

TEST REPORT FROM RFI GLOBAL SERVICES LTD

Test of: Wireless Reader Module z99-wr01 / 325-070-US

To: FCC Part 15 Subpart C: 2008 Part 15.249

Test Report Serial No:
RFI/RPT4/RP73223JD09A

Supersedes Test Report Serial No:
RFI/RPT3/RP73223JD09A

This Test Report Is Issued Under The Authority Of Brian Watson, Operations Director:	pp 
Checked By: Robert Graham 	Report Copy No: PDF01
Issue Date: 03 July 2009	Test Dates: 21 October 2008 to 03 July 2009

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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)

2.1. Identification of Equipment Under Test (EUT)

Brand Name:	Paxton Access
Model Name or Number:	z99-wr01 / 325-070-US
Serial Number:	None Stated
Hardware Version Number:	z-wr01 Rev. 6, ppc-wrm Rev. C
Software Version Number	Not stated
FCC ID Number:	USEWR01

2.2. Description of EUT

The equipment under test was a wireless reader module

2.3. Modifications Incorporated in the EUT

The EUT has had a modified firmware installed to allow it to permanently transmit for the purpose of the test. This did not affect the RF characteristics of the device.

2.4. Support Equipment

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

Description:	12 V DC Power Supply
Brand Name:	Stontronics Limited
Model Name or Number:	EPA-121DA-12
Serial Number:	T2323ST

2.5. Additional Information Related to Testing

Channel Spacing:	5 MHz		
Modulation Type:	O-QPSK		
Data Rate:	250 kbit/s		
Transmit Frequency Range:	2405 MHz to 2475 MHz		
Transmit Channels Tested:	Channel ID	Channel Number	Channel Frequency (MHz)
	Bottom	11	2405
	Middle	18	2440
	Top	25	2475
Receiver Frequency Range:	2405 MHz to 2475 MHz		

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3. Test Specification, Methods and Procedures

3.1. Test Specifications

Reference:	FCC Part 15 Subpart C: 2008 (Part 15.249).
Title:	Code of Federal Regulations, Part 15 (47CFR249)

3.2. Methods and Procedures

The methods and procedures used were as detailed in:

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.

3.3. 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.

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:

- Transmitting full power and configured to use either bottom, middle or top channel

5.2. Configuration and Peripherals

The EUT was tested in the following configuration:

- Standalone powered by a 12 V DC power supply.

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6. Summary of Test Results

Range of Measurements	Specification Reference	Port Type	Result
Transmitter AC Conducted Spurious Emissions	Part 15.207	AC Mains	Complied
Transmitter Fundamental Field Strength	Part 15.249 (a)	Antenna	Complied
Transmitter 20 dB Bandwidth	Part 2.1049	Antenna	Complied
Transmitter Radiated Emissions	Part 15.249(a)(d) (e) & 15.209(a)	Antenna	Complied
Transmitter Band Edge Radiated Emissions	Part 15.249(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

7.1.1. This section contains test results only.

7.1.2. 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.

7.1.3. As the device is a transceiver that operates periodically i.e. it transmits and receives simultaneously when in operation there is no 'receive only' condition. Consequently no testing of separate receive only emissions testing was performed as the performance was verified at the same time as the transmitter.

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7.2. Test Results

7.2.1. 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):	22
Relative Humidity (%):	35

Quasi-Peak Detector Measurements on Live and Neutral Lines

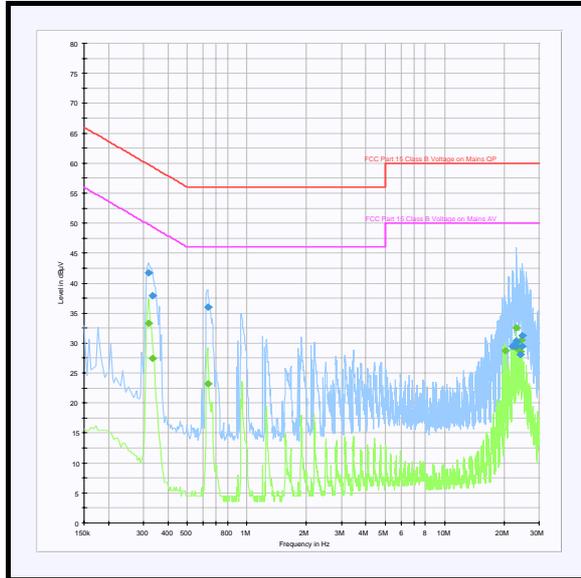
Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.316500	Live	41.7	59.8	18.1	Complied
0.334500	Live	37.9	59.3	21.4	Complied
0.631500	Live	35.9	56.0	20.1	Complied
22.024500	Live	29.5	60.0	30.5	Complied
22.978500	Live	30.4	60.0	29.6	Complied
23.050500	Live	29.4	60.0	30.6	Complied
23.100000	Live	30.2	60.0	29.8	Complied
23.995500	Live	28.1	60.0	31.9	Complied
24.517500	Neutral	29.4	60.0	30.6	Complied
24.652500	Live	31.3	60.0	28.7	Complied

Average Detector Measurements on Live and Neutral Lines

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.316500	Live	33.3	49.8	16.5	Complied
0.334500	Live	27.4	49.3	21.9	Complied
0.631500	Live	23.3	46.0	22.7	Complied
20.260500	Live	28.7	50.0	21.3	Complied
22.578000	Neutral	29.4	50.0	20.6	Complied
22.884000	Neutral	29.6	50.0	20.4	Complied
23.068500	Live	29.2	50.0	20.8	Complied
23.127000	Live	32.5	50.0	17.5	Complied
24.045000	Live	28.6	50.0	21.4	Complied
24.351000	Neutral	30.5	50.0	19.5	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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7.2.2. Transmitter Fundamental Field Strength

Test Summary:

FCC Part:	15.249(a)
Test Method Used:	As detailed in ANSI C63.4 Section 8 and relevant annexes

Environmental Conditions:

Temperature (°C):	22
Relative Humidity (%):	35

Peak Level Results:

Frequency (MHz)	Antenna Polarity	Detector Level (dB μ V)	Transducer Factor (dB)	Peak Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
2405	Horizontal	105.1	-7.7	97.4	114.0	16.6	Complied
2440	Horizontal	103.3	-8.0	95.3	114.0	18.7	Complied
2475	Horizontal	104.5	-8.2	96.3	114.0	17.7	Complied

Average Level Results:

Frequency (MHz)	Antenna Polarity	Detector Level (dB μ V)	Transducer Factor (dB)	Peak Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
2405	Horizontal	82.9	-7.7	75.2	94.0	18.8	Complied
2440	Horizontal	81.1	-8.0	73.1	94.0	20.9	Complied
2475	Horizontal	82.3	-8.2	74.1	94.0	19.9	Complied

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7.2.3. Transmitter 20 dB Bandwidth

Test Summary:

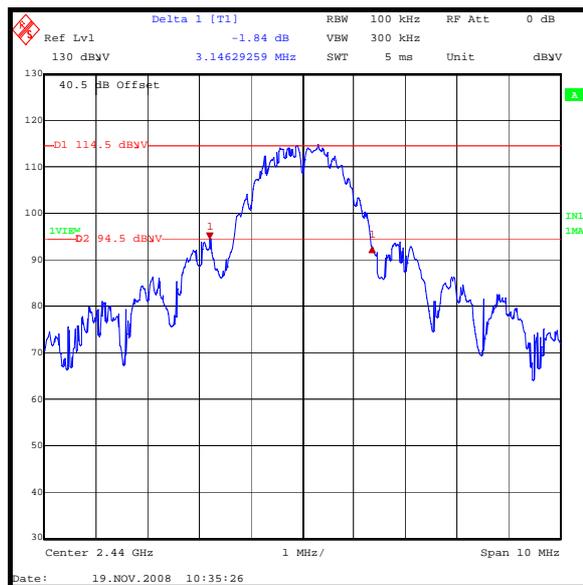
FCC Part:	2.1049
Test Method Used:	As detailed in ANSI C63.4 Section 13.1.7 and relevant annexes

Environmental Conditions:

Temperature (°C):	22
Relative Humidity (%):	34

Results:

Transmitter 20 dB Bandwidth (MHz)
3.146



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7.2.4. Transmitter Radiated Emissions

Test Summary:

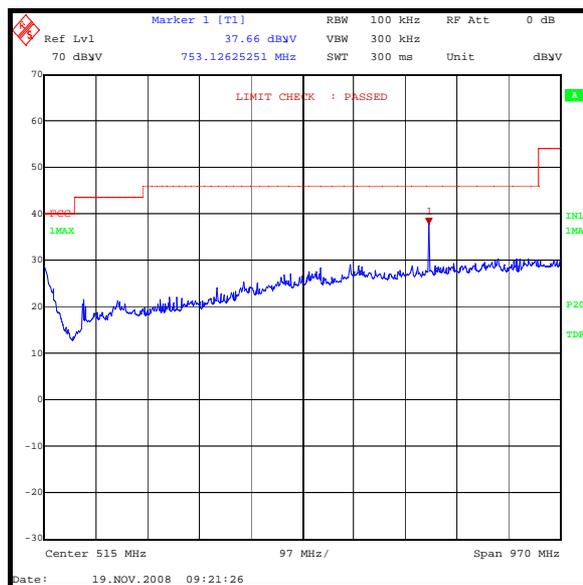
FCC Part:	15.249(a)(d)(e) & 15.209
Test Method Used:	As detailed in ANSI C63.4 Section 8 and relevant annexes
Frequency Range:	30 MHz to 1 GHz

Environmental Conditions:

Temperature (°C):	22
Relative Humidity (%):	34

Results:

Frequency (MHz)	Antenna Polarity	Q-P Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
753.126	Vertical	39.1	46.0	6.9	Complied



30 MHz to 1 GHz

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 Radiated Emissions (Continued)

Test Summary:

FCC Part:	15.249(a)(d)(e) & 15.209
Test Method Used:	As detailed in ANSI C63.4 Section 8 and relevant annexes
Frequency Range:	1 GHz to 26.5 GHz

Environmental Conditions:

Temperature (°C):	22
Relative Humidity (%):	34

Results: Highest Peak Level:

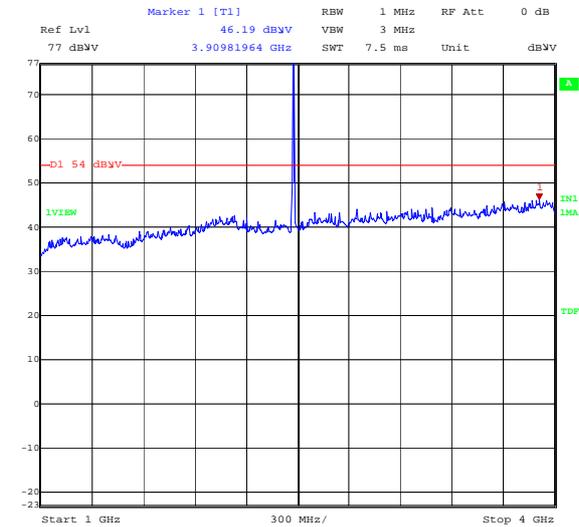
Frequency (MHz)	Antenna Polarity	Detector Level (dB μ V)	Transducer Factor (dB)	Peak Level (dB μ V/m)	Average Limit (dB μ V/m)	Margin (dB)	Result
10503.507	Vertical	54.7	8.5	46.2	54.0	7.8	Complied

Note(s):

- 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. 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.
- All other emissions were at least 20 dB below the specification limit.

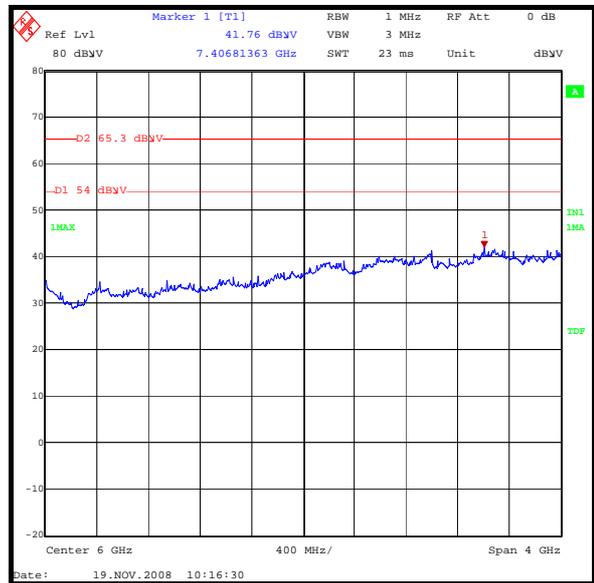
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Transmitter Radiated Emissions (Continued)

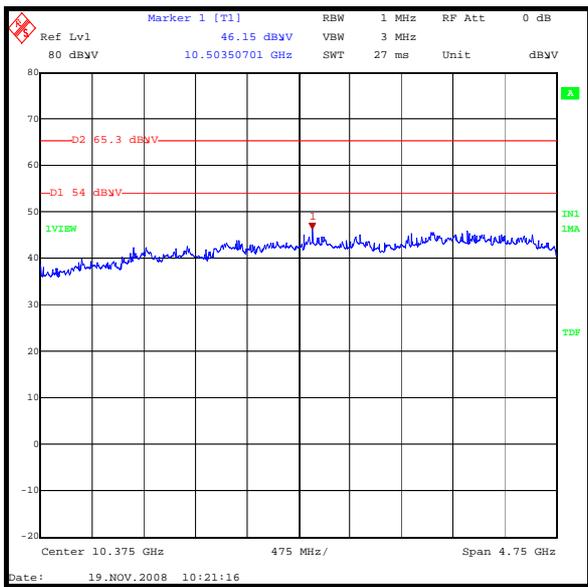


Title: 73223JD19
 Comment A: RADIATED SPURIOUS EMISSIONS TX MODE TOP CHANNEL
 Date: 1.JUL.2009 16:19:33

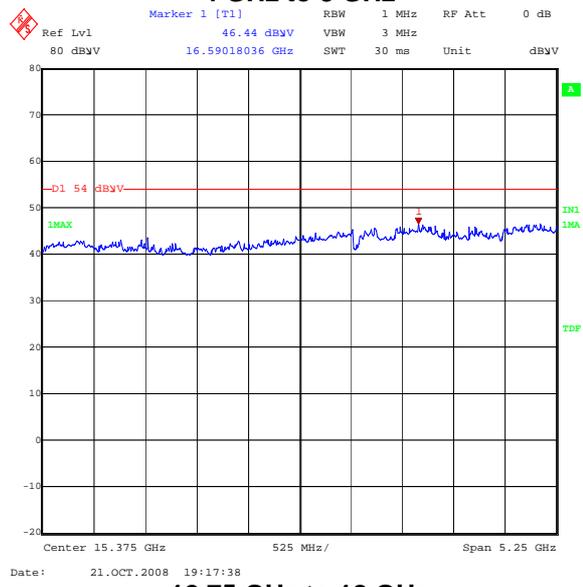
1 GHz to 4 GHz



4 GHz to 8 GHz



8 GHz to 12.75 GHz

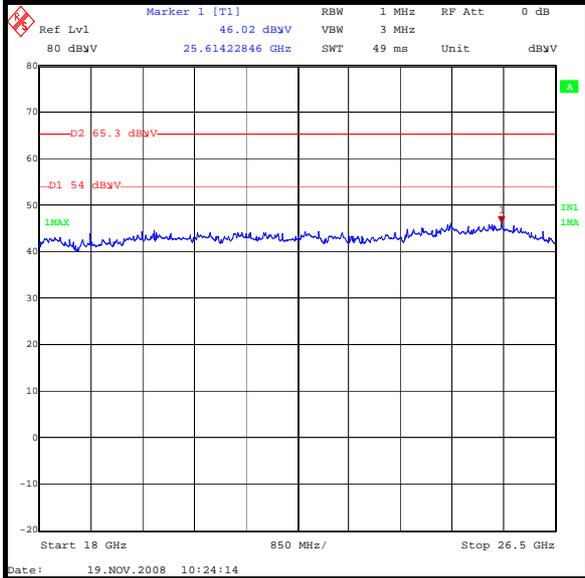


12.75 GHz to 18 GHz

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

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Transmitter Radiated Emissions: Section 15.249(a)(d)(e) & Section 15.209 (Continued)



18 GHz to 26.5 GHz

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

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7.2.6. Transmitter Radiated Emissions at Band Edges

Test Summary:

FCC Part:	15.249(d) & 15.209
Test Method Used:	As detailed in ANSI C63.4 Section 8 and relevant annexes

Environmental Conditions:

Temperature (°C):	30
Relative Humidity (%):	28

Peak Power Level:

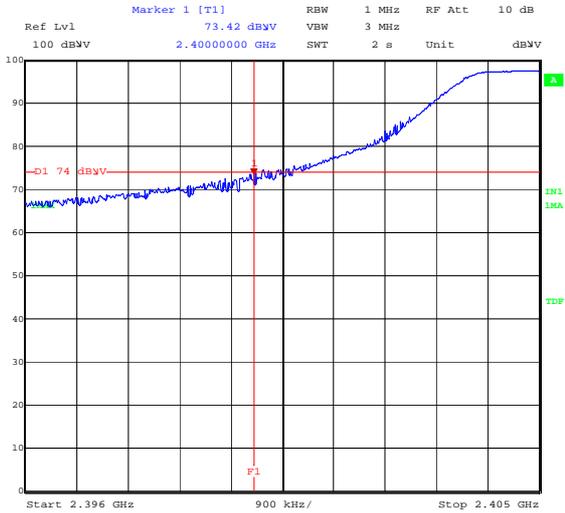
Frequency (GHz)	Antenna Polarity	Detector Level (dBμV)	Transducer Factor (dB)	Actual Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
2.4000	Horizontal	81.1	-7.7	73.4	74.0	0.6	Complied
2.4835	Horizontal	72.6	-8.2	64.4	74.0	9.6	Complied

Average Power Level:

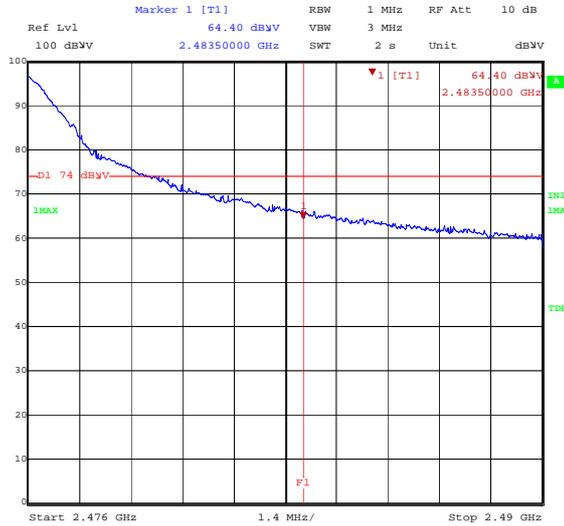
Frequency (GHz)	Antenna Polarity	Detector Level (dBμV)	Transducer Factor (dB)	Actual Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
2.4000	Horizontal	45.9	-7.7	38.2	54.0	15.8	Complied
2.4835	Horizontal	39.7	-8.2	31.5	54.0	22.5	Complied

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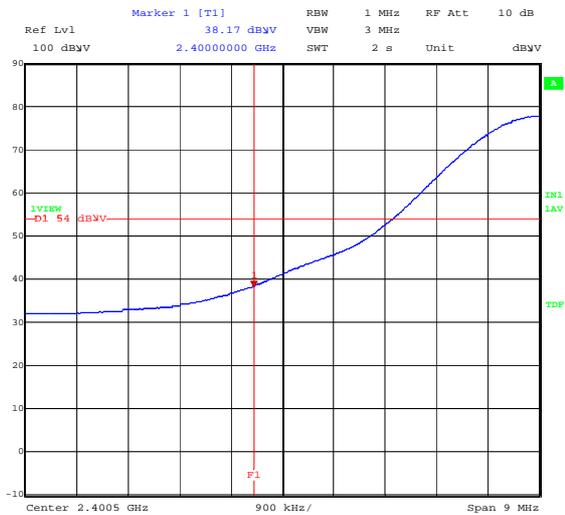
Transmitter Radiated Emissions at Band Edges (Continued)



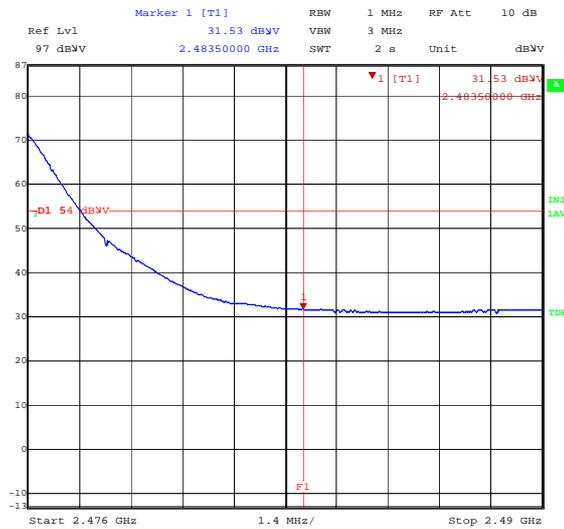
Title: 73223JD19
 Comment A: TRANSMITTER BAND EDGE - WIRELESS READER - TX MODE BOTTOM CHA
 NNEL
 Date: 3.JUL.2009 11:59:46



Title: 73223JD19
 Comment A: RADIATED SPURIOUS EMISSIONS TX MODE TOP CHANNEL
 Date: 1.JUL.2009 16:29:52



Title: 73223JD19
 Comment A: TRANSMITTER BAND EDGE - WIRELESS READER - TX MODE BOTTOM CHA
 NNEL
 Date: 3.JUL.2009 12:10:11



Title: 73223JD19
 Comment A: RADIATED SPURIOUS EMISSIONS TX MODE TOP CHANNEL
 Date: 1.JUL.2009 16:33:30

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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%	±3.25 dB
Fundamental Field Strength	Not Applicable	95%	±2.94 dB
20 dB Bandwidth	Not Applicable	95%	±0.92 ppm
Radiated Spurious Emissions	30 MHz 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.

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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	30 Apr 2009	12
A1299	Antenna	Schaffner	CBL6143	5094	28 Jul 2008	12
A1818	Antenna	EMCO	3115	00075692	25 Oct 2008	12
A1830	Pulse Limiter	Rhode & Schwarz	ESH3-Z2	100668	05 Jan 2009	12
K0001	5m SA Chamber	Rainford EMC	N/A	N/A	13 Aug 2008	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	28 Aug 2008	12
M1124	Test Receiver	Rohde & Schwarz	ESIB26	100046K	09 Mar 2009	12
M1379	Test Receiver	Rhode & Schwarz	ESIB7	100330	14 Aug 2008	12

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