

# TEST REPORT FROM RFI GLOBAL SERVICES LTD

Test of: Smartwave LF Tool

To: FCC Part 15: 2008 Subpart C Clauses 15.209 and 15.215,  
RSS-210 Issue 7 June 2007 & RSS-Gen Issue 2 June 2007

**Test Report Serial No:**  
RFI/RPT1/RP74748JD01A

<b>This Test Report Is Issued Under The Authority Of Brian Watson, Operations Director:</b>	
Checked By:	pp <i>R. Graham</i>
Signature:	<i>R. Graham</i>
Date of Issue:	23 June 2009

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## **1. Customer Information**

<b>Company Name:</b>	Omitec Ltd
<b>Address:</b>	Hopton Industrial Estate London Road Devizes Wiltshire SN10 2EU

## 2. Summary of Testing

### 2.1. General Information

<b>Specification Reference:</b>	47CFR15.209 & 47CFR15.215
<b>Specification Title:</b>	Code of Federal Regulations Volume 47 (Telecommunications) 2008: Part 15 Subpart B (Radio Frequency Devices) - Sections 15.209 & 15.215
<b>Specification Reference:</b>	RSS-210 Issue 7 June 2007
<b>Specification Title:</b>	Low-power Licence-exempt Radio communication Devices (All Frequency Bands): Category I Equipment.
<b>Specification Reference:</b>	RSS-GEN Issue 2 June 2007
<b>Specification Title:</b>	General Requirements and Information for the Certification of Radio communication Equipment
<b>Site Registration:</b>	FCC: 209735; Industry Canada: 3245B-2
<b>Location of Testing:</b>	RFI Global Services Ltd, Wade Road, Basingstoke, Hampshire, RG24 8AH.
<b>Test Dates:</b>	11 June 2009 to 23 June 2009

### 2.2. Summary of Test Results

FCC Reference (47CFR)	IC Reference	Measurement	Port Type	Result
Part 15.209(a)	RSS-Gen 4.9 RSS-210 A2.2	Transmitter Radiated Emissions	Antenna	
Part 15.215(c)	RSS-Gen 4.6.1	Transmitter 20 dB Bandwidth	Antenna	
<b>Key to Results</b>				
= Complied		= Did not comply		

### 2.3. Methods and Procedures

<b>Reference:</b>	ANSI C63.4 (2003)
<b>Title:</b>	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.

### 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)**

<b>Brand Name:</b>	Bendix
<b>Model Name:</b>	Smartwave LF Tool
<b>Model Number:</b>	200.0209
<b>Serial Number:</b>	None stated
<b>Hardware Version Number:</b>	Issue 1
<b>Software Version Number:</b>	Issue 1.3.0
<b>Industry Canada Number:</b>	6220A-2000209
<b>FCC ID Number:</b>	SV4-2000209

#### **3.2. Description of EUT**

The equipment under test is a 125 kHz transmitter which allows a technician to check the function of an RF transmitter in a tyre pressure monitoring sensor is working correctly.

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

No modifications were applied to the EUT during testing.

#### **3.4. Additional Information Related to Testing**

<b>Tested Technology:</b>	RFID	
<b>Channel Spacing:</b>	N/A as the EUT is a single channel device	
<b>Transmit Frequency:</b>	125 kHz	
<b>Power Supply Requirement:</b>	Nominal	9.0 V

#### **3.5. Support Equipment**

No support equipment was used to exercise the EUT during testing.

## **4. Operation and Monitoring of the EUT during Testing**

### **4.1. Operating Modes**

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

- The EUT constantly transmitted at maximum power.

### **4.2. Configuration and Peripherals**

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

- Standalone

## **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**

### **5.2.1. Transmitter Radiated Emissions**

#### **Test Summary:**

<b>FCC Part:</b>	15.209(a)
<b>Test Method Used:</b>	As detailed in ANSI C63.4 Section 8 and relevant annexes
<b>Frequency Range</b>	9 kHz to 1000 MHz

#### **Environmental Conditions:**

<b>Temperature (°C):</b>	23
<b>Relative Humidity (%):</b>	34

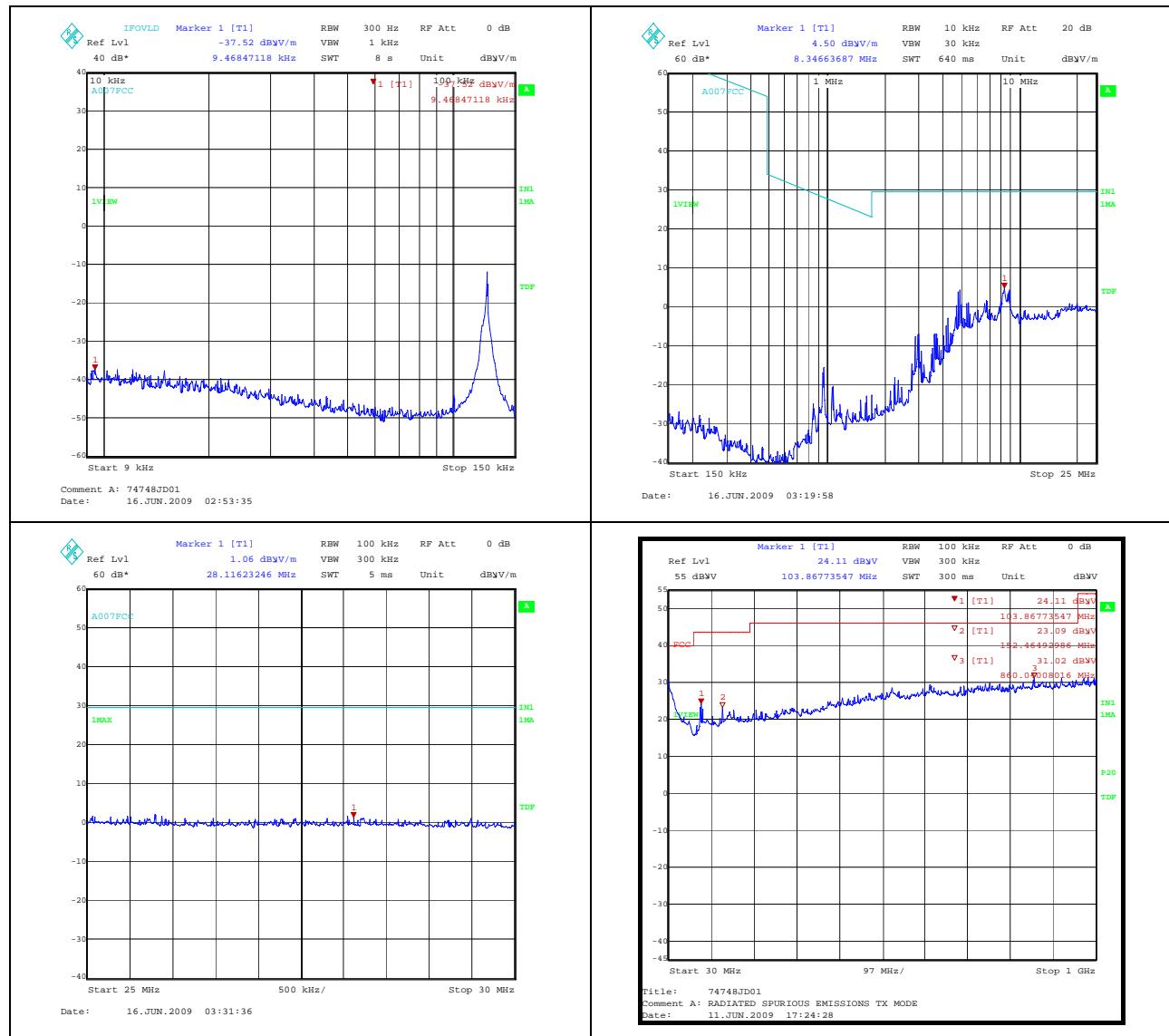
#### **Results: Electric Field Strength Measurements**

Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
0.125	90° to EUT	-11.5	19.2 (at 300 m)	30.7	Complied

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

1. Measurements were performed at 3 metres.
2. Limits below 30 MHz are specified at a test distance of 30 metres, whilst below 0.49 MHz they are specified at a test distance of 300 metres. However, as specified by FCC Section 15.31 (f)(2), measurements may be performed at a closer distance and the measured level corrected to the specified measurement distance by making the measurements at a minimum of two distances on at least one radial to determine the proper extrapolation factor.
3. A transducer factor on the test equipment was used to extrapolate the result obtained at 3 metres to the required measurement distance.
4. All other emissions were at least 20 dB below the appropriate limit.

## Transmitter Radiated Emissions (continued)



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

### **5.2.2. Transmitter 20 dB Bandwidth**

#### **Test Summary:**

<b>FCC Part:</b>	15.215
<b>Test Method Used:</b>	As detailed in ANSI C63.4 Section 13.1.7 and relevant annexes (see note below)

#### **Environmental Conditions:**

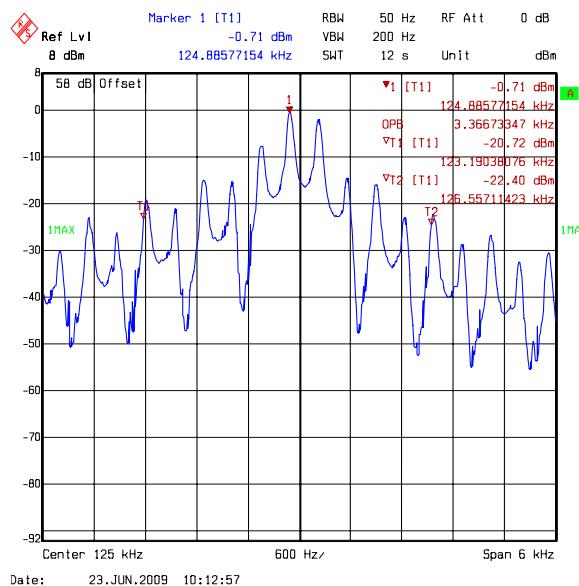
<b>Temperature (°C):</b>	26
<b>Relative Humidity (%):</b>	32

#### **Results:**

<b>20 dB Bandwidth (kHz)</b>	
	3.4

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

1. In lieu of the test method detailed in ANSI C63.4 Section 13.1.7 the 99% occupied bandwidth was measured using the Occupied Bandwidth function of the spectrum analyser



## **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
20 dB Bandwidth	N/A	95%	±0.92 ppm
Radiated Spurious Emissions	9 kHz to 30 MHz	95%	±3.53 dB
Radiated Spurious Emissions	30 MHz to 1000 MHz	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)
A007	Antenna	Rohde & Schwarz	HFH2-Z2	880 458/020	29 Mar 2009	12
A1299	Antenna	Schaffner	CBL6143	5094	28 Jul 2008	12
K0001	5m SAC Chamber	Rainford EMC	N/A	N/A	26 Aug 2008	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	26 Aug 2008	12
M1124	Test Receiver	Rohde & Schwarz	ESIB26	100046K	09 Mar 2009	12
M1273	Test Receiver	Rhode & Schwarz	ESIB26	100275	01 Apr 2009	12
M1242	Spectrum Analyser	Rhode & Schwarz	FSEM30	845986/022	09 Dec 2008	12

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