

**TEST REPORT  
FROM  
RFI GLOBAL SERVICES LTD**

Test of: IPWireless (UK) Ltd  
2.5 GHz UE PCMCIA V1, Model: FD

To: FCC OET Bulletin 65 Supplement C: 2001

**Test Report Serial No:**  
RFI/SARE1/RP49365JD03A

**This Test Report Is Issued Under The Authority  
Of Brian Watson, Operations Director:**



pp

**Tested By: Richlieu Quoi**



**Checked By: Joe Lomako**



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**Issue Date: 14 November 2007**

**Test Dates: 29 August 2007 to 13 September 2007**

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Registered in England and Wales. Company number: 2117901

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## 1. Customer Information

<b>Company Name:</b>	IPWireless (UK) Ltd
<b>Address:</b>	Unit 7 Greenways Business Park Bellinger Close Chippenham Wilts SN15 1BN UK
<b>Contact Name:</b>	Mr P Warburg

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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. Description of EUT**

The equipment under test is a Wireless Broadband Modem PCMCIA card operating at 2496 MHz to 2690 MHz frequency band.

### **2.2. Identification of Equipment Under Test (EUT)**

<b>Description:</b>	Wireless Broadband Modem
<b>Brand Name:</b>	IPWireless
<b>Model Name or Number:</b>	FD
<b>Serial Number:</b>	FD1A730000210
<b>FCC ID:</b>	PKTPCMCIAFD2
<b>Country of Manufacture:</b>	UK
<b>Date of Receipt:</b>	29 August 2007

### **2.3. Modifications Incorporated in the EUT**

During the course of testing the EUT was not modified.

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#### 2.4. Support Equipment

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

<b>Description:</b>	Laptop
<b>Brand Name:</b>	Sony Vaio
<b>Model Name or Number:</b>	VGN_BX195VP
<b>Serial Number:</b>	2-656-370-21
<b>Cable Length and Type:</b>	Not applicable
<b>Connected to Port:</b>	PCMCIA Single Port

<b>Description:</b>	Laptop
<b>Brand Name:</b>	Dell
<b>Model Name or Number:</b>	Latitude C840
<b>Serial Number:</b>	CN - 03J010 - 1296
<b>Cable Length and Type:</b>	Not applicable
<b>Connected to Port:</b>	PCMCIA Dual Port

<b>Description:</b>	Laptop
<b>Brand Name:</b>	Hewlett Packard
<b>Model Name or Number:</b>	Compaq NX9005
<b>Serial Number:</b>	CNF3200V5C
<b>Cable Length and Type:</b>	Not applicable
<b>Connected to Port:</b>	PCMCIA Dual Port

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## 2.5. Additional Information Related to Testing

<b>Equipment Category</b>	TDCDMA		
<b>Type of Unit</b>	Portable (powered via a laptop regulated supply)		
<b>Intended Operating Environment:</b>	Within Residential, Commercial TDCDMA Coverage		
<b>Transmitter Maximum Output Power Characteristics:</b>	24 dBm		
<b>Transmitter Maximum Measured Output Power :</b>	24.5 dBm		
<b>Transmitter Frequency Range:</b>	2496 MHz to 2690 MHz		
<b>Transmitter Frequency Allocation of EUT When Under Test:</b>	<b>Channel Number</b>	<b>Channel Description</b>	<b>Frequency (MHz)</b>
	12507	Low	2501.4
	12965	Middle	2593.0
	13423	High	2684.6
<b>Modulation(s):</b>	TDCDMA		
<b>Modulation Scheme (Crest Factor):</b>	3		
<b>Frame Rate:</b>	100 Hz		
<b>Data Rate:</b>	7.68 Mcps		
<b>Duty Cycle:</b>	33% for 5TX/10RX mode		
<b>Antenna Type:</b>	Internal		
<b>Antenna Gain:</b>	2 dBi		
<b>Number of Antenna Positions:</b>	1 Fixed		
<b>Power Supply Requirement:</b>	Via 3 host laptops delivering 3.3V DC / 1.0A		

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### **3. Test Specification, Methods and Procedures**

#### **3.1. Test Specification**

<b>Reference:</b>	OET Bulletin 65 Supplement C: (2001-01)
<b>Title:</b>	Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields.
<b>Purpose of Test:</b>	To determine whether the equipment met the basic restrictions as defined in OET Bulletin 65 Supplement C: (2001-01) using the SAR averaging method as described in the test specification above.

#### **3.2. Methods and Procedures Reference Documentation**

The methods and procedures used were as detailed in:

EN 62209-1: 2006

Title: Basic standard for the measurement of specific absorption rate related to human exposure to electromagnetic fields from mobile phones (300 MHz - 3 GHz).

ANSI/IEEE C95.1: 1999

IEEE standard for safety levels with respect to human exposure to radio frequency electromagnetic fields, 3 kHz to 300 GHz.

Federal Communications Commission, "Evaluating compliance with FCC Guidelines for human exposure to radio frequency electromagnetic fields", OET Bulletin 65 Supplement C, FCC, Washington, D.C, 20554, 2001.

Thomas Schmid, Oliver Egger and Neils Kuster, "Automated E-field scanning system for dosimetric assessments", IEEE Transaction on microwave theory and techniques, Vol. 44, pp. 105-113, January 1996.

Neils Kuster, Ralph Kastle and Thomas Schmid, "Dosimetric evaluation of mobile communications equipment with know precision", IEICE Transactions of communications, Vol. E80-B, No.5, pp. 645-652, May 1997.

#### **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 and Configuration of the EUT during Testing**

### **5.1. Operating Modes**

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

Transceiver mode: Set to transmit on 5 time slots and receive on 10 slots - 33% duty cycle, at 7.68 Mcps and 10 MHz channel data rate.

The reason for choosing this configuration was that it has been defined by the customer as being typical of normal use and likely to be worst case.

### **5.2. Configuration and Peripherals**

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

Supported via three host laptops PCMCIA ports using both the top and bottom PCMCIA ports. The EUT was positioned at 0 degrees and 90 degrees to the surface of the SAM phantom with 0 mm spacing at 0 degrees and 15mm spacing at 90 degrees.

#### **Body Configuration**

- a) The EUT was placed in a normal operating position where the centre of the EUT was aligned with the centre reference point on the flat section of the 'SAM' phantom.
  - b) With the EUT touching the phantom at an imaginary centre line. The EUT was aligned with a marked plane (X and Y axis) consisting of two lines.
  - c) For the touch-safe position the EUT was gradually moved towards the flat section of the 'SAM' phantom until any point of the EUT touched the phantom.
  - d) For position(s) greater than 0mm separation the EUT was positioned as per the touch-safe position, and then the vertical height was decreased/adjusted as required.
  - e) SAR measurements were evaluated at maximum power and the unit was operated for an appropriate period prior to the evaluation in order to minimise the drift.
  - f) The device was keyed to operate continuously in the transmit mode for the duration of the test.
  - g) The location of the maximum spatial SAR distribution (hot spot) was determined relative to the handset and its antenna.
  - h) The EUT was transmitting at full power throughout the duration of the test powered by a laptop PCMCIA port.
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## **6. Summary of Test Results**

<b>Test Name</b>	<b>Specification Reference</b>	<b>Compliance Status</b>
Specific Absorption Rate (SAR) Host Laptop Sony Vaio – TDCDMA 2500MHz Band Body	OET Bulletin 65 Supplement C: (2001-01)	Complied
Specific Absorption Rate (SAR) Host Laptop Dell Latitude – TDCDMA 2500MHz Band Body	OET Bulletin 65 Supplement C: (2001-01)	Complied
Specific Absorption Rate (SAR) Host Laptop HP Compaq – TDCDMA 2500MHz Band Body	OET Bulletin 65 Supplement C: (2001-01)	Complied

### **6.1. Location of Tests**

All the measurements described in this report were performed at the premises of RFI Global Services Ltd, Ewhurst Park, Ramsdell, Basingstoke, Hampshire, RG26 5RQ, UK.

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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. Specific Absorption Rate – Host Laptop Sony Vaio – TDCDMA 2500MHz Band Body**

#### **Test Summary:**

Tissue Volume:	1g
Maximum Level (W/kg):	0.577

#### **Environmental Conditions:**

Temperature Variation in Lab (°C):	24.0 to 25.0
Temperature Variation in Liquid (°C):	23.5 to 24.0

#### **Results:**

EUT Position	Phantom Configuration	Channel Number	Level (W/kg)	Limit (W/kg)	Margin (W/kg)	Note(s)	Result
EUT 0 Degree to Phantom	Flat (SAM)	12965	0.240	1.600	1.360	1,	Complied
EUT 90 Degree to Phantom	Flat (SAM)	12965	0.577	1.600	1.023	2,	Complied
EUT 0 Degree to Phantom	Flat (SAM)	12507	0.141	1.600	1.459	1,	Complied
EUT 90 Degree to Phantom	Flat (SAM)	12507	0.465	1.600	1.135	2,	Complied
EUT 0 Degree to Phantom	Flat (SAM)	13423	0.165	1.600	1.435	1,	Complied
EUT 90 Degree to Phantom	Flat (SAM)	13423	0.494	1.600	1.106	2,	Complied

#### **Note(s):**

1. SAR measurement was performed with the EUT at a separation distance of 0 mm from the 'SAM' phantom flat section.
2. SAR measurement was performed with the EUT at a separation distance of 15 mm from the 'SAM' phantom flat section.

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### 7.2.2. Specific Absorption Rate – Host Laptop Dell Latitude – TDCDMA 2500MHz Band Body

#### Test Summary:

Tissue Volume:	1g
Maximum Level (W/kg):	0.505

#### Environmental Conditions:

Temperature Variation in Lab (°C):	24.0 to 25.0
Temperature Variation in Liquid (°C):	23.5 to 24.0

#### Results:

EUT Position	Phantom Configuration	Channel Number	Level (W/kg)	Limit (W/kg)	Margin (W/kg)	Note(s)	Result
EUT 0 Degree to Phantom	Flat (SAM)	12965	0.160	1.600	1.440	1, 3,	Complied
EUT 90 Degree to Phantom	Flat (SAM)	12965	0.443	1.600	1.157	2, 3,	Complied
EUT 0 Degree to Phantom	Flat (SAM)	12965	0.282	1.600	1.318	1, 4,	Complied
EUT 90 Degree to Phantom	Flat (SAM)	12965	0.505	1.600	1.095	2, 4,	Complied
EUT 0 Degree to Phantom	Flat (SAM)	12507	0.151	1.600	1.449	1, 4,	Complied
EUT 90 Degree to Phantom	Flat (SAM)	12507	0.344	1.600	1.256	2, 4,	Complied
EUT 0 Degree to Phantom	Flat (SAM)	13423	0.115	1.600	1.485	1, 4,	Complied
EUT 90 Degree to Phantom	Flat (SAM)	13423	0.316	1.600	1.284	2, 4,	Complied

#### Note(s):

1. SAR measurement was performed with the EUT at a separation distance of 0 mm from the 'SAM' phantom flat section.
2. SAR measurement was performed with the EUT at a separation distance of 15 mm from the 'SAM' phantom flat section.
3. Top PCMCIA Slot
4. Bottom PCMCIA Slot

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### 7.2.3. Specific Absorption Rate – Host Laptop HP Compaq – TDCDMA 2500MHz Band Body

#### Test Summary:

Tissue Volume:	1g
Maximum Level (W/kg):	0.426

#### Environmental Conditions:

Temperature Variation in Lab (°C):	23.0 to 23.0
Temperature Variation in Liquid (°C):	23.4 to 23.1

#### Results:

EUT Position	Phantom Configuration	Channel Number	Level (W/kg)	Limit (W/kg)	Margin (W/kg)	Note(s)	Result
EUT 0 Degree to Phantom	Flat (SAM)	12965	0.179	1.600	1.421	1, 3,	Complied
EUT 90 Degree to Phantom	Flat (SAM)	12965	0.426	1.600	1.174	2, 3,	Complied
EUT 0 Degree to Phantom	Flat (SAM)	12965	0.181	1.600	1.419	1, 4,	Complied
EUT 90 Degree to Phantom	Flat (SAM)	12965	0.319	1.600	1.281	2, 4,	Complied
EUT 90 Degree to Phantom	Flat (SAM)	12507	0.314	1.600	1.286	2, 3,	Complied
EUT 90 Degree to Phantom	Flat (SAM)	13423	0.314	1.600	1.286	2, 3,	Complied
EUT 90 Degree to Phantom	Flat (SAM)	12507	0.251	1.600	1.349	2, 4,	Complied
EUT 90 Degree to Phantom	Flat (SAM)	13423	0.275	1.600	1.325	2, 4,	Complied

#### Note(s):

1. SAR measurement was performed with the EUT at a separation distance of 0 mm from the 'SAM' phantom flat section.
2. SAR measurement was performed with the EUT at a separation distance of 15 mm from the 'SAM' phantom flat section.
3. Top PCMCIA Slot
4. Bottom PCMCIA Slot

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#### 7.2.4. EIRP Measurement:

##### Sony Vaio – Integral Antenna

Channel	Frequency (MHz)	TX Power before Test (dBm)
Low	2501.4	22.5
Middle	2593.0	23.9
High	2684.6	22.9

##### Dell Latitude – Integral Antenna

Channel	Frequency (MHz)	TX Power before Test (dBm)
Low	2501.4	21.4
Middle	2593.0	24.5
High	2684.6	21.4

##### HP Compaq – Integral Antenna

Channel	Frequency (MHz)	TX Power before Test (dBm)
Low	2501.4	22.0
Middle	2593.0	24.3
High	2684.6	23.2

#### Note(s):

1. The EIRP was measured using 3 host Laptops for worst case level.
2. These measurements were performed as part of the Radio Performance testing which are included in RFI test report RFI/RPTE1/RP49365JD01A

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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”.

<b>Test Name</b>	<b>Confidence Level</b>	<b>Calculated Uncertainty</b>
Specific Absorption Rate Uncertainty at 2450 MHz Body 1g, Modulation Scheme calculated in accordance with IEC 62209-1 & IEEE 1528	95%	19.33

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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### 2450 MHz – Body Configuration

Type	Source of uncertainty	+ Value	- Value	Probability Distribution	Divisor	C <sub>i</sub> (t <sub>g</sub> )	Standard Uncertainty		v <sub>i</sub> or v <sub>eff</sub>
							+ u (%)	- u (%)	
B	Probe calibration	11.800	11.800	normal (k=2)	2.0000	1.0000	5.900	5.900	∞
B	Axial Isotropy	0.500	0.500	normal (k=2)	2.0000	1.0000	0.250	0.250	∞
B	Hemispherical Isotropy	2.600	2.600	normal (k=2)	2.0000	1.0000	1.300	1.300	∞
B	Spatial Resolution	0.500	0.500	Rectangular	1.7321	1.0000	0.289	0.289	∞
B	Boundary Effect	0.769	0.769	Rectangular	1.7321	1.0000	0.444	0.444	∞
B	Linearity	0.600	0.600	Rectangular	1.7321	1.0000	0.346	0.346	∞
B	Detection Limits	0.200	0.200	Rectangular	1.7321	1.0000	0.115	0.115	∞
B	Readout Electronics	0.560	0.560	normal (k=2)	2.0000	1.0000	0.280	0.280	∞
B	Response Time	0.000	0.000	Rectangular	1.7321	1.0000	0.000	0.000	∞
B	Integration Time	0.000	0.000	Rectangular	1.7321	1.0000	0.000	0.000	∞
B	RF Ambient conditions	3.000	3.000	Rectangular	1.7321	1.0000	1.732	1.732	∞
B	Probe Positioner Mechanical Restrictions	4.000	4.000	Rectangular	1.7321	1.0000	2.309	2.309	∞
B	Probe Positioning with regard to Phantom Shell	2.850	2.850	Rectangular	1.7321	1.0000	1.645	1.645	∞
B	Extrapolation and integration/ Maximum SAR evaluation	5.080	5.080	Rectangular	1.7321	1.0000	2.933	2.933	∞
A	Test Sample Positioning	2.920	2.920	normal (k=1)	1.0000	1.0000	2.920	2.920	10
A	Device Holder uncertainty	0.154	0.154	normal (k=1)	1.0000	1.0000	0.154	0.154	10
B	Phantom Uncertainty	4.000	4.000	Rectangular	1.7321	1.0000	2.309	2.309	∞
B	Drift of output power	5.000	5.000	Rectangular	1.7321	1.0000	2.887	2.887	∞
B	Liquid Conductivity (target value)	5.000	5.000	Rectangular	1.7321	0.6400	1.848	1.848	∞
A	Liquid Conductivity (measured value)	3.930	3.930	normal (k=1)	1.0000	0.6400	2.515	2.515	5
B	Liquid Permittivity (target value)	5.000	5.000	Rectangular	1.7321	0.6000	1.732	1.732	∞
A	Liquid Permittivity (measured value)	3.940	3.940	normal (k=1)	1.0000	0.6000	2.364	2.364	5
	Combined standard uncertainty			t-distribution			9.86	9.86	>400
	Expanded uncertainty			k = 1.96			19.33	19.33	>400