



**TEST REPORT
FROM
RFI GLOBAL SERVICES LTD**

Test of: Net2 nano with 2A PSU in plastic cabinet

To: FCC Part 15.247: 2007 (Subpart C)

Test Report Serial No:
RFI/RPT2/RP73774JD05A

Supersedes Test Report Serial No:
RFI/RPT1/RP73774JD05A

This Test Report Is Issued Under The Authority Of Brian Watson, Operations Director:	
	
pp	
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1. Customer Information

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

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2. Equipment Under Test (EUT)

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

2.1. Identification of Equipment Under Test (EUT)

Description:	Net2 nano 1 door access control unit
Brand Name:	Net2Air
Model Name or Number:	654-943
Unique Type Identification:	899392
Serial Number:	899392
Hardware Version:	z-n2n1 Rev. 18, ppc-n2n Rev. J
Software Version:	None Stated
FCC ID Number:	USE654943

2.2. Description of EUT

The equipment under test was a Net2 nano 1 door access control unit. The EUT was tested with the 2A PSU in plastic cabinet and this combination has a model number of 654-722.

2.3. Modifications Incorporated in EUT

It was not possible to test the EUT using the normal duty cycle as the transmitter on period is too small therefore for the purposes of testing only, the EUT was configured by the customer to transmit continuously.

2.4. Support Equipment

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

Description:	2A 12 V dc power supply in plastic cabinet
Brand Name:	Net2Air
Model Name or Number:	857-250

Description:	Proximity Reader
Brand Name:	Paxton
Model Name or Number:	Proximity P38 Reader
Serial Number:	692939
Cable Length and Type:	0.3m, 8 core reader cable
Connected to Port:	Net2 nano Reader Port

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Description:	Keypad Port Test Plug
Brand Name:	Degson Electronics
Model Name or Number:	2EDGK
Serial Number:	None Stated
Cable Length and Type:	8 pin socket
Connected to Port:	Keypad

Description:	Laptop PC
Brand Name:	None Stated
Model Name or Number:	Dell Inspiron 510m
Serial Number:	None Stated
Cable Length and Type:	1.8m / USB2 to USB
Connected to Port:	Wireless Hub USB2

Description:	USB Cable
Brand Name:	None Stated
Model Name or Number:	None Stated
Serial Number:	None Stated
Cable Length and Type:	1.8m / USB2 to USB
Connected to Port:	Wireless Hub USB2

Description:	Wireless USB Hub
Brand Name:	Net2Air
Model Name or Number:	Net2Air USB Bridge (encrypted)
Serial Number:	879806
Cable Length and Type:	1.8m / USB2 to USB
Connected to Port:	Laptop PC USB port

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2.5. Additional Information Related to Testing

Power supply range tested over:	V-Nom	120	V-Min	102	V-Max	138
EUT Power requirements:	12 V DC via the 120 V PSU					
Modulation Type:	DSSS					
Channel Spacing:	5 MHz					
Transmit Frequency Range:	2405 to 2475 MHz					
Transmit Channels Tested:	Channel ID		Channel Number		Channel Frequency (MHz)	
	Bottom		11		2405	
	Middle		18		2440	
	Top		25		2475	
Receive Frequency Range:	2405 to 2475 MHz					
Receive Channels Tested:	Channel ID		Channel Number		Channel Frequency (MHz)	
	Bottom		11		2405	
	Middle		18		2440	
	Top		25		2475	

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3. Test Specification, Methods and Procedures

Reference:	FCC Part 15.247: 2007 Subpart C
Title:	Code of Federal Regulations, Part 15.247 (47CFR22) (Intentional Radiators operating within the bands 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz)

3.1. Methods and Procedures

The methods and procedures used were as detailed in:

ANSI C63.2 (1987)

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

ANSI C63.4 (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.

ANSI C63.5 (1988)

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

ANSI C63.7 (1988)

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

CISPR 16-1: (1999)

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

3.2. Definition of Measurement Equipment

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

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4. Deviations from the Test Specification

There were no deviations from the test specification.

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5. Operation of the EUT during Testing

5.1. Operating Modes

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

- Continuously transmitting at maximum power on the bottom, centre and top channels.

5.2. Configuration and Peripherals

The EUT was tested in the following configuration:

- Using a bespoke application on the laptop PC supplied by the Client. A Net2Air USB bridge was connected to the laptop PC via the USB port. The PC application controlled the EUT transmit frequency over a radio link via the Net2Air USB bridge. The Net2Air USB bridge was turned off once the EUT was transmitting on the required frequency.
- A proximity reader and token were used in conjunction with the PC application to put the EUT into test mode.
- All ports on the EUT were terminated during the tests.
- EIRP tests were performed at voltage extremes with the EUT connected to a variable power supply.

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6. Summary of Test Results

Range of Measurements	FCC Part 15 Reference	Port Type	Result
Idle Mode AC Conducted Emissions	FCC Part 15.107	AC Mains	Complied
Idle Mode Radiated Spurious Emissions	FCC Part 15.109	Antenna	Complied
Transmitter AC Conducted Emissions	FCC Part 15.207	AC Mains	Complied
Transmitter Minimum 6 dB Bandwidth	FCC Part 15.247(a)(2)	Antenna	Complied
Transmitter 20 dB Bandwidth	FCC Part 2.1049	Antenna	Complied
Transmitter Peak Power Spectral Density	FCC Part 15.247(e)	Antenna	Complied
Transmitter Maximum Peak Output Power	FCC Part 15.247(b)(3)	Antenna	Complied
Transmitter Radiated Emissions	FCC Part 15.247(d) & 15.209(a)	Antenna	Complied
Transmitter Band Edge Radiated Emissions	FCC Part 15.247(d) & 15.209(a)	Antenna	Complied

6.1. Location of Tests

All the measurements described in this report were performed at the premises of RFI Global Services Ltd, Wade Road, Basingstoke, Hampshire, RG24 8AH.

6.2. Site Registration Numbers

FCC: 209735

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7. Measurements, Examinations and Derived Results

7.1. General Comments

This section contains test results only.

Measurement uncertainties are evaluated in accordance with current best practice. Our reported expanded uncertainties are based on standard uncertainties, which are multiplied by an appropriate coverage factor to provide a statistical confidence level of approximately 95%. Please refer to section 8 for details of measurement uncertainties.

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7.2. Test Results

7.2.1. Idle mode AC Conducted Spurious Emissions: Section 15.107

Ambient Temperature: 19°C

Relative Humidity: 52%

Results:

Quasi-Peak Detector Measurements on Live and Neutral Lines

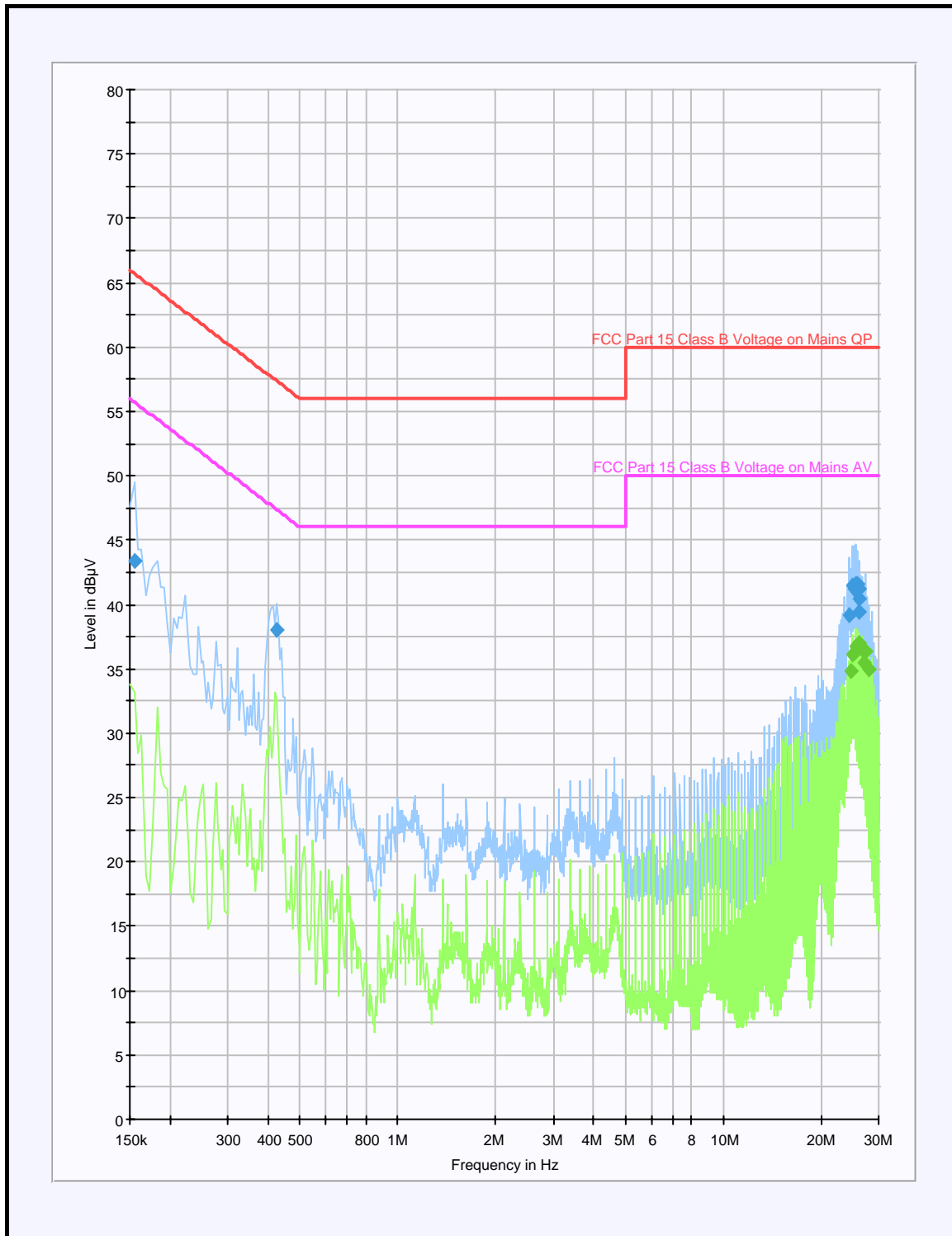
Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.154500	Live	43.4	65.8	22.4	Complied
0.424500	Neutral	38.0	57.4	19.4	Complied
24.373500	Neutral	39.2	60.0	20.8	Complied
24.999000	Neutral	41.4	60.0	18.6	Complied
25.251000	Neutral	41.3	60.0	18.7	Complied
25.498500	Neutral	41.6	60.0	18.4	Complied
25.750500	Neutral	41.6	60.0	18.4	Complied
25.998000	Neutral	41.2	60.0	18.8	Complied
26.124000	Neutral	39.5	60.0	20.5	Complied
26.250000	Live	40.4	60.0	19.6	Complied

Average Detector Measurements on Live and Neutral Lines

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
24.751500	Neutral	34.9	50.0	15.1	Complied
24.999000	Neutral	36.1	50.0	13.9	Complied
25.251000	Neutral	36.2	50.0	13.8	Complied
25.498500	Neutral	36.7	50.0	13.3	Complied
25.750500	Neutral	36.7	50.0	13.3	Complied
26.250000	Neutral	36.9	50.0	13.1	Complied
26.749500	Live	36.5	50.0	13.5	Complied
27.001500	Neutral	35.5	50.0	14.5	Complied
27.249000	Neutral	36.4	50.0	13.6	Complied
28.000500	Neutral	35.0	50.0	15.0	Complied

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Idle mode AC Conducted Spurious Emissions (Continued)



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

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7.2.2. Idle mode Radiated Spurious Emissions: Section 15.109

Ambient Temperature: 21°C

Relative Humidity: 41%

Results:

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

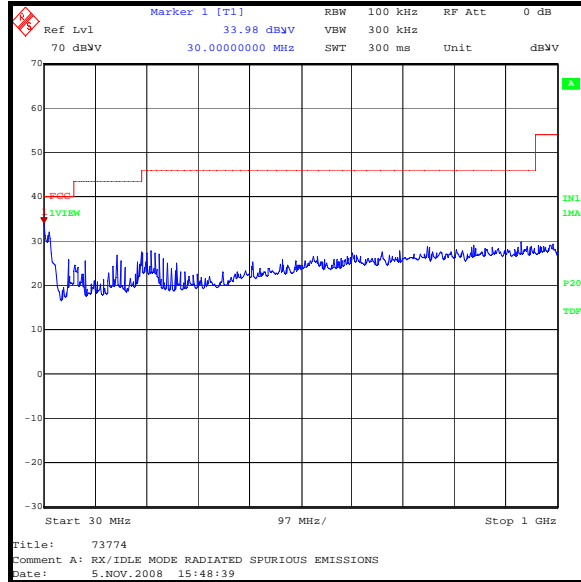
Frequency (MHz)	Antenna Polarity	Q-P Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
30.0	Horizontal	34.0	40.0	6.0	Complied

Note(s):

1. **Note: No spurious emissions were detected above the noise floor of the measuring receiver; therefore, the highest peak noise floor reading of the measuring receiver was recorded as shown in the table above.*

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Receiver Radiated Spurious Emissions (Continued)



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

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7.2.3. Idle mode Radiated Spurious Emissions: Section 15.109 (continued)

Results:

Electric Field Strength Measurements (Frequency Range: 1 to 12.75 GHz)

Highest Peak Level:

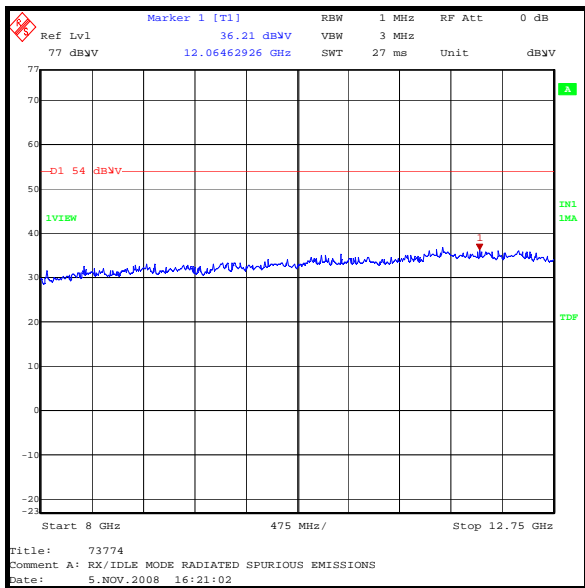
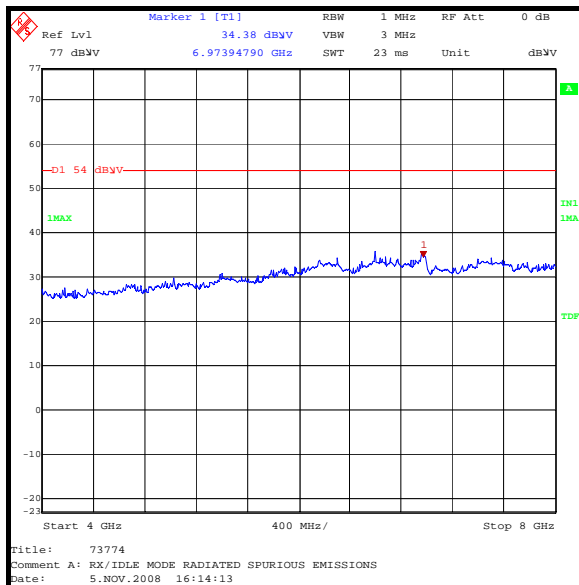
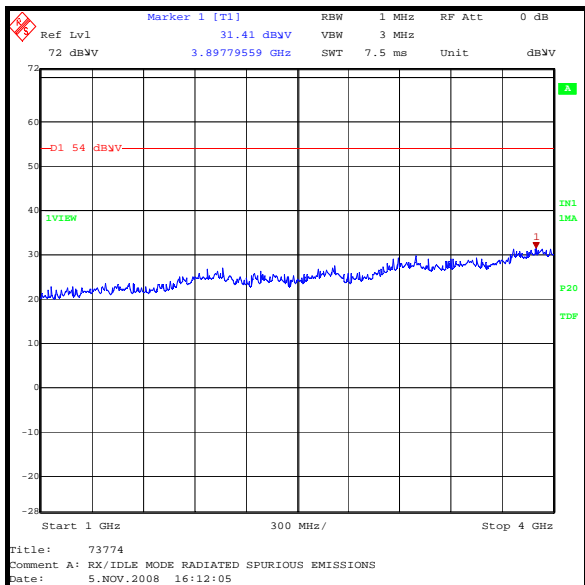
Frequency (GHz)	Antenna Polarity	Detector Level (dB μ V)	Transducer Factor (dB)	Actual Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
12.064	Horizontal	33.9	2.3	36.2	54.0	17.8	Complied

Note(s):

- *Note: No spurious emissions were detected above the noise floor of the measuring receiver; therefore, the highest peak noise floor reading of the measuring receiver was recorded as shown in the table above.
**Note: The peak level was compared to the average limit as opposed to being compared to the peak limit because this is the more onerous limit.*
- The carrier is shown at 2472 MHz on the 1 GHz to 4 GHz plot*

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Receiver Radiated Spurious Emissions (Continued)



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

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7.2.4. Transmitter AC Conducted Spurious Emissions: Section 15.207

Ambient Temperature: 19°C

Relative Humidity: 52%

Results:

Quasi-Peak Detector Measurements on Live and Neutral Lines

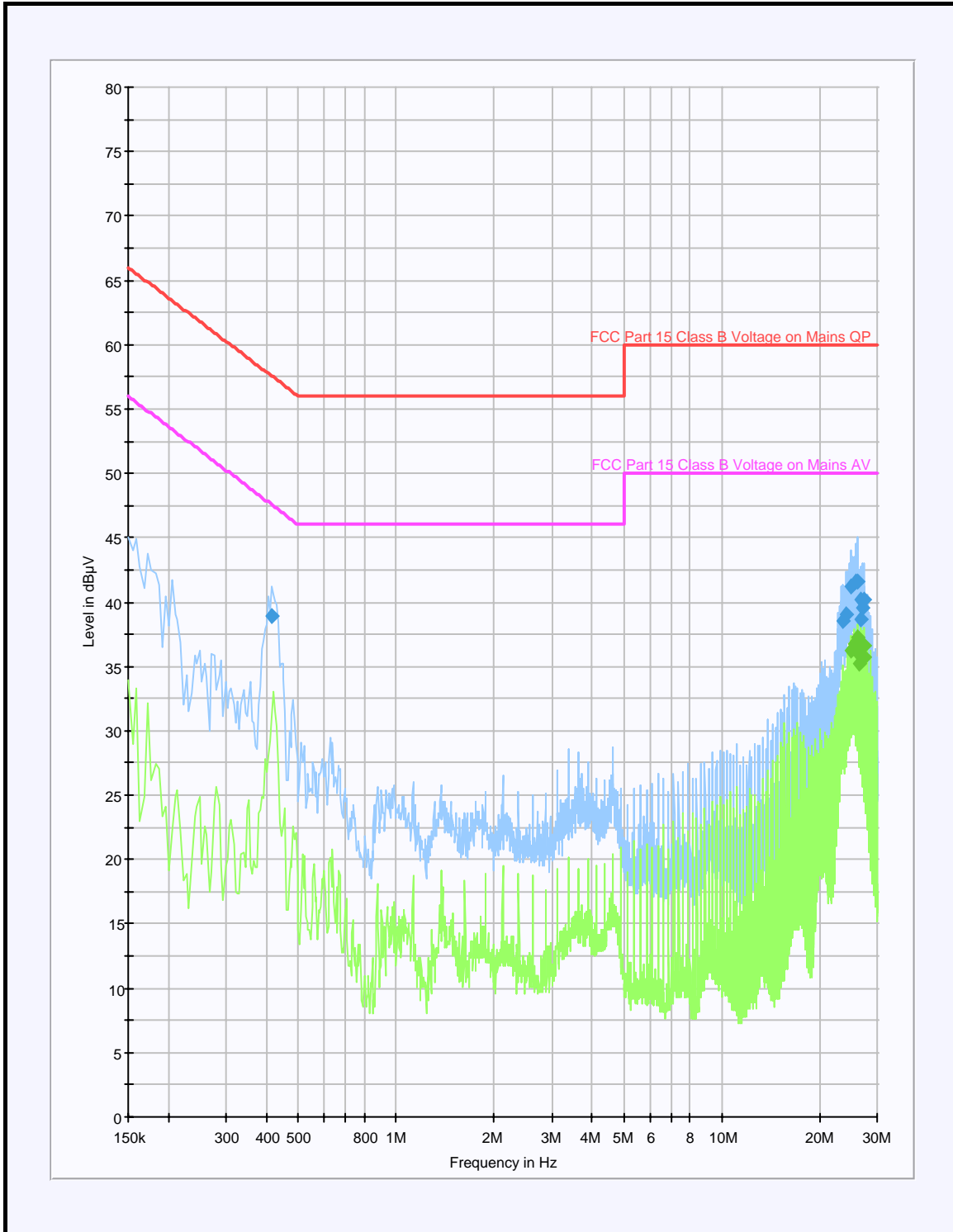
Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.415500	Neutral	38.9	57.5	18.6	Complied
23.500500	Neutral	38.6	60.0	21.4	Complied
24.000000	Neutral	39.0	60.0	21.0	Complied
24.999000	Neutral	41.2	60.0	18.8	Complied
25.750500	Neutral	41.5	60.0	18.5	Complied
26.250000	Neutral	41.6	60.0	18.4	Complied
26.749500	Live	40.1	60.0	19.9	Complied
26.875500	Neutral	38.6	60.0	21.4	Complied
27.001500	Neutral	39.6	60.0	20.4	Complied
27.249000	Neutral	40.2	60.0	19.8	Complied

Average Detector Measurements on Live and Neutral Lines

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
24.999000	Neutral	36.2	50.0	13.8	Complied
25.498500	Neutral	36.7	50.0	13.3	Complied
25.750500	Live	36.2	50.0	13.8	Complied
25.998000	Live	36.2	50.0	13.8	Complied
26.250000	Neutral	37.2	50.0	12.8	Complied
26.502000	Live	35.2	50.0	14.8	Complied
26.749500	Live	36.8	50.0	13.2	Complied
27.001500	Neutral	35.6	50.0	14.4	Complied
27.249000	Neutral	36.6	50.0	13.4	Complied
27.501000	Neutral	35.7	50.0	14.3	Complied

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Transmitter AC Conducted Spurious Emissions (Continued)



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

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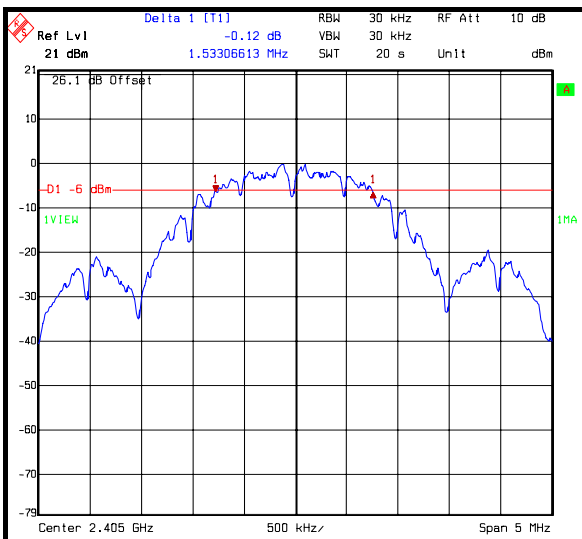
7.2.5. Transmitter Minimum 6 dB Bandwidth: Section 15.247(a)(2)

Ambient Temperature: 22°C

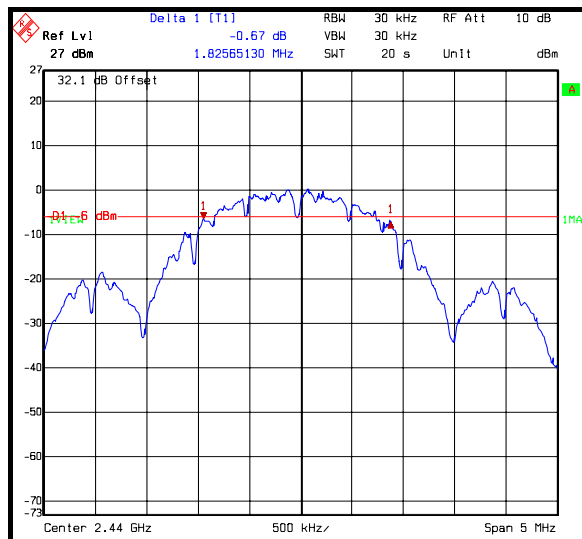
Relative Humidity: 38%

Results:

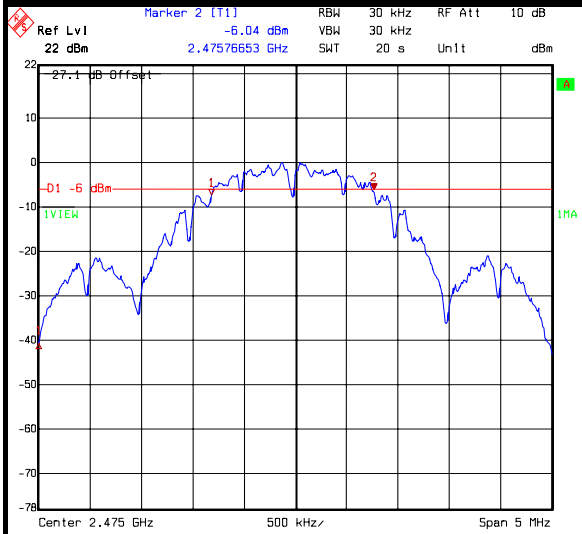
Channel	Transmitter 6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	1.533066	≥ 0.5	1.033066	Complied
Middle	1.825651	≥ 0.5	1.325651	Complied
Top	1.583166	≥ 0.5	1.083166	Complied



Title: 73774JD05
 Comment A: TRANSMITTER 6dB BANDWIDTH BOTTOM CHANNEL
 Date: 06.NOV.2008 14:36:42



Title: 73774JD05
 Comment A: TRANSMITTER 6dB BANDWIDTH CENTRE CHANNEL
 Date: 06.NOV.2008 14:23:35



Title: 73774JD05
 Comment A: TRANSMITTER 6dB BANDWIDTH TOP CHANNEL
 Date: 06.NOV.2008 14:29:10

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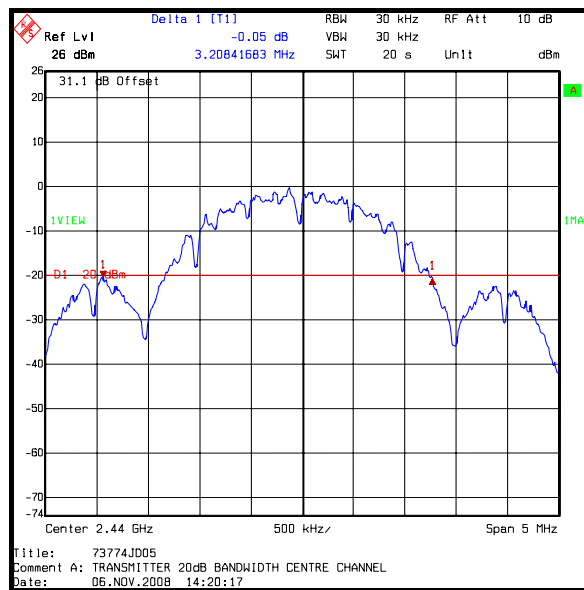
7.2.6. Transmitter 20 dB Bandwidth: Section 2.1049

Ambient Temperature: 22°C

Relative Humidity: 38%

Results:

Transmitter 20 dB Bandwidth (kHz)
3208.417



Test of: Net2 nano with 2A PSU in plastic cabinet
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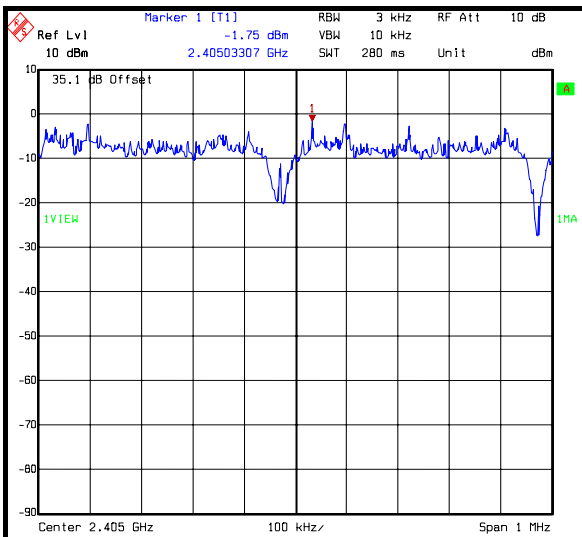
7.2.7. Transmitter Peak Power Spectral Density: Section 15.247(e)

Ambient Temperature: 22°C

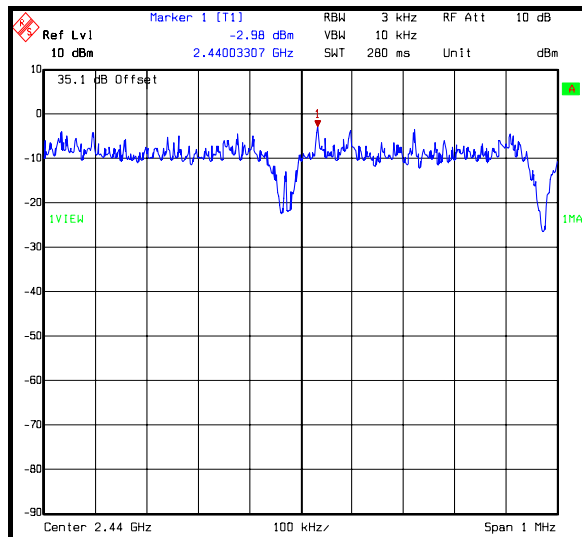
Relative Humidity: 38%

Results:

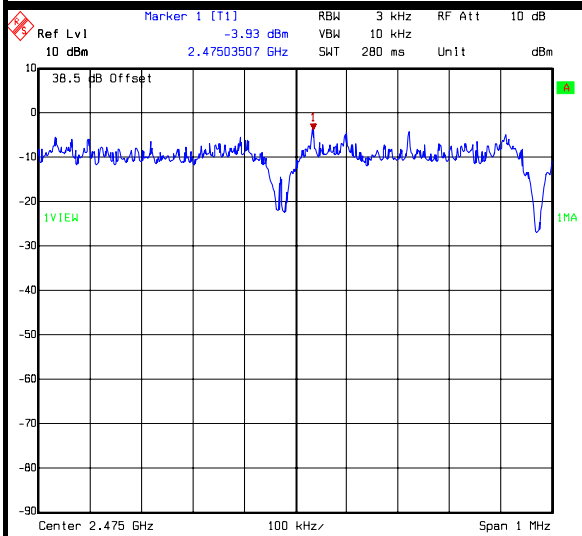
Channel	Output Power (dBm/3 kHz)	Limit (dBm/3 kHz)	Margin (dB)	Result
Bottom	-1.8	8.0	9.8	Complied
Middle	-3.0	8.0	11.0	Complied
Top	-3.9	8.0	11.9	Complied



Title: 73774JD05
 Comment A: TX PEAK POWER SPECTRAL DENSITY BOTTOM CHANNEL
 Date: 06.NOV.2008 11:40:20



Title: 73774JD05
 Comment A: TX PEAK POWER SPECTRAL DENSITY CENTRE CHANNEL
 Date: 06.NOV.2008 13:57:16



Title: 73774JD05
 Comment A: TX PEAK POWER SPECTRAL DENSITY TOP CHANNEL
 Date: 06.NOV.2008 13:50:26

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7.2.8. Transmitter Maximum Peak Output Power: (EIRP) Section 15.247(b)(3)

Ambient Temperature: 22°C

Relative Humidity: 38%

Results:

AC Powered Devices

Channel	Input Voltage (AC)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	102.00	13.2	30.0	16.8	Complied
Bottom	120.00	13.2	30.0	16.8	Complied
Bottom	138.00	13.2	30.0	16.8	Complied
Middle	102.00	11.9	30.0	18.1	Complied
Middle	120.00	11.9	30.0	18.1	Complied
Middle	138.00	11.9	30.0	18.1	Complied
Top	102.00	11.8	30.0	18.2	Complied
Top	120.00	11.5	30.0	18.5	Complied
Top	138.00	11.5	30.0	18.5	Complied

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7.2.9. Transmitter Radiated Emissions: Section 15.247(d) and 15.209(a)

Ambient Temperature: 21°C

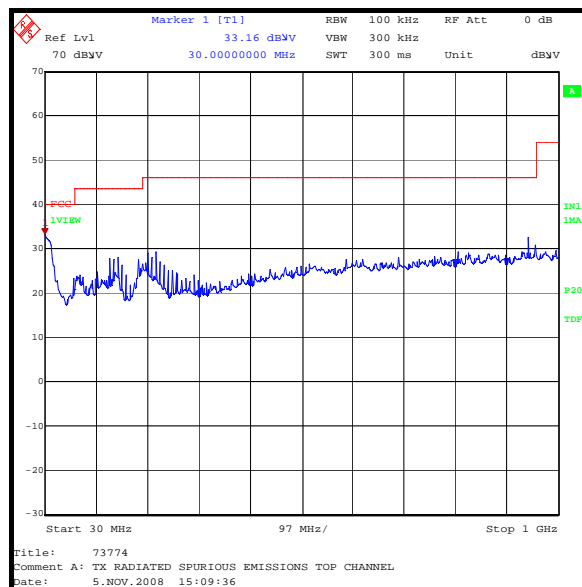
Relative Humidity: 41%

Results:

Electric Field Strength Measurements: 30 to 1000 MHz

Top Channel

Frequency (MHz)	Antenna Polarity	Q-P Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
30.0	Vertical	34.2	40.0	5.8	Complied



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

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7.2.10. Transmitter Radiated Emissions Section 15.247(d) and 15.209(a) (Continued)

Results:

Electric Field Strength Measurements (Frequency Range: 1 to 26.5 GHz)

Highest Peak Level: Bottom Channel

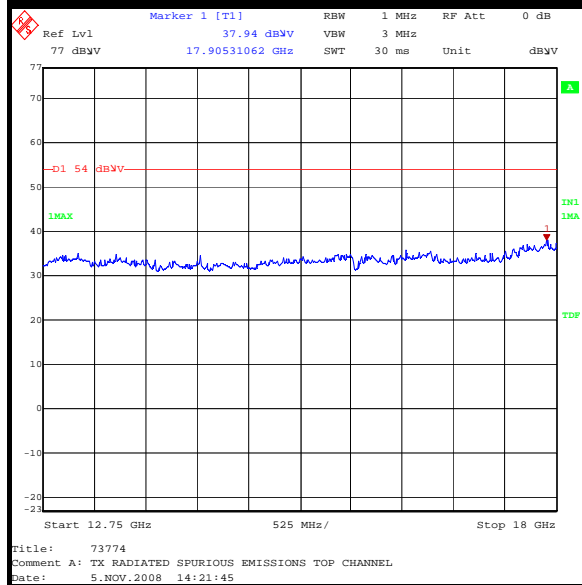
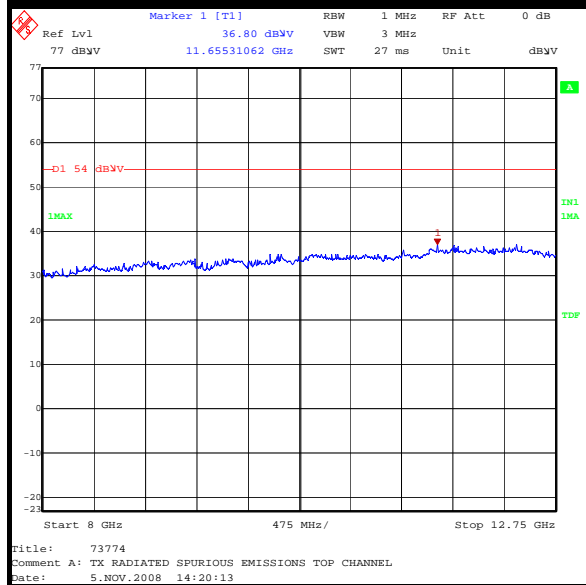
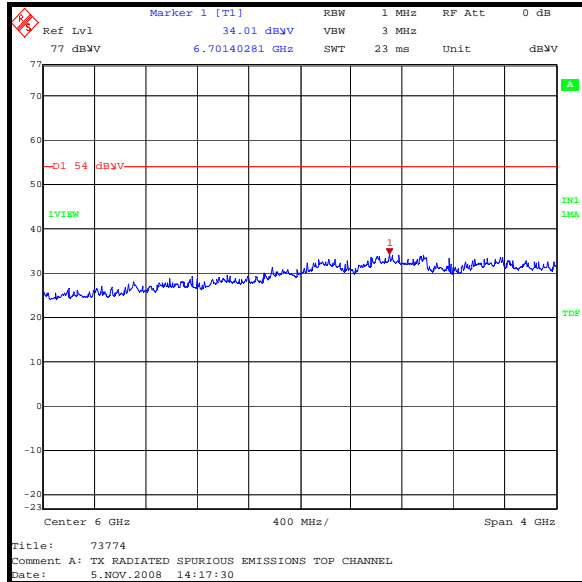
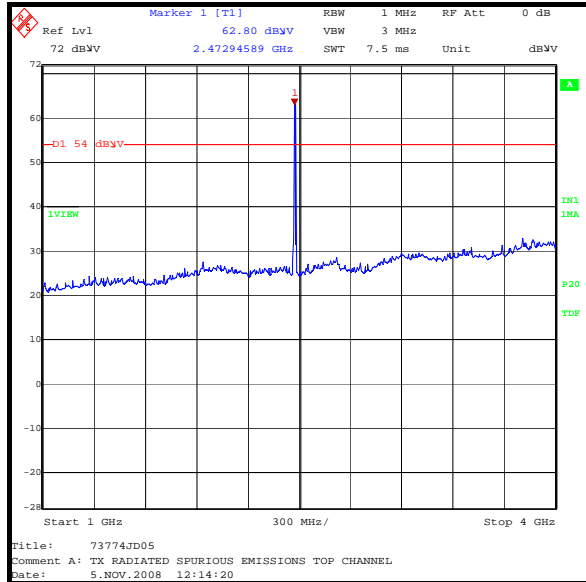
Frequency (GHz)	Antenna Polarity	Detector Level (dB μ V)	Transducer Factor (dB)	Actual Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
17.905310	Horizontal	33.8	4.1	37.9	54.0	16.1	Complied

Note(s):

- *Note: No spurious emissions were detected above the noise floor of the measuring receiver; therefore, the highest peak noise floor reading of the measuring receiver was recorded as shown in the table above.
**Note: The peak level was compared to the average limit as opposed to being compared to the peak limit because this is the more onerous limit.*
- The carrier is shown at 2472 MHz on the 1 GHz to 4 GHz plot*

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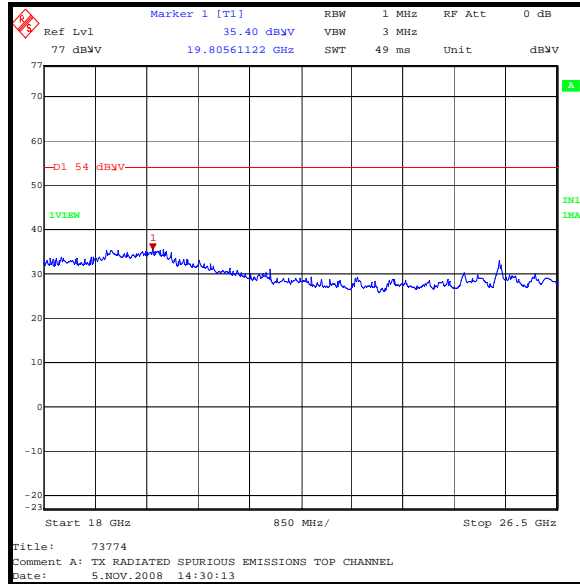
Transmitter Radiated Emissions (Continued)



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

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7.2.11. Transmitter Band Edge Radiated Emissions: Section 15.247(d) & 15.209(a)

Ambient Temperature: 21°C

Relative Humidity: 41%

Results:**Electric Field Strength Measurements****Peak Power Level:**

Frequency (GHz)	Antenna Polarity	Detector Level (dB μ V)	Transducer Factor (dB)	Actual Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
2.4000	Horizontal	70.4	-7.7	62.7	*84.5	21.8	Complied
2.4835	Horizontal	55.7	-8.1	47.6	74.0	26.4	Complied

Note(s):

* -20 dBc limit.

** Peak measurements were performed on the band edge frequency 2.4835 GHz, as it lies within the restricted bands.

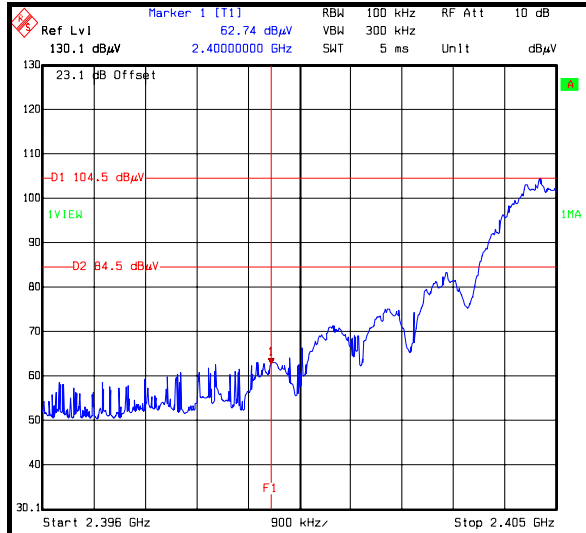
Test of: Net2 nano with 2A PSU in plastic cabinet
To: FCC Part 15.247: 2007 (Subpart C)

7.2.12. Transmitter Band Edge Radiated Emissions: Section 15.247(d) & 15.209(a) (Continued)**Results:****Average Power Level:**

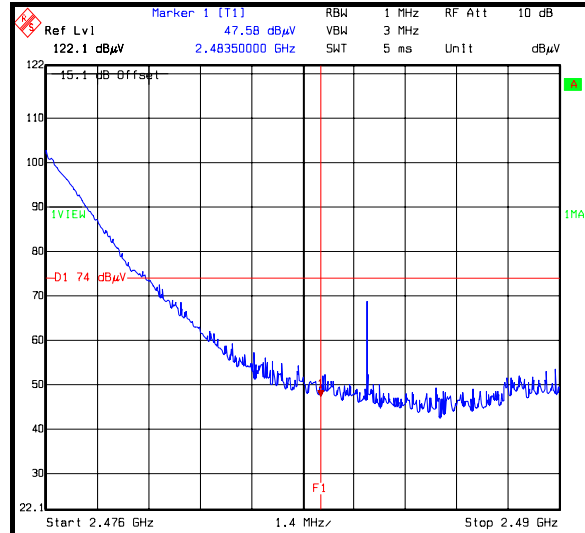
Frequency (GHz)	Antenna Polarity	Detector Level (dB μ V)	Transducer Factor (dB)	Actual Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
2.4835	Horizontal	46.7	-8.1	38.6	54.0	15.4	Complied

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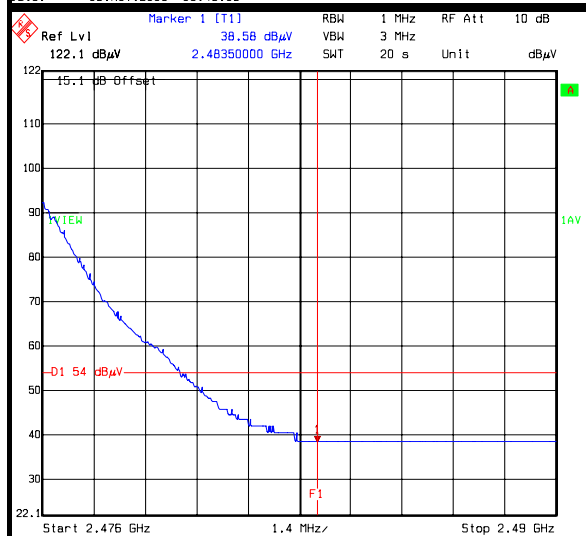
Transmitter Band Edge Radiated Emissions (Continued)



Title: 73774JD05
 Comment A: TX BAND EDGE RADIATED EMISSIONS LOWER BAND EDGE
 Date: 06.NOV.2008 09:48:38



Title: 73774JD05
 Comment A: TX BAND EDGE RADIATED EMISSIONS UPPER BAND EDGE PEAK DET.
 Date: 06.NOV.2008 10:24:05



Title: 73774JD05
 Comment A: TX BAND EDGE RADIATED EMISSIONS UPPER BAND EDGE AVG DET.
 Date: 06.NOV.2008 10:26:22

Test of: Net2 nano with 2A PSU in plastic cabinet
 To: FCC Part 15.247: 2007 (Subpart C)

8. Measurement Uncertainty

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

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

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

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

Measurement Type	Range	Confidence Level (%)	Calculated Uncertainty
AC Conducted Spurious Emissions	0.15 MHz to 30 MHz	95%	±3.72 dB
Transmitter Maximum Peak Output Power	Not applicable	95%	±2.94 dB
Conducted Emissions Antenna Port	30 MHz to 40 GHz	95%	±0.28 dB
Spectral Power Density	Not applicable	95%	±0.27 dB
6 dB/20 dB Bandwidth	Not applicable	95%	±11.4 ppm
Radiated Spurious Emissions	30 MHz to 1000 MHz	95%	±4.64 dB
Radiated Spurious Emissions	1 GHz to 40 GHz	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.

Test of: Net2 nano with 2A PSU in plastic cabinet
 To: FCC Part 15.247: 2007 (Subpart C)

Appendix 1. Test Equipment Used

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval (Months)
A004	Line Impedance Stabilization Network	Rohde & Schwarz	ESH3-Z5	890 604/027	19 May 2008	12
A1299	Antenna	Schaffner	CBL6143	5094	28 Jul 2008	12
A1793	Pre Amplifier	A.H.Systems Inc.	PAM-0118	183	03 Jul 2008	12
A1818	Antenna	EMCO	3115	00075692	25 Oct 2008	12
A1830	Pulse Limiter	Rhode & Schwarz	ESH3-Z2	100668	16 Jan 2008	12
A436	Antenna	Flann	20240-20	330	24 Apr 2006	36
C1164	Cable	Rosenberger Micro-Coax	FA210A1015 007070	43188-1	20 Apr 2008	12
C1296	3m Cable	Rosenberger	FA210A0030 005050	58940-02	10 Jul 2008	12
C363	Cable	Rosenberger	RG142	None	20 Apr 2008	12
K0004	Site Reference 4428	RFI Global Services Ltd	N/A	N/A	Calibration not required	12
M1124	Spectrum Analyser	Rohde & Schwarz	ESIB26	100046K	19 Feb 2008	12
M1229	Digital Multimeter	Fluke	179	87640015	09 May 2008	12
M1242	Spectrum Analyser	Rohde & Schwarz, Inc.	FSEM30	845986/022	29 Nov 2007	12
M1263	Test Receiver	Rohde & Schwarz	ESIB7	100265	06 Feb 2008	12
S0539	Power Supply Unit	Kikusui	PCR 1000L	13010170	Calibration not required	12

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