# TEST REPORT

## Test Report No. : UL-RPT-RP10155013JD27A V2.0

| | | |
|---|---|---|
| **Manufacturer** | : | Satellite Tracking of People LLC |
| **Model No.** | : | Blu+ |
| **FCC ID** | : | S5E0114BLU07 |
| **IC Certification No.** | : | 9086A-BLU07 |
| **Test Standard(s)** | : | FCC Parts 15.209, 15.215 & 15.219<br>Industry Canada RSS Gen Sections 4.6.1, 4.9 & 7.2.5;<br>RSS-210 Section A2.2 |

1. This test report shall not be reproduced in full or partial, without the written approval of UL VS LTD.
2. The results in this report apply only to the sample(s) tested.
3. The sample tested is in compliance with the above standard(s).
4. The test results in this report are traceable to the national or international standards.
5. Version 2.0 supersedes all previous versions.

**Date of Issue:** 24 September 2014

**Checked by:**

Sarah Williams
Engineer, Radio Laboratory

**Issued by :**

pp

John Newell
Quality Manager,
UL VS LTD

ilac-MRA UKAS TESTING 0644

This laboratory is accredited by UKAS. The tests reported herein have been performed in accordance with its terms of accreditation.

**UL VS LTD**

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## Table of Contents

# 1. Customer Information

| | |
|---|---|
| **Company Name:** | Satellite Tracking of People LLC |
| **Address:** | 212 North Post Oak Rd,<br>Suite 100,<br>Houston,<br>TX 77055<br>USA |

# 2. Summary of Testing

## 2.1. General Information

| | |
|---|---|
| **Specification Reference:** | 47CFR15.215 and 47CFR15.219 |
| **Specification Title:** | Code of Federal Regulations Volume 47 (Telecommunications):<br>Part 15 Subpart C (Radio Frequency Devices) - Sections 15.217 and 15.219 |
| **Specification Reference:** | 47CFR15.209 |
| **Specification Title:** | Code of Federal Regulations Volume 47 (Telecommunications):<br>Part 15 Subpart C (Intentional Radiators) – Section 15.209 |
| **Specification Reference:** | RSS-Gen Issue 3 December 2010 |
| **Specification Title:** | General Requirements and Information for the Certification of Radio Apparatus |
| **Specification Reference:** | RSS-210 Issue 8 December 2010 |
| **Specification Title:** | Licence-exempt Radio Apparatus (All Frequency Bands):<br>Category I Equipment. |
| **Site Registration:** | FCC: 209735; Industry Canada: 3245B-2 |
| **Location of Testing:** | UL VS LTD, Unit 3 Horizon, Wade Road, Kingsland Business Park,<br>Basingstoke, Hampshire, RG24 8AH, United Kingdom |
| **Test Dates:** | 15 August 2014 to 05 September 2014 |

## 2.2. Summary of Test Results

| FCC Reference (47CFR) | IC Reference | Measurement | Result |
|---|---|---|---|
| Part 15.219(a) | RSS-210 A2.2 | Transmitter Fundamental Field Strength | ✓ |
| N/A | RSS-Gen 4.6.1 | Transmitter 99% Emission Bandwidth | ✓ |
| Part 15.209 / 15.219(c) | RSS-Gen 4.9/ 7.2.5 / RSS-210 A2.2(d) | Transmitter Radiated Emissions | ✓ |

**Key to Results**

✓ = Complied ✗ = Did not comply

## 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:** | Blu+ V7 |
| **Model Name or Number:** | Blu+ |
| **Test Sample Serial Number:** | 003 *(Radiated Sample)* |
| **Hardware Version Number:** | KK37 V7 |
| **Software Version Number:** | 10.0.0. |
| **FCC ID:** | S5E0114BLU07 |
| **Industry Canada Certification Number:** | 9086A-BLU07 |

## 3.2. Description of EUT

The Equipment Under Test was an offender body worn tracking device fitted with an inductive loop system.

## 3.3. Modifications Incorporated in the EUT

No modifications were applied to the EUT during testing.

## 3.4. Additional Information Related to Testing

| | |
|---|---|
| **Type of Radio Device:** | Inductive Loop |
| **Transmit Frequency Band:** | 510-1705 kHz |

## 3.5. Support Equipment

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

| | |
|---|---|
| **Description:** | Blu+ Charger / PSU |
| **Brand Name:** | Spry Power Products |
| **Model Name or Number:** | PA1015-2HU |
| **Serial Number:** | B2013090007444 |

# 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 - continuously transmitting with 100% duty cycle at maximum power.
- Receive/Idle mode.

## 4.2. Configuration and Peripherals

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

- The EUT had test software pre-installed by the Customer. This allowed selection of continuous transmission at maximum power.
- A test SIM was fitted to the EUT for all tests.

# 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.

In accordance with UKAS requirements all the measurement equipment is on a calibration schedule. All equipment was within the calibration period on the date of testing.

## 5.2. Test Results

### 5.2.1. Transmitter Fundamental Field Strength

### Test Summary:

| | | | |
|---|---|---|---|
| **Test Engineer:** | Mark Percival | **Test Date:** | 04 September 2014 |
| **Test Sample Serial Number:** | 003 | | |

| | |
|---|---|
| **FCC Reference:** | Parts 15.209 & 15.219(c) |
| **Industry Canada Reference:** | RSS-Gen 4.8 / RSS-210 A2.2 |
| **Test Method Used:** | As detailed in ANSI C63.10 Section 6.4 |

### Environmental Conditions:

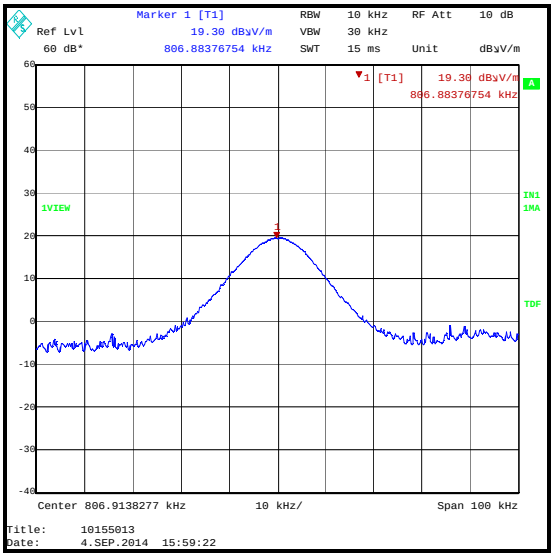
| | |
|---|---|
| **Temperature (°C):** | 24 |
| **Relative Humidity (%):** | 32 |

### Note(s):

1. The limit is specified at a test distance of 30 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 30 metres. A distance extrapolation factor of 40 dB was used.
3. Radiated measurements were performed with a peak detector (worst case). The peak level was compared to the FCC Part 15.209 and Industry Canada RSS-210 general limits.

### Results: Peak

| Frequency (kHz) | Antenna Polarity | Level (dBµV/m) | Limit at 30 m (dBµV/m) | Margin (dB) | Result |
|---|---|---|---|---|---|
| 806.884 | Tip 90°to EUT | 19.3 | 29.7 | 10.4 | Complied |



## Transmitter Fundamental Field Strength (continued)

## Test Equipment Used:

| Asset No. | Instrument | Manufacturer | Type No. | Serial No. | Date Calibration Due | Cal. Interval (Months) |
|---|---|---|---|---|---|---|
| M1622 | Thermohygrometer | JM Handelspunkt | 30.5015.06 | None stated | 31 Dec 2014 | 12 |
| K0001 | 5m RSE Chamber | Rainford EMC | N/A | N/A | 26 Nov 2014 | 12 |
| M1273 | Test Receiver | Rohde & Schwarz | ESIB 26 | 100275 | 15 Feb 2015 | 12 |
| M1568 | Magnetic Loop Antenna | Rohde & Schwarz | HFH2-Z2 | 879284/2 | 26 Feb 2015 | 12 |

## 5.2.2. Transmitter 99% Emission Bandwidth

### Test Summary:

| | | | |
|---|---|---|---|
| **Test Engineer:** | Mark Percival | **Test Date:** | 05 September 2014 |
| **Test Sample Serial Number:** | 003 | | |

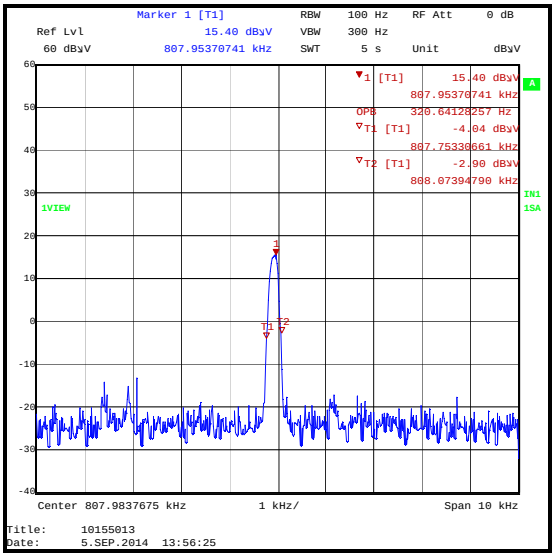
| | |
|---|---|
| **Industry Canada Reference:** | RSS-Gen 4.6.1 |
| **Test Method Used:** | RSS-Gen 4.6.1 |

### Environmental Conditions:

| | |
|---|---|
| **Temperature (°C):** | 22 |
| **Relative Humidity (%):** | 35 |

### Results:

| 99% Emission Bandwidth (Hz) |
|---|
| 321 |




### Test Equipment Used:

| Asset No. | Instrument | Manufacturer | Type No. | Serial No. | Date Calibration Due | Cal. Interval (Months) |
|---|---|---|---|---|---|---|
| M1622 | Thermohygrometer | JM Handelspunkt | 30.5015.06 | None stated | 31 Dec 2014 | 12 |
| K0001 | 5m RSE Chamber | Rainford EMC | N/A | N/A | 26 Nov 2014 | 12 |
| M1379 | Test Receiver | Rohde & Schwarz | ESIB 26 | 100275 | 15 Feb 2015 | 12 |
| M1568 | Magnetic Loop Antenna | Rohde & Schwarz | HFH2-Z2 | 879284/2 | 26 Feb 2015 | 12 |

## 5.2.3. Transmitter Radiated Spurious Emissions

### Test Summary:

| | | | |
|---|---|---|---|
| **Test Engineer:** | Mark Percival | **Test Dates:** | 15 August 2014 & 04 September 2014 |
| **Test Sample Serial Number:** | 003 | | |

| | |
|---|---|
| **FCC Reference:** | Parts 15.209(a) & 15.219(c) |
| **Industry Canada Reference:** | RSS-Gen 4.9 / 7.2.5 & RSS-210 A2.2(d) |
| **Test Method Used:** | As detailed in ANSI C63.4 Section 8 |
| **Frequency Range:** | 9 kHz to 1000 MHz |

### Environmental Conditions:

| | |
|---|---|
| **Temperature (°C):** | 24 |
| **Relative Humidity (%):** | 30 to 32 |

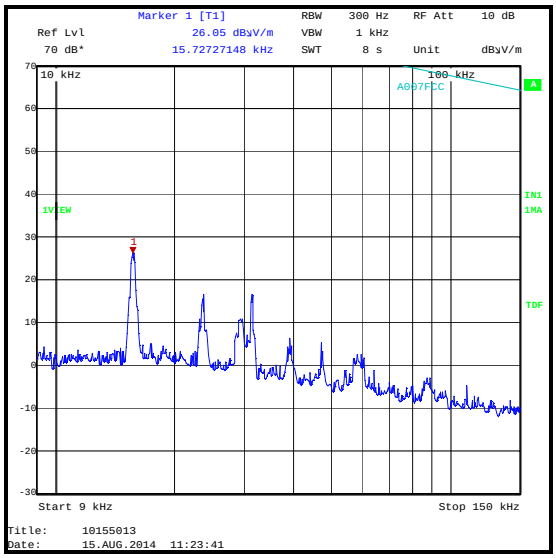
### Note(s):

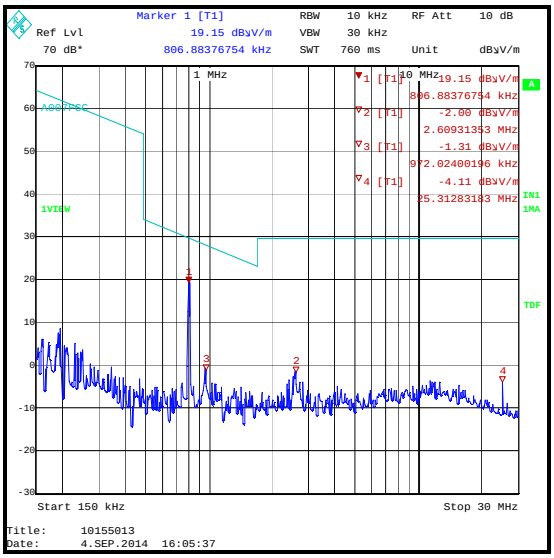
1. Limits below 30 MHz are specified at a test distance of 30 metres, whilst below 0.49 MHz they are specified at a test distance of 300 metres. However, as specified by FCC Section 15.31 (f)(2), measurements may be performed at a closer distance and the measured level corrected to the specified measurement distance by using the square of an inverse linear distance extrapolation factor (40dB/decade).
2. 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.
3. Final measurement values include corrections for antenna factor and cable losses.
4. The emission shown at approximately 806 kHz is the fundamental.
5. All emissions on the 9 kHz to 150 kHz plot were investigated and found to be radiating from the test site turntable.
6. 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.
7. Measurements in the range 30 MHz to 1 GHz were performed in a semi-anechoic chamber (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.
8. * -20 dBc limit.
9. ** Restricted band limit.

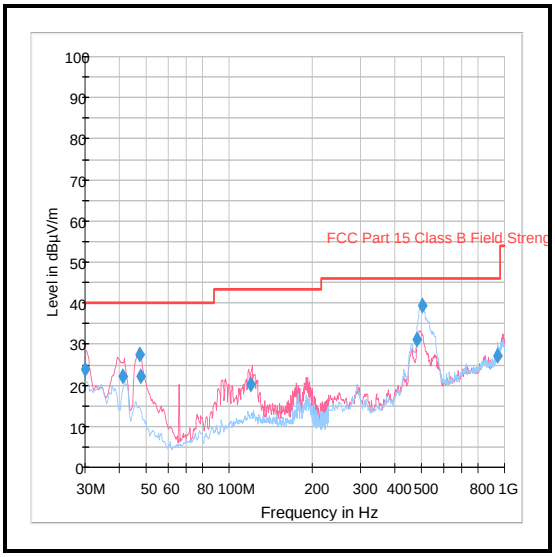
### Results: Quasi Peak

| Frequency (MHz) | Antenna Polarity | Level (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Result |
|---|---|---|---|---|---|
| 40.955 | Vertical | 24.8 | 39.3* | 14.5 | Complied |
| 119.836 | Vertical | 27.7 | 43.5** | 15.8 | Complied |
| 504.044 | Horizontal | 32.7 | 39.3* | 6.6 | Complied |

## Transmitter Radiated Spurious Emissions (continued)




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

## Transmitter Radiated Spurious Emissions (continued)

## Test Equipment Used:

| Asset No. | Instrument | Manufacturer | Type No. | Serial No. | Date Calibration Due | Cal. Interval (Months) |
|---|---|---|---|---|---|---|
| M1622 | Thermohygrometer | JM Handelspunkt | 30.5015.06 | None stated | 31 Dec 2014 | 12 |
| K0001 | 5m RSE Chamber | Rainford EMC | N/A | N/A | 26 Nov 2014 | 12 |
| G0543 | Amplifier | Sonoma | 310N | 230801 | 20 Nov 2014 | 3 |
| M1273 | Test Receiver | Rohde & Schwarz | ESIB 26 | 100275 | 15 Feb 2015 | 12 |
| A490 | Antenna | Chase | CBL6111A | 1590 | 29 Apr 2015 | 12 |
| A1834 | Attenuator | Hewlett Packard | 8491B | 10444 | 15 Nov 2014 | 12 |
| M1568 | Magnetic Loop Antenna | Rohde & Schwarz | HFH2-Z2 | 879284/2 | 26 Feb 2015 | 12 |

# 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 |
|---|---|---|---|
| Transmitter Fundamental Field Strength | 9 kHz to 30 MHz | 95% | ±3.73 dB |
| Occupied Bandwidth | 0.15 MHz to 30 MHz | 95% | ±3.92 % |
| Radiated Spurious Emissions | 30 MHz to 1 GHz | 95% | ±5.65 dB |
| Radiated Spurious Emissions | 9 kHz to 30 MHz | 95% | ±3.73 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.

# 7. Report Revision History

| Version Number | Revision Details | | |
|---|---|---|---|
| | Page No(s) | Clause | Details |
| 1.0 | - | - | Initial Version |
| 2.0 | - | - | Update to section 5.2.3 |

**--- END OF REPORT ---**