TEST REPORT

Test Report No. : UL-RPT-RP10033550JD01A V5.0

Manufacturer	:	BENTLEY MOTORS LIMITED
Model No.	:	D189100
FCC ID	:	IERRF-H588LTI
IC Certification No.	:	11183A-RFH588LTI
Technology	:	Proprietary (Wireless Audio Systems)
Test Standard(s)	:	FCC Parts 15.247, 15.209(a) Industry Canada RSS-210 A8.2(a), A8.4(4) & A8.5 and RSS-Gen 4.6.1, 4.6.2, 4.8, 4.9,

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 5.0 supersedes all previous versions.

Date of Issue: 26 November 2013

Checked by:

Sarah Williams
WiSE Engineer

Issued by :

pp
John Newell
Group Quality Manager, WiSE
Basingstoke,
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:	BENTLEY MOTORS LIMITED
Address:	Pyms Lane Cheshire CW1 3PL United Kingdom

2. Summary of Testing

2.1. General Information

Specification Reference:	47CFR15.247
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications): Part 15 Subpart C (Intentional Radiators) - Section 15.247
Specification Reference:	47CFR15.209
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications): Part 15 Subpart C (Intentional Radiators) - Sections 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): 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, Basingstoke, Hampshire, RG24 8AH, United Kingdom
Test Dates:	31 July 2013 to 23 September 2013

2.2. Summary of Test Results

FCC Reference (47CFR)	IC Reference	Measurement	Result
Part 15.247(a)(2)	RSS-Gen 4.6.2 RSS-210 A8.2(a)	Transmitter Minimum 6 dB Bandwidth	✓
N/A	RSS-Gen 4.6.1	Transmitter 99% Occupied Bandwidth	✓
Part 15.247(e)	RSS-210 A8.2(b)	Transmitter Power Spectral Density	✓
Part 15.247(b)(3)	RSS-Gen 4.8 RSS-210 A8.4(4)	Transmitter Maximum Peak Output Power	✓
Part 15.247(d)/ 15.209(a)	RSS-Gen 4.9 RSS-210 A8.5	Transmitter Radiated Emissions	✓
Part 15.247(d)/ 15.209(a)	RSS-Gen 4.9 RSS-210 A8.5	Transmitter Band Edge 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
Reference:	KDB 558074 D01 v03r01 April 9, 2013
Title:	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)

Brand Name:	BENTLEY MOTORS LIMITED
Model Name or Number:	D189100
Test Sample Serial Number:	1247000051 *(Radiated sample #1)*
Hardware Version Number:	03S
Software Version Number:	03S
FCC ID:	IERRF-H588LTI
Industry Canada Certification Number:	11183A-RFH588LTI

Brand Name:	BENTLEY MOTORS LIMITED
Model Name or Number:	D189100
Test Sample Serial Number:	1220MS0034 *(Radiated sample #2)*
Hardware Version Number:	03S
Software Version Number:	03S
FCC ID:	IERRF-H588LTI
Industry Canada Certification Number:	11183A-RFH588LTI

Brand Name:	BENTLEY MOTORS LIMITED
Model Name or Number:	D189100
Test Sample Serial Number:	1247000009 *(Conducted sample with RF port #1)*
Hardware Version Number:	03S
Software Version Number:	03S
FCC ID:	IERRF-H588LTI
Industry Canada Certification Number:	11183A-RFH588LTI

Brand Name:	BENTLEY MOTORS LIMITED
Model Name or Number:	D189100
Test Sample Serial Number:	131200221 *(Conducted sample with RF port #2)*
Hardware Version Number:	03S
Software Version Number:	03S
FCC ID:	IERRF-H588LTI
Industry Canada Certification Number:	11183A-RFH588LTI

Description:	Micro USB cable
Brand Name:	Not marked or stated
Model Name or Number:	Not marked or stated

3.2. Description of EUT

The Equipment Under Test (EUT) was a set of wireless headphones which contain the TI chipset combination CC8531 plus CC2590. The headphones operate as part of an in car infotainment system and connect to the DVD Loader (D189050) that is in the back of the front seat via a proprietary 2.4 GHz system. The headphones contain an internal antenna. The EUT could be powered either by USB or with two AAA batteries.

3.3. Modifications Incorporated in the EUT

No modifications were applied to the EUT during testing.

3.4. Additional Information Related to Testing

Technology Tested:	Proprietary (Digital Transmission System)		
Type of Unit:	Transceiver		
Channel Spacing:	4 MHz		
Modulation:	FSK		
Data Rate:	5 Mbps		
Power Supply Requirement(s):	Battery:	2.5 VDC	
	USB:	5.0 VDC	
Maximum Conducted Output Power:	Battery:	8.4 dBm	
	USB:	8.6 dBm	
Antenna Type:	Internal PCB trace antenna		
Antenna Gain:	2.0 dBi		
Transmit Frequency Range:	2402 MHz to 2480 MHz		
Transmit Channels Tested:	**Channel ID**	**Channel Number**	**Channel Frequency (MHz)**
	Bottom	1	2406
	Middle	9	2438
	Top	18	2474

3.5. Support Equipment

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

Description:	Laptop PC
Brand Name:	Dell
Model Name or Number:	D610
Serial Number:	0062

Description:	CC Debugger
Brand Name:	Texas Instruments
Model Name or Number:	1752232
Serial Number:	20130026349

Description:	Ribbon cable
Brand Name:	Not marked or stated
Model Name or Number:	Not marked or stated

Description:	Mini USB cable
Brand Name:	Not marked or stated
Model Name or Number:	Not marked or stated

Description:	2 x AAA rechargeable batteries
Brand Name:	Energizer
Model Name or Number:	Not marked or stated

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 in Test mode with modulation, maximum possible data length available.

4.2. Configuration and Peripherals

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

- Controlled using software application on the laptop PC supplied by the customer. The application was used to enable continuous transmission and to select the test channels, data rates and modulation as required.
- In order to place the EUT into test mode it required a Texas Instruments debugger, this was connected between the EUT and test laptop by a ribbon cable and a mini USB cable.
- The EUT could be powered in two different ways one was by two rechargeable AAA batteries at 2.5 Volts. The other way was by a USB port which could also charge the batteries. For the measurements where the batteries were being tested, two fully charged batteries were fitted before testing commenced and the voltage levels were monitored during testing.
- Radiated spurious emission measurements were investigated below 1 GHz with both possible power sources (two AAA batteries or a USB cable). The USB cable was deemed the worst case and it was used for the measurements above 1 GHz.
- The conducted sample with serial number 1247000009 was used for 6 dB bandwidth, 99% emission bandwidth, power spectral density and maximum peak output power tests.
- The conducted sample with serial number 131200221 was used for power spectral density and maximum peak output power tests.
- The EUT radiated samples with serial numbers 1247000051 & 1220MS0034 were used for radiated spurious emissions 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 Minimum 6 dB Bandwidth

Test Summary:

Test Engineer:	Mark Percival	**Test Date:**	31 July 2013
Test Sample Serial Number:	1247000009		

FCC Reference:	Part 15.247(a)(2)
Industry Canada Reference:	RSS-Gen 4.6.2 / RSS-210 A8.2(a)
Test Method Used:	As detailed in FCC KDB 558074 Section 8.1

Environmental Conditions:

Temperature (°C):	24
Relative Humidity (%):	59

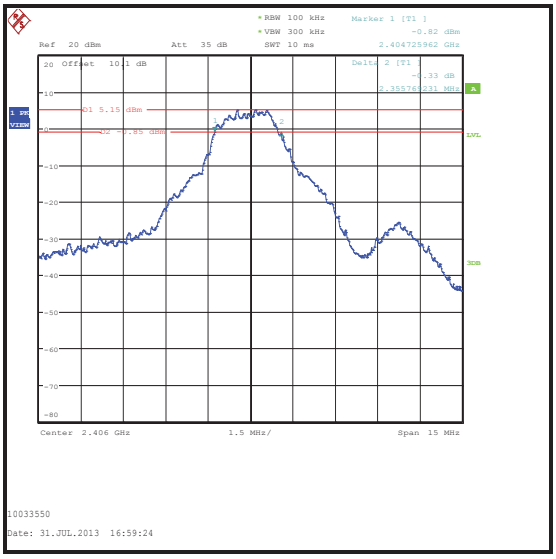
Note(s):

1. 6 dB DTS bandwidth tests were performed using a spectrum analyser in accordance with FCC KDB 558074 Section 8.1 Option 1.
2. The spectrum analyser 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 Max Hold. The span was set to 15 MHz. Normal and delta markers were placed 6 dB down from the peak of the carrier. These results are documented in the table below.
3. The spectrum analyser was connected to the RF port on the EUT using suitable attenuation and RF cable.

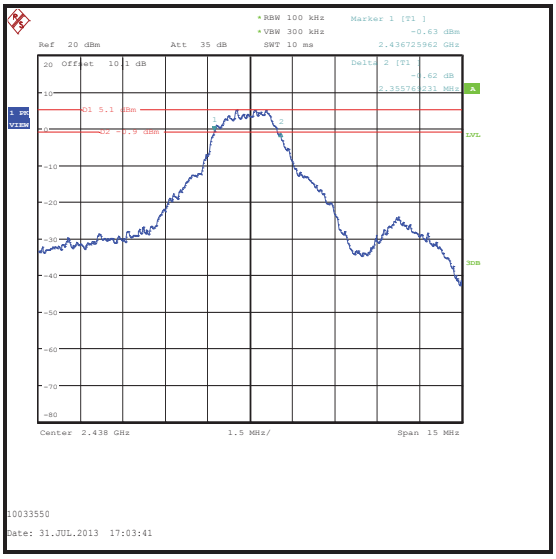
Transmitter Minimum 6 dB Bandwidth (continued)

Results:

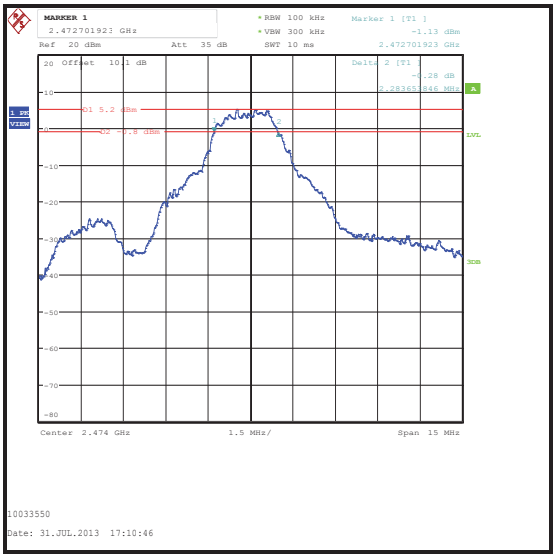
Channel	6 dB Bandwidth (kHz)	Limit (kHz)	Margin (kHz)	Result
Bottom	2355.769	≥500	1855.769	Complied
Middle	2355.769	≥500	1855.769	Complied
Top	2283.654	≥500	1783.654	Complied



Bottom Channel



Middle Channel



Top Channel

Transmitter Minimum 6 dB Bandwidth (continued)

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
L1076	Spectrum Analyzer	Rohde & Schwarz	FSU8	101349	29 May 2014	12
A2141	Attenuator	Atlan TecRF	AN18-10	090918-04	10 May 2014	12
M1657	Thermometer Hygrometer Station	JM Handelspunkt	30.5015.13	Not stated	24 May 2014	12

5.2.2. Transmitter 99% Occupied Bandwidth

Test Summary:

Test Engineer:	Mark Percival	**Test Date:**	31 July 2013
Test Sample Serial Number:	1247000009		

FCC Reference:	N/A
Industry Canada Reference:	RSS-Gen 4.6.1
Test Method Used:	Spectrum Analyser Occupied Bandwidth function

Environmental Conditions:

Temperature (°C):	24
Relative Humidity (%):	59

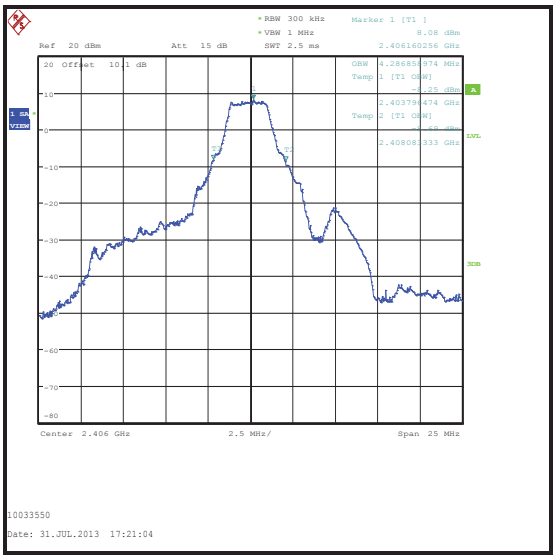
Note(s):

1. Occupied bandwidth (99% bandwidth) was measured using a spectrum analyser occupied bandwidth function. The span was wide enough to cover all possible emission skirts. The resolution bandwidth was set to 1% of the span and the video bandwidth set to 3 times the resolution bandwidth.
2. The spectrum analyser resolution bandwidth was set to 300 kHz and video bandwidth of 1 MHz. A sample detector was used, sweep time was set to auto and trace mode was Max Hold. The span was set to 1.5 times the DTS bandwidth. The highest peak was recorded.
3. The spectrum analyser was connected to the RF port on the EUT using suitable attenuation and RF cable.

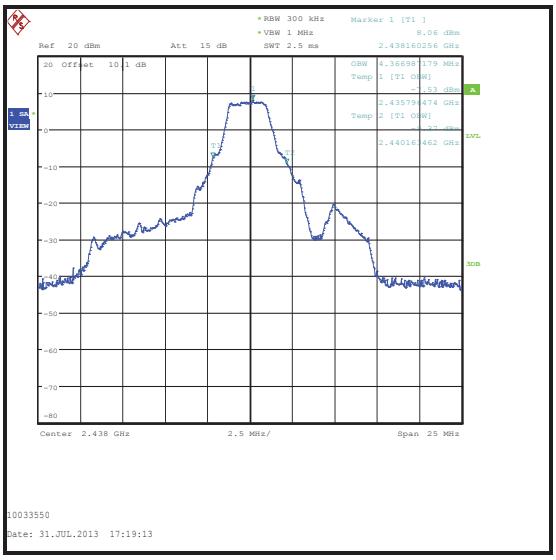
Transmitter 99% Occupied Bandwidth (continued)

Results:

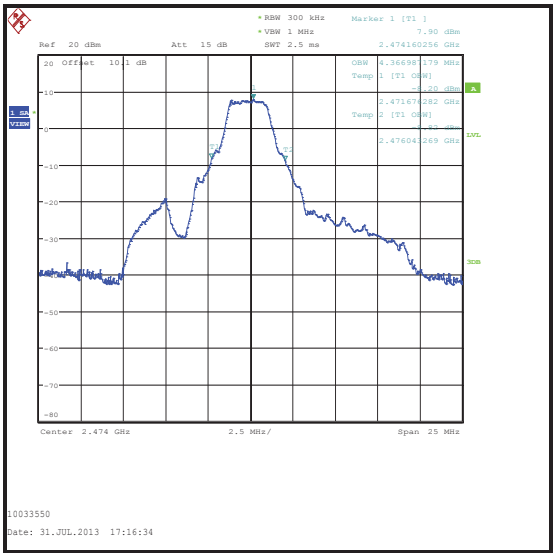
Channel	99% Occupied Bandwidth (MHz)
Bottom	4.287
Middle	4.367
Top	4.367



Bottom Channel



Middle Channel



Top Channel

Transmitter 99% Occupied Bandwidth (continued)

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
L1076	Spectrum Analyzer	Rohde & Schwarz	FSU8	101349	29 May 2014	12
A2141	Attenuator	Atlan TecRF	AN18-10	090918-04	10 May 2014	12
M1657	Thermometer Hygrometer Station	JM Handelspunkt	30.5015.13	Not stated	24 May 2014	12

5.2.3. Transmitter Power Spectral Density

Test Summary:

Test Engineers:	Mark Percival & Andrew Edwards	**Test Dates:**	31 July 2013 & 23 September 2013
Test Sample Serial Numbers:	1247000009 & 131200221		

FCC Reference:	Part 15.247(e)
Industry Canada Reference:	RSS-210 A8.2(b)
Test Method Used:	As detailed in FCC KDB 558074 Section 10.2

Environmental Conditions:

Temperature (°C):	24
Relative Humidity (%):	59

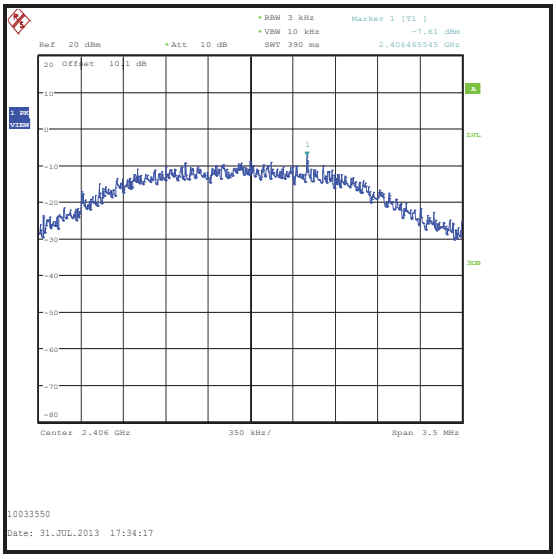
Note(s):

1. Transmitter Power Spectral Density tests were performed using a spectrum analyser in accordance with FCC KDB 558074 Section 10.2 measurement method PKPSD.
2. The spectrum analyser resolution bandwidth was set to 3 kHz and video bandwidth of 10 kHz. A peak detector was used, sweep time was set to auto and trace mode was Max Hold. The span was set to 1.5 times the DTS bandwidth. A marker was placed at the peak of the signal and the results recorded in the table below.
3. The spectrum analyser was connected to the RF port on the EUT using suitable attenuation and RF cable. An RF level offset was entered on the spectrum analyser to compensate for the loss of the attenuator and RF cable.
4. The sample with serial number 1247000009 was used for the battery measurements. The sample with serial number 131200221 was used for the USB measurements.

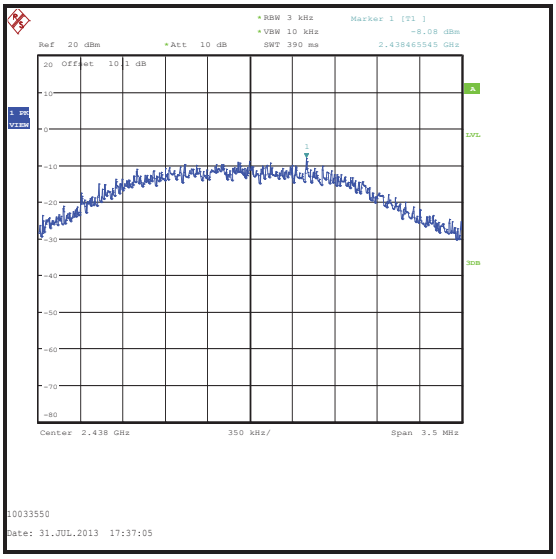
Transmitter Power Spectral Density (continued)

Results: Battery

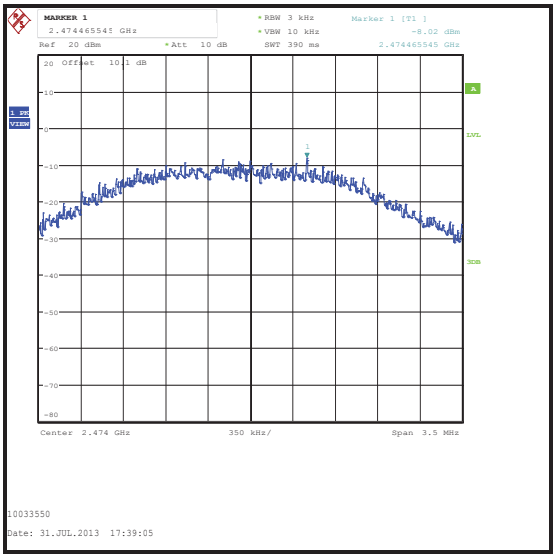
Channel	Output Power (dBm / 3 kHz)	Limit (dBm / 3 kHz)	Margin (dB)	Result
Bottom	-7.6	8.0	15.6	Complied
Middle	-8.1	8.0	16.1	Complied
Top	-8.0	8.0	16.0	Complied



Bottom Channel



Middle Channel

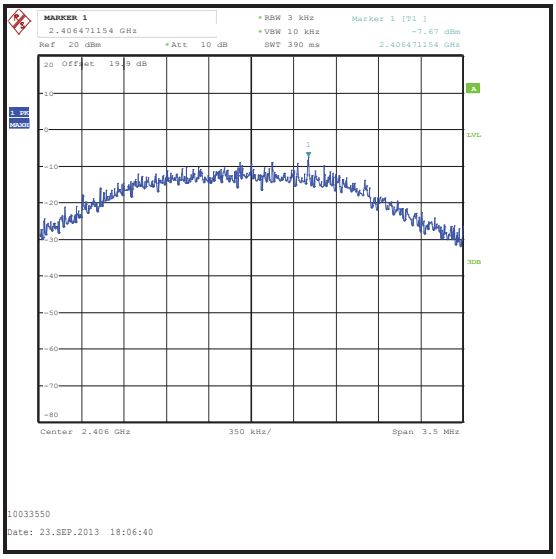


Top Channel

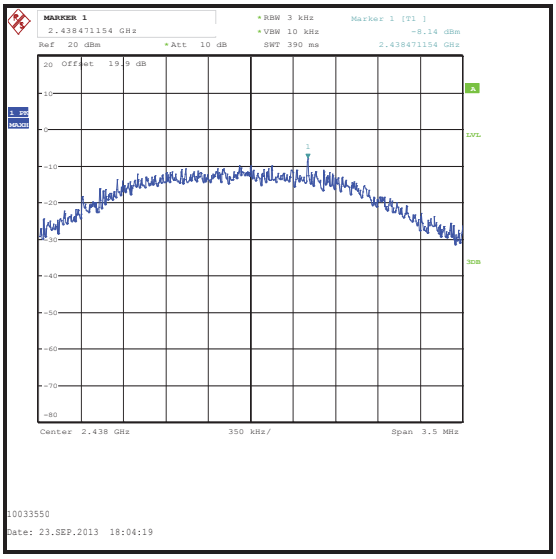
Transmitter Power Spectral Density (continued)

Results: USB

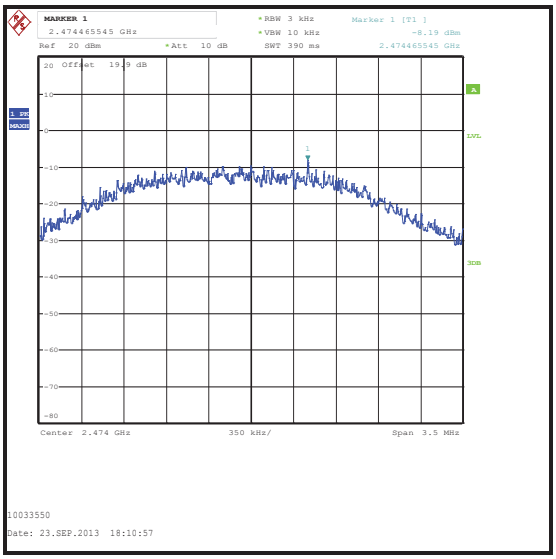
Channel	Output Power (dBm / 3 kHz)	Limit (dBm / 3 kHz)	Margin (dB)	Result
Bottom	-7.7	8.0	15.7	Complied
Middle	-8.1	8.0	16.1	Complied
Top	-8.2	8.0	16.2	Complied



Bottom Channel



Middle Channel



Top Channel

Transmitter Power Spectral Density (continued)

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
L1076	Spectrum Analyzer	Rohde & Schwarz	FSU8	101349	29 May 2014	12
A2141	Attenuator	Atlan TecRF	AN18-10	090918-04	10 May 2014	12
A2143	Attenuator	Atlan TecRF	AN18-20	081120-23	10 May 2014	12
M199	Power Meter	Rohde & Schwarz	NRVS	827023/075	15 May 2014	12
M1021	Signal Generator	Rohde & Schwarz	SMP02	833286/004	05 Feb 2014	12
M1145	Power Meter	Hewlett Packard	437B	3737U26557	21 Jun 2014	12
M1175	Power Sensor	Hewlett Packard	8485A	2942A10299	05 Sep 2013	12
M1267	Power Sensor	Rohde & Schwarz	NRV-Z52	100155	14 May 2014	12
M1657	Thermometer Hygrometer Station	JM Handelspunkt	30.5015.13	Not stated	24 May 2014	12

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.

5.2.4. Transmitter Maximum Peak Output Power

Test Summary:

Test Engineers:	Mark Percival & Andrew Edwards	**Test Dates:**	31 July 2013 & 18 September 2013
Test Sample Serial Numbers:	1247000009 & 131200221		

FCC Reference:	Part 15.247(b)(3)
Industry Canada Reference:	RSS-Gen 4.8 / RSS-210 A8.4(4)
Test Method Used:	As detailed in FCC KDB 558074 Section 9.1.1

Environmental Conditions:

Temperature (°C):	24
Relative Humidity (%):	59

Note(s):

1. Conducted power tests were performed using a spectrum analyser in accordance with FCC KDB 558074 Section 9.1.1 measurement method RBW ≥ DTS bandwidth.
2. The spectrum analyser resolution bandwidth was set to 3 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 20 MHz. A marker was placed at the peak of the signal and the results recorded in the table below.
3. The spectrum analyser was connected to the RF port on the EUT using suitable attenuation and RF cable. An RF level offset was entered on the spectrum analyser to compensate for the loss of the attenuator and RF cable.
4. The sample with serial number 1247000009 was used for the battery measurements. The sample with serial number 131200221 was used for the USB measurements.

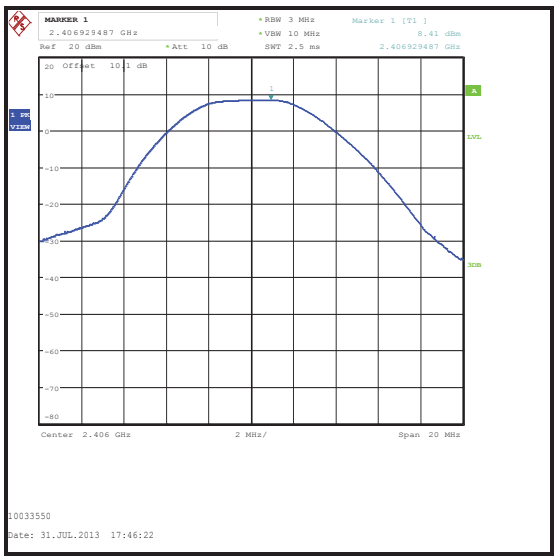
Results: Battery

Channel	Conducted Peak Power (dBm)	Conducted Peak Power Limit (dBm)	Margin (dB)	Result
Bottom	8.4	30.0	21.6	Complied
Middle	8.3	30.0	21.7	Complied
Top	8.4	30.0	21.6	Complied

Channel	Conducted Peak Power (dBm)	Declared Antenna Gain (dBi)	EIRP (dBm)	De Facto EIRP Limit (dBm)	Margin (dB)	Result
Bottom	8.4	2.0	10.4	36.0	25.6	Complied
Middle	8.3	2.0	10.3	36.0	25.7	Complied
Top	8.4	2.0	10.4	36.0	25.6	Complied

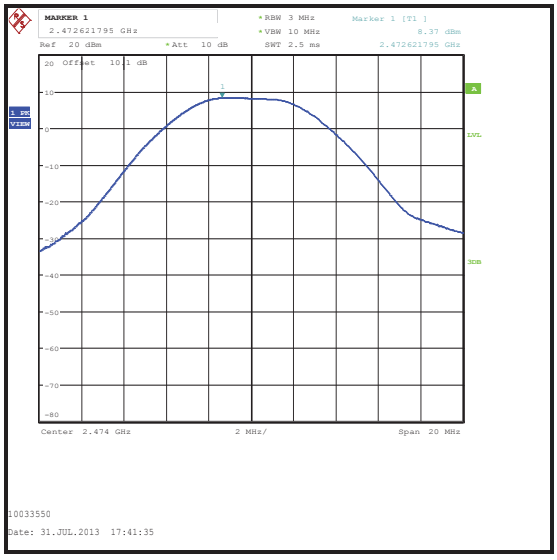
Transmitter Maximum Peak Output Power (continued)

Results: Battery



Bottom Channel

Middle Channel



Top Channel

Transmitter Maximum Peak Output Power (continued)

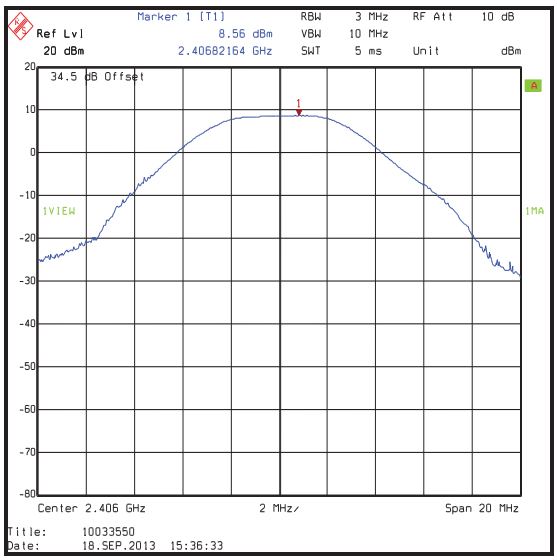
Results: USB

Channel	Conducted Peak Power (dBm)	Conducted Peak Power Limit (dBm)	Margin (dB)	Result
Bottom	8.6	30.0	21.4	Complied
Middle	8.3	30.0	21.7	Complied
Top	8.0	30.0	22.0	Complied

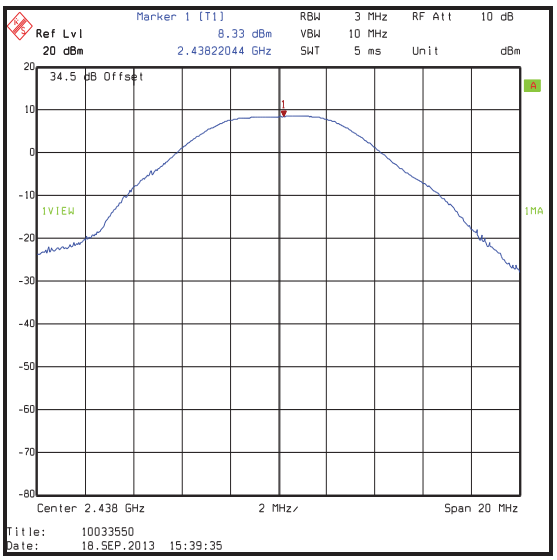
Channel	Conducted Peak Power (dBm)	Declared Antenna Gain (dBi)	EIRP (dBm)	De Facto EIRP Limit (dBm)	Margin (dB)	Result
Bottom	8.6	2.0	10.6	36.0	25.4	Complied
Middle	8.3	2.0	10.3	36.0	25.7	Complied
Top	8.0	2.0	10.0	36.0	26.0	Complied

Transmitter Maximum Peak Output Power (continued)

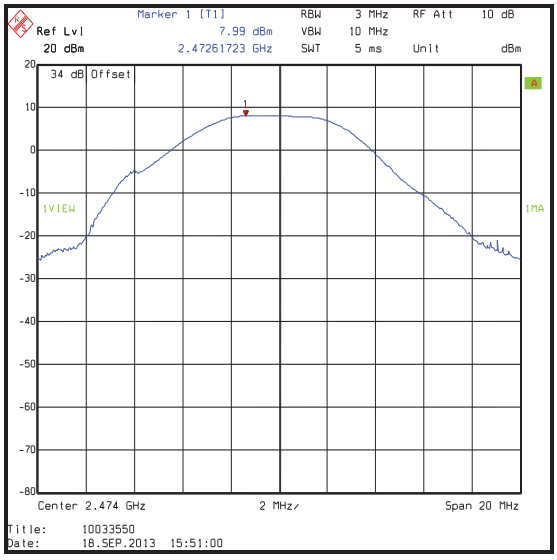
Results: USB



Bottom Channel



Middle Channel



Top Channel

Transmitter Maximum Peak Output Power (continued)

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
L1076	Spectrum Analyzer	Rohde & Schwarz	FSU8	101349	29 May 2014	12
A2141	Attenuator	Atlan TecRF	AN18-10	090918-04	10 May 2014	12
A2143	Attenuator	Atlan TecRF	AN18-20	081120-23	10 May 2014	12
M127	Spectrum Analyzer	Rohde & Schwarz	FSEB 30	842 659/016	19 Aug 2014	12
M199	Power Meter	Rohde & Schwarz	NRVS	827023/075	15 May 2014	12
M1021	Signal Generator	Rohde & Schwarz	SMP02	833286/004	05 Feb 2014	12
M1145	Power Meter	Hewlett Packard	437B	3737U26557	21 Jun 2014	12
M1175	Power Sensor	Hewlett Packard	8485A	2942A10299	05 Sep 2013	12
M1267	Power Sensor	Rohde & Schwarz	NRV-Z52	100155	14 May 2014	12
M1657	Thermometer Hygrometer Station	JM Handelspunkt	30.5015.13	Not stated	24 May 2014	12

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.

5.2.5. Transmitter Radiated Emissions

Test Summary:

Test Engineer:	Andrew Edwards	**Test Date:**	18 September 2013
Test Sample Serial Number:	1220MS0034		

FCC Reference:	Parts 15.247(d) & 15.209(a)
Industry Canada Reference:	RSS-Gen 4.9 / RSS-210 A8.5
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):	23
Relative Humidity (%):	41

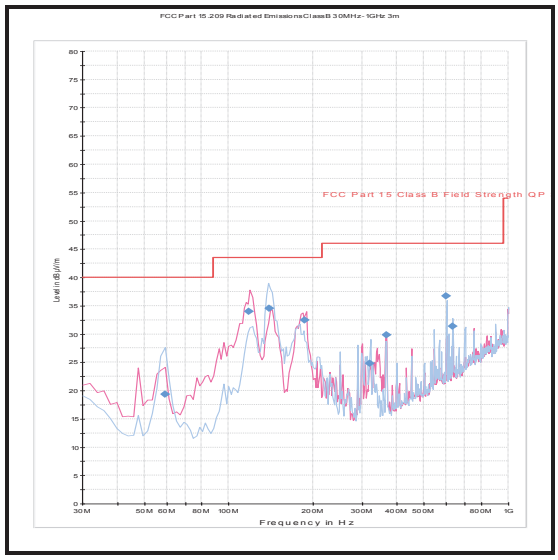
Note(s):

1. The final measured value, for the given emission, in the table below incorporates the calibrated antenna factor and cable loss.
2. The 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 were at least 20 dB below the appropriate limit or below the noise floor of the measurement system.
4. 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.
5. 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.
6. Final measurements were performed on the marker frequencies and the results entered into the table below. The test receiver resolution bandwidth was set to 120 kHz, using a CISPR quasi-peak detector and span big enough to see the whole emission.

Results: Top Channel

Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
118.109	Vertical	34.0	43.5	9.5	Complied

Transmitter Radiated Emissions (continued)



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

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
A490	Antenna	Chase	CBL6111A	1590	18 Apr 2014	12
A1834	Attenuator	Hewlett Packard	8491B	10444	27 Jan 2014	12
G0543	Amplifier	Sonoma	310N	230801	05 Oct 2013	3
K0001	5m RSE Chamber	Rainford EMC	N/A	N/A	24 Oct 2013	12
M1273	Test Receiver	Rohde & Schwarz	ESIB 26	100275	07 Feb 2014	12
M1656	Thermometer Hygrometer Station	JM Handelspunkt	30.5015.13	Not stated	24 May 2014	12

Transmitter Radiated Emissions (continued)

Test Summary:

Test Engineers:	Mark Percival & Andrew Edwards	**Test Dates:**	02 August 2013 & 19 September 2013
Test Sample Serial Numbers:	1247000051 & 1220MS0034		

FCC Reference:	Parts 15.247(d) & 15.209(a)
Industry Canada Reference:	RSS-Gen 4.9 / RSS-210 A8.5
Test Method Used:	As detailed in ANSI C63.10 Sections 6.3 and 6.6 referencing ANSI C63.4
Frequency Range	1 GHz to 25 GHz

Environmental Conditions:

Temperature (°C):	23 to 24
Relative Humidity (%):	41 to 46

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. *In accordance with ANSI C63.4 section 8.3.2.2,Note 1, the peak level complied with the average limit, therefore the average results were not required.
5. 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 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.
6. Pre-scans were performed and a marker placed on the highest measured level of the appropriate plot. The test receiver resolution bandwidth was set to 1 MHz and video bandwidth 3 MHz. The sweep time was set to auto. Final measurements: for peak measurements using the method stated above. For average measurements the test receiver resolution bandwidth was set to 1 MHz and video bandwidth 10 Hz.

Transmitter Radiated Emissions (continued)

Results: Peak / Bottom Channel

Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
4813.543	Vertical	57.0	74.0	17.0	Complied

Results: Average / Bottom Channel

Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
4811.940	Vertical	44.8	54.0	9.2	Complied

Results: Peak / Middle Channel

Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
4876.713	Vertical	56.3	74.0	17.7	Complied
7313.379	Vertical	51.1	54.0*	2.9	Complied

Results: Average / Middle Channel

Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
4875.992	Vertical	45.0	54.0	9.0	Complied

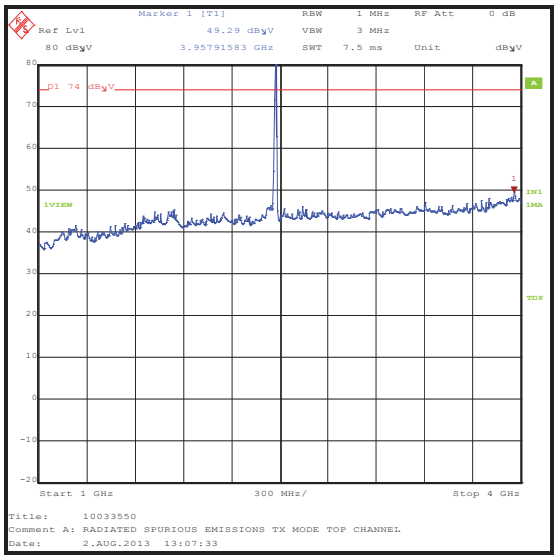
Results: Peak / Top Channel

Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
4946.854	Vertical	56.3	74.0	17.7	Complied
7420.301	Vertical	50.0	54.0*	4.0	Complied

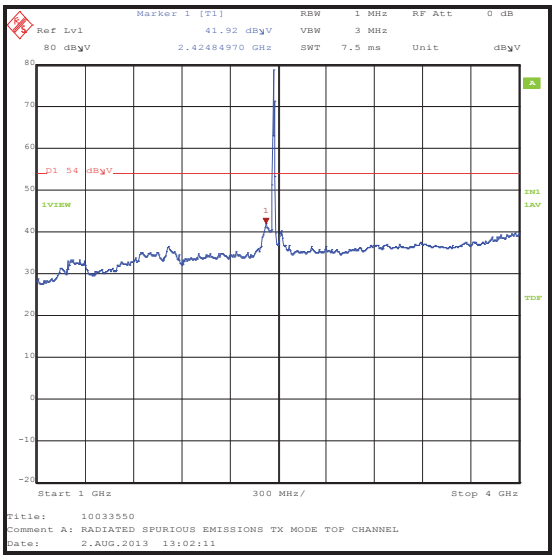
Results: Average / Top Channel

Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
4947.896	Vertical	44.9	54.0	9.1	Complied

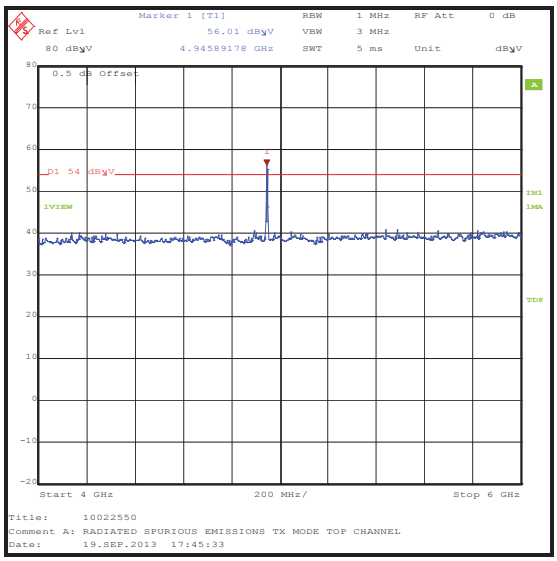
Transmitter Radiated Emissions (continued)



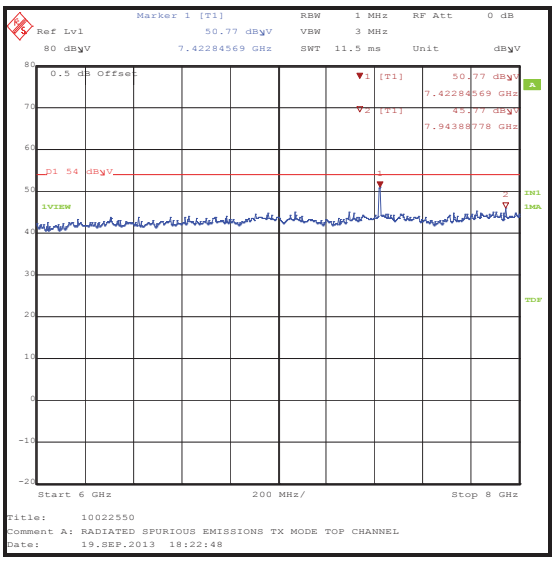
Peak Detector



Average Detector

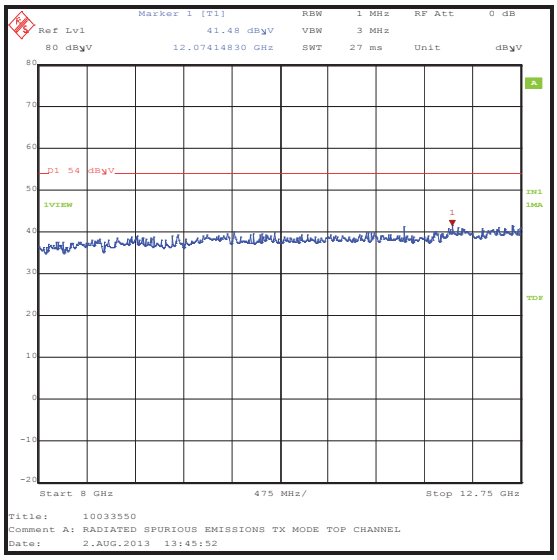


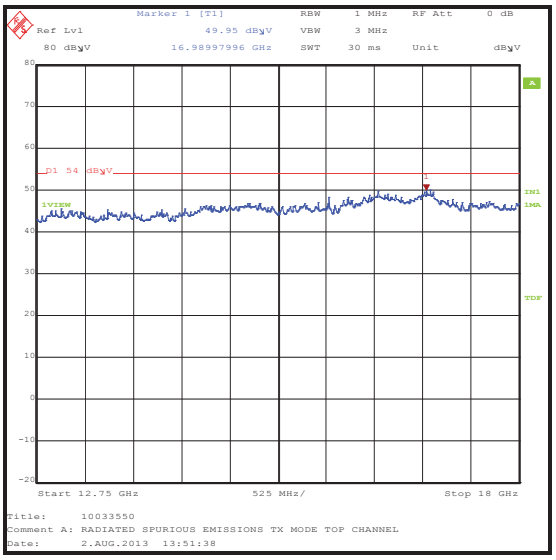
Peak Detector

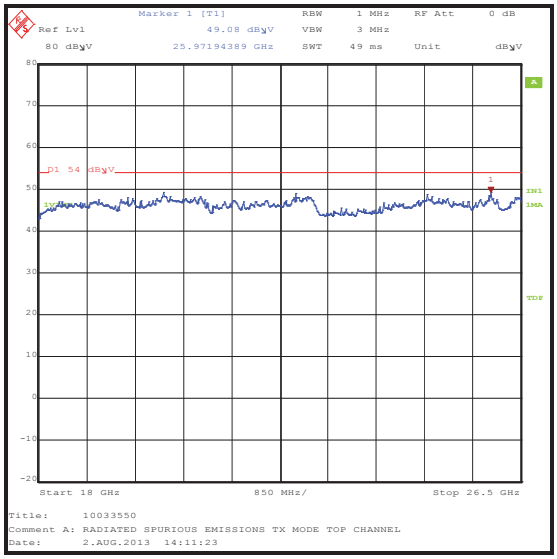


Average Detector

Transmitter Radiated Emissions (continued)







Transmitter Radiated Emissions (continued)

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
A253	Antenna	Flann	12240-20	128	04 Nov 2013	12
A254	Antenna	Flann	14240-20	139	04 Nov 2013	12
A255	Antenna	Flann	16240-20	519	04 Nov 2013	12
A256	Antenna	Flann	18240-20	400	04 Nov 2013	12
A436	Antenna	Flann	20240-20	330	04 Nov 2013	12
A1534	Pre Amplifier	Hewlett Packard	8449B	3008A00405	04 Nov 2013	12
A1818	Antenna	EMCO	3115	00075692	04 Nov 2013	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	04 Nov 2013	12
M1124	Test Receiver	Rohde & Schwarz	ESIB 26	100046K	20 Sep 2013	12
M1656	Thermometer Hygrometer Station	JM Handelspunkt	30.5015.13	Not stated	24 May 2014	12

5.2.6. Transmitter Band Edge Radiated Emissions

Test Summary:

Test Engineer:	Mark Percival	**Test Date:**	02 August 2013
Test Sample Serial Number:	1247000051		

FCC Reference:	Parts 15.247(d) & 15.209(a)
Industry Canada Reference:	RSS-Gen 4.9 / RSS-210 A8.5
Test Method Used:	As detailed in ANSI C63.10 Section 6.9.2 referencing FCC KDB 558074 Section 11

Environmental Conditions:

Temperature (°C):	23
Relative Humidity (%):	41

Note(s):

1. The final measured value, for the given emission, in the table below incorporates the calibrated antenna factor and cable loss.
2. For the lower band edge measurements: As the lower band edge falls within the non-restricted band only peak measurements are required. 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. The test receiver was left to sweep for a sufficient length of time in order to maximise the carrier level and out-of-band emissions. A marker and corresponding reference level line were placed on the peak of the carrier. As the maximum conducted output power was measured using a peak detector in accordance with FCC KDB 558074 Section 9.1.1 an out-of-band limit line was placed 20 dB below the peak level (FCC KDB 558074 Section 11.1(a)). A marker was placed on the band edge spot frequencies and a second marker placed on the highest emission level in the adjacent non-restricted band of operation (where a higher level emission was present). Marker frequencies and levels were recorded.
3. For the upper band edge measurements: As the upper band edge falls within restricted band both peak and average measurements were recorded by placing a marker at the edge of the band (2483.5 MHz). For peak measurements the test receiver resolution bandwidth was set to 1 MHz and video bandwidth 3 MHz. A peak detector was used, sweep time was set to auto and trace mode was Max Hold. For average measurements the test receiver resolution bandwidth was set to 1 MHz and video bandwidth 10 Hz. A peak detector was used, sweep time was set to auto and trace mode was Max Hold. The test receiver was left to sweep for a sufficient length of time in order to maximise the carrier level and out-of-band emissions. A marker was placed on the band edge spot frequencies and a second marker placed on the highest emission level in the adjacent restricted band of operation (where a higher level emission was present). Marker frequencies and levels were recorded.
4. * -20 dBc limit.

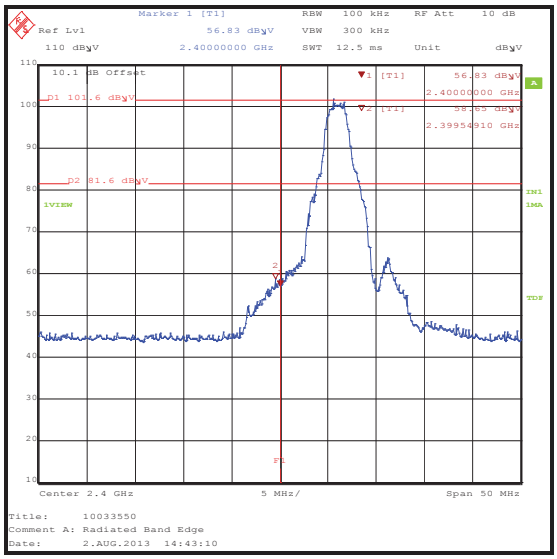
Transmitter Band Edge Radiated Emissions (continued)

Results: Peak

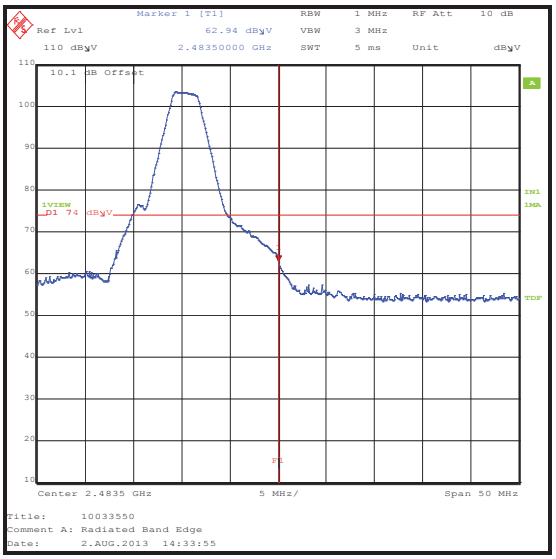
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2399.549	58.7	81.6*	22.9	Complied
2400.0	56.8	81.6*	24.8	Complied
2483.5	62.9	74.0	11.1	Complied

Results: Average

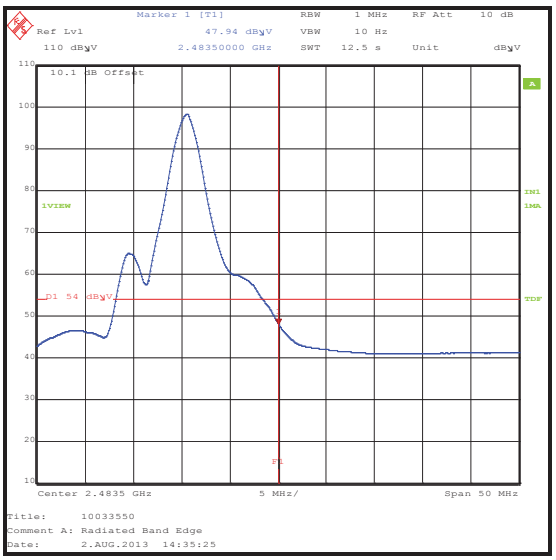
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2483.5	47.9	54.0	6.1	Complied



Lower Band Edge Peak Measurement



Upper Band Edge Peak Measurement



Upper Band Edge Average Measurement

Transmitter Band Edge Radiated Emissions (continued)

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
A1396	Attenuator	Huber & Suhner	6810.17.B	757987	10 May 2014	12
A1534	Pre Amplifier	Hewlett Packard	8449B	3008A00405	04 Nov 2013	12
A1818	Antenna	EMCO	3115	00075692	04 Nov 2013	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	04 Nov 2013	12
M1124	Test Receiver	Rohde & Schwarz	ESIB 26	100046K	20 Sep 2013	12
M1656	Thermometer Hygrometer Station	JM Handelspunkt	30.5015.13	Not stated	24 May 2014	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 measured (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
Conducted Maximum Peak Output Power	2.4 GHz to 2.4835 GHz	95%	±1.13 dB
Spectral Power Density	2.4 GHz to 2.4835 GHz	95%	±1.13 dB
Minimum 6 dB Bandwidth	2.4 GHz to 2.4835 GHz	95%	±0.92 ppm
99% Occupied Bandwidth	2.4 GHz to 2.4835 GHz	95%	±0.92 ppm
Radiated Spurious Emissions	30 MHz to 1 GHz	95%	±5.65 dB
Radiated Spurious Emissions	1 GHz 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.

7. Report Revision History

Version Number	Revision Details		
	Page No(s)	Clause	Details
1.0	-	-	Initial Version
2.0	-	-	Updated to include results for USB & update of channel numbers
3.0	-	-	Micro & Mini USB swapped between sections 3.1 & 3.4
4.0	-	-	Section 3.2 updated, FCC ID and Industry Canada certification numbers updated
5.0	-	-	Update to sections 3.2, 3.4, 5.2.3 & 5.2.4