



**TEST REPORT
FROM
RFI GLOBAL SERVICES LTD**

Test of: Net2Air Z99-d20

To: FCC Part 15.247: 2008 Subpart C

Test Report Serial No:
RFI/RPT1/RP73701JD20A

This Test Report Is Issued Under The Authority Of Brian Watson, Operations Director:	
Checked By:	Brian Watson
Signature:	
Date of Issue:	30 April 2009

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1. Customer Information












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

2. Summary of Testing

2.1. General Information

Specification Reference:	47CFR15.247
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications) 2008: Part 15 Subpart C (Radio Frequency Devices) - Section 15.247
Specification Reference:	47CFR15.107 and 47CFR15.109
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications) 2008: Part 15 Subpart B (Radio Frequency Devices) - Sections 15.107 and 15.109
Site Registration:	FCC: 209735
Location of Testing:	RFI Global Services Ltd, Wade Road, Basingstoke, Hampshire, RG24 8AH.
Test Dates:	07 April 2009 to 09 April 2009

2.2. Summary of Test Results

FCC Reference (47CFR)	Measurement	Port Type	Result
Part 15.107	Idle Mode AC Conducted Emissions	AC Mains	
Part 15.109	Idle Mode Radiated Spurious Emissions	Antenna	
Part 15.207	Transmitter AC Conducted Emissions	AC Mains	
Part 15.247(a)(2)	Transmitter Minimum 6 dB Bandwidth	Antenna	
Part 15 2.1049	Transmitter 20 dB Bandwidth	Antenna	
Part 15.247(e)	Transmitter Peak Power Spectral Density	Antenna	
Part 15.247(b)(3)	Transmitter Maximum Peak Output Power (EIRP)	Antenna	
Part 15 15.247(d) & 15.209(a)	Transmitter Radiated Emissions	Antenna	
Part 15 15.247(d) & 15.209(a)	Transmitter Band Edge Radiated Emissions	Antenna	
Key to Results			
 = Complied  = Did not comply			

2.3. Methods and Procedures

Reference:	ANSI C63.4 (2003)
Title:	American National Standard Methods of Measurement of Electromagnetic Emissions from Low Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.
Reference:	DA00-705 (2000)
Title:	Filing and Frequency Measurement Guidelines for Frequency Hopping Spread Spectrum Systems.

2.4. Deviations from the Test Specification

For the measurements contained within this test report, there were no deviations from, additions to, or exclusions from the test specification identified above.

3. Equipment Under Test (EUT)

3.1. Identification of Equipment Under Test (EUT)

Brand Name:	Net2Air USB Dongle
Model Name or Number:	380-592
Serial Number:	955563
Hardware Version:	z-don Rev. 4, ppc-don Rev. B
Software Version:	Not stated
FCC ID Number:	USE380592

3.2. Description of EUT

The equipment under test was a USB dongle for transferring images via a 2.4 GHz wireless connection that conforms to the IEEE 802.15.4 standard.

3.3. Modifications Incorporated in the EUT

No modifications were applied to the EUT during testing.

3.4. Additional Information Related to Testing

Power Supply Requirement:	5 V DC from USB port on PC		
Channel Spacing:	5 MHz		
Modulation Type:	DSSS (64QAM)		
Data Rate:	54 Mbit/s		
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
Maximum Peak Power Output (EIRP)	0.4 dBm		

3.5. Support Equipment

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

Description:	Laptop PC
Brand Name:	Dell
Model Name or Number:	Inspiron 510m
Serial Number:	Not stated

Description:	AC adaptor for laptop PC
Brand Name:	Dell
Model Name or Number:	PA-1650-05D
Serial Number:	CN-05U092-71615-4BB-6DE7

4. Operation and Monitoring of the EUT during Testing

4.1. Operating Modes

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

- Continuously transmitting at maximum power on the bottom, centre and top channels as required.
- Receiver/Idle mode tests were performed with the transmitter turned off.

4.2. Configuration and Peripherals

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

- Controlled using a bespoke application on the laptop PC supplied by the client. The application was used to select the bottom, centre and top channels as required.
- The EUT was configured to send test data at the minimum interval of 1 ms and maximum payload size of 91 bytes for all transmitter tests.
- The laptop PC was connected directly to the EUT via its USB connector for all tests.
- The AC power supply adaptor on the laptop PC was connected to a 120V 60 Hz supply via a LISN for the AC conducted tests.

5. Measurements, Examinations and Derived Results

5.1. General Comments

Measurement uncertainties are evaluated in accordance with current best practice. Our reported expanded uncertainties are based on standard uncertainties, which are multiplied by an appropriate coverage factor to provide a statistical confidence level of approximately 95%. Please refer to *Section 6. Measurement Uncertainty* for details.

5.2. Test Results**5.3. Idle Mode AC Conducted Spurious Emissions****Test Summary:**

FCC Part:	15.107(a)
Test Method Used:	As detailed in ANSI C63.4 Section 7 and relevant annexes

Environmental Conditions:

Temperature (°C):	21
Relative Humidity (%):	41

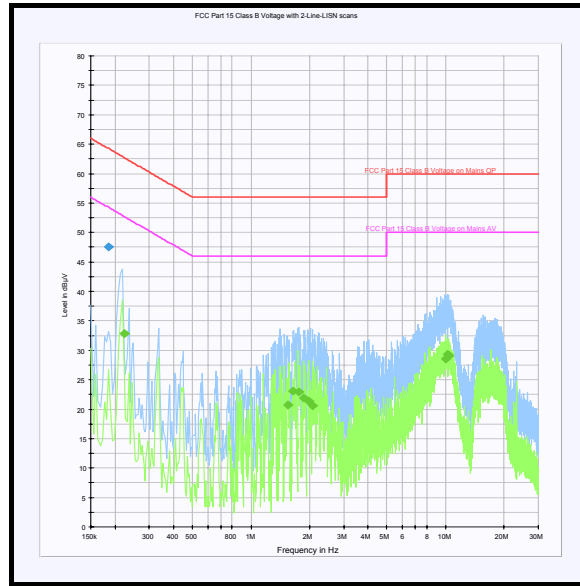
Results: Quasi Peak Detector Measurements

Frequency (MHz)	Line	Quasi Peak Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.186000	Neutral	47.5	64.2	16.7	Complied

Results: Average Detector Measurements

Frequency (MHz)	Line	Average Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.222000	Neutral	32.8	52.7	19.9	Complied
1.545000	Live	20.8	46.0	25.2	Complied
1.644000	Neutral	23.1	46.0	22.9	Complied
1.756500	Neutral	22.9	46.0	23.1	Complied
1.869000	Neutral	21.9	46.0	24.1	Complied
1.981500	Live	21.4	46.0	24.6	Complied
2.080500	Neutral	20.6	46.0	25.4	Complied
9.982500	Live	28.5	50.0	21.5	Complied
10.234500	Neutral	29.4	50.0	20.6	Complied
10.324500	Neutral	29.0	50.0	21.0	Complied

Idle Mode AC Conducted Spurious Emissions (continued)



5.4. Idle Mode Radiated Spurious Emissions

Test Summary:

FCC Part:	15.109
Test Method Used:	As detailed in ANSI C63.4 Section 8 and relevant annexes
Frequency Range:	30 to 1000 MHz

Environmental Conditions:

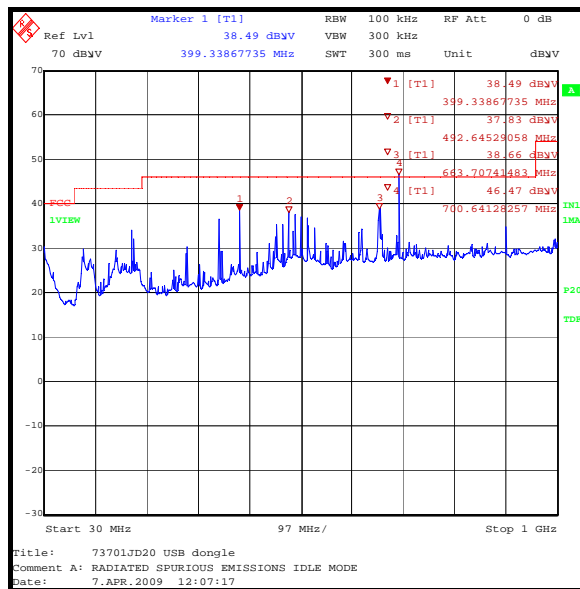
Temperature (°C):	25
Relative Humidity (%):	24

Results:

Frequency (MHz)	Antenna Polarity	Q-P Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
Refer to Notes 1 and 2 below					

Note(s):

- The emissions at 364.142 MHz, 399.399 MHz, 492.053 MHz, 504.034 MHz, 662.294 MHz and 699.430 MHz were investigated and found to be radiating from the laptop PC used as support equipment. These emissions were still present when the EUT was removed from the USB port on the laptop PC, therefore for the purpose of measurement these emissions were disregarded as they do not emanate from the EUT but are produced by the support laptop PC.
- All emissions produced and emanating from the EUT were, at least, 20 dB below the appropriate limit.



Idle Mode Radiated Spurious Emissions (continued)**Test Summary:**

FCC Part:	15.109
Test Method Used:	As detailed in ANSI C63.4 Section 8 and relevant annexes
Frequency Range:	1 to 12.75 GHz

Environmental Conditions:

Temperature (°C):	25
Relative Humidity (%):	24

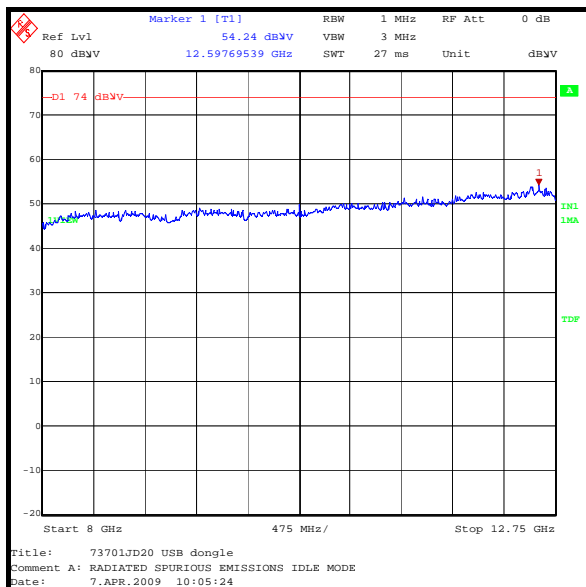
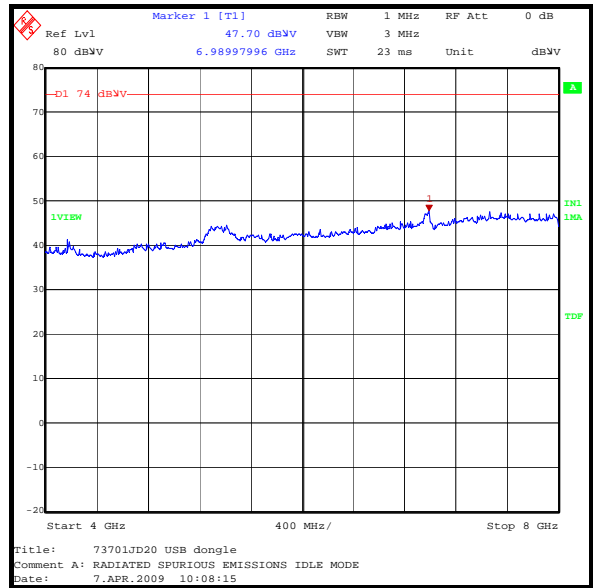
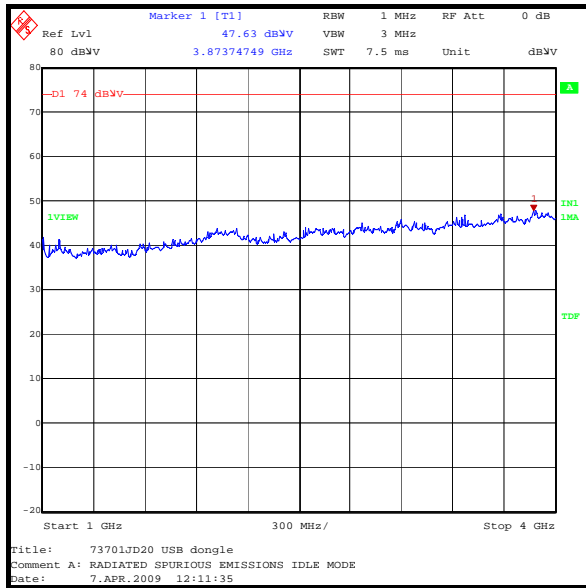
Results: Highest Peak Level

Frequency (GHz)	Antenna Polarity	Detector Level (dBμV)	Transducer Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
12.598	Vertical	41.1	13.1	54.2	74.0	19.8	Complied

Note(s):

1. No emissions were observed above the level of the spectrum analyser noise floor. The highest level of the noise floor was recorded in the above table.
2. The noise floor average level was at least 10 dB below the specified limit of 54 dB μ V/m.

Idle Mode Radiated Spurious Emissions (continued)



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

5.5. Transmitter AC Conducted Spurious Emissions

Test Summary:

FCC Part:	15.207
Test Method Used:	As detailed in ANSI C63.4 Section 7 and relevant annexes

Environmental Conditions:

Temperature (°C):	21
Relative Humidity (%):	41

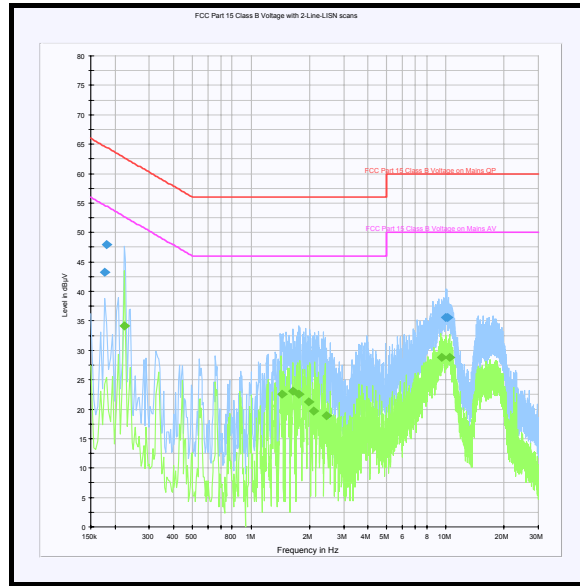
Results: Quasi Peak Detector Measurements

Frequency (MHz)	Line	Quasi Peak Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
0.177000	Live	43.2	64.6	21.4	Complied
0.181500	Live	48.0	64.4	16.4	Complied
10.059000	Neutral	35.5	60.0	24.5	Complied
10.230000	Neutral	35.5	60.0	24.5	Complied

Results: Average Detector Measurements

Frequency (MHz)	Line	Average Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
0.222000	Live	34.1	52.7	18.6	Complied
1.437000	Neutral	22.5	46.0	23.5	Complied
1.648500	Neutral	23.1	46.0	22.9	Complied
1.756500	Neutral	22.6	46.0	23.4	Complied
1.972500	Live	21.3	46.0	24.7	Complied
2.094000	Live	19.6	46.0	26.4	Complied
2.431500	Live	18.9	46.0	27.1	Complied
9.514500	Neutral	28.9	50.0	21.2	Complied
10.459500	Neutral	28.8	50.0	21.2	Complied

Transmitter AC Conducted Spurious Emissions (continued)



5.6. Transmitter 6 dB Bandwidth:**Test Summary:**

FCC Part:	15.247(a)(2)
Test Method Used:	As detailed in Public Notice DA 00-705 (March 30, 2000) (see note below)

Environmental Conditions:

Temperature (°C):	25
Relative Humidity (%):	24

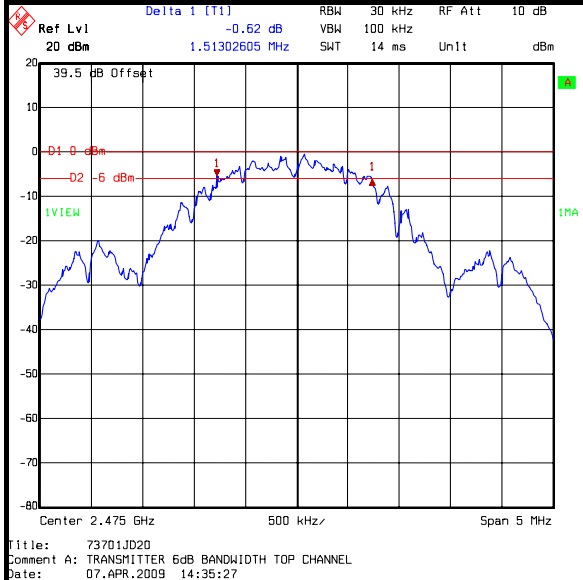
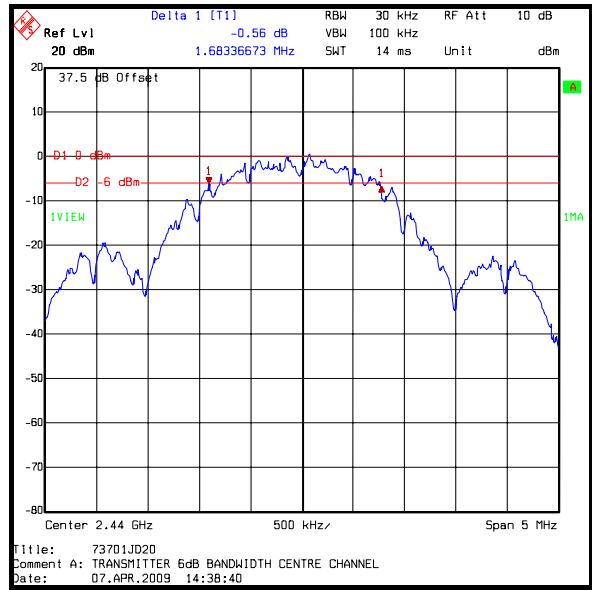
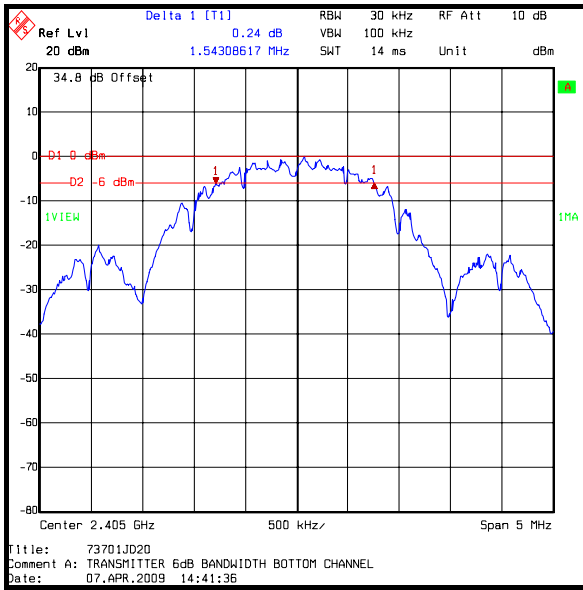
Results:

Channel	Transmitter 6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	1.543	≥0.5	1.043	Complied
Middle	1.683	≥0.5	1.183	Complied
Top	1.513	≥0.5	1.013	Complied

Note(s):

- To determine the 6 dB bandwidth, a resolution bandwidth of 30 kHz was used, which is > 1% of the 6 dB bandwidth. A video bandwidth of 100 kHz was used. The analyser was set to a span of greater than twice the 6 dB bandwidth and for a maximum hold scan to capture the profile of the signal. The peak level was then determined, and a reference established 6 dB below the peak level. The bandwidth was determined at the points where the 6 dB reference crossed the profile of the emission.

Transmitter 6 dB Bandwidth (continued)



5.7. Transmitter 20 dB Bandwidth:**Test Summary:**

FCC Part:	15.247(a)(2)
Test Method Used:	As detailed in Public Notice DA 00-705 (March 30, 2000) (see note below)

Environmental Conditions:

Temperature (°C):	25
Relative Humidity (%):	24

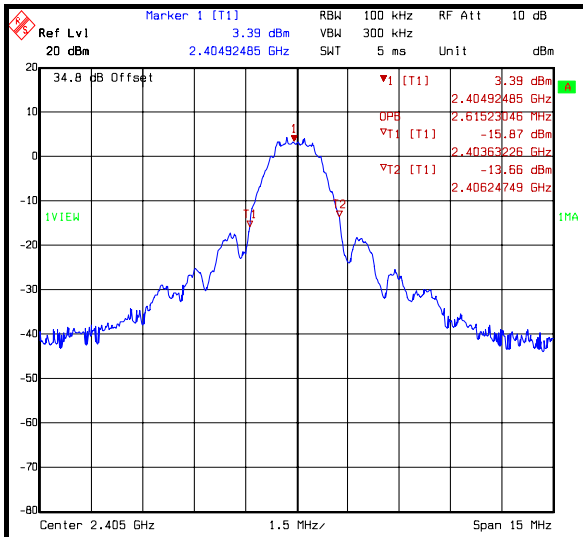
Results:

Channel	Transmitter 20 dB Bandwidth (MHz)	Limit (MHz)	Result
Bottom	2.615	None specified	Complied
Middle	2.826	None specified	Complied
Top	2.886	None specified	Complied

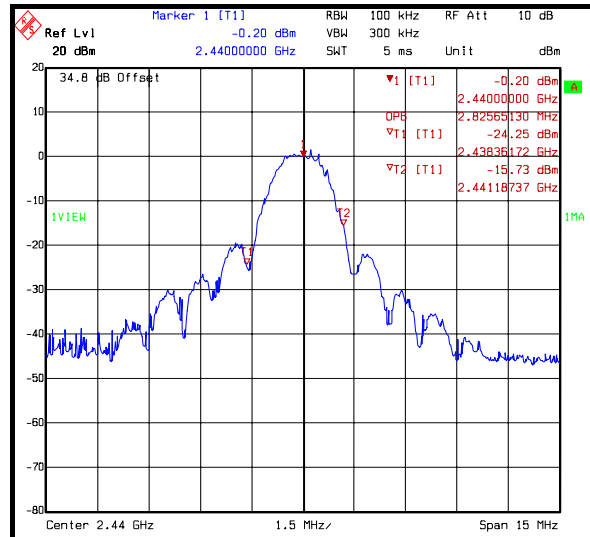
Note(s):

1. In lieu of the test method detailed in Public Notice DA 00-705 the 20 dB bandwidth was measured using the Occupied Bandwidth function of the spectrum analyser.

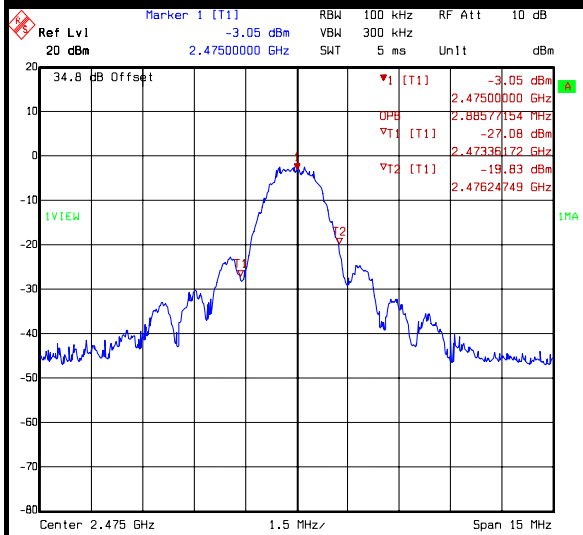
Transmitter 20 dB Bandwidth (continued)



Title: 73701JD20
 Comment A: TRANSMITTER 20dB BANDWIDTH BOTTOM CHANNEL
 Date: 07.APR.2009 14:58:18



Title: 73701JD20
 Comment A: TRANSMITTER 20dB BANDWIDTH CENTRE CHANNEL
 Date: 07.APR.2009 15:01:40



Title: 73701JD20
 Comment A: TRANSMITTER 20dB BANDWIDTH TOP CHANNEL
 Date: 07.APR.2009 15:03:49

5.8. Transmitter Peak Power Spectral Density

Test Summary:

FCC Part:	15.247(e)
Test Method Used:	As detailed in ANSI TIA-603-C-2004 and FCC CFR Part 2

Environmental Conditions:

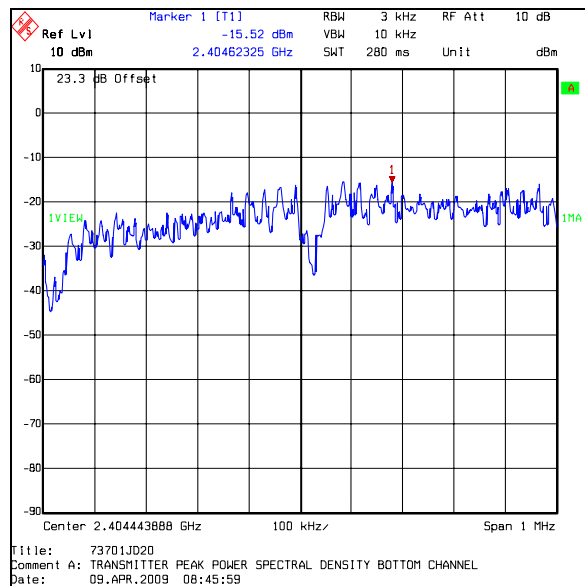
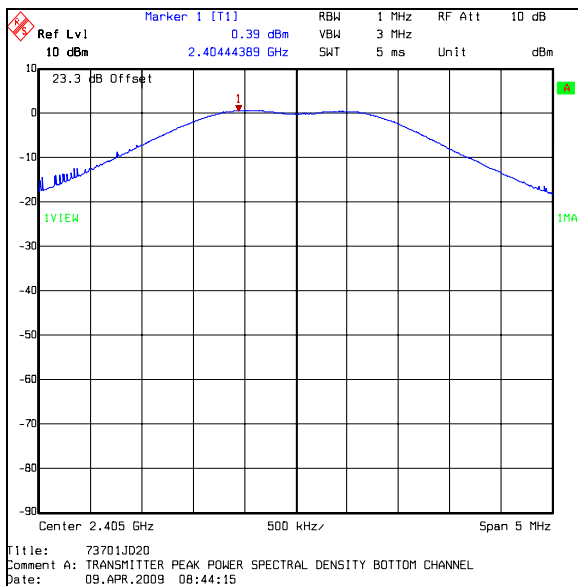
Temperature (°C):	26
Relative Humidity (%):	40

Results:

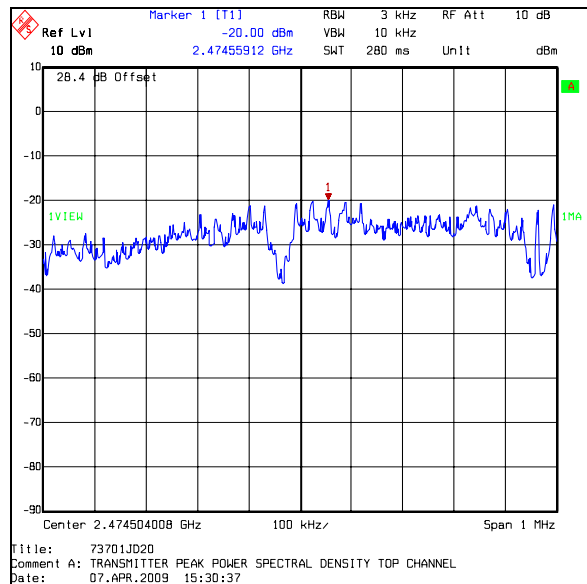
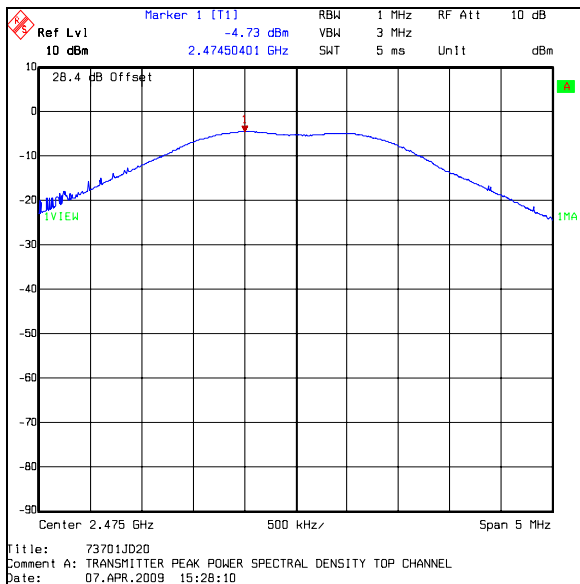
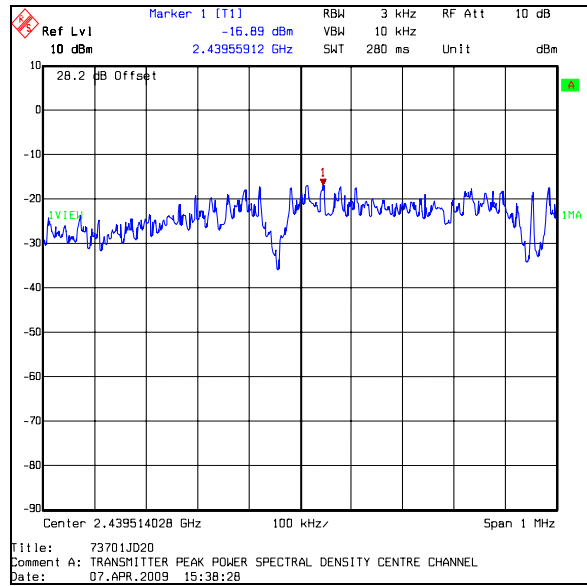
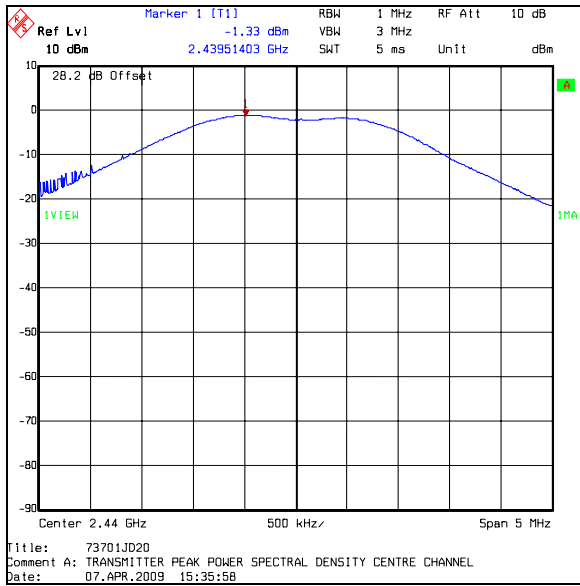
Channel	Output Power (dBm/3 kHz)	Limit (dBm/3 kHz)	Margin (dB)	Result
Bottom	-15.5	8.0	23.5	Complied
Middle	-16.9	8.0	24.9	Complied
Top	-20.0	8.0	28.0	Complied

Note(s):

1. The highest level of the carrier was identified using a wide resolution bandwidth and a marker placed on this point. The marker was centred in the display and the resolution bandwidth reduced to 3 kHz in a 1 MHz span. The highest level in a 1 MHz span was recorded in the table above.



Transmitter Peak Power Spectral Density (continued)



5.9. Transmitter Maximum Peak Output Power (EIRP)**Test Summary:**

FCC Part:	15.247(b)(3)
Test Method Used:	As detailed in Public Notice DA 00-705 (March 30, 2000), ANSI TIA-603-C-2004 and FCC CFR Part 2

Environmental Conditions:

Temperature (°C):	25
Relative Humidity (%):	24

Results:

Channel	EIRP (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	0.4	30.0	29.6	Complied
Middle	-1.3	30.0	31.3	Complied
Top	-4.7	30.0	34.7	Complied

Note(s):

1. These tests were performed radiated therefore the EUT antenna gain is encompassed in the final result and not measurable.

5.10. Transmitter Radiated Emissions

Test Summary:

FCC Part:	15.247(d) & 15.209(a)
Test Method Used:	As detailed in ANSI C63.4 Section 8
Frequency Range	30 to 1000 MHz

Environmental Conditions:

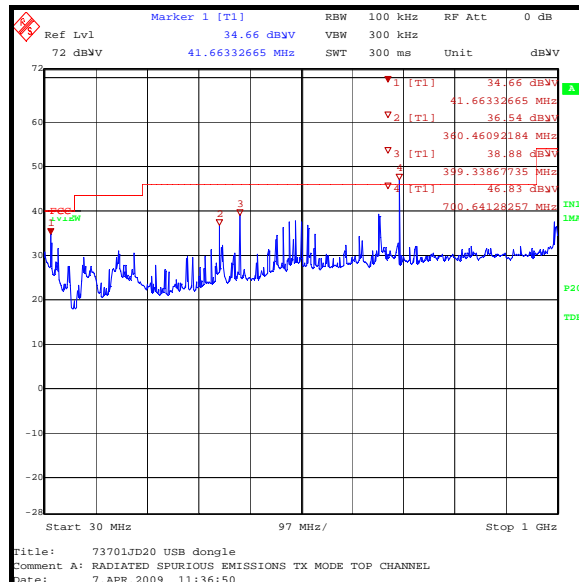
Temperature (°C):	25
Relative Humidity (%):	24

Results:

Frequency (MHz)	Antenna Polarity	Q-P Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
42.955	Horizontal	31.1	40.0	8.9	Complied

Note(s):

- The emissions at 364.142 MHz, 399.399 MHz, 492.053 MHz, 504.034 MHz, 662.294 MHz and 699.430 MHz were investigated and found to be radiating from the laptop PC used as support equipment. These emissions were still present when the EUT was removed from the USB port on the laptop PC, therefore for the purpose of measurement these emissions were disregarded as they do not emanate from the EUT but are produced by the support laptop PC.
- All other emissions produced and emanating from the EUT were, at least, 20 dB below the appropriate limit.



5.11. Transmitter Radiated Emissions**Test Summary:**

FCC Part:	15.247(d) & 15.209(a)
Test Method Used:	As detailed in ANSI C63.4 Section 8
Frequency Range	1 to 26.5 GHz

Environmental Conditions:

Temperature (°C):	25
Relative Humidity (%):	24

Results: 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
4.810872	Horizontal	59.7	-1.7	58.0	74.0	16.0	Complied

Results: Highest Average 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
4.810872	Horizontal	45.5	-1.7	43.8	54.0	10.2	Complied

Results: Highest Peak Level: Middle 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
4.880932	Horizontal	55.0	-1.3	53.7	74.0	20.3	Complied

Results: Highest Average Level: Middle 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
4.880932	Horizontal	41.4	-1.3	40.1	54.0	13.9	Complied

Transmitter Radiated Emissions (Continued)**Results: Highest Peak Level: Top 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
4.949228	Horizontal	49.2	-1.4	47.8	74.0	26.2	Complied

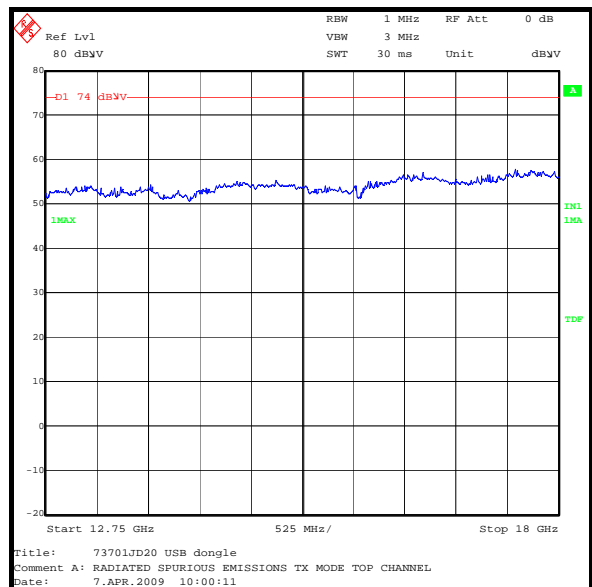
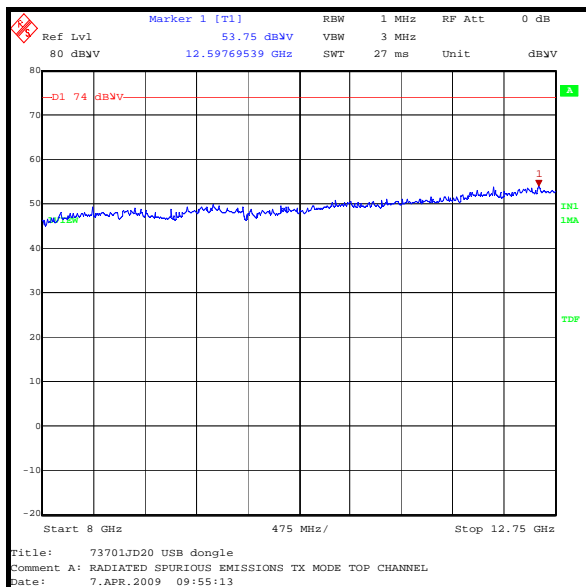
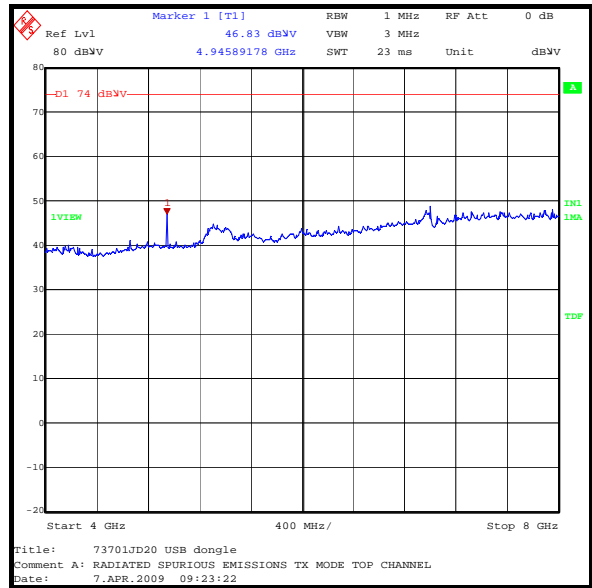
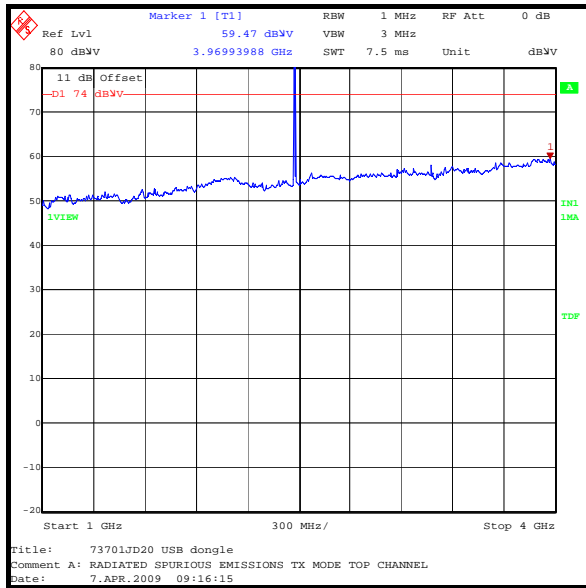
Results: Highest Average Level: Top Channel

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
4.949228	Horizontal	34.7	-1.4	33.3	54.0	20.7	Complied

Note(s):

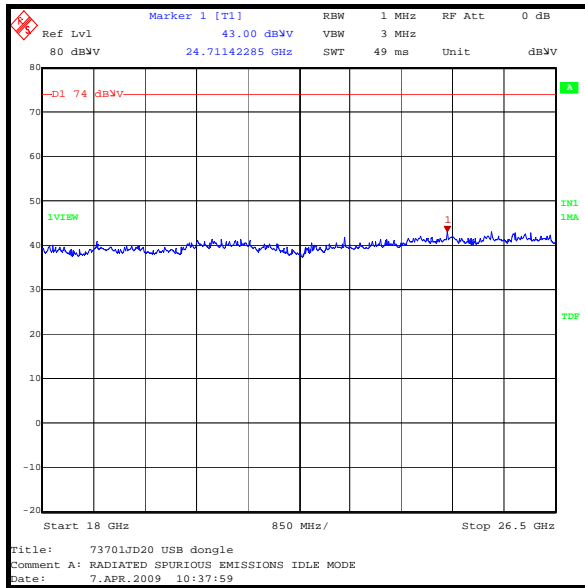
1. The carrier is shown on the 1 GHz to 4 GHz plot.
2. The emission shown on the pre-scan plots at approximately 6.99 GHz was investigated and found to be ambient.
3. The noise floor average level was at least 10 dB below the specified limit of 54 dB μ V/m.

Transmitter Radiated Emissions (continued)



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

Transmitter Radiated Emissions (continued)



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

5.12. Transmitter Band Edge Radiated Emissions**Test Summary:**

FCC Part:	15.247(d) & 15.209(a)
Test Method Used:	As detailed in ANSI C63.4 Section 8 and Public Notice DA 00-705 (March 30, 2000)

Environmental Conditions:

Temperature (°C):	26
Relative Humidity (%):	30

Results: Peak Power Level:

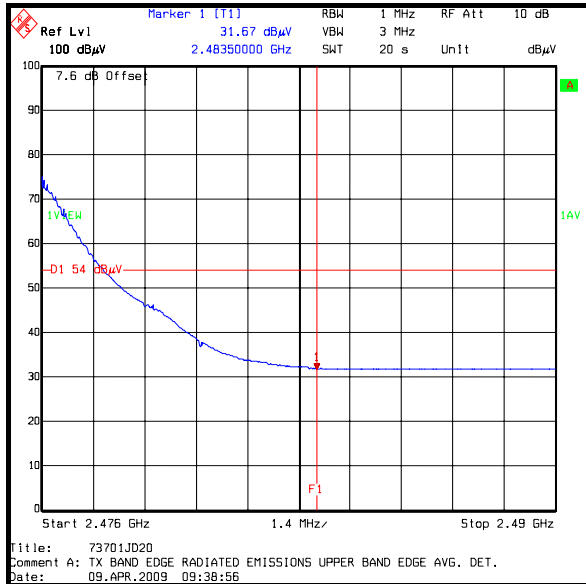
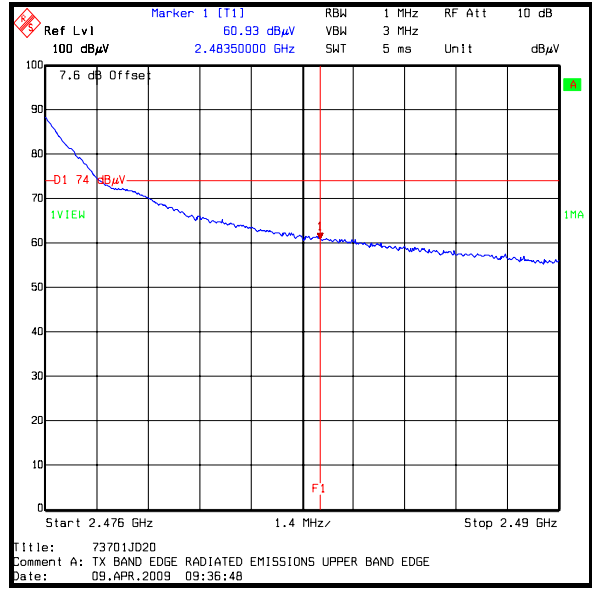
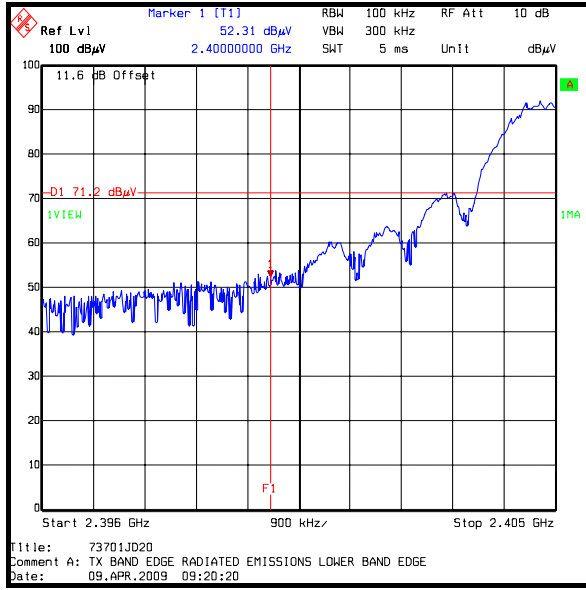
Frequency (GHz)	Antenna Polarity	Detector Level (dB μ V)	Transducer Factor (dB)	Actual Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
2.4000	Vertical	52.5	-0.2	52.3	71.2*	18.9	Complied
2.4835	Vertical	61.2	-0.3	60.9	74.0	13.1	Complied

* -20 dBc limit.

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	Vertical	32.0	-0.3	31.7	54.0	22.3	Complied

Transmitter Band Edge Radiated Emissions (continued)



6. Measurement Uncertainty

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

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

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

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

Measurement Type	Range	Confidence Level (%)	Calculated Uncertainty
AC Conducted Spurious Emissions	0.15 MHz to 30 MHz	95%	±3.72 dB
Transmitter Maximum Peak Output Power	Not Applicable	95%	±2.94 dB
Spectral Power Density	2.4 GHz to 2.4835 GHz	95%	±2.94 dB
6 dB / 20 dB Bandwidth	Not Applicable	95%	±0.92 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.

Appendix 1. Test Equipment Used

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval (Months)
A004	LISN	Rohde & Schwarz	ESH3-Z5	890604/027	19 May 2008	12
A1299	Antenna	Schaffner	CBL6143	5094	28 Jul 2008	12
A1391	Attenuator	Huber + Suhner	757987	6810.17.B	Calibrated before use	-
A1534	Pre Amplifier	Hewlett Packard	8449B OPT H02	3008A00405	Calibrated before use	-
A1818	Antenna	EMCO	3115	00075692	25 Oct 2008	12
A1830	Pulse Limiter	Rhode & Schwarz	ESH3-Z2	100668	05 Jan 2009	12
A436	Antenna	Flann	20240-20	330	24 Apr 2006	36
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	13 Aug 2008	-
M1124	Spectrum Analyser	Rohde & Schwarz	ESIB26	100046K	09 Mar 2009	12
M1242	Spectrum Analyser	Rohde & Schwarz	FSEM30	845986/022	09 Dec 2008	12
M1379	Test Receiver	Rohde & Schwarz	ESIB7	100330	14 Aug 2008	12

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