



TEST REPORT

Test Report No. : UL-RPT-RP11081018JD10A V2.0

Manufacturer : Axis Communications AB
Model No. : Axis Companion Recorder
FCC ID : PNB-AXISS2108
Technology : WLAN (IEEE 802.11a & n)
Test Standard(s) : FCC Parts 15.207, 15.209(a) & 15.407

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: 25 April 2016

Checked by:

Ian Watch
Senior Engineer, Radio Laboratory

**Company
Signatory:**

Steven White
Service Lead, Radio Laboratory
UL VS LTD



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

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1. Customer Information









Company Name:	Axis Communications AB
Address:	Emdalavägen 14 S-223 69 Lund Sweden

2. Summary of Testing

2.1. General Information

Specification Reference:	47CFR15.403 and 47CFR15.407
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications): Part 15 Subpart E (Unlicensed National Information Infrastructure Devices) – Sections 15.403 and 15.407
Specification Reference:	47CFR15.207 and 47CFR15.209
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications): Part 15 Subpart C (Intentional Radiators) - Sections 15.207 and 15.209
Site Registration:	209735
Location of Testing:	UL VS LTD, Unit 3 Horizon, Wade Road, Kingsland Business Park, Basingstoke, Hampshire, RG24 8AH, United Kingdom
Test Dates:	21 January 2016 to 03 April 2016

2.2. Summary of Test Results

FCC Reference (47CFR)	Measurement	Result
Part 15.207	Transmitter AC Conducted Emissions	
Part 15.403(i)	Transmitter 26 dB Emission Bandwidth	
Part 15.35(c)	Transmitter Duty Cycle	Note 1
Part 15.407(a)(1)(ii)	Transmitter Maximum Conducted Output Power	
Part 15.407(a)(1)(ii)	Transmitter Peak Power Spectral Density	
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	
Part 15.407(g)	Transmitter Frequency Stability (Temperature & Voltage Variation)	Note 2
Key to Results  = Complied  = Did not comply		

Note(s):

1. The measurement was performed to assist in the calculation of the level of average output power and power spectral density.
2. Frequency stability is better than 20 ppm which ensures that the signal remains in the allocated bands under all operational conditions stated in the user manual.

2.3. Methods and Procedures

Reference:	ANSI C63.10-2013
Title:	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
Reference:	KDB 174176 D01 v01r01, June 3, 2015
Title:	AC Power-Line Conducted Emissions, Frequently Asked Questions
Reference:	KDB 789033 D02 General UNII Test Procedures New Rules v01 r02 April 8, 2016
Title:	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)

Brand Name:	Axis Communications AB
Model Name or Number:	Axis Companion Recorder
Test Sample Serial Number:	00408C1866C1
Hardware Version:	1478039 R6
Software Version:	Axis-image-nvr-s2108-20160118105735.fimage
FCC ID:	PNB-AXISS2108

Brand Name:	Axis Communications AB
Model Name or Number:	Axis Companion Recorder
Test Sample Serial Number:	ACCC8E35FB65
Hardware Version:	1478039 R10
Software Version:	Axis-image-nvr-s2108-20160118105735.fimage
FCC ID:	PNB-AXISS2108

3.2. Description of EUT

The Equipment Under Test was a network video recorder that operates as an access point. It contains a WLAN radio transceiver that operates within the U-NII-1 band. It is powered from an AC to DC power supply and equipped with a fixed internal antenna mounted on the PCB.

3.3. Modifications Incorporated in the EUT

No modifications were applied to the EUT during testing.

3.4. Additional Information Related to Testing

Technology Tested:	WLAN (IEEE 802.11a,n)		
Type of Unit:	Transceiver		
Modulation:	BPSK, QPSK, 16QAM & 64QAM		
Data rates:	802.11a	6, 9, 12, 18, 24, 36 ,48 & 54 Mbit/s	
	802.11n HT20	MCS0 to MCS7 (1 spatial stream) GI = 800 ns or 400 ns	
Power Supply Requirement(s):	Nominal	48 VDC via 120 VAC 60 Hz adaptor	
Antenna Gain:	3.8 dBi		
Maximum Conducted Output Power:	14.5 dBm		
Channel Spacing:	20 MHz		
Transmit Frequency Band:	5150 MHz to 5250 MHz		
Transmit Channels Tested:	Channel ID	Channel Number	Channel Frequency (MHz)
	Bottom	36	5180
	Middle	40	5200
	Top	48	5240

3.5. Support Equipment

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

Brand Name:	FSP GROUP INC.
Description:	Switching Power Adaptor
Model Name or Number:	FSP090-AFAN2
Serial Number:	H000000010

Brand Name:	Laptop PC
Description:	Lenovo
Model Name or Number:	L440
Serial Number:	R9-019E9Z 14/04

Brand Name:	Kingston
Description:	USB Flash Disk
Model Name or Number:	DataTraveler 100 G3
Serial Number:	Not marked or stated

Brand Name:	Ethernet cable, length 1.2 metres
Description:	Not marked or stated
Model Name or Number:	Not marked or stated
Serial Number:	Not marked or stated

Brand Name:	Hirose Electric Europe B.V.
Description:	RF cable with SMA and MS-180 series male connector (1.5 dB insertion loss and 0.1 metre length)
Model Name or Number:	MS180LH1-HRMJ-088V100
Serial Number:	Not marked or stated

Brand Name:	AXIS
Description:	Network Camera with 1.9 metres Ethernet cable
Model Name or Number:	M3006-V
Serial Number:	ACCC8E010D11

Brand Name:	AXIS
Description:	Network Camera with 1.9 metres Ethernet cable
Model Name or Number:	M3006-V
Serial Number:	ACCC8E010D72

Support Equipment (continued)

Brand Name:	AXIS
Description:	Network Camera with 1.9 metres Ethernet cable
Model Name or Number:	M3006-V
Serial Number:	ACCC8E010D64

Brand Name:	AXIS
Description:	Network Camera with 1.9 metres Ethernet cable
Model Name or Number:	M3006-V
Serial Number:	ACCC8E010D70

Brand Name:	AXIS
Description:	Network Camera with 1.9 metres Ethernet cable
Model Name or Number:	M3006-V
Serial Number:	ACCC8E010D66

Brand Name:	AXIS
Description:	Network Camera with 1.9 metres Ethernet cable
Model Name or Number:	M3006-V
Serial Number:	ACCC8E010CAC

Brand Name:	AXIS
Description:	Network Camera with 1.9 metres Ethernet cable
Model Name or Number:	M3006-V
Serial Number:	ACCC8E010D7C

Brand Name:	AXIS
Description:	Network Camera with 1.9 metres Ethernet cable
Model Name or Number:	M3006-V
Serial Number:	ACCC8E010D2D

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 the RF chipset manufacturer's 'wl' development tool. This was run from within the terminal application on the EUT. The application was used to enable continuous transmission, select the test channels, data rates, modulation schemes. The country code *XT1990* was used to load the appropriate power settings as defined by the customer.
- For AC conducted emissions, radiated emissions and band edge radiated emissions the EUT's hard drive was forced to operate in a manner representative of a worst case real life operating mode. Data were streamed and stored in the EUT's hard drive. This was done using test commands via *PuTTY Release 0.63*. Test instructions were supplied by the customer in document *test_helpu4.txt*, archived on the UL VS LTD IT server. The network cameras were connected to the EUT via Ethernet cables.
- All supported modes and channel widths were initially investigated on one channel. The modes that produced the highest power and widest bandwidth for all bands were:
 - Highest power and power spectral density
 - 802.11a – 64QAM / 48 Mbit/s
 - 802.11n HT20 – QPSK / 19.5 Mbit/s / MCS2
 - Widest bandwidth
 - 802.11a – BPSK / 9 Mbit/s
 - 802.11n HT20 – QPSK / 19.5 Mbit/s / MCS2

Measurements were performed in these worst case modes. Pre-scan results for all other modes are archived on the UL VS LTD IT server and available for inspection if required.

- EUT was equipped with a Hirose Electric Europe B.V. MS-180 series female RF connector. For conducted tests, an RF cable with SMA and MS-180 series RF male connector was used to connect the EUT to a spectrum analyser. The cable's loss was incorporated into the measurement results.
- Transmitter spurious emissions were performed with the EUT transmitting with 802.11a / 48 Mbit/s. 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.
- Transmitter radiated spurious emissions and AC conducted emissions tests, were performed with the EUT transmitting with 802.11a / 48 Mbit/s. All EUT ports were terminated, employing all available accessories.
- Test sample with Serial Number 00408C1866C1 was used for 26 dB bandwidth, duty cycle, maximum output power and peak power spectral density tests.
- Test sample with Serial Number ACCC8E35FB65 was used for AC conducted emissions, band edge radiated emissions and radiated spurious emissions tests below 1 GHz.
- Test sample with Serial Number 00408C1866C1 was used for radiated spurious emissions tests above 1 GHz.

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 AC Conducted Spurious Emissions

Test Summary:

Test Engineer:	Georgios Vrezas	Test Date:	03 March 2016
Test Sample Serial Number:	ACCC8E35FB65		

FCC Reference:	Part 15.207
Test Method Used:	ANSI C63.10 Section 6.2 / FCC KDB 174176 and Notes below

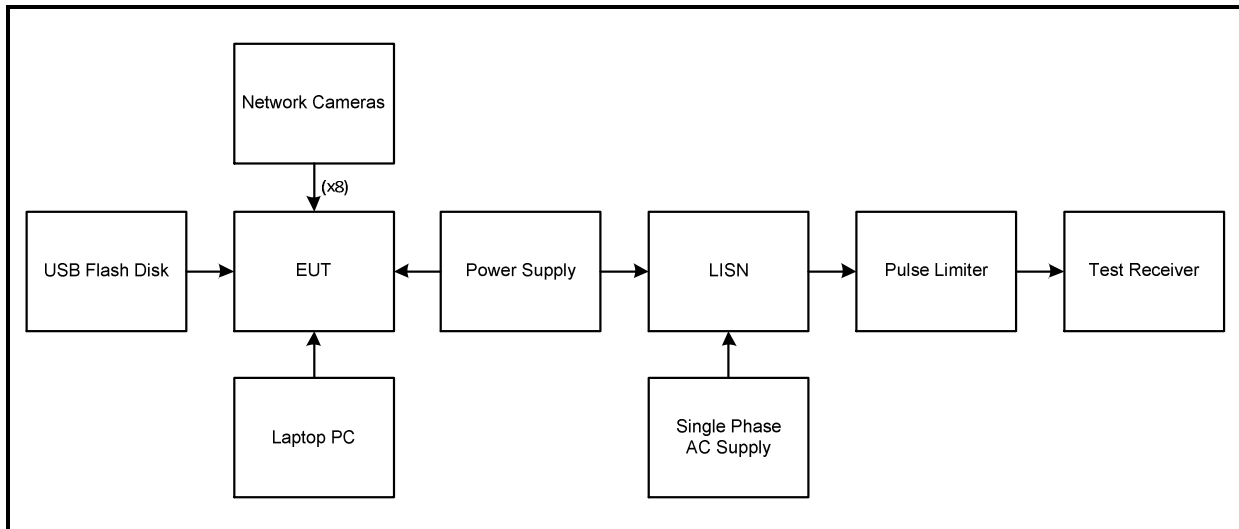
Environmental Conditions:

Temperature (°C):	22
Relative Humidity (%):	35

Note(s):

1. The EUT was connected to a power supply. The power supply was connected to 120 VAC 60 Hz single phase supply via a LISN.
2. In accordance with KDB 174176 Q4, tests were also performed with the power supply connected to a 240 VAC 60 Hz single phase supply via a LISN.
3. A pulse limiter was fitted between the LISN and the test receiver.
4. Pre-scans were performed and markers placed on the highest live and neutral measured levels. Final measurements were performed on the marker frequencies and the results entered into the tables below.

Test setup:



Transmitter AC Conducted Spurious Emissions (continued)**Results: Live / Quasi Peak / 120 VAC 60 Hz**

Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
0.267	Live	32.5	61.2	28.7	Complied
0.483	Live	26.8	56.3	29.5	Complied
2.351	Live	33.0	56.0	23.0	Complied
15.230	Live	48.1	60.0	11.9	Complied
15.774	Live	47.6	60.0	12.4	Complied
16.580	Live	50.0	60.0	10.0	Complied

Results: Live / Average / 120 VAC 60 Hz

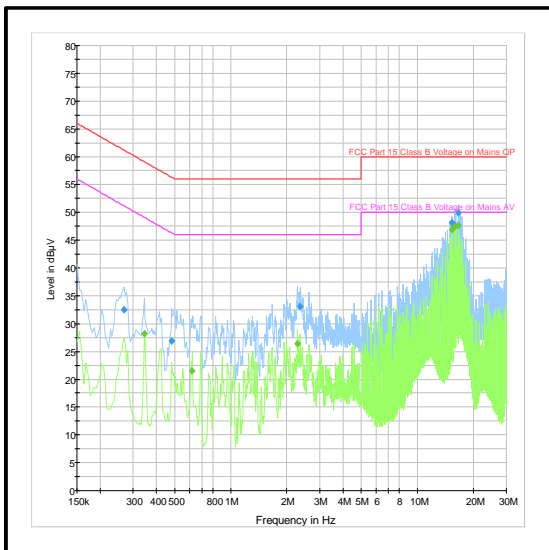
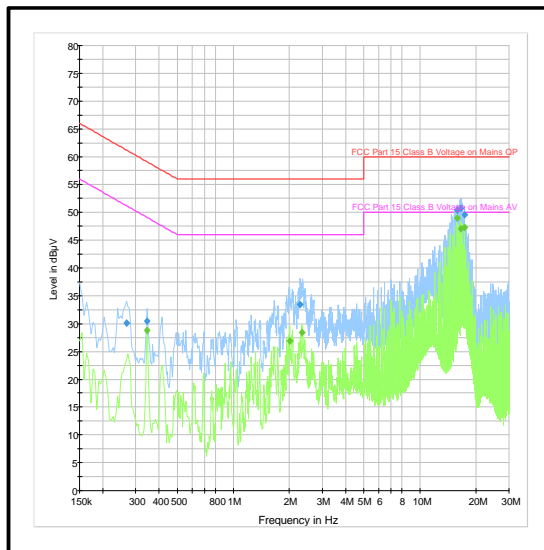
Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
0.344	Live	28.1	49.1	21.0	Complied
0.618	Live	21.5	46.0	24.5	Complied
2.279	Live	26.3	46.0	19.7	Complied
15.230	Live	46.9	50.0	3.1	Complied
15.770	Live	47.4	50.0	2.6	Complied
16.580	Live	47.6	50.0	2.4	Complied

Results: Neutral / Quasi Peak / 120 VAC 60 Hz

Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
0.267	Neutral	30.1	61.2	31.1	Complied
0.344	Neutral	30.4	59.1	28.7	Complied
2.283	Neutral	33.4	56.0	22.6	Complied
15.765	Neutral	50.4	60.0	9.6	Complied
16.575	Neutral	50.8	60.0	9.2	Complied
17.381	Neutral	49.5	60.0	10.5	Complied

Results: Neutral / Average / 120 VAC 60 Hz

Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
0.344	Neutral	28.7	49.1	20.4	Complied
2.004	Neutral	26.9	46.0	19.1	Complied
2.337	Neutral	28.5	46.0	17.5	Complied
15.765	Neutral	48.9	50.0	1.1	Complied
16.575	Neutral	47.1	50.0	2.9	Complied
17.381	Neutral	47.2	50.0	2.8	Complied

Transmitter AC Conducted Spurious Emissions (continued)**Live / 120 VAC 60 Hz****Neutral / 120 VAC 60 Hz**

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

Transmitter AC Conducted Spurious Emissions (continued)**Results: Live / Quasi Peak / 240 VAC 60 Hz**

Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
0.366	Live	39.1	58.6	19.5	Complied
0.798	Live	34.3	56.0	21.7	Complied
2.607	Live	35.9	56.0	20.1	Complied
15.792	Live	49.6	60.0	10.4	Complied
16.062	Live	48.5	60.0	11.5	Complied
16.598	Live	49.7	60.0	10.3	Complied

Results: Live / Average / 240 VAC 60 Hz

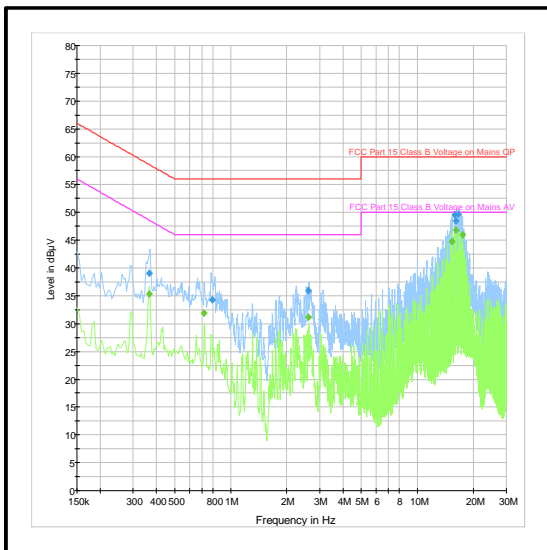
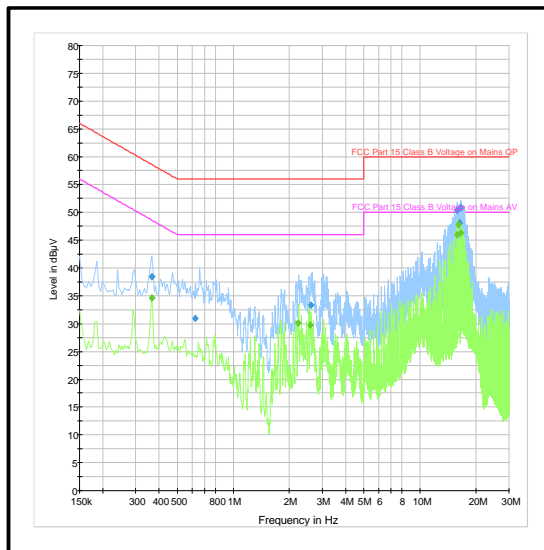
Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
0.366	Live	35.3	48.6	13.3	Complied
0.722	Live	31.9	46.0	14.1	Complied
2.607	Live	31.1	46.0	14.9	Complied
15.257	Live	44.7	50.0	5.3	Complied
16.062	Live	46.8	50.0	3.2	Complied
17.408	Live	45.9	50.0	4.1	Complied

Results: Neutral / Quasi Peak / 240 VAC 60 Hz

Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
0.366	Neutral	38.4	58.6	20.2	Complied
0.627	Neutral	31.0	56.0	25.0	Complied
2.594	Neutral	33.3	56.0	22.7	Complied
15.774	Neutral	50.4	60.0	9.6	Complied
16.314	Neutral	48.1	60.0	11.9	Complied
16.580	Neutral	50.9	60.0	9.1	Complied

Results: Neutral / Average / 240 VAC 60 Hz

Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
0.366	Neutral	34.6	48.6	14.0	Complied
2.216	Neutral	30.1	46.0	15.9	Complied
2.576	Neutral	29.8	46.0	16.2	Complied
15.774	Neutral	45.9	50.0	4.1	Complied
16.044	Neutral	47.8	50.0	2.2	Complied
16.584	Neutral	46.3	50.0	3.7	Complied

Transmitter AC Conducted Spurious Emissions (continued)**Live / 240 VAC 60 Hz****Neutral / 240 VAC 60 Hz**

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

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1625	Thermohygrometer	JM Handelspunkt	890603/002	None stated	11 Jan 2017	12
A067	LISN	Rohde & Schwarz	ESH3-Z5	890603/002	27 Aug 2016	12
A1829	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100671	26 Mar 2016	12
M1263	Test Receiver	Rohde & Schwarz	ESIB7	100265	16 Oct 2016	12
S0539	Variable AC Power Supply	Kikusui	PCR 1000L	13010170	Calibrated before use	-
M1229	Multimeter	Fluke	179	87640015	23 Apr 2016	12

5.2.2. Transmitter 26 dB Emission Bandwidth**Test Summary:**

Test Engineer:	Georgios Vrezas	Test Date:	21 January 2016
Test Sample Serial Number:	00408C1866C1		

FCC Reference:	Part 15.403(i)
Test Method Used:	KDB 789033 D02 Section II.C.1.

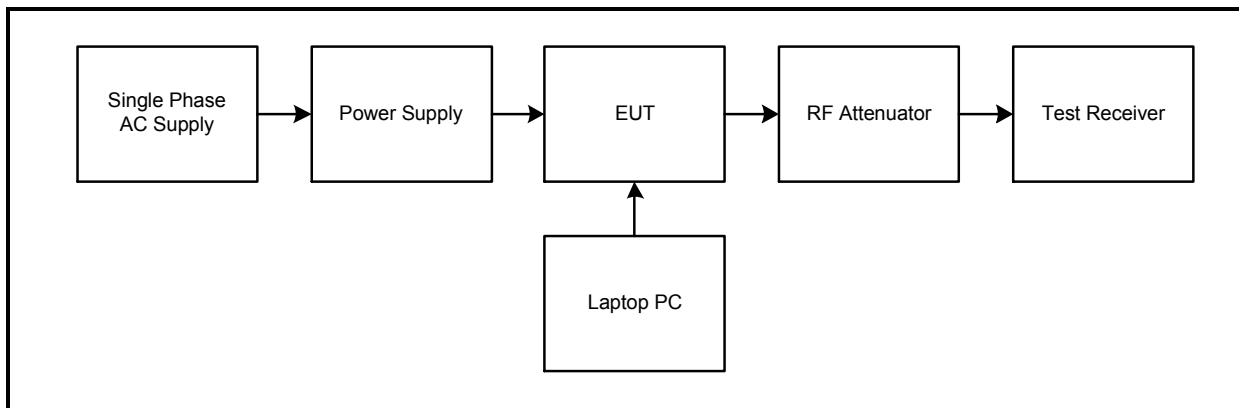
Environmental Conditions:

Temperatures (°C):	25
Relative Humidity (%):	31

Note(s):

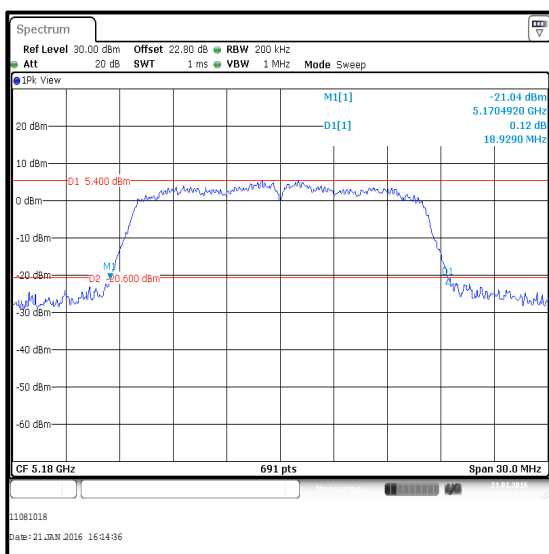
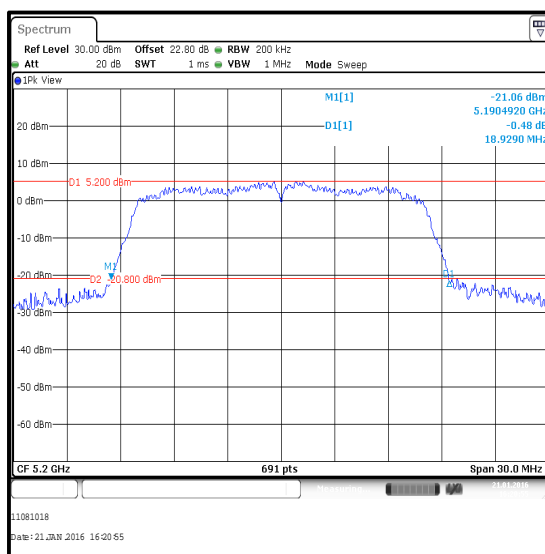
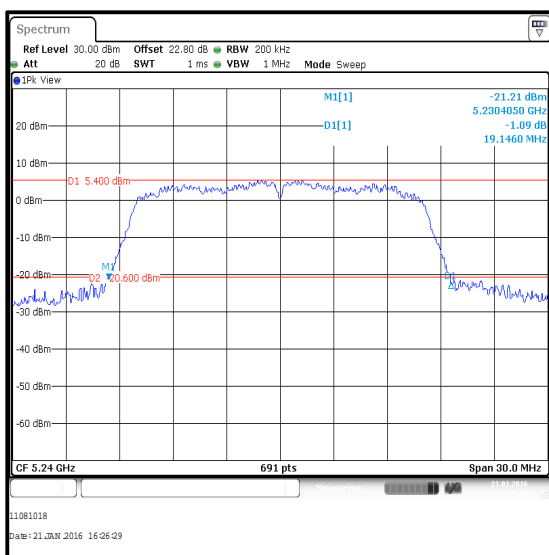
- All configurations supported by the EUT were investigated on the one channel in accordance with KDB 789033 Section II.C.1. Emission Bandwidth (EBW) test procedure. The data rates that produced the widest bandwidth and therefore deemed worst case were:
 - 802.11a – BPSK / 9 Mbit/s
 - 802.11n HT20 – QPSK / 19.5 Mbit/s / MCS2 (GI = 800 ns)
- Final measurements were performed in each supported operating band using the above configurations on the bottom, middle and top or single channels.
- Plots for all data rates are archived on the UL VS LTD IT server and available for inspection upon request.
- The test receiver was connected to the RF port on the EUT using suitable attenuation and RF cables.
- For the power measurements in this report, the highest power output level was recorded when the EUT was configured as:
 - 802.11a – 64QAM / 48 Mbit/s
 - 802.11n HT20 – QPSK / 19.5 Mbit/s / MCS2 (GI = 800 ns)

Emission bandwidth plots for 802.11a - 64QAM / 48 Mbit/s configuration have been included as 'Reference plots' at the end of this section.

Test setup:

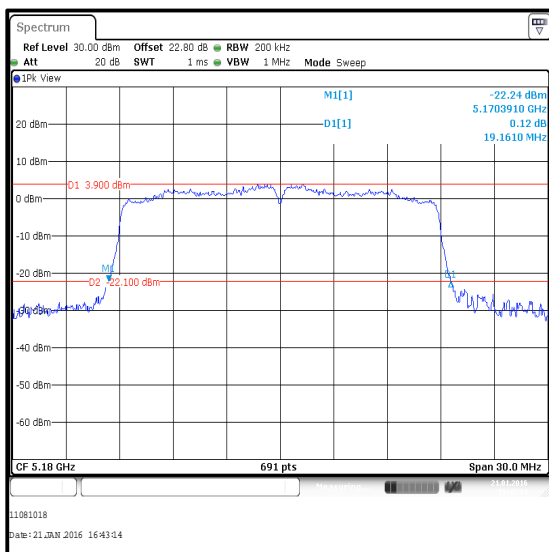
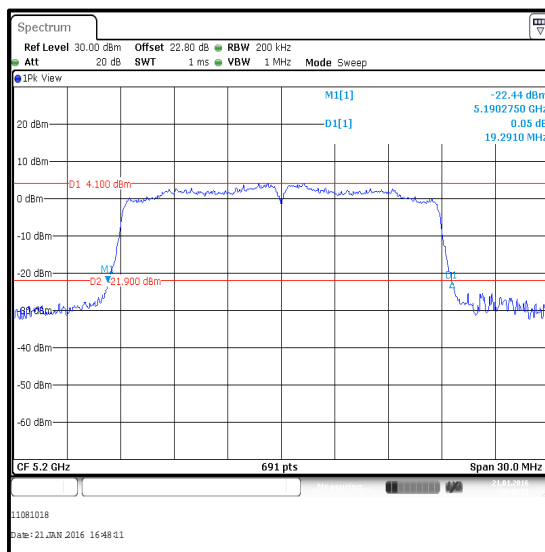
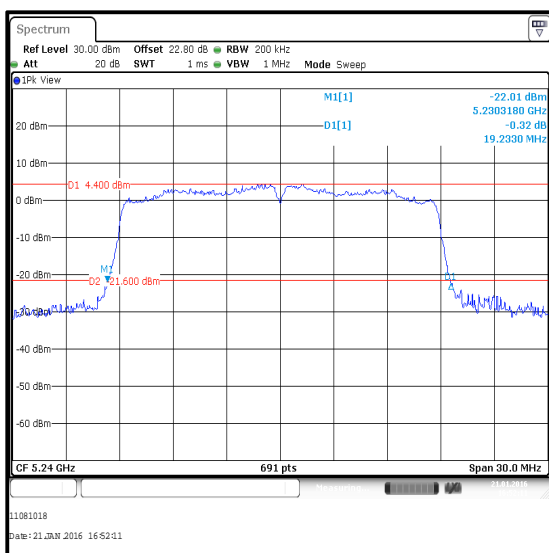
Transmitter 26 dB Emission Bandwidth (continued)**Results: 802.11a / 20 MHz**

Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbit/s	26 dB Emission Bandwidth (MHz)
Bottom	5180	BPSK	9	18.929
Middle	5200	BPSK	9	18.929
Top	5240	BPSK	9	19.146

**Bottom Channel****Middle Channel****Top Channel**

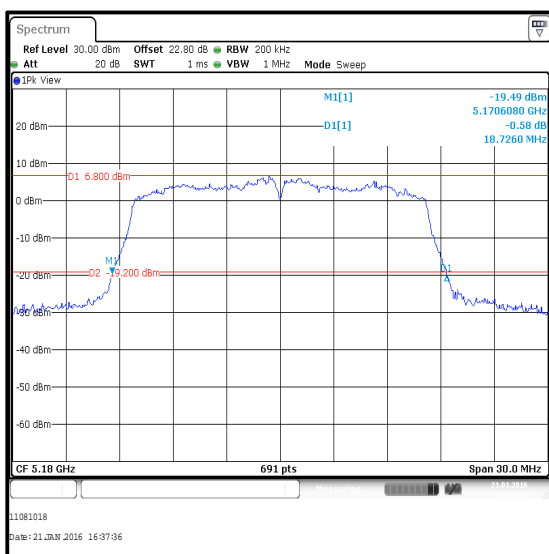
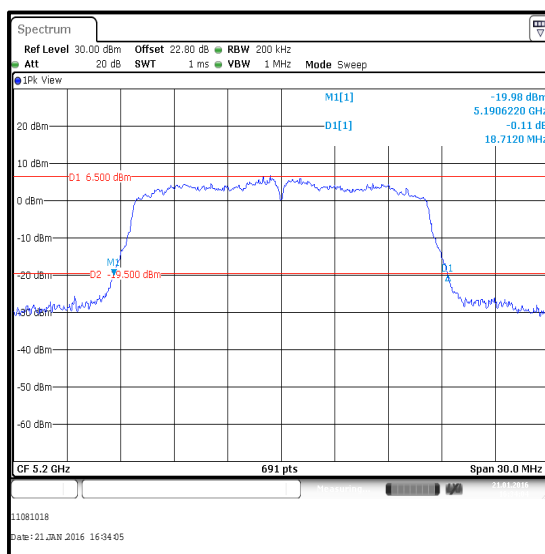
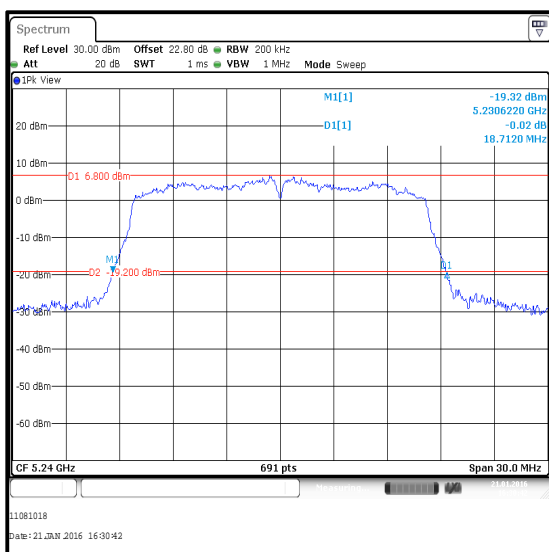
Transmitter 26 dB Emission Bandwidth (continued)**Results: 802.11n / 20 MHz**

Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbit/s / MCS	26 dB Emission Bandwidth (MHz)
Bottom	5180	QPSK	19.5 / 2	19.161
Middle	5200	QPSK	19.5 / 2	19.291
Top	5240	QPSK	19.5 / 2	19.233

**Bottom Channel****Middle Channel****Top Channel**

Transmitter 26 dB Emission Bandwidth (continued)**Results: Reference Plots / 802.11a / 20 MHz**

Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbit/s	26 dB Emission Bandwidth (MHz)
Bottom	5180	64QAM	48	18.726
Middle	5200	64QAM	48	18.712
Top	5240	64QAM	48	18.712

**Bottom Channel****Middle Channel****Top Channel**

Transmitter 26 dB Emission Bandwidth (continued)**Test Equipment Used:**

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1785	Thermohygrometer	JM Handelspunkt	30.5015.13	None stated	23 Apr 2016	12
M1873	Signal Analyser	Rohde & Schwarz	FSV30	103074	03 Jul 2016	12
A1999	Attenuator	Huber + Suhner AG	6820.17.B	07101	Calibrated before use	-
M1252	Signal Generator	Hewlett Packard	83640A	3119A00489	26 Oct 2017	24

5.2.3. Transmitter Duty Cycle**Test Summary:**

Test Engineer:	Georgios Vrezas	Test Date:	21 January 2016
Test Sample Serial Number:	00408C1866C1		

FCC Reference:	Part 15.35(c)
Test Method Used:	KDB 789033 D02 Section II.B.2.b)

Environmental Conditions:

Temperature (°C):	25
Relative Humidity (%):	31

Note(s):

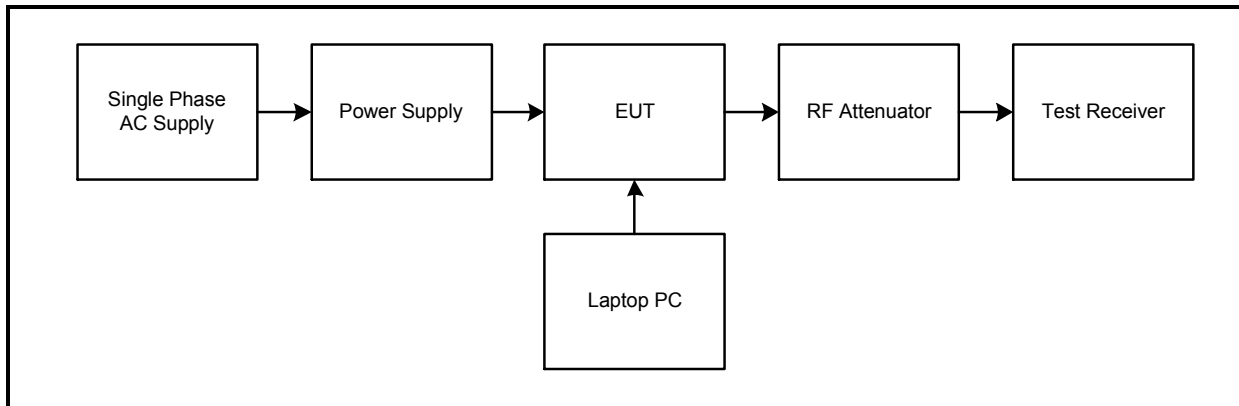
1. In order to assist with the determination of the conducted power and PSD levels, measurements were made of duty cycle to determine the transmission duration and the silent period time of the transmitter. The transmitter duty cycle was measured using a spectrum analyser in the time domain and calculated as follows:

$$10 \log (1 / (\text{On Time} / [\text{Period or } 100 \text{ ms whichever is the lesser}])).$$

$$802.11a / 48 \text{ Mbit/s duty cycle: } 10 \log (1 / (204.058/223.188)) = 0.4$$

$$802.11n \text{ HT20} / 19.5 \text{ Mbit/s} / \text{MCS0 duty cycle: } 10 \log (1 / (481.160/499.130)) = 0.2$$

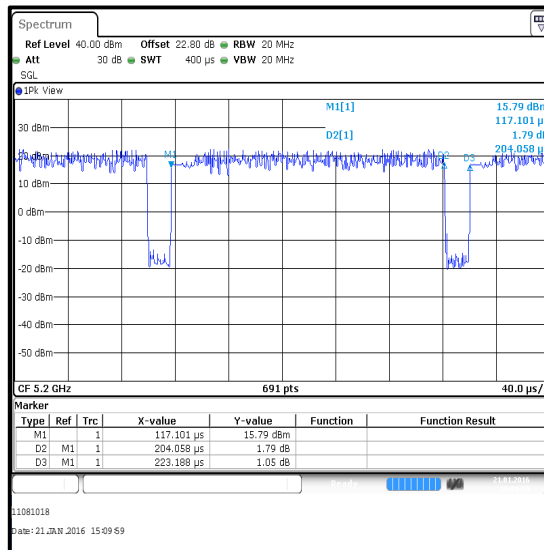
2. Plots below are for data rates with a duty cycle less than 98%. Results for all other modes are archived on the UL VS LTD IT server and available for inspection if required.

Test setup:

Transmitter Duty Cycle (continued)**Results: 802.11a / 20 MHz / 48 Mbit/s**

Pulse Duration (μ s)	Duty Cycle (dB)
204.058	0.4

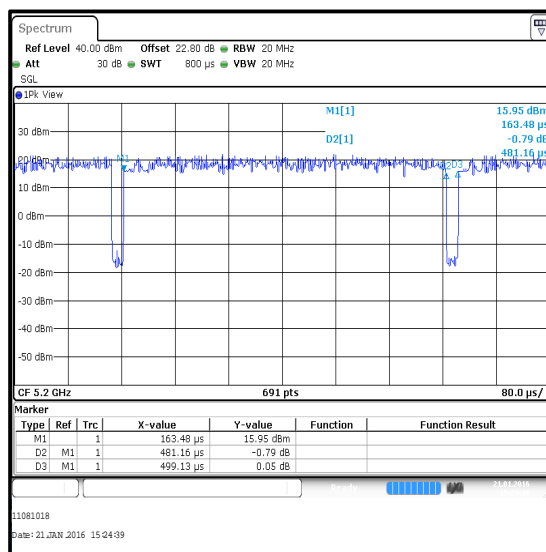
Period (μ s)
223.188



Transmitter Duty Cycle (continued)**Results: 802.11n / 20 MHz / 19.5 Mbit/s / MCS2**

Pulse Duration (μ s)	Duty Cycle (dB)
481.160	0.2

Period (μ s)
499.130

**Test Equipment Used:**

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1785	Thermohygrometer	JM Handelspunkt	30.5015.13	None stated	23 Apr 2016	12
M1873	Signal Analyser	Rohde & Schwarz	FSV30	103074	03 Jul 2016	12
A1999	Attenuator	Huber + Suhner AG	6820.17.B	07101	Calibrated before use	-
M1252	Signal Generator	Hewlett Packard	83640A	3119A00489	26 Oct 2017	24

5.2.4. Transmitter Maximum Conducted Output Power**Test Summary:**

Test Engineer:	Georgios Vrezas	Test Dates:	22 January 2016 & 03 April 2016
Test Sample Serial Number:	00408C1866C1		

FCC Reference:	Part 15.407(a)(1)(ii)
Test Methods Used:	KDB 789033 D02 Section II.E.2.b) & Section II.E.2.d)

Environmental Conditions:

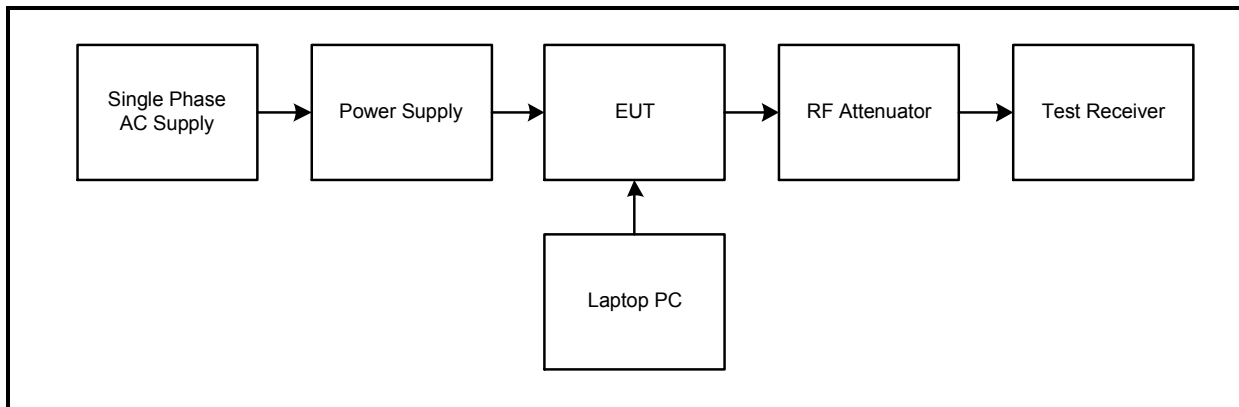
Temperature (°C):	23 to 24
Relative Humidity (%):	32 to 35

Note(s):

- The duty cycle was <98% and measurements were performed in accordance with FCC KDB 789033 II.E.2.d) Method SA-2. The duty cycle calculated in Section 5.2.3 of this test report was added to the measured power in order to compute the average power during the actual transmission time.
- All supported modes and channel widths were initially investigated on one channel. The modes that produced the highest power and therefore deemed worst case were:
 - 802.11a – 64QAM / 48 Mbit/s
 - 802.11n HT20 – QPSK / 19.5 Mbit/s / MCS2 (GI = 800 ns)

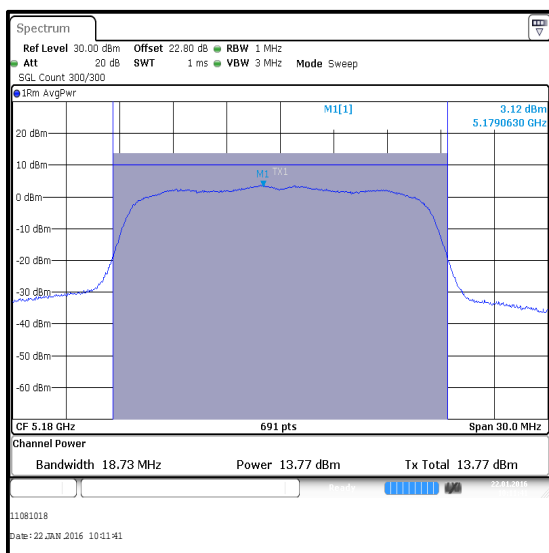
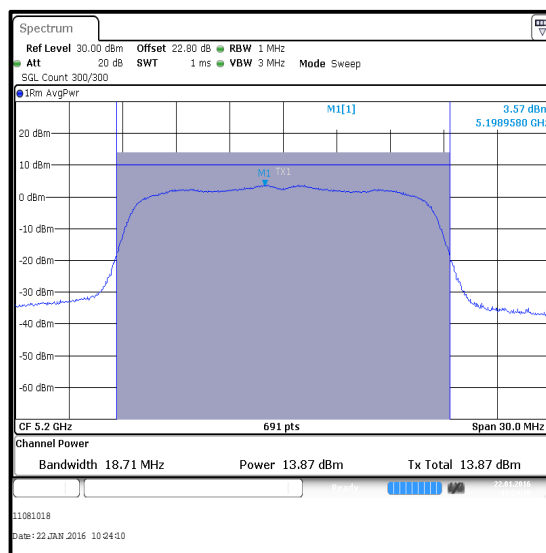
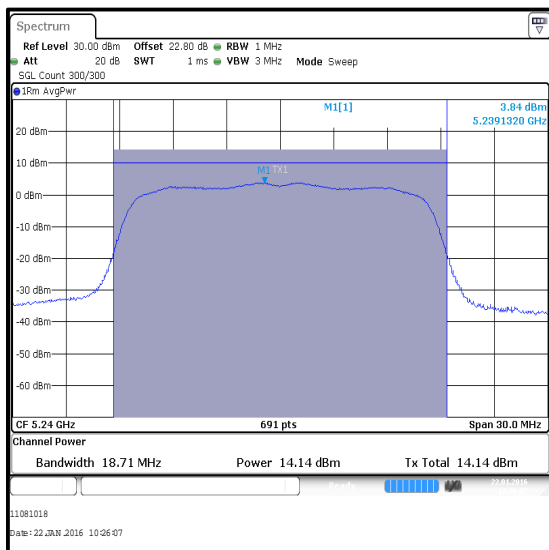
Measurements were then performed in these modes on bottom, middle and top channels.
- The EUT antenna has a gain of <6 dBi.
- The signal analyser was connected to the RF port on the EUT using suitable attenuation and RF cable. An RF level offset was entered on the spectrum analyser to compensate for the loss of the attenuator and RF cables.
- Maximum conducted power was calculated by integrating the spectrum across the EBW of the signal using the signal analyser's band power measurement function with band limits set equal to the EBW. Measurements of EBW can be found in Section 5.2.2 of this test report.
- For the 26 dB bandwidth measurements in this report, the widest bandwidth was recorded when the EUT was configured as:
 - 802.11a – BPSK/ 9 Mbit/s
 - 802.11n HT20 – QPSK / 19.5 Mbit/s / MCS2 (GI = 800 ns)

Power measurement plots for 802.11a - BPSK / 9 Mbit/s configuration have been included as 'Reference plots' at the end of this section. This configuration has >98% duty cycle.

Transmitter Maximum Conducted Output Power (continued)**Test setup:**

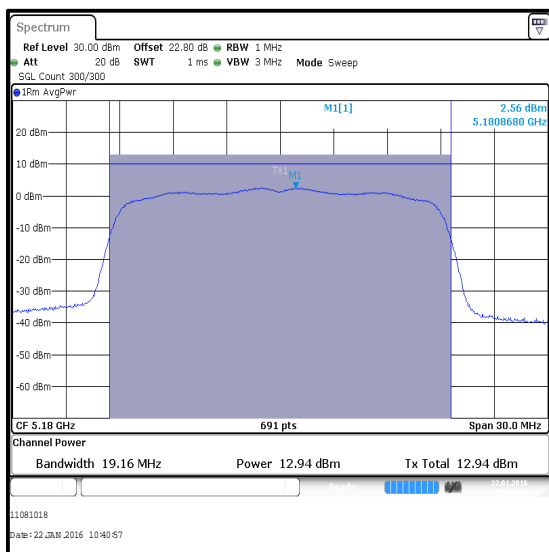
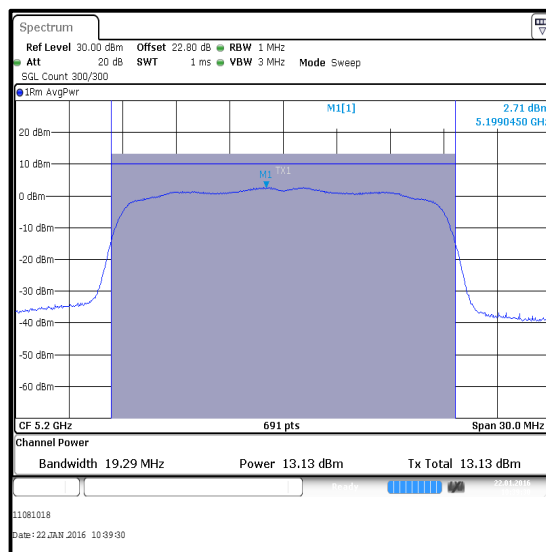
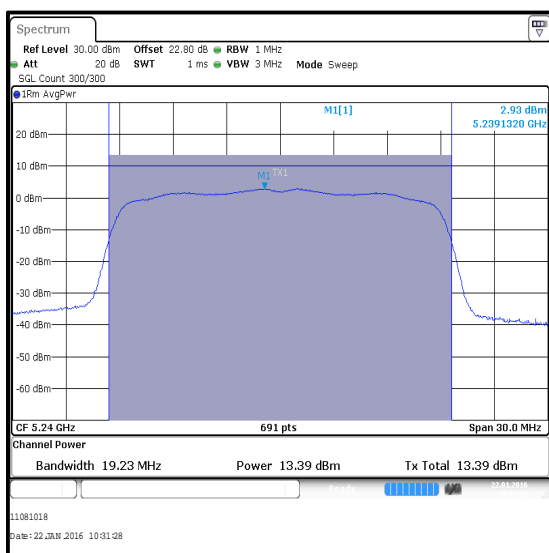
Transmitter Maximum Conducted Output Power (continued)**Results: 802.11a / 20 MHz / 64QAM / 48 Mbit/s**

Channel	Frequency (MHz)	Conducted Power (dBm)	Duty cycle correction factor (dB)	Corrected Conducted Power (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	5180	13.8	0.4	14.2	30.0	15.8	Complied
Middle	5200	13.9	0.4	14.3	30.0	15.7	Complied
Top	5240	14.1	0.4	14.5	30.0	15.5	Complied

**Bottom Channel****Middle Channel****Top Channel**

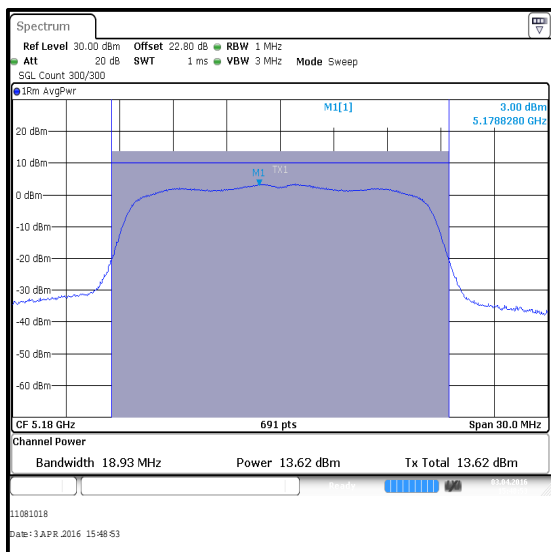
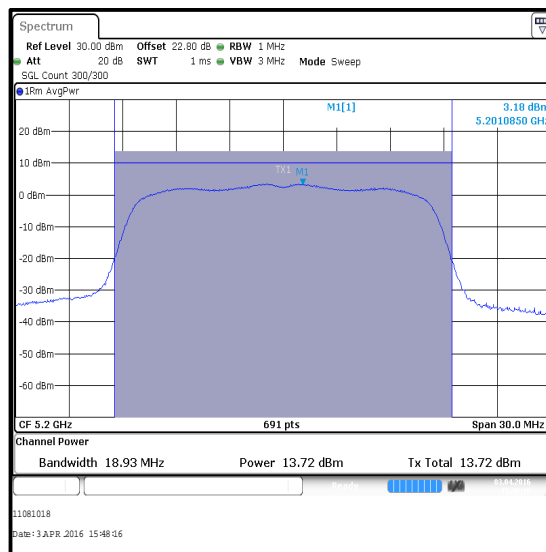
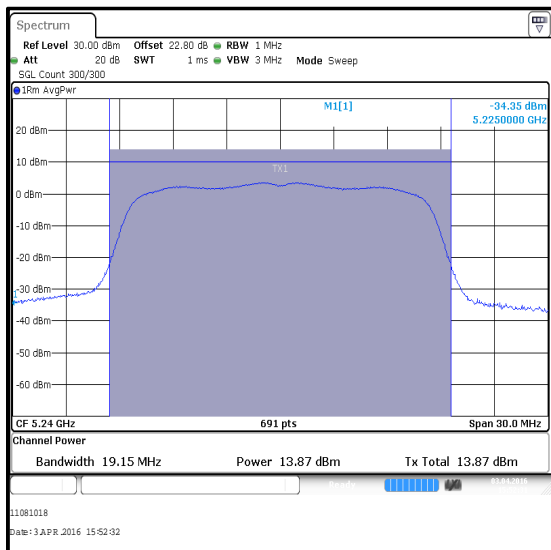
Transmitter Maximum Conducted Output Power (continued)**Results: 802.11n / 20 MHz / QPSK / 19.5 Mbit/s / MCS2**

Channel	Frequency (MHz)	Conducted Power (dBm)	Duty cycle correction factor (dB)	Corrected Conducted Power (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	5180	12.9	0.2	13.1	30.0	16.9	Complied
Middle	5200	13.1	0.2	13.3	30.0	16.7	Complied
Top	5240	13.4	0.2	13.6	30.0	16.4	Complied

**Bottom Channel****Middle Channel****Top Channel**

Transmitter Maximum Conducted Output Power (continued)**Results: Reference Plots / 802.11a / 20 MHz / BPSK / 9 Mbit/s**

Channel	Frequency (MHz)	Conducted Power (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	5180	13.6	30.0	16.4	Complied
Middle	5200	13.7	30.0	16.3	Complied
Top	5240	13.9	30.0	16.1	Complied

**Bottom Channel****Middle Channel****Top Channel**

Transmitter Maximum Conducted Output Power (continued)**Test Equipment Used:**

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1785	Thermohygrometer	JM Handelspunkt	30.5015.13	None stated	23 Apr 2016	12
M1873	Signal Analyser	Rohde & Schwarz	FSV30	103074	03 Jul 2016	12
A1999	Attenuator	Huber + Suhner AG	6820.17.B	07101	Calibrated before use	-
M1252	Signal Generator	Hewlett Packard	83640A	3119A00489	26 Oct 2017	24

5.2.5. Transmitter Maximum Power Spectral Density**Test Summary:**

Test Engineer:	Georgios Vrezas	Test Date:	22 January 2016
Test Sample Serial Number:	00408C1866C1		

FCC Reference:	Part 15.407(a)(1)(ii)
Test Method Used:	KDB 789033 D02 Section II.F. referencing II.E.2.d)

Environmental Conditions:

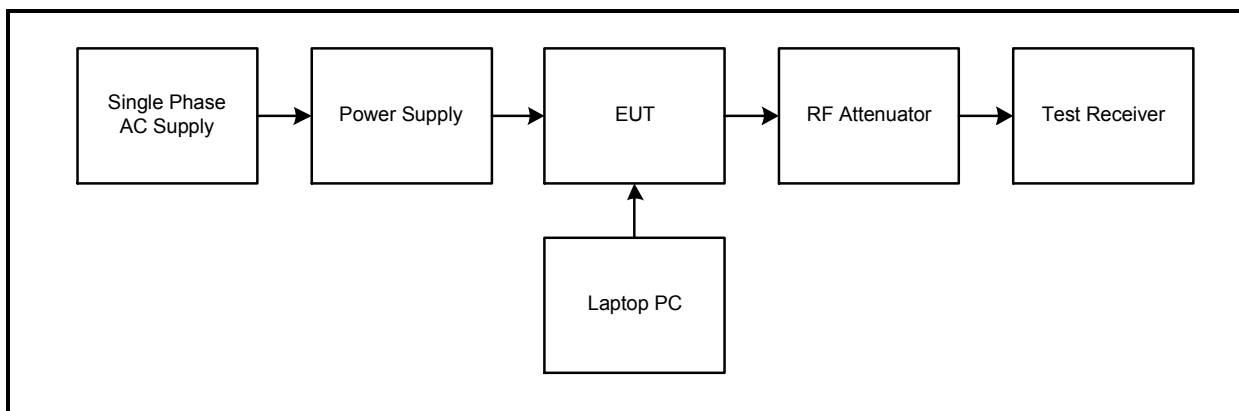
Temperature (°C):	24
Relative Humidity (%):	32

Note(s):

1. Transmitter Maximum Power Spectral Density tests in all bands were performed using a signal analyser in accordance with KDB 789033 II. F referencing II.E.2.d) Method SA-2.
2. All supported modes and channel widths were initially investigated on one channel. The modes that produced the highest power and therefore deemed worst case were:
 - o 802.11a – 64QAM / 48 Mbit/s
 - o 802.11n HT20 – QPSK / 19.5 Mbit/s / MCS2 (GI = 800 ns)

Measurements were then performed in these modes on bottom, middle and top channels in all operating bands.

3. The EUT was transmitting at <98% duty cycle and the calculated duty cycle in Section 5.2.3 was added to the measured maximum power spectral density in order to compute the average maximum power spectral density during the actual transmission time.
4. The EUT antenna has a gain of <6 dBi.
5. The signal analyser was connected to the RF port on the EUT using suitable attenuation and RF cable. An RF level offset was entered on the signal analyser to compensate for the loss of the attenuator and RF cables.
6. Conducted power spectral density plots can be found in Section 5.2.4 of this test report. A marker was placed on the peak of the spectrum and the value was recorded as the maximum power spectral density.

Test setup:

Transmitter Maximum Power Spectral Density (continued)**Results: 802.11a / 20 MHz / 64QAM / 48 Mbit/s**

Channel	Frequency (MHz)	PPSD (dBm /MHz)	Duty cycle correction factor (dB)	Corrected PPSD (dBm /MHz)	Limit (dBm /MHz)	Margin (dB)	Result
Bottom	5180	3.1	0.4	3.5	17.0	13.5	Complied
Middle	5200	3.6	0.4	4.0	17.0	13.0	Complied
Top	5240	3.8	0.4	4.2	17.0	12.8	Complied

Results: 802.11n / 20 MHz / QPSK / 19.5 Mbit/s / MCS2

Channel	Frequency (MHz)	PPSD (dBm /MHz)	Duty cycle correction factor (dB)	Corrected PPSD (dBm /MHz)	Limit (dBm /MHz)	Margin (dB)	Result
Bottom	5180	2.6	0.2	2.8	17.0	14.2	Complied
Middle	5200	2.7	0.2	2.9	17.0	14.1	Complied
Top	5240	2.9	0.2	3.1	17.0	13.9	Complied

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1785	Thermohygrometer	JM Handelspunkt	30.5015.13	None stated	23 Apr 2016	12
M1873	Signal Analyser	Rohde & Schwarz	FSV30	103074	03 Jul 2016	12
A1999	Attenuator	Huber + Suhner AG	6820.17.B	07101	Calibrated before use	-
M1252	Signal Generator	Hewlett Packard	83640A	3119A00489	26 Oct 2017	24

5.2.6. Transmitter Out of Band Radiated Emissions**Test Summary:**

Test Engineer:	David Doyle	Test Date:	08 March 2016
Test Sample Serial Number:	ACCC8E35FB65		

FCC Reference:	Parts 15.407(b)(1),(6),(7) & 15.209(a)
Test Method Used:	KDB 789033 II.G. & ANSI C63.10 Sections 6.3 and 6.5
Frequency Range:	9 kHz to 1000 MHz

Environmental Conditions:

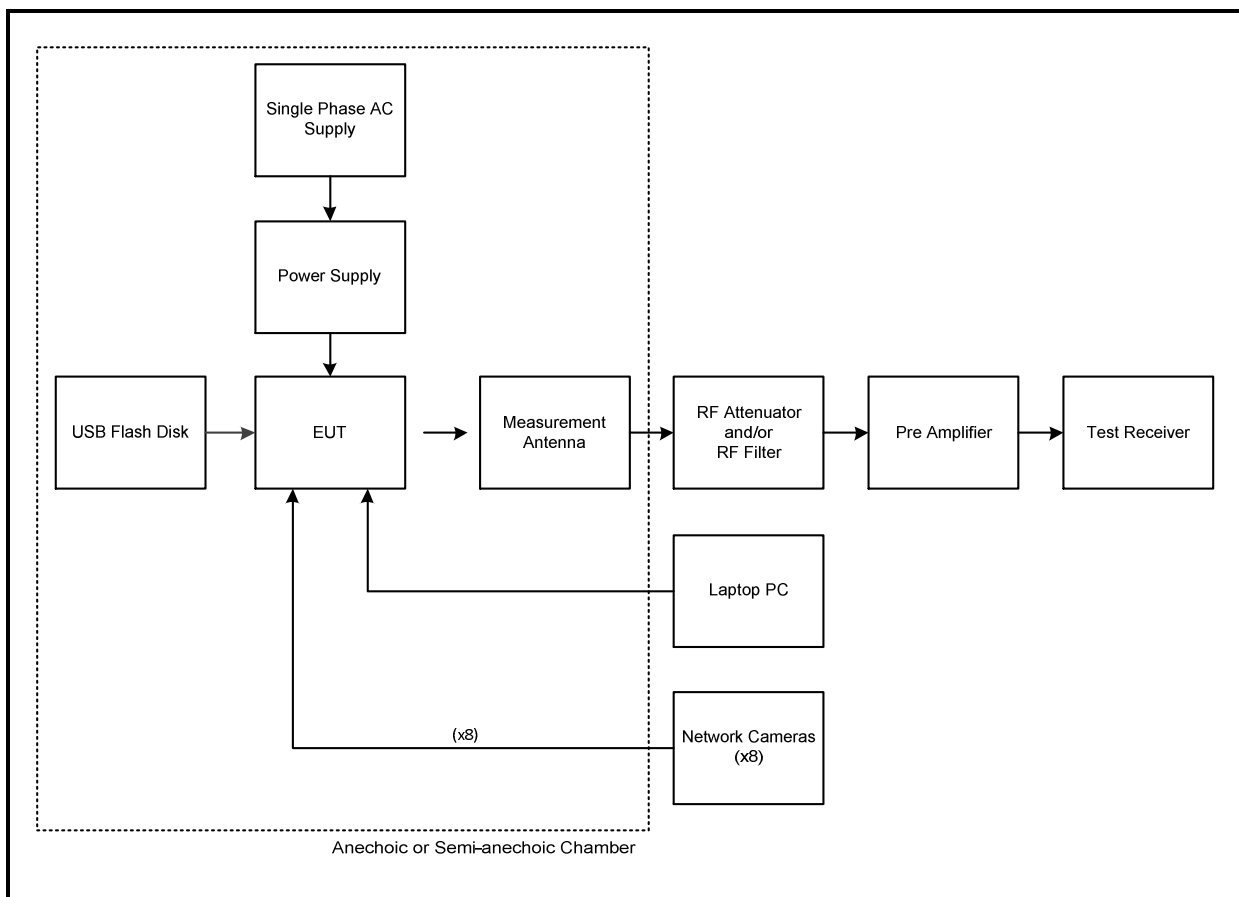
Temperature (°C):	19
Relative Humidity (%):	31

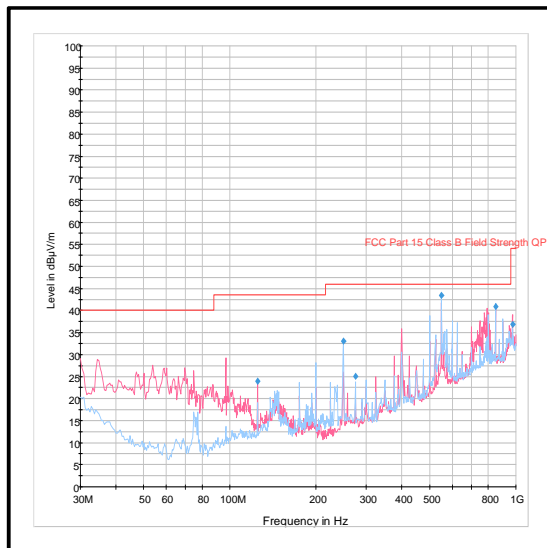
Note(s):

1. Measurements below 1 GHz were performed with the EUT was transmitting with a data rate of 48 Mbit/s (802.11a) as it produced the highest conducted output power 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 5.35 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, i.e. 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. 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.
5. 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.
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.

Results: Middle Channel / Field Strength

Frequency (MHz)	Antenna Polarity	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
124.979	Vertical	23.9	43.5	19.6	Complied
249.970	Horizontal	33.0	46.0	13.0	Complied
974.174	Vertical	36.8	54.0	17.2	Complied

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

Transmitter Out of Band Radiated Emissions (continued)

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

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1958	Thermohygrometer	JM Handelspunkt	30.5015.10	None stated	11 Jan 2017	12
K0001	5m RSE Chamber	Rainford EMC	N/A	N/A	12 Jan 2017	12
M1273	Test Receiver	Rohde & Schwarz	ESIB 26	100275	19 Mar 2016	12
G0543	Amplifier	Sonoma	310N	230801	29 May 2016	3
A259	Antenna	Chase	CBL6111A	1513	09 Apr 2016	12
A1834	Attenuator	Hewlett Packard	8491B	10444	Calibrated before use	-
M1124	Test Receiver	Rohde & Schwarz	ESIB 26	100046	18 Nov 2016	12
M1252	Signal Generator	Hewlett Packard	83640A	3119A00489	26 Oct 2017	24

Transmitter Out of Band Radiated Emissions (continued)**Test Summary:**

Test Engineer:	Georgios Vrezas	Test Dates:	24 January 2016 & 29 January 2016
Test Sample Serial Number:	00408C1866C1		

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

Environmental Conditions:

Temperature (°C):	21 to 22
Relative Humidity (%):	31 to 39

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. i.e. restricted bands of operation.
2. Pre-scans were performed with the EUT transmitting on the middle channel using 802.11a / 48 Mbit/s, as this mode has the highest output power and power spectral density.
3. The final measured value, for the given emission in the field strength 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 ANSI C63.10 Section 6.6.4.3, the frequency and amplitude of the six highest spurious emissions relative to the limit were recorded in the result tables.
7. 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 (continued)**Results: Bottom Channel / EIRP**

Frequency (MHz)	Antenna Polarity	Level (dBm)	Limit (dBm)	Margin (dB)	Result
3466.538	Horizontal	-43.6	-27.0	16.6	Complied

Results: Bottom Channel / Field Strength

Frequency (MHz)	Antenna Polarity	Peak Level (dBμV/m)	Average Limit (dBμV/m)	Margin (dB)	Result
1200.219	Horizontal	51.0	54.0	3.0	Complied
1399.937	Horizontal	49.5	54.0	4.5	Complied
1570.802	Horizontal	52.8	54.0	1.2	Complied
1599.957	Horizontal	50.5	54.0	3.5	Complied
2357.298	Vertical	49.9	54.0	4.1	Complied

Results: Middle Channel / EIRP

Frequency (MHz)	Antenna Polarity	Level (dBm)	Limit (dBm)	Margin (dB)	Result
3466.667	Horizontal	-43.9	-27.0	16.9	Complied

Results: Middle Channel / Field Strength

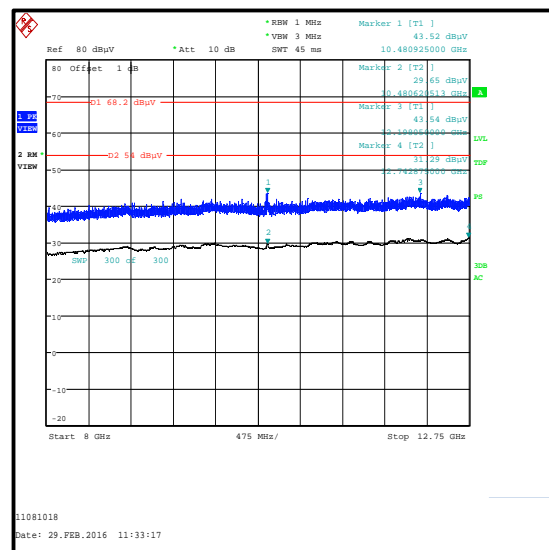
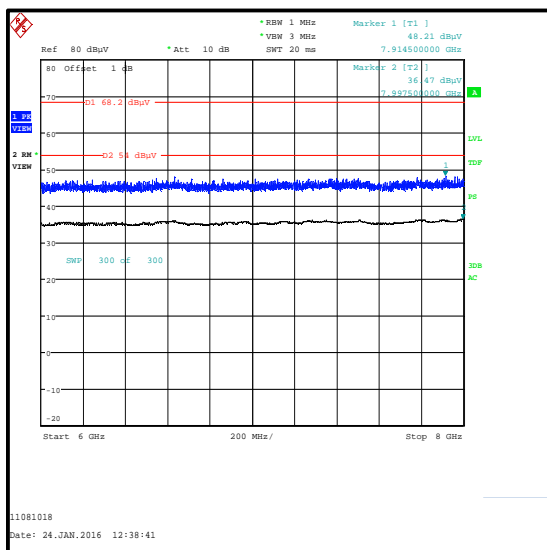
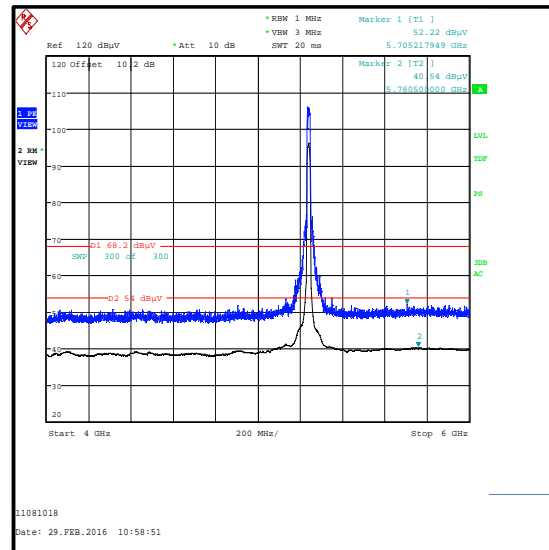
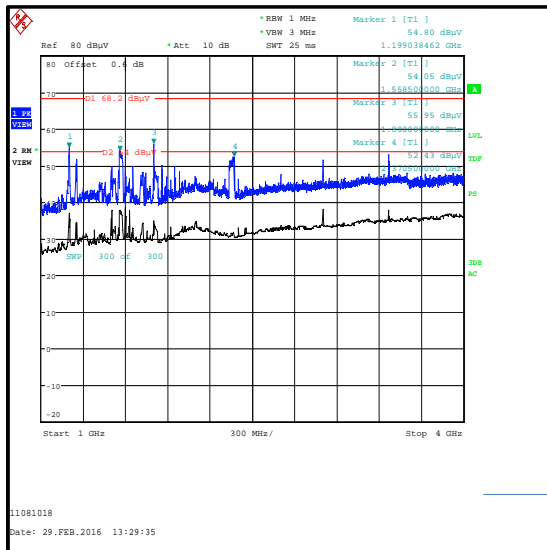
Frequency (MHz)	Antenna Polarity	Peak Level (dBμV/m)	Average Limit (dBμV/m)	Margin (dB)	Result
1200.221	Horizontal	50.8	54.0	3.2	Complied
1399.949	Horizontal	49.5	54.0	4.5	Complied
1570.763	Horizontal	53.1	54.0	0.9	Complied
1599.929	Horizontal	50.0	54.0	4.0	Complied
2357.212	Vertical	50.0	54.0	4.0	Complied

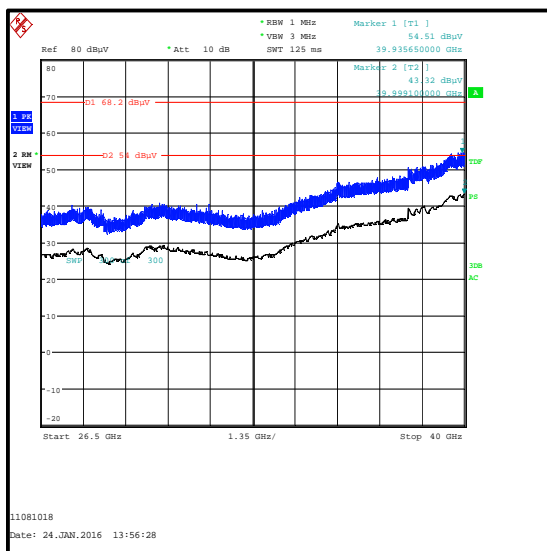
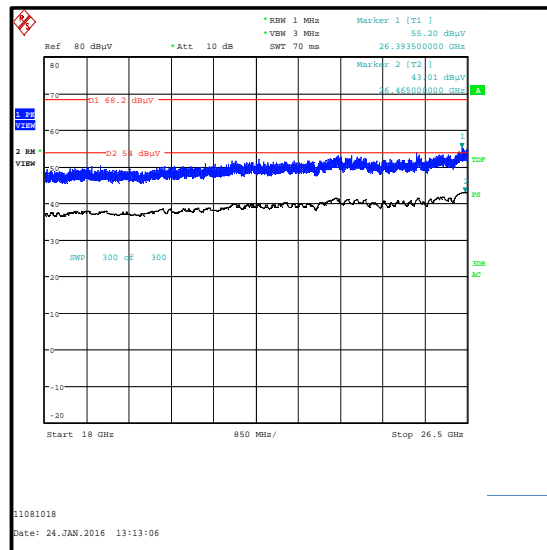
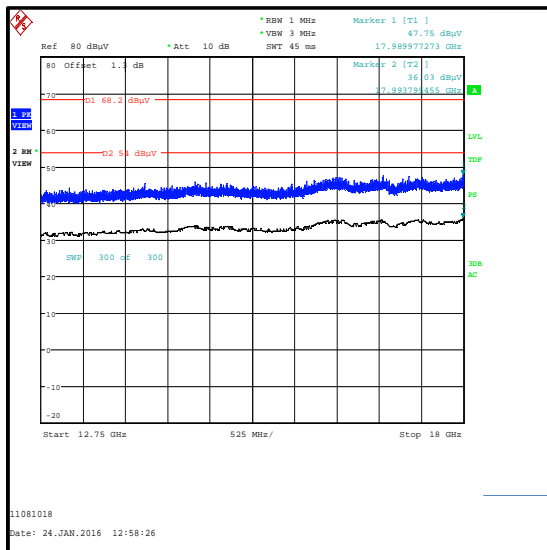
Results: Top Channel / EIRP

Frequency (MHz)	Antenna Polarity	Level (dBm)	Limit (dBm)	Margin (dB)	Result
3466.580	Horizontal	-43.4	-27.0	16.4	Complied

Results: Top Channel / Field Strength

Frequency (MHz)	Antenna Polarity	Peak Level (dBμV/m)	Average Limit (dBμV/m)	Margin (dB)	Result
1200.283	Horizontal	50.4	54.0	3.6	Complied
1399.903	Horizontal	50.0	54.0	4.0	Complied
1570.635	Horizontal	53.4	54.0	0.6	Complied
1599.890	Horizontal	49.7	54.0	4.3	Complied
2357.298	Vertical	50.7	54.0	3.3	Complied

Transmitter Out of Band Radiated Emissions (continued)

Transmitter Out of Band Radiated Emissions (continued)

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

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

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1656	Thermohygrometer	JM Handelspunkt	30.5015.13	None stated	23 Apr 2016	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	21 Dec 2016	12
M1874	Test Receiver	Rohde & Schwarz	ESU26	100553	12 Jun 2016	12
A1534	Pre Amplifier	Hewlett Packard	8449B	3008A00405	19 Dec 2016	12
A1818	Antenna	EMCO	3115	00075692	17 Dec 2016	12
A253	Antenna	Flann Microwave	12240-20	128	17 Dec 2016	12
A254	Antenna	Flann Microwave	14240-20	139	17 Dec 2016	12
A255	Antenna	Flann Microwave	16240-20	519	17 Dec 2016	12
A256	Antenna	Flann Microwave	18240-20	400	17 Dec 2016	12
A436	Antenna	Flann Microwave	20240-20	330	19 Dec 2016	12
A1396	Attenuator	Huber & Suhner	6810.17.B	757987	05 May 2016	12
A1980	High Pass Filter	AtlanTecRF	AFH-06000	09110900303	17 Apr 2016	12
A2134	Low Pass Filter	AtlanTecRF	AFL-05000	300195	17 Apr 2016	12
M1630	Test Receiver	Rohde & Schwarz	ESU40	100233	20 Feb 2016	12
A203	Antenna	Flann Microwave	22240-20	343	19 May 2016	36
A1785	Pre Amplifier	Farran Technology	FLNA-28-30	FTL 6483	12 Jan 2017	12
S0537	DC Power Supply	TTi	EL302D	249928	Calibrated before use	-
M122	Multimeter	Fluke	77	64910017	22 Apr 2016	12
M1623	Thermohygrometer	JM Handelspunkt	30.5015.13	None stated	11 Jan 2017	12
K0001	5m RSE Chamber	Rainford EMC	N/A	N/A	19 Mar 2016	12
G0543	Amplifier	Sonoma	310N	230801	10 Feb 2016	3
M1273	Test Receiver	Rohde & Schwarz	ESIB 26	100275	19 Mar 2016	12
A259	Antenna	Chase	CBL6111	1513	09 Apr 2016	12

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

Test Engineer:	Georgios Vrezas	Test Date:	29 February 2016
Test Sample Serial Number:	ACCC8E35FB65		

FCC Reference:	Parts 15.407(b)(1),(7), 15.205 & 15.209(a)
Test Method Used:	ANSI C63.10 Section 6.10 & KDB 789033 II.G.6

Environmental Conditions:

Temperature (°C):	22
Relative Humidity (%):	31

Note(s):

- Band edge measurements were performed in the EUT modes that produce the highest power and the widest bandwidths. The modes that produced the highest power and widest bandwidth were:
 - 802.11a – BPSK / 9 Mbit/s
 - 802.11a – 64QAM / 48 Mbit/s
 - 802.11n HT20 – QPSK / 19.5 Mbit/s / MCS2 (GI = 800 ns)
- Lower band edge measurements were performed with the EUT transmitting on the bottom channel. Upper band edge measurements were performed with the EUT transmitting on the top channel.
- 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.
- 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.
- For all average measurements of this section, 300 sweeps were used. This satisfies the requirement for the minimum number of sweep points, as stated in KDB 789033 Section II.G.6.c) Method AD (vi). Power averaging was used.
- In accordance with KDB 789033 Section II.G.6.c) Method AD (vii), for average measurements, data rates where the EUT was transmitting <98% duty cycle, the duty cycle correction factor calculated in Section 5.2.3 of this test report was added to the measured result.

Transmitter Band Edge Radiated Emissions (continued)**Results: 802.11a / 20 MHz / BPSK / 9 Mbit/s / Lower Band Edge / Peak**

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5149.679	71.2	74.0	2.8	Complied
5150	70.8	74.0	3.2	Complied

Results: 802.11a / 20 MHz / BPSK / 9 Mbit/s / Lower Band Edge / Average

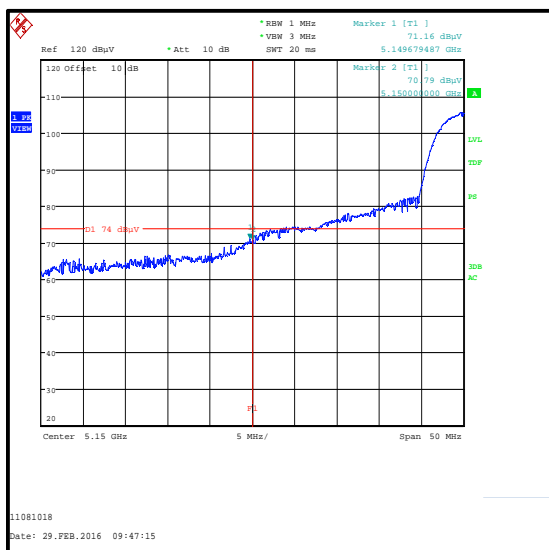
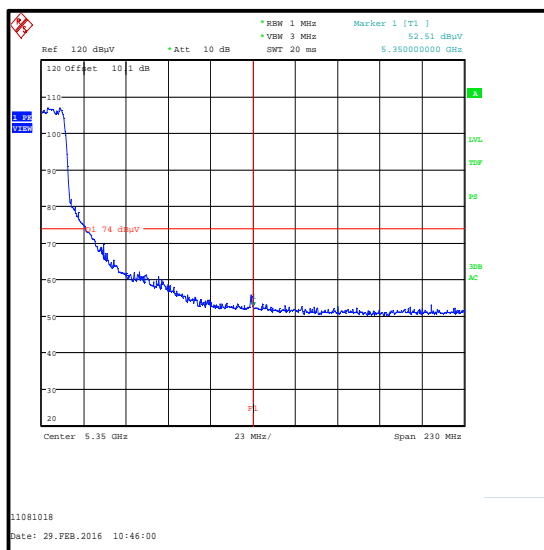
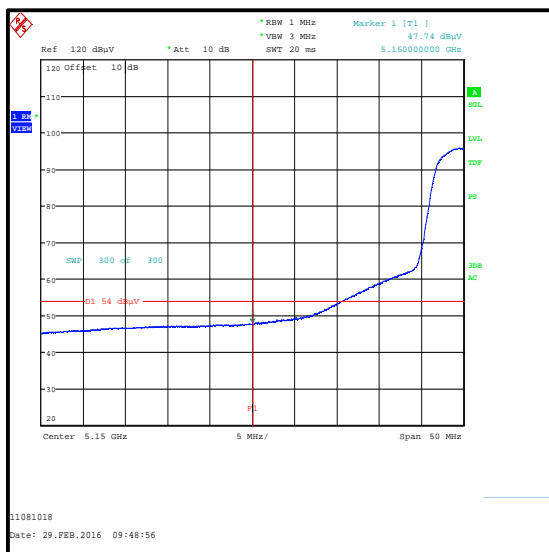
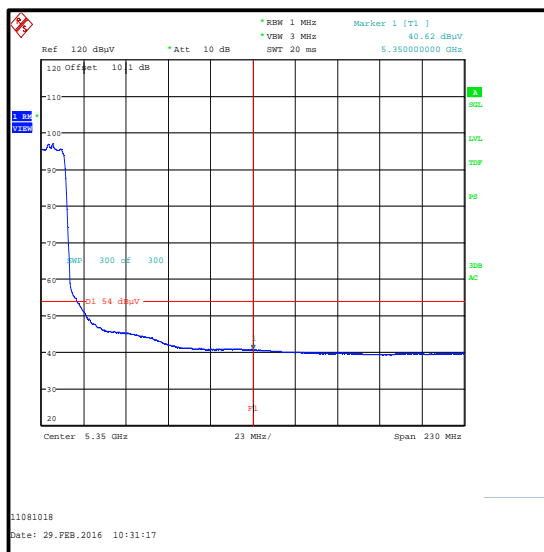
Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5150	47.7	54.0	6.3	Complied

Results: 802.11a / 20 MHz / BPSK / 9 Mbit/s / Upper Band Edge / Peak

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5150	52.5	74.0	21.5	Complied

Results: 802.11a / 20 MHz / BPSK / 9 Mbit/s / Upper Band Edge / Average

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5150	40.6	54.0	13.4	Complied

Transmitter Band Edge Radiated Emissions (continued)**Results: 802.11a / 20 MHz / BPSK / 9 Mbit/s****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 (continued)**Results: 802.11a / 20 MHz / 64QAM / 48 Mbit/s / Lower Band Edge / Peak**

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5148.317	68.2	74.0	5.8	Complied
5150	67.4	74.0	6.6	Complied

Results: 802.11a / 20 MHz / 64QAM / 48 Mbit/s / Lower Band Edge / Average

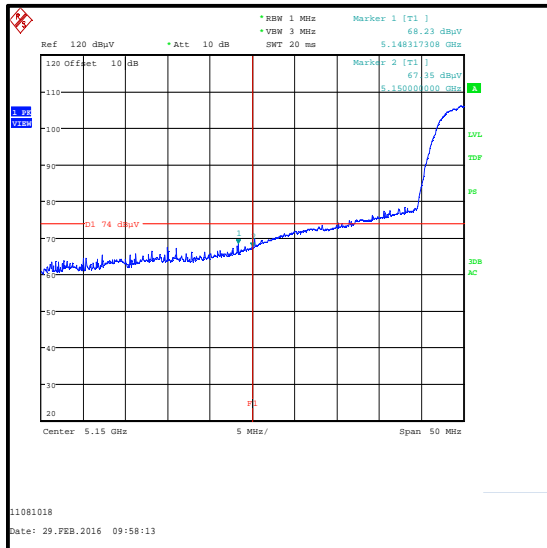
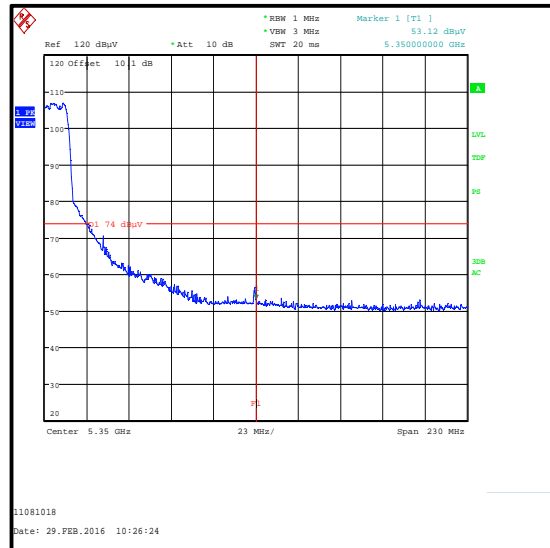
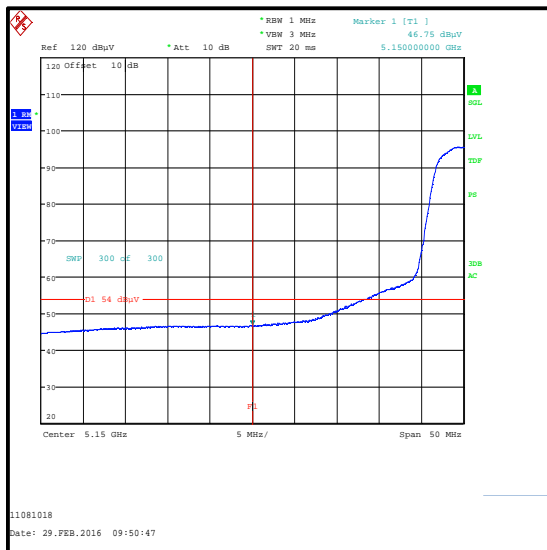
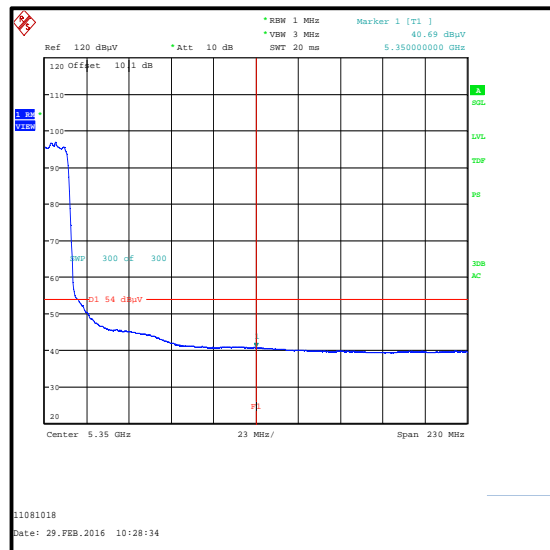
Frequency (MHz)	Level (dB μ V/m)	Duty Cycle correction (dB)	Corrected Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5150	46.8	0.4	47.2	54.0	6.8	Complied

Results: 802.11a / 20 MHz / 64QAM / 48 Mbit/s / Upper Band Edge / Peak

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5350	53.1	74.0	20.9	Complied

Results: 802.11a / 20 MHz / 64QAM / 48 Mbit/s / Upper Band Edge / Average

Frequency (MHz)	Level (dB μ V/m)	Duty Cycle correction (dB)	Corrected Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5350	40.7	0.4	41.1	54.0	12.9	Complied

Transmitter Band Edge Radiated Emissions (continued)**Results: 802.11a / 20 MHz / 64QAM / 48 Mbit/s****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 (continued)**Results: 802.11n / 20 MHz / QPSK / 19.5 Mbit/s / MCS2 / Lower Band Edge / Peak**

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5149.920	71.2	74.0	2.8	Complied
5150	69.6	74.0	4.4	Complied

Results: 802.11n / 20 MHz / QPSK / 19.5 Mbit/s / MCS2 / Lower Band Edge / Average

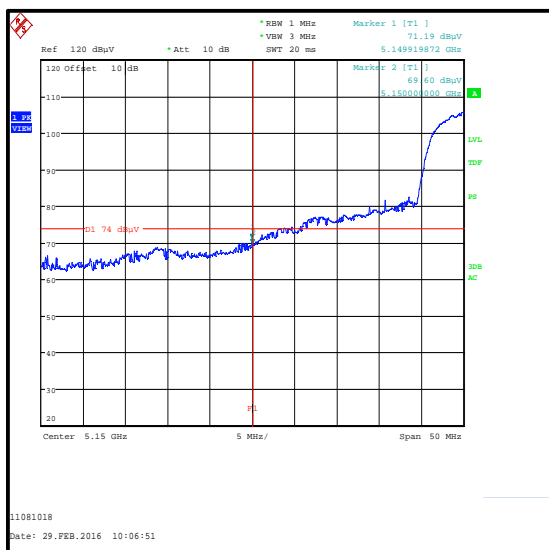
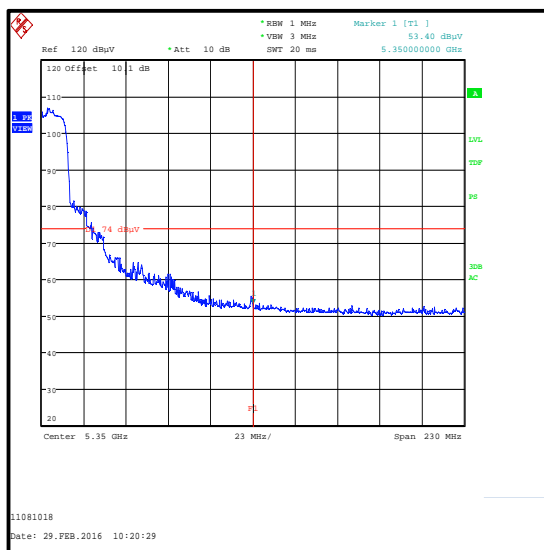
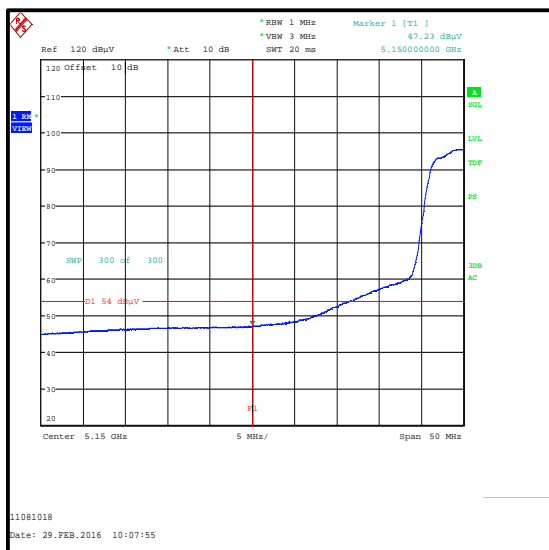
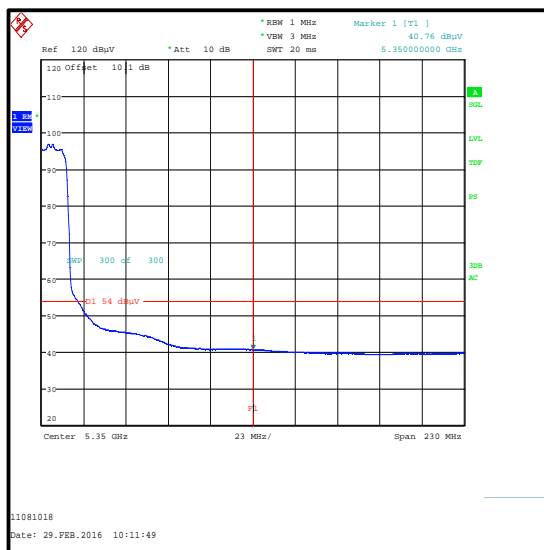
Frequency (MHz)	Level (dB μ V/m)	Duty Cycle correction (dB)	Corrected Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5150	47.2	0.2	47.4	54.0	6.6	Complied

Results: 802.11n / 20 MHz / QPSK / 19.5 Mbit/s / MCS2 / Upper Band Edge / Peak

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5350	53.4	74.0	20.6	Complied

Results: 802.11n / 20 MHz / QPSK / 19.5 Mbit/s / MCS2 / Upper Band Edge / Average

Frequency (MHz)	Level (dB μ V/m)	Duty Cycle correction (dB)	Corrected Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5350	40.8	0.2	41.0	54.0	13.0	Complied

Transmitter Band Edge Radiated Emissions (continued)**Results: 802.11n / 20 MHz / QPSK / 19.5 Mbit/s / MCS2****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 (continued)**Test Equipment Used:**

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1656	Thermohygrometer	JM Handelspunkt	30.5015.13	None stated	23 Apr 2016	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	21 Dec 2016	12
M1874	Test Receiver	Rohde & Schwarz	ESU26	100553	12 Jun 2016	12
A1534	Pre Amplifier	Hewlett Packard	8449B	3008A00405	19 Dec 2016	12
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
AC Conducted Spurious Emissions	0.15 MHz to 30 MHz	95%	±4.69 dB
Duty Cycle	5.15 GHz to 5.25 GHz	95%	±1.14 %
Maximum Conducted Output Power	5.15 GHz to 5.25 GHz	95%	±1.13 dB
Maximum Power Spectral Density	5.15 GHz to 5.25 GHz	95%	±1.13 dB
26 dB Emission Bandwidth	5.15 GHz to 5.25 GHz	95%	±3.92 %
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	7	-	Changed KDB 789033 D02 version from 'v01' to 'v01r02' and issue date to April 8, 2016

--- END OF REPORT ---