

TEST REPORT FROM RFI GLOBAL SERVICES LTD



Test of: Vitalsens Aingeal (VS200)

FCC ID: YVF-VS200

To: FCC Part 15.247(b)(3)

Test Report Serial No:
RFI-RPT-RP78483JD06A V6.0

Version 6.0 Supersedes All Previous Versions

This Test Report Is Issued Under The Authority Of Chris Guy, Head of Global Approvals:		
Checked By:	A. Henriques	
Signature:		
Date of Issue:	22 March 2011	

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1. Customer Information




Company Name:	Intelesens Limited
Address:	4 Heron Road Belfast Northern Ireland BT3 9LE United Kingdom

2. Summary of Testing

2.1. General Information

Specification Reference:	47CFR15.247
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications) 2010: Part 15 Subpart C (Intentional Radiators) - Section 15.247
Site Registration:	FCC: 209735
Location of Testing:	RFI Global Services Ltd, Wade Road, Basingstoke, Hampshire, RG24 8AH.
Test Date:	03 November 2010

2.2. Summary of Test Results

FCC Reference (47CFR)	Measurement	Result
Part 15.247(b)(3)	Transmitter Maximum Peak Output Power	
Part 15.247(b)(3)	Transmitter Average Output Power	Note 1
Key to Results  = Complied  = Did not comply		

Note 1: The measurement was performed to support SAR tests.

2.3. Methods and Procedures

Reference:	ANSI C63.4 (2009)
Title:	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
Reference:	ANSI C63.10 (2009)
Title:	American National Standard for Testing Unlicensed Wireless Devices

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:	Vitalsens
Model Name or Number:	Aingeal (VS200)
Serial Number:	QB002S0000005
Hardware Version Number:	QB002V0
Software Version Number:	Aingeal_FCC.txt
FCC ID:	YVF-VS200

Brand Name:	Vitalsens
Model Name or Number:	Aingeal (VS200)
Serial Number:	QB002S0000008
Hardware Version Number:	QB002V0
Software Version Number:	Aingeal_FCC.txt
FCC ID:	YVF-VS200

Brand Name:	Vitalsens
Model Name or Number:	Aingeal (VS200)
Serial Number:	QB002S0000013
Hardware Version Number:	QB002V0
Software Version Number:	Aingeal_FCC.txt
FCC ID:	YVF-VS200

3.2. Description of EUT

The equipment under test was a Wi-Fi 802.11b/g respiration, ECG analysis and cardiac event detection system, suitable for use on adult patients who are ambulatory or non-ambulatory, in health care facilities.

The device contains a pre-certified WiFi module with FCC ID U30-G2M5477.

3.3. Modifications Incorporated in the EUT

No modifications were applied to the EUT during testing.

3.4. Additional Information Related to Testing

Technology Tested:	Digital Transmission System IEEE 802.11		
Type of Unit:	Transceiver		
Data Rate:	802.11b 1 Mbps, 802.11b 11 Mbps, 802.11g 6 Mbps and 802.11g 54 Mbps		
Maximum Peak Conducted Power:	18.0 dBm		
Maximum Average Conducted Power::	12.3 dBm		
Transmit Frequency Range:	2412 MHz to 2462 MHz		
Transmit Channels Tested:	Channel ID	Channel Number	Channel Frequency (MHz)
	Bottom	1	2412
	Middle	6	2437
	Top	11	2462

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):

- Transmitting at maximum power on bottom, middle and top channels. Tests were performed with the EUT in 802.11b and 802.11g modes transmitting with the lowest and highest data rates supported in each mode.

4.2. Configuration and Peripherals

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

- The EUT was controlled by pre-loaded test software. The modes and data rates were selected from the user interface following instructions supplied by the Customer.
- The Customer supplied three samples for testing. Serial No. QB002S0000005 was used when performing tests on the bottom channel, QB002S0000013 was used when performing tests on the centre channel and QB002S0000008 was used when performing tests on the top channel.

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 Maximum Peak Output Power

Test Summary:

Test Engineer:	Nick Steele	Test Date:	03 November 2010
Test Sample Serial No:	QB002S00000005, QB002S00000013 and QB002S00000008		

FCC Part:	15.247(b)(3)
Test Method Used:	As detailed in ANSI C63.10 Sections 6.10.2, 6.3 and 6.6 referencing ANSI C63.4 (see note below)

Environmental Conditions:

Temperature (°C):	21
Relative Humidity (%):	23

Results: 802.11b 1 Mbps

Conducted Peak Limit Comparison

Channel	Conducted Peak Power (dBm)	Conducted Peak Power Limit (dBm)	Margin (dB)	Result
Bottom	13.9	30.0	16.1	Complied
Middle	13.6	30.0	16.4	Complied
Top	14.0	30.0	16.0	Complied

De Facto EIRP Limit Comparison

Channel	Conducted Peak Power (dBm)	Declared Antenna Gain (dBi)	EIRP (dBm)	De Facto EIRP Limit (dBm)	Margin (dB)	Result
Bottom	13.9	-1.2	12.7	36.0	23.3	Complied
Middle	13.6	-1.2	12.4	36.0	23.6	Complied
Top	14.0	-1.2	12.8	36.0	23.2	Complied

Transmitter Maximum Peak Output Power (continued)**Results: 802.11b 11 Mbps****Conducted Peak Limit Comparison**

Channel	Conducted Peak Power (dBm)	Conducted Peak Power Limit (dBm)	Margin (dB)	Result
Bottom	17.8	30.0	12.2	Complied
Middle	17.4	30.0	12.6	Complied
Top	18.0	30.0	12.0	Complied

De Facto EIRP Limit Comparison

Channel	Conducted Peak Power (dBm)	Declared Antenna Gain (dBi)	EIRP (dBm)	De Facto EIRP Limit (dBm)	Margin (dB)	Result
Bottom	17.8	-1.2	16.6	36.0	19.4	Complied
Middle	17.4	-1.2	16.2	36.0	19.8	Complied
Top	18.0	-1.2	16.8	36.0	19.2	Complied

Results: 802.11g 6 Mbps**Conducted Peak Limit Comparison**

Channel	Conducted Peak Power (dBm)	Conducted Peak Power Limit (dBm)	Margin (dB)	Result
Bottom	14.9	30.0	15.1	Complied
Middle	14.5	30.0	15.5	Complied
Top	15.0	30.0	15.0	Complied

De Facto EIRP Limit Comparison

Channel	Conducted Peak Power (dBm)	Declared Antenna Gain (dBi)	EIRP (dBm)	De Facto EIRP Limit (dBm)	Margin (dB)	Result
Bottom	14.9	-1.2	13.7	36.0	22.3	Complied
Middle	14.5	-1.2	13.3	36.0	22.7	Complied
Top	15.0	-1.2	13.8	36.0	22.2	Complied

Transmitter Maximum Peak Output Power (continued)**Results: 802.11g 54 Mbps****Conducted Peak Limit Comparison**

Channel	Conducted Peak Power (dBm)	Conducted Peak Power Limit (dBm)	Margin (dB)	Result
Bottom	16.9	30.0	13.1	Complied
Middle	16.6	30.0	13.3	Complied
Top	16.9	30.0	13.1	Complied

De Facto EIRP Limit Comparison

Channel	Conducted Peak Power (dBm)	Declared Antenna Gain (dBi)	EIRP (dBm)	De Facto EIRP Limit (dBm)	Margin (dB)	Result
Bottom	16.9	-1.2	15.7	36.0	20.3	Complied
Middle	16.6	-1.2	15.4	36.0	20.6	Complied
Top	16.9	-1.2	15.7	36.0	20.3	Complied

Note(s):

1. Tests were performed using a combination of the conducted test method described in ANSI C63.10 Section 6.10.2 and the test methods for radiated emissions measurements described in Sections 6.3 and 6.6. The reason for this being that the measurements were performed radiated as the EUT has an integral antenna and does not have an external antenna port.
2. The EUT does not have an external antenna port therefore the EIRP was measured and the antenna gain subtracted to obtain the conducted power.

5.2.2. Transmitter Average Output Power (EIRP)**Test Summary:**

Test Engineer:	Nick Steele	Test Date:	03 November 2010
Test Sample Serial No:	QB002S0000005, QB002S0000013 and QB002S0000008		

FCC Part:	15.247(b)(3)
Test Method Used:	As detailed in ANSI C63.10 Section 6.10.2 and Sections 6.3 and 6.6 referencing ANSI C63.4 (see note below)

Environmental Conditions:

Temperature (°C):	21
Relative Humidity (%):	23

Results: 802.11b 1 Mbps

Channel	Frequency (MHz)	Average Conducted Transmit Power (dBm)	Antenna Gain (dBi)	Average Transmit EIRP (dBm)	Note
Bottom	2412	8.9	-1.2	7.7	Note 1
Middle	2437	8.6	-1.2	7.4	
Top	2462	9.2	-1.2	8.0	

Results: 802.11b 11 Mbps

Channel	Frequency (MHz)	Average Conducted Transmit Power (dBm)	Antenna Gain (dBi)	Average Transmit EIRP (dBm)	Note
Bottom	2412	11.7	-1.2	10.5	Note 1
Middle	2437	11.3	-1.2	10.1	
Top	2462	12.0	-1.2	10.8	

Transmitter Average Output Power (continued)**Results: 802.11g 6 Mbps**

Channel	Frequency (MHz)	Average Conducted Transmit Power (dBm)	Antenna Gain (dBi)	Average Transmit EIRP (dBm)	Note
Bottom	2412	10.0	-1.2	8.8	Note 1
Middle	2437	9.7	-1.2	8.5	
Top	2462	10.2	-1.2	9.0	

Results: 802.11g 54 Mbps

Channel	Frequency (MHz)	Average Conducted Transmit Power (dBm)	Antenna Gain (dBi)	Average Transmit EIRP (dBm)	Note
Bottom	2412	12.1	-1.2	10.9	Note 1
Middle	2437	11.4	-1.2	10.2	
Top	2462	12.3	-1.2	11.1	

Note(s):

1. Average Transmit Power tests were performed to support SAR measurements.
2. Tests were performed using a combination of the conducted test method described in ANSI C63.10 Section 6.10.2 and the test methods for radiated emissions measurements described in Sections 6.3 and 6.6. The reason for this being that the measurements were performed radiated as the EUT has an integral antenna and does not have an external antenna port.
3. The EUT does not have an external antenna port therefore the EIRP was measured and the antenna gain subtracted to obtain the conducted power.

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
Radiated Maximum Peak Output Power	2.4 GHz to 2.4835 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 Calibration Due	Cal. Interval (Months)
A1534	Pre Amplifier	Hewlett Packard	8449B	3008A00405	06 Jun 2011	12
A1818	Antenna	EMCO	3115	00075692	05 Sep 2011	12
A1970	Pre Amplifier	RFI	1–18 GHz	N/A	22 Mar 2011	12
K0001	5m RSE Chamber	Rainford EMC	N/A	N/A	25 Apr 2011	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	05 Sep 2011	12
L1001	Test Receiver	Rohde & Schwarz	ESU26	100239	28 Jan 2011	12
M1124	Spectrum Analyser	Rohde & Schwarz	ESI26	100046K	22 Apr 2011	12

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