



# TEST REPORT

**Test Report No. : UL-RPT-RP11059461JD05A V2.0**

**Manufacturer** : Loc8tor Ltd  
**Model No.** : Loc8tor Tag  
**FCC ID** : TUW-BIR1  
**Technology** : Zigbee (IEEE 802.15.4)  
**Test Standard(s)** : FCC Parts 15.209(a) & 15.247

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. This 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:** 03 March 2016

**Checked by:**

Ian Watch  
Senior Engineer, Radio Laboratory

**Company  
Signatory:**

Steven White  
Service Lead, Radio Laboratory,  
UL VS LTD



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

---

## **UL VS LTD**

Pavilion A, Ashwood Park, Ashwood Way, Basingstoke, Hampshire, RG23 8BG, UK  
Telephone: +44 (0)1256 312000  
Facsimile: +44 (0)1256 312001

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	6
2.4. Deviations from the Test Specification	6
<b>3. Equipment Under Test (EUT) .....</b>	<b>7</b>
3.1. Identification of Equipment Under Test (EUT)	7
3.2. Description of EUT	7
3.3. Modifications Incorporated in the EUT	7
3.4. Additional Information Related to Testing	8
3.5. Support Equipment	8
<b>4. Operation and Monitoring of the EUT during Testing .....</b>	<b>9</b>
4.1. Operating Modes	9
4.2. Configuration and Peripherals	9
<b>5. Measurements, Examinations and Derived Results.....</b>	<b>10</b>
5.1. General Comments	10
5.2. Test Results	11
5.2.1. Transmitter Minimum 6 dB Bandwidth	11
5.2.2. Transmitter Duty Cycle	13
5.2.3. Transmitter Maximum Peak Output Power	15
5.2.4. Transmitter Radiated Emissions	17
5.2.5. Transmitter Band Edge Radiated Emissions	24
<b>6. Measurement Uncertainty .....</b>	<b>27</b>
<b>7. Report Revision History .....</b>	<b>28</b>

## **1. Customer Information**

<b>Company Name:</b>	Loc8tor Ltd
<b>Address:</b>	Devonshire House Manor Way Borehamwood Hertfordshire WD6 1QQ United Kingdom

## 2. Summary of Testing

### 2.1. General Information

<b>Specification Reference:</b>	47CFR15.247
<b>Specification Title:</b>	Code of Federal Regulations Volume 47 (Telecommunications): Part 15 Subpart C (Intentional Radiators) - Section 15.247
<b>Specification Reference:</b>	47CFR15.209
<b>Specification Title:</b>	Code of Federal Regulations Volume 47 (Telecommunications): Part 15 Subpart C (Intentional Radiators) - Section 15.209
<b>Site Registration:</b>	209735
<b>Location of Testing:</b>	UL VS LTD, Unit 3 Horizon, Wade Road, Kingsland Business Park, Basingstoke, Hampshire, RG24 8AH, United Kingdom
<b>Test Dates:</b>	15 January 2016 to 05 February 2016

### 2.2. Summary of Test Results

FCC Reference (47CFR)	Measurement	Result
Part 15.247(a)(2)	Transmitter Minimum 6 dB Bandwidth	✓
Part 15.35(c)	Transmitter Duty Cycle	Note 1
Part 15.247(e)	Transmitter Power Spectral Density	Note 2
Part 15.247(b)(3)	Transmitter Maximum Peak Output Power	✓
Part 15.247(d)/15.209(a)	Transmitter Radiated Emissions	✓
Part 15.247(d)/15.209(a)	Transmitter Band Edge Radiated Emissions	✓
<b>Key to Results</b>		
✓ = Complied	✗ = Did not comply	

#### Note(s):

1. The measurement was performed to assist in the calculation of the level of average radiated emission measurements.
2. In accordance with FCC KDB 558074 Section 10.1, PSD measurement is not required if the maximum conducted output power is less than the PSD limit of 8 dBm / 3 kHz. The PSD level is therefore deemed to be equal to the measured total output power.

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

<b>Reference:</b>	ANSI C63.10-2013
<b>Title:</b>	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
<b>Reference:</b>	FCC KDB 558074 D01 v03r04 January 7, 2016
<b>Title:</b>	Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247

### **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>	Loc8tor Tag
<b>Model Name or Number:</b>	Loc8tor Tag
<b>Test Sample Serial Number:</b>	1002 ( <i>Normal operating mode sample</i> )
<b>Hardware Version:</b>	Rev F
<b>Software Version:</b>	1.01
<b>FCC ID:</b>	TUW-BIR1

<b>Brand Name:</b>	Loc8tor Tag
<b>Model Name or Number:</b>	Loc8tor Tag
<b>Test Sample Serial Number:</b>	1001 ( <i>Continuously transmitting sample</i> )
<b>Hardware Version:</b>	Rev F
<b>Software Version:</b>	1.01
<b>FCC ID:</b>	TUW-BIR1

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

The Equipment Under Test was a personal asset tag with an internal antenna. It operates with a personal asset locator and is powered from a CR2032 coin cell battery.

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

No modifications were applied to the EUT during testing.

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

<b>Technology Tested:</b>	IEEE 802.15.4 (Digital Transmission System)	
<b>Type of Unit:</b>	Transceiver	
<b>Modulation:</b>	Phase Modulation	
<b>Data Rate:</b>	250 kbit/s	
<b>Power Supply Requirement(s):</b>	Nominal	3.0 VDC
<b>Maximum Conducted Output Power:</b>	3.5 dBm	
<b>Antenna Gain:</b>	-6.0 dBi	
<b>Transmit Frequency:</b>	2445 MHz	
<b>Transmit Channel Tested:</b>	<b>Channel ID</b>	<b>Channel Frequency (MHz)</b>
	Single	2445

### **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 with a modulated carrier on a signal channel
- Normal mode. Transmitting with a modulated carrier and worst-case duty cycle.

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

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

- The customer supplied a sample in its normal mode when connected to a bench power supply.
- The customer preconfigured the EUT to continuously transmit when powered by a CR2032 coin cell battery.
- Sample with serial number 1002 was used for duty cycle measurement.
- Sample with serial number 1001 was used for all other measurements.

## **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 Minimum 6 dB Bandwidth**

#### **Test Summary:**

Test Engineer:	Andrew Edwards	Test Date:	26 January 2016
Test Sample Serial Number:	1001		

FCC Reference:	Part 15.247(a)(2)
Test Method Used:	FCC KDB 558074 Section 8.1 Option 1

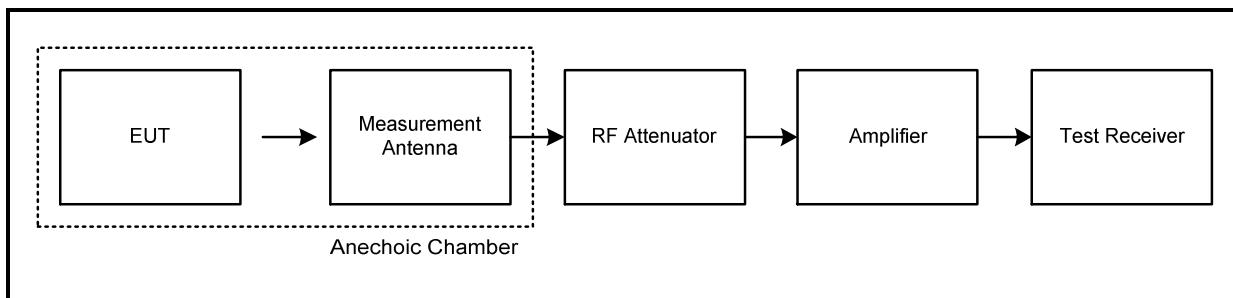
#### **Environmental Conditions:**

Temperature (°C):	24
Relative Humidity (%):	39

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

1. 6 dB DTS bandwidth tests were performed using a test receiver in accordance with FCC KDB 558074 Section 8.1 Option 1 measurement procedure. The test receiver resolution bandwidth was set to 100 kHz and video bandwidth 300 kHz. A peak detector was used, sweep time was set to auto and the trace mode was Max Hold. The DTS bandwidth was measured at 6 dB down from the peak of the signal.
2. The measurement was performed radiated.

#### **Test setup:**



**Transmitter Minimum 6 dB Bandwidth (continued)****Results:**

Channel	6 dB Bandwidth (kHz)	Limit (kHz)	Margin (kHz)	Result
Single	1410.256	≥500	910.256	Complied

**Test Equipment Used:**

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1656	Thermohygrometer	JM Handelpunkt	30.5015.13	Not stated	23 Apr 2016	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	21 Dec 2016	12
M1874	Test Receiver	Rohde & Schwarz	ESU26	100553	12 Jun 2016	12
A1534	Pre Amplifier	Hewlett Packard	8449B	3008A00405	19 Dec 2016	12
A1818	Antenna	EMCO	3115	00075692	17 Dec 2016	12
A1396	Attenuator	Huber & Suhner	6810.17.B	757987	05 May 2016	12

### **5.2.2. Transmitter Duty Cycle**

#### **Test Summary:**

<b>Test Engineer:</b>	Andrew Edwards	<b>Test Date:</b>	12 February 2016
<b>Test Sample Serial Number:</b>	1002		

<b>FCC Reference:</b>	Part 15.35(c)
<b>Test Method Used:</b>	ANSI C63.10 Section 7.5

#### **Environmental Conditions:**

<b>Temperature (°C):</b>	24
<b>Relative Humidity (%):</b>	37

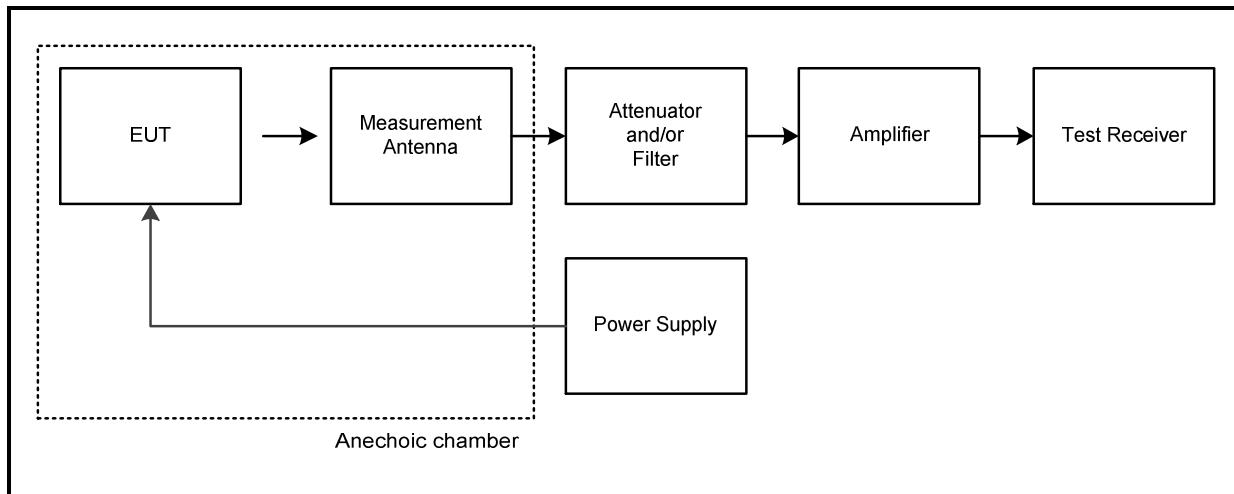
#### **Note(s):**

1. In order to assist with the determination of the average level of spurious emissions field strength, measurements were made of duty cycle to determine the transmission duration and the silent period time of the transmitter. Two pulses of 0.48 ms duration occurred within a 100 ms period, therefore the total transmitter on time is 0.96 ms. The transmitter on time was measured using a spectrum analyser in the time domain and duty cycle calculated as follows:

$$20 \log (On\ Time / 100\ ms)$$

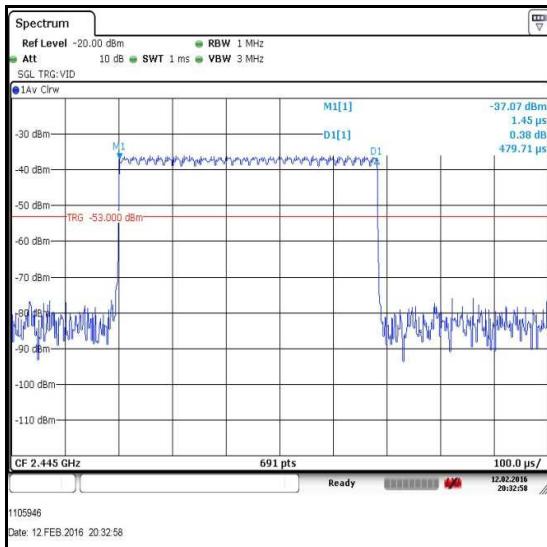
$$20 \log (0.96 / 100\ ms) = 40.4\ dB$$

#### **Test setup:**

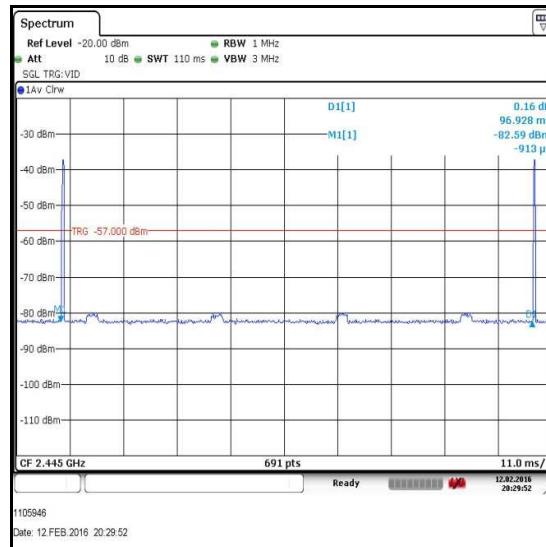


**Transmitter Duty Cycle (continued)****Results:**

Pulse Duration (ms)	Duty Cycle (dB)
0.480	40.4



TX on time



TX period

**Test Equipment Used:**

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1659	Thermohygrometer	JM Handelpunkt	30.5015.13	Not stated	23 Apr 2016	12
M1873	Signal Analyser	Rohde & Schwarz	FSV30	103074	03 Jul 2016	12
M1251	Digital Multimeter	Fluke	175	89170179	26 May 2016	12
S0538	Bench Power Supply	TTI	PL154	250135	Calibrated before use	-

### **5.2.3. Transmitter Maximum Peak Output Power**

#### **Test Summary:**

<b>Test Engineer:</b>	Andrew Edwards	<b>Test Date:</b>	26 January 2016
<b>Test Sample Serial Number:</b>	1001		

<b>FCC Reference:</b>	Part 15.247(b)(3)
<b>Test Method Used:</b>	FCC KDB 558074 Section 9.1.1, ANSI C63.10 Sections 6.3 & 6.6 and Notes below

#### **Environmental Conditions:**

<b>Temperature (°C):</b>	24
<b>Relative Humidity (%):</b>	39

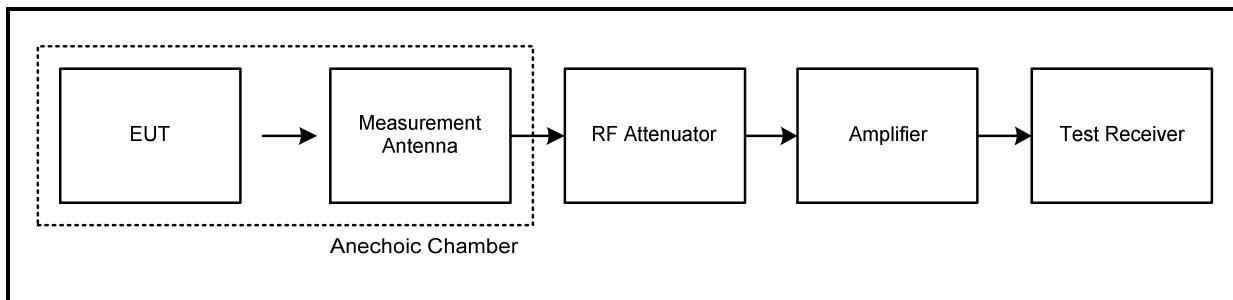
#### **Note(s):**

1. This test was performed as a radiated measurement, therefore the EUT antenna gain is encompassed in the final results and not measured.
2. The EUT has an integral antenna. The declared antenna gain (-6.0 dBi) was subtracted from the measured EIRP to obtain the conducted power.

$$EIRP - \text{Declared Antenna Gain} = \text{Conducted Power}$$

3. Measurements were performed using a combination of the conducted method described in FCC KDB 558074 Section 9.1.1 and the test method for radiated emissions measurements described in ANSI C63.10 Section 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.
4. The test receiver resolution bandwidth was set to 2 MHz and video bandwidth of 10 MHz. A peak detector was used, sweep time was set to auto and trace mode was Max Hold. The span was set to 10 MHz. A marker was placed at the peak of the signal and the results recorded in the table below.

#### **Test setup:**



**Transmitter Maximum Peak Output Power (continued)****Results:**

Channel	EIRP (dBm)	EIRP Limit (dBm)	Margin (dB)	Result
Single	-2.5	36.0	38.5	Complied

Channel	EIRP (dBm)	Declared Antenna Gain (dBi)	Conducted Peak Power (dBm)	Conducted Peak Power Limit (dBm)	Margin (dB)	Result
Single	-2.5	-6.0	3.5	30.0	26.5	Complied

**Test Equipment Used:**

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1656	Thermohygrometer	JM Handelpunkt	30.5015.10	Not stated	23 Apr 2016	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	21 Dec 2016	12
M1874	Test Receiver	Rohde & Schwarz	ESU26	100553	12 Jun 2016	12
A1534	Pre Amplifier	Hewlett Packard	8449B	3008A00405	19 Dec 2016	12
A1818	Antenna	EMCO	3115	00075692	17 Dec 2016	12
A1396	Attenuator	Huber & Suhner	6810.17.B	757987	05 May 2016	12
A239	Attenuator	Huber & Suhner	6806.17.B	Not stated	05 May 2016	12
A032	Antenna	EMCO	3115	2874	12 Mar 2016	36
G0606	Signal Generator	Rohde & Schwarz	SMIQ 03B	832870 / 054	02 Feb 2016	12
M199	Power Meter	Rohde & Schwarz	NRVS	827023/075	08 Apr 2016	24
M1267	Power Sensor	Rohde & Schwarz	NRV-Z52	100155	23 Apr 2016	24

### **5.2.4. Transmitter Radiated Emissions**

#### **Test Summary:**

<b>Test Engineer:</b>	Andrew Edwards	<b>Test Date:</b>	27 January 2016
<b>Test Sample Serial Number:</b>	1001		

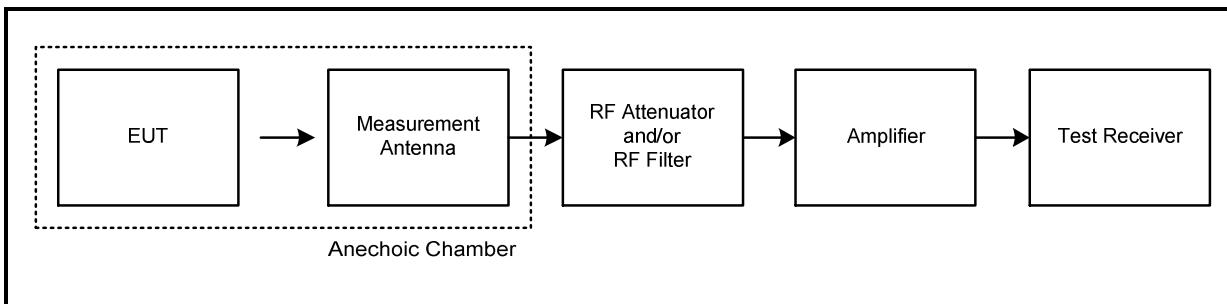
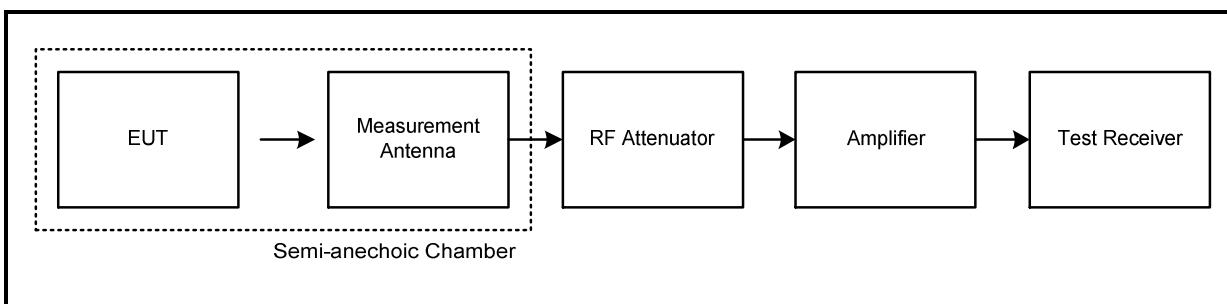
<b>FCC Reference:</b>	Parts 15.247(d) & 15.209(a)
<b>Test Method Used:</b>	ANSI C63.10 Sections 6.3 and 6.5
<b>Frequency Range</b>	30 MHz to 1000 MHz

#### **Environmental Conditions:**

<b>Temperature (°C):</b>	24
<b>Relative Humidity (%):</b>	37

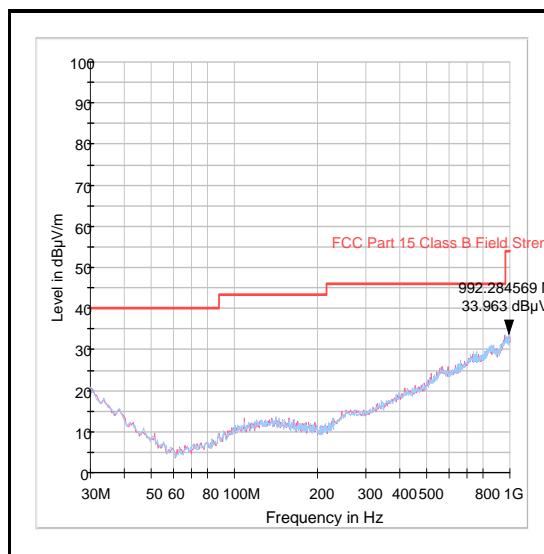
#### **Note(s):**

1. The final measured value, for the given emission, in the table below incorporates the calibrated antenna factor and cable loss.
2. No spurious emissions were detected above the noise floor of the measuring receiver therefore the highest peak noise floor reading of the measuring receiver was recorded as shown in the table below.
3. Measurements below 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.
4. Pre-scans were performed and markers placed on the highest measured levels. The test receiver resolution bandwidth was set to 100 kHz and video bandwidth 300 kHz. A peak detector was used, sweep time was set to auto and trace mode was Max Hold.

**Transmitter Radiated Emissions (continued)****Test setup for radiated measurements:**

**Transmitter Radiated Emissions (continued)****Results:**

Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
992.285	Vertical	34.0	54.0	20.0	Complied

**Test Equipment Used:**

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1623	Thermohygrometer	JM Handelspunkt	30.5015.13	Not stated	11 Jan 2017	12
K0001	5m RSE Chamber	Rainford EMC	N/A	N/A	12 Jan 2017	12
M1273	Test Receiver	Rohde & Schwarz	ESIB26	100275	19 Mar 2016	12
G0543	Pre-Amplifier	Sonoma	310N	230801	10 Feb 2016	3
A490	Antenna	Chase	CBL6111A	1590	30 Apr 2016	12
A1834	Attenuator	Hewlett Packard	8491B	10444	05 Mar 2016	12

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

<b>Test Engineer:</b>	Andrew Edwards	<b>Test Dates:</b>	15 January 2016 & 26 January 2016
<b>Test Sample Serial Number:</b>	1001		

<b>FCC Reference:</b>	Parts 15.247(d) & 15.209(a)
<b>Test Method Used:</b>	FCC KDB 558074 Sections 11 & 12 referencing ANSI C63.10 Sections 6.3 and 6.6
<b>Frequency Range</b>	1 GHz to 25 GHz

**Environmental Conditions:**

<b>Temperature (°C):</b>	24 to 26
<b>Relative Humidity (%):</b>	37 to 39

**Note(s):**

1. The final measured value, for the given emission, in the table below incorporates the calibrated antenna factor and cable loss.
2. 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.
3. The emission shown on the 1 GHz to 4 GHz plot is the EUT fundamental.
4. Pre-scans above 1 GHz were performed in a fully anechoic chamber (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 (Asset Number K0001) at a distance of 3 metres. The EUT was placed at a height of 1.5 m 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.
5. Pre-scans were performed and markers placed on the highest measured levels the test receiver was set up as followed: a RBW set to 1 MHz, the VBW set to 3, with the sweep time set to auto couple. Peak and average measurements were performed with their own appropriate detectors during the pre-scan measurements.
6. The reference level for the emission in the non-restricted band was established by following KDB 558074 Section 11.2 procedure.
7. \* -20 dBc limit applies in non-restricted bands as the radiated output power measurements were performed using a peak detector.
8. \*\*Duty cycle correction can be applied to peak measurement in order to calculate the average emission level. The FCC OET states the duty cycle correction factor cannot be greater than 20 dB. Duty cycle was measured as 40.4 dB which is greater than the permitted maximum 20 dB. Therefore 20 dB has been subtracted from the peak level in order to obtain the average level for the second harmonic at 4888.926 MHz:

$$\text{Peak emission level (dB}\mu\text{V/m)} - \text{Duty Cycle (dB)} = \text{Average emission level (dB}\mu\text{V/m)}$$

$$64.7 - 20.0 = 44.7 \text{ dB}\mu\text{V/m}$$

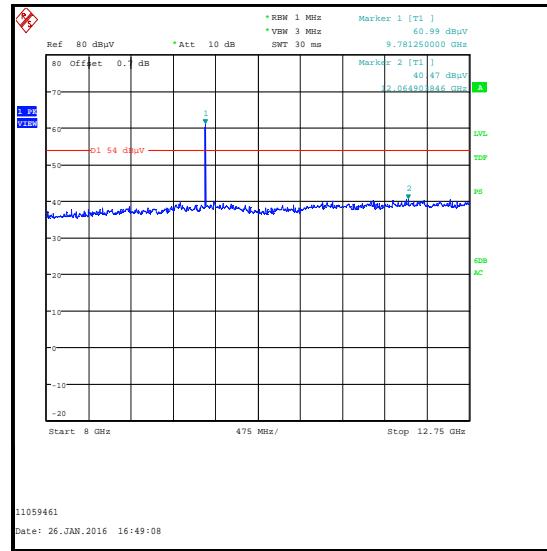
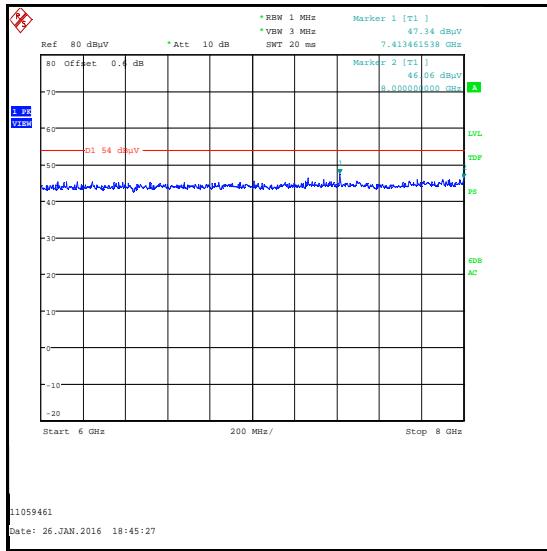
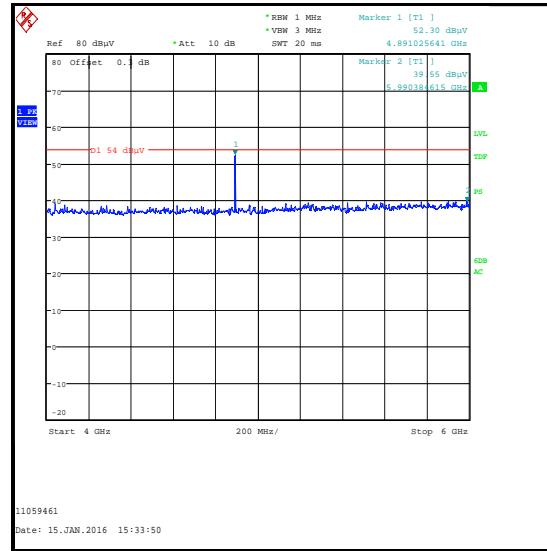
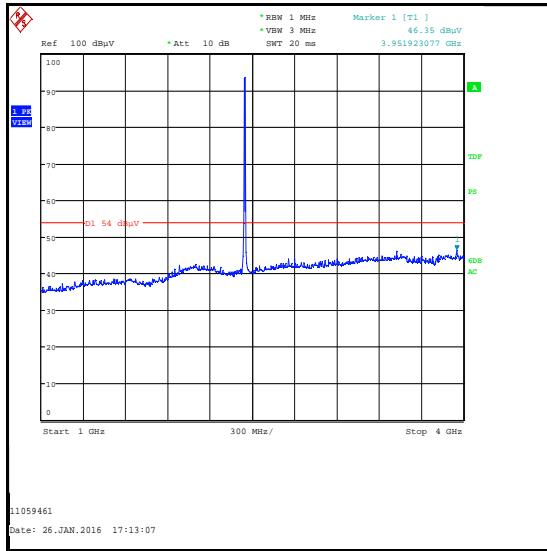
**Transmitter Radiated Emissions (continued)****Results: Peak**

Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
4888.926	Horizontal	64.7	74.0	9.3	Complied
7335.096	Horizontal	55.4	74.0	18.6	Complied
9781.908	Horizontal	58.6*	70.1	11.5	Complied

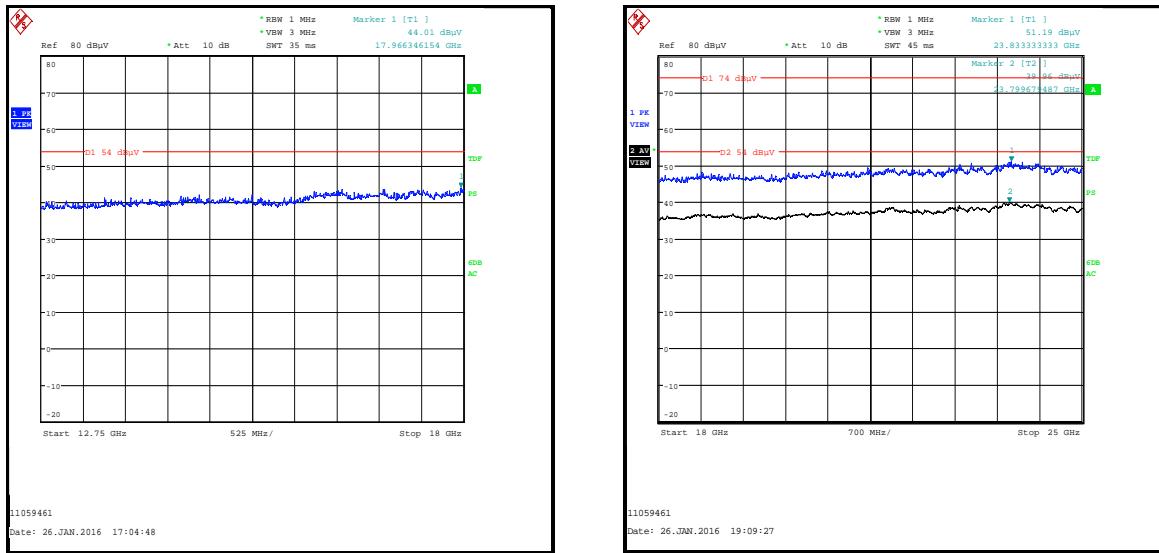
**Results: Average**

Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
4888.926	Horizontal	44.7**	54.0	9.3	Complied
7336.298	Horizontal	49.9	54.0	4.1	Complied

## Transmitter Radiated Emissions (continued)



## Transmitter Radiated Emissions (continued)



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

### Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1656	Thermohygrometer	JM Handelspunkt	30.5015.13	None stated	23 Apr 2016	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	21 Dec 2016	12
M1874	Test Receiver	Rohde & Schwarz	ESU26	100553	12 Jun 2016	12
A1534	Pre Amplifier	Hewlett Packard	8449B	3008A00405	19 Dec 2016	12
A1818	Antenna	EMCO	3115	00075692	17 Dec 2016	12
A253	Antenna	Flann Microwave	12240-20	128	17 Dec 2016	12
A254	Antenna	Flann Microwave	14240-20	139	17 Dec 2016	12
A255	Antenna	Flann Microwave	16240-20	519	17 Dec 2016	12
A256	Antenna	Flann Microwave	18240-20	400	17 Dec 2016	12
A436	Antenna	Flann Microwave	20240-20	330	19 Dec 2016	12
A1975	High Pass Filter	AtlanTecRF	AFH-03000	090424010	17 Apr 2016	12

**5.2.5. Transmitter Band Edge Radiated Emissions****Test Summary:**

<b>Test Engineer:</b>	Andrew Edwards	<b>Test Date:</b>	26 January 2016
<b>Test Sample Serial Number:</b>	1001		

<b>FCC Reference:</b>	Parts 15.247(d) & 15.209(a)
<b>Test Method Used:</b>	ANSI C63.10 Section 6.10.4, 6.10.5 & KDB 558074 Section 11

**Environmental Conditions:**

<b>Temperature (°C):</b>	24
<b>Relative Humidity (%):</b>	37

**Note(s):**

1. The final measured value, for the given emission, in the table below incorporates the calibrated antenna factor and cable loss.
2. The maximum peak conducted output power was previously measured. In accordance with FCC KDB 558074 Section 11.1(a), the lower band edge measurement was performed with a peak detector and the -20 dBc limit applied.
3. There is a restricted band 10 MHz below the lower band edge. The test receiver was set up as follows: the RBW set to 1 MHz, the VBW set to 3 MHz, with the sweep time set to auto couple. Peak and average measurements were performed with their respective detectors. Markers were placed on the highest point on each trace.
4. \* -20 dBc limit.

**Transmitter Band Edge Radiated Emissions (continued)****Results: Peak**

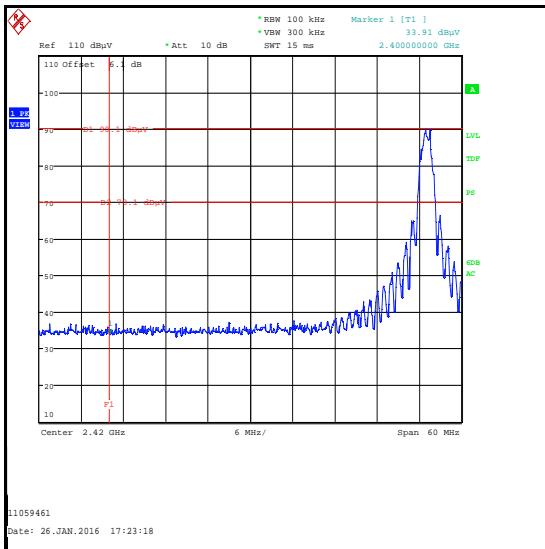
Frequency (MHz)	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
2356.154	47.1	74.0	26.9	Complied
2400	33.9	70.1*	36.2	Complied
2483.5	47.3	74.0	26.7	Complied

**Results: Average**

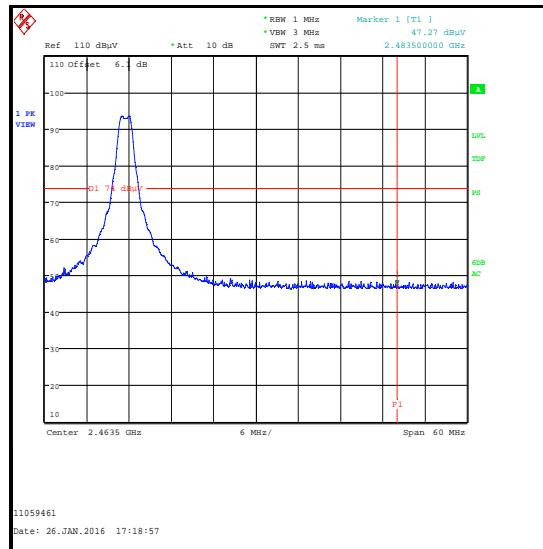
Frequency (MHz)	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
2312.821	38.3	54.0	15.7	Complied
2483.5	38.4	54.0	15.6	Complied

## Transmitter Band Edge Radiated Emissions (continued)

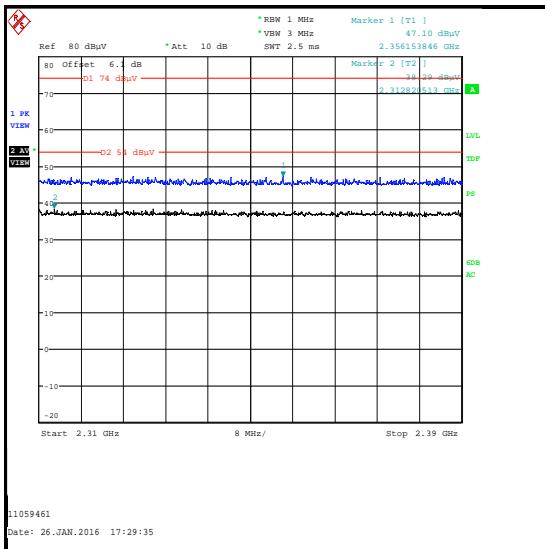
## **Results:**



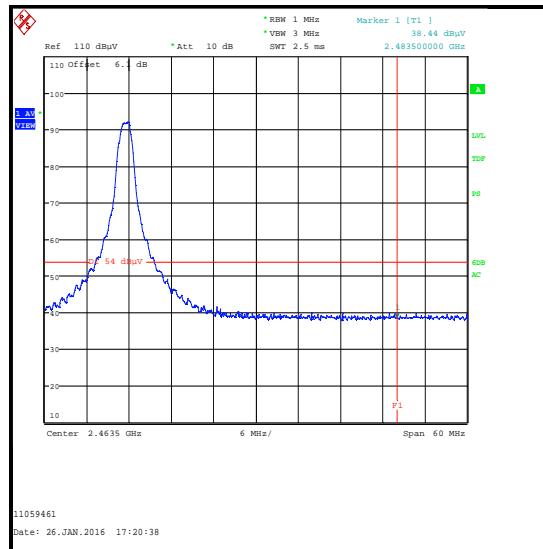
## Lower Band Edge Peak Measurement



## Upper Band Edge Peak Measurement



## 2310 MHz to 2390 MHz Restricted Band



## Upper Band Edge Average Measurement

### **Test Equipment Used:**

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1656	Thermohygrometer	JM Handelpunkt	30.5015.13	None stated	23 Apr 2016	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	21 Dec 2016	12
M1874	Test Receiver	Rohde & Schwarz	ESU26	100553	12 Jun 2016	12
A1534	Pre Amplifier	Hewlett Packard	8449B	3008A00405	19 Dec 2016	12
A1818	Antenna	EMCO	3115	00075692	17 Dec 2016	12
A239	Attenuator	Huber & Suhner	6806.17.B	None stated	05 May 2016	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
Radiated Maximum Peak Output Power	2.4 GHz to 2.4835 GHz	95%	$\pm 2.54$ dB
Minimum 6 dB Bandwidth	2.4 GHz to 2.4835 GHz	95%	$\pm 3.92$ %
Duty Cycle	2.4 GHz to 2.4835 GHz	95%	$\pm 1.14$ %
Radiated Spurious Emissions	30 MHz to 1 GHz	95%	$\pm 5.65$ dB
Radiated Spurious Emissions	1 GHz to 25 GHz	95%	$\pm 2.94$ 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.

## **7. Report Revision History**

Version Number	Revision Details		
	Page No(s)	Clause	Details
1.0	-	-	Initial Version
2.0	8, 15 & 16		The following changes were made at the request of the TCB: Changed antenna gain from 1 dBi to -6 dBi. Updated conducted power test results and Notes

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