

## TEST REPORT FROM RFI GLOBAL SERVICES LTD

Test of: Eclipse IRU600V2, 5.8GHz (High Band)

FCC ID: VK6-IRU600HB2

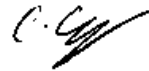
IC Certification Number: 4469A-IRU600HB2

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

**Test Report Serial No:**  
RFI-RPT-RP81852JD03B V3.0

**Version 3.0 supersedes all previous versions**

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



**Checked By:**

Steven White

**Signature:**



**Date of Issue:**

23 November 2011

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**1. Customer Information**










<b>Company Name:</b>	Aviat Networks
<b>Address:</b>	4 Bell Drive, Hamilton Intl Tech Park Blantyre Glasgow Lanarkshire G72 0FB 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) 2011: 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) 2011: 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) 2011: Part 15 Subpart C (Intentional Radiators) - Sections 15.207 and 15.209
<b>Specification Reference:</b>	RSS-Gen Issue 3 December 2010
<b>Specification Title:</b>	General Requirements and Information for the Certification of Radio Apparatus
<b>Specification Reference:</b>	RSS-210 Issue 8 December 2010
<b>Specification Title:</b>	Licence-exempt Radio Apparatus (All Frequency Bands): Category I Equipment.
<b>Site Registration:</b>	FCC: 209735; Industry Canada: 3245B-2
<b>Location of Testing:</b>	RFI Global Services Ltd, Wade Road, Basingstoke, Hampshire, RG24 8AH.
<b>Test Dates:</b>	12 July 2011 to 28 October 2011

### **2.2. Summary of Test Results**

<b>FCC Reference (47CFR)</b>	<b>IC Reference</b>	<b>Measurement</b>	<b>Result</b>
Part 15.207	RSS-Gen 7.2.4	Transmitter AC Conducted Emissions	
Part 15.247(a)(2)	RSS-Gen 4.6.2 RSS-210 A8.2(a)	Transmitter 6 dB Bandwidth	
Part 2.1049	RSS-Gen 4.6.1/4.6.3	Transmitter 20 dB Bandwidth	
Part 15.247(e)	RSS-210 A8.2(b)	Transmitter Power Spectral Density	
Part 15.247(b)(3)	RSS-Gen 4.8 RSS-210 A8.4(4)	Transmitter Maximum Average Output Power	
Part 15.247(d)/ 15.209(a)	RSS-Gen 4.9 RSS-210 A8.5	Transmitter Radiated Emissions	
Part 15.247(d)	RSS-Gen 4.9 RSS-210 A8.5	Transmitter Band Edge Conducted Emissions	
<b>Key to Results</b>  = Complied  = Did not comply			

#### **Notes:**

1. The customer declared that there is no idle mode and that the EUT goes into transceive mode as soon as it is powered up.

**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>	Aviat Networks
<b>Model Name or Number:</b>	Eclipse IRU600V2, 5.8GHz (high band) ERH-U52-101
<b>Serial Number:</b>	ZLS11200128
<b>Hardware Version Number:</b>	001
<b>Software Version Number:</b>	06.02.07
<b>FCC ID:</b>	VK6-IRU600HB2
<b>IC Certification Number:</b>	4469A-IRU600HB2

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

The equipment under test was a 5.8GHz microwave radio unit.

#### **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:	Microwave Fixed Link System	
Type of Unit:	Transceiver	
Channel Spacing	5 MHz, 10 MHz, 20 MHz and 30 MHz	
Modulation:	QPSK,16QAM,32QAM,64QAM,128QAM,256QAM	
Power Supply Requirement(s):	Nominal	48 V
Maximum Conducted Output Power:	28.9 dBm	
Antenna Gain:		
Parabolic Antenna: (4ft Tested)	35 dBi	
(15 ft End product)	45.9 dBi	
2ft flat panel antenna	28 dBi	
Channel Spacing	5 MHz	
Transmit Frequency Range:	5793 MHz to 5847 MHz	
Transmit Channels Tested:	Channel ID	Channel Frequency (MHz)
	Bottom	5793
	Middle	5820
	Top	5847
Receive Frequency Range:	5728 MHz to 5782 MHz	
Receive Channels Tested:	Channel ID	Channel Frequency (MHz)
	Bottom	5728
	Middle	5755
	Top	5782
Channel Spacing	10 MHz	
Transmit Frequency Range:	5795.5 MHz to 5844.5 MHz	
Transmit Channels Tested:	Channel ID	Channel Frequency (MHz)
	Bottom	5795.5
	Middle	5820.0
	Top	5844.5
Receive Frequency Range:	5730.5 MHz to 5779.5 MHz	
Receive Channels Tested:	Channel ID	Channel Frequency (MHz)
	Bottom	5730.5
	Middle	5755.0
	Top	5779.5



**Additional Information Related to Testing (continued)**

<b>Channel Spacing</b>	20 MHz	
<b>Transmit Frequency Range:</b>	5800.5 MHz to 5839.5 MHz	
<b>Transmit Channels Tested:</b>	<b>Channel ID</b>	<b>Channel Frequency (MHz)</b>
	Bottom	5800.5
	Middle	5820.0
	Top	5839.5
<b>Receive Frequency Range:</b>	5735.5 MHz to 5774.5 MHz	
<b>Receive Channels Tested:</b>	<b>Channel ID</b>	<b>Channel Frequency (MHz)</b>
	Bottom	5735.5
	Middle	5755.0
	Top	5774.5
<b>Channel Spacing</b>	30 MHz	
<b>Transmit Frequency Range:</b>	5805.5 MHz to 5834.5 MHz	
<b>Transmit Channels Tested:</b>	<b>Channel ID</b>	<b>Channel Frequency (MHz)</b>
	Bottom	5805.5
	Middle	5820.0
	Top	5834.5
<b>Receive Frequency Range:</b>	5740.5 MHz to 5769.5 MHz	
<b>Receive Channels Tested:</b>	<b>Channel ID</b>	<b>Channel Frequency (MHz)</b>
	Bottom	5740.5
	Middle	5755.0
	Top	5769.5

**3.5. Support Equipment**

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

<b>Description:</b>	4ft parabolic antenna, 35dBi gain
<b>Brand Name:</b>	Andrew Antennas
<b>Model Name or Number:</b>	HP4-57W-P3A/A
<b>Serial Number:</b>	10ACZ10602232

<b>Description:</b>	8 port network switch
<b>Brand Name:</b>	Belkin
<b>Model Name or Number:</b>	#F5D5131-8
<b>Serial Number:</b>	V3000uk

<b>Description:</b>	2ft flat panel antenna, 28dBi
<b>Brand Name:</b>	Radio Frequency Systems
<b>Model Name or Number:</b>	MA0528-28AN
<b>Serial Number:</b>	02205

<b>Description:</b>	Laptop
<b>Brand Name:</b>	Dell
<b>Model Name or Number:</b>	Latitude D600
<b>Serial Number:</b>	RFI Asset Number (PC 343NT)

<b>Description:</b>	DC Power Supply
<b>Brand Name:</b>	Hewlett Packard
<b>Model Name or Number:</b>	E4356A
<b>Serial Number:</b>	RFI Asset number G0565

## **4. Operation and Monitoring of the EUT during Testing**

### **4.1. Operating Modes**

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

- Transceive mode.

### **4.2. Configuration and Peripherals**

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

- The EUT was placed into a continuous transmit mode, with the appropriate modulation scheme enabled, using a bespoke software application which was supplied by the customer.
- For radiated emissions test a smaller 4 foot parabolic antenna of the same type as the 15 foot parabolic dish that would be used in the field was tested. This was done in accordance with FCC OET guidance: 450912 which states a smaller antenna can be used of the same type installed with data being extrapolated up the specification of the actual antenna. 7

The antenna gain for the antenna tested was 35 dBi, the antenna gain for the 15 foot end product is 45.9 dBi, as such, the difference being 10.9 dB. There were no radiated emissions found from the EUT above 1GHz either from the cabinet or the antenna and as such there was no need to add the 10.9 dB correction.

The radiated emission test was additionally performed on a 2 foot flat panel antenna which had an antenna gain of 28dBi.

- The EUT cannot be aligned over the frequency band of operation directly. In order to achieve the required channel the device is tuned through software and by replacing a filter section. The client advised that the FCC have agreed that the client may select channels by switching the filters and tuning of the EUT.
  - Filter, serial number: ELB10070590 was used for all Bottom channel tests.
  - Filter, serial number: ELB11341704 was used for all Middle channel tests.
  - Filter, serial number: ELB10460736 was used for all Top channel 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. Transmitter AC Conducted Spurious Emissions****Test Summary:**

<b>Test Engineer:</b>	Andrew Edwards	<b>Test Date:</b>	26 July 2011
<b>Test Sample Serial No:</b>	ZLS11200128		

<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>	30
<b>Relative Humidity (%):</b>	27

**Results: Live - Quasi Peak**

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.276	Live	39.0	60.9	21.9	Complied
0.546	Live	19.5	56.0	36.5	Complied
1.072	Live	7.9	56.0	48.1	Complied
3.889	Live	21.1	56.0	34.9	Complied
24.796	Live	22.0	60.0	38.0	Complied

**Results: Live - Average**

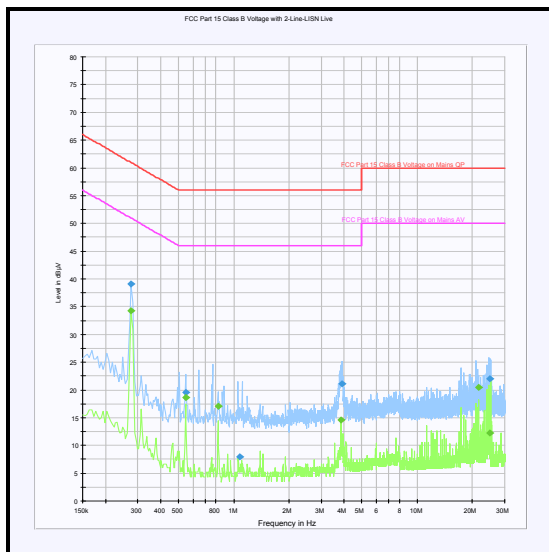
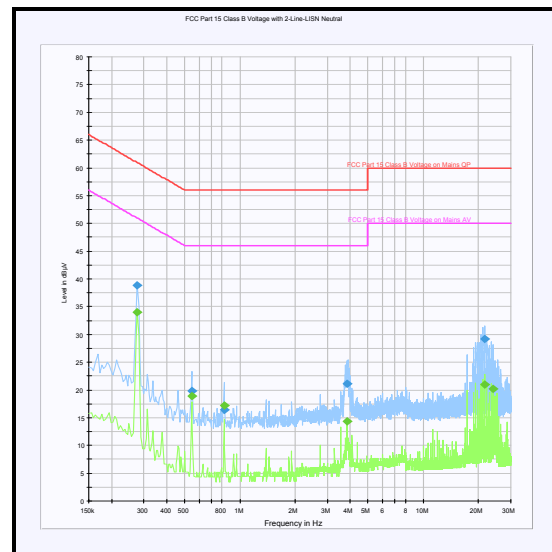
Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.276	Live	34.2	50.9	16.7	Complied
0.546	Live	18.7	46.0	27.3	Complied
0.820	Live	17.0	46.0	29.0	Complied
3.858	Live	14.6	46.0	31.4	Complied
21.615	Live	20.5	50.0	29.5	Complied
25.021	Live	12.2	50.0	37.8	Complied

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

Frequency (MHz)	Line	Level (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Result
0.276	Neutral	38.8	60.9	22.1	Complied
0.546	Neutral	19.8	56.0	36.2	Complied
0.820	Neutral	16.4	56.0	39.6	Complied
3.853	Neutral	21.1	56.0	34.9	Complied
21.597	Neutral	29.2	60.0	30.8	Complied

**Results: Neutral - Average**

Frequency (MHz)	Line	Level (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Result
0.276	Neutral	34.0	50.9	16.9	Complied
0.546	Neutral	18.9	46.0	27.1	Complied
0.820	Neutral	17.2	46.0	28.8	Complied
3.826	Neutral	14.3	46.0	31.7	Complied
21.597	Neutral	21.0	50.0	29.0	Complied
24.027	Neutral	20.2	50.0	29.8	Complied

**Live****Neutral**

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

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

<b>Test Engineer:</b>	Sarah Williams	<b>Test Date:</b>	17 October 2011, 19 October 2011 & 20 October 2011
<b>Test Sample Serial No:</b>	ZLS11200128		

<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>	22 to 26
<b>Relative Humidity (%):</b>	33 to 38

**Results: 5 MHz 128 QAM**

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	4.208	≥0.5	3.708	Complied
Middle	4.208	≥0.5	3.708	Complied
Top	4.235	≥0.5	3.735	Complied

**Results: 10 MHz QPSK**

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	8.778	≥0.5	8.278	Complied
Middle	8.717	≥0.5	8.217	Complied
Top	8.657	≥0.5	8.157	Complied

**Results: 10 MHz 16QAM**

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	8.477	≥0.5	7.977	Complied
Middle	8.056	≥0.5	7.556	Complied
Top	8.236	≥0.5	7.736	Complied

**Results: 10 MHz 64QAM**

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	8.537	≥0.5	8.037	Complied
Middle	8.657	≥0.5	8.157	Complied
Top	8.657	≥0.5	8.157	Complied

**Transmitter 6 dB Bandwidth (continued)****Results: 10 MHz 128QAM**

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	8.297	≥0.5	7.797	Complied
Middle	8.236	≥0.5	7.736	Complied
Top	8.236	≥0.5	7.736	Complied

**Results: 10 MHz 256QAM**

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	8.657	≥0.5	8.157	Complied
Middle	8.597	≥0.5	8.097	Complied
Top	8.597	≥0.5	8.097	Complied

**Results: 20 MHz QPSK**

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	17.315	≥0.5	16.815	Complied
Middle	17.555	≥0.5	17.055	Complied
Top	17.194	≥0.5	16.694	Complied

**Results: 20 MHz 16QAM**

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	17.555	≥0.5	17.055	Complied
Middle	16.954	≥0.5	16.454	Complied
Top	17.074	≥0.5	16.574	Complied

**Results: 20 MHz 64QAM**

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	17.435	≥0.5	16.935	Complied
Middle	17.555	≥0.5	17.055	Complied
Top	17.555	≥0.5	17.055	Complied

**Results: 20 MHz 256QAM**

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	17.555	≥0.5	17.055	Complied
Middle	17.555	≥0.5	17.055	Complied
Top	17.675	≥0.5	17.175	Complied



**Transmitter 6 dB Bandwidth (continued)****Results: 30 MHz QPSK**

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	27.234	≥0.5	26.734	Complied
Middle	27.054	≥0.5	26.554	Complied
Top	27.415	≥0.5	26.915	Complied

**Results: 30 MHz 16QAM**

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	27.693	≥0.5	27.193	Complied
Middle	26.693	≥0.5	26.193	Complied
Top	26.513	≥0.5	26.013	Complied

**Results: 30 MHz 64QAM**

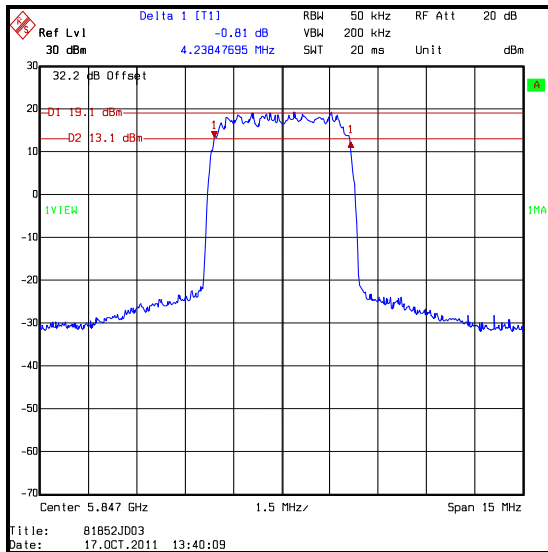
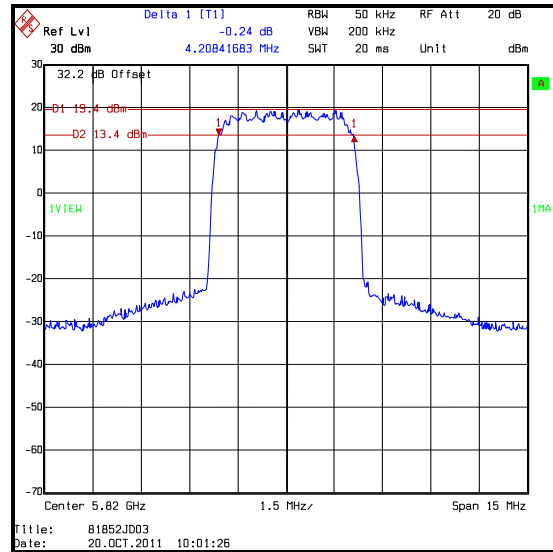
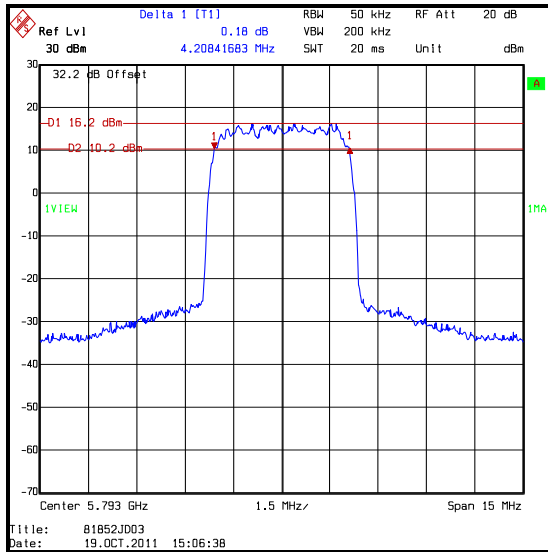
Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	26.152	≥0.5	25.652	Complied
Middle	25.972	≥0.5	25.472	Complied
Top	26.152	≥0.5	25.652	Complied

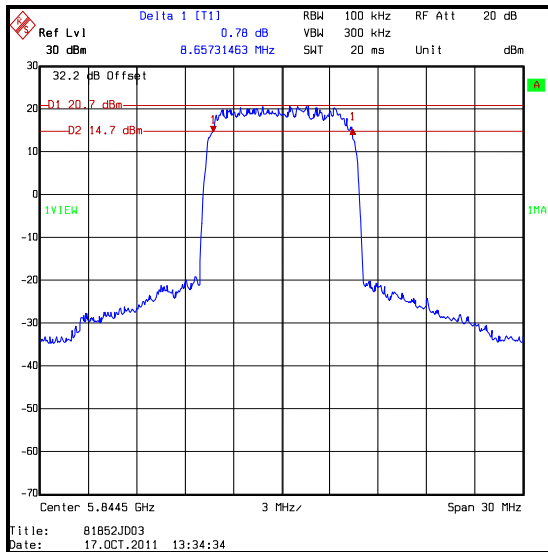
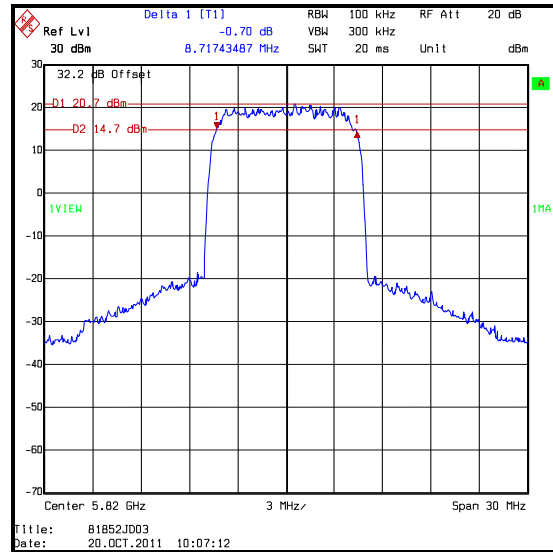
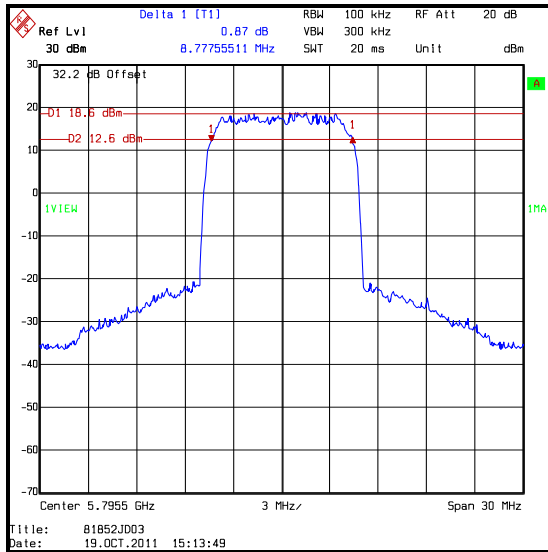
**Results: 30 MHz 128QAM**

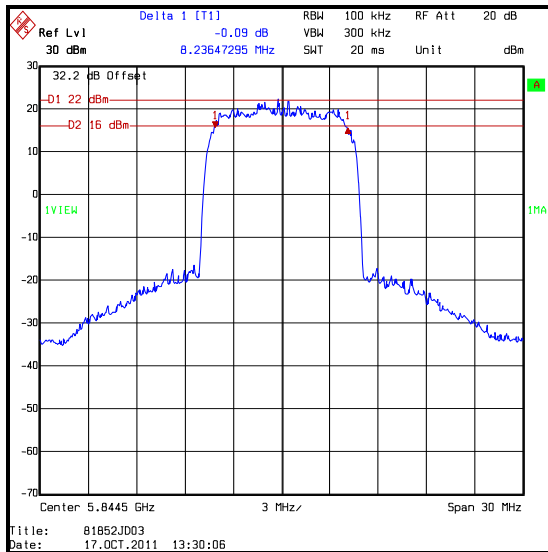
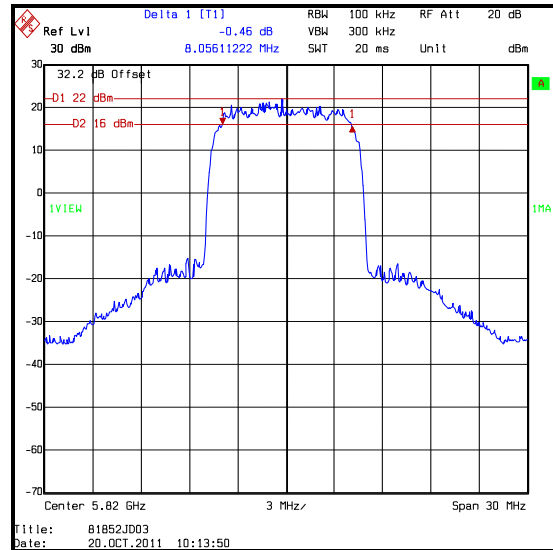
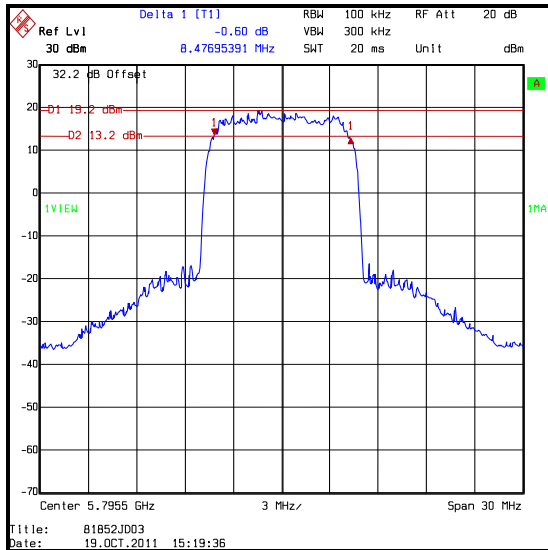
Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	26.513	≥0.5	26.013	Complied
Middle	26.513	≥0.5	26.013	Complied
Top	26.513	≥0.5	26.013	Complied

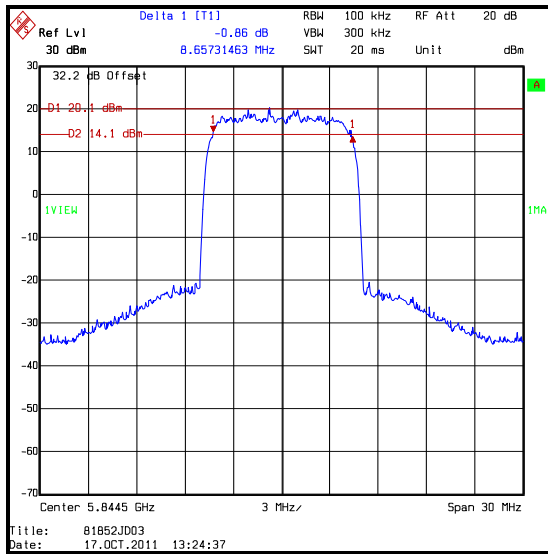
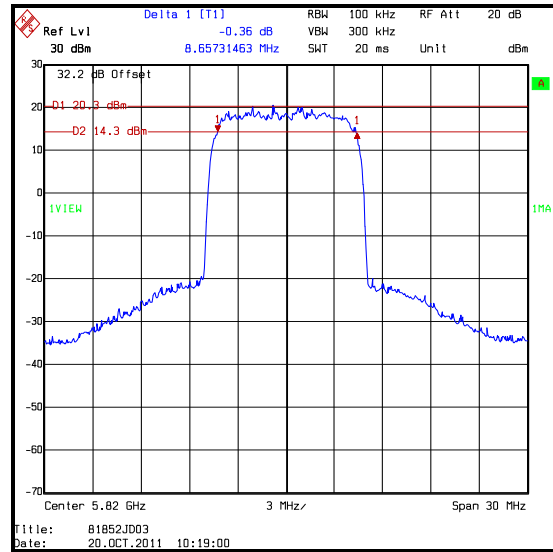
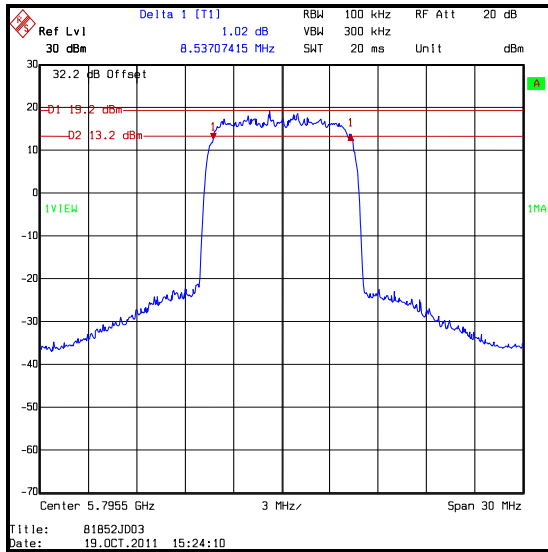
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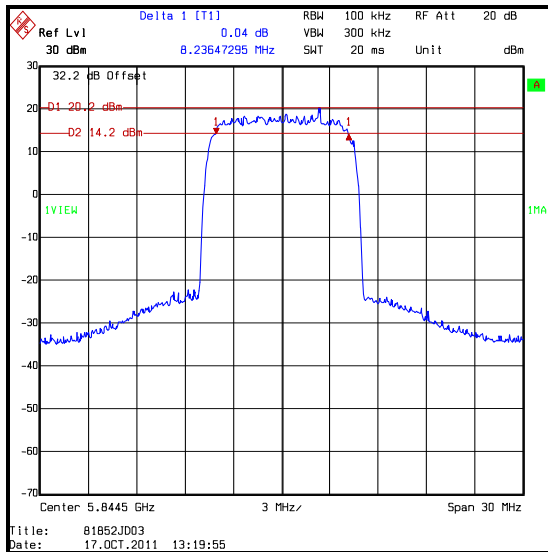
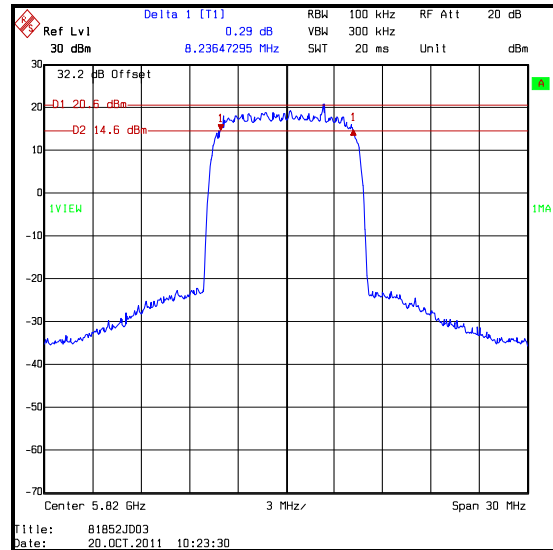
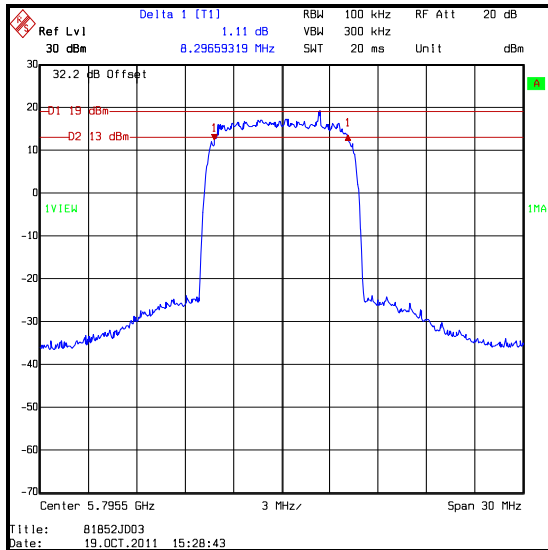
Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	27.415	≥0.5	26.915	Complied
Middle	27.054	≥0.5	26.554	Complied
Top	27.234	≥0.5	26.734	Complied

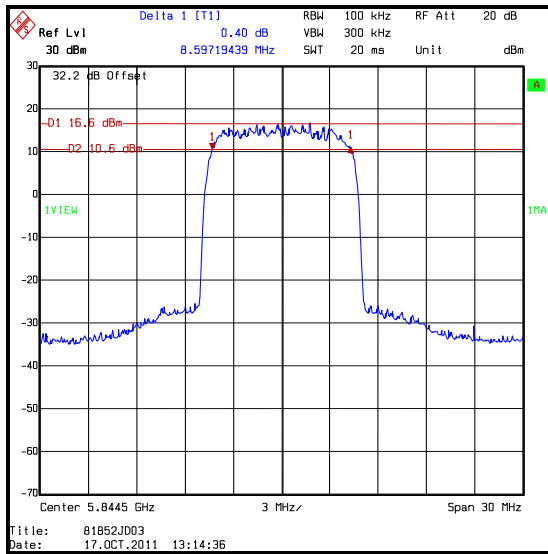
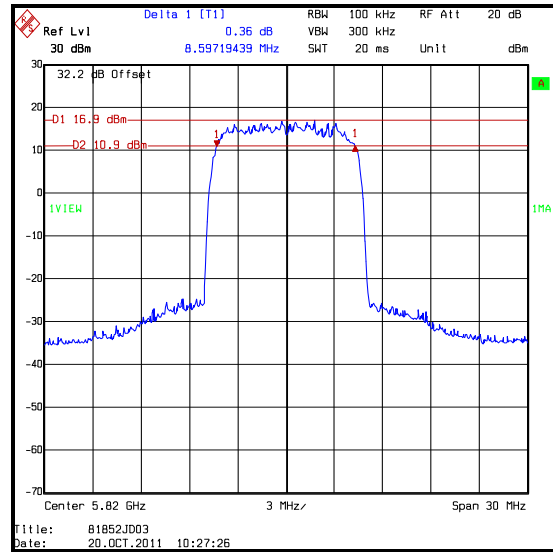
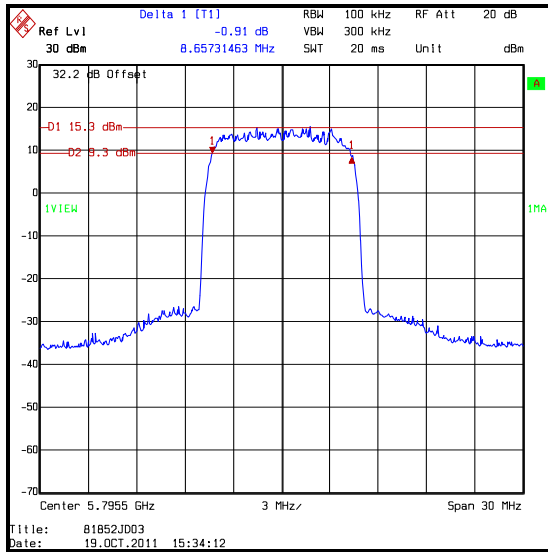
**Transmitter 6 dB Bandwidth (continued)****Results: 5 MHz 128 QAM**

**Transmitter 6 dB Bandwidth (continued)****Results: 10 MHz QPSK**

**Transmitter 6 dB Bandwidth (continued)****Results: 10 MHz 16QAM**

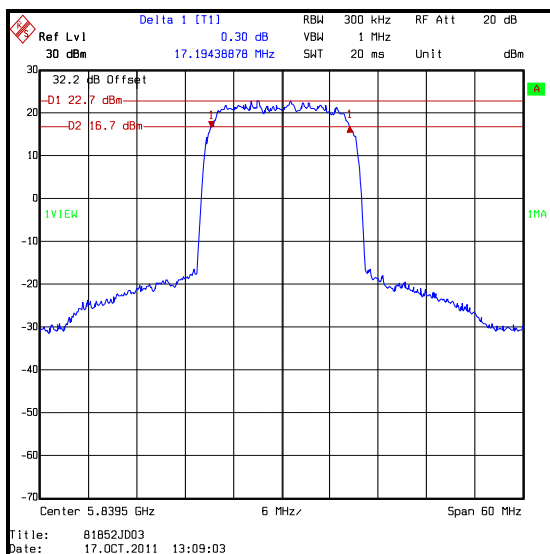
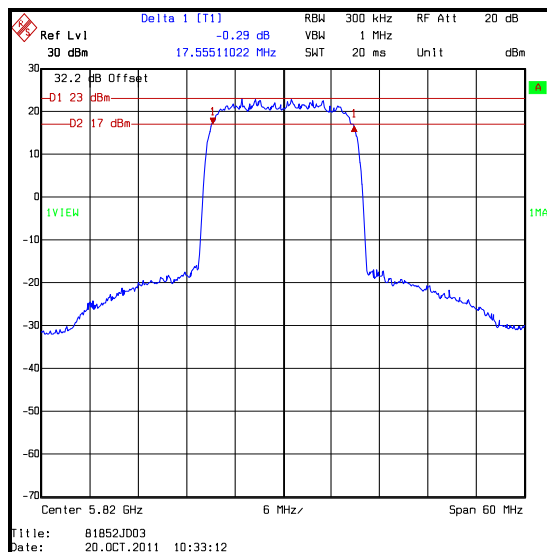
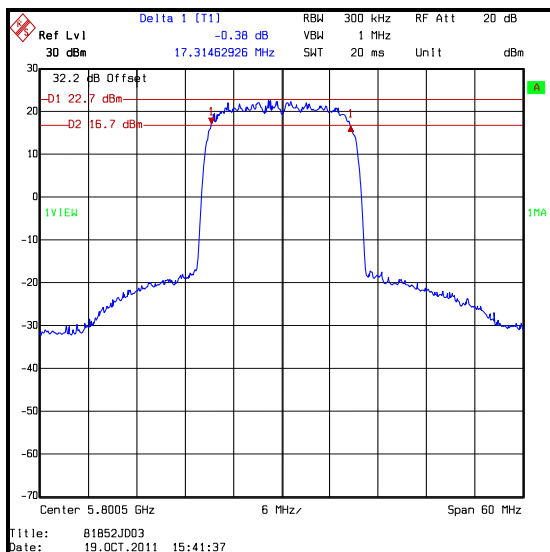
**Transmitter 6 dB Bandwidth (continued)****Results: 10 MHz 64QAM**

**Transmitter 6 dB Bandwidth (continued)****Results: 10 MHz 128QAM**

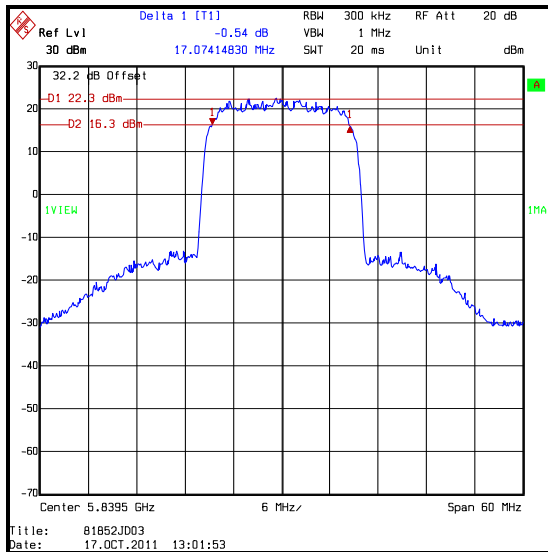
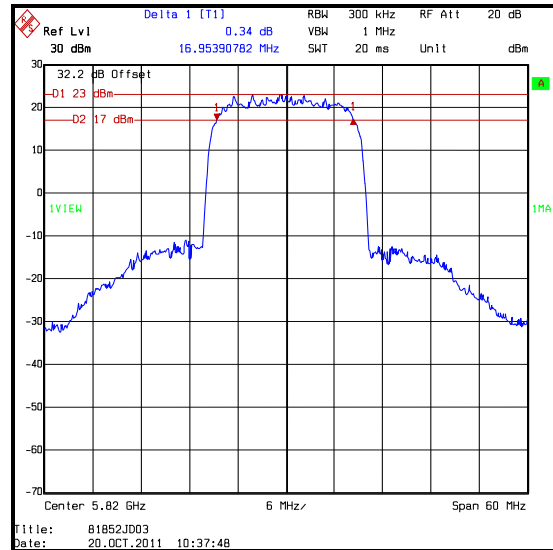
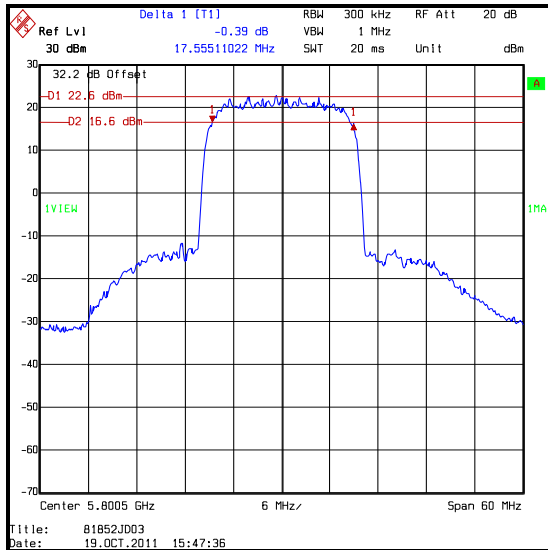
**Transmitter 6 dB Bandwidth (continued)****Results: 10 MHz 256QAM**

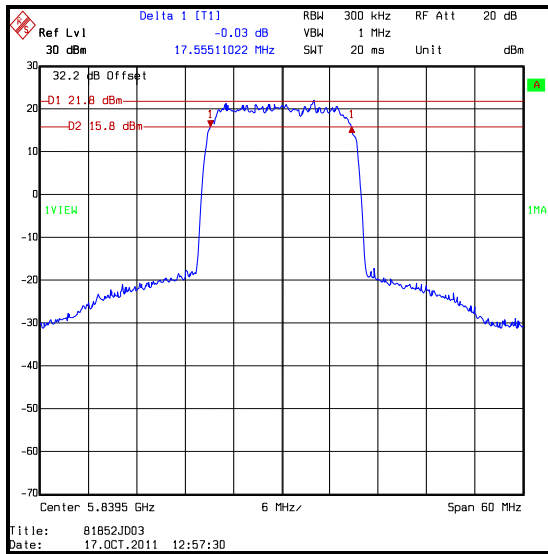
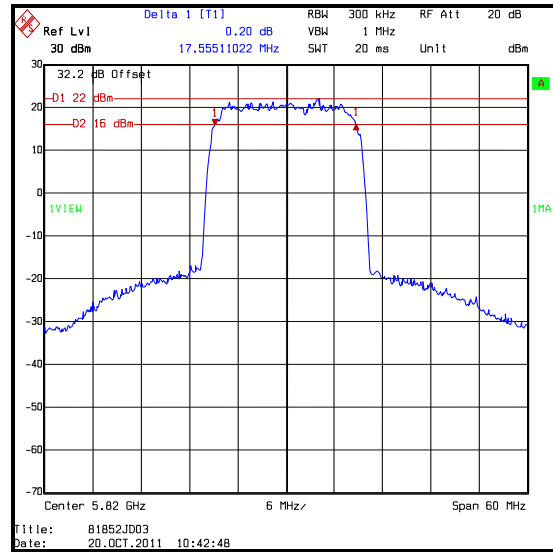
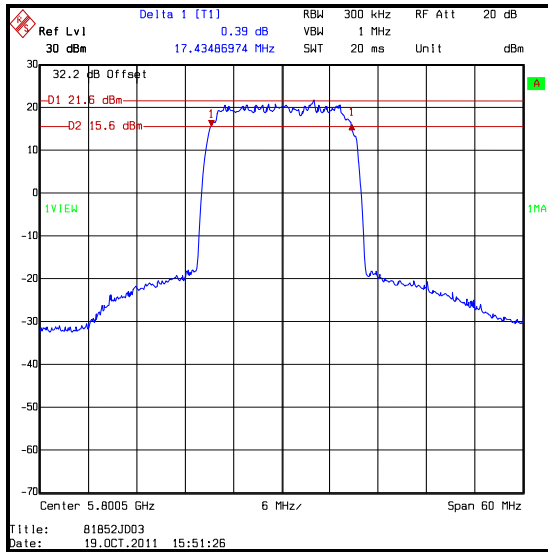
### Transmitter 6 dB Bandwidth (continued)

### Results: 20 MHz QPSK



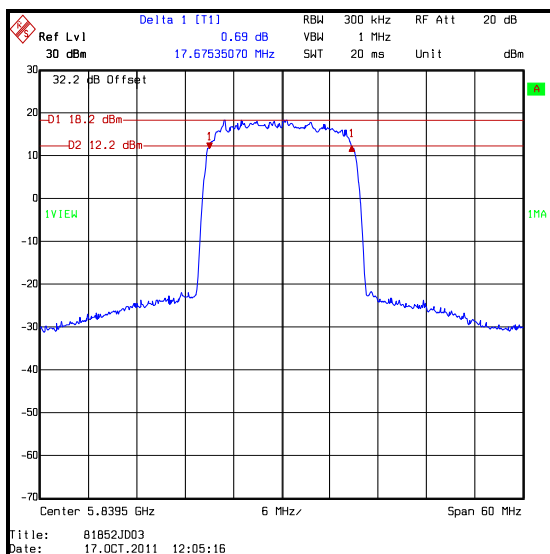
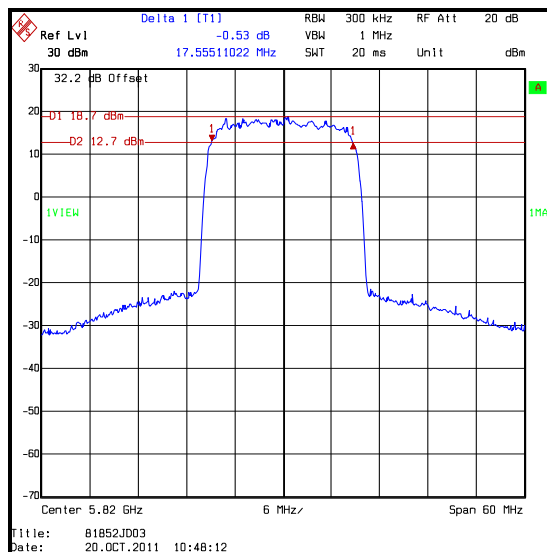
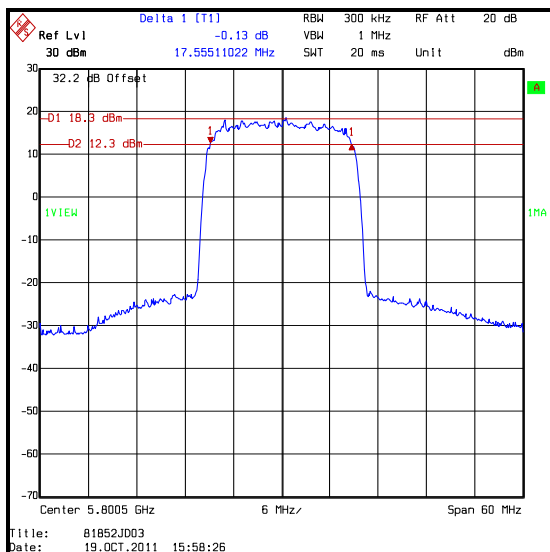


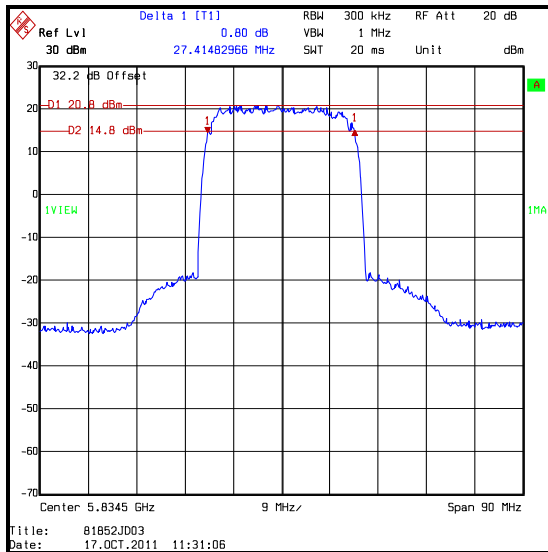
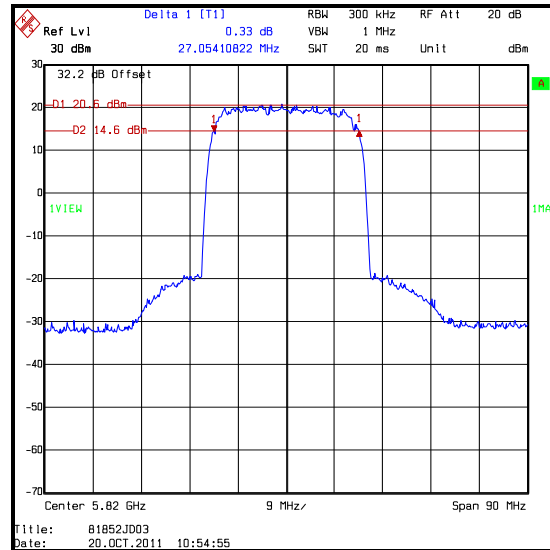
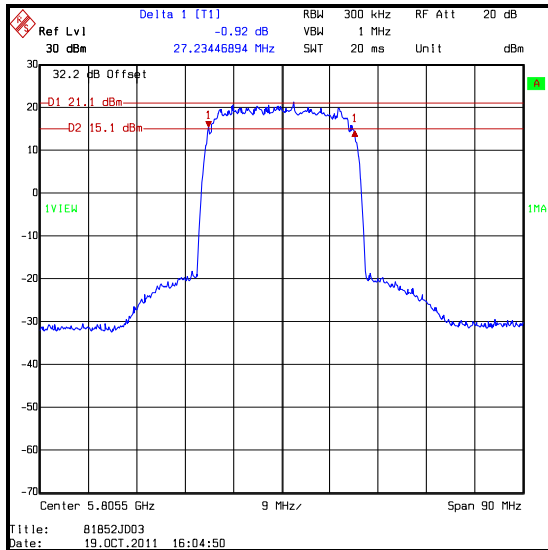
**Transmitter 6 dB Bandwidth (continued)****Results: 20 MHz 16QAM**

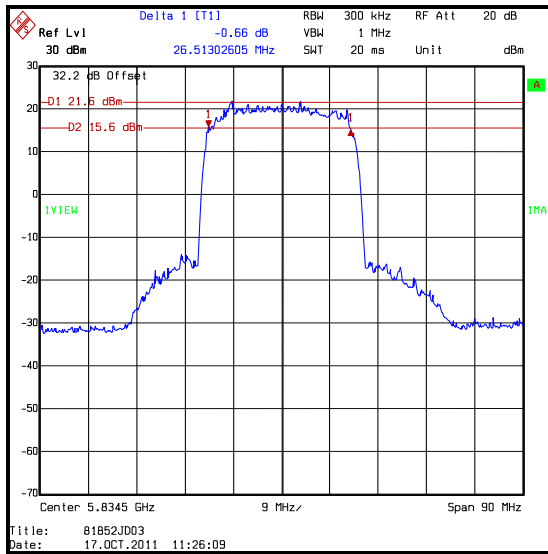
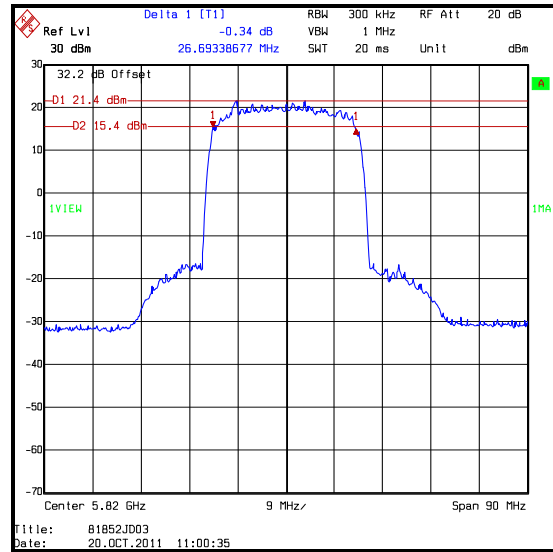
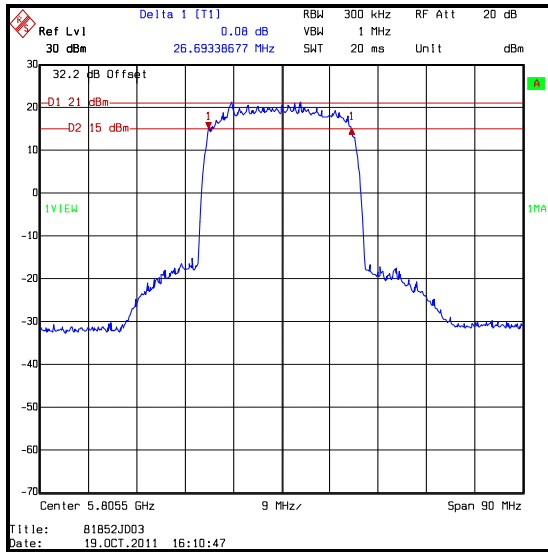
**Transmitter 6 dB Bandwidth (continued)****Results: 20 MHz 64QAM**

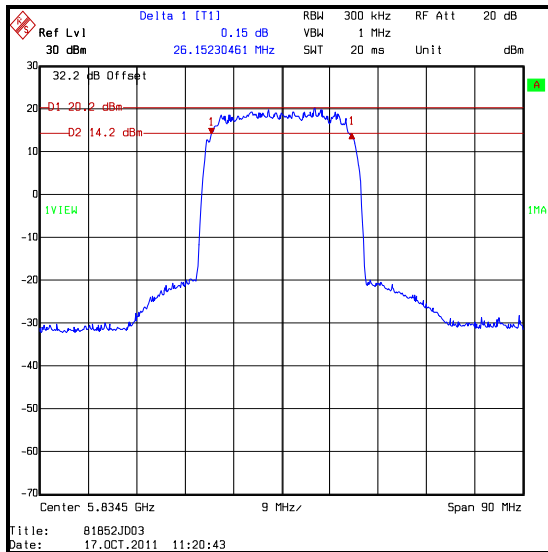
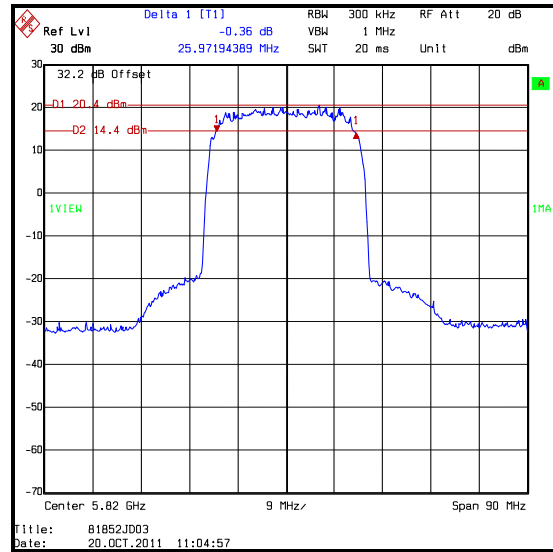
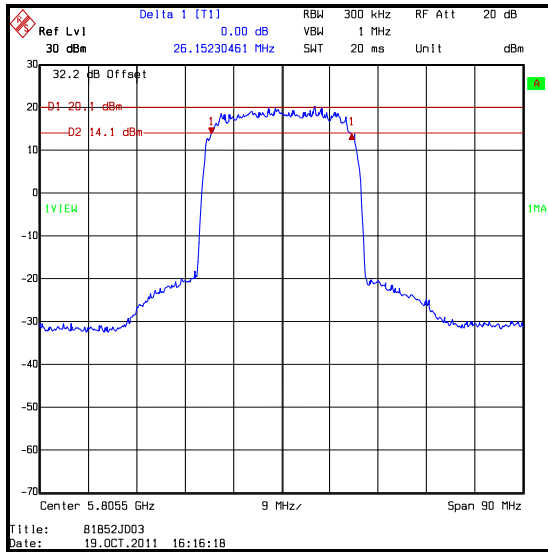
### Transmitter 6 dB Bandwidth (continued)

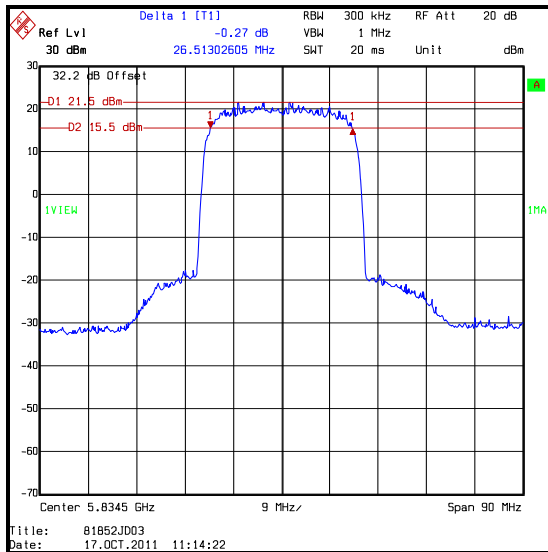
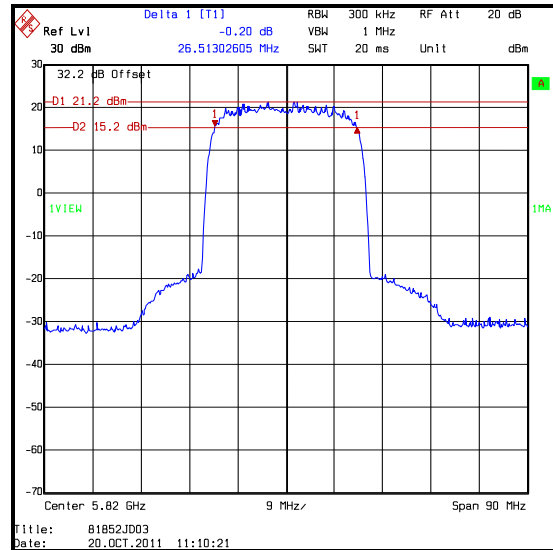
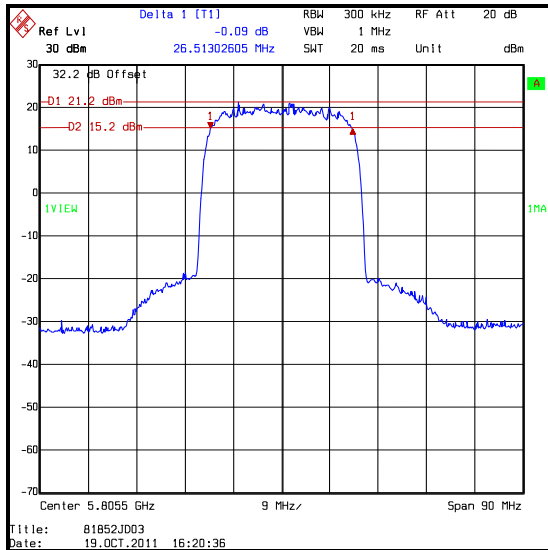
### Results: 20 MHz 256QAM

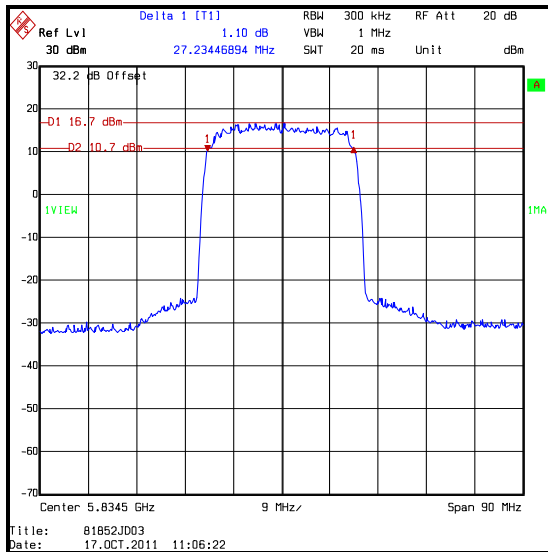
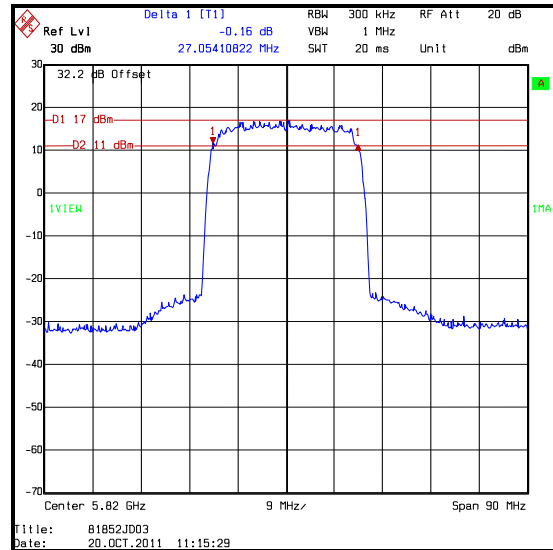
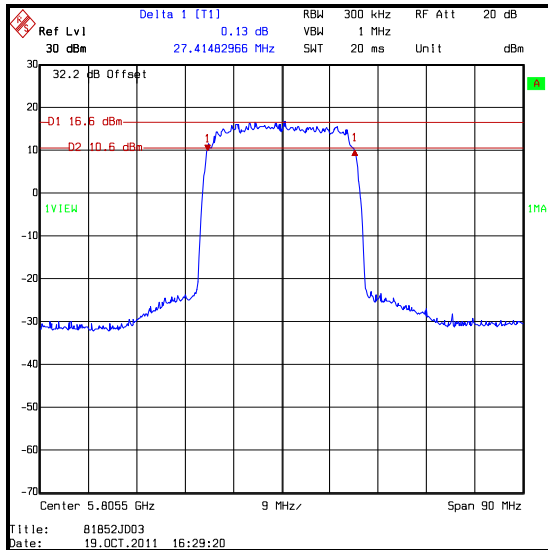


**Transmitter 6 dB Bandwidth (continued)****Results: 30 MHz QPSK**

**Transmitter 6 dB Bandwidth (continued)****Results: 30 MHz 16QAM**

**Transmitter 6 dB Bandwidth (continued)****Results: 30 MHz 64QAM**

**Transmitter 6 dB Bandwidth (continued)****Results: 30 MHz 128QAM**

**Transmitter 6 dB Bandwidth (continued)****Results: 30 MHz 256QAM**



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

<b>Test Engineer:</b>	Sarah Williams	<b>Test Date:</b>	17 October 2011 19 October 2011 & 20 October 2011
<b>Test Sample Serial No:</b>	ZLS11200128		

<b>FCC Part:</b>	2.1049
<b>Test Method Used:</b>	As detailed in ANSI C63.10 Section 6.9.1

**Environmental Conditions:**

<b>Temperature (°C):</b>	22 to 26
<b>Relative Humidity (%):</b>	33 to 38

**Results: 5 MHz 128QAM**

Channel	20 dB Bandwidth (MHz)
Bottom	4.629
Middle	4.629
Top	4.629

**Results: 10 MHz QPSK**

Channel	20 dB Bandwidth (MHz)
Bottom	9.739
Middle	9.739
Top	9.739

**Results: 10 MHz 16QAM**

Channel	20 dB Bandwidth (MHz)
Bottom	9.679
Middle	9.679
Top	9.679

**Results: 10 MHz 64QAM**

Channel	20 dB Bandwidth (MHz)
Bottom	9.679
Middle	9.679
Top	9.679

**Transmitter 20 dB Bandwidth (continued)****Results: 10 MHz 128QAM**

Channel	20 dB Bandwidth (MHz)
Bottom	9.679
Middle	9.679
Top	9.679

**Results: 10 MHz 256QAM**

Channel	20 dB Bandwidth (MHz)
Bottom	9.739
Middle	9.679
Top	9.739

**Results: 20 MHz QPSK**

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

**Results: 20 MHz 16QAM**

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

**Results: 20 MHz 64QAM**

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

**Results: 20 MHz 256QAM**

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

**Transmitter 20 dB Bandwidth (continued)****Results: 30 MHz QPSK**

Channel	20 dB Bandwidth (MHz)
Bottom	29.940
Middle	29.940
Top	30.120

**Results: 30 MHz 16QAM**

Channel	20 dB Bandwidth (MHz)
Bottom	29.760
Middle	29.760
Top	29.760

**Results: 30 MHz 64QAM**

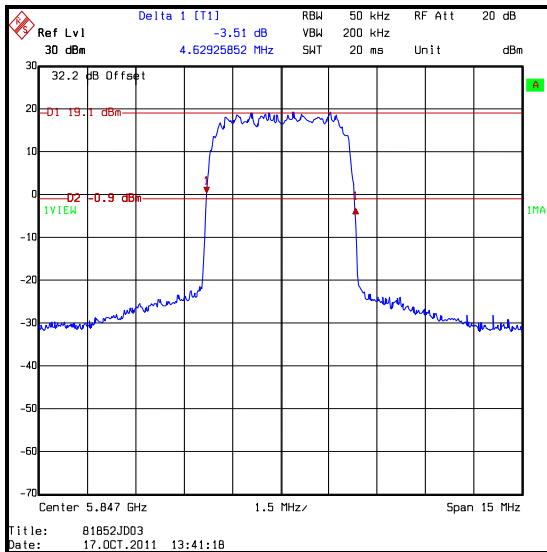
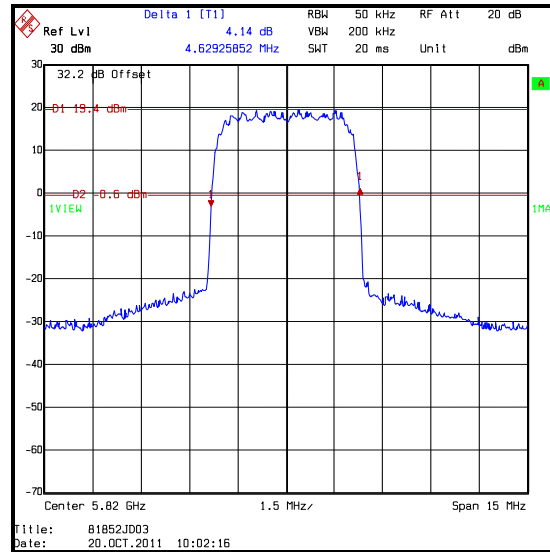
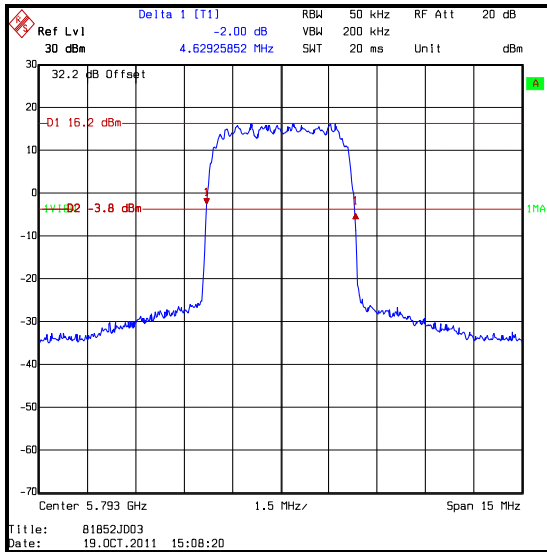
Channel	20 dB Bandwidth (MHz)
Bottom	29.760
Middle	29.760
Top	29.760

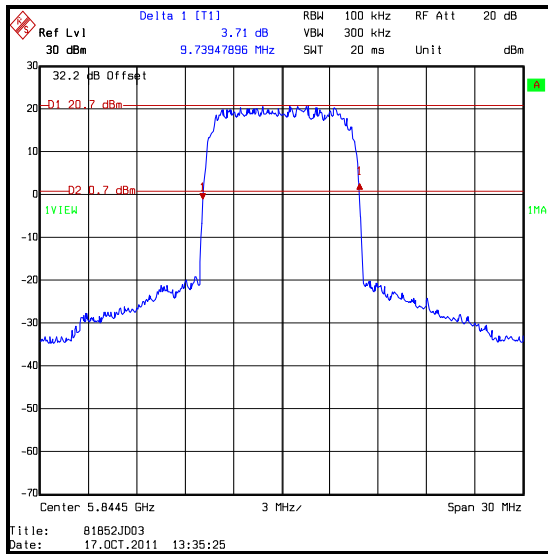
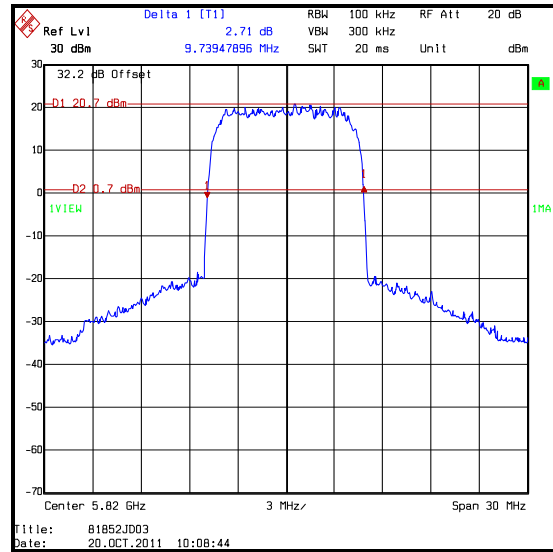
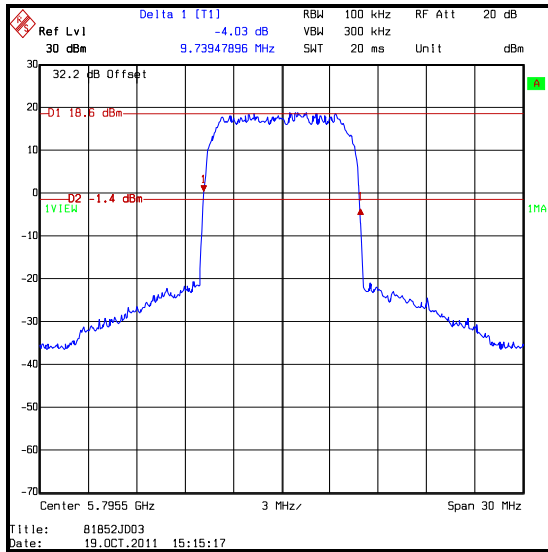
**Results: 30 MHz 128QAM**

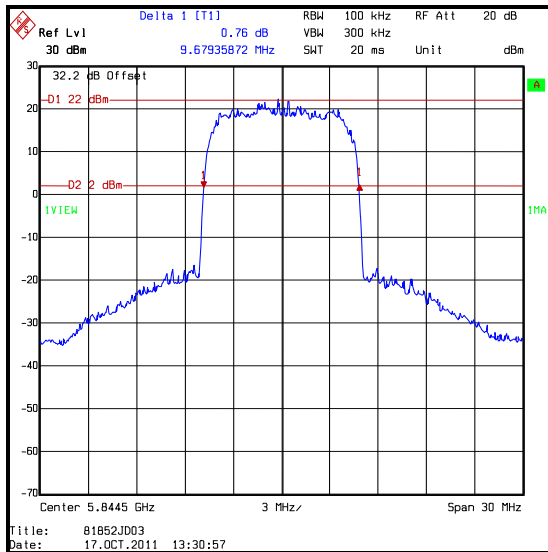
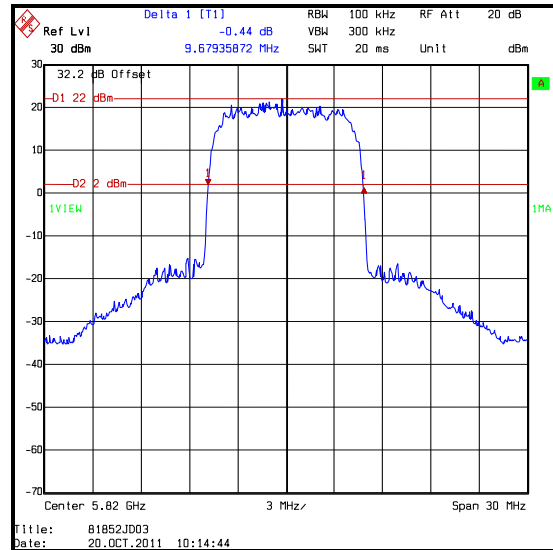
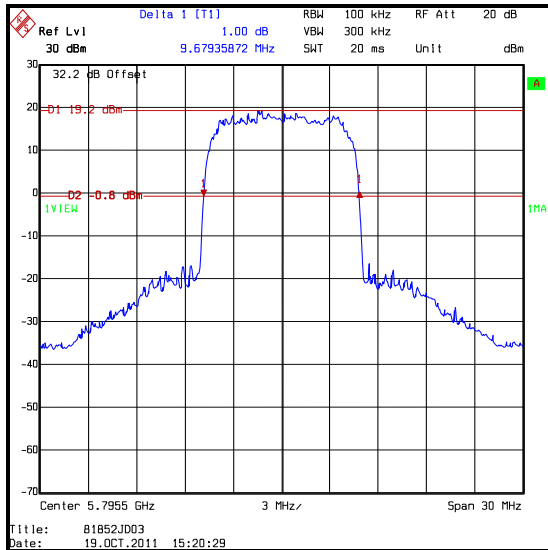
Channel	20 dB Bandwidth (MHz)
Bottom	29.760
Middle	29.940
Top	29.760

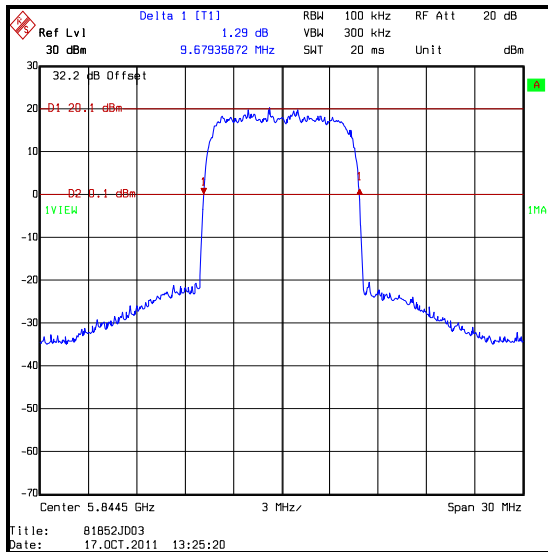
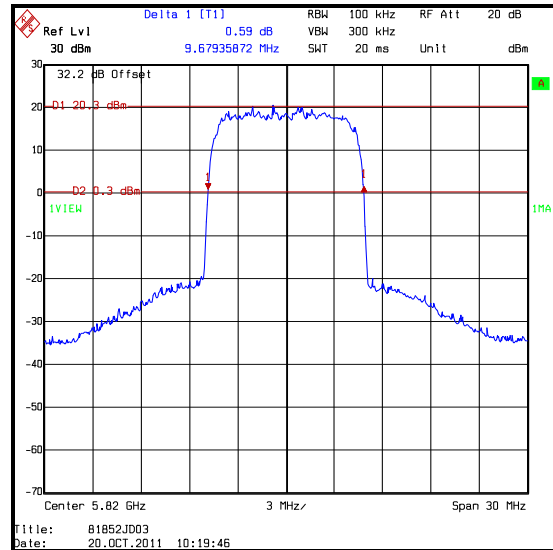
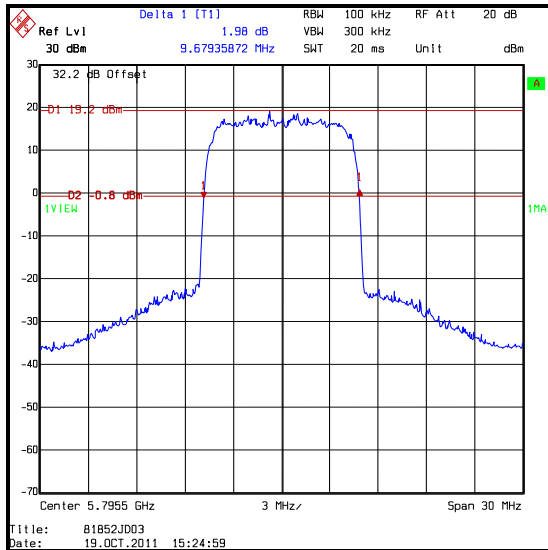
**Results: 30 MHz 256QAM**

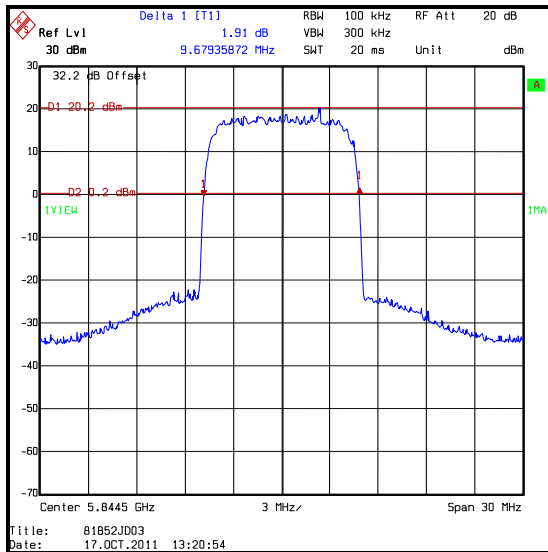
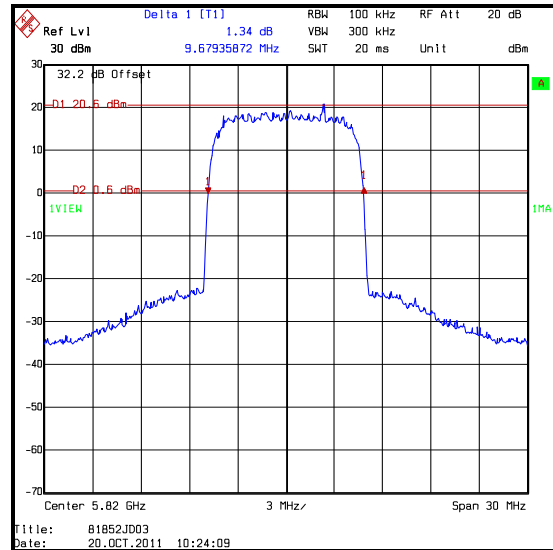
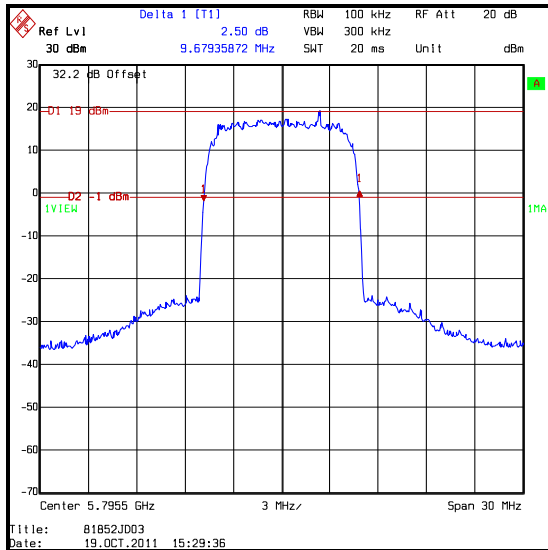
Channel	20 dB Bandwidth (MHz)
Bottom	29.940
Middle	29.760
Top	29.940

**Transmitter 20 dB Bandwidth (continued)****Results: 5 MHz 128QAM**

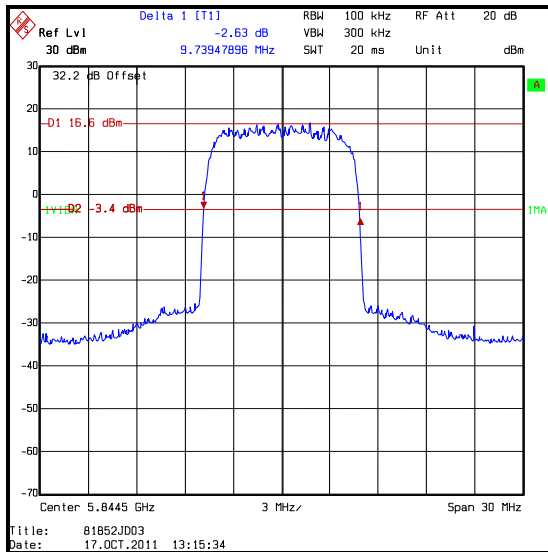
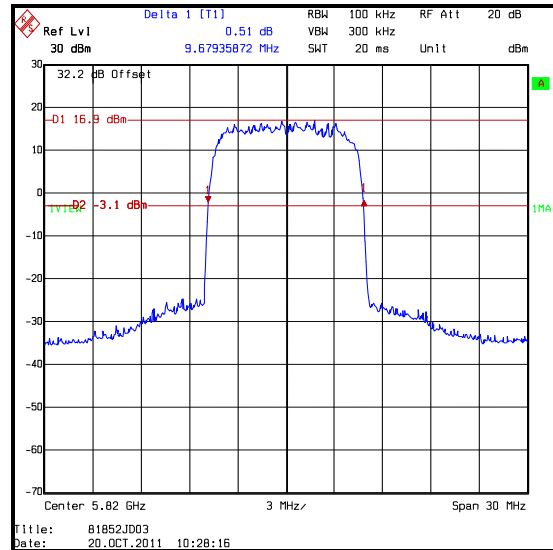
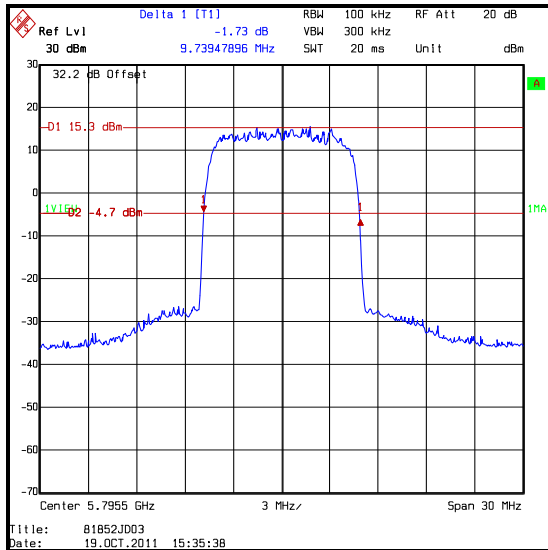
**Transmitter 20 dB Bandwidth (continued)****Results: 10 MHz QPSK**

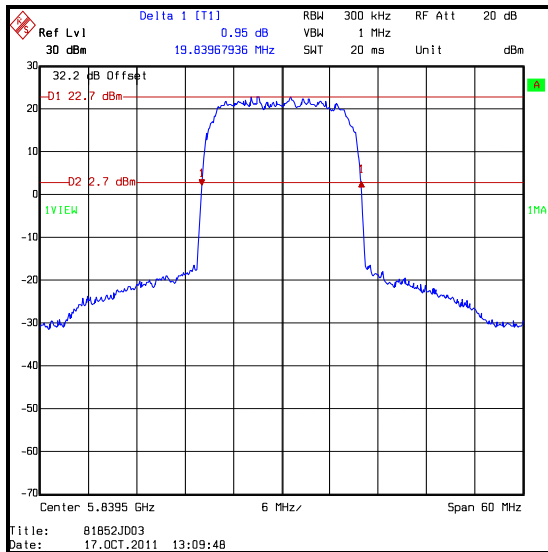
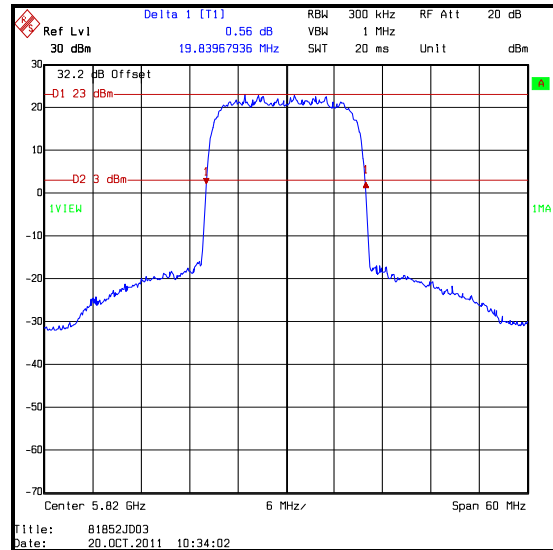
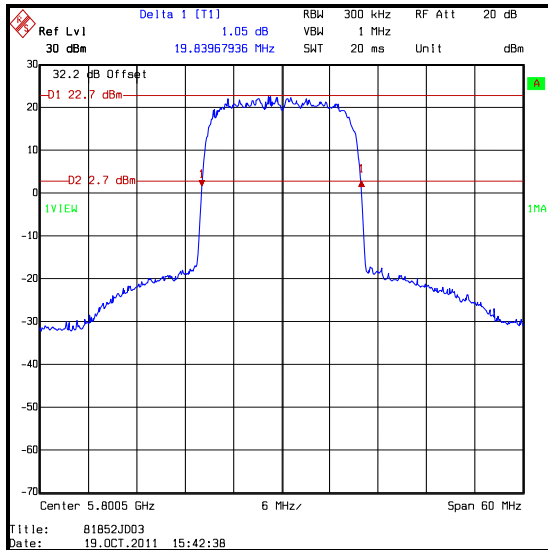
**Transmitter 20 dB Bandwidth (continued)****Results: 10 MHz 16QAM**

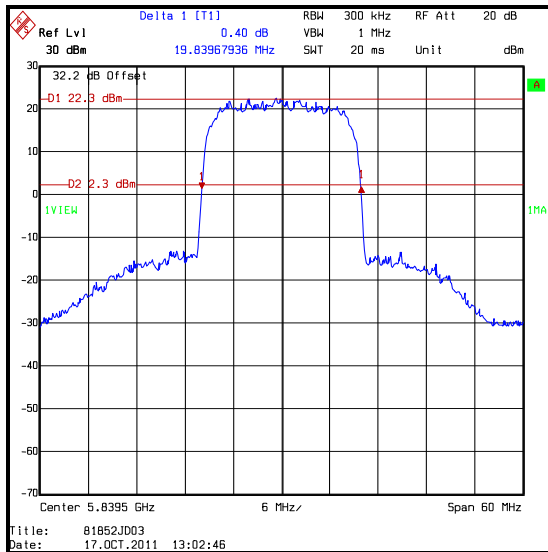
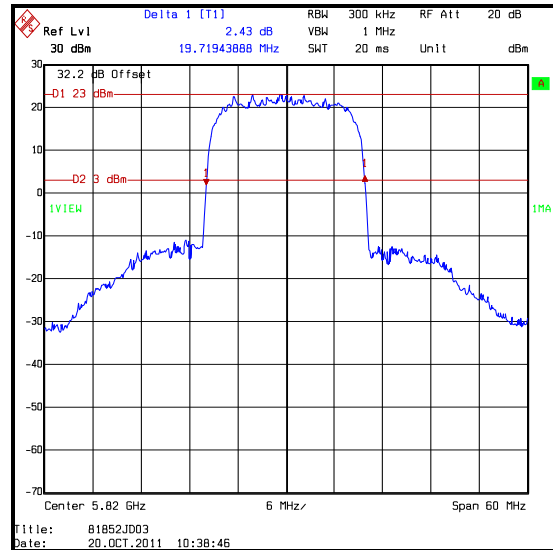
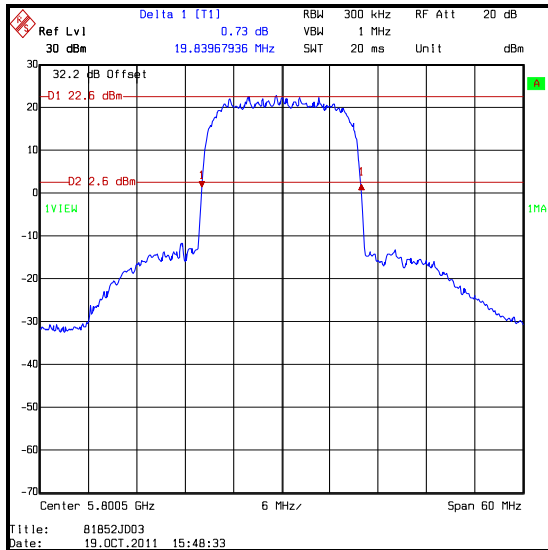
**Transmitter 20 dB Bandwidth (continued)****Results: 10 MHz 64QAM**

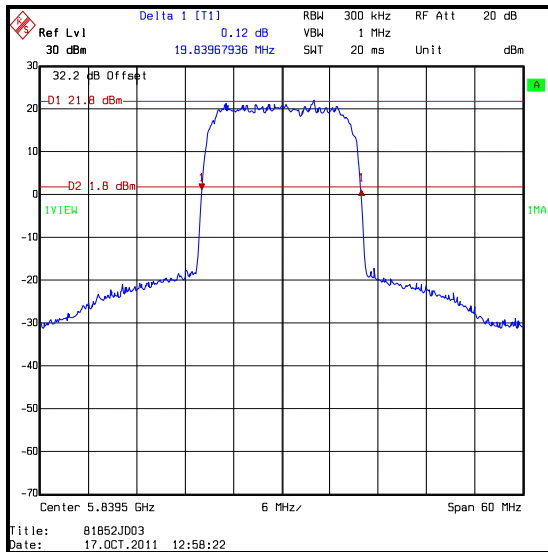
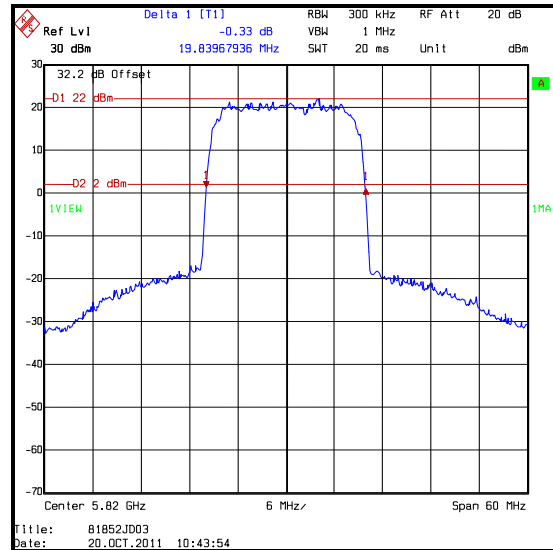
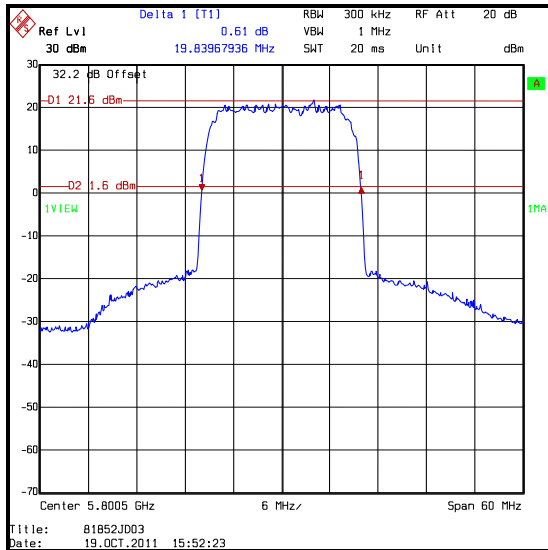
**Transmitter 20 dB Bandwidth (continued)****Results: 10 MHz 128QAM**

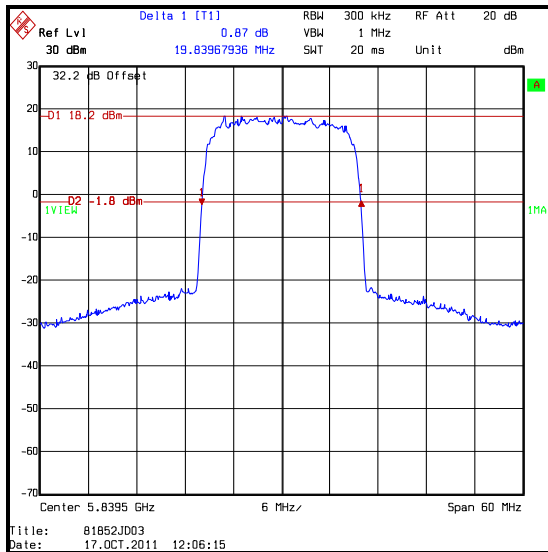
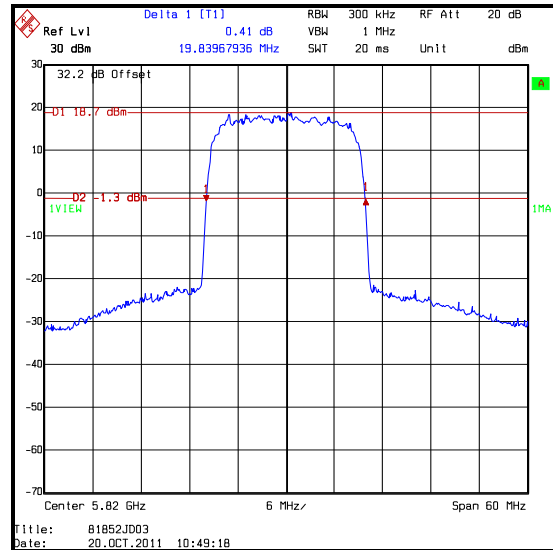
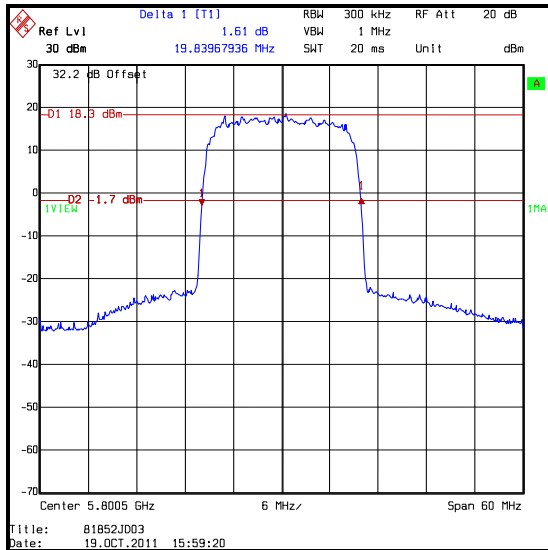


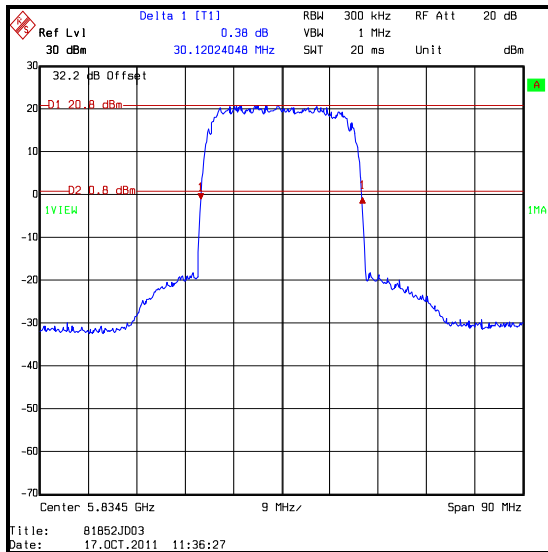
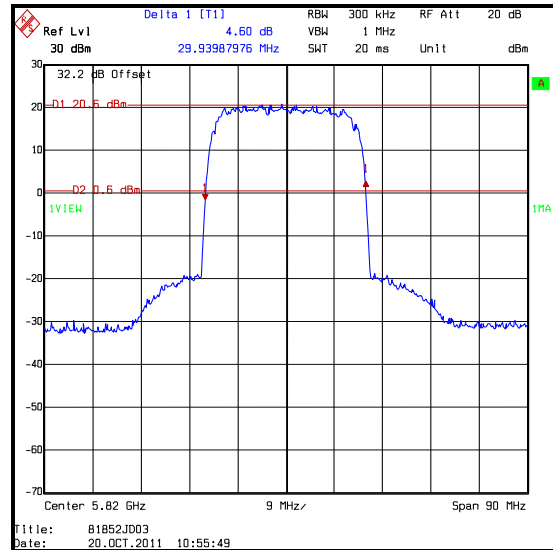
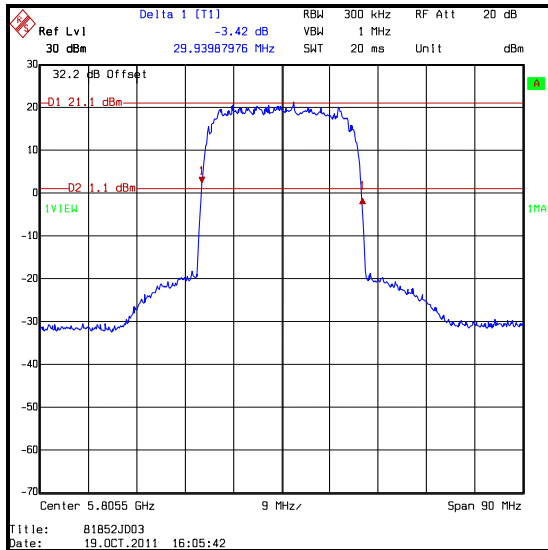
**Transmitter 20 dB Bandwidth (continued)****Results: 10 MHz 256QAM**

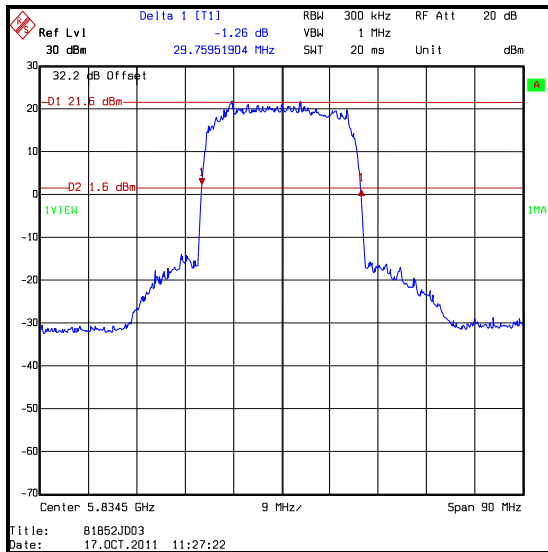
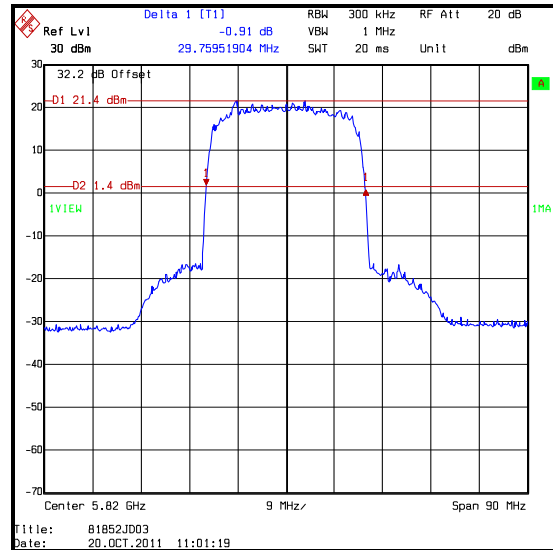
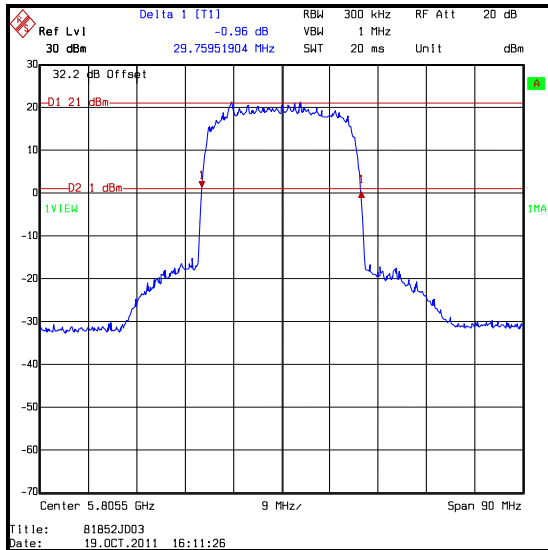
**Transmitter 20 dB Bandwidth (continued)****Results: 20 MHz QPSK**

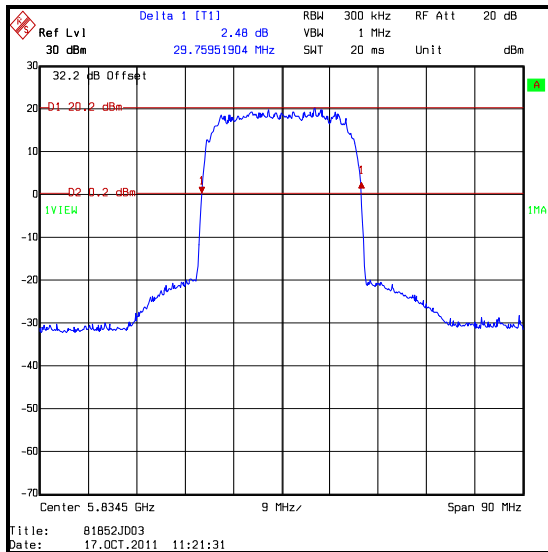
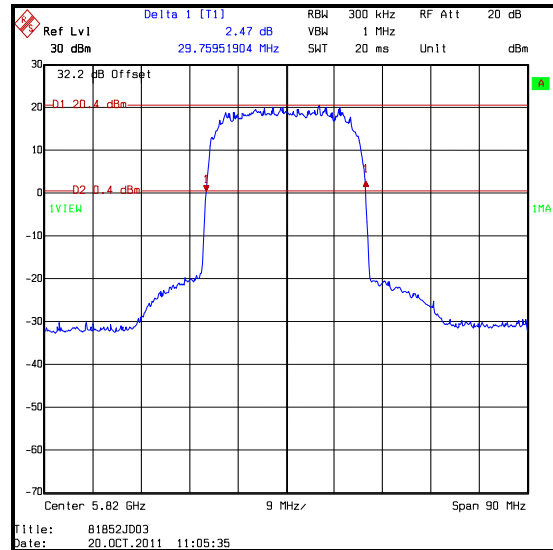
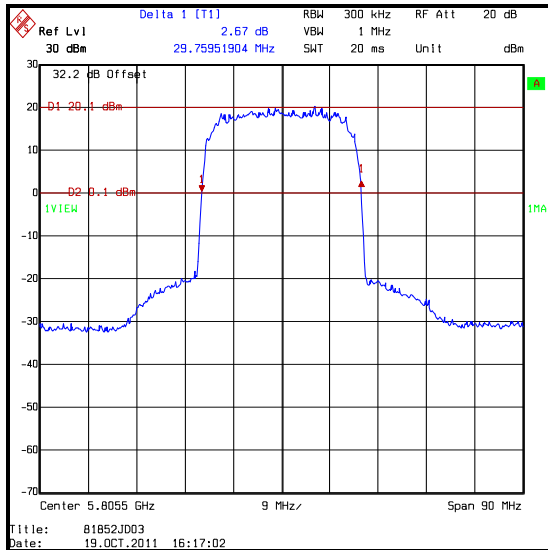
**Transmitter 20 dB Bandwidth (continued)****Results: 20 MHz 16QAM**

**Transmitter 20 dB Bandwidth (continued)****Results: 20 MHz 64QAM**

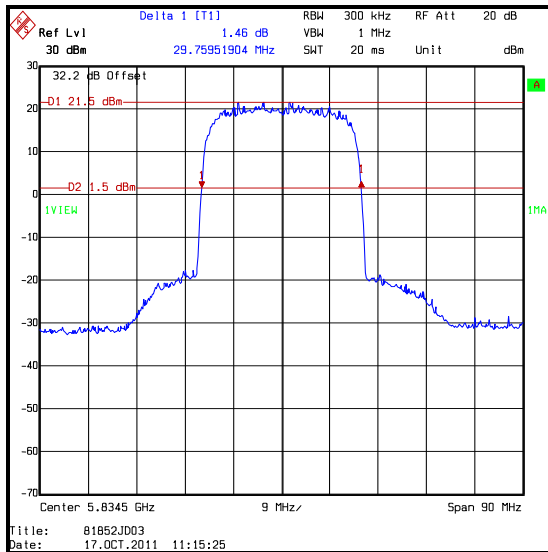
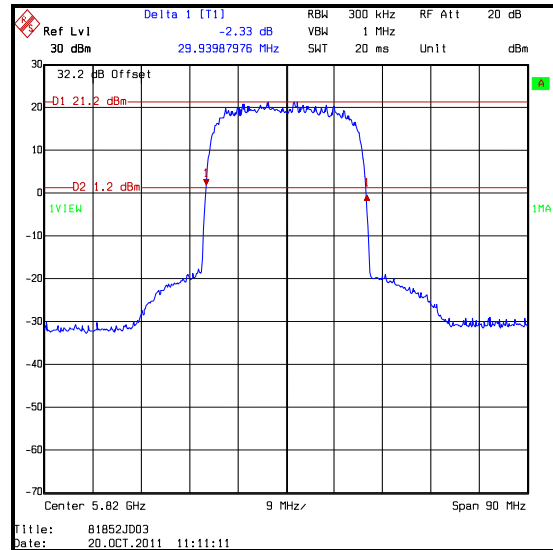
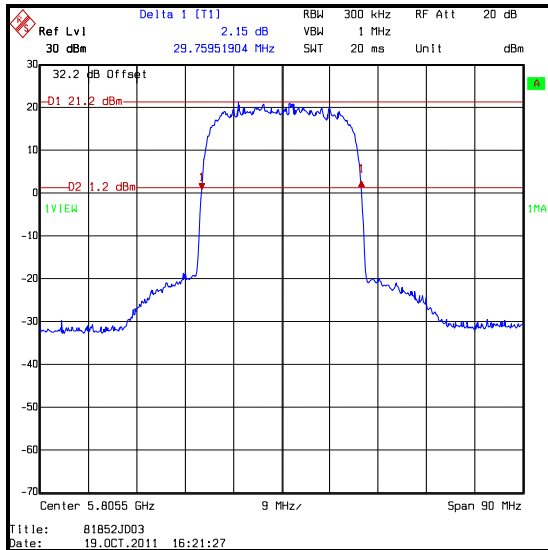
**Transmitter 20 dB Bandwidth (continued)****Results: 20 MHz 256QAM**

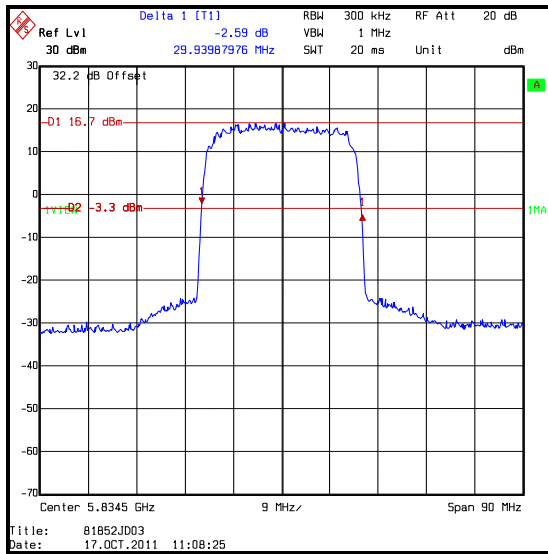
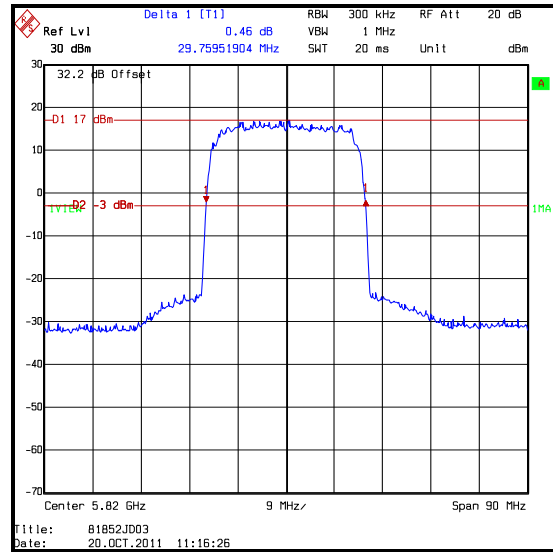
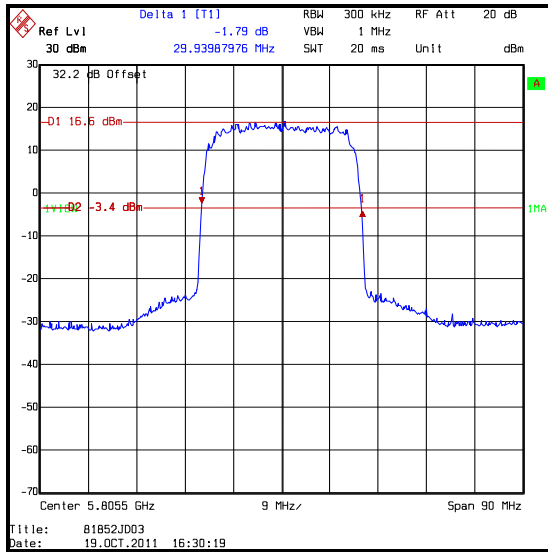
**Transmitter 20 dB Bandwidth (continued)****Results: 30 MHz QPSK**

**Transmitter 20 dB Bandwidth (continued)****Results: 30 MHz 16QAM**

**Transmitter 20 dB Bandwidth (continued)****Results: 30 MHz 64QAM**



**Transmitter 20 dB Bandwidth (continued)****Results: 30 MHz 128QAM**

**Transmitter 20 dB Bandwidth (continued)****Results: 30 MHz 256QAM**

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

<b>Test Engineer:</b>	Sarah Williams	<b>Test Date:</b>	28 October 2011
<b>Test Sample Serial No:</b>	ZLS11200128		

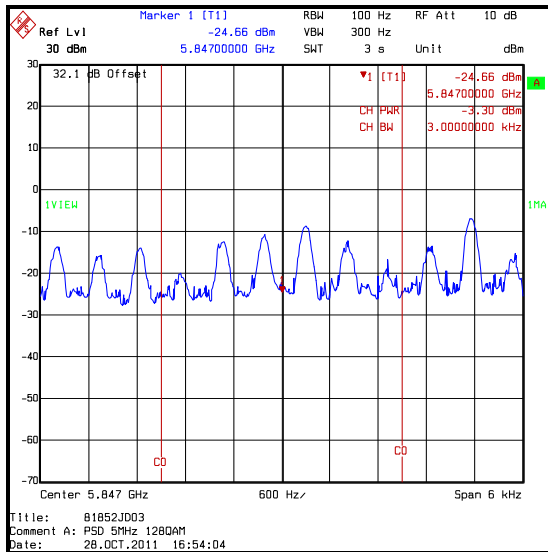
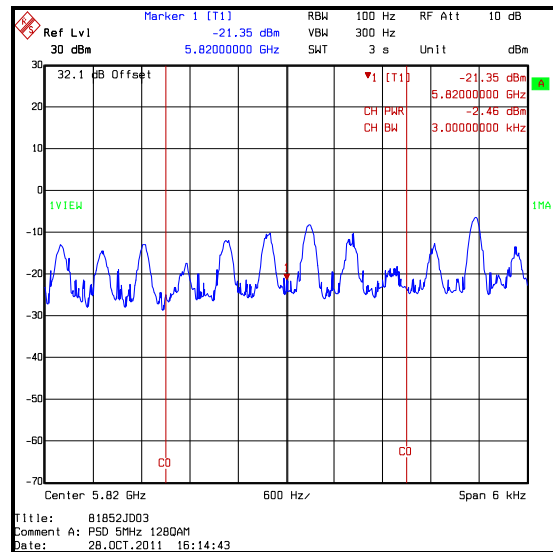
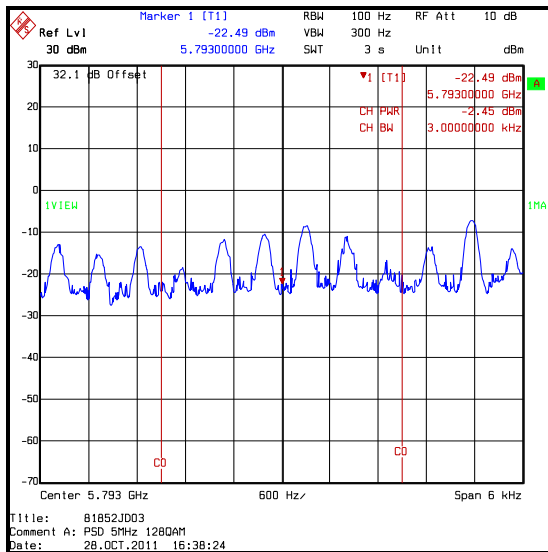
<b>FCC Part:</b>	15.247 (In line with KDB 558074, Measurement of Digital Transmission Systems)
<b>Test Method Used:</b>	The Power Spectral Density was measured by using a spectrum analyzer channel power integration function. This integrated the channel power over the specified 3kHz resulting in PSD dBm/3kHz.

**Environmental Conditions:**

<b>Temperature (°C):</b>	25
<b>Relative Humidity (%):</b>	34

**Results 5 MHz 128QAM:**

Channel	Output Power (dBm/3 kHz)	Limit (dBm/3 kHz)	Margin (dB)	Result
Bottom	-2.5	8.0	10.5	Complied
Middle	-2.5	8.0	10.5	Complied
Top	-3.3	8.0	11.3	Complied

**Transmitter Power Spectral Density (continued)****Results: 5 MHz 128QAM**

**5.2.5. Transmitter Maximum Average Output Power****Test Summary:**

<b>Test Engineer:</b>	Sarah Williams	<b>Test Date:</b>	19 October 2011 & 20 October 2011
<b>Test Sample Serial No:</b>	ZLS11200128		

<b>FCC Part:</b>	15.247(b)(3)
<b>Test Method Used:</b>	The Maximum Average Power was measured by using a spectrum analyzer channel power integration function. This integrated the power over the EUT's channel bandwidth resulting in the maximum power for the tested bandwidth. Note the EUT was transmitting on a 100% duty cycle and thus no duty cycle correction factor was applied.

**Environmental Conditions:**

<b>Temperature (°C):</b>	22 to 24
<b>Relative Humidity (%):</b>	33 to 34

**Results: 5 MHz 128QAM**

Channel	Power (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	26.7	30.0	3.3	Complied
Middle	27.6	30.0	2.4	Complied
Top	26.7	30.0	3.3	Complied

**Results: 10 MHz QPSK**

Channel	Power (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	28.3	30.0	1.7	Complied
Middle	28.9	30.0	1.1	Complied
Top	28.3	30.0	1.7	Complied

**Results: 10 MHz 16QAM**

Channel	Power (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	28.2	30.0	1.8	Complied
Middle	28.7	30.0	1.3	Complied
Top	28.2	30.0	1.8	Complied

**Transmitter Maximum Average Output Power (continued)****Results: 10 MHz 64QAM**

Channel	Power (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	28.1	30.0	1.9	Complied
Middle	28.5	30.0	1.5	Complied
Top	28.0	30.0	2.0	Complied

**Results: 10 MHz 128QAM**

Channel	Power (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	26.9	30.0	3.1	Complied
Middle	27.3	30.0	2.7	Complied
Top	26.8	30.0	3.2	Complied

**Results: 10 MHz 256QAM**

Channel	Power (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	27.7	30.0	2.3	Complied
Middle	28.1	30.0	1.9	Complied
Top	27.6	30.0	2.4	Complied

**Results: 20 MHz QPSK**

Channel	Power (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	28.4	30.0	1.6	Complied
Middle	28.7	30.0	1.3	Complied
Top	28.4	30.0	1.6	Complied

**Results: 20 MHz 16QAM**

Channel	Power (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	28.4	30.0	1.6	Complied
Middle	28.6	30.0	1.4	Complied
Top	28.3	30.0	1.7	Complied

**Transmitter Maximum Average Output Power (continued)****Results: 20 MHz 64QAM**

Channel	Power (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	28.2	30.0	1.8	Complied
Middle	28.4	30.0	1.6	Complied
Top	28.1	30.0	1.9	Complied

**Results: 20 MHz 256QAM**

Channel	Power (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	27.8	30.0	2.2	Complied
Middle	28.0	30.0	2.0	Complied
Top	27.8	30.0	2.2	Complied

**Results: 30 MHz QPSK**

Channel	Power (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	28.5	30.0	1.5	Complied
Middle	28.6	30.0	1.4	Complied
Top	28.3	30.0	1.7	Complied

**Results: 30 MHz 16QAM**

Channel	Power (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	28.6	30.0	1.4	Complied
Middle	28.5	30.0	1.5	Complied
Top	28.2	30.0	1.8	Complied

**Results: 30 MHz 64QAM**

Channel	Power (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	28.4	30.0	1.6	Complied
Middle	28.3	30.0	1.7	Complied
Top	28.1	30.0	1.9	Complied

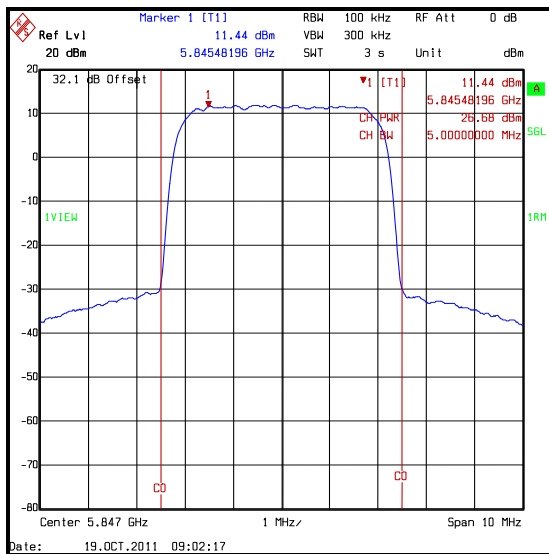
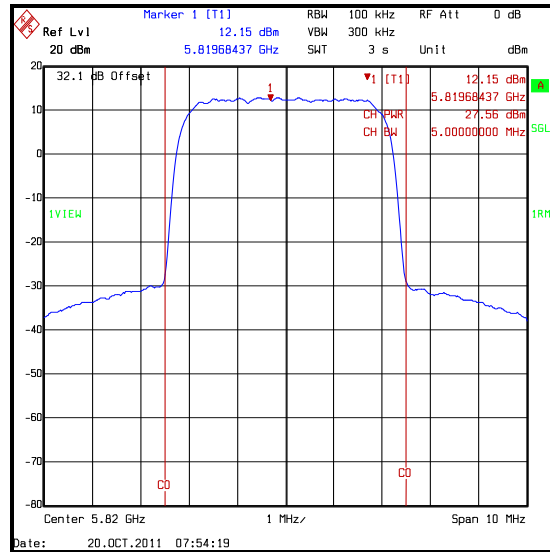
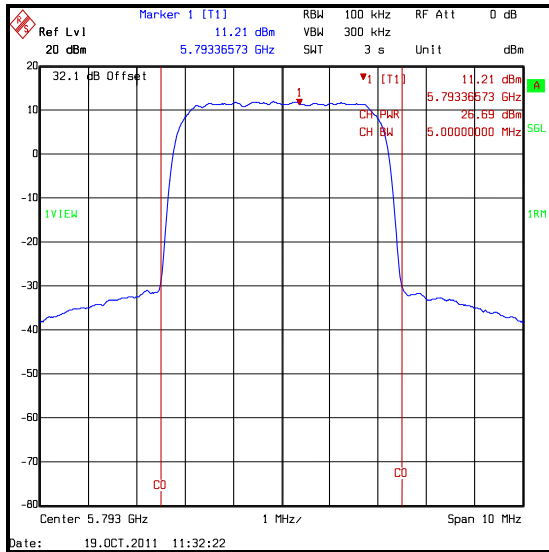
**Transmitter Maximum Average Output Power (continued)****Results: 30 MHz 128QAM**

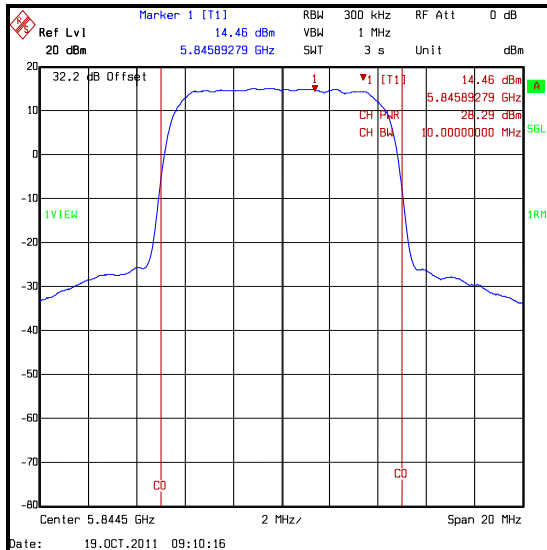
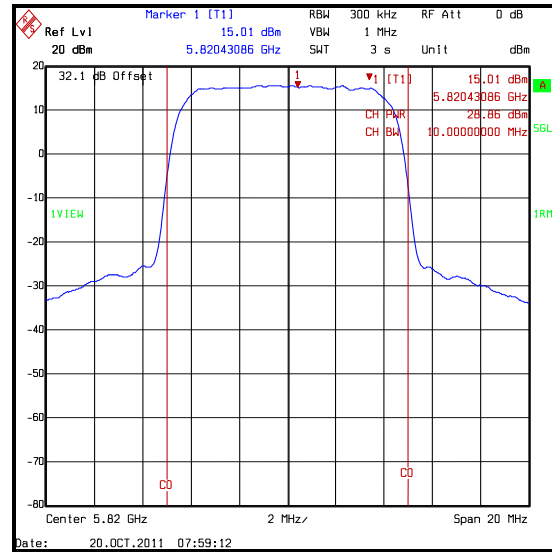
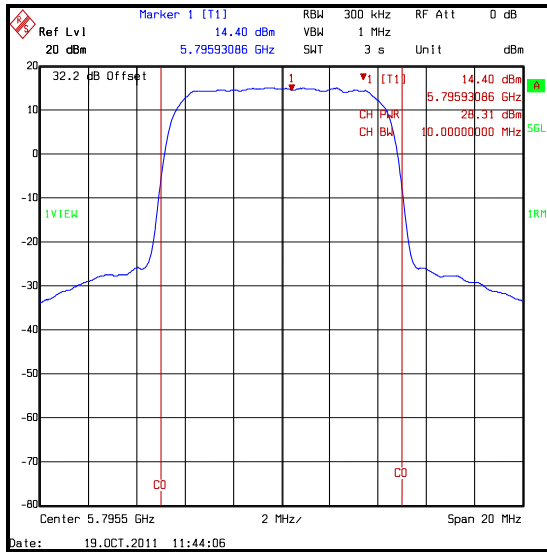
Channel	Power (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	28.6	30.0	1.4	Complied
Middle	28.5	30.0	1.5	Complied
Top	28.3	30.0	1.7	Complied

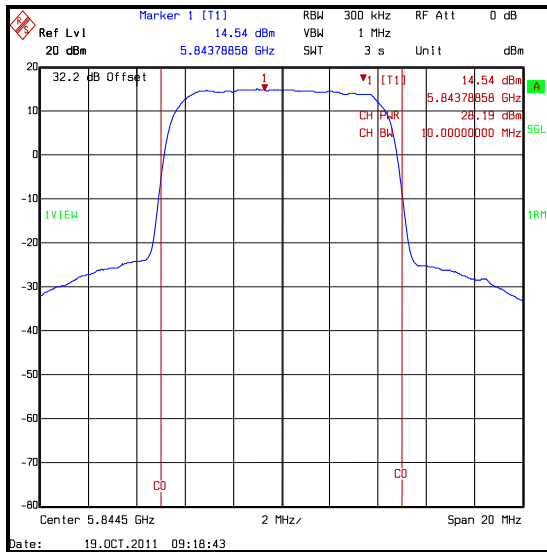
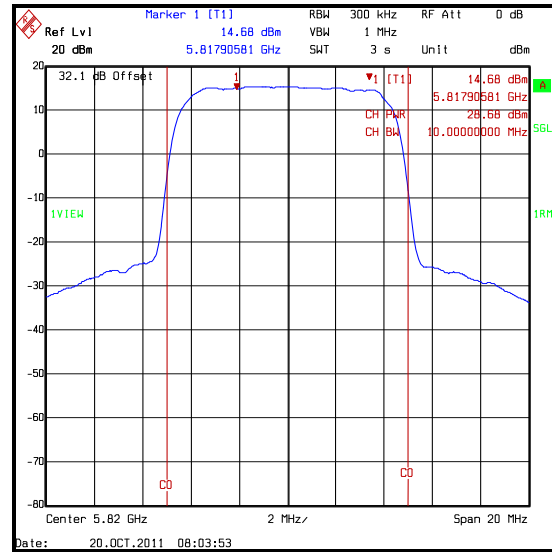
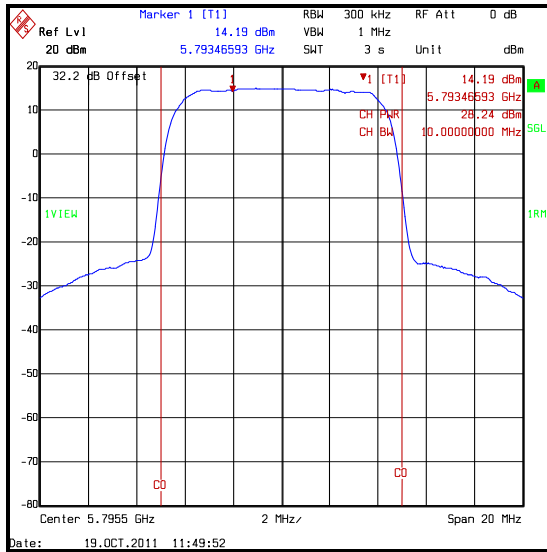
**Results: 30 MHz 256QAM**

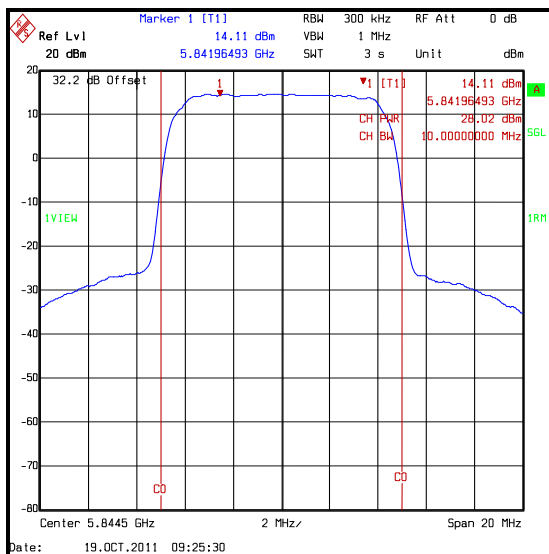
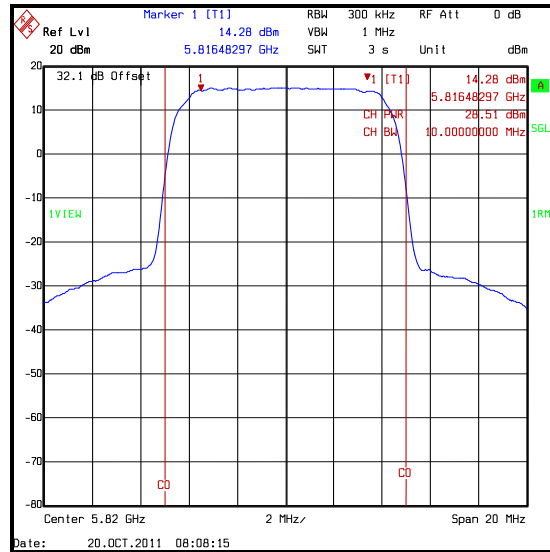
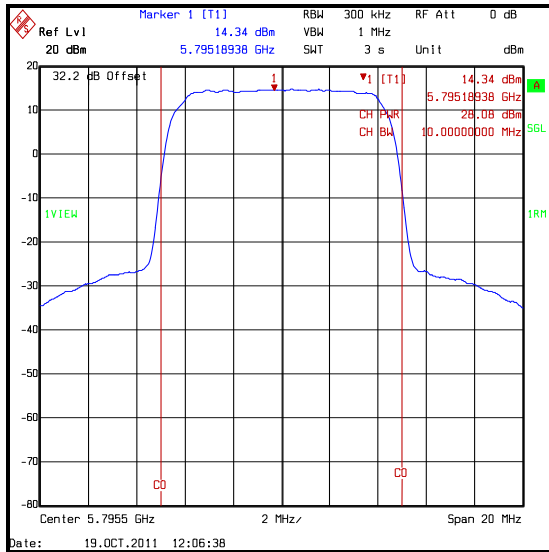
Channel	Power (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	28.1	30.0	1.9	Complied
Middle	27.9	30.0	2.1	Complied
Top	27.7	30.0	2.3	Complied

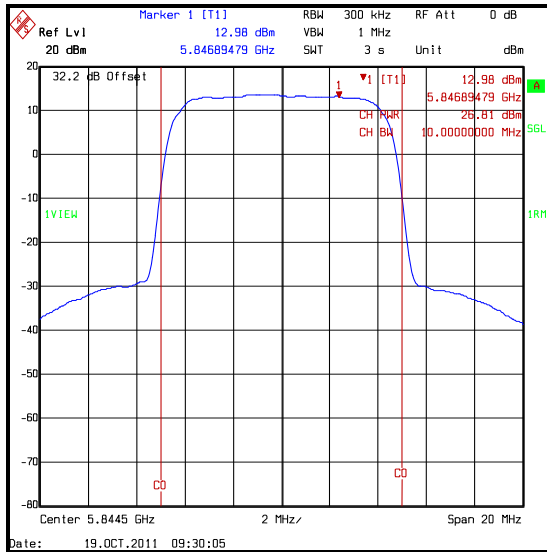
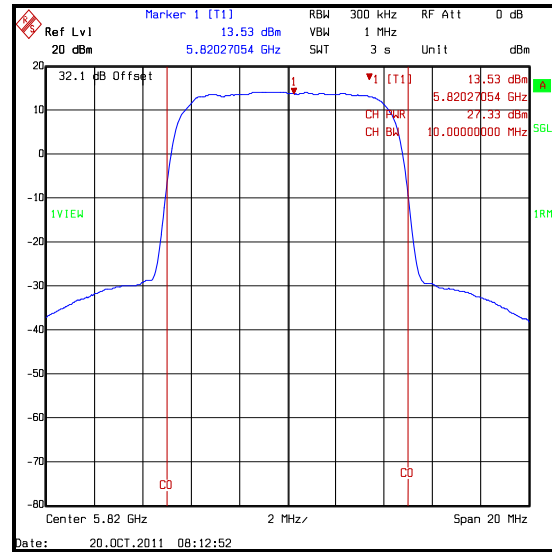
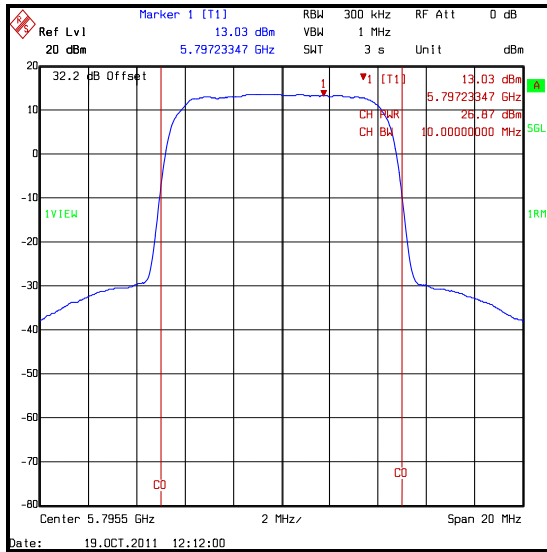


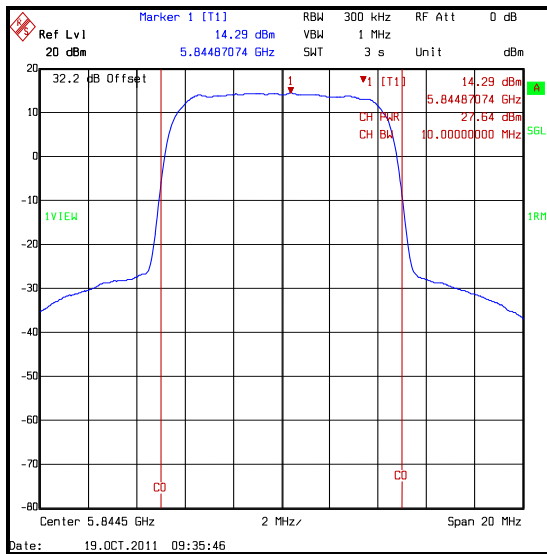
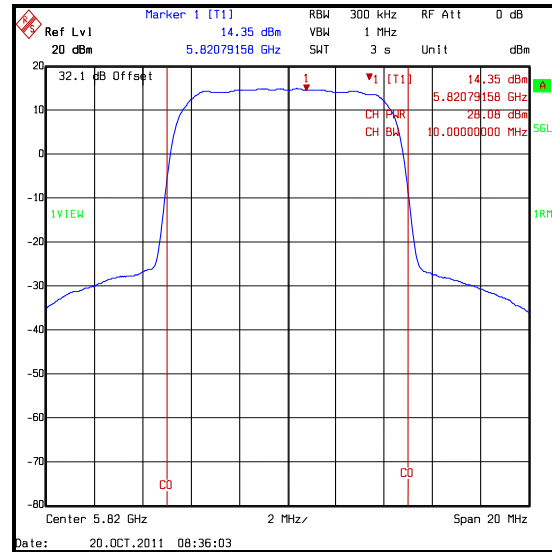
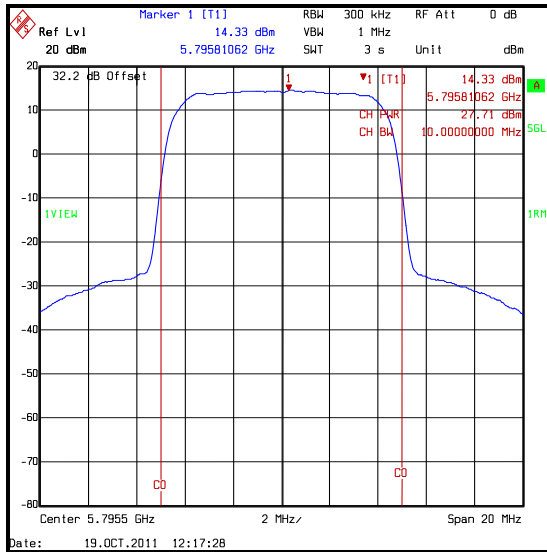
**Transmitter Maximum Average Output Power (continued)****Results: 5 MHz 128QAM**

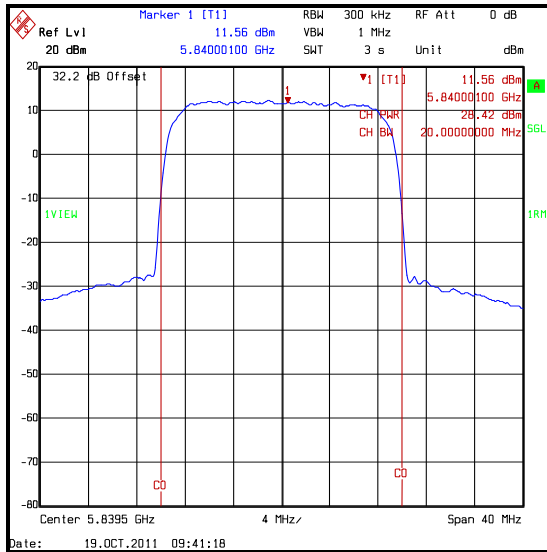
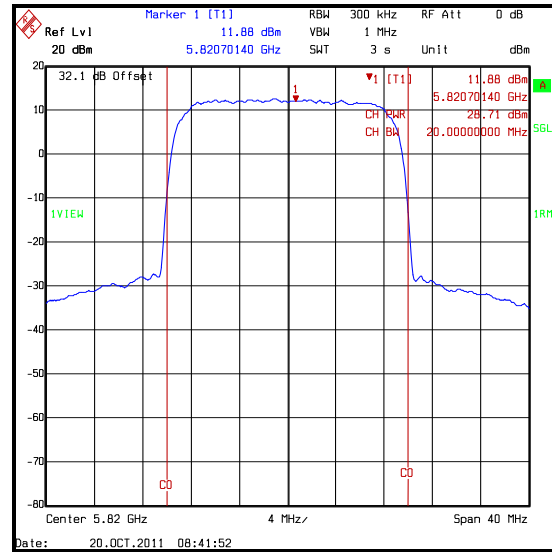
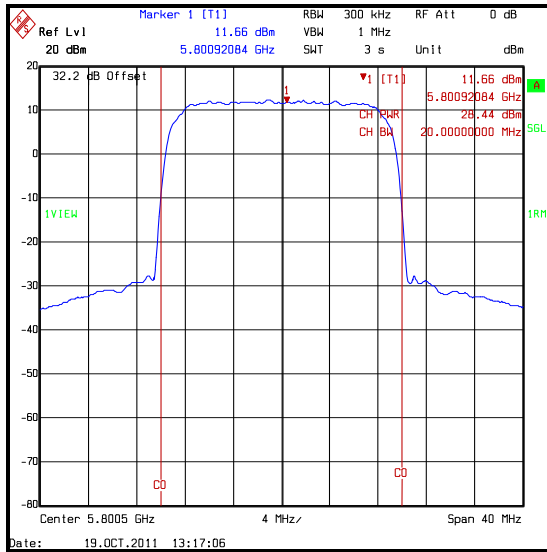
**Transmitter Maximum Average Output Power (continued)****Results: 10 MHz QPSK**

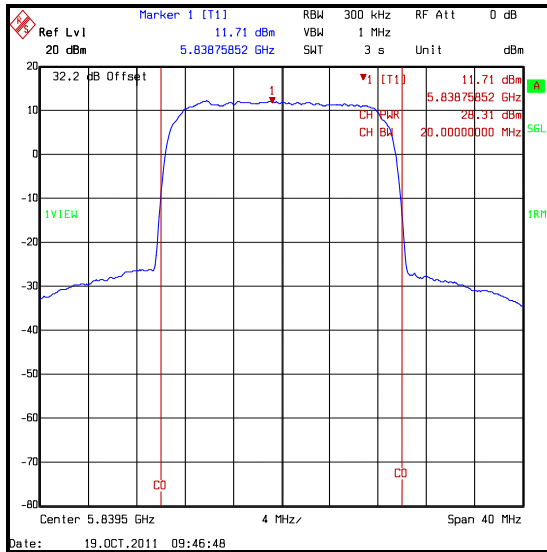
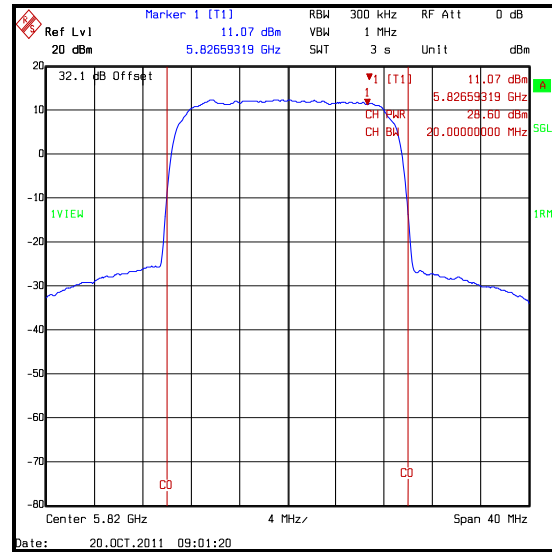
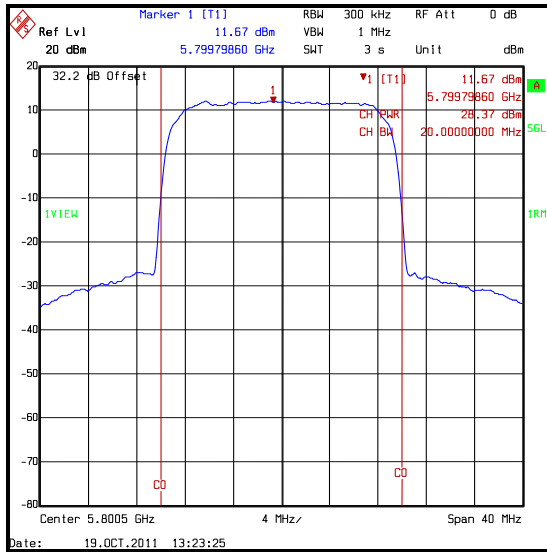
**Transmitter Maximum Average Output Power (continued)****Results: 10 MHz 16QAM**

**Transmitter Maximum Average Output Power (continued)****Results: 10 MHz 64QAM**

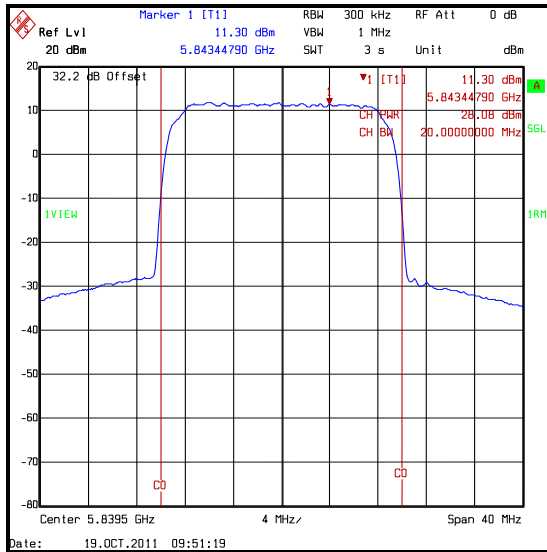
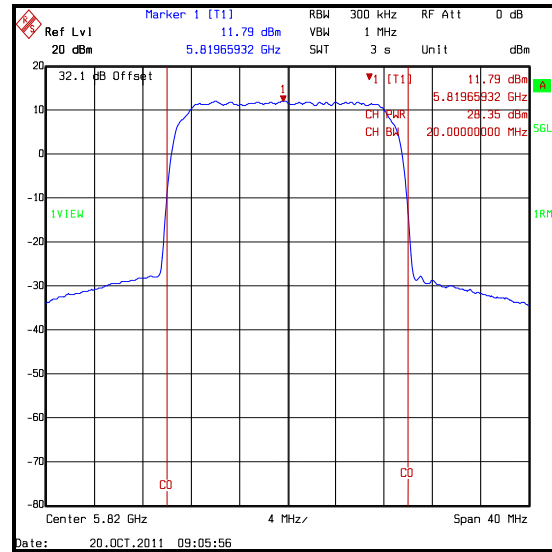
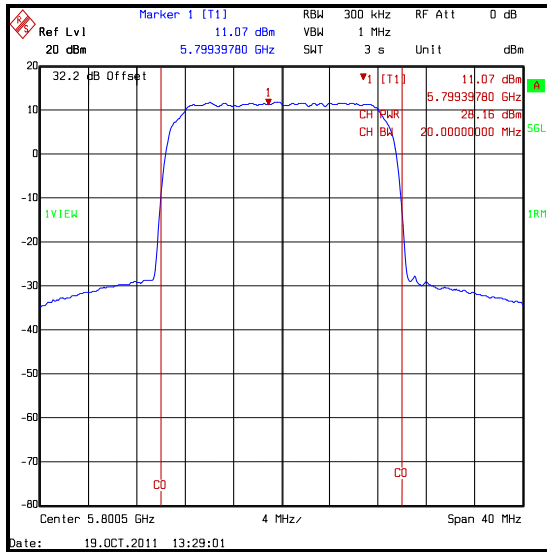
**Transmitter Maximum Average Output Power (continued)****Results: 10 MHz 128QAM**

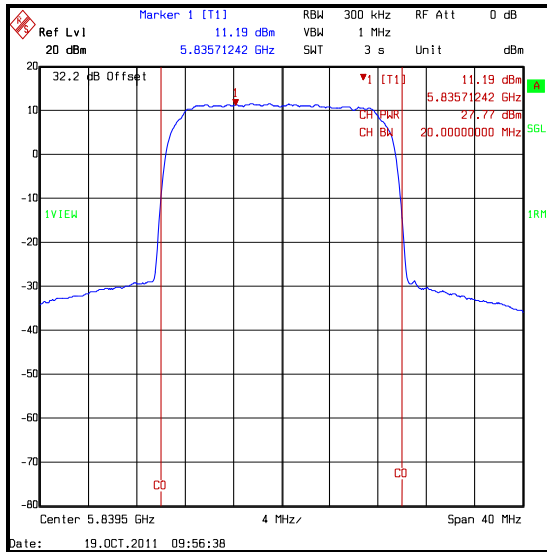
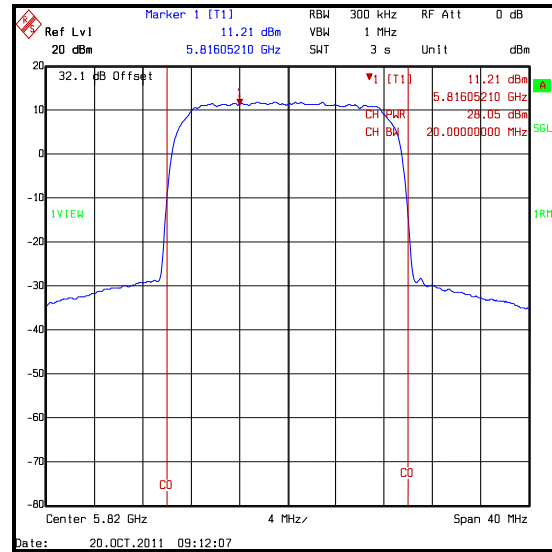
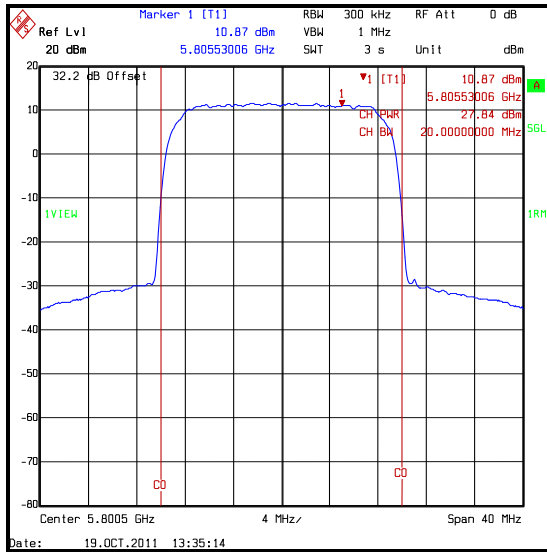
**Transmitter Maximum Average Output Power (continued)****Results: 10 MHz 256QAM**

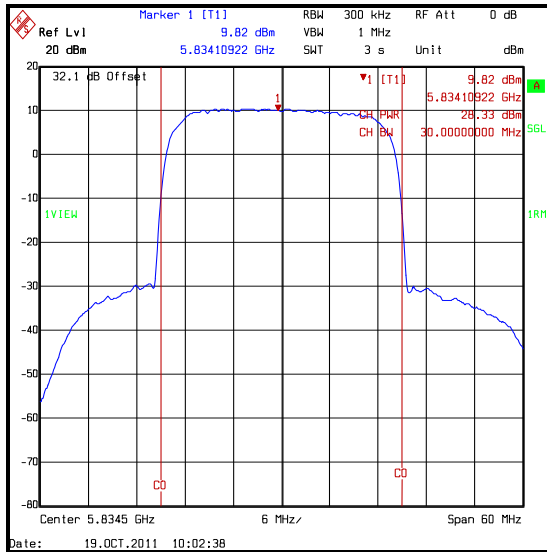
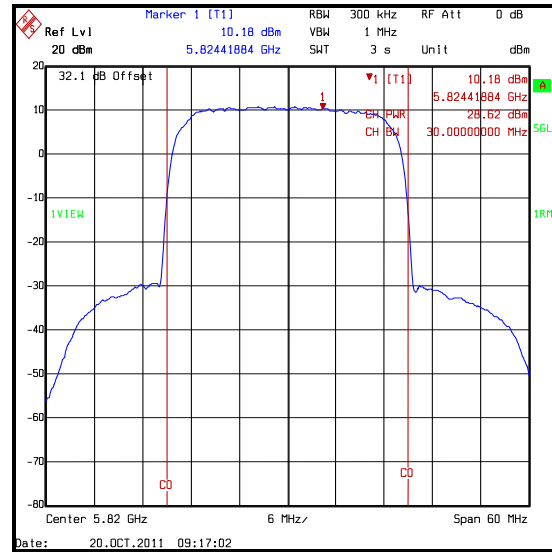
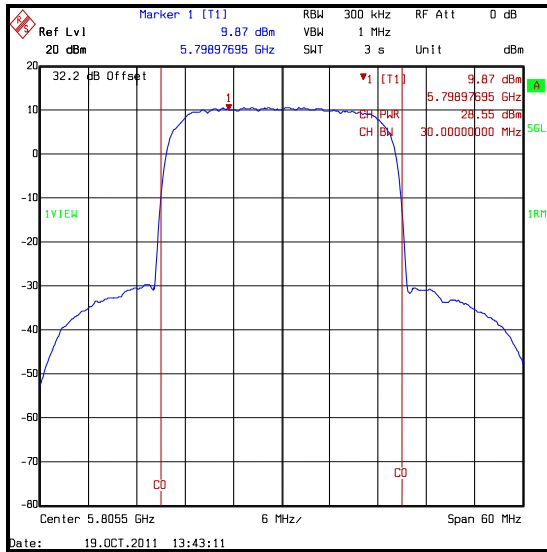
**Transmitter Maximum Average Output Power (continued)****Results: 20 MHz QPSK**

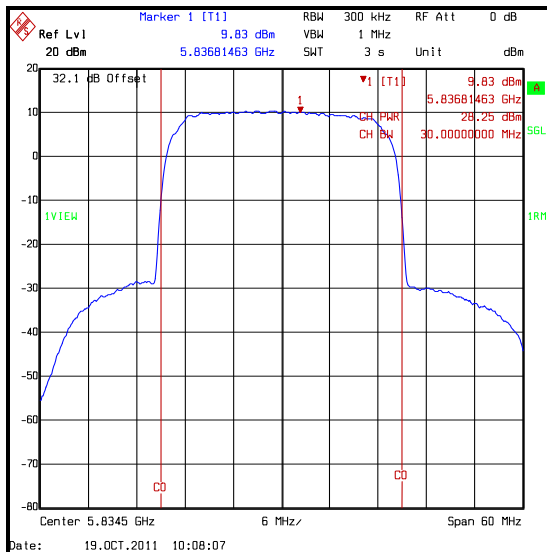
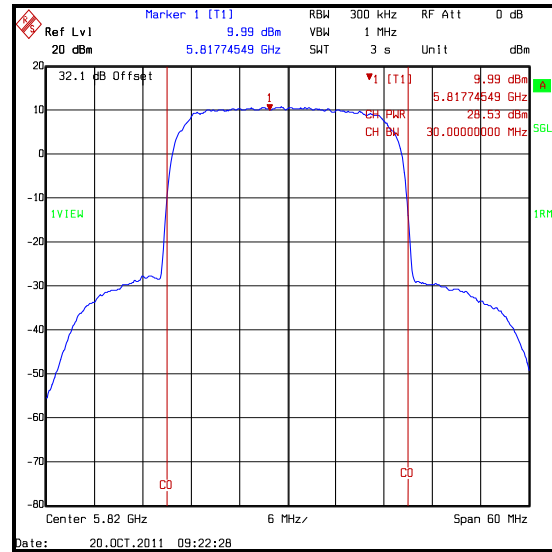
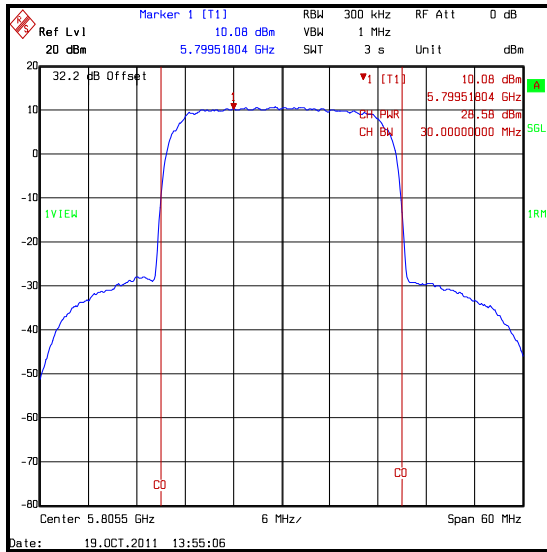
**Transmitter Maximum Average Output Power (continued)****Results: 20 MHz 16QAM**

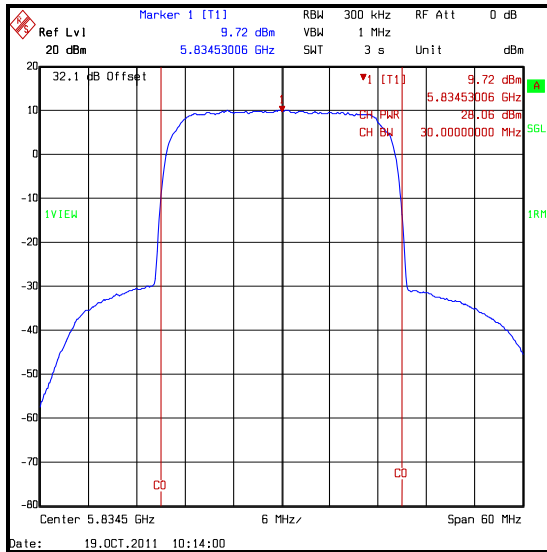
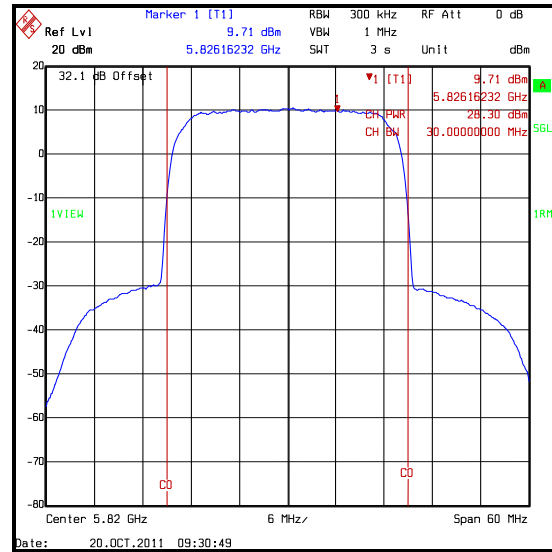
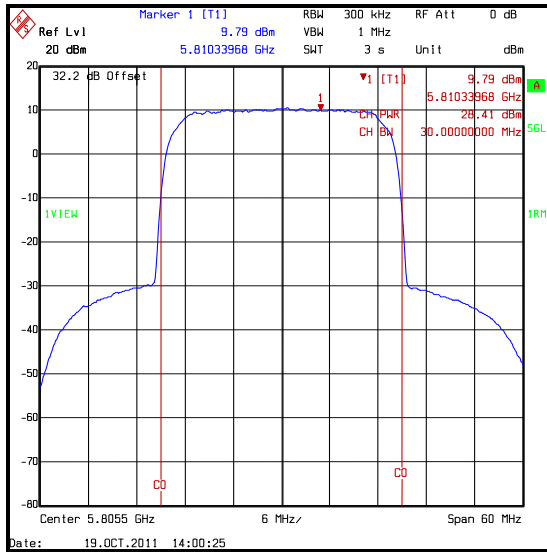


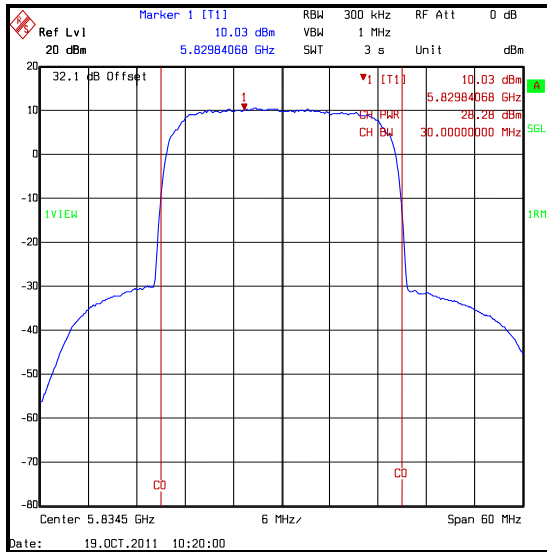
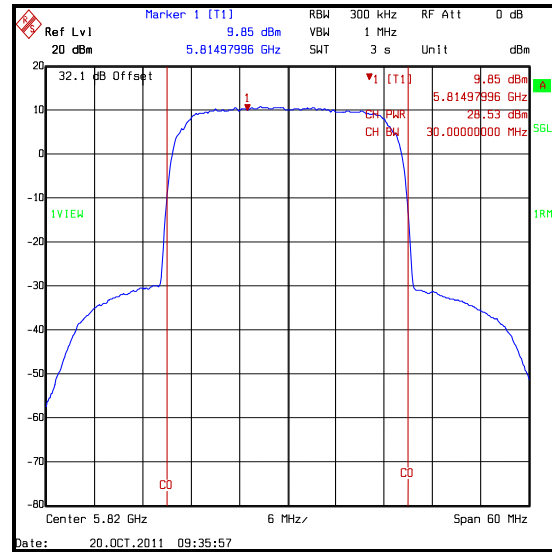
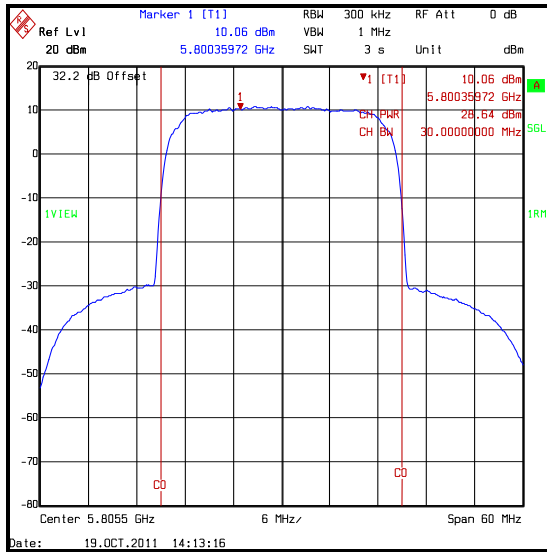
**Transmitter Maximum Average Output Power (continued)****Results: 20 MHz 64QAM**

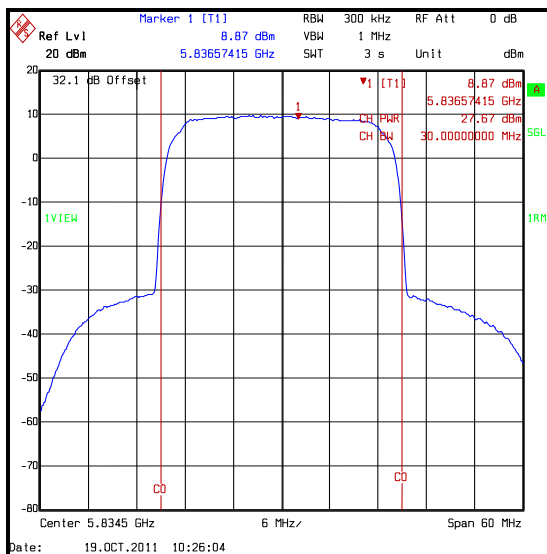
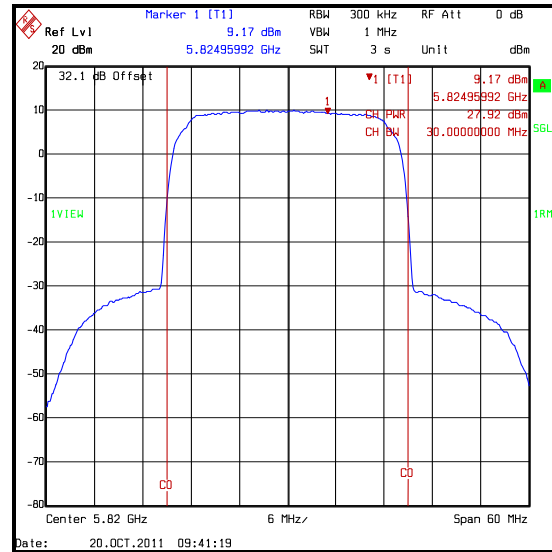
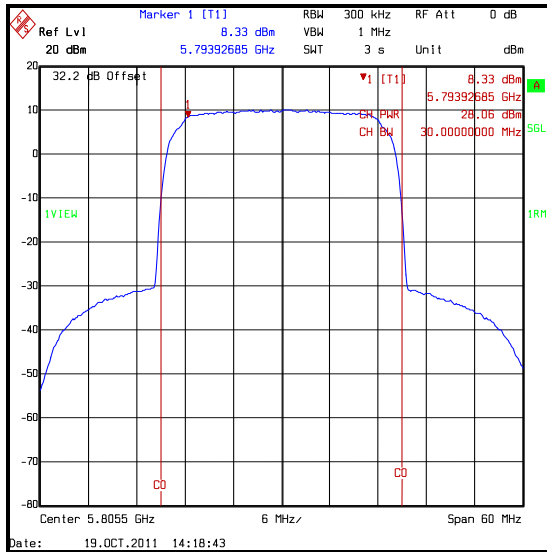
**Transmitter Maximum Average Output Power (continued)****Results: 20 MHz 256QAM**

**Transmitter Maximum Average Output Power (continued)****Results: 30 MHz QPSK**

**Transmitter Maximum Average Output Power (continued)****Results: 30 MHz 16QAM**

**Transmitter Maximum Average Output Power (continued)****Results: 30 MHz 64QAM**

**Transmitter Maximum Average Output Power (continued)****Results: 30 MHz 128QAM**

**Transmitter Maximum Average Output Power (continued)****Results: 30 MHz 256QAM**

**5.2.6. Transmitter Radiated Emissions - 4 foot parabolic antenna****Test Summary:**

Test Engineer:	Andrew Edwards	Test Date:	12 July 2011 & 13 July 2011
Test Sample Serial No:	ZLS11200128		

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):	31
Relative Humidity (%):	28

**Results:**

Frequency (MHz)	Antenna Polarity	Raw Level (dB $\mu$ V/m)	Correction Factor (dB)	Corrected Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Margin (dB)
102.014	Vertical	51.6	-17.3	34.3	43.5	9.2	9.2
249.999	Horizontal	60.0	-14.2	45.8	46.0	0.2	0.2
327.596	Horizontal	56.8	-11.5	45.3	46.0	0.7	0.7
409.095	Vertical	53.8	-9.2	44.6	46.0	1.4	1.4
655.169	Vertical	45.0	-3.8	41.2	46.0	4.8	4.8

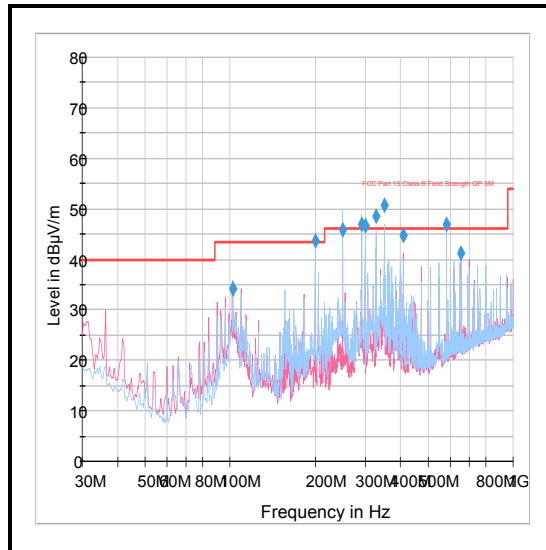
- The Correction factor shown includes the culmination of the antenna factor, cable loss and pre-amplification with the test system.



**Note(s):**

1. Spurious emissions were performed with the EUT operating at 10 MHz QPSK, as this was observed to give the highest output power and therefore deemed to be worst case.
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.
5. The following emissions were investigated using a peak detector and found to be in the non restricted band, therefore the -20dBc was applied instead of 15.209 limits. All emissions in the non restricted band were at least 20dB from the dBc limit, and were therefore not included with the final measurements.

199.998 MHz, 291.197 MHz, 300.002 MHz, 349.985 MHz and 582.420 MHz.

**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>	Andrew Edwards & Nick Steele	<b>Test Date:</b>	12 July 2011 & 13 July 2011
<b>Test Sample Serial No:</b>	ZLS11200128		

<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 40 GHz

**Environmental Conditions:**

<b>Temperature (°C):</b>	30
<b>Relative Humidity (%):</b>	25

**Results:****Results: Peak**

Frequency (MHz)	Antenna Polarity	Raw Level (dBµV/m)	Correction Factor (dB)	Corrected Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Margin (dB)
17924.400	Vertical	38.0	21.6	59.6	74.0	14.4	Complied

**Results: Average**

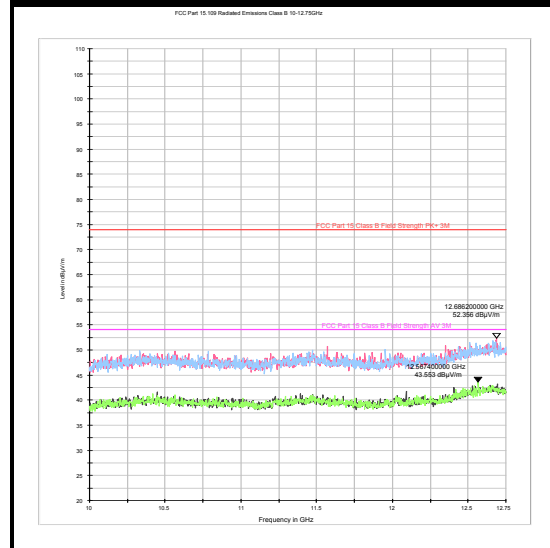
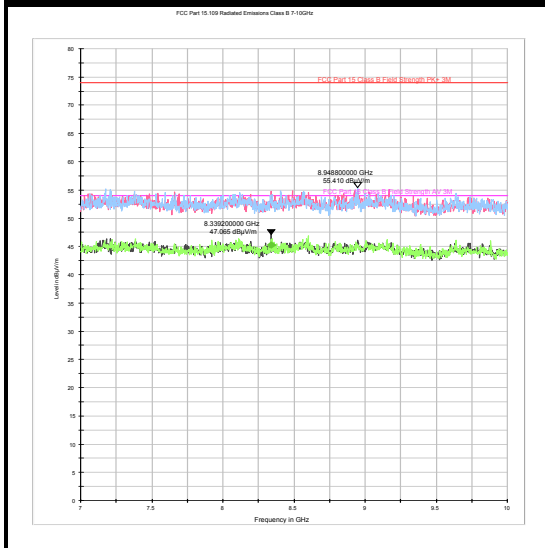
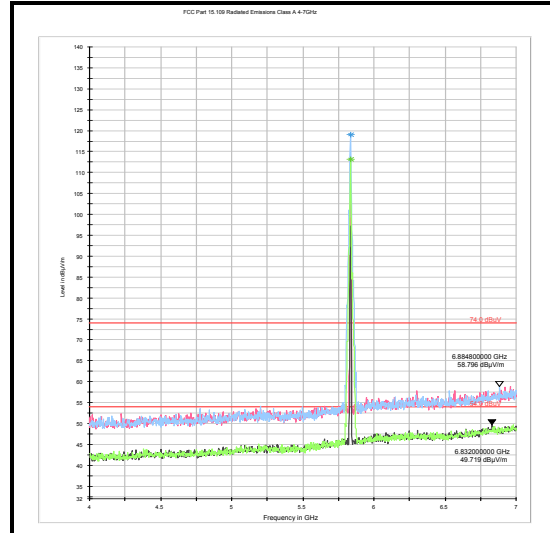
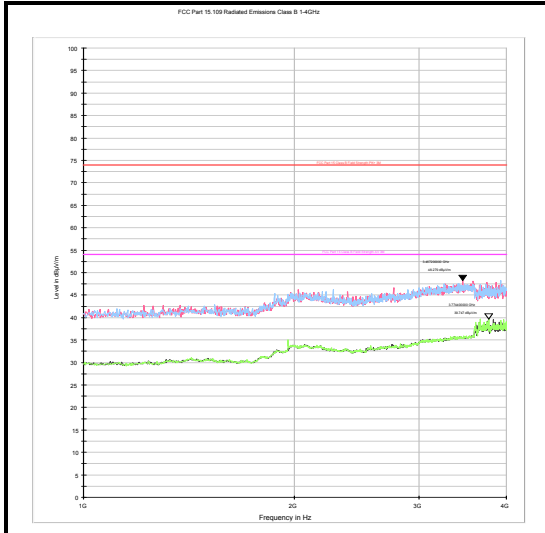
Frequency (MHz)	Antenna Polarity	Raw Level (dBµV/m)	Correction Factor (dB)	Corrected Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Margin (dB)
6832.000	Vertical	39.7	10	49.7	54.0	4.3	Complied

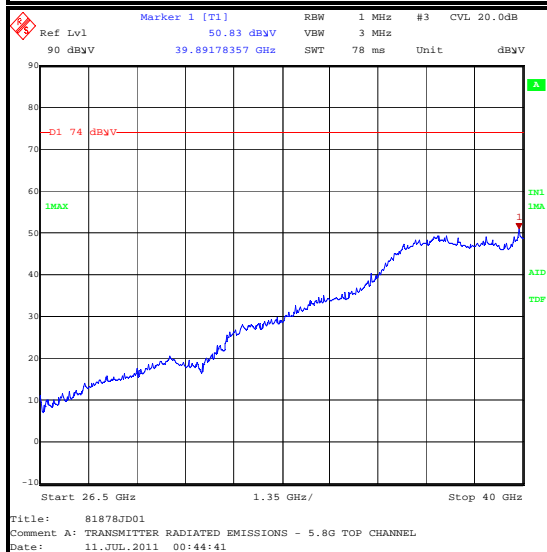
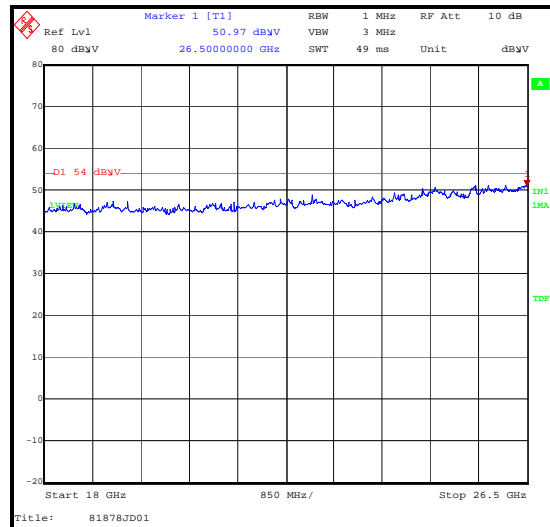
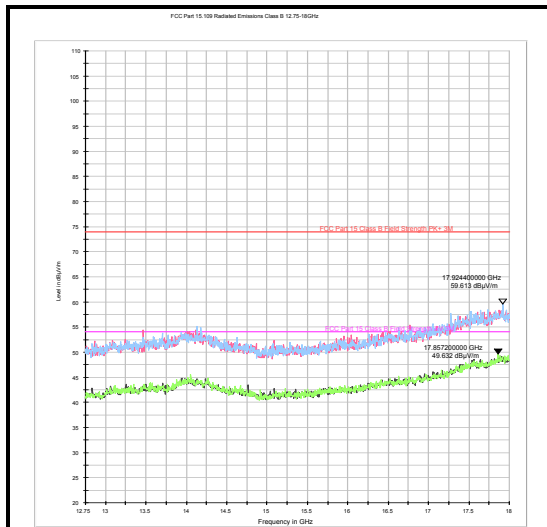
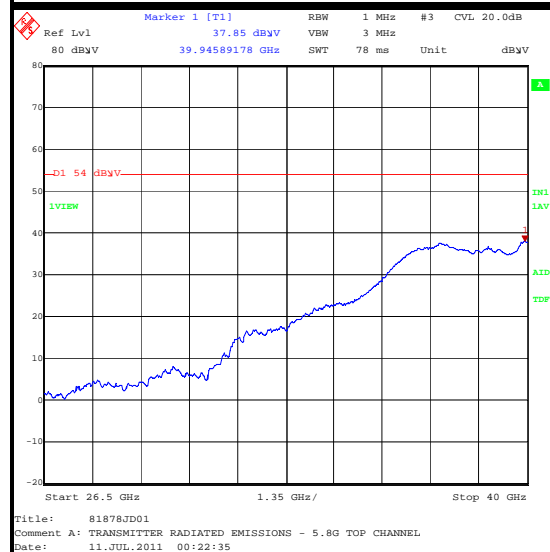
- The Correction factor shown includes the culmination of the antenna factor, cable loss and pre-amplification with the test system.

**Note(s):**

- Spurious emissions were performed with the EUT operating at 10 MHz QPSK, as this was observed to give the highest output power and therefore deemed to be worst case.
- No spurious emissions were detected above the noise floor of the measuring receiver, therefore the highest peak and Average noise floor reading of the measuring receiver was recorded as shown in the table above. The peak and average levels was compared to their appropriate limits.
- The emission shown at 5835 MHz on the 1 GHz to 4 GHz plot is the EUT fundamental.
- All measurements 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.

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)****Peak Detector****Average Detector**

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

**5.2.7. Transmitter Radiated Emissions - 2 foot flat panel antenna****Test Summary:**

<b>Test Engineer:</b>	Andrew Edwards	<b>Test Date:</b>	09 September 2011
<b>Test Sample Serial No:</b>	ZLS11200128		

<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>	31
<b>Relative Humidity (%):</b>	40

**Results:**

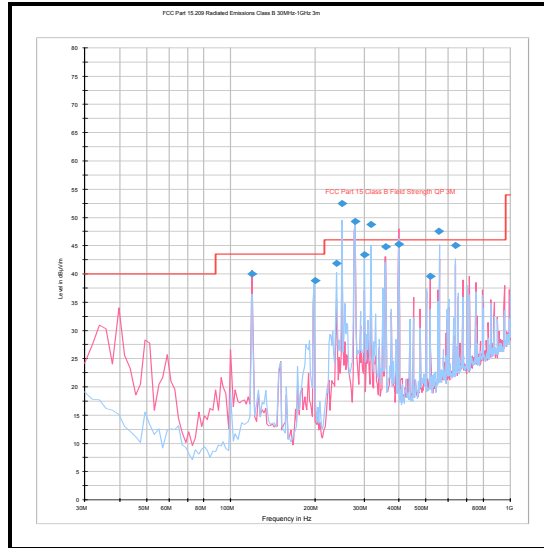
Frequency (MHz)	Antenna Polarity	Raw Level (dBµV/m)	Correction Factor (dB)	Corrected Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Margin (dB)
119.144	Vertical	55.4	-15.4	40.0	43.5	3.5	Complied
199.969	Horizontal	55.7	-16.9	38.8	43.5	4.7	Complied
238.298	Horizontal	56.8	-14.9	41.9	46.0	4.1	Complied
249.991	Horizontal	66.8	-14.3	52.5	56.0	3.5	Complied <sup>6</sup>
278.014	Horizontal	62.6	-13.3	49.3	56.0	6.7	Complied <sup>6</sup>
300.012	Horizontal	56.3	-12.9	43.4	46.0	2.6	Complied
357.473	Vertical	55.5	-10.7	44.8	46.0	1.2	Complied
399.987	Vertical	54.8	-9.5	45.3	46.0	0.7	Complied
516.332	Vertical	46.3	-6.7	39.6	46.0	6.4	Complied
635.497	Horizontal	49.3	-4.2	45.1	46.0	0.9	Complied

- The Correction factor shown includes the culmination of the antenna factor, cable loss and pre-amplification with the test system.

**Transmitter Radiated Emissions - 2 foot flat panel antenna (continued)****Note(s):**

1. Spurious emissions were performed with the EUT operating at 10 MHz QPSK, as this was observed to give the highest output power and therefore deemed to be worst case.
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.
5. The emissions at 317.738 MHz and 556.048 MHz are in the non restricted band therefore the limit is -20 dBc.
6. The emissions at 249.991MHz and 278.014 MHz were identified as being independent of the transmitter, being able to be observed even when the transmitter was disabled. The general Class A limits identified in Part 15.109 have therefore been applied to these emissions.



**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>	Andrew Edwards	<b>Test Date:</b>	09 September 2011
<b>Test Sample Serial No:</b>	ZLS11200128		

<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 40 GHz

**Environmental Conditions:**

<b>Temperature (°C):</b>	28
<b>Relative Humidity (%):</b>	23

**Results:****Results: Peak**

Frequency (MHz)	Antenna Polarity	Raw Level (dBμV/m)	Correction Factor (dB)	Corrected Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Margin (dB)
17610.721	Vertical	39.7	21.0	60.7	74.0	13.3	Complied

**Results: Average**

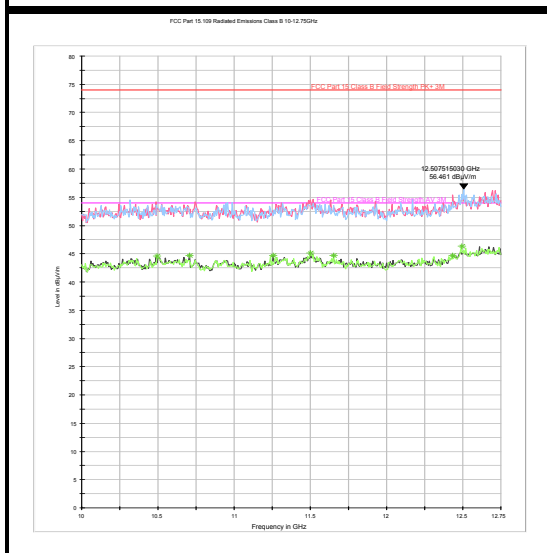
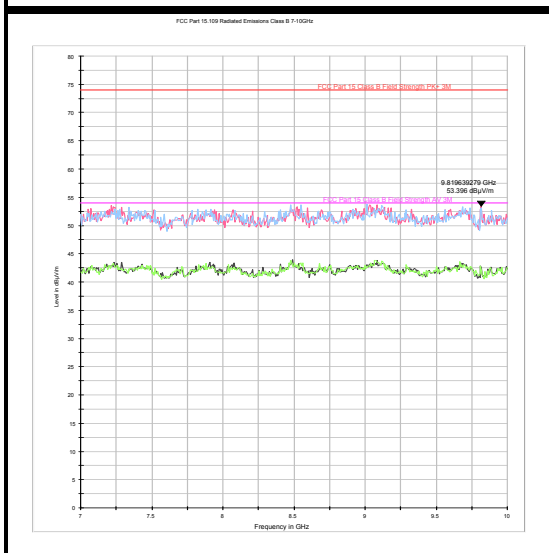
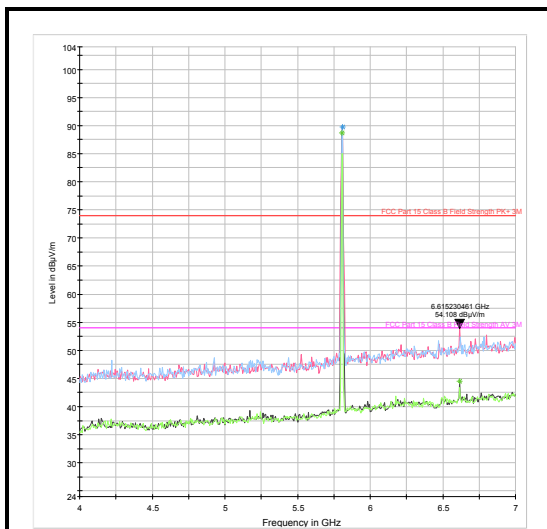
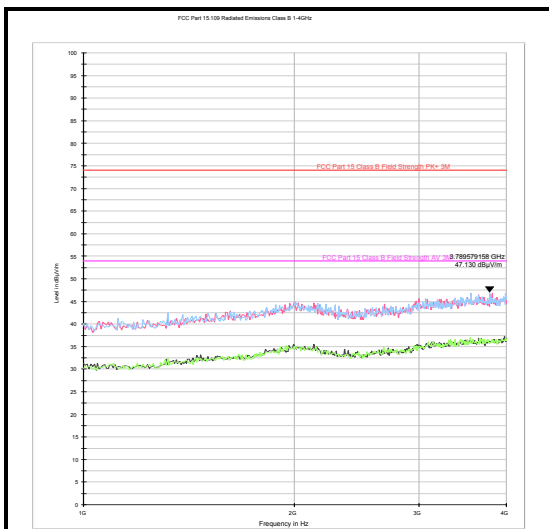
Frequency (MHz)	Antenna Polarity	Raw Level (dBμV/m)	Correction Factor (dB)	Corrected Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Margin (dB)
17915.832	Vertical	28.6	21.6	50.2	54.0	3.8	Complied

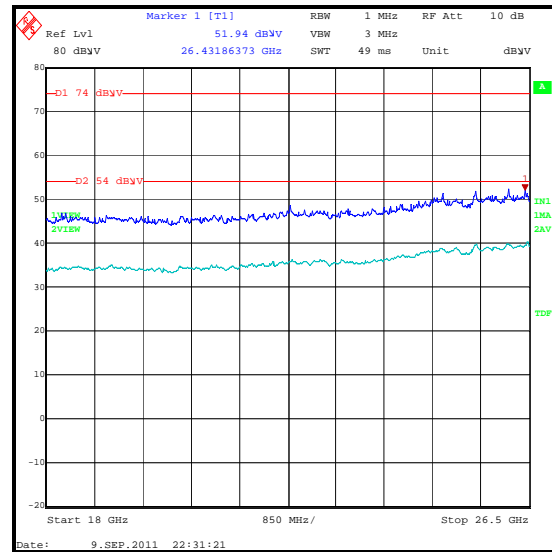
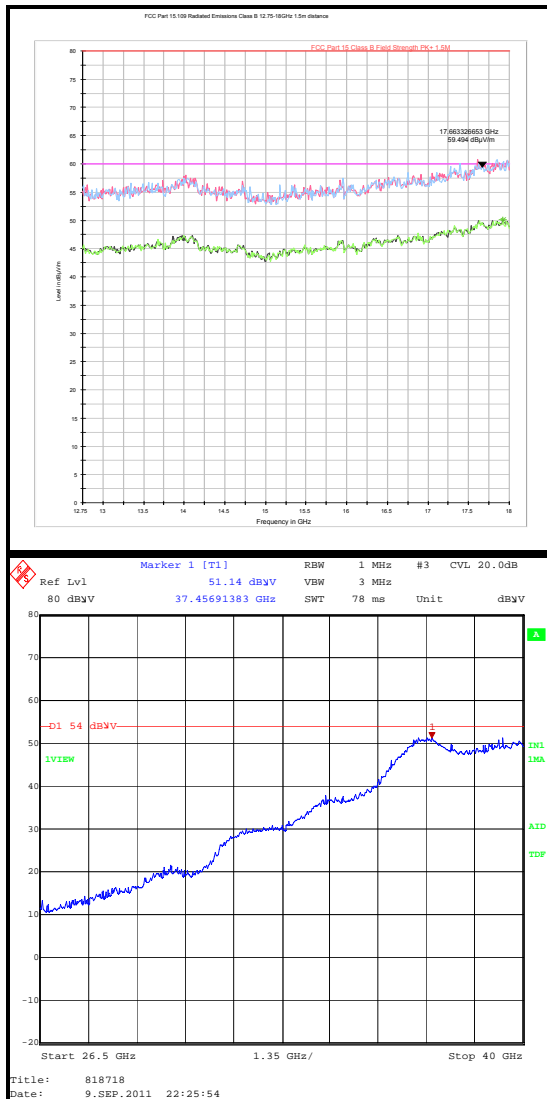
- The Correction factor shown includes the culmination of the antenna factor, cable loss and pre-amplification with the test system.

**Note(s):**

- Spurious emissions were performed with the EUT operating at 10 MHz QPSK, as this was observed to give the highest output power and therefore deemed to be worst case.
- No spurious emissions were detected above the noise floor of the measuring receiver, therefore the highest peak and Average noise floor reading of the measuring receiver was recorded as shown in the table above. The peak and average levels was compared to their appropriate limits.
- The final measured value, for the given emission, in the table above incorporates the calibrated antenna factor and cable loss
- The emission shown 5835 MHz on the 1 GHz to 4 GHz plot is the EUT fundamental.
- All measurements 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.

6. *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)**

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

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

<b>Test Engineer:</b>	Sarah Williams	<b>Test Date:</b>	19 October 2011
<b>Test Sample Serial No:</b>	ZLS11200128		

<b>FCC Part:</b>	15.247(d)
<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>	33

**Results: 5 MHz 128QAM**

Frequency (MHz)	Level (dBc)	Limit (dBc)	Margin (dB)	Result
5725.0	-66.6	-18.6*	48.0	Complied
5850.0	-33.0	-18.5*	14.5	Complied

**Results: 10 MHz QPSK**

Frequency (MHz)	Level (dBc)	Limit (dBc)	Margin (dB)	Result
5725.0	-66.6	-19.6*	47.0	Complied
5850.0	-31.4	-19.5*	11.9	Complied

**Results: 10 MHz 16QAM**

Frequency (MHz)	Level (dBc)	Limit (dBc)	Margin (dB)	Result
5725.0	-66.6	-19.8*	46.8	Complied
5850.0	-29.9	-19.5*	10.4	Complied

**Results: 10 MHz 64QAM**

Frequency (MHz)	Level (dBc)	Limit (dBc)	Margin (dB)	Result
5725.0	-66.6	-20.1*	46.5	Complied
5850.0	-31.4	-19.9*	11.5	Complied

**Transmitter Band Edge Conducted Emissions (continued)****Results: 10MHz 128QAM**

Frequency (MHz)	Level (dBc)	Limit (dBc)	Margin (dB)	Result
5725.0	-66.6	-21.0*	45.6	Complied
5850.0	-34.5	-21.1*	13.4	Complied

**Results: 10 MHz 256QAM**

Frequency (MHz)	Level (dBc)	Limit (dBc)	Margin (dB)	Result
5725.0	-66.6	-20.1*	46.5	Complied
5850.0	-32.3	-20.0*	12.3	Complied

**Results: 20 MHz QPSK**

Frequency (MHz)	Level (dBc)	Limit (dBc)	Margin (dB)	Result
5725.0	-66.6	-22.4*	44.2	Complied
5850.0	-35.1	-22.1*	13.0	Complied

**Results: 20 MHz 16QAM**

Frequency (MHz)	Level (dBc)	Limit (dBc)	Margin (dB)	Result
5725.0	-66.6	-22.6*	44.0	Complied
5850.0	-32.7	-22.3*	10.4	Complied

**Results: 20 MHz 64QAM**

Frequency (MHz)	Level (dBc)	Limit (dBc)	Margin (dB)	Result
5725.0	-66.6	-22.8*	43.8	Complied
5850.0	-34.1	-22.4*	11.7	Complied

**Results: 20 MHz 256QAM**

Frequency (MHz)	Level (dBc)	Limit (dBc)	Margin (dB)	Result
5725.0	-66.6	-23.0*	43.6	Complied
5850.0	-34.1	-23.0*	11.1	Complied

**Transmitter Band Edge Conducted Emissions (continued)****Results: 30 MHz QPSK**

Frequency (MHz)	Level (dBc)	Limit (dBc)	Margin (dB)	Result
5725.0	-66.6	-24.0*	42.6	Complied
5850.0	-31.7	-23.9*	7.8	Complied

**Results: 30 MHz 16QAM**

Frequency (MHz)	Level (dBc)	Limit (dBc)	Margin (dB)	Result
5725.0	-66.6	-24.0*	42.6	Complied
5850.0	-31.5	-24.0*	7.5	Complied

**Results: 30 MHz 64QAM**

Frequency (MHz)	Level (dBc)	Limit (dBc)	Margin (dB)	Result
5725.0	-66.6	-24.3*	42.3	Complied
5850.0	-33.0	-24.2*	8.8	Complied

**Results: 30MHz 128QAM**

Frequency (MHz)	Level (dBc)	Limit (dBc)	Margin (dB)	Result
5725.0	-66.6	-23.8*	42.8	Complied
5850.0	-32.3	-24.1*	8.2	Complied

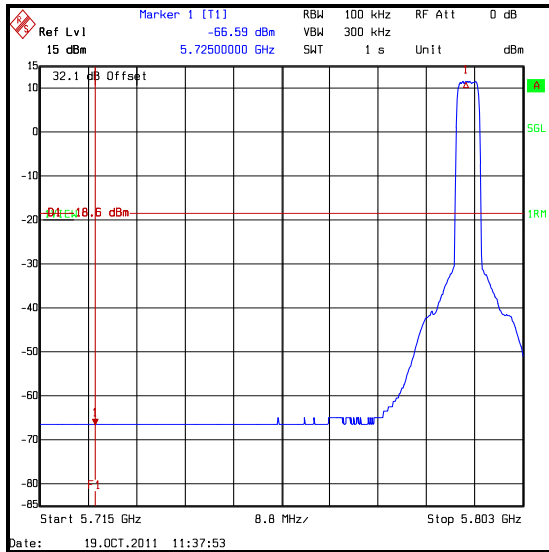
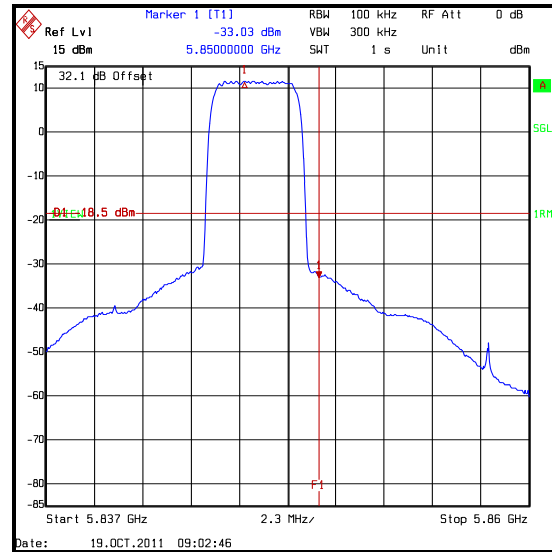
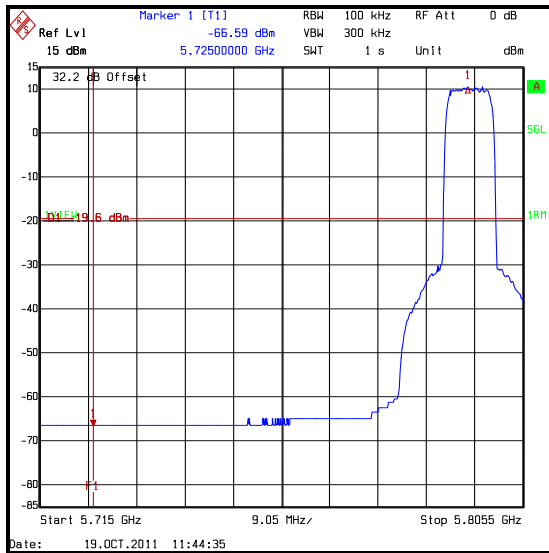
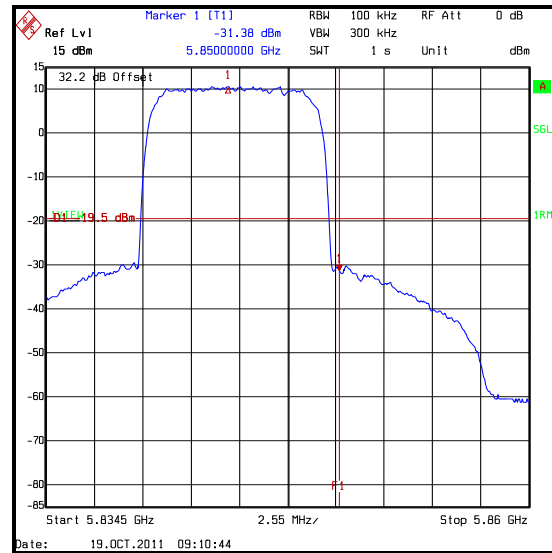
**Results: 30 MHz 256QAM**

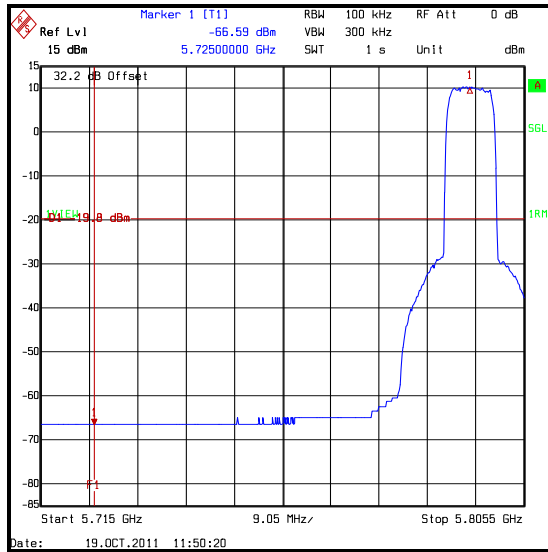
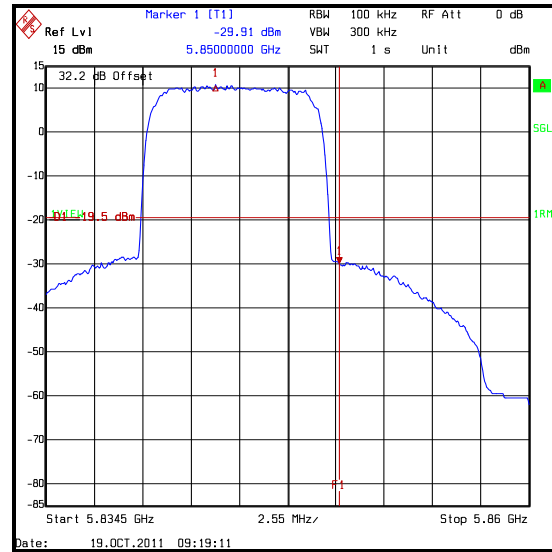
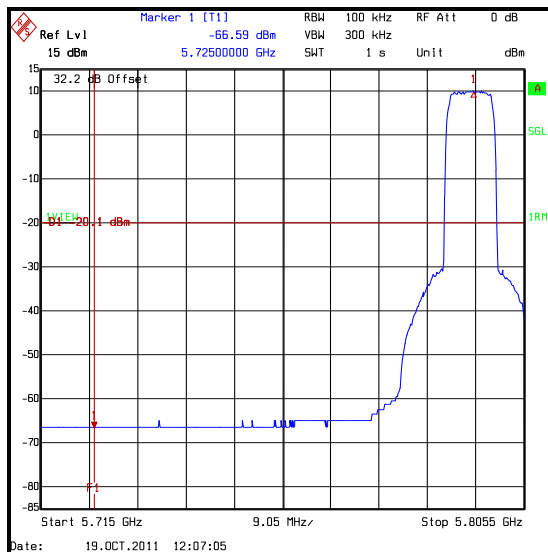
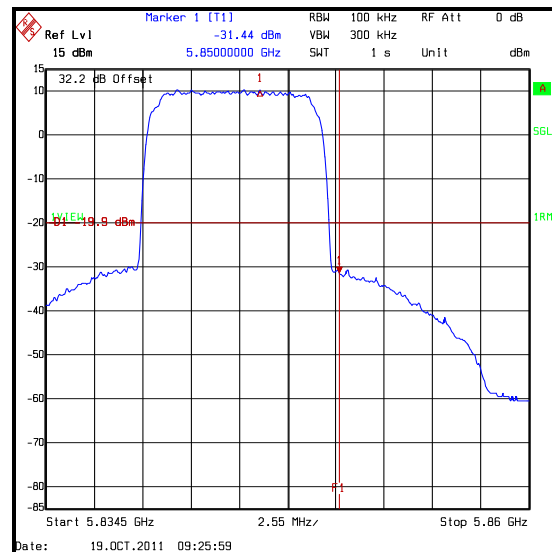
Frequency (MHz)	Level (dBc)	Limit (dBc)	Margin (dB)	Result
5725.0	-66.6	-24.6*	42.0	Complied
5850.0	-33.1	-24.7*	8.4	Complied

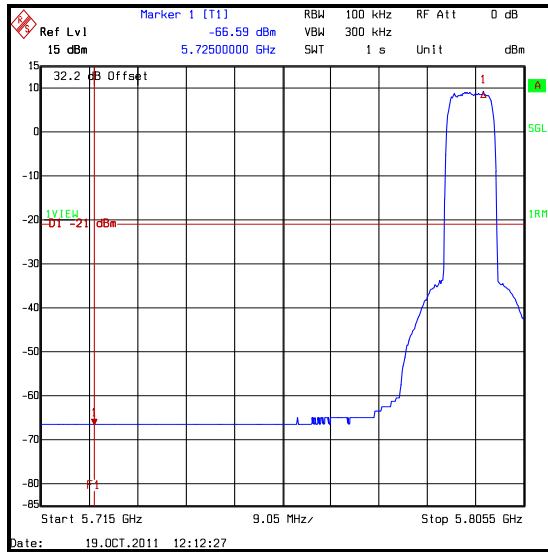
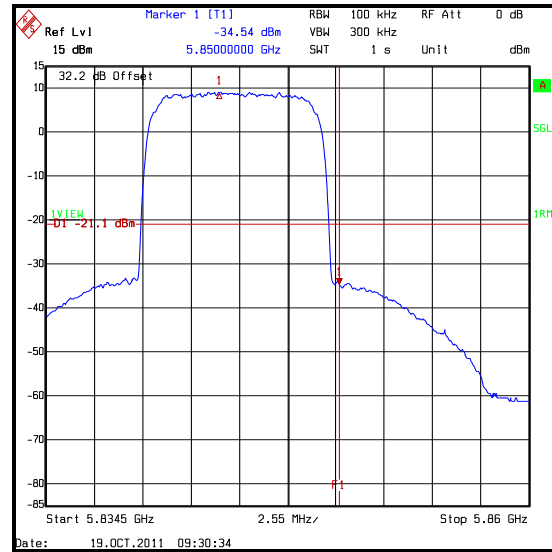
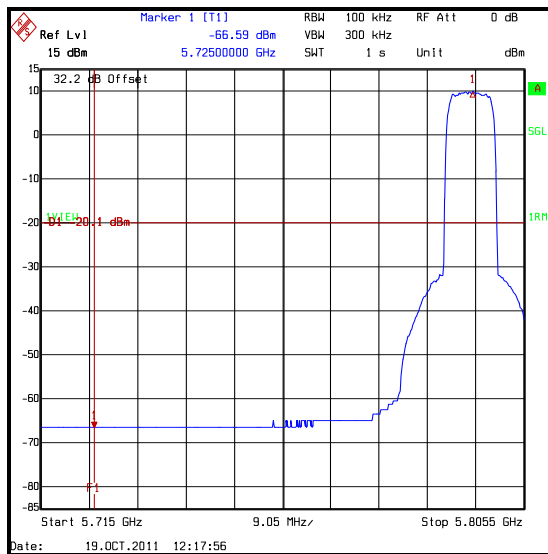
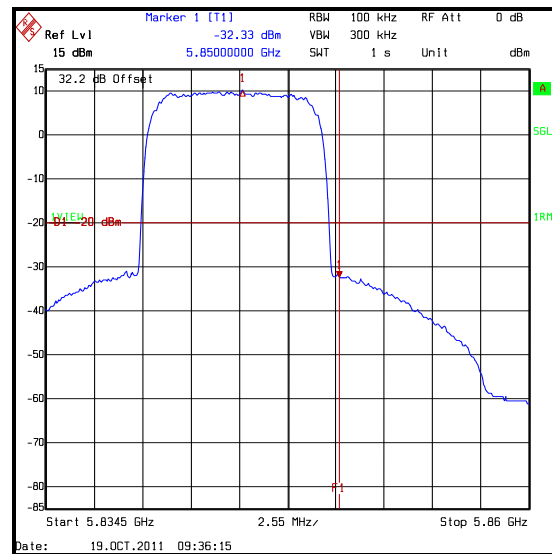
**Note(s)**

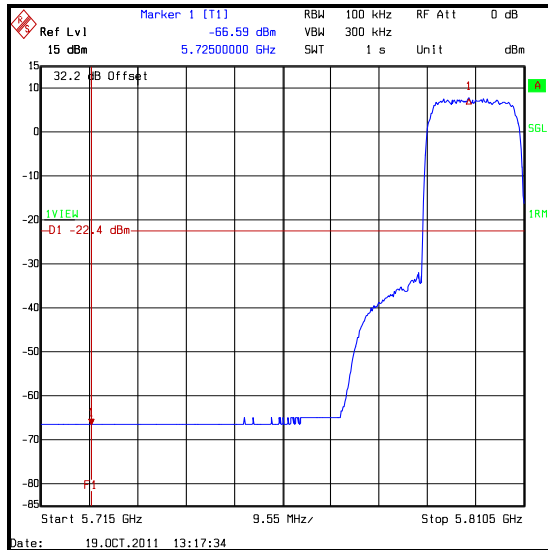
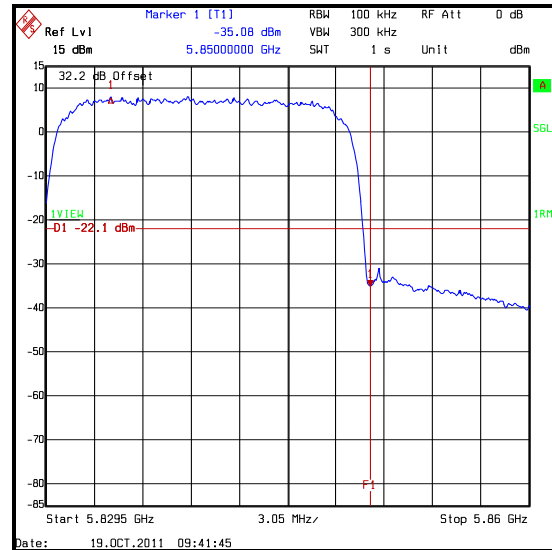
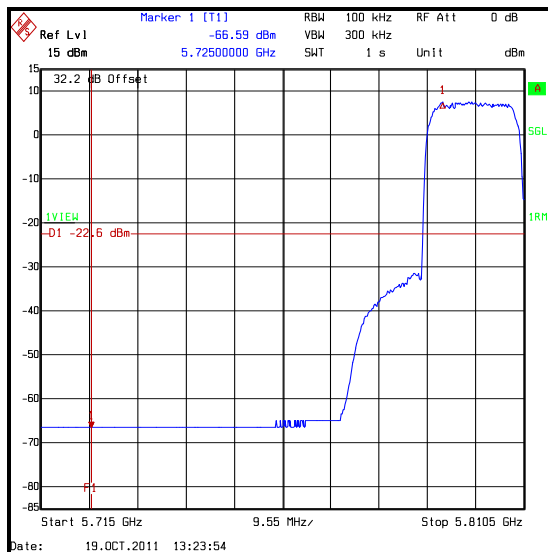
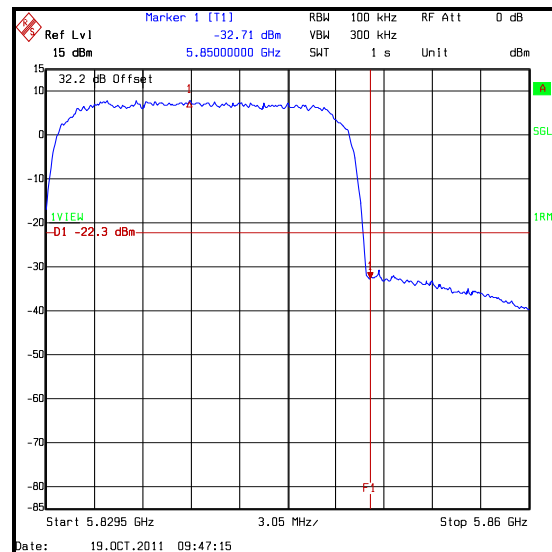
1. \*- 30 dBc limit

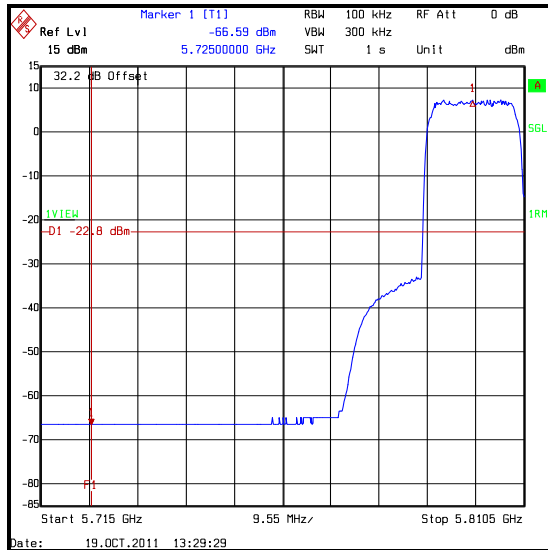
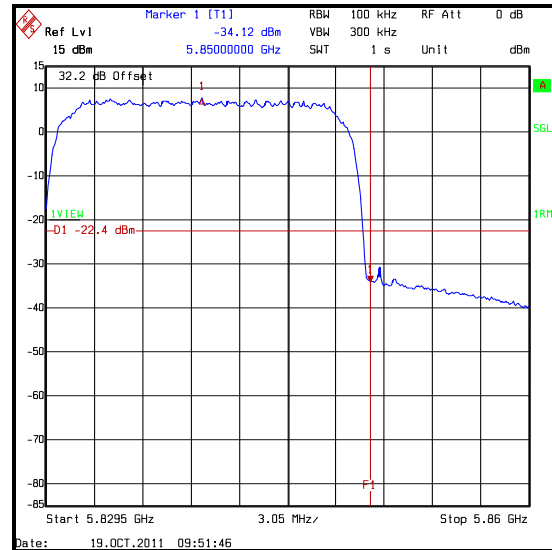
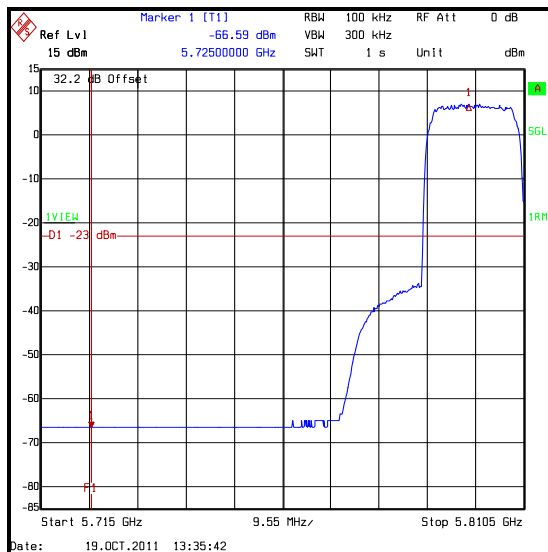
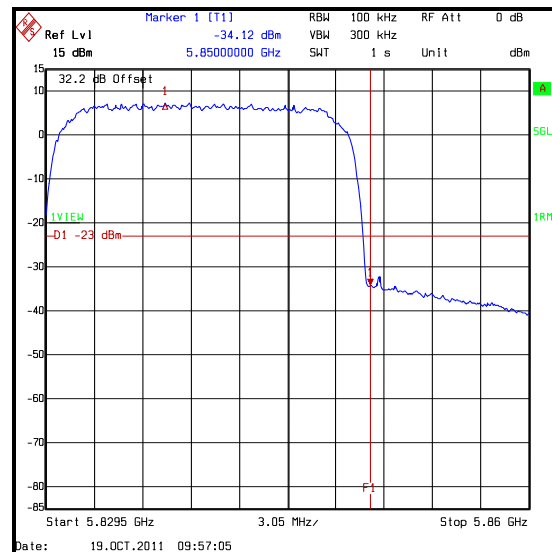


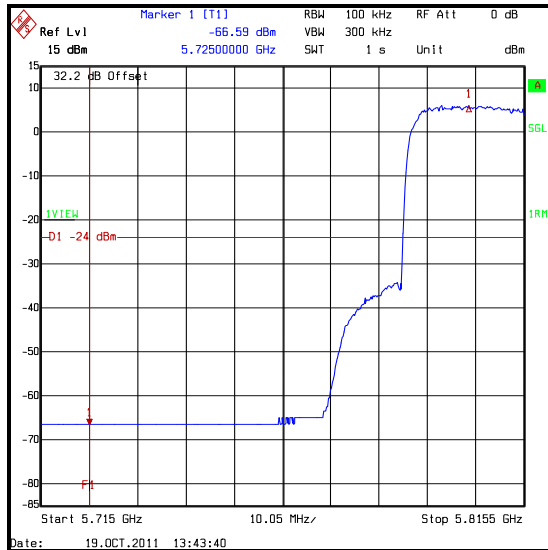
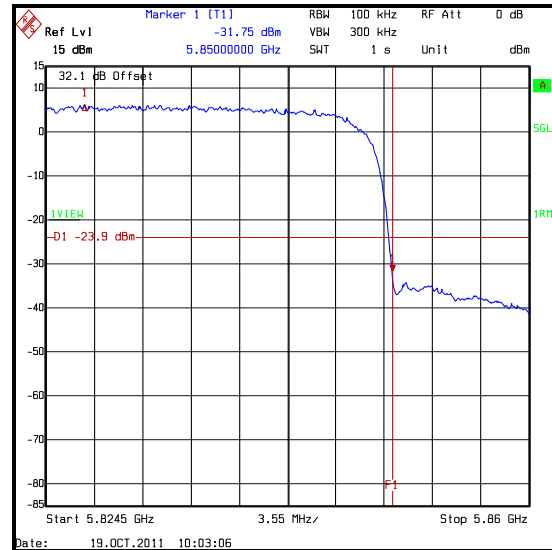
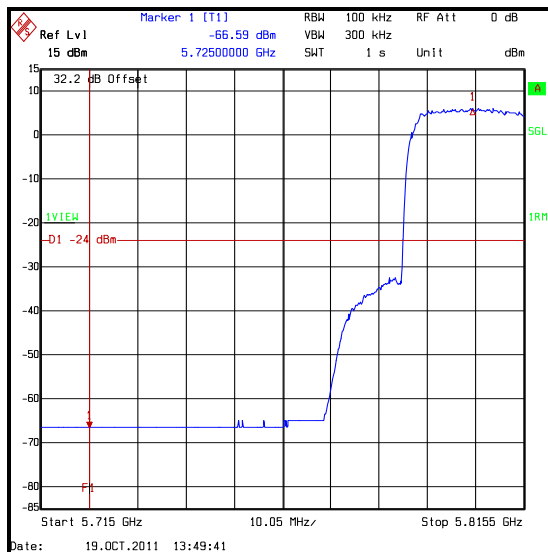
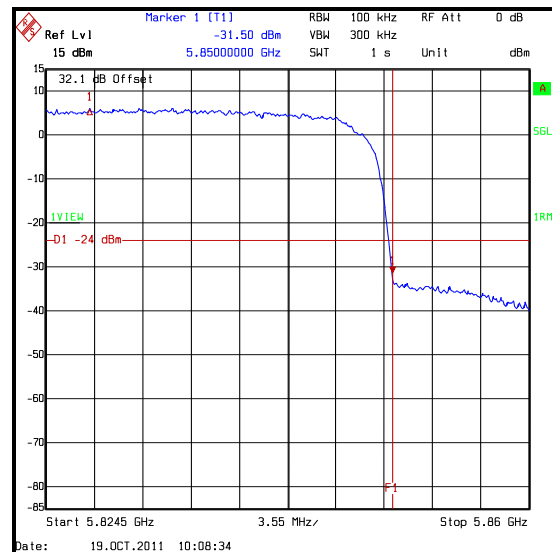
**Transmitter Band Edge Conducted Emissions (continued)****Results: 5 MHz 128QAM****Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement****Results: 10 MHz QPSK****Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

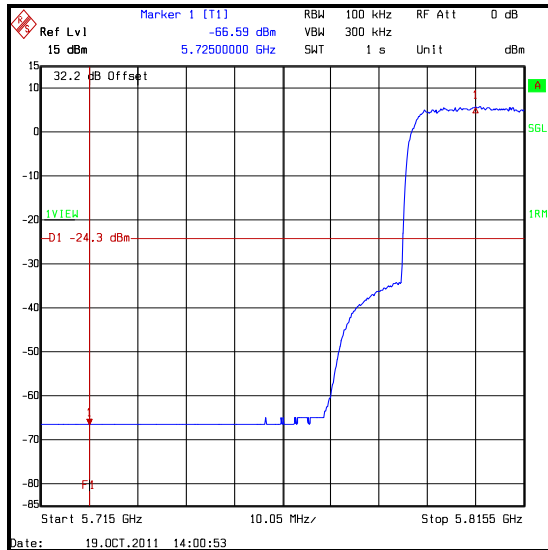
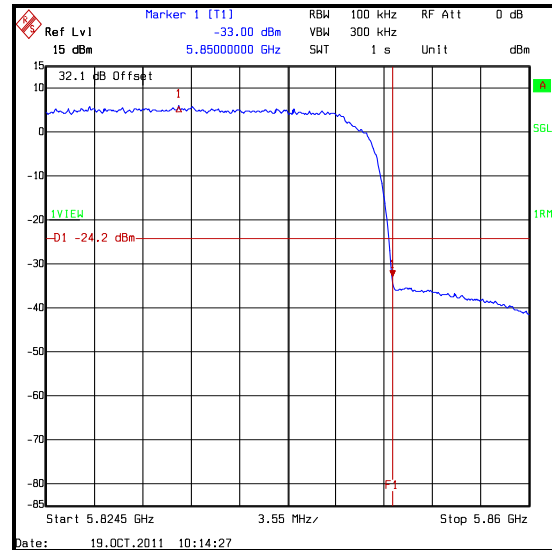
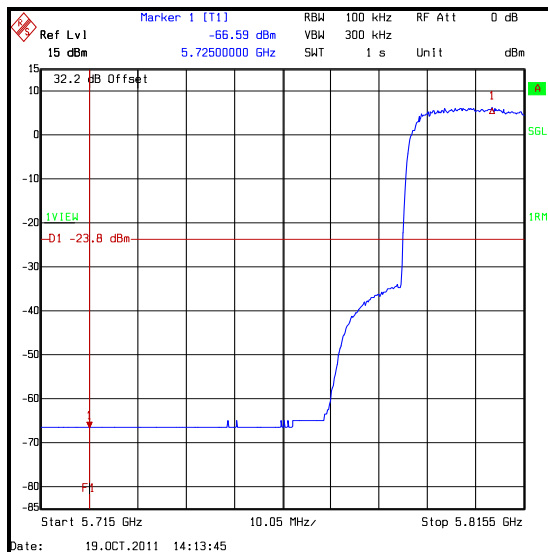
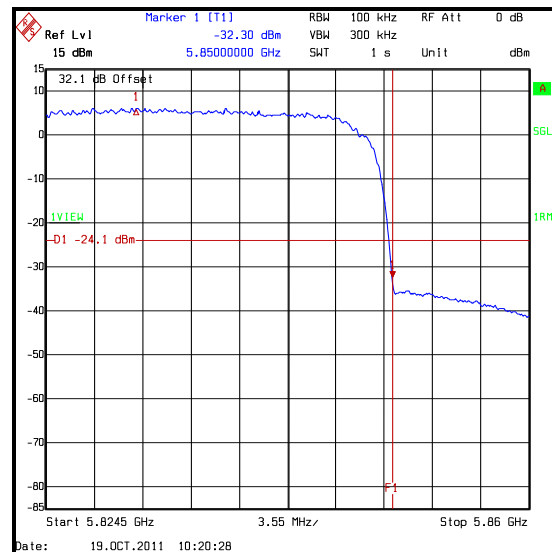
**Transmitter Band Edge Conducted Emissions (continued)****Results: 10 MHz 16QAM****Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement****Results: 10 MHz 64QAM****Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

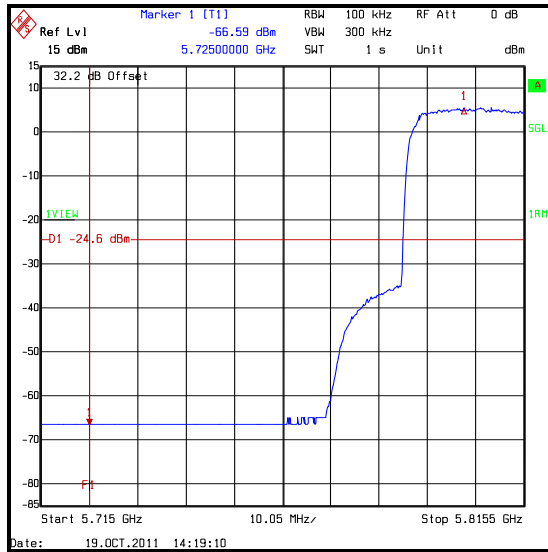
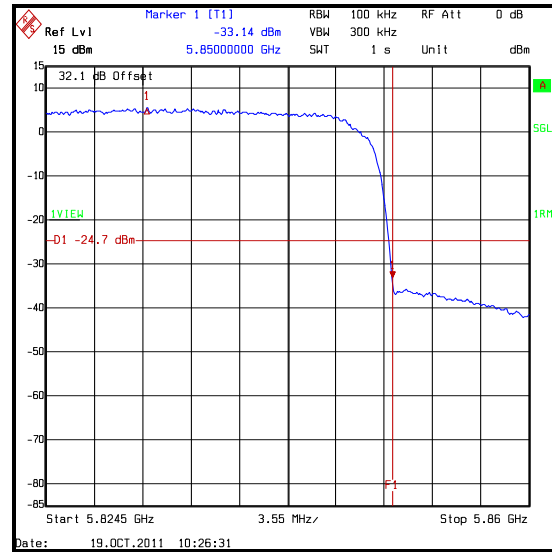
**Transmitter Band Edge Conducted Emissions (continued)****Results: 10MHz 128QAM****Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement****Results: 10 MHz 256QAM****Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

**Transmitter Band Edge Conducted Emissions (continued)****Results: 20 MHz QPSK****Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement****Results: 20 MHz 16QAM****Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

**Transmitter Band Edge Conducted Emissions (continued)****Results: 20 MHz 64QAM****Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement****Results: 20 MHz 256QAM****Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

**Transmitter Band Edge Conducted Emissions (continued)****Results: 30 MHz QPSK****Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement****Results: 30 MHz 16QAM****Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

**Transmitter Band Edge Conducted Emissions (continued)****Results: 30 MHz 64QAM****Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement****Results: 30 MHz 128QAM****Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

**Transmitter Band Edge Conducted Emissions (continued)****Results: 30 MHz 256QAM****Lower Band Edge Peak Measurement****Upper Band Edge Peak 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	5.8 GHz to 5.85 GHz	95%	±0.27 dB
Spectral Power Density	5.8 GHz to 5.85 GHz	95%	±2.94 dB
6 dB Bandwidth	5.8 GHz to 5.85 GHz	95%	±0.92 ppm
20 dB Bandwidth	5.8 GHz to 5.85 GHz	95%	±0.92 ppm
Conducted Spurious Emissions	1 MHz to 25 GHz	95%	±2.62 dB
Radiated Spurious Emissions	30 MHz to 40 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	Line Impedance Stabilization Network	Rohde & Schwarz	ESH3-Z5	890603/002	02 Jun 2012	12
A1393	Attenuator	Huber & Suhner	757456	6820.17.B	08 Jul 2012	12
A1490	Attenuator	Weinschel Corp	23-30-34	BH9156	09 Feb 2012	12
A1764	Waveguide Transition	Advanced Microtek	-	-	Calibrated before use	-
A1817	Antenna	EMCO	3115	00075694	03 Feb 2012	12
A1830	Pulse Limiter	Rhode & Schwarz	ESH3-Z2	100668	05 Mar 2012	12
A1834	Attenuator	Hewlett Packard	8491B	10444	26 Jul 2012	12
A203	Antenna	Flann Microwave	22240-20	343	09 Oct 2012	36
A255	Antenna	Flann Microwave	16240-20	519	09 Oct 2012	12
A256	Antenna	Flann Microwave	18240-20	400	09 Oct 2012	12
A366	Isolator	MRI	FRR-400	169	Calibration not required	-
A436	Antenna	Flann Microwave	20240-20	330	09 Oct 2012	12
A553	Antenna	Chase	CBL6111A	1593	26 Mar 2012	12
C363	Cable	Rosenberger	RG142	None	05 Mar 2012	12
G0565	Telecom DC Power Supply	Hewlett Packard	E4356A	US3929010 2	Calibrated before use	-
K0001	5m Semi-Anechoic Chamber	Rainford EMC	N/A	N/A	29 May 2012	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	05 Sep 2011	12
M1124	Spectrum Analyser	Rohde & Schwarz	ESL26	100046K	29 Jun 2012	12
M1242	Spectrum Analyser	Rohde & Schwarz	FSEM30	845986/022	03 Dec 2011	12
M1263	Test Receiver	Rohde & Schwarz	ESIB7	100265	13 Jul 2012	12
M1273	Test Receiver	Rohde & Schwarz	ESIB 26	100275	04 Feb 2012	12
M1390	Harmonic Mixer	Farran Technology	WHMP 28	FTL1677B	Calibrated before use	12
M1590	ESU 26	Rohde & Schwarz	ESU26	100239	15 Jun 2012	12

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