TEST REPORT

Test Report No. : UL-RPT-RP11624992JD13A V2.0

Customer	:	Apple Inc.
Model No./HVIN	:	A1842
PMN		Apple TV 4K
FCC ID	:	BCGA1842
ISED Certification No.	:	IC: 579C-A1842
Technology	:	*Bluetooth* – Low Energy (High Power Mode); *Bluetooth* – BR/EDR (High Power Mode); 2.4 GHz WLAN & 5 GHz WLAN
Test Standard(s)	:	FCC Parts 15.209(a), 15.247(d) & 15.407(b) ISED Canada RSS-247 5.5, 6.2.1.2, 6.2.2.2, 6.2.3.2, 6.2.4.2 & RSS-Gen 6.13
Test Laboratory	:	UL VS LTD, Basingstoke, Hampshire, RG24 8AH, United Kingdom

1. This test report shall not be reproduced in full or partial, without the written approval of UL VS LTD.
2. The results in this report apply only to the sample(s) tested.
3. The sample tested is in compliance with the above standard(s).
4. The test results in this report are traceable to the national or international standards.
5. Version 2.0 supersedes all previous versions.

Date of Issue: 22 August 2017

Checked by:

Ian Watch
Senior Test Engineer, Radio Laboratory

Company Signatory:

Sarah Williams
Senior Test Engineer, Radio Laboratory
UL VS LTD

0644

Report Revision History

Version Number	Issue Date	Revision Details	Revised By
1.0	16/08/2017	Initial Version	Ian Watch
2.0	22/08/2017	Changed Model No./HVIN to A1842 Changed description of EUT in Section 1.1	Ian Watch

Table of Contents

1. Attestation of Test Results

1.1. Description of EUT

The device is an interactive digital media player which plays content onto a screen through an HDMI port. It incorporates Wi-Fi and Bluetooth radios.

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 4 November 2014
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
ISED Canada Site Registration:	3245B-3 & 3245B-4
Test Dates:	07 August 2017 to 15 August 2017

1.3. Summary of Test Results

FCC Reference (47CFR)	ISEDC Reference	Measurement	Result
Bluetooth Basic Rate/High Power Mode & 5 GHz WLAN			
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/High Power Mode & 5 GHz WLAN			
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 & 5 GHz WLAN			
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 Basic Rate/High Power Mode & 2.4 GHz WLAN			
15.209(a)/15.247(d)	RSS-Gen 6.13 / RSS-247 5.5	Transmitter Out of Band Radiated Emissions	Complied
Bluetooth LE/High Power Mode & 2.4 GHz WLAN			
15.209(a)/15.247(d)	RSS-Gen 6.13 / RSS-247 5.5	Transmitter Out of Band Radiated Emissions	Complied
Bluetooth Basic Rate/High Power Mode & 2.4 GHz WLAN & 5 GHz WLAN			
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/High Power Mode & 2.4 GHz WLAN & 5 GHz WLAN			
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):

1. There are two vendors of the WiFi/*Bluetooth* radio modules, Vendor 1 and Vendor 2.
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 the worst case.
3. 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 2.4 GHz and 5 GHz bands. Only radiated spurious emissions related to intermodulation products are recorded in this test report. The highest out-of-band noise floor levels were recorded if no intermodulation products were observed across the required measurement ranges.

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	
Site 2	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 v04 April 5, 2017
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 v01r04 May 2, 2017
Title:	Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices (Part 15, Subpart E)
Reference:	KDB662911 D01 Multiple Transmitter Output v02r01 October 31, 2013
Title:	Emissions Testing of Transmitter with Multiple Outputs in the Same Band

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%	±5.65 dB
Radiated Spurious Emissions	1 GHz to 40 GHz	95%	±2.94 dB

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

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)
M2003	Thermohygrometer	Testo	608-H1	45046641	22 Feb 2018	12
K0017	3m RSE Chamber	Rainford	N/A	N/A	14 Apr 2018	12
M1995	Test Receiver	Rohde & Schwarz	ESU40	100428	13 Apr 2018	12
A2863	Preamplifier	Agilent	8449B	3008A02100	11 Apr 2018	12
A2891	Preamplifier	Schwarzbeck	BBV 9718	9718-306	11 Apr 2018	12
A2893	Preamplifier	Schwarzbeck	BBV 9721	9721-021	11 Apr 2018	12
A2903	Antenna	Schwarzbeck	VULB 9163	9163-944	22 Aug 2017	12
A2890	Antenna	Schwarzbeck	HWRD 750	014	11 Apr 2018	12
A2892	Antenna	Schwarzbeck	BBHA 9170	9170-727	11 Apr 2018	12
A2916	Attenuator	AtlanTecRF	AN18W5-10	832827#1	03 Mar 2018	12
A2131	Low Pass Filter	AtlanTecRF	AFL-02000	JFB1004-002	27 Feb 2018	12
A2971	Low Pass Filter	AtlanTecRF	AFL-02000	15062902845	06 Mar 2018	12
A2914	High Pass Filter	AtlanTecRF	AFH-03000	2155	06 Mar 2018	12
A2947	High Pass Filter	AtlanTecRF	AFH-07000	160190001	06 Mar 2018	12
M1656	Thermohygrometer	JM Handelspunkt	30.5015.13	Not stated	22 Feb 2018	12
K0002	3m RSE Chamber	Rainford	N/A	N/A	16 Nov 2017	12
M1874	Test Receiver	Rohde & Schwarz	ESU26	100553	21 Nov 2017	12
A1818	Antenna	EMCO	3115	00075692	08 Nov 2017	12
A253	Antenna	Flann Microwave	12240-20	128	08 Nov 2017	12
A254	Antenna	Flann Microwave	14240-20	139	08 Nov 2017	12
A255	Antenna	Flann Microwave	16240-20	519	08 Nov 2017	12
A256	Antenna	Flann Microwave	18240-20	400	08 Nov 2017	12
A1395	Attenuator	Huber & Suhner	6806.17.B	753459	02 Mar 2018	12
A1396	Attenuator	Huber & Suhner	6810.17.B	757987	28 Feb 2018	12
A2133	Low Pass Filter	AtlanTecRF	AFL-04000	JFB1006-002	28 Feb 2018	12
A1975	High Pass Filter	AtlanTecRF	AFH-03000	090424010	06 Mar 2018	12
A2947	High Pass Filter	AtlanTecRF	AFH-06000	1601900001	18 May 2018	12
A2176	High Pass Filter	AtlanTecRF	AFH-07000	800980	06 Mar 2018	12

3. Equipment Under Test (EUT)

3.1. Identification of Equipment Under Test (EUT)

Brand Name:	Apple Inc.
Model No./HVIN:	A1842
Test Sample Serial Number:	C07TK02ZJ4C7 *(Radiated sample #1)*
Hardware Version:	EVT
Software Version:	15J42500h
FCC ID:	BCGA1842
ISED Certification Number:	IC: 579C-A1842

Brand Name:	Apple Inc.
Model No./HVIN:	A1842
Test Sample Serial Number:	C07TK006J4C6 *(Radiated sample #2)*
Hardware Version:	EVT
Software Version:	15J42500h
FCC ID:	BCGA1842
ISED Certification Number:	IC: 579C-A1842

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:	*Bluetooth* Low Energy (Digital Transmission System)		
Type of Unit:	Transceiver		
Channel Spacing:	2 MHz		
Transmit Frequency Range:	2402 MHz to 2480 MHz		
Transmit Channels Tested:	**Channel ID**	**RF Channel**	**Channel Frequency (MHz)**
	Bottom	0	2402
	Top	39	2480

Tested Technology:	*Bluetooth* (FHSS)		
Mode:	Basic Rate		
Modulation:	GFSK		
Packet Type: (Maximum Payload)	DH5		
Data Rate (Mbit/s):	1		
Transmit Frequency Range:	2402 MHz to 2480 MHz		
Transmit Channels Tested:	**Channel ID**	**Channel Number**	**Channel Frequency (MHz)**
	Bottom	0	2402
	Top	78	2480

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

Additional Information Related to Testing (continued)

Technology Tested:	WLAN (IEEE 802.11a) / U-NII / LE-LAN		
Channel Spacing:	20 MHz		
Modulation:	BPSK		
Data Rate:	802.11n HT20 (MIMO)	MCS0 with CDD	
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 2 integrated antennas, with the following declared maximum gains at 2400 – 2483.5 MHz:

Antenna Port	Antenna Gain (dBi)
1	0.9
2	-0.1

The radio utilizes integrated antennas with the following maximum gains in the 5 GHz bands:

Frequency Band (MHz)	$G_{Antenna\ 1}$ (dBi)	$G_{Antenna\ 2}$ (dBi)
5150 to 5250	1.9	1.7
5725 to 5850	-0.1	1.6

3.5. Description of Test Setup

Support Equipment

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

Description:	Goldeneye Adaptor
Brand Name:	Apple
Model Name or Number:	X892
Serial Number:	C4MB4360888X8921H

Description:	USB to lightning cable
Brand Name:	Apple
Model Name or Number:	Kanzi
Serial Number:	316D67

Description:	Laptop PC
Brand Name:	Apple
Model Name or Number:	Macbook Pro
Serial Number:	C2QRC0BGQCT

Description:	HDMI Cable. Length 1.8 metres
Brand Name:	Apple
Model Name or Number:	Not marked or stated
Serial Number:	Not marked or stated

Description:	Multi Media player adaptor
Brand Name:	Sumvision
Model Name or Number:	Cyclone Micro
Serial Number:	UL VS LTD Asset No. A1986

Description:	Power Cable. Length 1.8 metres.
Brand Name:	Apple
Model Name or Number:	Not marked or stated
Serial Number:	Not marked or stated

Description:	Ethernet Hub
Brand Name:	Netgear
Model Name or Number:	GS605
Serial Number:	1YG19430021A1

Support Equipment (continued)

Description:	Ethernet Cable. Length 2.0 metres.
Brand Name:	Not marked or stated
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):

- Transmitting 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):

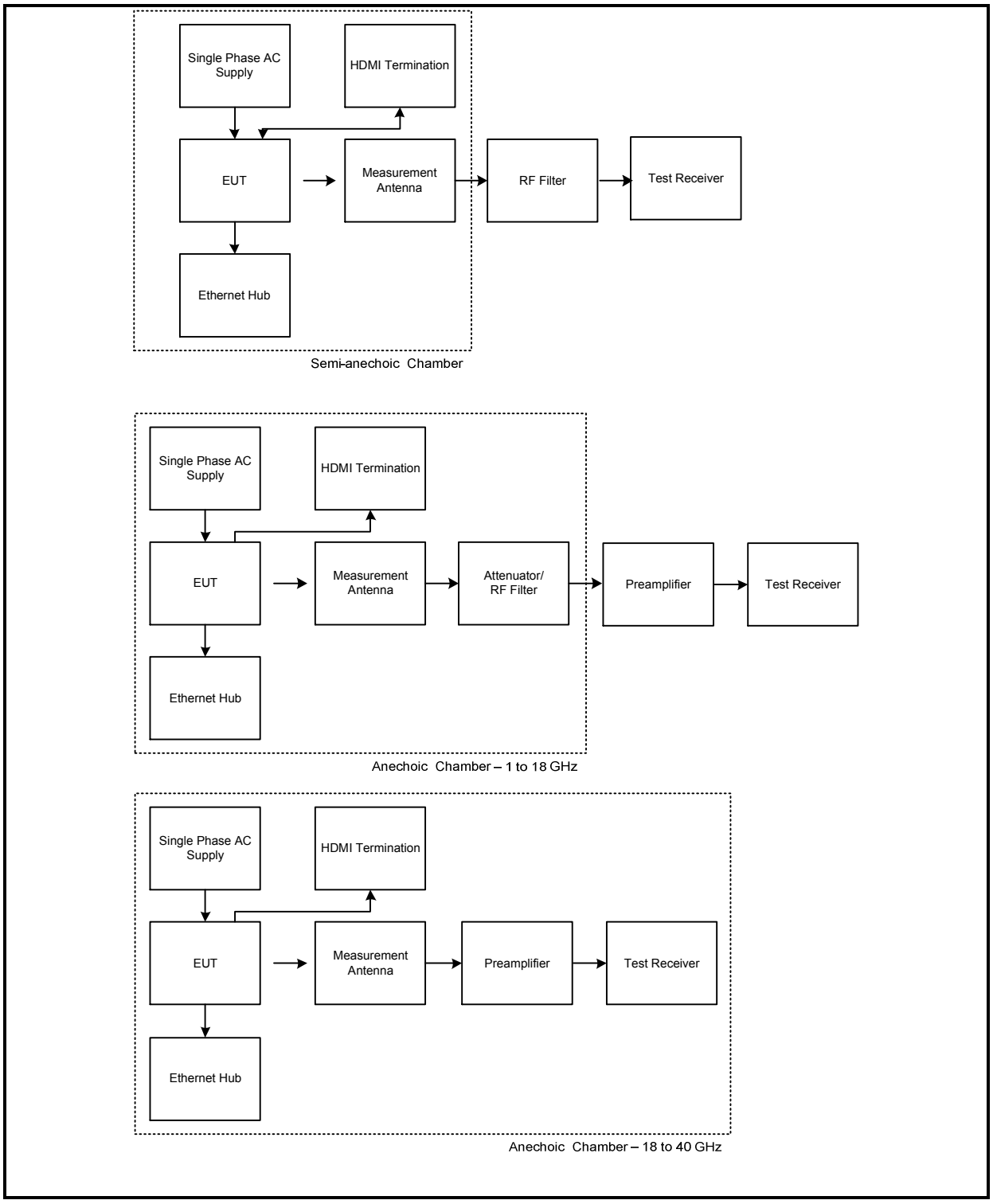
- The EUT was controlled in test mode using a software application on the laptop PC supplied by the customer. The application was used to enable a continuous transmission and to select the test channels as required. The customer supplied a document containing the setup instructions 'EUT_setup_v3.2.docx'. The laptop PC was connected to the EUT via a Goldeneye adaptor and Kanzi cable.
- *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 in using 802.11n / HT20 / MCS0 / MIMO (2Tx CDD). configuration as this mode 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 in using 802.11n / HT20 / MCS0 / MIMO (2Tx CDD).configuration as this mode was 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* 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* 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 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 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 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 top channel and 5 GHz WLAN on bottom channel.
- *Bluetooth* Basic Rate and 2.4 GHz WLAN co-location, with the EUT configured to simultaneously transmit two signals at maximum output power, *Bluetooth* bottom channel and 2.4 GHz WLAN on top channel.
- *Bluetooth* Basic Rate and 2.4 GHz WLAN co-location, with the EUT configured to simultaneously transmit two signals at maximum output power, *Bluetooth* top channel and 2.4 GHz WLAN on bottom channel.
- *Bluetooth* LE and 2.4 GHz WLAN co-location, with the EUT configured to simultaneously transmit two signals at maximum output power, *Bluetooth* LE bottom channel and 2.4 GHz WLAN on top channel.

- *Bluetooth* LE and 2.4 GHz WLAN co-location, with the EUT configured to simultaneously transmit two signals at maximum output power, *Bluetooth* LE top channel and 2.4 GHz WLAN on bottom channel.
- *Bluetooth* Basic Rate and 2.4 GHz WLAN and 5 GHz WLAN co-location, with the EUT configured to simultaneously transmit three signals at maximum output power, *Bluetooth* bottom channel and 2.4 GHz WLAN on top channel and 5 GHz WLAN bottom channel.
- *Bluetooth* Basic Rate and 2.4 GHz WLAN and 5 GHz WLAN co-location, with the EUT configured to simultaneously transmit three signals at maximum output power, *Bluetooth* bottom channel and 2.4 GHz WLAN on top channel and 5 GHz WLAN top channel.
- *Bluetooth* Basic Rate and 2.4 GHz WLAN and 5 GHz WLAN co-location, with the EUT configured to simultaneously transmit three signals at maximum output power, *Bluetooth* top channel and 2.4 GHz WLAN on bottom channel and 5 GHz WLAN bottom channel.
- *Bluetooth* Basic Rate and 2.4 GHz WLAN and 5 GHz WLAN co-location, with the EUT configured to simultaneously transmit three signals at maximum output power, *Bluetooth* top channel and 2.4 GHz WLAN on bottom channel and 5 GHz WLAN top channel.
- *Bluetooth* LE and 2.4 GHz WLAN and 5 GHz WLAN co-location, with the EUT configured to simultaneously transmit three signals at maximum output power, *Bluetooth* LE bottom channel and 2.4 GHz WLAN on top channel and 5 GHz WLAN bottom channel.
- *Bluetooth* LE and 2.4 GHz WLAN and 5 GHz WLAN co-location, with the EUT configured to simultaneously transmit three signals at maximum output power, *Bluetooth* LE bottom channel and 2.4 GHz WLAN on top channel and 5 GHz WLAN top channel.
- *Bluetooth* LE and 2.4 GHz WLAN and 5 GHz WLAN co-location, with the EUT configured to simultaneously transmit three signals at maximum output power, *Bluetooth* LE top channel and 2.4 GHz WLAN on bottom channel and 5 GHz WLAN bottom channel.
- *Bluetooth* LE and 2.4 GHz WLAN and 5 GHz WLAN co-location, with the EUT configured to simultaneously transmit three signals at maximum output power, *Bluetooth* LE top channel and 2.4 GHz WLAN on bottom channel and 5 GHz WLAN top channel.
- The EUT was powered from a 120 VAC 60 Hz single phase mains supply.

Test Setup Diagrams

Radiated Tests:

Test Setup for Transmitter Radiated Emissions



4. Test Results

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

Test Summary:

Test Engineers:	Bari Momen, Alan Withers, Doug Freegard & Andrew Edwards	**Test Dates:**	07 August 2017 to 14 August 2017
Test Sample Serial Number:	C07TK02ZJ4C7 & C07TK006J4C6		

FCC Reference:	Parts 15.205(a), 15.209(a), 15.247(d) & 15.407(b)
ISED Canada Reference:	RSS-Gen 6.13 / 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:	*Bluetooth* Basic Rate bottom channel / 5 GHz WLAN top channel

Environmental Conditions:

Temperature (°C):	23 to 25
Relative Humidity (%):	41 to 48

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

Note(s):

1. All intermodulation products were below the noise floor level or greater than 20 dB from the specification limit. The highest peak and average noise floor measurements are recorded in the following tables.
2. The *Bluetooth* fundamental is shown on the 1 GHz to 3 GHz plot.
3. The 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 emission at approximately 9608.500 MHz is the 4th harmonic of the *Bluetooth* signal and was therefore not measured.
6. RF attenuators and filters were used as required. The insertion losses are included in the measurements.
7. 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.
8. Measurements below 1 GHz were performed in a semi-anechoic chamber (UL VS LTD 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.
9. Measurements above 1 GHz were performed in a fully anechoic chamber (UL VS LTD Asset Numbers K0002 & 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. Maximum emission levels were determined by height searching the measurement antenna over the range 1 metre to 4 metres.

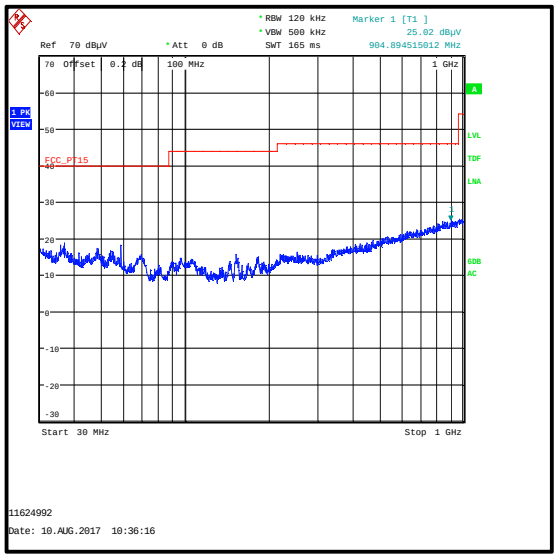
Results: Peak

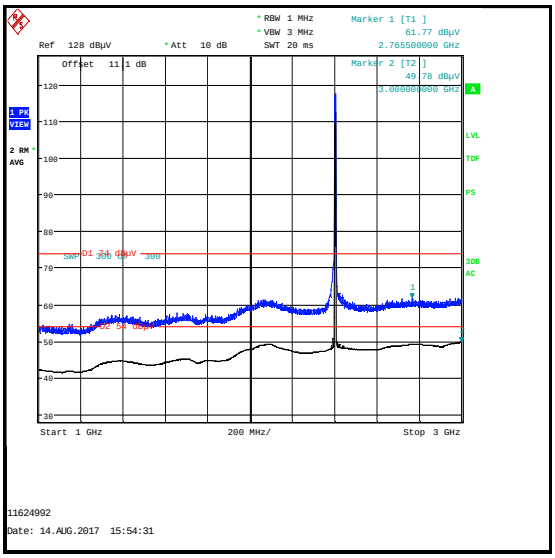
Frequency (MHz)	Antenna Polarity	Peak Level (dBµV/m)	Peak Limit (dBµV/m)	Margin (dB)	Result
2765.000	Horizontal	61.8	74.0	12.2	Complied

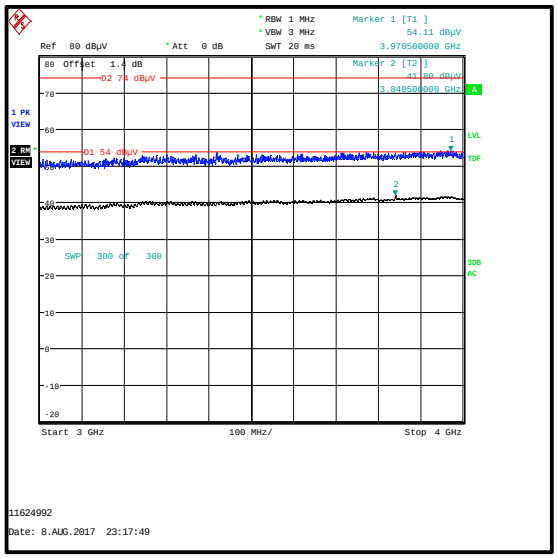
Results: Average

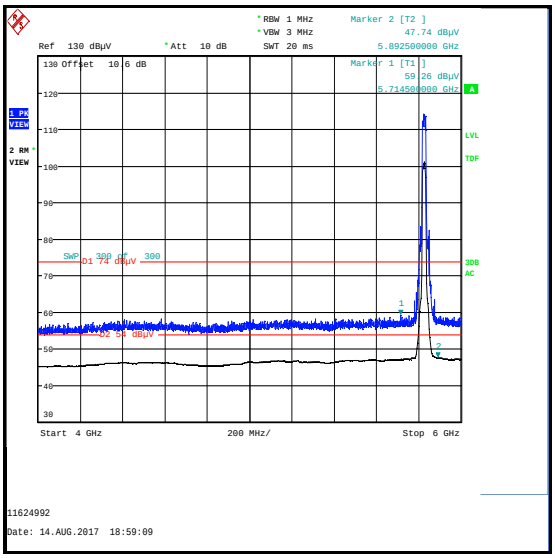
Frequency (MHz)	Antenna Polarity	Average Level (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)	Result
3000.000	Horizontal	49.8	54.0	4.2	Complied

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

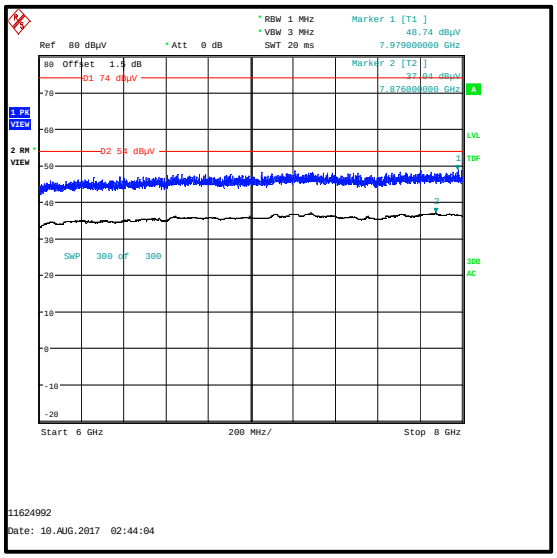


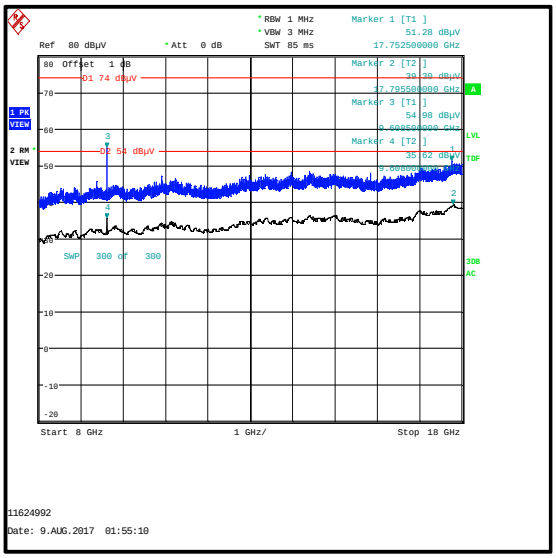


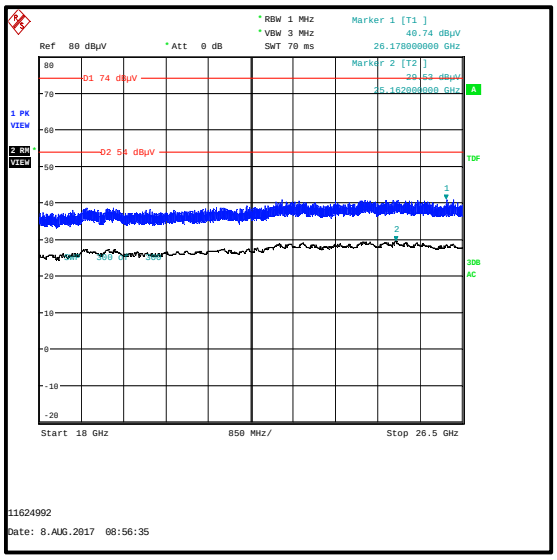


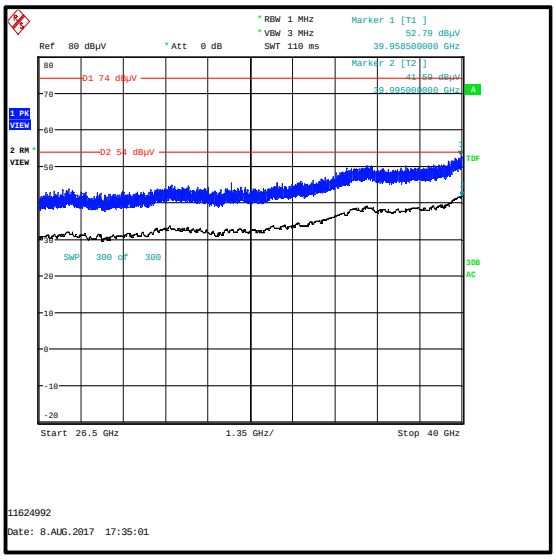


Transmitter Out of Band Radiated Emissions - *Bluetooth* Basic Rate bottom channel / 5 GHz WLAN top channel (continued)









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

Test Summary:

Test Engineers:	David Doyle, Andrew Edwards, John Ferdinand, Doug Freegard, Bari Momen & Alan Withers	**Test Dates:**	07 August 2017 to 14 August 2017
Test Sample Serial Numbers:	C07TK02ZJ4C7 & C07TK006J4C6		

FCC Reference:	Parts 15.205(a), 15.209(a), 15.247(d) & 15.407(b)
ISED Canada Reference:	RSS-Gen 6.13 / 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:	*Bluetooth* Basic Rate top channel / 5 GHz WLAN bottom channel

Environmental Conditions:

Temperature (°C):	23 to 25
Relative Humidity (%):	41 to 48

Note(s):

1. All intermodulation products were below the noise floor level or greater than 20 dB from the specification limit. The highest peak and average noise floor measurements are recorded in the following tables.
2. The *Bluetooth* fundamental is shown on the 1 GHz to 3 GHz plot.
3. The 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 emission at approximately 7430.000 MHz is the 3rd harmonic of the *Bluetooth* signal and was therefore not measured.
6. The emission at approximately 9919.500 MHz is the 4th harmonic of the *Bluetooth* signal and was therefore not measured.
7. RF attenuators and filters were used as required. The insertion losses are included in the measurements.
8. 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.
9. Measurements below 1 GHz were performed in a semi-anechoic chamber (UL VS LTD 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.
10. Measurements above 1 GHz were performed in a fully anechoic chamber (UL VS LTD Asset Numbers K0002 & 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.

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

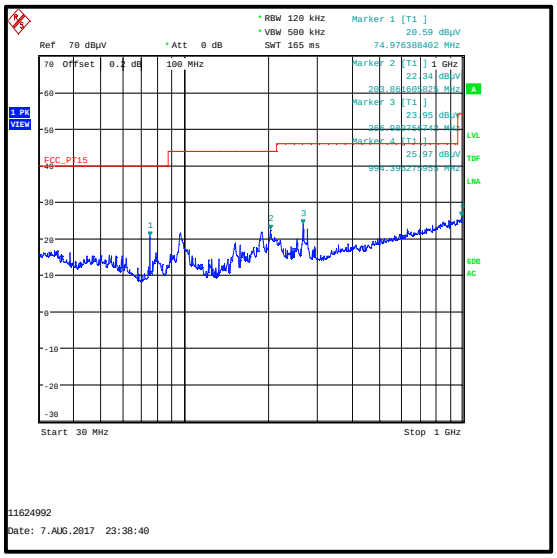
Results: Peak

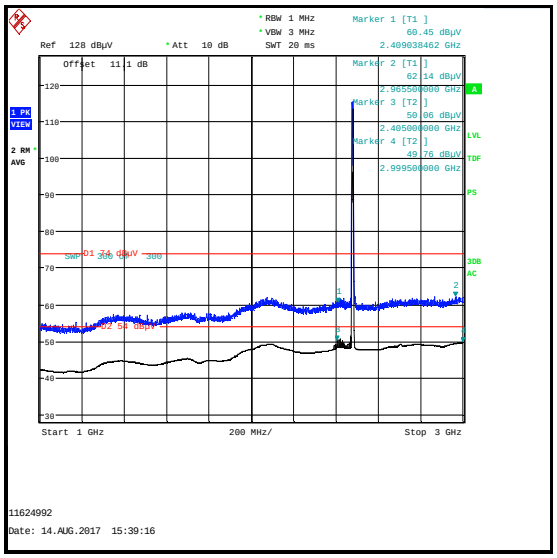
Frequency (MHz)	Antenna Polarity	Peak Level (dBµV/m)	Peak Limit (dBµV/m)	Margin (dB)	Result
2965.500	Horizontal	62.1	74.0	11.9	Complied

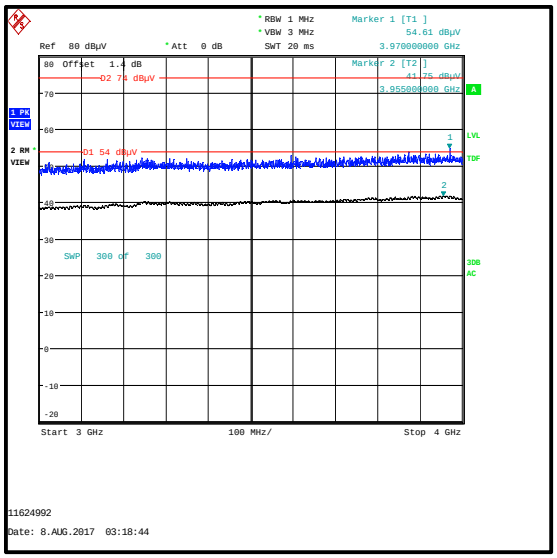
Results: Average

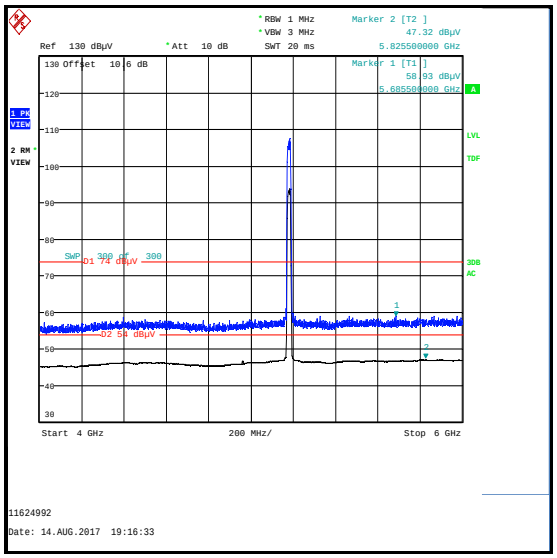
Frequency (MHz)	Antenna Polarity	Average Level (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)	Result
2405.000	Horizontal	50.1	54.0	3.9	Complied

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

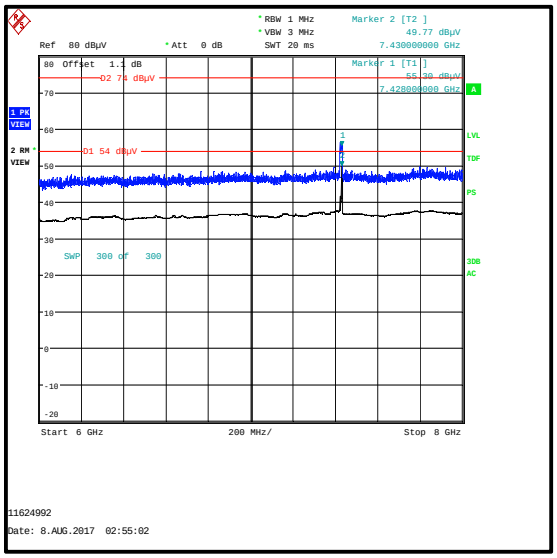


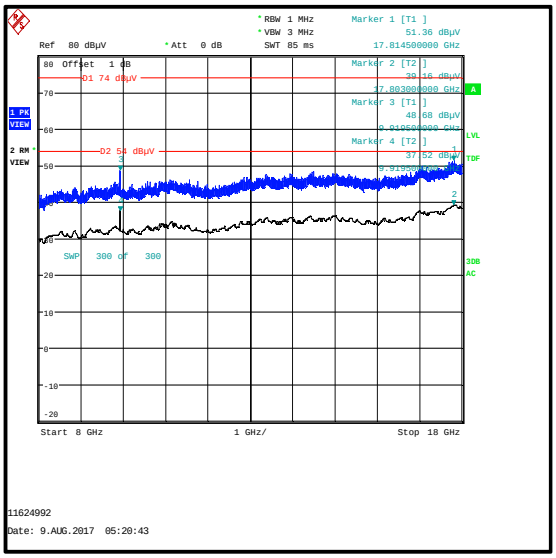


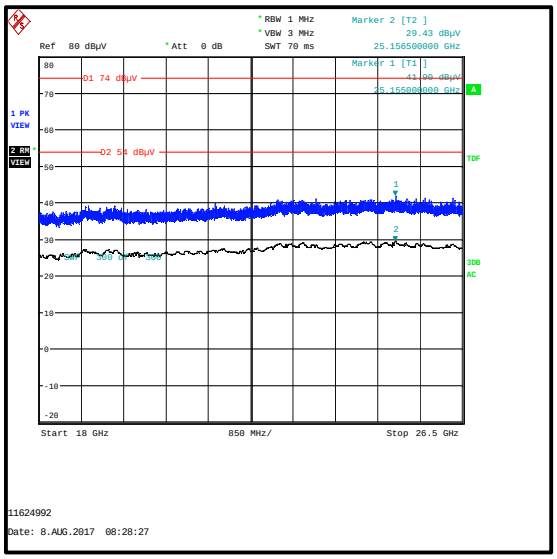


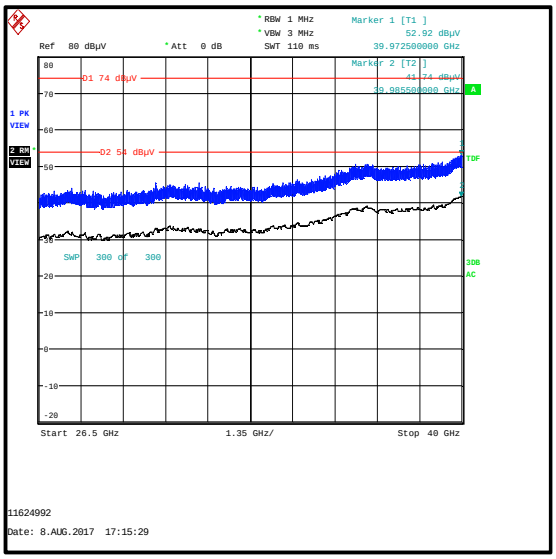


Transmitter Out of Band Radiated Emissions - *Bluetooth* Basic Rate top channel / 5 GHz WLAN bottom channel (continued)









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

Test Summary:

Test Engineers:	David Doyle, Andrew Edwards, Doug Freegard, Bari Momen & Alan Withers	**Test Dates:**	08 August 2017 to 14 August 2017
Test Sample Serial Numbers:	C07TK02ZJ4C7 & C07TK006J4C6		

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

Environmental Conditions:

Temperature (°C):	23 to 25
Relative Humidity (%):	41 to 48

Note(s):

1. All intermodulation products were below the noise floor level or greater than 20 dB from the specification limit. The highest peak and average noise floor measurements are recorded in the following tables.
2. The *Bluetooth* LE fundamental is shown on the 1 GHz to 3 GHz plot.
3. The 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 emission at approximately 9607.000 MHz is the 4th harmonic of the *Bluetooth* LE signal and was therefore not measured.
6. RF attenuators and filters were used as required. The insertion losses are included in the measurements.
7. 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.
8. Measurements below 1 GHz were performed in a semi-anechoic chamber (UL VS LTD 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.
9. Measurements above 1 GHz were performed in a fully anechoic chamber (UL VS LTD Asset Numbers K0002 & 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.

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

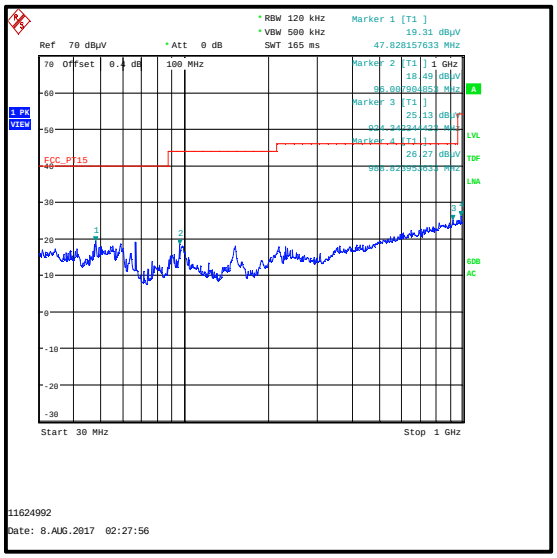
Results: Peak

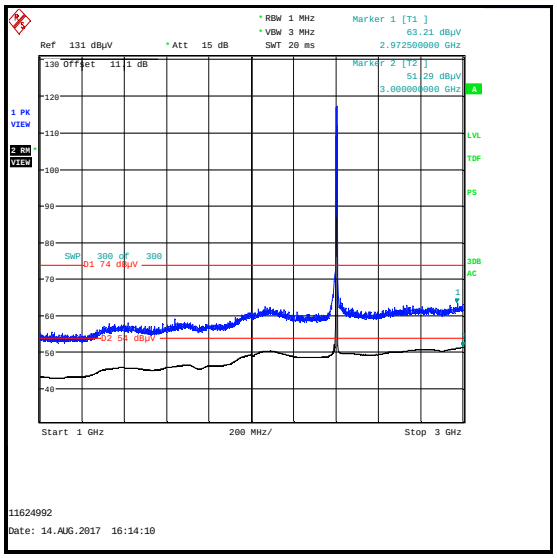
Frequency (MHz)	Antenna Polarity	Peak Level (dBµV/m)	Peak Limit (dBµV/m)	Margin (dB)	Result
2972.500	Horizontal	63.2	74.0	10.8	Complied

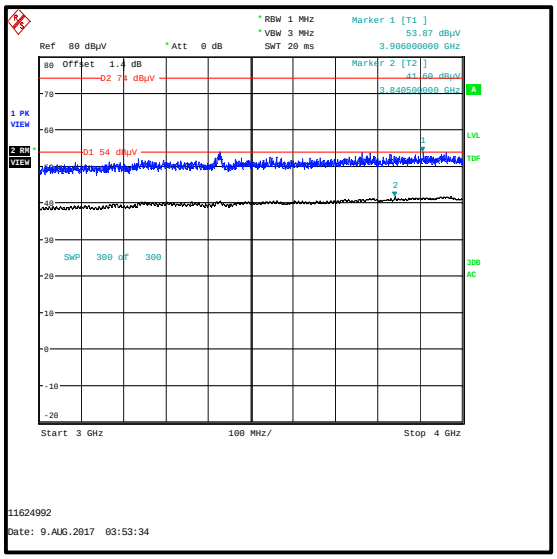
Results: Average

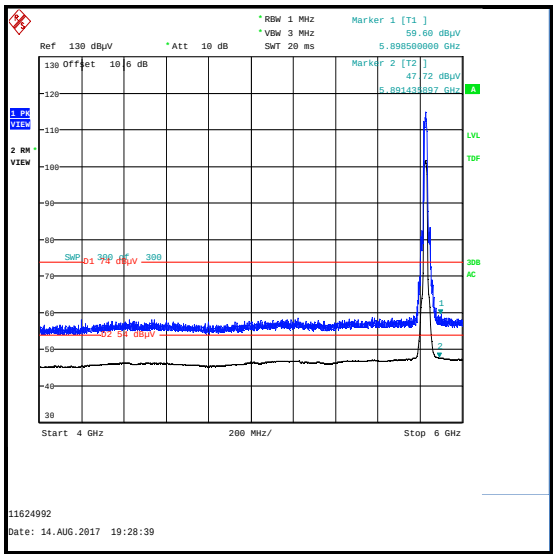
Frequency (MHz)	Antenna Polarity	Average Level (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)	Result
3000.000	Horizontal	51.3	54.0	2.7	Complied

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

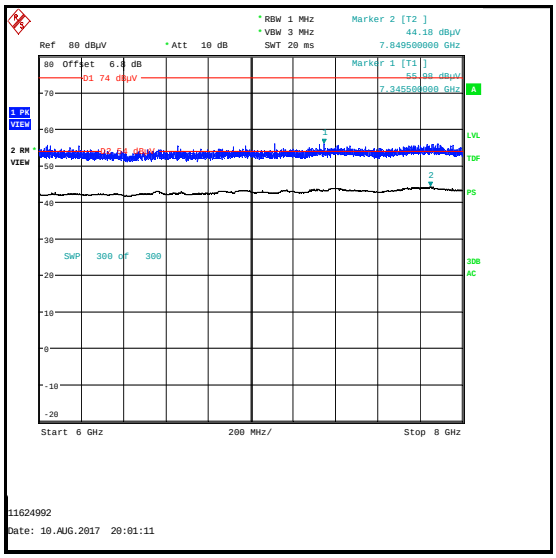


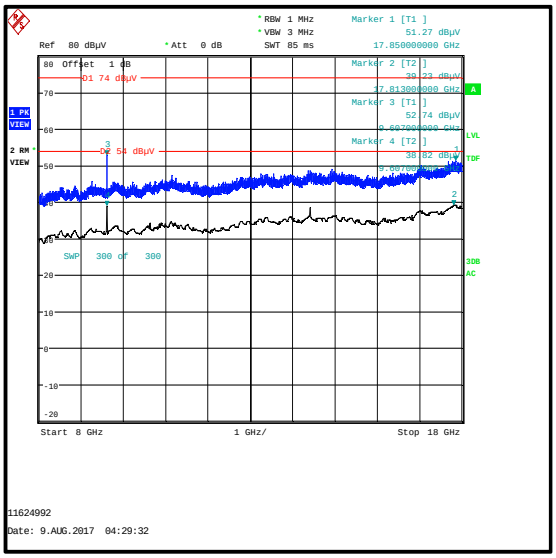


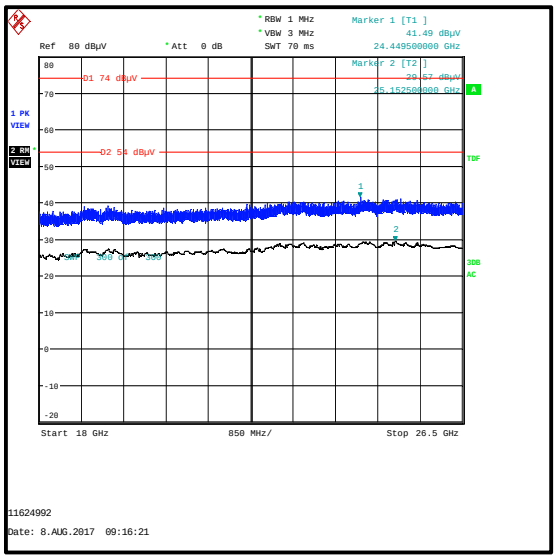


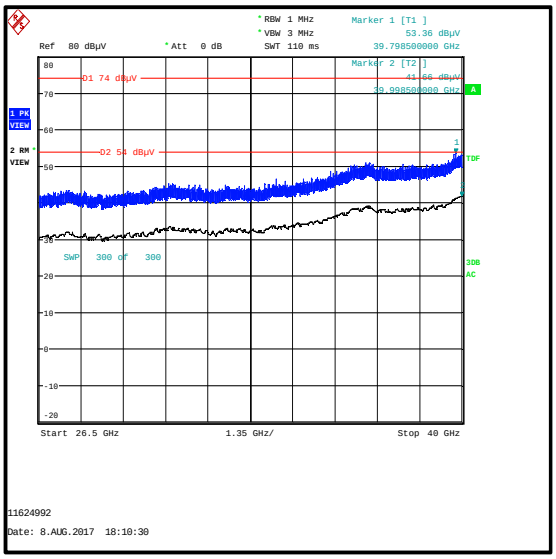


Transmitter Out of Band Radiated Emissions - *Bluetooth* LE bottom channel / 5 GHz WLAN top channel (continued)









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

Test Summary:

Test Engineers:	David Doyle, John Ferdinand, Doug Freegard, Andrew Edwards & Alan Withers	**Test Dates:**	08 August 2017 to 14 August 2017
Test Sample Serial Numbers:	C07TK02ZJ4C7 & C07TK006J4C6		

FCC Reference:	Parts 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 and 6.6, 11.11, 11.12.2.4, 11.12.2.5.1; FCC KDB 558074 Sections 11, 12.2.4 & 12.2.5.1; KDB 789033 II.G.
Frequency Range:	30 MHz to 40 GHz
Configuration:	*Bluetooth* LE top channel / 5 GHz WLAN bottom channel

Environmental Conditions:

Temperature (°C):	23 to 25
Relative Humidity (%):	41 to 48

Note(s):

1. All intermodulation products were below the noise floor level or greater than 20 dB from the specification limit. The highest peak and average noise floor measurements are recorded in the following tables.
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 emission at approximately 7440.000 MHz is the 3rd harmonic of the *Bluetooth* LE signal and was therefore not measured.
6. RF attenuators and filters were used as required. The insertion losses are included in the measurements.
7. 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.
8. Measurements below 1 GHz were performed in a semi-anechoic chamber (UL VS LTD 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.
9. Measurements above 1 GHz were performed in a fully anechoic chamber (UL VS LTD Asset Numbers K0002 & 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.

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

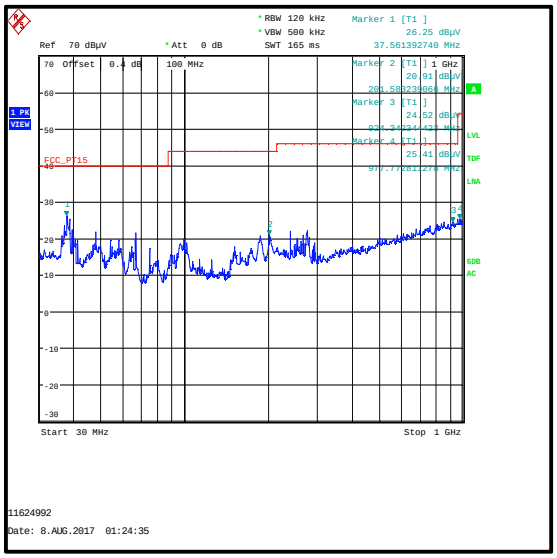
Results: Peak

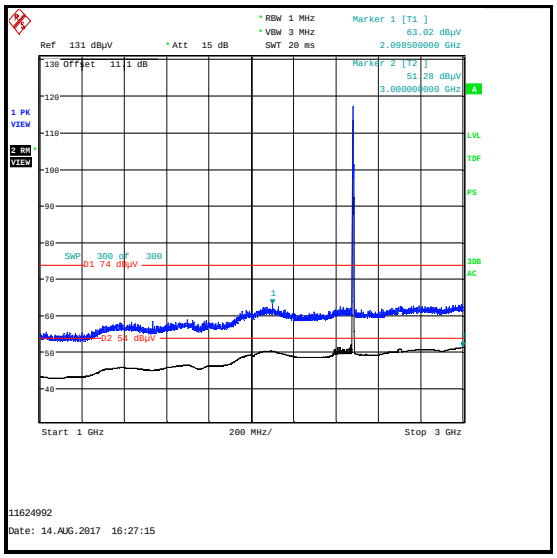
Frequency (MHz)	Antenna Polarity	Peak Level (dBµV/m)	Peak Limit (dBµV/m)	Margin (dB)	Result
2098.500	Horizontal	63.0	74.0	11.0	Complied

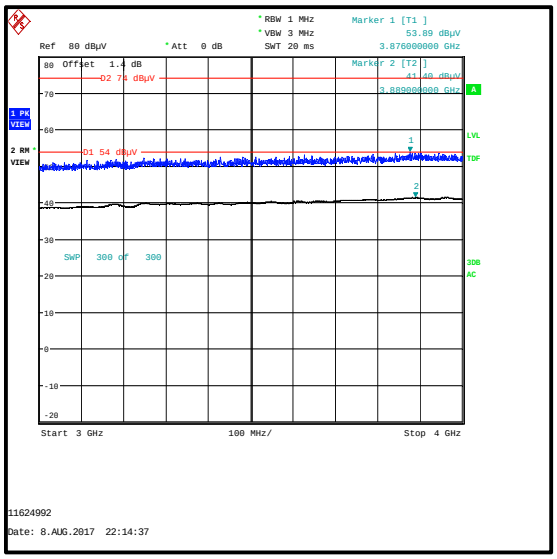
Results: Average

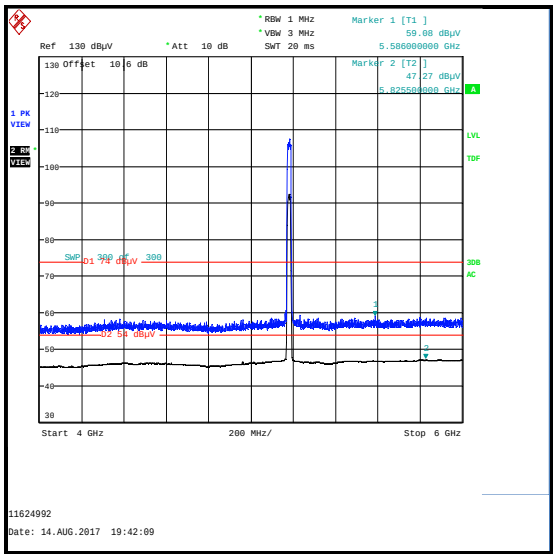
Frequency (MHz)	Antenna Polarity	Average Level (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)	Result
3000.000	Horizontal	51.3	54.0	2.7	Complied

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

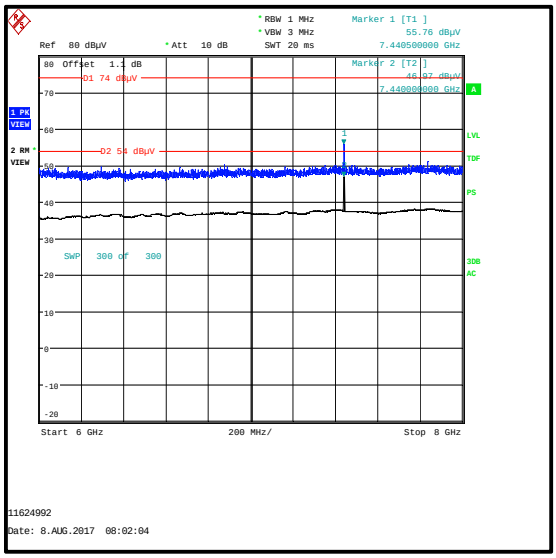


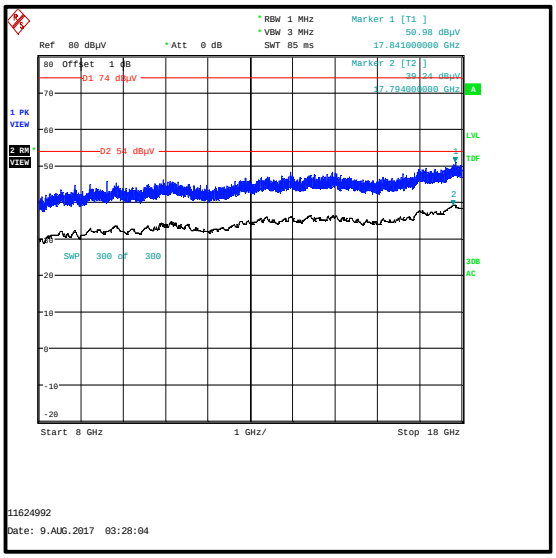


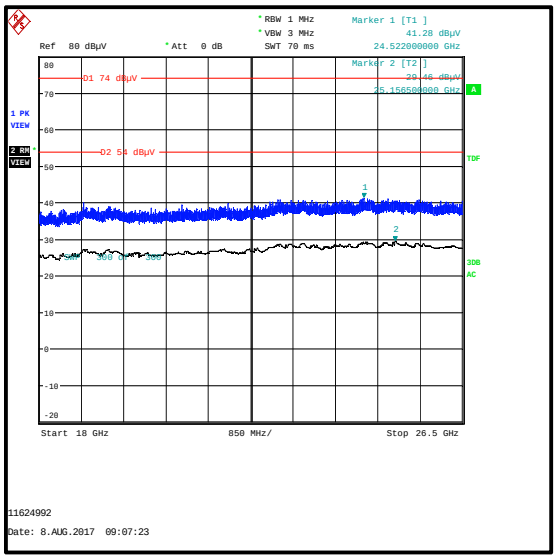


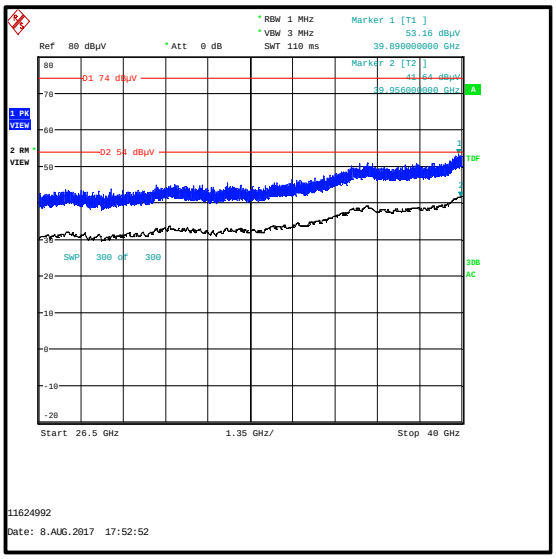


Transmitter Out of Band Radiated Emissions - *Bluetooth* LE top channel / 5 GHz WLAN bottom channel (continued)









4.5. Transmitter Out of Band Radiated Emissions - 2.4 GHz WLAN bottom channel / 5 GHz WLAN top channel

Test Summary:

Test Engineers:	Andrew Edwards, John Ferdinand, Doug Freegard & Bari Momen	**Test Dates:**	08 August 2017 to 14 August 2017
Test Sample Serial Numbers:	C07TK02ZJ4C7 & C07TK006J4C6		

FCC Reference:	Parts 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 and 6.6, 11.11, 11.12.2.4, 11.12.2.5.1; FCC KDB 558074 Sections 11, 12.2.4 & 12.2.5.1; KDB 789033 II.G
Frequency Range:	30 MHz to 40 GHz
Configuration:	2.4 GHz WLAN bottom channel / 5 GHz WLAN top channel

Environmental Conditions:

Temperature (°C):	23 to 25
Relative Humidity (%):	41 to 48

Note(s):

1. All intermodulation products were below the noise floor level or greater than 20 dB from the specification limit. The highest peak and average noise floor measurements are recorded in the following tables.
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 emission at approximately 9651.000 MHz is the 4th harmonic of the 2.4 GHz WLAN signal and was therefore not measured.
6. RF attenuators and filters were used as required. The insertion losses are included in the measurements.
7. 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.
8. Measurements below 1 GHz were performed in a semi-anechoic chamber (UL VS LTD 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.
9. Measurements above 1 GHz were performed in a fully anechoic chamber (UL VS LTD Asset Numbers K0002 & 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.

Transmitter Out of Band Radiated Emissions - 2.4 GHz WLAN bottom channel / 5 GHz WLAN top channel (continued)

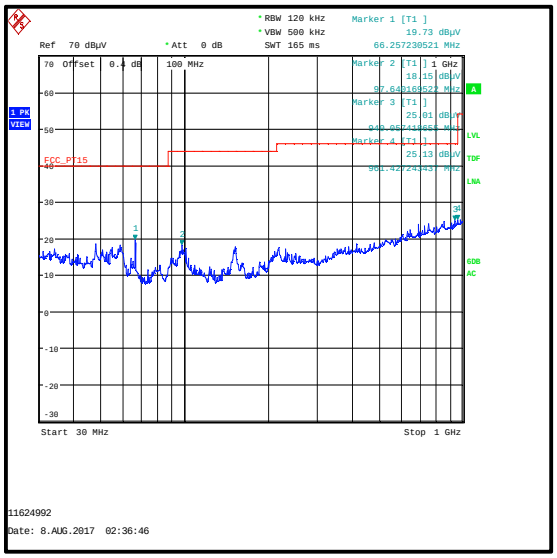
Results: Peak

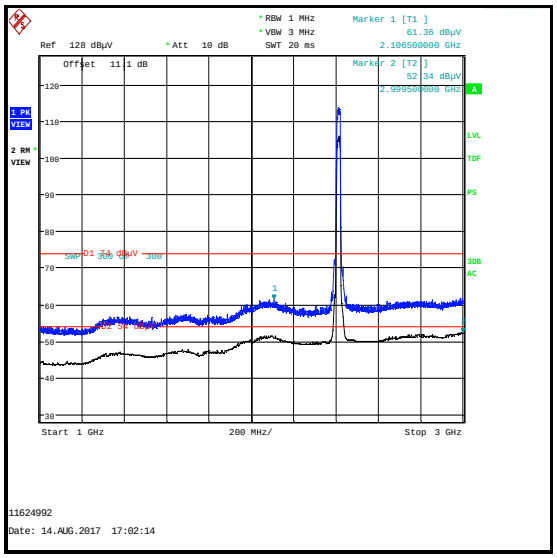
Frequency (MHz)	Antenna Polarity	Peak Level (dBµV/m)	Peak Limit (dBµV/m)	Margin (dB)	Result
2106.500	Horizontal	61.4	74.0	12.6	Complied

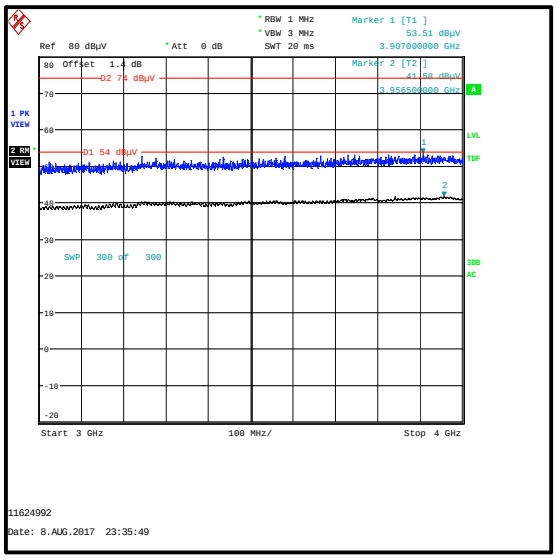
Results: Average

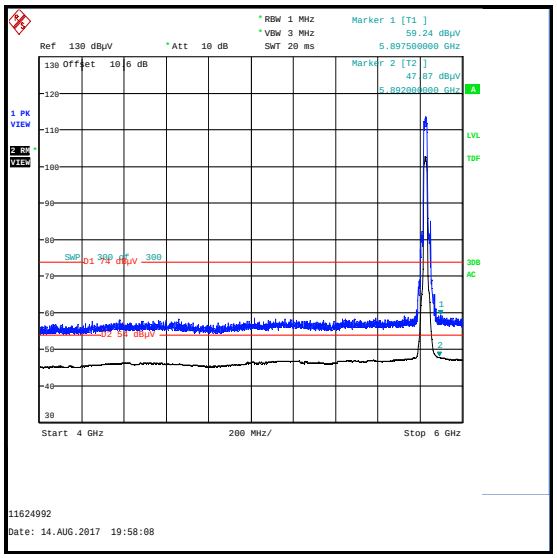
Frequency (MHz)	Antenna Polarity	Average Level (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)	Result
2999.500	Horizontal	52.3	54.0	4.2	Complied

Transmitter Out of Band Radiated Emissions - 2.4 GHz WLAN bottom channel / 5 GHz WLAN top channel (continued)

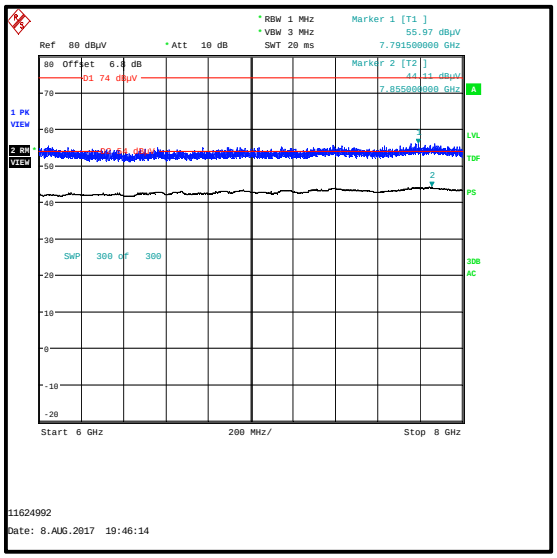


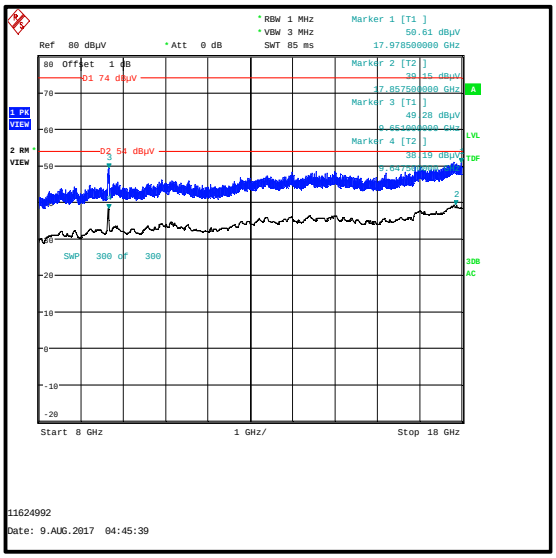


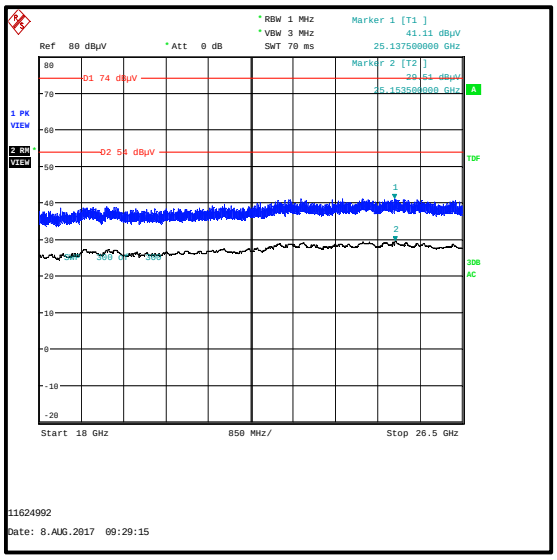


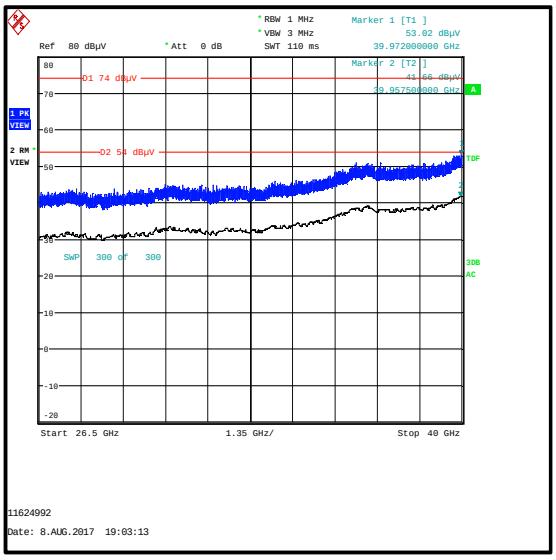


Transmitter Out of Band Radiated Emissions - 2.4 GHz WLAN bottom channel / 5 GHz WLAN top channel (continued)









4.6. Transmitter Out of Band Radiated Emissions - 2.4 GHz WLAN top channel / 5 GHz WLAN bottom channel

Test Summary:

Test Engineers:	David Doyle, Andrew Edwards, John Ferdinand, Doug Freegard, Bari Momen & Alan Withers	**Test Dates:**	08 August 2017 to 14 August 2017
Test Sample Serial Numbers:	C07TK02ZJ4C7 & C07TK006J4C6		

FCC Reference:	Parts 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 and 6.6, 11.11, 11.12.2.4, 11.12.2.5.1; FCC KDB 558074 Sections 11, 12.2.4 & 12.2.5.1; KDB 789033 II.G
Frequency Range:	30 MHz to 40 GHz
Configuration:	2.4 GHz WLAN top channel / 5 GHz WLAN bottom channel

Environmental Conditions:

Temperature (°C):	23 to 25
Relative Humidity (%):	41 to 48

Note(s):

1. All intermodulation products were below the noise floor level or greater than 20 dB from the specification limit. The highest peak and average noise floor measurements are recorded in the following tables.
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 emission at approximately 7408.500 MHz is the 3rd harmonic of the 2.4 GHz WLAN signal and was therefore not measured.
6. RF attenuators and filters were used as required. The insertion losses are included in the measurements.
7. 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.
8. Measurements below 1 GHz were performed in a semi-anechoic chamber (UL VS LTD 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.
9. Measurements above 1 GHz were performed in a fully anechoic chamber (UL VS LTD Asset Numbers K0002 & 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.

Transmitter Out of Band Radiated Emissions - 2.4 GHz WLAN top channel / 5 GHz WLAN bottom channel (continued)

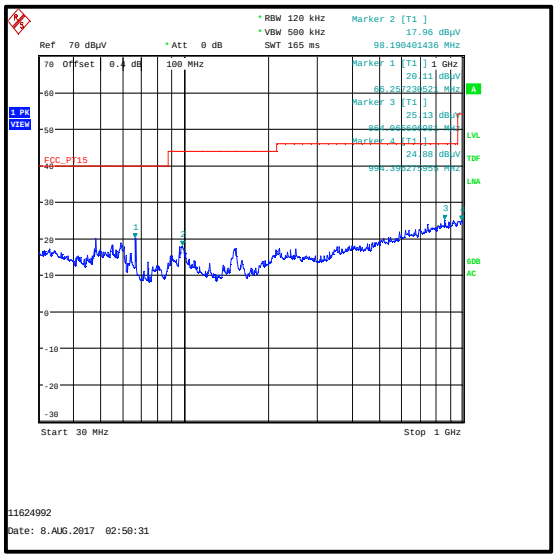
Results: Peak

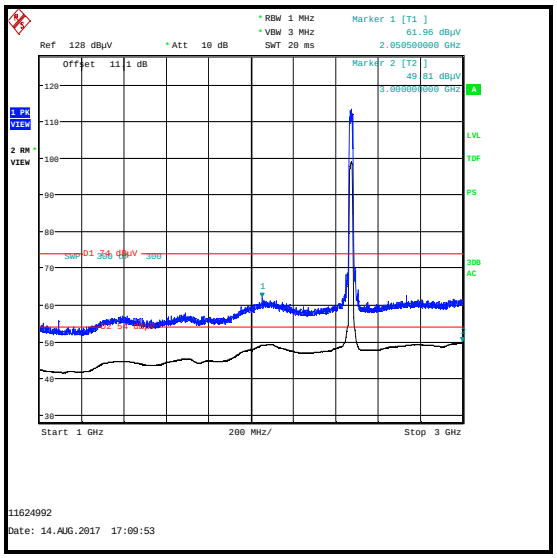
Frequency (MHz)	Antenna Polarity	Peak Level (dBµV/m)	Peak Limit (dBµV/m)	Margin (dB)	Result
2050.500	Horizontal	62.0	74.0	12.0	Complied

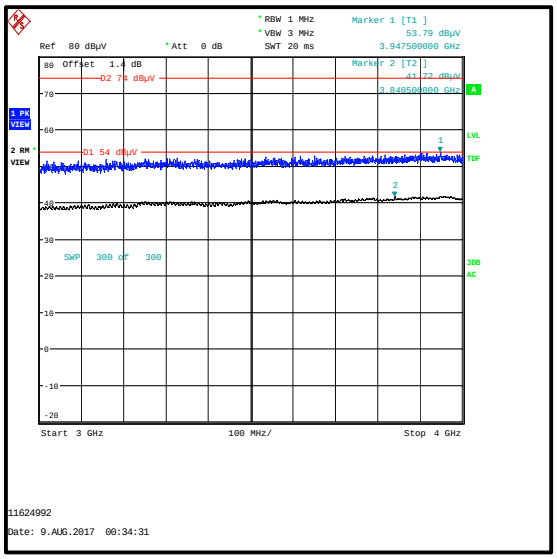
Results: Average

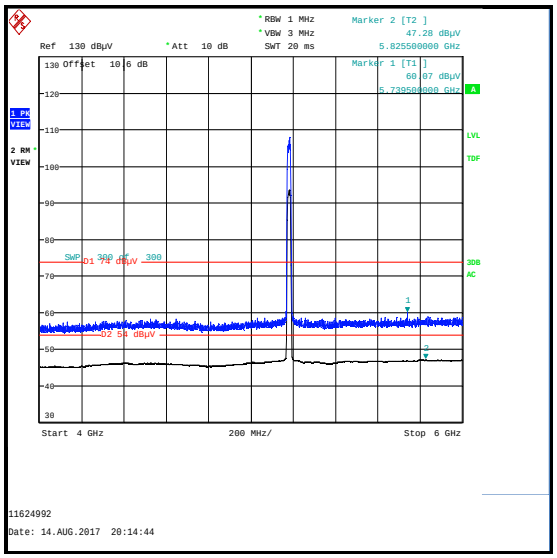
Frequency (MHz)	Antenna Polarity	Average Level (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)	Result
3000.000	Horizontal	49.8	54.0	4.2	Complied

Transmitter Out of Band Radiated Emissions - 2.4 GHz WLAN top channel / 5 GHz WLAN bottom channel (continued)

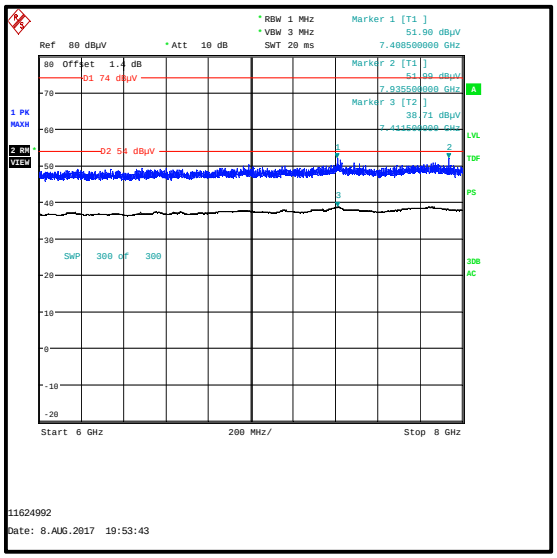


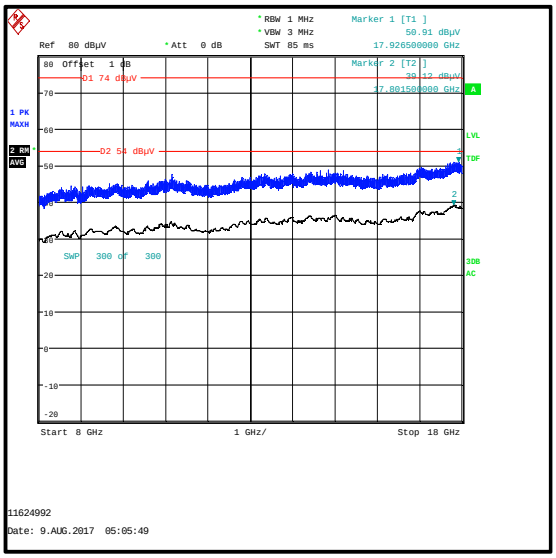


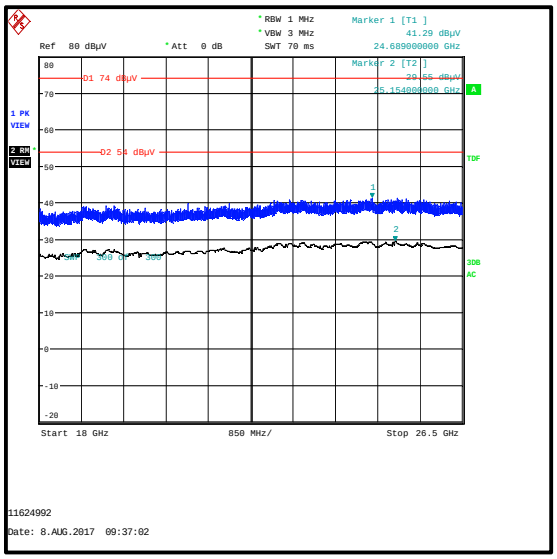


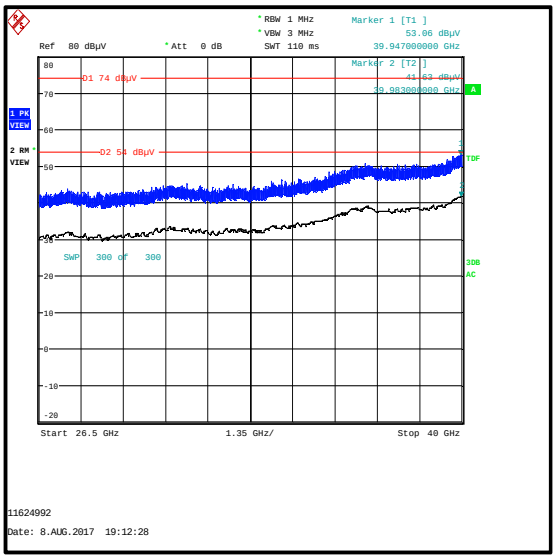


Transmitter Out of Band Radiated Emissions - 2.4 GHz WLAN top channel / 5 GHz WLAN bottom channel (continued)









4.7. Transmitter Out of Band Radiated Emissions - *Bluetooth* Basic Rate bottom channel / 2.4 GHz WLAN top channel

Test Summary:

Test Engineers:	David Doyle, Andrew Edwards, John Ferdinand, Doug Freegard, Bari Momen & Alan Withers	**Test Dates:**	08 August 2017 to 14 August 2017
Test Sample Serial Numbers:	C07TK02ZJ4C7 & C07TK006J4C6		

FCC Reference:	Parts 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 and 6.6, 11.11, 11.12.2.4, 11.12.2.5.1; & FCC KDB 558074 Sections 11, 12.2.4 & 12.2.5.1
Frequency Range:	30 MHz to 25 GHz
Configuration:	*Bluetooth* Basic Rate bottom channel / 2.4 GHz WLAN top channel

Environmental Conditions:

Temperature (°C):	23 to 25
Relative Humidity (%):	41 to 48

Transmitter Out of Band Radiated Emissions - *Bluetooth* Basic Rate bottom channel / 2.4 GHz WLAN top channel (continued)

Note(s):

1. All intermodulation products were below the noise floor level or greater than 20 dB from the specification limit. The highest peak and average noise floor measurements are recorded in the following tables.
2. The *Bluetooth* and 2.4 GHz WLAN fundamentals are shown on the 1 GHz to 3 GHz plot.
3. Pre-scans were made against the FCC Part 15 general limits for radiated emissions.
4. The emission at approximately 4804.000 MHz is the 2nd harmonic of the *Bluetooth* signal and was therefore not measured.
5. The emission at approximately 7206.500 MHz is the 3rd harmonic of the *Bluetooth* signal and was therefore not measured.
6. The emission at approximately 9609.000 MHz is the 4th harmonic of the *Bluetooth* signal and was therefore not measured.
7. RF attenuators and filters were used as required. The insertion losses are included in the measurements.
8. 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.
9. Measurements below 1 GHz were performed in a semi-anechoic chamber (UL VS LTD 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.
10. Measurements above 1 GHz were performed in a fully anechoic chamber (UL VS LTD Asset Numbers K0002 & 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.

Transmitter Out of Band Radiated Emissions - *Bluetooth* Basic Rate bottom channel / 2.4 GHz WLAN top channel (continued)

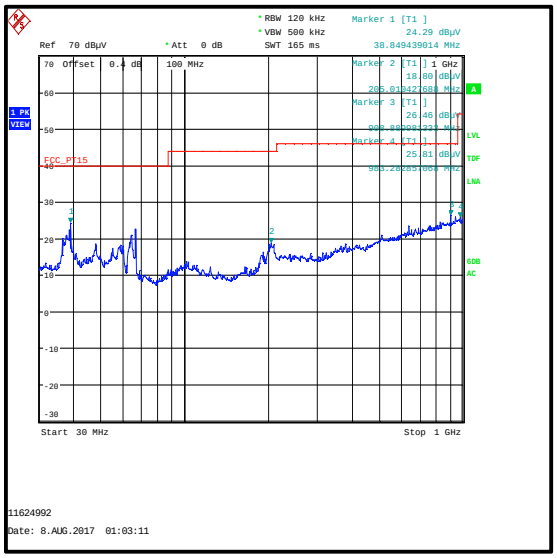
Results: Peak

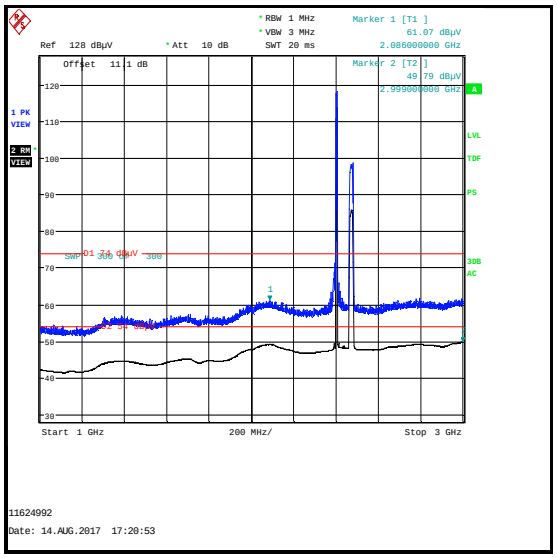
Frequency (MHz)	Antenna Polarity	Peak Level (dBµV/m)	Peak Limit (dBµV/m)	Margin (dB)	Result
2086.000	Horizontal	61.1	74.0	12.9	Complied

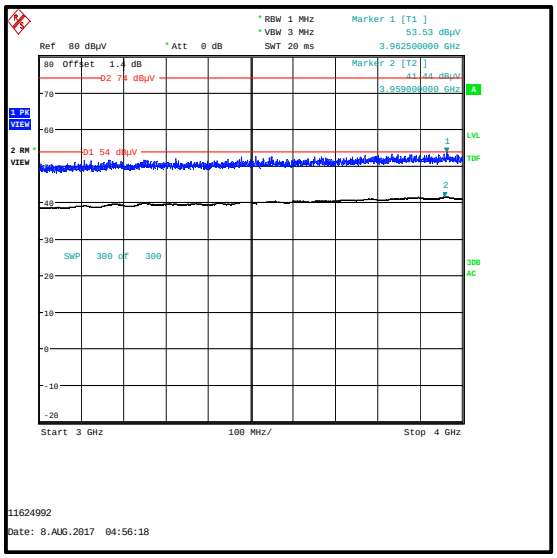
Results: Average

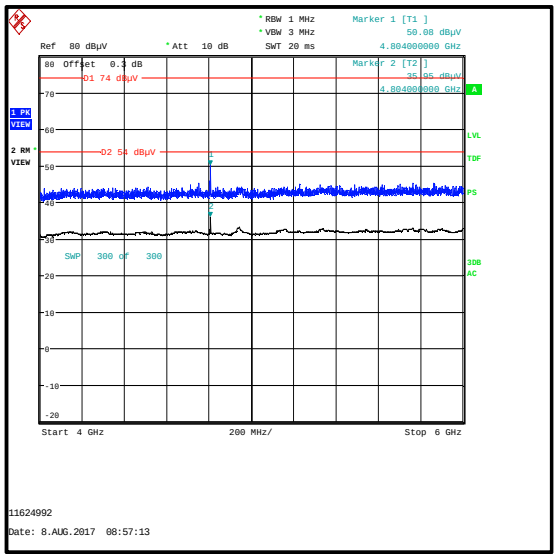
Frequency (MHz)	Antenna Polarity	Average Level (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)	Result
2999.000	Horizontal	49.8	54.0	4.2	Complied

Transmitter Out of Band Radiated Emissions - *Bluetooth* Basic Rate bottom channel / 2.4 GHz WLAN top channel (continued)

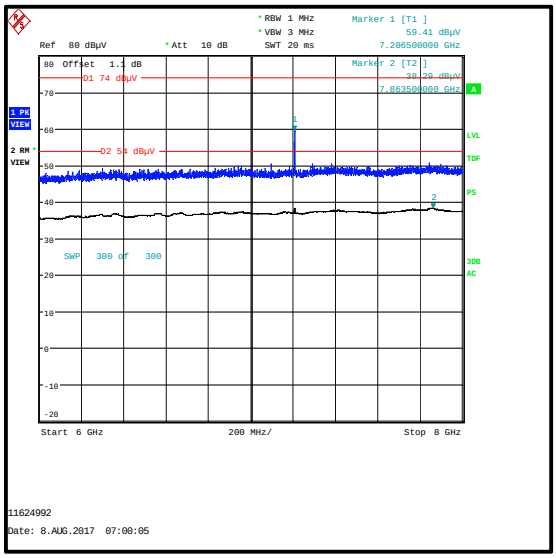


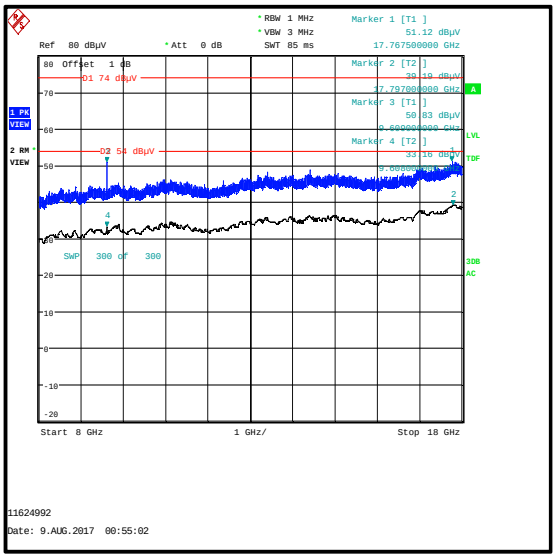


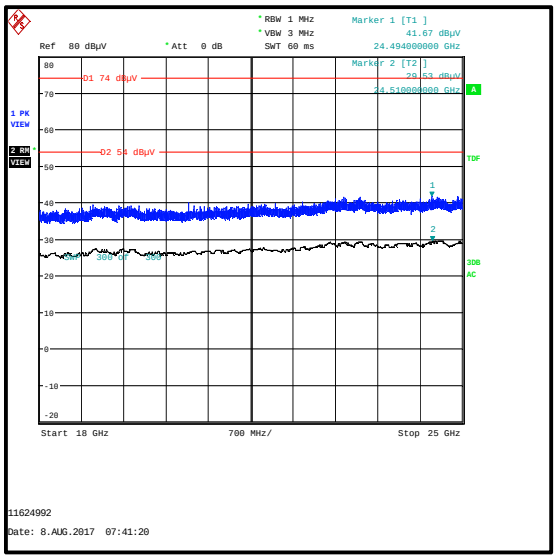




Transmitter Out of Band Radiated Emissions - *Bluetooth* Basic Rate bottom channel / 2.4 GHz WLAN top channel (continued)







4.8. Transmitter Out of Band Radiated Emissions - *Bluetooth* Basic Rate top channel / 2.4 GHz WLAN bottom channel

Test Summary:

Test Engineers:	David Doyle, Andrew Edwards, John Ferdinand, Doug Freegard, Bari Momen & Alan Withers	**Test Dates:**	08 August 2017 to 14 August 2017
Test Sample Serial Numbers:	C07TK02ZJ4C7 & C07TK006J4C6		

FCC Reference:	Parts 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 and 6.6, 11.11, 11.12.2.4, 11.12.2.5.1; FCC KDB 558074 Sections 11, 12.2.4 & 12.2.5.1
Frequency Range:	30 MHz to 25 GHz
Configuration:	*Bluetooth* Basic Rate top channel / 2.4 GHz WLAN bottom channel

Environmental Conditions:

Temperature (°C):	23 to 25
Relative Humidity (%):	41 to 48

Transmitter Out of Band Radiated Emissions - *Bluetooth* Basic Rate top channel / 2.4 GHz WLAN bottom channel (continued)

Note(s):

1. The emission at 2344.104 MHz is an intermodulation product produced by the 2.4 GHz WLAN 2nd harmonic minus the *Bluetooth* carrier. This emission falls within a restricted band and was measured against the peak and average limits of 74 dBµV/m and 54 dBµV/m. The measured level has been recorded in the tables below. Any other 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 are shown on the 1 GHz to 3 GHz plot.
3. Pre-scans were made against the FCC Part 15 general limits for radiated emissions.
4. The emission at approximately 7440.000 MHz is the 3rd harmonic of the *Bluetooth* signal and was therefore not measured.
5. The emission at approximately 9648.000 MHz is the 4th harmonic of the 2.4 GHz WLAN signal and was therefore not measured.
6. RF attenuators and filters were used as required. The insertion losses are included in the measurements.
7. 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.
8. Measurements below 1 GHz were performed in a semi-anechoic chamber (UL VS LTD 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.
9. Measurements above 1 GHz were performed in a fully anechoic chamber (UL VS LTD Asset Numbers K0002 & 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.

Transmitter Out of Band Radiated Emissions - *Bluetooth* Basic Rate top channel / 2.4 GHz WLAN bottom channel (continued)

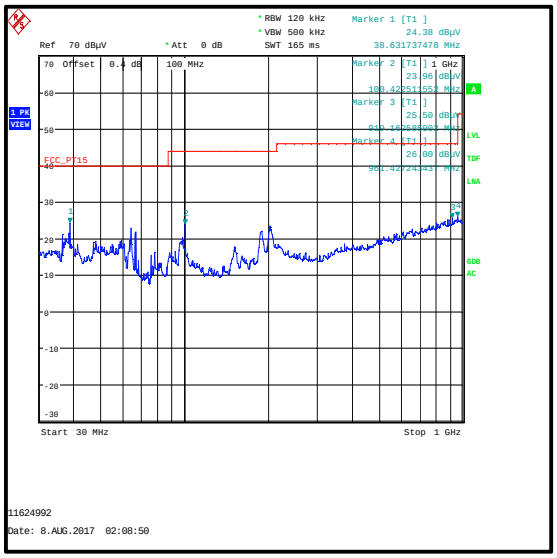
Results: Peak

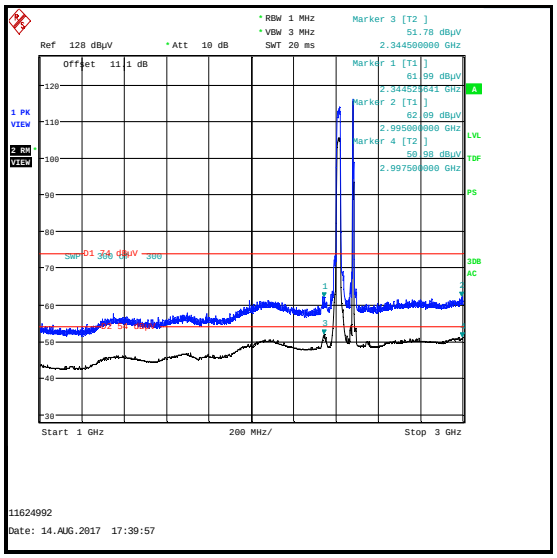
Frequency (MHz)	Antenna Polarity	Peak Level (dBµV/m)	Peak Limit (dBµV/m)	Margin (dB)	Result
2344.104	Vertical	61.9	74.0	12.1	Complied

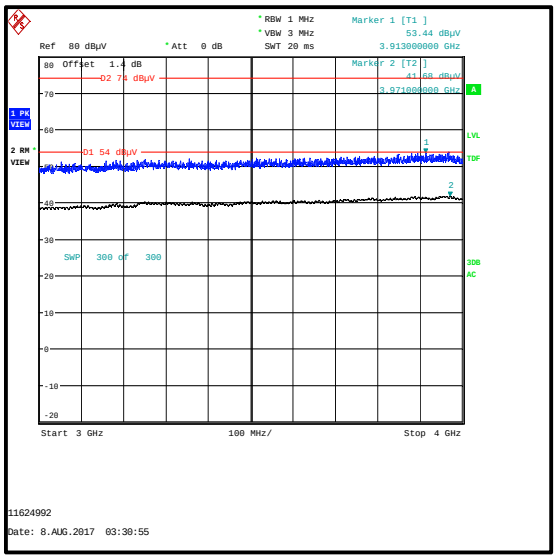
Results: Average

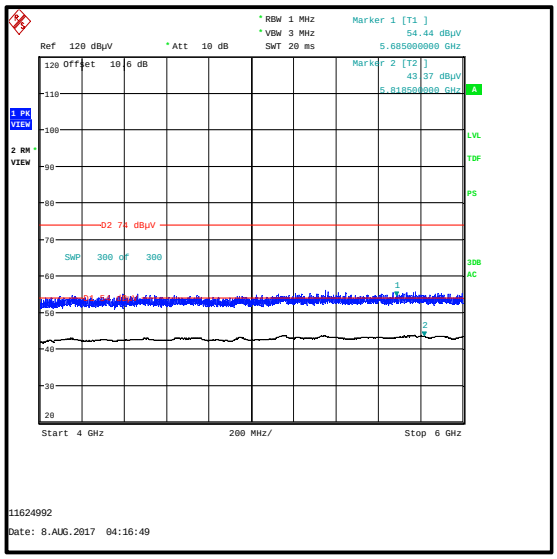
Frequency (MHz)	Antenna Polarity	Average Level (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)	Result
2344.104	Vertical	49.1	54.0	4.9	Complied

Transmitter Out of Band Radiated Emissions - *Bluetooth* Basic Rate top channel / 2.4 GHz WLAN bottom channel (continued)

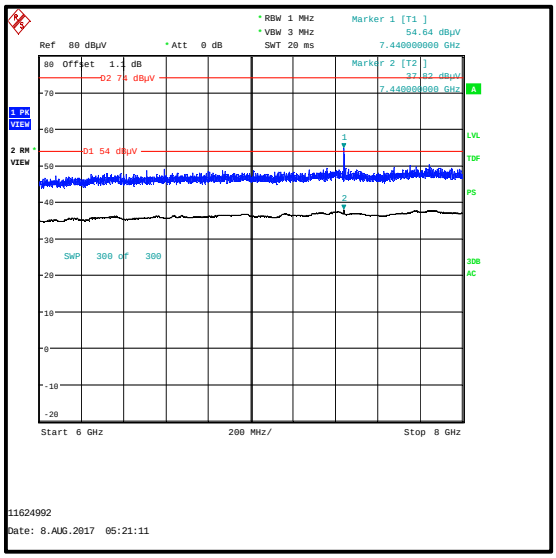


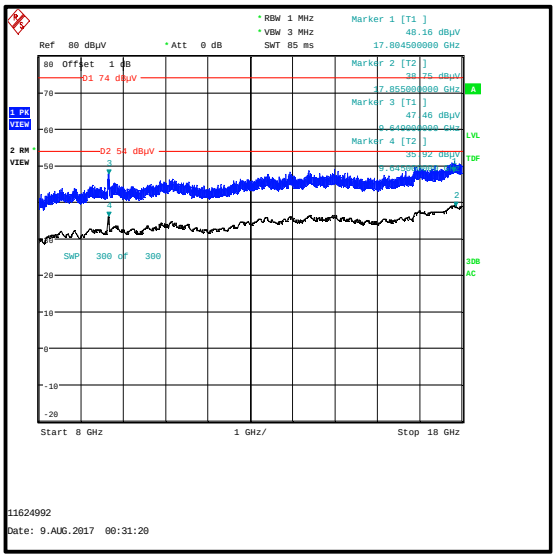


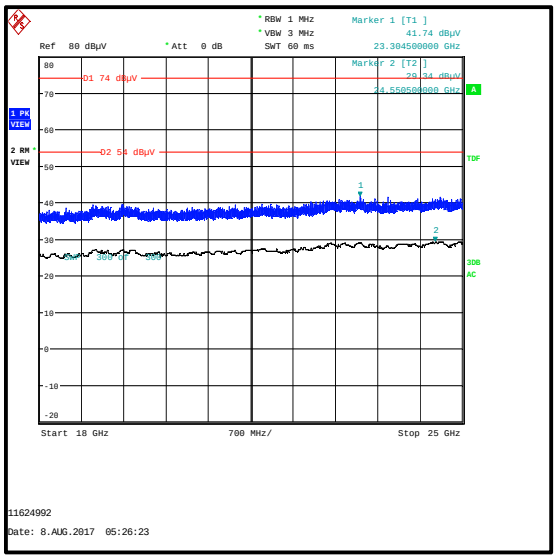




Transmitter Out of Band Radiated Emissions - *Bluetooth* Basic Rate top channel / 2.4 GHz WLAN bottom channel (continued)







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

4.9. Transmitter Out of Band Radiated Emissions - Bluetooth LE bottom channel / 2.4 GHz WLAN top channel

Test Summary:

Test Engineers:	David Doyle, Andrew Edwards, John Ferdinand, Doug Freegard, Bari Momen & Alan Withers	**Test Dates:**	08 August 2017 to 14 August 2017
Test Sample Serial Number:	C07TK02ZJ4C7 & C07TK006J4C6		

FCC Reference:	Parts 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 and 6.6, 11.11, 11.12.2.4, 11.12.2.5.1; FCC KDB 558074 Sections 11, 12.2.4 & 12.2.5.1
Frequency Range:	30 MHz to 25 GHz
Configuration:	*Bluetooth* LE bottom channel / 2.4 GHz WLAN top channel

Environmental Conditions:

Temperature (°C):	23 to 25
Relative Humidity (%):	41 to 48

Transmitter Out of Band Radiated Emissions - *Bluetooth* LE bottom channel / 2.4 GHz WLAN top channel (continued)

Note(s):

1. All intermodulation products were below the noise floor level or greater than 20 dB from the specification limit. The highest peak and average noise floor measurements are recorded in the following tables.
2. The *Bluetooth* LE and 2.4 GHz WLAN fundamental are shown on the 1 GHz to 3 GHz plot.
3. Pre-scans were made against the FCC Part 15 general limits for radiated emissions.
4. The emission at approximately 4804.000 MHz is the 2nd harmonic of the *Bluetooth* signal and was therefore not measured.
5. The emission at approximately 7206.000 MHz is the 3rd harmonic of the *Bluetooth* signal and was therefore not measured.
6. The emission at approximately 9607.000 MHz is the 4th harmonic of the *Bluetooth* signal and was therefore not measured.
7. RF attenuators and filters were used as required. The insertion losses are included in the measurements.
8. 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.
9. Measurements below 1 GHz were performed in a semi-anechoic chamber (UL VS LTD 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.
10. Measurements above 1 GHz were performed in a fully anechoic chamber (UL VS LTD Asset Numbers K0002 & 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.

Transmitter Out of Band Radiated Emissions - *Bluetooth* LE bottom channel / 2.4 GHz WLAN top channel (continued)

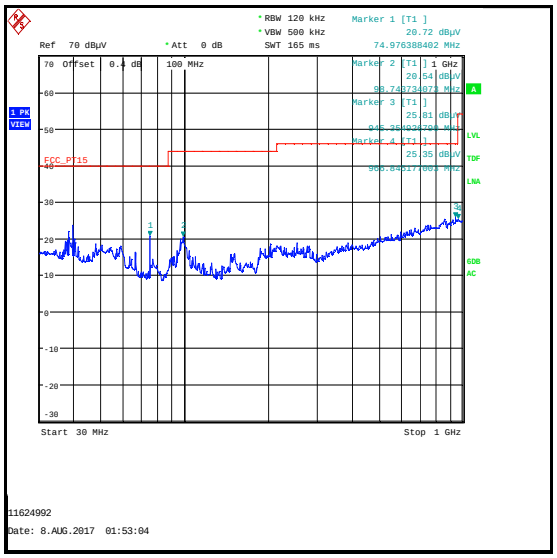
Results: Peak

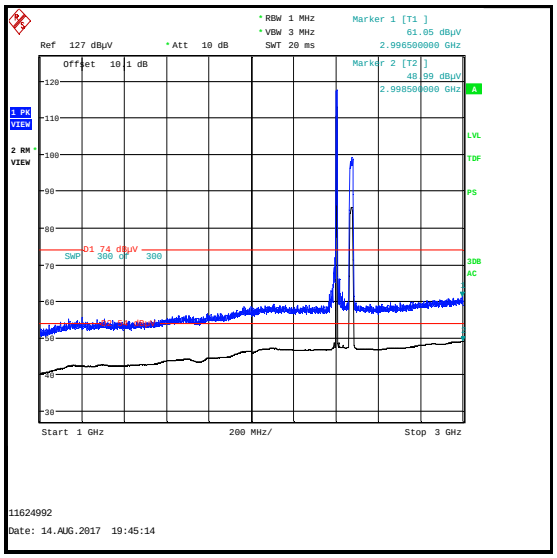
Frequency (MHz)	Antenna Polarity	Peak Level (dBµV/m)	Peak Limit (dBµV/m)	Margin (dB)	Result
2996.500	Vertical	61.1	74.0	12.9	Complied

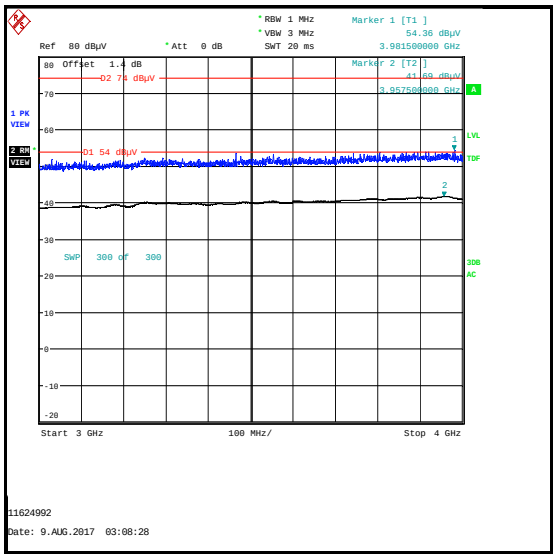
Results: Average

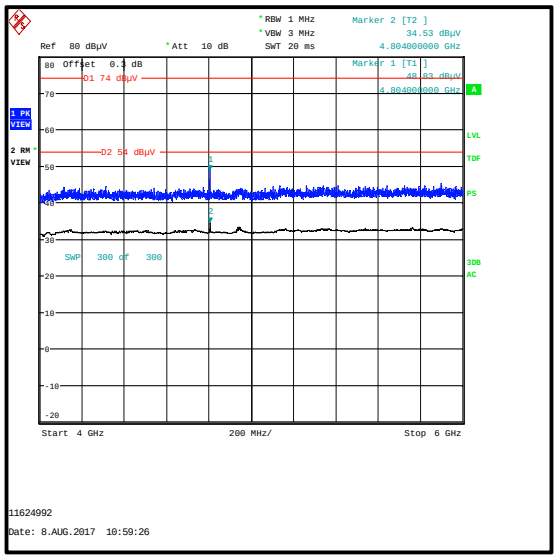
Frequency (MHz)	Antenna Polarity	Average Level (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)	Result
2998.500	Vertical	49.0	54.0	5.0	Complied

Transmitter Out of Band Radiated Emissions - *Bluetooth* LE bottom channel / 2.4 GHz WLAN top channel (continued)

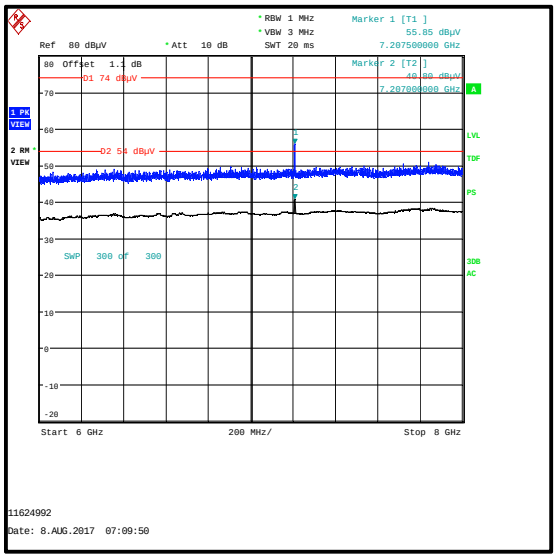


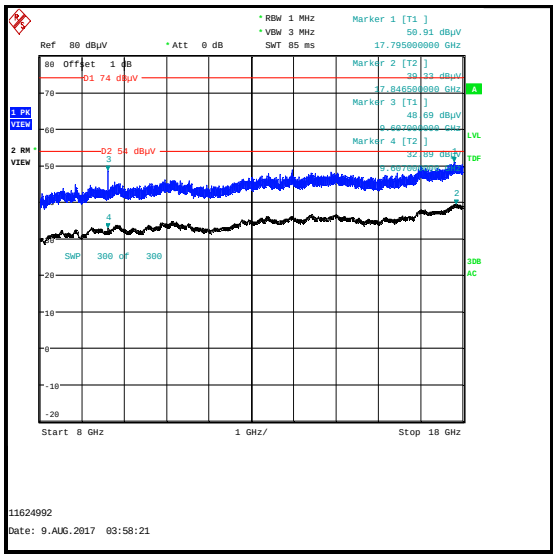


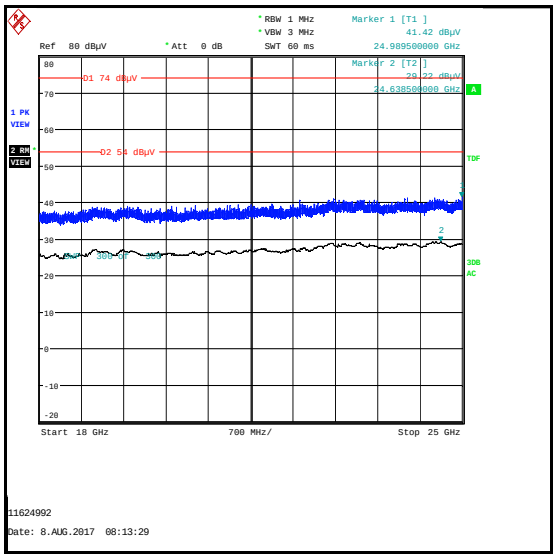




Transmitter Out of Band Radiated Emissions - *Bluetooth* LE bottom channel / 2.4 GHz WLAN top channel (continued)







4.10. Transmitter Out of Band Radiated Emissions - *Bluetooth* LE top channel / 2.4 GHz WLAN bottom channel

Test Summary:

Test Engineers:	David Doyle, Andrew Edwards, John Ferdinand, Doug Freegard, Bari Momen & Alan Withers	**Test Dates:**	08 August 2017 to 14 August 2017
Test Sample Serial Numbers:	C07TK02ZJ4C7 & C07TK006J4C6		

FCC Reference:	Parts 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 and 6.6, 11.11, 11.12.2.4, 11.12.2.5.1; FCC KDB 558074 Sections 11, 12.2.4 & 12.2.5.1
Frequency Range:	30 MHz to 25 GHz
Configuration:	*Bluetooth* LE top channel / 2.4 GHz WLAN bottom channel

Environmental Conditions:

Temperature (°C):	23 to 25
Relative Humidity (%):	41 to 48

Transmitter Out of Band Radiated Emissions - *Bluetooth* LE top channel / 2.4 GHz WLAN bottom channel (continued)

Note(s):

1. The emission at 2344.104 MHz was an intermodulation product produced by the 2.4 GHz WLAN 2nd harmonic minus the *Bluetooth* carrier. This emission falls within a restricted band and was measured against the peak and average limits of 74 dBµV/m and 54 dBµV/m. The measured level has been recorded in the tables below. All other intermodulation products were below the noise floor level or greater than 20 dB from the specification limit.
2. The *Bluetooth* LE and 2.4 GHz WLAN fundamentals are shown on the 1 GHz to 3 GHz plot.
3. Pre-scans were made against the FCC Part 15 general limits for radiated emissions.
4. The emission at approximately 4960.000 MHz is the 2nd harmonic of the *Bluetooth* signal and was therefore not measured.
5. The emission at approximately 7440.000 MHz is the 3rd harmonic of the *Bluetooth* signal and was therefore not measured.
6. The emission at approximately 9648.000 MHz is the 4th harmonic of the 2.4 GHz WLAN signal and was therefore not measured.
7. RF attenuators and filters were used as required. The insertion losses are included in the measurements.
8. 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.
9. 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.
10. Measurements above 1 GHz were performed in a fully anechoic chamber (UL VS LTD Asset Numbers K0002 & 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.

Transmitter Out of Band Radiated Emissions - *Bluetooth* LE top channel / 2.4 GHz WLAN bottom channel (continued)

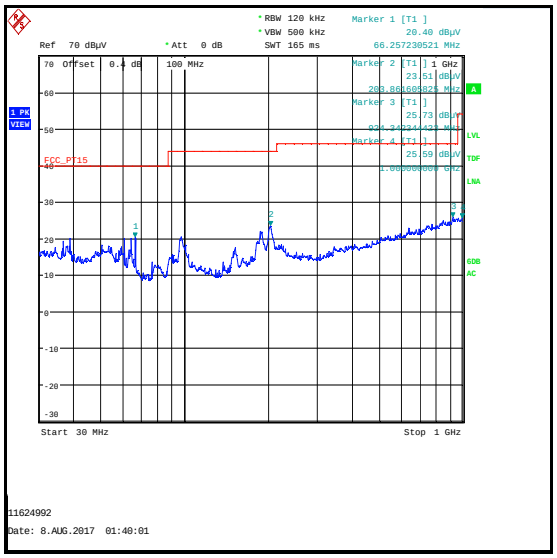
Results: Peak

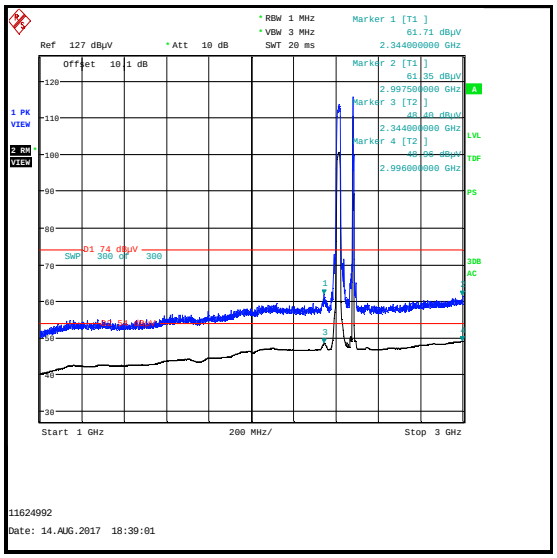
Frequency (MHz)	Antenna Polarity	Peak Level (dBµV/m)	Peak Limit (dBµV/m)	Margin (dB)	Result
2344.104	Vertical	61.9	74.0	12.1	Complied

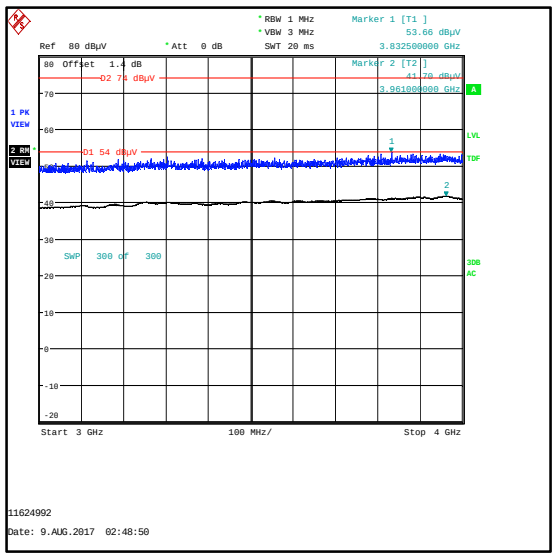
Results: Average

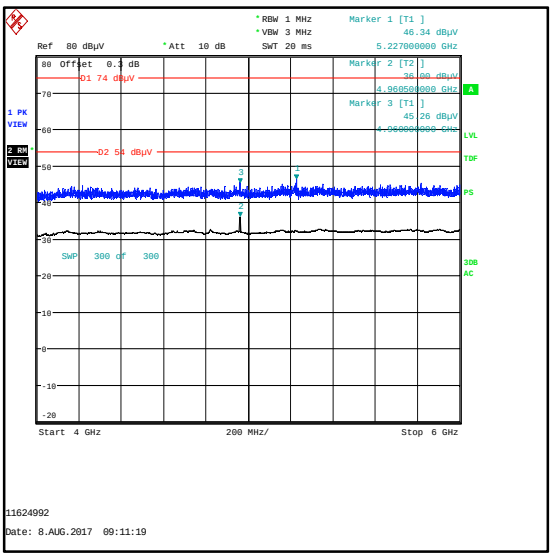
Frequency (MHz)	Antenna Polarity	Average Level (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)	Result
2344.104	Vertical	49.1	54.0	4.9	Complied

Transmitter Out of Band Radiated Emissions - *Bluetooth* LE top channel / 2.4 GHz WLAN bottom channel (continued)

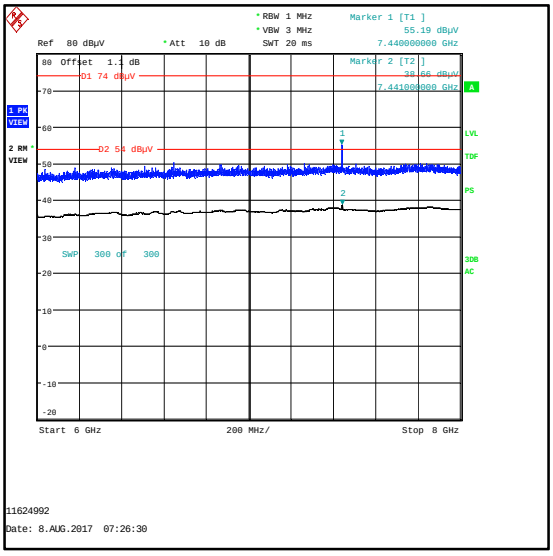


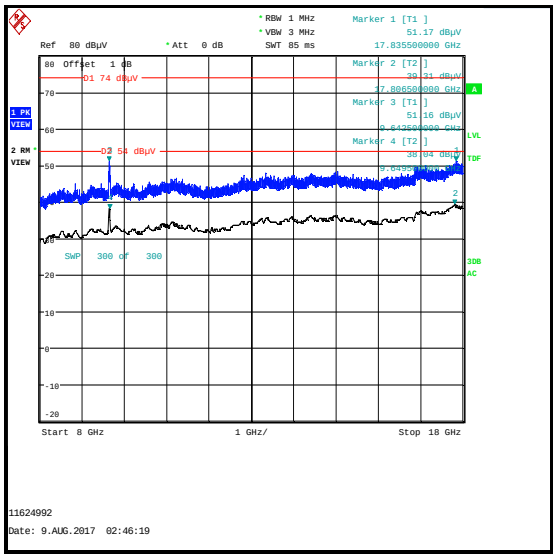


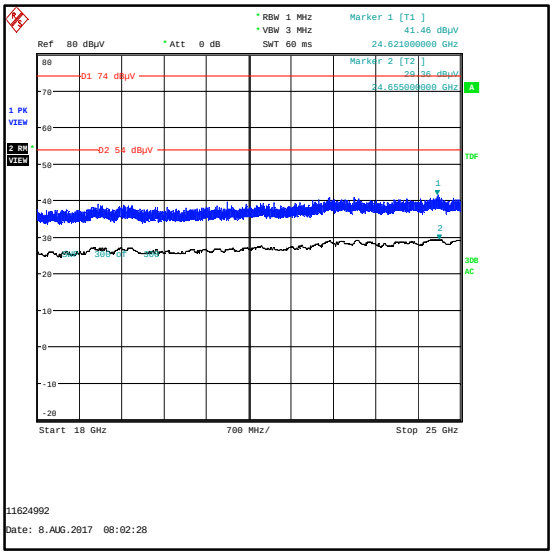




Transmitter Out of Band Radiated Emissions - *Bluetooth* LE top channel / 2.4 GHz WLAN bottom channel (continued)







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

4.11. Transmitter Out of Band Radiated Emissions - *Bluetooth* Basic Rate bottom channel / 2.4 GHz WLAN top channel / 5 GHz WLAN bottom channel

Test Summary:

Test Engineers:	Andrew Edwards, Doug Freegard & Alan Withers	**Test Dates:**	08 August 2017 to 15 August 2017
Test Sample Serial Numbers:	C07TK02ZJ4C7 & C07TK006J4C6		

FCC Reference:	Parts 15.205(a), 15.209(a), 15.247(d) & 15.407(b)
ISED Canada Reference:	RSS-Gen 6.13 / RSS-247 5.5, 6.2.1.2
Test Method Used:	ANSI C63.10 Sections 6.3, 6.5 and 6.6, 11.11, 11.12.2.4, 11.12.2.5.1; FCC 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:	*Bluetooth* Basic Rate bottom channel / 2.4 GHz WLAN top channel / 5 GHz WLAN bottom channel

Environmental Conditions:

Temperature (°C):	23 to 25
Relative Humidity (%):	41 to 48

Transmitter Out of Band Radiated Emissions - *Bluetooth* Basic Rate bottom channel / 2.4 GHz WLAN top channel / 5 GHz WLAN bottom channel (continued)

Note(s):

1. All intermodulation products were below the noise floor level or greater than 20 dB from the specification limit. The highest peak and average noise floor measurements are recorded in the following tables.
2. The *Bluetooth* and 2.4 GHz WLAN fundamentals are 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 emission at approximately 7206.000 MHz is the 3rd harmonic of the *Bluetooth* BR signal and was therefore not measured.
6. The emission at approximately 7416.000 MHz is the 3rd harmonic of the 2.4 GHz WLAN signal and was therefore not measured.
7. The emission at approximately 9609.000 MHz is the 4th harmonic of the *Bluetooth* BR signal and was therefore not measured.
8. RF attenuators and filters were used as required. The insertion losses are included in the measurements.
9. 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.
10. 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.
11. Measurements above 1 GHz were performed in a fully anechoic chamber (UL VS LTD Asset Numbers K0002 & 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.

Transmitter Out of Band Radiated Emissions - *Bluetooth* Basic Rate bottom channel / 2.4 GHz WLAN top channel / 5 GHz WLAN bottom channel (continued)

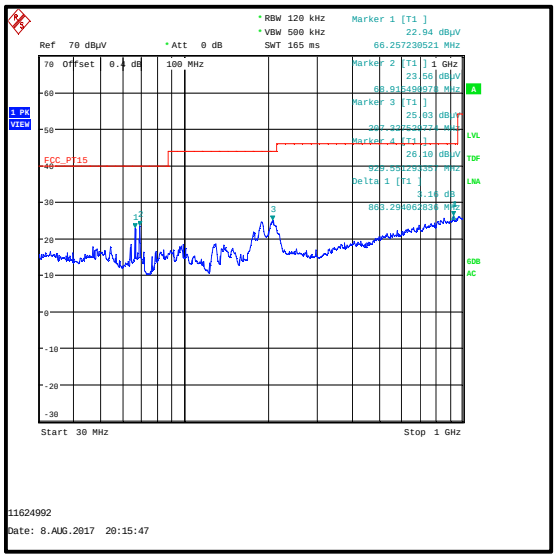
Results: Peak

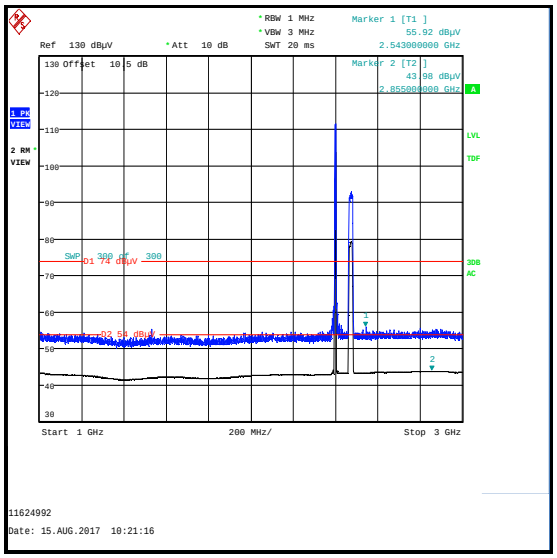
Frequency (MHz)	Antenna Polarity	Peak Level (dBµV/m)	Peak Limit (dBµV/m)	Margin (dB)	Result
5309.500	Horizontal	58.0	74.0	18.0	Complied

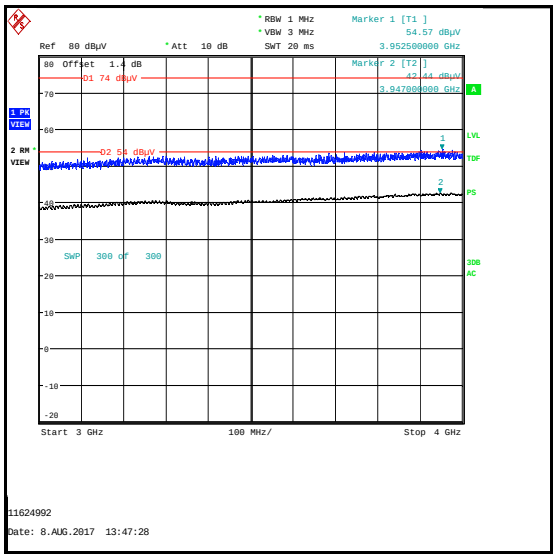
Results: Average

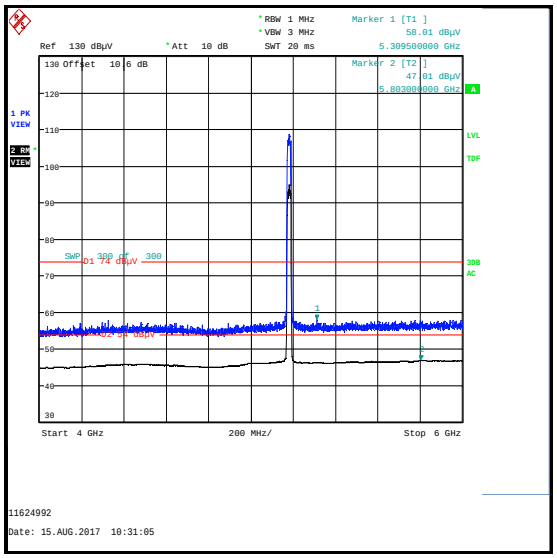
Frequency (MHz)	Antenna Polarity	Average Level (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)	Result
5803.000	Horizontal	47.0	54.0	7.0	Complied

Transmitter Out of Band Radiated Emissions - *Bluetooth* Basic Rate bottom channel / 2.4 GHz WLAN top channel / 5 GHz WLAN bottom channel (continued)

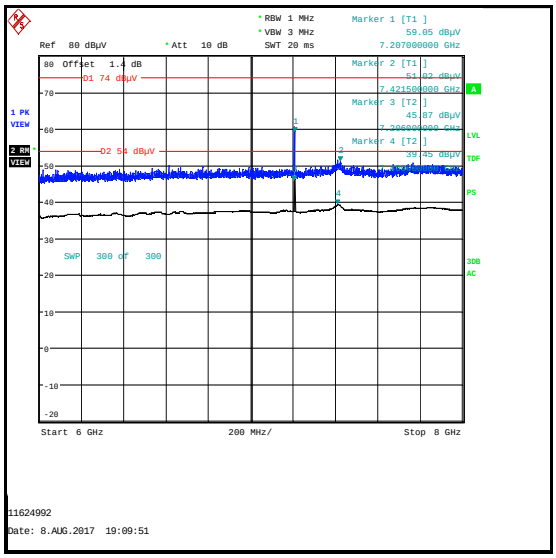


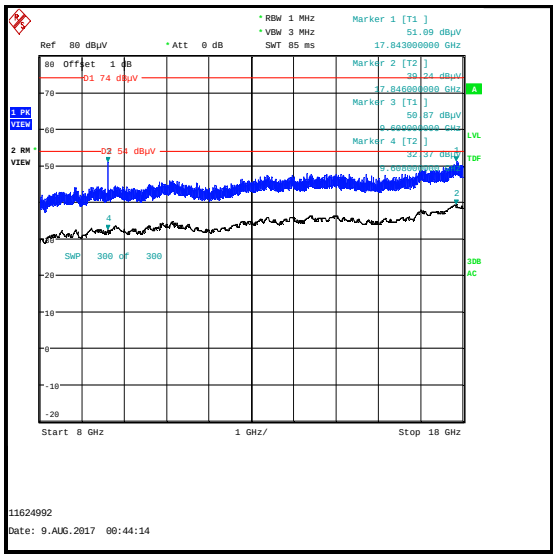


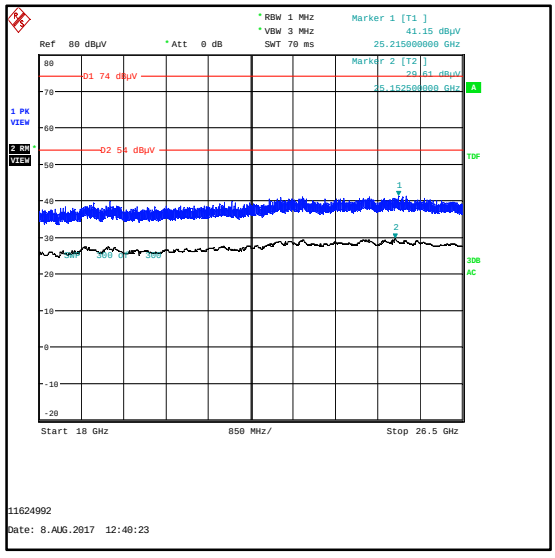


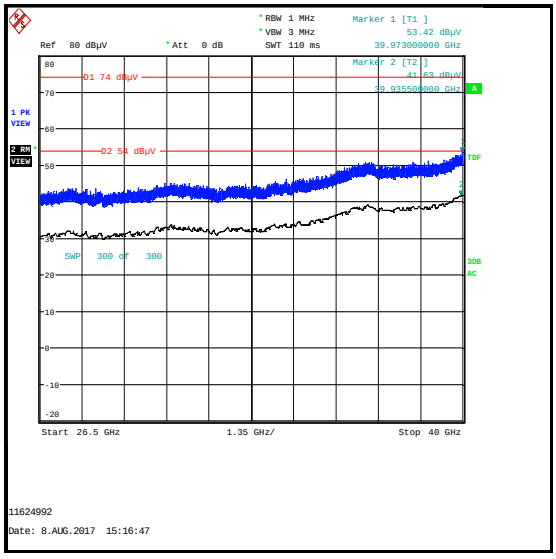


Transmitter Out of Band Radiated Emissions - *Bluetooth* Basic Rate bottom channel / 2.4 GHz WLAN top channel / 5 GHz WLAN bottom channel (continued)









4.12. Transmitter Out of Band Radiated Emissions - *Bluetooth* Basic Rate bottom channel / 2.4 GHz WLAN top channel / 5 GHz WLAN top channel

Test Summary:

Test Engineers:	Andrew Edwards, Doug Freegard, Bari Momen & Alan Withers	**Test Dates:**	08 August 2017 to 15 August 2017
Test Sample Serial Numbers:	C07TK02ZJ4C7 & C07TK006J4C6		

FCC Reference:	Parts 15.205(a) & 15.209(a) / 15.247(d) /15.407(b)
ISED Canada Reference:	RSS-Gen 6.13 / RSS-247 5.5, 6.2.4.2
Test Method Used:	ANSI C63.10 Sections 6.3, 6.5 and 6.6, 11.11, 11.12.2.4, 11.12.2.5.1; FCC 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:	*Bluetooth* Basic Rate bottom channel / 2.4 GHz WLAN top channel / 5 GHz WLAN top channel

Environmental Conditions:

Temperature (°C):	23 to 25
Relative Humidity (%):	41 to 48

Note(s):

1. All intermodulation products were below the noise floor level or greater than 20 dB from the specification limit. The highest peak and average noise floor measurements are recorded in the following tables.
2. The *Bluetooth* and 2.4 GHz WLAN fundamentals are 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 emission at approximately 7206.000 MHz is the 3rd harmonic of the *Bluetooth* signal and was therefore not measured.
6. RF attenuators and filters were used as required. The insertion losses are included in the measurements.
7. 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.
8. 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.
9. Measurements above 1 GHz were performed in a fully anechoic chamber (UL VS LTD Asset Numbers K0002 & 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.

Transmitter Out of Band Radiated Emissions - *Bluetooth* Basic Rate bottom channel / 2.4 GHz WLAN top channel / 5 GHz WLAN top channel (continued)

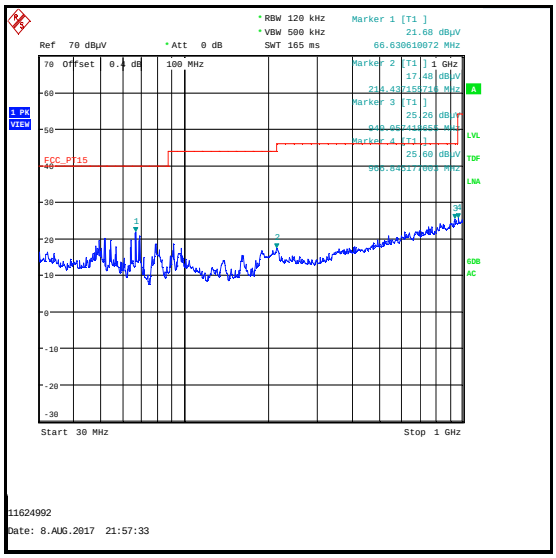
Results: Peak

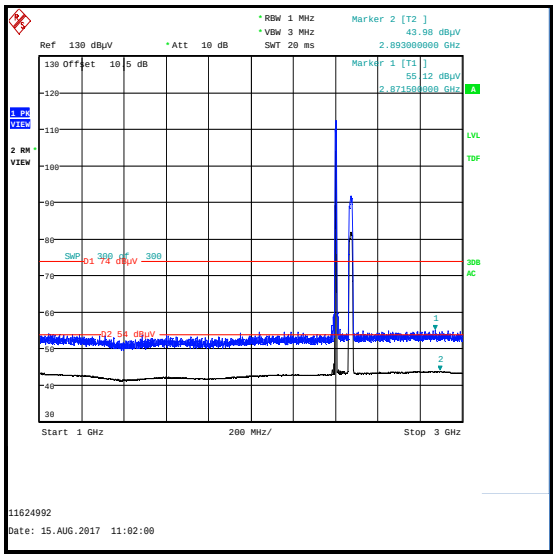
Frequency (MHz)	Antenna Polarity	Peak Level (dBµV/m)	Peak Limit (dBµV/m)	Margin (dB)	Result
7749.500	Horizontal	61.0	74.0	13.0	Complied

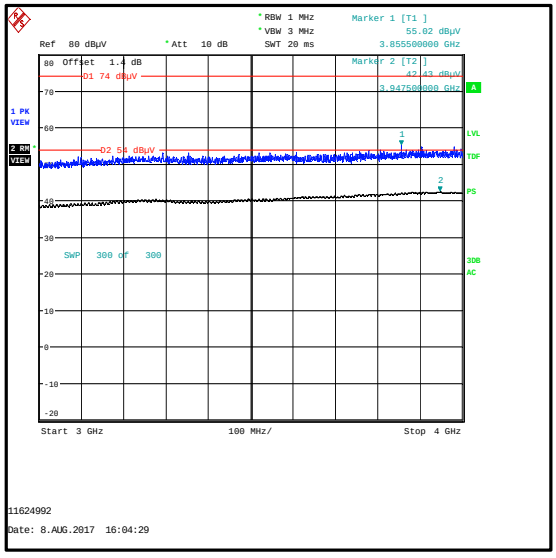
Results: Average

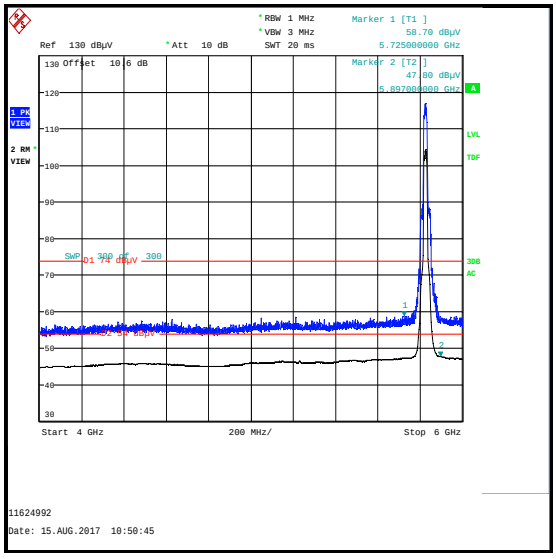
Frequency (MHz)	Antenna Polarity	Average Level (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)	Result
5897.000	Horizontal	47.8	54.0	6.2	Complied

Transmitter Out of Band Radiated Emissions - *Bluetooth* Basic Rate bottom channel / 2.4 GHz WLAN top channel / 5 GHz WLAN top channel (continued)

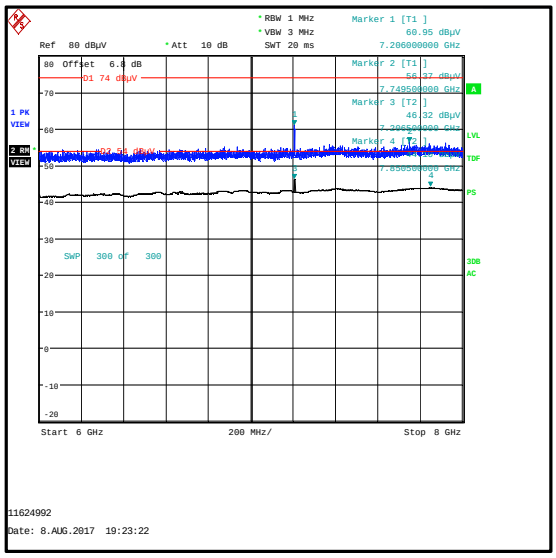


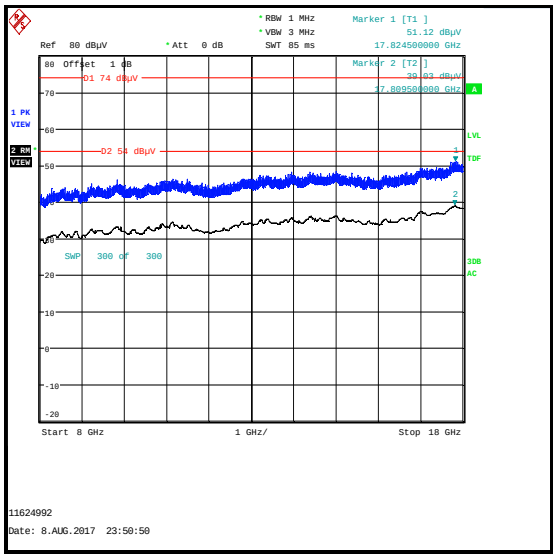


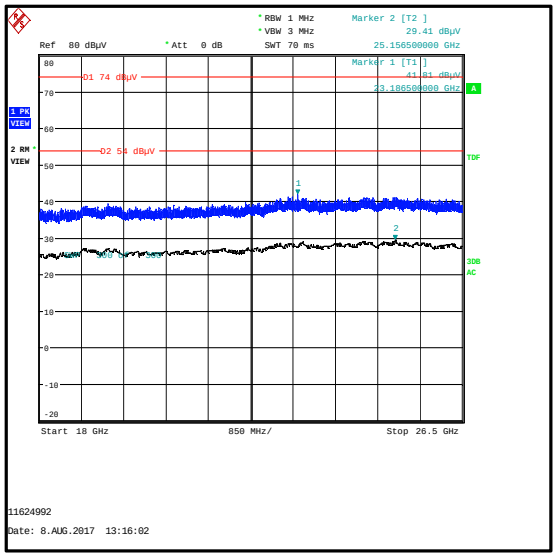


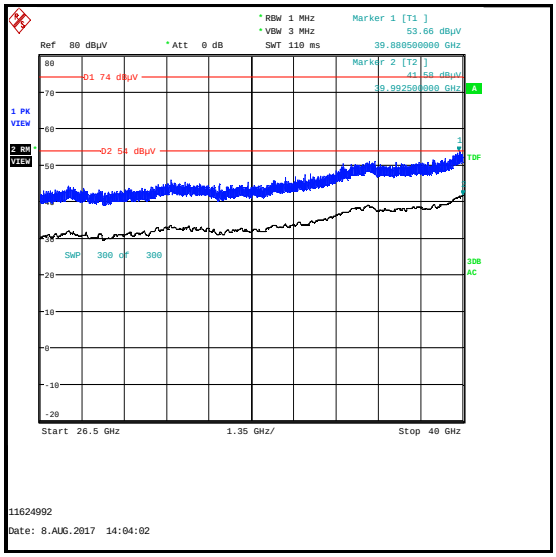


Transmitter Out of Band Radiated Emissions - *Bluetooth* Basic Rate bottom channel / 2.4 GHz WLAN top channel / 5 GHz WLAN top channel (continued)









4.13. Transmitter Out of Band Radiated Emissions - *Bluetooth* Basic Rate top channel / 2.4 GHz WLAN bottom channel / 5 GHz WLAN bottom channel

Test Summary:

Test Engineers:	David Doyle, Andrew Edwards, John Ferdinand, Doug Freegard, Bari Momen & Alan Withers	**Test Dates:**	08 August 2017 to 15 August 2017
Test Sample Serial Numbers:	C07TK02ZJ4C7 & C07TK006J4C6		

FCC Reference:	Parts 15.205(a), 15.209(a), 15.247(d) & 15.407(b)
ISED Canada Reference:	RSS-Gen 6.13 / RSS-247 5.5, 6.2.1.2
Test Method Used:	ANSI C63.10 Sections 6.3, 6.5 and 6.6, 11.11, 11.12.2.4, 11.12.2.5.1; FCC 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:	*Bluetooth* Basic Rate top channel / 2.4 GHz WLAN bottom channel / 5 GHz WLAN bottom channel

Environmental Conditions:

Temperature (°C):	23 to 25
Relative Humidity (%):	41 to 48

Transmitter Out of Band Radiated Emissions - *Bluetooth* Basic Rate top channel / 2.4 GHz WLAN bottom channel / 5 GHz WLAN bottom channel (continued)

Note(s):

1. All intermodulation products were below the noise floor level or greater than 20 dB from the specification limit. The highest peak and average noise floor measurements are recorded in the following tables.
2. The *Bluetooth* and 2.4 GHz WLAN fundamentals are 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 emission at approximately 7440.000 MHz is the 3rd harmonic of the *Bluetooth* signal and was therefore not measured.
6. The emission at approximately 9648.000 MHz is the 4^{th} harmonic of the 2.4 GHz WLAN signal and was therefore not measured.
7. RF attenuators and filters were used as required. The insertion losses are included in the measurements.
8. 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.
9. 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.
10. Measurements above 1 GHz were performed in a fully anechoic chamber (UL VS LTD Asset Numbers K0002 & 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.

Transmitter Out of Band Radiated Emissions - *Bluetooth* Basic Rate top channel / 2.4 GHz WLAN bottom channel / 5 GHz WLAN bottom channel (continued)

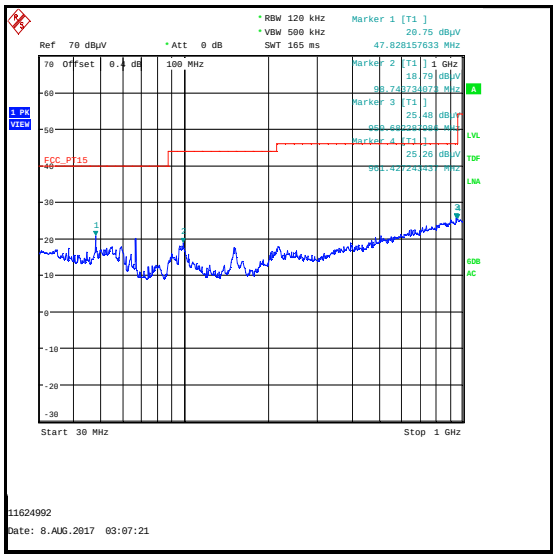
Results: Peak

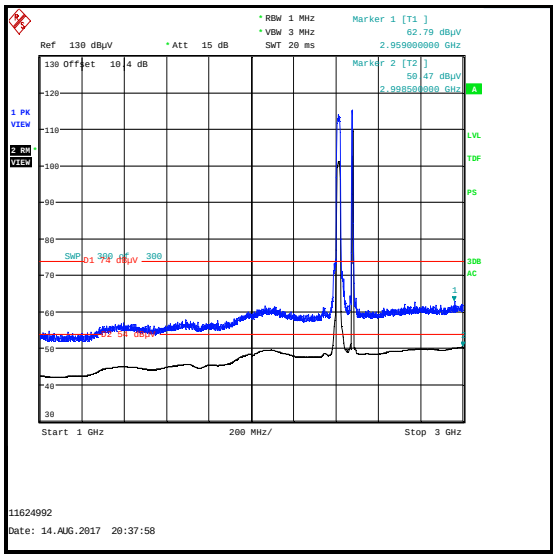
Frequency (MHz)	Antenna Polarity	Peak Level (dBµV/m)	Peak Limit (dBµV/m)	Margin (dB)	Result
2959.000	Vertical	62.8	74.0	11.2	Complied

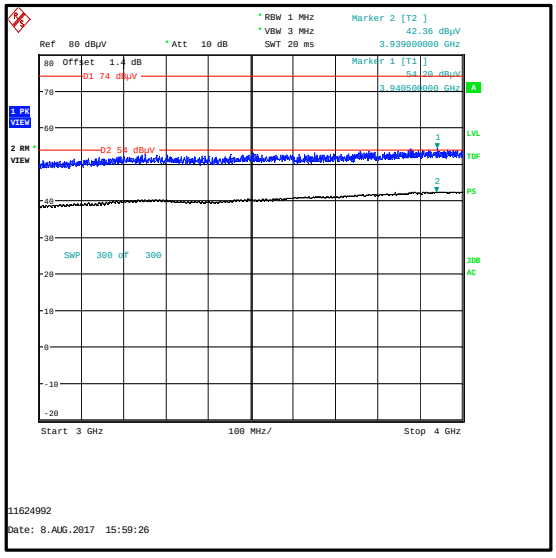
Results: Average

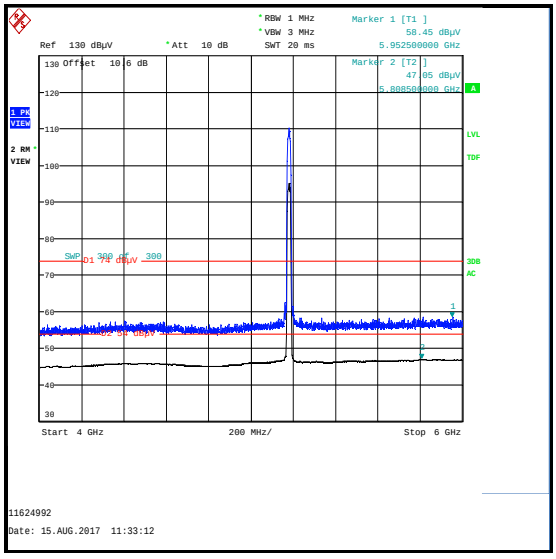
Frequency (MHz)	Antenna Polarity	Average Level (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)	Result
2998.500	Vertical	50.5	54.0	3.5	Complied

Transmitter Out of Band Radiated Emissions - *Bluetooth* Basic Rate top channel / 2.4 GHz WLAN bottom channel / 5 GHz WLAN bottom channel (continued)

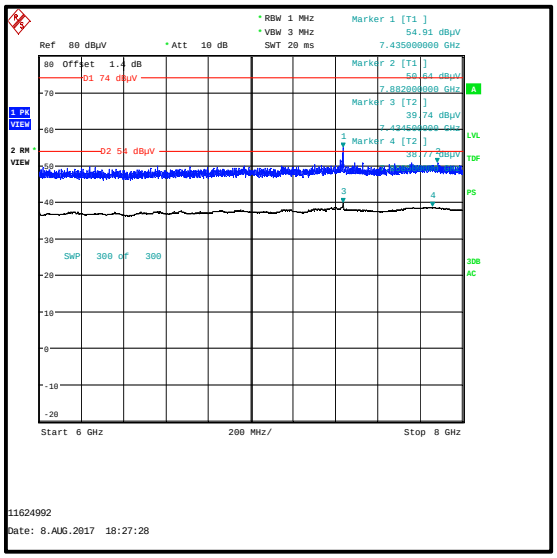


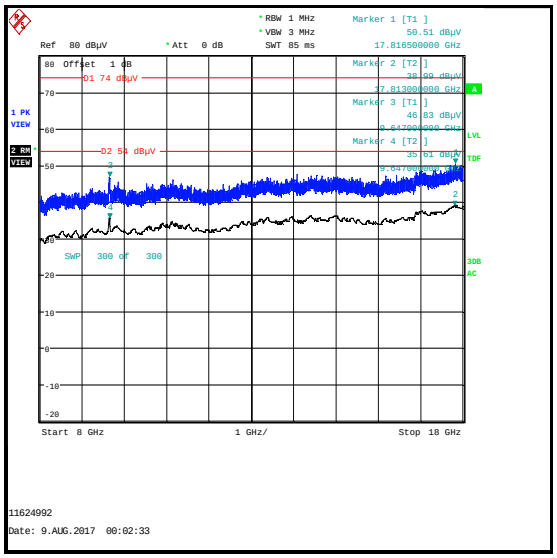


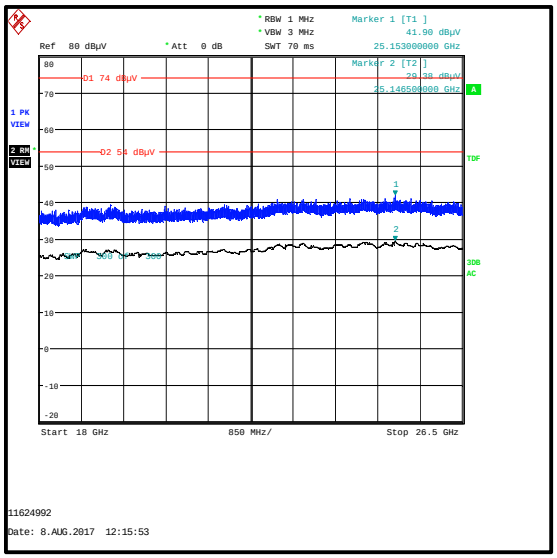


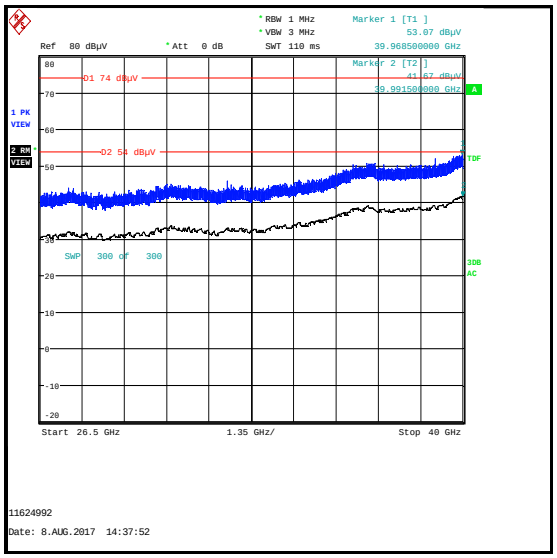


Transmitter Out of Band Radiated Emissions - *Bluetooth* Basic Rate top channel / 2.4 GHz WLAN bottom channel / 5 GHz WLAN bottom channel (continued)









4.14. Transmitter Out of Band Radiated Emissions - *Bluetooth* Basic Rate top channel / 2.4 GHz WLAN bottom channel / 5 GHz WLAN top channel

Test Summary:

Test Engineers:	David Doyle, Andrew Edwards, John Ferdinand, Doug Freegard & Alan Withers	**Test Dates:**	08 August 2017 to 15 August 2017
Test Sample Serial Numbers:	C07TK02ZJ4C7 & C07TK006J4C6		

FCC Reference:	Parts 15.205(a), 15.209(a), 15.247(d) & 15.407(b)
ISED Canada Reference:	RSS-Gen 6.13 / RSS-247 5.5, 6.2.4.2
Test Method Used:	ANSI C63.10 Sections 6.3, 6.5 and 6.6, 11.11, 11.12.2.4 11.12.2.5.1; FCC 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:	*Bluetooth* Basic Rate top channel / 2.4 GHz WLAN bottom channel / 5 GHz WLAN top channel

Environmental Conditions:

Temperature (°C):	23 to 25
Relative Humidity (%):	41 to 48

Transmitter Out of Band Radiated Emissions - *Bluetooth* Basic Rate top channel / 2.4 GHz WLAN bottom channel / 5 GHz WLAN top channel (continued)

Note(s):

1. The emission at 2344.042 MHz was an intermodulation product produced by the 2.4 GHz WLAN 2nd harmonic minus the *Bluetooth* carrier. This emission falls within a restricted band and measured against the peak and average limits of Part 15.209; 74 dBµV/m/54 dBµV/m limit was applied. The measured level has been recorded in the tables below. All other 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 fundamentals are 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 emission at approximately 7440.000 MHz is the 3rd harmonic of the *Bluetooth* signal and was therefore not measured.
6. The emission at approximately 9648.000 MHz is the 4th harmonic of the 2.4 GHz WLAN signal and was therefore not measured.
7. RF attenuators and filters were used as required. The insertion losses are included in the measurements.
8. 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.
9. 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.
10. Measurements above 1 GHz were performed in a fully anechoic chamber (UL VS LTD Asset Numbers K0002 & 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.

Transmitter Out of Band Radiated Emissions - *Bluetooth* Basic Rate top channel / 2.4 GHz WLAN bottom channel / 5 GHz WLAN top channel (continued)

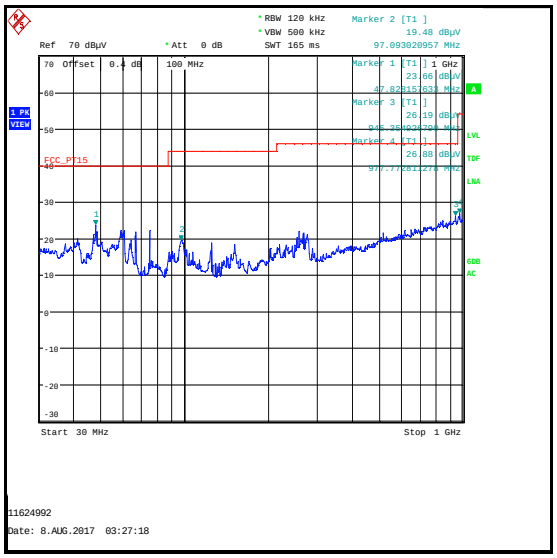
Results: Peak

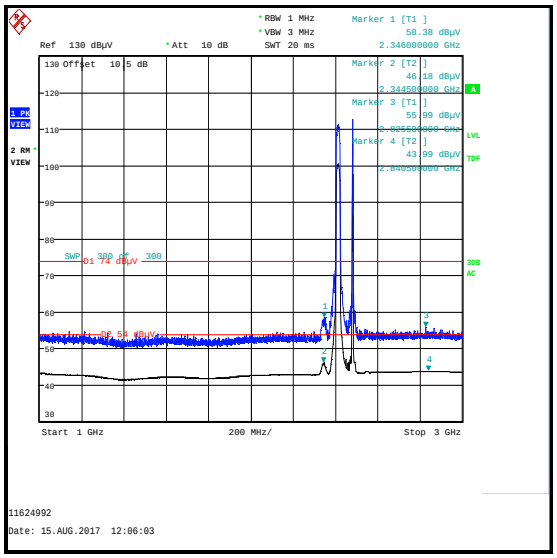
Frequency (MHz)	Antenna Polarity	Peak Level (dBµV/m)	Peak Limit (dBµV/m)	Margin (dB)	Result
2344.042	Vertical	60.8	74.0	13.2	Complied

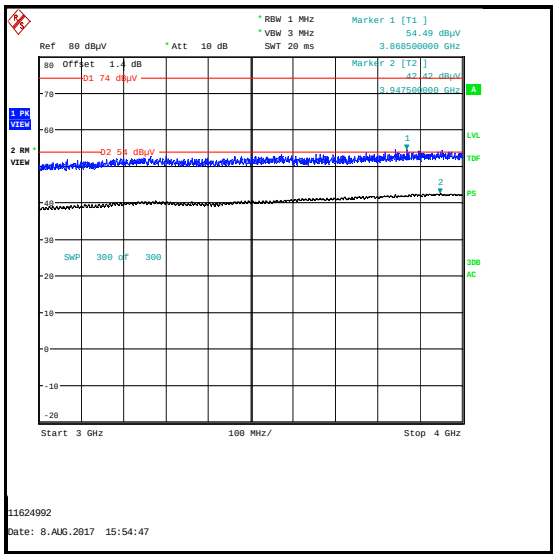
Results: Average

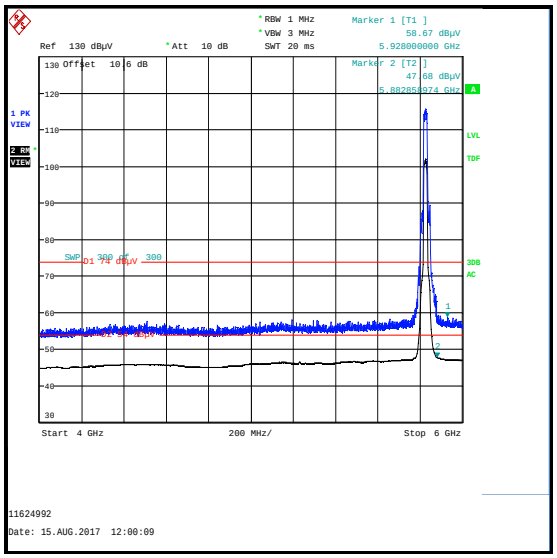
Frequency (MHz)	Antenna Polarity	Average Level (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)	Result
2344.042	Vertical	49.1	54.0	4.9	Complied

Transmitter Out of Band Radiated Emissions - *Bluetooth* Basic Rate top channel / 2.4 GHz WLAN bottom channel / 5 GHz WLAN top channel (continued)

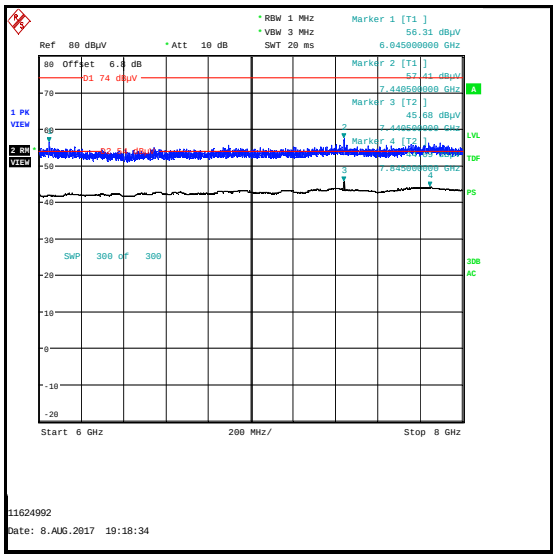


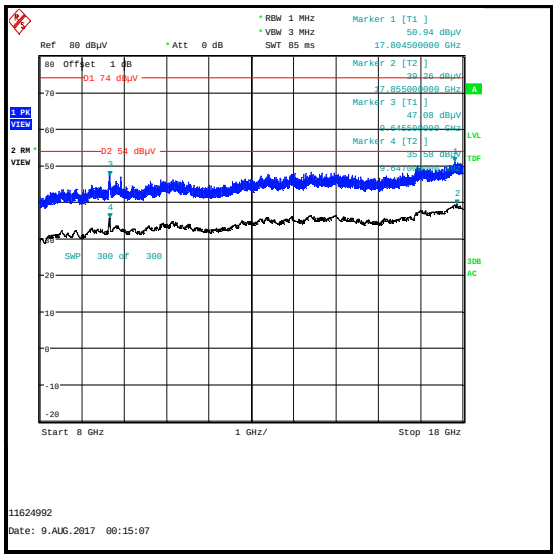


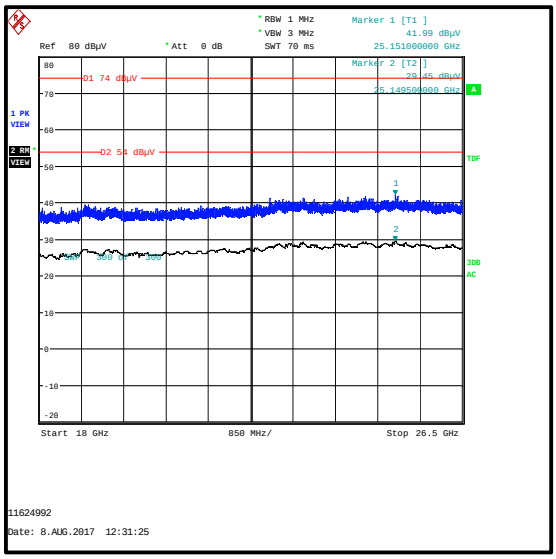


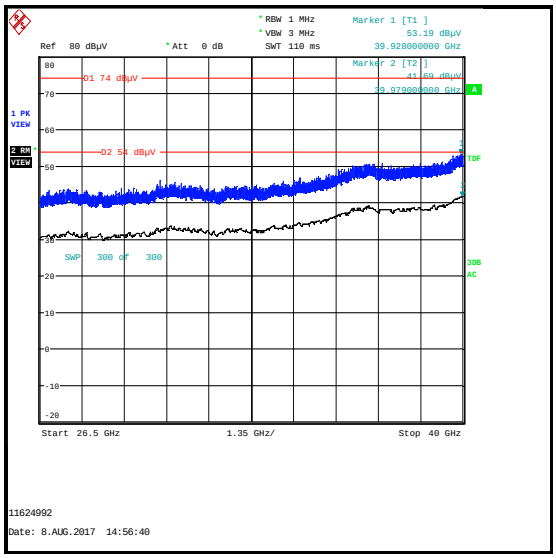


Transmitter Out of Band Radiated Emissions - *Bluetooth* Basic Rate top channel / 2.4 GHz WLAN bottom channel / 5 GHz WLAN top channel (continued)









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

4.15. Transmitter Out of Band Radiated Emissions - *Bluetooth* LE bottom channel / 2.4 GHz WLAN top channel / 5 GHz WLAN bottom channel

Test Summary:

Test Engineers:	Andrew Edwards, John Ferdinand, Doug Freegard & Alan Withers	**Test Dates:**	08 August 2017 to 15 August 2017
Test Sample Serial Numbers:	C07TK02ZJ4C7 & C07TK006J4C6		

FCC Reference:	Parts 15.205(a), 15.209(a), 15.247(d) & 15.407(b)
ISED Canada Reference:	RSS-Gen 6.13 / RSS-247 5.5, 6.2.1.2
Test Method Used:	ANSI C63.10 Sections 6.3, 6.5 and 6.6, 11.11, 11.12.2.4, 11.12.2.5.1; FCC 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:	*Bluetooth* LE bottom channel / 2.4 GHz WLAN top channel / 5 GHz WLAN bottom channel

Environmental Conditions:

Temperature (°C):	23 to 25
Relative Humidity (%):	41 to 48

Note(s):

1. All intermodulation products were below the noise floor level or greater than 20 dB from the specification limit. The highest peak and average noise floor measurements are recorded in the following tables.
2. The *Bluetooth* LE and 2.4 GHz WLAN fundamentals are 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 emission at approximately 7206.000 MHz is the 3rd harmonic of the *Bluetooth* LE signal and was therefore not measured.
6. RF attenuators and filters were used as required. The insertion losses are included in the measurements.
7. 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.
8. 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.
9. Measurements above 1 GHz were performed in a fully anechoic chamber (UL VS LTD Asset Numbers K0002 & 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.

Transmitter Out of Band Radiated Emissions - *Bluetooth* LE bottom channel / 2.4 GHz WLAN top channel / 5 GHz WLAN bottom channel (continued)

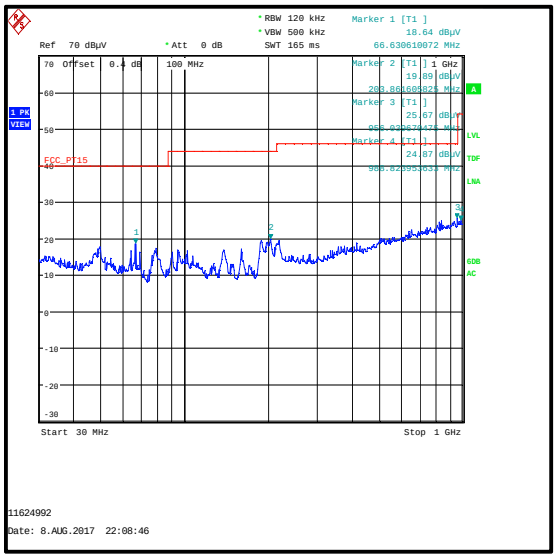
Results: Peak

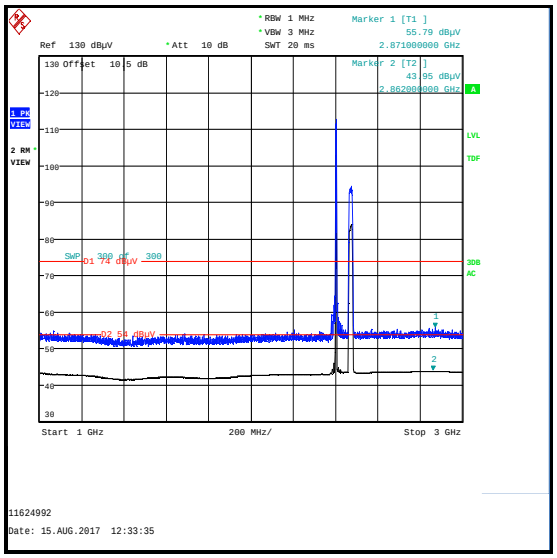
Frequency (MHz)	Antenna Polarity	Peak Level (dBµV/m)	Peak Limit (dBµV/m)	Margin (dB)	Result
4803.500	Horizontal	59.3	74.0	14.7	Complied

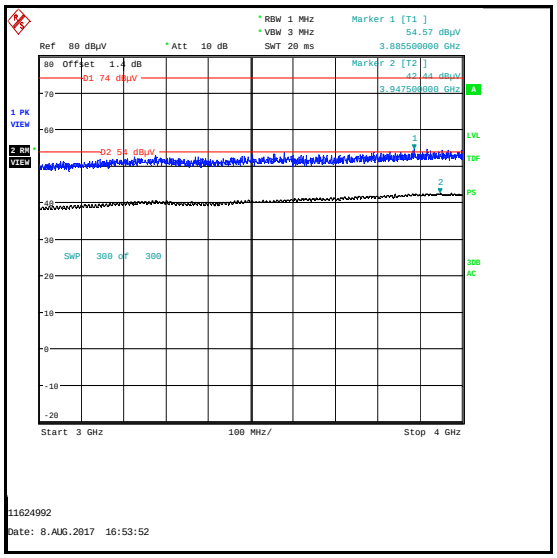
Results: Average

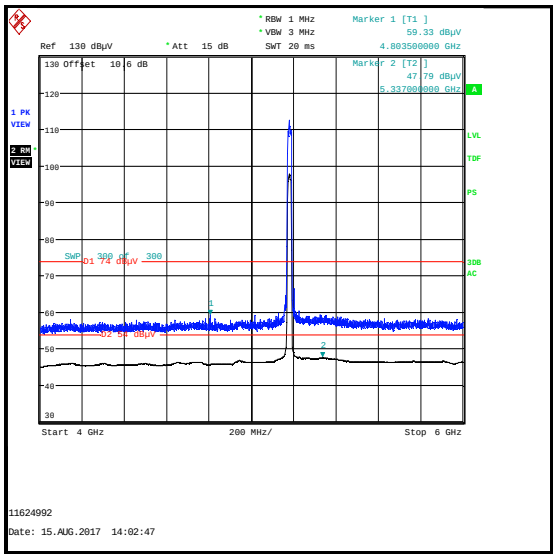
Frequency (MHz)	Antenna Polarity	Average Level (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)	Result
2862.000	Horizontal	44.0	54.0	10.0	Complied

Transmitter Out of Band Radiated Emissions - *Bluetooth* LE bottom channel / 2.4 GHz WLAN top channel / 5 GHz WLAN bottom channel (continued)

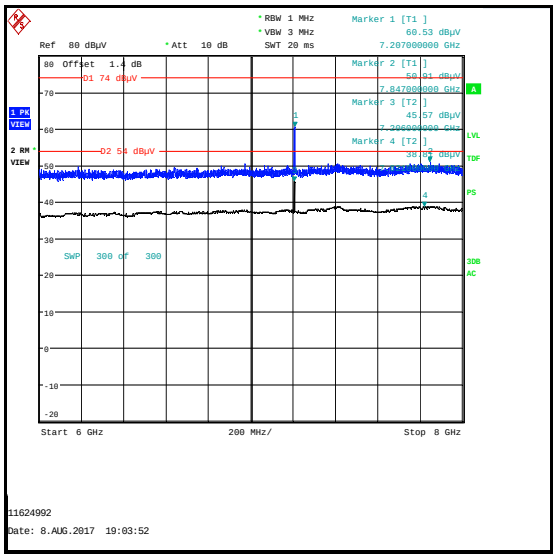


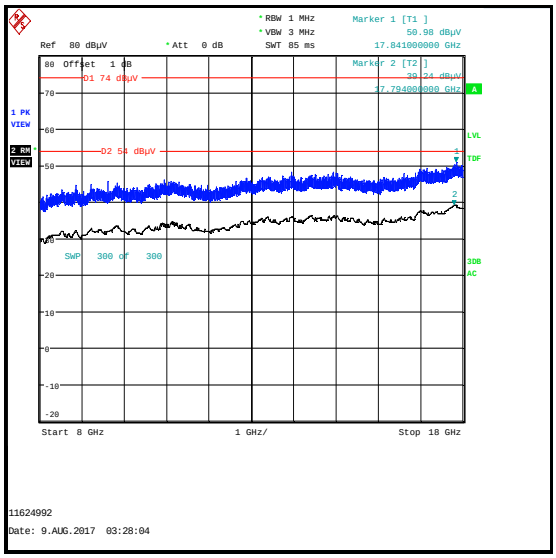


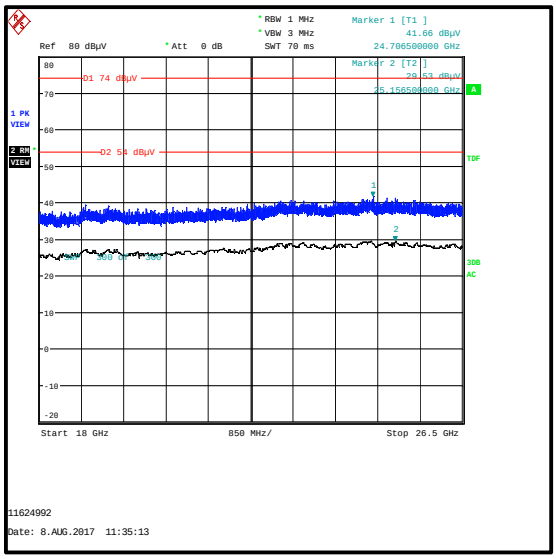


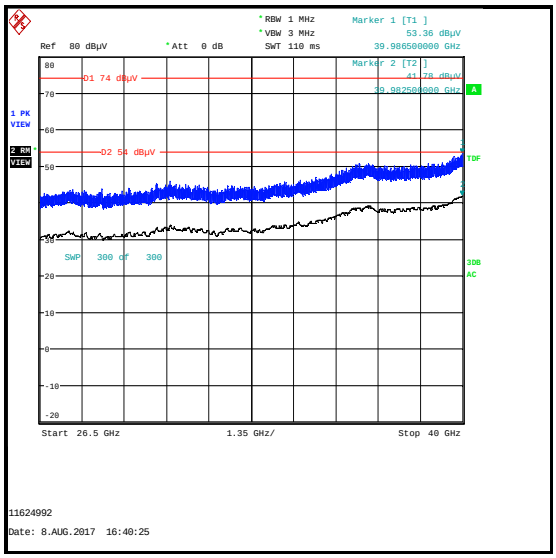


Transmitter Out of Band Radiated Emissions - *Bluetooth* LE bottom channel / 2.4 GHz WLAN top channel / 5 GHz WLAN bottom channel (continued)









4.16. Transmitter Out of Band Radiated Emissions - *Bluetooth* LE bottom channel / 2.4 GHz WLAN top channel / 5 GHz WLAN top channel

Test Summary:

Test Engineers:	Andrew Edwards, John Ferdinand, Doug Freegard & Alan Withers	**Test Dates:**	08 August 2017 to 15 August 2017
Test Sample Serial Numbers:	C07TK02ZJ4C7 & C07TK006J4C6		

FCC Reference:	Parts 15.205(a), 15.209(a), 15.247(d) & 15.407(b)
ISED Canada Reference:	RSS-Gen 6.13 / RSS-247 5.5, 6.2.4.2
Test Method Used:	ANSI C63.10 Sections 6.3, 6.5 and 6.6, 11.11, 11.12.2.4, 11.12.2.5.1; FCC 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:	*Bluetooth* LE bottom channel / 2.4 GHz WLAN top channel / 5 GHz WLAN top channel

Environmental Conditions:

Temperature (°C):	23 to 25
Relative Humidity (%):	41 to 48

Transmitter Out of Band Radiated Emissions - *Bluetooth* LE bottom channel / 2.4 GHz WLAN top channel / 5 GHz WLAN top channel (continued)

Note(s):

1. All intermodulation products were below the noise floor level or greater than 20 dB from the specification limit. The highest peak and average noise floor measurements are recorded in the following tables.
2. The *Bluetooth* LE and 2.4 GHz WLAN fundamentals are 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 emission at approximately 7206.000 MHz is the 3rd harmonic of the *Bluetooth* LE signal and was therefore not measured.
6. The emission at approximately 9607.000 MHz is the 4th harmonic of the *Bluetooth* LE signal and was therefore not measured.
7. RF attenuators and filters were used as required. The insertion losses are included in the measurements.
8. 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.
9. 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.
10. Measurements above 1 GHz were performed in a fully anechoic chamber (UL VS LTD Asset Numbers K0002 & 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.

Transmitter Out of Band Radiated Emissions - *Bluetooth* LE bottom channel / 2.4 GHz WLAN top channel / 5 GHz WLAN top channel (continued)

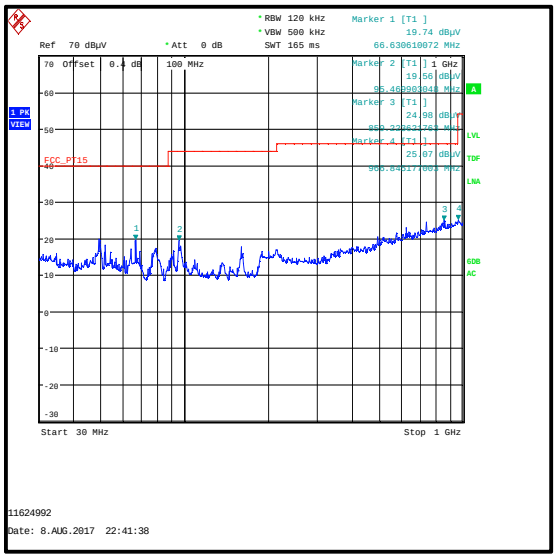
Results: Peak

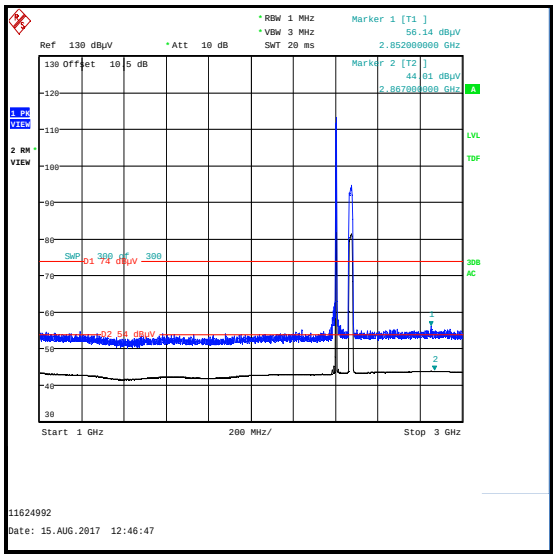
Frequency (MHz)	Antenna Polarity	Peak Level (dBµV/m)	Peak Limit (dBµV/m)	Margin (dB)	Result
2852.000	Horizontal	56.1	74.0	17.9	Complied

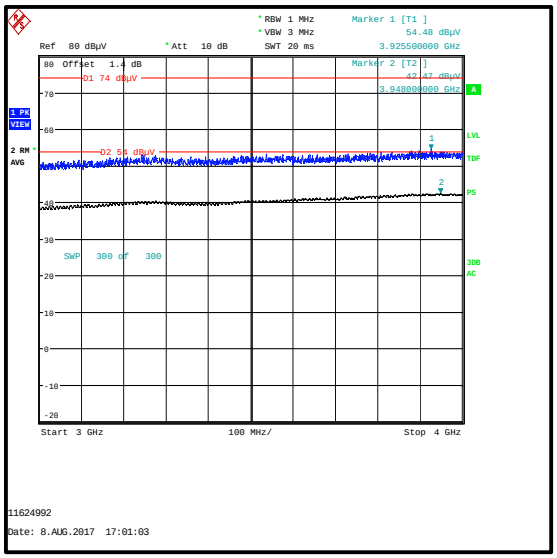
Results: Average

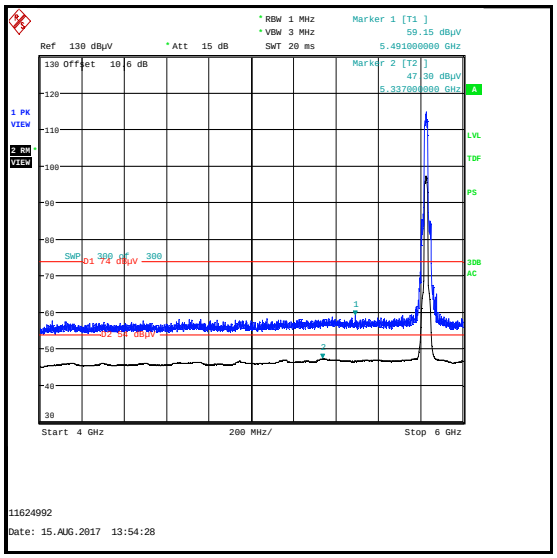
Frequency (MHz)	Antenna Polarity	Average Level (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)	Result
7848.500	Horizontal	44.2	54.0	9.8	Complied

Transmitter Out of Band Radiated Emissions - *Bluetooth* LE bottom channel / 2.4 GHz WLAN top channel / 5 GHz WLAN top channel (continued)

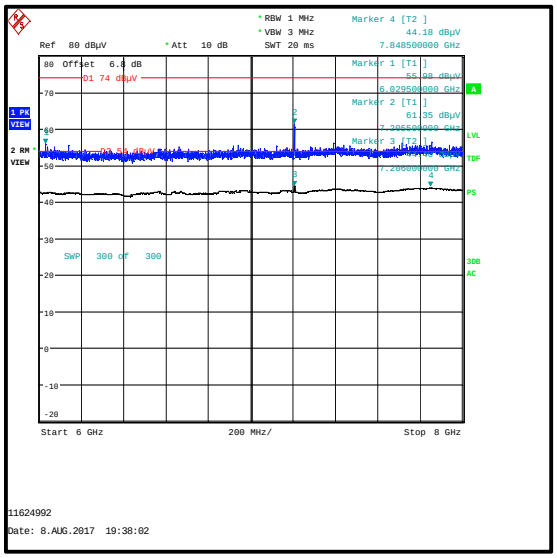


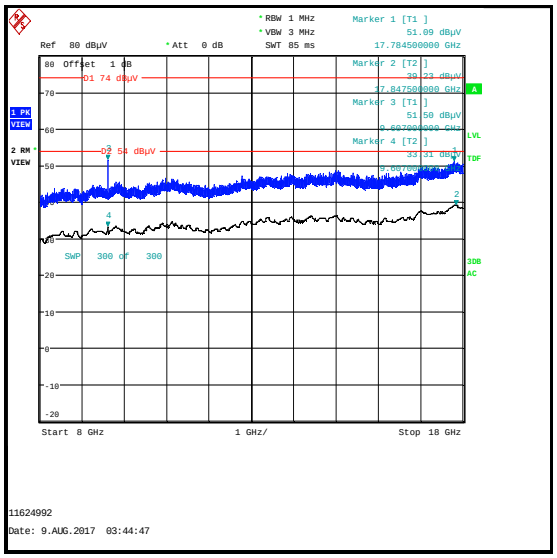


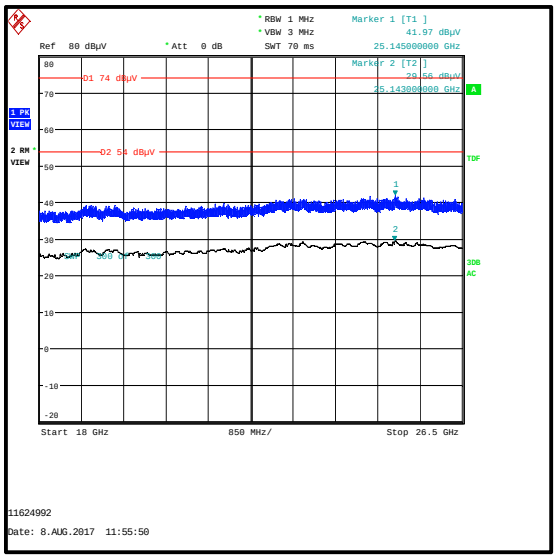


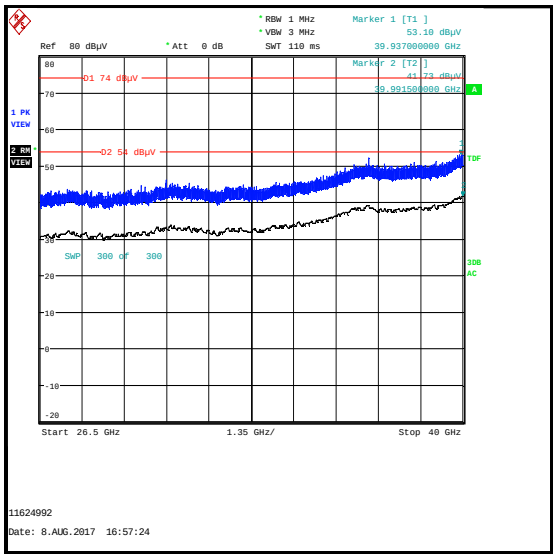


Transmitter Out of Band Radiated Emissions - *Bluetooth* LE bottom channel / 2.4 GHz WLAN top channel / 5 GHz WLAN top channel (continued)









4.17. Transmitter Out of Band Radiated Emissions - *Bluetooth* LE top channel / 2.4 GHz WLAN bottom channel / 5 GHz WLAN bottom channel

Test Summary:

Test Engineers:	Andrew Edwards, John Ferdinand, Doug Freegard & Alan Withers	**Test Dates:**	08 August 2017 to 15 August 2017
Test Sample Serial Numbers:	C07TK02ZJ4C7 & C07TK006J4C6		

FCC Reference:	Parts 15.205(a), 15.209(a), 15.247(d) & 15.407(b)
ISED Canada Reference:	RSS-Gen 6.13 / RSS-247 5.5, 6.2.1.2
Test Method Used:	ANSI C63.10 Sections 6.3, 6.5 and 6.6, 11.11, 11.12.2.4, 11.12.2.5.1; FCC 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:	*Bluetooth* LE top channel / 2.4 GHz WLAN bottom channel / 5 GHz WLAN bottom channel

Environmental Conditions:

Temperature (°C):	23 to 25
Relative Humidity (%):	41 to 48

Transmitter Out of Band Radiated Emissions - *Bluetooth* LE top channel / 2.4 GHz WLAN bottom channel / 5 GHz WLAN bottom channel (continued)

Note(s):

1. The emission at 2344.042 MHz was an intermodulation product produced by the 2.4 GHz WLAN 2nd harmonic minus the *Bluetooth* LE carrier. This emission falls within a restricted band and was measured against the peak and average limits of Part 15.209; 74 dBµV/m/54 dBµV/m limit was applied. The measured level has been recorded in the tables below. All other intermodulation products were below the noise floor level or greater than 20 dB from the specification limit.
2. The *Bluetooth* LE and 2.4 GHz WLAN fundamentals are 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 emission at approximately 7440.000 MHz is the 3rd harmonic of the *Bluetooth* LE signal and was therefore not measured.
6. The emission at approximately 9648.000 MHz is the 4th harmonic of the 2.4 GHz WLAN signal and was therefore not measured.
7. RF attenuators and filters were used as required. The insertion losses are included in the measurements.
8. 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.
9. 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.
10. Measurements above 1 GHz were performed in a fully anechoic chamber (UL VS LTD Asset Numbers K0002 & 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.

Transmitter Out of Band Radiated Emissions - *Bluetooth* LE top channel / 2.4 GHz WLAN bottom channel / 5 GHz WLAN bottom channel (continued)

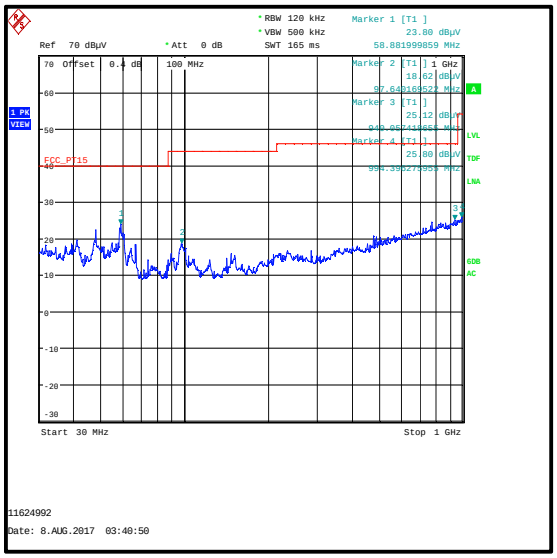
Results: Peak

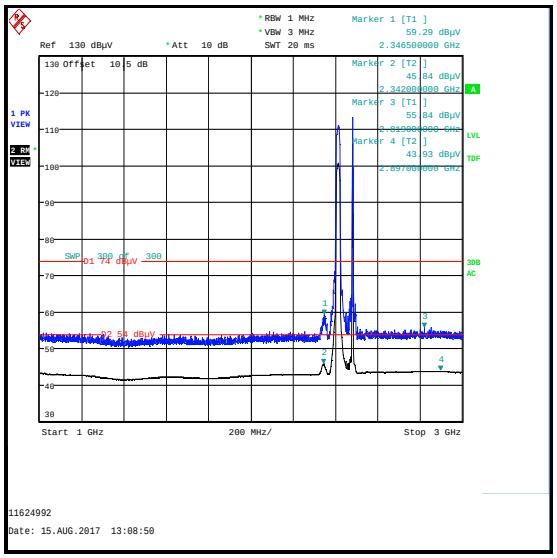
Frequency (MHz)	Antenna Polarity	Peak Level (dBµV/m)	Peak Limit (dBµV/m)	Margin (dB)	Result
2344.042	Vertical	60.8	74.0	13.2	Complied

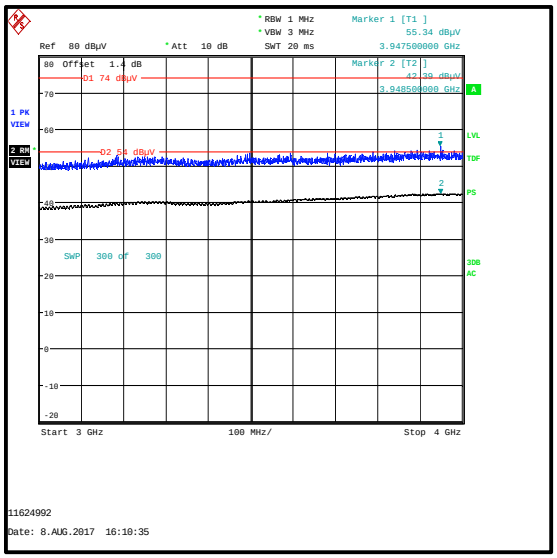
Results: Average

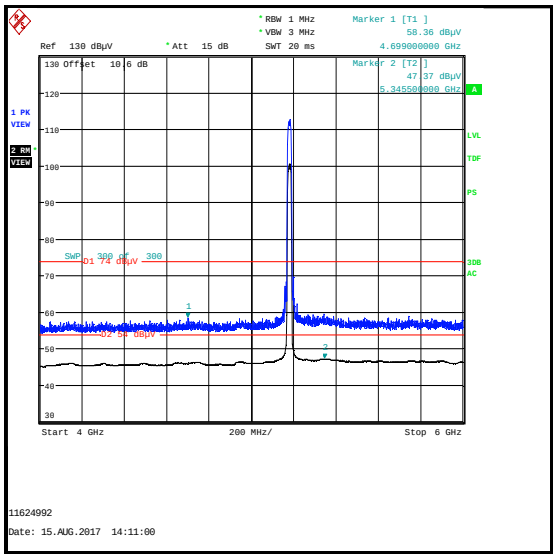
Frequency (MHz)	Antenna Polarity	Average Level (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)	Result
2344.042	Vertical	49.1	54.0	4.9	Complied

Transmitter Out of Band Radiated Emissions - *Bluetooth* LE top channel / 2.4 GHz WLAN bottom channel / 5 GHz WLAN bottom channel (continued)

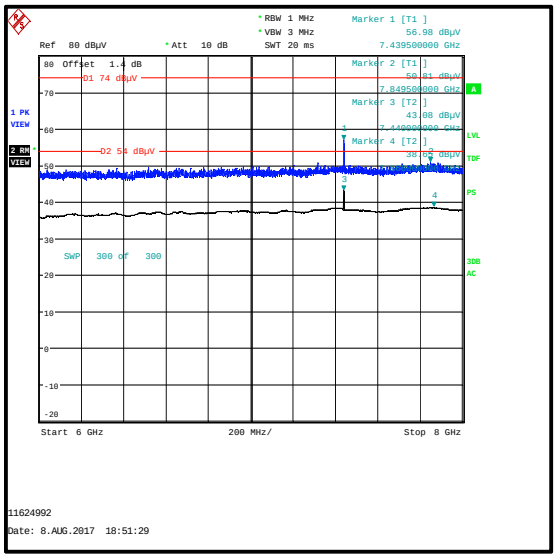


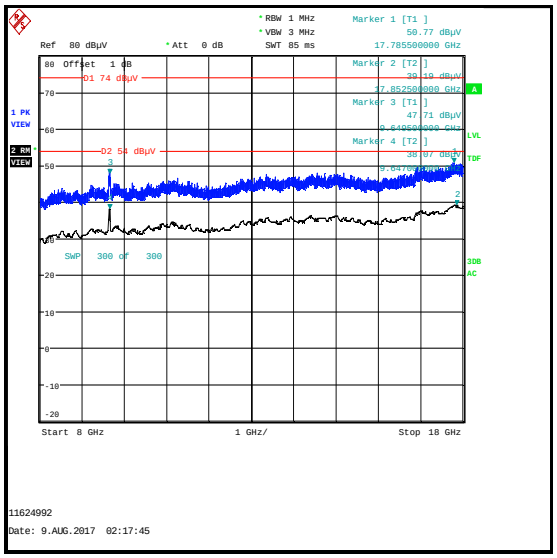


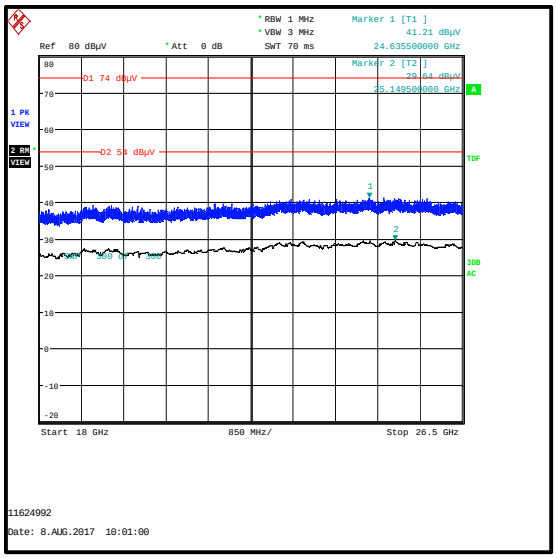


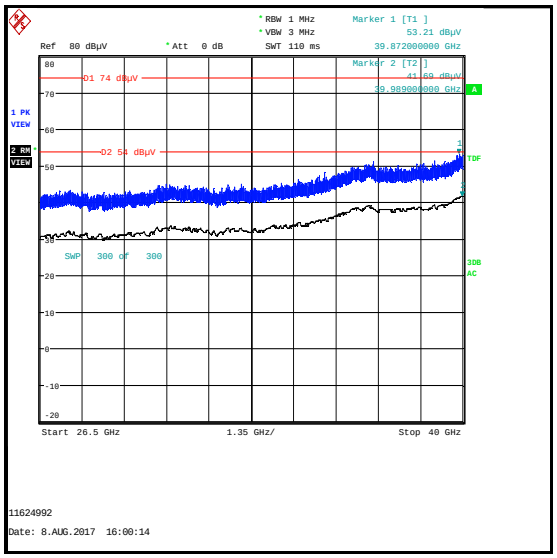


Transmitter Out of Band Radiated Emissions - *Bluetooth* LE top channel / 2.4 GHz WLAN bottom channel / 5 GHz WLAN bottom channel (continued)









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

4.18. Transmitter Out of Band Radiated Emissions - *Bluetooth* LE top channel / 2.4 GHz WLAN bottom channel / 5 GHz WLAN top channel

Test Summary:

Test Engineers:	Andrew Edwards, John Ferdinand, Doug Freegard, & Alan Withers	**Test Dates:**	08 August 2017 to 15 August 2017
Test Sample Serial Numbers:	C07TK02ZJ4C7 & C07TK006J4C6		

FCC Reference:	Parts 15.205(a), 15.209(a), 15.247(d) & 15.407(b)
ISED Canada Reference:	RSS-Gen 6.13 / RSS-247 5.5, 6.2.4.2
Test Method Used:	ANSI C63.10 Sections 6.3, 6.5 and 6.6, 11.11, 11.12.2.4, 11.12.2.5.1; FCC 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:	*Bluetooth* LE top channel / 2.4 GHz WLAN bottom channel / 5 GHz WLAN top channel

Environmental Conditions:

Temperature (°C):	23 to 25
Relative Humidity (%):	41 to 48

Transmitter Out of Band Radiated Emissions - *Bluetooth* LE top channel / 2.4 GHz WLAN bottom channel / 5 GHz WLAN top channel (continued)

Note(s):

1. The emission at 2344.042 MHz was an intermodulation product produced by the 2.4 GHz WLAN 2nd harmonic minus the *Bluetooth* LE carrier. This emission falls within a restricted band it has been measured against the peak and average limits of Part 15.209; 74 dBµV/m/54 dBµV/m limit was applied. The measured level has been recorded in the tables below. All other intermodulation products were below the noise floor level or greater than 20 dB from the specification limit.
2. The *Bluetooth* LE and 2.4 GHz WLAN fundamentals are 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 emission at approximately 7440.000 MHz is the 3rd harmonic of the *Bluetooth* LE signal and was therefore not measured.
6. The emission at approximately 9648.000 MHz is the 4th harmonic of the 2.4 GHz WLAN signal and was therefore not measured.
7. RF attenuators and filters were used as required. The insertion losses are included in the measurements.
8. 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.
9. 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.
10. Measurements above 1 GHz were performed in a fully anechoic chamber (UL VS LTD Asset Numbers K0002 & 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.

Transmitter Out of Band Radiated Emissions - *Bluetooth* LE top channel / 2.4 GHz WLAN bottom channel / 5 GHz WLAN top channel (continued)

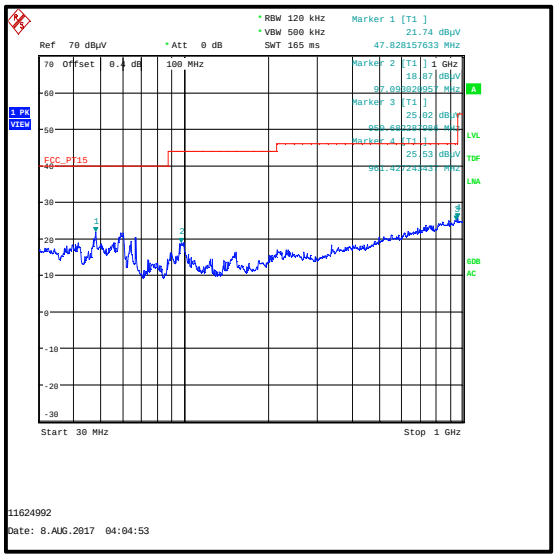
Results: Peak

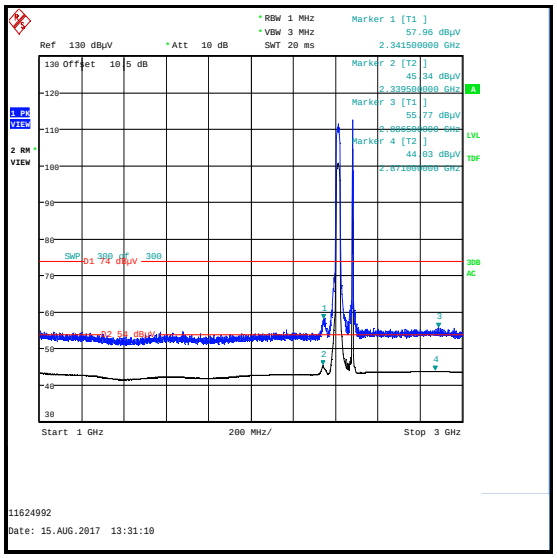
Frequency (MHz)	Antenna Polarity	Peak Level (dBµV/m)	Peak Limit (dBµV/m)	Margin (dB)	Result
2344.042	Vertical	60.8	74.0	13.2	Complied

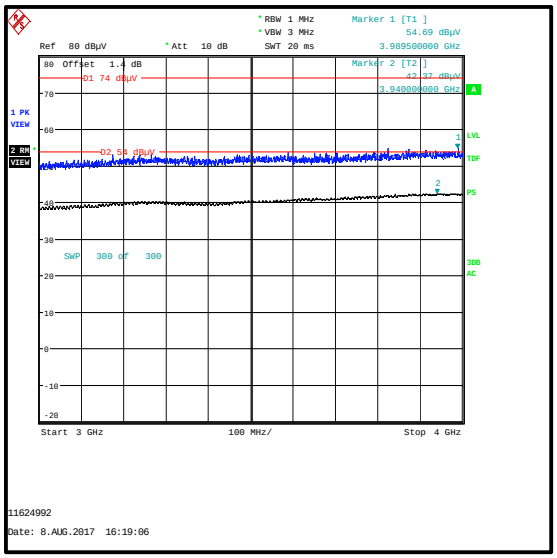
Results: Average

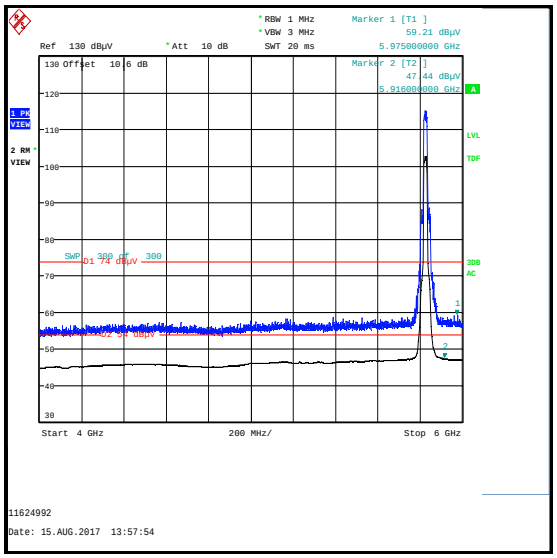
Frequency (MHz)	Antenna Polarity	Average Level (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)	Result
2344.042	Vertical	49.1	54.0	4.9	Complied

Transmitter Out of Band Radiated Emissions - *Bluetooth* LE top channel / 2.4 GHz WLAN bottom channel / 5 GHz WLAN top channel (continued)

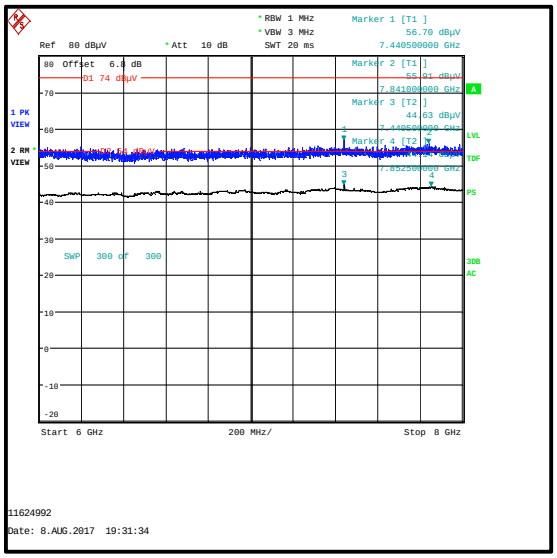


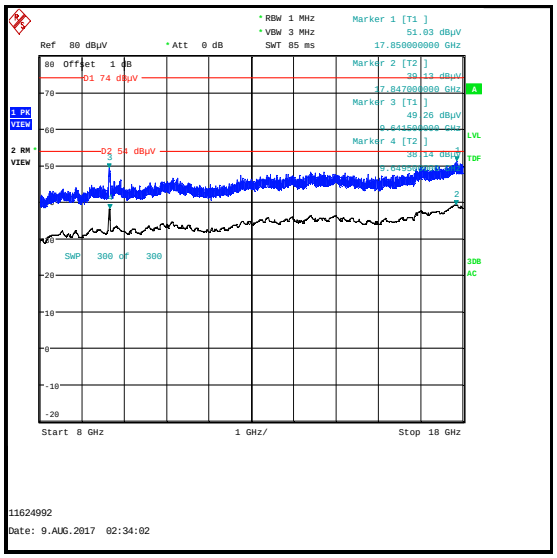


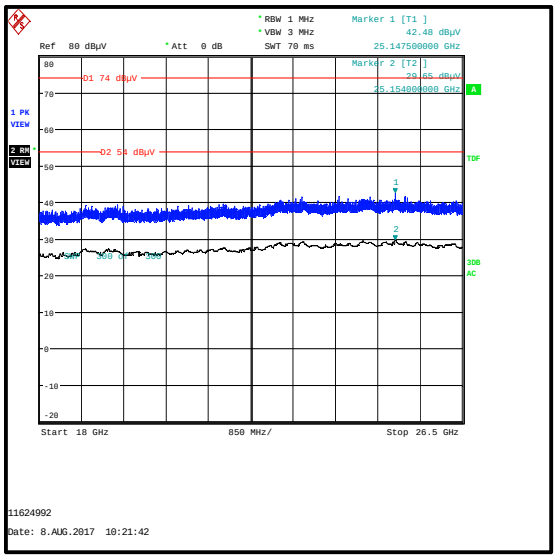


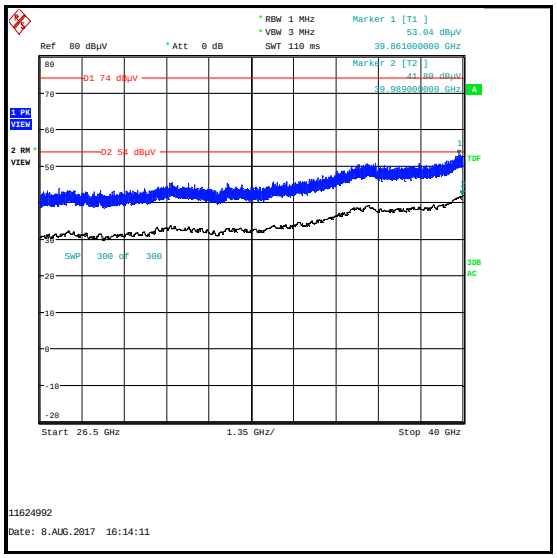


Transmitter Out of Band Radiated Emissions - *Bluetooth* LE top channel / 2.4 GHz WLAN bottom channel / 5 GHz WLAN top channel (continued)









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

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