

EMC TEST REPORT

COMPANY:

PAXTON ACCESS LTD

PRODUCT:

NET2 HANDSFREE

ACCESS CONTROL SYSTEM

REPORT NO.

07024171- Addendum 1

WRITTEN BY:

D A Legge

REVIEWED BY:

D Feasey

TEST ENGINEER:

D A Legge



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1. JOB DESCRIPTION

Equipment:

Net2 Handsfree Access Control System

Equipment Model No(s):

Equipment under Test

Net2 Hands free interface – 477 – 222 – US Net2 Hands free keyfob – 690 – 222 – US Net2 Hands free keycard – 690 – 333 – US

Support Equipment

Net2 RS 845 Comms Converter - 455-477-US

Net2 Door ACU – 385-527-US Exit Button E50 – 356-310-US

Proximity P200 reader - 323-110-US

12V psu -998-241-US

Laptop running Net2 software

Equipment Serial No:

None

Phase:

Compliance

Customer:

Paxton Access Ltd

Test Plan Reference:

-

Test Standards:

CFR47 Part 15: 207,209 and 249

Test Location:

Intertek ETL Semko Unit D Randalls Way

Leatherhead Surrey

KT22 7SB

Test Work Started:

12th July 2007

Test Work Completed:

19th July 2007

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2. TEST SUMMARY

PRODUCT REFERENCE STANDARDS

ANSI C63.4-2003,

TEST STANDARD	TEST	COMMENT
CFR 47 Part 15:207	Conducted Emissions	Pass
CFR 47 Part 15:209 and 249	Radiated Emissions	Pass

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3. EQUIPMENT UNDER TEST (EUT)

3.1. Description of the EUT

The Net2 Handsfree Access control system testboard is a representation of a single door Paxton Access PC based access control system, known as Net2 Handsfree. The system allows the user to gain access to their premises without the need to present a token to a reader. The system comprises of an active keyfob or Keycard(transponder) which can be carried somewhere on your person and an interface (transceiver) to computer software Net2.

The Net2 interface unit has 16 different channels available in the frequency band 2.4GHz to 2.48GHz and this report contains results on tests carried out on channel 7 (2.44GHz) and channel 26(2.48GHz) for both the Keycard and the Keyfob transponders. This report complements the results in Test report EM07024171 for channel 12 (2.41GHz). The channel/frequency table is shown in Annex 3.

The system was mounted on a wooden board and was tested as received.

3.2. EUT's Modes of Operation

The system was tested whilst communicating with the Keycard and the Keyfob.

3.3. EUT Configuration Diagram

See photographs in Annex 2

3.4. EUT Support Equipment

The Net2 Handsfree Access control system was monitored for functionality using the client software "Net2". Also used was the RS232/485 comms converter to provide the connection back to the PC/Software

3.5. Cables Associated With the EUT

EUT PORT	TYPE	LENGTH (m)	TERMINATION/LOAD
Net2 ACU	10 core	2	Net2 Handsfree Interface
Reader input	10 Core	2	Net2 Handsfree Interface
Net2 ACU	5 Core	1	RS232 Comms Converter
Laptop	9	3	RS232 Comms Converter
AC Mains	2	1	Net2 ACU

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4. CONDUCTED EMISSIONS

4.1. Conducted Emissions Test Method

The testing was performed in accordance with ANSI C63.4-2003.

The tests were performed in a screened room using a Line Impedance Stabilising Network (LISN). The tests were carried out on channels 7 and 26, whilst communicating with the Keycard and the Keyfob.

4.2. Conducted Emissions Test Results

Any measurements within 10dB below the average and quasi-peak limit lines are measured with the average and quasi-peak detectors respectively. The results for the Net2 Handsfree Access control system testboard and the Keyfob communicating are given in Tables 1 – 4 and Graphs 1 – 4, the results for the Keycard communicating are given in Tables 5 - 8 and Graphs 5 - 8.

4.3. Modification Performed During Testing

None

4.4. Conducted Emissions Conclusions

The EUT results are below the specification limit by a margin less than the measurement uncertainty; it is therefore not possible to state compliance based on the 95% level of confidence. However, the result indicates that compliance is more probable than non-compliance with the FCC Part 15:207 specification limit.

4.5. Measurement Uncertainty

150kHz to $30MHz \pm 2.9$ dB

The measurement uncertainties have been determined at a confidence level of not less than 95%.

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Table 1 Conducted Emissions Test Results

Standard:

FCC Part 15: 207

Test:

Conducted Emissions

Port:

Net2Handsfree Interface testboard - Positive Line

Units of measurement:

Frequency:

MHz

Amplitude:

 $dB\mu V$

Bandwidths:

10kHz

Mode of operation:

Active communicating with Keyfob every second

Comment:

Monitored for functionality by client Software Net2

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EM07024171

12 Jul 2007 16:26

Conducted Emissions

EUT:

Non Radio Test Board + I/O Board

Manuf:

Paxton Access

Op Cond: Operator: 120vac 60 Hz DAL

Test Spec:

FCC_15:207

Comment:

+ Line - Channel 18 (2.440GHz)

Result File:

Activated by Keyfob - Monitored by client software

Start

150kHz

4171q.dat : Non Radio Test Board+I/O Board - Conducted Emissions FCC 15

Scan Settings

(1 Range) Frequencies Stop 30MHz

Step 5kHz IF BW Detector 10kHz PΚ

Receiver Settings M-Time 20msec

Atten Auto

OFF

Preamp

OpRge 60dB

Final Measurement:

Detector: Meas Time; Peaks:

Acc Margin:

X QP 1sec

8

10 dB

Final Measurement Results

Frequency	QP Level	QP Limit	QP Delta
MHz	dBµV	dΒμV	dB
0.75	44.16	56.00	11.84
0.76	42.98	56.00	13.02
0.835	48.14	56.00	7.86
0.85	47.06	56.00	8.94
14.125	53.56	60.00	6.44
14.375	54.62	60.00	5.38
14.625	54.42	60.00	5.58
14.875	53.46	60.00	6.54

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Issue No.:

Graph 1 Conducted Emissions Test Results

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Detector

PΚ

Conducted Emissions

EUT: Non Radio Test Board + I/O Board

Manuf:

Paxton Access

Op Cond:

120vac 60 Hz

Operator: Test Spec:

DAL FCC_15:207

Comment:

+ Line - Channel 18 (2.440GHz)

Activated by Keylob - Monitored by client software

Step

6kHz

Result File: Scan Settings 4171q.dat : Non Radio Test Board+I/O Board - Conducted Emissions FCC 15

Frequencies Start Stop 30MHz 150kHz

IF BW 10kHz Receiver Settings M-Time Atlen 20msec Auto

Preamp OFF

OpRge 60dB

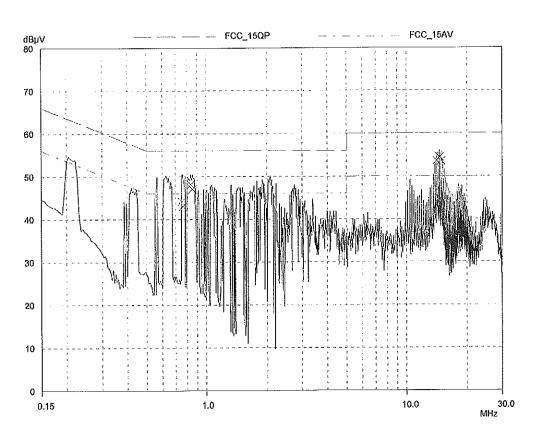
Final Measurement:

Detector: Meas Time: Peaks:

Acc Margin:

1sec 10 dB

X QP



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Table 2 Conducted Emissions Test Results

Standard:

FCC Part 15: 207

Test:

Conducted Emissions

Port:

Net2Handsfree Interface testboard - Neutral line

Units of measurement:

Frequency:

MHz

Amplitude:

 $dB\mu V$

Bandwidths:

10kHz

Mode of operation:

Active - communicating with Keyfob every second

Comment:

Monitored for functionality by client Software Net2

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Conducted Emissions

EUT:

Non Radio Test Board + I/O Board

Manuf:

Paxton Access

Op Cond; Operator: Test Spec:

120vac 60 Hz DAL

Result File:

Start

160kHz

FCC_15:207

Comment:

Neutral Line - Channel 18 (2.440GHz)

Activated by Keyfob - Monitored by client software 4171r.dat : Non Radio Test Board+I/O Board - Conducted Emissions FCC 15

IF BW

10kHz

Scan Settings

(1 Range) Frequencles

Stop 30MHz

Step 5kl-lz Detector

Receiver Settings M-Time Atten 20msec Aulo

Preamp OFF

OpRge 60dB

Final Measurement:

Detector: Meas Time: Peaks:

Acc Margin:

X QP 1860 8 10 dB

Final Measurement Results

Frequency	QP Lavel	QP Limit	QP Delta
MHz	dΒμV	dΒμV	đВ
0.63	48.46	56.00	7.54
0.825	48.84	56.00	7.16
0.84	49.14	56.00	6.86
0.855	47.70	56.00	8.30
2,105	46.26	56.00	9.74
14.125	53.88	60.00	6.12
14.375	54.94	60.00	5.06
14.625	54.34	60.00	5.66

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Graph 2 Conducted Emissions Test Results

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Conducted Emissions

Non Radio Test Board + I/O Board

Manuf: Op Cond: Paxton Access 120vac 60 Hz

Operator:

Test Spec:

FCC_15:207

(1 Range)

Stop

30MHz

Comment:

Neutral Line - Channel 18 (2.440GHz)

Activated by Keyfob - Monitored by client software

X QP

18ec 8

10 dB

Result File:

4171r.dat : Non Radio Test Board+I/O Board - Conducted Emissions FCC 15

Scan Settings Start 150kHz

Frequencies Step 5kHz

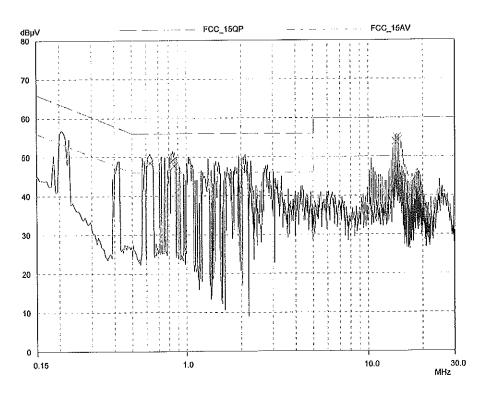
IF BW Detector PΚ 10kHz

Receiver Settings M-Time Atten 20msec Auto

OpRge Preamp OFF 60dB

Final Measurement:

Detector: Meas Time: Peaks: Acc Margin:



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Table 3 Conducted Emissions Test Results

Standard:

FCC Part 15: 207

Test:

Conducted Emissions

Port:

Net2Handsfree Interface testboard - Positive Line

Units of measurement:

Frequency:

MHz

Amplitude:

 $dB\mu V$

Bandwidths:

10kHz

Mode of operation:

Active communicating with Keyfob every second

Comment:

Monitored for functionality by client Software Net2

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Conducted Emissions

Net2 Air Interface System + I/O Board - Conducted Emissions
Paxton Access
120vac 96 Hz
DAL
FCC_16:207

EUT: Manuf: Op Cond: Operator: Test Spec: Comment:

Result File:

+ Line - channel 26 (2.48GHz) Activated by Keyfob - Monitored by client software 4171t.dat : Net2Air Interface System + I/O Board - Conducted Emissions

Scan Sellinga

(1 Range) Frequencies Stop 30MHz iF BW 10kH≥ Datector PK Start 150kHz 20maec

Final Measurement:

X QP Detector: Meas Time: Peaks: Aco Margin: 8 10 dB

Final Measurement Results

QP Limit Frequency MHz QP Level dΒμV dΒμV 48,36 38,52 47,42 48,90 46,52 47,38 54,40 64,26 68.00 58.00 58.00 56.00 56.00 7.64 17.48 0.615 0.615 0.75 0.81 0.64 2.055 2.065 14.376 14.625 8.68 7.10 9.48 8.62 5.60 6.74 60.00

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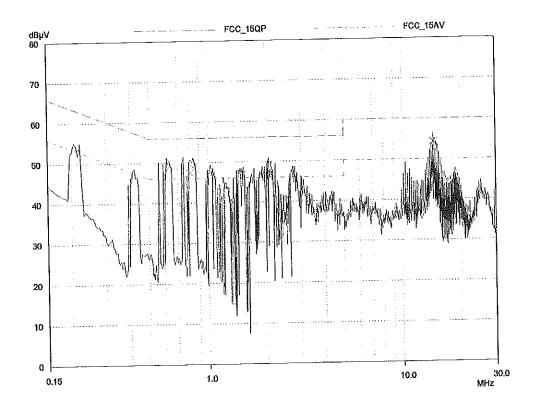
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Graph 3 Conducted Emissions Test Results

12 Jul 2007 15:47 EM07024171 Conducted Emissions Net2 Air Interface System + I/O Board - Conducted Emissions EUT: Paxton Access Manuf: 120vao 60 Hz Op Cond: DAL Operator: FCC_15:207 Test Spec: + Line - channel 26 (2.48GHz) Comment: Activated by Keyfob - Monitored by client software 4171t.dat : Nel2Air Interface System + I/O Board - Conducted Emissions Result File: (1 Range) Scan Settings Receiver Settings Frequencies Preamp OpRge M-Time Atten Step IF BW Detector Start Stop OFF 60dB Auto 10kHz PΚ 20msec 5kHz 150kHz 30MHz X QP Detector: Final Measurement: Meas Time: 18ec Peaks: Acc Margin: 10 dB



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Table 4 Conducted Emissions Test Results

Standard:

FCC Part 15: 207

Test:

Conducted Emissions

Port:

Net2Handsfree Interface testboard - Neutral Line

Units of measurement:

Frequency:

MHz

Amplitude:

 $dB\mu V$

Bandwidths:

10kHz

Mode of operation:

Active communicating with Keyfob every second

Comment:

Monitored for functionality by client Software Net2

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Conducted Emissions

EUT:

Net2 Air Interface System + I/O Board - Conducted Emissions

Manuf:

Paxton Access 120vac 60 Hz

DAL

Op Cond: Operator: Test Spec:

FCC_15:207

Comment:

Neutral Line - channel 28 (2.48GHz)

Result File:

Activated by Keyfob - Monitored by client software
4171s.dat : Net2 Air Interface System + I/O Board - Conducted Emissions

Scan Settings Start

150kHz

(1 Range) Frequencies Step Stop 5kHz 30MHz

IF BW Detector PK 10kHz

Receiver Settings M-Time Atten 20msec

OpRge OFF 60dB

Final Measurement:

Detector: Meas Time: Peaks: Ace Margin: X QP 1sec 10 dB

Final Measurement Results

MHz dBμV dBμV dB 0.555 41.42 56.00 14.58 0.62 48.06 56.00 7.94 0.825 48.50 56.00 7.50 0.855 45.20 56.00 10.80 0.87 24.10 56.00 31.90 2.065 46.24 56.00 9.76 14.375 54.30 60.00 5.70 14.625 54.08 60.00 5.92	Frequency	QP Level	QP Limii	QP Delt
0.62 48.06 56.00 7.94 0.825 48.50 58.00 7.50 0.895 45.20 58.00 10.80 0.87 24.10 56.00 31.90 2.065 46.24 56.00 9.76 14.376 54.30 60.00 5.70	MHz	dΒμV	dΒμV	dB
0.02 48.50 56.00 7.50 0.825 48.50 56.00 10.80 0.895 45.20 56.00 10.80 0.87 24.10 56.00 31.90 2.065 46.24 56.00 9.76 14.376 54.30 60.00 5.70	0.555	41.42	56.00	14.58
0.855 45.20 56.00 10.80 0.87 24.10 56.00 31.90 2.065 46.24 56.00 9.76 14.376 54.30 60.00 5.70	0.62	48.06	56.00	7.94
0.87 24.10 56.00 31.90 2.065 46.24 56.00 9.76 14.375 54.30 60.00 5.70	0.825	48.50	58.00	7.50
2.065 46.24 56.00 9.76 14.375 54.30 60.00 5.70	0.855	45.20	56.00	10.80
2.065 48.24 56.00 9.76 14.375 54.30 60.00 5.70	0.87	24,10	56,00	31.90
14.070 04.00		48,24	56,00	9.76
14.625 54.08 60.00 5,92	14.375	54.30	60.00	5,70
	14.625	54.08	60.00	5,92

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Graph 4 Conducted Emissions Test Results

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Final Measurement;

12 Jul 2007 15:55 EM07024171 Conducted Emissions Net2 Air Interfece System + I/O Board - Conducted Emissions EUT: Paxton Access Manuf: 120vac 60 Hz Op Cond: Operator: DAL. FCC_15:207 Test Spec: Neutral Line - channel 26 (2.48GHz) Comment: Activated by Keyfob - Monitored by client software 4171s.dat ; Net2 Air Interface System + I/O Board - Conducted Emissions Result File: (1 Range) Scan Settings Frequencles OpRge IF BW M-Time Atten Preamp Detector Step Start Stop 60dB 20msec Auto OFF PK 10kHz 30MHz 150kHz

X QP

1sec

10 dB

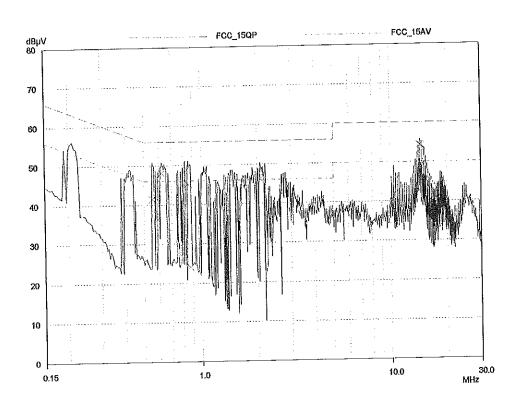
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Detector:

Peaks:

Meas Time:

Acc Margin:



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Table 5 Conducted Emissions Test Results

Standard:

FCC Part 15: 207

Test:

Conducted Emissions

Port:

Net2Handsfree Interface testboard - Positive Line.

Units of measurement:

Frequency:

MHz

Amplitude:

 $dB\mu V$

Bandwidths:

10kHz

Mode of operation:

Active communicating with keycard . Every second.

Comment:

Monitored for functionality by client Software Net2

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OpRge

Conducted Emissions

EUT: Manuf: Non Radio Test Board

Paxton Access 120vac 60 Hz

Op Cond: Operator:

DAL

Test Spec:

(1 Range) Frequencies

Stop

30MHz

Comment:

Result File:

Scan Settings

DAL

FCC_15:207

+ Line - Channel 18 (2.440GHz)

Activated by Keycard - Monitored by client software

4171o.dat : Non Radio Test Board+I/O Board - Conducted Emissions FCC 15

IF BW

10kHz

PK

Start 150kHz Step 5kHz

M-Time Detector 20msec

Receiver Settings -Atten Auto

Preamp

Final Measurement:

Detector: Meas Time:

Peaks: Acc Margin: X QP 1sec

10 dB

Final Measurement Results

Frequency MHz	QP Level dBµV	QP Limit dΒμV	QP Delta dB
0.6	46.38	56.00	9.62
0.625	48.10	56.00	7.90
0.825	48.68	56.00	7.32
0.84	48.80	56.00	7.20
0.86	47.58	56.00	8.42
14.125	53.68	60.00	6.32
14.375	54.72	60.00	5.28
14.625	54.36	60.00	5.64

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Receiver Settings

Alten

Auto

Preamp

OFF

OpRge

60dB

M-Time

20msec

1

Graph 5 Conducted Emissions Test Results

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Conducted Emissions

EUT:

Non Radio Test Board

Manuf:

Paxion Access 120vac 60 Hz

Op Cond: Operator:

DAL

(1 Range) Frequencies

Stop 30MHz

Test Spec:

FCC_15:207

Comment:

+ Line - Channel 18 (2.440GHz) Activated by Keycard - Monitored by client software

Step

5kHz

Result File:

Start

150kHz

Scan Settings

4171o.dat : Non Radio Test Board+I/O Board - Conducted Emissions FCC 15

IF BW

10kHz

Detector

PΚ

Final Measurement:

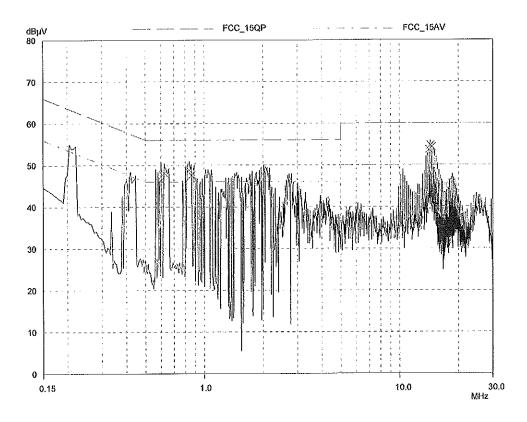
Detector:

X QP

Meas Time: Peaks:

1sec 8 10 dB

Acc Margin:



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Table 6 Conducted Emissions Test Results

Standard:

FCC Part 15: 207

Test:

Conducted Emissions

Port:

Net2Handsfree Interface testboard - Neutral Line

Units of measurement:

Frequency:

MHz

Amplitude:

 $dB\mu V$

Bandwidths:

10kHz

Mode of operation:

Active communicating with keycard . Every second.

Comment:

Monitored for functionality by client Software Net2

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EM07024171

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Conducted Emissions

EUT:

Non Radio Test Board + I/O Board

Manuf:

Paxton Access

Op Cond:

120vac 60 Hz DAL

FCC_15:207

Operator: Test Spec:

Neutral Line - Channel 18 (2.44GHz)

Comment:

Activated by Keycard - Monitored by client software

Result File:

Start

150kHz

4171p.dat : Non Radio Test Board+I/O Board - Conducted Emissions FCC 15

IF BW

10kHz

Scan Sellings

(1 Range) Frequencies Stop 30MHz

X QP

Detector PΚ

Receiver Settings -M-Time Atten Auto 20msec

Preamp OpRge 60dB OFF

Final Measurement:

Detector: Meas Time: Peaks: Acc Margin:

1sec 8 10 dB

Step

5kHz

Final Measurement Results

Frequency MHz	QP Level dBµV	QP Limit σ'8μV	QP Delta dB
0.615	48,40	56.00	7.60
0.825	48.78	56.00	7.22
0.84	48.98	56.00	7.02
0.87	26.14	56.00	29.86
14.125	53.44	60.00	6.56
14.375	54,30	60.00	5.70
14.625	54.06	60.00	5.94
14.875	53.08	60.00	6.92

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Graph 6 Conducted Emissions Test Results

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Conducted Emissions

EUT:

Non Radio Test Board + I/O Board

Manuf:

Paxton Access

Op Cond:

120vac 60 Hz

Operator:

DAL

Test Spec:

FCC_15:207

Comment:

Neutral Line - Channel 18 (2.44GHz)

Activated by Keycard - Monitored by client software

Result File:

4171p.dat : Non Radio Test Board+I/O Board - Conducted Emissions FCC 15

IF BW

10kHz

Scan Setlings Start

150kHz

(1 Range) Frequencies Stop 30MHz

X QP

Detector PΚ

Receiver Settings M-Time Atten Auto 20msec

Preamp OFF

OpRge 60dB

Final Measurement:

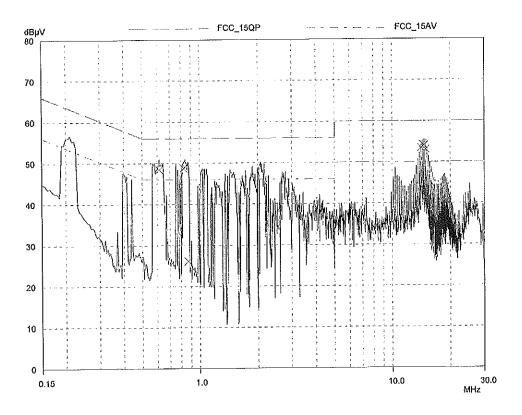
Detector: Meas Time:

isec 8

Peaks:

10 dB Acc Mergin:

Step



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Table 7 Conducted Emissions Test Results

Standard:

FCC Part 15: 207

Test:

Conducted Emissions

Port:

Net2Handsfree Interface testboard - Positive Line

Units of measurement:

Frequency:

MHz

Amplitude:

 $dB\mu V$

Bandwidths:

10kHz

Mode of operation:

Active communicating with keycard . Every second.

Comment:

Monitored for functionality by client Software Net2

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EM07024171

12 Jul 2007 16:02

Conducted Emissions

EUT:

Net2 Air Interface System + I/O Board - Conducted Emissions

Manuf:

Paxton Access 120vac 60 Hz

Op Cond:

Operator:

DAL FCC_15:207

Test Spec: Comment:

Result File:

Start

150kHz

Final Measurement:

+ Line - channel 26 (2.48GHz)

Activated by Keycard - Monitored by client software
4171u.dat : Net2 Air Interface System + I/O Board - Conducted Emissions

Scan Settings

(1 Range) Frequencies

Stop 30MHz

IF BW 10kHz

Detector

PK

Receiver Settings M-Time

20msec

Atten Preamp Auto OFF

OpRge 60dB

Detector: Meas Time:

Acc Margin:

Peaks:

X QP 1860 8 10 dB

Step

5kHz

Final Measurement Results

Frequency MHz	QP Level dBµV	QP Limit dΒμV	QP Delte dB
0.615	48,28	56.00	7.72
0.815	47.22	56,00	8.78
0.835	48.22	56.00	7.78
0.845	47.88	56,00	8.12
2.035	45.10	56.00	10.90
14.375	54.44	60.00	5.56
14.625	54.24	60.00	5.76
14.875	53,32	60.00	6.68

^{*} Ifmit exceeded

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Graph 7 Conducted Emissions Test Results

12 Jul 2007 16:02 EM07024171

Conducted Emissions

Net2 Air Interface System + I/O Board - Conducted Emissions EUT:

Manuf: Op Cond: Paxton Access 120vac 60 Hz

Operator:

Result File:

DAL FCC_15:207

Test Spec: Comment:

+ Line - channel 26 (2.48GHz)

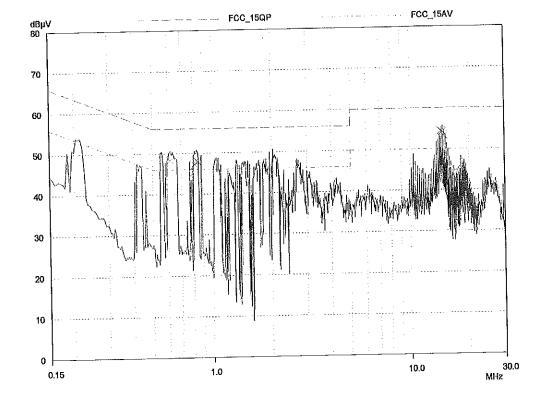
Activated by Keycard - Monitored by client software

4171u.dat : Net2 Air Interface System + I/O Board - Conducted Emissions

(1 Range) Scan Settings Receiver Settings Frequencies OpRge M-Time Atten Preamp IF BW Step Detector Start Stop 60dB Auto OFF 20msec PΚ 5kHz 10kHz 30MHz 150kHz

Final Measurement:

X QP Detector: Meas Time: 1560 Peaks: Aco Margin: 10 dB



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Net2 Handsfree Access Control

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Table 8 Conducted Emissions Test Results

Standard:

FCC Part 15: 207

Test:

Conducted Emissions

Port:

Net2Handsfree Interface testboard - Neutral Line

Units of measurement:

Frequency:

MHz

Amplitude:

 $dB\mu V$

Bandwidths:

10kHz

Mode of operation:

Active communicating with keycard . Every second.

Comment:

Monitored for functionality by client Software Net2

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Issue No.:

EM07024171

12 Jul 2007 16:10

Conducted Emissions

EUT:

Net2 Air Interface System + I/O Board - Conducted Emissions

Manuf; Op Cond:

Paxton Access 120vac 60 Hz DAL

Operator: Test Spec:

FCC_15:207

Comment:

Start

150kHz

Neutral Line - channel 26 (2.48GHz)

Activated by Keycard - Monitored by client software 4171v.dat : Net2 Air Interface System + I/O Board - Conducted Emissions

IF BW

10kHz

Datector

PΚ

Scan Settings

(1 Range) --- Frequencies Stop 30MHz

Step 5kHz Receiver Settings -M-Time Atten 20msec Auto

Preamp OFF

OpRge 60dB

Final Measurement:

Detector: Meas Time: Peaks:

Acc Margin:

X QP 1sec 8

10 dB

Final Measurement Results

Frequency MHz	QP Level dBµV	QP Limit dΒμV	QP Delta dB
0.62	48.42	56.00	7.58
0.63	48.52	56.00	7.48
0.825	48.72	58.00	7.28
0,835	48.14	56,00	7.86
0.865	46.12	56.00	9.88
14.375	54.34	60.00	5.66
14.625	54.06	60.00	5.94
14.875	53.18	60.00	6.62

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Issue No.:

Graph 8 Conducted Emissions Test Results

EM07024171

12 Jul 2007 16:10

Conducted Emissions

EUT:

Net2 Air Interface System + I/O Board - Conducted Emissions

Manuf: Op Cond:

Paxton Access 120vac 60 Hz

Operator:

DAL FCC_15:207

(1 Range)

Stop

30MHz

Test Spec: Comment:

Neutral Line - channel 26 (2.48GHz)

Activated by Keycard - Monitored by client software

Result File:

4171v.dat : Net2 Air Interface System + I/O Board - Conducted Emissions

X QP

1sec

10 dB

8

JF BW

10kHz

Scan Settings Start 150kHz

Frequencies Step 5kHz

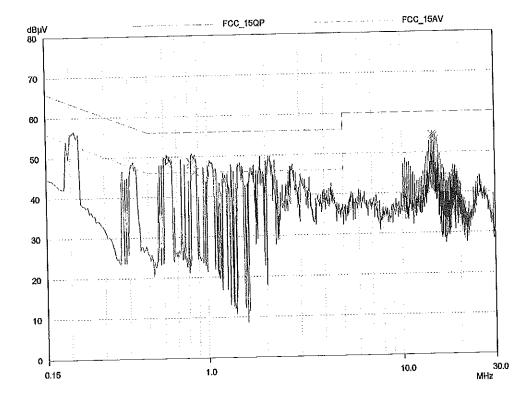
Receiver Sellings Atten M-Time Detector Auto 20msec PK

Preamp OFF

OpRge 60dB

Final Measurement:

Detector: Meas Time: Peaks: Acc Margin:



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5. RADIATED EMISSIONS

5.1. Radiated Emissions Test Method

The testing was performed in accordance with ANSI C63.4-2003.

The testing was carried out in a fully lined anechoic chamber, with the limit line at 10m distance for adjusted for a 3m test site. The limit line was also lowered by 6dB to give worst case conditions (the test site being fixed and unable to maximise signal levels).

5.2. Unintentional Radiated Emissions Test Results

The radiated emissions from 30 to 1000MHz were measured using a quasi-peak detector. Measurements above 1000MHz were measured using average and peak detectors.

The results for the frequency range 30 to 1000MHz for Net2Handsfree interface system communicating with the Keyfob are given in Tables 9 – 10 and Graphs 9-10 and for the keycard communicating, Tables 11 - 12 and Graphs 11 and 12.

The results for frequencies above 1000MHz are tabulated and shown in Tables 13 and 14.

5.3. Modifications Performed During Testing

None.

5.4. Radiated Emissions Conclusions

The intentional radiated field strengths complied with CFR47 Part15:249.

The non intentional radiated emissions complied with CFR47 Part15:209 for the Net2Handsfree Access control system communicating with the Keyfob.

The non intentional radiated emissions complied with CFR47 Part15:209 for the Net2Handsfree Access control system communicating with the keycard.

5.5. Measurement Uncertainty

30MHz to 1000MHz ±3.3dB

The measurement uncertainties have been determined at a confidence level of not less than 95%.

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Table 9 and Graph 9 Non Intentional Radiated Emissions Test Results Keyfob - Channel 18

Job Number 07024171

EUT: Net2 Air interface system Manufacturer: Paxton Glass

Operating Mode: Communicating with Keyfob - 2.44GHz

standard: CFR47 Part15:209 temp:23° humidity: 46% operator : D A Legge Scan

OP Horizontal

	Frequency(Hz)	Level(dBuV/m)	Height(m)	Polar	Angle(Deg)	Limit(dBuV/m)	Margin(dBuV/m)	Comment	Detector	RBW(Hz)
	127.991 M	34.44	0.00		132.00	37.50	-3.06		QP	120.0 k
	159,994 M	35.17	0.00	Π'n	149,00	37.50	-2.33		QP	120.0 k
1	175.989 M	33.19	0.00	<u> </u>	44.00	37,50	-4,31		QP	120.0 k
	183,996 M	30.27	0.00	l i	358.00	37.50	-7.23		4O	120.0 k
	192.0 M	26.88	0.00		13.00	37.50	-10.62		OP	120.0 k
	256.0 M	28.27	0.00		360.00	40.00	-11.73		OP	120.0 k
					309.00	40.00	-9.14		OP OP	120.0 k
	272 B37 M	30.86	0.00	1 1	309.00	I 40.00	-9.14		QP	120.01

OP Vertical

X , D	•								
Frequency(Hz)	Level(dBuV/m)	Height(m)	Polse	Angle(Deg)	Limit(dBuV/m)	Margin(dBuV/m)	Comment	Detector i	RBW(Hz)
127.984 M	31.21	0.00		346.00	37.50	∙6.29		QP	120.0 k
175,996 M	33.55	0.00		33.00	37.50	-3.95		QP	120.0 k
890.494 M	35.01	0.00	l i	295.00	40.00	-4.99		QP	120.0 k
901 826 M	34.94	0.00		131.00	40.00	-5.06		QP	120.0 k

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system

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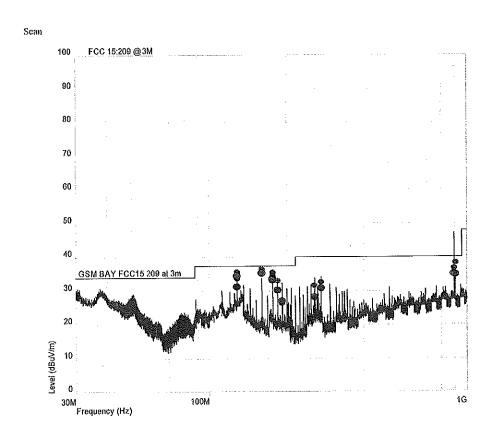
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Red Vertical

Blue Horizontal

 $Plot\ 2-Keyfob-2.44GHz$

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system

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Table 10 and Graph 10 Radiated Emissions Test Results Keyfob channel 26

Job Number 07024171

EUT: Net2 Air interface System Manufacturer: Paxton Glass

Operating Mode: Communicating with Keyfob - 2.48GHz

standard: CFR47 Part15:209

temp :23° humidity :46% operator : D A Legge Scan

QP Horizon	ntal									
Frequency(Hz)	Level(dBuV/m)	Height(m)	Polar	Angle(Deg)	Limit(dBuV/m)	Margin(dBuV/m)	Comment	Detector	RBW(Hz)	
586 106 M	33.02	0.00		352.00	40.00	-6.98		OP	120.0 k	

Scan

OP Vertical

	Q1 101000										
- 3	Freemency(Hz)	Level(dBuV/m)	Height(m)	Polar	Angle(Deg)	Limit(dBuV/m)	Margin(dBuV/m)	Comment	Detector	RBW(Hz)	ĺ
	127 997 M	33 37	0.00		122.00	37.50	-4.13		QP	120,0 k	1

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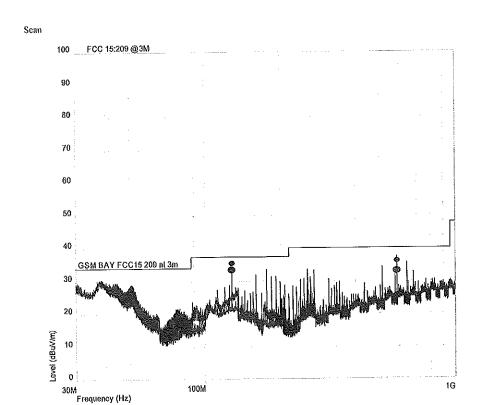
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Red Vertical

Blue Horizontal

Plot 4 Keyfob - 2.48GHz

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Table 11 and Graph 11 **Radiated Emissions Test Results Keycard channel 18**

Job Number 07024171 EUT: Non Radio test board Manufacturer: Paxton Glass

Operating Mode: Communicating with Keycard – Channel 7 - 2.44GHz standard: CFR47 Part15:209

temp: 23° humidity 46% operator: D A Legge

QP Horizontal Frequency(IIz) Level(dBuV/m) Height(m) Polar Angle(Deg) Limit(dBuV/m) Margin(dBuV/m) Comment Detector RBW(Hz)

Scan

OP Vertical									
Frequency(Hz)	Level(dBuV/m)	Height(m)	Polar	Angle(Deg)	Limit(dBuV/m)	Margin(dBnV/m)	Comment	Detector	RBW(Hz)
127.999 M	32.73	0.00	1	133.00	37.50	4.77		OP	120.0 k
		0.00		216.00	37.50	-11.48	••	OP	120.0 k
176,003 M	26,02					-9.45		OP	120 0 k
431.913 M	30,55	0,00		197.00	40.00			OP.	120,0 k
503.537 M	31.25	0.00	1 1	148.00	40.00	-8.75		l Qi	120.0 K

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system

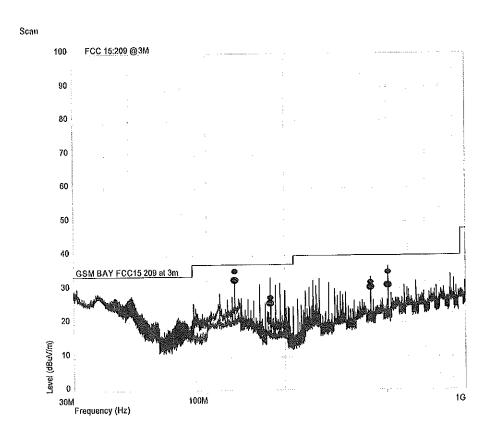
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Model No.:



Red Vertical

Blue Horizontal

Plot 1 - Keycard - 2.44GHz

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Radiated Emissions Test Results Table 12 and Graph 12 **Keyfob Channel 26**

Job Number 07024171 EUT : Net2 Air interface system

EUT: Not2 Air interface system
Manufacturer: Paxton Glass
Operating Mode: Communicating with Keyeard – 2.48GHz
temp: 23*
humidity: 46%
operator: Da Legge
Sean
QP Horizontal
Frequency(Hz) | Level(dBuV/m) | Heightfax | Pales | August Day | 1.15*

Frequency(Hz)	Level(dBuV/m)	Height(m)	Polar	Angle(Deg)	Limit(dBuV/m)	Margin(dBuV/m)	Comment	Detector	RHW(Hz)	
605,564 M	32.64	0.00		303.00	40.00	-7.36		QP	120.0 k	

Scan OP Vertical

QP vertical										
Frequency(Hz)	Level(dBuV/m)	Height(m)	Polar	Angle(Deg)	Limit(dBuV/m)	Margin(dBnV/m)	Comment	Detector	RBW(Hz)	
127.986 M	13.13	0.00		156.00	37.50	-4,38		Ql	120.0 k	
201 101 14	20.65	0.00		201.00	40.00	-11.35	The state of the s	OP	120.0 %	

Model No.:

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system

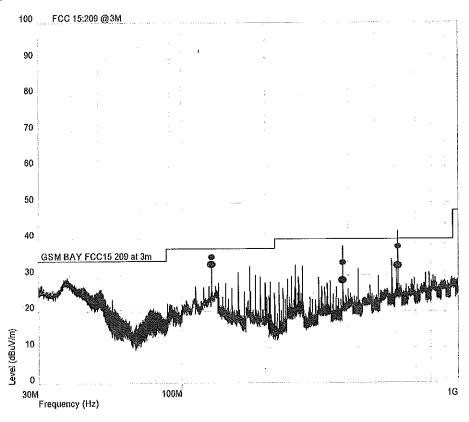
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Scan



Red Vertical

Blue Horizontal

Plot 3 Keycard Final - 2.48GHz

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Table 13 Radiated Emissions Test Result 1 to 24GHz Keyfob Communicating with Net2Handsfree system – channel 18

Frequency	Analyser	Antenna	Cables	Preamp	Total	Limit	Detector
GHz	dBµV	dB	dB	dB	dBµV/m	dBµV/m	
1 – 2.4	< 31.0	26.1	1.6	29.0	< 29.7	54.0	Average
1 – 2.4	< 36.0	26.1	1.6	29.0	< 34.7	74.0	Peak
2 – 4	< 27.0	30.5	2.4	28.0	< 31.9	54.0	Average
2 – 4	< 35.0	30.5	2.4	28.0	< 39.9	74.0	Peak
4.87	44.84	27.5	3.2	50	15.64	54.0	Average
4.87	57.01	27.5	3.46	50	27.81	54.0	Peak
5.66	<40.6	28.7	3.9	50	<10.9	54.0	Average
5.66	50.7	27.5	3.2	50	21.6	74.0	Peak
7.42	<39	27.5	3.46	50	<11.6	74.0	Average
7.42	<56	28.7	3.9	50	<22.6	74.0	Peak
8 – 12	< 30.0	33.4	4.5	27.0	< 30.9	54.0	Average
12 – 18	< 31.0	31.7	6.8	27.3	< 32.2	54.0	Average
18 – 24	< 30.0	33.8	9.2	26.0	< 37.0	54.0	Average
8 – 12	< 35.0	33.4	4.5	27.0	< 35.9	74.0	Peak
12 – 18	< 40.0	31.7	6.8	27.3	< 41.2	74.0	Peak
18 – 24	< 40.0	32.8	8.2	28.0	< 47.0	74.0	Peak

Note: < equates to measuring system noise

Keyfob communicating with Net2Handsfree system channel 26

Frequency	Analyser	Antenna	Cables	Preamp	Total	Limit	Detector
GHz	dΒμV	dB	dB	dB	dBμV/m	dΒμV/m	
1 – 2.4	< 31.0	26.1	1.6	29.0	< 29.7	54.0	Average
1 – 2.4	< 36.0	26.1	1.6	29.0	< 34.7	74.0	Peak
2 – 4	< 27.0	30.5	2.4	28.0	< 31.9	54.0	Average
2 – 4	< 35.0	30.5	2.4	28.0	< 39.9	74.0	Peak
4.94	<40.01	27.5	3.2	50	<10.8	54.0	Average
4.94	54.91	27.5	3.46	50	<25.71	54.0	Peak
5.73	<40.36	28.7	3.9	50	<11.26	54.0	Average
5.73	49.48	27.5	3.2	50	<20.38	74.0	Peak
7.43	<39	27.5	3.46	50	<11.6	54.0	Avarage
7.43	<49	28.7	3.9	50	<21.6	74.0	Peak
8 – 12	< 30.0	33.4	4.5	27.0	< 30.9	54.0	Average
12 – 18	< 32.0	31.7	6.8	27.3	< 43.2	54.0	Average
18 – 24	< 30.0	33.8	9.2	26.0	< 37.0	54.0	Average
8 – 12.	< 40.0	33.4	4.5	27.0	< 40.9	74.0	Peak
12 – 18	< 40.0	31.7	6.8	27.3	< 41.2	74.0	Peak
18 – 24	< 40.0	32.8	8.2	28.0	< 47.0	74.0	Peak

Note: < Equates to measuring system noise

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Table 14 Radiated Emissions Test Result 1 to 24GHz Keycard Communicating with Net2Handsfree system - channel 18

Frequency	Analyser	Antenna	Cables	Preamp	Total	Limit	Detector
GHz	dBµV	dB	dB	dB	dΒμV/m	dΒμV/m	
1 - 2.4	< 31.0	26.1	1.6	29.0	< 29.7	54.0	Average
1 – 2.4	< 36.0	26.1	1.6	29.0	< 34.7	74.0	Peak
2 – 4	< 27.0	30.5	2.4	28.0	< 31.9	54.0	Average
2 – 4	< 35.0	30.5	2.4	28.0	< 39.9	74.0	Peak
4.87	45.62	27.5	3.2	50	16.42	54.0	Average
5.66	42.96	27.5	3.46	50	13.86	54.0	Average
6.43	<41.0	28.7	3.9	50	<13.2	54.0	Average
4.87	60.92	27.5	3.2	50	31.72	74.0	Peak
5.66	56.15	27.5	3.46	50	27.05	74.0	Peak
6.43	51.55	28.7	3.9	50	23.75	74.0	Peak
8 – 12	< 29.0	33.4	4.5	27.0	< 29.9	54.0	Average
12 – 18	< 30.0	31.7	6.8	27.3	< 31.2	54.0	Average
18 – 24	< 30.0	33.8	9.2	26.0	< 37.0	54.0	Average
8 – 12	< 35.0	33.4	4.5	27.0	< 35.9	74.0	Peak
12 – 18	< 40.0	31.7	6.8	27.3	< 41.2	74.0	Peak
18 – 24	< 40.0	32.8	8.2	28.0	< 47.0	74.0	Peak

Note: < equates to measuring system noise

Keycard communicating with Net2Handsfree system channel 26

Frequency	Analyser	Antenna	Cables	Preamp	Total	Limit	Detector
GHz	dBµV	dB	dB	dB	dBµV/m	dΒμV/m	
1-2.4	< 31.0	26.1	1.6	29.0	< 29.7	54.0	Average
1 – 2.4	< 36.0	26.1	1.6	29.0	< 34.7	74.0	Peak
2 – 4	< 27.0	30.5	2.4	28.0	< 31.9	54.0	Average
2 – 4	< 35.0	30.5	2.4	28.0	< 39.9	74.0	Peak
4.94	44.66	27.5	3.2	50	15.46	54.0	Average
4.94	59.98	27.5	3.46	50	30.78	74.0	Peak
5.73	43.8	28.7	3.9	50	14.7	54.0	Average
5.73	53.07	27.5	3.2	50	23.97	74.0	Peak
7.43	<40.9	27.5	3.46	50	<13.5	54.0	Average
7.43	<49.9	28.7	3.9	50	<22.5	74.0	Peak
8 – 12	< 30.0	33.4	4.5	27.0	< 30.9	54.0	Average
12 – 18	< 30.0	31.7	6.8	27.3	< 31.2	54.0	Average
18 – 24	< 30.0	33.8	9.2	26.0	< 37.0	54.0	Average
8 – 12	< 40.0	33.4	4.5	27.0	< 40.9	74.0	Peak
12 – 18	< 40.0	31.7	6.8	27.3	< 41.2	74.0	Peak
18 – 24	< 40.0	32.8	8.2	28.0	< 47.0	74.0	Peak

Note: < Equates to measuring system noise

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system

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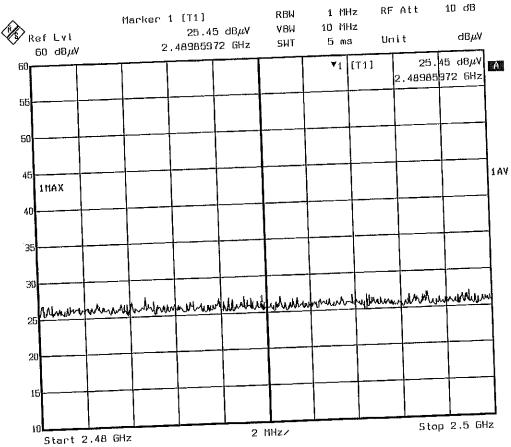
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Keyfob 2.48 - 2.5GHz - Average Detector - channel 18



Net2 Air Interface System - Channel 7 Comment A: Keyfob - 2.44GHz Average Detector Date: 16.JUL.2007 14:56:09

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system

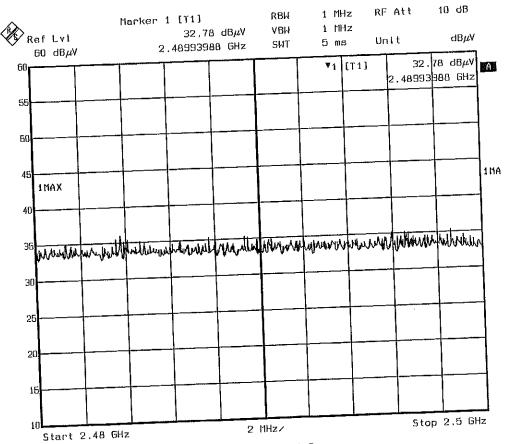
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Keyfob 2.48 – 2.5GHz – Peak Detector – channel18



Title: Net2 Air Interface System - Channel 7 Comment A: Keyfob - 2.44GHz Peak Detector Date: 15.JUL.2007 15:03:36

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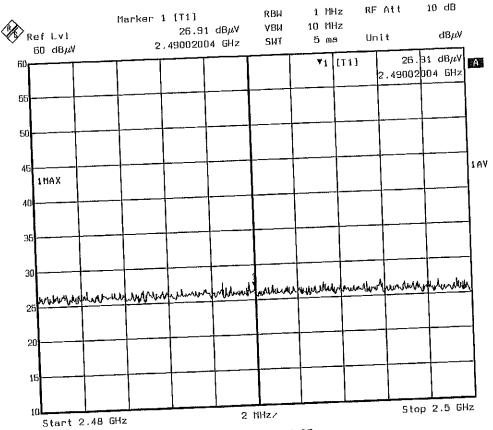
system

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Keyfob 2.48 – 2.5GHz – Average Detector – channel 26



Title: Net2 Air Interface System - Channel 26 Comment A: Keyfob - 2.48GHz Average Detector Oate: 16.JUL.2007 15:18:27

Model No.:

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system

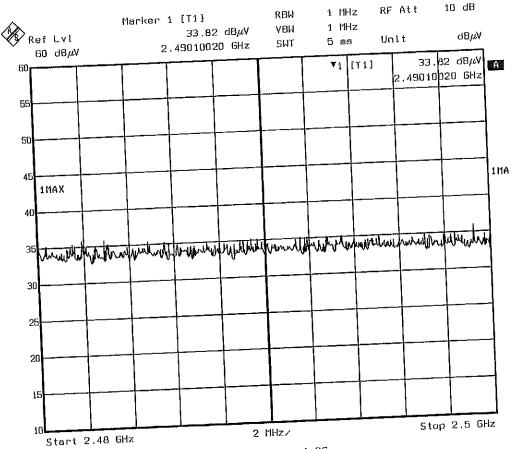
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Keyfob 2.48 - 2.5GHz - Peak Detector - channel 26



Title: Net2 Air Interface System - Channel 26 Comment A: Keyfob - 2.48GHz Peak Detector Date: 16.JUL.2007 15:10:39

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system

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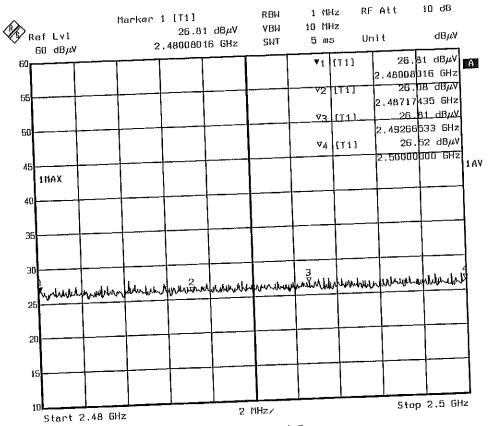
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Issue No.:

Issue Date:

Keycard 2.48 -2.5GHz – Average Detector – channel 18



Title: Net2 Alr Interface System - Channel 7 Comment A: Keycard - 2.446Hz Average Detector Date: 16.JUL.2007 14:45:09

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system

Model No.:

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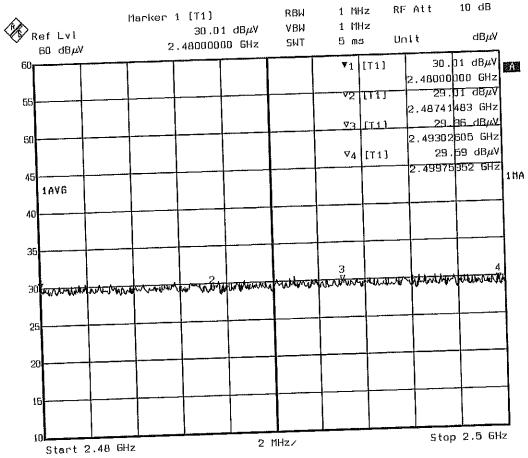
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Keycard 2.48- 2.5GHz - Peak Detector- channel 18



Title: Net2 Alr Interface System - Channel 7 Comment A: Keycard - 2.44GHz Peak Detector Date: 16.JUL.2007 14:37:16

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system

Model No.:

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Page:

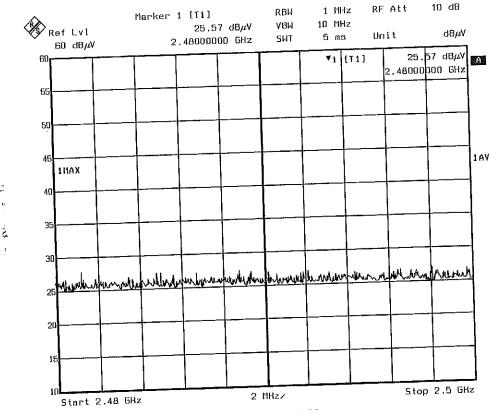
Issue Date:

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1

Issue No.:

Keycard 2.48 - 2.5GHz - Average Detector - channel 26



Title: Net2 Air Interface System - Channel 26 Comment A: Keycard - 2.48GHz Average Detector Date: 16.JUL.2007 14:04:07

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system

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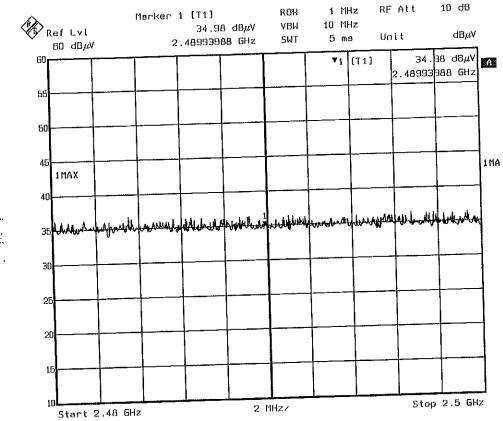
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Keycard 2.48 - 2.5GHz - Peak Detector - channel 26



Net2 Air Interface System - Channel 26 Comment A: Keycard - 2.48GHz Peak Detector Date: 16.JUL.2007 14:05:56

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6. TEST EQUIPMENT

Equipment	Туре	ID
Rohde & Schwarz FSEK	Analyser	1088
Rohde & Schwarz ESHS10	Receiver	7463
Rohde & Schwarz ESHS10	Receiver	4761
Rohde & Schwarz ESHS-Z5	Lisn	7473
Chase Antenna	Bilog	
2m N to N	Cable	8157
2m N to N	Cable	7258
3m N to N	Cable	7529
4m N to N	Cable	7177
2m K to K	Cable	7532
3m Kto K	Cable	7531
Emco Horn Antenna	1 to 18GHz	7512
Emco Horn Antenna	4 to 8GHz	7617
Emco Horn Antenna	8 to 12GHz	7614
Scientific Atlanta	12 to 18GHz	7615
Scientific Atlanta	18 to 26GHz	7513
ERA Wideband Amplifier	1 to 18GHz	7534
GSM A	Environment	7286
Test Bay 5	Environment	7404
High Accuracy THP	Environment Monitor	7519
High Accuracy THP	Environment Monitor	7516
Continuous Power International	115Vac 60Hz Generator	7497

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Model No.:

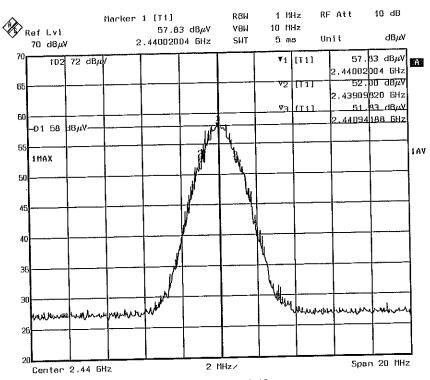
system As page 3 Page: Issue Date: 51 of 60 July 2007

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1

ANNEX 1 6dB Band Width Plots

Keyfob – Average Detector Channel 18



Title: Net2 Air Interface System - Channel 18
Comment A: Keyfob - 2.44GHz Average Detector
Date: 24.JUL.2007 15:01:32

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Net2 Handsfree Access Control

system

Model No.:

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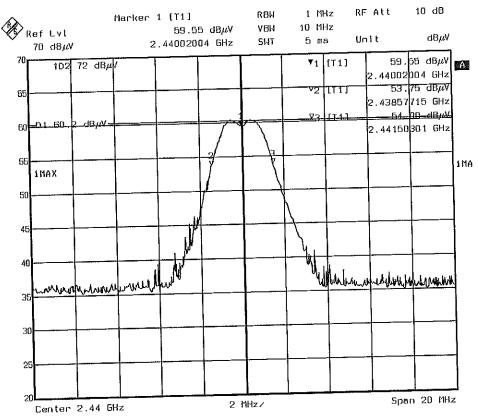
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Keyfob - Peak Detector Channel 18



Title: Net2 Air Interface System - Channel 18 Comment A: Keyfob - 2.44GHz Peak Detector Date: 24.JUL.2007 14:58:55

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system

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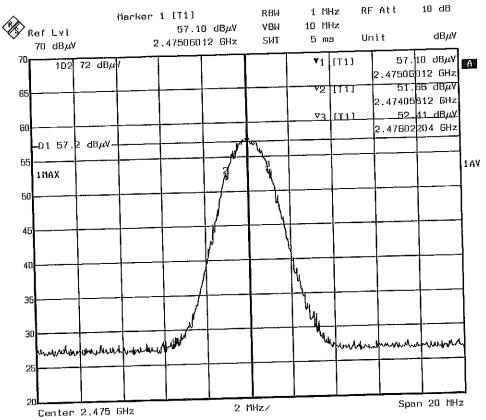
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Issue No.:

Keyfob – Average Detector Channel 26



Title: Net2 Air Interface System - Channel 28 Comment A: Keyfob - 2.48GHz Average Detector Date: 24.JUL.2007 14:51:32

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system

Model No.:

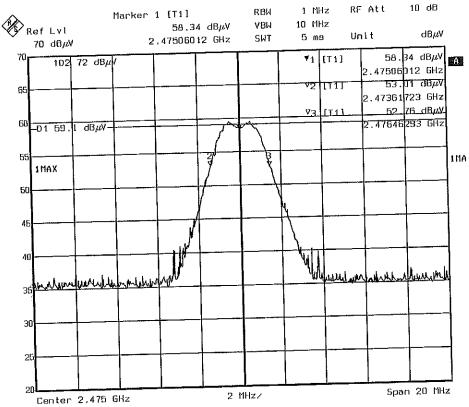
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Keyfob - Peak Detector Channel 26



Title: Net2 Alr Interface System - Channel 26 Comment A: Keyfob - 2.486Hz Peak Detector Date: 24.JUL.2007 14:54:15

Model No.:

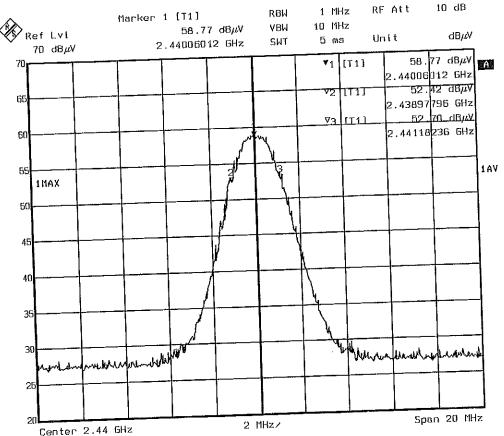
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Issue No.:

1

Keycard – Average Detector Channel 18



Title: Net2 Air Interface System – Channel 18 Comment A: Keycard – 2.446Hz Average Detector Date: 24.JUL.2007 14:14:33

Model No.:

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system

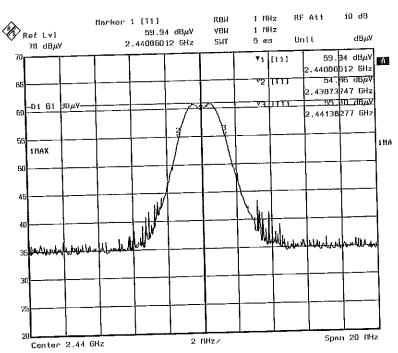
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Keycard – Peak Detector Channel 18



Title: Net2 Air Interface System - Channel 18
Comment A: Keycard - 2.44GHz Peak Detector
Date: 24.JUL.2007 14:19:43

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system

Model No.:

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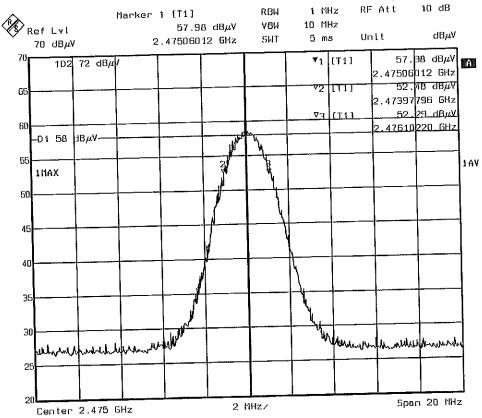
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Issue No.:

1

Keycard – Average Detector Channel 26



Title: Net2 Air Interface System - Channel 26 Comment A: Keycard - 2.48GHz Average Detector Date: 24.JUL.2007 14:46:01

Model No.:

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system

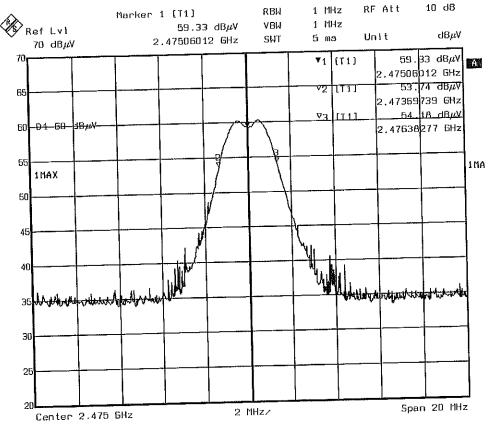
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Keycard – Peak Detector Channel 26



Title: Net2 Air Interface System - Channel 26 Comment A: Keycard - 2.486Hz Peak Detector Date: 24.JUL.2007 14:43:85

Model No.:

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system

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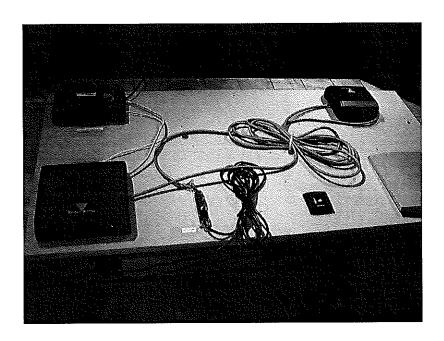
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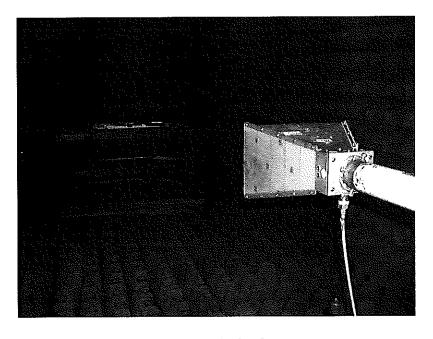
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ANNEX 2

Test Set up



Radiated Emissions



Radiated Emissions

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ANNEX 3

The unit has been tested at channels 12, 18, 26 with the keycard and the key fob.

All hands free tokens automatically configure themselves to use the new channel. No configuration of the token is required.

Switch Position	GHz	IEEE 802.15.4 Channel
0	2.405	11
1	2.41	12
2	2.415	13
3	2.42	14
4	2.425	15
5	2.43	16
6	2.435	17
7	2.44	18
8	2.445	19
9	2.45	20
Α	2.455	21
В	2.46	22
С	2.465	23
D	2.47	24
Е	2.475	25
F	2.48	26