



# TEST REPORT FROM RFI GLOBAL SERVICES LTD

Test of: BluHome



FCC ID: S5EBH017A

To: FCC Part 15.249: 2010 Subpart C

**Test Report Serial No:**

RFI-RPT-RP81915JD02A V3.0

**Version 3.0 Supersedes All Previous Versions**

This Test Report Is Issued Under The Authority Of Chris Guy, Head of Global Approvals:		
Checked By:	Ian Watch	
Signature:		
Date of Issue:	24 November 2011	

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## **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 USA

## 2. Summary of Testing

### 2.1. General Information

<b>Specification Reference:</b>	47CFR15.249
<b>Specification Title:</b>	Code of Federal Regulations Volume 47 (Telecommunications) 2010: Part 15 Subpart C (Intentional Radiators) - Section 15.249
<b>Specification Reference:</b>	47CFR15.207 and 47CFR15.209
<b>Specification Title:</b>	Code of Federal Regulations Volume 47 (Telecommunications) 2010: Part 15 Subpart C (Intentional Radiators) - Sections 15.207 and 15.209
<b>Site Registration:</b>	FCC: 209735
<b>Location of Testing:</b>	RFI Global Services Ltd, Wade Road, Basingstoke, Hampshire, RG24 8AH.
<b>Test Dates:</b>	16 June to 30 June 2011

### 2.2. Summary of Test Results

FCC Reference (47CFR)	Measurement	Result
Part 15.207	Transmitter AC Conducted Emissions	
Part 15.249(a)	Transmitter Fundamental Field Strength	
Part 2.1049	Transmitter 20 dB Bandwidth	
Part 15.249(a)(d)(e)/15.209(a)	Transmitter Radiated Emissions	
Part 15.249(d)/15.209(a)	Transmitter Band Edge Radiated Emissions	
<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

### **3. Equipment Under Test (EUT)**

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

<b>Brand Name:</b>	STOP
<b>Model Name or Number:</b>	BluHome
<b>Serial Number:</b>	004575
<b>Hardware Version Number:</b>	Not stated
<b>Software Version Number:</b>	v.2
<b>FCC ID::</b>	S5EBH0107A

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

The equipment under test was a BluHome and is the home monitoring receiver unit for BluBand and BluTag Passive. It is an optional accessory for BluTag Active and BluTag Hybrid. It sends monitoring data to VeriTracks using the enrollee's analog/landline or most digital (non-VoIP) telephone service. BluHome can also use cellular telephone service when transmitting radio frequency (RF) monitoring data.

#### **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>	Part 15 Low Power Transceiver	
<b>Power Supply Requirement:</b>	Nominal	120 V
<b>Type of Unit:</b>	Transceiver	
<b>Modulation:</b>	FSK	
<b>Transmit Frequency Range:</b>	902 - 928 MHz band	
<b>Transmit Channels Tested:</b>	<b>Channel Frequency (MHz)</b>	
	915	

#### **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):

- Continuously transmitting at maximum power

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

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

- For transmit mode, the client supplied a sample with pre installed test software, which allowed the selection of a continuous transmission.

## **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 AC Conducted Spurious Emissions****Test Summary:**

<b>Test Engineer:</b>	Crawford Lindsay	<b>Test Date:</b>	30 June 2011
<b>Test Sample Serial No:</b>	004575		

<b>FCC Part:</b>	15.207
<b>Test Method Used:</b>	As detailed in ANSI C63.10 Section 6.2 referencing ANSI C63.4

**Environmental Conditions:**

<b>Temperature (°C):</b>	30
<b>Relative Humidity (%):</b>	24

**Results: Live - Quasi Peak**

Frequency (MHz)	Line	Level (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Result
0.164	Live	52.2	65.3	65.3	Complied
0.168	Live	52.1	65.1	65.1	Complied
0.249	Live	43.1	61.8	61.8	Complied
0.375	Live	36.8	58.4	58.4	Complied
27.807	Live	35.5	60.0	24.5	Complied
29.697	Live	37.0	60.0	23.0	Complied

**Results: Live - Average**

Frequency (MHz)	Line	Level (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Result
0.150	Neutral	33.9	56.0	22.1	Complied

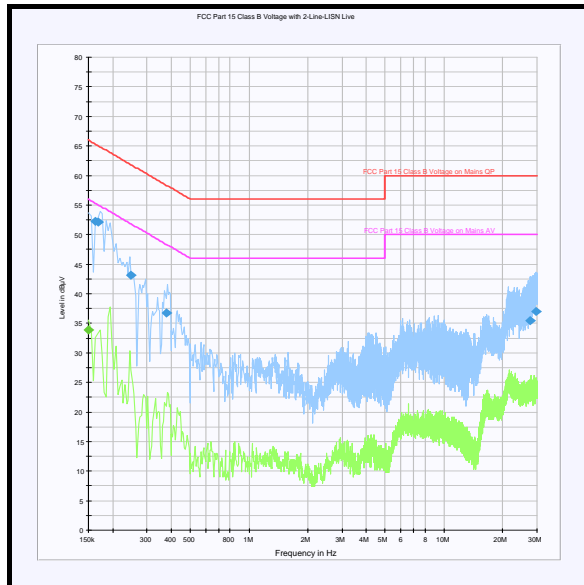
**Results: Neutral - Quasi Peak**

Frequency (MHz)	Line	Level (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Result
0.150	Neutral	54.4	66.0	11.6	Complied
0.195	Neutral	49.8	63.8	14.0	Complied
0.234	Neutral	41.5	61.6	20.1	Complied
0.389	Neutral	38.4	58.1	19.7	Complied
21.660	Neutral	35.6	60.0	24.4	Complied
23.762	Neutral	34.4	60.0	25.6	Complied
29.932	Neutral	36.4	60.0	23.6	Complied

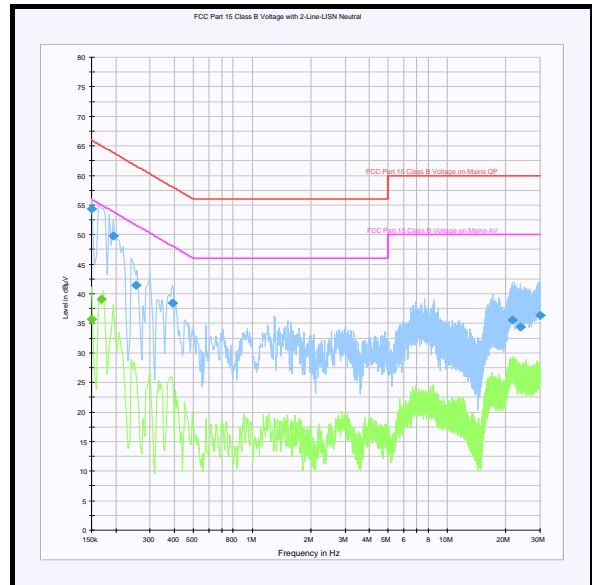
**Transmitter AC Conducted Spurious Emissions (continued)**

**Results: Neutral - Average**

Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
0.150	Neutral	35.7	56.0	20.3	Complied
0.168	Neutral	39.1	55.1	16.0	Complied



**Live**



**Neutral**

*Note: This plot is a pre-scan and for indication purposes only. For final measurements, see accompanying tables.*

**5.2.2. Transmitter Fundamental Field Strength**

**Test Summary:**

<b>Test Engineer:</b>	Andrew Edwards	<b>Test Date:</b>	24 June 2011
<b>Test Sample Serial No:</b>	004575		

<b>FCC Part:</b>	15.249(a)
<b>Test Method Used:</b>	As detailed in ANSI C63.10 Section 6.5

**Environmental Conditions:**

<b>Temperature (°C):</b>	28
<b>Relative Humidity (%):</b>	19

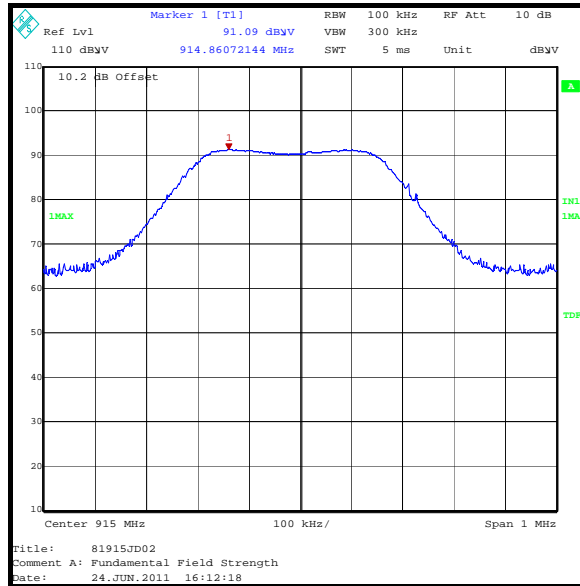
**Results:**

**Results Quasi-Peak**

Frequency (MHz)	Antenna Polarity	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
915.095	Vertical	90.8	94.0	3.6	Complied

**Note(s):**

1. The final measured value in the table above incorporates the calibrated antenna factor and cable loss
2. The plots of the fundamental shown on the following page were performed using a peak detector with final measurements being made with a quasi-peak detector.



**5.2.3. Transmitter 20 dB Bandwidth**

**Test Summary:**

<b>Test Engineer:</b>	Crawford Lindsay	<b>Test Date:</b>	22 June 2011
<b>Test Sample Serial No:</b>	004575		

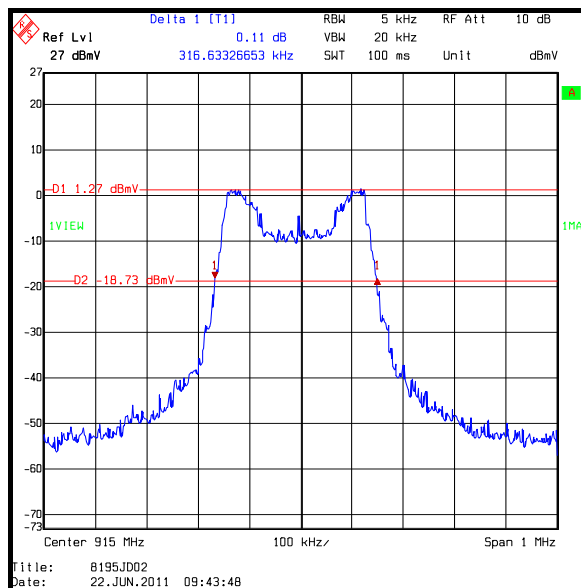
<b>FCC Part:</b>	2.1049
<b>Test Method Used:</b>	As detailed in ANSI C63.10 Section 6.9.1

**Environmental Conditions:**

<b>Temperature (°C):</b>	27
<b>Relative Humidity (%):</b>	32

**Results:**

<b>20 dB Bandwidth (kHz)</b>
316.633



**5.2.4. Transmitter Radiated Emissions****Test Summary:**

<b>Test Engineer:</b>	Nick Steele	<b>Test Date:</b>	22 June 2011
<b>Test Sample Serial No:</b>	004575		

<b>FCC Part:</b>	15.249(a)(d) & 15.209(a)
<b>Test Method Used:</b>	As detailed in ANSI C63.10 Sections 6.3 and 6.5 referencing ANSI C63.4
<b>Frequency Range</b>	30 MHz to 1000 MHz

**Environmental Conditions:**

<b>Temperature (°C):</b>	31
<b>Relative Humidity (%):</b>	22

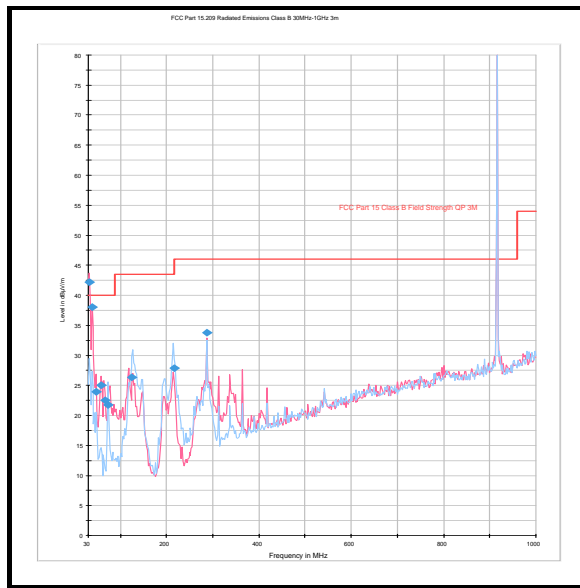
**Results: Quasi-Peak**

Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
32.272	Vertical	38.2	40.0	1.8	Complied
38.463	Vertical	38.0	40.0	2.0	Complied
48.192	Vertical	23.9	40.0	16.1	Complied
57.931	Vertical	25.0	40.0	15.0	Complied
65.543	Vertical	22.5	40.0	17.5	Complied
73.482	Horizontal	21.8	40.0	18.2	Complied
124.929	Horizontal	26.3	43.5	17.2	Complied
216.184	Horizontal	27.9	46.0	18.1	Complied
285.992	Vertical	33.7	46.0	12.3	Complied

**Note(s):**

1. The final measured value, for the given emission, in the table above incorporates the calibrated antenna factor and cable loss
2. The emission shown on the 30 MHz to 1 GHz plot is the EUT fundamental at 915 MHz.
3. All other emissions shown on the pre-scan plot were investigated and found to be ambient or >20 dB below the applicable limit or below the measurement system noise floor.
4. Measurements below 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 Emissions (continued)**



*Note: This plot is a pre-scan and for indication purposes only. For final measurements, see accompanying table.*

**Transmitter Radiated Emissions (continued)****Test Summary:**

<b>Test Engineer:</b>	Nick Steele	<b>Test Date:</b>	16 June 2011 & 17 June 2011
<b>Test Sample Serial No:</b>	004575		

<b>FCC Part:</b>	15.249(a)(d)(e) & 15.209(a)
<b>Test Method Used:</b>	As detailed in ANSI C63.10 Sections 6.3 and 6.6 referencing ANSI C63.4
<b>Frequency Range</b>	1 GHz to 9.3 GHz

**Environmental Conditions:**

<b>Temperature (°C):</b>	29
<b>Relative Humidity (%):</b>	20

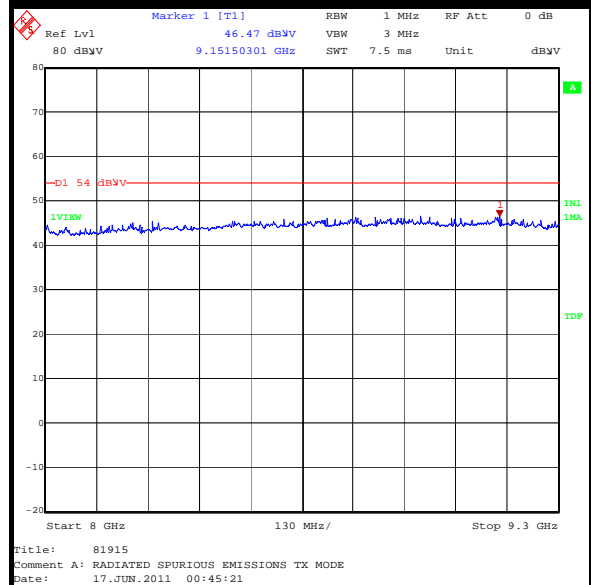
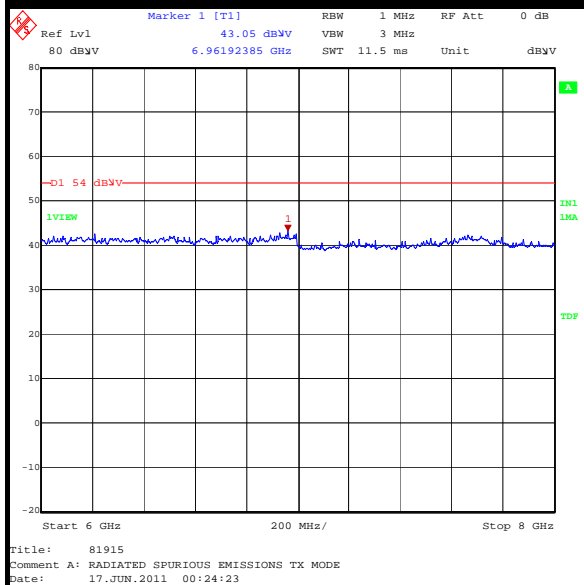
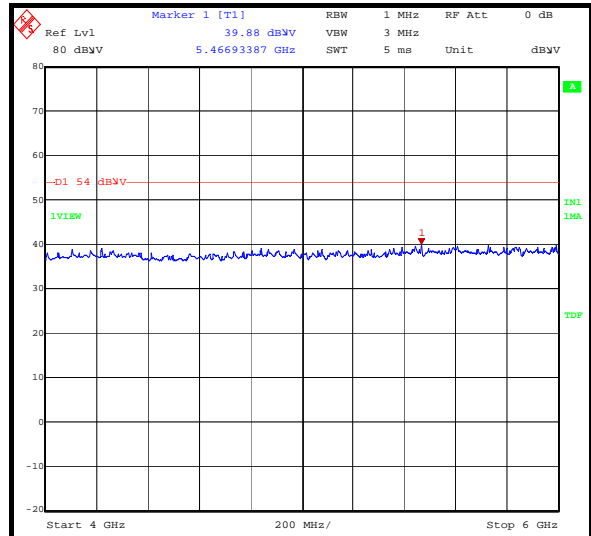
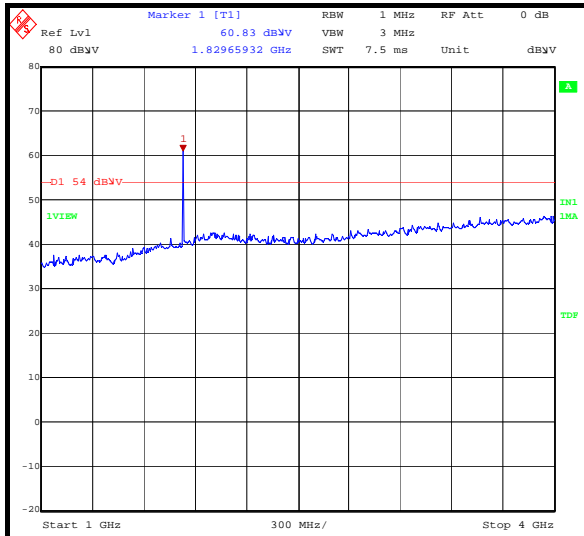
**Results**

<b>Frequency (MHz)</b>	<b>Antenna Polarity</b>	<b>Level (dB<math>\mu</math>V/m)</b>	<b>Limit (dB<math>\mu</math>V/m)</b>	<b>Margin (dB)</b>	<b>Result</b>
1829.659	Vertical	61.3	70.8*	9.5	Complied

**Note(s):**

- \*-20dBc limit
- The final measured value, for the given emission, in the table above incorporates the calibrated antenna factor and cable loss
- All other emissions shown on the pre-scan plot were investigated and found to be ambient or >20 dB below the applicable limit or below the measurement system noise floor.
- Pre-scans above 1 GHz were performed in a fully anechoic chamber (RFI Asset Number K0002) at a distance of 3 metres. The EUT was placed at a height of 1.5 metres above the test chamber floor in the centre of the chamber turntable. All measurement antennas were placed at a fixed height of 1.5 metres above the test chamber floor, in line with the EUT. Final measurements above 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 Emissions (continued)



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



**5.2.5. Transmitter Band Edge Radiated Emissions**

**Test Summary:**

<b>Test Engineer:</b>	Andrew Edwards	<b>Test Date:</b>	30 June 2011
<b>Test Sample Serial No:</b>	004575		

<b>FCC Part:</b>	15.249(d) & 15.209
<b>Test Method Used:</b>	As detailed in ANSI C63.10 Section 6.9.2

**Environmental Conditions:**

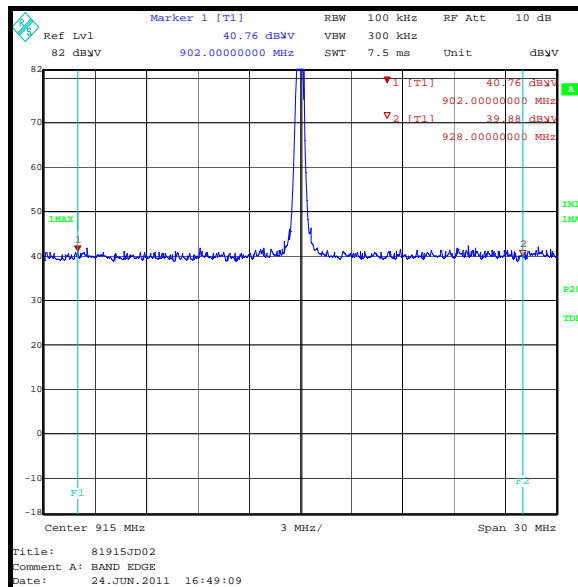
<b>Temperature (°C):</b>	28
<b>Relative Humidity (%):</b>	19

**Results: Quasi-Peak**

Frequency (MHz)	Antenna Polarity	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
902	Vertical	40.8	46.0	5.2	Complied
928	Vertical	39.9	46.0	6.1	Complied

**Note(s):**

- The final measured value, for the given emission, in the table above incorporates the calibrated antenna factor and cable loss.



## **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".

<b>Measurement Type</b>	<b>Range</b>	<b>Confidence Level (%)</b>	<b>Calculated Uncertainty</b>
AC Conducted Spurious Emissions	0.15 MHz to 30 MHz	95%	±3.25 dB
Fundamental Field Strength	902 MHz to 928 MHz	95%	±2.94 dB
20 dB Bandwidth	902 MHz to 928 MHz	95%	±0.92 ppm
Radiated Spurious Emissions	30 MHz to 9.3 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
A1396	Attenuator	Huber + Suhner	757987	6810.17.B	06 Jul 2011	12
A1818	Antenna	EMCO	3115	00075692	05 Sep 2011	12
A1830	Pulse Limiter	Rhode & Schwarz	ESH3-Z2	100668	05 Mar 2012	12
A1834	Attenuator	Hewlett Packard	8491B	10444	30 Jun 2011	12
A1974	High Pass Filter	AtlanTecRF	AFH-01000	090000283	29 Dec 2011	12
A1975	High Pass Filter	AtlanTecRF	AFH-03000	090424010	29 Dec 2011	12
A253	Antenna	Flann Microwave	12240-20	128	05 Sep 2011	12
A254	Antenna	Flann Microwave	14240-20	139	05 Sep 2011	12
A255	Antenna	Flann Microwave	16240-20	519	05 Sep 2011	12
A288	Antenna	Chase	CBL6111A	1589	05 Sep 2011	12
A553	Antenna	Chase	CBL6111A	1593	26 Mar 2012	12
A649	LISN	Rohde & Schwarz	ESH3-Z5	825562/008	05 Apr 2012	12
G0543	Amplifier	Sonoma	310N	230801	30 Jun 2011	12
K0001	5m Semi-Anechoic Chamber	Rainford EMC	N/A	N/A	29 May 2012	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	05 Sep 2011	12
M1124	Test Receiver	Rohde & Schwarz	ESL26	100046K	22 Jul 2011	12
M1263	Test Receiver	Rohde & Schwarz	ESIB7	100265	21 Jul 2011	12
M127	Spectrum Analyser	Rohde & Schwarz	FSEB 30	842 659/016	15 Sep 2011	12
M1273	Test Receiver	Rohde & Schwarz	ESIB 26	100275	04 Feb 2012	12

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