

# TEST REPORT FROM RFI GLOBAL SERVICES LTD



Test of: NTT docomo P-05C

FCC ID: UCE211039A

To: FCC Part 15.247: 2010 Subpart C

**Test Report Serial No:**  
RFI-RPT-RP81001JD12A V2.0

**Version 2.0 Supersedes All Previous Versions**

<b>This Test Report Is Issued Under The Authority Of Chris Guy, Head of Global Approvals:</b>	
<b>Checked By:</b>	Ian Watch
<b>Signature:</b>	
<b>Date of Issue:</b>	19 April 2011

This report is issued in Adobe Acrobat portable document format (PDF). It is only a valid copy of the report if it is being viewed in PDF format with the following security options not allowed: Changing the document, Selecting text and graphics, Adding or changing notes and form fields.

This report may not be reproduced other than in full, except with the prior written approval of RFI Global Services Ltd. The results in this report apply only to the sample(s) tested.

**RFI Global Services Ltd**

Pavilion A, Ashwood Park, Ashwood Way, Basingstoke, Hampshire RG23 8BG  
Telephone: +44 (0)1256 312000 Facsimile: +44 (0)1256 312001  
Email: [info@rfi-global.com](mailto:info@rfi-global.com) Website: [www.rfi-global.com](http://www.rfi-global.com)

Registered in England and Wales. Company number:2117901

This page has been left intentionally blank.

## **Table of Contents**

<b>1. Customer Information .....</b>	<b>4</b>
<b>2. Summary of Testing .....</b>	<b>5</b>
2.1. General Information	5
2.2. Summary of Test Results	5
2.3. Methods and Procedures	6
2.4. Deviations from the Test Specification	6
<b>3. Equipment Under Test (EUT) .....</b>	<b>7</b>
3.1. Identification of Equipment Under Test (EUT)	7
3.2. Description of EUT	7
3.3. Modifications Incorporated in the EUT	7
3.4. Additional Information Related to Testing	8
3.5. Support Equipment	9
<b>4. Operation and Monitoring of the EUT during Testing .....</b>	<b>10</b>
4.1. Operating Modes	10
4.2. Configuration and Peripherals	10
<b>5. Measurements, Examinations and Derived Results .....</b>	<b>11</b>
5.1. General Comments	11
5.2. Test Results	12
5.2.1. Receiver/Idle Mode AC Conducted Spurious Emissions	12
5.2.2. Receiver/Idle Mode Radiated Spurious Emissions	14
5.2.3. Transmitter AC Conducted Spurious Emissions	18
5.2.4. Transmitter 6 dB Bandwidth	20
5.2.5. Transmitter 20 dB Bandwidth	44
5.2.6. Transmitter Power Spectral Density	68
5.2.6. Transmitter Maximum Peak Output Power	70
5.2.7. Transmitter Average Output Power	81
5.2.8. Transmitter Radiated Emissions	82
5.2.9. Transmitter Band Edge Radiated Emissions	87
<b>6. Measurement Uncertainty .....</b>	<b>97</b>
<b>Appendix 1. Test Equipment Used .....</b>	<b>98</b>

## **1. Customer Information**












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

## 2. Summary of Testing

### 2.1. General Information

<b>Specification Reference:</b>	47CFR15.247
<b>Specification Title:</b>	Code of Federal Regulations Volume 47 (Telecommunications) 2010: Part 15 Subpart C (Intentional Radiators) - Section 15.247
<b>Specification Reference:</b>	47CFR15.107 and 47CFR15.109
<b>Specification Title:</b>	Code of Federal Regulations Volume 47 (Telecommunications) 2010: Part 15 Subpart B (Unintentional Radiators) - Sections 15.107 and 15.109
<b>Specification Reference:</b>	47CFR15.207 and 47CFR15.209
<b>Specification Title:</b>	Code of Federal Regulations Volume 47 (Telecommunications) 2010: Part 15 Subpart C (Intentional Radiators) - Sections 15.207 and 15.209
<b>Site Registration:</b>	FCC: 209735
<b>Location of Testing:</b>	RFI Global Services Ltd, Wade Road, Basingstoke, Hampshire, RG24 8AH.
<b>Test Dates:</b>	24 March 2011 to 13 April 2011

### 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 2.1049	Transmitter 20 dB Bandwidth	
Part 15.247(e)	Transmitter Power Spectral Density	
Part 15.247(b)(3)	Transmitter Maximum Peak Output Power	
Part 15.247(b)(3)	Transmitter Average Output Power	Note 1
Part 15.247(d) & 15.209(a)	Transmitter Radiated Emissions	
Part 15.247(d) & 15.209(a)	Transmitter Band Edge Radiated Emissions	
<b>Key to Results</b>		
 = Complied  = Did not comply		

Note 1: The measurement was performed to support SAR tests.

### **2.3. Methods and Procedures**

<b>Reference:</b>	ANSI C63.4 (2009)
<b>Title:</b>	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
<b>Reference:</b>	ANSI C63.10 (2009)
<b>Title:</b>	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)**

<b>Brand Name:</b>	NTT docomo
<b>Model Name or Number:</b>	P-05C
<b>IMEI:</b>	355320040013412 ( <i>Radiated sample #1</i> ) 355320040013420 ( <i>Radiated sample #2</i> ) 355320040012406 ( <i>Conducted RF port sample</i> )
<b>Hardware Version Number:</b>	Rev C
<b>Software Version Number:</b>	B-D11SL1-00.01.037 D11SL1_Cv58091405
<b>FCC ID:</b>	UCE211039A

<b>Brand Name:</b>	NTT docomo
<b>Description:</b>	Battery
<b>Model Name or Number:</b>	P20*

<b>Brand Name:</b>	NTT docomo
<b>Description:</b>	AC Charger
<b>Model Name or Number:</b>	FOMA AC Adapter 01 for Global use / MAS-BH0008-A 002

<b>Brand Name:</b>	NTT docomo
<b>Description:</b>	DC Charger
<b>Model Name or Number:</b>	FOMA DC Adapter 02

<b>Brand Name:</b>	NTT docomo
<b>Description:</b>	Charge/USB Data Cable
<b>Model Name or Number:</b>	FOMA USB Cable with Charge Function 02

<b>Brand Name:</b>	NTT docomo
<b>Description:</b>	Personal Hands-Free
<b>Model Name or Number:</b>	Stereo Earphone Set 01

#### **3.2. Description of EUT**

The equipment under test was a dual mode UMTS/GSM cellular handset with *Bluetooth*, WLAN 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**

<b>Technology Tested:</b>	WLAN (IEEE 802.11)		
<b>Type of Unit:</b>	Transceiver		
<b>Modulation Type:</b>	BPSK, QPSK, 16QAM and 64QAM		
<b>Data Rate:</b>	1, 2, 5.5, 11, 6, 9, 12, 18, 24, 36, 48, 54, 6.5, 13, 19.5, 26, 39, 52, 58.5 and 65 Mbps		
<b>Power Supply Requirement(s):</b>	Nominal	3.7V	
<b>Maximum Peak Power Output (Conducted)</b>	22.1 dBm		
<b>Antenna Gain:</b>	0.4 dBi		
<b>Transmit Frequency Range:</b>	2412 MHz to 2462 MHz		
<b>Transmit Channels Tested:</b>	<b>Channel ID</b>	<b>Channel Number</b>	<b>Channel Frequency (MHz)</b>
	Bottom	1	2412
	Middle	6	2437
	Top	11	2462
<b>Receive Frequency Range:</b>	2412 MHz to 2462 MHz		
<b>Receive Channels Tested:</b>	<b>Channel ID</b>	<b>Channel Number</b>	<b>Channel Frequency (MHz)</b>
	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:

<b>Brand Name:</b>	Sony
<b>Description:</b>	Laptop PC
<b>Model Name or Number:</b>	Vaio PCG-551N

<b>Brand Name:</b>	Generic
<b>Description:</b>	Micro SD Memory Card
<b>Model Name or Number:</b>	Not marked or stated

<b>Brand Name:</b>	Buffalo
<b>Description:</b>	USB Hub
<b>Model Name or Number:</b>	BSH4U01

## **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, centre and top channels as required using all data rates or the data rates which exhibited the widest spectral bandwidths and highest power levels, i.e. 802.11b 11 Mbps, 802.11g 54 Mbps and 802.11n 65 Mbps.

### **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 idle mode (enabled but not transmitting) and to select the test channels, data rates and modulation schemes as required.
- 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 mode and transmitter mode radiated spurious emissions tests were performed with the Personal Hands-Free connected to the EUT and with the TV antenna extended as this was found to be the worst case during pre-scans. All accessories were individually connected with the TV antenna extended and retracted during pre-scan measurements to determine the worst case combination.
- The sample with IMEI 355320040013420 was used for AC conducted emissions tests. The sample with IMEI 355320040013412 was used for radiated spurious emissions tests. The sample with IMEI 355320040012406 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:**

<b>Test Engineer:</b>	Patrick Jones	<b>Test Date:</b>	16 March 2011
<b>Test Sample IMEI:</b>	355320040013420		

<b>FCC Part:</b>	15.107(a)
<b>Test Method Used:</b>	As detailed in ANSI C63.10 Section 6.2 referencing ANSI C63.4

**Environmental Conditions:**

<b>Temperature (°C):</b>	25
<b>Relative Humidity (%):</b>	29

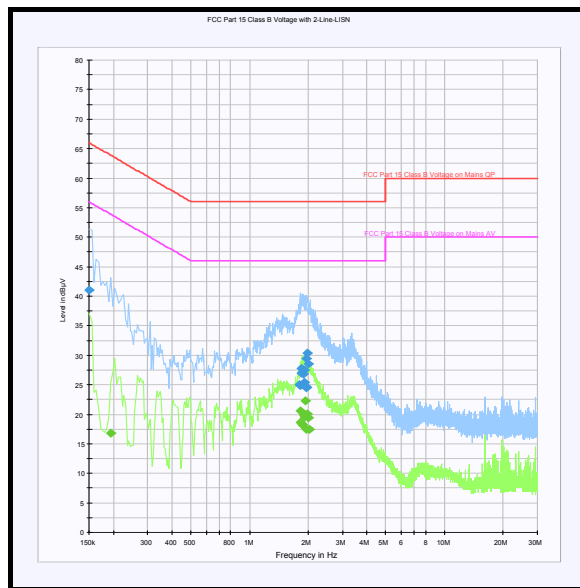
**Results: Quasi Peak**

Frequency (MHz)	Line	Level (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Result
0.150000	Neutral	41.0	66.0	25.0	Complied
1.806000	Live	25.0	56.0	31.0	Complied
1.833000	Live	24.9	56.0	31.1	Complied
1.842000	Live	27.0	56.0	29.0	Complied
1.851000	Live	27.8	56.0	28.2	Complied
1.878000	Live	27.4	56.0	28.6	Complied
1.891500	Live	26.9	56.0	29.1	Complied
1.900500	Live	25.4	56.0	30.6	Complied
1.918500	Live	27.4	56.0	28.6	Complied
1.923000	Live	24.7	56.0	31.3	Complied
1.945500	Live	24.7	56.0	31.3	Complied
1.954500	Live	29.5	56.0	26.5	Complied
1.963500	Live	24.5	56.0	31.5	Complied
1.986000	Live	30.4	56.0	25.6	Complied
1.999500	Live	28.6	56.0	27.4	Complied

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

**Results: Average**

Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
0.195000	Neutral	16.8	53.8	37.0	Complied
1.824000	Live	18.6	46.0	27.4	Complied
1.828500	Live	20.6	46.0	25.4	Complied
1.860000	Live	18.2	46.0	27.8	Complied
1.864500	Live	18.2	46.0	27.8	Complied
1.896000	Live	20.0	46.0	26.0	Complied
1.905000	Live	19.5	46.0	26.5	Complied
1.941000	Live	22.2	46.0	23.8	Complied
1.963500	Live	17.5	46.0	28.5	Complied
1.968000	Live	20.1	46.0	25.9	Complied
1.995000	Live	19.4	46.0	26.6	Complied
2.026500	Live	17.5	46.0	28.5	Complied



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

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

<b>Test Engineer:</b>	Andrew Edwards	<b>Test Date:</b>	22 March 2011
<b>Test Sample IMEI:</b>	355320040013412		

<b>FCC Part:</b>	15.109
<b>Test Method Used:</b>	As detailed in ANSI C63.10 Sections 6.3 and 6.5 referencing ANSI C63.4
<b>Frequency Range:</b>	30 MHz to 1000 MHz

**Environmental Conditions:**

<b>Temperature (°C):</b>	27
<b>Relative Humidity (%):</b>	20

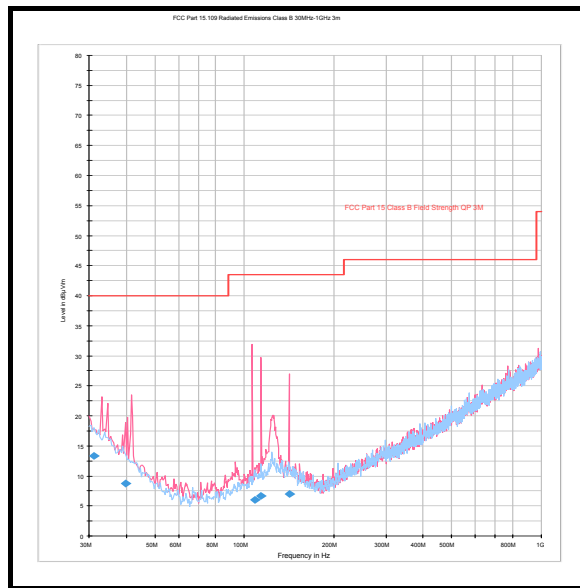
**Results: Quasi Peak**

Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
31.096	Vertical	13.4	40.0	26.6	Complied
39.935	Vertical	8.8	40.0	31.2	Complied
108.644	Vertical	6.0	43.5	37.5	Complied
114.100	Vertical	6.6	43.5	36.9	Complied
141.441	Vertical	7.0	43.5	36.5	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. 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:**

<b>Test Engineer:</b>	Andrew Edwards	<b>Test Date:</b>	22 March 2011
<b>Test Sample IMEI:</b>	355320040013412		

<b>FCC Part:</b>	15.109
<b>Test Method Used:</b>	As detailed in ANSI C63.10 Sections 6.3 and 6.6 referencing ANSI C63.4
<b>Frequency Range:</b>	1 GHz to 12.5 GHz

**Environmental Conditions:**

<b>Temperature (°C):</b>	27
<b>Relative Humidity (%):</b>	20

**Results:**

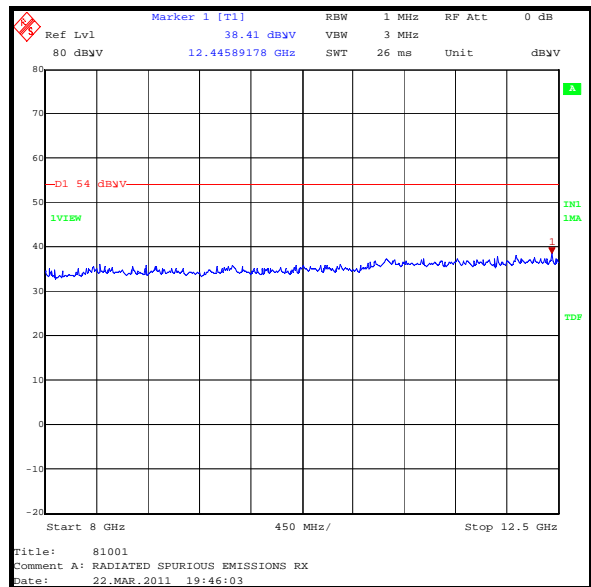
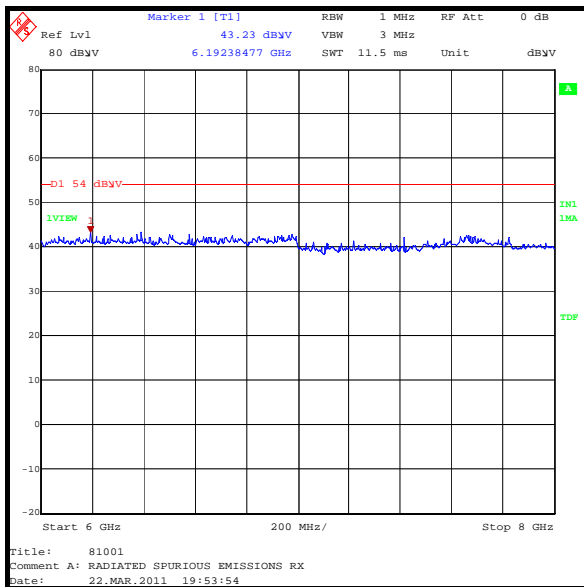
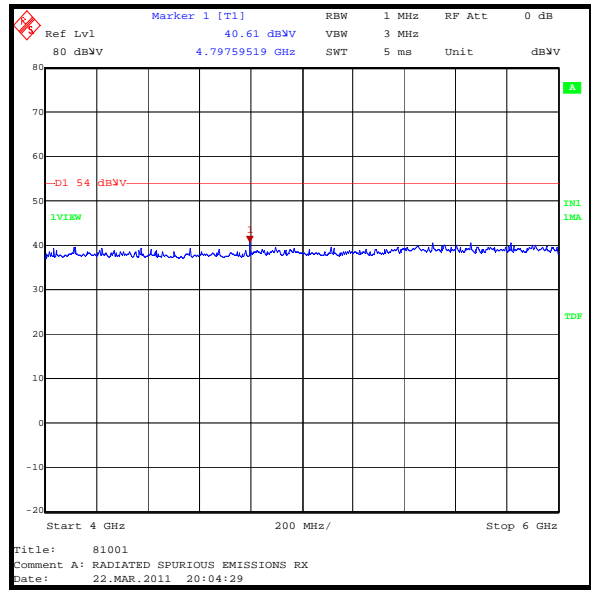
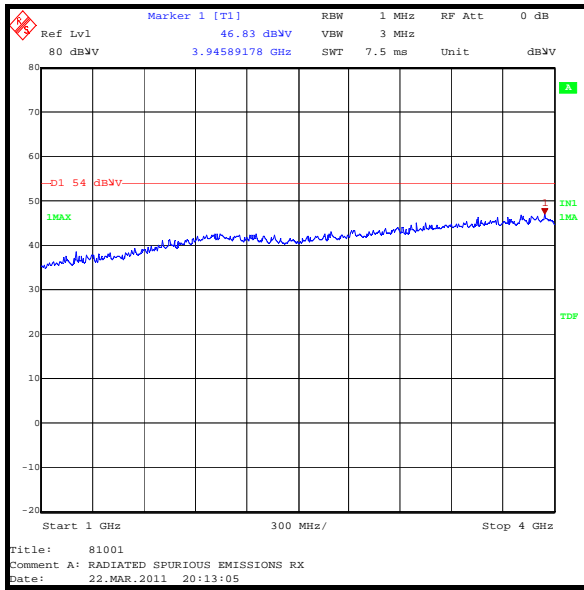
<b>Frequency (MHz)</b>	<b>Antenna Polarity</b>	<b>Peak Level (dB<math>\mu</math>V/m)</b>	<b>Average Limit (dB<math>\mu</math>V/m)</b>	<b>Margin (dB)</b>	<b>Result</b>
3945.892	Vertical	46.8	54.0	7.2	Complied

**Note(s):**

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



### Receiver/Idle Mode Radiated Spurious Emissions (continued)



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

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

<b>Test Engineer:</b>	Andrew Edwards	<b>Test Date:</b>	30 March 2011
<b>Test Sample IMEI:</b>	355320040013420		

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

**Environmental Conditions:**

<b>Temperature (°C):</b>	24
<b>Relative Humidity (%):</b>	29

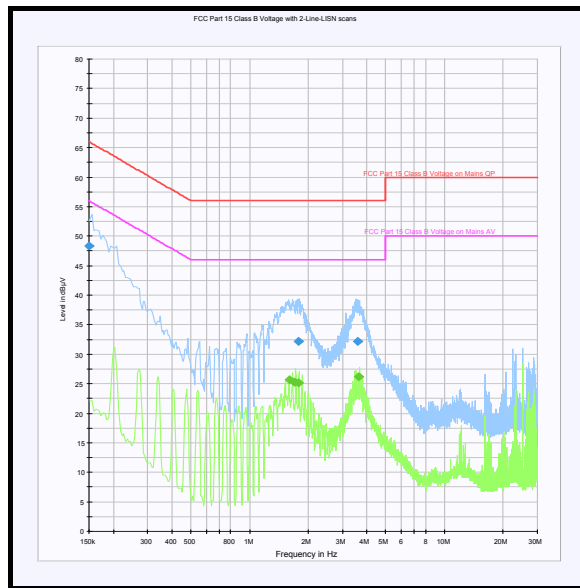
**Results: Quasi Peak**

Frequency (MHz)	Line	Level (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Result
0.150000	Neutral	48.3	66.0	17.7	Complied
1.779000	Neutral	32.2	56.0	23.8	Complied
3.583500	Neutral	32.2	56.0	23.8	Complied

**Results: Average**

Frequency (MHz)	Line	Level (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Result
1.599000	Neutral	25.7	46.0	20.3	Complied
1.693500	Neutral	25.3	46.0	20.7	Complied
1.702500	Neutral	25.3	46.0	20.7	Complied
1.779000	Neutral	25.1	46.0	20.9	Complied
3.633000	Neutral	26.2	46.0	19.8	Complied

### **Transmitter AC Conducted Spurious Emissions (continued)**



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

**5.2.4. Transmitter 6 dB Bandwidth****Test Summary:**

<b>Test Engineer:</b>	Patrick Jones	<b>Test Date:</b>	28 March 2011, 30 March 2011 & 13 April 2011
<b>Test Sample IMEI:</b>	355320040012406		

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

**Environmental Conditions:**

<b>Temperature (°C):</b>	23
<b>Relative Humidity (%):</b>	30

**Results: 802.11b 1 Mbps**

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

**Results: 802.11b 2 Mbps**

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	10.220	≥0.5	9.720	Complied
Middle	10.341	≥0.5	9.841	Complied
Top	10.351	≥0.5	9.851	Complied

**Results: 802.11b 5.5 Mbps**

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	10.701	≥0.5	10.201	Complied
Middle	10.581	≥0.5	10.081	Complied
Top	10.711	≥0.5	10.211	Complied

**Results: 802.11b 11 Mbps**

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	10.822	≥0.5	10.322	Complied
Middle	10.942	≥0.5	10.442	Complied
Top	11.192	≥0.5	10.692	Complied

**Transmitter 6 dB Bandwidth (continued)****Results: 802.11g 6 Mbps**

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	16.353	≥0.5	15.853	Complied
Middle	16.593	≥0.5	16.093	Complied
Top	16.603	≥0.5	16.103	Complied

**Results: 802.11g 9 Mbps**

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	16.353	≥0.5	15.853	Complied
Middle	16.593	≥0.5	16.093	Complied
Top	16.603	≥0.5	16.103	Complied

**Results: 802.11g 12 Mbps**

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	16.593	≥0.5	16.093	Complied
Middle	16.834	≥0.5	16.334	Complied
Top	16.603	≥0.5	16.103	Complied

**Results: 802.11g 18 Mbps**

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	16.593	≥0.5	16.093	Complied
Middle	16.593	≥0.5	16.093	Complied
Top	16.723	≥0.5	16.223	Complied

**Results: 802.11g 24 Mbps**

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	16.593	≥0.5	16.093	Complied
Middle	16.593	≥0.5	16.093	Complied
Top	16.723	≥0.5	16.223	Complied

**Results: 802.11g 36 Mbps**

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	16.593	≥0.5	16.093	Complied
Middle	16.593	≥0.5	16.093	Complied
Top	16.603	≥0.5	16.103	Complied

**Transmitter 6 dB Bandwidth (continued)****Results: 802.11g 48 Mbps**

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	16.593	≥0.5	16.093	Complied
Middle	16.834	≥0.5	16.334	Complied
Top	16.603	≥0.5	16.103	Complied

**Results: 802.11g 54 Mbps**

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	16.593	≥0.5	16.093	Complied
Middle	16.593	≥0.5	16.093	Complied
Top	16.723	≥0.5	16.223	Complied

**Results: 802.11n 6.5 Mbps**

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	17.675	≥0.5	17.175	Complied
Middle	17.675	≥0.5	17.175	Complied
Top	17.675	≥0.5	17.175	Complied

**Results: 802.11n 13 Mbps**

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	17.796	≥0.5	17.296	Complied
Middle	17.675	≥0.5	17.175	Complied
Top	17.916	≥0.5	17.416	Complied

**Results: 802.11n 19.5 Mbps**

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	17.916	≥0.5	17.416	Complied
Middle	17.796	≥0.5	17.296	Complied
Top	17.916	≥0.5	17.416	Complied

**Results: 802.11n 26 Mbps**

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	17.675	≥0.5	17.175	Complied
Middle	17.796	≥0.5	17.296	Complied
Top	17.916	≥0.5	17.416	Complied

**Transmitter 6 dB Bandwidth (continued)****Results: 802.11n 39 Mbps**

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	17.916	≥0.5	17.416	Complied
Middle	17.796	≥0.5	17.296	Complied
Top	17.916	≥0.5	17.416	Complied

**Results: 802.11n 52 Mbps**

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	17.916	≥0.5	17.416	Complied
Middle	17.796	≥0.5	17.296	Complied
Top	17.916	≥0.5	17.416	Complied

**Results: 802.11n 58.5 Mbps**

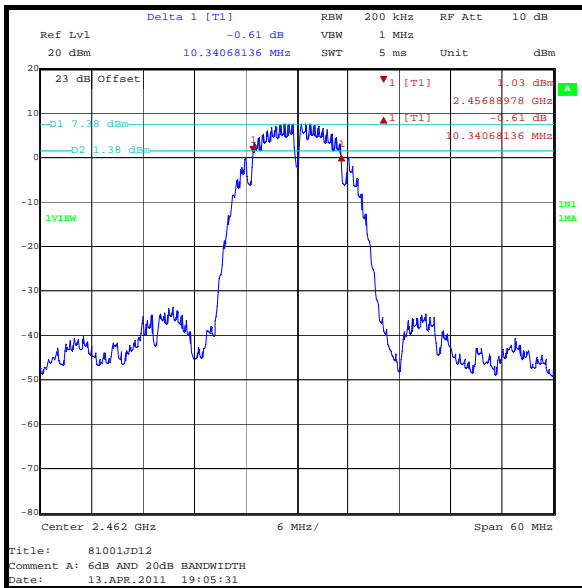
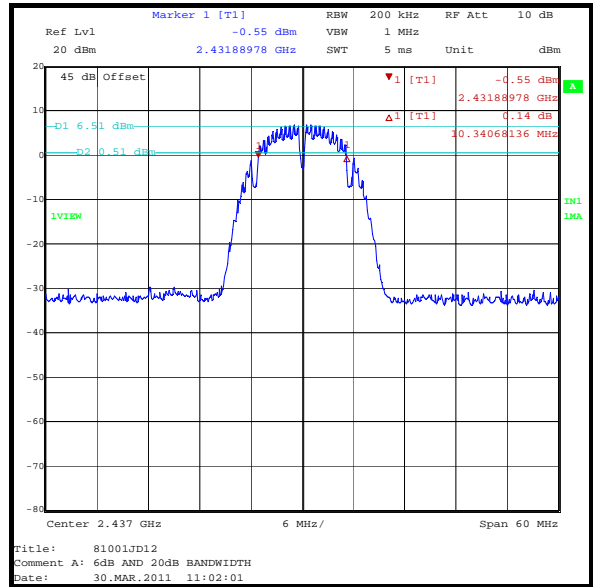
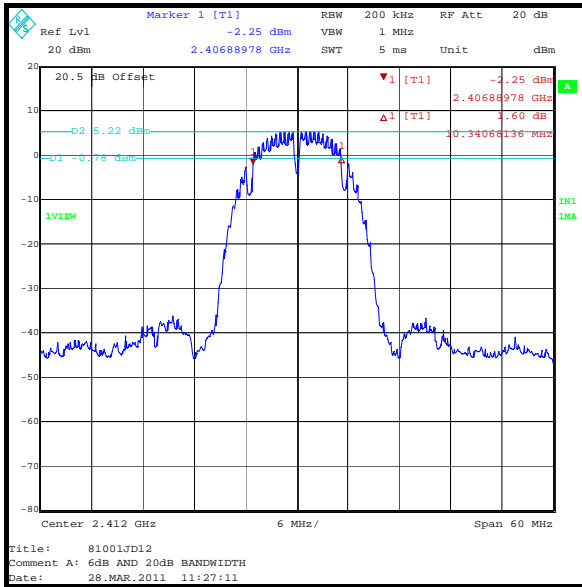
Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	17.916	≥0.5	17.416	Complied
Middle	17.796	≥0.5	17.296	Complied
Top	17.796	≥0.5	17.296	Complied

**Results: 802.11n 65 Mbps**

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	17.916	≥0.5	17.416	Complied
Middle	17.796	≥0.5	17.296	Complied
Top	17.916	≥0.5	17.416	Complied

### Transmitter 6 dB Bandwidth (continued)

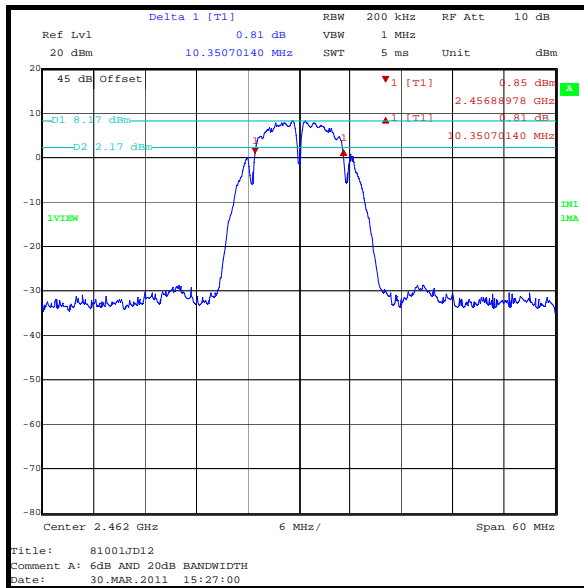
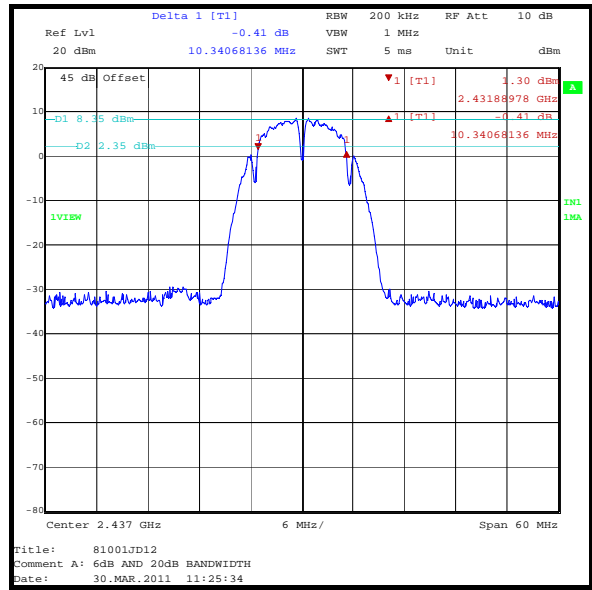
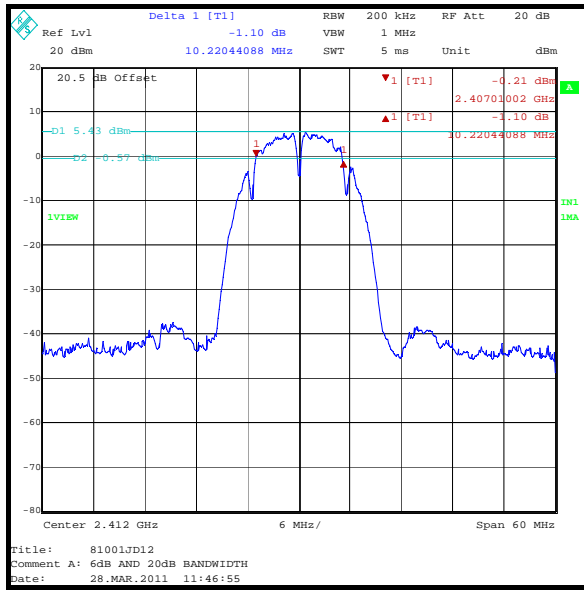
### Results: 802.11b 1 Mbps





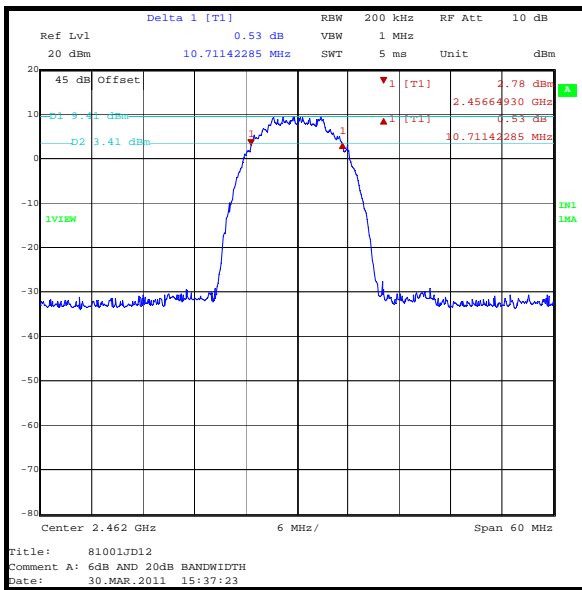
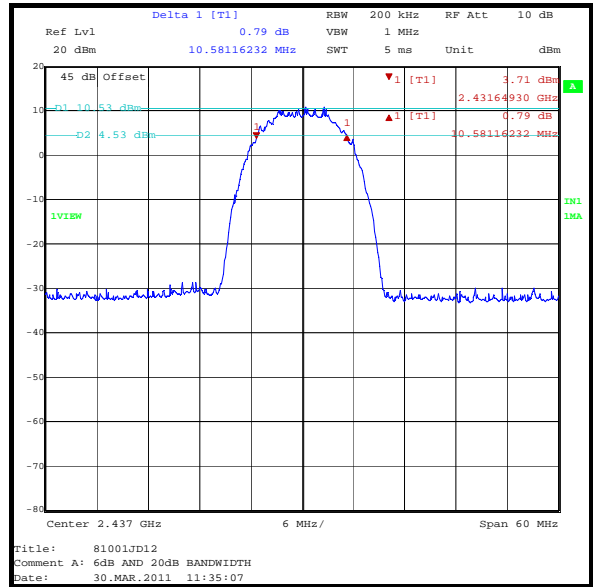
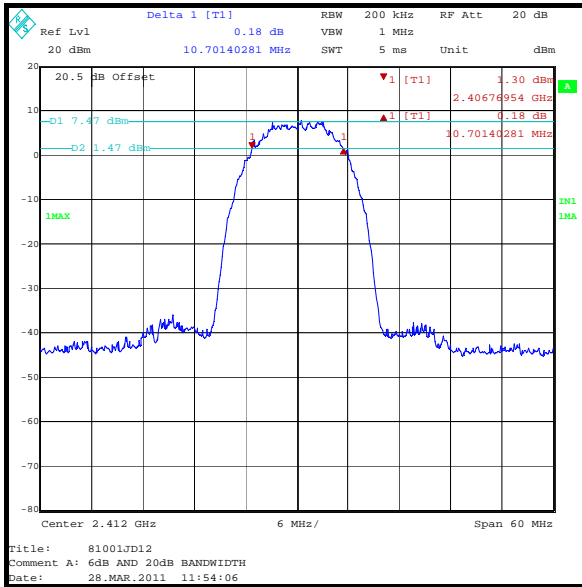
### Transmitter 6 dB Bandwidth (continued)

#### Results: 802.11b 2 Mbps



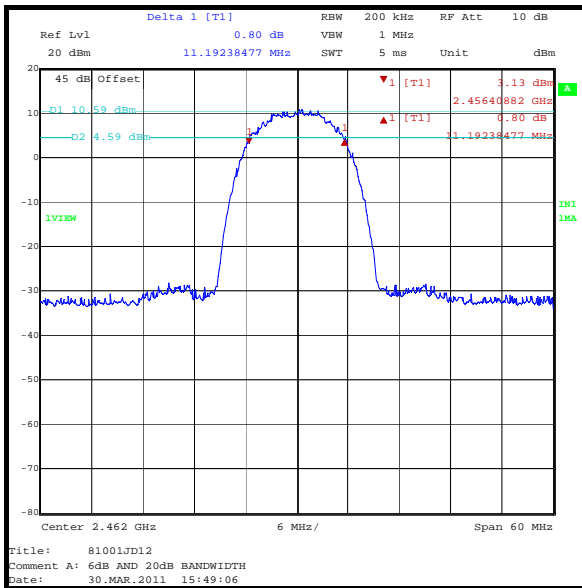
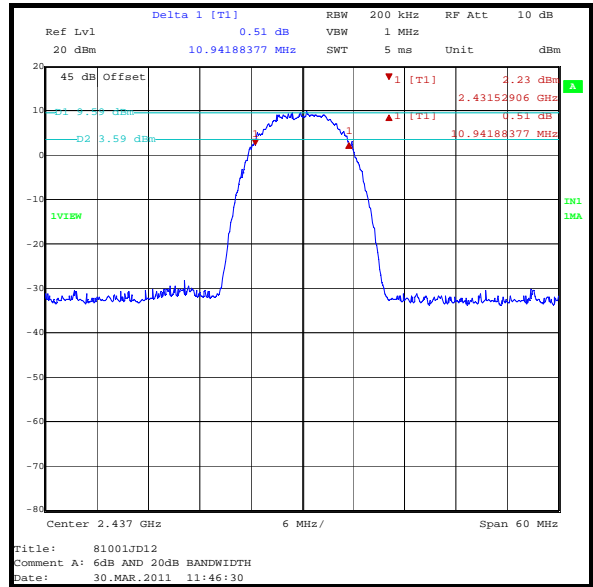
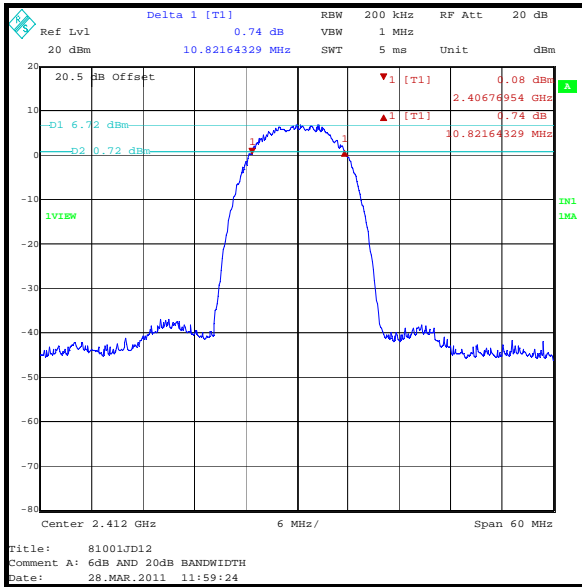
### Transmitter 6 dB Bandwidth (continued)

#### Results: 802.11b 5.5 Mbps



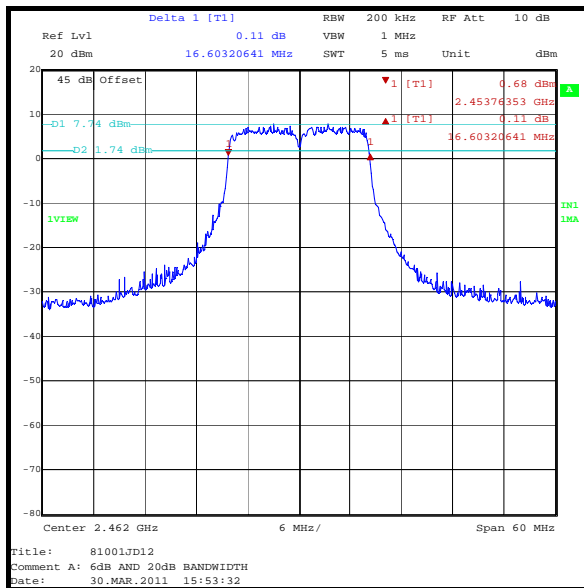
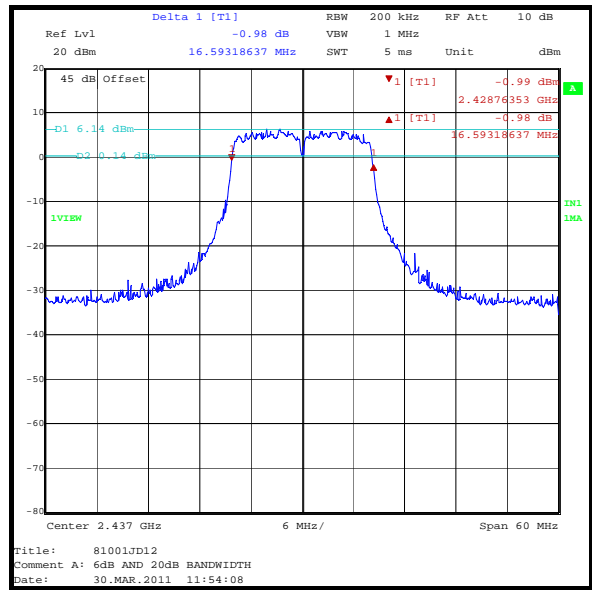
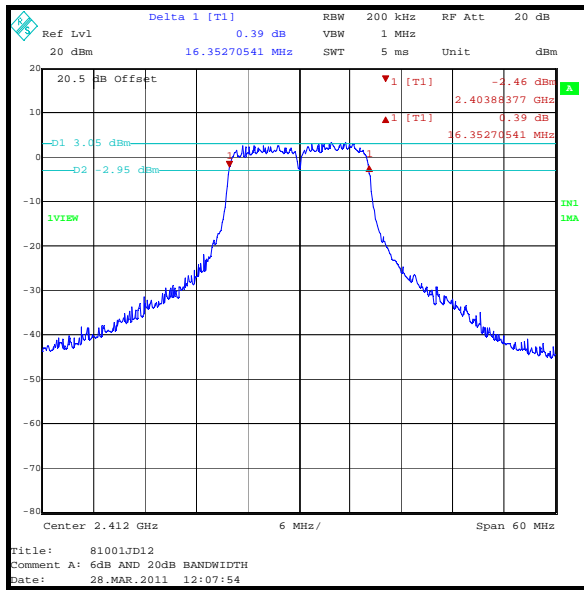
### Transmitter 6 dB Bandwidth (continued)

#### Results: 802.11b 11 Mbps



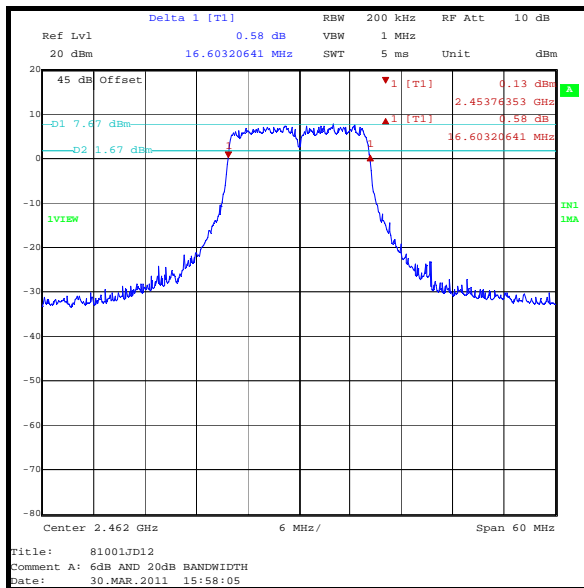
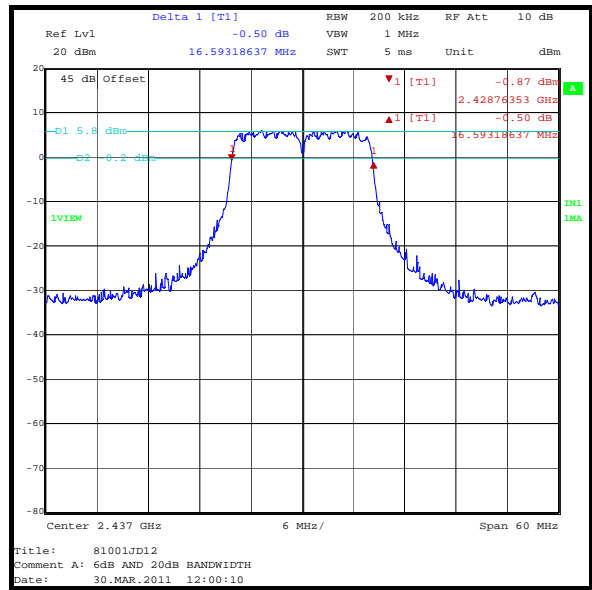
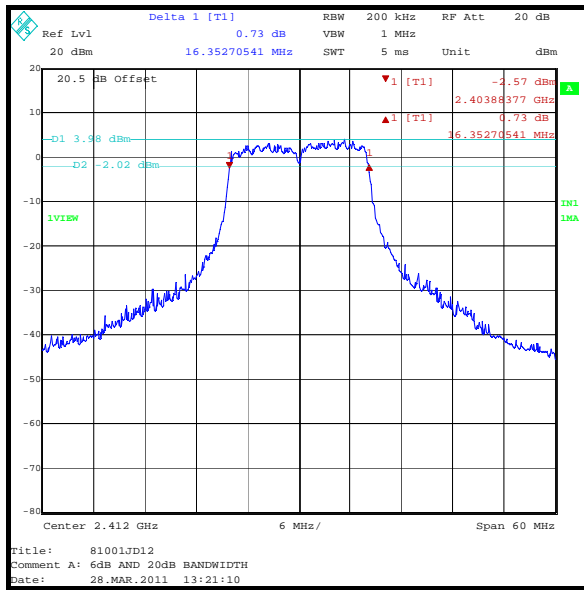
### Transmitter 6 dB Bandwidth (continued)

### Results: 802.11g 6 Mbps



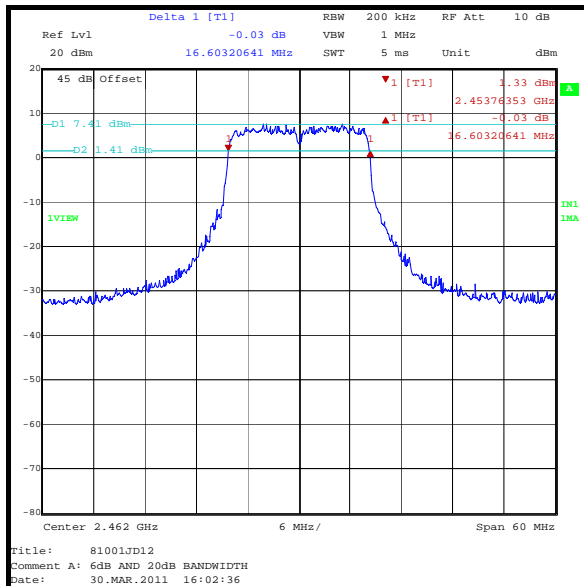
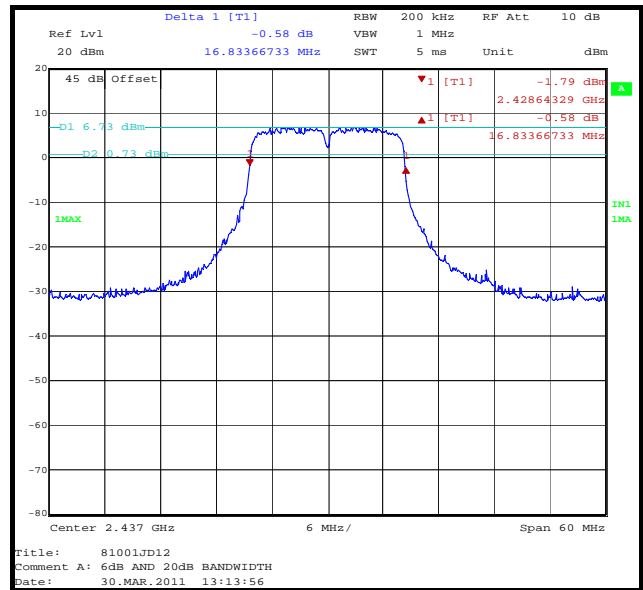
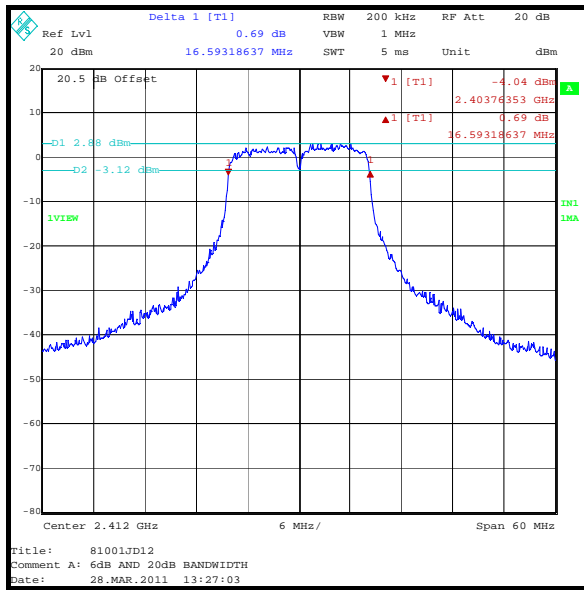
### Transmitter 6 dB Bandwidth (continued)

### Results: 802.11g 9 Mbps



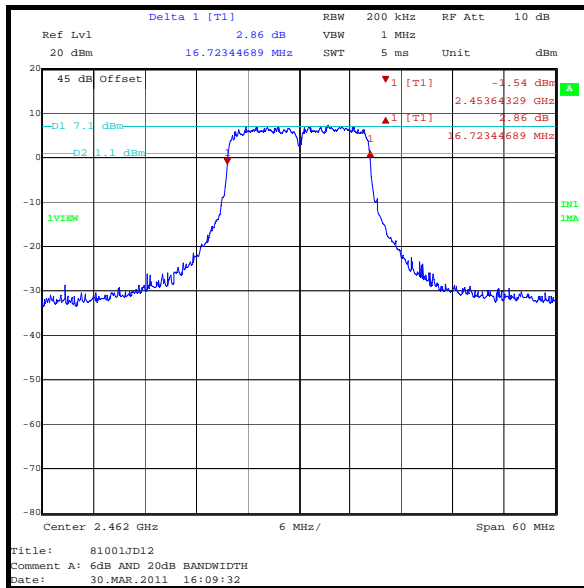
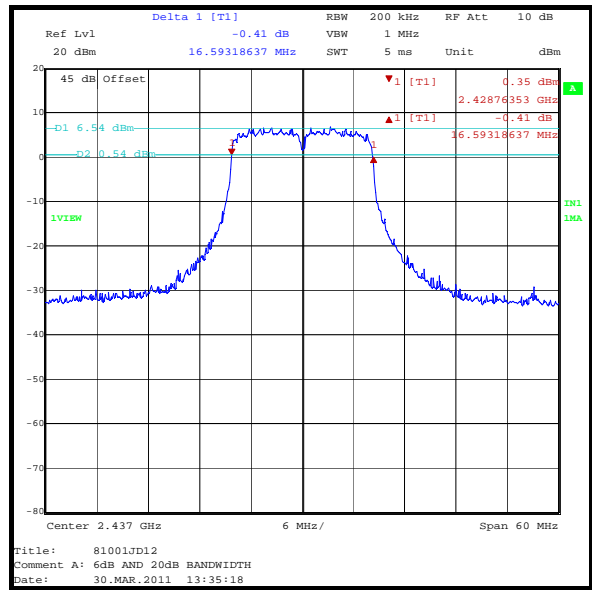
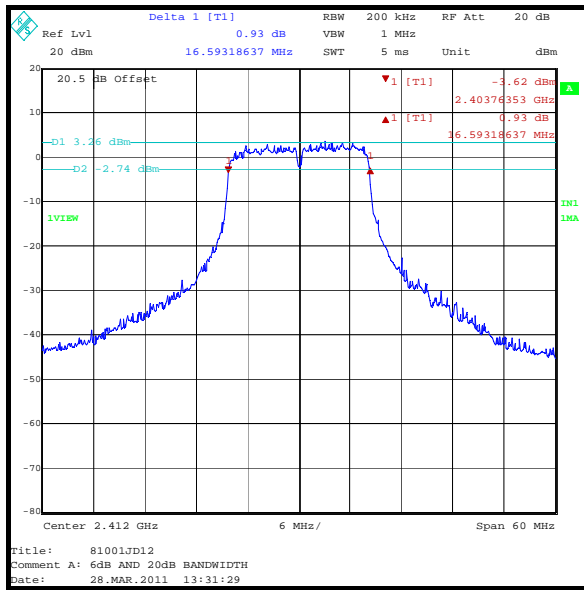
### Transmitter 6 dB Bandwidth (continued)

### Results: 802.11g 12 Mbps



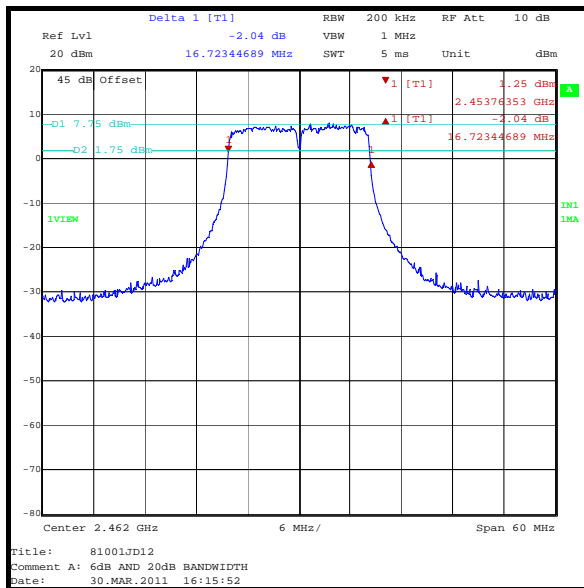
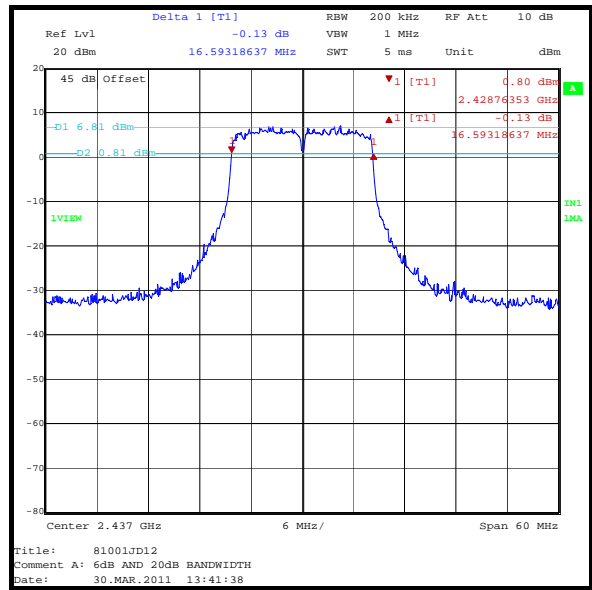
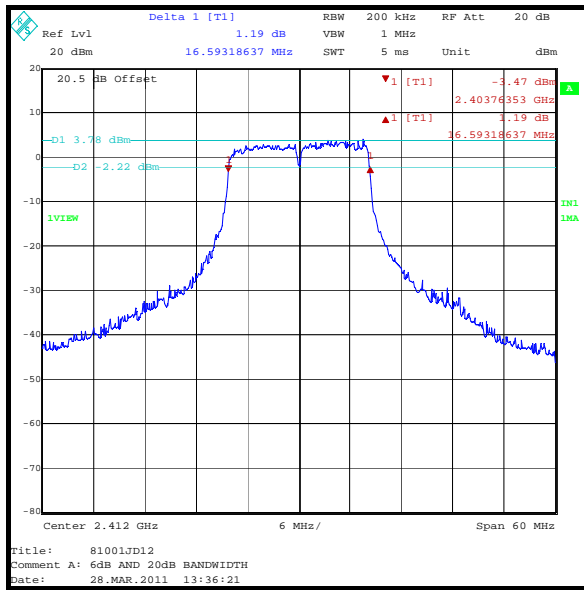
### Transmitter 6 dB Bandwidth (continued)

### Results: 802.11g 18 Mbps



### Transmitter 6 dB Bandwidth (continued)

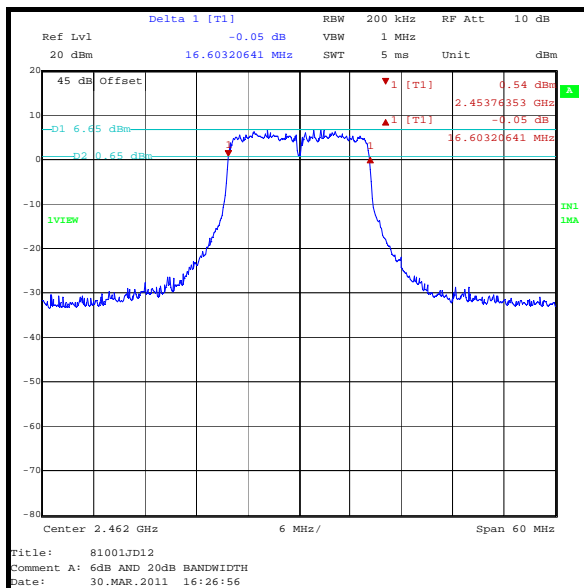
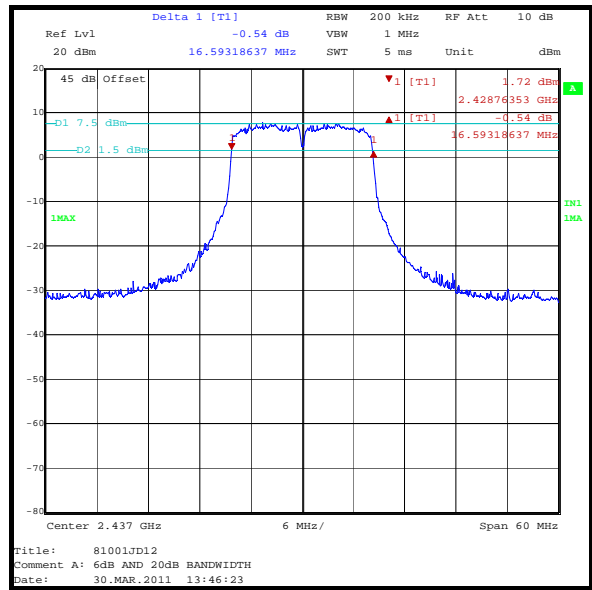
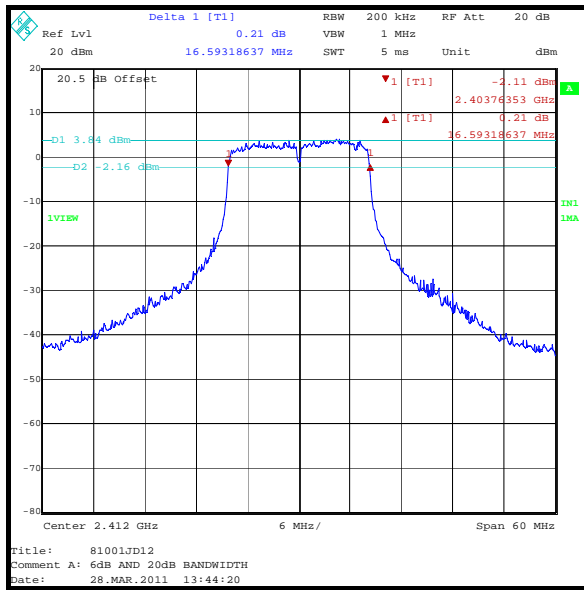
### Results: 802.11g 24 Mbps





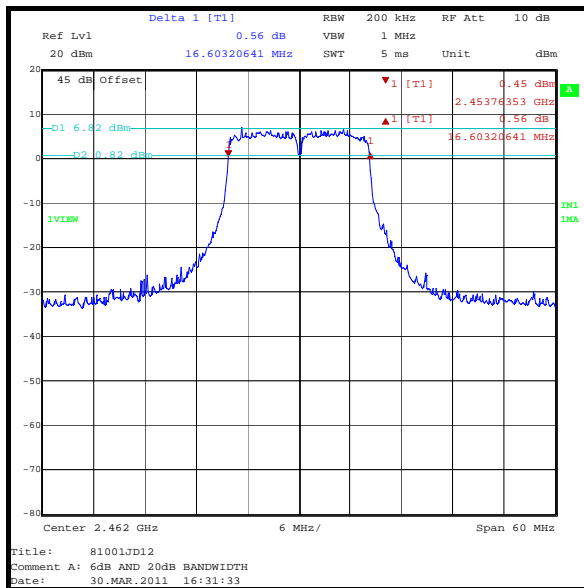
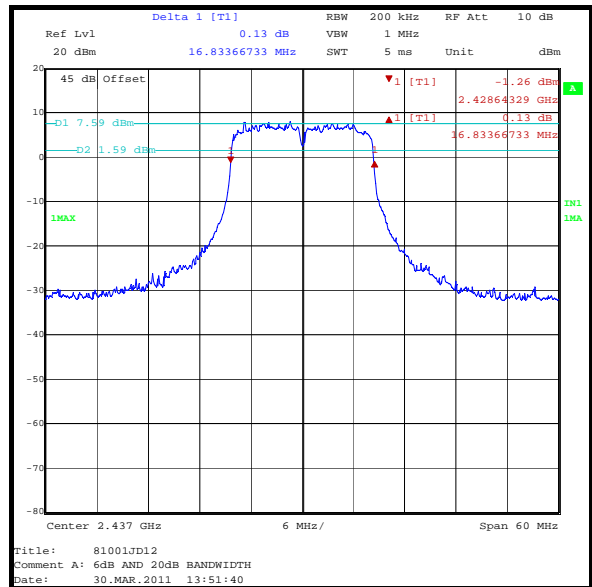
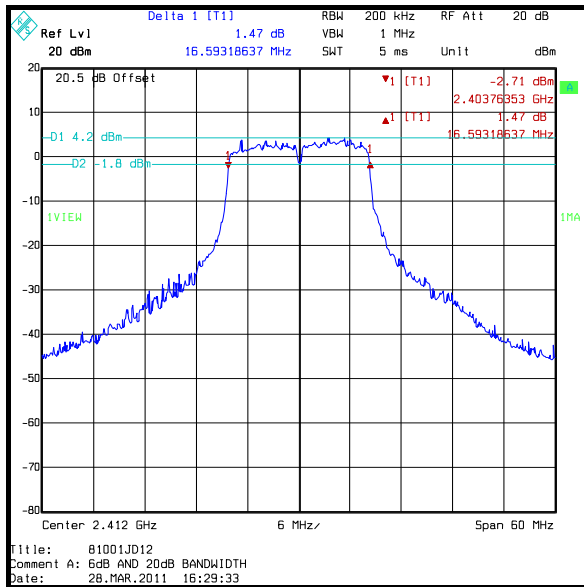
### Transmitter 6 dB Bandwidth (continued)

### Results: 802.11g 36 Mbps



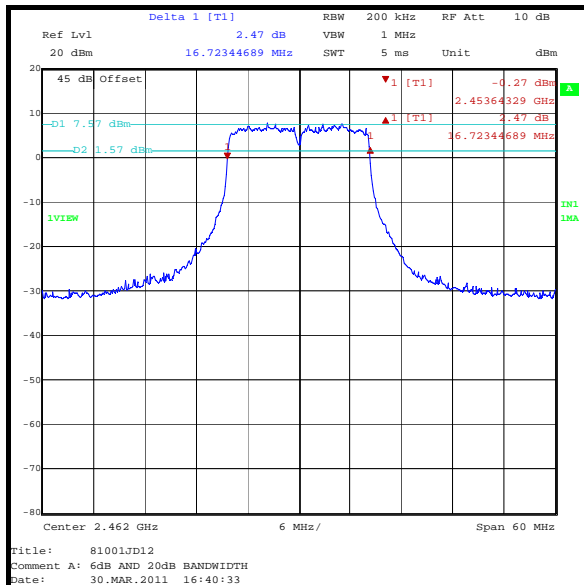
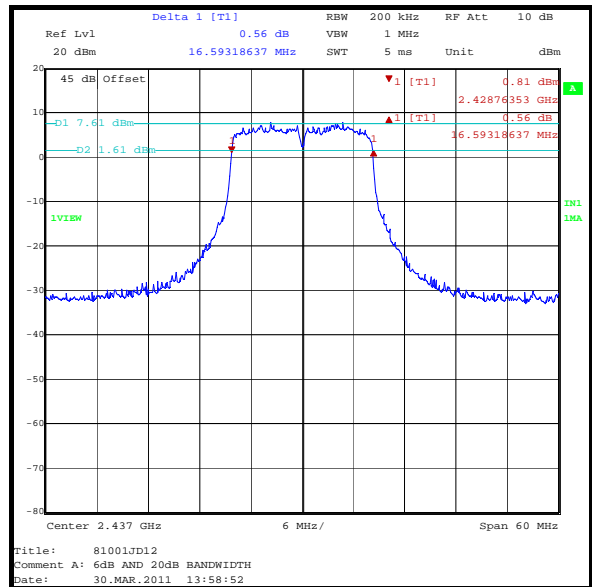
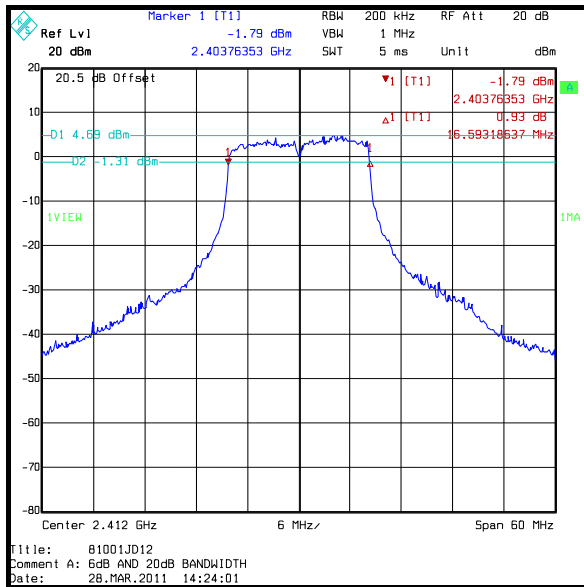
### Transmitter 6 dB Bandwidth (continued)

### Results: 802.11g 48 Mbps



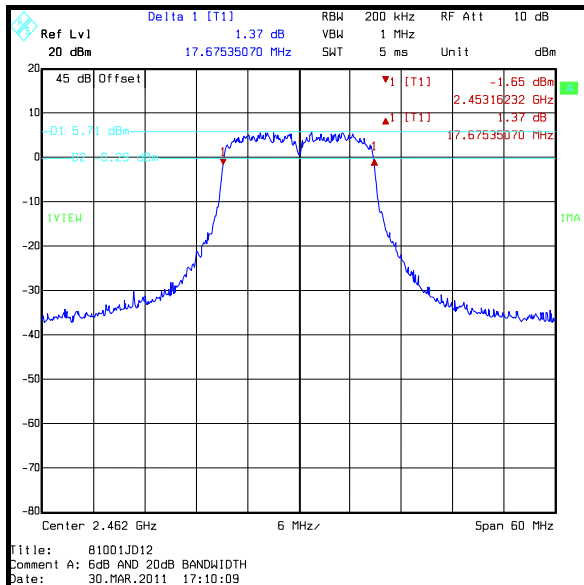
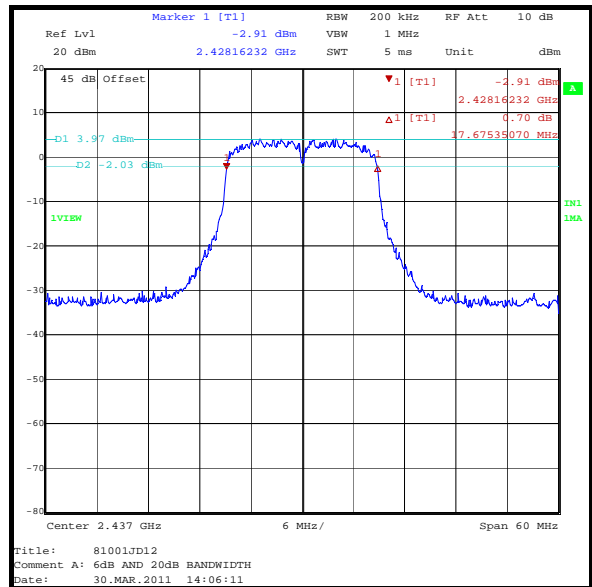
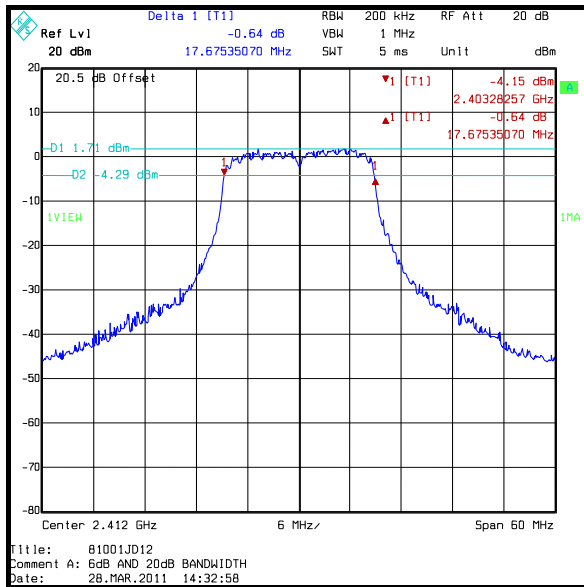
### Transmitter 6 dB Bandwidth (continued)

#### Results: 802.11g 54 Mbps



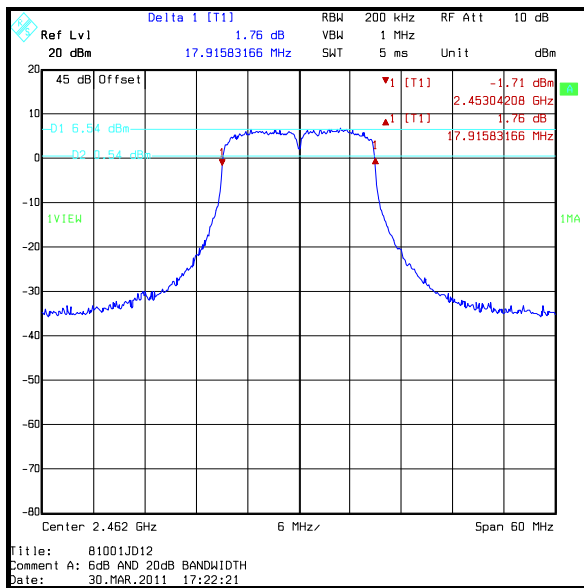
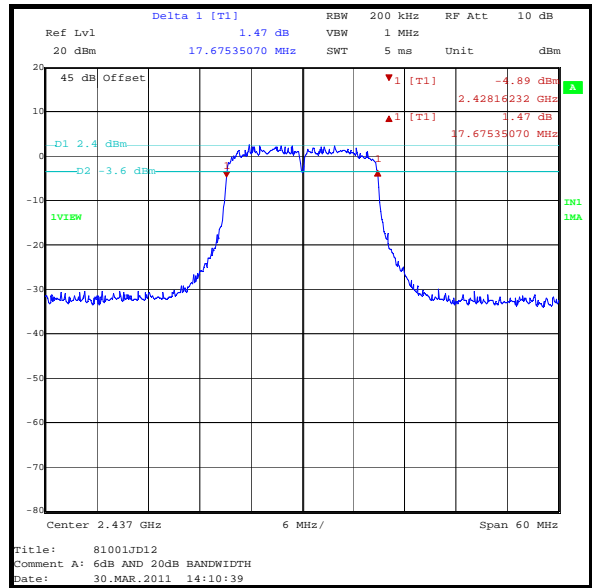
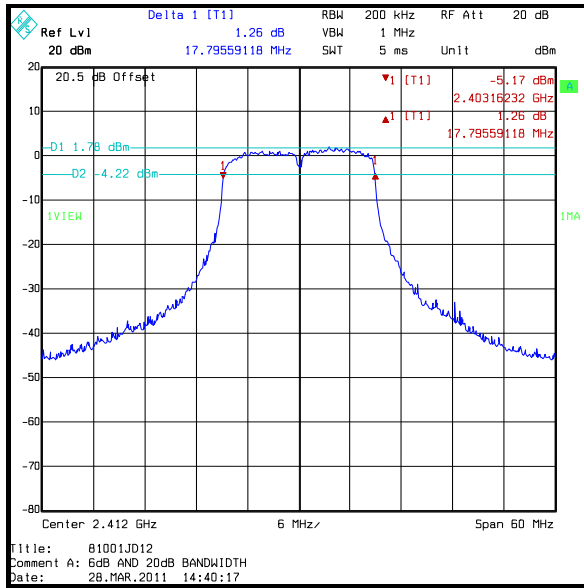
### Transmitter 6 dB Bandwidth (continued)

### Results: 802.11n 6.5 Mbps



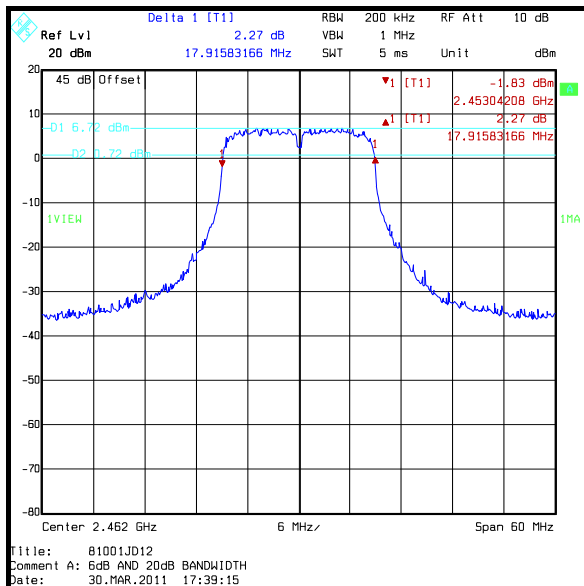
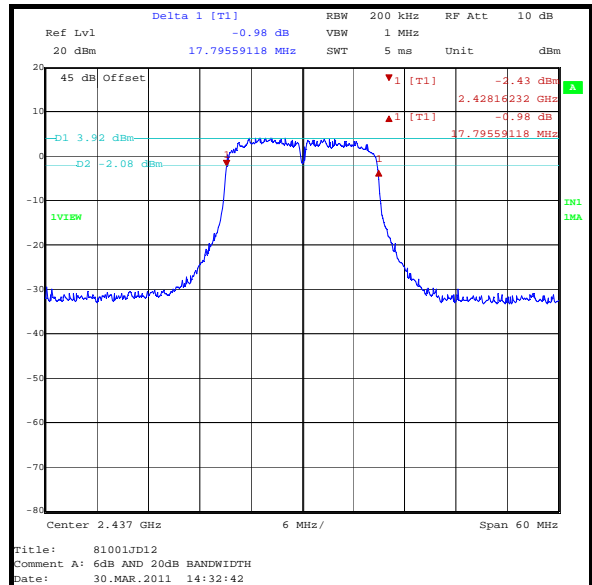
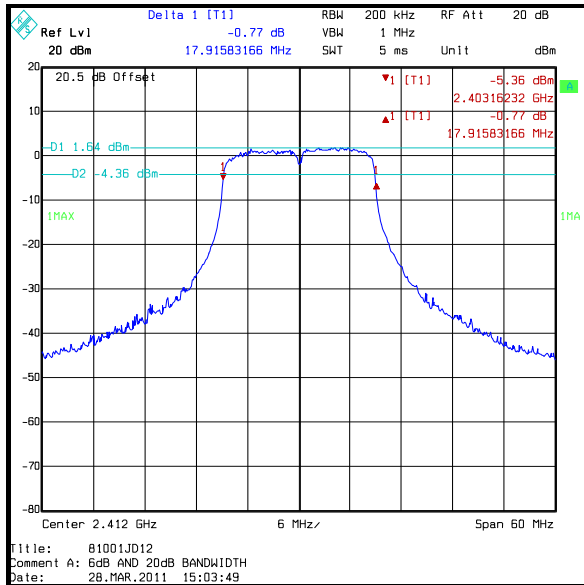
### Transmitter 6 dB Bandwidth (continued)

#### Results: 802.11n 13 Mbps



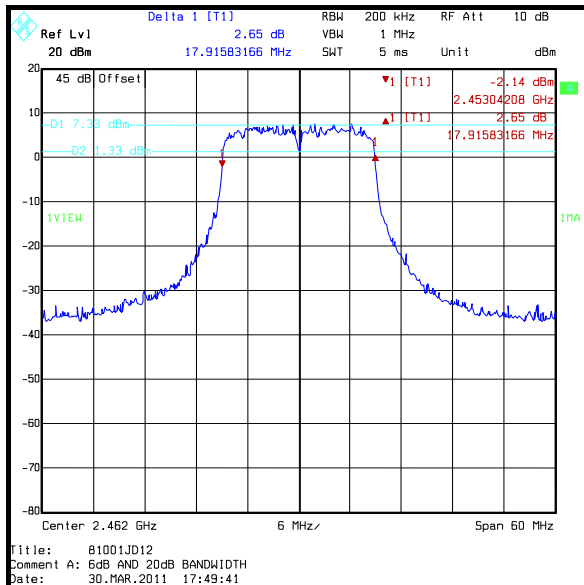
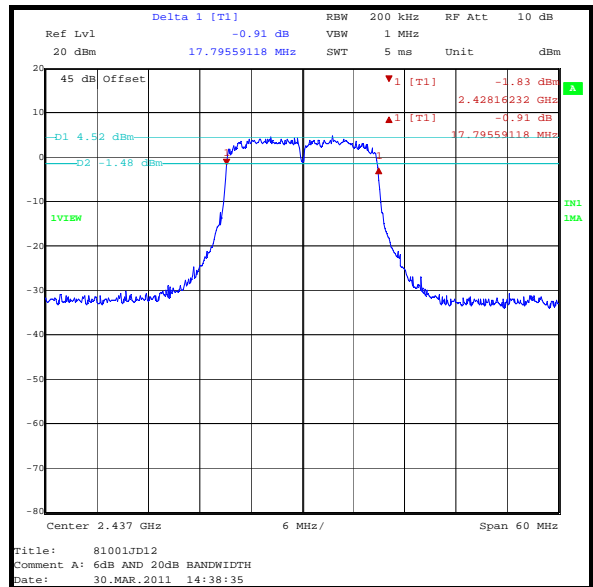
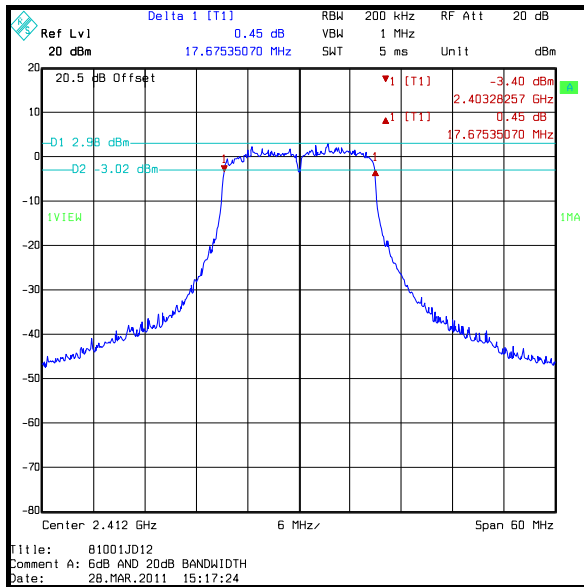
### Transmitter 6 dB Bandwidth (continued)

#### Results: 802.11n 19.5 Mbps



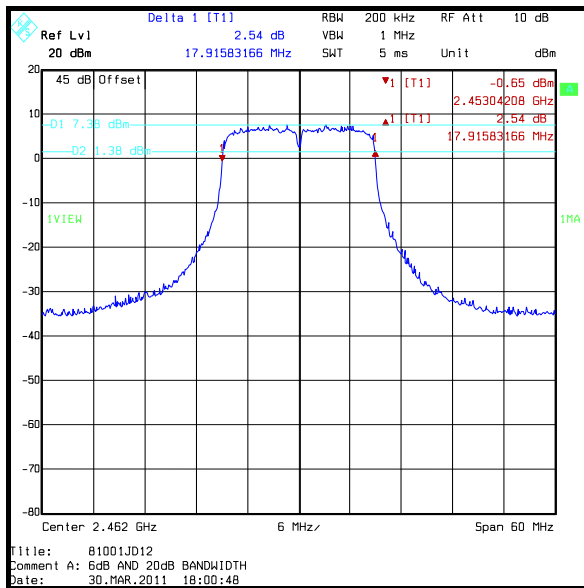
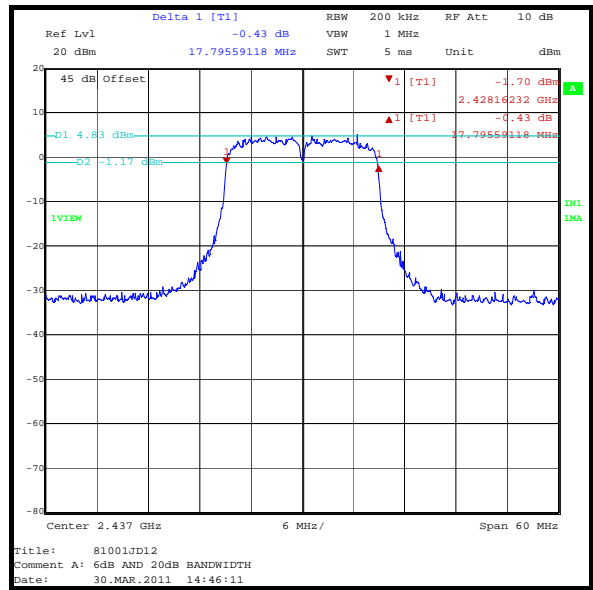
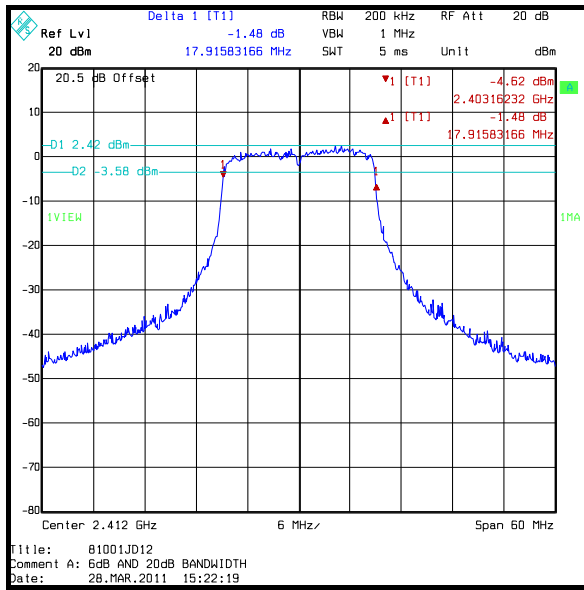
### Transmitter 6 dB Bandwidth (continued)

### Results: 802.11n 26 Mbps



### Transmitter 6 dB Bandwidth (continued)

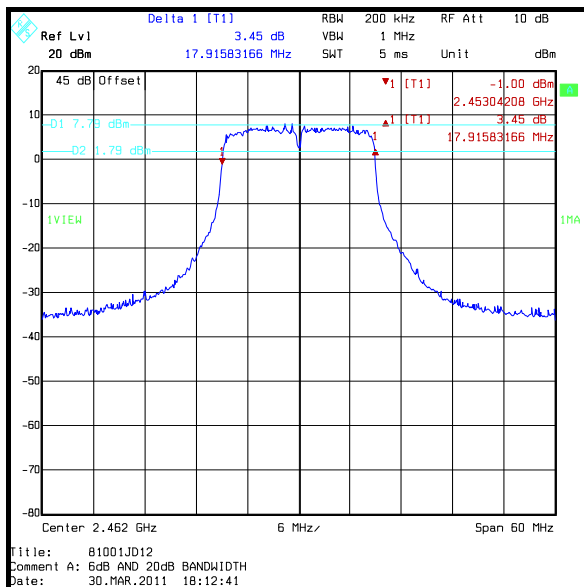
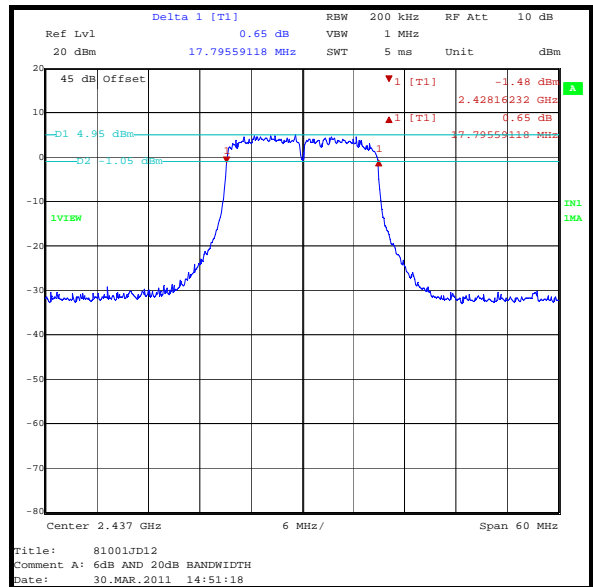
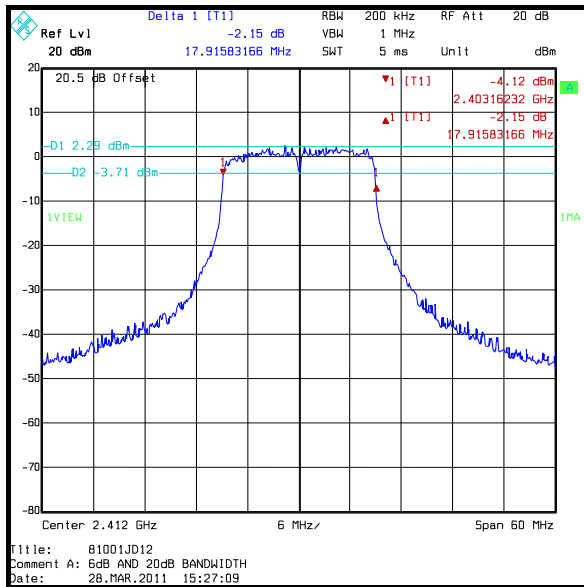
### Results: 802.11n 39 Mbps





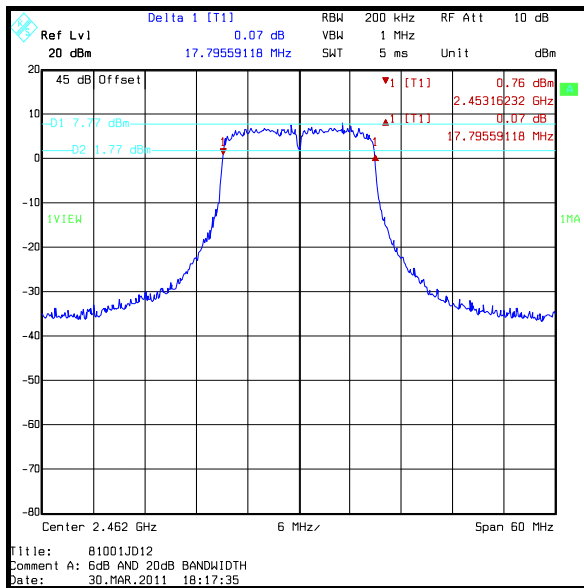
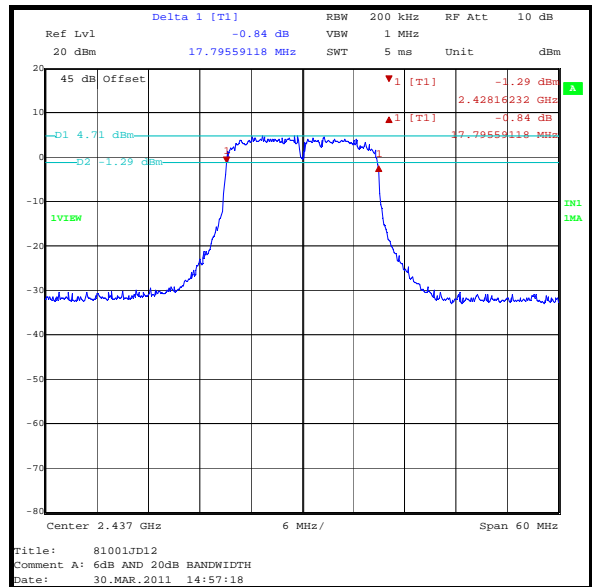
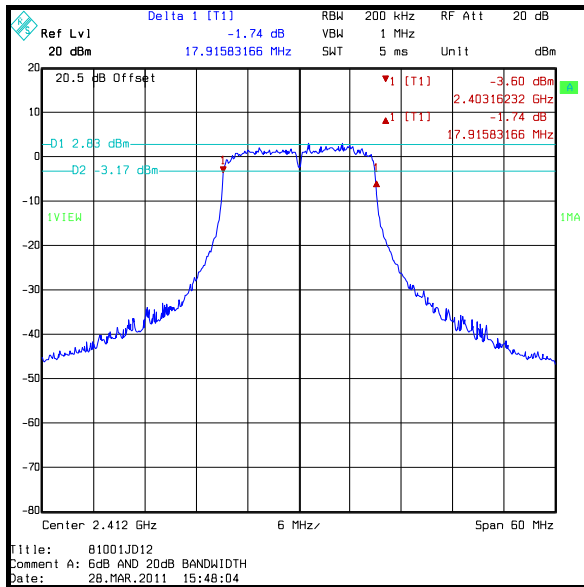
### Transmitter 6 dB Bandwidth (continued)

### Results: 802.11n 52 Mbps



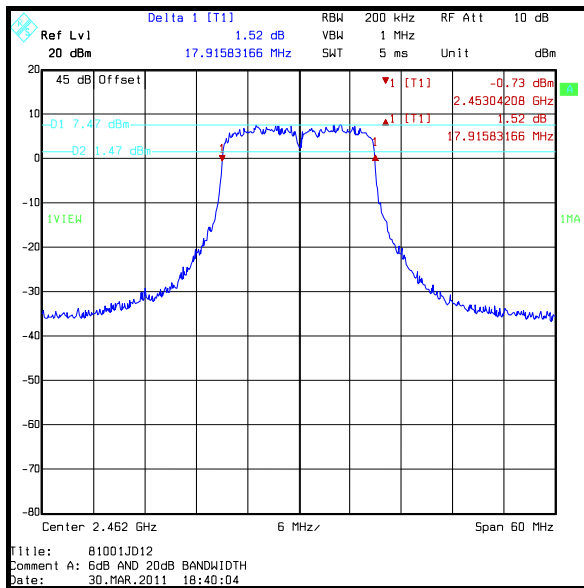
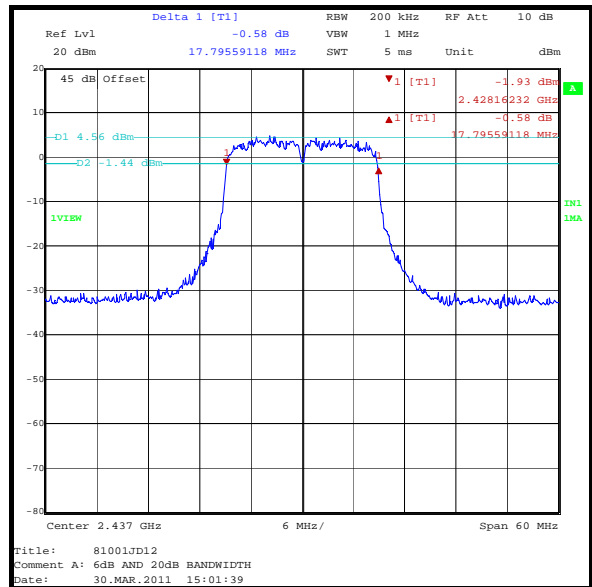
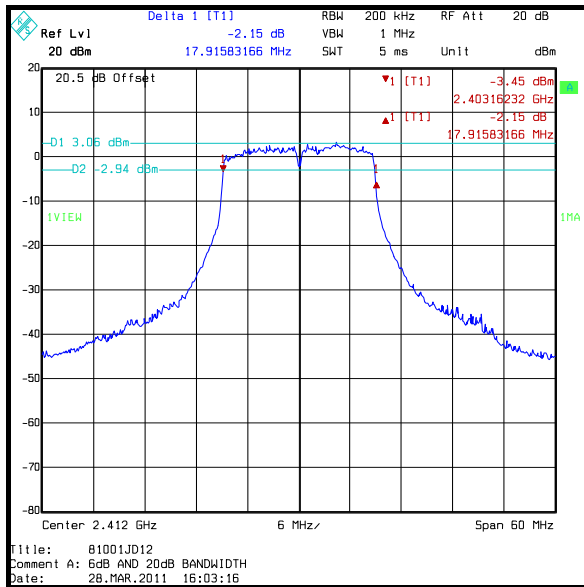
### Transmitter 6 dB Bandwidth (continued)

#### Results: 802.11n 58.5 Mbps



### Transmitter 6 dB Bandwidth (continued)

### Results: 802.11n 65 Mbps



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

<b>Test Engineer:</b>	Patrick Jones	<b>Test Date:</b>	28 March 2011 & 30 March 2011
<b>Test Sample IMEI:</b>	355320040012406		

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

**Environmental Conditions:**

<b>Temperature (°C):</b>	23
<b>Relative Humidity (%):</b>	30

**Results: 802.11b 1 Mbps**

Channel	20 dB Bandwidth (MHz)
Bottom	15.872
Middle	15.872
Top	15.641

**Results: 802.11b 2 Mbps**

Channel	20 dB Bandwidth (MHz)
Bottom	15.752
Middle	15.752
Top	15.882

**Results: 802.11b 5.5 Mbps**

Channel	20 dB Bandwidth (MHz)
Bottom	15.752
Middle	15.872
Top	16.002

**Results: 802.11b 11 Mbps**

Channel	20 dB Bandwidth (MHz)
Bottom	15.872
Middle	15.752
Top	15.882

**Transmitter 20 dB Bandwidth (continued)****Results: 802.11g 6 Mbps**

Channel	20 dB Bandwidth (MHz)
Bottom	18.878
Middle	18.878
Top	19.008

**Results: 802.11g 9 Mbps**

Channel	20 dB Bandwidth (MHz)
Bottom	18.758
Middle	19.479
Top	19.128

**Results: 802.11g 12 Mbps**

Channel	20 dB Bandwidth (MHz)
Bottom	18.758
Middle	19.359
Top	19.369

**Results: 802.11g 18 Mbps**

Channel	20 dB Bandwidth (MHz)
Bottom	18.517
Middle	18.878
Top	18.888

**Results: 802.11g 24 Mbps**

Channel	20 dB Bandwidth (MHz)
Bottom	18.517
Middle	18.517
Top	19.008

**Results: 802.11g 36 Mbps**

Channel	20 dB Bandwidth (MHz)
Bottom	18.517
Middle	18.517
Top	18.287

**Transmitter 20 dB Bandwidth (continued)****Results: 802.11g 48 Mbps**

Channel	20 dB Bandwidth (MHz)
Bottom	18.637
Middle	18.758
Top	18.768

**Results: 802.11g 54 Mbps**

Channel	20 dB Bandwidth (MHz)
Bottom	18.878
Middle	18.277
Top	18.888

**Results: 802.11n 6.5 Mbps**

Channel	20 dB Bandwidth (MHz)
Bottom	20.681
Middle	19.960
Top	19.960

**Results: 802.11n 13 Mbps**

Channel	20 dB Bandwidth (MHz)
Bottom	19.840
Middle	19.960
Top	20.080

**Results: 802.11n 19.5 Mbps**

Channel	20 dB Bandwidth (MHz)
Bottom	20.200
Middle	19.599
Top	19.960

**Results: 802.11n 26 Mbps**

Channel	20 dB Bandwidth (MHz)
Bottom	19.359
Middle	19.719
Top	19.840

**Transmitter 20 dB Bandwidth (continued)****Results: 802.11n 39 Mbps**

Channel	20 dB Bandwidth (MHz)
Bottom	19.599
Middle	19.719
Top	19.960

**Results: 802.11n 52 Mbps**

Channel	20 dB Bandwidth (MHz)
Bottom	19.719
Middle	19.599
Top	19.719

**Results: 802.11n 58.5 Mbps**

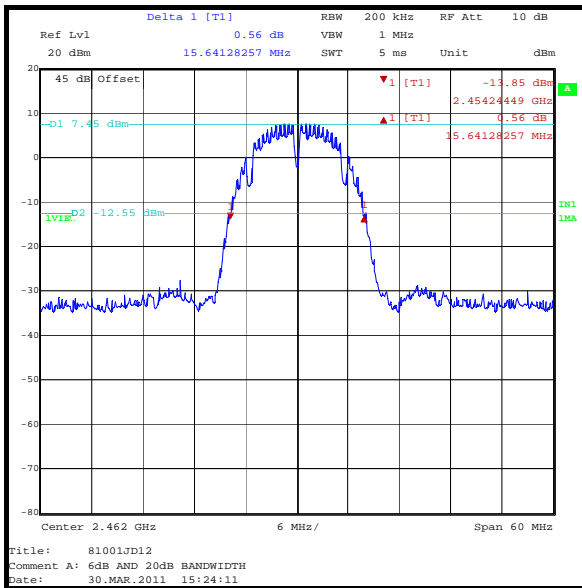
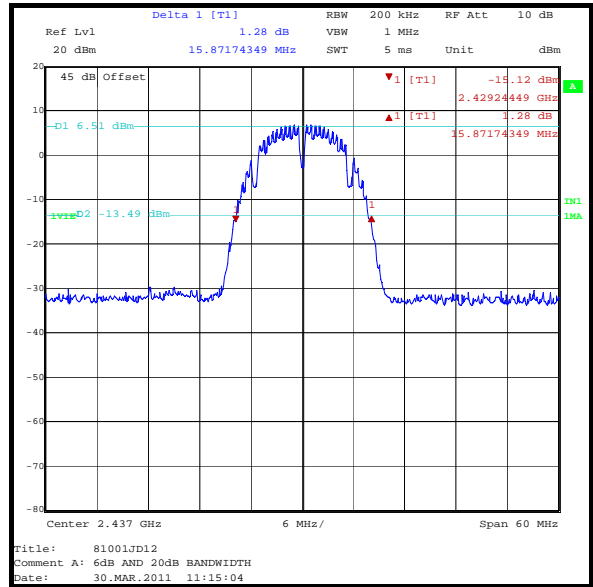
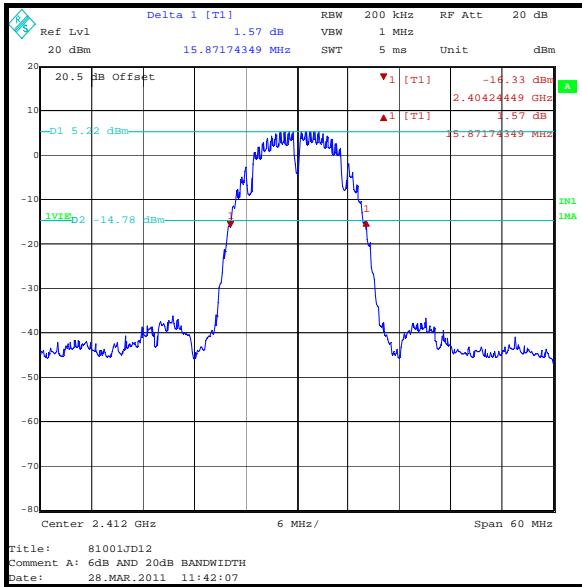
Channel	20 dB Bandwidth (MHz)
Bottom	19.719
Middle	19.719
Top	19.599

**Results: 802.11n 65 Mbps**

Channel	20 dB Bandwidth (MHz)
Bottom	19.960
Middle	19.359
Top	19.599

### Transmitter 20 dB Bandwidth (continued)

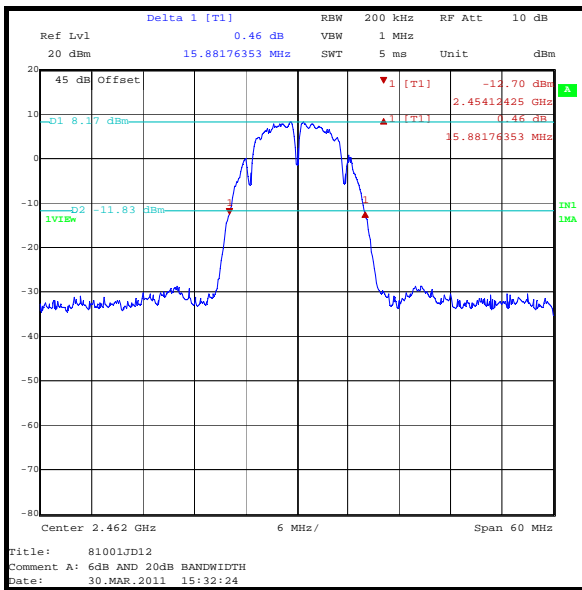
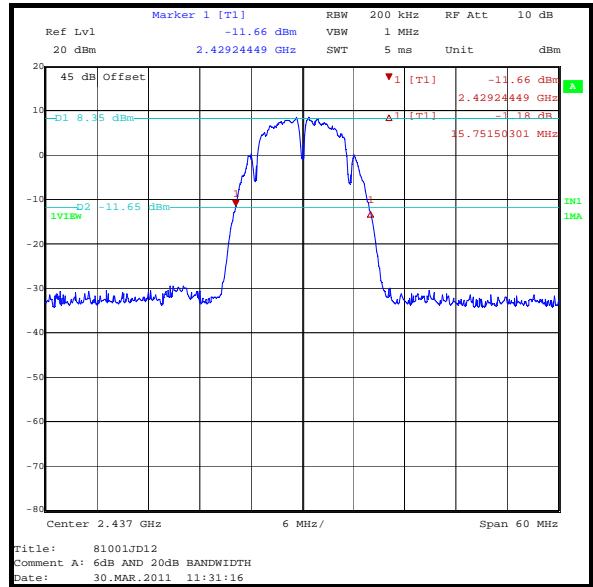
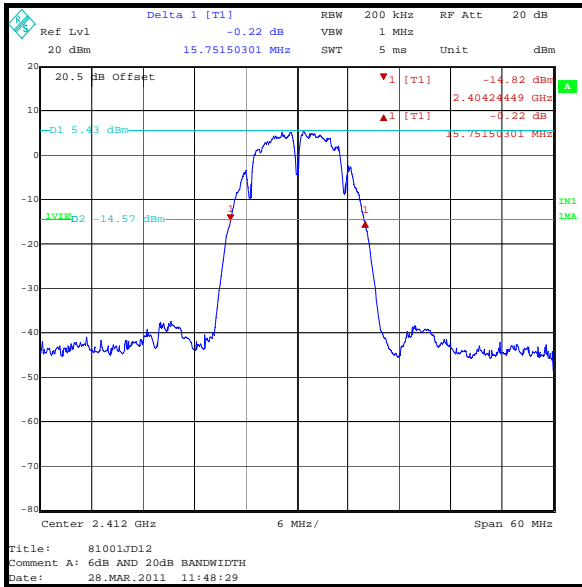
#### Results: 802.11b 1 Mbps





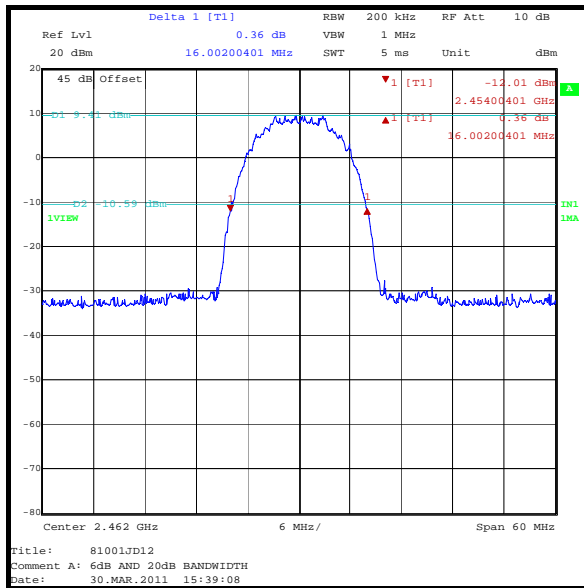
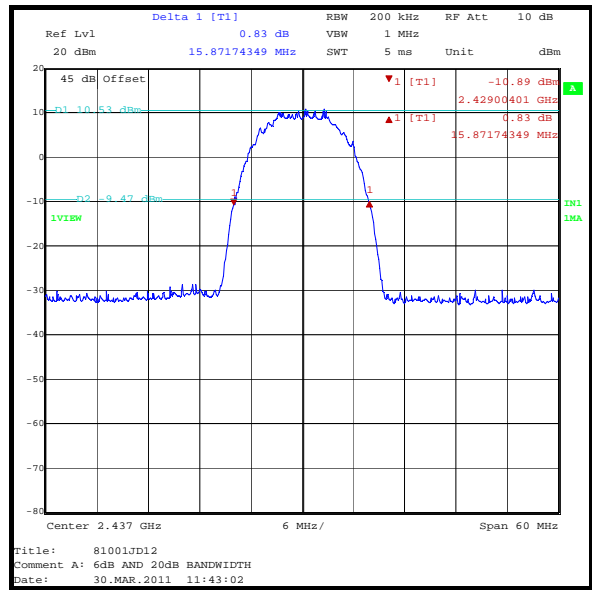
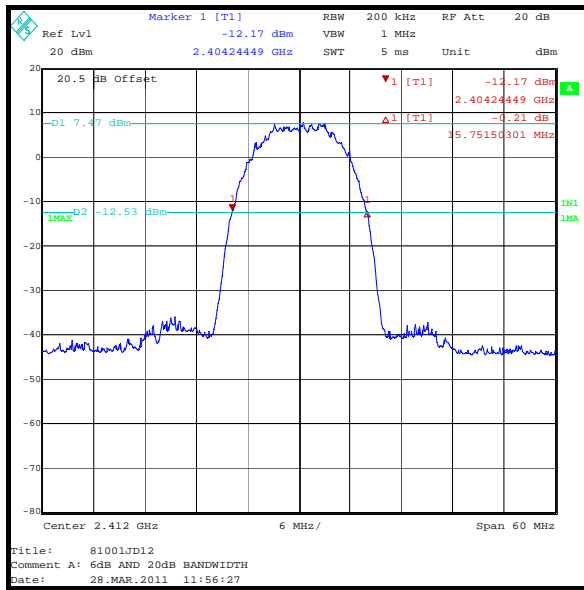
### Transmitter 20 dB Bandwidth (continued)

#### Results: 802.11b 2 Mbps



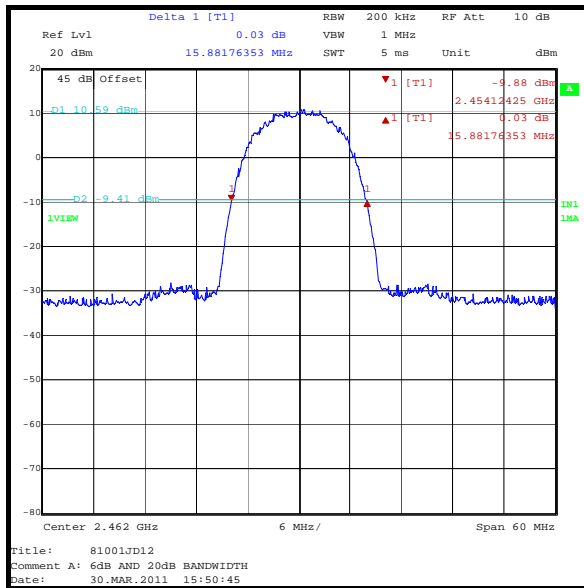
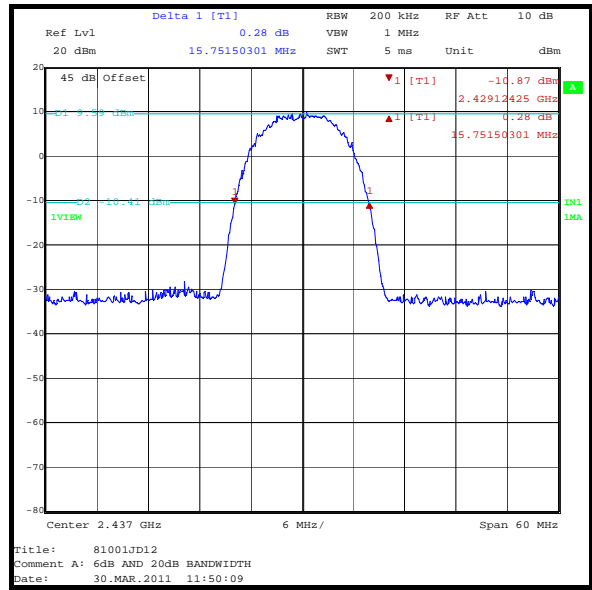
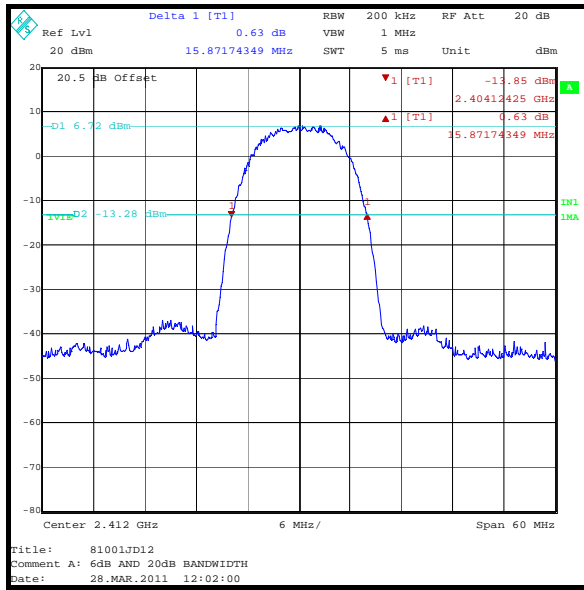
### Transmitter 20 dB Bandwidth (continued)

#### Results: 802.11b 5.5 Mbps



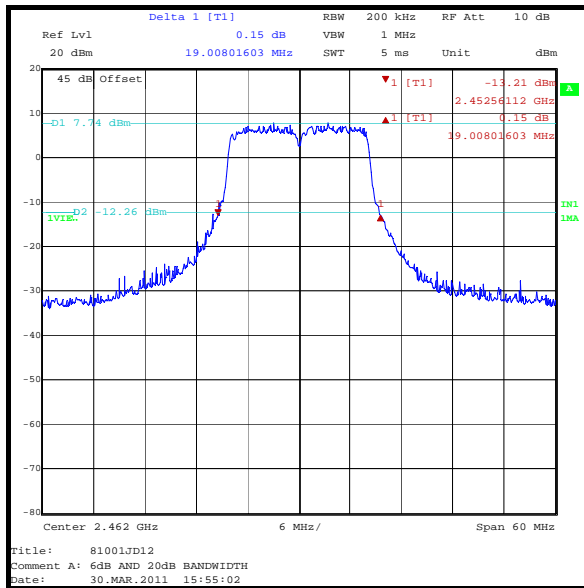
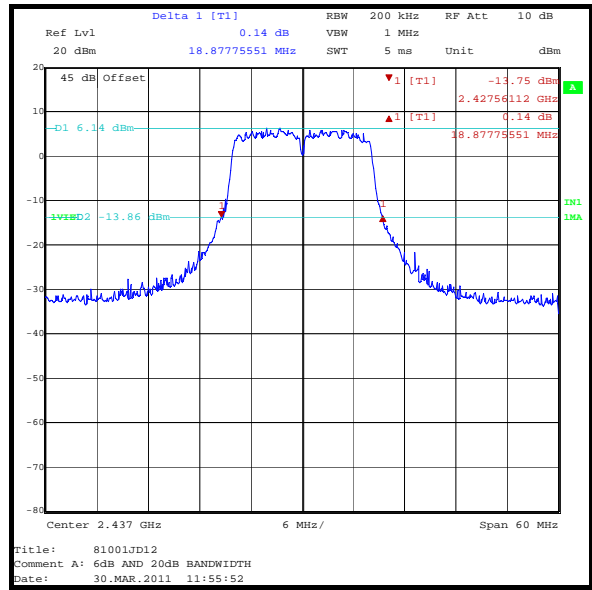
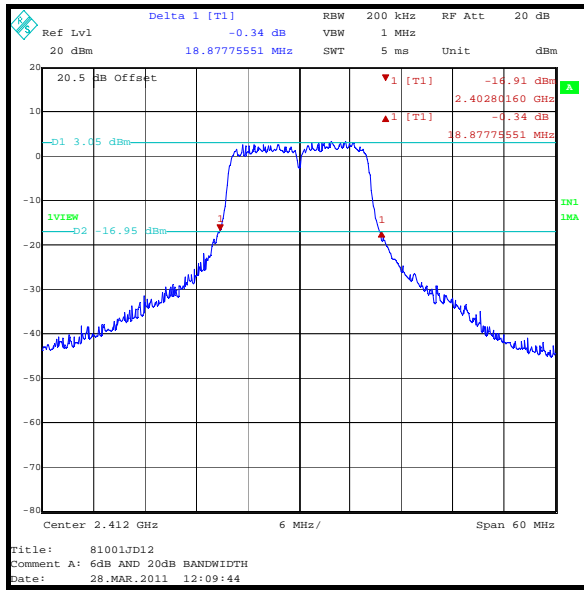
### Transmitter 20 dB Bandwidth (continued)

#### Results: 802.11b 11 Mbps



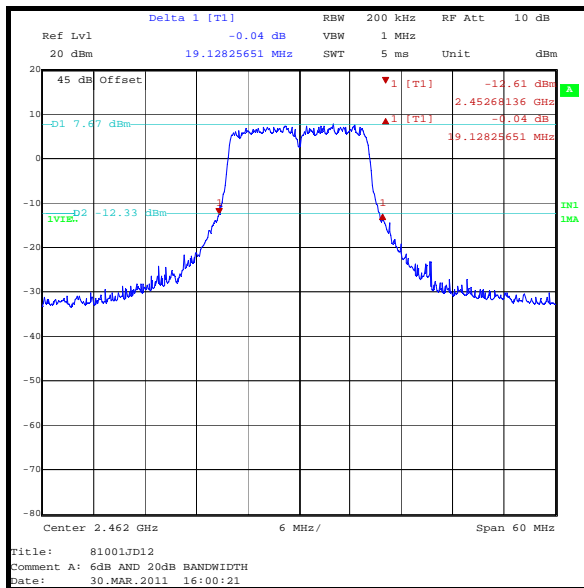
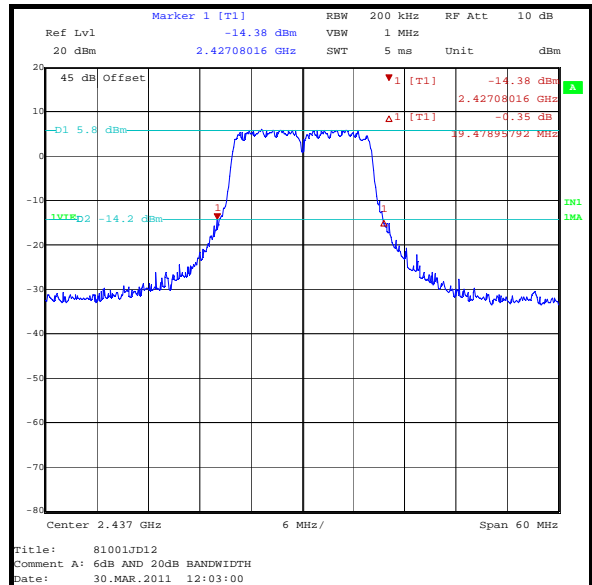
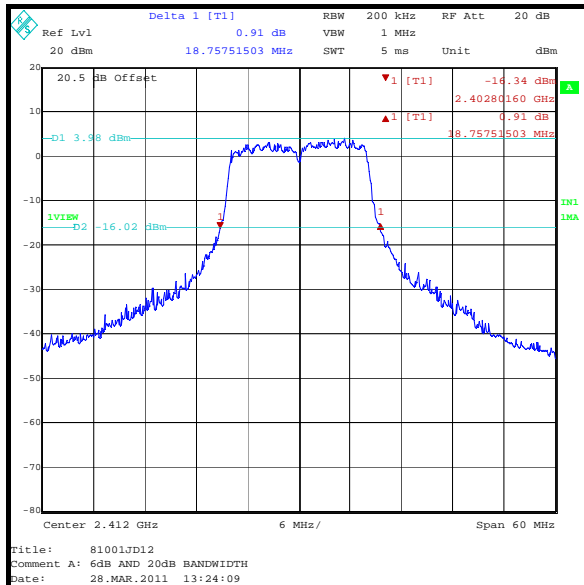
### Transmitter 20 dB Bandwidth (continued)

#### Results: 802.11g 6 Mbps



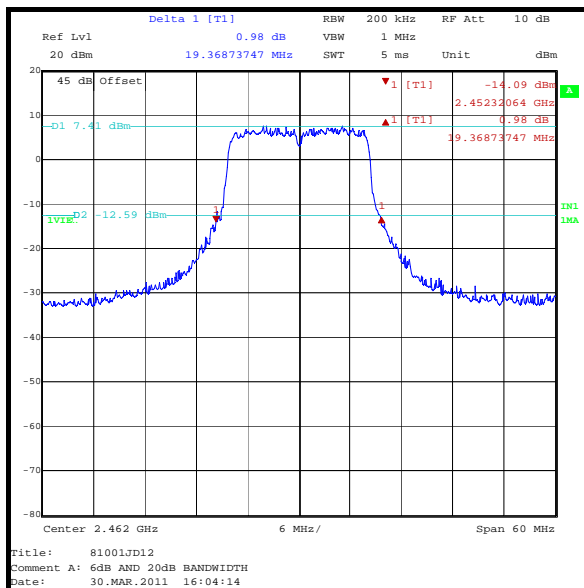
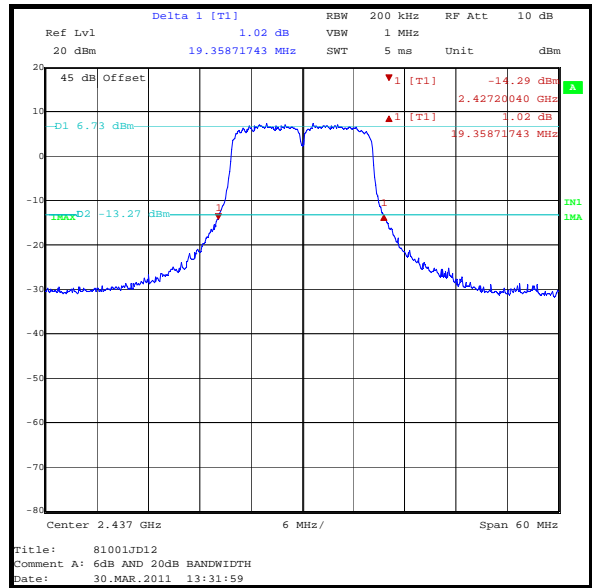
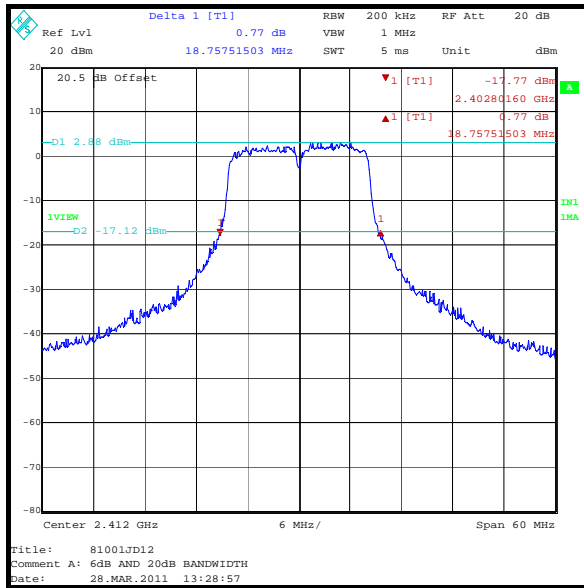
### Transmitter 20 dB Bandwidth (continued)

#### Results: 802.11g 9 Mbps



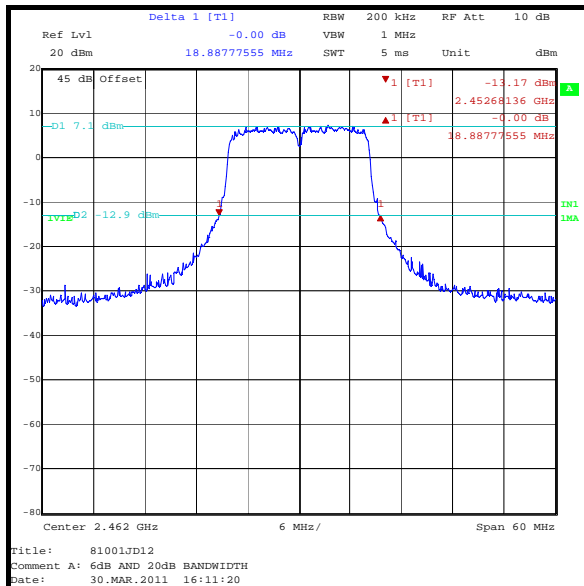
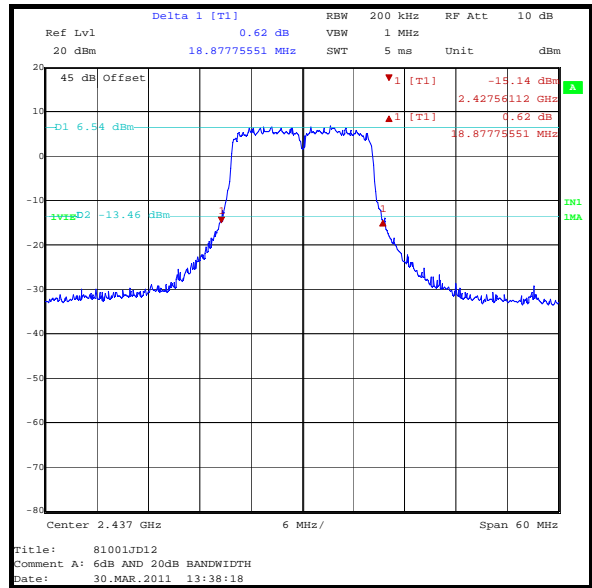
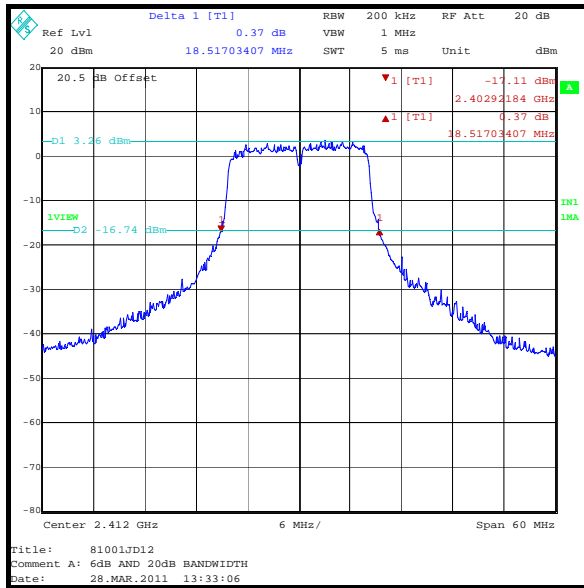
### Transmitter 20 dB Bandwidth (continued)

#### Results: 802.11g 12 Mbps



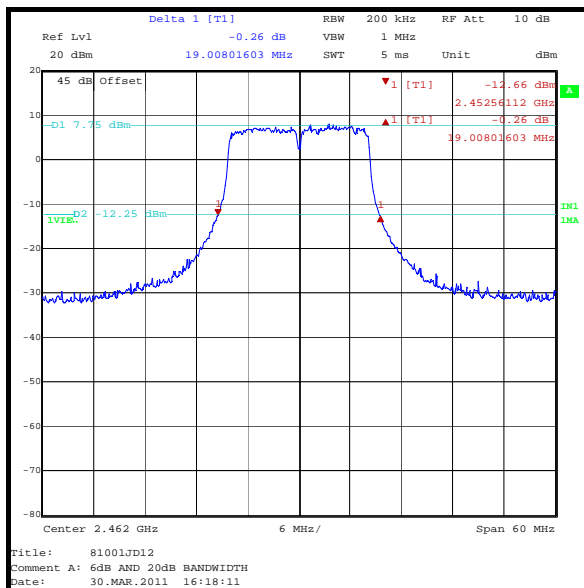
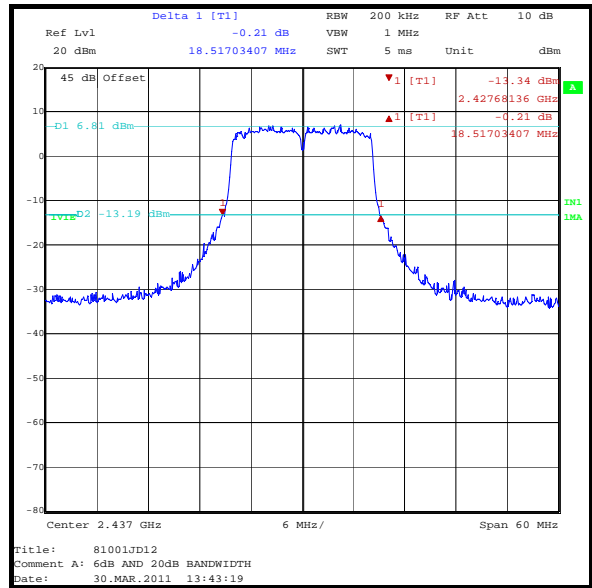
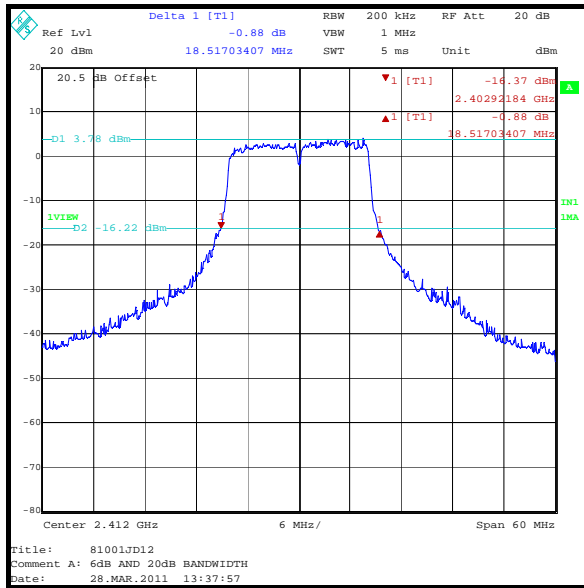
### Transmitter 20 dB Bandwidth (continued)

#### Results: 802.11g 18 Mbps



### Transmitter 20 dB Bandwidth (continued)

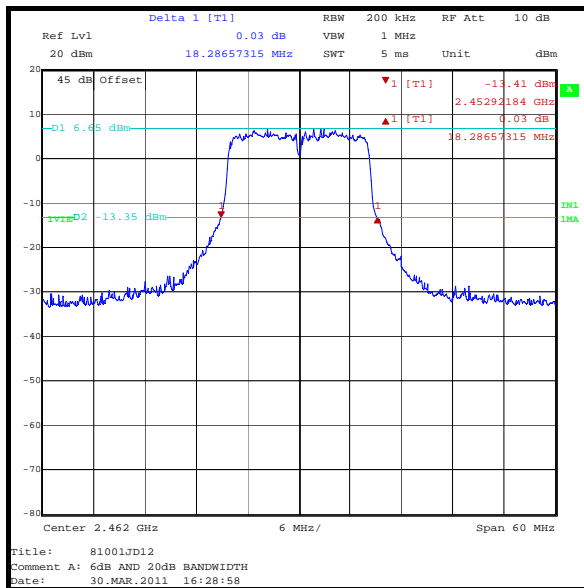
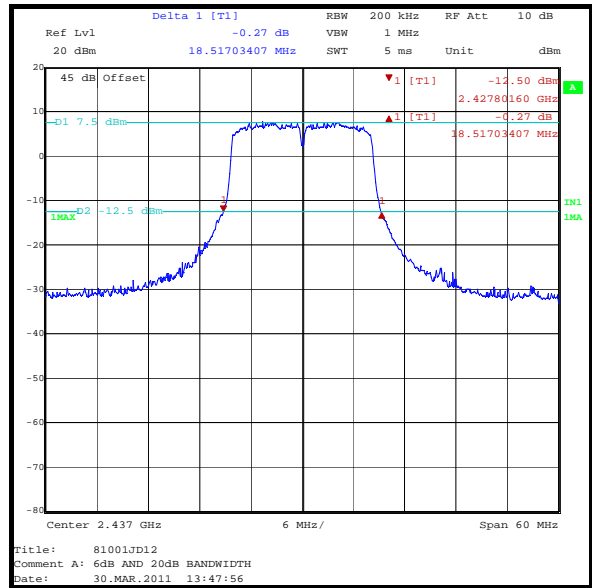
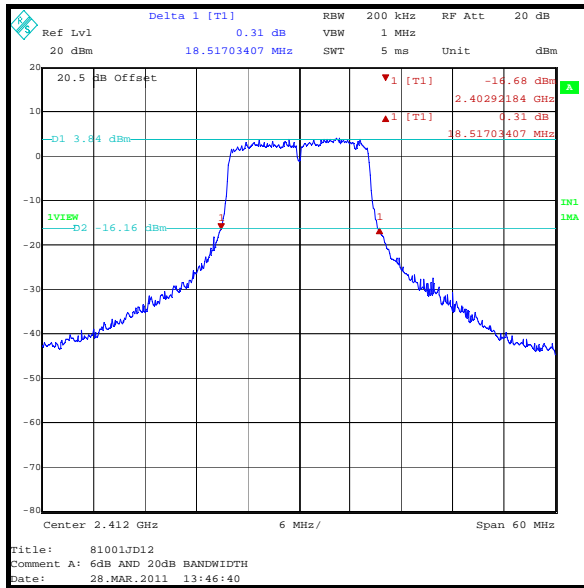
#### Results: 802.11g 24 Mbps





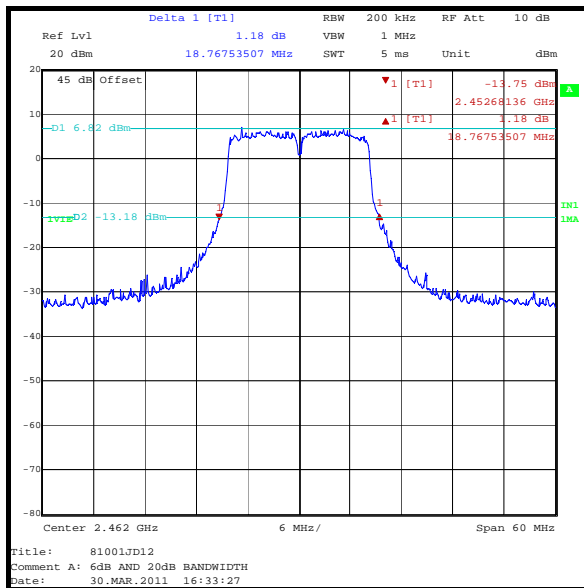
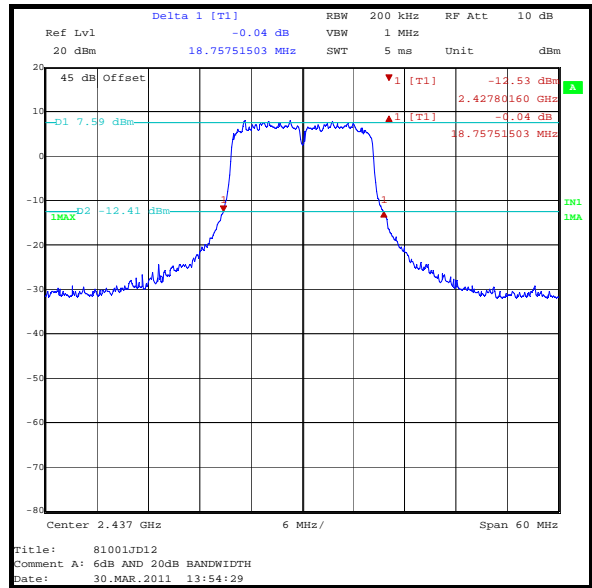
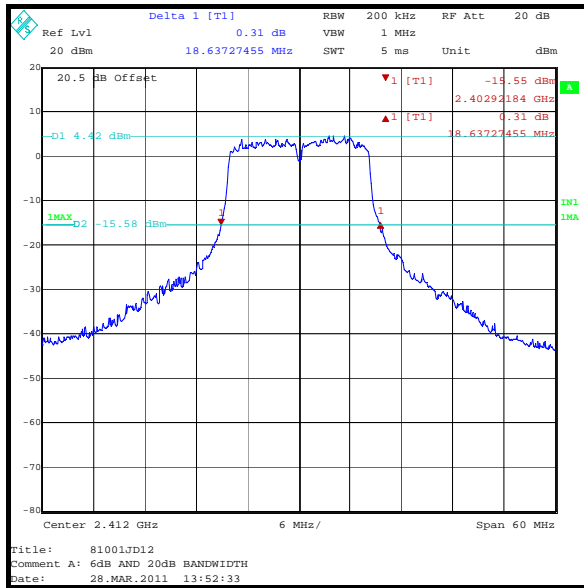
### Transmitter 20 dB Bandwidth (continued)

#### Results: 802.11g 36 Mbps



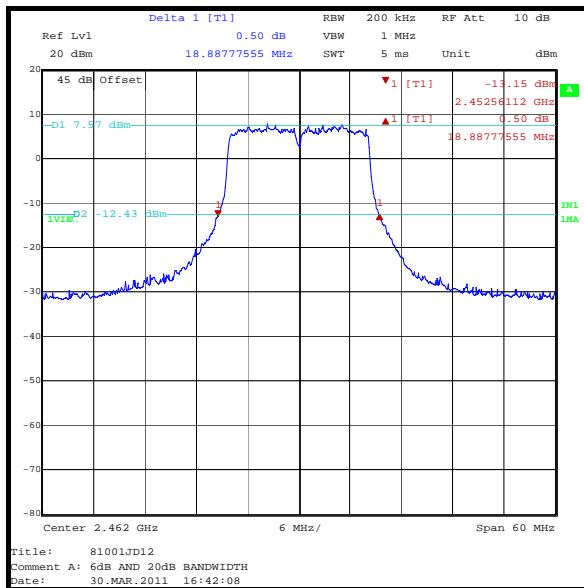
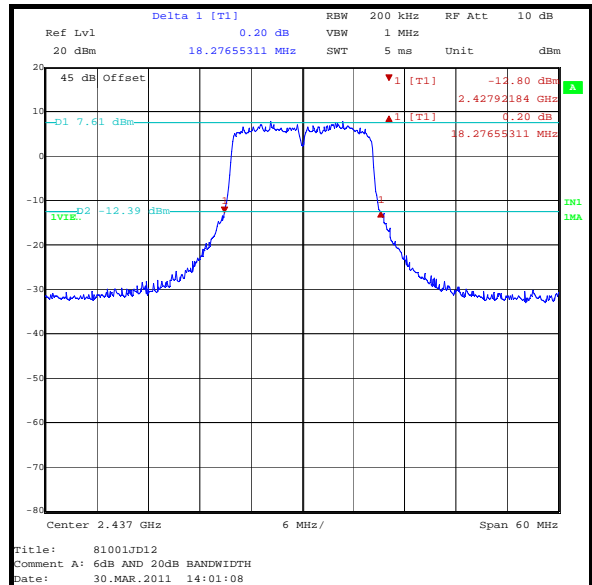
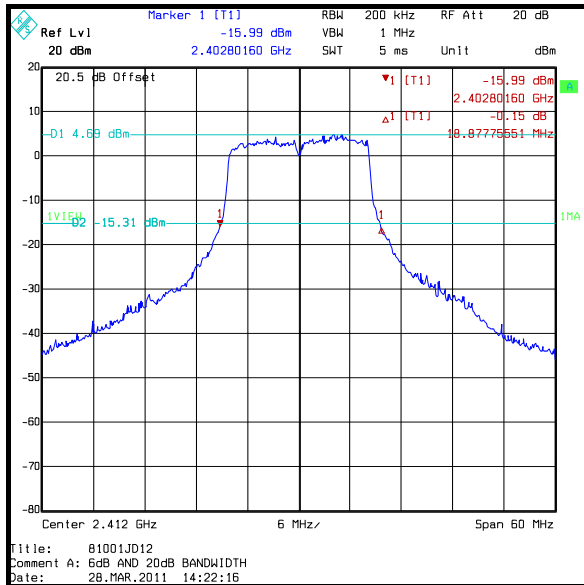
### Transmitter 20 dB Bandwidth (continued)

#### Results: 802.11g 48 Mbps



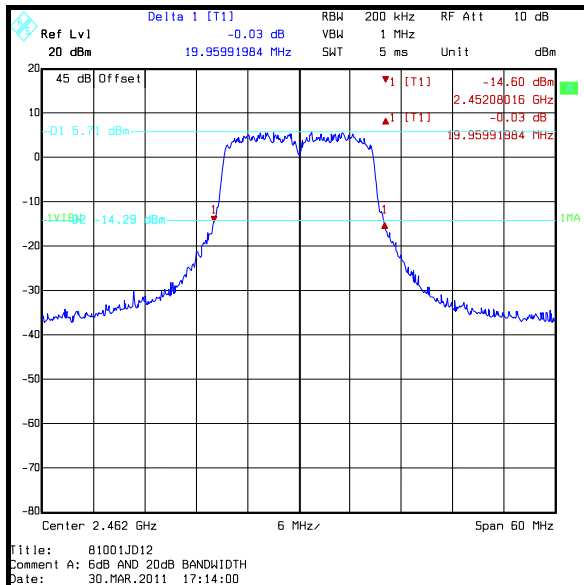
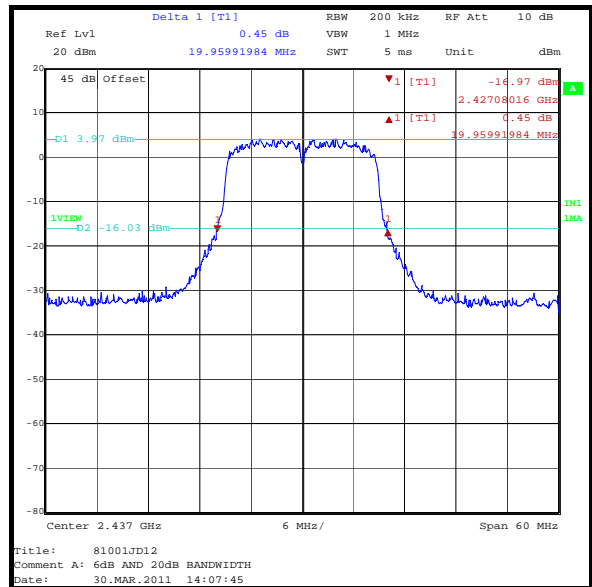
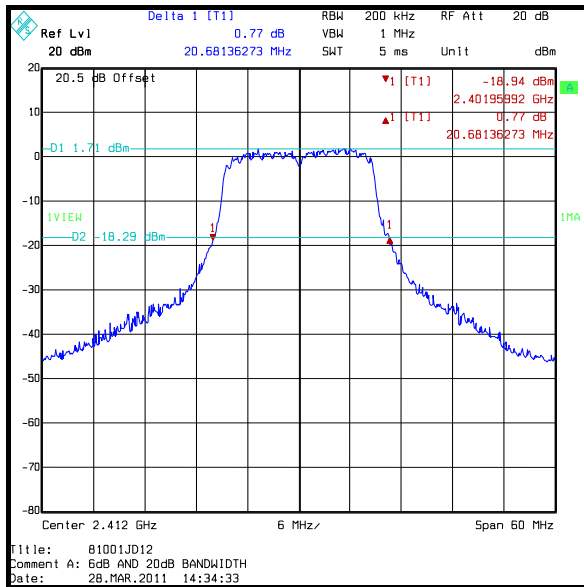
### Transmitter 20 dB Bandwidth (continued)

#### Results: 802.11g 54 Mbps



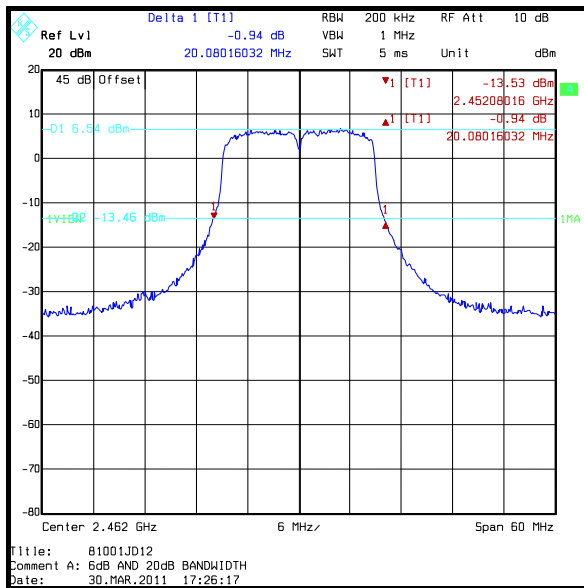
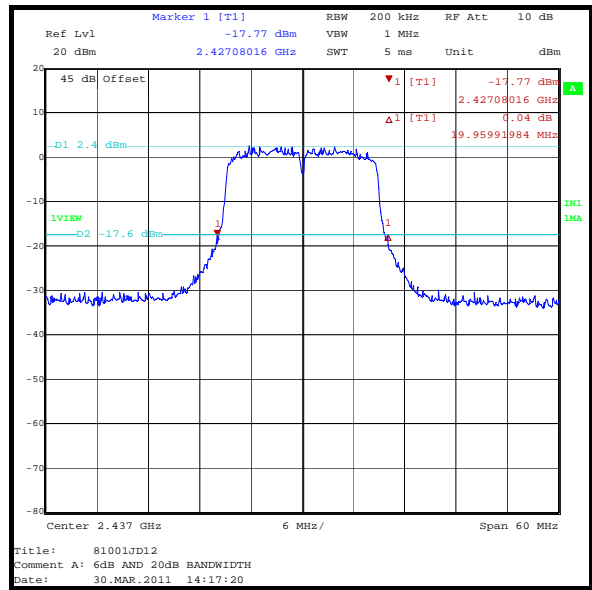
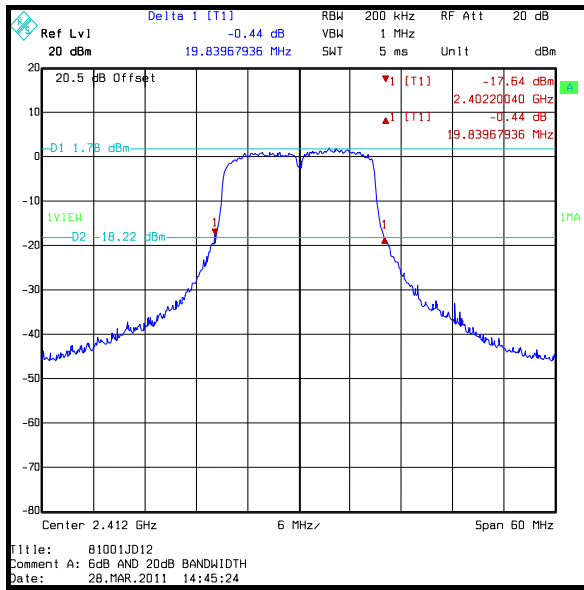
### Transmitter 20 dB Bandwidth (continued)

#### Results: 802.11n 6.5 Mbps



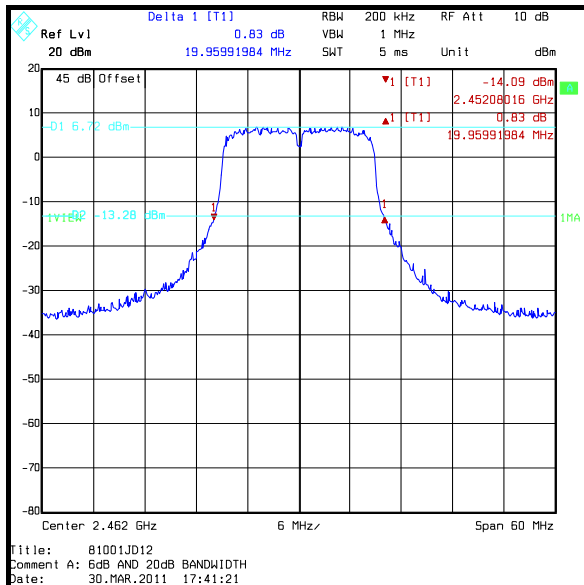
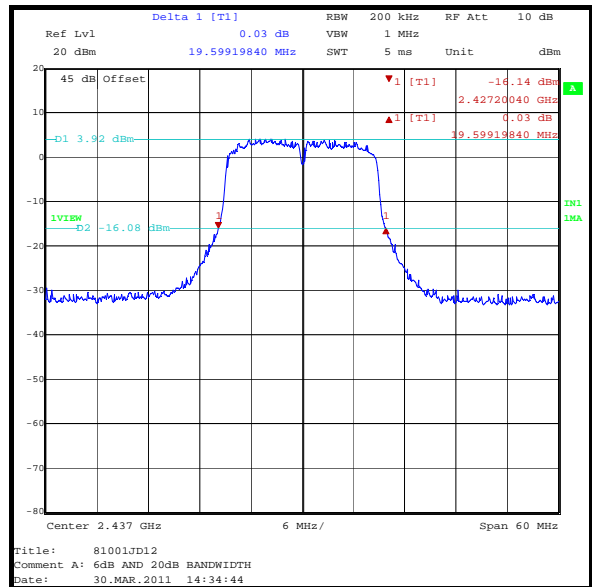
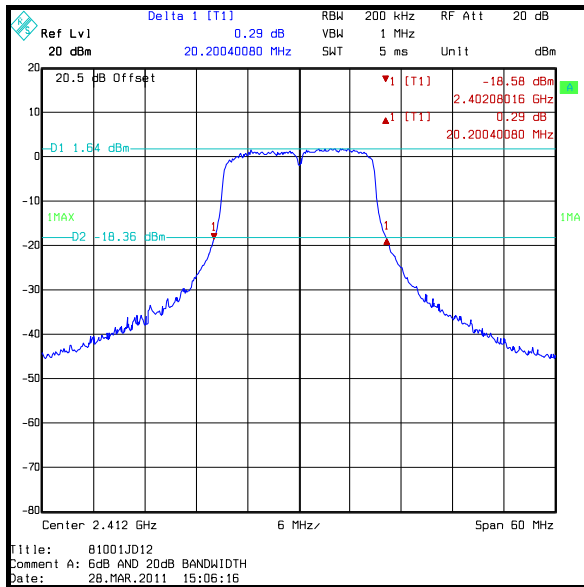
### Transmitter 20 dB Bandwidth (continued)

### Results: 802.11n 13 Mbps



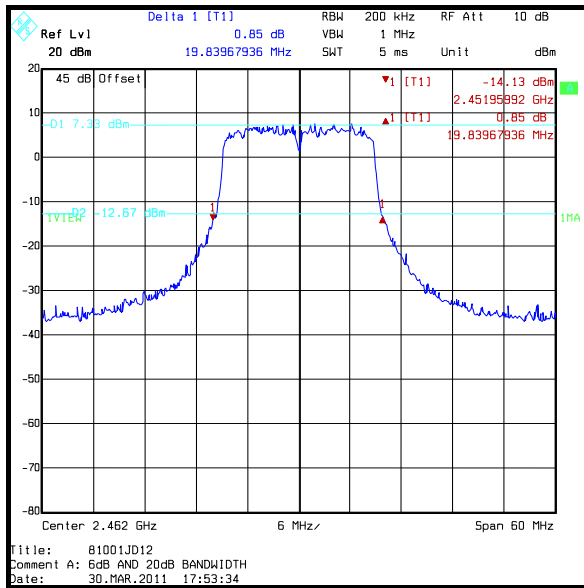
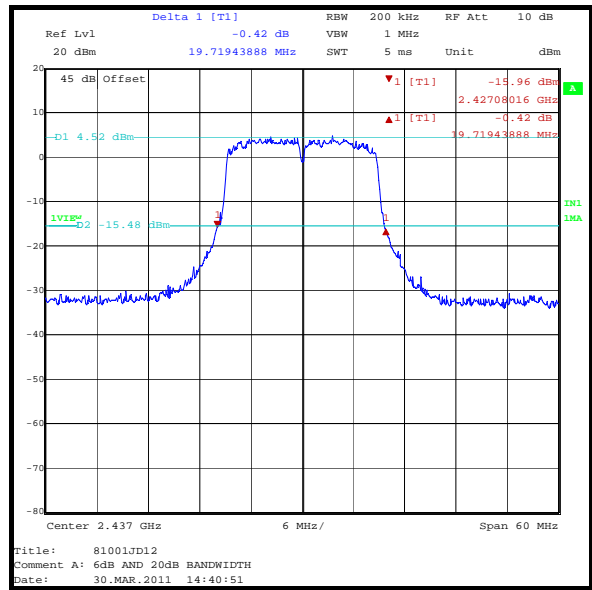
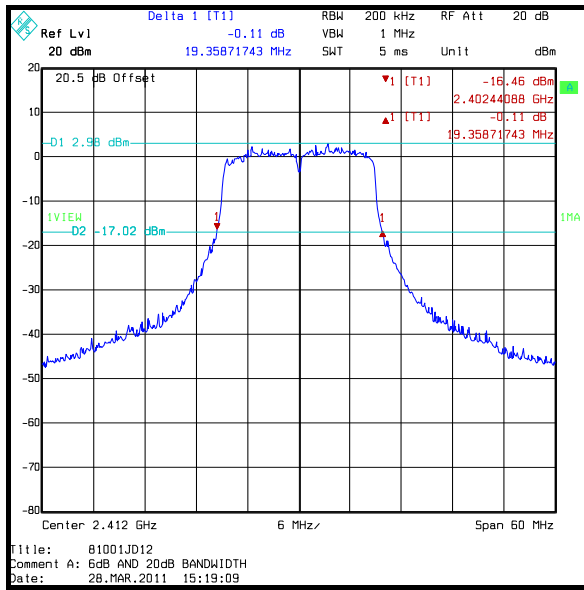
### Transmitter 20 dB Bandwidth (continued)

#### Results: 802.11n 19.5 Mbps



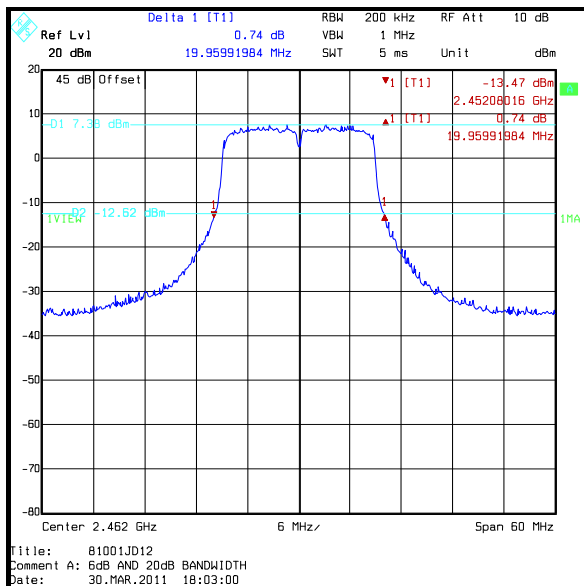
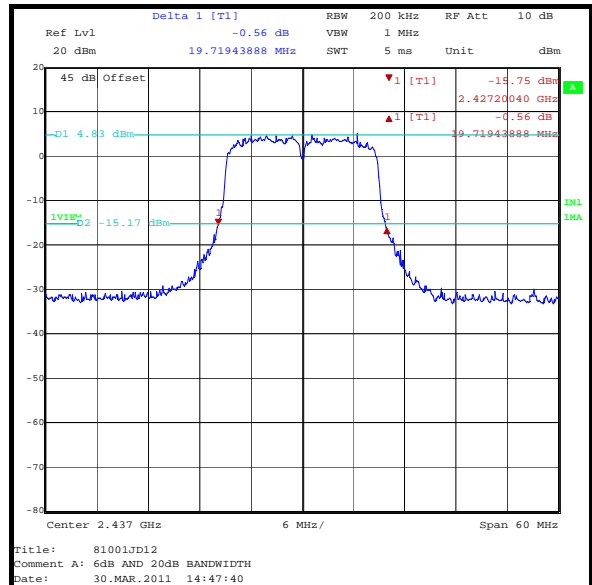
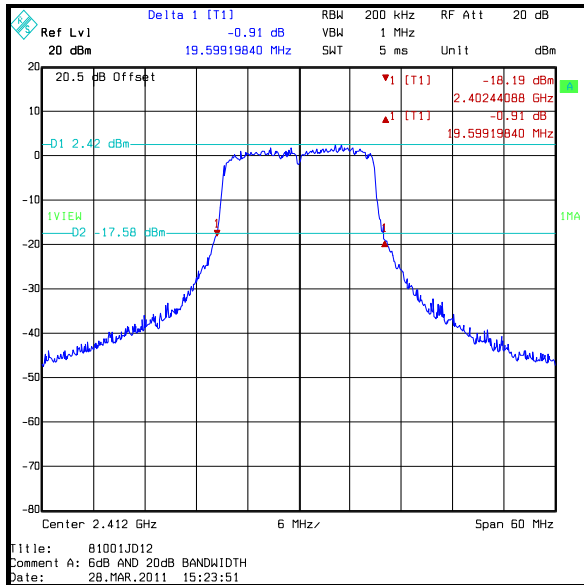
### Transmitter 20 dB Bandwidth (continued)

### Results: 802.11n 26 Mbps



### Transmitter 20 dB Bandwidth (continued)

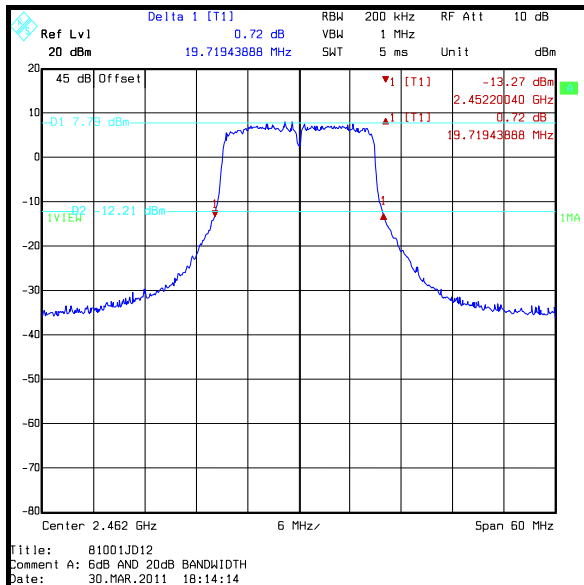
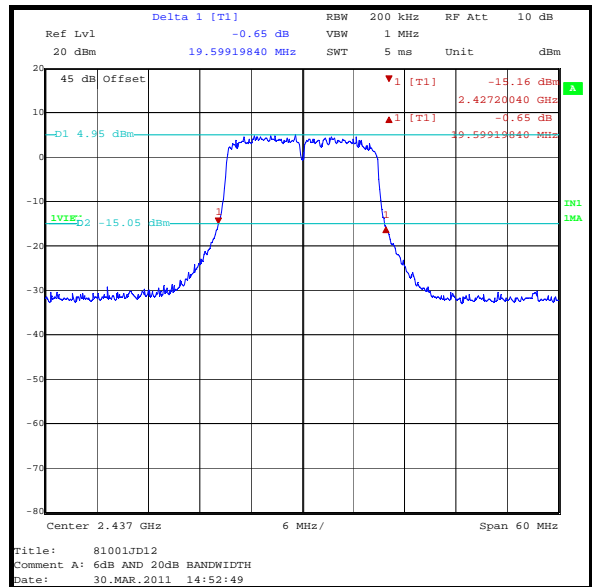
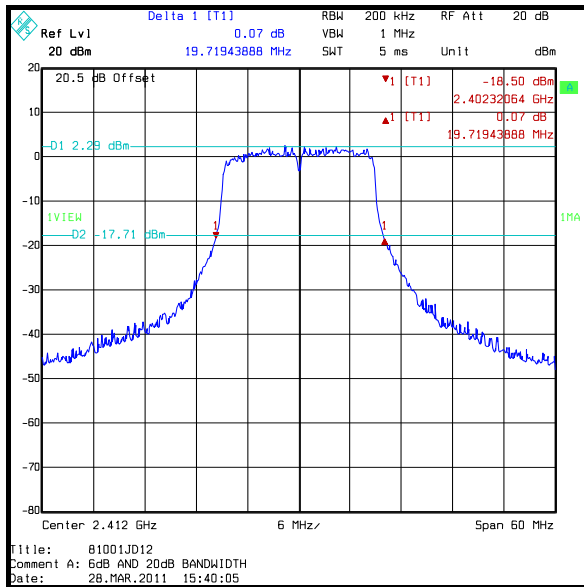
#### Results: 802.11n 39 Mbps





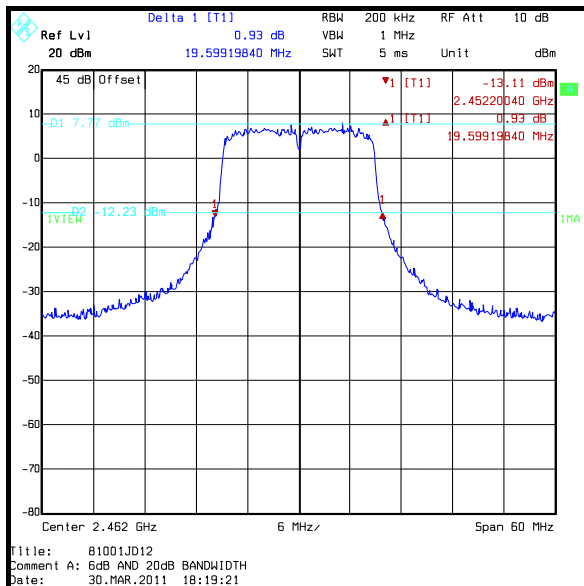
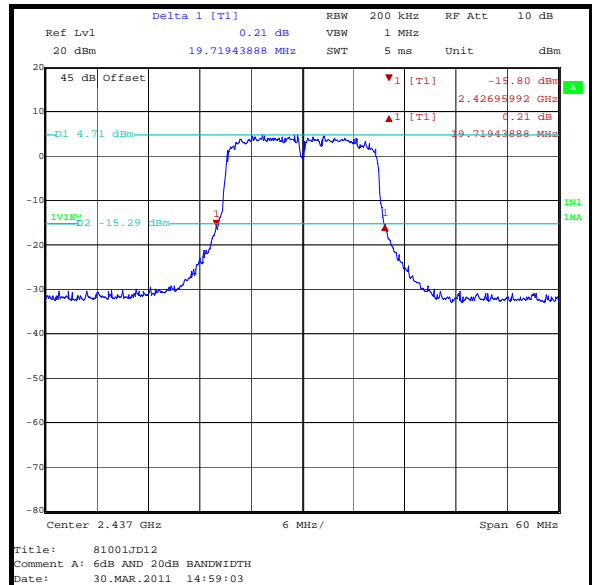
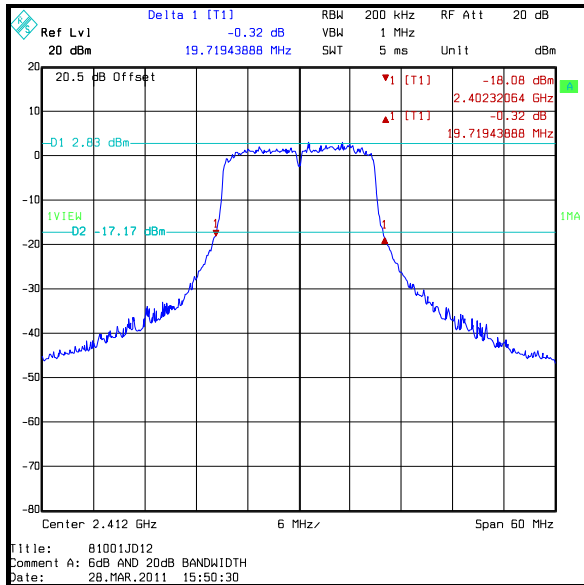
### Transmitter 20 dB Bandwidth (continued)

### Results: 802.11n 52 Mbps



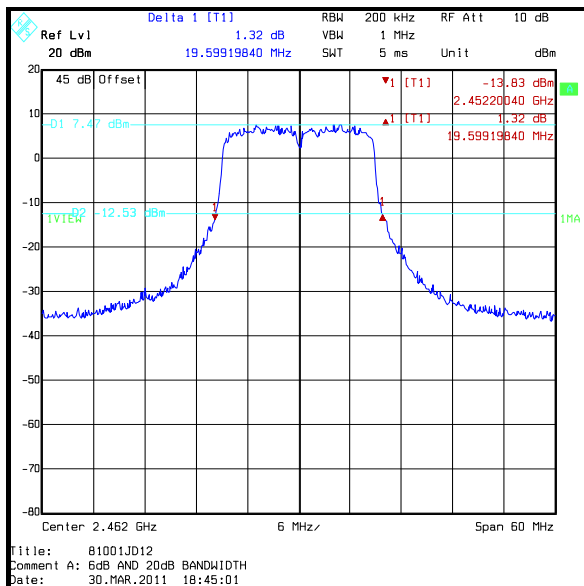
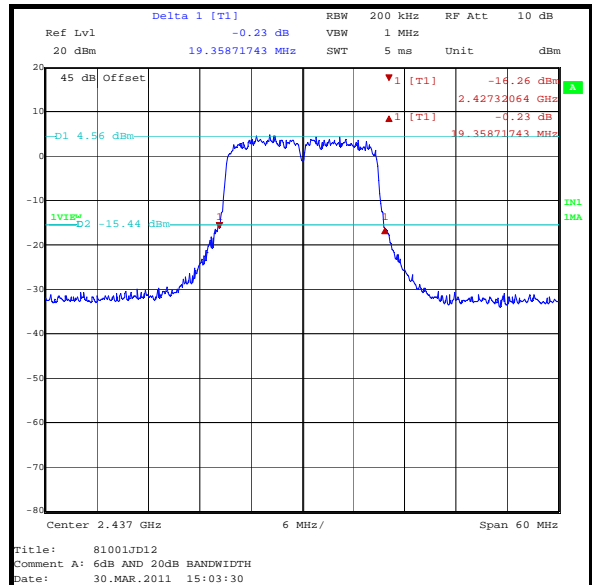
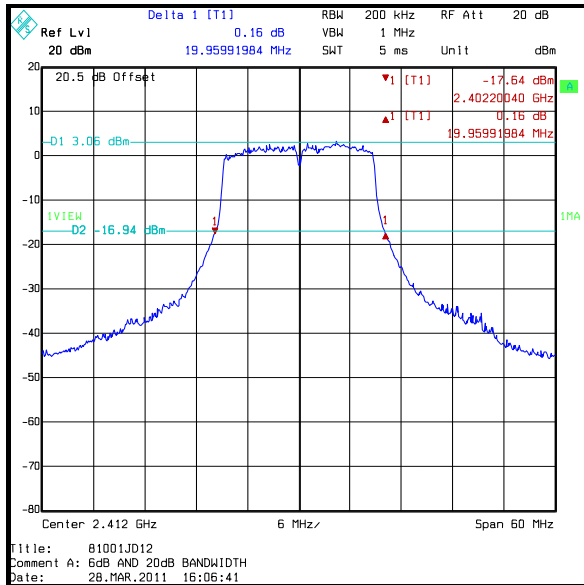
### Transmitter 20 dB Bandwidth (continued)

#### Results: 802.11n 58.5 Mbps



### Transmitter 20 dB Bandwidth (continued)

#### Results: 802.11n 65 Mbps



**5.2.6 Transmitter Power Spectral Density****Test Summary:**

<b>Test Engineer:</b>	Patrick Jones	<b>Test Date:</b>	31 March 2011, 01 April 2011 & 03 April 2011
<b>Test Sample IMEI:</b>	355320040012406		

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

**Environmental Conditions:**

<b>Temperature (°C):</b>	24
<b>Relative Humidity (%):</b>	36

**Results: 802.11b 2 Mbps**

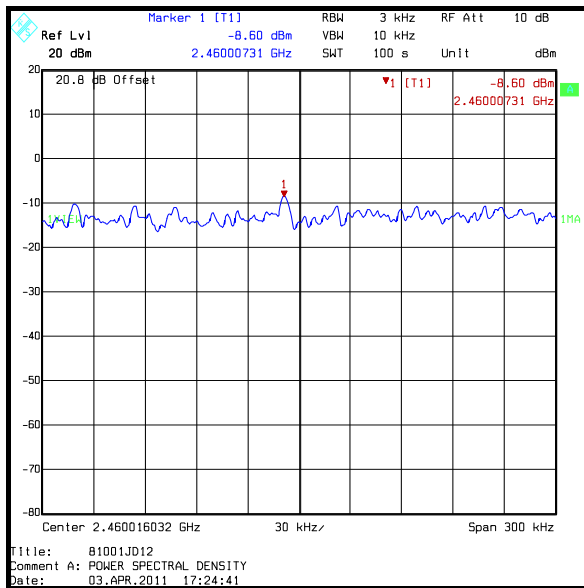
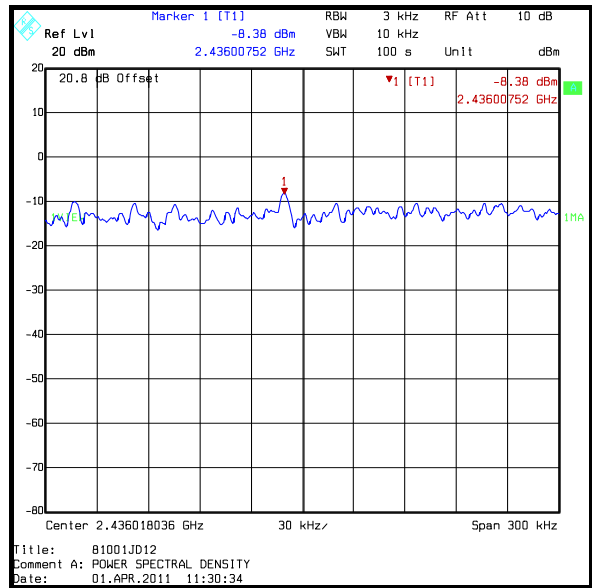
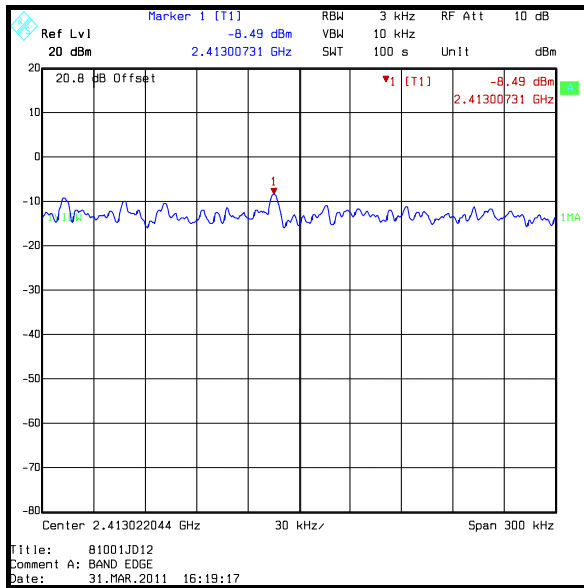
<b>Channel</b>	<b>Output Power (dBm/3 kHz)</b>	<b>Limit (dBm/3 kHz)</b>	<b>Margin (dB)</b>	<b>Result</b>
Bottom	-8.5	8.0	16.5	Complied
Middle	-8.4	8.0	16.4	Complied
Top	-8.6	8.0	16.6	Complied

**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 spectral density level is recorded in the table above.

### Transmitter Power Spectral Density (continued)

#### Results: 802.11b 2 Mbps



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

<b>Test Engineer:</b>	Andrew Edwards	<b>Test Date:</b>	25 March 2011
<b>Test Sample IMEI:</b>	355320040012406		

<b>FCC Part:</b>	15.247(b)(3)
<b>Test Method Used:</b>	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:**

<b>Temperature (°C):</b>	24
<b>Relative Humidity (%):</b>	27

**Results: 1 Mbps****Conducted Peak Limit Comparison**

Channel	Conducted Peak Power (dBm)	Conducted Peak Power Limit (dBm)	Margin (dB)	Result
Bottom	18.5	30.0	11.5	Complied
Middle	19.4	30.0	10.6	Complied
Top	19.0	30.0	11.0	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	18.5	0.4	18.9	36.0	17.1	Complied
Middle	19.4	0.4	19.8	36.0	16.2	Complied
Top	19.0	0.4	19.4	36.0	16.6	Complied

**Transmitter Maximum Peak Output Power (continued)****Results: 2 Mbps****Conducted Peak Limit Comparison**

Channel	Conducted Peak Power (dBm)	Conducted Peak Power Limit (dBm)	Margin (dB)	Result
Bottom	19.2	30.0	10.8	Complied
Middle	19.4	30.0	10.6	Complied
Top	19.0	30.0	11.0	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	19.2	0.4	19.6	36.0	16.4	Complied
Middle	19.4	0.4	19.8	36.0	16.2	Complied
Top	19.0	0.4	19.4	36.0	16.6	Complied

**Results: 5.5 Mbps****Conducted Peak Limit Comparison**

Channel	Conducted Peak Power (dBm)	Conducted Peak Power Limit (dBm)	Margin (dB)	Result
Bottom	21.6	30.0	8.4	Complied
Middle	22.0	30.0	8.0	Complied
Top	21.5	30.0	8.5	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	21.6	0.4	22.0	36.0	14.0	Complied
Middle	22.0	0.4	22.4	36.0	13.6	Complied
Top	21.5	0.4	21.9	36.0	14.1	Complied

**Transmitter Maximum Peak Output Power (continued)****Results: 11 Mbps****Conducted Peak Limit Comparison**

Channel	Conducted Peak Power (dBm)	Conducted Peak Power Limit (dBm)	Margin (dB)	Result
Bottom	21.7	30.0	8.3	Complied
Middle	22.1	30.0	7.9	Complied
Top	21.7	30.0	8.3	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	21.7	0.4	22.1	36.0	13.9	Complied
Middle	22.1	0.4	22.5	36.0	13.5	Complied
Top	21.7	0.4	22.1	36.0	13.9	Complied

**Results: 6 Mbps****Conducted Peak Limit Comparison**

Channel	Conducted Peak Power (dBm)	Conducted Peak Power Limit (dBm)	Margin (dB)	Result
Bottom	20.4	30.0	9.6	Complied
Middle	20.6	30.0	9.4	Complied
Top	20.4	30.0	9.6	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	20.4	0.4	20.8	36.0	15.2	Complied
Middle	20.6	0.4	21.0	36.0	15.0	Complied
Top	20.4	0.4	20.8	36.0	15.2	Complied



**Transmitter Maximum Peak Output Power (continued)****Results: 9 Mbps****Conducted Peak Limit Comparison**

Channel	Conducted Peak Power (dBm)	Conducted Peak Power Limit (dBm)	Margin (dB)	Result
Bottom	20.3	30.0	10.7	Complied
Middle	20.9	30.0	10.1	Complied
Top	20.5	30.0	10.5	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	20.3	0.4	20.7	36.0	15.3	Complied
Middle	20.9	0.4	21.3	36.0	14.7	Complied
Top	20.5	0.4	20.9	36.0	15.1	Complied

**Results: 12 Mbps****Conducted Peak Limit Comparison**

Channel	Conducted Peak Power (dBm)	Conducted Peak Power Limit (dBm)	Margin (dB)	Result
Bottom	20.4	30.0	9.6	Complied
Middle	21.1	30.0	8.9	Complied
Top	20.7	30.0	9.3	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	20.4	0.4	20.8	36.0	15.2	Complied
Middle	21.1	0.4	21.5	36.0	14.5	Complied
Top	20.7	0.4	21.1	36.0	14.9	Complied

**Transmitter Maximum Peak Output Power (continued)****Results: 18 Mbps****Conducted Peak Limit Comparison**

Channel	Conducted Peak Power (dBm)	Conducted Peak Power Limit (dBm)	Margin (dB)	Result
Bottom	20.3	30.0	9.7	Complied
Middle	21.0	30.0	9.0	Complied
Top	20.7	30.0	9.3	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	20.3	0.4	20.7	36.0	15.3	Complied
Middle	21.0	0.4	21.4	36.0	14.6	Complied
Top	20.7	0.4	21.1	36.0	14.9	Complied

**Results: 24 Mbps****Conducted Peak Limit Comparison**

Channel	Conducted Peak Power (dBm)	Conducted Peak Power Limit (dBm)	Margin (dB)	Result
Bottom	20.7	30.0	9.3	Complied
Middle	21.2	30.0	8.8	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	20.7	0.4	21.1	36.0	14.9	Complied
Middle	21.2	0.4	21.6	36.0	14.4	Complied
Top	20.9	0.4	21.3	36.0	14.7	Complied

**Transmitter Maximum Peak Output Power (continued)****Results: 36 Mbps****Conducted Peak Limit Comparison**

Channel	Conducted Peak Power (dBm)	Conducted Peak Power Limit (dBm)	Margin (dB)	Result
Bottom	20.9	30.0	9.1	Complied
Middle	21.5	30.0	8.5	Complied
Top	21.1	30.0	8.9	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	20.9	0.4	21.3	36.0	14.7	Complied
Middle	21.5	0.4	21.9	36.0	14.1	Complied
Top	21.1	0.4	21.5	36.0	14.5	Complied

**Results: 48 Mbps****Conducted Peak Limit Comparison**

Channel	Conducted Peak Power (dBm)	Conducted Peak Power Limit (dBm)	Margin (dB)	Result
Bottom	21.2	30.0	8.8	Complied
Middle	21.4	30.0	8.6	Complied
Top	21.0	30.0	9.0	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	21.2	0.4	21.6	36.0	14.4	Complied
Middle	21.4	0.4	21.8	36.0	14.2	Complied
Top	21.0	0.4	21.4	36.0	14.6	Complied

**Transmitter Maximum Peak Output Power (continued)****Results: 54 Mbps****Conducted Peak Limit Comparison**

Channel	Conducted Peak Power (dBm)	Conducted Peak Power Limit (dBm)	Margin (dB)	Result
Bottom	21.3	30.0	8.7	Complied
Middle	21.8	30.0	8.2	Complied
Top	21.3	30.0	8.7	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	21.3	0.4	21.7	36.0	14.3	Complied
Middle	21.8	0.4	22.2	36.0	13.8	Complied
Top	21.3	0.4	21.7	36.0	14.3	Complied

**Results: 6.5 Mbps****Conducted Peak Limit Comparison**

Channel	Conducted Peak Power (dBm)	Conducted Peak Power Limit (dBm)	Margin (dB)	Result
Bottom	18.7	30.0	11.3	Complied
Middle	19.0	30.0	11.0	Complied
Top	19.1	30.0	10.9	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	18.7	0.4	19.1	36.0	16.9	Complied
Middle	19.0	0.4	19.4	36.0	16.6	Complied
Top	19.1	0.4	19.5	36.0	16.5	Complied

**Transmitter Maximum Peak Output Power (continued)****Results: 13 Mbps****Conducted Peak Limit Comparison**

Channel	Conducted Peak Power (dBm)	Conducted Peak Power Limit (dBm)	Margin (dB)	Result
Bottom	19.1	30.0	10.9	Complied
Middle	19.3	30.0	10.7	Complied
Top	19.4	30.0	10.4	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	19.1	0.4	19.5	36.0	16.5	Complied
Middle	19.3	0.4	19.7	36.0	16.3	Complied
Top	19.4	0.4	19.8	36.0	16.2	Complied

**Results: 19.5 Mbps****Conducted Peak Limit Comparison**

Channel	Conducted Peak Power (dBm)	Conducted Peak Power Limit (dBm)	Margin (dB)	Result
Bottom	19.1	30.0	10.9	Complied
Middle	19.2	30.0	10.8	Complied
Top	19.5	30.0	10.5	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	19.1	0.4	19.5	36.0	16.5	Complied
Middle	19.2	0.4	19.6	36.0	16.4	Complied
Top	19.5	0.4	19.9	36.0	16.1	Complied

**Transmitter Maximum Peak Output Power (continued)****Results: 26 Mbps****Conducted Peak Limit Comparison**

Channel	Conducted Peak Power (dBm)	Conducted Peak Power Limit (dBm)	Margin (dB)	Result
Bottom	19.7	30.0	10.3	Complied
Middle	19.8	30.0	10.2	Complied
Top	19.5	30.0	10.5	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	19.7	0.4	20.1	36.0	15.9	Complied
Middle	19.8	0.4	20.2	36.0	15.8	Complied
Top	19.5	0.4	19.9	36.0	16.1	Complied

**Results: 39 Mbps****Conducted Peak Limit Comparison**

Channel	Conducted Peak Power (dBm)	Conducted Peak Power Limit (dBm)	Margin (dB)	Result
Bottom	19.7	30.0	10.3	Complied
Middle	19.9	30.0	10.1	Complied
Top	19.6	30.0	10.4	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	19.7	0.4	20.1	36.0	15.9	Complied
Middle	19.9	0.4	20.3	36.0	15.7	Complied
Top	19.6	0.4	20.0	36.0	16.0	Complied

**Transmitter Maximum Peak Output Power (continued)****Results: 52 Mbps****Conducted Peak Limit Comparison**

Channel	Conducted Peak Power (dBm)	Conducted Peak Power Limit (dBm)	Margin (dB)	Result
Bottom	19.6	30.0	10.4	Complied
Middle	19.8	30.0	10.2	Complied
Top	19.7	30.0	10.3	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	19.6	0.4	20.0	36.0	16.0	Complied
Middle	19.8	0.4	20.2	36.0	15.8	Complied
Top	19.7	0.4	20.1	36.0	15.9	Complied

**Results: 58.5 Mbps****Conducted Peak Limit Comparison**

Channel	Conducted Peak Power (dBm)	Conducted Peak Power Limit (dBm)	Margin (dB)	Result
Bottom	19.8	30.0	10.2	Complied
Middle	20.0	30.0	10.0	Complied
Top	19.9	30.0	10.1	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	19.8	0.4	20.2	36.0	15.8	Complied
Middle	20.0	0.4	20.4	36.0	15.6	Complied
Top	19.9	0.4	20.3	36.0	15.7	Complied

**Transmitter Maximum Peak Output Power (continued)****Results: 65 Mbps****Conducted Peak Limit Comparison**

Channel	Conducted Peak Power (dBm)	Conducted Peak Power Limit (dBm)	Margin (dB)	Result
Bottom	19.6	30.0	10.4	Complied
Middle	19.7	30.0	10.3	Complied
Top	19.8	30.0	10.2	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	19.6	0.4	20.0	36.0	16.0	Complied
Middle	19.7	0.4	20.1	36.0	15.9	Complied
Top	19.8	0.4	20.2	36.0	15.8	Complied

**Note(s):**

- Conducted 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. The RF attenuator and RF cable losses were measured using a calibrated signal generator and calibrated power meter prior to testing and the total path loss entered as an RF level offset on the spectrum analyser during testing.



**5.2.7. Transmitter Average Output Power****Test Summary:**

<b>Test Engineer:</b>	Naseer Mirza	<b>Test Date:</b>	15 March 2011
<b>Test Sample Serial No:</b>	355320040012406		

<b>FCC Part:</b>	15.247(b)(3)
<b>Test Method Used:</b>	As detailed in ANSI C63.10 Section 6.10.2

**Environmental Conditions:**

<b>Temperature (°C):</b>	23
<b>Relative Humidity (%):</b>	32

**Results:**

Channel Number	Frequency (GHz)	Conducted Average TX Power (dBm)	Mode
1	2.412	14.9	802.11b (1 Mbps)
6	2.437	14.8	
11	2.462	14.6	
1	2.412	14.6	802.11b (11 Mbps)
6	2.437	14.3	
11	2.462	14.3	
1	2.412	14.8	802.11g (6 Mbps)
6	2.437	14.6	
11	2.462	14.6	
1	2.412	14.3	802.11g (54 Mbps)
6	2.437	13.9	
11	2.462	13.9	
1	2.412	13.3	802.11n (6.5 Mbps)
6	2.437	13.0	
11	2.462	12.6	
1	2.412	12.5	802.11n (65 Mbps)
6	2.437	12.2	
11	2.462	11.8	

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

<b>Test Engineer:</b>	Patrick Jones	<b>Test Date:</b>	29 March 2011
<b>Test Sample IMEI:</b>	355320040013412		

<b>FCC Part:</b>	15.247(d) & 15.209(a)
<b>Test Method Used:</b>	As detailed in ANSI C63.10 Sections 6.3 and 6.5 referencing ANSI C63.4
<b>Frequency Range</b>	30 MHz to 1000 MHz

**Environmental Conditions:**

<b>Temperature (°C):</b>	25
<b>Relative Humidity (%):</b>	28

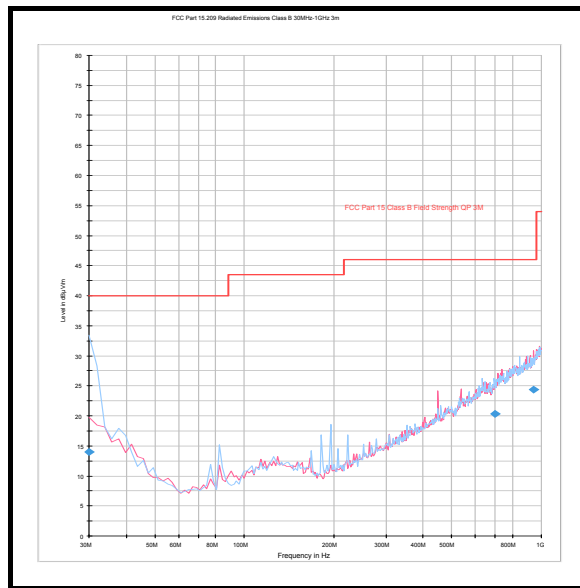
**Results: Top Channel 11 Mbps**

Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
30.034	Horizontal	14.0	40.0	26.0	Complied
695.353	Horizontal	20.3	46.0	25.7	Complied
942.948	Vertical	24.3	46.0	21.7	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 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:**

<b>Test Engineer:</b>	Patrick Jones	<b>Test Date:</b>	29 March 2011
<b>Test Sample IMEI:</b>	355320040013412		

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

**Environmental Conditions:**

<b>Temperature (°C):</b>	24
<b>Relative Humidity (%):</b>	21

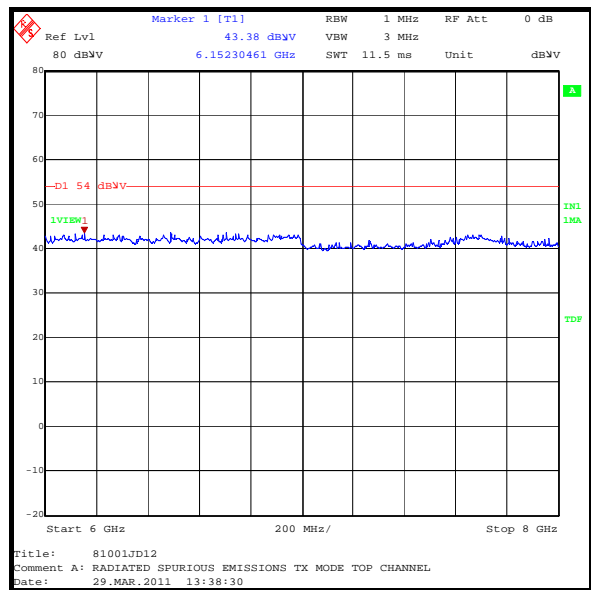
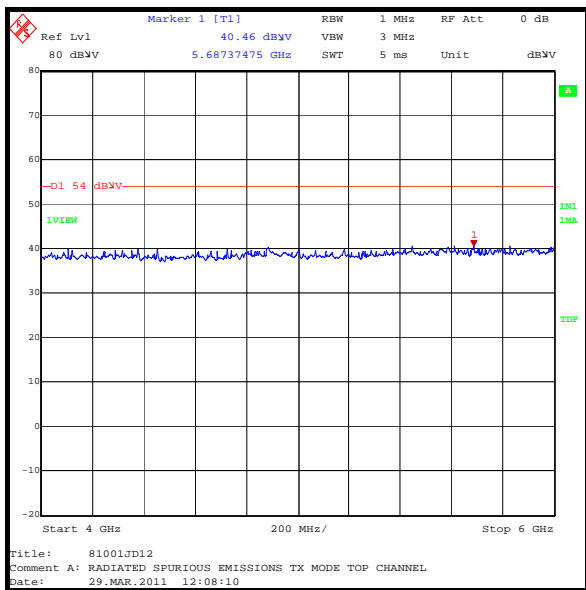
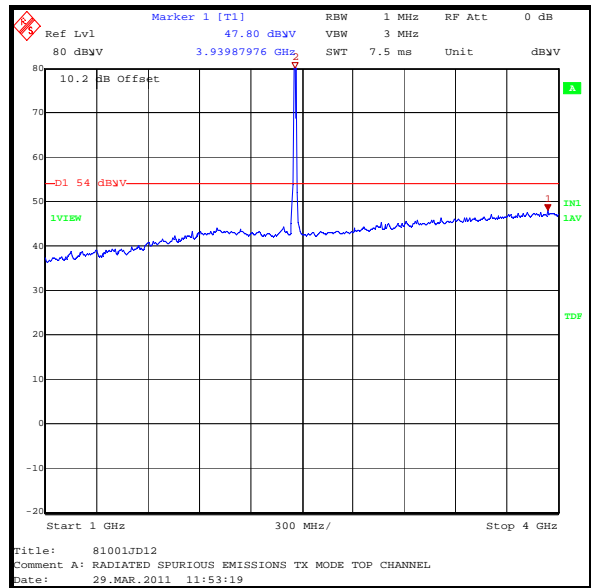
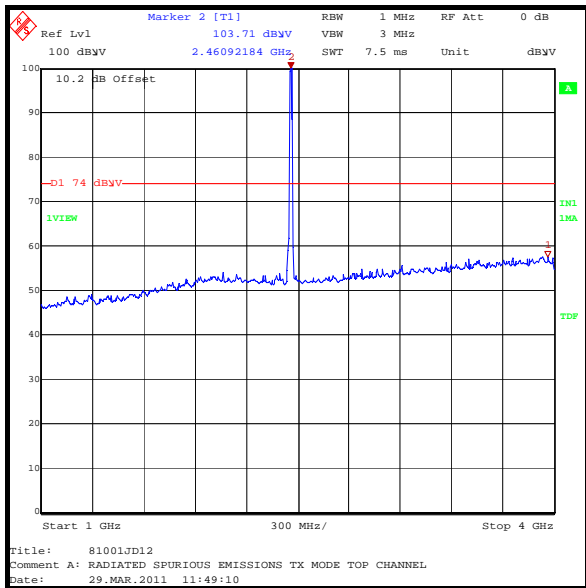
**Results:**

<b>Frequency (MHz)</b>	<b>Antenna Polarity</b>	<b>Peak Level (dB<math>\mu</math>V/m)</b>	<b>Average Limit (dB<math>\mu</math>V/m)</b>	<b>Margin (dB)</b>	<b>Result</b>
24803.607	Vertical	49.3	54.0	4.7	Complied

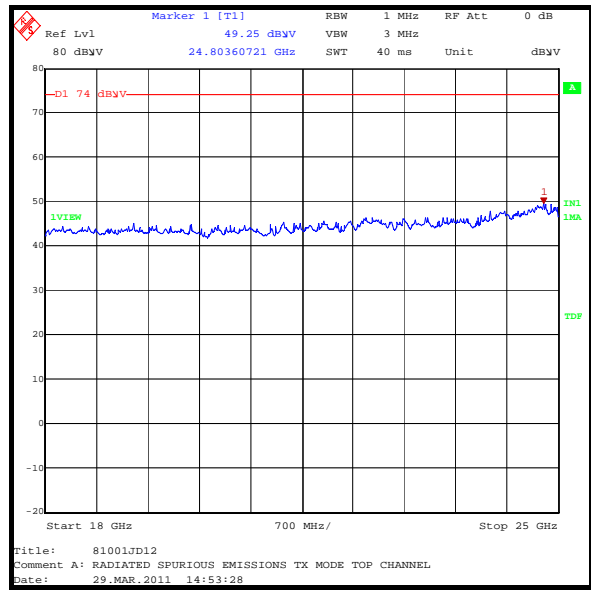
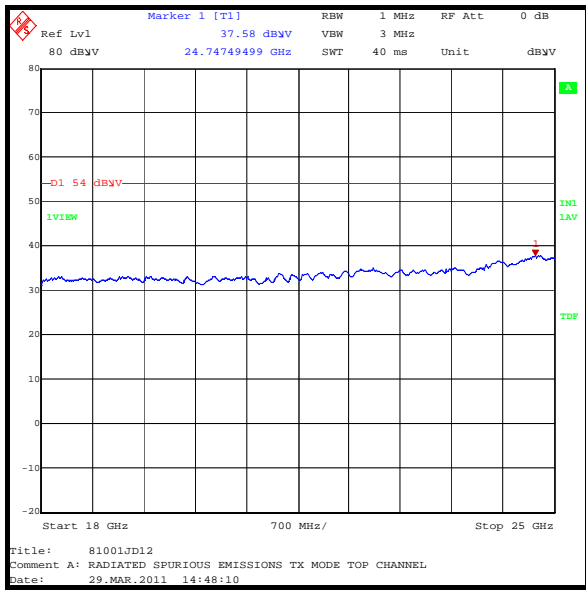
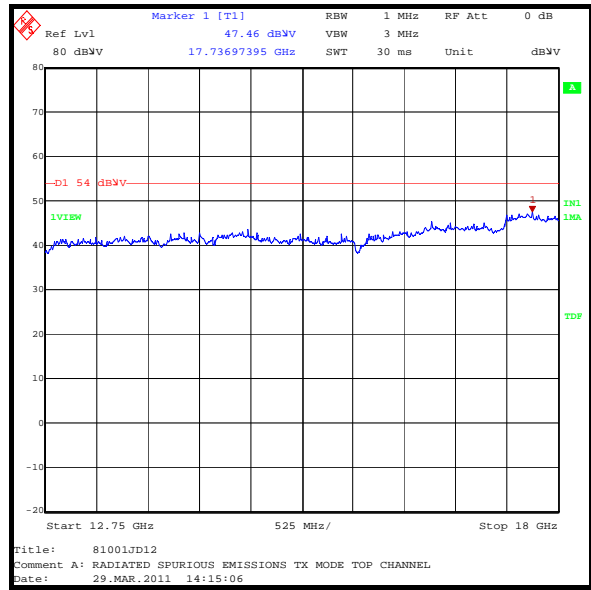
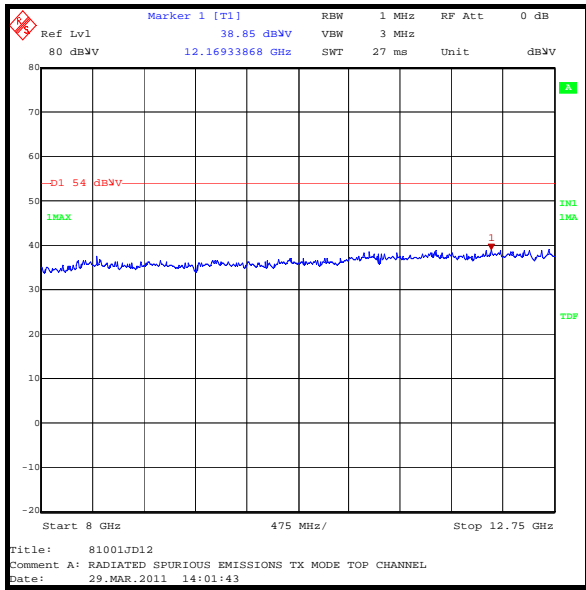
**Note(s):**

1. The final measured value, for the given emission, in the table above incorporates the calibrated antenna factor and cable loss
2. 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. 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. The emission shown at 2462 MHz on the 1 GHz to 4 GHz plot is the EUT fundamental.
5. 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)



Average detector

Peak detector

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

<b>Test Engineer:</b>	Patrick Jones	<b>Test Date:</b>	31 March 2011
<b>Test Sample IMEI:</b>	355320040012406		

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

**Environmental Conditions:**

<b>Temperature (°C):</b>	24
<b>Relative Humidity (%):</b>	34

**Results: Peak 802.11b 11 Mbps**

Frequency (MHz)	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
2400	53.1	84.1*	31.0	Complied
2483.5	56.7	74.0	17.3	Complied

**Results: Average 802.11b 11 Mbps**

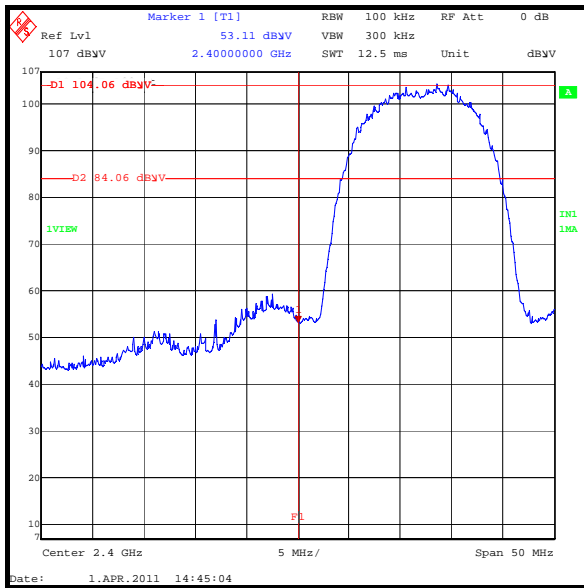
Frequency (MHz)	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
2483.5	45.0	54.0	9.0	Complied

**Note(s):**

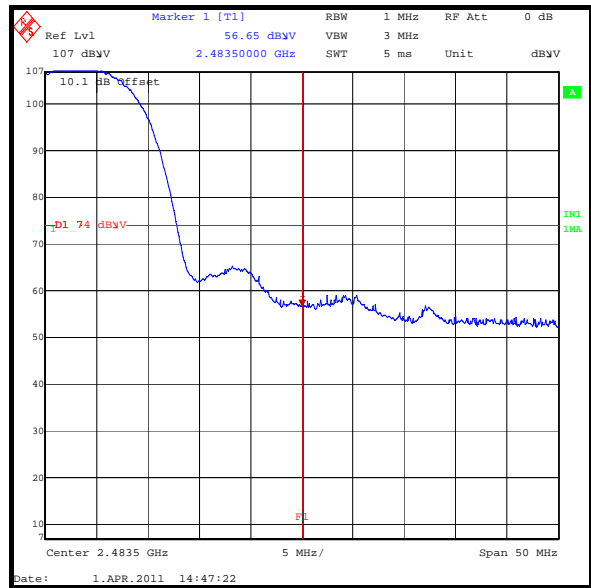
- \*-20 dBc limit.
- The final measured value, for the given emission, in the table above incorporates the calibrated antenna factor and cable loss.
- Test were performed in the modes that produced the highest power, widest bandwidth and highest data rate.

### Transmitter Band Edge Radiated Emissions (continued)

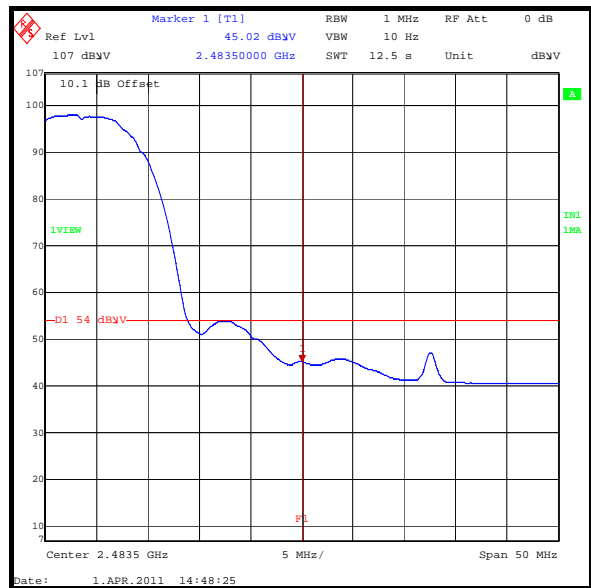
#### Results: 802.11b 11 Mbps



Lower Band Edge Peak Measurement



Upper Band Edge Peak Measurement



Upper Band Edge Average Measurement



**Transmitter Band Edge Radiated Emissions (continued)****Results: Peak 802.11g 9 Mbps**

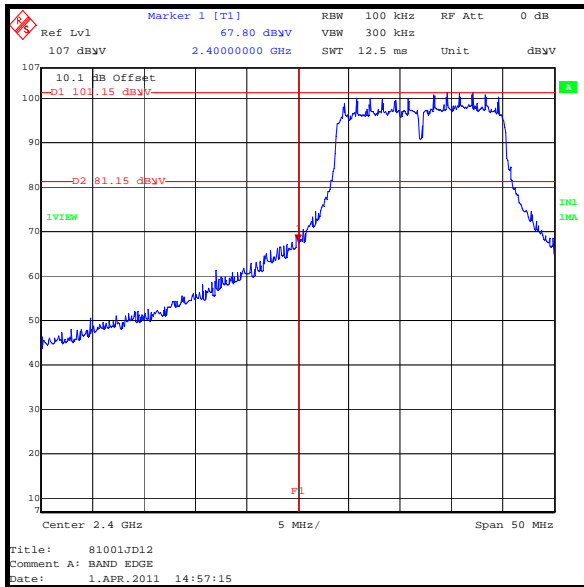
Frequency (MHz)	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
2400	67.8	81.2*	13.4	Complied
2483.5	66.4	74.0	7.6	Complied

**Results: Average 802.11g 9 Mbps**

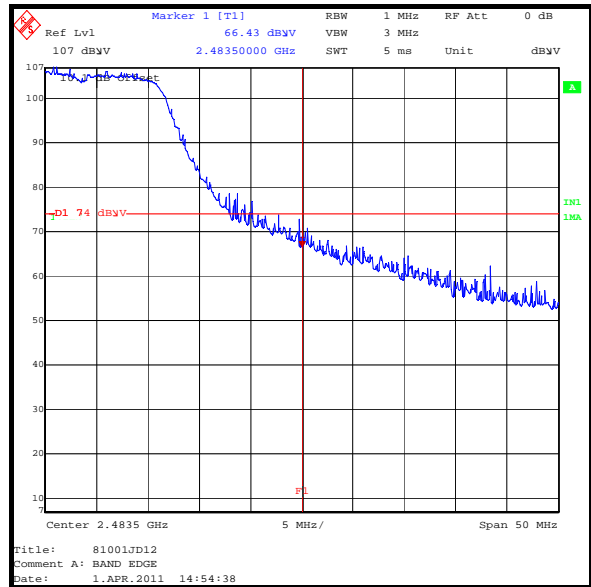
Frequency (MHz)	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
2483.5	48.1	54.0	5.9	Complied

### Transmitter Band Edge Radiated Emissions (continued)

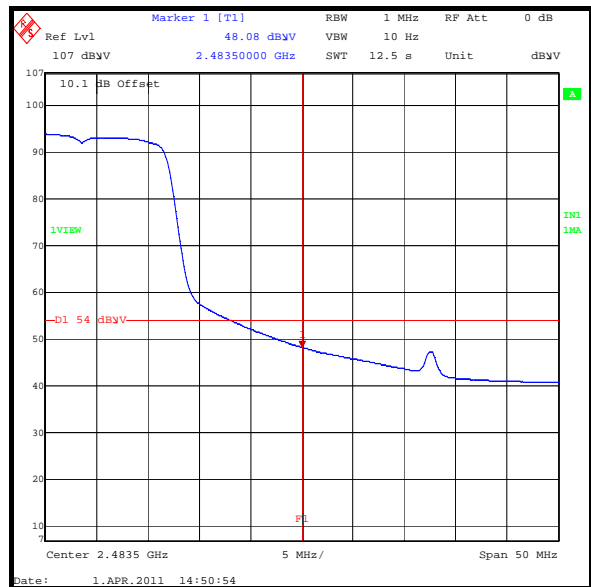
#### Results: 802.11g 9 Mbps



Lower Band Edge Peak Measurement



Upper Band Edge Peak Measurement



Upper Band Edge Average Measurement

**Transmitter Band Edge Radiated Emissions (continued)****Results: Peak 802.11n 18 Mbps**

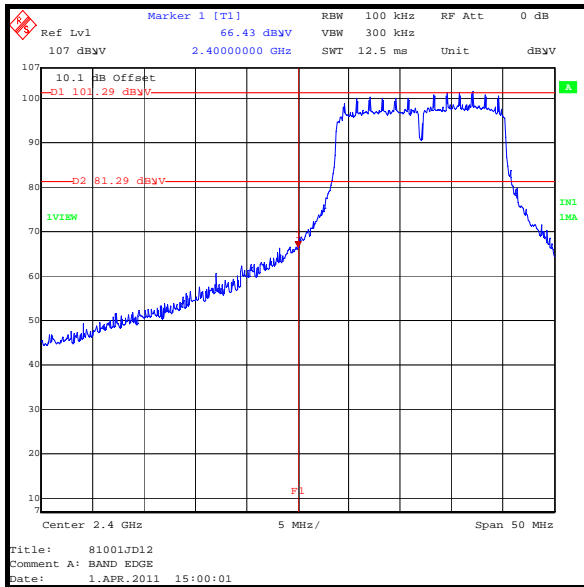
Frequency (MHz)	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
2400	66.4	81.3*	14.9	Complied
2483.5	67.8	74.0	6.2	Complied

**Results: Average 802.11n 18 Mbps**

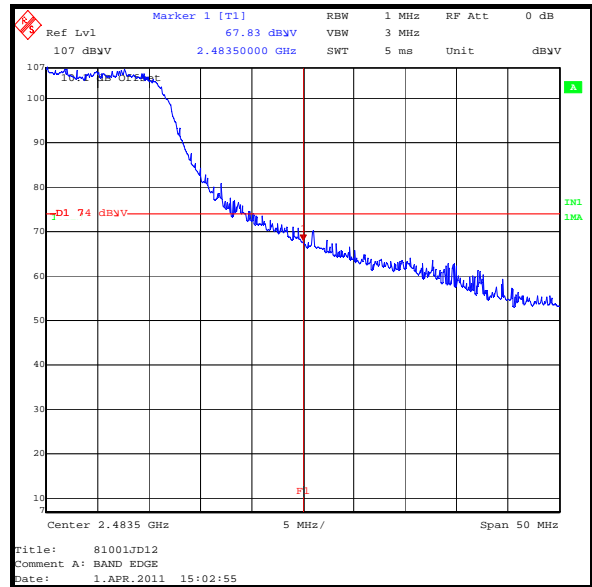
Frequency (MHz)	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
2483.5	47.8	54.0	6.2	Complied

### Transmitter Band Edge Radiated Emissions (continued)

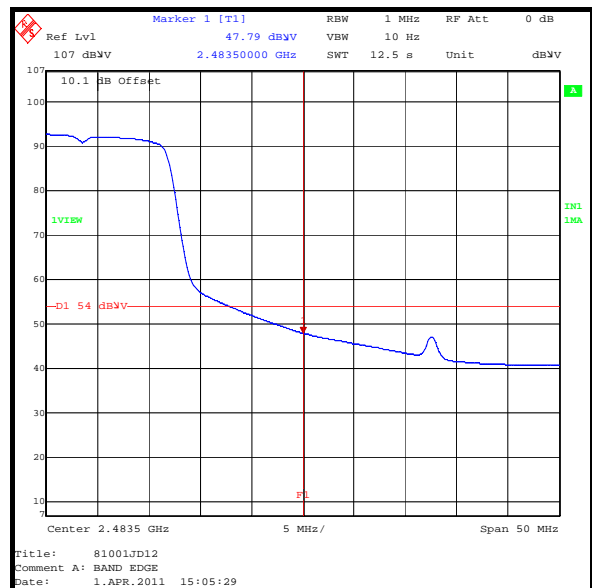
#### Results: 802.11n 18 Mbps



Lower Band Edge Peak Measurement



Upper Band Edge Peak Measurement



Upper Band Edge Average Measurement

**Transmitter Band Edge Radiated Emissions (continued)****Results: Peak 802.11n 48 Mbps**

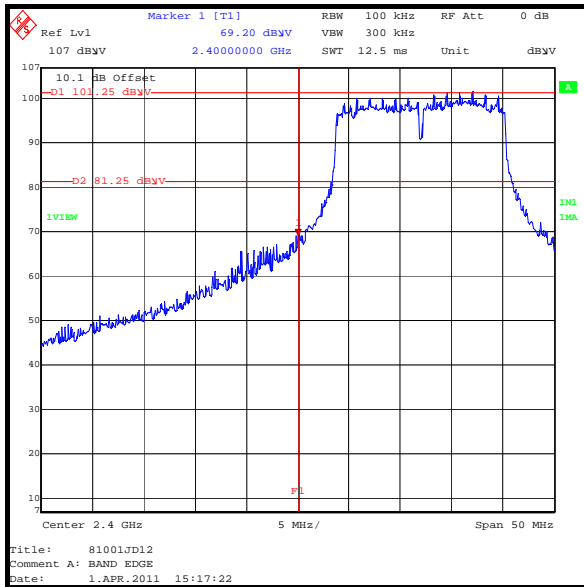
Frequency (MHz)	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
2400	69.2	81.3*	12.1	Complied
2483.5	68.3	74.0	5.7	Complied

**Results: Average 802.11n 48 Mbps**

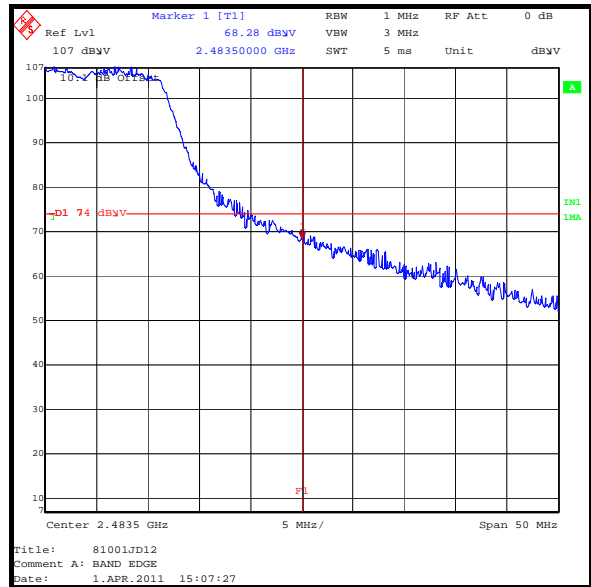
Frequency (MHz)	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
2483.5	47.3	54.0	6.7	Complied

### Transmitter Band Edge Radiated Emissions (continued)

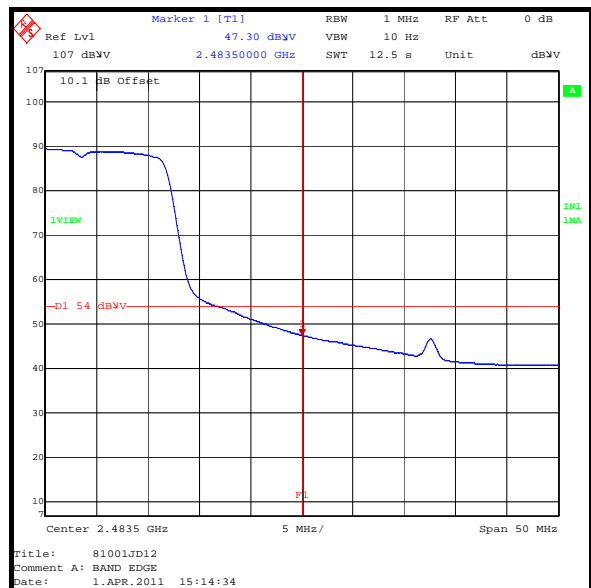
#### Results: 802.11n 48 Mbps



Lower Band Edge Peak Measurement



Upper Band Edge Peak Measurement



Upper Band Edge Average Measurement

**Transmitter Band Edge Radiated Emissions (continued)****Results: Peak 802.11n 65 Mbps**

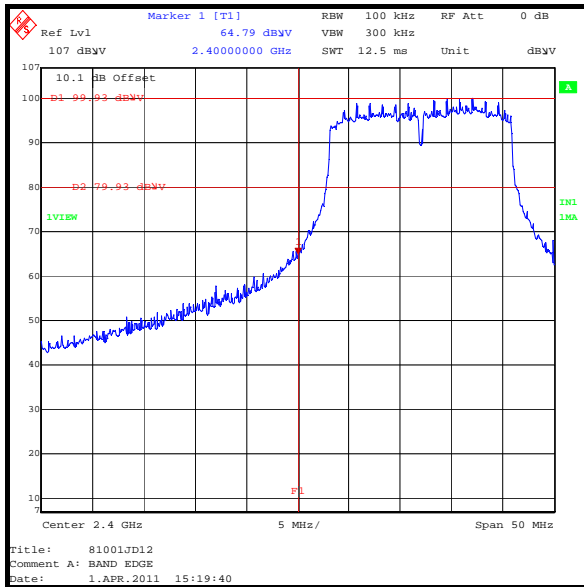
Frequency (MHz)	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
2400	64.8	79.9*	15.1	Complied
2483.5	64.4	74.0	9.6	Complied

**Results: Average 802.11n 65 Mbps**

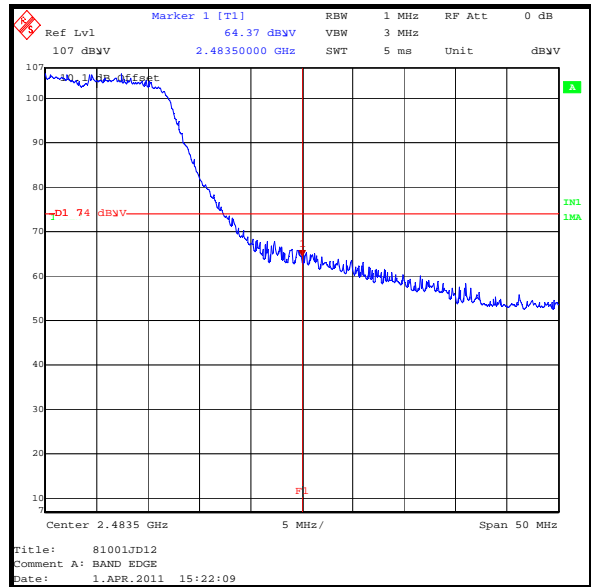
Frequency (MHz)	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
2483.5	45.7	54.0	8.3	Complied

### Transmitter Band Edge Radiated Emissions (continued)

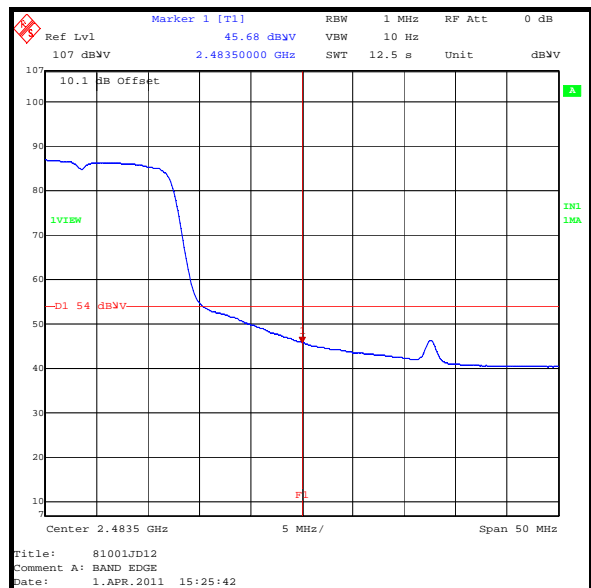
#### Results: 802.11n 65 Mbps



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".

<b>Measurement Type</b>	<b>Range</b>	<b>Confidence Level (%)</b>	<b>Calculated Uncertainty</b>
AC Conducted Spurious Emissions	0.15 MHz to 30 MHz	95%	±3.25 dB
Conducted Maximum Peak Output Power	2.4 GHz to 2.4835 GHz	95%	±0.27 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
20 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)
A1069	LISN	Rohde & Schwarz	ESH3-Z5	837469/012	13 Apr 2011	12
A1393	Attenuator	Huber & Suhner	757456	6820.17.B	06 Jul 2011	12
A1396	Attenuator	Huber & Suhner	757987	6810.17.B	06 Jul 2011	12
A1534	Pre Amplifier	Hewlett Packard	8449B	3008A00405	06 Jun 2011	12
A1818	Antenna	EMCO	3115	00075692	05 Sep 2011	12
A1830	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100668	05 Mar 2012	12
A1834	Attenuator	Hewlett Packard	8491B	10444	30 Jun 2011	12
A1996	Attenuator	Huber & Suhner	6810.17.B	301749	09 Feb 2012	12
A253	Antenna	Flann Microwave	12240-20	128	05 Sep 2011	12
A254	Antenna	Flann Microwave	14240-20	139	05 Sep 2011	12
A255	Antenna	Flann Microwave	16240-20	519	05 Sep 2011	12
A256	Antenna	Flann Microwave	18240-20	400	05 Sep 2011	12
A288	Antenna	Chase	CBL6111A	1589	05 Sep 2011	12
A436	Antenna	Flann	20240-20	330	05 Sep 2011	12
A553	Antenna	Chase	CBL6111A	1593	26 Mar 2012	12
G0543	Amplifier	Sonoma	310N	230801	30 Jun 2011	12
K0001	5m RSE Chamber	Rainford EMC	N/A	N/A	25 Apr 2011	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	05 Sep 2011	12
M1124	Spectrum Analyser	Rohde & Schwarz	ESI26	100046K	22 Apr 2011	12
M1263	Test Receiver	Rohde & Schwarz	ESIB7	100265	28 Jun 2011	12
M127	Spectrum Analyser	Rohde & Schwarz	FSEB 30	842 659/016	15 Sep 2011	12
M1273	Test Receiver	Rohde & Schwarz	ESIB 26	100275	04 Feb 2012	12

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