

TEST REPORT FROM RFI GLOBAL SERVICES LTD

Test of: SoftBank EB-3236

FCC ID: UCE211047A

To: FCC Part 15.247: 2011 Subpart C

Test Report Serial No.:
RFI-RPT-RP85037JD01G

This Test Report Is Issued Under The Authority
Of Chris Guy, Head of Global Approvals:



Checked By:

Ian Watch

Signature:



Date of Issue:

31 January 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:	05 January 2012 to 16 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)(2)	Transmitter Minimum 6 dB Bandwidth	
Part 15.247(e)	Transmitter Power Spectral Density	
Part 15.247(b)(3)	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:	SoftBank
Model Name or Number:	EB-3236
IMEI:	004401221182070 (<i>Radiated sample 1</i>) 004401221182112 (<i>Radiated sample 2</i>) 004401221182088 (<i>Radiated sample 3</i>) 004401221182146 (<i>Conducted RF port sample 1</i>) 004401221182120 (<i>Conducted RF port sample 2</i>)
Hardware Version Number:	Rev C
Software Version Number:	ACPU: sbm-07-0192 CCPU: R1B_1_EC02_01_S02
FCC ID:	UCE211047A

Brand Name:	SoftBank
Description:	AC Charger
Model Name or Number:	PMCBD1
Hardware Version Number:	N0JZZY000007

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

Brand Name:	SoftBank
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

Technology Tested:	WLAN (IEEE 802.11)		
Type of Unit:	Transceiver		
Modulation Type:	BPSK, QPSK, 16 QAM and 64QAM		
Data Rate:	1, 2, 5.5, 11, 6, 9, 12, 18, 24, 36, 48, 54,6.5,13,19.5, 26, 39, 52, 58.5, 65, 7.2,14.4, 21.7, 28.9, 43.3, 57.8, 65 & 72.2 Mbps		
Declared Antenna Gain	-1.6 dBi		
Power Supply Requirement(s):	Nominal	3.8 V	
Maximum Conducted Output Power:	21.1 dBm		
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
Receive Frequency Range:	2412 MHz to 2462 MHz		
Receive 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:	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):

- Receiver/Idle mode.
- Continuously transmitting at maximum power on the bottom, middle and top channels as required using the supported data rates.

4.2. Configuration and Peripherals

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

- Controlled using a bespoke application on the laptop PC supplied by the Client. The application was used to enable continuous transmission and receive mode and to select the test channels, data rates and modulation schemes as required.
- Receive/Idle tests: The 802.11 mode was active but not transmitting.
- Transmitter spurious emissions were performed with the EUT transmitting with a data rate of 11 Mbps, as this was found to have the highest power level and therefore deemed to be worst case.
- Idle and transmitter radiated spurious emissions tests were performed with the AC charger and Personal Hands-Free connected to the EUT.
- The conducted sample with IMEI 004401221182120 was used for maximum output power tests.
- The radiated sample with IMEI 004401221182112 was used for transmitter band edge and transmitter radiated spurious emissions > 1 GHz tests.
- The conducted sample with IMEI 004401221182146 was used for bandwidth and PSD tests.
- The radiated sample with IMEI 004401221182088 was used for the receiver/idle mode radiated spurious emissions < 1 GHz test.
- The radiated sample with IMEI 004401221182070 was used for all other 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:	Sarah Williams	Test Date:	16 January 2012
Test Sample IMEI:	004401221182070		

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 (dBμV)	Limit (dBμV)	Margin (dB)	Result
0.407	Live	38.2	57.7	19.5	Complied
0.528	Live	31.3	56.0	24.7	Complied
0.798	Live	35.3	56.0	20.7	Complied
0.960	Live	34.1	56.0	21.9	Complied
1.617	Live	35.6	56.0	20.4	Complied
2.108	Live	34.0	56.0	22.0	Complied

Results: Live / Average

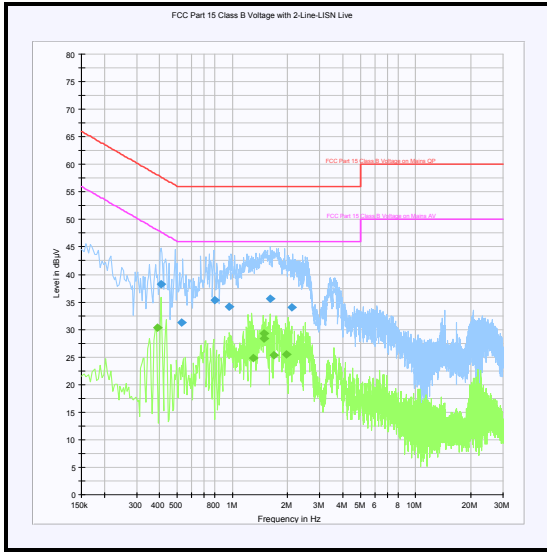
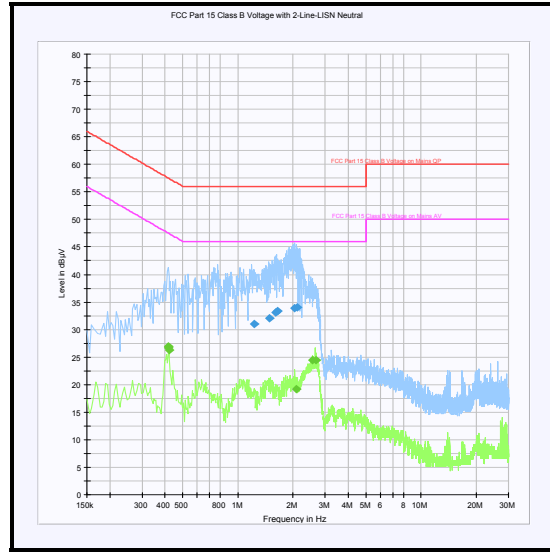
Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
0.389	Live	30.4	48.1	17.7	Complied
1.307	Live	24.8	46.0	21.2	Complied
1.496	Live	28.3	46.0	17.7	Complied
1.496	Live	29.3	46.0	16.7	Complied
1.676	Live	25.4	46.0	20.6	Complied
1.973	Live	25.5	46.0	20.5	Complied

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
1.226	Neutral	30.9	56.0	25.1	Complied
1.487	Neutral	32.1	56.0	23.9	Complied
1.617	Neutral	33.1	56.0	22.9	Complied
1.649	Neutral	33.4	56.0	22.6	Complied
2.036	Neutral	33.9	56.0	22.1	Complied
2.108	Neutral	34.0	56.0	22.0	Complied

Results: Neutral / Average

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.416	Neutral	26.7	47.5	20.8	Complied
0.416	Neutral	26.9	47.5	20.6	Complied
0.420	Neutral	26.3	47.4	21.2	Complied
2.076	Neutral	19.1	46.0	26.9	Complied
2.567	Neutral	24.4	46.0	21.6	Complied
2.666	Neutral	24.5	46.0	21.5	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:	Nick Steele	Test Date:	06 January 2012
Test Sample IMEI:	004401221182088		

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

Environmental Conditions:

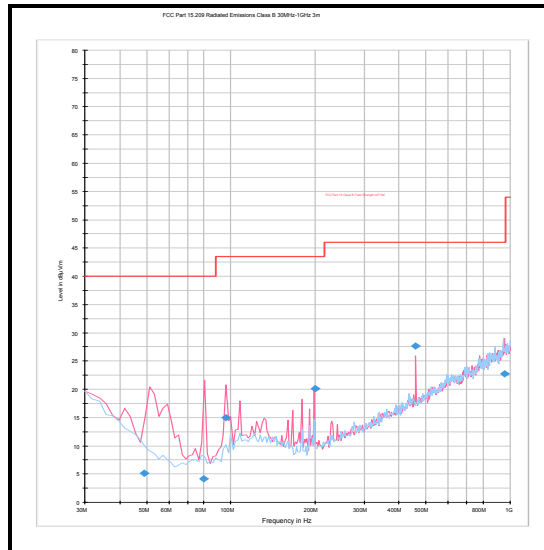
Temperature (°C):	23
Relative Humidity (%):	26

Results: Quasi Peak

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
49.002	Vertical	5.1	40.0	34.9	Complied
80.007	Vertical	4.1	40.0	35.9	Complied
96.039	Vertical	14.9	43.5	28.6	Complied
199.998	Vertical	20.1	43.5	23.4	Complied
458.777	Vertical	27.7	46.0	18.3	Complied
955.401	Vertical	22.7	46.0	23.3	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 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:	Mark Percival & Sarah Williams	Test Date:	05 January 2012
Test Sample IMEI:	004401221182070		

FCC Part:	15.109
Test Method Used:	As detailed in ANSI C63.4 Section 8
Frequency Range:	1 GHz to 12.75 GHz

Environmental Conditions:

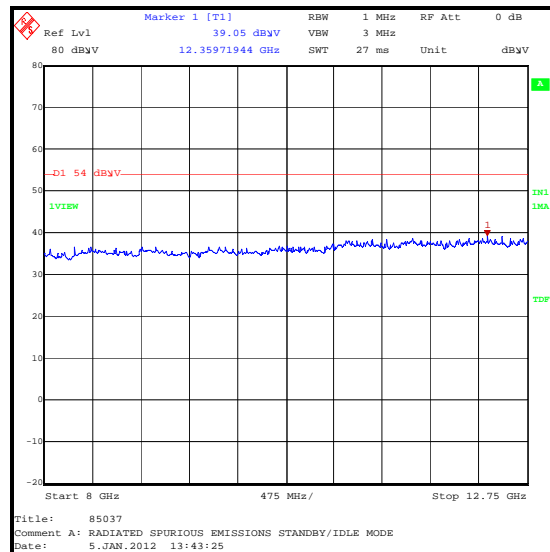
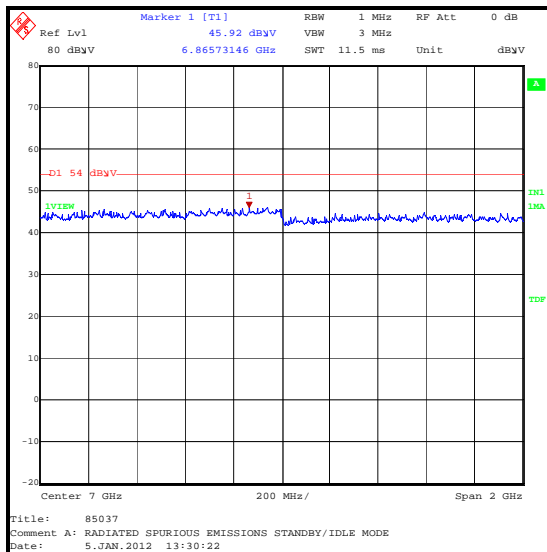
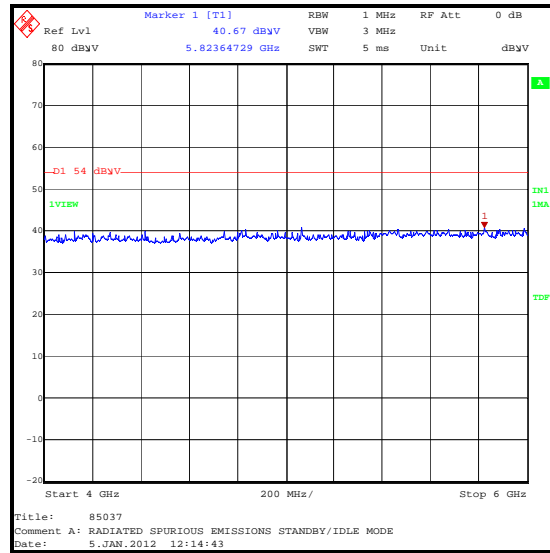
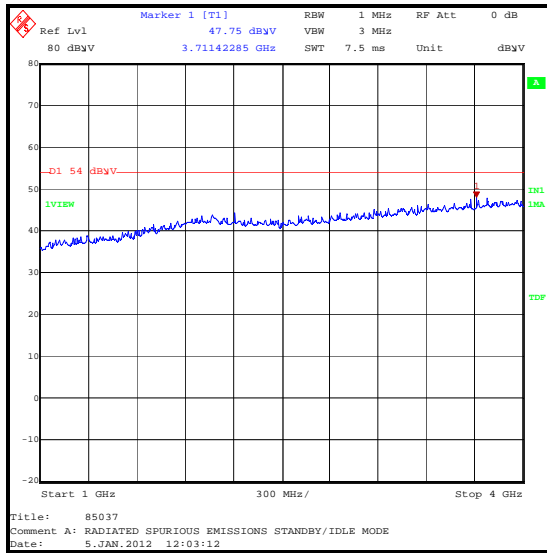
Temperature (°C):	21
Relative Humidity (%):	35

Results:

Frequency (MHz)	Antenna Polarity	Peak Level (dBμV/m)	Average Limit (dBμV/m)	Margin (dB)	Result
3711.423	Horizontal	47.8	54.0	6.2	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:	Sarah Williams	Test Date:	16 January 2012
Test Sample IMEI:	004401221182070		

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
0.407	Live	41.0	57.7	16.7	Complied
0.636	Live	32.6	56.0	23.4	Complied
0.771	Live	35.6	56.0	20.4	Complied
0.852	Live	40.7	56.0	15.3	Complied
1.181	Live	42.4	56.0	13.6	Complied
2.027	Live	41.1	56.0	14.9	Complied

Results: Live / Average

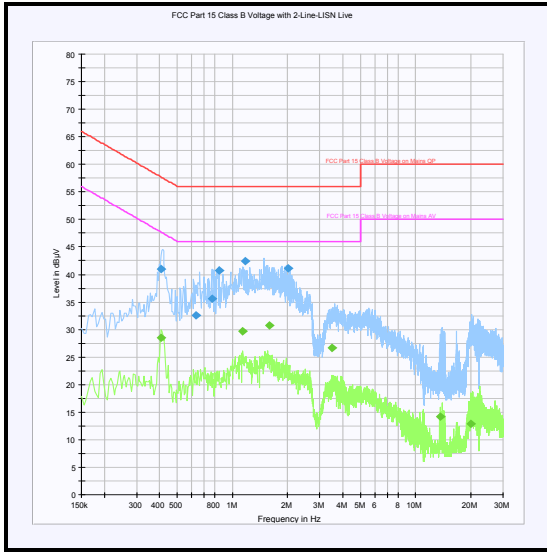
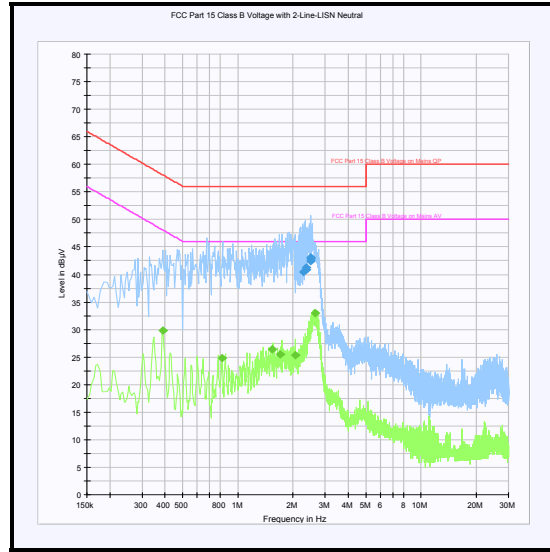
Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.407	Live	28.5	47.7	19.2	Complied
1.131	Live	29.6	46.0	16.4	Complied
1.586	Live	30.8	46.0	15.2	Complied
3.507	Live	26.6	46.0	19.4	Complied
13.668	Live	14.3	50.0	35.7	Complied
19.991	Live	12.8	50.0	37.2	Complied

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

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
2.274	Neutral	40.5	56.0	15.5	Complied
2.351	Neutral	40.8	56.0	15.2	Complied
2.355	Neutral	41.2	56.0	14.8	Complied
2.486	Neutral	43.1	56.0	12.9	Complied
2.495	Neutral	42.8	56.0	13.2	Complied
2.504	Neutral	42.5	56.0	13.5	Complied

Results: Neutral / Average

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.389	Neutral	29.8	48.1	18.3	Complied
0.816	Neutral	24.8	46.0	21.2	Complied
1.545	Neutral	26.4	46.0	19.6	Complied
1.712	Neutral	25.5	46.0	20.5	Complied
2.054	Neutral	25.3	46.0	20.7	Complied
2.657	Neutral	33.0	46.0	13.0	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 6 dB Bandwidth**Test Summary:**

Test Engineer:	Mark Percival & Sarah Williams	Test Dates:	06 January 2012 & 10 January 2012
Test Sample IMEI:	004401221182146		

FCC Part:	15.247(a)(2)
Test Method Used:	As detailed in ANSI C63.10 Section 6.9.1

Environmental Conditions:

Temperature (°C):	23
Relative Humidity (%):	29

Results: 1 Mbps

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	10.100	≥0.5	9.600	Complied
Middle	10.066	≥0.5	9.566	Complied
Top	10.020	≥0.5	9.520	Complied

Results: 2 Mbps

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	9.780	≥0.5	9.280	Complied
Middle	9.780	≥0.5	9.280	Complied
Top	9.780	≥0.5	9.280	Complied

Results: 5.5 Mbps

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	10.501	≥0.5	10.001	Complied
Middle	10.020	≥0.5	9.520	Complied
Top	10.261	≥0.5	9.761	Complied

Transmitter 6 dB Bandwidth (continued)**Results: 11 Mbps**

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	10.341	≥0.5	9.841	Complied
Middle	10.100	≥0.5	9.600	Complied
Top	10.180	≥0.5	9.680	Complied

Results: 6 Mbps

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	16.273	≥0.5	15.773	Complied
Middle	16.192	≥0.5	15.692	Complied
Top	16.192	≥0.5	15.692	Complied

Results: 9 Mbps

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	16.112	≥0.5	15.612	Complied
Middle	16.112	≥0.5	15.612	Complied
Top	16.112	≥0.5	15.612	Complied

Results: 12 Mbps

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	16.433	≥0.5	15.933	Complied
Middle	16.192	≥0.5	15.692	Complied
Top	16.192	≥0.5	15.692	Complied

Results: 18 Mbps

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	16.433	≥0.5	15.993	Complied
Middle	16.112	≥0.5	15.612	Complied
Top	16.273	≥0.5	15.773	Complied

Results: 24 Mbps

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	16.754	≥0.5	16.254	Complied
Middle	16.673	≥0.5	16.173	Complied
Top	16.273	≥0.5	15.773	Complied

Transmitter 6 dB Bandwidth (continued)**Results: 36 Mbps**

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	16.673	≥0.5	16.173	Complied
Middle	16.673	≥0.5	16.173	Complied
Top	16.673	≥0.5	16.173	Complied

Results: 48 Mbps

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	16.673	≥0.5	16.173	Complied
Middle	16.673	≥0.5	16.173	Complied
Top	16.673	≥0.5	16.173	Complied

Results: 54 Mbps

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	16.673	≥0.5	16.173	Complied
Middle	16.673	≥0.5	16.173	Complied
Top	16.673	≥0.5	16.173	Complied

Results: 6.5 Mbps

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	17.315	≥0.5	16.815	Complied
Middle	17.395	≥0.5	16.895	Complied
Top	17.395	≥0.5	16.895	Complied

Results: 13 Mbps

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	17.315	≥0.5	16.815	Complied
Middle	17.395	≥0.5	16.895	Complied
Top	17.635	≥0.5	17.135	Complied

Results: 19.5 Mbps

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	17.395	≥0.5	16.895	Complied
Middle	17.315	≥0.5	16.815	Complied
Top	17.475	≥0.5	16.975	Complied

Transmitter 6 dB Bandwidth (continued)**Results: 26 Mbps**

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	17.956	≥0.5	17.456	Complied
Middle	17.876	≥0.5	17.376	Complied
Top	17.956	≥0.5	17.456	Complied

Results: 39 Mbps

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	17.956	≥0.5	17.456	Complied
Middle	17.956	≥0.5	17.456	Complied
Top	17.936	≥0.5	17.436	Complied

Results: 52 Mbps

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	18.036	≥0.5	17.536	Complied
Middle	18.036	≥0.5	17.536	Complied
Top	18.036	≥0.5	17.536	Complied

Results: 58.5 Mbps

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	17.836	≥0.5	17.336	Complied
Middle	18.036	≥0.5	17.536	Complied
Top	17.936	≥0.5	17.436	Complied

Results: 65 Mbps

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	18.036	≥0.5	17.536	Complied
Middle	17.936	≥0.5	17.436	Complied
Top	17.936	≥0.5	17.436	Complied

Results: 7.2 Mbps

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	17.335	≥0.5	16.835	Complied
Middle	17.285	≥0.5	16.785	Complied
Top	17.134	≥0.5	16.634	Complied

Transmitter 6 dB Bandwidth (continued)**Results: 14.4 Mbps**

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	17.134	≥0.5	16.634	Complied
Middle	17.535	≥0.5	17.035	Complied
Top	17.435	≥0.5	16.935	Complied

Results: 21.7 Mbps

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	17.435	≥0.5	16.935	Complied
Middle	17.535	≥0.5	17.035	Complied
Top	17.435	≥0.5	16.935	Complied

Results: 28.9 Mbps

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	17.936	≥0.5	17.436	Complied
Middle	18.036	≥0.5	17.536	Complied
Top	17.936	≥0.5	17.436	Complied

Results: 43.3 Mbps

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	17.836	≥0.5	17.336	Complied
Middle	17.936	≥0.5	17.436	Complied
Top	17.936	≥0.5	17.436	Complied

Results: 57.8 Mbps

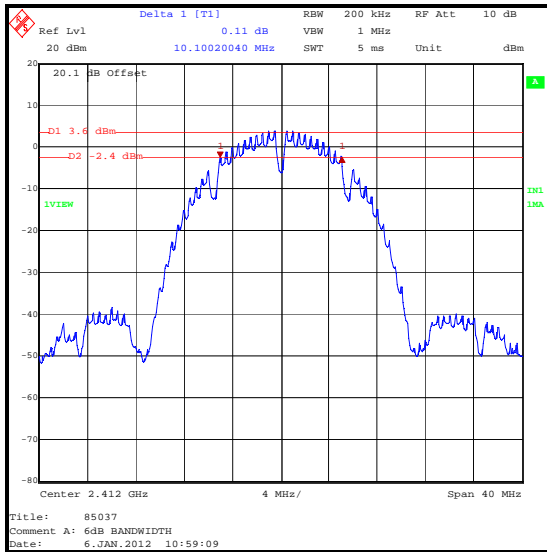
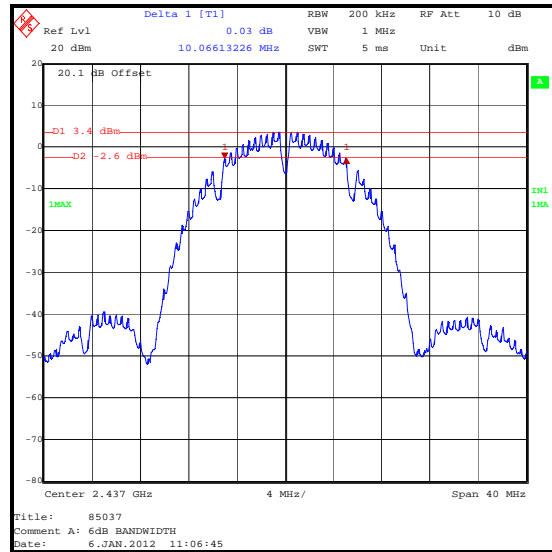
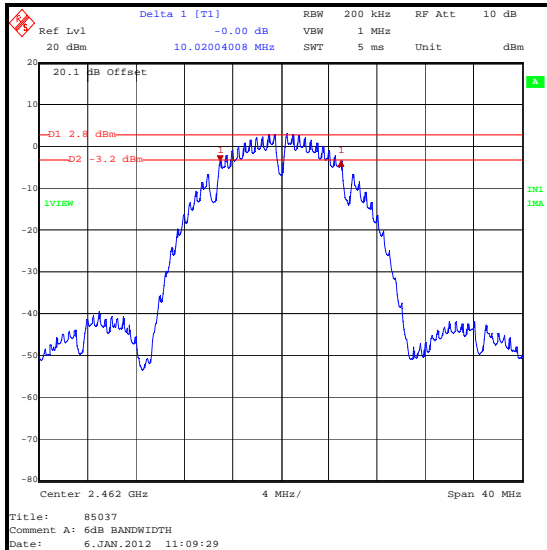
Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	18.036	≥0.5	17.536	Complied
Middle	18.036	≥0.5	17.536	Complied
Top	18.036	≥0.5	17.536	Complied

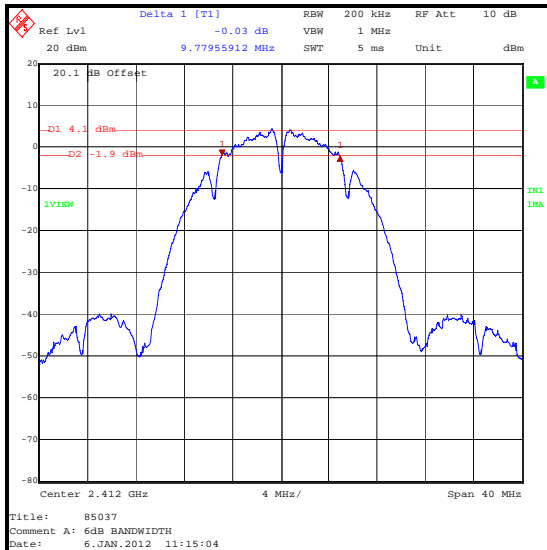
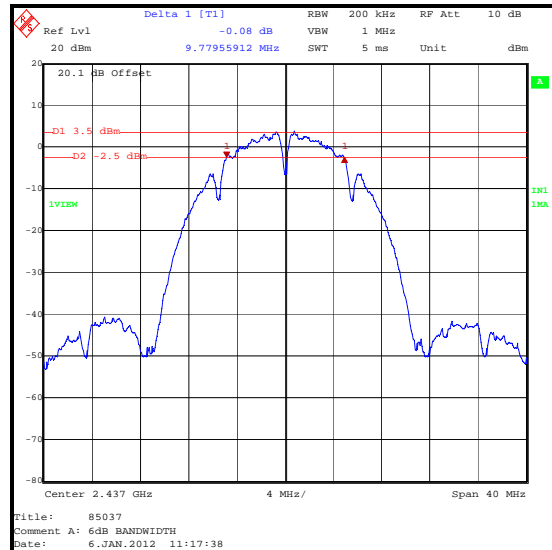
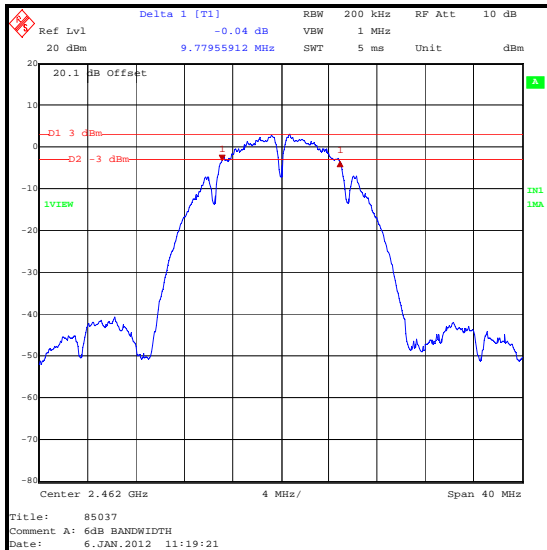
Results: 65 Mbps

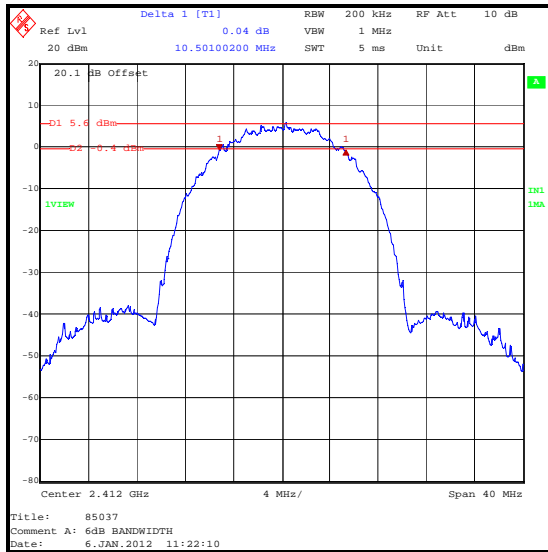
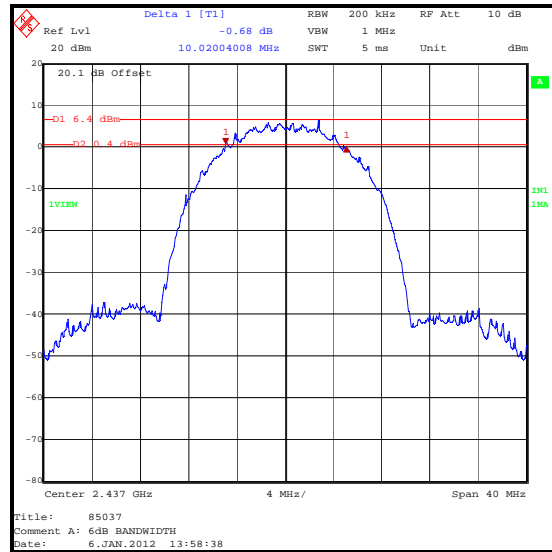
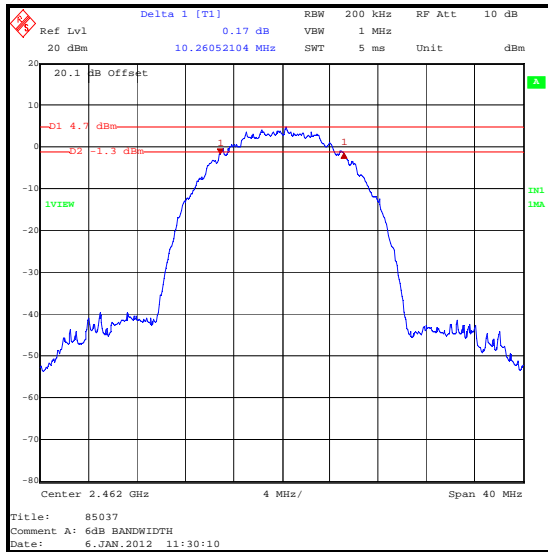
Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	18.036	≥0.5	17.536	Complied
Middle	18.036	≥0.5	17.536	Complied
Top	18.036	≥0.5	17.536	Complied

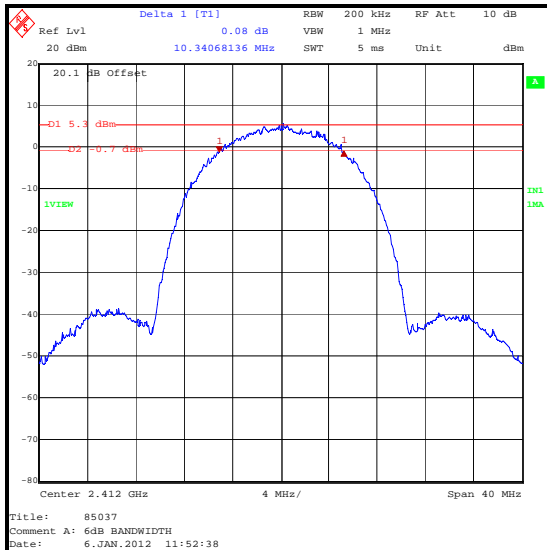
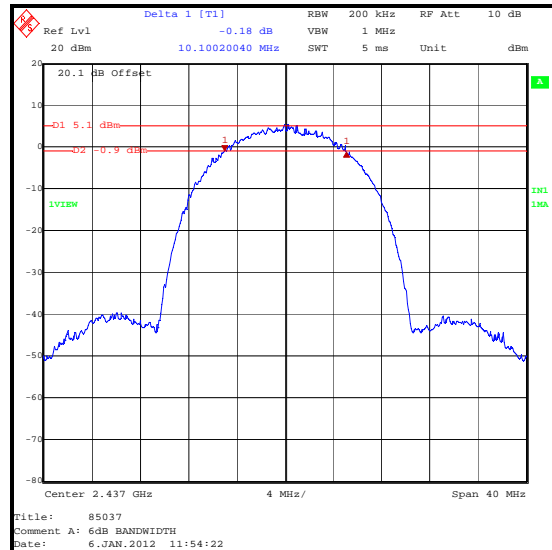
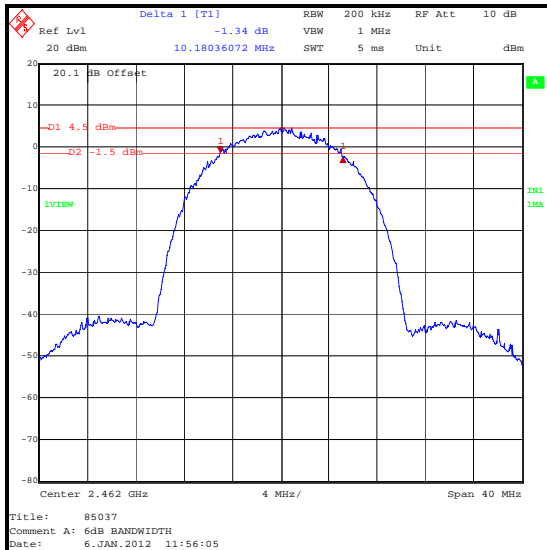
Transmitter 6 dB Bandwidth (continued)**Results: 72.2 Mbps**

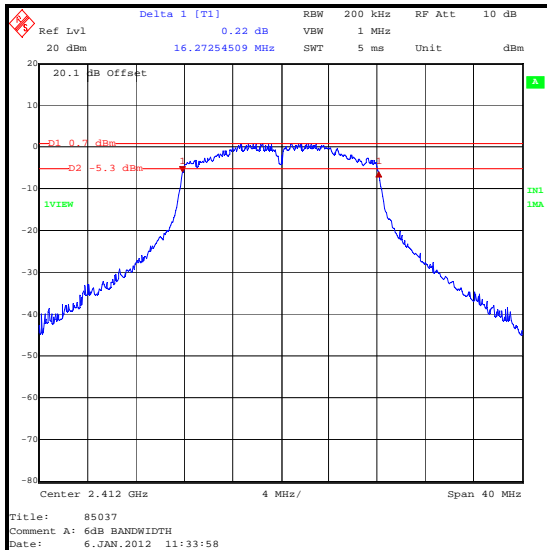
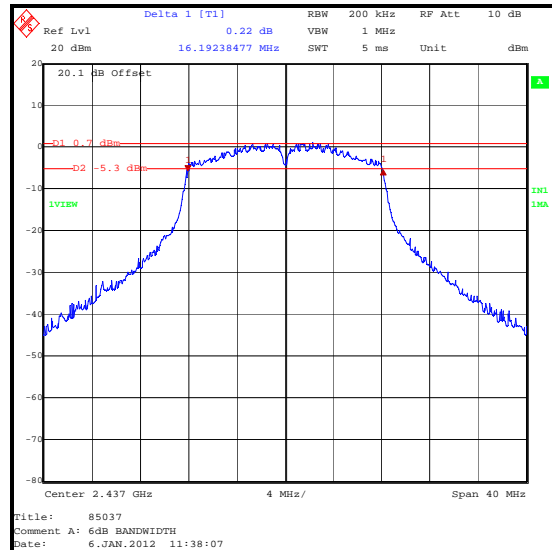
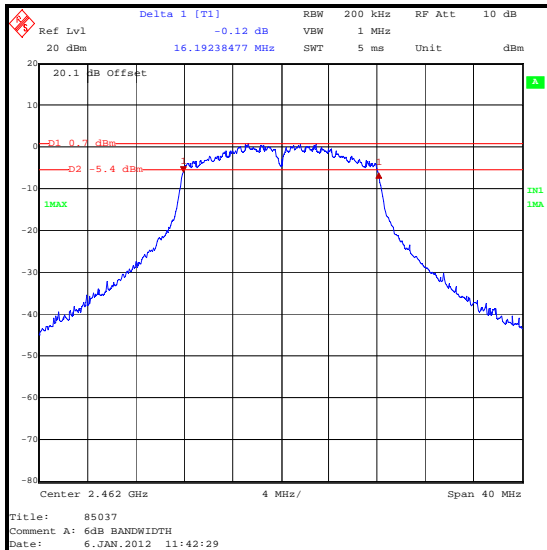
Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	18.036	≥0.5	17.536	Complied
Middle	18.036	≥0.5	17.536	Complied
Top	18.036	≥0.5	17.536	Complied

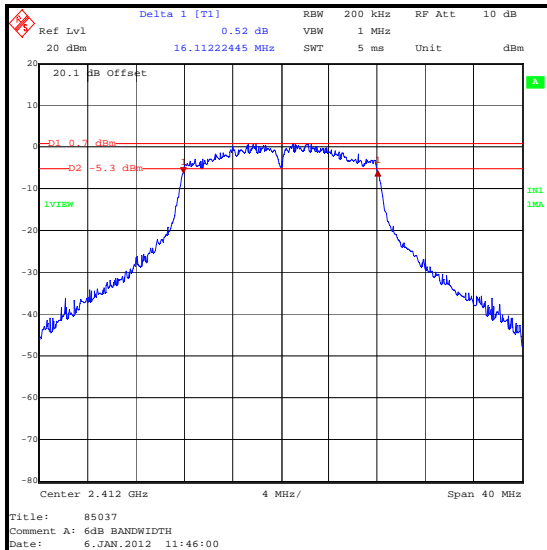
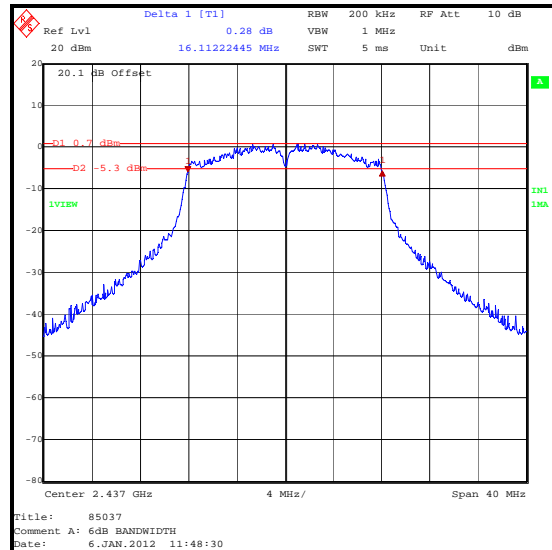
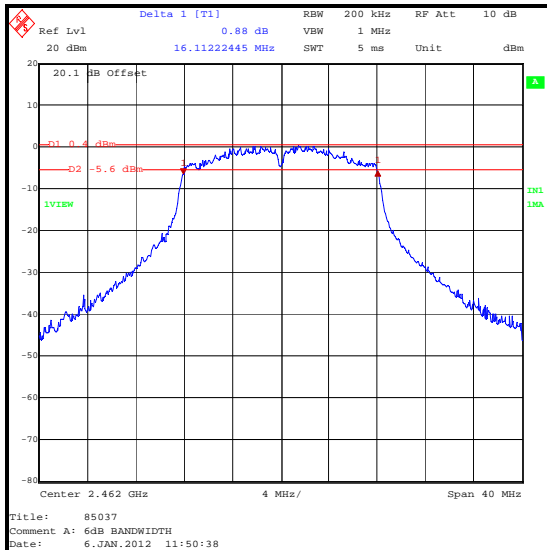
Transmitter 6 dB Bandwidth (continued)**Results: 1 Mbps****Bottom channel****Middle channel****Top channel**

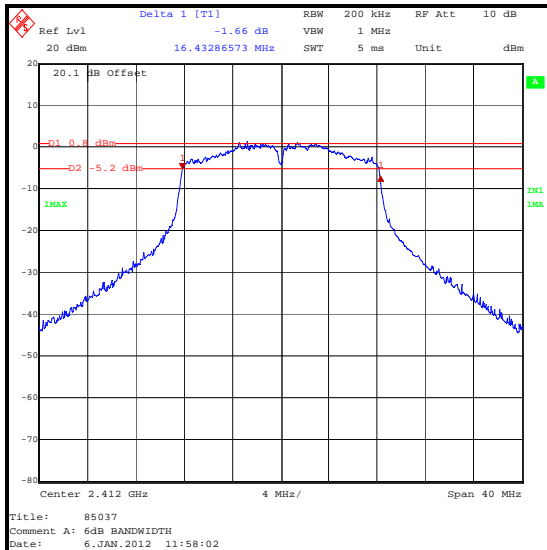
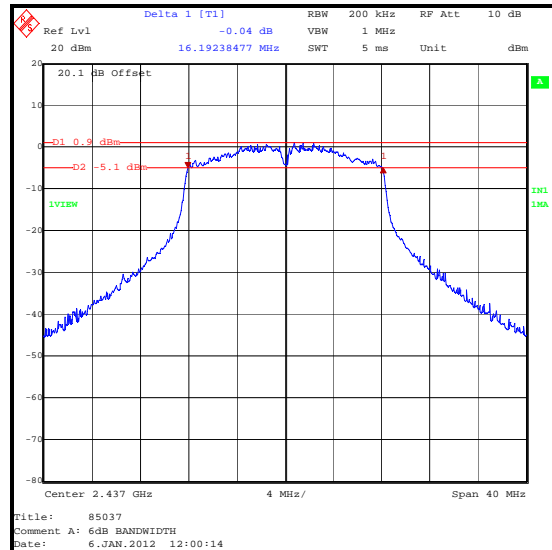
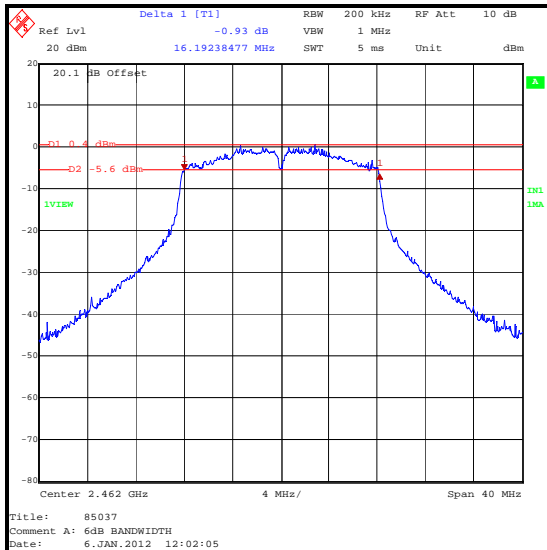
Transmitter 6 dB Bandwidth (continued)**Results: 2 Mbps****Bottom channel****Middle channel****Top channel**

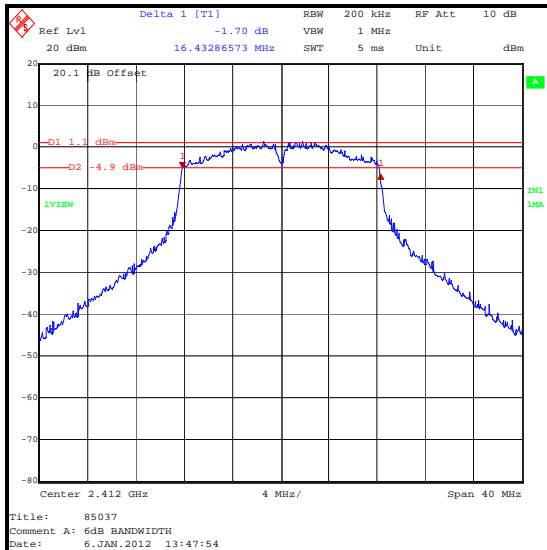
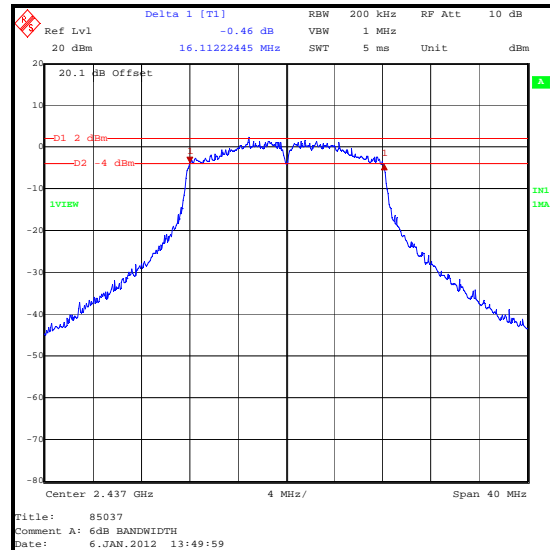
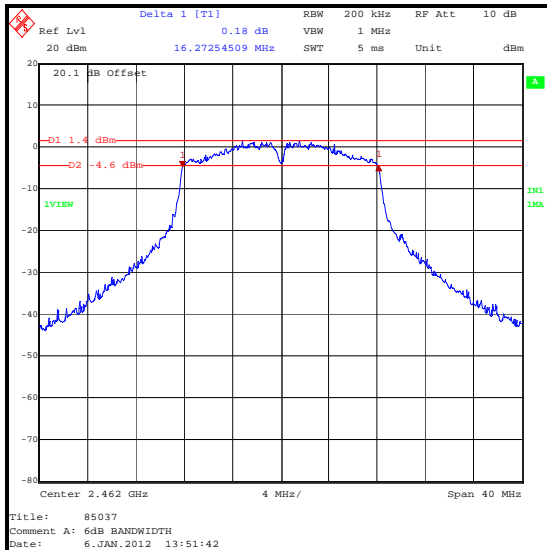
Transmitter 6 dB Bandwidth (continued)**Results: 5.5 Mbps****Bottom channel****Middle channel****Top channel**

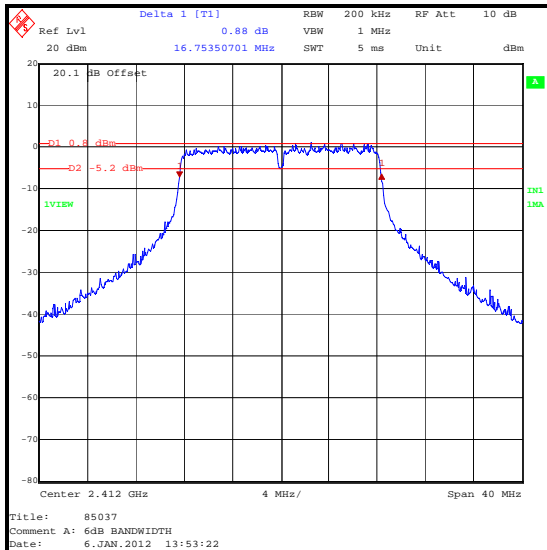
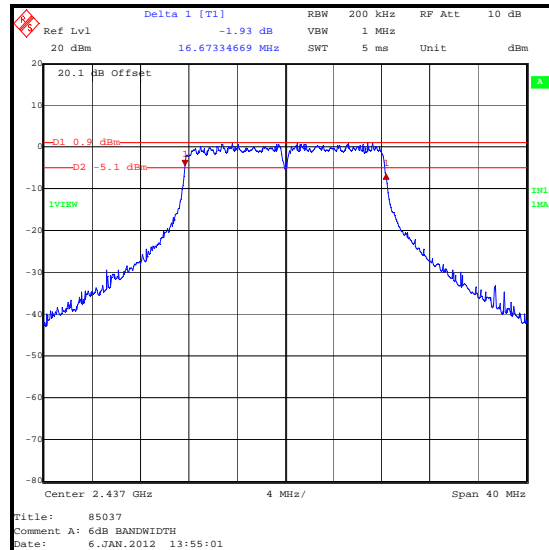
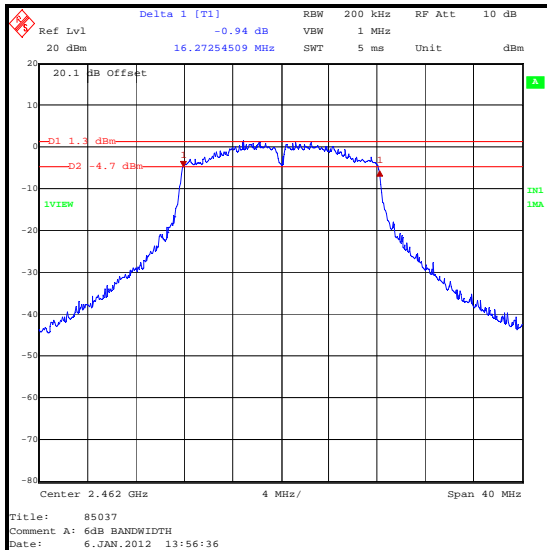
Transmitter 6 dB Bandwidth (continued)**Results: 11 Mbps****Bottom channel****Middle channel****Top channel**

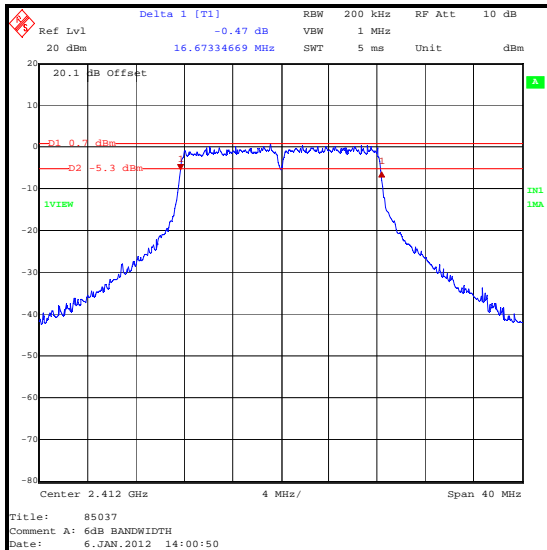
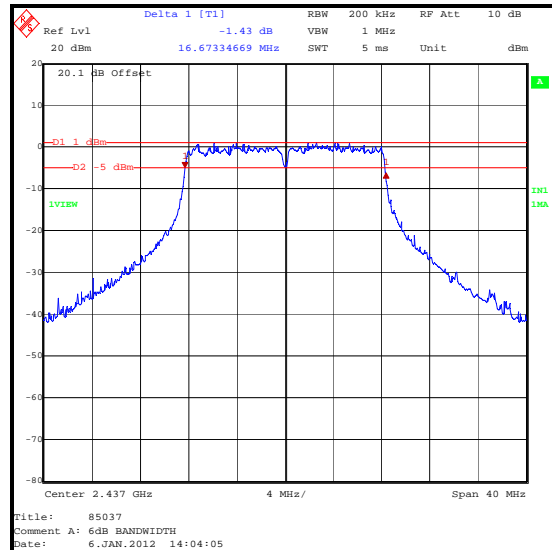
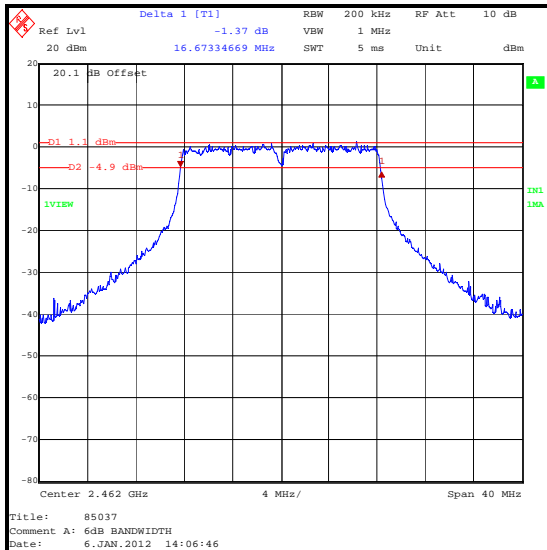
Transmitter 6 dB Bandwidth (continued)**Results: 6 Mbps****Bottom channel****Middle channel****Top channel**

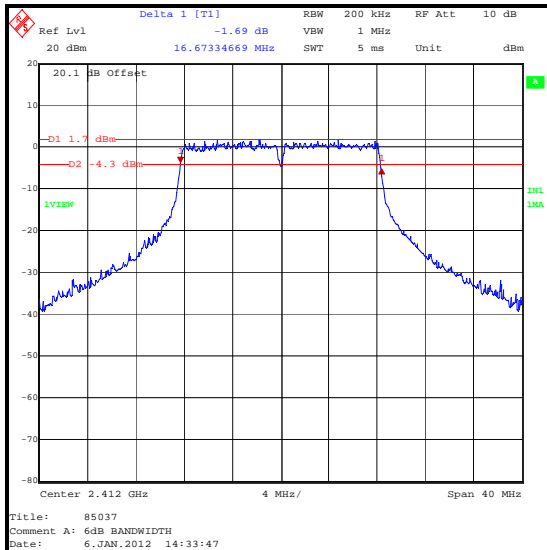
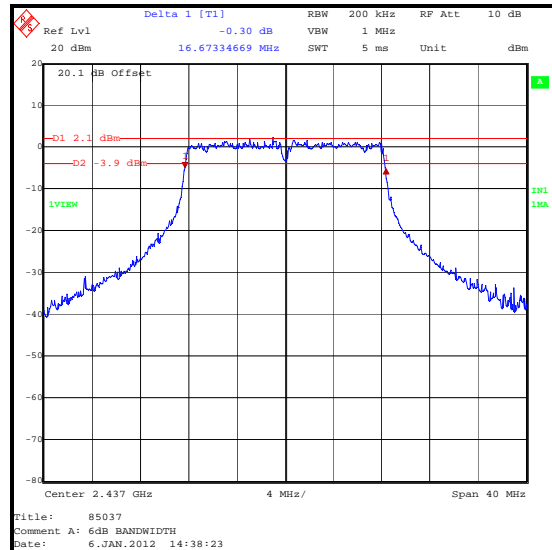
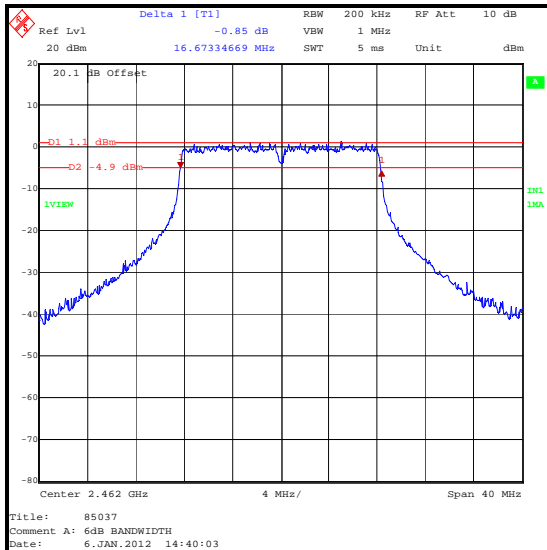
Transmitter 6 dB Bandwidth (continued)**Results: 9 Mbps****Bottom channel****Middle channel****Top channel**

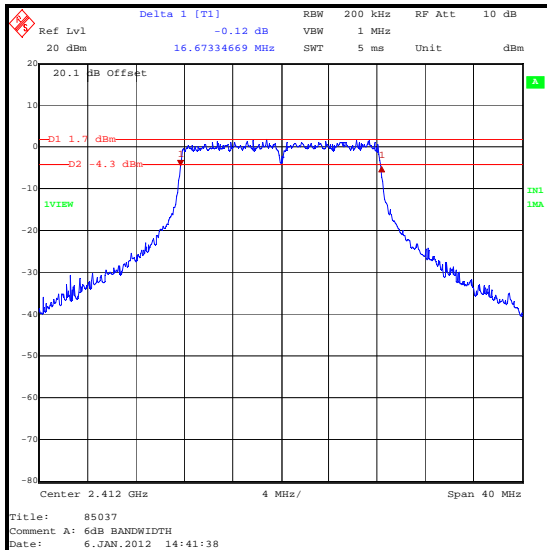
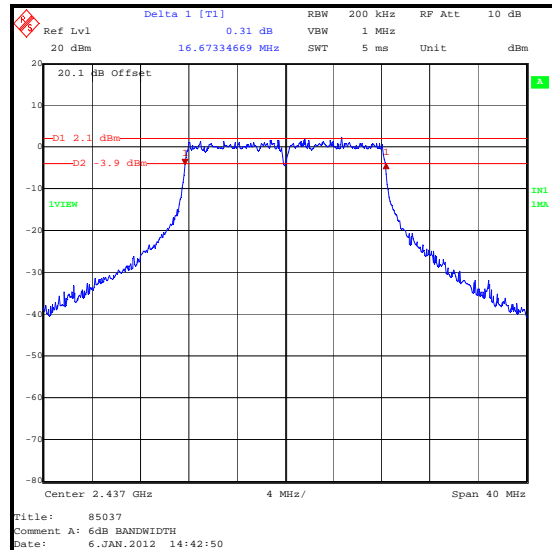
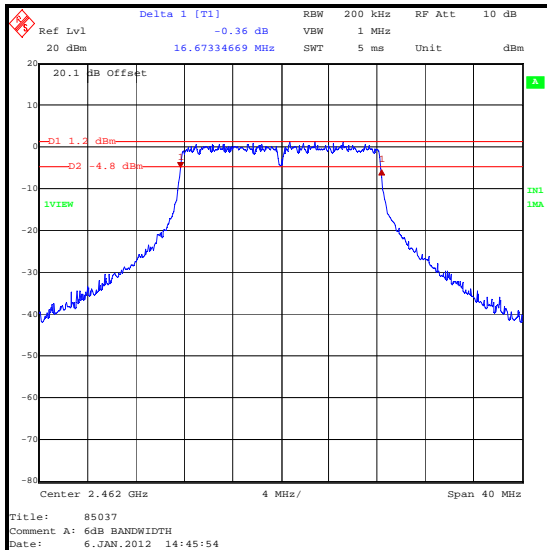
Transmitter 6 dB Bandwidth (continued)**Results: 12 Mbps****Bottom channel****Middle channel****Top channel**

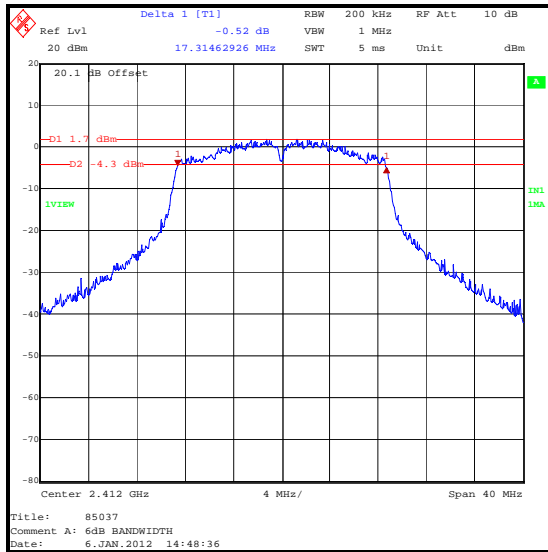
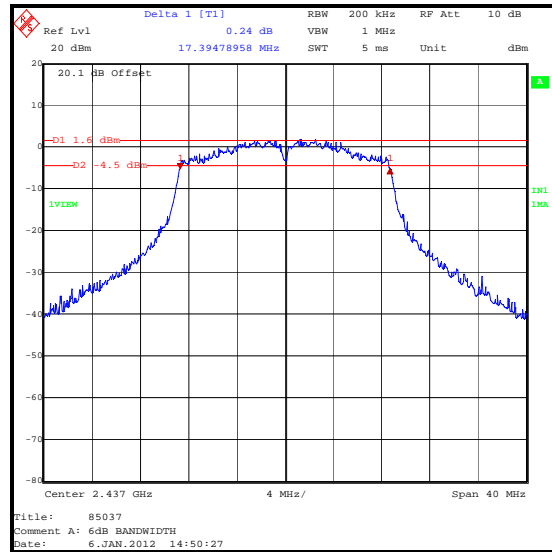
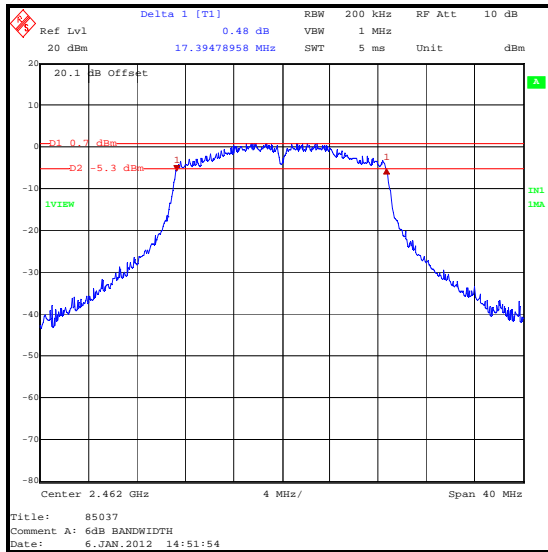
Transmitter 6 dB Bandwidth (continued)**Results: 18 Mbps****Bottom channel****Middle channel****Top channel**

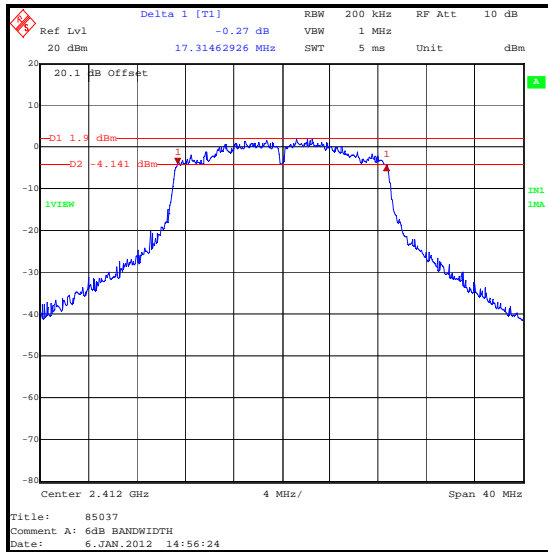
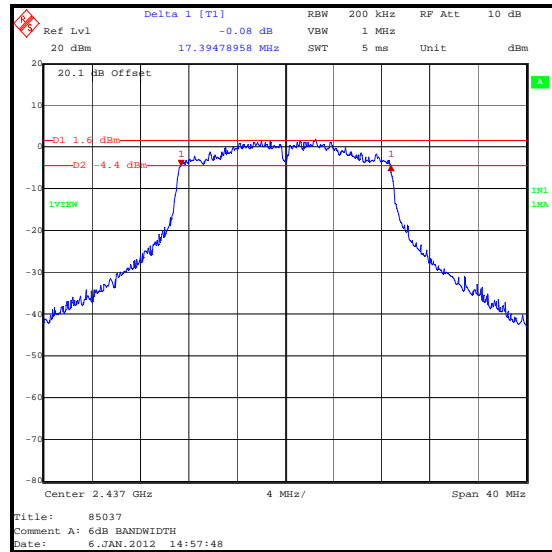
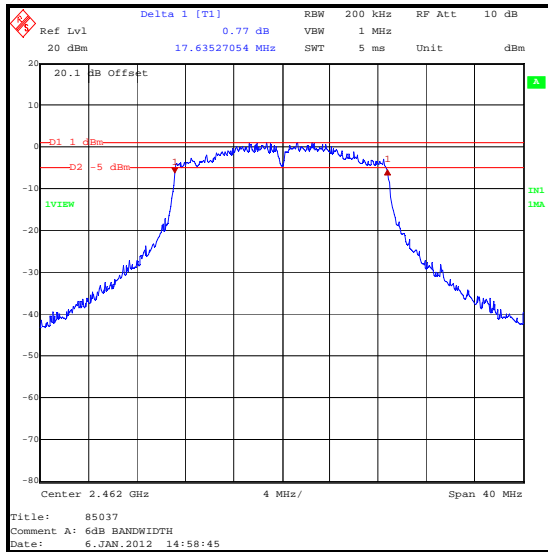
Transmitter 6 dB Bandwidth (continued)**Results: 24 Mbps****Bottom channel****Middle channel****Top channel**

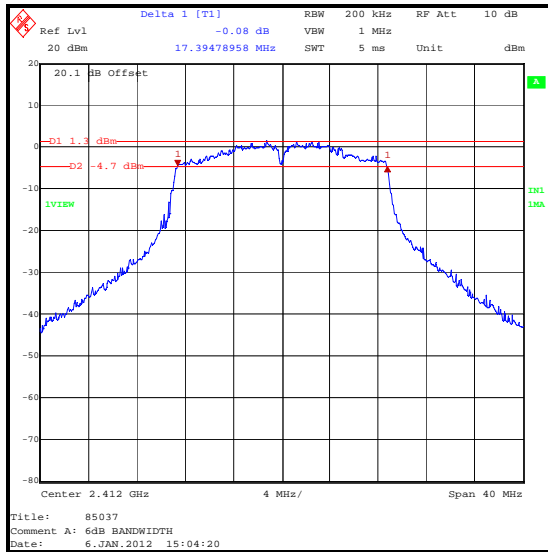
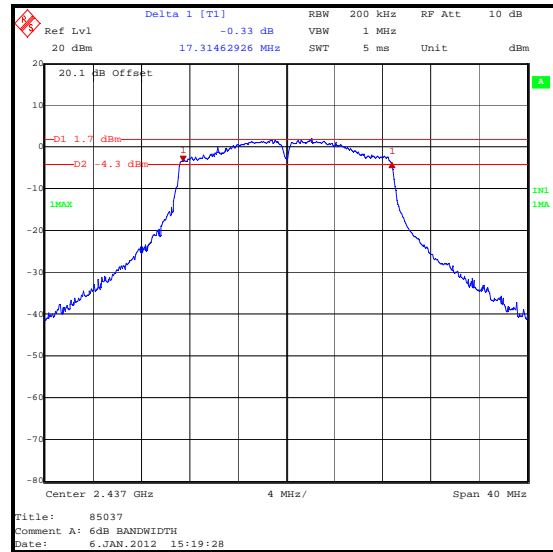
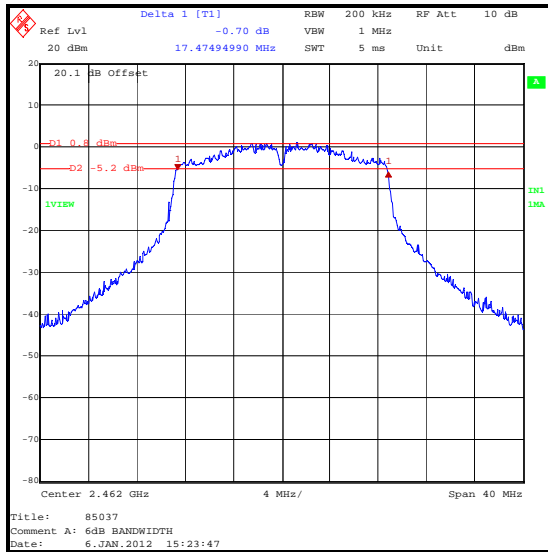
Transmitter 6 dB Bandwidth (continued)**Results: 36 Mbps****Bottom channel****Middle channel****Top channel**

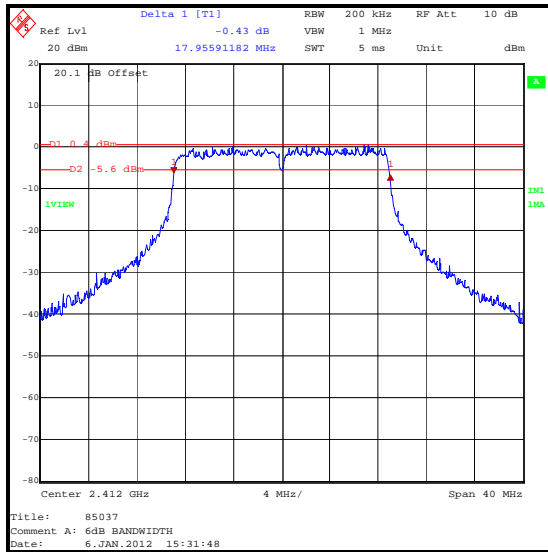
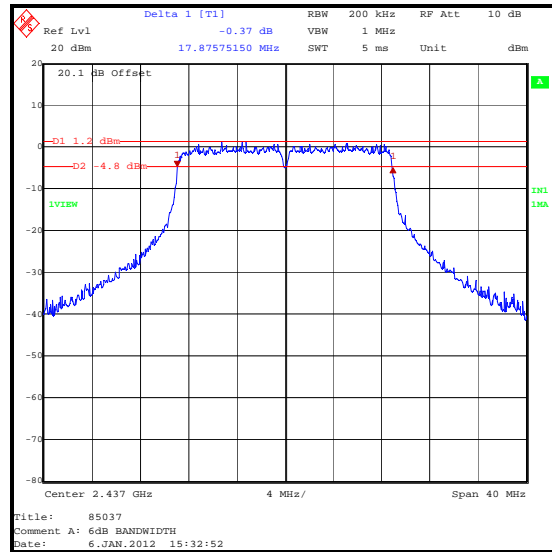
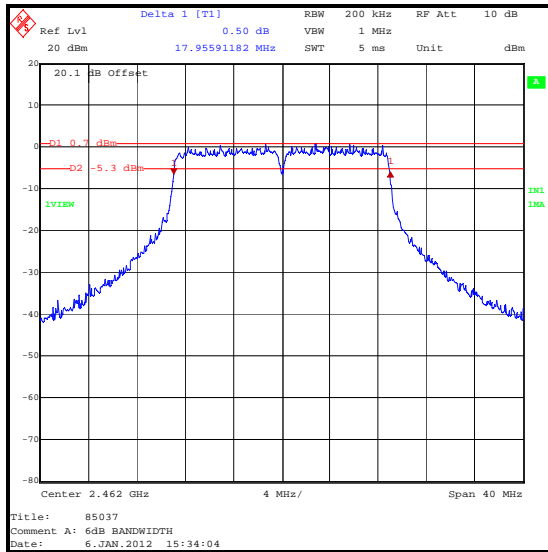
Transmitter 6 dB Bandwidth (continued)**Results: 48 Mbps****Bottom channel****Middle channel****Top channel**

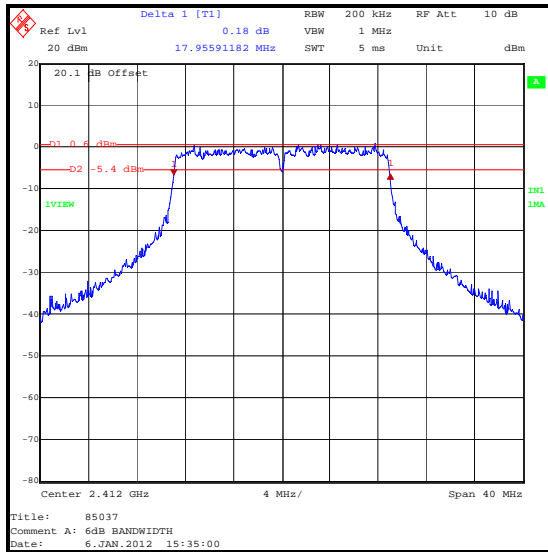
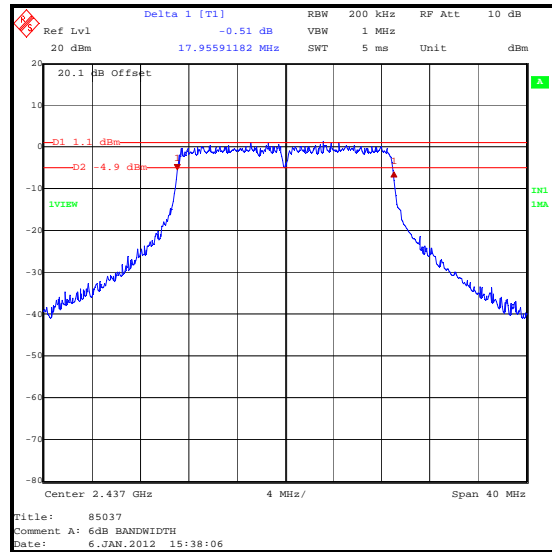
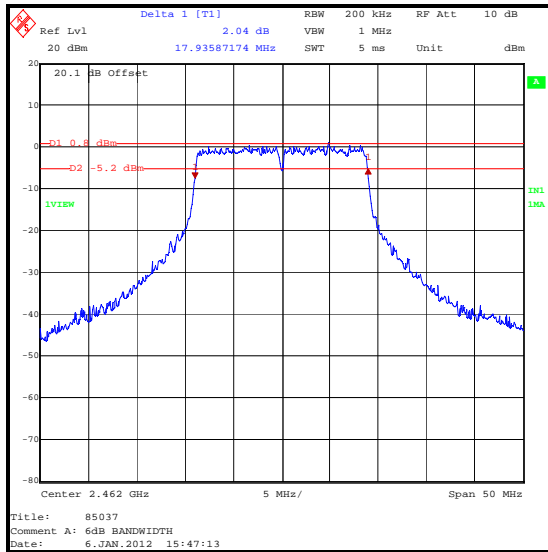
Transmitter 6 dB Bandwidth (continued)**Results: 54 Mbps****Bottom channel****Middle channel****Top channel**

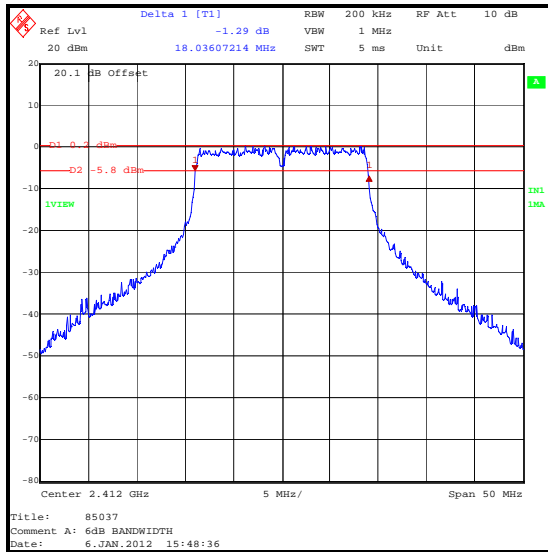
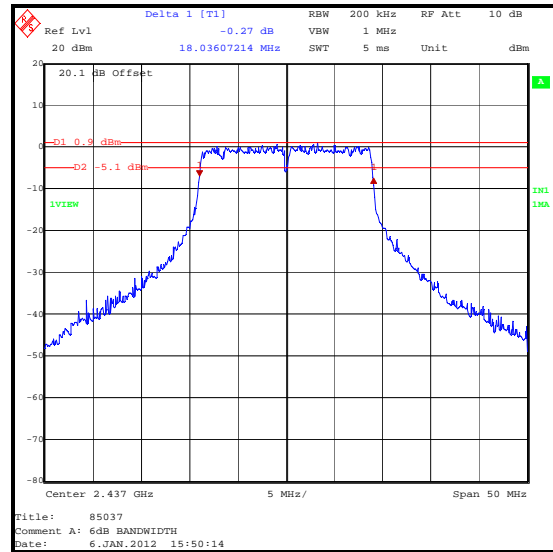
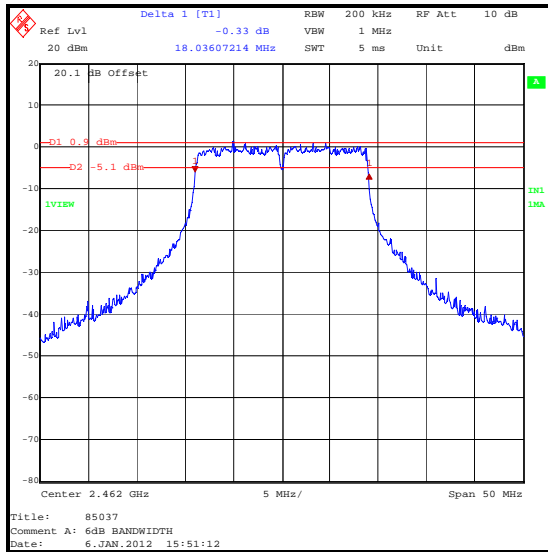
Transmitter 6 dB Bandwidth (continued)**Results: 6.5 Mbps****Bottom channel****Middle channel****Top channel**

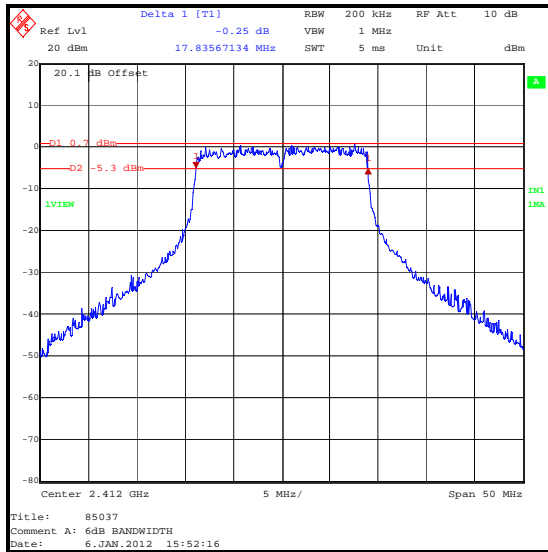
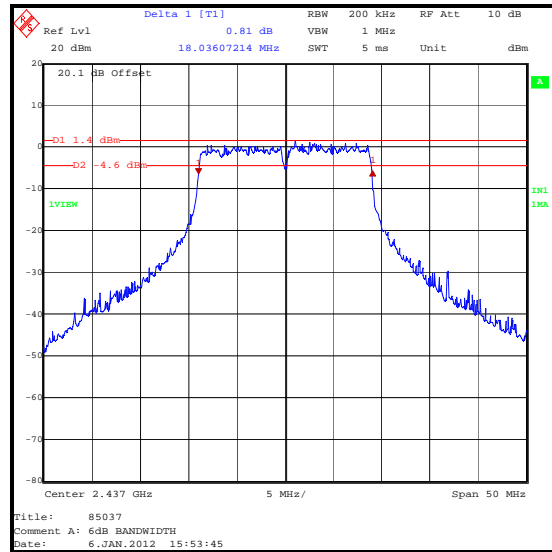
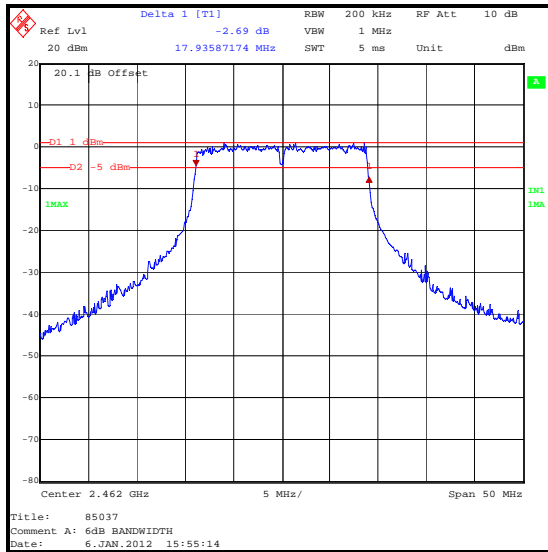
Transmitter 6 dB Bandwidth (continued)**Results: 13 Mbps****Bottom channel****Middle channel****Top channel**

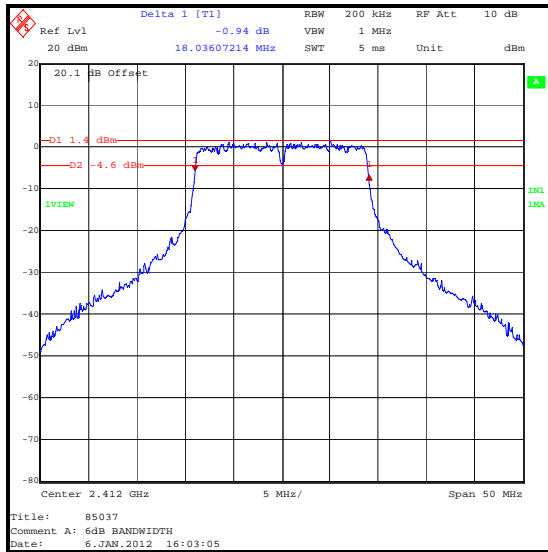
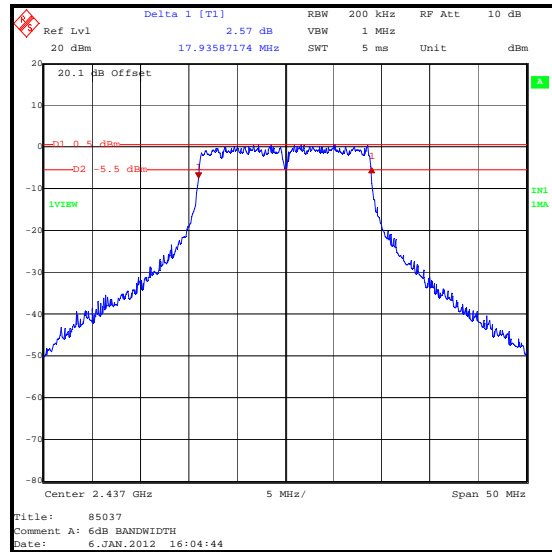
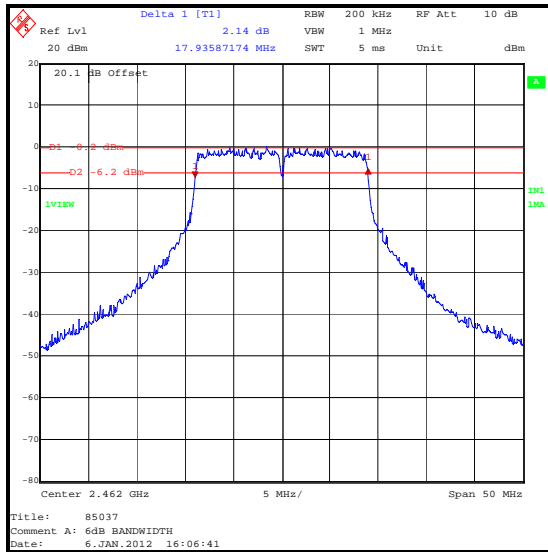
Transmitter 6 dB Bandwidth (continued)**Results: 19.5 Mbps****Bottom channel****Middle channel****Top channel**

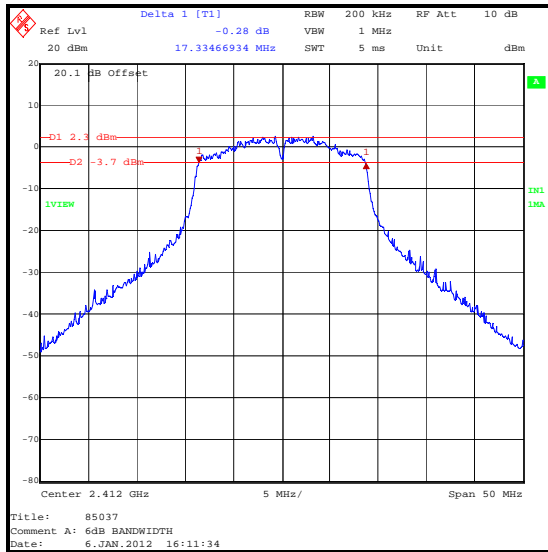
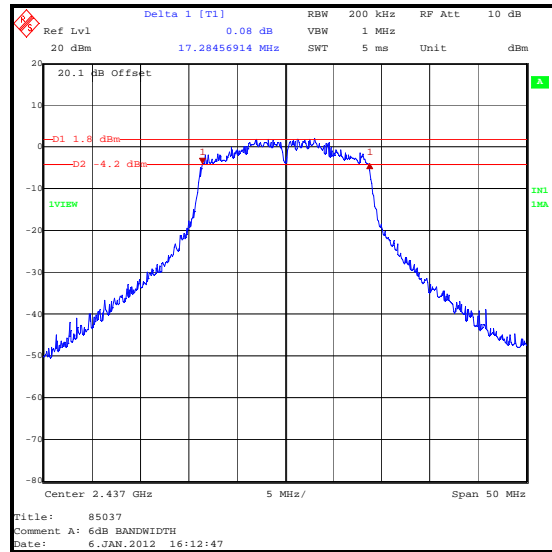
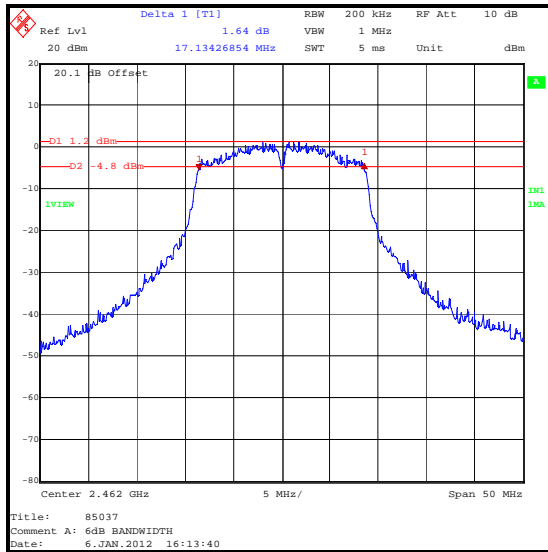
Transmitter 6 dB Bandwidth (continued)**Results: 26 Mbps****Bottom channel****Middle channel****Top channel**

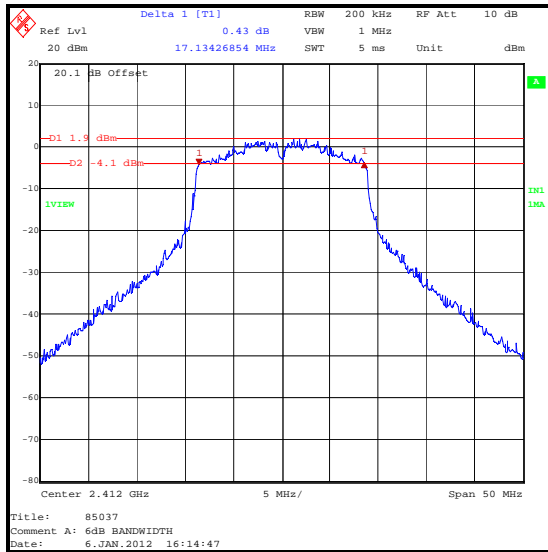
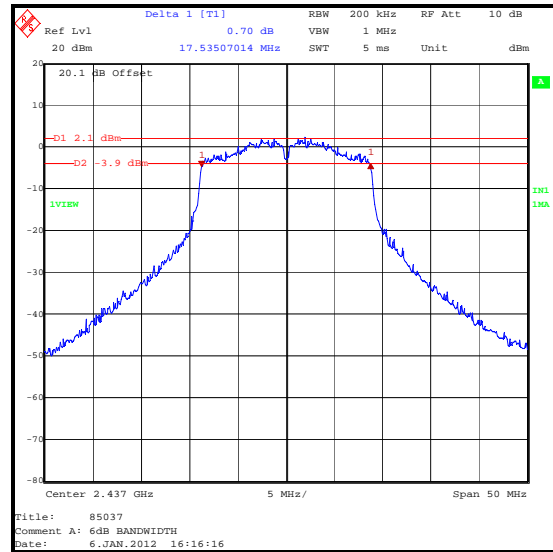
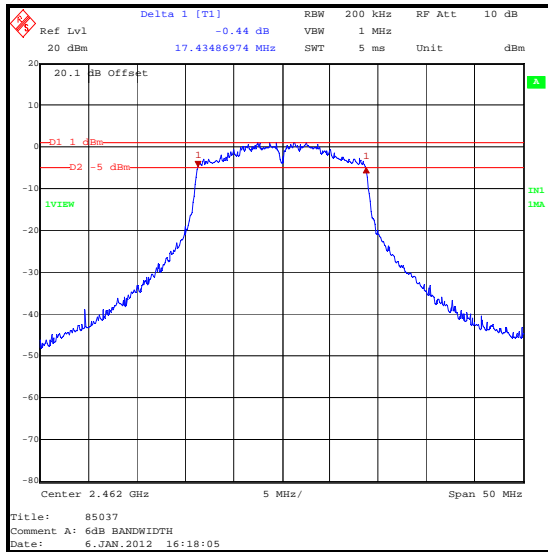
Transmitter 6 dB Bandwidth (continued)**Results: 39 Mbps****Bottom channel****Middle channel****Top channel**

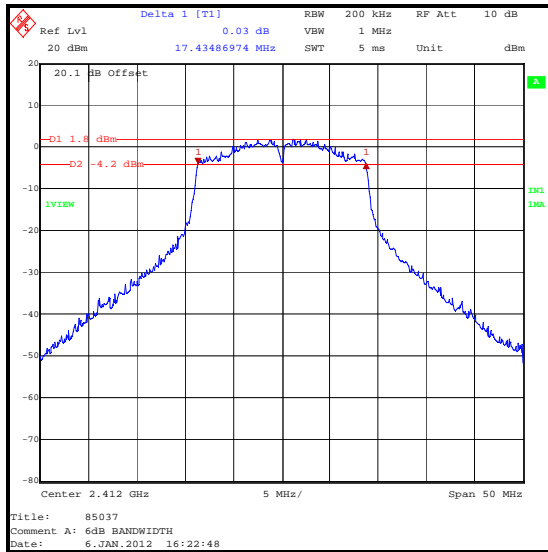
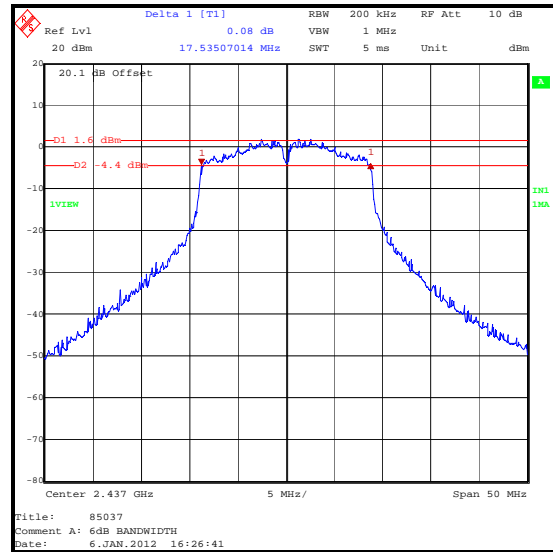
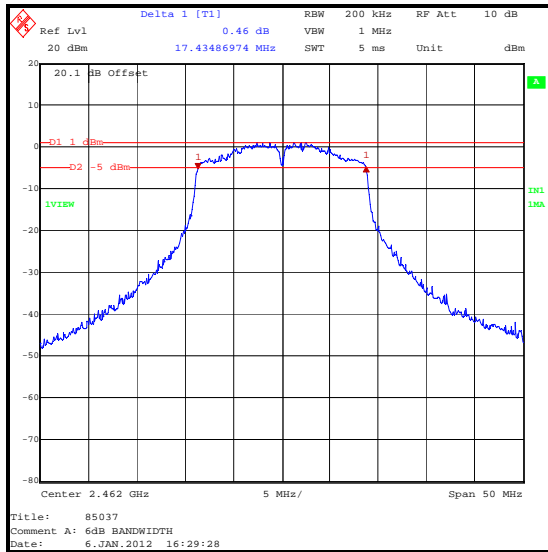
Transmitter 6 dB Bandwidth (continued)**Results: 52 Mbps****Bottom channel****Middle channel****Top channel**

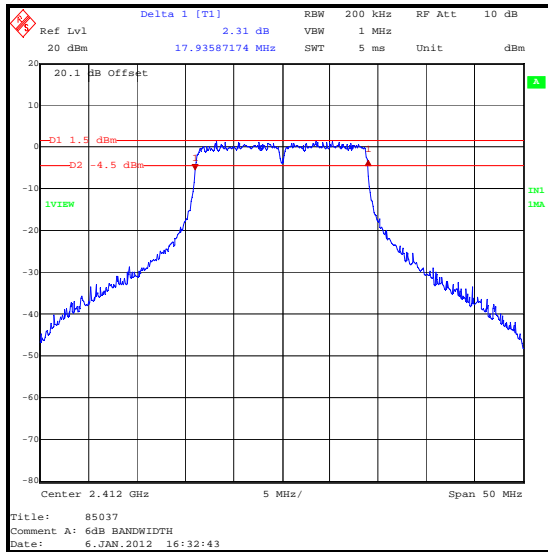
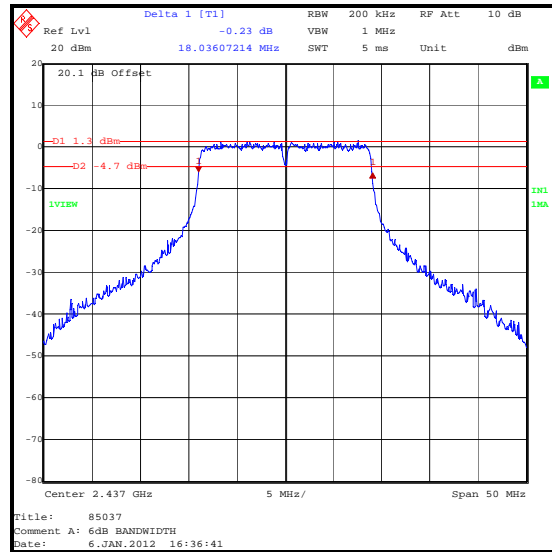
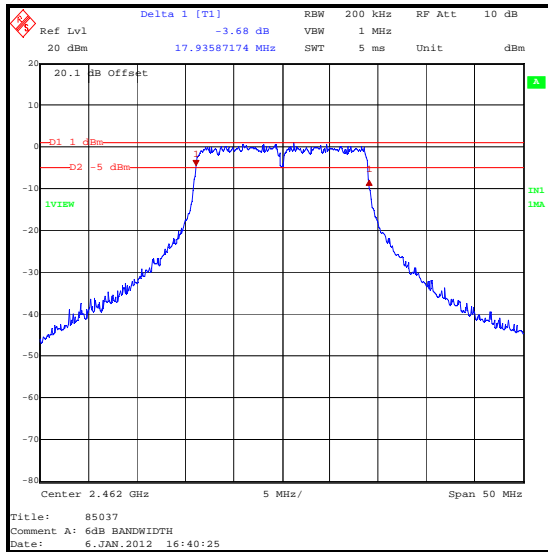
Transmitter 6 dB Bandwidth (continued)**Results: 58.5 Mbps****Bottom channel****Middle channel****Top channel**

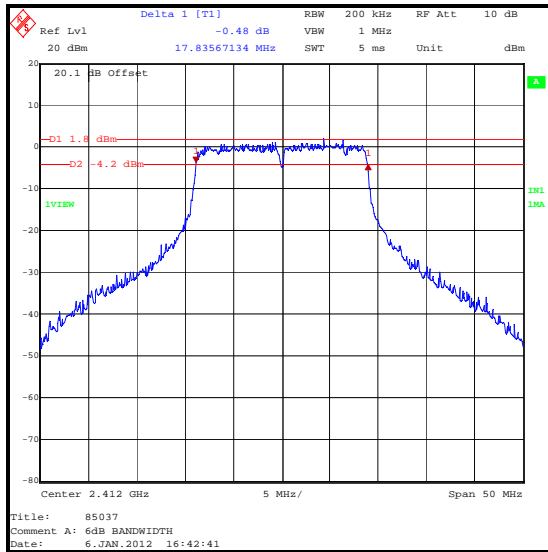
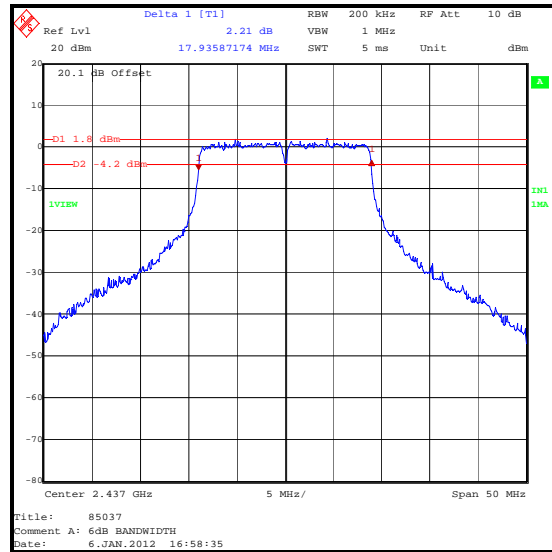
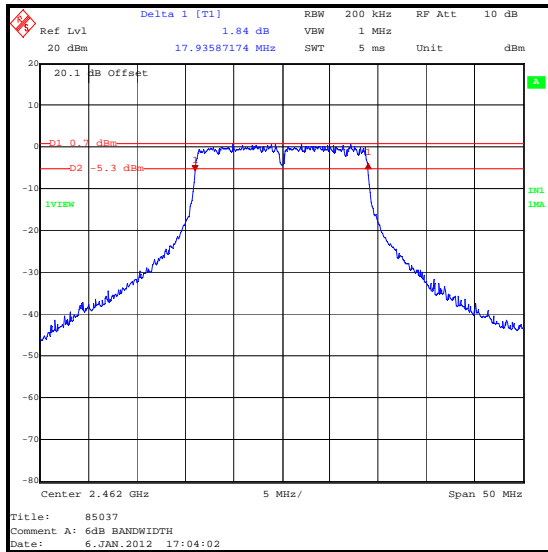
Transmitter 6 dB Bandwidth (continued)**Results: 65 Mbps****Bottom channel****Middle channel****Top channel**

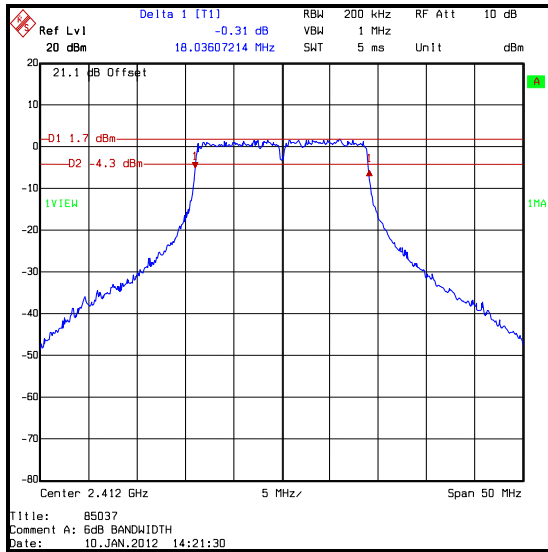
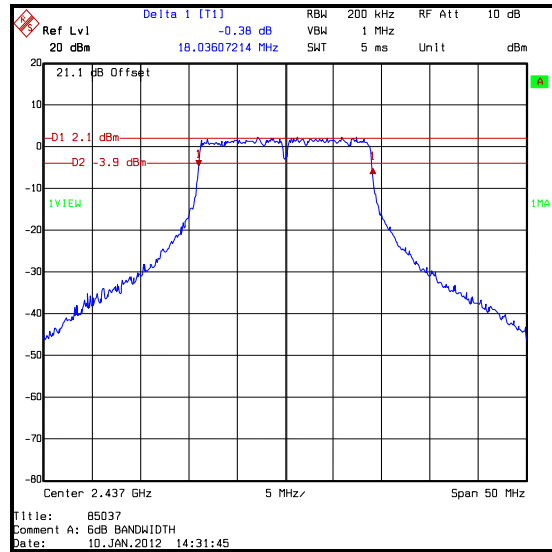
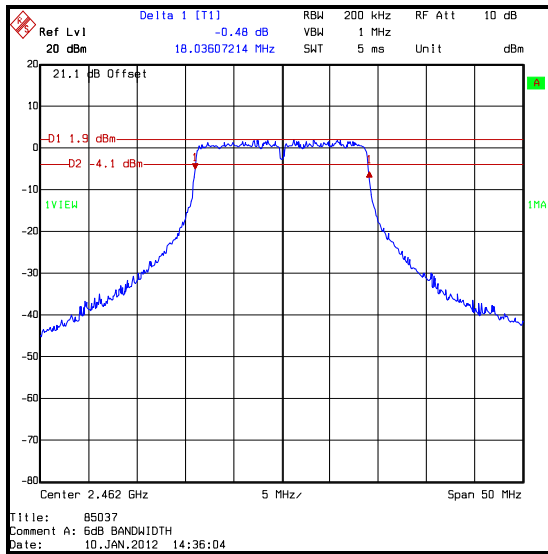
Transmitter 6 dB Bandwidth (continued)**Results: 7.2 Mbps****Bottom channel****Middle channel****Top channel**

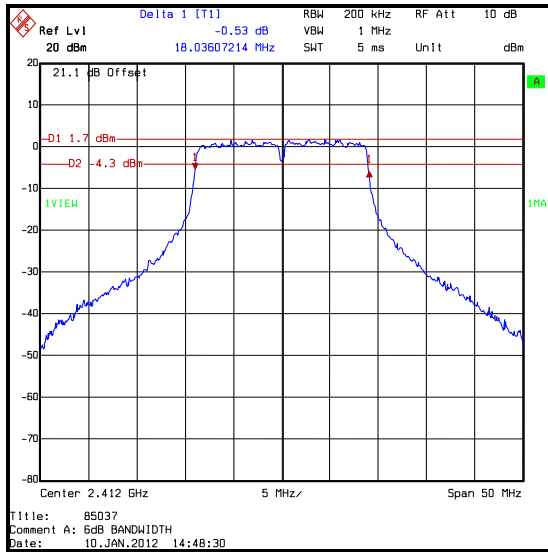
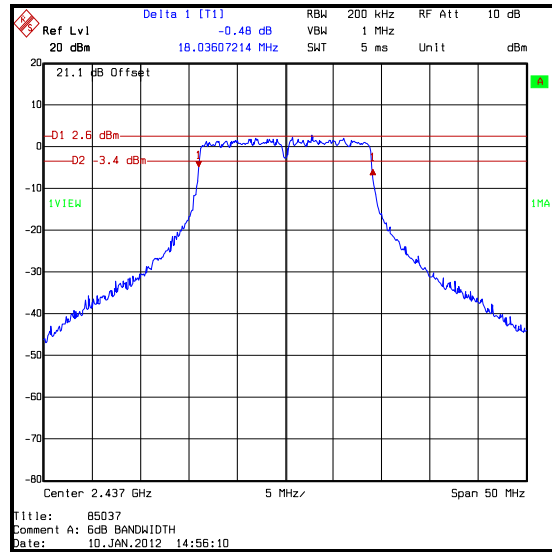
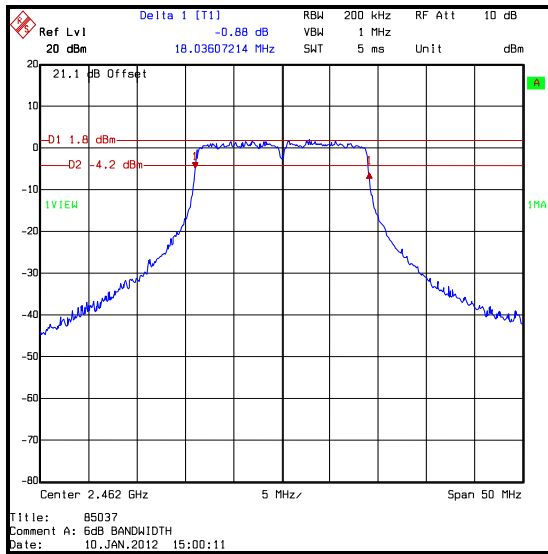
Transmitter 6 dB Bandwidth (continued)**Results: 14.4 Mbps****Bottom channel****Middle channel****Top channel**

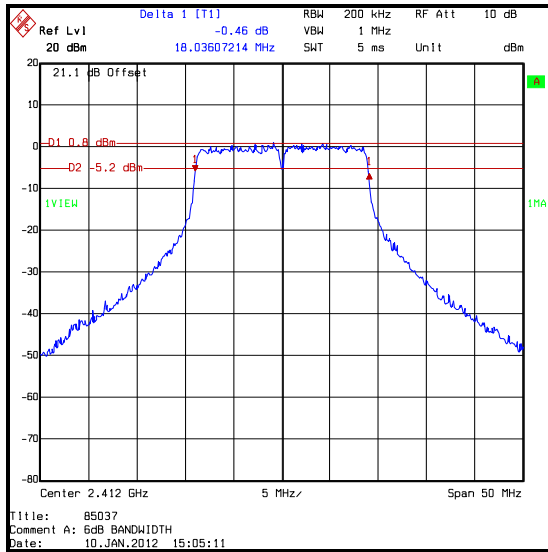
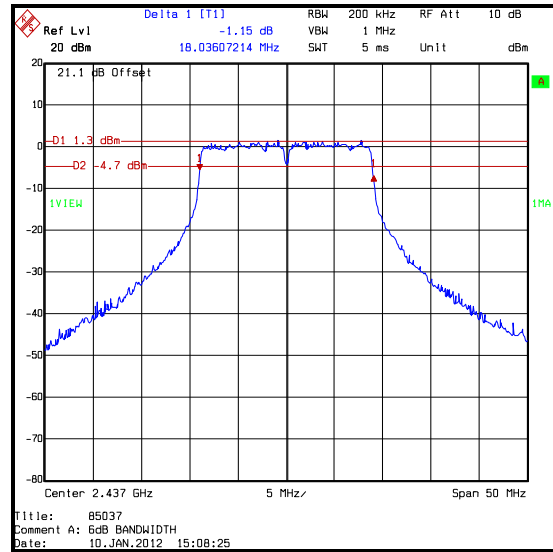
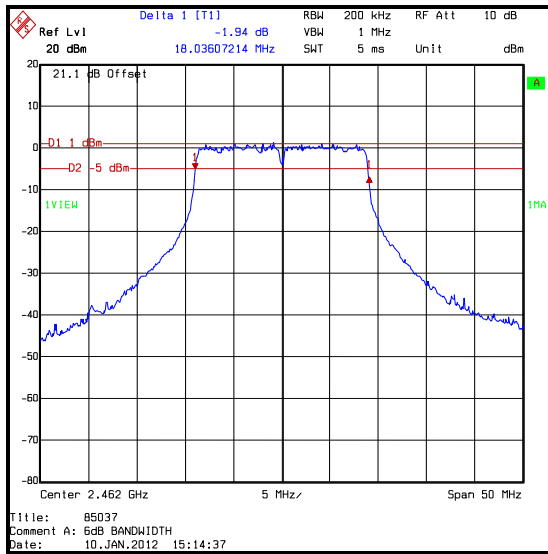
Transmitter 6 dB Bandwidth (continued)**Results: 21.7 Mbps****Bottom channel****Middle channel****Top channel**

Transmitter 6 dB Bandwidth (continued)**Results: 28.9 Mbps****Bottom channel****Middle channel****Top channel**

Transmitter 6 dB Bandwidth (continued)**Results: 43.3 Mbps****Bottom channel****Middle channel****Top channel**

Transmitter 6 dB Bandwidth (continued)**Results: 57.8 Mbps****Bottom channel****Middle channel****Top channel**

Transmitter 6 dB Bandwidth (continued)**Results: 65 Mbps****Bottom channel****Middle channel****Top channel**

Transmitter 6 dB Bandwidth (continued)**Results: 72.2 Mbps****Bottom channel****Middle channel****Top channel**

5.2.5. Transmitter Power Spectral Density**Test Summary:**

Test Engineer:	Sarah Williams	Test Dates:	10 January 2012 & 11 January 2012
Test Sample IMEI:	004401221182146		

FCC Part:	15.247(e)
Test Method Used:	As detailed in ANSI C63.10 Section 6.11.2

Environmental Conditions:

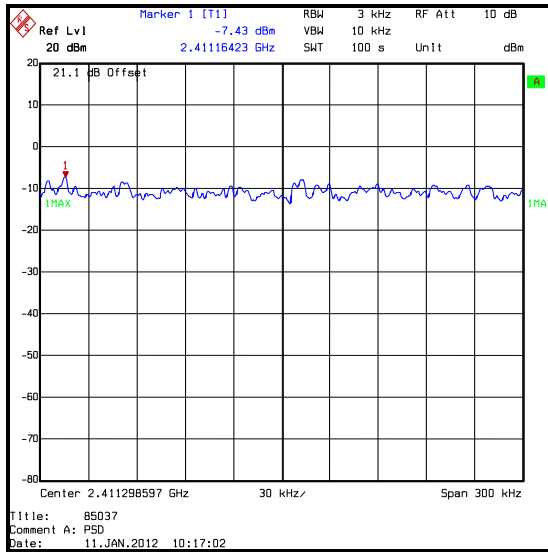
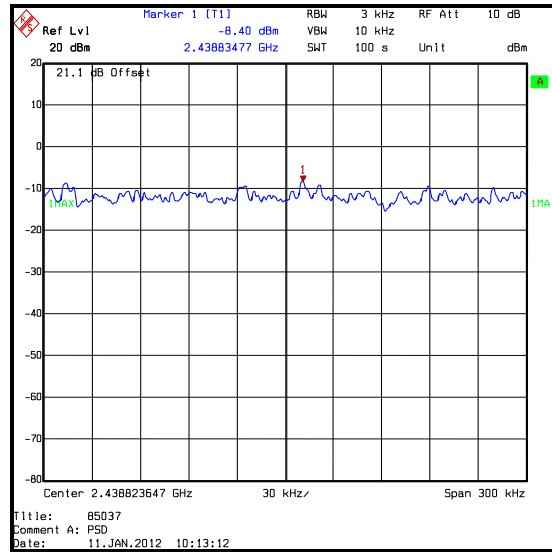
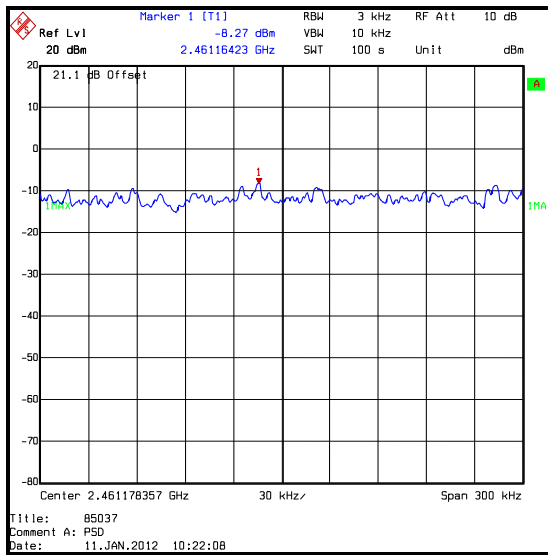
Temperature (°C):	25
Relative Humidity (%):	26

Results: 1 Mbps

Channel	Output Power (dBm/3 kHz)	Limit (dBm/3 kHz)	Margin (dB)	Result
Bottom	-7.4	8.0	15.4	Complied
Middle	-8.4	8.0	16.4	Complied
Top	-8.3	8.0	16.3	Complied

Note(s):

1. All supported modes were tested on the bottom, middle and top channels to determine the worst case configuration. The configuration that produced the highest levels is recorded in the table above.

Transmitter Power Spectral Density (continued)**Results: 1 Mbps****Bottom channel****Middle channel****Top channel**

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

Test Engineer:	Mark Percival & Sarah Williams	Test Date:	09 January 2012
Test Sample IMEI:	004401221182120		

FCC Part:	15.247(b)(3)
Test Method Used:	As detailed in ANSI C63.10 Section 6.10.2 and Sections 6.3 and 6.6 referencing ANSI C63.4 (see note below)

Environmental Conditions:

Temperature (°C):	21
Relative Humidity (%):	27

Results: 11 Mbps**Conducted Peak Limit Comparison**

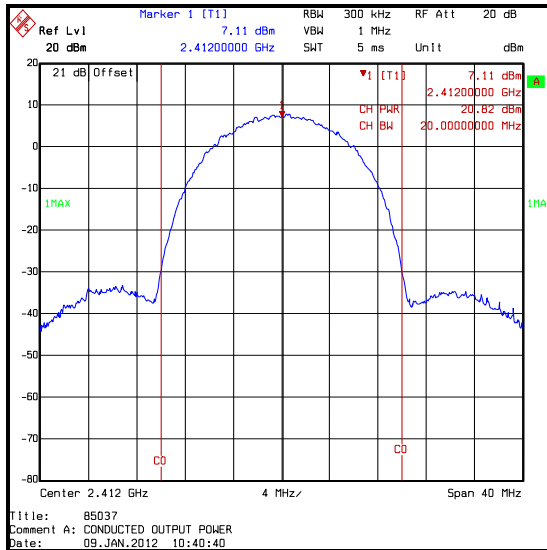
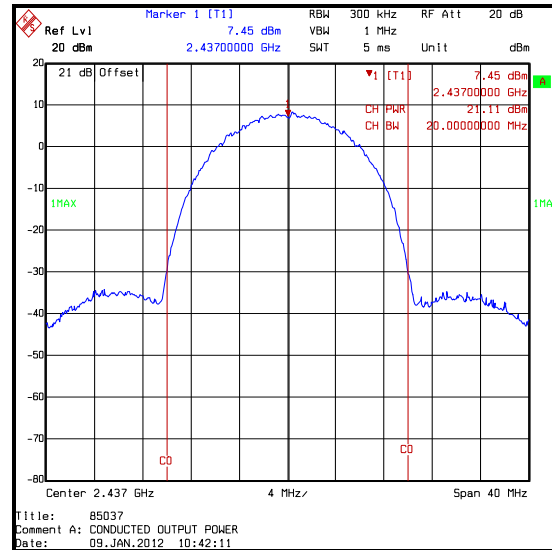
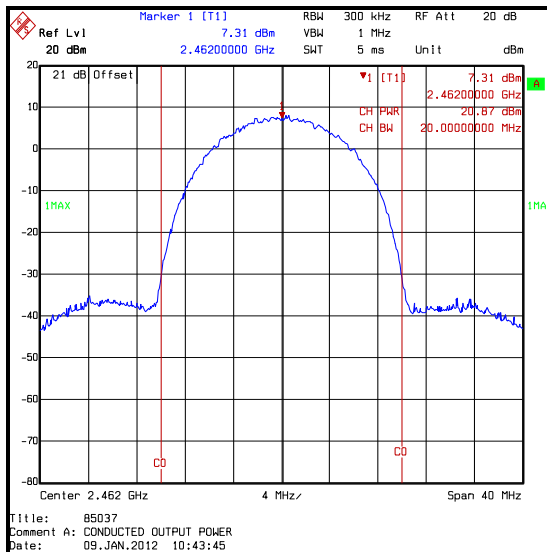
Channel	Conducted Peak Power (dBm)	Conducted Peak Power Limit (dBm)	Margin (dB)	Result
Bottom	20.8	30.0	9.2	Complied
Middle	21.1	30.0	8.9	Complied
Top	20.9	30.0	9.1	Complied

De Facto EIRP Limit Comparison

Channel	Conducted Peak Power (dBm)	Declared Antenna Gain (dBi)	EIRP (dBm)	De Facto EIRP Limit (dBm)	Margin (dB)	Result
Bottom	20.8	-1.6	19.2	36.0	16.8	Complied
Middle	21.1	-1.6	19.5	36.0	16.5	Complied
Top	20.9	-1.6	19.3	36.0	16.7	Complied

Note(s):

1. Power was measured using the channel power function on a spectrum analyser. The spectrum analyser was connected to the RF port on the EUT using suitable attenuation and RF cable.
2. All supported modes of operation were tested. The mode that produced the highest conducted output power is reported.

Transmitter Maximum Peak Output Power (continued)**Results: 11 Mbps****Bottom channel****Middle channel****Top channel**

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

Test Engineer:	Sarah Williams	Test Date:	11 January 2012
Test Sample IMEI:	004401221182070		

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:

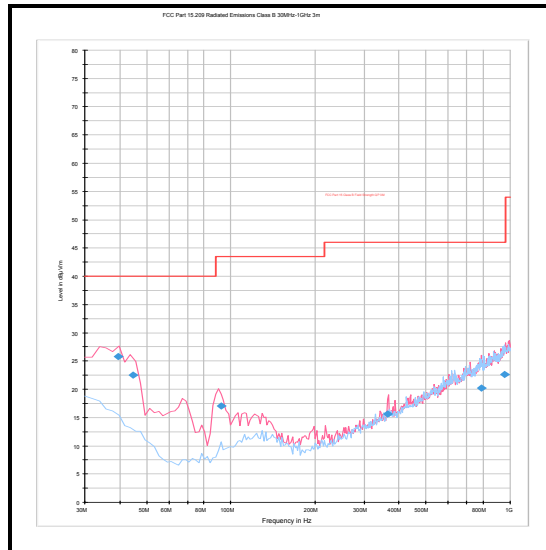
Temperature (°C):	25
Relative Humidity (%):	30

Results: Top Channel 11 Mbps

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
39.455	Vertical	25.8	40.0	14.2	Complied
44.535	Vertical	22.5	40.0	17.5	Complied
92.208	Vertical	17.0	43.5	26.5	Complied
365.133	Vertical	15.6	46.0	30.4	Complied
788.862	Vertical	20.2	46.0	25.8	Complied
955.631	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. 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 were at least 20 dB below the appropriate limit or below the noise floor of the measurement system.
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:	Mark Percival & Sarah Williams	Test Dates:	09 January 2012 & 10 January 2012
Test Sample IMEI:	004401221182112		

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):	23
Relative Humidity (%):	28

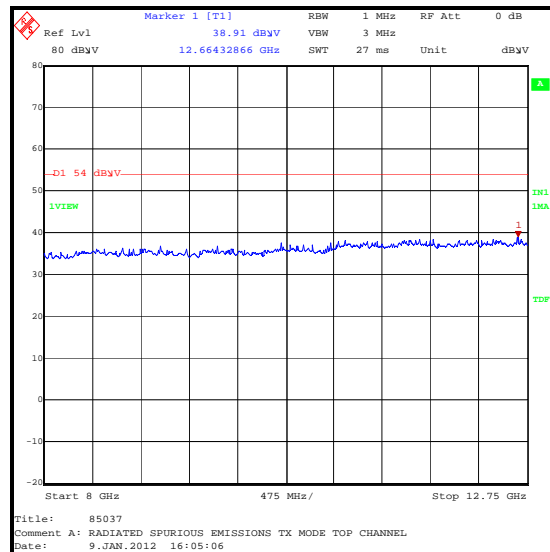
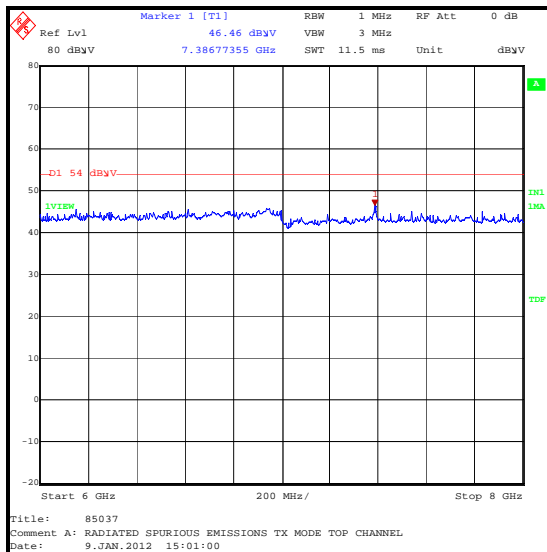
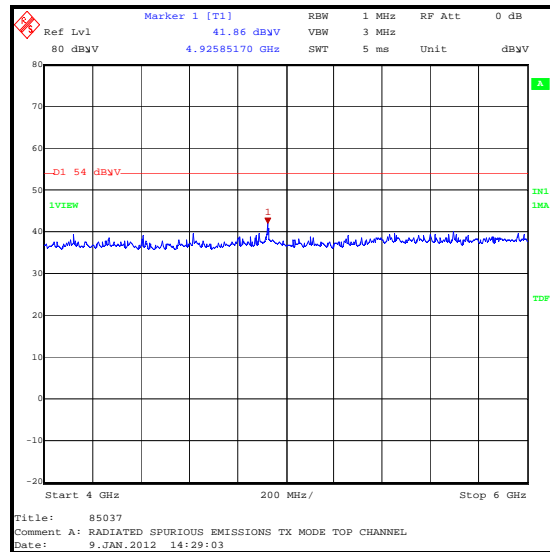
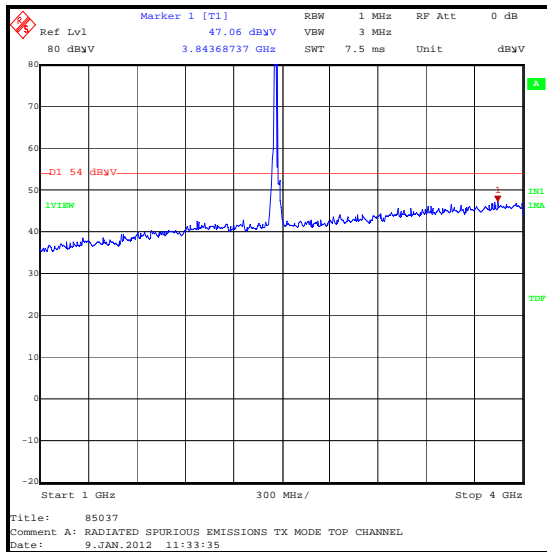
Results: Top Channel

Frequency (MHz)	Antenna Polarity	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
24817.635	Vertical	49.5	54.0	4.5	Complied

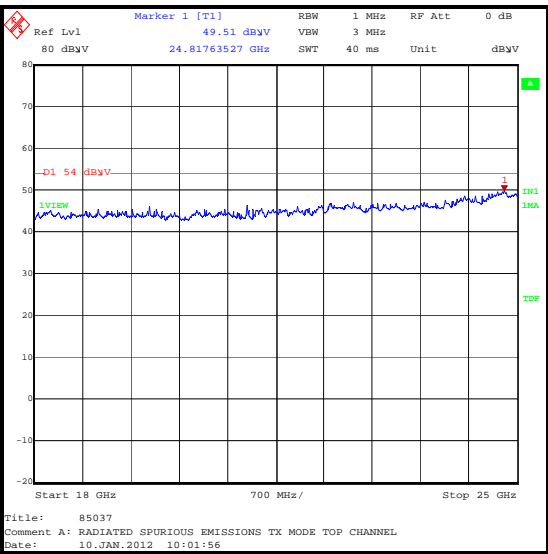
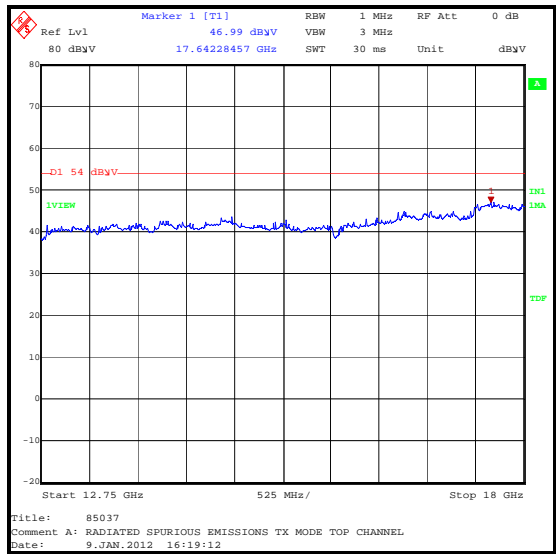
Note(s):

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. 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 (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)



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

Test Engineer:	Mark Percival	Test Date:	10 January 2012
Test Sample IMEI:	004401221182112		

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

Environmental Conditions:

Temperature (°C):	24
Relative Humidity (%):	26

Results: Peak / 1 Mbps

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
2400	52.1	76.8*	24.7	Complied
2483.5	60.6	74.0	13.4	Complied

Results: Average / 1 Mbps

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
2483.5	47.9	54.0	6.1	Complied

Results: Peak / 9 Mbps

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
2400	60.7	72.7*	12.0	Complied
2483.5	60.8	74.0	13.2	Complied

Results: Average / 9 Mbps

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
2483.5	48.5	54.0	5.5	Complied

Transmitter Band Edge Radiated Emissions (continued)**Results: Peak / 11 Mbps**

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
2400	53.5	75.8*	22.3	Complied
2483.5	60.9	74.0	13.1	Complied

Results: Average / 11 Mbps

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
2483.5	47.7	54.0	6.3	Complied

Results: Peak / 21.7 Mbps

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
2400	61.9	73.0*	11.1	Complied
2483.5	61.1	74.0	12.9	Complied

Results: Average / 21.7 Mbps

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
2483.5	48.4	54.0	5.6	Complied

Transmitter Band Edge Radiated Emissions (continued)**Results: Peak / 48 Mbps**

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
2400	60.1	71.4*	11.3	Complied
2483.5	61.9	74.0	12.1	Complied

Results: Average / 48 Mbps

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
2483.5	48.7	54.0	5.3	Complied

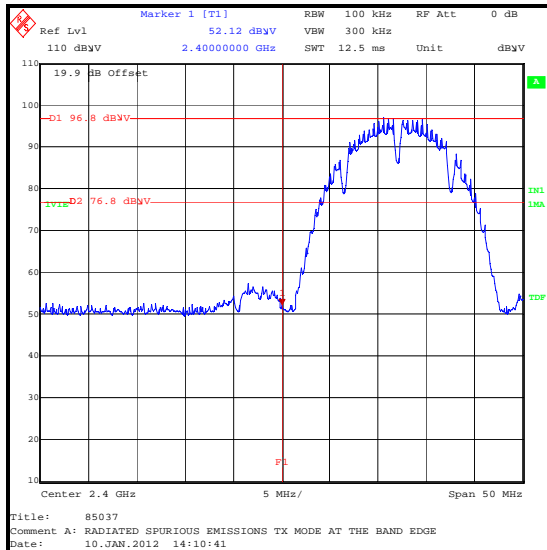
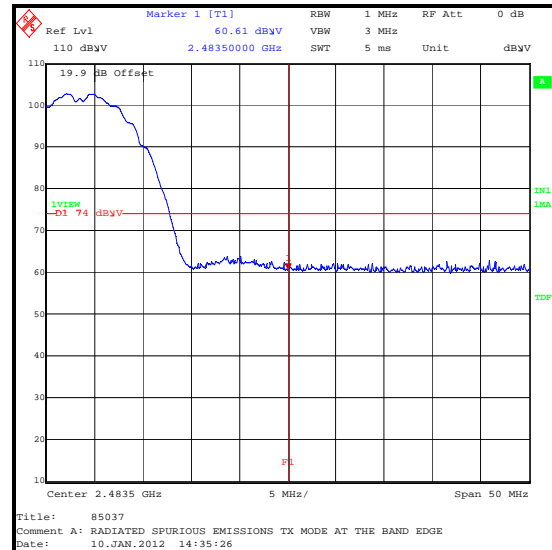
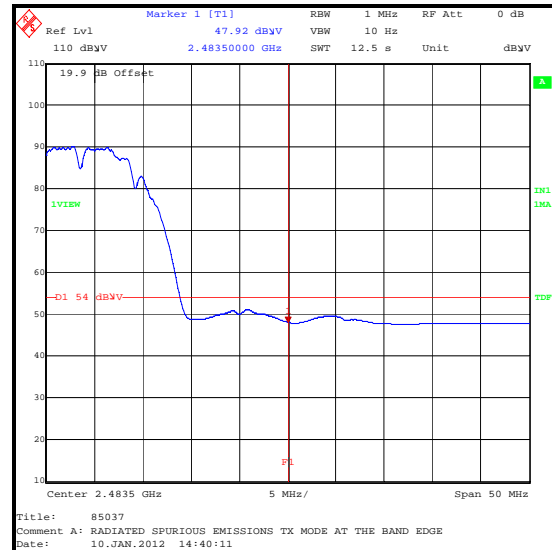
Results: Peak / 72.2 Mbps

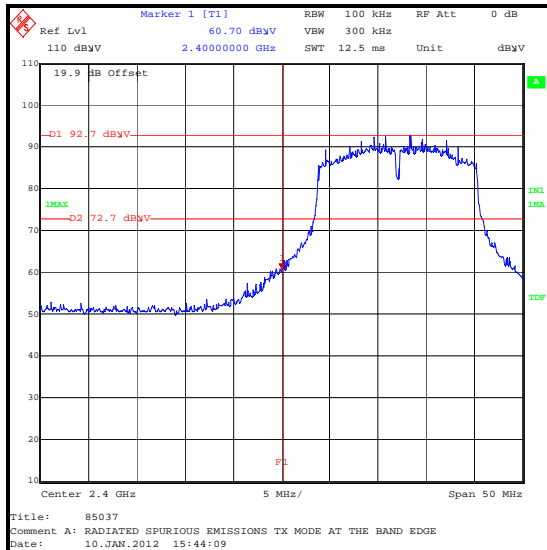
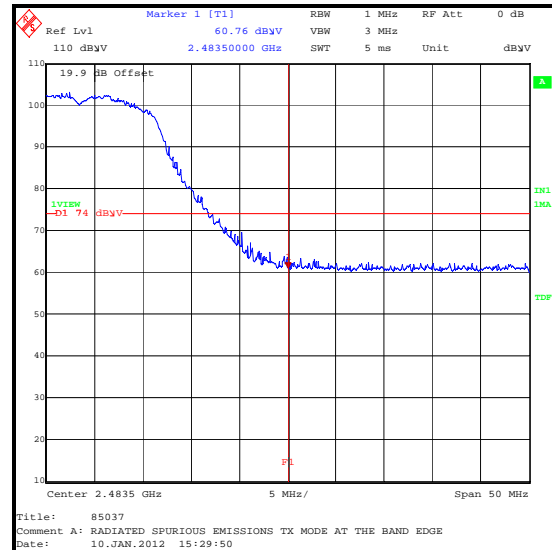
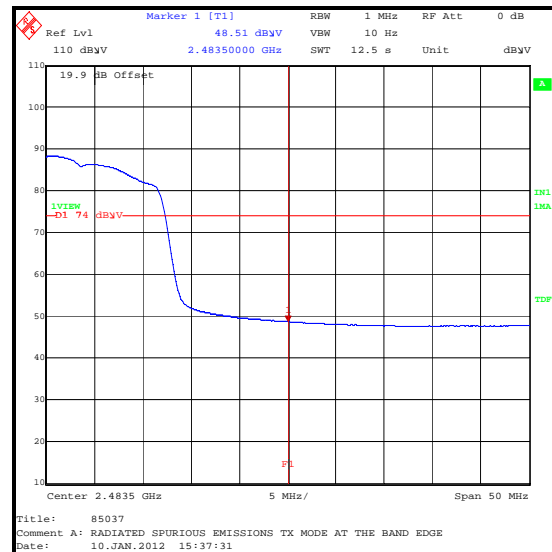
Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
2400	62.2	70.5*	8.3	Complied
2483.5	61.6	74.0	12.4	Complied

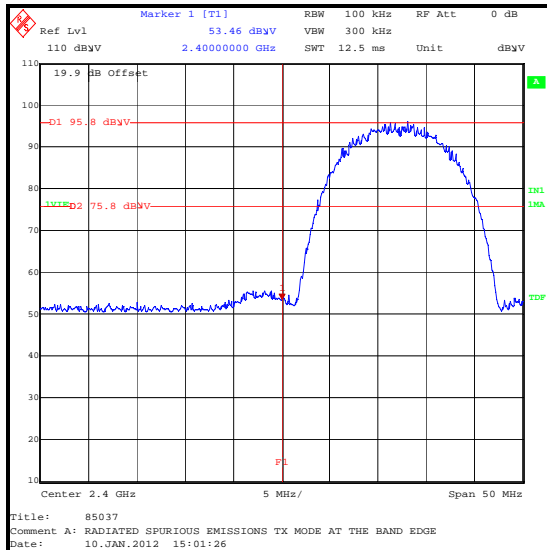
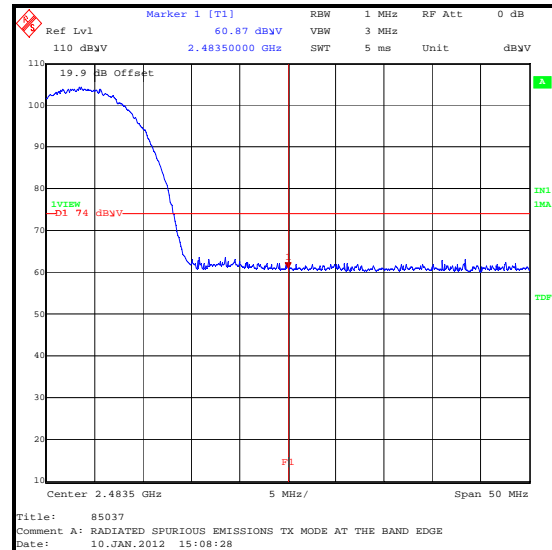
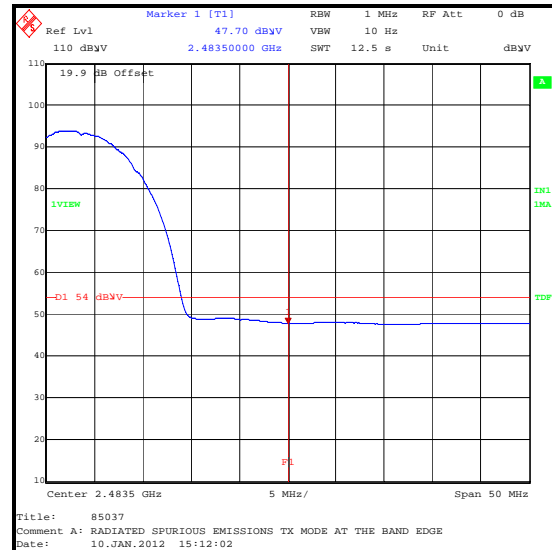
Results: Average / 72.2 Mbps

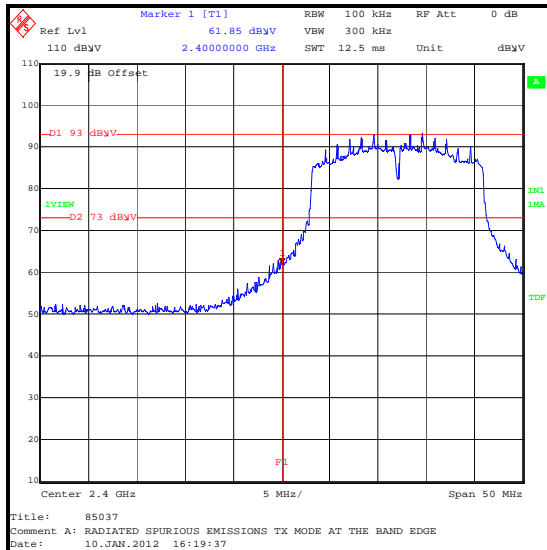
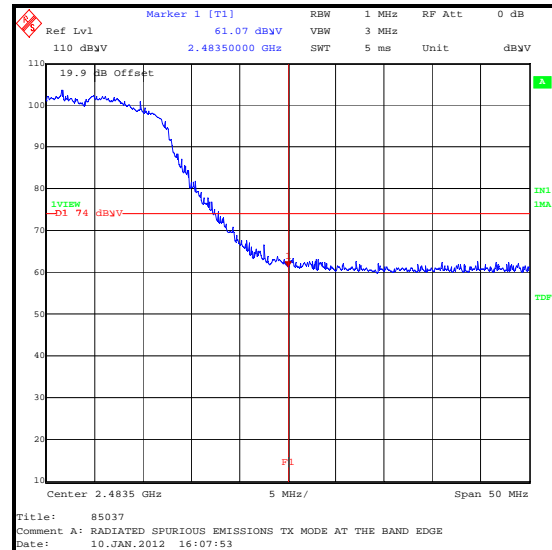
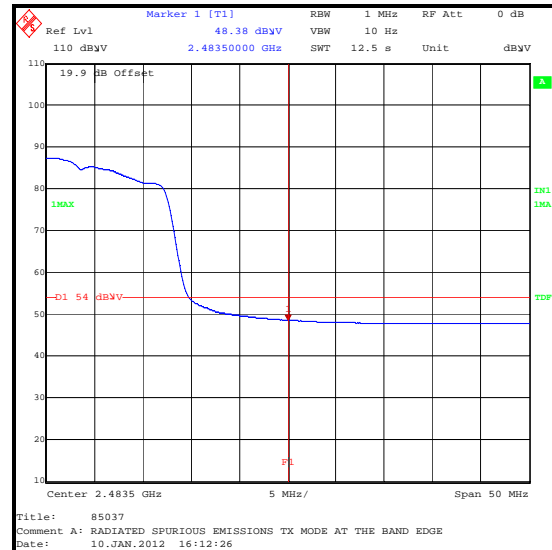
Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
2483.5	48.4	54.0	5.6	Complied

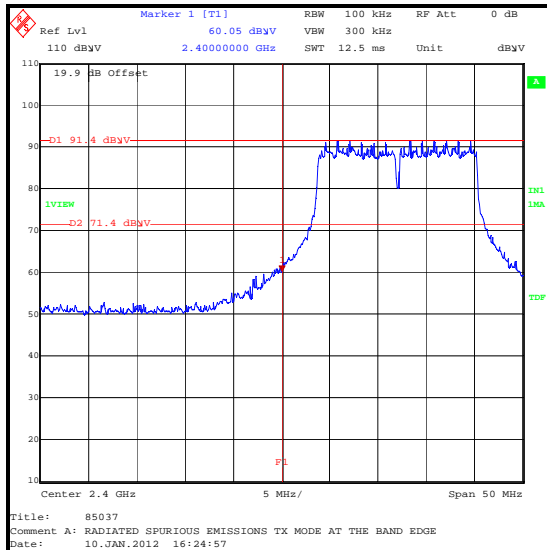
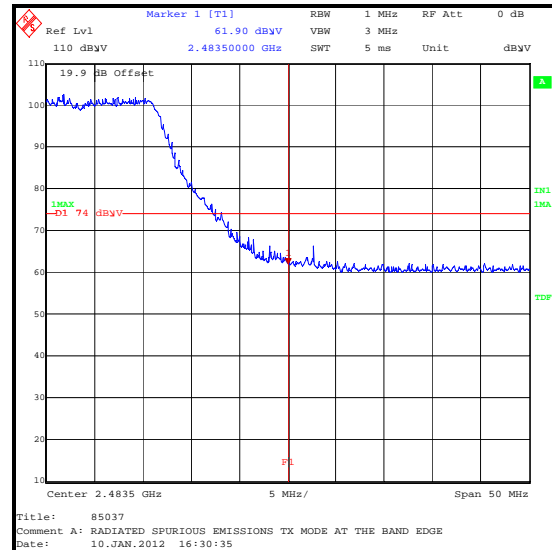
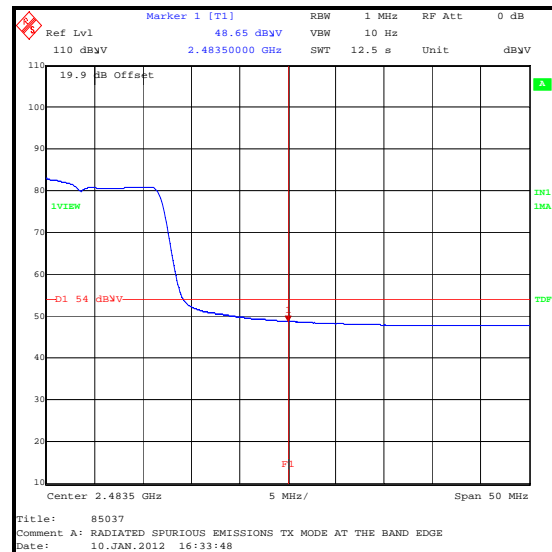
*-20 dBc limit

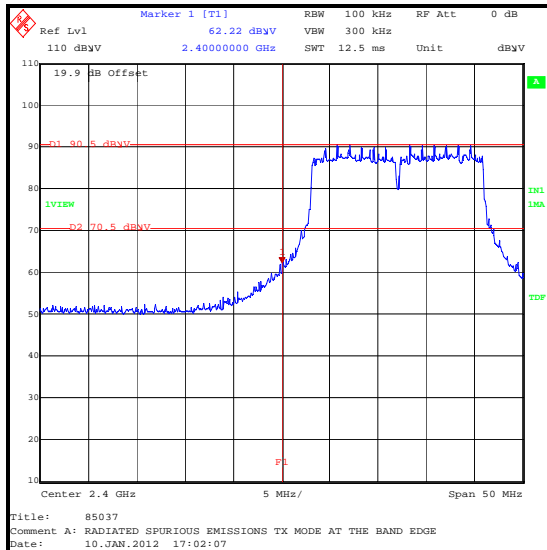
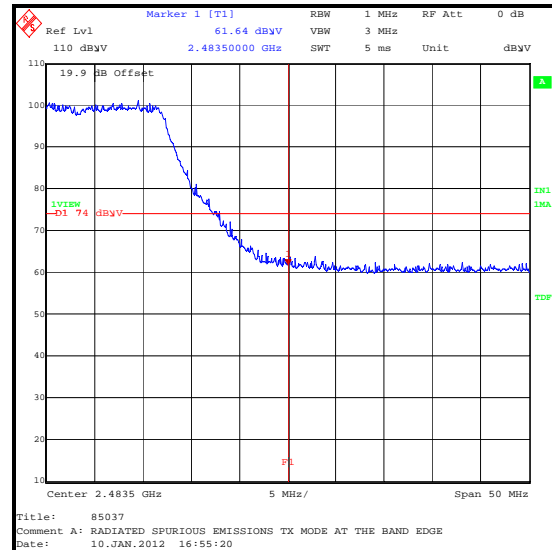
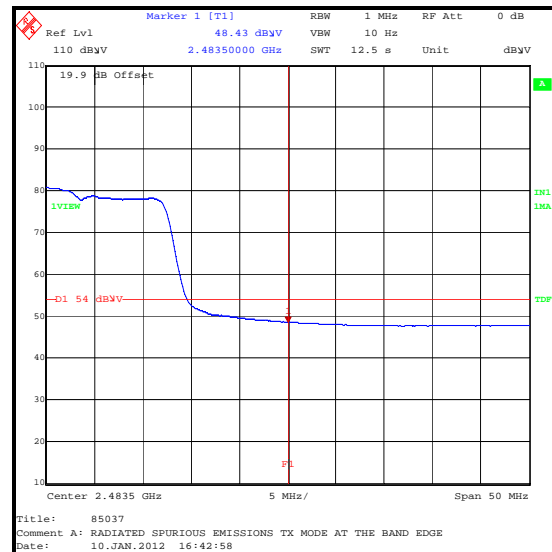
Transmitter Band Edge Radiated Emissions (continued)**Results: 1 Mbps****Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement****Upper Band Edge Average Measurement**

Transmitter Band Edge Radiated Emissions (continued)**Results: 9 Mbps****Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement****Upper Band Edge Average Measurement**

Transmitter Band Edge Radiated Emissions (continued)**Results: 11 Mbps****Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement****Upper Band Edge Average Measurement**

Transmitter Band Edge Radiated Emissions (continued)**Results: 21.7 Mbps****Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement****Upper Band Edge Average Measurement**

Transmitter Band Edge Radiated Emissions (continued)**Results: 48 Mbps****Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement****Upper Band Edge Average Measurement**

Transmitter Band Edge Radiated Emissions (continued)**Results: 72.2 Mbps****Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement****Upper Band Edge Average Measurement**

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
Spectral Power Density	2.4 GHz to 2.4835 GHz	95%	±2.94 dB
6 dB Bandwidth	2.4 GHz to 2.4835 GHz	95%	±0.92 ppm
Radiated Spurious Emissions	30 MHz 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.

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
A1393	Attenuator	Huber & Suhner	757456	6820.17.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
A244	Attenuator	Schaffner	6820-17-B	None	09 Feb 2012	12
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
A436	Antenna	Flann Microwave	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
M1263	Test Receiver	Rohde & Schwarz	ESIB7	100265	13 Jul 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.