



## TEST REPORT FROM RFI GLOBAL SERVICES LTD

Test of: StarMAX 8200-25

To: FCC Part 27: 2008 Subpart C

**Test Report Serial No:**  
RFI/RPT3/RP75353JD07A

**Supersedes Test Report Serial No:**  
RFI/RPT2/RP7353JD07A

<b>This Test Report Is Issued Under The Authority Of Brian Watson, Operations Director:</b>	
	
<b>Checked By:</b>	Nigel Davison
<b>Signature:</b>	
<b>Date of Issue:</b>	18 December 2009

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**1. Customer Information**
















<b>Company Name:</b>	Harris Stratex Networks
<b>Address:</b>	4 Bell Drive Hamilton International Technology Park Blantyre, Lanarkshire Scotland G72 0FB

## 2. Summary of Testing

### 2.1. General Information

<b>Specification Reference:</b>	47CFR27
<b>Specification Title:</b>	Code of Federal Regulations Volume 47 (Telecommunications) 2008: Part 27 Subpart C (Miscellaneous Wireless Communication Services)
<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>	12 November 2009 to 30 November 2009

### 2.2. Summary of Test Results

FCC Reference (47CFR)	Measurement	Port Type	Result
FCC Part 15.107	Idle Mode AC Conducted Spurious Emissions	AC Mains	
FCC Part 15.109	Idle Mode Radiated Spurious Emissions	Enclosure	
FCC Part 15.207	Transmitter AC Conducted Spurious Emissions	AC Mains	
FCC Part 2.1046 FCC Part 27.50	Transmitter Carrier Output Power	Antenna Terminals	
FCC Part 27.50	Transmitter Equivalent Isotropic Radiated Power (EIRP)	Enclosure	
FCC Part 2.1049	Transmitter Occupied Bandwidth	Antenna Terminals	
FCC Part 27.53	Transmitter 6 dB Bandwidth and 26 dB Bandwidth	Antenna Terminals	
FCC Part 2.1055 FCC Part 27.54	Transmitter Frequency Stability (Temperature Variation)	Antenna Terminals	
FCC Part 2.1055 FCC Part 27.54	Transmitter Frequency Stability (Voltage Variation)	Antenna Terminals	
FCC Part 2.1051 FCC Part 27.53	Transmitter Conducted Emissions	Antenna Terminals	
FCC Part 2.1051 FCC Part 27.53	Transmitter Band Edge Conducted Emissions	Antenna Terminals	
FCC Part 2.1051 FCC Part 27.53	Transmitter Radiated Spurious Emissions	Enclosure	
FCC Part 2.1051 FCC Part 27.53	Transmitter Band Edge Radiated Emissions	Enclosure	
<b>Key to Results</b>  = Complied  = Did not comply			

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

<b>Reference:</b>	ANSI/TIA-603-C-2004
<b>Title:</b>	Land Mobile Communications Equipment, Measurements and performance Standards
<b>Reference:</b>	ANSI C63.4 (2003)
<b>Title:</b>	American National Standard Methods of Measurement of Electromagnetic Emissions from Low Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

### **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>Description:</b>	Base Station – Outdoor Unit
<b>Brand Name:</b>	Harris Stratex Networks
<b>Product:</b>	StarMAX 8200-25
<b>Model Name or Number:</b>	8200-25-10-01
<b>Serial Number:</b>	TCM09381117
<b>Unit Code:</b>	AX01081T24961070000-101 Rev.F
<b>Hardware Version:</b>	Carrier board : 0 ODU 2 hardware type: DPD-CDRS-CPRI-1-WiMax
<b>Software Version:</b>	Carrier board : 3.6.3 ODU 2 software version: 6328 ODU 2 software build: 3263
<b>FCC ID Number:</b>	VPX-8200-25A

<b>Description:</b>	Base Station – Indoor Unit
<b>Brand Name:</b>	Harris Stratex Networks
<b>Product:</b>	StarMAX 6100
<b>OEM Code:</b>	6112-00-00-001
<b>Serial Number:</b>	MLI18180801817
<b>Hardware Version:</b>	StarMAX Chassis: PTZ6010BA0A0 ACB Board: 402-0008-045
<b>Software Version:</b>	System software version: 4.1.1.1 Kernel: 4.1.1.1 Application: 4.1.1.1

<b>Description:</b>	Omni directional antenna
<b>Brand Name:</b>	Doradus
<b>Antenna Code:</b>	OMNI
<b>Frequency Range:</b>	2.6 GHz
<b>Polarity:</b>	Vertical
<b>Gain:</b>	13.0 dBi

<b>Description:</b>	Sectorised antenna
<b>Brand Name:</b>	PCTEL
<b>Model Name or Number:</b>	SP2327-18XP60NUF
<b>Frequency Range:</b>	2.3 – 2.7 GHz
<b>3 dB Beamwidth:</b>	60°
<b>Gain:</b>	18 dBi
<b>Serial Number:</b>	460148

<b>Description:</b>	Fibre optic cable
<b>Brand Name:</b>	Huber & Suhner
<b>Model Name or Number:</b>	0309 374170
<b>Serial Number:</b>	Not marked or stated
<b>Cable Length and Type:</b>	10 metre / 2 core
<b>Connected to Port:</b>	Optical1 on ODU and F02 on IDU

<b>Description:</b>	Power cable
<b>Brand Name:</b>	LiYCY-OZ
<b>Model Name or Number:</b>	Not marked or stated
<b>Serial Number:</b>	Not marked or stated
<b>Cable Length and Type:</b>	10 metre / 2 core + earth
<b>Connected to Port:</b>	-48V DC in on ODU and F4AL on IDU

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

The equipment under test was a radio Base Station operating in the 2.5 to 2.6 GHz band. The equipment operates according to WiMax IEEE 802.16e -2005. The EUT comprises of an indoor unit (IDU) and an outdoor unit (ODU). The IDU is normally mounted inside a cabinet or building on the radio site. The ODU is tower mounted. Both units communicate with each other over a fibre optic link.

### **3.3. Modifications Incorporated in the EUT**

No modifications were applied to the EUT during testing.



**3.4. Additional Information Related to Testing**

Tested Technology:	WiMAX 802.16e - 2005							
Category of Equipment:	Transceiver							
Type of Equipment	Base Station							
Intended Operating Environment:	Residential, Commercial & Industrial							
Highest Internally Generated Clock or Oscillator Frequency:	2.7 GHz							
Modulation Type:	QPSK		16QAM		64QAM			
Coding Scheme:	1/2	3/4	1/2	3/4	2/3	3/4	5/6	
Duty Cycle	60%							
Channel Spacing:	5 MHz, 10 MHz							
Antenna Connection Type:	Two, external N type							
Antenna Type:	Omni directional and cross polarised directional							
Antenna Gain:	13 dBi (Omni directional) and 18 dBi (directional)							
Power Supply Requirement:	Nominal	-48.0 V DC						
	Minimum	-40.8 V DC						
	Maximum	-55.2 V DC						
Tested Temperature Range:	Minimum	-30°C						
	Maximum	+50°C						
FCC Part 27 Transmit Frequency Range:	2496 MHz to 2603 MHz							
FCC Part 27 Transmit and Receive Channels Tested:	Channel Bandwidth (MHz)	Bottom Channel Frequency (MHz)		Centre Channel Frequency (MHz)		Top Channel Frequency (MHz)		
	5	2498.5		2550.0		2600.5		
	10	2501.0		2545.0		2598.0		

### 3.5. Port Identification

Port	Description	Type	Applicable
1	ODU – Antenna Port 1	N-Type	Yes
2	ODU – Antenna Port 2	N-Type	Yes
3	ODU – Fibre Optic	Custom	No
4	ODU - -48 V DC Input	Twin Core	Yes
5	IDU – 10x Ethernet Port	CAT5/CAT6	No
6	IDU - -48 V DC Input	Twin Core	Yes
7	IDU – 4x Fibre Optic Ports	Twin Fibre	No

### 3.6. Support Equipment

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

<b>Description:</b>	PC for NMS Server + IP Packet Generator for Base Station
<b>Brand Name:</b>	Dell
<b>Model Name or Number:</b>	OPTIPLEX GX620
<b>Serial Number:</b>	PC393NT
<b>Cable Length and Type:</b>	CAT5 Ethernet Cable > 3 Metre
<b>Connected to Port:</b>	Base Station via Netgear Router

<b>Description:</b>	Network Router
<b>Brand Name:</b>	Netgear
<b>Model Name or Number:</b>	DG834 v4
<b>Serial Number:</b>	1PL596BD001A4
<b>Cable Length and Type:</b>	2x CAT5 Ethernet Cables >3 Metres
<b>Connected to Port:</b>	Base Station [M Eth Port + D Eth Port] NMS Server + IP Packet Generator PC

<b>Description:</b>	Subscriber Unit
<b>Brand Name:</b>	Harris Stratex Networks
<b>Model Name or Number:</b>	WiMAX 3160 16e Outdoor SS
<b>Code:</b>	3160-25-12-01
<b>Serial Number:</b>	TSS40340900031
<b>MAC Address:</b>	00:02:73:00:12:2F
<b>Cable Length and Type:</b>	Air Link / Simulated Air Link
<b>Connected to Port:</b>	Antenna Port

<b>Description:</b>	Power Block + Communications for Subscriber Unit
<b>Brand Name:</b>	PowerDsine
<b>Model Name or Number:</b>	PowerDsine 3001
<b>Part Number:</b>	PD-3001/AC
<b>Serial Number:</b>	R08126050010732901
<b>Cable Length and Type:</b>	2x CAT5 Ethernet Cable + IEC Lead
<b>Connected to Port:</b>	Subscriber Unit, IP Packet Generator PC + AC Mains

<b>Description:</b>	IP Packet Generator PC for Subscriber Unit
<b>Brand Name:</b>	Dell
<b>Model Name or Number:</b>	OPTIPLEX GX620
<b>Serial Number:</b>	PC460NT
<b>Cable Length and Type:</b>	CAT5 Ethernet Cable >3 Metre
<b>Connected to Port:</b>	Subscriber Unit

<b>Description:</b>	Regulated DC power supply
<b>Brand Name:</b>	Kikusui
<b>Model Name or Number:</b>	PWR1600L
<b>Serial Number:</b>	LD002491
<b>Cable Length and Type:</b>	3 metre / 3 core
<b>Connected to Port:</b>	-48 VDC IN on ODU and F4AL on IDU

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

### **4.1. Operating Modes**

The EUT was tested in the following operating modes, unless otherwise stated:

- Idle mode with the transmitter turned off
- Transmit mode operating at maximum output power with a modulated carrier operating with maximum packet transmission on the downlink.

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

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

The indoor unit F02 port was connected to the outdoor unit Optical 1 port by fibre optic cables. The indoor unit M.ETH and D.ETH Ethernet ports were connected to the NMS PC by Ethernet cable via a hub. The indoor unit and outdoor unit were powered by the -48 VDC power supply.

- **Radiated Testing**
  - Idle Mode – The EUT was connected to a -48 V DC power supply. The power supply input was connected to a 120 VAC 60 Hz supply. The transmitter was turned off within the base station via the management software.
  - Transmitting Mode – The EUT was connected to a -48 V DC power supply. The power supply input was connected to a 120 VAC 60 Hz supply. Both the indoor and outdoor unit were connected via fibre optic cable. The indoor unit was connected to an NMS server and IP packet generator PC via a network router.
  - The IP packet generator PC provided IP data which was sent on the downlink to the indoor unit at the maximum data rate allowed for each specific modulation / coding scheme. The outdoor unit was connected by a radio link to the subscriber unit and an active link was maintained throughout all testing.
- **Conducted Testing**
  - Idle Mode – The EUT was connected to a -48 V DC power supply. The power supply input was connected to a 120 VAC 60 Hz supply. Both the indoor and outdoor unit were connected via fibre optic cable. The transmitter was turned off within the base station via the management software.
  - Transmitting Mode – The EUT was connected to a -48 V DC power supply. The power supply input was connected to a 120 VAC 60 Hz supply. The IP packet generator PC provided IP data which was sent to the indoor unit (IDU) at the maximum data rate allowed for each specific modulation / coding scheme. The outdoor unit was connected via an attenuator and cable assembly to the subscriber unit and an active link was maintained throughout all testing.
  - The IP packet generator PC provided IP data which was sent on the downlink to the indoor unit at the maximum data rate allowed for each specific modulation / coding scheme. The outdoor unit was connected by a radio link to the subscriber unit and an active link was maintained throughout all testing.

## **5. Measurements, Examinations and Derived Results**

### **5.1. General Comments**

Measurement uncertainties are evaluated in accordance with current best practice. Our reported expanded uncertainties are based on standard uncertainties, which are multiplied by an appropriate coverage factor to provide a statistical confidence level of approximately 95%. Please refer to *Section 6. Measurement Uncertainty* for details.

## **5.2. Test Results**

### **5.2.1. Idle Mode AC Conducted Spurious Emissions**

#### **Test Summary:**

<b>FCC Part:</b>	FCC 15.107
<b>Test Method Used:</b>	As detailed in ANSI C63.4 Section 7

#### **Environmental Conditions:**

<b>Temperature (°C):</b>	21
<b>Relative Humidity (%):</b>	34

#### **Note(s):**

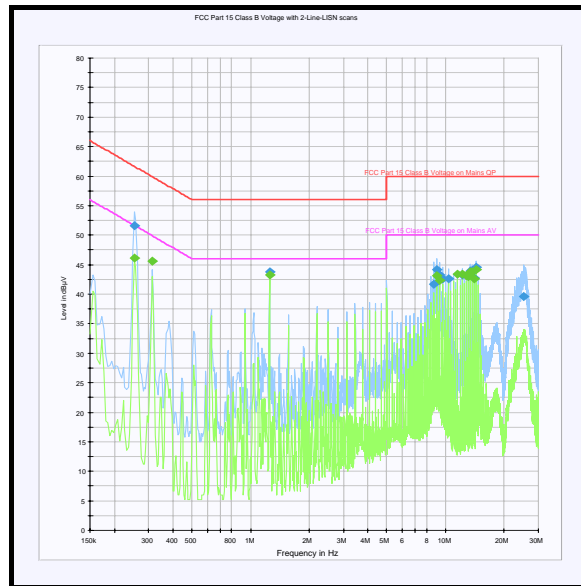
1. -48 VDC power to the EUT was provided from a power supply with 120 VAC 60 Hz input. The 120 VAC 60 Hz input voltage to the power supply was provided through a LISN.
2. The EUT outdoor unit ANT 1 port was connected to a Subscriber Station through suitable RF cables and attenuators. A communication link between EUT and Subscriber Station was established. The EUT transmitter was turned off.
3. The EUT outdoor unit ANT 2 port was terminated in a dummy load.

**Idle Mode AC Conducted Spurious Emissions (continued)****Results: Quasi Peak Detector Measurements**

Frequency (MHz)	Line	Quasi Peak Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
0.253500	Live 1	51.7	61.6	9.9	Complied
1.252500	Live 1	43.8	56.0	12.2	Complied
8.754000	Live 1	41.7	60.0	18.3	Complied
9.064500	Live 1	44.1	60.0	15.9	Complied
9.379500	Live 1	43.3	60.0	16.7	Complied
9.690000	Live 1	42.6	60.0	17.4	Complied
10.315500	Live 1	42.6	60.0	17.4	Complied
12.192000	Neutral	43.3	60.0	16.7	Complied
13.443000	Live 1	44.0	60.0	16.0	Complied
13.753500	Live 1	44.0	60.0	16.0	Complied
14.068500	Neutral	42.8	60.0	17.2	Complied
14.379000	Neutral	44.5	60.0	15.5	Complied
25.129500	Neutral	39.6	60.0	20.4	Complied

**Results: Average Detector Measurements**

Frequency (MHz)	Line	Average Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
0.253500	Live 1	46.1	51.6	5.5	Complied
0.312000	Live 1	45.6	49.9	4.3	Complied
1.252500	Live 1	43.3	46.0	2.7	Complied
9.064500	Live 1	43.2	50.0	6.8	Complied
9.379500	Live 1	42.3	50.0	7.7	Complied
11.566500	Neutral	43.4	50.0	6.6	Complied
12.192000	Live 1	43.4	50.0	6.6	Complied
12.817500	Live 1	43.1	50.0	6.9	Complied
13.128000	Live 1	43.0	50.0	7.0	Complied
13.443000	Live 1	43.8	50.0	6.2	Complied
13.753500	Live 1	43.8	50.0	6.2	Complied
14.068500	Neutral	42.6	50.0	7.4	Complied
14.379000	Neutral	44.2	50.0	5.8	Complied

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

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



### **5.2.2. Idle Mode Radiated Spurious Emissions**

#### **Test Summary:**

<b>FCC Part:</b>	FCC 15.109
<b>Test Method Used:</b>	ANSI C63.4
<b>Frequency Range:</b>	30 MHz – 1000 MHz

#### **Environmental Conditions:**

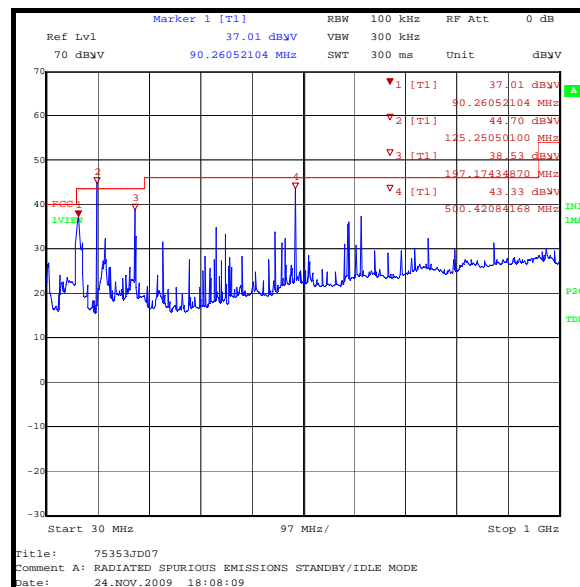
<b>Temperature (°C):</b>	24
<b>Relative Humidity (%):</b>	35

#### **Note(s):**

1. The outdoor unit was mounted vertically on a metal pole using the supplied brackets in accordance with the Customer's Base Station Installation Manual. This represents a typical user configuration. The centre of the outdoor unit was at a height of 1.5 metres above the chamber floor and directly in line with the measurement antenna. The outdoor unit was positioned in the centre of the anechoic chamber turntable. The indoor unit was positioned on the chamber floor directly below the outdoor unit and all interconnecting cables run vertically down the pole between both units. Surplus cable was bundled and cable tied.
2. Earthing points on the indoor unit and outdoor unit were connected by earth strap to the metal of the test chamber.
3. -48 VDC supply to the EUT during the test was provided by a 120 VAC 60 Hz power supply located outside the anechoic chamber. Interconnecting cables were run through access points in the chamber wall and floor.
4. The ANT1 port was connected via RF cables and attenuators to a Subscriber Station located outside the anechoic chamber. Interconnecting cables were run through access points in the chamber wall and floor. A BS-SS link was established and packet data sent on the downlink at the maximum data rate. The ANT2 port was terminated into a suitable 50 Ohm load.
5. The EUT was configured to transmit at maximum power on the FCC top channel of 2600.5 MHz as this is the highest operational frequency. The EUT transmitter was then turned off and the test performed.
6. The EUT was rotated through 360°. Measurements were made with the test system antenna in the horizontal and vertical planes. The highest level was recorded.
7. Pre-scans were performed with a peak detector as this was known to be the worst case.
8. Final measurements were performed with a quasi-peak detector.

**Idle Mode Radiated Spurious Emissions (continued)****Results:**

Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
90.380	Horizontal	35.1	43.5	8.4	Complied
124.970	Vertical	42.5	43.5	1.0	Complied
194.974	Horizontal	38.7	43.5	4.8	Complied
368.606	Vertical	31.6	46.0	14.4	Complied
499.977	Vertical	42.1	46.0	3.9	Complied
599.975	Vertical	36.4	46.0	9.6	Complied
624.975	Horizontal	37.1	46.0	8.9	Complied



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

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

<b>FCC Part:</b>	FCC 15.109
<b>Test Method Used:</b>	ANSI C63.4 Section 8 and relevant annexes
<b>Frequency Range:</b>	1 GHz to 13 GHz

**Environmental Conditions:**

<b>Temperature (°C):</b>	24
<b>Relative Humidity (%):</b>	35

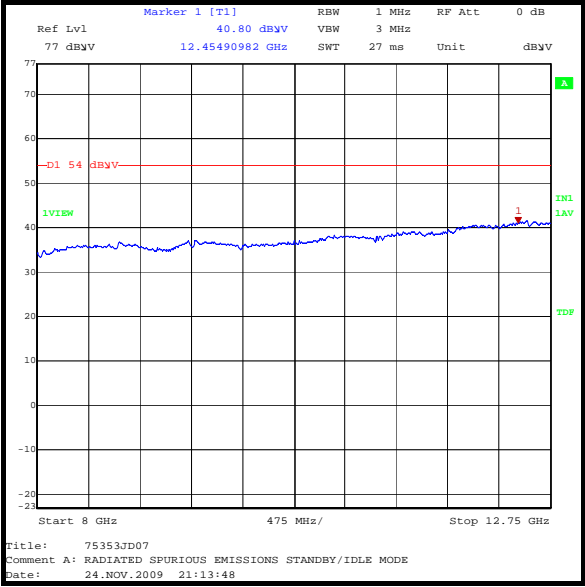
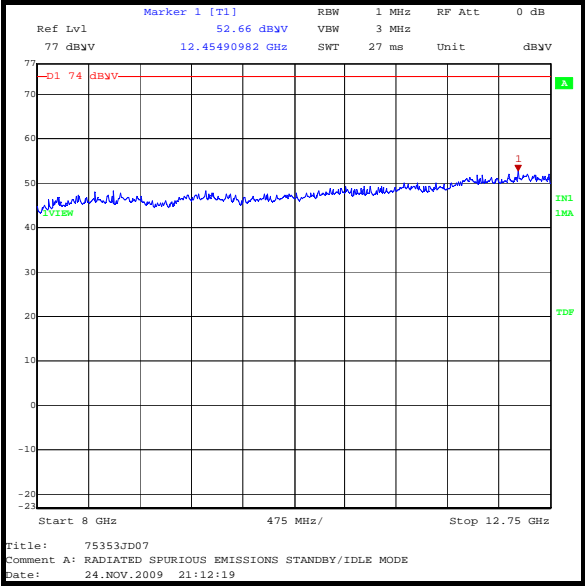
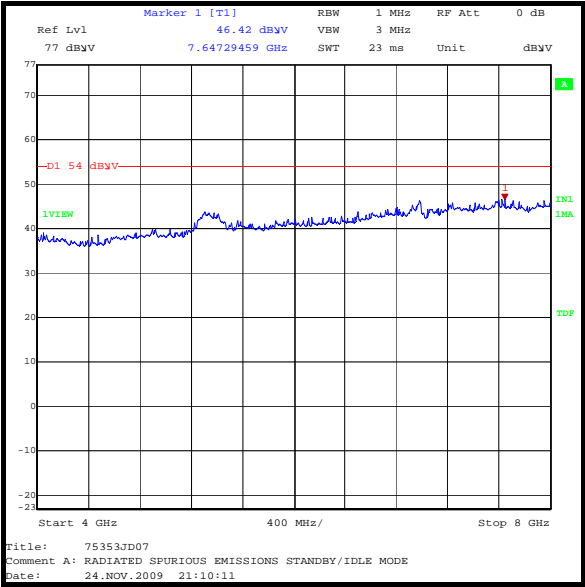
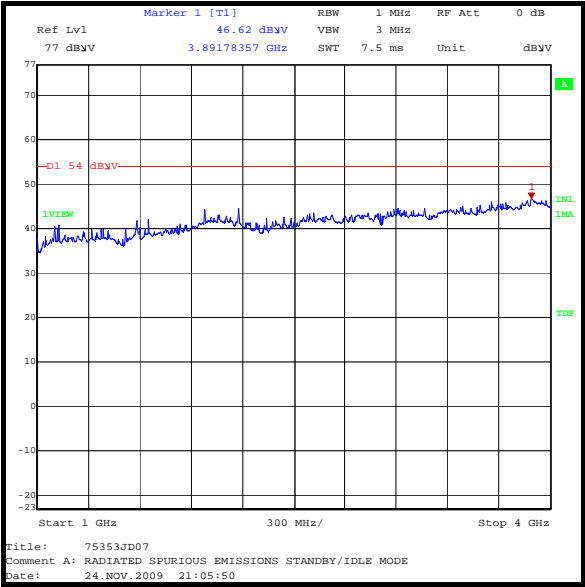
**Note(s):**

1. The outdoor unit was mounted vertically on a metal pole using the supplied brackets in accordance with the Customer's Base Station Installation Manual. This represents a typical user configuration. The centre of the outdoor unit was at a height of 1.5 metres above the chamber floor and directly in line with the measurement antenna. The outdoor unit was positioned in the centre of the anechoic chamber turntable. The indoor unit was positioned on the chamber floor directly below the outdoor unit and all interconnecting cables run vertically down the pole between both units. Surplus cable was bundled and cable tied.
2. Earthing points on the indoor unit and outdoor unit were connected by earth strap to the metal of the test chamber.
3. -48 VDC supply to the EUT during the test was provided by a 120 VAC 60 Hz power supply located outside the anechoic chamber. Interconnecting cables were run through access points in the chamber wall and floor.
4. The ANT1 port was connected via RF cables and attenuators to a Subscriber Station located outside the anechoic chamber. Interconnecting cables were run through access points in the chamber wall and floor. A BS-SS link was established and packet data sent on the downlink at the maximum data rate. The ANT2 port was terminated into a suitable 50 Ohm load.
5. The EUT was configured to transmit at maximum power on the FCC top channel of 2600.5 MHz as this is the highest operational frequency. The EUT transmitter was then turned off and the test performed.
6. The EUT was rotated through 360°. Measurements were made with the test system antenna in the horizontal and vertical planes. The highest level was recorded.
7. Pre-scans were performed with a peak detector against the average limit as this was known to be the worst case. Tests were repeated with an average detector against average limit across some frequency ranges as the peak detector caused the noise floor to be close to or above the average limit.
8. No spurious emissions were observed above the noise floor of the test system or within 20 dB of the limit, therefore the highest noise floor level was recorded.

**Results: Highest Average Level**

Frequency (GHz)	Antenna Polarity	Detector Level (dBµV)	Transducer Factor (dB)	Actual Level (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)	Result
7.647	Horizontal	39.8	6.6	46.4	54.0	7.6	Complied

Idle Mode Radiated Spurious Emissions (continued)

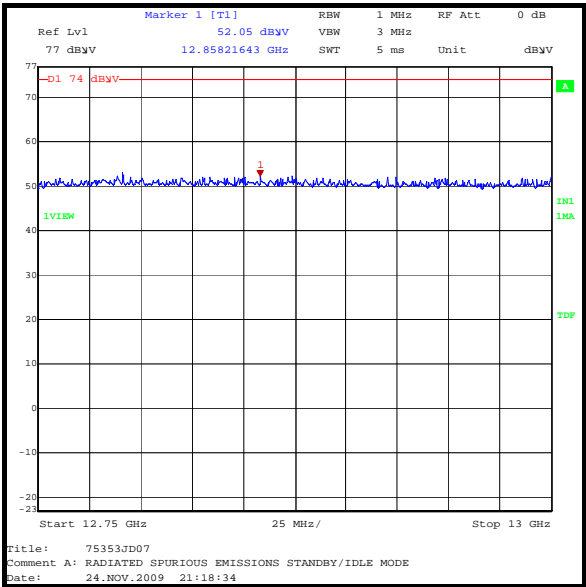


Peak detector

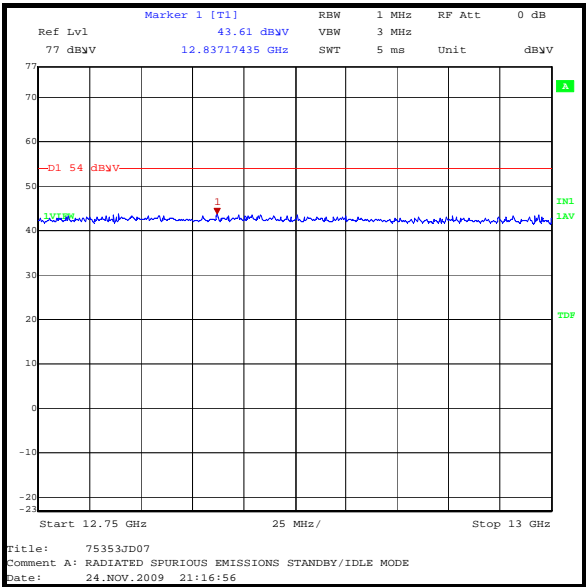
Average detector

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

Idle Mode Radiated Spurious Emissions (continued)



Peak detector



Average detector

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

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

<b>FCC Part:</b>	FCC 15.207
<b>Test Method Used:</b>	As detailed in ANSI C63.4 Section 7 and relevant annexes

**Environmental Conditions:**

<b>Temperature (°C):</b>	21
<b>Relative Humidity (%):</b>	34

**Note(s):**

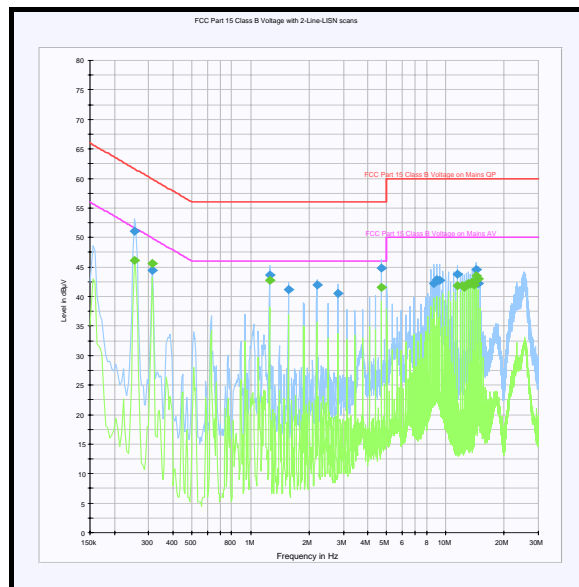
1. -48 VDC power to the EUT was provided from a power supply with 120 VAC 60 Hz input. The 120 VAC 60 Hz input voltage to the power supply was provided through a LISN.
2. The EUT outdoor unit ANT 1 port was connected to a Subscriber Station through suitable RF cables and attenuators. A communication link between EUT and Subscriber Station was established and the packets sent on the downlink in order to force the EUT to maximum power.
3. The EUT outdoor unit ANT 2 port was terminated in a dummy load.
4. The EUT was transmitting at maximum power on the 5 MHz top channel using QPSK 1/2 modulation during the test.

**Results: Quasi Peak Detector Measurements**

Frequency (MHz)	Line	Quasi Peak Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
0.253500	Live 1	51.1	61.6	10.5	Complied
0.312000	Live 1	44.4	59.9	15.5	Complied
1.252500	Live 1	43.6	56.0	12.4	Complied
1.563000	Live 1	41.1	56.0	14.9	Complied
2.188500	Neutral	41.9	56.0	14.1	Complied
2.814000	Neutral	40.6	56.0	15.4	Complied
4.690500	Neutral	44.8	56.0	11.2	Complied
8.754000	Live 1	42.2	60.0	17.8	Complied
9.064500	Live 1	42.9	60.0	17.1	Complied
9.379500	Live 1	42.8	60.0	17.2	Complied
11.566500	Live 1	43.8	60.0	16.2	Complied
14.379000	Live 1	44.5	60.0	15.5	Complied
14.694000	Neutral	42.2	60.0	17.8	Complied

**Transmitter AC Conducted Spurious Emissions (continued)****Results: Average Detector Measurements**

Frequency (MHz)	Line	Average Level (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Result
0.253500	Live 1	46.1	51.6	5.5	Complied
0.312000	Live 1	45.6	49.9	4.3	Complied
1.252500	Live 1	42.7	46.0	3.3	Complied
4.690500	Neutral	41.5	46.0	4.5	Complied
11.566500	Neutral	41.8	50.0	8.2	Complied
12.192000	Neutral	41.9	50.0	8.1	Complied
12.502500	Live 1	41.5	50.0	8.5	Complied
12.817500	Live 1	42.0	50.0	8.0	Complied
13.128000	Live 1	42.2	50.0	7.8	Complied
13.443000	Live 1	42.1	50.0	7.9	Complied
13.753500	Live 1	42.5	50.0	7.5	Complied
14.068500	Neutral	42.0	50.0	8.0	Complied
14.379000	Neutral	43.6	50.0	6.4	Complied
14.694000	Neutral	43.0	50.0	7.0	Complied



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

#### **5.2.4. Transmitter Carrier Output Power and EIRP Limitations**

##### **Test Summary:**

<b>FCC Part:</b>	FCC 2.1046, FCC Part 27.50(h)(1)
<b>Test Method Used:</b>	As detailed in ANSI TIA-603-C-2004 Section 2.2.1 & 2.2.17

##### **Environmental Conditions:**

<b>Temperature (°C):</b>	22 to 24
<b>Relative Humidity (%):</b>	36 to 39

##### **Note(s):**

1. The manufacturer's stated maximum conducted output power is 39 dBm on each antenna port.
2. Power measurements were made using a calibrated Agilent N1912A power meter and N1921A wideband power sensor. WiMax configuration was selected on the power meter. The power meter was configured to perform a gated measurement across the complete EUT transmit burst.
3. A client/server session was established between the PCs connected to the EUT and Subscriber Station. Packets were sent from PC connected to the BS to the PC connected to the SS at the maximum packet rate supported by the modulation scheme under test.
4. The Effective Isotropic Radiated Power (EIRP) was calculated by adding the Client's stated antenna gain to the measured conducted RF output power. The omnidirectional antenna stated gain is +13 dBi. The sectorised antenna stated gain is +18 dBi and antenna beam width is 60 degrees. Coaxial cable loss between the EUT and antenna is unknown and not taken into account in the calculations.
5. Occupied bandwidths used to calculate the above limits were obtained from the measured values shown in the occupied bandwidth section of this report.
6. Measurements were performed with the EUT transmitting all supported modulation types on the ANT1 port. Additional testing was performed with QPSK 1/2 and 64QAM 5/6 to show compliance on the ANT2 port.
7. The EUT bottom channel and centre channels lie within the LBS, and the top channel lies within the MBS.
8. Part 27.50 (h)(1) limit for omnidirectional antennas is calculated as  $33+10 \log (\text{Occupied Bandwidth}/Y)$  dBW. (where Y is 6 MHz for channels in the MBS and 5.5 MHz for channels in the LBS).
9. Part 27.50 (h)(1) limit for non-omnidirectional antennas is calculated as  $33+10 \log (\text{Occupied Bandwidth}/Y) + 10 \log (360 / \text{Antenna Beamwidth})$  dBW. (where Y is 6 MHz for channels in the MBS and 5.5 MHz for channels in the LBS).



**Note(s) (continued)**

10. Calculations of limits when the EUT is transmitting a 5 MHz channel are shown below:

*Omnidirectional antenna in the LBS:*

$$33 + 10 \log (4.599 / 5.5) = 32.2 \text{ dBW EIRP}$$

*Omnidirectional antenna in the MBS:*

$$33 + 10 \log (4.629 / 6.0) = 31.9 \text{ dBW EIRP}$$

*Sectorised antenna in the LBS:*

$$33 + (10 \log (4.629 / 5.5) + 10 \log (360 / 60)) = 40.1 \text{ dBW EIRP}$$

*Sectorised antenna in the MBS:*

$$33 + 10 \log (4.629 / 6.0) + 10 \log (360 / 60) = 39.7 \text{ dBW EIRP}$$

11. Calculations of FCC limits when the EUT is transmitting a 10 MHz channel are shown below:

*Omnidirectional antenna in the LBS:*

$$33 + (10 \log (9.298 / 5.5)) = 35.3 \text{ dBW EIRP}$$

*Omnidirectional antenna in the MBS:*

$$33 + (10 \log (9.298 / 6.0)) = 34.9 \text{ dBW EIRP}$$

*Sectorised antenna in the LBS:*

$$33 + 10 \log (9.298 / 5.5) + 10 \log (360 / 60) = 43.1 \text{ dBW EIRP}$$

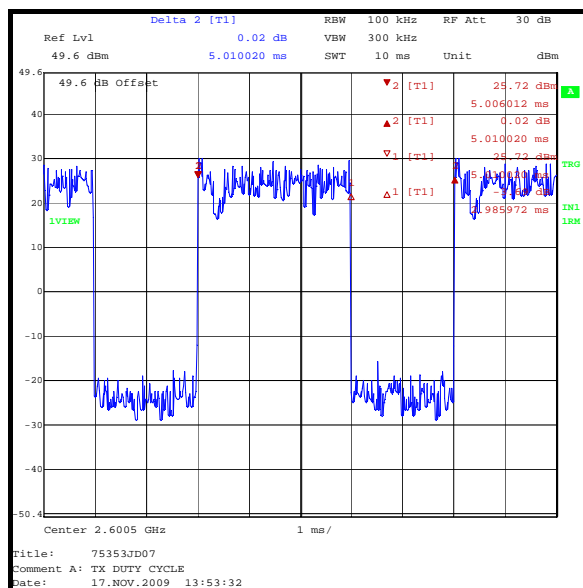
*Sectorised antenna in the MBS:*

$$33 + 10 \log (9.298 / 6.0) + 10 \log (360 / 60) = 42.7 \text{ dBW EIRP}$$

12. The EUT complies with Industry Canada RSS-193 Section 6.2 as the measured output power was within  $\pm 1.0$  dB of the manufacturer's rated power.

### **Transmitter Output Power and EIRP Limitations (continued)**

### TX Duty Cycle



TX On period = 3ms

TX Off period = 2 ms

Duty cycle = 60%

**Transmitter Output Power and EIRP Limitations (continued)****Results: 5 MHz Channel Width / ANT1 port / Bottom channel**

Modulation	Frequency (MHz)	Conducted RF O/P Power (dBm)	Stated Antenna Gain (dBi)	EIRP (dBm)	EIRP (dBW)	Limit EIRP (dBW)	Margin (dB)	Result
QPSK 1/2	2498.5	39.0	13.0	52.0	22.0	32.2	10.2	Complied
QPSK 3/4	2498.5	38.9	13.0	51.9	21.9	32.2	10.3	Complied
16QAM 1/2	2498.5	39.0	13.0	52.0	22.0	32.2	10.2	Complied
16QAM 3/4	2498.5	39.1	13.0	52.1	22.1	32.2	10.1	Complied
64QAM 2/3	2498.5	38.9	13.0	51.9	21.9	32.2	10.3	Complied
64QAM 3/4	2498.5	39.0	13.0	52.0	22.0	32.2	10.2	Complied
64QAM 5/6	2498.5	39.1	13.0	52.1	22.1	32.2	10.1	Complied

Modulation	Frequency (MHz)	Conducted RF O/P Power (dBm)	Stated Antenna Gain (dBi)	EIRP (dBm)	EIRP (dBW)	Limit EIRP (dBW)	Margin (dB)	Result
QPSK 1/2	2498.5	39.0	18.0	57.0	27.0	40.1	13.1	Complied
QPSK 3/4	2498.5	38.9	18.0	56.9	26.9	40.1	13.2	Complied
16QAM 1/2	2498.5	39.0	18.0	57.0	27.0	40.1	13.1	Complied
16QAM 3/4	2498.5	39.1	18.0	57.1	27.1	40.1	13.0	Complied
64QAM 2/3	2498.5	38.9	18.0	56.9	26.9	40.1	13.2	Complied
64QAM 3/4	2498.5	39.0	18.0	57.0	27.0	40.1	13.1	Complied
64QAM 5/6	2498.5	39.1	18.0	57.1	27.1	40.1	13.0	Complied

**Transmitter Output Power and EIRP Limitations (continued)****Results: 5 MHz Channel Width / ANT2 port / Bottom channel**

Modulation	Frequency (MHz)	Conducted RF O/P Power (dBm)	Stated Antenna Gain (dBi)	EIRP (dBm)	EIRP (dBW)	Limit EIRP (dBW)	Margin (dB)	Result
QPSK 1/2	2498.5	39.0	13.0	52.0	22.0	32.2	10.2	Complied
64QAM 5/6	2498.5	39.0	13.0	52.0	22.0	32.2	10.2	Complied

Modulation	Frequency (MHz)	Conducted RF O/P Power (dBm)	Stated Antenna Gain (dBi)	EIRP (dBm)	EIRP (dBW)	Limit EIRP (dBW)	Margin (dB)	Result
QPSK 1/2	2498.5	39.0	18.0	57.0	27.0	40.1	13.1	Complied
64QAM 5/6	2498.5	39.0	18.0	57.0	27.0	40.1	13.1	Complied

**Transmitter Output Power and EIRP Limitations (continued)****5 MHz Channel Width / ANT1 port / Centre channel**

Modulation	Frequency (MHz)	Conducted RF O/P Power (dBm)	Stated Antenna Gain (dBi)	EIRP (dBm)	EIRP (dBW)	Limit EIRP (dBW)	Margin (dB)	Result
QPSK 1/2	2550.0	39.0	13.0	52.0	22.0	32.2	10.2	Complied
QPSK 3/4	2550.0	39.0	13.0	52.0	22.0	32.2	10.2	Complied
16QAM 1/2	2550.0	39.0	13.0	52.0	22.0	32.2	10.2	Complied
16QAM 3/4	2550.0	39.0	13.0	52.0	22.0	32.2	10.2	Complied
64QAM 2/3	2550.0	39.0	13.0	52.0	22.0	32.2	10.2	Complied
64QAM 3/4	2550.0	38.9	13.0	51.9	21.9	32.2	10.3	Complied
64QAM 5/6	2550.0	39.1	13.0	52.1	22.1	32.2	10.1	Complied

Modulation	Frequency (MHz)	Conducted RF O/P Power (dBm)	Stated Antenna Gain (dBi)	EIRP (dBm)	EIRP (dBW)	Limit EIRP (dBW)	Margin (dB)	Result
QPSK 1/2	2550.0	39.0	18.0	57.0	27.0	40.1	13.1	Complied
QPSK 3/4	2550.0	39.0	18.0	57.0	27.0	40.1	13.1	Complied
16QAM 1/2	2550.0	39.0	18.0	57.0	27.0	40.1	13.1	Complied
16QAM 3/4	2550.0	39.0	18.0	57.0	27.0	40.1	13.1	Complied
64QAM 2/3	2550.0	39.0	18.0	57.0	27.0	40.1	13.1	Complied
64QAM 3/4	2550.0	38.9	18.0	56.9	26.9	40.1	13.2	Complied
64QAM 5/6	2550.0	39.1	18.0	57.1	27.1	40.1	13.0	Complied

**Transmitter Output Power and EIRP Limitations (continued)****Results: 5 MHz Channel Width / ANT2 port / Centre channel**

Modulation	Frequency (MHz)	Conducted RF O/P Power (dBm)	Stated Antenna Gain (dBi)	EIRP (dBm)	EIRP (dBW)	Limit EIRP (dBW)	Margin (dB)	Result
QPSK 1/2	2550.0	38.9	13.0	51.8	21.8	32.2	10.4	Complied
64QAM 5/6	2550.0	39.0	13.0	52.0	22.0	32.2	10.2	Complied

Modulation	Frequency (MHz)	Conducted RF O/P Power (dBm)	Stated Antenna Gain (dBi)	EIRP (dBm)	EIRP (dBW)	Limit EIRP (dBW)	Margin (dB)	Result
QPSK 1/2	2550.0	38.9	18.0	56.9	26.9	40.1	13.2	Complied
64QAM 5/6	2550.0	39.0	18.0	57.0	27.0	40.1	13.1	Complied

**Transmitter Output Power and EIRP Limitations (continued)****Results: 5 MHz Channel Width / ANT1 port / Top channel**

Modulation	Frequency (MHz)	Conducted RF O/P Power (dBm)	Stated Antenna Gain (dBi)	EIRP (dBm)	EIRP (dBW)	Limit EIRP (dBW)	Margin (dB)	Result
QPSK 1/2	2600.5	39.1	13.0	52.1	22.1	31.9	9.8	Complied
QPSK 3/4	2600.5	39.1	13.0	52.1	22.1	31.9	9.8	Complied
16QAM 1/2	2600.5	39.2	13.0	52.2	22.2	31.9	9.7	Complied
16QAM 3/4	2600.5	39.2	13.0	52.2	22.2	31.9	9.7	Complied
64QAM 2/3	2600.5	39.2	13.0	52.2	22.2	31.9	9.7	Complied
64QAM 3/4	2600.5	39.1	13.0	52.1	22.1	31.9	9.8	Complied
64QAM 5/6	2600.5	39.1	13.0	52.1	22.1	31.9	9.8	Complied

Modulation	Frequency (MHz)	Conducted RF O/P Power (dBm)	Stated Antenna Gain (dBi)	EIRP (dBm)	EIRP (dBW)	Limit EIRP (dBW)	Margin (dB)	Result
QPSK 1/2	2600.5	39.1	18.0	57.1	27.1	39.7	12.6	Complied
QPSK 3/4	2600.5	39.1	18.0	57.1	27.1	39.7	12.6	Complied
16QAM 1/2	2600.5	39.2	18.0	57.2	27.2	39.7	12.5	Complied
16QAM 3/4	2600.5	39.2	18.0	57.2	27.2	39.7	12.5	Complied
64QAM 2/3	2600.5	39.2	18.0	57.2	27.2	39.7	12.5	Complied
64QAM 3/4	2600.5	39.1	18.0	57.1	27.1	39.7	12.6	Complied
64QAM 5/6	2600.5	39.1	18.0	57.1	27.1	39.7	12.6	Complied

**Transmitter Output Power and EIRP Limitations (continued)****Results: 5 MHz Channel Width / ANT2 port / Top channel**

Modulation	Frequency (MHz)	Conducted RF O/P Power (dBm)	Stated Antenna Gain (dBi)	EIRP (dBm)	EIRP (dBW)	Limit EIRP (dBW)	Margin (dB)	Result
QPSK 1/2	2600.5	38.8	13.0	51.8	21.8	31.9	10.1	Complied
64QAM 5/6	2600.5	38.9	13.0	51.9	21.9	31.9	10.0	Complied

Modulation	Frequency (MHz)	Conducted RF O/P Power (dBm)	Stated Antenna Gain (dBi)	EIRP (dBm)	EIRP (dBW)	Limit EIRP (dBW)	Margin (dB)	Result
QPSK 1/2	2600.5	38.8	18.0	56.8	26.8	39.7	12.9	Complied
64QAM 5/6	2600.5	38.9	18.0	56.9	26.9	39.7	12.8	Complied



**Transmitter Output Power and EIRP Limitations (continued)****Results: 10 MHz Channel Width / ANT1 port / Bottom channel**

Modulation	Frequency (MHz)	Conducted RF O/P Power (dBm)	Stated Antenna Gain (dBi)	EIRP (dBm)	EIRP (dBW)	Limit EIRP (dBW)	Margin (dB)	Result
QPSK 1/2	2501	39.1	13.0	52.1	22.1	35.3	13.2	Complied
QPSK 3/4	2501	39.1	13.0	52.1	22.1	35.3	13.2	Complied
16QAM 1/2	2501	39.1	13.0	52.1	22.1	35.3	13.2	Complied
16QAM 3/4	2501	39.1	13.0	52.1	22.1	35.3	13.2	Complied
64QAM 2/3	2501	39.0	13.0	52.0	22.0	35.3	13.3	Complied
64QAM 3/4	2501	39.0	13.0	52.0	22.0	35.3	13.3	Complied
64QAM 5/6	2501	39.0	13.0	52.0	22.0	35.3	13.3	Complied

Modulation	Frequency (MHz)	Conducted RF O/P Power (dBm)	Stated Antenna Gain (dBi)	EIRP (dBm)	EIRP (dBW)	Limit EIRP (dBW)	Margin (dB)	Result
QPSK 1/2	2501	39.1	18.0	57.1	27.1	43.1	16.0	Complied
QPSK 3/4	2501	39.1	18.0	57.1	27.1	43.1	16.0	Complied
16QAM 1/2	2501	39.1	18.0	57.1	27.1	43.1	16.0	Complied
16QAM 3/4	2501	39.1	18.0	57.1	27.1	43.1	16.0	Complied
64QAM 2/3	2501	39.0	18.0	57.0	27.0	43.1	16.1	Complied
64QAM 3/4	2501	39.0	18.0	57.0	27.0	43.1	16.1	Complied
64QAM 5/6	2501	39.0	18.0	57.0	27.0	43.1	16.1	Complied

**Transmitter Output Power and EIRP Limitations (continued)****Results: 10 MHz Channel Width / ANT2 port / Bottom channel**

Modulation	Frequency (MHz)	Conducted RF O/P Power (dBm)	Stated Antenna Gain (dBi)	EIRP (dBm)	EIRP (dBW)	Limit EIRP (dBW)	Margin (dB)	Result
QPSK 1/2	2501	39.0	13.0	52.0	22.0	35.3	13.3	Complied
64QAM 5/6	2501	39.1	13.0	52.1	22.1	35.3	13.2	Complied

Modulation	Frequency (MHz)	Conducted RF O/P Power (dBm)	Stated Antenna Gain (dBi)	EIRP (dBm)	EIRP (dBW)	Limit EIRP (dBW)	Margin (dB)	Result
QPSK 1/2	2501	39.0	18.0	57.0	27.0	43.1	16.1	Complied
64QAM 5/6	2501	39.1	18.0	57.1	27.1	43.1	16.1	Complied

**Transmitter Output Power and EIRP Limitations (continued)****Results: 10 MHz Channel Width / ANT1 port / Centre channel**

Modulation	Frequency (MHz)	Conducted RF O/P Power (dBm)	Stated Antenna Gain (dBi)	EIRP (dBm)	EIRP (dBW)	Limit EIRP (dBW)	Margin (dB)	Result
QPSK 1/2	2545	39.1	13.0	52.1	22.1	35.3	13.2	Complied
QPSK 3/4	2545	39.1	13.0	52.1	22.1	35.3	13.2	Complied
16QAM 1/2	2545	39.0	13.0	52.0	22.0	35.3	13.3	Complied
16QAM 3/4	2545	39.1	13.0	52.1	22.1	35.3	13.2	Complied
64QAM 2/3	2545	39.0	13.0	52.0	22.0	35.3	13.3	Complied
64QAM 3/4	2545	39.0	13.0	52.0	22.0	35.3	13.3	Complied
64QAM 5/6	2545	38.9	13.0	51.9	21.9	35.3	13.4	Complied

Modulation	Frequency (MHz)	Conducted RF O/P Power (dBm)	Stated Antenna Gain (dBi)	EIRP (dBm)	EIRP (dBW)	Limit EIRP (dBW)	Margin (dB)	Result
QPSK 1/2	2545	39.1	18.0	57.1	27.1	43.1	16.0	Complied
QPSK 3/4	2545	39.1	18.0	57.1	27.1	43.1	16.0	Complied
16QAM 1/2	2545	39.0	18.0	57.0	27.0	43.1	16.1	Complied
16QAM 3/4	2545	39.1	18.0	57.1	27.1	43.1	16.0	Complied
64QAM 2/3	2545	39.0	18.0	57.0	27.0	43.1	16.1	Complied
64QAM 3/4	2545	39.0	18.0	57.0	27.0	43.1	16.1	Complied
64QAM 5/6	2545	38.9	18.0	56.9	26.9	43.1	16.2	Complied

**Transmitter Output Power and EIRP Limitations (continued)****Results: 10 MHz Channel Width / ANT2 port / Centre channel**

Modulation	Frequency (MHz)	Conducted RF O/P Power (dBm)	Stated Antenna Gain (dBi)	EIRP (dBm)	EIRP (dBW)	Limit EIRP (dBW)	Margin (dB)	Result
QPSK 1/2	2545	38.9	13.0	51.9	21.9	35.3	13.4	Complied
64QAM 5/6	2545	38.9	13.0	51.9	21.9	35.3	13.4	Complied

Modulation	Frequency (MHz)	Conducted RF O/P Power (dBm)	Stated Antenna Gain (dBi)	EIRP (dBm)	EIRP (dBW)	Limit EIRP (dBW)	Margin (dB)	Result
QPSK 1/2	2545	38.9	18.0	56.9	26.9	43.1	16.2	Complied
64QAM 5/6	2545	38.9	18.0	56.9	26.9	43.1	16.2	Complied

**Transmitter Output Power and EIRP Limitations (continued)****Results: 10 MHz Channel Width / ANT1 port / Top channel**

Modulation	Frequency (MHz)	Conducted RF O/P Power (dBm)	Stated Antenna Gain (dBi)	EIRP (dBm)	EIRP (dBW)	Limit EIRP (dBW)	Margin (dB)	Result
QPSK 1/2	2598	39.0	13.0	52.0	22.0	34.9	12.9	Complied
QPSK 3/4	2598	39.0	13.0	52.0	22.0	34.9	12.9	Complied
16QAM 1/2	2598	39.1	13.0	52.1	22.1	34.9	12.8	Complied
16QAM 3/4	2598	39.1	13.0	52.1	22.1	34.9	12.8	Complied
64QAM 2/3	2598	39.0	13.0	52.0	22.0	34.9	12.9	Complied
64QAM 3/4	2598	39.0	13.0	52.0	22.0	34.9	12.9	Complied
64QAM 5/6	2598	38.9	13.0	51.9	21.9	34.9	13.0	Complied

Modulation	Frequency (MHz)	Conducted RF O/P Power (dBm)	Stated Antenna Gain (dBi)	EIRP (dBm)	EIRP (dBW)	Limit EIRP (dBW)	Margin (dB)	Result
QPSK 1/2	2598	39.0	18.0	57.0	27.0	42.7	15.7	Complied
QPSK 3/4	2598	39.0	18.0	57.0	27.0	42.7	15.7	Complied
16QAM 1/2	2598	39.1	18.0	57.1	27.1	42.7	15.6	Complied
16QAM 3/4	2598	39.1	18.0	57.1	27.1	42.7	15.6	Complied
64QAM 2/3	2598	39.0	18.0	57.0	27.0	42.7	15.7	Complied
64QAM 3/4	2598	39.0	18.0	57.0	27.0	42.7	15.7	Complied
64QAM 5/6	2598	38.9	18.0	56.9	26.9	42.7	15.8	Complied

**Transmitter Output Power and EIRP Limitations (continued)****Results: 10 MHz Channel Width / ANT2 port / Top channel**

Modulation	Frequency (MHz)	Conducted RF O/P Power (dBm)	Stated Antenna Gain (dBi)	EIRP (dBm)	EIRP (dBW)	Limit EIRP (dBW)	Margin (dB)	Result
QPSK 1/2	2598	39.0	13.0	52.0	22.0	34.9	12.9	Complied
64QAM 5/6	2598	39.0	13.0	52.0	22.0	34.9	12.9	Complied

Modulation	Frequency (MHz)	Conducted RF O/P Power (dBm)	Stated Antenna Gain (dBi)	EIRP (dBm)	EIRP (dBW)	Limit EIRP (dBW)	Margin (dB)	Result
QPSK 1/2	2598	39.0	18.0	57.0	27.0	42.7	15.7	Complied
64QAM 5/6	2598	39.0	18.0	57.0	27.0	42.7	15.7	Complied

**5.2.5. Transmitter Equivalent Isotropic Radiated Power (EIRP)****Test Summary:**

<b>FCC Part:</b>	FCC 27.50(h)(2)
<b>Test Method Used:</b>	As detailed in ANSI TIA-603-C-2004 Section 2.2.1 & 2.2.17

**Environmental Conditions:**

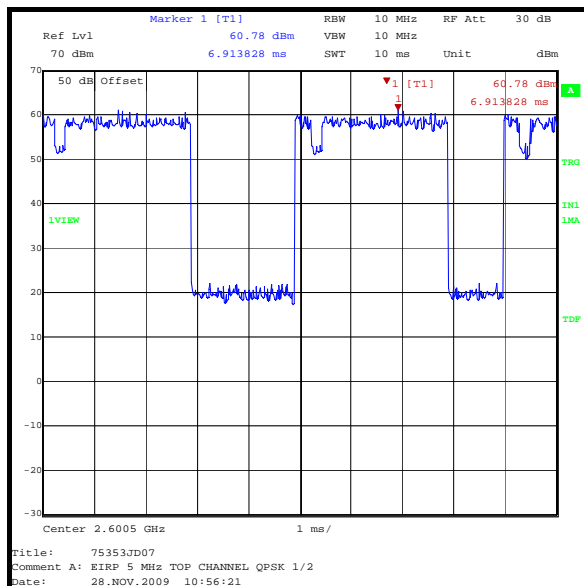
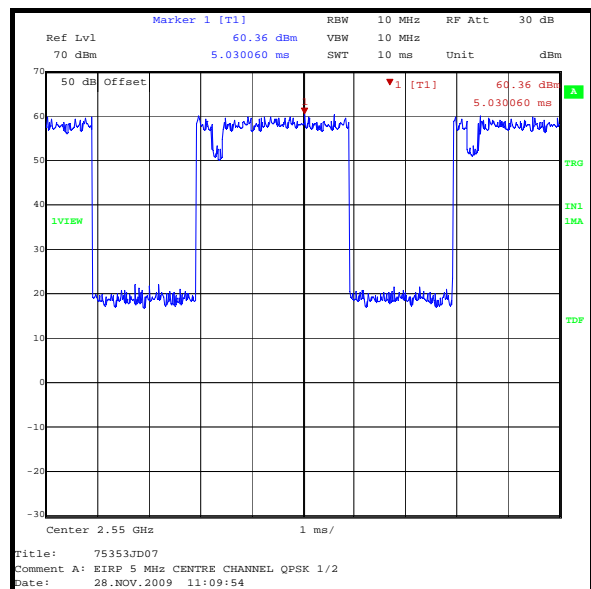
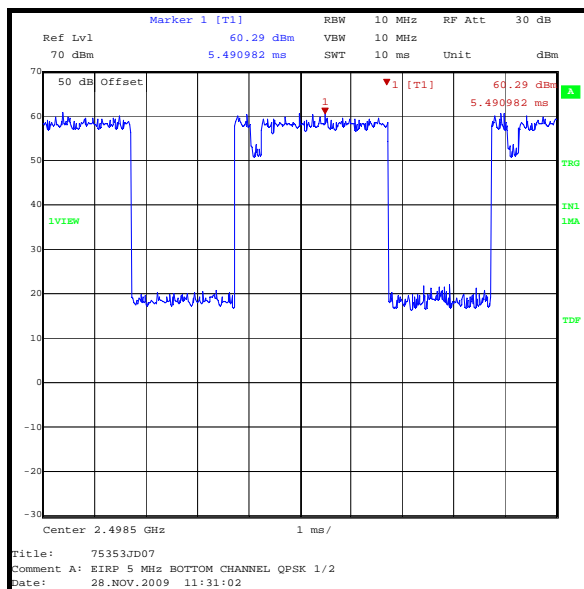
<b>Temperature (°C):</b>	21 to 22
<b>Relative Humidity (%):</b>	26 to 30

**Note(s):**

1. Testing was performed with the sectorised antenna only as this has the highest gain (18 dBi) and is cross polarised.
2. The antenna was mounted vertically on a metal pole using the supplied brackets. The Base Station outdoor unit was also fitted on the metal pole using the supplied brackets in accordance with the Customer's Base Station Installation Manual. The Base Station outdoor unit was positioned below the antenna. This represents a typical user configuration. The centre of the EUT antenna was at a height of 1.5 metres above the chamber floor and directly in line with the measurement antenna. The EUT antenna was positioned in the centre of the anechoic chamber turntable. The Base Station indoor unit was positioned on the chamber floor directly below the outdoor unit and all interconnecting cables run vertically down the pole between both units. Surplus cable was bundled and cable tied. The BS outdoor unit ANT1 and ANT2 ports were connected to both ports on the sectorised antenna using short RF cables with an insertion loss of 0.2 dB.
3. Earthing points on the indoor unit and outdoor unit were connected by earth strap to the metal structure of the test chamber.
4. -48 VDC supply to the EUT during the test was provided by a 120 VAC 60 Hz power supply located outside the anechoic chamber. Interconnecting cables were run through access points in the chamber wall and floor.
5. A Subscriber Station was located outside the anechoic chamber and a suitable support antenna placed inside the anechoic chamber. Interconnecting cables between Subscriber Station and support antenna were run through access points in the chamber wall and floor. A BS-SS link over the radio path was established and packet data sent on the downlink at the maximum data rate to drive the BS to the maximum output power.
6. EIRP was measured with the spectrum analyser span set to 0 Hz in order to perform the measurement in the time domain. The purpose of this was to avoid any additive effect of the power from the Subscriber Station transmitting on the same frequency in close proximity.
7. 50 dB attenuation was used at the input of the spectrum analyser due to high RF levels. This was compensated for by use of a 50 dB RF level offset shown on each plot. All previously measured site attenuation was incorporated into a transducer factor which was enabled on the spectrum analyser.
8. Measurements were made with the EUT transmitting a 5 MHz channel with QPSK 1/2 modulation only as previous testing confirmed similar conducted power with all modulation types.
9. The measurement distance was 3 metres.
10. FCC EIRP limits were calculated in the Transmitter Carrier Output Power section of this report.

**Transmitter Equivalent Isotropic Radiated Power (continued)****Results: FCC / 5 MHz Bandwidth / QPSK1/2**

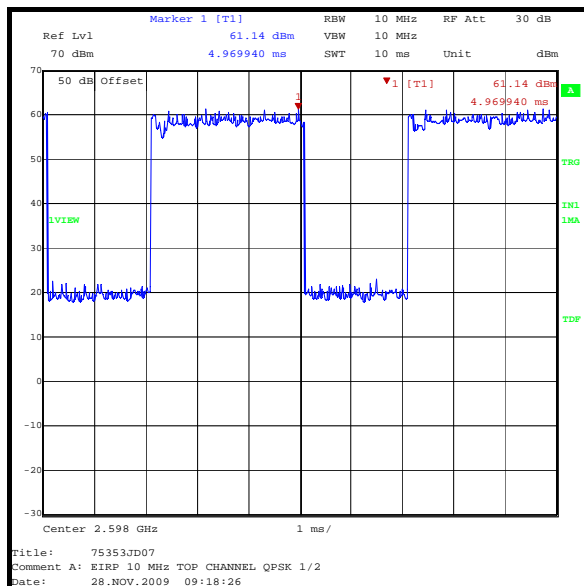
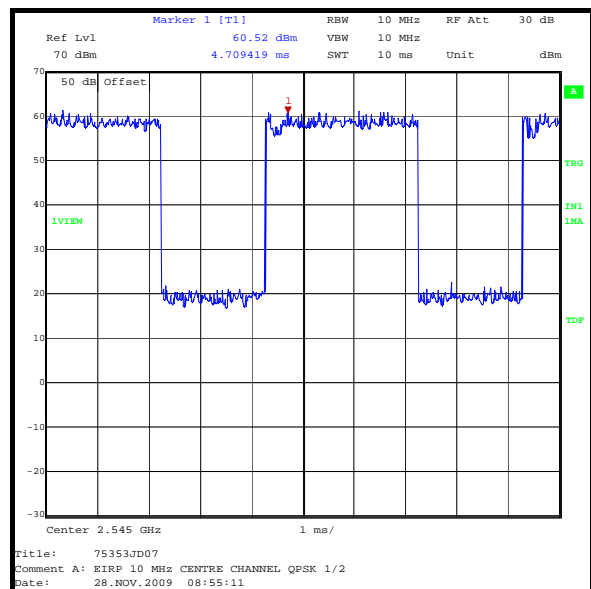
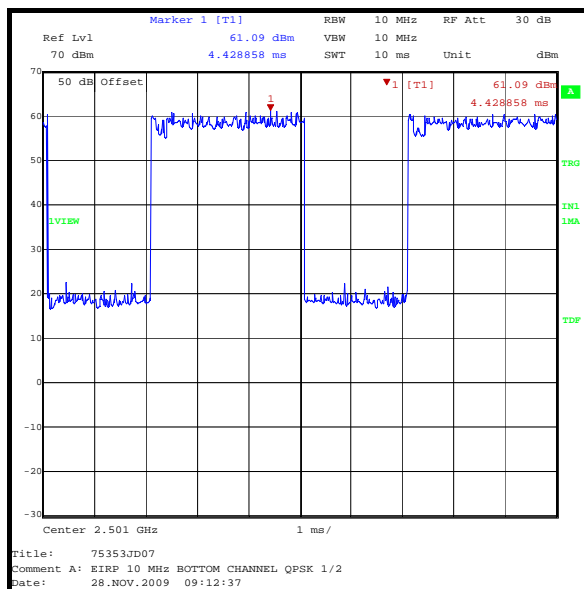
Channel	Frequency (MHz)	EIRP (dBW)	Limit EIRP (dBW)	Margin (dB)	Result
Bottom	2498.5	30.3	40.1	9.8	Complied
Centre	2550.0	30.4	40.1	9.7	Complied
Top	2600.5	30.8	39.7	8.9	Complied





**Transmitter Equivalent Isotropic Radiated Power (continued)****Results: FCC / 10 MHz Bandwidth / QPSK1/2**

Channel	Frequency (MHz)	EIRP (dBW)	Limit EIRP (dBW)	Margin (dB)	Result
Bottom	2501.0	31.1	43.1	12.0	Complied
Centre	2545.0	30.5	43.1	12.6	Complied
Top	2598.0	31.1	42.7	11.6	Complied



**5.2.6. Transmitter Occupied Bandwidth****Test Summary:**

<b>FCC Part:</b>	FCC 2.1049
<b>Test Method Used:</b>	The occupied bandwidth was measured by using the channel bandwidth function of the measurement spectrum analyser.

**Environmental Conditions:**

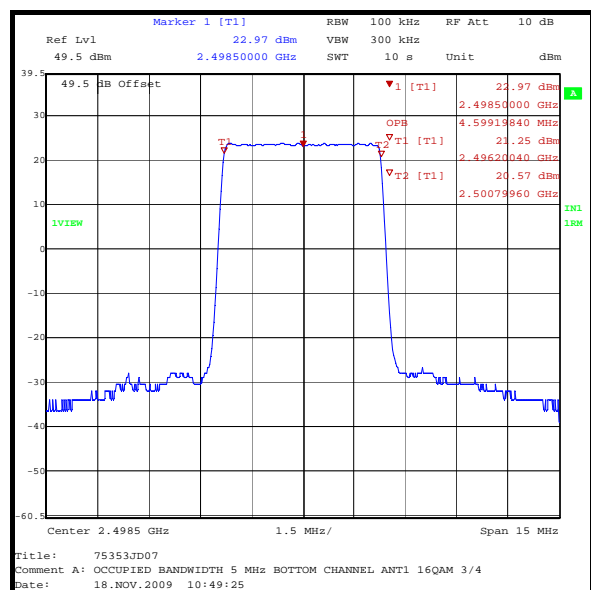
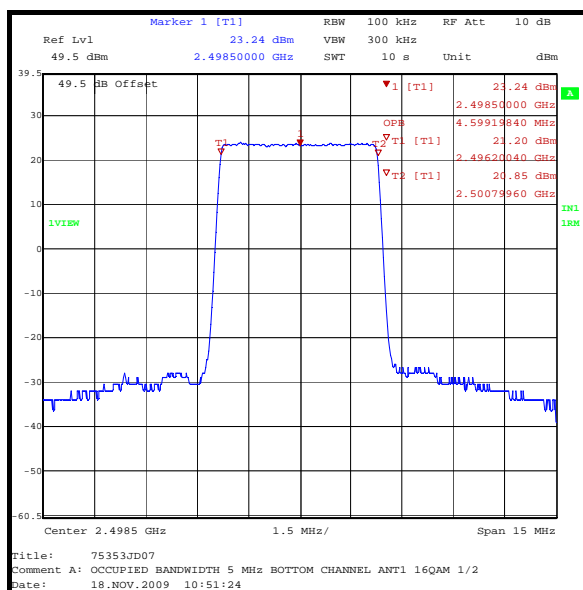
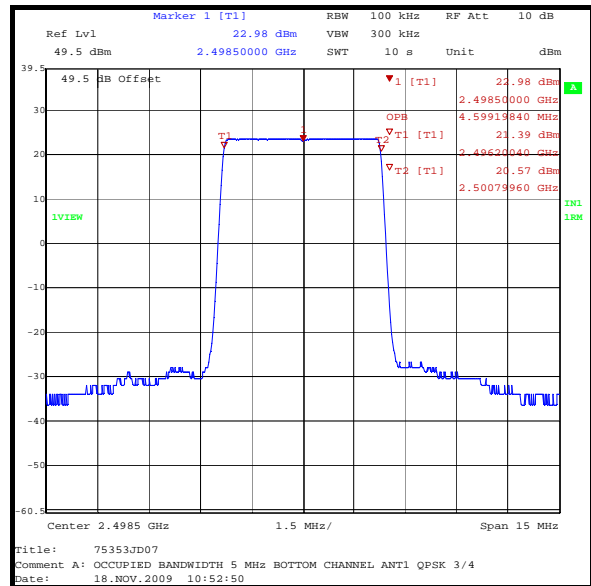
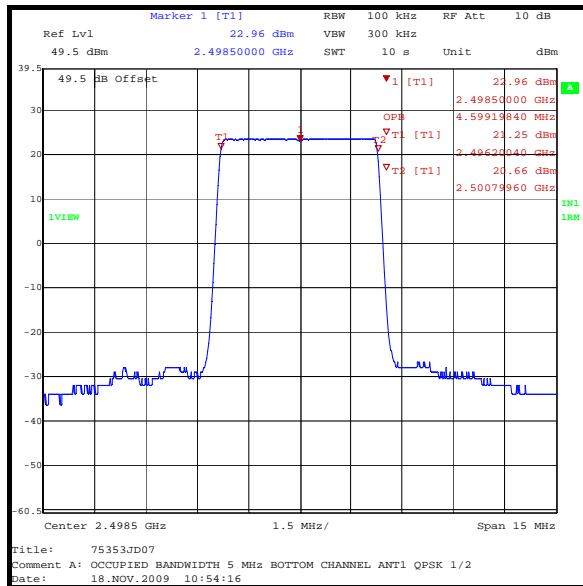
<b>Temperature (°C):</b>	22 to 24
<b>Relative Humidity (%):</b>	31 to 40

**Note(s):**

1. The EUT was configured to transmit at a maximum power on both supported channel bandwidths.
2. Packet data transmission was increased on the downlink until the EUT maximum power and bandwidth had been obtained. Measurements were performed at this point.
3. All modulation types were tested on the ANT1 port. Comparison tests using QPSK 1/2 and 64QAM 5/6 modulation were performed on the ANT2 port.
4. The 99% occupied bandwidth was measured using the occupied bandwidth function of a spectrum analyser. The measurement bandwidths were set automatically by the spectrum analyser based on the EUT 5 MHz and 10 MHz channel widths.

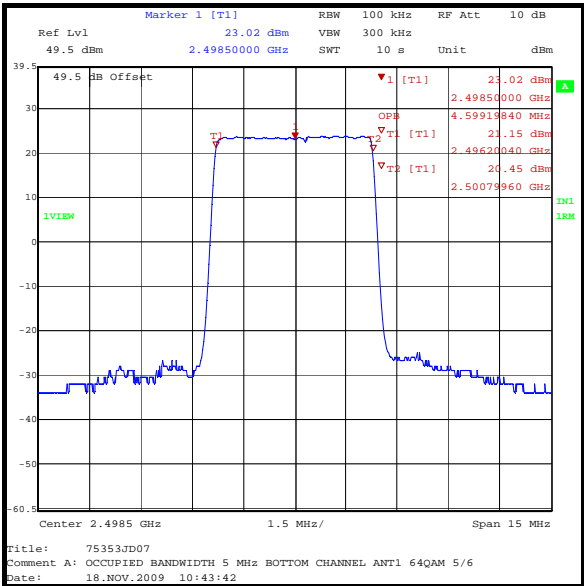
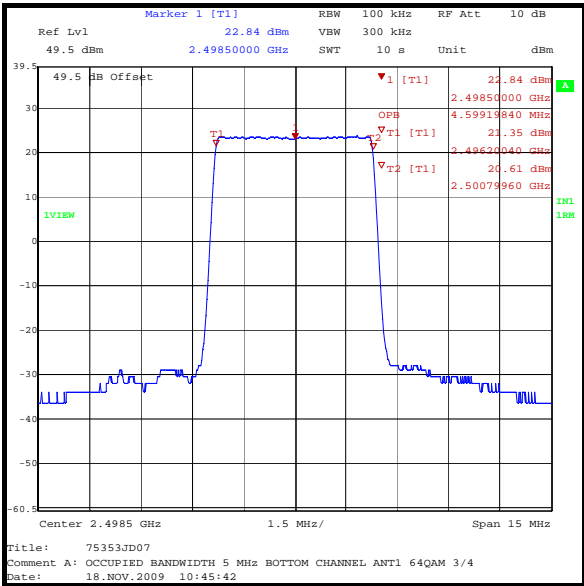
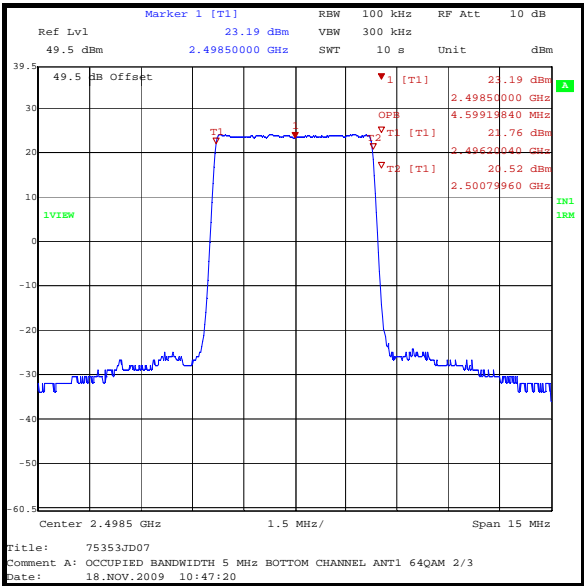
**Transmitter Occupied Bandwidth (continued)****Results: 5 MHz Bandwidth / Bottom channel / 2498.5 MHz**

<b>Modulation</b>	<b>Port</b>	<b>Resolution Bandwidth (kHz)</b>	<b>Video Bandwidth (kHz)</b>	<b>Occupied Bandwidth (MHz)</b>
QPSK 1/2	ANT1	100	300	4.599198
QPSK 3/4	ANT1	100	300	4.599198
16QAM 1/2	ANT1	100	300	4.599198
16QAM 3/4	ANT1	100	300	4.599198
64QAM 2/3	ANT1	100	300	4.599198
64QAM 3/4	ANT1	100	300	4.599198
64QAM 5/6	ANT1	100	300	4.599198
QPSK 1/2	ANT2	100	300	4.599198
64QAM 5/6	ANT2	100	300	4.599198

**Transmitter Occupied Bandwidth (continued)****5 MHz Bandwidth / Bottom channel / 2498.5 MHz / ANT1 Port:**

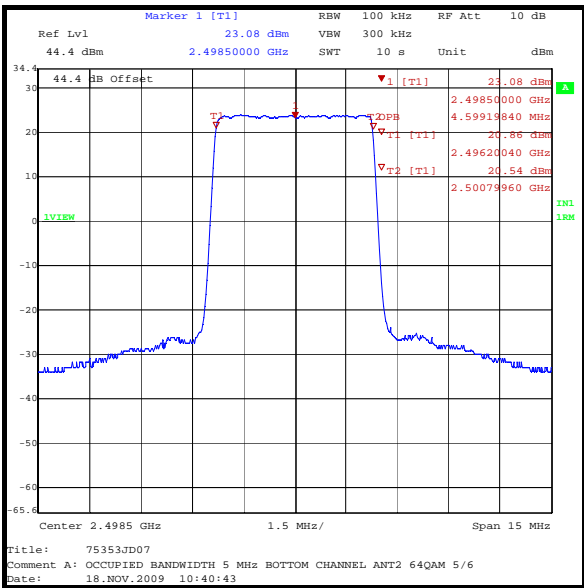
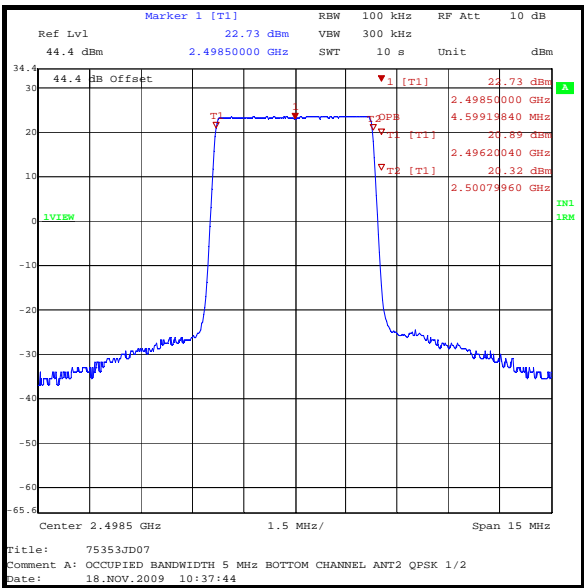
Transmitter Occupied Bandwidth (continued)

5 MHz Bandwidth / Bottom channel / 2498.5 MHz / ANT1 Port:



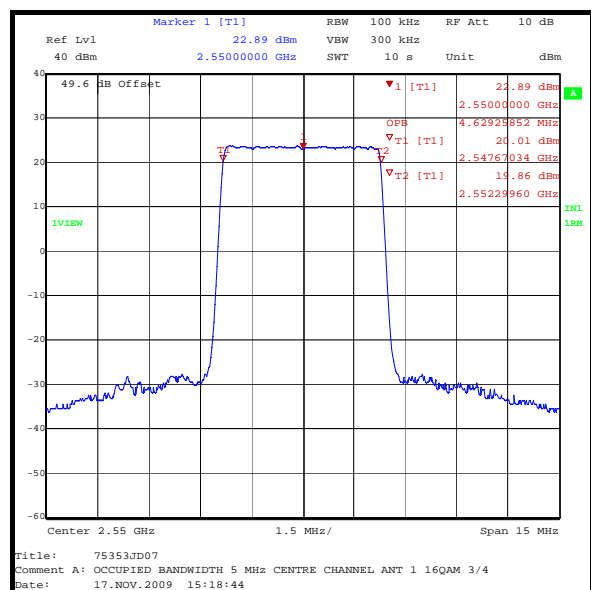
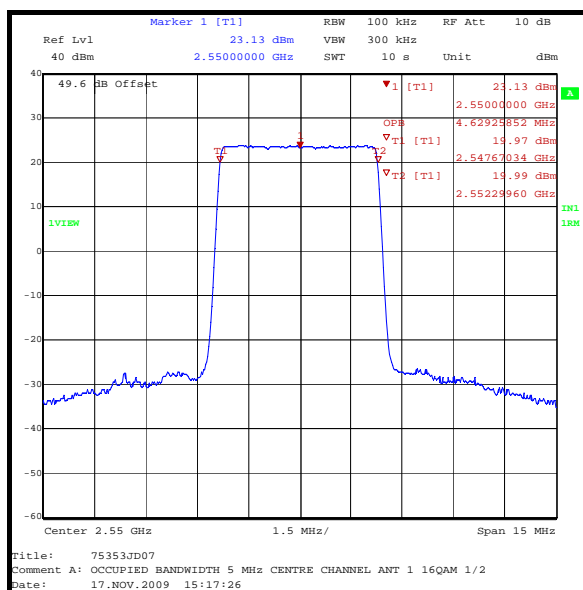
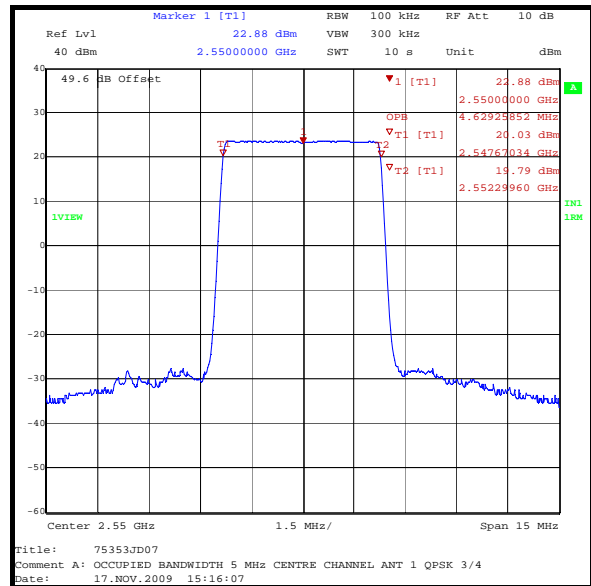
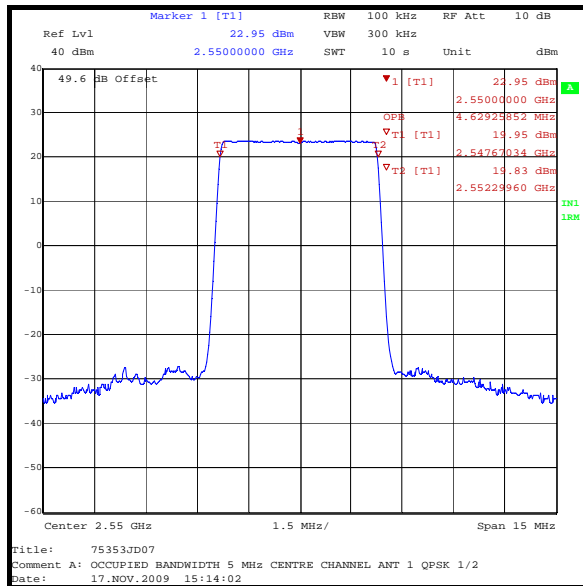
Transmitter Occupied Bandwidth (continued)

5 MHz Bandwidth / Bottom channel / 2498.5 MHz / ANT2 Port:



**Transmitter Occupied Bandwidth (continued)****Results: 5 MHz Bandwidth / Centre channel / 2550 MHz:**

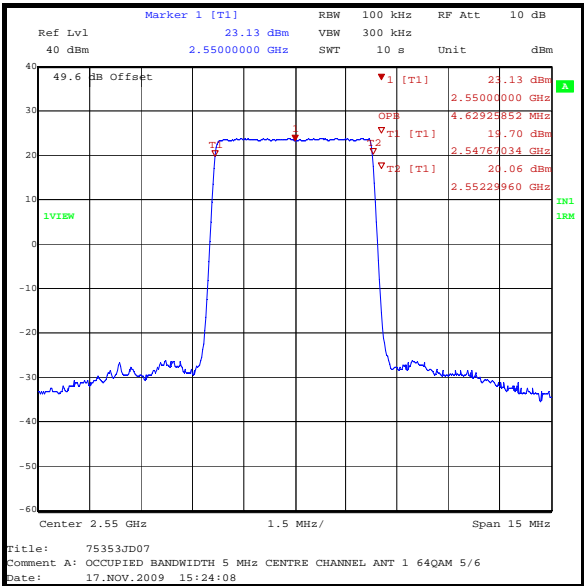
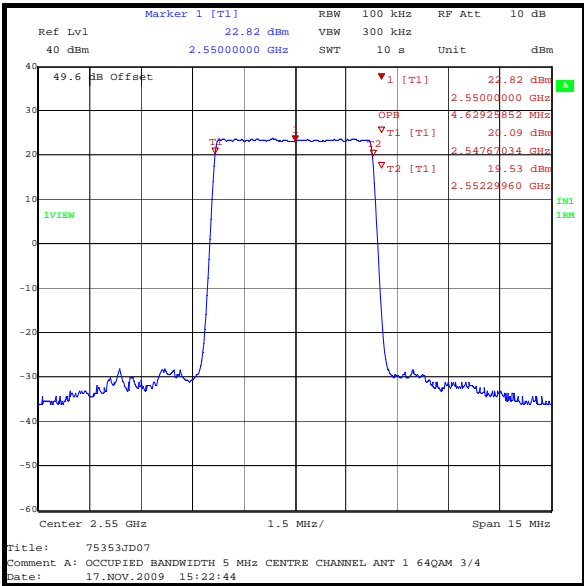
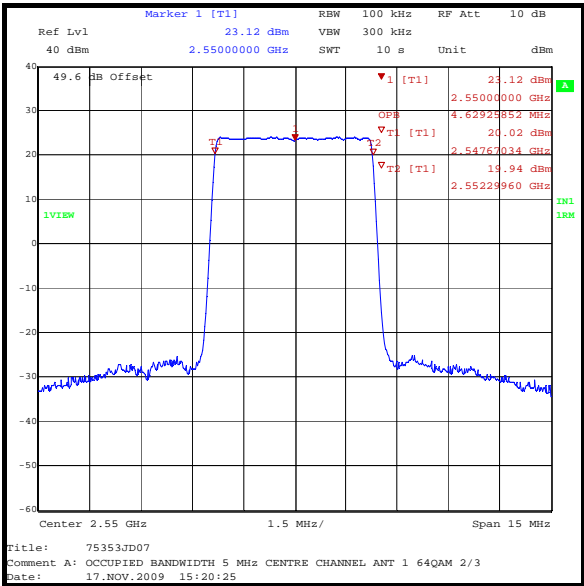
Modulation	Port	Resolution Bandwidth (kHz)	Video Bandwidth (kHz)	Occupied Bandwidth (MHz)
QPSK 1/2	ANT1	100	300	4.629258
QPSK 3/4	ANT1	100	300	4.629258
16QAM 1/2	ANT1	100	300	4.629258
16QAM 3/4	ANT1	100	300	4.629258
64QAM 2/3	ANT1	100	300	4.629258
64QAM 3/4	ANT1	100	300	4.629258
64QAM 5/6	ANT1	100	300	4.629258
QPSK 1/2	ANT2	100	300	4.629258
64QAM 5/6	ANT2	100	300	4.629258

**Transmitter Occupied Bandwidth (continued)****5 MHz Bandwidth / Centre channel / 2550 MHz / ANT1 Port:**



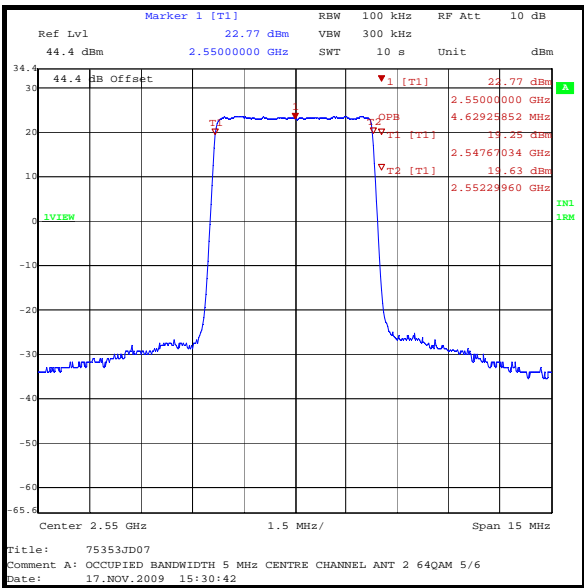
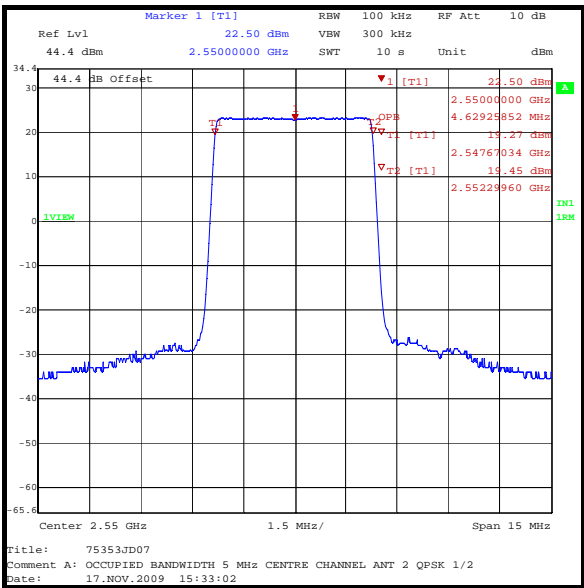
Transmitter Occupied Bandwidth (continued)

5 MHz Bandwidth / Centre channel / 2550 MHz / ANT1 Port:



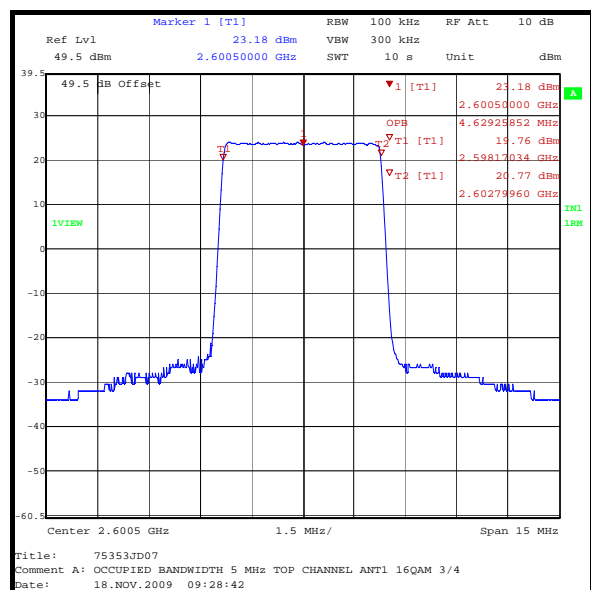
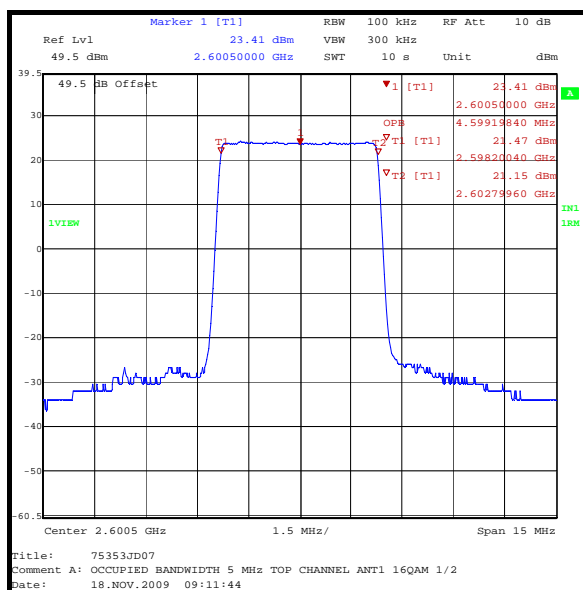
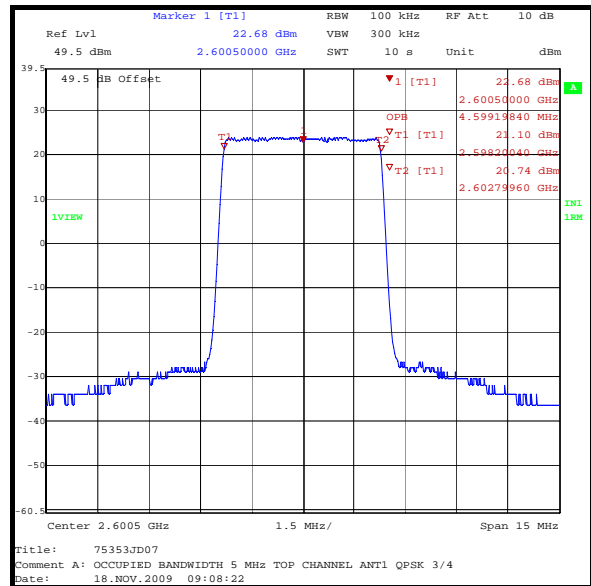
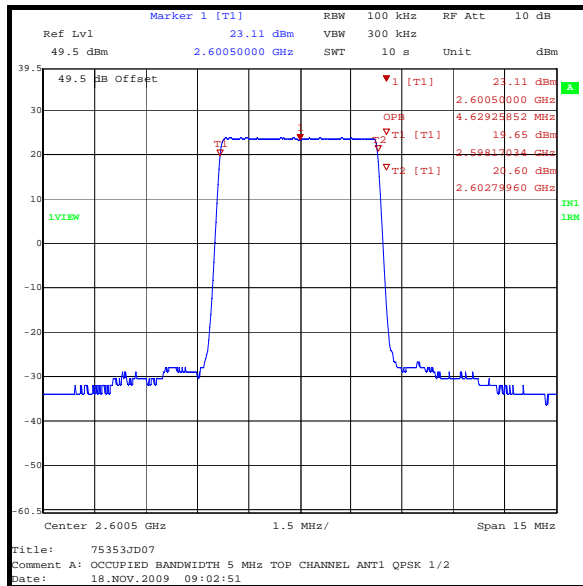
Transmitter Occupied Bandwidth (continued)

5 MHz Bandwidth / Centre channel / 2550 MHz / ANT2 Port:



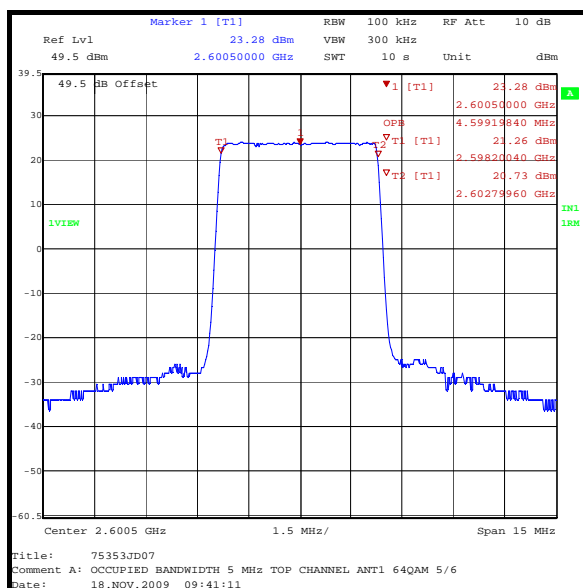
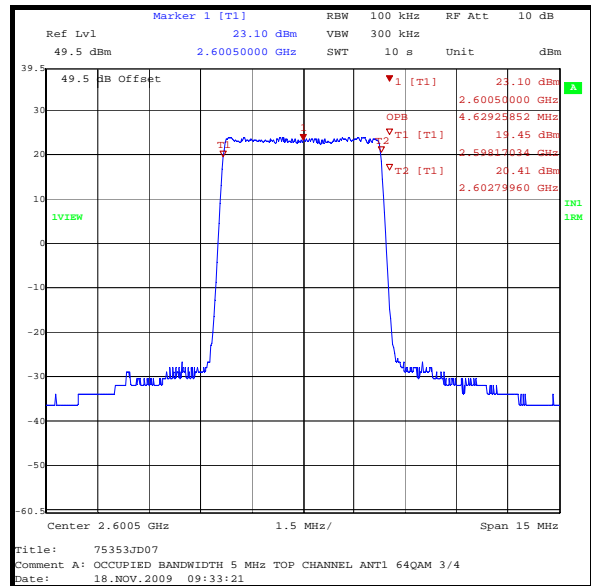
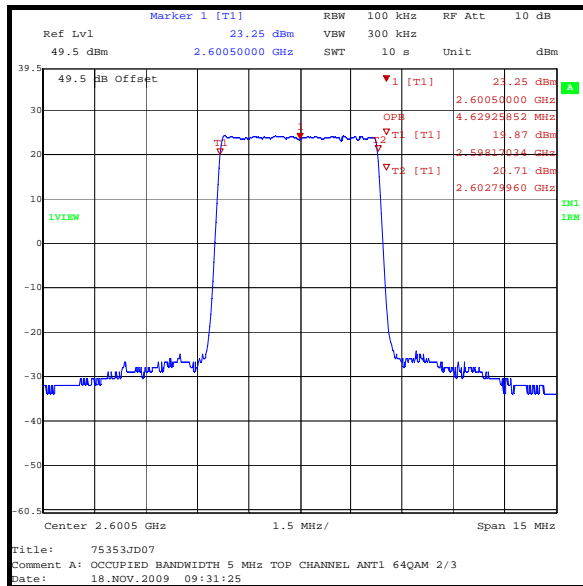
**Transmitter Occupied Bandwidth (continued)****Results: 5 MHz Bandwidth / Top channel / 2600.5 MHz:**

<b>Modulation</b>	<b>Port</b>	<b>Resolution Bandwidth (kHz)</b>	<b>Video Bandwidth (kHz)</b>	<b>Occupied Bandwidth (MHz)</b>
QPSK 1/2	ANT1	100	300	4.629258
QPSK 3/4	ANT1	100	300	4.599198
16QAM 1/2	ANT1	100	300	4.599198
16QAM 3/4	ANT1	100	300	4.629258
64QAM 2/3	ANT1	100	300	4.629258
64QAM 3/4	ANT1	100	300	4.629258
64QAM 5/6	ANT1	100	300	4.599198
QPSK 1/2	ANT2	100	300	4.599198
64QAM 5/6	ANT2	100	300	4.599198

**Transmitter Occupied Bandwidth (continued)****5 MHz Bandwidth / Top channel / 2600.5 MHz / ANT1 Port:**

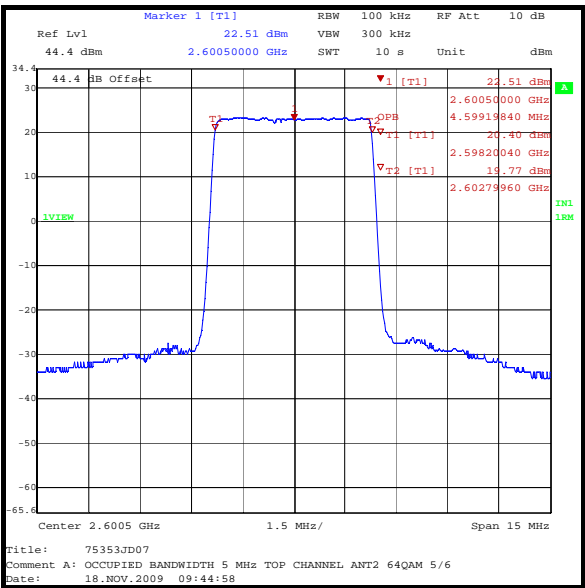
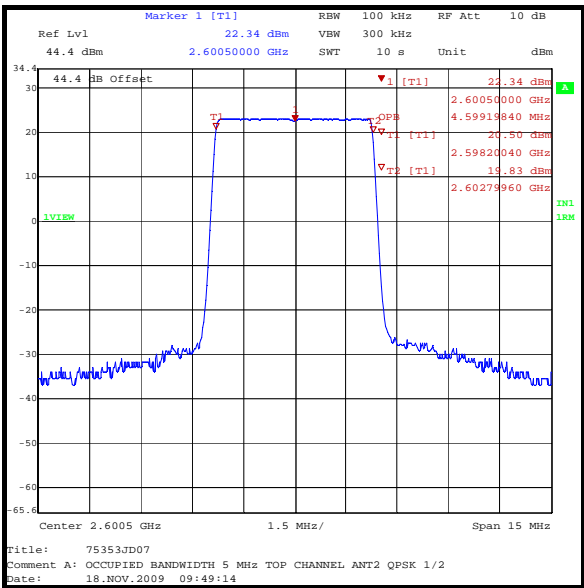
### Transmitter Occupied Bandwidth (continued)

**5 MHz Bandwidth / Top channel / 2600.5 MHz / ANT1 Port:**



Transmitter Occupied Bandwidth (continued)

5 MHz Bandwidth / Top channel / 2600.5 MHz / ANT2 Port

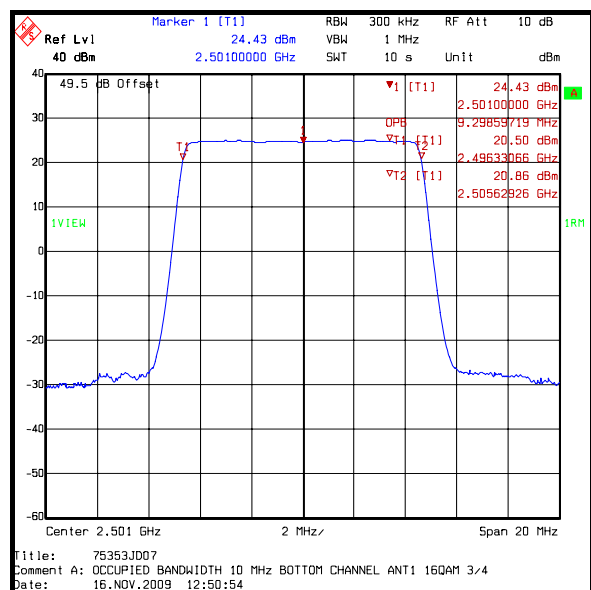
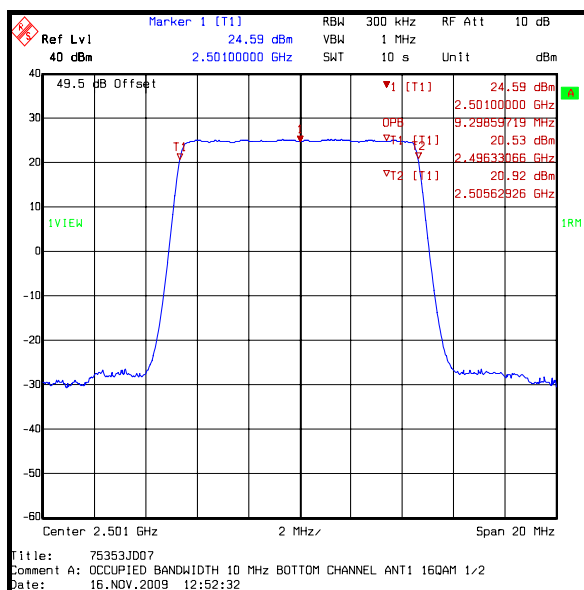
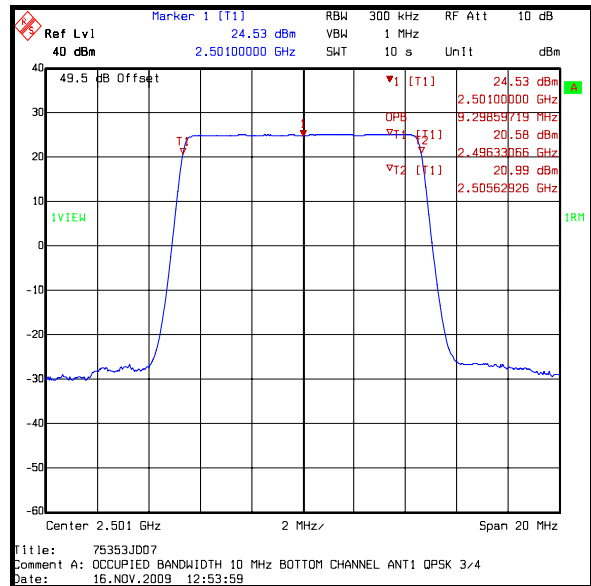
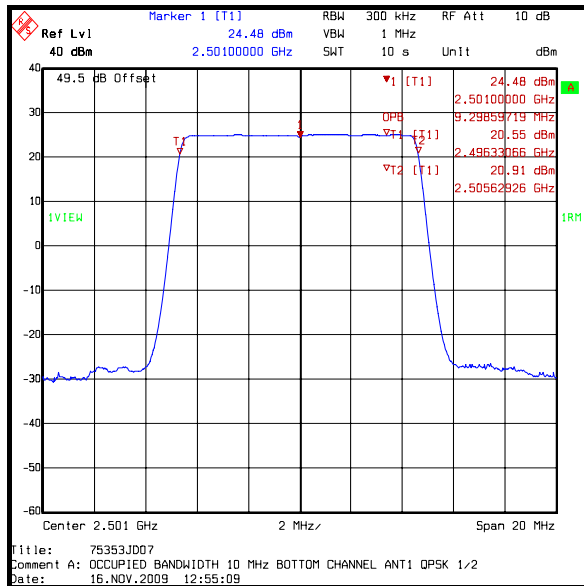


**Transmitter Occupied Bandwidth (continued)****Results: 10 MHz Bandwidth / Bottom channel / 2501 MHz:**

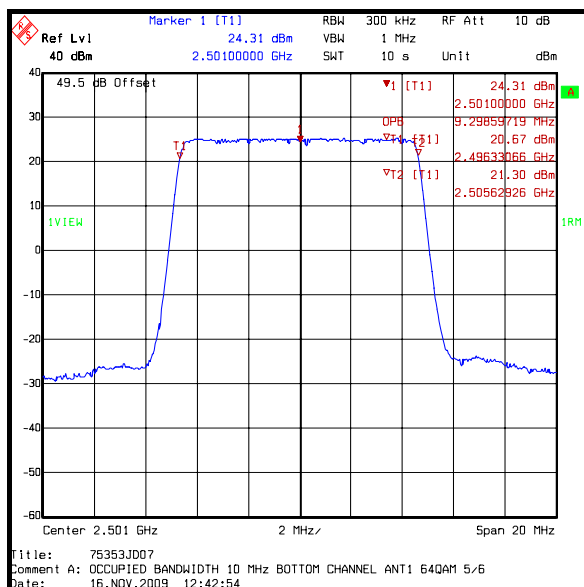
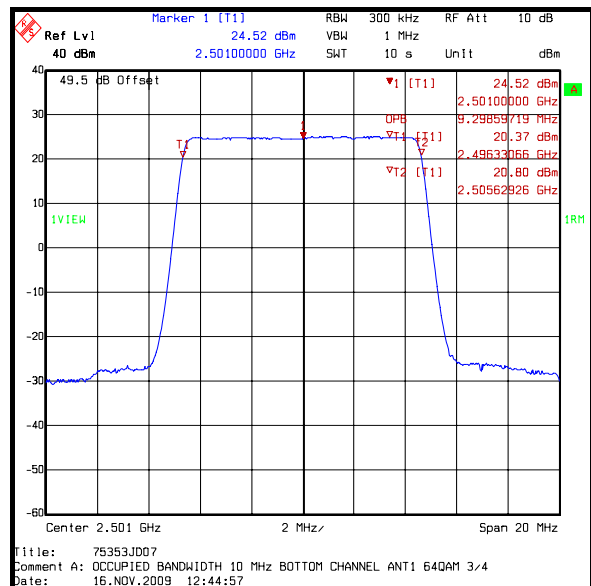
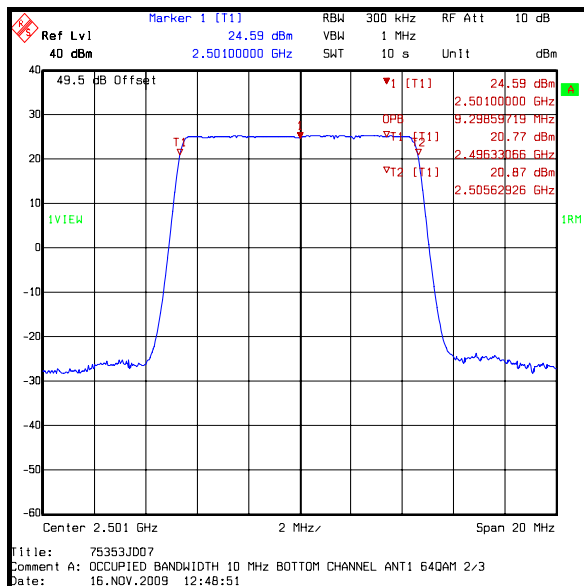
<b>Modulation</b>	<b>Port</b>	<b>Resolution Bandwidth (kHz)</b>	<b>Video Bandwidth (kHz)</b>	<b>Occupied Bandwidth (MHz)</b>
QPSK 1/2	ANT1	300	1000	9.298597
QPSK 3/4	ANT1	300	1000	9.298597
16QAM 1/2	ANT1	300	1000	9.298597
16QAM 3/4	ANT1	300	1000	9.298597
64QAM 2/3	ANT1	300	1000	9.298597
64QAM 3/4	ANT1	300	1000	9.298597
64QAM 5/6	ANT1	300	1000	9.298597
QPSK 1/2	ANT2	300	1000	9.258517
64QAM 5/6	ANT2	300	1000	9.258517

### Transmitter Occupied Bandwidth (continued)

**10 MHz Bandwidth / Bottom channel / 2501 MHz / ANT1 Port**

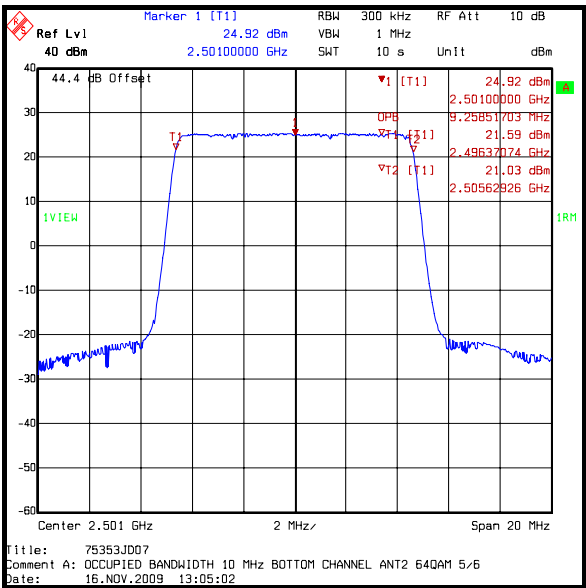
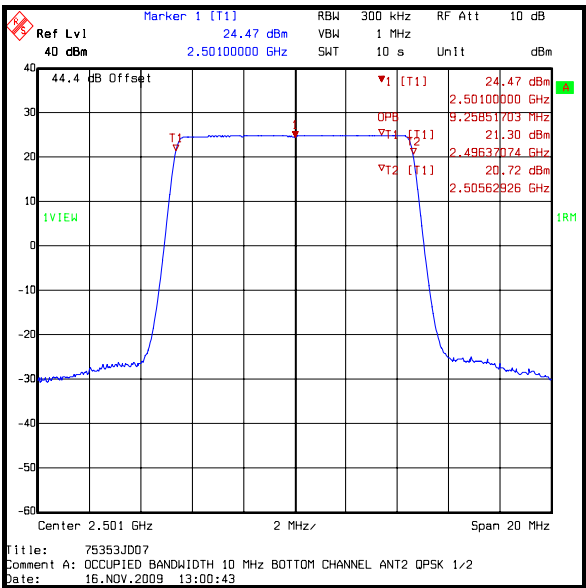




**Transmitter Occupied Bandwidth (continued)****10 MHz Bandwidth / Bottom channel / 2501 MHz / ANT1 Port**

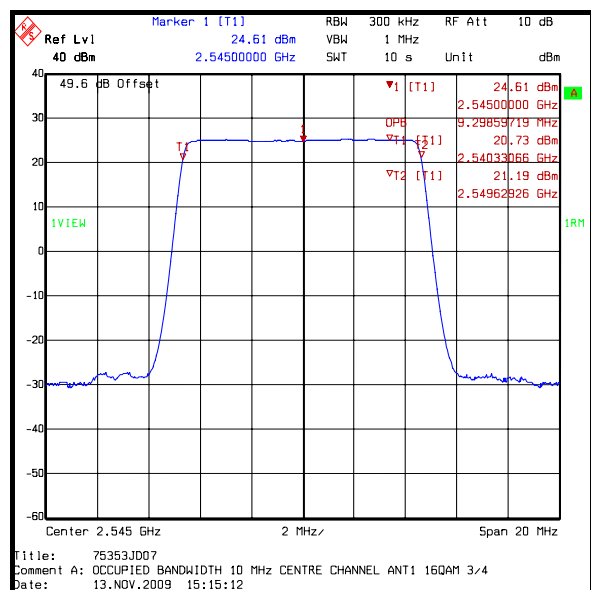
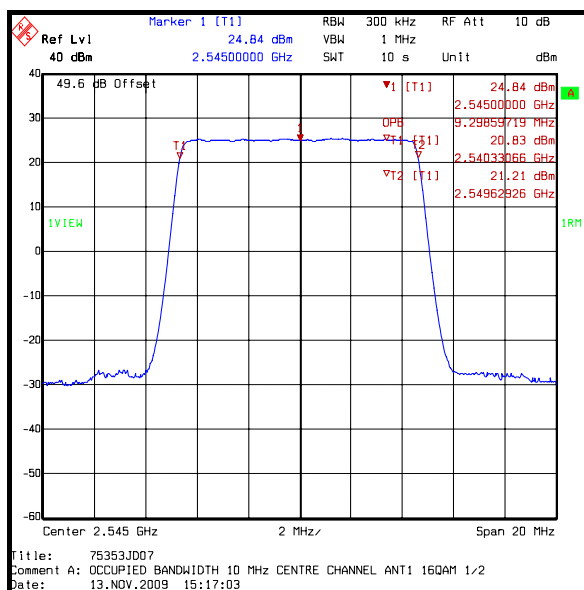
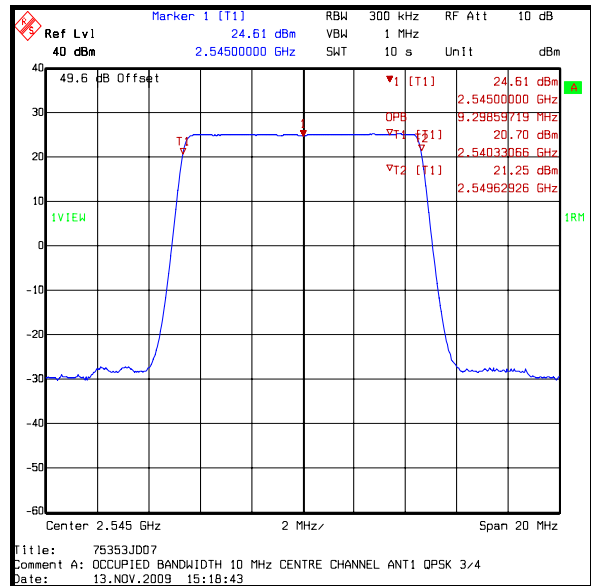
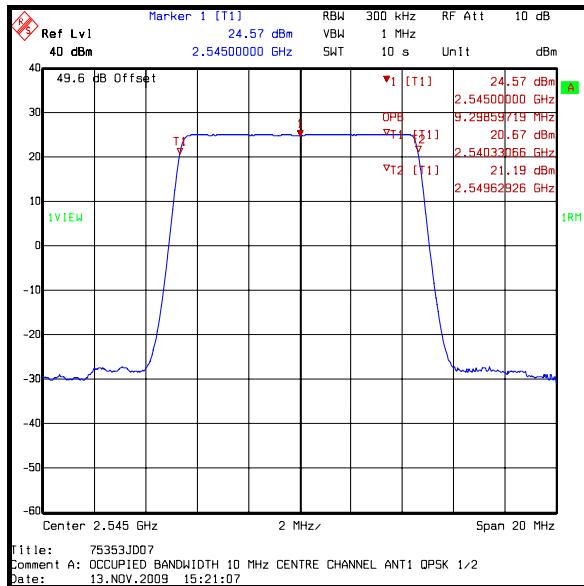
Transmitter Occupied Bandwidth (continued)

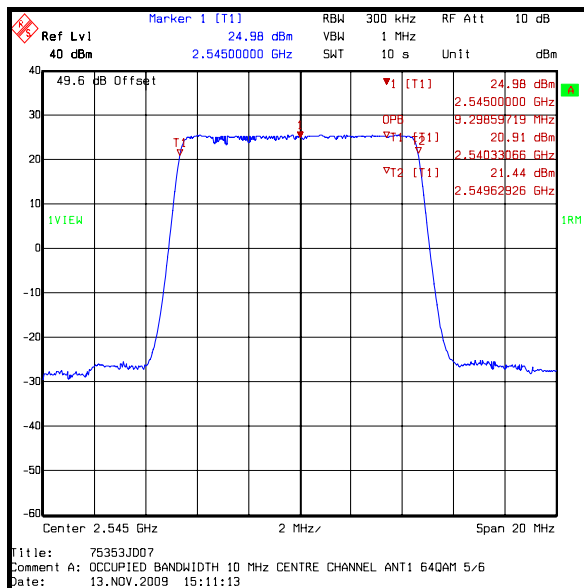
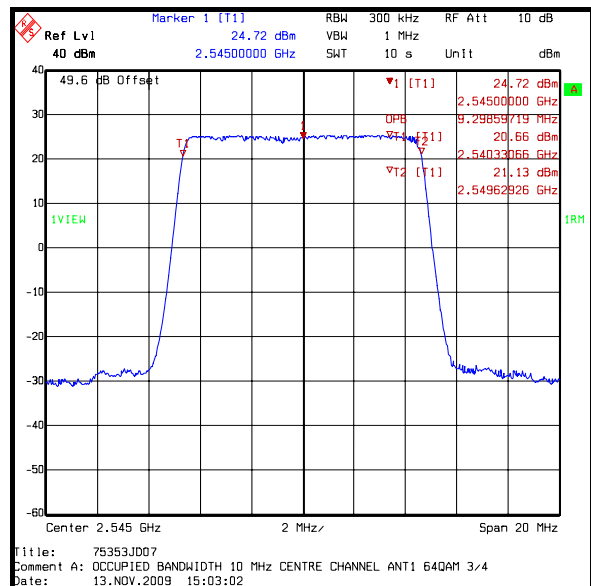
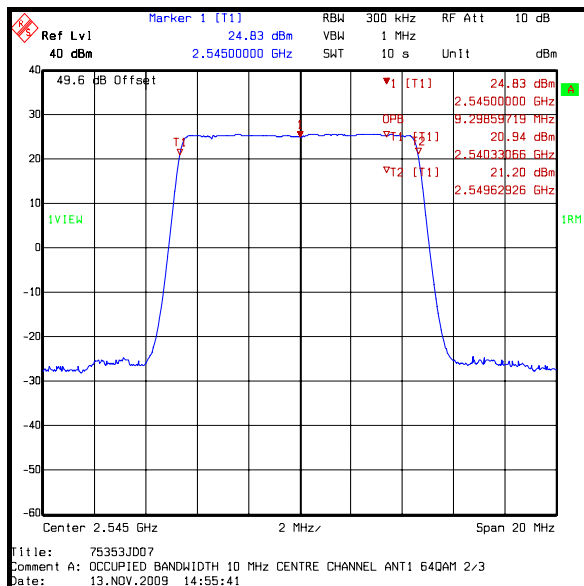
10 MHz Bandwidth / Bottom channel / 2501 MHz / ANT2 Port



**Transmitter Occupied Bandwidth (continued)****Results: 10 MHz Bandwidth / Centre channel / 2545 MHz**

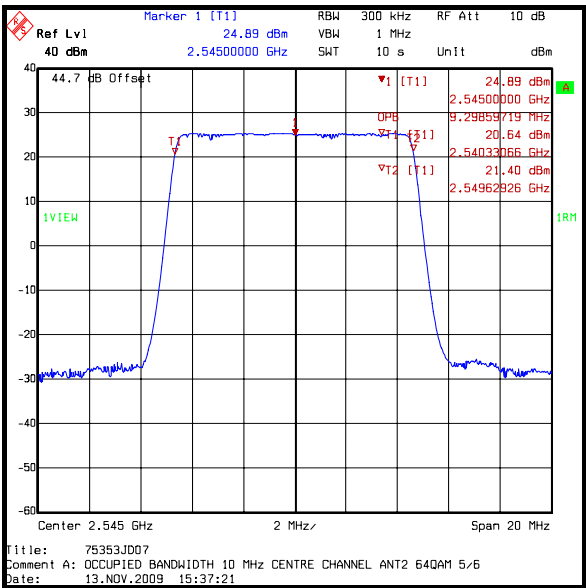
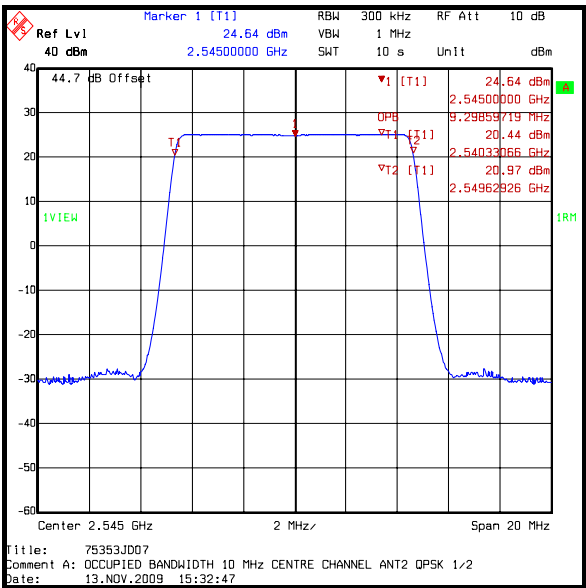
Modulation	Port	Resolution Bandwidth (kHz)	Video Bandwidth (kHz)	Occupied Bandwidth (MHz)
QPSK 1/2	ANT1	300	1000	9.298597
QPSK 3/4	ANT1	300	1000	9.298597
16QAM 1/2	ANT1	300	1000	9.298597
16QAM 3/4	ANT1	300	1000	9.298597
64QAM 2/3	ANT1	300	1000	9.298597
64QAM 3/4	ANT1	300	1000	9.298597
64QAM 5/6	ANT1	300	1000	9.298597
QPSK 1/2	ANT2	300	1000	9.298597
64QAM 5/6	ANT2	300	1000	9.298597

**Transmitter Occupied Bandwidth (continued)****10 MHz Bandwidth / Centre channel / 2545 MHz / ANT1 Port**

**Transmitter Occupied Bandwidth (continued)****10 MHz Bandwidth / Centre channel / 2545 MHz / ANT1 Port**

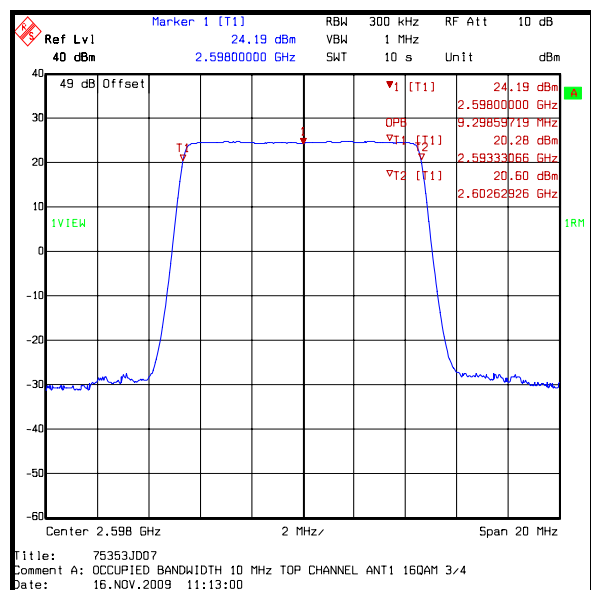
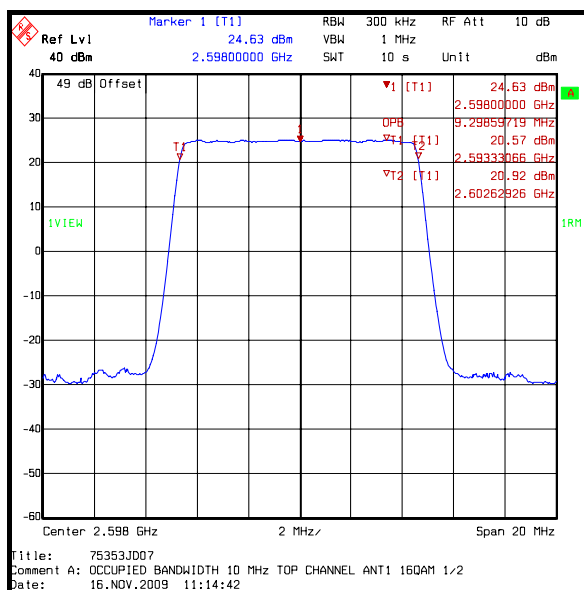
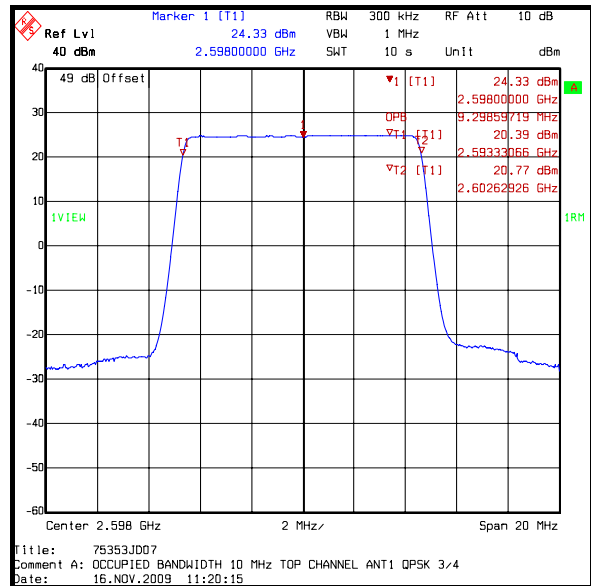
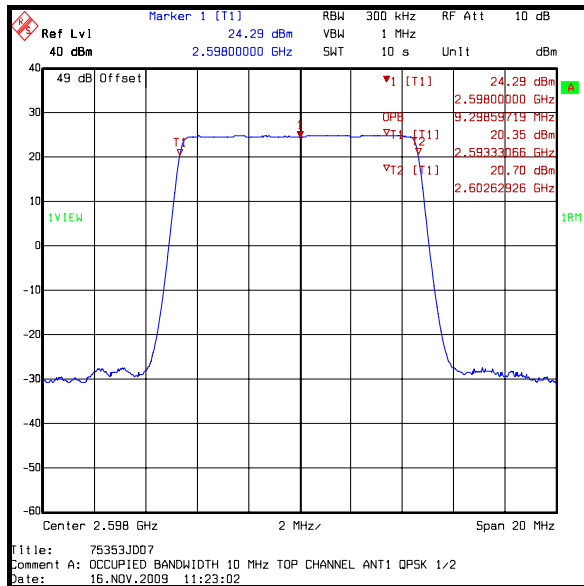
Transmitter Occupied Bandwidth (continued)

10 MHz Bandwidth / Centre channel / 2545 MHz / ANT2 Port

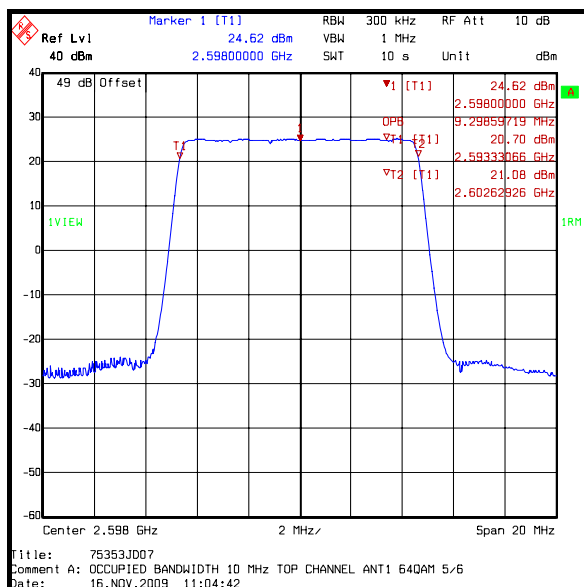
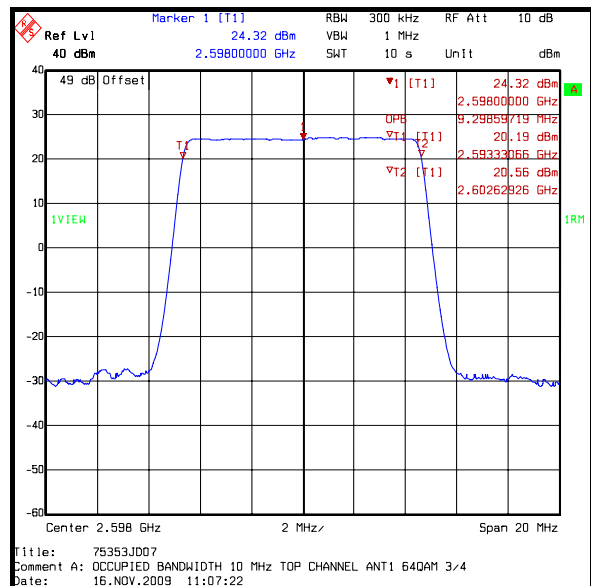
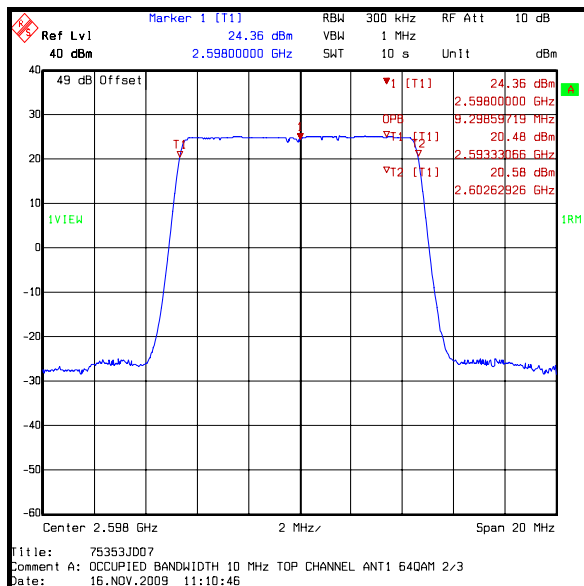


**Transmitter Occupied Bandwidth (continued)****Results: 10 MHz Bandwidth / Top channel / 2598 MHz**

<b>Modulation</b>	<b>Port</b>	<b>Resolution Bandwidth (kHz)</b>	<b>Video Bandwidth (kHz)</b>	<b>Occupied Bandwidth (MHz)</b>
QPSK 1/2	ANT1	300	1000	9.298597
QPSK 3/4	ANT1	300	1000	9.298597
16QAM 1/2	ANT1	300	1000	9.298597
16QAM 3/4	ANT1	300	1000	9.298597
64QAM 2/3	ANT1	300	1000	9.298597
64QAM 3/4	ANT1	300	1000	9.298597
64QAM 5/6	ANT1	300	1000	9.298597
QPSK 1/2	ANT2	300	1000	9.298597
64QAM 5/6	ANT2	300	1000	9.298597

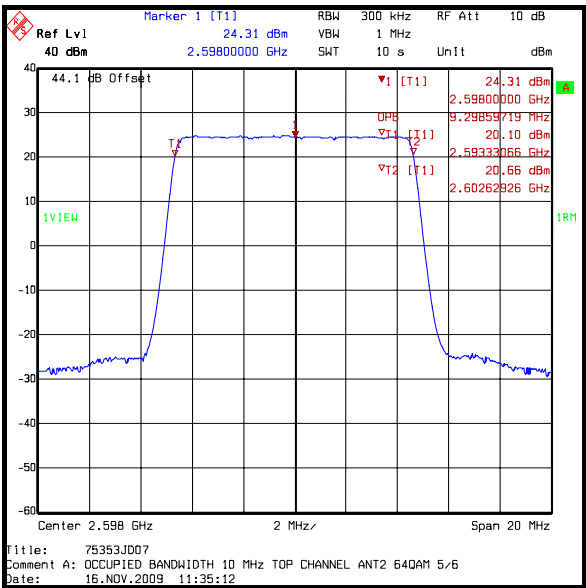
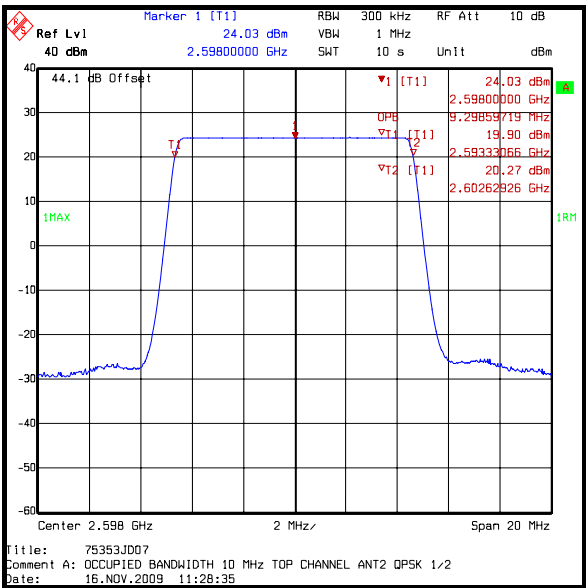
**Transmitter Occupied Bandwidth (continued)****10 MHz Bandwidth / Top channel / 2598 MHz / ANT1 Port**



**Transmitter Occupied Bandwidth (continued)****10 MHz Bandwidth / Top channel / 2598 MHz / ANT1 Port**

Transmitter Occupied Bandwidth (continued)

10 MHz Bandwidth / Top channel / 2598 MHz / ANT2 Port



**5.2.7. Transmitter 6dB Bandwidth and 26 dB Bandwidth****Test Summary:**

<b>FCC Part:</b>	27.53(m)(6)
<b>Test Method Used:</b>	As detailed in ANSI C63.4 Section 13.1.7 and relevant annexes.

**Environmental Conditions:**

<b>Temperature (°C):</b>	22 to 24
<b>Relative Humidity (%):</b>	34 to 37

**Note(s):**

1. The EUT was configured to transmit at a maximum power on both supported channel bandwidths.
2. Packet data transmission was increased on the downlink until the EUT maximum power and bandwidth had been obtained. Measurements were performed at this point.
3. Measurement bandwidth was set to approximately 1% of the emission bandwidth. Video bandwidth was set to three times the emission bandwidth or as close to three times the emission bandwidth as the spectrum analyser allows.
4. 20 dB bandwidth tests were previously performed on all modulation types and all channels. No noticeable difference was observed in the 20 dB bandwidth on any channel or modulation type. Therefore 6dB bandwidth and 26 dB bandwidth tests were only performed on the centre channels using QPSK 1/2 and 64QAM 5/6 modulation.

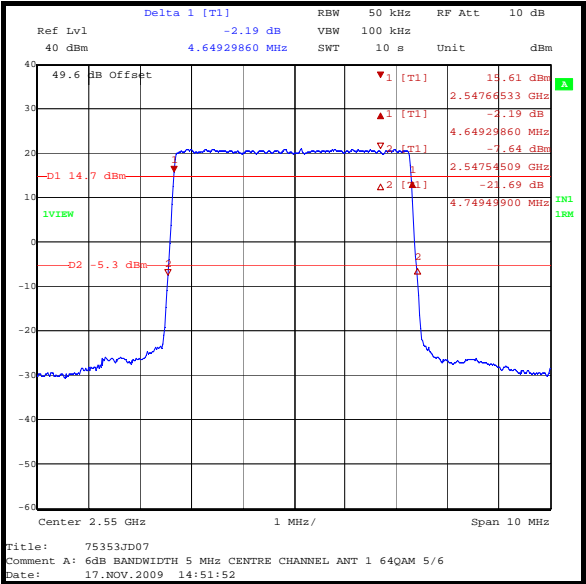
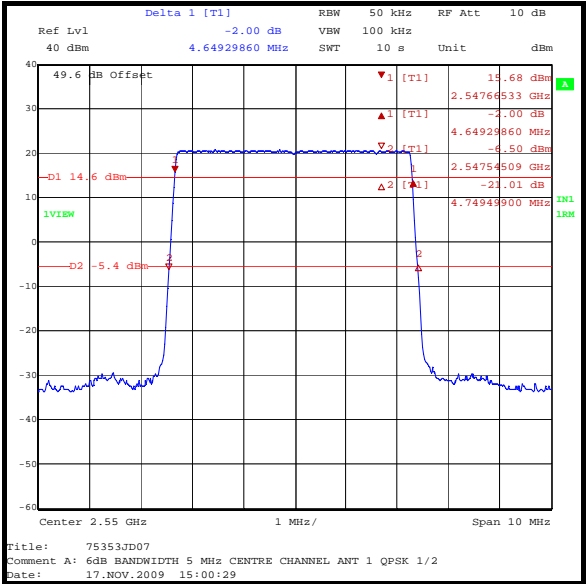
Transmitter 6dB Bandwidth and 26 dB Bandwidth (continued)

Results: 5 MHz Channel Bandwidth / Centre channel / 2550 MHz / ANT1 Port/ 6 dB Bandwidth

Modulation	Port	Resolution Bandwidth (kHz)	Video Bandwidth (kHz)	6dB Bandwidth (MHz)
QPSK 1/2	ANT1	50	100	4.649299
64QAM 5/6	ANT1	50	100	4.649299

Results: 5 MHz Channel Bandwidth / Centre channel / 2550 MHz / ANT1 Port/ 26 dB Bandwidth

Modulation	Port	Resolution Bandwidth (kHz)	Video Bandwidth (kHz)	26dB Bandwidth (MHz)
QPSK 1/2	ANT1	50	100	4.749499
64QAM 5/6	ANT1	50	100	4.749499

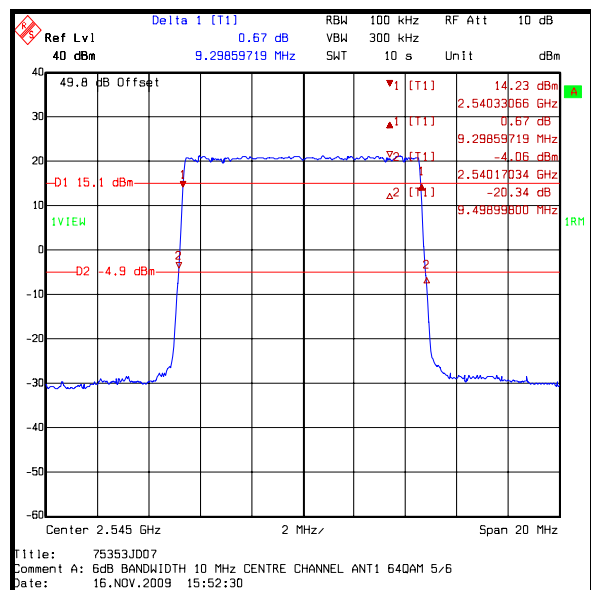
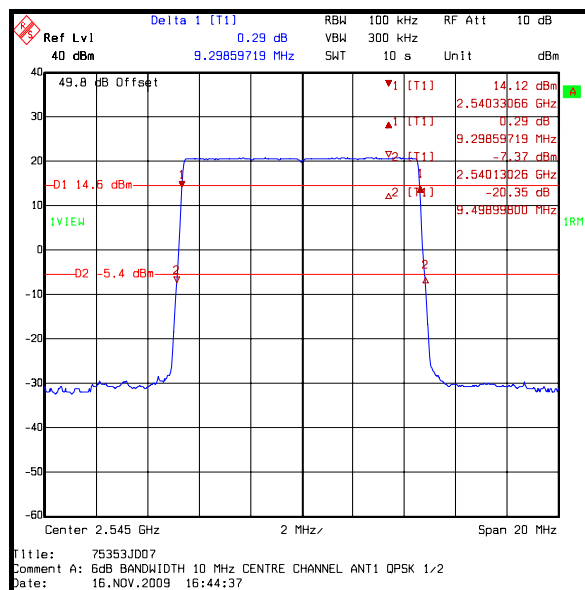


**Transmitter 6dB Bandwidth and 26 dB Bandwidth (continued)****Results: 10 MHz Channel Bandwidth / Centre channel / 2545 MHz / ANT1 Port**

Modulation	Port	Resolution Bandwidth (kHz)	Video Bandwidth (kHz)	6 dB Bandwidth (MHz)
QPSK 1/2	ANT1	100	300	9.298597
64QAM 5/6	ANT1	100	300	9.298597

**Results: 10 MHz Channel Bandwidth / Centre channel / 2550 MHz / ANT1 Port/ 26 dB Bandwidth**

Modulation	Port	Resolution Bandwidth (kHz)	Video Bandwidth (kHz)	26dB Bandwidth (MHz)
QPSK 1/2	ANT1	100	300	9.498998
64QAM 5/6	ANT1	100	300	9.498998



**5.2.8. Transmitter Frequency Stability (Temperature Variation)****Test Summary:**

<b>FCC Part:</b>	FCC 2.1055(a)(1) and FCC 27.54
<b>Test Method Used:</b>	FCC 2.1055(a)(1) – Centre frequency was measured and compared to the upper or lower authorised frequency band. The margin to the limit was recorded

**Environmental Conditions:**

<b>Ambient Temperature Variation (°C):</b>	26
<b>Ambient Relative Humidity (%):</b>	33

**Note(s):**

1. It was not possible to turn the modulation off. Measurements were made with the EUT transmitting a 5 MHz channel at maximum power with QPSK1/2 modulation.
2. A measurement bandwidth of 100 kHz (>1% of the emission bandwidth) was used and frequency recorded where the carrier intersected the -20 dBc points closest to the applicable band edge.
3. The centre of the top channel is approximately 90 MHz from the FCC upper band edge at 2690 MHz.
4. A minimum 30 minute stabilisation period was used between temperature changes before measurements were made. Measurements were performed once the transmitter frequency had stabilised.
5. Temperature within the test chamber was monitored using a calibrated digital thermometer.

**Limits:**

The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

**5.2.9. Transmitter Frequency Stability - Temperature Variation (continued)****Results: Lower band edge / 5 MHz Channel Bandwidth / Bottom channel / ANT1 Port**

Temperature (°C)	Measured Frequency (MHz) at lower -20 dB edge	Band Edge (MHz)	$\Delta$ Lower -20 dB edge to lower band edge (kHz)	Result
-30	2496.014830	2496.0	14.830	Complied
-20	2496.013940	2496.0	13.940	Complied
-10	2496.019240	2496.0	19.240	Complied
0	2496.019240	2496.0	19.240	Complied
10	2496.023960	2496.0	23.960	Complied
20	2496.035070	2496.0	35.070	Complied
30	2496.035670	2496.0	35.670	Complied
40	2496.033870	2496.0	33.870	Complied
50	2496.029460	2496.0	29.460	Complied

**Results: Upper band edge / 5 MHz Channel Bandwidth / Top channel / ANT1 Port**

Temperature (°C)	Measured Frequency (MHz) at upper -20 dB edge	Band Edge (MHz)	$\Delta$ Upper -20 dB edge to upper band edge (kHz)	Result
-30	2602.974950	2690.0	87025.050	Complied
-20	2602.974950	2690.0	87025.050	Complied
-10	2602.974950	2690.0	87025.050	Complied
0	2602.974950	2690.0	87025.050	Complied
10	2602.994990	2690.0	87005.010	Complied
20	2602.974950	2690.0	87025.050	Complied
30	2602.994990	2690.0	87005.010	Complied
40	2602.974950	2690.0	87025.050	Complied
50	2602.974950	2690.0	87025.050	Complied

**5.2.10. Transmitter Frequency Stability (Voltage Variation)****Test Summary:**

<b>FCC Part:</b>	FCC 2.1055 and FCC 27.54
<b>Test Method Used:</b>	FCC 2.1055(a)(1) – Centre frequency was measured and compared to the upper or lower authorised frequency band. The margin to the limit was recorded

**Environmental Conditions:**

<b>Temperature Variation (°C):</b>	20
<b>Relative Humidity (%):</b>	43

**Results: FCC Lower band edge / 5 MHz Channel Bandwidth / Bottom channel / ANT1 Port**

Supply voltage (VDC)	Measured Frequency (MHz) at lower -20 dB edge	Band Edge (MHz)	$\Delta$ Lower -20 dB edge to lower band edge (kHz)	Result
-40.8	2496.035070	2496.0	35.070	Complied
-48	2496.035070	2496.0	35.070	Complied
-55.2	2496.035070	2496.0	35.070	Complied

**Results: FCC Upper band edge / 5 MHz Channel Bandwidth / Top channel / ANT1 Port**

Temperature (°C)	Measured Frequency (MHz) at upper -20 dB edge	Band Edge (MHz)	$\Delta$ Upper -20 dB edge to upper band edge (kHz)	Result
-40.8	2602.974950	2690.0	87025.050	Complied
-48	2602.974950	2690.0	87025.050	Complied
-55.2	2602.974950	2690.0	87025.050	Complied



**5.2.11. Transmitter Conducted Emissions****Test Summary:**

<b>FCC Part:</b>	FCC 2.1051 and FCC Part 27.53(m)(2)
<b>Test Method Used:</b>	FCC Part 27.53(m)(6) & EIA/TIA-6030C 2.2.13.1, 2.2.13.2(d)

**Environmental Conditions:**

<b>Temperature (°C):</b>	22
<b>Relative Humidity (%):</b>	46

**Note(s):**

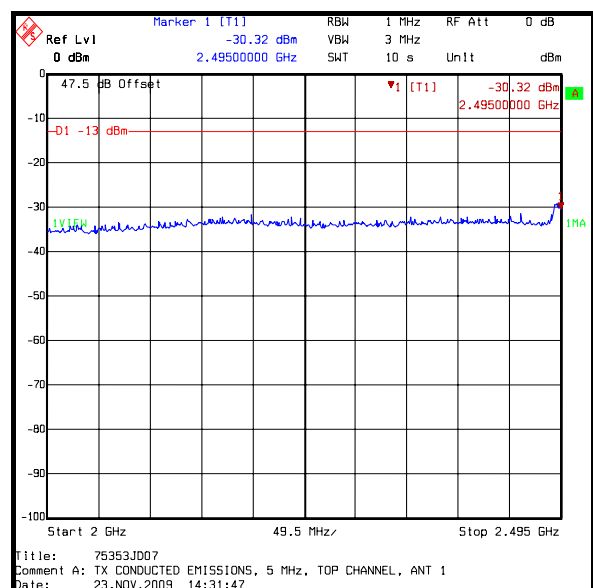
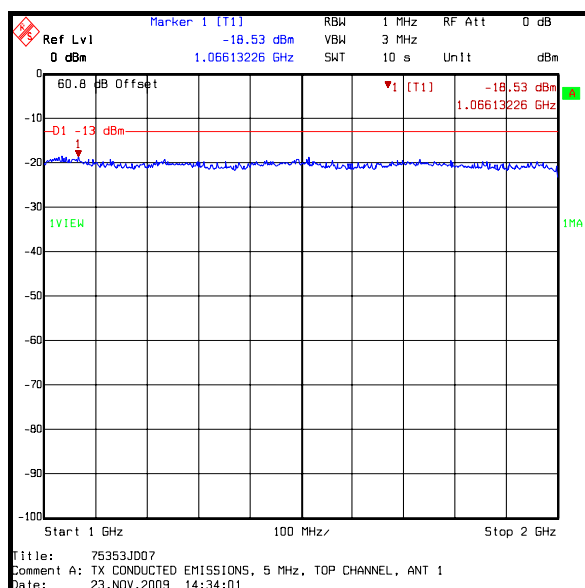
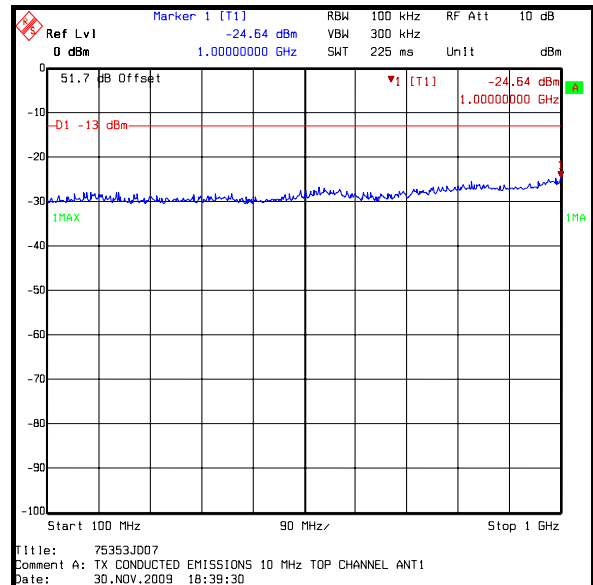
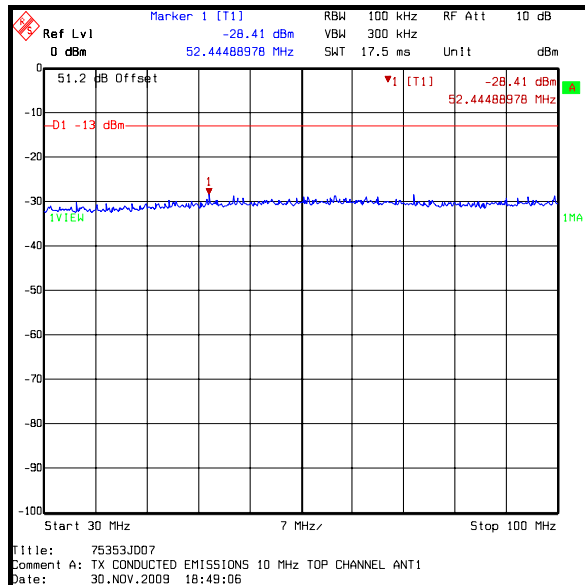
1. Measurements were made on the ANT1 and ANT2 ports. Individual attenuators and directional couplers were connected to both ports. The through paths of both directional couplers were connected to a subscriber station main and diversity ports by cables and additional attenuation. The coupled path of each directional coupler was connected to the measurement equipment by suitable RF cables. The path loss between antenna ports and measurement equipment was used as an RF level offset on the measurement equipment.
2. Pre-scans were performed with a peak detector. The EUT was transmitting a 5 MHz channel and QPSK 1/2 modulation at maximum power with packet data transmitted on the downlink at the maximum supported rate. All modulation types were checked on both EUT RF ports and both supported channel widths.
3. Final measurements were performed using appropriate RF attenuators and filters where required.
4. The emission shown on the pre-scan plot at approximately 5195 MHz was investigated and found to be the second harmonic of the top channel. The test was repeated using a 3 GHz high pass filter to suppress the carrier. The emission level reduced to below the level of the measurement system noise floor when the filter was used. The second harmonics of the bottom and centre channels were checked and also found to be below the measurement system noise floor when using the same measurement technique.
5. Any other emissions shown on the pre-scan plots were investigated and found to be >20dB below the applicable limit or below the level of the measurement system noise floor. Therefore the highest level of the noise floor was recorded.

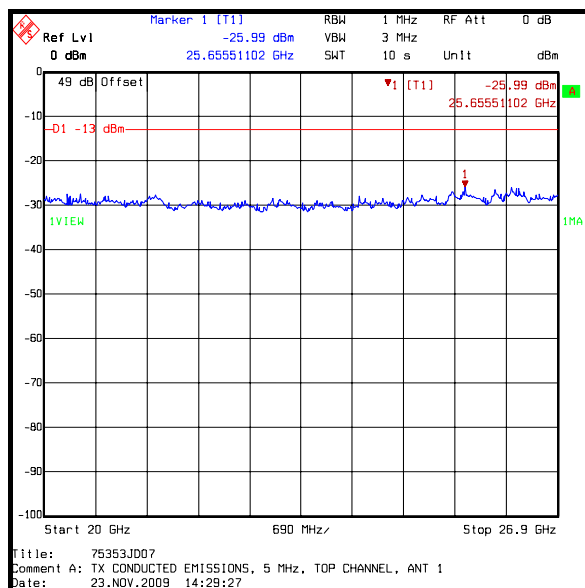
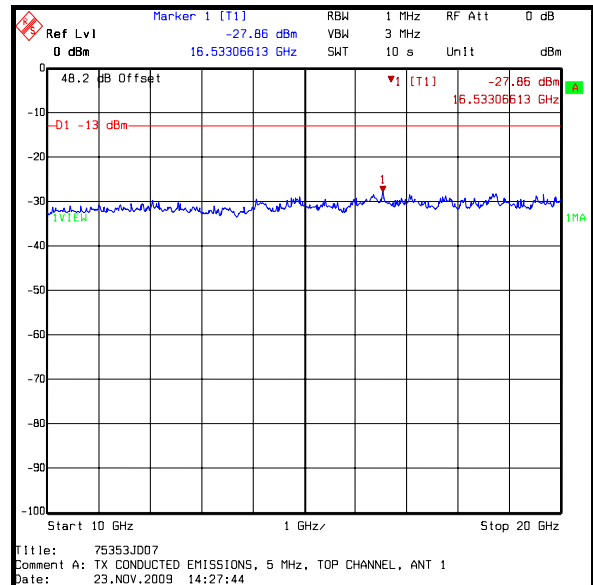
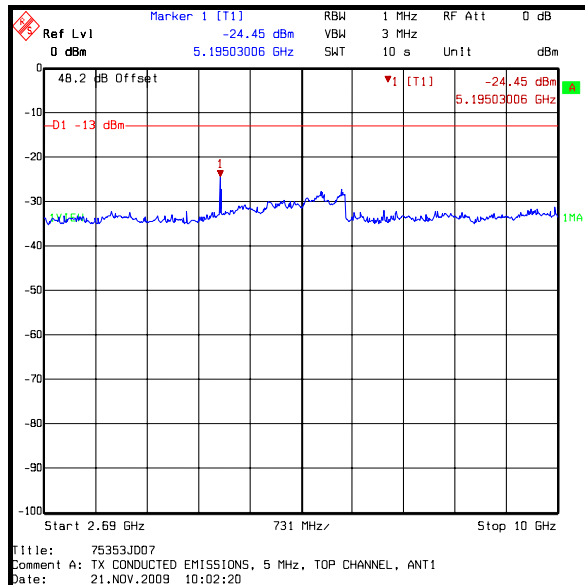
**Limits:**

Frequency Range	Applicable limit	Limit (dBm)
30 MHz to 26.9 GHz	$43 + 10 \log (P)$	-13.0

**Results: Top Channel (5 MHz Bandwidth)**

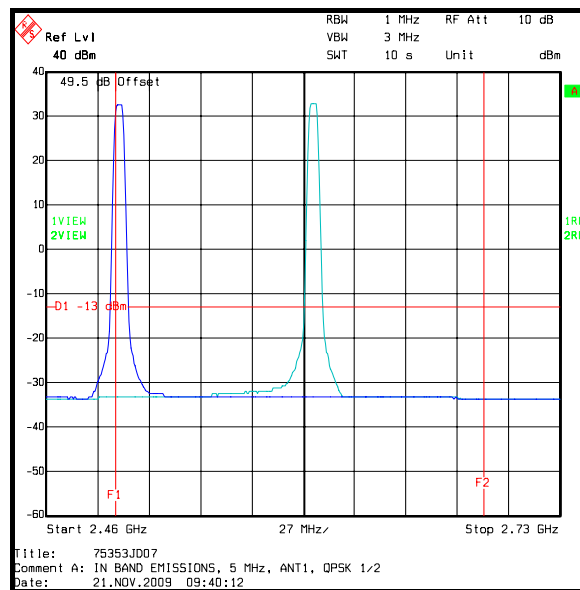
Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
1066.132	-18.5	-13.0	5.5	Complied

**Transmitter Conducted Emissions (continued)**

**Transmitter Conducted Emissions (continued)**

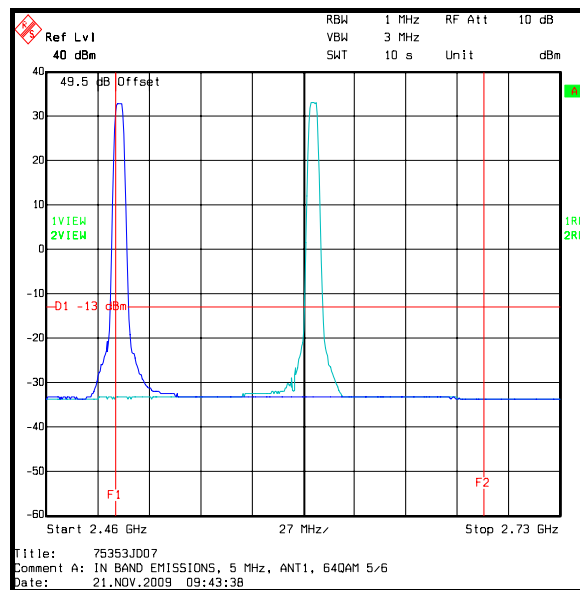
**Transmitter Conducted Emissions (continued)****Results: In band emissions 5 MHz channel width / ANT1 Port / QPSK 1/2**

The plot below shows the in band emissions with the EUT transmitting on the top and bottom channels using a 5 MHz channel bandwidth. One test was performed with the EUT transmitting on the bottom channel at 2498.5 MHz and the test repeated with the EUT transmitting on the top channel at 2600.5 MHz. Both traces were overlaid on the same plot. Frequency lines were placed on the band edges at 2496 MHz and 2690 MHz. The limit line shown on the plot only applies out of band.



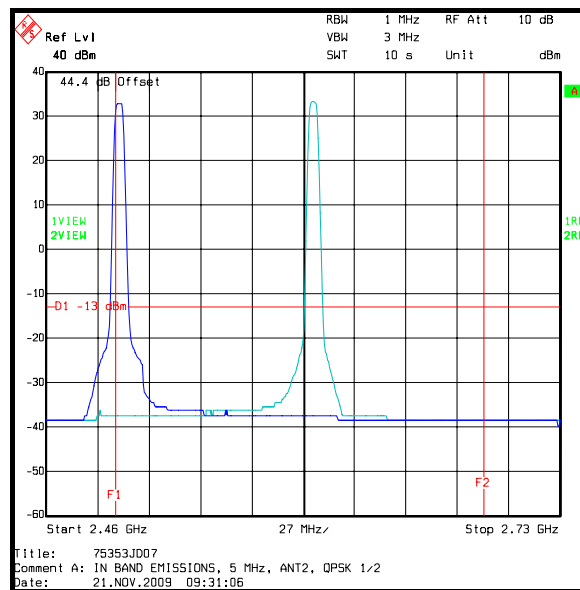
**Transmitter Conducted Emissions (continued)****Results: In band emissions 5 MHz channel width / ANT1 Port / 64QAM 5/6**

The plot below shows the in band emissions with the EUT transmitting on the top and bottom channels using a 5 MHz channel bandwidth. One test was performed with the EUT transmitting on the bottom channel at 2498.5 MHz and the test repeated with the EUT transmitting on the top channel at 2600.5 MHz. Both traces were overlaid on the same plot. Frequency lines were placed on the band edges at 2496 MHz and 2690 MHz. The limit line shown on the plot only applies out of band.



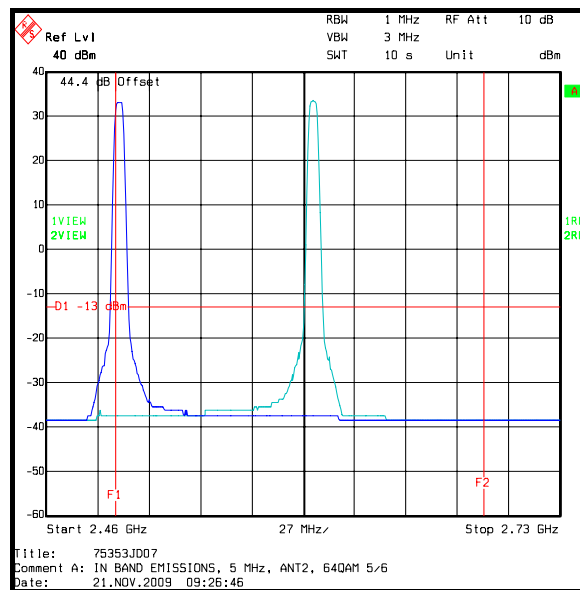
**Transmitter Conducted Emissions (continued)****Results: In band emissions 5 MHz channel width / ANT2 Port / QPSK 1/2**

The plot below shows the in band emissions with the EUT transmitting on the top and bottom channels using a 5 MHz channel bandwidth. One test was performed with the EUT transmitting on the bottom channel at 2498.5 MHz and the test repeated with the EUT transmitting on the top channel at 2600.5 MHz. Both traces were overlaid on the same plot. Frequency lines were placed on the band edges at 2496 MHz and 2690 MHz. The limit line shown on the plot only applies out of band.



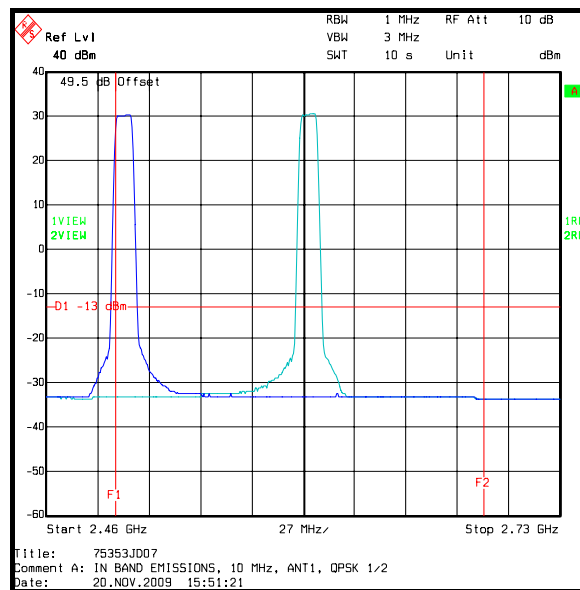
**Transmitter Conducted Emissions (continued)****Results: In band emissions 5 MHz channel width / ANT2 Port / 64QAM 5/6**

The plot below shows the in band emissions with the EUT transmitting on the top and bottom channels using a 5 MHz channel bandwidth. One test was performed with the EUT transmitting on the bottom channel at 2498.5 MHz and the test repeated with the EUT transmitting on the top channel at 2600.5 MHz. Both traces were overlaid on the same plot. Frequency lines were placed on the band edges at 2496 MHz and 2690 MHz. The limit line shown on the plot only applies out of band.



**Transmitter Conducted Emissions (continued)****Results: In band emissions 10 MHz channel width / ANT1 Port / QPSK 1/2**

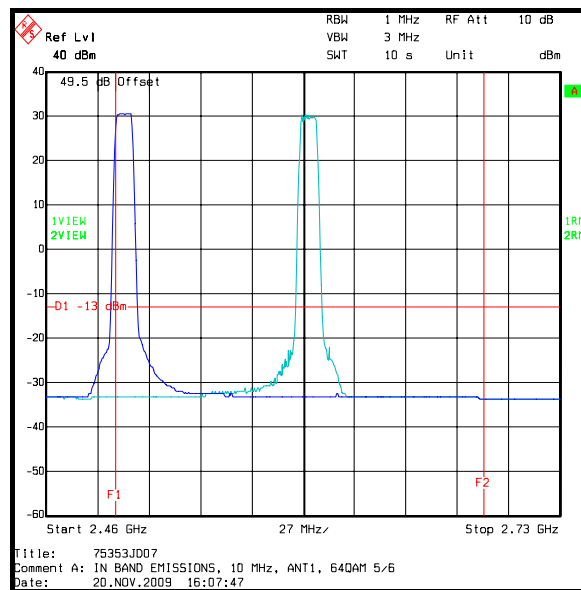
The plot below shows the in band emissions with the EUT transmitting on the top and bottom channels using a 10 MHz channel bandwidth. One test was performed with the EUT transmitting on the bottom channel at 2501 MHz and the test repeated with the EUT transmitting on the top channel at 2598 MHz. Both traces were overlaid on the same plot. Frequency lines were placed on the band edges at 2496 MHz and 2690 MHz. The limit line shown on the plot only applies out of band.





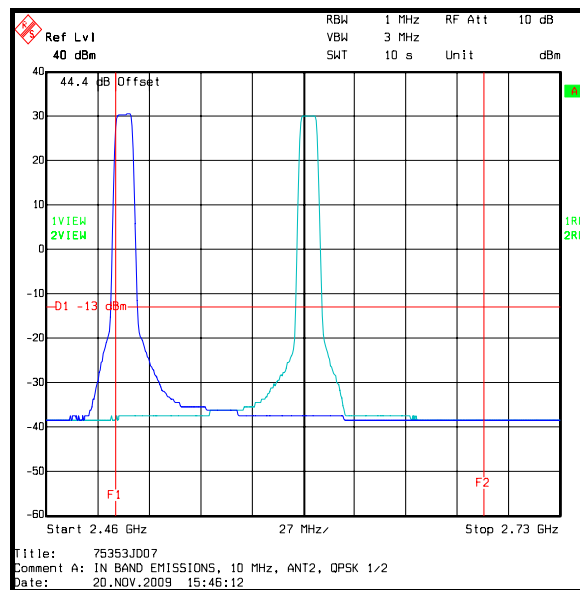
**Transmitter Conducted Emissions (continued)****Results: In band emissions 10 MHz channel width / ANT1 Port / 64QAM 5/6**

The plot below shows the in band emissions with the EUT transmitting on the top and bottom channels using a 10 MHz channel bandwidth. One test was performed with the EUT transmitting on the bottom channel at 2501 MHz and the test repeated with the EUT transmitting on the top channel at 2598 MHz. Both traces were overlaid on the same plot. Frequency lines were placed on the band edges at 2496 MHz and 2690 MHz. The limit line shown on the plot only applies out of band.



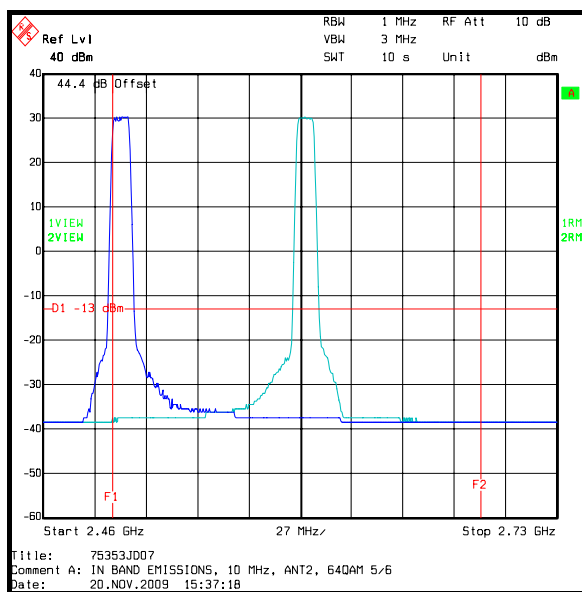
**Transmitter Conducted Emissions (continued)****Results: In band emissions 10 MHz channel width / ANT2 Port / QPSK 1/2**

The plot below shows the in band emissions with the EUT transmitting on the top and bottom channels using a 10 MHz channel bandwidth. One test was performed with the EUT transmitting on the bottom channel at 2501 MHz and the test repeated with the EUT transmitting on the top channel at 2598 MHz. Both traces were overlaid on the same plot. Frequency lines were placed on the band edges at 2496 MHz and 2690 MHz. The limit line shown on the plot only applies out of band.



**Transmitter Conducted Emissions (continued)****Results: In band emissions 10 MHz channel width / ANT2 Port / 64QAM 5/6**

The plot below shows the in band emissions with the EUT transmitting on the top and bottom channels using a 10 MHz channel bandwidth. One test was performed with the EUT transmitting on the bottom channel at 2501 MHz and the test repeated with the EUT transmitting on the top channel at 2598 MHz. Both traces were overlaid on the same plot. Frequency lines were placed on the band edges at 2496 MHz and 2690 MHz. The limit line shown on the plot only applies out of band.



**5.2.12. Transmitter Conducted Emissions at Band Edges****Test Summary:**

<b>FCC Part:</b>	FCC 2.1051 and FCC Part 27.53(m)(2)
<b>Test Method Used:</b>	FCC Part 27.53(m)(6) & EIA/TIA-6030C 2.2.13.1, 2.2.13.2(d)

**Environmental Conditions:**

<b>Temperature (°C):</b>	21 to 23
<b>Relative Humidity (%):</b>	43 to 46

**Note(s):**

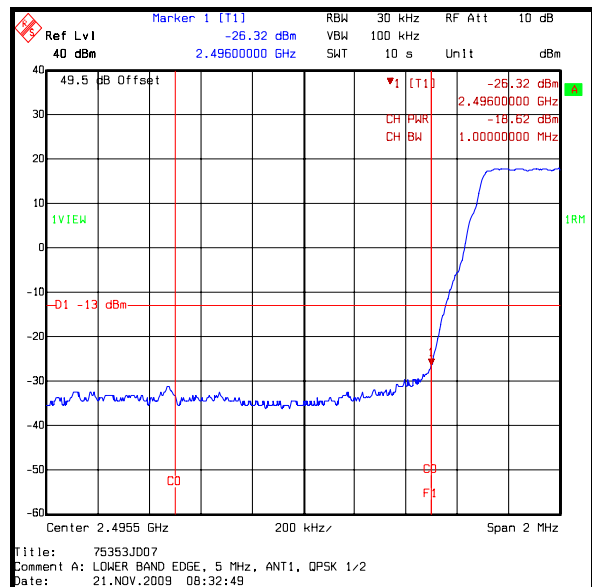
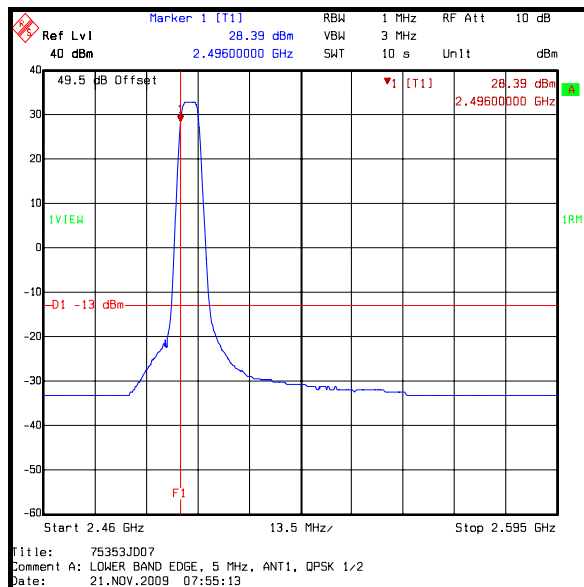
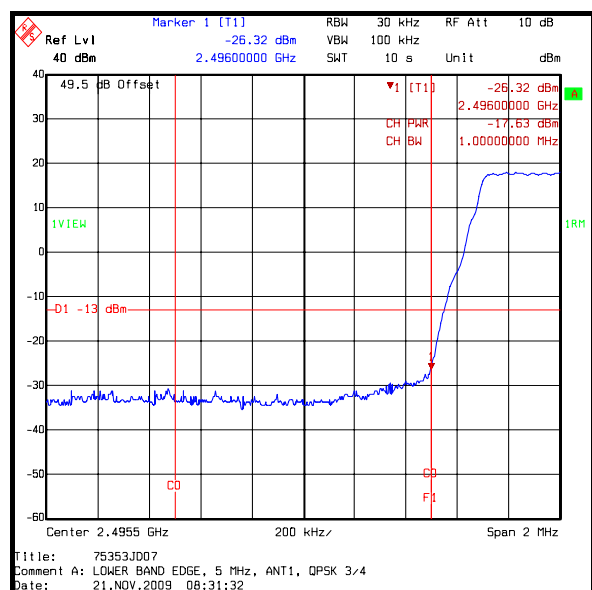
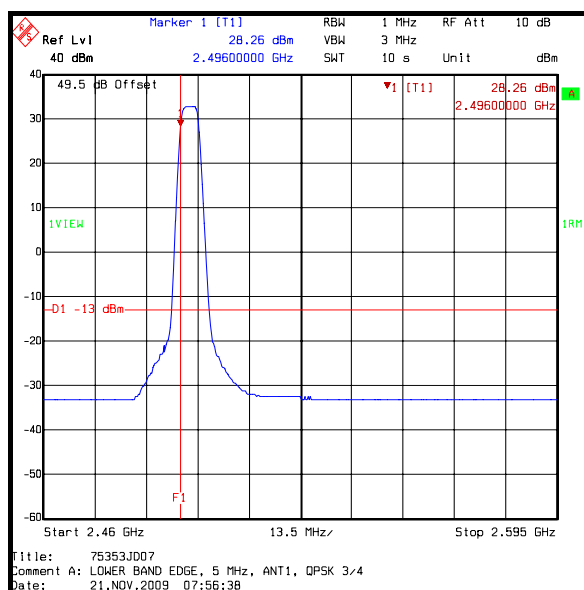
1. Measurements were made on the ANT1 and ANT2 ports. Individual attenuators and directional couplers were connected to both ports. The through paths of both directional couplers were connected to a subscriber station main and diversity ports by cables and additional attenuation. The coupled path of each directional coupler was connected to the measurement equipment by suitable RF cables. The path loss between antenna ports and measurement equipment was used as an RF level offset on the measurement equipment.
2. The EUT was configured to transmit at maximum power on the top and bottom channels.
3. All modulation types were tested on the ANT1 port. In addition, QPSK 1/2 and 64QAM 5/6 modulations were tested on the ANT2 port in order to show compliance on both ports.
4. Measurements were made with the EUT transmitting a 5 MHz channel and repeated with a 10 MHz channel.
5. The band edge limit is calculated as follows;  $43 + 10\log(P)$  where P is the transmitter power in Watts.
6. Where the bottom or top channel is adjacent to the lower band edge, additional measurements were made in the 1 MHz band immediately outside and adjacent to the band edge. Measurements in the 1 MHz band were made using the channel power function of a spectrum analyser. Measurement bandwidths were set automatically by the spectrum analyser.
7. Full testing was performed on the FCC lower and upper band edges. Minimal differences between measured levels in any modulation type or RF port were observed; therefore testing on the Industry Canada lower and upper band edges was only performed on the ANT1 port using QPSK 1/2, 16QAM 3/4 and 64QAM 5/6 modulation.
8. Industry Canada Radio Equipment Standards department confirmed to RFI Global Services Ltd. on 28<sup>th</sup> November 2009 that the emissions mask stated in RSS-193 Section 6.3(c)(i) cannot be applied to WiMax technology. Pending a later version of the Standard or release of a Standard by Industry Canada that covers this technology, the  $43 + 10\log(P)$  limit stated in RSS-193 Section 6.3(c)(ii) was applied at the applicable sub-band edges without an emission mask.

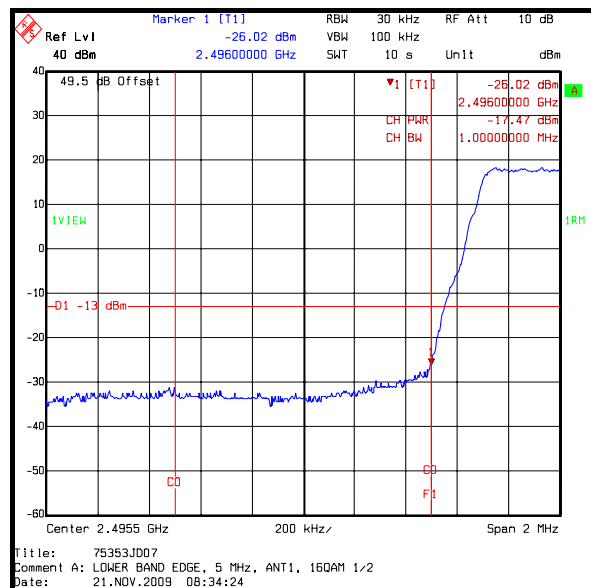
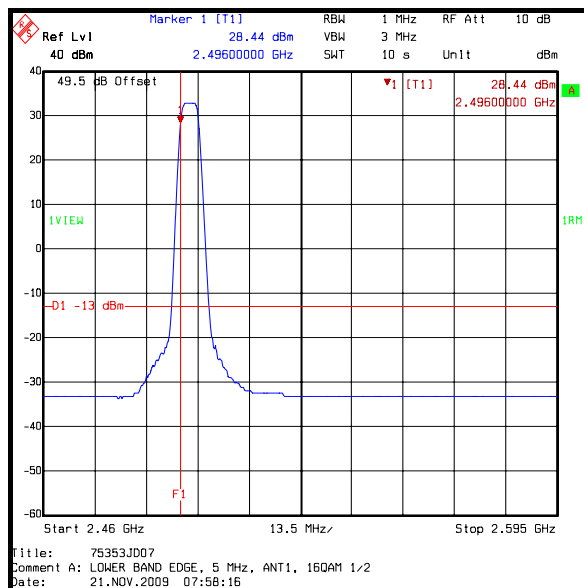
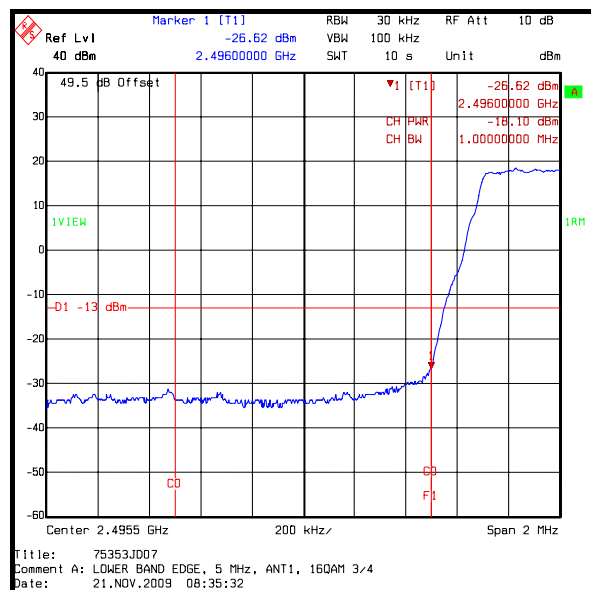
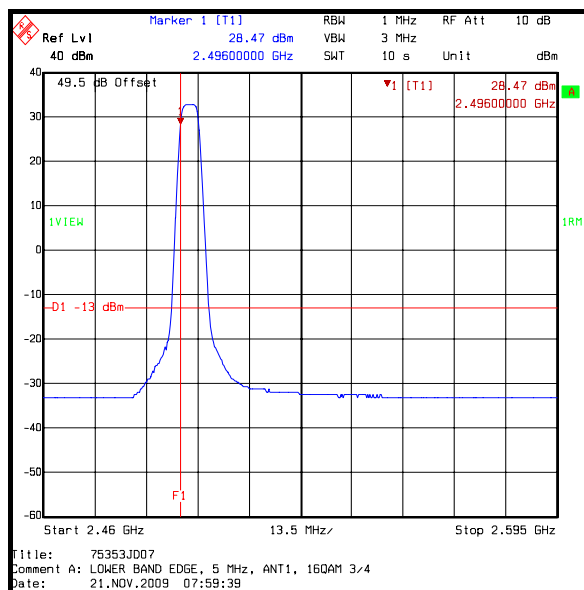
**Limits:**

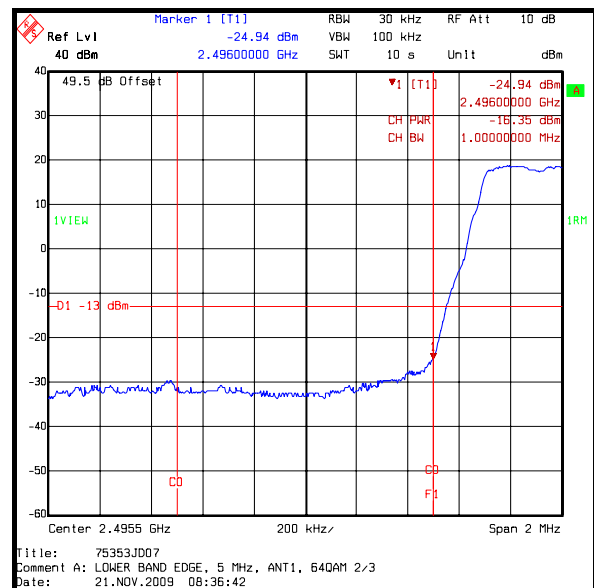
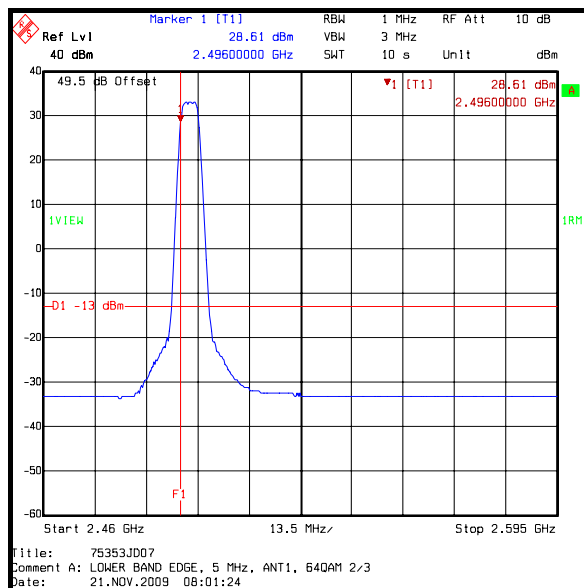
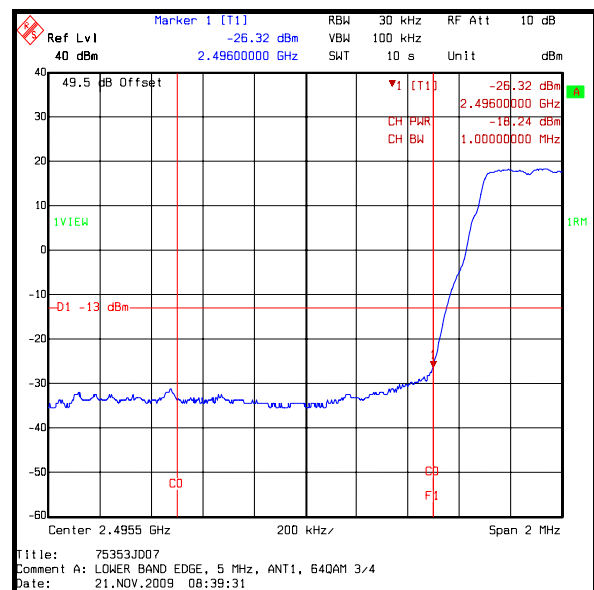
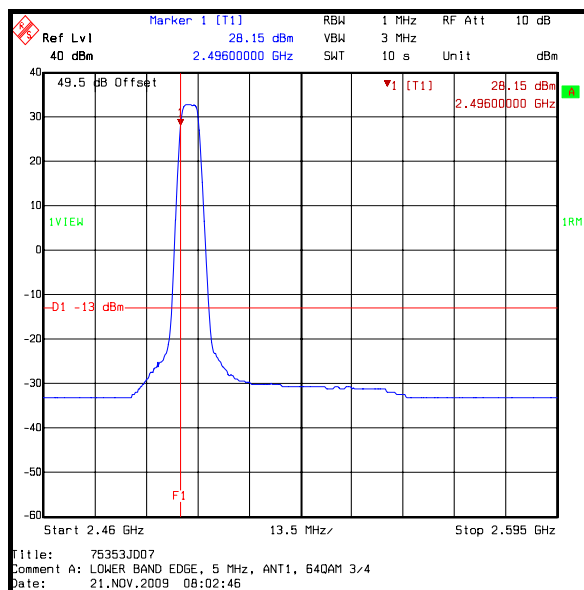
Frequency Range	Applicable limit	Limit (dBm)
30 MHz to 26.9 GHz	$43 + 10\log(P)$	-13.0

**Transmitter Conducted Emissions at Band Edges (continued)****Results: Bottom Channel / 5 MHz Bandwidth / FCC Lower Band Edge**

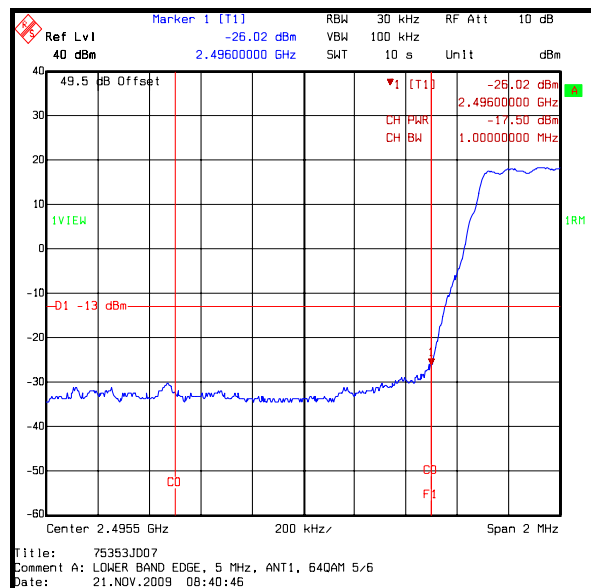
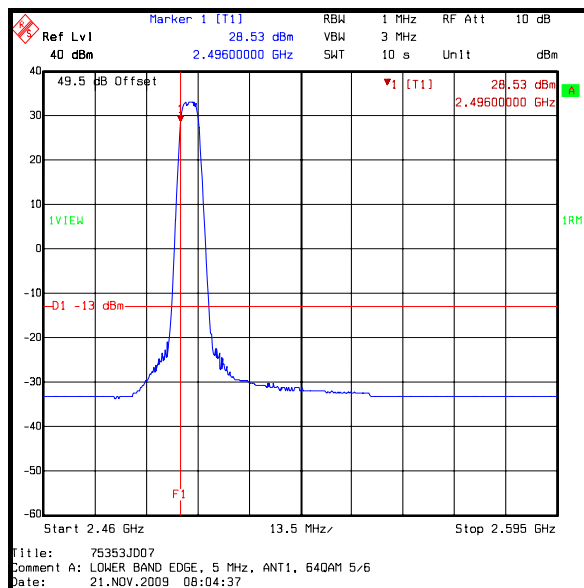
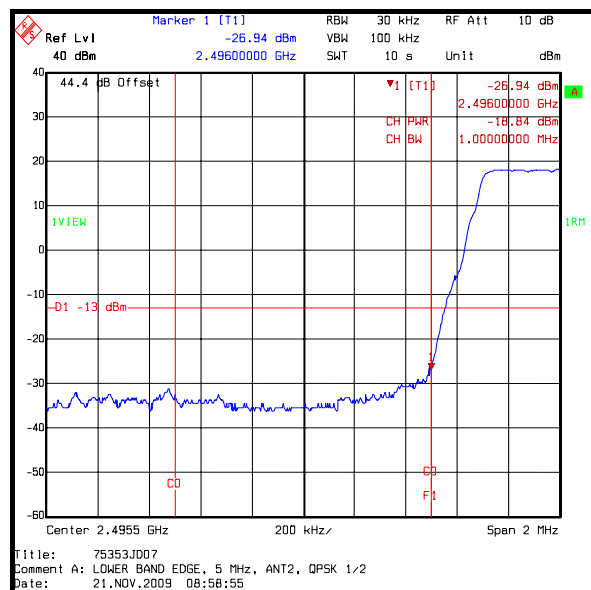
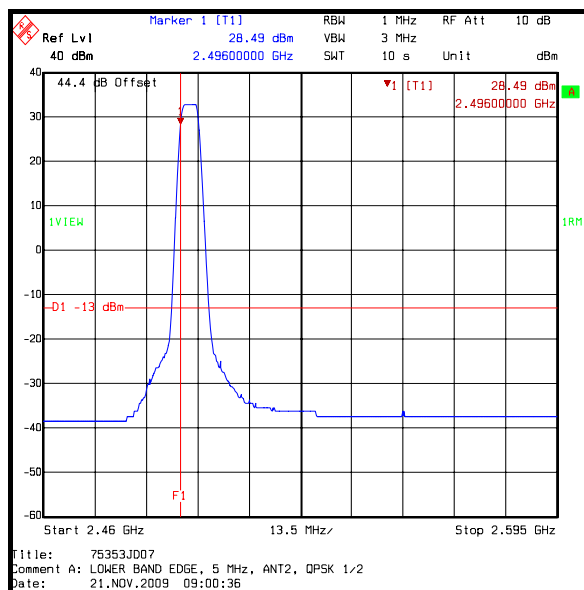
Modulation	Port	Emission Level (dBm)	Band Edge Limit (dBm)	Margin (dB)	Result
QPSK 1/2	ANT1	-18.6	-13.0	5.6	Complied
QPSK 3/4	ANT1	-17.6	-13.0	4.6	Complied
16QAM 1/2	ANT1	-17.5	-13.0	4.5	Complied
16QAM 3/4	ANT1	-18.1	-13.0	5.1	Complied
64QAM 2/3	ANT1	-16.4	-13.0	3.4	Complied
64QAM 3/4	ANT1	-18.2	-13.0	5.2	Complied
64QAM 5/6	ANT1	-17.5	-13.0	4.5	Complied
QPSK 1/2	ANT2	-18.8	-13.0	5.8	Complied
64QAM 5/6	ANT2	-18.0	-13.0	5.0	Complied

**Transmitter Conducted Emissions at Band Edges (continued)****Bottom Channel / 5 MHz Bandwidth / FCC Lower Band Edge / QPSK 1/2 / ANT1 Port****Bottom Channel / 5 MHz Bandwidth / FCC Lower Band Edge / QPSK 3/4 / ANT1 Port**

**Transmitter Conducted Emissions at Band Edges (continued)****Bottom Channel / 5 MHz Bandwidth / FCC Lower Band Edge / 16QAM 1/2 / ANT1 Port****Bottom Channel / 5 MHz Bandwidth / FCC Lower Band Edge / 16QAM 3/4 / ANT1 Port**

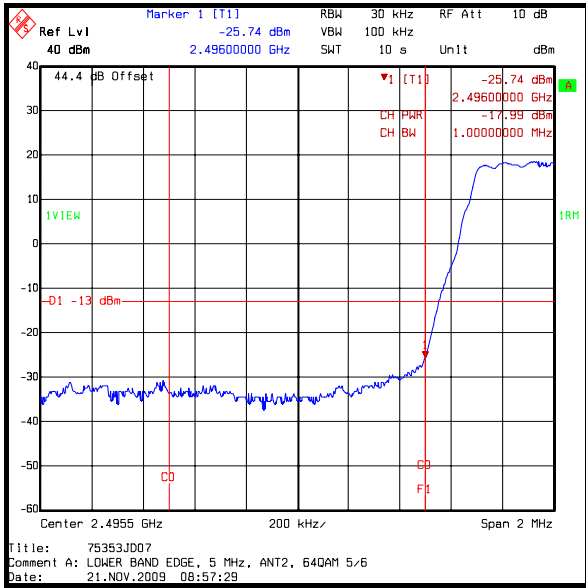
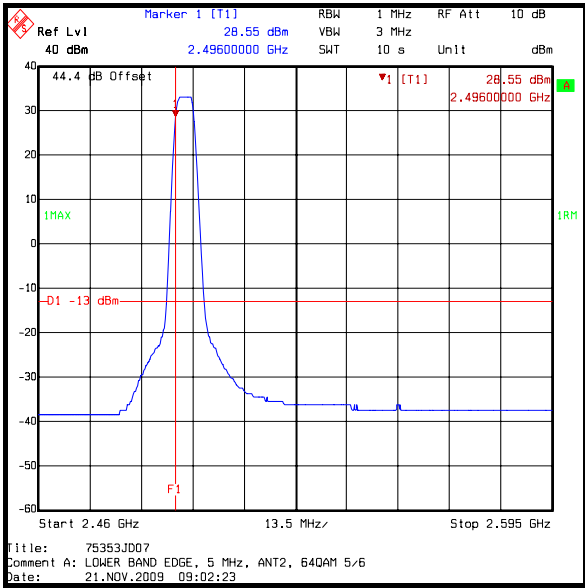
**Transmitter Conducted Emissions at Band Edges (continued)****Bottom Channel / 5 MHz Bandwidth / FCC Lower Band Edge / 64QAM 2/3 / ANT1 Port****Bottom Channel / 5 MHz Bandwidth / FCC Lower Band Edge / 64QAM 3/4 / ANT1 Port**



**Transmitter Conducted Emissions at Band Edges (continued)****Bottom Channel / 5 MHz Bandwidth / FCC Lower Band Edge / 64QAM 5/6 / ANT1 Port****Bottom Channel / 5 MHz Bandwidth / FCC Lower Band Edge / QPSK 1/2 / ANT2 Port**

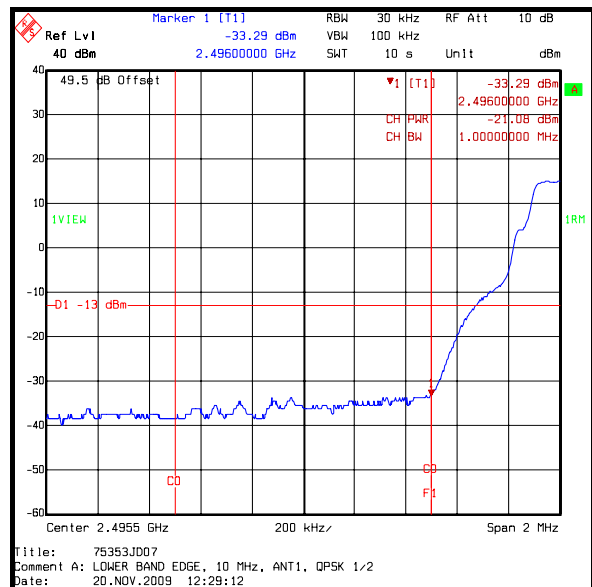
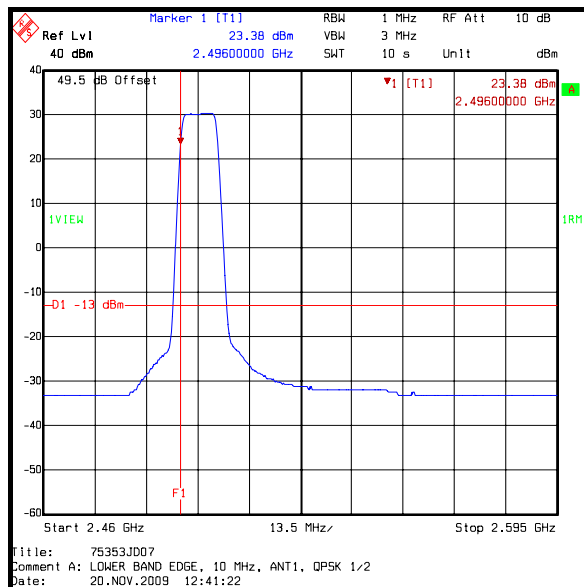
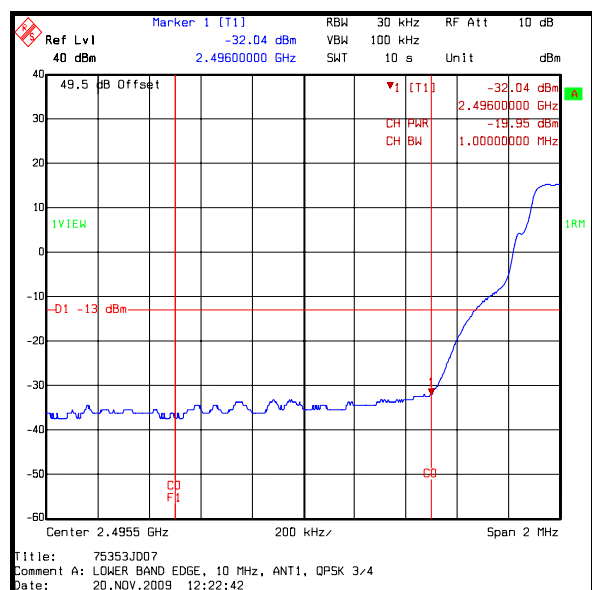
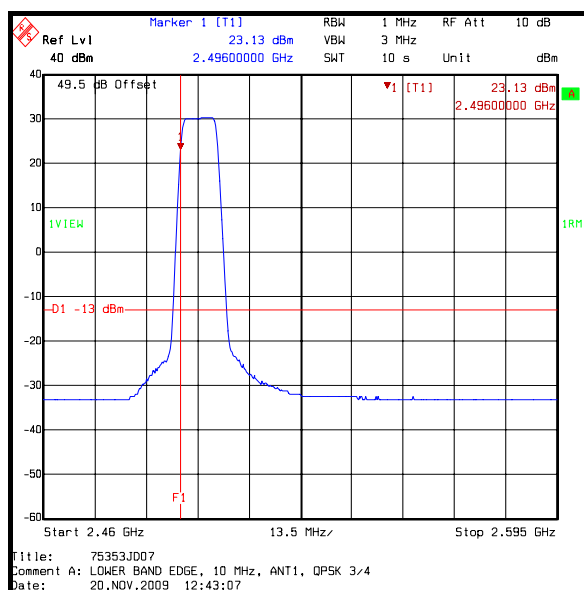
Transmitter Conducted Emissions at Band Edges (continued)

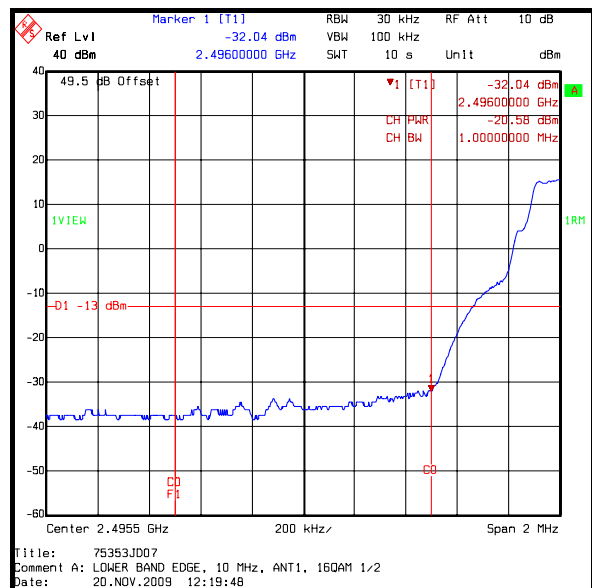
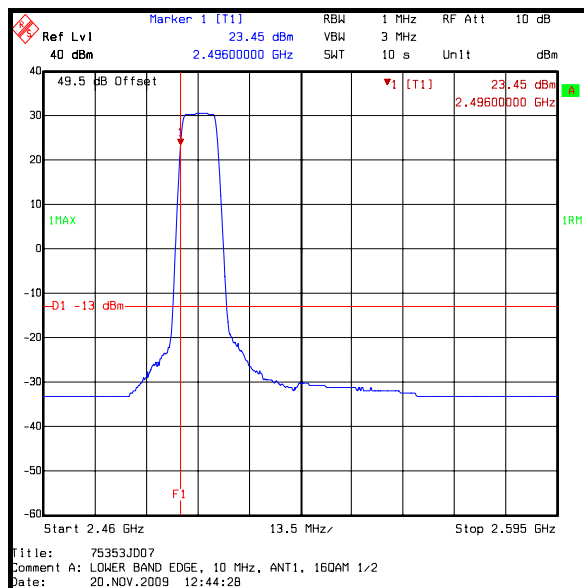
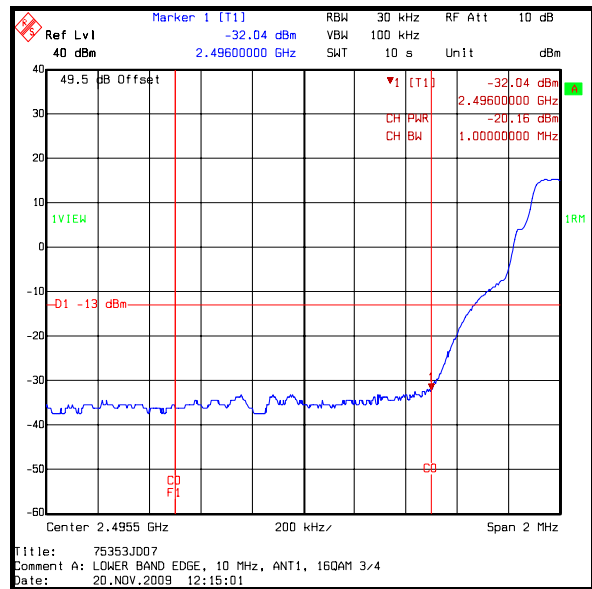
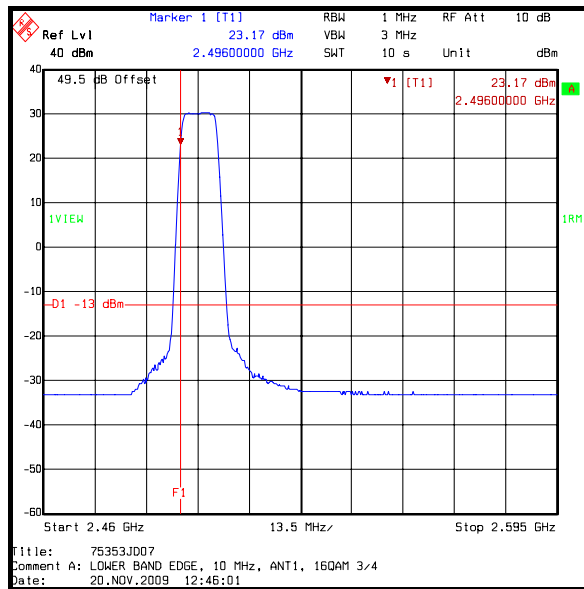
Bottom Channel / 5 MHz Bandwidth / FCC Lower Band Edge / 64QAM 5/6 / ANT2 Port

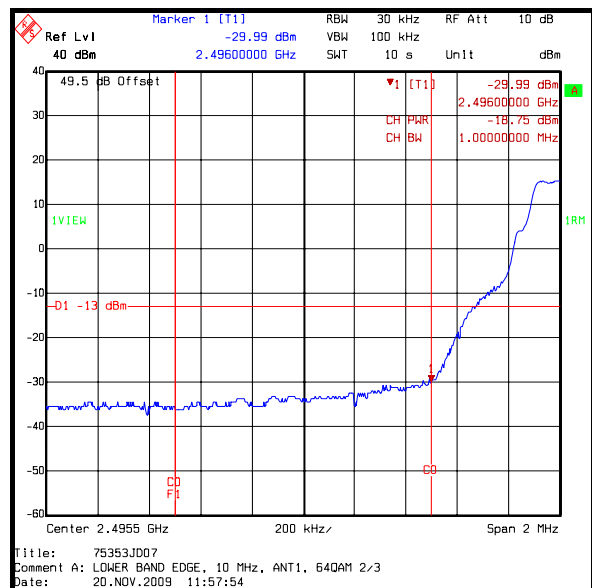
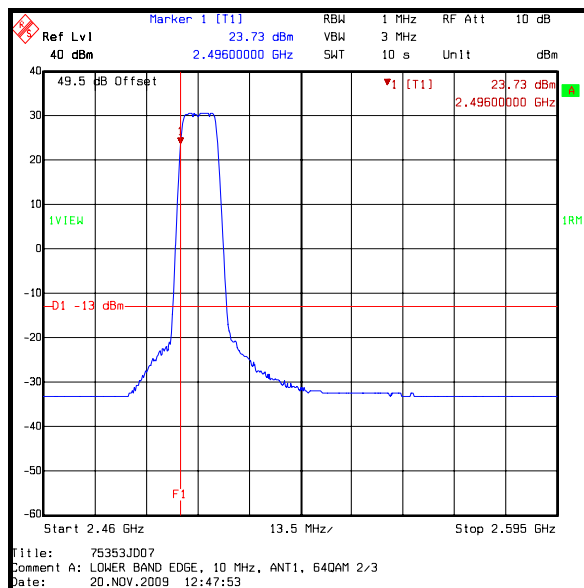
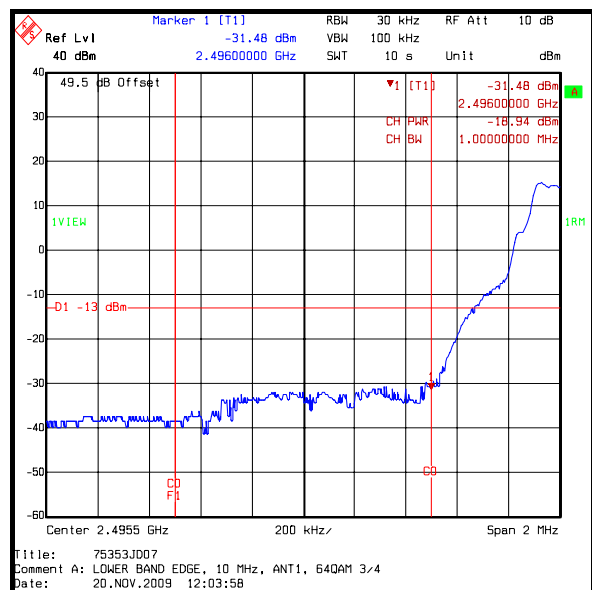
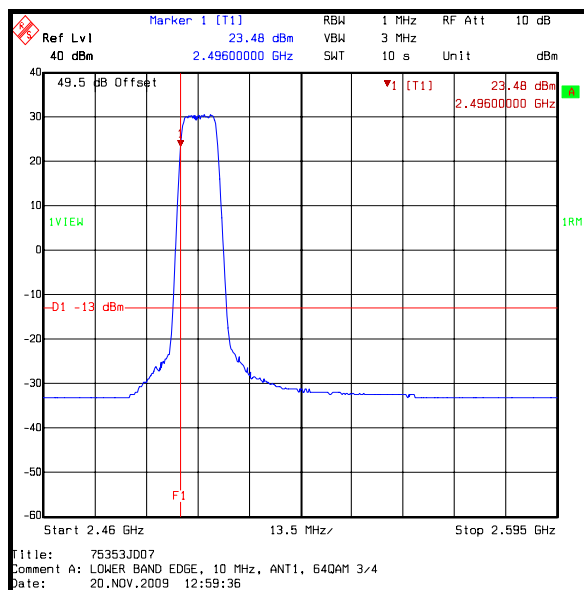


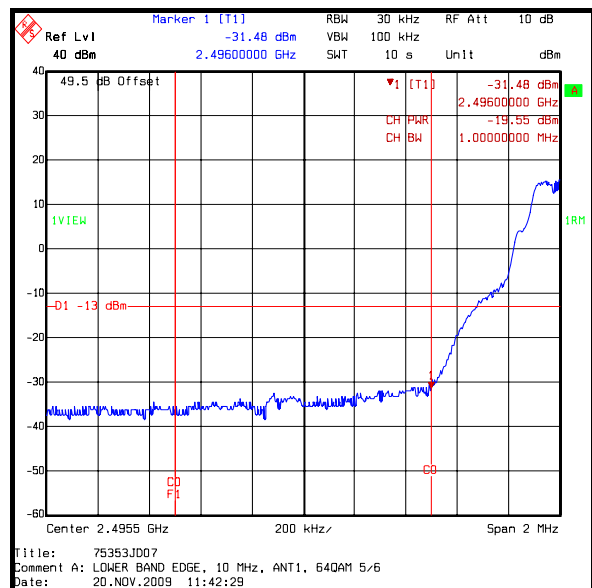
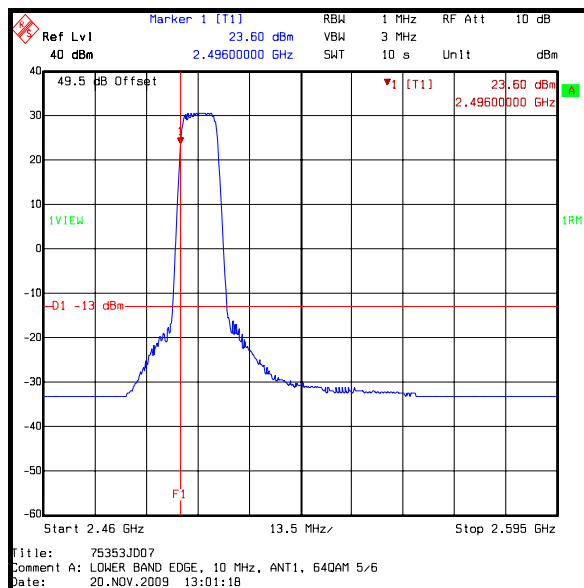
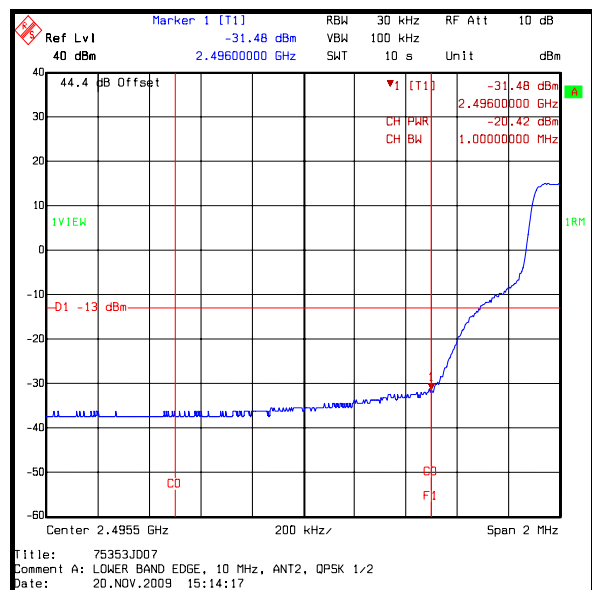
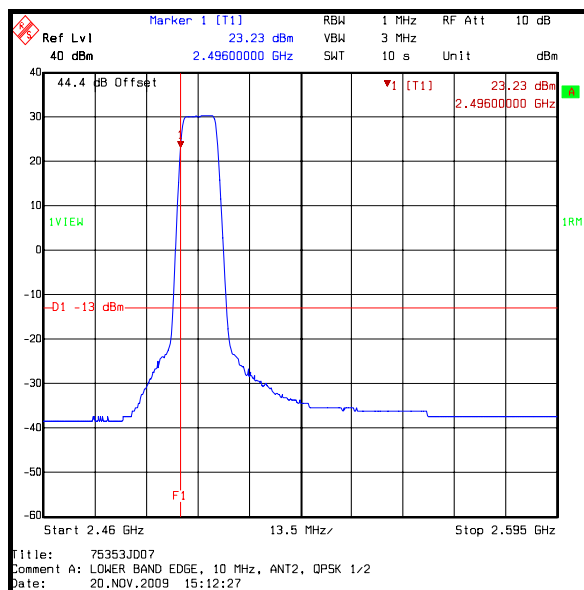
**Transmitter Conducted Emissions at Band Edges (continued)****Results: Bottom Channel / 10 MHz Bandwidth / FCC Lower Band Edge**

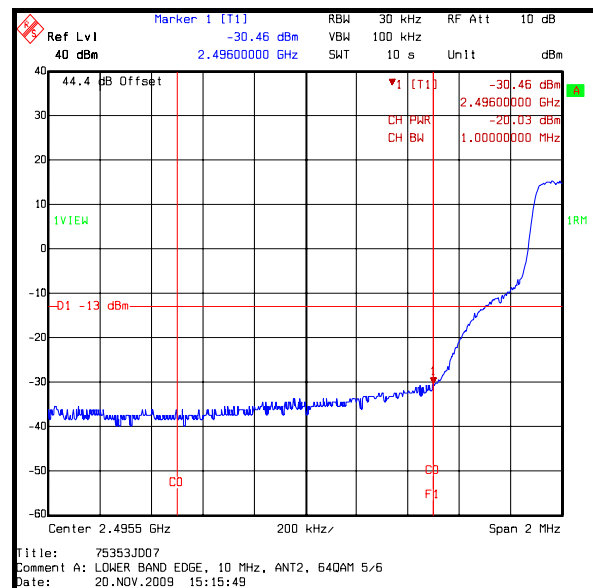
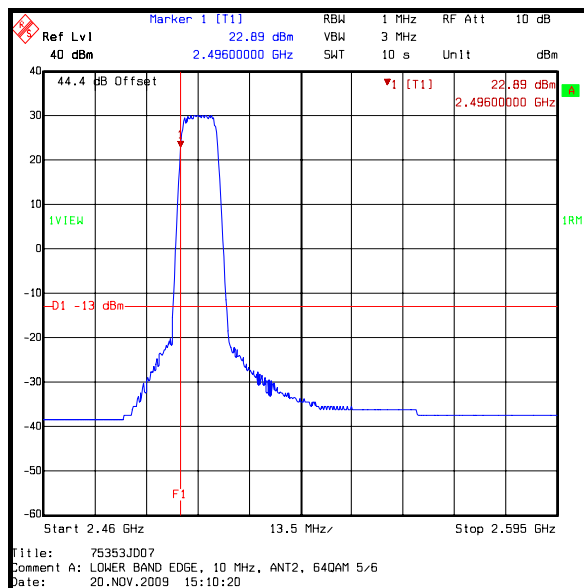
<b>Modulation</b>	<b>Port</b>	<b>Emission Level (dBm)</b>	<b>Band Edge Limit (dBm)</b>	<b>Margin (dB)</b>	<b>Result</b>
QPSK 1/2	ANT1	-21.1	-13.0	8.1	Complied
QPSK 3/4	ANT1	-20.0	-13.0	7.0	Complied
16QAM 1/2	ANT1	-20.6	-13.0	7.6	Complied
16QAM 3/4	ANT1	-20.2	-13.0	7.2	Complied
64QAM 2/3	ANT1	-18.8	-13.0	5.8	Complied
64QAM 3/4	ANT1	-18.9	-13.0	5.9	Complied
64QAM 5/6	ANT1	-19.6	-13.0	6.6	Complied
QPSK 1/2	ANT2	-20.4	-13.0	7.4	Complied
64QAM 5/6	ANT2	-20.0	-13.0	7.0	Complied

**Transmitter Conducted Emissions at Band Edges (continued)****Bottom Channel / 10 MHz Bandwidth / FCC Lower Band Edge / QPSK 1/2 / ANT1 Port****Bottom Channel / 10 MHz Bandwidth / FCC Lower Band Edge / QPSK 3/4 / ANT1 Port**

**Transmitter Conducted Emissions at Band Edges (continued)****Bottom Channel / 10 MHz Bandwidth / FCC Lower Band Edge / 16QAM 1/2 / ANT1 Port****Bottom Channel / 10 MHz Bandwidth / FCC Lower Band Edge / 16QAM 3/4 / ANT1 Port**

**Transmitter Conducted Emissions at Band Edges (continued)****Bottom Channel / 10 MHz Bandwidth / FCC Lower Band Edge / 64QAM 2/3 / ANT1 Port****Bottom Channel / 10 MHz Bandwidth / FCC Lower Band Edge / 64QAM 3/4 / ANT1 Port**

**Transmitter Conducted Emissions at Band Edges (continued)****Bottom Channel / 10 MHz Bandwidth / FCC Lower Band Edge / 64QAM 5/6 / ANT1 Port****Bottom Channel / 10 MHz Bandwidth / FCC Lower Band Edge / QPSK 1/2 / ANT2 Port**

**Transmitter Conducted Emissions at Band Edges (continued)****Bottom Channel / 10 MHz Bandwidth / FCC Lower Band Edge / 64QAM 5/6 / ANT2 Port**

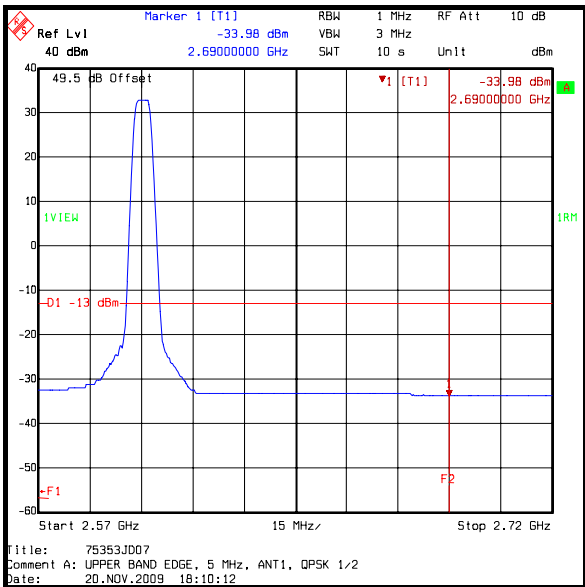


**Transmitter Conducted Emissions at Band Edges (continued)****Results: Top Channel / 5 MHz Bandwidth / FCC Upper Band Edge**

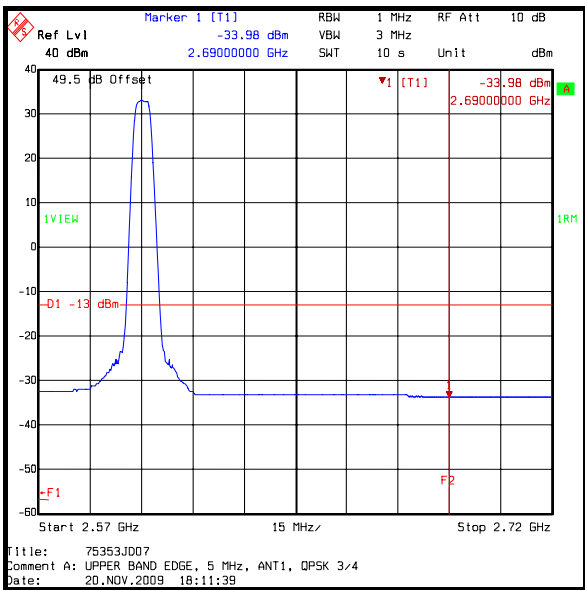
Modulation	Port	Emission Level (dBm)	Band Edge Limit (dBm)	Margin (dB)	Result
QPSK 1/2	ANT1	-34.0	-13.0	21.0	Complied
QPSK 3/4	ANT1	-34.0	-13.0	21.0	Complied
16QAM 1/2	ANT1	-34.0	-13.0	21.0	Complied
16QAM 3/4	ANT1	-34.0	-13.0	21.0	Complied
64QAM 2/3	ANT1	-34.0	-13.0	21.0	Complied
64QAM 3/4	ANT1	-34.0	-13.0	21.0	Complied
64QAM 5/6	ANT1	-34.0	-13.0	21.0	Complied
QPSK 1/2	ANT2	-38.7	-13.0	25.7	Complied
64QAM 5/6	ANT2	-38.7	-13.0	25.7	Complied

Transmitter Conducted Emissions at Band Edges (continued)

Top Channel / 5 MHz Bandwidth / FCC Upper Band Edge / QPSK 1/2 / ANT1 Port

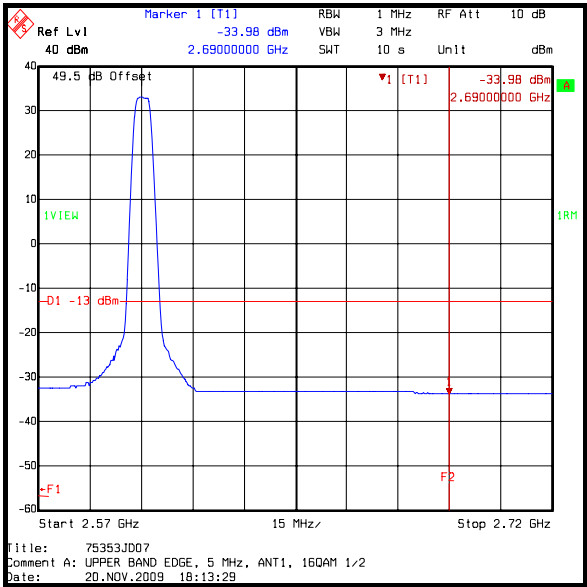


Top Channel / 5 MHz Bandwidth / FCC Upper Band Edge / QPSK 3/4 / ANT1 Port

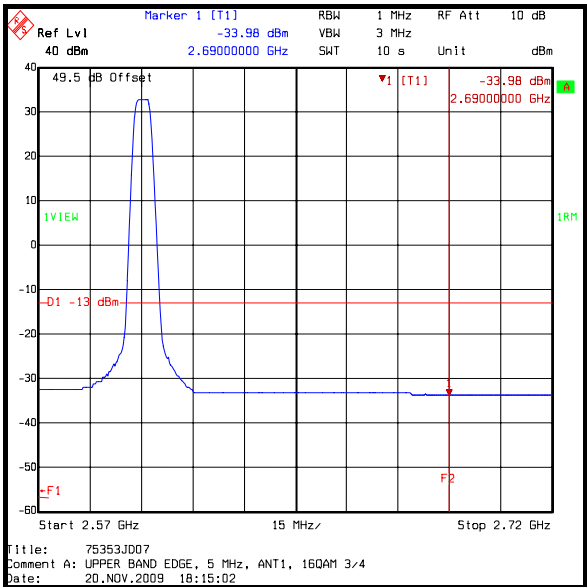


Transmitter Conducted Emissions at Band Edges (continued)

Top Channel / 5 MHz Bandwidth / FCC Upper Band Edge / 16QAM 1/2 / ANT1 Port

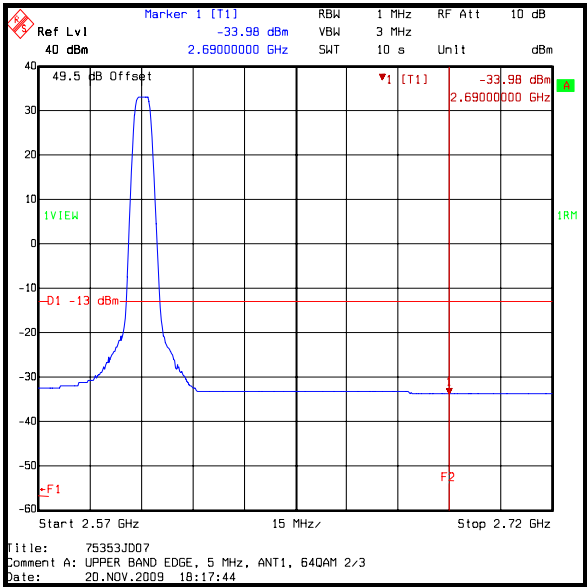


Top Channel / 5 MHz Bandwidth / FCC Upper Band Edge / 16QAM 3/4 / ANT1 Port

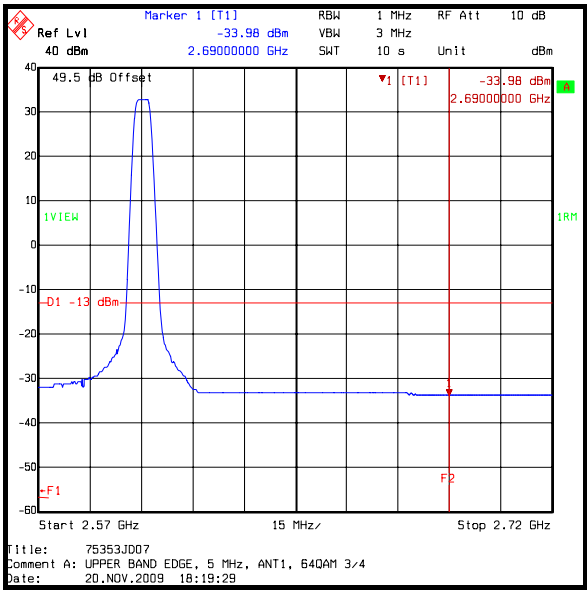


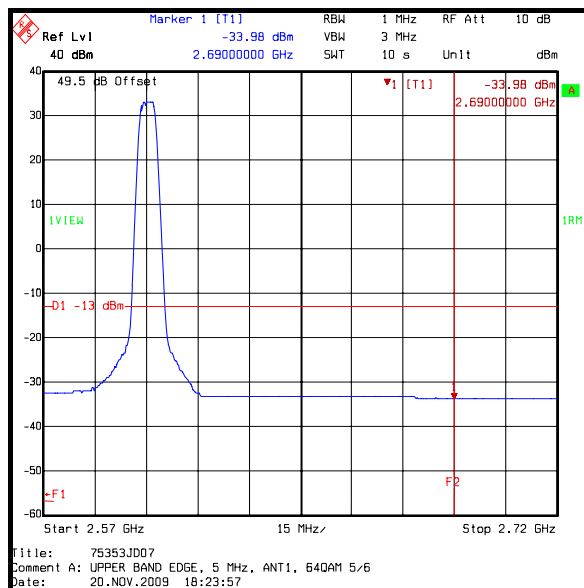
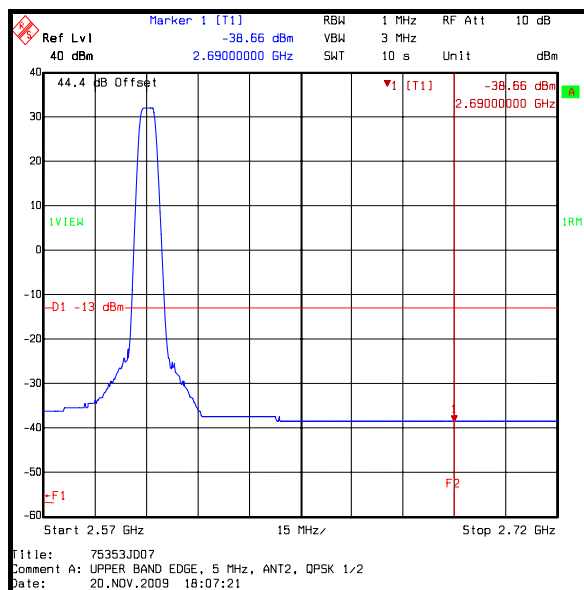
Transmitter Conducted Emissions at Band Edges (continued)

Top Channel / 5 MHz Bandwidth / FCC Upper Band Edge / 64QAM 2/3 / ANT1 Port



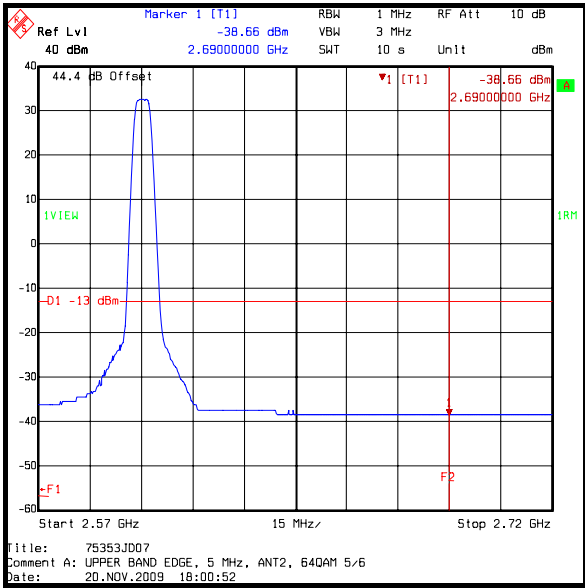
Top Channel / 5 MHz Bandwidth / FCC Upper Band Edge / 64QAM 3/4 / ANT1 Port



**Transmitter Conducted Emissions at Band Edges (continued)****Top Channel / 5 MHz Bandwidth / FCC Upper Band Edge / 64QAM 5/6 / ANT1 Port****Top Channel / 5 MHz Bandwidth / FCC Upper Band Edge / QPSK 1/2 / ANT2 Port**

Transmitter Conducted Emissions at Band Edges (continued)

Top Channel / 5 MHz Bandwidth / FCC Upper Band Edge / 64QAM 5/6 / ANT2 Port

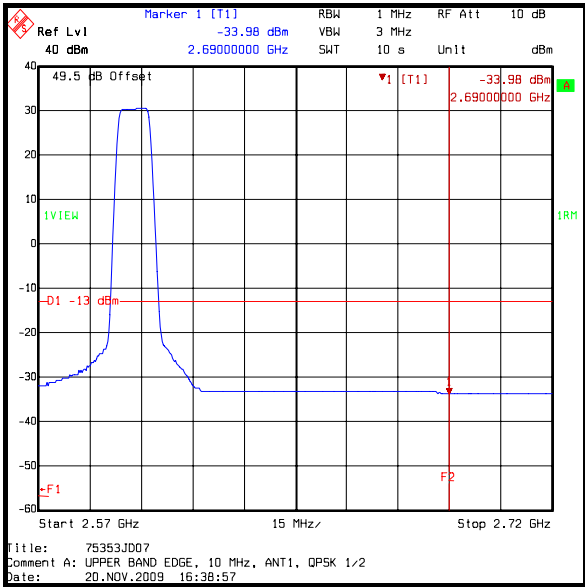


**Transmitter Conducted Emissions at Band Edges (continued)****Results: Top Channel / 10 MHz Bandwidth / FCC Upper Band Edge**

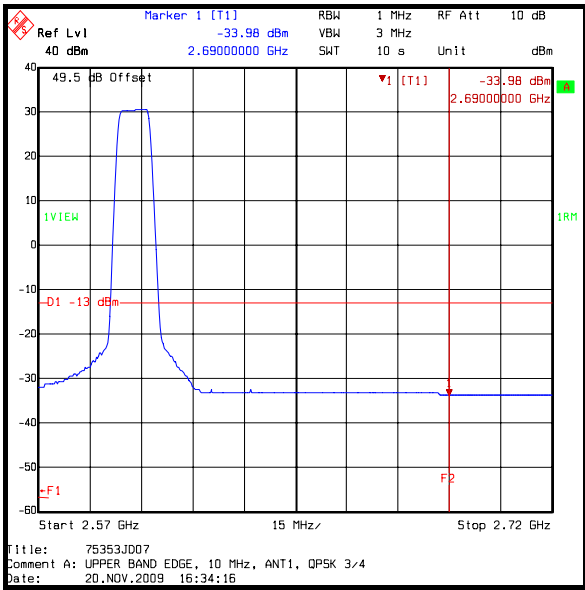
Modulation	Port	Emission Level (dBm)	Band Edge Limit (dBm)	Margin (dB)	Result
QPSK 1/2	ANT1	-34.0	-13.0	21.0	Complied
QPSK 3/4	ANT1	-34.0	-13.0	21.0	Complied
16QAM 1/2	ANT1	-34.0	-13.0	21.0	Complied
16QAM 3/4	ANT1	-34.0	-13.0	21.0	Complied
64QAM 2/3	ANT1	-34.0	-13.0	21.0	Complied
64QAM 3/4	ANT1	-34.0	-13.0	21.0	Complied
64QAM 5/6	ANT1	-34.0	-13.0	21.0	Complied
QPSK 1/2	ANT2	-38.7	-13.0	25.7	Complied
64QAM 5/6	ANT2	-38.7	-13.0	25.7	Complied

Transmitter Conducted Emissions at Band Edges (continued)

Top Channel / 10 MHz Bandwidth / FCC Upper Band Edge / QPSK 1/2 / ANT1 Port



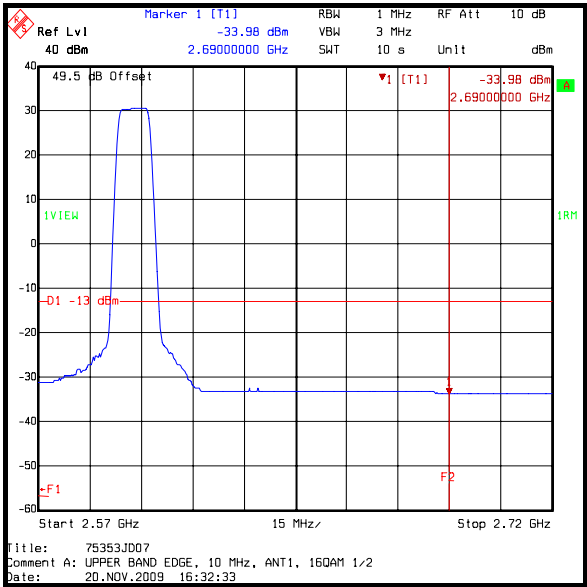
Top Channel / 10 MHz Bandwidth / FCC Upper Band Edge / QPSK 3/4 / ANT1 Port



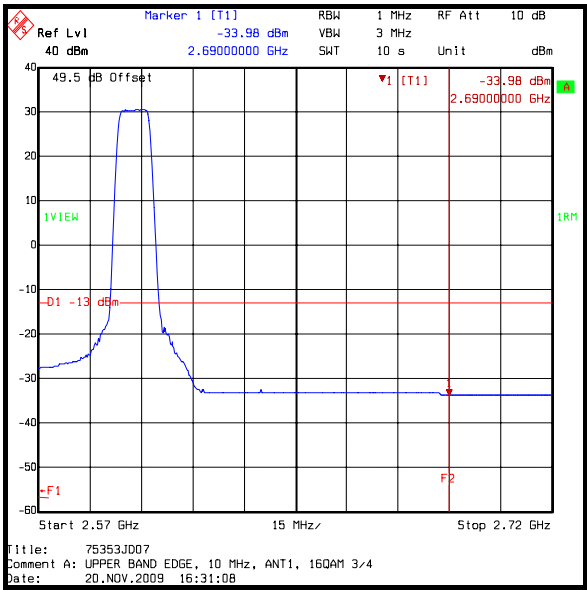


Transmitter Conducted Emissions at Band Edges (continued)

Top Channel / 10 MHz Bandwidth / FCC Upper Band Edge / 16QAM 1/2 / ANT1 Port

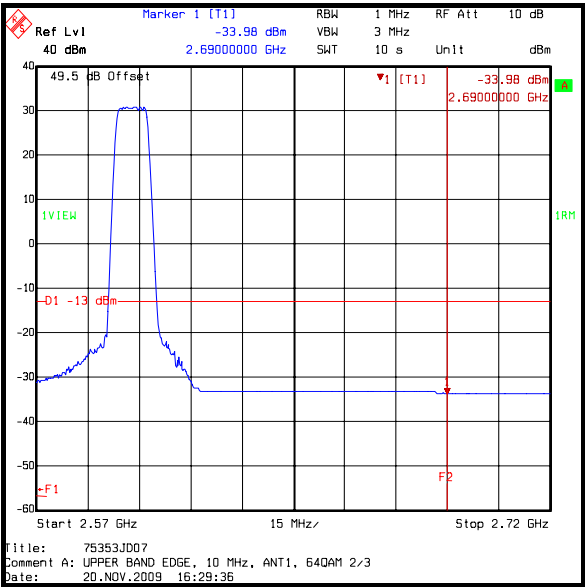


Top Channel / 10 MHz Bandwidth / FCC Upper Band Edge / 16QAM 3/4 / ANT1 Port

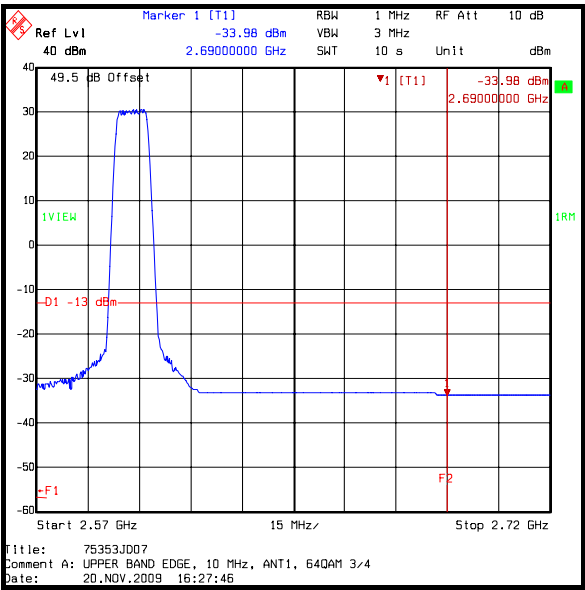


Transmitter Conducted Emissions at Band Edges (continued)

Top Channel / 10 MHz Bandwidth / FCC Upper Band Edge / 64QAM 2/3 / ANT1 Port

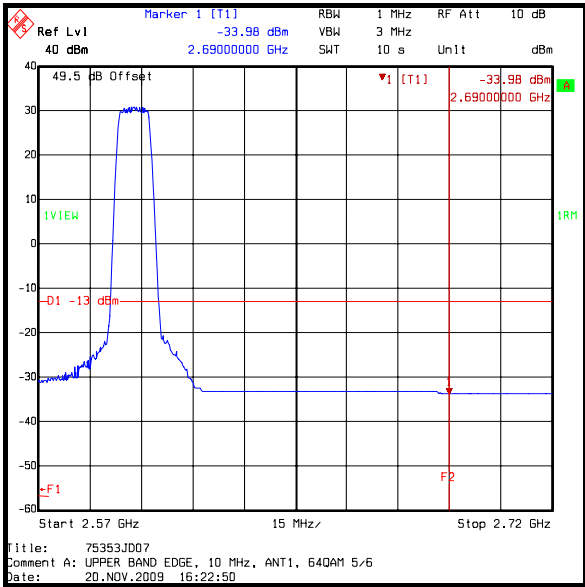


Top Channel / 10 MHz Bandwidth / FCC Upper Band Edge / 64QAM 3/4 / ANT1 Port

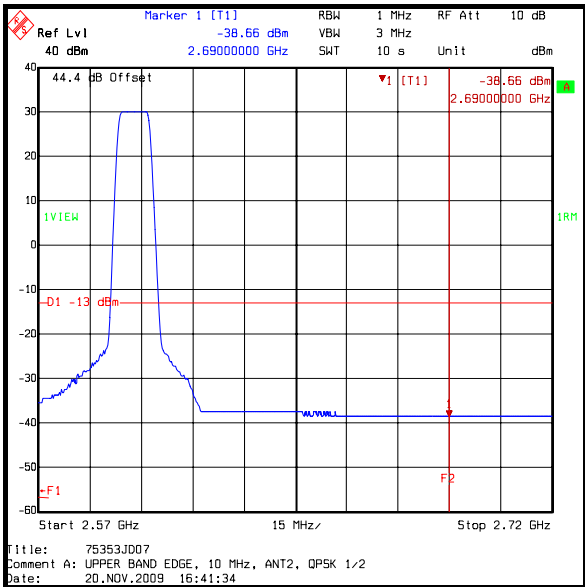


Transmitter Conducted Emissions at Band Edges (continued)

Top Channel / 10 MHz Bandwidth / FCC Upper Band Edge / 64QAM 5/6 / ANT1 Port

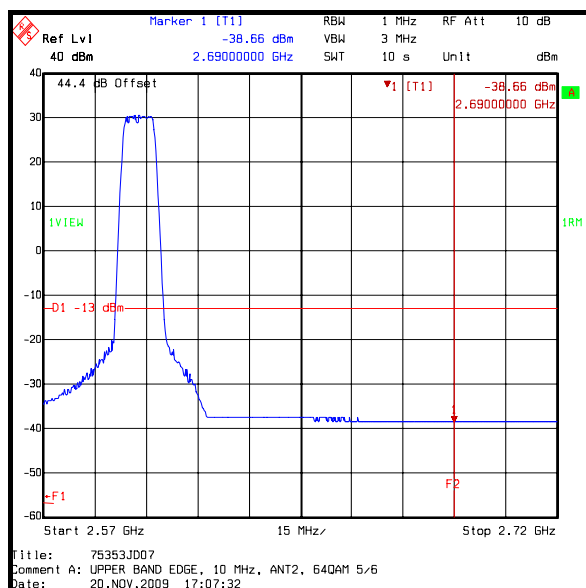


Top Channel / 10 MHz Bandwidth / FCC Upper Band Edge / QPSK 1/2 / ANT2 Port



### **Transmitter Conducted Emissions at Band Edges (continued)**

**Top Channel / 10 MHz Bandwidth / FCC Upper Band Edge / 64QAM 5/6 / ANT2 Port**



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

<b>FCC Part:</b>	FCC 2.1051 and FCC Part 27.53(m)(2)
<b>Test Method Used:</b>	FCC Part 27.53(m)(6) and EIA/TIA-603-C 2.2.12.1, 2.2.12.2(b)

**Environmental Conditions:**

<b>Temperature (°C):</b>	25
<b>Relative Humidity (%):</b>	33

**Note(s):**

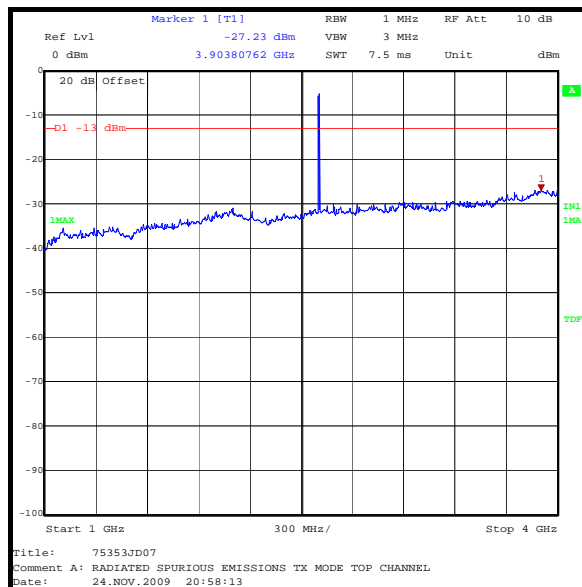
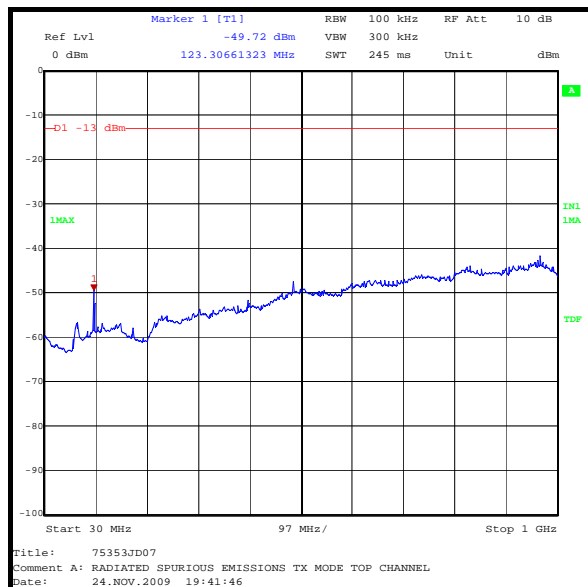
1. The outdoor unit was mounted vertically on a metal pole using the supplied brackets in accordance with the Customer's Base Station Installation Manual. This represents a typical user configuration. The centre of the outdoor unit was at a height of 1.5 metres above the chamber floor and directly in line with the measurement antenna. The outdoor unit was positioned in the centre of the anechoic chamber turntable. The indoor unit was positioned on the chamber floor directly below the outdoor unit and all interconnecting cables run vertically down the pole between both units. Surplus cable was bundled and cable tied.
2. Earthing points on the indoor unit and outdoor unit were connected by earth strap to the metal structure of the test chamber.
3. -48 VDC supply to the EUT during the test was provided by a 120 VAC 60 Hz power supply located outside the anechoic chamber. Interconnecting cables were run through access points in the chamber wall and floor.
4. The ANT1 port was connected via RF cables and attenuators to a Subscriber Station located outside the anechoic chamber. Interconnecting cables were run through access points in the chamber wall and floor. A BS-SS link was established and packet data sent on the downlink at the maximum data rate. The ANT2 port was terminated into a suitable 50 Ohm load.
5. The EUT was configured to transmit at maximum power on the FCC top channel of 2600.5 MHz as this is the highest operational frequency.
6. Measurements were made with the EUT transmitting QPSK 1/2 modulation on a 5 MHz channel.
7. The spurious emission limit is calculated according to FCC Part 27.53 (m)(2) and Industry Canada RSS-193 Section 6.3(c)(ii) as follows;  $43 + 10\log(P)$  where P is the transmitter power in Watts.
8. The EUT was rotated through 360°. Measurements were made with the test system antenna in the horizontal and vertical planes. The highest level was recorded.
9. Pre-scans were performed with a peak detector as this was known to be the worst case.
10. No spurious emissions were observed above the noise floor of the test system or within 20 dB of the limit, therefore the highest noise floor level was recorded.

**Limits:**

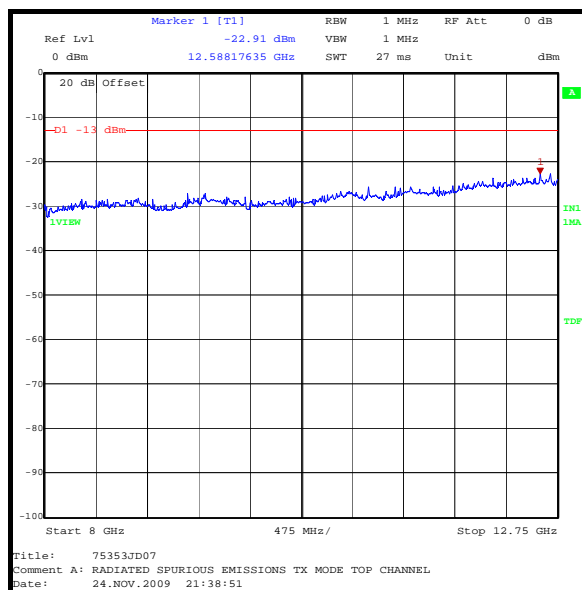
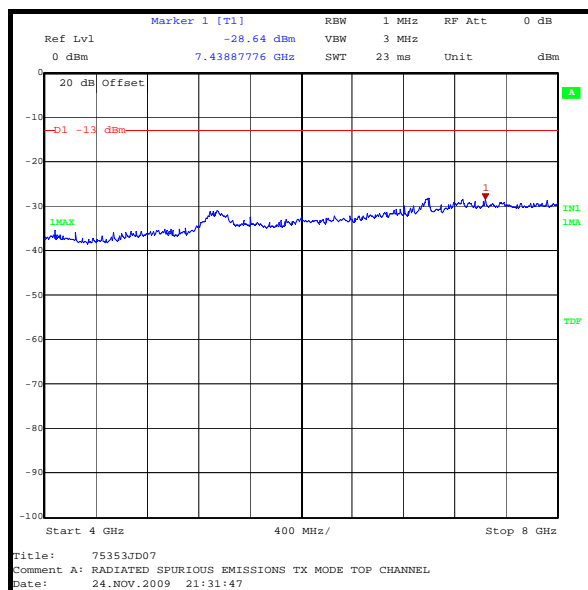
Frequency Range	Applicable limit	Limit (dBm)
30 MHz to 26500 MHz	$43 + 10 \log (P)$	-13

**Results:**

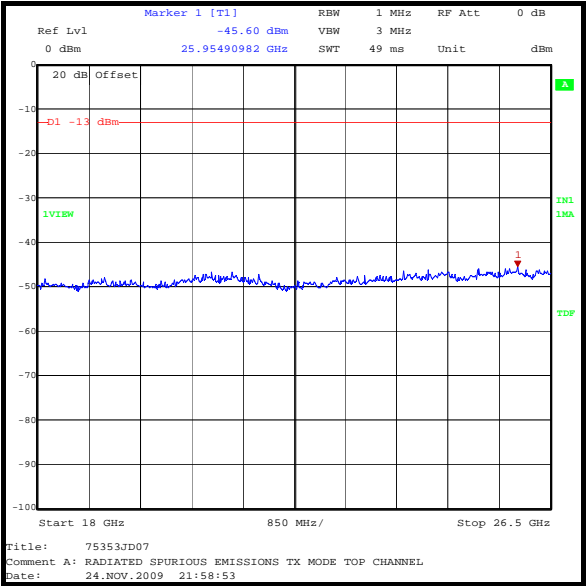
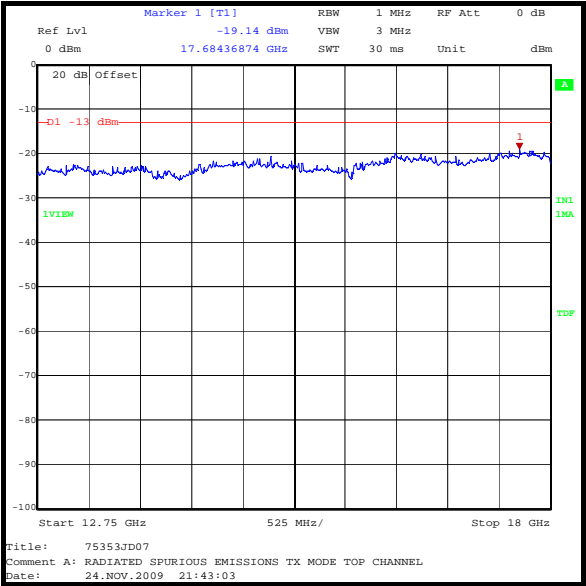
Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
17684.369	-19.1	-13.0	6.1	Complied

**Transmitter Radiated Emissions (continued)**

NOTE: The carrier is shown on the above pre-scan plot



Transmitter Radiated Emissions (continued)



**5.2.14. Transmitter Radiated Emissions at Band Edges****Test Summary:**

<b>FCC Part:</b>	FCC 2.1051 and FCC Part 27.53(m)(2)
<b>Test Method Used:</b>	FCC Part 27.53(m)(6) and EIA/TIA-603-C 2.2.12.1, 2.2.12.2(b)

**Environmental Conditions:**

<b>Temperature (°C):</b>	25
<b>Relative Humidity (%):</b>	27 to 33

**Note(s):**

1. The EUT was positioned as stated in the radiated spurious emissions section of this report.
2. The EUT was configured to transmit at maximum power on the top or bottom channels.
3. Measurements were made with the EUT transmitting QPSK 1/2 modulation on a 5 MHz channel and repeated with a 10 MHz channel. Conducted band edge measurements were previously performed on all modulation types and minimal differences were observed between each type.
4. Tests were performed with the EUT configured for operation on the FCC frequency range of 2496 MHz to 2690 MHz using the Customer declared FCC bottom and top channels. Tests were repeated on the Industry Canada frequency range of 2500 MHz to 2596 MHz using the Customer declared IC bottom and top channels.
5. The band edge limit is calculated according to FCC Part 27.53 (m)(2) and Industry Canada RSS-193 Section 6.3(c)(ii) as follows;  $43 + 10\log(P)$  where P is the transmitter power in Watts.
6. Industry Canada Radio Equipment Standards department confirmed to RFI Global Services Ltd. on 28<sup>th</sup> November 2009 that the emissions mask stated in RSS-193 Section 6.3(c)(i) cannot be applied to WiMax technology. Pending a later version of the Standard or release of a Standard by Industry Canada that covers this technology, the  $43 + 10 \log (P)$  limit stated in RSS-193 Section 6.3(c)(ii) was applied at the applicable sub-band edges without an emission mask. Measurements on the FCC top channels were made with a peak detector (worst case as the top channel is approximately 90 MHz from the FCC upper band edge). All other measurements were made with an average detector.
7. The EUT was rotated through 360°. Measurements were made with the test system antenna in the horizontal and vertical planes. The highest level was recorded.



**Transmitter Radiated Emissions at FCC Band Edges (continued)****Results: Bottom Channel / 5 MHz Bandwidth / FCC Lower Band Edge**

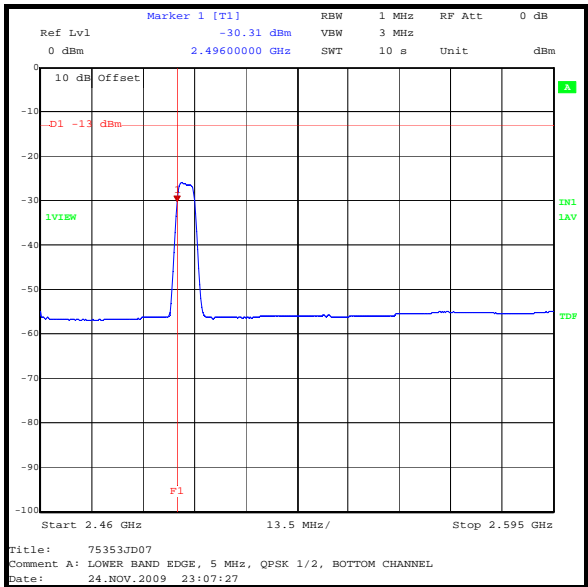
Modulation	Port	Emission Level Average (dBm)	Band Edge Limit (dBm)	Margin (dB)	Result
QPSK 1/2	ANT1	-30.3	-13.0	17.3	Complied

**Results: Top Channel / 5 MHz Bandwidth / FCC Upper Band Edge**

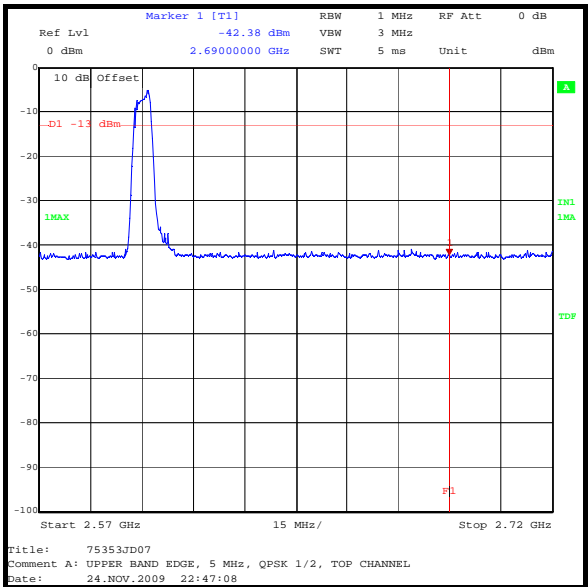
Modulation	Port	Emission Level Peak (dBm)	Band Edge Limit (dBm)	Margin (dB)	Result
QPSK 1/2	ANT1	-42.4	-13.0	29.4	Complied

Transmitter Radiated Emissions at FCC Band Edges (continued)

5 MHz Channel / QPSK 1/2 / ANT1 Port



Average detector – Lower band edge



Peak detector – Upper band edge

**Transmitter Radiated Emissions at FCC Band Edges (continued)****Results: Bottom Channel / 10 MHz Bandwidth / FCC Lower Band Edge**

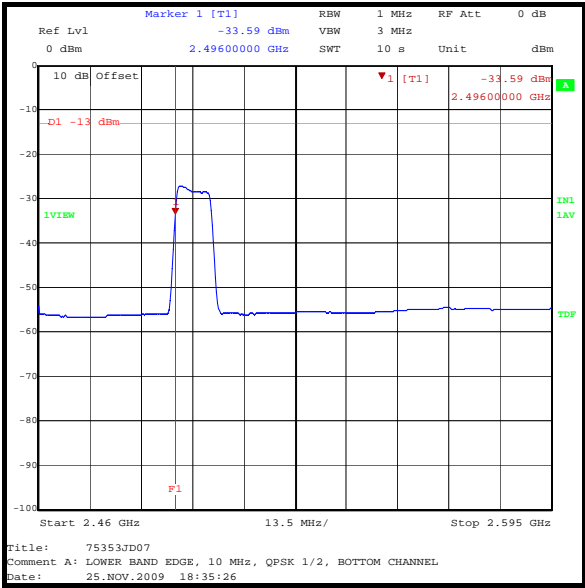
Modulation	Port	Emission Level Average (dBm)	Band Edge Limit (dBm)	Margin (dB)	Result
QPSK 1/2	ANT1	-33.6	-13.0	20.6	Complied

**Top Channel / 10 MHz Bandwidth / FCC Upper Band Edge**

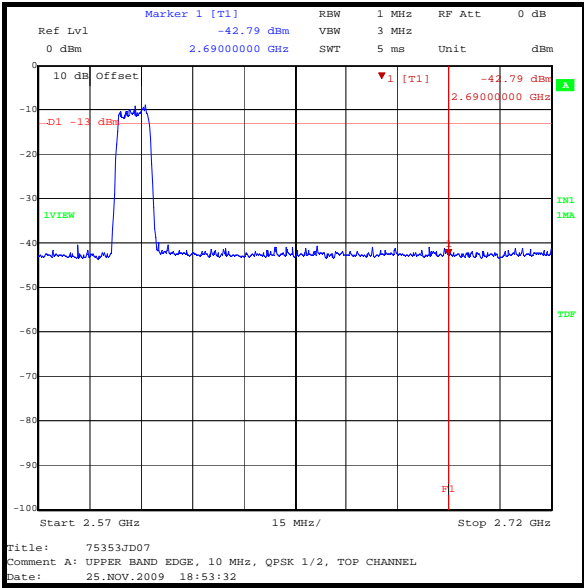
Modulation	Port	Emission Level Peak (dBm)	Band Edge Limit (dBm)	Margin (dB)	Result
QPSK 1/2	ANT1	-42.8	-13.0	29.8	Complied

Transmitter Radiated Emissions at FCC Band Edges (continued)

10 MHz Channel / QPSK 1/2 / ANT1 Port



Average detector – Lower band edge



Peak detector – Upper band edge

## 6. Measurement Uncertainty

No measurement or test can ever be perfect and the imperfections give rise to error of measurement in the results. Consequently the result of a measurement is only an approximation to the value of the measurand (the specific quantity subject to measurement) and is only complete when accompanied by a statement of the uncertainty of the approximation.

The expression of uncertainty of a measurement result allows realistic comparison of results with reference values and limits given in specifications and standards.

The uncertainty of the result may need to be taken into account when interpreting the measurement results.

The reported expanded uncertainties below are based on a standard uncertainty multiplied by an appropriate coverage factor such that a confidence level of approximately 95% is maintained. For the purposes of this document “approximately” is interpreted as meaning “effectively” or “for most practical purposes”.

Measurement Type	Range	Confidence Level (%)	Calculated Uncertainty
AC Conducted Spurious Emissions	0.15 MHz to 30.0 MHz	95%	±3.25 dB
Conducted Carrier Output Power	2496 MHz to 2603 MHz	95%	±1.2 dB
Carrier Output Power (EIRP)	2496 MHz to 2603 MHz	95%	±1.78 dB
Occupied Bandwidth	2496 MHz to 2603 MHz	95%	±0.92 ppm
Conducted Emissions Antenna Port	30 MHz to 26.5 GHz	95%	±1.2 dB
Frequency Stability	2496 MHz to 2603 MHz	95%	±0.92 ppm
Radiated Spurious Emissions	30 MHz to 1000 MHz	95%	±5.26 dB
Radiated Spurious Emissions	1 GHz to 26.5 GHz	95%	±2.94 dB

The methods used to calculate the above uncertainties are in line with those recommended within the various measurement specifications. Where measurement specifications do not include guidelines for the evaluation of measurement uncertainty the published guidance of the appropriate accreditation body is followed.

**Appendix 1. Test Equipment Used**

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval (Months)
A1249	Coaxial Coupler	Narda	252888	0955-0125	Calibrated before use	-
A126	CDN	RFI Ltd Basingstoke	801-AF4	None	Calibration not required	-
A1368	Directional Coupler	Pasternack Enterprises.	PE2214-10	None	Calibrated before use	-
A1378	E-Field Probe	Schmid & Partner	EX3DV3	3508	26 Jun 2009	12
A1392	Attenuator	HUBER + SUHNER AG	757456	6820.17.B	Calibrated before use	-
A1399	Attenuator	Weinschel Associates	WA46-10	A126	Calibrated before use	-
A1418	Attenuator	HP	N/A	CSC21296	Calibrated before use	-
A1490	Attenuator	Weinschel Corp	23-30-34	BH9156	Calibrated before use	-
A1534	Pre Amplifier	Hewlett Packard	8449B OPT H02	3008A00405	Calibrated before use	-
A1537	Dual Directional Coupler	Hewlett Packard	778D	1144A05122	Calibrated before use	-
A1818	Antenna	EMCO	3115	00075692	27 Nov 2009	12
A1830	Pulse Limiter	Rhode & Schwarz	ESH3-Z2	100668	05 Jan 2009	12
A1975	High Pass Filter	AtlanTecRF	AFH-03000	090424010	Calibrated before use	-
A490	Antenna	Chase	CBL6111A	1590	13 Jan 2009	12
A649	Single Phase LISN	Rohde & Schwarz	ESH3-Z5	825562/008	19 Mar 2009	12
C1028	Coaxial Cable	Rosenberger	FA210B-1-010M-30X30	FA00C 7588	04 May 2009	12
C1263	Cable	Rosenberger	FA210A1020005050	49316-01	29 Mar 2009	12
C151	Cable	Rosenberger	UFA210A-1-1181-70x70	None	20 Apr 2009	12
K0001	5m Semi-Anechoic Chamber	Rainford EMC	N/A	N/A	04 May 2009	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	01 Sep 2009	12

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval (Months)
K0005	Site Reference 4429	RFI Global Services Ltd	N/A	N/A	Calibration not required	-
K0008	Site Reference 4422	RFI Global Services Ltd	N/A	N/A	Calibration not required	-
L0998	Agilent N1912A Power Meter	Agilent	N1912A	MY45100213	28 Oct 2009	12
LD002491	PWR1600L PSU input = 120VDC	Kikusui	N/A	N/A	Calibrated before use	24
M1124	Spectrum Analyser	Rohde & Schwarz	ESIB26	100046K	09 Mar 2009	12
M1242	Spectrum Analyser	Rohde & Schwarz, Inc.	FSEM30	845986/022	09 Dec 2008	12
M1263	Test Receiver	Rohde & Schwarz	ESIB7	100265	22 Apr 2009	12
M1273	Test Receiver	Rhode & Schwarz	ESIB 26	100275	01 Apr 2009	12
M1379	Test Receiver	Rohde and Schwarz	ESIB7	100330	20 Aug 2009	12
M259	SME03 Signal Generator	Rohde & Schwarz	1038.6002.03	827758/021	Calibrated before use	-

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