



# TEST REPORT FROM RFI GLOBAL SERVICES LTD

Test of: Blu+

FCC ID: S5E1106MM1

To: FCC Part 15.209 and 15.215 (c)

**Test Report Serial No:**  
RFI-RPT-RP80655JD23A V3.0  
**Version 3.0 supersedes all previous versions**

<b>This Test Report Is Issued Under The Authority Of John Newell, Group Quality Manager:</b> 	
<b>Checked By:</b>	Philip Harrison
<b>Signature:</b>	
<b>Date of Issue:</b>	07 June 2012

This report is issued in Adobe Acrobat portable document format (PDF). It is only a valid copy of the report if it is being viewed in PDF format with the following security options not allowed: Changing the document, Selecting text and graphics, Adding or changing notes and form fields.

This report may not be reproduced other than in full, except with the prior written approval of RFI Global Services Ltd. The results in this report apply only to the sample(s) tested.

This page has been left intentionally blank.

**Table of Contents**

<b>1. Customer Information .....</b>	<b>4</b>
<b>2. Summary of Testing .....</b>	<b>5</b>
2.1. General Information	5
2.2. Summary of Test Results	5
2.3. Methods and Procedures	5
2.4. Deviations from the Test Specification	5
<b>3. Equipment Under Test (EUT) .....</b>	<b>6</b>
3.1. Identification of Equipment Under Test (EUT)	6
3.2. Description of EUT	6
3.3. Modifications Incorporated in the EUT	6
3.4. Additional Information Related to Testing	6
3.5. Support Equipment	6
<b>4. Operation and Monitoring of the EUT during Testing .....</b>	<b>7</b>
4.1. Operating Modes	7
4.2. Configuration and Peripherals	7
<b>5. Measurements, Examinations and Derived Results .....</b>	<b>8</b>
5.1. General Comments	8
5.2. Test Results	9
5.2.1. Transmitter Radiated Emissions (Fundamental)	9
5.2.2. Transmitter Radiated Spurious Emissions	10
5.2.3. Transmitter 20 dB Bandwidth	12
<b>6. Measurement Uncertainty .....</b>	<b>13</b>
<b>Appendix 1. Test Equipment Used .....</b>	<b>14</b>

**1. Customer Information**






<b>Company Name:</b>	Satellite Tracking of People LLC
<b>Address:</b>	1212 North Post Oak Road Suite 100 Houston Texas 77055

## **2. Summary of Testing**

### **2.1. General Information**

<b>Specification Reference:</b>	47CFR15.209 and 47CFR15.215
<b>Specification Title:</b>	Code of Federal Regulations Volume 47 (Telecommunications) 2011: Part 15 Subpart C (Intentional Radiators) - Sections 15.209 and 15.215
<b>Site Registration:</b>	FCC: 209735
<b>Location of Testing:</b>	RFI Global Services Ltd, Wade Road, Basingstoke, Hampshire, RG24 8AH.
<b>Test Date:</b>	9 May 2012

### **2.2. Summary of Test Results**

<b>FCC Reference (47CFR)</b>	<b>Measurement</b>	<b>Result</b>
Part 15.209	Transmitter Radiated Emissions (Fundamental)	
Part 15.209	Transmitter Radiated Emissions	
Part 15.215(c)	Transmitter 20 dB Bandwidth	
<b>Key to Results</b>  = Complied  = Did not comply		

### **2.3. Methods and Procedures**

<b>Reference:</b>	ANSI C63.4 (2009)
<b>Title:</b>	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
<b>Reference:</b>	ANSI C63.10 (2009)
<b>Title:</b>	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:	Blutag
Model Name or Number:	Blu+
Hardware Version Number:	GG79-009
Software Version Number:	RFI_V104 (Used to enable testing)
Unique Identification/IMEI	353197040010826
FCC ID:	S5E1106MM1

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

The equipment under test was an ankle worn tracking device containing a 128.4 kHz transmitter module.

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

No modifications were applied to the EUT during testing.

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

Tested Technology:	RFID	
Power Supply Requirement:	Nominal	3.7 VDC
Type of Unit:	Transmitter	
Transmit Frequency	128.4 kHz	

#### **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):

- Transmit mode.

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

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

- The EUT was enabled into a test mode which allowed for continuous transmission, as soon as the battery was connected.

## **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 (Fundamental)

#### Test Summary:

Test Engineer:	Andrew Edwards	Test Date:	09 May 2012
Test Sample IMEI No:	353197040010826		

FCC Part:	15.209
Test Method Used:	ANSI C63.10 Section 6.4

#### Environmental Conditions:

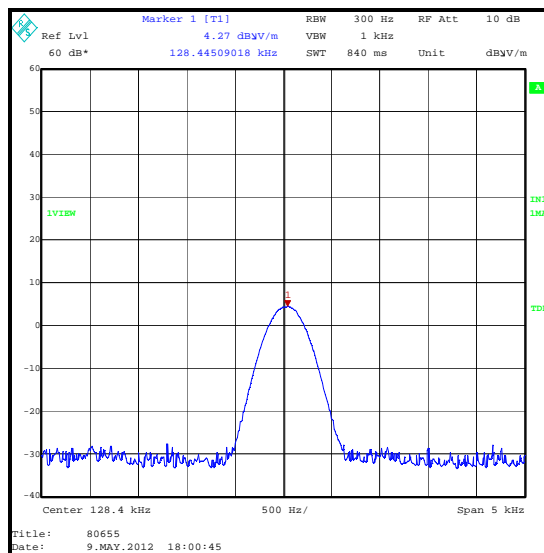
Temperature (°C):	28
Relative Humidity (%):	38

#### Results: Quasi Peak

Frequency (kHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Limit at 300 m (dB $\mu$ V/m)	Margin (dB)	Result
128.4	90° to EUT	4.2	19.2	15.0	Complied

#### Note(s):

1. The limit is 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 using the square of an inverse linear distance extrapolation factor (40dB/decade).
2. A transducer factor on the measuring instrument was used to extrapolate the results at 3 metres to a distance of 300 metres. A distance extrapolation factor of 80 dB was used.



**5.2.2. Transmitter Radiated Spurious Emissions****Test Summary:**

<b>Test Engineer:</b>	Andrew Edwards	<b>Test Date:</b>	09 May 2012
<b>Test Sample IMEI No:</b>	353197040010826		

<b>FCC Part:</b>	15.209
<b>Test Method Used:</b>	As detailed in ANSI C63.10 Sections 6.3, 6.4 and 6.5 referencing ANSI C63.4
<b>Frequency Range:</b>	9 kHz to 1000 MHz

**Environmental Conditions:**

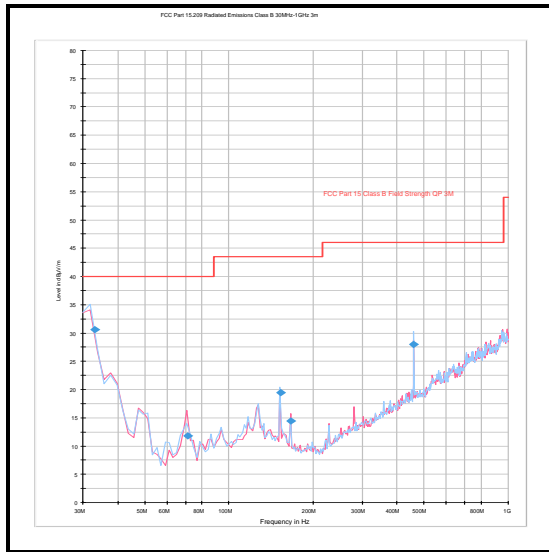
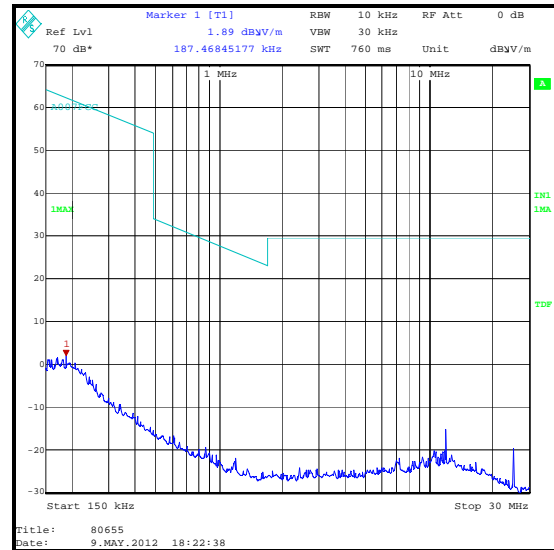
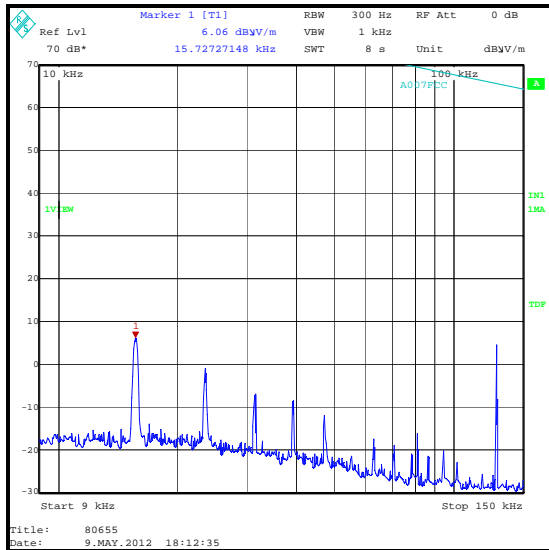
<b>Temperature (°C):</b>	27
<b>Relative Humidity (%):</b>	38

**Results: Quasi Peak**

Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
33.186	Horizontal	30.6	40.0	9.4	Complied
71.163	Vertical	11.8	40.0	28.2	Complied
153.325	Vertical	19.5	43.5	24.0	Complied
166.077	Vertical	14.4	43.5	29.1	Complied
458.777	Horizontal	28.0	46.0	18.0	Complied

**Note(s):**

- 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 using the square of an inverse linear distance extrapolation factor (40dB/decade).
- A transducer factor on the measuring instrument was used to extrapolate the results at 3 metres to a distance of 30 metres where required. A distance extrapolation factor of 40 dB was used.
- Final measurement values include corrections for antenna factor and cable losses.
- The emission shown at approximately 128.4 kHz is the fundamental.
- All emissions on the 9 kHz to 150 kHz plot were investigated and found to be ambient.
- All other emissions shown on the pre-scan plots were investigated and found to be >20 dB below the applicable limit or below the measurement system noise floor.
- Measurements in the range 30 MHz to 1 GHz were performed in a semi-anechoic chamber (RFI Asset Number K0001) at a distance of 3 metres. The EUT was placed at a height of 80 cm above the reference ground plane in the centre of the chamber turntable. Maximum emission levels were determined by height searching the measurement antenna over the range 1 metre to 4 metres.

**Transmitter Radiated Spurious Emissions (continued)**

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

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

<b>Test Engineer:</b>	Andrew Edwards	<b>Test Date:</b>	09 May 2012
<b>Test Sample IMEI No:</b>	353197040010826		

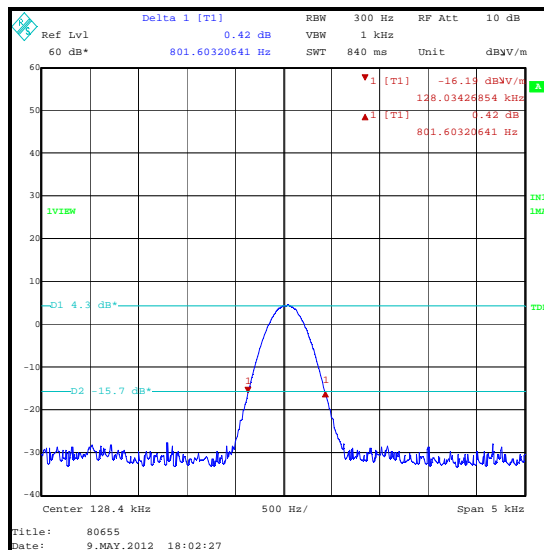
<b>FCC Part:</b>	15.215(c)
<b>Test Method Used:</b>	As detailed in ANSI C63.10 Section 6.9.1

**Environmental Conditions:**

<b>Temperature (°C):</b>	27
<b>Relative Humidity (%):</b>	38

**Results:**

<b>20 dB Bandwidth (Hz)</b>
801.6 Hz



## **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	128 kHz	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 Calibration Due	Cal. Interval (months)
A1834	Attenuator	Hewlett Packard	8491B	10444	29 Jan 2013	12
A553	Antenna	Chase	CBL6111A	1593	15 Feb 2013	12
G0543	Amplifier	Sonoma Instrument Co.	310N	230801	13 Jul 2012	3
K0001	5m Semi-Anechoic Chamber	Rainford EMC	N/A	N/A	29 May 2012	12
M1273	Test Receiver	Rohde & Schwarz	ESIB 26	100275	03 Feb 2013	12
M1568	Magnetic Loop	Rohde & Schwarz	HFH2-Z2	879284/2	08 Feb 2013	12

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