



TEST REPORT FROM RFI GLOBAL SERVICES LTD



Test of: NTT DoCoMo EB-4054

FCC ID: UCE211046A

To: FCC Part 15.247: 2011 Subpart C

Test Report Serial No.:
RFI-RPT-RP85051JD01G V2.0

Version 2.0 Supersedes All Previous Versions

This Test Report Is Issued Under The Authority Of Chris Guy, Head of Global Approvals:		
Checked By:	Ian Watch	
Signature:		
Date of Issue:	14 February 2012	

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1. Customer Information












Company Name:	Panasonic Mobile Communications Development of Europe Ltd.
Address:	Panasonic House Willoughby Road Bracknell Berkshire RG12 8FP United Kingdom

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
Site Registration:	209735
Location of Testing:	RFI Global Services Ltd, Wade Road, Basingstoke, Hampshire, RG24 8AH.
Test Dates:	17 January 2012 to 25 January 2012

2.2. Summary of Test Results

FCC Reference (47CFR)	Measurement	Result
Part 15.107(a)	Receiver/Idle Mode AC Conducted Emissions	
Part 15.109	Receiver/Idle Mode Radiated Spurious Emissions	
Part 15.207	Transmitter AC Conducted Emissions	
Part 15.247(a)(1)	Transmitter 20 dB Bandwidth	
Part 15.247(a)(1)	Transmitter Carrier Frequency Separation	
Part 15.247(a)(1)(iii)	Transmitter Number of Hopping Frequencies and Average Time of Occupancy	
Part 15.247(b)(1)	Transmitter Maximum Peak Output Power	
Part 15.247(d) & 15.209(a)	Transmitter Radiated Emissions	
Part 15.247(d) & 15.209(a)	Transmitter Band Edge Radiated Emissions	
Key to Results		
 = Complied  = Did not comply		

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:	NTT DoCoMo
Model Name or Number:	EB-4054
IMEIs:	359569040021561 (<i>Radiated sample #1</i>) 359569040021504 (<i>Radiated sample #2</i>) 359569040021280 (<i>Conducted RF port sample #1</i>)
Hardware Version Number:	Rev C
Software Version Number:	ACPU: dcm-07-0215 CCPU: R1B_1_EC02_01_DOO
FCC ID:	UCE211046A

Brand Name:	NTT DoCoMo
Description:	AC Charger
Model Name or Number:	P01
Hardware Version Number:	N0JZZY000008

Brand Name:	NTT DoCoMo
Description:	Charge/USB Data cable
Model Name or Number:	Not marked or stated

Brand Name:	NTT DoCoMo
Description:	Personal Hands-Free
Model Name or Number:	Not marked or stated

3.2. Description of EUT

The equipment under test was a Dual Mode UMTS/GSM Mobile Phone with WLAN, *Bluetooth* and RFID

3.3. Modifications Incorporated in the EUT

No modifications were applied to the EUT during testing.

3.4. Additional Information Related to Testing

Tested Technology:	<i>Bluetooth</i>		
Power Supply Requirement:	Nominal	3.8 V	
Type of Unit:	Transceiver		
Channel Spacing:	1 MHz		
Mode:	Basic Rate	Enhanced Data Rate	
Modulation:	GFSK	$\pi/4$ -DQPSK	8DQPSK
Packet Type: (Maximum Payload)	DH5	2DH5	3DH5
Data Rate (Mbit/s):	1	2	3
Declared Antenna Gain:	-1.6 dBi		
Maximum Conducted Output Power:	0.2 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

3.5. Support Equipment

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

Brand Name:	Panasonic
Description:	Laptop PC
Model Name or Number:	Toughbook CF-74

4. Operation and Monitoring of the EUT during Testing

4.1. Operating Modes

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

- Receive/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):

- For Transmit tests: Standalone, connected via a radio link to a Bluetooth tester in order to place the EUT into Bluetooth test mode. The laptop PC with the Client's bespoke application was used to place the EUT into Bluetooth mode.
- Receive/Idle tests: Standalone, with the Bluetooth mode active but not transmitting.
- 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.
- Idle and transmitter radiated spurious emissions tests were performed with the AC charger and Personal Hands-Free connected to the EUT.
- The conducted sample IMEI 359569040021280 was used for 20 dB bandwidth, carrier frequency separation, average time of occupancy and maximum output power tests
- The radiated sample IMEI 359569040021561 was used for AC conducted emissions, receiver radiated spurious emissions and radiated band edge tests.
- The radiated sample IMEI 359569040021504 was used for transmitter radiated spurious emissions tests.

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:	Mark Percival	Test Date:	24 January 2012
Test Sample IMEI:	359369040021561		

FCC Part:	15.107
Test Method Used:	As detailed in ANSI C63.10 Section 6.2 referencing ANSI C63.4

Environmental Conditions:

Temperature (°C):	20
Relative Humidity (%):	23

Results: Live / Quasi Peak

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.357	Live	43.0	58.8	15.8	Complied
0.645	Live	35.3	56.0	20.7	Complied
0.758	Live	36.5	56.0	19.5	Complied
0.762	Live	39.7	56.0	16.3	Complied
0.762	Live	39.0	56.0	17.0	Complied
0.870	Live	37.2	56.0	18.8	Complied
0.992	Live	40.2	56.0	15.8	Complied
1.005	Live	39.5	56.0	16.5	Complied
1.509	Live	40.6	56.0	15.4	Complied

Results: Live / Average

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.362	Live	35.3	48.7	13.4	Complied
0.735	Live	29.1	46.0	16.9	Complied
1.086	Live	26.6	46.0	19.4	Complied
1.185	Live	31.4	46.0	14.6	Complied
1.388	Live	27.9	46.0	18.1	Complied
1.442	Live	26.3	46.0	19.7	Complied
1.478	Live	28.8	46.0	17.2	Complied
1.559	Live	26.2	46.0	19.8	Complied
1.577	Live	25.6	46.0	20.4	Complied

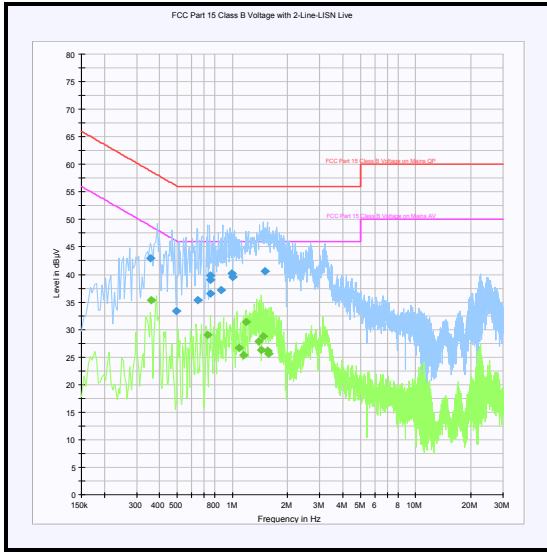
Receiver/Idle Mode AC Conducted Spurious Emissions (continued)**Results: Neutral / Quasi Peak**

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
1.064	Neutral	30.8	56.0	25.2	Complied
1.113	Neutral	31.2	56.0	24.8	Complied
1.208	Neutral	32.4	56.0	23.6	Complied
1.275	Neutral	32.6	56.0	23.4	Complied
1.284	Neutral	31.9	56.0	24.1	Complied
1.410	Neutral	32.2	56.0	23.8	Complied
1.487	Neutral	33.1	56.0	23.0	Complied
1.842	Neutral	32.4	56.0	23.6	Complied
1.860	Neutral	32.7	56.0	23.3	Complied
2.112	Neutral	19.6	56.0	36.4	Complied

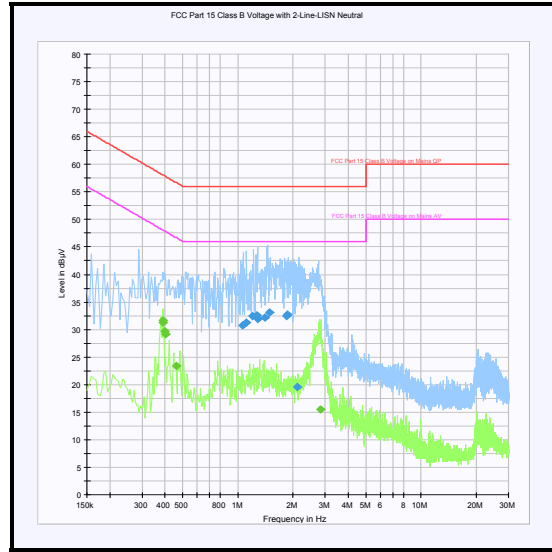
Results: Neutral / Average

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.389	Neutral	31.2	48.1	16.9	Complied
0.389	Neutral	31.7	48.1	16.4	Complied
0.398	Neutral	29.7	47.9	18.2	Complied
0.402	Neutral	29.1	47.8	18.7	Complied
0.461	Neutral	23.4	46.7	23.3	Complied
2.832	Neutral	15.6	46.0	30.4	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.

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

Test Engineer:	Andrew Edwards	Test Date:	17 January 2012
Test Sample IMEI:	359569040021561		

FCC Part:	15.109
Test Method Used:	As detailed in ANSI C63.4 Section 8
Frequency Range:	30 MHz to 1000 MHz

Environmental Conditions:

Temperature (°C):	23
Relative Humidity (%):	28

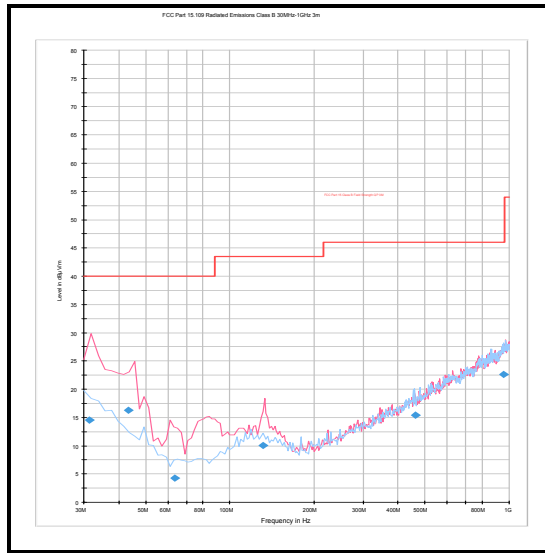
Results: Quasi Peak

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
31.393	Vertical	14.6	40.0	25.4	Complied
43.238	Vertical	16.3	40.0	23.7	Complied
63.416	Vertical	4.2	40.0	35.8	Complied
131.934	Vertical	10.0	43.5	33.5	Complied
460.556	Horizontal	15.4	46.0	30.6	Complied
957.191	Horizontal	22.6	46.0	23.4	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. 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.

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.

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

Test Engineer:	Andrew Edwards	Test Date:	18 January 2012
Test Sample IMEI:	359569040021561		

FCC Part:	15.109
Test Method Used:	As detailed in ANSI C63.4 Section 8
Frequency Range:	1 GHz to 12.5 GHz

Environmental Conditions:

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

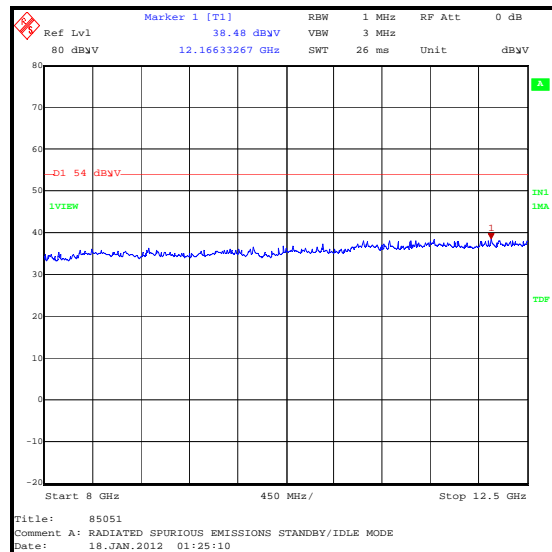
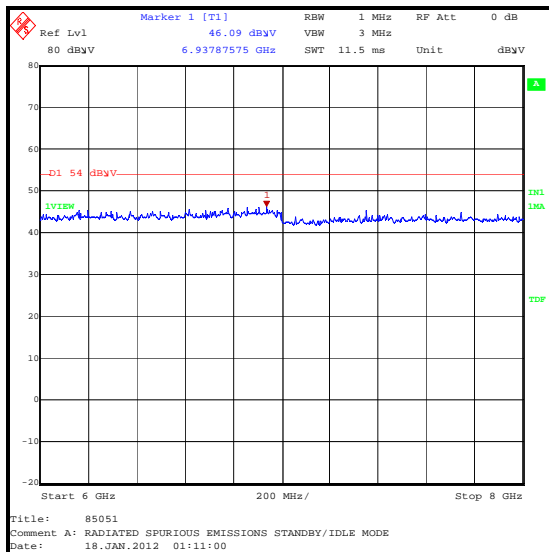
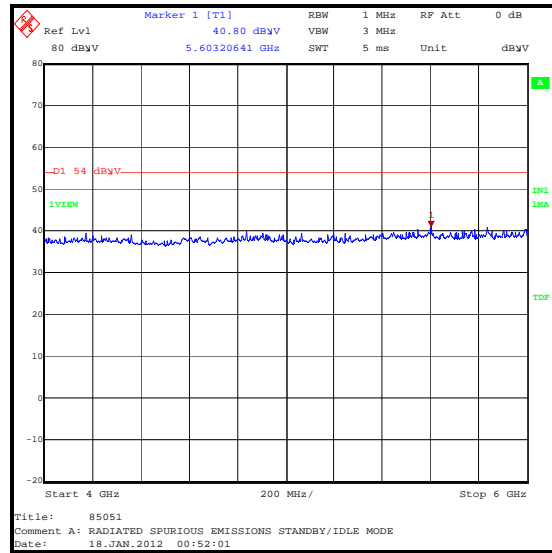
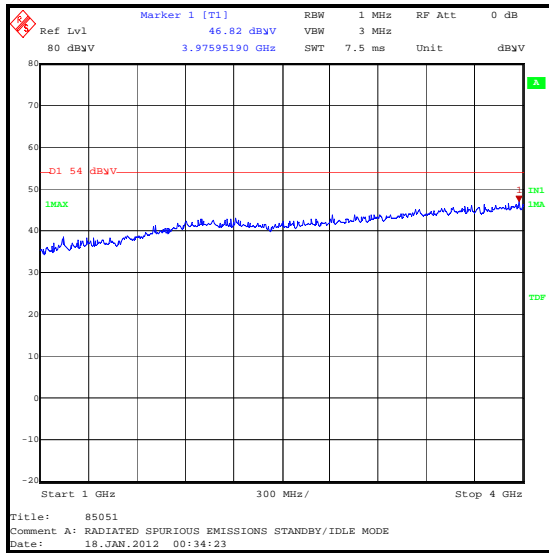
Results:

Frequency (MHz)	Antenna Polarity	Peak Level (dBμV/m)	Average Limit (dBμV/m)	Margin (dB)	Result
3975.952	Vertical	46.8	54.0	7.2	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. 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.
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)



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

Test Engineer:	Mark Percival	Test Date:	24 January 2012
Test Sample IMEI:	359369040021561		

FCC Part:	15.207
Test Method Used:	As detailed in ANSI C63.10 Section 6.2 referencing ANSI C63.4

Environmental Conditions:

Temperature (°C):	20
Relative Humidity (%):	23

Results: Live / Quasi Peak

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.641	Live	38.8	56.0	17.2	Complied
0.677	Live	42.3	56.0	13.7	Complied
0.753	Live	43.0	56.0	13.0	Complied
0.758	Live	42.1	56.0	13.9	Complied
0.758	Live	42.0	56.0	14.0	Complied
0.893	Live	40.1	56.0	15.9	Complied
0.974	Live	41.7	56.0	14.3	Complied
1.005	Live	41.0	56.0	15.0	Complied
1.239	Live	42.2	56.0	13.8	Complied
1.550	Live	40.4	56.0	15.6	Complied

Results: Live / Average

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.389	Live	32.3	48.1	15.8	Complied
0.749	Live	30.0	46.0	16.0	Complied
0.749	Live	29.4	46.0	16.6	Complied
0.906	Live	28.6	46.0	17.4	Complied
1.176	Live	29.9	46.0	16.1	Complied
1.428	Live	28.5	46.0	17.5	Complied
1.617	Live	28.5	46.0	17.5	Complied
1.734	Live	26.3	46.0	19.7	Complied
1.770	Live	24.4	46.0	21.6	Complied
3.008	Live	28.1	46.0	17.9	Complied

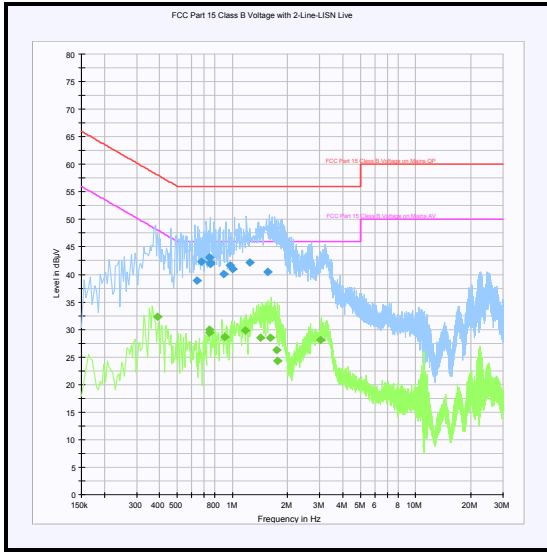
Transmitter AC Conducted Spurious Emissions (continued)**Results: Neutral / Quasi Peak**

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
1.545	Neutral	37.5	56.0	18.5	Complied
1.572	Neutral	36.7	56.0	19.3	Complied
1.653	Neutral	36.4	56.0	19.6	Complied
1.721	Neutral	36.9	56.0	19.1	Complied
1.752	Neutral	36.4	56.0	19.6	Complied
1.757	Neutral	37.0	56.0	19.0	Complied
1.851	Neutral	36.2	56.0	19.8	Complied
1.860	Neutral	36.1	56.0	19.9	Complied
1.959	Neutral	36.0	56.0	20.0	Complied
2.130	Neutral	34.8	56.0	21.2	Complied

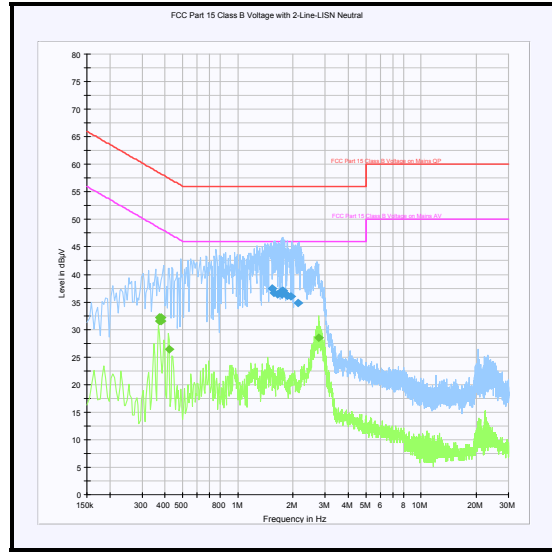
Results: Neutral / Average

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.375	Neutral	32.2	48.1	16.2	Complied
0.375	Neutral	31.5	48.1	16.9	Complied
0.380	Neutral	31.6	47.9	16.7	Complied
0.380	Neutral	32.2	47.8	16.1	Complied
0.423	Neutral	26.4	46.7	21.0	Complied
2.769	Neutral	28.5	46.0	17.5	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.

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

Test Engineer:	Sarah Williams	Test Date:	25 January 2012
Test Sample IMEI:	359569040021280		

FCC Part:	15.247(a)(1)
Test Method Used:	As detailed in ANSI C63.10 Section 6.9.1

Environmental Conditions:

Temperature (°C):	26
Relative Humidity (%):	30

Results DH5:

Channel	20 dB Bandwidth (kHz)
Bottom	951.904
Middle	961.924
Top	961.924

Results 2DH5:

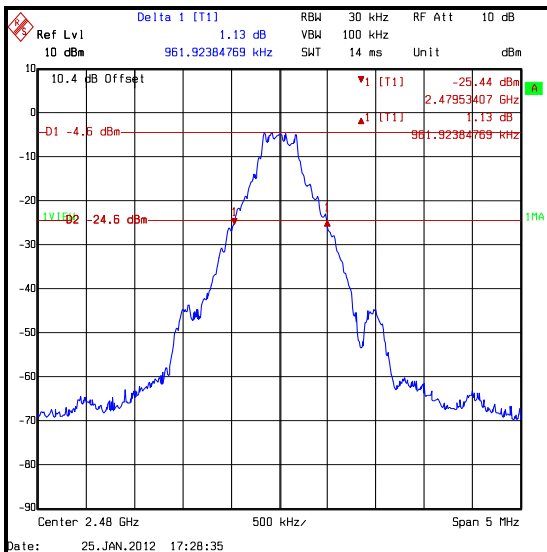
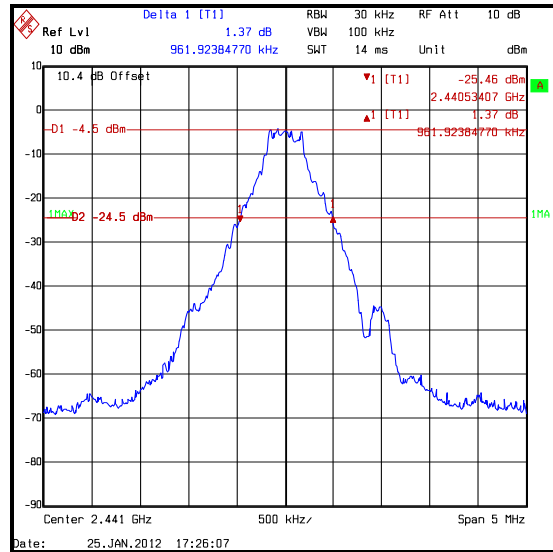
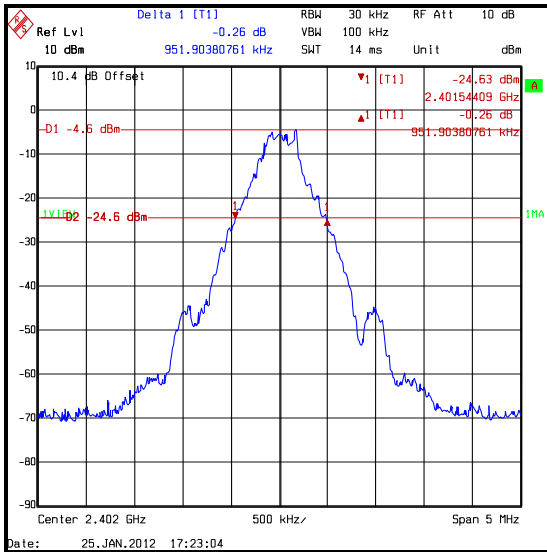
Channel	20 dB Bandwidth (kHz)
Bottom	1362.725
Middle	1362.725
Top	1352.705

Results 3DH5:

Channel	20 dB Bandwidth (kHz)
Bottom	1332.665
Middle	1342.685
Top	1332.665

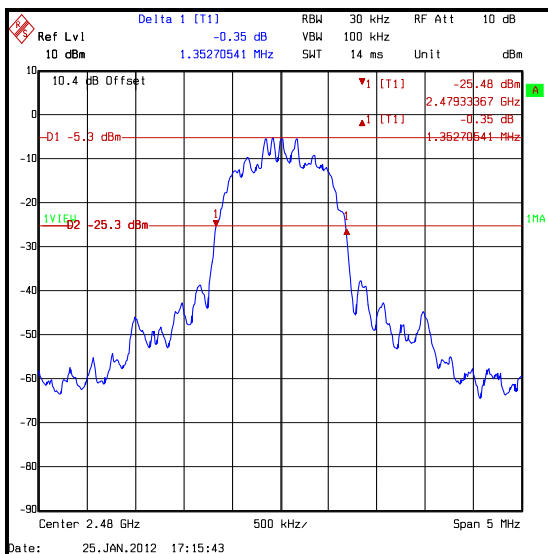
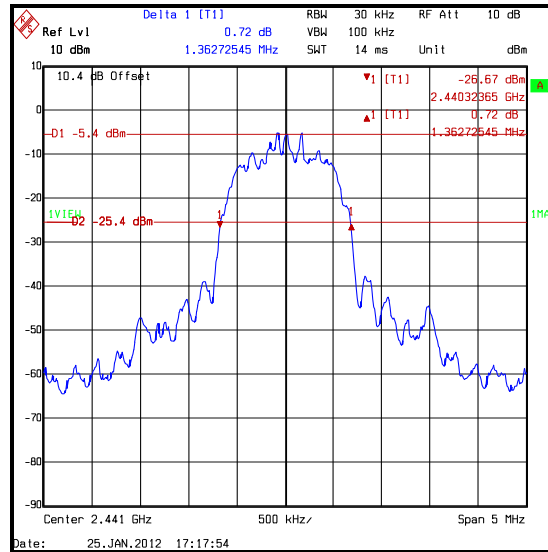
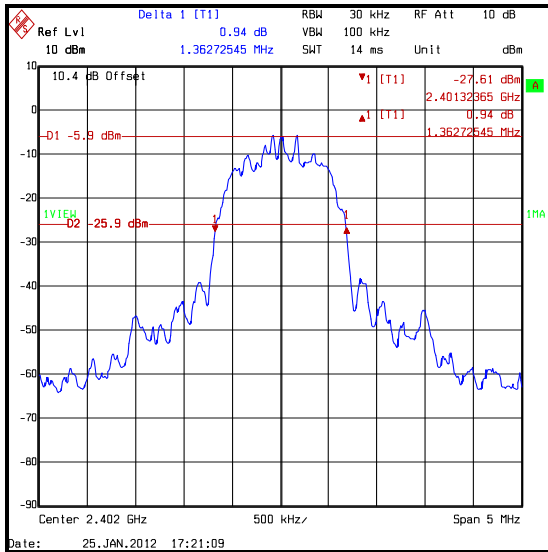
Transmitter 20 dB Bandwidth (continued)

Results DH5:



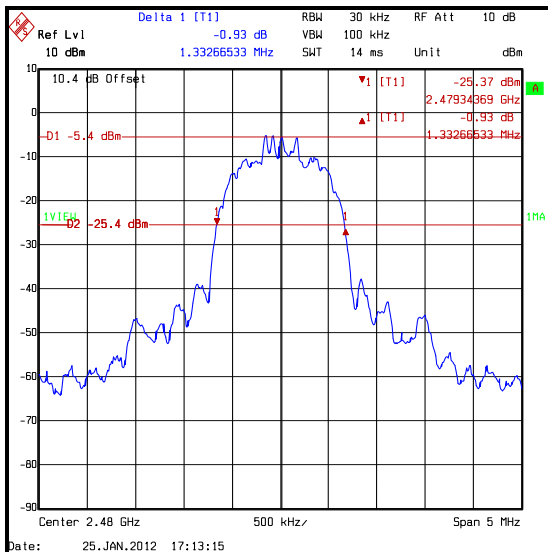
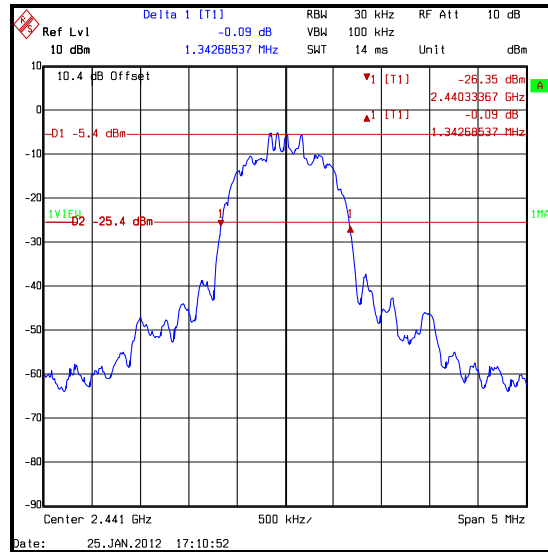
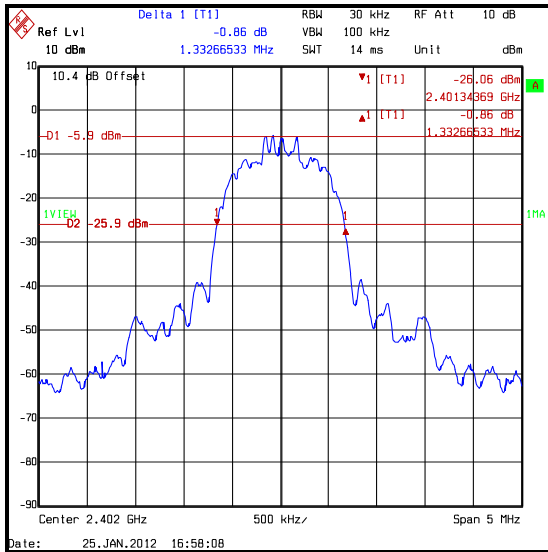
Transmitter 20 dB Bandwidth (continued)

Results 2DH5:



Transmitter 20 dB Bandwidth (continued)

Results 3DH5:



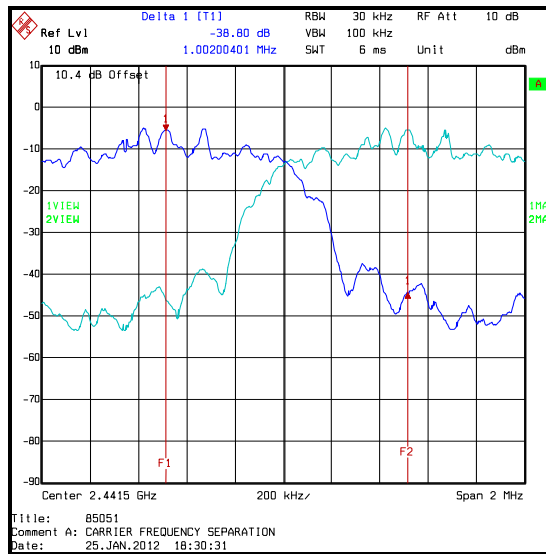
Transmitter Carrier Frequency Separation (continued)

Results: 2DH5

Carrier Frequency Separation (kHz)	Limit ($2/3$ of 20 dB BW) (kHz)	Margin (kHz)	Result
1002.004	908.483	93.521	Complied

Note(s):

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



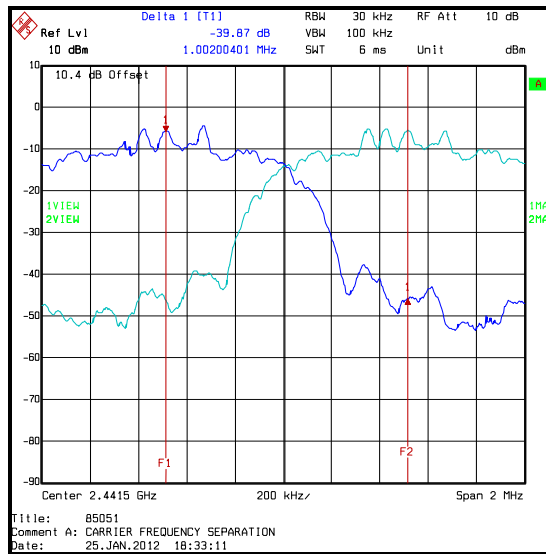
Transmitter Carrier Frequency Separation (continued)

Results: 3DH5

Carrier Frequency Separation (kHz)	Limit ($2/3$ of 20 dB BW) (kHz)	Margin (kHz)	Result
1002.004	895.123	106.881	Complied

Note(s):

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



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

Test Engineer:	Sarah Williams	Test Date:	25 January 2012
Test Sample IMEI:	359569040021280		

FCC Part:	15.247(a)(1)(iii)
Test Method Used:	As detailed in ANSI C63.10 Section 7.7.3 & 7.7.4

Environmental Conditions:

Temperature (°C):	25
Relative Humidity (%):	30

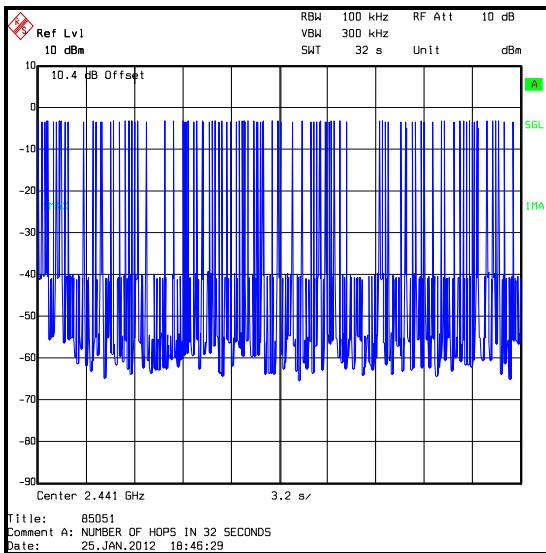
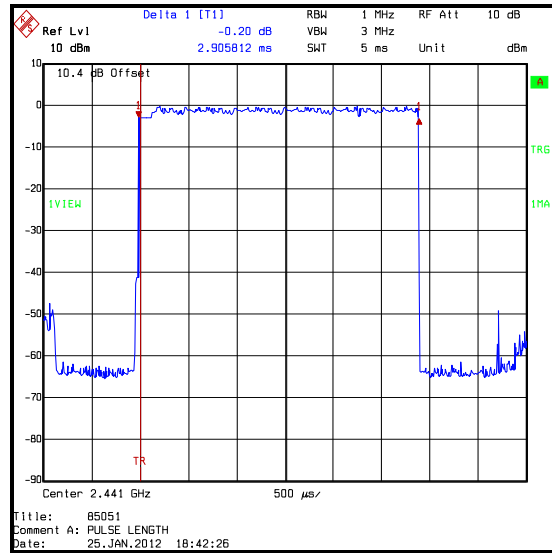
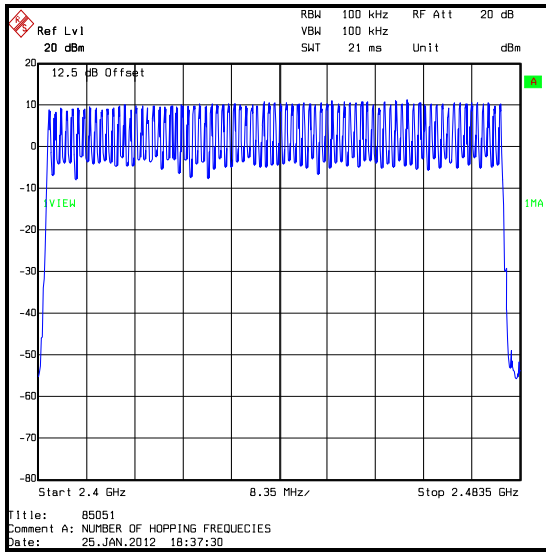
Results:

Emission Width (μs)	Number of Hops in 31.6 Seconds	Average Time of Occupancy (s)	Limit (s)	Margin (s)	Result
2905.812	97	0.282	0.4	0.118	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.

Transmitter Number of Hopping Frequencies and Average Time of Occupancy (continued)



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

Test Engineer:	Sarah Williams	Test Date:	25 January 2012
Test Sample IMEI:	359569040021280		

FCC Part:	15.247(b)(1)
Test Method Used:	As detailed in ANSI C63.10 Section 6.10.1

Environmental Conditions:

Temperature (°C):	26
Relative Humidity (%):	30

Results: DH5

Channel	Conducted Peak Power (dBm)	Conducted Peak Power Limit (dBm)	Margin (dB)	Result
Bottom	-2.9	30.0	32.9	Complied
Middle	-2.2	30.0	32.2	Complied
Top	-2.3	30.0	32.3	Complied

Channel	Conducted Peak Power (dBm)	Declared Antenna Gain (dBi)	EIRP (dBm)	De Facto EIRP Limit (dBm)	Margin (dB)	Result
Bottom	-2.9	-1.6	-4.5	36.0	40.5	Complied
Middle	-2.2	-1.6	-3.8	36.0	39.8	Complied
Top	-2.3	-1.6	-3.9	36.0	39.9	Complied

Results: 2DH5

Channel	Conducted Peak Power (dBm)	Conducted Peak Power Limit (dBm)	Margin (dB)	Result
Bottom	-1.3	21.0	22.3	Complied
Middle	-0.6	21.0	21.6	Complied
Top	-0.6	21.0	21.6	Complied

Channel	Conducted Peak Power (dBm)	Declared Antenna Gain (dBi)	EIRP (dBm)	De Facto EIRP Limit (dBm)	Margin (dB)	Result
Bottom	-1.3	-1.6	-2.9	27.0	29.9	Complied
Middle	-0.6	-1.6	-2.2	27.0	29.2	Complied
Top	-0.6	-1.6	-2.2	27.0	29.2	Complied

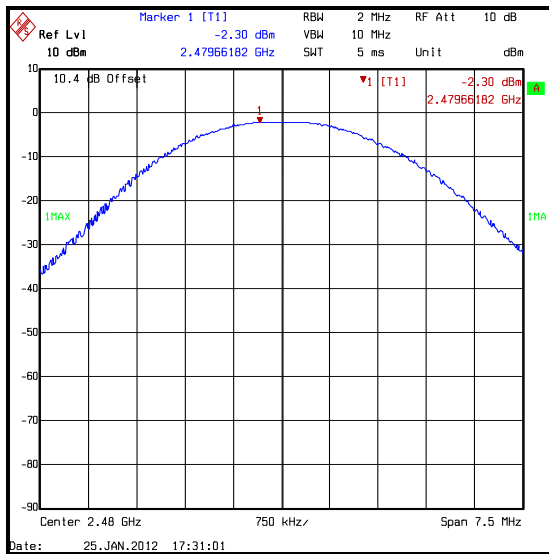
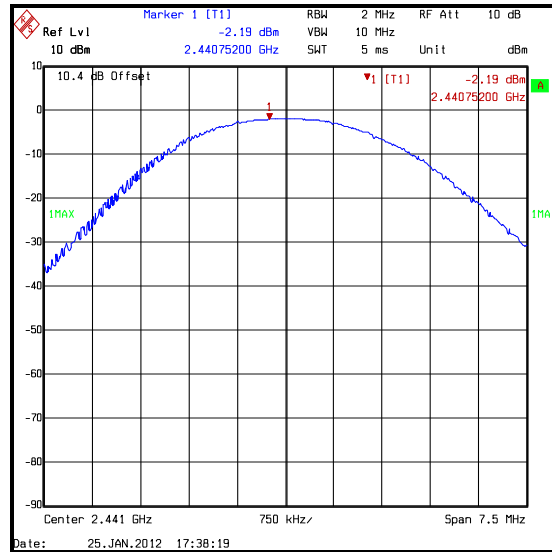
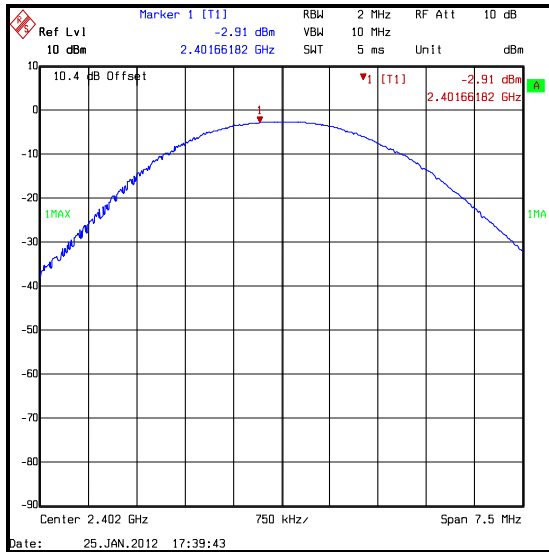
Transmitter Maximum Peak Output Power (continued)**Results: 3DH5**

Channel	Conducted Peak Power (dBm)	Conducted Peak Power Limit (dBm)	Margin (dB)	Result
Bottom	-0.6	21.0	21.6	Complied
Middle	0.2	21.0	20.8	Complied
Top	0.2	21.0	20.8	Complied

Channel	Conducted Peak Power (dBm)	Declared Antenna Gain (dBi)	EIRP (dBm)	De Facto EIRP Limit (dBm)	Margin (dB)	Result
Bottom	-0.6	-1.6	-2.2	27.0	29.2	Complied
Middle	0.2	-1.6	-1.4	27.0	28.4	Complied
Top	0.2	-1.6	-1.4	27.0	28.4	Complied

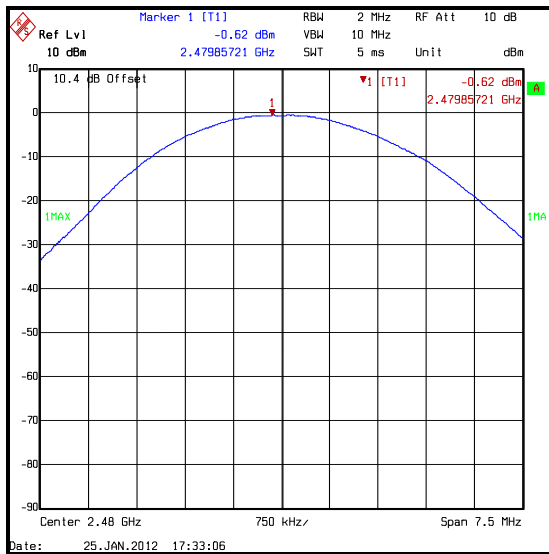
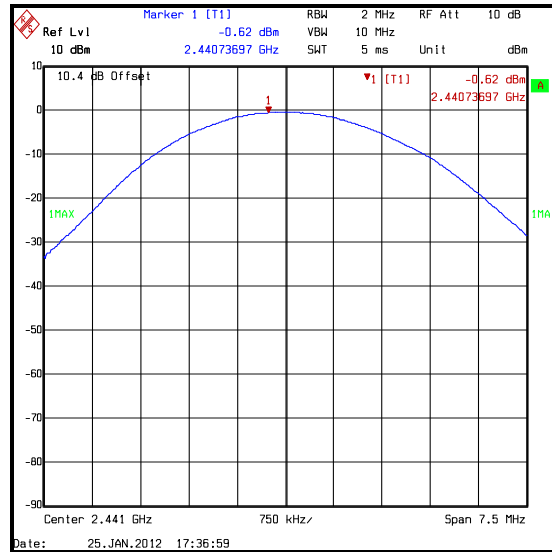
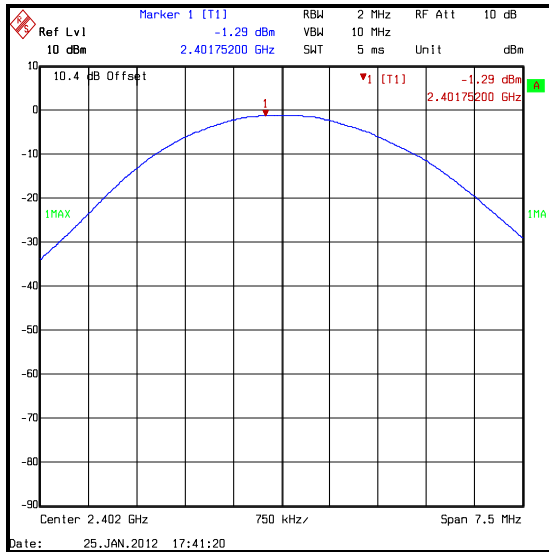
Transmitter Maximum Peak Output Power (continued)

Results: Basic Rate DH5



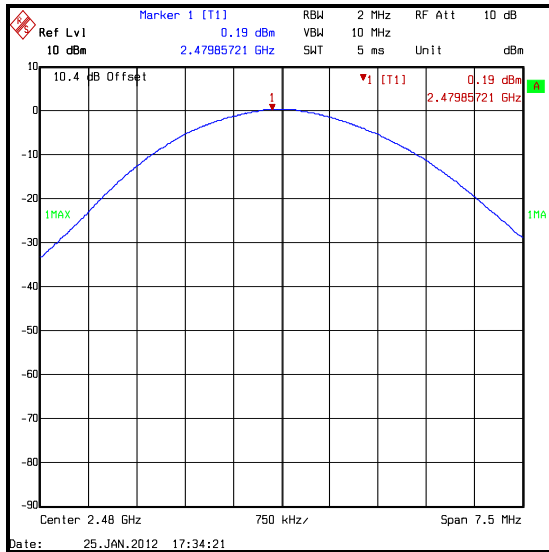
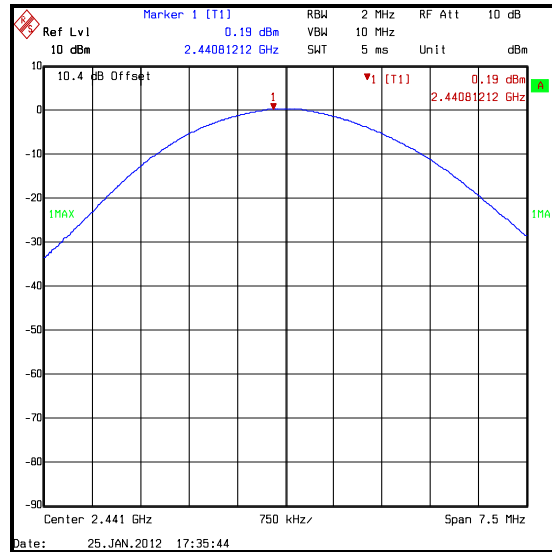
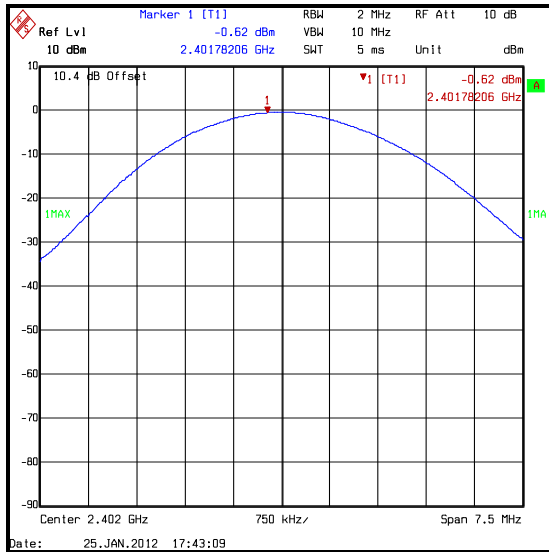
Transmitter Maximum Peak Output Power (continued)

Results: 2DH5



Transmitter Maximum Peak Output Power (continued)

Results: 3DH5



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

Test Engineer:	Andrew Edwards	Test Date:	18 January 2012
Test Sample IMEI:	359569040021504		

FCC Part:	15.247(d) & 15.209(a)
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):	27
Relative Humidity (%):	24

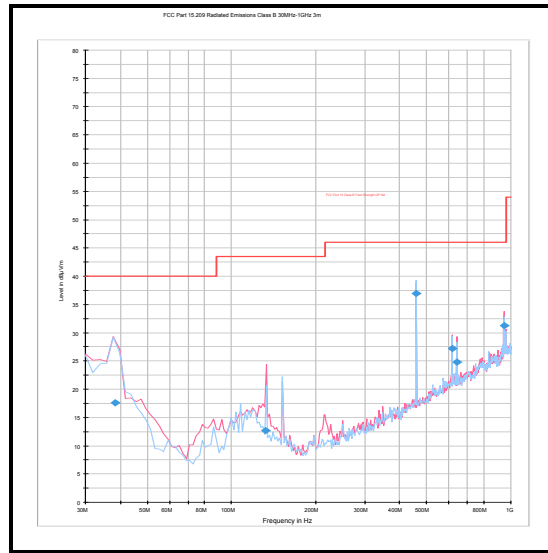
Results: Quasi-Peak 3 DH5

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
38.242	Vertical	17.6	40.0	22.4	Complied
132.973	Horizontal	20.5	43.5	23.0	Complied
458.815	Horizontal	37.0	46.0	9.0	Complied
615.250	Vertical	27.2	46.0	18.8	Complied
639.231	Vertical	24.9	46.0	21.1	Complied
945.606	Vertical	31.3	46.0	14.7	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.

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

Test Engineer:	Patrick Jones	Test Date:	23 January 2012
Test Sample IMEI:	359569040021504		

FCC Part:	15.247(d) & 15.209(a)
Test Method Used:	As detailed in ANSI C63.10 Sections 6.3 and 6.6 referencing ANSI C63.4
Frequency Range	1 GHz to 25 GHz

Environmental Conditions:

Temperature (°C):	22
Relative Humidity (%):	23

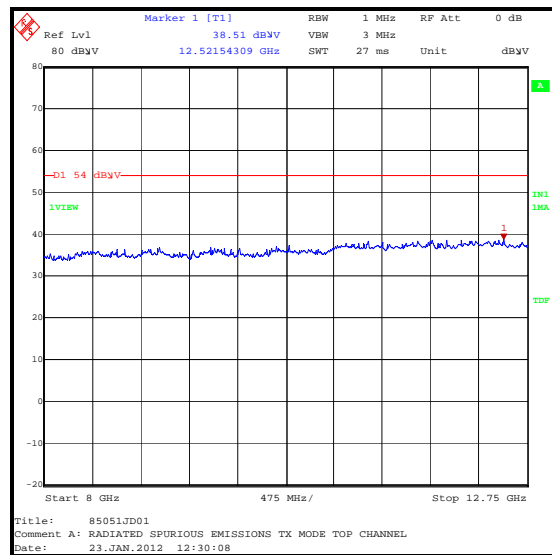
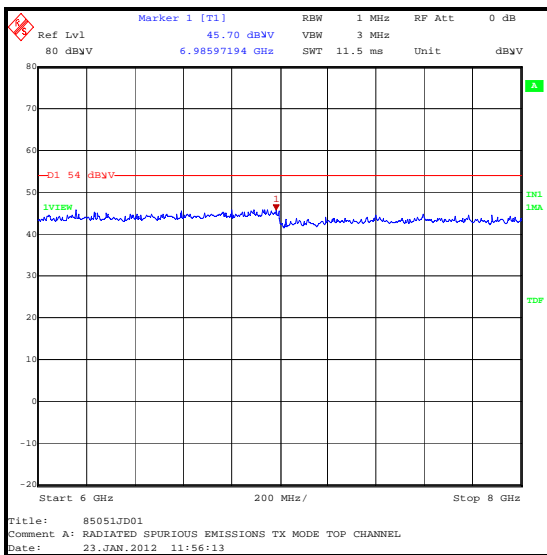
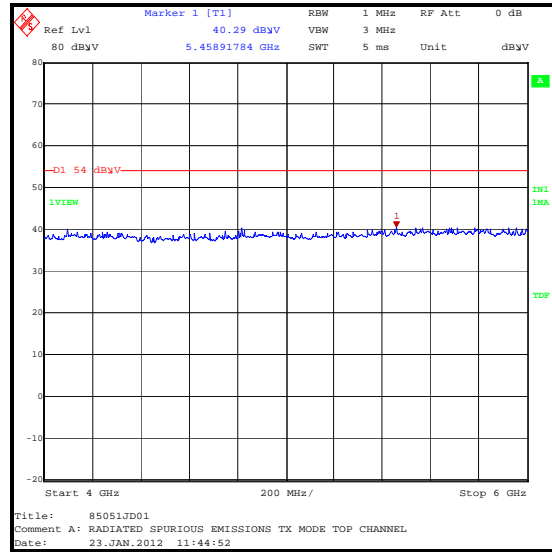
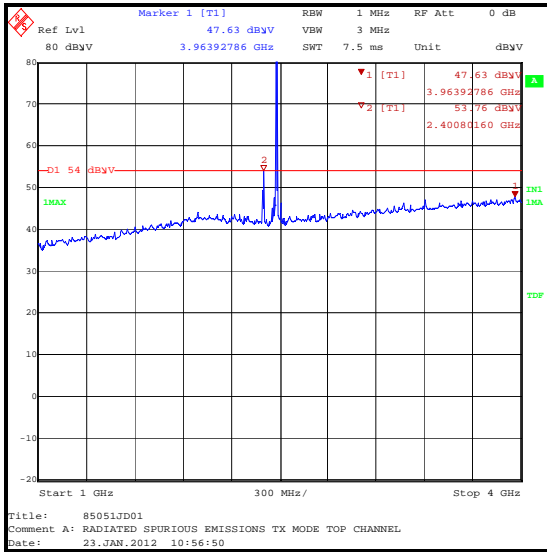
Results: 3DH5

Frequency (MHz)	Antenna Polarity	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
24831.663	Horizontal	48.9	74.0	25.1	Complied

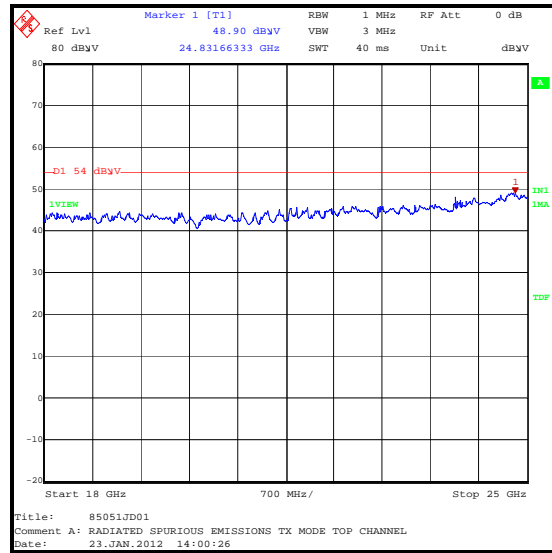
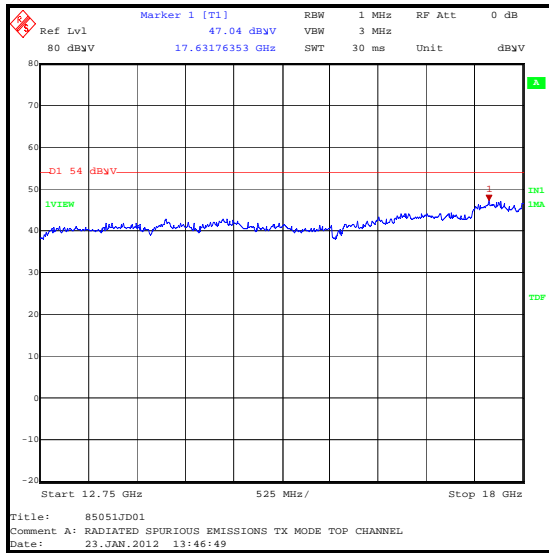
Note(s):

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. The emission shown at approximately 2400.802 MHz is the transmit frequency of the *Bluetooth* test set being used as support equipment.
3. 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."
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)



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

Test Engineer:	Nick Steele	Test Date:	25 January 2012
Test Sample IMEI:	359569040021561		

FCC Part:	15.247(d) & 15.209(a)
Test Method Used:	As detailed in ANSI C63.10 Sections 6.9.2

Environmental Conditions:

Temperature (°C):	23
Relative Humidity (%):	24

Results: Static Mode DH5

Frequency (MHz)	Antenna Polarity	Peak Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
2400.0	Horizontal	42.6	71.8*	29.2	Complied
2483.5	Horizontal	55.4	74.0	18.6	Complied

Frequency (MHz)	Antenna Polarity	Average Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
2483.5	Horizontal	43.7	54.0	10.3	Complied

Results: Hopping Mode DH5

Frequency (MHz)	Antenna Polarity	Peak Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
2400.0	Horizontal	43.5	71.8*	28.3	Complied
2483.5	Horizontal	54.0	74.0	20.0	Complied

Frequency (MHz)	Antenna Polarity	Average Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
2483.5	Horizontal	40.4	54.0	13.6	Complied

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

Frequency (MHz)	Antenna Polarity	Peak Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
2400.0	Horizontal	44.4	70.8*	26.4	Complied
2483.5	Horizontal	56.6	74.0	17.4	Complied

Frequency (MHz)	Antenna Polarity	Average Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
2483.5	Horizontal	42.5	54.0	11.5	Complied

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	43.4	71.4*	28.0	Complied
2483.5	Horizontal	54.8	74.0	19.2	Complied

Frequency (MHz)	Antenna Polarity	Average Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
2483.5	Horizontal	40.5	54.0	13.5	Complied

Transmitter Band Edge Radiated Emissions (continued)**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	45.9	71.0*	25.1	Complied
2483.5	Horizontal	57.0	74.0	17.0	Complied

Frequency (MHz)	Antenna Polarity	Average Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
2483.5	Horizontal	42.6	54.0	11.4	Complied

Results: Hopping Mode 3DH5

Frequency (MHz)	Antenna Polarity	Peak Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
2400.0	Horizontal	45.9	71.2*	25.3	Complied
2483.5	Horizontal	55.1	74.0	18.9	Complied

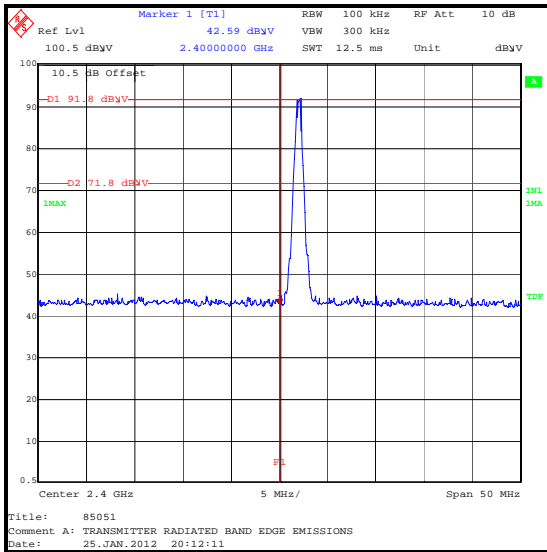
Frequency (MHz)	Antenna Polarity	Average Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
2483.5	Horizontal	40.6	54.0	12.4	Complied

Note(s):

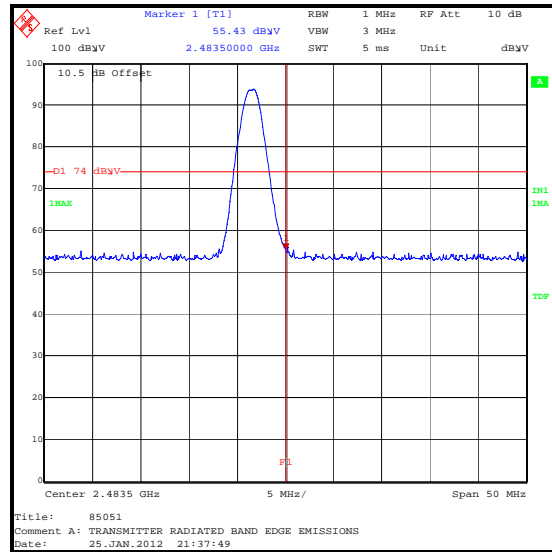
1. The final measured value, for the given emission, in the table above incorporates the calibrated antenna factor and cable loss.
2. * -20 dBc limit

Transmitter Band Edge Radiated Emissions (continued)

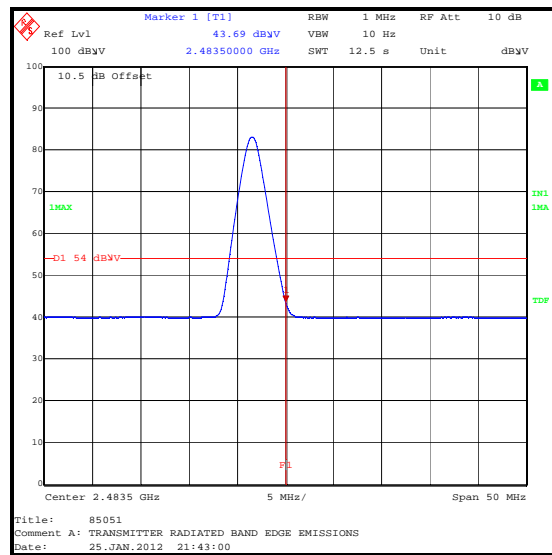
DH5 Static Mode



Lower Band Edge Peak Static



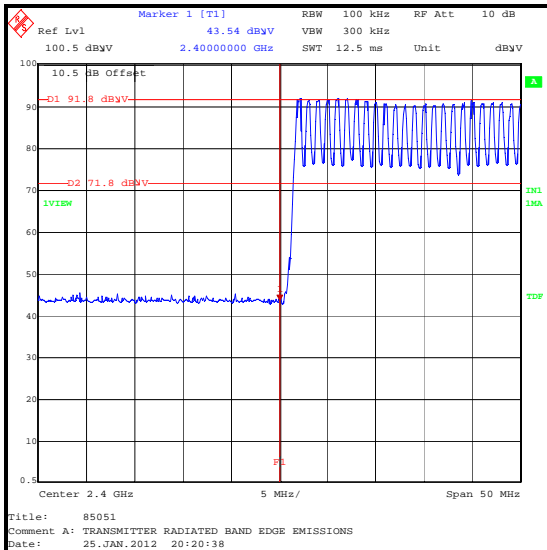
Upper Band Edge Peak Static



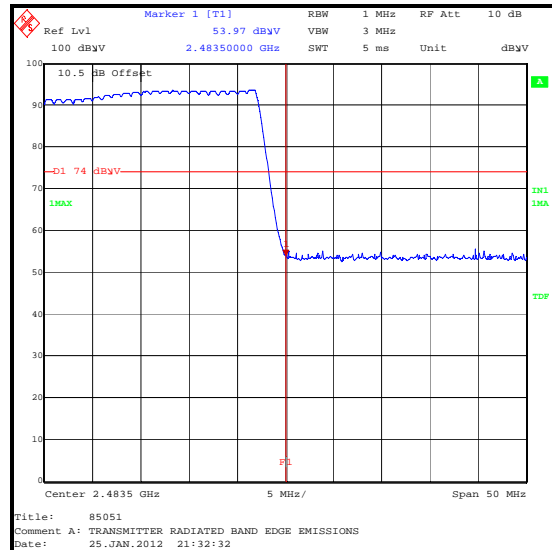
Upper Band Edge Average Static

Transmitter Band Edge Radiated Emissions (continued)

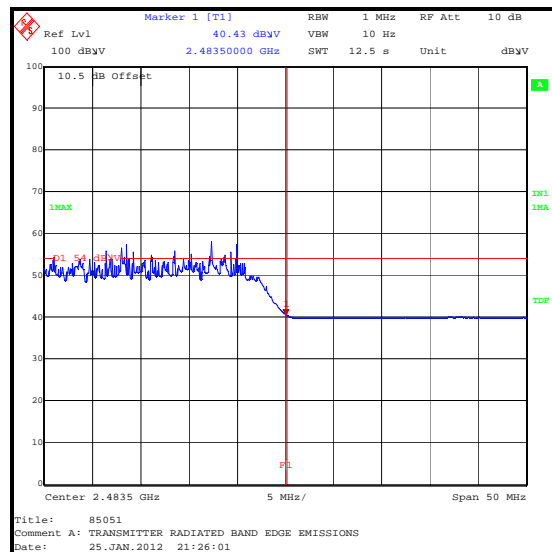
DH5 Hopping Mode



Lower Band Edge Peak Hopping



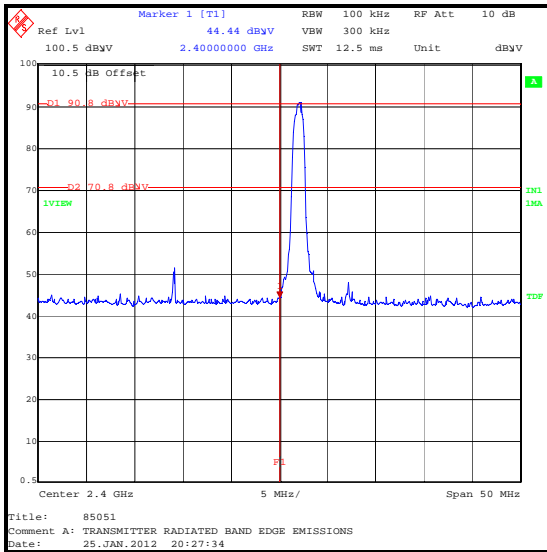
Upper Band Edge Peak Hopping



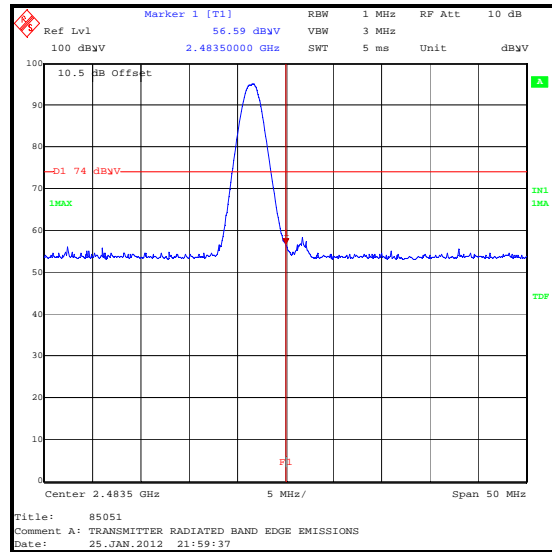
Upper Band Edge Average Hopping

Transmitter Band Edge Radiated Emissions (continued)

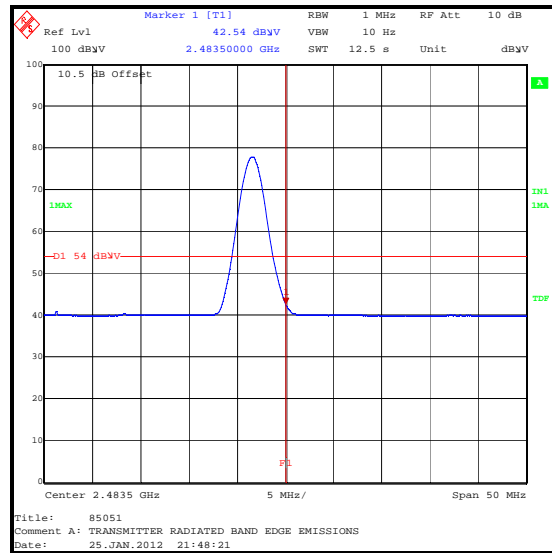
2DH5 Static Mode



Lower Band Edge Peak Static



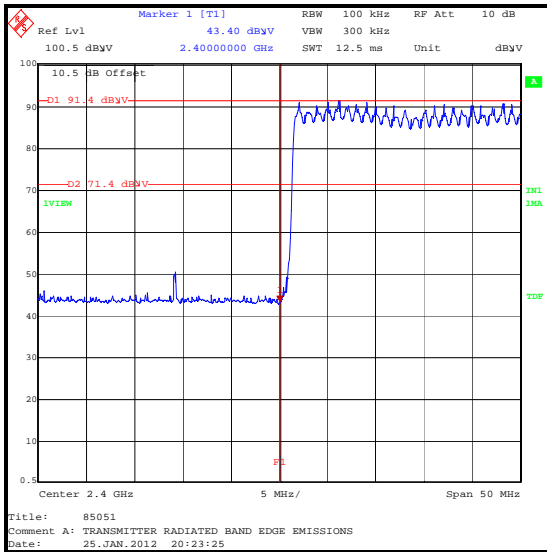
Upper Band Edge Peak Static



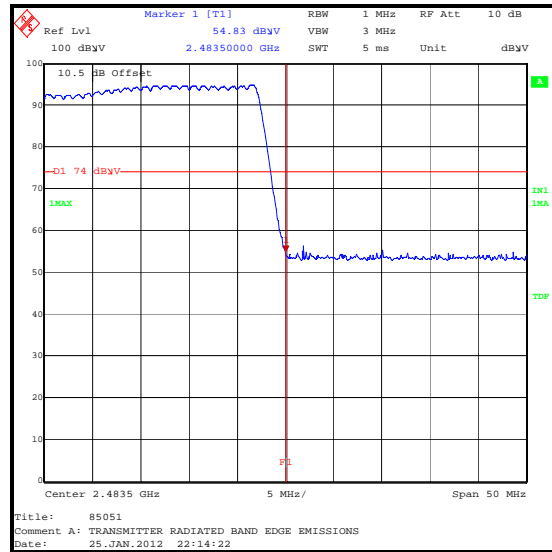
Upper Band Edge Average Static

Transmitter Band Edge Radiated Emissions (continued)

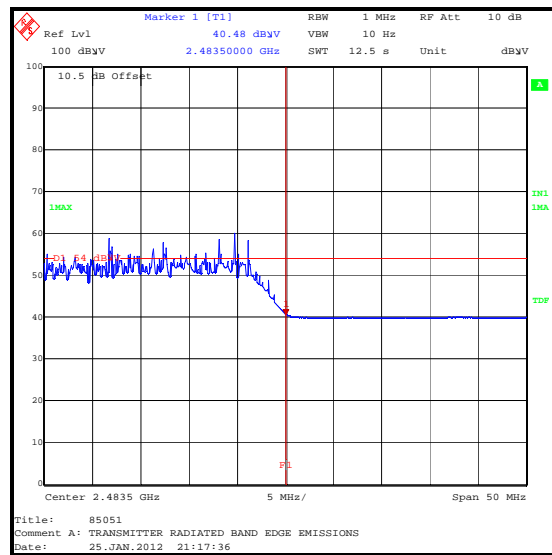
2DH5 Hopping Mode



Lower Band Edge Peak Hopping



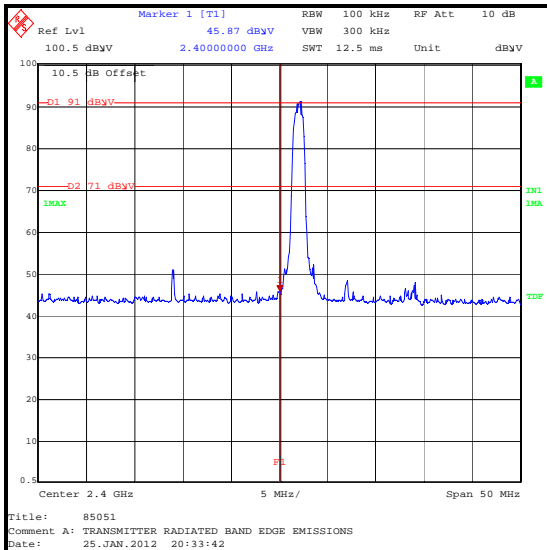
Upper Band Edge Peak Hopping



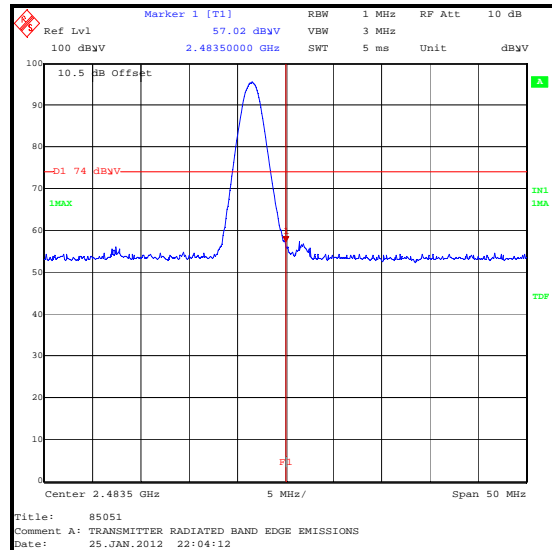
Upper Band Edge Average Hopping

Transmitter Band Edge Radiated Emissions (continued)

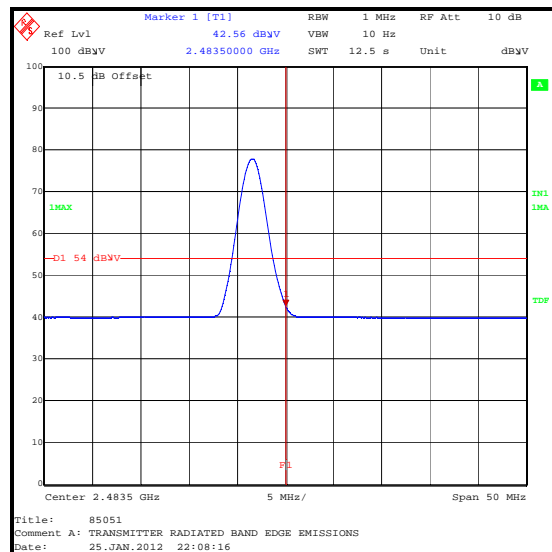
3DH5 Static Mode



Lower Band Edge Peak Static



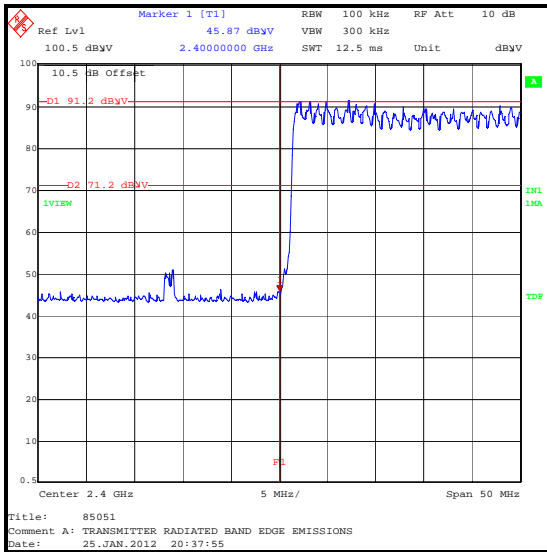
Upper Band Edge Peak Static



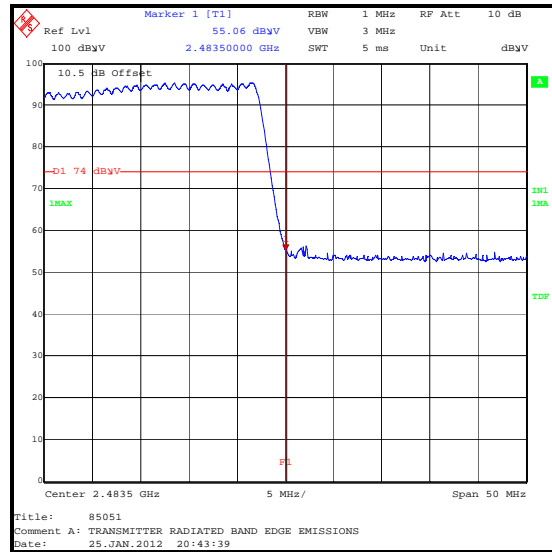
Upper Band Edge Average Static

Transmitter Band Edge Radiated Emissions (continued)

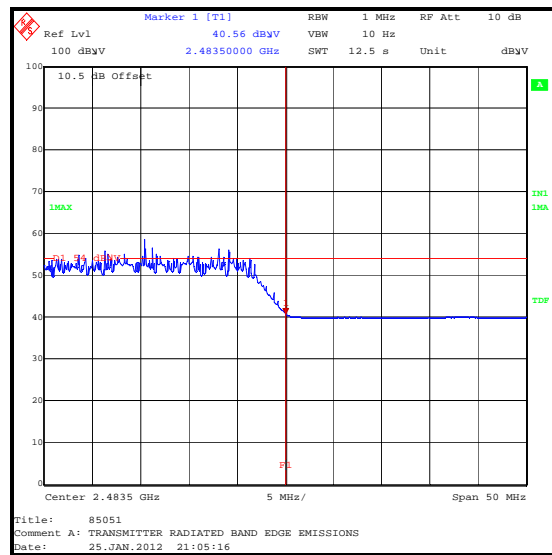
3DH5 Hopping Mode



Lower Band Edge Peak Hopping



Upper Band Edge Peak Hopping



Upper Band Edge Average Hopping

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
Maximum Peak Output Power	2.4 GHz to 2.4835 GHz	95%	±2.94 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
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.

Appendix 1. Test Equipment Used

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
A067	LISN	Rohde & Schwarz	ESH3-Z5	890603/002	02 Jun 2012	12
A1396	Attenuator	Huber & Suhner	757987	6810.17.B	08 Jul 2012	12
A1534	Pre Amplifier	Hewlett Packard	8449B	3008A00405	09 Oct 2012	12
A1818	Antenna	EMCO	3115	00075692	09 Oct 2012	12
A1830	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100668	05 Mar 2012	12
A1834	Attenuator	Hewlett Packard	8491B	10444	26 Jul 2012	12
A2072	Directional Coupler	Narda	4242B	03549	Calibrated before use	-
A253	Antenna	Flann Microwave	12240-20	128	09 Oct 2012	12
A254	Antenna	Flann Microwave	14240-20	139	09 Oct 2012	12
A255	Antenna	Flann Microwave	16240-20	519	09 Oct 2012	12
A256	Antenna	Flann Microwave	18240-20	400	09 Oct 2012	12
A288	Antenna	Chase	CBL6111A	1589	25 Aug 2012	12
A436	Antenna	Flann	20240-20	330	09 Oct 2012	12
A553	Antenna	Chase	CBL6111A	1593	26 Mar 2012	12
K0001	5m RSE Chamber	Rainford EMC	N/A	N/A	29 May 2012	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	09 Oct 2012	12
M1124	Spectrum Analyser	Rohde & Schwarz	ESI26	100046K	29 Jun 2012	12
M1242	Spectrum Analyser	Rohde & Schwarz	FSEM30	845986/022	12 Dec 2012	12
M1273	Test Receiver	Rohde & Schwarz	ESIB 26	100275	04 Feb 2012	12
M1379	Test Receiver	Rohde & Schwarz	ESIB7	100330	20 Sep 2012	12

NB In accordance with UKAS requirements all the measurement equipment is on a calibration schedule.