

### FCC CFR47 PART 15 SUBPART C INDUSTRY CANADA RSS-210 ISSUE 7

**CERTIFICATION TEST REPORT** 

FOR DC544D\_2 PCIe DAUGHTER CARD FOR 2.4 / 5 GHz AP/ROUTER APPLICATIONS\_DFS

MODEL NUMBER: 65-VN780-P2

FCC ID: J9C-DC544D2 IC: 2723A-DC544D2

REPORT NUMBER: 09U12687-5, Revision A

ISSUE DATE: MARCH 29, 2010

Prepared for QUALCOMM INC. 3165 KIFER ROAD SANTA CLARA, CA 95051 USA

Prepared by COMPLIANCE CERTIFICATION SERVICES 47173 BENICIA STREET FREMONT, CA 94538, U.S.A. TEL: (510) 771-1000 FAX: (510) 661-0888

NVLAP LAB CODE 200065-0

#### Revision History

Rev.	lssue Date	Revisions	Revised By
	7/22/2009	Initial Issue	F. Ibrahim
А	03/29/10	Updated test results for modifications of EUT	F. Ibrahim

Page 2 of 193

# TABLE OF CONTENTS

1.	ATTI	ESTATION OF TEST RESULTS	.5
2.	TES	T METHODOLOGY	.6
3.	FAC	ILITIES AND ACCREDITATION	.6
4.	CAL	IBRATION AND UNCERTAINTY	.6
4	.1.	MEASURING INSTRUMENT CALIBRATION	. 6
4	.2.	SAMPLE CALCULATION	. 6
4	.3.	MEASUREMENT UNCERTAINTY	. 6
5.	EQU	IPMENT UNDER TEST	.7
5	.1.	DESCRIPTION OF EUT	. 7
5	.2.	MAXIMUM OUTPUT POWER	. 7
5	.3.	DESCRIPTION OF AVAILABLE ANTENNAS	. 7
5	.4.	SOFTWARE AND FIRMWARE	. 8
5	.5.	WORST-CASE CONFIGURATION AND MODE	. 8
5	.6.	MODIFICATIONS	. 8
5	.7.	TEST RESULTS FOR MODIFIED SAMPLE	.9
5	.8.	DESCRIPTION OF TEST SETUP	. 9
6.	TEQ	T AND MEASUREMENT EQUIPMENT1	14
υ.			
_			
7.		ENNA PORT TEST RESULTS1	
	.1.	ENNA PORT TEST RESULTS1 2.4 GHz BAND CHANNEL TESTS FOR 802.11b MODE1	12
		ENNA PORT TEST RESULTS	<i>12</i> 12
	7.1. 7.1.1 7.1.2 7.1.3	ENNA PORT TEST RESULTS	12 12 15 18
	. <i>1.</i> 7.1.1 7.1.2 7.1.3 7.1.4	ENNA PORT TEST RESULTS       1         2.4 GHz BAND CHANNEL TESTS FOR 802.11b MODE       1         6 dB BANDWIDTH       1         99% & 26 dB BANDWIDTH       1         OUTPUT POWER       1         AVERAGE POWER       2	12 12 15 18 25
	7.1.1 7.1.2 7.1.2 7.1.3 7.1.4 7.1.5	ENNA PORT TEST RESULTS       1         2.4 GHz BAND CHANNEL TESTS FOR 802.11b MODE       1         6 dB BANDWIDTH       1         99% & 26 dB BANDWIDTH       1         OUTPUT POWER       1         AVERAGE POWER       2         POWER SPECTRAL DENSITY       2	12 12 15 18 25 26
7	.1. 7.1.1 7.1.2 7.1.3 7.1.4 7.1.5 7.1.6	ENNA PORT TEST RESULTS       1         2.4 GHz BAND CHANNEL TESTS FOR 802.11b MODE       1         6 dB BANDWIDTH       1         99% & 26 dB BANDWIDTH       1         OUTPUT POWER       1         AVERAGE POWER       2         POWER SPECTRAL DENSITY       2         CONDUCTED SPURIOUS EMISSIONS       2	12 12 15 18 25 26 29
7	7.1.1 7.1.2 7.1.3 7.1.4 7.1.5	ENNA PORT TEST RESULTS       1         2.4 GHz BAND CHANNEL TESTS FOR 802.11b MODE       1         6 dB BANDWIDTH       1         99% & 26 dB BANDWIDTH       1         OUTPUT POWER       1         AVERAGE POWER       1         POWER SPECTRAL DENSITY       2         CONDUCTED SPURIOUS EMISSIONS       2         2.4 GHz BAND CHANNEL TESTS FOR 802.11g MODE       3	12 12 15 18 25 26 29 33
7	.1. 7.1.2 7.1.3 7.1.4 7.1.5 7.1.6 .2. 7.2.1 7.2.2	ENNA PORT TEST RESULTS       1         2.4 GHz BAND CHANNEL TESTS FOR 802.11b MODE       1         6 dB BANDWIDTH       1         99% & 26 dB BANDWIDTH       1         OUTPUT POWER       1         AVERAGE POWER       1         POWER SPECTRAL DENSITY       2         CONDUCTED SPURIOUS EMISSIONS       2         2.4 GHz BAND CHANNEL TESTS FOR 802.11g MODE       3         6 dB BANDWIDTH       3         99% & 26 dB BANDWIDTH       3	12 12 15 18 25 29 33 33 36
7	.1. 7.1.1 7.1.2 7.1.3 7.1.4 7.1.5 7.1.6 .2. 7.2.1 7.2.2 7.2.3	ENNA PORT TEST RESULTS12.4 GHz BAND CHANNEL TESTS FOR 802.11b MODE16 dB BANDWIDTH199% & 26 dB BANDWIDTH10UTPUT POWER1AVERAGE POWER2POWER SPECTRAL DENSITY2CONDUCTED SPURIOUS EMISSIONS22.4 GHz BAND CHANNEL TESTS FOR 802.11g MODE36 dB BANDWIDTH399% & 26 dB BANDWIDTH30UTPUT POWER30UTPUT POWER3	12 12 15 18 25 26 29 33 36 39
7	.1. 7.1.1 7.1.2 7.1.3 7.1.4 7.1.5 7.1.6 7.2.1 7.2.2 7.2.3 7.2.4	ENNA PORT TEST RESULTS       1         2.4 GHz BAND CHANNEL TESTS FOR 802.11b MODE       1         6 dB BANDWIDTH       1         99% & 26 dB BANDWIDTH       1         OUTPUT POWER       1         AVERAGE POWER       2         POWER SPECTRAL DENSITY       2         CONDUCTED SPURIOUS EMISSIONS       2         2.4 GHz BAND CHANNEL TESTS FOR 802.11g MODE       3         6 dB BANDWIDTH       3         99% & 26 dB BANDWIDTH       3         OUTPUT POWER       3         AVERAGE POWER       3	<i>12</i> 12 15 18 25 29 33 36 39 46
7	7.1.1 7.1.2 7.1.3 7.1.4 7.1.5 7.1.6 7.2.1 7.2.2 7.2.3 7.2.4 7.2.5	ENNA PORT TEST RESULTS       1         2.4 GHz BAND CHANNEL TESTS FOR 802.11b MODE       1         6 dB BANDWIDTH       1         99% & 26 dB BANDWIDTH       1         OUTPUT POWER       1         AVERAGE POWER       2         POWER SPECTRAL DENSITY       2         CONDUCTED SPURIOUS EMISSIONS       2         2.4 GHz BAND CHANNEL TESTS FOR 802.11g MODE       3         6 dB BANDWIDTH       3         99% & 26 dB BANDWIDTH       3         OUTPUT POWER       3         AVERAGE POWER       3         AVERAGE POWER       3         OUTPUT POWER       3         99% & 26 dB BANDWIDTH       3         99% & 26 dB BANDWIDTH       3         OUTPUT POWER       3         POWER SPECTRAL DENSITY       3         OUTPUT POWER       3         AVERAGE POWER       4         POWER SPECTRAL DENSITY       4	12 15 15 26 29 33 36 39 46 47
7	7.1.1 7.1.2 7.1.3 7.1.4 7.1.5 7.1.6 7.2.1 7.2.2 7.2.3 7.2.4 7.2.5 7.2.6	ENNA PORT TEST RESULTS12.4 GHz BAND CHANNEL TESTS FOR 802.11b MODE16 dB BANDWIDTH199% & 26 dB BANDWIDTH10UTPUT POWER1AVERAGE POWER2POWER SPECTRAL DENSITY2CONDUCTED SPURIOUS EMISSIONS22.4 GHz BAND CHANNEL TESTS FOR 802.11g MODE36 dB BANDWIDTH399% & 26 dB BANDWIDTH399% & 26 dB BANDWIDTH30UTPUT POWER3AVERAGE POWER4OUTPUT POWER3OUTPUT POWER3AVERAGE POWER4CONDUCTED SPURIOUS EMISSIONS4CONDUCTED SPURIOUS EMISSIONS4	12 15 15 26 29 33 36 39 46 47 50
7	7.1.1 7.1.2 7.1.3 7.1.4 7.1.5 7.1.6 7.2.1 7.2.2 7.2.3 7.2.4 7.2.5	ENNA PORT TEST RESULTS       1         2.4 GHz BAND CHANNEL TESTS FOR 802.11b MODE       1         6 dB BANDWIDTH       1         99% & 26 dB BANDWIDTH       1         OUTPUT POWER       1         AVERAGE POWER       2         POWER SPECTRAL DENSITY       2         CONDUCTED SPURIOUS EMISSIONS       2         2.4 GHz BAND CHANNEL TESTS FOR 802.11g MODE       3         6 dB BANDWIDTH       3         99% & 26 dB BANDWIDTH       3         OUTPUT POWER       3         AVERAGE POWER       3         6 dB BANDWIDTH       3         99% & 26 dB BANDWIDTH       3         OUTPUT POWER       3         AVERAGE POWER       4         POWER SPECTRAL DENSITY       4         CONDUCTED SPURIOUS EMISSIONS       5         2.4 GHz BAND CHANNEL TESTS FOR 802.11n HT20 MODE       5         2.4 GHz BAND CHANNEL TESTS FOR 802.11n HT20 MODE       5         6 dB BANDWIDTH       5	<i>12</i> 15 18 22 33 33 39 46 75 54
7	7.1.1 7.1.2 7.1.3 7.1.4 7.1.5 7.1.6 7.2.1 7.2.2 7.2.3 7.2.4 7.2.5 7.2.6 7.2.6 7.3.1 7.3.1 7.3.2	ENNA PORT TEST RESULTS       1         2.4 GHz BAND CHANNEL TESTS FOR 802.11b MODE       1         6 dB BANDWIDTH       1         99% & 26 dB BANDWIDTH       1         OUTPUT POWER       1         AVERAGE POWER       2         POWER SPECTRAL DENSITY       2         CONDUCTED SPURIOUS EMISSIONS       2         2.4 GHz BAND CHANNEL TESTS FOR 802.11g MODE       3         6 dB BANDWIDTH       3         99% & 26 dB BANDWIDTH       3         99% & 26 dB BANDWIDTH       3         OUTPUT POWER       3         AVERAGE POWER       4         OUTPUT POWER       3         6 dB BANDWIDTH       3         99% & 26 dB BANDWIDTH       3         99% & 26 dB BANDWIDTH       3         99% & 26 dB BANDWIDTH       3         2       4         OUTPUT POWER       4         AVERAGE POWER       4         POWER SPECTRAL DENSITY       4         CONDUCTED SPURIOUS EMISSIONS       5         2.4 GHz BAND CHANNEL TESTS FOR 802.11n HT20 MODE       5         2.4 GHz BAND CHANNEL TESTS FOR 802.11n HT20 MODE       5         99% & 26 dB BANDWIDTH       5         99% & 26 dB BANDWIDTH	<i>12</i> 12 15 18 22 33 36 36 47 57 57 57 57 57 57 57 57 57 5
7	7.1.1 7.1.2 7.1.3 7.1.4 7.1.5 7.1.6 7.2.1 7.2.2 7.2.3 7.2.4 7.2.5 7.2.6 7.2.6 7.3.1 7.3.2 7.3.1 7.3.2 7.3.3	ENNA PORT TEST RESULTS       1         2.4 GHz BAND CHANNEL TESTS FOR 802.11b MODE       1         6 dB BANDWIDTH       1         99% & 26 dB BANDWIDTH       1         OUTPUT POWER       1         AVERAGE POWER       2         POWER SPECTRAL DENSITY       2         CONDUCTED SPURIOUS EMISSIONS       2         2.4 GHz BAND CHANNEL TESTS FOR 802.11g MODE       3         6 dB BANDWIDTH       3         99% & 26 dB BANDWIDTH       3         2.4 GHz BAND CHANNEL TESTS FOR 802.11n HT20 MODE       5         2.4 GHz BAND CHANNEL TESTS FOR 802.11n HT20 MODE       5         99% & 26 dB BANDWIDTH       5 <td>12         13         14         15         15         16         17         17         17         17         17         17         18         17         17         18         17         17         18         17         17         18         17</td>	12         13         14         15         15         16         17         17         17         17         17         17         18         17         17         18         17         17         18         17         17         18         17
7	.1. 7.1.1 7.1.2 7.1.3 7.1.4 7.1.5 7.1.6 7.2.1 7.2.2 7.2.3 7.2.4 7.2.5 7.2.6 7.2.6 7.2.6 7.3.1 7.3.2 7.3.3 7.3.4	ENNA PORT TEST RESULTS       1         2.4 GHz BAND CHANNEL TESTS FOR 802.11b MODE       1         6 dB BANDWIDTH       1         99% & 26 dB BANDWIDTH       1         OUTPUT POWER       1         AVERAGE POWER       2         POWER SPECTRAL DENSITY       2         CONDUCTED SPURIOUS EMISSIONS       2         2.4 GHz BAND CHANNEL TESTS FOR 802.11g MODE       3         6 dB BANDWIDTH       3         99% & 26 dB BANDWIDTH       3         OUTPUT POWER       4         POWER SPECTRAL DENSITY       4         CONDUCTED SPURIOUS EMISSIONS       5         2.4 GHz BAND CHANNEL TESTS FOR 802.11n HT20 MODE       5         2.4 GHz BAND CHANNEL TESTS FOR 802.11n HT20 MODE       5         2.4 GHz BAND CHANNEL TESTS FOR 802.11n HT20 MODE       5         2.4 GHz BAND CHANNEL TESTS FOR 802.11n HT20 MODE       5         2.4 GHZ BAND CHANNEL TESTS FOR 802.11n HT20 MODE       5         3.4 GHZ BAND CHANNEL TESTS FOR 802.11n HT20 MODE       5         3.4 GHZ	12         12         15         12         15
7	7.1.1 7.1.2 7.1.3 7.1.4 7.1.5 7.1.6 7.2.1 7.2.2 7.2.3 7.2.4 7.2.5 7.2.6 7.2.6 7.3.1 7.3.2 7.3.1 7.3.2 7.3.3	ENNA PORT TEST RESULTS       1         2.4 GHz BAND CHANNEL TESTS FOR 802.11b MODE       1         99% & 26 dB BANDWIDTH       1         99% & 26 dB BANDWIDTH       1         OUTPUT POWER       1         AVERAGE POWER       2         POWER SPECTRAL DENSITY       2         CONDUCTED SPURIOUS EMISSIONS       2         2.4 GHz BAND CHANNEL TESTS FOR 802.11g MODE       3         6 dB BANDWIDTH       3         99% & 26 dB BANDWIDTH       3         OUTPUT POWER       3         AVERAGE POWER       4         POWER SPECTRAL DENSITY       4         CONDUCTED SPURIOUS EMISSIONS       5         2.4 GHz BAND CHANNEL TESTS FOR 802.11n HT20 MODE       5         2.4 GHz BAND CHANNEL TESTS FOR 802.11n HT20 MODE       5         6 dB BANDWIDTH       5         99% & 26 dB BANDWIDTH       5 </td <td>12         13         14         15         15         16         17         17         17         18         17         18         18         18         18         18         18         18         18         18         18         18         18</td>	12         13         14         15         15         16         17         17         17         18         17         18         18         18         18         18         18         18         18         18         18         18         18
7 7 7 7	7.1.1 7.1.2 7.1.3 7.1.4 7.1.5 7.1.6 7.2.1 7.2.2 7.2.3 7.2.4 7.2.5 7.2.6 7.3.1 7.3.2 7.3.1 7.3.2 7.3.3 7.3.4 7.3.5	ENNA PORT TEST RESULTS       1         2.4 GHz BAND CHANNEL TESTS FOR 802.11b MODE       1         6 dB BANDWIDTH       1         99% & 26 dB BANDWIDTH       1         OUTPUT POWER       1         AVERAGE POWER       2         POWER SPECTRAL DENSITY       2         CONDUCTED SPURIOUS EMISSIONS       2         2.4 GHz BAND CHANNEL TESTS FOR 802.11g MODE       3         6 dB BANDWIDTH       3         99% & 26 dB BANDWIDTH       3         OUTPUT POWER       4         POWER SPECTRAL DENSITY       4         CONDUCTED SPURIOUS EMISSIONS       5         2.4 GHz BAND CHANNEL TESTS FOR 802.11n HT20 MODE       5         2.4 GHz BAND CHANNEL TESTS FOR 802.11n HT20 MODE       5         2.4 GHz BAND CHANNEL TESTS FOR 802.11n HT20 MODE       5         2.4 GHz BAND CHANNEL TESTS FOR 802.11n HT20 MODE       5         2.4 GHZ BAND CHANNEL TESTS FOR 802.11n HT20 MODE       5         3.4 GHZ BAND CHANNEL TESTS FOR 802.11n HT20 MODE       5         3.4 GHZ	12         15         16         17         17         17         17         17         17         17         17         17         18         17         17         17         17         17         17         17         17         17         17         17         18         17         17         18         17         17         17         18         17         17         17

7.3.6.	CONDUCTED SPURIOUS EMISSIONS	.71
7.4. 2.4 7.4.1. 7.4.2. 7.4.3.	GHz BAND CHANNEL TESTS FOR 802.11n HT40 MODE 6 dB BANDWIDTH 99% & 26 dB BANDWIDTH OUTPUT POWER	.75 .78
7.4.4. 7.4.5. 7.4.6.	AVERAGE POWER POWER SPECTRAL DENSITY CONDUCTED SPURIOUS EMISSIONS	.89
7.5. 5.8 7.5.1. 7.5.2. 7.5.3. 7.5.4. 7.5.5.	GHz BAND CHANNEL TESTS FOR 802.11a MODE 6 dB BANDWIDTH	.96 .99 102 109
7.5.6. 7.6. 5.8	CONDUCTED SPURIOUS EMISSIONS	
7.6.1. 7.6.2. 7.6.3. 7.6.4. 7.6.5. 7.6.6.	6 dB BANDWIDTH	117 120 123 130 131
7.7. 5.8 7.7.1. 7.7.2. 7.7.3. 7.7.4. 7.7.5. 7.7.6.	GHz BAND CHANNEL TESTS FOR 802.11n HT40 MODE       1         6 dB BANDWIDTH       1         99% & 26 dB BANDWIDTH       1         OUTPUT POWER       1         AVERAGE POWER       1         POWER SPECTRAL DENSITY       1         CONDUCTED SPURIOUS EMISSIONS       1	138 140 142 147 148
7.8. RE	CEIVER CONDUCTED SPURIOUS EMISSIONS1	153
8. RADIAT	ED TEST RESULTS1	56
8.1. LIN	IITS AND PROCEDURE	156
8.2. TR. 8.2.1. 8.2.2. 8.2.3. 8.2.4. 8.2.5. 8.2.6. 8.2.7.	ANSMITTER ABOVE 1 GHz       1         802.11b MODE IN THE 2.4 GHz BAND       1         802.11g MODE IN THE 2.4 GHz BAND       1         802.11n HT20 MODE IN THE 2.4 GHz BAND       1         802.11n HT40 MODE IN THE 2.4 GHz BAND       1         802.11n HT40 MODE IN THE 2.4 GHz BAND       1         802.11n HT40 MODE IN THE 5.8 GHz BAND       1         802.11n HT40 MODE IN THE 5.8 GHz BAND       1         802.11n HT20 MODE IN THE 5.8 GHz BAND       1         802.11n HT20 MODE IN THE 5.8 GHz BAND       1         802.11n HT40 MODE IN THE 5.8 GHz BAND       1	157 162 167 172 177 178
8.3. WC	DRST-CASE BELOW 1 GHz1	180
9. AC POW	/ER LINE CONDUCTED EMISSIONS1	82
10. MAXI	MUM PERMISSIBLE EXPOSURE1	88
11. SETU	Р РНОТОЅ1	91

Page 4 of 193

# **1. ATTESTATION OF TEST RESULTS**

COMPANY NAME:	QUALCOMM INC. 3165 KIFER RD SANTA CLARA, CA 95051 USA
EUT DESCRIPTION:	DC544D_2 PCIe DAUGHTER CARD FOR 2.4 / 5 GHz AP/ROUTER APPLICATIONS_DFS
MODEL:	65-VN780-P2
SERIAL NUMBER:	7916 for Antenna Port, 7929 for Radiated Emission, and 02324 for DFS 9021 for the additional testing for EUT with rectangular shield
DATE TESTED:	JUNE 24 – JULY 17, 2009 JANUARY 28 – FEBRUARY 12, 2010 MARCH 24 – MARCH 25, 2010

APPLICABLE STANDARDS					
STANDARD	TEST RESULTS				
CFR 47 Part 15 Subpart C	Pass				
INDUSTRY CANADA RSS-210 Issue 7 Annex 8	Pass				
INDUSTRY CANADA RSS-GEN Issue 2	Pass				

Compliance Certification Services, Inc. (CCS) tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by CCS based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

**Note:** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by CCS and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by CCS will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Approved & Released For CCS By:

FRANK IBRAHIM EMC SUPERVISOR COMPLIANCE CERTIFICATION SERVICES Tested By:

VIEN TRAN EMC ENGINEER COMPLIANCE CERTIFICATION SERVICES

Page 5 of 193

COMPLIANCE CERTIFICATION SERVICES FORM NO: CCSUP4701C 47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888 This report shall not be reproduced except in full, without the written approval of CCS.

# 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4-2003, FCC CFR 47 Part 2, FCC CFR 47 Part 15, RSS-GEN Issue 2, and RSS-210 Issue 7.

# 3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 Benicia Street, Fremont, California, USA.

CCS is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at <u>http://www.ccsemc.com</u>.

# 4. CALIBRATION AND UNCERTAINTY

# 4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

# 4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB) 36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

## 4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	3.52 dB
Radiated Disturbance, 30 to 1000 MHz	4.94 dB

Uncertainty figures are valid to a confidence level of 95%.

Page 6 of 193

# 5. EQUIPMENT UNDER TEST

## 5.1. DESCRIPTION OF EUT

The EUT is an 802.11a/b/g/n WLAN transceiver module in a PCI form factor, for 2.4 / 5 GHz AP/Router Applications that include DFS bands. It is equipped with four identical transmitter / receiver chains.

The radio module is manufactured by Qualcomm, Inc.

### 5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum peak conducted output power as follows:

Frequency Range	Mode	Output Power	Output Power	
(MHz)		(dBm)	(mW)	
2.4 GHz BAND				
2412 - 2462	802.11b	26.92	492.04	
2412 - 2462	802.11g	27.26	532.11	
2412 - 2462	802.11n HT20	27.07	509.33	
2422 - 2452	802.11n HT40	27.46	557.19	
5.8 GHz BAND				
5745 - 5825	802.11a	26.85	484.17	
5745 - 5825	802.11n HT20	27.91	618.02	
5755 - 5795	802.11n HT40	27.91	618.02	

### 5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a dual band omni monopole (4 identical) antenna, each with a maximum gain of 2 dBi in the 2.4 GHz band and 3 dBi in the 5.8 GHz band.

For the 802.11a/b/g legacy modes the effective legacy antenna gain is:

		Effective Legacy Gain	
(dBi)	(dB)	(dBi)	
2	6.02	8.02	
3	6.02	9.02	

Page 7 of 193

### 5.4. SOFTWARE AND FIRMWARE

The EUT driver software installed during testing was Qualcomm, rev. 0.0.500.5.

The test utility software used during emissions testing was PTT Gui, rev. 5.1.

### 5.5. WORST-CASE CONFIGURATION AND MODE

The EUT was tested as an external module installed in a test jig board connected to a host Laptop PC.

Worst-Case data rates were utilized from preliminary testing of the Chipset, worst-case data rates used during the testing are as follows:

802.11b Mode (20 MHz BW operation): 1 Mbps, CCK.
802.11g Mode (20 MHz BW operation): 6 Mbps, OFDM.
802.11n MIMO HT20 Mode: MCS31, 260 Mbps, 4 Spatial Streams.
802.11n MIMO HT40 Mode: MCS31, 540 Mbps, 4 Spatial Streams.

Worst-case mode and channel used for 30-1000 MHz radiated and power line conducted emissions was the mode and channel with the highest output power, that was determined to be 11g mode, mid channel.

For bandwidth measurement preliminary testing showed that there is no significant difference among different chains, so the measurements were performed using Chain 0.

For conducted spurious measurement preliminary testing showed that combiner is worst-case compared to individual chains; therefore final measurements were performed using combiner for all channels and modes.

For PSD measurement preliminary testing showed that combiner is worst-case compared to individual chains; therefore final measurements were performed using combiner for all channels and modes.

For Radiated Band Edge measurements preliminary testing showed that the worst case was vertical polarization, so final measurements were performed with vertical polarization.

## 5.6. MODIFICATIONS

The EUT was modified during the project, as follows:

A shield was added to the bottom side of the PCB to meet ETSI receiver spurious limits. This shield was subsequently incorporated into all versions of this radio module.

## 5.7. TEST RESULTS FOR MODIFIED SAMPLE

As a result of the shield modification, the original data was analyzed to find worst-case modes and margins, then preliminary tests were performed to determine where additional final testing was required. This report is updated with all new final measurements that show degraded performance compared to the original configuration.

# 5.8. DESCRIPTION OF TEST SETUP

#### SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST							
Description	FCC ID						
Laptop	IBM	T43 ThinkPad	L3-XDLXW06/02	DoC			
AC Adapter	IBM	08K8204	11S08K8204Z1Z9	DoC			
DC Power Supply	Tektronic	PS2521G	N/A	N/A			
DC Power Supply	HP	336108	KR24104150	N/A			
Extender PCI	ALLION	V1 EC-PEM V1.0	A073	N/A			

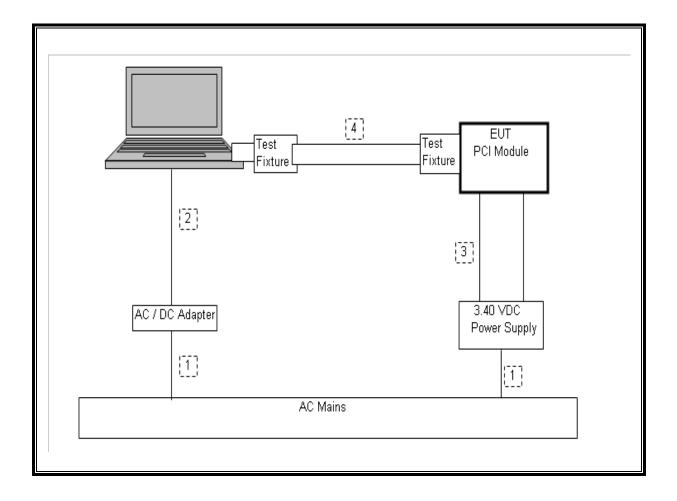
#### I/O CABLES

	I/O CABLE LIST								
Cable No.	Port	# of Identical Ports	Connecto Type	Cable Type	Cable Length	Remarks			
1	AC	2	US115	Un-shielded	1.5 m	For laptop			
2	DC	1	DC	Un-shielded	1.5 m	For laptop			
3	DC	1	Cable	Un-shielded	1.0 m	For EUT			
4	Ribbon	1	Ribbon	Un-shielded	.4 m	Test Fixture			

#### TEST SETUP

The EUT is connected to a host laptop computer via a test fixture during the tests. Test software exercised the radio card.

#### **SETUP DIAGRAM FOR TESTS**



Page 10 of 193

# 6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

TEST EQUIPMENT LIST								
Description Manufacturer Model Asset Cal Date Cal Due								
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01069	01/05/09	01/05/10			
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01011	01/14/09	01/14/10			
Antenna, Horn, 18 GHz	EMCO	3115	C00945	04/22/09	04/22/10			
Antenna, Horn, 26.5 GHz	ARA	MWH-1826/B	C00589	09/29/08	11/28/09			
Antenna, Horn, 40 GHz	ARA	MWH-2640B	C00981	05/21/09	05/21/10			
Preamplifier, 40 GHz	Miteq	NSP4000-SP2	C00990	10/11/08	10/11/09			
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00885	03/31/09	03/31/10			
Preamplifier, 1-26GHz	Agilent / HP	8449B	C01052	08/05/08	08/05/09			
Peak Power Meter	Boonton	4541	C01186	01/19/09	01/19/10			
Peak Power Sensor	Boonton	4541	C01189	01/15/09	01/15/10			
LISN, 30 MHz	FCC	LISN-50/250-25-2	N02625	10/29/08	10/29/09			
EMI Test Receiver, 30 MHz	R&S	ESHS 20	N02396	02/06/08	08/06/09			

The following test and measurement equipment was utilized for the additional tests with the modified shield:

	TEST E	EQUIPMENT LIST			
Description	Manufacturer	Model	Asset	Cal Date	Cal Due
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01159	11/07/08	02/07/11
Antenna, Horn, 18 GHz	EMCO	3115	C00945	04/22/08	04/22/10
Preamplifier	Agilent / HP	8449B	C01052	02/04/09	02/04/11
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01011	01/14/09	01/14/11
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00885	12/16/08	12/16/10

Page 11 of 193

# 7. ANTENNA PORT TEST RESULTS

## 7.1. 2.4 GHz BAND CHANNEL TESTS FOR 802.11b MODE

### 7.1.1.6 dB BANDWIDTH

#### LIMITS

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

The minimum 6 dB bandwidth shall be at least 500 kHz.

#### TEST PROCEDURE

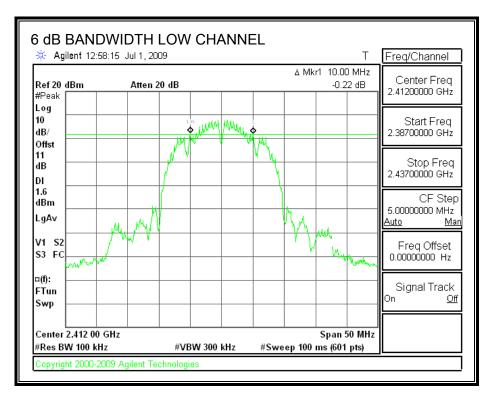
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

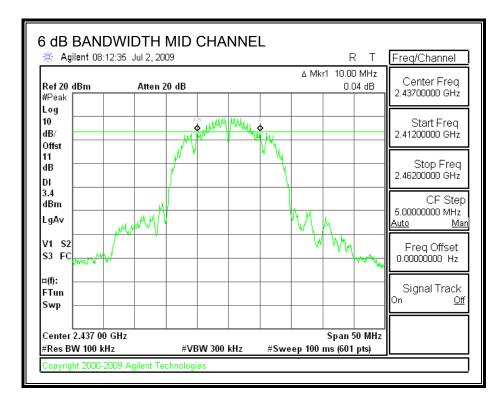
#### <u>RESULTS</u>

Channel	Frequency	6 dB BW	Minimum Limit
	(MHz)	(MHz)	(MHz)
Low	2412	10.00	0.5
Middle	2437	10.00	0.5
High	2462	9.00	0.5

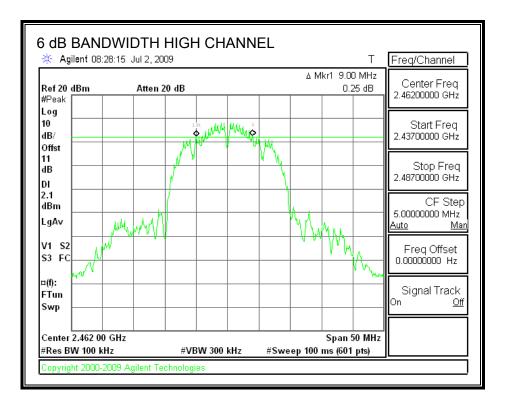
Page 12 of 193

#### 6 dB BANDWIDTH





Page 13 of 193



Page 14 of 193

### 7.1.2. 99% & 26 dB BANDWIDTH

#### LIMITS

None; for reporting purposes only.

#### TEST PROCEDURE

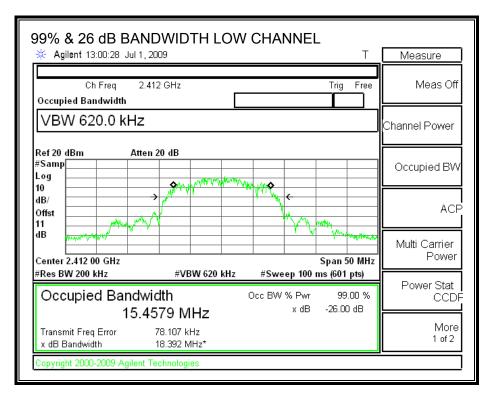
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth measurement function is utilized.

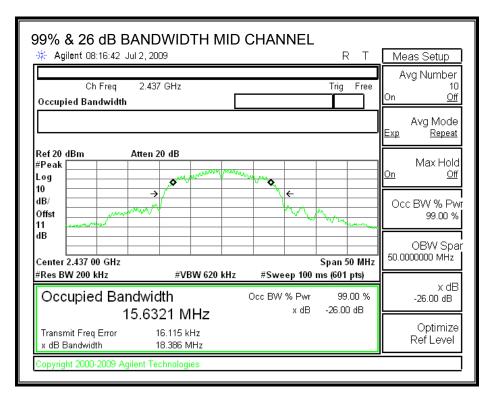
#### **RESULTS**

Channel	Frequency	99% OBW	26 dB BW
	(MHz)	(MHz)	(MHz)
Low	2412	15.46	18.39
Middle	2437	15.63	18.39
High	2462	15.61	18.45

Page 15 of 193

#### 99% & 26 dB BANDWIDTH





Page 16 of 193

99% & 26 dB BANDWIDTH HIGH CHANNEL	BW/Avg
Ch Freq 2.462 GHz Trig Free	Res BW 200.0 kHz Auto <u>Man</u>
Ref 20 dBm Atten 20 dB	Video BW 620.0 kHz <u>Auto Man</u> VBW/RBW 3.00000
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Auto <u>Man</u> Average 10 On <u>Off</u>
	Avg/VBW Type Log-Pwr (Video) ► <u>Auto Man</u>
Occupied Bandwidth         Occ BW % Pwr         99.00 %           15.6128 MHz         x dB         -26.00 dB           Transmit Freq Error         151.036 kHz         x dB           x dB Bandwidth         18.448 MHz         -26.00 dB	Span/RBW 106 <u>Auto Man</u>
Copyright 2000-2009 Agilent Technologies	

Page 17 of 193

### 7.1.3. OUTPUT POWER

#### LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

#### TEST PROCEDURE

Output power was measured based on the use of RMS averaging over a time interval in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

#### **RESULTS**

Effective Legacy Mode Composite Gain of 4 Identical Antennas:

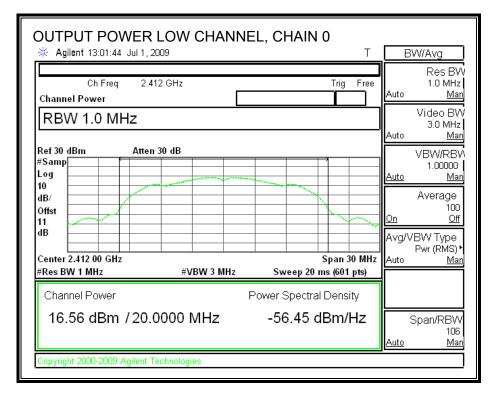
Antenna Gain	10 Log (# Tx Chains)	Effective Legacy Gain
(dBi)	(dB)	(dBi)
2	6.02	8.02

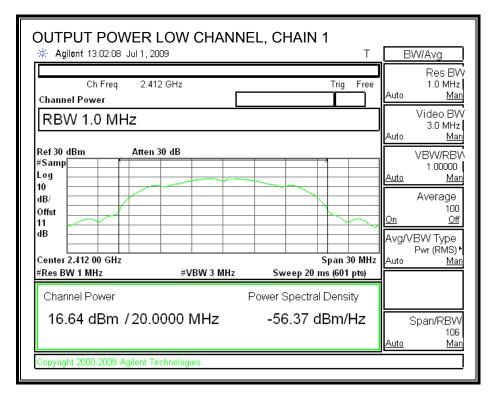
The composite antenna gain is 8.02 dBi, therefore the limit is 27.98 dBm.

Channel	Frequency	Chain 0	Chain 1	Chain 2	Chain 3	Total	Limit	Margin
		Power	Power	Power	Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	2412	16.56	16.64	16.57	16.55	22.60	27.98	-5.38
Mid	2437	21.01	20.83	20.94	20.80	26.92	27.98	-1.06
High	2462	16.70	16.80	16.79	16.65	22.76	27.98	-5.22

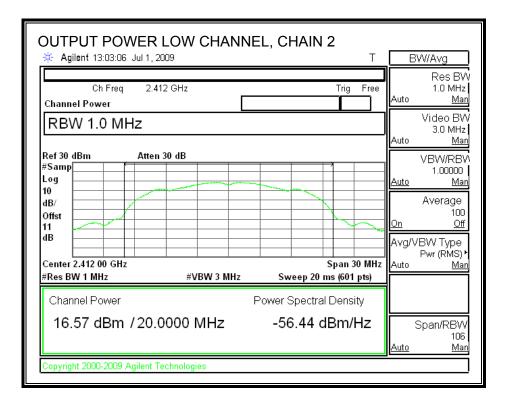
Page 18 of 193

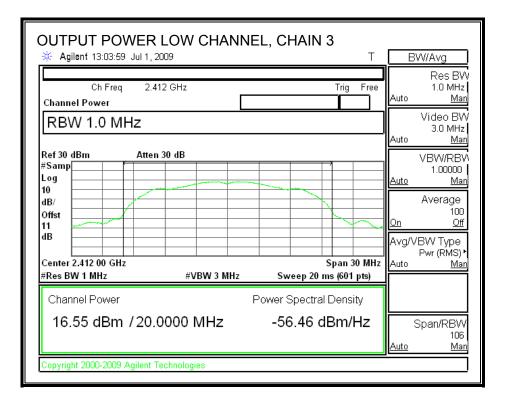
#### **OUTPUT POWER, LOW CHANNEL**





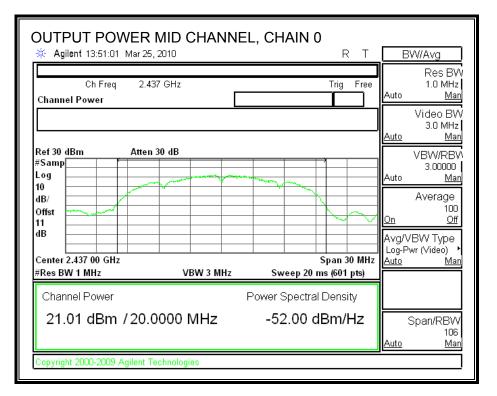
Page 19 of 193

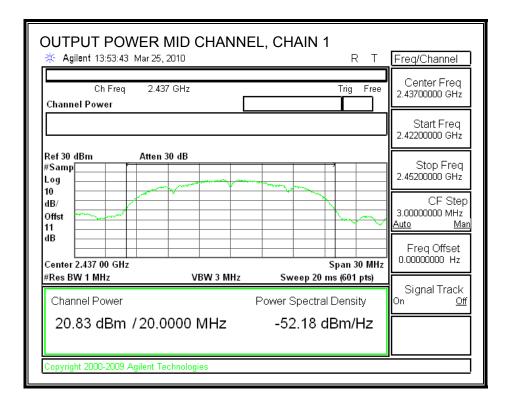




Page 20 of 193

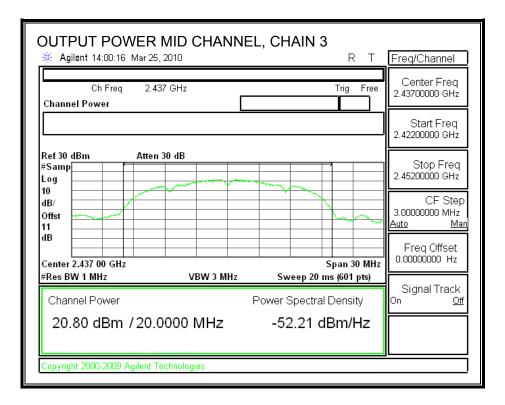
#### **OUTPUT POWER, MID CHANNEL**





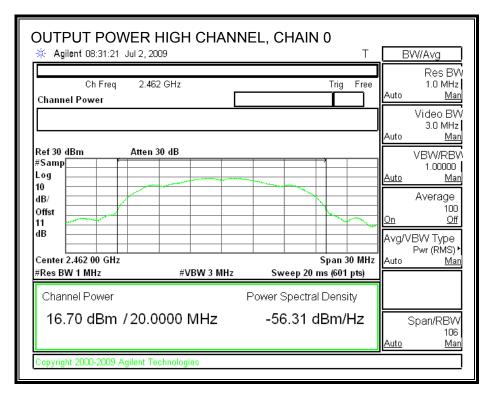
Page 21 of 193

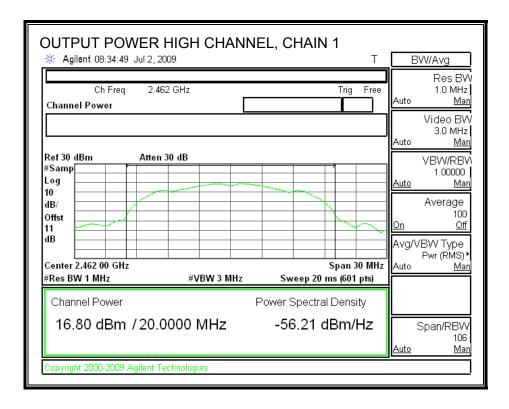
		,	
Agilent         13:58:01         Mar 25, 3           Ch         Ch         Freq         2.437           Channel Power         Channel Power         Channel Power	7 GHz	R T	Center Freq 2.43700000 GHz
		J	Start Freq 2.42200000 GHz
Ref 30 dBm Atten 3 #Samp Log 10	0 dB		Stop Freq 2.45200000 GHz CF Step
dB/ Offst 11 dB			3.00000000 MHz Auto Man Freq Offset
Center 2.437 00 GHz #Res BW 1 MHz	VBW 3 MHz	Span 30 MHz Sweep 20 ms (601 pts)	
Channel Power 20.94 dBm /20.0		Power Spectral Density -52.07 dBm/Hz	On <u>Off</u>
Copyright 2000-2009 Agilent Te	chnologies		



Page 22 of 193

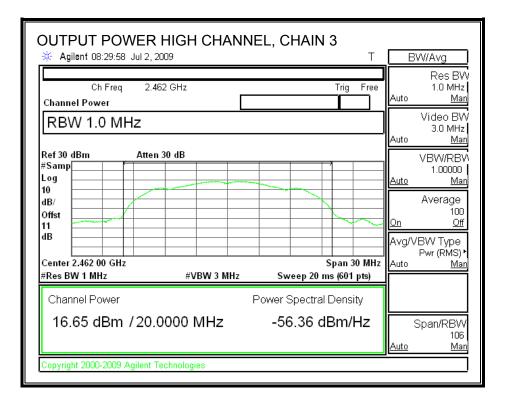
#### **OUTPUT POWER, HIGH CHANNEL**





Page 23 of 193

🎋 Agilent 08:36:01 Jul 2, 2009	T BW/Avg
Ch Freq 2.462 GHz Channel Power	Trig Free 1.0 MH
	Video B 3.0 MH Auto <u>M</u>
Ref 30 dBm         Atten 30 dB           Samp	VBW/RE 1.0000 Auto M Average
Dffst	Avg/VBW Type Pwr (RMS
Center 2.462 00 GHz {Res BW 1 MHz #VBW 3 MH:	Span 30 MHz Auto <u>M</u> Sweep 20 ms (601 pts)
Channel Power	ower Spectral Density
16.79 dBm / 20.0000 MHz	-56.22 dBm/Hz



Page 24 of 193

### 7.1.4. AVERAGE POWER

#### LIMITS

None; for reporting purposes only.

#### TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 11 dB (including 10 dB pad and 1 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

#### **RESULTS**

Channel	Frequency	Chain 0	Chain 1	Chain 2	Chain 3
		Power	Power	Power	Power
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)
Low	2412	16.54	16.67	16.65	16.50
Middle	2437	20.90	20.75	20.83	20.65
High	2462	16.69	16.88	16.68	16.77

Page 25 of 193

### 7.1.5. POWER SPECTRAL DENSITY

#### <u>LIMITS</u>

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

#### TEST PROCEDURE

Output power was measured based on the use of RMS averaging over a time interval, therefore the power spectral density was measured using PSD Option 2 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

Preliminary tests on individual chains, and on all chains with a combiner, were performed. The worst-case configuration was with a combiner, therefore final test were performed with all chains feeding a combiner.

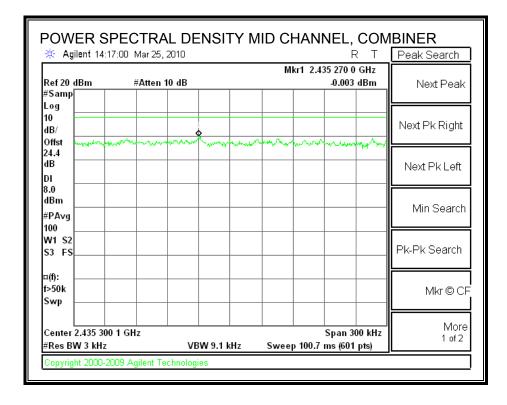
#### **RESULTS**

Channel	Frequency	PSD with Combiner	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	2412	-9.547	8	-17.55
Middle	2437	-0.003	8	-8.00
High	2462	-7.006	8	-15.01

Page 26 of 193

#### **POWER SPECTRAL DENSITY**

R Aglient 07:22	2:18 Jul 10, 2009			RT		W/Avg
tef 20 dBm Samp	Atten 10 dB		Mkr1 2.4	14 224 7 GHz -9.547 dBm	Auto	Res B∖ 3.0 kHz <u>Ma</u>
og 0  B/					Auto	Video BV 9.1 kHz <u>Ma</u>
N	and the second second second	and the second		and the and the and the state	Auto	VBW/RB 3.00000 <u>Ma</u>
.0 Bm PAvg 00					<u>On</u>	Average 100 <u>Of</u>
V1 S2 i3 FS AA						BW Type Pwr (RMS) <u>Ma</u>
(f): >50k swp					-	
Center 2.414 150 Res BW 3 kHz		BW 9.1 kHz	Sweep 100.7	Span 300 kHz ms (601 nts)	Auto	Span/RBV 108 Ma



Page 27 of 193

🔆 Agilent 07:29	:57 Jul 10, 2009			RT	BW/Avg
Project: Ref 20 dBm #Samp	Atten 10 dB		Mkr1 2.4	60 447 4 GHz -7.006 dBm	Res E 3.0 kH Auto <u>M</u>
Log 10 dB/ Offst	1				Video E 9.1 kł Auto <u>M</u>
dB DI			And and a second second		VBW/RI 1.0000 Auto M
8.0 dBm					Averag
#PAvg 100 W1 S2					On <u>(</u> Avg/VBW Typ
\$3 FS					Pwr (RMS Auto <u>N</u>
¤(f): f>50k Swp					
Center 2.460 500	0 GHz			Span 300 kHz	Span/RB
#Res BW 3 kHz		/ 9.1 kHz	Sweep 100.7	•	Auto N

Page 28 of 193

### 7.1.6. CONDUCTED SPURIOUS EMISSIONS

#### <u>LIMITS</u>

FCC §15.247 (d)

IC RSS-210 A8.5

Output power was measured based on the use of RMS averaging over a time interval, therefore the required attenuation is 30 dBc.

#### TEST PROCEDURE

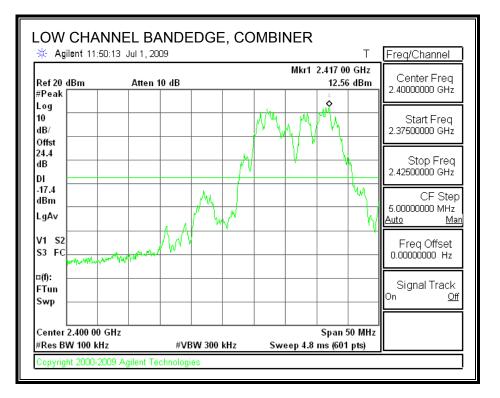
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

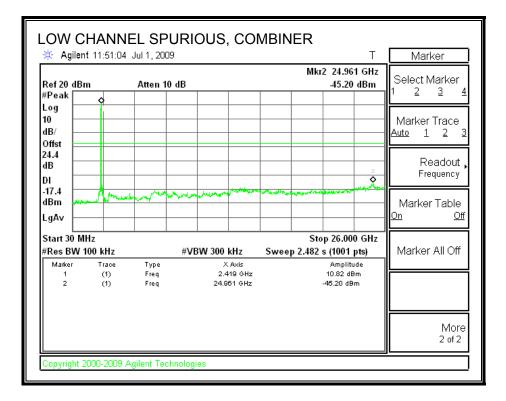
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

Preliminary tests on individual chains, and on all chains with a combiner, were performed. The worst-case configuration was with a combiner, therefore final test were performed with all chains feeding a combiner.

Page 29 of 193

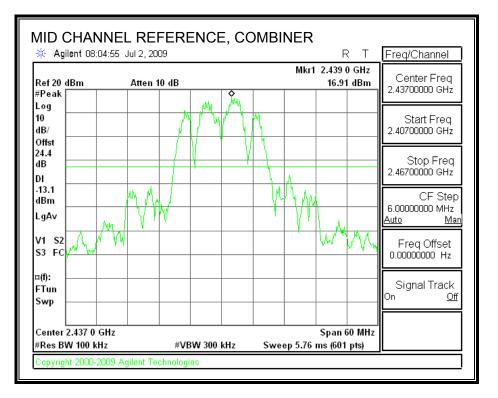
#### LOW CHANNEL SPURIOUS EMISSIONS

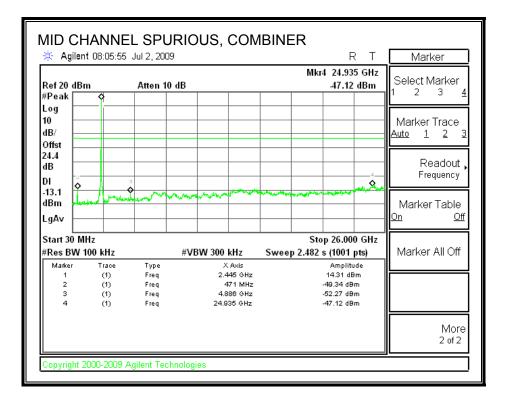




Page 30 of 193

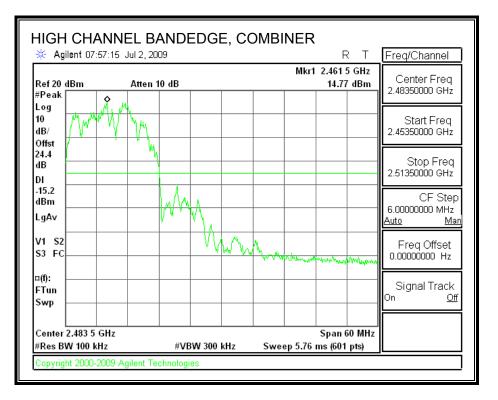
#### MID CHANNEL SPURIOUS EMISSIONS

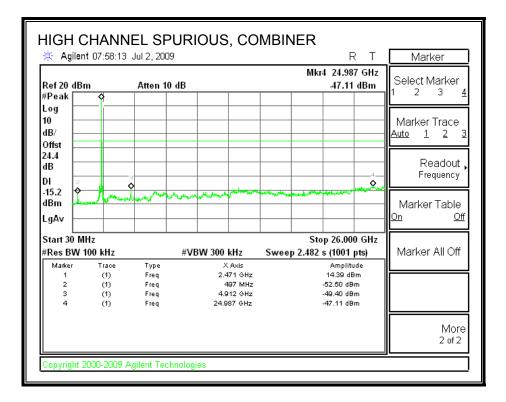




Page 31 of 193

#### HIGH CHANNEL SPURIOUS EMISSIONS





Page 32 of 193

## 7.2. 2.4 GHz BAND CHANNEL TESTS FOR 802.11g MODE

### 7.2.1. 6 dB BANDWIDTH

#### **LIMITS**

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

The minimum 6 dB bandwidth shall be at least 500 kHz.

#### TEST PROCEDURE

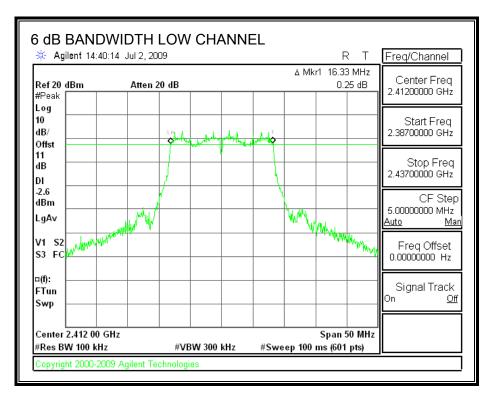
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

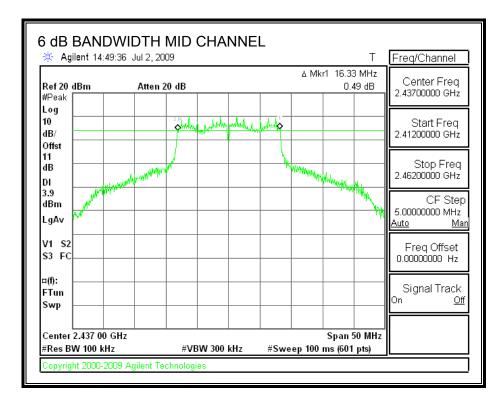
#### **RESULTS**

Channel	Frequency	6 dB BW	Minimum Limit
	(MHz)	(MHz)	(MHz)
Low	2412	16.33	0.5
Middle	2437	16.33	0.5
High	2462	16.33	0.5

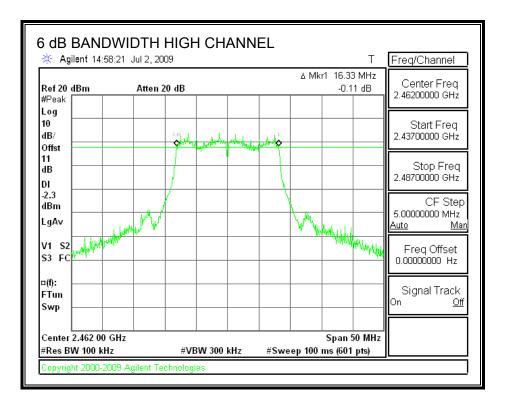
Page 33 of 193

#### 6 dB BANDWIDTH





Page 34 of 193



Page 35 of 193

### 7.2.2. 99% & 26 dB BANDWIDTH

#### **LIMITS**

None; for reporting purposes only.

#### TEST PROCEDURE

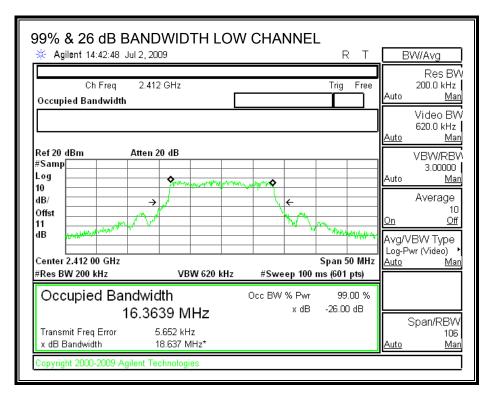
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth measurement function is utilized.

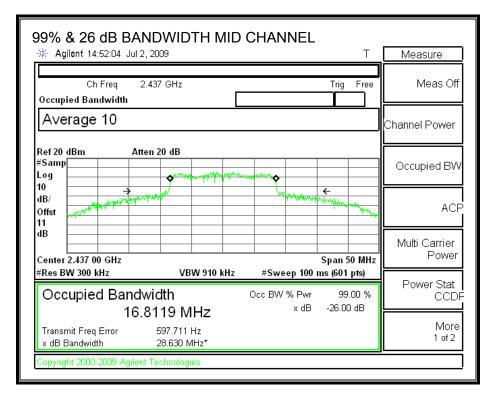
#### **RESULTS**

Channel	Frequency	99% OBW	26 dB BW
	(MHz)	(MHz)	(MHz)
Low	2412	16.36	18.64
Middle	2437	16.81	28.63
High	2462	16.49	18.38

Page 36 of 193

#### 99% & 26 dB BANDWIDTH





Page 37 of 193

99% & 26 dB BAN		GH CHANNE	L T	Measure
Relience 14:55:10 Juli2,	2009		·	Ivieasure
Ch Freq 2.4 Occupied Bandwidth	462 GHz		Trig Free	Meas Off
				Channel Power
Ref 20 dBm Atte #Samp	n 20 dB			Occupied BW
10 dB/				ACF
Offst 11 dB www.ehold/rep.ed/			Span 50 MHz	Multi Carrier Power
#Res BW 180 kHz	#VBW 560 kHz	z #Sweep 100 i	•	
Occupied Bandw	idth ⋅874 MHz	Occ BW % Pwr x dB		Power Stat CCDF
Transmit Freq Error x dB Bandwidth	12.553 kHz 18.376 MHz*			More 1 of 2
Copyright 2000-2009 Agilent	Technologies			

Page 38 of 193

# 7.2.3. OUTPUT POWER

### LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

### TEST PROCEDURE

Output power was measured based on the use of RMS averaging over a time interval in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

### **RESULTS**

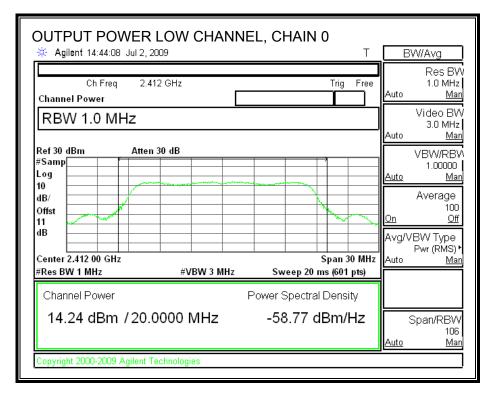
Effective Legacy Mode Composite Gain of 4 Identical Antennas:

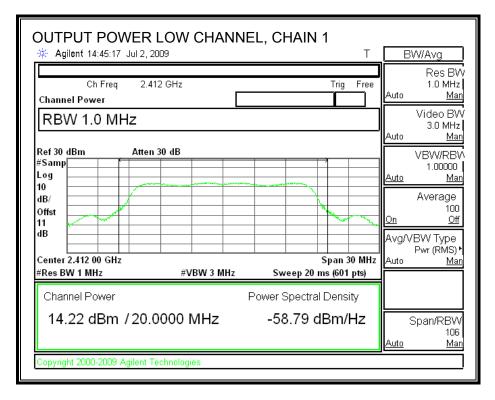
Antenna Gain (dBi)	• • • •	Effective Legacy Gain (dBi)
2	6.02	8.02

The composite antenna gain is 8.02 dBi, therefore the limit is 27.98 dBm.

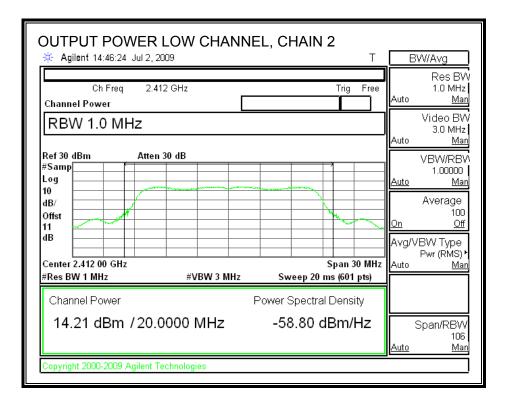
Channel	Frequency	Chain 0	Chain 1	Chain 2	Chain 3	Total	Limit	Margin
		Power	Power	Power	Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	2412	14.24	14.22	14.21	14.19	20.24	27.98	-7.74
Mid	2437	21.47	21.40	20.61	21.41	27.26	27.98	-0.72
High	2462	14.13	13.99	14.14	14.08	20.11	27.98	-7.87

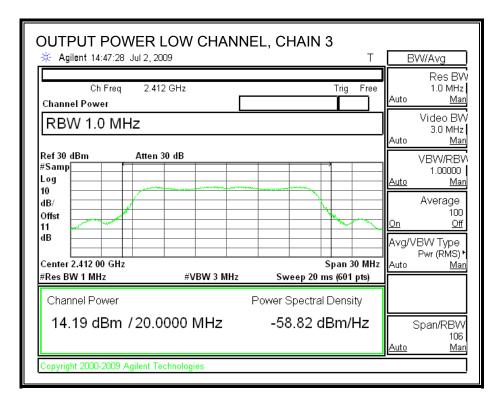
### **OUTPUT POWER, LOW CHANNEL**





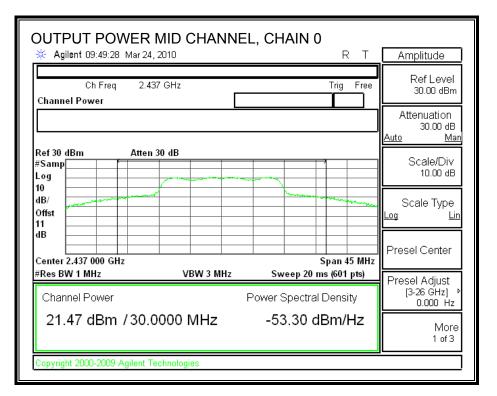
Page 40 of 193

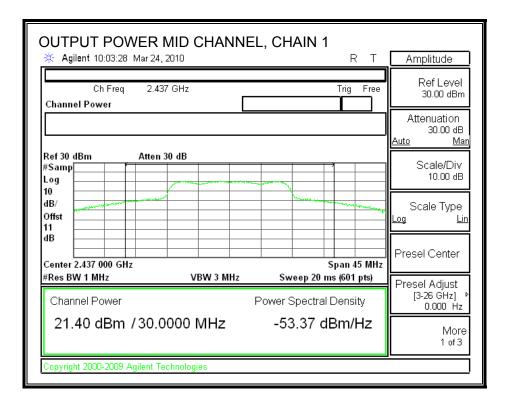




Page 41 of 193

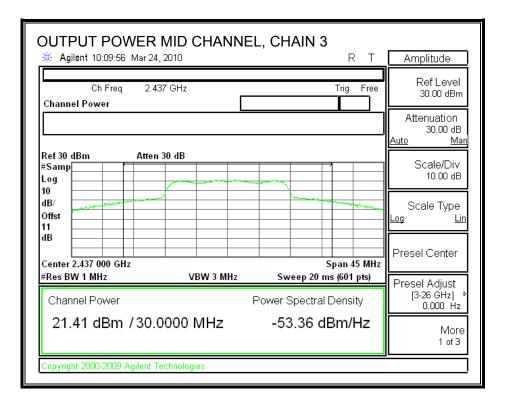
### **OUTPUT POWER, MID CHANNEL**





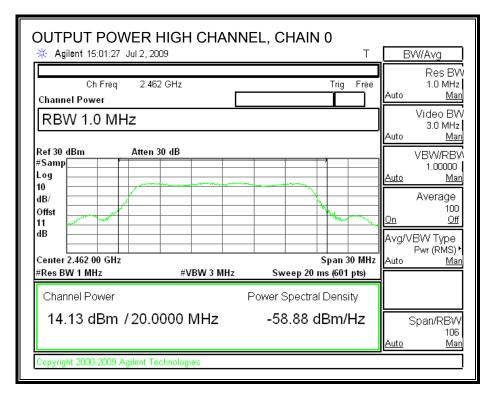
Page 42 of 193

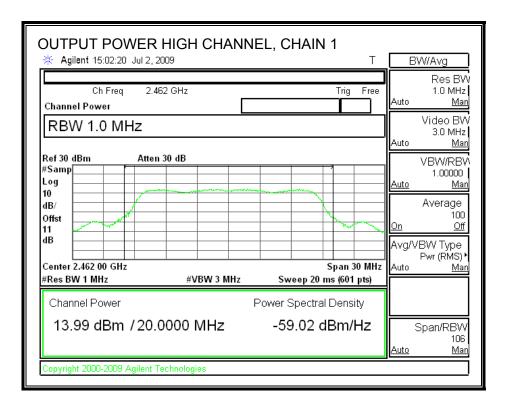
OUTPUT POWER N		EL, CHAIN 2	Amplitude
Ch Freq 2.437 Channel Power		Trig Free	Ref Level 30.00 dBm
Ref 30 dBm Atten 3 #Samp Log 10 dB/ Offst #	0 dB		30.00 dB Auto Man Scale/Div 10.00 dB
Center 2.437 000 GHz #Res BW 1 MHz	VBW 3 MHz	Span 45 MHz Sweep 20 ms (601 pts)	Presel Center
Channel Power 20.61 dBm / 30.0	000 MHz	Power Spectral Density -54.16 dBm/Hz	[3-26 GHz] ♪ 0.000 Hz More 1 of 3
Copyright 2000-2009 Agilent Teo	chnologies		



Page 43 of 193

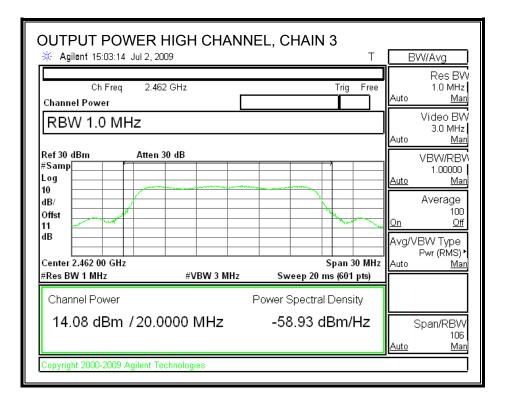
### **OUTPUT POWER, HIGH CHANNEL**





Page 44 of 193

🔆 Agilent 15:00:16 Jul 2, 2	009	Т	BW/Avg
Ch Freq 2.44 Channel Power	52 GHz	Trig Free	Auto <u>Mar</u>
RBW 1.0 MHz			Video BV 3.0 MHz Auto <u>Ma</u>
Ref 30 dBm Atten ≇Samp Log 10	30 dB		VBW/RB\ 1.00000 <u>Auto Ma</u>
dB/ Offst 11			Average 100 <u>On Off</u>
dB		Span 30 MH	Avg/VBW Type Pwr (RMS) Z Auto <u>Ma</u>
# <b>Res BW 1 MHz</b> Channel Power	#VBW 3 MHz	Sweep 20 ms (601 pts) Power Spectral Density	=
14.14 dBm / 20.0	0000 MHz	-58.87 dBm/Hz	Span/RBW 106 Auto Mai



Page 45 of 193

# 7.2.4. AVERAGE POWER

### LIMITS

None; for reporting purposes only.

### TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 11 dB (including 10 dB pad and 1 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

### **RESULTS**

Channel	Frequency	Chain 0	Chain 1	Chain 2	Chain 3
		Power	Power	Power	Power
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)
Low	2412.00	14.12	14.04	14.11	14.14
Middle	2437.00	21.43	21.33	20.50	21.31
High	2462.00	13.95	14.10	14.02	14.11

Page 46 of 193

# 7.2.5. POWER SPECTRAL DENSITY

# <u>LIMITS</u>

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

## TEST PROCEDURE

Output power was measured based on the use of RMS averaging over a time interval, therefore the power spectral density was measured using PSD Option 2 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

Preliminary tests on individual chains, and on all chains with a combiner, were performed. The worst-case configuration was with a combiner, therefore final test were performed with all chains feeding a combiner.

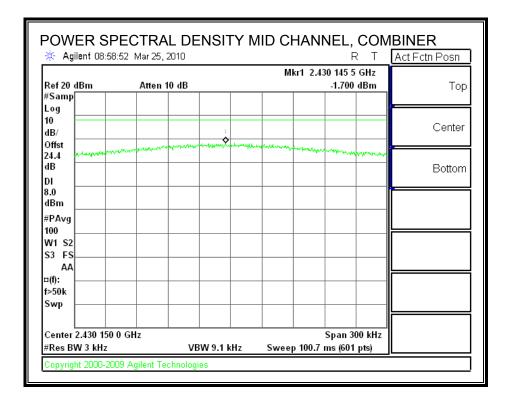
## **RESULTS**

Channel	Frequency	PSD with Combiner	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	2412	-10.116	8	-18.12
Middle	2437	-1.700	8	-9.70
High	2462	-11.317	8	-19.32

Page 47 of 193

### **POWER SPECTRAL DENSITY**

🔆 Agilent 07:32	2:33 Jul 10, 2009			RT	Peak Search
Ref 20 dBm #Samp	Atten 10 dB		Mkr1 2	.419 208 9 GHz -10.116 dBm	Next Peak
Log 10 dB/ Offst					Next Pk Right
24.4 dB	1	where the second s	1 minter markers	6	Next Pk Left
3.0 dBm ≇PA∨g					Min Search
100 W1 S2 S3 FS					Pk-Pk Search
a(f): ⇒50k Swp					Mkr © Cl
Center 2.419 250 #Res BW 3 kHz		W 9.1 kHz	Sweep 100	Span 300 kHz .7 ms (601 pts)	More 1 of 2



Page 48 of 193

🔆 Agilent 07:37:	24 Jul 10, 2009	R	T BW/Avg
Ref 20 dBm	Atten 10 dB	 Mkr1 2.464 507 5 G -11.317 d	Bm 3.0 kHz
#Samp			Auto <u>Ma</u>
Log 10 dB/			Video B <sup>V</sup> 9.1 kH:
Offst			Auto <u>Ma</u>
24.4 dB		where we want the second second	VBW/RB 1.00000
DI .0		 and the second s	Auto Ma
dBm			Average
#PA∨g 100			<u>On</u> <u>Ot</u>
W1 S2 S3 FS			Avg/VBW Type Pwr (RMS)
33 ГЗ			Auto <u>Ma</u>
¤(f):			
Swp			
			Span/RBV
Center 2.464 500	) GHz	Span 300	

Page 49 of 193

# 7.2.6. CONDUCTED SPURIOUS EMISSIONS

# <u>LIMITS</u>

FCC §15.247 (d)

IC RSS-210 A8.5

Output power was measured based on the use of RMS averaging over a time interval, therefore the required attenuation is 30 dBc.

### TEST PROCEDURE

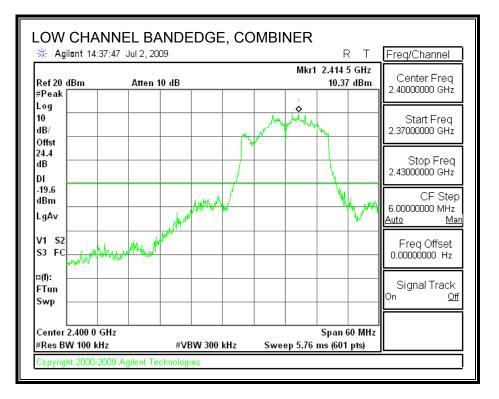
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

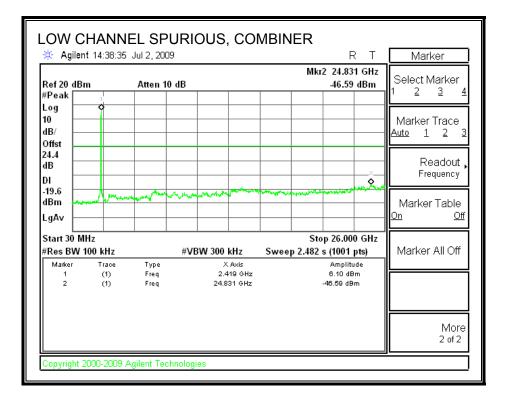
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

Preliminary tests on individual chains, and on all chains with a combiner, were performed. The worst-case configuration was with a combiner, therefore final test were performed with all chains feeding a combiner.

Page 50 of 193

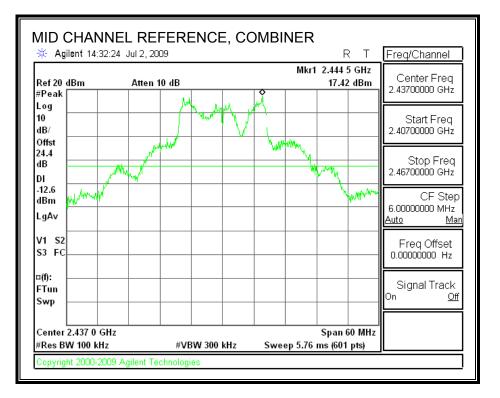
#### LOW CHANNEL SPURIOUS EMISSIONS

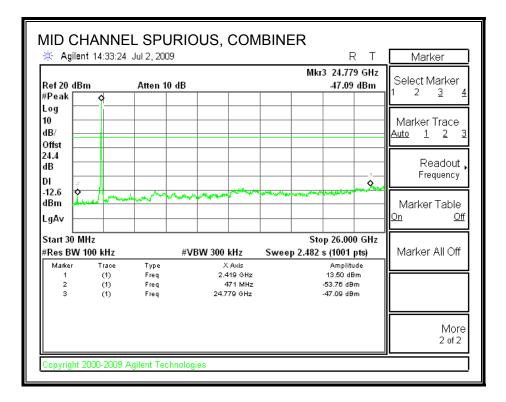




Page 51 of 193

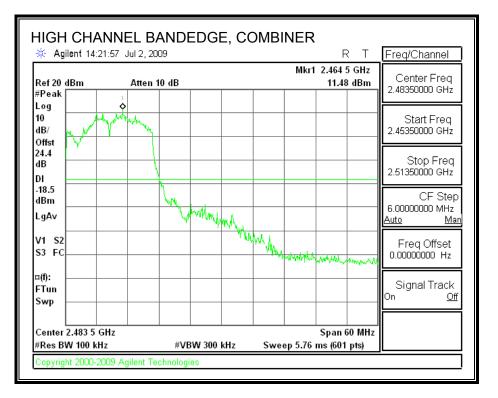
### MID CHANNEL SPURIOUS EMISSIONS

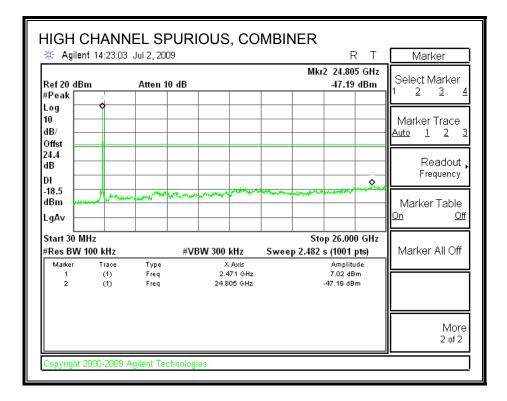




Page 52 of 193

#### HIGH CHANNEL SPURIOUS EMISSIONS





Page 53 of 193

# 7.3. 2.4 GHz BAND CHANNEL TESTS FOR 802.11n HT20 MODE

# 7.3.1. 6 dB BANDWIDTH

### **LIMITS**

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

The minimum 6 dB bandwidth shall be at least 500 kHz.

## TEST PROCEDURE

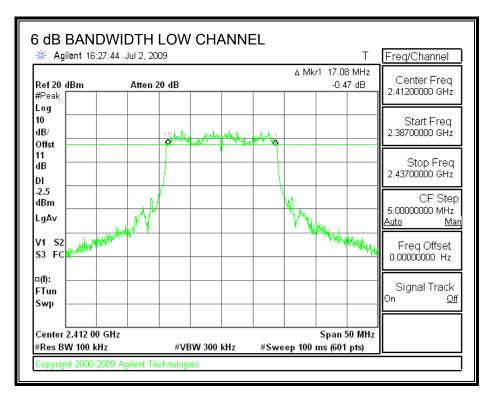
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

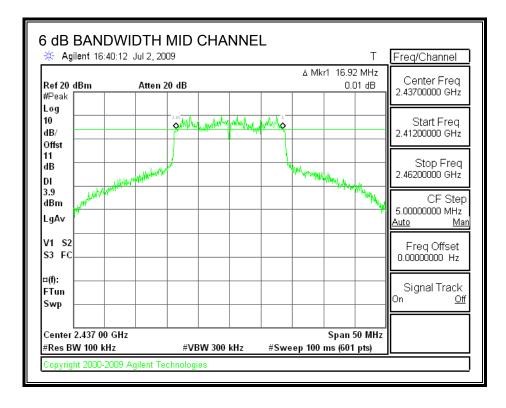
### **RESULTS**

Channel	Frequency	6 dB BW	Minimum Limit
	(MHz)	(MHz)	(MHz)
Low	2412	17.08	0.5
Middle	2437	16.92	0.5
High	2462	17.25	0.5

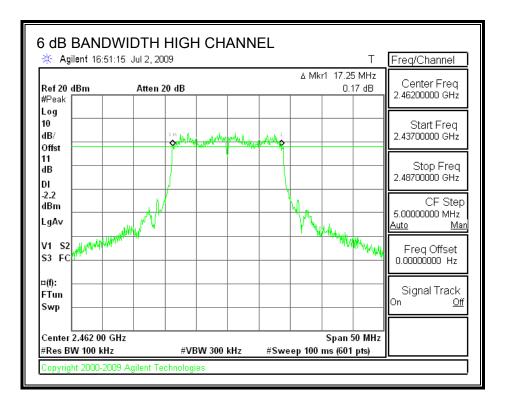
Page 54 of 193

### 6 dB BANDWIDTH





Page 55 of 193



Page 56 of 193

# 7.3.2. 99% & 26 dB BANDWIDTH

### **LIMITS**

None; for reporting purposes only.

### TEST PROCEDURE

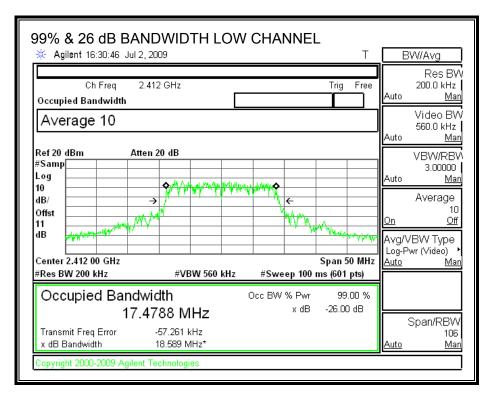
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth measurement function is utilized.

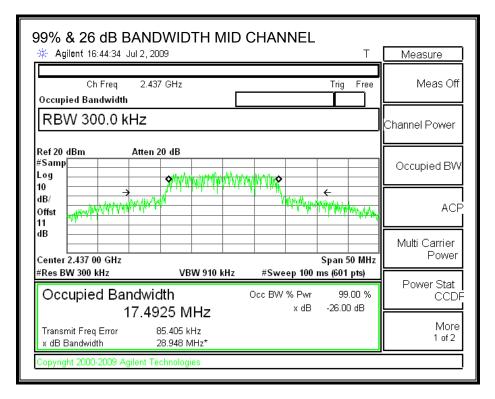
#### **RESULTS**

Channel	Frequency	99% OBW	26 dB BW
	(MHz)	(MHz)	(MHz)
Low	2412	17.48	18.59
Middle	2437	17.49	28.95
High	2462	17.43	18.30

Page 57 of 193

#### 99% & 26 dB BANDWIDTH





Page 58 of 193

99% & 26 dB BANDWIDTH	HIGH CHANNEL	Т	BW/Avg
Ch Freq 2.462 GHz Occupied Bandwidth	1	Frig Free	Res BW 200.0 kHz Auto <u>Man</u>
A∨erage 10		]	Video BW 560.0 kHz Auto <u>Man</u>
dB/ →	Martin C		VBW/RBW 3.00000 Auto <u>Man</u> Average 10 On Off
Offst 11 dB 	Sp	an 50 MHz	<u>On Off</u> Avg/VBW Type Log-Pwr (Video) ► <u>Auto Man</u>
#Res BW 200 kHz #VBW 560	Occ BW % Pwr	(601 pts) 99.00 %	
Occupied Bandwidth 17.4306 MHz		99.00 % 6.00 dB	Span/RBW
Transmit Freq Error -31.402 kHz x dB Bandwidth 18.300 MHz*			106 Auto Man
Copyright 2000-2009 Agilent Technologies			

Page 59 of 193

# 7.3.3. OUTPUT POWER

### **LIMITS**

FCC §15.247 (b)

IC RSS-210 A8.4

## TEST PROCEDURE

Output power was measured based on the use of RMS averaging over a time interval in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

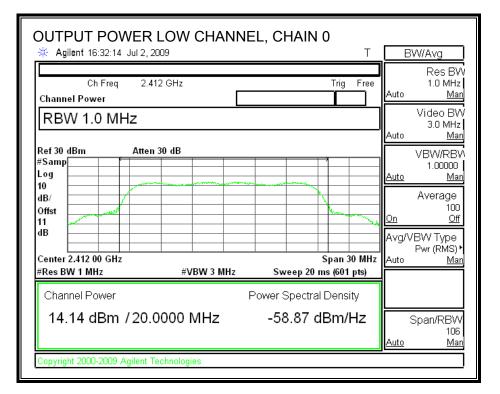
### **RESULTS**

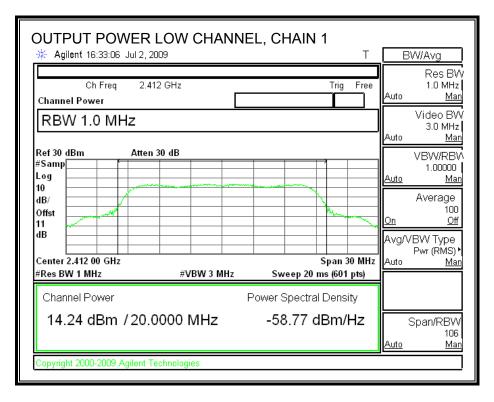
The antenna gain is less than 6 dBi, therefore the limit is 30 dBm.

Channel	Frequency	Chain 0	Chain 1	Chain 2	Chain 3	Total	Limit	Margin
		Power	Power	Power	Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	2412	14.14	14.24	14.18	13.98	20.16	30	-9.84
Mid	2437	21.47	20.79	20.46	21.41	27.07	30	-2.93
High	2462	13.9	14.05	13.76	14.26	20.02	30	-9.98

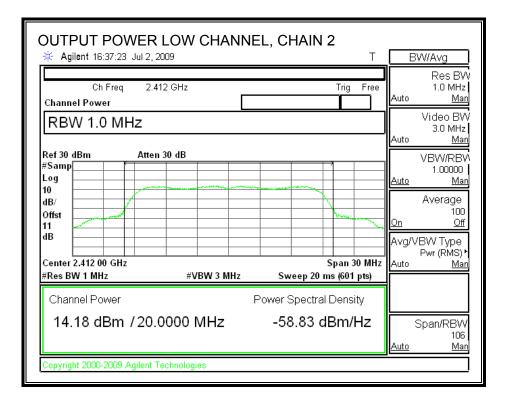
Page 60 of 193

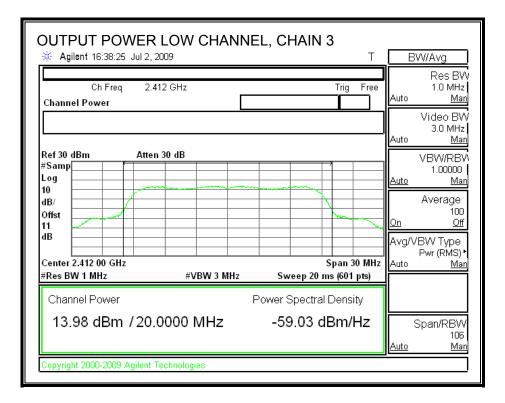
### **OUTPUT POWER, LOW CHANNEL**





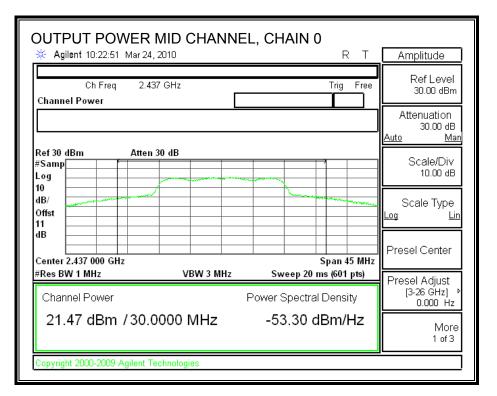
Page 61 of 193

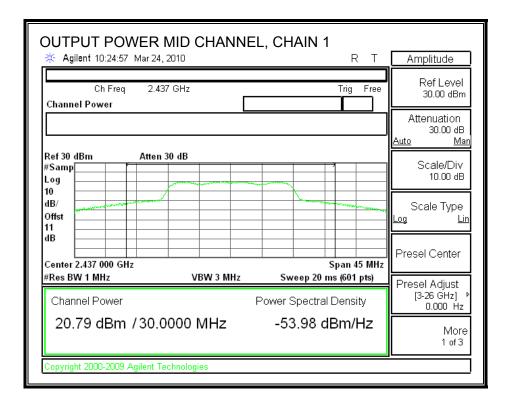




Page 62 of 193

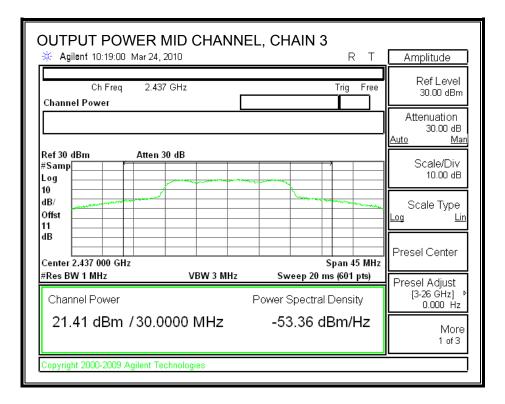
### **OUTPUT POWER, MID CHANNEL**





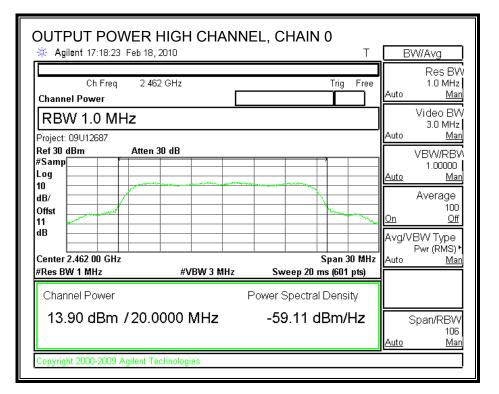
Page 63 of 193

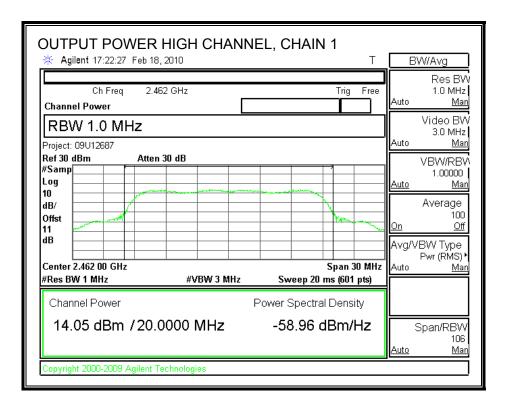
OUTPUT POWER MID CHA	NNEL, CHAIN 2	Amplitude
Ch Freq 2.437 GHz Channel Power	Trig Free	Ref Level 30.00 dBm
Ref 30 dBm         Atten 30 dB           #Samp		30.00 dB <u>Auto Man</u> Scale/Div 10.00 dB Scale Type Log Lin
Center 2.437 000 GHz #Res BW 1 MHz VBW 3 M		Presel Center Presel Adjust [3-26 GHz] ♪
Channel Power 20.46 dBm /30.0000 MHz	Power Spectral Density -54.31 dBm/Hz	0.000 Hz More 1 of 3
Copyright 2000-2009 Agilent Technologies		



Page 64 of 193

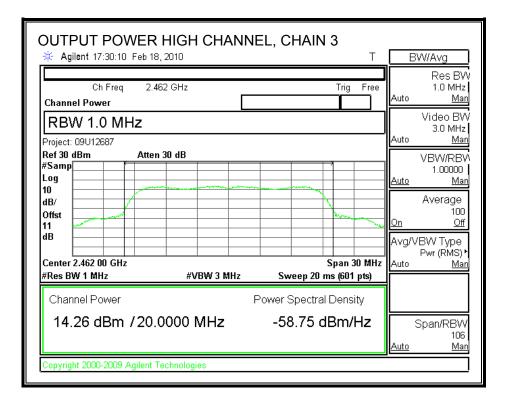
### **OUTPUT POWER, HIGH CHANNEL**





Page 65 of 193

OUTPUT POWER		EL, CHAIN 2	BW/Avg
	2 GHz	Trig Free	Res BW 1.0 MHz Auto <u>Man</u>
RBW 1.0 MHz Project: 09U12687			Video BW 3.0 MHz Auto <u>Man</u>
Ref 30 dBm Atten #Samp Log 10	30 dB		VBW/RBV 1.00000 <u>Auto Man</u> Average
dB/ Offst 11 dB		- tommer	Average 100 <u>On Off</u> Avg/VBW Type
Center 2.462 00 GHz #Res BW 1 MHz	#VBW 3 MHz	Span 30 MHz Sweep 20 ms (601 pts)	Pwr (RMS) ► Auto <u>Man</u>
Channel Power 13.76 dBm /20.0		Power Spectral Density -59.25 dBm/Hz	Span/RBW
Copyright 2000-2009 Agilent Te	chnologies		<u>Auto Man</u>



Page 66 of 193

# 7.3.4. AVERAGE POWER

### LIMITS

None; for reporting purposes only.

### TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 11 dB (including 10 dB pad and 1 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

### **RESULTS**

Channel	Frequency	Chain 0	Chain 1	Chain 2	Chain 3
		Power	Power	Power	Power
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)
Low	2412.00	14.16	14.11	14.05	14.14
Middle	2437.00	21.40	20.69	20.36	21.35
High	2462.00	13.60	13.80	13.60	14.00

Page 67 of 193

# 7.3.5. POWER SPECTRAL DENSITY

# LIMITS

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

### TEST PROCEDURE

Output power was measured based on the use of RMS averaging over a time interval, therefore the power spectral density was measured using PSD Option 2 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

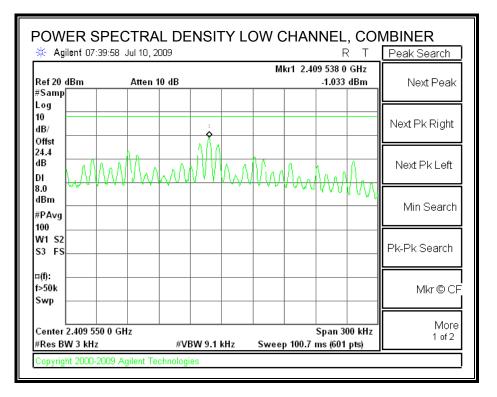
Preliminary tests on individual chains, and on all chains with a combiner, were performed. The worst-case configuration was with a combiner, therefore final test were performed with all chains feeding a combiner.

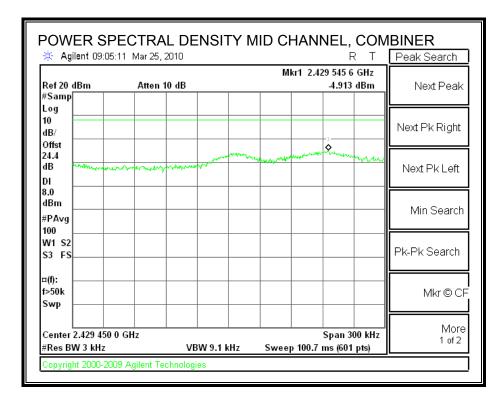
### **RESULTS**

Channel	Frequency	PSD with Combiner	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	2412	-1.033	8	-9.03
Middle	2437	-4.913	8	-12.91
High	2462	-11.320	8	-19.32

Page 68 of 193

### **POWER SPECTRAL DENSITY**





Page 69 of 193

🔆 Agilent 07:37	:24 Jul 10, 2009		R	T BW/Avg
Ref 20 dBm #Samp	Atten 10 dB		Mkr1 2.464 507 5 G -11.317 dE	
Log 10 dB/ Offst				Video B\ 9.1 kHz Auto <u>Ma</u>
24.4	hand a second and a second	1 	Marine Mari	VBW/RB 1.00000 <u>Auto Ma</u>
dBm #PAvg 100				Average 100 <u>On Of</u>
W1 S2 S3 FS				Avg/VBW Type Pwr (RMS) Auto <u>Ma</u>
¤(f): f>50k Swp				
Center 2.464 500 #Res BW 3 kHz	0 GHz #VBW 1	) 1 kHz Sv	Span 300 Zeep 100.7 ms (601 pt	

Page 70 of 193

# 7.3.6. CONDUCTED SPURIOUS EMISSIONS

# <u>LIMITS</u>

FCC §15.247 (d)

IC RSS-210 A8.5

Output power was measured based on the use of RMS averaging over a time interval, therefore the required attenuation is 30 dBc.

### TEST PROCEDURE

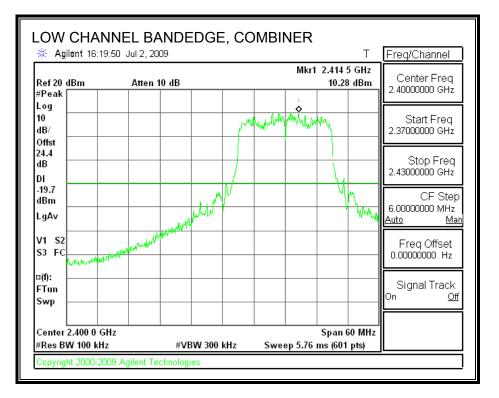
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

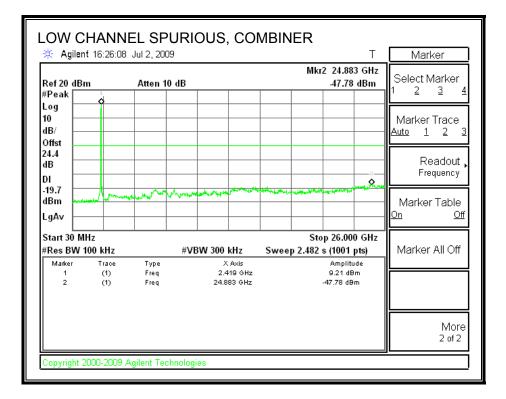
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

Preliminary tests on individual chains, and on all chains with a combiner, were performed. The worst-case configuration was with a combiner, therefore final test were performed with all chains feeding a combiner.

Page 71 of 193

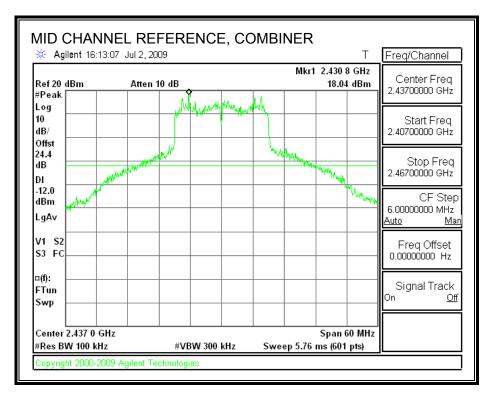
### LOW CHANNEL SPURIOUS EMISSIONS

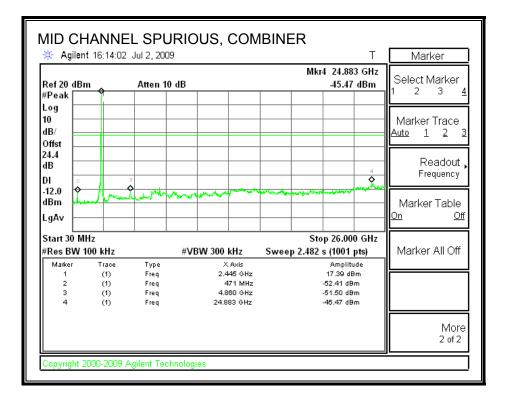




Page 72 of 193

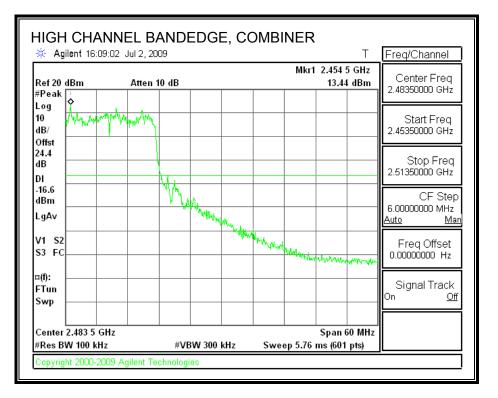
### MID CHANNEL SPURIOUS EMISSIONS

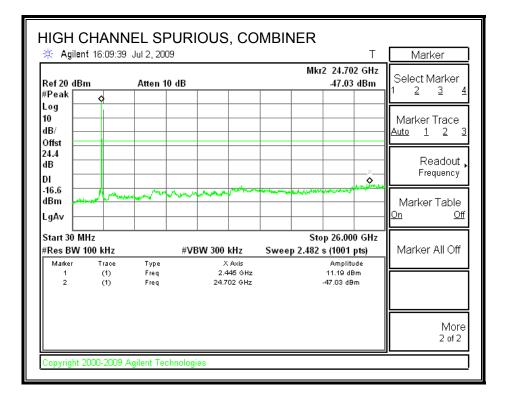




Page 73 of 193

### HIGH CHANNEL SPURIOUS EMISSIONS





Page 74 of 193

# 7.4. 2.4 GHz BAND CHANNEL TESTS FOR 802.11n HT40 MODE

# 7.4.1. 6 dB BANDWIDTH

# **LIMITS**

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

The minimum 6 dB bandwidth shall be at least 500 kHz.

# TEST PROCEDURE

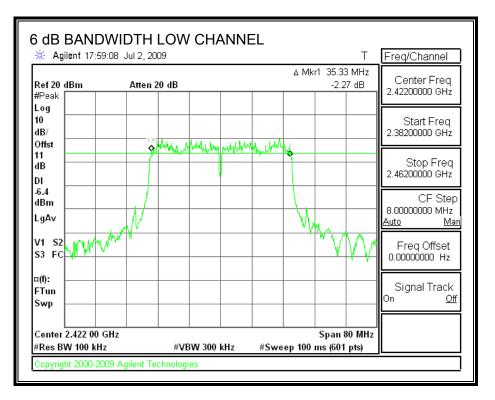
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

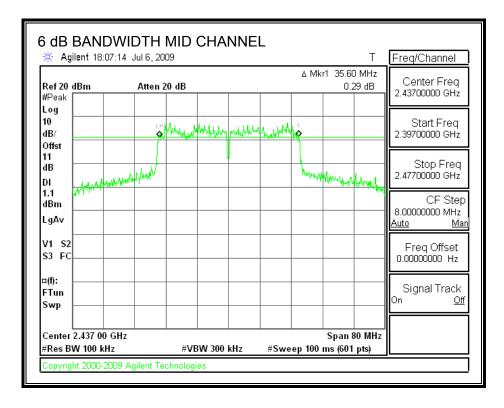
## **RESULTS**

Channel	Frequency	6 dB BW	Minimum Limit
	(MHz)	(MHz)	(MHz)
Low	2422	35.33	0.5
Mid	2437	35.60	0.5
High	2452	35.47	0.5

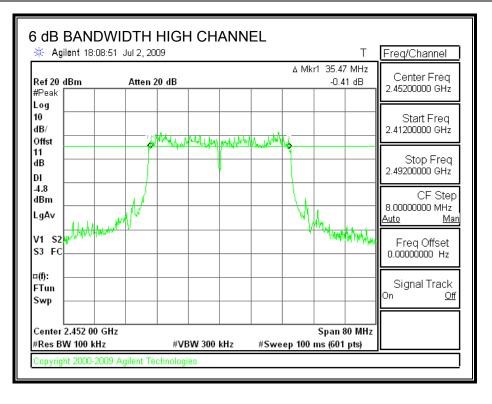
Page 75 of 193

### 6 dB BANDWIDTH





Page 76 of 193



Page 77 of 193

# 7.4.2. 99% & 26 dB BANDWIDTH

### **LIMITS**

None; for reporting purposes only.

### TEST PROCEDURE

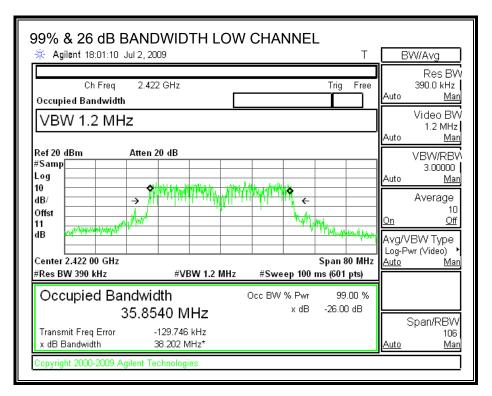
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth measurement function is utilized.

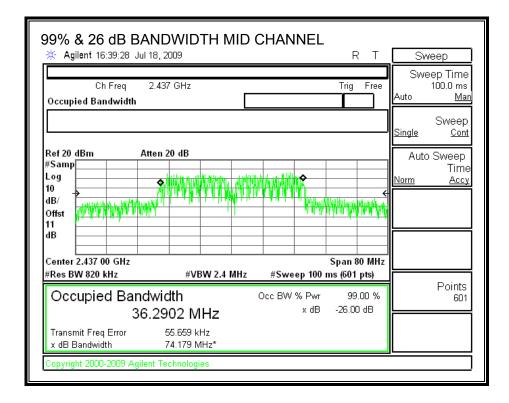
### **RESULTS**

Channel	Frequency	99% OBW	26 dB BW	
	(MHz)	(MHz)	(MHz)	
Low	2422	35.85	38.20	
Mid	2437	36.29	74.18	
High	2452	35.51	38.76	

Page 78 of 193

### 99% & 26 dB BANDWIDTH





Page 79 of 193

🔆 Agilent 18:11:06 Jul 2, 2	2009		T	BV	V/Avg
Ch Freq 2.4 Occupied Bandwidth	52 GHz	Т	rig Free	Auto	Res BV 390.0 kHz <u>Ma</u>
Average 10				Auto	Video BV 1.2 MHz <u>Ma</u>
Ref 20 dBm Atter #Samp Log 10 dB/ Offst 11 dB				Auto <u>On</u> Avg/VE	VBW/RB' 10.00000 <u>Ma</u> Average 10 <u>Off</u> 3W Type r (Video)
Center 2.452 00 GHz ⊭Res BW 390 kHz	#VBW 1.2 MHz	Spa #Sweep 100 ms (		<u>Auto</u>	<u>Ma</u>
Occupied Bandw 35.5	idth 145 MHz	Occ BW % Pwr x dB -2	99.00 % 6.00 dB		
Transmit Freq Error x dB Bandwidth	2.365 kHz 38.756 MHz*			ڪ <u>Auto</u>	ipan/RBV 106 <u>Ma</u>

Page 80 of 193

# 7.4.3. OUTPUT POWER

# LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

## TEST PROCEDURE

Output power was measured based on the use of RMS averaging over a time interval in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

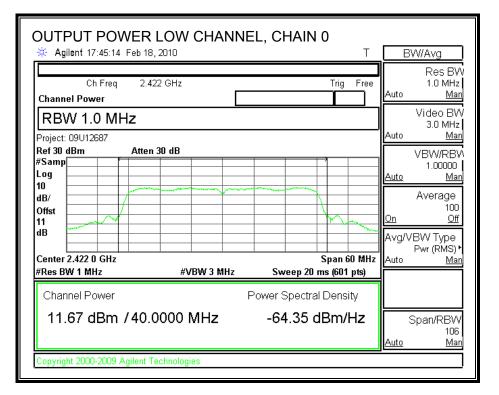
## **RESULTS**

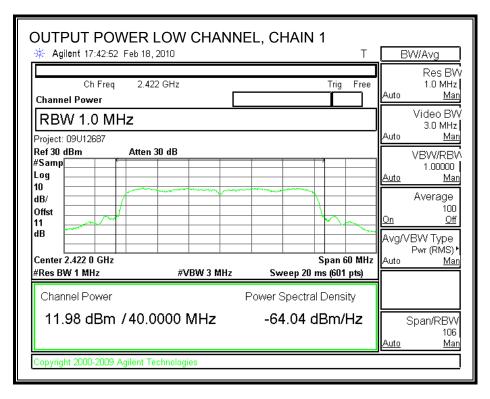
The antenna gain is less than 6 dBi, therefore the limit is 30 dBm.

Channel	Frequency	Chain 0	Chain 1	Chain 2	Chain 3	Total	Limit	Margin
		Power	Power	Power	Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	2422	11.67	11.98	11.94	12.21	17.97	30	-12.03
Mid	2437	21.95	21.17	21.13	21.44	27.46	30	-2.54
High	2452	11.74	12.23	11.76	12.25	18.02	30	-11.98

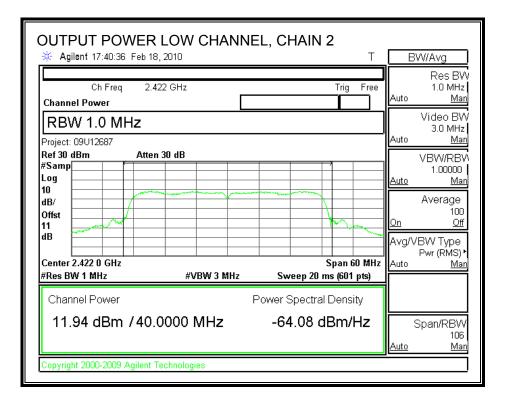
Page 81 of 193

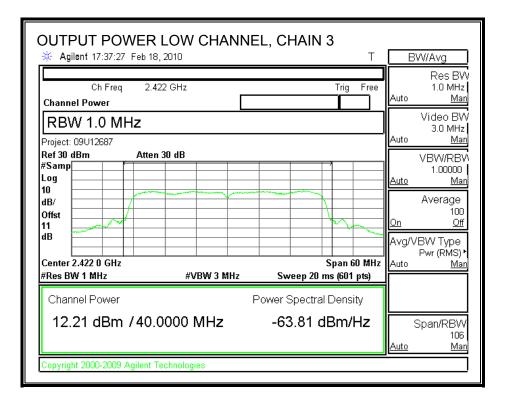
## **OUTPUT POWER, LOW CHANNEL**





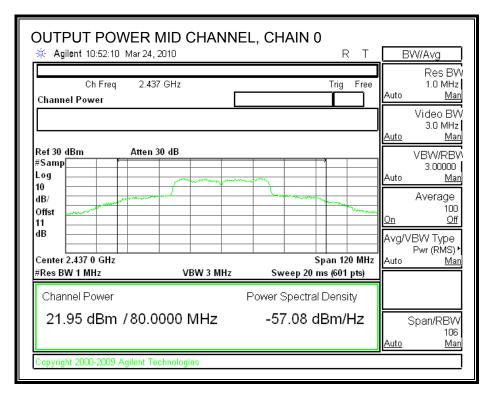
Page 82 of 193

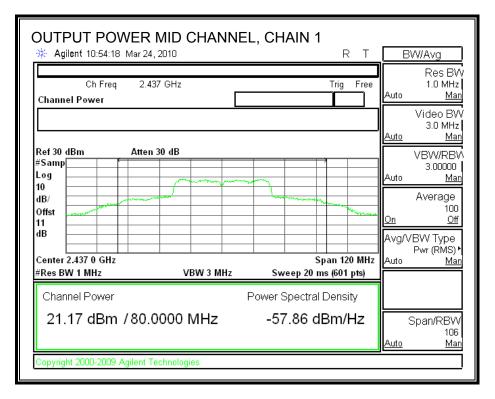




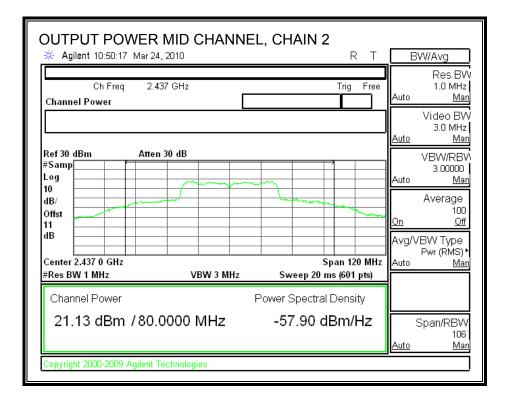
Page 83 of 193

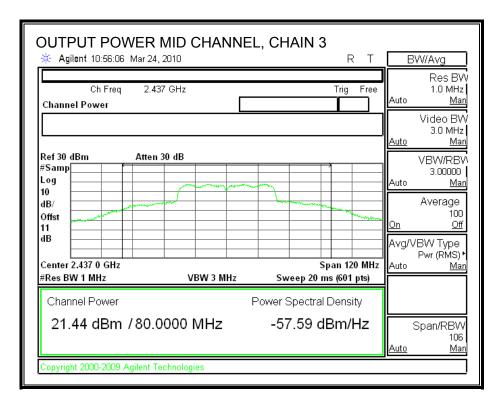
### **OUTPUT POWER, MID CHANNEL**





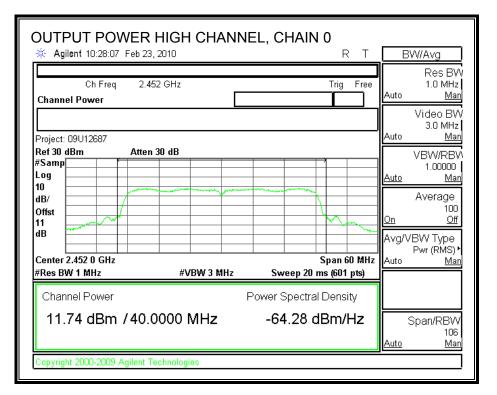
Page 84 of 193

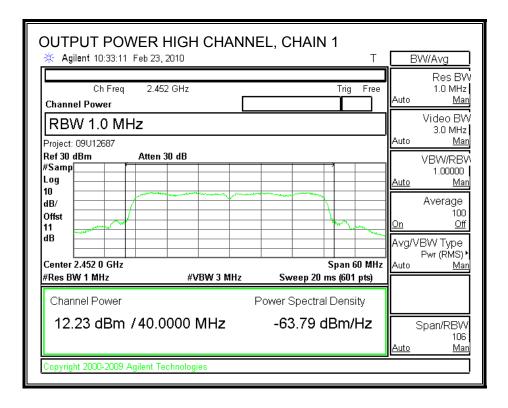




Page 85 of 193

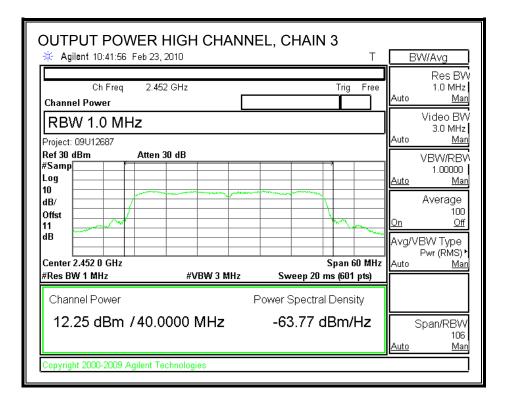
## **OUTPUT POWER, HIGH CHANNEL**





Page 86 of 193

OUTPUT POWER HIGH CHANNEL, CHAIN 2	
✤ Agilent 10:37:57 Feb 23, 2010	BW/Avg
Ch Freq 2.452 GHz Trig Free Channel Power	Res BW 1.0 MHz Auto <u>Man</u>
RBW 1.0 MHz Project: 09U12687	Video BW 3.0 MHz Auto <u>Man</u>
Ref 30 dBm         Atten 30 dB           #Samp	VBW/RBW 1.00000 <u>Auto Man</u>
dB/ Offst 11 dB	Average 100 <u>On Off</u>
Center 2.452 0 GHz Span 60 MHz #Res BW 1 MHz #VBW 3 MHz Sweep 20 ms (601 pts)	Avg/VBW Type Pwr (RMS) <sup>►</sup> Auto <u>Man</u>
Channel Power Power Spectral Density	
11.76 dBm / 40.0000 MHz -64.26 dBm/Hz	Span/RBW 106 <u>Auto Man</u>
Copyright 2000-2009 Agilent Technologies	



Page 87 of 193

# 7.4.4. AVERAGE POWER

# LIMITS

None; for reporting purposes only.

## TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 11 dB (including 10 dB pad and 1 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

### **RESULTS**

Channel	Frequency	Chain 0	Chain 1	Chain 2	Chain 3
		Power Power		Power	Power
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)
Low	2422.00	11.60	11.80	11.60	12.00
Mid	2437.00	21.80	21.09	21.00	21.31
High	2452.00	11.60	12.10	11.70	12.10

Page 88 of 193

# 7.4.5. POWER SPECTRAL DENSITY

# LIMITS

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

# TEST PROCEDURE

Output power was measured based on the use of RMS averaging over a time interval, therefore the power spectral density was measured using PSD Option 2 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

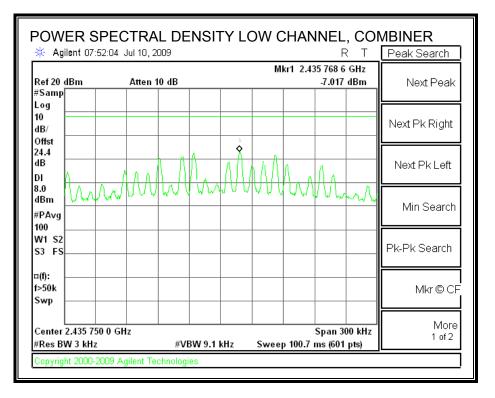
Preliminary tests on individual chains, and on all chains with a combiner, were performed. The worst-case configuration was with a combiner, therefore final test were performed with all chains feeding a combiner.

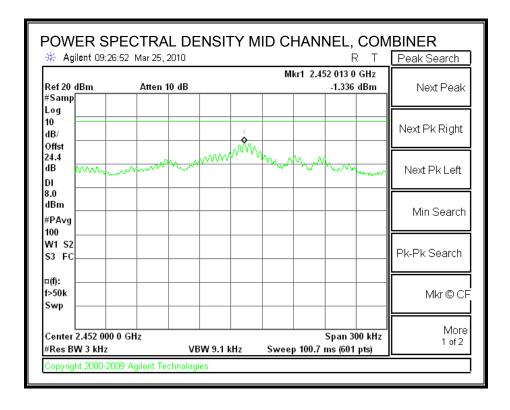
# **RESULTS**

Channel	Frequency	PSD with Combiner	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	2422	-7.017	8	-15.02
Mid	2437	-1.336	8	-9.34
High	2452	-9.839	8	-17.84

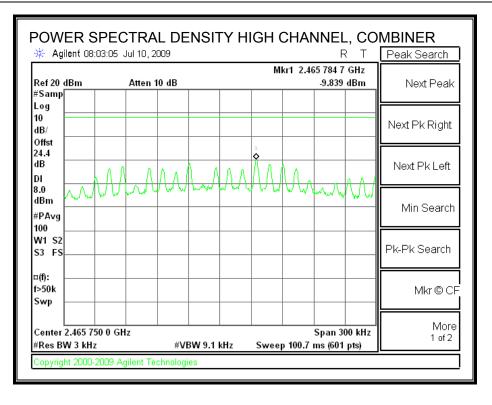
Page 89 of 193

### **POWER SPECTRAL DENSITY**





Page 90 of 193



Page 91 of 193

# 7.4.6. CONDUCTED SPURIOUS EMISSIONS

# <u>LIMITS</u>

FCC §15.247 (d)

IC RSS-210 A8.5

Output power was measured based on the use of RMS averaging over a time interval, therefore the required attenuation is 30 dBc.

## TEST PROCEDURE

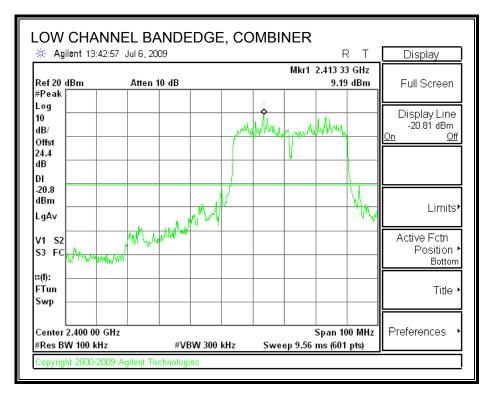
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

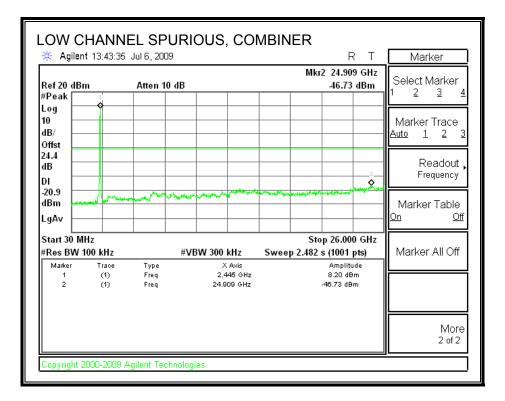
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

Preliminary tests on individual chains, and on all chains with a combiner, were performed. The worst-case configuration was with a combiner, therefore final test were performed with all chains feeding a combiner.

Page 92 of 193

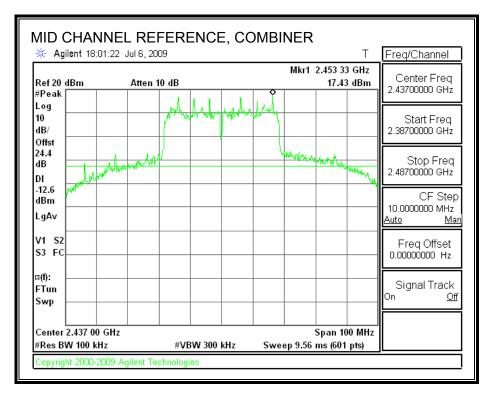
### LOW CHANNEL SPURIOUS EMISSIONS

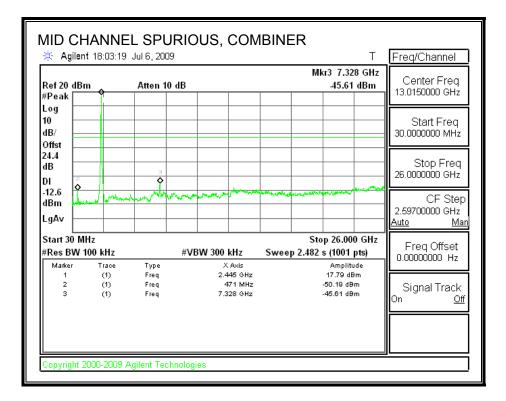




Page 93 of 193

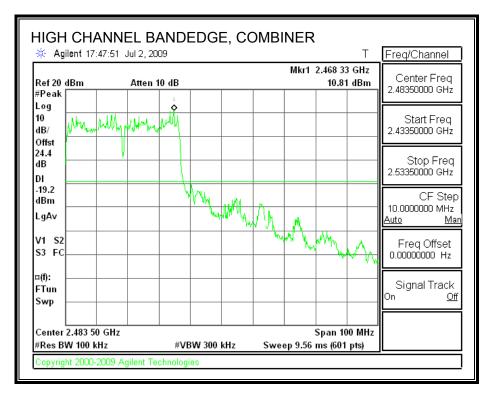
### MID CHANNEL SPURIOUS EMISSIONS

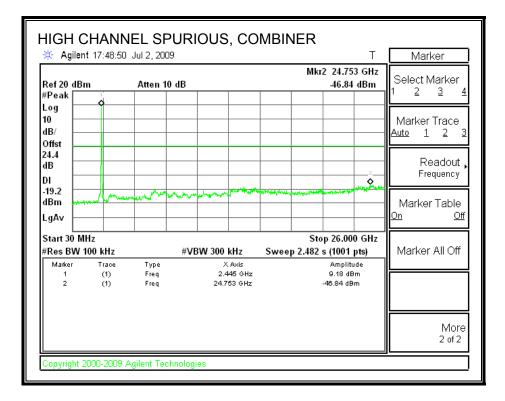




Page 94 of 193

### HIGH CHANNEL SPURIOUS EMISSIONS





Page 95 of 193

# 7.5. 5.8 GHz BAND CHANNEL TESTS FOR 802.11a MODE

# 7.5.1. 6 dB BANDWIDTH

# **LIMITS**

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

The minimum 6 dB bandwidth shall be at least 500 kHz.

# TEST PROCEDURE

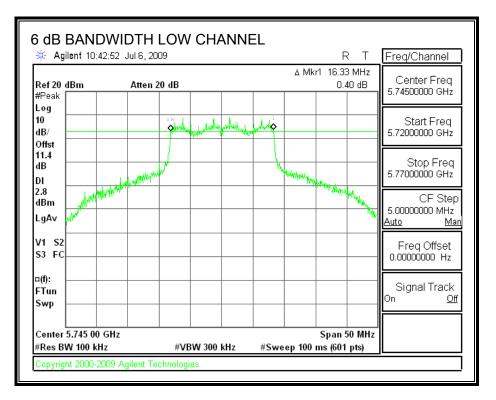
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

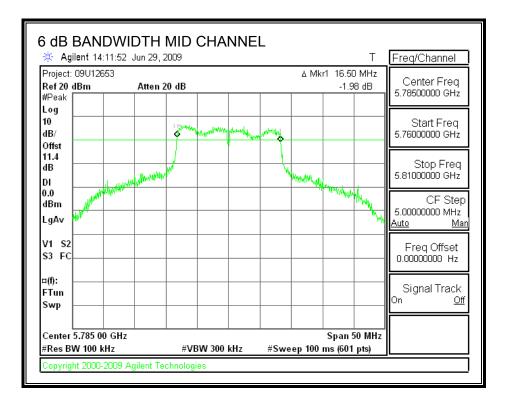
## **RESULTS**

Channel	Frequency	6 dB BW	Minimum Limit
	(MHz)	(MHz)	(MHz)
Low	5745	16.33	0.5
Middle	5785	16.50	0.5
High	5825	16.33	0.5

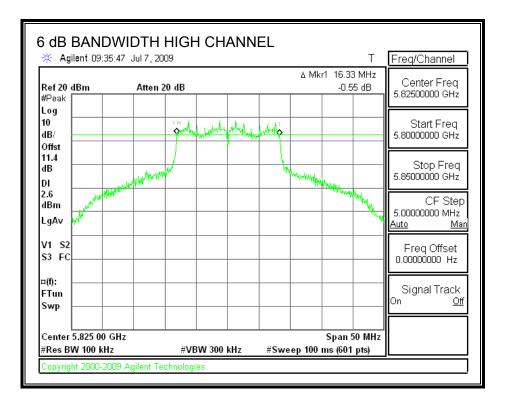
Page 96 of 193

### 6 dB BANDWIDTH





Page 97 of 193



Page 98 of 193

# 7.5.2. 99% & 26 dB BANDWIDTH

## **LIMITS**

None; for reporting purposes only.

### TEST PROCEDURE

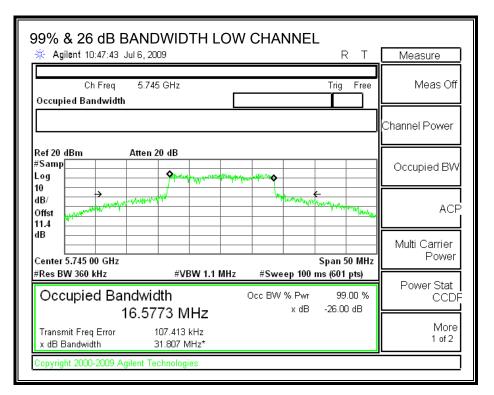
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth measurement function is utilized.

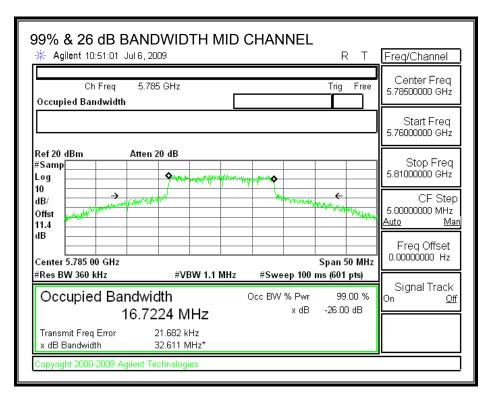
### **RESULTS**

Channel	Frequency	99% OBW	26 dB BW
	(MHz)	(MHz)	(MHz)
Low	5745	16.58	31.81
Middle	5785	16.72	32.61
High	5825	16.79	31.51

Page 99 of 193

### 99% & 26 dB BANDWIDTH





Page 100 of 193

99% & 26 dB BANI		H CHANNE	L R T	BW/Avg
	 5 GHz Γ		Trig Free	Res BVV 360.0 kHz Auto <u>Man</u>
				Video BW 1.2 MHz Auto <u>Man</u>
Ref 20 dBm         Atten           #Samp	Anter and and a second			VBW/RBV 3.00000 Auto <u>Man</u>
10 dB/ Offst 11.4	5 W <sup>ad</sup>		+ www.weller	Average 10 <u>On Off</u>
dB Center 5.825 00 GHz			Span 50 MHz	Avg/VBW Type Log-Pwr (Video) ト <u>Auto Man</u>
#Res BW 360 kHz	#VBW 1.2 MHz	#Sweep 100	ms (601 pts) 99 00 %	
Occupied Bandwi 16.78	395 MHz	x dB	-26.00 dB	Span/RBW
	141.052 kHz 31.512 MHz*			106 Auto Man
Copyright 2000-2009 Agilent Te	echnologies			

Page 101 of 193

# 7.5.3. OUTPUT POWER

# **LIMITS**

FCC §15.247 (b)

IC RSS-210 A8.4

## TEST PROCEDURE

Output power was measured based on the use of RMS averaging over a time interval in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

## **RESULTS**

Effective Legacy Mode Composite Gain of 4 Identical Antennas:

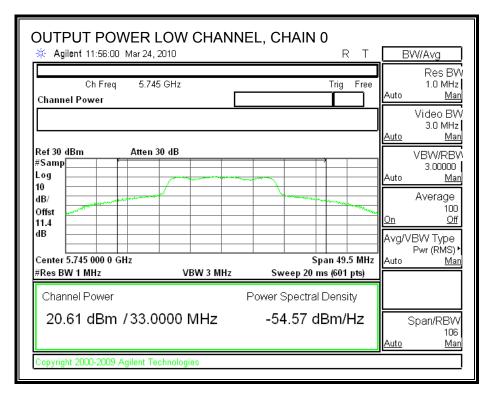
Antenna Gain (dBi)	• • • •	Effective Legacy Gain (dBi)	
3	6.02	9.02	

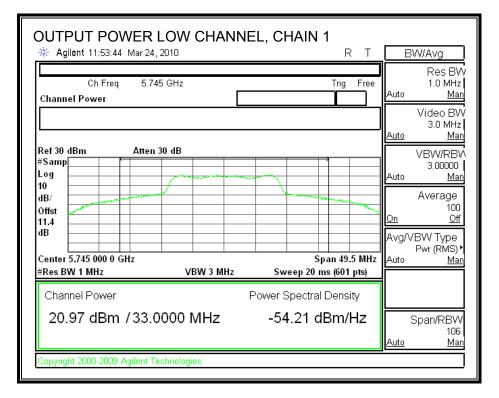
The composite antenna gain is 9.02 dBi, therefore the limit is 26.98 dBm.

Channel	Frequency	Chain 0	Chain 1	Chain 2	Chain 3	Total	Limit	Margin
		Power	Power	Power	Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5745	20.61	20.97	20.71	20.82	26.80	26.98	-0.18
Mid	5785	20.61	21.06	20.77	20.86	26.85	26.98	-0.13
High	5825	19.14	19.08	19.11	19.07	25.12	26.98	-1.86

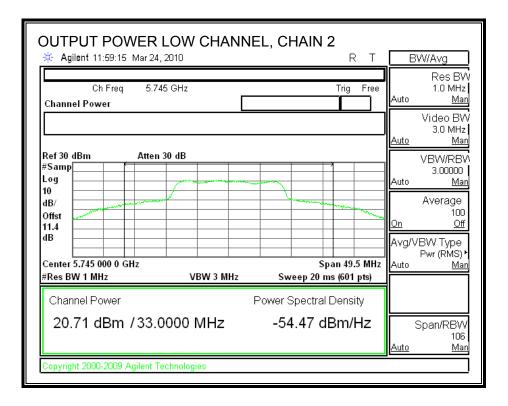
Page 102 of 193

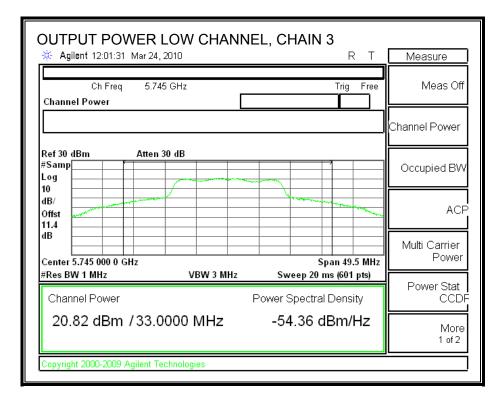
## **OUTPUT POWER, LOW CHANNEL**





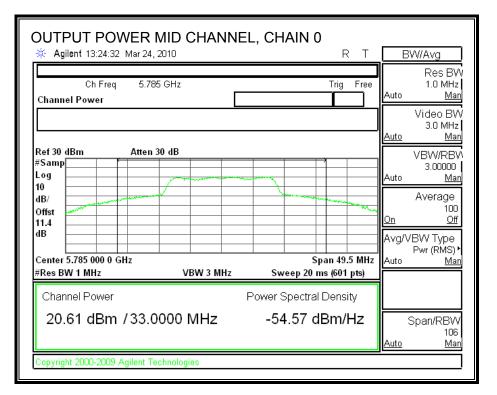
Page 103 of 193

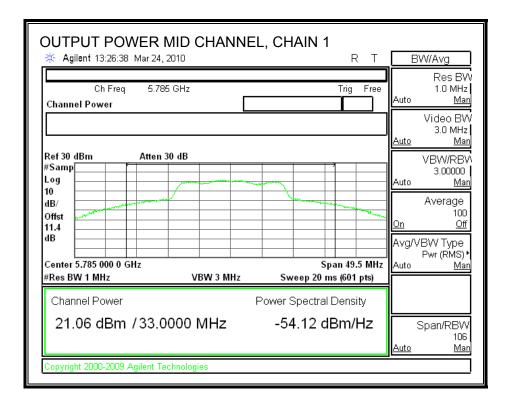




Page 104 of 193

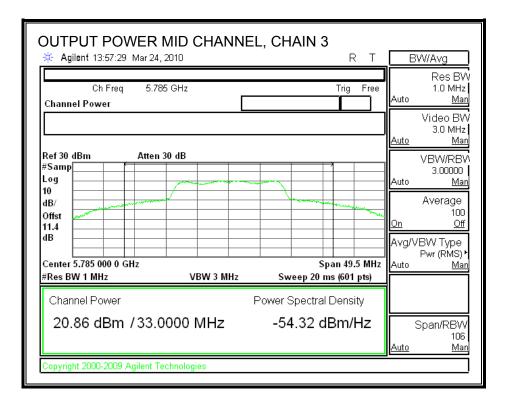
### **OUTPUT POWER, MID CHANNEL**





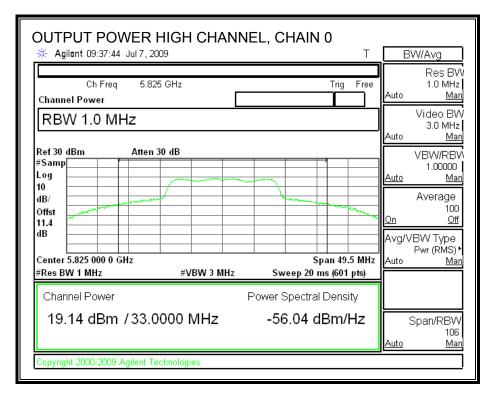
Page 105 of 193

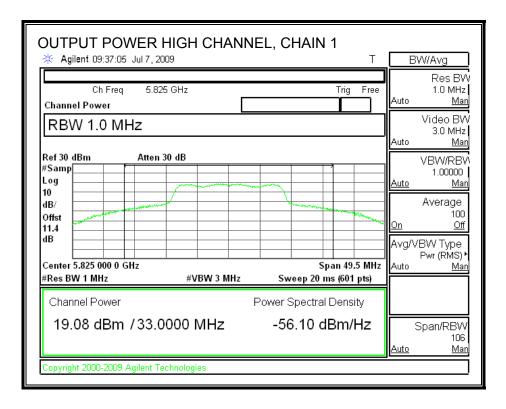
Ch Freq 5.785 GHz Trig Free Auto Mar Channel Power Video BW 3.0 MHz Ref 30 dBm Atten 30 dB VBW/RBV #Samp VBW/RBV 3.00000	OUTPUT POWER		L, CHAIN 2	2 R T	DIA	WAva .
Ref 30 dBm     Atten 30 dB     Video BV/ 3.0 MHz       Log     VBW/RBV       10     VBW/RBV       0dB/     Average       0fist     10       11.4     0       dB     0       0     0       0     0       0     0       0     0       0     0       0     0       0     0       0     0       0     0       0     0       0     0       0     0       0     0       0     0       0     0	Ch Freq 5.78					Res BW 1.0 MHz <u>Man</u>
#Samp         VDV/RDV           Log         3.00000           10         4B/           Offst         0           11.4         0           4B         0           0         0		L				Video BV 3.0 MHz <u>Man</u>
dB/ Offst         Average           11.4 dB         11.4           11.4         11.4	#Samp	30 dB				
Avg/VBVV Type Pwr (RMS)*	dB/ Offst					100
			s	pan 49.5 MHz	Γ F	Pwr (RMS) •
	20.77 dBm / 33.0000 MHz -54.42 dBm/Hz					106
106	Copyright 2000-2009 Agilent Te	echnologies			<u>Auto</u>	<u>Man</u>



Page 106 of 193

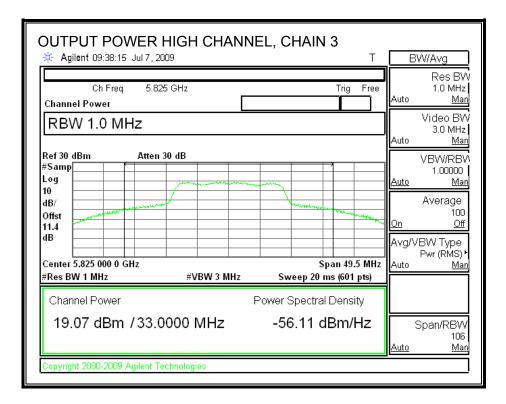
## **OUTPUT POWER, HIGH CHANNEL**





Page 107 of 193

OUTPUT POWER	BW/Avg		
Ch Freq 5.82 Channel Power	25 GHz	Trig Free	Res BV 1.0 MHz Auto <u>Ma</u>
RBW 1.0 MHz	Video BV 3.0 MHz Auto <u>Ma</u>		
Ref 30 dBm Atten #Samp Dog 10	30 dB		VBW/RB 1.00000 <u>Auto Ma</u>
dB/ Offst 11.4			Average 100 <u>On Off</u>
dB Center 5.825 000 0 GHz #Res BW 1 MHz	#VBW 3 MHz	Span 49.5 MHz Sweep 20 ms (601 pts)	Avg/VBW Type Pwr (RMS) Auto <u>Ma</u>
Channel Power		Power Spectral Density	]
19.11 dBm /33.0	0000 MHz	-56.08 dBm/Hz	Span/RBV 106 <u>Auto Ma</u>
Copyright 2000-2009 Agilent T	echnologies		



Page 108 of 193

# 7.5.4. AVERAGE POWER

### LIMITS

None; for reporting purposes only.

#### TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 11.4 dB (including 10 dB pad and 1.4 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

#### RESULTS

Channel	Frequency	Chain 0	Chain 1	Chain 2	Chain 3
		Power	Power	Power	Power
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)
Low	5745	20.42	20.80	20.58	20.56
Middle	5785	20.46	20.90	20.67	20.60
High	5825	19.21	18.90	19.22	19.13

Page 109 of 193

# 7.5.5. POWER SPECTRAL DENSITY

# LIMITS

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

#### TEST PROCEDURE

Output power was measured based on the use of RMS averaging over a time interval, therefore the power spectral density was measured using PSD Option 2 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

Preliminary tests on individual chains, and on all chains with a combiner, were performed. The worst-case configuration was with a combiner, therefore final test were performed with all chains feeding a combiner.

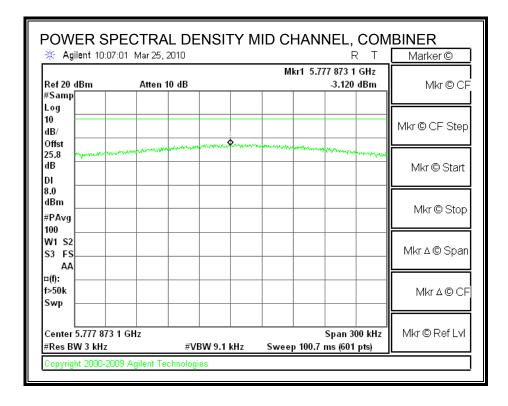
# **RESULTS**

Channel	Frequency	PSD with Combiner	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	5745	-2.942	8	-10.94
Middle	5785	-3.120	8	-11.12
High	5825	-6.414	8	-14.41

Page 110 of 193

#### **POWER SPECTRAL DENSITY**

n nglient it	0:00:57 Mar 25, 2010			RT	Freq/Channel
Ref 20 dBm ¢Samp	Atten 10 dB		Mkr1 5.744 120 -2.942	4 GHz 2 dBm	Center Freq 5.74415000 GHz
_og  0  B/					Start Freq 5.74400000 GHz
25.8	Concession and and the	and		par anna	Stop Freq 5.74430000 GHz
3.0 IBm ≰PA∨g I00					CF Step 30.0000000 kHz <u>Auto Mar</u>
N1 S2 53 FS					Freq Offset 0.00000000 Hz
¤(f): ⇒50k Swp					Signal Track On <u>Off</u>
Center 5.744 * Res BW 3 kH		W 9.1 kHz	Span 3 Sweep 100.7 ms (60	300 kHz	



Page 111 of 193

🔆 Agilent 08:10	):50 Jul 10, 2009			RT	BW	Avg
Ref 20 dBm #Samp	Atten 10 dB		Mkr1 5.819 763 -6.41	5 GHz 10 dBm	Auto	Res B\ 3.0 kHz Ma
Log 10 dB/		1				ideo B\ 9.1 kHz <u>Ma</u>
25.8 dB DI 8.0		hand the former of the	where where we wanted and the second se	and and the second s	VE <u>Auto</u>	3W/RB <sup>*</sup> 1.00000 <u>Ma</u>
dBm #PAvg 100					A' <u>On</u>	verage 100 <u>Of</u>
W1 S2 S3 FS					Avg/VBV Pv Auto	V Type vr (RMS) <u>Ma</u>
¤(f): f>50k Swp						
Center 5.819 750 #Res BW 3 kHz		9.1 kHz S	Span weep 100.7 ms (6(	300 kHz	Sp: <u>Auto</u>	an/RBV 108 Ma

Page 112 of 193

# 7.5.6. CONDUCTED SPURIOUS EMISSIONS

# LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

Output power was measured based on the use of RMS averaging over a time interval, therefore the required attenuation is 30 dBc.

#### TEST PROCEDURE

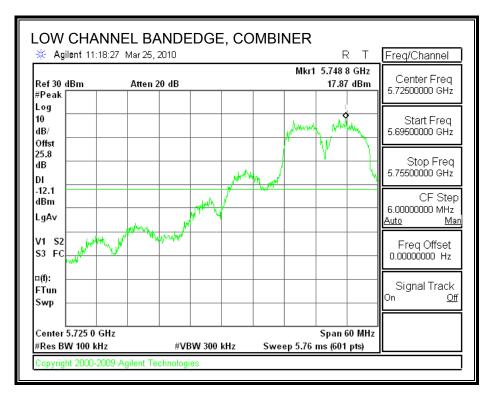
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

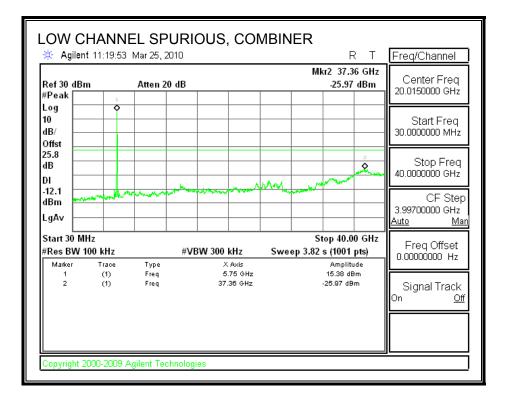
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

Preliminary tests on individual chains, and on all chains with a combiner, were performed. The worst-case configuration was with a combiner, therefore final test were performed with all chains feeding a combiner.

Page 113 of 193

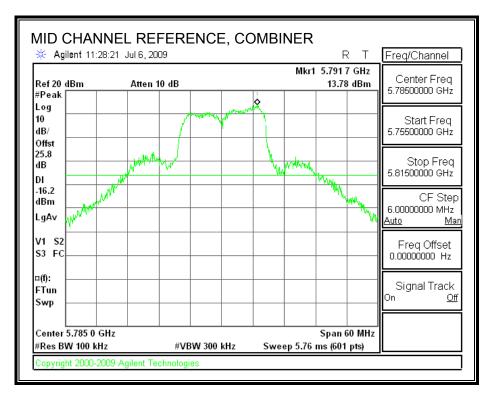
#### LOW CHANNEL SPURIOUS EMISSIONS

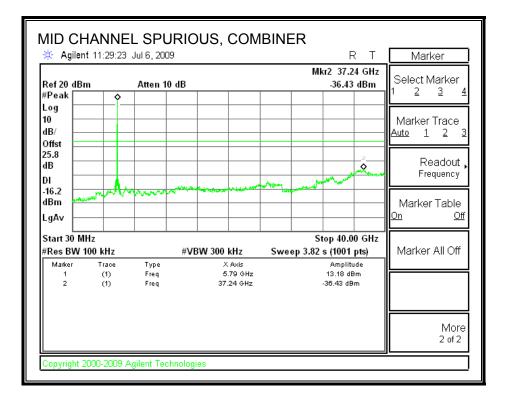




Page 114 of 193

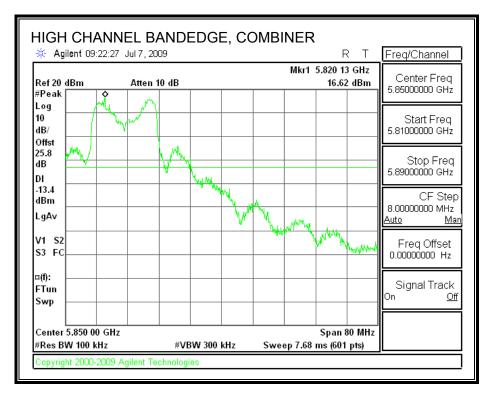
#### MID CHANNEL SPURIOUS EMISSIONS

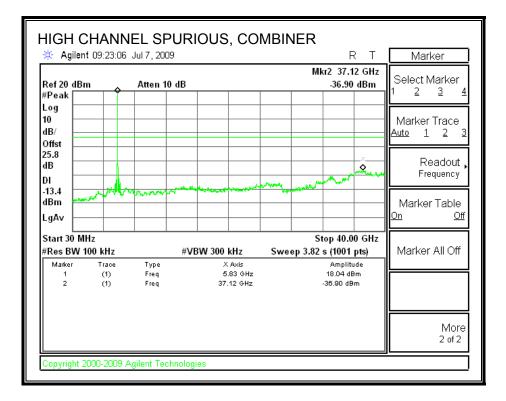




Page 115 of 193

#### HIGH CHANNEL SPURIOUS EMISSIONS





Page 116 of 193

# 7.6. 5.8 GHz BAND CHANNEL TESTS FOR 802.11n HT20 MODE

# 7.6.1. 6 dB BANDWIDTH

### **LIMITS**

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

The minimum 6 dB bandwidth shall be at least 500 kHz.

# TEST PROCEDURE

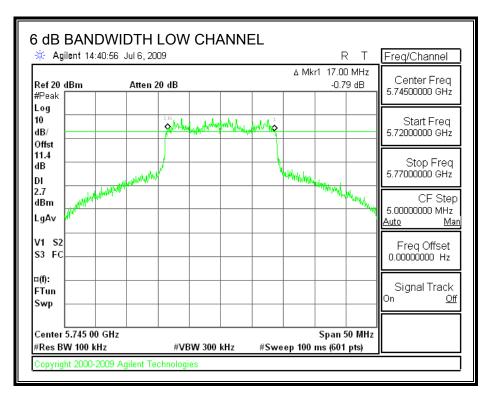
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

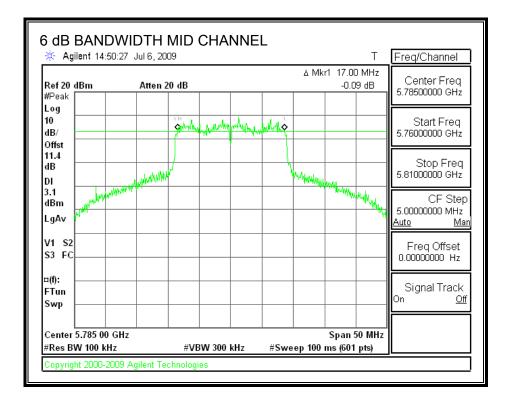
#### **RESULTS**

Channel	Frequency	6 dB BW	Minimum Limit
	(MHz)	(MHz)	(MHz)
Low	5745	17.00	0.5
Middle	5785	17.00	0.5
High	5825	16.50	0.5

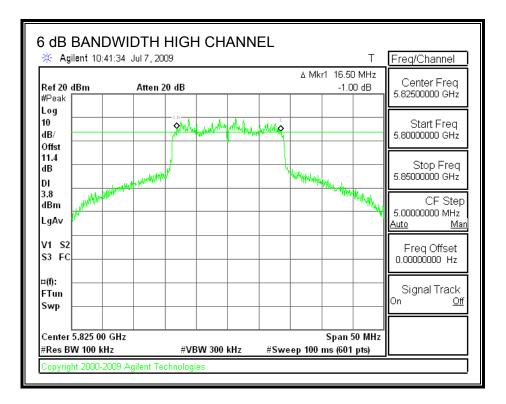
Page 117 of 193

#### 6 dB BANDWIDTH





Page 118 of 193



Page 119 of 193

# 7.6.2. 99% & 26 dB BANDWIDTH

#### **LIMITS**

None; for reporting purposes only.

#### TEST PROCEDURE

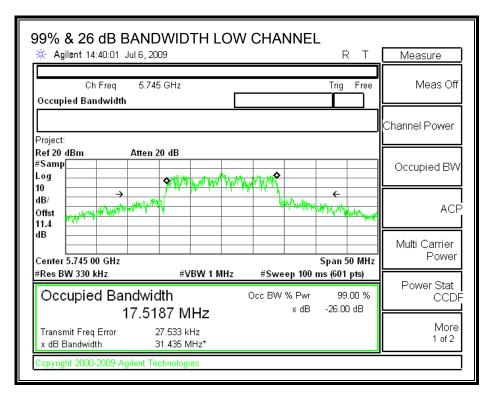
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth measurement function is utilized.

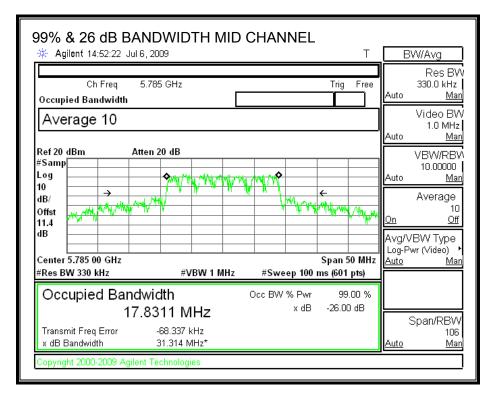
#### **RESULTS**

Channel	Frequency	99% OBW	26 dB BW
	(MHz)	(MHz)	(MHz)
Low	5745	17.52	31.44
Middle	5785	17.83	31.31
High	5825	17.58	31.29

Page 120 of 193

#### 99% & 26 dB BANDWIDTH





Page 121 of 193

99% & 26 dB BANDWIDTH HIGH CHANNE	L T	Measure
Ch Freq 5.825 GHz Occupied Bandwidth	Trig Free	Meas Off
Average 10		Channel Power
Ref 20 dBm Atten 20 dB #Samp		Occupied BW
dB/ Offst 11.4		ACP
dB Center 5.825 00 GHz #Res BW 330 kHz #VBW 1.2 MHz #Sweep 100	Span 50 MHz ms (601 pts)	Multi Carrier Power
Occupied Bandwidth Occ BW % Pwr 17.5760 MHz × dB	99.00 %	Power Stat CCDF
Transmit Freq Error 61.513 kHz x dB Bandwidth 31.285 MHz*		More 1 of 2
Copyright 2000-2009 Agilent Technologies		

Page 122 of 193

# 7.6.3. OUTPUT POWER

## **LIMITS**

FCC §15.247 (b)

IC RSS-210 A8.4

#### TEST PROCEDURE

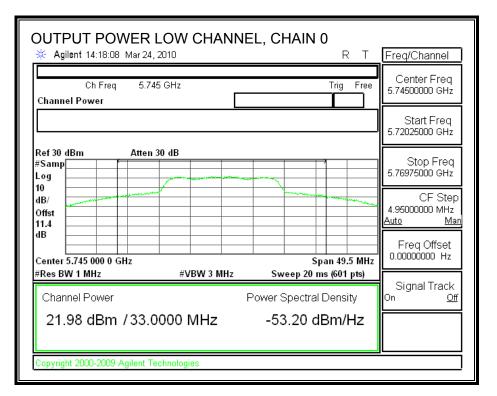
Output power was measured based on the use of RMS averaging over a time interval in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

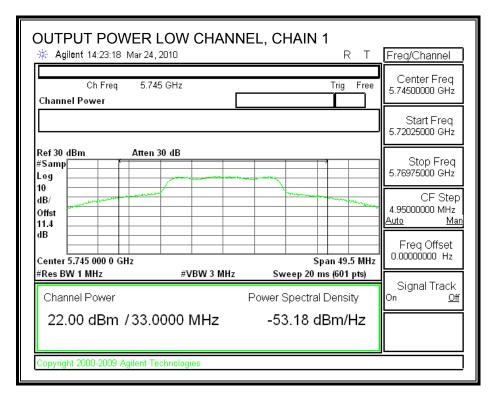
#### **RESULTS**

The maximum antenna gain is less than 6 dBi, therefore the limit is 30 dBm.

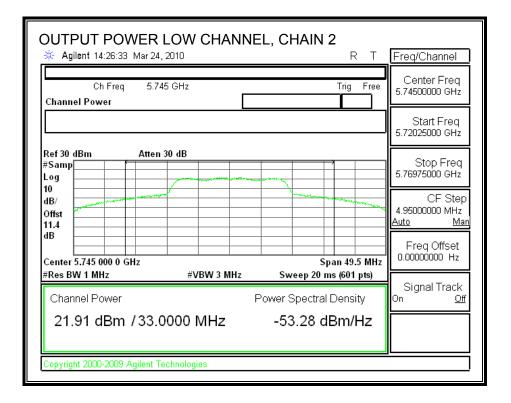
Channel	Frequency	Chain 0	Chain 1	Chain 2	Chain 3	Total	Limit	Margin
		Power	Power	Power	Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5745	21.98	22.00	21.91	21.67	27.91	30	-2.09
Mid	5785	21.81	21.92	21.89	21.73	27.86	30	-2.14
High	5825	19.23	19.19	19.28	19.16	25.24	30	-4.76

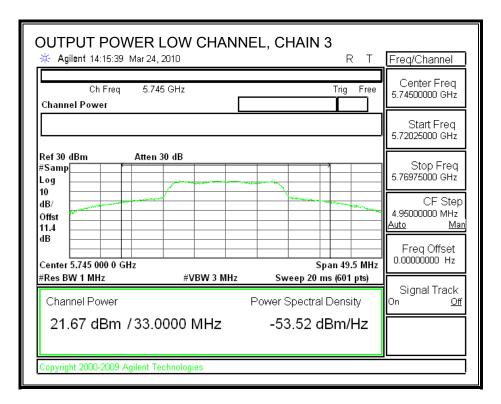
#### **OUTPUT POWER, LOW CHANNEL**





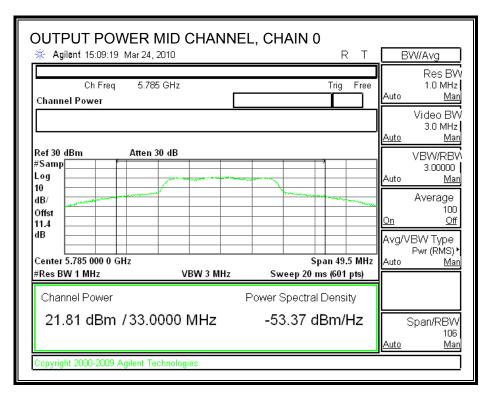
Page 124 of 193

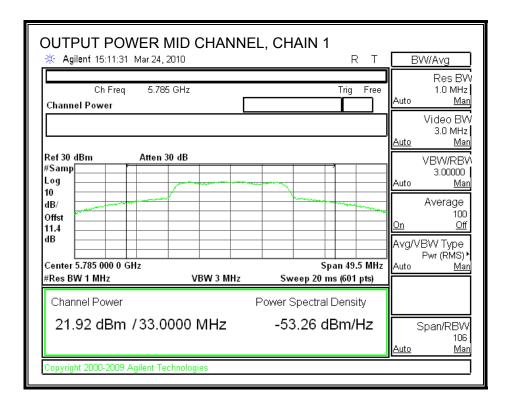




Page 125 of 193

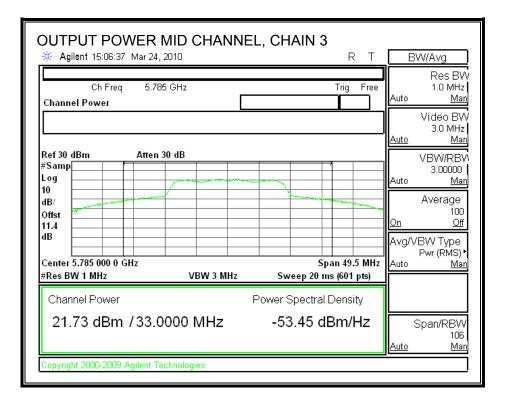
#### **OUTPUT POWER, MID CHANNEL**





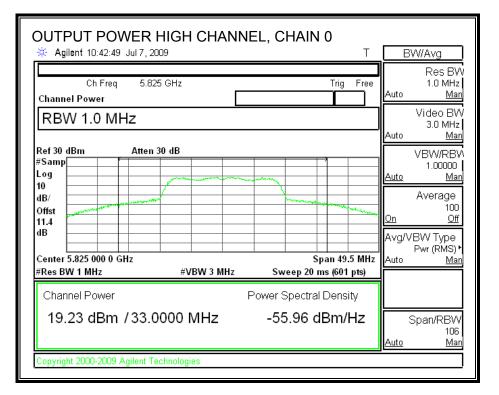
Page 126 of 193

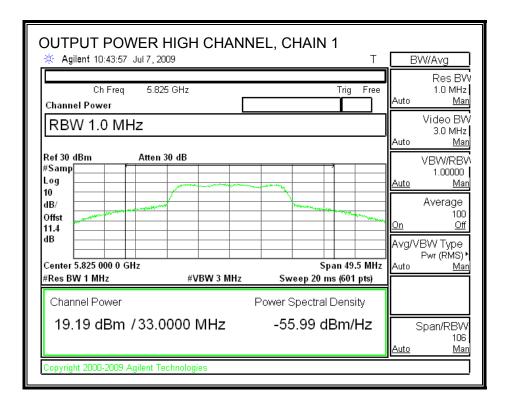
🎋 Agilent 14:59:16 Mar 24,	2010		RT	BM	//Avg
Ch Freq 5.78 Channel Power	5 GHz		Trig Free	Auto	Res B\ 1.0 MHz <u>Ma</u>
				۱ <u>Auto</u>	/ideo BV 3.0 MHz <u>Ma</u>
Ref 30 dBm Atten	30 dB			\ Auto	/BW/RB 3.00000 <u>Ma</u>
IB/				, <u>On</u>	Average 100 <u>Of</u>
IB		Spar	1 49.5 MHz		3W Type Pwr (RMS) Ma
≉Res BW 1 MHz	VBW 3 MHz	Sweep 20 ms		, idto	<u></u>
Channel Power		Power Spectral D	ensity		
21.89 dBm /33.0	000 MHz	-53.30 dB	m/Hz	S; Auto	can/RBV 108 Ma



Page 127 of 193

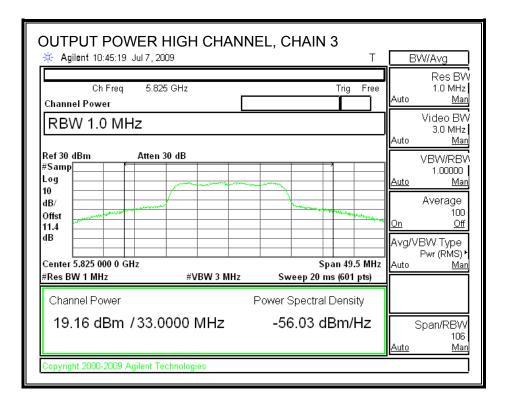
#### **OUTPUT POWER, HIGH CHANNEL**





Page 128 of 193

OUTPUT POWER		EL, CHAIN 2	BW/Avg
Ch Freq 5.82 Channel Power	5 GHz	Trig Free	Res BV 1.0 MHz Auto <u>Mar</u>
RBW 1.0 MHz			Video BV 3.0 MHz Auto <u>Mar</u>
Ref 30 dBm Atten #Samp Log 10 dB/ constant	30 dB		VBVV/RB\ 1.00000 <u>Auto Mar</u> Average
Offst 11.4 dB			Avg/VBW Type Pwr (RMS)
Center 5.825 000 0 GHz #Res BW 1 MHz	#VBW 3 MHz	Span 49.5 MHz Sweep 20 ms (601 pts)	Auto <u>Mar</u>
Channel Power	F	Power Spectral Density	]
19.28 dBm /33.0	0000 MHz	-55.91 dBm/Hz	Span/RBW 106 Auto Mar
Copyright 2000-2009 Agilent Te	chnologies		



Page 129 of 193

# 7.6.4. AVERAGE POWER

### LIMITS

None; for reporting purposes only.

#### TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 11.4 dB (including 10 dB pad and 1.4 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

#### **RESULTS**

Channel	Frequency	Chain 0	Chain 1	Chain 2	Chain 3
		Power	Power	Power	Power
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)
Low	5745	21.80	21.83	21.70	21.50
Middle	5785	21.46	21.60	21.63	21.73
High	5825	19.23	19.2	19.27	19.17

Page 130 of 193

# 7.6.5. POWER SPECTRAL DENSITY

# LIMITS

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

#### TEST PROCEDURE

Output power was measured based on the use of RMS averaging over a time interval, therefore the power spectral density was measured using PSD Option 2 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

Preliminary tests on individual chains, and on all chains with a combiner, were performed. The worst-case configuration was with a combiner, therefore final test were performed with all chains feeding a combiner.

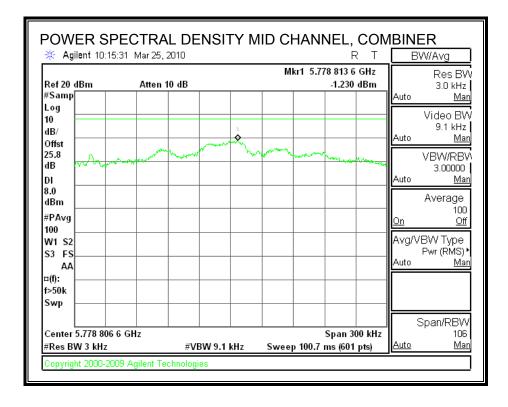
# **RESULTS**

Channel	Frequency	PSD with Combiner	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	5745	-4.516	8	-12.52
Middle	5785	-1.230	8	-9.23
High	5825	0.326	8	-7.67

Page 131 of 193

#### POWER SPECTRAL DENSITY

🔆 Agilent 10:11:	:55 Mar 25, 2010			RT	Peak Search
Ref 20 dBm Samp	Atten 10 dB		Mkr1 5.744 4 4	108 6 GHz 1.516 dBm	Next Peak
.og 0 IB/					Next Pk Right
5.8 IB )I	man and a second a		- market and a second s		Next Pk Left
:.0 IBm ⊧PAvg					Min Search
00 V1 S2 53 FS AA					Pk-Pk Search
l(f): >50k Swp					Mkr © Cł
Center 5.744 416 i Res BW 3 kHz		N 9.1 kHz	Sp Sweep 100.7 ms	an 300 kHz (601 pts)	More 1 of 2



Page 132 of 193

Agilent 08:18:01 Jul 10, 2009				BW/Avg	
Ref 20 dBm #Samp	Atten 10 dB		Mkr1 5.7	78 805 0 GHz 0.326 dBm	Res BV 3.0 kHz Auto Mai
Log 10 dB/ Offst					Video BV 9.1 kHz Auto <u>Ma</u>
25.8			M	Mum	VBW/RB\ 1.00000 <u>Auto Mar</u>
dBm #PA∨g 100					Average 100 <u>On Off</u>
W1 S2 S3 FS					Avg/VBW Type Pwr (RMS) <sup>1</sup> Auto <u>Ma</u>
¤(f): f>50k Swp					
Center 5.778 800 #Res BW 3 kHz		/BW 9.1 kHz	Sweep 100.7	Span 300 kHz ms (601 pts)	Span/RBV 106 <u>Auto Ma</u>

Page 133 of 193

# 7.6.6. CONDUCTED SPURIOUS EMISSIONS

# <u>LIMITS</u>

FCC §15.247 (d)

IC RSS-210 A8.5

Output power was measured based on the use of RMS averaging over a time interval, therefore the required attenuation is 30 dBc.

#### TEST PROCEDURE

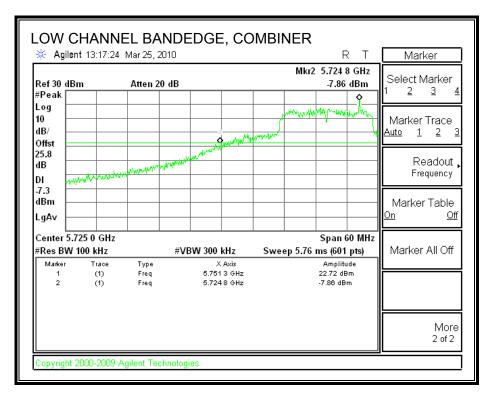
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

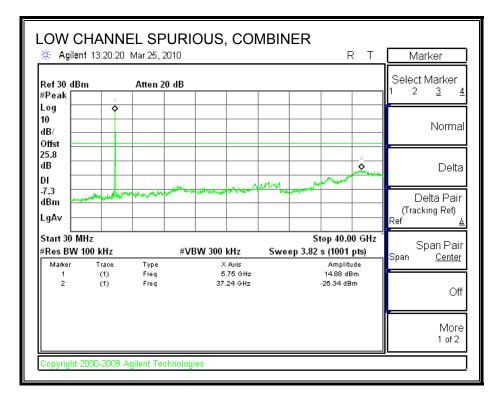
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

Preliminary tests on individual chains, and on all chains with a combiner, were performed. The worst-case configuration was with a combiner, therefore final test were performed with all chains feeding a combiner.

Page 134 of 193

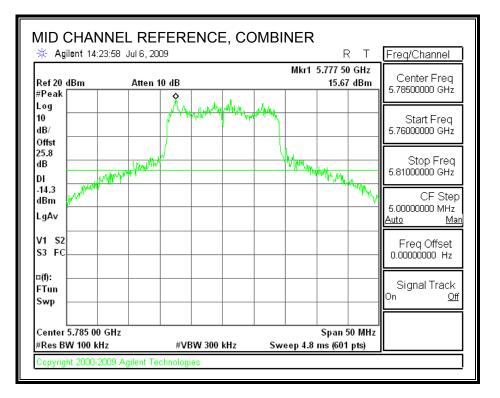
#### LOW CHANNEL SPURIOUS EMISSIONS

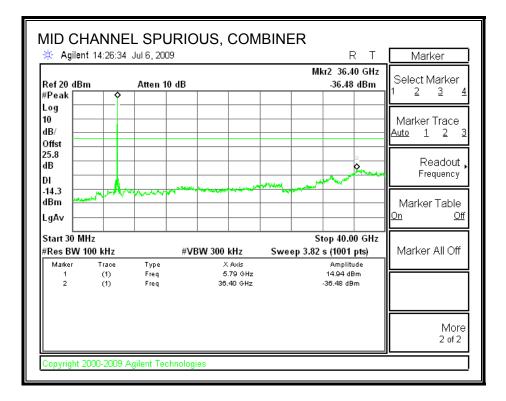




Page 135 of 193

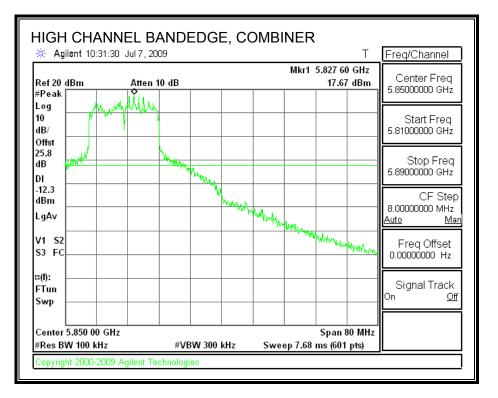
#### MID CHANNEL SPURIOUS EMISSIONS

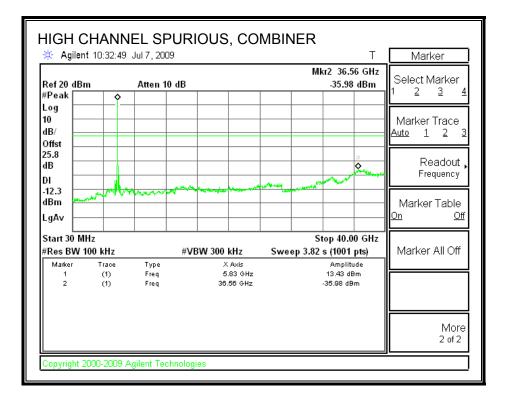




Page 136 of 193

#### HIGH CHANNEL SPURIOUS EMISSIONS





Page 137 of 193

# 7.7. 5.8 GHz BAND CHANNEL TESTS FOR 802.11n HT40 MODE

# 7.7.1. 6 dB BANDWIDTH

# LIMITS

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

The minimum 6 dB bandwidth shall be at least 500 kHz.

# TEST PROCEDURE

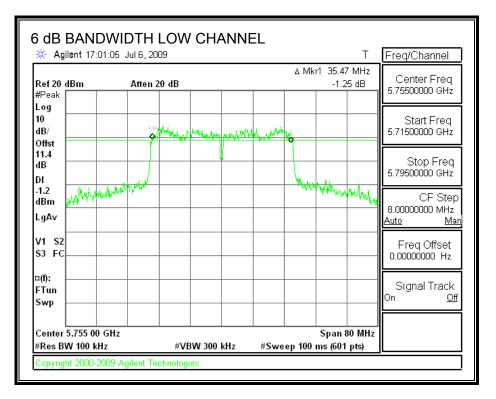
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

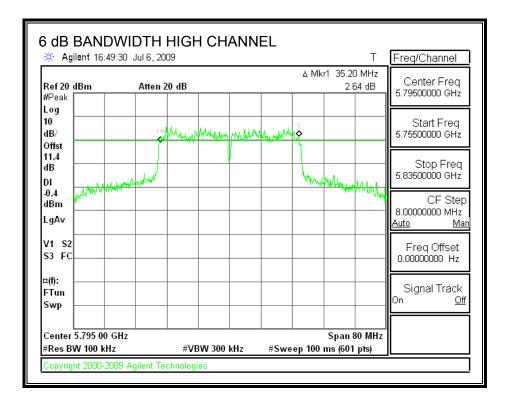
#### **RESULTS**

Channel	Frequency	6 dB BW	Minimum Limit
	(MHz)	(MHz)	(MHz)
Low	5755	35.47	0.5
High	5795	35.20	0.5

Page 138 of 193

#### 6 dB BANDWIDTH





Page 139 of 193

# 7.7.2. 99% & 26 dB BANDWIDTH

### LIMITS

None; for reporting purposes only.

### TEST PROCEDURE

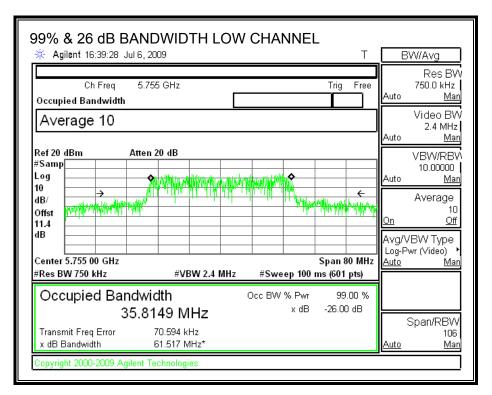
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth measurement function is utilized.

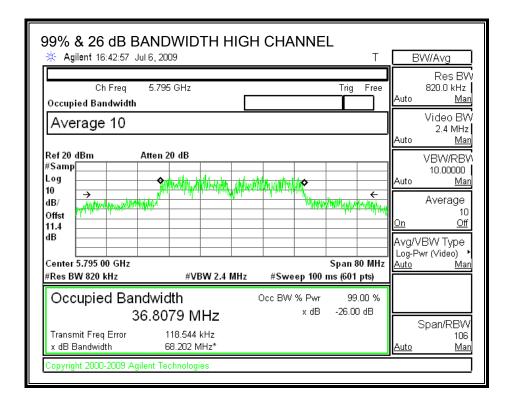
#### **RESULTS**

Channel	Frequency	99% OBW	26 dB BW
	(MHz)	(MHz)	(MHz)
Low	5755	35.8149	61.517
High	5795	36.8079	68.202

Page 140 of 193

#### 99% & 26 dB BANDWIDTH





Page 141 of 193

# 7.7.3. OUTPUT POWER

# LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

# TEST PROCEDURE

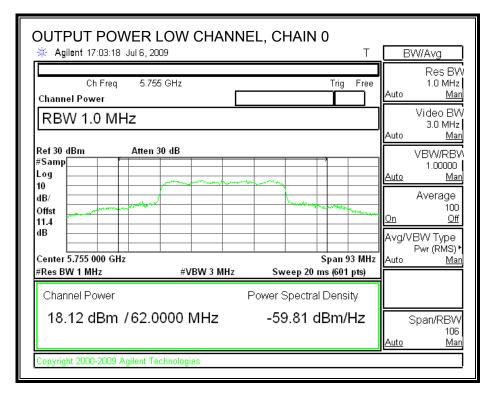
Output power was measured based on the use of RMS averaging over a time interval in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

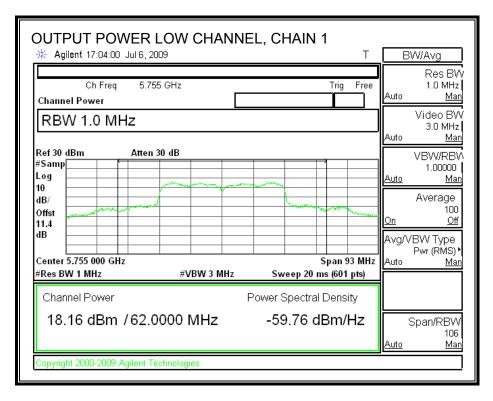
#### **RESULTS**

The maximum antenna gain is less than 6 dBi, therefore the limit is 30 dBm.

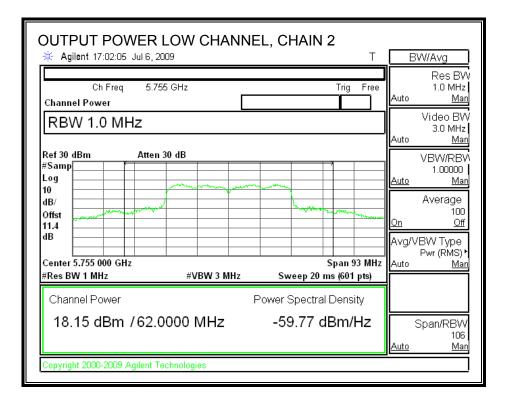
Channel	Frequency	Chain 0	Chain 1	Chain 2	Chain 3	Total	Limit	Margin
		Power	Power	Power	Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5755	18.12	18.16	18.15	18.10	24.15	30.00	-5.85
High	5795	21.93	21.91	21.97	21.75	27.91	30.00	-2.09

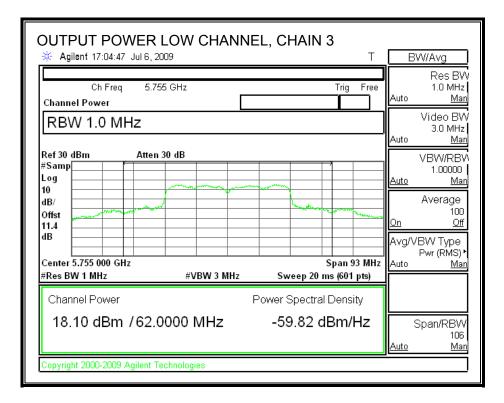
#### **OUTPUT POWER, LOW CHANNEL**





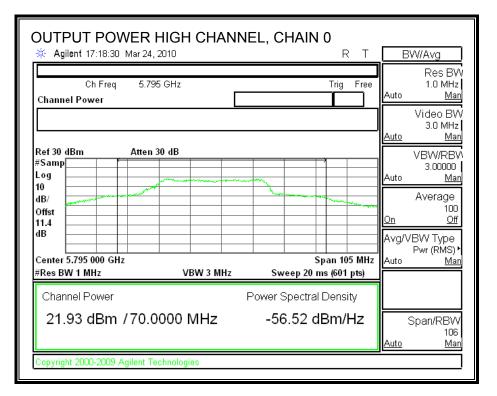
Page 143 of 193

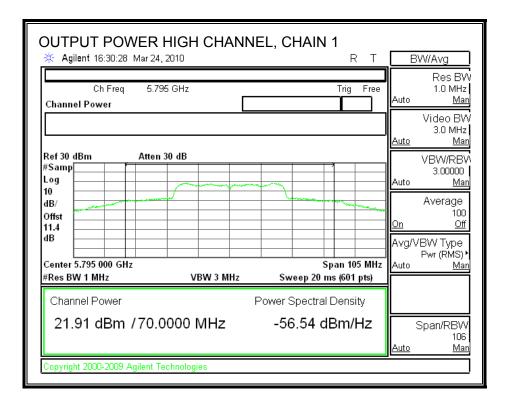




Page 144 of 193

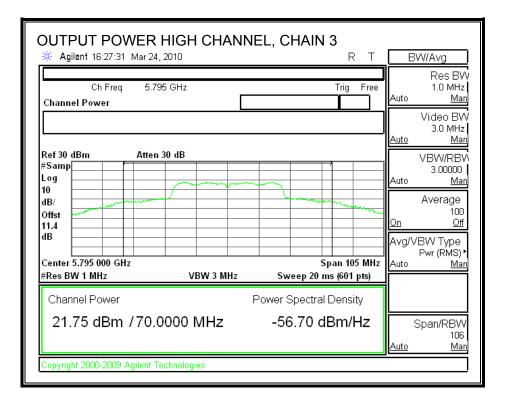
## **OUTPUT POWER, HIGH CHANNEL**





Page 145 of 193

Agilent 17:20:32 Mar 24, 2010	H CHANN	IEL, CHAI	N 2 R T	BW	/Avg
Ch Freq 5.795 GHz Channel Power	<u>.</u>		Trig Free		Res BW 1.0 MHz <u>Man</u> ideo BW 3.0 MHz
Ref 30 dBm         Atten 30 dB           #Samp				Auto A <u>On</u> Avg/VB	Man BW/RBV 3.00000   Man Verage 100 Off W Type wr (RMS) *
Center 5.795 000 GHz #Res BW 1 MHz	VBW 3 MHz	Sweep 2	Span 105 MHz 0 ms (601 pts)	Auto	<u>Mar</u>
Channel Power 21.97 dBm / 70.0000	) MHz	Power Spect -56.48	ral Density dBm/Hz	Sp <u>Auto</u>	an/RBW 106 <u>Mar</u>
Copyright 2000-2009 Agilent Technol	ogies				



Page 146 of 193

## 7.7.4. AVERAGE POWER

## LIMITS

None; for reporting purposes only.

## TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 11.4 dB (including 10 dB pad and 1.4 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

## **RESULTS**

Channel	Frequency	Chain 0	Chain 1	Chain 2	Chain 3
		Power	Power	Power	Power
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)
Low	5755	18.13	18.29	18.15	17.92
High	5795	21.65	21.67	21.69	21.50

Page 147 of 193

## 7.7.5. POWER SPECTRAL DENSITY

## <u>LIMITS</u>

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

## TEST PROCEDURE

Output power was measured based on the use of RMS averaging over a time interval, therefore the power spectral density was measured using PSD Option 2 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

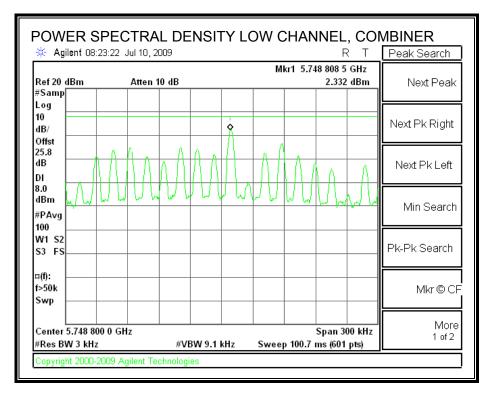
Preliminary tests on individual chains, and on all chains with a combiner, were performed. The worst-case configuration was with a combiner, therefore final test were performed with all chains feeding a combiner.

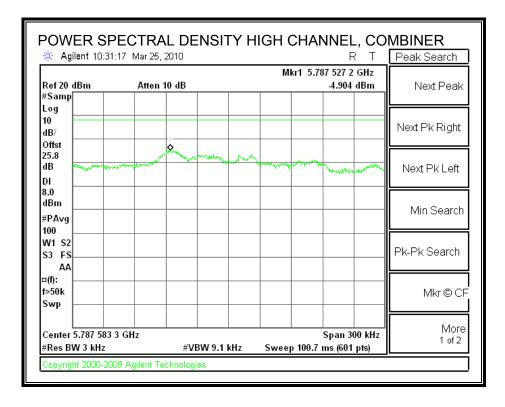
## **RESULTS**

Channel	Frequency	PSD with Combiner	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	5755	2.332	8	-5.67
High	5795	-4.904	8	-12.90

Page 148 of 193

## **POWER SPECTRAL DENSITY**





Page 149 of 193

## 7.7.6. CONDUCTED SPURIOUS EMISSIONS

## <u>LIMITS</u>

FCC §15.247 (d)

IC RSS-210 A8.5

Output power was measured based on the use of RMS averaging over a time interval, therefore the required attenuation is 30 dBc.

## TEST PROCEDURE

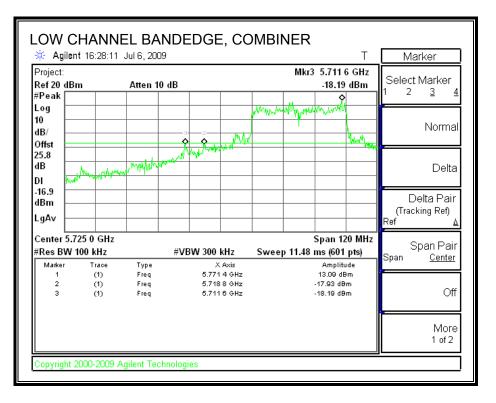
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

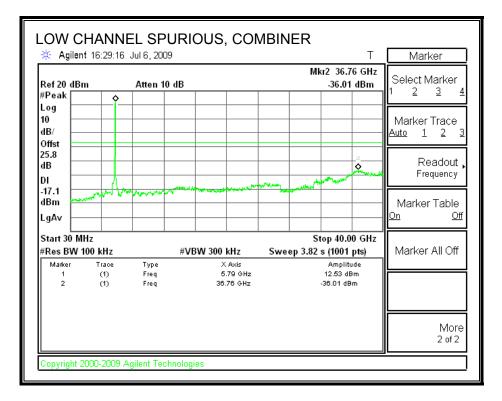
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

Preliminary tests on individual chains, and on all chains with a combiner, were performed. The worst-case configuration was with a combiner, therefore final test were performed with all chains feeding a combiner.

Page 150 of 193

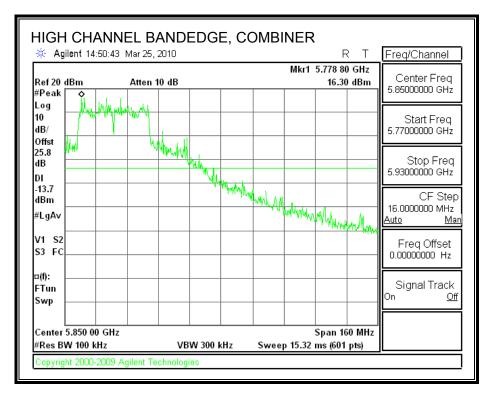
### LOW CHANNEL SPURIOUS EMISSIONS

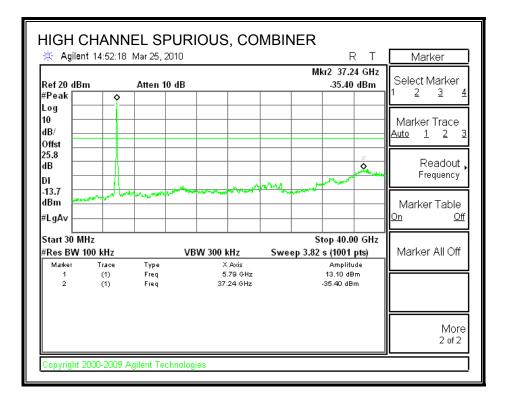




Page 151 of 193

### HIGH CHANNEL SPURIOUS EMISSIONS





Page 152 of 193

## 7.8. RECEIVER CONDUCTED SPURIOUS EMISSIONS

## LIMITS

IC RSS-GEN 7.2.3.1

Antenna Conducted Measurement: Receiver spurious emissions at any discrete frequency shall not exceed 2 nanowatts (-57 dBm) in the band 30-1000 MHz, or 5 nanowatts (-53 dBm) above 1 GHz.

## TEST PROCEDURE

IC RSS-GEN 4.10, Conducted Method

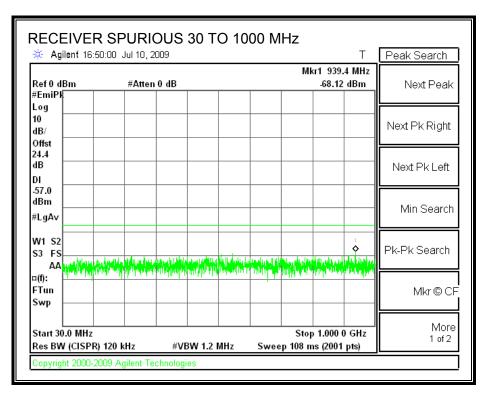
The receiver antenna port is connected to a spectrum analyzer.

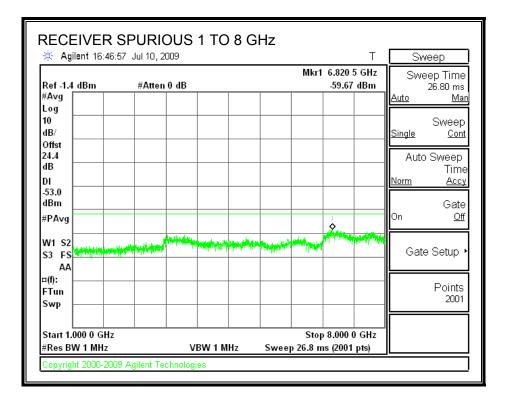
The spectrum from 30 MHz to 8 GHz is investigated with the receiver set to the middle channel of the 2.4 GHz band.

The spectrum from 30 MHz to 18 GHz is investigated with the receiver set to the middle channel of each 5 GHz band.

Preliminary tests on individual chains, and on all chains with a combiner, were performed. The worst-case configuration was with a combiner, therefore final test were performed with all chains feeding a combiner.

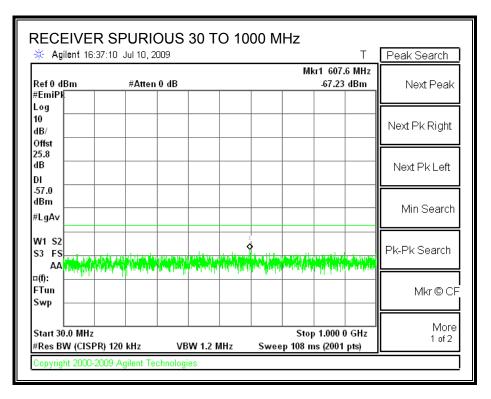
### **RECEIVER SPURIOUS EMISSIONS IN THE 2.4 GHz BAND**

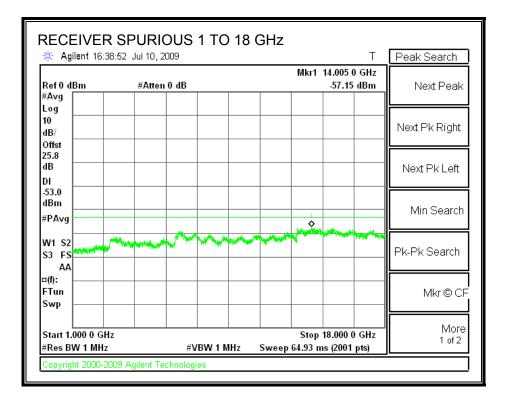




Page 154 of 193

### **RECEIVER SPURIOUS EMISSIONS IN THE 5.8 GHz BAND**





Page 155 of 193

## 8. RADIATED TEST RESULTS

## 8.1. LIMITS AND PROCEDURE

## <u>LIMITS</u>

FCC §15.205 and §15.209

IC RSS-210 Clause 2.6 (Transmitter)

IC RSS-GEN Clause 6 (Receiver)

Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

## TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.4. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.

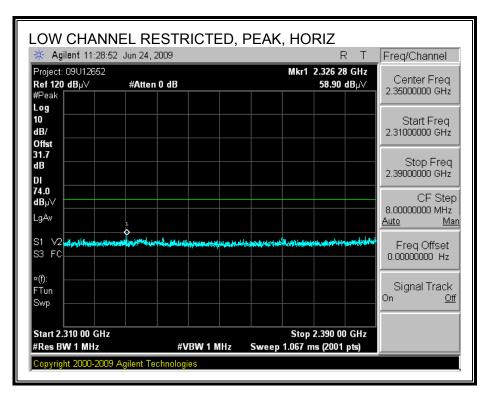
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

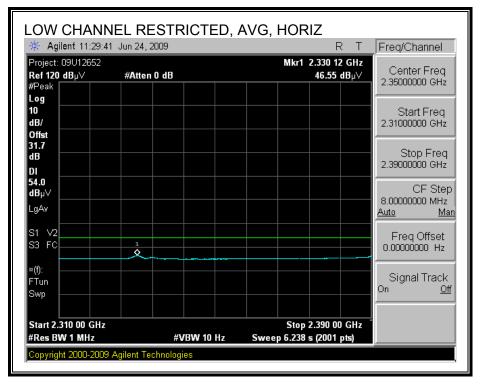
Page 156 of 193

## 8.2. TRANSMITTER ABOVE 1 GHz

## 8.2.1. 802.11b MODE IN THE 2.4 GHz BAND

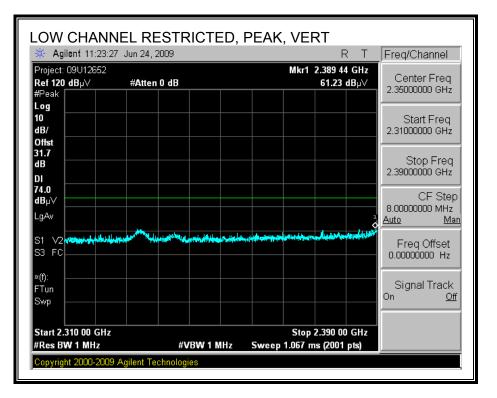
### RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

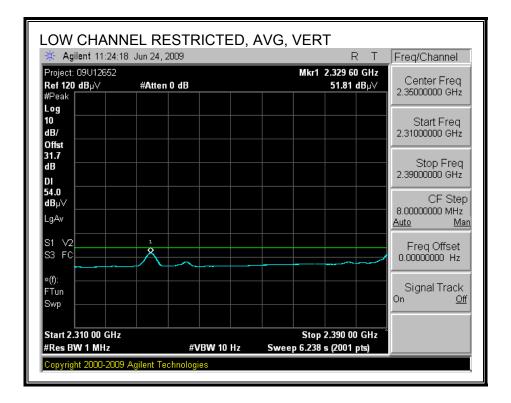




Page 157 of 193

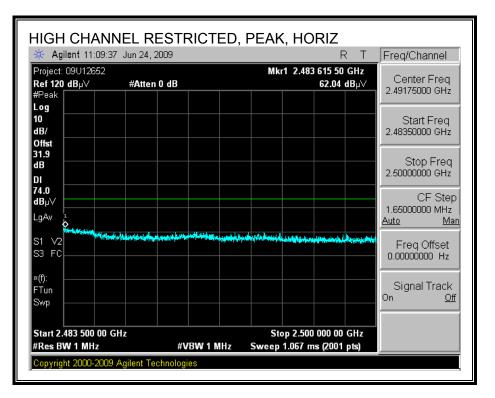
## **RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**

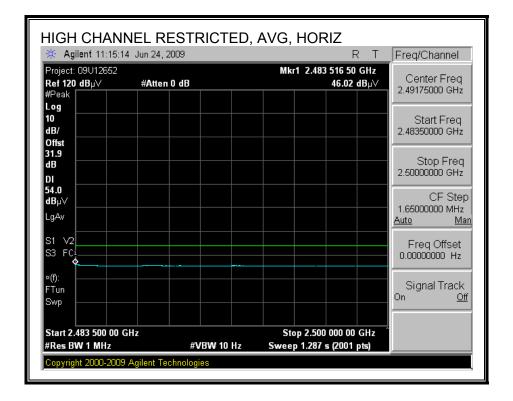




Page 158 of 193

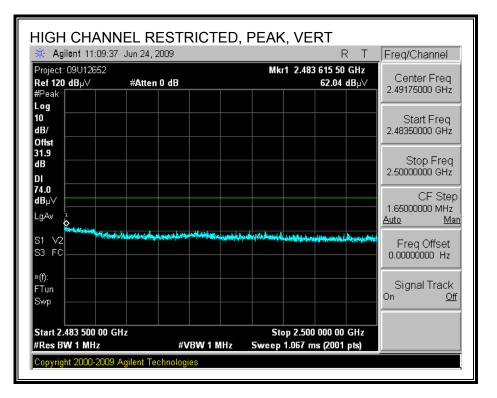
## **RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)**

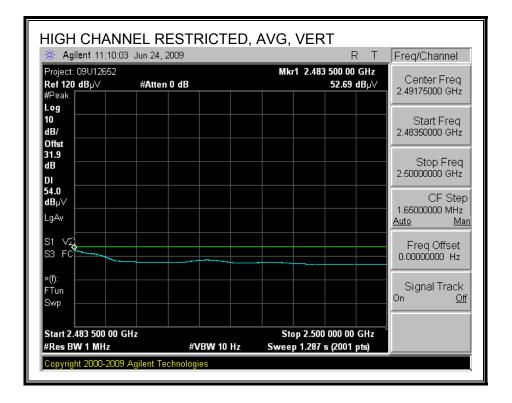




Page 159 of 193

## **RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)**





Page 160 of 193

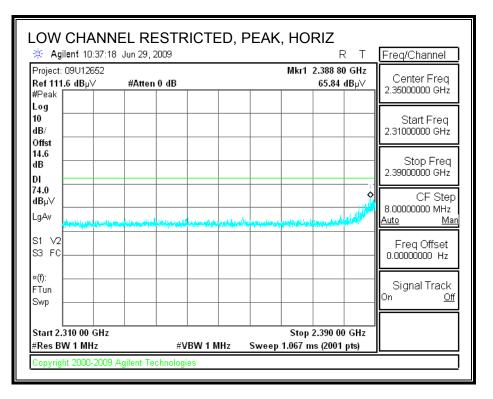
### HARMONICS AND SPURIOUS EMISSIONS

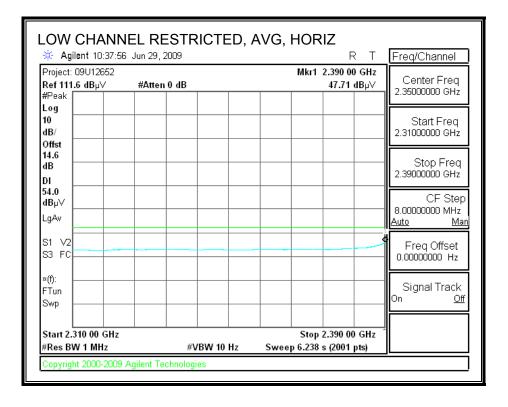
Date:		William		g											
		02/11/10													
Project #:		09U1268		-											
Company:		Qualcor		eless											
EUT Descr	iption:			~ 1											
EUT M/N:		Card SN		UI											
Test Targe		FCC 15.		w											
Mode Ope	r: f	T0T1T2T Measurer	,			D	• • • • •			A	F:- 13 C4				
	ı Dist	Distance			-	Preamp ( Distance			4	-	Field Stren dd Strength	-			
	Read	Analyzer			Avg			trength @			na strengtn 75. Average				
	AF	Antenna	-		Avg Peak	-		: Field Stre		-	rs. Average rs. Peak Lii				
	CL	Cable Lo:			HPF	High Pas:			engin	wargin v	75. Feak Lu	aut			
	CL.	Cable Lo:	**		IIFF	ilign Fas:	, rmei								
f	Dist	Read	AF	CL	Amp	D Corr	Fltr	Corr.	Limit	Margin	Ant. Pol.	Det	AntHigh	Table Angle	Notes
GHz	(m)	dBuV	dB/m	dB	aB	dB	dB	dBuV/m	dBuV/m		V/H	P/A/QP	cm	Degree	
Low Ch. 2	412 MF	łz													
4.824	3.0	46.7	33.0	5.8	-36.5	0.0	0.6	49.6	74.0	-24.4	V	Р	101.7	263.2	
4.824	3.0	44.1	33.0	5.8	-36.5	0.0	0.6	47.0	54.0	-7.0	V	A	101.7	263.2	
4.824	3.0	40.9	33.0	5.8	-36.5	0.0	0.6	43.9	74.0	- <b>30.1</b>	H	Р	100.0	315.5	
4.824	3.0	32.9	33.0	5.8	-36.5	0.0	0.6	35.9	54.0	-18.2	H	A	100.0	315.5	
Mid Ch. 2								F	- 10			Р	101.0	140.4	
4.874 4.874	3.0 3.0	50.8 49.2	33.1 33.1	5.8 5.8	-36.5 -36.5	0.0 0.0	0.6 0.6	53.9 52.3	74.0 54.0	-20.1 -1.7	V V	P A	101.0 101.0	148.4 148.4	
4.874	3.0	47.2	33.1	5.8	-36.5	0.0	0.6	45.7	54.0 74.0	-28.3	Р Н	P	101.0	260.4	
4.874	3.0	37.8	33.1	5.8	-36.5	0.0	0.6	40.9	54.0	-13.1	H	Å	100.0	260.4	
7.311	3.0	51.8	35.3	7.3	-36.2	0.0	0.6	58.8	74.0	-15.2	v	P	131.7	97.7	
7.311	3.0	44.7	35.3	7.3	-36.2	0.0	0.6	51.7	54.0	-2.3	V	A	131.7	97.7	
7.311	3.0	45.6	35.3	7.3	-36.2	0.0	0.6	52.6	74.0	- <b>21.4</b>	H	Р	100.2	65.9	
7.311	3.0	35.2	35.3	7.3	-36.2	0.0	0.6	42.2	54.0	-11.8	H	A	100.2	65.9	
High Ch.				ļ											
4.924	3.0	50.4	33.1	5.9	-36.5	0.0	0.6	53.6	74.0	-20.4	V	P	102.0	234.8	
4.924	3.0	48.2	33.1	5.9	-36.5	0.0	0.6	51.3	54.0	-2.7	V	A	102.0	234.8	
4.924 4.924	3.0 3.0	41.4 34.9	33.1 33.1	5.9 5.9	-36.5 -36.5	0.0 0.0	0.6 0.6	44.6 38.1	74.0 54.0	-29.4 -15.9	H H	P A	101.0 101.0	177.9 177.9	
4.924 7.386	3.0	34.9 45.0	35.4	7.3	-36.2	0.0	0.6	38.1 52.2	54.U 74.0	-15.9	n V	A P	101.0	136.6	
7.386	3.0	38.5	35.4	7.3	-36.2	0.0	0.6	45.6	54.0	-8.4	v	A A	156.6	136.6	
7.386	3.0	39.9	35.4	7.3	-36.2	0.0	0.6	47.1	74.0	-26.9	Ĥ	P	108.3	74.5	
7.386	3.0	30.4	35.4	7.3	-36.2	0.0	0.6	37.5	54.0	-16.5	H	Ā	108.3	74.5	

Page 161 of 193

## 8.2.2. 802.11g MODE IN THE 2.4 GHz BAND

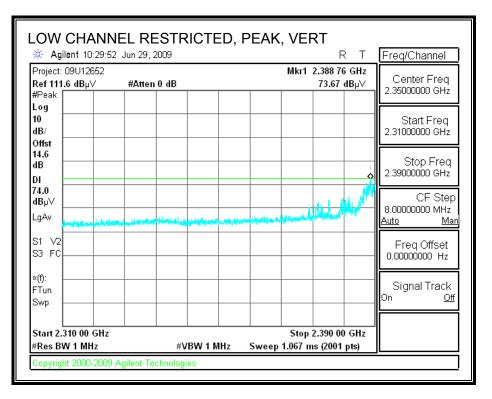
#### **RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)**

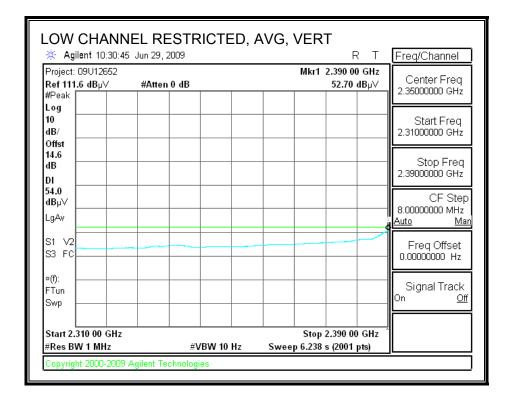




Page 162 of 193

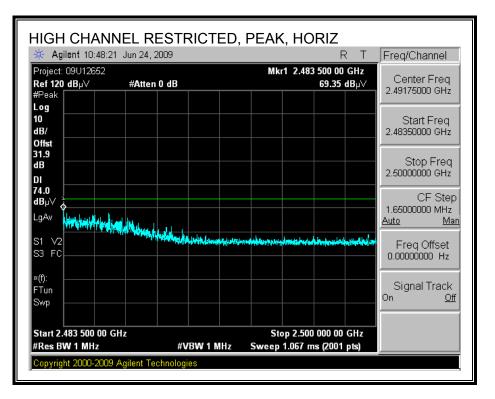
### **RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**

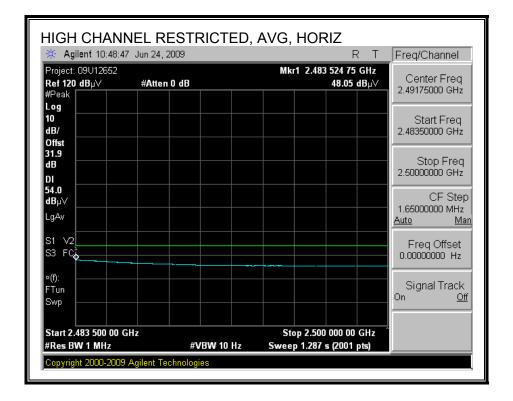




Page 163 of 193

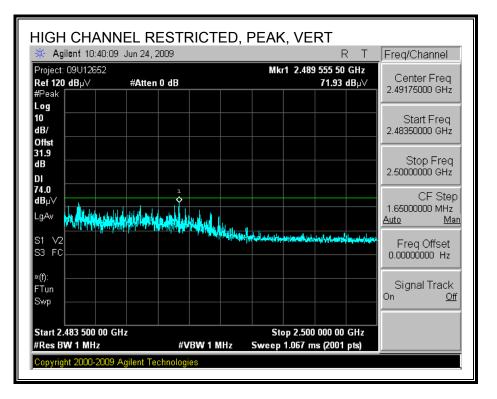
## **RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)**

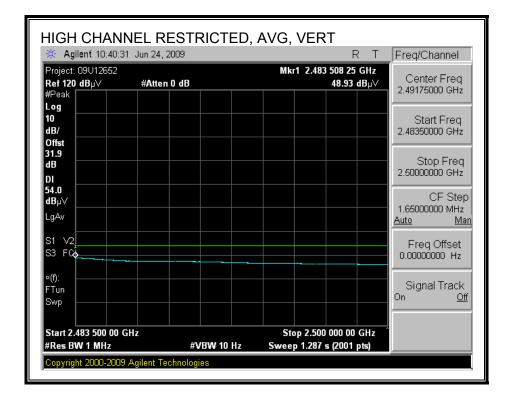




Page 164 of 193

## **RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)**





Page 165 of 193

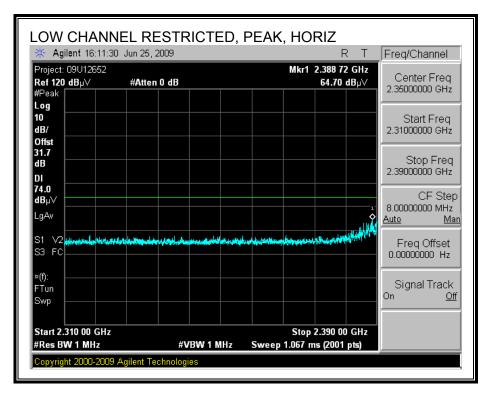
### HARMONICS AND SPURIOUS EMISSIONS

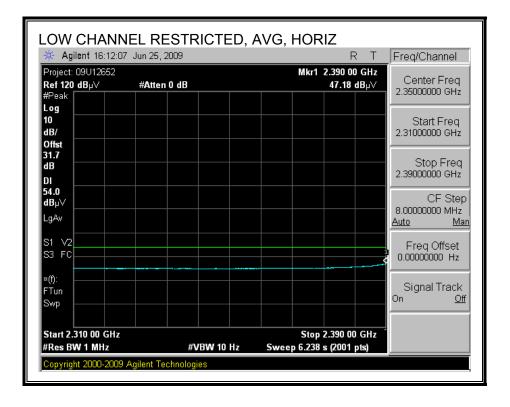
-	•	William		g											
Date:		02/16/10													
Project #		09U1268													
Company FIT D		Qualcor		eless											
EUT Desc EUT M/N:		Card SN		~											
COI MDN: Test Targ		FCC 15.		01											
Mode Op		TOTIT2T		Mada											
mode Op	f	Measurer				Preamp (	Lain			A 170 YO 40	Field Stren	oth I innit			
	Dist	Distance			-	Distance		nt to 3 met	ors	-	eld Strength	-			
	Read	Analyzer			Avg			trength @			vs. Average				
	AF	Antenna	-		Peak	-		: Field Stre		-	vs. Peak Li				
	CL	Cable Lo:			HPF	High Pass			******	-varent .	, can bi				
f	Dist	Read	AF	CL	Amp	D Corr	Fltr	Corr.	Limit	Margin	Ant. Pol.	Det	Ant.High	Table Angle	Notes
GHz	(m)	dBuV	dB/m	dB	dB	dB	dB	dBuV/m	dBuV/m	dB	V/H	P/A/QP	cm	Degree	
Low Ch. 3	2412 MF	łz													
4.824	3.0	44.4	33.0	5.8	-36.5	0.0	0.0	46.7	74.0	-27.3	V	P	114.8	338.0	
4.824	3.0	32.2	33.0	5.8	-36.5	0.0	0.0	34.6	54.0	-19.4	V	A	114.8	338.0	
4.824	3.0	39.1	33.0	5.8	-36.5	0.0	0.0	41.4	74.0	-32.6	H	Р	100.0	164.1	
4.824	3.0	26.5	33.0	5.8	-36.5	0.0	0.0	28.8	54.0	-25.2	H	A	100.0	164.1	
Mid Ch. 2		·····					~ ~ ~						100.0		
4.874	3.0	52.2	33.1	5.8	-36.5	0.0	0.0	54.7	74.0	-19.3	V	Р	100.0	55.1	
4.874 4.874	3.0 3.0	40.2 43.2	33.1 33.1	5.8 5.8	-36.5 -36.5	0.0 0.0	0.0	42.7 45.7	54.0 74.0	-11.3 -28.3	V H	A P	100.0 100.8	55.1 48.5	
4.874	3.0	30.7	33.1	5.8	-36.5	0.0	0.0	33.1	54.0	-20.9	H	F A	100.8	48.5	
7.311	3.0	54.2	35.3	7.3	-36.2	0.0	0.0	60.6	74.0	-13.4	v	P	101.0	265.4	
7.311	3.0	39.2	35.3	7.3	-36.2	0.0	0.0	45.5	54.0	-8.5	v	Ā	101.0	265.4	
7.311	3.0	46.0	35.3	7.3	-36.2	0.0	0.0	52.4	74.0	-21.6	H	P	115.6	236.7	
7.311	3.0	33.1	35.3	7.3	-36.2	0.0	0.0	39.4	54.0	-14.6	н	A	115.6	236.7	
High Ch.	2462 M	Hz		1	Ì	ĺ				l					
4.924	3.0	45.7	33.1	5.9	-36.5	0.0	0.0	48.2	74.0	-25.8	V	P	101.4	37.8	
4.924	3.0	32.1	33.1	5.9	-36.5	0.0	0.0	34.7	54.0	-19.3	V	A	101.4	37.8	
4.924	3.0	40.7	33.1	5.9	-36.5	0.0	0.0	43.2	74.0	-30.8	H	P	103.8	219.7	
4.924	3.0	27.0	33.1	5.9	-36.5	0.0	0.0	29.5	54.0	-24.5	H	A	103.8	219.7	
7.386	3.0	41.4	35.4	7.3	-36.2	0.0	0.0	47.9	74.0	-26.1	V	Р	100.4	264.2	
	3.0 3.0	28.2 38.1	35.4	7.3	-36.2	0.0 0.0	0.0	34.7	54.0 74.0	-19.3	V U	A	100.4	264.2	
7.386		38.1 25.2	35.4 35.4	7.3 7.3	-36.2 -36.2	0.0	0.0	44.6 31.7	74.0 54.0	-29.4 -22.3	H H	P A	100.9 100.9	171.7 171.7	
	3.0						0.0			<b></b>					

Page 166 of 193

## 8.2.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

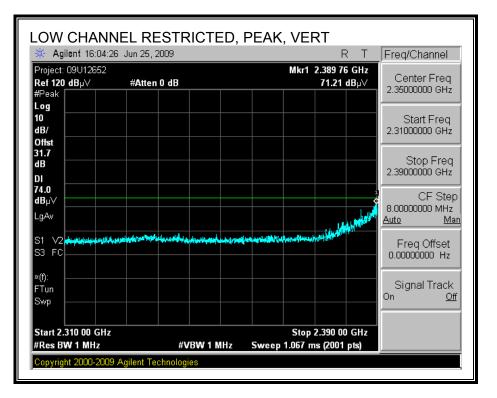
### **RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)**

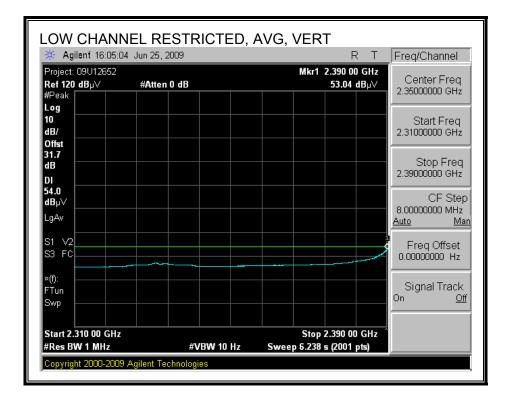




Page 167 of 193

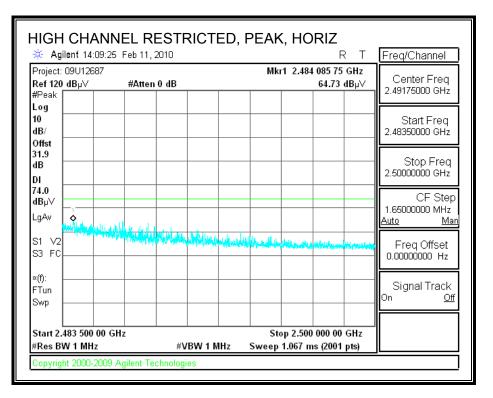
## **RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**

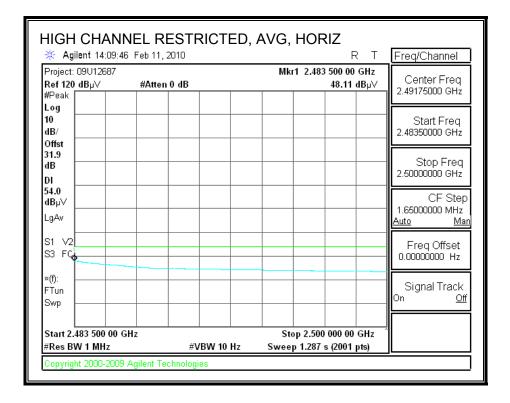




Page 168 of 193

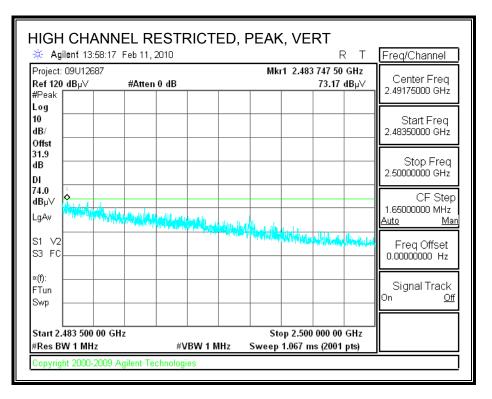
## **RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)**

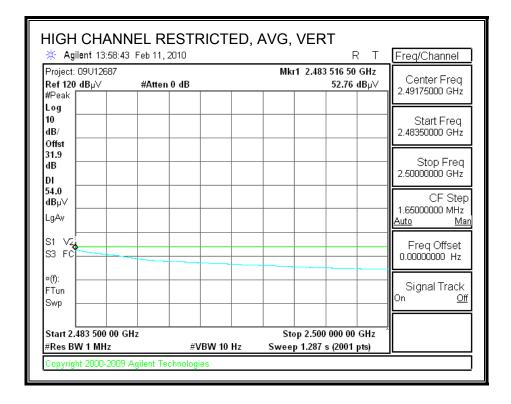




Page 169 of 193

## **RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)**





Page 170 of 193

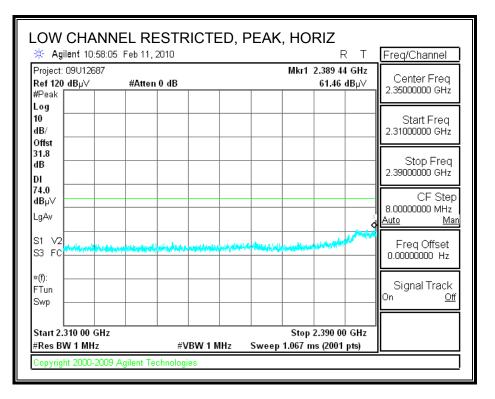
### HARMONICS AND SPURIOUS EMISSIONS

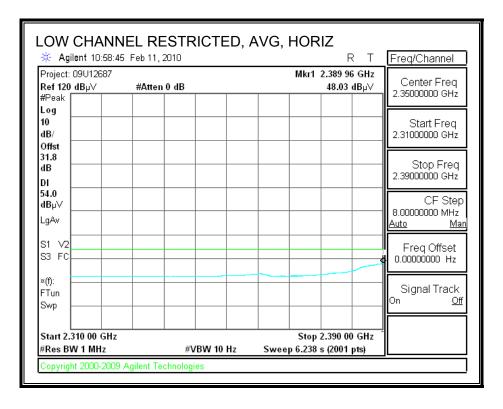
Test Engr Date:	•	William 02/16/10		g											
Project #:		09U1268	7												
Company		Qualcor	nm Wir	eless											
EUT Desc	ription:	Etherne	t Card												
EUT M/N:		Card SN	:9129-F	01											
Test Targ		FCC 15.	247												
Mode Op		TOT1T2T													
	f	Measurer			-	Preamp (					Field Stren;	~			
	Dist	Distance				Distance					ld Strength				
	Read	Analyzer	-		Avg			trength @			rs. Average				
	AF	Antenna			Peak			Field Stre	ength	Margin v	rs. Peak Lir	nut			
	CL	Cable Lo:	55		HPF	High Pas	s Filtei	: :							
f	Dist	Read	AF	CL	Amp	D Corr	Fltr	Согт.	Limit	Mangin	Ant. Pol.	Det.	Ant High	Table Angle	Notes
CHz	(m)	dBuV	dB/m	dB	dB	dB	dB		dBuV/m	dB	V/H	P/A/QP	cm	Degree	110125
Low Ch. 2	1 7 6		1	<del>                                     </del>	<del>  _</del>	+						<b>-</b>			
4.824	3.0	39.9	33.0	5.8	-36.5	0.0	0.0	42.2	74.0	-31.8	v	Р	110.6	315.3	
4.824	3.0	28.0	33.0	5.8	-36.5	0.0	0.0	30.3	54.0	-23.7	V	A	110.6	315.3	
4.824	3.0	38.5	33.0	5.8	-36.5	0.0	0.0	40.9	74.0	-33.1	H	Р	156.0	158.7	
4.824	3.0	26.4	33.0	5.8	-36.5	0.0	0.0	28.8	54.0	-25.2	H	A	156.0	158.7	
Mid Ch. 3				<u> </u>						ļ		_			
4.874	3.0	51.4	33.1	5.8	-36.5	0.0	0.0	53.9	74.0	-20.1	V	P	103.7	170.9	
4.874 4.874	3.0 3.0	36.9 40.6	33.1 33.1	5.8 5.8	-36.5 -36.5	0.0 0.0	0.0 0.0	39.3 43.0	54.0 74.0	-14.7 -31.0	V H	A P	103.7 102.4	170.9 48.0	
4.874	3.0	28.3	33.1	5.8	-36.5	0.0	0.0	30.8	74.0 54.0	-31.0	H H	F A	102.4	48.0	
7.311	3.0	48.6	35.3	7.3	-36.2	0.0	0.0	55.0	74.0	-19.0	v	P	122.2	351.5	
7.311	3.0	35.0	35.3	7.3	-36.2	0.0	0.0	41.3	54.0	-12.7	V	Ā	122.2	351.5	
7.311	3.0	43.9	35.3	7.3	-36.2	0.0	0.0	50.2	74.0	- <b>23.8</b>	H	Р	109.1	49.5	
7.311	3.0	28.7	35.3	7.3	-36.2	0.0	0.0	35.0	54.0	-19.0	H	A	109.1	49.5	
High Ch.				Ļ.,								_			
4.924	3.0	42.4	33.1	5.9	-36.5	0.0	0.0	44.9	74.0	-29.1	V	P	124.3	121.9	
4.924 4.924	3.0 3.0	29.9 38.6	33.1 33.1	5.9 5.9	-36.5 -36.5	0.0 0.0	0.0 0.0	32.5 41.1	54.0 74.0	-21.5 -32.9	V H	A P	124.3 109.9	121.9 88.6	
4.924 4.924	3.0	38.0	33.1	5.9	-36.5	0.0	0.0	41.1 28.9	74.0 54.0	-32.9	н Н	P A	109.9	88.6	
7.386	3.0	39.5	35.4	7.3	-36.2	0.0	0.0	46.0	74.0	-28.0	v	P	102.3	232.9	
7.386	3.0	27.5	35.4	7.3	-36.2	0.0	0.0	34.0	54.0	-20.0	v	Ā	102.3	232.9	
7.386	3.0	37.4	35.4	7.3	-36.2	0.0	0.0	43.9	74.0	- <b>30.1</b>	H	P	187.9	175.7	
	3.0	25.1	35.4	7.3	-36.2	0.0	0.0	31.6	54.0	-22.4	H	A	187.9	175.7	

Page 171 of 193

## 8.2.4. 802.11n HT40 MODE IN THE 2.4 GHz BAND

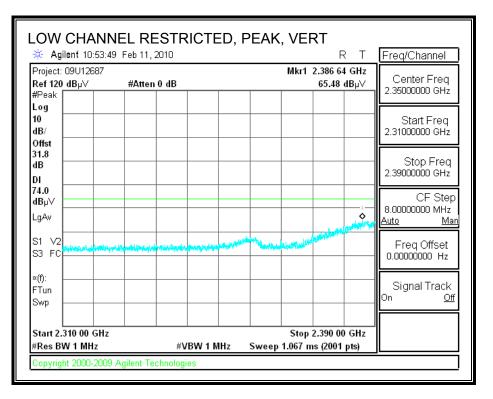
### **RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)**

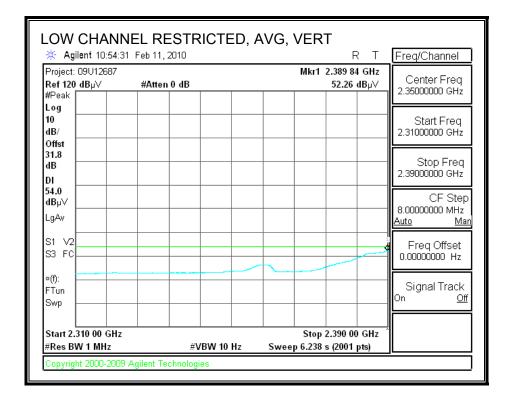




Page 172 of 193

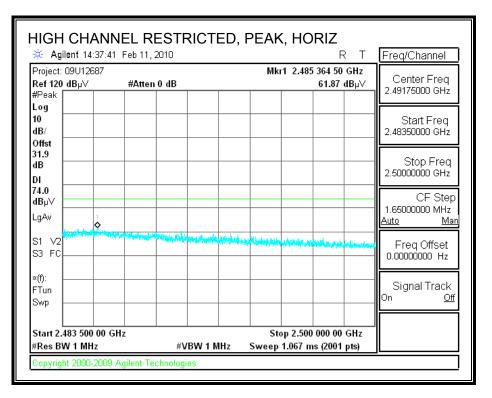
### **RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**

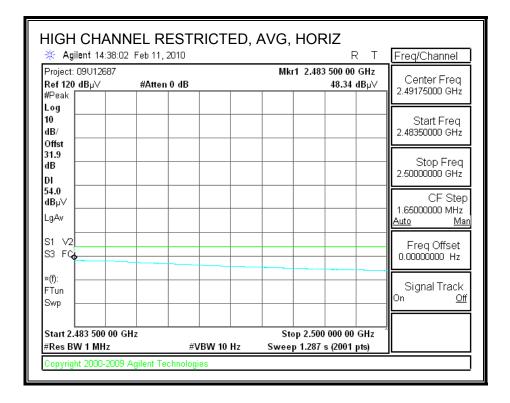




Page 173 of 193

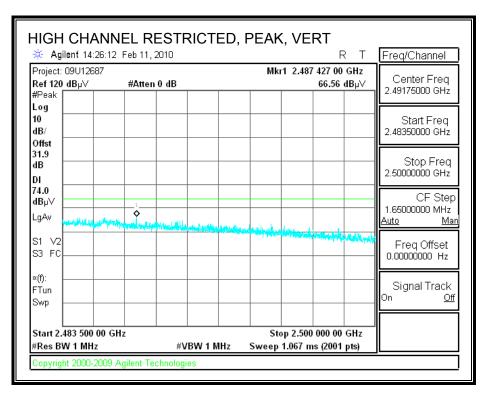
## **RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)**

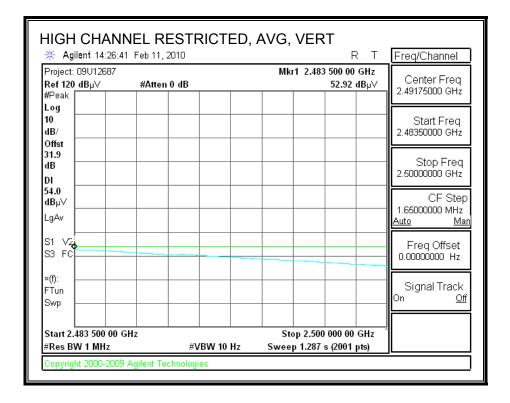




Page 174 of 193

## **RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)**





Page 175 of 193

## HARMONICS AND SPURIOUS EMISSIONS

Test Eng Date: Project #		William 02/16/10 09U1268		g											
Compan		Qualcor		~lass											
		Etherne		eless											
EUT M/N	-	Card SN		01											
Test Tars		FCC 15.		~1											
Mode Op		TOT1T2T		IT40 B	Todo										
noue of	f	Measurer				Preamp G	ain			Average	Field Stren	eth Limit			
	Dist	Distance				Distance		t to 3 me	ters	-	ld Strength	-			
	Read	Analyzer			Avg			trength @			75. Average				
	AF	Antenna			Peak			: Field Stre			rs. Peak Lii				
	CL	Cable Lo:			HPF	High Pass									
f	Dist	Read	AF	CL	Amp	D Corr	Fltr	Corr.	Limit	Margin	Ant. Pol.	Det	Ant.High	Table Angle	Notes
GHz	(m)	dBuV	dB/m	dB	dB	dB	dB	dBuV/m	dBuV/m	dB	V/H	P/A/QP	cm	Degree	
Low Ch.	2422 MF	łz	1		1										
4.844	3.0	41.3	33.1	5.8	-36.5	0.0	0.0	43.8	74.0	-30.2	V	Р	102.4	34.0	
4.844	3.0	27.3	33.1	5.8	-36.5	0.0	0.0	29.7	54.0	-24.3	V	A	102.4	34.0	
4.844	3.0	38.6	33.1	5.8	-36.5	0.0	0.0	41.0	74.0	- <b>33.0</b>	H	P	123.5	253.4	
4.844	3.0	26.3	33.1	5.8	-36.5	0.0	0.0	28.7	54.0	-25.3	H	A	123.5	253.4	
7.266	3.0	37.5	35.2	7.2	-36.2	0.0	0.0	43.8	74.0	-30.2	V	P	127.9	250.3	
7.266	3.0	25.7	35.2	7.2	-36.2	0.0	0.0	32.0	54.0	-22.0	V	A	127.9	250.3	
7.266	3.0	37.2	35.2	7.2	-36.2	0.0	0.0	43.5	74.0	-30.5	H	P	118.1	81.3	
7.266	3.0	25.1	35.2	7.2	-36.2	0.0	0.0	31.4	54.0	-22.6	H	A	118.1	81.3	
Mid Ch.		1z 48.8	22.7		-36.5		0.0	51.2	74.0	-22.8	v	Р	103.4	32.6	
4.874 4.874	3.0 3.0	48.8 34.5	33.1 33.1	5.8 5.8	-36.5	0.0 0.0	0.0	51.2 37.0	74.0 54.0	-22.8	v V	P A	103.4	32.6 32.6	
4.874 4.874	3.0	34.5 41.2	33.1	5.8	-36.5	0.0	0.0	43.7	54.0 74.0	-17.0	v H	P A	103.4	48.1	
4.874	3.0	27.2	33.1	5.8	-36.5	0.0	0.0	29.7	54.0	-24.3	H	A	103.1	48.1	
7.311	3.0	49.4	35.3	7.3	-36.2	0.0	0.0	55.7	74.0	-18.3	v	P	130.6	269.6	
7.311	3.0	34.7	35.3	7.3	-36.2	0.0	0.0	41.0	54.0	-13.0	v	Â	130.6	269.6	
7.311	3.0	41.5	35.3	7.3	-36.2	0.0	0.0	47.8	74.0	-26.2	H	P	121.1	35.5	
7.311	3.0	27.6	35.3	7.3	-36.2	0.0	0.0	34.0	54.0	-20.0	H	A	121.1	35.5	
High Ch		·····		ļ						Ļ					
4.904	3.0	40.5	33.1	5.9	-36.5	0.0	0.0	43.1	74.0	- <b>30.9</b>	V	P	103.9	40.5	
4.904	3.0	27.5	33.1	5.9	-36.5	0.0	0.0	30.0	54.0	-24.0	V	A	103.9	40.5	
4.904	3.0	38.7	33.1	5.9	-36.5	0.0	0.0	41.2	74.0	-32.8	H	P	199.2	71.8	
4.904	3.0	26.3	33.1	5.9	-36.5	0.0	0.0	28.8	54.0	-25.2	H	A	199.2	71.8	
7.356	3.0	38.5	35.4	7.3	-36.2	0.0	0.0	44.9	74.0	-29.1	v v	P	101.1	235.3	
7.356 7.356	3.0 3.0	26.0 37.6	35.4 35.4	7.3	-36.2 -36.2	0.0 0.0	0.0	32.5 44.1	54.0 74.0	-21.5 -29.9	å	A P	101.1 102.2	235.3 76.5	
7.356	3.0	37.0 25.1	35.4	7.3	-36.2	0.0	0.0	44.1 31.5	74.0 54.0	-29.9	H H	P A	102.2	76.5	
(.350	<u>3.0</u> 2.7	20.1	; 35.4	: 7.3	- 30.2	0.0	0.0	51.5	54.0	-22.0	п	. A	102.2	/0.5	

Page 176 of 193

## 8.2.5. 802.11a MODE IN THE 5.8 GHz BAND

### HARMONICS AND SPURIOUS EMISSIONS

lest Target: Mode Oper:		FCC DT:	:0-P2 s		ule										
-		Transmi		ada											
f		Measuren			, A man	Preamp (	lain			Å 170 Y 3 70	Field Stren	ath I innit			
		Distance				Distance		t to 3 mo	tors		ld Strength				
-		Analyzer			Avg	Average 1					m strengtn 75. Average				
		Anaiyzer Antenna	-		Avg Peak	Calculate				-	rs. Average rs. Peak Lir				
		Antenna Cable Los			Peak HPF	High Pass			angan	wargin v	o. reak Lli	itut			
C C		Capie LOS			1151	mgn Pass	ruter								
f	Dist	Read	AF	CL	Amp	D Corr	Fltr	Corr.	Limit	Margin	Ant. Pol.	Det.	Ant.High	Table Angle	Notes
GHz	(m)	dBuV	dB/m	dB	dB	dB	dB	dBuV/m	dBuV/m	dB	V/H	P/A/QP	cm	Degree	
ow ch 5745	MHz,	set 19db	m												
	3.0	43.3	38.4	9.5	-35.9	0.0	0.7	56.0	74.0	-18.0	v	Р	100.1	302.3	
1.490	3.0	40.0	38.4	9.5	-35.9	0.0	0.7	52.8	54.0	-1.2	v	A	100.1	302.3	
	3.0	38.6	38.4	9.5	-35.9	0.0	0.7	51.4	74.0	-22.6	H	Р	100.1	26.6	
	3.0	30.9	38.4	9.5	-35.9	0.0	0.7	43.7	54.0	- <b>10.3</b>	H	A	100.1	26.6	
Mid ch 5785			·····											ļļ.	
	3.0	43.1	38.5	9.5	-35.8	0.0	0.7	56.0	74.0	- <b>18.0</b>	V	P	149.9	303.4	
	3.0	39.8	38.5	9.5		0.0	0.7	52.7	54.0	- <b>1.3</b>	V	A	149.9	303.4	
	3.0	39.5	38.5	9.5	-35.8	0.0	0.7	52.4	74.0	- <b>21.6</b>	H	Р	100.0	27.0	
	3.0	32.1	38.5	9.5	-35.8	0.0	0.7	45.0	54.0	- <b>9.0</b>	H	A	100.0	27.0	
ligh ch 582			v												
	3.0	43.9	38.6	9.6	-35.7	0.0	0.7	57.0	74.0	- <b>17.0</b>	V	P	120.4	133.7	
	3.0	40.3	38.6	9.6		0.0	0.7	53.5	54.0	- <b>0.5</b>	v	A	120.4	133.7	
	3.0	38.1	38.6	9.6	-35.7	0.0	0.7	51.2	74.0	-22.8	H	Р	102.4	18.9	
1.650	3.0	30.5	38.6	9.6	-35.7	0.0	0.7	43.6	54.0	-10.4	H	A	102.4	18.9	
			ļ												

**Note:** a spot check was performed on 03/25/10 and showed that the spurious emissions are better than the previous radiated emissions that exist here.

Page 177 of 193

## 8.2.6. 802.11n HT20 MODE IN THE 5.8 GHz BAND

#### HARMONICS AND SPURIOUS EMISSIONS

	06/30/09 09U1265 Qualcon 802.11 al	2 nm Inc.												
	Qualcon 802.11 al	nm Inc.												
	802.11 al													
		4774												
		ogn 484	Mody	ule										
	65-VN78													
	FCC DT	5												
•	Transmi	t												
f	Measuren	nent Freq	puency	Amp	Preamp (	Gain			Average	Field Stren	gth Limit			
Dist	Distance	to Anter	ma	D Corr	Distance	Corre	et to 3 me	eters						
Read	Analyzer	Reading		Avg	Average	Field S	trength @	)3 m	Margin v	rs. Average	Limit			
AF	Antenna	Factor		Peak	Calculate	d Peak	Field Str	ength						
CL	Cable Los	is		HPF	High Pas:	s Filter	r							
Dist	Read			Amp	D Corr					Ant. Pol.		Ant.High	Table Angle	Notes
(m)	dBuV	dB/m	dB	dB	dB	dB	dBuV/m	dBuV/m	dB	V/H	P/A/QP	cm	Degree	
Th set	19dbm													
3.0	44.0	38.4	9.5	-35.9	0.0	0.0	56.0	74.0	-18.0	V	Р	131.7	159.5	
3.0	40.8	38.4	9.5	-35.9	0.0	0.0	52.9	54.0	- <b>1.1</b>	V	A	131.7	159.5	
3.0	41.9	38.4	9.5	-35.9	0.0	0.0	53.9	74.0	- <b>20.1</b>	H	P	131.9	100.7	
3.0	30.5	38.4	9.5	-35.9	0.0	0.0	42.6	54.0	-11.4	H	A	131.9	100.7	
	19dbm		ļ											
	43.7				<b>******</b>			·····	¢		······			
	¢		¢		\$									
					\$							¢		
		38.5	9.5	-35.8	0.0	0.0	40.5	54.0	-13.5	H	A	101.0	92.4	
								- 10					100 5	
	¢		¢		·				Q					
	¢		¢		<b>~</b>									
3.0	38.9	38.6 38.6	9.6 9.6	-35.7 -35.7	0.0	0.0	51.3	74.0	-22.7	H	P	148.7	86.6	
3.0	32.1			:15.7	0.0	0.0	44.5	54.0	-9.5	H	A	148.7	86.6	
	Dist Read F L Dist (m) Ch set 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0	Dist         Distance           lead         Analyzer           Artenna         Cable Los           Dist         Read           (m)         dBuV           Ch set 19dbm         3.0           3.0         40.8           3.0         41.9           3.0         43.7           3.0         43.7           3.0         30.5           h set 19dbm           3.0         43.7           3.0         43.7           3.0         43.7           3.0         45.4           3.0         45.4           3.0         45.4	Dist         Distance to Anter           lead         Analyzer Reading           F         Antenna Factor           Cable Loss         Cable Loss           Dist         Read         AF           (m)         dBuV         dB/m           3.0         44.0         38.4           3.0         41.9         38.4           3.0         43.7         38.5           3.0         43.7         38.5           3.0         43.7         38.5           3.0         43.7         38.5           3.0         43.7         38.5           3.0         42.2         38.5           3.0         42.4         38.5           3.0         45.4         38.6           3.0         45.4         38.6           3.0         45.4         38.6           3.0         45.4         38.6           3.0         45.4         38.6           3.0         41.6         38.6	Dist         Distance to Antenna           lead         Analyzer Reading           Artenna Factor         Cable Loss           Dist         Read         AF         CL           Obst         BBuV         dB/m         dB           Dist         Read         AF         CL           (m)         dBuV         dB/m         dB           3.0         44.0         38.4         9.5           3.0         40.8         38.4         9.5           3.0         41.9         38.4         9.5           3.0         40.7         38.5         9.5           3.0         40.7         38.5         9.5           3.0         43.7         38.5         9.5           3.0         43.8         38.5         9.5           3.0         36.8         38.5         9.5           3.0         28.2         38.5         9.5           3.0         28.2         38.6         9.6           3.0         45.4         38.6         9.6	Dist         Distance to Antenna         D Corr           Read         Analyzer Reading         Avg           AF         Antenna Factor         Peak           L         Cable Loss         HPF           Dist         Read         AF         CL         Amp           (m)         dBuV         dB/m         dB         dB           3.0         44.0         38.4         9.5         -35.9           3.0         40.8         38.4         9.5         -35.9           3.0         40.19         38.4         9.5         -35.9           3.0         40.7         38.5         9.5         -35.9           3.0         40.7         38.5         9.5         -35.8           3.0         40.7         38.5         9.5         -35.8           3.0         40.7         38.5         9.5         -35.8           3.0         40.7         38.5         9.5         -35.8           3.0         28.2         38.5         9.5         -35.8           3.0         28.2         38.5         9.5         -35.8           3.0         45.4         38.6         9.6         -35.7	Dist         Distance to Antenna         D Corr         Distance           Read         Analyzer Reading         Avg         Average           Artenna Factor         Peak         Calculate           L         Cable Loss         HPF         High Pas           Dist         Read         AF         CL         Amp         D Corr           (m)         dBuV         dB/m         dB         dB         dB           3.0         44.0         38.4         9.5         -35.9         0.0           3.0         44.0         38.4         9.5         -35.9         0.0           3.0         41.9         38.4         9.5         -35.9         0.0           3.0         41.9         38.4         9.5         -35.9         0.0           3.0         41.9         38.4         9.5         -35.9         0.0           3.0         41.7         38.5         9.5         -35.8         0.0           3.0         43.7         38.5         9.5         -35.8         0.0           3.0         36.8         38.5         9.5         -35.8         0.0           3.0         28.2         38.5         9.5	Dist         Distance to Antenna         D Corr         Distance Corrected           Analyzer Reading         Avg         Average Field S           Arenna Factor         Peak         Calculated Peal           Cable Loss         HPF         High Pass Filter           Dist         Read         AF         CL         Amp         D Corr         Fltr           Main         BB/W         dB/m         dB         dB         dB         dB         dB           So         44.0         38.4         9.5         -35.9         0.0         0.0           3.0         44.0         38.4         9.5         -35.9         0.0         0.0           3.0         41.9         38.4         9.5         -35.9         0.0         0.0           3.0         41.9         38.4         9.5         -35.9         0.0         0.0           3.0         43.7         38.5         9.5         -35.8         0.0         0.0           3.0         43.7         38.5         9.5         -35.8         0.0         0.0           3.0         40.7         38.5         9.5         -35.8         0.0         0.0           3.0         43.7 </td <td>Dist         Distance to Antenna         D Corr         Distance Correct to 3 ma           Read         Analyzer Reading         Avg         Average Field Strength @           Arerage Field Strength         Peak         Calculated Peak Field Strength @           Cable Loss         HPF         High Pass Filter           Dist         Read         AF         CL         Amp         D Corr         Fltr         Corr.           Dist         Read         AF         CL         Amp         D Corr         Fltr         Corr.           Dist         Read         AF         CL         Amp         D Corr         Fltr         Corr.           Max         B/m         dB         dB         dB         dB         dB         dB         V/m           3.0         44.0         38.4         9.5         -35.9         0.0         0.0         56.0           3.0         41.9         38.4         9.5         -35.9         0.0         0.0         56.0           3.0         41.9         38.4         9.5         -35.9         0.0         0.0         56.0           3.0         43.7         38.5         9.5         -35.8         0.0         0.0</td> <td>Dist         Distance to Antenna         D Corr         Distance Correct to 3 meters           Aaalyzer Reading         Avg         Average Field Strength @ 3 m           Arenna Factor         Peak         Calculated Peak Field Strength           Cable Loss         HPF         High Pass Filter           Dist         Read         AF         CL         Amp         D Corr         Fltr         Corr.         Limit           Mist         BBw         dB         dB         dB         Corr.         Limit           Mont         BBw         dB         dB         dB         Corr.         Limit           3.0         44.0         38.4         9.5         -35.9         0.0         0.0         56.0         74.0           3.0         44.9         38.4         9.5         -35.9         0.0         0.0         52.9         54.0           3.0         41.9         38.4         9.5         -35.9         0.0         0.0         52.9         54.0           3.0         43.7         38.5         9.5         -35.8         0.0         0.0         52.9         54.0           3.0         40.7         38.5         9.5         -35.8         0.0</td> <td>Dist         Distance to Antenna         D Corr         Distance Correct to 3 meters         Peak Fiele           Read         Analyzer Reading         Avg         Average Field Strength @ 3 m         Margin v           Antenna Factor         Peak         Calculated Peak Field Strength         Margin v           Cable Loss         HPF         High Pass Filter         Margin v           Dist         Read         AF         CL         Amp         D Corr         Fltr         Corr.         Limit         Margin v           0:1         Cable Loss         HPF         High Pass Filter         Margin v         Margin v           0:1         dBuV         dB/m         dB         dB         dB         dB         Margin v           3:0         44.0         38.4         9.5         -35.9         0.0         0.0         56.0         74.0         -18.0           3:0         40.8         38.4         9.5         -35.9         0.0         0.0         52.9         54.0         -1.1           3:0         41.9         38.4         9.5         -35.9         0.0         0.0         52.9         54.0         -1.1           3:0         43.7         38.5         9.5         -3</td> <td>Dist         Distance to Antenna         D Corr         Distance Correct to 3 meters         Peak Field Strength           Analyzer Reading         Avg         Average Field Strength @ 3 m         Margin vs. Average           Antenna Factor         Peak         Calculated Peak Field Strength         Margin vs. Average           Cable Loss         HPF         High Pass Filter         Margin vs. Peak Li           Dist         Read         AF         CL         Amp         D Corr         Fltr         Corr.         Limit         Margin vs. Peak Li           (m)         dBuV         dB/m         dB         dB         dB         dB         dBuV/m         dB         V/H           3.0         44.0         38.4         9.5         -35.9         0.0         0.0         53.9         74.0         -18.0         V           3.0         44.9         38.4         9.5         -35.9         0.0         0.0         53.9         74.0         -11.1         V           3.0         41.9         38.4         9.5         -35.9         0.0         0.0         53.9         74.0         -11.4         H           3.0         30.5         38.4         9.5         -35.8         0.0         0.0</td> <td>Dist         Distance to Antenna         D Corr         Distance Correct to 3 meters         Peak Field Strength Limit           kad         Analyzer Reading         Avg         Average Field Strength @ 3 m         Margin vs. Average Limit           KF         Antenna Factor         Peak         Galculated Peak Field Strength         @ 3 m         Margin vs. Average Limit           Cable Loss         HPF         High Pass Filter         Margin vs. Peak Limit         Margin vs. Peak Limit           Dist         Read         AF         CL         Amp         D Corr         Filt         Corr.         Limit         Margin vs. Peak Limit           030         44.0         38.4         9.5         -35.9         0.0         0.0         56.0         74.0         -18.0         V         P           3.0         44.0         38.4         9.5         -35.9         0.0         0.0         52.9         54.0         -11.1         V         A           3.0         41.9         38.4         9.5         -35.9         0.0         0.0         52.9         54.0         -11.4         H         A           3.0         30.5         38.4         9.5         -35.8         0.0         0.0         52.9         54.0</td> <td>Dist         Distance to Antenna         D Corr         Distance Correct to 3 meters         Peak Field Strength (2) 3 m         Margin vs. Average Limit           Aaalyzer Reading         Avg         Average Field Strength (2) 3 m         Margin vs. Average Limit         Margin vs. Average Limit           Artenna Factor         Calculated Peak Field Strength         Margin vs. Peak Limit         Margin vs. Peak Limit           Cable Loss         HPF         High Pass Filter         Carrect Ki Buv/m         Margin vs. Peak Limit           Dist         Read         AF         CL         Amp         D Corr         Filt         Corr.         Limit         Margin vs. Peak Limit           Dist         Read         AF         CL         Amp         D Corr         Filt         Corr.         Limit         Margin vs. Peak Limit         Margin vs. Peak Limit           3.0         44.0         38.4         9.5         -35.9         0.0         0.0         56.0         74.0         -18.0         V         P         131.7           3.0         44.0         38.4         9.5         -35.9         0.0         0.0         53.9         74.0         -18.0         V         P         131.7           3.0         41.0         38.4         9.5         <td< td=""><td>Dist         Distance to Antenna         D Corr         Distance Correct to 3 meters         Peak Field Strength Limit           Analyzer Reading         Avg         Average Field Strength @ 3 m         Margin vs. Average Limit         Margin vs. Average Limit           FF         Antenna Factor         Peak         HPF         High Pass Filet         Margin vs. Peak Limit         Margin vs. Peak Limit           Dist         Read         AF         CL         Amp         D Corr         Filt         Corr.         Limit         Margin vs. Peak Limit         Margin vs. Peak Limit           Dist         Read         AF         CL         Amp         D Corr         Filt         Corr.         Limit         Margin vs. Peak Limit         Margin vs. Peak Limit           0.1         BWV         dBm         dB         dB         dBuV/m         dBuV/m         dB         V/H         P/A/QP         cm         Degreee           3.0         44.0         38.4         9.5         -35.9         0.0         0.0         52.9         74.0         -11.1         V         A         131.7         159.5           3.0         40.8         38.4         9.5         -35.9         0.0         0.0         52.9         74.0         -11.1</td></td<></td>	Dist         Distance to Antenna         D Corr         Distance Correct to 3 ma           Read         Analyzer Reading         Avg         Average Field Strength @           Arerage Field Strength         Peak         Calculated Peak Field Strength @           Cable Loss         HPF         High Pass Filter           Dist         Read         AF         CL         Amp         D Corr         Fltr         Corr.           Dist         Read         AF         CL         Amp         D Corr         Fltr         Corr.           Dist         Read         AF         CL         Amp         D Corr         Fltr         Corr.           Max         B/m         dB         dB         dB         dB         dB         dB         V/m           3.0         44.0         38.4         9.5         -35.9         0.0         0.0         56.0           3.0         41.9         38.4         9.5         -35.9         0.0         0.0         56.0           3.0         41.9         38.4         9.5         -35.9         0.0         0.0         56.0           3.0         43.7         38.5         9.5         -35.8         0.0         0.0	Dist         Distance to Antenna         D Corr         Distance Correct to 3 meters           Aaalyzer Reading         Avg         Average Field Strength @ 3 m           Arenna Factor         Peak         Calculated Peak Field Strength           Cable Loss         HPF         High Pass Filter           Dist         Read         AF         CL         Amp         D Corr         Fltr         Corr.         Limit           Mist         BBw         dB         dB         dB         Corr.         Limit           Mont         BBw         dB         dB         dB         Corr.         Limit           3.0         44.0         38.4         9.5         -35.9         0.0         0.0         56.0         74.0           3.0         44.9         38.4         9.5         -35.9         0.0         0.0         52.9         54.0           3.0         41.9         38.4         9.5         -35.9         0.0         0.0         52.9         54.0           3.0         43.7         38.5         9.5         -35.8         0.0         0.0         52.9         54.0           3.0         40.7         38.5         9.5         -35.8         0.0	Dist         Distance to Antenna         D Corr         Distance Correct to 3 meters         Peak Fiele           Read         Analyzer Reading         Avg         Average Field Strength @ 3 m         Margin v           Antenna Factor         Peak         Calculated Peak Field Strength         Margin v           Cable Loss         HPF         High Pass Filter         Margin v           Dist         Read         AF         CL         Amp         D Corr         Fltr         Corr.         Limit         Margin v           0:1         Cable Loss         HPF         High Pass Filter         Margin v         Margin v           0:1         dBuV         dB/m         dB         dB         dB         dB         Margin v           3:0         44.0         38.4         9.5         -35.9         0.0         0.0         56.0         74.0         -18.0           3:0         40.8         38.4         9.5         -35.9         0.0         0.0         52.9         54.0         -1.1           3:0         41.9         38.4         9.5         -35.9         0.0         0.0         52.9         54.0         -1.1           3:0         43.7         38.5         9.5         -3	Dist         Distance to Antenna         D Corr         Distance Correct to 3 meters         Peak Field Strength           Analyzer Reading         Avg         Average Field Strength @ 3 m         Margin vs. Average           Antenna Factor         Peak         Calculated Peak Field Strength         Margin vs. Average           Cable Loss         HPF         High Pass Filter         Margin vs. Peak Li           Dist         Read         AF         CL         Amp         D Corr         Fltr         Corr.         Limit         Margin vs. Peak Li           (m)         dBuV         dB/m         dB         dB         dB         dB         dBuV/m         dB         V/H           3.0         44.0         38.4         9.5         -35.9         0.0         0.0         53.9         74.0         -18.0         V           3.0         44.9         38.4         9.5         -35.9         0.0         0.0         53.9         74.0         -11.1         V           3.0         41.9         38.4         9.5         -35.9         0.0         0.0         53.9         74.0         -11.4         H           3.0         30.5         38.4         9.5         -35.8         0.0         0.0	Dist         Distance to Antenna         D Corr         Distance Correct to 3 meters         Peak Field Strength Limit           kad         Analyzer Reading         Avg         Average Field Strength @ 3 m         Margin vs. Average Limit           KF         Antenna Factor         Peak         Galculated Peak Field Strength         @ 3 m         Margin vs. Average Limit           Cable Loss         HPF         High Pass Filter         Margin vs. Peak Limit         Margin vs. Peak Limit           Dist         Read         AF         CL         Amp         D Corr         Filt         Corr.         Limit         Margin vs. Peak Limit           030         44.0         38.4         9.5         -35.9         0.0         0.0         56.0         74.0         -18.0         V         P           3.0         44.0         38.4         9.5         -35.9         0.0         0.0         52.9         54.0         -11.1         V         A           3.0         41.9         38.4         9.5         -35.9         0.0         0.0         52.9         54.0         -11.4         H         A           3.0         30.5         38.4         9.5         -35.8         0.0         0.0         52.9         54.0	Dist         Distance to Antenna         D Corr         Distance Correct to 3 meters         Peak Field Strength (2) 3 m         Margin vs. Average Limit           Aaalyzer Reading         Avg         Average Field Strength (2) 3 m         Margin vs. Average Limit         Margin vs. Average Limit           Artenna Factor         Calculated Peak Field Strength         Margin vs. Peak Limit         Margin vs. Peak Limit           Cable Loss         HPF         High Pass Filter         Carrect Ki Buv/m         Margin vs. Peak Limit           Dist         Read         AF         CL         Amp         D Corr         Filt         Corr.         Limit         Margin vs. Peak Limit           Dist         Read         AF         CL         Amp         D Corr         Filt         Corr.         Limit         Margin vs. Peak Limit         Margin vs. Peak Limit           3.0         44.0         38.4         9.5         -35.9         0.0         0.0         56.0         74.0         -18.0         V         P         131.7           3.0         44.0         38.4         9.5         -35.9         0.0         0.0         53.9         74.0         -18.0         V         P         131.7           3.0         41.0         38.4         9.5 <td< td=""><td>Dist         Distance to Antenna         D Corr         Distance Correct to 3 meters         Peak Field Strength Limit           Analyzer Reading         Avg         Average Field Strength @ 3 m         Margin vs. Average Limit         Margin vs. Average Limit           FF         Antenna Factor         Peak         HPF         High Pass Filet         Margin vs. Peak Limit         Margin vs. Peak Limit           Dist         Read         AF         CL         Amp         D Corr         Filt         Corr.         Limit         Margin vs. Peak Limit         Margin vs. Peak Limit           Dist         Read         AF         CL         Amp         D Corr         Filt         Corr.         Limit         Margin vs. Peak Limit         Margin vs. Peak Limit           0.1         BWV         dBm         dB         dB         dBuV/m         dBuV/m         dB         V/H         P/A/QP         cm         Degreee           3.0         44.0         38.4         9.5         -35.9         0.0         0.0         52.9         74.0         -11.1         V         A         131.7         159.5           3.0         40.8         38.4         9.5         -35.9         0.0         0.0         52.9         74.0         -11.1</td></td<>	Dist         Distance to Antenna         D Corr         Distance Correct to 3 meters         Peak Field Strength Limit           Analyzer Reading         Avg         Average Field Strength @ 3 m         Margin vs. Average Limit         Margin vs. Average Limit           FF         Antenna Factor         Peak         HPF         High Pass Filet         Margin vs. Peak Limit         Margin vs. Peak Limit           Dist         Read         AF         CL         Amp         D Corr         Filt         Corr.         Limit         Margin vs. Peak Limit         Margin vs. Peak Limit           Dist         Read         AF         CL         Amp         D Corr         Filt         Corr.         Limit         Margin vs. Peak Limit         Margin vs. Peak Limit           0.1         BWV         dBm         dB         dB         dBuV/m         dBuV/m         dB         V/H         P/A/QP         cm         Degreee           3.0         44.0         38.4         9.5         -35.9         0.0         0.0         52.9         74.0         -11.1         V         A         131.7         159.5           3.0         40.8         38.4         9.5         -35.9         0.0         0.0         52.9         74.0         -11.1

**Note:** a spot check was performed on 03/25/10 and showed that the spurious emissions are better than the previous radiated emissions that exist here.

Page 178 of 193

## 8.2.7. 802.11n HT40 MODE IN THE 5.8 GHz BAND

#### HARMONICS AND SPURIOUS EMISSIONS

Test Eng Date: Compan; EUT Desc EUT M/N	y: ription:	Thanh N 06/30/09 Qualcor 802.11 a 65-VN78	nm Inc. bgn 4X4	Mod	ule										
Test Targ		FCC DT													
Mode Op		Transmi		Mode											
-	f	Measurer	nent Fre	quency	Amp	Preamp (	Gain			Average	Field Stren	gth Limit			
	Dist	Distance	to Anter	nna	D Con	Distance	Correc	t to 3 me	ters	Peak Fie	ld Strength	Limit			
	Read	Analyzer	Reading		Avg	Average	Field S	trength @	3 m	Margin v	rs. Average	Limit			
	AF	Antenna	Factor		Peak	Calculate	d Peak	Field Stre	ngth	Margin v	rs. Peak Lii	mit			
	CL	Cable Lo:	55		HPF	High Pas	s Filter	:		-					
f	Dist	Read	AF	CL	Amp	D Corr	Fltr	Corr.	Limit	Margin	Ant. Pol.	Det.	AntHigh	Table Angle	Notes
GHz	(m)	dBuV	dB/m	dB	dB	dB	dВ	dBuV/m	dBuV/m	4B	V/H	P/A/QP	cm –	Degree	
Low Ch :	755MH	z_Set 19d	bm		1	1									
11.510	3.0	41.4	38.4	9.5	-35.9	0.0	0.0	53.5	74.0	-20.5	v	P	129.3	281.3	
11.510	3.0	25.4	38.4	9.5	-35.9	0.0	0.0	37.4	54.0	- <b>16.6</b>	V	A	129.3	281.3	
11.510	3.0	36.7	38.4	9.5	-35.9	0.0	0.0	48.8	74.0	-25.2	H	P	187.2	309.1	
11.510	3.0	24.2	38.4	9.5	-35.9	0.0	0.0	36.3	54.0	-17.7	H	A	187.2	309.1	
		lz_Set 19	••									<u>.</u>			
11.585	3.0	36.5	38.6	9.6	-35.7	0.0	0.0	49.0	74.0	-25.0	V	P	127.9	270.8	
11.585	3.0	24.0	38.6	9.6	-35.7	0.0	0.0	36.4	54.0	-17.6	v	A	127.9	270.8	
11.585	3.0	36.8	38.6	9.6	-35.7	0.0	0.0	49.2	74.0	-24.8	H	P	187.2	309.1	
11.585	3.0	24.2	38.6	9.6	-35.7	0.0	0.0	36.6	54.0	-17.4	Н	A	187.2	309.1	
Rev. 4. 1.7 Note: No		missions	were de	tected	1 above :	the syster	m noi	se floor.							

**Note:** a spot check was performed on 03/25/10 and showed that the spurious emissions are better than the previous radiated emissions that exist here.

Page 179 of 193

## 8.3. WORST-CASE BELOW 1 GHz

## 2.4 GHz BAND

### SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION)

ce Certif	•	urement rvices, Fi		t 5m Ch	amber							
		guyen										
		_										
	-		_									
ription:			ale									
21:	Transmit	Worst C	lase 2.	4GHz ba	ind							
f	Measurem	ent Frequ	ency	Amp	Preamp (	Gain			Margin	Margin vs.	Limit	
Dist	Distance t	o Antenn	a	D Corr	Distance	Correct	to 3 meters					
Read	Analyzer H	Reading		Filter	Filter Ins	ert Loss						
AF	Antenna F	actor		Corr.	Calculate	d Field S	trength					
CL	Cable Loss	;		Limit	Field Stre	ngth Lir	nit					
Dist	Read	AF	CL	Атр			Согт.	Limit				Notes
		·		<u> </u>								
			o						<b>***********************</b> *************			Full Scan
			\$									
							<b>*************************</b> ***********					
			\$				\$			· · · · · · · · · · · · · · · · · · ·		
			Ø				<b>************************</b> ************		<b>**********************</b> **************			
			\$				&		\$			
			¢				<b>\$</b>		\$			
3.0	42.7	19.4	2.5	27.2	0.0	0.0	37.8	46.0	-8.2	H	EP	
;		20.1	2.5	27.3	0.0	0.0	39.4	46.0	-6.6	H	EP	
3.0	44.1											
	: ciption: et: er: f Dist Read AF CL Dist (m) 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0	: Thanh Ng 06/25/09 : QualCon ciption: PCI 802.) 65-VN78( et: FCC Class f Measurem Dist Distance t Read Analyzer 1 AF Antenna F CL Cable Loss Dist Read (m) dBuV 3.0 53.1 3.0 45.6 3.0 41.3 3.0 39.0 3.0 38.3 3.0 44.2 3.0 50.6 3.0 50.7 3.0 52.5	Imanh Nguyen 06/25/09           ciption:         PCI 802.11n modu 65-VN780-P1           ett:         FCC Class B           ett:         Transmit Worst C           f         Measurement Frequ Dist           Distance to Antenn Read         Analyzer Reading AF           Artenna Factor CL         Cable Loss           Dist         Read         AF (m)           3.0         53.1         7.9           3.0         45.6         13.3           3.0         41.3         14.4           3.0         38.3         20.2           3.0         44.2         1.0           3.0         50.6         7.3           3.0         50.7         11.9           3.0         50.7         11.9           3.0         52.5         13.4	:       Thanh Nguyen 06/25/09         :       QualComm Inc.         ciption:       PCI 802.11n module 65-VN780-P1         ett:       FCC Class B         ett:       FCC Class B         ett:       Transmit Worst Case 2.         f       Measurement Frequency Dist         Distance to Antenna Read       Analyzer Reading AF         Aff       Antenna Factor CL         CL       Cable Loss         Dist       Read       AF         (m)       dBuV       dB/m       dB         3.0       53.1       7.9       0.7         3.0       45.6       13.3       1.1         3.0       38.3       20.2       2.5         3.0       38.3       20.2       2.5         3.0       50.6       7.3       0.8         3.0       50.7       1.9       1.3         3.0       50.7       1.9       1.3         3.0       50.7       1.9       1.3         3.0       50.7       1.9       1.3         3.0       50.5       13.4       1.5	Thanh Nguyen 06/25/09         06/25/09         QualComm Inc. ciption: PCI 802.11n module 65-VN780-P1         FCC Class B         Transmit Worst Case 2.4 GHz base         f       Measurement Frequency Dist       Amp Dist Distance to Antenna D Corr Read       Analyzer Reading F       Filter Corr. CL         Dist       Read       AF       CL       Amp dB         (m)       dBuV       dB/m       dB       dB         3.0       53.1       7.9       0.7       28.4         3.0       45.6       13.3       1.1       28.3         3.0       38.3       20.2       2.5       27.3         3.0       38.3       20.2       2.5       27.3         3.0       50.6       7.3       0.8       28.2         3.0       50.6       7.3       0.8       28.2         3.0       50.7       1.9       1.3       28.2         3.0       50.7       1.9       1.3       28.2         3.0       50.5       13.4       1.5       28.1	06/25/09           ciption:         PCI 802.11n module 65-VN780-P1           et:         FCC Class B           er:         Transmit Worst Case 2.4GHz band           f         Measurement Frequency         Amp         Preamp O           Dist         Distance to Antenna         D Corr         Distance           Read         Analyzer Reading         Filter         Filter Filter Ins           AF         Antenna Factor         Corr.         Calculate           CL         Cable Loss         Limit         Field Street           Dist         Read         AF         CL         Amg         D Corr           J.0         53.1         7.9         0.7         28.4         0.0           3.0         45.6         13.3         1.1         28.3         0.0           3.0         44.6         17.0         2.1         27.8         0.0           3.0         38.3         20.2         2.5         27.3         0.0           3.0         50.6         7.3         0.8         28.3         0.0           3.0         50.6         7.3         0.8         28.3         0.0           3.0         50.6         7.3         0.8	Thanh Nguyen 06/25/09         06/25/09         ciption: PCI 802.11n module 65-VN780-P1         FCC Class B         FCC Class B         Er: Transmit Worst Case 2.4GHz band         f       Measurement Frequency Dist       Amp Distance to Antenna Read       Preamp Gain Dist         AF       Antenna Factor       Corr.       Calculated Field S         CL       Cable Loss       Limit       Field Strength Lin         Dist       Read       AF       CL       Amp Field Strength Lin         Dist       Read       AF       CL       Amp AB       D Corr       Filter Field Strength Lin         Dist       Read       AF       CL       Amp Amp       D Corr       Filter Field Strength Lin         Dist       Read       AF       CL       Amp Amp       D Corr       Filter Field Strength Lin         Dist       Read       AF       CL       Amp Amp       D Corr       Filter Filter         0.3.0       43.1       7.9       0.7       28.4       0.0       0.0         3.0       43.3       20.2       2.5       27.3       0.0       0.0         3.0       34.2       21.0	Thanh Nguyen 06/25/09         06/25/09         c: QualComm Inc. ciption: PCI 802.11n module 65-VN780-P1         FCC Class B         prime FCC Class B         Preamp Gain Dist Distance to Antenna         D Corr Distance Correct to 3 meters Read Analyzer Reading AF Antenna Factor         Corr. Calculated Field Strength CL Cable Loss         Dist Read AF CL Amp D Corr Filter Insert Loss         Dist       Read AF       CL Amp D Corr       Filter Limit         Dist       Read AF       CL Amp D Corr       Filter Corr. Filter Limit         Dist       Read AF       CL Amp D Corr       Filter Corr.         Joint       Read AF       CL Amp D Corr Silter       Filter Corr.         Joint       Read AF       CL Amp D Corr Silter       O.0       33.3         3.0       45.6       13.3       1.1       28.3       0.0       0.0       31.7         3.0       41.3       14.4       1.7       28.1       0.0       0.0       33.8         3.0       34.2       21.0       2.6       27.4       0.0       0.0       33.8         3.0       30.0       50.6       7.3       0.8       28.3	Thanh Nguyen 06/25/09         06/25/09         c: QualComm Inc. ciption: PCI 802.11n module 65-VN780-P1         FCC Class B         Transmit Worst Case 2.4GHz band         f       Measurement Frequency Dist       Amp Distance to Antenna Read       Preamp Gain Dist       Transmit Worst Case 2.4GHz band         f       Measurement Frequency Dist       Amp Distance to Antenna Read       Preamp Gain Filter       Transmit Loss         AF       Antenna Factor       Corr.       Calculated Field Strength Limit       Transmit Mound BuV/m       Dost and BuV/m       MBuV/m         Dist       Read       AF       CL       Amp Amp       D Corr       Filter Insert Loss         Minit       Gable Loss       Limit       Field Strength Limit         Dist       Read       AF       CL       Amp Amp       D Corr       Filter       Filter       Corr.       Limit         Jost       Read       AF       CL       Amp Amp       D Corr       Filter       Corr.       Limit         Jost       Read       AF       CL       Amp Amp       D Corr       Filter       Corr.       Limit         Jost       Read       AF       CL       Amp Amp       D O	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	$\begin{array}{cccccccccccccccccccccccccccccccccccc$

Page 180 of 193

## 5.8 GHz BAND

## SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION)

		fication Se	uremen rvices, Fi		t 5m Cha	mber							
Test Engr		Thanh Ng	guyen										
Date:		06/25/09											
Company: QualComm Inc.													
EUT Desci	iption:	PCI 802.1		ıle									
EUT M/N:													
Test Targe		FCC Cla											
Mode Ope	·r:	Tx 5 GH	z Band_\	Worst	Case								
	f	Measurem	ent Frequ	ency	Amp	Preamp (	Gain			Margin	Margin vs	Limit	
	Dist	Distance t	o Antenn	a	D Corr	Distance	Correct	to 3 meters		2	-		
	Read	Analyzer l	Reading		Filter	Filter Ins	ert Loss						
	AF	Antenna F	actor -		Corr.	Calculate	d Field S	trength					
	CL	Cable Loss	,		Limit	Field Stre	ngth Lir	nit					
f	Dist	Read	AF	CL	Amp	D Corr		Согт.	Limit		Ant. Pol.		Notes
f MHz	Dist (m)	dBuV	dB/m	dB	Amp dB	D Corr dB	Filter dB	dBuV/m	dBuV/m	<u>ab</u>	V/H	P/A/QP	
MHz 90.002	(m) 3.0	dBuV 52.1	dB/m 7.6	dB 0.8	dB 28.3	4B 0.0	dB 0.0	dBuV/m 32.2	dBuV/m 43.5	dB -11.3	V/H H	P/A/QP EP	Notes Full Scan
MHz 90.002 234.608	(m) 3.0 3.0	dBuV 52.1 51.0	dB/m 7.6 11.9	dB 0.8 1.3	dB 28.3 28.2	dB 0.0 0.0	dB 0.0 0.0	dBuV/m 32.2 36.0	dBuV/m 43.5 46.0	dB -11.3 -10.0	V/H H H	P/A/QP EP EP	
MHz 90.002 234.608 299.171	(m) 3.0 3.0 3.0	dBuV 52.1 51.0 51.5	dB/m 7.6 11.9 13.4	dB 0.8 1.3 1.5	dB 28.3 28.2 28.1	dB 0.0 0.0 0.0	dB 0.0 0.0 0.0	dBuV/m 32.2 36.0 38.2	dBuV/m 43.5 46.0 46.0	dB -11.3 -10.0 -7.8	V/H H H H	P/A/QP EP EP EP	
MHz 90.002 234.608 299.171 429.136	(m) 3.0 3.0 3.0 3.0 3.0	dBuV 52.1 51.0 51.5 45.8	dB/m 7.6 11.9 13.4 15.4	dB 0.8 1.3 1.5 1.9	dB 28.3 28.2 28.1 28.0	dB 0.0 0.0 0.0 0.0	dB 0.0 0.0 0.0 0.0	dBuV/m 32.2 36.0 38.2 35.1	dBuV/m 43.5 46.0 46.0 46.0	dB -11.3 -10.0 -7.8 -10.9	V/H H H H	P/A/QP EP EP EP EP	
MHz 90.002 234.608 299.171 429.136 639.985	(m) 3.0 3.0 3.0 3.0 3.0 3.0	dBuV 52.1 51.0 51.5 45.8 44.1	dB/m 7.6 11.9 13.4 15.4 18.9	dB 0.8 1.3 1.5 1.9 2.3	dB 28.3 28.2 28.1 28.0 27.4	dB 0.0 0.0 0.0 0.0 0.0	dB 0.0 0.0 0.0 0.0 0.0	dBuV/m 32.2 36.0 38.2 35.1 37.9	dBuV/m 43.5 46.0 46.0 46.0 46.0	dB -11.3 -10.0 -7.8 -10.9 -8.1	V/H H H H H	P/A/QP EP EP EP EP EP	
MHz 90.002 234.608 299.171 429.136 639.985 799.952	(m) 3.0 3.0 3.0 3.0 3.0 3.0 3.0	dBuV 52.1 51.0 51.5 45.8 44.1 46.2	dB/m 7.6 11.9 13.4 15.4 18.9 21.0	dB 0.8 1.3 1.5 1.9 2.3 2.6	dB 28.3 28.2 28.1 28.0 27.4 27.4	dB           0.0           0.0           0.0           0.0           0.0           0.0           0.0           0.0           0.0           0.0	dB 0.0 0.0 0.0 0.0 0.0 0.0	dBuV/m 32.2 36.0 38.2 35.1 37.9 42.3	dBuV/m 43.5 46.0 46.0 46.0 46.0 46.0	dB -11.3 -10.0 -7.8 -10.9 -8.1 -3.7	V/H H H H H H	P/A/QP EP EP EP EP EP EP	
MHz 90.002 234.608 299.171 429.136 639.985 799.952 61.441	(m) 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0	dBuV 52.1 51.0 51.5 45.8 44.1 46.2 53.4	dB/m 7.6 11.9 13.4 15.4 18.9 21.0 7.9	dB 0.8 1.3 1.5 1.9 2.3 2.6 0.7	dB 28.3 28.2 28.1 28.0 27.4 27.4 27.4 28.4	dB 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	dB 0.0 0.0 0.0 0.0 0.0 0.0 0.0	dBuV/m 32.2 36.0 38.2 35.1 37.9 42.3 33.7	dBuV/m 43.5 46.0 46.0 46.0 46.0 46.0 46.0 40.0	dB -11.3 -10.0 -7.8 -10.9 -8.1 -3.7 -6.3	V/H H H H H V	P/A/QP EP EP EP EP EP EP EP	
MHz 90.002 234.608 299.171 429.136 639.985 799.952 61.441 142.925	(m) 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0	dBuV           52.1           51.0           51.5           45.8           44.1           46.2           53.4           45.9	dB/m 7.6 11.9 13.4 15.4 18.9 21.0 7.9 13.1	dB 0.8 1.3 1.5 1.9 2.3 2.6 0.7 1.1	dB 28.3 28.2 28.1 28.0 27.4 27.4 27.4 28.4 28.3	dB           0.0           0.0           0.0           0.0           0.0           0.0           0.0           0.0           0.0           0.0           0.0           0.0           0.0           0.0           0.0           0.0           0.0	dB 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	dBuV/m 32.2 36.0 38.2 35.1 37.9 42.3 33.7 31.8	dBuV/m 43.5 46.0 46.0 46.0 46.0 46.0 40.0 43.5	dB -11.3 -10.0 -7.8 -10.9 -8.1 -3.7 -6.3 -11.7	V/H H H H H V V	P/A/QP EP EP EP EP EP EP EP EP	
MHz 90.002 234.608 299.171 429.136 639.985 799.952 61.441 142.925 498.379	(m) 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0	dBuV           52.1           51.0           51.5           45.8           44.1           46.2           53.4           45.9           39.0	dB/m           7.6           11.9           13.4           15.4           18.9           21.0           7.9           13.1           16.7	dB 0.8 1.3 1.5 1.9 2.3 2.6 0.7 1.1 2.0	dB 28.3 28.2 28.1 28.0 27.4 27.4 28.4 28.3 27.8	dB           0.0           0.0           0.0           0.0           0.0           0.0           0.0           0.0           0.0           0.0           0.0           0.0           0.0           0.0           0.0           0.0           0.0           0.0           0.0	dB 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	dBuV/m 32.2 36.0 38.2 35.1 37.9 42.3 33.7 31.8 29.9	dBuV/m 43.5 46.0 46.0 46.0 46.0 46.0 40.0 43.5 46.0	dB -11.3 -10.0 -7.8 -10.9 -8.1 -3.7 -6.3 -11.7 -16.1	V/H H H H H V V V V	P/A/QP EP EP EP EP EP EP EP EP EP EP	
MHz 90.002 234.608 299.171 429.136 639.985 799.952 61.441	(m) 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0	dBuV           52.1           51.0           51.5           45.8           44.1           46.2           53.4           45.9	dB/m 7.6 11.9 13.4 15.4 18.9 21.0 7.9 13.1	dB 0.8 1.3 1.5 1.9 2.3 2.6 0.7 1.1	dB 28.3 28.2 28.1 28.0 27.4 27.4 27.4 28.4 28.3	dB           0.0           0.0           0.0           0.0           0.0           0.0           0.0           0.0           0.0           0.0           0.0           0.0           0.0           0.0           0.0           0.0           0.0	dB 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	dBuV/m 32.2 36.0 38.2 35.1 37.9 42.3 33.7 31.8	dBuV/m 43.5 46.0 46.0 46.0 46.0 46.0 40.0 43.5	dB -11.3 -10.0 -7.8 -10.9 -8.1 -3.7 -6.3 -11.7	V/H H H H H V V	P/A/QP EP EP EP EP EP EP EP EP	

Page 181 of 193

# 9. AC POWER LINE CONDUCTED EMISSIONS

## LIMITS

FCC §15.207 (a)

RSS-Gen 7.2.2

Frequency of Emission (MHz)	Conducted Limit (dBuV)			
	Quasi-peak	Average		
0.15-0.5	66 to 56 *	56 to 46 "		
0.5-5	56	46		
5-30	60	50		

\* Decreases with the logarithm of the frequency.

## TEST PROCEDURE

ANSI C63.4

Page 182 of 193

### **RESULTS**

### **<u>6 WORST EMISSIONS</u>**

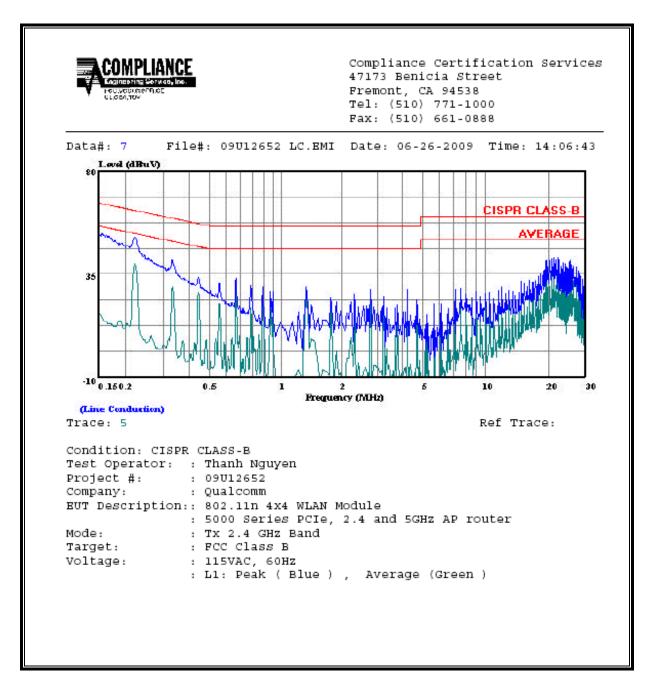
## Transmit 2.4 GHz

CONDUCTED EMISSIONS DATA (115VAC 60Hz)										
Freq.		Closs	Limit	EN_B	Margin		Remark			
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV(dB)	L1/L2	
0.22	51.00		38.34	0.00	62.78	52.78	-11.78	-14.44	L1	
0.33	41.16		29.23	0.00	59.35	49.35	-18.19	-20.12	L1	
21.26	42.22		35.52	0.00	60.00	50.00	-17.78	-14.48	L1	
0.22	50.33		36.39	0.00	62.78	52.78	-12.45	-16.39	L2	
0.33	39.00		27.59	0.00	59.35	49.35	-20.35	-21.76	L2	
21.71	38.01		31.87	0.00	60.00	50.00	-21.99	-18.13	L2	
6 Worst I	 Data 									
Transmi	t 5.8GHz									

CONDUCTED EMISSIONS DATA (115VAC 60Hz)										
Freq.			Closs	Limit	EN_B	Margin		Remark		
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV(dB)	L1/L2	
0.22	49.94		36.55	0.00	62.74	52.74	-12.80	-16.19	L1	
0.33	39.76		28.62	0.00	59.35	49.35	-19.59	-20.73	L1	
21.15	41.63		37.25	0.00	60.00	50.00	-18.37	-12.75	L1	
0.22	49.89		36.03	0.00	62.82	52.82	-12.93	-16.79	L2	
0.33	39.80		27.12	0.00	59.35	49.35	-19.55	-22.23	L2	
21.71	38.81		32.20	0.00	60.00	50.00	-21.19	-17.80	L2	
6 Worst I	Data									

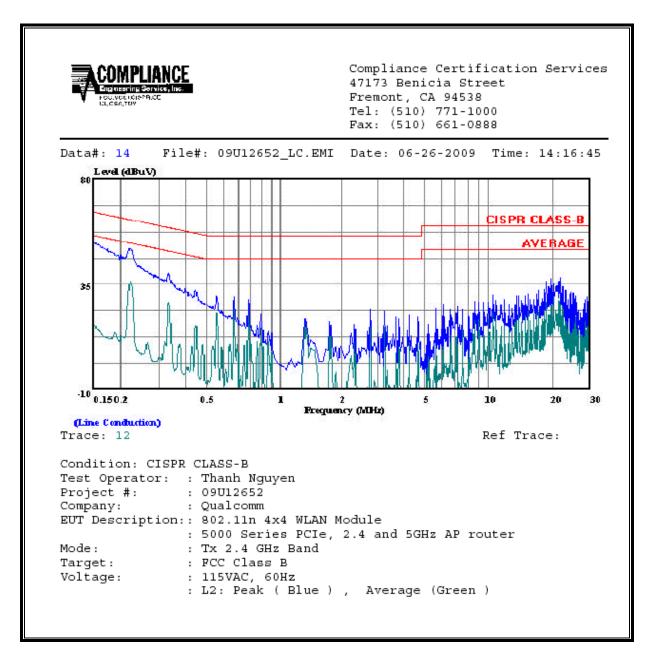
Page 183 of 193

## LINE 1 RESULTS: Transmit 2.4GHz



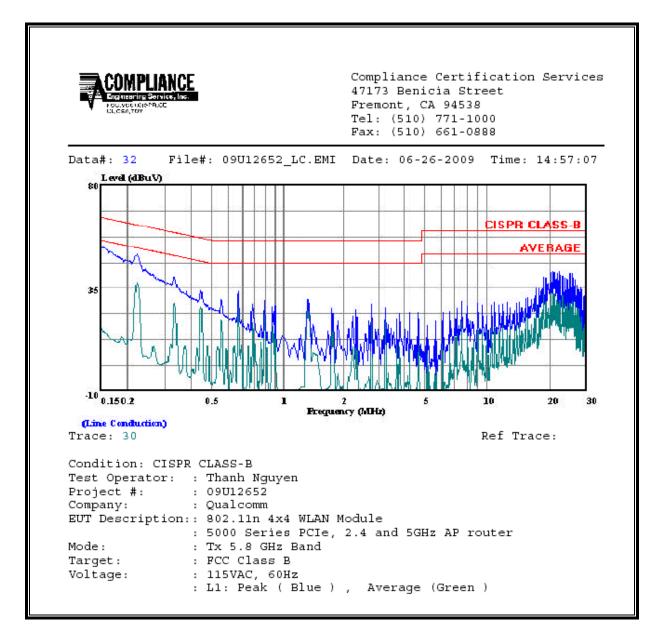
Page 184 of 193

## LINE 2 RESULTS



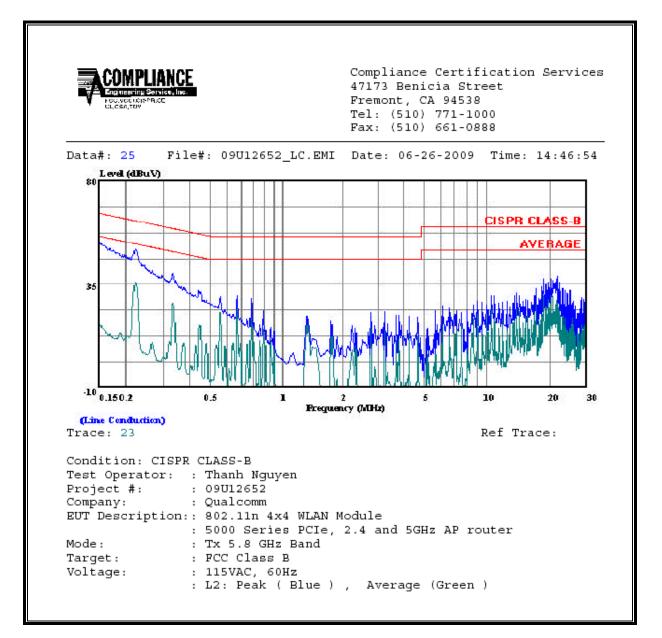
Page 185 of 193

## LINE 1 RESULTS: Transmit 5.8GHz



Page 186 of 193

## LINE 2 RESULTS



Page 187 of 193

#### 10. MAXIMUM PERMISSIBLE EXPOSURE

### FCC RULES

§1.1310 The criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in §1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of §2.1093 of this chapter.

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm²)	Averaging time (minutes)
(A) Lim	its for Occupational	l/Controlled Exposu	res	
0.3–3.0 3.0–30 30–300 300–1500 1500–100,000	614 1842/f 61.4	1.63 4.89/F 0.163	*(100) *(900/f²) 1.0 f/300 5	6 6 6 6
(B) Limits	for General Populati	on/Uncontrolled Exp	oosure	
0.3–1.34 1.34–30	614 824/f	1.63 2.19/f	*(100) *(180/f²)	30 30

#### TABLE 1-LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

#### TABLE 1-LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)-Continued

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm²)	Averaging time (minutes)	
30–300 300–1500 1500–100.000	27.5	0.073	0.2 f/1500 1.0	30 30 30	

f = frequency in MHz

\* = Plane-wave equivalent power density NOTE 1 TO TABLE 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occu-tions where a transient through a location where occu-

pational/controlled limits apply provided he or she is made aware of the potential for exposure. NOTE 2 TO TABLE 1: General population/uncontrolled exposures apply in situations in which the general public may be ex-posed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

Page 188 of 193

## IC RULES

IC Safety Code 6, Section 2.2.1 (a) A person other than an RF and microwave exposed worker shall not be exposed to electromagnetic radiation in a frequency band listed in Column 1 of Table 5, if the field strength exceeds the value given in Column 2 or 3 of Table 5, when averaged spatially and over time, or if the power density exceeds the value given in Column 4 of Table 5, when averaged spatially and over time.

## Table 5

Exposure Limits for Persons Not Classed As RF and Microwave Ex-
posed Workers (Including the General Public)

1 Frequency (MHz)	2 Electric Field Strength; rms (V/m)	3 Magnetic Field Strength; rms (A/m)	4 Power Density (W/m <sup>2</sup> )	5 Averaging Time (min)
0.003–1	280	2.19		6
1–10	280/f	2.19/ <i>f</i>		6
10–30	28	2.19/ <i>f</i>		6
30–300	28	0.073	2*	6
300–1 500	1.585 <i>f</i> <sup>0.5</sup>	0.0042f <sup>0.5</sup>	f/150	6
1 500–15 000	61.4	0.163	10	6
15 000–150 000	61.4	0.163	10	616 000 /f <sup>1.2</sup>
150 000–300 000	0.158 <i>f</i> <sup>0.5</sup>	4.21 x 10 <sup>-4</sup> f <sup>0.5</sup>	6.67 x 10 <sup>-5</sup> ƒ	616 000 /f <sup>1.2</sup>

\* Power density limit is applicable at frequencies greater than 100 MHz.

Notes: 1. Frequency, f, is in MHz.

- 2. A power density of 10 W/m<sup>2</sup> is equivalent to  $1 \text{ mW/cm}^2$ .
- A magnetic field strength of 1 A/m corresponds to 1.257 microtesla (μT) or 12.57 milligauss (mG).

Page 189 of 193

## EQUATIONS

Power density is given by:

S = EIRP / (4 \* Pi \* D^2)

where

S = Power density in W/m<sup>2</sup> EIRP = Equivalent Isotropic Radiated Power in W D = Separation distance in m

Power density in units of W/m<sup>2</sup> is converted to units of mWc/m<sup>2</sup> by dividing by 10.

Distance is given by:

D = SQRT (EIRP / (4 \* Pi \* S))

where

D = Separation distance in m EIRP = Equivalent Isotropic Radiated Power in W S = Power density in W/m<sup>2</sup>

In the table(s) below, Power and Gain are entered in units of dBm and dBi respectively and conversions to linear forms are used for the calculations.

## <u>LIMITS</u>

From FCC 1.1310 Table 1 (B), the maximum value of S = 1.0 mW/cm<sup>2</sup> From IC Safety Code 6, Section 2.2 Table 5 Column 4, S = 10 W/m<sup>2</sup>

## <u>RESULTS</u>

(MPE distance equals 20 cm)

Band	Mode	Separation	Output	Antenna	IC Power	FCC Power
		Distance	Power	Gain	Density	Density
		(m)	(dBm)	(dBi)	(W/m^2)	(mW/cm^2)
2.4 GHz	Legacy	0.20	27.26	8.02	6.71	0.671
2.4 GHz	MIMO	0.20	27.46	2	1.76	0.176
5.8 GHz	Legacy	0.20	26.85	9.02	7.69	0.769
5.8 GHz	MIMO	0.20	27.91	3	2.45	0.245

Page 190 of 193