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**	
ISSUE: 1	**DATE: July 2007**	**TOTAL PAGES: 60**

Opinions and interpretations based on test results are outside our scope of UKAS Accreditation.

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TABLES

GRAPHS

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

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

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

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 ± 2.9 dB

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

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: dBμV

Bandwidths: 10kHz

Mode of operation: Active communicating with Keyfob every second

Comment: Monitored for functionality by client Software Net2

EM07024171 12 Jul 2007 16:26

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:	+ Line - Channel 18 (2.440GHz)
	Activated by Keyfob - Monitored by client software
Result File:	4171q.dat : Non Radio Test Board+I/O Board - Conducted Emissions FCC 15

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	5kHz	10kHz	PK	20msec	Auto	OFF	60dB

Final Measurement:

Detector:	X QP
Meas Time:	1sec
Peaks:	8
Acc Margin:	10 dB

Final Measurement Results

Frequency MHz	QP Level dBµV	QP Limit dBµV	QP Delta 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

* limit exceeded

Graph 1 Conducted Emissions Test Results

EM07024171 12 Jul 2007 16:26

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:	+ Line - Channel 18 (2.440GHz)
	Activated by Keyfob - Monitored by client software
Result File:	4171q.dat : Non Radio Test Board+I/O Board - Conducted Emissions FCC 15

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	5kHz	10kHz	PK	20msec	Auto	OFF	60dB

Final Measurement: Detector: X QP
Meas Time: 1sec
Peaks: 8
Acc Margin: 10 dB

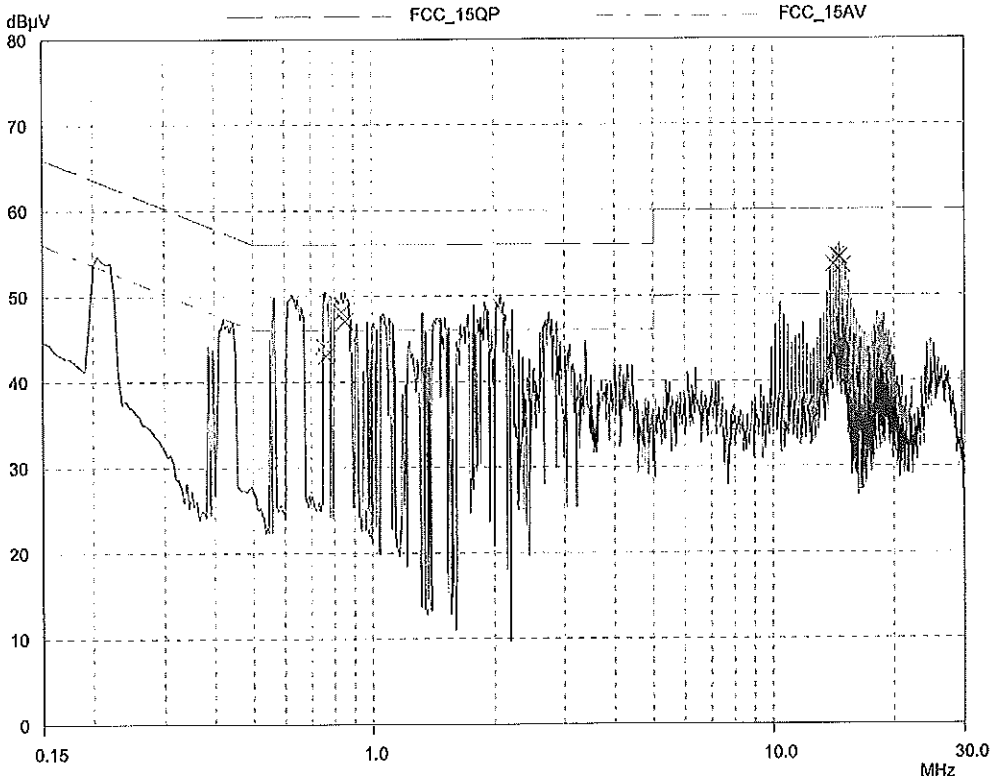

Table 2 Conducted Emissions Test Results

Standard:	FCC Part 15: 207		
Test:	Conducted Emissions		
Port:	Net2Handsfree Interface testboard - Neutral line		
Units of measurement :			
Frequency:	MHz	Amplitude:	dBµV
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:	120vac 60 Hz
Operator:	DAL
Test Spec:	FCC_15:207
Comment:	Neutral Line - Channel 18 (2.440GHz)
	Activated by Keyfob - Monitored by client software
Result File:	4171r.dat : Non Radio Test Board+I/O Board - Conducted Emissions FCC 15

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	5kHz	10kHz	PK	20msec	Auto	OFF	60dB

Final Measurement:

Detector:	X QP
Meas Time:	1sec
Peaks:	8
Acc Margin:	10 dB

Final Measurement Results

Frequency MHz	QP Level dBµV	QP Limit dBµV	QP Delta dB
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

* limit exceeded

Graph 2 Conducted Emissions Test Results

EM07024171 12 Jul 2007 16:19

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 (2.440GHz)
	Activated by Keyfob - Monitored by client software
Result File:	4171r.dat : Non Radio Test Board+I/O Board - Conducted Emissions FCC 15

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	5kHz	10kHz	PK	20msec	Auto	OFF	60dB

Final Measurement:

Detector:	X QP
Meas Time:	1sec
Peaks:	8
Acc Margin:	10 dB

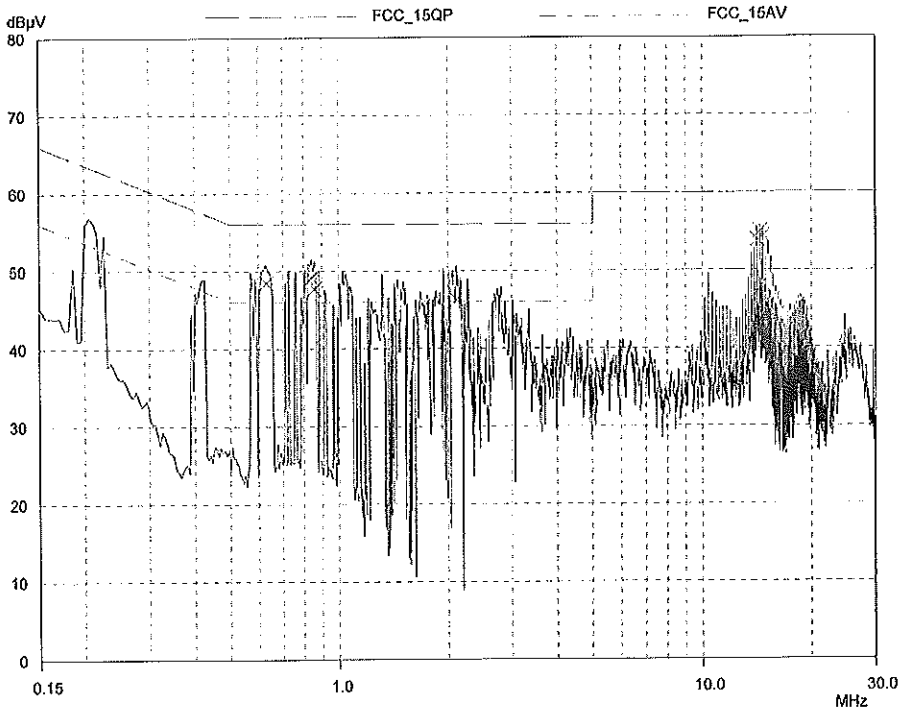

Table 3 Conducted Emissions Test Results

Standard: FCC Part 15: 207

Test: Conducted Emissions

Port: Net2Handsfree Interface testboard - Positive Line

Units of measurement:

Frequency: MHz Amplitude: dBµV

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
Op Cond:	120vac 60 Hz
Operator:	DAL
Test Spec:	FCC_15:207
Comment:	+ Line - channel 26 (2.48GHz) Activated by Keyfob - Monitored by client software
Result File:	4171t.dat : Net2Air Interface System + I/O Board - Conducted Emissions

Scan Settings (1 Range)

Frequencies					Receiver S
Start	Stop	Step	IF BW	Detector	M-Time
150kHz	30MHz	5kHz	10kHz	PK	20msec

Final Measurement:

Detector:	X QP
Meas Time:	1sec
Peaks:	8
Acc Margin:	10 dB

Final Measurement Results

Frequency MHz	QP Level dBµV	QP Limit dBµV	QP Delta dB
0.615	48.36	56.00	7.64
0.75	38.52	56.00	17.48
0.81	47.42	56.00	8.58
0.84	48.90	56.00	7.10
2.055	46.52	56.00	9.48
2.085	47.38	56.00	8.62
14.375	54.40	60.00	5.60
14.625	54.26	60.00	5.74

* limit exceeded

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Graph 3 Conducted Emissions Test Results

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Conducted Emissions

EUT:	Net2 Air Interface System + I/O Board - Conducted Emissions
Manuf:	Paxton Access
Op Cond:	120vac 60 Hz
Operator:	DAL
Test Spec:	FCC_15:207
Comment:	+ Line - channel 26 (2.48GHz)
	Activated by Keyfob - Monitored by client software
Result File:	4171t.dat : Net2Air Interface System + I/O Board - Conducted Emissions

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	5kHz	10kHz	PK	20msec	Auto	OFF	60dB

Final Measurement:

Detector:	X QP
Meas Time:	1sec
Peaks:	8
Acc Margin:	10 dB

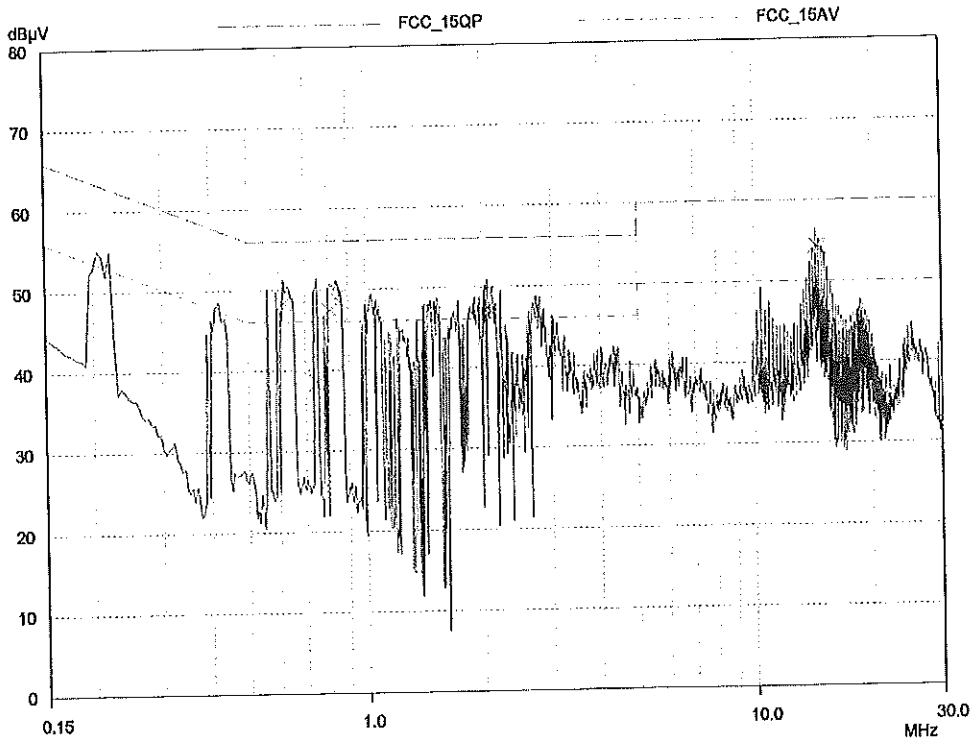

Table 4 Conducted Emissions Test Results

Standard: FCC Part 15: 207

Test: Conducted Emissions

Port: Net2Handsfree Interface testboard - Neutral Line

Units of measurement:

Frequency: MHz Amplitude: dBμV

Bandwidths: 10kHz

Mode of operation: Active communicating with Keyfob every second

Comment: Monitored for functionality by client Software Net2

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EM07024171

Conducted Emissions

EUT:	Net2 Air Interface System + I/O Board - Conducted Emissions
Manuf:	Paxton Access
Op Cond:	120vac 60 Hz
Operator:	DAL
Test Spec:	FCC_15:207
Comment:	Neutral Line - channel 26 (2.48GHz)
	Activated by Keyfob - Monitored by client software
Result File:	4171s.dat : Net2 Air Interface System + I/O Board - Conducted Emissions

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	5kHz	10kHz	PK	20msec	Auto	OFF	60dB

Final Measurement:

Detector:	X QP
Meas Time:	1sec
Peaks:	8
Acc Margin:	10 dB

Final Measurement Results

Frequency MHz	QP Level dBµV	QP Limit dBµV	QP Delta 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

* limit exceeded

Graph 4 Conducted Emissions Test Results

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EM07024171

Conducted Emissions

EUT:	Net2 Air Interface System + I/O Board - Conducted Emissions
Manuf:	Paxton Access
Op Cond:	120vac 60 Hz
Operator:	DAL
Test Spec:	FCC_15:207
Comment:	Neutral Line - channel 26 (2.48GHz)
	Activated by Keyfob - Monitored by client software
Result File:	4171s.dat ; Net2 Air Interface System + I/O Board - Conducted Emissions

Scan Settings (1 Range)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	5kHz	10kHz	PK	20msec	Auto	OFF	60dB

Final Measurement:

Detector:	X QP
Meas Time:	1sec
Peaks:	8
Acc Margin:	10 dB

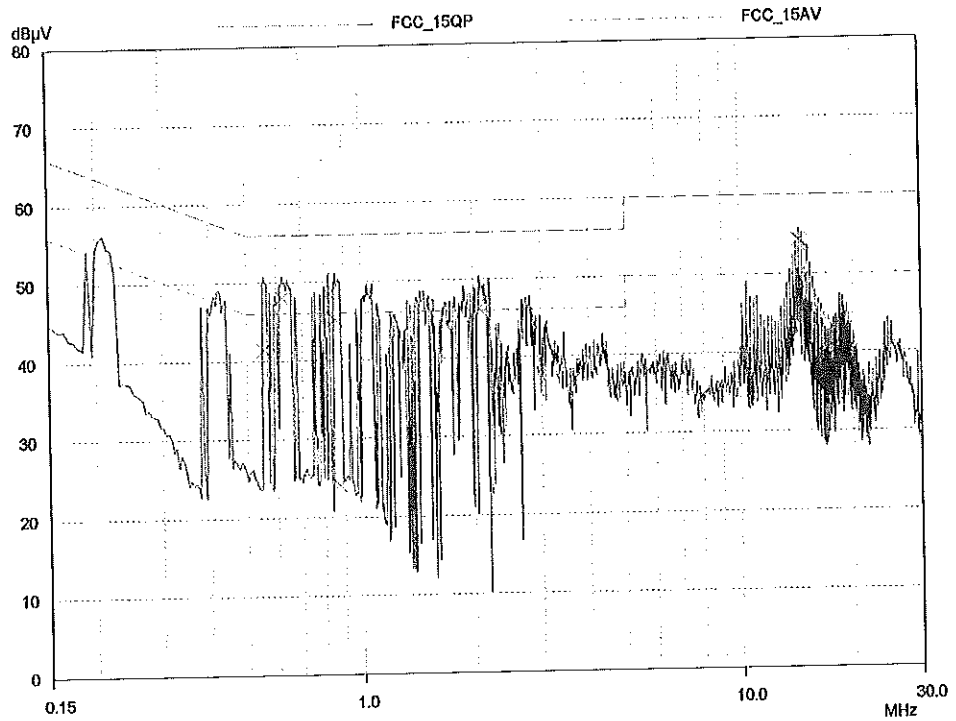

Table 5 Conducted Emissions Test Results

Standard: FCC Part 15: 207

Test: Conducted Emissions

Port: Net2Handsfree Interface testboard - Positive Line.

Units of measurement:

Frequency: MHz Amplitude: dBμV

Bandwidths: 10kHz

Mode of operation: Active communicating with keycard . Every second.

Comment: Monitored for functionality by client Software Net2

EM07024171 12 Jul 2007 14:00

Conducted Emissions

EUT: Non Radio Test Board
Manuf: Paxton Access
Op Cond: 120vac 60 Hz
Operator: DAL
Test Spec: FCC_15:207
Comment: + Line - Channel 18 (2.440GHz)
Activated by Keycard - Monitored by client software
Result File: 4171o.dat : Non Radio Test Board+I/O Board - Conducted Emissions FCC 15

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	5kHz	10kHz	PK	20msec	Auto	OFF	60dB

Final Measurement: Detector: X QP
Meas Time: 1sec
Peaks: 8
Acc Margin: 10 dB

Final Measurement Results

Frequency MHz	QP Level dBµV	QP Limit dBµV	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

* limit exceeded

Graph 5 Conducted Emissions Test Results

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Conducted Emissions

EUT:	Non Radio Test Board
Manuf:	Paxton Access
Op Cond:	120vac 60 Hz
Operator:	DAL
Test Spec:	FCC_15:207
Comment:	+ Line - Channel 18 (2.440GHz)
	Activated by Keycard - Monitored by client software
Result File:	4171o.dat : Non Radio Test Board+I/O Board - Conducted Emissions FCC 15

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	5kHz	10kHz	PK	20msec	Auto	OFF	60dB

Final Measurement:

Detector:	X QP
Meas Time:	1sec
Peaks:	8
Acc Margin:	10 dB

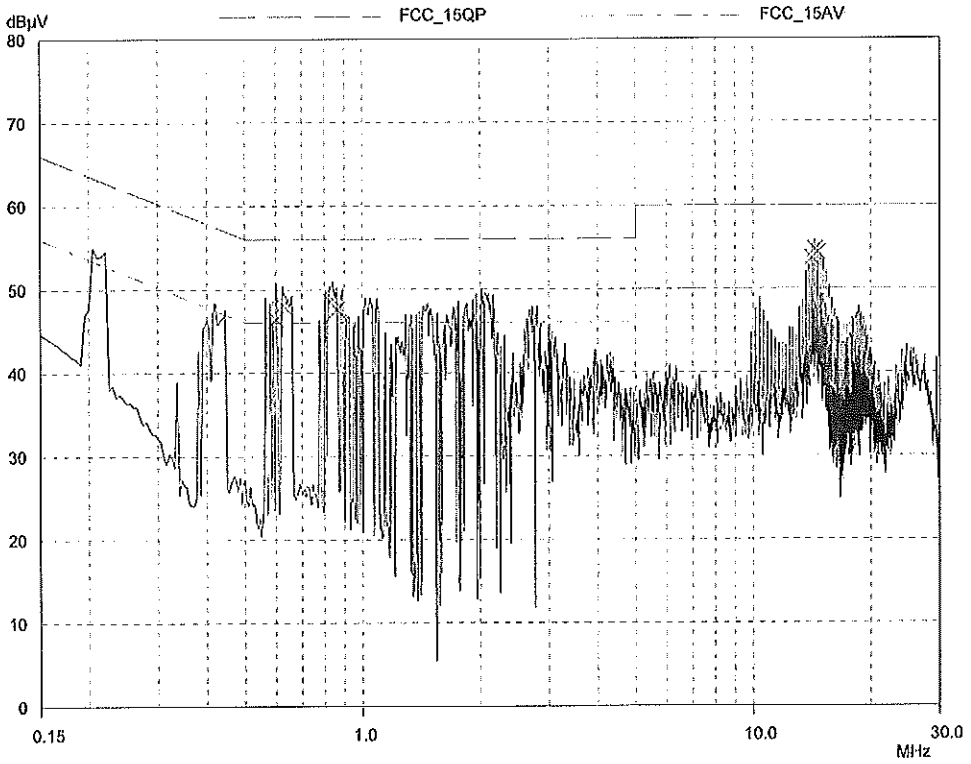


Table 6 Conducted Emissions Test Results

Standard: FCC Part 15: 207

Test: Conducted Emissions

Port: Net2Handsfree Interface testboard - Neutral Line

Units of measurement:

Frequency: MHz Amplitude: dBμV

Bandwidths: 10kHz

Mode of operation: Active communicating with keycard . Every second.

Comment: Monitored for functionality by client Software Net2

EM07024171 12 Jul 2007 14:11

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

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	5kHz	10kHz	PK	20msec	Auto	OFF	60dB

Final Measurement:

Detector:	X QP
Meas Time:	1sec
Peaks:	8
Acc Margin:	10 dB

Final Measurement Results

Frequency MHz	QP Level dBµV	QP Limit dBµV	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

* limit exceeded

Graph 6 Conducted Emissions Test Results

EM07024171 12 Jul 2007 14:11

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

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRgs
150kHz	30MHz	5kHz	10kHz	PK	20msec	Auto	OFF	60dB

Final Measurement:

Detector:	X QP
Meas Time:	1sec
Peaks:	8
Acc Margin:	10 dB

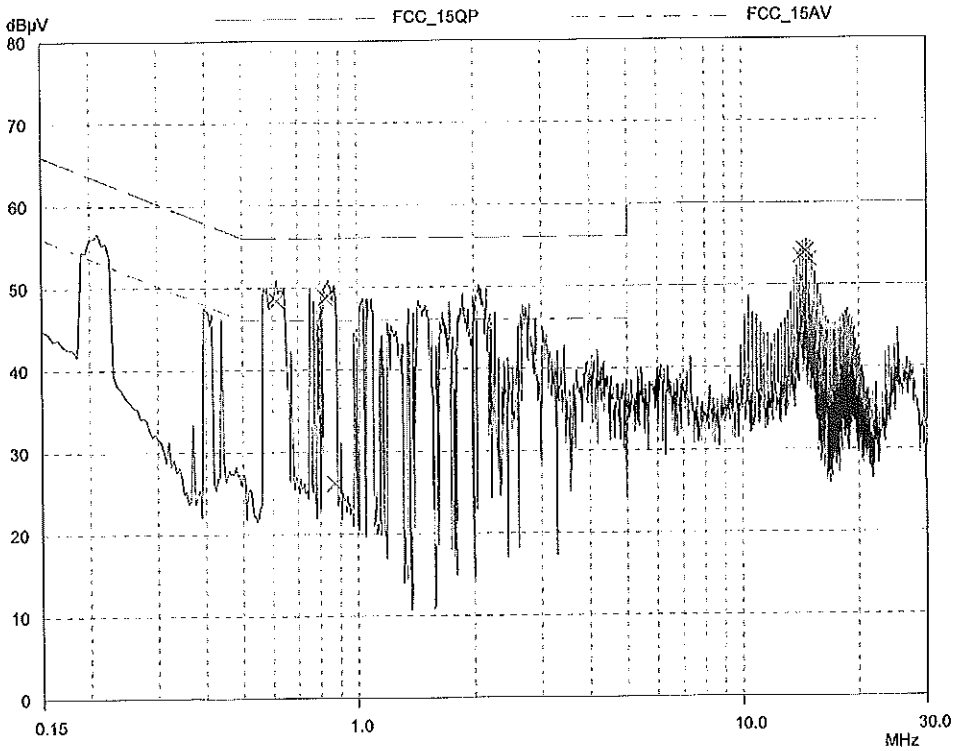


Table 7 Conducted Emissions Test Results

Standard: FCC Part 15: 207

Test: Conducted Emissions

Port: Net2Handsfree Interface testboard - Positive Line

Units of measurement:

Frequency: MHz Amplitude: dBμV

Bandwidths: 10kHz

Mode of operation: Active communicating with keycard . Every second.

Comment: Monitored for functionality by client Software Net2

12 Jul 2007 16:02

EM07024171

Conducted Emissions

EUT:	Net2 Air Interface System + I/O Board - Conducted Emissions
Manuf:	Paxton Access
Op Cond:	120vac 60 Hz
Operator:	DAL
Test Spec:	FCC_15:207
Comment:	+ Line - channel 26 (2.48GHz)
	Activated by Keycard - Monitored by client software
Result File:	4171u.dat : Net2 Air Interface System + I/O Board - Conducted Emissions

Scan Settings (1 Range)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	5kHz	10kHz	PK	20msec	Auto	OFF	60dB

Final Measurement:

Detector:	X QP
Meas Time:	1sec
Peaks:	8
Acc Margin:	10 dB

Final Measurement Results

Frequency MHz	QP Level dBµV	QP Limit dBµV	QP Delta 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

* limit exceeded

Graph 7 Conducted Emissions Test Results

12 Jul 2007 16:02

EM07024171

Conducted Emissions

EUT:	Net2 Air Interface System + I/O Board - Conducted Emissions
Manuf:	Paxton Access
Op Cond:	120vac 60 Hz
Operator:	DAL
Test Spec:	FCC_15:207
Comment:	+ Line - channel 26 (2.48GHz)
	Activated by Keycard - Monitored by client software
Result File:	4171u.dat : Net2 Air Interface System + I/O Board - Conducted Emissions

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	5kHz	10kHz	PK	20msec	Auto	OFF	60dB

Final Measurement:

Detector:	X QP
Meas Time:	1sec
Peaks:	8
Acc Margin:	10 dB

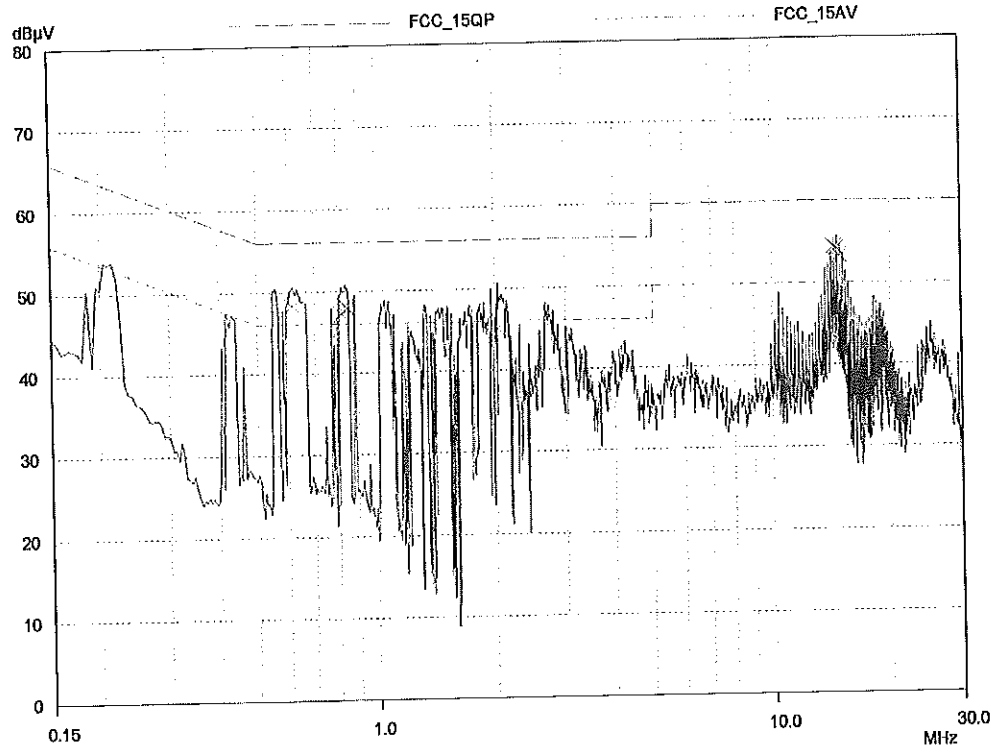


Table 8 Conducted Emissions Test Results

Standard: FCC Part 15: 207

Test: Conducted Emissions

Port: Net2Handsfree Interface testboard - Neutral Line

Units of measurement:

Frequency: MHz Amplitude: dBμV

Bandwidths: 10kHz

Mode of operation: Active communicating with keycard . Every second.

Comment: Monitored for functionality by client Software Net2

EM07024171

12 Jul 2007 16:10

Conducted Emissions

EUT: Net2 Air Interface System + I/O Board - Conducted Emissions
Manuf: Paxton Access
Op Cond: 120vac 60 Hz
Operator: DAL
Test Spec: FCC_15:207
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

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	5kHz	10kHz	PK	20msec	Auto	OFF	60dB

Final Measurement: Detector: X QP
Meas Time: 1sec
Peaks: 6
Acc Margin: 10 dB

Final Measurement Results

Frequency MHz	QP Level dBµV	QP Limit dBµV	QP Delta dB
0.62	48.42	56.00	7.58
0.63	48.52	56.00	7.48
0.825	48.72	56.00	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

* limit exceeded

Graph 8 Conducted Emissions Test Results

12 Jul 2007 16:10

EM07024171

Conducted Emissions

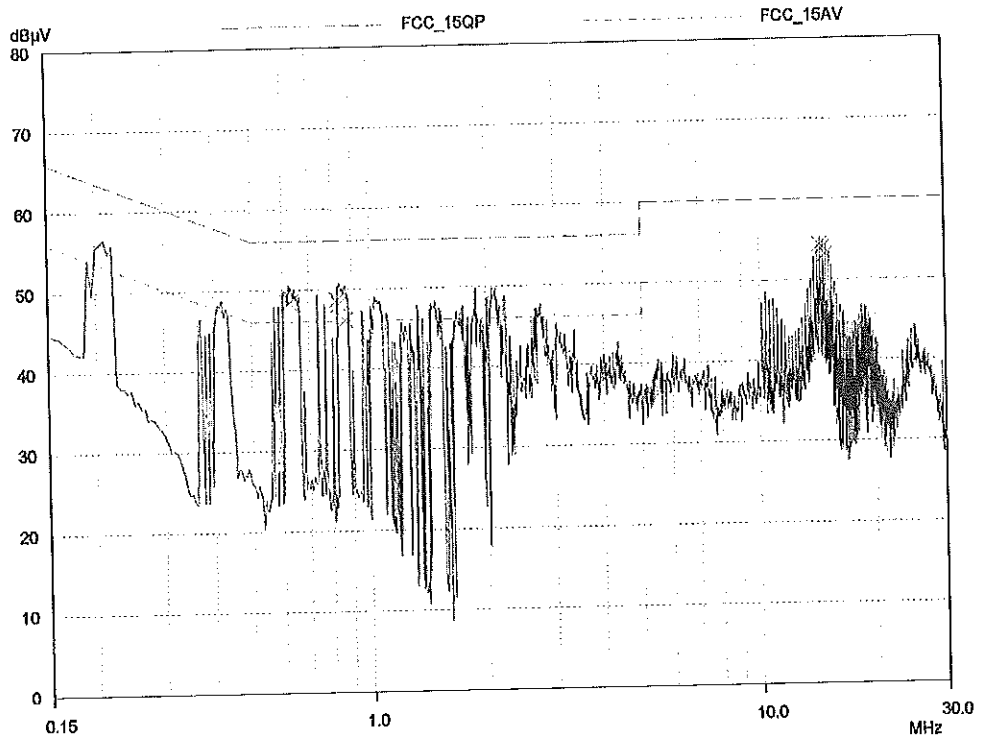
EUT:	Net2 Air Interface System + I/O Board - Conducted Emissions
Manuf:	Paxton Access
Op Cond:	120vac 60 Hz
Operator:	DAL
Test Spec:	FCC_15:207
Comment:	Neutral Line - channel 26 (2.48GHz)
	Activated by Keycard - Monitored by client software
Result File:	4171v.dat : Net2 Air Interface System + I/O Board - Conducted Emissions

Scan Settings (1 Range)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	5kHz	10kHz	PK	20msec	Auto	OFF	60dB

Final Measurement:

Detector:	X QP
Meas Time:	1sec
Peaks:	8
Acc Margin:	10 dB



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%.

Table 9 and Graph 9 Non Intentional Radiated Emissions Test Results

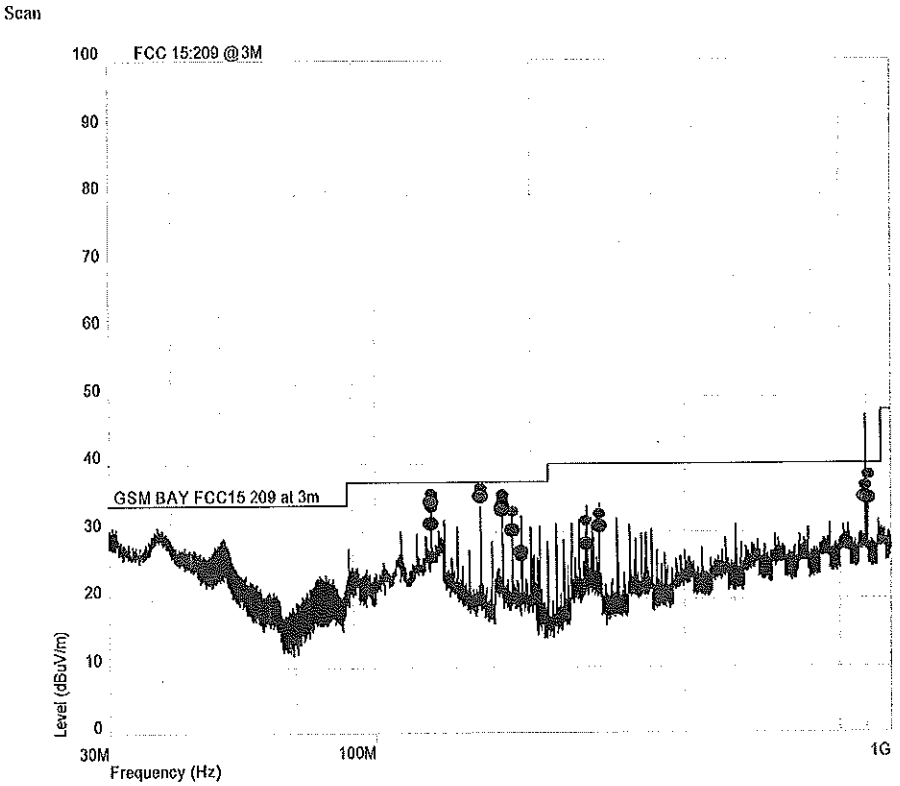
Keyfob – Channel 18

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
QP 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	|	149.00	37.50	-2.33		QP	120.0 k
175.989 M	33.19	0.00	|	44.00	37.50	-4.31		QP	120.0 k
183.996 M	30.27	0.00	|	358.00	37.50	-7.23		QP	120.0 k
192.0 M	26.88	0.00	|	13.00	37.50	-10.62		QP	120.0 k
256.0 M	28.27	0.00	|	360.00	40.00	-11.73		QP	120.0 k
272.037 M	30.86	0.00	|	309.00	40.00	-9.14		QP	120.0 k

Scan
QP Vertical

Frequency(Hz)	Level(dBuV/m)	Height(m)	Polar	Angle(Deg)	Limit(dBuV/m)	Margin(dBuV/m)	Comment	Detector	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	|	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



Red Vertical Blue Horizontal

Plot 2 – Keyfob – 2.44GHz

Table 10 and Graph 10 Radiated Emissions Test Results

Keyfob channel 26

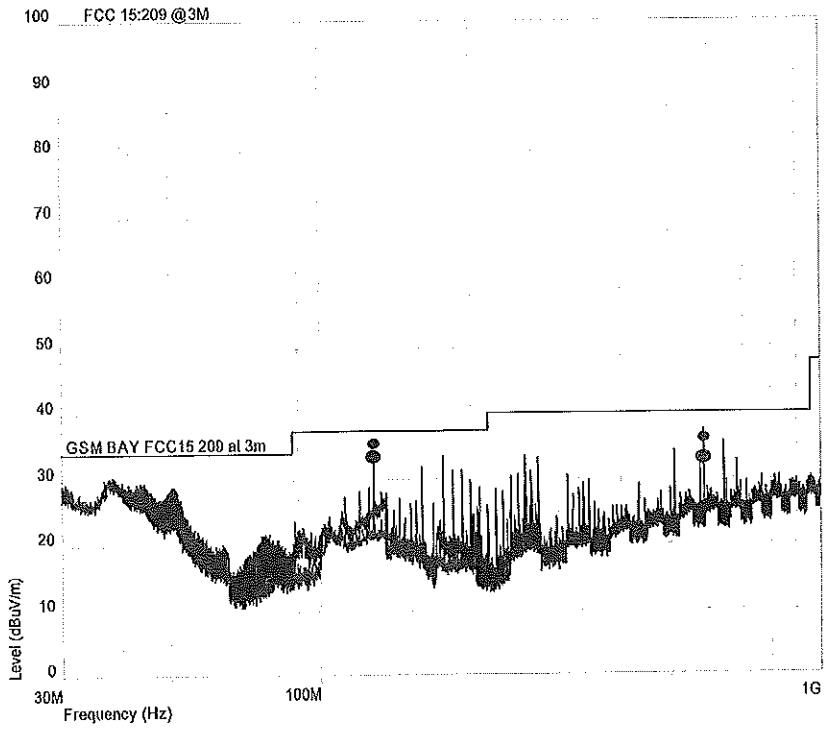
Job Number 07024171
EUT : Net2 Air interface System
Manufacturer : Paxton Glass
Operating Mode : Communicating with Keyfob – 2.48GHz
standard : CFR47 Part15:209
temp :23°
humidity :46%
operator : D A Legge
Scan
QP Horizontal

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		QP	120.0 k

Scan
QP Vertical

Frequency(Hz)	Level(dBuV/m)	Height(m)	Polar	Angle(Deg)	Limit(dBuV/m)	Margin(dBuV/m)	Comment	Detector	RBW(Hz)
127.997 M	33.37	0.00	|	122.00	37.50	-4.13		QP	120.0 k

Scan



Red Vertical Blue Horizontal

Plot 4 Keyfob – 2.48GHz

Table 11 and Graph 11 Radiated Emissions Test Results

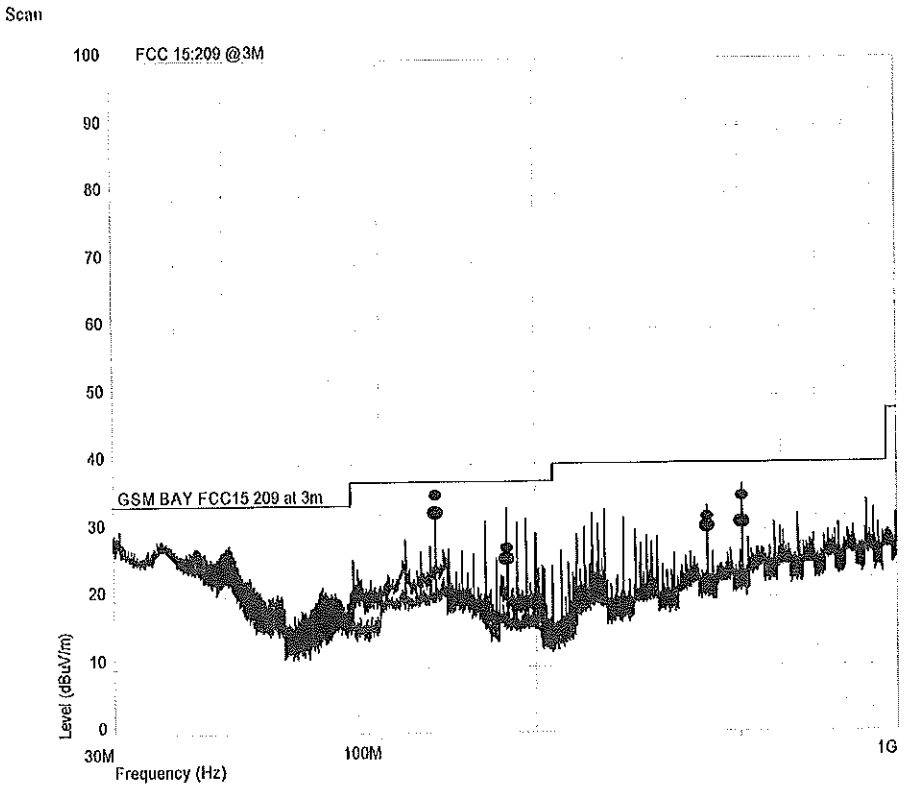
Keycard channel 18

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
Scan
QP Horizontal

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

Scan
QP Vertical

Frequency(Hz)	Level(dBuV/m)	Height(m)	Polar	Angle(Deg)	Limit(dBuV/m)	Margin(dBuV/m)	Comment	Detector	RBW(Hz)
127.999 M	32.73	0.00		133.00	37.50	-4.77		QP	120.0 k
176.003 M	26.02	0.00		216.00	37.50	-11.48		QP	120.0 k
431.913 M	30.55	0.00		197.00	40.00	-9.45		QP	120.0 k
503.537 M	31.25	0.00		148.00	40.00	-8.75		QP	120.0 k



Red Vertical Blue Horizontal

Plot 1 – Keycard – 2.44GHz

Table 12 and Graph 12 Radiated Emissions Test Results

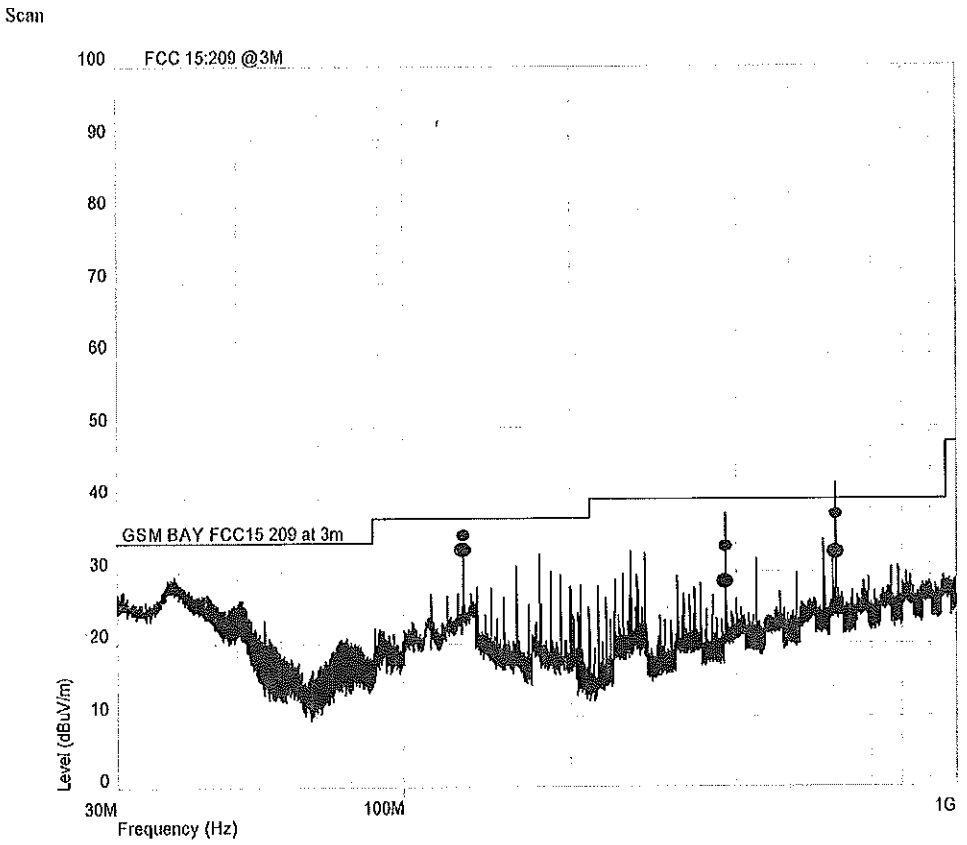
Keyfob Channel 26

Job Number 07024171
EUT : Net2 Air interface system
Manufacturer: Paxton Glass
Operating Mode : Communicating with Keycard – 2.48GHz
temp : 23°
humidity : 46%
operator : D a Legge
Scan
QP Horizontal

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

Scan
QP Vertical

Frequency(Hz)	Level(dBuV/m)	Height(m)	Polar	Angle(Deg)	Limit(dBuV/m)	Margin(dBuV/m)	Comment	Detector	RBW(Hz)
127.986 M	33.12	0.00		156.00	37.50	-4.38		QP	120.0 k
381.404 M	28.65	0.00		283.00	40.00	-11.35		QP	120.0 k



Red Vertical Blue Horizontal

Plot 3 Keycard Final – 2.48GHz

Table 13 Radiated Emissions Test Result 1 to 24GHz

Keyfob Communicating with Net2Handsfree system – channel 18

Frequency GHz	Analyser dBµV	Antenna dB	Cables dB	Preamp dB	Total dBµV/m	Limit dBµV/m	Detector
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 GHz	Analyser dBµV	Antenna dB	Cables dB	Preamp dB	Total dBµV/m	Limit dBµV/m	Detector
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

Table 14 Radiated Emissions Test Result 1 to 24GHz

Keycard Communicating with Net2Handsfree system – channel 18

Frequency GHz	Analyser dBµV	Antenna dB	Cables dB	Preamp dB	Total dBµV/m	Limit dBµV/m	Detector
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

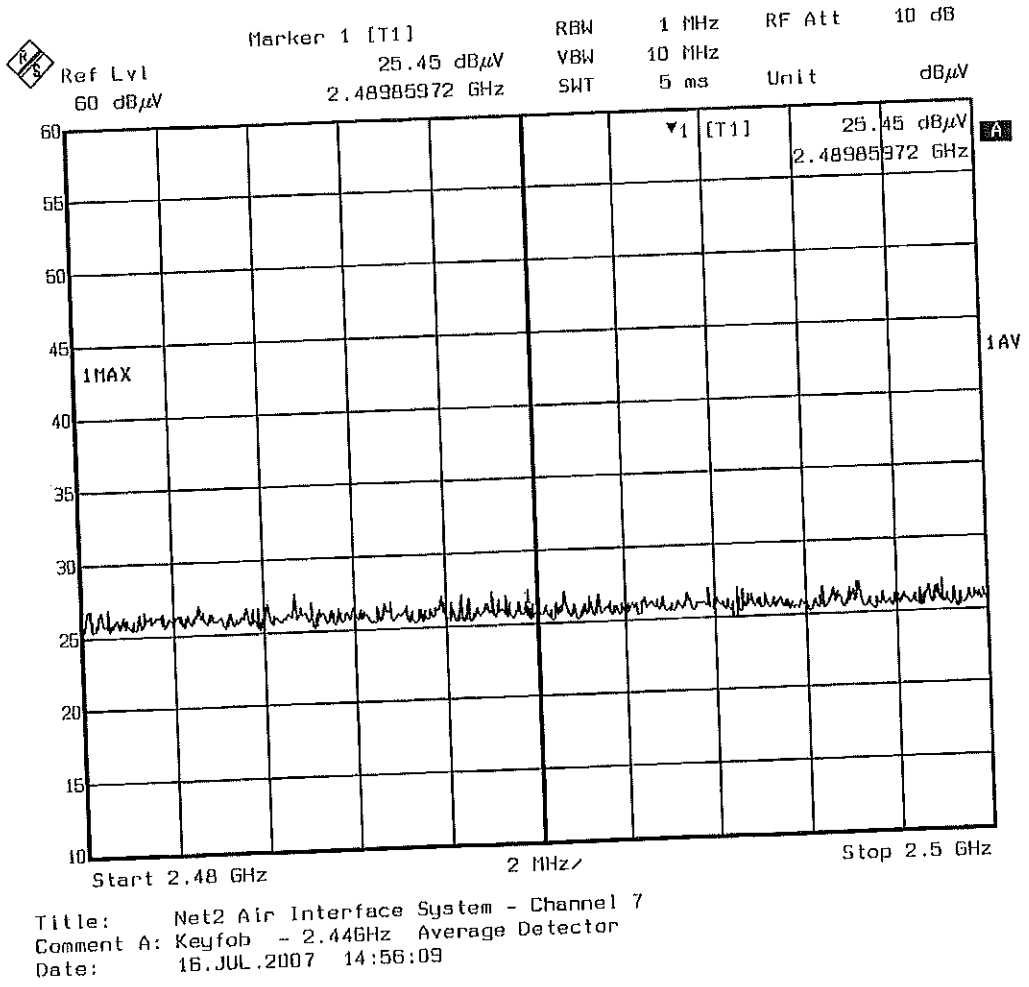
Note: < equates to measuring system noise

Keycard communicating with Net2Handsfree system channel 26

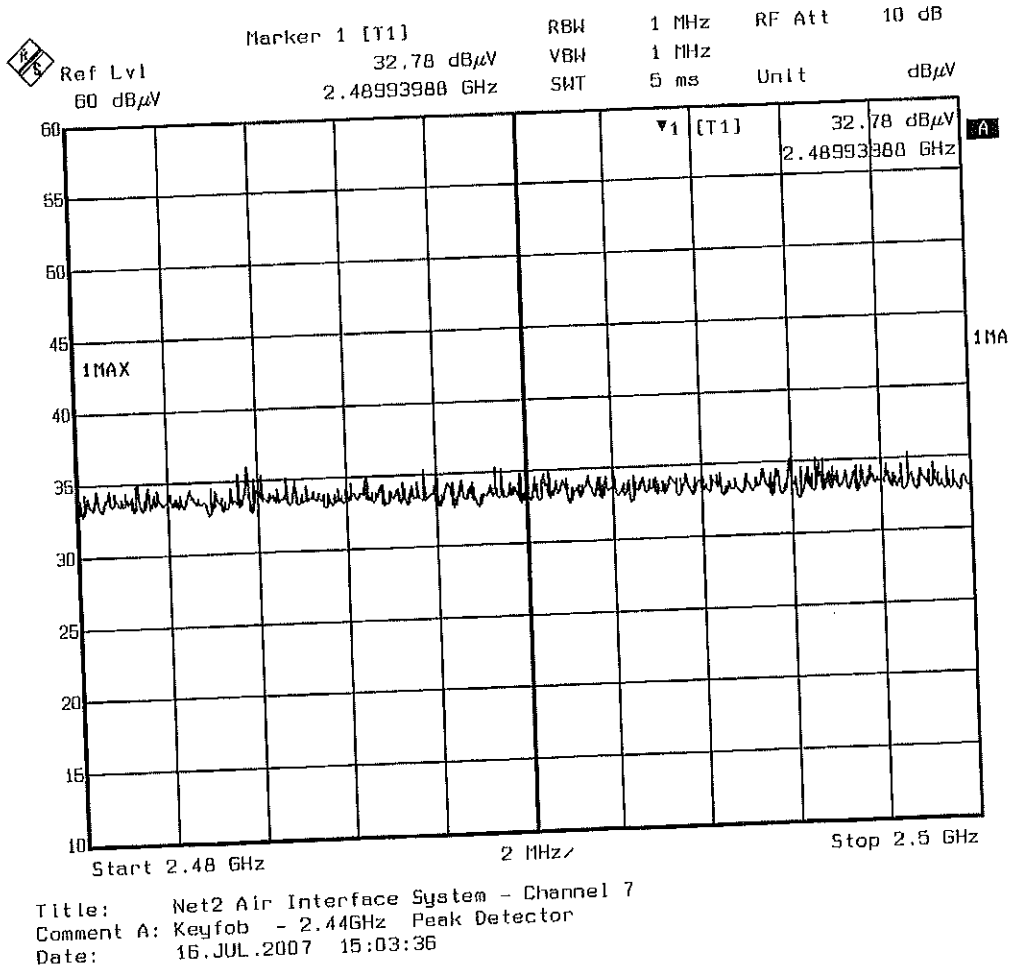
Frequency GHz	Analyser dBµV	Antenna dB	Cables dB	Preamp dB	Total dBµV/m	Limit dBµV/m	Detector
1 – 2.4	< 31.0	26.1	1.6	29.0	< 29.7	54.0	Average
1 – 2.4	< 36.0	26.1	1.6	29.0	< 34.7	74.0	Peak
2 – 4	< 27.0	30.5	2.4	28.0	< 31.9	54.0	Average
2 – 4	< 35.0	30.5	2.4	28.0	< 39.9	74.0	Peak
4.94	44.66	27.5	3.2	50	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

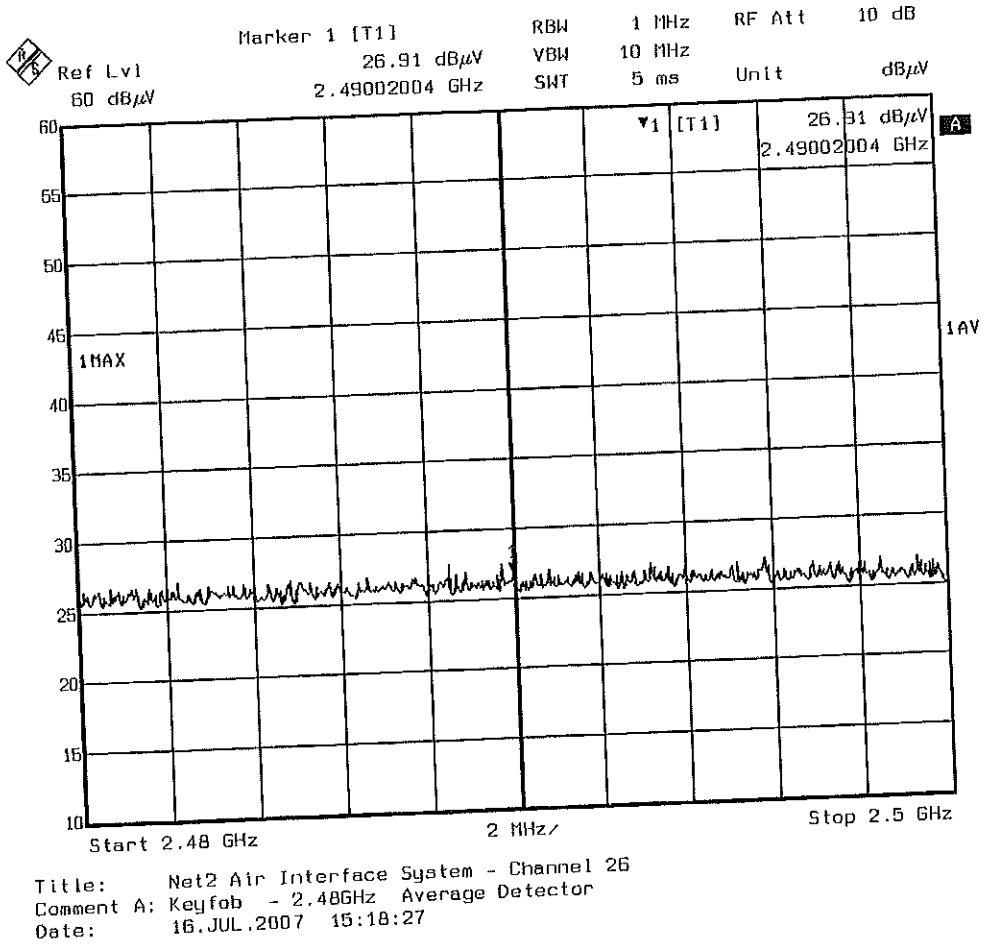
Keyfob 2.48 – 2.5GHz - Average Detector – channel 18



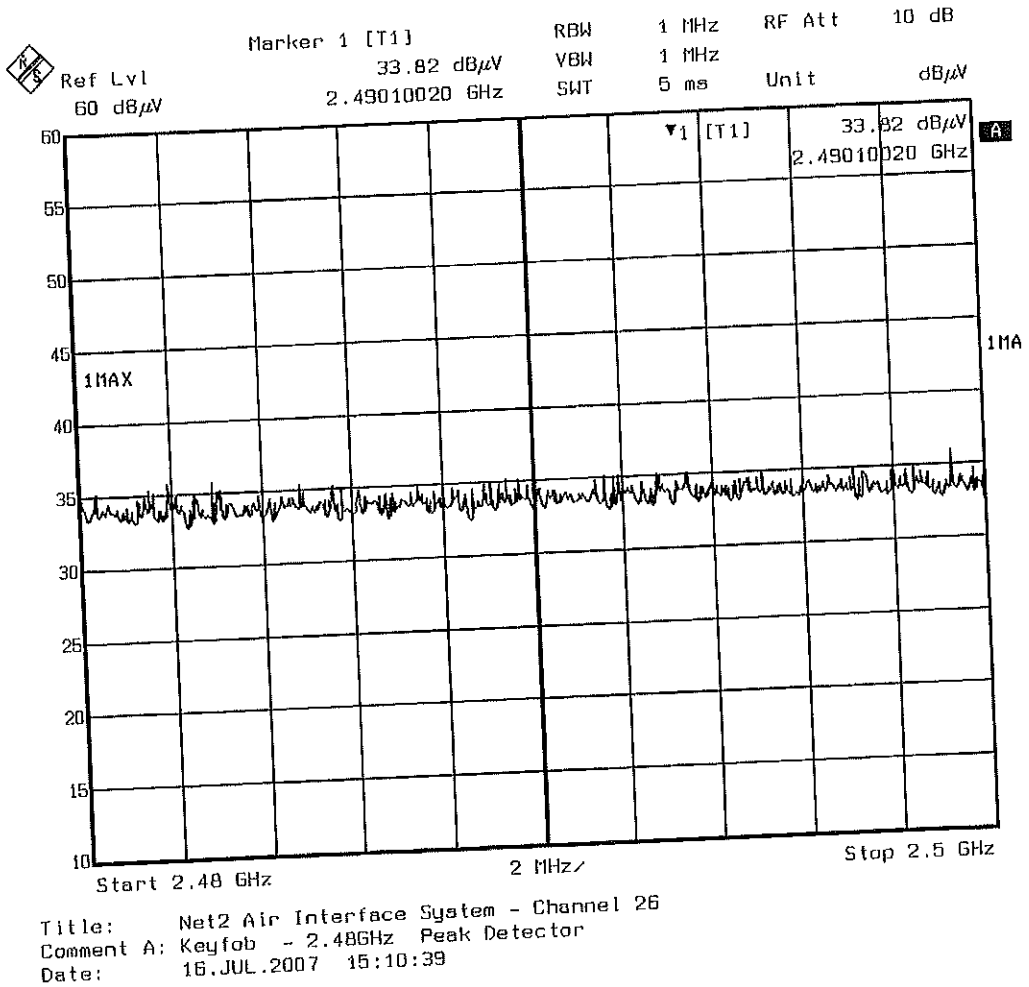
Keyfob 2.48 – 2.5GHz – Peak Detector – channel18



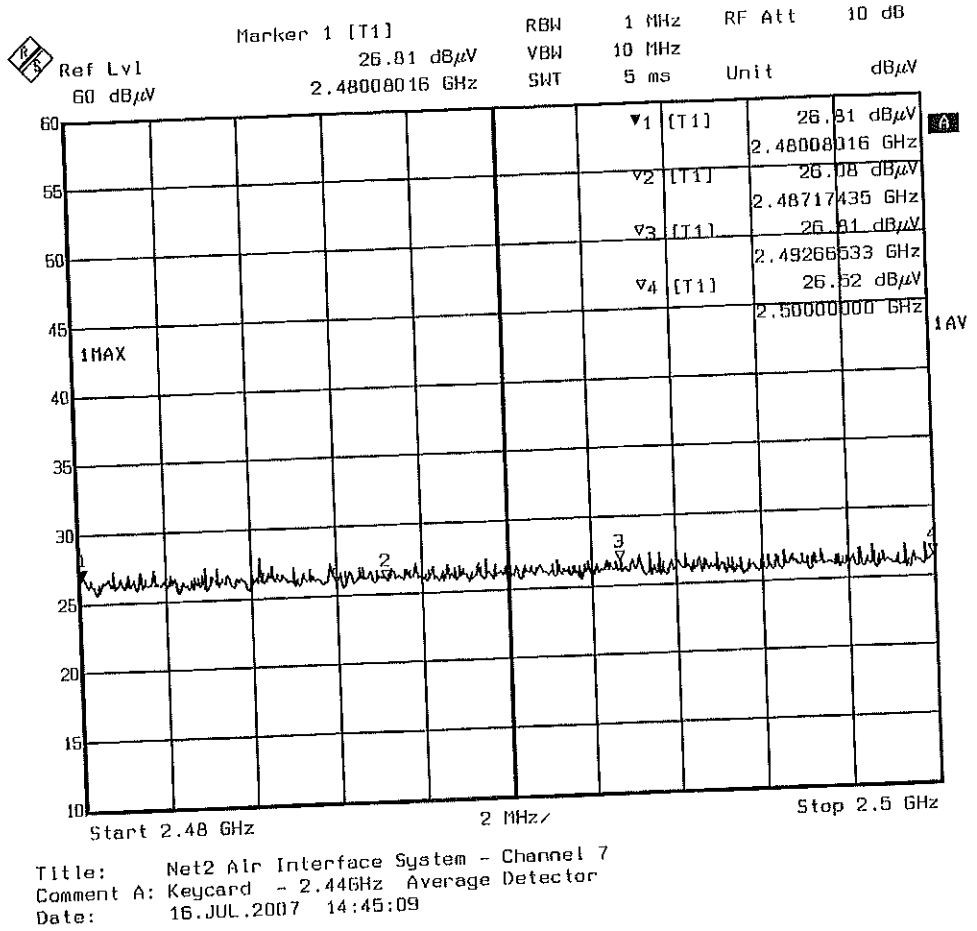
Keyfob 2.48 – 2.5GHz – Average Detector – channel 26



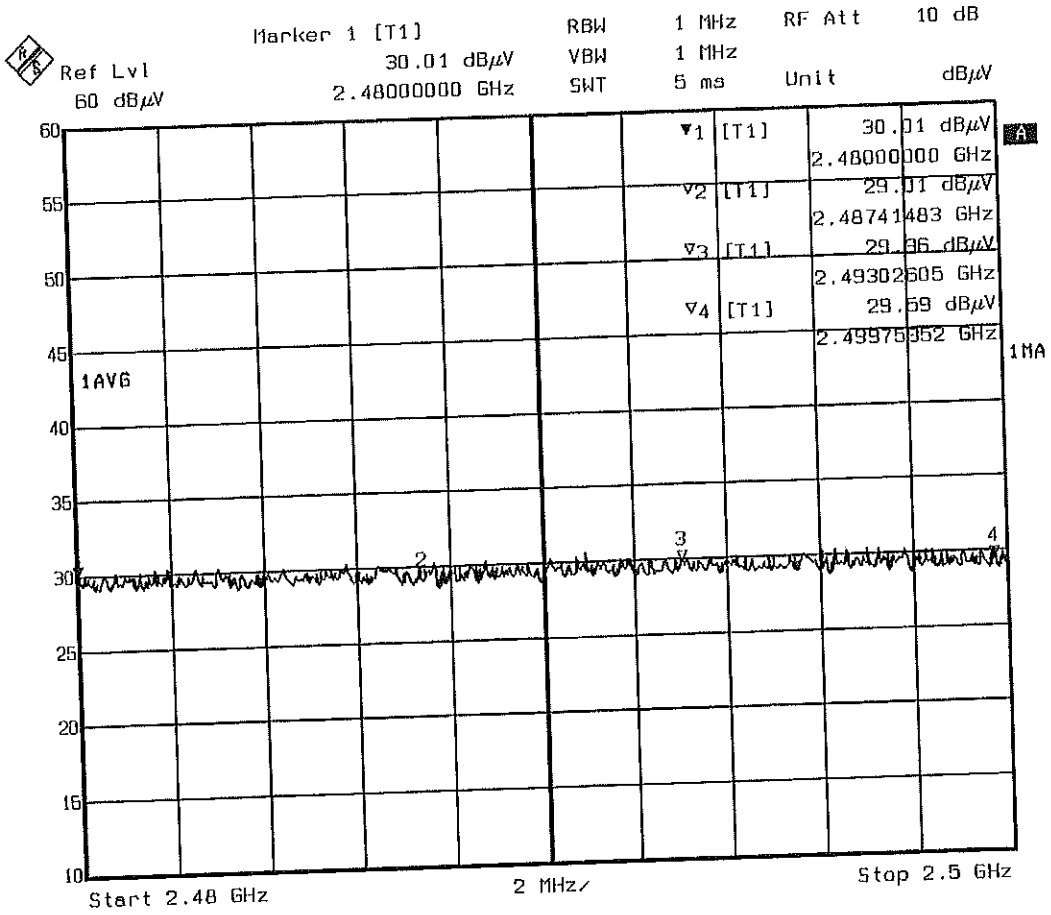
Keyfob 2.48 – 2.5GHz - Peak Detector – channel 26



Keycard 2.48 -2.5GHz – Average Detector – channel 18

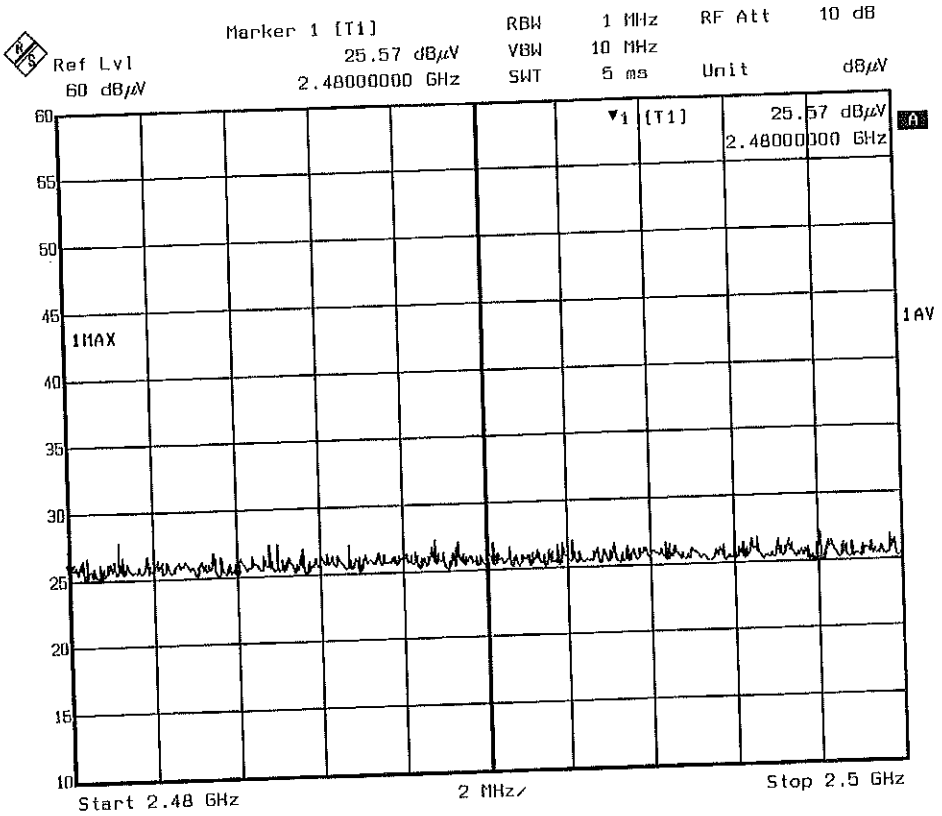


Keycard 2.48- 2.5GHz - Peak Detector- channel 18



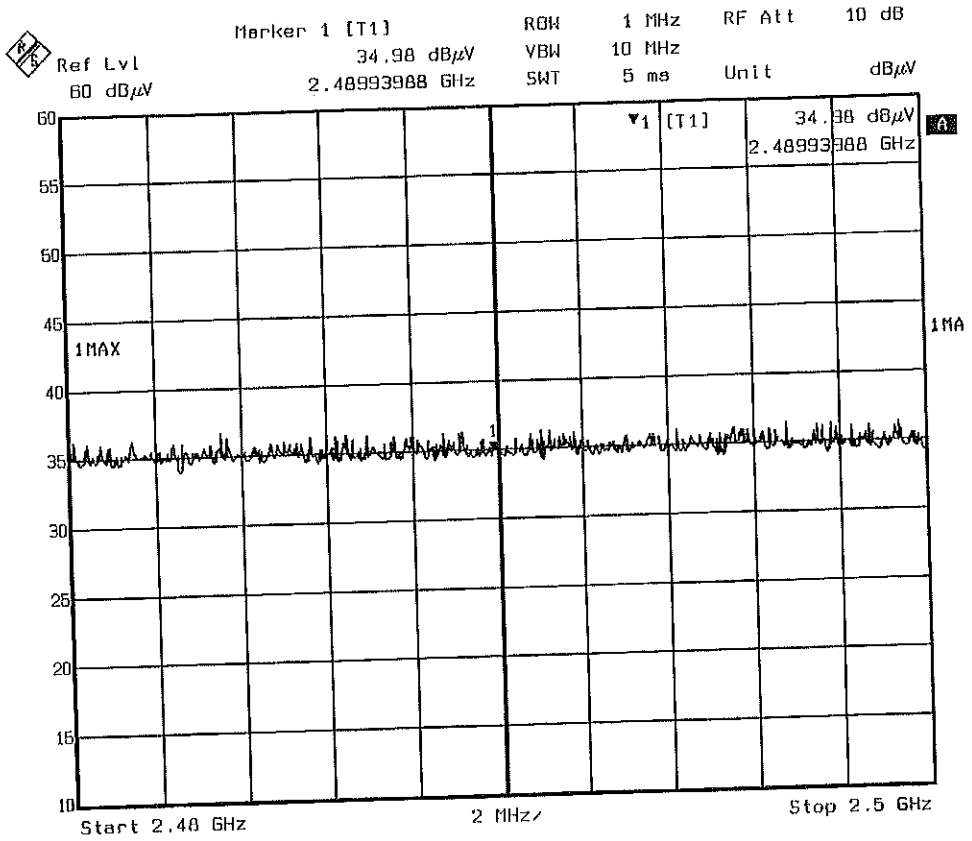
Title: Net2 Air Interface System - Channel 7
Comment A: Keycard - 2.44GHz Peak Detector
Date: 16.JUL.2007 14:37:16

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

Keycard 2.48 – 2.5GHz – Peak Detector – channel 26



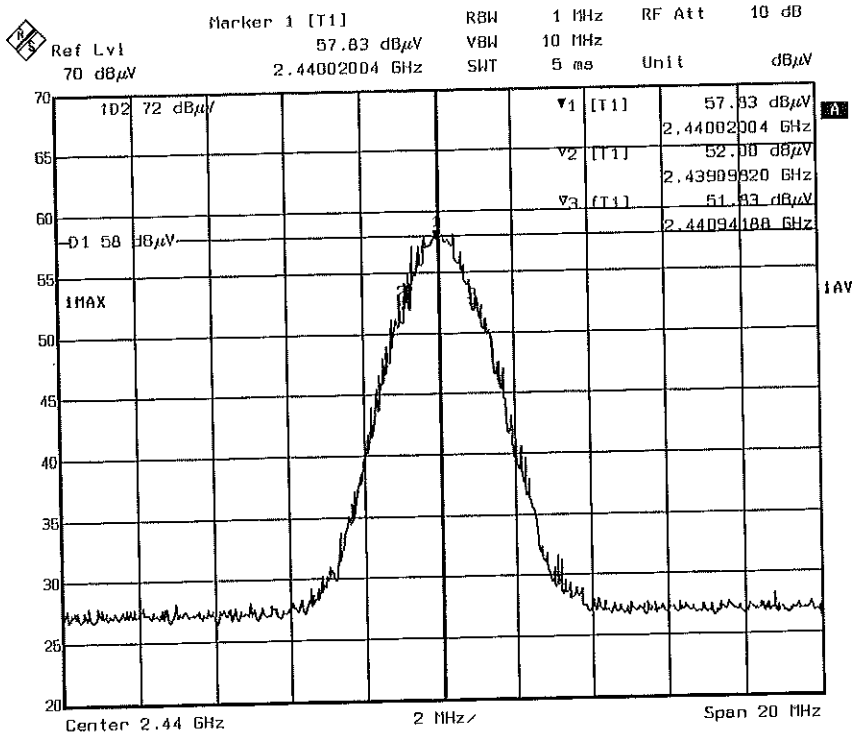
6. TEST EQUIPMENT

Equipment	Type	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

ANNEX 1

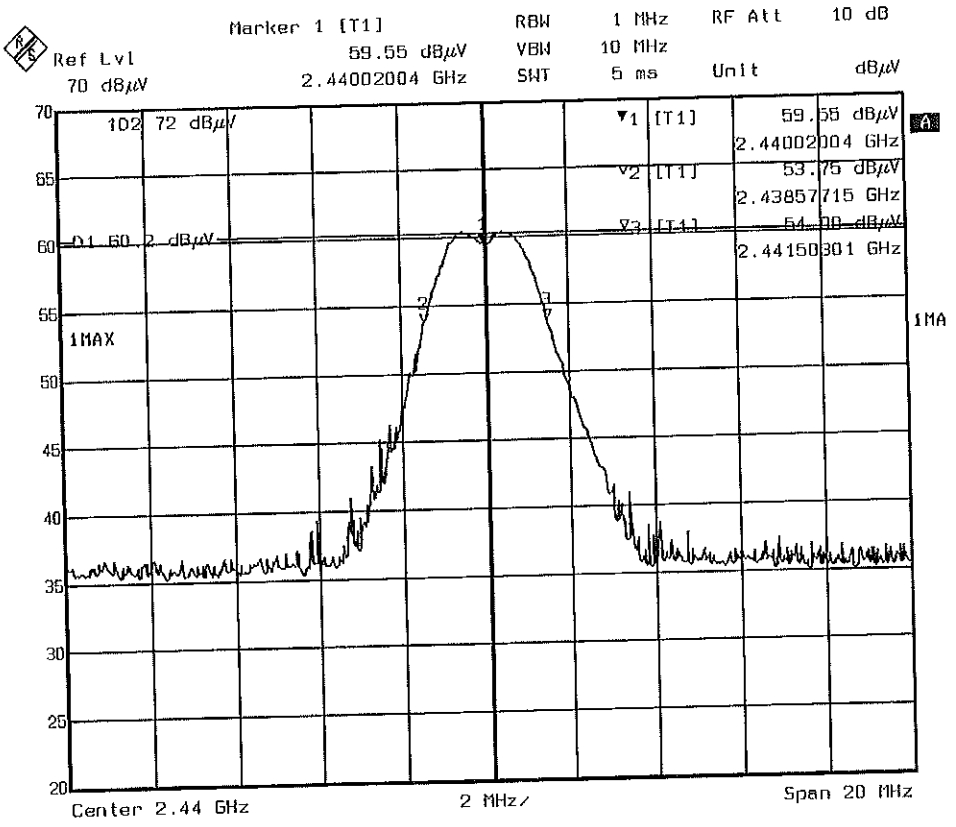
6dB Band Width Plots

Keyfob – Average Detector Channel 18



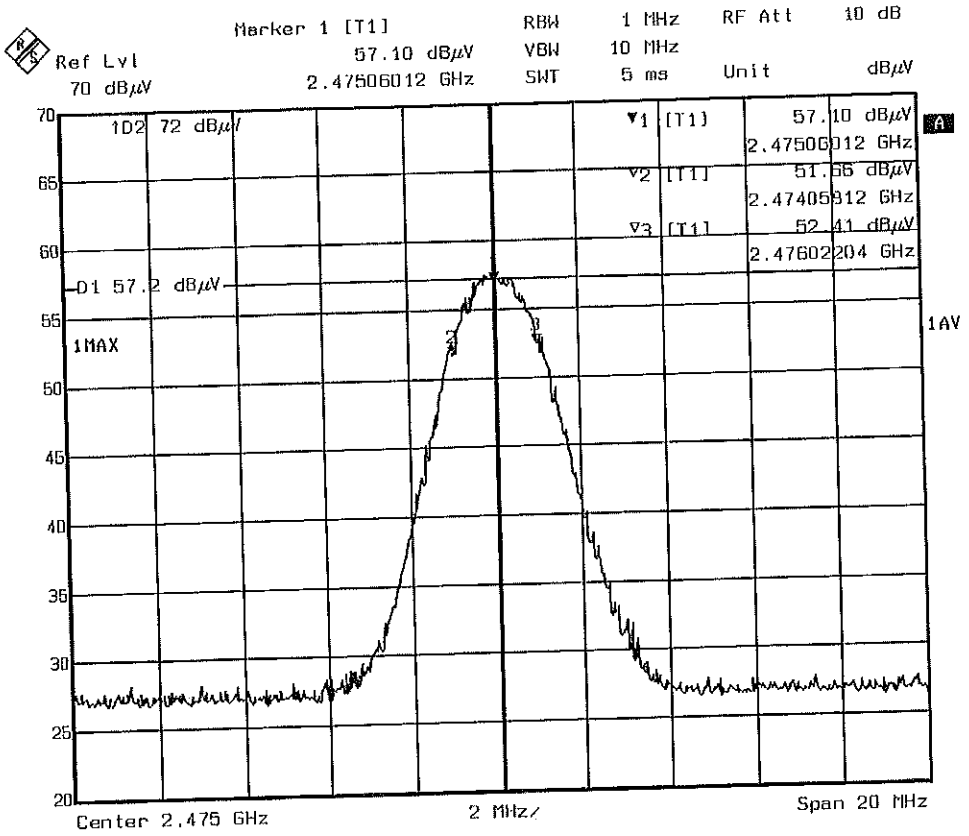
Title: Net2 Air Interface System - Channel 18
Comment A: Keyfob - 2.44GHz Average Detector
Date: 24.JUL.2007 15:01:32

Keyfob – Peak Detector Channel 18



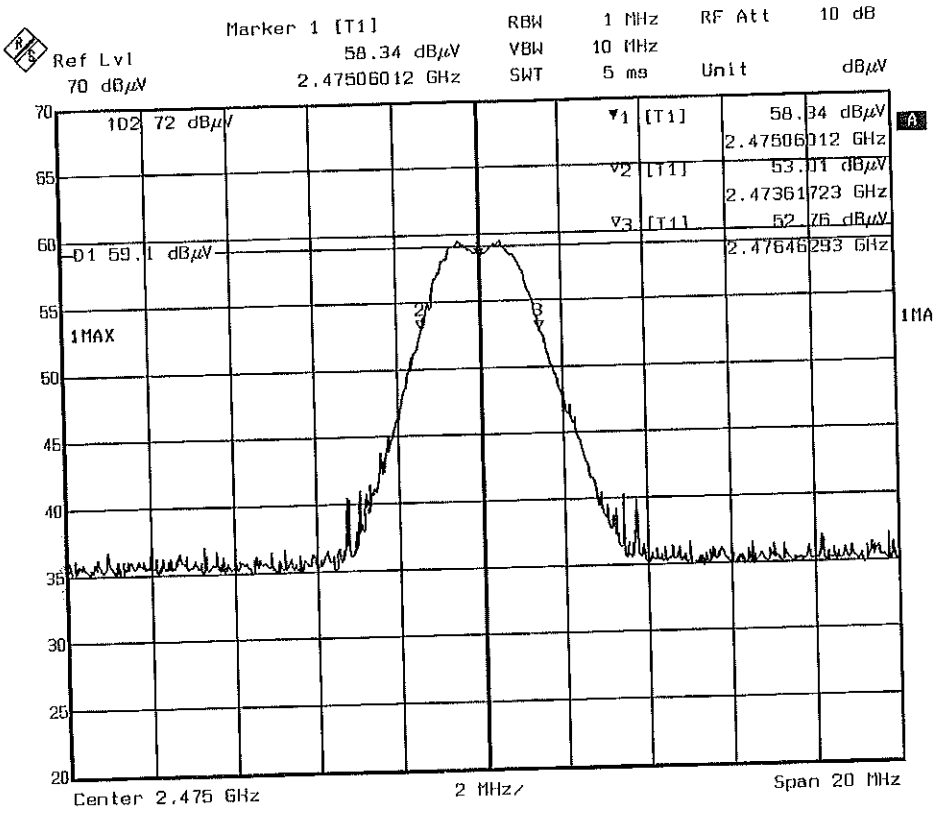
Title: Net2 Air Interface System - Channel 18
Comment A: Keyfob - 2.44GHz Peak Detector
Date: 24.JUL.2007 14:58:55

Keyfob – Average Detector Channel 26

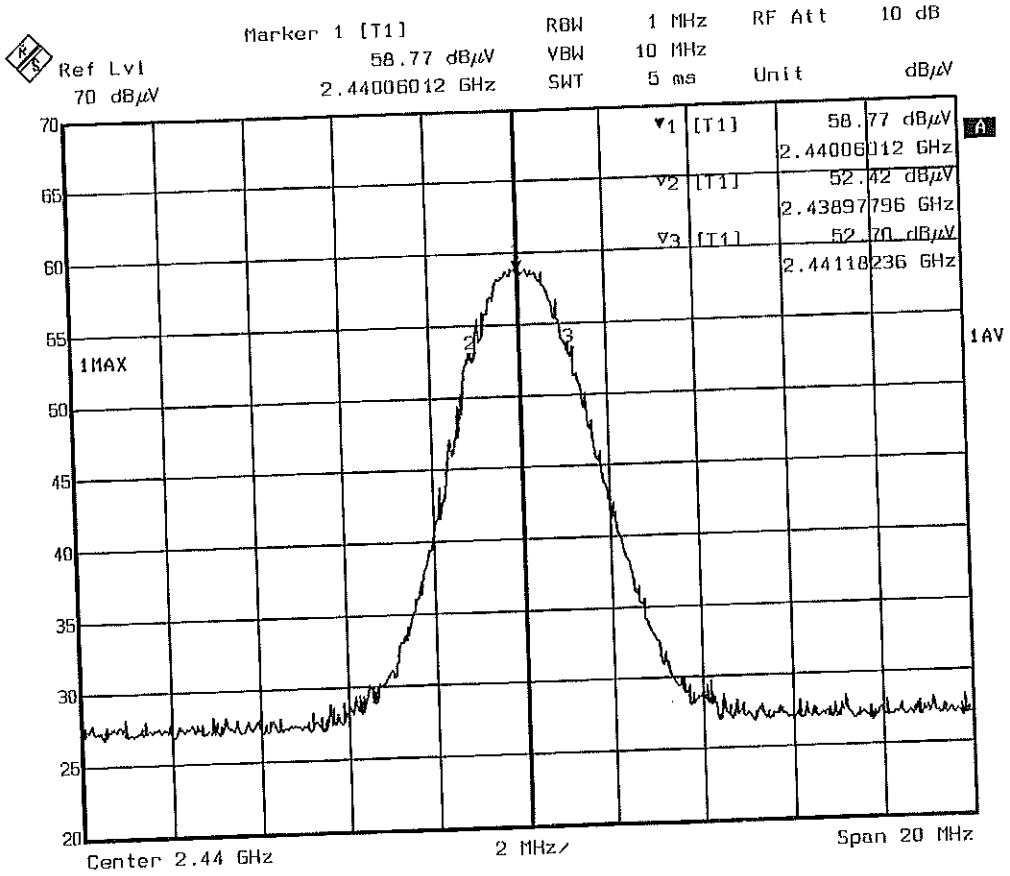


Title: Net2 Air Interface System - Channel 26
Comment A: Keyfob - 2.406Hz Average Detector
Date: 24.JUL.2007 14:51:32

Keyfob – Peak Detector Channel 26

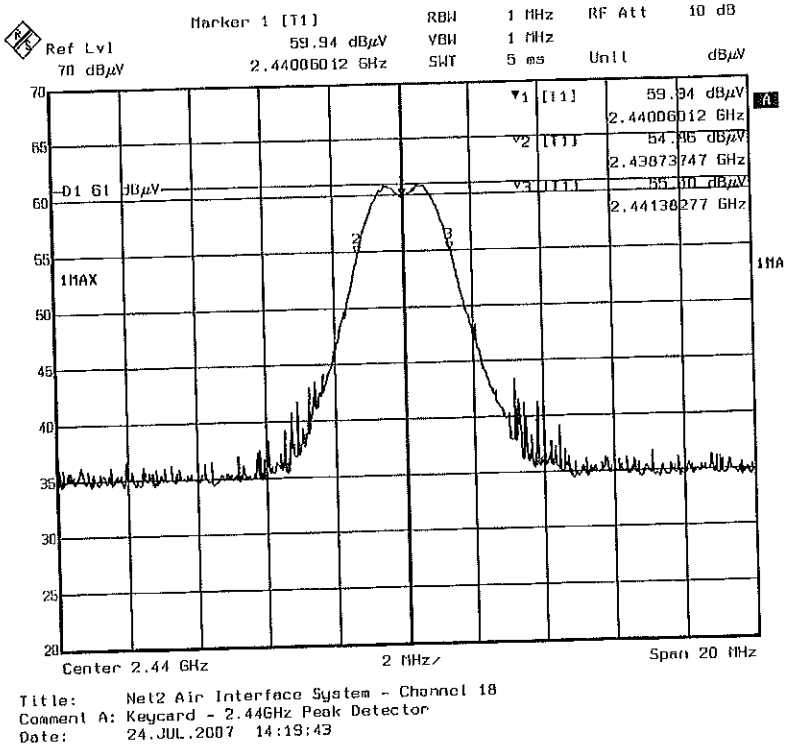


Keycard – Average Detector Channel 18

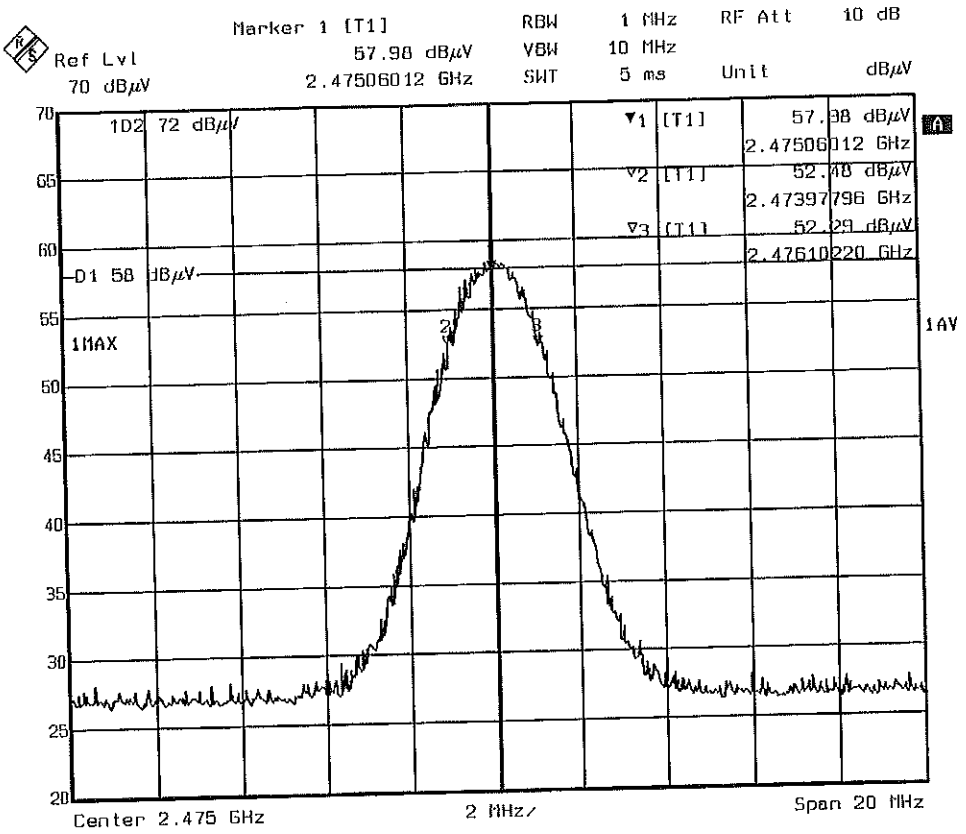


Title: Net2 Air Interface System - Channel 18
Comment A: Keycard - 2.44GHz Average Detector
Date: 24.JUL.2007 14:14:33

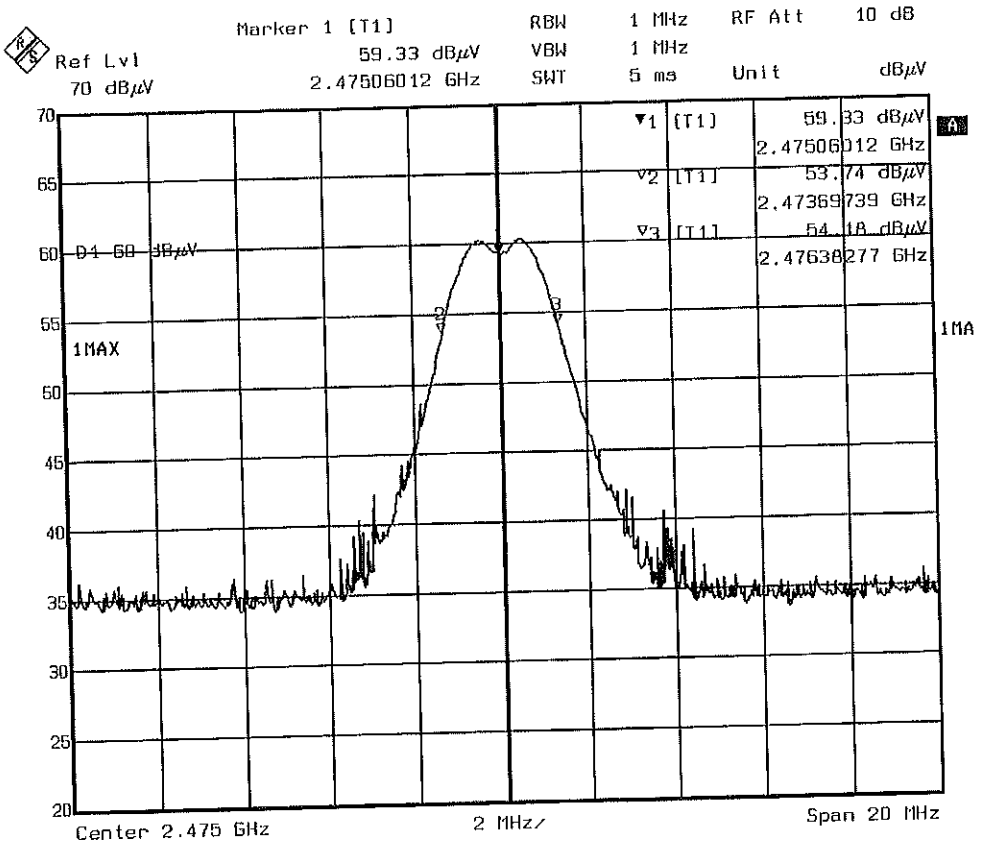
Keycard – Peak Detector Channel 18



Keycard – Average Detector Channel 26



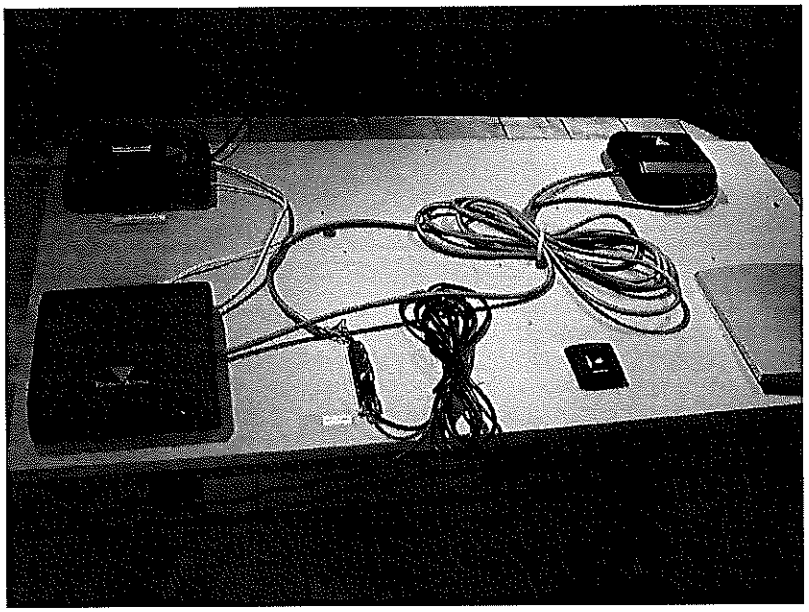
Keycard – Peak Detector Channel 26



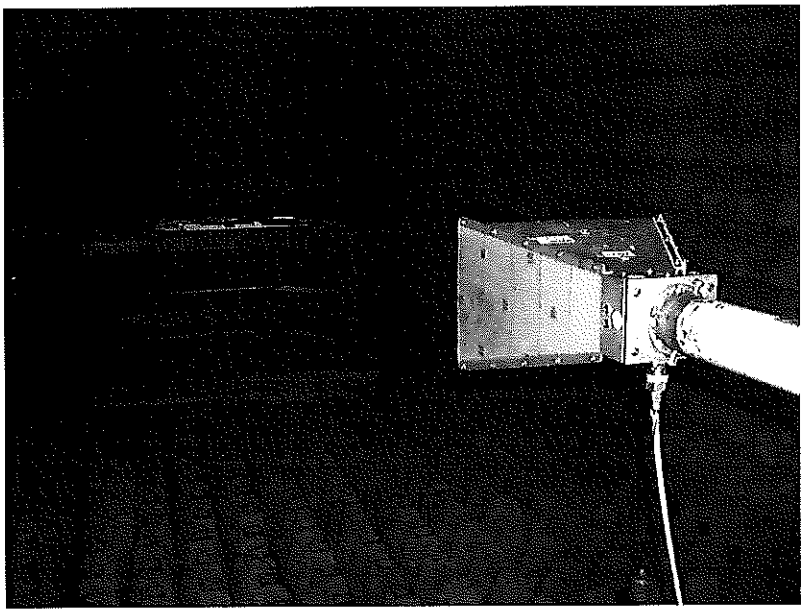
Title: Net2 Air Interface System - Channel 26
Comment A: Keycard - 2.486Hz Peak Detector
Date: 24.JUL.2007 14:43:06

ANNEX 2

Test Set up



Radiated Emissions



Radiated Emissions

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
A	2.455	21
B	2.46	22
C	2.465	23
D	2.47	24
E	2.475	25
F	2.48	26