



TEST REPORT

Test Report No. : UL-RPT-RP13170021-116A V3.0

Customer : Winnow Solutions Ltd

Model No. : Winnow Vision 3.0

FCC ID : 2AUM4WV03

Technology : WLAN

Test Standard(s) : FCC Parts 15.35(c), 15.209(a) & 15.247(d)

Test Laboratory : UL International (UK) Ltd, Basingstoke, Hampshire, RG24 8AH, United Kingdom

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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 3.0 supersedes all previous versions.

Date of Issue: 05 July 2021

Checked by:

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Customer Information

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Report Revision History

Version Number	Issue Date	Revision Details	Revised By
1.0	22/04/2020	Initial Version	Ben Mercer
2.0	06/05/2020	Removed ISED references at TCB request.	Ben Mercer
3.0	05/07/2021	Added MIMO results at TCB request	Sarah Williams

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1 Attestation of Test Results

1.1 Description of EUT

The equipment under test was a 2.4 GHz and 5.15 to 5.35 GHz WLAN module.

1.2 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:	685609
FCC Lab. Designation No.:	UK2011
Location of Testing:	Unit 3 Horizon, Wade Road, Kingsland Business Park, Basingstoke, Hampshire, RG24 8AH, United Kingdom
Test Dates:	25 February 2020 to 27 April 2021

1.3 Summary of Test Results

FCC Reference (47CFR)	Measurement	Result
Part 15.35(c)	Transmitter Duty Cycle	Note 1
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	

Note(s):

1. The measurement was performed to assist in the calculation of the level of emissions as the EUT employs pulsed operation.

1.4 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.

2 Summary of Testing

2.1 Facilities and Accreditation

The test site and measurement facilities used to collect data are located at Unit 3 Horizon, Wade Road, Kingsland Business Park, Basingstoke, Hampshire, RG24 8AH, United Kingdom. The following table identifies which facilities were utilised for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

Site 1	X
Site 2	
Site 17	X

UL International (UK) Ltd is accredited by the United Kingdom Accreditation Service (UKAS). UKAS is one of the signatories to the International Laboratory Accreditation Co-operation (ILAC) Arrangement for the mutual recognition of test reports. The tests reported herein have been performed in accordance with its terms of accreditation.

2.2 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 15.247 Meas Guidance v05r02 April 2, 2019
Title:	Guidance for Compliance Measurements on Digital Transmission System, Frequency Hopping Spread Spectrum System, and Hybrid Devices Operating Under Section 15.247 of the FCC Rules

2.3 Calibration and Uncertainty

Measuring Instrument Calibration

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.

Measurement Uncertainty & Decision Rule

Overview

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.

Decision Rule

The decision rule applied is based upon the accuracy method criteria. The measurement uncertainty is met and the result is considered in conformance with the requirement criteria if the observed value is within the prescribed limit.

Measurement Uncertainty

The reported expanded uncertainties below are based on a standard uncertainty multiplied by an appropriate coverage factor such that a confidence level of approximately 95% is maintained. For the purposes of this document "approximately" is interpreted as meaning "effectively" or "for most practical purposes".

Measurement Type	Range	Confidence Level (%)	Calculated Uncertainty
Duty Cycle	2.4 GHz to 2.4835 GHz	95%	±1.14 %
Radiated Spurious Emissions	30 MHz to 1 GHz	95%	±4.65 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.

2.4 Test and Measurement Equipment

Test Equipment Used for Duty Cycle / Transmitter Band Edge Radiated Emissions

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
K0017	3m RSE Chamber	Rainford EMC	N/A	N/A	21 Oct 2021	12
M2003	Thermohygrometer	Testo	608-H1	45046641	10 Dec 2021	12
M1995	Test Receiver	Rohde & Schwarz	ESU40	100428	07 Dec 2021	12
A2863	Pre-Amplifier	Agilent	8449B	3008A02100	21 Oct 2021	12
A2889	Antenna	Schwarzbeck	BBHA 9120 B	BBHA 9120 B 653	23 Oct 2021	12
A2916	Attenuator	AtlanTecRF	AN18W5-10	832827#1	01 Feb 2022	12
K0001	3m RSE Chamber	Rainford EMC	N/A	N/A	16 Oct 2020	12
M2040	Thermohygrometer	Testo	608-H1	45124934	07 Jan 2021	12
M2044	Test Receiver	Rohde & Schwarz	ESU26	100122	01 Apr 2020	12
A3179	Pre-Amplifier	Agilent	8449B	3008A00934	09 Oct 2020	12
A3138	Antenna	Schwarzbeck	BBHA 9120 B	00702	04 Oct 2020	12
A2523	Attenuator	AtlanTecRF	AN18W5-10	832827#1	04 Mar 2020	12

Test Equipment Used for Transmitter Radiated Emissions

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
K0017	3m RSE Chamber	Rainford EMC	N/A	N/A	01 Aug 2020	12
M2003	Thermohygrometer	Testo	608-H1	45046641	07 Jan 2021	12
M1995	Test Receiver	Rohde & Schwarz	ESU40	100428	20 Jan 2021	12
A3167	Pre-Amplifier	Com-Power	PAM-103	18020010	08 Aug 2020	12
A2863	Pre-Amplifier	Agilent	8449B	3008A02100	08 Aug 2020	12
A3142	Pre-Amplifier	Schwarzbeck	BBV 9718 B	00020	08 Aug 2020	12
A2893	Pre-Amplifier	Schwarzbeck	BBV 9721	9721-021	31 July 2020	12
A3161	Antenna	Teseq	CBL6111D	50859	07 Jan 2021	12
A2889	Antenna	Schwarzbeck	BBHA 9120 B	BBHA 9120 B 653	08 Aug 2020	12
A2890	Antenna	Schwarzbeck	HWRD 750	014	08 Aug 2020	12
A2892	Antenna	Schwarzbeck	BBHA 9170	9170-727	01 Aug 2020	12
A2916	Attenuator	AtlanTecRF	AN18W5-10	832827#1	06 Feb 2021	12
A2131	Low Pass Filter	AtlanTecRF	AFL-02000	JFB1004-002	07 Nov 2020	12
A3014	High Pass Filter	AtlanTecRF	AFH-06000	17042400007	05 Feb 2021	12

Note: All test equipment was within its calibration period at the time of test.

3 Equipment Under Test (EUT)

3.1 Identification of Equipment Under Test (EUT)

Brand Name:	Winnow Vision Gen3
Model Name:	Winnow Vision 3.0
Test Sample Serial Number:	1424819028087
Hardware Version:	WV03-01
Software Version:	0.6.5
FCC ID:	2AUM4WV03

3.2 Modifications Incorporated in the EUT

No modifications were applied to the EUT during testing.

3.3 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	1, 2, 5.5 & 11 Mbps (SISO)			
	802.11g	6, 9, 12, 18, 24, 36, 48 & 54 Mbps (SISO)			
	802.11n HT20	MCS0 to MCS7 (1 spatial stream), with or without CDD MCS8 to MCS15 (2 spatial streams)			
Power Supply Requirement(s):	Nominal	120 VAC 60 Hz			
Channel Spacing:	20 MHz				
Transmit Frequency Range:	2412 MHz to 2472 MHz				
Transmit Channels Tested:	Channel ID	Channel Number	Channel Frequency (MHz)		
	Bottom	1	2412		
	Middle	6	2437		
	Top	13	2472		

3.4 Description of Available Antennas

The radio utilizes an external antenna with the following maximum gains:

Manufacturer	Model Number	Type	Frequency Range (MHz)	Antenna Gain (dBi)
Siretta	Tango 23	Omni	2412 to 2472	3.0

3.5 Description of Test Setup

Support Equipment

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

Description:	Dual Band Wireless Router
Brand Name:	ASUS
Model Name or Number:	RT-AX88U
Serial Number:	JBIUHP000173 (UL Asset No. A3202)

Description:	Laptop PC
Brand Name:	Lenovo
Model Name or Number:	ThinkPad L480
Serial Number:	PF1EHZQ0 (UL Asset No. RPT002)

Description:	Ethernet Cable. Quantity 1. Length 2 m.
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 3 m.
Brand Name:	Not marked or stated
Model Name or Number:	Not marked or stated
Serial Number:	Not marked or stated

Description:	USB 2.0 Hub
Brand Name:	Hama
Model Name or Number:	00078498
Serial Number:	21825891500

Description:	3 Port HDMI Switch
Brand Name:	Not marked or stated
Model Name or Number:	Not marked or stated
Serial Number:	Not marked or stated

Description:	Ethernet Router
Brand Name:	Netgear
Model Name or Number:	DG834G v3
Serial Number:	1JX167B008C4A

Support Equipment (continued)

Description:	USB Cable. Quantity 1. Length 3 m.
Brand Name:	Not marked or stated
Model Name or Number:	Not marked or stated
Serial Number:	Not marked or stated

Description:	HDMI Cable. Quantity 1. Length 3 m.
Brand Name:	Maplin
Model Name or Number:	Not marked or stated
Serial Number:	Not marked or stated

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.

Configuration and Peripherals

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

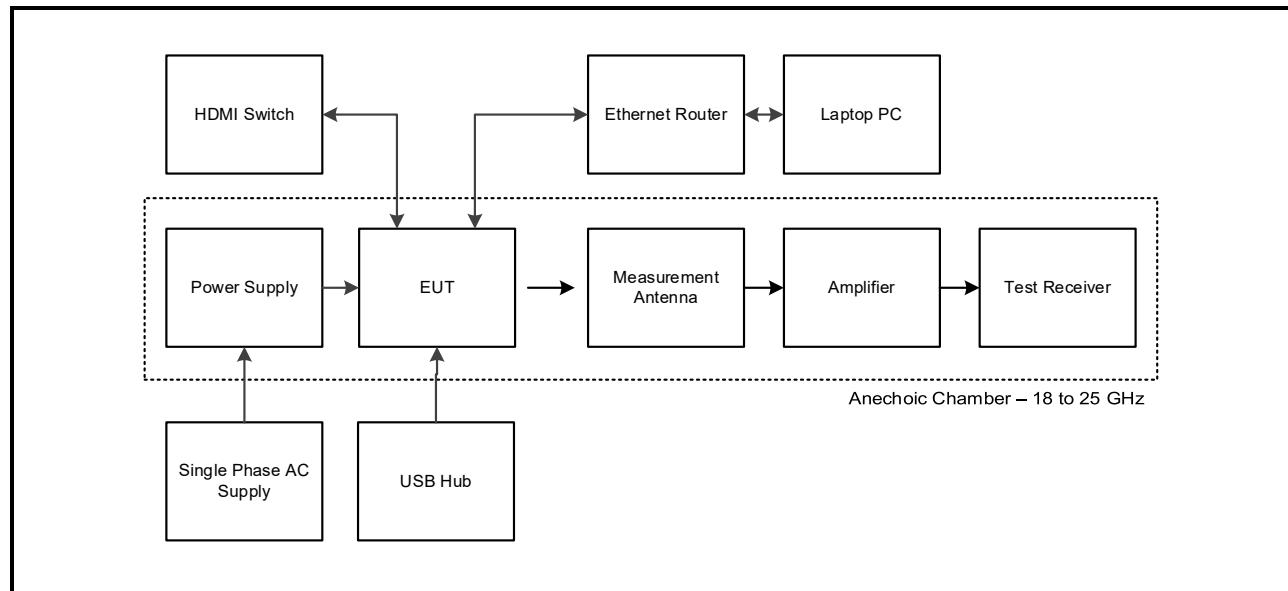
- The EUT was connected to a laptop PC via a DHCP router which were both placed in the ante-chamber. A terminal application running on the laptop PC was used to enable continuous transmission and select the test channel, data rate and modulation schemes as required. The customer supplied a document containing the setup instructions 'NEW Intructions_Winnow-tx2-connection-instructions_29-10-19 & WLAN_Android_TX_Commands.pdf'
- The EUT was powered from a 120 VAC 60 Hz single phase mains supply.
- The customer declared the following worst case modes to be tested:
 - 802.11b - BPSK / 1 Mbps
 - 802.11g - BPSK / 6 Mbps
 - 802.11n HT20 SISO - BPSK / MCS0
 - 802.11n HT20 MIMO - BPSK / MCS0
- Testing was performed using the power settings defined in the supplied document 'Jetson_TX2_WWSafe_Power_Q_Table.pdf'.
- Transmitter spurious emissions were performed with the EUT transmitting with a data rate of 802.11n HT20 / MCS0. This was found to be the worst case mode with regards to emissions after preliminary investigations.
- Transmitter radiated spurious emissions tests were performed with the EUT position in its worst case orientation with respect to emissions. All active ports were terminated.

Test Setup Diagrams

Radiated Tests:

Test Setup for Transmitter Radiated Tests



Test Setup Diagrams (continued)**Radiated Tests:****Test Setup for Transmitter Radiated Tests**

4 Antenna Port Test Results

4.1 Transmitter Duty Cycle

Test Summary:

Test Engineer:	Mohamed Toubella	Test Date:	17 March 2020
Test Sample Serial Number:	1424819028087		

FCC Reference:	Part 15.35(c)
Test Method Used:	FCC KDB 558074 Section 6 referencing ANSI C63.10 Section 11.6

Environmental Conditions:

Temperature (°C):	22
Relative Humidity (%):	36

Note(s):

1. In order to assist with the determination of the average level of spurious emissions field strength, 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 by using the following calculation:

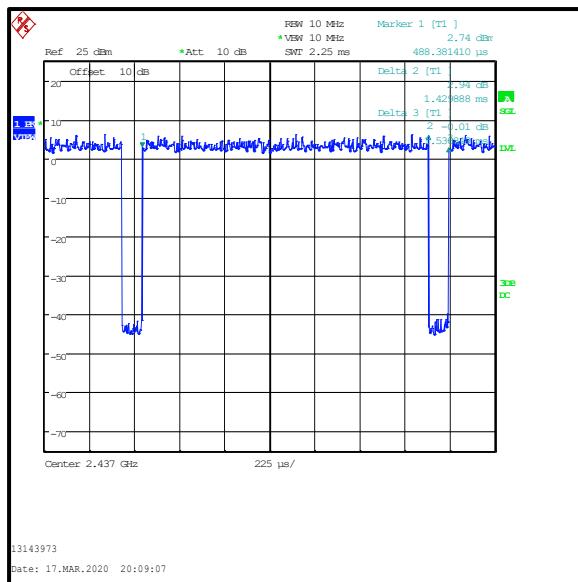
$$10 \log 1 / (\text{On Time} / [\text{Period or } 100\text{ms whichever is the lesser}]).$$

$$802.11g / 20 \text{ MHz} / 6 \text{ Mbps: } 10 \log (1 / (1.430 / 1.531)) = 0.3 \text{ dB}$$
$$802.11n / \text{HT20} / \text{MCS0: } 10 \log (1 / (1.340 / 1.441)) = 0.3 \text{ dB}$$

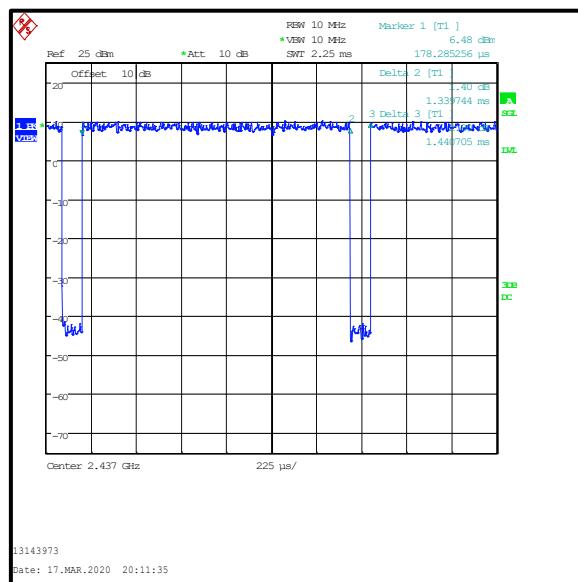
2. Plots below are for data rates with a duty cycle less than 98%.

Transmitter Duty Cycle (continued)**Results: 802.11g / 20 MHz / 6 Mbps**

Pulse Duration (ms)	Period (ms)	Duty Cycle (dB)
1.430	1.531	0.3

**Results: 802.11n / HT20 / MCS0**

Pulse Duration (ms)	Period (ms)	Duty Cycle (dB)
1.340	1.441	0.3



5 Radiated Test Results

5.1 Transmitter Radiated Emissions <1 GHz

Test Summary:

Test Engineer:	Mohamed Toubella	Test Date:	26 February 2020
Test Sample Serial Number:	1424819028087		

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):	25
Relative Humidity (%):	39

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 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. Therefore the highest peak noise floor reading of the measuring receiver was recorded in the table below.
4. Pre-scans were performed and markers placed on the highest measured levels. The test receiver resolution bandwidth was set to 120 kHz and video bandwidth 500 kHz. A peak detector was used, sweep time was set to auto and trace mode was Max Hold.
5. Measurements below 1 GHz were performed in a semi-anechoic chamber (Asset Number K0017) at a distance of 3 metres. The EUT was placed at a height of 80 cm above the reference ground plane in the centre of the chamber turntable. Maximum emission levels were determined by height searching the measurement antenna over the range 1 metre to 4 metres.

Transmitter Radiated Emissions (continued)**Results: Middle Channel / 802.11n / HT20 / BPSK / MCS0**

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
835.418	Horizontal	37.6	46.0	8.4	Complied



5.2 Transmitter Radiated Emissions >1 GHz

Test Summary:

Test Engineer:	Mohamed Toubella	Test Date:	25 February 2020
Test Sample Serial Number:	1424819028087		

FCC Reference:	Parts 15.247(d) & 15.209(a)
Test Method Used:	FCC KDB 558074 Sections 8.5 & 8.6 referencing ANSI C63.10 Sections 6.3, 6.6, 11.11, 11.12.2.4 & 11.12.2.5.2
Frequency Range	1 GHz to 25 GHz

Environmental Conditions:

Temperature (°C):	24
Relative Humidity (%):	33

Note(s):

1. The final measured value, for the given emission, in the table below incorporates the calibrated antenna factor and cable loss.
2. All emissions shown on the pre-scan plot were investigated and found to be ambient, >20 dB below the appropriate limit or below the measurement system noise floor. Therefore the highest peak and average noise floor readings of the measuring receiver were recorded in the tables below.
3. The emission shown approximately at 2437 MHz on the 1 GHz to 3 GHz plot is the EUT fundamental.
4. Pre-scans above 1 GHz were performed in a fully anechoic chamber (Asset Number K0017) 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.
5. 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 respective detectors during the pre-scan measurements.

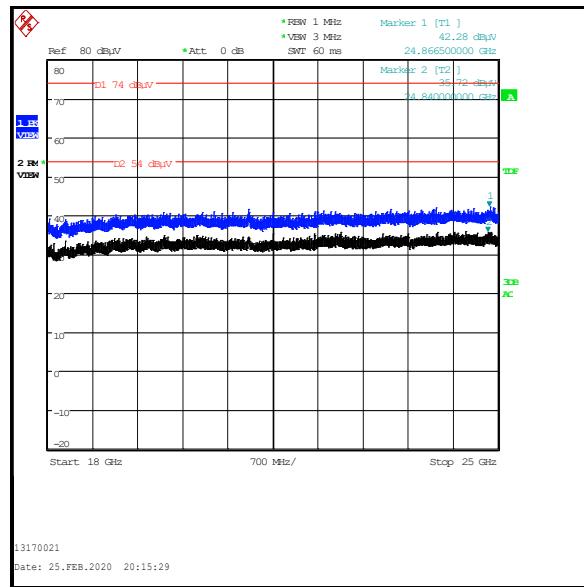
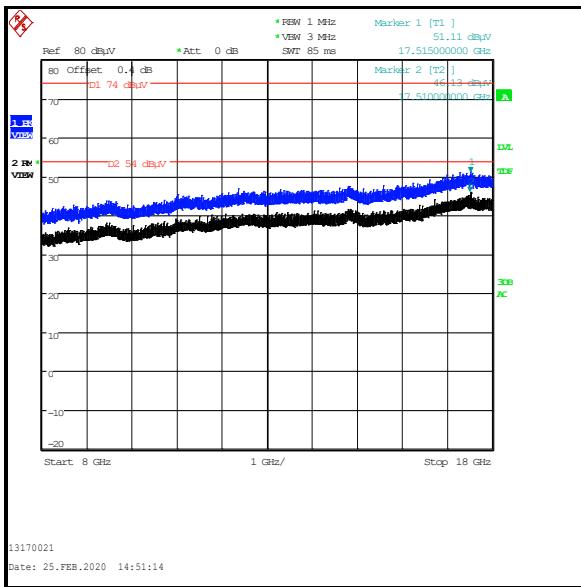
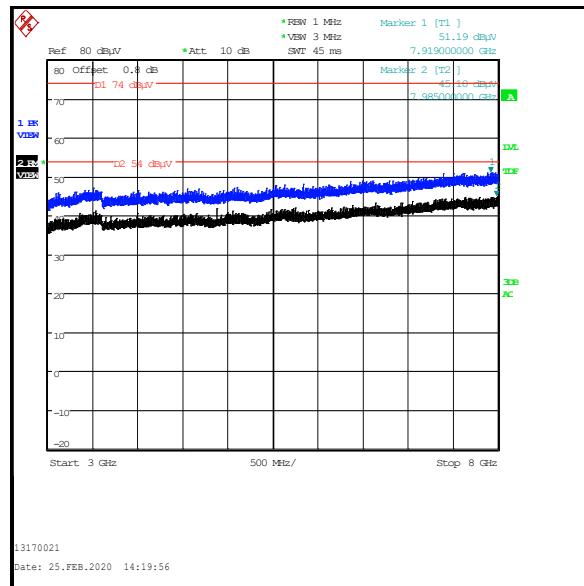
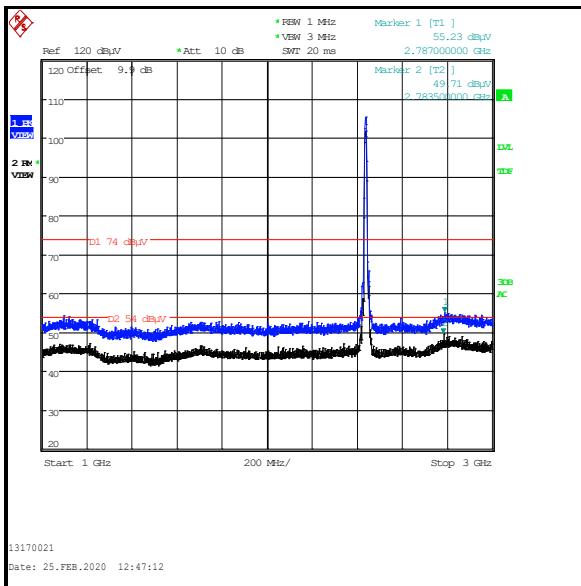
Results: Middle Channel / 802.11n / HT20 / BPSK / MCS0 / Peak

Frequency (MHz)	Antenna Polarity	Peak Level (dB μ V/m)	Peak Limit (dB μ V/m)	Margin (dB)	Result
2787.000	Horizontal	55.2	74.0	18.8	Complied

Results: Middle Channel / 802.11n / HT20 / BPSK / MCS0 / Average

Frequency (MHz)	Antenna Polarity	Average Level (dB μ V/m)	Average Limit (dB μ V/m)	Margin (dB)	Result
2783.500	Horizontal	49.7	54.0	4.3	Complied

Transmitter Radiated Emissions (continued)



5.3 Transmitter Band Edge Radiated Emissions

Test Summary:

Test Engineers:	Tom Sleigh, Jose Bayona & Mohamed Toubella	Test Dates:	26 February 2020 to 27 April 2021
Test Sample Serial Number:	1424819028087		

FCC Reference:	Parts 15.247(d) & 15.209(a)
Test Method Used:	KDB 558074 Section 8.7 referencing ANSI C63.10 Sections 6.10, 11.11, 11.12 & 11.13

Environmental Conditions:

Temperature (°C):	20 to 25
Relative Humidity (%):	26 to 36

Transmitter Band Edge Radiated Emissions (continued)**Note(s):**

1. The following modes were tested:
 - 802.11b / BPSK / 1 Mbps
 - 802.11g / BPSK / 6 Mbps
 - 802.11n HT20 SISO / BPSK / MCS0
 - 802.11n HT20 MIMO / BPSK / MCS0
2. The final measured value, for the given emission, in the table below incorporates the calibrated antenna factor and cable loss.
3. As the lower band edge is adjacent to a non-restricted band, only peak measurements are required. In accordance with ANSI C63.10 Section 11.11.1, 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 ANSI C63.10 Section 11.9.2.2.2 or 11.9.2.2.4 an out-of-band limit line was placed 30 dB (ANSI C63.10 Section 11.11.1(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.
4. As the upper band edge is adjacent to 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 3 MHz. An RMS detector was used, sweep time was set to auto and trace mode was trace averaging over 300 sweeps. 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.
5. * -30 dBc limit.
6. 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.
7. For the upper band edge average result, the EUT had a duty cycle <98%. The duty cycle correction factor calculated in Section 4.1 has been applied.

Transmitter Band Edge Radiated Emissions (continued)**Results: 802.11b / 20 MHz / BPSK / 1 Mbps****Results: Lower Band Edge**

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	-30 dBc Limit (dB μ V/m)	Margin (dB)	Result
2397.997	Horizontal	57.4	70.6	13.2	Complied
2400	Horizontal	52.1	70.6	18.5	Complied

Results: Upper Band Edge / Peak

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
2483.5	Horizontal	57.9	74.0	16.1	Complied
2483.580	Horizontal	59.2	74.0	14.8	Complied

Results: Upper Band Edge / Average

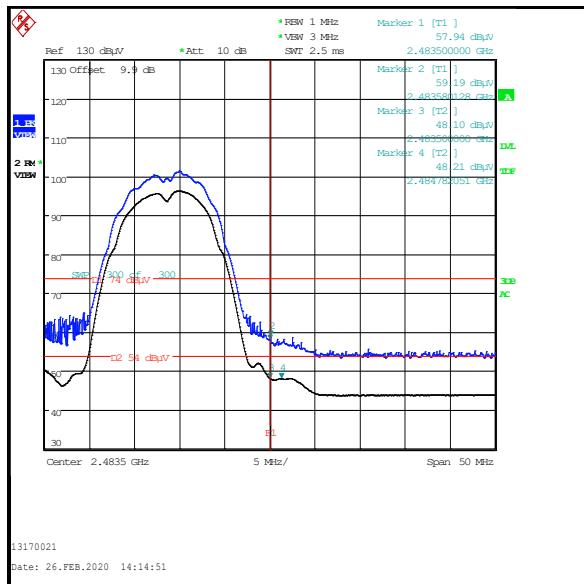
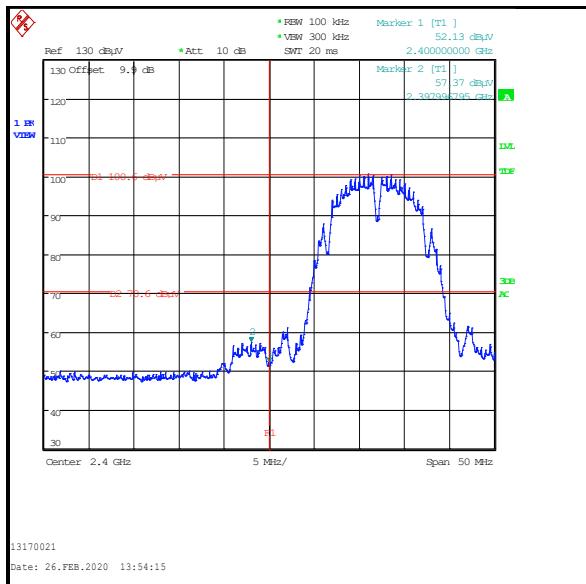
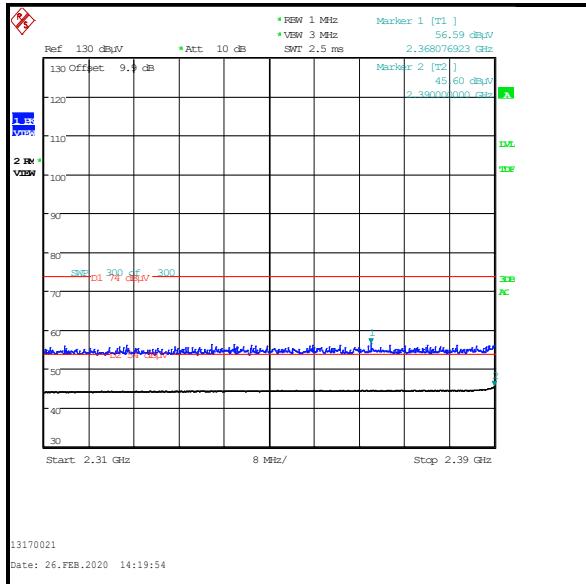
Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
2483.5	Horizontal	48.1	54.0	5.9	Complied
2484.782	Horizontal	48.2	54.0	5.8	Complied

Results: 2310 MHz to 2390 MHz Restricted Band / Peak

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
2368.077	Horizontal	56.6	74.0	17.4	Complied

Results: 2310 MHz to 2390 MHz Restricted Band / Average

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
2390.000	Horizontal	45.6	54.0	8.4	Complied

Transmitter Band Edge Radiated Emissions (continued)**Results: 802.11b / 20 MHz / BPSK / 1 Mbps****Lower Band Edge****Upper Band Edge****2310 MHz to 2390 MHz Restricted Band**

Transmitter Band Edge Radiated Emissions (continued)**Results: 802.11g / 20 MHz / BPSK / 6 Mbps****Results: Lower Band Edge**

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	-30 dBc Limit (dB μ V/m)	Margin (dB)	Result
2399.519	Horizontal	64.6	68.3	3.7	Complied
2400	Horizontal	60.0	68.3	8.3	Complied

Results: Upper Band Edge / Peak

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
2483.5	Horizontal	69.7	74.0	4.3	Complied

Results: Upper Band Edge / Average

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Duty cycle correction (dB)	Corrected Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
2483.5	Horizontal	51.1	0.3	51.4	54.0	2.6	Complied

Results: 2310 MHz to 2390 MHz Restricted Band / Peak

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
2390.000	Horizontal	60.2	74.0	13.8	Complied

Results: 2310 MHz to 2390 MHz Restricted Band / Average

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Duty cycle correction (dB)	Corrected Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
2390.000	Horizontal	45.7	0.3	46.0	54.0	8.0	Complied

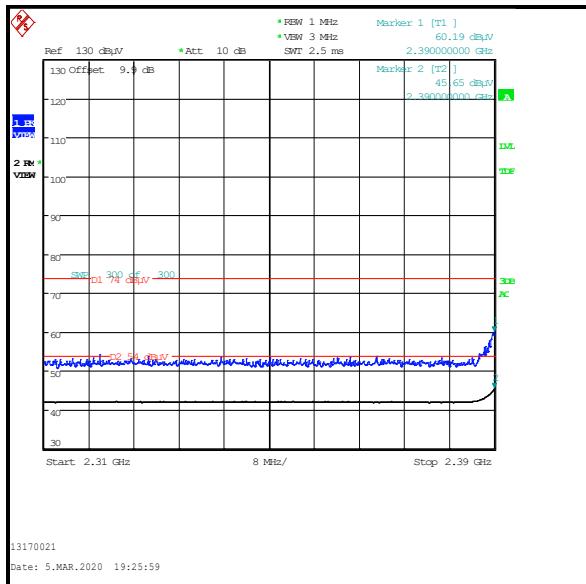
Transmitter Band Edge Radiated Emissions (continued)

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



Lower Band Edge

Upper Band Edge



2310 MHz to 2390 MHz Restricted Band

Transmitter Band Edge Radiated Emissions (continued)**Results: 802.11n HT20 / SISO / BPSK / MCS0****Results: Lower Band Edge**

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	-30 dBc Limit (dB μ V/m)	Margin (dB)	Result
2399.519	Horizontal	62.5	69.5	7.0	Complied
2400	Horizontal	60.5	69.5	9.0	Complied

Results: Upper Band Edge / Peak

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
2483.5	Horizontal	69.6	74.0	4.4	Complied

Results: Upper Band Edge / Average

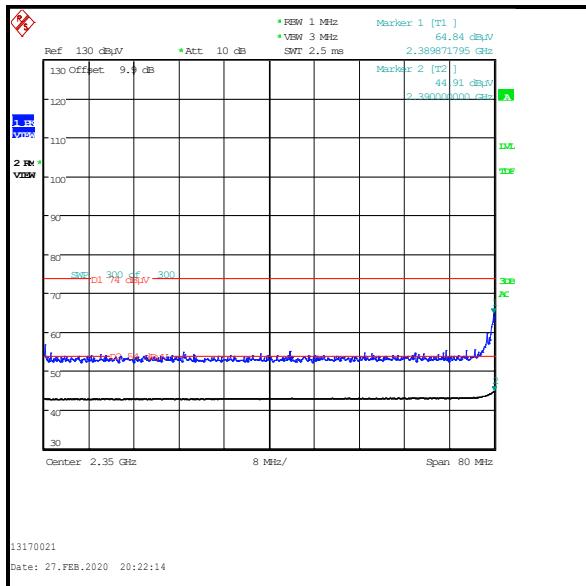
Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Duty cycle correction (dB)	Corrected Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
2483.5	Horizontal	52.7	0.3	53.0	54.0	1.0	Complied

Results: 2310 MHz to 2390 MHz Restricted Band / Peak

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
2389.872	Horizontal	64.8	74.0	9.2	Complied

Results: 2310 MHz to 2390 MHz Restricted Band / Average

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Duty cycle correction (dB)	Corrected Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
2390.000	Horizontal	44.9	0.3	45.2	54.0	8.8	Complied

Transmitter Band Edge Radiated Emissions (continued)**Results: 802.11n HT20 / SISO / BPSK / MCS0****Lower Band Edge****Upper Band Edge****2310 MHz to 2390 MHz Restricted Band**

Transmitter Band Edge Radiated Emissions (continued)**Results: 802.11n HT20 / MIMO / BPSK / MCS0****Results: Lower Band Edge**

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	-30 dBc Limit (dB μ V/m)	Margin (dB)	Result
2396.635	Horizontal	64.5	71.0	6.5	Complied
2400	Horizontal	60.2	71.0	10.8	Complied

Results: Upper Band Edge / Peak

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
2483.5	Horizontal	66.3	74.0	7.7	Complied
2483.660	Horizontal	67.7	74.0	6.3	Complied

Results: Upper Band Edge / Average

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Duty cycle correction (dB)	Corrected Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
2483.5	Horizontal	49.5	0.3	49.8	54.0	4.2	Complied

Results: 2310 MHz to 2390 MHz Restricted Band / Peak

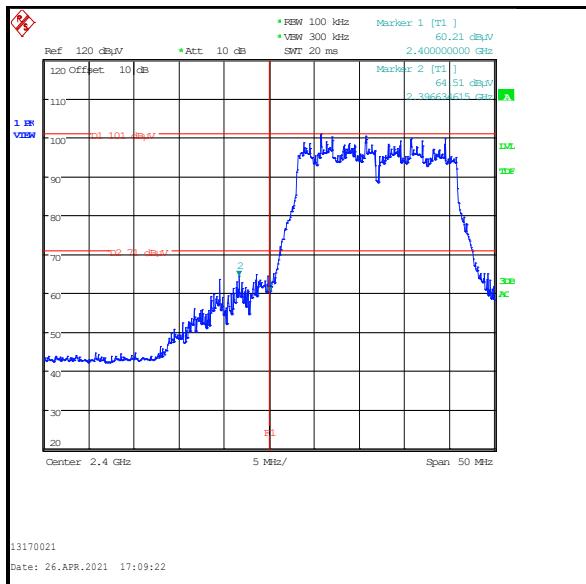
Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
2390.000	Horizontal	65.2	74.0	8.8	Complied

Results: 2310 MHz to 2390 MHz Restricted Band / Average

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Duty cycle correction (dB)	Corrected Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
2389.872	Horizontal	46.0	0.3	46.3	54.0	7.7	Complied

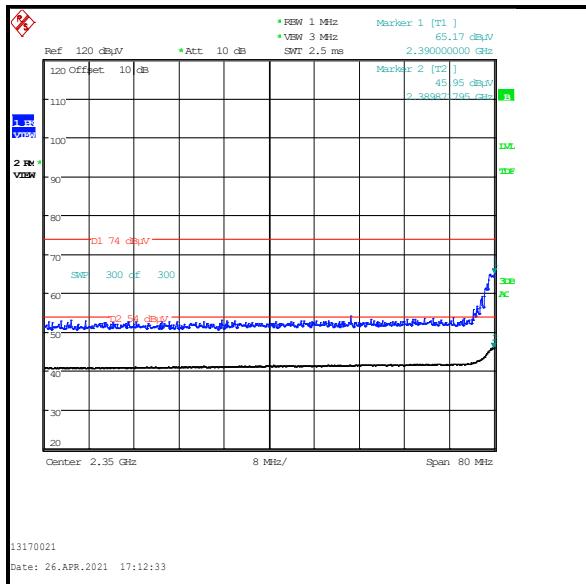
Transmitter Band Edge Radiated Emissions (continued)

Results: 802.11n HT20 / MIMO / BPSK / MCS0



Lower Band Edge

Upper Band Edge



2310 MHz to 2390 MHz Restricted Band

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