

# TEST REPORT FROM RFI GLOBAL SERVICES LTD

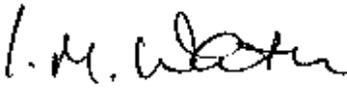
Test of: DN200

FCC ID: OFD-2003DN001

To: FCC Parts 15.205, 15.207, 15.209(a), 15.403 & 15.407(a)(b)

**Test Report Serial No.:**  
RFI-RPT-RP85509JD08A V2.0

**Version 2.0 Supersedes All Previous Versions**

<b>This Test Report Is Issued Under The Authority Of John Newell, Group Quality Manager:</b>	
<b>Checked By:</b>	Ian Watch
<b>Signature:</b>	
<b>Date of Issue:</b>	08 August 2012

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## **1. Customer Information**

<b>Company Name:</b>	Datasat Technologies A.G.
<b>Address:</b>	Industriestrasse 7 Zug Switzerland

## 2. Summary of Testing

### 2.1. General Information

<b>Specification Reference:</b>	47CFR15.407
<b>Specification Title:</b>	Code of Federal Regulations Volume 47 (Telecommunications) 2011: Part 15 Subpart E (Unlicensed National Information Infrastructure Devices) – Sections 15.403 and 15.407
<b>Location of Testing:</b>	RFI Global Services Ltd., Wade Road, Basingstoke, Hampshire, RG24 8AH.
<b>Site Registration:</b>	FCC: 209735
<b>Test Dates:</b>	03 April 2012 to 25 May 2012

### 2.2. Summary of Test Results

FCC Reference (47CFR)	Measurement	Result
Part 15.207	Transmitter AC Conducted Emissions	
Part 15.403(i)	Transmitter 26 dB Emission Bandwidth	Note 1
Part 15.407(a)(1)	Transmitter Maximum Conducted Output Power	
Part 15.407(a)(1)	Transmitter Peak Power Spectral Density	
Parts 15.407(b)(1),(6),(7) & 15.209(a)	Transmitter Out of Band Emissions (Conducted)	
Parts 15.407(b)(1),(7), 15.205 & 15.209(a)	Transmitter Band Edge Emissions (Conducted)	
Parts 15.407(b)(1),(6),(7) & 15.209(a)	Transmitter Out of Band Emissions (Radiated)	
Parts 15.407(b)(1),(7), 15.205 & 15.209(a)	Transmitter Band Edge Emissions (Radiated)	
<b>Key to Results</b>		
 = Complied  = Did not comply		

#### Note(s):

1. Measurements were performed for Conducted power and are for reference purposes only.

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

<b>Reference:</b>	ANSI C63.4 (2009)
<b>Title:</b>	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
<b>Reference:</b>	ANSI C63.10 (2009)
<b>Title:</b>	American National Standard for Testing Unlicensed Wireless Devices
<b>Reference:</b>	FCC KDB 789033 D01 v01r01 3/5/2012
<b>Title:</b>	Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E
<b>Reference:</b>	FCC KDB 662911 D01 v01r01 10/25/2011
<b>Title:</b>	Emissions Testing of Transmitters with Multiple Outputs in the Same Band
<b>Reference:</b>	FCC KDB 662911 D02 v01r01 10/25/2011
<b>Title:</b>	MIMO with Cross-Polarized Antennas v01 10/25/2011

### **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 specifications identified above.

### **3. Equipment Under Test (EUT)**

#### **3.1. Identification of Equipment Under Test (EUT)**

<b>Brand Name:</b>	Datasat
<b>Model Name or Number:</b>	DN200
<b>Hardware Version:</b>	Rev 1.0
<b>Software Version:</b>	Rev 1.0
<b>Serial Number:</b>	261293
<b>FCC ID:</b>	OFD-2003DN001

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

The equipment under test was a dual band multi radio Wireless Network System containing four RF modules operating in accordance with IEEE 802.11a,b,g,n transmitting in the 2.4 to 2.4835 GHz, 5.15 to 5.25 GHz & 5.725 to 5.825 GHz bands. The EUT has eight external antenna ports, two transmit per radio module, MIMO is supported. The EUT is designed to work in various configurations and with various antenna types depending on the end user requirements.

A 120 VAC 60 Hz to 48 VDC power supply is used to provide power.

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

No modifications were applied to the EUT during testing.

**3.4. Additional Information Related to Testing**

<b>Technology Tested:</b>	IEEE 802.11a,b,g,n		
<b>Type of Unit:</b>	Transceiver		
<b>Modulation:</b>	CCK, BPSK, QPSK, 16QAM, 64QAM		
<b>Data rates:</b>	802.11a	6, 9, 12, 18, 24, 36, 48 and 54 Mbps	
	802.11n 20 MHz	6.5, 13, 19.5, 26, 39, 52, 58.5, 65, 78, 104, 117, 130 Mbps	
	802.11n 40 MHz	13.5, 27, 40.5, 54, 81, 108, 121.5, 135, 162, 216, 243 & 270 Mbps	
<b>Power Supply Requirement(s):</b>	Nominal	48 VDC via 120 VAC 60 Hz PSU	
<b>Channel Spacing:</b>	20 MHz		
<b>Transmit &amp; Receive Frequency Band:</b>	5150 MHz to 5250 MHz		
<b>Transmit &amp; Receive Channels Tested:</b>	<b>Channel ID</b>	<b>Channel Number</b>	<b>Channel Frequency (MHz)</b>
	Bottom	36	5180
	Middle	40	5200
	Top	48	5240
<b>Channel Spacing:</b>	40 MHz		
<b>Transmit Frequency Band:</b>	5150 MHz to 5250 MHz		
<b>Transmit Channels Tested:</b>	<b>Channel ID</b>	<b>Channel Number</b>	<b>Channel Frequency (MHz)</b>
	Bottom	38	5190
	Top	46	5230

### **3.5. Support Equipment**

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

<b>Description:</b>	Laptop
<b>Brand Name:</b>	Dell
<b>Model Name or Number:</b>	D610
<b>Serial Number:</b>	RFI Global Services Ltd 00062

<b>Description:</b>	Ethernet hub
<b>Brand Name:</b>	Netgear
<b>Model Name or Number:</b>	GS605
<b>Serial Number:</b>	1YG19430021A1

<b>Description:</b>	Omnidirectional antenna (5 dBi Gain)
<b>Brand Name:</b>	TerraWave Solutions
<b>Model Name or Number:</b>	T58050R10002 (DT-OM360I-5805-RPTNC)

<b>Description:</b>	Sectorised antenna (7.5 dBi Gain)
<b>Brand Name:</b>	MARS Antennas & RF Systems Ltd.
<b>Model Name or Number:</b>	MA-WC2458-2H (DT-ST060O-5875-N)

<b>Description:</b>	Omnidirectional antenna (10 dBi Gain)
<b>Brand Name:</b>	MARS Antennas & RF Systems Ltd.
<b>Model Name or Number:</b>	MA-WO55-10NH (DT-OM360O-5810-N)

### **3.6. Antenna**

The table below lists the antennas that the Customer intends to use with this product:

<b>Type</b>	<b>Stated Gain (dBi)</b>	<b>Model</b>	<b>Part No.</b>	<b>Used for Testing</b>	<b>Note</b>
Omnidirectional	3.0	390645/TWS5000W	DT-OM360I-2403-RPTNC		3
Omnidirectional	5.0	T58050R10002	DT-OM360I-5805-RPTNC	X	1
Omnidirectional	10.0	MA-WO55-10NH	DT-OM360O-5810-N	X	2
Sectorised	5.0	MA-WE2458-2H2	DT-ST120O-5805-N		3
Sectorised	7.5	MA-WC2458-2H	DT-ST060O-5875-N	X	2

X = This antenna was used for testing purposes

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

1. This antenna was used for testing as it has a gain of less than 6 dBi and therefore has the highest conducted power.
2. This antenna was used for testing as it has the highest gain for the type of antenna and therefore has the highest EIRP.
3. This antenna is a lower gain antenna of the same type to that tested. Therefore it was not tested.

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

### **4.1. Operating Modes**

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

- The unit operates in transceiver mode only.
- Continuously transmitting at maximum power with >99% duty cycle in test mode on the bottom, middle and top channels as required using the supported data rates.

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

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

- Controlled using a bespoke application on a laptop PC. The application was used to enable continuous transmission and to select the test channels, data rates and modulation schemes as required.
- The EUT supports four radio modules each containing 2 x 2 MIMO. The radio module with the highest conducted output power was used to make measurements as this was deemed to be worst case.
- All active ports were terminated during radiated spurious emissions and AC conducted emissions testing. Ports stated as inactive by the Customer were not terminated.
- AC conducted emissions testing was performed with the power supply connected to a 120 VAC 60 Hz single phase supply via a LISN. The EUT was set to transmit at maximum power on the top channel during the test.

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

### **5.1. General Comments**

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

**5.2. Test Results****5.2.1. Transmitter Mode AC Conducted Spurious Emissions****Test Summary:**

<b>Test Engineer:</b>	Andrew Edwards	<b>Test Date:</b>	09 May 2012
<b>Test Sample Serial No.:</b>	261293		

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

**Environmental Conditions:**

<b>Temperature (°C):</b>	26
<b>Relative Humidity (%):</b>	42

**Results: Live / Quasi Peak**

Frequency (MHz)	Line	Level (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Result
0.159	Live	59.8	65.5	5.7	Complied
3.579	Live	40.0	56.0	16.0	Complied
3.714	Live	37.1	56.0	18.9	Complied
4.137	Live	36.8	56.0	19.2	Complied
4.641	Live	35.3	56.0	20.7	Complied
4.745	Live	40.3	56.0	15.7	Complied
4.781	Live	36.7	56.0	19.3	Complied
4.848	Live	32.9	56.0	23.1	Complied
9.839	Live	27.4	60.0	32.6	Complied
9.938	Live	31.8	60.0	28.2	Complied

**Results: Live / Average**

Frequency (MHz)	Line	Level (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Result
0.159	Live	45.1	55.5	10.4	Complied
10.460	Live	21.0	50.0	29.0	Complied
10.707	Live	19.0	50.0	31.0	Complied
10.955	Live	18.4	50.0	31.6	Complied
11.202	Live	19.0	50.0	31.0	Complied
11.450	Live	19.4	50.0	30.6	Complied

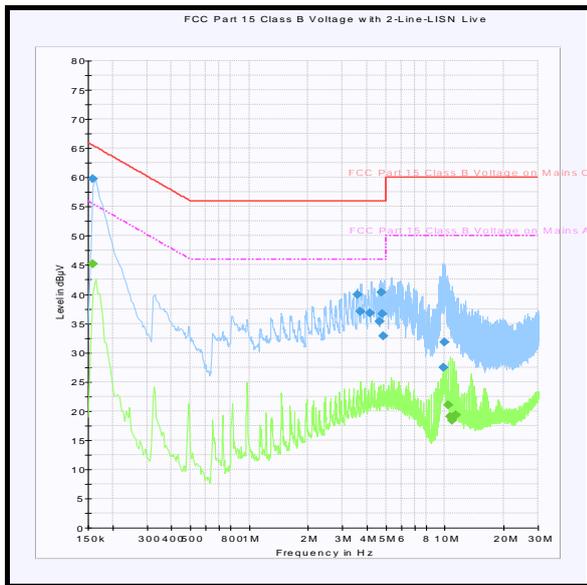
**Transmitter AC Conducted Spurious Emissions (continued)****Results: Neutral / Quasi Peak**

Frequency (MHz)	Line	Level (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Result
0.155	Neutral	62.3	65.8	3.5	Complied
0.245	Neutral	50.2	61.9	11.7	Complied
0.488	Neutral	42.5	56.2	13.7	Complied
0.969	Neutral	34.1	56.0	21.9	Complied
3.125	Neutral	29.3	56.0	26.7	Complied
3.593	Neutral	35.7	56.0	20.3	Complied
3.678	Neutral	27.9	56.0	28.1	Complied
4.286	Neutral	35.9	56.0	20.1	Complied
4.646	Neutral	31.3	56.0	24.7	Complied
4.907	Neutral	29.4	56.0	26.6	Complied

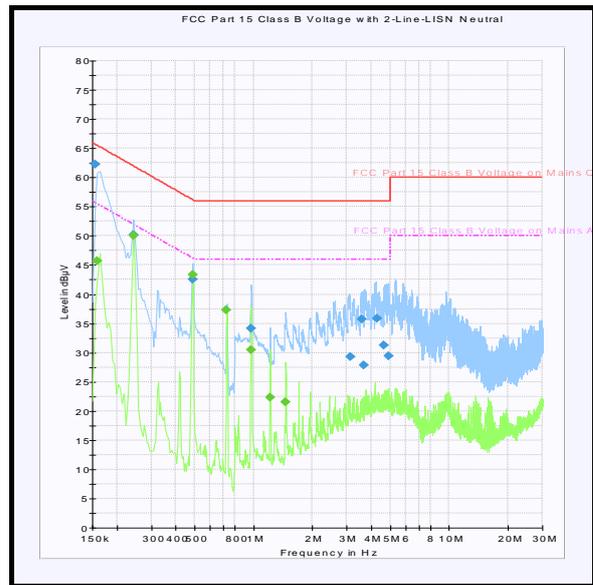
**Results: Neutral / Average**

Frequency (MHz)	Line	Level (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Result
0.159	Neutral	45.7	55.5	9.8	Complied
0.245	Neutral	50.0	51.9	1.9	Complied
0.488	Neutral	43.3	46.2	2.9	Complied
0.726	Neutral	37.3	46.0	8.7	Complied
0.974	Neutral	30.4	46.0	15.6	Complied
1.217	Neutral	22.3	46.0	23.7	Complied
1.460	Neutral	21.5	46.0	24.5	Complied

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



**Live**



**Neutral**

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

**5.2.2. Transmitter 26 dB Emission Bandwidth****Test Summary:**

<b>Test Engineer:</b>	Sarah Williams	<b>Test Date:</b>	03 April 2012
<b>Test Sample Serial No.:</b>	261293		

<b>FCC Reference:</b>	Part 15.403(i)
<b>Test Method Used:</b>	FCC KDB 789033 Section D)

**Environmental Conditions:**

<b>Temperature (°C):</b>	23
<b>Relative Humidity (%):</b>	26

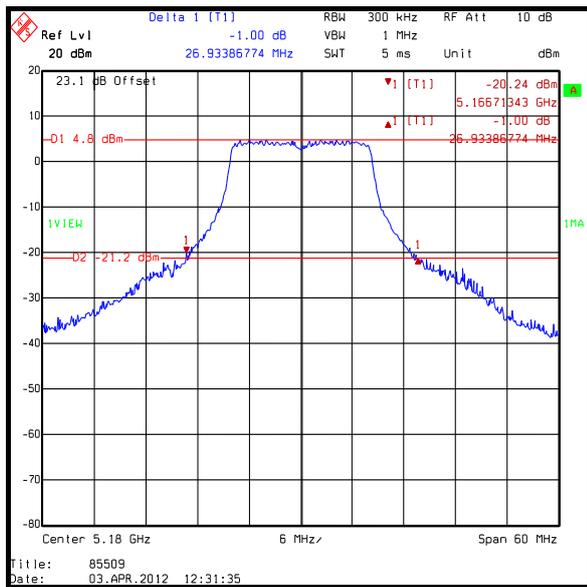
**Note(s):**

4. These measurements were performed for reference purposes. The measured bandwidth is used for calculations in Section 5.2.3 Maximum conducted output power.

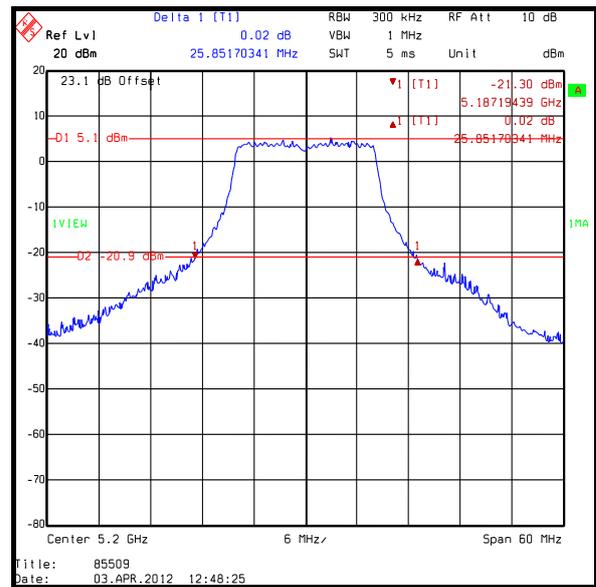
**Transmitter 26 dB Emission Bandwidth (continued)**

**Results: 802.11a / 20 MHz / 5.15-5.25 GHz band (Reference plots)**

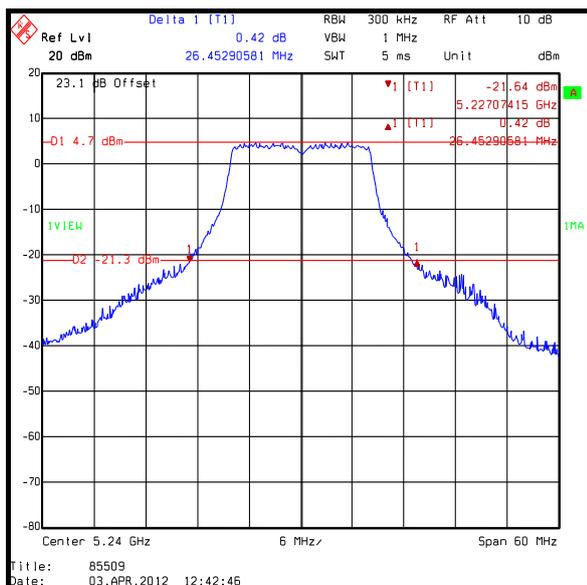
Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbps	26 dB Emission Bandwidth (MHz)
Bottom	5180	BPSK	6	26.934
Middle	5200	BPSK	6	25.852
Top	5240	BPSK	6	26.453



**Bottom Channel**



**Middle Channel**

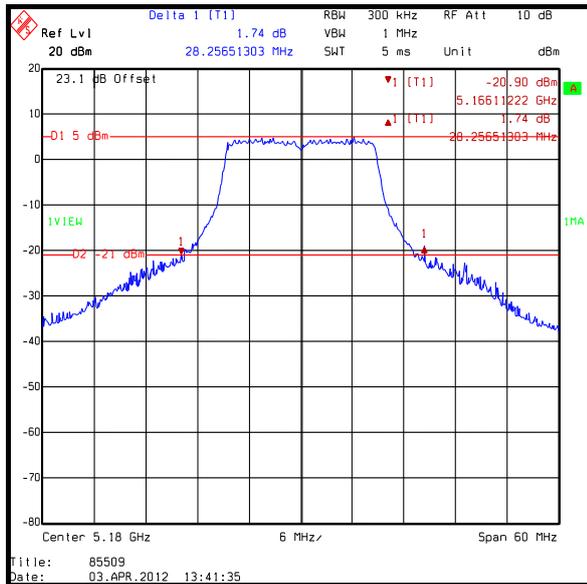


**Top Channel**

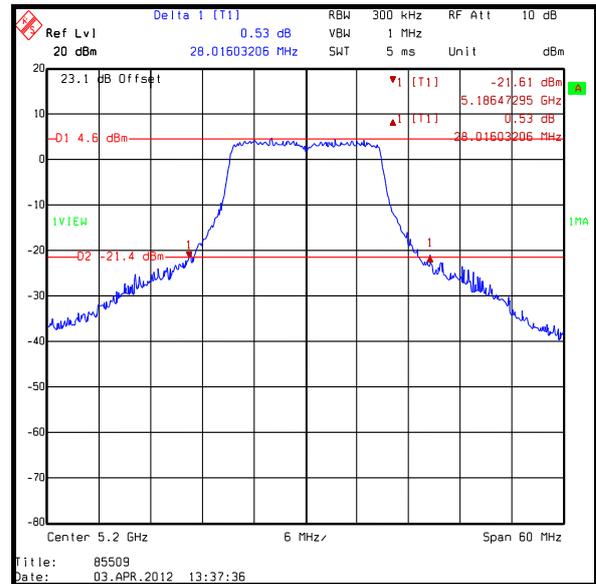
**Transmitter 26 dB Emission Bandwidth (continued)**

**Results: 802.11n / 20 MHz / 5.15-5.25 GHz band (Reference plots)**

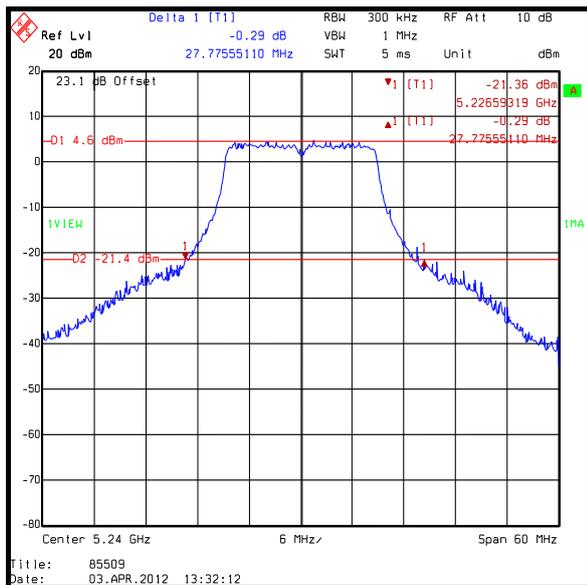
Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbps / MCS	26 dB Emission Bandwidth (MHz)
Bottom	5180	BPSK	6.5 / 0	28.257
Middle	5200	BPSK	6.5 / 0	28.016
Top	5240	BPSK	6.5 / 0	27.776



**Bottom Channel**



**Middle Channel**

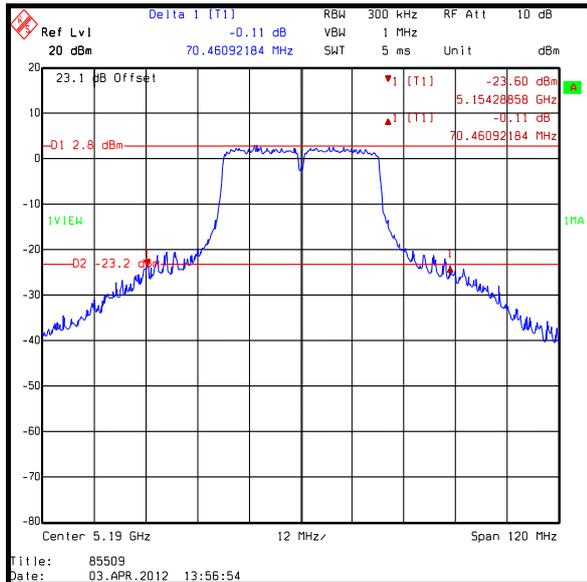


**Top Channel**

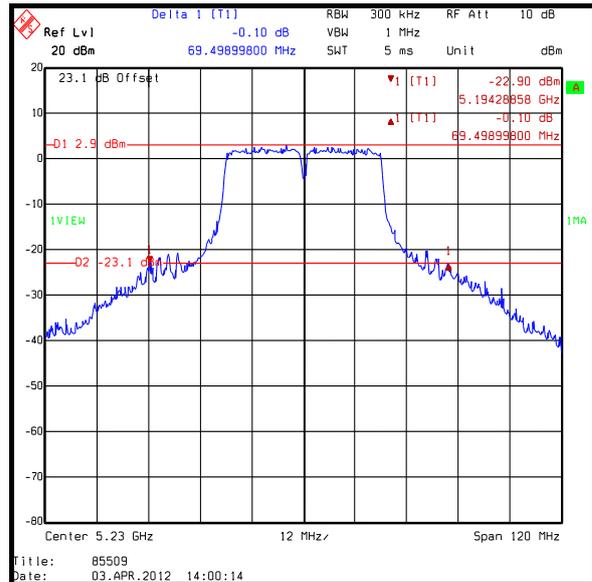
**Transmitter 26 dB Emission Bandwidth (continued)**

**Results: 802.11n / 40 MHz / 5.15-5.25 GHz band (Reference plots)**

Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbps / MCS	26 dB Emission Bandwidth (MHz)
Bottom	5190	BPSK	13.5 / 0	70.461
Top	5230	BPSK	13.5 / 0	69.499



**Bottom Channel**



**Top Channel**

**5.2.3. Transmitter Maximum Conducted Output Power****Test Summary:**

<b>Test Engineer:</b>	Sarah Williams	<b>Test Date:</b>	24 May 2012
<b>Test Sample Serial No.:</b>	261293		

<b>FCC Reference:</b>	Part 15.407(a)(1)
<b>Test Method Used:</b>	FCC KDB 789033 D01 Section C)3)b) & FCC KDB 662911 D01

**Environmental Conditions:**

<b>Temperature (°C):</b>	26
<b>Relative Humidity (%):</b>	40

## **Transmitter Maximum Conducted Output Power (continued)**

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

1. All conducted power tests were performed using a spectrum analyser accordance with FCC KDB 789033 D01 C)3)b) Method SA-1.
2. The EUT has 4 radio modules with two RF ports each. Initial measurements were performed on one channel on all 8 ports to find the radio module with the highest output power. For this EUT radio module 1 had the highest power. The ports are numbered Port 0 and Port 1. Power from both ports was measured and combined using the measure-and-sum method stated in FCC KDB 662911 D01.
3. The EUT was transmitting at >99% duty cycle.
4. All supported modes and channel widths were initially investigated on one channel. The modes that produced the highest power and therefore the worst case were 6 Mbps for 802.11a, BPSK / 6.5 Mbps / MCS0 for 802.11n 20 MHz channel bandwidth and BPSK / 13.5 Mbps / MCS0 for 802.11n 40 MHz channel bandwidth. Measurements were then performed on the relevant mode on bottom, middle and top channels on both ports.
5. The Part 15.407(a)(1) limit is the lesser of 50 mW (17.0 dBm) or  $4 \text{ dBm} + 10 \log_{10} B$ , where B is the previously measured 26 dB emission bandwidth in MHz. The limit for each channel was calculated as below:

$$802.11a \text{ 20 MHz channel width / Bottom channel} = 4 \text{ dBm} + 10 \log_{10} 26.9 = 18.3 \text{ dBm}$$

$$802.11a \text{ 20 MHz channel width / Middle channel} = 4 \text{ dBm} + 10 \log_{10} 25.9 = 18.1 \text{ dBm}$$

$$802.11a \text{ 20 MHz channel width / Top channel} = 4 \text{ dBm} + 10 \log_{10} 26.5 = 18.2 \text{ dBm}$$

$$802.11n \text{ 20 MHz channel width / Bottom channel} = 4 \text{ dBm} + 10 \log_{10} 28.3 = 18.5 \text{ dBm}$$

$$802.11n \text{ 20 MHz channel width / Middle channel} = 4 \text{ dBm} + 10 \log_{10} 28.0 = 18.5 \text{ dBm}$$

$$802.11n \text{ 20 MHz channel width / Top channel} = 4 \text{ dBm} + 10 \log_{10} 27.8 = 18.4 \text{ dBm}$$

$$802.11n \text{ 40 MHz channel width / Bottom channel} = 4 \text{ dBm} + 10 \log_{10} 70.5 = 22.5 \text{ dBm}$$

$$802.11n \text{ 40 MHz channel width / Top channel} = 4 \text{ dBm} + 10 \log_{10} 69.5 = 22.4 \text{ dBm}$$

Therefore the lesser of the two limits is the fixed limit of 50 mW (17 dBm). This was applied to the results. The limits for the 7.5 and 10 dBi antennas have been adjusted accordingly.

6. Conducted measurements were performed taking into account the highest gain antenna of each type declared by the Customer. The lowest gain antenna had the highest conducted power and the highest gain antenna had the lowest conducted power. Power settings on the EUT were adjusted in order for the lowest gain and highest gain antenna to meet conducted power, EIRP and spurious emissions requirements.

Various antennas have gains of less than 6 dBi. Tests were performed and results calculated based on the 5 dBi gain omnidirectional antenna. The conducted power limit is therefore the fixed limit of 17 dBm as calculated above. The EUT was configured with a power setting of 13.0.

One antenna is sectorised with a declared gain of 7.5 dBi. The conducted power limit of 17 dBm was reduced to 15.5 dBm as the 6 dBi gain allowed was exceeded by 1.5 dB according to Part 15.407(a)(1). The EUT was configured with a power setting of 11.0.

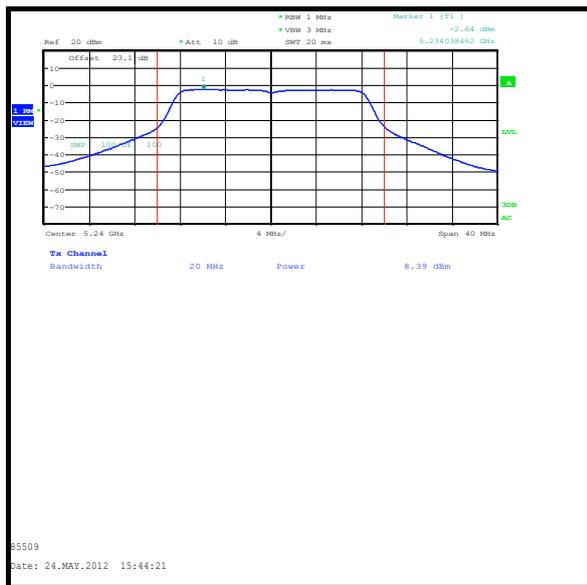
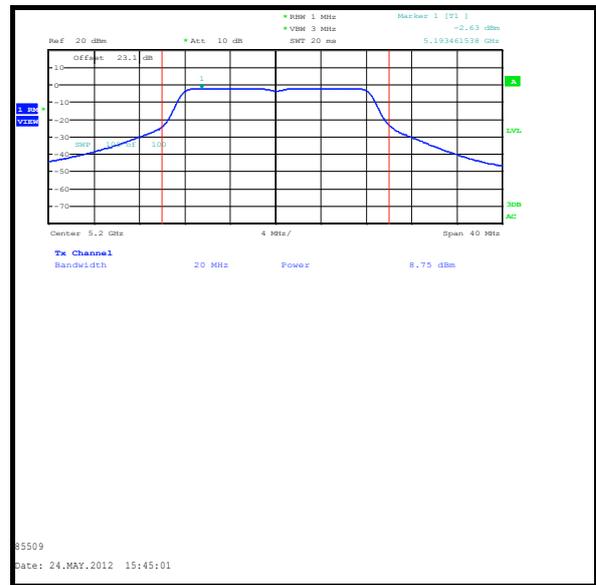
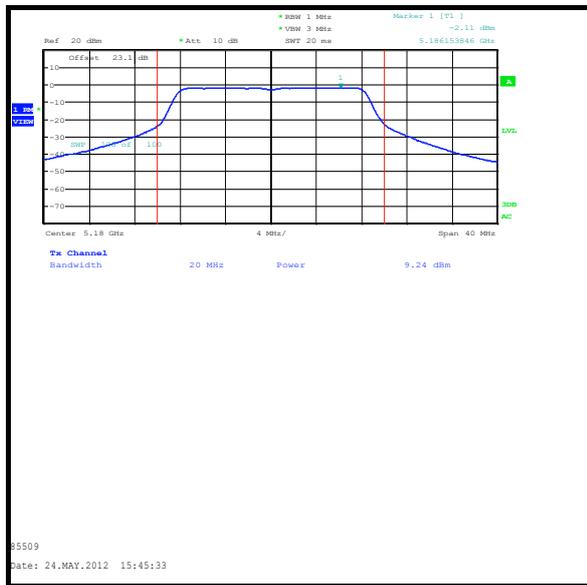
One antenna is omnidirectional and has a declared gain of 10 dBi. The conducted power limit of 17 dBm was reduced to 13 dBm as the 6 dBi gain allowed was exceeded by 4 dB according to Part 15.407(a)(1). The EUT was configured with a power setting of 9.5

**Transmitter Maximum Conducted Output Power (Continued)**

**Results: 802.11a / 20 MHz / 6 Mbps / BPSK / 5 dBi omnidirectional antenna**

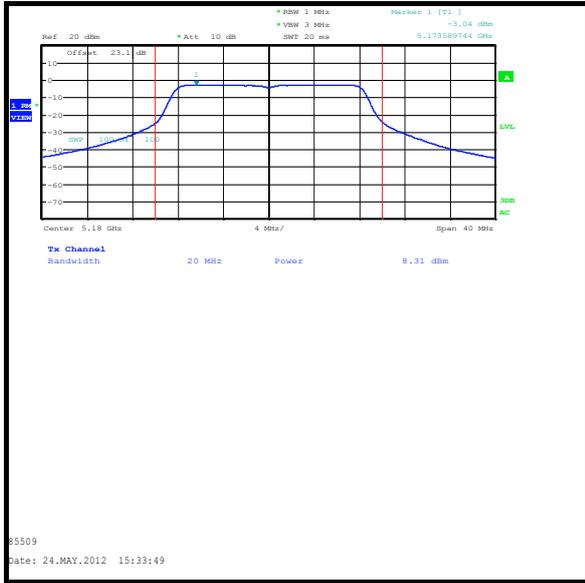
Channel	Frequency (MHz)	Port 0 Power (dBm)	Port 1 Power (dBm)	Combined Power (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	5180	9.2	8.3	11.8	17.0	5.2	Complied
Middle	5200	8.8	8.3	11.6	17.0	5.4	Complied
Top	5240	8.4	8.2	11.3	17.0	5.7	Complied

**Results: 802.11a / 20 MHz / 6 Mbps / BPSK / Port 0 / 5 dBi omnidirectional antenna**

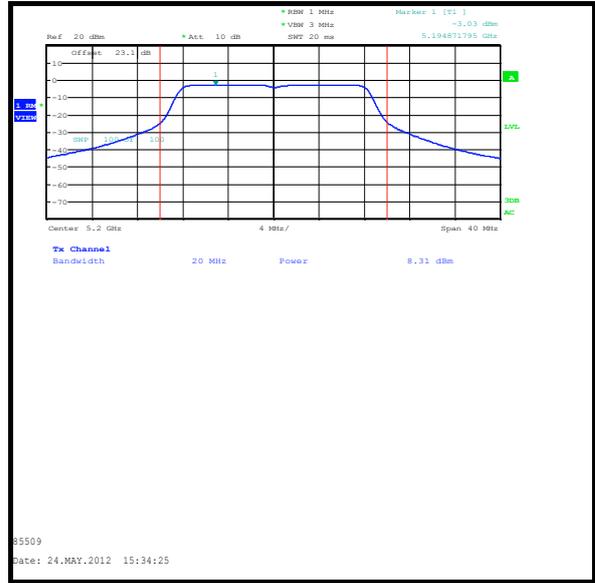


**Transmitter Maximum Conducted Output Power (continued)**

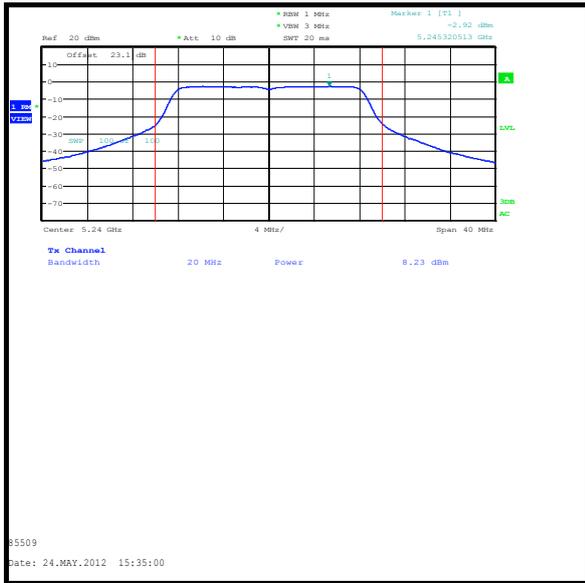
**Results: 802.11a / 20 MHz / 6 Mbps / BPSK / Port 1 / 5 dBi omnidirectional antenna**



**Bottom Channel**



**Middle Channel**



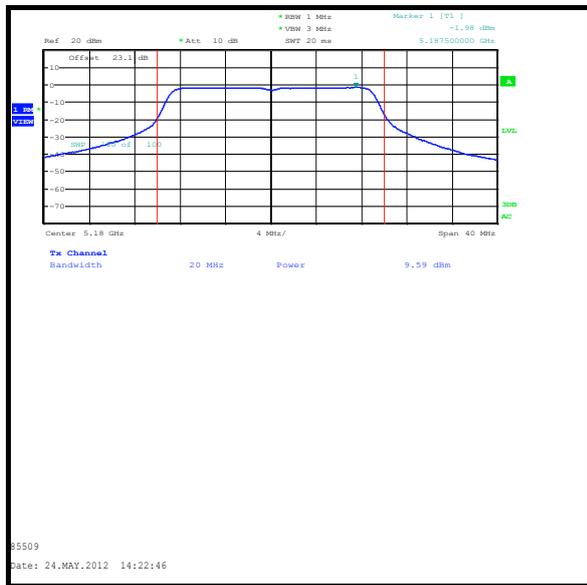
**Top Channel**

**Transmitter Maximum Conducted Output Power (continued)**

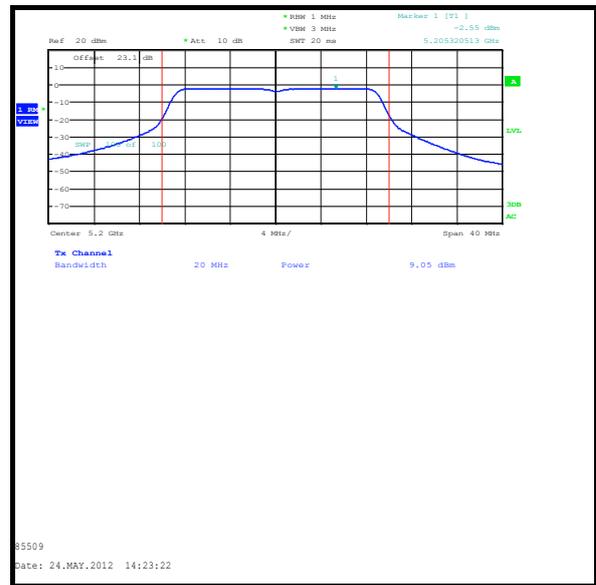
**Results: 802.11n / 20 MHz / 6.5 Mbps / BPSK / MCS0 / 5 dBi omnidirectional antenna**

Channel	Frequency (MHz)	Port 0 Power (dBm)	Port 1 Power (dBm)	Combined Power (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	5180	9.6	8.7	12.2	17.0	4.8	Complied
Middle	5200	9.1	8.5	11.8	17.0	5.2	Complied
Top	5240	8.7	8.5	11.6	17.0	5.4	Complied

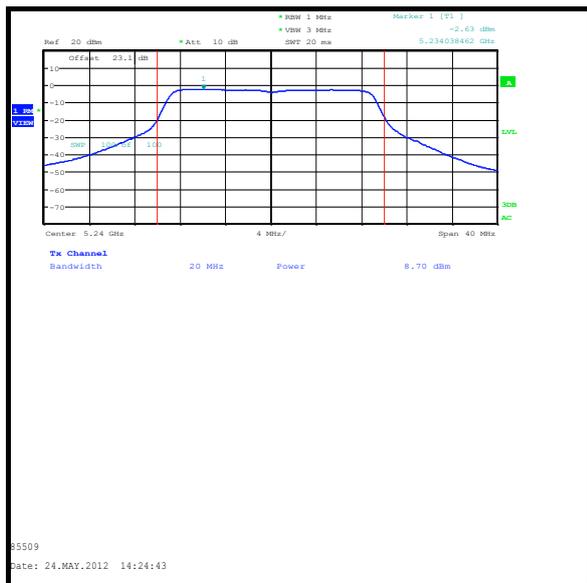
**Results: 802.11n / 20 MHz / 6.5 Mbps / BPSK / MCS0 / Port 0 / 5 dBi omnidirectional antenna**



**Bottom Channel**



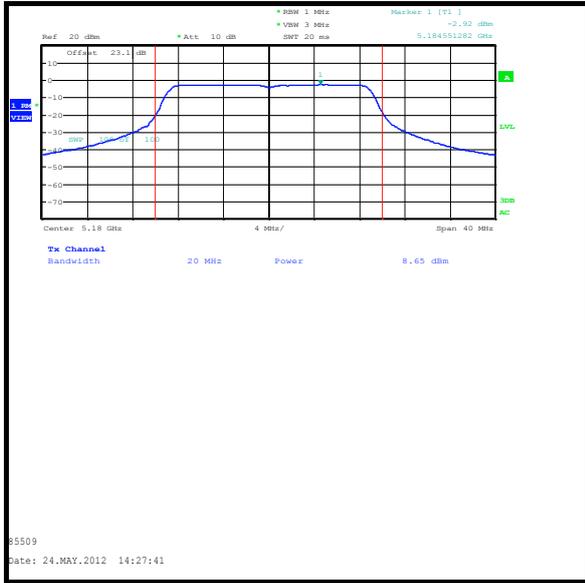
**Middle Channel**



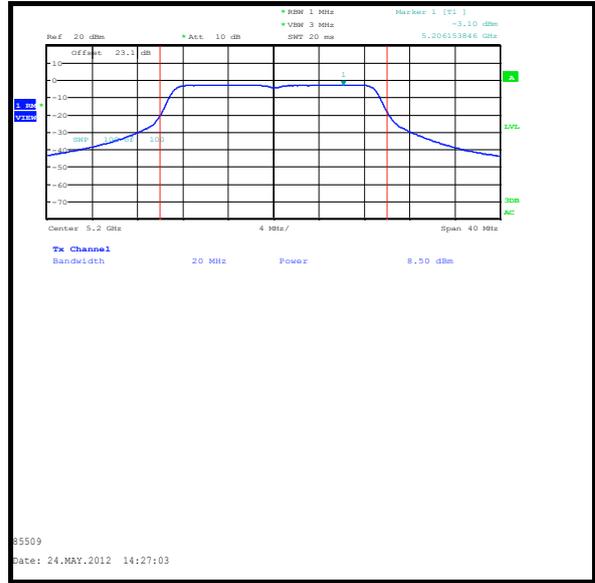
**Top Channel**

**Transmitter Maximum Conducted Output Power (continued)**

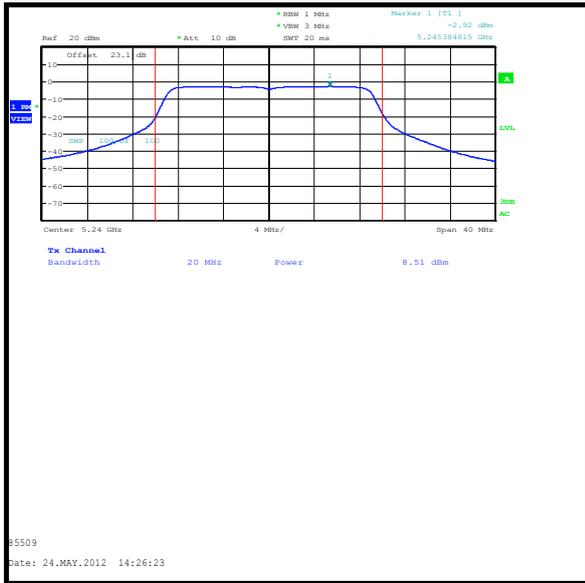
**Results: 802.11n / 20 MHz / 6.5 Mbps / BPSK / MCS0 / Port 1 / 5 dBi omnidirectional antenna**



**Bottom Channel**



**Middle Channel**



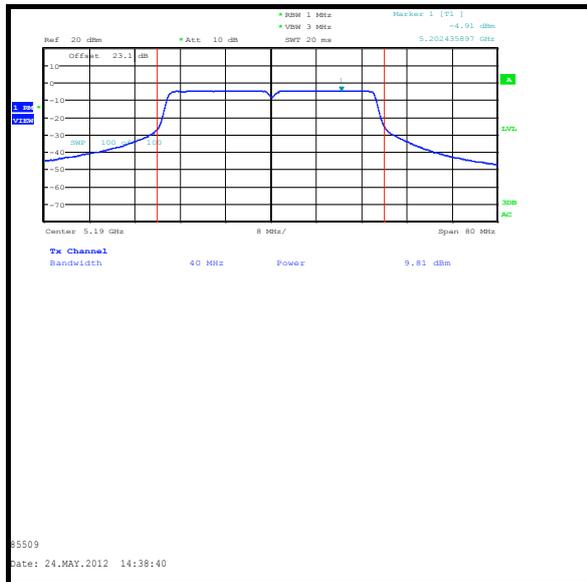
**Top Channel**

**Transmitter Maximum Conducted Output Power (continued)**

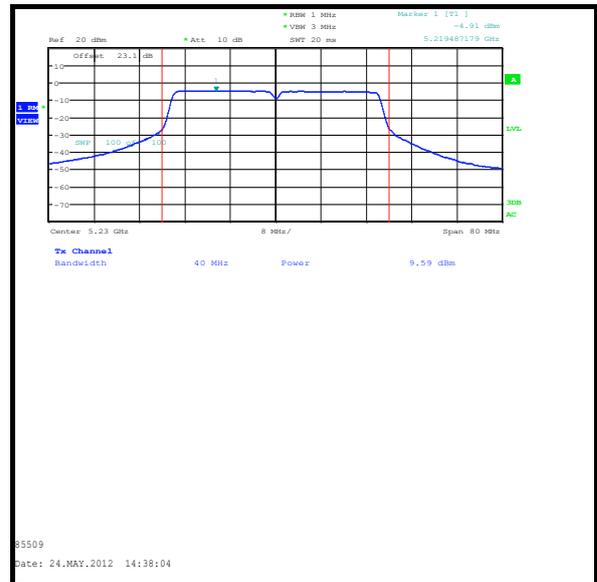
**Results: 802.11n / 40 MHz / 13.5 Mbps / BPSK / MCS0 / 5 dBi omnidirectional antenna**

Channel	Frequency (MHz)	Port 0 Power (dBm)	Port 1 Power (dBm)	Combined Power (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	5190	9.8	9.2	12.5	17.0	4.5	Complied
Top	5230	9.6	9.4	12.5	17.0	4.5	Complied

**Results: 802.11n / 40 MHz / 13.5 Mbps / BPSK / MCS0 / Port 0 / 5 dBi omnidirectional antenna**

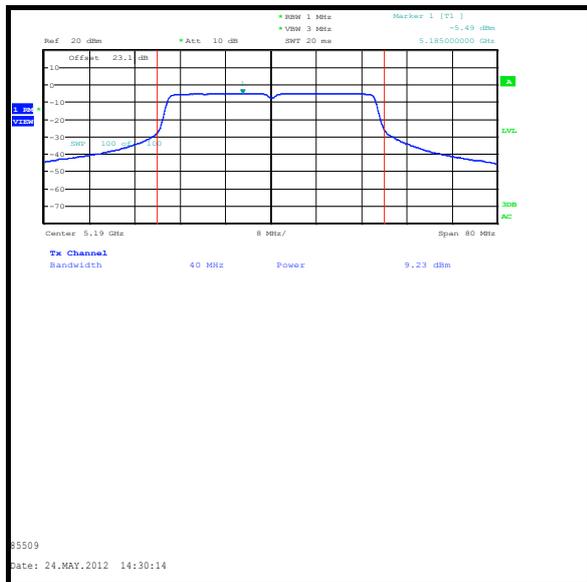


Bottom Channel

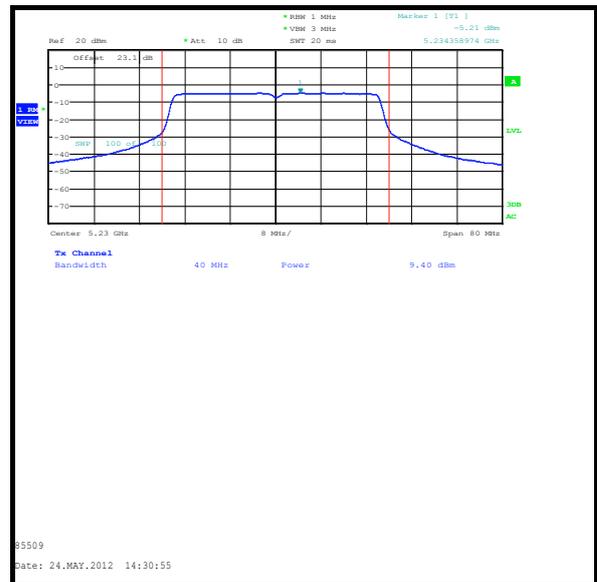


Top Channel

**Results: 802.11n / 40 MHz / 13.5 Mbps / BPSK / MCS0 / Port 1 / 5 dBi omnidirectional antenna**



Bottom Channel



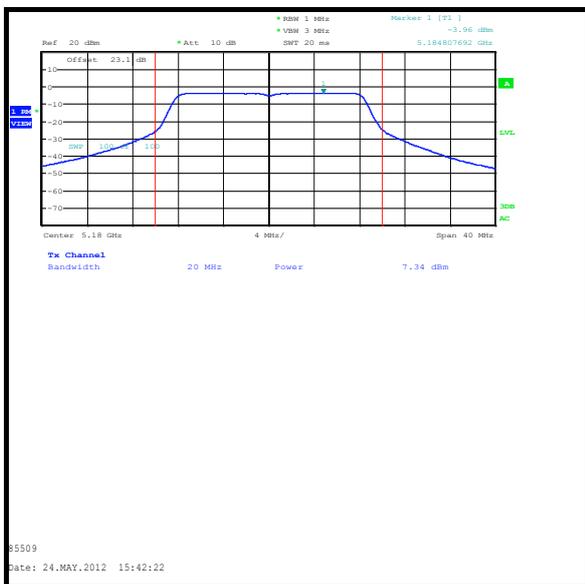
Top Channel

**Transmitter Maximum Conducted Output Power (continued)**

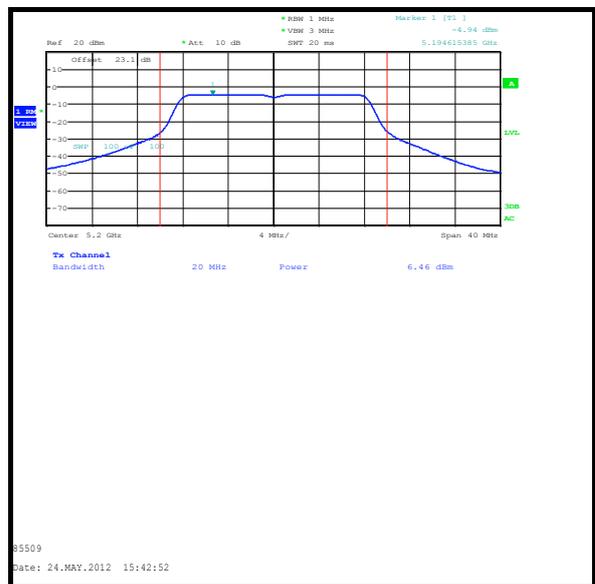
**Results: 802.11a / 20 MHz / 6 Mbps / BPSK / 7.5 dBi sectorised antenna**

Channel	Frequency (MHz)	Port 0 Power (dBm)	Port 1 Power (dBm)	Combined Power (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	5180	7.3	6.6	10.0	15.5	5.5	Complied
Middle	5200	6.5	5.9	9.2	15.5	6.3	Complied
Top	5240	6.2	5.7	9.0	15.5	6.5	Complied

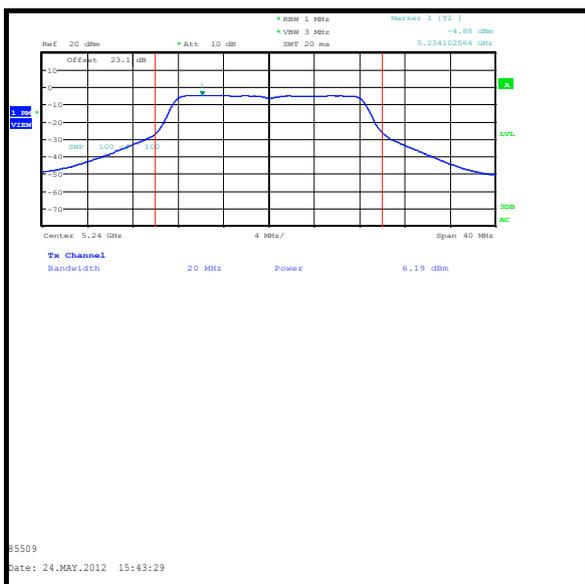
**Results: 802.11a / 20 MHz / 6 Mbps / BPSK / Port 0 / 7.5 dBi sectorised antenna**



**Bottom Channel**



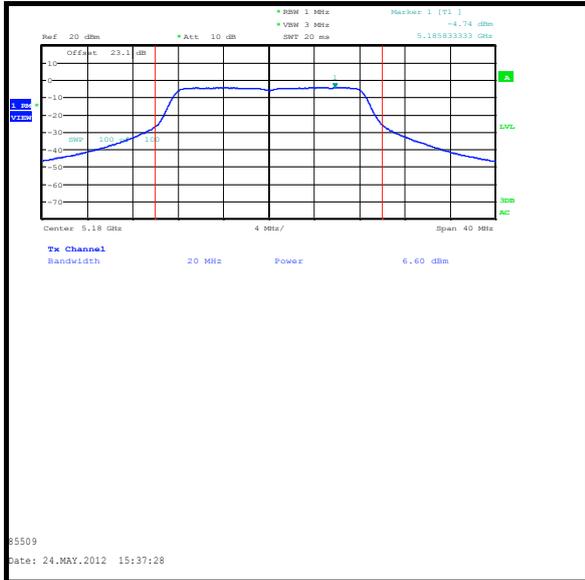
**Middle Channel**



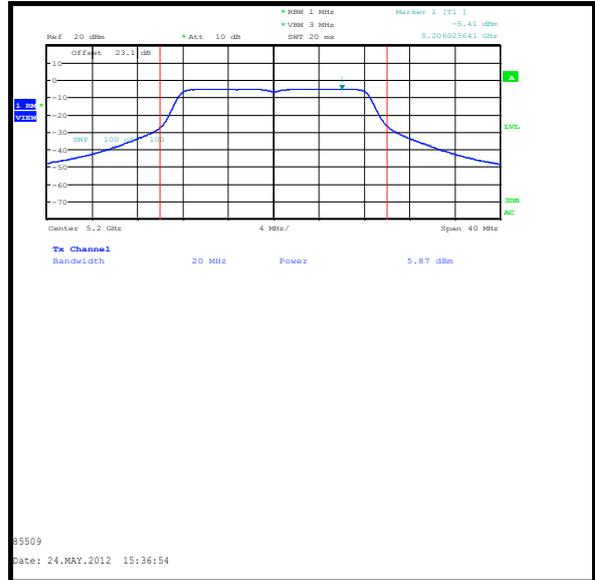
**Top Channel**

**Transmitter Maximum Conducted Output Power (continued)**

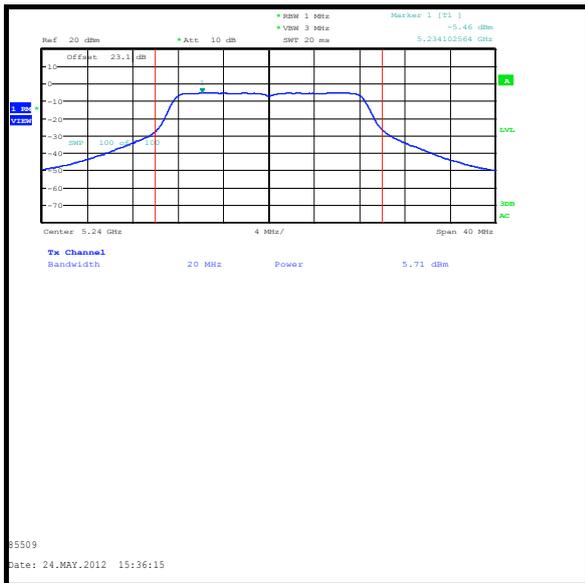
**Results: 802.11a / 20 MHz / 6 Mbps / BPSK / Port 1 / 7.5 dBi sectorised antenna**



**Bottom Channel**



**Middle Channel**



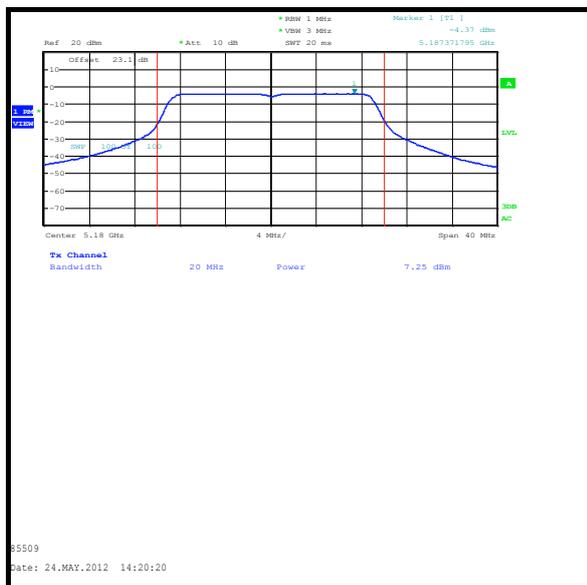
**Top Channel**

**Transmitter Maximum Conducted Output Power (continued)**

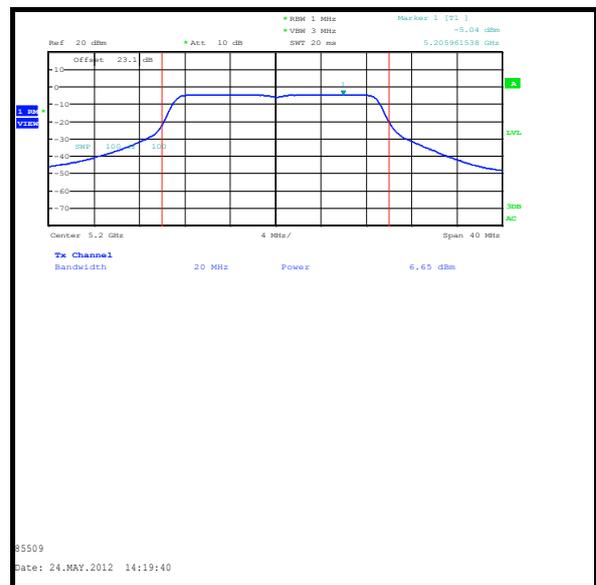
**Results: 802.11n / 20 MHz / 6.5 Mbps / BPSK / MCS0 / 7.5 dBi sectorised antenna**

Channel	Frequency (MHz)	Port 0 Power (dBm)	Port 1 Power (dBm)	Combined Power (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	5180	7.3	6.8	10.1	15.5	5.4	Complied
Middle	5200	6.7	6.2	9.5	15.5	6.0	Complied
Top	5240	6.6	5.9	9.3	15.5	6.2	Complied

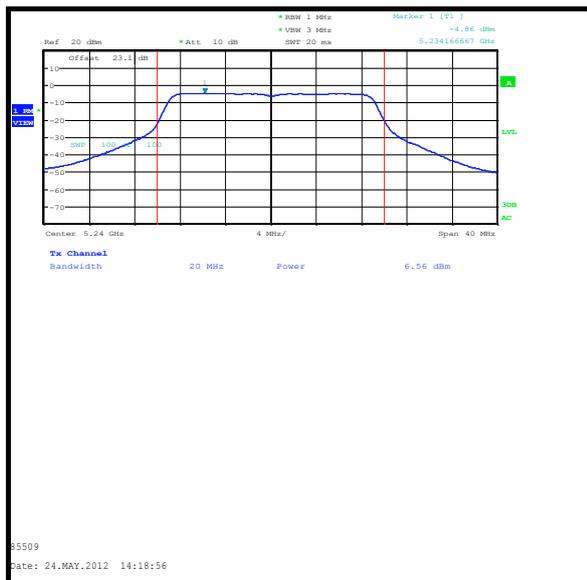
**Results: 802.11n / 20 MHz / 6.5 Mbps / BPSK / MCS0 / Port 0 / 7.5 dBi sectorised antenna**



**Bottom Channel**



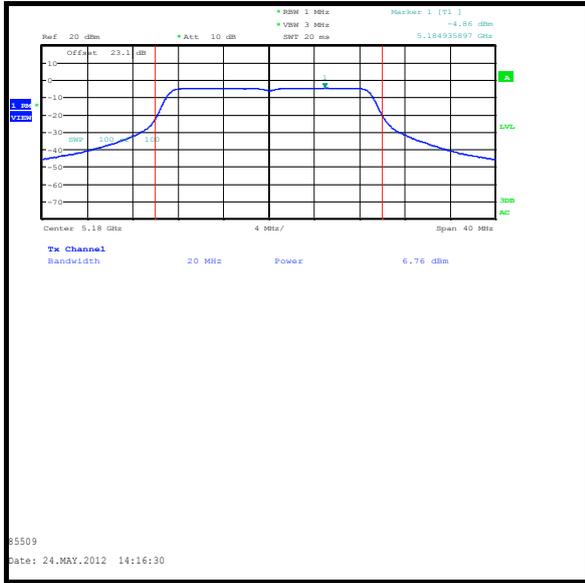
**Middle Channel**



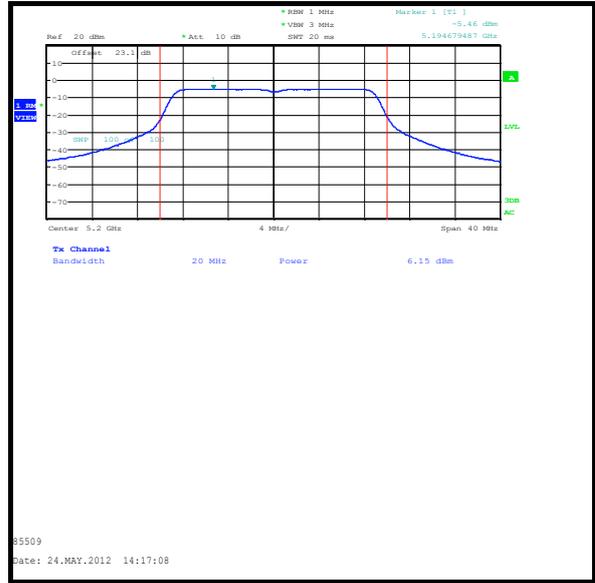
**Top Channel**

**Transmitter Maximum Conducted Output Power (continued)**

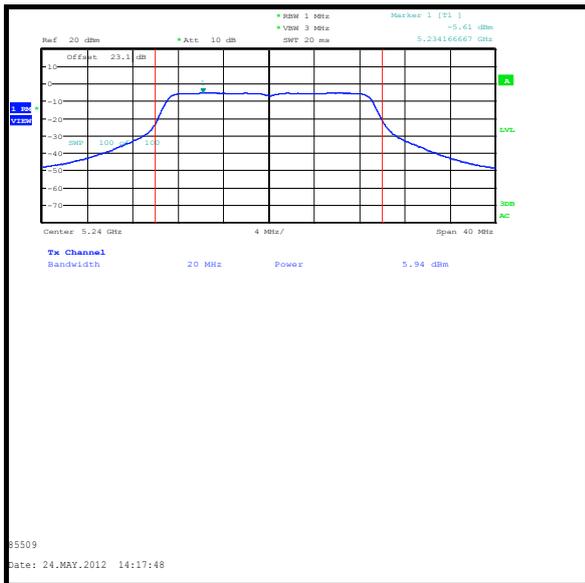
**Results: 802.11n / 20 MHz / 6.5 Mbps / BPSK / MCS0 / Port 1 / 7.5 dBi sectorised antenna**



**Bottom Channel**



**Middle Channel**



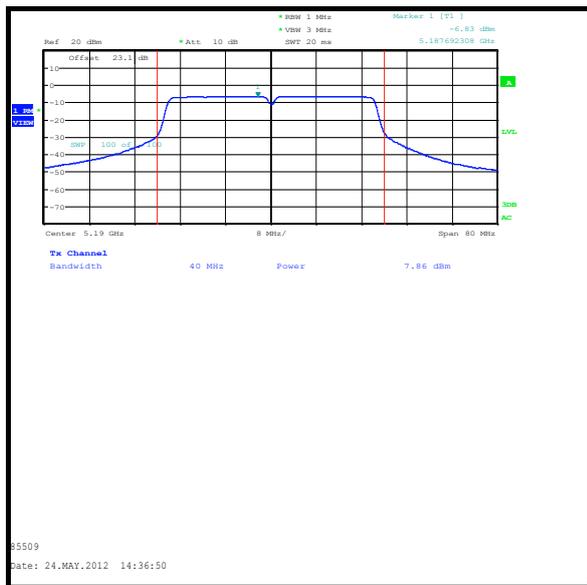
**Top Channel**

**Transmitter Maximum Conducted Output Power (continued)**

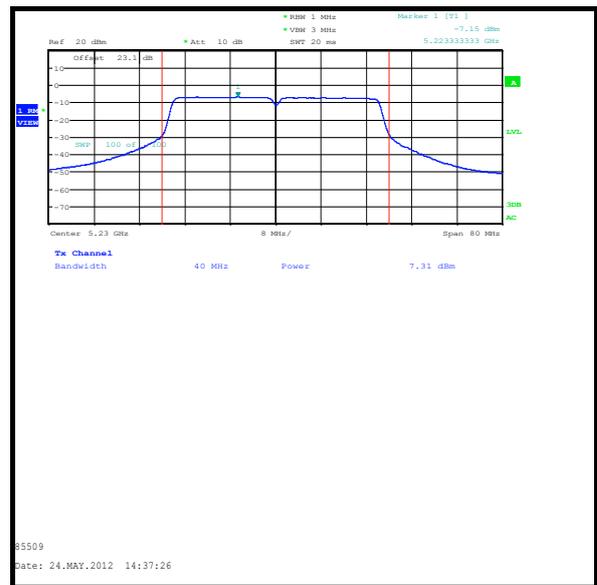
**Results: 802.11n / 40 MHz / 13.5 Mbps / BPSK / MCS0 / 7.5 dBi sectorised antenna**

Channel	Frequency (MHz)	Port 0 Power (dBm)	Port 1 Power (dBm)	Combined Power (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	5190	7.9	7.5	10.7	15.5	4.8	Complied
Top	5230	7.3	7.6	10.5	15.5	5.0	Complied

**Results: 802.11n / 40 MHz / 13.5 Mbps / BPSK / MCS0 / Port 0 / 7.5 dBi sectorised antenna**

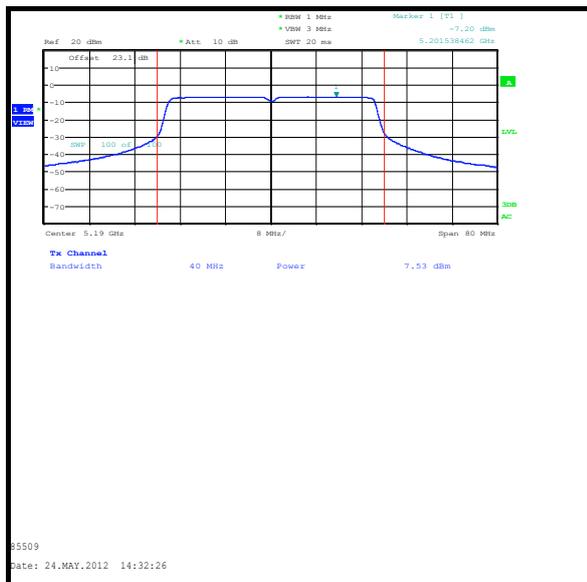


Bottom Channel

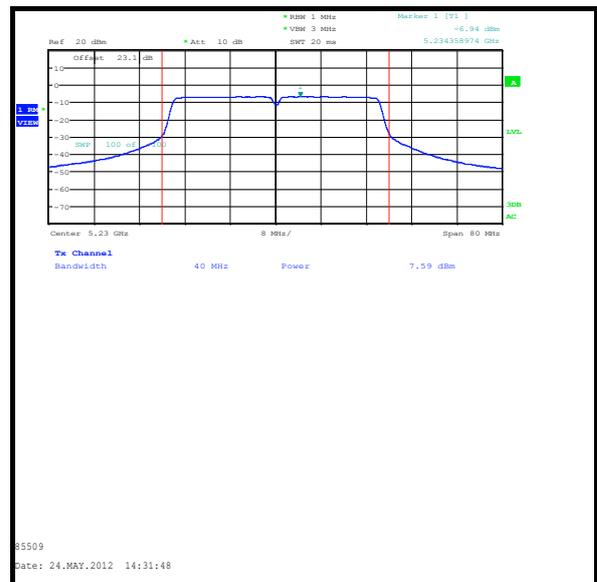


Top Channel

**Results: 802.11n / 40 MHz / 13.5 Mbps / BPSK / MCS0 / Port 1 / 7.5 dBi sectorised antenna**



Bottom Channel



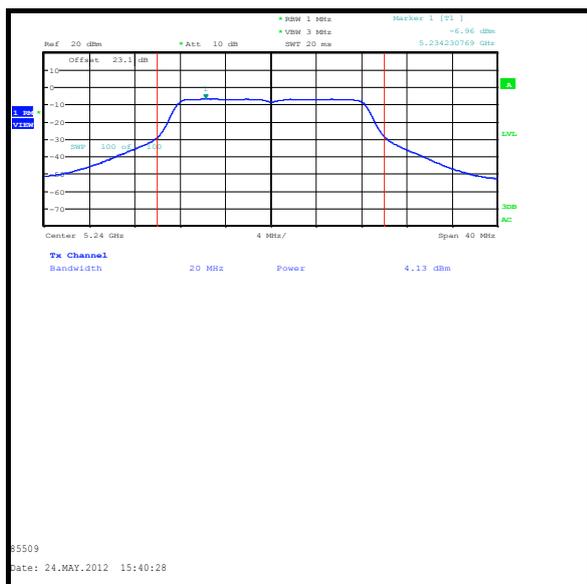
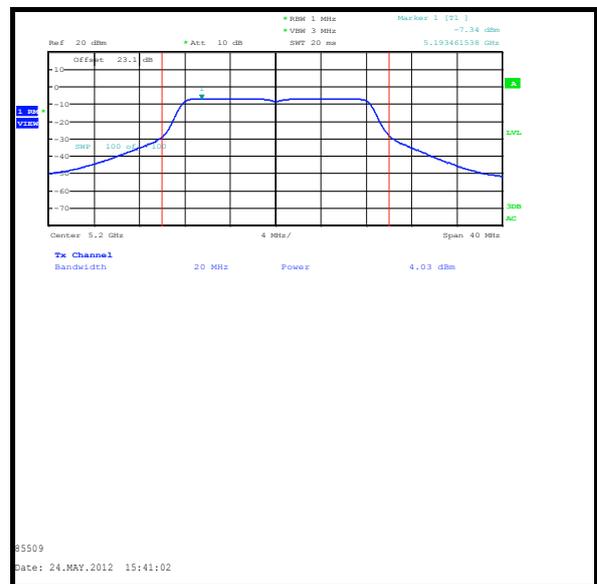
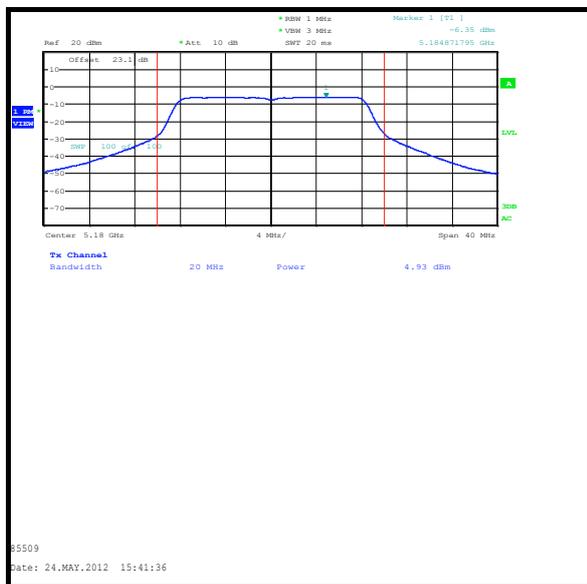
Top Channel

**Transmitter Maximum Conducted Output Power (continued)**

**Results: 802.11a / 20 MHz / 6 Mbps / BPSK / 10 dBi omnidirectional antenna**

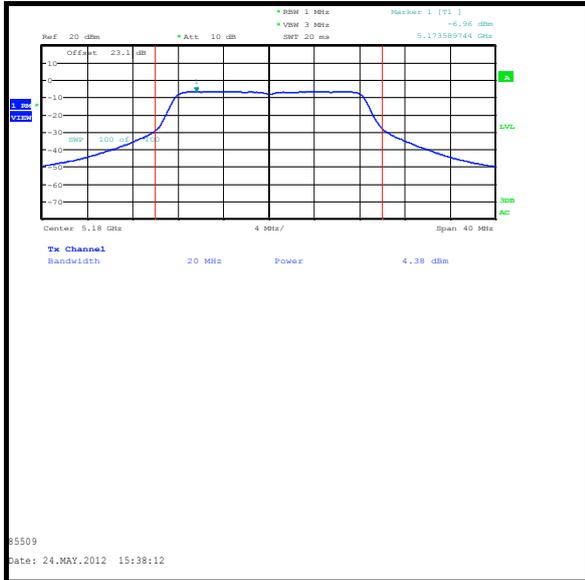
Channel	Frequency (MHz)	Port 0 Power (dBm)	Port 1 Power (dBm)	Combined Power (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	5180	4.9	4.4	7.7	13.0	5.3	Complied
Middle	5200	4.0	3.9	7.0	13.0	6.0	Complied
Top	5240	4.1	2.7	6.5	13.0	6.5	Complied

**Results: 802.11a / 20 MHz / 6 Mbps / BPSK / Port 0 / 10 dBi omnidirectional antenna**

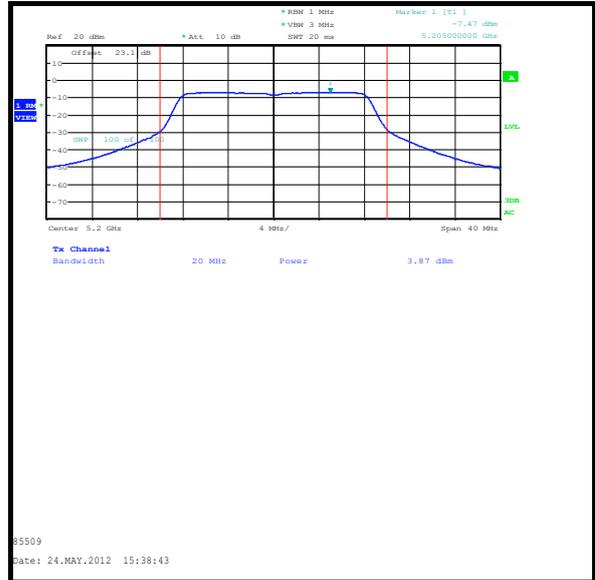


**Transmitter Maximum Conducted Output Power (continued)**

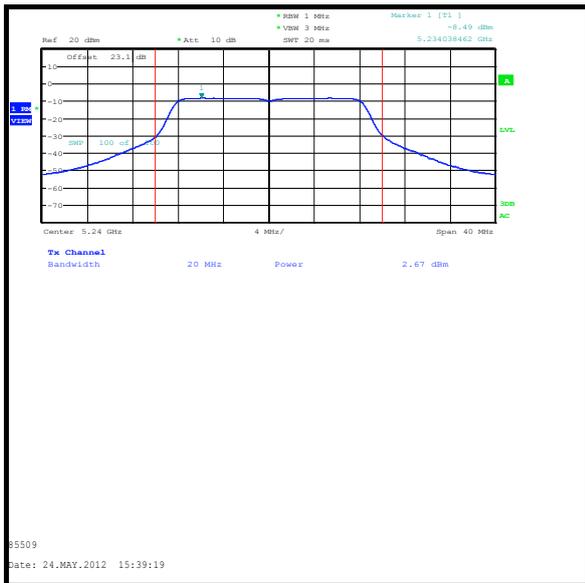
**Results: 802.11a / 20 MHz / 6 Mbps / BPSK / Port 1 / 10 dBi omnidirectional antenna**



**Bottom Channel**



**Middle Channel**



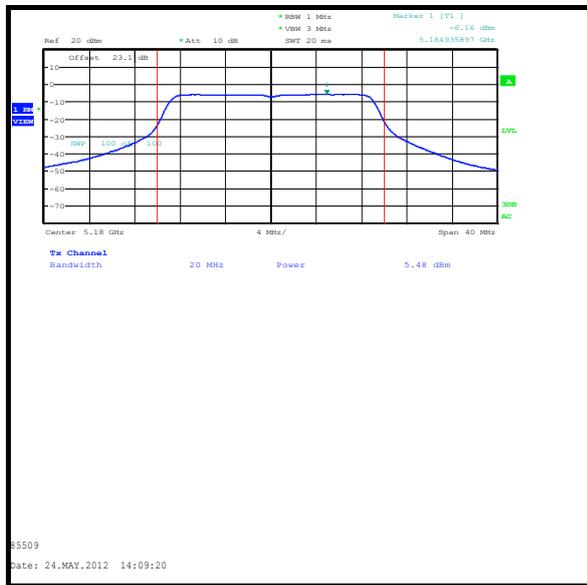
**Top Channel**

**Transmitter Maximum Conducted Output Power (continued)**

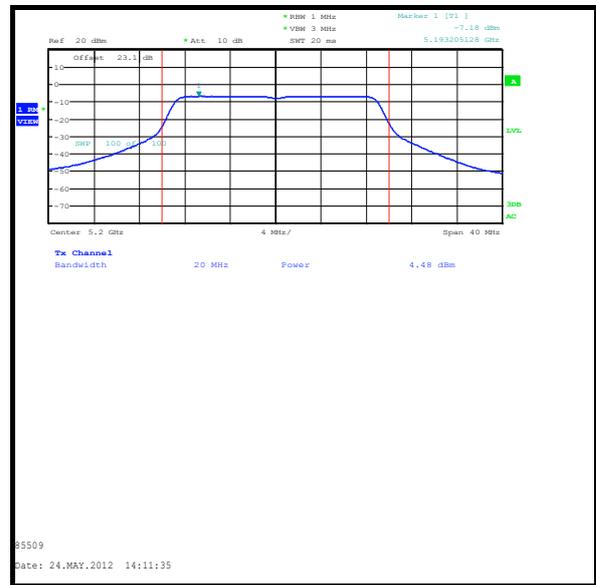
**Results: 802.11n / 20 MHz / 6.5 Mbps / BPSK / MCS0 / 10 dBi omnidirectional antenna**

Channel	Frequency (MHz)	Port 0 Power (dBm)	Port 1 Power (dBm)	Combined Power (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	5180	5.5	4.5	8.0	13.0	5.0	Complied
Middle	5200	4.5	4.1	7.3	13.0	5.7	Complied
Top	5240	4.7	2.8	6.9	13.0	6.1	Complied

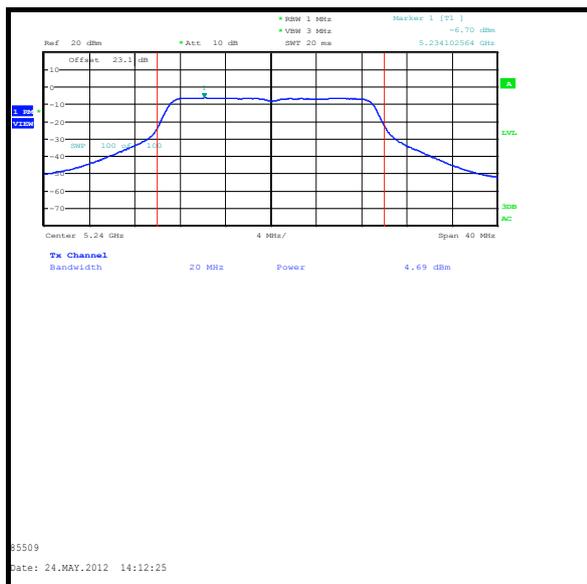
**Results: 802.11n / 20 MHz / 6.5 Mbps / BPSK / MCS0 / Port 0 / 10 dBi omnidirectional antenna**



**Bottom Channel**



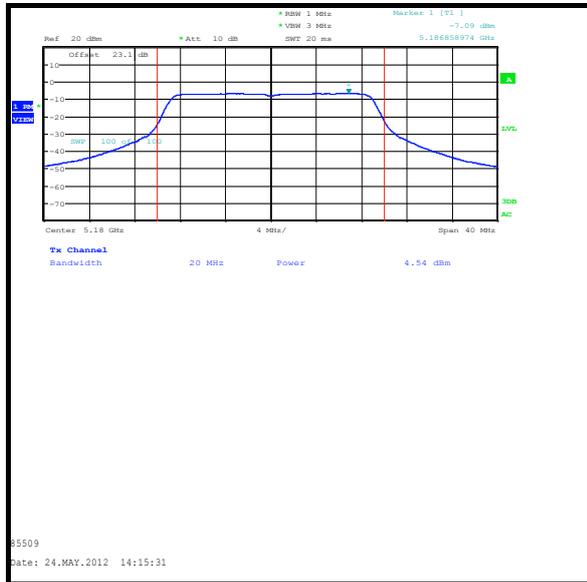
**Middle Channel**



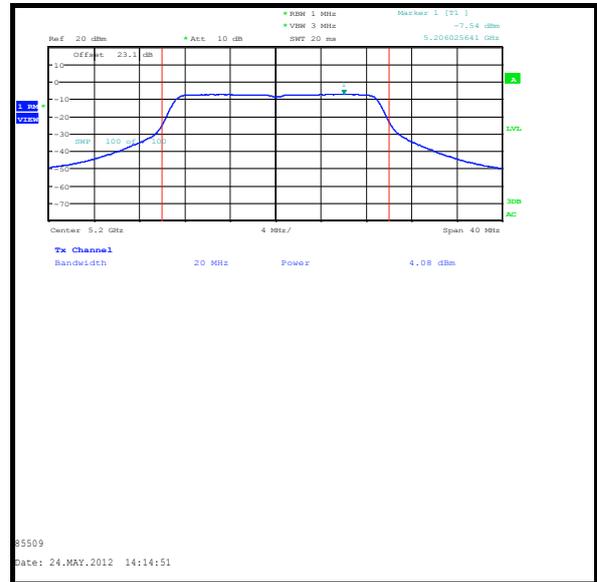
**Top Channel**

**Transmitter Maximum Conducted Output Power (continued)**

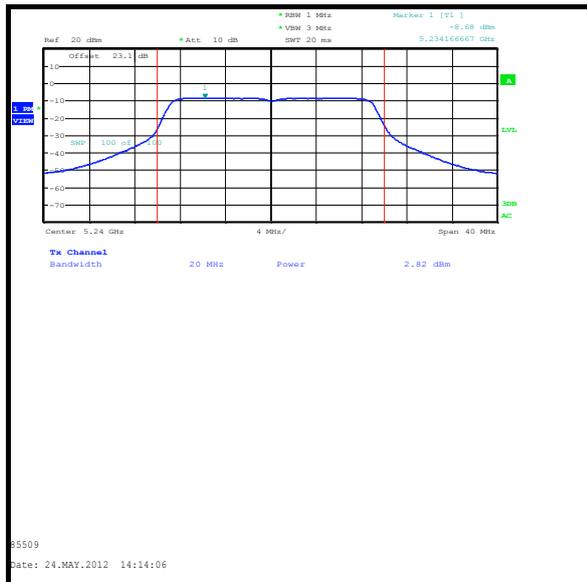
**Results: 802.11n / 20 MHz / 6.5 Mbps / BPSK / MCS0 / Port 1 / 10 dBi omnidirectional antenna**



**Bottom Channel**



**Middle Channel**



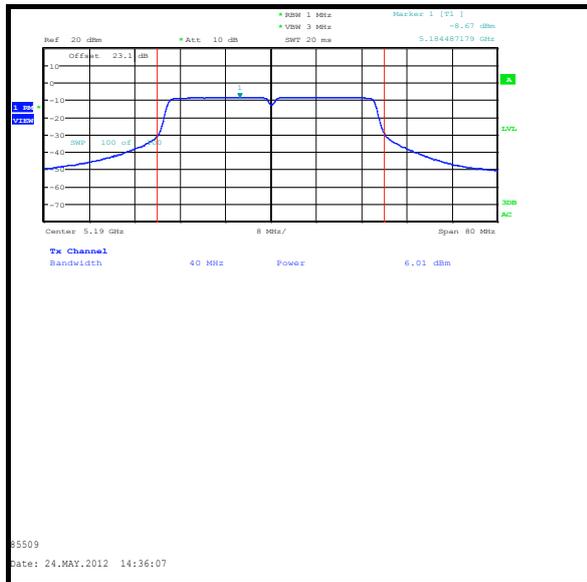
**Top Channel**

**Transmitter Maximum Conducted Output Power (continued)**

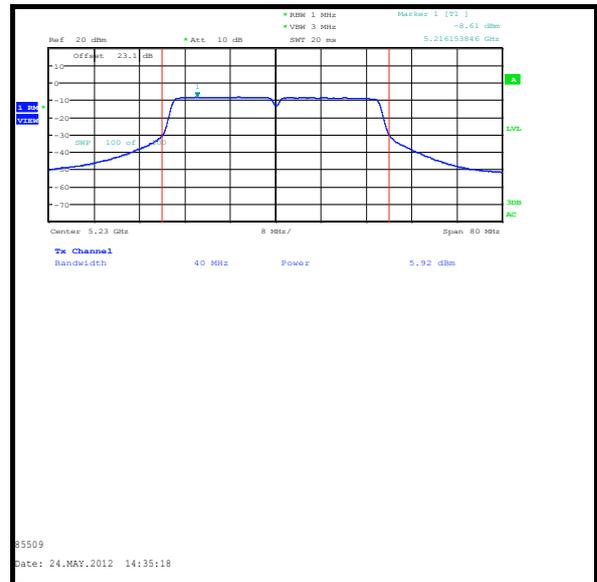
**Results: 802.11n / 40 MHz / 13.5 Mbps / BPSK / MCS0 / 10 dBi omnidirectional antenna**

Channel	Frequency (MHz)	Port 0 Power (dBm)	Port 1 Power (dBm)	Combined Power (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	5190	6.0	5.6	8.8	13.0	4.2	Complied
Top	5230	5.9	5.4	8.7	13.0	4.3	Complied

**Results: 802.11n / 40 MHz / 13.5 Mbps / BPSK / MCS0 / Port 0 / 10 dBi omnidirectional antenna**

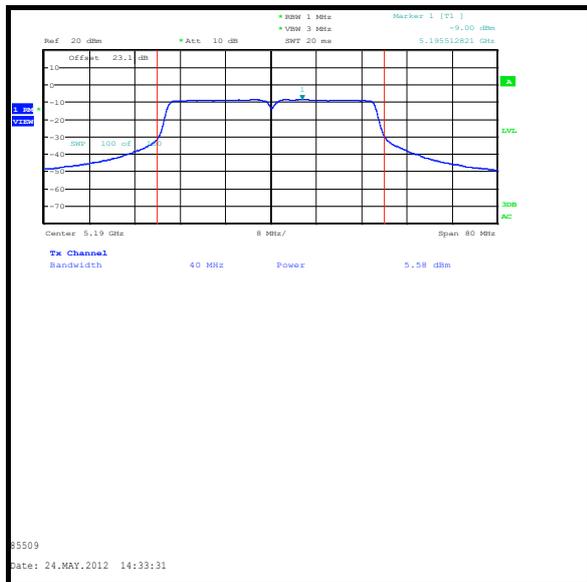


Bottom Channel

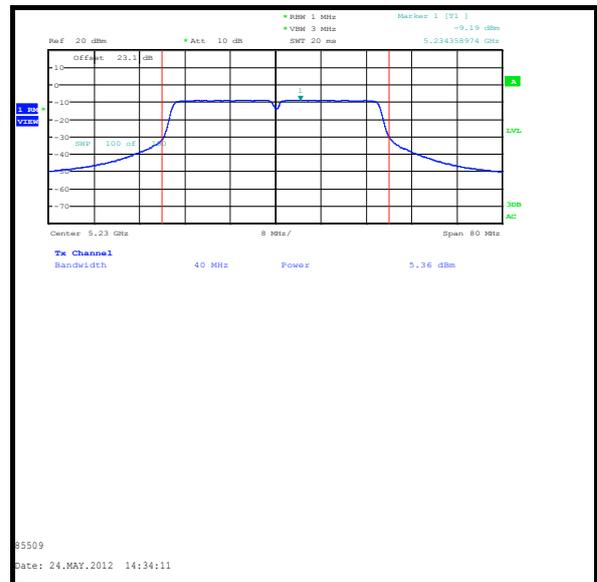


Top Channel

**Results: 802.11n / 40 MHz / 13.5 Mbps / BPSK / MCS0 / Port 1 / 10 dBi omnidirectional antenna**



Bottom Channel



Top Channel

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

<b>Test Engineer:</b>	Sarah Williams	<b>Test Date:</b>	24 May 2012
<b>Test Sample Serial No.:</b>	261293		

<b>FCC Reference:</b>	Part 15.407(a)(1)
<b>Test Method Used:</b>	FCC KDB 789033 E) referencing KDB 789033 C)3)b), Method SA-1

**Environmental Conditions:**

<b>Temperature (°C):</b>	26
<b>Relative Humidity (%):</b>	40

**Note(s):**

1. Transmitter Peak Power Spectral Density tests were performed using a spectrum analyser in accordance with FCC KDB 789033 D01 C)3)b) Method SA-1.
2. Conducted output power and Transmitter Peak Power Spectral Density are measured with the same measurement method of SA-1 and therefore plots with PPSD results can be found in the Transmitter Maximum Conducted Output Power section of this test report.
3. The EUT has 4 radio modules with two RF ports each. Initial measurements were performed on one channel on all 8 ports to find the radio module with the highest power. For this EUT radio module 1 had the highest power. The ports are numbered Port 0 and Port 1. Power from both ports was measured and combined using the measure-and-sum method stated in FCC KDB 662911 D01.
4. The EUT was transmitting at >99% duty cycle.
5. All supported modes and channel widths were initially investigated on one channel. The modes that produced the highest PPSD (worst case) for 20 MHz channels (BPSK / 6.5 Mbps / MCS0) and 40 MHz channels (BPSK / 13.5 Mbps / MCS0). Measurements were then performed in these modes on bottom, middle and top channels on both ports for 20 MHz channel width and bottom and top channels for 40 MHz channel width.
6. Conducted measurements were performed for the highest gain antenna of each type declared by the Customer. The lowest gain antenna had the highest conducted power and the highest gain antenna had the lowest conducted power. Power settings on the EUT were adjusted in order for the lowest gain and highest gain antenna to meet conducted power, EIRP and spurious emissions requirements.

Various antennas have gains of less than 6 dBi. Tests were performed and results calculated based on the 5 dBi gain omnidirectional antenna. The peak power spectral density limit is 4 dBm in any 1 MHz band. The EUT was configured with a power setting of 13.0.

One antenna is sectorised with a declared gain of 7.5 dBi. The peak power spectral density limit of 4 dBm in any 1 MHz band was reduced to 2.5 dBm as the 6 dBi gain allowed was exceeded by 1.5 dB according to Part 15.407(a)(1). The EUT was configured with a power setting of 11.0.

One antenna is omnidirectional and has a declared gain of 10 dBi. The peak power spectral density limit of 4.0 dBm in any 1 MHz band was reduced to 0 dBm as the 6 dBi gain allowed was exceeded by 4.0 dB according to Part 15.407(a)(1). The EUT was configured with a power setting of 9.5.

**Transmitter Peak Power Spectral Density (continued)****Results: 802.11n / 20 MHz / 6.5 Mbps / BPSK / MCS0 / 5 dBi omnidirectional antenna**

Channel	Frequency (MHz)	PPSD Port 0 (dBm /MHz)	PPSD Port 1 (dBm /MHz)	Combined PPSD (dBm /MHz)	Limit (dBm /MHz)	Margin (dB)	Result
Bottom	5180	-2.0	-2.9	0.6	4.0	3.4	Complied
Middle	5200	-2.6	-3.1	0.2	4.0	3.8	Complied
Top	5240	-2.6	-2.9	0.3	4.0	3.7	Complied

**Results: 802.11n / 40 MHz / 13.5 Mbps / BPSK / MCS0 / 5 dBi omnidirectional antenna**

Channel	Frequency (MHz)	PPSD Port 0 (dBm /MHz)	PPSD Port 1 (dBm /MHz)	Combined PPSD (dBm /MHz)	Limit (dBm /MHz)	Margin (dB)	Result
Bottom	5190	-4.9	-5.5	-2.2	4.0	6.2	Complied
Top	5230	-4.9	-5.2	-2.0	4.0	6.0	Complied

**Results: 802.11n / 20 MHz / 6.5 Mbps / BPSK / MCS0 / 7.5 dBi sectorised antenna**

Channel	Frequency (MHz)	PPSD Port 0 (dBm /MHz)	PPSD Port 1 (dBm /MHz)	Combined PPSD (dBm /MHz)	Limit (dBm /MHz)	Margin (dB)	Result
Bottom	5180	-4.4	-4.9	-1.6	2.5	4.1	Complied
Middle	5200	-5.0	-5.5	-2.2	2.5	4.7	Complied
Top	5240	-4.9	-5.6	-2.2	2.5	4.7	Complied

**Results: 802.11n / 40 MHz / 13.5 Mbps / BPSK / MCS0 / 7.5 dBi sectorised antenna**

Channel	Frequency (MHz)	PPSD Port 0 (dBm /MHz)	PPSD Port 1 (dBm /MHz)	Combined PPSD (dBm /MHz)	Limit (dBm /MHz)	Margin (dB)	Result
Bottom	5190	-6.8	-7.2	-4.0	2.5	6.5	Complied
Top	5230	-7.2	-6.9	-4.0	2.5	6.5	Complied

**Transmitter Peak Power Spectral Density (continued)****Results: 802.11n / 20 MHz / 6.5 Mbps / BPSK / MCS0 / 10 dBi omnidirectional antenna**

Channel	Frequency (MHz)	PPSD Port 0 (dBm /MHz)	PPSD Port 1 (dBm /MHz)	Combined PSD (dBm /MHz)	Limit (dBm /MHz)	Margin (dB)	Result
Bottom	5180	-6.2	-7.1	-3.6	0	3.6	Complied
Middle	5200	-7.2	-7.5	-4.3	0	4.3	Complied
Top	5240	-6.7	-8.7	-4.6	0	4.6	Complied

**Results: 802.11n / 40 MHz / 13.5 Mbps / BPSK / MCS0 / 10 dBi omnidirectional antenna**

Channel	Frequency (MHz)	PPSD Port 0 (dBm /MHz)	PPSD Port 1 (dBm /MHz)	Combined PSD (dBm /MHz)	Limit (dBm /MHz)	Margin (dB)	Result
Bottom	5190	-8.7	-9.0	-5.8	0	5.8	Complied
Top	5230	-8.6	-9.2	-5.9	0	5.9	Complied

**5.2.5. Transmitter Out of Band Emissions (Conducted)****Test Summary:**

<b>Test Engineer:</b>	Sarah Williams	<b>Test Date:</b>	25 May 2012
<b>Test Sample Serial No.:</b>	261293		

<b>FCC Reference:</b>	Parts 15.407(b)(1),(7) & 15.209(a)
<b>Test Method Used:</b>	FCC KDB 789033 G) & ANSI C63.10 Sections 6.3 and 6.6
<b>Frequency Range:</b>	30 MHz to 40 GHz

**Environmental Conditions:**

<b>Temperature (°C):</b>	23
<b>Relative Humidity (%):</b>	45

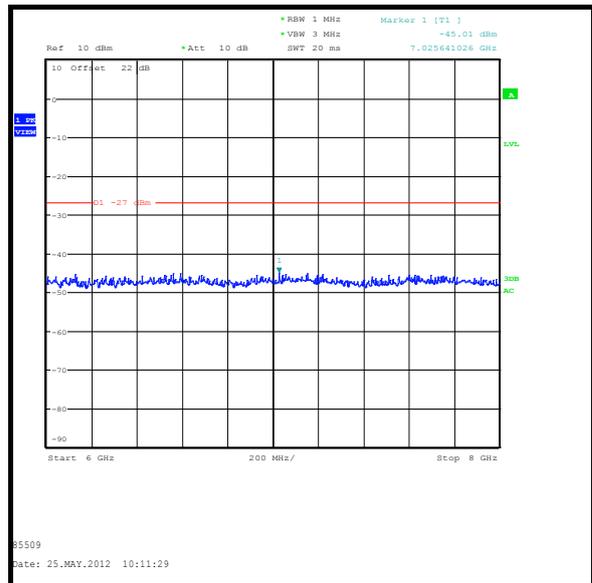
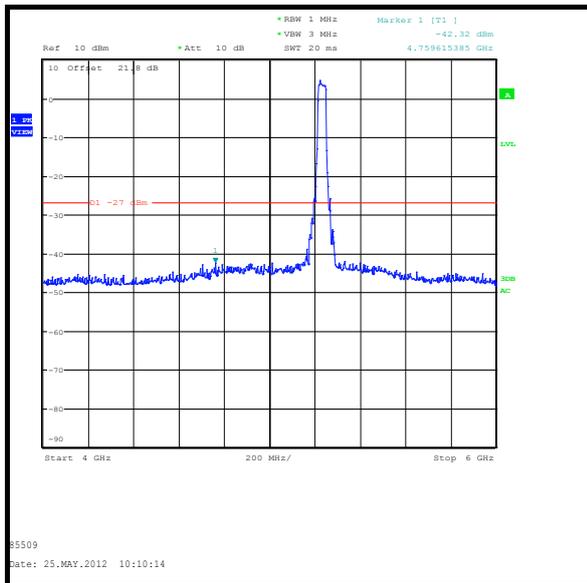
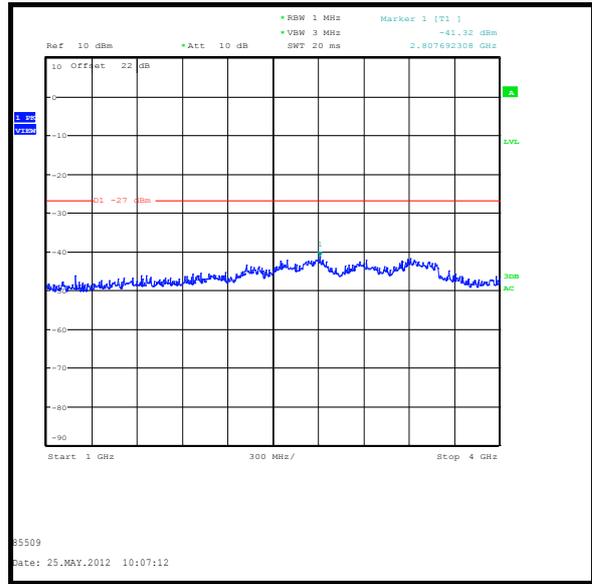
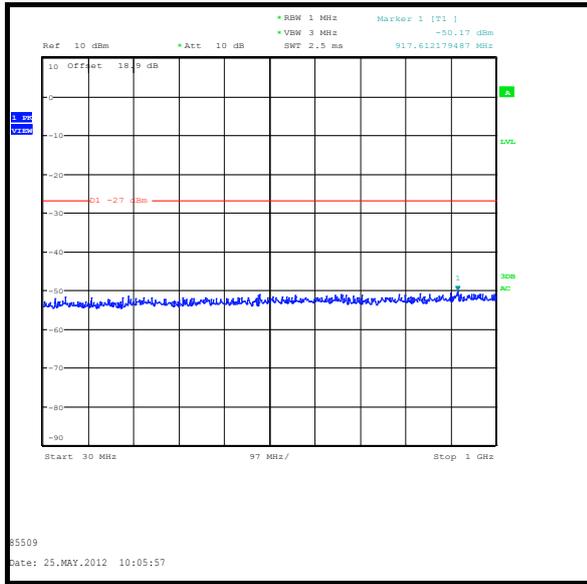
**Note(s):**

1. FCC Part 15.407(b)(1) states for devices operating in the 5.15 to 5.25 GHz band, all emissions outside the 5.15-5.35 GHz band shall not exceed and EIRP of -27 dBm/MHz. Part 15.407(b)(7) states the provisions of 15.205 apply, e.g. restricted bands of operation.
2. Measurements were performed with the EUT transmitting MCS0 / 40 MHz channel width / Port 0 as all configurations were previously measured and this combination produced the highest output power. Pre-scans were performed with the EUT transmitting at >99% duty cycle on the top channel. The EUT was set to a power setting of 13.0.
3. The emission shown at approximately 5230 MHz on the 4 GHz to 6 GHz plot is the EUT fundamental.
4. No spurious emissions were detected above the noise floor of the measuring receiver therefore the highest peak noise floor reading of the measuring receiver was recorded as shown in the results table.
5. As antenna port conducted emissions test were performed, cabinet emissions test were also performed as required in FCC KDB 789033 Section G(3)b).

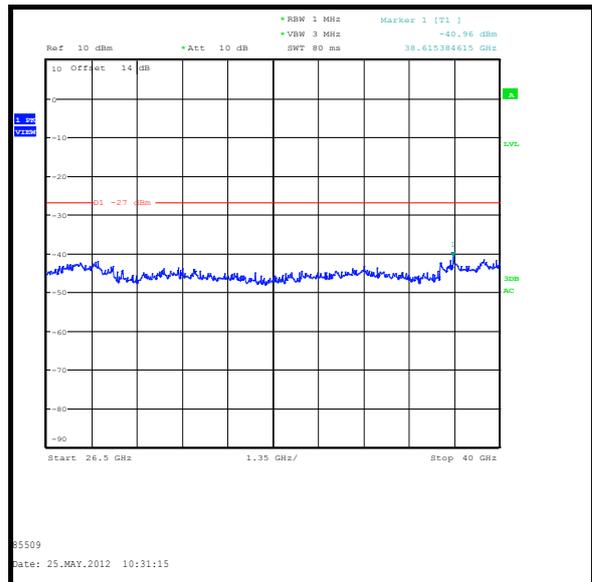
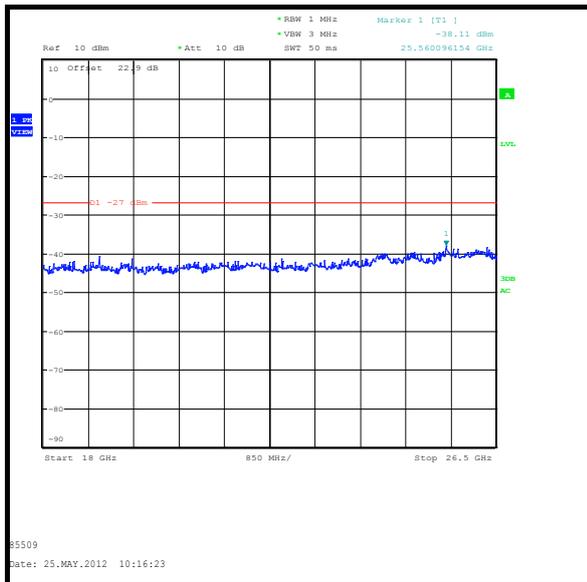
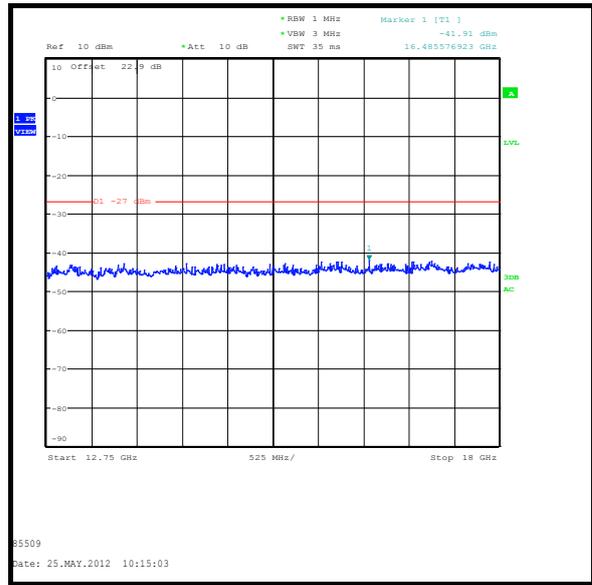
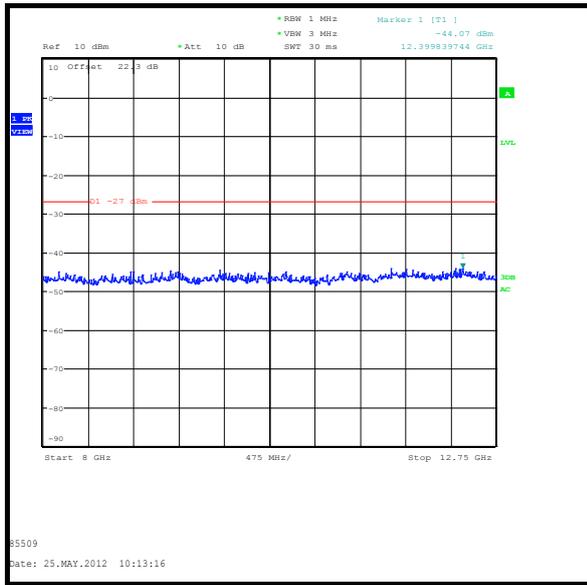
**Results: MCS0 / 40 MHz Top Channel**

<b>Frequency (MHz)</b>	<b>Peak Level (dBm)</b>	<b>Limit (dBm)</b>	<b>Margin (dB)</b>	<b>Result</b>
25560.096	-38.1	-27.0	11.1	Complied

**Transmitter Out of Band Emissions (Conducted) (continued)**



**Transmitter Out of Band Emissions (Conducted) (continued)**



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

**5.2.6. Transmitter Band Edge Emissions (Conducted)****Test Summary:**

<b>Test Engineer:</b>	Sarah Williams	<b>Test Date:</b>	24 May 2012
<b>Test Sample Serial No.:</b>	261293		

<b>FCC Reference:</b>	Parts 15.407(b)(1), 15.407(b)(7), 15.205 & 15.209(a)
<b>Test Method Used:</b>	ANSI C63.10 Section 6.9.2 KDB 789033 Section G.1.c

**Environmental Conditions:**

<b>Temperature (°C):</b>	23
<b>Relative Humidity (%):</b>	38

**Note(s):**

1. FCC Response to Inquiry (Tracking Number 917954 / Date: 14<sup>th</sup> February 2012) confirmed band edge measurements need only be performed in the EUT modes that produce the highest power and the widest bandwidths. Transmitter power in all modes was previously measured and BPSK / MCS0 was found to have the highest power output. Occupied bandwidth in all modes was previously measured and found to be the same modes as transmitter output power. Band edge testing was performed in these modes on both supported channel widths.
2. For transmitters operating in the 5.15-5.25 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz. However, there are restricted bands of operation below the lower band edge at 4.5-5.15 GHz and also above the upper band edge at 5.35-5.46 GHz therefore the provisions of FCC Part 15.205 apply.
3. Field strength measurements using peak and average detectors were performed in the restricted bands below 5.15 GHz and above 5.35 GHz. Field strength and EIRP results were found to be compliant with the restricted band limits and Part 15.407 out-of-band limits.
4. FCC Response to Inquiry (Tracking Number 789033 / Date: 05 March 2012) Average measurements are not required if the peak measurement complies with average limit.
5. Lower band edge measurements were performed with the EUT transmitting on the bottom channel. Upper band edge measurements were performed with the EUT transmitting on the top channel.
6. Plots at both band edges show peak and average results on the same plots. The upper trace shows the peak result and lower trace shows the average result.

**Transmitter Band Edge Emissions (Conducted) (continued)****Results: Peak / 802.11n / 20 MHz / 6.5 Mbps / BPSK / MCS0 / Port 0 / 5 dBi omnidirectional antenna**

Frequency (MHz)	Port 0 Peak Level (dBm)	Antenna Gain + Cable Loss (dBi)	Peak Level + Antenna Gain (dBm EIRP)	Peak Limit (dBm EIRP)	Margin (dB)	Result
5150	-33.8	2.6	-31.2	-21.2	10.0	Complied
5350	-43.6	2.6	-41.0	-21.2	19.8	Complied

**Results: Average / 802.11n / 20 MHz / 6.5 Mbps / BPSK / MCS0 / Port 0 / 5 dBi omnidirectional antenna**

Frequency (MHz)	Port 0 Average Level (dBm)	Antenna Gain + Cable Loss (dBi)	Average Level + Antenna Gain (dBm EIRP)	Average Limit (dBm EIRP)	Margin (dB)	Result
5150	-51.7	2.6	-49.1	-41.2	7.9	Complied
5350	-53.9	2.6	-51.3	-41.2	10.1	Complied

**Results: Peak / 802.11n / 20 MHz / 6.5 Mbps / BPSK / MCS0 / Port 1 / 5 dBi omnidirectional antenna**

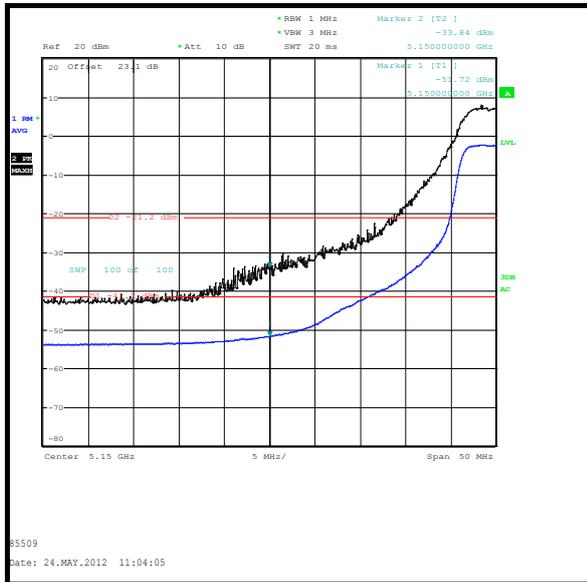
Frequency (MHz)	Port 1 Peak Level (dBm)	Antenna Gain + Cable Loss (dBi)	Peak Level + Antenna Gain (dBm EIRP)	Peak Limit (dBm EIRP)	Margin (dB)	Result
5150	-34.4	2.6	-31.8	-21.2	10.6	Complied
5350	-42.1	2.6	-39.5	-21.2	18.3	Complied

**Results: Average / 802.11n / 20 MHz / 6.5 Mbps / BPSK / MCS0 / Port 1 / 5 dBi omnidirectional antenna**

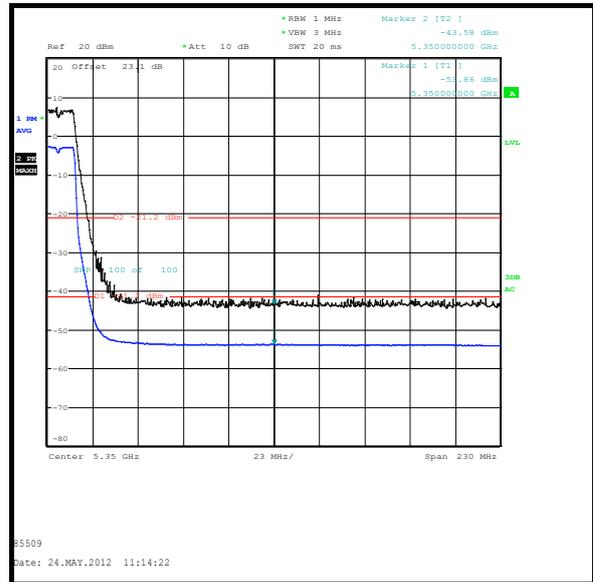
Frequency (MHz)	Port 1 Average Level (dBm)	Antenna Gain + Cable Loss (dBi)	Average Level + Antenna Gain (dBm EIRP)	Average Limit (dBm EIRP)	Margin (dB)	Result
5150	-51.3	2.6	-48.7	-41.2	7.5	Complied
5350	-53.1	2.6	-50.5	-41.2	9.3	Complied

**Transmitter Band Edge Emissions (Conducted) (continued)**

**Results: 802.11n / 20 MHz / 6.5 Mbps / BPSK / MCS0 / Port 0 / 5 dBi omnidirectional antenna**

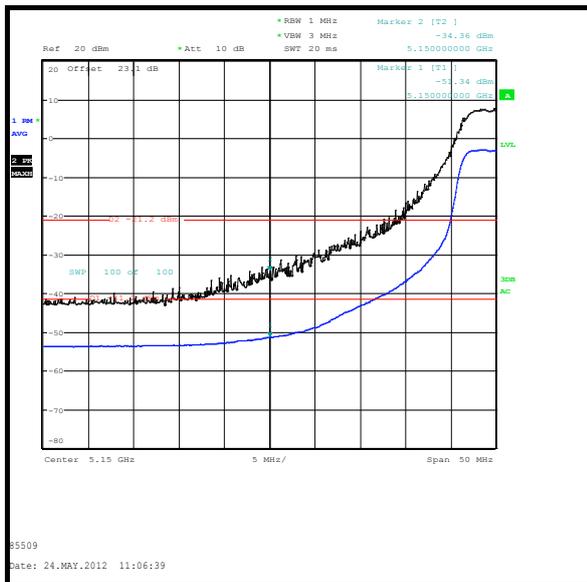


Lower Band Edge Peak and Average

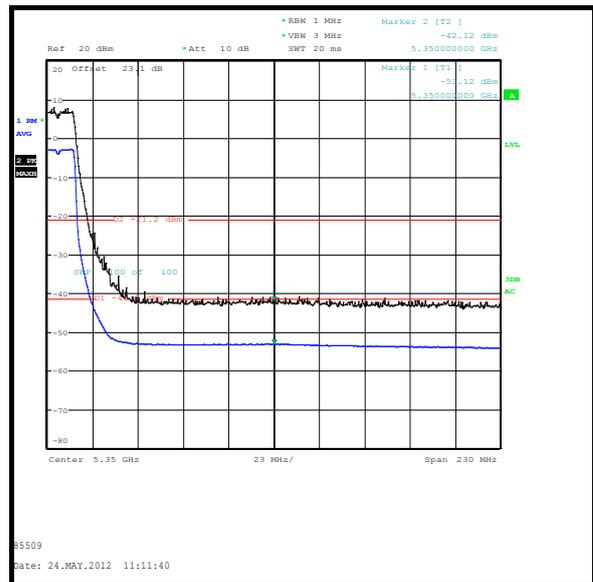


Upper Band Edge Peak and Average

**Results: 802.11n / 20 MHz / 6.5 Mbps / BPSK / MCS0 / Port 1 / 5 dBi omnidirectional antenna**



Lower Band Edge Peak and Average



Upper Band Edge Peak and Average

**Transmitter Band Edge Emissions (Conducted) (continued)****Results: Peak / 802.11n / 40 MHz / 13.5 Mbps / BPSK / MCS0 / Port 0 / 5 dBi omnidirectional antenna**

Frequency (MHz)	Port 0 Peak Level (dBm)	Antenna Gain + Cable Loss (dBi)	Peak Level + Antenna Gain (dBm EIRP)	Peak Limit (dBm EIRP)	Margin (dB)	Result
5150	-25.5	2.6	-22.9	-21.2	1.7	Complied
5350	-42.9	2.6	-40.3	-21.2	19.1	Complied

**Results: Average / 802.11n / 40 MHz / 13.5 Mbps / BPSK / MCS0 / Port 0 / 5 dBi omnidirectional antenna**

Frequency (MHz)	Port 0 Average Level (dBm)	Antenna Gain + Cable Loss (dBi)	Average Level + Antenna Gain (dBm EIRP)	Average Limit (dBm EIRP)	Margin (dB)	Result
5150	-45.2	2.6	-42.6	-41.2	1.4	Complied
5350	-53.8	2.6	-51.2	-41.2	10.0	Complied

**Results: Peak / 802.11n / 40 MHz / 13.5 Mbps / BPSK / MCS0 / Port 1 / 5 dBi omnidirectional antenna**

Frequency (MHz)	Port 1 Peak Level (dBm)	Antenna Gain + Cable Loss (dBi)	Peak Level + Antenna Gain (dBm EIRP)	Peak Limit (dBm EIRP)	Margin (dB)	Result
5150	-26.3	2.6	-23.7	-21.2	2.5	Complied
5350	-42.5	2.6	-39.9	-21.2	18.7	Complied

**Results: Average / 802.11n / 40 MHz / 13.5 Mbps / BPSK / MCS0 / Port 1 / 5 dBi omnidirectional antenna**

Frequency (MHz)	Port 1 Average Level (dBm)	Antenna Gain + Cable Loss (dBi)	Average Level + Antenna Gain (dBm EIRP)	Average Limit (dBm EIRP)	Margin (dB)	Result
5150	-44.6	2.6	-42.0	-41.2	0.8	Complied
5350	-53.0	2.6	-50.4	-41.2	9.2	Complied



**Transmitter Band Edge Emissions (Conducted) (continued)****Results: Peak / 802.11n / 20 MHz / 6.5 Mbps / BPSK / MCS0 / Port 0 / 7.5 dBi sectorised antenna**

Frequency (MHz)	Port 0 Peak Level (dBm)	Antenna Gain + Cable Loss (dBi)	Peak Level + Antenna Gain (dBm EIRP)	Peak Limit (dBm EIRP)	Margin (dB)	Result
5150	-39.8	5.1	-34.7	-21.2	13.5	Complied
5350	-43.9	5.1	-38.8	-21.2	17.6	Complied

**Results: Average / 802.11n / 20 MHz / 6.5 Mbps / BPSK / MCS0 / Port 0 / 7.5 dBi sectorised antenna**

Frequency (MHz)	Port 0 Average Level (dBm)	Antenna Gain + Cable Loss (dBi)	Average Level + Antenna Gain (dBm EIRP)	Average Limit (dBm EIRP)	Margin (dB)	Result
5150	-52.5	5.1	-47.4	-41.2	6.2	Complied
5350	-53.7	5.1	-48.6	-41.2	7.4	Complied

**Results: Peak / 802.11n / 20 MHz / 6.5 Mbps / BPSK / MCS0 / Port 1 / 7.5 dBi sectorised antenna**

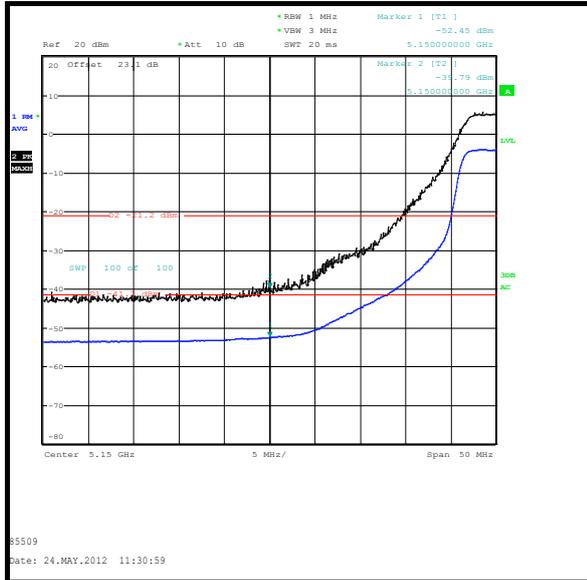
Frequency (MHz)	Port 1 Peak Level (dBm)	Antenna Gain + Cable Loss (dBi)	Peak Level + Antenna Gain (dBm EIRP)	Peak Limit (dBm EIRP)	Margin (dB)	Result
5150	-40.0	5.1	-34.9	-21.2	13.7	Complied
5350	-43.1	5.1	-38.0	-21.2	16.8	Complied

**Results: Average / 802.11n / 20 MHz / 6.5 Mbps / BPSK / MCS0 / Port 1 / 7.5 dBi sectorised antenna**

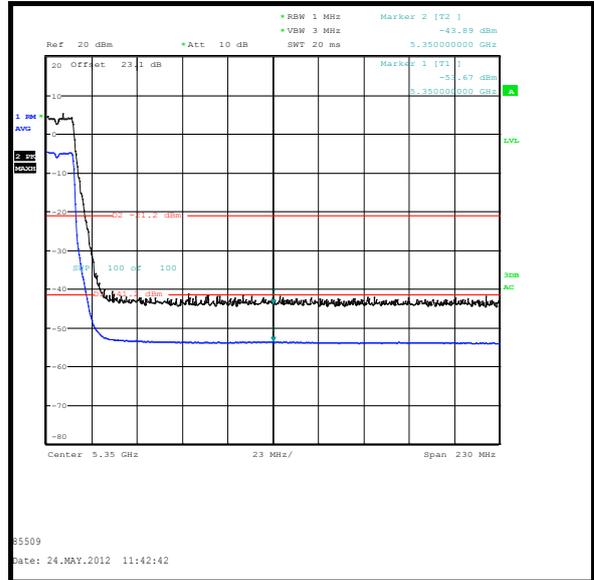
Frequency (MHz)	Port 1 Average Level (dBm)	Antenna Gain + Cable Loss (dBi)	Average Level + Antenna Gain (dBm EIRP)	Average Limit (dBm EIRP)	Margin (dB)	Result
5150	-52.6	5.1	-47.5	-41.2	6.3	Complied
5350	-53.1	5.1	-48.0	-41.2	6.8	Complied

**Transmitter Band Edge Emissions (Conducted) (continued)**

**Results: 802.11n / 20 MHz / 6.5 Mbps / BPSK / MCS0 / Port 0 / 7.5 dBi sectorised antenna**

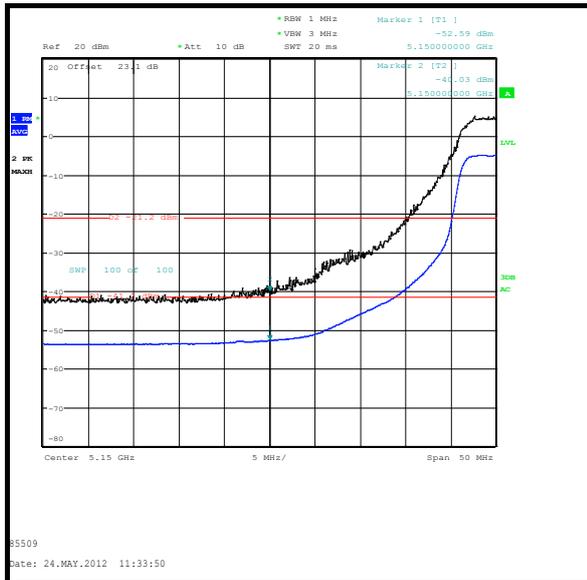


**Lower Band Edge Peak and Average**

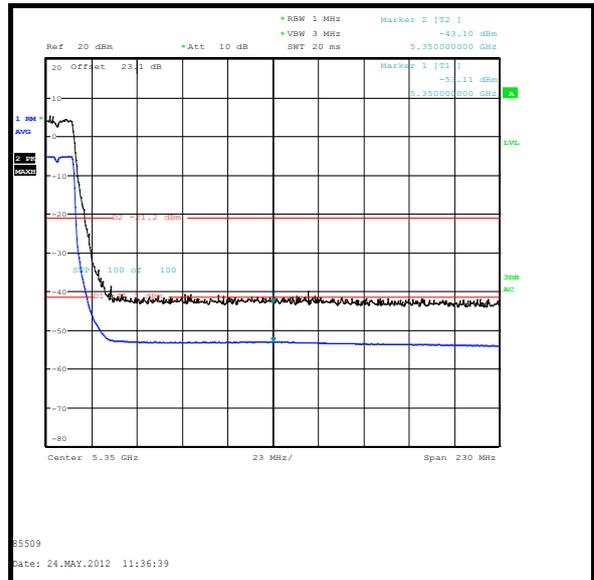


**Upper Band Edge Peak and Average**

**Results: 802.11n / 20 MHz / 6.5 Mbps / BPSK / MCS0 / Port 1 / 7.5 dBi sectorised antenna**



**Lower Band Edge Peak and Average**



**Upper Band Edge Peak and Average**

**Transmitter Band Edge Emissions (Conducted) (continued)****Results: Peak / 802.11n / 40 MHz / 13.5 Mbps / BPSK / MCS0 / Port 0 / 7.5 dBi sectorised antenna**

Frequency (MHz)	Port 0 Peak Level (dBm)	Antenna Gain + Cable Loss (dBi)	Peak Level + Antenna Gain (dBm EIRP)	Peak Limit (dBm EIRP)	Margin (dB)	Result
5150	-31.9	5.1	-26.8	-21.2	5.6	Complied
5350	-43.3	5.1	-38.2	-21.2	17.0	Complied

**Results: Average / 802.11n / 40 MHz / 13.5 Mbps / BPSK / MCS0 / Port 0 / 7.5 dBi sectorised antenna**

Frequency (MHz)	Port 0 Average Level (dBm)	Antenna Gain + Cable Loss (dBi)	Average Level + Antenna Gain (dBm EIRP)	Average Limit (dBm EIRP)	Margin (dB)	Result
5150	-48.2	5.1	-43.1	-41.2	1.9	Complied
5350	-53.8	5.1	-48.7	-41.2	7.5	Complied

**Results: Peak / 802.11n / 40 MHz / 13.5 Mbps / BPSK / MCS0 / Port 1 / 7.5 dBi sectorised antenna**

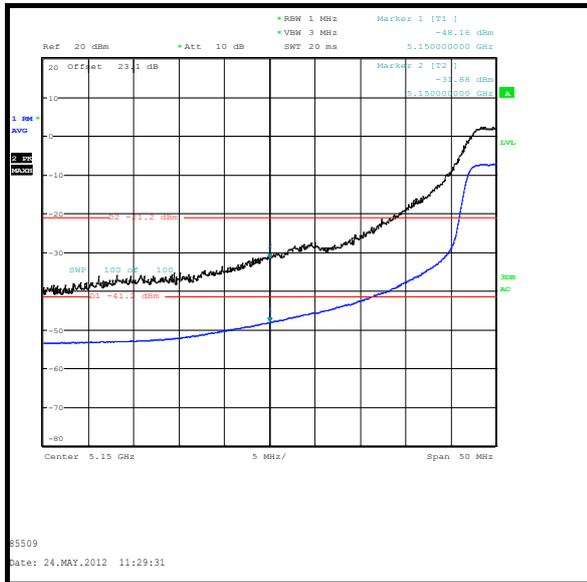
Frequency (MHz)	Port 1 Peak Level (dBm)	Antenna Gain + Cable Loss (dBi)	Peak Level + Antenna Gain (dBm EIRP)	Peak Limit (dBm EIRP)	Margin (dB)	Result
5150	-31.5	5.1	-26.4	-21.2	5.2	Complied
5350	-43.1	5.1	-38.0	-21.2	16.8	Complied

**Results: Average / 802.11n / 40 MHz / 13.5 Mbps / BPSK / MCS0 / Port 1 / 7.5 dBi sectorised antenna**

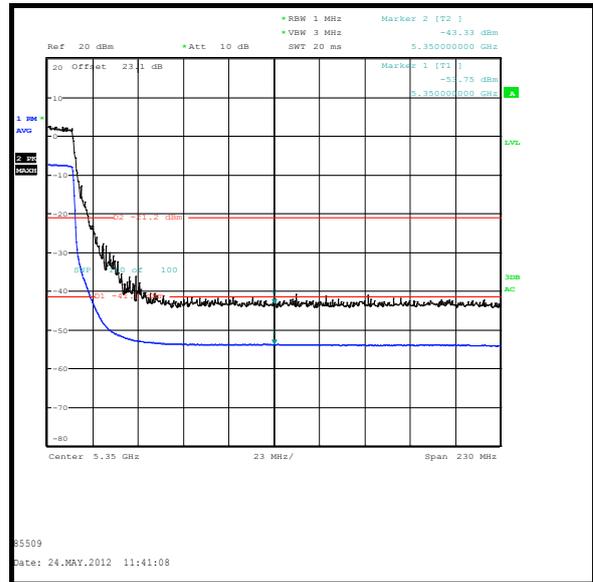
Frequency (MHz)	Port 1 Average Level (dBm)	Antenna Gain + Cable Loss (dBi)	Average Level + Antenna Gain (dBm EIRP)	Average Limit (dBm EIRP)	Margin (dB)	Result
5150	-47.0	5.1	-41.9	-41.2	0.7	Complied
5350	-50.0	5.1	-44.9	-41.2	3.7	Complied

**Transmitter Band Edge Emissions (Conducted) (continued)**

**Results: 802.11n / 40 MHz / 13.5 Mbps / BPSK / MCS0 / Port 0 / 7.5 dBi sectorised antenna**

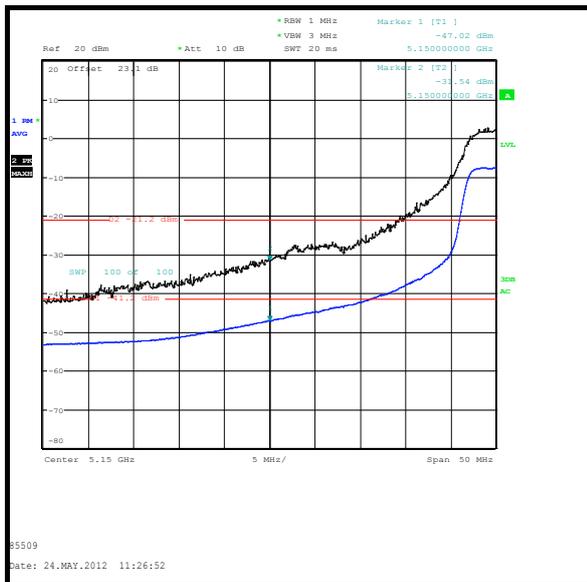


**Lower Band Edge Peak and Average**

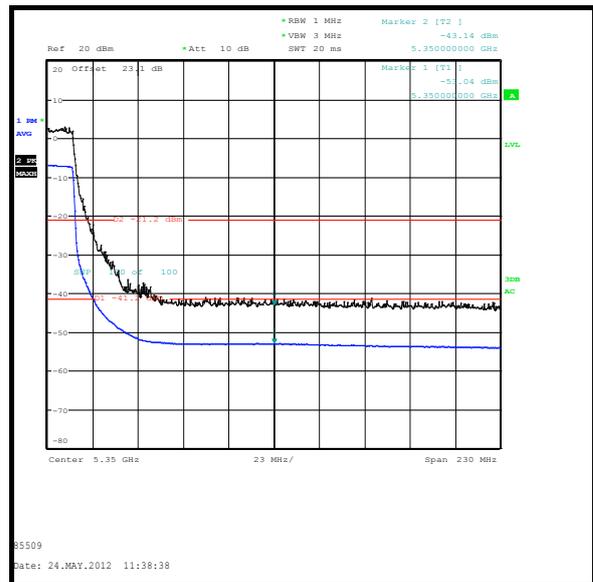


**Upper Band Edge Peak and Average**

**Results: 802.11n / 40 MHz / 13.5 Mbps / BPSK / MCS0 / Port 1 / 7.5 dBi sectorised antenna**



**Lower Band Edge Peak and Average**



**Upper Band Edge Peak and Average**

**Transmitter Band Edge Emissions (Conducted) (continued)****Results: Peak / 802.11n / 20 MHz / 6.5 Mbps / BPSK / MCS0 / Port 0 / 10 dBi omnidirectional antenna**

Frequency (MHz)	Port 0 Peak Level (dBm)	Antenna Gain + Cable Loss (dBi)	Peak Level + Antenna Gain (dBm EIRP)	Peak Limit (dBm EIRP)	Margin (dB)	Result
5150	-41.2	7.6	-33.6	-21.2	12.4	Complied
5350	-45.0	7.6	-37.4	-21.2	16.2	Complied

**Results: Average / 802.11n / 20 MHz / 6.5 Mbps / BPSK / MCS0 / Port 0 / 10 dBi omnidirectional antenna**

Frequency (MHz)	Port 0 Average Level (dBm)	Antenna Gain + Cable Loss (dBi)	Average Level + Antenna Gain (dBm EIRP)	Average Limit (dBm EIRP)	Margin (dB)	Result
5150	-54.5	7.6	-46.9	-41.2	5.7	Complied
5350	-55.0	7.6	-47.4	-41.2	6.2	Complied

**Results: Peak / 802.11n / 20 MHz / 6.5 Mbps / BPSK / MCS0 / Port 1 / 10 dBi omnidirectional antenna**

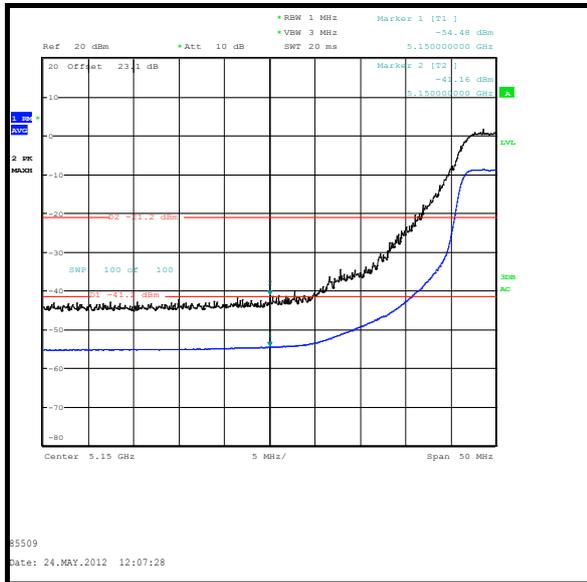
Frequency (MHz)	Port 1 Peak Level (dBm)	Antenna Gain + Cable Loss (dBi)	Peak Level + Antenna Gain (dBm EIRP)	Peak Limit (dBm EIRP)	Margin (dB)	Result
5150	-43.1	7.6	-35.5	-21.2	14.3	Complied
5350	-44.0	7.6	-36.4	-21.2	15.2	Complied

**Results: Average / 802.11n / 20 MHz / 6.5 Mbps / BPSK / MCS0 / Port 1 / 10 dBi omnidirectional antenna**

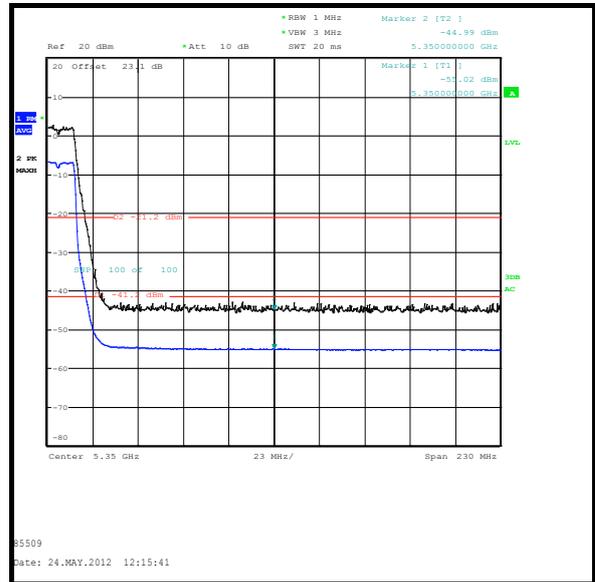
Frequency (MHz)	Port 1 Average Level (dBm)	Antenna Gain + Cable Loss (dBi)	Average Level + Antenna Gain (dBm EIRP)	Average Limit (dBm EIRP)	Margin (dB)	Result
5150	-54.2	7.6	-46.6	-41.2	5.4	Complied
5350	-54.7	7.6	-47.1	-41.2	5.9	Complied

**Transmitter Band Edge Emissions (Conducted) (continued)**

**Results: 802.11n / 20 MHz / 6.5 Mbps / BPSK / MCS0 / Port 0 / 10 dBi omnidirectional antenna**

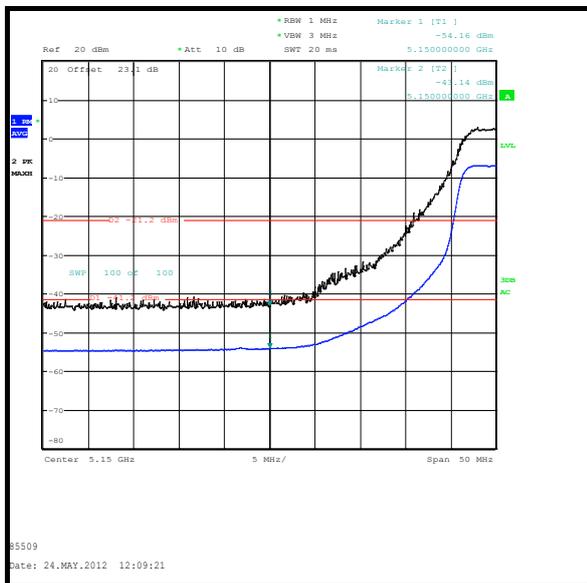


Lower Band Edge Peak and Average

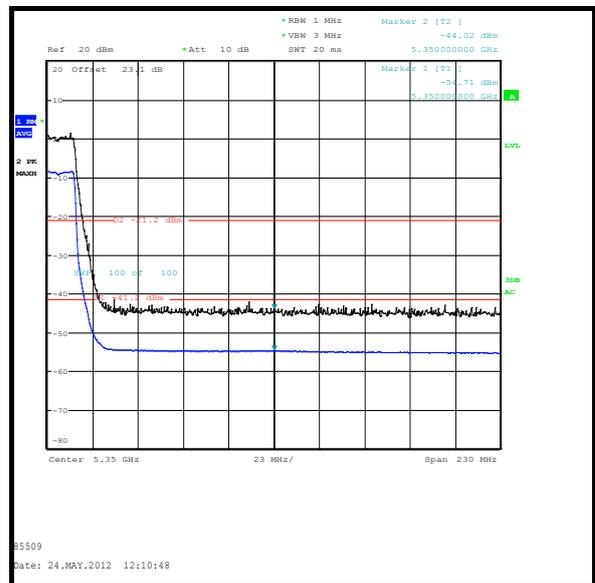


Upper Band Edge Peak and Average

**Results: 802.11n / 20 MHz / 6.5 Mbps / BPSK / MCS0 / Port 1 / 10 dBi omnidirectional antenna**



Lower Band Edge Peak and Average



Upper Band Edge Peak and Average

**Transmitter Band Edge Emissions (Conducted) (continued)****Results: Peak / 802.11n / 40 MHz / 13.5 Mbps / BPSK / MCS0 / Port 0 / 10 dBi omnidirectional antenna**

Frequency (MHz)	Port 0 Peak Level (dBm)	Antenna Gain + Cable Loss (dBi)	Peak Level + Antenna Gain (dBm EIRP)	Peak Limit (dBm EIRP)	Margin (dB)	Result
5150	-36.3	7.6	-28.7	-21.2	7.5	Complied
5350	-42.6	7.6	-35.0	-21.2	13.8	Complied

**Results: Average / 802.11n / 40 MHz / 13.5 Mbps / BPSK / MCS0 / Port 0 / 10 dBi omnidirectional antenna**

Frequency (MHz)	Port 0 Average Level (dBm)	Antenna Gain + Cable Loss (dBi)	Average Level + Antenna Gain (dBm EIRP)	Average Limit (dBm EIRP)	Margin (dB)	Result
5150	-50.2	7.6	-42.6	-41.2	1.4	Complied
5350	-53.7	7.6	-46.1	-41.2	4.9	Complied

**Results: Peak / 802.11n / 40 MHz / 13.5 Mbps / BPSK / MCS0 / Port 1 / 10 dBi omnidirectional antenna**

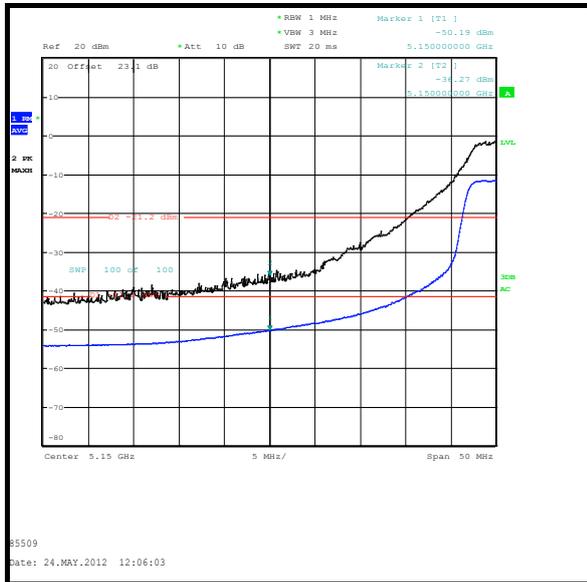
Frequency (MHz)	Port 1 Peak Level (dBm)	Antenna Gain + Cable Loss (dBi)	Peak Level + Antenna Gain (dBm EIRP)	Peak Limit (dBm EIRP)	Margin (dB)	Result
5150	-35.8	7.6	-28.2	-21.2	7.0	Complied
5350	-43.0	7.6	-35.4	-21.2	14.2	Complied

**Results: Average / 802.11n / 40 MHz / 13.5 Mbps / BPSK / MCS0 / Port 1 / 10 dBi omnidirectional antenna**

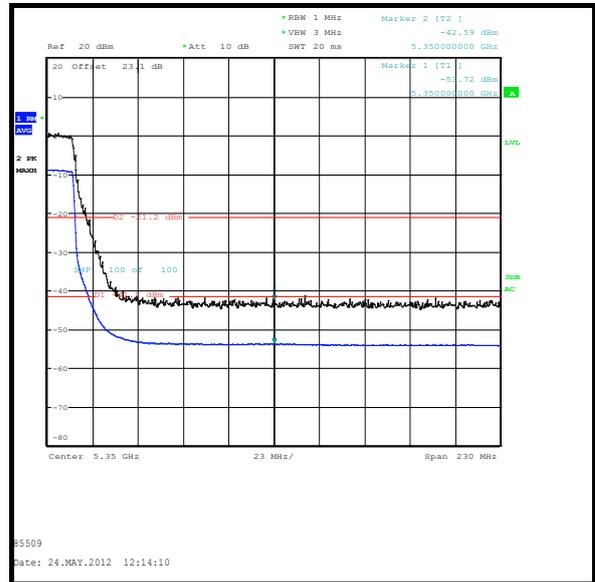
Frequency (MHz)	Port 1 Average Level (dBm)	Antenna Gain + Cable Loss (dBi)	Average Level + Antenna Gain (dBm EIRP)	Average Limit (dBm EIRP)	Margin (dB)	Result
5150	-49.2	7.6	-41.6	-41.2	0.4	Complied
5350	-53.9	7.6	-46.3	-41.2	5.1	Complied

**Transmitter Band Edge Emissions (Conducted) (continued)**

**Results: 802.11n / 40 MHz / 13.5 Mbps / BPSK / MCS0 / Port 0 / 10 dBi omnidirectional antenna**

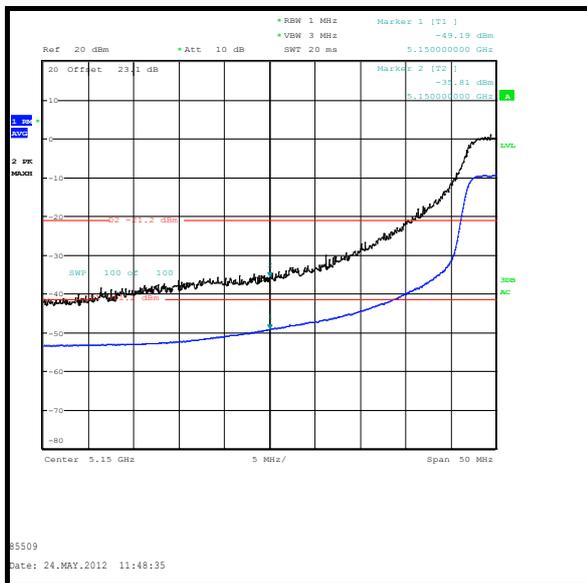


Lower Band Edge Peak and Average

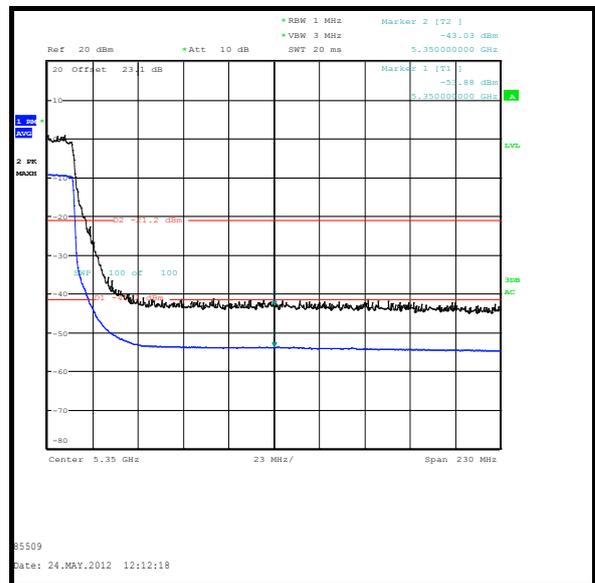


Upper Band Edge Peak and Average

**Results: 802.11n / 40 MHz / 13.5 Mbps / BPSK / MCS0 / Port 1 / 10 dBi omnidirectional antenna**



Lower Band Edge Peak and Average



Upper Band Edge Peak and Average

**5.2.7. Transmitter Out of Band Emissions (Radiated)****Test Summary:**

<b>Test Engineers:</b>	Sarah Williams & Andrew Edwards	<b>Test Date:</b>	30 April 2012
<b>Test Sample Serial No.:</b>	261293		

<b>FCC Reference:</b>	Parts 15.407(b)(1),(6),(7) & 15.209(a)
<b>Test Method Used:</b>	FCC KDB 789033 G) & ANSI C63.10 Sections 6.3 and 6.5
<b>Frequency Range:</b>	30 MHz to 1000 MHz

**Environmental Conditions:**

<b>Temperature (°C):</b>	25
<b>Relative Humidity (%):</b>	32

**Note(s):**

1. Pre-scans with the EUT transmitting on the top channel were measured according to FCC Part 15.407(b)(1). This states that for transmitters operating in the band 5.15 to 5.25 GHz: all emissions outside of the 5.15-5.35 GHz band will not exceed an EIRP of -27 dBm/MHz. Part15.407(b)(6) states unwanted emissions below 1 GHz must comply with the general field strength limits set forth in 15.209. Part15.407(b)(7) states the provisions of 15.205 apply, eg restricted bands of operation.
2. All antenna ports were terminated using 50 Ohm loads.
3. The final measured value, for the given emission in the field strength result tables, incorporates the calibrated antenna factor and cable loss.
4. The preliminary scans showed similar emission levels below 1 GHz, for each channel of operation. Therefore final radiated emissions measurements were performed with the EUT set to the top channel only.
5. All other emissions were at least 20 dB below the appropriate limit or below the noise floor of the measurement system.
6. Measurements below 1 GHz were performed in a semi-anechoic chamber (RFI Asset Number K0001) at a distance of 3 metres. The EUT was placed at a height of 80 cm above the reference ground plane in the centre of the chamber turntable. Maximum emission levels were determined by height searching the measurement antenna over the range 1 metre to 4 metres.

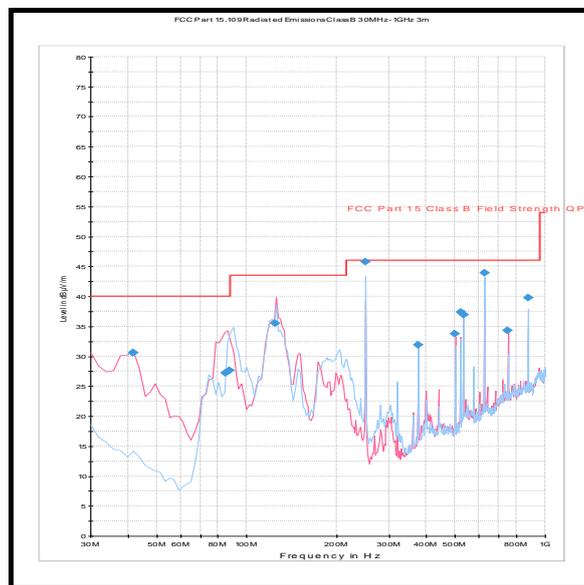
**Transmitter Out of Band Emissions (Radiated) (continued)**

**Results: Top Channel / Field Strength**

Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
124.976	Vertical	35.5	43.5	8.0	Complied
250.001	Horizontal	45.8	46.0	0.2	Complied

**Results: Top Channel / EIRP**

Frequency (MHz)	Antenna Polarity	Level (dBm)	Limit (dBm)	Margin (dB)	Result
124.976	Vertical	-59.7	-27.0	32.7	Complied
250.001	Horizontal	-49.4	-27.0	22.4	Complied



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

**Transmitter Out of Band Emissions (Radiated) (continued)****Test Summary:**

<b>Test Engineers:</b>	Andrew Edwards & Sarah Williams	<b>Test Dates:</b>	01 May 2012 & 02 May 2012
<b>Test Sample Serial No.:</b>	261293		

<b>FCC Reference:</b>	Parts 15.407(b)(1),(7) & 15.209(a)
<b>Test Method Used:</b>	FCC KDB 789033 G) & ANSI C63.10 Sections 6.3 and 6.6
<b>Frequency Range:</b>	1 GHz to 40 GHz

**Environmental Conditions:**

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

**Note(s):**

1. FCC Part 15.407(b)(1) states for devices operating in the 5.15 to 5.25 GHz band, all emissions outside the 5.15-5.35 GHz band shall not exceed and EIRP of -27 dBm/MHz. Part 15.407(b)(7) states the provisions of 15.205 apply, eg restricted bands of operation.
2. All antenna ports were terminated using 50 Ohm loads.
3. Measurements were performed with the EUT transmitting 13.5 Mbps/ MCS0 / 40 MHz channel width as all configurations were previously measured and this combination produced the highest output power. Pre-scans were performed with the EUT transmitting on the top channel.
4. Final emissions were measured on both 20 MHz and 40 MHz channel widths using MCS0 with the EUT set to a power setting of 9.0.
5. The emission shown at approximately 5230 MHz on the 4 GHz to 6 GHz plot is the EUT fundamental.
6. The final measured value, for the given emission in the field strength result tables, incorporates the calibrated antenna factor and cable loss.
7. Final measurements above 1 GHz were performed in a semi-anechoic chamber (RFI Asset Number K0001) at a distance of 3 metres. The EUT was placed at a height of 80 cm above the reference ground plane in the centre of the chamber turntable. Maximum emission levels were determined by height searching the measurement antenna over the range 1 metre to 4 metres.

**Transmitter Out of Band Emissions (Radiated) (continued)****Results: Bottom Channel / EIRP / 20 MHz / MCS0**

Frequency (MHz)	Antenna Polarity	Level (dBm)	Limit (dBm)	Margin (dB)	Result
5000.046	Horizontal	-53.0	-27.0	26.0	Complied
10350.882	Vertical	-36.8	-27.0	9.8	Complied
15596.443	Vertical	-47.0	-27.0	20.0	Complied

**Results: Bottom Channel / Field strength / 20 MHz / MCS0 / Peak**

Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
5000.046	Horizontal	42.2	74.0	31.8	Complied
10350.882	Vertical	58.4	74.0	15.6	Complied
15596.443	Vertical	48.2	74.0	25.8	Complied

**Results: Bottom Channel / Field strength / 20 MHz / MCS0 / Average**

Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
5000.046	Horizontal	35.5	54.0	18.5	Complied
15596.443	Vertical	35.0	54.0	19.0	Complied

**Results: Middle Channel / EIRP / 20 MHz / MCS0**

Frequency (MHz)	Antenna Polarity	Level (dBm)	Limit (dBm)	Margin (dB)	Result
5000.046	Horizontal	-53.0	-27.0	26.0	Complied
10393.086	Vertical	-35.5	-27.0	8.5	Complied
15601.553	Vertical	-47.5	-27.0	20.5	Complied

**Results: Middle Channel / Field strength / 20 MHz / MCS0 / Peak**

Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
5000.046	Horizontal	42.2	74.0	31.8	Complied
10393.086	Vertical	59.7	74.0	14.3	Complied
15601.553	Vertical	47.7	74.0	26.3	Complied

**Results: Middle Channel / Field strength / 20 MHz / MCS0 / Average**

Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
5000.046	Horizontal	35.5	54.0	18.5	Complied
15601.553	Vertical	34.5	54.0	19.5	Complied

**Transmitter Out of Band Emissions (Radiated) (continued)****Results: Top Channel / EIRP / 20 MHz / MCS0**

Frequency (MHz)	Antenna Polarity	Level (dBm)	Limit (dBm)	Margin (dB)	Result
5000.046	Horizontal	-53.0	-27.0	26.0	Complied
10484.509	Vertical	-39.5	-27.0	12.5	Complied
15712.434	Vertical	-49.9	-27.0	22.9	Complied

**Results: Top Channel / Field strength / 20 MHz / MCS0 / Peak**

Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
5000.046	Horizontal	42.2	74.0	31.8	Complied
10484.509	Vertical	55.7	74.0	18.3	Complied
15712.434	Vertical	45.3	74.0	28.7	Complied

**Results: Top Channel / Field strength / 20 MHz / MCS0 / Average**

Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
5000.046	Horizontal	35.5	54.0	18.5	Complied
15712.434	Vertical	32.3	54.0	21.7	Complied

**Results: Bottom Channel / EIRP / 40 MHz / MCS0**

Frequency (MHz)	Antenna Polarity	Level (dBm)	Limit (dBm)	Margin (dB)	Result
5000.046	Horizontal	-53.0	-27.0	26.0	Complied
10391.523	Vertical	-36.3	-27.0	9.3	Complied
15553.868	Vertical	-45.8	-27.0	18.8	Complied

**Results: Bottom Channel / Field strength / 40 MHz / MCS0 / Peak**

Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
5000.046	Horizontal	42.2	74.0	31.8	Complied
10391.523	Vertical	58.9	74.0	15.1	Complied
15553.868	Vertical	49.4	74.0	24.6	Complied

**Results: Bottom Channel / Field strength / 40 MHz / MCS0 / Average**

Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
5000.046	Horizontal	35.5	54.0	18.5	Complied
15553.868	Vertical	34.5	54.0	19.5	Complied

**Transmitter Out of Band Emissions (Radiated) (continued)****Results: Top Channel / EIRP / 40 MHz / MCS0**

Frequency (MHz)	Antenna Polarity	Level (dBm)	Limit (dBm)	Margin (dB)	Result
5000.046	Horizontal	-53.0	-27.0	26.0	Complied
10450.481	Vertical	-38.3	-27.0	11.3	Complied
15675.872	Vertical	-44.4	-27.0	17.4	Complied

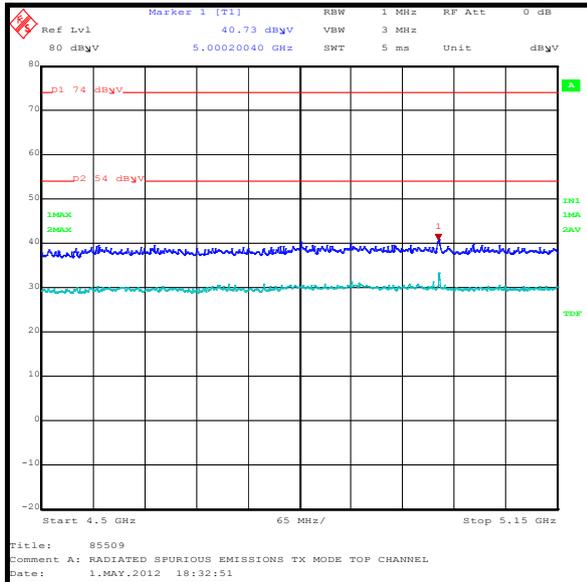
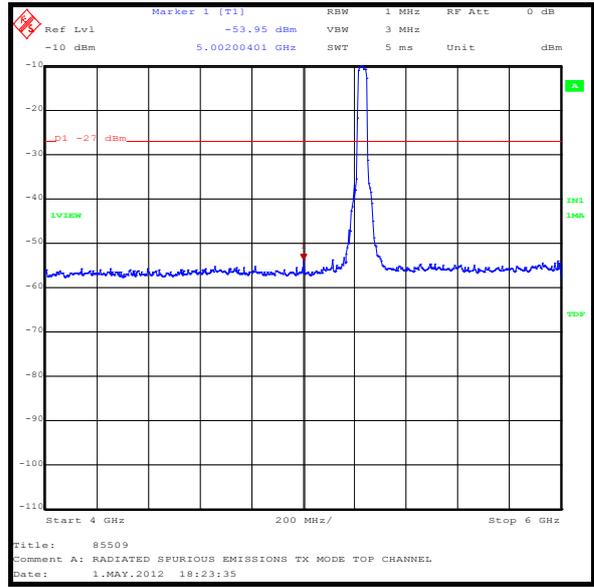
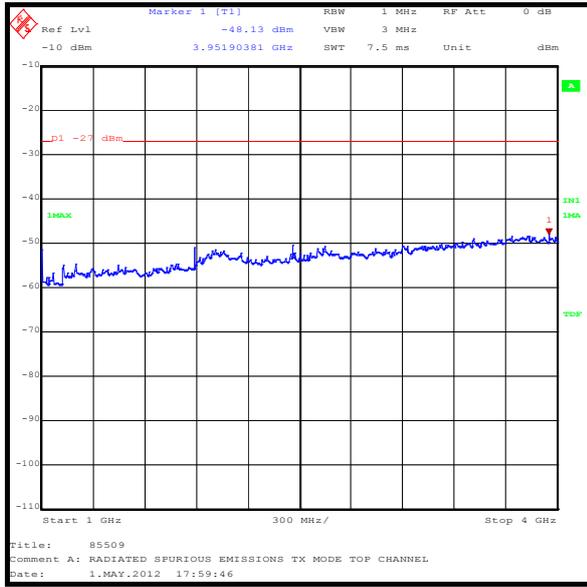
**Results: Top Channel / Field strength / 40 MHz / MCS0 / Peak**

Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
5000.046	Horizontal	42.2	74.0	31.8	Complied
10450.481	Vertical	56.9	74.0	17.1	Complied
15675.872	Vertical	50.8	74.0	23.2	Complied

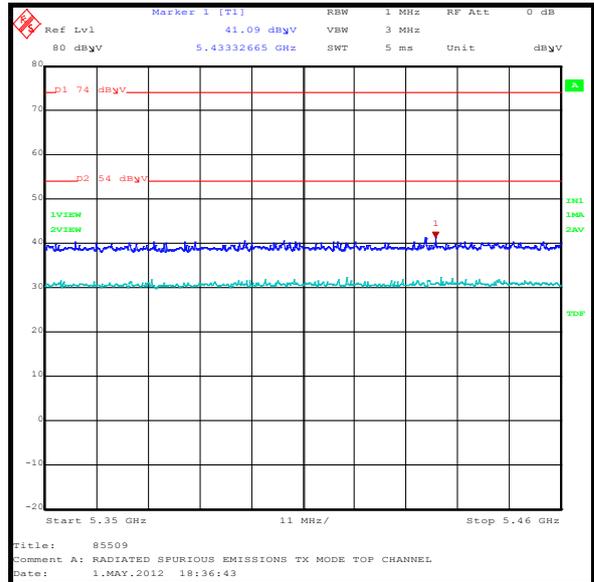
**Results: Top Channel / Field strength / 40 MHz / MCS0 / Average**

Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
5000.046	Horizontal	35.5	54.0	18.5	Complied
15675.872	Vertical	34.0	54.0	20.0	Complied

**Transmitter Out of Band Emissions (Radiated) (continued)**

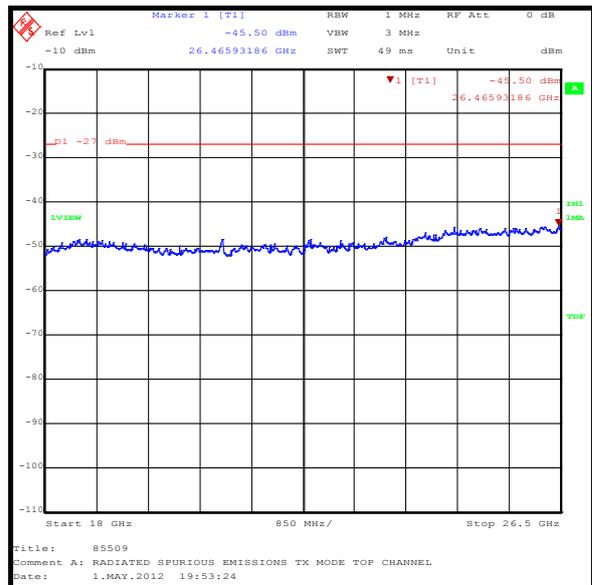
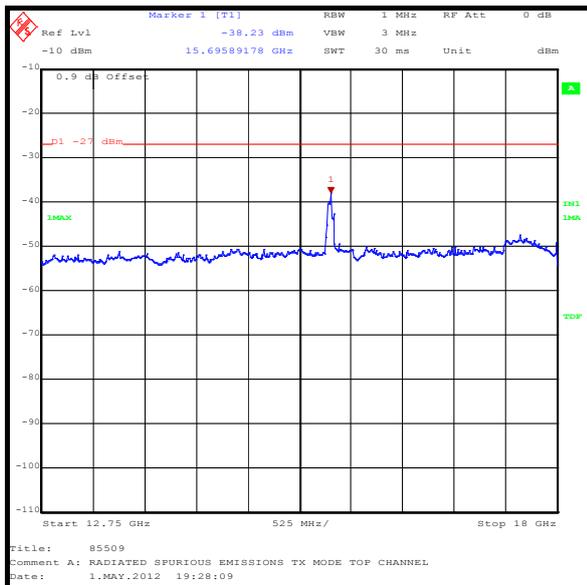
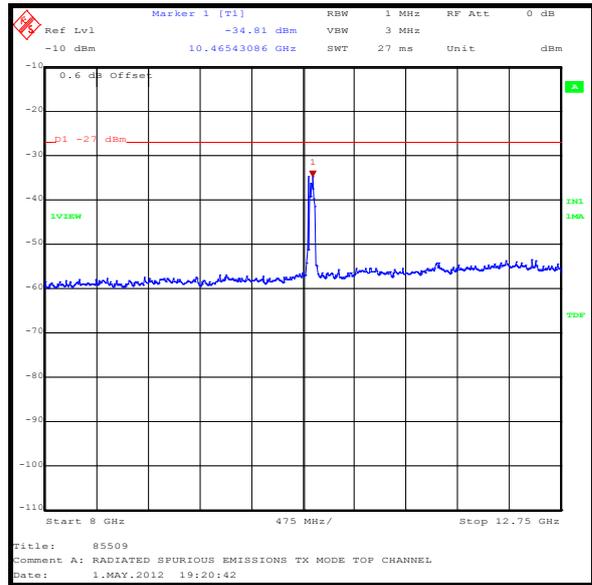
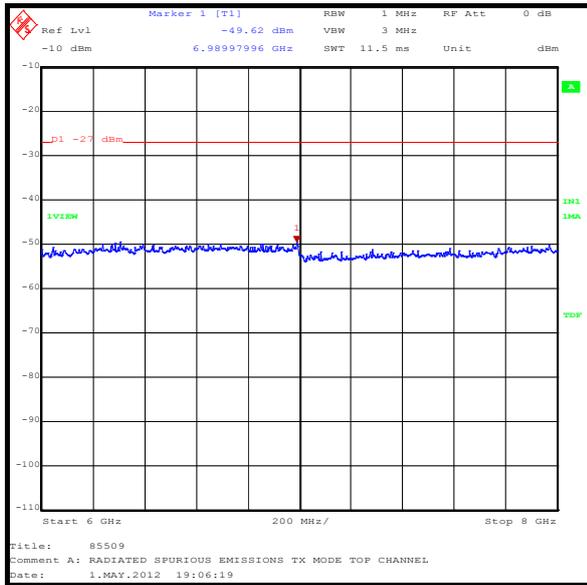


**Restricted Band 4.5 GHz to 5.15 GHz**

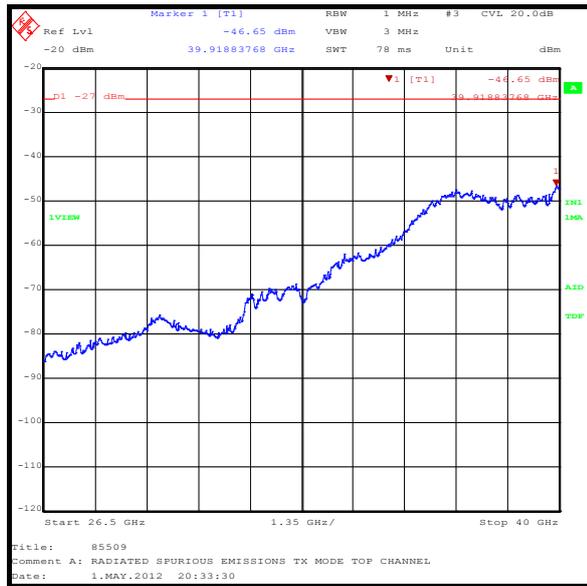


**Restricted Band 5.35 GHz to 5.46 GHz**

**Transmitter Out of Band Emissions (Radiated) (continued)**



**Transmitter Out of Band Emissions (Radiated) (continued)**



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

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

<b>Test Engineer:</b>	Andrew Edwards	<b>Test Date:</b>	03 May 2012
<b>Test Sample Serial No.:</b>	261293		

<b>FCC Reference:</b>	Parts 15.407(b)(1), 15.407(b)(7), 15.205 & 15.209(a)
<b>Test Method Used:</b>	ANSI C63.10 Section 6.9.2 KDB 789033 Section G.1.c

**Environmental Conditions:**

<b>Temperature (°C):</b>	23
<b>Relative Humidity (%):</b>	26

**Note(s):**

1. FCC Response to Inquiry (Tracking Number 917954 / Date: 14<sup>th</sup> February 2012) confirmed band edge measurements need only be performed in the EUT modes that produce the highest power and the widest bandwidths. Transmitter power in all modes was previously measured and BPSK / MCS0 was found to have the highest power output. Occupied bandwidth in all modes was previously measured and found to be the same modes as transmitter output power. Band edge testing was performed in this modes on both supported channel widths.
2. All antenna ports were terminated using 50 Ohm loads.
3. Lower band edge measurements were performed with the EUT transmitting on the bottom channel. Upper band edge measurements were performed with the EUT transmitting on the top channel.
4. For transmitters operating in the 5.15-5.25 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz. However, there are restricted bands of operation below the lower band edge at 4.5-5.15 GHz and also above the upper band edge at 5.35-5.46 GHz therefore the provisions of FCC Part 15.205 apply.
5. Field strength measurements using peak and average detectors were performed in the restricted bands below 5.15 GHz and above 5.35 GHz. Field strength and EIRP results were found to be compliant with the restricted band limits and Part 15.407 out-of-band limits.
6. FCC Response to Inquiry (Tracking Number 789033 / Date: 05 March 2012); Average measurements are not required if the EUT Peak measurement complies with average limit.

**Transmitter Band Edge Emissions (Radiated) (continued)****Results: 20 MHz Channel / BPSK / MCS0 / Peak / High power setting**

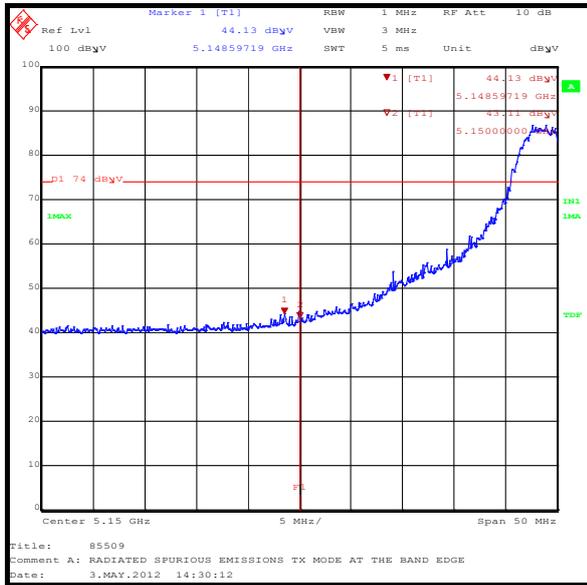
Frequency (MHz)	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
5148.597	44.1	74.0	29.9	Complied
5150	43.1	74.0	30.9	Complied
5350	40.6	74.0	33.4	Complied
5358.527	42.3	74.0	31.7	Complied

**Results: 20 MHz Channel / BPSK / MCS0 / Average / High power setting**

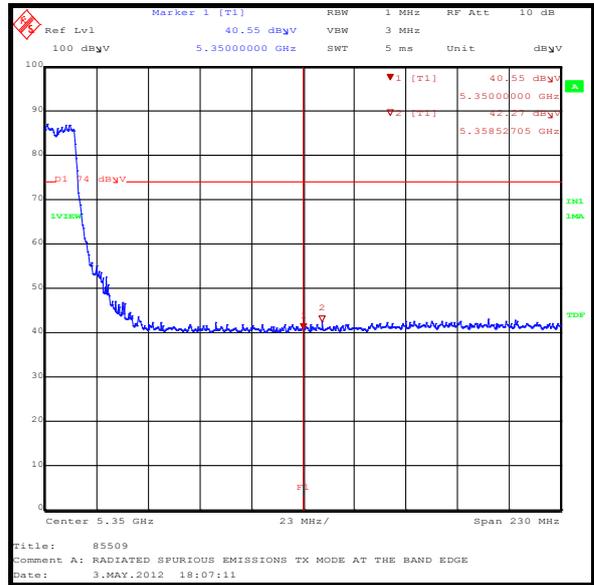
Frequency (MHz)	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
5150	29.8	54.0	24.2	Complied
5350	29.5	54.0	24.5	Complied

### Transmitter Band Edge Emissions (Radiated) (continued)

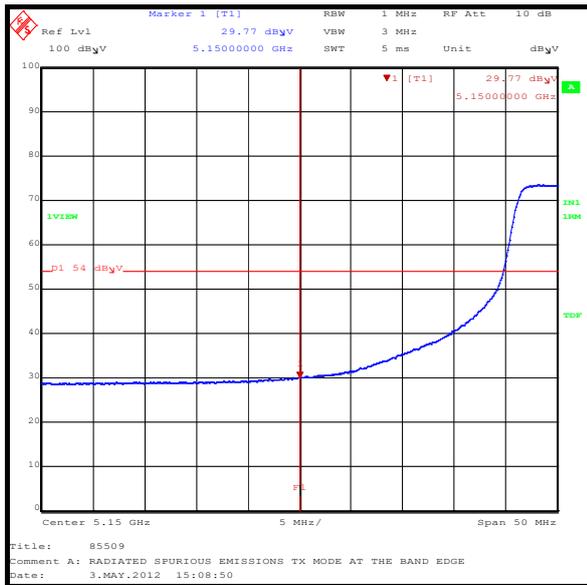
#### Results: 20 MHz Channel / BPSK / MCS0 / High power setting



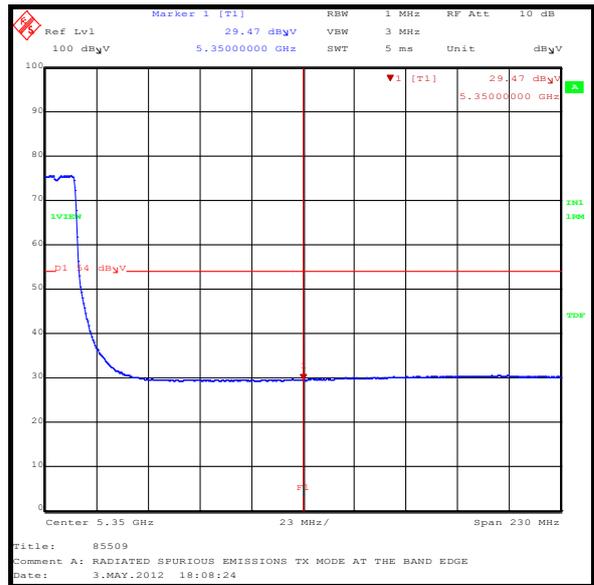
Lower Band Edge Peak



Upper Band Edge Peak



Lower Band Edge Average



Upper Band Edge Average

**Transmitter Band Edge Emissions (Radiated) (continued)****Results: 20 MHz Channel / BPSK / MCS0 / Peak / Low power setting**

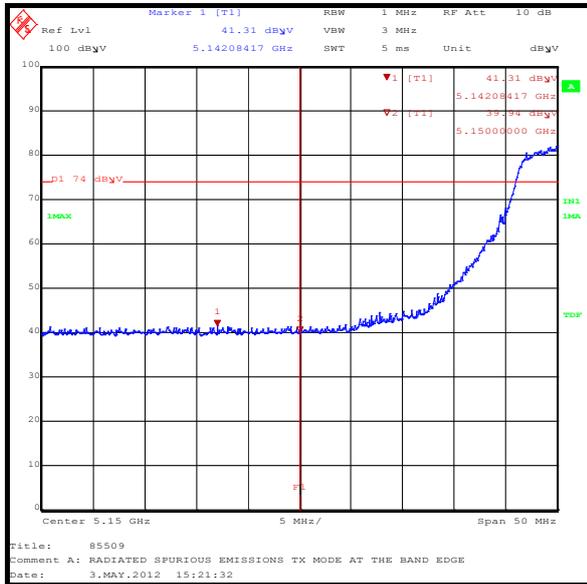
Frequency (MHz)	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
5142.084	41.3	74.0	32.7	Complied
5150	39.9	74.0	34.1	Complied
5350	41.2	74.0	32.8	Complied
5363.367	42.3	74.0	31.7	Complied

**Results: 20 MHz Channel / BPSK / MCS 0 / Average / Low power setting**

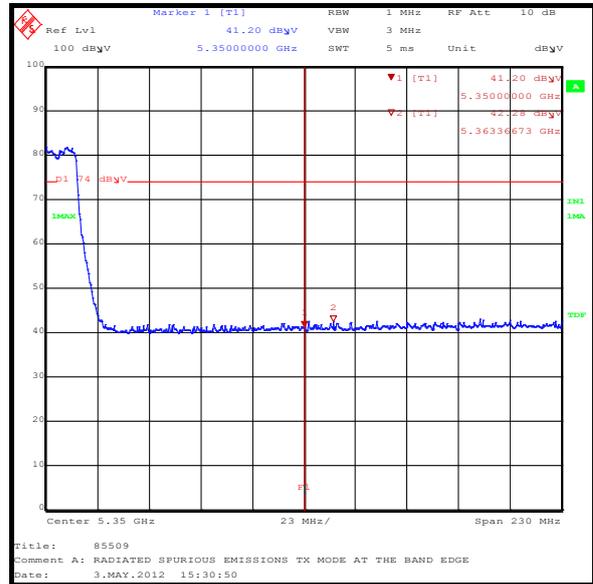
Frequency (MHz)	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
5150	28.8	54.0	25.2	Complied
5350	29.2	54.0	24.8	Complied

**Transmitter Band Edge Emissions (Radiated) (continued)**

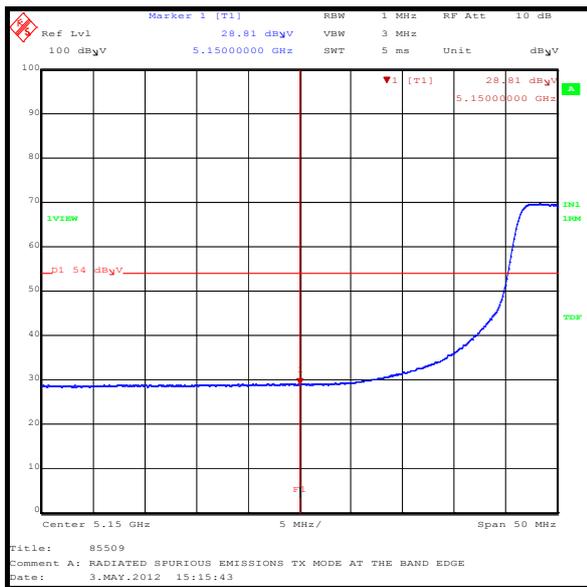
**Results: 20 MHz Channel / BPSK / MCS 0 / Low power setting**



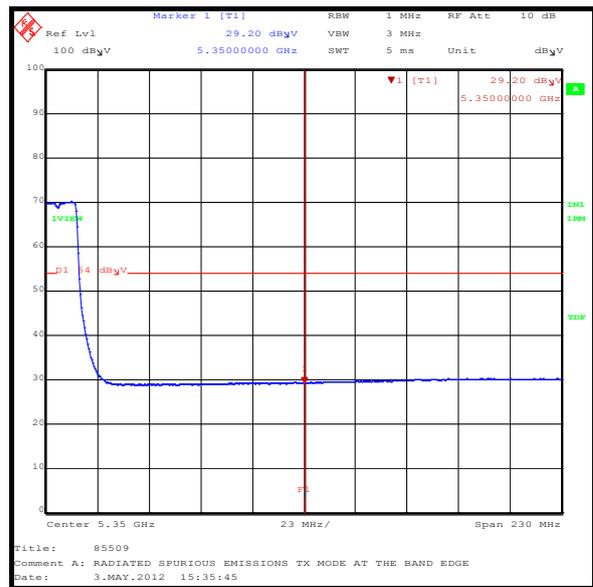
**Lower Band Edge Peak**



**Upper Band Edge Peak**



**Lower Band Edge Average**



**Lower Band Edge Average**

**Transmitter Band Edge Emissions (Radiated) (continued)****Results: 40 MHz Channel / BPSK / MCS0 / Peak / High power setting**

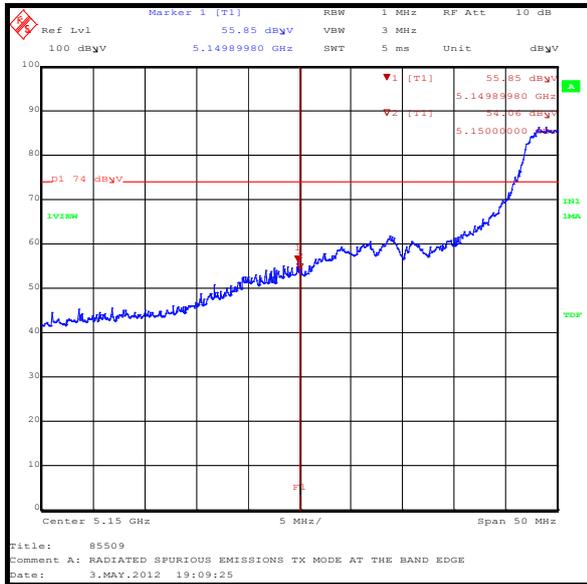
Frequency (MHz)	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
5149.900	55.9	74.0	18.1	Complied
5150	54.1	74.0	19.9	Complied
5350	41.2	74.0	32.8	Complied
5373.748	42.4	74.0	31.6	Complied

**Results: 40 MHz Channel / BPSK / MCS0 / Average / High power setting**

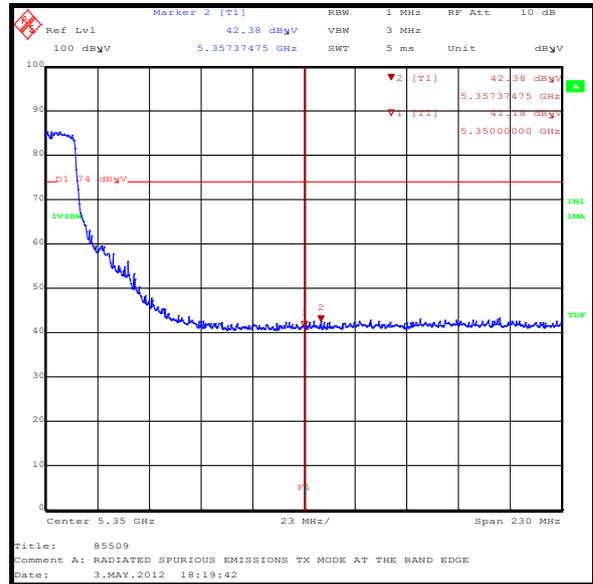
Frequency (MHz)	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
5150	36.5	54.0	17.5	Complied
5350	29.6	54.0	24.4	Complied

**Transmitter Band Edge Emissions (Radiated) (continued)**

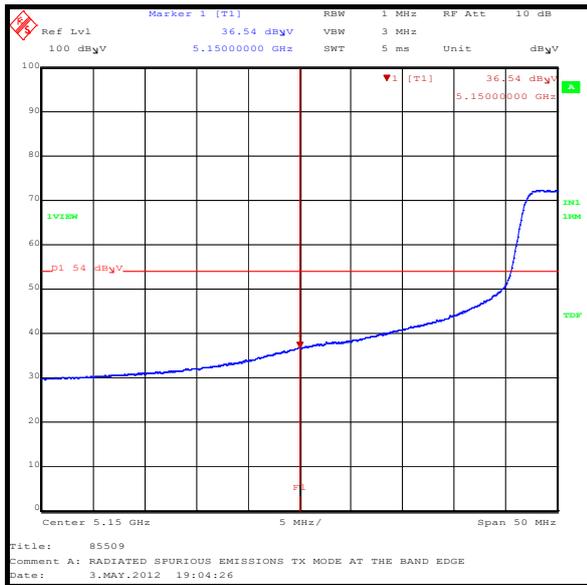
**Results: 40 MHz Channel / BPSK / MCS0 / High power setting**



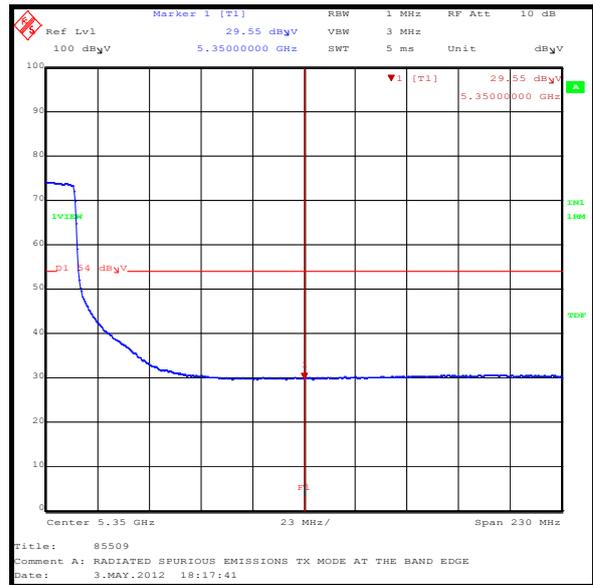
**Lower Band Edge Peak**



**Upper Band Edge Peak**



**Lower Band Edge Average**



**Upper Band Edge Average**

**Transmitter Band Edge Emissions (Radiated) (continued)****Results: 40 MHz Channel / BPSK / MCS0 / Peak / Low power setting**

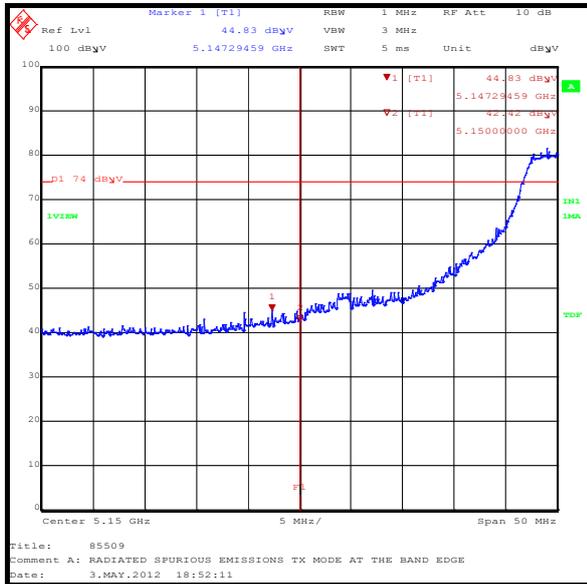
Frequency (MHz)	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
5147.295	44.8	74.0	29.2	Complied
5150	42.4	74.0	31.6	Complied
5350	40.6	74.0	33.4	Complied
5356.453	41.8	74.0	32.2	Complied

**Results: 40 MHz Channel / BPSK / MCS0 / Average / Low power setting**

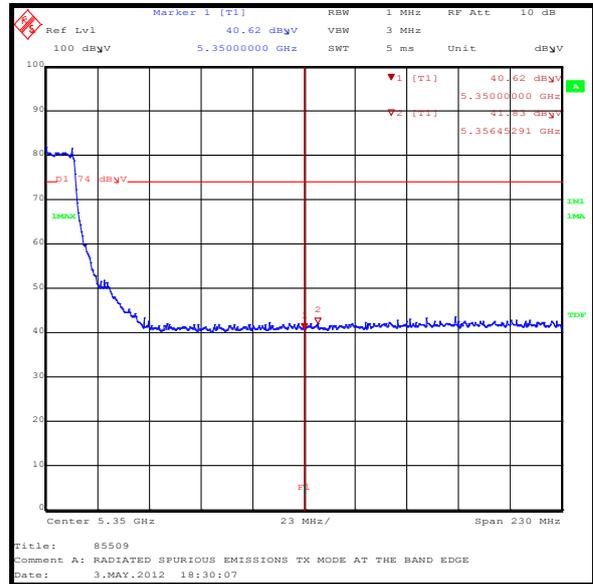
Frequency (MHz)	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
5150	31.1	54.0	22.9	Complied
5350	29.3	54.0	24.7	Complied

**Transmitter Band Edge Emissions (Radiated) (continued)**

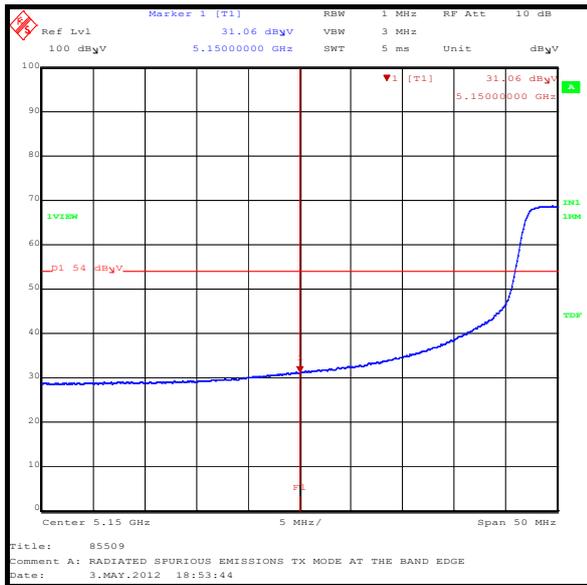
**Results: 40 MHz Channel / BPSK / MCS0 / Low power setting**



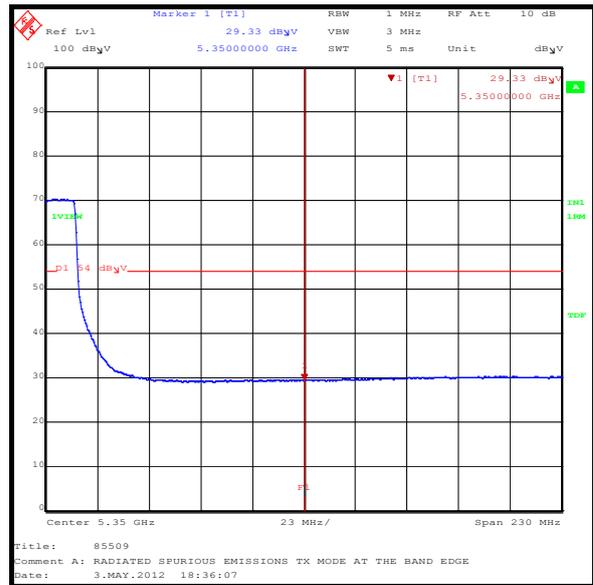
**Lower Band Edge Peak**



**Upper Band Edge Peak**



**Lower Band Edge Average**



**Upper Band Edge Average**

## **6. Measurement Uncertainty**

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

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

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

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

<b>Measurement Type</b>	<b>Range</b>	<b>Confidence Level (%)</b>	<b>Calculated Uncertainty</b>
AC Conducted Spurious Emissions	0.15 MHz to 30 MHz	95%	±3.25 dB
Maximum Conducted Output Power	5.15 GHz to 5.25 GHz	95%	±0.28 dB
Peak Power Spectral Density	5.15 GHz to 5.25 GHz	95%	±0.28 dB
26 dB Emission Bandwidth	5.15 GHz to 5.25 GHz	95%	±0.92 ppm
Radiated Spurious Emissions	30 MHz to 40 GHz	95%	±2.94 dB
Conducted Spurious Emissions	30 MHz to 40 GHz	95%	±2.62 dB

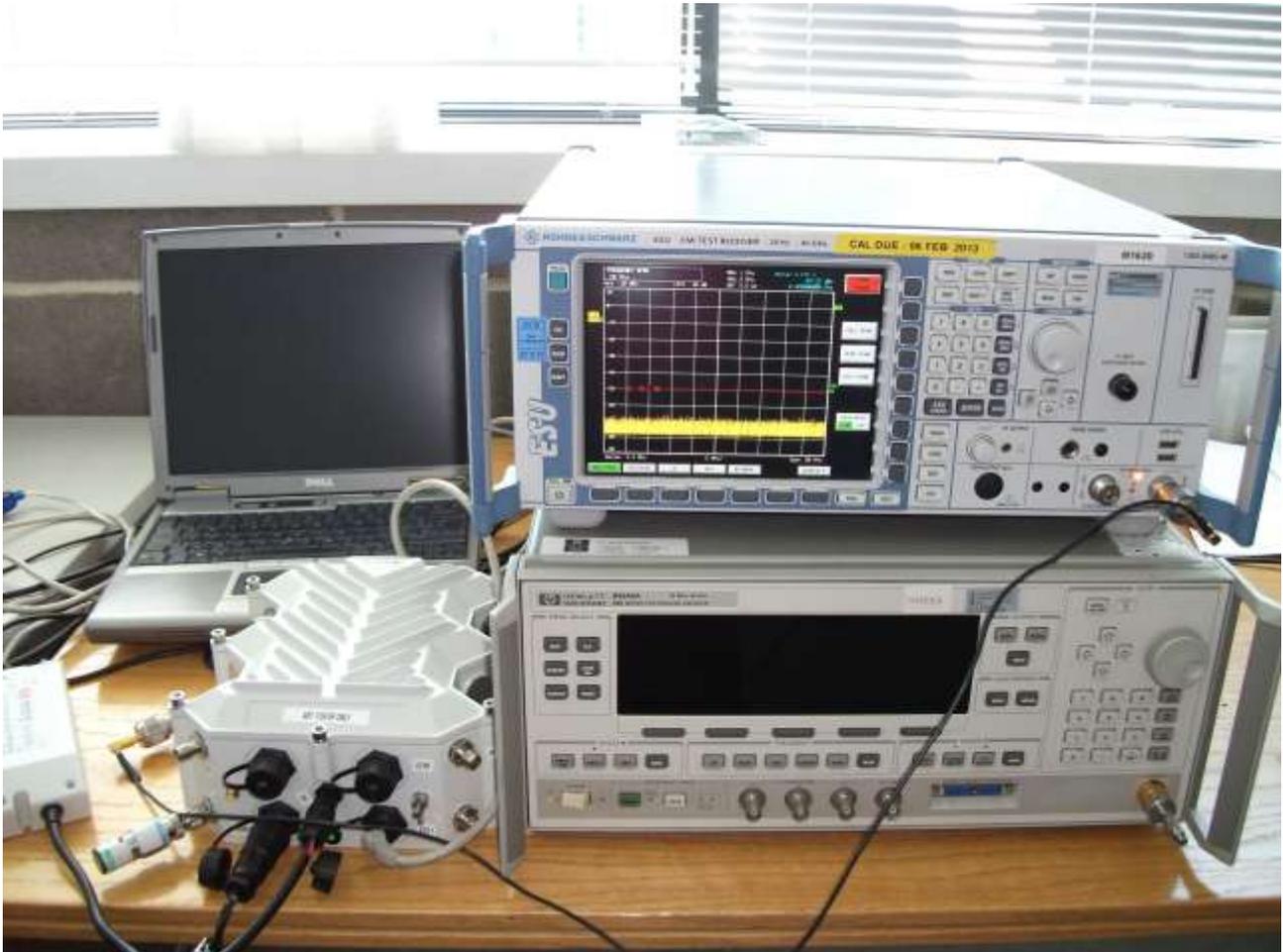
The methods used to calculate the above uncertainties are in line with those recommended within the various measurement specifications. Where measurement specifications do not include guidelines for the evaluation of measurement uncertainty the published guidance of the appropriate accreditation body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

## Appendix 1. Test Equipment Used

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (months)
A067	LISN	Rohde & Schwarz	ESH3-Z5	890603/002	02 Jun 2012	12
A1534	Pre Amplifier	Hewlett Packard	8449B	3008A00405	09 Oct 2012	12
A1738	Attenuator	Atlantic Microwave	BBS40-10	R1379	Calibrated before use	-
A1818	Antenna	EMCO	3115	00075692	09 Oct 2012	12
A1830	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100668	25 Feb 2013	12
A1980	High Pass Filter	Atlan TecRF	AFH-06000	09110900303	15 Mar 2013	12
A1999	Attenuator	Huber & Suhner	6820.17.B	07101	03 Apr 2013	12
A2055	Attenuator	Atlantic Microwave	WA-54-10-12	A2055	15 Jun 2012	12
A2130	High Pass Filter	Atlan TecRF	AFH-08000	80rJFBD06-002	25 Apr 2013	12
A253	Antenna	Flann Microwave	12240-20	128	09 Oct 2012	12
A254	Antenna	Flann Microwave	14240-20	139	09 Oct 2012	12
A255	Antenna	Flann Microwave	16240-20	519	09 Oct 2012	12
A256	Antenna	Flann Microwave	18240-20	400	09 Oct 2012	12
A436	Antenna	Flann	20240-20	330	09 Oct 2012	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	09 Oct 2012	12
M1124	Spectrum Analyser	Rohde & Schwarz	ESI26	100046K	29 Jun 2012	12
M1379	Test Receiver	Rohde & Schwarz	ESIB7	100330	20 Sep 2012	12
M1630	Test Receiver	Rohde & Schwarz	ESU40	100233	06 Feb 2013	12

**NB** In accordance with UKAS requirements all the measurement equipment is on a calibration schedule. All test equipment was within the previous or current calibration period on the date of testing.

## Appendix 2. Test Setup Photographs



Test setup for conducted measurements. DN200 is the white box to the left of the signal generator.