

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

CERTIFICATION TEST REPORT

FOR

DC544D_2 PCIe DAUGHTER CARD FOR 2.4 / 5GHz AP APPLICATIONS_DFS

MODEL NUMBER: 65-VN780-P2

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

REPORT NUMBER: 09U12687-5

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

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NVLAP LAB CODE 200065-0

Revision History

| Rev. | Issue Date | Revisions | Revised By |
|------|---------------|---------------|------------|
| | 7/22/2009 | Initial Issue | F. Ibrahim |

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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 / 5GHZ AP APPLICATIONS_DFS |
| MODEL: | 65-VN780-P2 |
| SERIAL NUMBER: | 7916 for Antenna Port, 7929 for Radiated Emission, and 02324 for DFS |
| DATE TESTED: | JUNE 24 – JULY 17, 2009 |
| | 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

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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%.

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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 / 5GHz AP 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 | 24.37 | 273.53 |
| 2412 - 2462 | 802.11g | 26.20 | 416.87 |
| 2412 - 2462 | 802.11n HT20 | 26.15 | 412.10 |
| 2422 - 2452 | 802.11n HT40 | 26.05 | 402.72 |
| 5.8 GHz BAND | - | | |
| 5745 - 5825 | 802.11a | 25.15 | 327.34 |
| 5745 - 5825 | 802.11n HT20 | 25.24 | 334.20 |
| 5755 - 5795 | 802.11n HT40 | 25.05 | 319.89 |

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 |

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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.

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5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

| PERIPHERAL SUPPORT EQUIPMENT LIST | | | | | | | |
|-----------------------------------|--------------|----------------|----------------|--------|--|--|--|
| Description | Manufacturer | Model | Serial Number | 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

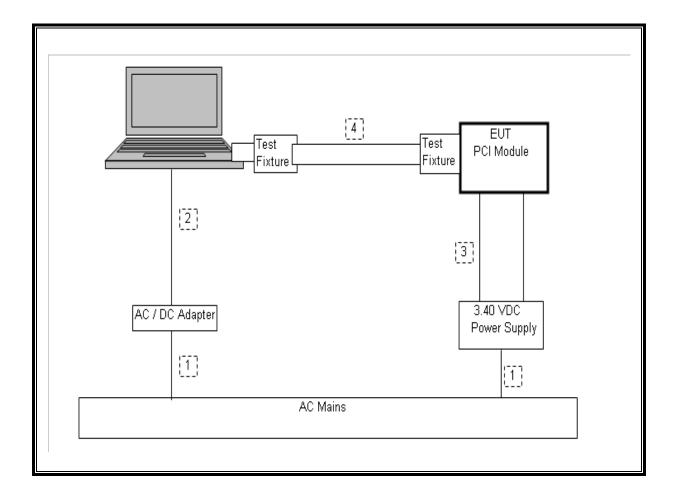
| | I/O CABLE LIST | | | | | | | | |
|--------------|----------------|----------------------------|------------------|---------------|-----------------|--------------|--|--|--|
| Cable No. | Port | # of Identical Ports | Connecto Type | Cable Type | Cable Length | Remarks | | | |
| 1 | AC | 2 | US115 | 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.

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SETUP DIAGRAM FOR TESTS



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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 | | |

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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

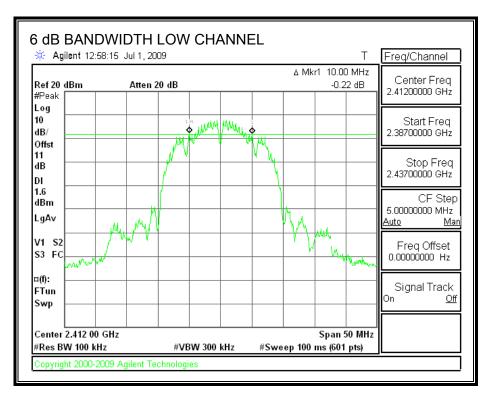
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

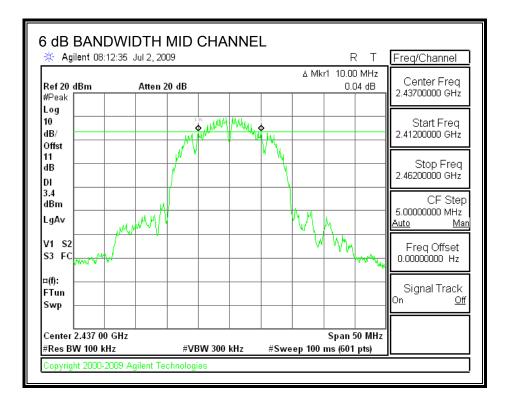
RESULTS

| Channel | el 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 |

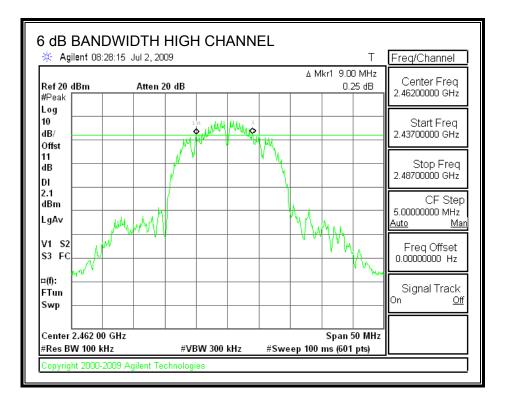
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6 dB BANDWIDTH





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7.1.2. 99% & 26 dB BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

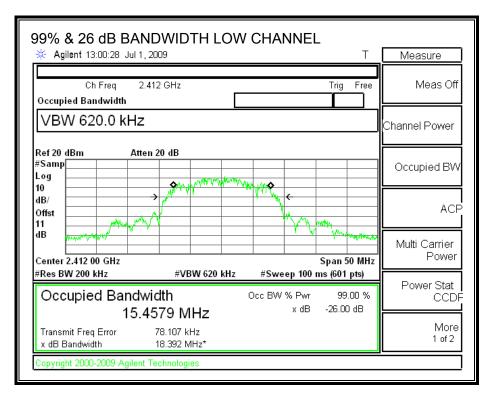
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth measurement function is utilized.

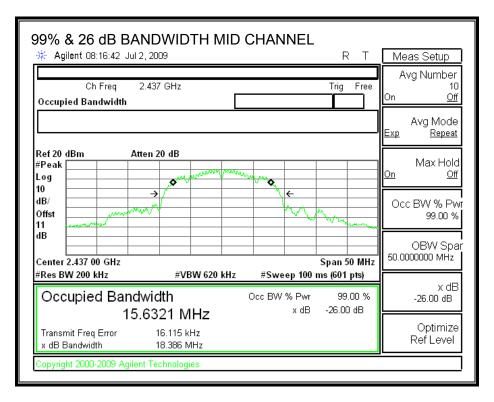
RESULTS

| 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 |

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99% & 26 dB BANDWIDTH





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| 99% & 26 dB BANI | | GH CHANNE | L т | | |
|---------------------------------------|---------------------------|--------------|-----------------------------|-------------|--|
| Rylient 00.20.56 Jul 2, 2 | 009 | | | ┢── | |
| Ch Freq 2.48 Occupied Bandwidth | 62 GHz | | Trig Free | Auto | Res BW 200.0 kHz <u>Man</u> |
| RBW 200.0 kHz | | | | Auto | Video BW 620.0 kHz Man |
| #Peak | 20 dB | annan anna | | Auto | VBW/RBM 3.00000 <u>Man</u> |
| 10 dB/ Offst 11 | | \ ← | Win has | On | Average 10 <u>Off</u> |
| dB | VBW 620 kH | z #Sweep 100 | Span 50 MHz ms (601 pts) | Log-P | ′BW Type wr (Video) ► <u>Man</u> |
| Occupied Bandwi | dth | Occ BW % Pwr | 99.00 % | | |
| | 128 MHz | x dB | -26.00 dB | | Span/RBW |
| Transmit Freq Error x dB Bandwidth | 151.036 kHz 18.448 MHz | | | <u>Auto</u> | 106 106 |
| Copyright 2000-2009 Agilent T | echnologies | | | - | |

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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:

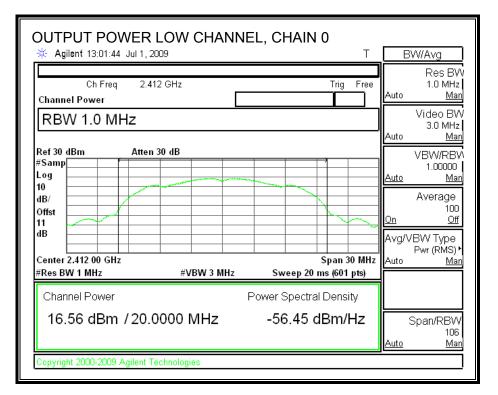
| Antenna Gain (dBi) | • • • • | Effective Legacy Gain (dBi) |
|-----------------------|---------|--------------------------------|
| 2 | 6.02 | 8.02 |

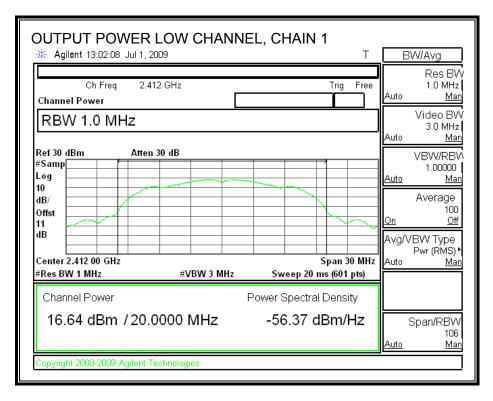
The composite antenna gain is 8.02 dBi, therefore the limit is 27.98 dBm.

| 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 | 16.56 | 16.64 | 16.57 | 16.55 | 22.60 | 27.98 | -5.38 |
| Mid | 2437 | 18.35 | 18.38 | 18.35 | 18.30 | 24.37 | 27.98 | -3.61 |
| High | 2462 | 16.70 | 16.80 | 16.79 | 16.65 | 22.76 | 27.98 | -5.22 |

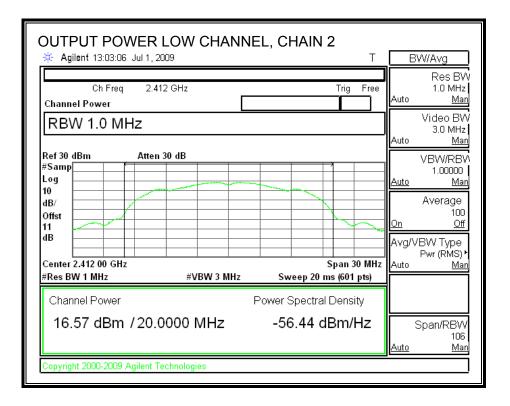
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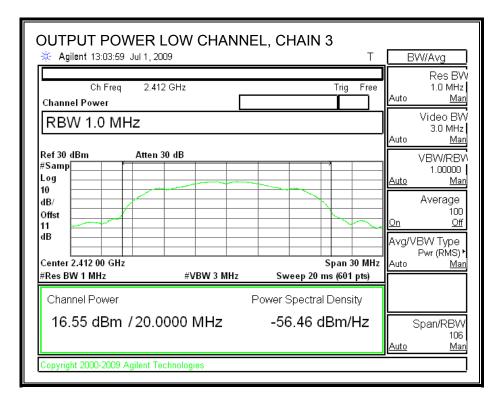
OUTPUT POWER, LOW CHANNEL





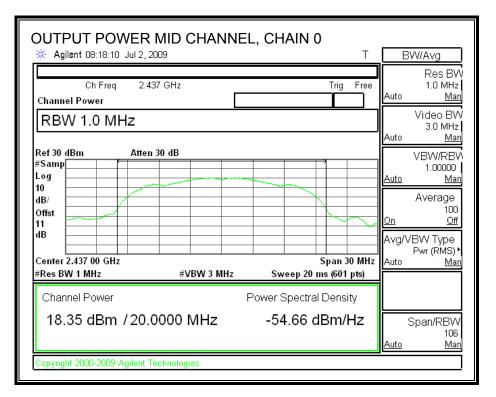
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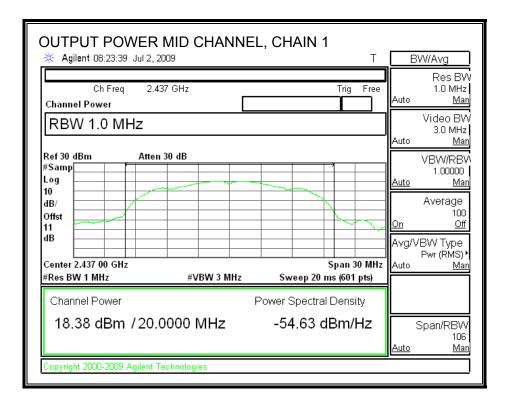




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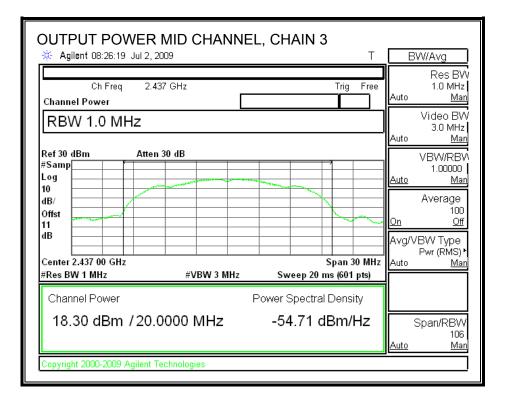
OUTPUT POWER, MID CHANNEL





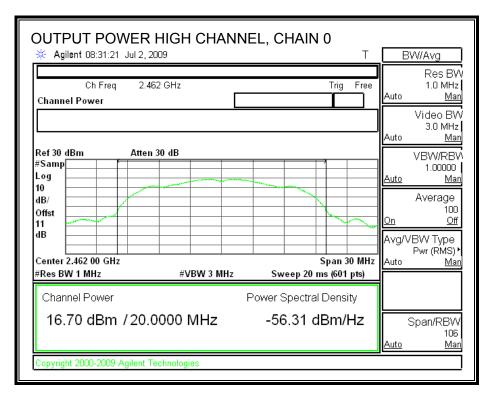
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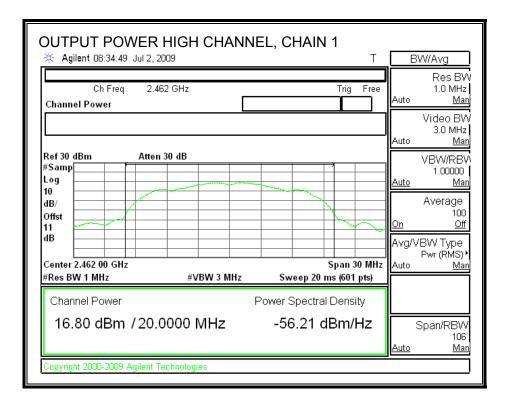
| Ch Freq 2.437 GHz Trig Free 1.0 MHz Channel Power Image: constraint of the stress of t | OUTPUT POWER | | EL, CHAIN 2 | Т | B | W/Avg |
|--|--|------------|-------------|-----------|-----------|---|
| Ref 30 dBm Atten 30 dB 3.0 MHz Auto Main Log VBW/RBV 10 0 dB/ 0 Offst 0 11 0 dB 0 Center 2.437 00 GHz Span 30 MHz #Res BW 1 MHz #VBW 3 MHz Sweep 20 ms (601 pts) Channel Power Power Spectral Density 18.35 dBm / 20.0000 MHz -54.66 dBm/Hz Span/RBW | 1 | 7 GHz | | Trig Free | Auto | Res BW 1.0 MHz <u>Man</u> |
| #Samp Image: Control of the second secon | | 20. J.D. | | | Auto | 3.0 MHz <u>Man</u> |
| Center 2.437 00 GHz Span 30 MHz Auto Máz #Res BW 1 MHz #VBW 3 MHz Sweep 20 ms (601 pts) | #Samp Log 10 dB/ Offst 11 | | | | <u>On</u> | 1.00000 <u>Man</u> Average 100 <u>Off</u> 'BW Type |
| 18.35 dBm / 20.0000 MHz -54.66 dBm/Hz Span/RBW | | #VBW 3 MHz | | • | Auto | Pwr (RMS)∙ <u>Mar</u> |
| | | | | | | Span/RBW 106 <u>Mar</u> |



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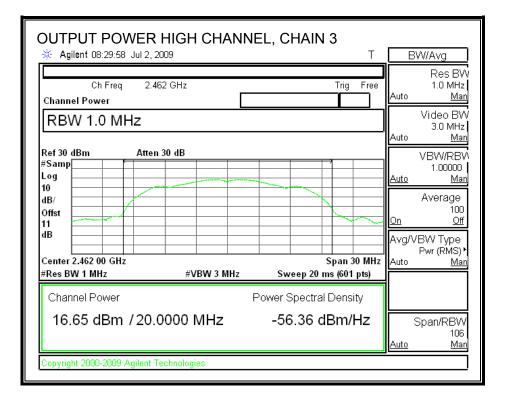
OUTPUT POWER, HIGH CHANNEL





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| OUTPUT POWER | | EL, CHAIN 2 | Т | B | W/Avg |
|--|------------|-----------------------|----------------------|-------------------|---|
| Ch Freq 2.462 Channel Power | 2 GHz | nT I | ig Free | Auto | Res BW 1.0 MHz <u>Man</u> |
| | | | | Auto | Video BW 3.0 MHz <u>Man</u> |
| Ref 30 dBm Atten 3 #Samp | | | | <u>Auto</u> On | VBW/RBW 1.00000 <u>Man</u> Average 100 <u>Off</u> BW Type |
| Center 2.462 00 GHz #Res BW 1 MHz | #VBW 3 MHz | Spa Sweep 20 ms (6 | n 30 MHz 501 pts) | Auto | Pwr (RMS) ► <u>Man</u> |
| Channel Power Power Spectral Density 16.79 dBm / 20.0000 MHz -56.22 dBm/Hz | | | | | Span/RBW 106 <u>Man</u> |
| Copyright 2000-2009 Agilent Te | chnologies | | | | |



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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 | 18.23 | 18.36 | 18.29 | 18.04 |
| High | 2462 | 16.69 | 16.88 | 16.68 | 16.77 |

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7.1.5. 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.

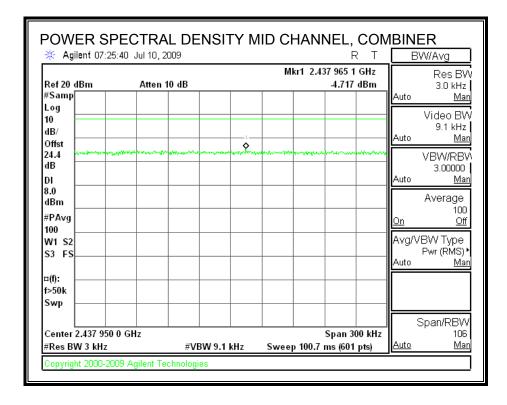
RESULTS

| Channel | Frequency | PSD with Combiner | Limit | Margin |
|---------|-----------|-------------------|-------|--------|
| | (MHz) | (dBm) | (dBm) | (dB) |
| Low | 2412 | -9.55 | 8 | -17.55 |
| Middle | 2437 | -4.72 | 8 | -12.72 |
| High | 2462 | -7.01 | 8 | -15.01 |

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POWER SPECTRAL DENSITY

| 🔆 Agilent 07:22 | 2:18 Jul 10, 2009 | | | RT | BV | ///Avg |
|----------------------------------|---|-------------------------------------|-------------|-------------------------------|----------------|-----------------------------------|
| Ref 20 dBm Samp | Atten 10 dB | | Mkr1 2.4 | 14 224 7 GHz -9.547 dBm | Auto | Res BV 3.0 kHz <u>Ma</u> |
| .og 0 IB/ | | | | | Auto | Video BV 9.1 kHz <u>Ma</u> |
| | an hang gang an | ungeletise in a second and a second | 1 | The ward in the second second | Auto | VBW/RB 3.00000 <u>Ma</u> |
| :.0 IBm :PA∨g 00 | | | | | <u>On</u> | Average 100 <u>Off</u> |
| N1 S2 53 FS AA | | | | | Avg/VI Auto | BW Type Pwr (RMS) <u>Ma</u> |
| l(f): >50k Swp | | | | | | |
| Center 2.414 150 Res BW 3 kHz | | 3W 9.1 kHz | Sweep 100.7 | Span 300 kHz ms (601 pts) | Auto S | pan/RBV 106 <u>Ma</u> i |



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| * Agilent 07:29 | | | HCHANNEL, COR | BW/Avg |
|-----------------------------------|--|------------|--|---|
| Project: Ref 20 dBm #Samp | Atten 10 dB | | Mkr1 2.460 447 4 GHz -7.006 dBm | Res BV 3.0 kHz Auto <u>Ma</u> |
| Log 10 dB/ Offst | | | | Video BV 9.1 kHz Auto <u>Ma</u> |
| dB DI | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | VBW/RB\ 1.00000 <u>Auto Ma</u> |
| 8.0 dBm #PAvg 100 | | | | Average 100 <u>On Off</u> |
| W1 S2 S3 FS | | | | Avg/VBW Type Pwr (RMS) Auto <u>Ma</u> |
| ¤(f): f>50k Swp | | | | |
| Center 2.460 500 #Res BW 3 kHz | 0 GHz #VBW 1 |).1 kHz Sw | Span 300 kHz eep 100.7 ms (601 pts) | Span/RBW z 106 <u>Auto Ma</u> |

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7.1.6. 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

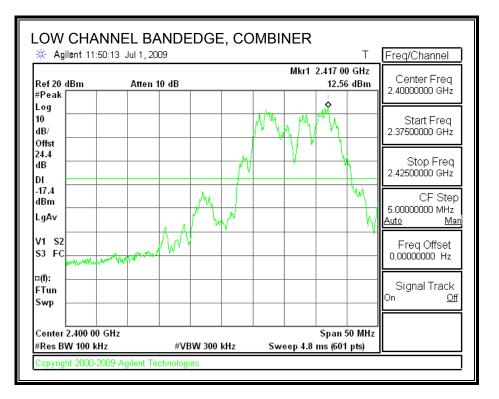
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

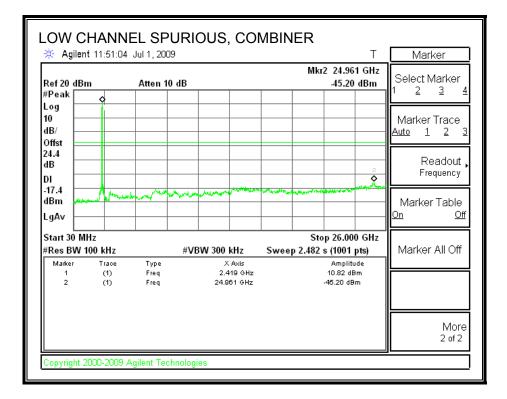
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

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.

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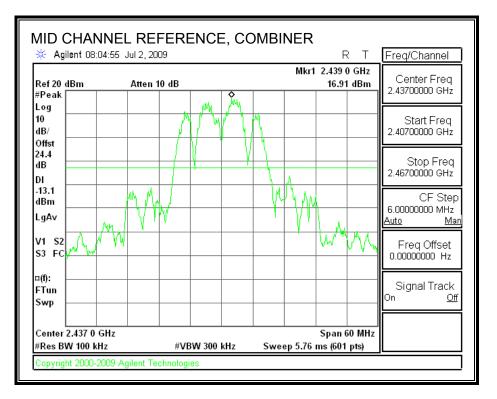
LOW CHANNEL SPURIOUS EMISSIONS

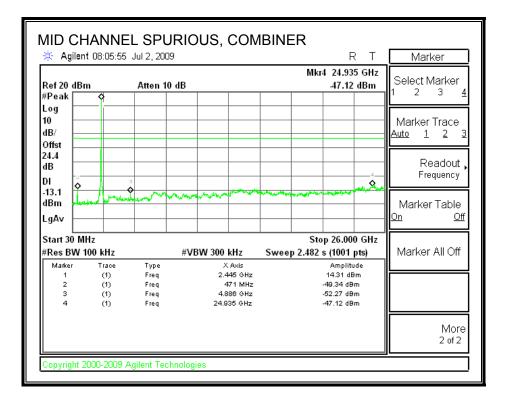




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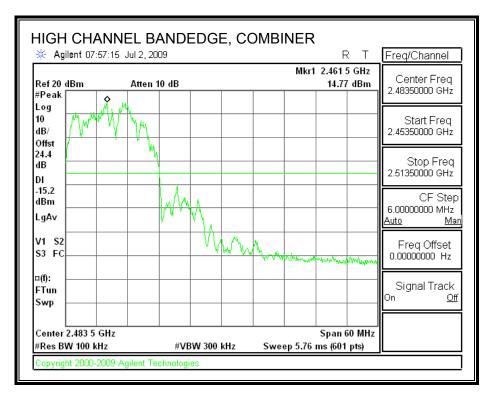
MID CHANNEL SPURIOUS EMISSIONS

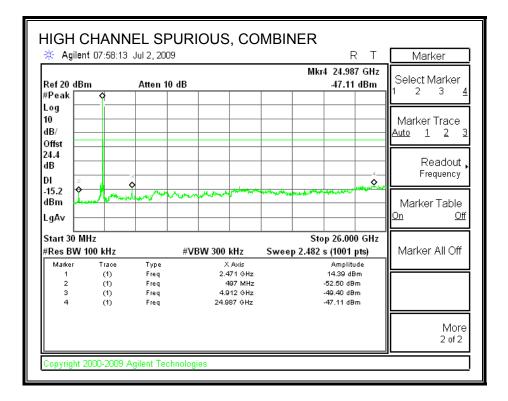




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HIGH CHANNEL SPURIOUS EMISSIONS





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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

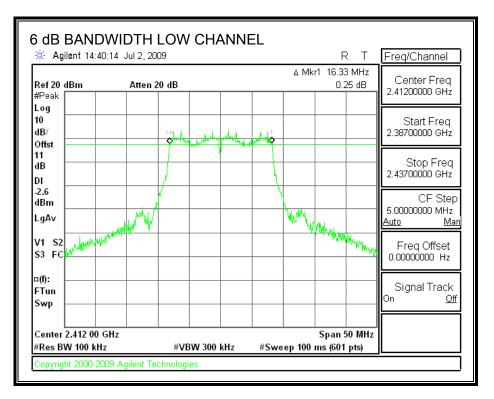
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

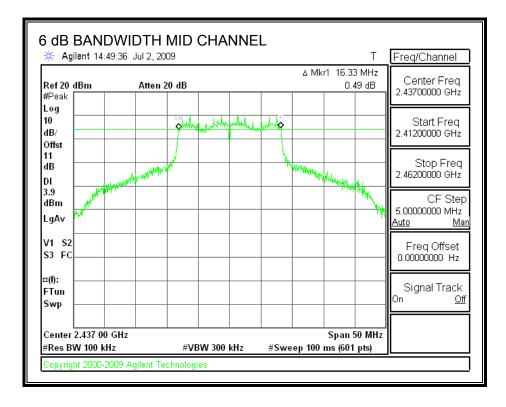
RESULTS

| 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 |

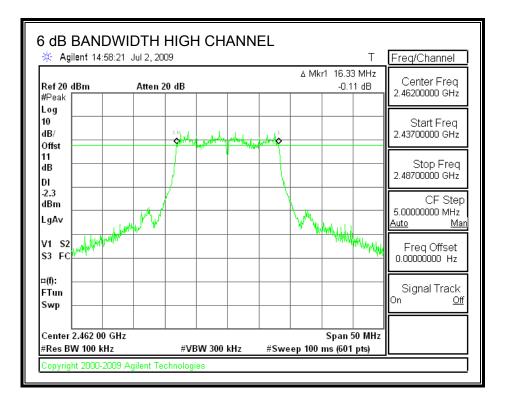
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6 dB BANDWIDTH





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7.2.2. 99% & 26 dB BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

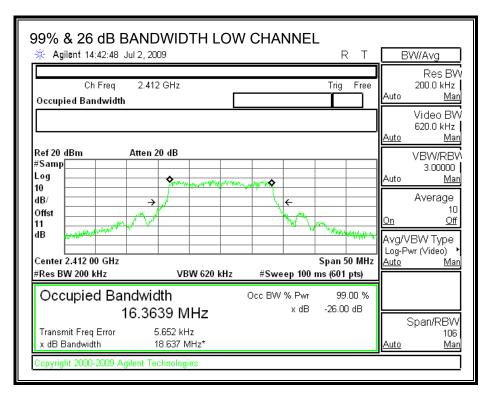
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth measurement function is utilized.

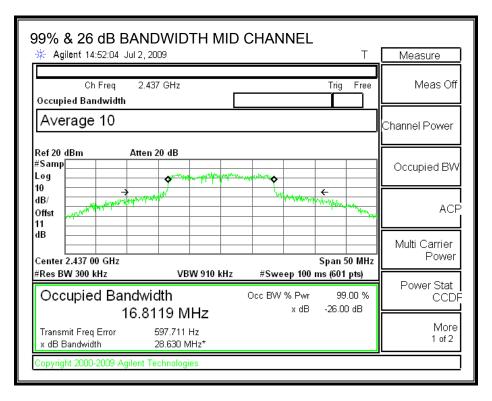
RESULTS

| 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 |

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99% & 26 dB BANDWIDTH





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| 99% & 26 dB BANDWIDT | H HIGH | I CHANNEI | _ | |
|--|--|---------------------------------------|---------------------|------------------------|
| 🔆 Agilent 14:59:10 Jul 2, 2009 | | | Т | Measure |
| Ch Freq 2.462 GHz Occupied Bandwidth | | | Trig Free | Meas Off |
| | | | | Channel Power |
| Ref 20 dBm Atten 20 dB #Samp Log 10 \$ | AN A | | | Occupied BW |
| dB/ Offst 11 | | · · · · · · · · · · · · · · · · · · · | Mary Mary Mary Mary | ACP |
| Center 2.462 00 GHz | | | Span 50 MHz | Multi Carrier Power |
| #Res BW 180 kHz #VBV Occupied Bandwidth | V 560 kHz | #Sweep 100 r | · · · | Power Stat CCDF |
| 16.4874 MH | Ηz | x dB | -26.00 dB | |
| Transmit Freq Error 12.553 kH: x dB Bandwidth 18.376 MH | z | | | More 1 of 2 |
| Copyright 2000-2009 Agilent Technologies | 3 | | | |

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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

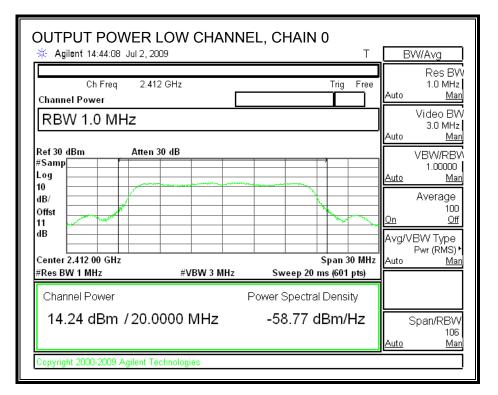
Effective Legacy Mode Composite Gain of 4 Identical Antennas:

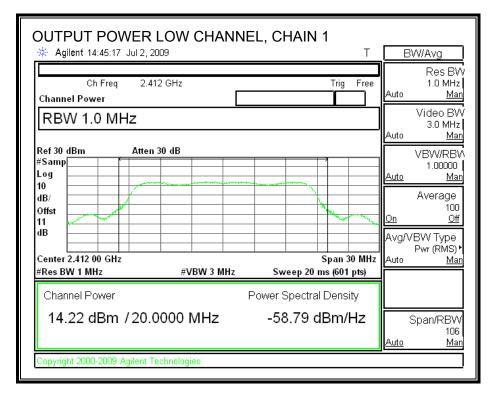
| • • • • | | Effective Legacy Gain (dBi) | | |
|---------|------|--------------------------------|--|--|
| 2 | 6.02 | 8.02 | | |

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

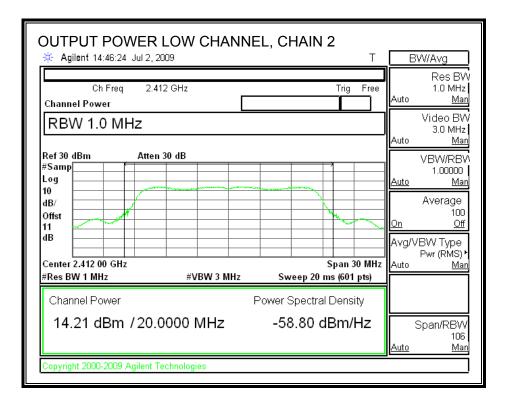
| Channel | Frequency | Chain 0 | Chain 1 | Chain 2 | Chain 3 | Total | Limit | Margin |
|---------|-----------|---------|---------|---------|---------|-------|-------|--------|
| | | Power | Power | Power | Power | Power | | |
| | (MHz) | (dBm) | (dBm) | (dBm) | (dBm) | (dBm) | (dBm) | (dB) |
| Low | 2412 | 14.24 | 14.22 | 14.21 | 14.19 | 20.24 | 27.98 | -7.74 |
| Mid | 2437 | 20.21 | 20.24 | 20.11 | 20.17 | 26.20 | 27.98 | -1.78 |
| High | 2462 | 14.13 | 13.99 | 14.14 | 14.08 | 20.11 | 27.98 | -7.87 |

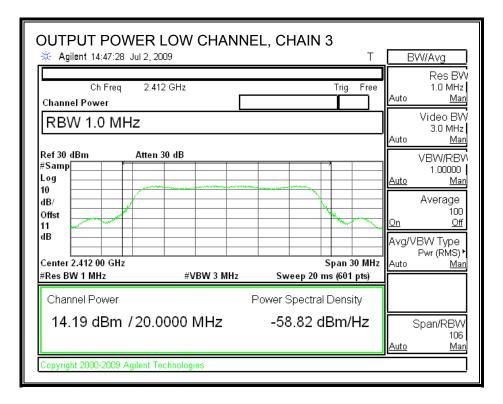
OUTPUT POWER, LOW CHANNEL





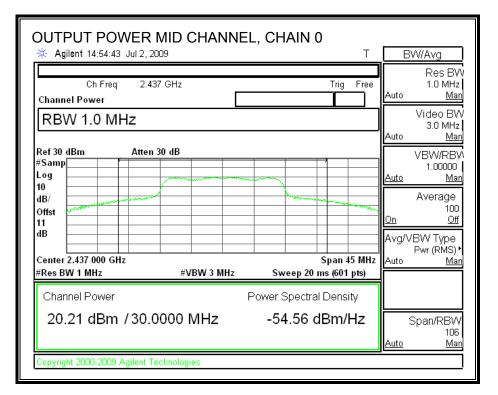
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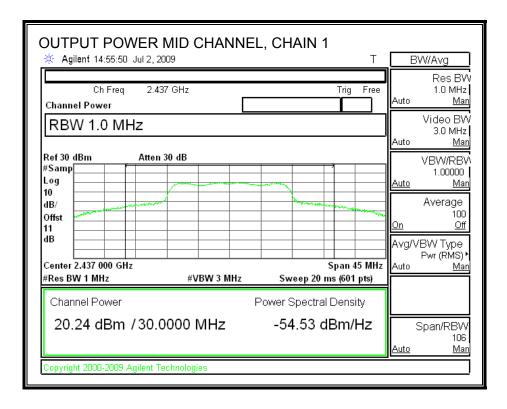




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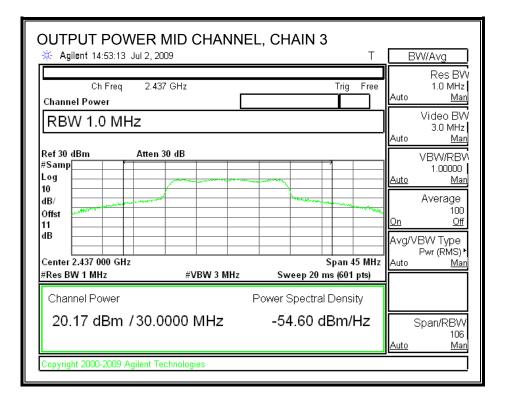
OUTPUT POWER, MID CHANNEL





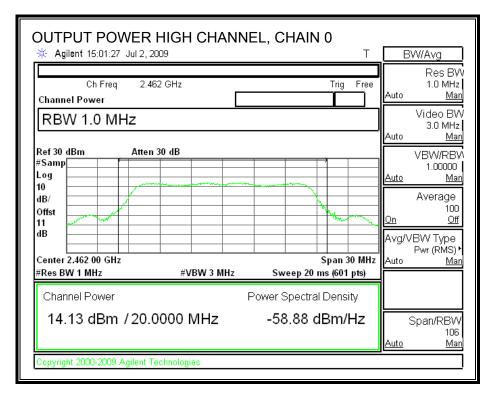
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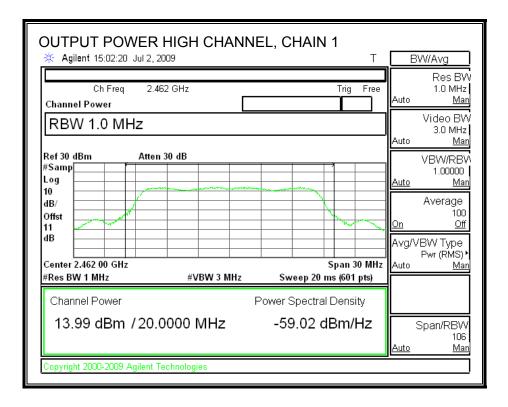
| OUTPUT POWER | | L, CHAIN 2 | Т | BV | N/Avg |
|--|-------------|----------------------------------|---------------------|-------------------|---|
| Channel Power | 7 GHz | Tri | ig Free | Auto | Res BW 1.0 MHz <u>Man</u> Video BW |
| RBW 1.0 MHZ | 30 dB | |] | Auto | 3.0 MHz <u>Man</u> |
| #Samp Log 10 dB/ Offst 11 dB | | | | <u>Auto</u> On | 1.00000 <u>Man</u> Average 100 <u>Off</u> |
| Center 2.437 000 GHz #Res BW 1 MHz | #VBW 3 MHz | Spa Sweep 20 ms (6 | n 45 MHz 01 pts) | | BW Type Pwr (RMS)∙ <u>Man</u> |
| Channel Power 20.11 dBm /30.0 | | Power Spectral Dei -54.66 dBn | , i | S <u>Auto</u> |)pan/RBW 106 <u>Man</u> |
| Copyright 2000-2009 Agilent Te | echnologies | | | 1 | |



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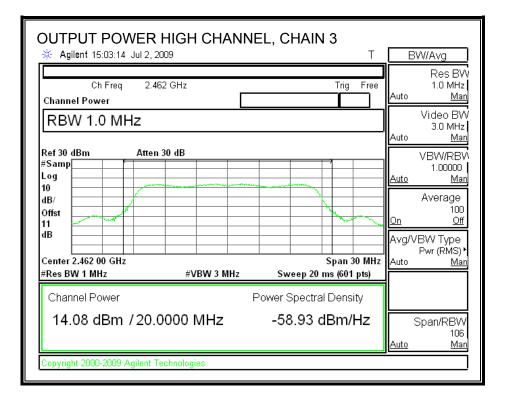
OUTPUT POWER, HIGH CHANNEL





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| OUTPUT POWER | | EL, CHAIN 2 | BW/Avg |
|--|------------|---|--|
| | 2 GHz | Trig Free | Res BW 1.0 MHz Auto <u>Man</u> |
| RBW 1.0 MHz | 30 dB | | Video BW 3.0 MHz Auto <u>Man</u> |
| #Samp Attent | | | VBW/RBV 1.00000 <u>Auto Man</u> Average 100 0n <u>Off</u> |
| dB Center 2.462 00 GHz #Res BW 1 MHz | #VBW 3 MHz | Span 30 MHz Sweep 20 ms (601 pts) | Avg/VBW Type Pwr (RMS) • |
| Channel Power 14.14 dBm /20.0 | | Power Spectral Density -58.87 dBm/Hz | Span/RBW 106 <u>Auto Man</u> |
| Copyright 2000-2009 Agilent Te | chnologies | | |



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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 | 20.15 | 20.21 | 20.12 | 20.14 |
| High | 2462.00 | 13.95 | 14.10 | 14.02 | 14.11 |

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7.2.5. 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.

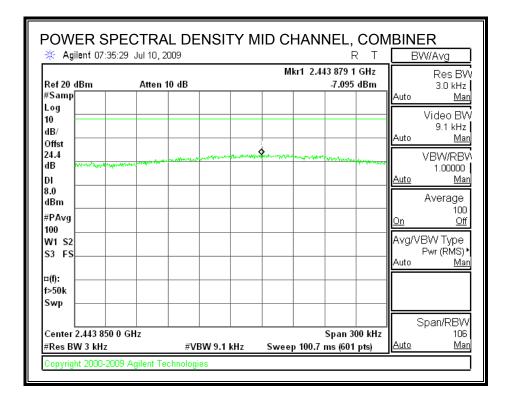
RESULTS

| Channel | Frequency | PSD with Combiner | Limit | Margin |
|---------|-----------|-------------------|-------|--------|
| | (MHz) | (dBm) | (dBm) | (dB) |
| Low | 2412 | -10.12 | 8 | -18.12 |
| Middle | 2437 | -7.10 | 8 | -15.10 |
| High | 2462 | -11.32 | 8 | -19.32 |

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POWER SPECTRAL DENSITY

| 🔆 Agilent 07:32 | :33 Jul 10, 2009 | | | RΤ | Peak Search |
|---|--|-------------------------------------|---|-----------------------|----------------|
| Ref 20 dBm #Samp | Atten 10 dB | | Mkr1 2.419 20 -10.1 | 89 GHz 16 dBm | Next Peak |
| Log 10 dB/ Offst | | | | | Next Pk Right |
| 24.4 dB ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, | www.eeks.gr.esuers.esuer.enview.www.eeks.gr.esuers.esuer.e | Person and and a start of the start | when the second s | , | Next Pk Left |
| 8.0 dBm ≠PA∨g | | | | | Min Search |
| 100 W1 S2 S3 FS | | | | | Pk-Pk Search |
| ¤(f): i>50k Swp | | | | | Mkr © Cf |
| Center 2.419 250 #Res BW 3 kHz | | / 9.1 kHz | Spar Sweep 100.7 ms (6 | n 300 kHz 601 pts) | More 1 of 2 |



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| 🔆 Agilent 07:37 | :24 Jul 10, 2009 | | R | T BW/Avg |
|-----------------------------------|------------------|-----------|-------------------------------|--|
| Ref 20 dBm #Samp | Atten 10 dB | | Mkr1 2.464 507 5 -11.317 | Kes Di |
| Log 10 dB/ Offst | | | | Video BV 9.1 kHz Auto <u>Ma</u> |
| 24.4 | | 1 | "Marine harring a second and | VBW/RB ¹ 1.00000 <u>Auto Ma</u> |
| dBm #PAvg 100 | | | | Average 100 <u>On Off</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 | | 9.1 kHz S | Span 30 weep 100.7 ms (601 | |

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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

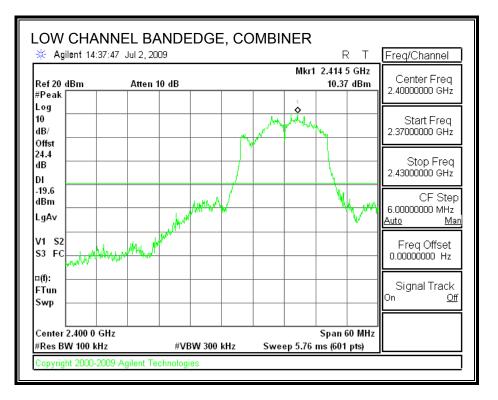
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

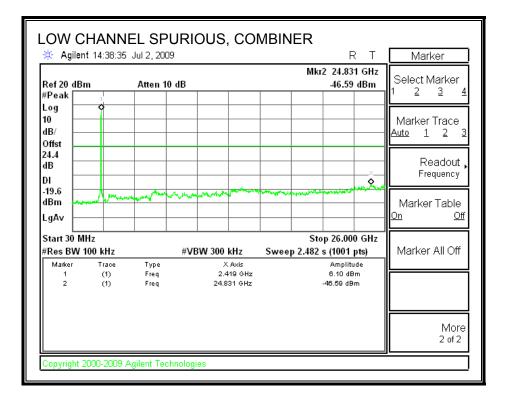
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

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.

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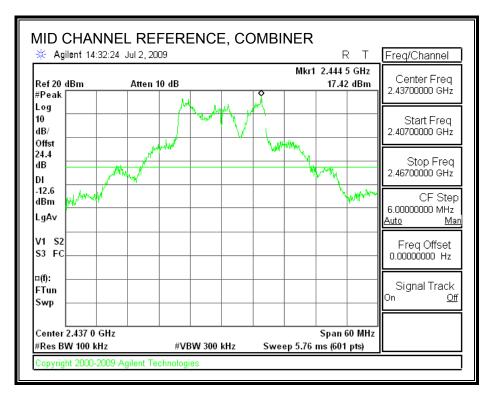
LOW CHANNEL SPURIOUS EMISSIONS

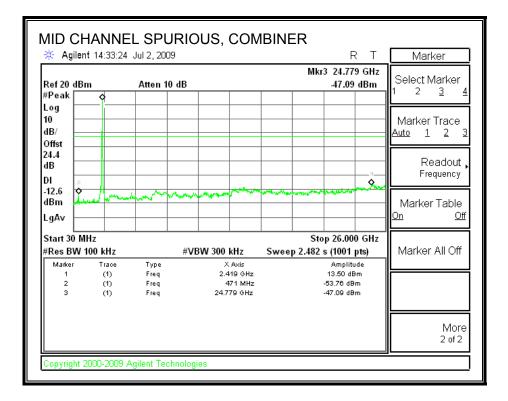




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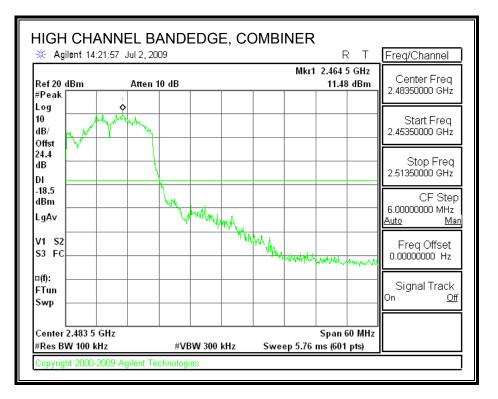
MID CHANNEL SPURIOUS EMISSIONS

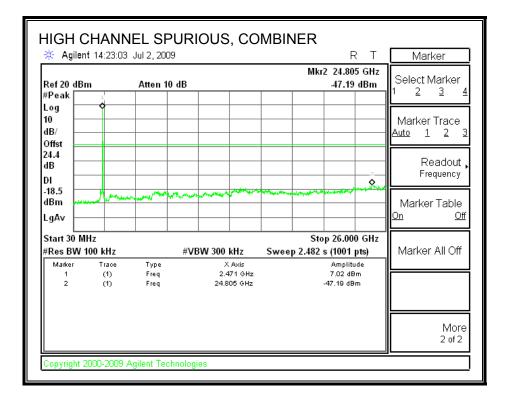




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HIGH CHANNEL SPURIOUS EMISSIONS





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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

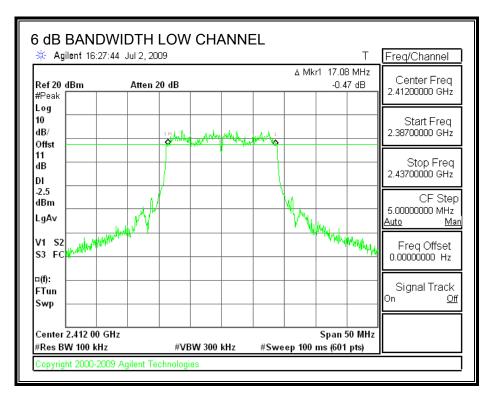
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

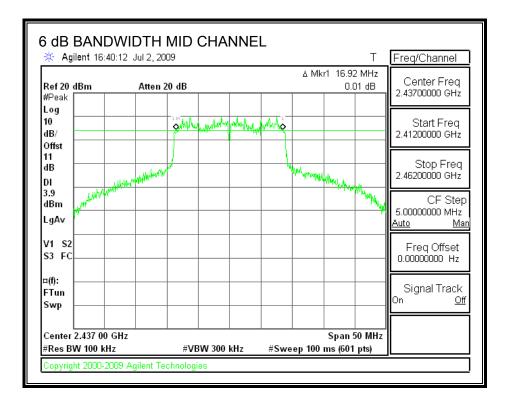
RESULTS

| 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 |

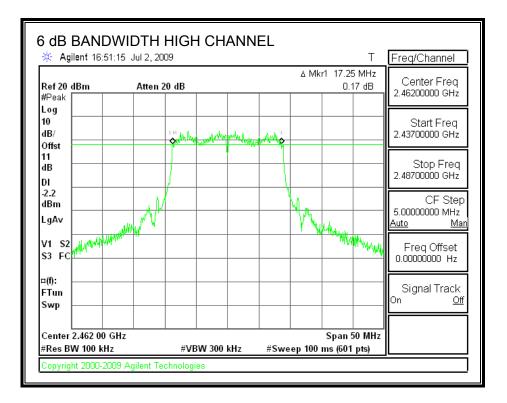
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6 dB BANDWIDTH





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7.3.2. 99% & 26 dB BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

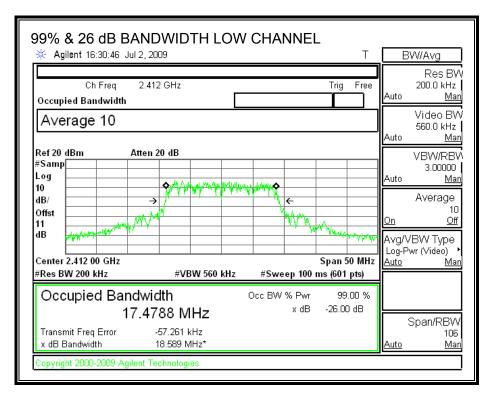
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth measurement function is utilized.

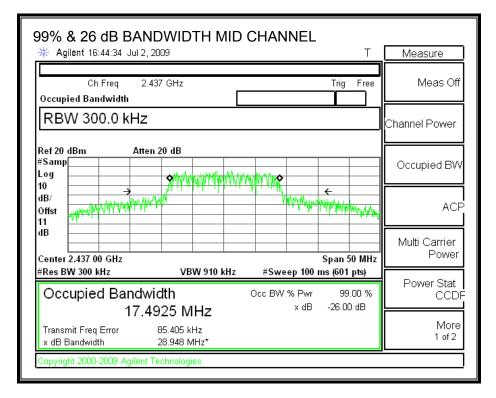
RESULTS

| 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 |

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99% & 26 dB BANDWIDTH





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| 99% & 26 dB BANI | - | H CHANNE | L T | В | W/Avg |
|--|----------------------------|---------------------------------------|--|-------------|-------------------------------------|
| Ch Freq 2.48 Occupied Bandwidth | 62 GHz | | Trig Free | Auto | Res BW 200.0 kHz <u>Man</u> |
| Average 10 | | | | Auto | Video BW 560.0 kHz <u>Man</u> |
| #Samp Log 10 | 20 dB | · · · · · · · · · · · · · · · · · · · | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | Logi | |
| Center 2.462 00 GHz #Res BW 200 kHz | #VBW 560 kHz | #Sweep 100 i | Span 50 MHz ns (601 pts) | <u>Auto</u> | <u>Man</u> |
| Occupied Bandwi 17.43 | dth 306 MHz | Occ BW % Pwr x dB | 99.00 % -26.00 dB | | Span/RBW |
| Transmit Freq Error x dB Bandwidth | -31.402 kHz 18.300 MHz* | | | <u>Auto</u> | 106 <u>Man</u> |
| Copyright 2000-2009 Agilent T | echnologies | | | | |

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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.

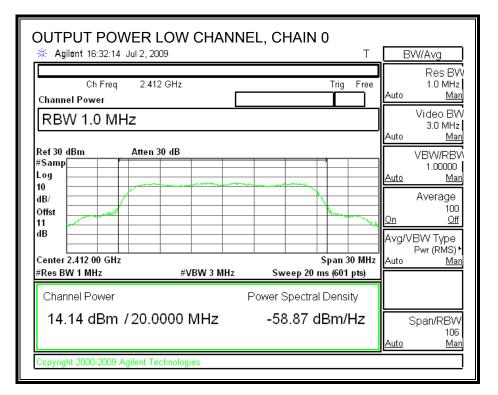
RESULTS

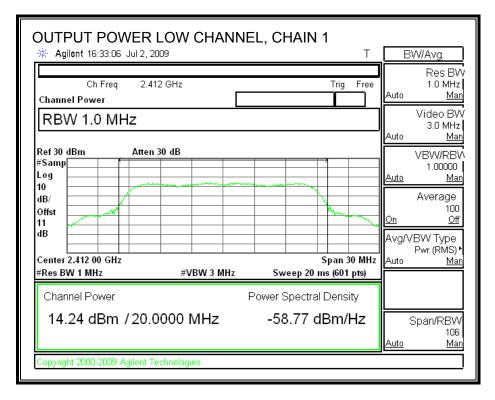
The antenna gain is less than 6 dBi, therefore the limit is 30 dBm.

| 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 | 20.16 | 20.25 | 19.99 | 20.10 | 26.15 | 30 | -3.85 |
| High | 2462 | 14.22 | 14.20 | 14.22 | 14.17 | 20.22 | 30 | -9.78 |

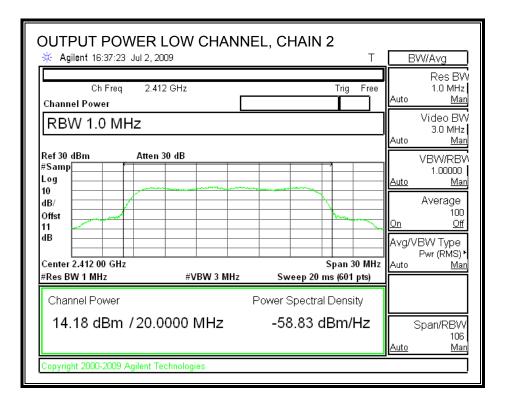
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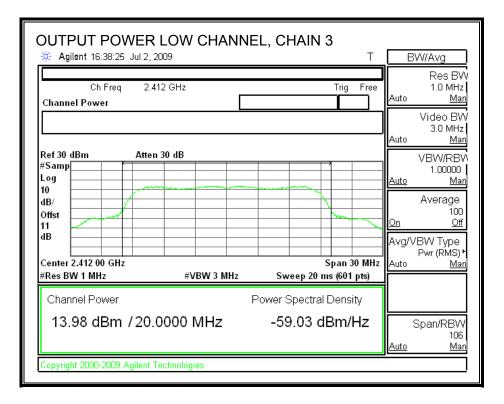
OUTPUT POWER, LOW CHANNEL





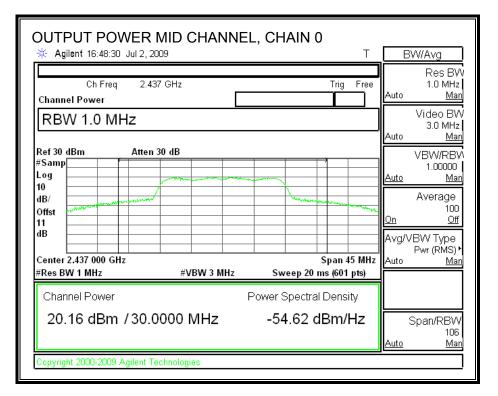
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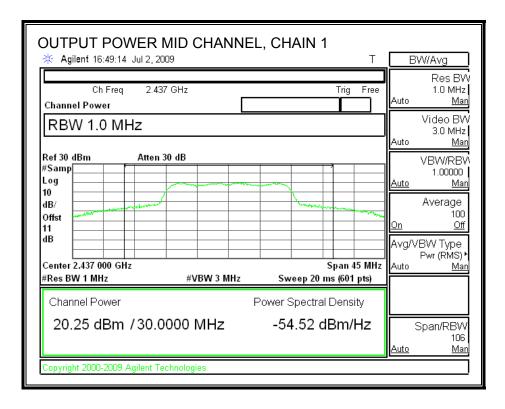




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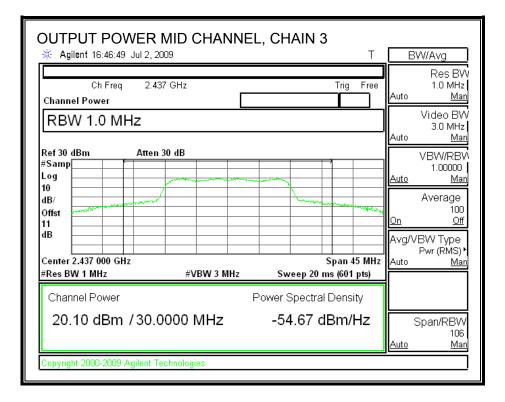
OUTPUT POWER, MID CHANNEL





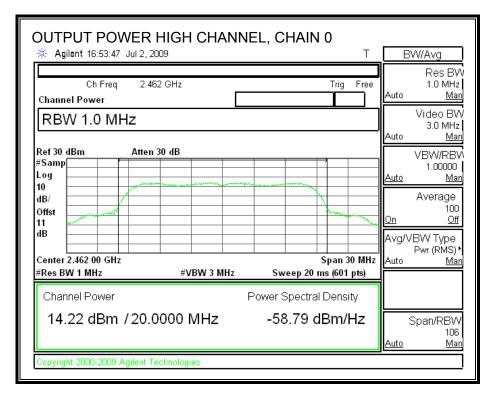
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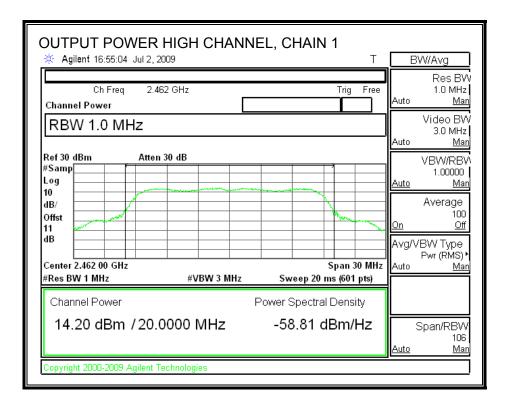
| OUTPUT POWER N | | L, CHAIN 2 | Т | В | ///Avg |
|---|------------|-------------------------------|---------------------------|-------------------|---|
| Ch Freq 2.437 Channel Power | GHz | | Trig Free | Auto | Res BW 1.0 MHz <u>Man</u> Video BW |
| RBW 1.0 MHz | dB | | | Auto | 3.0 MHz <u>Man</u> VBW/RBV |
| #Samp Log 10 dB/ Offst 11 | | | and the state | <u>Auto</u> On | 1.00000 <u>Man</u> Average 100 <u>Off</u> |
| dB Center 2.437 000 GHz #Res BW 1 MHz | #VBW 3 MHz | Sweep 20 ms | pan 45 MHz s (601 pts) | | BW Type Pwr (RMS) ► <u>Man</u> |
| Channel Power 19.99 dBm / 30.00 | | Power Spectral [-54.78 dE | - | Auto | Span/RBW 106 <u>Man</u> |
| Copyright 2000-2009 Agilent Tecl | hnologies | | | | |



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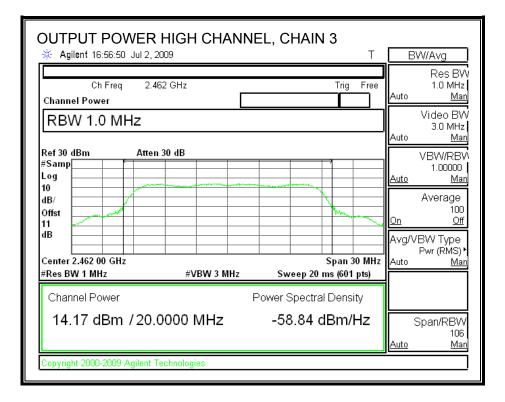
OUTPUT POWER, HIGH CHANNEL





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| OUTPUT POWER | | EL, CHAIN 2 | BW/Avg |
|--|-------------|---|--|
| Ch Freq 2.46 Channel Power RBW 1.0 MHz | i2 GHz | Trig Fre | Pe Res BW 1.0 MHz Auto Man Video BW 3.0 MHz |
| Ref 30 dBm Atten #Samp 0 Log 0 dB/ 0 offst 0 dB 0 dB 0 dB 0 dB 0 dB 0 dB 0 dB 0 dB | 30 dB | | Auto Man VBW/RBW 1.00000 Auto Man Average 100 On Off Avg/VBW Type |
| Center 2.462 00 GHz #Res BW 1 MHz | #VBW 3 MHz | Span 30 M Sweep 20 ms (601 pts) | Pwr (RMS) ► |
| Channel Power 14.22 dBm /20.0 | | [⊃] ower Spectral Density -58.79 dBm/Hz | Span/RBW 106 <u>Auto Man</u> |
| Copyright 2000-2009 Agilent Te | echnologies | | |



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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 | 20.18 | 20.16 | 20.11 | 20.09 |
| High | 2462.00 | 14.17 | 14.14 | 14.08 | 14.18 |

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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.

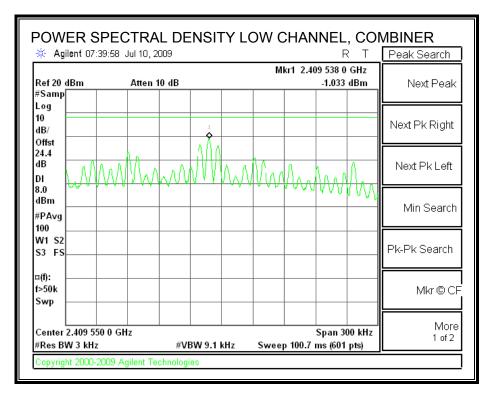
Preliminary tests on individual chains, and on all chains with a combiner, were performed. The worst-case configuration was with a combiner, therefore final test were performed with all chains feeding a combiner.

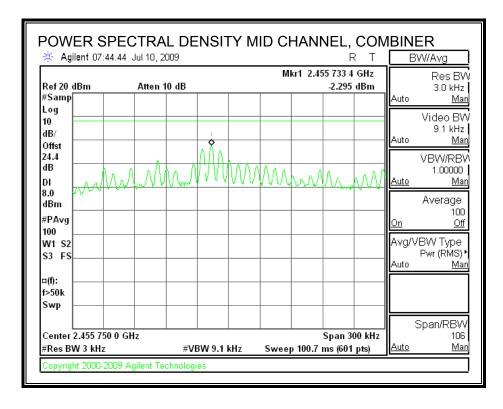
RESULTS

| Channel | Frequency | PSD with Combiner | Limit | Margin |
|---------|-----------|-------------------|-------|--------|
| | (MHz) | (dBm) | (dBm) | (dB) |
| Low | 2412 | -1.03 | 8 | -9.03 |
| Middle | 2437 | -2.30 | 8 | -10.30 |
| High | 2462 | -11.32 | 8 | -19.32 |

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POWER SPECTRAL DENSITY





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| 🔆 Agilent 07:37 | :24 Jul 10, 2009 | | | RТ | BW/Avg |
|-----------------------------------|------------------|---------|-------------------------|-----------------------|--|
| Ref 20 dBm #Samp | Atten 10 dB | | Mkr1 2.464 50 -11.3 | 75GHz 317dBm | Res E 3.0 kH Auto <u>M</u> |
| Log 10 dB/ Offst | | | | | Video E 9.1 kH Auto <u>M</u> |
| 24.4 | | 1 | * Marine harrow hours | man | VBW/RI 1.0000 <u>Auto M</u> |
| dBm #PAvg 100 | | | | | Average 1(<u>On (</u> |
| W1 S2 S3 FS | | | | | Avg/VBW Typ Pwr (RMS Auto <u>M</u> |
| ¤(f): f>50k Swp | | | | | |
| Center 2.464 500 #Res BW 3 kHz | | 9.1 kHz | Spa Sweep 100.7 ms (| n 300 kHz 501 pts) | Span/RB 1(Auto M |

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7.3.6. 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

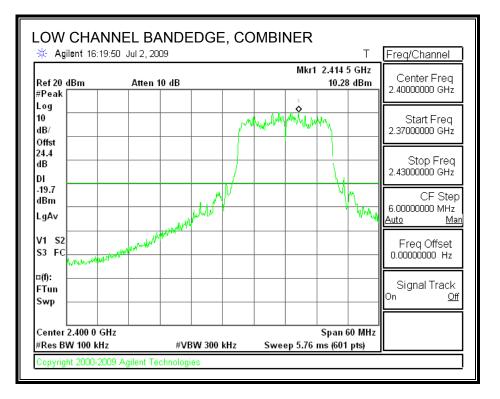
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

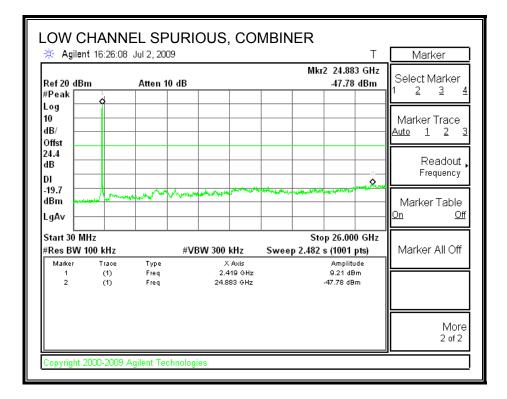
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

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.

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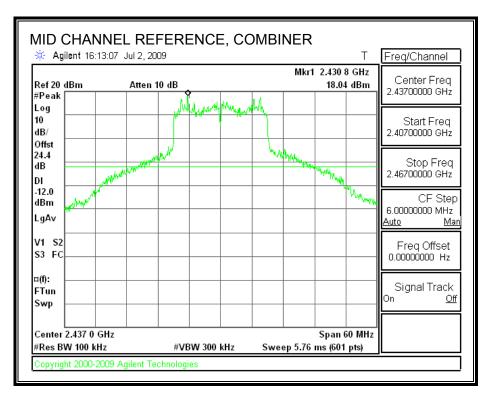
LOW CHANNEL SPURIOUS EMISSIONS

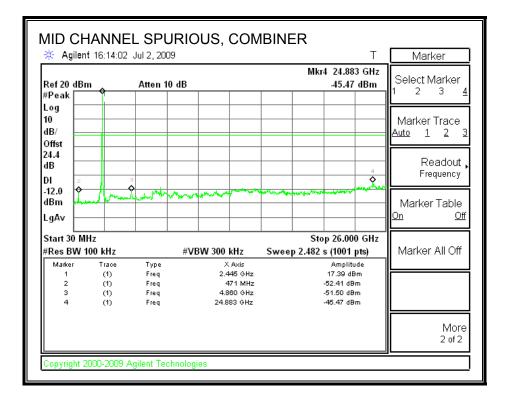




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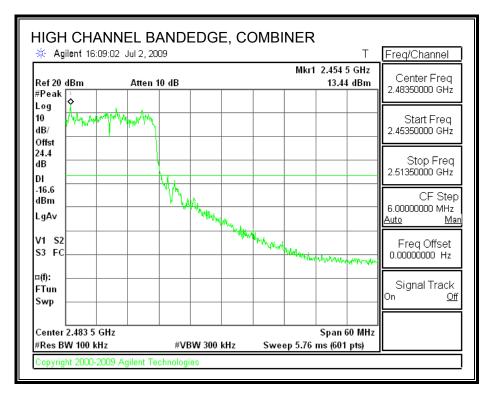
MID CHANNEL SPURIOUS EMISSIONS

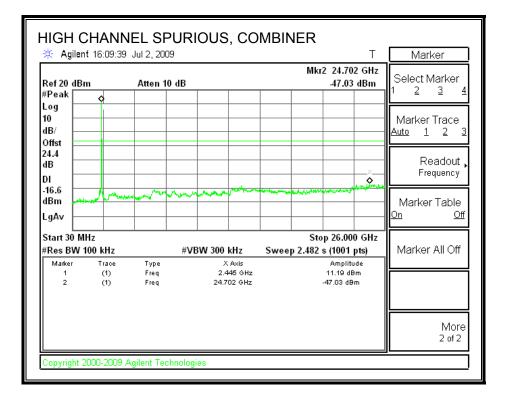




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HIGH CHANNEL SPURIOUS EMISSIONS





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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

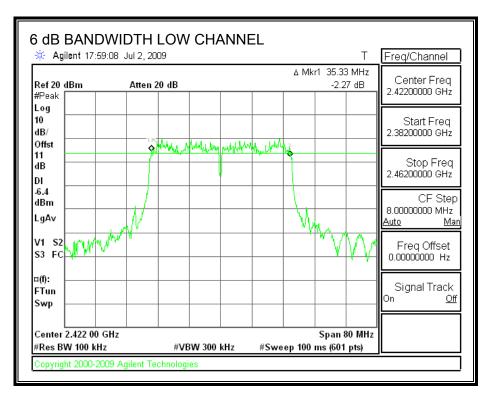
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

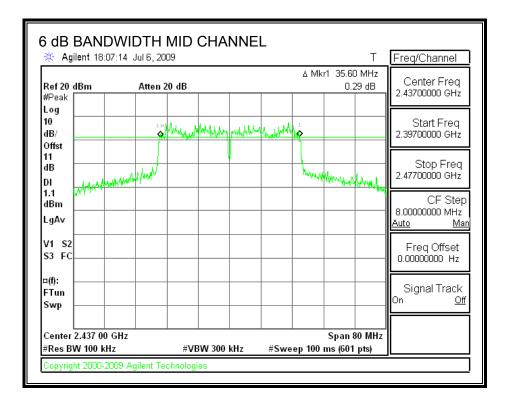
RESULTS

| 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 |

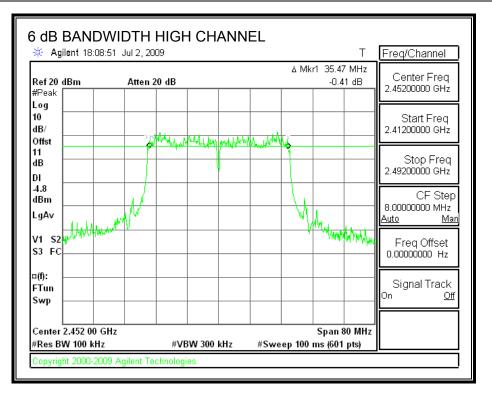
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6 dB BANDWIDTH





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7.4.2. 99% & 26 dB BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

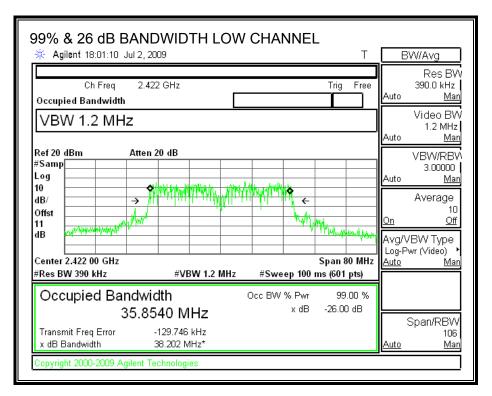
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth measurement function is utilized.

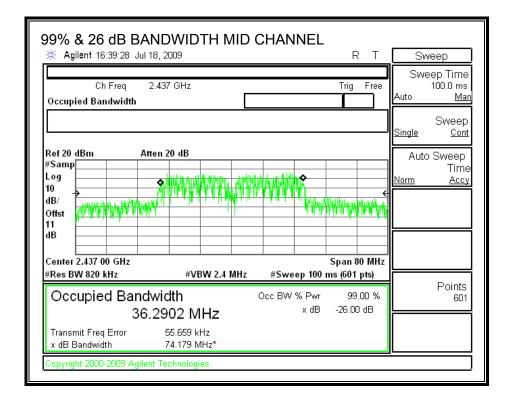
RESULTS

| 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 |

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99% & 26 dB BANDWIDTH





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| 🔆 Agilent 18:11:06 Jul 2, | 2009 | | Т | BW/ | Avg |
|--|--------------------------|----------------------|--|---|----------------------------------|
| Ch Freq 2. Occupied Bandwidth | 452 GHz | | Trig Free | | Res BV 0.0 kHz <u>Ma</u> i |
| Average 10 | | | | Vi Auto | deo BV 1.2 MHz <u>Ma</u> |
| #Samp Log 10 dB/ → Offst 11 dB | n 20 dB | | Versh to a section of the section of | Auto Av <u>On</u> Avg/VBV Log-Pwr (| |
| Center 2.452 00 GHz #Res BW 390 kHz | #VBW 1.2 MHz | #Sweep 100 n | | <u>Auto</u> | <u>Ma</u> |
| Occupied Bandw 35.5 | /idth 5145 MHz | Occ BW % Pwr x dB | 99.00 % -26.00 dB | Snd | an/RBV |
| Transmit Freq Error x dB Bandwidth | 2.365 kHz 38.756 MHz* | | | Auto | аником 106 <u>Ма</u> |

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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.

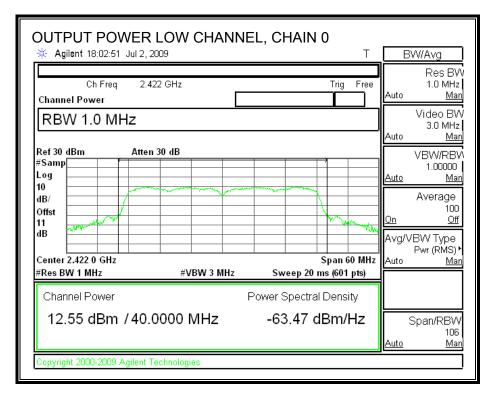
RESULTS

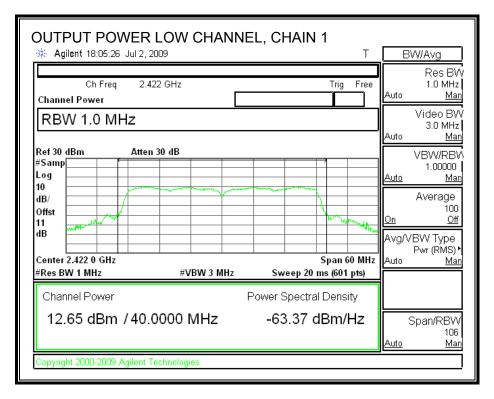
The antenna gain is less than 6 dBi, therefore the limit is 30 dBm.

| 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 | 12.55 | 12.65 | 12.64 | 12.49 | 18.60 | 30 | -11.40 |
| Mid | 2437 | 20.08 | 20.01 | 19.99 | 20.02 | 26.05 | 30 | -3.95 |
| High | 2452 | 13.54 | 13.57 | 13.56 | 13.61 | 19.59 | 30 | -10.41 |

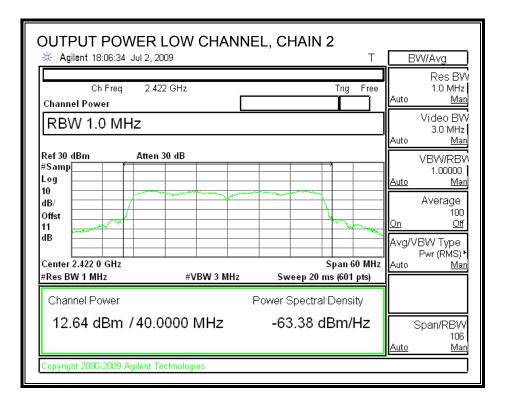
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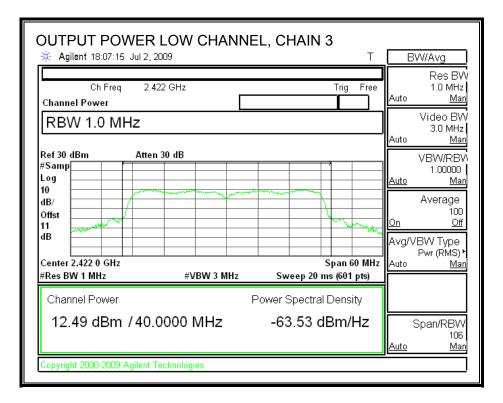
OUTPUT POWER, LOW CHANNEL





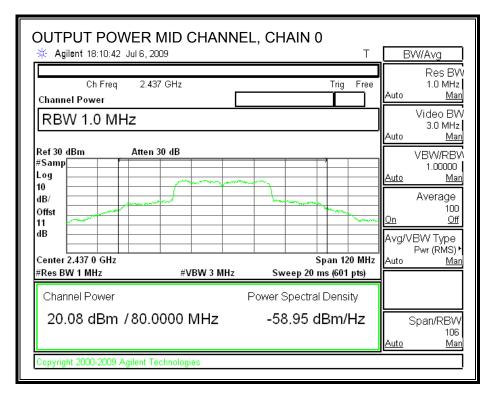
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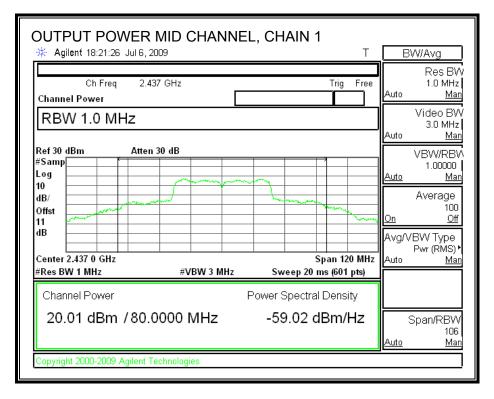




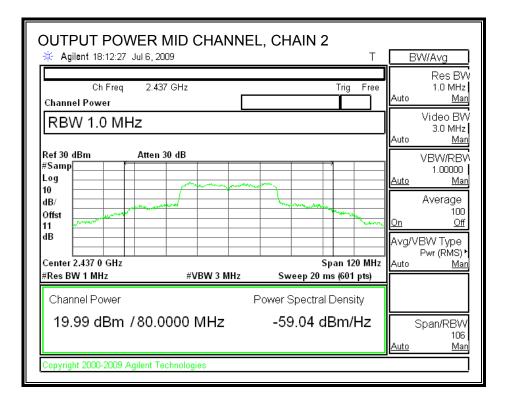
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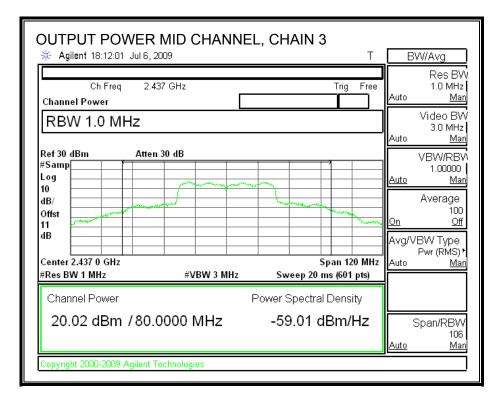
OUTPUT POWER, MID CHANNEL





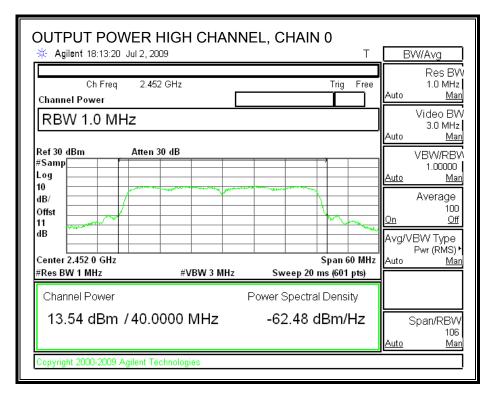
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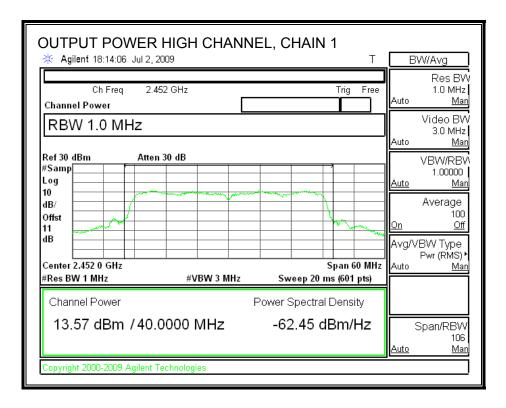




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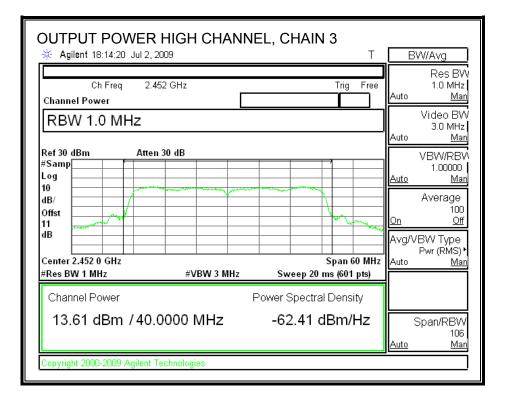
OUTPUT POWER, HIGH CHANNEL





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| OUTPUT POWER | | EL, CHAIN 2 | BW/Avg |
|---|-----------------|---|---|
| Channel Power RBW 1.0 MHz Ref 30 dBm Atten #Samp | 52 GHz 30 dB | Trig Free | Res BW 1.0 MHz Auto Man Video BW 3.0 MHz Auto Man VBW/RBW VBW/RBW 1.00000 |
| Log 10 dB/ Offst 11 dB | | | Auto Man Average 0n 0ff Avg/VBW Type Pwr (RMS)* |
| Center 2.452 0 GHz #Res BW 1 MHz | #VBW 3 MHz | Span 60 MHz Sweep 20 ms (601 pts) | Auto <u>Man</u> |
| Channel Power 13.56 dBm / 40.0 | | Power Spectral Density -62.46 dBm/Hz | Span/RBW 106 <u>Auto Man</u> |
| Copyright 2000-2009 Agilent T | echnologies | | |



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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 | 12.64 | 12.53 | 12.50 | 12.65 |
| Mid | 2437.00 | 20.19 | 20.20 | 20.19 | 20.23 |
| High | 2452.00 | 13.65 | 13.54 | 13.52 | 13.53 |

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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.

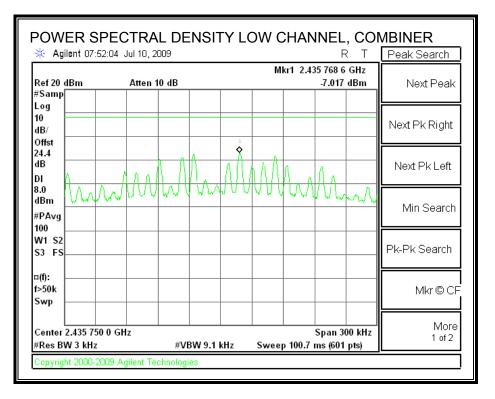
Preliminary tests on individual chains, and on all chains with a combiner, were performed. The worst-case configuration was with a combiner, therefore final test were performed with all chains feeding a combiner.

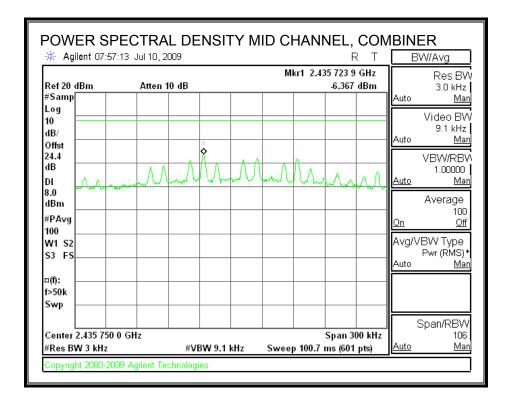
RESULTS

| Channel | Frequency | PSD with Combiner | Limit | Margin |
|---------|-----------|-------------------|-------|--------|
| | (MHz) | (dBm) | (dBm) | (dB) |
| Low | 2422 | -7.02 | 8 | -15.02 |
| Mid | 2437 | -6.37 | 8 | -14.37 |
| High | 2452 | -9.84 | 8 | -17.84 |

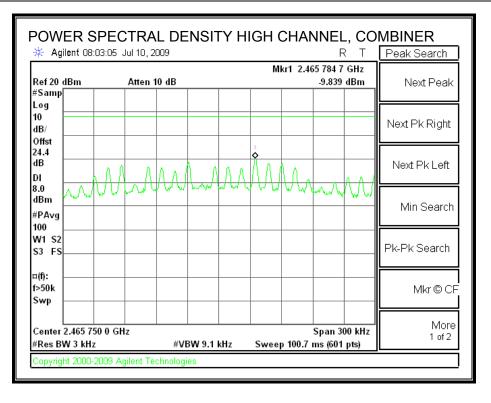
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POWER SPECTRAL DENSITY





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7.4.6. 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

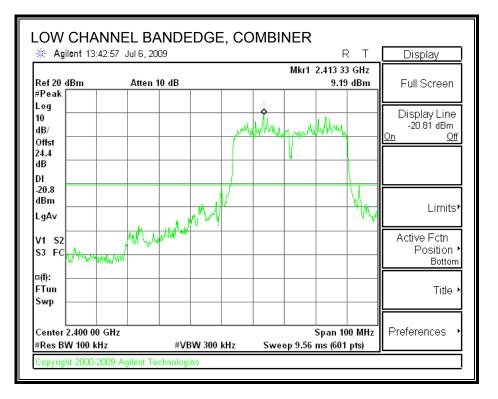
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

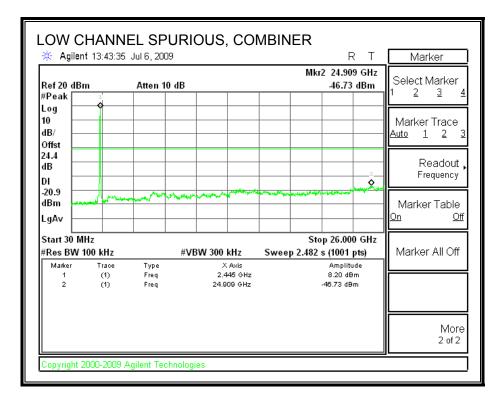
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

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.

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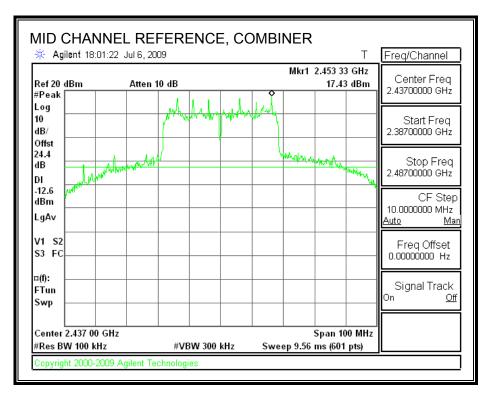
LOW CHANNEL SPURIOUS EMISSIONS

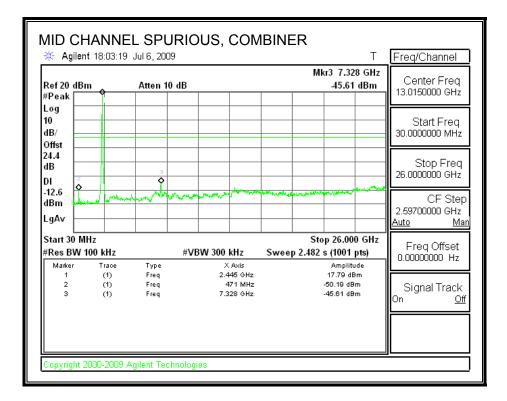




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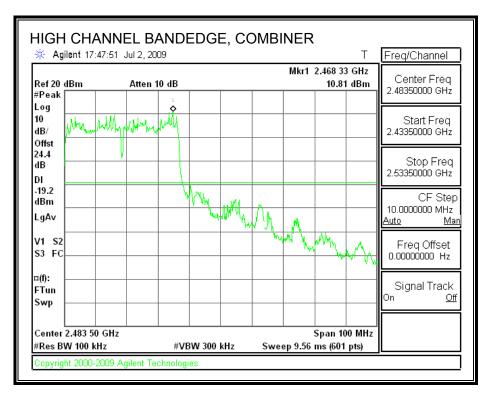
MID CHANNEL SPURIOUS EMISSIONS

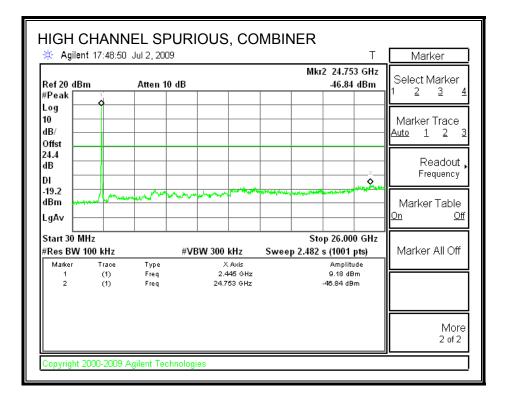




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HIGH CHANNEL SPURIOUS EMISSIONS





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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

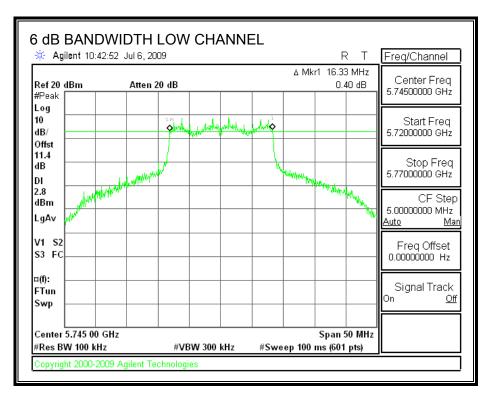
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

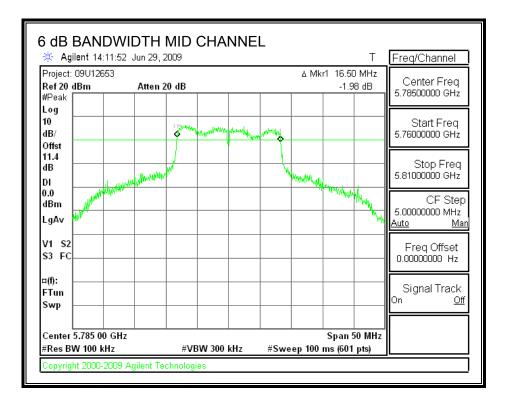
RESULTS

| 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 |

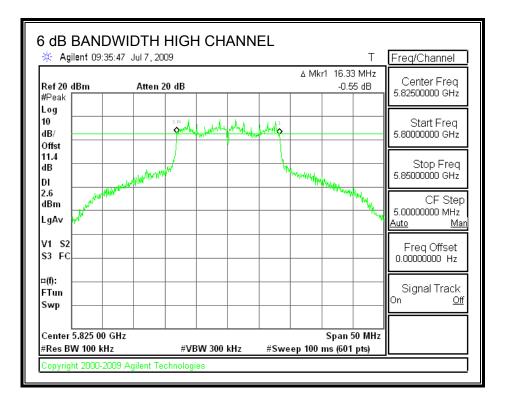
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6 dB BANDWIDTH





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7.5.2. 99% & 26 dB BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

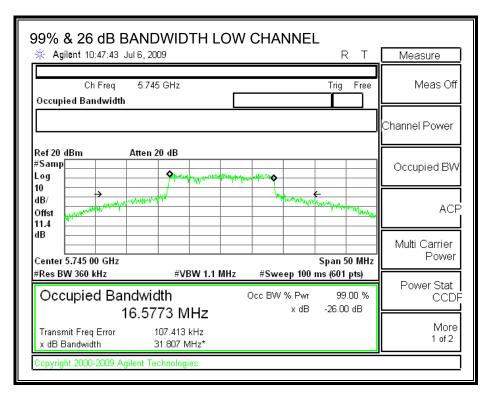
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth measurement function is utilized.

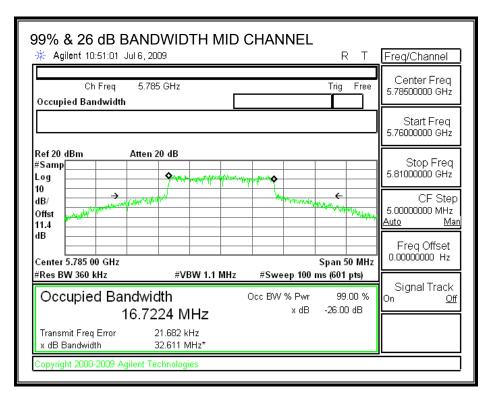
RESULTS

| 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 |

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99% & 26 dB BANDWIDTH





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| 99% & 26 dB BAN | | IGH CHAN | | |
|---|----------------------------|-----------------------|------------------------------|---|
| 🔆 Agilent 09:31:48 Jul 7, | , 2009 | | RT | BW/Avg |
| Ch Freq 5. Occupied Bandwidth | 825 GHz | | Trig Free | Res BW 360.0 kHz Auto <u>Man</u> |
| | | | | Video BW 1.2 MHz Auto <u>Man</u> |
| #Samp | en 20 dB | - Marine and a second | | VBW/RBW 3.00000 Auto <u>Man</u> |
| 10 dB/ Offst 11.4 | | | | Average 10 <u>On Off</u> |
| dB | | | Span 50 MHz | Avg/VBW Type Log-Pwr (Video) ► Auto Man |
| #Res BW 360 kHz | #VBW 1.2 M | /Hz #Sweep | 100 ms (601 pts) | |
| Occupied Bandv | vidth 7895 MHz | Occ BW % x | Pwr 99.00 % :dB -26.00 dB | |
| TO./ Transmit Freq Error x dB Bandwidth | 141.052 kHz 31.512 MHz* | | | Span/RBW 106 <u>Auto Man</u> |
| Copyright 2000-2009 Agilent | Technologies | | | |

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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:

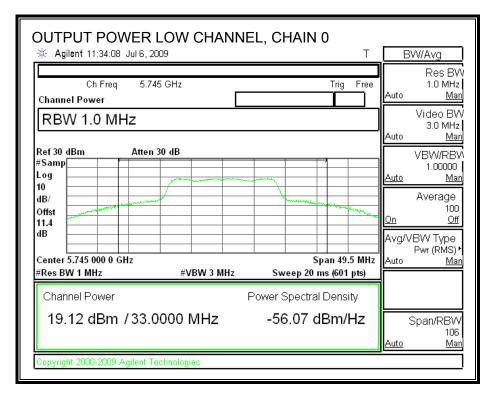
| Antenna Gain 10 Log (# Tx Chains) | | Effective Legacy Gain | |
|-----------------------------------|------|-----------------------|--|
| (dBi) (dB) | | (dBi) | |
| 3 | 6.02 | 9.02 | |

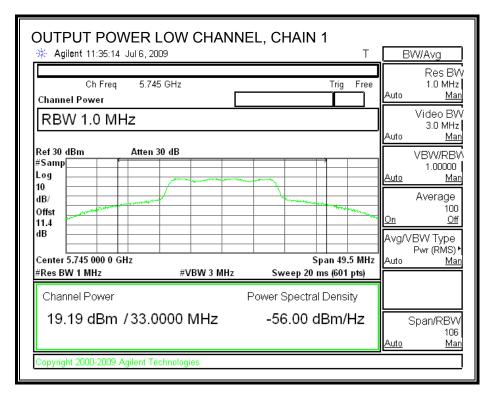
The composite antenna gain is 9.02 dBi, therefore the limit is 26.98 dBm.

| 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 | 19.12 | 19.19 | 19.16 | 19.06 | 25.15 | 26.98 | -1.83 |
| Mid | 5785 | 19.19 | 19.22 | 19.11 | 18.94 | 25.14 | 26.98 | -1.84 |
| High | 5825 | 19.14 | 19.08 | 19.11 | 19.07 | 25.12 | 26.98 | -1.86 |

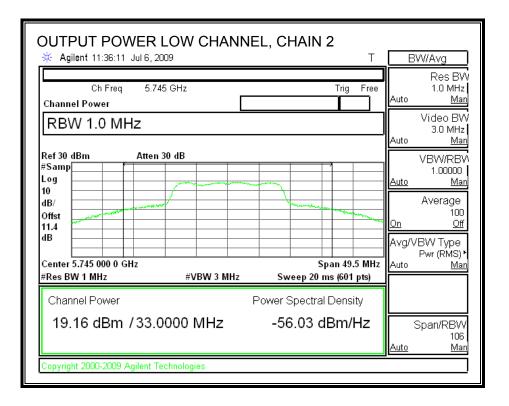
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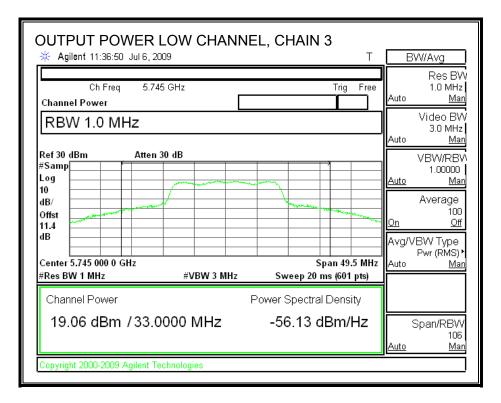
OUTPUT POWER, LOW CHANNEL





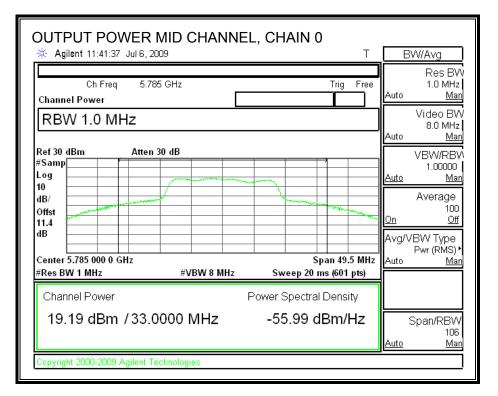
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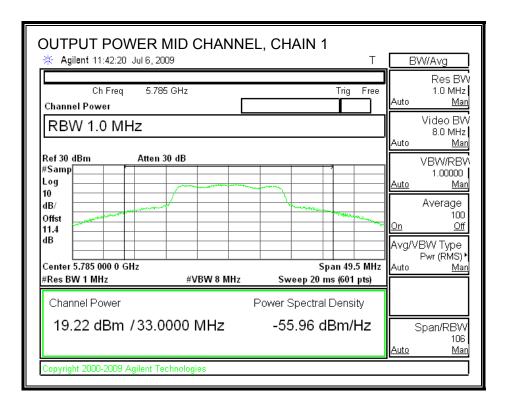




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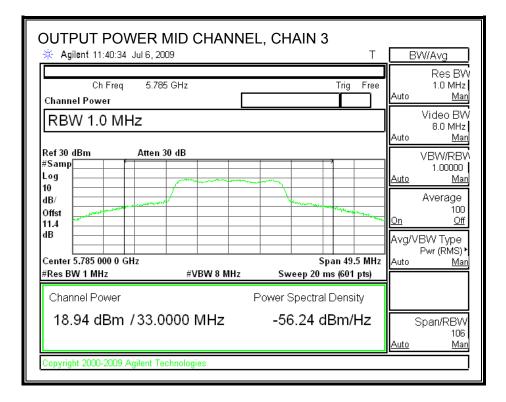
OUTPUT POWER, MID CHANNEL





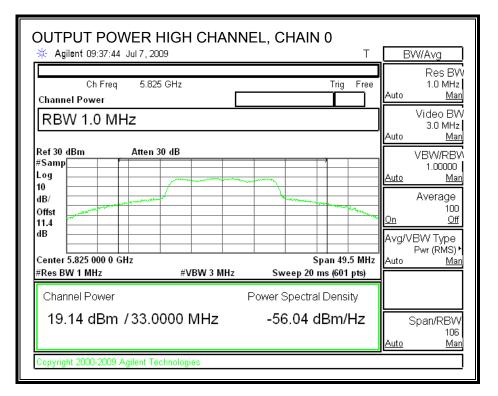
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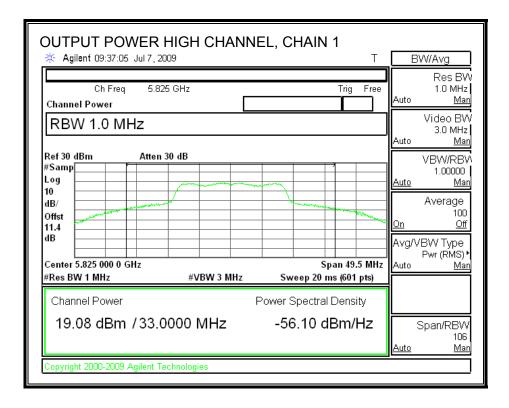
| OUTPUT POWER | | L, CHAIN 2 | Т | BW/Avg |
|---|------------------------------------|-----------------------|----------------------|--|
| Ch Freq 5.78 Channel Power | 5 GHz | Ţ | rig Free | Res BW 1.0 MHz Auto <u>Man</u> |
| RBW 1.0 MHz | 20. JD | |] | Video BW 8.0 MHz Auto <u>Man</u> |
| Ref 30 dBm Atten . #Samp | | | Welkerson Marco | VBW/RBV 1.00000 <u>Auto Man</u> Average 100 <u>On Off</u> Avg/VBW Type |
| Center 5.785 000 0 GHz #Res BW 1 MHz | #VBW 8 MHz | Span Sweep 20 ms (| 49.5 MHz 601 pts) | Pwr (RMS) ► Auto <u>Man</u> |
| Channel Power 19.11 dBm /33.0 | Span/RBW 106 <u>Auto Man</u> | | | |
| Copyright 2000-2009 Agilent Te | chnologies | | | |



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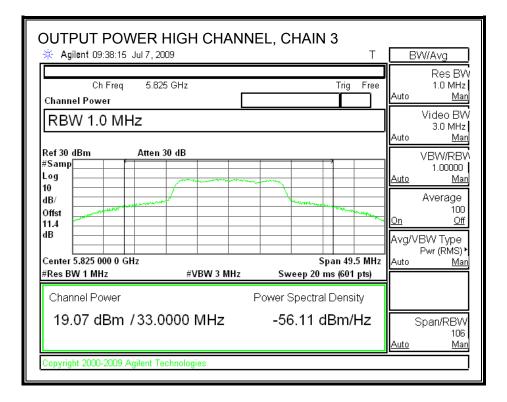
OUTPUT POWER, HIGH CHANNEL





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| OUTPUT POWER | | EL, CHAIN 2 | 2 T | BW/Avg | |
|--|-------------|--------------------|----------------------------|---|---|
| Ch Freq 5.82 Channel Power | 5 GHz | | Trig Free | | Hz ∕lan |
| RBW 1.0 MHz | | | | Video E 3.0 M Auto <u>h</u> | |
| Ref 30 dBm Atten #Samp | 30 dB | | | Averag 1 <u>On</u> Avg/VBW Typ | 00 <u>vlan</u> 19 00 00 00 |
| Center 5.825 000 0 GHz #Res BW 1 MHz | #VBW 3 MHz | Spa Sweep 20 ms | an 49.5 MHz s (601 pts) | Pwr (RM: Auto <u>N</u> | S) ^ ∦an |
| Channel Power 19.11 dBm /33.0 | II | 3VV 06 1/an | | | |
| Copyright 2000-2009 Agilent Te | echnologies | | | | |



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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 | 19.17 | 18.99 | 19.22 | 19.11 |
| Middle | 5785 | 19.18 | 19.04 | 19.13 | 19.17 |
| High | 5825 | 19.21 | 18.90 | 19.22 | 19.13 |

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7.5.5. 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.

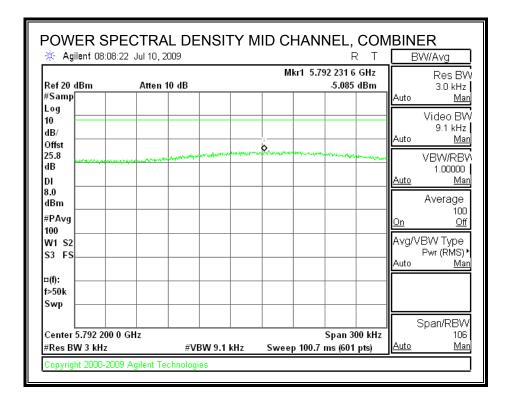
RESULTS

| Channel | Frequency | PSD with Combiner | Limit | Margin |
|---------|-----------|-------------------|-------|--------|
| | (MHz) | (dBm) | (dBm) | (dB) |
| Low | 5745 | -6.00 | 8 | -14.00 |
| Middle | 5785 | -5.09 | 8 | -13.09 |
| High | 5825 | -6.41 | 8 | -14.41 |

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POWER SPECTRAL DENSITY

| 🄆 Agilent 08:08 | 6:52 Jul 10, 2009 | | | RT | Peak Search |
|-----------------------------------|--|-------------------|-------------|---------------------------------|----------------|
| Ref 20 dBm #Samp | Atten 10 dB | | Mkr1 5.75 | 51 914 6 GHz -6.000 dBm | Next Peak |
| Log 10 dB/ Offst | | | 1 | | Next Pk Right |
| 25.8 | and the second | an market and the | | aborton and and a second second | Next Pk Left |
| 3.0 dBm ≠PA∨g | | | | | Min Search |
| 100 W1 S2 S3 FS | | | | | Pk-Pk Search |
| ɪ(f): ⇒50k Swp | | | | | Mkr © CF |
| Center 5.751 850 #Res BW 3 kHz | | BW 9.1 kHz | Sweep 100.7 | Span 300 kHz ms (601 pts) | More 1 of 2 |



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| 🔆 Agilent 08:10 |):50 Jul 10, 2009 | | | RT | BW/Avg |
|-----------------------------------|--|--------------------|-----------------|-------------------------------|---|
| Ref 20 dBm #Samp | Atten 10 dB | | Mkr1 5.4 | 319 763 5 GHz -6.410 dBm | Res B\ 3.0 kHz Auto <u>Ma</u> |
| Log 10 dB/ Offst | | 1 | | | Video B\ 9.1 kHz Auto <u>Ma</u> |
| dB DI | and the second | Mineter Mars Spran | - marine marine | the same the second second | VBVV/RB 1.00000 <u>Auto Ma</u> |
| 8.0 dBm #PAvg | | | | | Average 100 <u>On Of</u> |
| 100 W1 S2 S3 FS | | | | | Avg/VBW Type Pwr (RMS) Auto <u>Ma</u> |
| ⊏(f): f>50k Swp | | | | | |
| Center 5.819 750 #Res BW 3 kHz | | W 9.1 kHz | Sweep 100.7 | Span 300 kHz ′ms (601 pts) | Span/RBV 108 <u>Auto Ma</u> |

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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

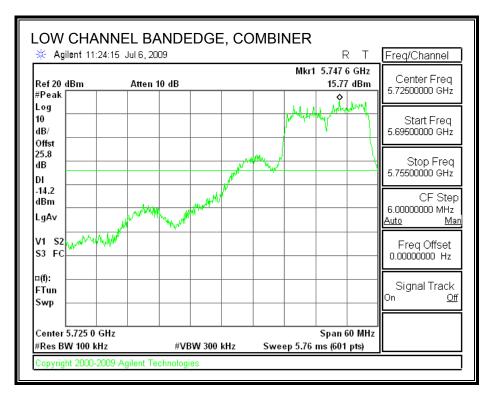
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

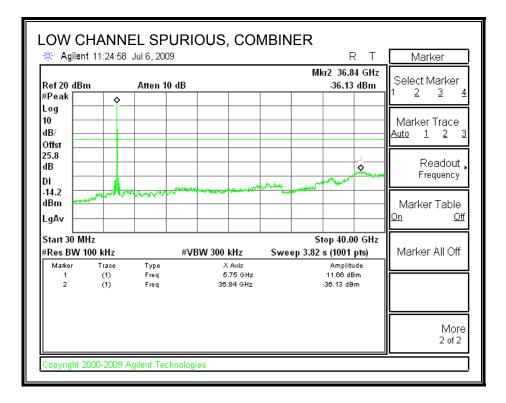
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

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.

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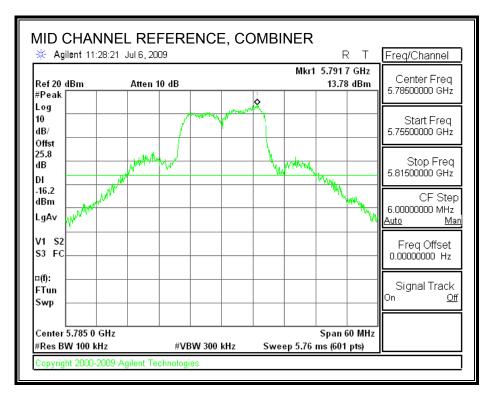
LOW CHANNEL SPURIOUS EMISSIONS

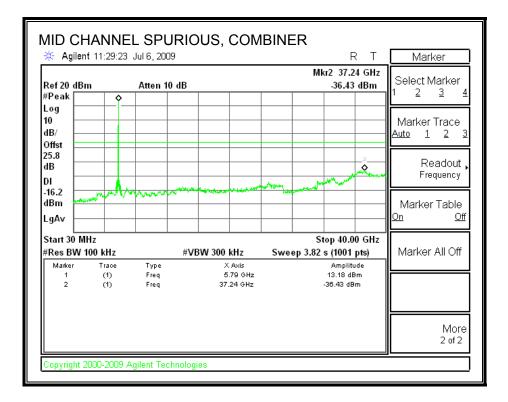




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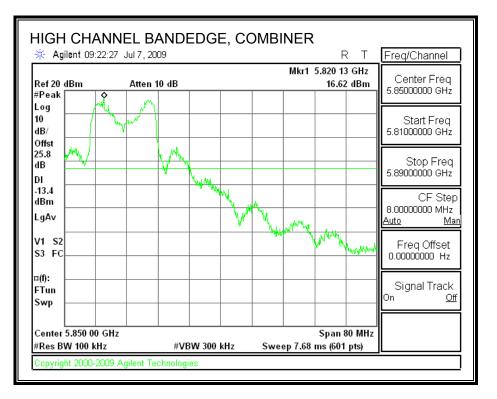
MID CHANNEL SPURIOUS EMISSIONS

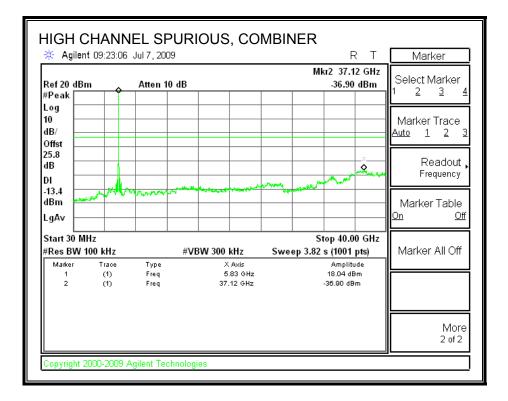




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HIGH CHANNEL SPURIOUS EMISSIONS





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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

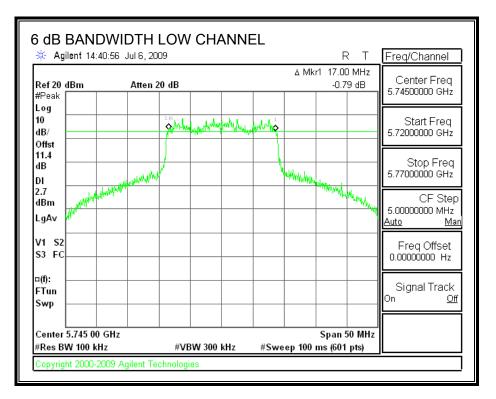
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

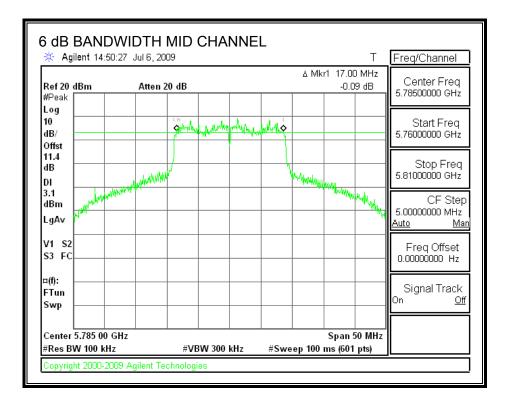
RESULTS

| 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 |

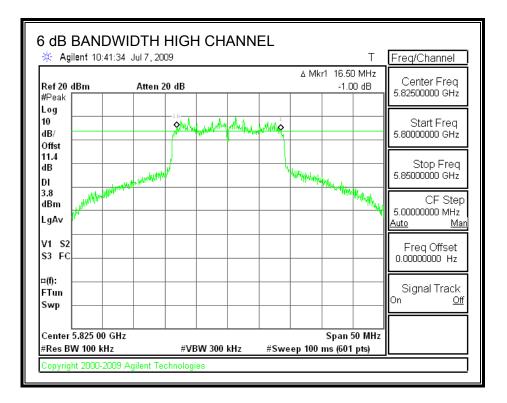
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6 dB BANDWIDTH





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7.6.2. 99% & 26 dB BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

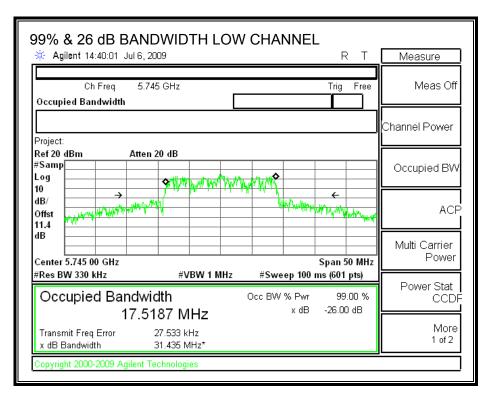
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth measurement function is utilized.

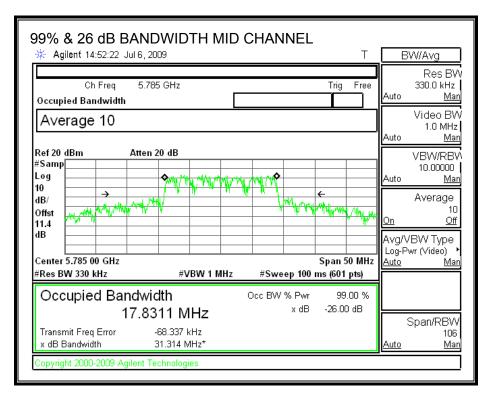
RESULTS

| 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 |

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99% & 26 dB BANDWIDTH





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| 99% & 26 dB BANDWIDTH HIGH CHANNEL | |
|---|------------------------|
| | Measure |
| Ch Freq 5.825 GHz Trig Free Occupied Bandwidth | Meas Off |
| Average 10 | Channel Power |
| Ref 20 dBm Atten 20 dB #Samp Log 10 Atten 20 dB | Occupied BW |
| dB/ offst 11.4 | ACF |
| dB Center 5.825 00 GHz Span 50 MHz | Multi Carrier Power |
| #Res BW 330 kHz #VBW 1.2 MHz #Sweep 100 ms (601 pts) | Power Stat |
| Occupied Bandwidth Occ BW % Pwr 99.00 % 17.5760 MHz × dB -26.00 dB | CCDF |
| Transmit Freq Error 61.513 kHz x dB Bandwidth 31.285 MHz* | More 1 of 2 |
| Copyright 2000-2009 Agilent Technologies | |

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7.6.3. OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

TEST PROCEDURE

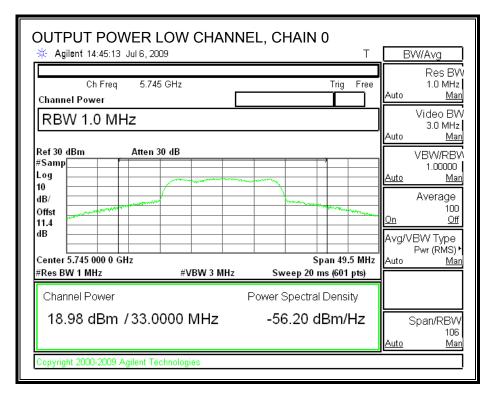
Output power was measured based on the use of RMS averaging over a time interval in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

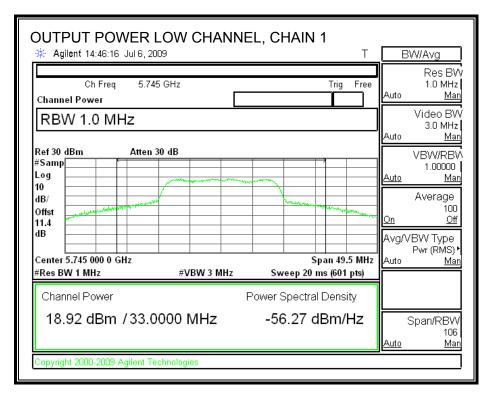
RESULTS

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

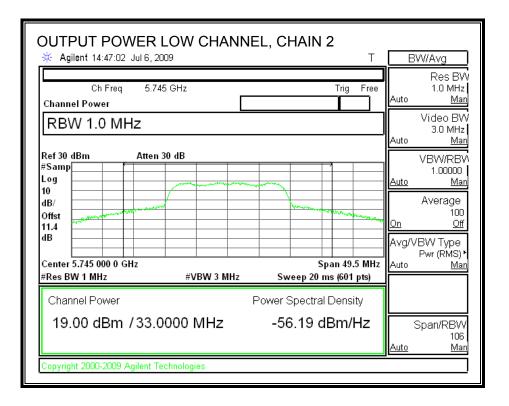
| Channel | Frequency | Chain 0 | Chain 1 | Chain 2 | Chain 3 | Total | Limit | Margin |
|---------|-----------|---------|---------|---------|---------|-------|-------|--------|
| | | Power | Power | Power | Power | Power | | |
| | (MHz) | (dBm) | (dBm) | (dBm) | (dBm) | (dBm) | (dBm) | (dB) |
| Low | 5745 | 18.98 | 18.92 | 19.00 | 19.04 | 25.01 | 30 | -4.99 |
| Mid | 5785 | 18.98 | 19.13 | 18.96 | 18.99 | 25.04 | 30 | -4.96 |
| High | 5825 | 19.23 | 19.19 | 19.28 | 19.16 | 25.24 | 30 | -4.76 |

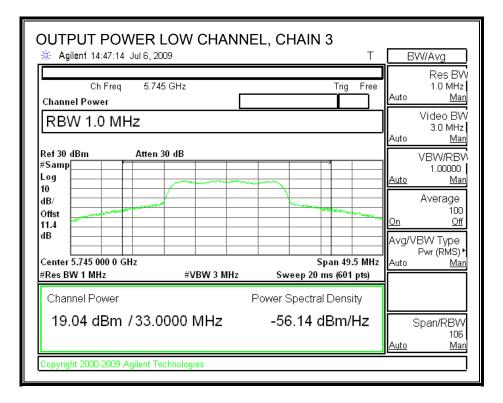
OUTPUT POWER, LOW CHANNEL





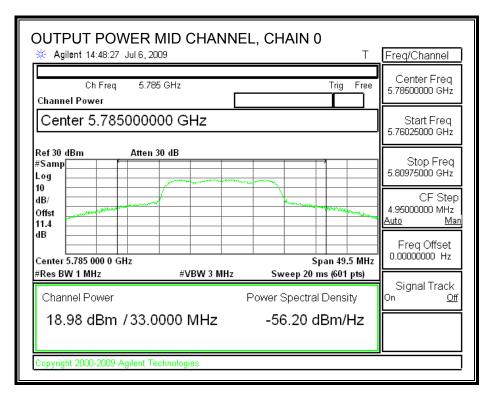
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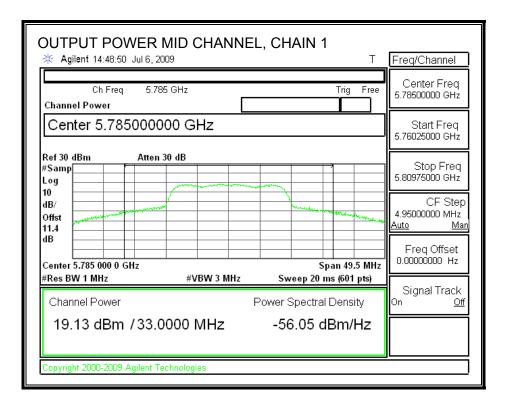




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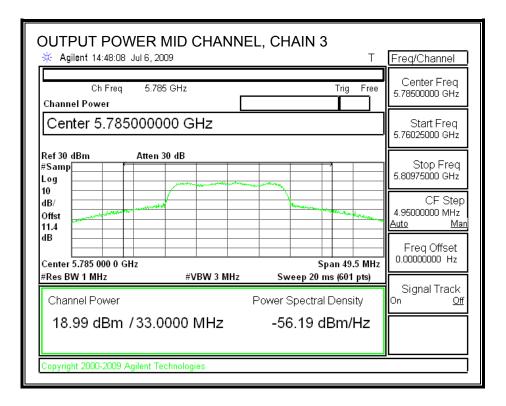
OUTPUT POWER, MID CHANNEL





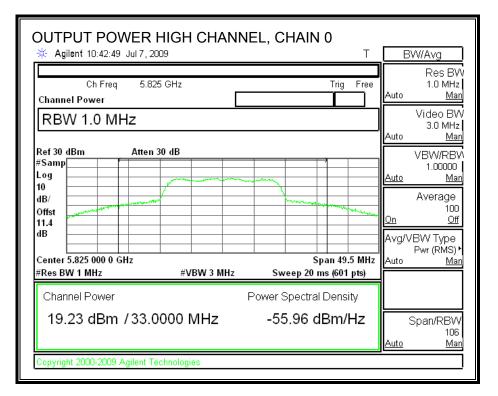
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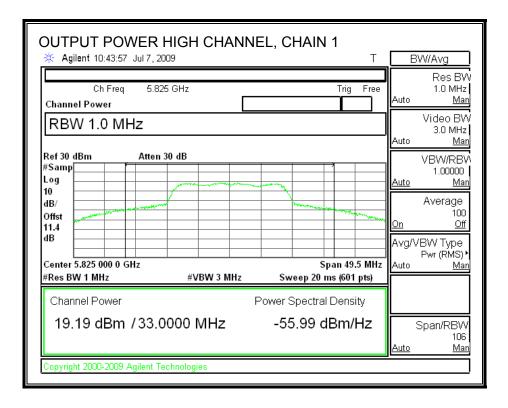
| OUTPUT POWER N * Agilent 14:49:16 Jul 6, 20 | | L, CHAIN 2 | Т | Freq/Channel |
|---|------------|--------------------|---|--|
| Ch Freq 5.785 Channel Power | | | Trig Free | Center Freq 5.78500000 GHz |
| Center 5.7850000 | | | | Start Freq 5.76025000 GHz Stop Freq |
| #Samp Log 10 dB/ Offst 11.4 | | | 197-201-10-10-10-10-10-10-10-10-10-10-10-10-1 | 5.80975000 GHz CF Step 4.95000000 MHz <u>Auto Man</u> |
| dB Center 5.785 000 0 GHz #Res BW 1 MHz | #VBW 3 MHz | Spa Sweep 20 ms | n 49.5 MHz (601 pts) | Freq Offset 0.00000000 Hz |
| Channel Power Power Spectral Density Signal Track On 18.96 dBm / 33.0000 MHz -56.23 dBm/Hz | | | | |
| Copyright 2000-2009 Agilent Tee | chnologies | | | |



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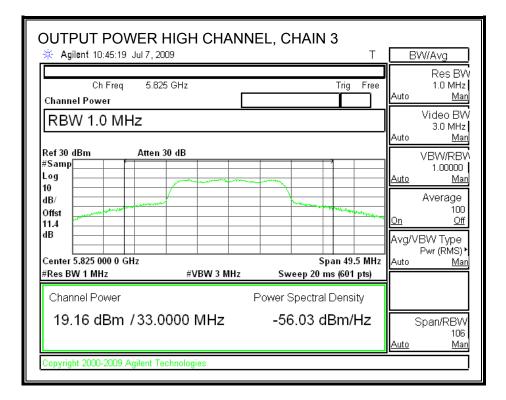
OUTPUT POWER, HIGH CHANNEL





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| OUTPUT POWER | | EL, CHAIN 2 | 2 T | BW/Avg |
|---|------------|---------------------------------------|-------------------------|---|
| Ch Freq 5.825 Channel Power | i GHz | | Trig Free | Res BW 1.0 MHz Auto <u>Man</u> Video BW |
| RBW 1.0 MHz | 0 dB | · · · · · · · · · · · · · · · · · · · |] | 3.0 MHz Auto <u>Man</u> VBW/RBV |
| #Samp Log 10 dB/ Offst | | | ······ | 1.00000 <u>Auto Man</u> Average 100 <u>On Off</u> |
| dB Center 5.825 000 0 GHz #Res BW 1 MHz | #VBW 3 MHz | Spa Sweep 20 ms | n 49.5 MHz (601 pts) | Avg/VBW Type Pwr (RMS) • Auto <u>Man</u> |
| Channel Power Power Spectral Density 19.28 dBm / 33.0000 MHz -55.91 dBm/Hz | | | | Span/RBW 106 <u>Auto Man</u> |
| Copyright 2000-2009 Agilent Ter | chnologies | | | |



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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 | 18.93 | 18.98 | 19.04 | 19.13 |
| Middle | 5785 | 19.13 | 18.95 | 19.09 | 19.19 |
| High | 5825 | 19.23 | 19.2 | 19.27 | 19.17 |

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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.

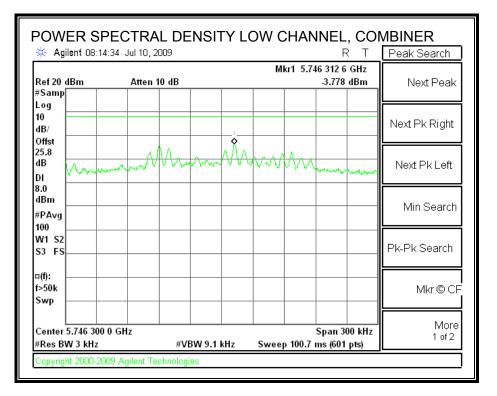
Preliminary tests on individual chains, and on all chains with a combiner, were performed. The worst-case configuration was with a combiner, therefore final test were performed with all chains feeding a combiner.

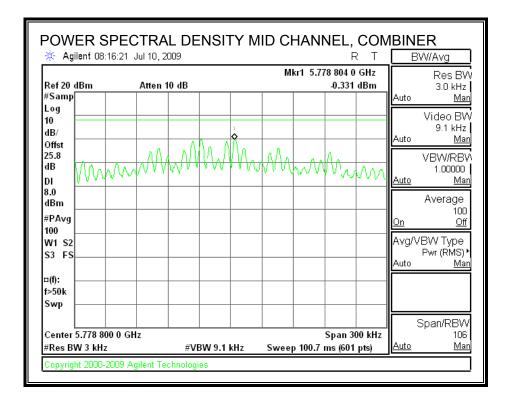
RESULTS

| Channel | Frequency | PSD with Combiner | Limit | Margin |
|---------|-----------|-------------------|-------|--------|
| | (MHz) | (dBm) | (dBm) | (dB) |
| Low | 5745 | -3.778 | 8 | -11.78 |
| Middle | 5785 | -0.331 | 8 | -8.33 |
| High | 5825 | 0.326 | 8 | -7.67 |

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POWER SPECTRAL DENSITY





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| 🔆 Agilent 08:18:0 | Agilent 08:18:01 Jul 10, 2009 R T | | | BW/Avg | |
|-------------------------------------|-----------------------------------|---|-------------|------------------------------|---|
| Ref 20 dBm #Samp | Atten 10 dB | Mkr1 5.778 805 0 GHz ten 10 dB 0.326 dBm | | | Res BV 3.0 kHz Auto <u>Ma</u> |
| Log 10 dB/ Offst | | | | | Video BV 9.1 kHz Auto <u>Ma</u> |
| 25.8 dB DI 8.0 | ~~~~ | WWW | MALAN | Mum | VBW/RB\ 1.00000 <u>Auto Ma</u> |
| dBm #PA∨g 100 | | | | | Average 100 <u>On Off</u> |
| W1 S2 S3 FS | | | | | Avg/VBW Type Pwr (RMS) Auto <u>Ma</u> |
| ⊏(f): f>50k Swp | | | | | |
| Center 5.778 800 0 #Res BW 3 kHz | | BW 9.1 kHz | Sweep 100.7 | Span 300 kHz ms (601 pts) | Span/RBV 106 Auto Ma |

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7.6.6. 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

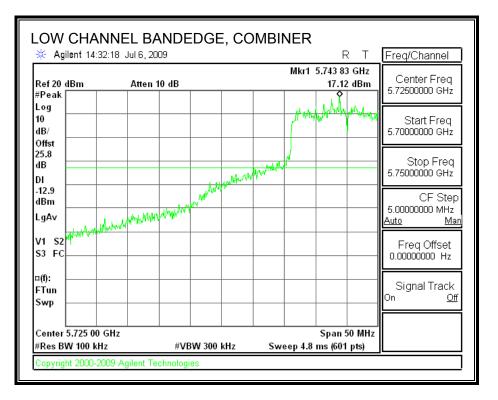
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

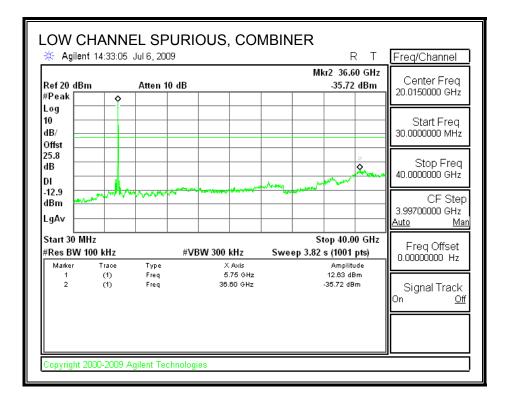
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

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.

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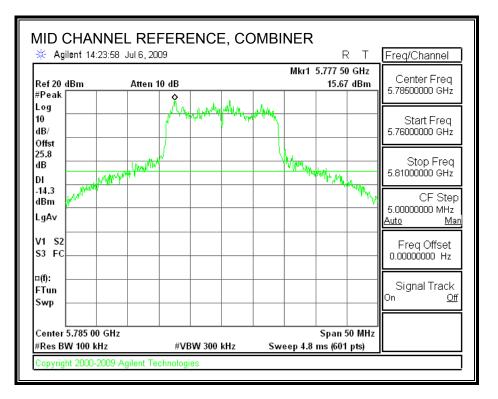
LOW CHANNEL SPURIOUS EMISSIONS

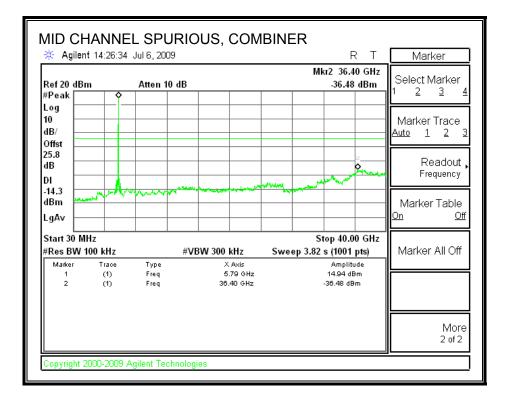




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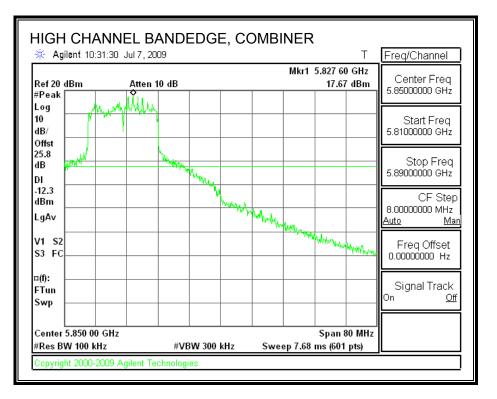
MID CHANNEL SPURIOUS EMISSIONS

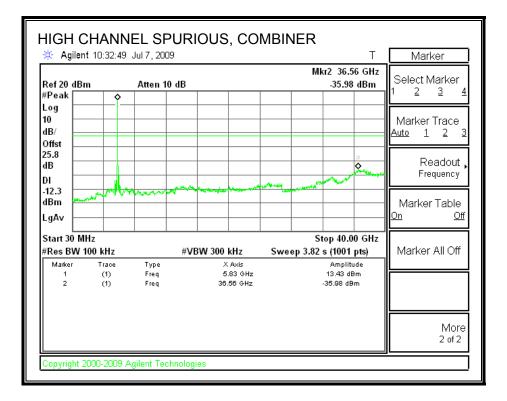




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HIGH CHANNEL SPURIOUS EMISSIONS





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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

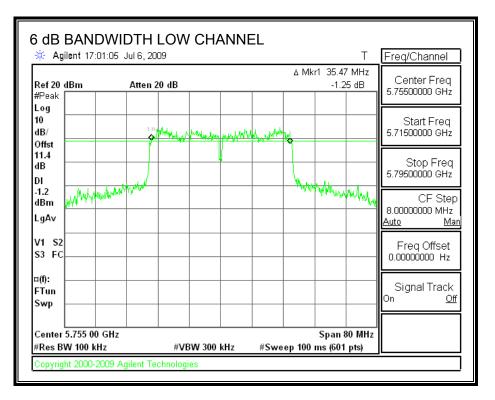
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

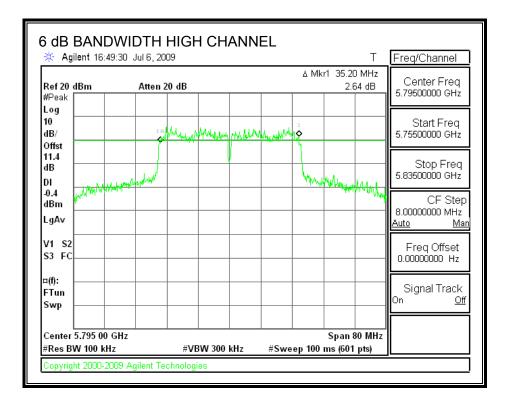
RESULTS

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

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6 dB BANDWIDTH





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7.7.2. 99% & 26 dB BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

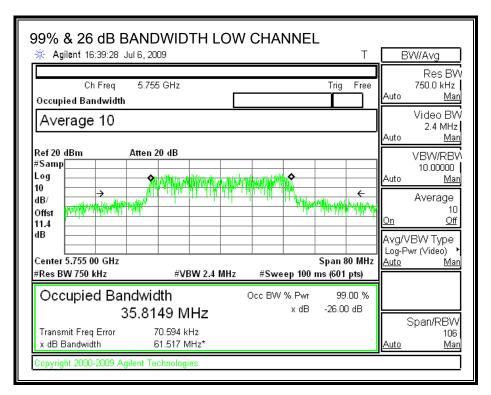
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth measurement function is utilized.

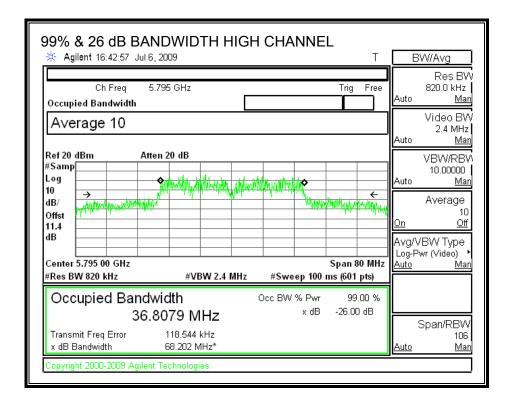
RESULTS

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

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99% & 26 dB BANDWIDTH





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7.7.3. OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

TEST PROCEDURE

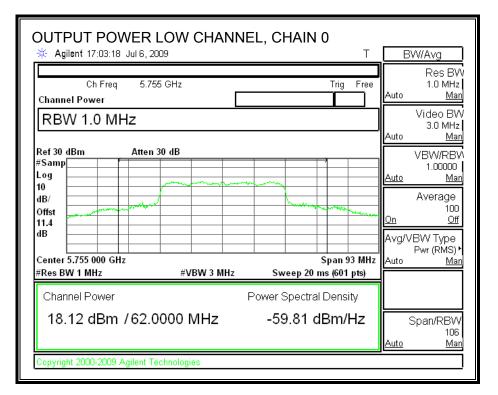
Output power was measured based on the use of RMS averaging over a time interval in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

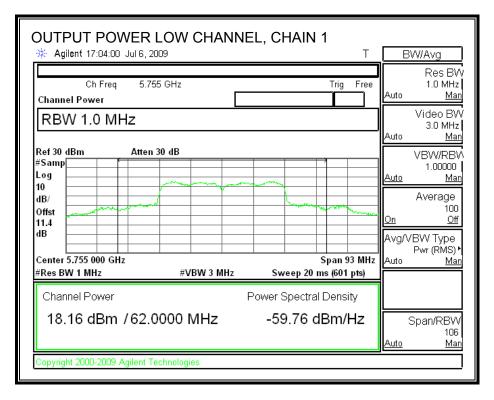
RESULTS

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

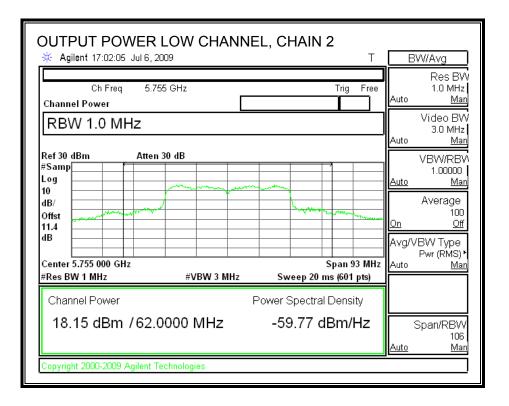
| Channel | Frequency | Chain 0 | Chain 1 | Chain 2 | Chain 3 | Total | Limit | Margin |
|---------|-----------|---------|---------|---------|---------|-------|-------|--------|
| | | Power | Power | Power | Power | Power | | |
| | (MHz) | (dBm) | (dBm) | (dBm) | (dBm) | (dBm) | (dBm) | (dB) |
| Low | 5755 | 18.12 | 18.16 | 18.15 | 18.10 | 24.15 | 30.00 | -5.85 |
| High | 5795 | 19.12 | 18.94 | 19.04 | 18.97 | 25.04 | 30.00 | -4.96 |

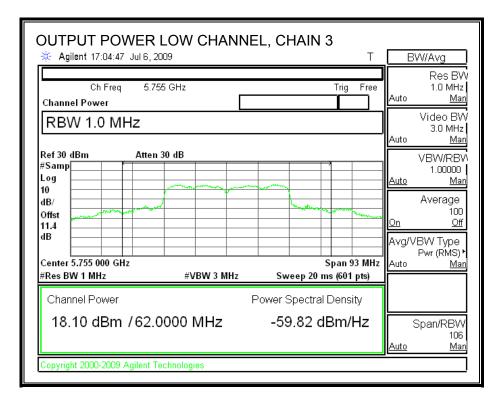
OUTPUT POWER, LOW CHANNEL





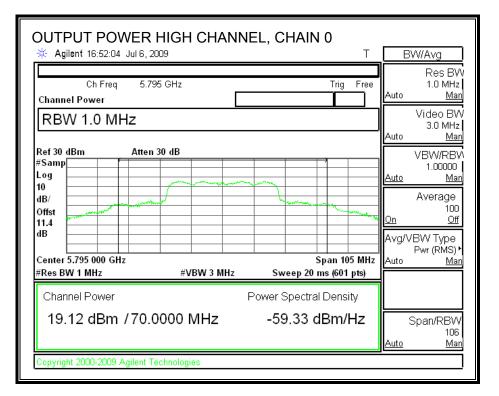
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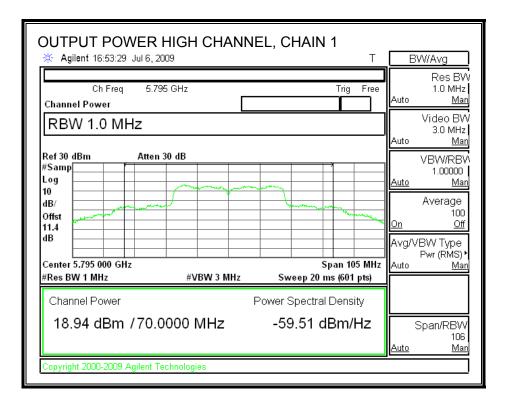




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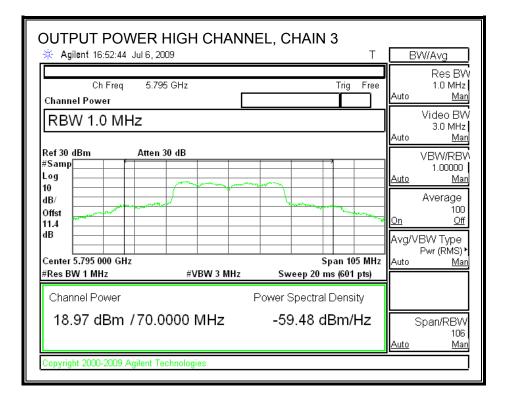
OUTPUT POWER, HIGH CHANNEL





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| OUTPUT POWER | | EL, CHAIN | 2 | BW | /Avg |
|--|-------------|--|-----------------------------|-------------------------------|--|
| Ch Freq 5.79 Channel Power | 5 GHz | | Trig Free | Auto | Res BW 1.0 MHz <u>Man</u> |
| RBW 1.0 MHz | 20 dB | | | Auto | ideo BW 3.0 MHz <u>Man</u> |
| #Samp Atten #Samp defined and the second def | | | | <u>Auto</u> A <u>On</u> | BW/RBV 1.00000 <u>Man</u> verage 100 <u>Off</u> |
| Center 5.795 000 GHz #Res BW 1 MHz | #VBW 3 MHz | Sweep 20 n | pan 105 MHz 1s (601 pts) | Avg/VB\ Pv Auto | wr(RMS)∙ <u>Man</u> |
| Channel Power 19.04 dBm /70.0 | | [⊃] ower Spectral -59.41 d | , i | Sp <u>Auto</u> | an/RBW 106 <u>Man</u> |
| Copyright 2000-2009 Agilent Te | echnologies | | | | |



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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 | 18.91 | 18.96 | 19.02 | 19.06 |

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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.

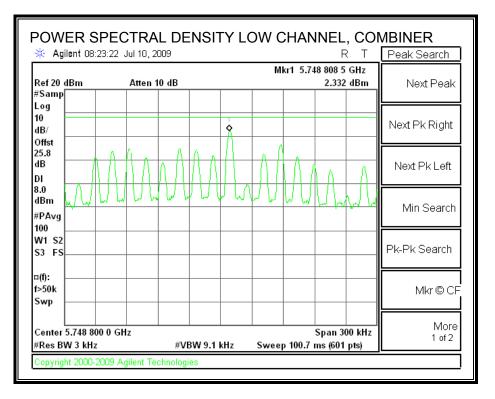
Preliminary tests on individual chains, and on all chains with a combiner, were performed. The worst-case configuration was with a combiner, therefore final test were performed with all chains feeding a combiner.

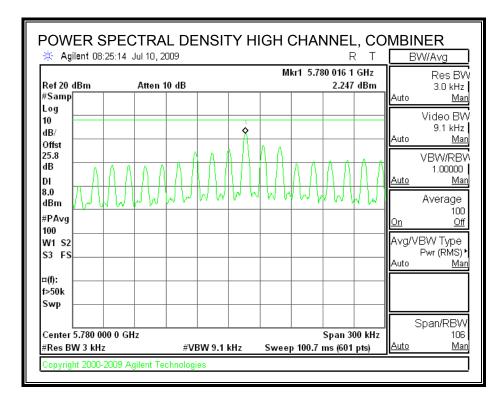
RESULTS

| Channel | Frequency | PSD with Combiner | Limit | Margin |
|---------|-----------|-------------------|-------|--------|
| | (MHz) | (dBm) | (dBm) | (dB) |
| Low | 5755 | 2.332 | 8 | -5.67 |
| High | 5795 | 2.25 | 8 | -5.75 |

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POWER SPECTRAL DENSITY





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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

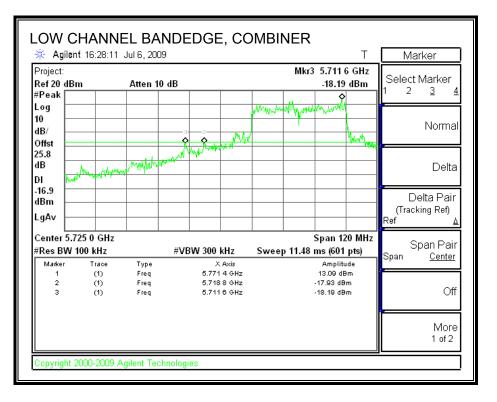
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

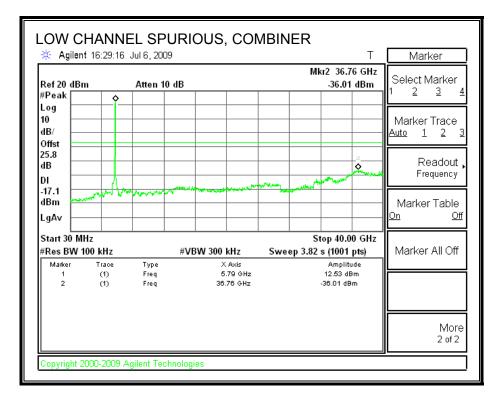
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

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.

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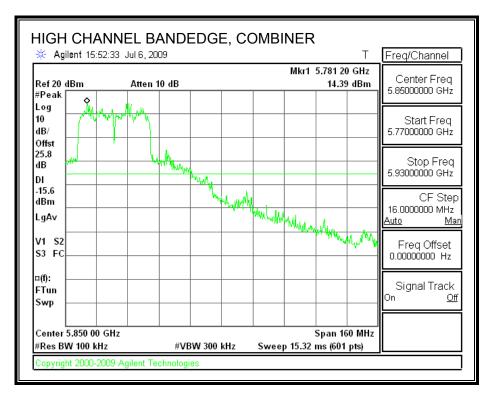
LOW CHANNEL SPURIOUS EMISSIONS

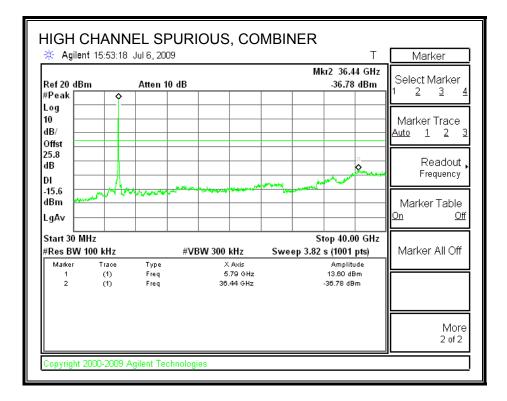




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HIGH CHANNEL SPURIOUS EMISSIONS





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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

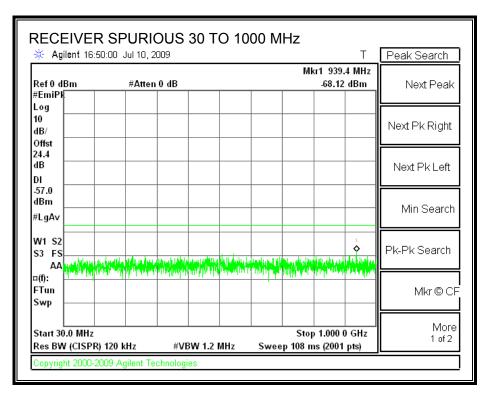
The receiver antenna port is connected to a spectrum analyzer.

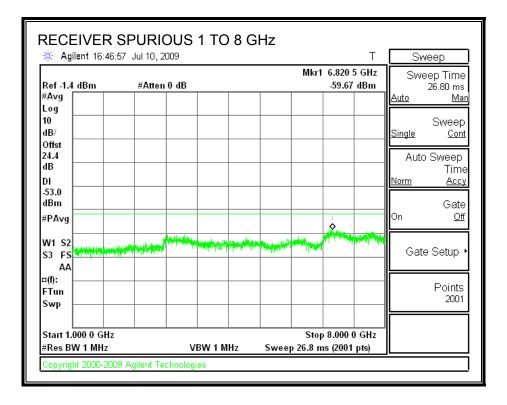
The spectrum from 30 MHz to 8 GHz is investigated with the receiver set to the middle channel of the 2.4 GHz band.

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

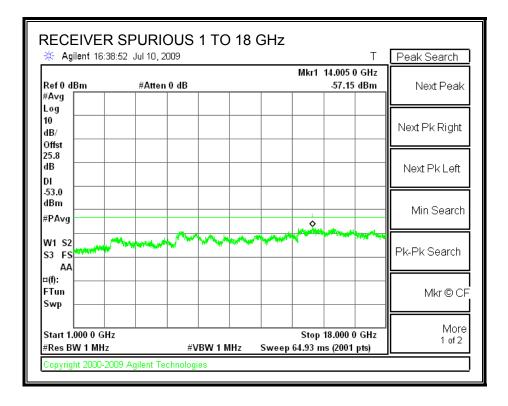




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RECEIVER SPURIOUS EMISSIONS IN THE 5.8 GHz BAND

| 🔆 Agilent 16:3 | | | TO 10 | | | | Т | Peak Search |
|---------------------------------|----------------|--|-------|------|----------------|--------------------|---|----------------|
| Ref0dBm #EmiPk | #Atten | 0 dB | | | Mk | r1 607. _67.23 | | Next Peak |
| Log 10 dB/ Offst | | | | | | | | Next Pk Right |
| dB DI | | | | | | | | Next Pk Left |
| -57.0 dBm #LgAv | | | | | | | | Min Search |
| W1 S2 S3 FS | | | | | | | | Pk-Pk Search |
| ¤(f): FTun Swp | and the sector | •••••••••••••••••••••••••••••••••••••• | | | | | | Mkr © CF |
| Start 30.0 MHz #Res BW (CISP | R) 120 kHz | VBW 1. | 2 MHz | Swee | Stop p108 m | 1.000 (s (2001 | | More 1 of 2 |



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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.

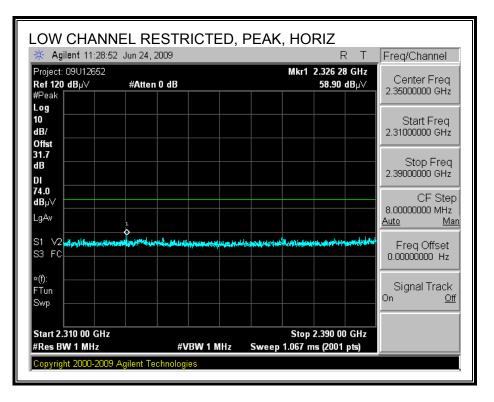
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

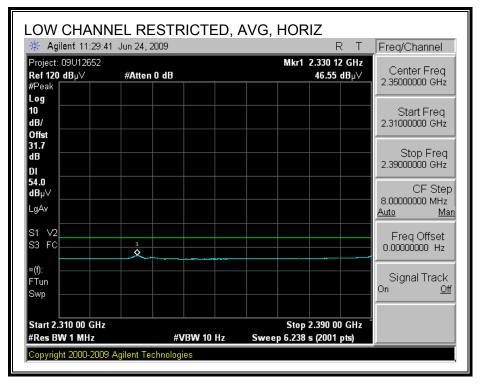
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8.2. TRANSMITTER ABOVE 1 GHz

8.2.1. 802.11b MODE IN THE 2.4 GHz BAND

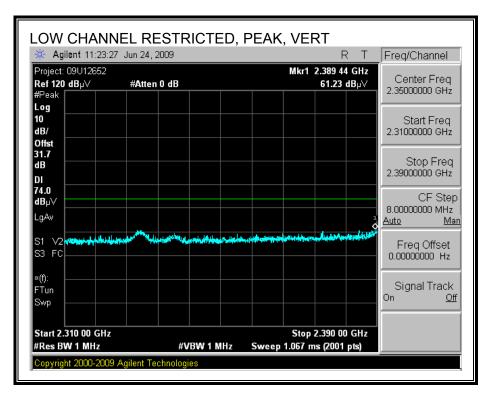
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

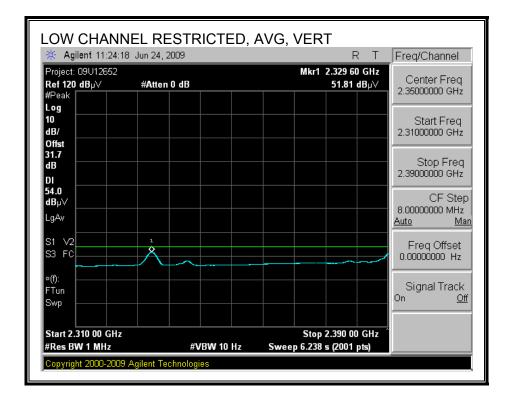




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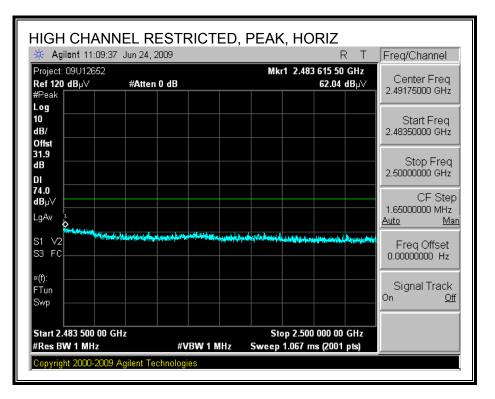
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)

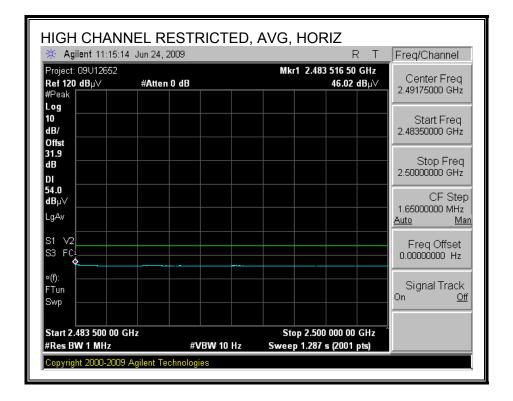




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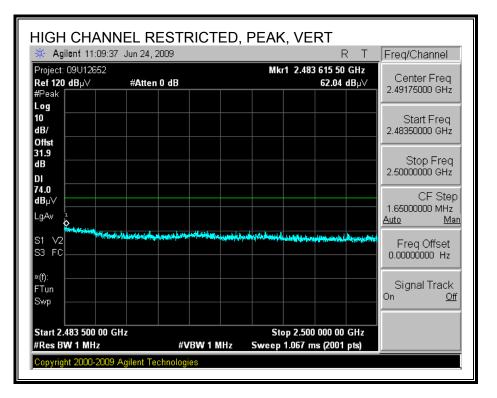
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)

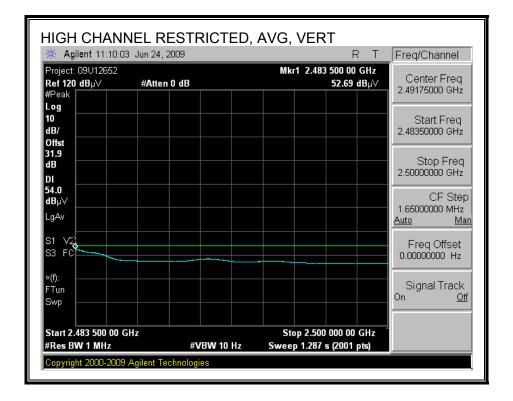




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RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)





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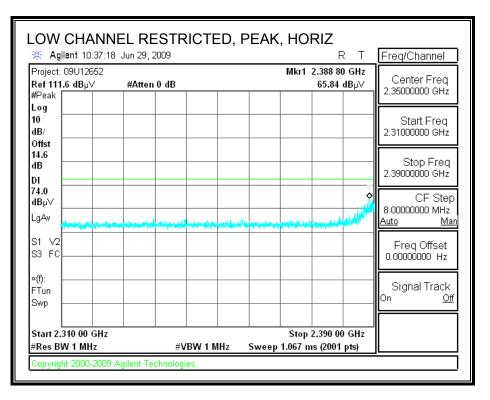
HARMONICS AND SPURIOUS EMISSIONS

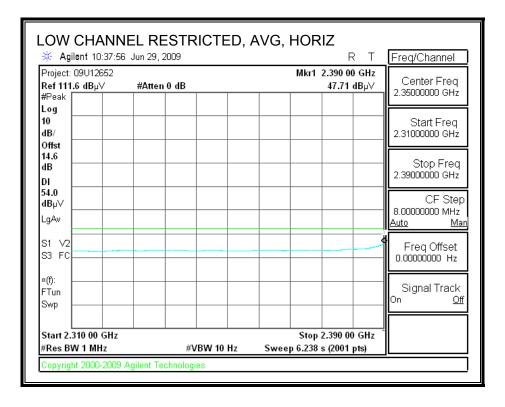
| | | Measurer tification | nent Services, F | remoi | nt 5m C | hamber | | | | | | | | | |
|-----------------|------------|------------------------|---------------------|------------|----------------|------------|------------|--------------|--------------|----------------|----------------|----------------|-----------------|---|--------------|
| Test Engr | • | | Thanh Ng | uven | | | | | | | | | | | |
| Date: | • | | 06/30/09 | uyen. | | | | | | | | | | | |
| Company | | | Qualcom | n Inc | | | | | | | | | | | |
| EUT Desc | | | 802.11 abs | | Module | | | | | | | | | | |
| EUT M/N: | | | 65-VN780 | | | - | | | | | | | | | |
| Test Targ | | | FCC Clas | | | | | | | | | | | | |
| Mode Op | | | Transmit | | e | | | | | | | | | | |
| LIVEL OF | f | Measurer | nent Frequer | | Amp | Preamp (| Gain | | | Average | Field Stren; | th Limit | | | |
| | Dist | | to Antenna | , | - | Distance | | t to 3 me | ters | - | ld Strength | - | | | |
| | Read | Analyzer | Reading | | Avg | | | trength @ | | | rs. Average | | | | |
| | AF | Antenna | | | Peak | | | Field Stre | | - | rs. Peak Lir | | | | |
| | CL | Cable Lo: | | | HPF | High Pas: | s Filter | | | - | | | | | |
| f | Dist | Read | AF | CL | Атр | D Corr | Fltr | Corr. | Limit | N | Ant. Pol. | Det | A | Table Angle | Notes |
| GHz | (m) | nead dBuV | Ar dB/m | dB | Amp dB | dB | dB | | dBuV/m | Margin dB | ANL POL V/H | Det. P/A/QP | Ant fligh cm | Degree | 110162 |
| | | t 16.5dbn | | | | | | | abu rall | | **** | Tura | | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | |
| 4.824 | 3.0 | 44.8 | 33.0 | 5.8 | -36.5 | 0.0 | 0.0 | 47.1 | 74.0 | -26.9 | v | Р | 129.4 | 241.0 | |
| 4.824 | 3.0 | 41.4 | 33.0 | 5.8 | -36.5 | 0.0 | 0.0 | 43.8 | 54.0 | -10.2 | v | Ā | 129.4 | 241.0 | |
| 4.824 | 3.0 | 40.2 | 33.0 | 5.8 | -36.5 | 0.0 | 0.0 | 42.6 | 74.0 | -31.4 | н | Р | 116.2 | 197.3 | Noise floor |
| 4.824 | 3.0 | 31.4 | 33.0 | 5.8 | -36.5 | 0.0 | 0.0 | 33.8 | 54.0 | -20.2 | H | A | 116.2 | 197.3 | Noise floor |
| | | , set 20db | | | | | | | | | | | | | |
| 4.874 | 3.0 | 46.0 | 33.1 | 5.8 | -36.5 | 0.0 | 0.0 | 48.5 | 74.0 | -25.5 | v | Р | 116.1 | 272.7 | |
| 4.874 | 3.0 | 42.9 | 33.1 | 5.8 | -36.5 | 0.0 | 0.0 | 45.3 | 54.0 | - 8. 7 | V | A | 116.1 | 272.7 | |
| 7.311 | 3.0 | 45.0 39.5 | 35.3 | 7.3 | -36.2 -36.2 | 0.0 0.0 | 0.0 | 51.3 45.9 | 74.0 | -22.7 | v v | P | 157.9 | 305.2 | |
| 7.311 12.185 | 3.0 3.0 | 39.5 | 35.3 39.0 | 9.8 | -36.2 | 0.0 0.0 | 0.0 0.0 | 45.9 | 54.0 74.0 | -8.1 -23.8 | v V | A P | 157.9 103.8 | 305.2 360.0 | Noise floor |
| 12.185 | 3.0 | 23.6 | 39.0 | 9.8 | -35.4 | 0.0 | 0.0 | 37.0 | 74.0 54.0 | -17.0 | v | A | 103.8 | 360.0 | Noise floor |
| 4.874 | 3.0 | 40.3 | 33.1 | 5.8 | -36.5 | 0.0 | 0.0 | 42.8 | 74.0 | -31.2 | Ĥ | P | 103.9 | 221.2 | 110132 11001 |
| 4.874 | 3.0 | 32.7 | 33.1 | 5.8 | -36.5 | 0.0 | 0.0 | 35.1 | 54.0 | -18.9 | H | Ā | 103.9 | 221.2 | |
| 7.311 | 3.0 | 37.5 | 35.3 | 7.3 | -36.2 | 0.0 | 0.0 | 43.9 | 74.0 | -30.1 | Н | P | 142.0 | 211.3 | |
| 7.311 | 3.0 | 27.6 | 35.3 | 7.3 | -36.2 | 0.0 | 0.0 | 33.9 | 54.0 | - 20.1 | H | A | 142.0 | 211.3 | |
| 12.185 | 3.0 | 35.7 | 39.0 | 9.8 | -35.4 | 0.0 | 0.0 | 49.1 | 74.0 | -24.9 | H | Р | 116.2 | 356.5 | Noise floor |
| 12.185 | 3.0 | 23.5 | 39.0 | 9.8 | -35.4 | 0.0 | 0.0 | 36.9 | 54.0 | -17.1 | H | A | 116.2 | 356.5 | Noise floor |
| | | Lz set 16. | | | | | | | - 40 | | | ъ | 100.1 | | |
| 4.924 4.924 | 3.0 3.0 | 45.3 41.4 | 33.1 33.1 | 5.9 5.9 | -36.5 -36.5 | 0.0 0.0 | 0.0 0.0 | 47.9 43.9 | 74.0 54.0 | -26.1 -10.1 | v v | P A | 198.1 198.1 | 245.8 245.8 | |
| 4.924 7.386 | 3.0 | 41.4 | 35.4 | 7.3 | -36.2 | 0.0 | 0.0 0.6 | 43.9 | 54.0 74.0 | -10.1 | v V | А Р | 198.1 | 170.9 | |
| 7.386 | 3.0 | 39.8 | 35.4 | 7.3 | -36.2 | 0.0 | 0.6 | 40.9 38.2 | 74.0 54.0 | -15.8 | v | A | 156.2 | 170.9 | |
| 4.924 | 3.0 | 40.6 | 33.1 | 5.9 | -36.5 | 0.0 | 0.0 | 43.2 | 24.0 74.0 | -30.8 | Н | P | 102.3 | 150.9 | |
| 4.924 | 3.0 | 33.1 | 33.1 | 5.9 | -36.5 | 0.0 | 0.0 | 35.7 | 54.0 | -18.3 | н | Â | 102.3 | 150.9 | |
| 7.386 | 3.0 | 36.8 | 35.4 | 7.3 | -36.2 | 0.0 | 0.6 | 43.9 | 74.0 | - 30.1 | Н | Р | 173.5 | 156.4 | Noise floor |
| 7.386 | 3.0 | 24.9 | 35.4 | 7.3 | -36.2 | 0.0 | 0.6 | 32.0 | 54.0 | -22.0 | Н | A | 173.5 | 156.4 | Noise floor |
| | | | | | | | | | | | | | | <u> </u> | |
| Rev. 4.1.2 | | | | | | | | | | | | | | | |
| Note: No | other e | missions | were detec | ted ab | ove the | system n | oise fl | 00T. | | | | | | | |

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8.2.2. 802.11g MODE IN THE 2.4 GHz BAND

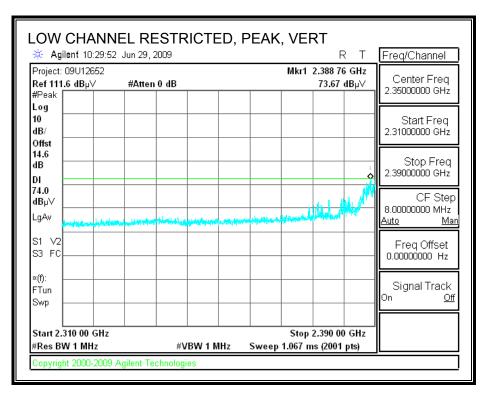
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

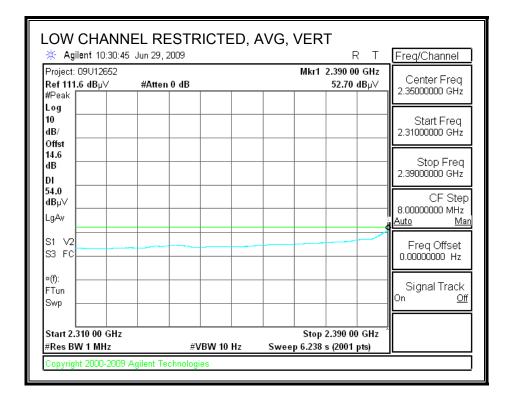




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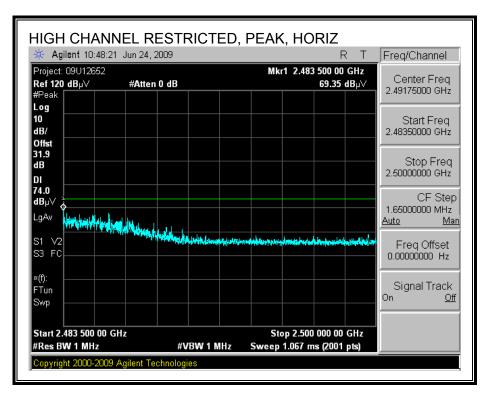
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)

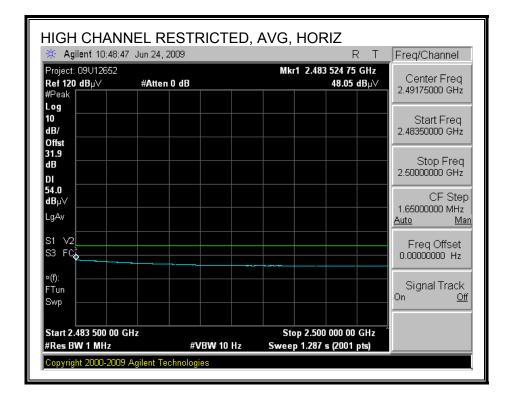




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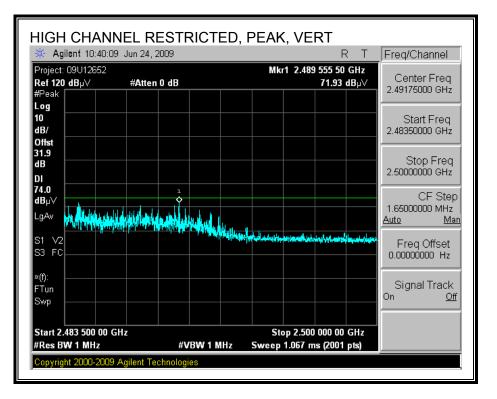
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)

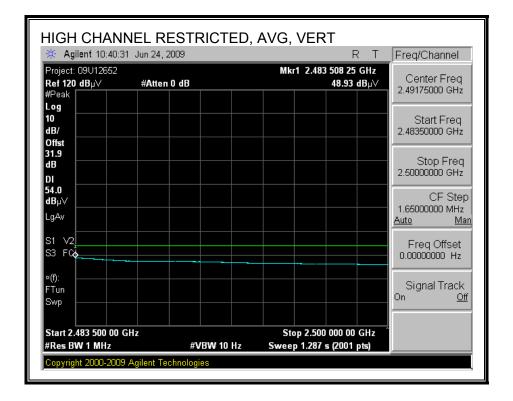




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RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)





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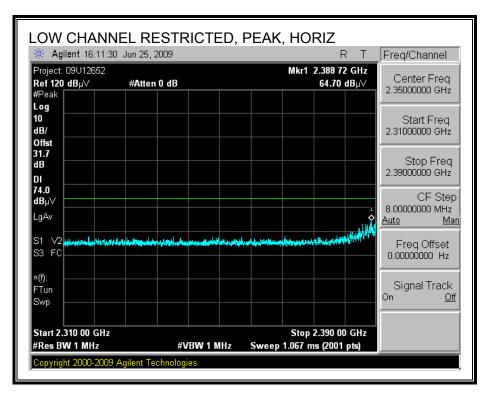
HARMONICS AND SPURIOUS EMISSIONS

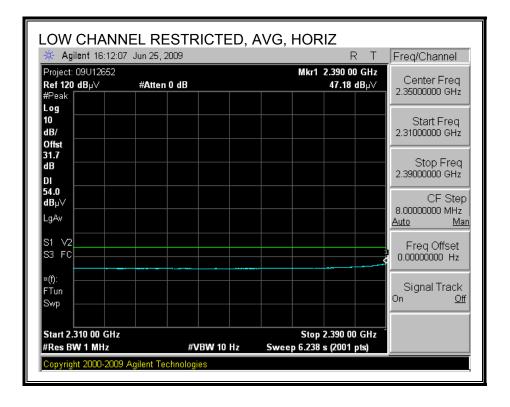
| 9U12652 Qualcom 02.11 ab 5-VN78(CC Clar ransmit leasurem tistance t nalyzer 1 ntenna F able Loss Read dBuV 41.2 35.0 | m Inc. gn 4X4)-P2 ss B ent Freq o Anten Reading factor | e puency | • Amp | | Corre Field S d Peak s Filter | trength @ r Field Stre r Corr. | 3 m | Peak Fie Margin Margin | Field Stren ald Strength vs. Average vs. Peak Liv | Limit Limit | | | |
|---|---|---|---|---|--|--|--|--|--|--|--|--|---|
| 02.11 ab 5-VN78(CC Clar ransmit leasurem fistance t nalyzer l ntenna F able Loss Read dBuV 41.2 | gn 4X4)-P2 ss B g mode ent Freq o Anten Reading Factor s AF dB/m | na CL | Amp D Corr Avg Peak HPF Amp | Distance Average I Calculate High Pas: D Corr | Correc Field S d Peak s Filter Fltr | trength @ r Field Stre r Corr. | 3 m angth | Peak Fie Margin Margin | eld Strength vs. Average vs. Peak Lir | Limit Limit | | | |
| 5-VN78(CC Clas ransmit leasurem tistance t nalyzer l ntenna F able Loss Read dBuV 41.2 |)-P2 ss B ent Freq o Anten Reading Factor AF dB/m | na CL | Amp D Corr Avg Peak HPF Amp | Distance Average I Calculate High Pas: D Corr | Correc Field S d Peak s Filter Fltr | trength @ r Field Stre r Corr. | 3 m angth | Peak Fie Margin Margin | eld Strength vs. Average vs. Peak Lir | Limit Limit | | | |
| CC Clar ransmit leasurem iistance t nalyzer l ntenna F able Loss Read dBuV 41.2 | ss B ent Freq o Anten Reading Factor AF dB/m | pency na CL | D Corr Avg Peak HPF Amp | Distance Average I Calculate High Pas: D Corr | Correc Field S d Peak s Filter Fltr | trength @ r Field Stre r Corr. | 3 m angth | Peak Fie Margin Margin | eld Strength vs. Average vs. Peak Lir | Limit Limit | | | |
| ransmit leasurem istance t nalyzer l ntenna F able Loss Read dBuV 41.2 | g mode ent Freg o Anten Reading Factor ; AF dB/m | pency na CL | D Corr Avg Peak HPF Amp | Distance Average I Calculate High Pas: D Corr | Correc Field S d Peak s Filter Fltr | trength @ r Field Stre r Corr. | 3 m angth | Peak Fie Margin Margin | eld Strength vs. Average vs. Peak Lir | Limit Limit | | | |
| leasurem istance t nalyzer l ntenna F able Loss Read dBuV 41.2 | ent Freq o Anten Reading Factor s AF dB/m | pency na CL | D Corr Avg Peak HPF Amp | Distance Average I Calculate High Pas: D Corr | Correc Field S d Peak s Filter Fltr | trength @ r Field Stre r Corr. | 3 m angth | Peak Fie Margin Margin | eld Strength vs. Average vs. Peak Lir | Limit Limit | | | |
| istance t nalyzer l ntenna F able Loss Read dBuV 41.2 | o Anten Reading Factor AF dB/m | na | D Corr Avg Peak HPF Amp | Distance Average I Calculate High Pas: D Corr | Correc Field S d Peak s Filter Fltr | trength @ r Field Stre r Corr. | 3 m angth | Peak Fie Margin Margin | eld Strength vs. Average vs. Peak Lir | Limit Limit | | | |
| nalyzer l ntenna F able Loss Read dBuV 41.2 | Reading Factor AF dB/m | CL | Avg Peak HPF Amp | Average I Calculate High Pass | Field S d Peak s Filter Fltr | trength @ r Field Stre r Corr. | 3 m angth | Margin v Margin v | vs. Average vs. Peak Li | Limit | | | |
| ntenna F able Loss Read dBuV 41.2 | AF dB/m | | Peak HPF Amp | Calculate High Pas D Corr | d Peak s Filter Fltr | r Field Stre r Corr. | ength | Margin | vs. Peak Li | | | | |
| able Loss Read dBuV 41.2 | AF dB/m | | HPF Amp | High Pas D Corr | s Filter Fltr | r Corr. | | | - | mit | | | |
| Read dBuV 41.2 | AF dB/m | | Amp | D Corr | Fltr | Согт. | Limit | | | | | | |
| dBuV 41.2 | dB/m | | | | | | Limit | | | - | | | |
| dBuV 41.2 | dB/m | | | | | | Limit | | | | | | |
| 41.2 | | ۵۵ | <u> </u> | | | 3D U/ | dBuV/m | | Ant. Pol. V/H | Det. P/A/QP | | Table Angle | Notes |
| | 22.0 | | | | ab | abuv/m | abuv/m | | • •/n | PIA/QP | cm | Degree | |
| | | | | | | 40.0 | - 10 | | v | Р | 110.1 | 225.9 | |
| 3 2. 0 i | | 5.8 | -36.5 -36.5 | 0.0 | 0.0 | 43.6 | 74.0 | -30.4 | v V | ö | 113.1 113.1 | 225.9 | |
| 39.4 | 33.0 33.0 | 5.8 5.8 | -36.5 | 0.0 0.0 | 0.0 0.0 | 37.4 41.7 | 54.0 74.0 | -16.6 -32.3 | V H | A P | 115.1 | 187.4 | |
| 30.2 | 33.0 | 5.8 | -36.5 | 0.0 | 0.0 | 32.5 | 54.0 | -32.5 | H H | F A | 100.0 | 187.4 | |
| | | | -30.2 | v.v | v.v | | ~ 76.0 | | | | 100.0 | 101.4 | |
| 50.2 | 33.1 | 5.8 | -36.5 | 0.0 | 0.0 | 52.7 | 74.0 | -21.3 | v | Р | 139.4 | 228.7 | |
| 34.5 | 33.1 | 5.8 | -36.5 | 0.0 | 0.0 | 37.0 | 54.0 | -17.0 | v | Ā | 139.4 | 228.7 | |
| 48.5 | 35.3 | 7.3 | -36.2 | 0.0 | 0.0 | 56.4 | 74.0 | -17.6 | v | P | 157.0 | 294.1 | |
| 34.6 | 35.3 | 7.3 | -36.2 | 0.0 | 0.0 | 40.9 | 54.0 | -13.1 | V | A | 157.0 | 294.1 | |
| 46.2 | 33.1 | 5.8 | -36.5 | 0.0 | 0.0 | 48.8 | 74.0 | -25.2 | H | P | 139.4 | 228.7 | |
| 30.2 | 33.1 | 5.8 | -36.5 | 0.0 | 0.0 | 42.8 | 54.0 | -11.2 | H | A | 139.4 | 228.7 | |
| 45.6 | 35.3 | 7.3 | -36.2 | 0.0 | 0.0 | 56.4 | 74.0 | -21.4 | н | Р | 157.0 | 294.1 | |
| 40.0 | 35.3 | 7.3 | -36.2 | 0.0 | 0.0 | 47.0 | 54.0 | - 7.0 | H | A | 157.0 | 294.1 | |
| | | | | | | | | ļ | | | | | |
| 42.6 | 33.1 | 5.9 | -36.5 | 0.0 | 0.0 | 45.2 | 74.0 | -28.8 | v | | 111.5 | 225.7 | |
| 36.3 | | | | • | | | | | \$ | A | ¢ | | |
| | | | • | · | | | | | ¢ | | ¢ | | |
| | | | | ••••••••• | ····· | | | • | ¢ | | ¢ | | |
| | | | | • | | | | | | | | | |
| | | | • | · | | | | • | ¢ | | ¢ | | |
| | | | | | ····· | | | | | | | | |
| | | | | | | 921-7 | v nv | | ····· | | | 10010 | |
| | 48.5 34.6 46.2 30.2 45.6 40.0 42.6 | 34.5 33.1 48.5 35.3 34.6 35.3 34.6 35.3 46.2 33.1 30.2 33.1 45.6 35.3 40.0 35.3 42.6 33.1 36.3 33.1 38.5 35.4 26.0 35.4 37.3 33.1 36.5 35.4 36.5 35.4 | 34.5 33.1 5.8 48.5 35.3 7.3 44.6 35.3 7.3 46.2 33.1 5.8 46.2 33.1 5.8 46.2 33.1 5.8 45.6 35.3 7.3 40.0 35.3 7.3 40.0 35.3 7.3 42.6 33.1 5.9 38.5 35.4 7.3 26.0 35.4 7.3 37.3 33.1 5.9 33.4 33.1 5.9 36.5 35.4 7.3 36.5 35.4 7.3 | 34.5 33.1 5.8 -36.5 48.5 35.3 7.3 -36.2 34.6 35.3 7.3 -36.2 46.2 33.1 5.8 -36.5 46.2 33.1 5.8 -36.5 45.0 35.3 7.3 -36.2 40.0 35.3 7.3 -36.2 40.0 35.3 7.3 -36.2 40.0 35.3 7.3 -36.2 42.6 33.1 5.9 -36.5 36.3 33.1 5.9 -36.5 36.3 33.1 5.9 -36.5 38.5 35.4 7.3 -36.2 26.0 35.4 7.3 -36.2 37.3 33.1 5.9 -36.5 36.5 35.4 7.3 -36.2 33.1 5.9 -36.5 36.5 | $\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$ | $\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$ | $\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$ | $\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$ | $\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$ | $\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$ | $\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$ | $\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$ | $\begin{array}{c ccccccccccccccccccccccccccccccccccc$ |

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8.2.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

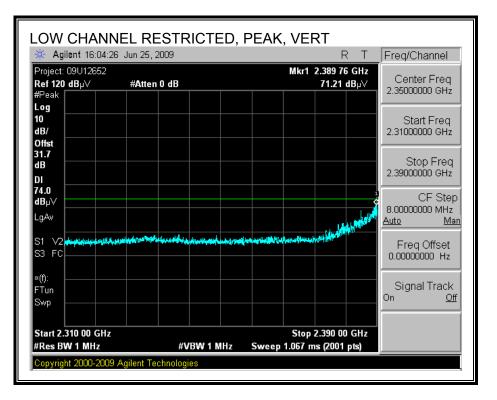
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

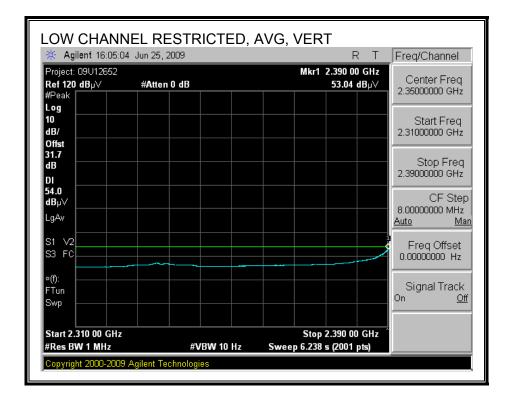




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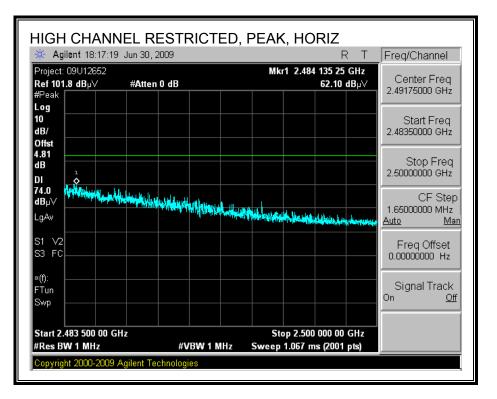
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)

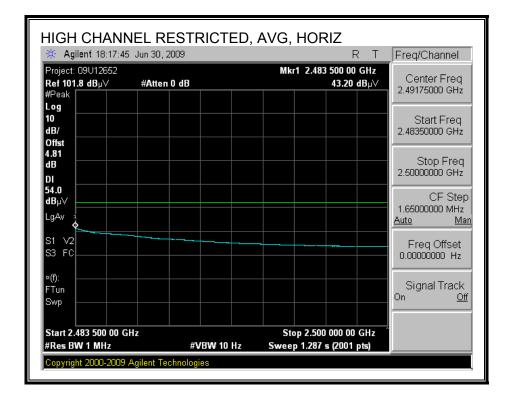




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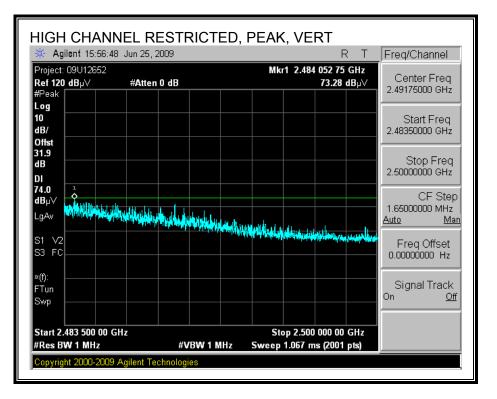
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)

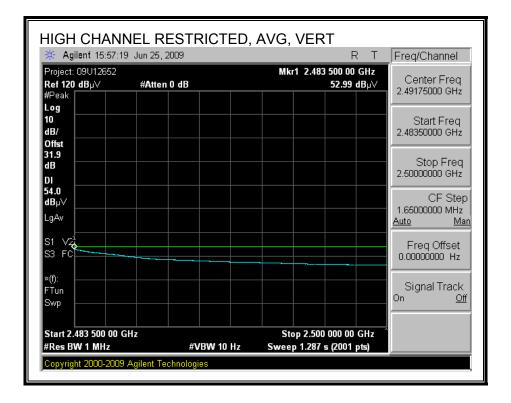




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RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)





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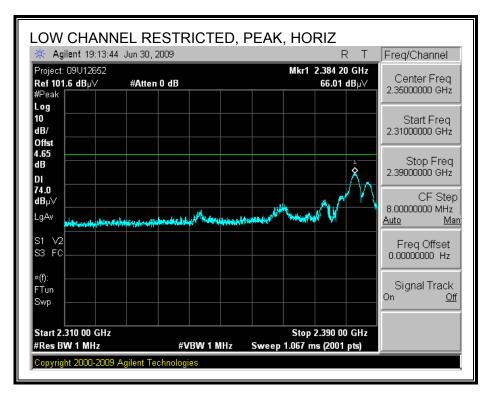
HARMONICS AND SPURIOUS EMISSIONS

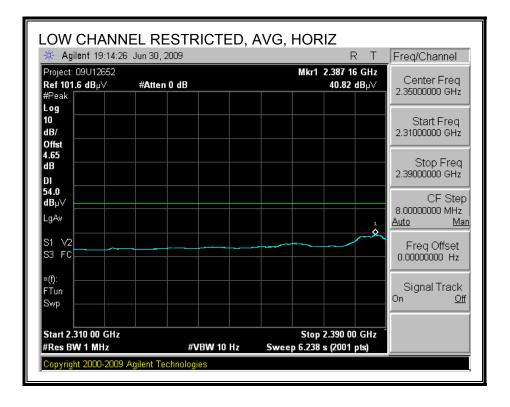
| сотриало | - | Measuren Lification | | s, Fre | mont 51 | n Chamb | er | | | | | | | | |
|----------------|------------|------------------------|--------------|------------|----------------|------------|------------|--------------|--------------|----------------|--------------|-------------|----------------|----------------|-------|
| lest Engr: | | Thanh N | zuven | | | | | | | | | | | | |
| Date: | | 06/30/09 | | | | | | | | | | | | | |
| Company: | | Oualcon | | | | | | | | | | | | | |
| UT Descri | | - | | Mod | սե | | | | | | | | | | |
| UT M/N: | φιιοπ. | 65-VN78 | - | , THEOR | uic | | | | | | | | | | |
| lest Targei | | FCC Cla | | | | | | | | | | | | | |
| Mode Open | | Transmi | | mada | | | | | | | | | | | |
| - | f | Measuren | | | . 4 mp | Preamp | Gain | | | Å 170 Y 3 70 | Field Stren | eth I innit | | | |
| | Dist | Distance | | | - | Distance | | + + o 3 mo | tow | | eld Strength | | | | |
| | Read | Analyzer | | | Avg | | | trength @ | | | vs. Average | | | | |
| | AF | Antenna | - | | Peak | | | Field Stre | | - | vs. Peak Lii | | | | |
| | CL | Cable Los | | | HPF | High Pas | | | | margin | | | | | |
| | | Capie 103 | | | | 116111-02 | , i mei | | | | | | | | |
| 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_set 14 | ldbm | | ļ | | | | | | | | | | | | |
| 1.824 | 3.0 | 41.3 | 33.0 | 5.8 | -36.5 | 0.0 | 0.0 | 43.7 | 74.0 | -30.3 | V | Р | 100.0 | 225.9 | |
| 1.824 | 3.0 | 34.2 | 33.0 | 5.8 | -36.5 | 0.0 | 0.0 | 36.5 | 54.0 | -17.5 | V | A | 100.0 | 225.9 | |
| 1.824 | 3.0 | 38.8 | 33.0 | 5.8 | -36.5 | 0.0 | 0.0 | 41.1 | 74.0 | - 32.9 | H | P | 114.9 | 197.8 | |
| .824 | 3.0 | 29.5 | 33.0 | 5.8 | -36.5 | 0.0 | 0.0 | 31.8 | 54.0 | -22.2 | H | A | 114.9 | 197.8 | |
| Iid_set 20 | | | ļ <u>.</u> | | | | | | | | | ······ | | | |
| 1.874 | 3.0 | 52.8 | 33.1 | 5.8 | -36.5 | 0.0 | 0.0 | 55.3 | 74.0 | -18.7 | V | P | 108.3 | 187.0 | |
| 1.874 | 3.0 | 35.7 | 33.1 | 5.8 | -36.5 | 0.0 | 0.0 | 38.2 | 54.0 | -15.8 | V V | A | 108.3 | 187.0 | |
| 7.311 7.311 | 3.0 3.0 | 50.3 30.2 | 35.3 35.3 | 7.3 7.3 | -36.2 -36.2 | 0.0 0.0 | 0.6 0.6 | 57.3 37.1 | 74.0 54.0 | -16.7 -16.9 | v V | P | 162.7 162.7 | 212.0 212.0 | |
| 2.185 | 3.0 | 35.6 | 39.0 | 9.8 | -35.4 | 0.0 | 0.0 | 49.7 | 54.0 74.0 | -10.5 | v | A P | 162.7 | 212.0 | |
| 2.185 | 3.0 | 23.6 | 39.0 | 9.8 | -35.4 | 0.0 | 0.7 | 37.6 | 54.0 | -16.4 | v | F A | 162.7 | 212.0 | |
| 1.874 | 3.0 | 43.7 | 33.1 | 5.8 | -36.5 | 0.0 | 0.0 | 46.2 | 74.0 | -27.8 | Р Н | P | 102.7 | 198.4 | |
| .874 | 3.0 | 29.4 | 33.1 | 5.8 | -36.5 | 0.0 | 0.0 | 31.9 | 54.0 | -22.1 | H | Å | 100.0 | 198.4 | |
| .311 | 3.0 | 39.3 | 35.3 | 7.3 | -36.2 | 0.0 | 0.6 | 46.3 | 74.0 | -27.7 | H | P | 136.4 | 245.8 | |
| .311 | 3.0 | 25.1 | 35.3 | 7.3 | -36.2 | 0.0 | 0.6 | 32.1 | 54.0 | -21.9 | H | Ā | 136.4 | 245.8 | |
| ligh_set l | | | 1 | | _ | | | 1 | | | | | | | |
| .924 | 3.0 | 43.5 | 33.1 | 5.9 | -36.5 | 0.0 | 0.0 | 46.1 | 74.0 | -27.9 | V | Р | 125.1 | 224.9 | |
| 1.924 | 3.0 | 35.6 | 33.1 | 5.9 | -36.5 | 0.0 | 0.0 | 38.1 | 54.0 | -15.9 | V | A | 125.1 | 224.9 | |
| .386 | 3.0 | 37.4 | 35.4 | 7.3 | -36.2 | 0.0 | 0.6 | 44.5 | 74.0 | -29.5 | V | P | 165.5 | 286.8 | |
| .386 | 3.0 | 25.8 | 35.4 | 7.3 | -36.2 | 0.0 | 0.6 | 32.9 | 54.0 | - 21.1 | V | A | 165.5 | 286.8 | |
| | 3.0 | 39.1 | 33.1 | 5.9 | -36.5 | 0.0 | 0.0 | 41.6 | 74.0 | -3 2. 4 | H | P | 100.0 | 198.8 | |
| 1.924 | 3.0 | 29.9 | 33.1 | 5.9 | -36.5 | 0.0 | 0.0 | 32.4 | 54.0 | -21.6 | H | A | 100.0 | 198.8 | |
| 1.924 1.924 | | 36.8 | 35.4 | 7.3 | -36.2 | 0.0 | 0.6 | 43.9 | 74.0 | - 30.1 | H | Р | 100.0 | 198.8 | |
| 1.924 | 3.0 3.0 | 24.7 | 35.4 | 7.3 | -36.2 | 0.0 | 0.6 | 31.8 | 54.0 | -22.2 | н | A | 100.0 | 198.8 | |

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8.2.4. 802.11n HT40 MODE IN THE 2.4 GHz BAND

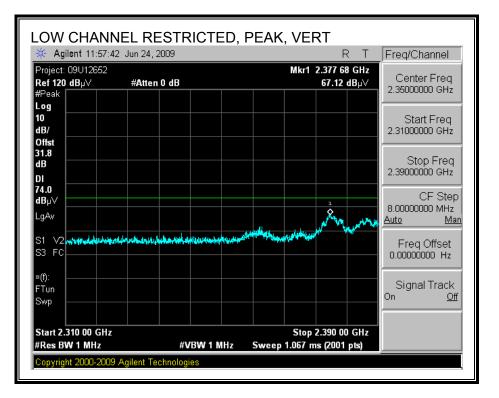
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

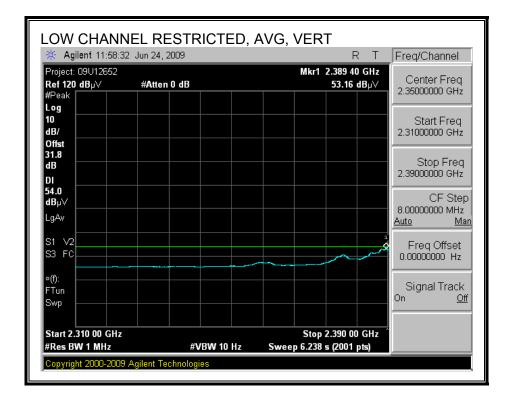




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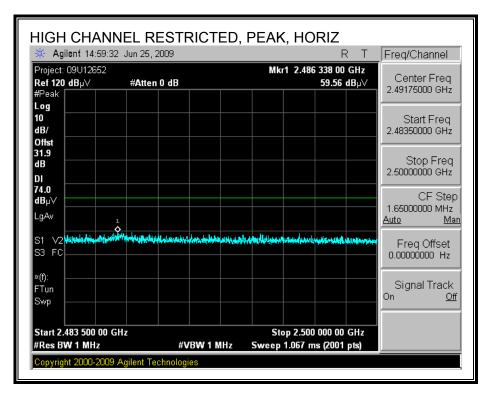
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)

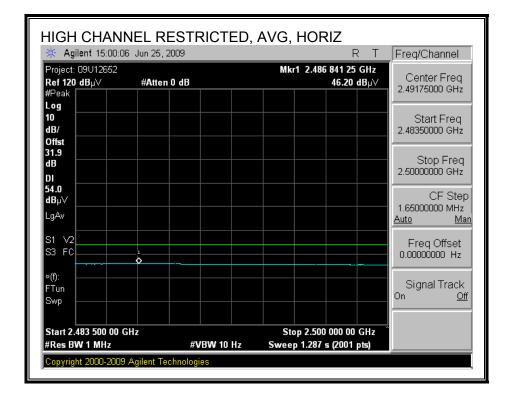




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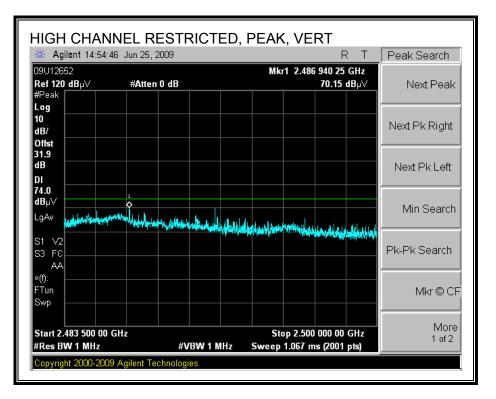
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)

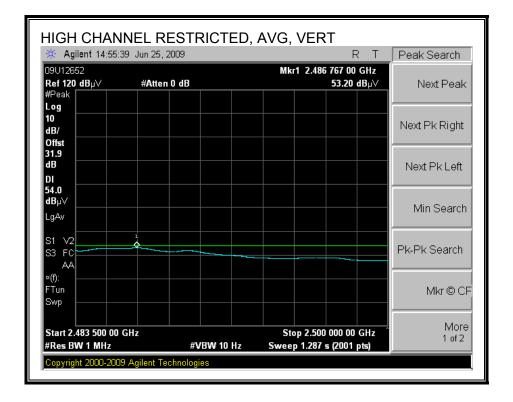




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RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)





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HARMONICS AND SPURIOUS EMISSIONS

| CUT M/N: Cest Target: Mode Oper: f Di | FC Tra | VN780- C Class ansmit l | | | | | | | | | | | | | |
|---|-----------|-------------------------------|---------|--------|---------|------------|--------|-------------|--------|-------|---------------------------|----------|----------|-------------|-------------|
| Node Oper: f | Tra | | | | | | | | | | | | | | |
| f | | | | | | | | | | | | | | | |
| - | | asureme: | | | A | Preamp (| | | | A | Field Stren: | -+1. T : | | | |
| | | asureme: tance to | | | | - | | t to 3 mete | or: | · · | ld Strength | - | | | |
| | | alyzer R | | | Avg | | | trength @ 1 | | | m Strengtn 75. Average | | | | |
| AI | | tenna Fa | ~ | | Peak | | | Field Strer | | | rs. Peak Lir | | | | |
| CI | | ole Loss | | | HPF | High Pas | | | | | | | | | |
| | | lead | AF | CL | - | D Corr | | | | | Ant. Pol. | Det. | Ant.High | Table Angle | Notes |
| | <u> </u> | BuV (| dB/m | dB | dB | dB | dB | dBuV/m o | dBuV/m | dB | V/H | P/A/QP | cm | Degree | |
| .ow ch set 12 | | | | | | | | | | | | | | ļ | |
| | | | 33.1 | 5.8 | -36.5 | 0.0 | 10.0 | 51.3 | 74.0 | -22.7 | V | P | 188.2 | 209.4 | Noise floor |
| | | 25.9 | 33.1 | 5.8 | -36.5 | 0.0 | 10.0 | 38.3 | 54.0 | -15.7 | v | A | 188.2 | 209.4 | |
| ligh ch set l 904 | | 39.4 | 33.1 | 5.9 | -36.5 | 0.0 | 10.0 | 51.9 | 74.0 | -22.1 | v | Р | 186.0 | 269.7 | Noise floor |
| | | | 33.1 | | -36.5 | 0.0 | 10.0 | 38.8 | 54.0 | -15.2 | v | F A | 186.0 | 269.7 | 10026 1001 |
| | | | | *** | | | | | * ••• | | • | | | | |
| | | | | | | | | | | | | | | | |
| Rev. 4.1.2.7 | | | | | | | | | | | | | | | |
| | | | ere dei | tected | ahove 1 | the system | m nois | e floor. | | | | | | | |

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8.2.5. 802.11a MODE IN THE 5.8 GHz BAND

HARMONICS AND SPURIOUS EMISSIONS

| Date: | l | Thanh N 06/30/09 | | | | | | | | | | | | | |
|----------------------------------|---------------------------------------|--------------------------------|----------|--------|--------|-----------|----------|--------------|--------|---------------|--------------|-----------|---------|-------------|-------|
| Company EUT Desci EUT M/N: | | Qualcor 802.11 a 65-VN78 | bgn 4X4 | | ule | | | | | | | | | | |
| fest Targe | et: | FCC DT | s | | | | | | | | | | | | |
| Mode Ope | T: | Transmi | t lla M | ode | | | | | | | | | | | |
| | f | Measurer | nent Fre | quency | 7 Amp | Preamp (| Gain | | | Average | Field Stren; | gth Limit | | | |
| | Dist | Distance | | | D Corr | Distance | Correc | et to 3 me | ters | | ld Strength | | | | |
| | Read | Analyzer | Reading | | Avg | | | trength @ | | | rs. Average | | | | |
| | AF | Antenna | Factor | | Peak | Calculate | d Peak | : Field Stre | ngth | Margin | rs. Peak Liz | mit | | | |
| | CL | Cable Lo: | 55 | | HPF | High Pas | s Filter | r | | | | | | | |
| 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 | dB | V/H | P/A/QP | cm – | Degree | |
| Low ch 57 | 45MHz | , set 19 d b | m | | | | | | | | | | | | |
| 11.490 | 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 | |
| 11.490 | 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 | |
| 11.490 | 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 | |
| 11.490 | 3.0 | 30.9 | 38.4 | 9.5 | -35.9 | 0.0 | 0.7 | 43.7 | 54.0 | - 10.3 | H | A | 100.1 | 26.6 | |
| Mid ch 57 | 85MHz | set 19dbı | n | | | | | | | | | | | | |
| 11.570 | 3.0 | 43.1 | 38.5 | 9.5 | | 0.0 | 0.7 | 56.0 | 74.0 | - 18.0 | V | Р | 149.9 | 303.4 | |
| 11.570 | 3.0 | 39.8 | 38.5 | 9.5 | -35.8 | 0.0 | 0.7 | 52.7 | 54.0 | - 1.3 | V | A | 149.9 | 303.4 | |
| 11.570 | 3.0 | 39.5 | 38.5 | 9.5 | -35.8 | 0.0 | 0.7 | 52.4 | 74.0 | - 21.6 | H | Р | 100.0 | 27.0 | |
| 11.570 | 3.0 | 32.1 | 38.5 | 9.5 | -35.8 | 0.0 | 0.7 | 45.0 | 54.0 | -9.0 | H | A | 100.0 | 27.0 | |
| High ch 5 | · · · · · · · · · · · · · · · · · · · | | ····· | | | | | Ļ | | | | | | | |
| 11.650 | 3.0 | 43.9 | 38.6 | 9.6 | | 0.0 | 0.7 | 57.0 | 74.0 | -17.0 | V | P | 120.4 | 133.7 | |
| 11.650 | 3.0 | 40.3 | 38.6 | 9.6 | -35.7 | 0.0 | 0.7 | 53.5 | 54.0 | -0.5 | V | A | 120.4 | 133.7 | |
| 11.650 | 3.0 | 38.1 | 38.6 | 9.6 | -35.7 | 0.0 | 0.7 | 51.2 | 74.0 | -22.8 | H | P | 102.4 | 18.9 | |
| 11.650 | 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 | |

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8.2.6. 802.11n HT20 MODE IN THE 5.8 GHz BAND

HARMONICS AND SPURIOUS EMISSIONS

| | : | Thanh N | guyen | | | | | | | | | | | | |
|--|--|--|--|--|--|---|---|--|--|---|--|--------------------------------------|---|---|-------|
| Date: | | 06/30/09 | | | | | | | | | | | | | |
| Project # | | 09U1265 | 2 | | | | | | | | | | | | |
| Company | / : | Qualcor | nm Inc. | | | | | | | | | | | | |
| EUT Desc | ription: | 802.11 a | bgn 4X4 | Modu | ıle | | | | | | | | | | |
| EUT M/N: | _ | 65-VN78 | 0-P2 | | | | | | | | | | | | |
| Test Targ | et: | FCC DT | 5 | | | | | | | | | | | | |
| Mode Op | er: | Transmi | t | | | | | | | | | | | | |
| - | f | Measurer | nent Freq | piency | Amp | Preamp (| Gain | | | Average | Field Stren | gth Limit | | | |
| | Dist | Distance | to Anter | una - | D Corr | Distance | Corre | rt to 3 me | ters | Peak Fie | ld Strength | Limit | | | |
| | Read | Analyzer | Reading | | Avg | Average I | Field S | trength @ |) 3 m | Margin v | rs. Average | Limit | | | |
| | AF | Antenna | Factor | | Peak | Calculate | | | | Margin v | rs. Peak Lii | mit | | | |
| | CL | Cable Lo: | is | | 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 | |
| HT20 Lov | v Ch set | 19dbm | | | | | | 1 | | | | | | : : | |
| | | | | | | | | | | | | | | | |
| 11.490 | 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 | |
| 11.490 11.490 | 3.0 3.0 | 44.0 40.8 | 38.4 38.4 | 9.5 9.5 | | 0.0 0.0 | 0.0 0.0 | 56.0 52.9 | 74.0 54.0 | -18.0 -1.1 | v v | P A | 131.7 131.7 | 159.5 159.5 | |
| 11.490 11.490 | 3.0 3.0 | 40.8 41.9 | 38.4 38.4 | 9.5 9.5 | -35.9 -35.9 | | 0.0 0.0 | 52.9 53.9 | 54.0 74.0 | -1.1 -20.1 | V H | A P | 131.7 131.9 | 159.5 100.7 | |
| 11.490 11.490 11.490 | 3.0 3.0 3.0 | 40.8 41.9 30.5 | 38.4 | 9.5 | -35.9 | 0.0 | 0.0 | 52.9 | 54.0 | - 1.1 | v | A | 131.7 | 159.5 | |
| 11.490 11.490 11.490 HT20 Mid | 3.0 3.0 3.0 L Ch set | 40.8 41.9 30.5 19dbm | 38.4 38.4 38.4 | 9.5 9.5 9.5 | -35.9 -35.9 -35.9 | 0.0 0.0 0.0 | 0.0 0.0 0.0 | 52.9 53.9 42.6 | 54.0 74.0 54.0 | -1.1 -20.1 -11.4 | V H H | A P A | 131.7 131.9 131.9 | 159.5 100.7 100.7 | |
| 11.490 11.490 11.490 HT20 Mid 11.570 | 3.0 3.0 3.0 I Ch set 3.0 | 40.8 41.9 30.5 19dbm 43.7 | 38.4 38.4 38.4 38.5 | 9.5 9.5 9.5 9.5 | -35.9 -35.9 -35.9 -35.8 | 0.0 0.0 0.0 | 0.0 0.0 0.0 | 52.9 53.9 42.6 56.0 | 54.0 74.0 54.0 74.0 | -1.1 -20.1 -11.4 -18.0 | V H H | A P A P | 131.7 131.9 131.9 131.5 | 159.5 100.7 100.7 100.7 159.8 | |
| 11.490 11.490 11.490 HT20 Mid 11.570 11.570 | 3.0 3.0 3.0 I Ch set 3.0 3.0 | 40.8 41.9 30.5 19dbm 43.7 40.7 | 38.4 38.4 38.4 38.5 38.5 | 9.5 9.5 9.5 9.5 9.5 9.5 | -35.9 -35.9 -35.9 -35.8 -35.8 | 0.0 0.0 0.0 0.0 0.0 | 0.0 0.0 0.0 0.0 0.0 | 52.9 53.9 42.6 56.0 52.9 | 54.0 74.0 54.0 74.0 54.0 | -1.1 -20.1 -11.4 -18.0 -1.1 | V H H V V | A P A P A | 131.7 131.9 131.9 131.5 131.5 | 159.5 100.7 100.7 159.8 159.8 | |
| 11.490 11.490 11.490 HT20 Mid HT20 Mid 11.570 11.570 11.570 | 3.0 3.0 3.0 1 Ch set 3.0 3.0 3.0 3.0 | 40.8 41.9 30.5 19dbm 43.7 40.7 36.8 | 38.4 38.4 38.4 38.5 38.5 38.5 38.5 | 9.5 9.5 9.5 9.5 9.5 9.5 9.5 | -35.9 -35.9 -35.9 -35.8 -35.8 -35.8 | 0.0 0.0 0.0 0.0 0.0 0.0 | 0.0 0.0 0.0 0.0 0.0 0.0 | 52.9 53.9 42.6 56.0 52.9 49.0 | 54.0 74.0 54.0 74.0 54.0 74.0 | -1.1 -20.1 -11.4 -18.0 -1.1 -25.0 | V H H V V H | A P A P A P | 131.7 131.9 131.9 131.5 131.5 131.5 101.0 | 159.5 100.7 100.7 159.8 159.8 92.4 | |
| 11.490 11.490 11.490 HT20 Mid 11.570 11.570 11.570 11.570 11.570 | 3.0 3.0 3.0 1 Ch set 3.0 3.0 3.0 3.0 3.0 | 40.8 41.9 30.5 19dbm 43.7 40.7 36.8 28.2 | 38.4 38.4 38.4 38.5 38.5 | 9.5 9.5 9.5 9.5 9.5 9.5 | -35.9 -35.9 -35.9 -35.8 -35.8 | 0.0 0.0 0.0 0.0 0.0 | 0.0 0.0 0.0 0.0 0.0 | 52.9 53.9 42.6 56.0 52.9 | 54.0 74.0 54.0 74.0 54.0 | -1.1 -20.1 -11.4 -18.0 -1.1 | V H H V V | A P A P A | 131.7 131.9 131.9 131.5 131.5 | 159.5 100.7 100.7 159.8 159.8 | |
| 11.490 11.490 HT20 Mid 11.570 11.570 11.570 11.570 11.570 HT20 Hig | 3.0 3.0 1 Ch set 3.0 3.0 3.0 3.0 3.0 ch Ch se | 40.8 41.9 30.5 19dbm 43.7 40.7 36.8 28.2 t 19dbm | 38.4 38.4 38.4 38.5 38.5 38.5 38.5 38.5 | 9.5 9.5 9.5 9.5 9.5 9.5 9.5 9.5 | -35.9 -35.9 -35.9 -35.8 -35.8 -35.8 -35.8 -35.8 | 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 | 52.9 53.9 42.6 56.0 52.9 49.0 40.5 | 54.0 74.0 54.0 74.0 54.0 74.0 54.0 54.0 | -1.1 -20.1 -11.4 -18.0 -1.1 -25.0 -13.5 | V H H V V H H | A P A P A P | 131.7 131.9 131.9 131.5 131.5 101.0 101.0 | 159.5 100.7 100.7 159.8 159.8 92.4 92.4 | |
| 11.490 11.490 HT20 Mid 11.570 11.570 11.570 11.570 11.570 HT20 Hig 11.650 | 3.0 3.0 3.0 1 Ch set 3.0 3.0 3.0 3.0 ch Ch se 3.0 | 40.8 41.9 30.5 19dbm 43.7 40.7 36.8 28.2 t 19dbm 45.4 | 38.4 38.4 38.4 38.5 38.5 38.5 38.5 38.5 38.5 38.5 | 9.5 9.5 9.5 9.5 9.5 9.5 9.5 9.5 | -35.9 -35.9 -35.8 -35.8 -35.8 -35.8 -35.8 -35.8 -35.8 | 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 | 52.9 53.9 42.6 56.0 52.9 49.0 40.5 57.8 | 54.0 74.0 54.0 74.0 54.0 74.0 54.0 74.0 | -1.1 -20.1 -11.4 -18.0 -1.1 -25.0 -13.5 -16.2 | V H V V H H | A P A P A P A P | 131.7 131.9 131.9 131.5 131.5 101.0 101.0 122.8 | 159.5 100.7 100.7 159.8 159.8 92.4 92.4 92.4 120.5 | |
| 11.490 11.490 11.570 11.570 11.570 11.570 11.570 11.570 HT20 Hig 11.650 11.650 | 3.0 3.0 1 Ch set 3.0 3.0 3.0 3.0 3.0 5 Ch se 3.0 3.0 3.0 3.0 | 40.8 41.9 30.5 19dbm 43.7 40.7 36.8 28.2 t 19dbm 45.4 41.6 | 38.4 38.4 38.4 38.5 38.5 38.5 38.5 38.5 38.5 38.6 38.6 | 9.5 9.5 9.5 9.5 9.5 9.5 9.5 9.5 9.6 9.6 | -35.9 -35.9 -35.8 -35.8 -35.8 -35.8 -35.8 -35.8 -35.7 -35.7 | 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 | 52.9 53.9 42.6 56.0 52.9 49.0 40.5 57.8 54.0 | 54.0 74.0 54.0 74.0 54.0 74.0 54.0 74.0 54.0 | -1.1 -20.1 -11.4 -18.0 -1.1 -25.0 -13.5 -16.2 0.0 | V H H V V H H V V V | A P A P A P A | 131.7 131.9 131.9 131.5 131.5 101.0 101.0 122.8 122.8 | 159.5 100.7 100.7 159.8 159.8 92.4 92.4 92.4 120.5 120.5 | |
| 11.490 11.490 HT20 Mid 11.570 11.570 11.570 11.570 11.570 HT20 Hig 11.650 | 3.0 3.0 3.0 1 Ch set 3.0 3.0 3.0 3.0 ch Ch se 3.0 | 40.8 41.9 30.5 19dbm 43.7 40.7 36.8 28.2 t 19dbm 45.4 | 38.4 38.4 38.4 38.5 38.5 38.5 38.5 38.5 38.5 38.5 | 9.5 9.5 9.5 9.5 9.5 9.5 9.5 9.5 | -35.9 -35.9 -35.8 -35.8 -35.8 -35.8 -35.8 -35.8 -35.7 -35.7 | 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 | 52.9 53.9 42.6 56.0 52.9 49.0 40.5 57.8 | 54.0 74.0 54.0 74.0 54.0 74.0 54.0 74.0 | -1.1 -20.1 -11.4 -18.0 -1.1 -25.0 -13.5 -16.2 | V H V V H H | A P A P A P A P | 131.7 131.9 131.9 131.5 131.5 101.0 101.0 122.8 | 159.5 100.7 100.7 159.8 159.8 92.4 92.4 92.4 120.5 | |

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8.2.7. 802.11n HT40 MODE IN THE 5.8 GHz BAND

HARMONICS AND SPURIOUS EMISSIONS

| Company: EUT Descrip EUT M/N: Fest Target: | | | | Mod | .1. | | | | | | | | | | |
|---|------------|-----------------------|--------------|------------|----------------|------------|------------|--------------|--------------|----------------|--------------|-----------|----------------|----------------|-------|
| EUT M/N: | | | ogn 4A4 | | | | | | | | | | | | |
| | | 65-VIN/8 | 0-P2 | | iiic | | | | | | | | | | |
| | | FCC DT | | | | | | | | | | | | | |
| Mode Oper | | Transmi | t HT40 | Mode | | | | | | | | | | | |
| - f | | Measuren | nent Free | puency | Amp | Preamp (| Gain | | | Average | Field Stren; | zth Limit | | | |
| I | Dist | Distance [•] | to Anter | na | D Corr | Distance | Correc | rt to 3 me | ters | Peak Fie | ld Strength | Limit | | | |
| F | Read | Analyzer | Reading | | Avg | Average I | Field S | trength @ | 3 m | Margin v | rs. Average | Limit | | | |
| - | | Antenna | Factor | | Peak | Calculate | d Peak | Field Stre | ngth | Margin v | rs. Peak Lir | nit | | | |
| C | CL | Cable Los | is | | HPF | High Pas | s Filter | r | | | | | | | |
| | Dist | Read | AF | CL | Amp | D Corr | Fltr | Согт. | | Margin | Ant. Pol. | | 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 575 | 5MHz | | | | | | | | | | | | | | |
| 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 | -16.6 | v | <u>A</u> | 129.3 | 281.3 | |
| 11.510 11.510 | 3.0 3.0 | 36.7 24.2 | 38.4 38.4 | 9.5 9.5 | -35.9 -35.9 | 0.0 0.0 | 0.0 0.0 | 48.8 36.3 | 74.0 54.0 | -25.2 -17.7 | H H | P A | 187.2 187.2 | 309.1 309.1 | |
| High Ch 57 | | | | 7.7 | -32.9 | U.U | 0.0 | J0.J | 74.U | -1/./ | п | n | 10/.4 | 309.1 | |
| 11.585 | 3.0 | 36.5 | 38.6 | 9.6 | -35.7 | 0.0 | 0.0 | 49.0 | 74.0 | -25.0 | v | Р | 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 | Ā | 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 | н | Р | 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 | H | A | 187.2 | 309.1 | |
| | | | | | | | | | | | | | | | |

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8.3. WORST-CASE BELOW 1 GHz

2.4 GHz BAND

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

| | | iency Meas fication Sei | | | t 5m Cha | amber | | | | | | | |
|---|---|--|--|---|--|--|--|--|---|---|---|---|--------------------|
| Test Engr: Date: | | Thanh Ng 06/25/09 | uyen, | | | | | | | | | | |
| Company EUT Desci EUT M/N: | ription: | QualCon PCI 802.1 65-VN780 | l In modu I-PI | цle | | | | | | | | | |
| Test Targe | | FCC Clas | | | | _ | | | | | | | |
| Mode Ope | 21: | Transmit | Worst C | ase 2. | 4GHz ba | and | | | | | | | |
| | f | Measureme | ant Frequ | ency | Amp | Preamp (| Gain | | | Margin | Margin vs. | Limit | |
| | Dist | Distance to | - | | - | - | | to 3 meters | | ¥ | ¥ | | |
| | Read | Analyzer F | Reading | | Filter | Filter Ins | ert Loss | | | | | | |
| | AF | Antenna F | - | | Corr. | Calculate | d Field St | trength | | | | | |
| | CL | Cable Loss | | | Limit | Field Stre | ngth Lin | nit | | | | | |
| | | | | | | | | | | | | | |
| f | Dist | Read | AF | CL | Amp | D Corr | Filter | Согт. | Limit | Margin | Ant. Pol. | Det. | Notes |
| f MHz | Dist (m) | Read dBuV | AF dB/m | CL dB | Amp dB | D Corr dB | Filter dB | Corr. dBuV/m | Limit dBuV/m | Margin dB | Ant. Pol. V/H | Det. P/A/QP | Notes |
| MHz | | | | | | | | | | ; - | | | Notes Full Scan |
| MHz 61.681 | (m) | dBuV | dB/m | dB | dB | dB | dB | dBuV/m | dBuV/m | dB | V/H | P/A/QP | |
| MHz 61.681 138.124 364.934 | (m) 3.0 3.0 3.0 | dBuV 53.1 45.6 41.3 | dB/m 7.9 13.3 14.4 | dB 0.7 1.1 1.7 | dB 28.4 28.3 28.1 | 4B 0.0 0.0 0.0 | dB 0.0 0.0 0.0 | dBuV/m 33.3 31.7 29.2 | dBuV/m 40.0 43.5 46.0 | dB -6.7 -11.8 -16.8 | V/H V V V | P/A/QP EP EP EP | |
| MHz 61.681 138.124 364.934 514.340 | (m) 3.0 3.0 3.0 3.0 3.0 | dBuV 53.1 45.6 41.3 39.0 | dB/m 7.9 13.3 14.4 17.0 | dB 0.7 1.1 1.7 2.1 | dB 28.4 28.3 28.1 27.8 | dB 0.0 0.0 0.0 0.0 | dB 0.0 0.0 0.0 0.0 | dBuV/m 33.3 31.7 29.2 30.3 | dBuV/m 40.0 43.5 46.0 46.0 | dB -6.7 -11.8 -16.8 -15.7 | V/H V V V V | P/A/QP EP EP EP EP | |
| MHz 61.681 138.124 364.934 514.340 745.109 | (m) 3.0 3.0 3.0 3.0 3.0 3.0 | dBuV 53.1 45.6 41.3 39.0 38.3 | dB/m 7.9 13.3 14.4 17.0 20.2 | dB 0.7 1.1 1.7 2.1 2.5 | dB 28.4 28.3 28.1 27.8 27.3 | dB 0.0 0.0 0.0 0.0 0.0 | dB 0.0 0.0 0.0 0.0 0.0 | dBuV/m 33.3 31.7 29.2 30.3 33.8 | dBuV/m 40.0 43.5 46.0 46.0 46.0 | dB -6.7 -11.8 -16.8 -15.7 -12.2 | V/H V V V V V | P/A/QP EP EP EP EP EP EP | |
| MHz 61.681 138.124 364.934 514.340 745.109 799.952 | (m) 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 | dBuV 53.1 45.6 41.3 39.0 38.3 44.2 | dB/m 7.9 13.3 14.4 17.0 20.2 21.0 | dB 0.7 1.1 1.7 2.1 2.5 2.6 | dB 28.4 28.3 28.1 27.8 27.3 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 33.3 31.7 29.2 30.3 33.8 40.3 | dBuV/m 40.0 43.5 46.0 46.0 46.0 46.0 | dB -6.7 -11.8 -16.8 -15.7 -12.2 -5.7 | V/H V V V V V V | P/A/QP EP EP EP EP EP EP | |
| MHz 61.681 138.124 364.934 514.340 745.109 799.952 80.042 | (m) 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 | dBuV 53.1 45.6 41.3 39.0 38.3 44.2 50.6 | dB/m 7.9 13.3 14.4 17.0 20.2 21.0 7.3 | dB 0.7 1.1 1.7 2.1 2.5 2.6 0.8 | dB 28.4 28.3 28.1 27.8 27.3 27.4 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 | dB 0.0 0.0 0.0 0.0 0.0 0.0 0.0 | dBuV/m 33.3 31.7 29.2 30.3 33.8 40.3 30.4 | dBuV/m 40.0 43.5 46.0 46.0 46.0 46.0 46.0 40.0 | dB 6.7 -11.8 -16.8 -15.7 -12.2 -5.7 -9.6 | V/H V V V V V V H | P/A/QP EP EP EP EP EP EP EP | |
| MHz 61.681 138.124 364.934 514.340 745.109 799.952 80.042 233.048 | (m) 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 | dBuV 53.1 45.6 41.3 39.0 38.3 44.2 50.6 50.7 | dB/m 7.9 13.3 14.4 17.0 20.2 21.0 7.3 11.9 | dB 0.7 1.1 1.7 2.1 2.5 2.6 0.8 1.3 | dB 28.4 28.3 28.1 27.8 27.3 27.4 28.3 28.2 | 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 | dB 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 | dBuV/m 33.3 31.7 29.2 30.3 33.8 40.3 30.4 35.7 | dBuV/m 40.0 43.5 46.0 46.0 46.0 46.0 40.0 46.0 | dB -6.7 -11.8 -16.8 -15.7 -12.2 -5.7 -9.6 -10.3 | V/H V V V V V H H | P/A/QP EP EP | |
| MHz 61.681 138.124 364.934 514.340 745.109 799.952 80.042 233.048 299.171 | (m) 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 | dBuV 53.1 45.6 41.3 39.0 38.3 44.2 50.6 50.7 52.5 | dB/m 7.9 13.3 14.4 17.0 20.2 21.0 7.3 11.9 13.4 | dB 0.7 1.1 1.7 2.1 2.5 2.6 0.8 1.3 1.5 | dB 28.4 28.3 28.1 27.8 27.3 27.4 28.3 28.2 28.1 | 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 | 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 | dBuV/m 33.3 31.7 29.2 30.3 33.8 40.3 30.4 35.7 39.3 | <u>dBuV/m</u> 40.0 43.5 46.0 46.0 46.0 46.0 46.0 46.0 46.0 46.0 | dB -6.7 -11.8 -16.8 -15.7 -12.2 -5.7 -9.6 -10.3 -6.7 | V/H V V V V V H H H | P/A/QP EP EP EP EP EP EP EP EP EP | |
| MHz 61.681 138.124 364.934 514.340 745.109 799.952 80.042 233.048 299.171 718.348 | (m) 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 | dBuV 53.1 45.6 41.3 39.0 38.3 44.2 50.6 50.7 52.5 42.7 | dB/m 7.9 13.3 14.4 17.0 20.2 21.0 7.3 11.9 13.4 19.8 | dB 0.7 1.1 2.1 2.5 2.6 0.8 1.3 1.5 2.5 | dB 28.4 28.3 28.1 27.8 27.3 27.4 28.3 28.2 28.1 27.2 | 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 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 | dBuV/m 33.3 31.7 29.2 30.3 33.8 40.3 30.4 35.7 39.3 37.8 | <u>dBuV/m</u> 40.0 43.5 46.0 46.0 46.0 46.0 46.0 46.0 46.0 46.0 | dB -6.7 -11.8 -16.8 -15.7 -12.2 -5.7 -9.6 -10.3 -6.7 -8.2 | V/H V V V V H H H H | P/A/QP EP EP EP EP EP EP EP EP EP EP EP EP | |
| _ | (m) 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 | dBuV 53.1 45.6 41.3 39.0 38.3 44.2 50.6 50.7 52.5 | dB/m 7.9 13.3 14.4 17.0 20.2 21.0 7.3 11.9 13.4 | dB 0.7 1.1 1.7 2.1 2.5 2.6 0.8 1.3 1.5 | dB 28.4 28.3 28.1 27.8 27.3 27.4 28.3 28.2 28.1 | 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 | 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 | dBuV/m 33.3 31.7 29.2 30.3 33.8 40.3 30.4 35.7 39.3 | <u>dBuV/m</u> 40.0 43.5 46.0 46.0 46.0 46.0 46.0 46.0 46.0 46.0 | dB -6.7 -11.8 -16.8 -15.7 -12.2 -5.7 -9.6 -10.3 -6.7 | V/H V V V V V H H H | P/A/QP EP EP EP EP EP EP EP EP EP | |

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5.8 GHz BAND

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

| | ce Certif | ency Meas ication Se | urement 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: | | 65-VN780 | | | | | | | | | | | |
| Test Targe | | FCC Clas | | | | | | | | | | | |
| Mode Ope | r: | Tx 5 GHz | z Band_\ | Worst | Case | | | | | | | | |
| | f | Measurem | ent Fregu | ency | Amp | Preamp (| Gain | | | Margin | Margin vs | Limit | |
| | Dist | Distance t | o Antenn | a | D Corr | Distance | Correct | to 3 meters | | 2 | - | | |
| | Read | Analyzer I | Reading | | Filter | Filter Ins | ert Loss | | | | | | |
| | AF | Antenna F | actor | | Corr. | Calculate | d Field S | trength | | | | | |
| | CL | Cable Loss | | | | | | | | | | | |
| | | Cable Loss | ; | | Limit | Field Stre | ength Lir | nit | | | | | |
| f | Dist | Read | AF | CL | Amp | Field Stre | - | nit Corr. | Limit | Margin | Ant. Pol. | Det. | Notes |
| f MHz | | | | CL dB | | | - | | | Margin dB | Ant Pol V/H | Det. P/A/QP | Notes |
| MHz 90.002 | Dist (m) 3.0 | Read dBuV 52.1 | AF dB/m 7.6 | dB 0.8 | Amp dB 28.3 | D Corr | Filter | Corr. dBuV/m 32.2 | dBuV/m 43.5 | | | | Notes Full Scan |
| MHz 90.002 234.608 | Dist (m) 3.0 3.0 | Read dBuV 52.1 51.0 | AF dB/m 7.6 11.9 | dB 0.8 1.3 | Amp dB 28.3 28.2 | D Corr dB 0.0 0.0 | - Filter dB | Corr. dBuV/m 32.2 36.0 | dBuV/m | dB -11.3 -10.0 | V/H | P/A/QP EP EP | |
| MHz 90.002 234.608 299.171 | Dist (m) 3.0 3.0 3.0 | Read dBuV 52.1 51.0 51.5 | AF dB/m 7.6 11.9 13.4 | dB 0.8 1.3 1.5 | Amp dB 28.3 28.2 28.1 | D Corr dB 0.0 0.0 0.0 | Filter dB 0.0 0.0 0.0 | Corr. 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 | Dist (m) 3.0 3.0 3.0 3.0 3.0 | Read dBuV 52.1 51.0 51.5 45.8 | AF dB/m 7.6 11.9 13.4 15.4 | dB 0.8 1.3 1.5 1.9 | Amp dB 28.3 28.2 28.1 28.0 | D Corr dB 0.0 0.0 0.0 0.0 | Filter dB 0.0 0.0 0.0 0.0 | Corr. 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 | Dist (m) 3.0 3.0 3.0 3.0 3.0 3.0 | Read dBuV 52.1 51.0 51.5 45.8 44.1 | AF dB/m 7.6 11.9 13.4 15.4 18.9 | dB 0.8 1.3 1.5 1.9 2.3 | Amp dB 28.3 28.2 28.1 28.0 27.4 | D Corr dB 0.0 0.0 0.0 0.0 0.0 | Filter dB 0.0 0.0 0.0 0.0 0.0 0.0 | Corr. 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 | Dist (m) 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 | Read dBuV 52.1 51.0 51.5 45.8 44.1 46.2 | AF 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 | Amp dB 28.3 28.2 28.1 28.0 27.4 27.4 | D Corr dB 0.0 0.0 0.0 0.0 0.0 0.0 0.0 | Filter dB 0.0 0.0 0.0 0.0 0.0 0.0 0.0 | Corr. 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 | Dist (m) 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 | Read dBuV 52.1 51.0 51.5 45.8 44.1 46.2 53.4 | AF 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 | Amp dB 28.3 28.2 28.1 28.0 27.4 27.4 27.4 28.4 | D Corr dB 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 | Filter dB 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 | Corr. 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 H 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 | Dist (m) 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 | Read dBuV 52.1 51.5 45.8 44.1 46.2 53.4 45.9 | AF 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 | Amp dB 28.3 28.2 28.1 28.0 27.4 27.4 27.4 28.4 28.3 | D Corr dB 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 | Filter dB 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 | Corr. 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 | Dist (m) 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 | Read dBuV 52.1 51.0 51.5 45.8 44.1 46.2 53.4 45.9 39.0 | AF 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 | Amp dB 28.3 28.2 28.1 28.0 27.4 27.4 27.4 28.4 28.3 27.8 | D Corr dB 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0. | Filter dB 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0. | Corr. 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 | |
| MHz 90.002 234.608 | Dist (m) 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 | Read dBuV 52.1 51.5 45.8 44.1 46.2 53.4 45.9 | AF 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 | Amp dB 28.3 28.2 28.1 28.0 27.4 27.4 27.4 28.4 28.3 | D Corr dB 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 | Filter dB 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 | Corr. 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 | |

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9. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

RSS-Gen 7.2.2

| Frequency of Emission (MHz) | Conducted I | 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

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RESULTS

<u>6 WORST EMISSIONS</u>

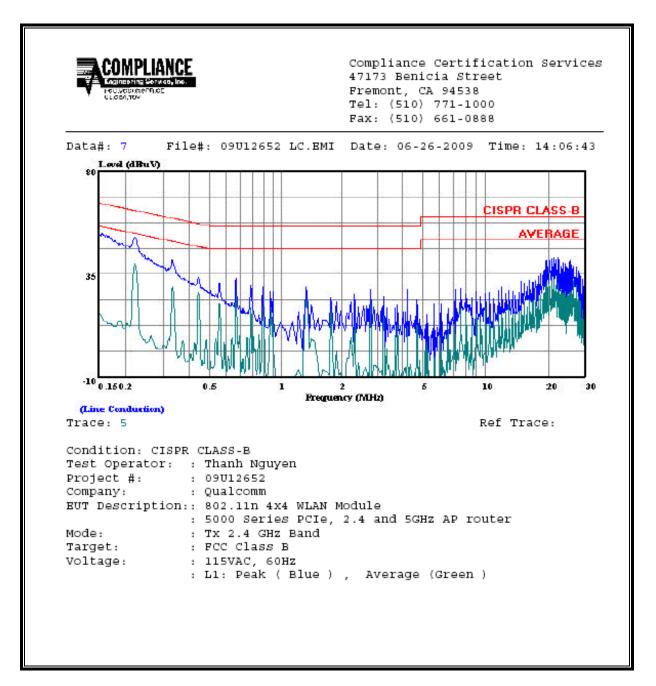
Transmit 2.4 GHz

| | CONDUCTED EMISSIONS DATA (115VAC 60Hz) | | | | | | | | | | | | |
|-----------|--|-------------|-----------|------|--------|-------|---------|--------|-------|--|--|--|--|
| Freq. | | Closs Limit | 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 | Marg | jin . | 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 | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

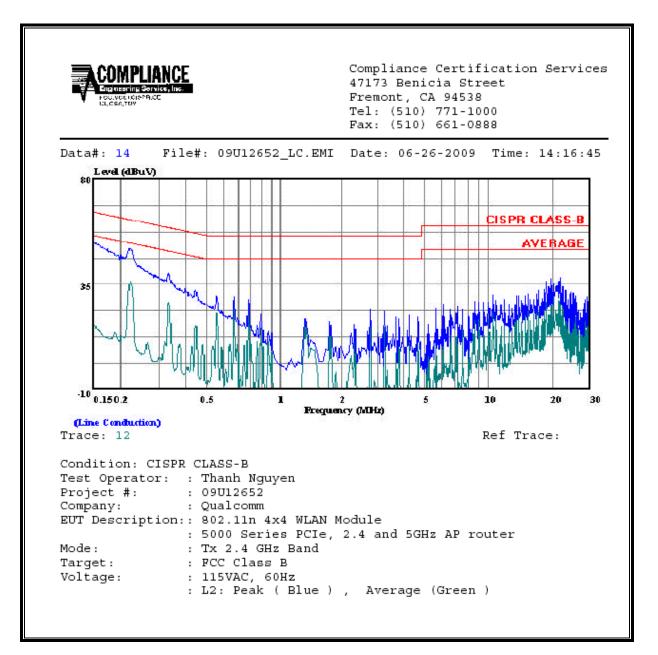
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LINE 1 RESULTS: Transmit 2.4GHz



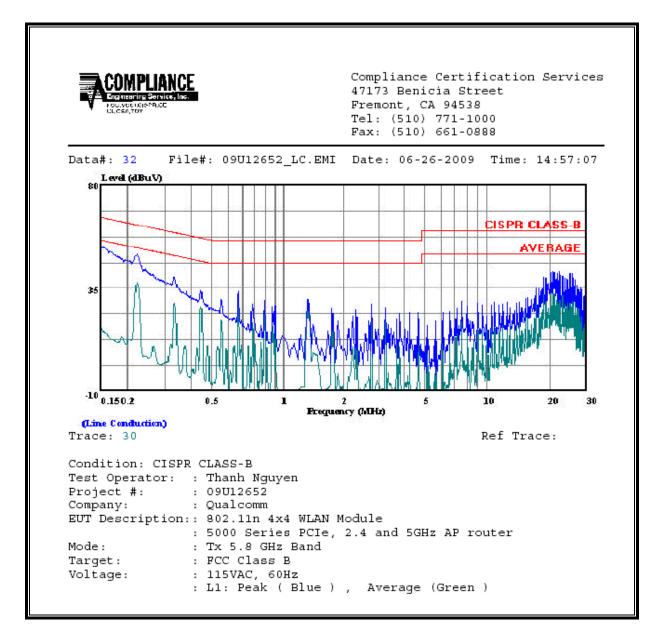
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LINE 2 RESULTS



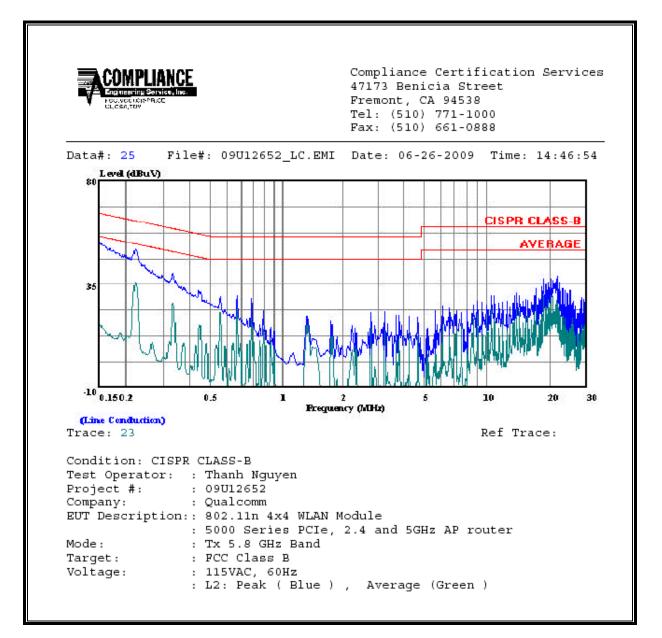
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LINE 1 RESULTS: Transmit 5.8GHz



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LINE 2 RESULTS



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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.

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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 ²) | 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/f | | 6 |
| 30–300 | 28 | 0.073 | 2* | 6 |
| 300–1 500 | 1.585 <i>f</i> ^{0.5} | 0.0042f ^{0.5} | 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 ^{1.2} |
| 150 000–300 000 | 0.158f ^{0.5} | 4.21 x 10 ⁻⁴ f ^{0.5} | 6.67 x 10 ⁻⁵ f | 616 000 /f ^{1.2} |

* 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/m² is equivalent to 1 mW/cm^2 .
- A magnetic field strength of 1 A/m corresponds to 1.257 microtesla (μT) or 12.57 milligauss (mG).

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EQUATIONS

Power density is given by:

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

where

S = Power density in W/m² EIRP = Equivalent Isotropic Radiated Power in W D = Separation distance in m

Power density in units of W/m² is converted to units of mWc/m² 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/m²

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/cm² From IC Safety Code 6, Section 2.2 Table 5 Column 4, S = 10 W/m²

<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 | 26.20 | 8.02 | 5.26 | 0.526 |
| 2.4 GHz | MIMO | 0.20 | 26.15 | 2 | 1.30 | 0.130 |
| 5.8 GHz | Legacy | 0.20 | 25.15 | 9.02 | 5.20 | 0.520 |
| 5.8 GHz | MIMO | 0.20 | 25.24 | 3 | 1.33 | 0.133 |

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