

TEST REPORT FROM RFI GLOBAL SERVICES LTD

Test of: XE500T1C

FCC ID: A3LXE500T1C & A3LXE500T1C-N

Industry Canada Certification Number: 649E-XE500T1C & 649E-XE500T1CN

To: FCC Part 15.247: 2011 Subpart C & Industry Canada RSS-210 Issue
8 December 2010; RSS-Gen Issue 3 December 2010

Test Report Serial No.:
RFI-RPT-RP89958JD03A V4.0
Version 4.0 Supersedes All Previous Versions

**This Test Report Is Issued Under The Authority
Of John Newell, Group Quality Manager:**



Checked By:

Sarah Williams

Signature:

pp



Date of Issue:

08 October 2012

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1. Customer Information

Company Name:	Samsung Electronics Co. Ltd.
Address:	416, Maetan-3Dong, Yeongtong-Gu, Suwon-City, Gyeonggi-Do, 443-742, Korea

2. Summary of Testing

2.1. General Information

Specification Reference:	47CFR15.247
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications) 2011: Part 15 Subpart C (Intentional Radiators) – Section 15.247
Specification Reference:	47CFR15.107 and 47CFR15.109
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications) 2011: Part 15 Subpart B (Unintentional Radiators) – Sections 15.107 and 15.109
Specification Reference:	47CFR15.207 and 47CFR15.209
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications) 2011: Part 15 Subpart C (Intentional Radiators) – Sections 15.207 and 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:	RFI Global Services Ltd, Wade Road, Basingstoke, Hampshire, RG24 8AH.
Test Dates:	21 August 2012 to 05 September 2012

2.2. Summary of Test Results

FCC Reference (47CFR)	IC Reference	Measurement	Result
Part 15.107(a)	RSS-Gen 7.2.4	Receiver/Idle Mode AC Conducted Emissions	
Part 15.109	RSS-Gen 4.10/6.1	Receiver/Idle Mode Radiated Spurious Emissions	
Part 15.207	RSS-Gen 7.2.4	Transmitter AC Conducted Emissions	
Part 15.247(a)(1)	RSS-Gen 4.6.1 RSS-210 A8.1(a)	Transmitter 20 dB Bandwidth	
Part 15.247(a)(1)	RSS-210 A8.1(b)	Transmitter Carrier Frequency Separation	
Part 15.247(a)(1)(iii)	RSS-210 A8.1(d)	Transmitter Number of Hopping Frequencies and Average Time of Occupancy	
Part 15.247(b)(1)	RSS-Gen 4.8 RSS-210 A8.4(2)	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

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:	Samsung
Model Name or Number:	XE500T1C
Serial Number:	HX2W91SC700004R (<i>Radiated sample</i>)
Hardware Version Number:	PV
Software Version Number:	Window OS
FCC ID:	A3LXE500T1C
FCC ID:	A3LXE500T1C-N
Industry Canada Certification Number:	649E-XE500T1C
Industry Canada Certification Number:	649E-XE500T1CN

Brand Name:	Samsung
Model Name or Number:	XE500T1C
Serial Number:	HX2W91SC700031T (<i>Conducted sample RF port</i>)
Hardware Version Number:	PV
Software Version Number:	Window OS
FCC ID:	A3LXE500T1C
FCC ID:	A3LXE500T1C-N
Industry Canada Certification Number:	649E-XE500T1C
Industry Canada Certification Number:	649E-XE500T1CN

Brand Name:	Not stated
Description:	AC Charger
Model Name or Number:	Not stated
Serial Number:	CNS440001595DON825J00RA

3.2. Description of EUT

The equipment under test was a Tablet PC with 3G, IEEE 802.11a,b,g,n operating in the 2.4 GHz, 5 GHz bands and *Bluetooth* (including Basic Rate, EDR and Low Energy).

3.3. Maximum Output Power

Frequency Range (MHz)	Mode	Conducted Output Power (dBm)
2402 MHz to 2480 MHz	3DH5	9.7

3.4. Modifications Incorporated in the EUT

No modifications were applied to the EUT during testing.

3.5. Additional Information Related to Testing

Tested Technology:	Bluetooth Basic Rate and EDR (FHSS)		
Power Supply Requirement:	Nominal	12 VDC via 120 VAC 60 Hz adaptor	
Type of Unit:	Transceiver		
Channel Spacing:	1 MHz		
Mode:	Basic Rate	Enhanced Data Rate	
Modulation:	GFSK	π/4-DQPSK	8DQPSK
Packet Type: (Maximum Payload)	DH5	2DH5	3DH5
Data Rate (Mbit/s):	1	2	3
Maximum Conducted Output Power:	9.7 dBm		
Transmit Frequency Range:	2402 MHz to 2480 MHz		
Transmit Channels Tested:	Channel ID	Channel Number	Channel Frequency (MHz)
	Bottom	0	2402
	Middle	39	2441
	Top	78	2480
Receive Frequency Range:	2402 MHz to 2480 MHz		
Receive Channels Tested:	Channel ID	Channel Number	Channel Frequency (MHz)
	Bottom	0	2402
	Middle	39	2441
	Top	78	2480

3.6. Support Equipment

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

Description:	USIM
Brand Name:	Comprion
Model Name or Number:	Micro USIM

Description:	SD RAM
Brand Name:	San Disk
Model Name or Number:	8 GB

Description:	USB Hub
Brand Name:	Belkin
Model Name or Number:	F5U404-BLK
Serial Number:	D12-00047182

Brand Name:	Not stated
Description:	HDMI cable
Model Name or Number:	Not stated

Description:	USB cable
Brand Name:	Generic
Model Name or Number:	Not stated

Description:	Cyclone Micro Media Player Adaptor
Brand Name:	Sumvision
Model Name or Number:	Cyclone Micro
Serial Number:	RFI Asset No. A1986

4. Operation and Monitoring of the EUT during Testing

4.1. Operating Modes

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

- Receiver/Idle mode.
- Transmit mode with Basic Rate (DH5 packets) or EDR (2DH5 or 3DH5 packets) as required.

4.2. Configuration and Peripherals

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

- Receive/Idle tests: The Bluetooth mode was active but not transmitting.
- For Transmit tests: Connected via a radio link to a Bluetooth tester in order to place the EUT into Bluetooth test mode. The EUT had a test application installed was used to place the EUT into Bluetooth test mode.
- Both EDR/Basic rate modes were compared and tests were performed with the mode that presented the worst case result. For output power, bandwidth, band edge and channel separation, all modes were tested.
- The EUT conducted sample HX2W91SC700031T was used for 20 dB bandwidth, occupied bandwidth, carrier frequency separation, average time of occupancy and conducted output power tests
- The EUT radiated sample HX2W91SC700004R was used for AC conducted emissions, EIRP and radiated spurious emissions tests.
- All unused ports were terminated during emissions testing.

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.

5.2. Test Results**5.2.1. Receiver/Idle Mode AC Conducted Spurious Emissions****Test Summary:**

Test Engineer:	Andrew Edwards	Test Date:	23 August 2012
Test Sample Serial Number:	HX2W91SC700004R		

FCC Reference:	Part 15.107(a)
Industry Canada Reference:	RSS-Gen 7.2.4
Test Method Used:	As detailed in ANSI C63.10 Section 6.2 referencing ANSI C63.4

Environmental Conditions:

Temperature (°C):	25
Relative Humidity (%):	45

Note(s):

1. All other emissions were >20 dB below the specified limit.

Receiver/Idle Mode AC Conducted Spurious Emissions (continued)**Results: Live / Quasi Peak**

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.155	Live	51.0	65.8	14.8	Complied
0.168	Live	51.5	65.1	13.6	Complied
0.222	Live	42.0	62.7	20.7	Complied
14.361	Live	24.6	60.0	35.4	Complied
16.899	Live	32.3	60.0	27.7	Complied
19.280	Live	31.3	60.0	28.7	Complied

Results: Live / Average

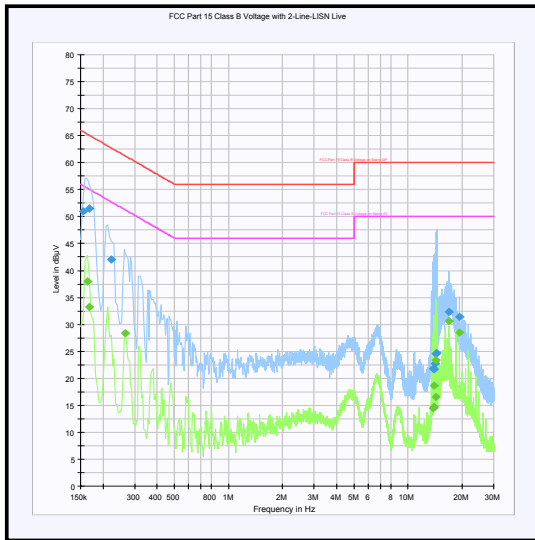
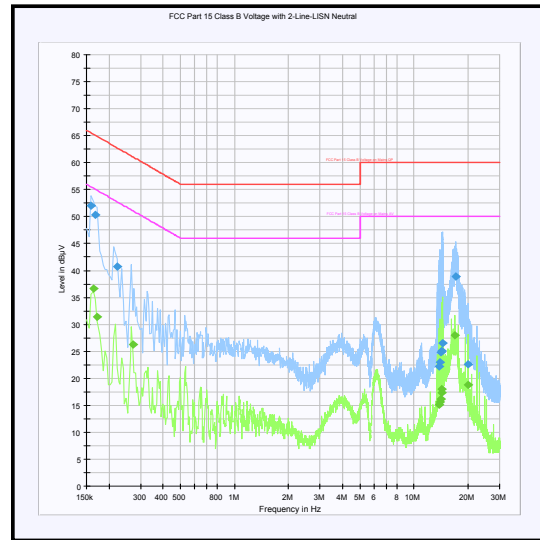
Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.164	Live	37.9	55.3	17.4	Complied
0.168	Live	33.3	55.1	21.8	Complied
0.267	Live	28.4	51.2	22.8	Complied
14.028	Live	18.6	50.0	31.4	Complied
14.276	Live	23.3	50.0	26.7	Complied
19.284	Live	28.4	50.0	21.6	Complied

Receiver/Idle Mode AC Conducted Spurious Emissions (continued)**Results: Neutral / Quasi Peak**

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.159	Neutral	52.1	65.5	13.4	Complied
0.168	Neutral	50.3	65.1	14.8	Complied
0.222	Neutral	40.7	62.7	22.0	Complied
14.267	Neutral	25.1	60.0	34.9	Complied
14.388	Neutral	26.6	60.0	33.4	Complied
17.025	Neutral	38.9	60.0	21.1	Complied

Results: Neutral / Average

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.164	Neutral	36.6	55.3	18.7	Complied
0.173	Neutral	31.3	54.8	23.5	Complied
0.272	Neutral	26.2	51.1	24.9	Complied
14.357	Neutral	17.9	50.0	32.1	Complied
16.962	Neutral	28.0	50.0	22.0	Complied
20.058	Neutral	18.7	50.0	31.3	Complied

Receiver/Idle Mode AC Conducted Spurious Emissions (continued)**Live****Neutral**

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

Test Equipment Used:

RFI ID	Instrument Description	Model Number	Calibration Due	Calibration Interval (Months)
M1263	EMI Test Receiver	ESIB7	04 Apr 2013	12
A1830	Pulse Limiter	ESH3-Z2	25 Feb 2013	12
A649	Single Phase LISN	ESH3-Z5	19 Feb 2013	12

5.2.2. Receiver/Idle Mode Radiated Spurious Emissions**Test Summary:**

Test Engineer:	Andrew Edwards	Test Date:	21 August 2012
Test Sample Serial Number:	HX2W91SC700004R		

FCC Reference:	Part 15.109
Industry Canada Reference:	RSS-Gen 4.10 & 6.1
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:

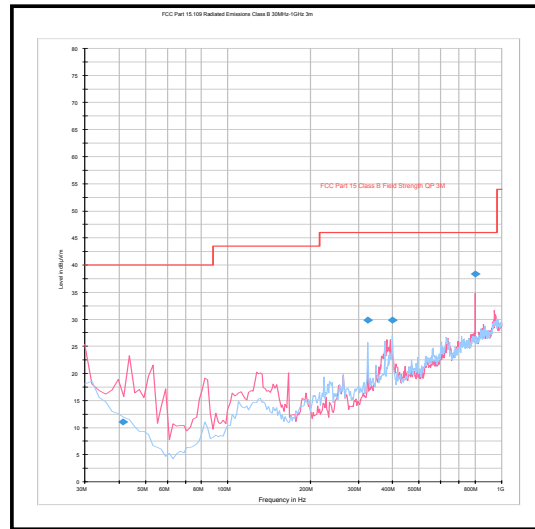
Temperature (°C):	29
Relative Humidity (%):	35

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. Measurements below 1 GHz were performed in a semi-anechoic chamber (RFI 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.

Results: Quasi Peak

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
41.486	Vertical	11.1	40.0	28.9	Complied
324.484	Horizontal	29.9	46.0	16.1	Complied
399.372	Horizontal	29.8	46.0	16.2	Complied
798.745	Vertical	38.3	46.0	7.7	Complied

Receiver/Idle Mode Radiated Spurious Emissions (continued)

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

Test Equipment Used:

RFI ID	Instrument Description	Model Number	Calibration Due	Calibration Interval (Months)
K0001	5m Semi-Anechoic Chamber	N/A	31 Sep 2012	12
M1273	Test Receiver	ESIB 26	03 Feb 2013	12
A1834	Attenuator	8491B	29 Jan 2013	12
G0543	Amplifier 9 kHz – 1 GHz	310N	15 Oct 2012	12
A553	Bi-log Antenna	CBL6111A	15 Feb 2013	12

Receiver/Idle Mode Radiated Spurious Emissions (continued)**Test Summary:**

Test Engineer:	Andrew Edwards	Test Date:	22 August 2012
Test Sample Serial Number:	HX2W91SC700004R		

FCC Reference:	15.109
Industry Canada Reference:	RSS-Gen 4.10 & 6.1
Test Method Used:	As detailed in ANSI C63.10 Sections 6.3 and 6.6 referencing ANSI C63.4
Frequency Range:	1 GHz to 12.75 GHz

Environmental Conditions:

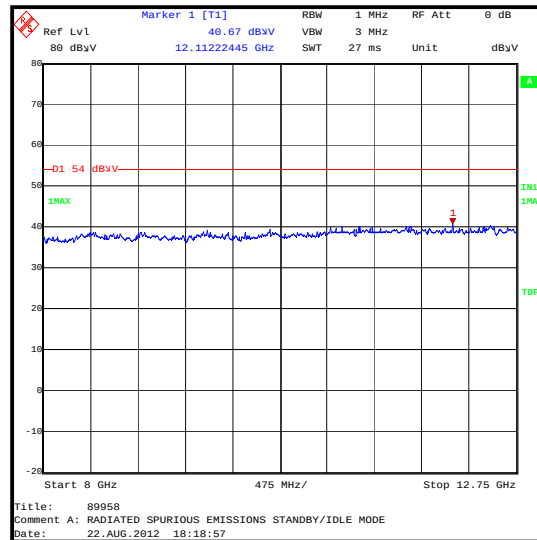
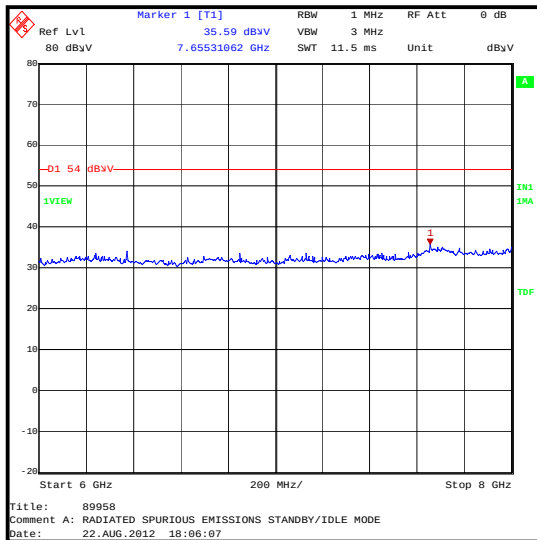
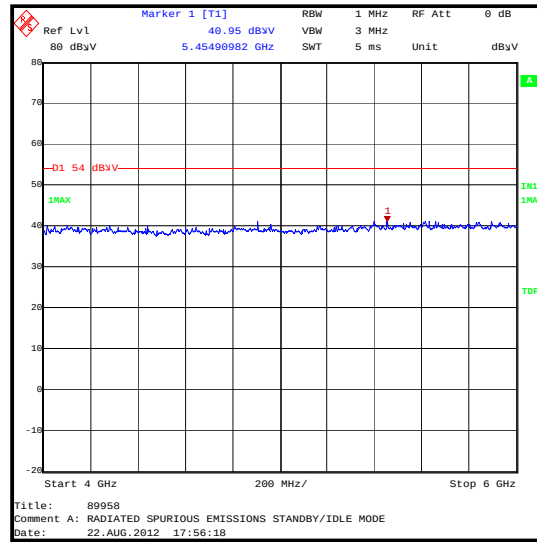
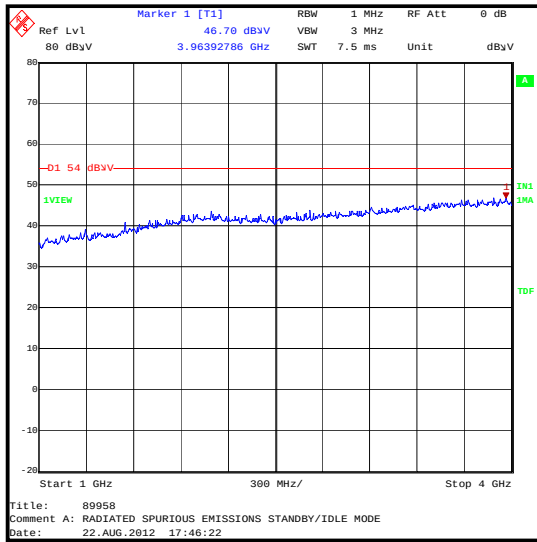
Temperature (°C):	25
Relative Humidity (%):	44

Results:

Frequency (MHz)	Antenna Polarity	Peak Level (dBμV/m)	Average Limit (dBμV/m)	Margin (dB)	Result
3963.928	Vertical	46.7	54.0	7.3	Complied

Note(s):

1. No spurious emissions were detected above the noise floor of the measuring receiver therefore the highest peak noise floor reading of the measuring receiver was recorded as shown in the table above. The peak level was compared to the average limit as opposed to being compared to the peak limit because this is the more onerous limit.
2. The final measured value, for the given emission, in the table above incorporates the calibrated antenna factor and cable loss.
3. Pre-scans above 1 GHz were performed in a fully anechoic chamber (RFI 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 (RFI 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.

Receiver/Idle Mode Radiated Spurious Emissions (continued)**Test Equipment Used:**

RFI ID	Instrument Description	Model Number	Calibration Due	Calibration Interval (Months)
K0002	3m RSE Chamber	N/A	09 Oct 2012	12
M1124	Test Receiver	ESIB 26	14 Aug 2013	12
A1534	Pre Amplifier	8449B	09 Oct 2012	12
A1818	Horn Antenna	3115	09 Oct 2012	12
A253	Horn Antenna	12240-20	09 Oct 2012	12
A254	Horn Antenna	14240-20	09 Oct 2012	12
A255	Horn Antenna	16240-20	09 Oct 2012	12

5.2.3. Transmitter AC Conducted Spurious Emissions**Test Summary:**

Test Engineer:	Andrew Edwards	Test Date:	23 August 2012
Test Sample Serial Number:	HX2W91SC700004R		

FCC Reference:	Part 15.107(a)
Industry Canada Reference:	RSS-Gen 7.2.4
Test Method Used:	As detailed in ANSI C63.10 Section 6.2 referencing ANSI C63.4

Environmental Conditions:

Temperature (°C):	25
Relative Humidity (%):	45

Note(s):

1. All other emissions were >20 dB below the specified limit.

Transmitter AC Conducted Spurious Emissions (continued)**Results: Live / Quasi Peak**

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.150	Live	50.1	66.0	15.9	Complied
0.159	Live	46.8	65.5	18.7	Complied
13.920	Live	17.6	60.0	42.4	Complied
14.339	Live	20.5	60.0	39.6	Complied
14.469	Live	21.8	60.0	38.2	Complied
15.414	Live	23.1	60.0	36.9	Complied
16.229	Live	31.9	60.0	28.1	Complied
17.214	Live	21.4	60.0	38.6	Complied

Results: Live / Average

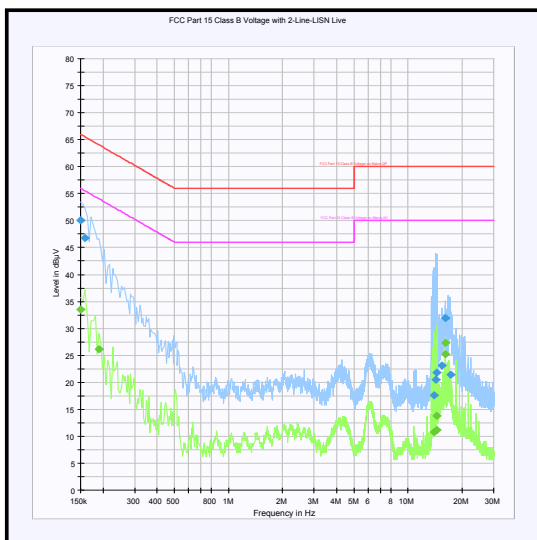
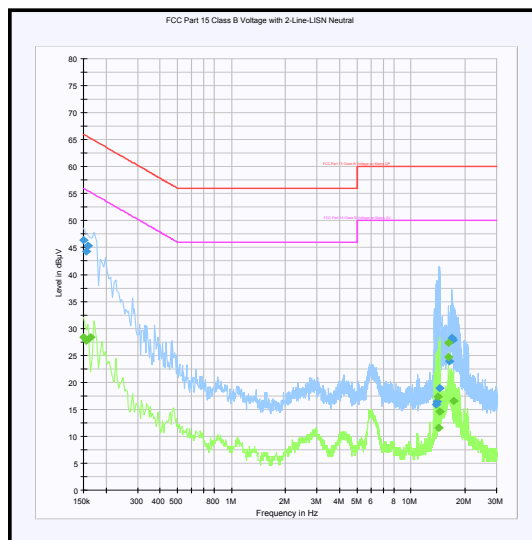
Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.150	Live	33.5	56.0	22.5	Complied
0.191	Live	26.2	54.0	27.8	Complied
13.965	Live	10.7	50.0	39.3	Complied
14.361	Live	11.2	50.0	38.8	Complied
14.478	Live	13.8	50.0	36.2	Complied
16.166	Live	25.2	50.0	24.8	Complied
16.229	Live	27.3	50.0	22.7	Complied

Transmitter AC Conducted Spurious Emissions (continued)**Results: Neutral / Quasi Peak**

Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
0.150	Neutral	46.4	66.0	19.6	Complied
0.155	Neutral	44.3	65.8	21.5	Complied
0.159	Neutral	45.3	65.5	20.2	Complied
13.808	Neutral	15.9	60.0	44.1	Complied
13.974	Neutral	16.4	60.0	43.6	Complied
14.361	Neutral	18.9	60.0	41.1	Complied
16.260	Neutral	23.8	60.0	36.2	Complied
16.944	Neutral	28.2	60.0	31.8	Complied
17.088	Neutral	27.9	60.0	32.1	Complied

Results: Neutral / Average

Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
0.150	Neutral	28.4	56.0	27.6	Complied
0.155	Neutral	27.7	55.8	28.1	Complied
0.164	Neutral	28.4	55.3	26.9	Complied
14.150	Neutral	17.3	50.0	32.7	Complied
14.352	Neutral	11.5	50.0	38.5	Complied
14.456	Neutral	14.6	50.0	35.4	Complied
16.166	Neutral	24.7	50.0	25.3	Complied
16.229	Neutral	27.4	50.0	22.6	Complied
17.309	Neutral	16.6	50.0	33.4	Complied

Transmitter AC Conducted Spurious Emissions (continued)**Live****Neutral**

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

Test Equipment Used:

RFI ID	Instrument Description	Model Number	Calibration Due	Calibration Interval (Months)
M1263	EMI Test Receiver	ESIB7	04 Apr 2013	12
A1830	Pulse Limiter	ESH3-Z2	25 Feb 2013	12
A649	Single Phase LISN	ESH3-Z5	19 Feb 2013	12

5.2.4.Transmitter 20 dB Bandwidth**Test Summary:**

Test Engineer:	Andrew Edwards	Test Date:	05 September 2012
Test Sample Serial Number:	HX2W91SC700031T		

FCC Reference:	15.247(a)(1)
Industry Canada Reference:	RSS-Gen 4.6.1 & RSS-210 A8.1(a)
Test Method Used:	As detailed in ANSI C63.10 Section 6.9.1

Environmental Conditions:

Temperature (°C):	26
Relative Humidity (%):	36

Results: DH5

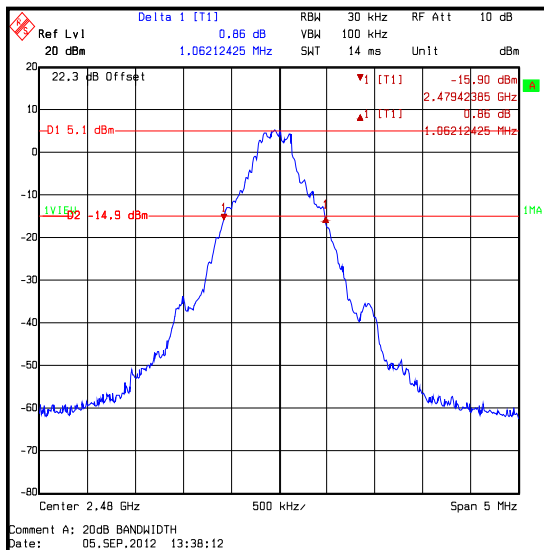
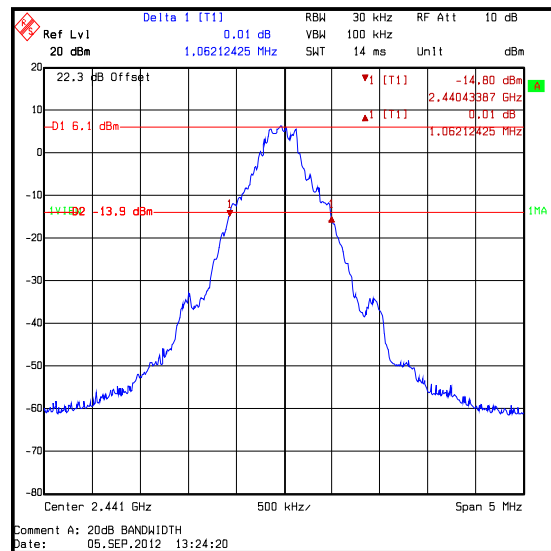
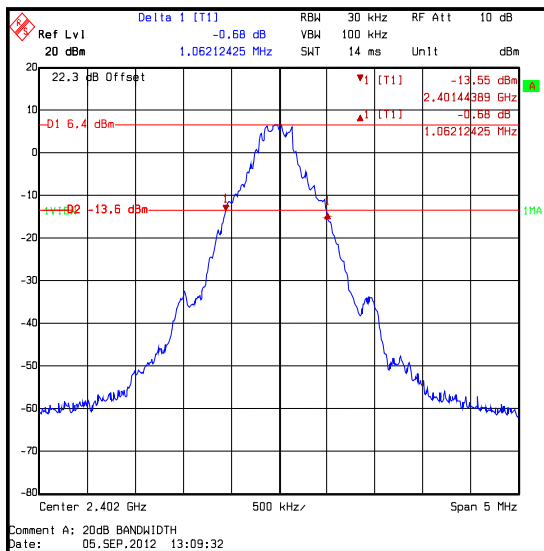
Channel	20 dB Bandwidth (kHz)
Bottom	1062.124
Middle	1062.124
Top	1062.124

Results: 2DH5

Channel	20 dB Bandwidth (kHz)
Bottom	1362.725
Middle	1362.725
Top	1362.725

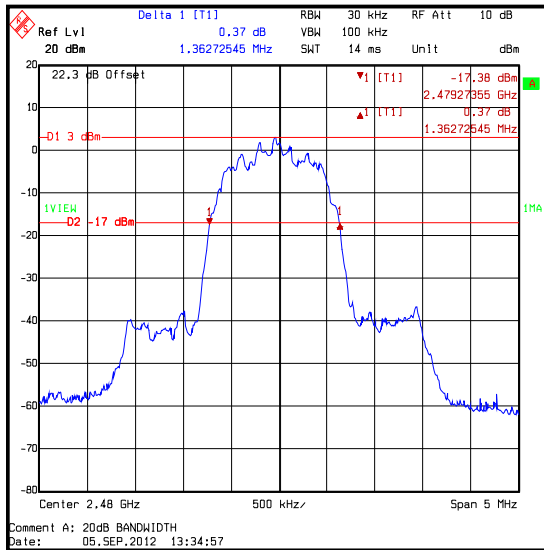
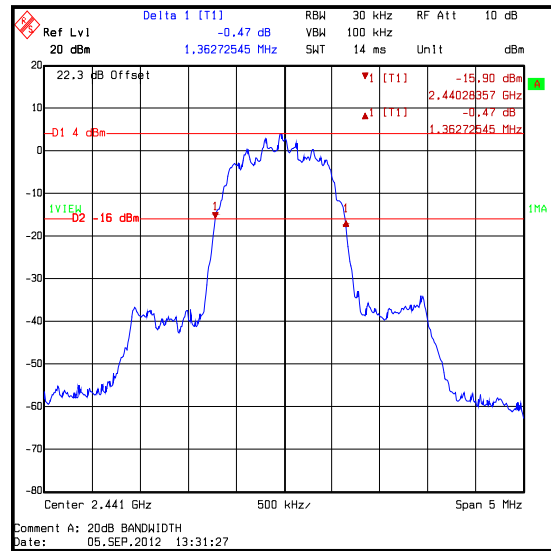
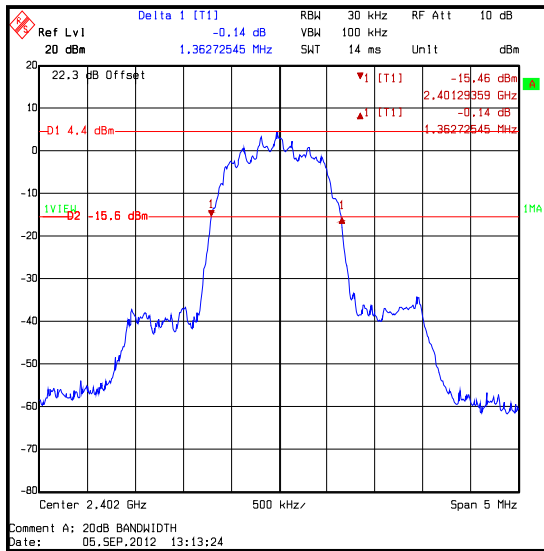
Results: 3DH5

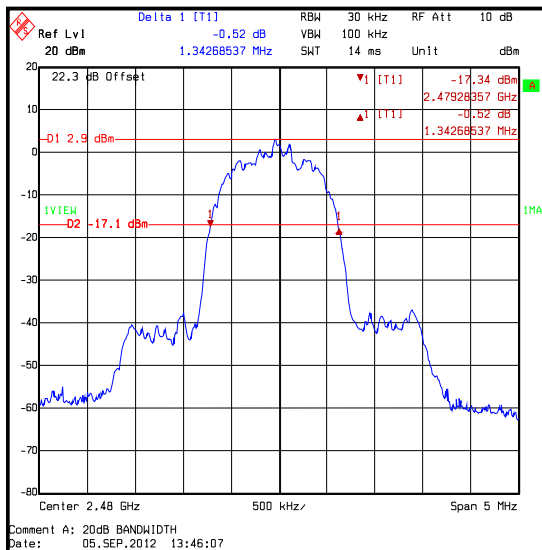
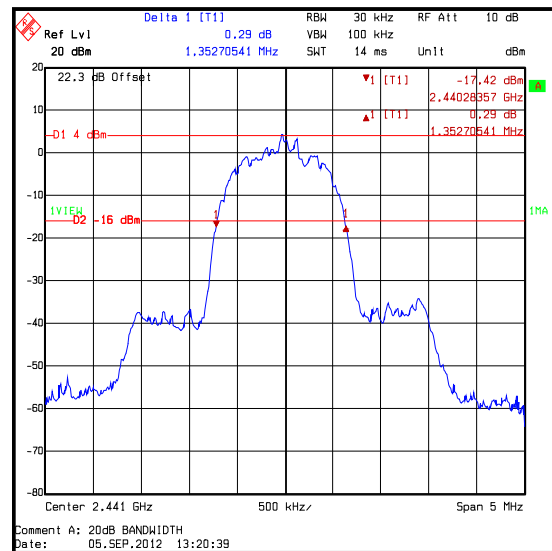
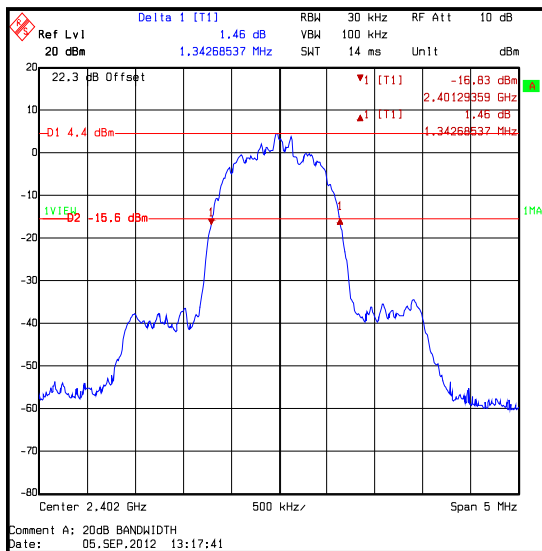
Channel	20 dB Bandwidth (kHz)
Bottom	1342.685
Middle	1352.705
Top	1342.685

Transmitter 20 dB Bandwidth (continued)**Results: DH5**

Transmitter 20 dB Bandwidth (continued)

Results: 2DH5



Transmitter 20 dB Bandwidth (continued)**Results: 3DH5****Test Equipment Used:**

RFI ID	Instrument Description	Model Number	Calibration Due	Calibration Interval (Months)
M127	Spectrum Analyser	FSB30	13 Aug 2013	12
A1997	Attenuator	6810.17.B	03 Apr 2013	12
A2137	Directional coupler	A4224-10	Calibrated before use	-

5.2.5. Transmitter Carrier Frequency Separation**Test Summary:**

Test Engineer:	Andrew Edwards	Test Date:	04 September 2012
Test Sample Serial Number:	HX2W91SC700031T		

FCC Part:	15.247(a)(1)
Industry Canada Reference:	RSS-210 A8.1(b)
Test Method Used:	As detailed in ANSI C63.10 Section 7.7.2

Environmental Conditions:

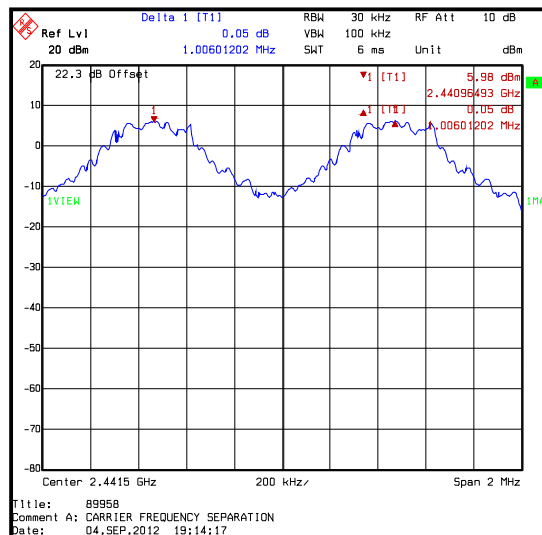
Temperature (°C):	24
Relative Humidity (%):	60

Results: DH5

Carrier Frequency Separation (kHz)	Limit ($2f_3$ of 20 dB BW) (kHz)	Margin (kHz)	Result
1006.012	708.083	297.929	Complied

Note(s):

- The 20 dB bandwidth measured for the middle channel operating at 2441 MHz was used to calculate the limit.

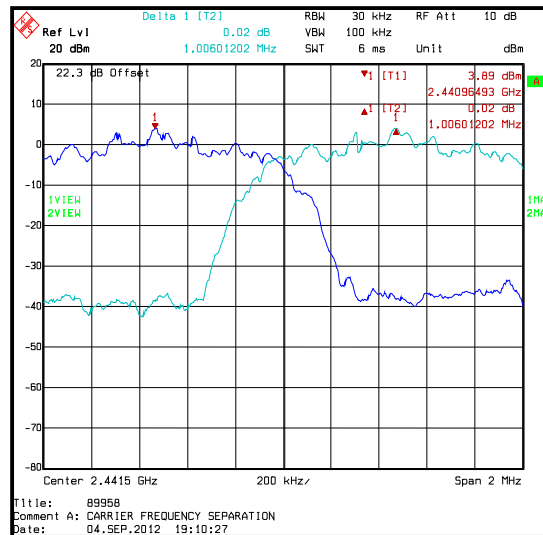


Transmitter Carrier Frequency Separation (continued)**Results: 2DH5**

Carrier Frequency Separation (kHz)	Limit ($^2I_3$ of 20 dB BW) (kHz)	Margin (kHz)	Result
1006.012	908.483	97.529	Complied

Note(s):

- The 20 dB bandwidth measured for the middle channel operating at 2441 MHz was used to calculate the limit.

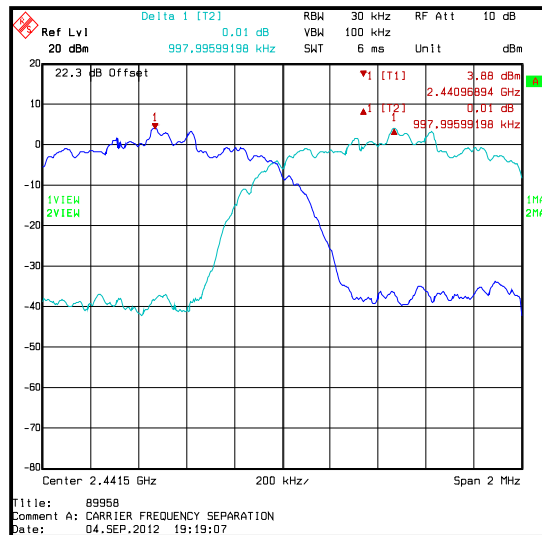


Transmitter Carrier Frequency Separation (continued)**Results: 3DH5**

Carrier Frequency Separation (kHz)	Limit ($^2I_3$ of 20 dB BW) (kHz)	Margin (kHz)	Result
997.996	901.803	96.193	Complied

Note(s):

- The 20 dB bandwidth measured for the middle channel operating at 2441 MHz was used to calculate the limit.

**Test Equipment Used:**

RFI ID	Instrument Description	Model Number	Calibration Due	Calibration Interval (Months)
M1242	Spectrum Analyser	FSM30	24 Nov 2012	12
A1997	Attenuator	6810.17.B	03 Apr 2013	12
A2137	Directional coupler	A4224-10	Calibrated before use	-

5.2.6. Transmitter Number of Hopping Frequencies and Average Time of Occupancy**Test Summary:**

Test Engineer:	Andrew Edwards	Test Date:	05 September 2012
Test Sample Serial Number:	HX2W91SC700031T		

FCC Reference:	15.247(a)(1)(iii)
Industry Canada Reference:	RSS-210 A8.1(d)
Test Method Used:	ANSI C63.10 Section 7.7.3 & 7.7.4

Environmental Conditions:

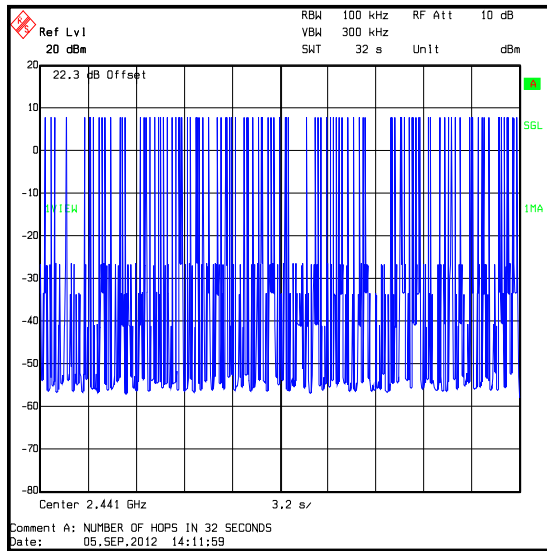
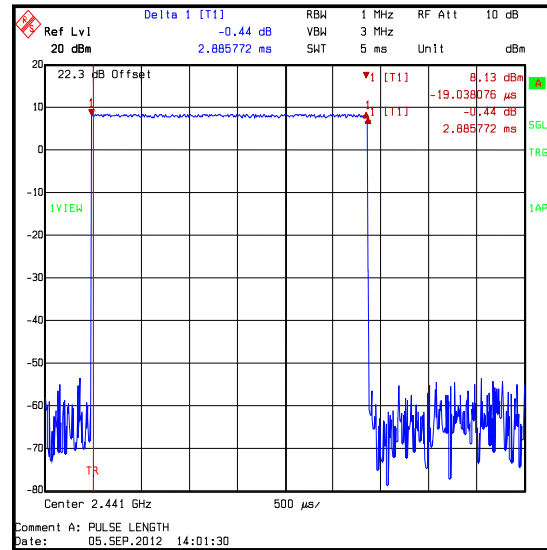
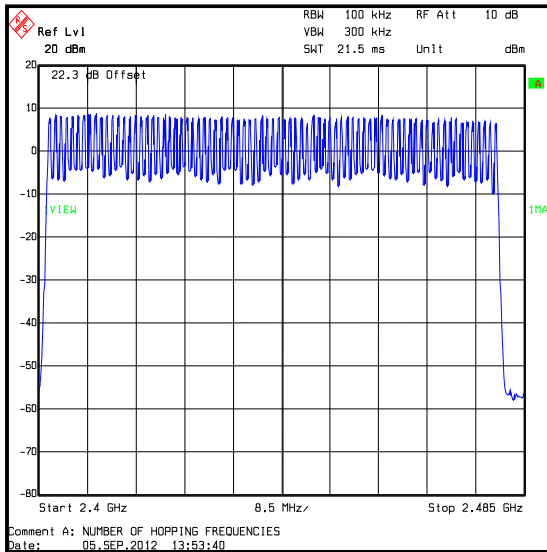
Temperature (°C):	26
Relative Humidity (%):	35

Results:

Emission Width (μs)	Number of Hops in 31.6 Seconds	Average Time of Occupancy (s)	Limit (s)	Margin (s)	Result
2885.772	93	0.268	0.4	0.132	Complied

Note(s):

1. Tests were performed to identify the average time of occupancy in number of channels (79) x 0.4 seconds. The calculated period is 31.6 seconds.
2. This device complies with the Bluetooth specifications and can operate in hopping mode on N channels, where $20 \leq N \leq 79$. As the same pseudo random hopping channel selection mechanism is used for all cases of N, by complying with the dwell time requirements of channel occupancy < 0.4s in N x 0.4s for N = 79, compliance with any value for N is demonstrated.

Transmitter Number of Hopping Frequencies and Average Time of Occupancy (continued)**Test Equipment Used:**

RFI ID	Instrument Description	Model Number	Calibration Due	Calibration Interval (Months)
M127	Spectrum Analyser	FSB30	13 Aug 2013	12
A1997	Attenuator	6810.17.B	03 Apr 2013	12
A2137	Directional coupler	A4224-10	Calibrated before use	-

5.2.7. Transmitter Maximum Peak Output Power**Test Summary:**

Test Engineer:	Andrew Edwards	Test Date:	04 September 2012
Test Sample Serial Number:	HX2W91SC700031T		

FCC Reference:	15.247(b)(1)
Industry Canada Reference:	RSS-Gen 4.8 & RSS-210 A8.4(2)
Test Method Used:	ANSI C63.10 Section 6.10.1

Environmental Conditions:

Temperature (°C):	25
Relative Humidity (%):	58

Results: DH5

Channel	Conducted Peak Power (dBm)	Conducted Peak Power Limit (dBm)	Margin (dB)	Result
Bottom	9.3	21.0	11.7	Complied
Middle	8.8	21.0	12.2	Complied
Top	8.0	21.0	13.0	Complied

Channel	Conducted Peak Power (dBm)	Declared Antenna Gain (dBi)	EIRP (dBm)	De Facto EIRP Limit (dBm)	Margin (dB)	Result
Bottom	9.3	3.48	12.78	36.0	23.22	Complied
Middle	8.8	3.48	12.28	36.0	23.72	Complied
Top	8.0	3.48	11.48	36.0	24.52	Complied

Results: 2DH5

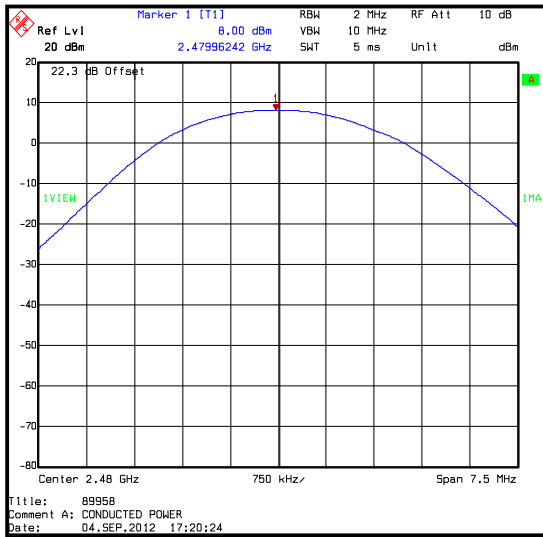
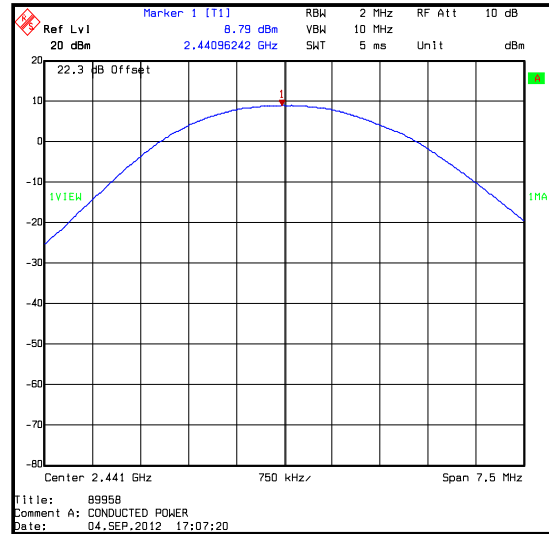
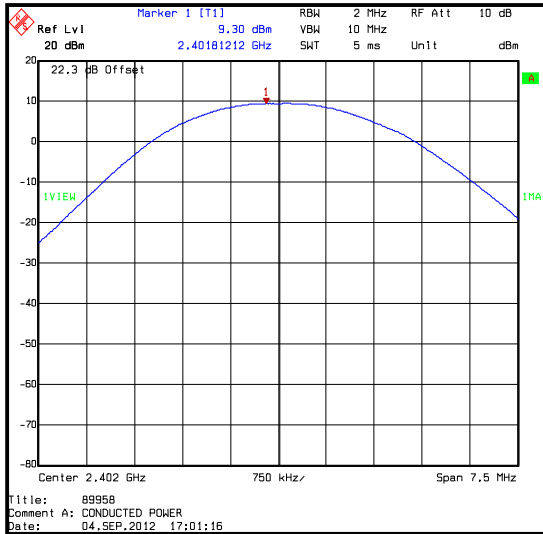
Channel	Conducted Peak Power (dBm)	Conducted Peak Power Limit (dBm)	Margin (dB)	Result
Bottom	9.2	21.0	11.8	Complied
Middle	8.7	21.0	12.3	Complied
Top	7.8	21.0	13.2	Complied

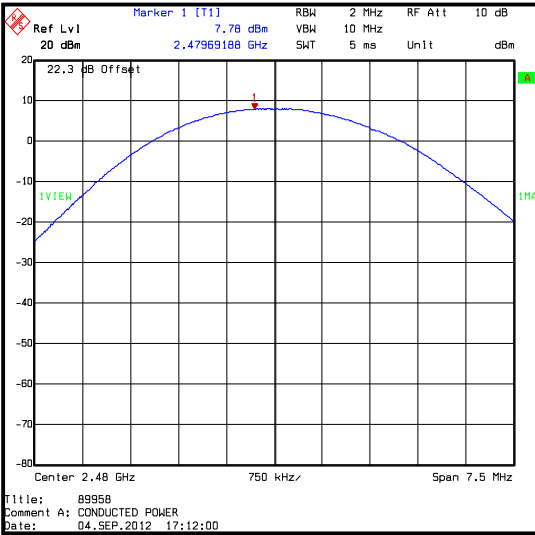
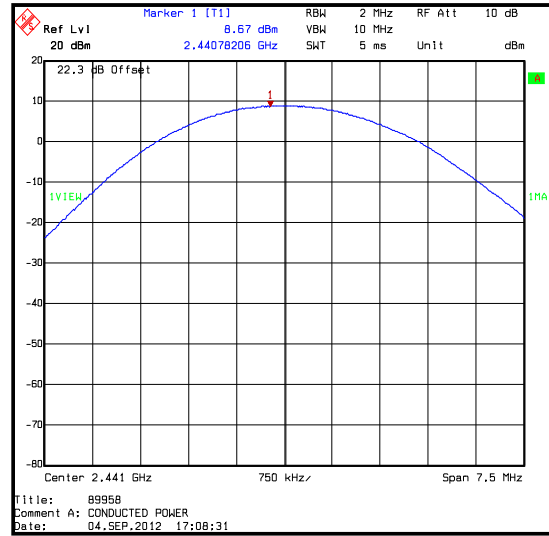
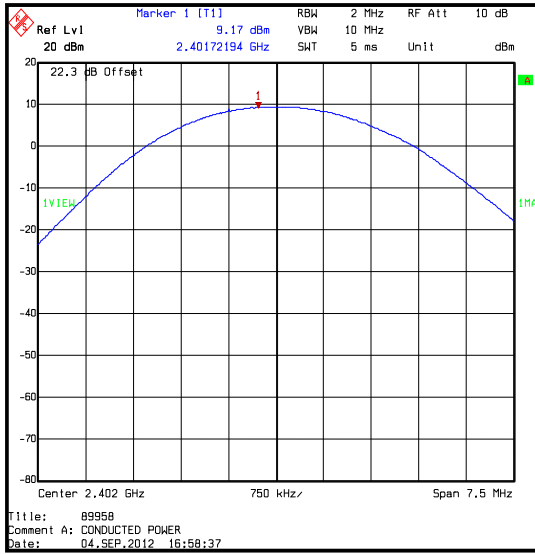
Channel	Conducted Peak Power (dBm)	Declared Antenna Gain (dBi)	EIRP (dBm)	De Facto EIRP Limit (dBm)	Margin (dB)	Result
Bottom	9.2	3.48	12.68	27.0	14.32	Complied
Middle	8.7	3.48	12.18	27.0	14.82	Complied
Top	7.8	3.48	11.28	27.0	15.72	Complied

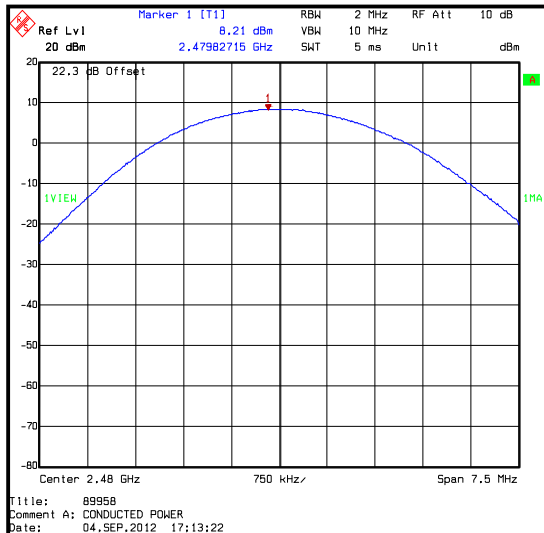
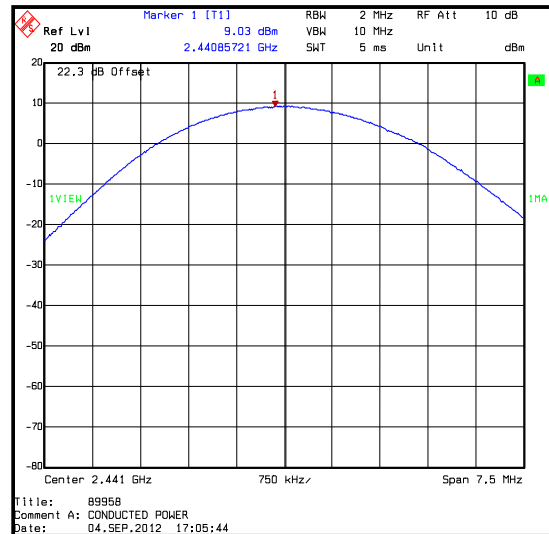
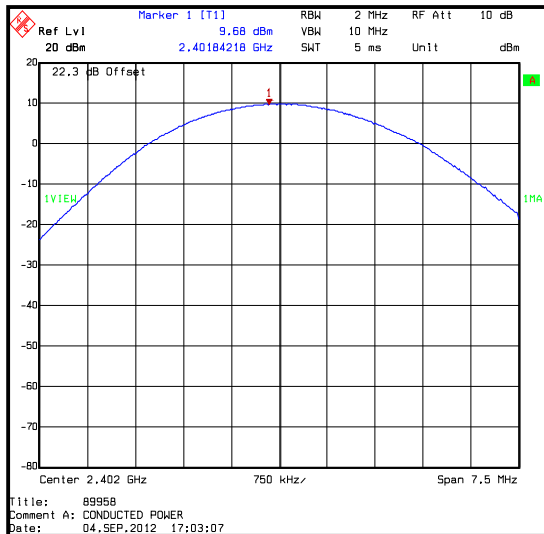
Transmitter Maximum Peak Output Power (continued)**Results: 3DH5**

Channel	Conducted Peak Power (dBm)	Conducted Peak Power Limit (dBm)	Margin (dB)	Result
Bottom	9.7	21.0	11.3	Complied
Middle	9.0	21.0	12.0	Complied
Top	8.2	21.0	12.8	Complied

Channel	Conducted Peak Power (dBm)	Declared Antenna Gain (dBi)	EIRP (dBm)	De Facto EIRP Limit (dBm)	Margin (dB)	Result
Bottom	9.7	3.48	13.18	27.0	13.82	Complied
Middle	9.0	3.48	12.48	27.0	14.52	Complied
Top	8.2	3.48	11.68	27.0	15.32	Complied

Transmitter Maximum Peak Output Power (continued)**Results: DH5**

Transmitter Maximum Peak Output Power (continued)**Results: 2DH5**

Transmitter Maximum Peak Output Power (continued)**Results: 3DH5****Test Equipment Used:**

RFI ID	Instrument Description	Model Number	Calibration Due	Calibration Interval (Months)
M1242	Spectrum Analyser	FSM30	24 Nov 2012	12
A1997	Attenuator	6810.17.B	03 Apr 2013	12
A2137	Directional coupler	A4224-10	Calibrated before use	-
M199	Power Meter	NRVS	07 Jun 2013	12
M1267	Thermal Power Sensor	NRV-Z52	07 Jun 2013	12
G085	Signal Generator	83650L	09 Nov 2012	12

5.2.8. Transmitter Radiated Emissions**Test Summary:**

Test Engineer:	Nick Steele	Test Date:	04 September 2012
Test Sample Serial Number:	HX2W91SC700004R		

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

Environmental Conditions:

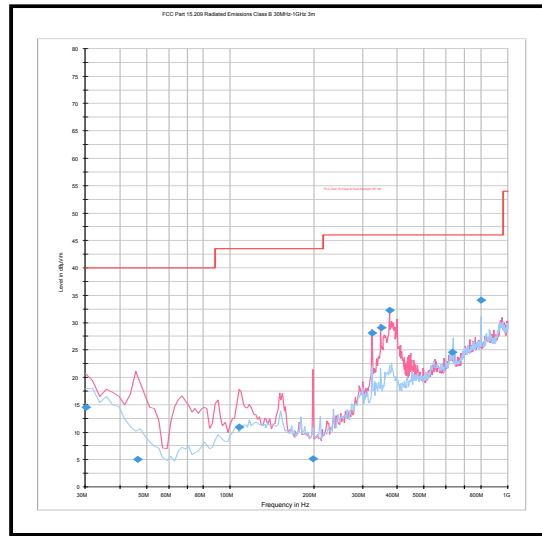
Temperature (°C):	26
Relative Humidity (%):	40

Results: Quasi-Peak / 3DH5

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
324.485	Vertical	28.1	46.0	17.9	Complied

Note(s):

1. The final measured value, for the given emission, in the table above 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 measurement system noise floor.
4. Measurements below 1 GHz were performed in a semi-anechoic chamber (RFI 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.

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:

RFI ID	Instrument Description	Model Number	Calibration Due	Calibration Interval (Months)
K0001	5m Semi-Anechoic Chamber	N/A	31 Sep 2012	12
M1273	Test Receiver	ESIB 26	03 Feb 2013	12
A1834	Attenuator	8491B	29 Jan 2013	12
G0543	Amplifier 9 kHz – 1 GHz	310N	15 Oct 2012	12
A553	Bi-log Antenna	CBL6111A	15 Feb 2013	12

Transmitter Radiated Emissions (continued)**Test Summary:**

Test Engineer:	Nick Steele	Test Date:	04 September 2012
Test Sample Serial Number:	HX2W91SC700004R		

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

Environmental Conditions:

Temperature (°C):	26
Relative Humidity (%):	53

Results: Peak Bottom Channel 3DH5

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
4803.988	Vertical	45.7	74.0	28.3	Complied

Results: Average Bottom Channel 3DH5

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
4803.988	Vertical	28.8	54.0	25.2	Complied

Results: Peak Middle Channel 3DH5

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
4881.747	Vertical	46.8	74.0	27.2	Complied

Results: Average Middle Channel 3DH5

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
4881.747	Vertical	29.4	54.0	24.6	Complied

Transmitter Radiated Emissions (continued)**Results: Peak Top Channel 3DH5**

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
4959.956	Vertical	47.2	74.0	26.8	Complied

Results: Average Top Channel 3DH5

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
4959.956	Vertical	29.8	54.0	24.2	Complied

Results: Peak Hopping Mode 3DH5

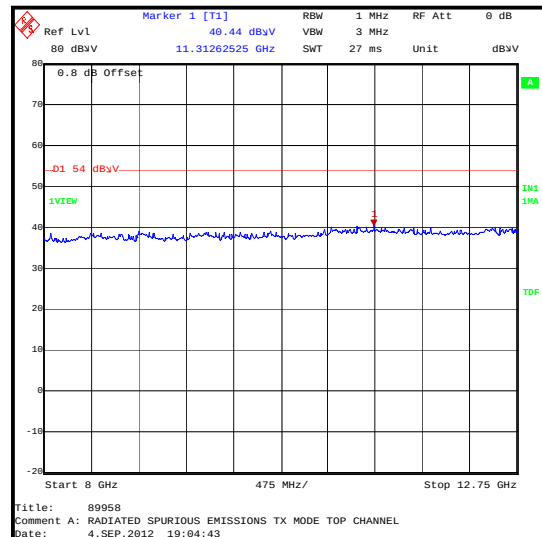
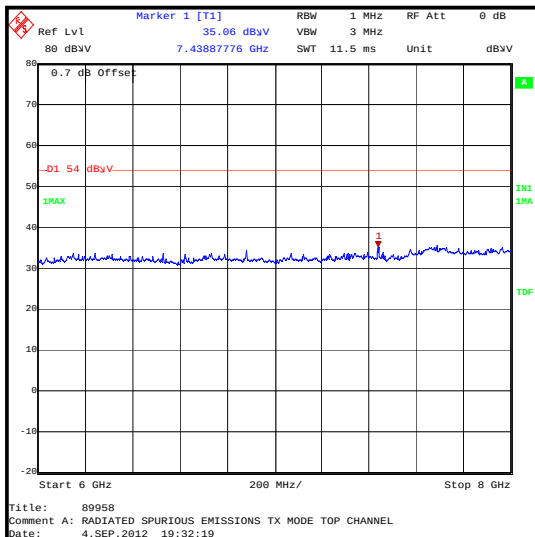
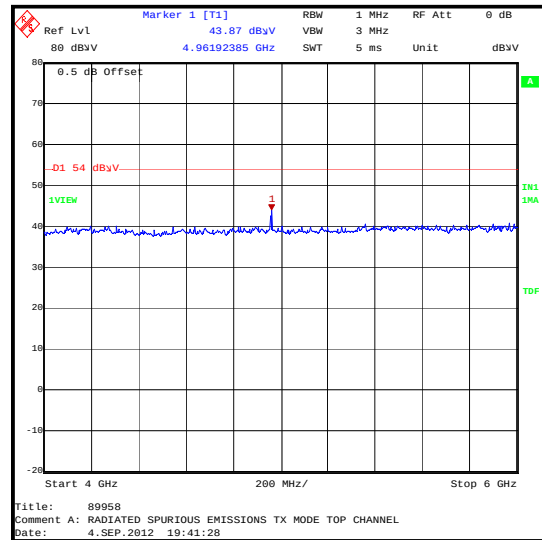
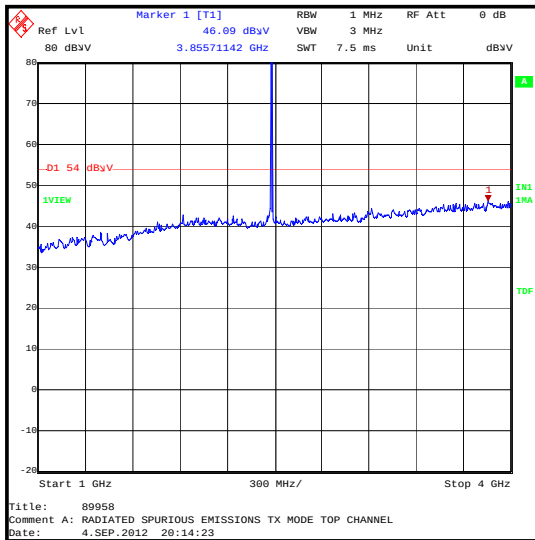
Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
4960.015	Vertical	47.1	74.0	26.9	Complied

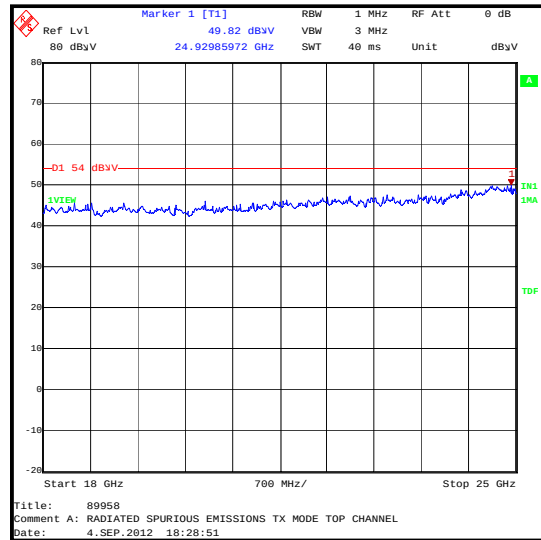
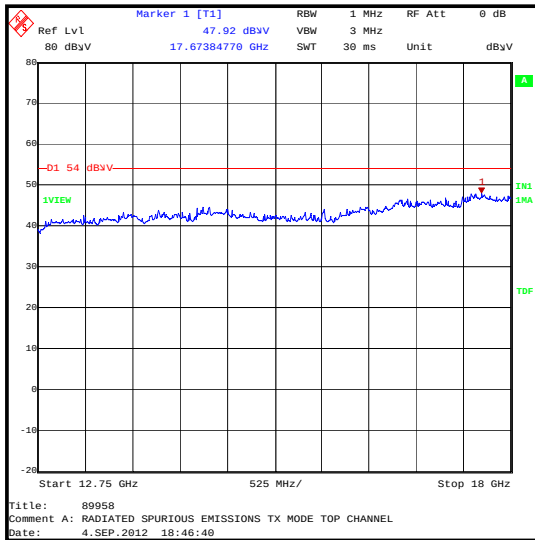
Results: Average Hopping Mode 3DH5

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
4960.797	Vertical	27.2	54.0	26.8	Complied

Note(s):

1. The final measured value, for the given emission, in the table above incorporates the calibrated antenna factor and cable loss.
2. The emission shown on the 1 GHz to 4 GHz plot is the EUT fundamental at 2480 MHz.
3. All other emissions shown on the pre-scan plot were investigated and found to be ambient or >20 dB below the applicable limit or below the measurement system noise floor.
4. Pre-scans above 1 GHz were performed in a fully anechoic chamber (RFI 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 (RFI 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.

Transmitter Radiated Emissions (continued)

Transmitter Radiated Emissions (continued)**Test Equipment Used:**

RFI ID	Instrument Description	Model Number	Calibration Due	Calibration Interval (Months)
K0001	5m Semi-Anechoic Chamber	N/A	31 Sep 2012	12
K0002	3m RSE Chamber	N/A	09 Oct 2012	12
M1124	Test Receiver	ESIB 26	14 Aug 2013	12
A1534	Pre Amplifier	8449B	09 Oct 2012	12
A1818	Horn Antenna	3115	09 Oct 2012	12
A1975	High Pass Filter	AFH-03000	15 May 2013	12
A253	Horn Antenna	12240-20	09 Oct 2012	12
A254	Horn Antenna	14240-20	09 Oct 2012	12
A255	Horn Antenna	16240-20	09 Oct 2012	12
A256	Horn Antenna	18240-20	09 Oct 2012	12
A436	Horn Antenna	20240-20	09 Oct 2012	12

5.2.9. Transmitter Band Edge Radiated Emissions**Test Summary:**

Test Engineer:	Nick Steele	Test Date:	04 September 2012
Test Sample Serial Number:	HX2W91SC700004R		

FCC Reference:	15.247(d) & 15.209(a)
Industry Canada Reference:	RSS-Gen 4.9 & RSS-210 A8.5
Test Method Used:	ANSI C63.10 Sections 6.9.2

Environmental Conditions:

Temperature (°C):	26
Relative Humidity (%):	53

Results: Static Mode DH5

Frequency (MHz)	Antenna Polarity	Peak Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2400.0	Horizontal	45.4	86.0*	40.6	Complied
2483.5	Horizontal	58.2	74.0	15.8	Complied

Frequency (MHz)	Antenna Polarity	Average Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2483.5	Horizontal	48.8	54.0	5.2	Complied

Results: Hopping Mode DH5

Frequency (MHz)	Antenna Polarity	Peak Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2400.0	Horizontal	41.7	86.3*	44.6	Complied
2483.5	Horizontal	58.0	74.0	16.0	Complied

Frequency (MHz)	Antenna Polarity	Average Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2483.5	Horizontal	33.6	54.0	20.4	Complied

Results: Static Mode 2DH5

Frequency (MHz)	Antenna Polarity	Peak Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2400.0	Horizontal	48.9	83.8*	34.9	Complied
2483.5	Horizontal	59.4	74.0	14.6	Complied

Frequency (MHz)	Antenna Polarity	Average Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2483.5	Horizontal	48.1	54.0	5.9	Complied

Transmitter Band Edge Radiated Emissions (continued)**Results: Hopping Mode 2DH5**

Frequency (MHz)	Antenna Polarity	Peak Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
2400.0	Horizontal	45.8	83.3*	37.5	Complied
2483.5	Horizontal	58.5	74.0	15.5	Complied

Frequency (MHz)	Antenna Polarity	Average Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
2483.5	Horizontal	32.2	54.0	21.8	Complied

Results: Static Mode 3DH5

Frequency (MHz)	Antenna Polarity	Peak Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
2400.0	Horizontal	48.0	83.9*	35.9	Complied
2483.5	Horizontal	59.6	74.0	14.4	Complied

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

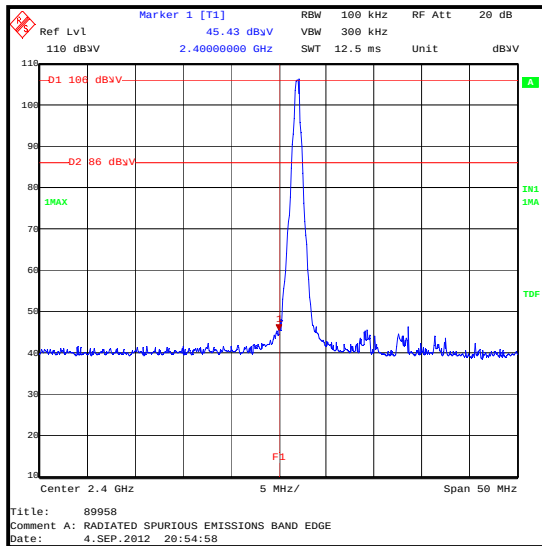
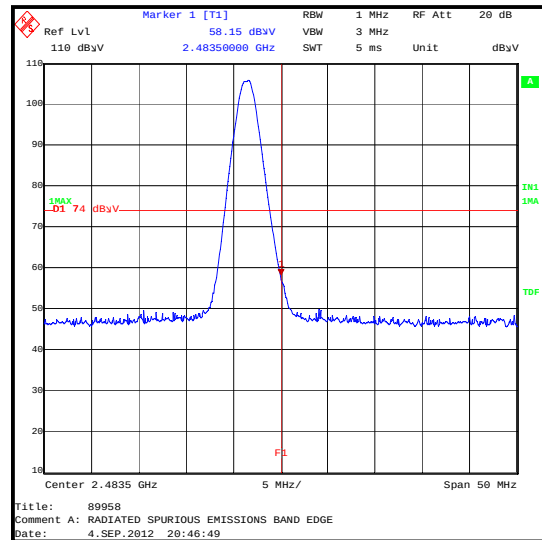
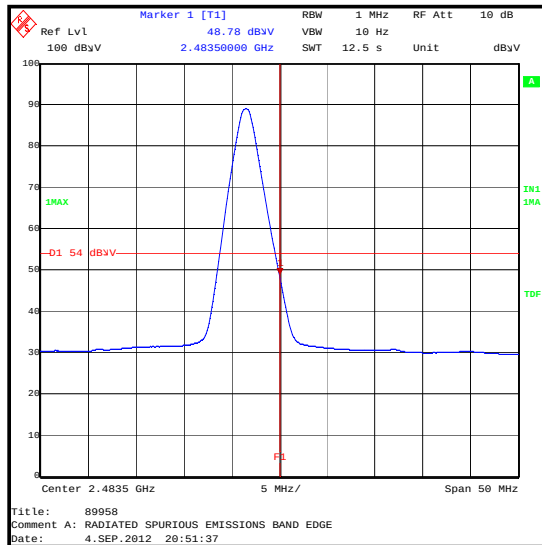
Results: Hopping Mode 3DH5

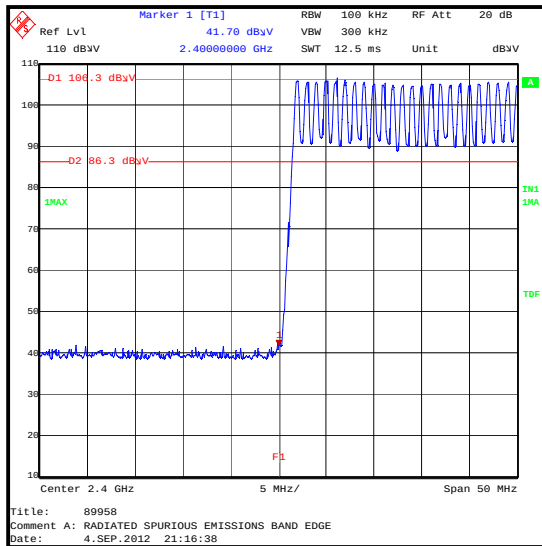
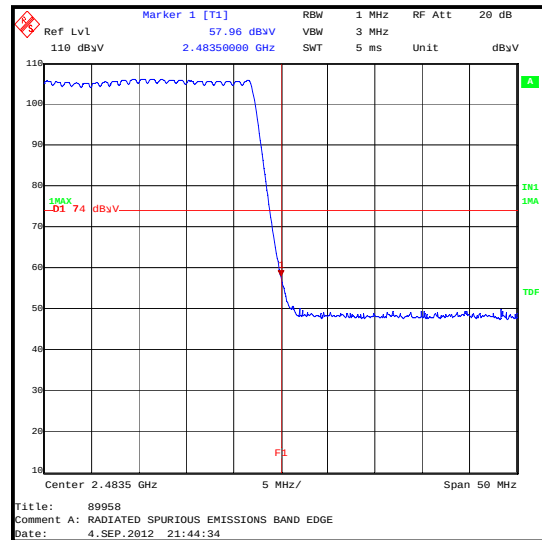
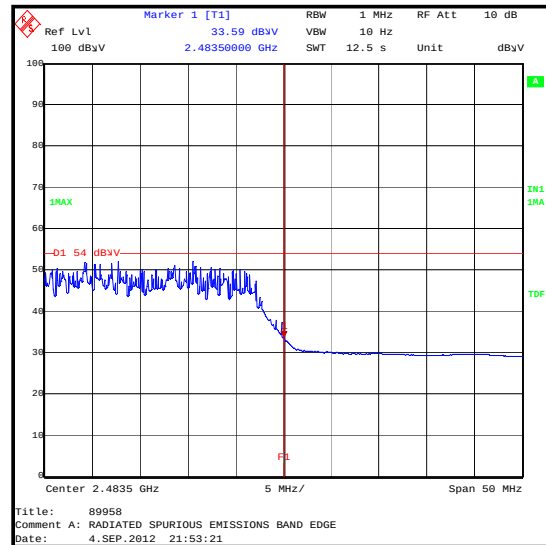
Frequency (MHz)	Antenna Polarity	Peak Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
2399.850	Horizontal	47.9	84.2*	36.3	Complied
2400.0	Horizontal	45.8	84.2*	38.4	Complied
2483.5	Horizontal	58.4	74.0	15.6	Complied

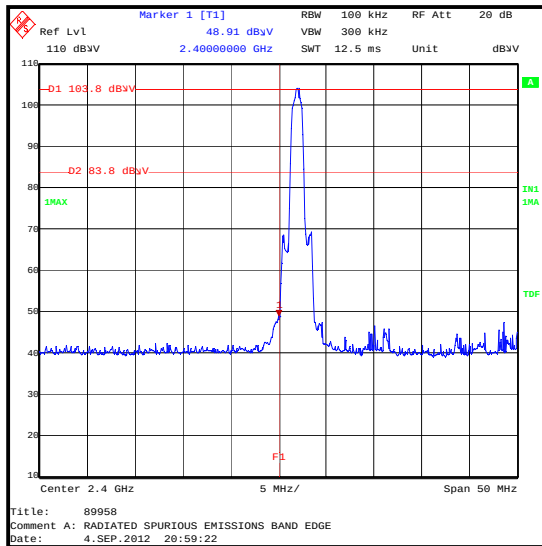
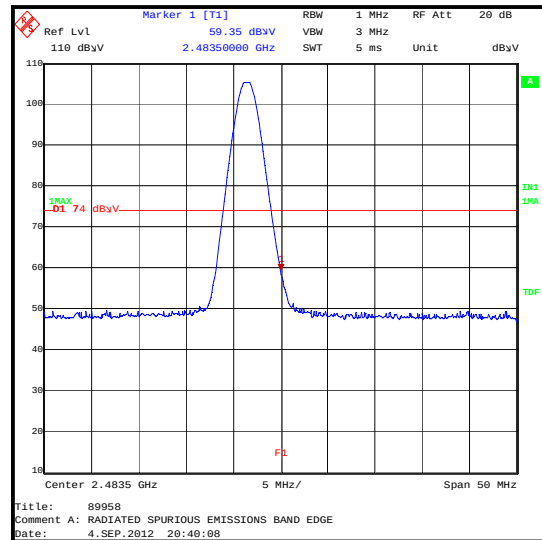
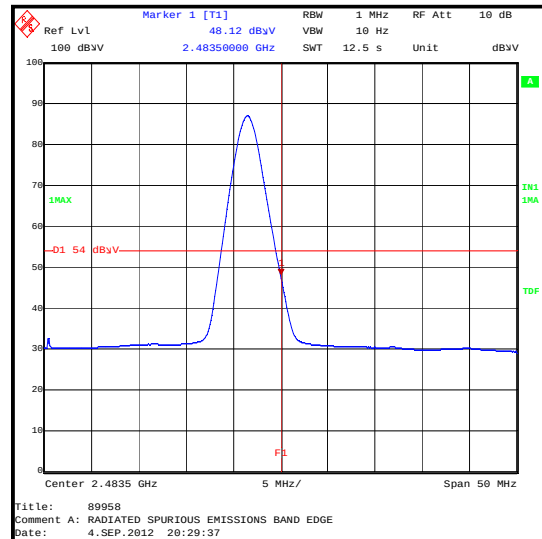
Frequency (MHz)	Antenna Polarity	Average Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
2483.5	Horizontal	33.4	54.0	20.6	Complied

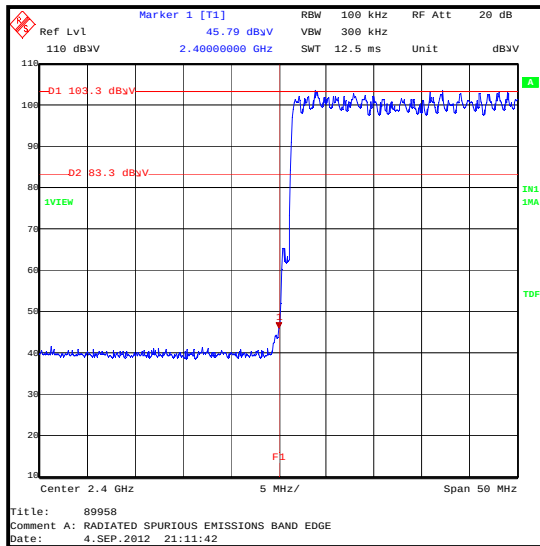
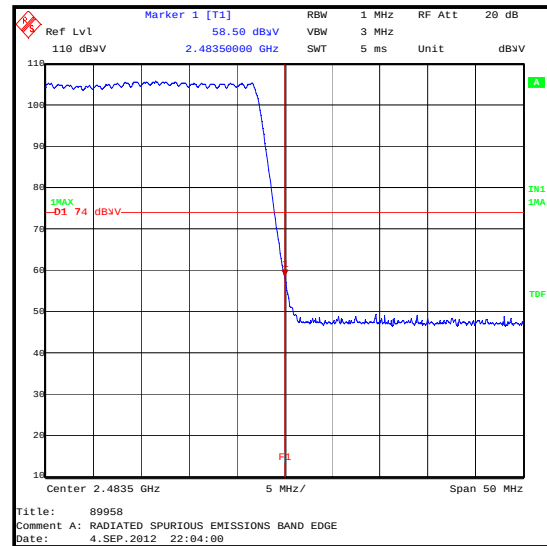
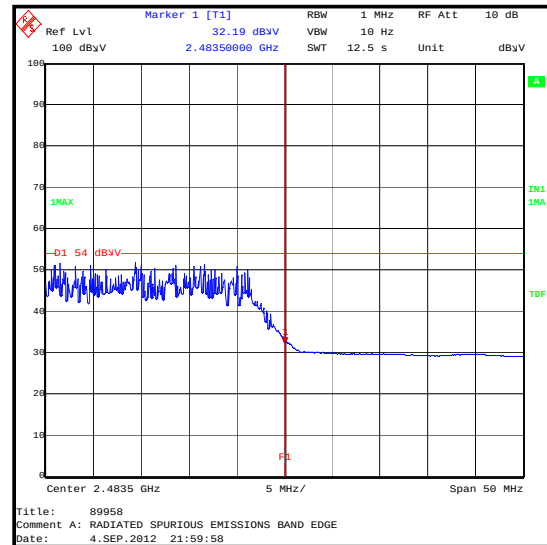
Note(s):

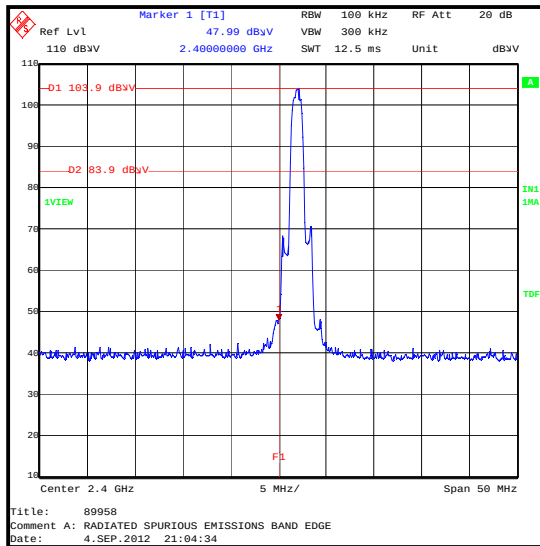
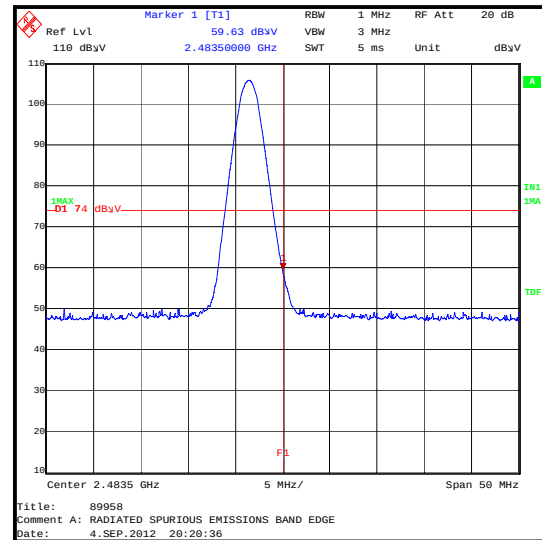
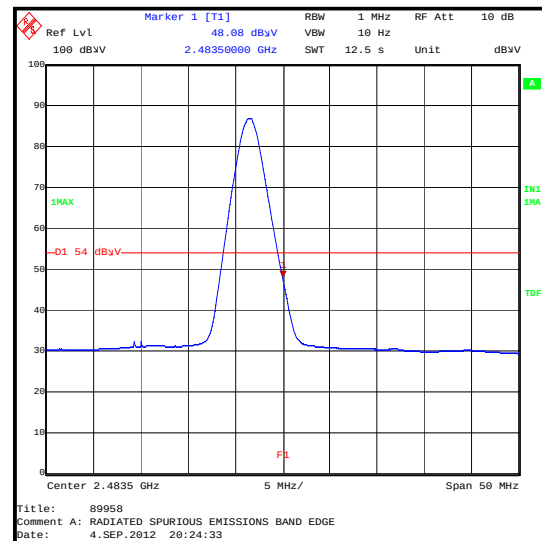
1. The final measured value, for the given emission, in the table above incorporates the calibrated antenna factor and cable loss.
2. * -20 dBc limit

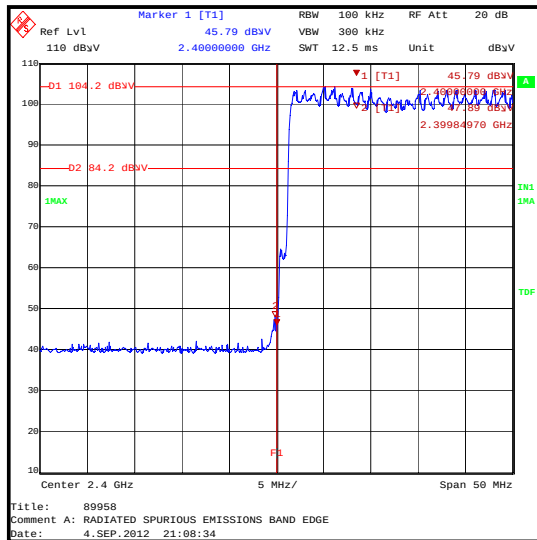
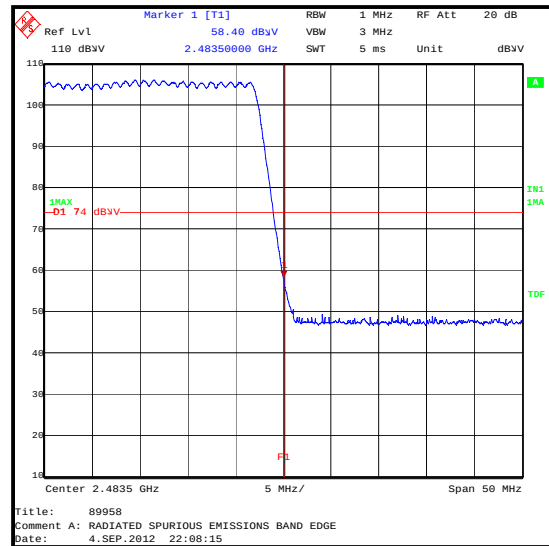
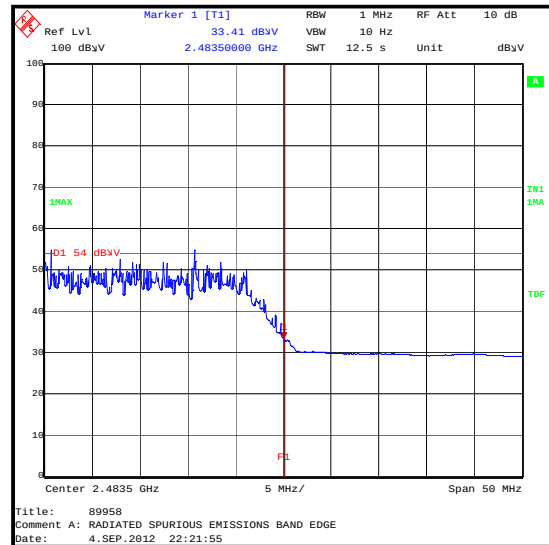
Transmitter Band Edge Radiated Emissions (continued)**Results: DH5 Static Mode****Lower Band Edge Peak Static****Upper Band Edge Peak Static****Upper Band Edge Average Static**

Transmitter Band Edge Radiated Emissions (continued)**Results: DH5 Hopping Mode****Lower Band Edge Peak Hopping****Upper Band Edge Peak Hopping****Upper Band Edge Average Hopping**

Transmitter Band Edge Radiated Emissions (continued)**Results: 2DH5 Static Mode****Lower Band Edge Peak Static****Upper Band Edge Peak Static****Upper Band Edge Average Static**

Transmitter Band Edge Radiated Emissions (continued)**Results: 2DH5 Hopping Mode****Lower Band Edge Peak Hopping****Upper Band Edge Peak Hopping****Upper Band Edge Average Hopping**

Transmitter Band Edge Radiated Emissions (continued)**Results: 3DH5 Static Mode****Lower Band Edge Peak Static****Upper Band Edge Peak Static****Upper Band Edge Average Static**

Transmitter Band Edge Radiated Emissions (continued)**Results: 3DH5 Hopping Mode****Lower Band Edge Peak Hopping****Upper Band Edge Peak Hopping****Upper Band Edge Average Hopping****Test Equipment Used:**

RFI ID	Instrument Description	Model Number	Calibration Due	Calibration Interval (Months)
K0001	5m Semi-Anechoic Chamber	N/A	31 Sep 2012	12
K0002	3m RSE Chamber	N/A	09 Oct 2012	12
M1124	Test Receiver	ESIB 26	14 Aug 2013	12
A1534	Pre Amplifier	8449B	09 Oct 2012	12
A1818	1-18 GHz Horn Antenna	3115	09 Oct 2012	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
AC Conducted Spurious Emissions	0.15 MHz to 30 MHz	95%	±3.25 dB
Conducted Maximum Peak Output Power	2.4 GHz to 2.4835 GHz	95%	±0.28 dB
Carrier Frequency Separation	2.4 GHz to 2.4835 GHz	95%	±0.92 ppm
Average Time of Occupancy	2.4 GHz to 2.4835 GHz	95%	±0.3 ns
20 dB Bandwidth	2.4 GHz to 2.4835 GHz	95%	±0.92 ppm
Occupied Bandwidth	2.4 GHz to 2.4835 GHz	95%	±0.92 ppm
Radiated Spurious Emissions	30 MHz to 26.5 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	-	-	Added setup photos and power versus frequency table
3.0	-	-	FCC ID updated
4.0	33	-	Limit corrected