TEST REPORT

Test Report No. : UL-RPT-RP91476JD12A V4.0

Manufacturer	:	BENTLEY MOTORS LIMITED
Model No.	:	D189070
FCC ID	:	2AAKLD189070
IC Certification No.	:	11196A-D189070
Technology	:	WLAN
Test Standard(s)	:	FCC Parts 15.209(a) & 15.247 Industry Canada RSS-210 A8.2(a), A8.2(b), A8.4(4), A8.5 and RSS-Gen 4.6.1, 4.6.2, 4.8 & 4.9

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 4.0 supersedes all previous versions.

Date of Issue: 08 April 2014

Checked by:

Sarah Williams
Engineer, Radio Performance

Issued by :

pp
John Newell
Group Quality Manager,
Basingstoke,
UL VS LTD

0644

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

UL VS LTD

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1. Customer Information

Company Name:	BENTLEY MOTORS LIMITED
Address:	Pyms Lane Cheshire CW1 3PL United Kingdom

2. Summary of Testing

2.1. General Information

Specification Reference:	47CFR15.247
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications): Part 15 Subpart C (Intentional Radiators) - Section 15.247
Specification Reference:	47CFR15.209
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications): Part 15 Subpart C (Intentional Radiators) - Section 15.209
Specification Reference:	RSS-Gen Issue 3 December 2010
Specification Title:	General Requirements and Information for the Certification of Radio Apparatus
Specification Reference:	RSS-210 Issue 8 December 2010
Specification Title:	Licence-exempt Radio Apparatus (All Frequency Bands): Category I Equipment.
Site Registration:	FCC: 209735; Industry Canada: 3245B-2
Location of Testing:	UL VS LTD, Unit 3 Horizon, Wade Road, Kingsland Business Park, Basingstoke, Hampshire, RG24 8AH, United Kingdom
Test Dates:	20 May 2013 to 27 March 2014

2.2. Summary of Test Results

FCC Reference (47CFR)	IC Reference	Measurement	Result
Part 15.247(a)(2)	RSS-Gen 4.6.2 RSS-210 A8.2(a)	Transmitter Minimum 6 dB Bandwidth	✓
N/A	RSS-Gen 4.6.1	Transmitter 99% Occupied Bandwidth	✓
Part 15.247(e)	RSS-210 A8.2(b)	Transmitter Power Spectral Density	✓
Part 15.247(b)(3)	RSS-Gen 4.8 RSS-210 A8.4(4)	Transmitter Maximum Peak Output Power	✓
Part 15.247(d) & 15.209(a)	RSS-Gen 4.9 RSS-210 A8.5	Transmitter Radiated Emissions	✓
Part 15.247(d) & 15.209(a)	RSS-Gen 4.9 RSS-210 A8.5	Transmitter Band Edge Radiated Emissions	✓

Key to Results

✓ = Complied ✗ = Did not comply

2.3. Methods and Procedures

Reference:	ANSI C63.4 (2009)
Title:	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
Reference:	ANSI C63.10 (2009)
Title:	American National Standard for Testing Unlicensed Wireless Devices
Reference:	KDB 558074 D01 v03r01 April 9, 2013
Title:	Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247

2.4. Deviations from the Test Specification

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

3. Equipment Under Test (EUT)

3.1. Identification of Equipment Under Test (EUT)

Brand Name:	BENTLEY MOTORS LIMITED
Model Name or Number:	D189070
Description:	Body Connectivity Unit
Test Sample Serial Number:	621D1890701306AH00141
Hardware Version Number:	H08
Software Version Number:	34
FCC ID:	2AAKLD189070
Industry Canada Certification Number:	11196A-D189070

Brand Name:	BENTLEY MOTORS LIMITED
Model Name or Number:	D189070
Description:	Body Connectivity Unit
Test Sample Serial Number:	621D1890701327AL005906
Hardware Version Number:	H08
Software Version Number:	34
FCC ID:	2AAKLD189070
Industry Canada Certification Number:	11196A-D189070

Brand Name:	BENTLEY MOTORS LIMITED
Model Name or Number:	4W0.962.131
Description:	WLAN & *Bluetooth* Antenna (maximum antenna gain 3.2 dBi)
Test Sample Serial Number:	00076

3.2. Description of EUT

The equipment under test was the Body Connectivity Unit (BCU), the main system to vehicle interface of a Vehicle Rear Seat Entertainment System. The EUT includes hard wired and wireless interfaces to various media sources as well as connecting to BY621 Loader Units (DVD players) which are mounted in the rear seats of the vehicle. The EUT supports multiple technologies consisting of GSM/GPRS/UMTS, *Bluetooth* and WLAN 802.11 b/g/n 2.4 GHz. The EUT has external antenna ports. The model number of the BCU is D189070.

3.3. Modifications Incorporated in the EUT

No modifications were applied to the EUT during testing.

3.4. Additional Information Related to Testing

Technology Tested:	WLAN (IEEE 802.11 a,b,g,n) / Digital Transmission System		
Type of Unit:	Transceiver		
Modulation Type:	DBPSK, DQPSK, BPSK, QPSK, 16QAM & 64QAM		
Data Rates:	802.11b	1, 2, 5.5 & 11 Mbps	
	802.11g	6, 9, 12, 18, 24, 36, 48 & 54 Mbps	
	802.11n HT20	MCS0 to MCS7 (1 spatial stream) GI = 800 ns or 400 ns Greenfield & Mixed modes	
Power Supply Requirement(s):	Nominal	12 V	
Maximum Conducted Output Power:	18.0 dBm		
Declared Antenna Gain:	3.2 dBi		
Transmit Frequency Range:	2412 MHz to 2462 MHz		
Transmit Channels Tested:	**Channel ID**	**Channel Number**	**Channel Frequency (MHz)**
	Bottom	1	2412
	Middle	6	2437
	Top	11	2462

3.5. Support Equipment

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

Brand Name:	BENTLEY MOTORS LIMITED
Model Name or Number:	D189050
Description:	Loader
Test Sample Serial Number:	621D1890501303OS50222
Hardware Version Number:	H10
Software Version Number:	34

Brand Name:	BENTLEY MOTORS LIMITED
Model Name or Number:	D189050
Description:	Loader
Test Sample Serial Number:	621D18905013070S50273
Hardware Version Number:	H10
Software Version Number:	34

Brand Name:	BENTLEY MOTORS LIMITED
Model Name or Number:	3W7.035.524.A
Description:	GSM / UMTS antenna (maximum antenna gain 2.15 dBi)
Test Sample Serial Number:	KW 472012 3435

Support Equipment (Continued)

Description:	Power Harnessing
Brand Name:	Bentley
Model Name or Number:	Not marked or stated

Description:	Car battery
Brand Name:	Optima batteries
Model Name or Number:	8012-254
Serial Number:	Not marked or stated

Description:	Laptop PC
Brand Name:	Dell
Model Name or Number:	D610
Serial Number:	0062

Description:	MDI Mitsumi
Brand Name:	Bentley
Model Name or Number:	5N0 035 341A
Serial Number:	1000003-002

Description:	2 x Male to male USB cable
Brand Name:	Not marked or stated
Model Name or Number:	Not marked or stated

Description:	Termination Cabling
Brand Name:	Not marked or stated
Model Name or Number:	Not marked or stated

Description:	Cyclone Micro Media Player Adaptor
Brand Name:	SUMVISION
Model Name or Number:	Cyclone Micro
Serial Number:	SUM091104017

4. Operation and Monitoring of the EUT during Testing

4.1. Operating Modes

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

- Continuously transmitting with a modulated carrier at maximum power on the bottom, middle and top channels as required using the supported data rates/modulation types.

4.2. Configuration and Peripherals

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

- Controlled using a Putty commutation application on the laptop PC. The application was used to enable continuous transmission and to select the test channels, data rates and modulation schemes as required.
- All supported modes and channel widths were initially investigated on one channel. The modes that produced the highest power, narrowest and widest bandwidths were:
    - Highest power
        - 802.11b – DQPSK / 11 Mbps (Short)
        - 802.11g – 64QAM / 54 Mbps
        - 802.11n HT20 – 64QAM / 52 Mbps / MCS5 (Greenfield / GI=800ns)
    - Narrowest bandwidth
        - 802.11b – DQPSK / 5.5 Mbps (Long)
        - 802.11g – QPSK / 12 Mbps
        - 802.11n HT20 – BPSK / 6.5 Mbps / MCS0 (Greenfield / GI=800ns)
    - Widest bandwidth
        - 802.11b – DQPSK / 11 Mbps (Short)
        - 802.11g – BPSK / 6 Mbps
        - 802.11n HT20 – BPSK / 6.5 Mbps / MCS0 (Greenfield / GI=800ns)
- Transmitter spurious emissions were performed with the EUT transmitting with a data rate of 54 Mbps, as this was found to have the highest power level and therefore deemed to be worst case.
- For Transmitter Radiated Spurious Emissions the GSM/UMTS antenna, Loaders and LCD screens were connected to the BCU for termination of active ports. The Loaders and LCD screens were not powered on. The BCU was powered by a car battery in the relevant test mode.
- For radiated measurements a car battery was used to power the EUT.
- For conducted measurements a DC bench power supply was used to power the EUT.
- The reference measurements for occupied bandwidth, power spectral density, conducted output power and band edge radiated emissions were performed with serial number 621D1890701327AL005906. All other measurements were performed with serial number 621D1890701306AH00141.
- For radiated measurements the WLAN Antenna was connected to the EUT via a 5m cable. This is representative of what will be used when the system is installed in the car.

5. Measurements, Examinations and Derived Results

5.1. General Comments

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

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

5.2. Test Results

5.2.1. Transmitter Minimum 6 dB Bandwidth

Test Summary:

Test Engineer:	Andrew Edward	**Test Date:**	20 May 2013
Test Sample Serial Number:	621D1890701306AH00141		

FCC Reference:	Part 15.247(a)(2)
Industry Canada Reference:	RSS-Gen 4.6.2 / RSS-210 A8.2(a)
Test Method Used:	As detailed in FCC KDB 558074 Section 8.1

Environmental Conditions:

Temperature (°C):	24
Relative Humidity (%):	39

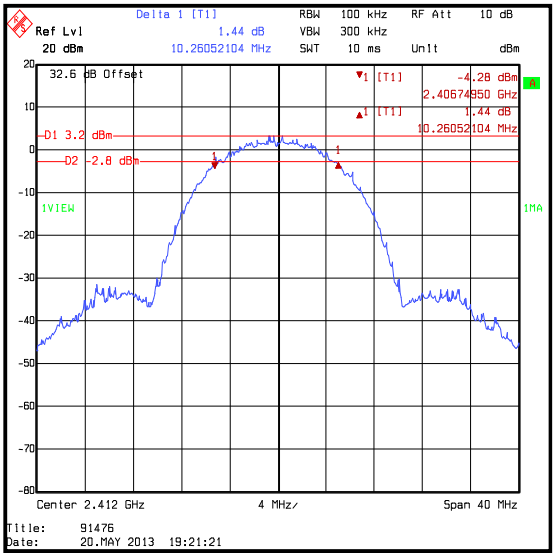
Note(s):

1. All configurations supported by the EUT were investigated on one channel in accordance with FCC KDB 558074 Section 8.1 option 1 DTS bandwidth measurement procedure. The data rates that produced the narrowest bandwidth and therefore deemed worst case were:
    - 802.11b – DQPSK / 5.5 Mbps (Long)
    - 802.11g – QPSK / 12 Mbps
    - 802.11n HT20 – BPSK / 6.5 Mbps / MCS0 (Greenfield / GI=800ns)
2. Final measurements were performed using the above configurations on the bottom, middle and top channels.
3. The spectrum analyser resolution bandwidth was set to 100 kHz and video bandwidth 300 kHz. A peak detector was used, sweep time was set to auto and the trace mode Max Hold. The span was set to 40MHz. Normal and delta markers were placed 6 dB down from the peak of the carrier. These results are documented in the tables below.
4. The spectrum analyser was connected to the RF port on the EUT using suitable attenuation and RF cable.

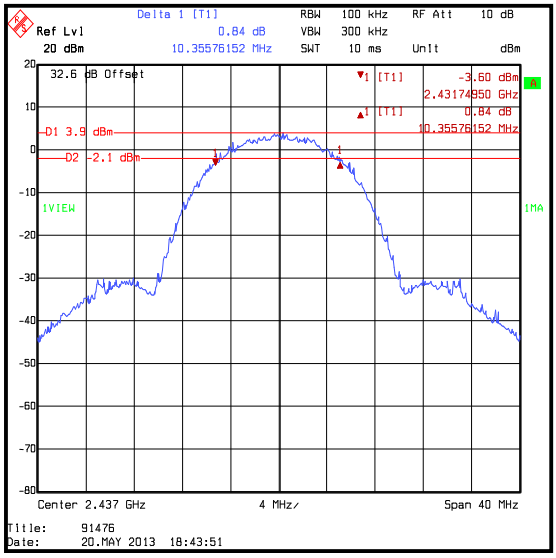
Transmitter Minimum 6 dB Bandwidth (continued)

Results: 802.11b / 20 MHz / DQPSK / 5.5 Mbps

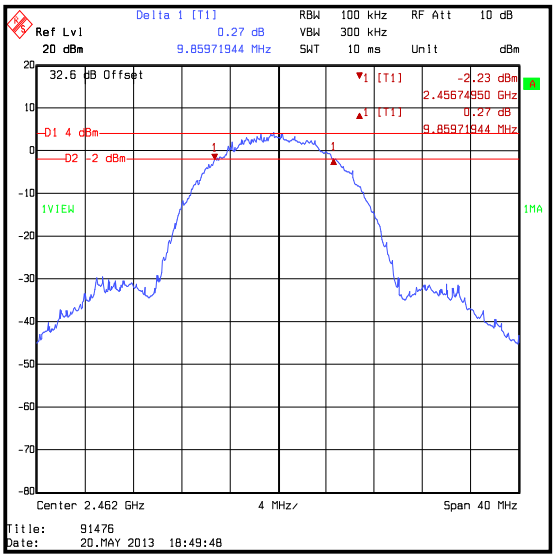
Channel	6 dB Bandwidth (kHz)	Limit (kHz)	Margin (kHz)	Result
Bottom	10260.521	≥500	9760.521	Complied
Middle	10355.762	≥500	9855.762	Complied
Top	9859.719	≥500	9359.719	Complied



Bottom Channel



Middle Channel

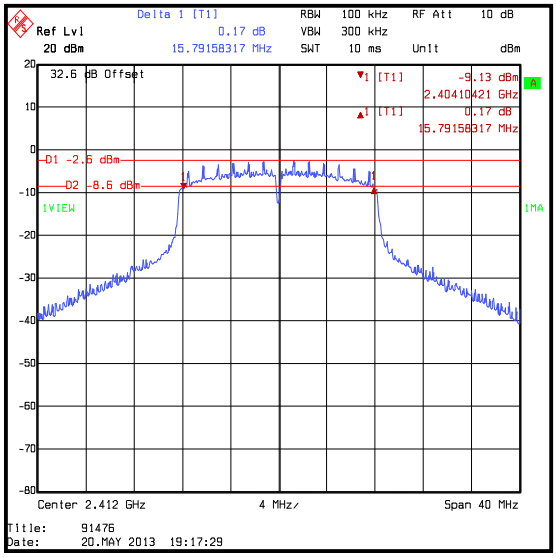


Top Channel

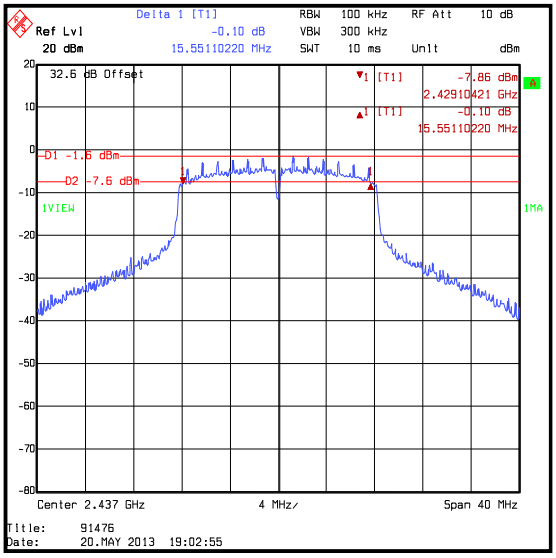
Transmitter Minimum 6 dB Bandwidth (continued)

Results: 802.11g / 20 MHz / QPSK / 12 Mbps

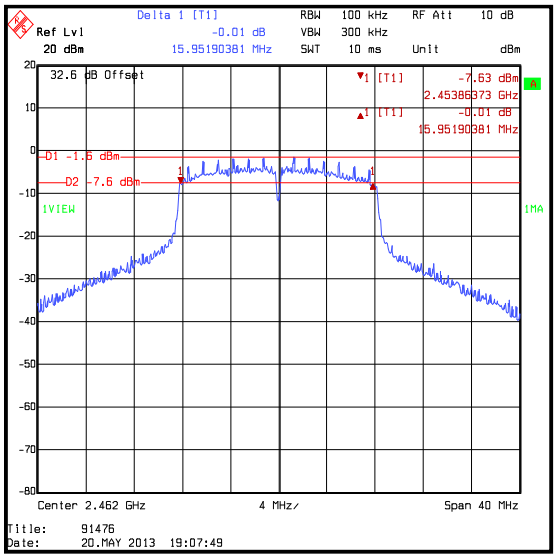
Channel	6 dB Bandwidth (kHz)	Limit (kHz)	Margin (kHz)	Result
Bottom	15791.583	≥500	15291.583	Complied
Middle	15551.102	≥500	15051.102	Complied
Top	15951.904	≥500	15451.904	Complied



Bottom Channel



Middle Channel

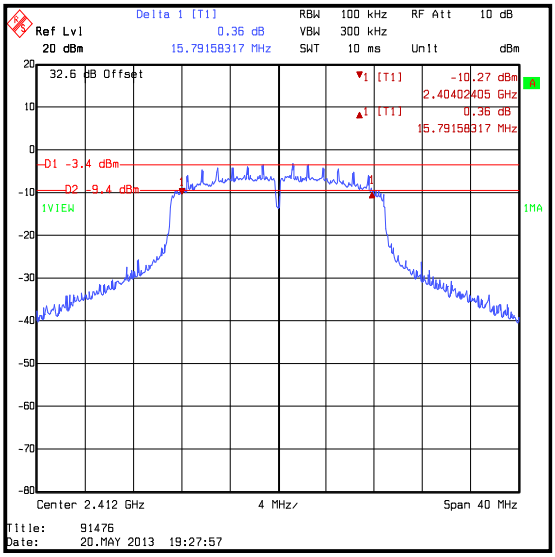


Top Channel

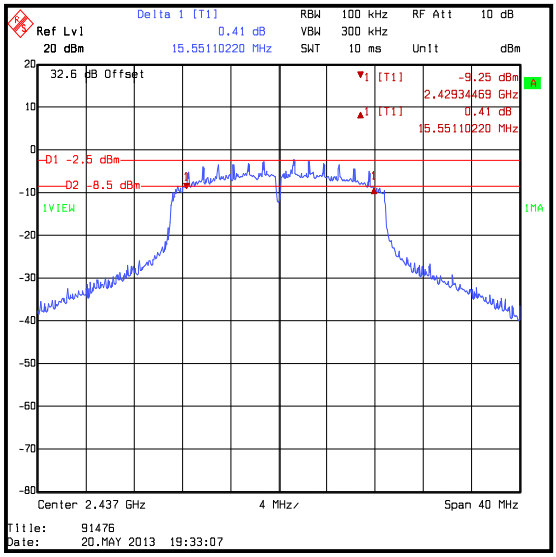
Transmitter Minimum 6 dB Bandwidth (continued)

Results: 802.11n / 20 MHz / BPSK / 6.5 Mbps / MCS0

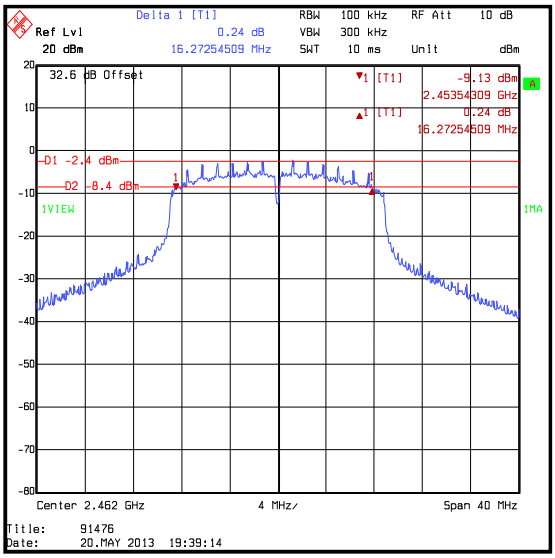
Channel	6 dB Bandwidth (kHz)	Limit (kHz)	Margin (kHz)	Result
Bottom	15791.583	≥500	15291.583	Complied
Middle	15551.102	≥500	15051.102	Complied
Top	16272.545	≥500	15772.545	Complied



Bottom Channel



Middle Channel



Top Channel

Transmitter Minimum 6 dB Bandwidth (continued)

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
A2142	Attenuator	AtlanTecRF	AN18-20	081120-23	Calibrated before use	-
M127	Spectrum Analyser	Rohde & Schwarz	FSEB 30	842 659/016	13 Aug 2013	12
S0537	DC Power Supply Unit	TTI	EL302D	249928	Calibrated before use	-
M1229	Multimeter	Fluke	179	87640015	18 Jun 2013	12
M1658	Thermometer Hygrometer Station	JM Handelspunkt	30.5015.13	Not stated	10 Jun 2013	12

5.2.2. Transmitter Occupied Bandwidth

Test Summary:

Test Engineer:	Andrew Edwards	**Test Dates:**	23 May 2013 & 20 November 2013
Test Sample Serial Numbers:	621D1890701306AH00141& 621D1890701327AL005906		

FCC Reference:	N/A
Industry Canada Reference:	RSS-Gen 4.6.1
Test Method Used:	Tested using the occupied bandwidth function of a Spectrum Analyser

Environmental Conditions:

Temperature (°C):	23 to 24
Relative Humidity (%):	30 to 33

Note(s):

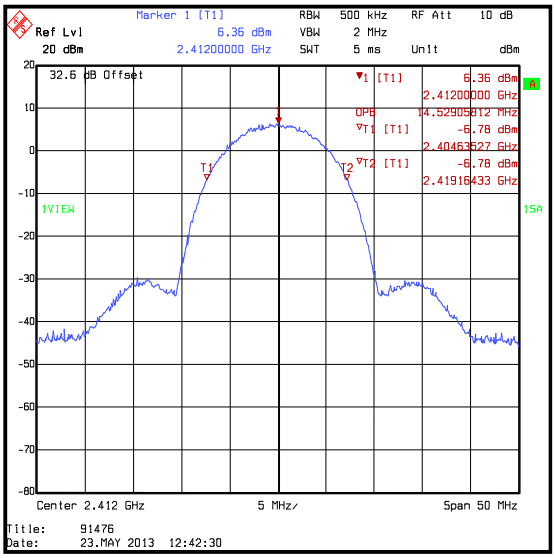
1. All configurations supported by the EUT were investigated on one channel in accordance with RSS-Gen 4.6.1, using the spectrum analyser Occupied bandwidth (99% bandwidth) function. The data rates that produced the widest bandwidth and therefore deemed worst case were:
    - 802.11b – DQPSK / 11 Mbps (Short)
    - 802.11g – BPSK / 6 Mbps
    - 802.11n HT20 – BPSK / 6.5 Mbps / MCS0 (Greenfield / GI=800ns)
2. Occupied bandwidth (99% bandwidth) was measured using a spectrum analyser occupied bandwidth function. The span was wide enough to cover all possible emission skirts. The resolution bandwidth was set to 1% of the span and the video bandwidth set to 3 times the resolution bandwidth.
3. The spectrum analyser resolution bandwidth was set to 500 kHz and video bandwidth 2 MHz. A sample detector was used, sweep time was set to auto and the trace mode was Max Hold. The span was set to 50 MHz. The analyser function set the measurements to be made at 99% of the emission bandwidth. The results are given in the tables below.
4. The spectrum analyser was connected to the RF port on the EUT using suitable attenuation and RF cable.
5. For the power measurements in this report, the occupied bandwidth was measured at maximum power of the EUT, which was with the EUT configured as:
    - 802.11b – DQPSK / 11 Mbps (Short)
    - 802.11g – 64QAM / 54 Mbps
    - 802.11n HT20 – 64QAM / 52 Mbps / MCS5 (Greenfield / GI=800ns)

    Emission bandwidth plots for 802.11g and 802.11n configurations have been included as ‘Reference plots’ at the end of this Section.

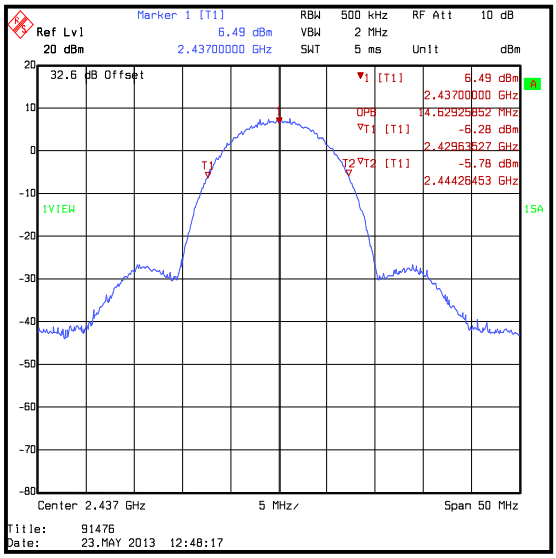
Transmitter Occupied Bandwidth (continued)

Results: 802.11b / 20 MHz / DQPSK / 11 Mbps

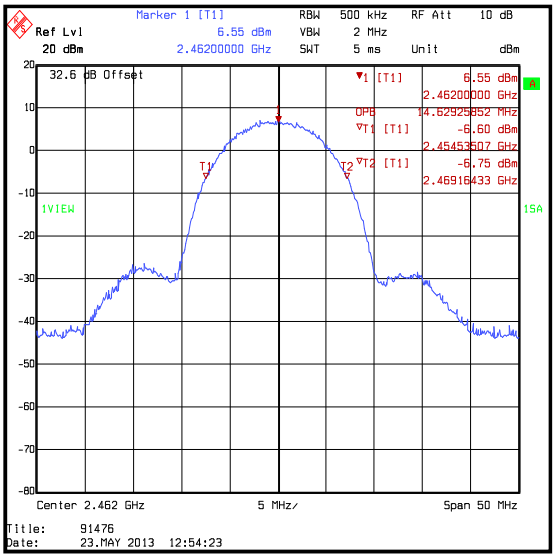
Channel	Occupied Bandwidth (MHz)
Bottom	14.529
Middle	14.629
Top	14.629



Bottom Channel



Middle Channel

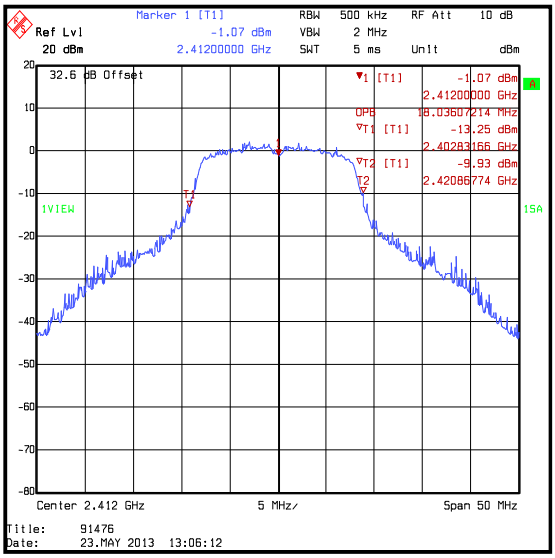


Top Channel

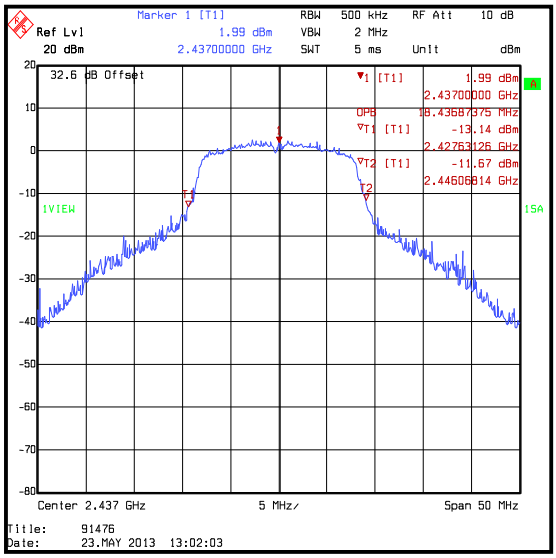
Transmitter Occupied Bandwidth (continued)

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

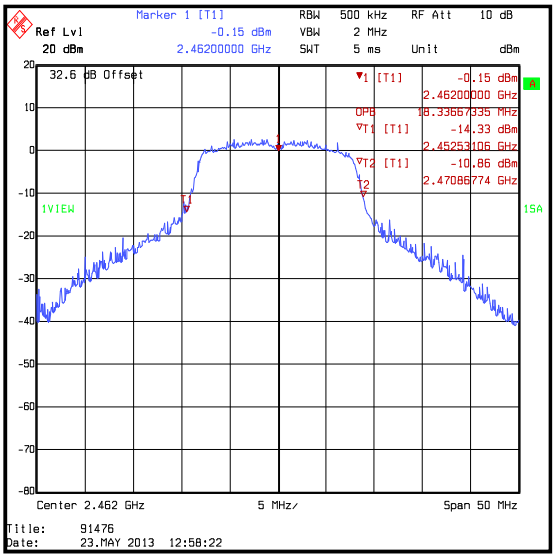
Channel	Occupied Bandwidth (MHz)
Bottom	18.036
Middle	18.437
Top	18.337



Bottom Channel



Middle Channel

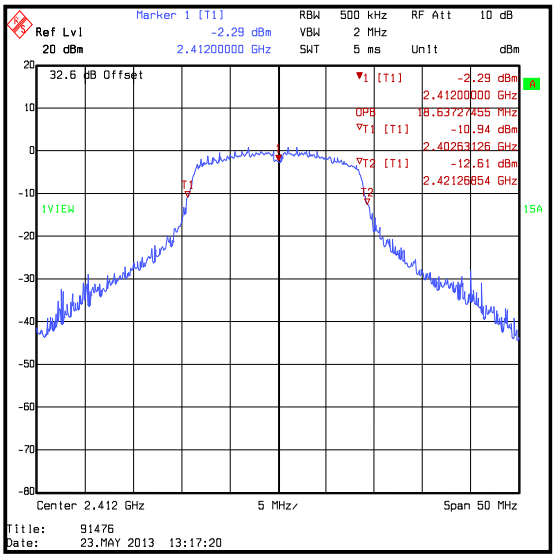


Top Channel

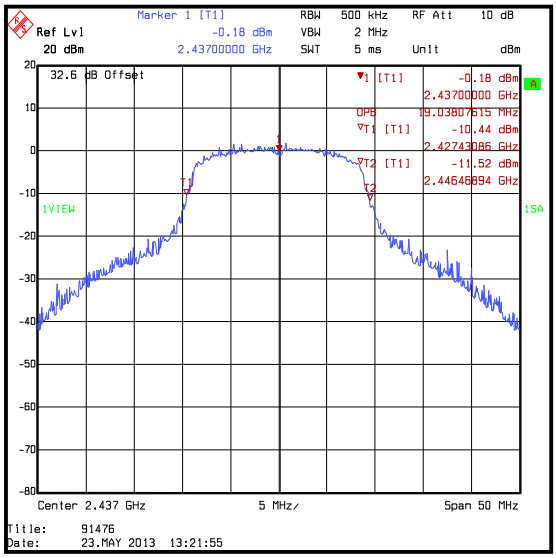
Transmitter Occupied Bandwidth (continued)

Results: 802.11n / 20 MHz / BPSK / 6.5 Mbps / MCS0

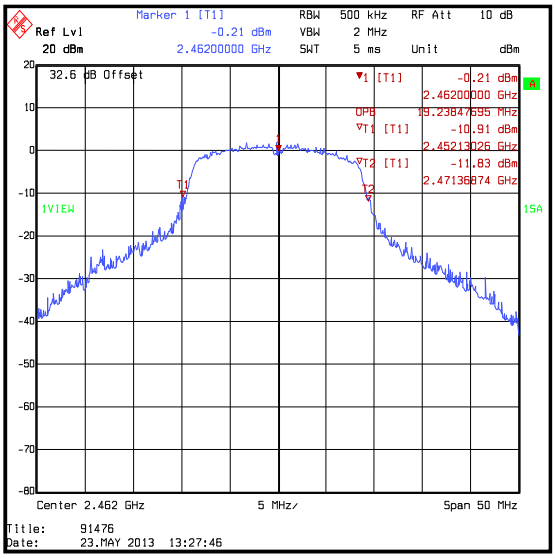
Channel	Occupied Bandwidth (MHz)
Bottom	18.637
Middle	19.038
Top	19.238



Bottom Channel



Middle Channel

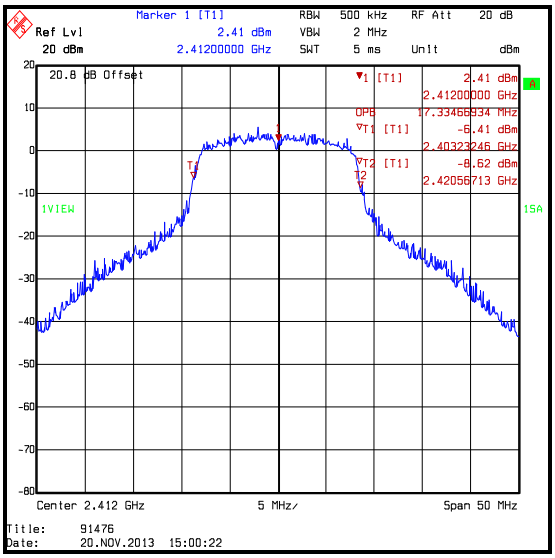


Top Channel

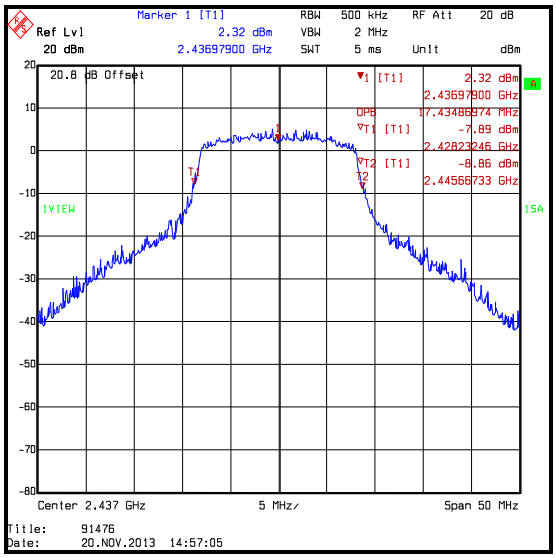
Transmitter Occupied Bandwidth (continued)

Results: 802.11g / 20 MHz / 64QAM / 54 Mbps (Reference plots)

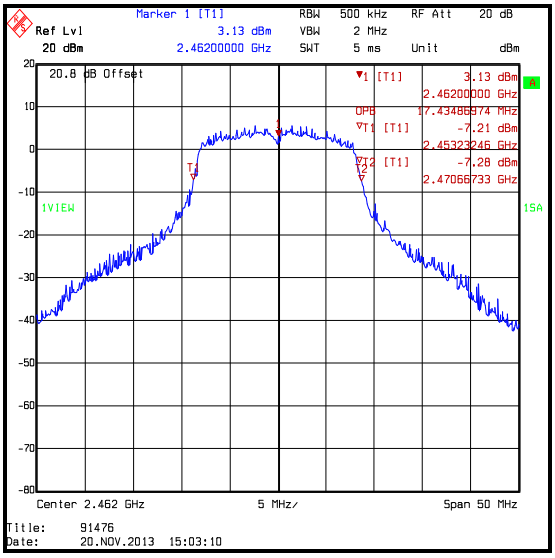
Channel	Occupied Bandwidth (MHz)
Bottom	17.335
Middle	17.435
Top	17.435



Bottom Channel



Middle Channel

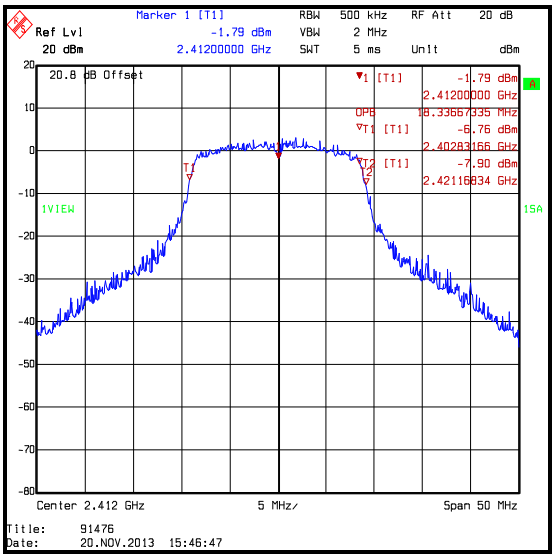


Top Channel

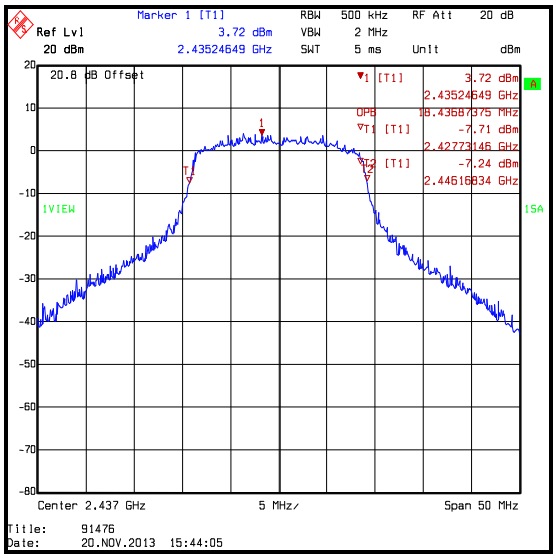
Transmitter Occupied Bandwidth (continued)

Results: 802.11n / 20 MHz / 64QAM / 52 Mbps / MCS5 (Reference plots)

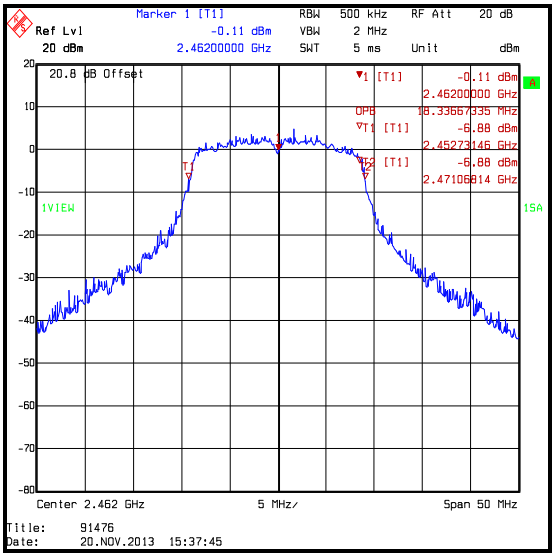
Channel	Occupied Bandwidth (MHz)
Bottom	18.337
Middle	18.437
Top	18.337



Bottom Channel



Middle Channel



Top Channel

Transmitter Occupied Bandwidth (continued)

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
A2142	Attenuator	Atlan TecRF	AN18-20	081120-23	Calibrated before use	-
M127	Spectrum Analyser	Rohde & Schwarz	FSEB 30	842 659/016	13 Aug 2013	12
M1229	Multimeter	Fluke	179	87640015	18 Jun 2013	12
M1242	Spectrum Analyser	Rohde & Schwarz	FSEM30	845986/022	19 Dec 2013	12
M1658	ThermoHygrometer	JM Handelspunkt	30.5015.13	Not stated	10 Jun 2013	12
S0537	DC Power Supply Unit	TTI	EL302D	249928	Calibrated before use	-

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

5.2.3. Transmitter Power Spectral Density

Test Summary:

Test Engineer:	Mark Percival	**Test Date:**	26 March 2014
Test Sample Serial Number:	621D1890701327AL005906		

FCC Reference:	Part 15.247(e)
Industry Canada Reference:	RSS-210 A8.2(b)
Test Method Used:	As detailed in FCC KDB 558074 Section 10.2

Environmental Conditions:

Temperature (°C):	22
Relative Humidity (%):	32

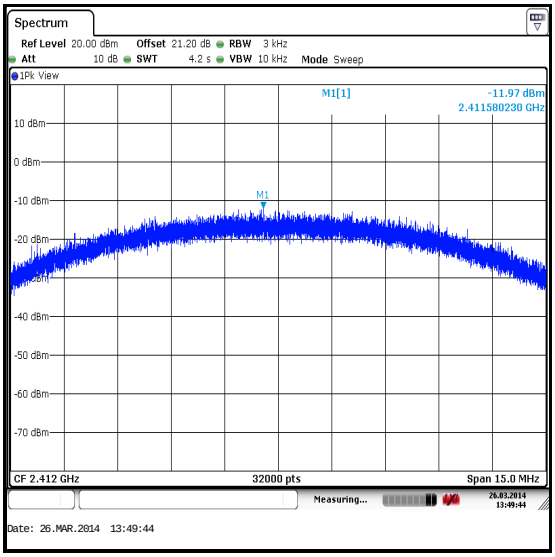
Note(s):

1. All configurations supported by the EUT were investigated on one channel in accordance with FCC KDB 558074 Section 10.2 Method PKPSD (peak PSD) measurement procedure. The data rates that produced the highest power and therefore deemed worst case were:
    - 802.11b – DQPSK / 11 Mbps (Short)
    - 802.11g – 64QAM / 54 Mbps
    - 802.11n NT20 – 64QAM / 52 Mbps / MCS5 (Greenfield / GI=800ns)
2. Final measurements were performed using the above configurations on the bottom, middle and top channels.
3. The spectrum analyser resolution bandwidth was set to 3 kHz and video bandwidth 10 kHz. A peak detector was used, sweep time was set to auto and the trace mode Max Hold. The span was set to 1.5 times the measured DTS bandwidth. A marker was placed at the peak of the signal and the results recorded in the tables below.
4. The spectrum analyser was connected to the RF port on the EUT using suitable attenuation and RF cable. An RF level offset was entered on the spectrum analyser to compensate for the loss of the attenuator and RF cable.

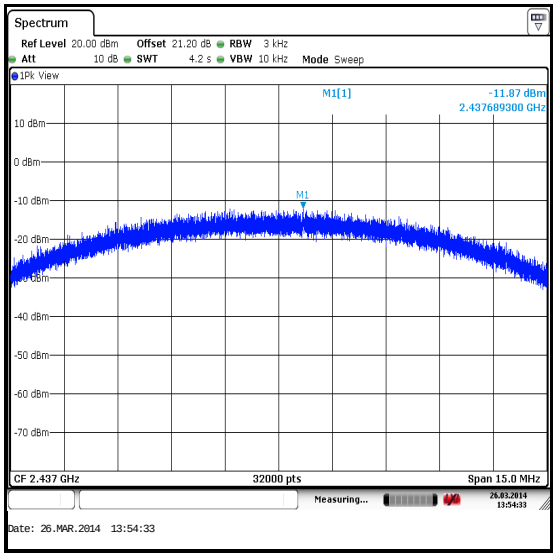
Transmitter Power Spectral Density (continued)

Results: 802.11b / 20 MHz / DQPSK / 11 Mbps

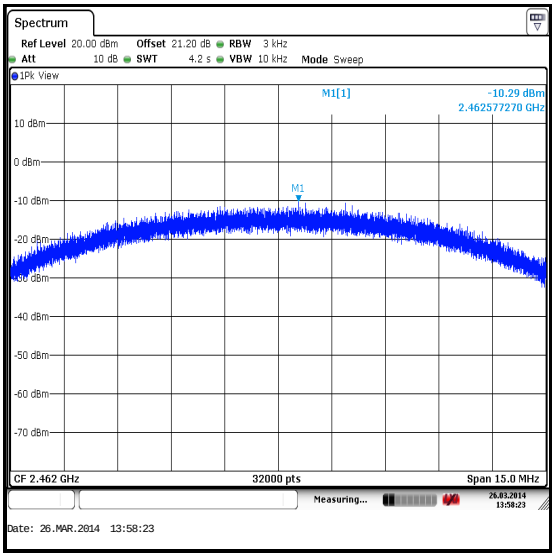
Channel	Output Power (dBm/3 kHz)	Limit (dBm/3 kHz)	Margin (dB)	Result
Bottom	-12.0	8.0	20.0	Complied
Middle	-11.9	8.0	19.9	Complied
Top	-10.3	8.0	18.3	Complied



Bottom Channel



Middle Channel

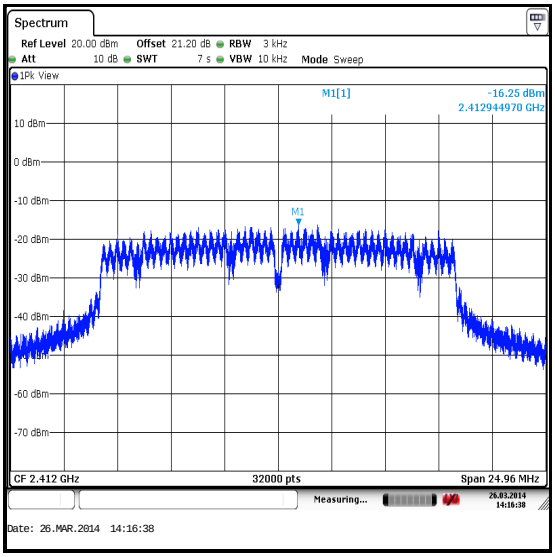


Top Channel

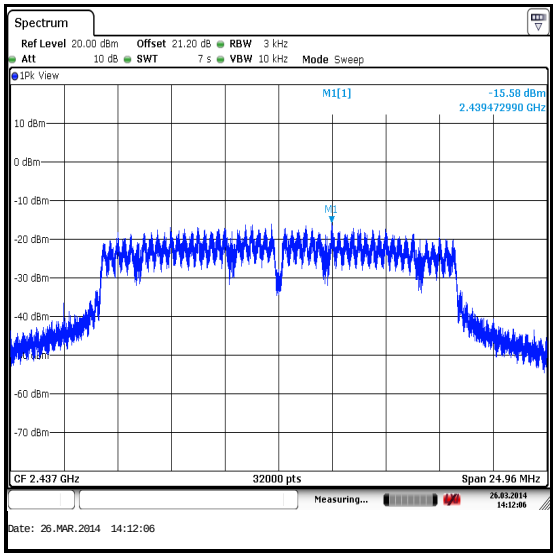
Transmitter Power Spectral Density (continued)

Results: 802.11g / 20 MHz / 64QAM / 54 Mbps

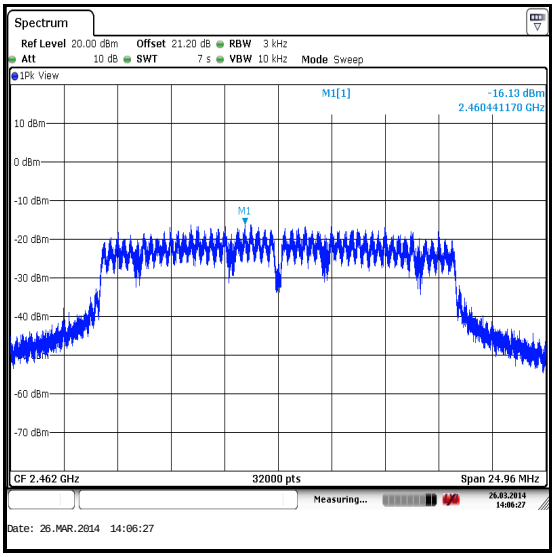
Channel	Output Power (dBm/3 kHz)	Limit (dBm/3 kHz)	Margin (dB)	Result
Bottom	-16.3	8.0	24.3	Complied
Middle	-15.6	8.0	23.6	Complied
Top	-16.1	8.0	24.1	Complied



Bottom Channel



Middle Channel

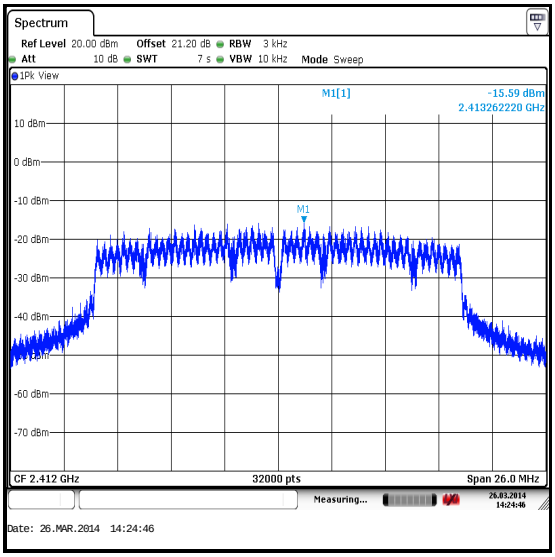


Top Channel

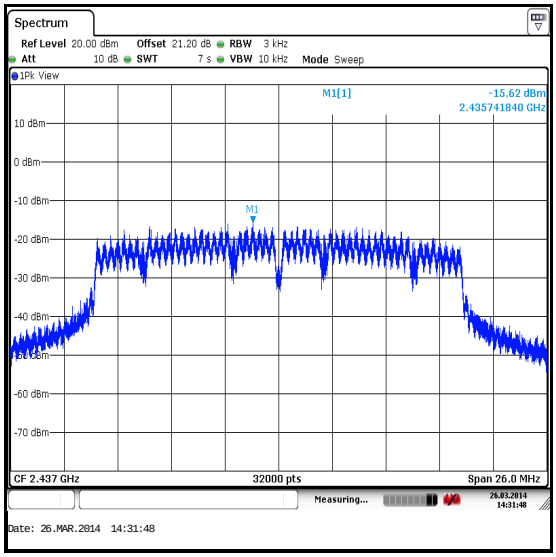
Transmitter Power Spectral Density (continued)

Results: 802.11n / 20 MHz / 64QAM / 52 Mbps / MCS5

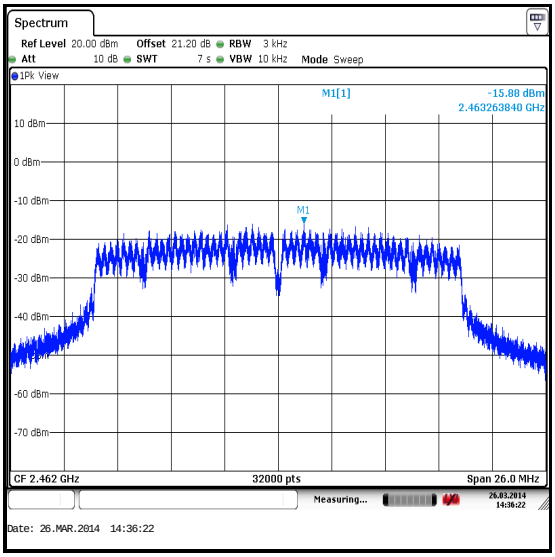
Channel	Output Power (dBm/3 kHz)	Limit (dBm/3 kHz)	Margin (dB)	Result
Bottom	-15.6	8.0	23.6	Complied
Middle	-15.6	8.0	23.6	Complied
Top	-15.9	8.0	23.9	Complied



Bottom Channel



Middle Channel



Top Channel

Transmitter Power Spectral Density (continued)

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
A1998	Attenuator	Huber & Suhner	6820.17.B	07101	05 Apr 2014	12
L1028	Signal Analyser	Rohde & Schwarz	FSV 30	100854	23 May 2014	12
M1252	Signal Generator	Hewlett Packard	83640A	3119A00489	24 Oct 2015	24
M199	Power Meter	Rohde & Schwarz	NRVS	827023/075	15 May 2014	12
M1267	Power Sensor	Rohde & Schwarz	NRV-Z52	100155	14 May 2014	12
M1658	Thermohygrometer	JM Handelspunkt	30.5015.13	Not stated	14 Mar 2015	12
S0537	DC Power Supply Unit	TTI	EL302D	249928	Calibrated before use	-
M1229	Digital Multimeter	Fluke	179	87640015	26 Jun 2014	12

5.2.4. Transmitter Maximum Peak Output Power

Test Summary:

Test Engineer:	Mark Percival	**Test Dates:**	25 March 2014 & 26 March 2014
Test Sample Serial Number:	621D1890701327AL005906		

FCC Reference:	Part 15.247(b)(3)
Industry Canada Reference:	RSS-Gen 4.8 / RSS-210 A8.4(4)
Test Method Used:	As detailed in FCC KDB 558074 Section 9.1.2

Environmental Conditions:

Temperature (°C):	21 to 23
Relative Humidity (%):	33 to 35

Note(s):

1. All configurations supported by the EUT were investigated on one channel in accordance with FCC KDB 558074 Section 9.1.2 integrated band power measurement procedure. The data rates that produced the highest power and therefore deemed worst case were:
    - 802.11b – DQPSK / 11 Mbps (Short)
    - 802.11g – 64QAM / 54 Mbps
    - 802.11n HT20 – 64QAM / 52 Mbps / MCS5 (Greenfield / GI=800ns)
2. Final measurements were performed using the above configurations on the bottom, middle and top channels.
3. The spectrum analyser's integration function was used to integrate across the DTS bandwidth. The resolution bandwidth was set to 1 MHz and video bandwidth 3 MHz. A peak detector was used, sweep time was set to auto and trace mode was Max Hold. The span was set to at least 1.5 times the DTS bandwidth. The channel power results are recorded in the tables below.
4. The spectrum analyser was connected to the RF port on the EUT using suitable attenuation and RF cable. An RF level offset was entered on the spectrum analyser to compensate for the loss of the attenuator and RF cable.
5. For the occupied bandwidth measurements in this report, the power was measured using a measurement bandwidth equal to the maximum occupied bandwidth of the EUT, which was with the EUT configured as:
    - 802.11b – DQPSK / 11 Mbps (Short)
    - 802.11g – BPSK / 6 Mbps
    - 802.11n HT20 – BPSK / 6.5 Mbps / MCS0 (Greenfield / GI=800ns)

    Output power plots for 802.11g and 802.11n configurations have been included as 'Reference plots' at the end of this Section.

Transmitter Maximum Peak Output Power (continued)

Results: 802.11b / 20 MHz / DQPSK / 11 Mbps

Conducted Peak Limit Comparison

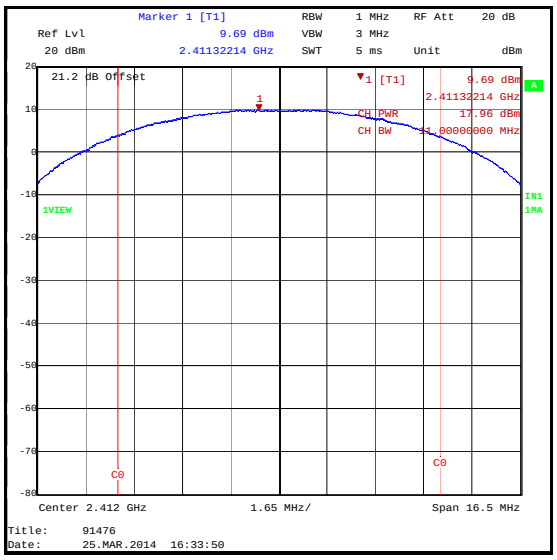
Channel	Conducted Power (dBm)	Conducted Peak Power Limit (dBm)	Margin (dB)	Result
Bottom	18.0	30.0	12.0	Complied
Middle	17.5	30.0	12.5	Complied
Top	17.6	30.0	12.4	Complied

De Facto EIRP Limit Comparison

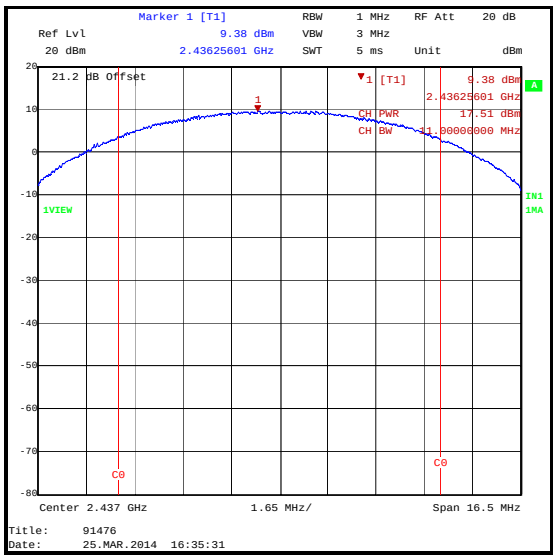
Channel	Corrected Conducted Power (dBm)	Declared Antenna Gain (dBi)	EIRP (dBm)	De Facto EIRP Limit (dBm)	Margin (dB)	Result
Bottom	18.0	3.2	21.2	36.0	14.8	Complied
Middle	17.5	3.2	20.7	36.0	15.3	Complied
Top	17.6	3.2	20.8	36.0	15.2	Complied

Transmitter Maximum Peak Output Power (continued)

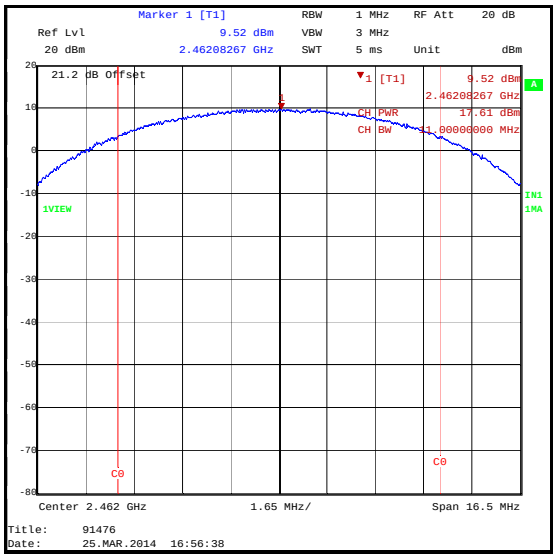
Results: 802.11b / 20 MHz / DQPSK / 11 Mbps



Bottom Channel



Middle Channel



Top Channel

Transmitter Maximum Peak Output Power (continued)

Results: 802.11g / 20 MHz / 64QAM / 54 Mbps

Conducted Peak Limit Comparison

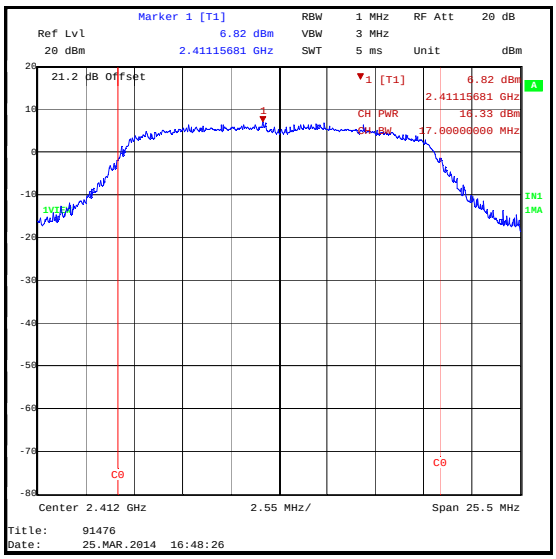
Channel	Conducted Power (dBm)	Conducted Peak Power Limit (dBm)	Margin (dB)	Result
Bottom	16.3	30.0	13.7	Complied
Middle	16.3	30.0	13.7	Complied
Top	16.0	30.0	14.0	Complied

De Facto EIRP Limit Comparison

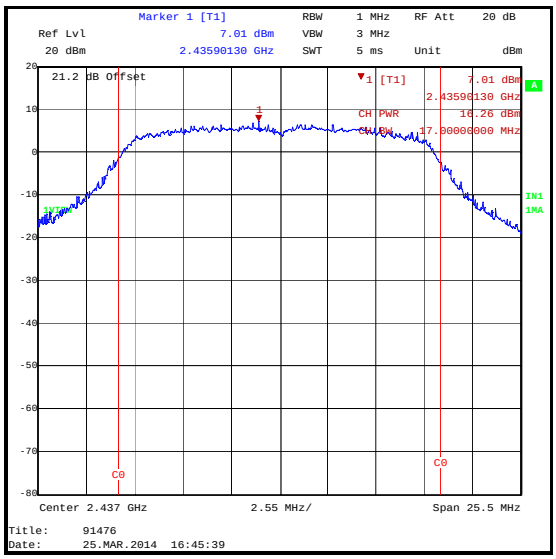
Channel	Corrected Conducted Power (dBm)	Declared Antenna Gain (dBi)	EIRP (dBm)	De Facto EIRP Limit (dBm)	Margin (dB)	Result
Bottom	16.3	3.2	19.5	36.0	16.5	Complied
Middle	16.3	3.2	19.5	36.0	16.5	Complied
Top	16.0	3.2	19.2	36.0	16.8	Complied

Transmitter Maximum Peak Output Power (continued)

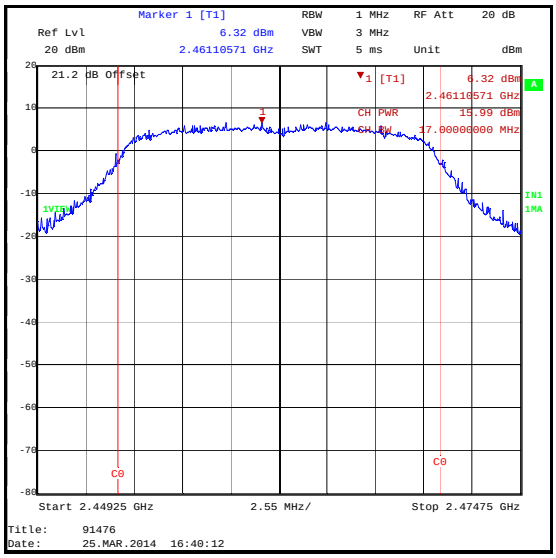
Results: 802.11g / 20 MHz / 64QAM / 54 Mbps



Bottom Channel



Middle Channel



Top Channel

Transmitter Maximum Peak Output Power (continued)

Results: 802.11n / 20 MHz / 64QAM / 52 Mbps / MCS5

Conducted Peak Limit Comparison

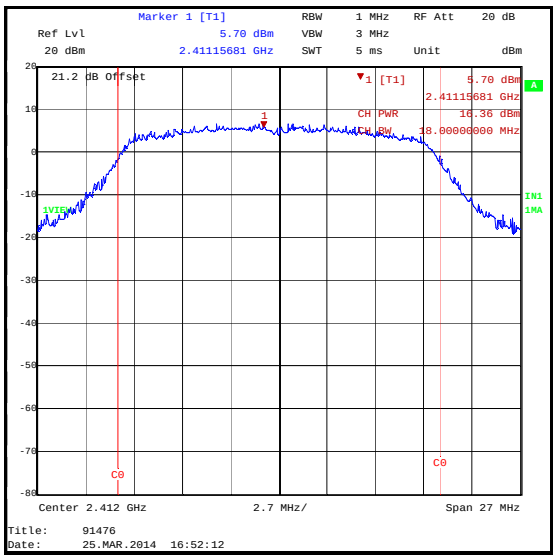
Channel	Conducted Power (dBm)	Conducted Peak Power Limit (dBm)	Margin (dB)	Result
Bottom	16.4	30.0	13.6	Complied
Middle	16.3	30.0	13.7	Complied
Top	16.3	30.0	13.7	Complied

De Facto EIRP Limit Comparison

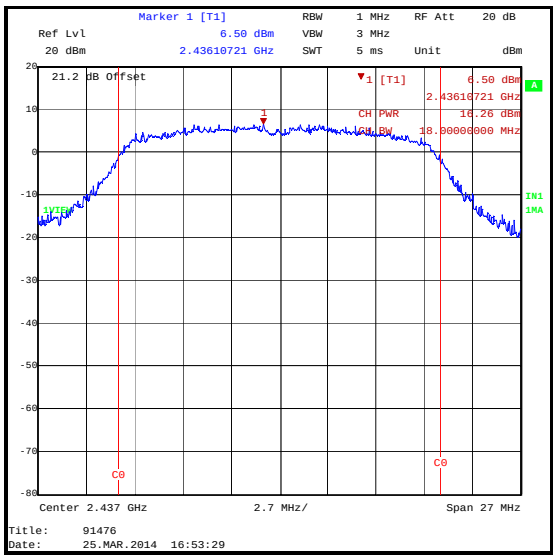
Channel	Corrected Conducted Power (dBm)	Declared Antenna Gain (dBi)	EIRP (dBm)	De Facto EIRP Limit (dBm)	Margin (dB)	Result
Bottom	16.4	3.2	19.6	36.0	16.4	Complied
Middle	16.3	3.2	19.5	36.0	16.5	Complied
Top	16.3	3.2	19.5	36.0	16.5	Complied

Transmitter Maximum Peak Output Power (continued)

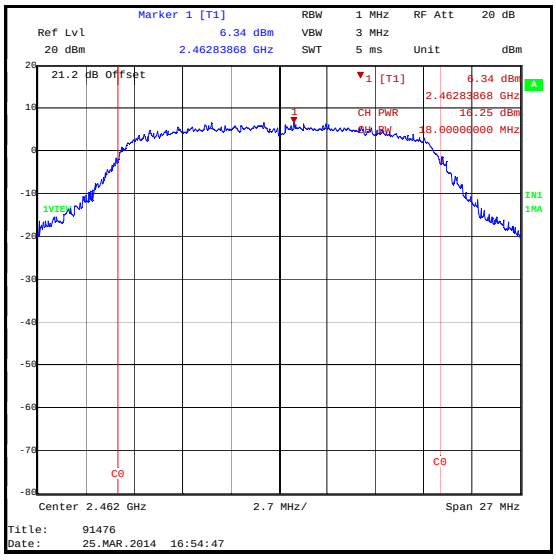
Results: 802.11n / 20 MHz / 64QAM / 52 Mbps / MCS5



Bottom Channel



Middle Channel



Top Channel

Transmitter Maximum Peak Output Power (continued)

Results: 802.11g / 20 MHz / BPSK / 6 Mbps (Reference plots)

Conducted Peak Limit Comparison

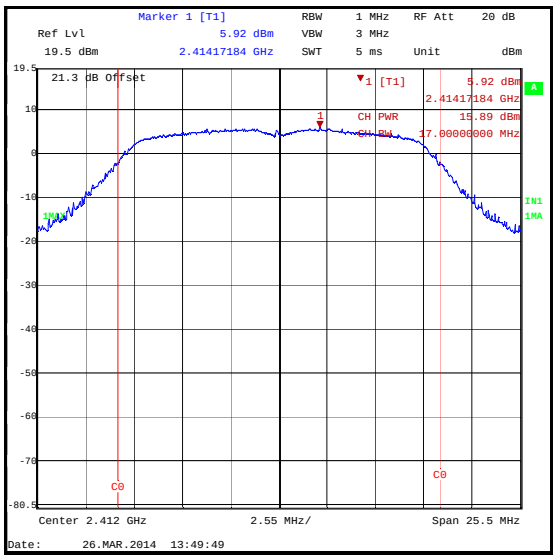
Channel	Conducted Power (dBm)	Conducted Peak Power Limit (dBm)	Margin (dB)	Result
Bottom	15.9	30.0	14.1	Complied
Middle	15.9	30.0	14.1	Complied
Top	15.8	30.0	14.2	Complied

De Facto EIRP Limit Comparison

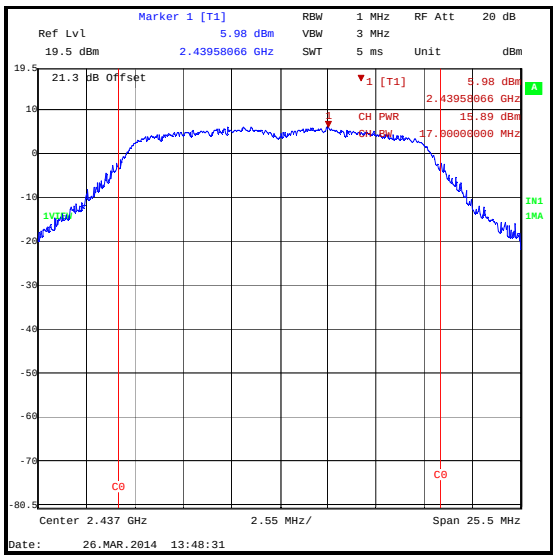
Channel	Corrected Conducted Power (dBm)	Declared Antenna Gain (dBi)	EIRP (dBm)	De Facto EIRP Limit (dBm)	Margin (dB)	Result
Bottom	15.9	3.2	19.1	36.0	16.9	Complied
Middle	15.9	3.2	19.1	36.0	16.9	Complied
Top	15.8	3.2	19.0	36.0	17.0	Complied

Transmitter Maximum Peak Output Power (continued)

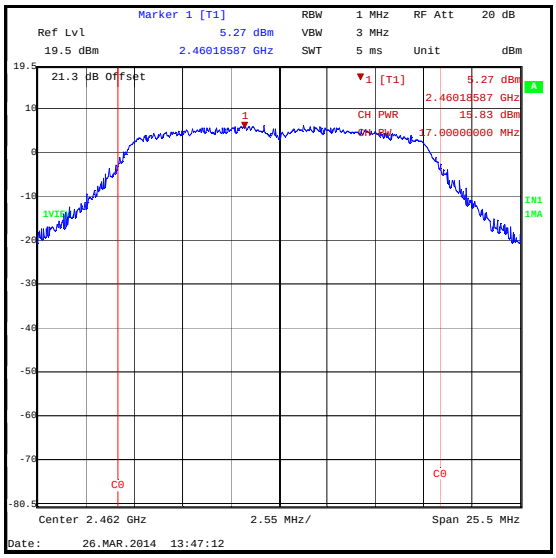
Results: 802.11g / 20 MHz / BPSK / 6 Mbps (Reference plots)



Bottom Channel



Middle Channel



Top Channel

Transmitter Maximum Peak Output Power (continued)

Results: 802.11n / 20 MHz / BPSK / 6.5 Mbps / MCS0 (Reference plots)

Conducted Peak Limit Comparison

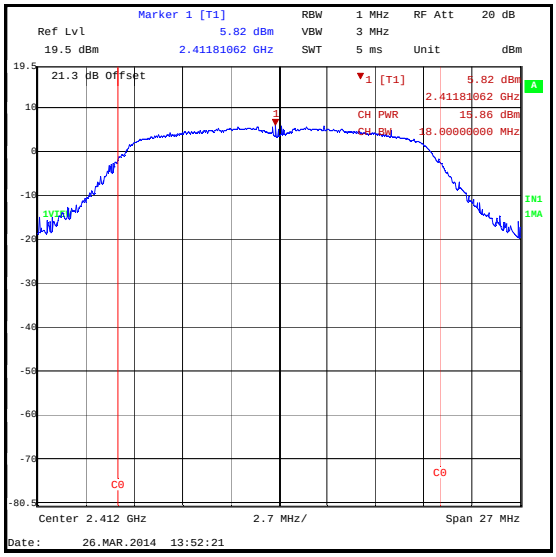
Channel	Conducted Power (dBm)	Conducted Peak Power Limit (dBm)	Margin (dB)	Result
Bottom	15.9	30.0	14.1	Complied
Middle	16.0	30.0	14.0	Complied
Top	16.0	30.0	14.0	Complied

De Facto EIRP Limit Comparison

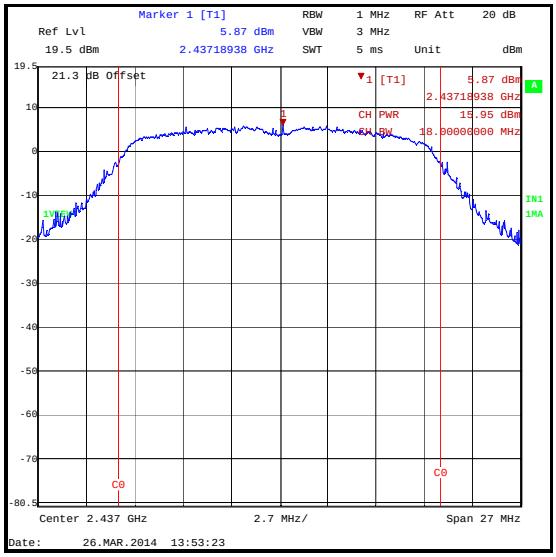
Channel	Corrected Conducted Power (dBm)	Declared Antenna Gain (dBi)	EIRP (dBm)	De Facto EIRP Limit (dBm)	Margin (dB)	Result
Bottom	15.9	3.2	19.1	36.0	16.9	Complied
Middle	16.0	3.2	19.2	36.0	16.8	Complied
Top	16.0	3.2	19.2	36.0	16.8	Complied

Transmitter Maximum Peak Output Power (continued)

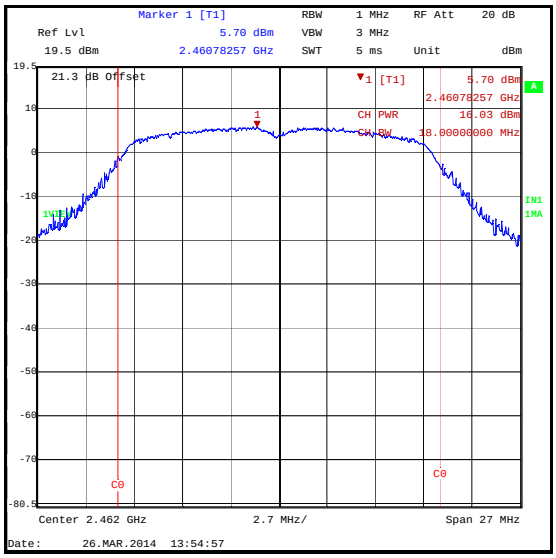
Results: 802.11n / 20 MHz / BPSK / 6.5 Mbps / MCS0 (Reference plots)



Bottom Channel



Middle Channel



Top Channel

Transmitter Maximum Peak Output Power (continued)

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
A2144	Attenuator	Atlan TecRF	AN18-20	081120-23	Calibrated before use	-
A1999	Attenuator	Huber & Suhner	6820.17.B	07101	05 Apr 2014	12
M1379	Test Receiver	Rohde & Schwarz	ESIB7	100330	02 Dec 2014	12
M1021	Signal Generator	Rohde & Schwarz	SMP02	833286/004	05 Feb 2014	12
M1145	Power Meter	Hewlett Packard	437B	3737U26557	21 Jun 2014	12
M1175	Power Sensor	Hewlett Packard	8485A	2942A10299	26 Sep 2014	12
M1658	Thermohygrometer	JM Handelspunkt	30.5015.13	Not stated	14 Mar 2015	12
S0537	DC Power Supply Unit	TTI	EL302D	249928	Calibrated before use	-
S0557	DC Power Supply Unit	TTI	EL303R	395819	Calibrated before use	-
M1229	Digital Multimeter	Fluke	179	87640015	26 Jun 2014	12

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

5.2.5. Transmitter Radiated Emissions

Test Summary:

Test Engineer:	Andrew Edwards	**Test Date:**	22 May 2013
Test Sample Serial Number:	621D1890701306AH00141		

FCC Reference:	Parts 15.247(d) & 15.209(a)
Industry Canada Reference:	RSS-Gen 4.9 / RSS-210 A8.5
Test Method Used:	As detailed in ANSI C63.10 Sections 6.3 and 6.5 referencing ANSI C63.4
Frequency Range	30 MHz to 1000 MHz

Environmental Conditions:

Temperature (°C):	23
Relative Humidity (%):	31

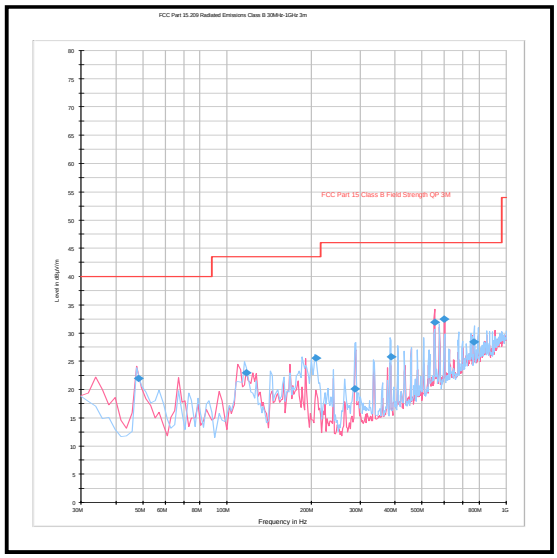
Note(s):

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

Results: Top Channel / 802.11g / 64QAM / 54 Mbps

Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
117.556	Horizontal	23.0	43.5	20.5	Complied

Transmitter Radiated Emissions (continued)



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

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
A490	Antenna	Chase	CBL6111A	1590	18 Apr 2014	12
A1834	Attenuator	Hewlett Packard	8491B	10444	27 Jan 2014	12
G0543	Amplifier	Sonoma	310N	230801	04 Jul 2013	3
K0001	5 m RSE Chamber	Rainford EMC	N/A	N/A	24 Oct 2013	12
M1273	Test Receiver	Rohde & Schwarz	ESIB 26	100275	07 Feb 2014	12
M1656	Thermometer Hygrometer Station	JM Handelspunkt	30.5015.13	Not stated	10 Jun 2013	12

Transmitter Radiated Emissions (continued)

Test Summary:

Test Engineer:	Mark Percival	**Test Date:**	27 March 2014
Test Sample Serial Number:	621D1890701327AL005906		

FCC Reference:	Parts 15.247(d) & 15.209(a)
Industry Canada Reference:	RSS-Gen 4.9 / RSS-210 A8.5
Test Method Used:	As detailed in ANSI C63.10 Sections 6.3 and 6.6 referencing ANSI C63.4 and FCC KDB 558074 Section 11.0
Frequency Range	1 GHz to 25 GHz

Environmental Conditions:

Temperature (°C):	23
Relative Humidity (%):	32

Note(s):

1. The final measured value, for the given emission, in the table below incorporates the calibrated antenna factor and cable loss
2. All other emissions shown on the pre-scan plot were investigated and found to be ambient or >20 dB below the applicable limit or below the measurement system noise floor.
3. The emission shown at 2462 MHz on the 1 GHz to 4 GHz plot is the EUT fundamental.
4. Pre-scans above 1 GHz were performed in a fully anechoic chamber (Asset Number K0002) at a distance of 3 metres. The EUT was placed at a height of 1.5 metres above the test chamber floor in the centre of the chamber turntable. All measurement antennas were placed at a fixed height of 1.5 metres above the test chamber floor, in line with the EUT. Final measurements above 1 GHz were performed in a semi-anechoic chamber (Asset Number K0001) at a distance of 3 metres. The EUT was placed at a height of 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.
5. Pre-scans were performed and a marker placed on the highest measured level of the appropriate plot. The test receiver resolution bandwidth was set to 1 MHz and video bandwidth 3 MHz. The sweep time was set to auto. Peak and average measurements were performed with their own appropriate detectors during the pre-scan measurements.
6. Final peak emissions were measured with the test receiver set to the same configuration as the pre-scan except with a span that could see the whole emission. Final average measurements that fall within the restricted bands were made with the test receiver resolution bandwidth was set to 1 MHz and video bandwidth 10 Hz. A peak detector was used, sweep time was set to auto and trace mode was Max Hold. The spectrum analyser was left to sweep for a sufficient length of time in order to maximise the out-of-band emissions.

Transmitter Radiated Emissions (continued)

Results: Peak Bottom Channel

Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
4826.773	Vertical	67.5	74.0	6.5	Complied

Results: Average Bottom Channel

Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
4823.888	Horizontal	52.7	54.0	1.3	Complied

Results: Peak Middle Channel

Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
4870.619	Horizontal	64.9	74.0	9.1	Complied

Results: Average Middle Channel

Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
4872.735	Horizontal	52.3	54.0	1.7	Complied

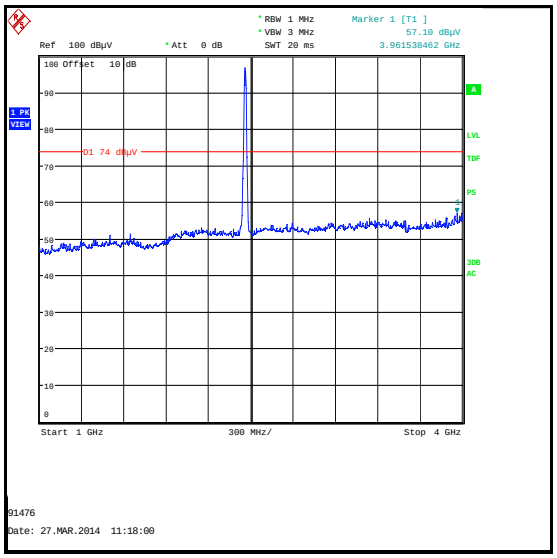
Results: Peak Top Channel

Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
4917.047	Vertical	59.0	74.0	15.0	Complied

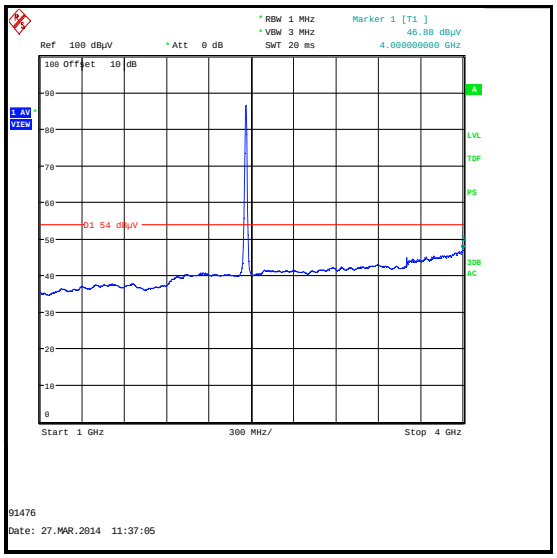
Results: Average Top Channel

Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
4921.278	Vertical	46.4	54.0	7.6	Complied

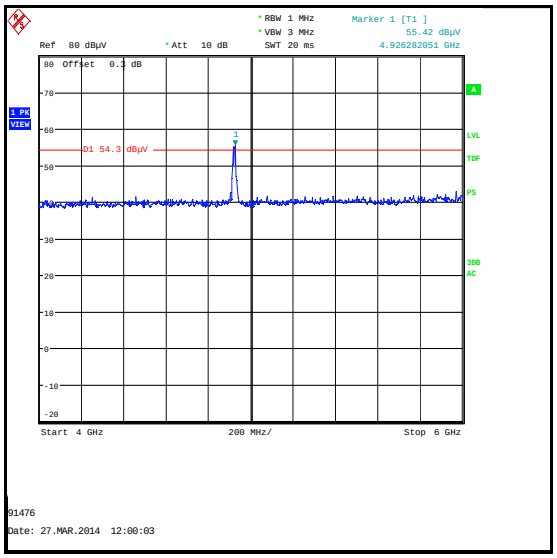
Transmitter Radiated Emissions (continued)

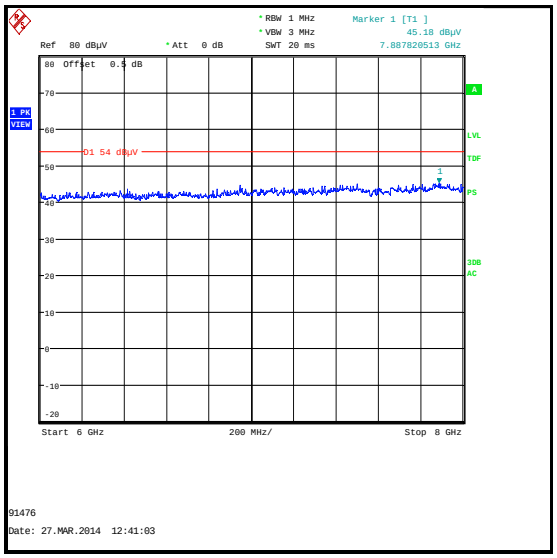


Peak Detector

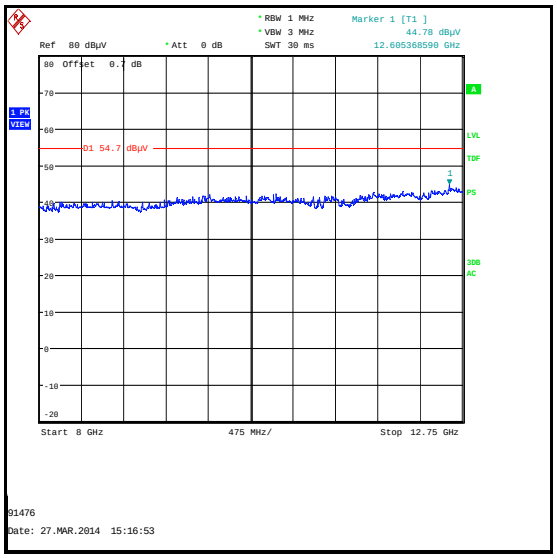


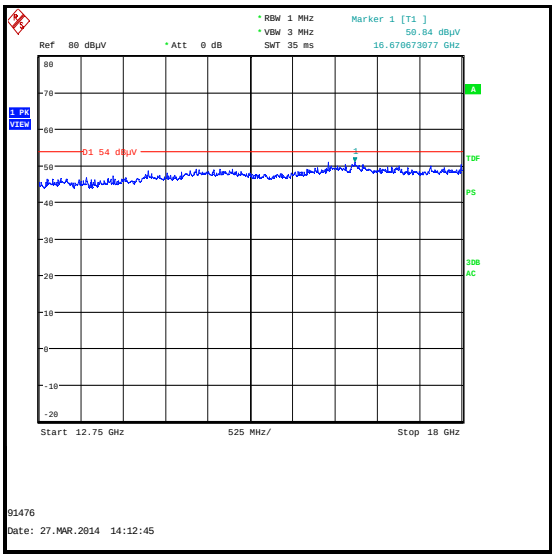
Average Detector

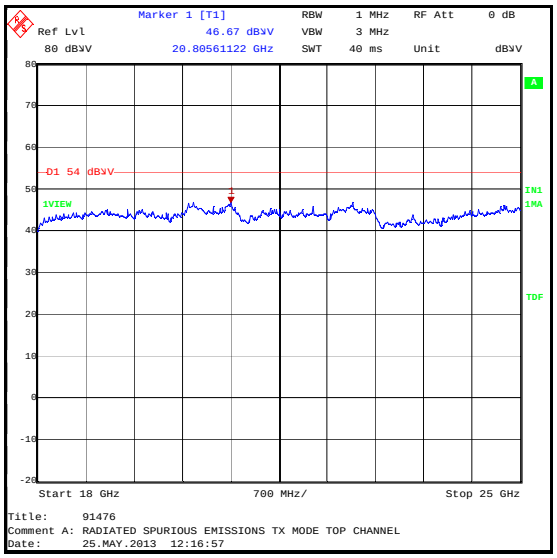




Transmitter Radiated Emissions (continued)







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

Transmitter Radiated Emissions (continued)

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
A253	Antenna	Flann	12240-20	128	14 Nov 2014	12
A254	Antenna	Flann	14240-20	139	14 Nov 2014	12
A255	Antenna	Flann	16240-20	519	14 Nov 2014	12
A256	Antenna	Flann	18240-20	400	14 Nov 2014	12
A436	Antenna	Flann	20240-20	330	14 Nov 2014	12
A1534	Pre Amplifier	Hewlett Packard	8449B	3008A00405	14 Nov 2014	12
A1818	Antenna	EMCO	3115	00075692	14 Nov 2014	12
A2139	Attenuator	AtlanTecRF	AN18-10	090918-04#1	10 May 2014	12
A1975	High Pass Filter	AtlanTecRF	AFH-03000	090424010	19 Apr 2014	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	14 Nov 2014	12
M1630	Test Receiver	Rohde & Schwarz	ESU40	100233	13 Mar 2015	12
M1656	Thermohygrometer	JM Handelspunkt	30.5015.13	Not stated	14 Mar 2015	12

5.2.6. Transmitter Band Edge Radiated Emissions

Test Summary:

Test Engineer:	Mark Percival	**Test Date:**	27 March 2014
Test Sample Serial Number:	621D1890701327AL005906		

FCC Reference:	Parts 15.247(d) & 15.209(a)
Industry Canada Reference:	RSS-Gen 4.9 / RSS-210 A8.5
Test Method Used:	As detailed in ANSI C63.10 Section 6.9.2 referencing FCC KDB 558074 Section 11.0

Environmental Conditions:

Temperature (°C):	23
Relative Humidity (%):	32

Note(s):

1. All configurations supported by the EUT were investigated on one channel. The data rates that produced the highest power and widest bandwidth and therefore deemed worst case were:
    - 802.11b – DQPSK / 11 Mbps (Short)
    - 802.11g – BPSK / 6 Mbps & 64QAM / 54 Mbps
    - 802.11n HT20 – BPSK / 6.5 Mbps / MCS0 (Greenfield / GI =800ns) & 64QAM / 52 Mbps / MCS5 (Greenfield / GI =800ns)
2. Final measurements were performed with the above configurations.
3. The final measured value, for the given emission, in the table below incorporates the calibrated antenna factor and cable loss.
4. For the lower band edge measurements: As the lower band edge falls within the non-restricted band only peak measurements are required. In accordance with FCC KDB 558074 Section 11.1, the test method in Section 11.3 was followed: the test receiver resolution bandwidth was set to 100 kHz and video bandwidth 300 kHz. A peak detector was used, sweep time was set to auto and trace mode was Max Hold. The test receiver was left to sweep for a sufficient length of time in order to maximise the carrier level and out-of-band emissions. A marker and corresponding reference level line were placed on the peak of the carrier. As the maximum conducted output power was measured using a peak detector in accordance with FCC KDB 558074 Section 9.1.2 an out-of-band limit line was placed 20 dB (FCC KDB 558074 Section 11.1(a)) below the peak level. A marker was placed on the band edge spot frequencies and a second marker placed on the highest emission level in the adjacent non-restricted band of operation (where a higher level emission was present). Marker frequencies and levels were recorded.
5. For the upper band edge measurements: As the upper band edge falls within restricted band both peak and average measurements were recorded by placing a marker at the edge of the band (2483.5 MHz). In accordance with FCC KDB 558074 Section 12.1, the test method in ANSI C63.10 Section 6.9.2 was followed: for peak measurements the test receiver resolution bandwidth was set to 1 MHz and video bandwidth 3 MHz. A peak detector was used, sweep time was set to auto and trace mode was Max Hold. For average measurements the test receiver resolution bandwidth was set to 1 MHz and video bandwidth 10 Hz. A peak detector was used, sweep time was set to auto and trace mode was Max Hold. The test receiver was left to sweep for a sufficient length of time in order to maximise the carrier level and out-of-band emissions. A marker was placed on the band edge spot frequencies and a second marker placed on the highest emission level in the adjacent restricted band of operation (where a higher level emission was present). Marker frequencies and levels were recorded.
6. * -20 dBc limit.

Transmitter Band Edge Radiated Emissions (continued)

Results: Peak / 802.11b / 20 MHz / DQPSK / 11 Mbps

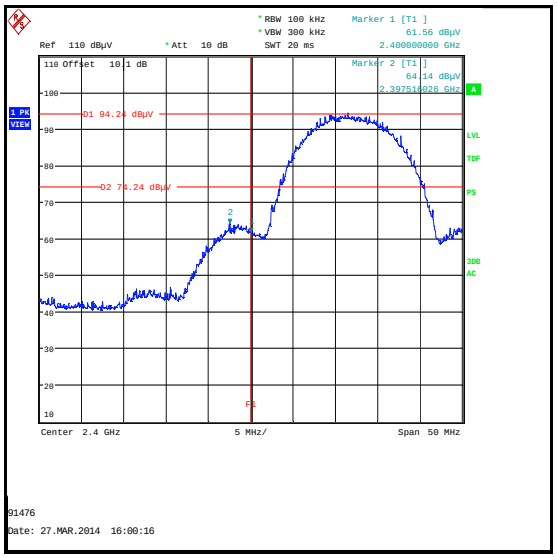
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2397.516	64.1	74.2*	10.1	Complied
2400	61.6	74.2*	12.6	Complied
2483.5	52.5	74.0	21.5	Complied
2485.103	52.8	74.0	21.2	Complied

Results: Average / 802.11b / 20 MHz / DQPSK / 11 Mbps

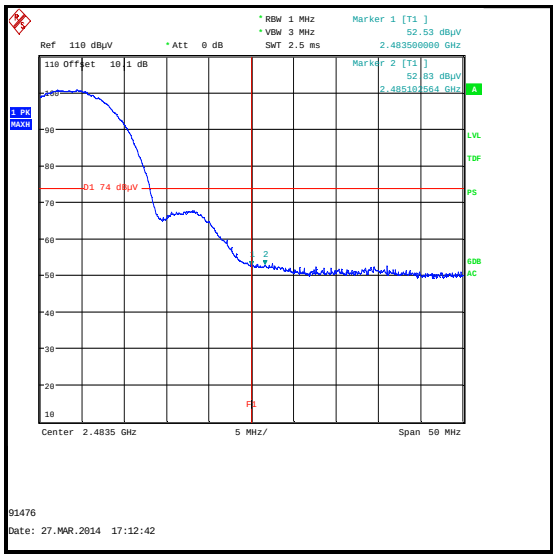
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2483.5	39.4	54.0	14.6	Complied

Transmitter Band Edge Radiated Emissions (continued)

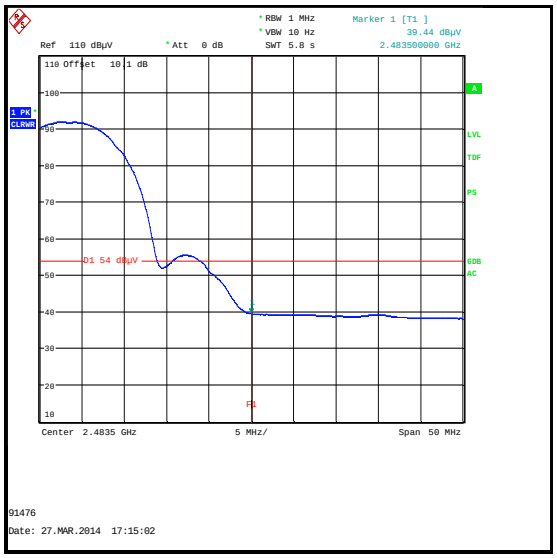
Results: 802.11b / 20 MHz / DQPSK / 11 Mbps



Lower Band Edge Peak Measurement



Upper Band Edge Peak Measurement



Upper Band Edge Average Measurement

Transmitter Band Edge Radiated Emissions (continued)

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

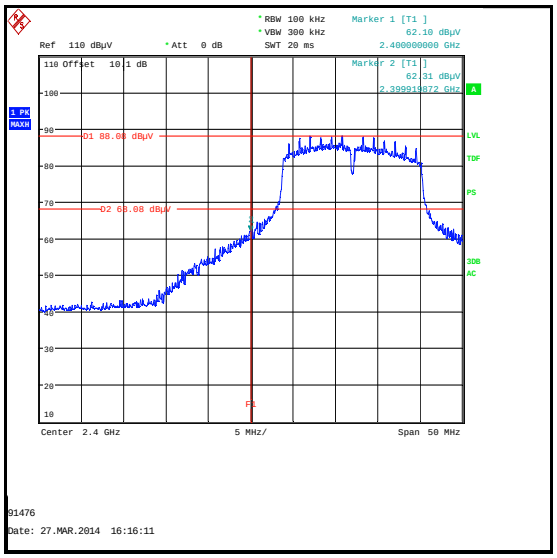
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2399.920	62.3	68.1*	5.8	Complied
2400	62.1	68.1*	6.0	Complied
2483.5	61.6	74.0	12.4	Complied
2483.580	63.0	74.0	11.0	Complied

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

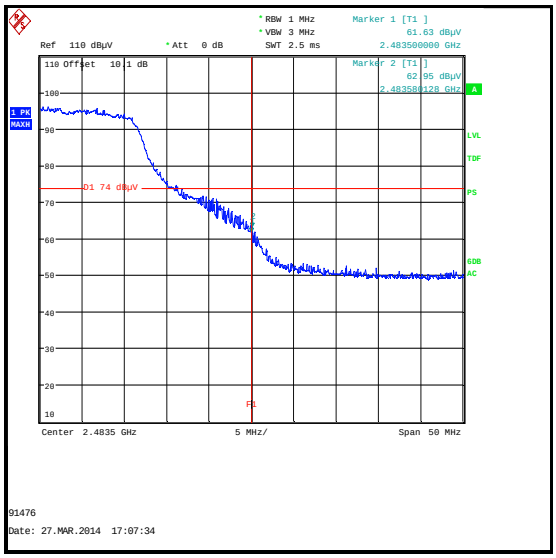
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2483.5	42.6	54.0	11.4	Complied

Transmitter Band Edge Radiated Emissions (continued)

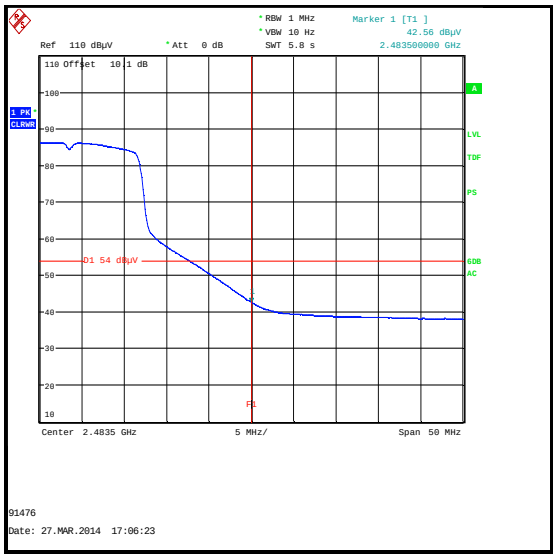
Results: 802.11g / 20 MHz / BPSK / 6 Mbps



Lower Band Edge Peak Measurement



Upper Band Edge Peak Measurement



Upper Band Edge Average Measurement

Transmitter Band Edge Radiated Emissions (continued)

Results: Peak / 802.11g / 20 MHz / 64QAM / 54 Mbps

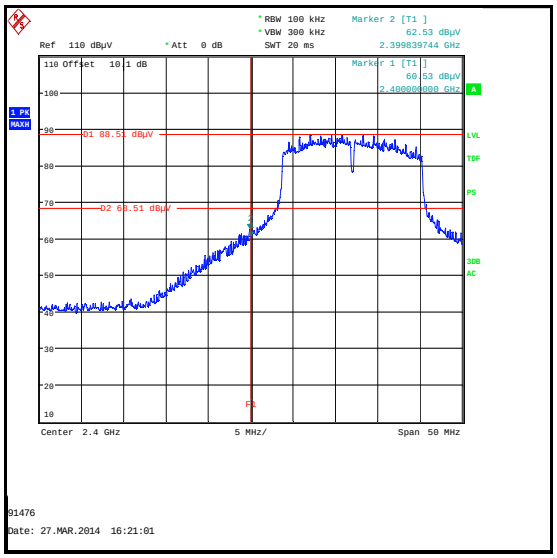
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2399.840	62.5	68.5*	6.0	Complied
2400	60.5	68.5*	8.0	Complied
2483.5	60.9	74.0	13.1	Complied
2483.580	61.5	74.0	12.5	Complied

Results: Average / 802.11g / 20 MHz / 64QAM / 54 Mbps

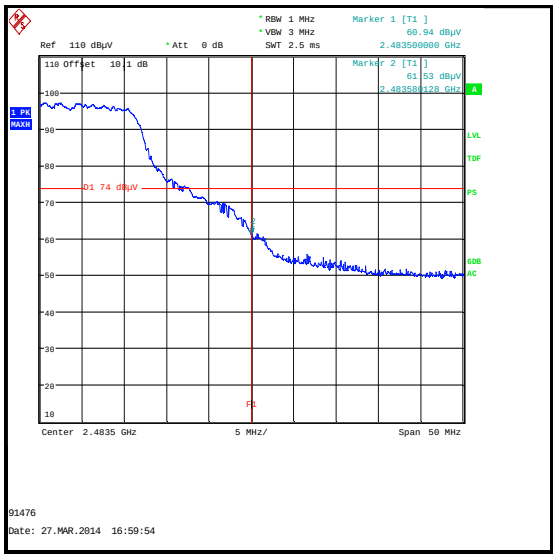
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2483.5	43.5	54.0	10.5	Complied

Transmitter Band Edge Radiated Emissions (continued)

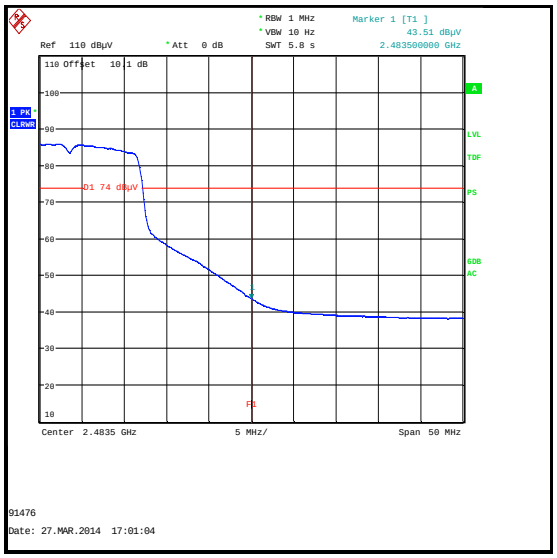
Results: Peak / 802.11g / 20 MHz / 64QAM / 54 Mbps



Lower Band Edge Peak Measurement



Upper Band Edge Peak Measurement



Upper Band Edge Average Measurement

Transmitter Band Edge Radiated Emissions (continued)

Results: Peak / 802.11n / 20 MHz / BPSK / 6.5 Mbps / MCS0

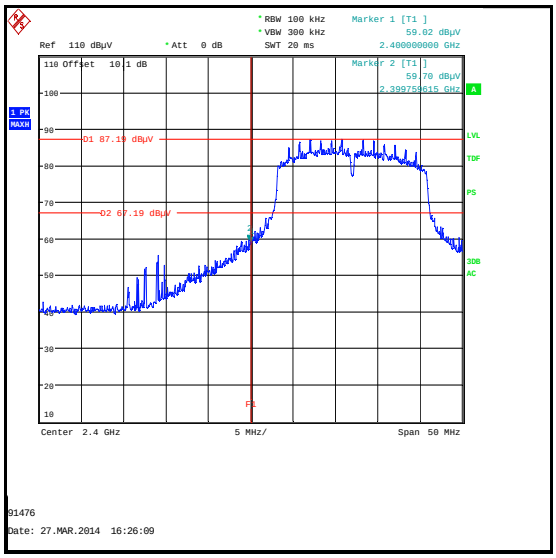
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2399.760	59.7	67.2*	7.5	Complied
2400	59.0	67.2*	8.2	Complied
2483.5	62.0	74.0	12.0	Complied

Results: Average / 802.11n / 20 MHz / BPSK / 6.5 Mbps / MCS0

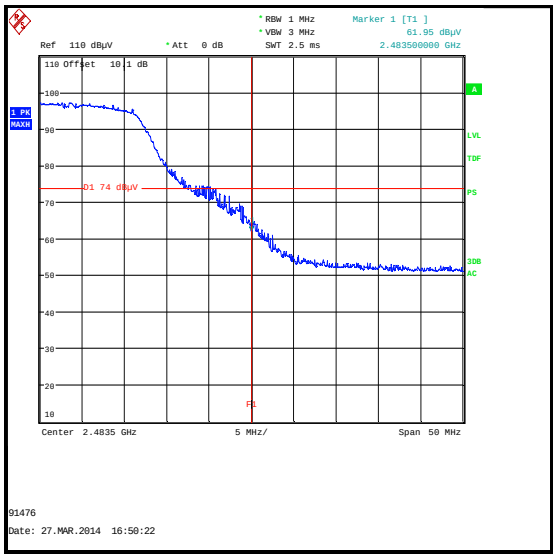
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2483.5	42.5	54.0	11.5	Complied

Transmitter Band Edge Radiated Emissions (continued)

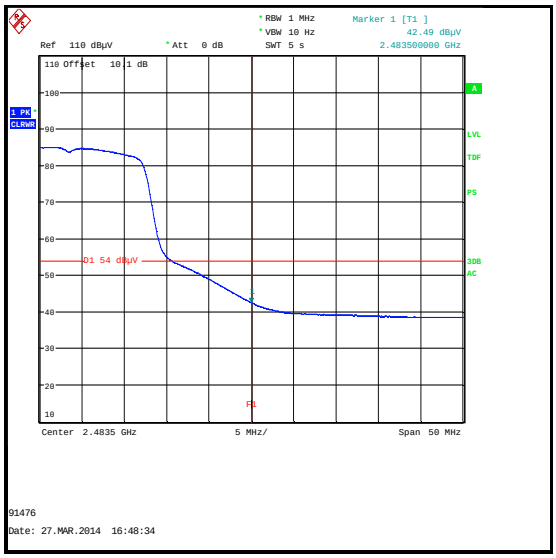
Results: Peak / 802.11n / 20 MHz / BPSK / 6.5 Mbps / MCS0



Lower Band Edge Peak Measurement



Upper Band Edge Peak Measurement



Upper Band Edge Average Measurement

Transmitter Band Edge Radiated Emissions (continued)

Results: Peak / 802.11n / 20 MHz / 64QAM / 52 Mbps / MCS5

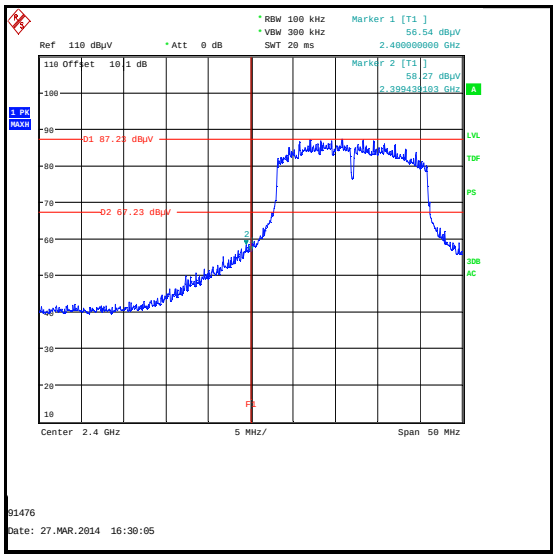
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2399.439	58.3	67.2*	8.9	Complied
2400	56.5	67.2*	10.7	Complied
2483.5	62.4	74.0	11.6	Complied

Results: Average / 802.11n / 20 MHz / 64QAM / 52 Mbps / MCS5

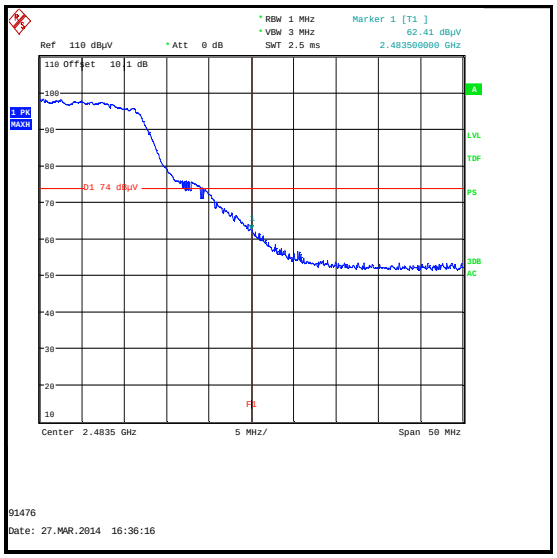
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2483.5	43.5	54.0	10.5	Complied

Transmitter Band Edge Radiated Emissions (continued)

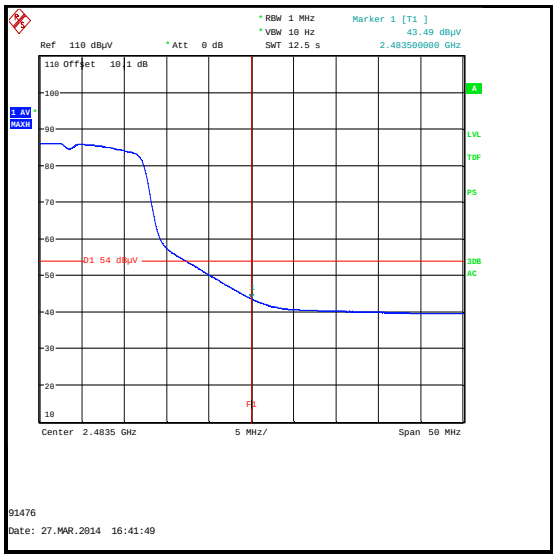
Results: Peak / 802.11n / 20 MHz / 64QAM / 52 Mbps / MCS5



Lower Band Edge Peak Measurement



Upper Band Edge Peak Measurement



Upper Band Edge Average Measurement

Transmitter Band Edge Radiated Emissions (continued)

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
A1534	Pre Amplifier	Hewlett Packard	8449B	3008A00405	14 Nov 2014	12
A1818	Antenna	EMCO	3115	00075692	14 Nov 2014	12
A2139	Attenuator	AtlanTecRF	AN18-10	090918-04#1	10 May 2014	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	14 Nov 2014	12
M1630	Test Receiver	Rohde & Schwarz	ESU40	100233	13 Mar 2015	12
M1656	Thermohygrometer	JM Handelspunkt	30.5015.13	Not stated	14 Mar 2015	12

6. Measurement Uncertainty

No measurement or test can ever be perfect and the imperfections give rise to error of measurement in the results. Consequently the result of a measurement is only an approximation to the value of the measurand (the specific quantity subject to measurement) and is only complete when accompanied by a statement of the uncertainty of the approximation.

The expression of uncertainty of a measurement result allows realistic comparison of results with reference values and limits given in specifications and standards.

The uncertainty of the result may need to be taken into account when interpreting the measurement results.

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

Measurement Type	Range	Confidence Level (%)	Calculated Uncertainty
Conducted Maximum Peak Output Power	2.4 GHz to 2.4835 GHz	95%	±1.13 dB
Spectral Power Density	2.4 GHz to 2.4835 GHz	95%	±1.13 dB
6 dB Bandwidth	2.4 GHz to 2.4835 GHz	95%	±0.92 ppm
99% Occupied Bandwidth	2.4 GHz to 2.4835 GHz	95%	±0.92 ppm
Radiated Spurious Emissions	30 MHz to 1 GHz	95%	±5.65 dB
Radiated Spurious Emissions	1 GHz to 25 GHz	95%	±2.94 dB

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

7. Report Revision History

Version Number	Revision Details		
	Page No(s)	Clause	Details
1.0	-	-	Initial Version
2.0	-	-	Model number of BCU and Loader updated, Industry Canada certification number updated Additional EUT added to section 3.1 Reference plots added to sections 5.2.2 & 5.2.4 Additional MU in section 6.
3.0	-	-	Minor updates to sections 3.1, 3.2, 3.5 & 4.2
4.0	-	-	Retest of Transmitter tests: Power Spectral Density, Maximum Peak Output Power, Radiated Emissions and Band Edge Radiated Emissions.