



# TEST REPORT

**Test Report No. : UL-RPT-RP10895526JD05A V2.0**

**Manufacturer** : Bang & Olufsen a/s  
**Model No.** : WUS-AC08V  
**FCC ID** : TTUWUSAC08V  
**Technology** : WLAN  
**Test Standard(s)** : FCC Parts 15.209(a) & 15.407(b)

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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:** 19 December 2016

**Checked by:** Sarah Williams  
Sarah Williams  
Engineer, Radio Laboratory

**Company Signatory:**

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UL VS LTD



This laboratory is accredited by UKAS.  
The tests reported herein have been  
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of accreditation.

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## **1. Customer Information**

<b>Company Name:</b>	Bang & Olufsen A/S
<b>Address:</b>	Peter Bangs Vej 15 7600 Struer Denmark

## 2. Summary of Testing

### 2.1. General Information

<b>Specification Reference:</b>	47CFR15.407
<b>Specification Title:</b>	Code of Federal Regulations Volume 47 (Telecommunications): Part 15 Subpart E (Unlicensed National Information Infrastructure Devices) – Sections 15.407
<b>Specification Reference:</b>	47CFR15.209
<b>Specification Title:</b>	Code of Federal Regulations Volume 47 (Telecommunications): Part 15 Subpart C (Intentional Radiators) - Sections 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>	22 March 2016 to 30 March 2016

### 2.2. Summary of Test Results

FCC Reference (47CFR)	Measurement	Result
Part 15.407(b)/15.209(a)	Transmitter Out of Band Radiated Emissions	✓
Part 15.407(b)/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 C63.10-2013
<b>Title:</b>	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
<b>Reference:</b>	KDB 789033 D02 General UNII Test Procedures New Rules v01r03 August 22, 2016
<b>Title:</b>	Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E

### 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 specifications identified above.

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

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

<b>Brand Name:</b>	WUS-AC08V
<b>Model Name or Number:</b>	WUS-AC08V
<b>Test Sample MAC address:</b>	542AA22F8F19 ( <i>Conducted sample</i> )
<b>Hardware Version:</b>	A1G
<b>Software Version:</b>	4.2.3.5
<b>FCC ID:</b>	TTUWUSAC08V

#### **3.1.1 Host Product Details**

<b>Brand Name:</b>	BeoVision 14-40
<b>Model Name or Number:</b>	BeoVision 14-40
<b>Test Sample Serial Number:</b>	92804 ( <i>Radiated sample</i> )
<b>Hardware Version:</b>	8009004
<b>Software Version:</b>	7.77

<b>Description:</b>	AC power cable
<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

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

The equipment under test was a *Bluetooth Basic Rate + EDR, Bluetooth Low Energy, IEEE 802.11a,b,g,n,ac* WLAN module operating in the 2.4 GHz and 5 GHz bands, which was incorporated into a 40" Television. The EUT has two external antenna ports with two transmit chains and MIMO is supported. For 802.11a/g/n/ac operation the device uses two by two MIMO transmitters. Depending on the 802.11 data rate, the device transmits 1 or 2 spatial stream. The device uses spatial multiplexing and from an RF point of view the streams are correlated.

#### **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 802.11a,n,ac) / U-NII		
<b>Type of Unit:</b>	Transceiver		
<b>Modulation:</b>	BPSK, QPSK, 16QAM, 64QAM & 256QAM		
<b>Data rates:</b>	802.11a	6, 9, 12, 18, 24, 36 ,48 & 54 Mbps	
	802.11n HT20 (SISO)	MCS0 to MCS7	
	802.11n HT20 (MIMO)	MCS0 to MCS15 (CDD MCS0 to MCS7)	
	802.11n HT40 (SISO)	MCS0 to MCS7	
	802.11n HT40 (MIMO)	MCS0 to MCS15 (CDD MCS0 to MCS7)	
	802.11ac VHT20	MCS0 to MCS8	
	802.11ac VHT40	MCS0 to MCS9	
	802.11ac VHT80	MCS0 to MCS9	
<b>Transmit Frequency Band:</b>	5150 MHz to 5250 MHz		
<b>Channel Spacing:</b>	20 MHz		
<b>Transmit Channels Tested:</b>	<b>Channel ID</b>	<b>Channel Number</b>	<b>Channel Frequency (MHz)</b>
	Bottom	36	5180
	Middle	40	5200
	Top	48	5240
<b>Channel Spacing:</b>	40 MHz		
<b>Transmit Channels Tested:</b>	<b>Channel ID</b>	<b>Channel Number</b>	<b>Channel Frequency (MHz)</b>
	Bottom	38	5190
	Top	46	5230
<b>Channel Spacing:</b>	80 MHz		
<b>Transmit Channel Tested:</b>	<b>Channel ID</b>	<b>Channel Number</b>	<b>Channel Frequency (MHz)</b>
	Single	42	5210

**Additional Information Related to Testing (continued)**

<b>Transmit Frequency Band:</b>	5725 MHz to 5850 MHz		
<b>Channel Spacing:</b>	20 MHz		
<b>Transmit Channels Tested:</b>	Channel ID	Channel Number	Channel Frequency (MHz)
	Bottom	149	5745
	Middle	157	5785
	Top	165	5825
<b>Channel Spacing:</b>	40 MHz		
<b>Transmit Channels Tested:</b>	Channel ID	Channel Number	Channel Frequency (MHz)
	Bottom	151	5755
	Top	159	5795
<b>Channel Spacing:</b>	80 MHz		
<b>Transmit Channel Tested:</b>	Channel ID	Channel Number	Channel Frequency (MHz)
	Single	155	5775

### **3.5. Support Equipment**

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

<b>Description:</b>	Remote control
<b>Brand Name:</b>	Bang & Olufsen a/s
<b>Model Name or Number:</b>	BeoRemote One T30
<b>Serial Number:</b>	25143484

<b>Description:</b>	BTLE box
<b>Brand Name:</b>	Alpha Network
<b>Model Name or Number:</b>	WUS-AC08V
<b>Serial Number:</b>	H11145216

<b>Description:</b>	HDMI cable. Quantity 3. Length 2m
<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

<b>Description:</b>	HDMI cable. Quantity 1. Length 3m
<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

<b>Description:</b>	Now TV set top box
<b>Brand Name:</b>	Sky
<b>Model Name or Number:</b>	2400SK
<b>Serial Number:</b>	1MM4DE006281

<b>Description:</b>	Now TV set top box
<b>Brand Name:</b>	Sky
<b>Model Name or Number:</b>	2400SK
<b>Serial Number:</b>	1MM552038807

<b>Description:</b>	USB Hub
<b>Brand Name:</b>	Belkin
<b>Model Name or Number:</b>	Not marked or stated
<b>Serial Number:</b>	Not marked or stated

**Support Equipment (continued)**

<b>Description:</b>	Now TV set top box
<b>Brand Name:</b>	Sky
<b>Model Name or Number:</b>	2400SK
<b>Serial Number:</b>	1MM4D8006255

<b>Description:</b>	HDMI media player
<b>Brand Name:</b>	SUMVISION
<b>Model Name or Number:</b>	Cyclone Micro
<b>Serial Number:</b>	SUM091104017

<b>Description:</b>	Ethernet cable. Quantity 3. Length 2m
<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

<b>Description:</b>	Ethernet cable. Quantity 3. Length 3m
<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

<b>Description:</b>	Ethernet cable. Quantity 1. Length 5m
<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

<b>Description:</b>	Ethernet cable. Quantity 1. Length 10m
<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

<b>Description:</b>	ADSL2+ Modem Router
<b>Brand Name:</b>	Netgear
<b>Model Name or Number:</b>	DG834 v4
<b>Serial Number:</b>	1PL596BD001A4

**Support Equipment (continued)**

<b>Description:</b>	ADSL Modem Router
<b>Brand Name:</b>	Linksys
<b>Model Name or Number:</b>	WAG54G
<b>Serial Number:</b>	CF610E100799

<b>Description:</b>	USB cable type A male to type A male. Quantity 3. Length 3m
<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

<b>Description:</b>	Audio cable 3.5mm male to 3.5mm male. Quantity 1. Length 3m
<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

<b>Description:</b>	Aerial cable. Quantity 1. Length 2m
<b>Brand Name:</b>	Belkin
<b>Model Name or Number:</b>	Not marked or stated
<b>Serial Number:</b>	Not marked or stated

<b>Description:</b>	Freeview Set Top Box
<b>Brand Name:</b>	Sagem
<b>Model Name or Number:</b>	251657024
<b>Serial Number:</b>	441901036882

<b>Description:</b>	USB cable type A male to type B male. Quantity 1. Length 3m with 3 FAIR-RITE V0 ferrites and 1 unmarked or stated ferrite
<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

<b>Description:</b>	Laptop Computer
<b>Brand Name:</b>	Lenovo
<b>Model Name or Number:</b>	E555
<b>Serial Number:</b>	PF03XEND

## **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 *MT7662U\_QA\_tool\_V1.0.3.0* test application supplied by the customer on a UL laptop PC. 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 and channel widths were initially investigated on one channel. The modes that produced the highest power for all bands were:
  - Highest power
    - 802.11a SISO – BPSK / 6 Mbps
    - 802.11a CDD – BPSK / 6 Mbps
    - 802.11n HT20 SISO – 16QAM / 26 Mbps / MCS3
    - 802.11n HT40 SISO – 16QAM / 54 Mbps / MCS3
    - 802.11n HT20 MIMO – QPSK / 13 Mbps / MCS1
    - 802.11n HT40 MIMO – 16QAM / 54 Mbps / MCS3
    - 802.11ac VHT80 SISO – QPSK / 87.8 Mbps / MCS2
    - 802.11ac VHT80 MIMO – 16QAM / 117 Mbps / MCS3
  - Widest bandwidth
    - 802.11a SISO – BPSK / 6 Mbps
    - 802.11a CDD – BPSK / 6 Mbps
    - 802.11n HT20 SISO – BPSK / 6.5 Mbps / MCS0
    - 802.11n HT40 SISO – BPSK / 13.5 Mbps / MCS0
    - 802.11n HT20 MIMO – BPSK / 6.5 Mbps / MCS0
    - 802.11n HT40 MIMO – BPSK / 13.5 Mbps / MCS0
    - 802.11ac VHT80 SISO – QPSK / 87.8 Mbps / MCS2
    - 802.11ac VHT80 MIMO – BPSK / 29.3 Mbps / MCS0
- For 802.11n HT modes, *HT MixMode* & *HT GreenField* data formats were selectable. Both formats were initially compared on a range of modulation types and bandwidths, and found to give identical results. For all tests requiring HT modes, *HT MixMode* was therefore selected.
- For all radiated measurements the EUT, being the TV, was connected to 120 VAC 60 Hz. The customer had fitted a USB cable to the module that was inside the TV. This was used to place the TV into test mode as required.
- The customer declared the power settings which are stated in section 4.3 of this test report.

### **Configuration and Peripherals (continued)**

- Radiated spurious emissions tests were performed with the EUT transmitting with a data rate of 802.11a / 6 Mbps on Antenna 1 as it produced the worst conducted output power and highest spectral density level and was therefore deemed worst case.
- In order to operate the EUT the TV needed to be enabled. This was done by turning on the TV and pairing it with T30 remote control with the external BTLE box which was connected to the TV. The external BTLE box has a 0.83 metre cable with a USB type A male connector. Once the TV was enabled, the EUT could be controlled using the MT7662U application.
- Once the TV was turned on and the EUT was in transmit mode the T30 remote control and external BTLE box were removed from the chamber.
- For all radiated tests the support equipment was used to terminate all active ports.

### **4.3. Power Settings Used During Testing**

The manufacturer's declared power settings stated in the table below were used for both SISO and MIMO measurements:

Mode	Power Setting					
	Frequency Band 5.15 to 5.25 GHz			Frequency Band 5.725 to 5.85 GHz		
	Bottom Channel	Middle Channel	Top Channel	Bottom Channel	Middle Channel	Top Channel
802.11a SISO / 6 Mbps	16	16	16	16	16	16
802.11a CDD / 6 Mbps	10	10	10	10	10	10
802.11n HT20 / SISO / MCS0	18	18	18	18	18	18
802.11n HT20 / SISO / MCS3	18	18	18	18	18	18
802.11n HT40 / SISO / MCS0	18	N/A	18	18	N/A	18
802.11n HT40 / SISO / MCS3	18	N/A	18	18	N/A	18
802.11n HT20 / MIMO / MCS0	12	12	12	12	12	12
802.11n HT20 / MIMO / MCS1	12	12	12	12	12	12
802.11n HT40 / MIMO / MCS0	12	N/A	12	12	N/A	12
802.11n HT40 / MIMO / MCS3	12	N/A	12	12	N/A	12
802.11ac VHT80 / SISO / MCS2	N/A	1A	N/A	N/A	1A	N/A
802.11ac VHT80 / MIMO / MCS0	N/A	14	N/A	N/A	14	N/A
802.11ac VHT80 / MIMO / MCS3	N/A	14	N/A	N/A	14	N/A

## **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 Out of Band Radiated Emissions**

#### **Test Summary:**

<b>Test Engineer:</b>	Andrew Edwards	<b>Test Date:</b>	30 March 2016
<b>Test Sample Serial Number:</b>	92804		

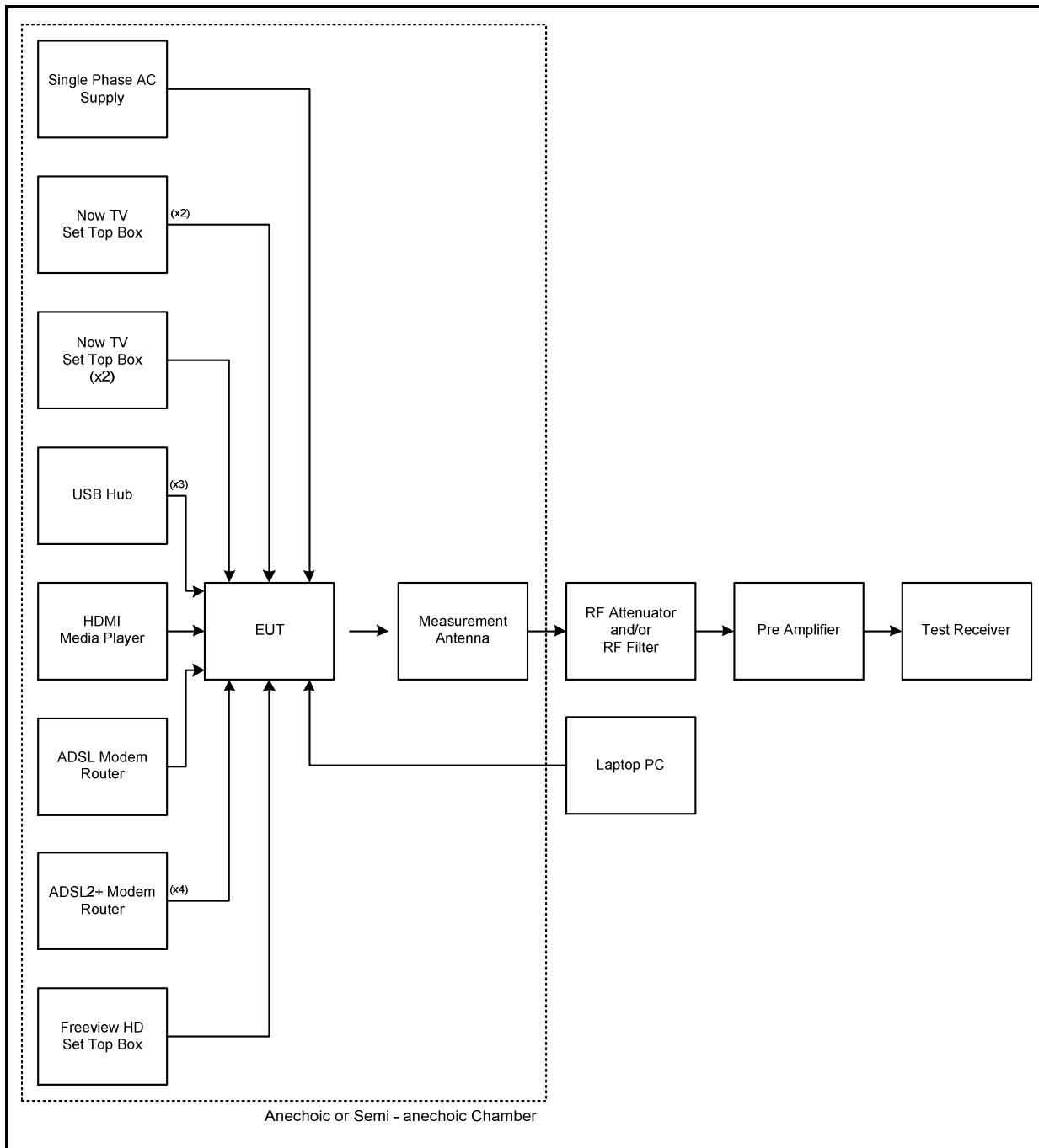
<b>FCC Reference:</b>	Parts 15.407(b)(1),(6),(7) & 15.209(a)
<b>Test Method Used:</b>	KDB 789033 II.G. & ANSI C63.10 Sections 6.3 and 6.5
<b>Frequency Range:</b>	30 MHz to 1000 MHz

#### **Environmental Conditions:**

<b>Temperature (°C):</b>	24
<b>Relative Humidity (%):</b>	36

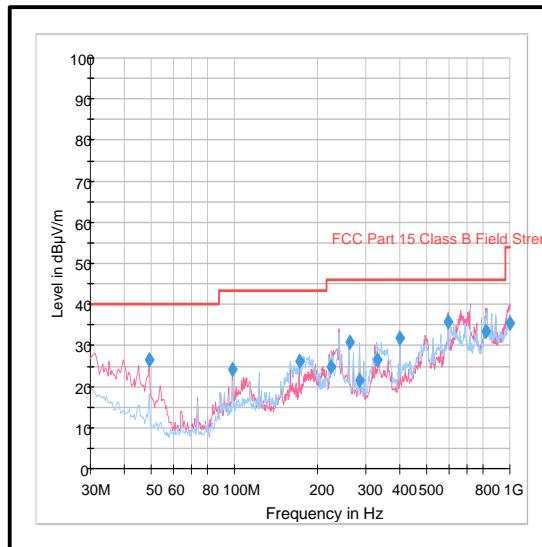
#### **Note(s):**

1. Measurements below 1 GHz were limited to the 5.15-5.25 GHz band, the EUT was transmitting with a data rate of 6 Mbps (802.11a) as it produced the highest EIRP and was therefore deemed worst case
2. Pre-scans with the EUT transmitting on the middle channel were measured according to FCC Part 15.407(b)(1) which states for transmitters operating in the band 5.15 to 5.25 GHz: all emissions outside of the band 5.15-5.35 GHz band shall not exceed -27 dBm/MHz. Part(b)(6) states unwanted emissions below 1 GHz must comply with the general field strength limits set forth in 15.209. Part(b)(7) states the provisions of 15.205 apply, e.g. restricted bands of operation.
3. The final measured value, for the given emission in the field strength result tables, incorporates the calibrated antenna factor and cable loss.
4. 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.
5. 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.
6. 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.

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

**Transmitter Out of Band Radiated Emissions (5.15-5.25 GHz band operation) (continued)****Results: Middle Channel / Field Strength**

Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
172.021	Horizontal	26.0	43.5	17.5	Complied
262.135	Horizontal	30.9	46.0	15.1	Complied
329.771	Horizontal	26.5	46.0	19.5	Complied
399.988	Horizontal	31.9	46.0	14.1	Complied
998.352	Vertical	35.3	54.0	18.7	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)
M1945	Thermohygrometer	JM Handelspunkt	30.5015.01	112	23 Apr 2016	12
K0001	5m RSE Chamber	Rainford EMC	N/A	N/A	12 Jan 2017	12
M1124	Test Receiver	Rohde & Schwarz	ESIB26	100046	18 Nov 2016	12
G0543	Amplifier	Sonoma	310N	230801	29 May 2016	3
A259	Antenna	Chase	CBL6111	1513	09 Apr 2016	12
A1834	Attenuator	Hewlett Packard	8491B	10444	30 Mar 2017	12

**Transmitter Out of Band Radiated Emissions (5.15-5.25 GHz band operation) (continued)****Test Summary:**

<b>Test Engineer:</b>	Andrew Edwards	<b>Test Dates:</b>	23 March 2016 & 29 March 2016
<b>Test Sample Serial Number:</b>	92804		

<b>FCC Reference:</b>	Part 15.407(b)(1),(7) & 15.209(a)
<b>Test Method Used:</b>	KDB 789033 II.G. & ANSI C63.10 Sections 6.3 and 6.6
<b>Frequency Range:</b>	1 GHz to 40 GHz

**Environmental Conditions:**

<b>Temperature (°C):</b>	22 to 24
<b>Relative Humidity (%):</b>	29 to 33

**Transmitter Out of Band Radiated Emissions (5.15-5.25 GHz band operation) (continued)****Note(s):**

1. FCC Part 15.407(b)(1) states for transmitters operating in the band 5.15 to 5.25 GHz: all emissions outside of the 5.15 to 5.35 GHz band will not exceed -27 dBm/MHz. Part(b)(7) states the provisions of 15.205 apply e.g. restricted bands of operation.
2. Pre-scans were performed with the EUT transmitting on middle channel in the 5.15 to 5.25 GHz band. An inquiry was made to the FCC and the response was pre-scans could be performed in the band with the highest EIRP and all final measurements should be performed on any emissions seen in each band.
3. The final measured value, for the given emission in the result tables, incorporates the calibrated antenna factor and cable loss.
4. Appropriate RF filters and attenuators were used during pre-scans and final measurements. Insertion losses were entered on the spectrum analyser as RF levels offsets.
5. \*In accordance with KDB 789033 Section II.G.1.c) if the peak measurement is below the average limit, it is not necessary to perform a separate average measurement.
6. In accordance with KDB 789033 Section II.G.6.c) Method AD (vi), the average measurements were performed using an increased number of sweeps. The number of sweeps used was 116.
7. In accordance with KDB 789033 Section II.G.6.c) Method AD (iii), pre-scan plots from 1 to 26.5 GHz were performed using an increased number of sweep points as calculated below:
  - o 1 to 4 GHz – 6001 sweep points
  - o 4 to 6 GHz – 4001 sweep points
  - o 4.5 to 5.15 GHz – 1301 sweep points
  - o 5.35 to 5.46 GHz – 301 sweep points
  - o 6 to 8 GHz – 4001 sweep points
  - o 8 to 12.75 GHz – 9501 sweep points
  - o 12.75 to 18 GHz – 10501 sweep points
  - o 18 to 26.5 GHz – 17001 sweep points

All other measurements were performed with the Test Receiver's default setting of 625 sweep points.

8. In accordance with KDB 789033 Section II.G.6.c) Method AD (vii), for average measurements on data rates where the EUT was transmitting <98% duty cycle, the duty cycle correction factor was added to the measured result. Refer to UL test report UL-RPT-RP10895558JD02G Section 5.2.4 for duty cycle correction factor calculations.
9. 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.
10. 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.

**Transmitter Out of Band Radiated Emissions (5.15-5.25 GHz band operation) (continued)****Results: Bottom Channel / EIRP**

Frequency (MHz)	Antenna Polarity	Level (dBm)	Limit (dBm)	Margin (dB)	Result
1284.676	Horizontal	-41.5	-27.0	14.5	Complied
6155.763	Horizontal	-42.3	-27.0	15.3	Complied
7201.466	Horizontal	-40.3	-27.0	13.3	Complied
10359.808	Vertical	-37.0	-27.0	10.0	Complied

**Results: Bottom Channel / Field Strength / Peak**

Frequency (MHz)	Antenna Polarity	Peak Level (dB $\mu$ V/m)	Peak Limit (dB $\mu$ V/m)	Margin (dB)	Result
1114.141	Vertical	52.5	54.0*	1.5	Complied
1189.966	Horizontal	51.9	54.0*	2.1	Complied
1480.815	Vertical	51.0	54.0*	3.0	Complied
2695.391	Horizontal	40.1	54.0*	13.9	Complied
2865.521	Vertical	57.7	74.0	16.3	Complied
15534.712	Horizontal	64.5	74.0	9.5	Complied

**Results: Bottom Channel / Field Strength / Average**

Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Duty Cycle correction (dB)	Corrected Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
2860.854	Vertical	44.6	0.6	45.2	54.0	8.8	Complied
15538.438	Horizontal	48.6	0.6	49.2	54.0	4.8	Complied

**Transmitter Out of Band Radiated Emissions (5.15-5.25 GHz band operation) (continued)****Results: Middle Channel / EIRP**

Frequency (MHz)	Antenna Polarity	Level (dBm)	Limit (dBm)	Margin (dB)	Result
1284.676	Horizontal	-41.5	-27.0	14.5	Complied
6155.763	Horizontal	-42.3	-27.0	15.3	Complied
7201.466	Horizontal	-40.3	-27.0	13.3	Complied
10405.00	Vertical	-36.2	-27.0	9.2	Complied

**Results: Middle Channel / Field Strength / Peak**

Frequency (MHz)	Antenna Polarity	Peak Level (dB $\mu$ V/m)	Peak Limit (dB $\mu$ V/m)	Margin (dB)	Result
1114.141	Vertical	52.5	54.0*	1.5	Complied
1189.966	Horizontal	51.9	54.0*	2.1	Complied
1480.815	Vertical	51.0	54.0*	3.0	Complied
2695.391	Horizontal	40.1	54.0*	13.9	Complied
2865.521	Vertical	57.7	74.0	16.3	Complied
15600.000	Horizontal	65.1	74.0	8.9	Complied

**Results: Middle Channel / Field Strength / Average**

Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Duty Cycle correction (dB)	Corrected Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
2860.854	Vertical	44.6	0.6	45.2	54.0	8.8	Complied
15597.716	Horizontal	49.5	0.6	50.1	54.0	3.9	Complied

**Transmitter Out of Band Radiated Emissions (5.15-5.25 GHz band operation) (continued)****Results: Top Channel / EIRP**

Frequency (MHz)	Antenna Polarity	Level (dBm)	Limit (dBm)	Margin (dB)	Result
1284.676	Horizontal	-41.5	-27.0	14.5	Complied
6155.763	Horizontal	-42.3	-27.0	15.3	Complied
7201.466	Horizontal	-40.3	-27.0	13.3	Complied
10479.615	Vertical	-36.2	-27.0	9.2	Complied

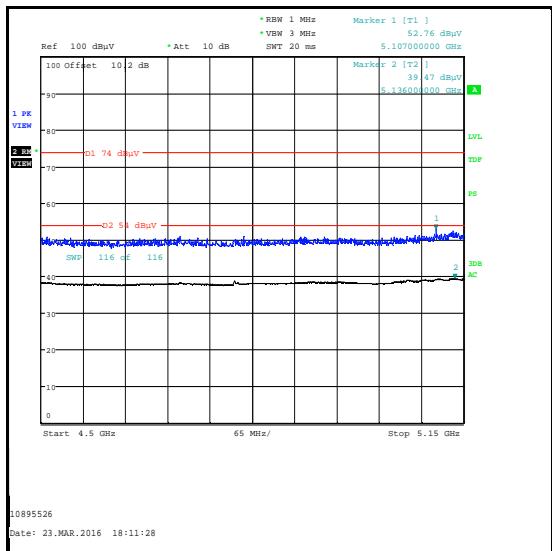
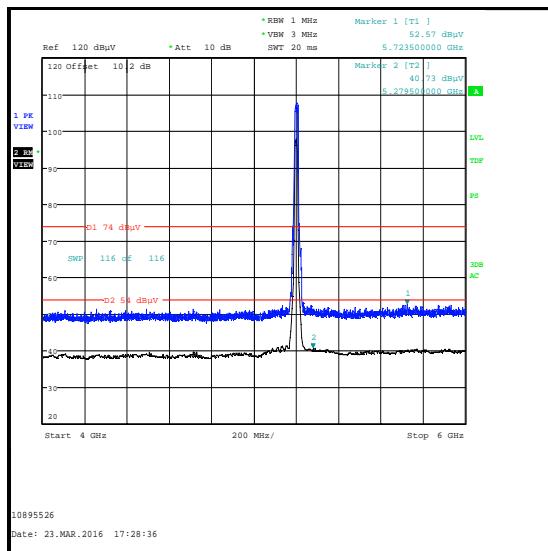
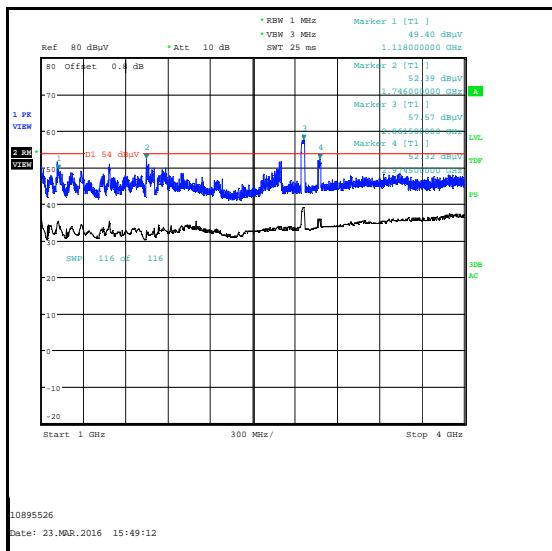
**Results: Top Channel / Field Strength / Peak**

Frequency (MHz)	Antenna Polarity	Peak Level (dB $\mu$ V/m)	Peak Limit (dB $\mu$ V/m)	Margin (dB)	Result
1114.141	Vertical	52.5	54.0*	1.5	Complied
1189.966	Horizontal	51.9	54.0*	2.1	Complied
1480.815	Vertical	51.0	54.0*	3.0	Complied
2695.391	Horizontal	40.1	54.0*	13.9	Complied
2865.521	Vertical	57.7	74.0	16.3	Complied
15722.764	Vertical	64.9	74.0	9.1	Complied

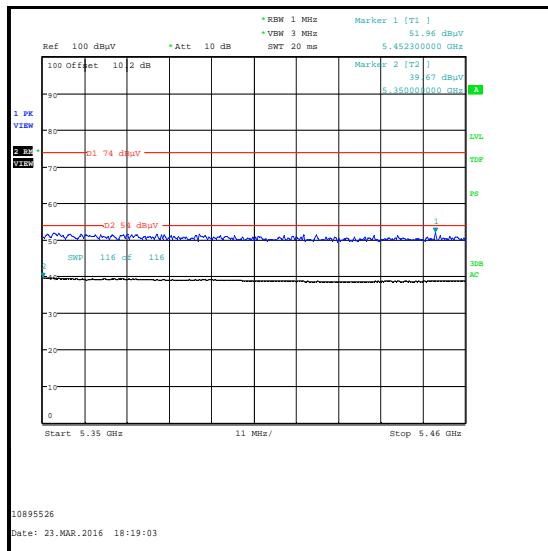
**Results: Top Channel / Field Strength / Average**

Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Duty Cycle correction (dB)	Corrected Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
2860.854	Vertical	44.6	0.6	45.2	54.0	8.8	Complied
15718.918	Vertical	48.9	0.6	49.5	54.0	4.5	Complied

### Transmitter Out of Band Radiated Emissions (5.15-5.25 GHz band operation) (continued)

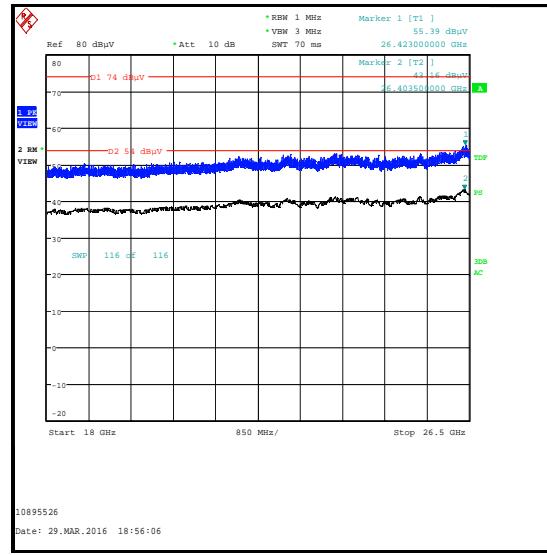
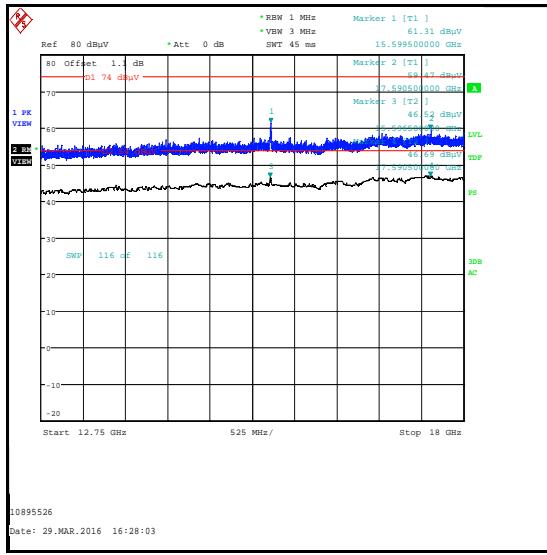
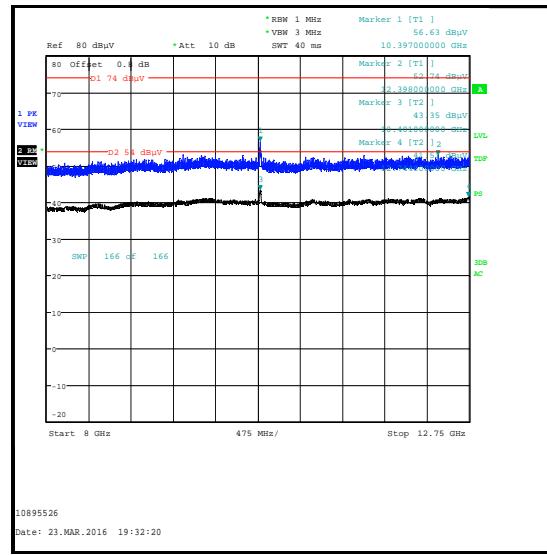
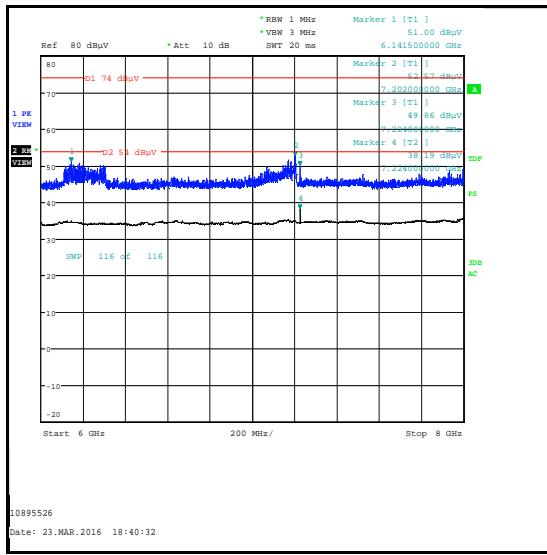


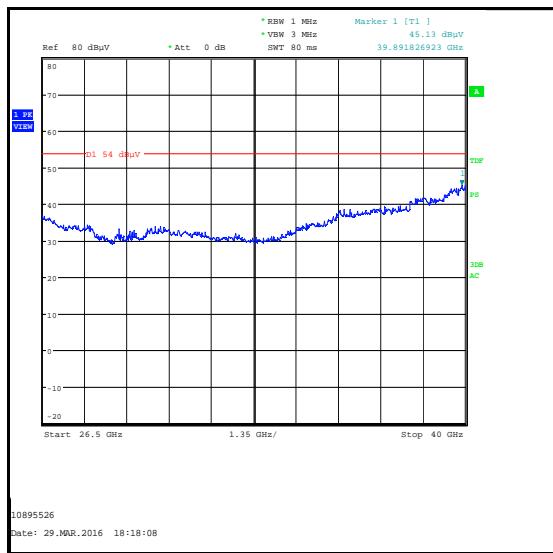
Restricted Band 4.5 GHz to 5.15 GHz



Restricted Band 5.35 GHz to 5.46 GHz

## Transmitter Out of Band Radiated Emissions (5.15-5.25 GHz band operation) (continued)



**Transmitter Out of Band Radiated Emissions (5.15-5.25 GHz band operation) (continued)**

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

**Transmitter Out of Band Radiated Emissions (5.725-5.85 GHz band operation) (continued)****Test Summary:**

<b>Test Engineer:</b>	Andrew Edwards	<b>Test Dates:</b>	23 March 2016 & 29 March 2016
<b>Test Sample Serial Number:</b>	92804		

<b>FCC Reference:</b>	Part 15.407(b)(4)(i),(7) & 15.209(a)
<b>Test Method Used:</b>	KDB 789033 II.G. & ANSI C63.10 Sections 6.3 and 6.6
<b>Frequency Range:</b>	1 GHz to 40 GHz

**Environmental Conditions:**

<b>Temperature (°C):</b>	22 to 23
<b>Relative Humidity (%):</b>	30 to 33

**Note(s):**

1. FCC Part 15.407(b)(4)(i) states for transmitters operating in the band 5.725 to 5.85 GHz: all emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge. Part(b)(7) states the provisions of 15.205 apply e.g. restricted bands of operation
2. Pre-scans were performed with the EUT transmitting on middle channel in 5.15 to 5.25 GHz band. An inquiry was made to the FCC and the response was pre-scans could be performed in the band with the highest conducted output power and all final measurements should be performed on any emissions seen in each band.
3. The final measured value, for the given emission in the result tables, incorporates the calibrated antenna factor and cable loss.
4. Appropriate RF filters and attenuators were used during pre-scans and final measurements. Insertion losses were entered on the spectrum analyser as RF levels offsets.
5. \*In accordance with KDB 789033 Section II.G.1.c) if the peak measurement is below the average limit, it is not necessary to perform a separate average measurement.
6. In accordance with KDB 789033 Section II.G.6.c) Method AD (vii), for average measurements on data rates where the EUT was transmitting <98% duty cycle, the duty cycle correction factor was added to the measured result. Refer to UL test report UL-RPT-RP10895558JD02G Section 5.2.4 for duty cycle correction factor calculations.
7. 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.
8. The third harmonic emission was observed on the 12.75 to 18 GHz pre-scan plot when the EUT is transmitting on middle channel in the 5.15 to 5.25 GHz band. This harmonic was investigated in the 5.725 to 5.85 GHz band and emission levels were found to be below the measurement system noise floor on bottom, middle and top channels.
9. 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.

**Transmitter Out of Band Radiated Emissions (5.725-5.85 GHz band operation) (continued)****Results: Bottom Channel / EIRP**

Frequency (MHz)	Antenna Polarity	Level (dBm)	Limit (dBm)	Margin (dB)	Result
1284.676	Horizontal	-41.5	-27.0	14.5	Complied
1800.449	Vertical	-42.4	-27.0	15.4	Complied
6155.763	Horizontal	-42.3	-27.0	15.3	Complied
7201.466	Horizontal	-40.3	-27.0	13.3	Complied

**Results: Bottom Channel / Field Strength / Peak**

Frequency (MHz)	Antenna Polarity	Peak Level (dB $\mu$ V/m)	Peak Limit (dB $\mu$ V/m)	Margin (dB)	Result
1114.141	Vertical	52.5	54.0*	1.5	Complied
1189.966	Horizontal	51.9	54.0*	2.1	Complied
1480.815	Vertical	51.0	54.0*	3.0	Complied
2695.391	Horizontal	40.1	54.0*	13.9	Complied
2865.521	Vertical	57.7	74.0	16.3	Complied
11490.000	Vertical	60.0	74.0	14.0	Complied

**Results: Bottom Channel / Field Strength / Average**

Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Duty Cycle correction (dB)	Corrected Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
2860.854	Vertical	44.6	0.6	45.2	54.0	8.8	Complied
11490.256	Vertical	44.4	0.6	45.0	54.0	9.0	Complied

**Transmitter Out of Band Radiated Emissions (5.725-5.85 GHz band operation) (continued)****Results: Middle Channel / EIRP**

Frequency (MHz)	Antenna Polarity	Level (dBm)	Limit (dBm)	Margin (dB)	Result
1284.676	Horizontal	-41.5	-27.0	14.5	Complied
1800.449	Vertical	-42.4	-27.0	15.4	Complied
6155.763	Horizontal	-42.3	-27.0	15.3	Complied
7201.466	Horizontal	-40.3	-27.0	13.3	Complied

**Results: Middle Channel / Field Strength / Peak**

Frequency (MHz)	Antenna Polarity	Peak Level (dB $\mu$ V/m)	Peak Limit (dB $\mu$ V/m)	Margin (dB)	Result
1114.141	Vertical	52.5	54.0*	1.5	Complied
1189.966	Horizontal	51.9	54.0*	2.1	Complied
1480.815	Vertical	51.0	54.0*	3.0	Complied
2695.391	Horizontal	40.1	54.0*	13.9	Complied
2865.521	Vertical	57.7	74.0	16.3	Complied
11567.885	Vertical	58.9	74.0	15.1	Complied

**Results: Middle Channel / Field Strength / Average**

Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Duty Cycle correction (dB)	Corrected Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
2860.854	Vertical	44.6	0.6	45.2	54.0	8.8	Complied
11569.423	Vertical	45.2	0.6	45.8	54.0	8.2	Complied

**Transmitter Out of Band Radiated Emissions (5.725-5.85 GHz band operation) (continued)****Results: Top Channel / EIRP**

Frequency (MHz)	Antenna Polarity	Level (dBm)	Limit (dBm)	Margin (dB)	Result
1284.676	Horizontal	-41.5	-27.0	14.5	Complied
1800.449	Vertical	-42.4	-27.0	15.4	Complied
6155.763	Horizontal	-42.3	-27.0	15.3	Complied
7201.466	Horizontal	-40.3	-27.0	13.3	Complied

**Results: Top Channel / Field Strength / Peak**

Frequency (MHz)	Antenna Polarity	Peak Level (dB $\mu$ V/m)	Peak Limit (dB $\mu$ V/m)	Margin (dB)	Result
1114.141	Vertical	52.5	54.0*	1.5	Complied
1189.966	Horizontal	51.9	54.0*	2.1	Complied
1480.815	Vertical	51.0	54.0*	3.0	Complied
2695.391	Horizontal	40.1	54.0*	13.9	Complied
2865.521	Vertical	57.7	74.0	16.3	Complied
11653.526	Vertical	57.3	74.0	16.7	Complied

**Results: Top Channel / Field Strength / Average**

Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Duty Cycle correction (dB)	Corrected Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
2860.854	Vertical	44.6	0.6	45.2	54.0	8.8	Complied
11653.526	Vertical	43.4	0.6	44.0	54.0	10.0	Complied

**Transmitter Out of Band Radiated Emissions (5.725-5.85 GHz band operation) (continued)****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
M1630	Test receiver	Rohde & Schwarz	ESU40	100233	17 Feb 2017	12
A1534	Pre Amplifier	Hewlett Packard	8449B	3008A00405	19 Dec 2016	12
A1785	Pre Amplifier	Farran Technology	FLNA-28-30	FTL 6483	12 Jan 2017	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
A203	Antenna	Flann Microwave	22240-20	343	19 May 2016	12
S0537	DC Power Supply	TTI	EL302D	249928	Calibrated before use	-
M1229	Multimeter	Fluke	179	87640015	23 Apr 2016	12
A1396	Attenuator	Huber & Suhner	6810.17.B	757987	05 May 2016	12
A2133	Low Pass Filter	AtlanTecRF	AFL-04000	JFB1006-002	17 Apr 2016	12
A2176	High Pass Filter	AtlanTecRF	AFH-07000	800980	17 Apr 2016	12
M1945	Thermohygrometer	JM Handelpunkt	30.5015.01	None stated	23 Apr 2016	12
K0001	5m RSE Chamber	Rainford EMC	N/A	N/A	12 Jan 2017	12
M1124	Test Receiver	Rohde & Schwarz	ESIB26	100046	18 Nov 2016	12

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

<b>Test Engineers:</b>	David Doyle & Andrew Edwards	<b>Test Dates:</b>	22 March 2016 & 30 March 2016
<b>Test Sample Serial Number:</b>	92804		

<b>FCC Reference:</b>	Parts 15.407(b)(1),(7), 15.205 & 15.209(a)
<b>Test Method Used:</b>	ANSI C63.10 Section 6.10 & KDB 789033 II.G.

**Environmental Conditions:**

<b>Temperature (°C):</b>	21 to 23
<b>Relative Humidity (%):</b>	32 to 33

**Note(s):**

1. Band edge measurements were performed in the EUT modes that produce the highest power and the widest bandwidths. The modes were:
  - o 802.11a - BPSK / 6 Mbps
  - o 802.11a CDD - BPSK / 6 Mbps
  - o 802.11n HT20 SISO - BPSK / MCS0 & 16QAM / MCS3
  - o 802.11n HT40 SISO - BPSK / MCS0 & 16QAM / MCS3
  - o 802.11n HT20 MIMO - BPSK / MCS0 & QPSK / MCS1
  - o 802.11n HT40 MIMO - BPSK / MCS0 & 16QAM / MCS3
  - o 802.11ac VHT80 SISO - QPSK / MCS2
  - o 802.11ac VHT80 MIMO - BPSK / MCS0 & 16QAM / MCS3
2. Lower band edge measurements were performed with the EUT transmitting on the bottom or single channel. Upper band edge measurements were performed with the EUT transmitting on the top or single channel.
3. For transmitters operating in the 5.15-5.25 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz. However, there are restricted bands of operation below the lower band edge at 4.5-5.15 GHz and also above the upper band edge at 5.35-5.46 GHz therefore the provisions of FCC Part 15.205 apply.
4. Field strength measurements using peak and average detectors were performed in the restricted bands below 5.15 GHz and above 5.35 GHz. Field strength and EIRP results were found to be compliant with the restricted band limits and Part 15.407 out-of-band limits.

**Transmitter Band Edge Radiated Emissions (5.15-5.25 GHz band operation) (continued)****Note(s):**

5. In accordance with KDB 789033 Section II.G.6.c) Method AD (vi), the average measurements were performed using a number of sweeps greater than or equal to the number of sweeps calculated below:
  - o 802.11a - BPSK / 6 Mbps – 116 sweeps
  - o 802.11a CDD - BPSK / 6 Mbps – 115 sweeps
  - o 802.11n HT20 SISO - BPSK / MCS0 – 117 sweeps
  - o 802.11n HT20 SISO – 16QAM / MCS3 – 165 sweeps
  - o 802.11n HT40 SISO - BPSK / MCS0 – 134 sweeps
  - o 802.11n HT40 SISO – 16QAM / MCS3 – 206 sweeps
  - o 802.11n HT20 MIMO - BPSK / MCS0 – 133 sweeps
  - o 802.11n HT20 MIMO - QPSK / MCS1 – 164 sweeps
  - o 802.11n HT40 MIMO - BPSK / MCS0 – 158 sweeps
  - o 802.11n HT40 MIMO – 16QAM / MCS3 – 272 sweeps
  - o 802.11ac VHT80 SISO - QPSK / MCS2 – 247 sweeps
  - o 802.11ac VHT80 MIMO - BPSK / MCS0 – 161 sweeps
  - o 802.11ac VHT80 MIMO – 16QAM / MCS3 – 323 sweeps
6. In accordance with KDB 789033 Section II.G.6.c) Method AD (vii), for average measurements on data rates where the EUT was transmitting <98% duty cycle, the duty cycle correction factor was added to the measured result. Refer to UL test report UL-RPT-RP10895558JD02G Section 5.2.4 for duty cycle correction factor calculations.

**Transmitter Band Edge Radiated Emissions (5.15-5.25 GHz band operation) (continued)****Results: 802.11a / 20 MHz / BPSK / 6 Mbps / Peak**

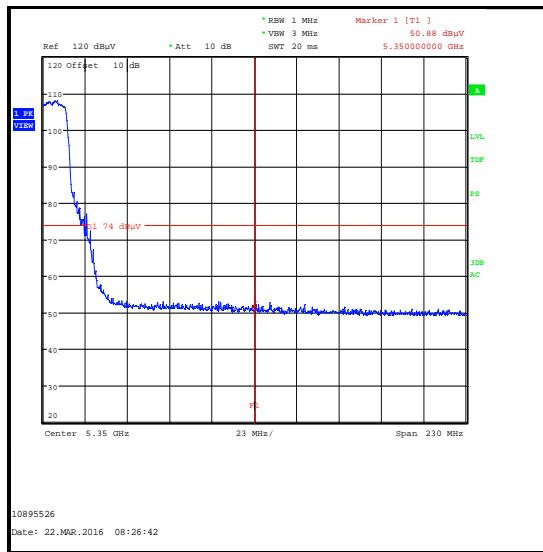
Frequency (MHz)	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
5149.840	56.6	74.0	17.4	Complied
5150	54.9	74.0	19.1	Complied
5350	50.9	74.0	23.1	Complied

**Results: 802.11a / 20 MHz / BPSK / 6 Mbps / Average**

Frequency (MHz)	Level (dB $\mu$ V/m)	Duty Cycle correction (dB)	Corrected Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
5150	42.6	0.6	43.2	54.0	10.8	Complied
5350	40.2	0.6	40.8	54.0	13.2	Complied

**Transmitter Band Edge Radiated Emissions (5.15-5.25 GHz band operation) (continued)****Results: 802.11a / 20 MHz / BPSK / 6 Mbps**

10895526  
Date: 22.MAR.2016 07:48:28



10895526  
Date: 22.MAR.2016 08:26:42

**Lower Band Edge Peak Measurement**

10895526  
Date: 22.MAR.2016 07:51:07

**Lower Band Edge Average Measurement**

10895526  
Date: 22.MAR.2016 08:27:14

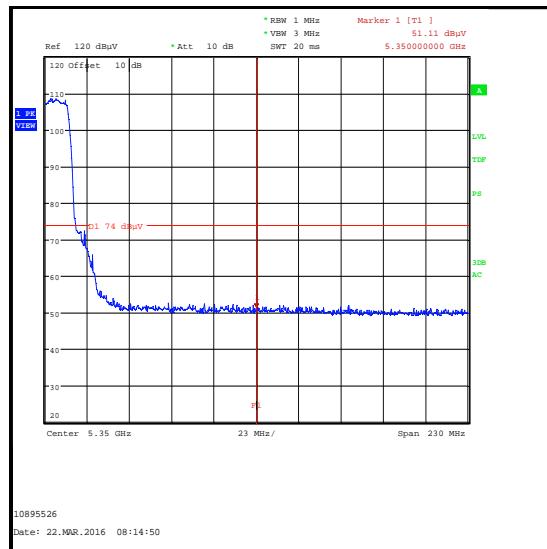
**Upper Band Edge Average Measurement**

**Transmitter Band Edge Radiated Emissions (5.15-5.25 GHz band operation) (continued)****Results: 802.11a / 20 MHz / CDD / BPSK / 6 Mbps / Peak**

Frequency (MHz)	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
5149.519	55.3	74.0	18.7	Complied
5150	54.3	74.0	19.7	Complied
5350	51.1	74.0	22.9	Complied

**Results: 802.11a / 20 MHz / CDD / BPSK / 6 Mbps / Average**

Frequency (MHz)	Level (dB $\mu$ V/m)	Duty Cycle correction (dB)	Corrected Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
5150	42.7	0.6	43.3	54.0	10.7	Complied
5350	40.3	0.6	40.9	54.0	13.1	Complied

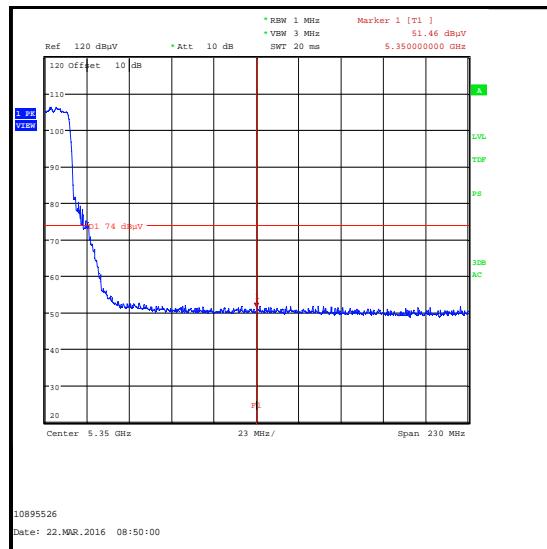
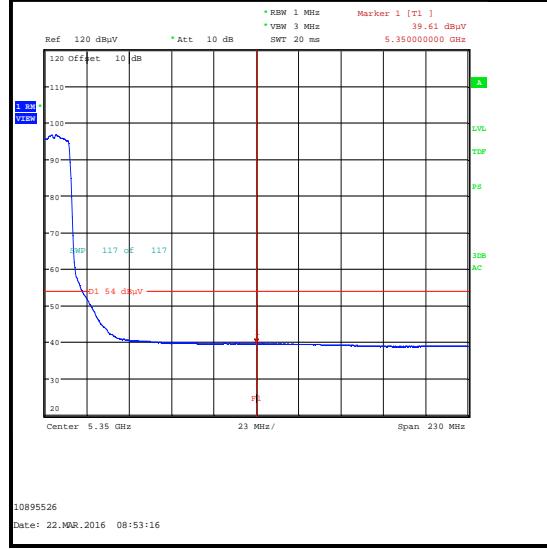
**Transmitter Band Edge Radiated Emissions (5.15-5.25 GHz band operation) (continued)****Results: 802.11a / 20 MHz / CDD / BPSK / 6 Mbps****Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement****Lower Band Edge Average Measurement****Upper Band Edge Average Measurement**

**Transmitter Band Edge Radiated Emissions (5.15-5.25 GHz band operation) (continued)****Results: 802.11n / 20 MHz / SISO / BPSK / MCS0 / Peak**

Frequency (MHz)	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
5149.038	55.6	74.0	18.4	Complied
5150	54.3	74.0	19.7	Complied
5350	51.5	74.0	22.5	Complied

**Results: 802.11n / 20 MHz / SISO / BPSK / 6.5 Mbps / MCS0 / Average**

Frequency (MHz)	Level (dB $\mu$ V/m)	Duty Cycle correction (dB)	Corrected Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
5150	42.2	0.6	42.8	54.0	11.2	Complied
5350	39.6	0.6	40.2	54.0	13.8	Complied

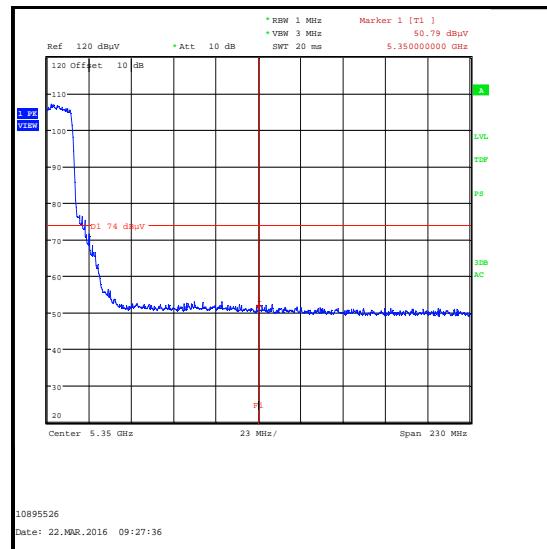
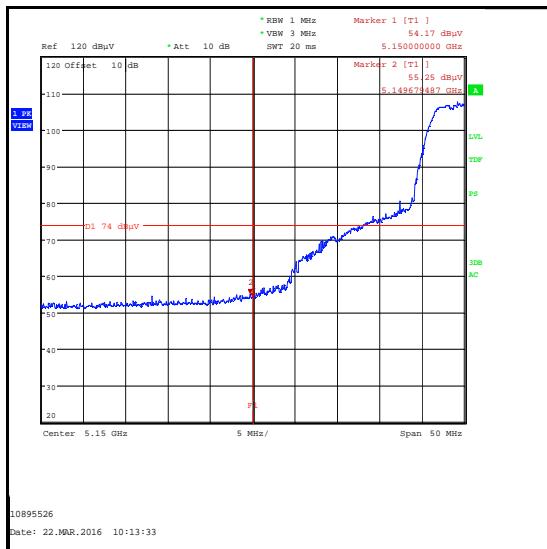
**Transmitter Band Edge Radiated Emissions (5.15-5.25 GHz band operation) (continued)****Results: 802.11n / 20 MHz / SISO / BPSK / MCS0****Lower Band Edge Peak Measurement****Lower Band Edge Average Measurement****Upper Band Edge Average Measurement**

**Transmitter Band Edge Radiated Emissions (5.15-5.25 GHz band operation) (continued)****Results: 802.11n / 20 MHz / SISO / 16QAM / MCS3 / Peak**

Frequency (MHz)	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
5149.679	55.3	74.0	18.7	Complied
5150	54.2	74.0	19.8	Complied
5350	50.8	74.0	23.2	Complied

**Results: 802.11n / 20 MHz / SISO / 16QAM / MCS3 / Average**

Frequency (MHz)	Level (dB $\mu$ V/m)	Duty Cycle correction (dB)	Corrected Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
5150	41.8	2.0	43.8	54.0	10.2	Complied
5350	39.8	2.0	41.8	54.0	12.2	Complied

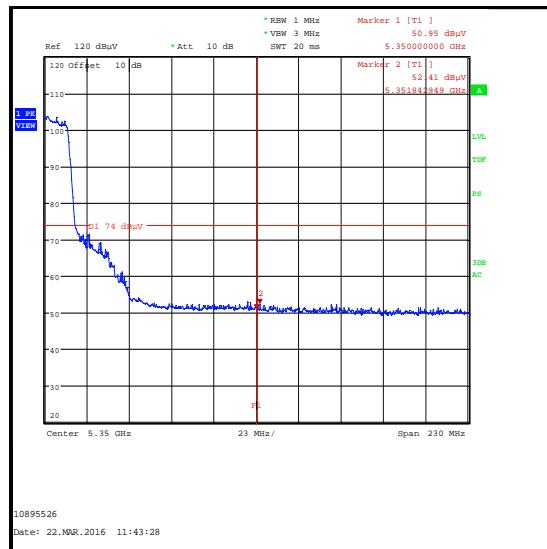
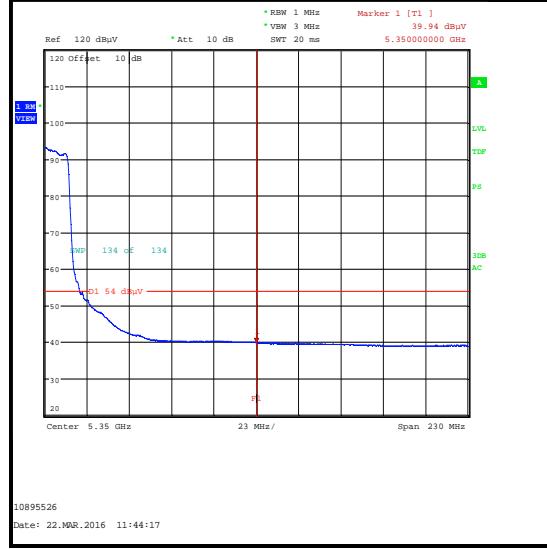
**Transmitter Band Edge Radiated Emissions (5.15-5.25 GHz band operation) (continued)****Results: 802.11n / 20 MHz / SISO / 16QAM / MCS3****Lower Band Edge Peak Measurement****Lower Band Edge Average Measurement****Upper Band Edge Average Measurement**

**Transmitter Band Edge Radiated Emissions (5.15-5.25 GHz band operation) (continued)****Results: 802.11n / 40 MHz / SISO / BPSK / MCS0 / Peak**

Frequency (MHz)	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
5149.599	68.7	74.0	5.3	Complied
5150	68.0	74.0	6.0	Complied
5350	51.0	74.0	23.0	Complied
5351.843	52.4	74.0	21.6	Complied

**Results: 802.11n / 40 MHz / SISO / BPSK / MCS0 / Average**

Frequency (MHz)	Level (dB $\mu$ V/m)	Duty Cycle correction (dB)	Corrected Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
5150	49.1	1.2	50.3	54.0	3.7	Complied
5350	39.9	1.2	41.1	54.0	12.9	Complied

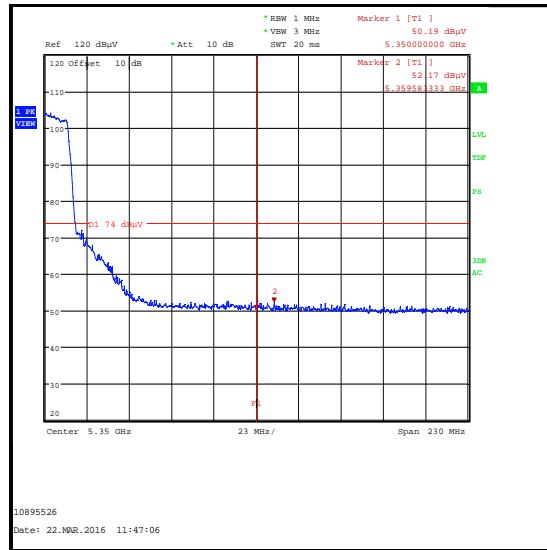
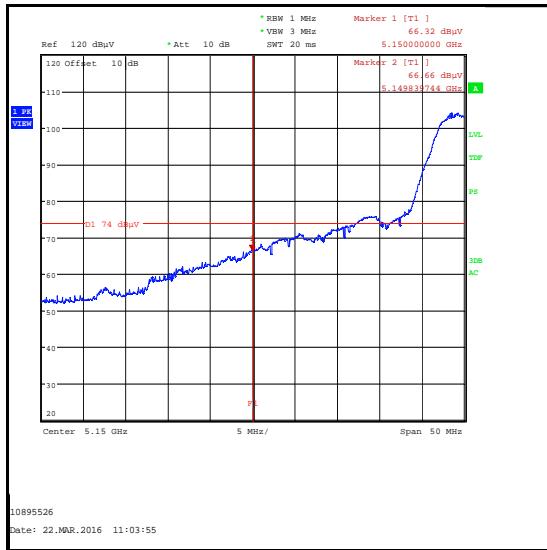
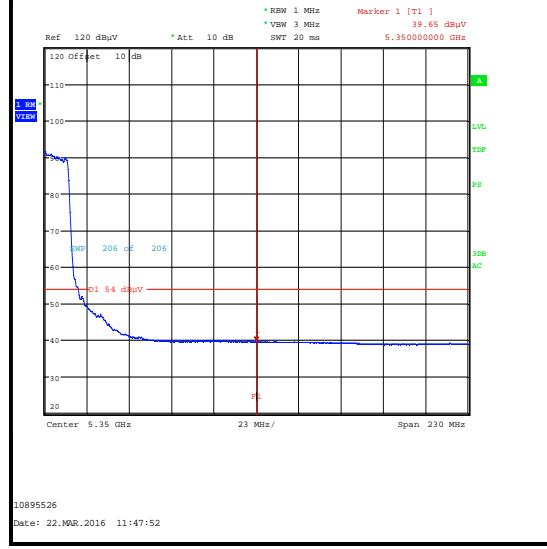
**Transmitter Band Edge Radiated Emissions (5.15-5.25 GHz band operation) (continued)****Results: 802.11n / 40 MHz / SISO / BPSK / MCS0****Lower Band Edge Peak Measurement****Lower Band Edge Average Measurement****Upper Band Edge Average Measurement**

**Transmitter Band Edge Radiated Emissions (5.15-5.25 GHz band operation) (continued)****Results: 802.11n / 40 MHz / SISO / 16QAM / MCS3 / Peak**

Frequency (MHz)	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
5149.840	66.7	74.0	7.3	Complied
5150	66.3	74.0	7.7	Complied
5350	50.2	74.0	23.8	Complied
5359.583	52.2	74.0	21.8	Complied

**Results: 802.11n / 40 MHz / SISO / 16QAM / MCS3 / Average**

Frequency (MHz)	Level (dB $\mu$ V/m)	Duty Cycle correction (dB)	Corrected Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
5150	47.2	3.1	50.3	54.0	3.7	Complied
5350	39.7	3.1	42.8	54.0	11.2	Complied

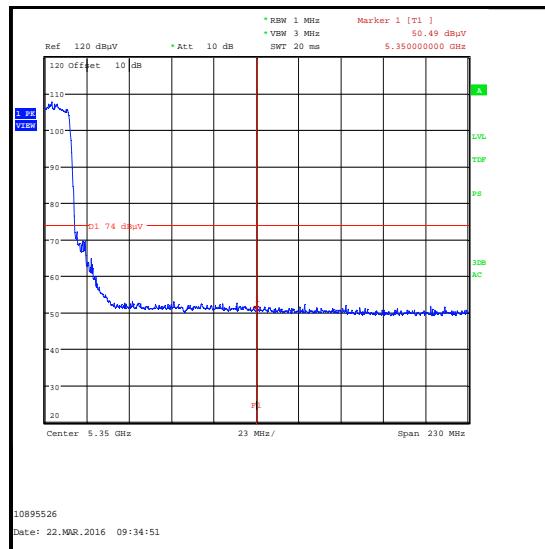
**Transmitter Band Edge Radiated Emissions (5.15-5.25 GHz band operation) (continued)****Results: 802.11n / 40 MHz / SISO / 16QAM / MCS3****Lower Band Edge Peak Measurement****Lower Band Edge Average Measurement****Upper Band Edge Average Measurement**

**Transmitter Band Edge Radiated Emissions (5.15-5.25 GHz band operation) (continued)****Results: 802.11n / 20 MHz / MIMO / BPSK / MCS0 / Peak**

Frequency (MHz)	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
5147.196	54.8	74.0	19.2	Complied
5150	54.0	74.0	20.0	Complied
5350	50.5	74.0	23.5	Complied

**Results: 802.11n / 20 MHz / MIMO / BPSK / MCS0 / Average**

Frequency (MHz)	Level (dB $\mu$ V/m)	Duty Cycle correction (dB)	Corrected Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
5150	41.8	0.6	42.4	54.0	11.6	Complied
5350	39.9	0.6	40.5	54.0	13.5	Complied

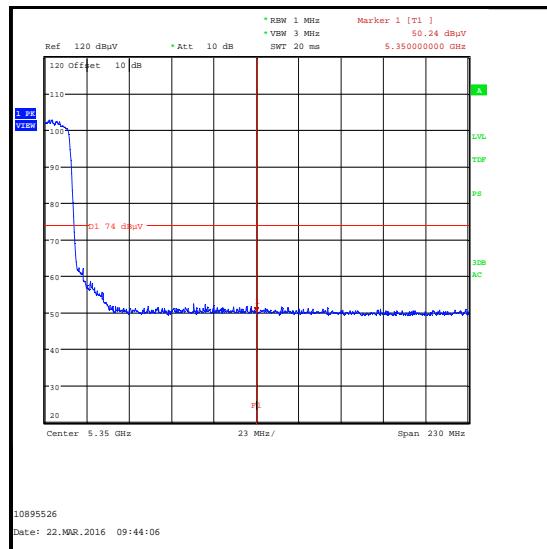
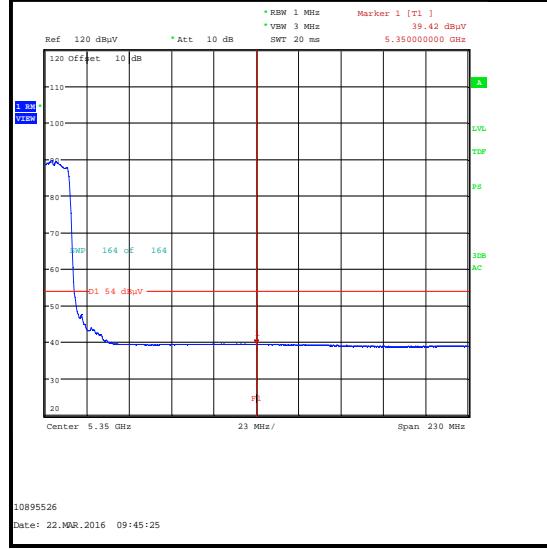
**Transmitter Band Edge Radiated Emissions (5.15-5.25 GHz band operation) (continued)****Results: 802.11n / 20 MHz / MIMO / BPSK / MCS0****Lower Band Edge Peak Measurement****Lower Band Edge Average Measurement****Upper Band Edge Average Measurement**

**Transmitter Band Edge Radiated Emissions (5.15-5.25 GHz band operation) (continued)****Results: 802.11n / 20 MHz / MIMO / QPSK / MCS1 / Peak**

Frequency (MHz)	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
5148.237	54.5	74.0	19.5	Complied
5150	53.1	74.0	20.9	Complied
5350	50.2	74.0	23.8	Complied

**Results: 802.11n / 20 MHz / MIMO / QPSK / MCS1 / Average**

Frequency (MHz)	Level (dB $\mu$ V/m)	Duty Cycle correction (dB)	Corrected Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
5150	41.4	1.1	42.5	54.0	11.5	Complied
5350	39.4	1.1	40.5	54.0	13.5	Complied

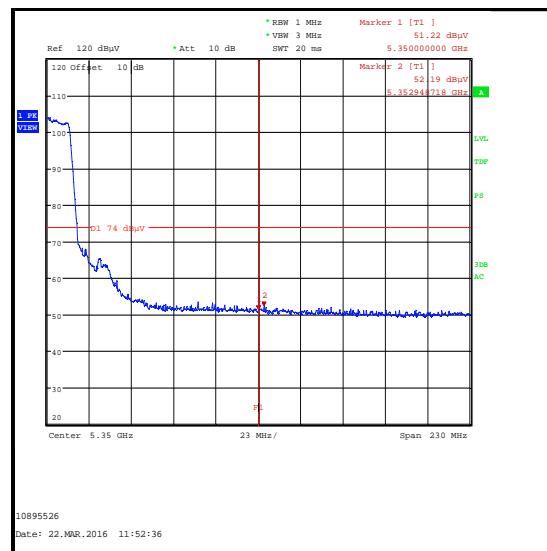
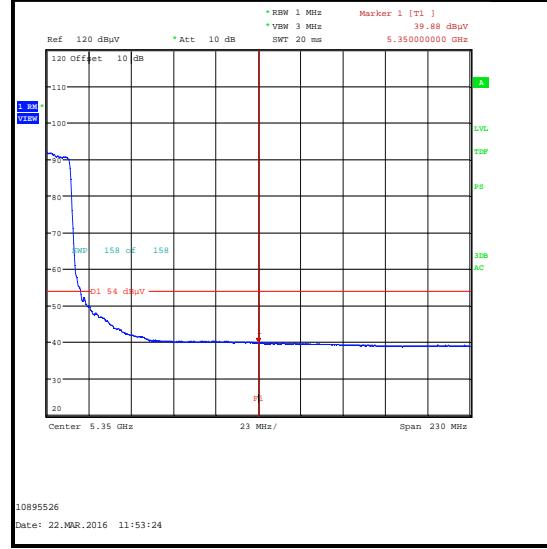
**Transmitter Band Edge Radiated Emissions (5.15-5.25 GHz band operation) (continued)****Results: 802.11n / 20 MHz / MIMO / QPSK / MCS1****Lower Band Edge Peak Measurement****Lower Band Edge Average Measurement****Upper Band Edge Average Measurement**

**Transmitter Band Edge Radiated Emissions (5.15-5.25 GHz band operation) (continued)****Results: 802.11n / 40 MHz / MIMO / BPSK / MCS0 / Peak**

Frequency (MHz)	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
5147.596	63.3	74.0	10.7	Complied
5150	62.8	74.0	11.2	Complied
5350	51.2	74.0	22.8	Complied
5352.949	52.2	74.0	21.8	Complied

**Results: 802.11n / 40 MHz / MIMO / BPSK / MCS0 / Average**

Frequency (MHz)	Level (dB $\mu$ V/m)	Duty Cycle correction (dB)	Corrected Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
5150	45.8	1.2	47.0	54.0	7.0	Complied
5350	39.9	1.2	41.1	54.0	12.9	Complied

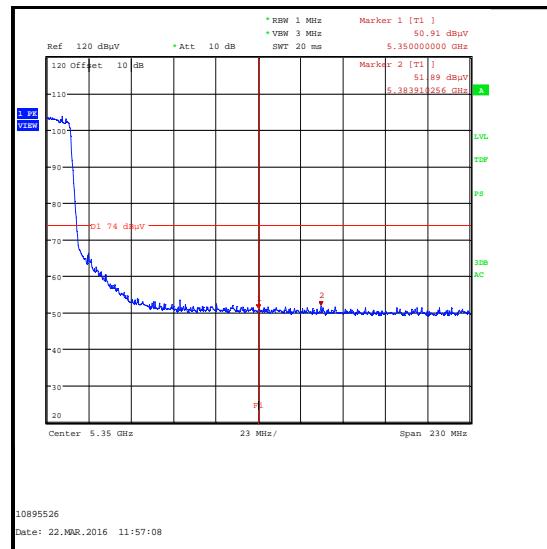
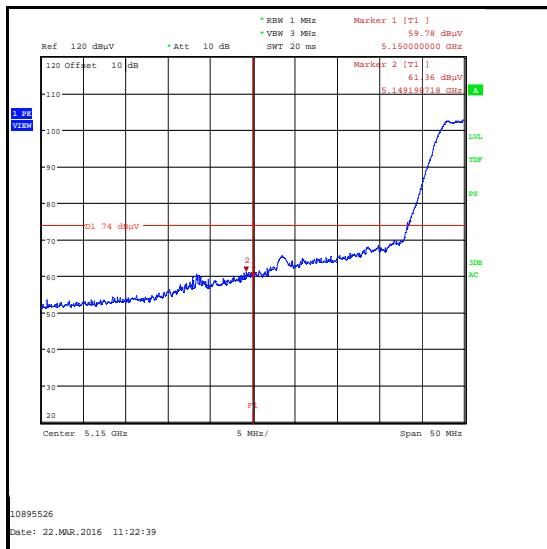
**Transmitter Band Edge Radiated Emissions (5.15-5.25 GHz band operation) (continued)****Results: 802.11n / 40 MHz / MIMO / BPSK / MCS0****Lower Band Edge Peak Measurement****Lower Band Edge Average Measurement****Upper Band Edge Average Measurement**

**Transmitter Band Edge Radiated Emissions (5.15-5.25 GHz band operation) (continued)****Results: 802.11n / 40 MHz / MIMO / 16QAM / MCS3 / Peak**

Frequency (MHz)	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
5149.199	61.4	74.0	12.6	Complied
5150	59.8	74.0	14.2	Complied
5350	50.9	74.0	23.1	Complied
5383.910	51.9	74.0	22.1	Complied

**Results: 802.11n / 40 MHz / MIMO / 16QAM / MCS3 / Average**

Frequency (MHz)	Level (dB $\mu$ V/m)	Duty cycle correction (dB)	Corrected Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
5150	43.7	3.1	46.8	54.0	7.2	Complied
5350	39.5	3.1	42.6	54.0	11.4	Complied

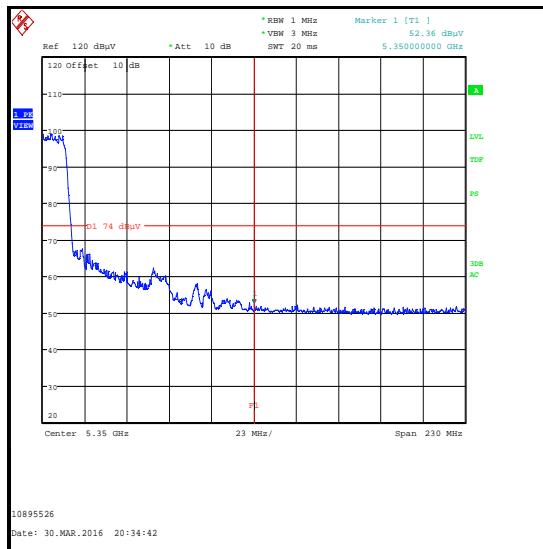
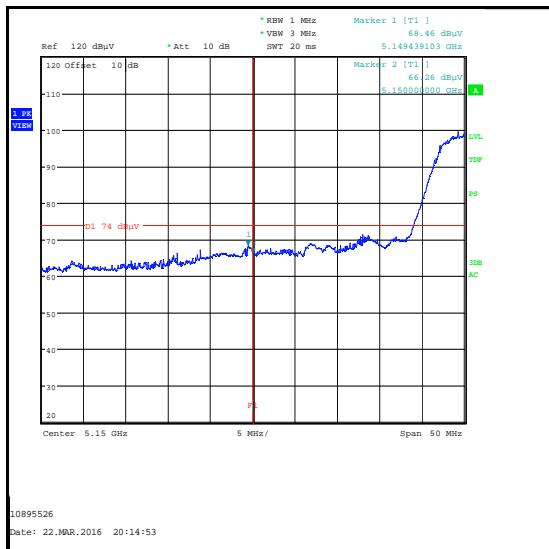
**Transmitter Band Edge Radiated Emissions (5.15-5.25 GHz band operation) (continued)****Results: 802.11n / 40 MHz / MIMO / 16QAM / MCS3****Lower Band Edge Peak Measurement****Lower Band Edge Average Measurement****Upper Band Edge Average Measurement**

**Transmitter Band Edge Radiated Emissions (5.15-5.25 GHz band operation) (continued)****Results: 802.11ac / 80 MHz / SISO / QPSK / MCS2 / Peak**

Frequency (MHz)	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
5149.439	68.5	74.0	5.5	Complied
5150	66.3	74.0	7.7	Complied
5350	52.4	74.0	21.6	Complied

**Results: 802.11ac / 80 MHz / SISO / QPSK / MCS2 / Average**

Frequency (MHz)	Level (dB $\mu$ V/m)	Duty cycle correction (dB)	Corrected Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
5150	49.3	3.9	53.2	54.0	0.8	Complied
5350	39.7	3.9	43.6	54.0	10.4	Complied

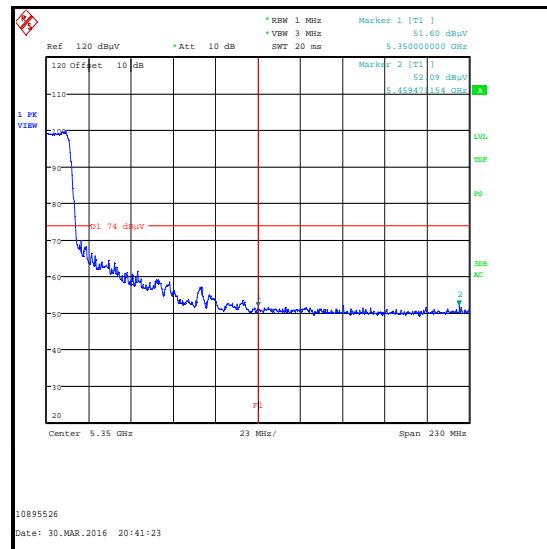
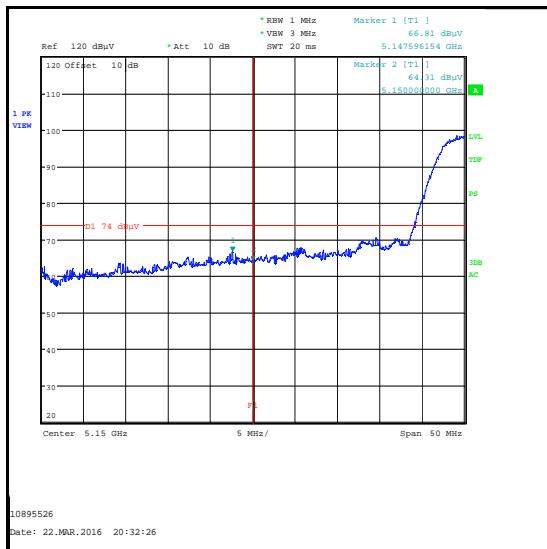
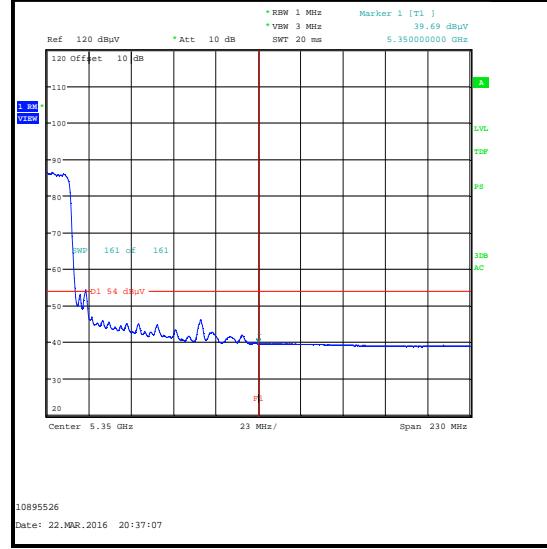
**Transmitter Band Edge Radiated Emissions (5.15-5.25 GHz band operation) (continued)****Results: 802.11ac / 80 MHz / SISO / QPSK / MCS2****Lower Band Edge Peak Measurement****Lower Band Edge Average Measurement****Upper Band Edge Average Measurement**

**Transmitter Band Edge Radiated Emissions (5.15-5.25 GHz band operation) (continued)****Results: 802.11ac / 80 MHz / MIMO / BPSK / MCS0 / Peak**

Frequency (MHz)	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
5147.596	66.8	74.0	7.2	Complied
5150	64.3	74.0	9.7	Complied
5350	51.6	74.0	22.4	Complied
5459.471	52.1	74.0	21.9	Complied

**Results: 802.11ac / 80 MHz / MIMO / BPSK / MCS0 / Average**

Frequency (MHz)	Level (dB $\mu$ V/m)	Duty Cycle correction (dB)	Corrected Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
5147.837	48.4	2.1	50.5	54.0	3.5	Complied
5150	48.0	2.1	50.1	54.0	3.9	Complied
5350	39.7	2.1	41.8	54.0	12.2	Complied

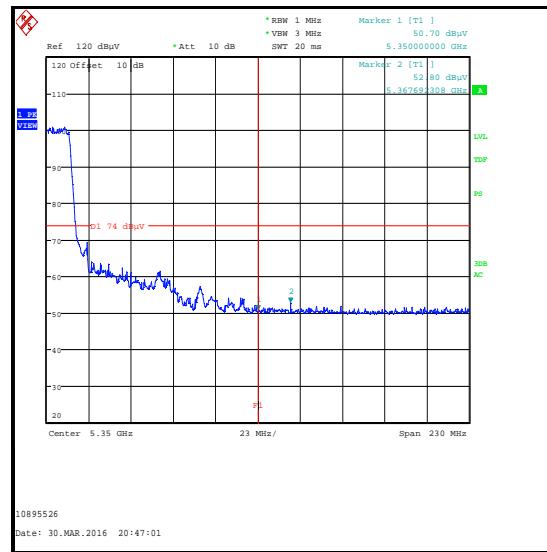
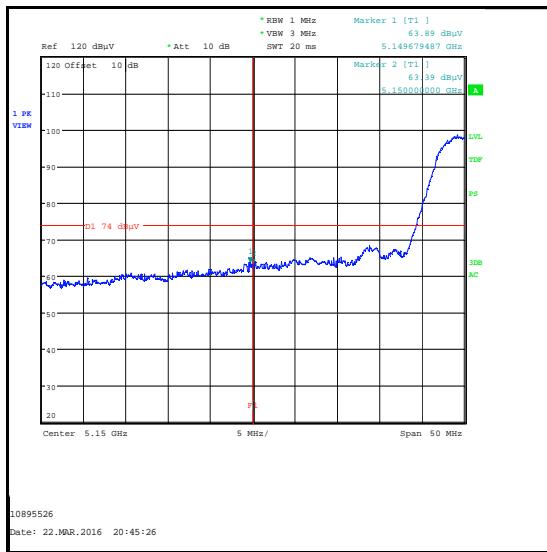
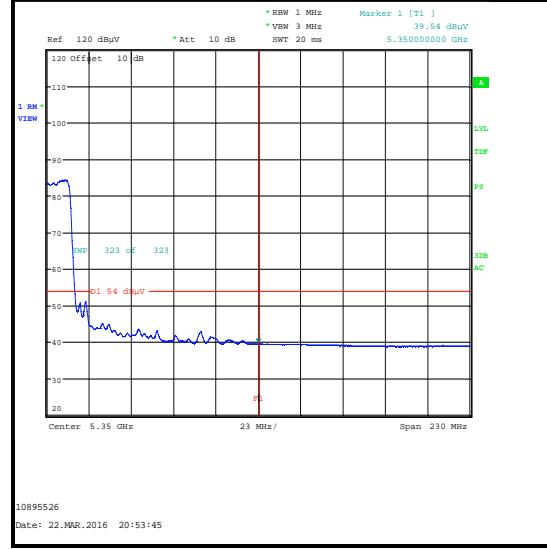
**Transmitter Band Edge Radiated Emissions (5.15-5.25 GHz band operation) (continued)****Results: 802.11ac / 80 MHz / MIMO / BPSK / MCS0****Lower Band Edge Peak Measurement****Lower Band Edge Average Measurement****Upper Band Edge Average Measurement**

**Transmitter Band Edge Radiated Emissions (5.15-5.25 GHz band operation) (continued)****Results: 802.11ac / 80 MHz / MIMO / 16QAM / MCS3 / Peak**

Frequency (MHz)	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
5149.679	63.9	74.0	10.1	Complied
5150	63.4	74.0	10.6	Complied
5350	50.7	74.0	23.3	Complied
5367.692	52.8	74.0	21.2	Complied

**Results: 802.11ac / 80 MHz / MIMO / 16QAM / MCS3 / Average**

Frequency (MHz)	Level (dB $\mu$ V/m)	Duty cycle correction (dB)	Corrected Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
5147.756	45.2	4.5	49.7	54.0	4.3	Complied
5150	44.8	4.5	49.3	54.0	4.7	Complied
5350	39.5	4.5	44.0	54.0	10.0	Complied

**Transmitter Band Edge Radiated Emissions (5.15-5.25 GHz band operation) (continued)****Results: 802.11ac / 80 MHz / MIMO / 16QAM / MCS3****Lower Band Edge Peak Measurement****Lower Band Edge Average Measurement****Upper Band Edge Average Measurement**

**Transmitter Band Edge Radiated Emissions (5.725-5.85 GHz band)****Test Summary:**

Test Engineer:	Andrew Edwards	Test Date:	22 March 2016
Test Sample Serial Number:	92804		

FCC Reference:	Parts 15.407(b)(4),(7), 15.205 & 15.209(a)
Test Method Used:	ANSI C63.10 Section 6.10.4 & KDB 789033 II.G.

**Environmental Conditions:**

Temperature (°C):	24
Relative Humidity (%):	30

**Note(s):**

1. Band edge measurements were performed in the EUT modes that produce the highest power and the widest bandwidths. The modes were:
  - o 802.11a - BPSK / 6 Mbps
  - o 802.11a CDD - BPSK / 6 Mbps
  - o 802.11n HT20 SISO - BPSK / MCS0 & 16QAM / MCS3
  - o 802.11n HT40 SISO - BPSK / MCS0 & 16QAM / MCS3
  - o 802.11n HT20 MIMO - BPSK / MCS0 & QPSK / MCS1
  - o 802.11n HT40 MIMO - BPSK / MCS0 & 16QAM / MCS3
  - o 802.11ac VHT80 SISO - QPSK / MCS2
  - o 802.11ac VHT80 MIMO - BPSK / MCS0 & 16QAM / MCS3
2. Lower band edge measurements were performed with the EUT transmitting on the bottom or single channel. Upper band edge measurements were performed with the EUT transmitting on the top or single channel.
3. For completeness, results are also shown as EIRP in dBm and also as field strength in dB $\mu$ V/m. Measured field strength was converted to EIRP in accordance with KDB 789033 G.2.d)(ii) using a conversion factor of 95.2.
4. An amendment of Part 15.407(b)(4) was published on 6<sup>th</sup> April 2016 with effective date 6<sup>th</sup> May 2016. As testing was performed before that date, the former and stricter emission limits were applied to show compliance at band edges. Compliance with those limits is deemed worst case. Therefore the EUT will also comply with the new emission limits. Please refer to Appendix 1 for a comparison graph between the new and former emission limits.

**Transmitter Band Edge Radiated Emissions (5.725-5.85 GHz band operation) (continued)**

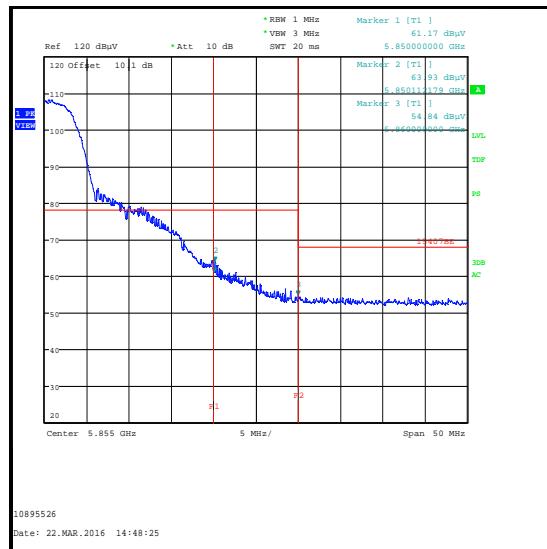
Results: 802.11a / 20 MHz / BPSK / 6 Mbps / Peak

Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Result
5715	-40.7	-27.0	13.7	Complied
5725	-26.7	-17.0	9.7	Complied
5850	-34.0	-17.0	17.0	Complied
5850.112	-31.3	-17.0	14.3	Complied
5860	-40.4	-27.0	13.4	Complied

Frequency (MHz)	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
5715	54.5	68.2	13.7	Complied
5725	68.5	78.2	9.7	Complied
5850	61.2	78.2	17.0	Complied
5850.112	63.9	78.2	14.3	Complied
5860	54.8	68.2	13.4	Complied



## Lower Band Edge Measurement



## Upper Band Edge Measurement

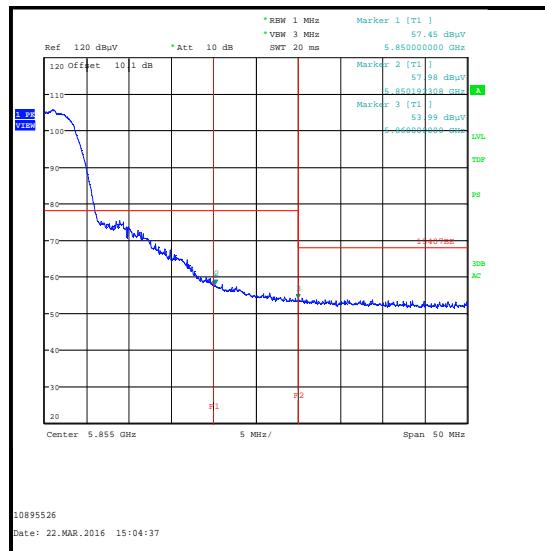
**Transmitter Band Edge Radiated Emissions (5.725-5.85 GHz band operation) (continued)****Results: 802.11a / 20 MHz / CDD / BPSK / 6 Mbps / Peak**

Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Result
5715	-41.5	-27.0	14.5	Complied
5724.888	-28.3	-17.0	11.3	Complied
5725	-28.3	-17.0	11.3	Complied
5850	-37.7	-17.0	20.7	Complied
5850.192	-37.2	-17.0	20.2	Complied
5860	-41.2	-27.0	14.2	Complied

Frequency (MHz)	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
5715	53.7	68.2	14.5	Complied
5724.888	66.9	78.2	11.3	Complied
5725	66.9	78.2	11.3	Complied
5850	57.5	78.2	20.7	Complied
5850.192	58.0	78.2	20.2	Complied
5860	54.0	68.2	14.2	Complied



Lower Band Edge Measurement



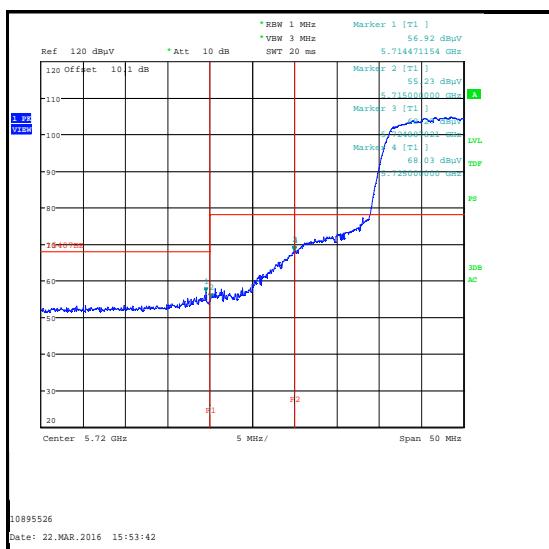
Upper Band Edge Measurement

**Transmitter Band Edge Radiated Emissions (5.725-5.85 GHz band operation) (continued)**

## Results: 802.11n / 20 MHz / SISO / BPSK / MCS0 / Peak

Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Result
5714.471	-38.3	-27.0	11.3	Complied
5715	-40.0	-27.0	13.0	Complied
5724.888	-26.9	-17.0	9.9	Complied
5725	-27.2	-17.0	10.2	Complied
5850	-36.7	-17.0	19.7	Complied
5850.192	-36.6	-17.0	19.6	Complied
5860	-43.1	-27.0	16.1	Complied
5861.891	-41.8	-27.0	14.8	Complied

Frequency (MHz)	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
5714.471	56.9	68.2	11.3	Complied
5715	55.2	68.2	13.0	Complied
5724.888	68.3	78.2	9.9	Complied
5725	68.0	78.2	10.2	Complied
5850	58.5	78.2	19.7	Complied
5850.192	58.6	78.2	19.6	Complied
5860	52.1	68.2	16.1	Complied
5861.891	53.4	68.2	14.8	Complied



### Lower Band Edge Measurement



## Upper Band Edge Measurement

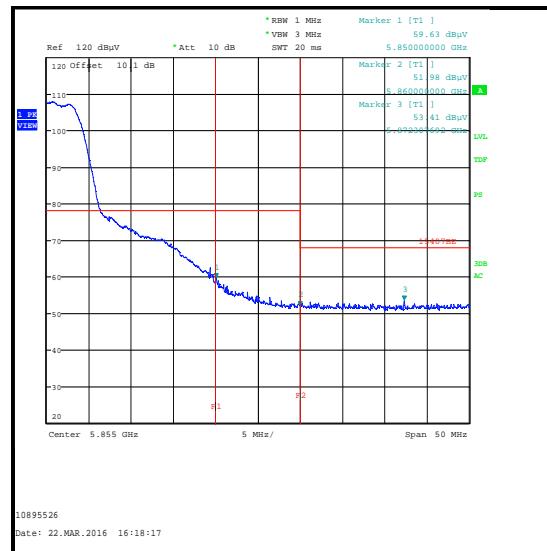
**Transmitter Band Edge Radiated Emissions (5.725-5.85 GHz band operation) (continued)****Results: 802.11n / 20 MHz / SISO / 16QAM / MCS3 / Peak**

Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Result
5712.147	-40.7	-27.0	13.7	Complied
5715	-42.4	-27.0	15.4	Complied
5725	-31.7	-17.0	14.7	Complied
5850	-35.6	-17.0	18.6	Complied
5860	-43.2	-27.0	16.2	Complied
5872.308	-41.8	-27.0	14.8	Complied

Frequency (MHz)	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
5712.147	54.5	68.2	13.7	Complied
5715	52.8	68.2	15.4	Complied
5725	63.5	78.2	14.7	Complied
5850	59.6	78.2	18.6	Complied
5860	52.0	68.2	16.2	Complied
5872.308	53.4	68.2	14.8	Complied



Lower Band Edge Measurement

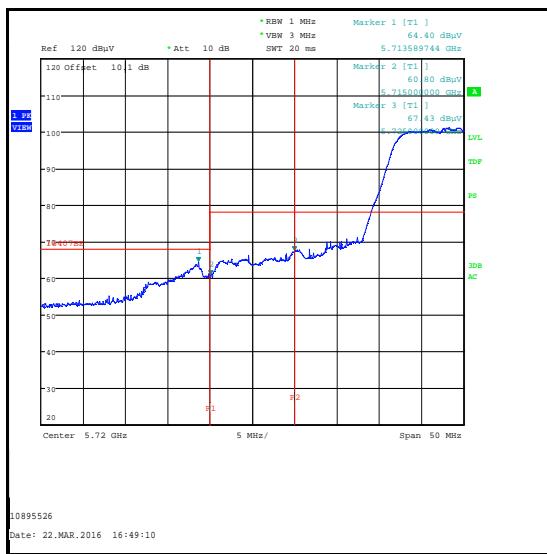


Upper Band Edge Measurement

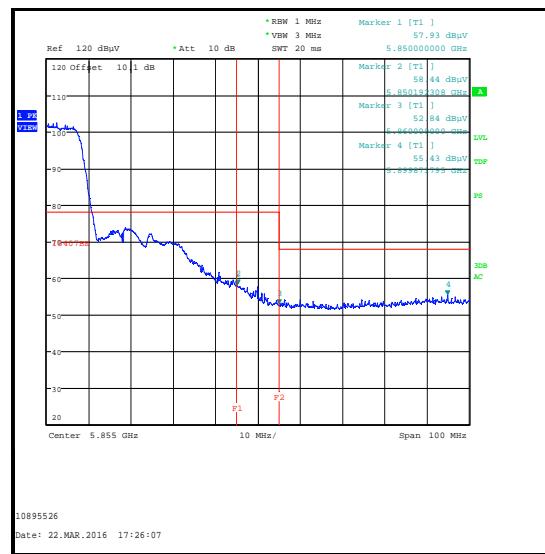
**Transmitter Band Edge Radiated Emissions (5.725-5.85 GHz band operation) (continued)****Results: 802.11n / 40 MHz / SISO / BPSK / MCS0 / Peak**

Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Result
5713.590	-30.8	-27.0	3.8	Complied
5715	-34.4	-27.0	7.4	Complied
5725	-27.8	-17.0	10.8	Complied
5850	-37.3	-17.0	20.3	Complied
5850.192	-36.8	-17.0	19.8	Complied
5860	-42.4	-27.0	15.4	Complied
5899.872	-39.8	-27.0	12.8	Complied

Frequency (MHz)	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
5713.590	64.4	68.2	3.8	Complied
5715	60.8	68.2	7.4	Complied
5725	67.4	78.2	10.8	Complied
5850	57.9	78.2	20.3	Complied
5850.192	58.4	78.2	19.8	Complied
5860	52.8	68.2	15.4	Complied
5899.872	55.4	68.2	12.8	Complied



Lower Band Edge Measurement

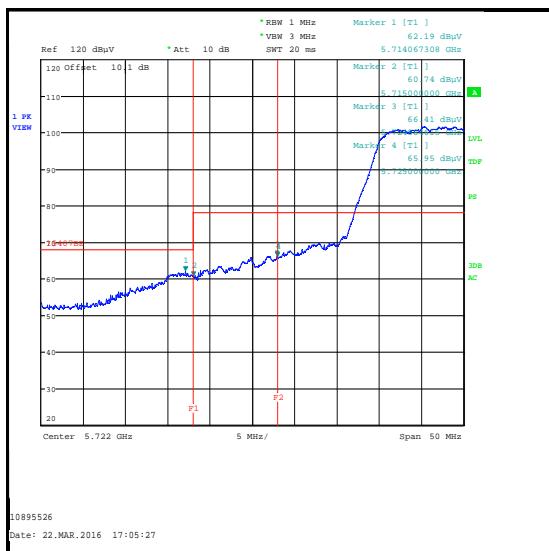


Upper Band Edge Measurement

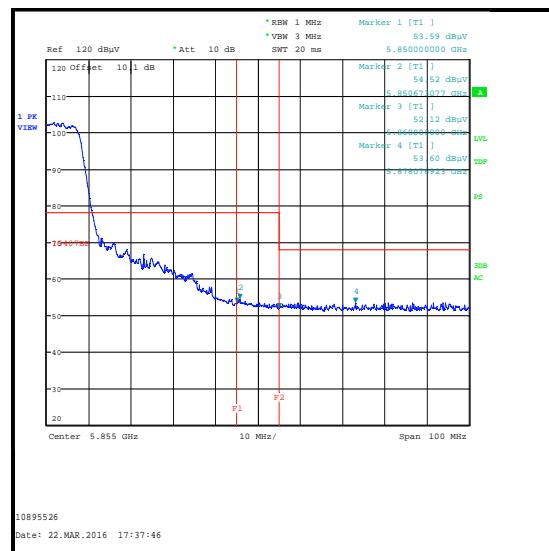
**Transmitter Band Edge Radiated Emissions (5.725-5.85 GHz operation) (continued)****Results: 802.11n / 40 MHz / SISO / 16QAM / MCS3 / Peak**

Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Result
5714.067	-33.0	-27.0	6.0	Complied
5715	-34.5	-27.0	7.5	Complied
5724.885	-28.8	-17.0	11.8	Complied
5725	-29.2	-17.0	12.2	Complied
5850	-41.6	-17.0	24.6	Complied
5850.673	-40.7	-17.0	23.7	Complied
5860	-43.1	-27.0	16.1	Complied
5878.077	-41.6	-27.0	14.6	Complied

Frequency (MHz)	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
5714.067	62.2	68.2	6.0	Complied
5715	60.7	68.2	7.5	Complied
5724.885	66.4	78.2	11.8	Complied
5725	66.0	78.2	12.2	Complied
5850	53.6	78.2	24.6	Complied
5850.673	54.5	78.2	23.7	Complied
5860	52.1	68.2	16.1	Complied
5878.077	53.6	68.2	14.6	Complied



Lower Band Edge Measurement

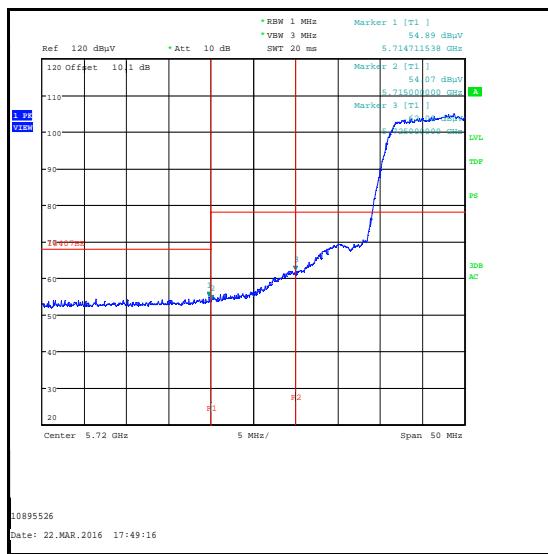


Upper Band Edge Measurement

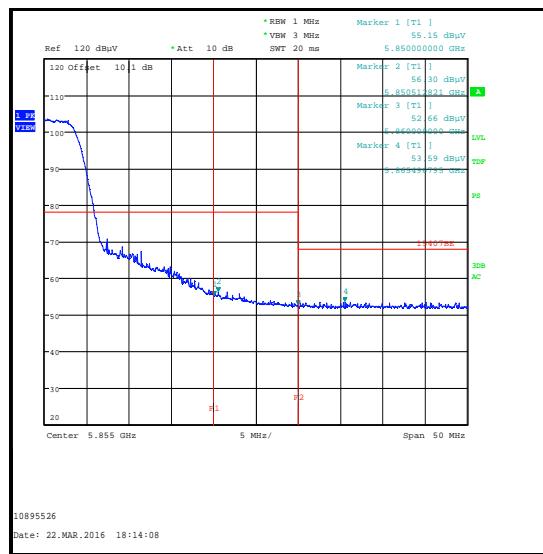
**Transmitter Band Edge Radiated Emissions (5.725-5.85 GHz band operation) (continued)****Results: 802.11n / 20 MHz / MIMO / BPSK / MCS0 / Peak**

Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Result
5714.712	-40.3	-27.0	13.3	Complied
5715	-41.1	-27.0	14.1	Complied
5725	-33.1	-17.0	16.1	Complied
5850	-40.0	-17.0	23.0	Complied
5850.513	-38.9	-17.0	21.9	Complied
5860	-42.5	-27.0	15.5	Complied
5865.497	-41.6	-27.0	14.6	Complied

Frequency (MHz)	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
5714.712	54.9	68.2	13.3	Complied
5715	54.1	68.2	14.1	Complied
5725	62.1	78.2	16.1	Complied
5850	55.2	78.2	23.0	Complied
5850.513	56.3	78.2	21.9	Complied
5860	52.7	68.2	15.5	Complied
5865.497	53.6	68.2	14.6	Complied



Lower Band Edge Measurement

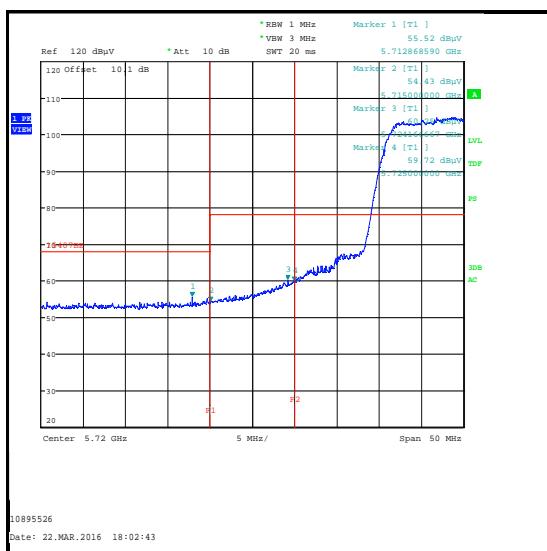


Upper Band Edge Measurement

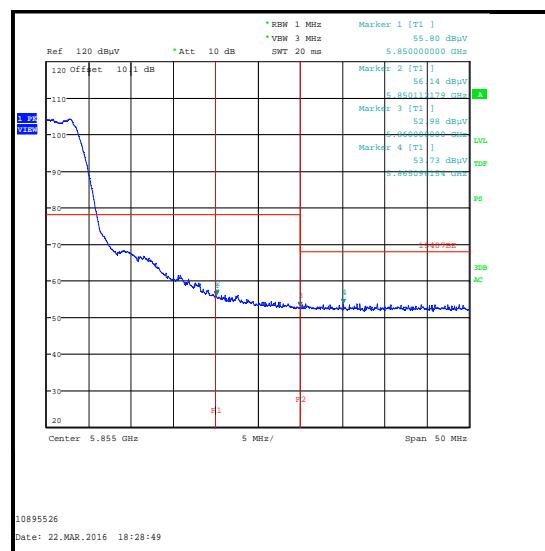
**Transmitter Band Edge Radiated Emissions (5.725-5.85 GHz band operation) (continued)****Results: 802.11n / 20 MHz / MIMO / QPSK / MCS1 / Peak**

Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Result
5712.869	-39.7	-27.0	12.7	Complied
5715	-40.8	-27.0	13.8	Complied
5724.167	-34.9	-17.0	17.9	Complied
5725	-35.5	-17.0	18.5	Complied
5850	-39.4	-17.0	22.4	Complied
5850.112	-39.1	-17.0	22.1	Complied
5860	-42.2	-27.0	15.2	Complied
5865.096	-41.5	-27.0	14.5	Complied

Frequency (MHz)	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
5712.869	55.5	68.2	12.7	Complied
5715	54.4	68.2	13.8	Complied
5724.167	60.3	78.2	17.9	Complied
5725	59.7	78.2	18.5	Complied
5850	55.8	78.2	22.4	Complied
5850.112	56.1	78.2	22.1	Complied
5860	53.0	68.2	15.2	Complied
5865.096	53.7	68.2	14.5	Complied



Lower Band Edge Measurement

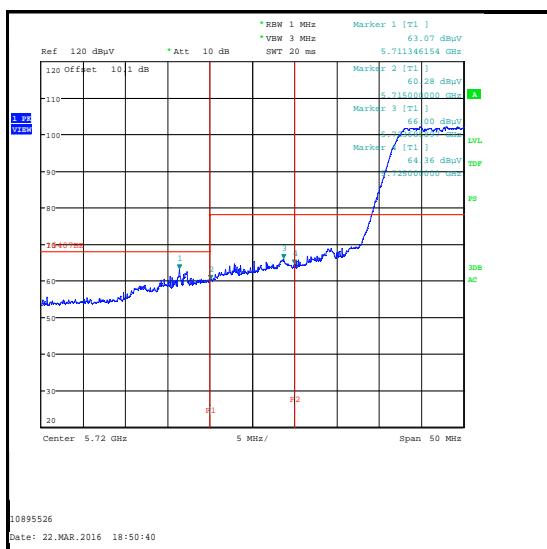


Upper Band Edge Measurement

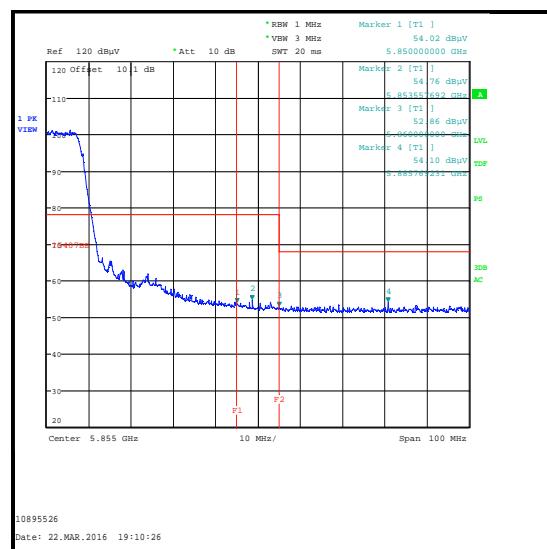
**Transmitter Band Edge Radiated Emissions (5.725-5.85 GHz band operation) (continued)****Results: 802.11n / 40 MHz / MIMO / BPSK / MCS0 / Peak**

Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Result
5711.346	-32.1	-27.0	5.1	Complied
5715	-34.9	-27.0	7.9	Complied
5723.686	-29.2	-17.0	12.2	Complied
5725	-30.8	-17.0	13.8	Complied
5850	-41.2	-17.0	24.2	Complied
5853.558	-40.4	-17.0	23.4	Complied
5860	-42.3	-27.0	15.3	Complied
5885.769	-41.1	-27.0	14.1	Complied

Frequency (MHz)	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
5711.346	63.1	68.2	5.1	Complied
5715	60.3	68.2	7.9	Complied
5723.686	66.0	78.2	12.2	Complied
5725	64.4	78.2	13.8	Complied
5850	54.0	78.2	24.2	Complied
5853.558	54.8	78.2	23.4	Complied
5860	52.9	68.2	15.3	Complied
5885.769	54.1	68.2	14.1	Complied



Lower Band Edge Measurement

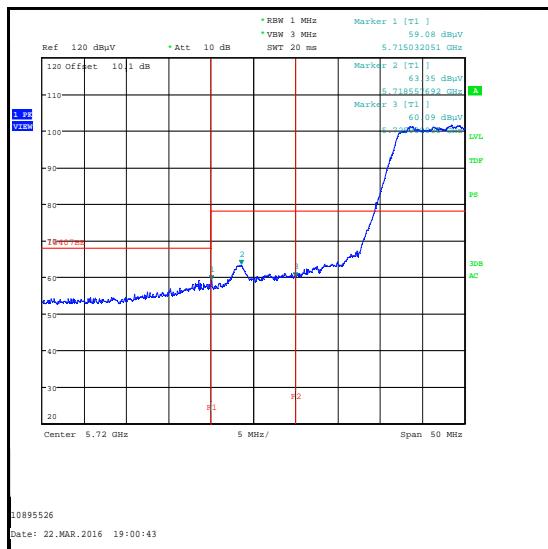


Upper Band Edge Measurement

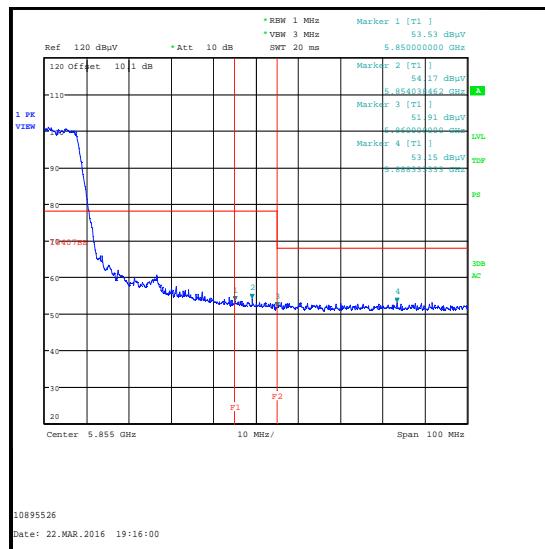
**Transmitter Band Edge Radiated Emissions (5.725-5.85 GHz band operation) (continued)****Results: 802.11n / 40 MHz / MIMO / 16QAM / MCS3 / Peak**

Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Result
5715.032	-36.1	-27.0	9.1	Complied
5718.558	-31.8	-17.0	14.8	Complied
5725	-35.1	-17.0	18.1	Complied
5850	-41.7	-17.0	24.7	Complied
5854.038	-41.0	-17.0	24.0	Complied
5860	-43.3	-27.0	16.3	Complied
5888.333	-42.0	-27.0	15.0	Complied

Frequency (MHz)	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
5715.032	59.1	68.2	9.1	Complied
5718.558	63.4	78.2	14.8	Complied
5725	60.1	78.2	18.1	Complied
5850	53.5	78.2	24.7	Complied
5854.038	54.2	78.2	24.0	Complied
5860	51.9	68.2	16.3	Complied
5888.333	53.2	68.2	15.0	Complied



Lower Band Edge Measurement

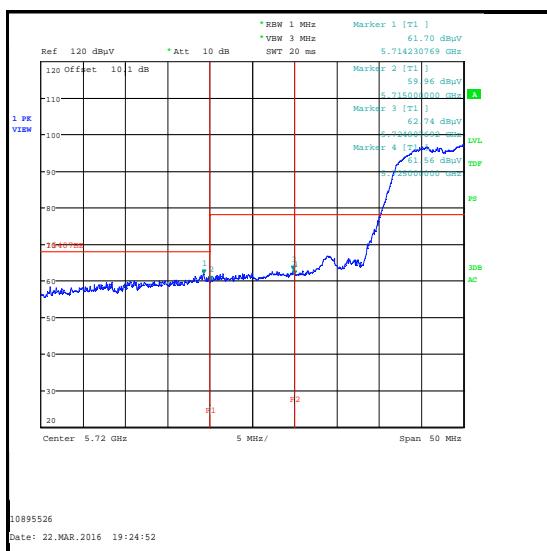


Upper Band Edge Measurement

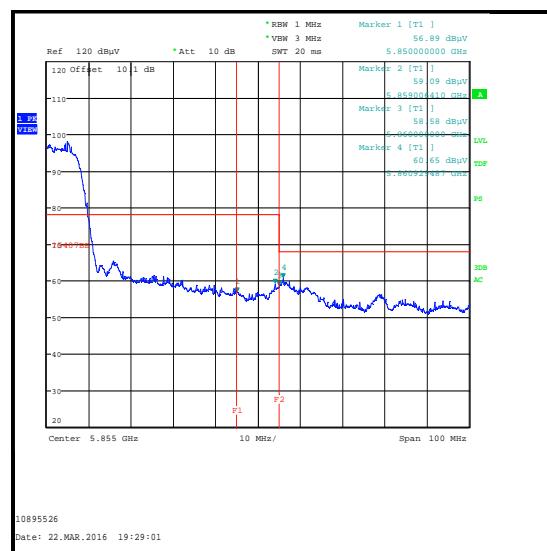
**Transmitter Band Edge Radiated Emissions (5.725-5.85 GHz band operation) (continued)****Results: 802.11ac / 80 MHz / SISO / QPSK / MCS2 / Peak**

Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Result
5714.231	-33.5	-27.0	6.5	Complied
5715	-35.2	-27.0	8.2	Complied
5724.808	-32.5	-17.0	15.5	Complied
5725	-33.6	-17.0	16.6	Complied
5850	-38.3	-17.0	21.3	Complied
5859.006	-36.1	-17.0	19.1	Complied
5860	-36.6	-27.0	9.6	Complied
5860.929	-34.5	-27.0	7.5	Complied

Frequency (MHz)	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
5714.231	61.7	68.2	6.5	Complied
5715	60.0	68.2	8.2	Complied
5724.808	62.7	78.2	15.5	Complied
5725	61.6	78.2	16.6	Complied
5850	56.9	78.2	21.3	Complied
5859.006	59.1	78.2	19.1	Complied
5860	58.6	68.2	9.6	Complied
5860.929	60.7	68.2	7.5	Complied



Lower Band Edge Measurement

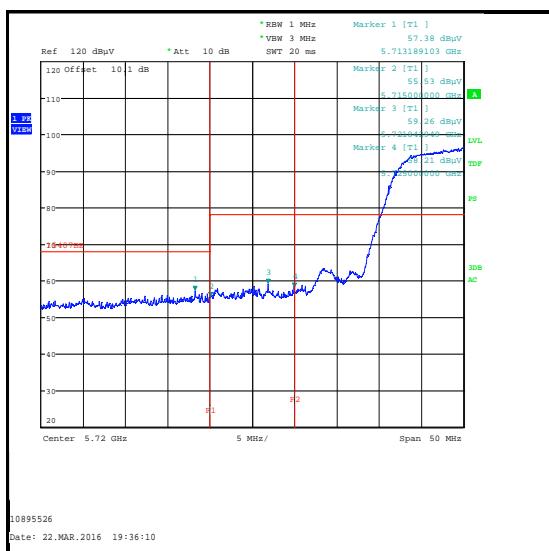


Upper Band Edge Measurement

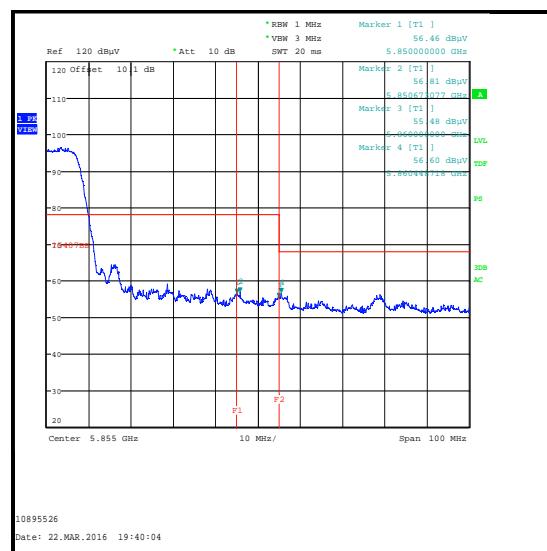
**Transmitter Band Edge Radiated Emissions (5.725-5.85 GHz band operation) (continued)****Results: 802.11ac / 80 MHz / MIMO / BPSK / MCS0 / Peak**

Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Result
5713.189	-37.8	-27.0	10.8	Complied
5715	-39.7	-27.0	12.7	Complied
5721.843	-35.9	-17.0	18.9	Complied
5725	-37.0	-17.0	20.0	Complied
5850	-38.7	-17.0	21.7	Complied
5850.673	-38.4	-17.0	21.4	Complied
5860	-39.7	-27.0	12.7	Complied
5860.449	-38.6	-27.0	11.6	Complied

Frequency (MHz)	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
5713.189	57.4	68.2	10.8	Complied
5715	55.5	68.2	12.7	Complied
5721.843	59.3	78.2	18.9	Complied
5725	58.2	78.2	20.0	Complied
5850	56.5	78.2	21.7	Complied
5850.673	56.8	78.2	21.4	Complied
5860	55.5	68.2	12.7	Complied
5860.449	56.6	68.2	11.6	Complied



Lower Band Edge Measurement

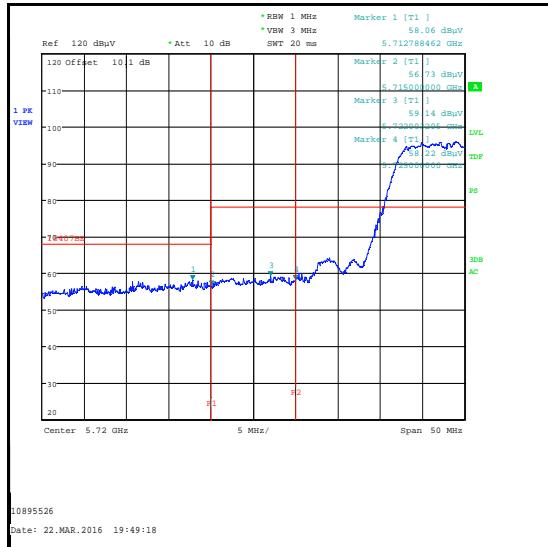


Upper Band Edge Measurement

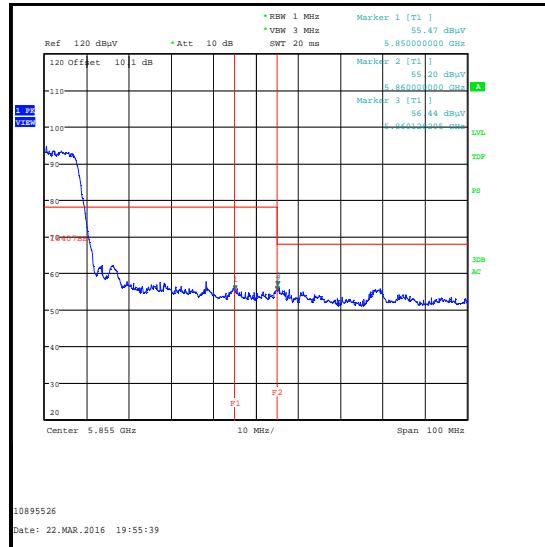
**Transmitter Band Edge Radiated Emissions (5.725-5.85 GHz band operation) (continued)****Results: 802.11ac / 80 MHz / MIMO / 16QAM / MCS3 / Peak**

Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Result
5712.788	-37.1	-27.0	10.1	Complied
5715	-38.5	-27.0	11.5	Complied
5722.003	-36.1	-17.0	19.1	Complied
5725	-37.0	-17.0	20.0	Complied
5850	-39.7	-17.0	22.7	Complied
5860	-40.0	-27.0	13.0	Complied
5860.128	-38.8	-27.0	11.8	Complied

Frequency (MHz)	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
5712.788	58.1	68.2	10.1	Complied
5715	56.7	68.2	11.5	Complied
5722.003	59.1	78.2	19.1	Complied
5725	58.2	78.2	20.0	Complied
5850	55.5	78.2	22.7	Complied
5860	55.2	68.2	13.0	Complied
5860.128	56.4	68.2	11.8	Complied



Lower Band Edge Measurement



Upper Band Edge Measurement

**Transmitter Band Edge Radiated Emissions (continued)****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
A253	Antenna	Flann Microwave	12240-20	128	17 Dec 2016	12
A1396	Attenuator	Huber & Suhner	6810.17.B	757987	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".

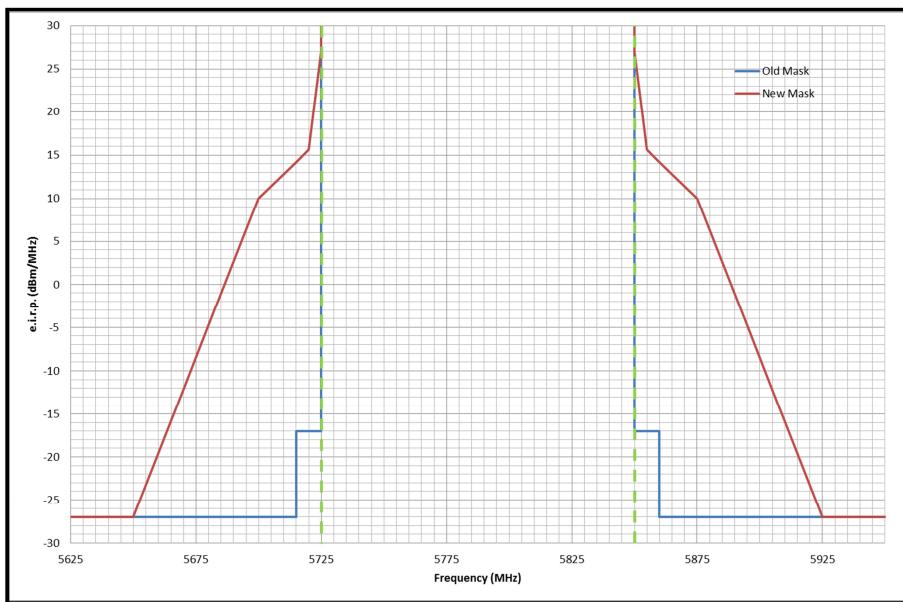
Measurement Type	Range	Confidence Level (%)	Calculated Uncertainty
Radiated Spurious Emissions	30 MHz to 1 GHz	95%	±5.65 dB
Radiated Spurious Emissions	1 GHz to 40 GHz	95%	±2.94 dB

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	-	-	Model Number updated, Sections 3.1 and 3.2 updated

## Appendix 1. Part 15.407(b)(4) Emission Limits



Comparison graph of Part 15.407(b)(4) emission limits

### Note(s):

1. Red line corresponds to the Part 15.407(b)(4)(i) emission limits with effective date 6<sup>th</sup> May 2016.
2. Blue line corresponds to the former Part 15.407(b)(4) emission limits.
3. Green dotted frequency lines are placed at the band edge frequencies.

--- END OF REPORT ---