



TEST REPORT

Test Report No. : UL-RPT-RP13041774JD11A V2.0

Customer : Apple Inc.

Model No./HVIN : A2251

PMN : MacBook Pro

FCC ID : BCGA2251

ISED Certification No. : IC: 579C-A2251

Technologies : *Bluetooth* – Low Energy;
Bluetooth – BR/EDR;
2.4 GHz WLAN & 5 GHz WLAN

Test Standard(s) : FCC Parts 15.33, 15.205(a), 15.209(a), 15.247(d) & 15.407(b)
ISED Canada RSS-247 5.5, 6.2.1.2, 6.2.4.2 &
RSS-Gen 6.13, 8.9 & 8.10

Test Laboratory : UL VS 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 2.0 supersedes all previous versions.

Date of Issue:

21 April 2020

Checked by:

Ian Watch

Senior Test Engineer, Radio Laboratory

Company Signatory:

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Senior Test Engineer, Radio Laboratory
UL VS LTD

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Customer Information

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Report Revision History

Version Number	Issue Date	Revision Details	Revised By
1.0	12/03/2020	Initial Version	Ian Watch
2.0	21/04/2020	Antenna gains in section 3.4 updated	Sarah Williams

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1. Attestation of Test Results

1.1. Description of EUT

The Equipment Under Test (EUT) was a Laptop Computer with *Bluetooth*, *Bluetooth* Low Energy and 802.11 a/b/g/n/ac capabilities in the 2.4 GHz and 5.0 GHz bands.

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
Specification Reference:	47CFR15.407
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications): Part 15 Subpart E (Unlicensed National Information Infrastructure Devices) – Sections 15.407
Specification Reference:	RSS-Gen Issue 5 April 2018
Specification Title:	General Requirements for Compliance of Radio Apparatus
Specification Reference:	RSS-247 Issue 2 February 2017
Specification Title:	Digital Transmission Systems (DTSS), Frequency Hopping Systems (FHSS) and Licence-Exempt Local Area Network (LE-LAN) Devices
FCC Test Firm Registration No.:	621311
ISED Canada Site Registration No.:	3245B
Test Dates:	08 December 2019 to 10 January 2020

1.3. Summary of Test Results

FCC Reference (47CFR)	ISED Canada Reference	Measurement	Result
Bluetooth Basic Rate & 5 GHz WLAN (SISO & MIMO)			
15.209(a)/15.247(d) /15.407(b)	RSS-Gen 6.13 / RSS-247 5.5, 6.2.1.2, & 6.2.4.2	Transmitter Out of Band Radiated Emissions	Complied
Bluetooth LE & 5 GHz WLAN (SISO)			
15.209(a)/15.247(d) /15.407(b)	RSS-Gen 6.13 / RSS-247 5.5, 6.2.1.2, & 6.2.4.2	Transmitter Out of Band Radiated Emissions	Complied
2.4 GHz WLAN (SISO) & 5 GHz WLAN (MIMO)			
15.209(a)/15.247(d) /15.407(b)	RSS-Gen 6.13 / RSS-247 5.5, 6.2.1.2, & 6.2.4.2	Transmitter Out of Band Radiated Emissions	Complied

Note(s):

- There are two vendors of the WiFi/*Bluetooth* radio modules, Vendor 1 and Vendor 2.
- The WiFi/*Bluetooth* radio modules have the same mechanical outline (i.e. the same packaging dimension and pin layout), use the same on-board antenna matching circuit, have an identical antenna structure and are built and tested to conform to the same specification and to operate within the same tolerances.

Baseline testing was performed on the two vendors to determine worst case.

- The EUT supports Simultaneous-In-Band (SIB) and Simultaneous-Dual-Band (SDB) transmission. Testing was performed to verify compliance of radiated spurious emissions against applicable limits when the EUT was simultaneously transmitting in the *Bluetooth* and 5 GHz band (SIB) and simultaneously in the 2.4 GHz and 5 GHz bands (SDB). Only radiated spurious emissions related to intermodulation products are recorded in this test report.

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 17	X

UL VS LTD is accredited by UKAS. 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 DTS Meas Guidance v05r02 April 2, 2019
Title:	Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under Section 15.247
Reference:	KDB 789033 D02 General U-NII Test Procedures New Rules v02r01 December 14, 2017
Title:	Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices (Part 15, Subpart E)

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

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 measured (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%	±3.30 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.

2.4. Test and Measurement Equipment

Test Equipment Used for Transmitter Radiated Emissions Tests

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
K0017	3m RSE Chamber	Rainford	N/A	N/A	01 Aug 2020	12
M2003	Thermohygrometer	Testo	608-H1	45046641	06 Jan 2020	12
M1630	Test Receiver	Rohde & Schwarz	ESU40	100233	12 Nov 2020	12
A2915	Low Pass Filter	AtlanTecRF	AFL-04000	2156	20 Feb 2020	12
A2916	Attenuator	AtlanTecRF	AN18W5-10	832827#1	20 Feb 2020	12
A2863	Pre-Amplifier	Agilent	8449B	3008A02100	08 Aug 2020	12
A2889	Antenna	Schwarzbeck	BBHA 9120B	BBHA 9120 B653	08 Aug 2020	12
A3014	High Pass Filter	AtlanTecRF	AFH-06000	17042400007	20 Feb 2020	12
A2474	5.725 GHz to 5.85 GHz Band Reject Filter	Wainwright Instruments	WRCJV8-5665-5725-5850-5910-50SS	1	15 Nov 2020	12
A2914	High Pass Filter	AtlanTecRF	AFH-03000	2155	20 Feb 2020	12
A2471	5.15 GHz to 5.25 GHz Band Reject Filter	Wainwright Instruments	WRCJV8-5100-5250-5300-50SS	1	13 Sep 2020	12
A2896	Pre-Amplifier	Schwarzbeck	BBV 9721	9721 - 023	08 Feb 2020	12
A2895	Antenna	Schwarzbeck	BBHA 9170	9170-728	08 Feb 2020	12
A2472	5.25 GHz to 5.35 GHz Band Reject Filter	Wainwright Instruments	WRCJV8-5200-5250-5350-5400-50SS	1	13 Sep 2020	12
A2892	Antenna	Schwarzbeck	BBHA 9170	9170-727	01 Aug 2020	12
A2893	Pre-Amplifier	Schwarzbeck	BBV 9721	9721-021	31 Jul 2020	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
A3154	Pre-Amplifier	Com-Power	PAM-103	18020012	04 Oct 2020	12
A553	Antenna	Chase	CBL6111A	1593	14 Oct 2020	12
A3112	Attenuator	AtlanTecRF	AN18-06	219706#2	14 Oct 2020	12
A3083	Low Pass Filter	AtlanTecRF	AFL-01000	18010900076	08 Apr 2020	12
A2141	Attenuator	AtlanTecRF	AN18-10	090918-04	07 Nov 2020	12
A3139	Antenna	Schwarzbeck	Schwarzbeck	Schwarzbeck	07 Oct 2020	12
A3093	High Pass Filter	AtlanTecRF	AFH-03000	18051800077	09 Apr 2020	12

3. Equipment Under Test (EUT)

3.1. Identification of Equipment Under Test (EUT)

Brand Name:	Apple
Model No. / HVIN:	A2251
Test Sample Serial Number:	C02ZG00KP22J (<i>Radiated sample #1</i>)
Hardware Version:	REV 1.0
Software Version:	19C19
FCC ID:	BCGA2251
ISED Certification Number:	IC: 579C-A2251

Brand Name:	Apple
Model No. / HVIN:	A2251
Test Sample Serial Number:	C02ZG00UP22J (<i>Radiated sample #2</i>)
Hardware Version:	REV 1.0
Software Version:	19C19
FCC ID:	BCGA2251
ISED Certification Number:	IC: 579C-A2251

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:	<i>Bluetooth</i> Low Energy (Digital Transmission System)		
Type of Unit:	Transceiver		
Channel Spacing:	2 MHz		
Transmit Frequency Range:	2400 MHz to 2483.5 MHz		
Transmit Channels Tested:	Channel ID	Channel Number	Channel Frequency (MHz)
	Bottom	37	2402
	Top	39	2480

Tested Technology:	<i>Bluetooth</i> (FHSS)		
Mode:	Basic Rate		
Modulation:	GFSK		
Packet Type: (Maximum Payload)	DH5		
Data Rate (Mbps):	1		
Transmit Frequency Range:	2400 MHz to 2483.5 MHz		
Transmit Channels Tested:	Channel ID	Channel Number	Channel Frequency (MHz)
	Bottom	0	2402
	Top	78	2480

Technology Tested:	WLAN (IEEE 802.11b/g/n) / Digital Transmission System		
Channel Spacing:	20 MHz		
Modulation:	BPSK		
Data Rate:	802.11n HT20 (SISO)	MCS0	
	802.11n HT20 (MIMO)	MCS0 with CDD	
Transmit Frequency Range:	2400 MHz to 2483.5 MHz		
Transmit Channels Tested:	Channel ID	Channel Number	Channel Frequency (MHz)
	Bottom	1	2412
	Top	13	2472

Additional Information Related to Testing (continued)

Technology Tested:	WLAN (IEEE 802.11a/n/ac) / U-NII / LE-LAN		
Channel Spacing:	20 MHz		
Modulation:	BPSK		
Data Rate:	802.11n HT20 (SISO)	MCS0	
	802.11n HT20 (MIMO)	MCS0 with CDD	
Transmit Frequency Range:	5150 MHz to 5850 MHz		
Transmit Channels Tested:	Channel ID	Channel Number	Channel Frequency (MHz)
	Bottom	36	5180
	Top	165	5825

3.4. Description of Available Antennas

The radio utilizes integrated antennas with the following maximum gains:

Bluetooth:

The radio utilizes an integrated antenna, with the following maximum gain:

Frequency Range (MHz)	Antenna Gain (dBi)
2400-2480	1.1

2.4 GHz WLAN:

The radio utilizes three integrated antennas, with the following maximum gains:

Frequency Band (MHz)	$G_{\text{Antenna 1 / Core 0}}$ (dBi)	$G_{\text{Antenna 2 / Core 1}}$ (dBi)	$G_{\text{Antenna 3 / Core 2}}$ (dBi)
2400 -2480	1.8	1.1	2.2

5 GHz WLAN:**Directional Antenna Gain for Correlated Signals (CDD) / Output Power Measurements:**

Frequency Band (MHz)	$G_{\text{Antennas Core 0 \& Core 1}}$ (dBi)	$G_{\text{Antennas Core 1, Core 0, Core 2}}$ (dBi)
5150 to 5250	5.6	5.6
5250 to 5350	5.2	5.2
5470 to 5725	4.3	4.3
5725 to 5850	4.4	4.4

3.5. Description of Test Setup

Support Equipment

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

Description:	Personal Hands Free (PHF)
Brand Name:	Apple
Model Name or Number:	Apple EarPods
Serial Number:	Not marked or stated

Description:	USB Hub
Brand Name:	Hama
Model Name or Number:	00078498
Serial Number:	09825891600

Description:	USB Cable. Length 3.0 metres. Quantity 3
Brand Name:	Not marked or stated
Model Name or Number:	Not marked or stated
Serial Number:	Not marked or stated

Description:	USB-C to USB Adaptor. Quantity 3
Brand Name:	Apple
Model Name or Number:	A1632
Serial Number:	Not marked or stated

Description:	USB Hub
Brand Name:	Belkin
Model Name or Number:	F5U404-BLK
Serial Number:	Not marked or stated

Description:	61W USB-C Power Adapter
Brand Name:	Apple
Model Name or Number:	A1947
Serial Number:	Not marked or stated

Operating Modes

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

- Transmitting at maximum power on bottom and top channels using all combinations of technologies supported in the 2.4 and 5 GHz bands.

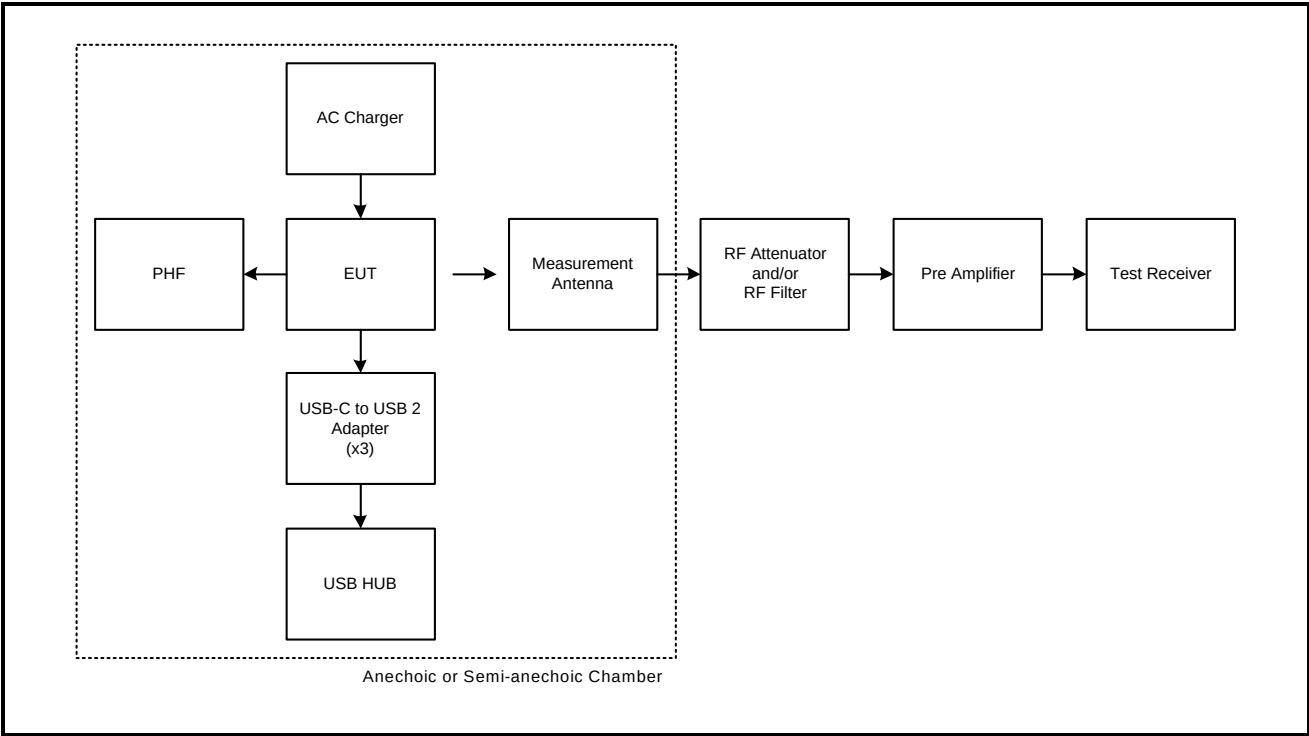
Configuration and Peripherals

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

- *Bluetooth* Basic Rate: Transmitter radiated spurious emissions tests were performed with the EUT transmitting in Basic Rate mode as this mode was found to transmit higher power than EDR mode.
- *Bluetooth* LE: Transmitter radiated spurious emissions tests were performed with the EUT transmitting in LE mode as this mode was found to transmit higher power than LE2M mode.
- 2.4 GHz WLAN: Transmitter radiated spurious emissions tests were performed with the EUT transmitting using 802.11b / 1 Mbps / SISO configuration as this modes was found to transmit higher EIRP than all the other 2.4 GHz WLAN modes.
- 5 GHz WLAN: Transmitter radiated spurious emissions tests were performed with the EUT transmitting using either 802.11n / HT20 / MCS0 / MIMO (3Tx CDD) or 802.11n / HT20 / MCS0 / SISO configuration as these modes were found to transmit higher EIRP than all the other 5 GHz WLAN modes.
- *Bluetooth* Basic Rate and 5 GHz WLAN co-location, with the EUT configured to simultaneously transmit two signals at maximum output power, *Bluetooth* on bottom channel and 5 GHz WLAN on top channel.
- *Bluetooth* Basic Rate and 5 GHz WLAN co-location, with the EUT configured to simultaneously transmit two signals at maximum output power, *Bluetooth* on top channel and 5 GHz WLAN on bottom channel.
- *Bluetooth* LE and 5 GHz WLAN co-location, with the EUT configured to simultaneously transmit two signals at maximum output power, *Bluetooth* LE on bottom channel and 5 GHz WLAN on top channel.
- *Bluetooth* LE and 5 GHz WLAN co-location, with the EUT configured to simultaneously transmit two signals at maximum output power, *Bluetooth* LE on top channel and 5 GHz WLAN on bottom channel.
- 2.4 GHz WLAN and 5 GHz WLAN co-location, with the EUT configured to simultaneously transmit two signals at maximum output power, 2.4 GHz WLAN on bottom channel and 5 GHz WLAN on top channel.
- 2.4 GHz WLAN and 5 GHz WLAN co-location, with the EUT configured to simultaneously transmit two signals at maximum output power, 2.4 GHz WLAN on top channel and 5 GHz WLAN on bottom channel.
- The EUT was powered from a 120 VAC 60 Hz single phase mains supply.
- Radiated spurious emissions tests were performed with the PHF connected to the EUT. The remaining USB ports were connected via a USB cable to a hub. The USB-C ports were connected via a USB C-A adaptor and USB cable to a hub. The hub was placed under the floor inside the chamber.

Test Setup Diagrams

Transmitter Radiated Emissions



4. Radiated Test Results

4.1. Transmitter Out of Band Radiated Emissions - *Bluetooth* Basic Rate bottom channel / 5 GHz WLAN (SISO) top channel

Test Summary:

Test Engineers:	Mark Perry, John Ferdinand, Mohamed Toubella, Marco Zunarelli, Tom Sleigh & Andrew Harding	Test Dates:	08 December 2019 to 22 December 2019
Test Sample Serial Numbers:	C02ZG00KP22J & C02ZG00UP22J		

FCC Reference:	Parts 15.33, 15.205(a), 15.209(a), 15.247(d) & 15.407(b)
ISED Canada Reference:	RSS-Gen 6.13 & 8.9 / RSS-247 5.5 & 6.2.4.2
Test Method Used:	KDB 789033 II.G & ANSI C63.10 Sections 6.3, 6.5 and 6.6
Frequency Range:	30 MHz to 40 GHz
Configuration:	<i>Bluetooth</i> Basic Rate bottom channel / 5 GHz WLAN (SISO) top channel

Environmental Conditions:

Temperature (°C):	20 to 24
Relative Humidity (%):	31 to 40

Note(s):

1. All intermodulation products were below the noise floor level or greater than 20 dB from the specification limit.
2. The *Bluetooth* fundamental is shown on the 1 GHz to 3 GHz plot.
3. The 5 GHz WLAN fundamental is shown on the 4 GHz to 6 GHz plot.
4. Pre-scans were made against the FCC Part 15 general limits for radiated emissions.
5. The test receiver resolution bandwidth was set to 120 kHz and video bandwidth 500 kHz, for measurements below 1 GHz. For measurements above 1 GHz resolution bandwidth was set 1 MHz and video bandwidth 3 MHz, with the sweep time set to auto. Markers were placed on the highest measured level.
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.
7. Measurements above 1 GHz were performed in fully anechoic chambers (Asset Numbers K0001 and 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.

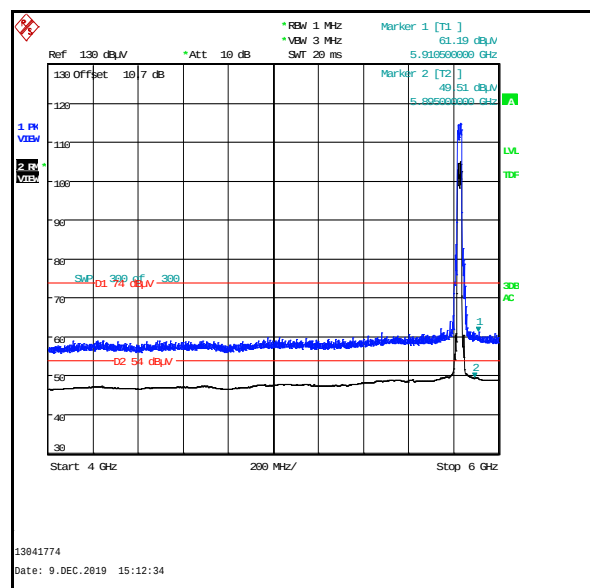
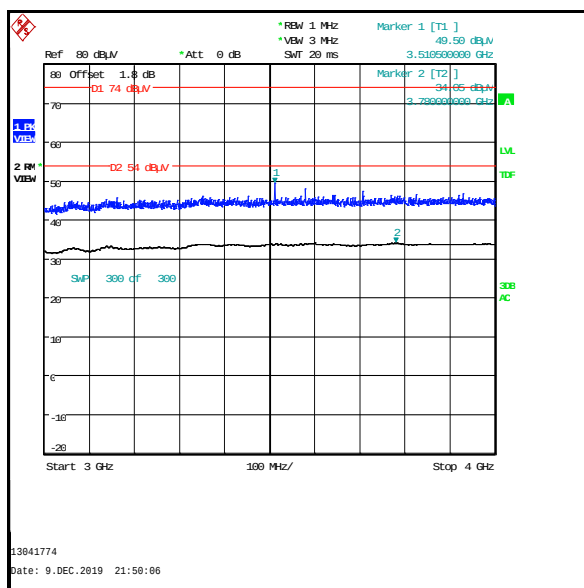
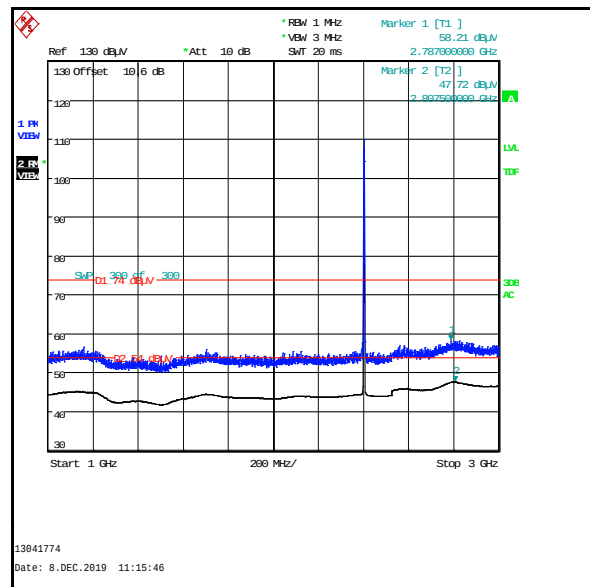
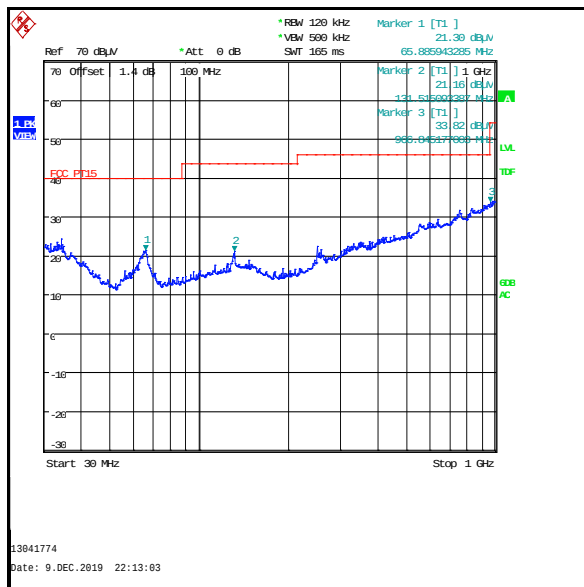
Transmitter Out of Band Radiated Emissions - *Bluetooth* Basic Rate bottom channel / 5 GHz WLAN top channel (continued)

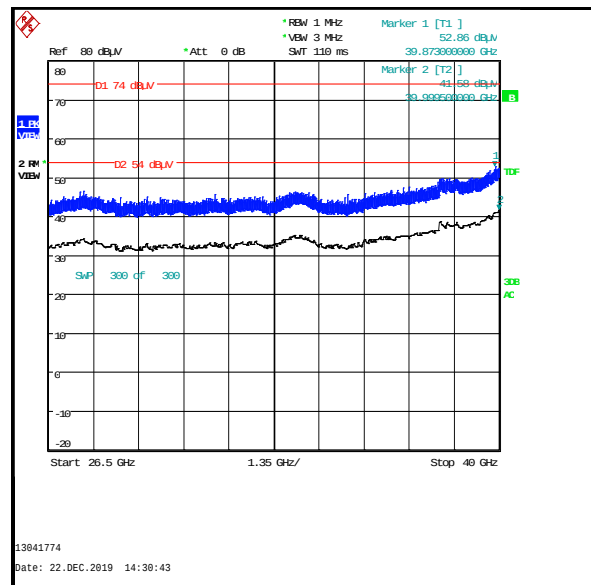
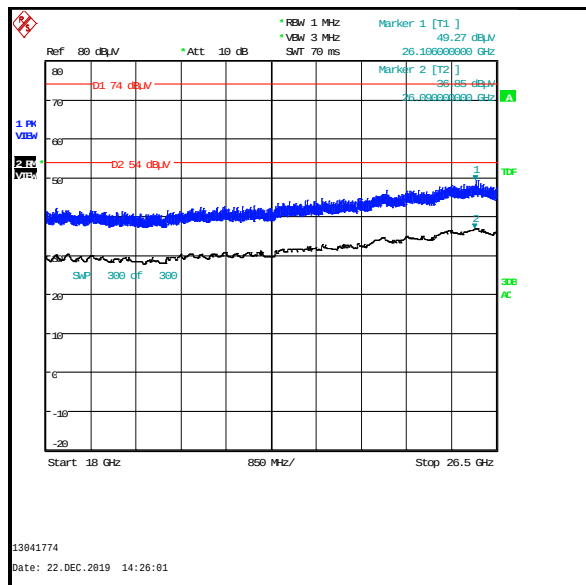
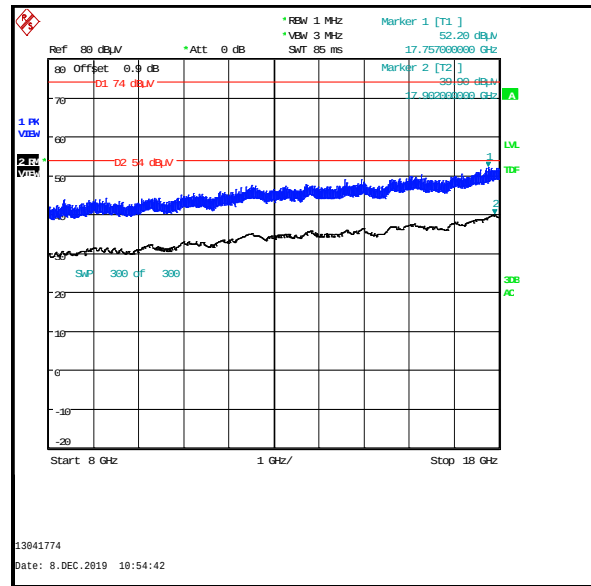
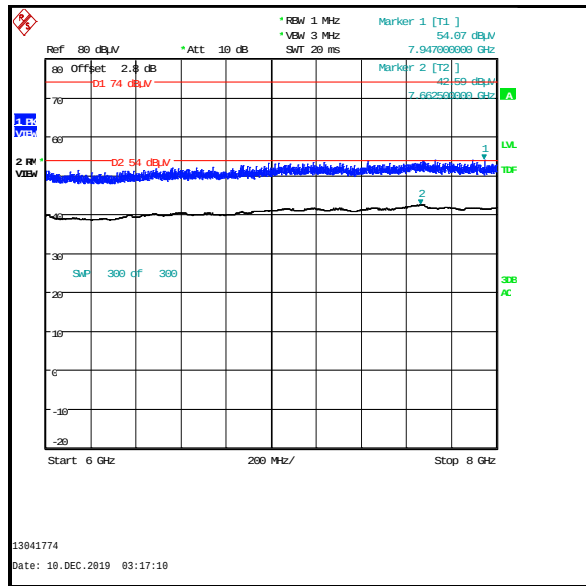
Results: Peak

Frequency (MHz)	Antenna Polarity	Peak Level (dB μ V/m)	Peak Limit (dB μ V/m)	Margin (dB)	Result
See note 1					

Results: Average

Frequency (MHz)	Antenna Polarity	Average Level (dB μ V/m)	Average Limit (dB μ V/m)	Margin (dB)	Result
See note 1					



Transmitter Out of Band Radiated Emissions - *Bluetooth* Basic Rate bottom channel / 5 GHz WLAN (SISO) top channel (continued)

4.2. Transmitter Out of Band Radiated Emissions - *Bluetooth* Basic Rate top channel / 5 GHz WLAN (SISO) bottom channel

Test Summary:

Test Engineers:	Mark Perry, John Ferdinand Mohamed Toubella, Marco Zunarelli, Tom Sleigh & Andrew Harding	Test Dates:	08 December 2019 to 22 December 2019
Test Sample Serial Numbers:	C02ZG00KP22J & C02ZG00UP22J		

FCC Reference:	Parts 15.33, 15.205(a), 15.209(a), 15.247(d) & 15.407(b)
ISED Canada Reference:	RSS-Gen 6.13 & 8.9 / RSS-247 5.5 & 6.2.1.2
Test Method Used:	KDB 789033 II.G & ANSI C63.10 Sections 6.3, 6.5 and 6.6
Frequency Range:	30 MHz to 40 GHz
Configuration:	<i>Bluetooth</i> Basic Rate top channel / 5 GHz WLAN (SISO) bottom channel

Environmental Conditions:

Temperature (°C):	20 to 24
Relative Humidity (%):	31 to 40

Note(s):

1. All intermodulation products were below the noise floor level or greater than 20 dB from the specification limit.
2. The *Bluetooth* fundamental is shown on the 1 GHz to 3 GHz plot.
3. The 5 GHz WLAN fundamental is shown on the 4 GHz to 6 GHz plot.
4. Pre-scans were made against the FCC Part 15 general limits for radiated emissions.
5. The test receiver resolution bandwidth was set to 120 kHz and video bandwidth 500 kHz, for measurements below 1 GHz. For measurements above 1 GHz resolution bandwidth was set 1 MHz and video bandwidth 3 MHz, with the sweep time set to auto. Markers were placed on the highest measured level.
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.
7. Measurements above 1 GHz were performed in fully anechoic chambers (Asset Numbers K0001 and 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.

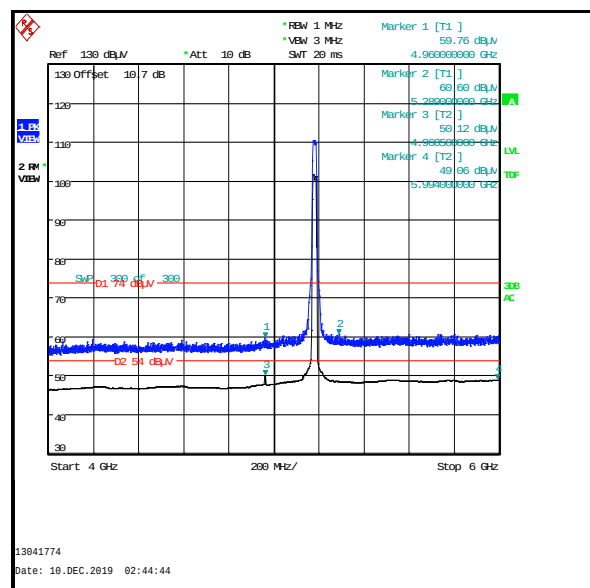
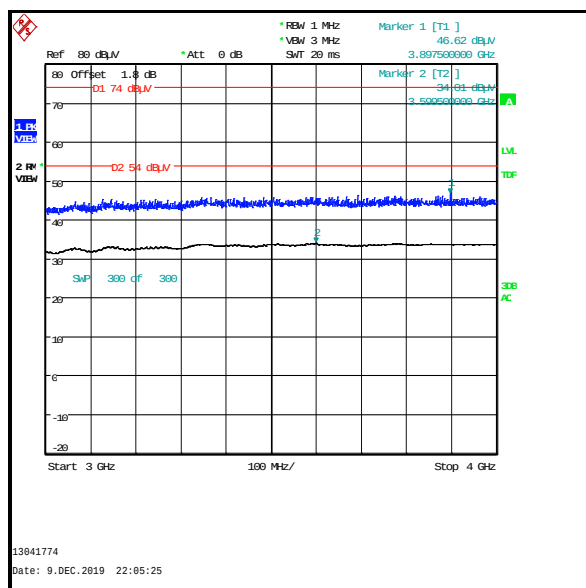
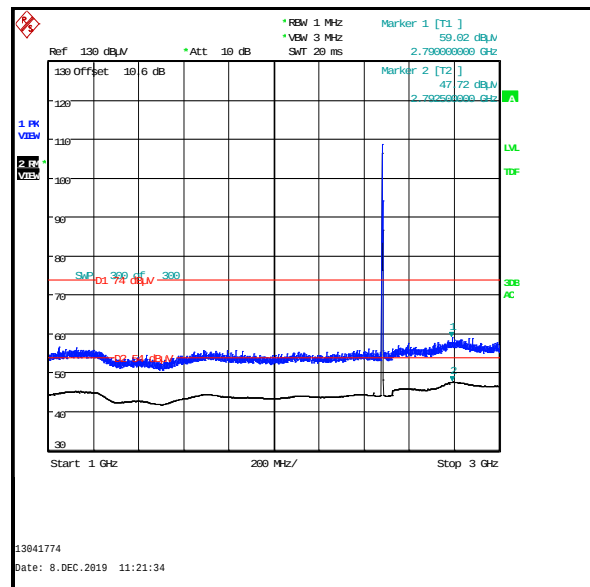
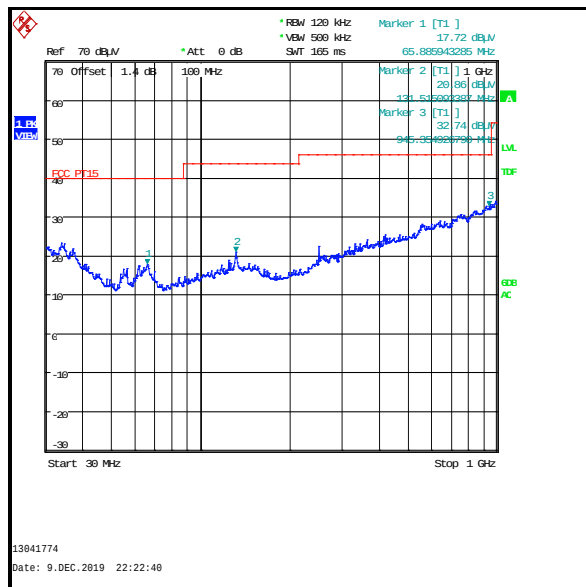
Transmitter Out of Band Radiated Emissions - *Bluetooth* Basic Rate top channel / 5 GHz WLAN (SISO) bottom channel (continued)

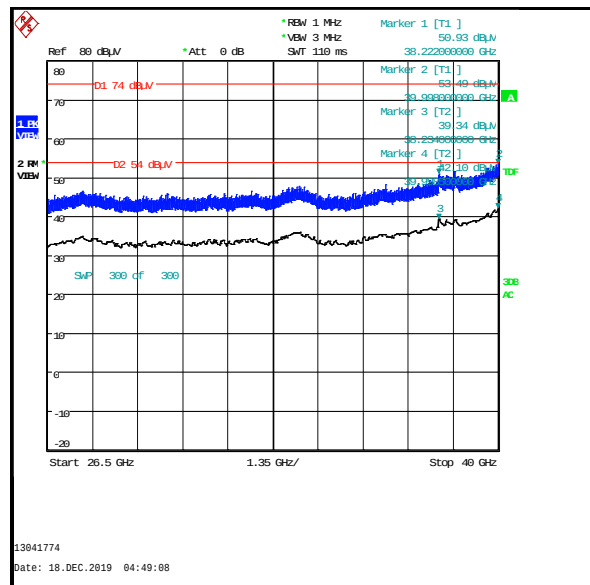
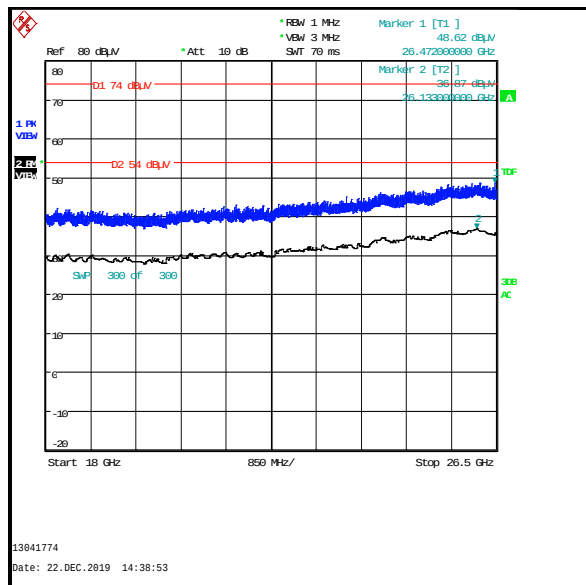
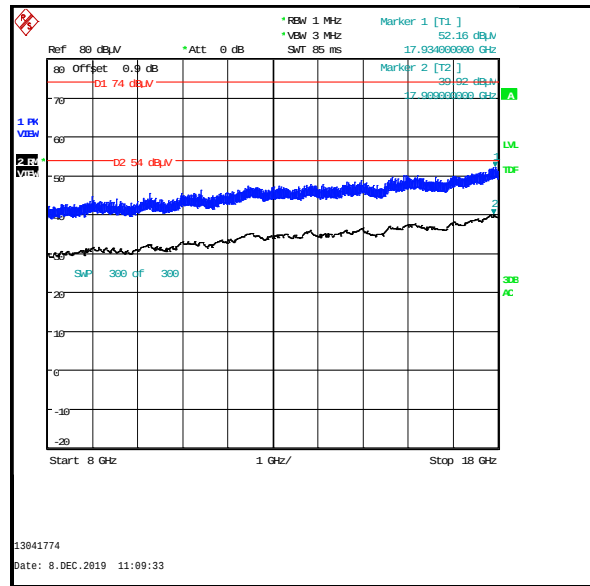
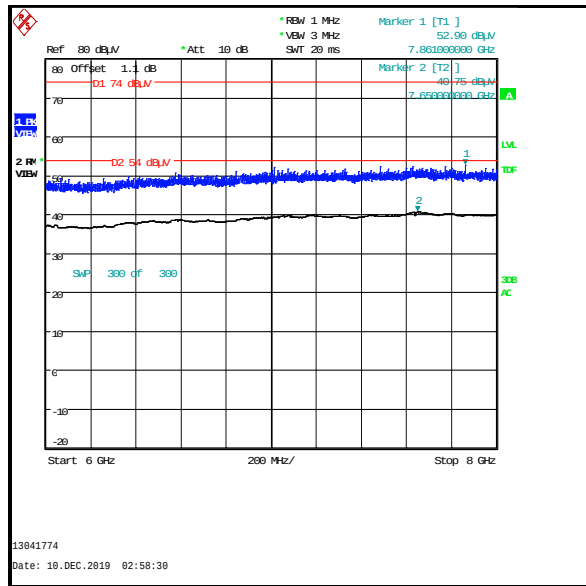
Results: Peak

Frequency (MHz)	Antenna Polarity	Peak Level (dB μ V/m)	Peak Limit (dB μ V/m)	Margin (dB)	Result
See note 1					

Results: Average

Frequency (MHz)	Antenna Polarity	Average Level (dB μ V/m)	Average Limit (dB μ V/m)	Margin (dB)	Result
See note 1					



Transmitter Out of Band Radiated Emissions - *Bluetooth* Basic Rate top channel / 5 GHz WLAN (SISO) bottom channel (continued)

4.3. Transmitter Out of Band Radiated Emissions - *Bluetooth* LE bottom channel / 5 GHz WLAN (SISO) top channel

Test Summary:

Test Engineers:	Mark Perry, John Ferdinand, Mohamed Toubella, Marco Zunarelli, Tom Sleigh & Andrew Harding	Test Dates:	10 December 2019 to 18 December 2019
Test Sample Serial Numbers:	C02ZG00KP22J & C02ZG00UP22J		

FCC Reference:	Parts 15.33, 15.205(a), 15.209(a), 15.247(d) & 15.407(b)
ISED Canada Reference:	RSS-Gen 6.13 & 8.9 / RSS-247 5.5 & 6.2.4.2
Test Method Used:	ANSI C63.10 Sections 6.3, 6.5, 6.6, 11.11, 11.12.2.4 & 11.12.2.5.1 KDB 558074 Sections 11, 12.2.4 & 12.2.5.1, KDB 789033 II.G
Frequency Range:	30 MHz to 40 GHz
Configuration:	<i>Bluetooth</i> LE bottom channel / 5 GHz WLAN (SISO) top channel

Environmental Conditions:

Temperature (°C):	20 to 24
Relative Humidity (%):	31 to 40

Note(s):

1. All intermodulation products were below the noise floor level or greater than 20 dB from the specification limit.
2. The *Bluetooth* LE fundamental is shown on the 1 GHz to 3 GHz plot.
3. The 5 GHz WLAN fundamental is shown on the 4 GHz to 6 GHz plot.
4. Pre-scans were made against the FCC Part 15 general limits for radiated emissions.
5. The test receiver resolution bandwidth was set to 120 kHz and video bandwidth 500 kHz, for measurements below 1 GHz. For measurements above 1 GHz resolution bandwidth was set 1 MHz and video bandwidth 3 MHz, with the sweep time set to auto. Markers were placed on the highest measured level.
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.
7. Measurements above 1 GHz were performed in fully anechoic chambers (Asset Numbers K0001 and 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.

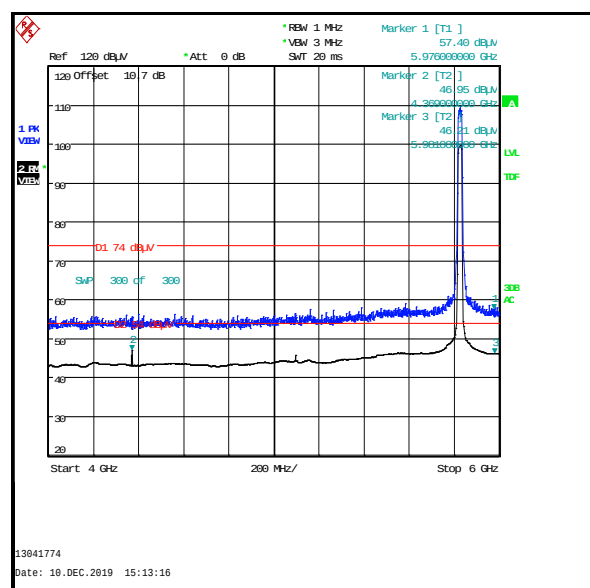
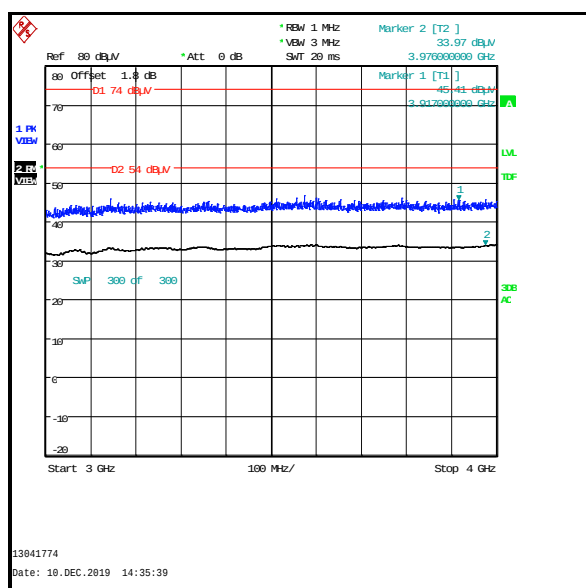
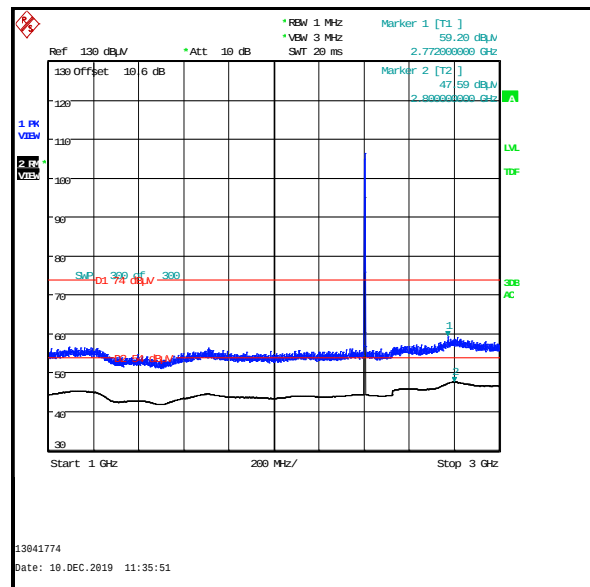
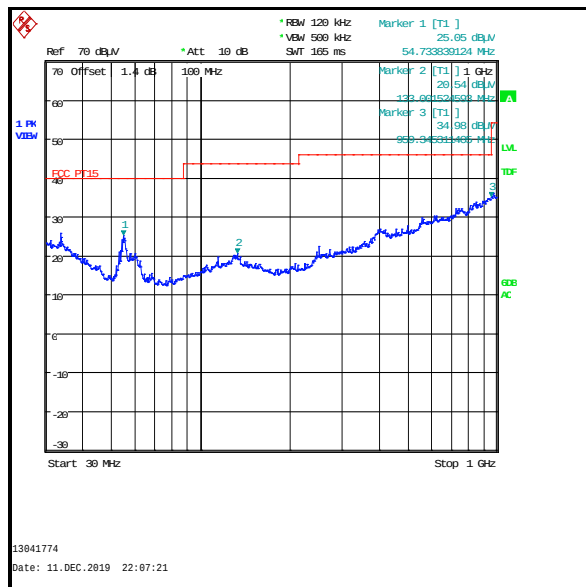
Transmitter Out of Band Radiated Emissions - *Bluetooth* LE bottom channel / 5 GHz WLAN (SISO) top channel (continued)

Results: Peak

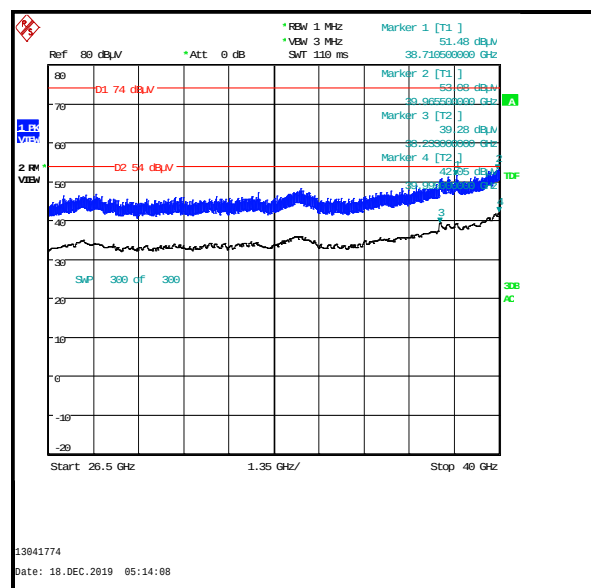
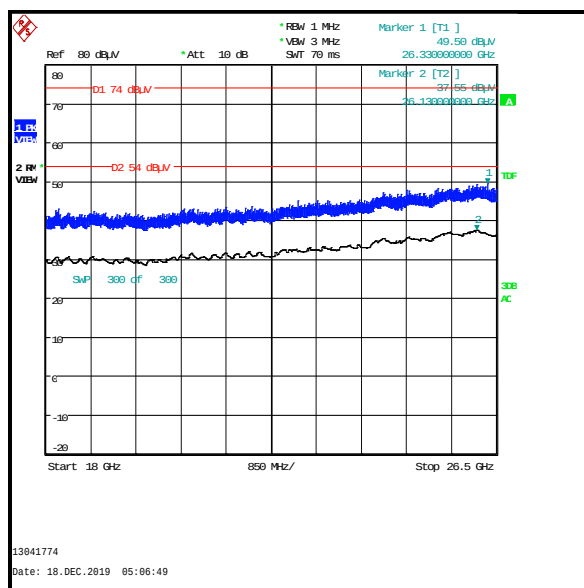
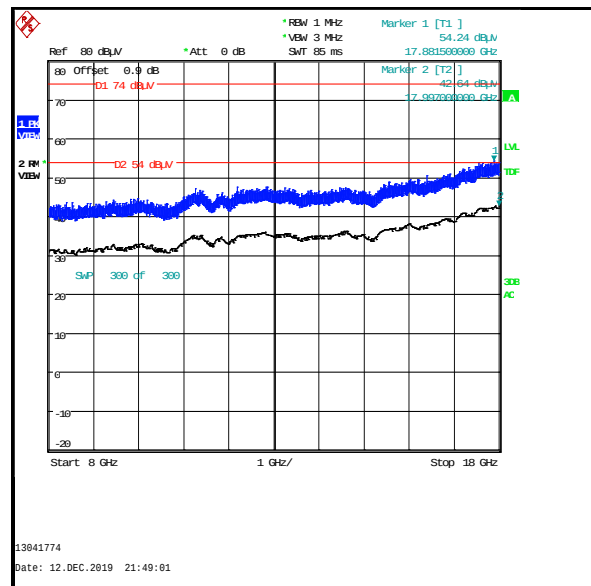
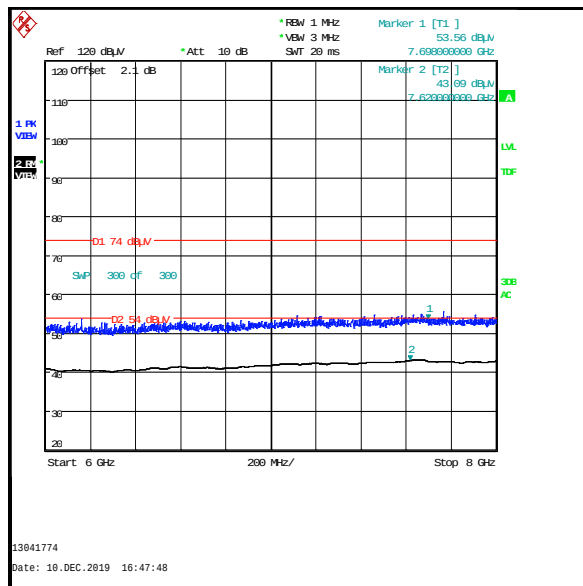
Frequency (MHz)	Antenna Polarity	Peak Level (dB μ V/m)	Peak Limit (dB μ V/m)	Margin (dB)	Result
See note 1					

Results: Average

Frequency (MHz)	Antenna Polarity	Average Level (dB μ V/m)	Average Limit (dB μ V/m)	Margin (dB)	Result
See note 1					



Transmitter Out of Band Radiated Emissions - Bluetooth LE bottom channel / 5 GHz WLAN (SISO) top channel (continued)



4.4. Transmitter Out of Band Radiated Emissions - *Bluetooth* LE top channel / 5 GHz WLAN (SISO) bottom channel

Test Summary:

Test Engineers:	Mark Perry, John Ferdinand, Mohamed Toubella, Marco Zunarelli, Tom Sleigh & Andrew Harding	Test Dates:	10 December 2019 to 22 December 2019
Test Sample Serial Numbers:	C02ZG00KP22J & C02ZG00UP22J		

FCC Reference:	Parts 15.33, 15.205(a), 15.209(a), 15.247(d) & 15.407(b)
ISED Canada Reference:	RSS-Gen 6.13 & 8.9 / RSS-247 5.5 & 6.2.1.2
Test Method Used:	ANSI C63.10 Sections 6.3, 6.5, 6.6, 11.11, 11.12.2.4 & 11.12.2.5.1, KDB 558074 Sections 11, 12.2.4 & 12.2.5.1, KDB 789033 II.G
Frequency Range:	30 MHz to 40 GHz
Configuration:	<i>Bluetooth</i> LE top channel / 5 GHz WLAN (SISO) bottom channel

Environmental Conditions:

Temperature (°C):	20 to 24
Relative Humidity (%):	31 to 40

Note(s):

1. All intermodulation products were below the noise floor level or greater than 20 dB from the specification limit.
2. The *Bluetooth* LE fundamental is shown on the 1 GHz to 3 GHz plot.
3. The 5 GHz WLAN fundamental is shown on the 3 GHz to 6 GHz plot.
4. Pre-scans were made against the FCC Part 15 general limits for radiated emissions.
5. The emission at approximately 6043 MHz was investigated and found not to be an intermodulation product.
6. The test receiver resolution bandwidth was set to 120 kHz and video bandwidth 500 kHz, for measurements below 1 GHz. For measurements above 1 GHz resolution bandwidth was set 1 MHz and video bandwidth 3 MHz, with the sweep time set to auto. Markers were placed on the highest measured level.
7. 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.
8. Measurements above 1 GHz were performed in fully anechoic chambers (Asset Numbers K0001 and 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.

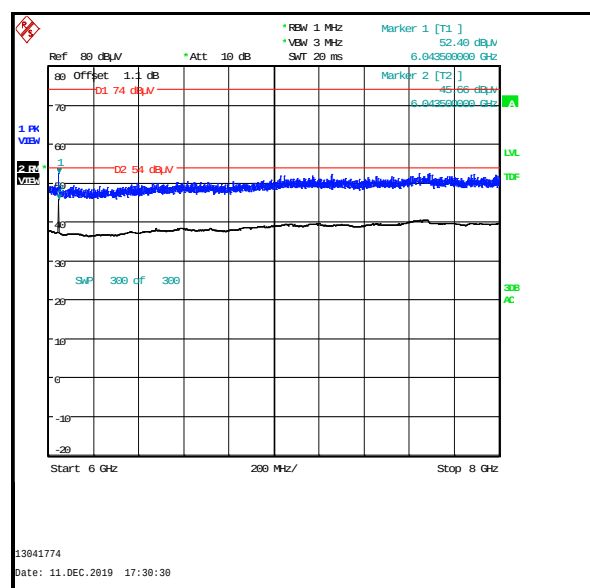
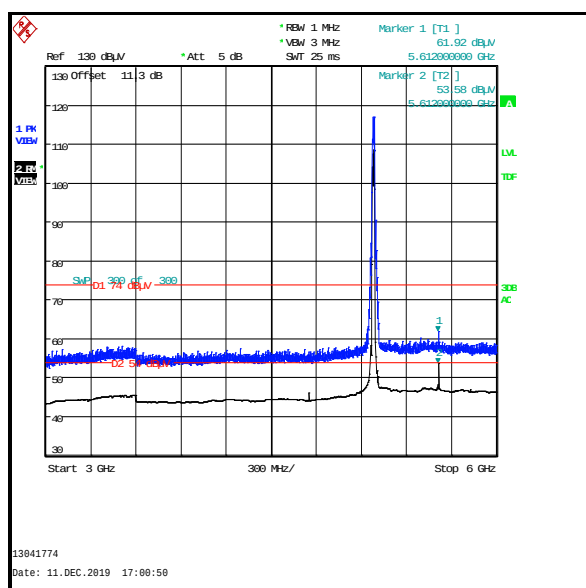
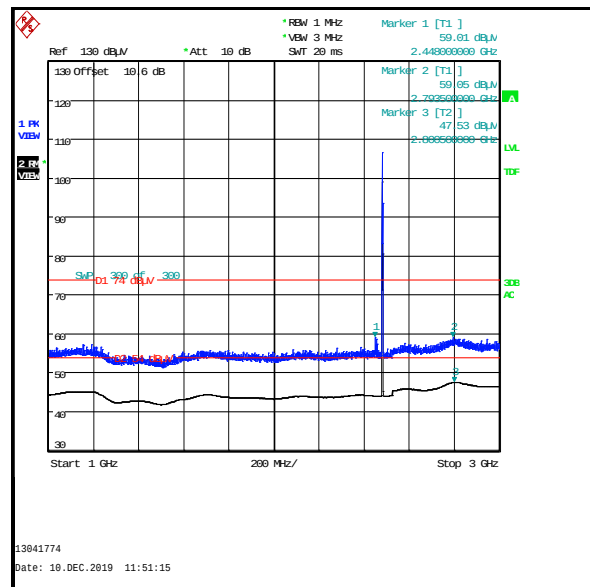
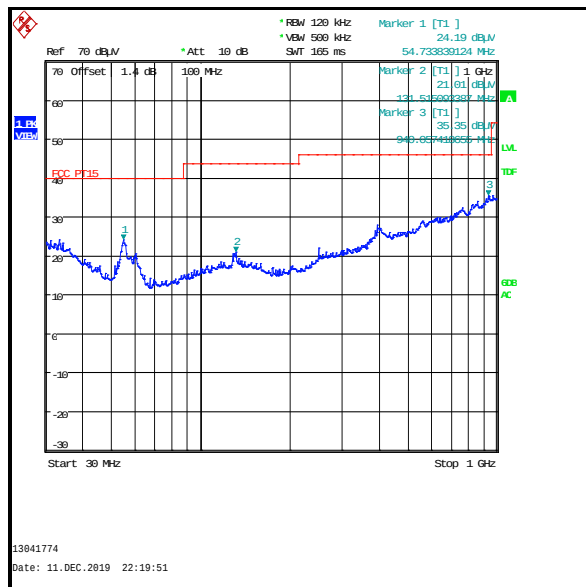
Transmitter Out of Band Radiated Emissions - *Bluetooth* LE top channel / 5 GHz WLAN (SISO) bottom channel (continued)

Results: Peak

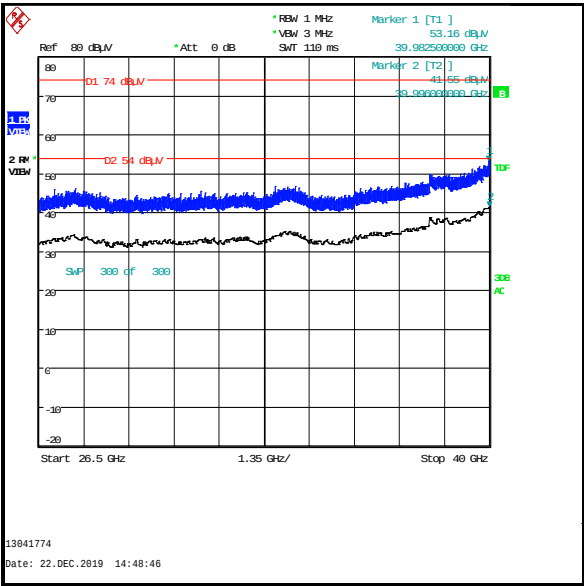
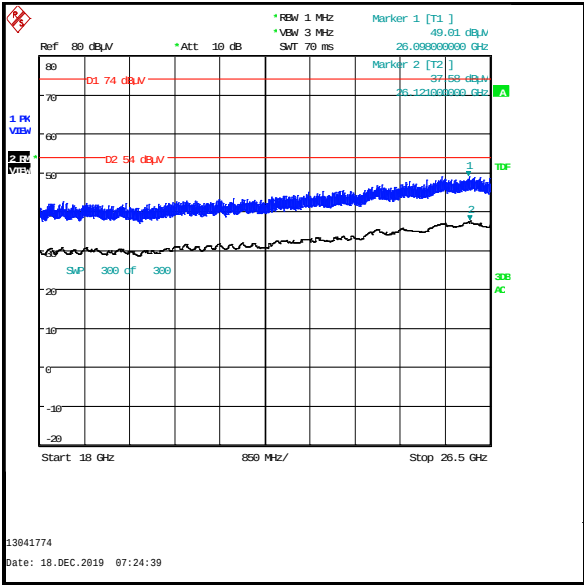
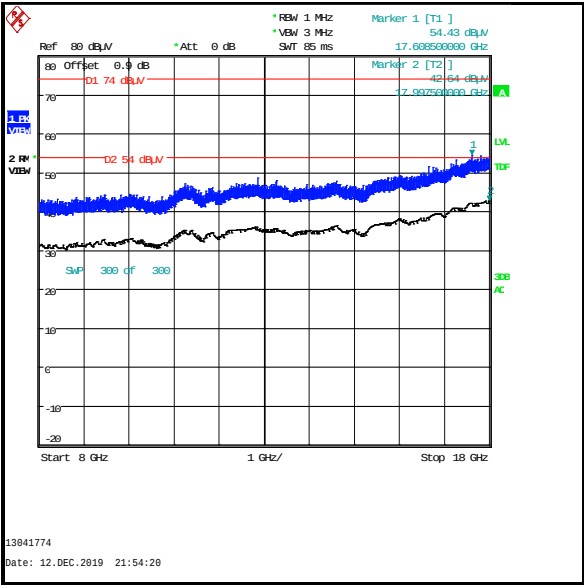
Frequency (MHz)	Antenna Polarity	Peak Level (dB μ V/m)	Peak Limit (dB μ V/m)	Margin (dB)	Result
See note 1					

Results: Average

Frequency (MHz)	Antenna Polarity	Average Level (dB μ V/m)	Average Limit (dB μ V/m)	Margin (dB)	Result
See note 1					



Transmitter Out of Band Radiated Emissions - *Bluetooth* LE top channel / 5 GHz WLAN (SISO) bottom channel (continued)



4.5. Transmitter Out of Band Radiated Emissions – 5.0 GHz WLAN (MIMO) top channel / Bluetooth Basic Rate bottom channel

Test Summary:

Test Engineers:	Mark Perry, John Ferdinand, Mohamed Toubella, Marco Zunarelli, Tom Sleigh & Andrew Harding	Test Dates:	16 December 2019 to 22 December 2019
Test Sample Serial Numbers:	C02ZG00KP22J & C02ZG00UP22J		

FCC Reference:	Parts 15.33, 15.205(a), 15.209(a), 15.247(d) & 15.407(b)
ISED Canada Reference:	RSS-Gen 6.13 & 8.9 / RSS-247 5.5 & 6.2.4.2
Test Method Used:	ANSI C63.10 Sections 6.3, 6.5, 6.6, 11.11, 11.12.2.4 & 11.12.2.5.1, KDB 558074 Sections 11, 12.2.4 & 12.2.5.1, KDB 789033 II.G
Frequency Range:	30 MHz to 40 GHz
Configuration:	5.0 GHz WLAN (MIMO) top channel / Bluetooth Basic Rate bottom channel

Environmental Conditions:

Temperature (°C):	20 to 24
Relative Humidity (%):	31 to 40

Note(s):

1. All intermodulation products were below the noise floor level or greater than 20 dB from the specification limit.
2. The 2.4 GHz WLAN fundamental is shown on the 1 GHz to 3 GHz plot.
3. The 5 GHz WLAN fundamental is shown on the 4 GHz to 6 GHz plot.
4. Pre-scans were made against the FCC Part 15 general limits for radiated emissions.
5. The test receiver resolution bandwidth was set to 120 kHz and video bandwidth 500 kHz, for measurements below 1 GHz. For measurements above 1 GHz resolution bandwidth was set 1 MHz and video bandwidth 3 MHz, with the sweep time set to auto. Markers were placed on the highest measured level.
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.
7. Measurements above 1 GHz were performed in fully anechoic chambers (Asset Numbers K0001 and 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.

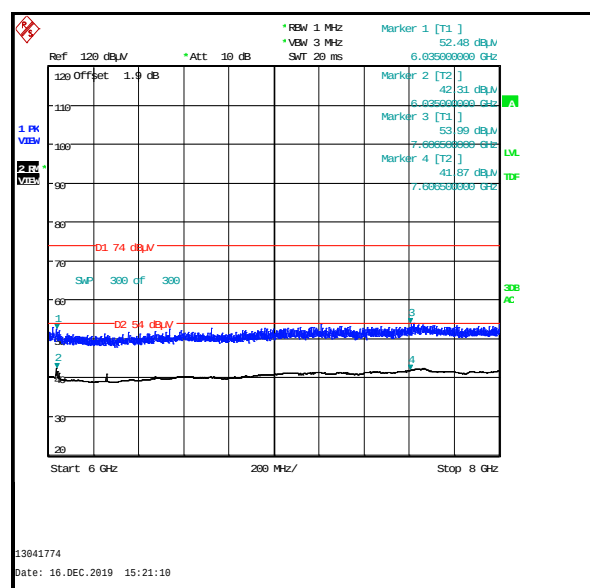
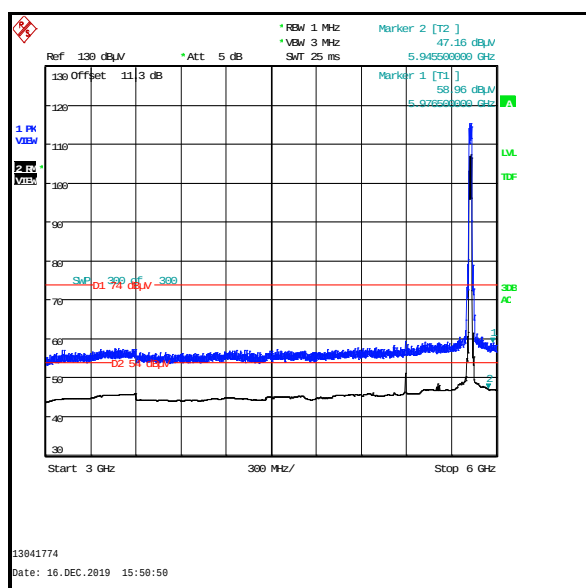
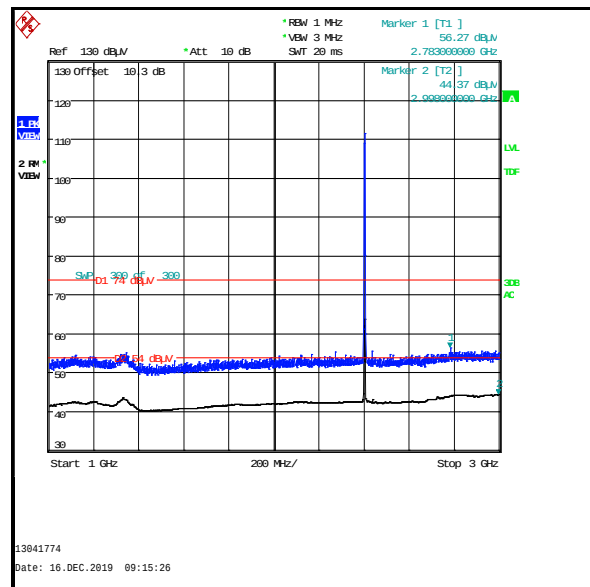
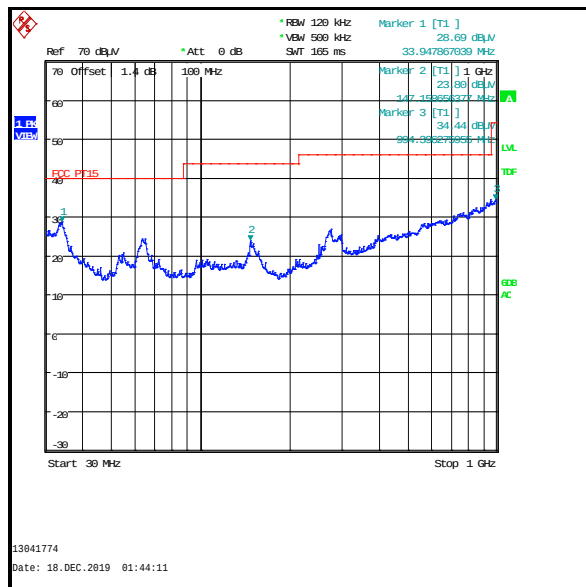
Transmitter Out of Band Radiated Emissions - 5.0 GHz WLAN (MIMO) top channel / Bluetooth Basic Rate bottom channel (continued)

Results: Peak

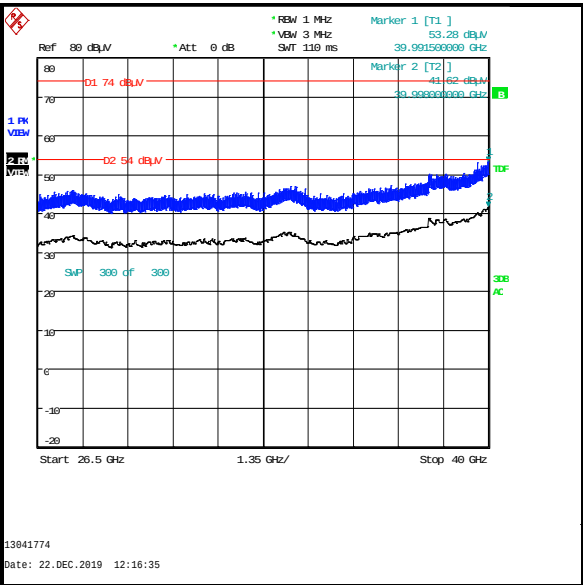
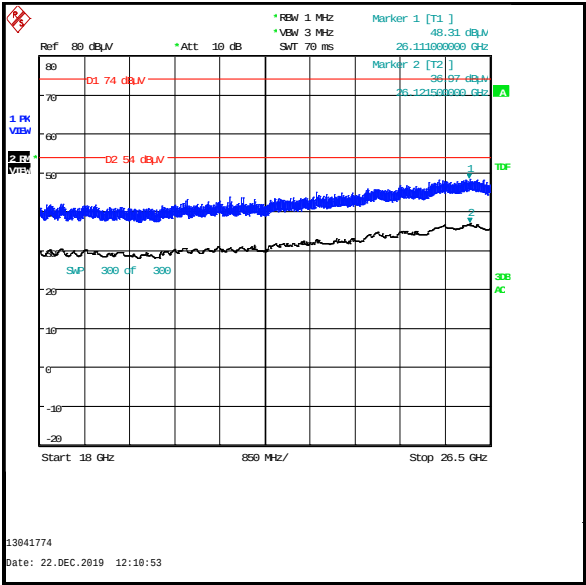
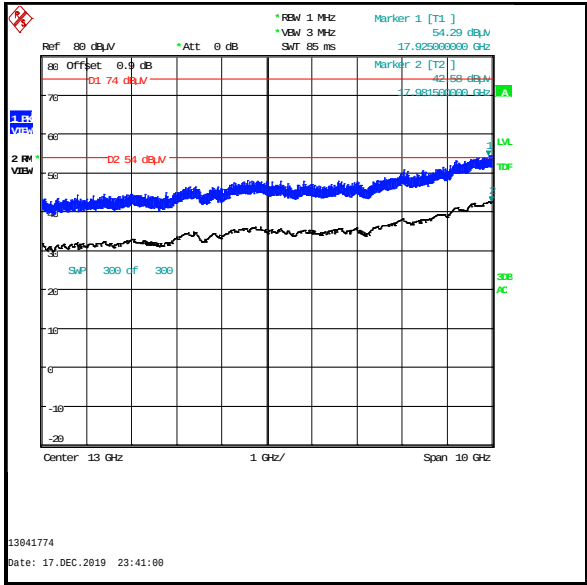
Frequency (MHz)	Antenna Polarity	Peak Level (dBμV/m)	Peak Limit (dBμV/m)	Margin (dB)	Result
See Note 1					

Results: Average

Frequency (MHz)	Antenna Polarity	Average Level (dBμV/m)	Average Limit (dBμV/m)	Margin (dB)	Result
See Note 1					



Transmitter Out of Band Radiated Emissions - 5.0 GHz WLAN (MIMO) top channel / Bluetooth Basic Rate bottom channel (continued)



4.6. Transmitter Out of Band Radiated Emissions - *Bluetooth* Basic Rate top channel / 5.0 GHz WLAN (MIMO) bottom channel

Test Summary:

Test Engineers:	Mark Perry, John Ferdinand Mohamed Toubella, Marco Zunarelli, Tom Sleigh & Andrew Harding	Test Dates:	16 December 2019 to 10 January 2020
Test Sample Serial Numbers:	C02ZG00KP22J & C02ZG00UP22J		

FCC Reference:	Parts 15.33, 15.205(a), 15.209(a), 15.247(d) & 15.407(b)
ISED Canada Reference:	RSS-Gen 6.13 & 8.9 / RSS-247 5.5 & 6.2.1.2
Test Method Used:	ANSI C63.10 Sections 6.3, 6.5, 6.6, 11.11, 11.12.2.4 & 11.12.2.5.1, KDB 558074 Sections 11, 12.2.4 & 12.2.5.1, KDB 789033 II.G
Frequency Range:	30 MHz to 40 GHz
Configuration:	5.0 GHz WLAN (MIMO) bottom channel / <i>Bluetooth</i> Basic Rate top channel

Environmental Conditions:

Temperature (°C):	20 to 24
Relative Humidity (%):	31 to 40

Note(s):

1. All intermodulation products were below the noise floor level or greater than 20 dB from the specification limit.
2. The *Bluetooth* fundamental is shown on the 1 GHz to 3 GHz plot.
3. The 5 GHz WLAN fundamental is shown on the 3 GHz to 6 GHz plot.
4. Pre-scans were made against the FCC Part 15 general limits for radiated emissions.
5. The test receiver resolution bandwidth was set to 120 kHz and video bandwidth 500 kHz, for measurements below 1 GHz. For measurements above 1 GHz resolution bandwidth was set 1 MHz and video bandwidth 3 MHz, with the sweep time set to auto. Markers were placed on the highest measured level.
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.
7. Measurements above 1 GHz were performed in fully anechoic chambers (Asset Numbers K0001 and 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.

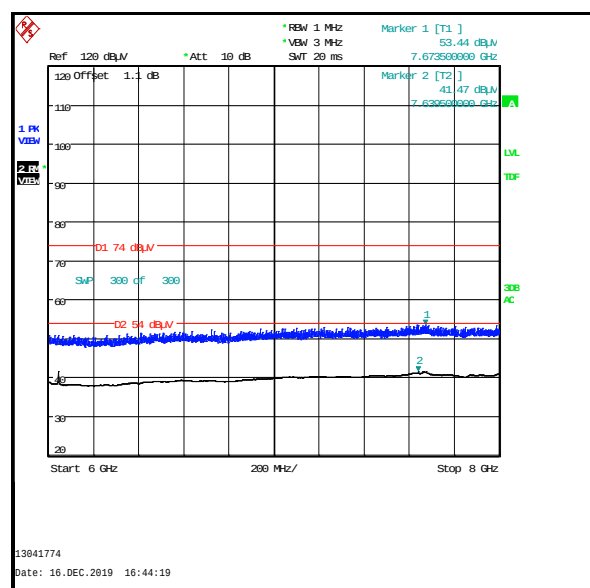
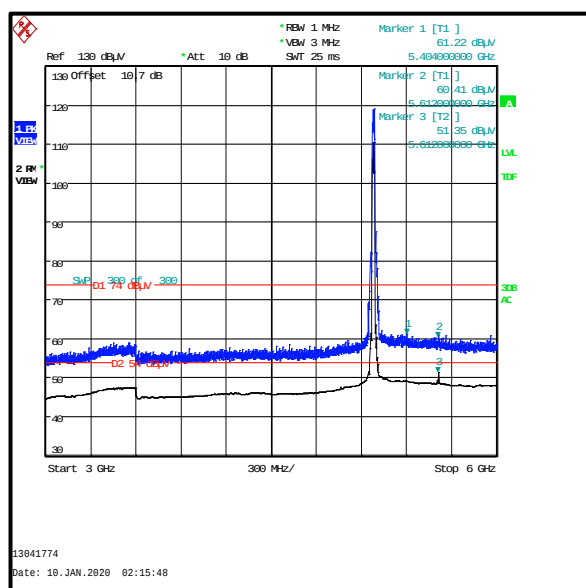
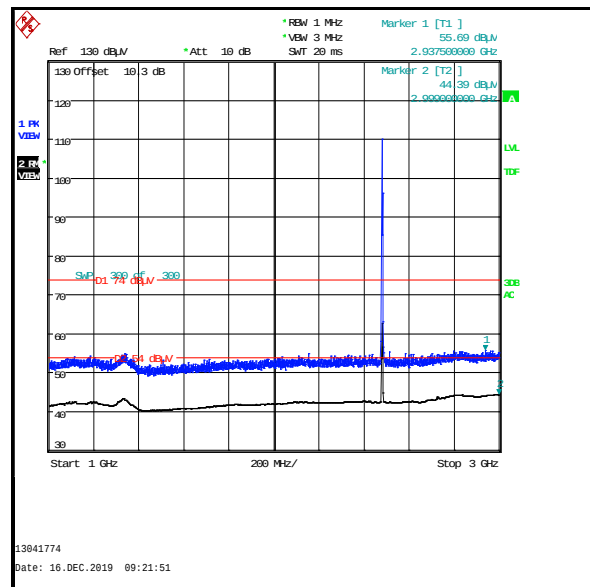
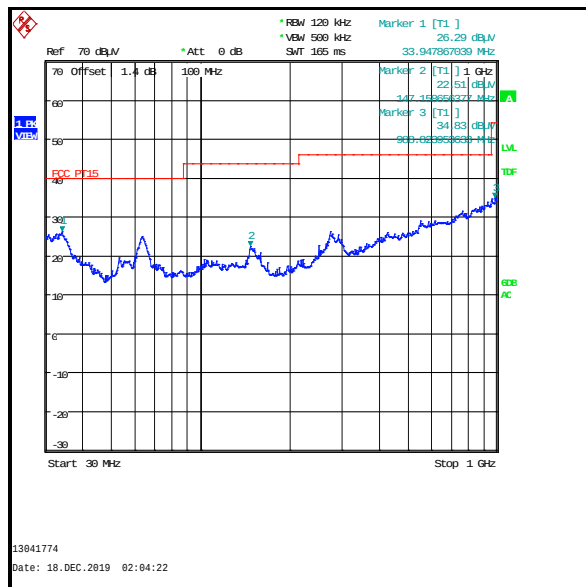
Transmitter Out of Band Radiated Emissions - *Bluetooth* Basic Rate top channel / 5.0 GHz WLAN (MIMO) bottom channel (continued)

Results: Peak

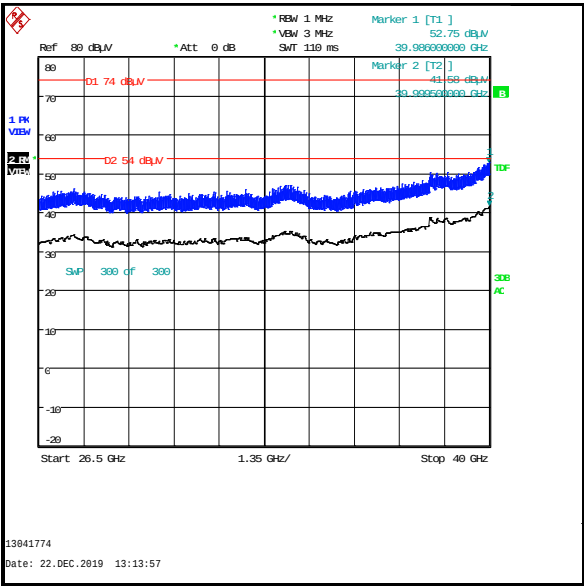
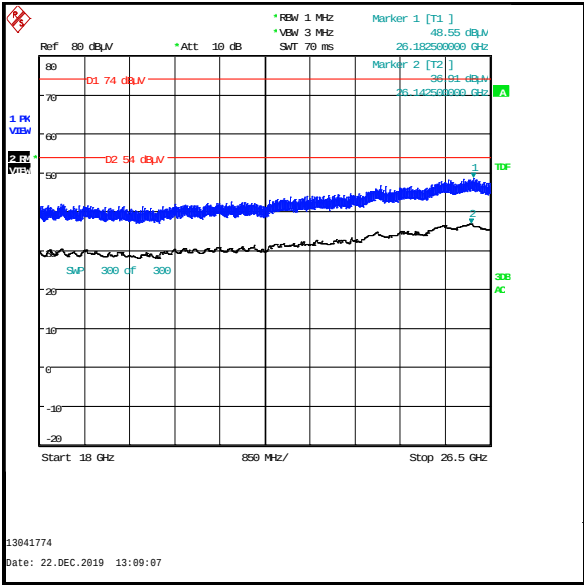
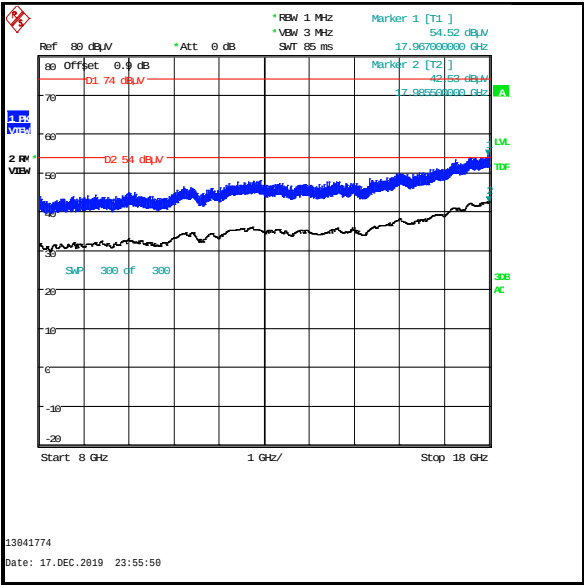
Frequency (MHz)	Antenna Polarity	Peak Level (dBμV/m)	Peak Limit (dBμV/m)	Margin (dB)	Result
See Note 1					

Results: Average

Frequency (MHz)	Antenna Polarity	Average Level (dBμV/m)	Average Limit (dBμV/m)	Margin (dB)	Result
See Note 1					



Transmitter Out of Band Radiated Emissions - 5.0 GHz WLAN (MIMO) bottom channel / Bluetooth Basic Rate top channel (continued)



4.7. Transmitter Out of Band Radiated Emissions - 5.0 GHz WLAN (MIMO) top channel / Bluetooth LE bottom channel**Test Summary:**

Test Engineers:	Mark Perry, John Ferdinand, Mohamed Toubella, Marco Zunarelli, Tom Sleigh & Andrew Harding	Test Dates:	16 December 2019 to 22 December 2019
Test Sample Serial Numbers:	C02ZG00KP22J & C02ZG00UP22J		

FCC Reference:	Parts 15.33, 15.205(a), 15.209(a) & 15.247(d)
ISED Canada Reference:	RSS-Gen 6.13 & 8.9 / RSS-247 5.5
Test Method Used:	ANSI C63.10 Sections 6.3, 6.5, 6.6, 11.11, 11.12.2.4 & 11.12.2.5.1, KDB 558074 Sections 11, 12.2.4 & 12.2.5.1
Frequency Range:	30 MHz to 25 GHz
Configuration:	5.0 GHz WLAN (MIMO) top channel / Bluetooth LE bottom channel

Environmental Conditions:

Temperature (°C):	20 to 24
Relative Humidity (%):	31 to 40

Note(s):

1. All intermodulation products were below the noise floor level or greater than 20 dB from the specification limit.
2. The Bluetooth LE fundamental is shown on the 1 GHz to 3 GHz plot.
3. The 5 GHz WLAN fundamental is shown on the 3 GHz to 6 GHz plot.
4. Pre-scans were made against the FCC Part 15 general limits for radiated emissions.
5. The test receiver resolution bandwidth was set to 120 kHz and video bandwidth 500 kHz, for measurements below 1 GHz. For measurements above 1 GHz resolution bandwidth was set 1 MHz and video bandwidth 3 MHz, with the sweep time set to auto. Markers were placed on the highest measured level.
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.
7. Measurements above 1 GHz were performed in fully anechoic chambers (Asset Numbers K0001 and 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.

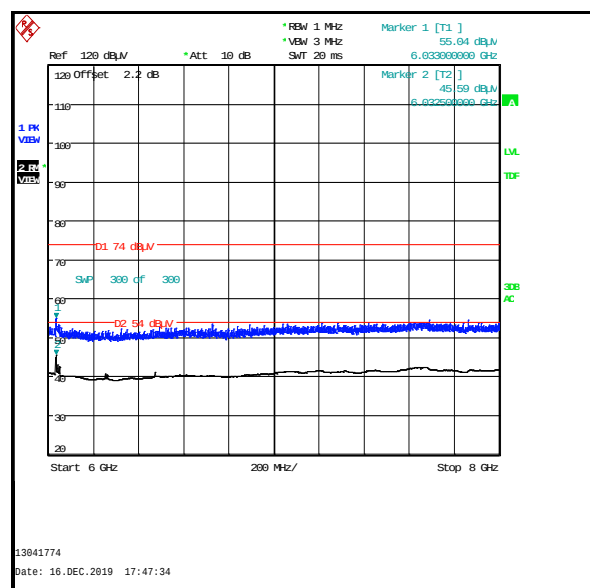
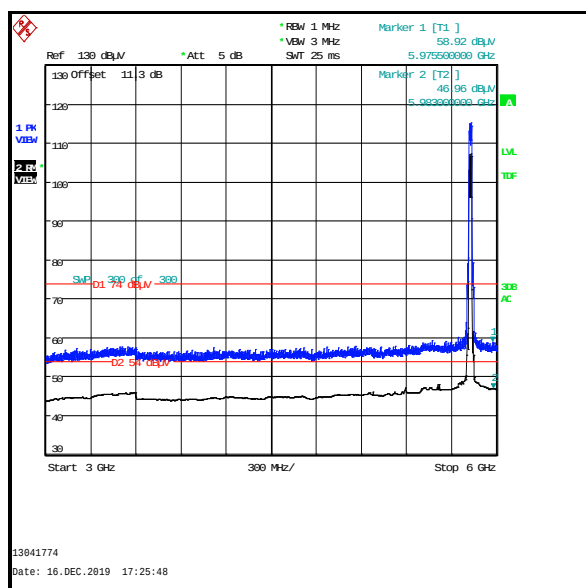
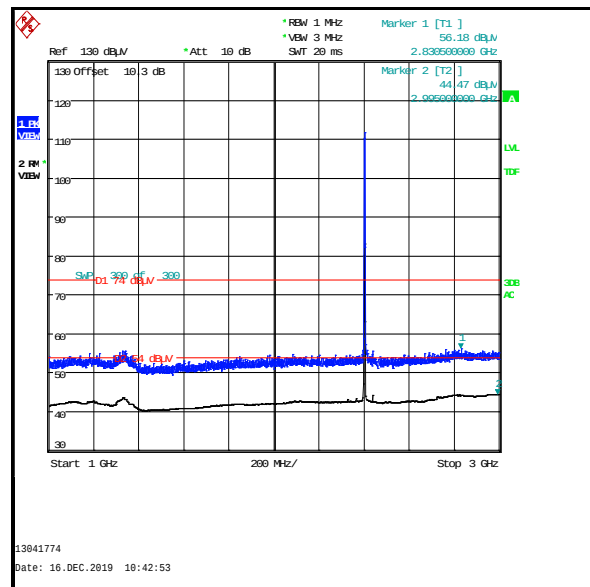
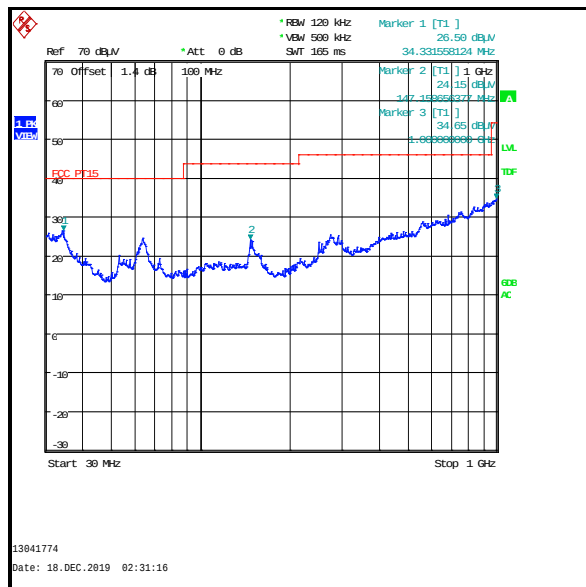
Transmitter Out of Band Radiated Emissions - 5.0 GHz WLAN (MIMO) top channel / Bluetooth LE bottom channel (continued)

Results: Peak

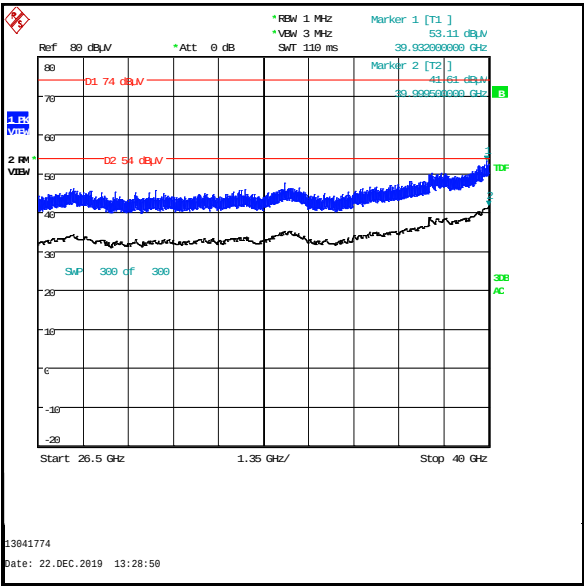
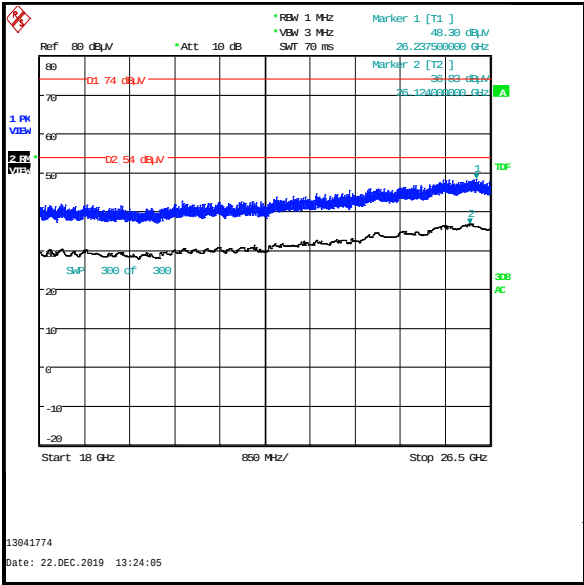
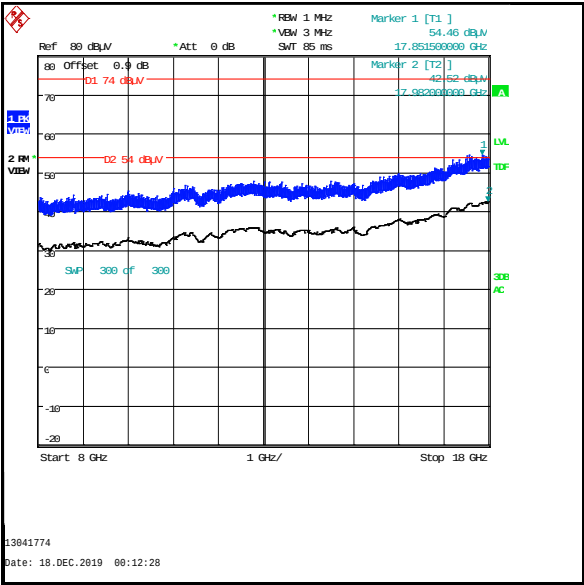
Frequency (MHz)	Antenna Polarity	Peak Level (dB μ V/m)	Peak Limit (dB μ V/m)	Margin (dB)	Result
See note 1					

Results: Average

Frequency (MHz)	Antenna Polarity	Average Level (dB μ V/m)	Average Limit (dB μ V/m)	Margin (dB)	Result
See note 1					



Transmitter Out of Band Radiated Emissions - 5.0 GHz WLAN (MIMO) top channel / Bluetooth LE bottom channel (continued)



4.8. Transmitter Out of Band Radiated Emissions - 5.0 GHz WLAN (MIMO) bottom channel / Bluetooth LE top channel

Test Summary:

Test Engineers:	Mark Perry, John Ferdinand, Mohamed Toubella, Marco Zunarelli, Tom Sleigh & Andrew Harding	Test Dates:	16 December 2019 to 22 December 2019
Test Sample Serial Numbers:	C02ZG00KP22J & C02ZG00UP22J		

FCC Reference:	Parts 15.33, 15.205(a), 15.209(a) & 15.247(d)
ISED Canada Reference:	RSS-Gen 6.13 & 8.9 / RSS-247 5.5 & 6.2.1.2
Test Method Used:	ANSI C63.10 Sections 6.3, 6.5, 6.6, 11.11, 11.12.2.4 & 11.12.2.5.1, KDB 558074 Sections 11, 12.2.4 & 12.2.5.1
Frequency Range:	30 MHz to 25 GHz
Configuration:	5.0 GHz WLAN (MIMO) bottom channel / Bluetooth LE top channel

Environmental Conditions:

Temperature (°C):	20 to 24
Relative Humidity (%):	31 to 40

Note(s):

1. All intermodulation products were below the noise floor level or greater than 20 dB from the specification limit.
2. The Bluetooth LE fundamental is shown on the 1 GHz to 3 GHz plot.
3. The 5 GHz WLAN fundamental is shown on the 3 GHz to 6 GHz plot.
4. Pre-scans were made against the FCC Part 15 general limits for radiated emissions.
5. The test receiver resolution bandwidth was set to 120 kHz and video bandwidth 500 kHz, for measurements below 1 GHz. For measurements above 1 GHz resolution bandwidth was set 1 MHz and video bandwidth 3 MHz, with the sweep time set to auto. Markers were placed on the highest measured level.
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.
7. Measurements above 1 GHz were performed in fully anechoic chambers (Asset Numbers K0001 and 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.

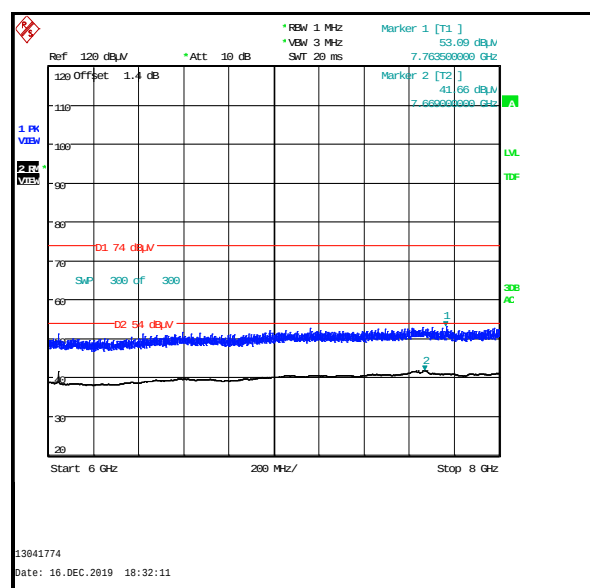
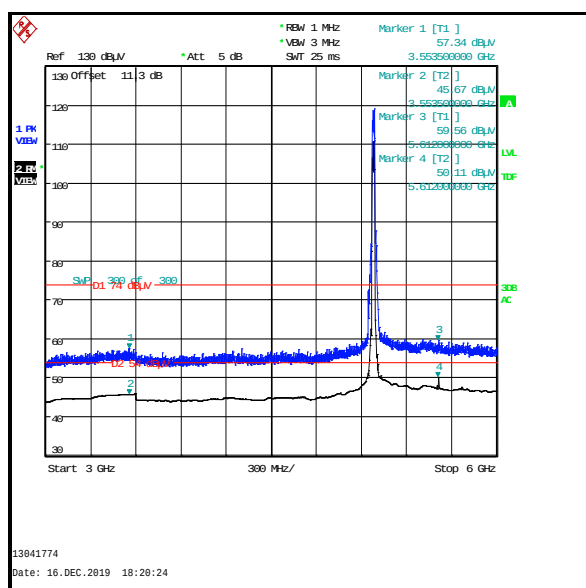
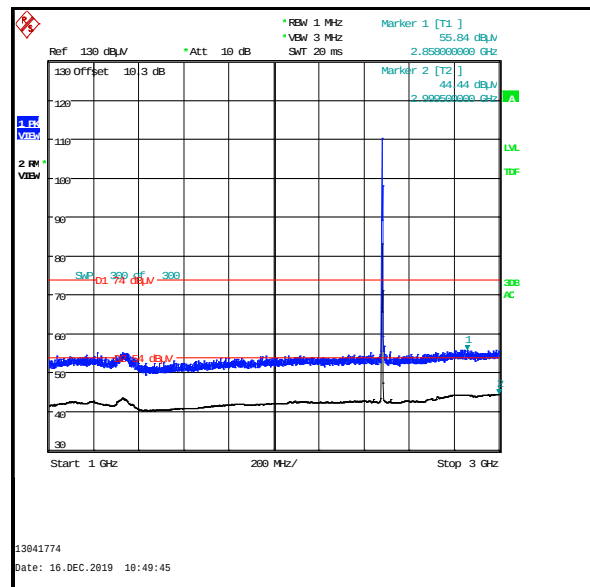
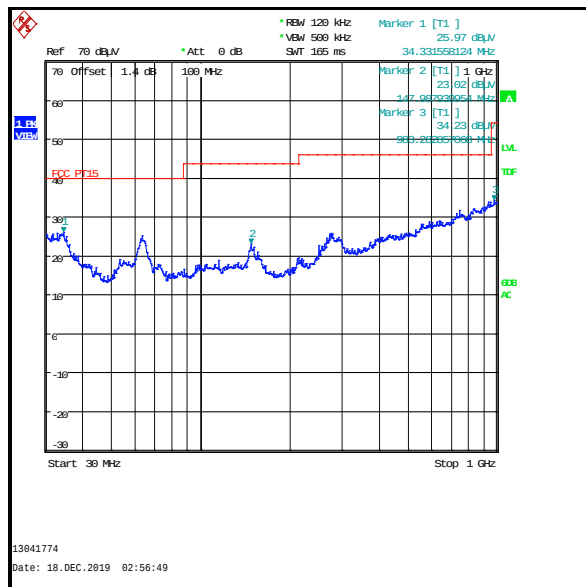
Transmitter Out of Band Radiated Emissions - 5.0 GHz WLAN (MIMO) bottom channel / Bluetooth LE top channel (continued)

Results: Peak

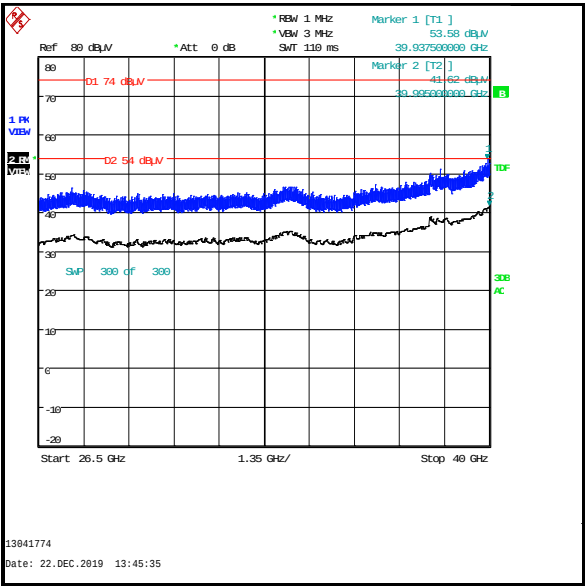
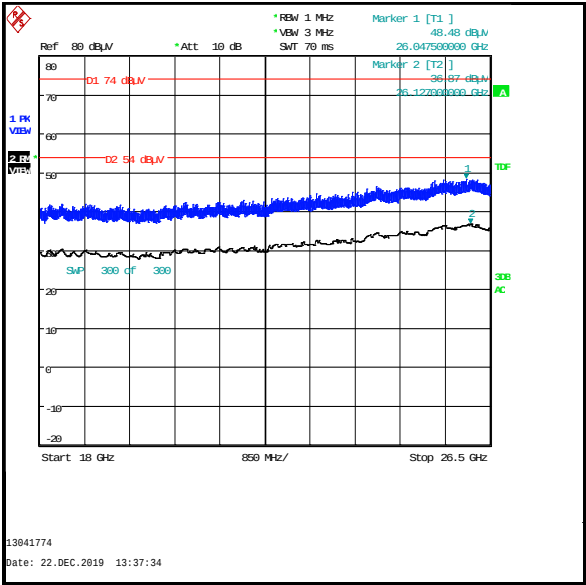
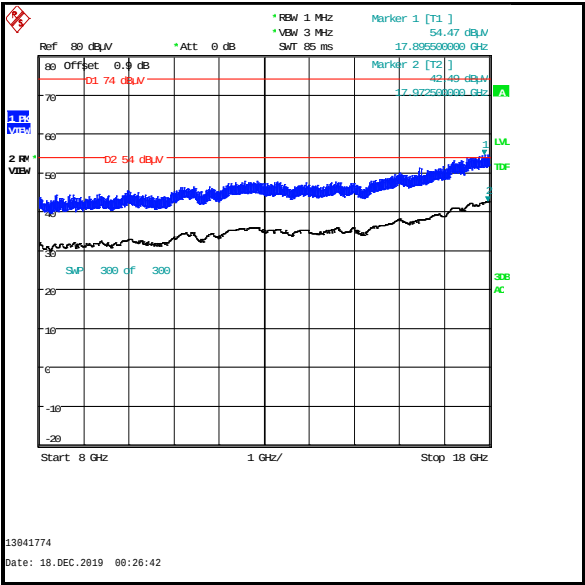
Frequency (MHz)	Antenna Polarity	Peak Level (dB μ V/m)	Peak Limit (dB μ V/m)	Margin (dB)	Result
See note 1					

Results: Average

Frequency (MHz)	Antenna Polarity	Peak Level (dB μ V/m)	Peak Limit (dB μ V/m)	Margin (dB)	Result
See note 1					



Transmitter Out of Band Radiated Emissions - 5.0 GHz WLAN (MIMO) bottom channel / Bluetooth LE top channel (continued)



4.9. Transmitter Out of Band Radiated Emissions - 5.0 GHz WLAN (MIMO) top channel / 2.4 GHz WLAN (SISO) bottom channel

Test Summary:

Test Engineers:	Mark Perry, John Ferdinand, Mohamed Toubella, Marco Zunarelli, Tom Sleigh & Andrew Harding	Test Dates:	09 December 2019 to 10 January 2020
Test Sample Serial Numbers:	C02ZG00KP22J & C02ZG00UP22J		

FCC Reference:	Parts 15.33, 15.205(a), 15.209(a), 15.247(d) & 15.407(b)
ISED Canada Reference:	RSS-Gen 6.13 & 8.9 / RSS-247 5.5 & 6.2.4.2
Test Method Used:	ANSI C63.10 Sections 6.3, 6.5, 6.6, 11.11, 11.12.2.4 & 11.12.2.5.1, KDB 558074 Sections 11, 12.2.4 & 12.2.5.1
Frequency Range:	30 MHz to 40 GHz
Configuration:	5.0 GHz WLAN (MIMO) top channel / 2.4 GHz WLAN (SISO) bottom channel

Environmental Conditions:

Temperature (°C):	20 to 24
Relative Humidity (%):	31 to 40

Note(s):

1. All intermodulation products were below the noise floor level or greater than 20 dB from the specification limit.
2. The 2.4 GHz WLAN fundamental is shown on the 1 GHz to 3 GHz plot.
3. The 5 GHz WLAN fundamental is shown on the 3 GHz to 6 GHz plot.
4. Pre-scans were made against the FCC Part 15 general limits for radiated emissions.
5. The test receiver resolution bandwidth was set to 120 kHz and video bandwidth 500 kHz, for measurements below 1 GHz. For measurements above 1 GHz resolution bandwidth was set 1 MHz and video bandwidth 3 MHz, with the sweep time set to auto. Markers were placed on the highest measured level.
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.
7. Measurements above 1 GHz were performed in fully anechoic chambers (Asset Numbers K0001 and 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.

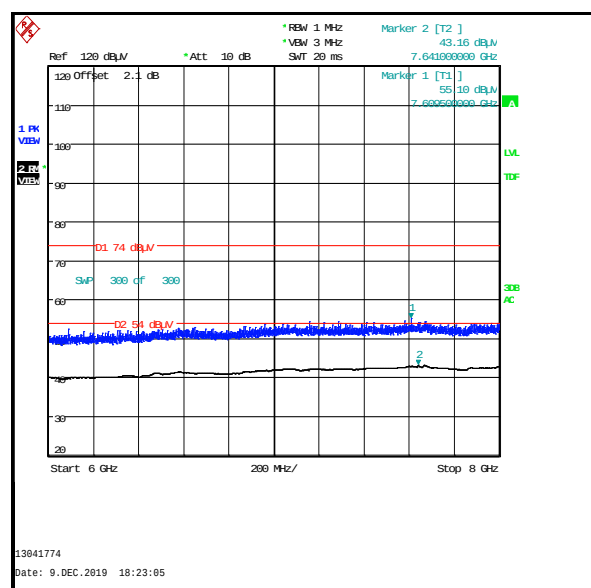
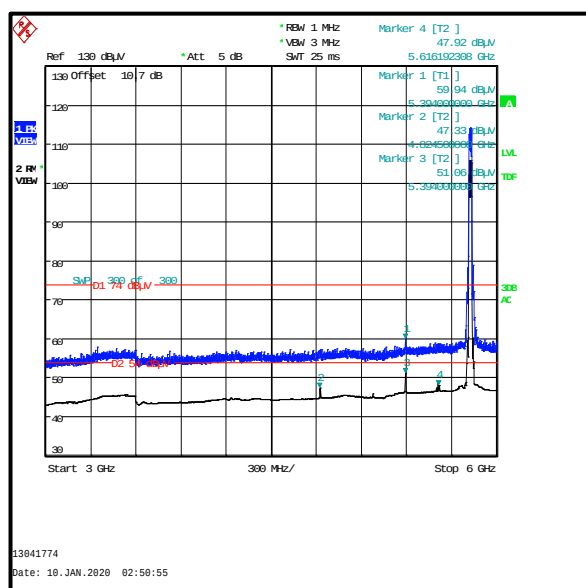
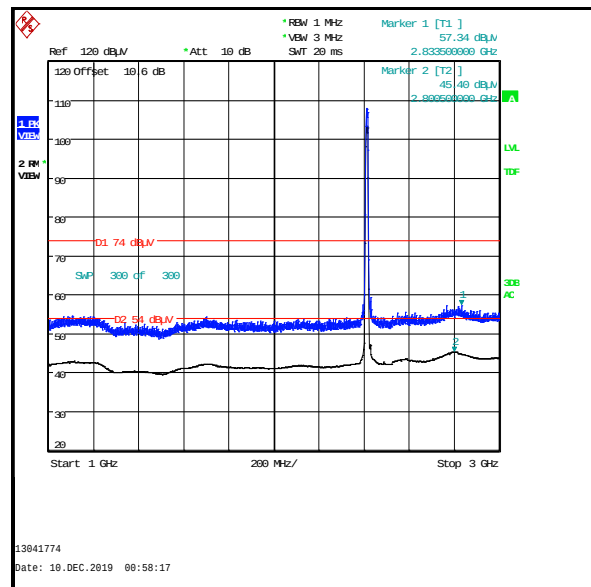
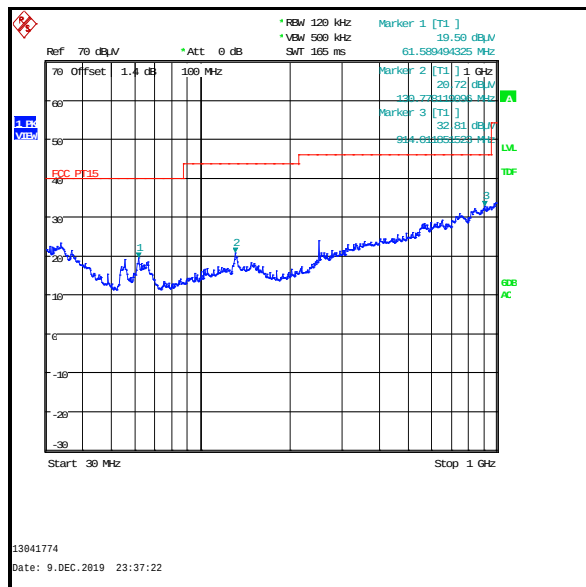
Transmitter Out of Band Radiated Emissions - 5.0 GHz WLAN (MIMO) top channel / 2.4 GHz WLAN (SISO) bottom channel (continued)

Results: Peak

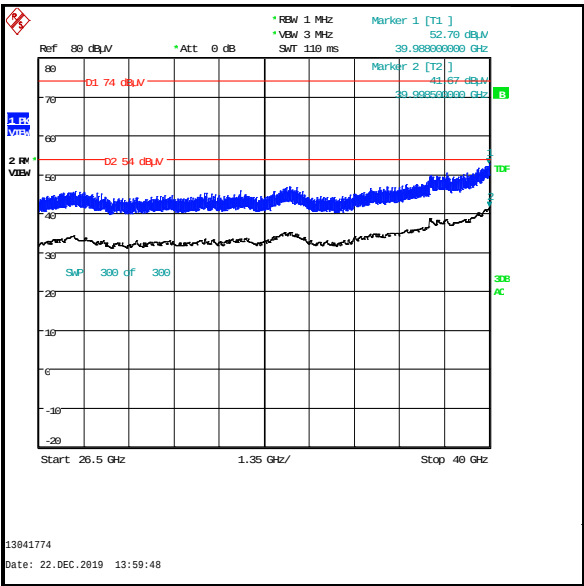
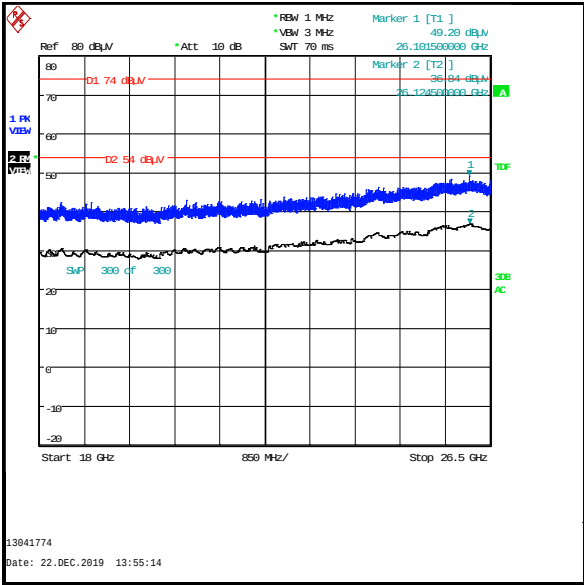
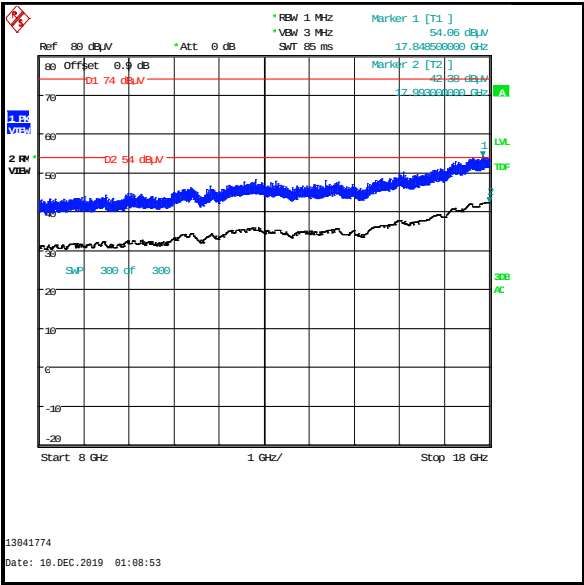
Frequency (MHz)	Antenna Polarity	Peak Level (dB μ V/m)	Peak Limit (dB μ V/m)	Margin (dB)	Result
See note 1					

Results: Average

Frequency (MHz)	Antenna Polarity	Average Level (dB μ V/m)	Average Limit (dB μ V/m)	Margin (dB)	Result
See note 1					



Transmitter Out of Band Radiated Emissions - 5.0 GHz WLAN (MIMO) top channel / 2.4 GHz WLAN (SISO) bottom channel (continued)



4.10. Transmitter Out of Band Radiated Emissions - 5.0 GHz WLAN (MIMO) bottom channel / 2.4 GHz WLAN (SISO) top channel

Test Summary:

Test Engineers:	Mark Perry, John Ferdinand, Mohamed Toubella, Marco Zunarelli, Tom Sleigh & Andrew Harding	Test Dates:	08 December 2019 to 22 December 2019
Test Sample Serial Numbers:	C02ZG00KP22J & C02ZG00UP22J		

FCC Reference:	Parts 15.33, 15.205(a), 15.209(a), 15.247(d) & 15.407(b)
ISED Canada Reference:	RSS-Gen 6.13 & 8.9 / RSS-247 5.5 & 6.2.1.2
Test Method Used:	ANSI C63.10 Sections 6.3, 6.5, 6.6, 11.11, 11.12.2.4 & 11.12.2.5.1, KDB 558074 Sections 11, 12.2.4, 12.2.5.1, 12.7, KDB 789033 II.G
Frequency Range:	30 MHz to 40 GHz
Configuration:	5.0 GHz WLAN (MIMO) bottom channel / 2.4 GHz WLAN (SISO) top channel

Environmental Conditions:

Temperature (°C):	20 to 24
Relative Humidity (%):	31 to 40

Note(s):

1. All intermodulation products were below the noise floor level or greater than 20 dB from the specification limit.
2. The *Bluetooth* and 2.4 GHz WLAN fundamental is shown on the 1 GHz to 3 GHz plot.
3. The 5 GHz WLAN fundamental is shown on the 3 GHz to 6 GHz plot.
4. Pre-scans were made against the FCC Part 15 general limits for radiated emissions.
5. The emission at approximately 5761MHz was investigated and found not to be an intermodulation product and was therefore not measured.
6. The test receiver resolution bandwidth was set to 120 kHz and video bandwidth 500 kHz, for measurements below 1 GHz. For measurements above 1 GHz resolution bandwidth was set 1 MHz and video bandwidth 3 MHz, with the sweep time set to auto. Markers were placed on the highest measured level.
7. 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.
8. Measurements above 1 GHz were performed in fully anechoic chambers (Asset Numbers K0001 and 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.

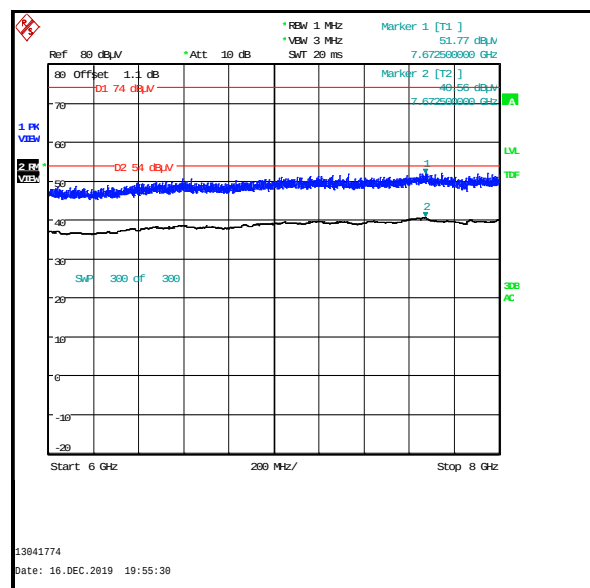
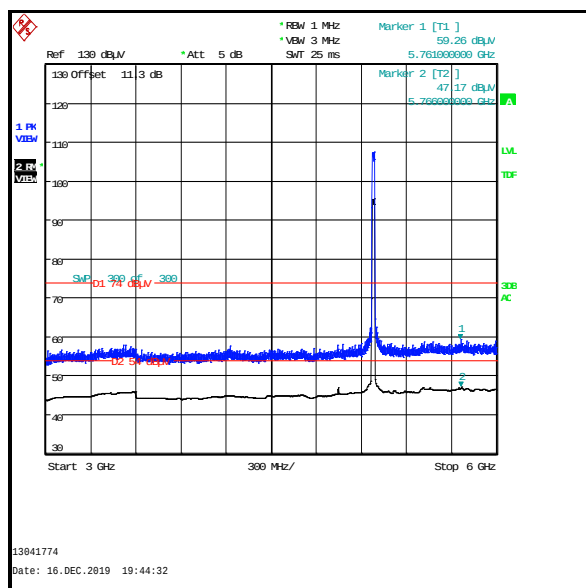
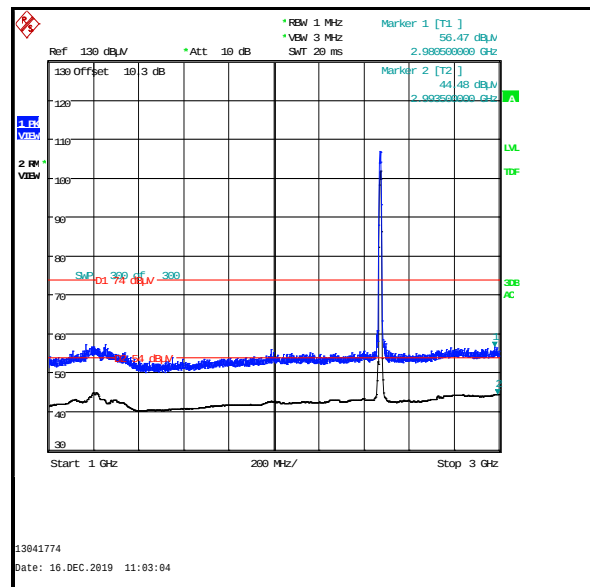
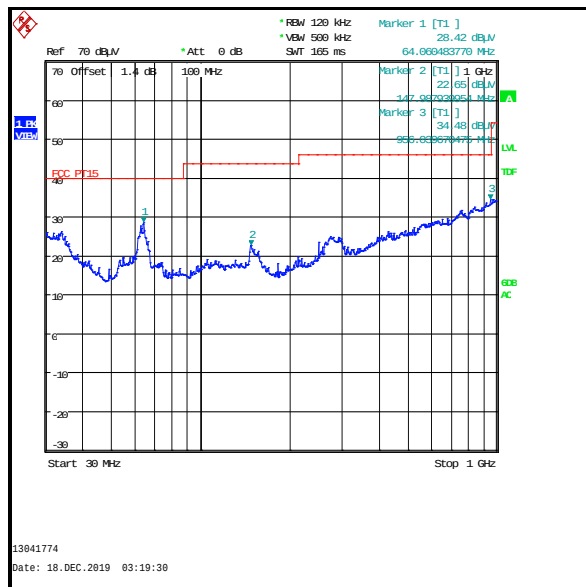
Transmitter Out of Band Radiated Emissions - 5.0 GHz WLAN (MIMO) bottom channel / 2.4 GHz WLAN (SISO) top channel (continued)

Results: Peak

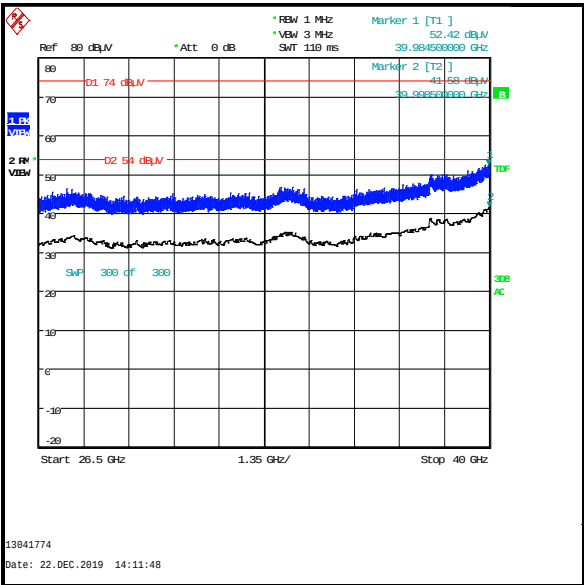
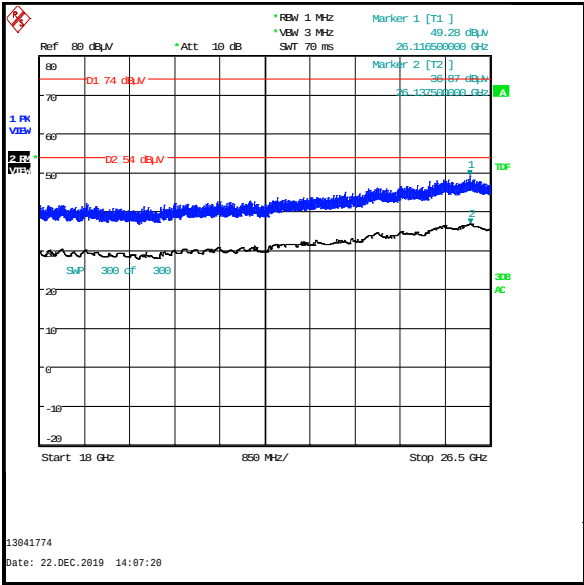
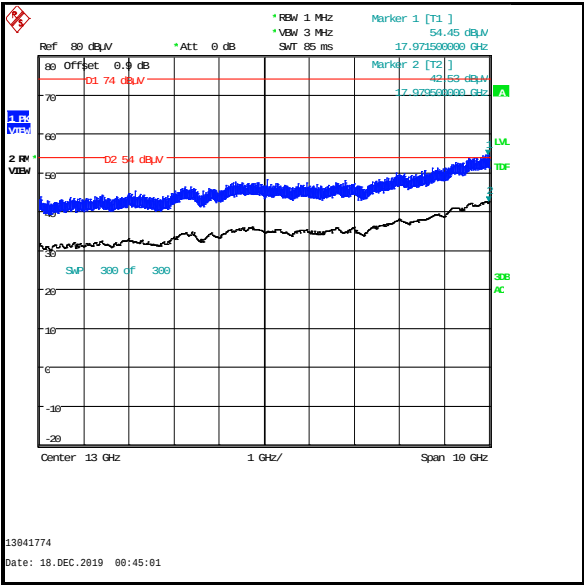
Frequency (MHz)	Antenna Polarity	Peak Level (dBμV/m)	Peak Limit (dBμV/m)	Margin (dB)	Result
See Note 1					

Results: Average

Frequency (MHz)	Antenna Polarity	Average Level (dBμV/m)	Average Limit (dBμV/m)	Margin (dB)	Result
See Note 1					



Transmitter Out of Band Radiated Emissions 5.0 GHz WLAN (MIMO) bottom channel / 2.4 GHz WLAN (SISO) top channel (continued)



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