

# TEST REPORT FROM RFI GLOBAL SERVICES LTD

Test of: Tablet PC T-C12-R1.0A-V1 C12

FCC ID: W5MT0BIIC12B

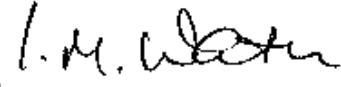
IC Certification Number: 8099A-TOBIIC12B

To: FCC Parts 15.209, 15.247(b)(d) & Industry Canada RSS-Gen 4.8, 4.9; RSS-210 A8.4, A8.5

**Test Report Serial No.:**  
RFI-RPT-RP80826JD06A V2.0

**Version 2.0 supersedes all previous versions**

**This Test Report Is Issued Under The Authority  
Of Chris Guy, Head of Global Approvals:**

  
pp

<b>Checked By:</b>	Ian Watch
<b>Signature:</b>	
<b>Date of Issue:</b>	16 April 2012

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## **1. Customer Information**

<b>Company Name:</b>	Tobii Technology AB
<b>Address:</b>	Karlsrovägen 2D 7th floor Danderyd 182 53 Sweden

## 2. Summary of Testing

### 2.1. General Information

<b>Specification Reference:</b>	47CFR15.209
<b>Specification Title:</b>	Code of Federal Regulations Volume 47 (Telecommunications) 2011: Part 15 Subpart C (Intentional Radiators) - Section 15.209
<b>Specification Reference:</b>	47CFR15.247
<b>Specification Title:</b>	Code of Federal Regulations Volume 47 (Telecommunications) 2011: Part 15 Subpart C (Intentional Radiators) - Section 15.247
<b>Specification Reference:</b>	RSS-Gen Issue 3 December 2010
<b>Specification Title:</b>	General Requirements and Information for the Certification of Radio Apparatus
<b>Specification Reference:</b>	RSS-210 Issue 8 December 2010
<b>Specification Title:</b>	Licence-exempt Radio Apparatus (All Frequency Bands): Category I 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 July 2011 to 4 April 2012

### 2.2. Summary of Test Results

FCC Reference (47CFR)	IC Reference	Measurement	Result
Part 15.247(b)(1)	RSS-Gen 4.8 RSS-210 A8.4(2)	Transmitter Maximum Peak Output Power	✓
Part 15.247(d)/ 15.209(a)	RSS-Gen 4.9 RSS-210 A8.5	Transmitter 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

### 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>	Tobii
<b>Model Name or Number:</b>	T-C12-R1.0A-V1 C12
<b>Serial Number:</b>	MTC12-030110458195
<b>Hardware Version Number:</b>	Not Stated
<b>Software Version Number:</b>	Windows 7 Home Premium
<b>FCC ID:</b>	W5MTOBIIC12B
<b>IC Certification Number:</b>	8099A-TOBIIC12B

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

The equipment under test was a tablet PC. It contained a quad band GSM module, a WiFi 802.11b/g/n module and a V2.0 Bluetooth module.

#### **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>	<i>Bluetooth</i>		
<b>Power Supply Requirement:</b>	Nominal	120 VAC 60 Hz	
<b>Type of Unit:</b>	Transceiver		
<b>Channel Spacing:</b>	1 MHz		
<b>Mode:</b>	Basic Rate		
<b>Modulation:</b>	GFSK		
<b>Packet Type: (Maximum Payload)</b>	DH5		
<b>Data Rate (Mbit/s):</b>	1		
<b>Maximum Peak Output Power:</b>	3.2 dBm		
<b>Transmit Frequency Range:</b>	2402 MHz to 2480 MHz		
<b>Transmit Channels Tested:</b>	<b>Channel ID</b>	<b>Channel Number</b>	<b>Channel Frequency (MHz)</b>
	Bottom	0	2402
	Middle	39	2441
	Top	78	2480

## **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 the bottom, centre and top channels.
- Transmitting Basic Rate (DH5) packets in static or frequency hopping modes.

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

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

- Connected via a radio link to a Bluetooth tester in order to place the EUT into Bluetooth test mode. The Bluetooth chipset manufacturer's application was used to place the EUT into Bluetooth test mode via the EUT desktop.

## **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:**

<b>Test Engineer:</b>	Andrew Edwards	<b>Test Date:</b>	11 July 2011
<b>Test Sample Serial No:</b>	MTC12-030110458195		

<b>FCC Part:</b>	15.247(b)(1)
<b>Test Method Used:</b>	As detailed in ANSI C63.10 Section 6.10.1 and Sections 6.3 and 6.6 referencing ANSI C63.4 (see note below)

#### **Environmental Conditions:**

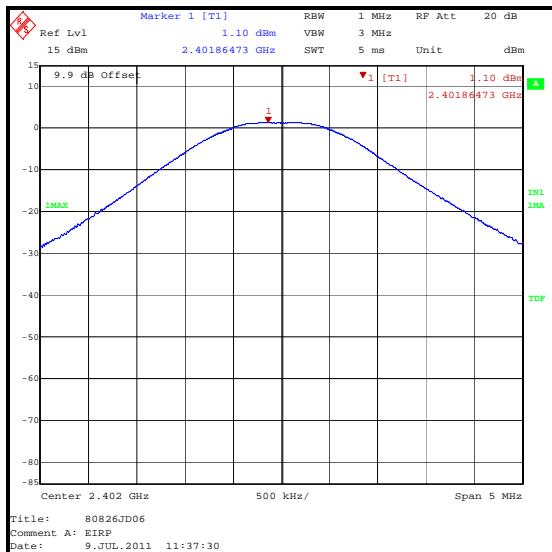
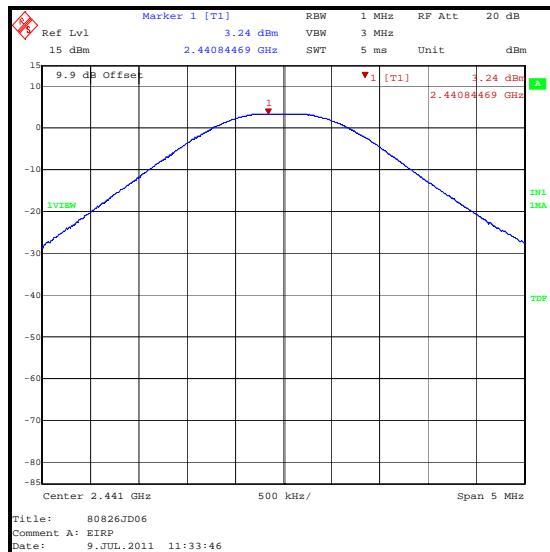
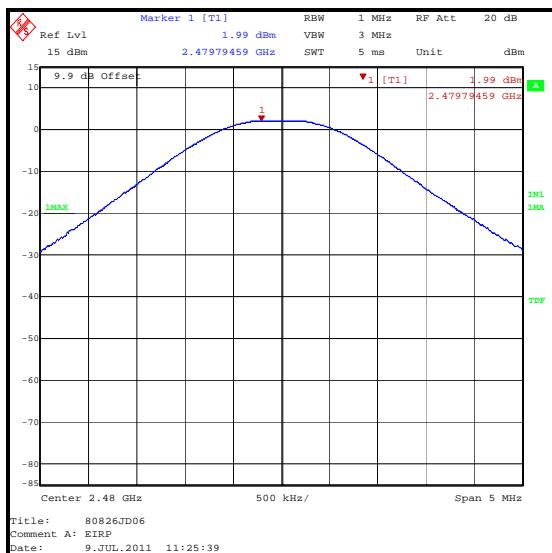
<b>Temperature (°C):</b>	28
<b>Relative Humidity (%):</b>	22

#### **Results: DH5**

<b>Channel</b>	<b>EIRP (dBm)</b>	<b>De Facto EIRP Limit (dBm)</b>	<b>Margin (dB)</b>	<b>Result</b>
Bottom	1.1	36.0	35.8	Complied
Middle	3.2	36.0	32.8	Complied
Top	2.1	36.0	33.9	Complied

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

1. These tests were performed radiated, therefore the EUT antenna gain is encompassed in the final result and not measurable.
2. Tests were performed using a combination of the conducted test method described in ANSI C63.10 Section 6.10.1 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. 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 Maximum Peak Output Power (continued)****Results: DH5****Bottom Channel****Middle Channel****Top Channel**

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

Test Engineer:	Mark Percival	Test Date:	04 April 2012
Test Sample Serial No:	MTC12-030110458195		

FCC Part:	15.247(d) & 15.209(a)
Test Method Used:	As detailed in ANSI C63.10 Sections 6.3 and 6.5 referencing ANSI C63.4
Frequency Range	30 MHz to 1000 MHz

**Environmental Conditions:**

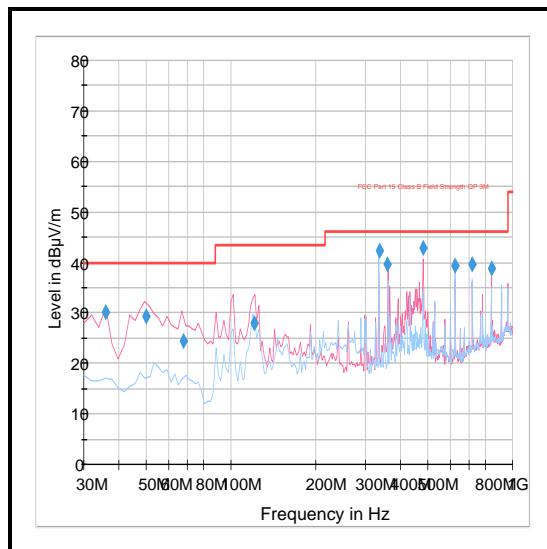
Temperature (°C):	29
Relative Humidity (%):	26

**Results: Quasi-Peak DH5**

Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
120.732	Vertical	27.9	43.5	15.6	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 preliminary scans showed similar emission levels below 1 GHz, for each channel of operation. Therefore final radiated emissions measurements were performed with the EUT set to the top channel only.
3. All other emissions shown on the pre-scan plot were investigated and found to be ambient, >20 dB below the non-restricted band limits 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>	Mark Percival	<b>Test Date:</b>	30 March 2012
<b>Test Sample Serial No:</b>	MTC12-030110458195		

<b>FCC Part:</b>	15.247(d) & 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 26.5 GHz

**Environmental Conditions:**

<b>Temperature (°C):</b>	24
<b>Relative Humidity (%):</b>	21

**Results: Peak Bottom Channel DH5**

Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
1600.301	Vertical	50.7	74.0	23.3	Complied
4804.016	Horizontal	48.7	74.0	25.3	Complied

**Results: Average Bottom Channel DH5**

Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
1600.089	Vertical	41.1	54.0	12.9	Complied
4803.964	Vertical	43.5	54.0	10.5	Complied

**Results: Peak Middle Channel DH5**

Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
1600.225	Vertical	50.5	74.0	23.5	Complied
4876.033	Vertical	50.8	74.0	23.2	Complied

**Results: Average Middle Channel DH5**

Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
1600.349	Vertical	46.5	54.0	7.5	Complied
4881.955	Vertical	38.5	54.0	15.5	Complied

**Transmitter Radiated Emissions (continued)****Results: Peak Top Channel DH5**

Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
1600.286	Vertical	50.7	74.0	23.3	Complied
4959.982	Vertical	53.5	74.0	20.5	Complied

**Results: Average Top Channel DH5**

Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
1600.219	Vertical	47.9	54.0	6.1	Complied
4959.993	Vertical	39.9	54.0	14.1	Complied

**Results: Peak DH5 Hopping Mode**

Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
1600.220	Vertical	46.2	74.0	27.8	Complied
4840.554	Vertical	53.0	74.0	21.0	Complied

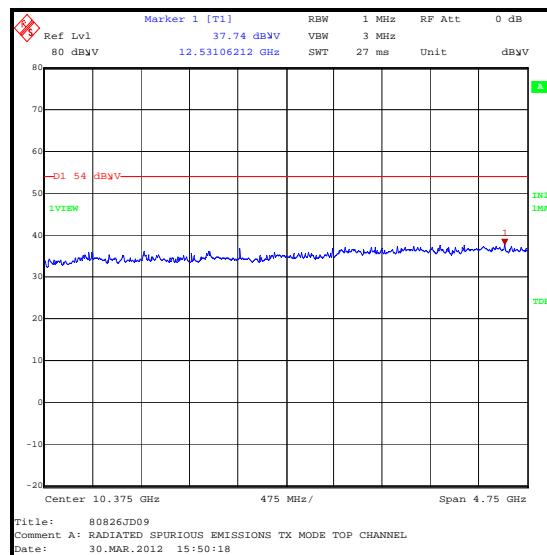
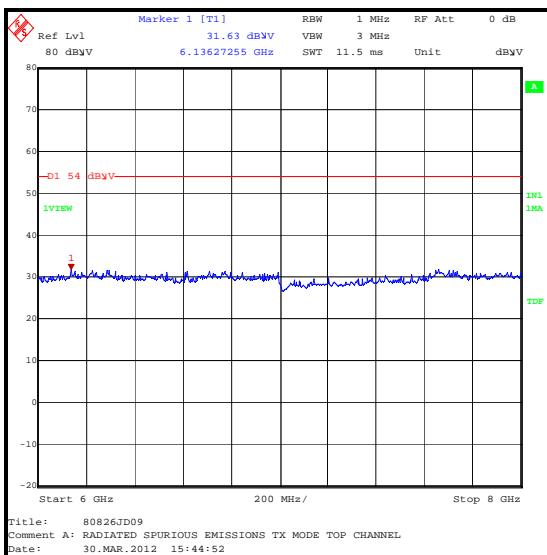
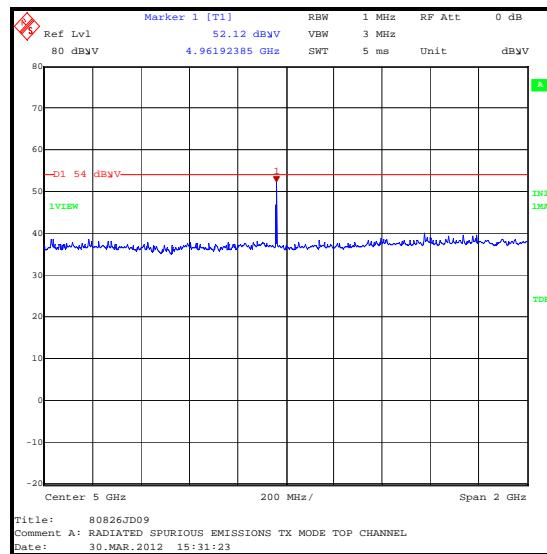
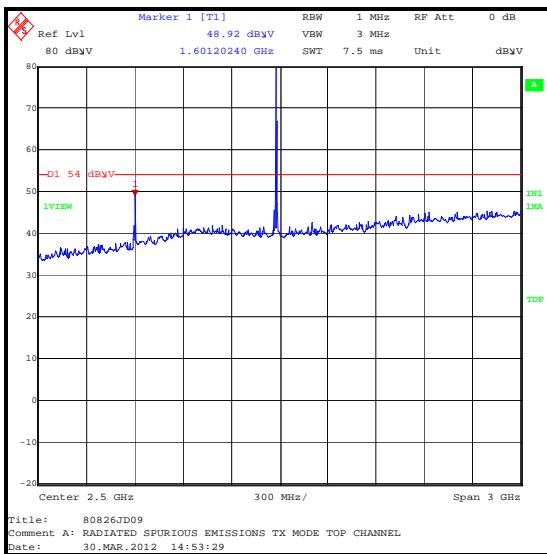
**Results: Average DH5 Hopping Mode**

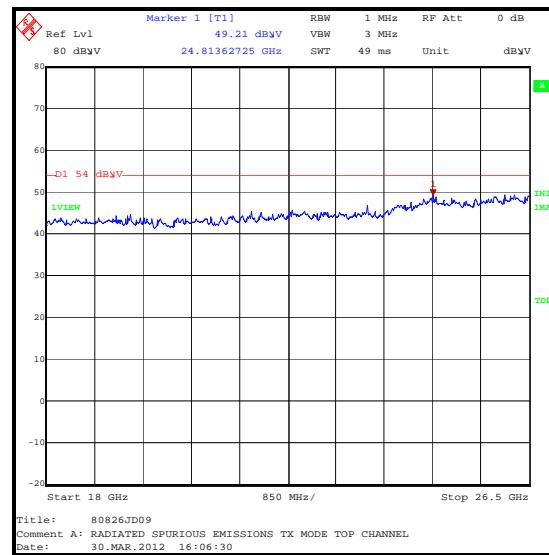
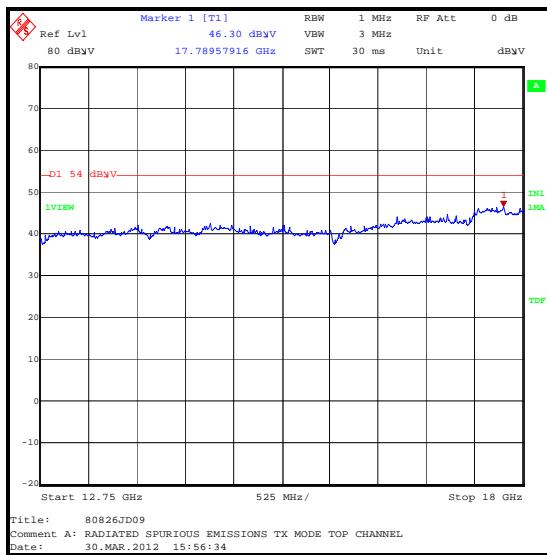
Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
4960.130	Vertical	34.6	54.0	19.4	Complied

**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 1 GHz to 4 GHz plot is the EUT fundamental at 2480 MHz.
3. All other emissions shown on the pre-scan plots were investigated and found to be ambient or >20 dB below the applicable limit or below the measurement system noise floor.
4. The peak level was compared to the average limit as opposed to being compared to the peak limit because this is the more onerous limit.
5. 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)



**Transmitter Radiated Emissions (continued)**

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

## **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
Radiated Spurious Emissions	30 MHz to 26.5 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
A1393	Attenuator	Huber & Suhner	757456	6820.17.B	08 Jul 2012	12
A1396	Attenuator	Huber & Suhner	757987	6810.17.B	08 Jul 2012	12
A1534	Pre Amplifier	Hewlett Packard	8449B	3008A00405	20 Jun 2012	12
A253	Antenna	Flann Microwave	12240-20	128	09 Oct 2012	12
A254	Antenna	Flann Microwave	14240-20	139	09 Oct 2012	12
A255	Antenna	Flann Microwave	16240-20	519	09 Oct 2012	12
A256	Antenna	Flann Microwave	18240-20	400	09 Oct 2012	12
A288	Antenna	Chase	CBL6111A	1589	25 Aug 2012	12
A436	Antenna	Flann	20240-20	330	09 Oct 2012	12
A1817	Antenna	EMCO	3115	00075694	03 Feb 2012	12
A1818	Antenna	EMCO	3115	00075692	05 Sep 2011	12
A1834	Attenuator	Hewlett Packard	8491B	10444	26 Jul 2012	12
K0001	5m RSE Chamber	Rainford EMC	N/A	N/A	29 May 2012	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	09 Oct 2012	12
M1124	Spectrum Analyser	Rohde & Schwarz	ESI26	100046K	29 Jun 2012	12
M1590	Test Receiver	Rohde & Schwarz	ESU26	100239	15 Jun 2012	12

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