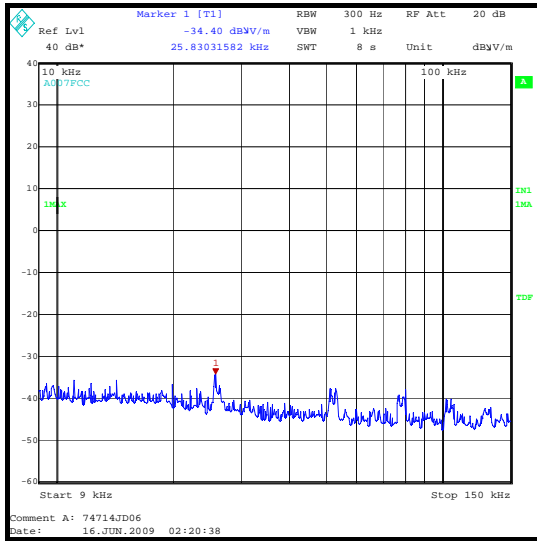
Results: Electric Field Strength Measurements

Frequency (MHz)	Antenna Polarity	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
352.639	Vertical	27.1	46.0	18.9	Complied
461.123	Horizontal	33.5	46.0	12.5	Complied
488.252	Horizontal	33.6	46.0	12.4	Complied
515.368	Vertical	34.2	46.0	11.8	Complied
542.508	Vertical	34.2	46.0	11.8	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 making the measurements at a minimum of two distances on at least one radial to determine the proper extrapolation factor.
2. A transducer factor on the measuring instrument was used to extrapolate the results at 3 metres to a distance of 30 metres where required.
3. The emission shown at approximately 13.5 MHz on the pre-scan 150 kHz to 1 GHz plot is the fundamental.

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 Radiated Emissions at Band Edges

Test Summary:

FCC Part:	15.209(a) 15.225(c)(d)
Test Method Used:	As detailed in ANSI C63.4 Section 8 and relevant annexes

Environmental Conditions:

Temperature (°C):	26
Relative Humidity (%):	33

Results: Lower Band Edge

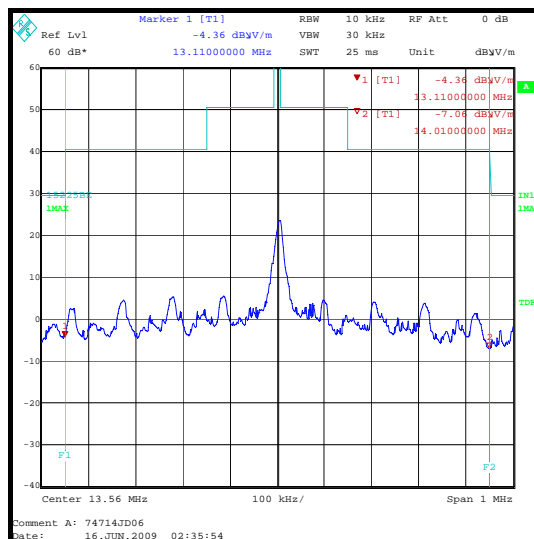
Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
13.11	-4.4	40.5	44.9	Complied

Results: Upper Band Edge

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
14.01	-7.1	40.5	47.6	Complied

Note(s):

1. Measurements were performed at 3 metres and results extrapolated to 30 metres.
2. A transducer factor on the measuring instrument was used to extrapolate the results at 3 metres to a distance of 30 metres where required.



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

5.2.5. Transmitter 20 dB Bandwidth

Test Summary:

FCC Part:	2.1049
Test Method Used:	As detailed in ANSI C63.4 Section 13.1.7 and relevant annexes (see note below)

Environmental Conditions:

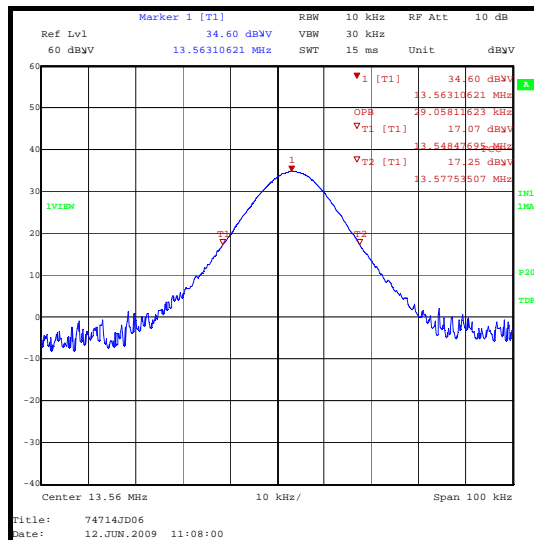
Temperature (°C):	24
Relative Humidity (%):	30

Results:

Transmitter 20 dB Bandwidth (kHz)
29.058

Note(s):

- In lieu of the test method detailed in ANSI C63.4 Section 13.1.7 the 20 dB bandwidth was measured using the Occupied Bandwidth function of the spectrum analyser.



5.2.6. Transmitter Frequency Stability (Temperature & Voltage Variation)**Test Summary:**

FCC Part:	15.225 (e)
Test Method Used:	As detailed in ANSI C63.4 Section 13.1.6 and relevant annexes

Environmental Conditions:

Temperature (°C):	20
Relative Humidity (%):	29

Results: Maximum frequency error of the EUT with variations in ambient temperature

Temp (°C)	Nominal Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (%)	Limit (%)	Margin (%)	Result
-20	13.56	13.562846	13	0.000096	0.01	0.009904	Complied
20	13.56	13.562833	0	0	-	-	-
50	13.56	13.562816	17	0.000125	0.01	0.009875	Complied

Results: Maximum frequency error of the EUT with variations in nominal operating voltage at an ambient temperature of 20°C

Supply Voltage (V)	Nominal Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (%)	Limit (%)	Margin (%)	Result
8.0	13.56	13.562826	7	0.000052	0.01	0.009948	Complied
12.0	13.56	13.562833	0	0	-	-	-
14.0	13.56	13.562857	24	0.000177	0.01	0.009823	Complied

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
Occupied Bandwidth	13 MHz to 14 MHz	95%	±0.92 ppm
Frequency Stability	13 MHz to 14 MHz	95%	±0.92 ppm
Radiated Spurious Emissions	9 kHz to 30 MHz	95%	±3.53 dB
Radiated Spurious Emissions	30 MHz to 1000 MHz	95%	±2.94 dB

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 Last Calibrated	Cal. Interval
A007	Antenna	Rohde & Schwarz	HFH2-Z2	880 458/020	29 Mar 2009	12
A1299	Antenna	Schaffner	CBL6143	5094	28 Jul 2008	12
A1830	Pulse Limiter	Rhode & Schwarz	ESH3-Z2	100668	05 Jan 2009	12
A649	Single Phase LISN	Rohde & Schwarz	ESH3-Z5	825562/008	19 Mar 2009	12
E013	Environmental Chamber	Sanyo	ATMOS chamber	None	Calibrated before use	-
K0001	5m SA Chamber	Rainford EMC	N/A	N/A	04 May 2009	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	26 Aug 2008	12
M1068	Thermometer	Iso-Tech	RS55	93102884	09 Jul 2008	12
M1124	Spectrum Analyser	Rohde & Schwarz	ESIB26	100046K	09 Mar 2009	12
M1269	Multimeter	Fluke	179	90250210	09 Apr 2009	12
M1263	Test Receiver	Rohde & Schwarz	ESIB7	100265	22 Apr 2009	12
M1273	Test Receiver	Rhode & Schwarz	ESIB 26	100275	01 Apr 2009	12
M1379	Test Receiver	Rohde and Schwarz	ESIB7	100330	14 Aug 2008	12
S021	DC Power Supply	Thurlby Thandar Instruments	CPX200	061034	Calibrated before use	-

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