



# TEST REPORT

**Test Report No. : UL-RPT-RP10821606JD06A V2.0**

**Manufacturer** : Dyson  
**Model No.** : WIFIAMFA001  
**FCC ID** : QVHWIFIMODULE001  
**Technology** : WLAN  
**Test Standard(s)** : FCC Parts 15.209(a) & 15.247(d)

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

**Date of Issue:** 05 November 2015

**Checked by:**

Steven White  
Project Lead, Radio Laboratory

**Issued by :**

pp

John Newell  
Quality Manager,  
UL VS LTD



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

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## UL VS LTD

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**1. Customer Information**





<b>Company Name:</b>	Dyson Ltd
<b>Address:</b>	Tetbury Hill Malmesbury Wiltshire SN16 0RP

## **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 July 2015 to 04 November 2015

### **2.2. Summary of Test Results**

<b>FCC Reference (47CFR)</b>	<b>Measurement</b>	<b>Result</b>
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		

### **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
<b>Reference:</b>	KDB 558074 D01 DTS Meas Guidance v03r03 June 9, 2015
<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>	Dyson
<b>Model Name or Number:</b>	WIFIAMFA001
<b>Test Sample Serial Number:</b>	22 ( <i>Radiated sample #1</i> )
<b>Hardware Version:</b>	140763-01
<b>Software Version:</b>	1.0.3.34
<b>FCC ID:</b>	QVHWIFIMODULE001

<b>Brand Name:</b>	Dyson
<b>Model Name or Number:</b>	WIFIAMFA001
<b>Test Sample Serial Number:</b>	4 ( <i>Radiated sample #2</i> )
<b>Hardware Version:</b>	140763-01
<b>Software Version:</b>	1.0.3.34
<b>FCC ID:</b>	QVHWIFIMODULE001

<b>Brand Name:</b>	Dyson
<b>Model Name or Number:</b>	WIFIAMFA001
<b>Test Sample Serial Number:</b>	12 ( <i>Radiated sample #3</i> )
<b>Hardware Version:</b>	140763-01
<b>Software Version:</b>	1.0.3.34
<b>FCC ID:</b>	QVHWIFIMODULE001

<b>Brand Name:</b>	Dyson
<b>Model Name or Number:</b>	WIFIAMFA001
<b>Test Sample Serial Number:</b>	18 ( <i>Conducted sample</i> )
<b>Hardware Version:</b>	140763-01
<b>Software Version:</b>	1.0.3.34
<b>FCC ID:</b>	QVHWIFIMODULE001

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

The equipment under test was a 2.4GHz Wireless LAN 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>Technology Tested:</b>	WLAN (IEEE 802.11b,g,n) / Digital Transmission System	
<b>Type of Unit:</b>	Transceiver	
<b>Modulation Type:</b>	DBPSK, DQPSK, BPSK, QPSK, 16QAM & 64QAM	
<b>Data Rates:</b>	802.11b	1, 2, 5.5 & 11 Mbps
	802.11g	6, 9, 12, 18, 24, 36, 48 & 54 Mbps
	802.11n HT20	MCS0 to MCS7
<b>Power Supply Requirement(s):</b>	Nominal	10.0 VDC
<b>Channel Spacing:</b>	20 MHz	
<b>Transmit Frequency Range:</b>	2412 MHz to 2462 MHz	
<b>Transmit Channels Tested:</b>	<b>Channel Number</b>	<b>Channel Frequency (MHz)</b>
	1	2412
	6	2437
	11	2462

### **3.5. Support Equipment**

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

<b>Brand Name:</b>	Dell
<b>Description:</b>	Test Laptop
<b>Model Name or Number:</b>	E5410
<b>Serial Number:</b>	00732

<b>Brand Name:</b>	USB to TTL Serial Cable
<b>Description:</b>	Not marked or stated
<b>Model Name or Number:</b>	Not marked or stated
<b>Serial Number:</b>	Not marked or stated

<b>Brand Name:</b>	5m USB extension cable
<b>Description:</b>	Not marked or stated
<b>Model Name or Number:</b>	Not marked or stated
<b>Serial Number:</b>	Not marked or stated

<b>Description:</b>	Test jig
<b>Brand Name:</b>	Not marked or stated
<b>Model Name or Number:</b>	Not marked or stated
<b>Serial Number:</b>	Not marked or stated

### **3.6. Antenna**

The following table lists the antenna details for this product:

<b>Type</b>	<b>Stated Gain</b>
PCB Printed Antenna (monopole)	2.08 dBi



## **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 with a modulated carrier at maximum power on the bottom, middle and top channels as required using the supported data rates/modulation types.

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

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

- Controlled using a bespoke application on the laptop PC supplied by the customer. The application was used to enable a continuous transmission mode and to select the test channels, data rates and modulation schemes as required.
- All supported modes were initially investigated on one channel. The modes that produced the highest power and widest bandwidth for all bands were:
  - Highest power
    - 802.11b – DQPSK / 5.5 Mbit/s
    - 802.11g – BPSK / 6 Mbit/s
    - 802.11n HT20 – BPSK / 6.5 Mbit/s / MCS0
  - Widest bandwidth
    - 802.11b – DQPSK / 5.5 Mbit/s
    - 802.11g – 16QAM / 36 Mbit/s
    - 802.11n HT20 – 64QAM / 65 Mbit/s / MCS7

These modes were used for radiated band edge testing. The results of the investigation are stored on file for reference.

- Transmitter spurious emissions were performed with the EUT transmitting with a data rate of 5.5 Mbps . This was found to be the worst case modulation scheme with regards to emissions after preliminary investigations and as this mode emits the highest output power level, it was deemed to be the worst case.

## **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 Radiated Emissions

#### Test Summary:

Test Engineer:	David Doyle	Test Date:	20 July 2015
Test Sample Serial Number:	22		

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

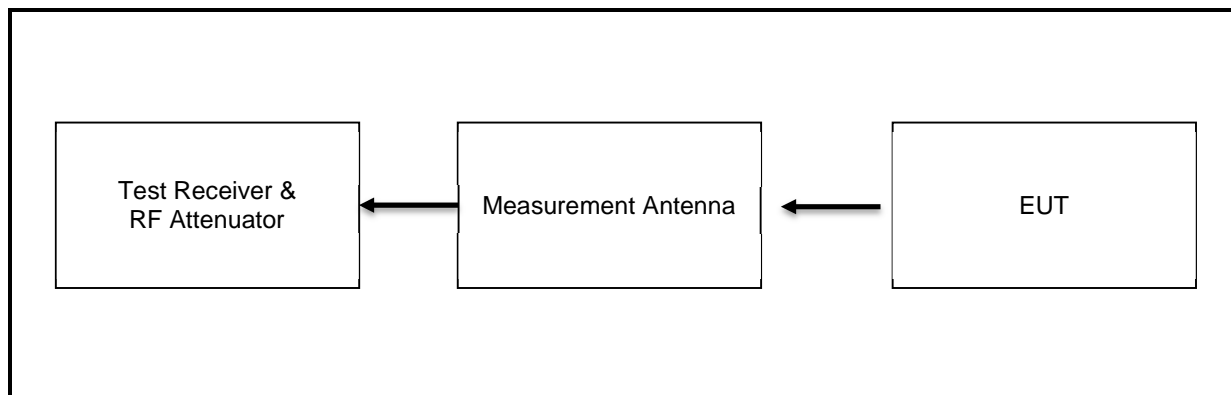
#### Environmental Conditions:

Temperature (°C):	24
Relative Humidity (%):	37

#### Note(s):

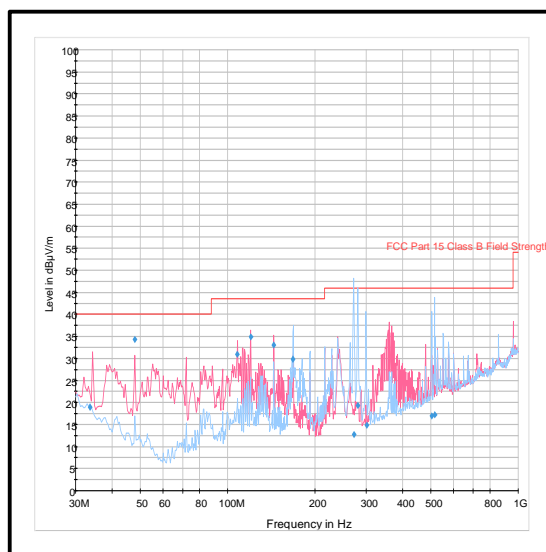
1. The final measured value, for the given emission, in the table below incorporates the calibrated antenna factor and cable loss.
2. The preliminary scans showed similar emission levels below 1 GHz, for each channel of operation. Therefore final radiated emissions measurements were performed with the EUT set to the middle channel only.
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. 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.

#### Test setup for Transmitter Radiated Emissions measurements:



**Transmitter Radiated Emissions (continued)****Results: Middle Channel / 802.11b / DQPSK / 5.5 Mbit/s**

Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
108.001	Vertical	31.0	43.5	12.5	Complied
120.018	Vertical	34.8	43.5	8.7	Complied
168.057	Horizontal	29.8	43.5	13.7	Complied



*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)
M1623	Thermohygrometer	JM Handelspunkt	30.5015.13	None stated	07 Jan 2016	12
K0001	5m RSE Chamber	Rainford EMC	N/A	N/A	19 Mar 2016	12
A259	Antenna	Chase	CBL6111	1513	08 Apr 2016	12
M1273	Test Receiver	Rohde & Schwarz	ESIB 26	100275	19 Mar 2016	12
G0543	Amplifier	Sonoma	310N	230801	06 Nov 2015	3
A1834	Attenuator	Hewlett Packard	8491B	10444	05 Mar 2016	12
A1256	Power Supply	Farnell	11E30/1B	000378	Calibrated before use	-
M1269	Multimeter	Fluke	179	90250210	26 May 2016	12

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

<b>Test Engineer:</b>	David Doyle	<b>Test Dates:</b>	13 July 2015 & 17 July 2015
<b>Test Sample Serial Number:</b>	4		

<b>FCC Reference:</b>	Parts 15.247(d) & 15.209(a)
<b>Test Method Used:</b>	ANSI C63.10 Sections 6.3 and 6.6 referencing ANSI C63.4
<b>Frequency Range:</b>	1 GHz to 25 GHz

**Environmental Conditions:**

<b>Temperature (°C):</b>	24 to 25
<b>Relative Humidity (%):</b>	48 to 49

**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 approximately at 2437 MHz on the 1 GHz to 4 GHz plot is the EUT fundamental.
4. \*In accordance with ANSI C63.10 Section 6.6.4.2, if the peak measured value complies with the average limit, it is unnecessary to perform an average measurement.
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.

**Transmitter Radiated Emissions (continued)****Results: Peak / Bottom Channel**

Frequency (MHz)	Antenna Polarity	Peak Level (dB $\mu$ V/m)	Peak Limit (dB $\mu$ V/m)	Margin (dB)	Result
4020.609	Horizontal	54.9	74.0	19.1	Complied
4823.910	Horizontal	50.8	54.0*	3.2	Complied

**Results: Average / Bottom Channel**

Frequency (MHz)	Antenna Polarity	Average Level (dB $\mu$ V/m)	Average Limit (dB $\mu$ V/m)	Margin (dB)	Result
4020.032	Horizontal	49.6	54.0	4.4	Complied

**Results: Peak / Middle Channel**

Frequency (MHz)	Antenna Polarity	Peak Level (dB $\mu$ V/m)	Peak Limit (dB $\mu$ V/m)	Margin (dB)	Result
4062.404	Horizontal	56.6	74.0	17.4	Complied
4873.942	Horizontal	51.7	54.0*	2.3	Complied

**Results: Average / Middle Channel**

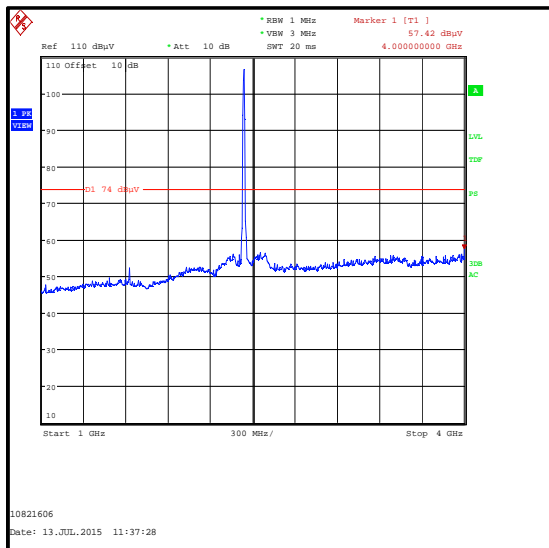
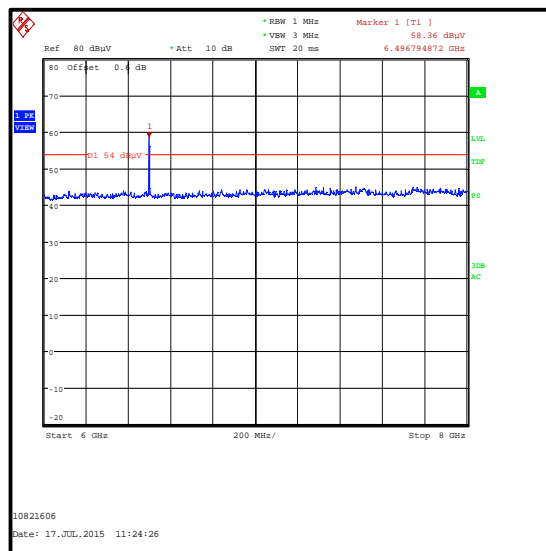
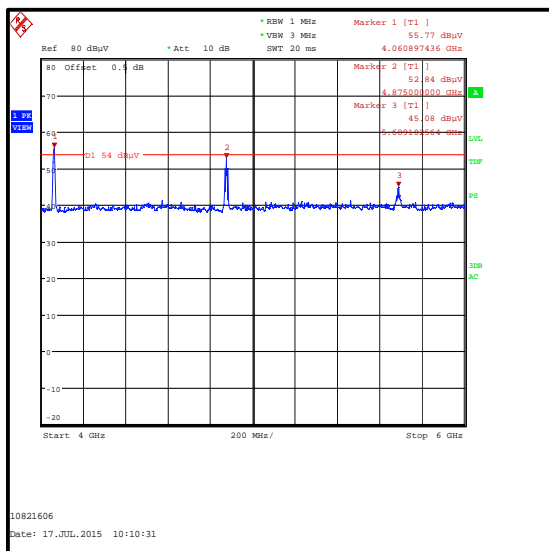
Frequency (MHz)	Antenna Polarity	Average Level (dB $\mu$ V/m)	Average Limit (dB $\mu$ V/m)	Margin (dB)	Result
4062.340	Horizontal	51.3	54.0	2.7	Complied

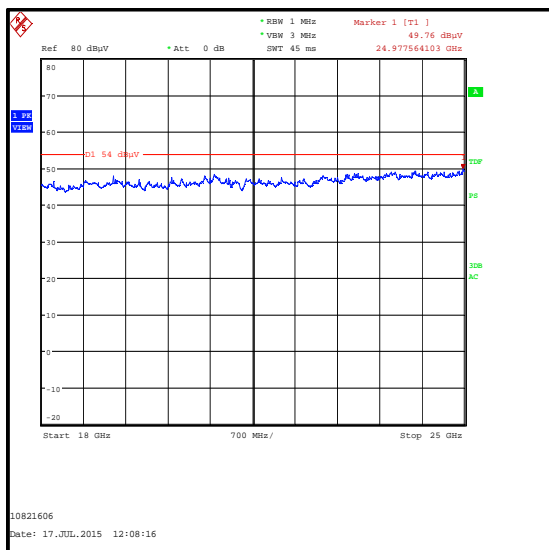
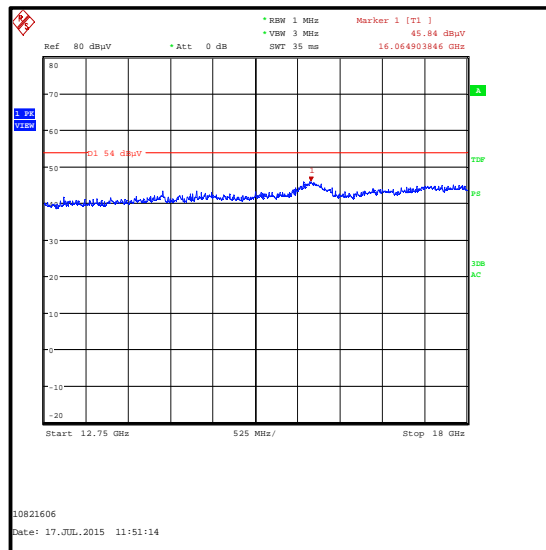
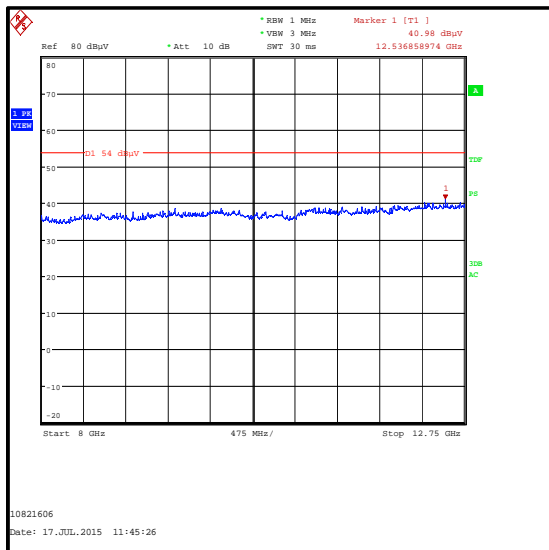
**Results: Peak / Top Channel**

Frequency (MHz)	Antenna Polarity	Peak Level (dB $\mu$ V/m)	Peak Limit (dB $\mu$ V/m)	Margin (dB)	Result
4103.974	Horizontal	58.1	74.0	15.9	Complied
4923.942	Horizontal	55.9	74.0	18.1	Complied

**Results: Average / Top Channel**

Frequency (MHz)	Antenna Polarity	Average Level (dB $\mu$ V/m)	Average Limit (dB $\mu$ V/m)	Margin (dB)	Result
4103.397	Horizontal	52.6	54.0	1.4	Complied
4924.071	Horizontal	52.2	54.0	1.8	Complied

**Transmitter Radiated Emissions (continued)***Peak detector**Average detector*

**Transmitter Radiated Emissions (continued)**

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



**Transmitter Radiated Emissions (continued)****Test Equipment Used:**

<b>Asset No.</b>	<b>Instrument</b>	<b>Manufacturer</b>	<b>Type No.</b>	<b>Serial No.</b>	<b>Date Calibration Due</b>	<b>Cal. Interval (Months)</b>
M1656	Thermohygrometer	JM Handelspunkt	30.5015.13	Not stated	23 Apr 2016	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	01 May 2016	12
M1874	Test Receiver	Rohde & Schwarz	ESU26	100553	12 Jun 2016	12
A1534	Pre Amplifier	Hewlett Packard	8449B	3008A00405	21 Dec 2015	12
A253	Antenna	Flann Microwave	12240-20	128	20 Dec 2015	12
A254	Antenna	Flann Microwave	14240-20	139	20 Dec 2015	12
A255	Antenna	Flann Microwave	16240-20	519	20 Dec 2015	12
A256	Antenna	Flann Microwave	18240-20	400	20 Dec 2015	12
A436	Antenna	Flann Microwave	20240-20	330	21 Dec 2015	12
A1818	Antenna	EMCO	3115	00075692	20 Dec 2015	12
A1396	Attenuator	Huber & Suhner	6810.17.B	757987	05 May 2016	12
A1975	High Pass Filter	AtlanTecRF	AFH-03000	090424010	17 Apr 2016	12
A1256	Power Supply	Farnell	11E30/1B	000378	Calibrated before use	-
M1269	Multimeter	Fluke	179	90250210	26 May 2016	12

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

<b>Test Engineer:</b>	David Doyle	<b>Test Dates:</b>	17 July 2015 & 04 November 2015
<b>Test Sample Serial Numbers:</b>	22 & 12		

<b>FCC Reference:</b>	Parts 15.247(d) & 15.209(a)
<b>Test Method Used:</b>	ANSI C63.10 Section 6.9.2 & FCC KDB 558074 Sections 11 & 13

**Environmental Conditions:**

<b>Temperature (°C):</b>	25
<b>Relative Humidity (%):</b>	42 to 49

**Note(s):**

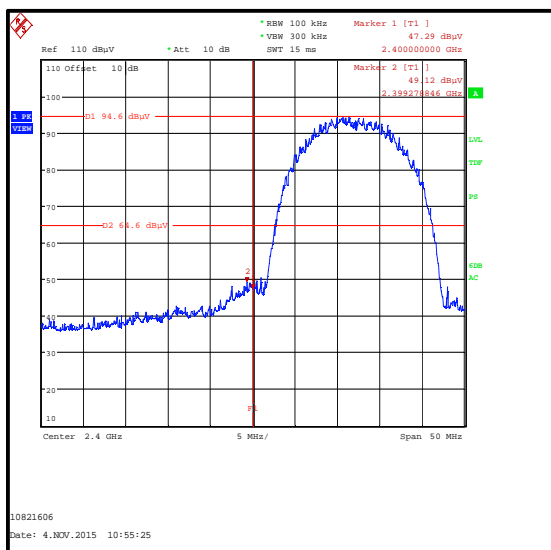
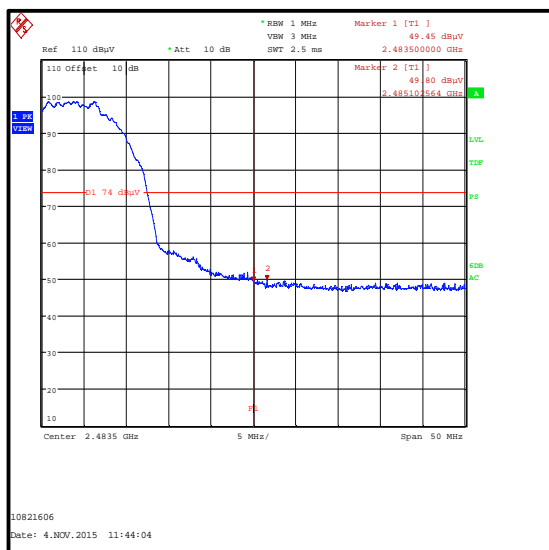
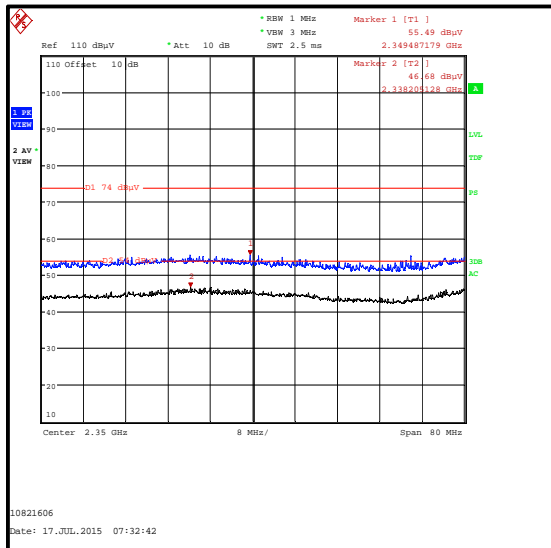
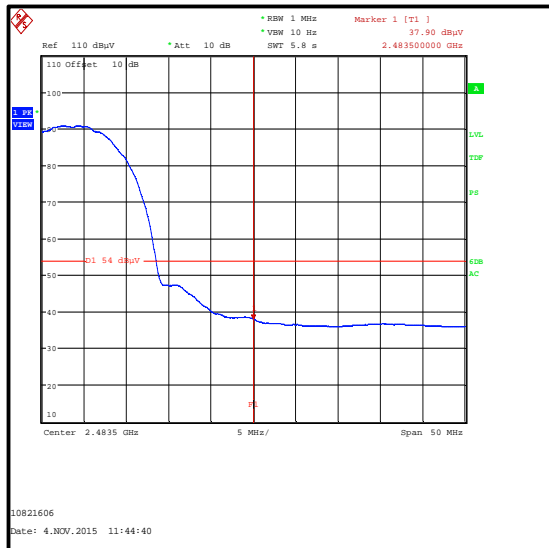
1. All configurations supported by the EUT were investigated on one channel. The data rates that produced the highest power and widest bandwidth were therefore deemed worst case :
  - o 802.11b – DQPSK / 5.5 Mbit/s
  - o 802.11g – BPSK / 6 Mbit/s & 16QAM / 36 Mbit/s
  - o 802.11n – BPSK / 6.5 Mbit/s / MCS0 & 64QAM / 65 Mbit/s / MCS7
2. Final measurements were performed with the above configurations.
3. The final measured value, for the given emission, in the table below incorporates the calibrated antenna factor and cable loss.
4. In accordance with FCC KDB 558074 Section 11.1(b), the lower band edge measurement should be performed with a peak detector and the -30 dBc limit applied.
5. As the lower band edge falls within a non-restricted band, only peak measurements are required. In accordance with FCC KDB 558074 Section 11.1, the test method in Section 11.3 was followed: 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 (average) output power was measured using an RMS detector in accordance with FCC KDB 558074 Section 9.2.2.4 an out-of-band limit line was placed 30 dB (FCC KDB 558074 Section 11.1(b)) below the peak level. 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.
6. As the upper band edge falls within a restricted band both peak and average measurements were recorded by placing a marker at the edge of the band. For peak measurements the test receiver resolution bandwidth was set to 1 MHz and the 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 the 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.
7. \* -30 dBc limit.
8. EUT serial number 22 was used for restricted band plots and serial number 12 was used for band edge plots..

**Transmitter Band Edge Radiated Emissions (continued)****Results: 802.11b / 20 MHz / DQPSK / 5.5 Mbit/s****Results: Peak**

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
2349.487	55.5	74.0	18.5	Complied
2399.279	49.1	64.6*	15.5	Complied
2400	47.3	64.6*	17.3	Complied
2483.5	49.5	74.0	24.5	Complied
2485.103	49.8	74.0	24.2	Complied

**Results: Average**

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
2338.205	46.7	54.0	7.3	Complied
2483.5	37.9	54.0	16.1	Complied

**Transmitter Band Edge Radiated Emissions (continued)****Results: 802.11b / 20 MHz / DQPSK / 5.5 Mbit/s****Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement****2310 MHz to 2390 MHz Restricted Band Plot****Upper Band Edge Average Measurement**

**Transmitter Band Edge Radiated Emissions (continued)****Results: 802.11g / 20 MHz / BPSK / 6 Mbit/s****Results: Peak**

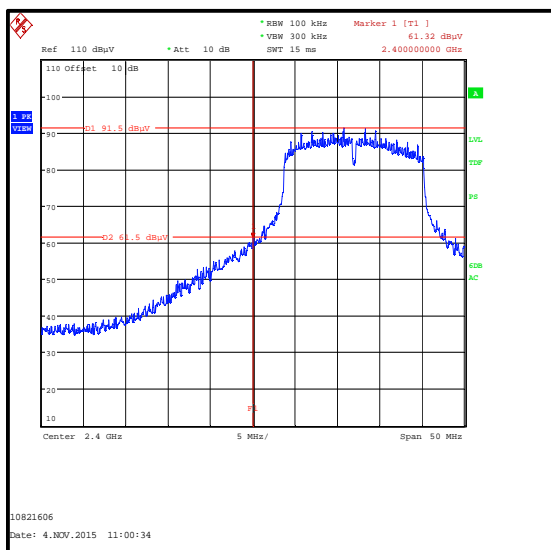
Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
2387.692	65.1	74.0	8.9	Complied
2400	61.3	61.5*	0.2	Complied
2483.5	55.9	74.0	18.1	Complied
2483.580	56.7	74.0	17.3	Complied

**Results: Average**

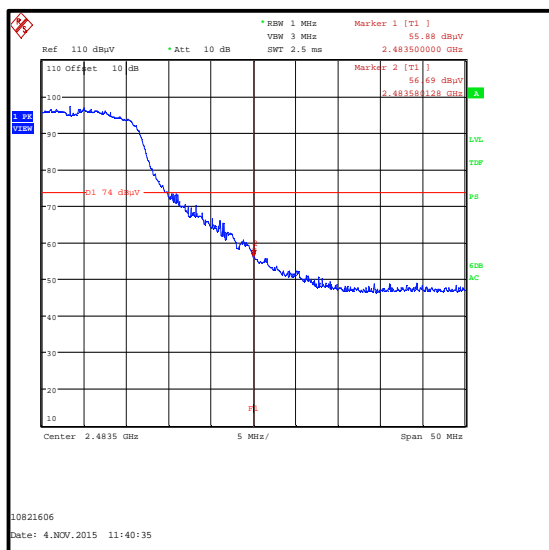
Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
2390	49.7	54.0	4.3	Complied
2483.5	40.6	54.0	13.4	Complied

### **Transmitter Band Edge Radiated Emissions (continued)**

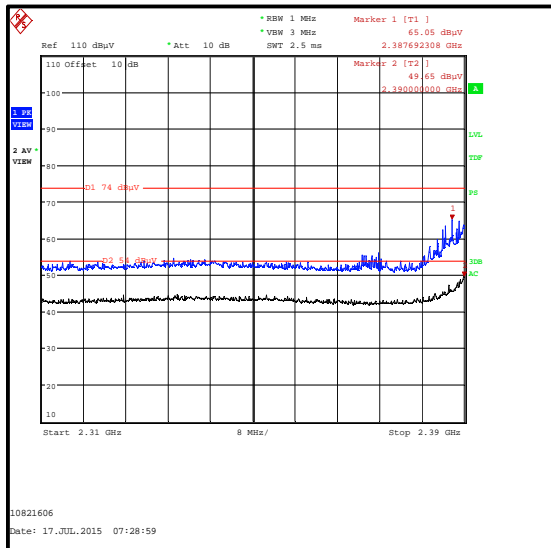
**Results: 802.11g / 20 MHz / BPSK / 6 Mbit/s**



### Lower Band Edge Peak Measurement



### Upper Band Edge Peak Measurement



### 2310 MHz to 2390 MHz Restricted Band Plot



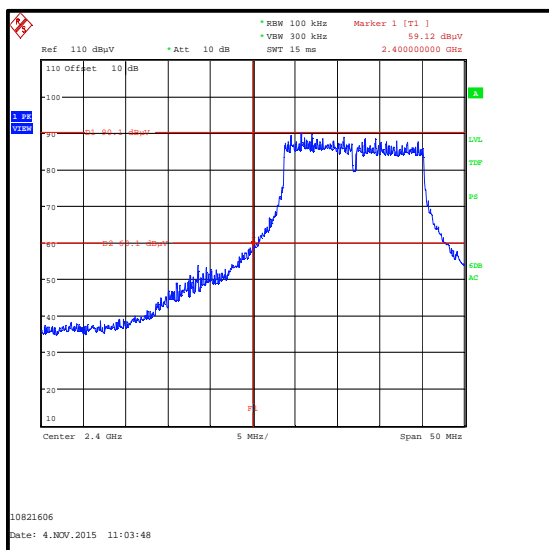
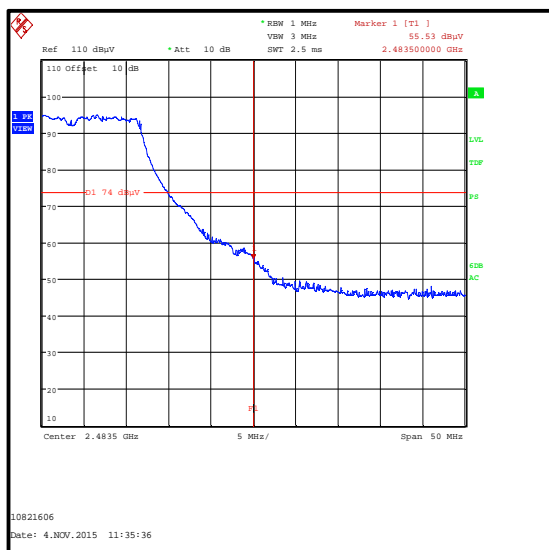
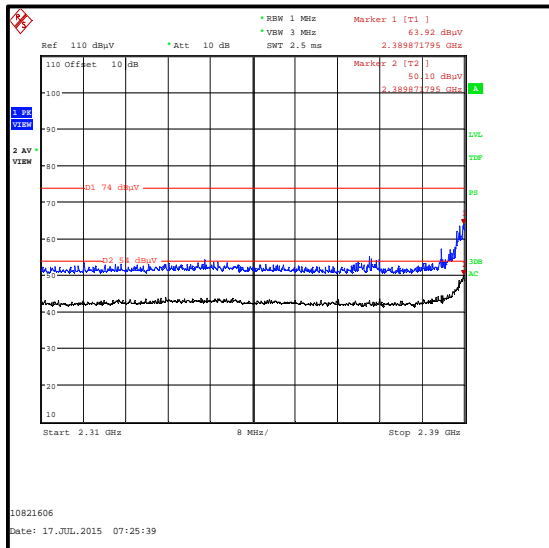
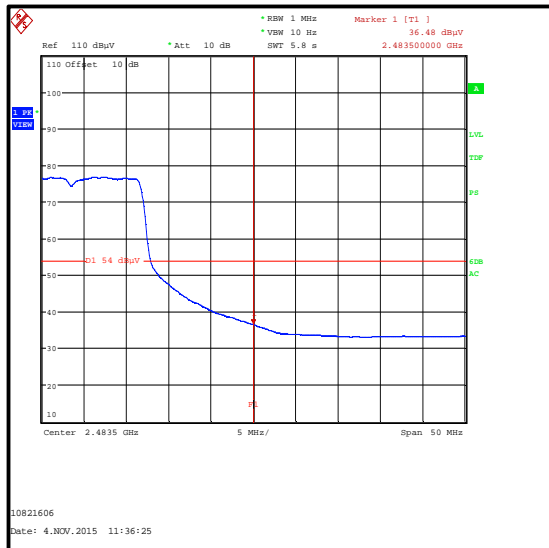
### Upper Band Edge Average Measurement

**Transmitter Band Edge Radiated Emissions (continued)****Results: 802.11g / 20 MHz / 16QAM / 36 Mbit/s****Results: Peak**

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
2389.872	63.9	74.0	10.1	Complied
2400	59.1	60.1*	1.0	Complied
2483.5	55.5	74.0	18.5	Complied

**Results: Average**

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
2389.872	50.1	54.0	3.9	Complied
2483.5	36.5	54.0	17.5	Complied

**Transmitter Band Edge Radiated Emissions (continued)****Results: 802.11g / 20 MHz / 16QAM / 36 Mbit/s****Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement****2310 MHz to 2390 MHz Restricted Band Plot****Upper Band Edge Average Measurement**

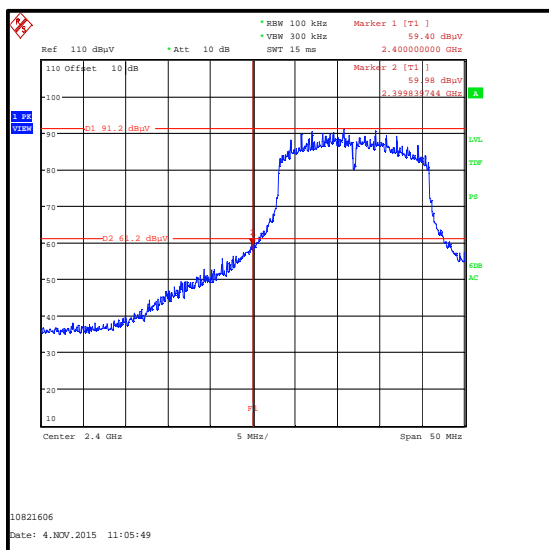
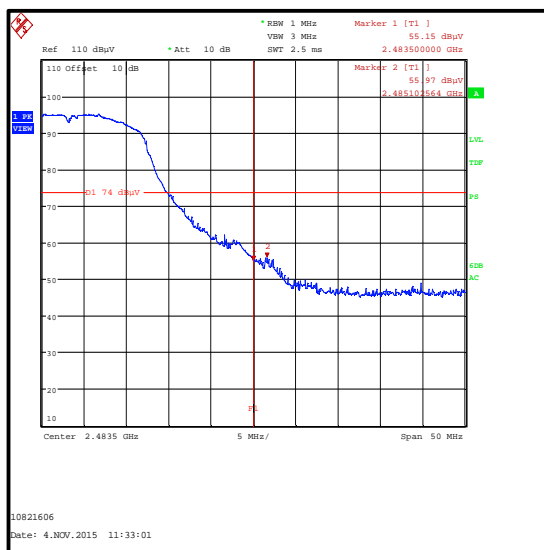
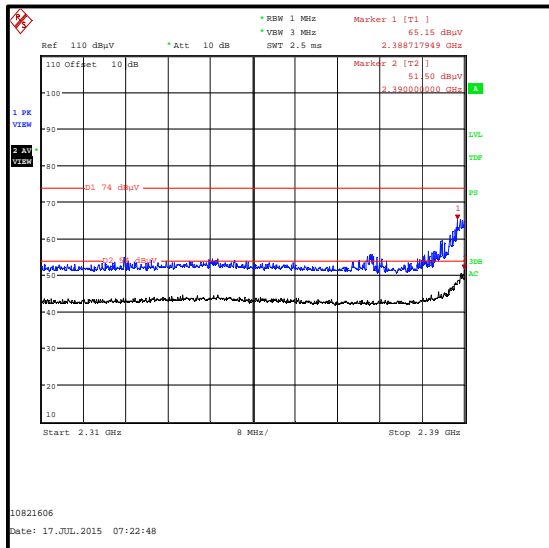
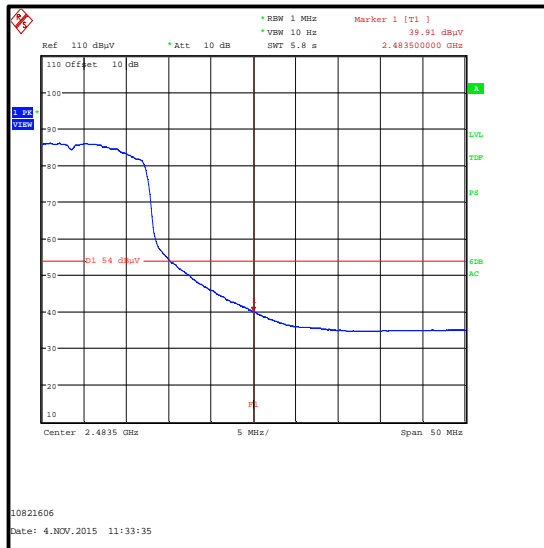


**Transmitter Band Edge Radiated Emissions (continued)****Results: 802.11n HT20 / BPSK / 6.5 Mbit/s / MCS0****Results: Peak**

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
2388.718	65.2	74.0	8.8	Complied
2399.840	60.0	61.2*	1.2	Complied
2400	59.4	61.2*	1.8	Complied
2483.5	55.2	74.0	18.8	Complied
2485.103	56.0	74.0	18.0	Complied

**Results: Average**

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
2390	51.5	54.0	2.5	Complied
2483.5	39.9	54.0	14.1	Complied

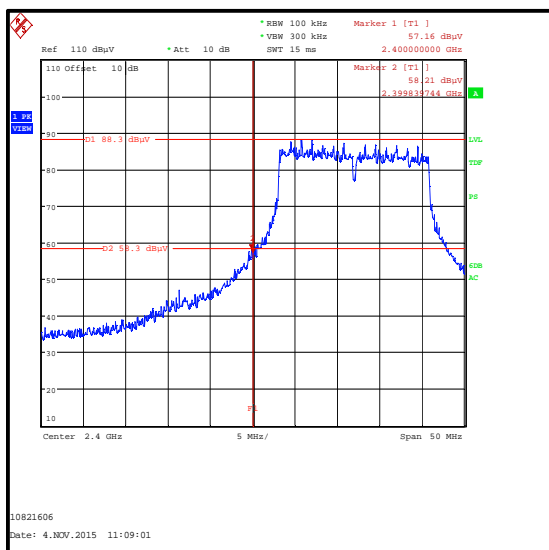
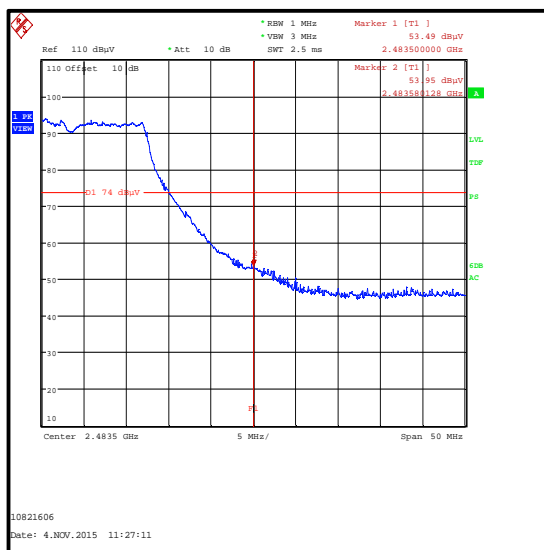
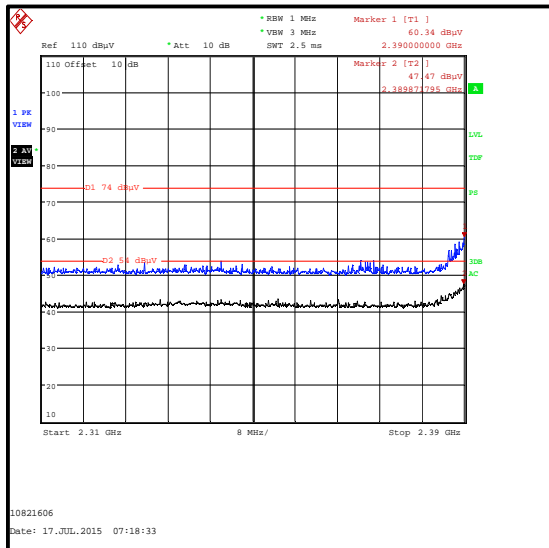
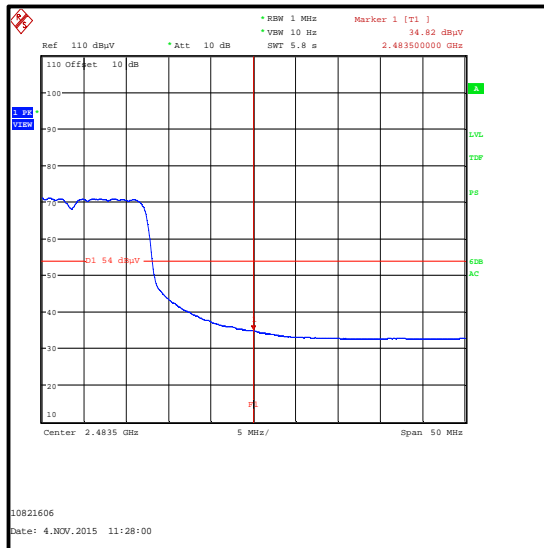
**Transmitter Band Edge Radiated Emissions (continued)****Results: 802.11n HT20 / BPSK / 6.5 Mbit/s / MCS0****Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement****2310 MHz to 2390 MHz Restricted Band Plot****Upper Band Edge Average Measurement**

**Transmitter Band Edge Radiated Emissions (continued)****Results: 802.11n HT20 / 64QAM / 65 Mbit/s / MCS7****Results: Peak**

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
2390	60.3	74.0	13.7	Complied
2399.840	58.2	58.3*	0.1	Complied
2400	57.2	58.3*	1.1	Complied
2483.5	53.5	74.0	20.5	Complied
2483.580	54.0	74.0	20.0	Complied

**Results: Average**

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
2389.872	47.5	54.0	6.5	Complied
2483.5	34.8	54.0	19.2	Complied

**Transmitter Band Edge Radiated Emissions (continued)****Results: 802.11n HT20 / 64QAM / 65 Mbit/s / MCS7****Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement****2310 MHz to 2390 MHz Restricted Band Plot****Upper Band Edge Average Measurement**

**Transmitter Band Edge Radiated Emissions (continued)****Test Equipment Used:**

<b>Asset No.</b>	<b>Instrument</b>	<b>Manufacturer</b>	<b>Type No.</b>	<b>Serial No.</b>	<b>Date Calibration Due</b>	<b>Cal. Interval (Months)</b>
M1656	Thermohygrometer	JM Handelspunkt	30.5015.13	Not stated	23 Apr 2016	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	01 May 2016	12
M1874	Test Receiver	Rohde & Schwarz	ESU26	100553	12 Jun 2016	12
A1534	Pre Amplifier	Hewlett Packard	8449B	3008A00405	21 Dec 2015	12
A1818	Antenna	EMCO	3115	00075692	20 Dec 2015	12
A1396	Attenuator	Huber & Suhner	6810.17.B	757987	05 May 2016	12
A1256	Power Supply	Farnell	11E30/1B	000378	Calibrated before use	-
S0537	Power Supply	TTI	EL302D	249928	Calibrated before use	-
M1269	Multimeter	Fluke	179	90250210	26 May 2016	12
M1229	Multimeter	Fluke	179	87640015	23 Apr 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
Duty Cycle	2.4 GHz to 2.4835 GHz	95%	±1.14%
Conducted Maximum Output Power	2.4 GHz to 2.4835 GHz	95%	±1.13 dB
Radiated Spurious Emissions	30 MHz to 1 GHz	95%	±5.65 dB
Radiated Spurious Emissions	1 GHz to 25 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	-	-	Sections 2.2, 3.4 & 4.2 updated Section 3.6 added Sections 5.2.1 & 5.2.2 removed Block diagram in section 5.2.3 updated

--- END OF REPORT ---