TEST REPORT

Test Report No. : UL-RPT-RP10895510JD04A V2.0

Manufacturer	:	Bang & Olufsen a/s
Model No.	:	WUS-AC08V
FCC ID	:	TTUWUSAC08V
Technology	:	WLAN
Test Standard(s)	:	FCC Parts 15.209(a) & 15.247(d)

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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: 25 January 2017

Checked by:

Sarah Williams
Senior Engineer, Radio Laboratory

Company Signatory:

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Senior Engineer, Radio Laboratory
UL VS LTD

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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:	Bang & Olufsen A/S
Address:	Peter Bangs Vej 15 7600 Struer Denmark

2. Summary of Testing

2.1. General Information

Specification Reference:	47CFR15.247
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications): Part 15 Subpart C (Intentional Radiators) - Section 15.247
Specification Reference:	47CFR15.209
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications): Part 15 Subpart C (Intentional Radiators) - Section 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:	10 January 2017 to 22 January 2017

2.2. Summary of Test Results

FCC Reference (47CFR)	Measurement	Result
Part 15.247(d) & 15.209(a)	Transmitter Radiated Emissions	
Part 15.247(d) & 15.209(a)	Transmitter Band Edge Radiated Emissions	
Key to Results = Complied = Did not comply		

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 558074 D01 DTS Meas Guidance v03r05 April 8, 2016
Title:	Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247

2.4. Deviations from the Test Specification

For the measurements contained within this test report, there were no deviations from, additions to, or exclusions from the test specification identified above.

3. Equipment Under Test (EUT)

3.1. Identification of Equipment Under Test (EUT)

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

3.1.1 Host Product Details

Brand Name:	BeoVision Avant 85 NG
Model Name or Number:	BeoVision Avant 85 NG
Test Sample Serial Number:	92997 *(Radiated sample)*
Hardware Version:	8009004
Software Version:	1.0.66

Description:	AC power cable
Brand Name:	Not marked or stated
Model Name or Number:	Not marked or stated
Serial Number:	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 85“ 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

Technology Tested:	WLAN (IEEE 802.11b,g,n) / Digital Transmission System		
Type of Unit:	Transceiver		
Modulation Type:	DBPSK, DQPSK, BPSK, QPSK, 16QAM & 64QAM		
Data Rates:	802.11b (SISO)	1, 2, 5.5 & 11 Mbps	
	802.11g	6, 9, 12, 18, 24, 36, 48 & 54 Mbps (SISO, or MIMO with CDD)	
	802.11n HT20	MCS0 to MCS7 (1 spatial streams with either SISO, or 2-chain MIMO with CDD/STBC) MCS8 to MCS15 (2 spatial streams on 2 transmit chains)	
	802.11n HT40	MCS0 to MCS7 (1 spatial streams with either SISO, or 2-chain MIMO with CDD/STBC) MCS8 to MCS15 (2 spatial streams on 2 transmit chains)	
Power Supply Requirement(s):	Nominal	120 VAC 60 Hz	
Channel Spacing:	20 MHz		
Transmit Frequency Range:	2412 MHz to 2462 MHz		
Transmit Channels Tested:	**Channel Number**	**Channel Frequency (MHz)**	
	1	2412	
	6	2437	
	11	2462	
Channel Spacing:	40 MHz		
Transmit Frequency Range:	2422 MHz to 2452 MHz		
Transmit Channels Tested:	**Channel Number**	**Channel Frequency (MHz)**	
	3	2422	
	9	2452	

3.5. Support Equipment

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

Description:	Laptop PC
Brand Name:	Lenovo
Model Name or Number:	T61
Serial Number:	L3E7586

Description:	USB Keyboard
Brand Name:	Not marked or stated
Model Name or Number:	Not marked or stated
Serial Number:	Not marked or stated

Description:	HDMI cable. Quantity 3. Length 2m
Brand Name:	Not marked or stated
Model Name or Number:	Not marked or stated
Serial Number:	Not marked or stated

Description:	HDMI cable. Quantity 2. Length 3m
Brand Name:	Not marked or stated
Model Name or Number:	Not marked or stated
Serial Number:	Not marked or stated

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

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

Description:	Freeview HD Set Top Box
Brand Name:	Technika
Model Name or Number:	STBHDIS2010
Serial Number:	GRTB58073912047

Support Equipment (continued)

Description:	HDMI media player
Brand Name:	SUMVISION
Model Name or Number:	Cyclone Micro
Serial Number:	SUM091104017

Description:	Ethernet cable. Quantity 3. Length 2m
Brand Name:	Not marked or stated
Model Name or Number:	Not marked or stated
Serial Number:	Not marked or stated

Description:	Ethernet cable. Quantity 3. Length 3m
Brand Name:	Not marked or stated
Model Name or Number:	Not marked or stated
Serial Number:	Not marked or stated

Description:	Ethernet cable. Quantity 1. Length 5m
Brand Name:	Not marked or stated
Model Name or Number:	Not marked or stated
Serial Number:	Not marked or stated

Description:	Ethernet cable. Quantity 1. Length 10m
Brand Name:	Not marked or stated
Model Name or Number:	Not marked or stated
Serial Number:	Not marked or stated

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

Description:	ADSL Modem Router
Brand Name:	Linksys
Model Name or Number:	WAG54G
Serial Number:	CF610E100799

Support Equipment (continued)

Description:	USB cable type A male to type A male. Quantity 3. Length 3m
Brand Name:	Not marked or stated
Model Name or Number:	Not marked or stated
Serial Number:	Not marked or stated

Description:	Audio cable 3.5mm male to 3.5mm male. Quantity 1. Length 3m
Brand Name:	Not marked or stated
Model Name or Number:	Not marked or stated
Serial Number:	Not marked or stated

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

Description:	Freeview Set Top Box
Brand Name:	Sagem
Model Name or Number:	251657024
Serial Number:	441901036882

Description:	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
Brand Name:	Not marked or stated
Model Name or Number:	Not marked or stated
Serial Number:	Not marked or stated

Description:	Laptop Computer
Brand Name:	Lenovo
Model Name or Number:	E555
Serial Number:	PF03XEND

Description:	USB Hub
Brand Name:	Belkin
Model Name or Number:	Not marked or stated
Serial Number:	Not marked or stated

4. Operation and Monitoring of the EUT during Testing

4.1. Operating Modes

The EUT was tested in the following operating mode(s):

- 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* bespoke 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 and widest bandwidth for all bands were:
    - Highest power
        - 802.11b – DQPSK / 2 Mbps
        - 802.11g SISO – BPSK / 6 Mbps
        - 802.11g CDD1 – BPSK / 6 Mbps
        - 802.11n HT20 SISO – 16QAM / 39 Mbps / MCS4
        - 802.11n HT20 CDD1 – BPSK / 6.5 Mbps / MCS0
        - 802.11n HT40 SISO – 16QAM / 81 Mbps / MCS4
        - 802.11n HT40 CDD1 – BPSK / 13.5 Mbps / MCS0
    - Widest bandwidth
        - 802.11b – DQPSK / 2 Mbps
        - 802.11g SISO – BPSK / 6 Mbps
        - 802.11g CDD1 – BPSK / 6 Mbps
        - 802.11n HT20 SISO – QPSK / 13 Mbps / MCS1
        - 802.11n HT20 CDD1 – BPSK / 6.5 Mbps / MCS0
        - 802.11n HT40 SISO – BPSK / 13.5 Mbps / MCS0
        - 802.11n HT40 CDD1 – BPSK / 13.5 Mbps / MCS0
- Transmitter spurious emissions were performed with the EUT transmitting with a data rate of 802.11g / 6 Mbps on Antenna 1. 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. Conducted output power results can be located in UL-RPT- RP10895558JD02A test report and are available for inspection on the company server if required.
- For all radiated tests the support equipment was used to terminate all active ports.

4.3. Power Settings

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

Mode	Power Setting		
	Bottom Channel	Middle Channel	Top Channel
802.11b SISO – 2 Mbps	12	14	14
802.11g SISO – 6 Mbps	14	16	16
802.11g CDD1 – 6 Mbps	0E	10	10
802.11n HT20 SISO – 13 Mbps / MCS1	14	N/A	16
802.11n HT20 SISO – 39 Mbps / MCS4	14	1A	16
802.11n HT20 CDD1 – 6.5 Mbps / MCS0	0E	10	10
802.11n HT40 SISO – 13.5 Mbps / MCS0	16	N/A	13
802.11n HT40 SISO – 81 Mbps / MCS4	1A	1A	18
802.11n HT40 CDD1 – 13.5 Mbps / MCS0	10	10	10

5. Measurements, Examinations and Derived Results

5.1. General Comments

Measurement uncertainties are evaluated in accordance with current best practice. Our reported expanded uncertainties are based on standard uncertainties, which are multiplied by an appropriate coverage factor to provide a statistical confidence level of approximately 95%. Please refer to *Section 6. Measurement Uncertainty* for details.

In accordance with UKAS requirements all the measurement equipment is on a calibration schedule. All equipment was within the calibration period on the date of testing.

5.2. Test Results

5.2.1. Transmitter Radiated Emissions

Test Summary:

Test Engineer:	Georgios Vrezas	**Test Date:**	20 January 2017
Test Sample Serial Number:	92997		

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

Environmental Conditions:

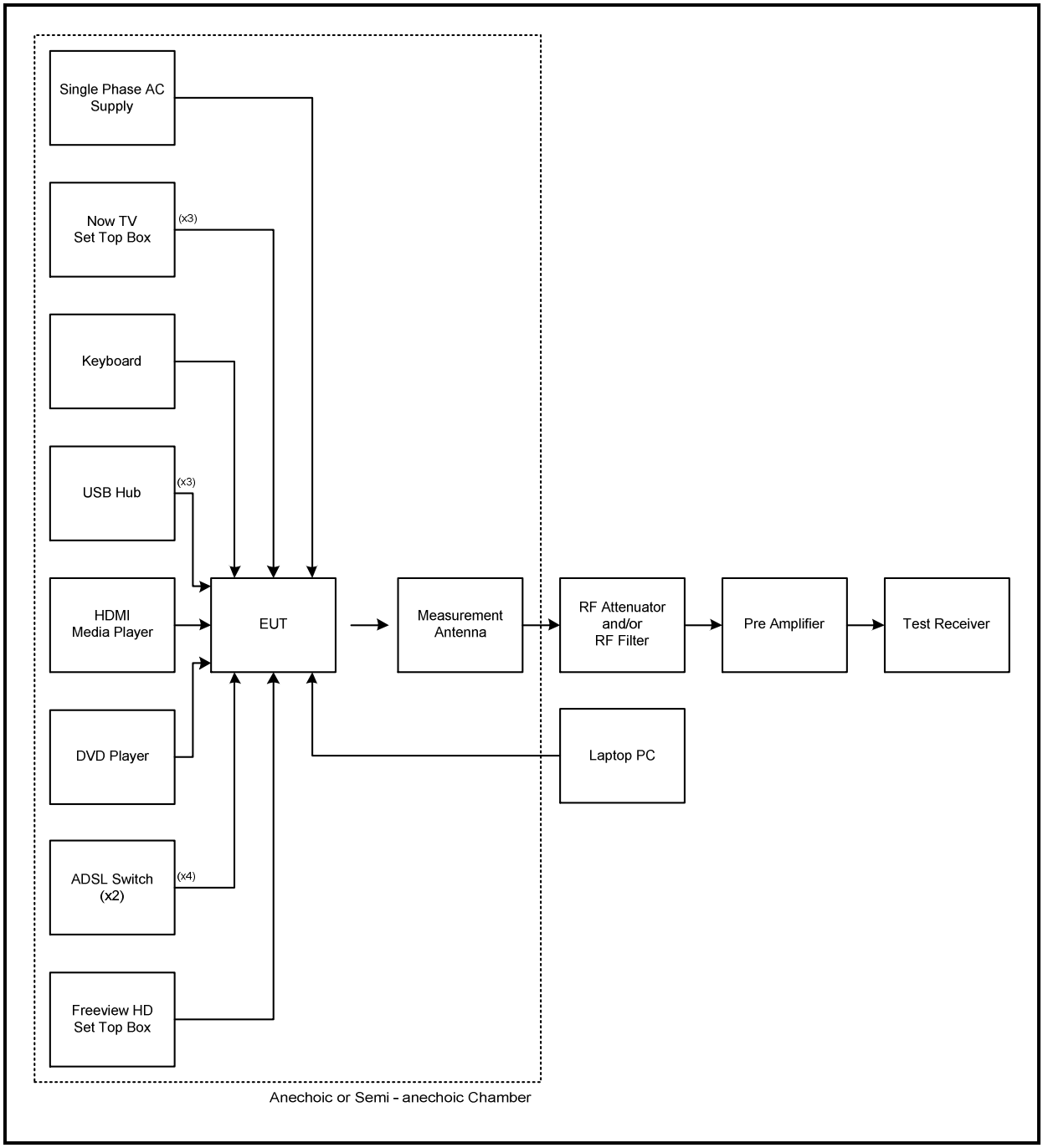
Temperature (°C):	22
Relative Humidity (%):	26

Note(s):

1. The final measured value, for the given emission, in the table below incorporates the calibrated antenna factor and cable loss.
2. The preliminary scans showed similar emission levels below 1 GHz, for each channel of operation. Therefore final radiated emissions measurements were performed with the EUT set to the middle channel only.
3. All other emissions shown on the pre-scan plots were investigated and found to be ambient, or >20 dB below the applicable limit or below the measurement system noise floor.
4. Measurements below 1 GHz were performed in a semi-anechoic chamber (Asset Number K0001) at a distance of 3 metres. The EUT was placed 0.5 metres above the reference ground-plane (in agreement with the FCC via lab KDB correspondence), in the centre of the chamber turntable. Maximum emission levels were determined by height searching the measurement antenna over the range 1 metre to 4 metres.
5. Pre-scans were performed and markers placed on the highest measured levels. The test receiver resolution bandwidth was set to 100 kHz and video bandwidth 300 kHz. A peak detector was used, sweep time was set to auto and trace mode was Max Hold.
6. Final measurements were performed on the marker frequencies and the results entered into the table below. The test receiver resolution bandwidth was set to 120 kHz, using a CISPR quasi-peak detector and span big enough to see the whole emission.

Transmitter Radiated Emissions (continued)

Test setup for radiated measurements:

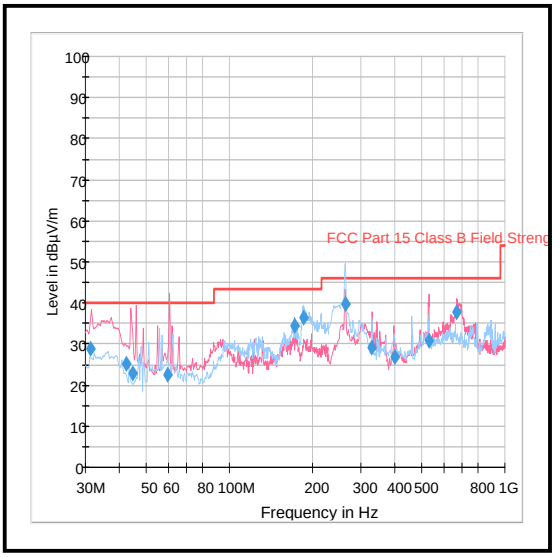


Note: The number in brackets relates to the quantity of cables which were connected between the TV and the support equipment.

Transmitter Radiated Emissions (continued)

Results: Middle Channel / 802.11g / 6 Mbps / SISO / Antenna 1

Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
172.028	Vertical	34.5	43.5	9.0	Complied
264.983	Horizontal	39.6	46.0	6.4	Complied
328.862	Vertical	29.0	46.0	17.0	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)
M2014	Thermohygrometer	Testo	608-H1	45046246	10 Jun 2017	12
K0001	5m RSE Chamber	Rainford EMC	N/A	N/A	07 Dec 2017	12
G0543	Amplifier	Sonoma	310N	230801	09 Jun 2017	6
M1124	Test Receiver	Rohde & Schwarz	ESIB26	100046	31 May 2017	12
A2959	Antenna	Schwarzbeck	VULB 9163	9163-967	08 Sep 2017	12
A1834	Attenuator	Hewlett Packard	8491B	10444	30 Mar 2017	12

Transmitter Radiated Emissions (continued)

Test Summary:

Test Engineer:	Georgios Vrezas	**Test Dates:**	10 January 2017 to 22 January 2017
Test Sample Serial Number:	92997		

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

Environmental Conditions:

Temperature (°C):	21 to 22
Relative Humidity (%):	26 to 28

Note(s):

1. Transmitter radiated spurious emissions tests were performed with the EUT transmitting in 802.11g / 6 Mbps / SISO / Antenna 1, as this was found to transmit the highest power and therefore deemed worst case.
2. The final measured value, for the given emission, in the table below incorporates the calibrated antenna factor and cable loss.
3. 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.
4. The emission shown approximately at 2437 MHz on the 1 GHz to 4 GHz plot is the EUT fundamental.
5. Measurements above 1 GHz were performed in a semi-anechoic chamber (Asset Number K0001) at a distance of 3 metres. The EUT was placed 0.5 metres above the reference ground-plane (in agreement with the FCC via lab KDB correspondence), in the centre of the chamber turntable. Maximum emission levels were determined by height searching the measurement antenna over the range 1 metre to 4 metres.
6. Pre-scans were performed and a marker placed on the highest measured level of the appropriate plot. The test receiver resolution bandwidth was set to 1 MHz and video bandwidth 3 MHz. The sweep time was set to auto. Peak and average measurements were performed with their appropriate detectors during the pre-scan measurements.
7. In accordance with ANSI C63.10 Section 6.6.4.3, Note 1, if the peak measured value complies with the average limit, it is unnecessary to perform an average measurement.

Transmitter Radiated Emissions (continued)

Results: Bottom Channel

Frequency (MHz)	Antenna Polarity	Peak Level (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)	Result
1048.571	Horizontal	43.8	54.0	10.2	Complied
1317.857	Horizontal	40.1	54.0	13.9	Complied
2696.779	Vertical	53.7	54.0	0.3	Complied

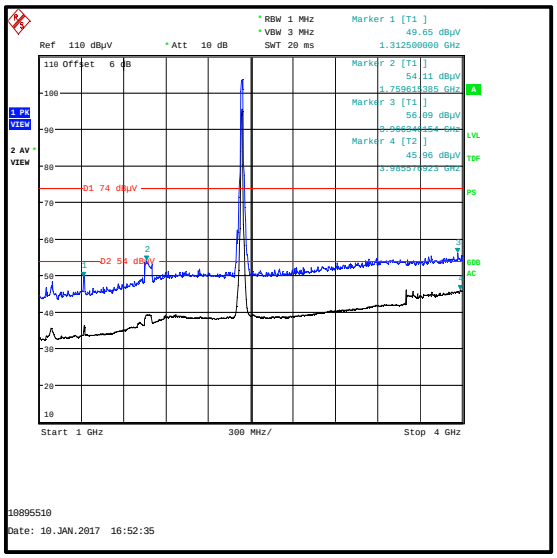
Results: Middle Channel

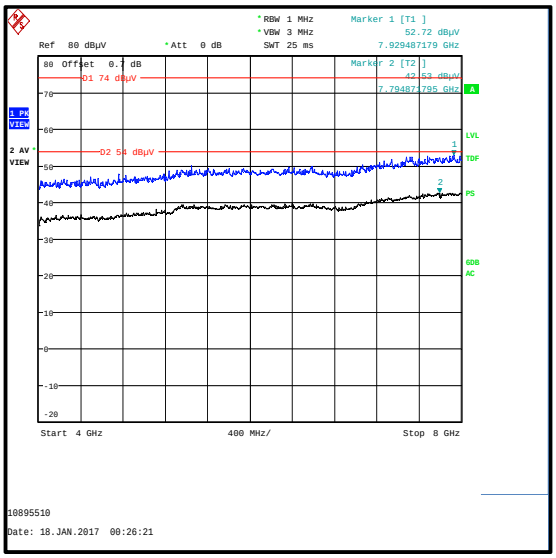
Frequency (MHz)	Antenna Polarity	Peak Level (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)	Result
1048.571	Horizontal	43.8	54.0	10.2	Complied
1317.857	Horizontal	40.1	54.0	13.9	Complied
2696.779	Vertical	53.7	54.0	0.3	Complied

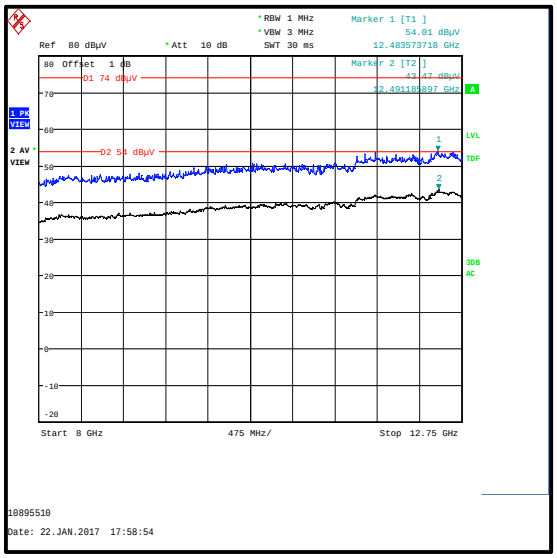
Results: Top Channel

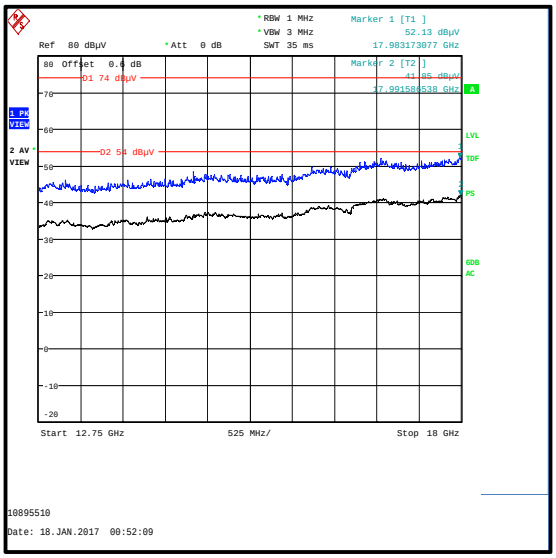
Frequency (MHz)	Antenna Polarity	Peak Level (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)	Result
1048.571	Horizontal	43.8	54.0	10.2	Complied
1317.857	Horizontal	40.1	54.0	13.9	Complied
2696.779	Vertical	53.7	54.0	0.3	Complied

Transmitter Radiated Emissions (continued)

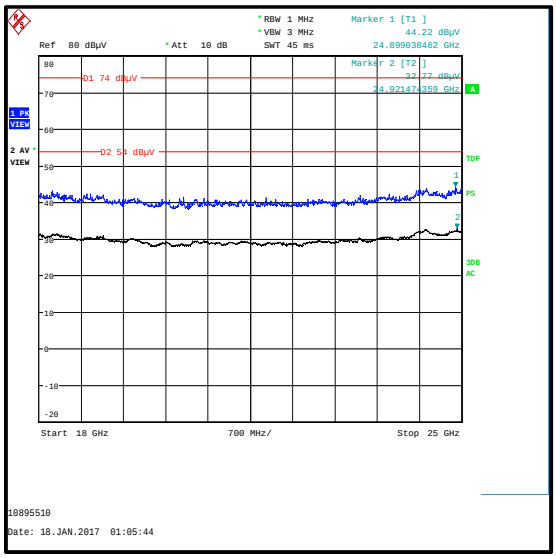








Transmitter Radiated Emissions (continued)



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)
M2014	Thermohygrometer	Testo	608-H1	45046246	10 Jun 2017	12
K0001	3m RSE Chamber	Rainford EMC	N/A	N/A	07 Dec 2017	12
M1630	Test receiver	Rohde & Schwarz	ESU40	100233	17 Feb 2017	12
A1227	Pre-Amplifier	Agilent	8449B	3008A01566	09 Jun 2017	12
A2893	Pre-Amplifier	Schwarzbeck	BBV 9721	9721-021	07 Apr 2017	12
A1817	Antenna	EMCO	3115	00075694	14 Oct 2017	12
A2898	Antenna	Schwarzbeck	HWRD 750	013	06 May 2017	12
A2899	Antenna	Schwarzbeck	BBHA 9120 B	BBHA 9120 B 652	06 May 2017	12
A2892	Antenna	Schwarzbeck	BBHA 9170	9170-727	07 Apr 2017	12
A1395	Attenuator	Huber & Suhner	6806.17.B	753459	04 Nov 2017	12
A1975	High Pass Filter	AtlanTecRF	AFH-03000	090424010	26 Apr 2017	12
A2176	High Pass Filter	AtlanTecRF	AFH-07000	800980	26 Apr 2017	12

5.2.2. Transmitter Band Edge Radiated Emissions

Test Summary:

Test Engineers:	Georgios Vrezas & David Doyle	**Test Date:**	20 January 2017
Test Sample Serial Number:	92997		

FCC Reference:	Parts 15.247(d) & 15.209(a)
Test Method Used:	ANSI C63.10 Section 6.10 & FCC KDB 558074 Section 11

Environmental Conditions:

Temperature (°C):	22
Relative Humidity (%):	28

Note(s):

1. All supported modes and channel widths were initially investigated on one channel. The modes that produced the highest power and widest bandwidths were:
    - 802.11b – DQPSK / 2 Mbps / DAC0
    - 802.11g SISO – BPSK / 6 Mbps / DAC0
    - 802.11g CDD1 – BPSK / 6 Mbps
    - 802.11n HT20 SISO – QPSK / 13 Mbps / MCS1 / DAC 0
    - 802.11n HT20 SISO – 16QAM / 39 Mbps / MCS4 / DAC 0
    - 802.11n HT20 CDD1 – BPSK / 6.5 Mbps / MCS0
    - 802.11n HT40 SISO – BPSK / 13.5 Mbps / MCS0 / DAC 0
    - 802.11n HT40 SISO – 16QAM / 81 Mbps / MCS4 / DAC 0
    - 802.11n HT40 CDD1 – BPSK / 13.5 Mbps / MCS0

    Final measurements were performed with the above configurations.
2. For SISO modes, the EUT was transmitting from Port 1 (DAC 0) only as this Port emits the highest output power level and was therefore deemed to be worst case. For CDD1 modes, the EUT was transmitting from both ports.
3. The final measured value, for the given emission, in the table below incorporates the calibrated antenna factor and cable loss.
4. The maximum conducted (average) output power was previously measured. In accordance with FCC KDB 558074 Section 11.1(b), the lower band edge measurement should be performed with a peak detector and the -30 dBc limit applied.

Transmitter Band Edge Radiated Emissions (continued)

Note(s):

5. As the lower band edge falls within a non-restricted band, only peak measurements are required. In accordance with FCC KDB 558074 Section 11.1, the test method in Section 11.3 was followed: the test receiver resolution bandwidth was set to 100 kHz and video bandwidth 300 kHz. A peak detector was used, sweep time was set to auto and trace mode was Max Hold. The test receiver was left to sweep for a sufficient length of time in order to maximise the carrier level and out-of-band emissions. A marker and corresponding reference level line were placed on the peak of the carrier. As the maximum conducted (average) output power was measured using an RMS detector in accordance with FCC KDB 558074 Section 9.2.2.4 an out-of-band limit line was placed 30 dB (FCC KDB 558074 Section 11.1(b)) below the peak level. A marker was placed on the band edge spot frequencies and a second marker placed on the highest emission level in the adjacent non-restricted band of operation (where a higher level emission was present). Marker frequencies and levels were recorded.
6. As the upper band edge falls within a restricted band both peak and average measurements were recorded by placing a marker at the edge of the band. For peak measurements the test receiver resolution bandwidth was set to 1 MHz and the video bandwidth 3 MHz. A peak detector was used, sweep time was set to auto and trace mode was Max Hold. For average measurements the test receiver resolution bandwidth was set to 1 MHz and the video bandwidth 10 Hz. A peak detector was used, sweep time was set to auto and trace mode was Max Hold. The test receiver was left to sweep for a sufficient length of time in order to maximise the carrier level and out-of-band emissions. A marker was placed on the band edge spot frequencies and a second marker placed on the highest emission level in the adjacent restricted band of operation (where a higher level emission was present). Marker frequencies and levels were recorded.
7. There is a restricted band 10 MHz below the lower band edge. The test receiver was set up as follows: the RBW set to 1 MHz, the VBW set to 3 MHz, with the sweep time set to auto couple. Peak and average measurements were performed with their respective detectors. Markers were placed on the highest point on each trace.

Transmitter Band Edge Radiated Emissions (continued)

Results: 802.11b / 20 MHz / DQPSK / 2 Mbps / DAC 0

Frequency (MHz)	Level (dBµV/m)	-30 dBc Limit (dBµV/m)	Margin (dB)	Result
2399.558	48.8	61.2	12.4	Complied
2400	47.6	61.2	13.6	Complied

Results: Upper Band Edge & Restricted Band / Peak

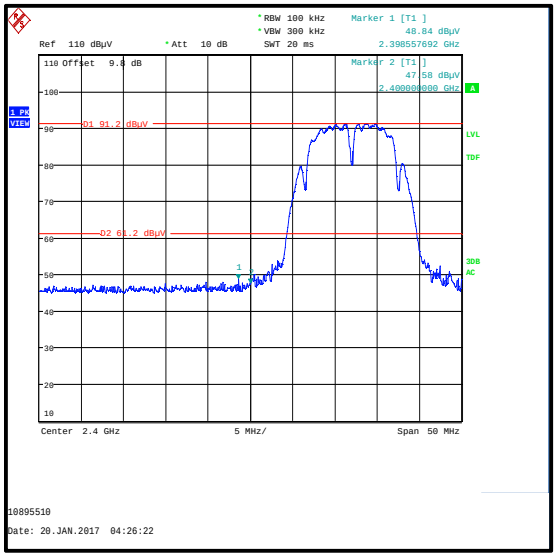
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2389.359	52.9	74.0	21.1	Complied
2483.5	57.3	74.0	16.7	Complied
2483.580	59.0	74.0	15.0	Complied

Results: Upper Band Edge & Restricted Band / Average

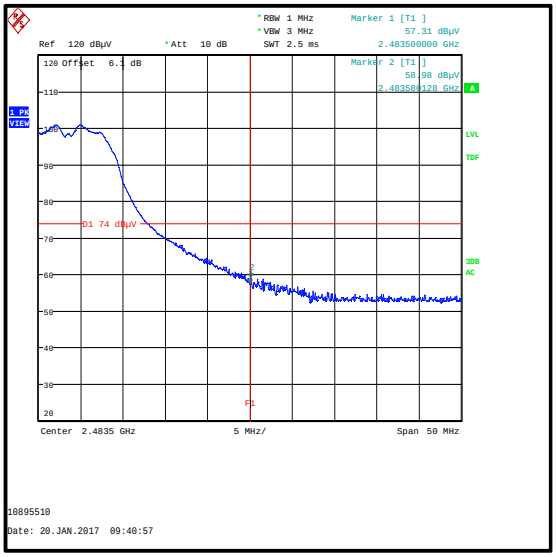
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2387.949	43.1	54.0	10.9	Complied
2483.5	47.9	54.0	6.1	Complied
2491.032	49.0	54.0	5.0	Complied

Transmitter Band Edge Radiated Emissions (continued)

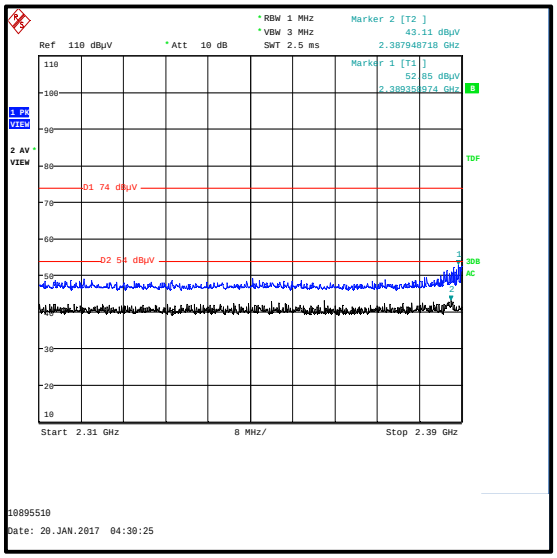
Results: 802.11b / 20 MHz / DQPSK / 2 Mbps / DAC 0



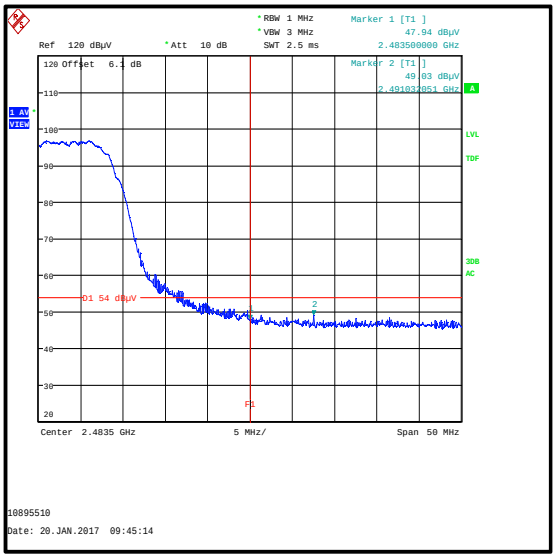
Lower Band Edge Peak Measurement



Upper Band Edge Peak Measurement



2310 MHz to 2390 MHz Restricted Band Plot



Upper Band Edge Average Measurement

Transmitter Band Edge Radiated Emissions (continued)

Results: 802.11g / 20 MHz / SISO / BPSK / 6 Mbps / DAC 0

Results: Lower Band Edge

Frequency (MHz)	Level (dBµV/m)	-30 dBc Limit (dBµV/m)	Margin (dB)	Result
2399.519	54.1	61.1	7.0	Complied
2400	52.2	61.1	8.9	Complied

Results: Upper Band Edge & Restricted Band / Peak

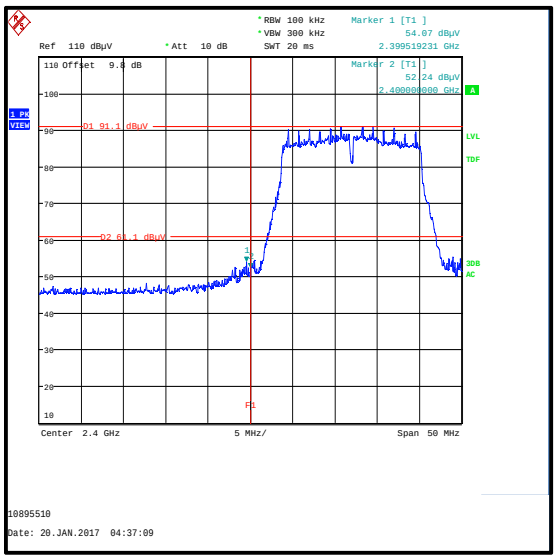
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2389.872	53.0	74.0	21.0	Complied
2483.5	62.2	74.0	11.8	Complied

Results: Upper Band Edge & Restricted Band / Average

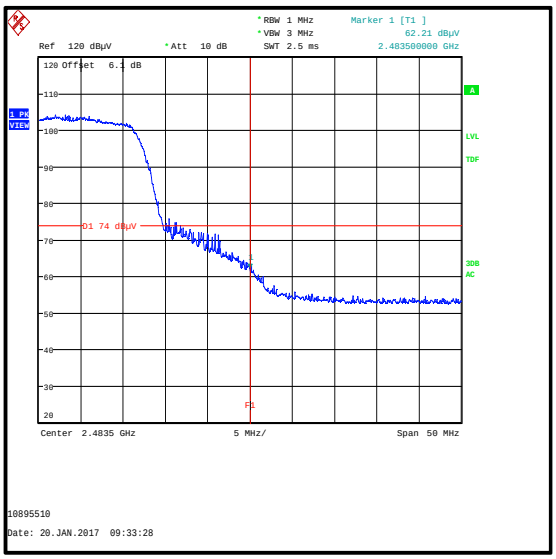
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2388.974	45.4	54.0	8.6	Complied
2483.5	50.7	54.0	3.3	Complied
2483.821	52.1	54.0	1.9	Complied

Transmitter Band Edge Radiated Emissions (continued)

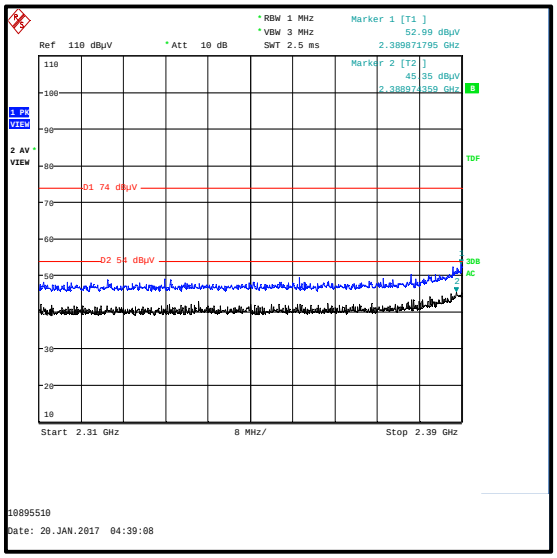
Results: 802.11g / 20 MHz / SISO / BPSK / 6 Mbps / DAC 0



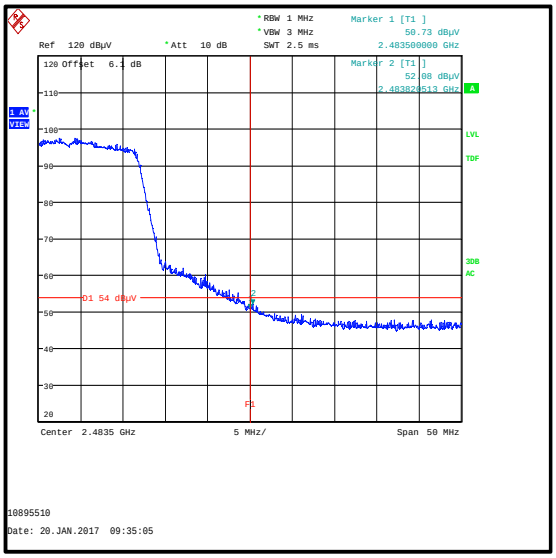
Lower Band Edge Peak Measurement



Upper Band Edge Peak Measurement



2310 MHz to 2390 MHz Restricted Band Plot



Upper Band Edge Average Measurement

Transmitter Band Edge Radiated Emissions (continued)

Results: 802.11g / 20 MHz / CDD1 / BPSK / 6 Mbps

Results: Lower Band Edge

Frequency (MHz)	Level (dBµV/m)	-30 dBc Limit (dBµV/m)	Margin (dB)	Result
2398.798	50.4	59.5	9.1	Complied
2400	49.1	59.5	10.4	Complied

Results: Upper Band Edge & Restricted Band / Peak

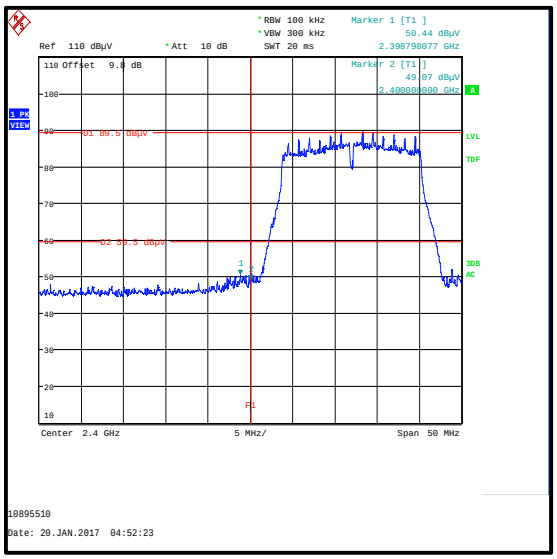
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2389.487	50.3	74.0	23.7	Complied
2483.5	59.5	74.0	14.5	Complied

Results: Upper Band Edge & Restricted Band / Average

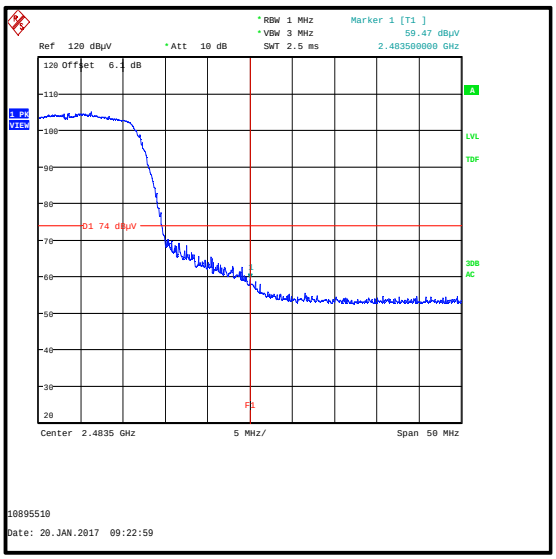
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2388.590	43.4	54.0	10.6	Complied
2483.5	48.7	54.0	5.3	Complied
2483.821	50.0	54.0	4.0	Complied

Transmitter Band Edge Radiated Emissions (continued)

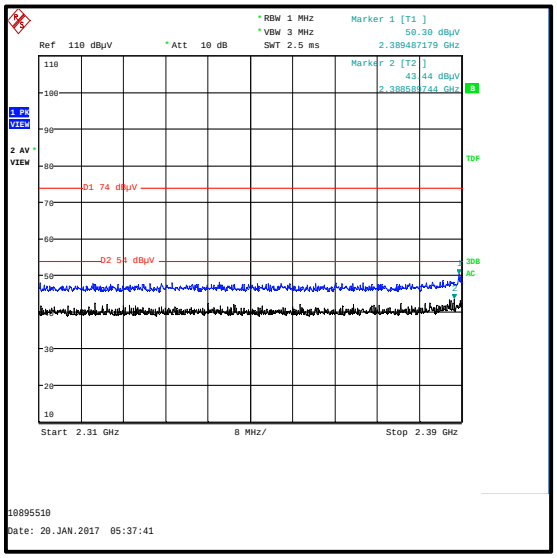
Results: 802.11g / 20 MHz / CDD1 / BPSK / 6 Mbps



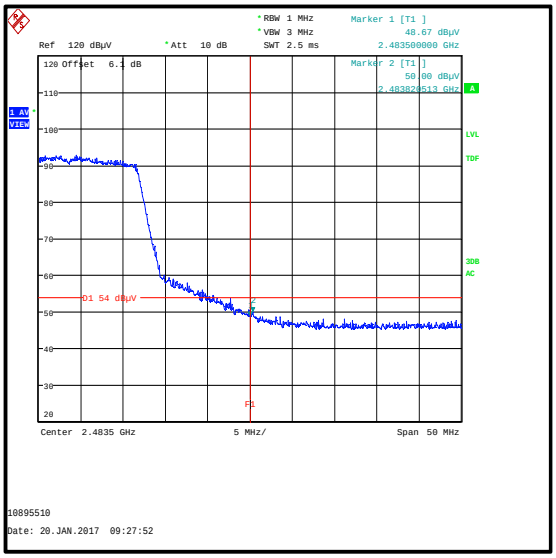
Lower Band Edge Peak Measurement



Upper Band Edge Peak Measurement



2310 MHz to 2390 MHz Restricted Band Plot



Upper Band Edge Average Measurement

Transmitter Band Edge Radiated Emissions (continued)

Results: 802.11n HT20 / SISO / QPSK / MCS1 / DAC 0

Results: Lower Band Edge

Frequency (MHz)	Level (dBµV/m)	-30 dBc Limit (dBµV/m)	Margin (dB)	Result
2399.439	54.5	61.9	7.4	Complied
2400	53.0	61.9	8.9	Complied

Results: Upper Band Edge & Restricted Band / Peak

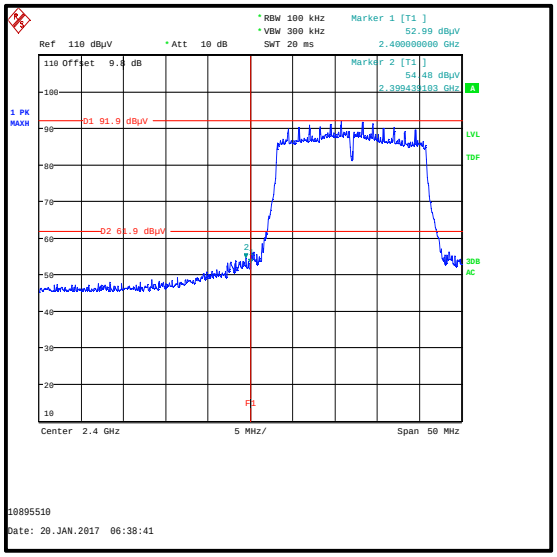
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2388.974	56.6	74.0	17.4	Complied
2483.5	57.9	74.0	16.1	Complied
2483.660	59.5	74.0	14.5	Complied

Results: Upper Band Edge & Restricted Band / Average

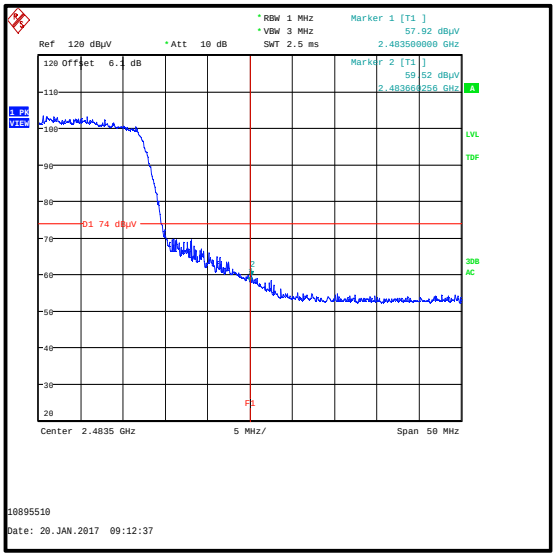
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2388.718	46.3	54.0	7.7	Complied
2483.5	50.8	54.0	3.2	Complied
2483.821	51.4	54.0	2.6	Complied

Transmitter Band Edge Radiated Emissions (continued)

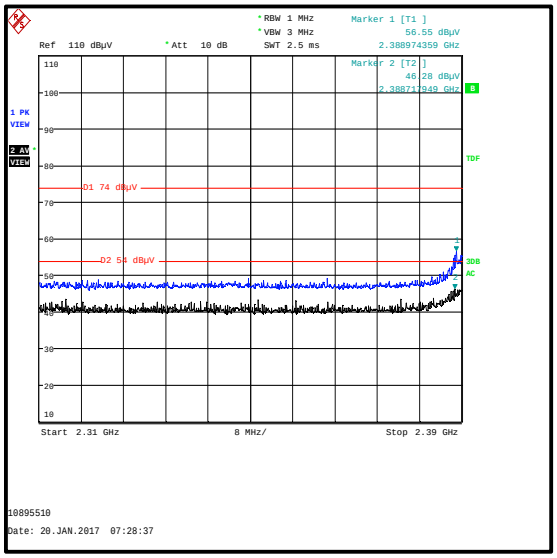
Results: 802.11n HT20 / SISO / QPSK / MCS1 / DAC 0



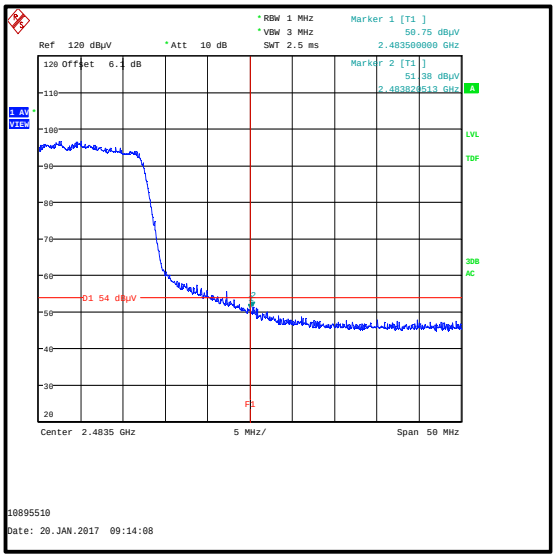
Lower Band Edge Peak Measurement



Upper Band Edge Peak Measurement



2310 MHz to 2390 MHz Restricted Band Plot



Upper Band Edge Average Measurement

Transmitter Band Edge Radiated Emissions (continued)

Results: 802.11n HT20 / SISO / 16QAM / MCS4 / DAC 0

Results: Lower Band Edge

Frequency (MHz)	Level (dBµV/m)	-30 dBc Limit (dBµV/m)	Margin (dB)	Result
2396.955	52.2	59.6	7.4	Complied
2400	49.6	59.6	10.0	Complied

Results: Upper Band Edge & Restricted Band / Peak

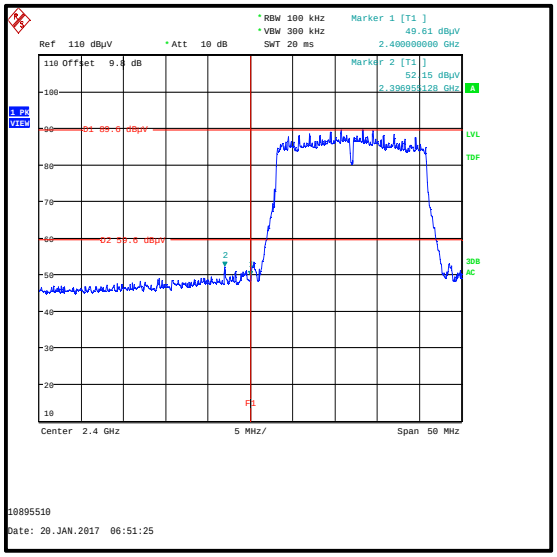
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2388.718	54.2	74.0	19.8	Complied
2483.5	61.0	74.0	13.0	Complied
2483.901	62.4	74.0	11.6	Complied

Results: Upper Band Edge & Restricted Band / Average

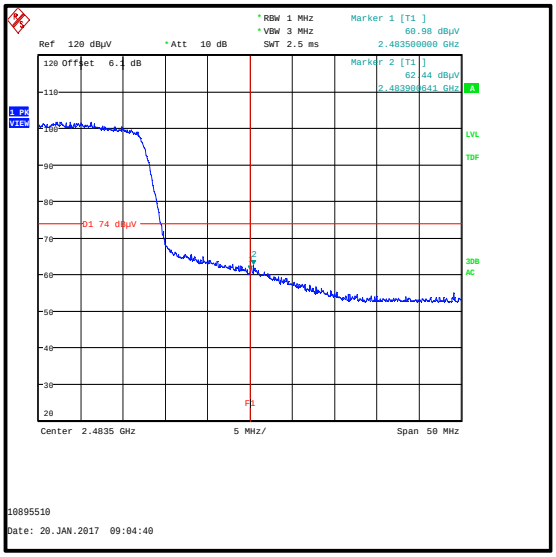
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2389.615	47.7	54.0	6.3	Complied
2483.5	51.8	54.0	2.2	Complied

Transmitter Band Edge Radiated Emissions (continued)

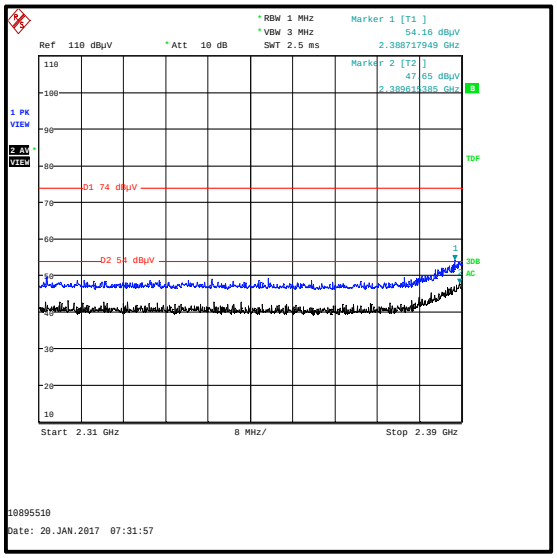
Results: 802.11n HT20 / SISO / 16QAM / MCS4 / DAC 0



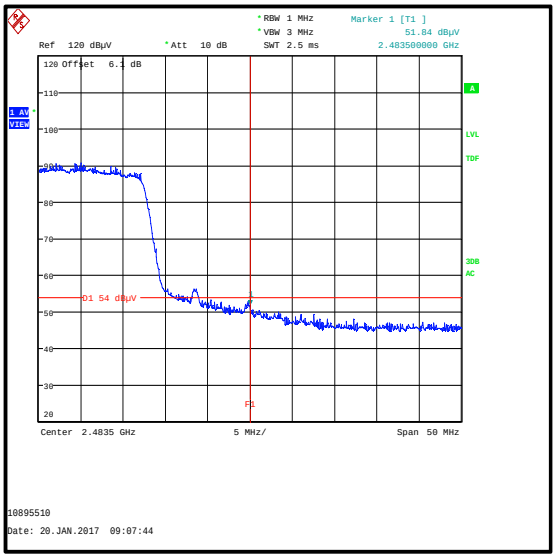
Lower Band Edge Peak Measurement



Upper Band Edge Peak Measurement



2310 MHz to 2390 MHz Restricted Band Plot



Upper Band Edge Average Measurement

Transmitter Band Edge Radiated Emissions (continued)

Results: 802.11n HT20 / CDD1 / BPSK / MCS0

Results: Lower Band Edge

Frequency (MHz)	Level (dBµV/m)	-30 dBc Limit (dBµV/m)	Margin (dB)	Result
2398.798	51.8	59.1	7.3	Complied
2400	50.3	59.1	8.8	Complied

Results: Upper Band Edge & Restricted Band / Peak

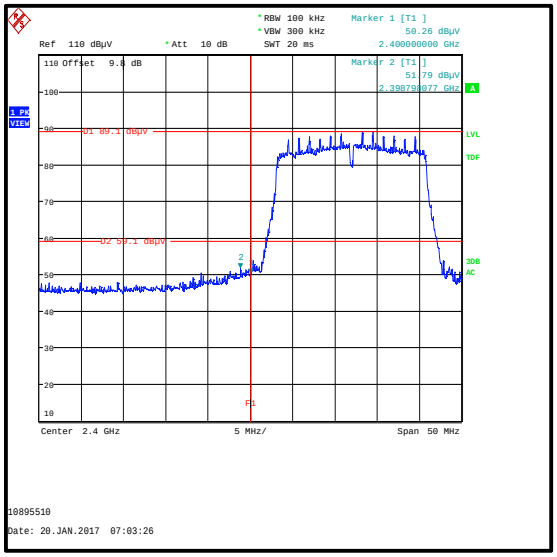
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2389.872	62.0	74.0	12.0	Complied
2483.5	60.3	74.0	13.7	Complied
2484.301	60.6	74.0	13.4	Complied

Results: Upper Band Edge & Restricted Band / Average

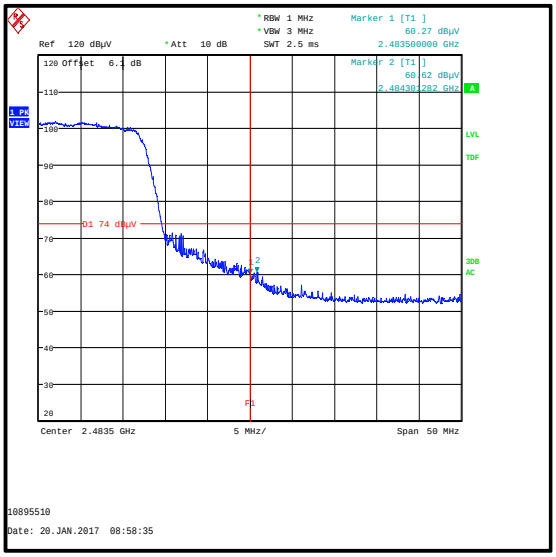
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2389.872	50.7	54.0	3.3	Complied
2483.5	50.5	54.0	3.5	Complied

Transmitter Band Edge Radiated Emissions (continued)

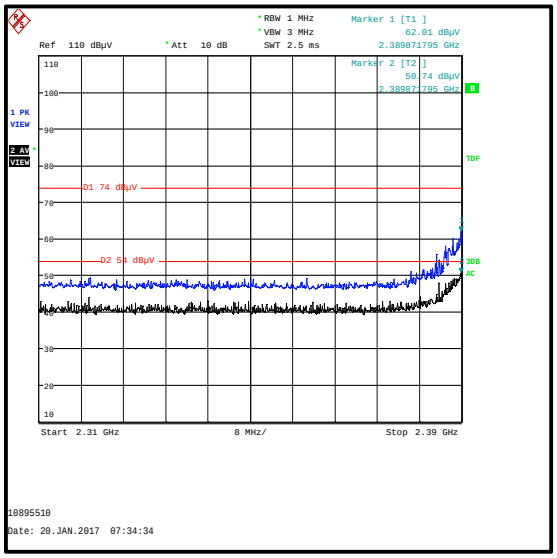
Results: 802.11n HT20 / CDD1 / BPSK / MCS0



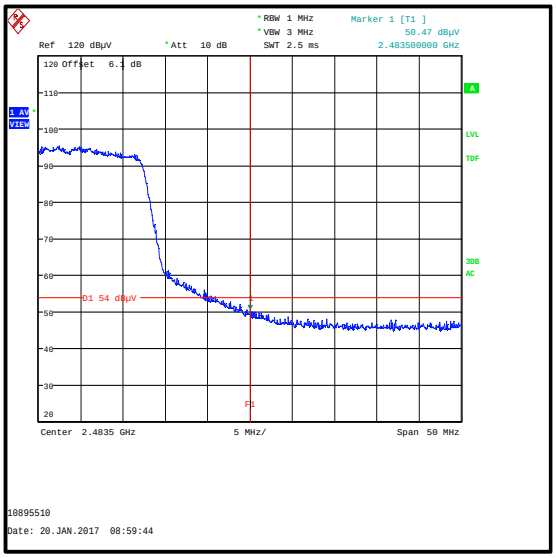
Lower Band Edge Peak Measurement



Upper Band Edge Peak Measurement



2310 MHz to 2390 MHz Restricted Band Plot



Upper Band Edge Average Measurement

Transmitter Band Edge Radiated Emissions (continued)

Results: 802.11n / HT40 / SISO / BPSK / MCS0 / DAC 0

Results: Lower Band Edge

Frequency (MHz)	Level (dBµV/m)	-30 dBc Limit (dBµV/m)	Margin (dB)	Result
2400	53.1	59.1	6.0	Complied

Results: Upper Band Edge & Restricted Band / Peak

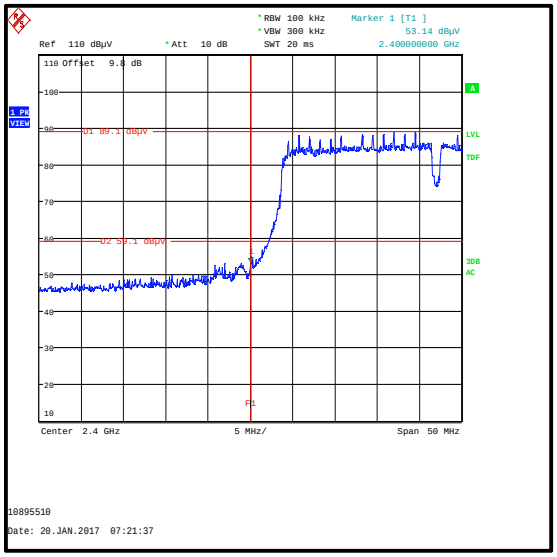
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2390.000	60.3	74.0	13.7	Complied
2483.5	58.7	74.0	15.3	Complied
2484.462	61.7	74.0	12.3	Complied

Results: Upper Band Edge & Restricted Band / Average

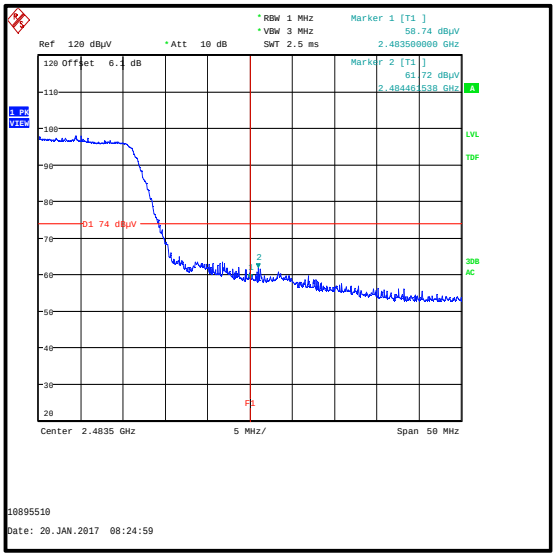
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2386.282	51.2	54.0	2.8	Complied
2483.5	50.8	54.0	3.2	Complied
2486.785	52.7	54.0	1.3	Complied

Transmitter Band Edge Radiated Emissions (continued)

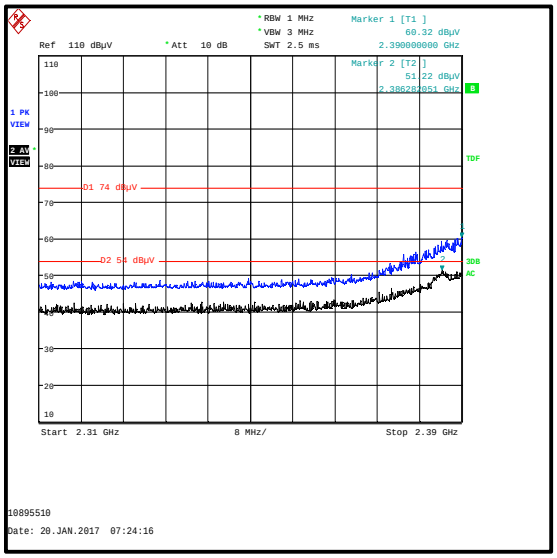
Results: 802.11n / HT40 / SISO / BPSK / MCS0 / DAC 0



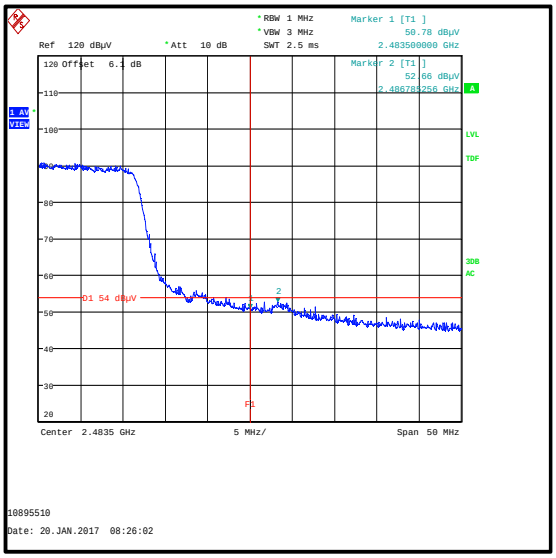
Lower Band Edge Peak Measurement



Upper Band Edge Peak Measurement



2310 MHz to 2390 MHz Restricted Band Plot



Upper Band Edge Average Measurement

Transmitter Band Edge Radiated Emissions (continued)

Results: 802.11n / HT40 / SISO / 16QAM / MCS4 / DAC 0

Results: Lower Band Edge

Frequency (MHz)	Level (dBµV/m)	-30 dBc Limit (dBµV/m)	Margin (dB)	Result
2394.471	54.0	59.5	5.5	Complied
2400	52.8	59.5	6.7	Complied

Results: Upper Band Edge & Restricted Band / Peak

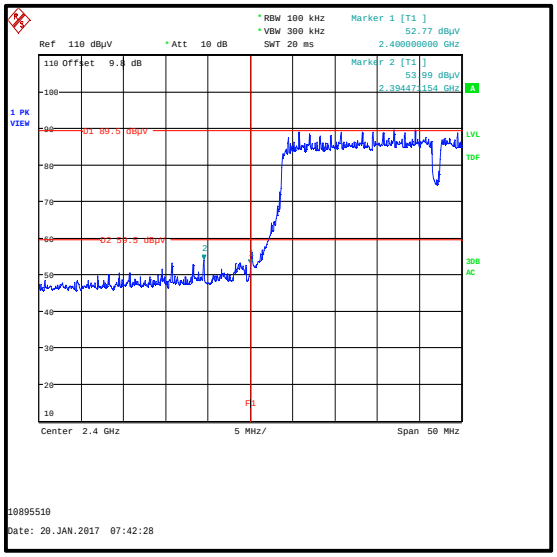
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2389.615	62.1	74.0	11.9	Complied
2483.5	58.0	74.0	16.0	Complied
2492.554	58.5	74.0	15.5	Complied

Results: Upper Band Edge & Restricted Band / Average

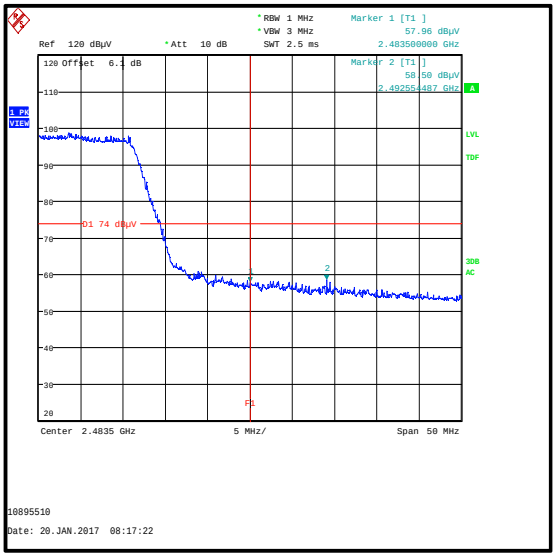
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2389.615	52.0	54.0	2.0	Complied
2483.5	49.9	54.0	4.1	Complied
2488.147	53.1	54.0	0.9	Complied

Transmitter Band Edge Radiated Emissions (continued)

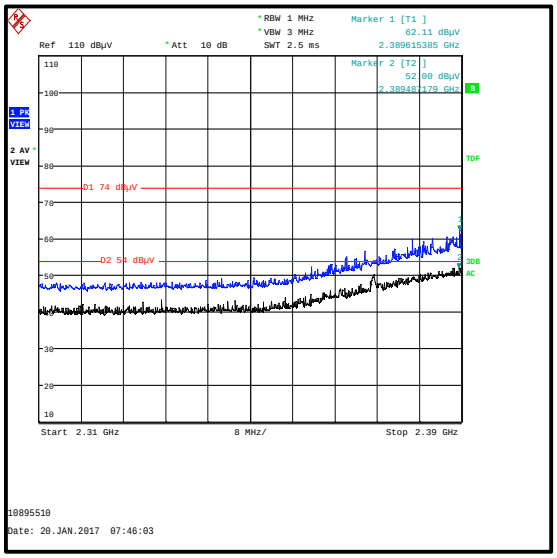
Results: 802.11n / HT40 / SISO / 16QAM / MCS4 / DAC 0



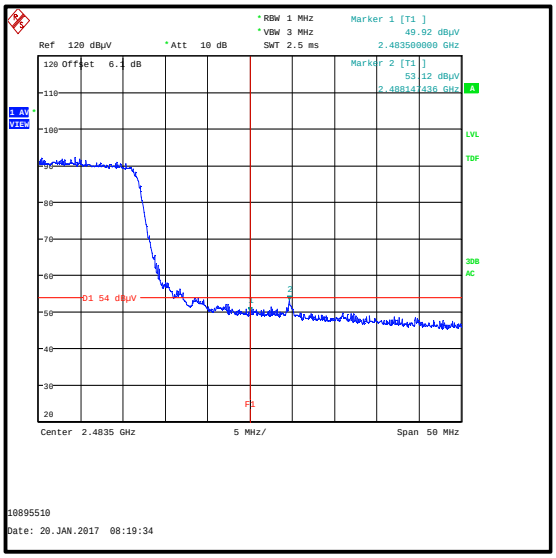
Lower Band Edge Peak Measurement



Upper Band Edge Peak Measurement



2310 MHz to 2390 MHz Restricted Band Plot



Upper Band Edge Average Measurement

Transmitter Band Edge Radiated Emissions (continued)

Results: 802.11n / HT40 / CDD1 / BPSK / MCS0

Results: Lower Band Edge

Frequency (MHz)	Level (dBµV/m)	-30 dBc Limit (dBµV/m)	Margin (dB)	Result
2395.753	56.6	59.9	3.3	Complied
2400	54.7	59.9	5.2	Complied

Results: Upper Band Edge & Restricted Band / Peak

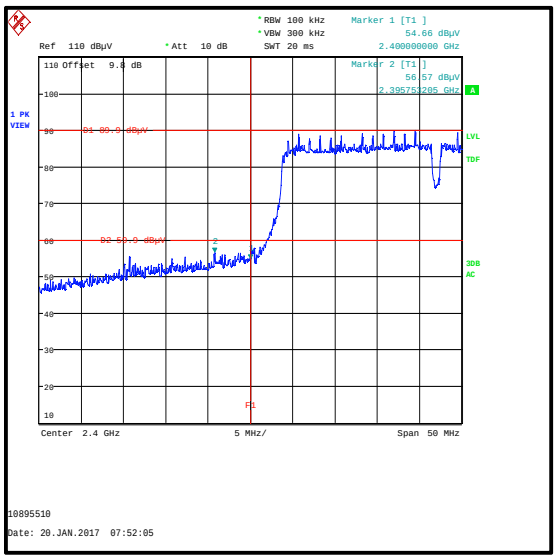
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2384.231	60.0	74.0	14.0	Complied
2483.5	60.9	74.0	13.1	Complied
2485.263	63.3	74.0	10.7	Complied

Results: Upper Band Edge & Restricted Band / Average

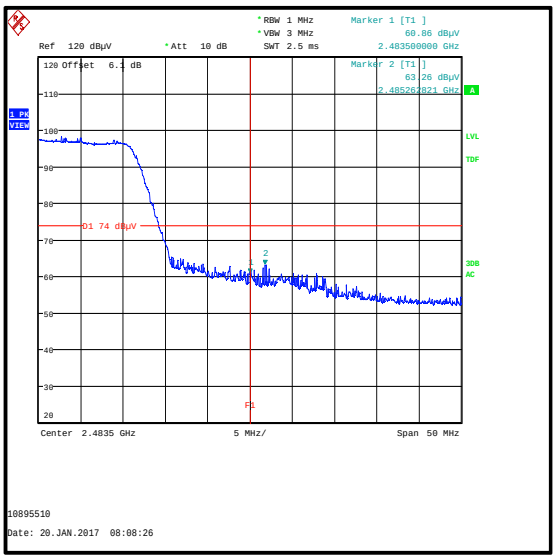
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2386.667	51.8	54.0	2.2	Complied
2483.5	50.7	54.0	3.3	Complied
2487.587	52.2	54.0	1.8	Complied

Transmitter Band Edge Radiated Emissions (continued)

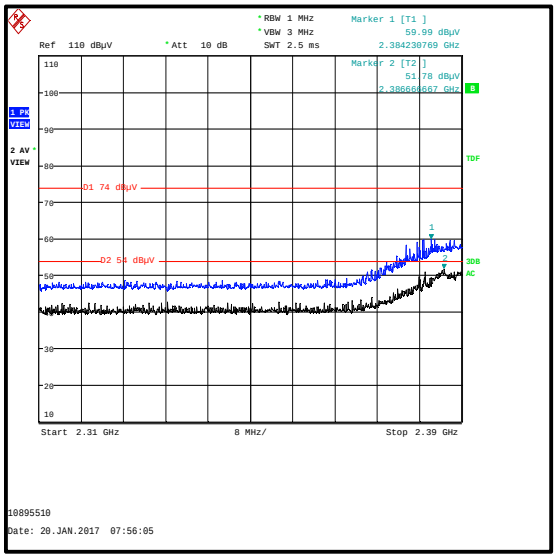
Results: 802.11n / HT40 / CDD1 / BPSK / MCS0



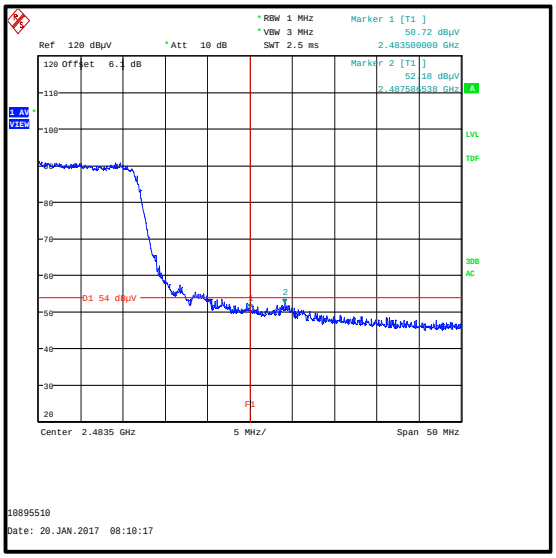
Lower Band Edge Peak Measurement



Upper Band Edge Peak Measurement



2310 MHz to 2390 MHz Restricted Band Plot



Upper Band Edge Average Measurement

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M2014	Thermohygrometer	Testo	608-H1	45046246	10 Jun 2017	12
K0001	3m RSE Chamber	Rainford EMC	N/A	N/A	07 Dec 2017	12
M1630	Test receiver	Rohde & Schwarz	ESU40	100233	17 Feb 2017	12
A1227	Pre-Amplifier	Agilent	8449B	3008A01566	09 Jun 2017	6
A1817	Antenna	EMCO	3115	00075694	14 Oct 2017	12
A1395	Attenuator	Huber & Suhner	6806.17.B	753459	04 Nov 2017	12
A2140	Attenuator	AtlanTecRF	AN18-10	090918-14	26 Apr 2017	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 25 GHz	95%	±2.94 dB

The methods used to calculate the above uncertainties are in line with those recommended within the various measurement specifications. Where measurement specifications do not include guidelines for the evaluation of measurement uncertainty the published guidance of the appropriate accreditation body is followed.

7. Report Revision History

Version Number	Revision Details		
	Page No(s)	Clause	Details
1.0	-	-	Initial Version
2.0	-	-	Tested in accordance with FCC KDB correspondence

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