7.5. 802.11n THREE CHAINS HT40 MODE IN THE 5.2 GHz BAND

CDD MCS0

This mode is not implemented in the 5.2 GHz band and will be disabled in production devices.

Preliminary testing demonstrated that CDD MCS0 was the worst case of various HT40 modes, therefore radiated measurements in the CDD MCS0 mode were performed.

STBC MCS0

7.5.1. 26 dB and 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

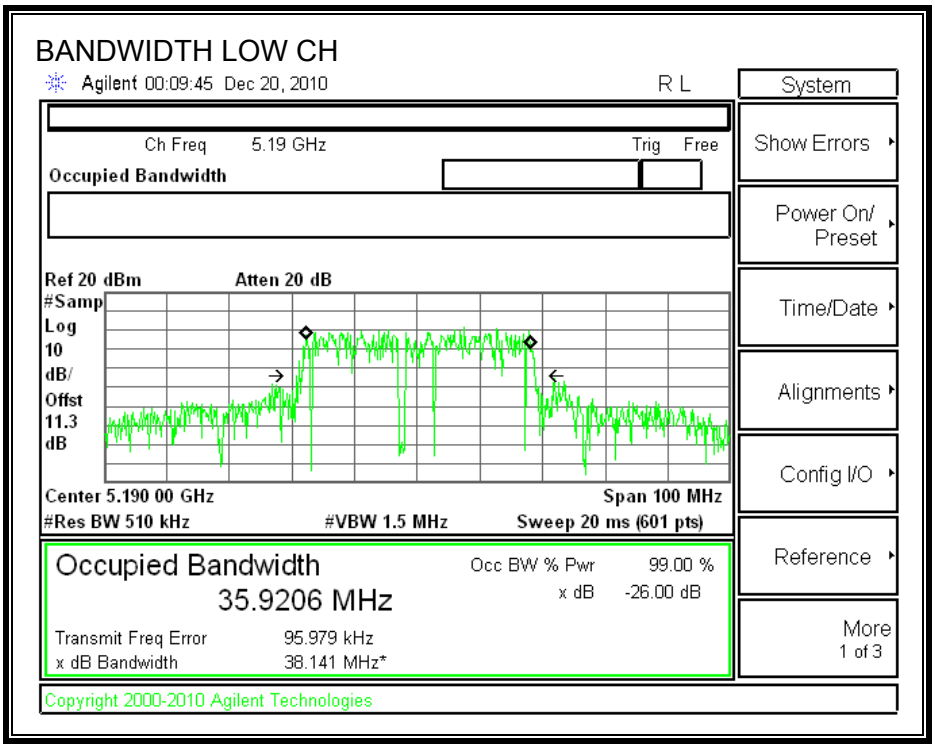
TEST PROCEDURE

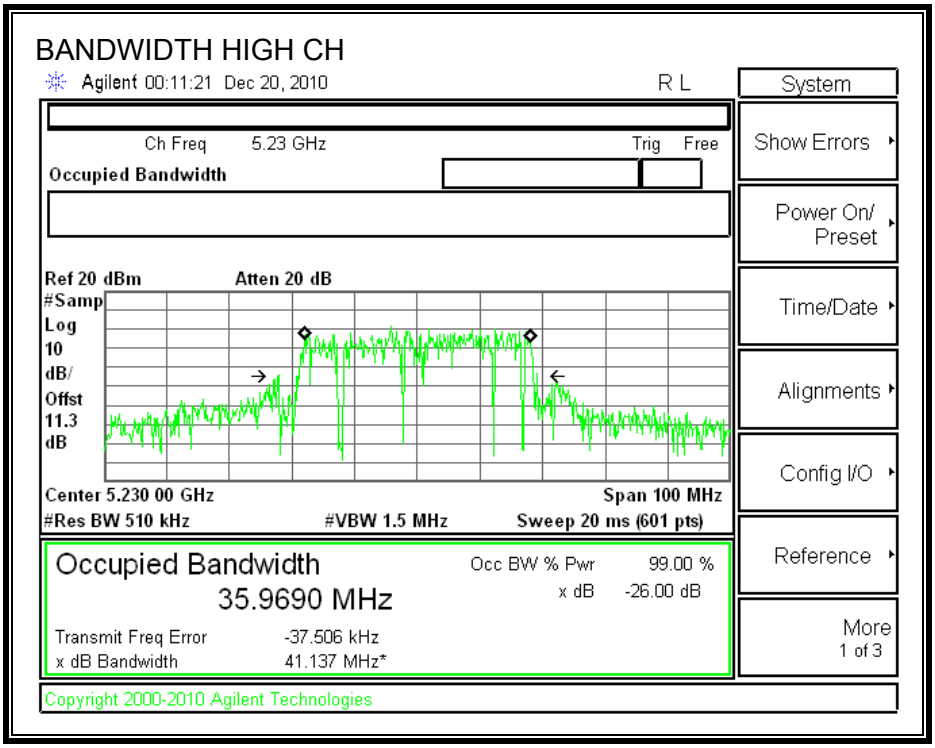
The transmitter outputs are connected to the spectrum analyzer via a combiner. The RBW is set to 1% to 3% of the measured bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth function is utilized.

RESULTS

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5190	38.141	35.9206
High	5230	41.137	35.9690

26 dB and 99% BANDWIDTH





7.5.2. OUTPUT POWER

LIMITS

FCC §15.407 (a) (1)

IC RSS-210 A9.2 (1)

For the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW or 4 dBm + 10 log B, where B is the 26-dB emission bandwidth in MHz. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

TEST PROCEDURE

The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

The transmitter output operates continuously therefore Method # 1 is used.

RESULTS

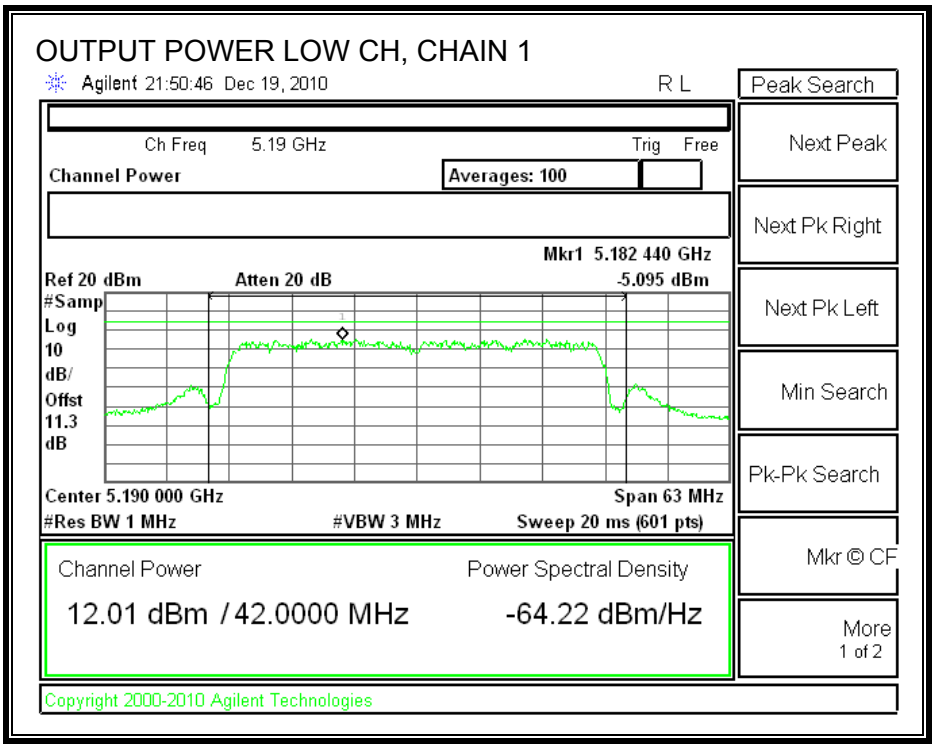
Limit

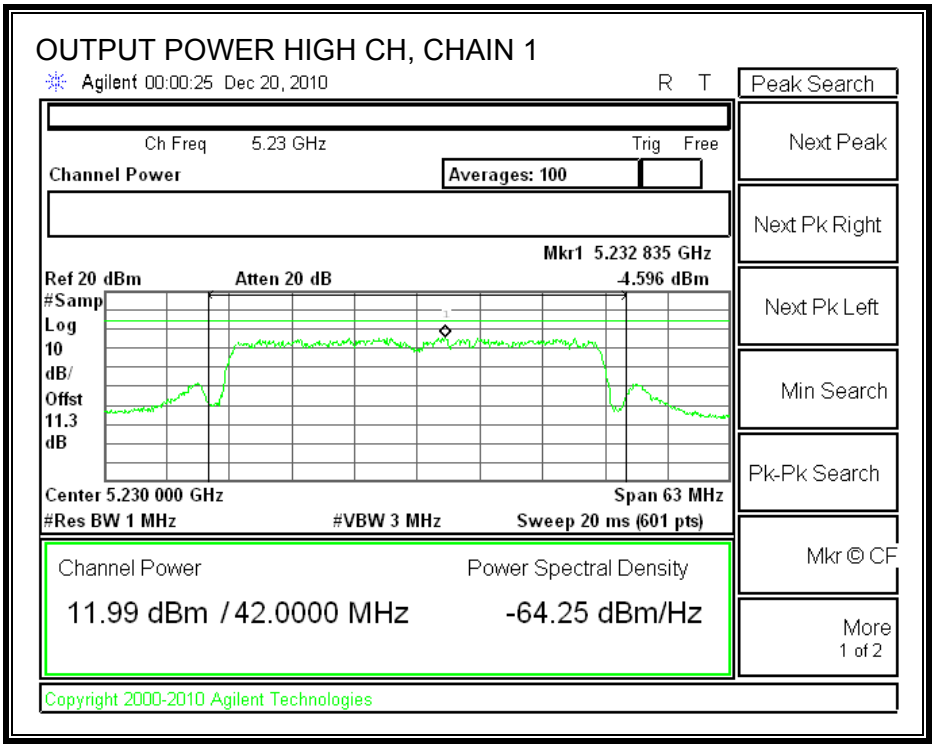
Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	4 + 10 Log B Limit (dBm)	Antenna Gain (dBi)	Limit (dBm)
Low	5190	16.99	38.141	19.81	6.02	16.97
High	5230	16.99	41.137	20.14	6.02	16.99

Individual Chain Results

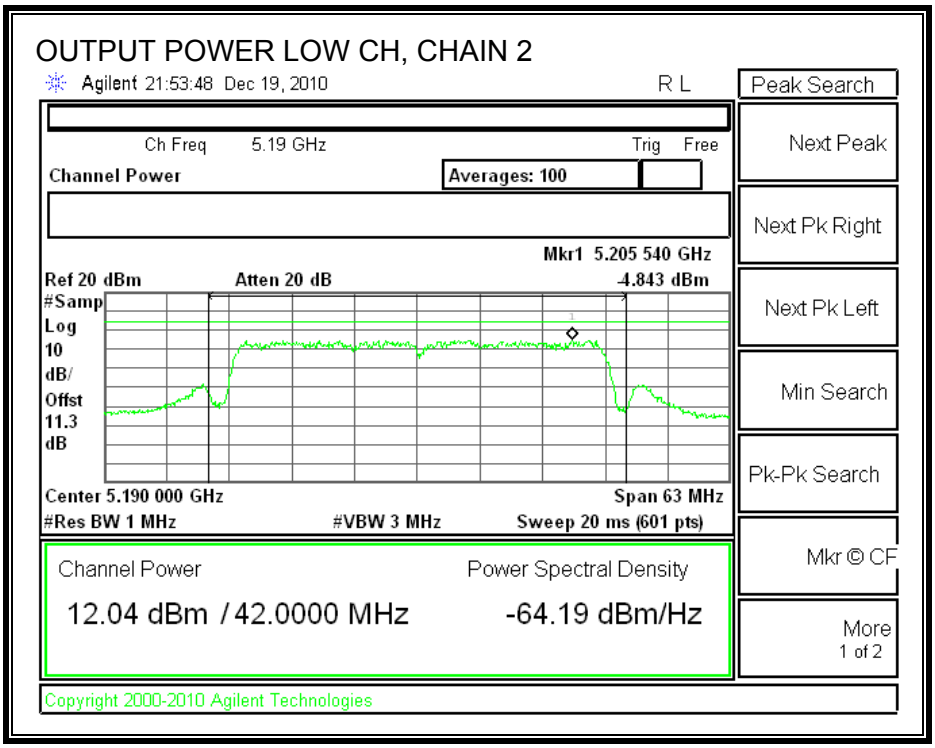
Channel	Frequency (MHz)	Chain 0 Power (dBm)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)
Low	5190	12.01	12.04	11.96	16.77	16.97	-0.20
High	5230	11.99	11.92	11.60	16.61	16.99	-0.38

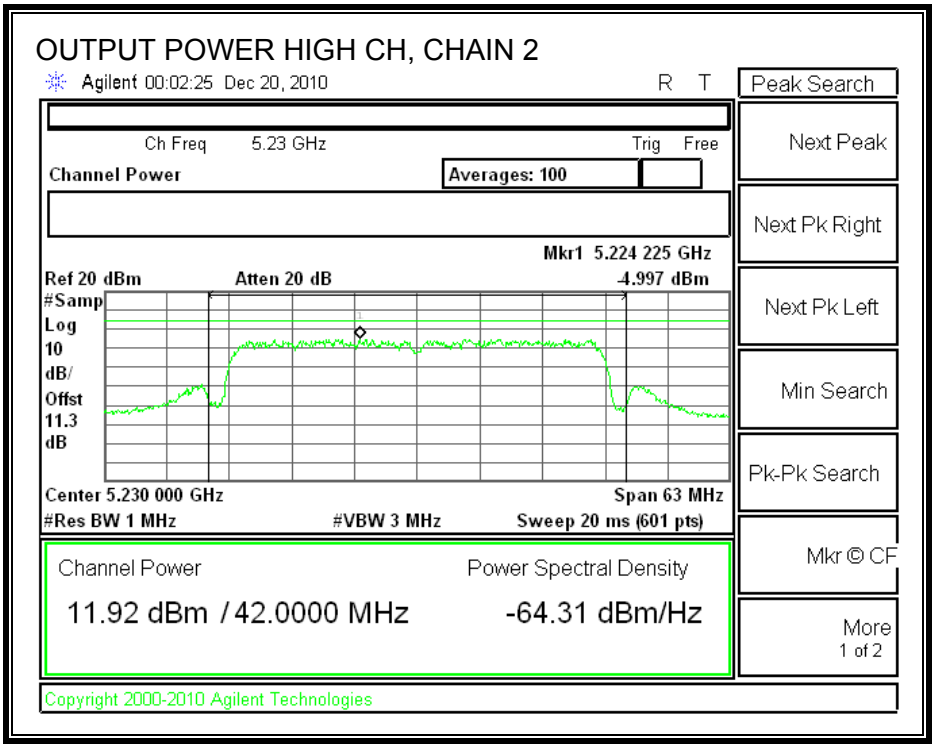
CHAIN 1 OUTPUT POWER



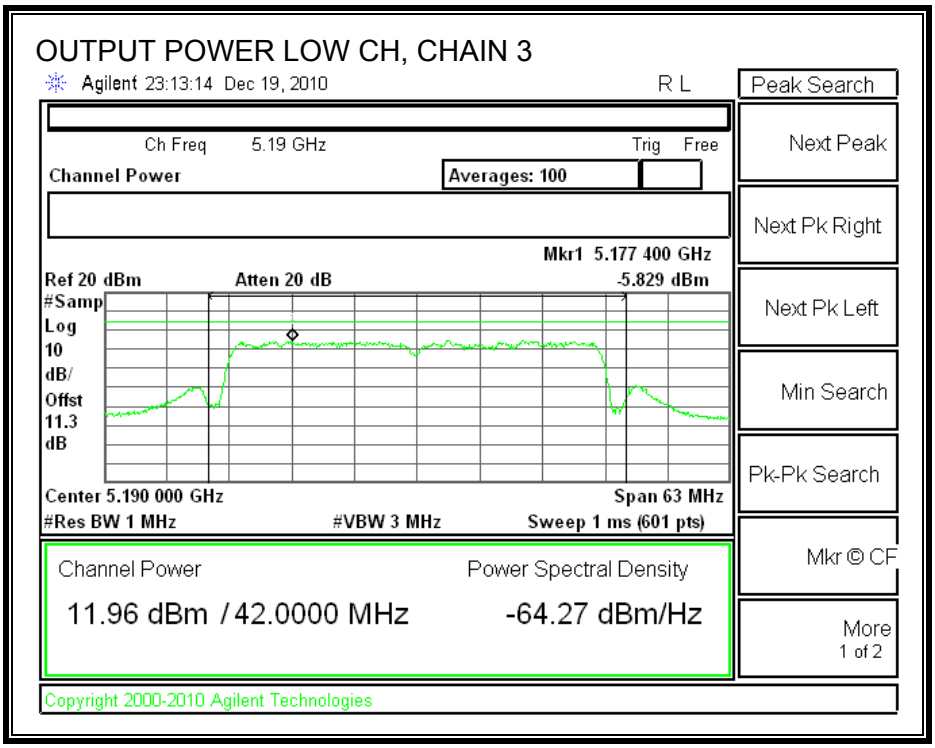


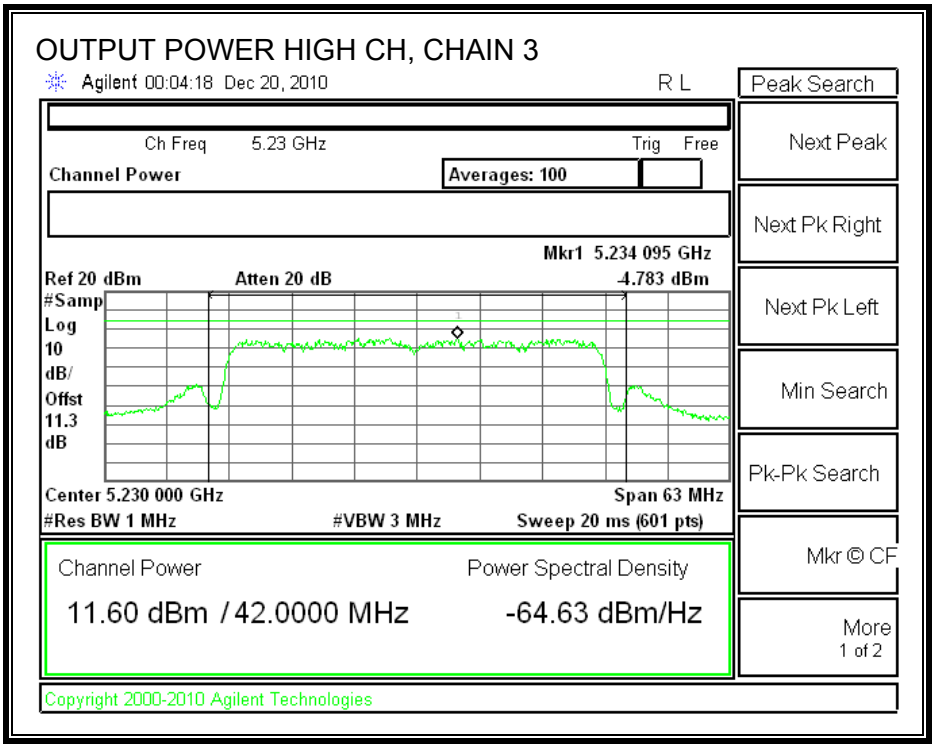
CHAIN 2 OUTPUT POWER





CHAIN 3 OUTPUT POWER





7.5.3. PEAK POWER SPECTRAL DENSITY

LIMITS

FCC §15.407 (a) (1)

IC RSS-210 A9.2 (1)

For the 5.15-5.25 GHz band, the peak power spectral density shall not exceed 4 dBm in any 1 MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The maximum antenna gain is 6.02 dBi, therefore the limit is 3.98 dBm.

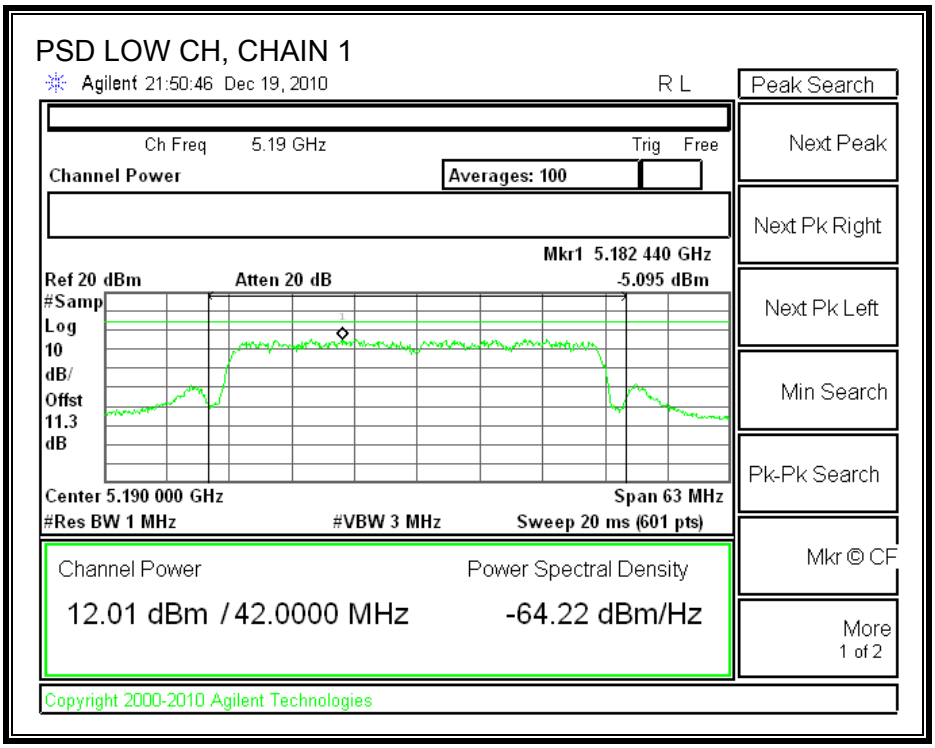
TEST PROCEDURE

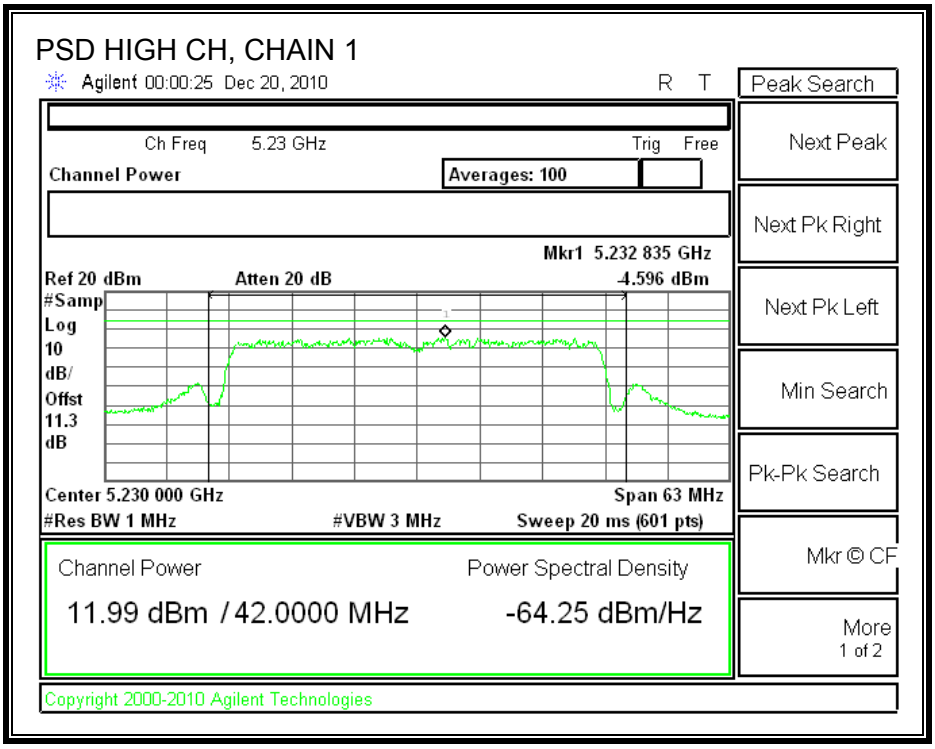
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002. PPSD method #2 was used.

RESULTS

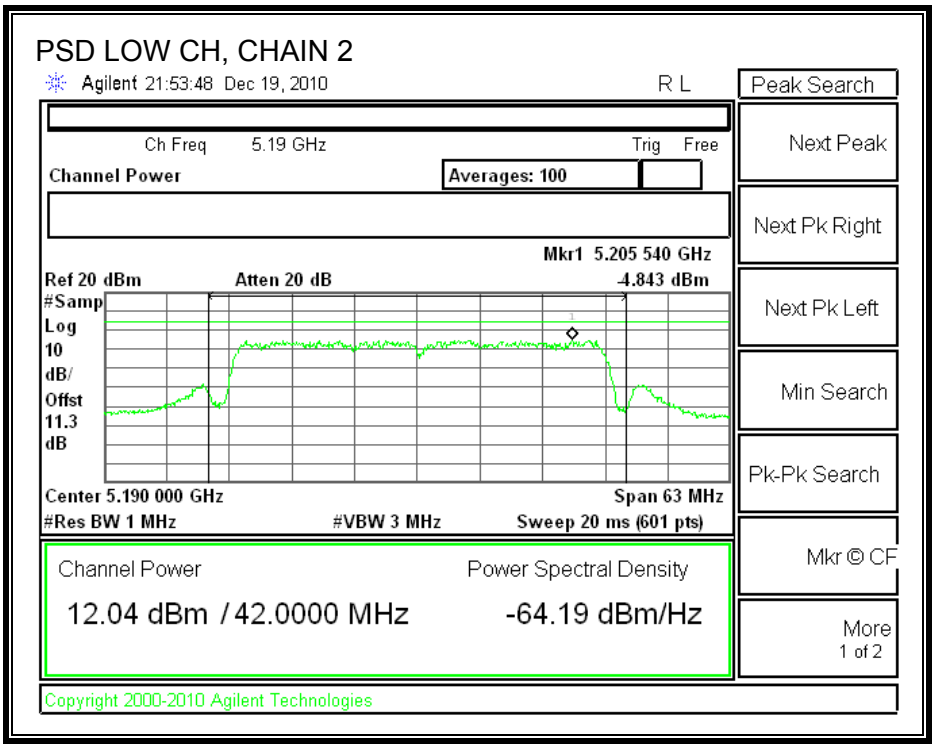
Channel	Frequency (MHz)	Chain 1 PPSD (dBm)	Chain 2 PPSD (dBm)	Chain 3 PPSD (dBm)	Total (dBm)	Limit (dBm)	Margin (dB)
Low	5190	-5.095	-4.843	-5.829	-0.465	3.98	-4.44
High	5230	-4.596	-4.997	-4.783	-0.018	3.98	-4.00

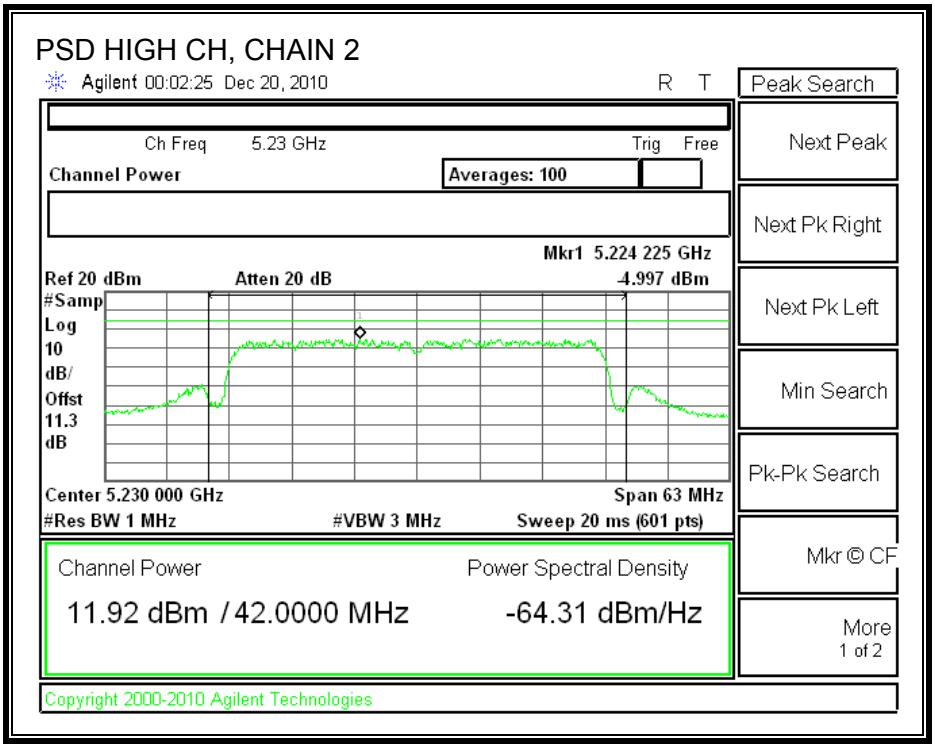
CHAIN 1 OUTPUT POWER SPECTRAL DENSITY



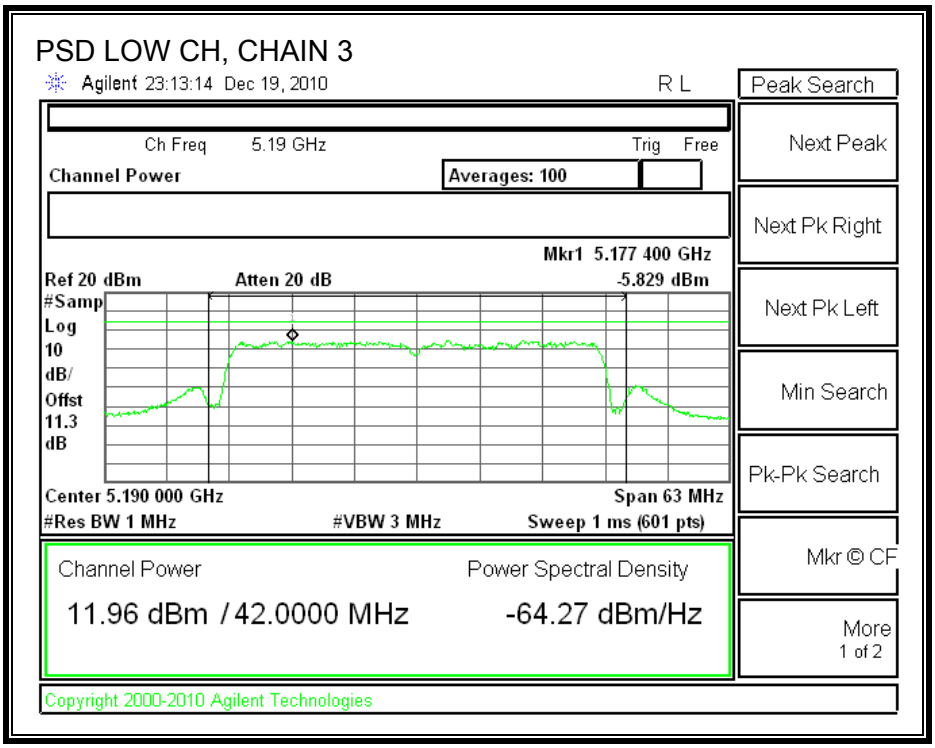


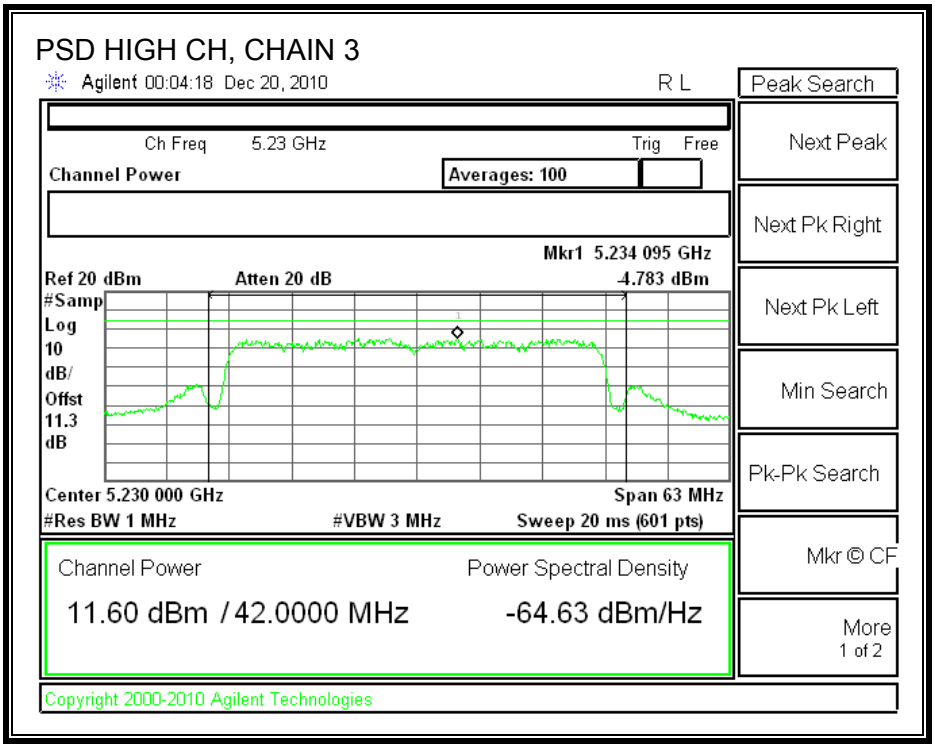
CHAIN 2 OUTPUT POWER SPECTRAL DENSITY





CHAIN 3 OUTPUT POWER SPECTRAL DENSITY





7.5.4. PEAK EXCURSION

LIMITS

FCC §15.407 (a) (6)

The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

TEST PROCEDURE

The transmitter outputs are connected to the spectrum analyzer via a combiner.

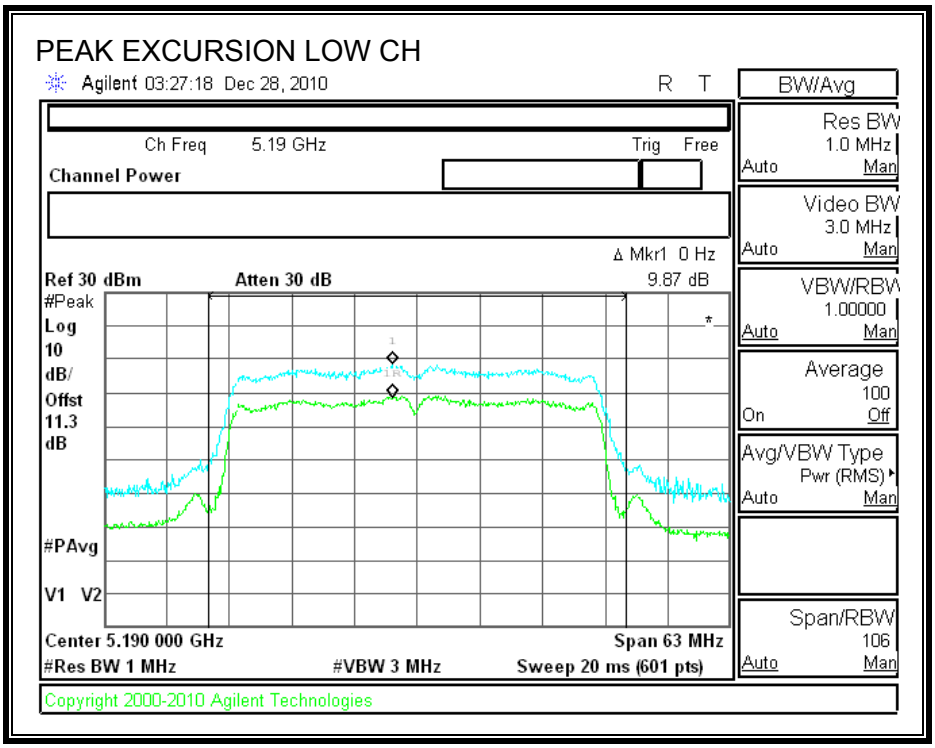
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

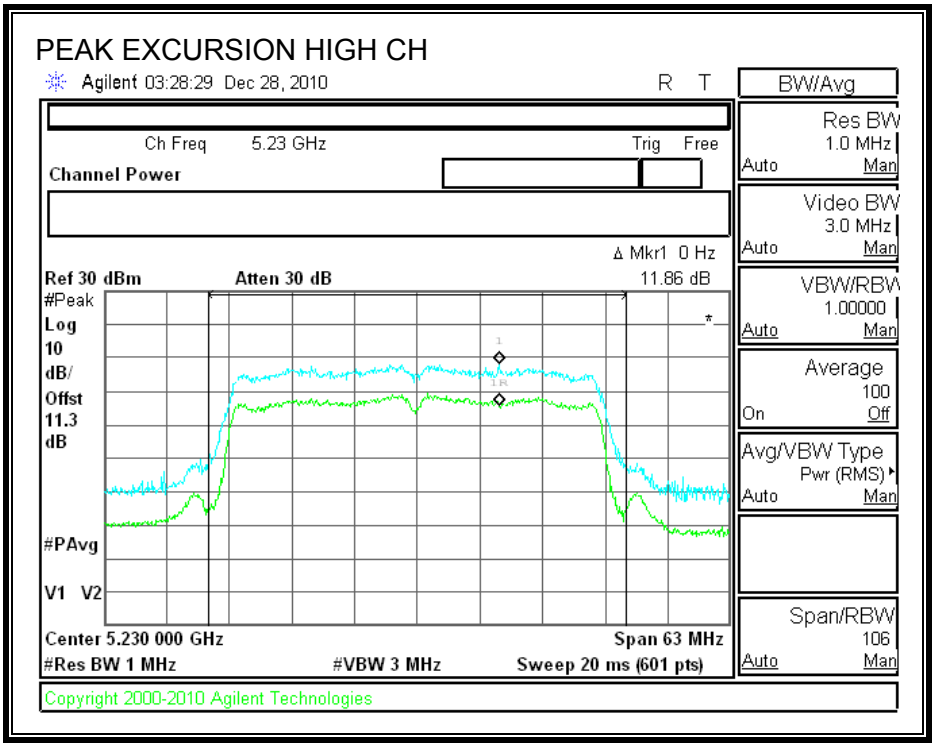
Since Method # 1 was used for peak power measurements, Method # 1 settings are used for the second PPSD trace.

RESULTS

Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5190	9.87	13	-3.13
High	5230	11.86	13	-1.14

PEAK EXCURSION





7.5.5. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.407 (b) (1)

IC RSS-210 A9.3 (1)

For transmitters operating in the 5.15-5.25 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm / MHz.

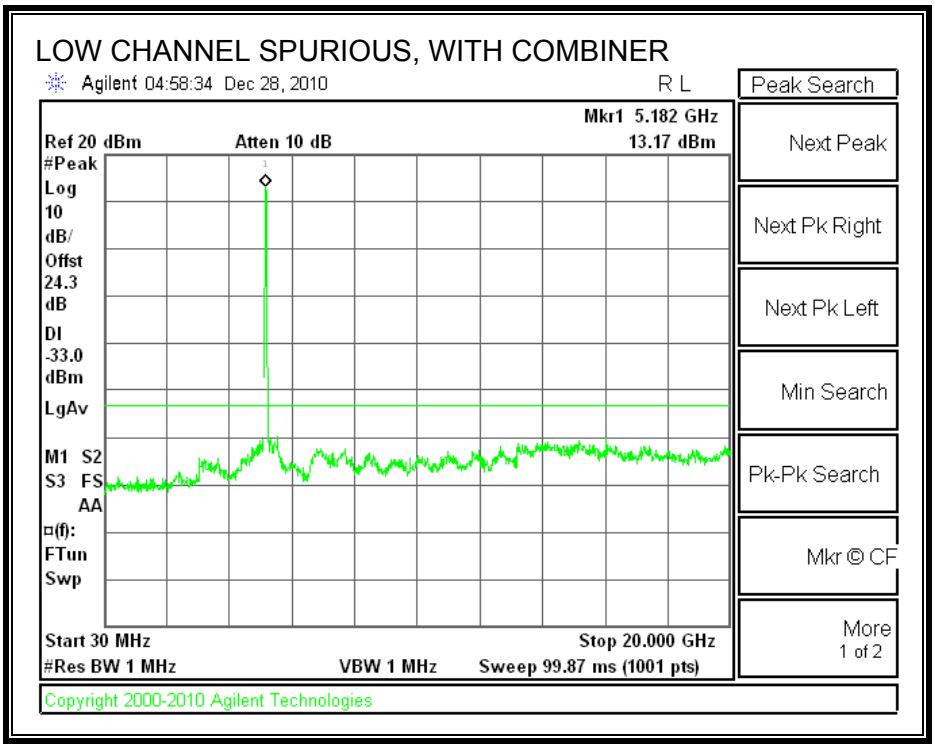
TEST PROCEDURE

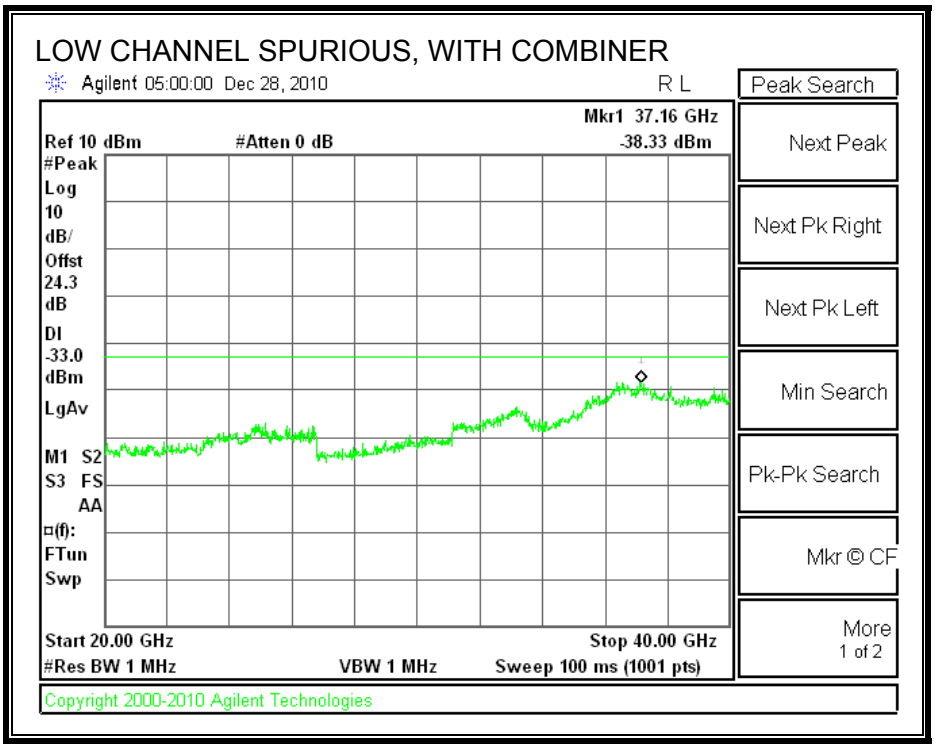
Conducted RF measurements of the transmitter output are made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 1 MHz. Peak detection measurements are compared to EIRP limit, adjusted for the maximum antenna gain.

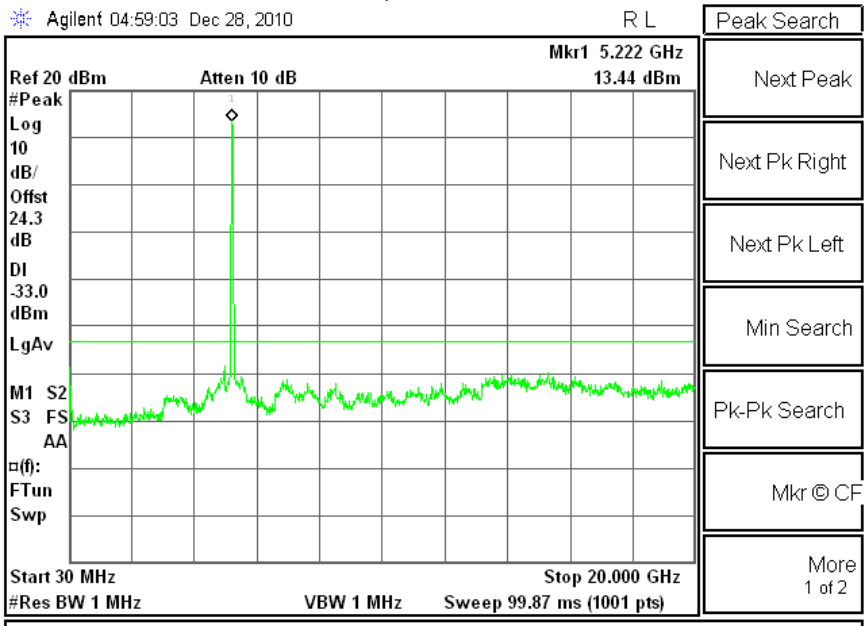
Measurements are made over the 30 MHz to 40 GHz range with the transmitter set to the lowest, middle, and highest channels.

SPURIOUS EMISSIONS WITH COMBINER

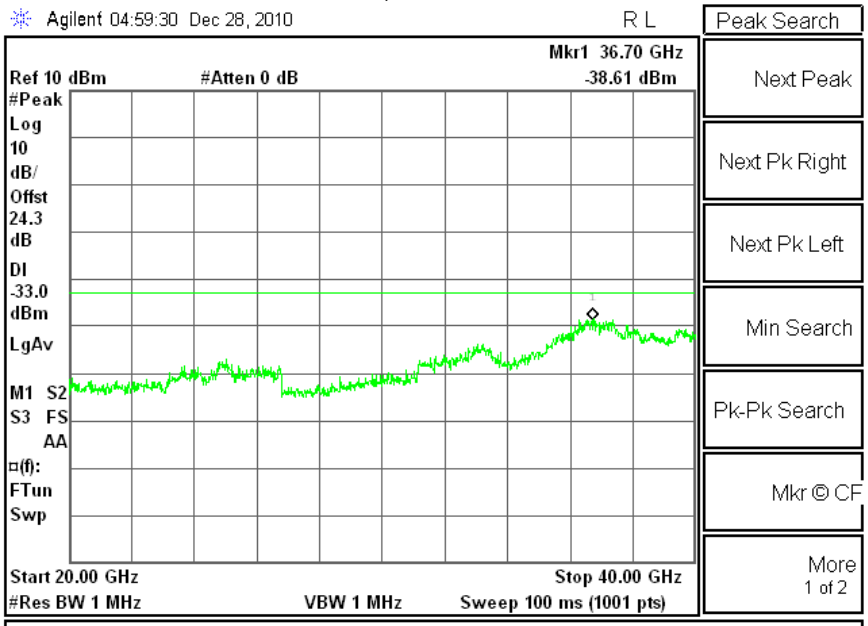




HIGH CHANNEL SPURIOUS, WITH COMBINER



HIGH CHANNEL SPURIOUS, WITH COMBINER



SDM MCS8

7.5.6. 26 dB and 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

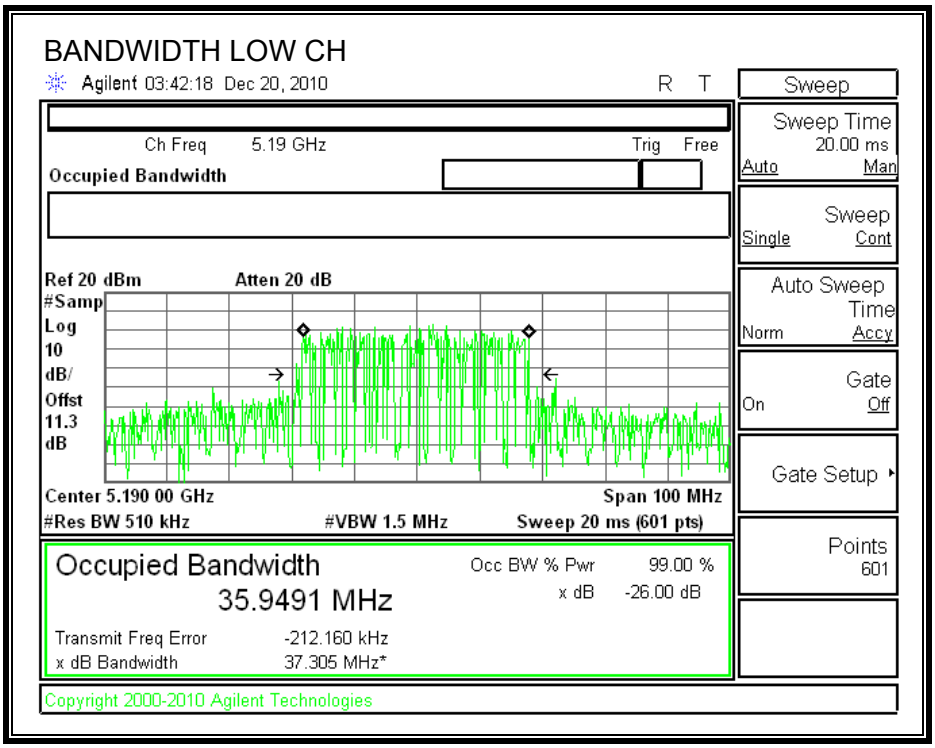
TEST PROCEDURE

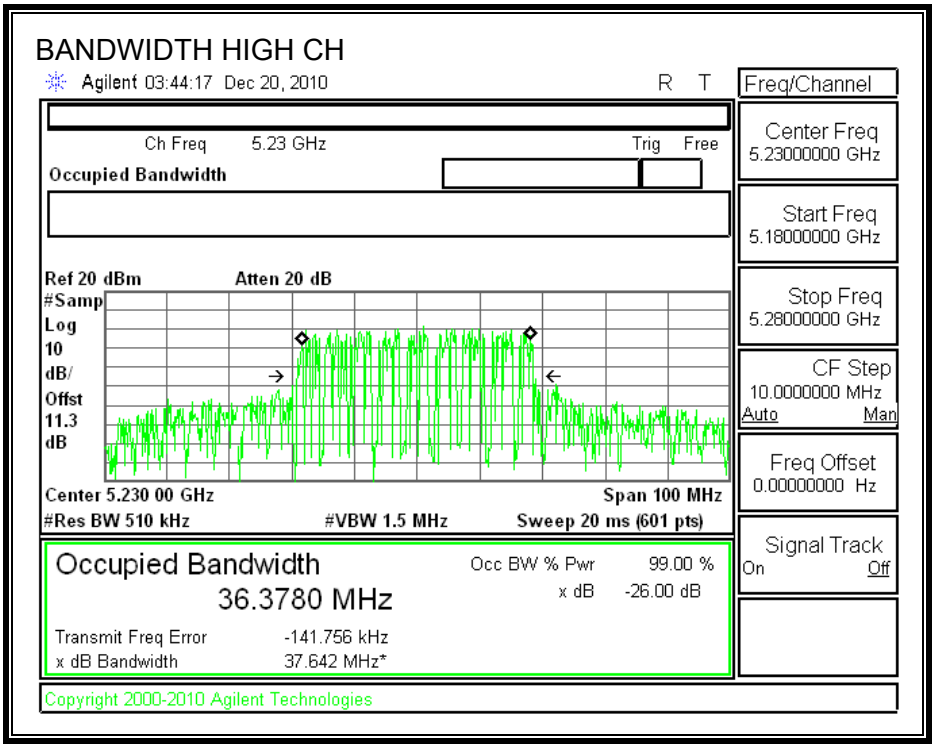
The transmitter outputs are connected to the spectrum analyzer via a combiner. The RBW is set to 1% to 3% of the measured bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth function is utilized.

RESULTS

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5190	37.305	35.9491
High	5230	37.642	36.3780

26 dB and 99% BANDWIDTH





7.5.7. OUTPUT POWER

LIMITS

FCC §15.407 (a) (1)

IC RSS-210 A9.2 (1)

For the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW or 4 dBm + 10 log B, where B is the 26-dB emission bandwidth in MHz. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

TEST PROCEDURE

The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

The transmitter output operates continuously therefore Method # 1 is used.

RESULTS

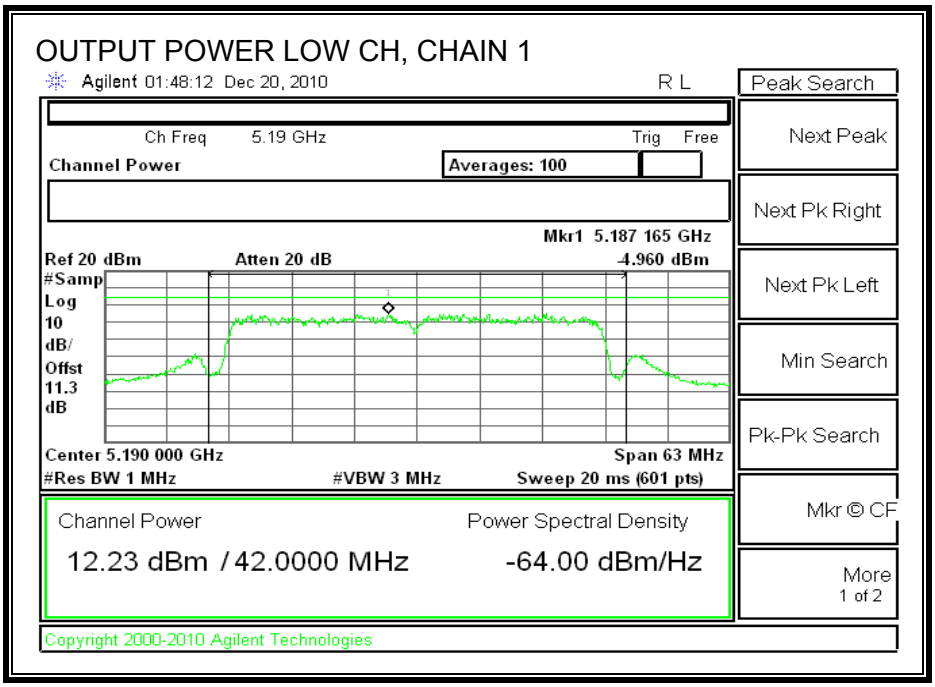
Limit

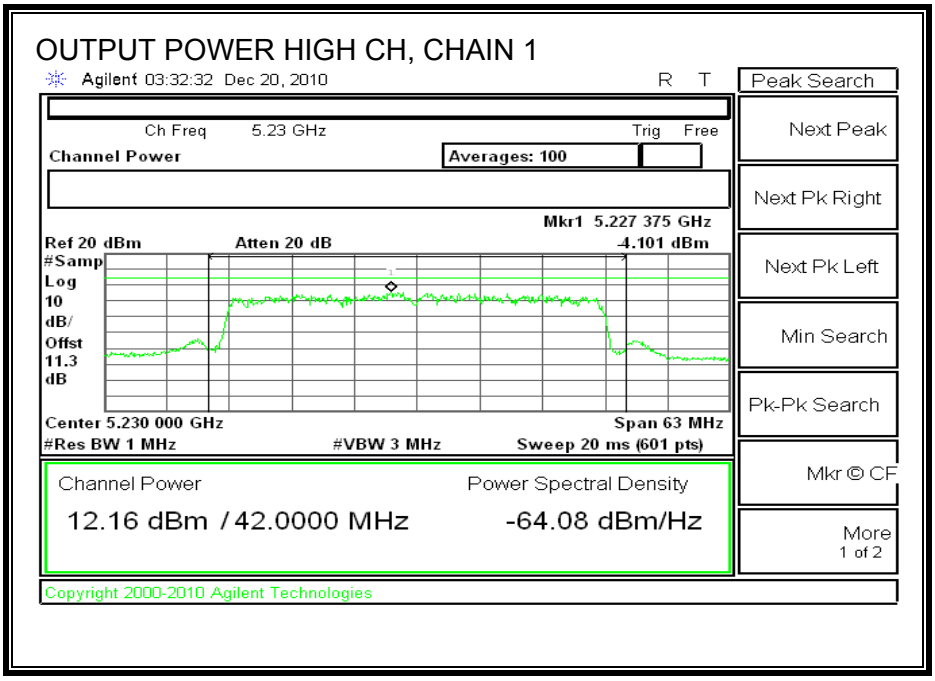
Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	4 + 10 Log B Limit (dBm)	Antenna Gain (dBi)	Limit (dBm)
Low	5190	16.99	37.305	19.72	6.02	16.97
High	5230	16.99	37.642	19.76	6.02	16.99

Individual Chain Results

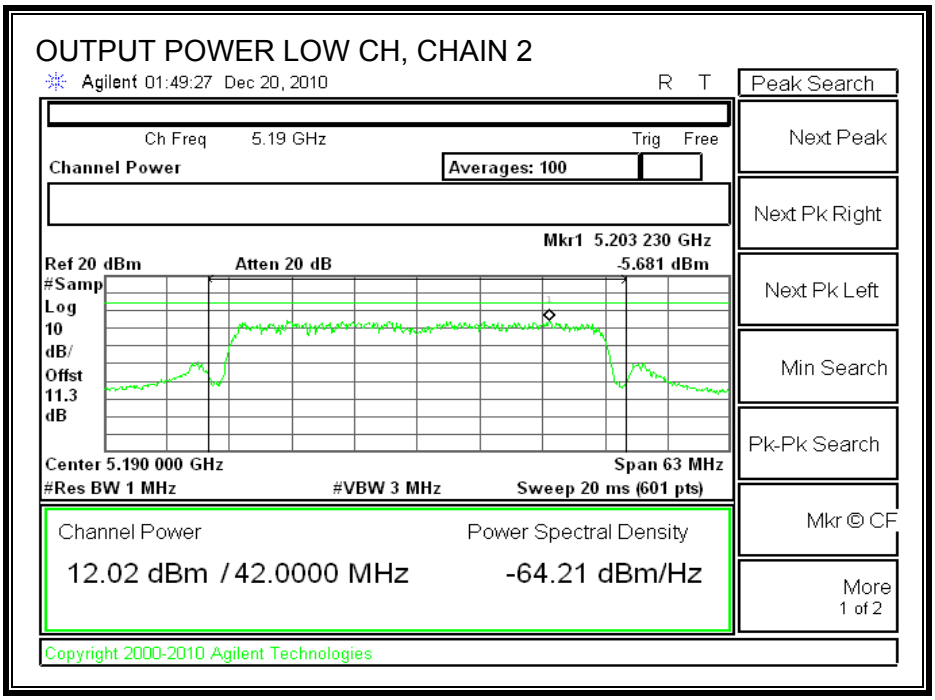
Channel	Frequency (MHz)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Chain 3 Power (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)
Low	5190	12.23	12.02	11.90	16.82	16.97	-0.15
High	5230	12.16	12.09	11.96	16.84	16.99	-0.15

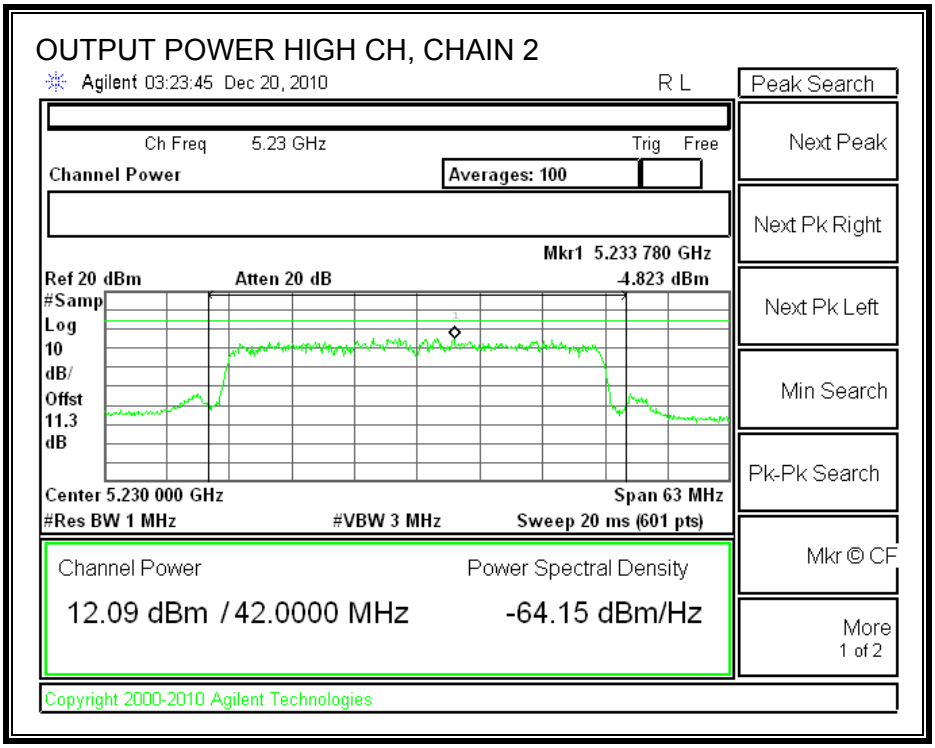
CHAIN 1 OUTPUT POWER



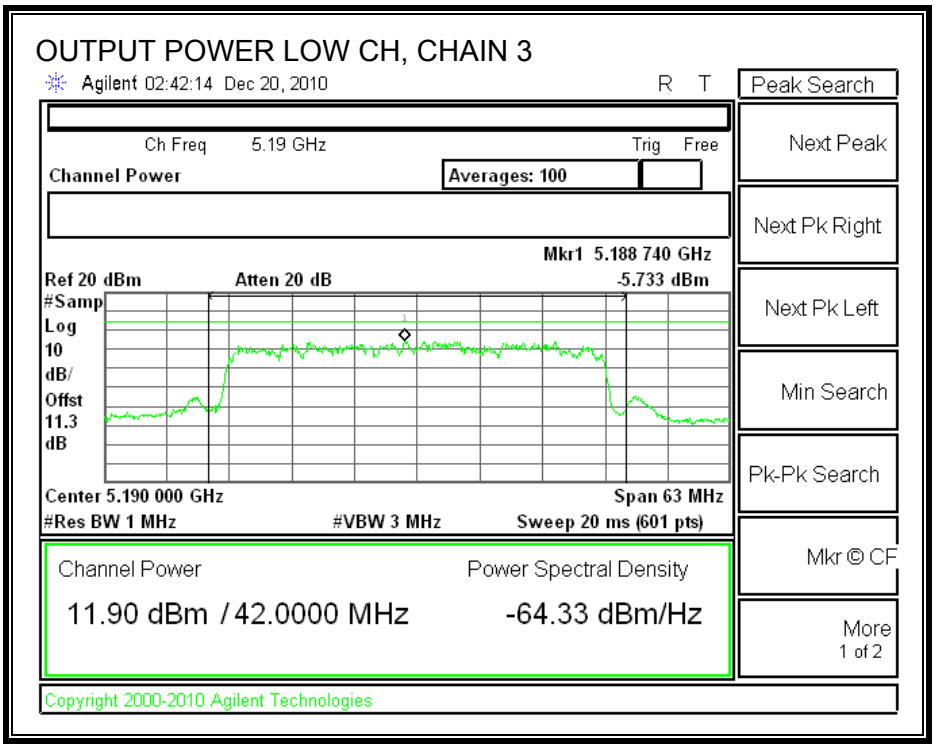


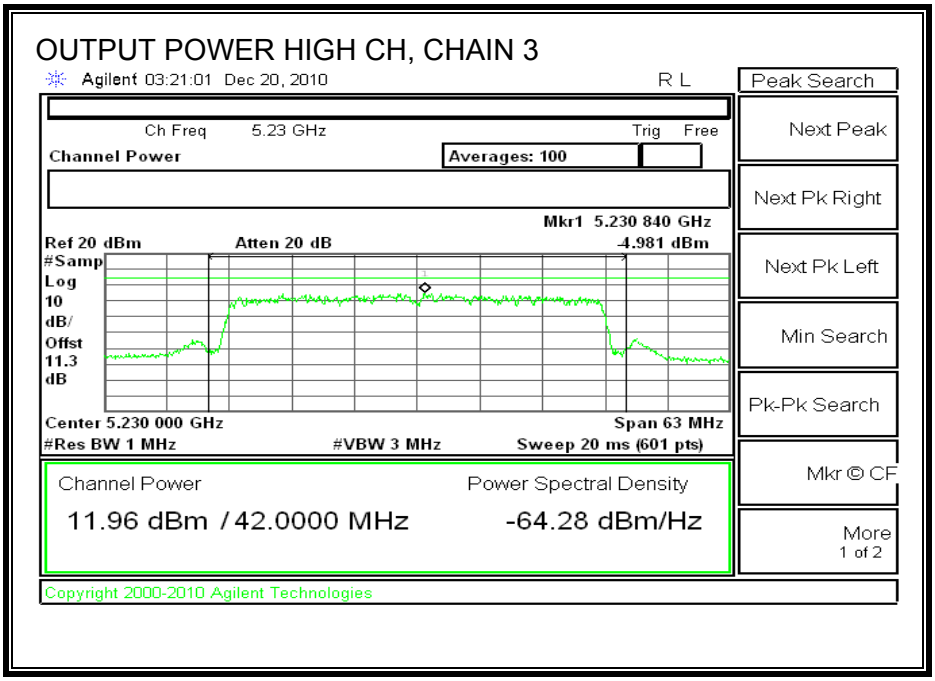
CHAIN 2 OUTPUT POWER





CHAIN 3 OUTPUT POWER





7.5.8. PEAK POWER SPECTRAL DENSITY

LIMITS

FCC §15.407 (a) (1)

IC RSS-210 A9.2 (1)

For the 5.15-5.25 GHz band, the peak power spectral density shall not exceed 4 dBm in any 1 MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The maximum antenna gain is 6.02 dBi, therefore the limit is 3.98 dBm.

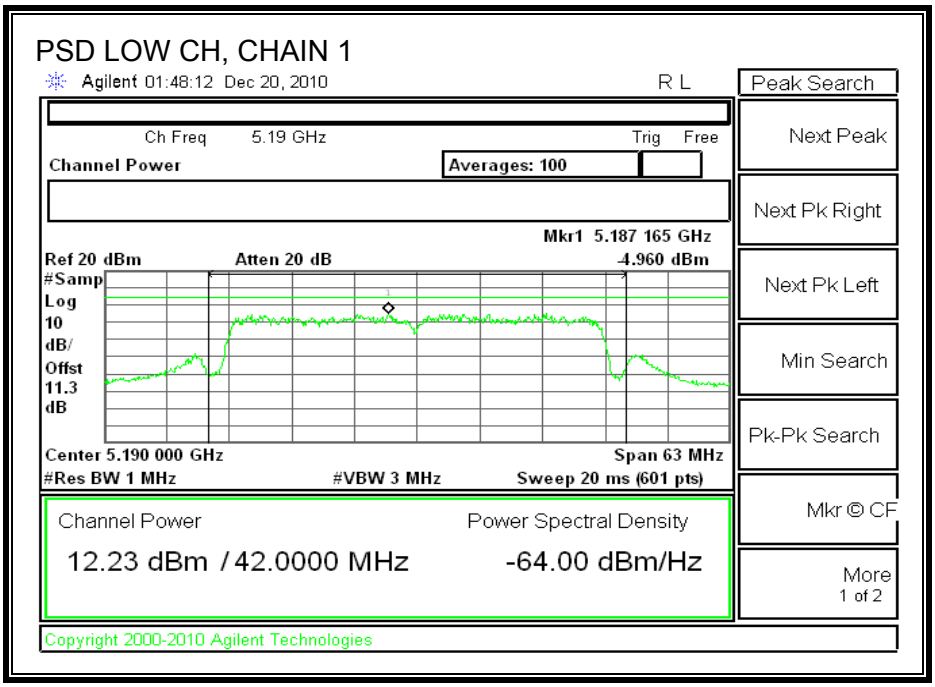
TEST PROCEDURE

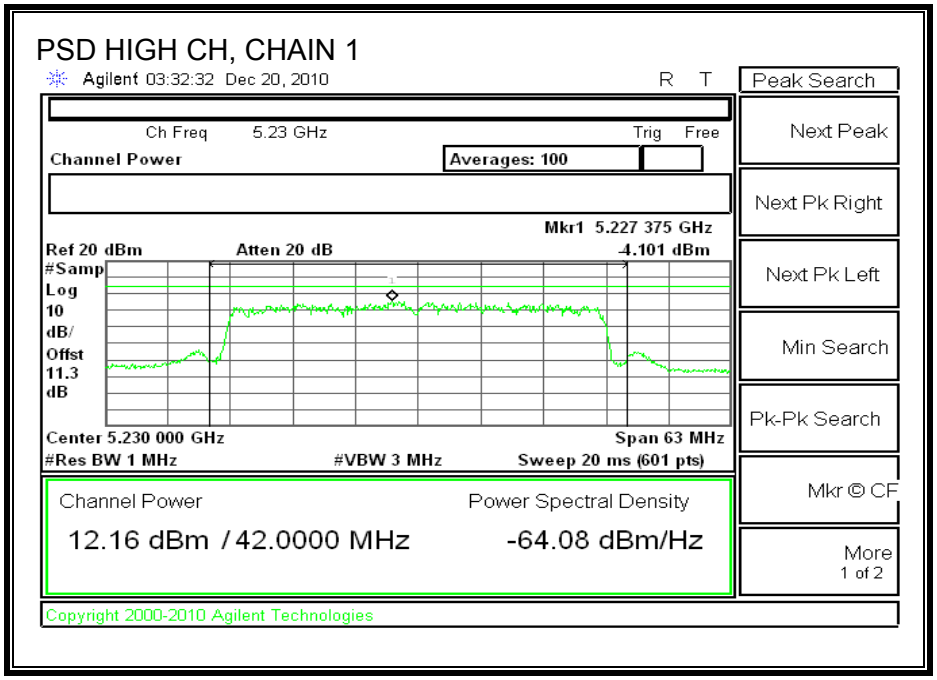
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002. PPSD method #2 was used.

RESULTS

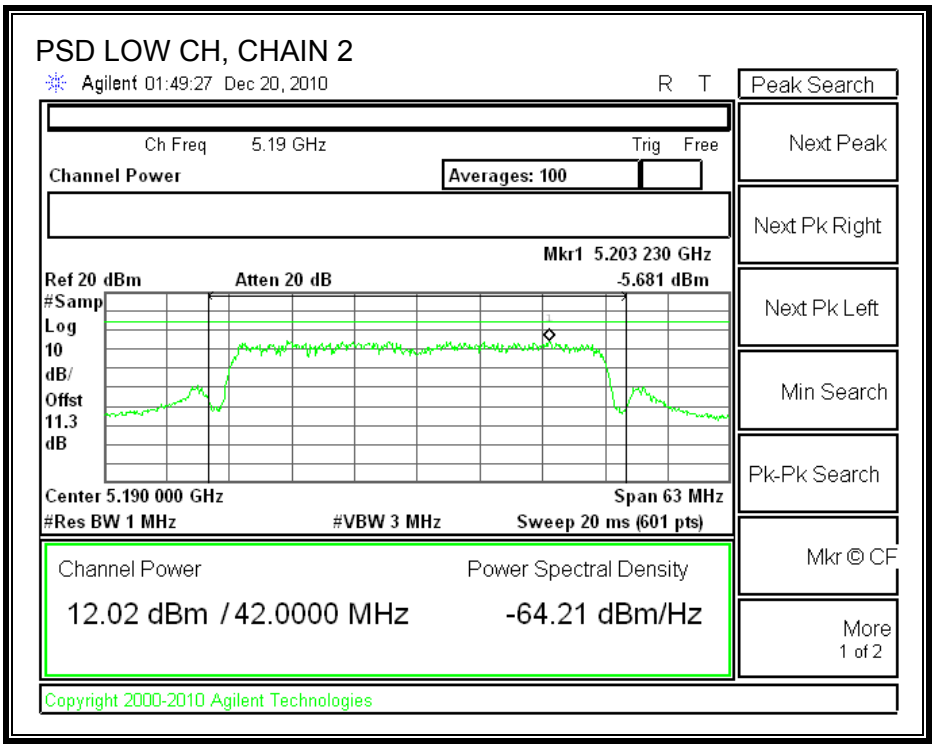
Channel	Frequency (MHz)	Chain 1 PPSD (dBm)	Chain 2 PPSD (dBm)	Chain 3 PPSD (dBm)	Total	Limit (dBm)	Margin (dB)
Low	5190	-4.96	-5.681	-5.733	-0.7	3.98	-4.65
High	5230	-4.101	-4.823	-4.981	0.2	3.98	-3.83

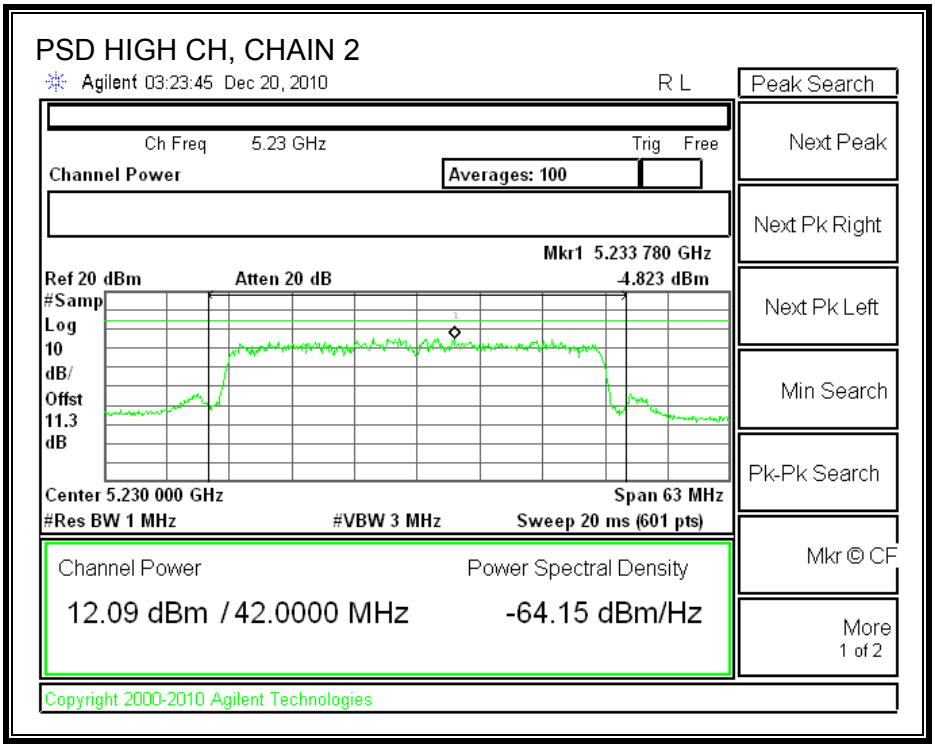
CHAIN 1 POWER SPECTRAL DENSITY





CHAIN 2 POWER SPECTRAL DENSITY





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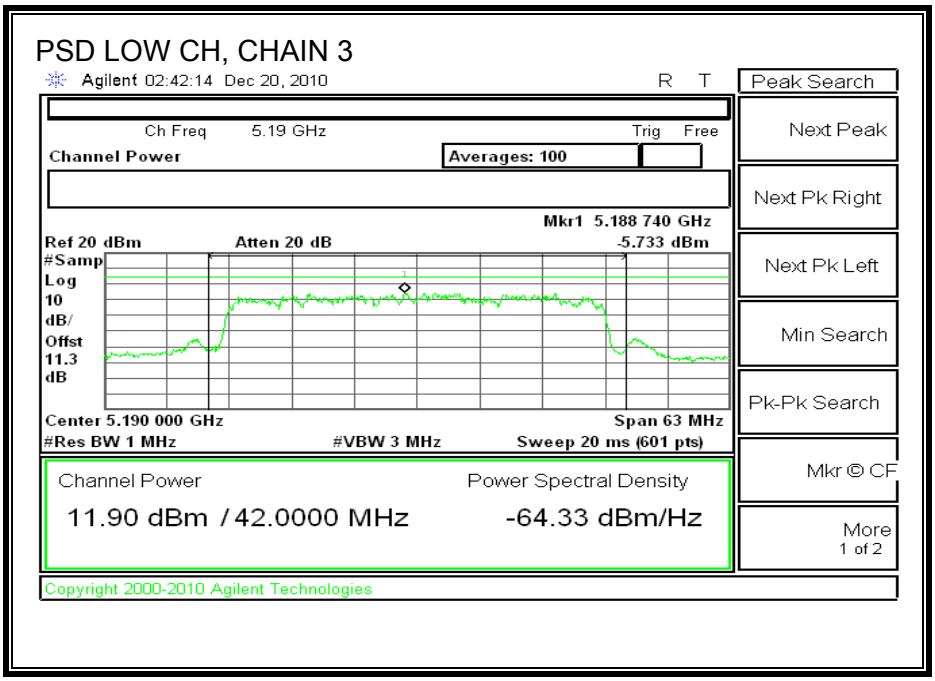
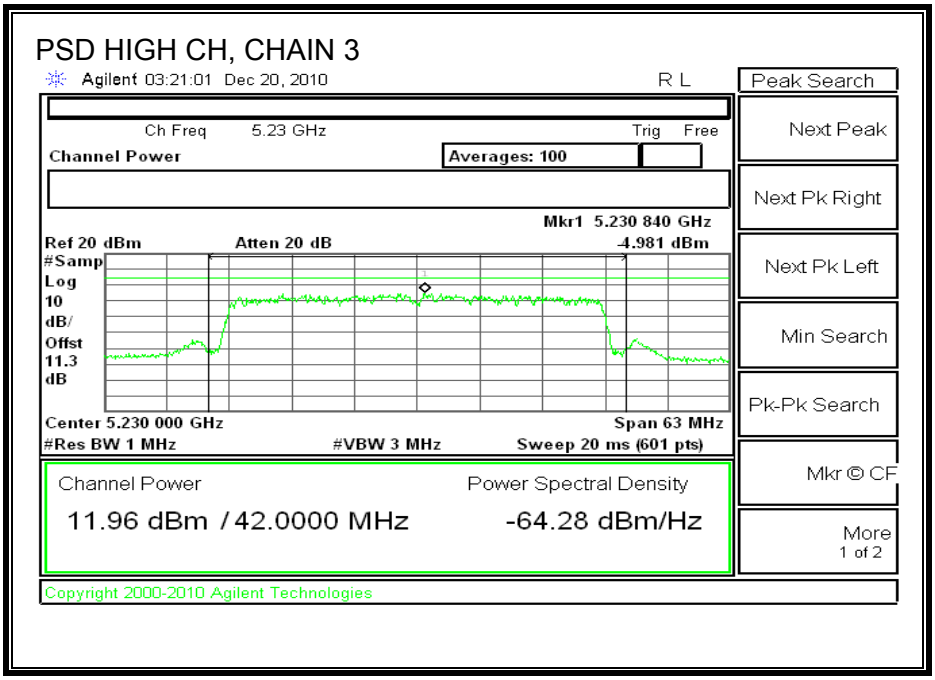




7.5.9. PEAK EXCURSION

LIMITS

FCC §15.407 (a) (6)

The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

TEST PROCEDURE

The transmitter outputs are connected to the spectrum analyzer via a combiner.

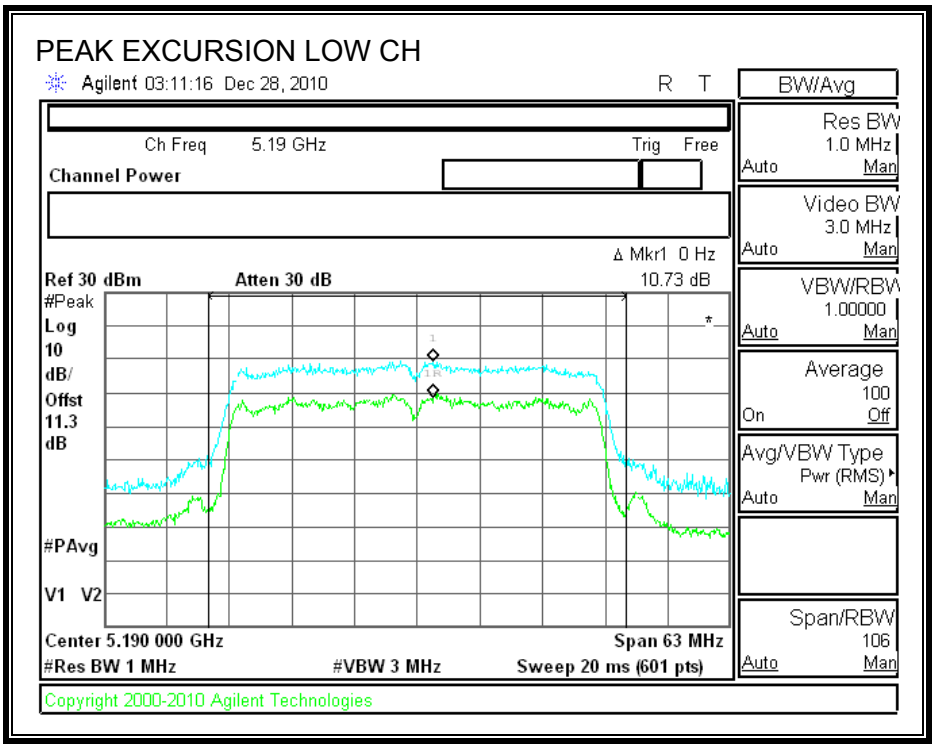
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

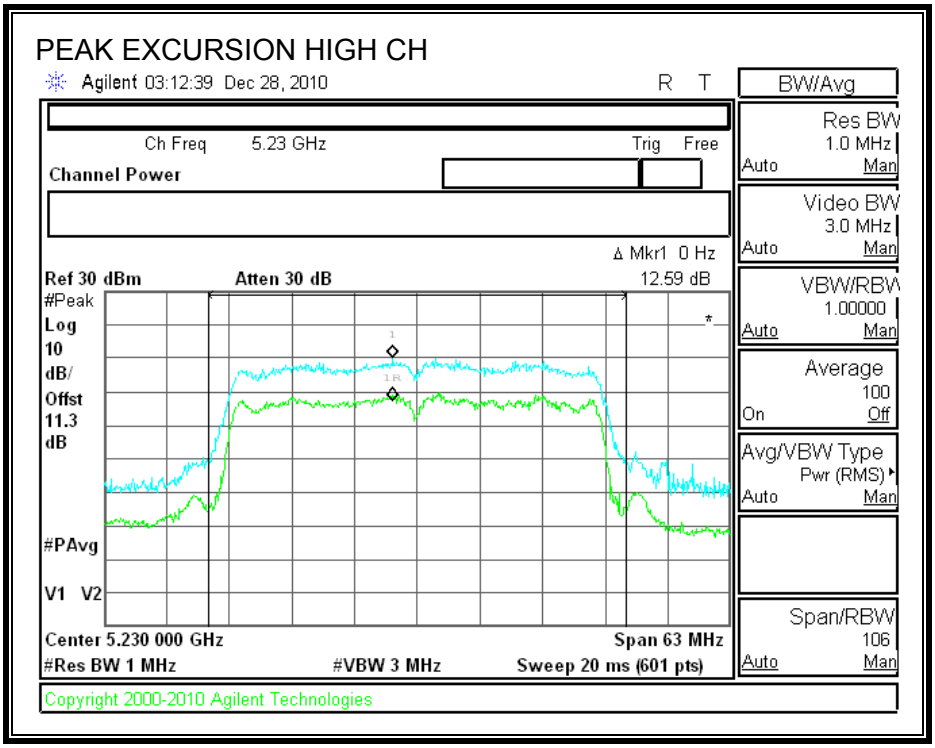
Since Method # 1 was used for peak power measurements, Method # 1 settings are used for the second PPSD trace.

RESULTS

Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5190	10.73	13	-2.27
High	5230	12.59	13	-0.41

PEAK EXCURSION





7.5.10. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.407 (b) (1)

IC RSS-210 A9.3 (1)

For transmitters operating in the 5.15-5.25 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm / MHz.

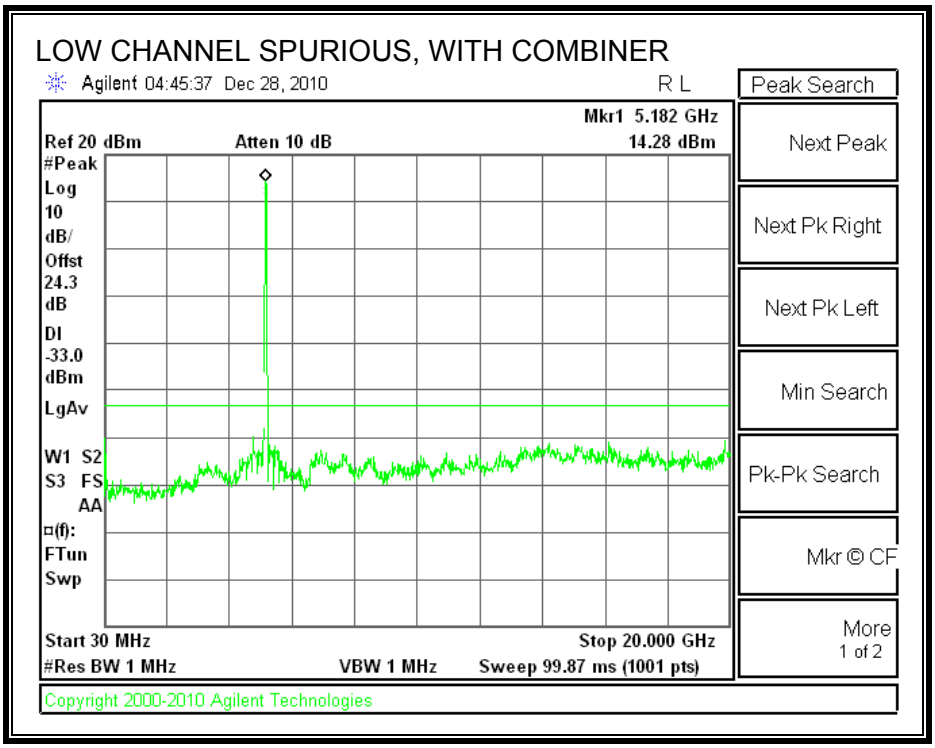
TEST PROCEDURE

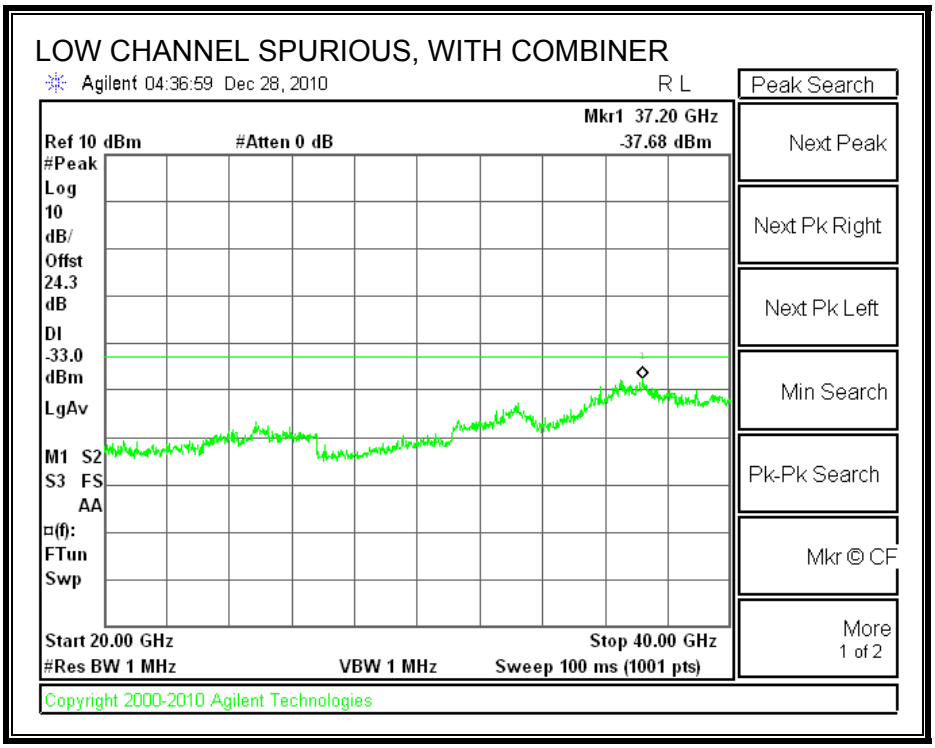
Conducted RF measurements of the transmitter output are made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 1 MHz. Peak detection measurements are compared to EIRP limit, adjusted for the maximum antenna gain.

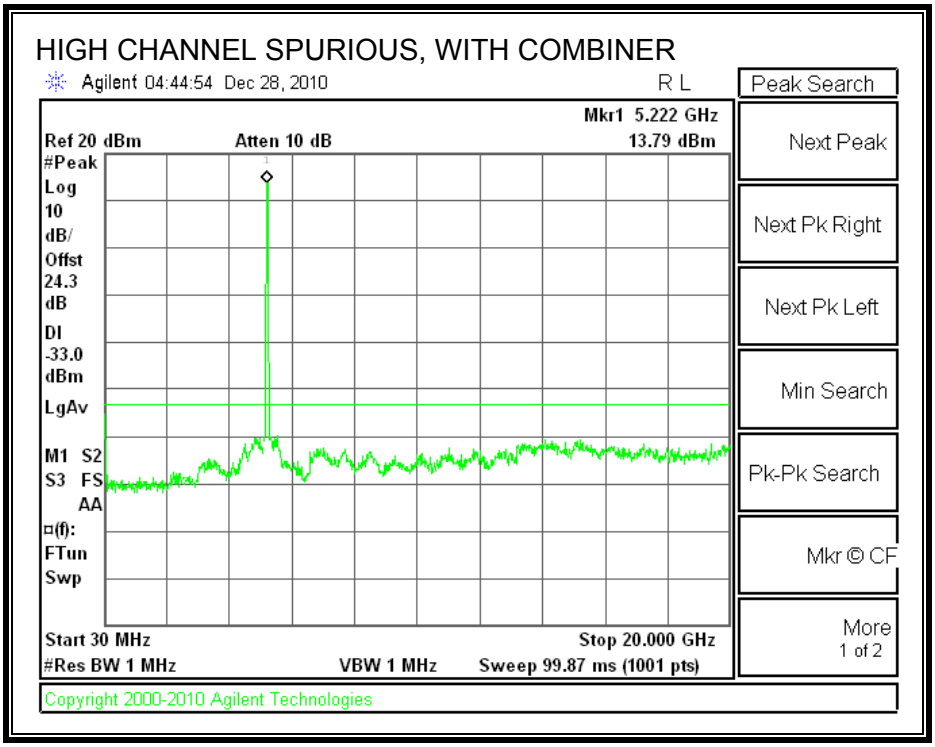
Measurements are made over the 30 MHz to 40 GHz range with the transmitter set to the lowest, middle, and highest channels.

SPURIOUS EMISSIONS WITH COMBINER

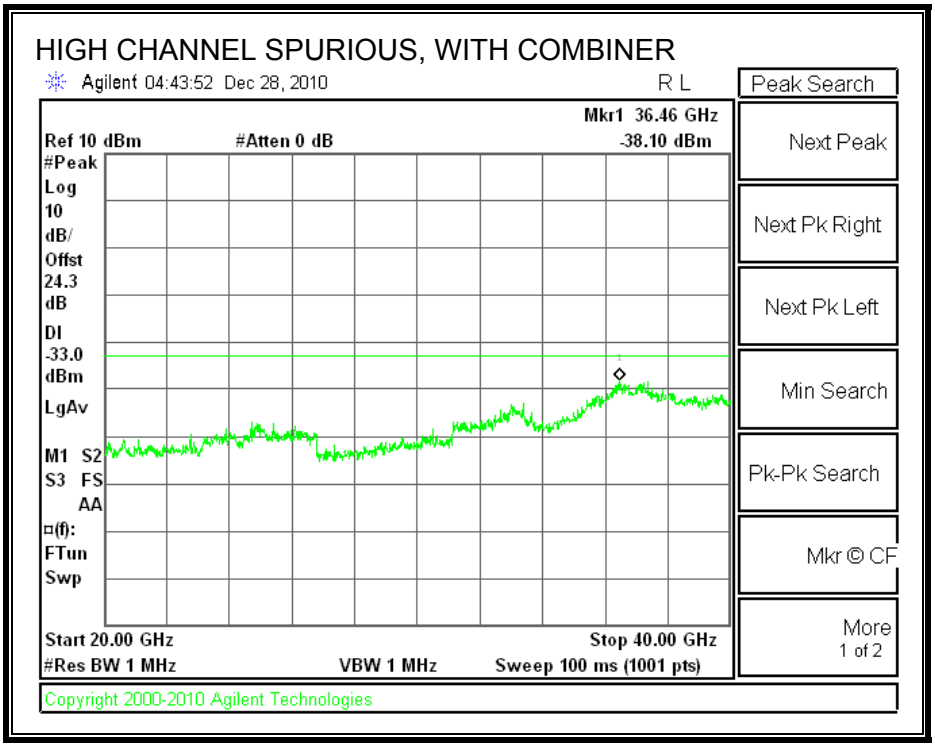




HIGH CHANNEL SPURIOUS, WITH COMBINER



HIGH CHANNEL SPURIOUS, WITH COMBINER



SDM MCS12

7.5.11. 26 dB and 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

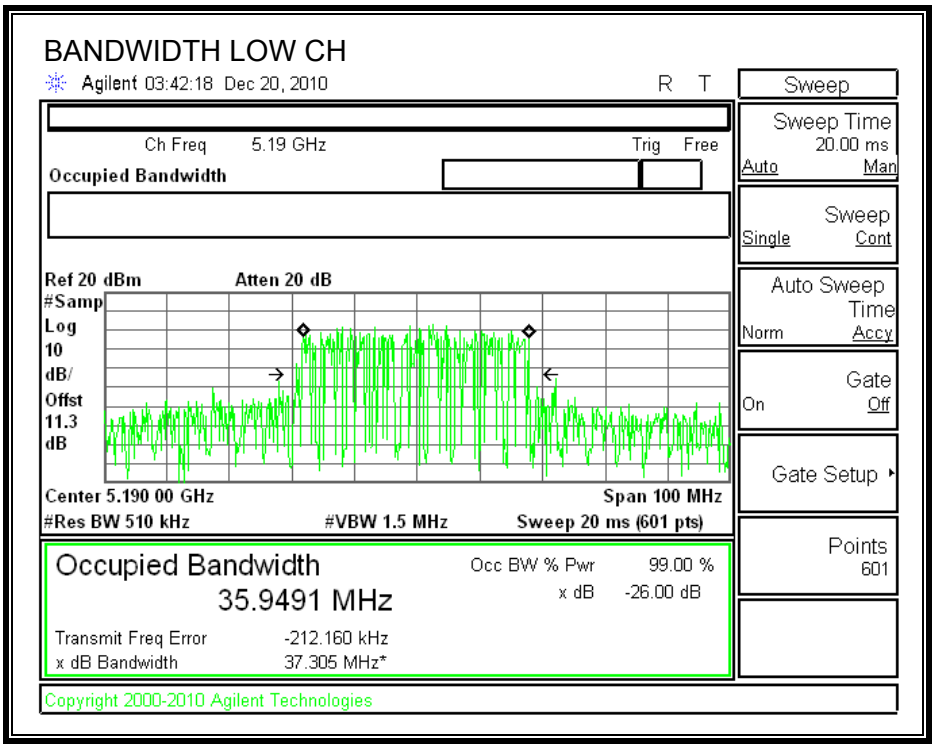
The transmitter outputs are connected to the spectrum analyzer via a combiner. The RBW is set to 1% to 3% of the measured bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth function is utilized.

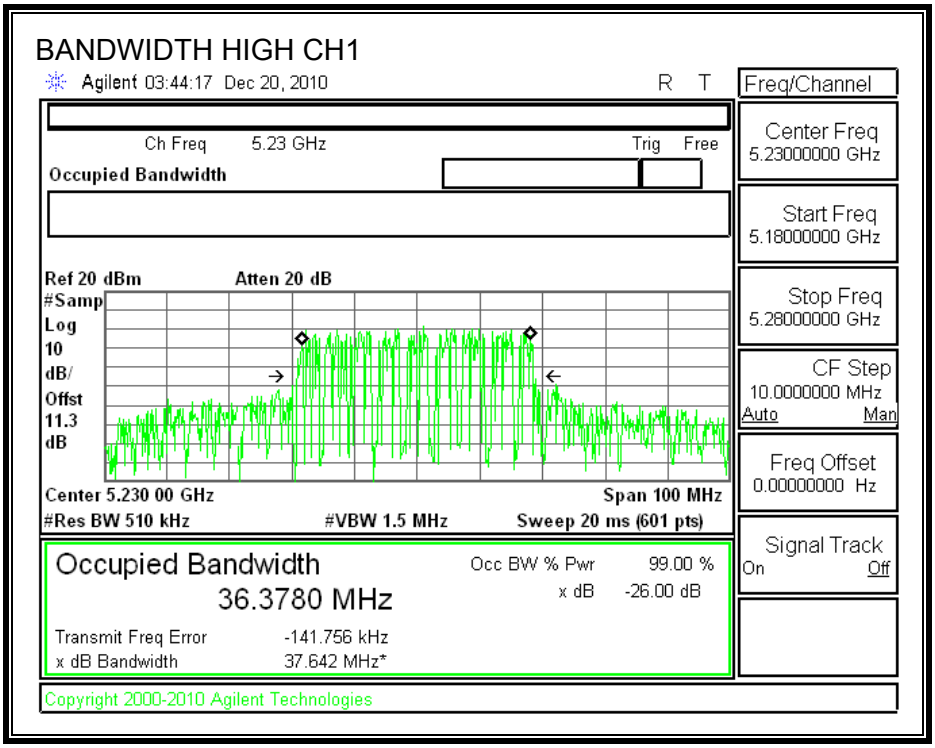
RESULTS

CHAIN 1

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5190	37.305	35.9491
High	5230	37.642	36.378

26 dB and 99% BANDWIDTH





7.5.12. OUTPUT POWER

LIMITS

FCC §15.407 (a) (1)

IC RSS-210 A9.2 (1)

For the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW or 4 dBm + 10 log B, where B is the 26-dB emission bandwidth in MHz. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

TEST PROCEDURE

The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

The transmitter output operates continuously therefore Method # 1 is used.

RESULTS

SDM MCS12

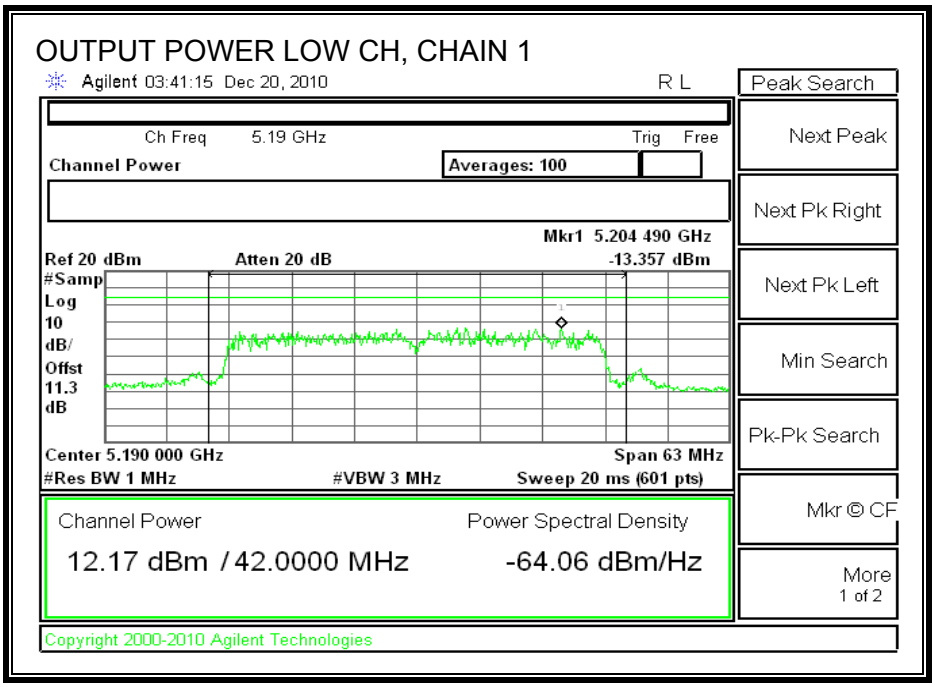
Limit

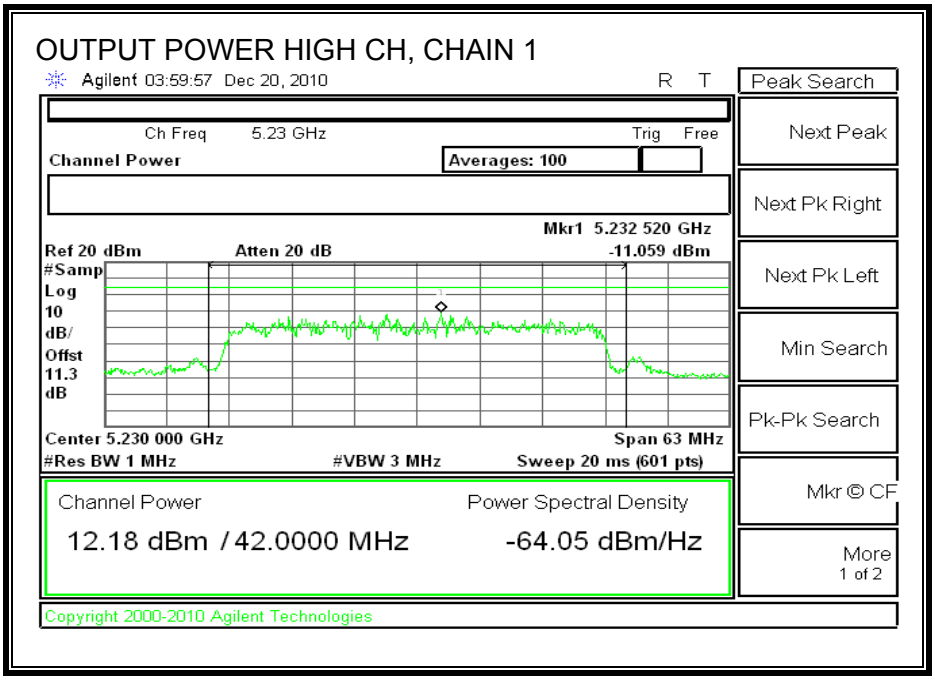
Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	4 + 10 Log B Limit (dBm)	Antenna Gain (dBi)	Limit (dBm)
Low	5190	16.99	37.305	19.72	6.02	16.97
High	5230	16.99	37.642	19.76	6.02	16.99

Individual Chain Results

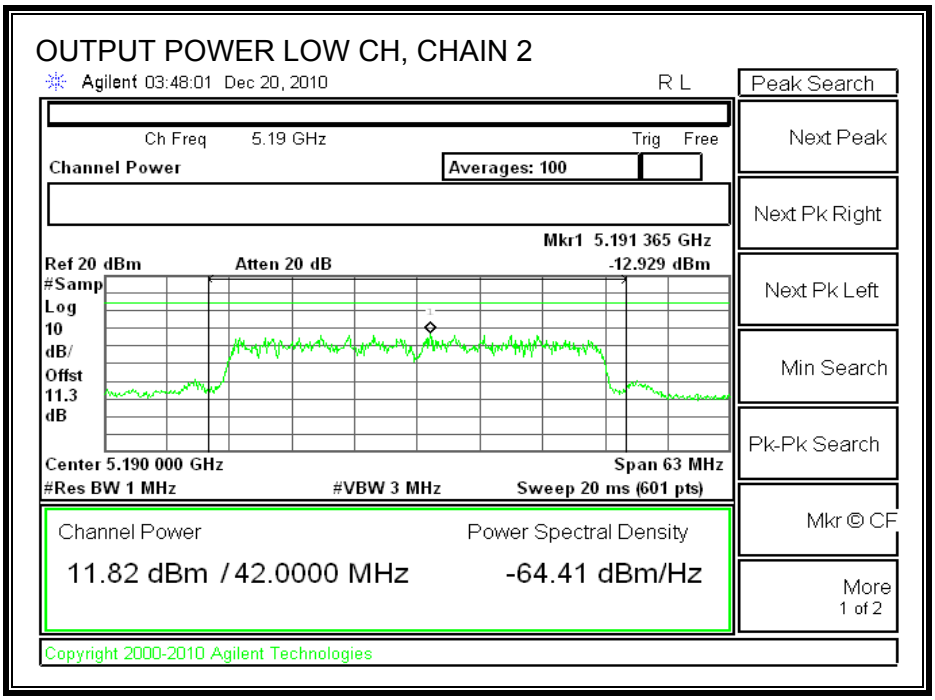
Channel	Frequency (MHz)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Chain 3 Power (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)
Low	5190	12.17	11.82	12.01	16.77	16.97	-0.20
High	5230	12.18	12.07	11.83	16.80	16.99	-0.19

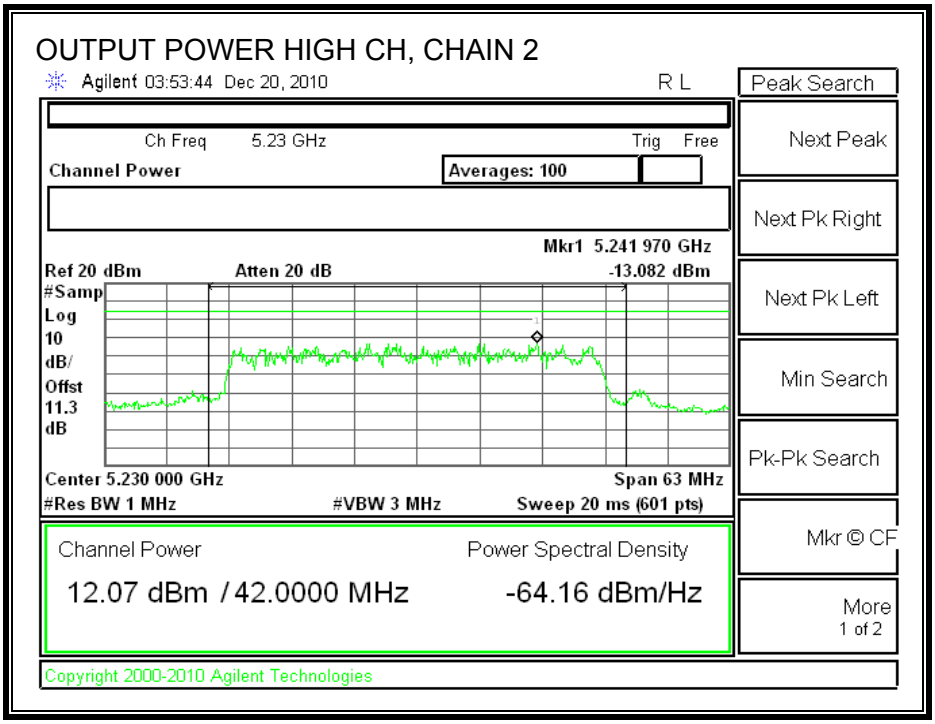
CHAIN1 OUTPUT POWER



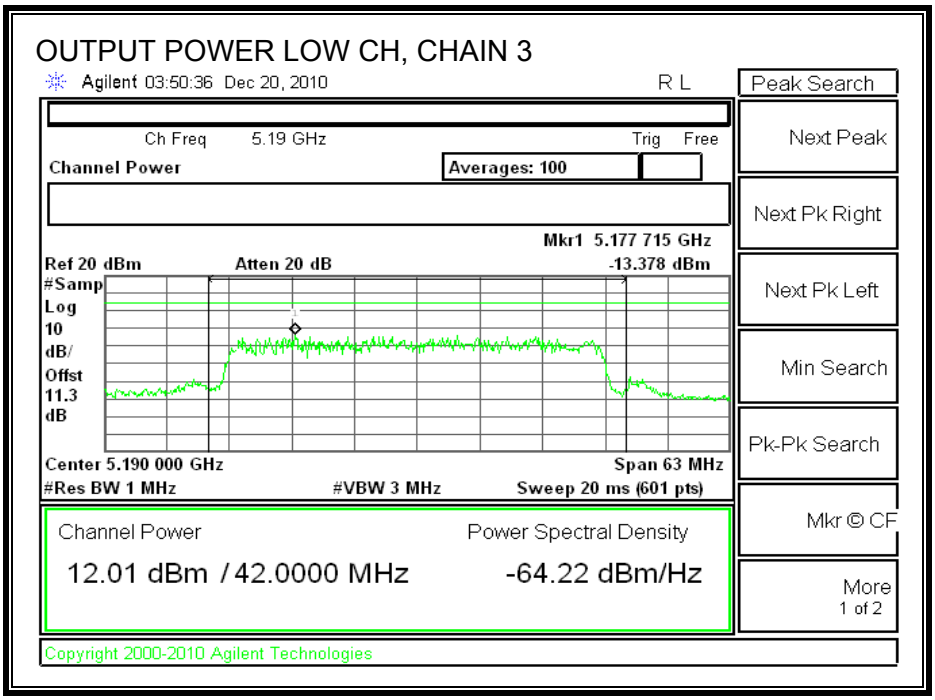


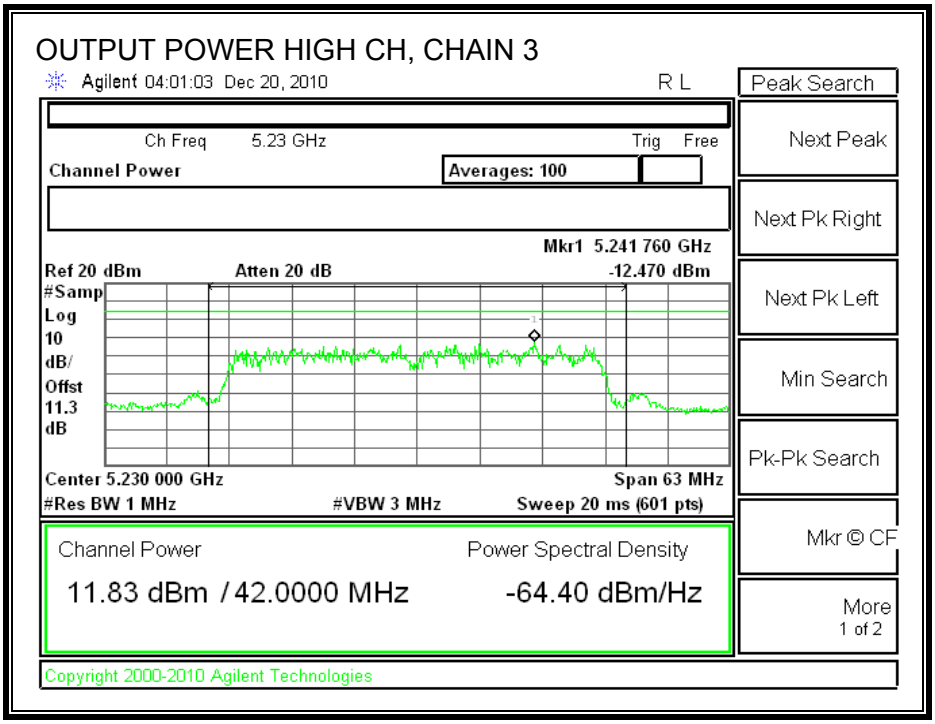
CHAIN 2 OUTPUT POWER





CHAIN 3 OUTPUT POWER





7.5.13. PEAK POWER SPECTRAL DENSITY

LIMITS

FCC §15.407 (a) (1)

IC RSS-210 A9.2 (1)

For the 5.15-5.25 GHz band, the peak power spectral density shall not exceed 4 dBm in any 1 MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The maximum antenna gain is 6.02 dBi, therefore the limit is 3.98 dBm.

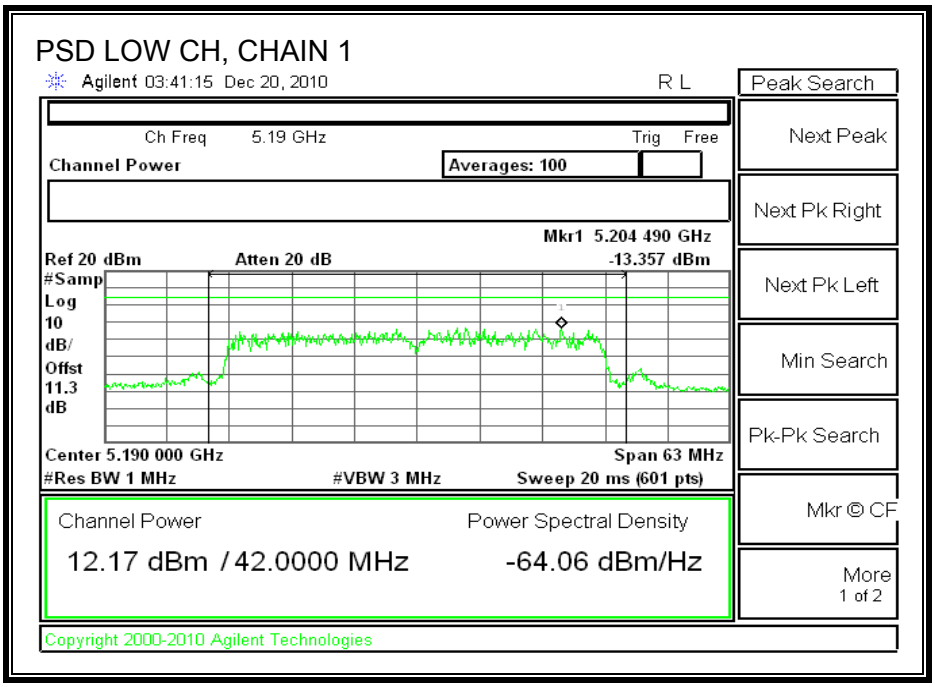
TEST PROCEDURE

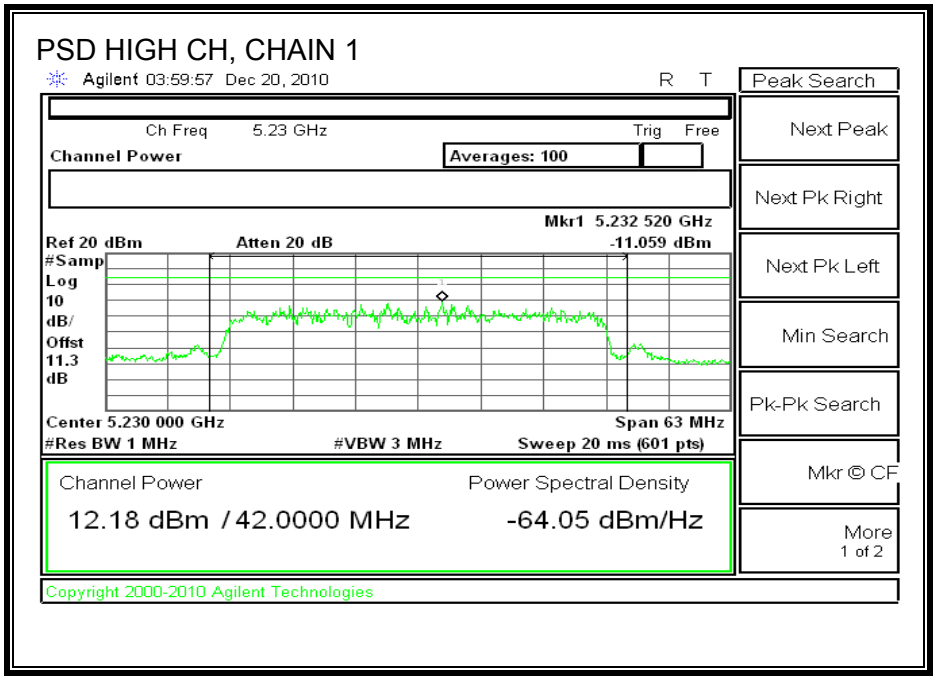
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002. PPSD method #2 was used.

RESULTS

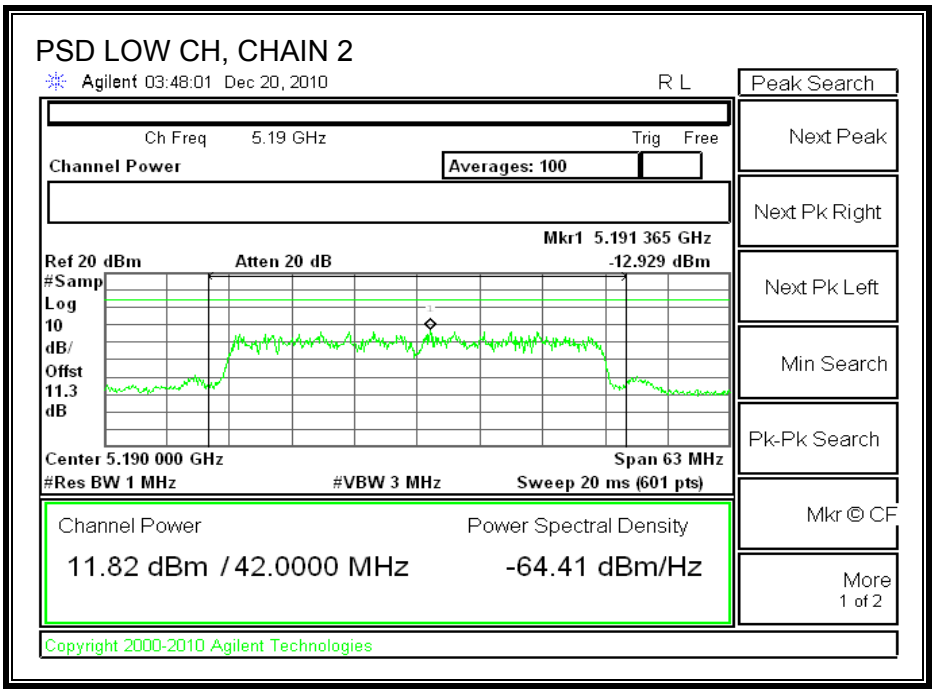
Channel	Frequency (MHz)	Chain 1 PPSD (dBm)	Chain 2 PPSD (dBm)	Chain 3 PPSD (dBm)	Total	Limit (dBm)	Margin (dB)
Low	5190	-13.357	-12.929	-13.378	-8.4	3.98	-12.43
High	5230	-11.059	-13.082	-12.47	-7.3	3.98	-11.33

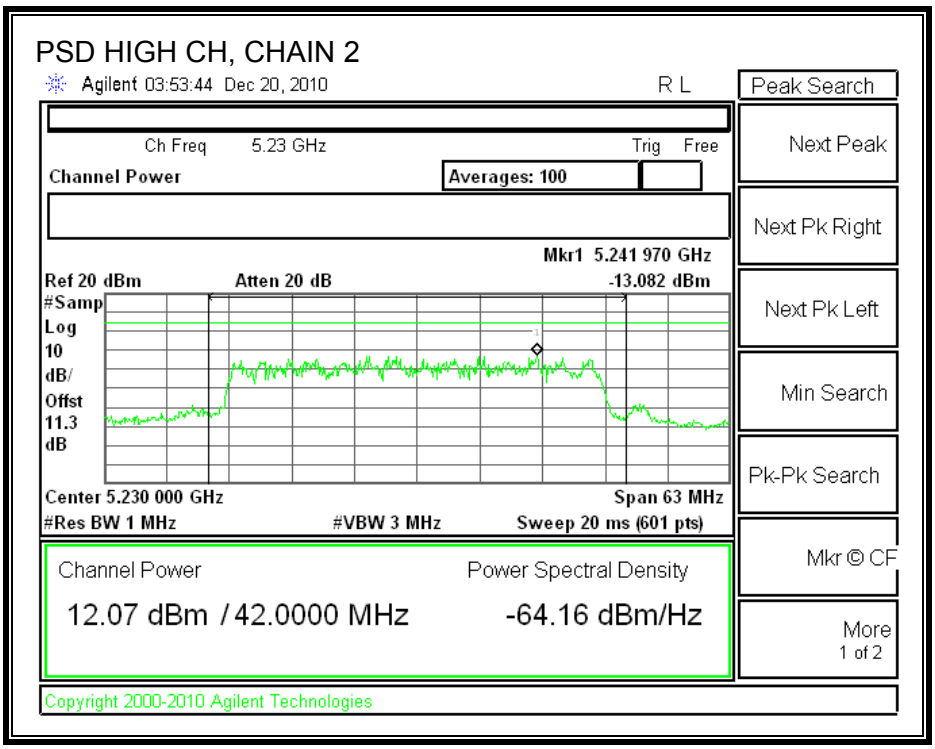
CHAIN 1 POWER SPECTRAL DENSITY



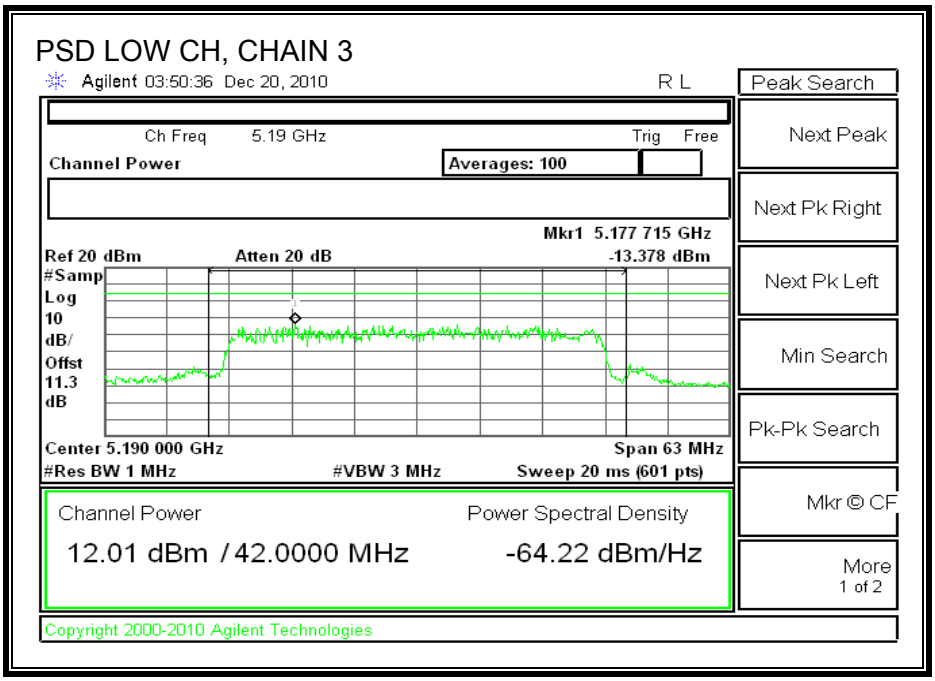


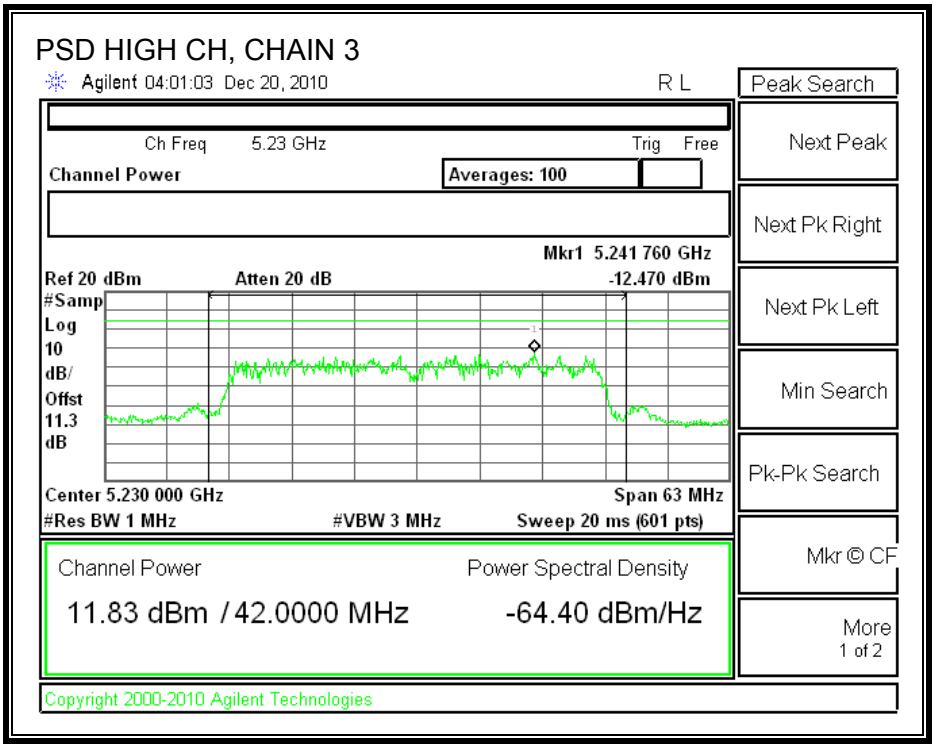
CHAIN 2 POWER SPECTRAL DENSITY





CHAIN 3 POWER SPECTRAL DENSITY





7.5.14. PEAK EXCURSION

LIMITS

FCC §15.407 (a) (6)

The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

TEST PROCEDURE

The transmitter outputs are connected to the spectrum analyzer via a combiner.

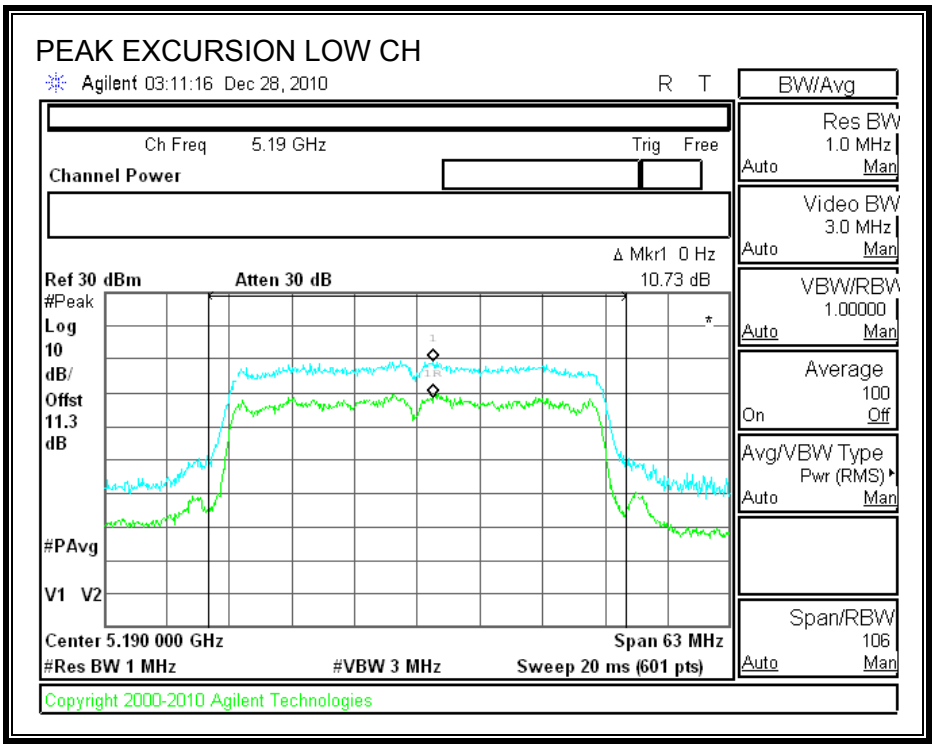
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

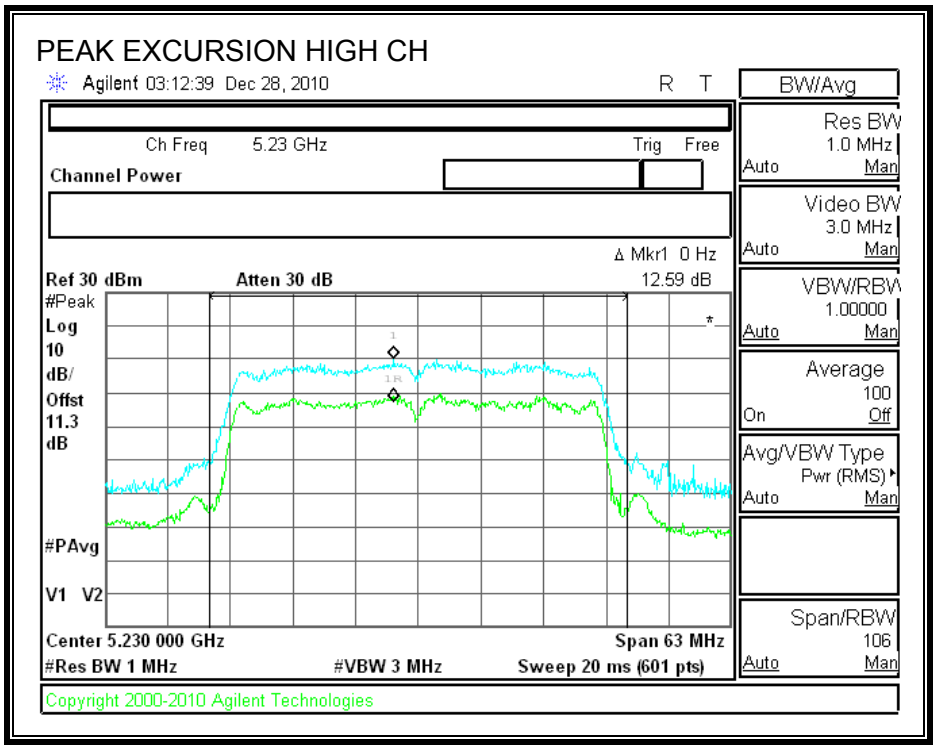
Since Method # 1 was used for peak power measurements, Method # 1 settings are used for the second PPSD trace.

RESULTS

Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5190	10.73	13	-2.27
High	5230	12.59	13	-0.41

PEAK EXCURSION





7.5.15. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.407 (b) (1)

IC RSS-210 A9.3 (1)

For transmitters operating in the 5.15-5.25 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm / MHz.

TEST PROCEDURE

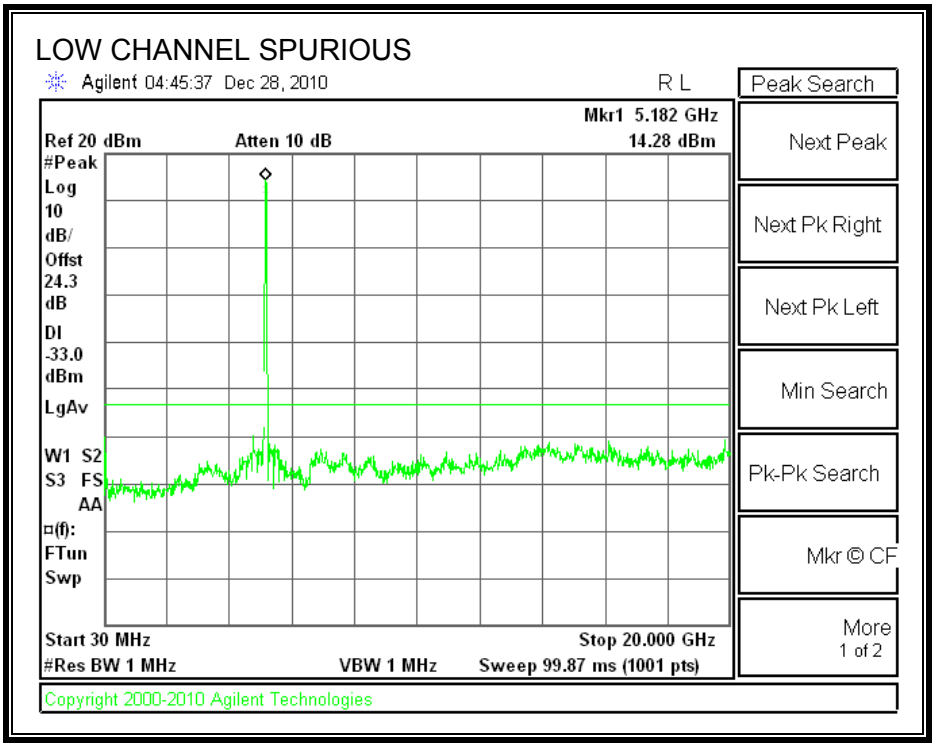
Conducted RF measurements of the transmitter output are made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

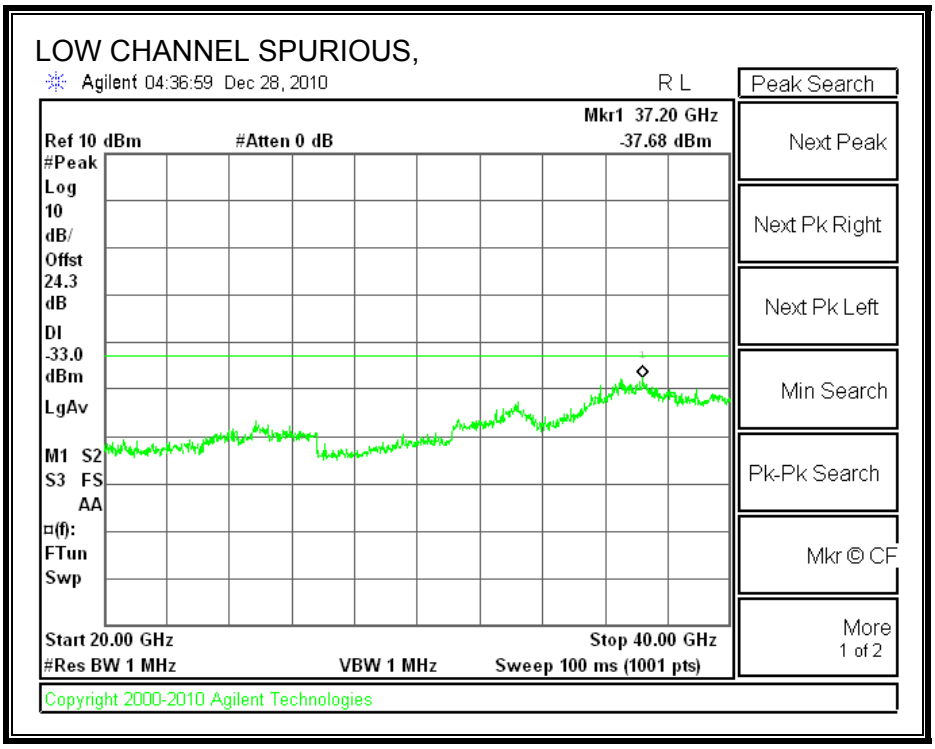
The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 1 MHz. Peak detection measurements are compared to EIRP limit, adjusted for the maximum antenna gain.

Measurements are made over the 30 MHz to 40 GHz range with the transmitter set to the lowest, middle, and highest channels.

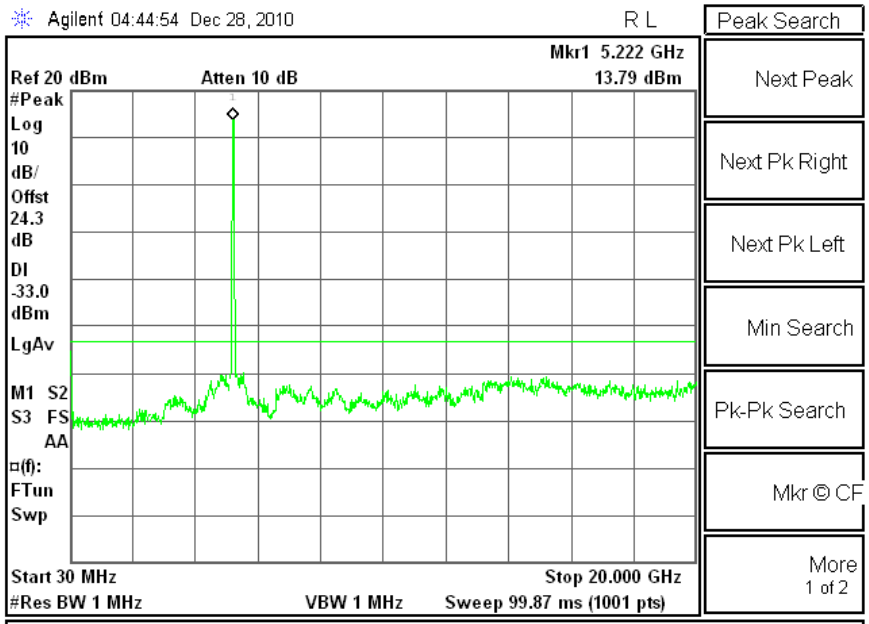
RESULTS

SPURIOUS EMISSIONS COMBINER

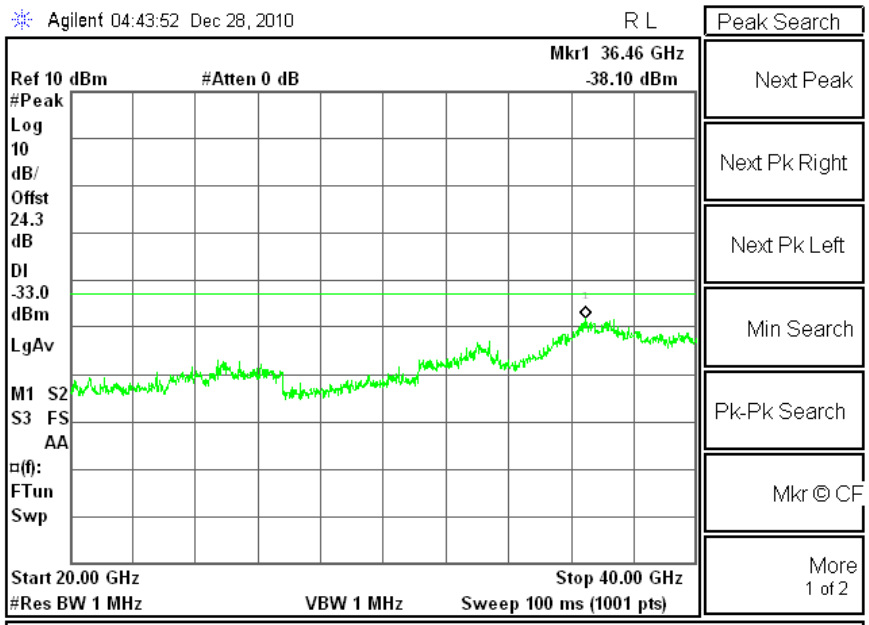




HIGH CHANNEL SPURIOUS



HIGH CHANNEL SPURIOUS



SDM MCS16

7.5.16. 26 dB and 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

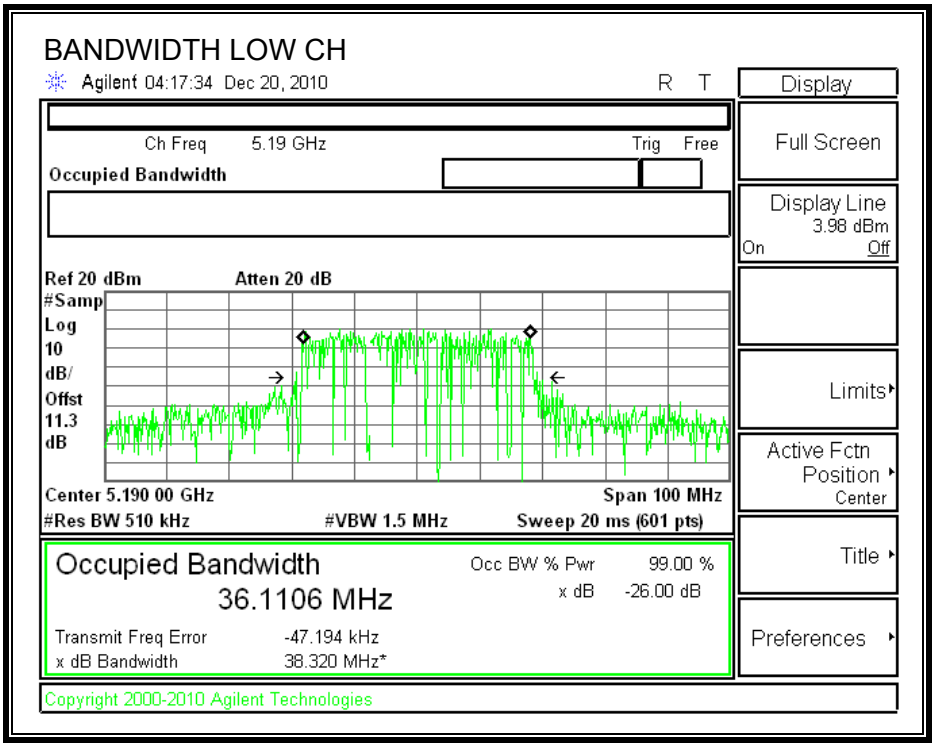
TEST PROCEDURE

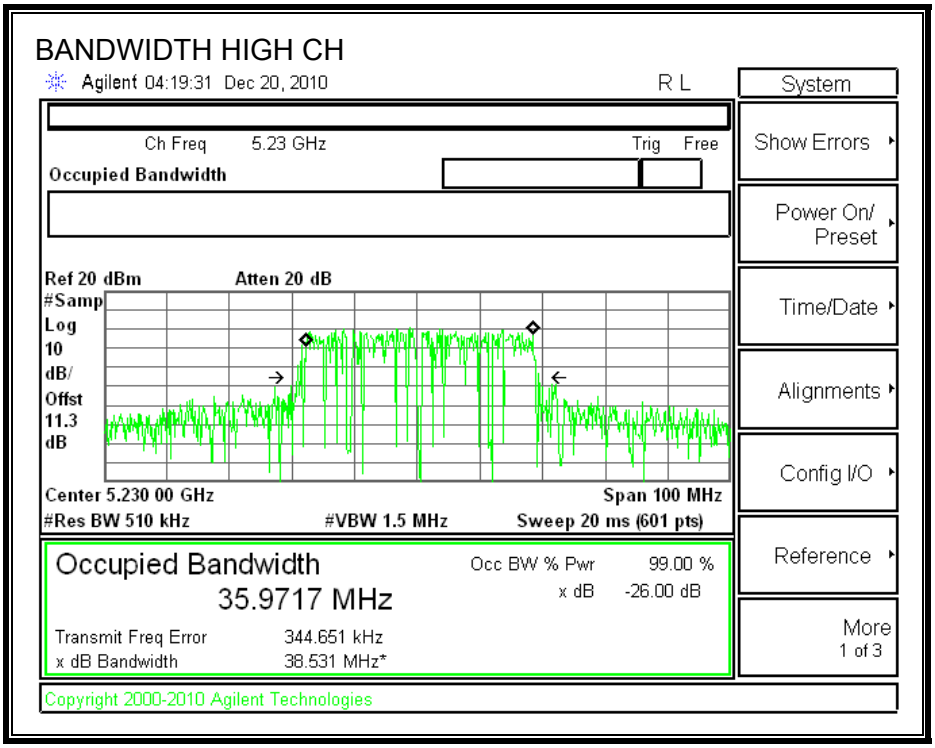
The transmitter outputs are connected to the spectrum analyzer via a combiner. The RBW is set to 1% to 3% of the measured bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth function is utilized.

RESULTS

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5190	38.32	36.1106
High	5230	38.531	35.9717

26 dB and 99% BANDWIDTH





7.5.17. OUTPUT POWER

LIMITS

FCC §15.407 (a) (1)

IC RSS-210 A9.2 (1)

For the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW or 4 dBm + 10 log B, where B is the 26-dB emission bandwidth in MHz. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

TEST PROCEDURE

The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

The transmitter output operates continuously therefore Method # 1 is used.

RESULTS

SDM MCS 16

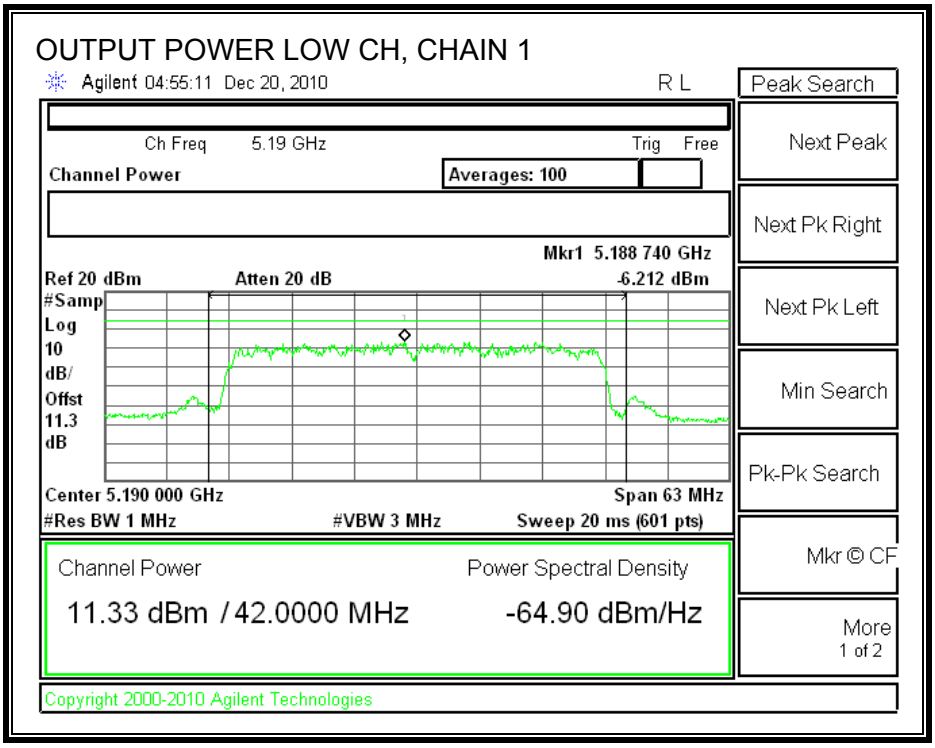
Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	4 + 10 Log B Limit (dBm)	Antenna Gain (dBi)	Limit (dBm)
5190	16.99	38.32	19.83	6.02	16.97
5230	16.99	38.531	19.86	6.02	16.99

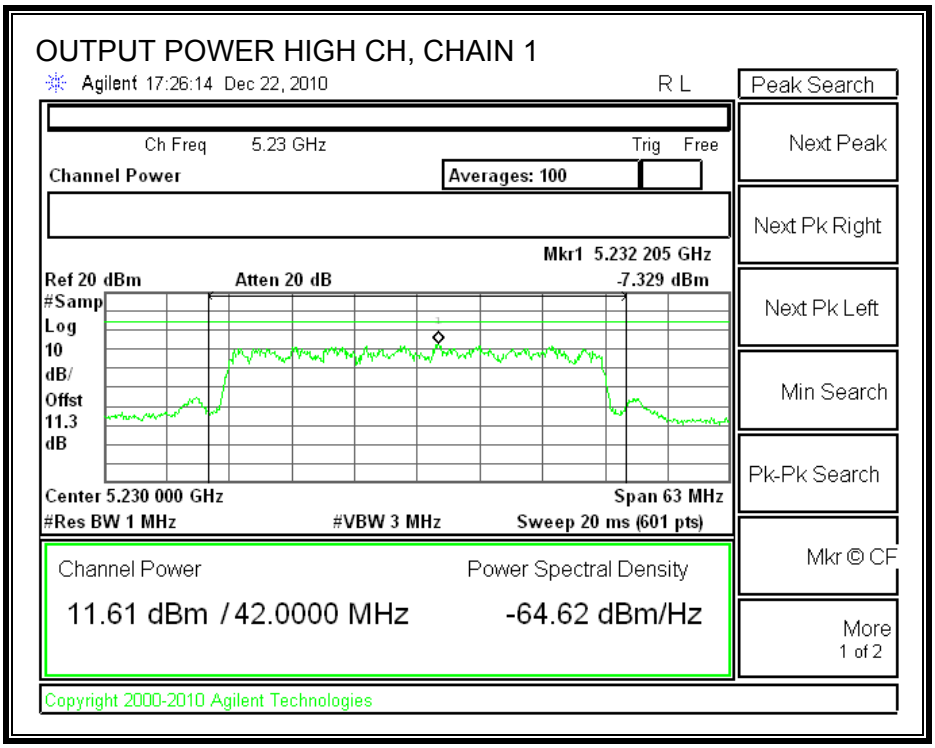
Chain Results

Frequency (MHz)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Chain 3 Power (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)
5190	11.33	11.84	12.04	16.52	16.97	-0.45
5230	11.61	12.32	12.21	16.83	16.99	-0.16

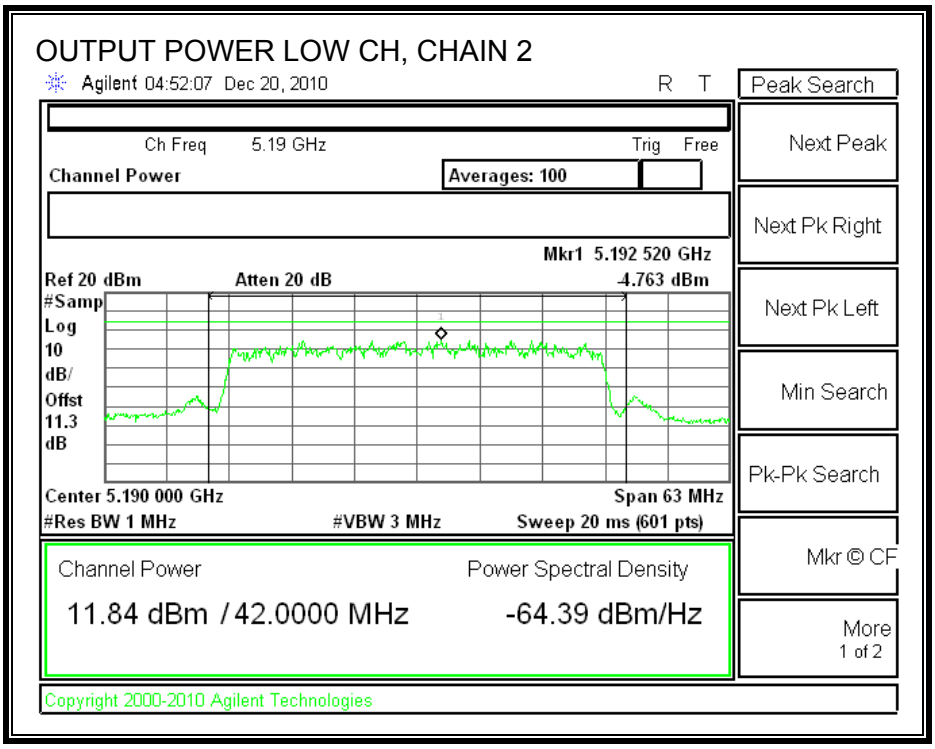
SDM MCS16

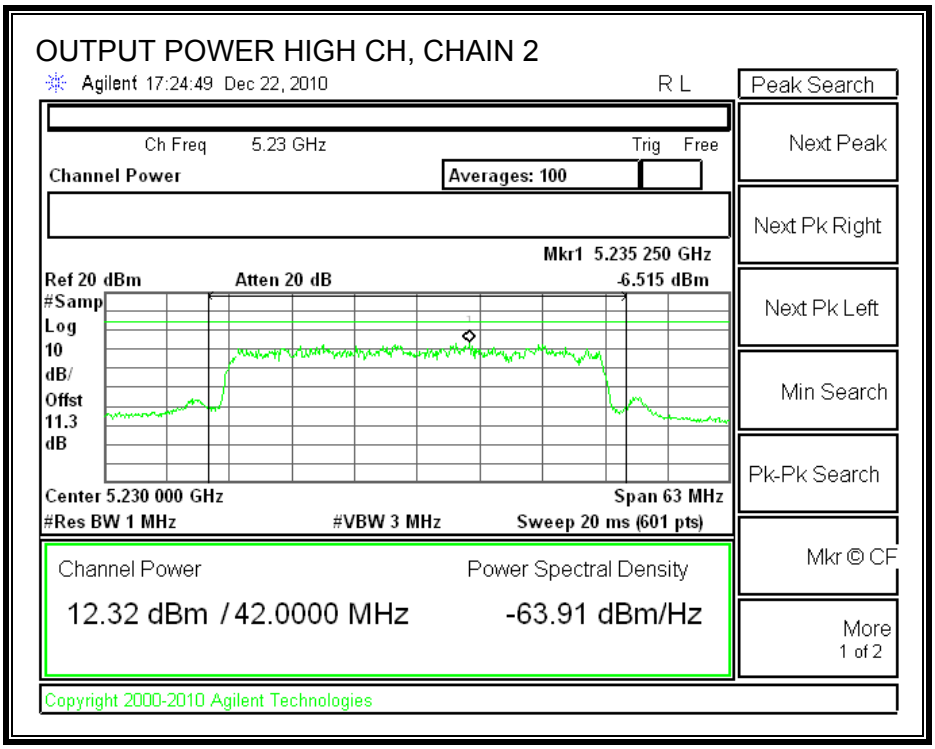
CHAIN 1 OUTPUT POWER



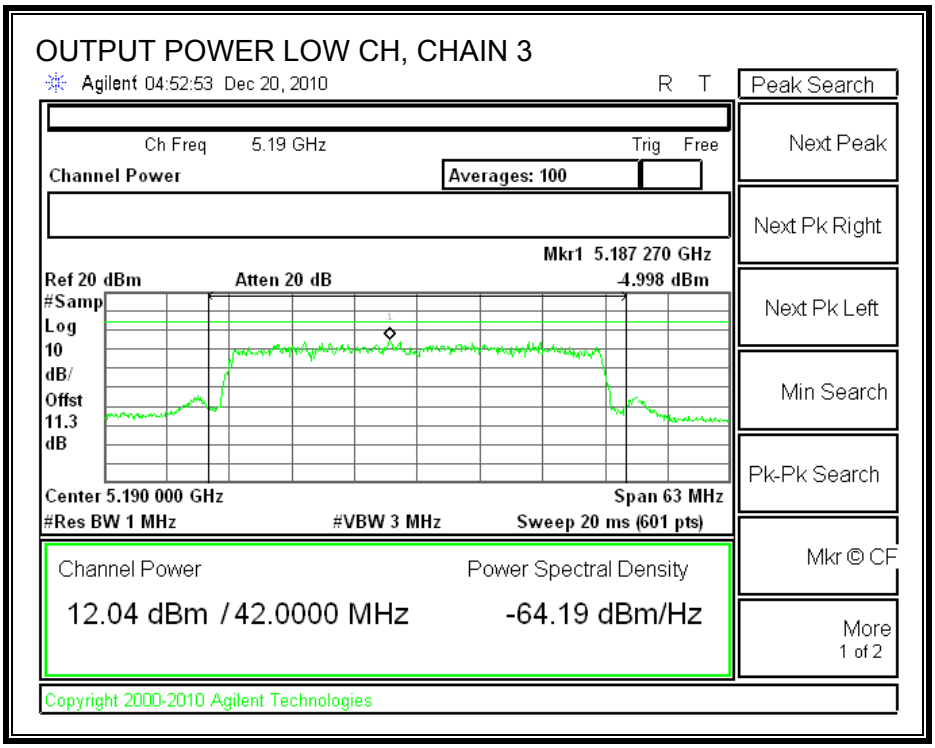


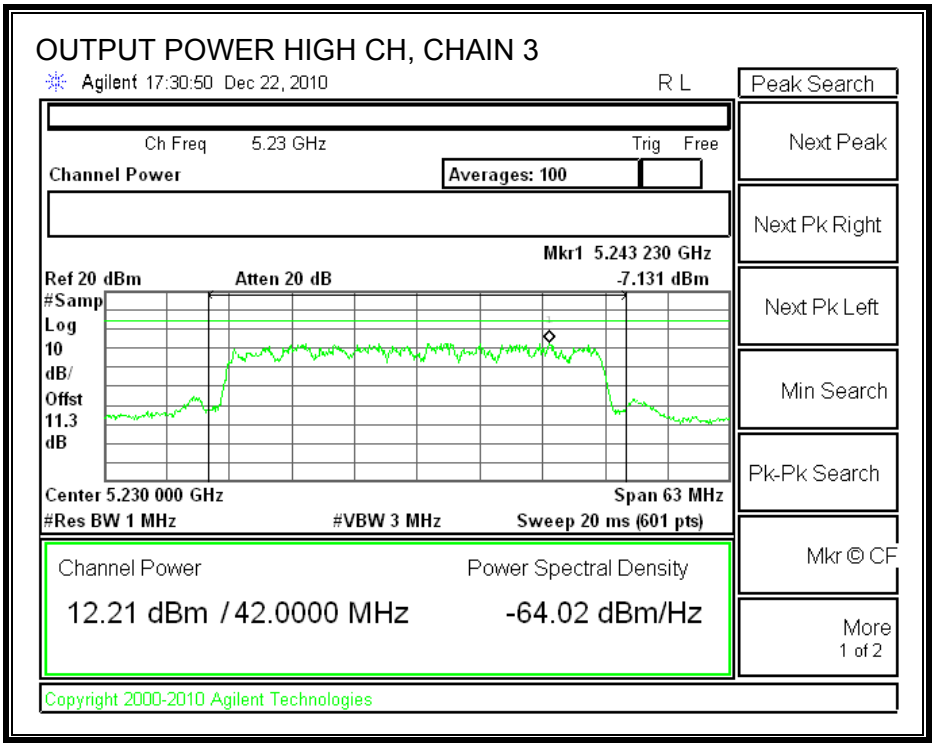
CHAIN 2 OUTPUT POWER





CHAIN 3 OUTPUT POWER





7.5.18. PEAK POWER SPECTRAL DENSITY

LIMITS

FCC §15.407 (a) (1)

IC RSS-210 A9.2 (1)

For the 5.15-5.25 GHz band, the peak power spectral density shall not exceed 4 dBm in any 1 MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The maximum antenna gain is 6.02 dBi, therefore the limit is 3.98 dBm.

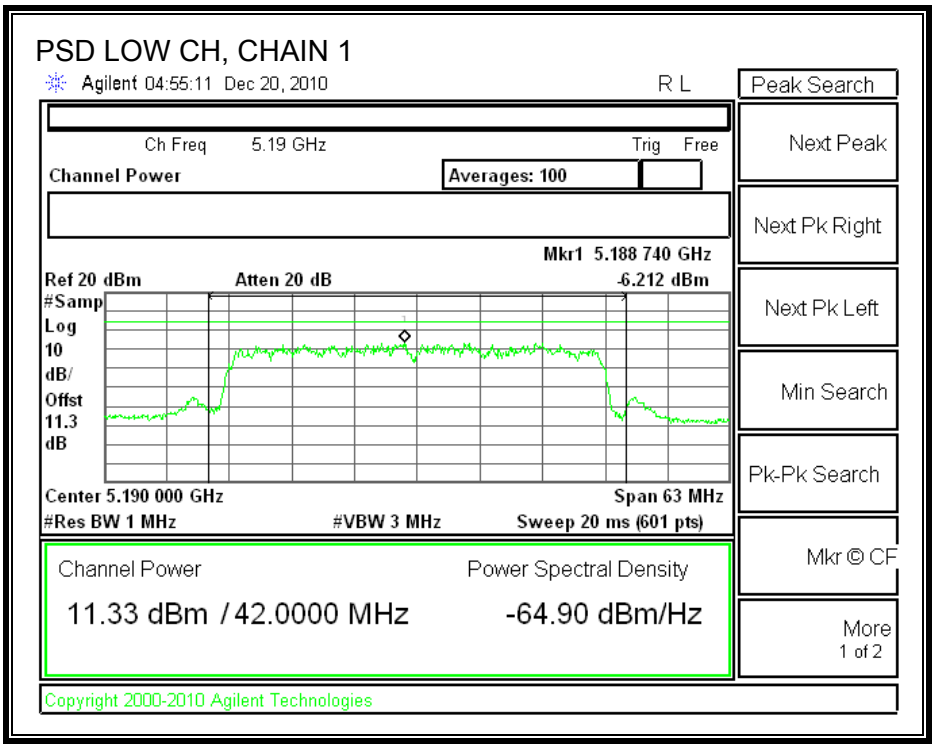
TEST PROCEDURE

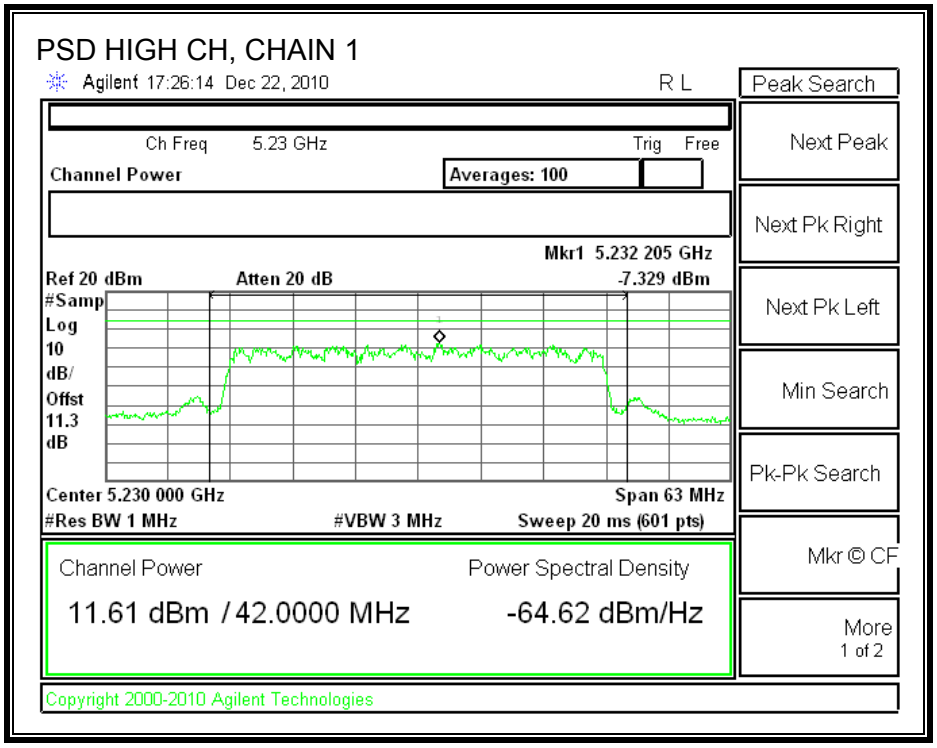
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002. PPSD method #2 was used.

RESULTS

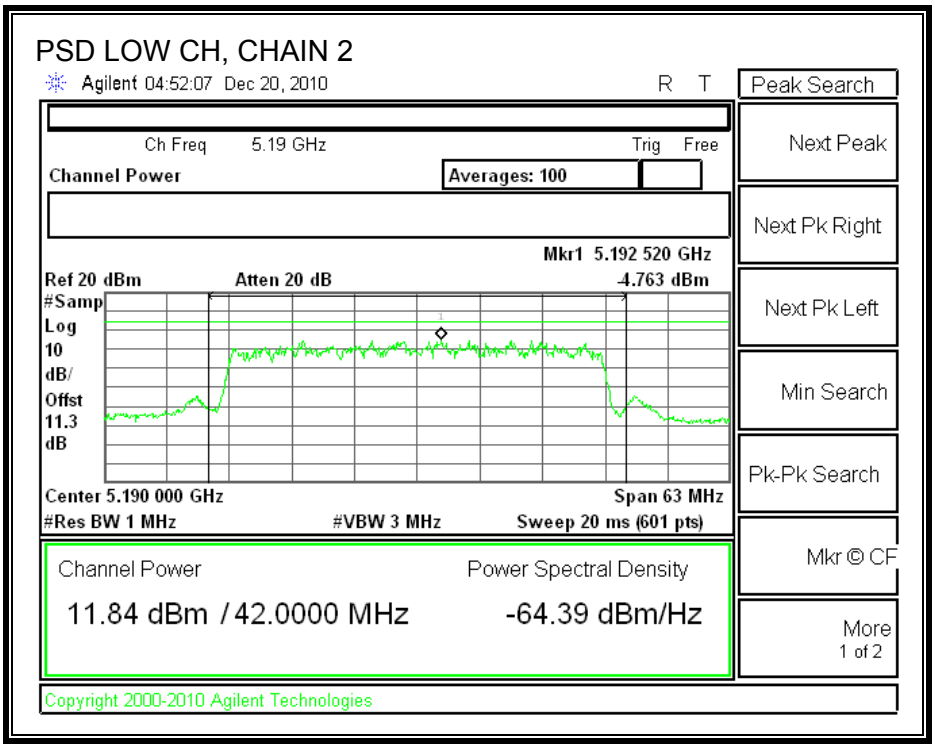
Channel	Frequency (MHz)	Chain 1 PPSD (dBm)	Chain 2 PPSD (dBm)	Chain 3 PPSD (dBm)	Total	Limit (dBm)	Margin (dB)
Low	5190	-6.212	-4.763	-4.998	-0.5	3.98	-4.49
High	5230	-7.329	-6.515	-7.131	-2.2	3.98	-6.19

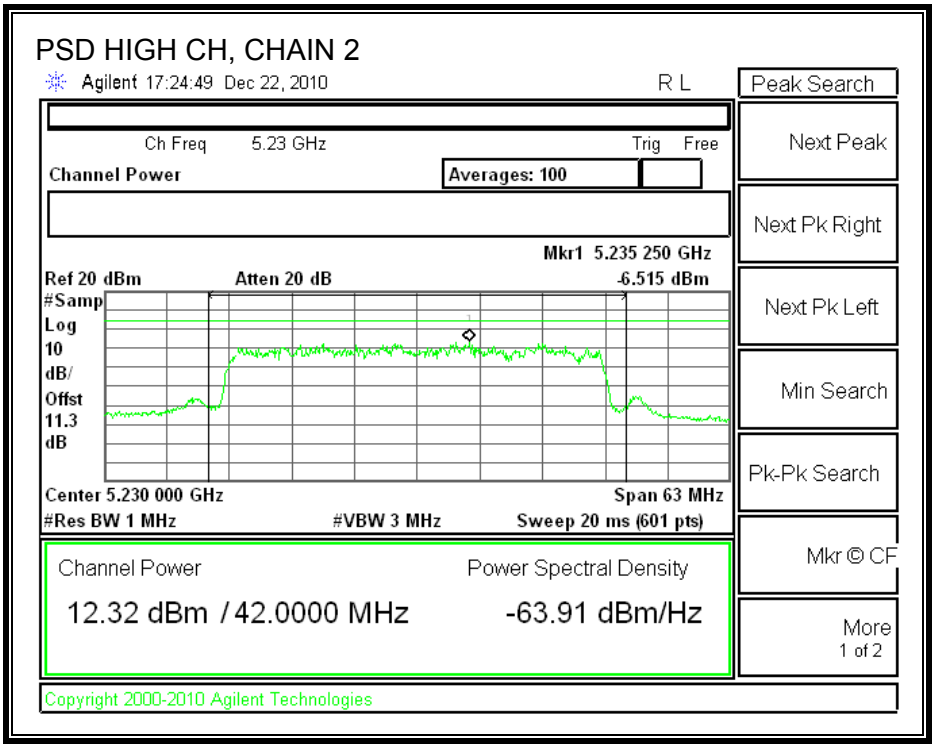
CHAIN 1 POWER SPECTRAL DENSITY



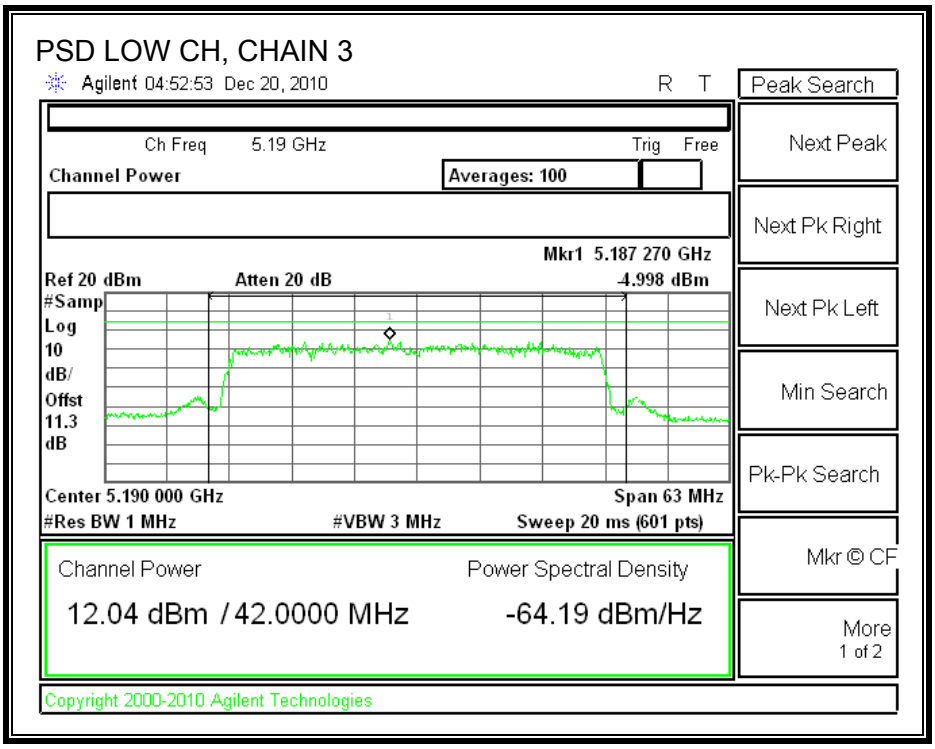


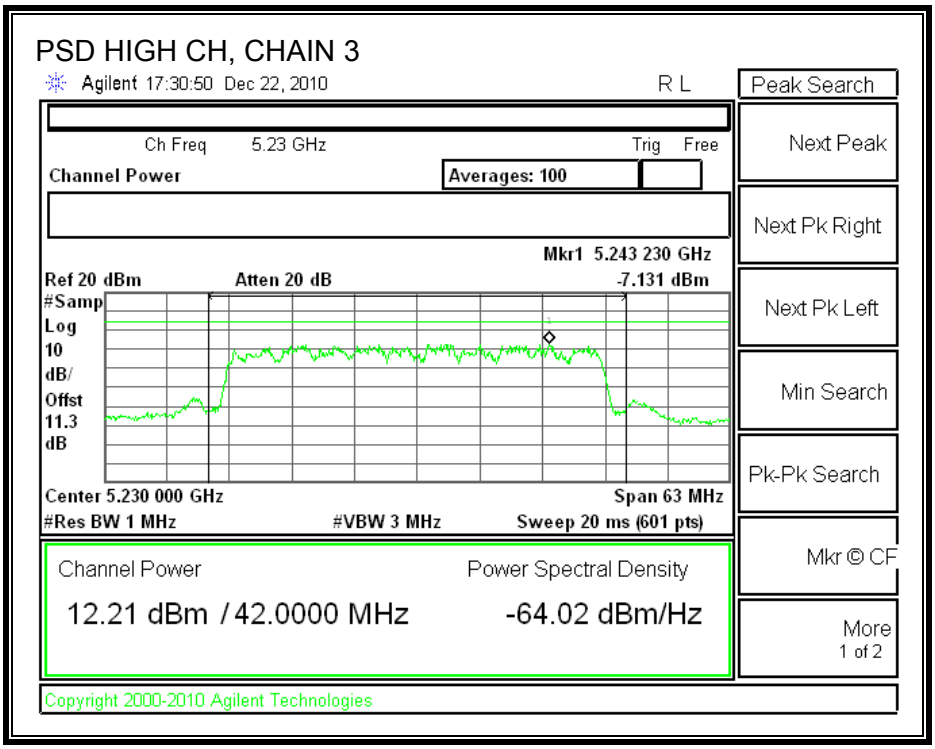
CHAIN 2 POWER SPECTRAL DENSITY





CHAIN 3 POWER SPECTRAL DENSITY





7.5.19. PEAK EXCURSION

LIMITS

FCC §15.407 (a) (6)

The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

TEST PROCEDURE

The transmitter outputs are connected to the spectrum analyzer via a combiner.

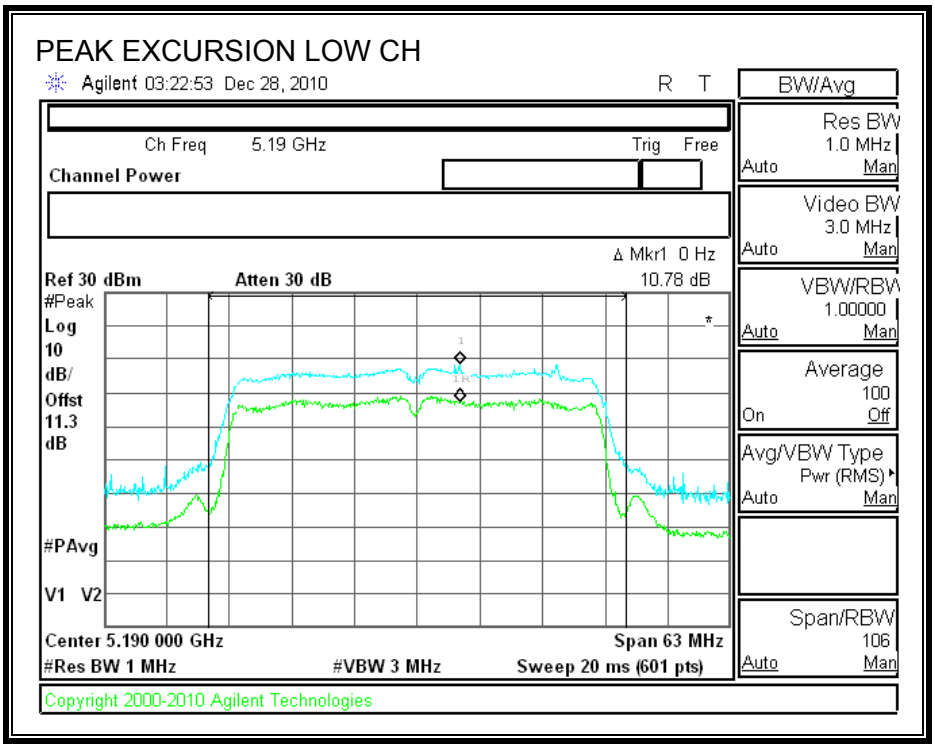
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

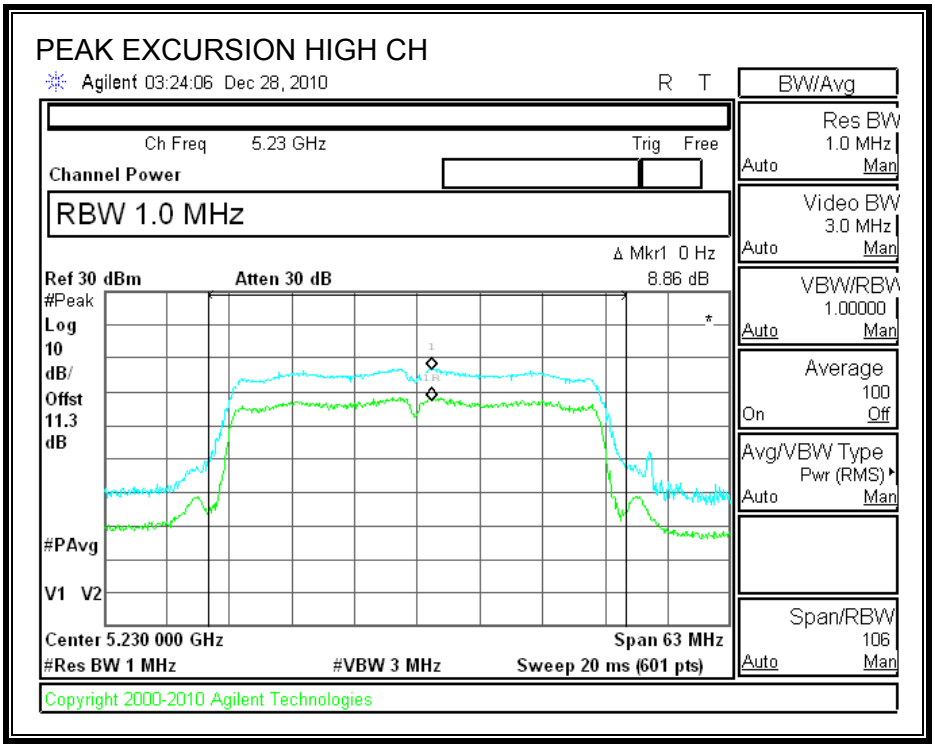
Since Method # 1 was used for peak power measurements, Method # 1 settings are used for the second PPSD trace.

RESULTS

Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5190	10.78	13	-2.22
High	5230	8.86	13	-4.14

PEAK EXCURSION





7.5.20. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.407 (b) (1)

IC RSS-210 A9.3 (1)

For transmitters operating in the 5.15-5.25 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm / MHz.

TEST PROCEDURE

Conducted RF measurements of the transmitter output are made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

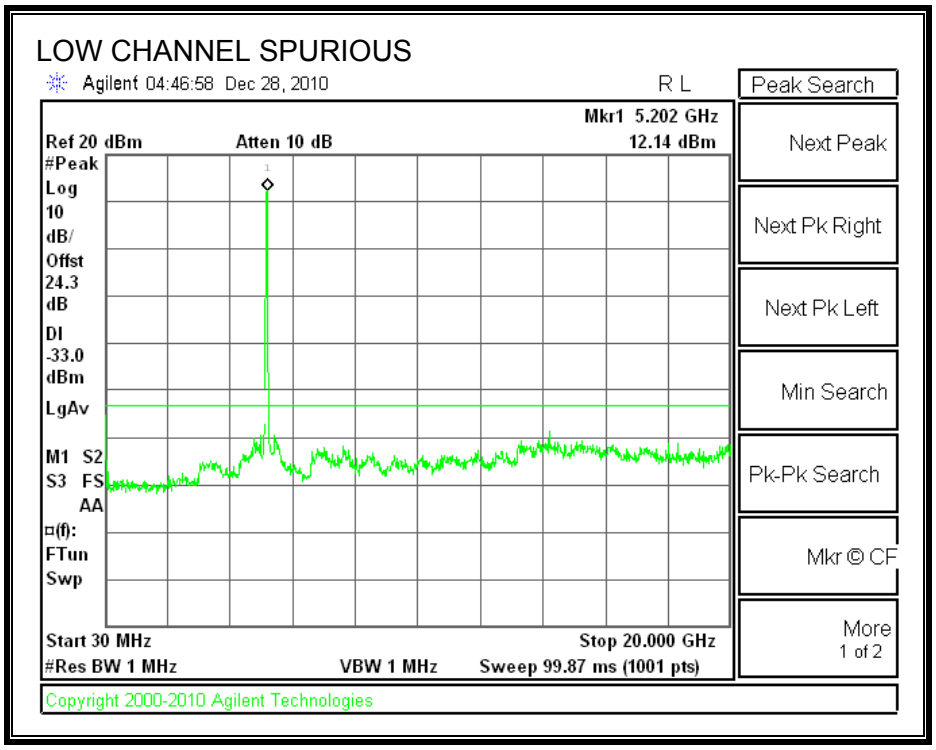
The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 1 MHz. Peak detection measurements are compared to EIRP limit, adjusted for the maximum antenna gain.

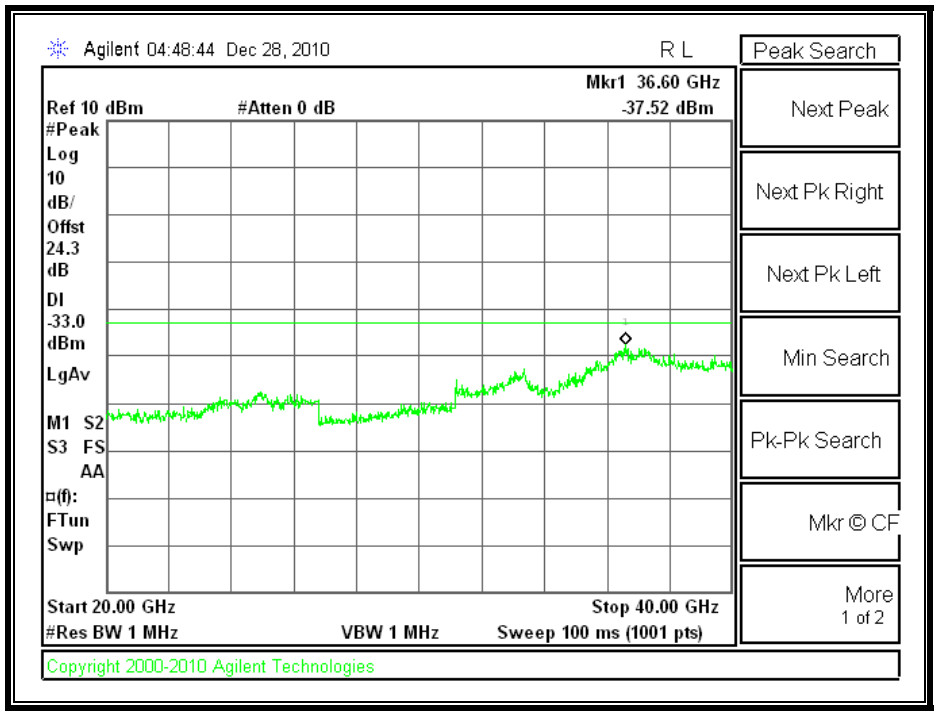
Measurements are made over the 30 MHz to 40 GHz range with the transmitter set to the lowest, middle, and highest channels.

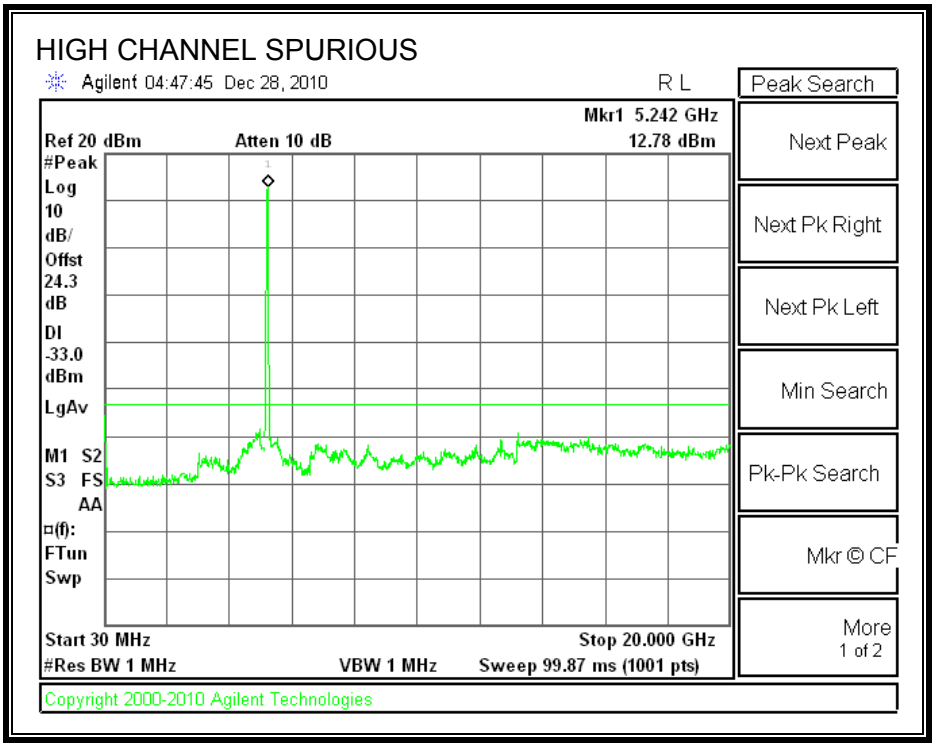
RESULTS

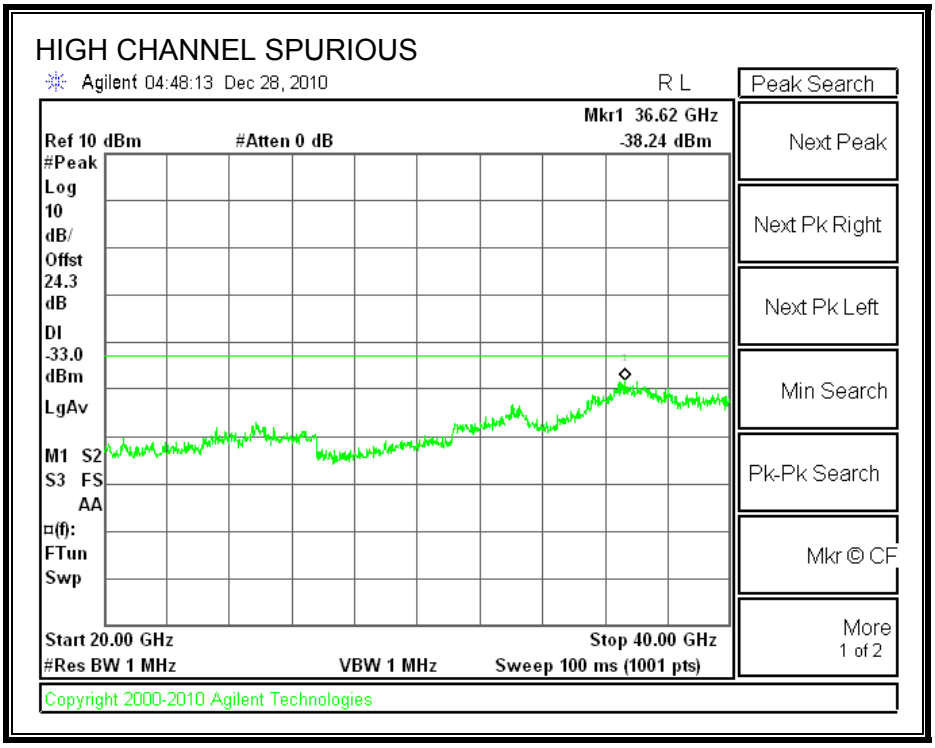
SPURIOUS EMISSIONS, COMBINER

LOW CHANNEL SPURIOUS









SDM MCS21

7.5.21. 26 dB and 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

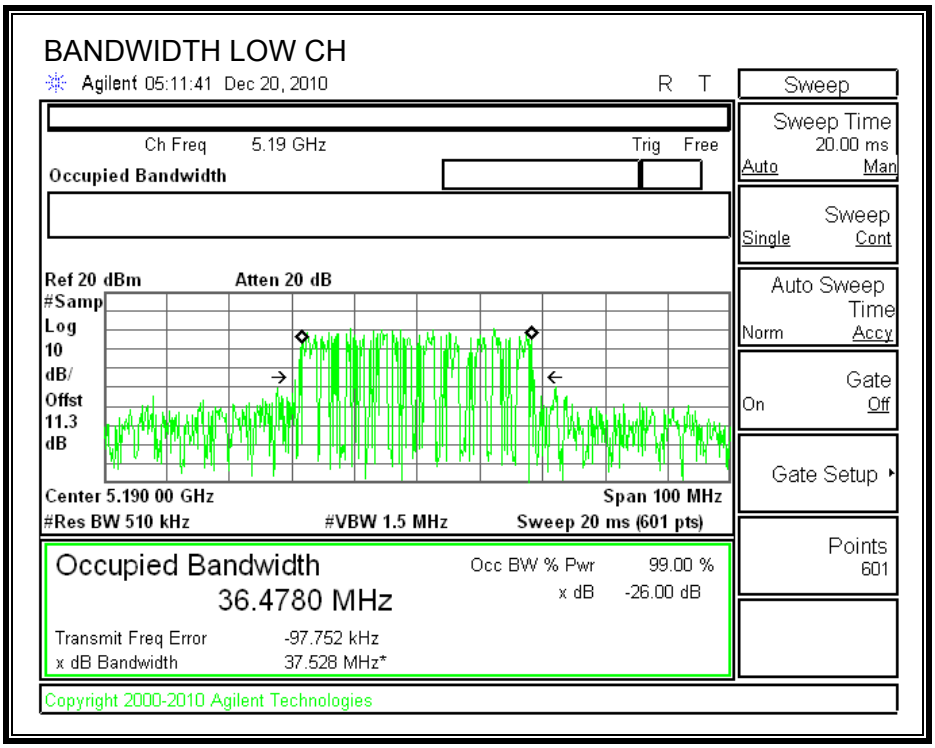
TEST PROCEDURE

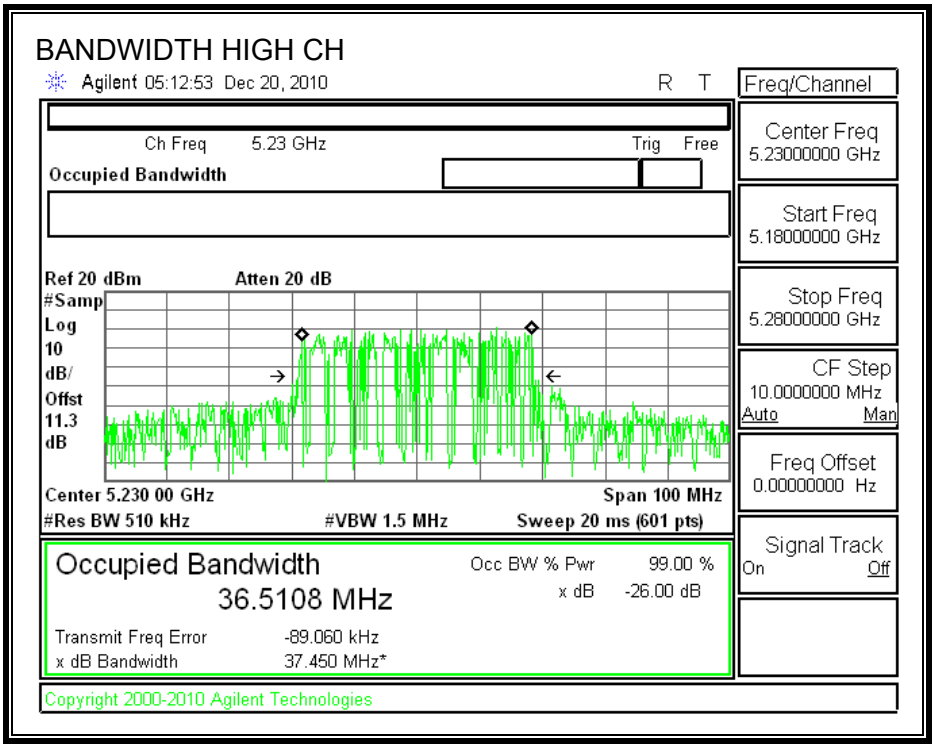
The transmitter outputs are connected to the spectrum analyzer via a combiner. The RBW is set to 1% to 3% of the measured bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth function is utilized.

RESULTS

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5190	37.528	36.4780
High	5230	37.450	36.5108

26 dB and 99% BANDWIDTH





7.5.22. OUTPUT POWER

LIMITS

FCC §15.407 (a) (1)

IC RSS-210 A9.2 (1)

For the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW or 4 dBm + 10 log B, where B is the 26-dB emission bandwidth in MHz. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

TEST PROCEDURE

The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

The transmitter output operates continuously therefore Method # 1 is used.

RESULTS

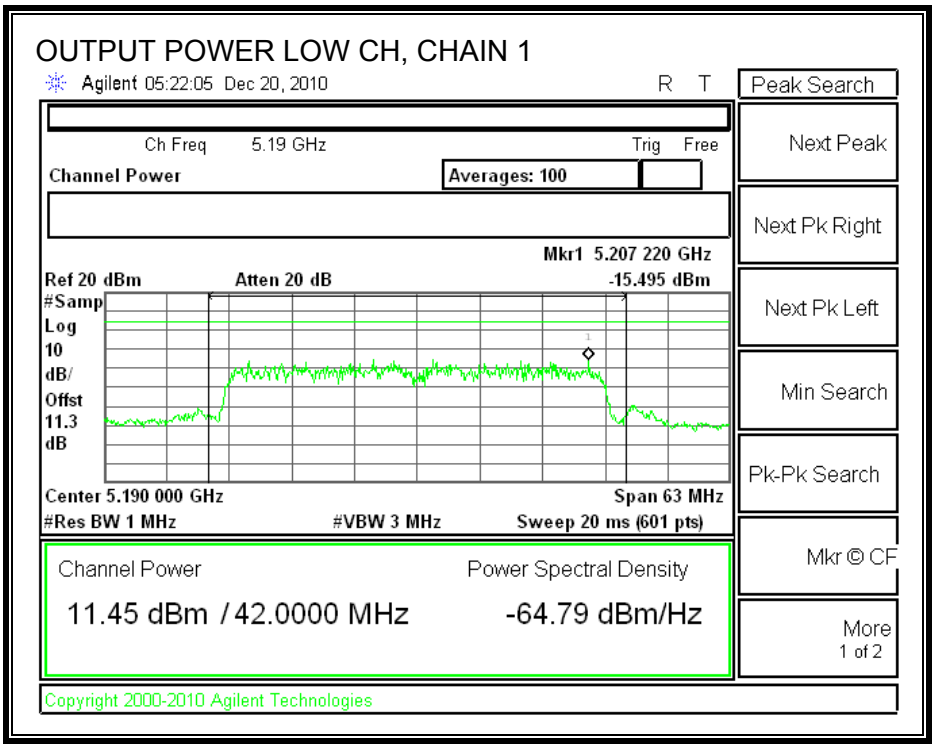
Limit

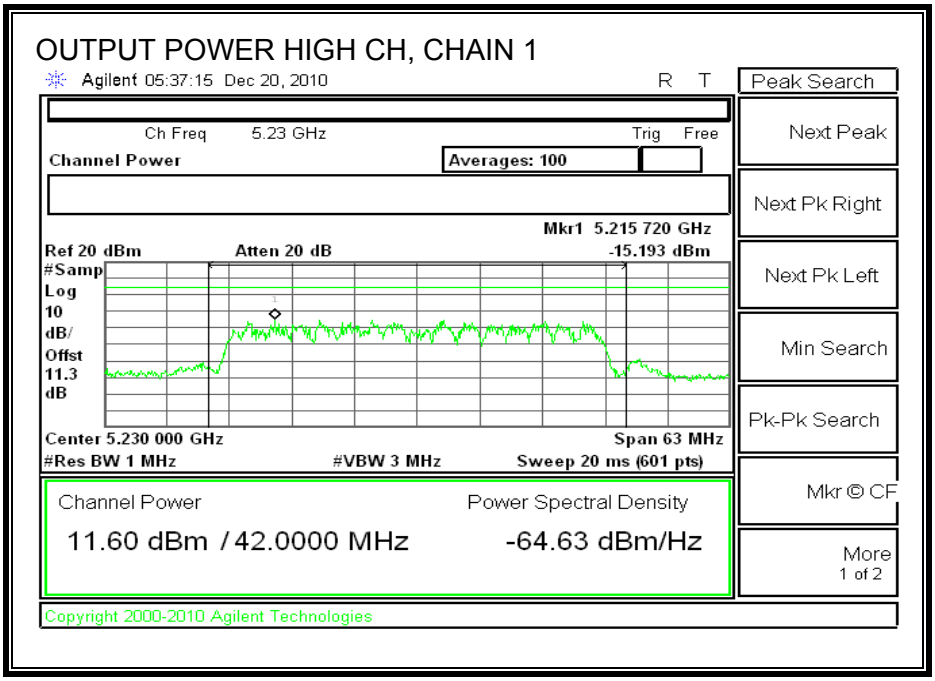
Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	4 + 10 Log B Limit (dBm)	Antenna Gain (dBi)	Limit (dBm)
Low	5190	16.99	37.528	19.74	6.02	16.97
High	5230	16.99	37.450	19.73	6.02	16.99

Individual Chain Results

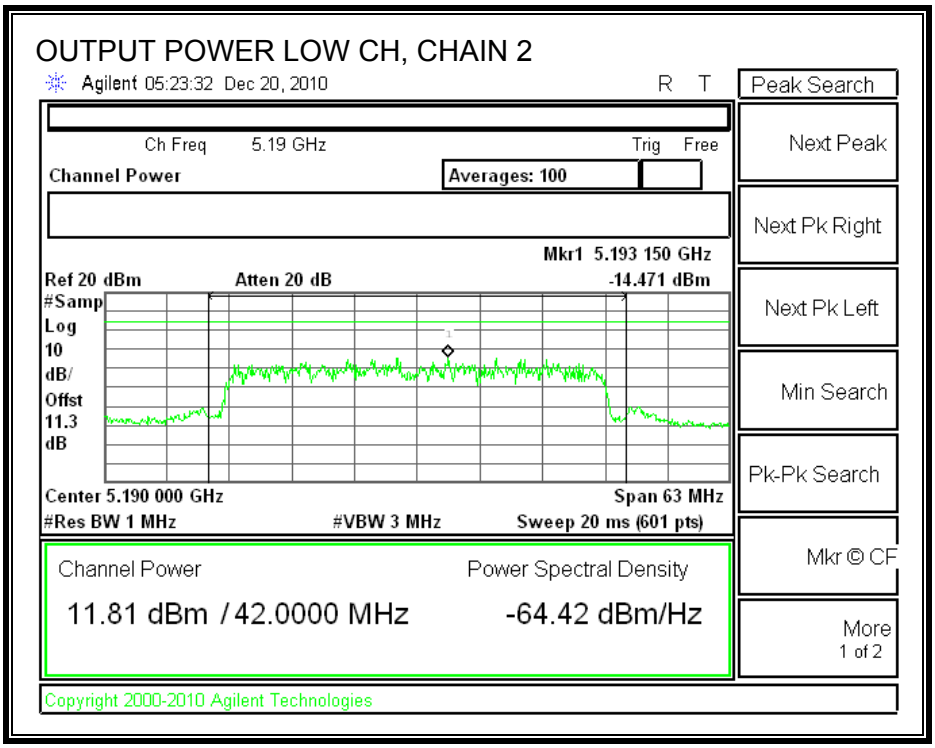
Channel	Frequency (MHz)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Chain 3 Power (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)
Low	5190	11.45	11.81	11.85	16.48	16.97	-0.49
High	5230	11.60	11.84	11.81	16.52	16.99	-0.47

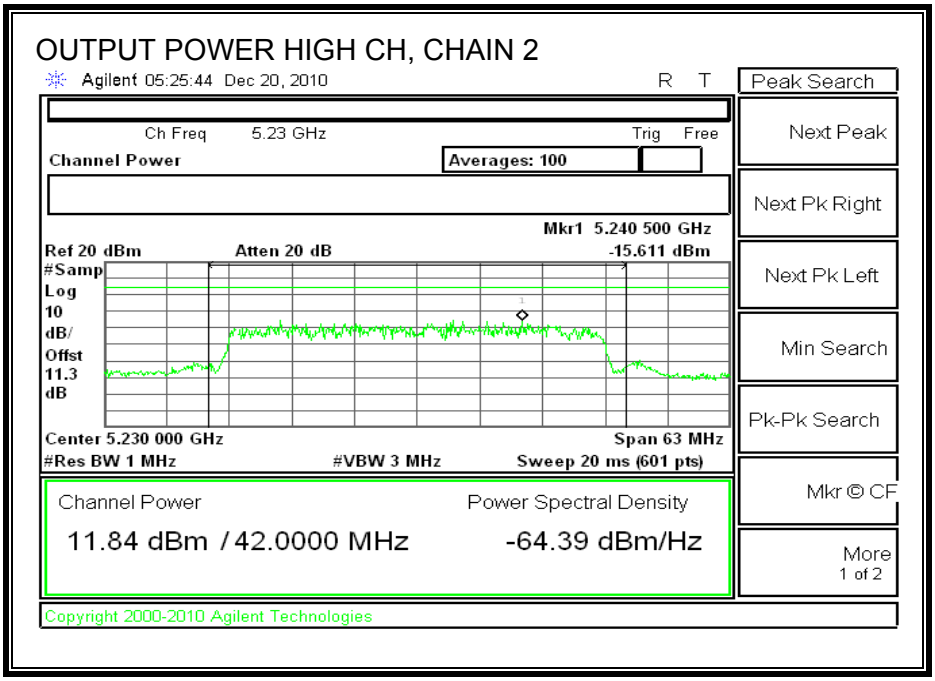
CHAIN 1 OUTPUT POWER



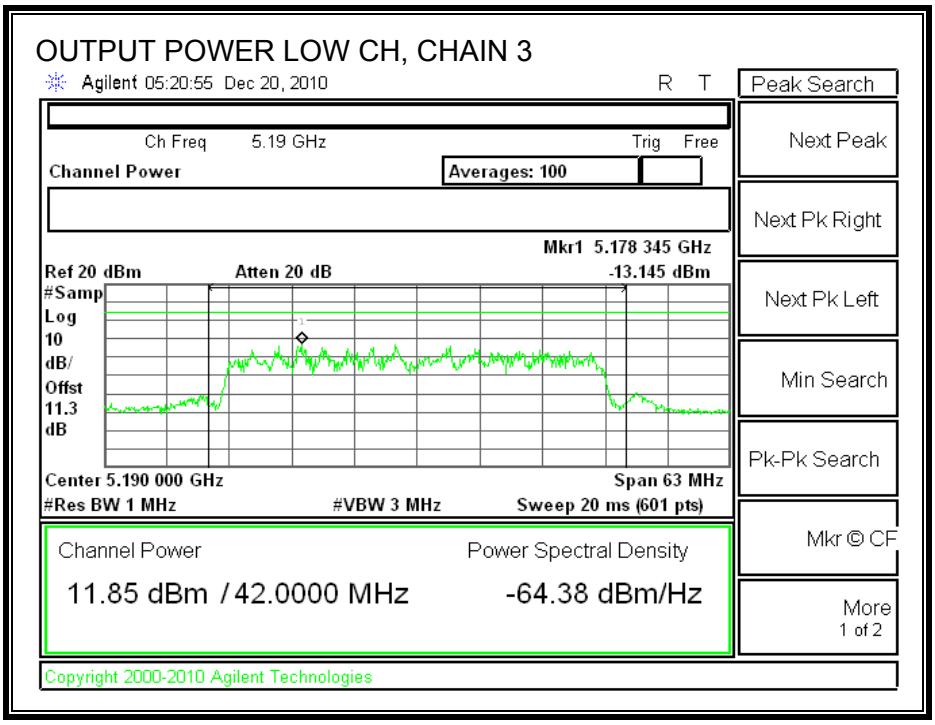


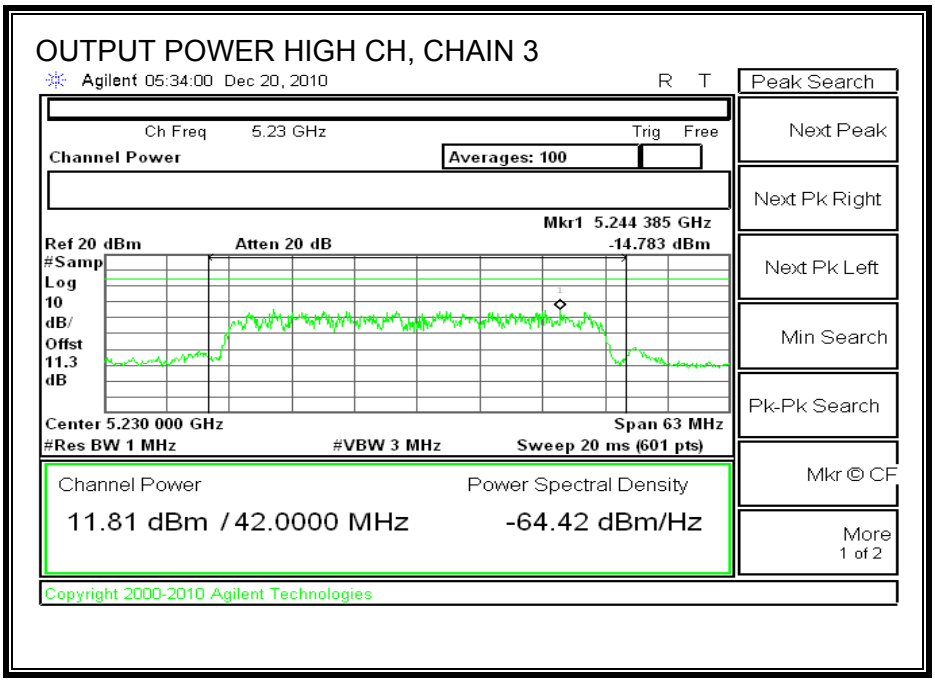
CHAIN 2 OUTPUT POWER





CHAIN 3 OUTPUT POWER





7.5.23. PEAK POWER SPECTRAL DENSITY

LIMITS

FCC §15.407 (a) (1)

IC RSS-210 A9.2 (1)

For the 5.15-5.25 GHz band, the peak power spectral density shall not exceed 4 dBm in any 1 MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The maximum antenna gain is 6.02 dBi, therefore the limit is 3.98 dBm.

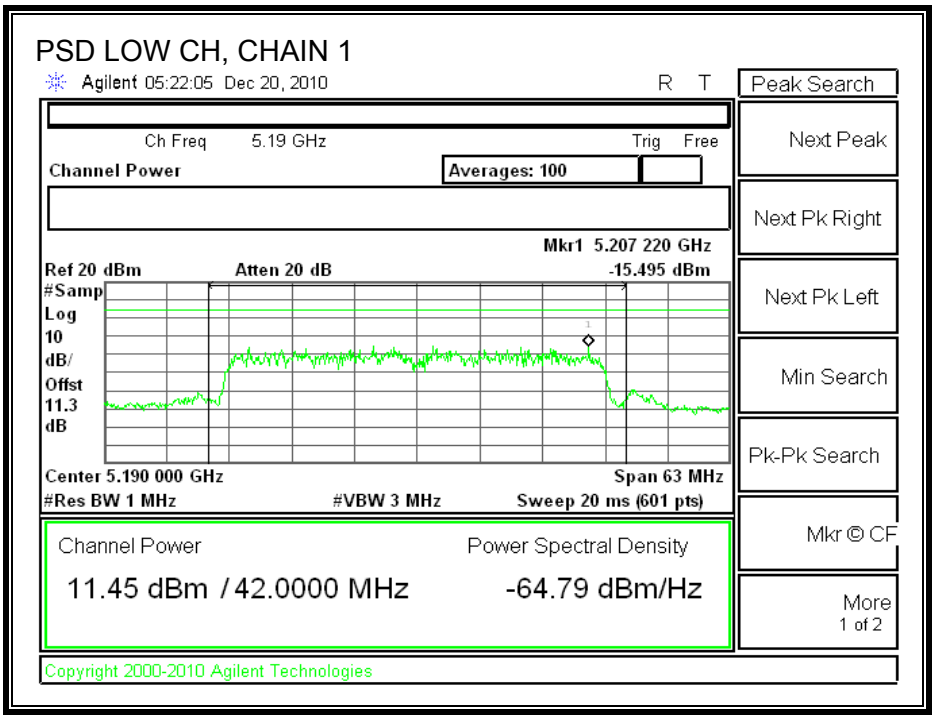
TEST PROCEDURE

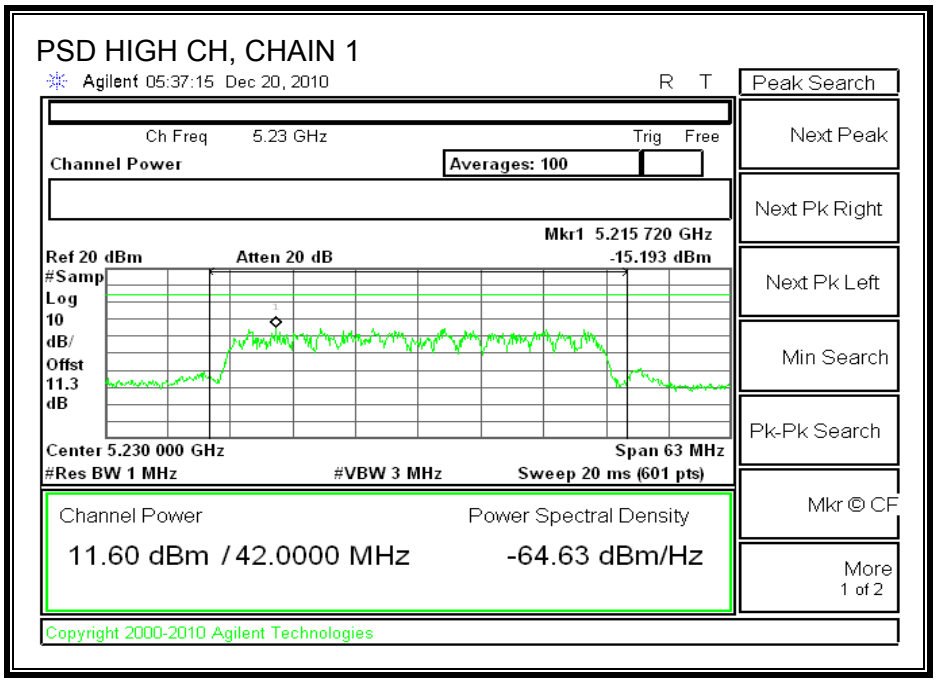
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002. PPSD method #2 was used.

RESULTS

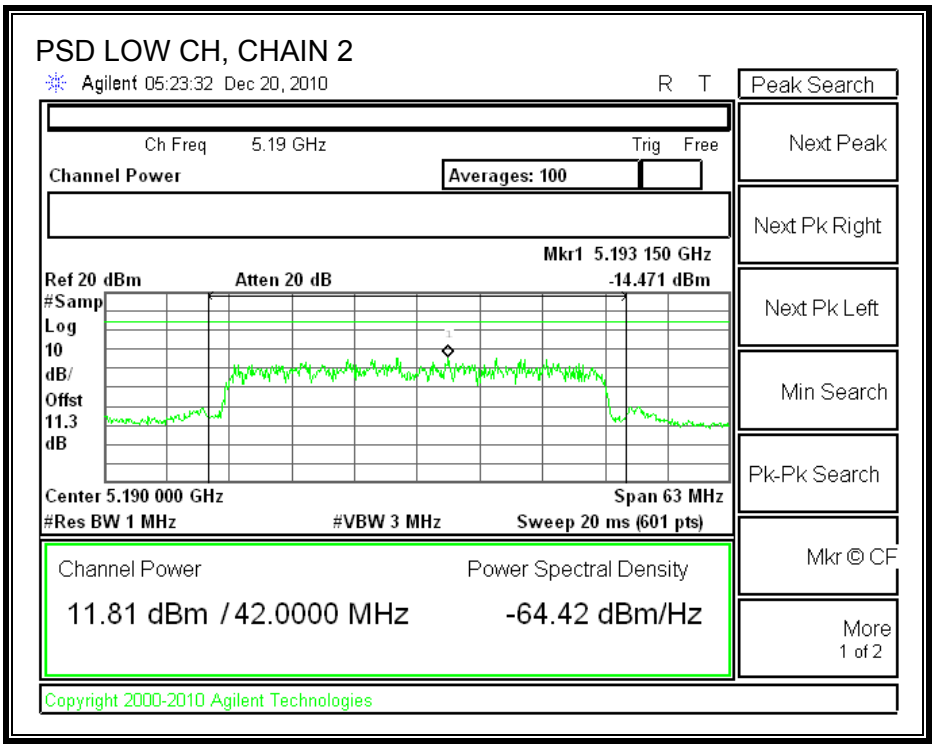
Channel	Frequency (MHz)	Chain 1 PPSD (dBm)	Chain 2 PPSD (dBm)	Chain 3 PPSD (dBm)	Total	Limit (dBm)	Margin (dB)
Low	5190	-15.495	-14.471	-13.145	-9.5	3.98	-13.47
High	5230	-15.193	-15.611	-14.783	-10.4	3.98	-14.39

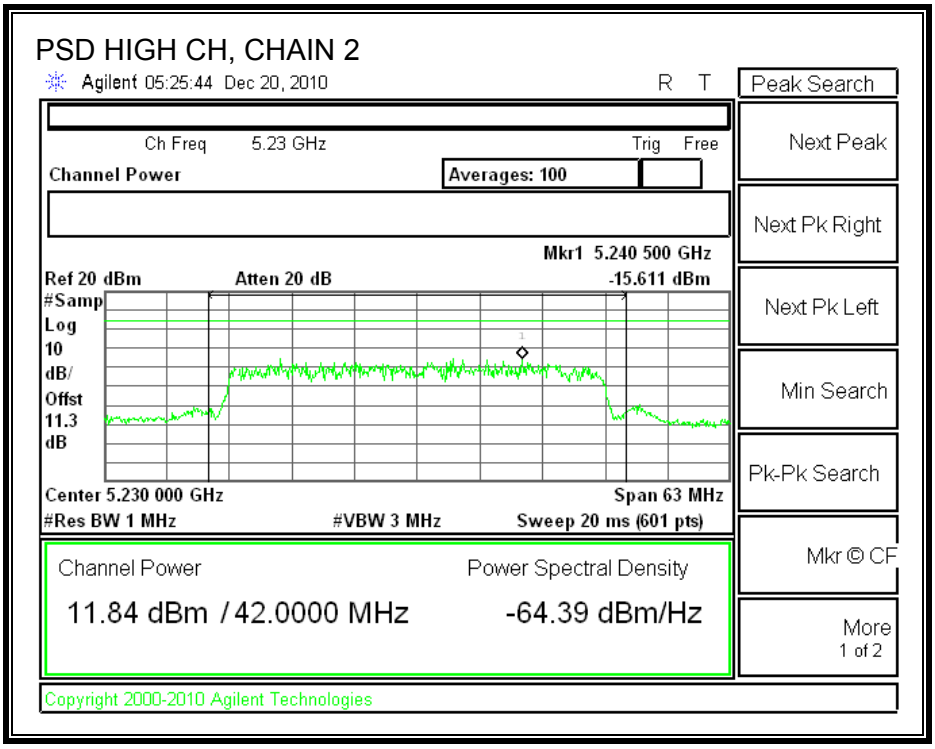
CHAIN 1 POWER SPECTRAL DENSITY



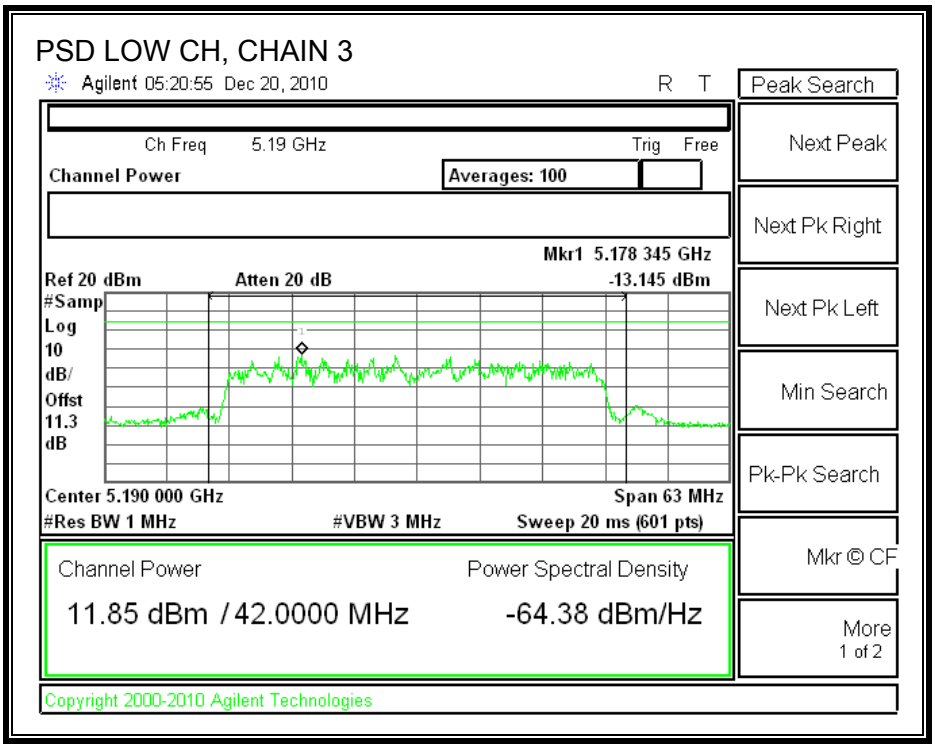


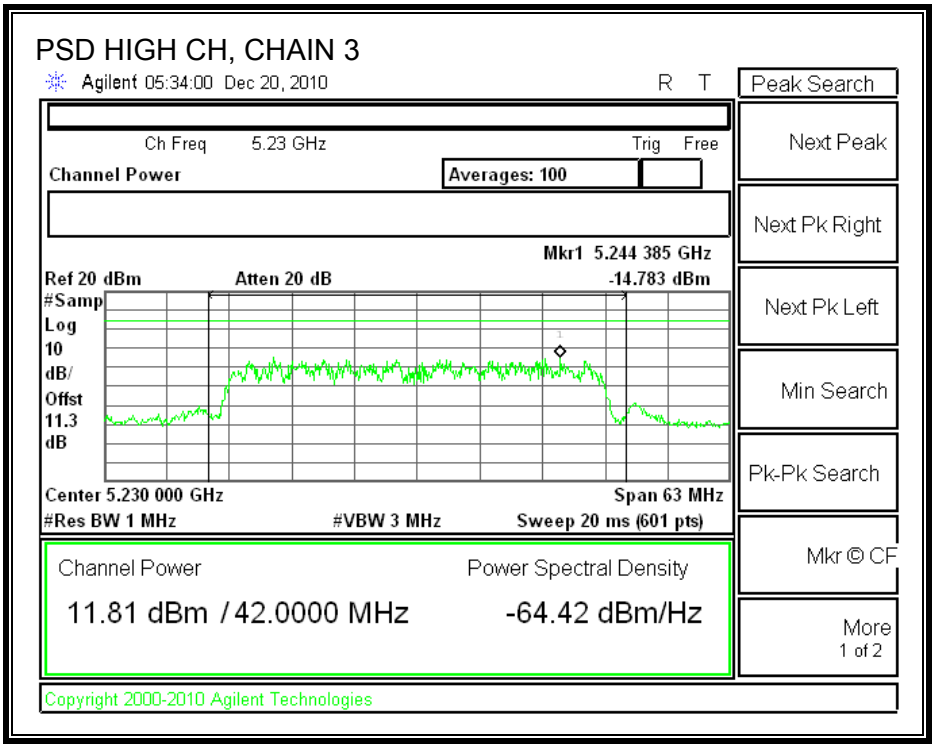
CHAIN 2 POWER SPECTRAL DENSITY





CHAIN 3 POWER SPECTRAL DENSITY





7.5.24. PEAK EXCURSION

LIMITS

FCC §15.407 (a) (6)

The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

TEST PROCEDURE

The transmitter outputs are connected to the spectrum analyzer via a combiner.

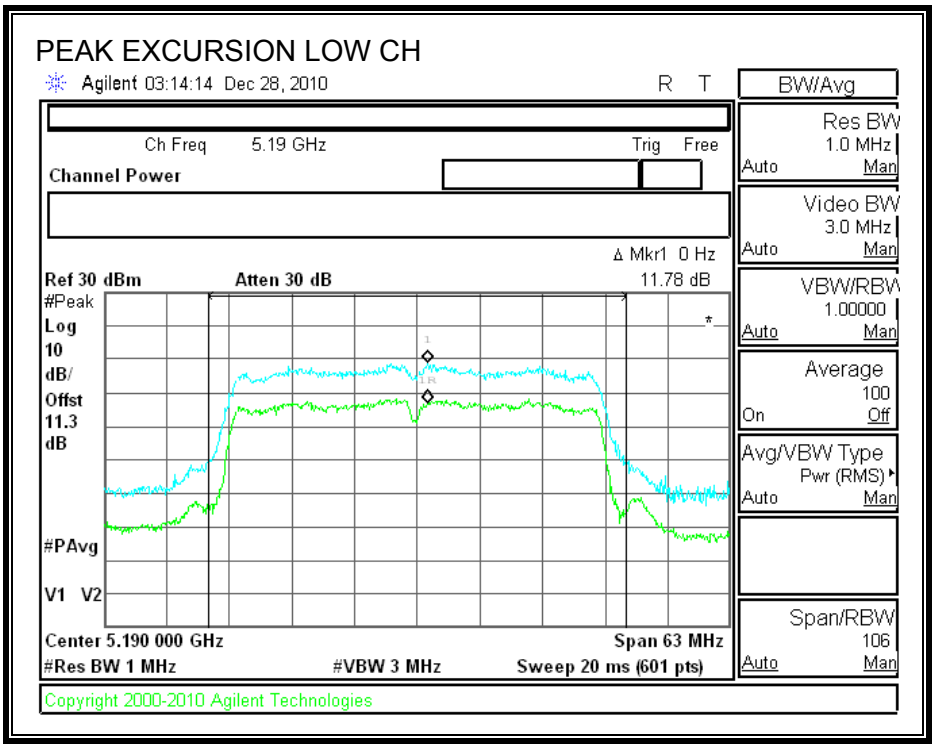
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

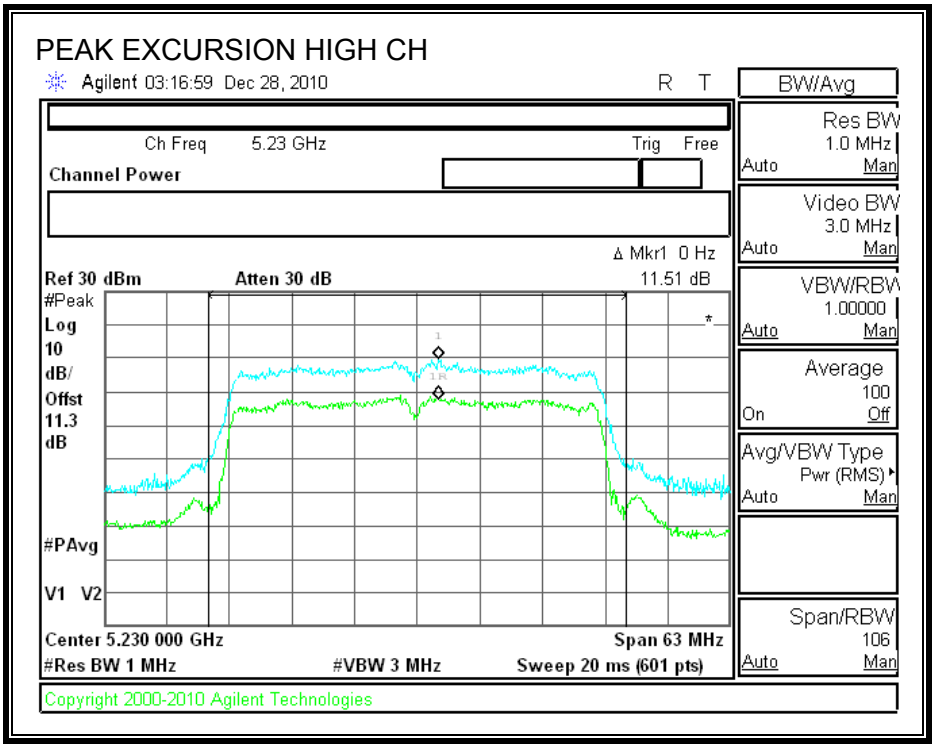
Since Method # 1 was used for peak power measurements, Method # 1 settings are used for the second PPSD trace.

RESULTS

Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5190	11.78	13	-1.22
High	5230	11.51	13	-1.49

PEAK EXCURSION





7.5.25. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.407 (b) (1)

IC RSS-210 A9.3 (1)

For transmitters operating in the 5.15-5.25 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm / MHz.

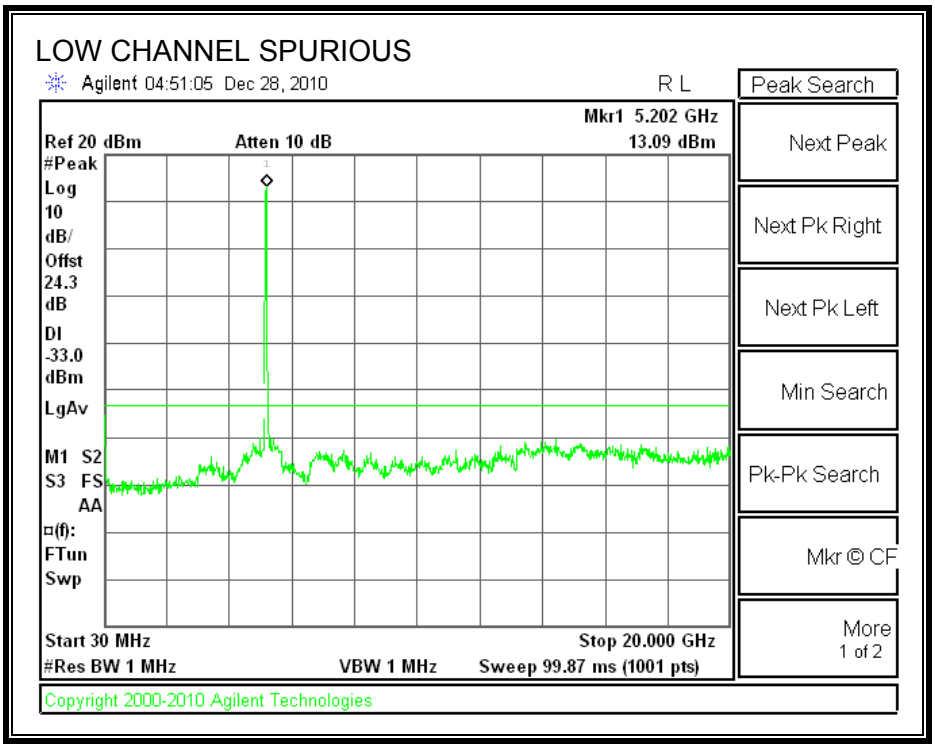
TEST PROCEDURE

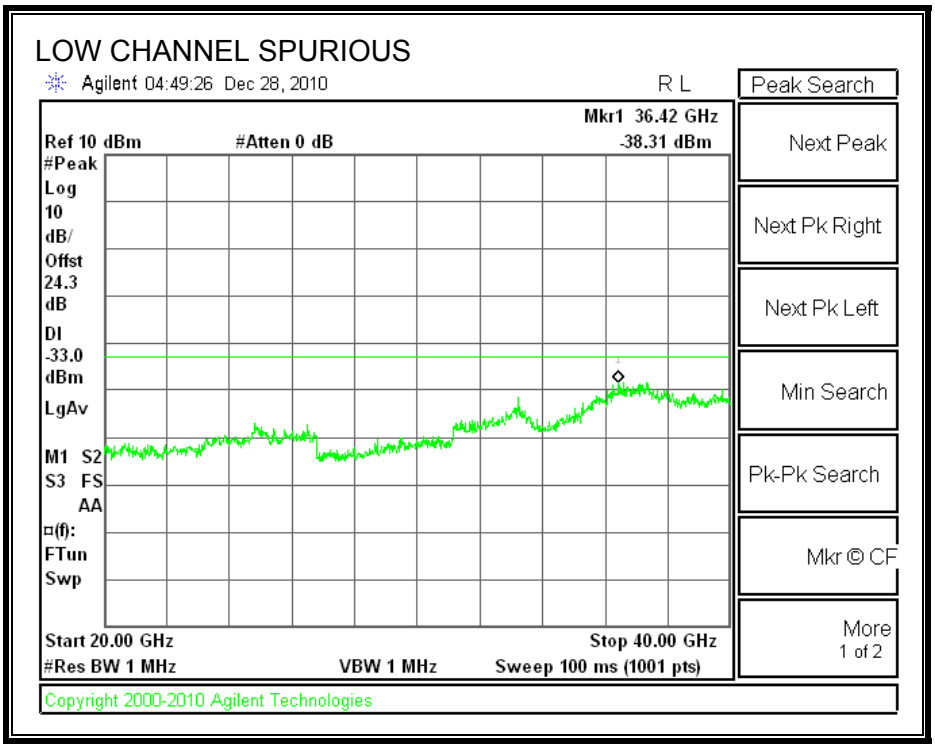
Conducted RF measurements of the transmitter output are made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 1 MHz. Peak detection measurements are compared to EIRP limit, adjusted for the maximum antenna gain.

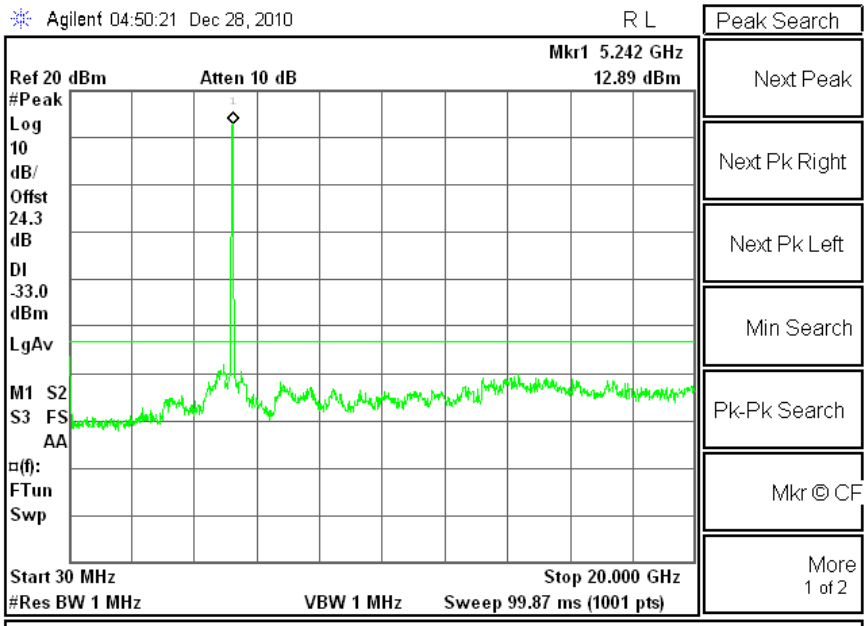
Measurements are made over the 30 MHz to 40 GHz range with the transmitter set to the lowest, middle, and highest channels.

CHAIN 1 SPURIOUS EMISSIONS - COMBINER

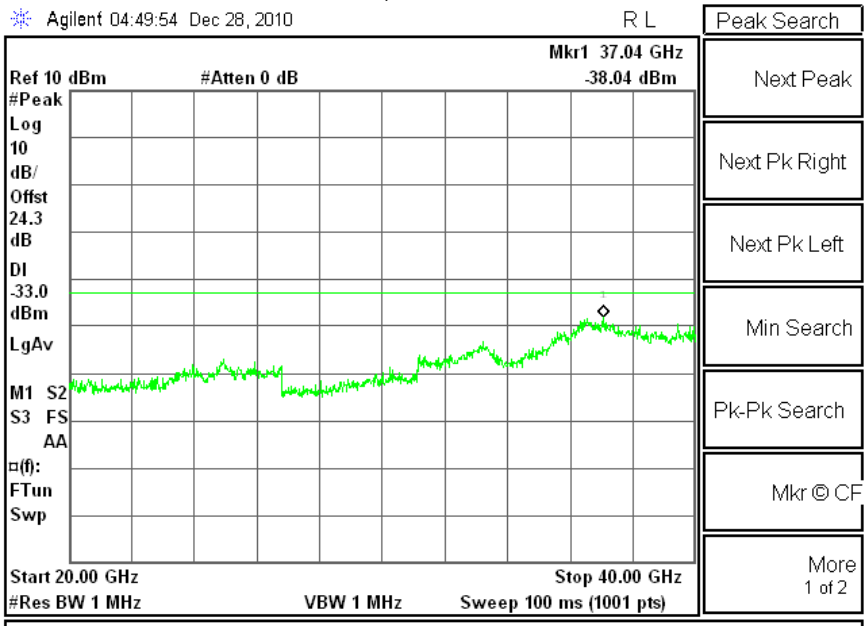




HIGH CHANNEL SPURIOUS



HIGH CHANNEL SPURIOUS, CHAIN 1



7.6. 802.11a LEGACY MODE IN THE 5.3 GHz BAND

7.6.1. 26 dB and 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

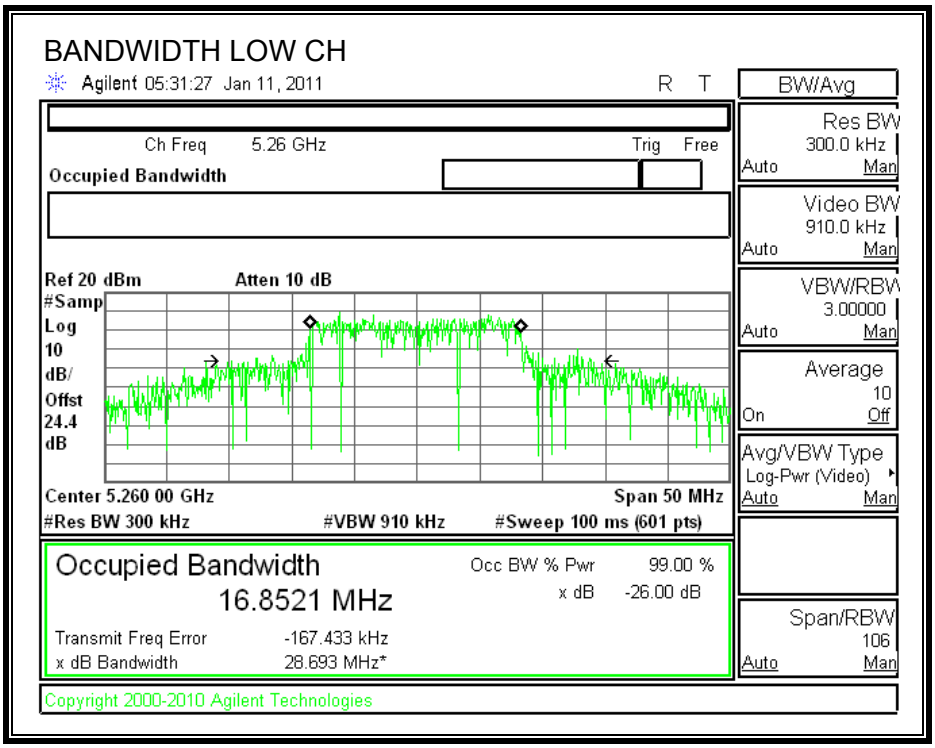
TEST PROCEDURE

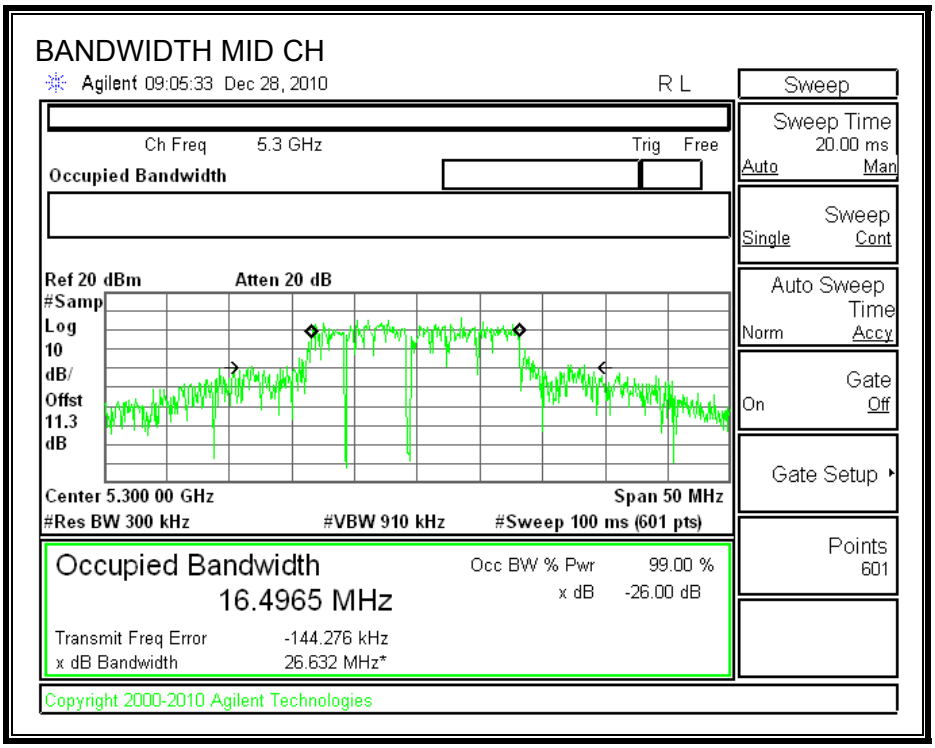
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the measured bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth function is utilized.

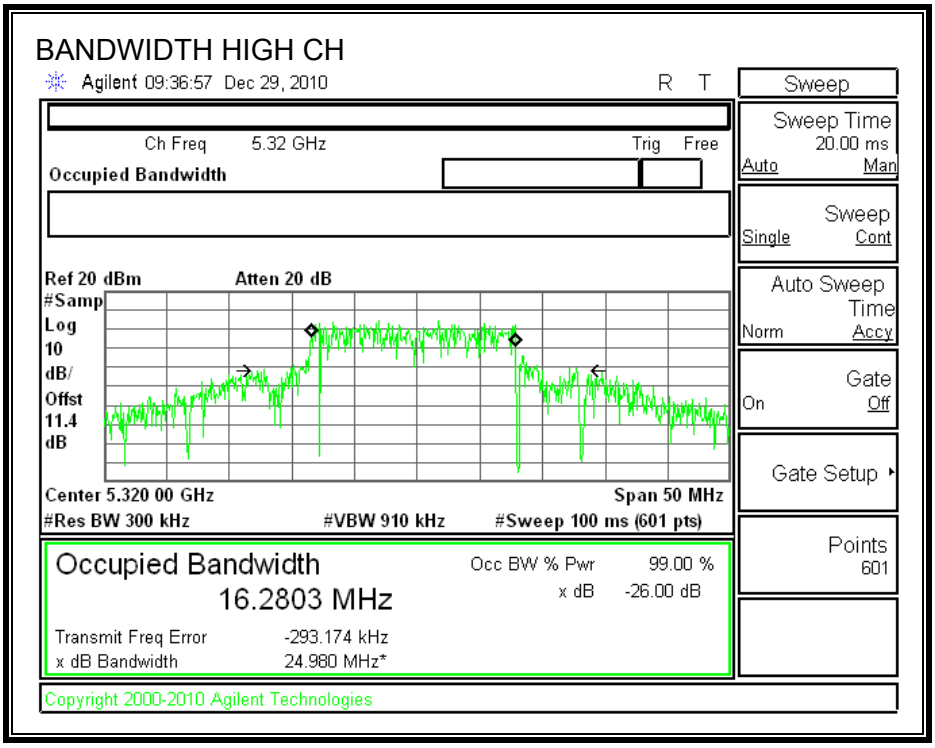
RESULTS

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5260	28.693	16.8521
Middle	5300	26.632	16.4965
High	5320	24.98	16.2803

26 dB and 99% BANDWIDTH







7.6.2. OUTPUT POWER

LIMITS

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

For the 5.25-5.35 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26-dB emission bandwidth in MHz. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

TEST PROCEDURE

The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

The transmitter output operates continuously therefore Method # 1 is used.

RESULTS

Limit

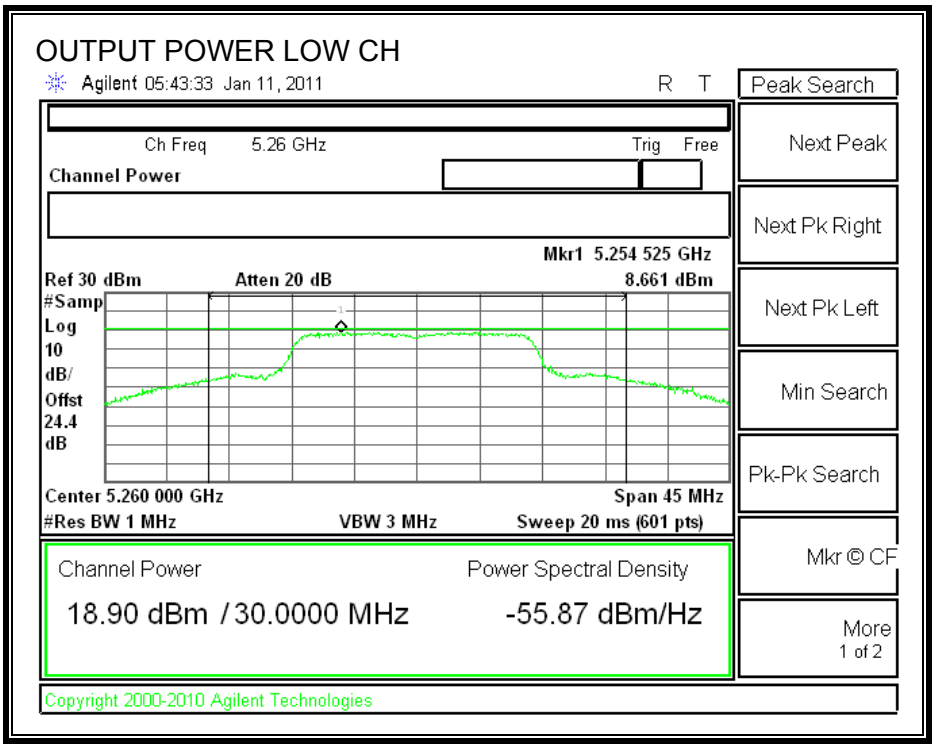
Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	11 + 10 Log B Limit (dBm)	Antenna Gain (dBi)	Limit (dBm)
Low	5300	24	28.693	25.58	6.80	23.20
Mid	5300	24	26.632	25.25	6.80	23.20
High	5320	24	24.98	24.98	6.80	23.20

Results

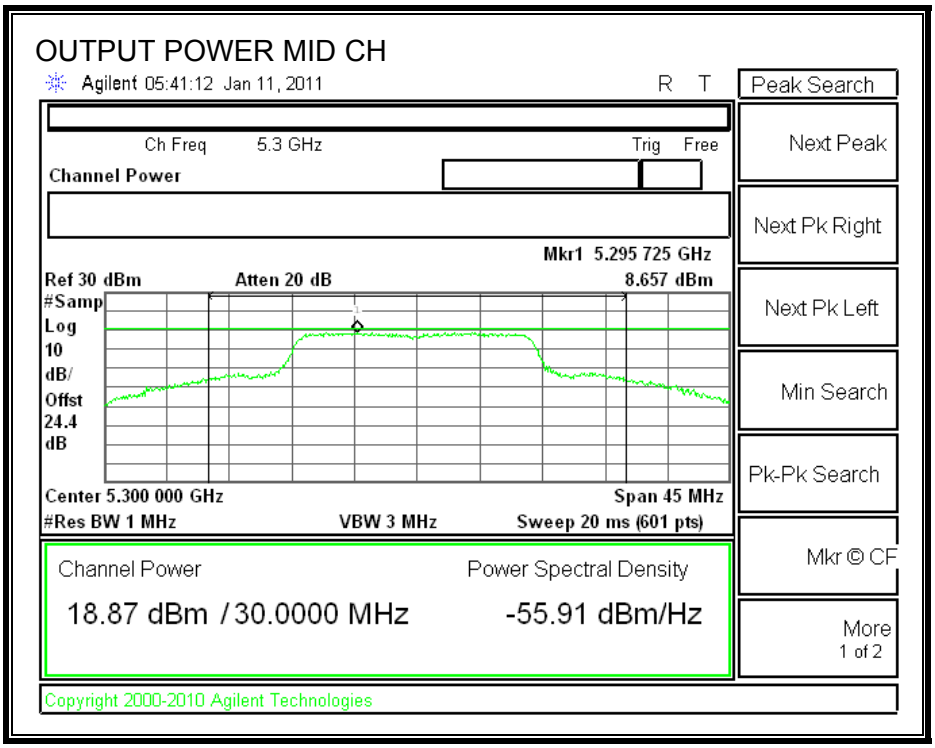
Channel	Frequency (MHz)	Power (dBm)	Limit (dBm)	Margin (dB)
Low	5260	18.90	23.20	-4.30
Mid	5300	18.87	23.20	-4.33
High	5320	17.92	23.20	-5.28

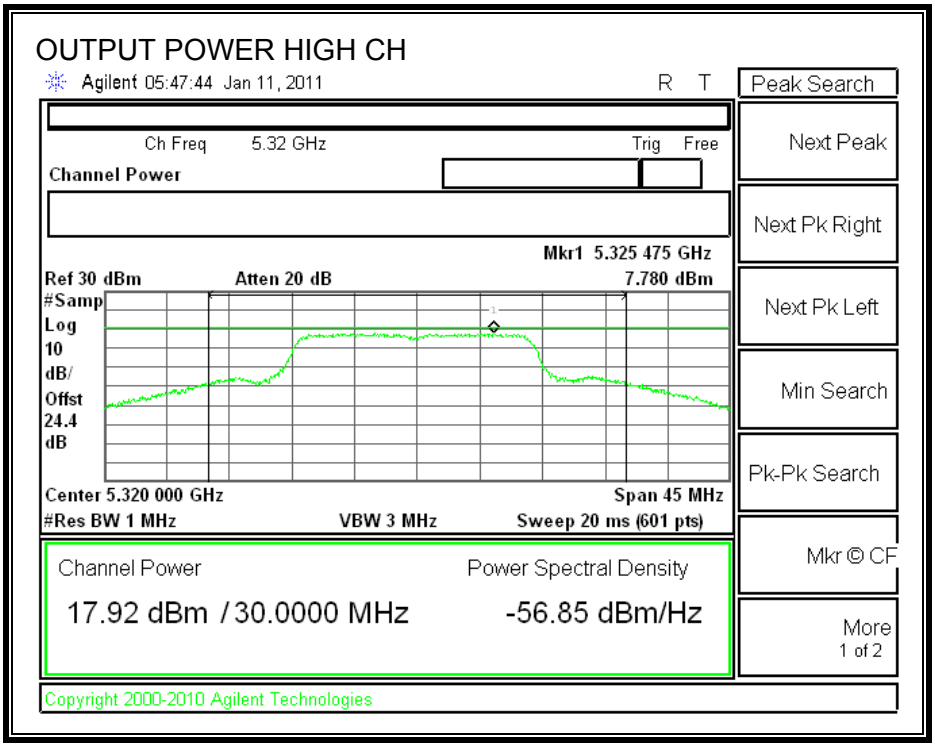
OUTPUT POWER

OUTPUT POWER LOW CH



OUTPUT POWER MID CH





7.6.3. PEAK POWER SPECTRAL DENSITY

LIMITS

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

For the 5.25–5.35 GHz band, the peak power spectral density shall not exceed 11 dBm in any 1 MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The maximum antenna gain is 6.8 dBi, therefore the limit is 10.2 dBm.

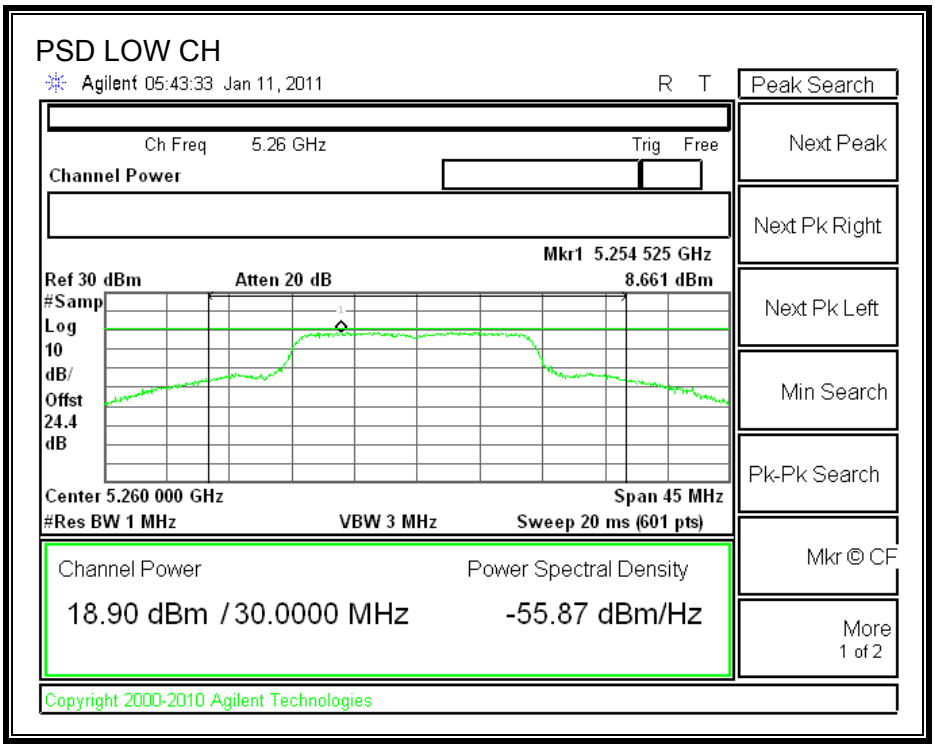
TEST PROCEDURE

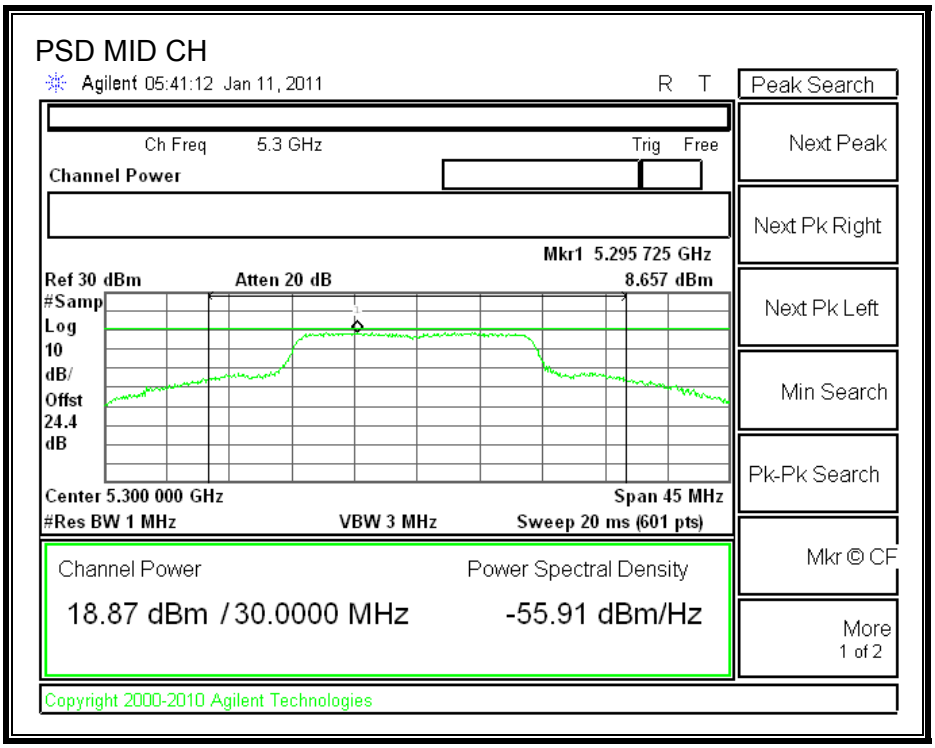
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002. PPSD method #2 was used.

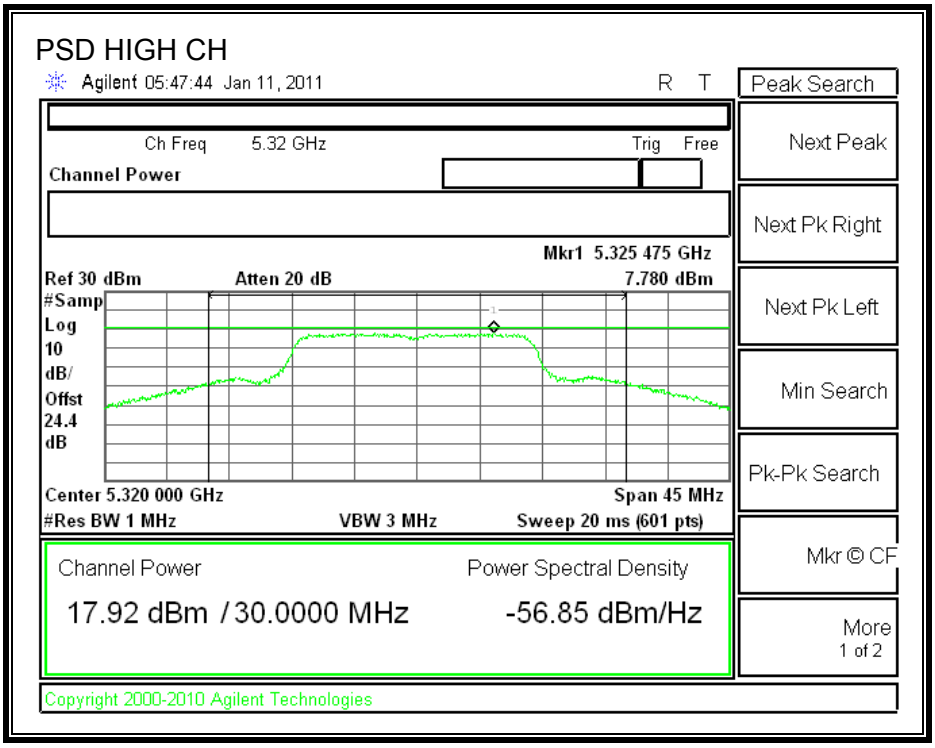
RESULTS

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	5260	8.661	10.2	-1.54
Middle	5300	8.657	10.2	-1.54
High	5320	7.780	10.2	-2.42

POWER SPECTRAL DENSITY







7.6.4. PEAK EXCURSION

LIMITS

FCC §15.407 (a) (6)

The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

TEST PROCEDURE

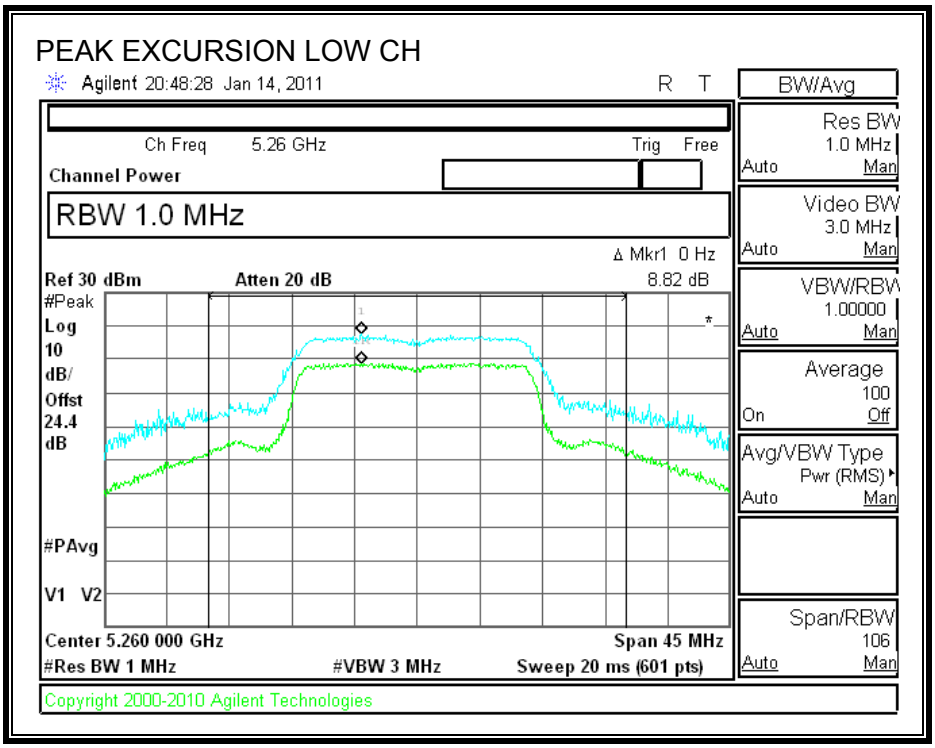
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

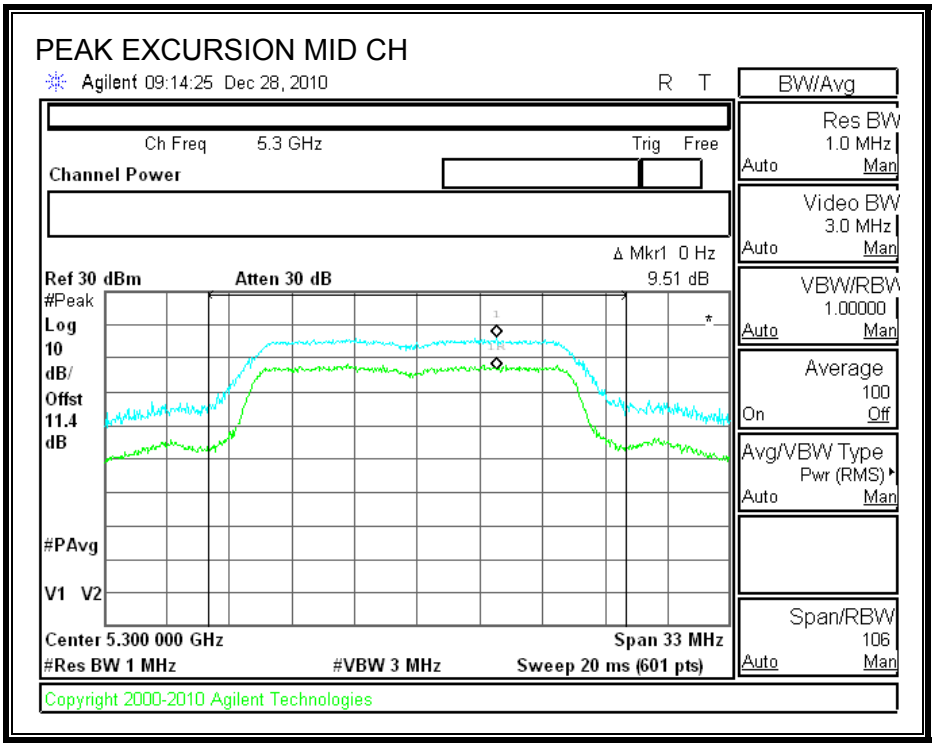
Since Method # 1 was used for peak power measurements, Method # 1 settings are used for the second PPSD trace.

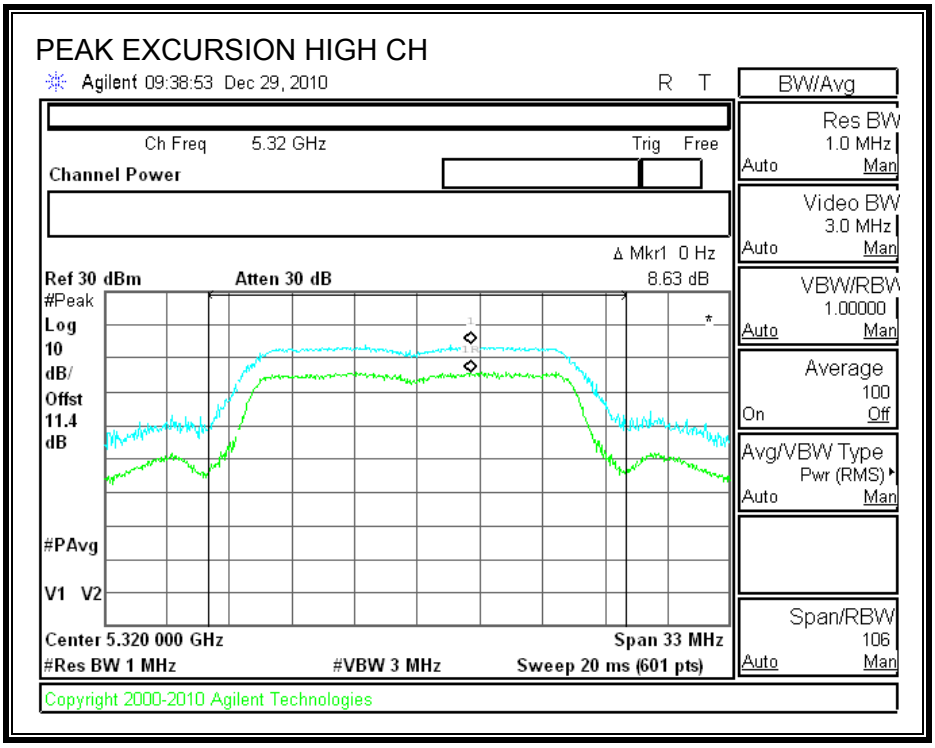
RESULTS

Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5260	8.82	13	-4.18
Middle	5300	9.51	13	-3.49
High	5320	8.63	13	-4.37

PEAK EXCURSION







7.6.5. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.407 (b) (2)

IC RSS-210 A9.3 (2)

For transmitters operating in the 5.25-5.35 GHz band: all emissions outside of the 5.25-5.35 GHz band shall not exceed an EIRP of -27 dBm / MHz.

Devices operating in the 5.25-5.35 GHz band that generate emissions in the 5.15-5.25 GHz band must meet all applicable technical requirements for operation in the 5.15-5.25 GHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5.15-5.25 GHz band.

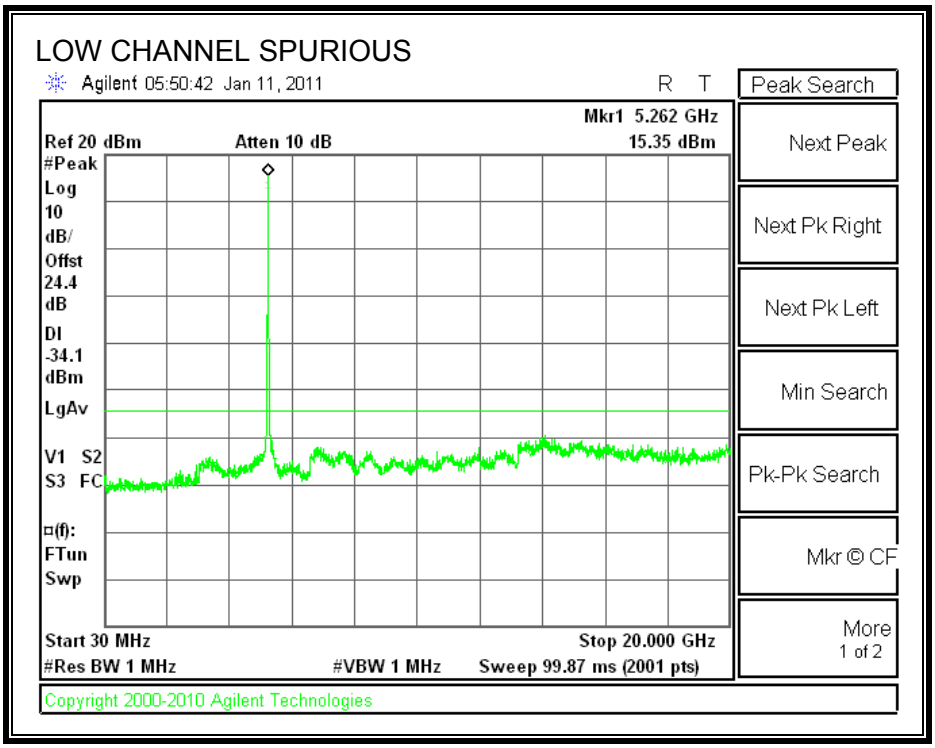
TEST PROCEDURE

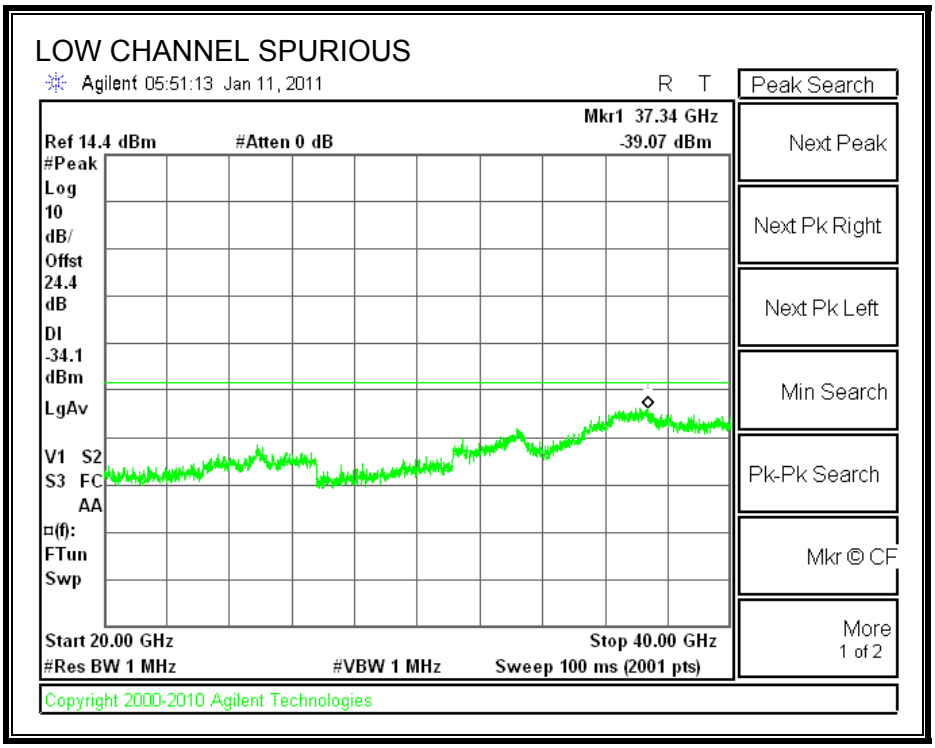
Conducted RF measurements of the transmitter output are made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

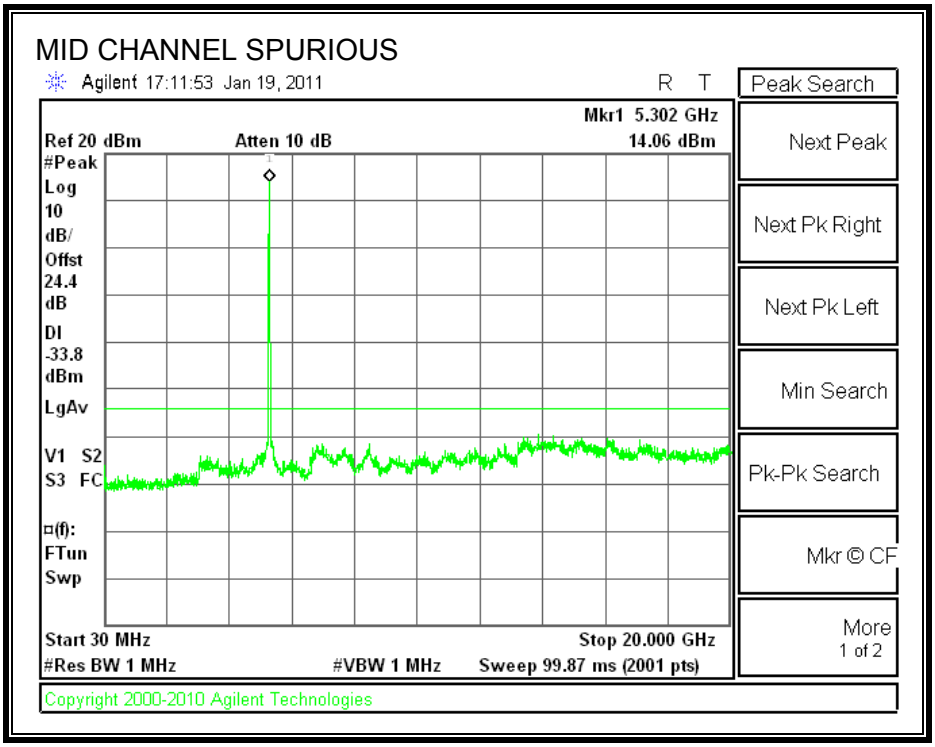
The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 1 MHz. Peak detection measurements are compared to EIRP limit, adjusted for the maximum antenna gain.

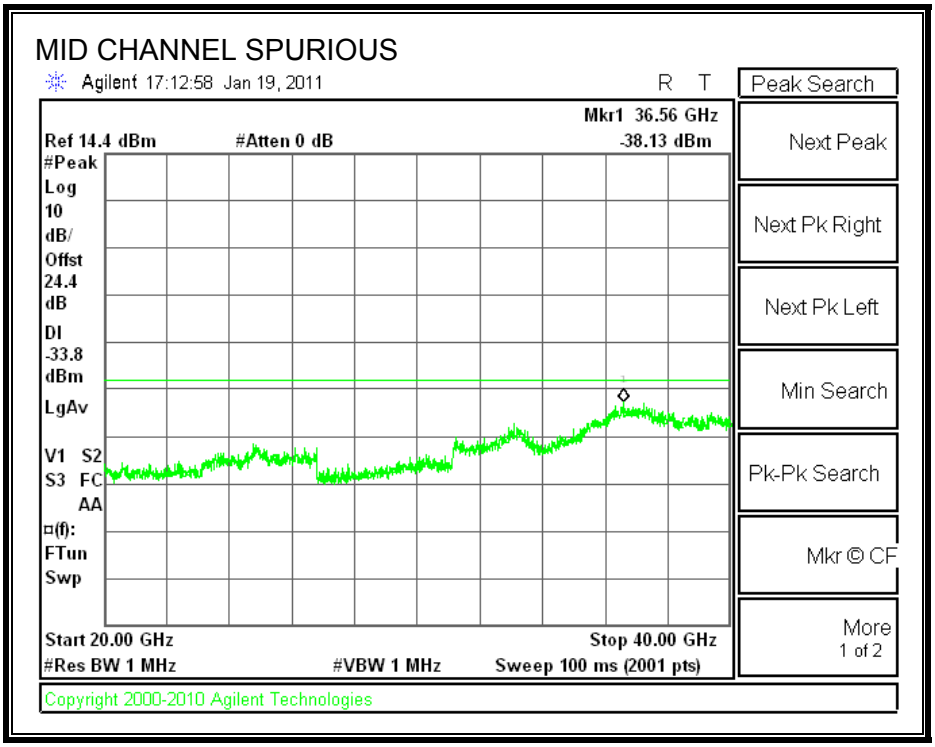
Measurements are made over the 30 MHz to 40 GHz range with the transmitter set to the lowest, middle, and highest channels.

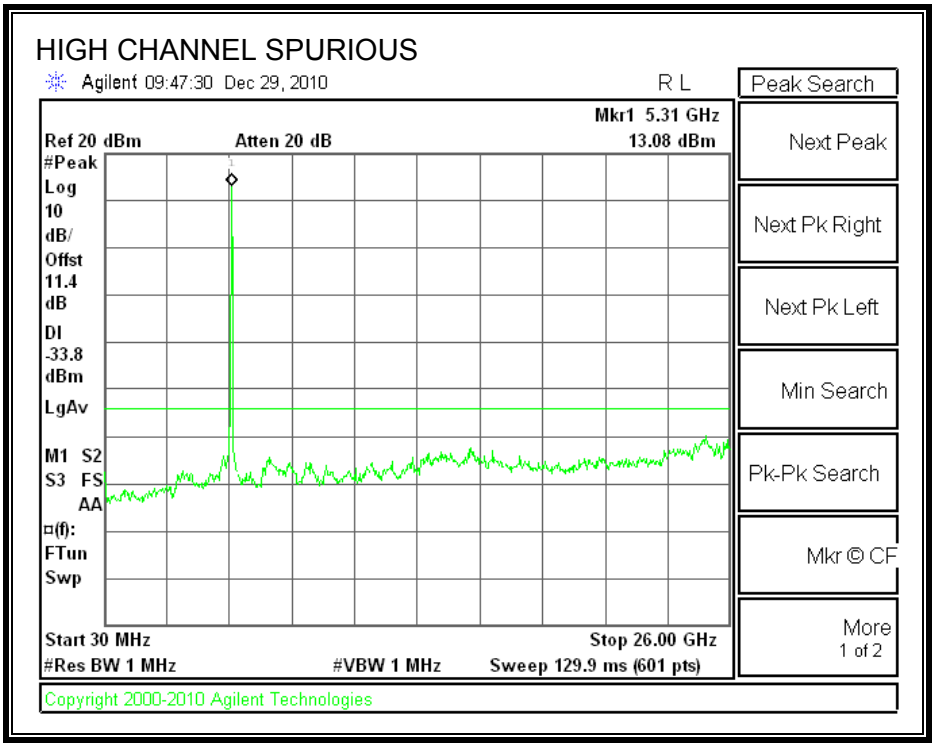
RESULTS SPURIOUS EMISSIONS

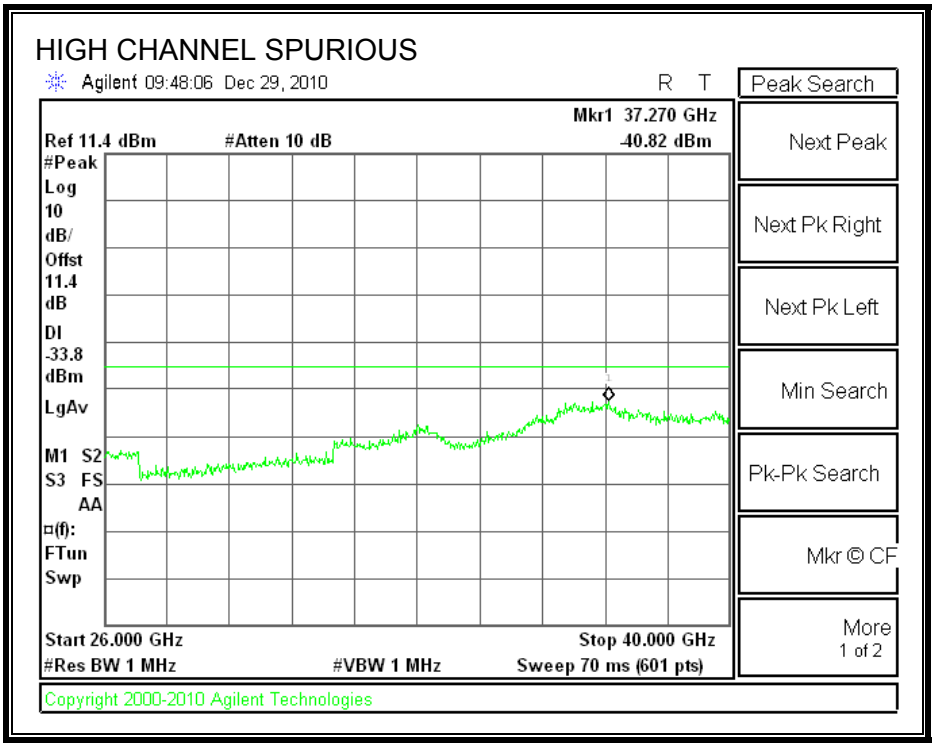












7.7. 802.11n THREE CHAINS HT20 MODE IN THE 5.3 GHz BAND

CDD MCS0

7.7.1. 26 dB and 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

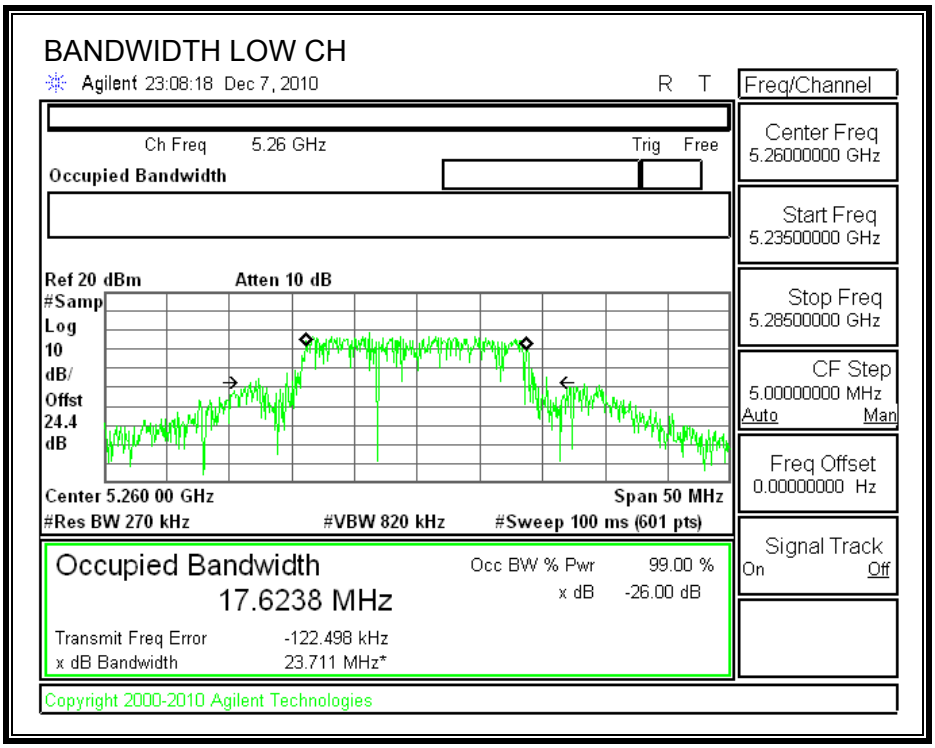
TEST PROCEDURE

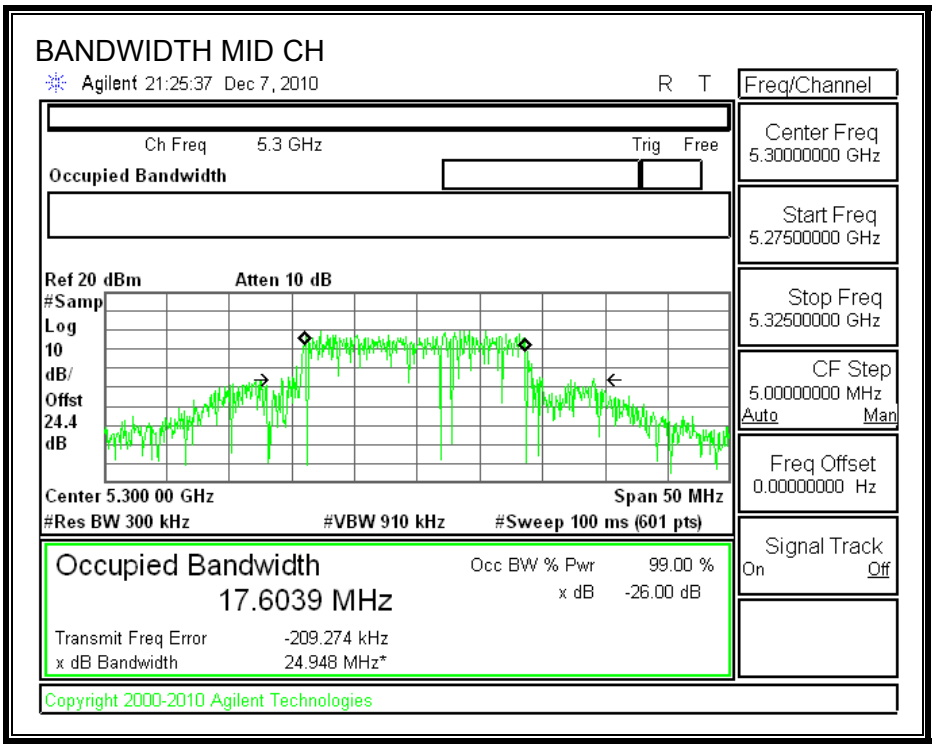
The transmitter outputs are connected to the spectrum analyzer via a combiner. The RBW is set to 1% to 3% of the measured bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth function is utilized.

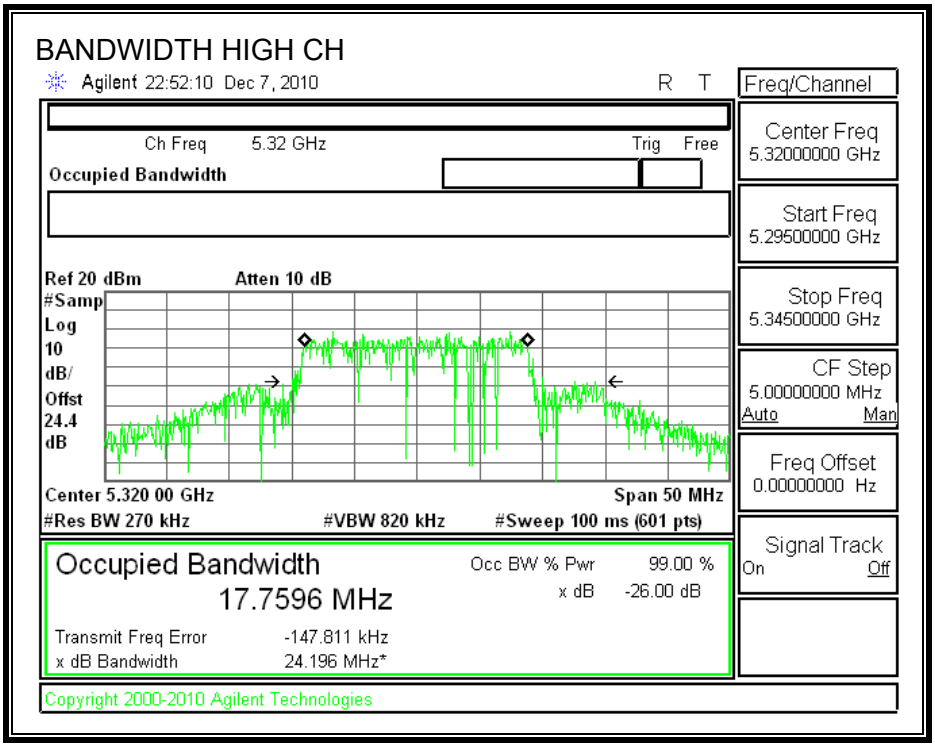
RESULTS

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5260	23.711	17.6238
Middle	5300	24.948	17.6039
High	5320	24.196	17.7596

26 dB and 99% BANDWIDTH







7.7.2. OUTPUT POWER

LIMITS

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

For the 5.25-5.35 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26-dB emission bandwidth in MHz. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

TEST PROCEDURE

The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

The transmitter output operates continuously therefore Method # 1 is used.

RESULTS

Limit

Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	11 + 10 Log B Limit (dBm)	Antenna Gain (dBi)	Limit (dBm)
Low	5260	23.98	23.711	24.75	10.99	18.99
Mid	5300	23.98	24.948	24.97	10.99	18.99
High	5320	23.98	24.196	24.84	10.99	18.99

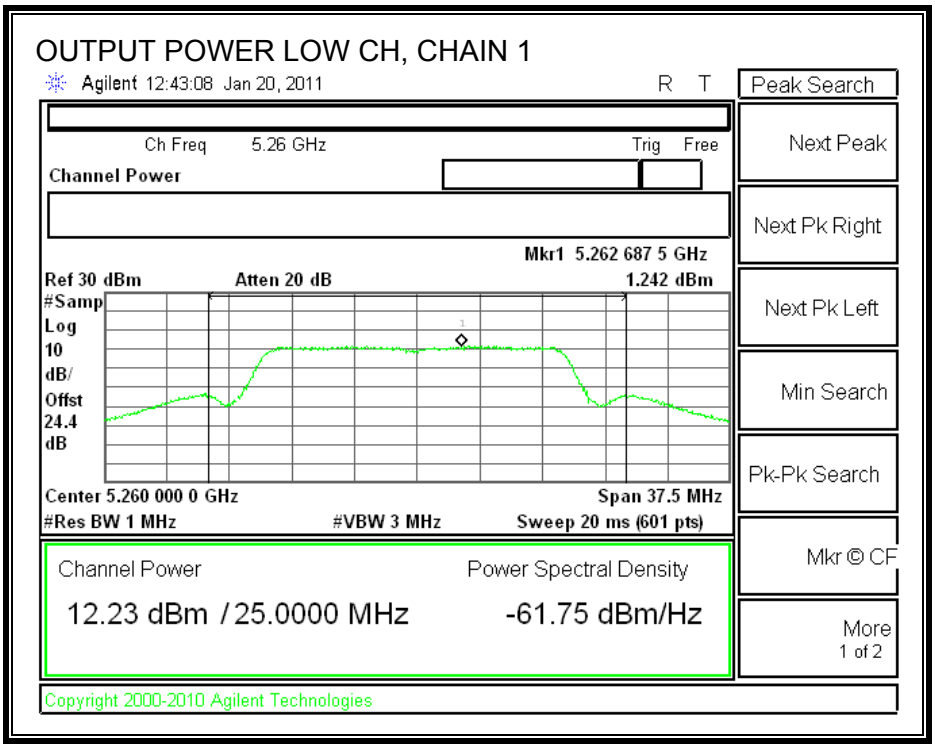
Individual Chain Results

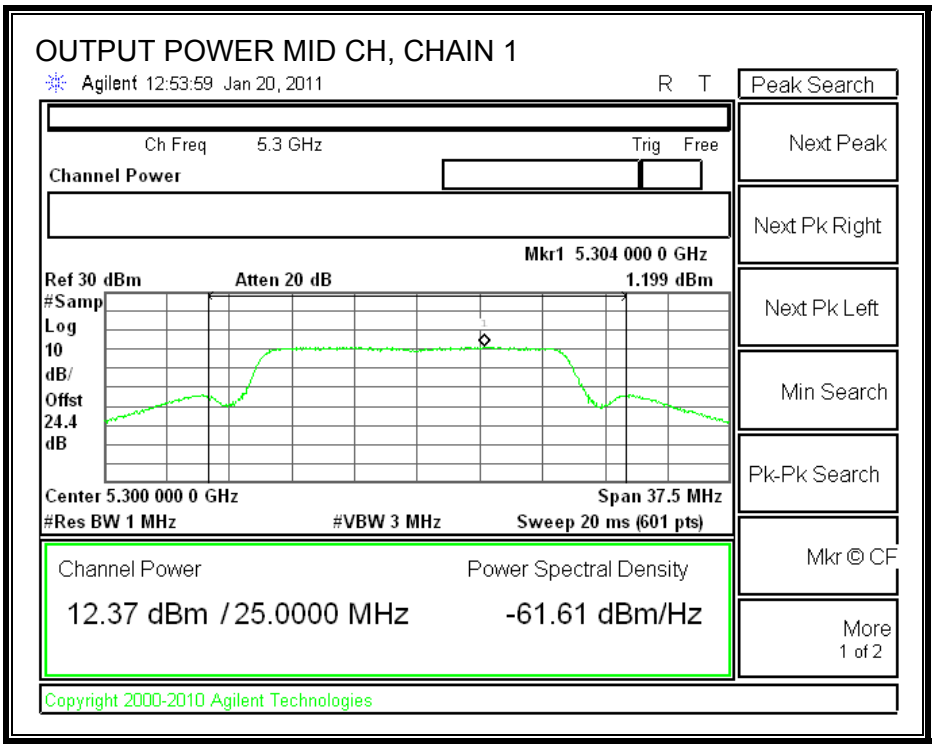
Channel	Frequency (MHz)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Chain 3 Power (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)
Low	5260	12.23	12.17	12.18	16.96	18.99	-2.03
Mid	5300	12.37	12.16	11.91	16.92	18.99	-2.07
High	5320	12.21	12.19	11.85	16.86	18.99	-2.13

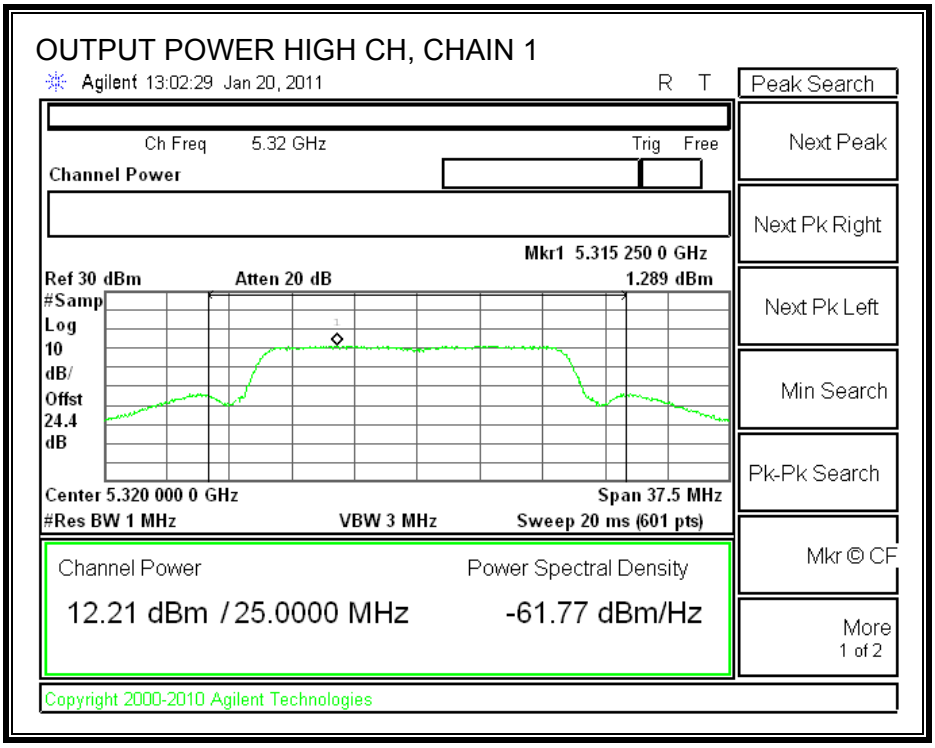
TPC Results

TPC Delta Power		Chain 0	Chain 1	Chain 2			
		4.67	4.45	4.28			
Worst-case TPC Power		Chain 0	Chain 1	Chain 2	Total Power	Ant Gain	EIRP
Low	5260	7.56	7.72	7.90	12.50	10.99	23.49
						TPC Limit (dBm)	24
						Margin (dB)	-0.51

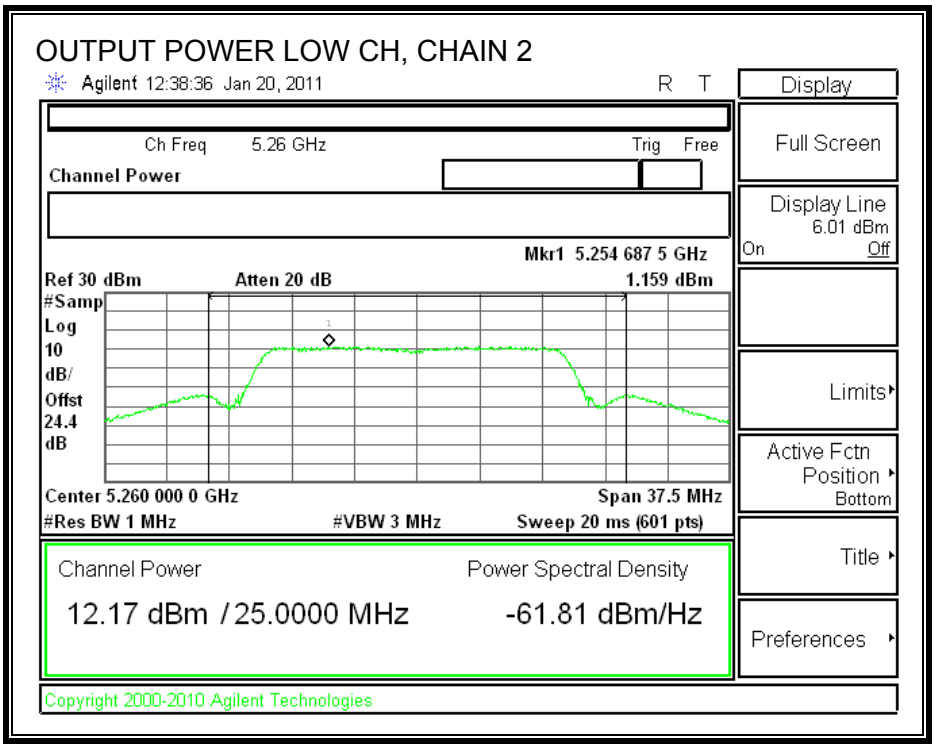
CHAIN 1 OUTPUT POWER

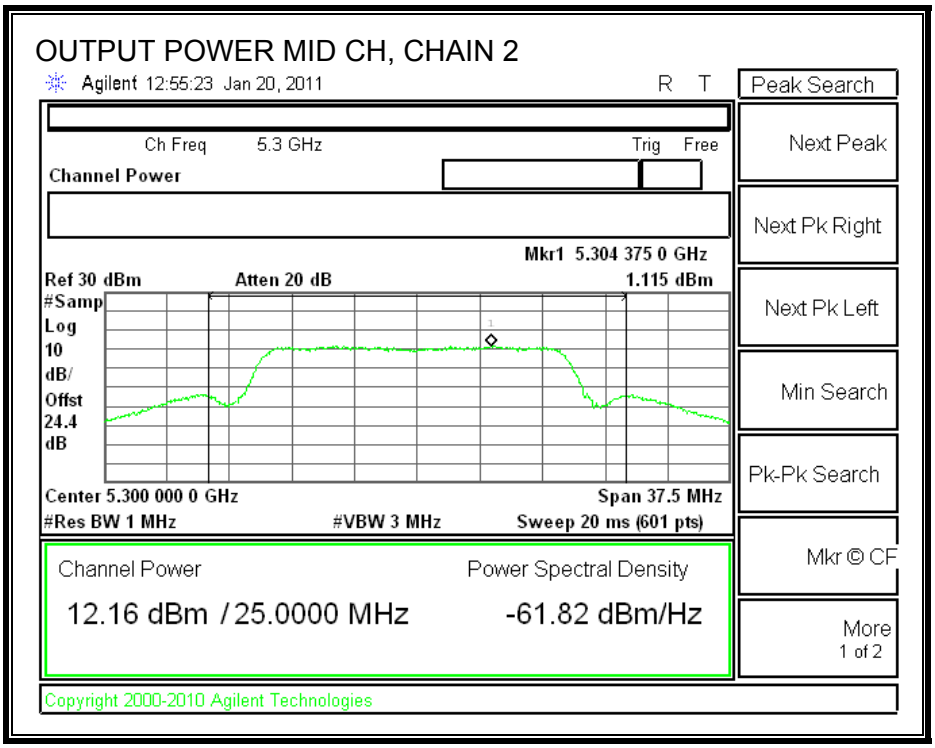


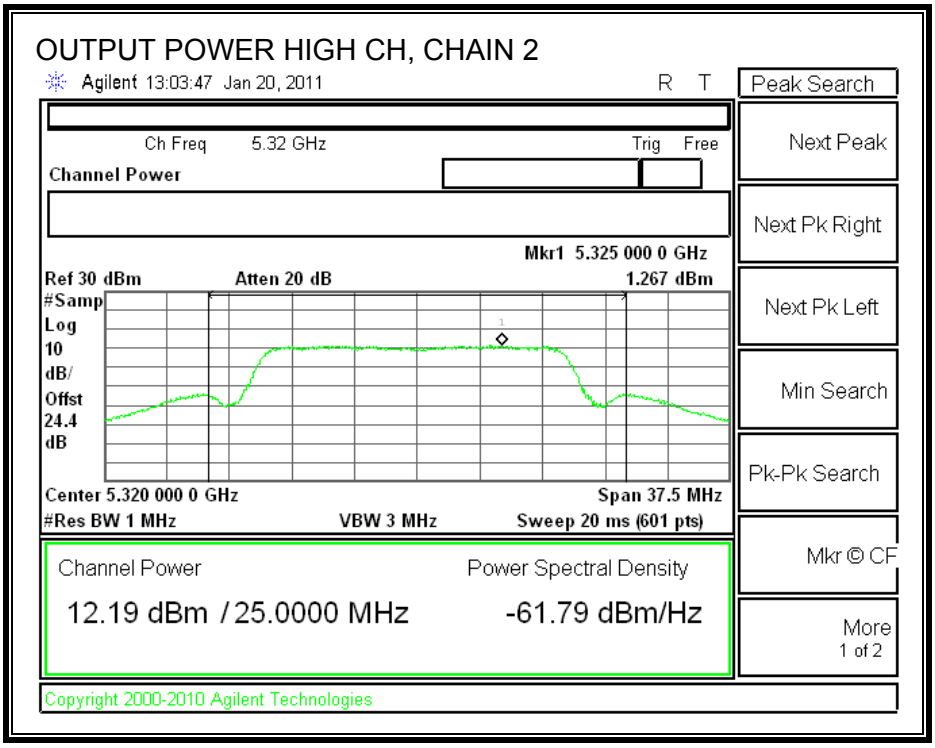




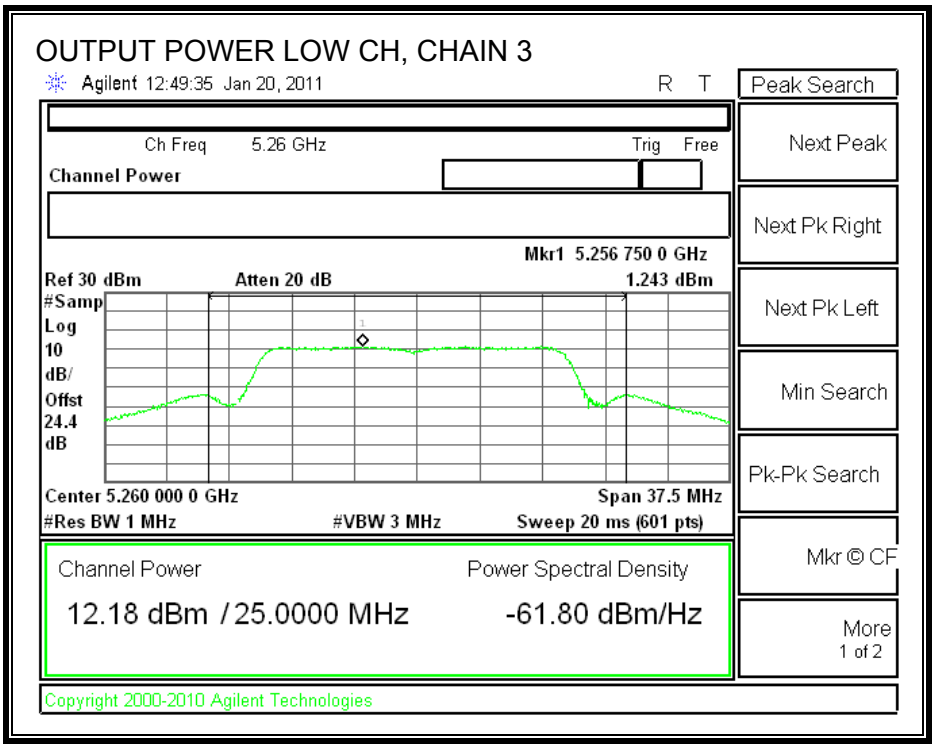
CHAIN 2 OUTPUT POWER

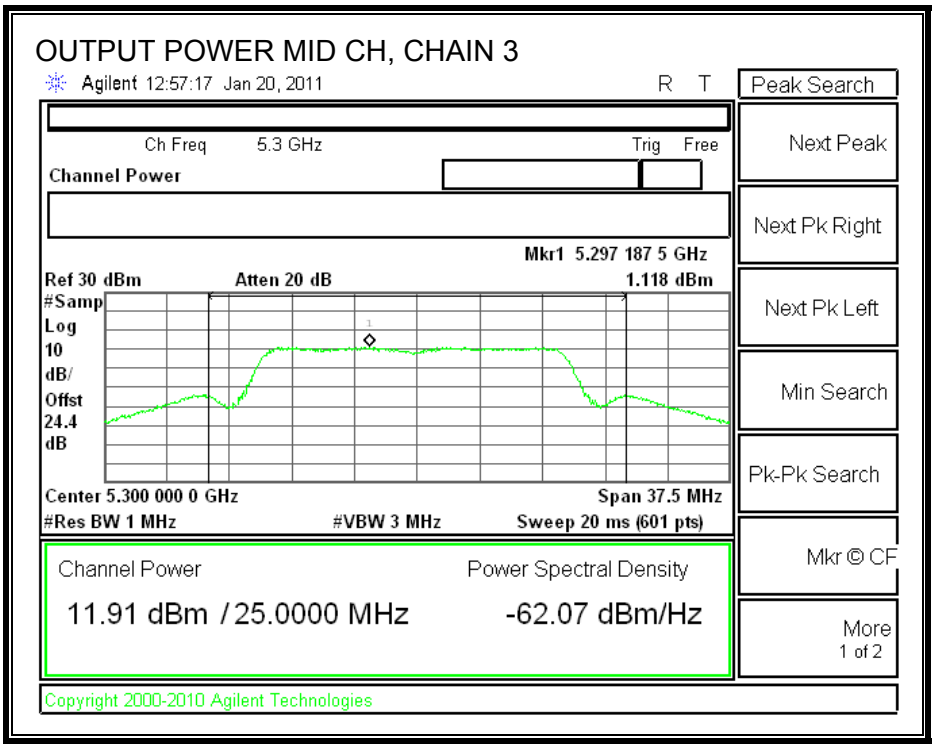


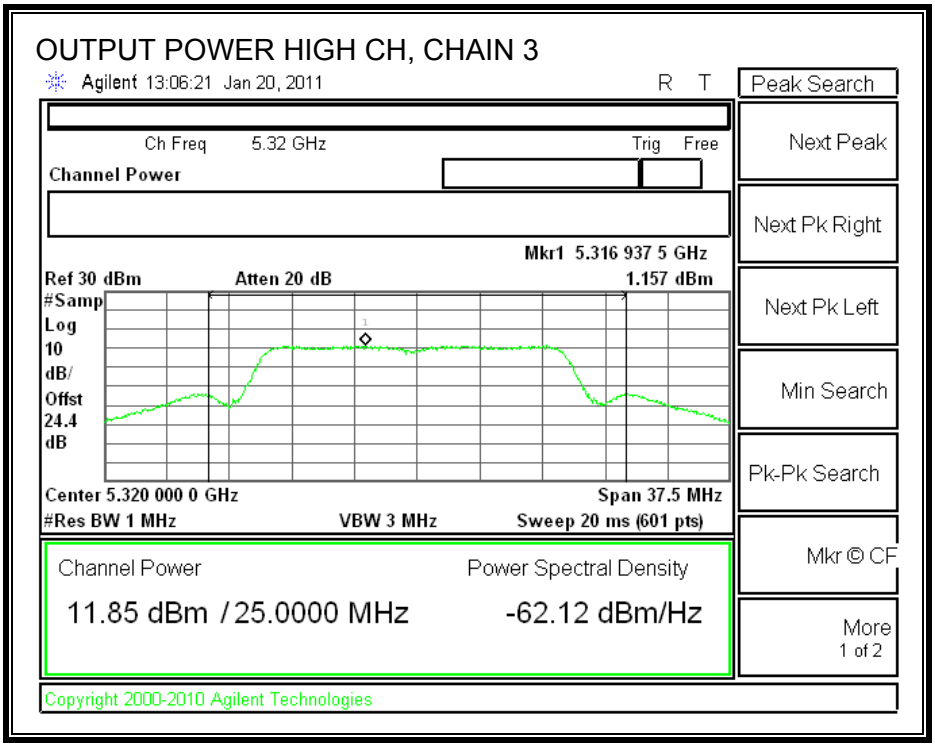




CHAIN 3 OUTPUT POWER

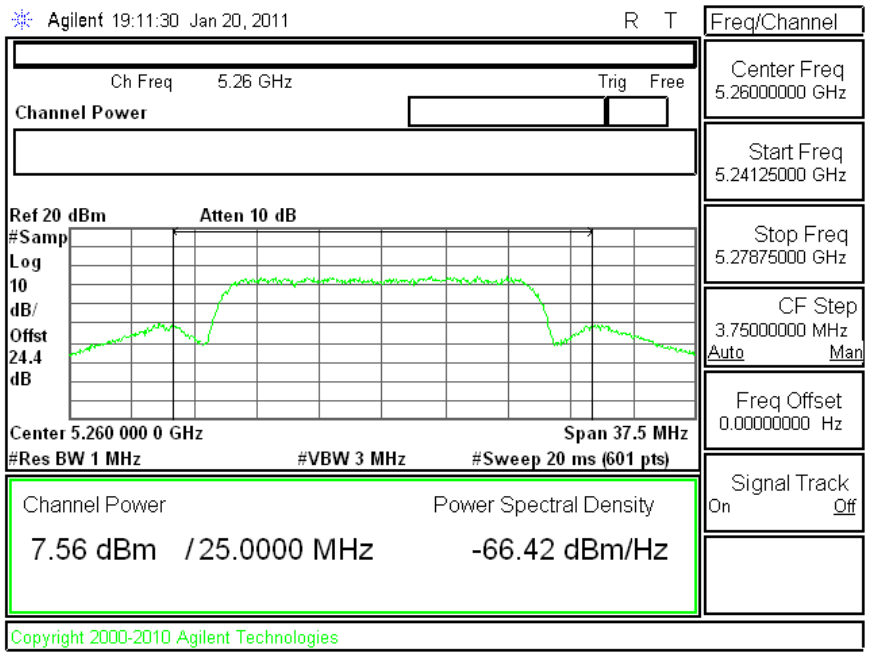




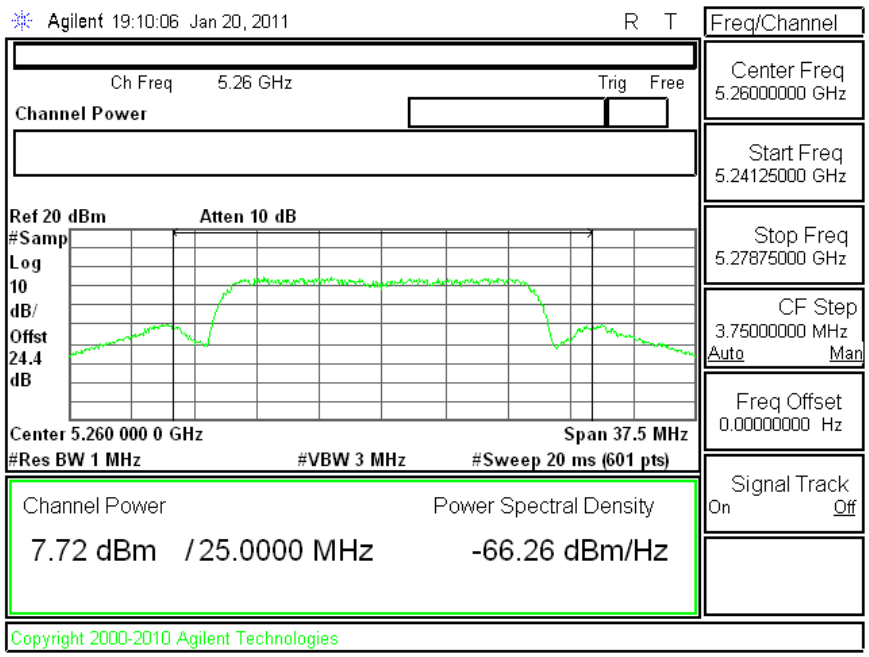


TPC OUTPUT POWER

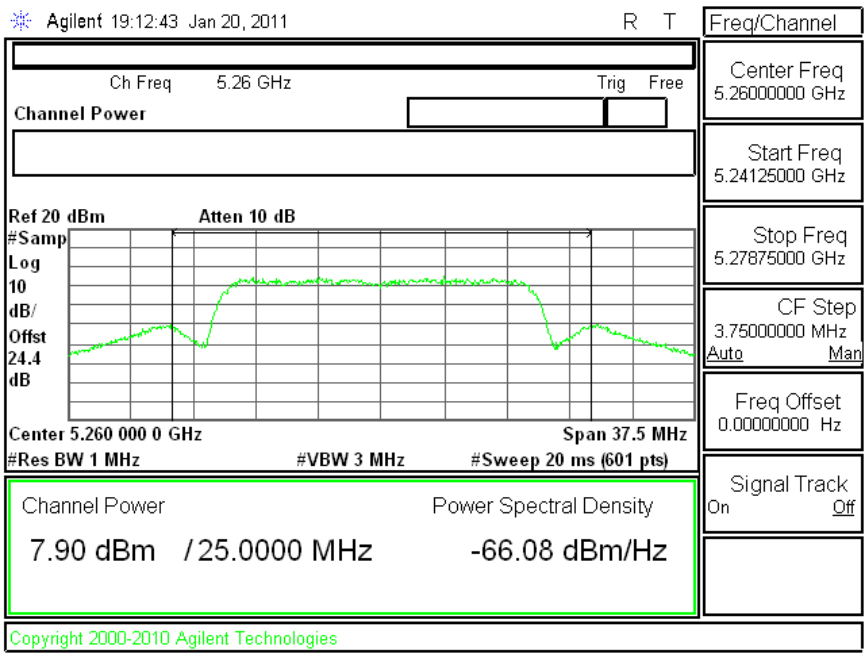
OUTPUT POWER LOW CH, CHAIN 0



OUTPUT POWER LOW CH, CHAIN 1



OUTPUT POWER LOW CH, CHAIN 2



7.7.3. PEAK POWER SPECTRAL DENSITY

LIMITS

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

For the 5.25–5.35 GHz band, the peak power spectral density shall not exceed 11 dBm in any 1 MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The composite antenna gain is equal to 10.99 dBi, therefore the limit is 6.01 dBm.

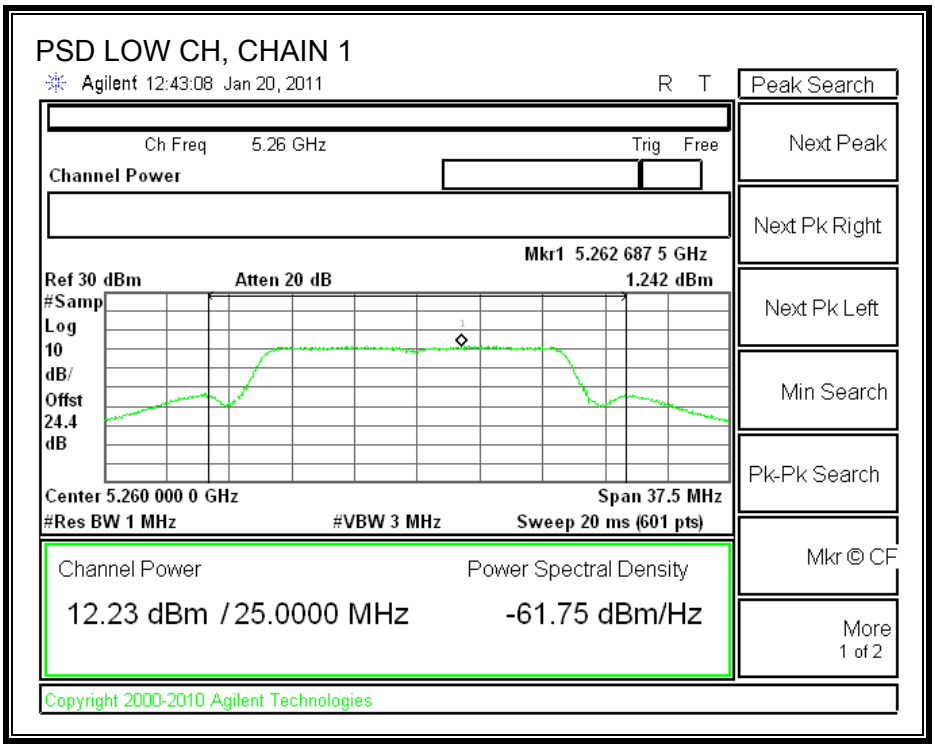
TEST PROCEDURE

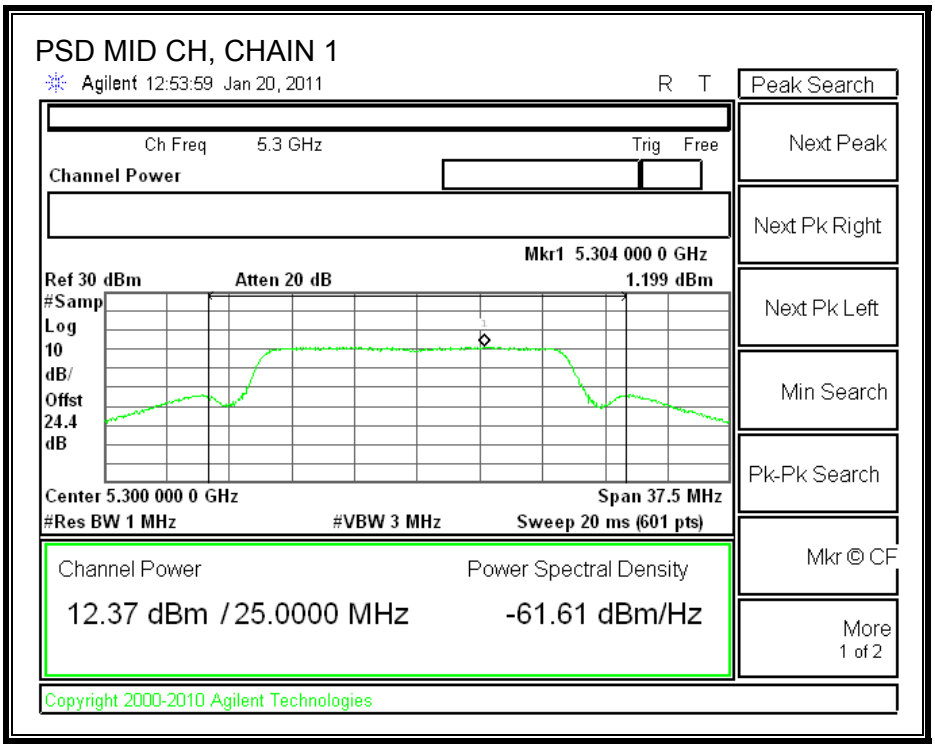
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002. PPSD method #2 was used.

RESULTS

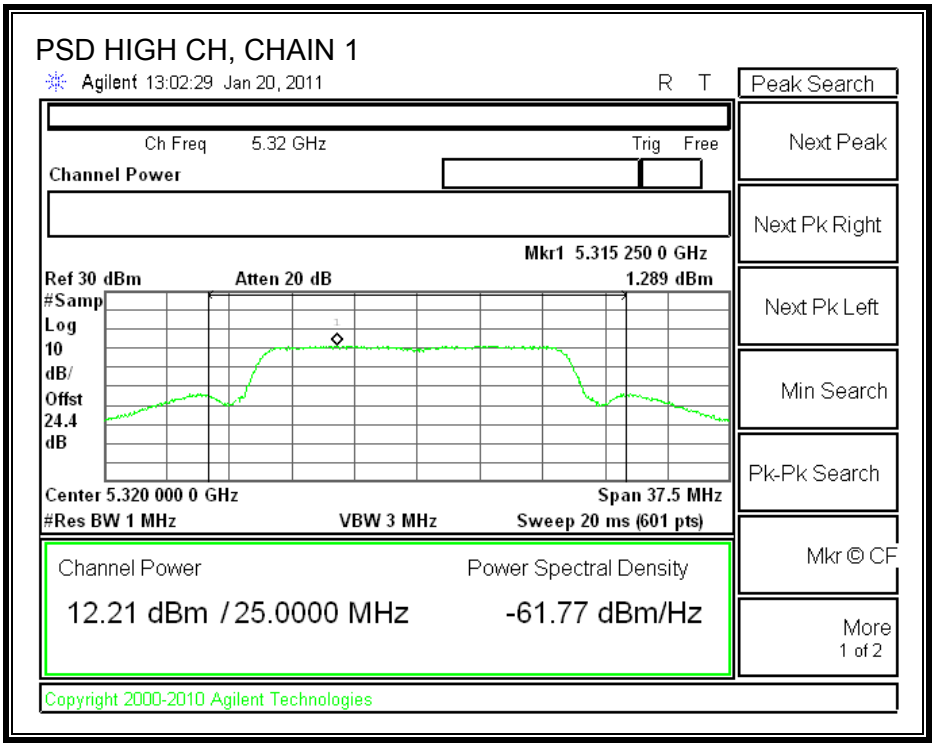
Channel	Frequency (MHz)	Chain 1 PPSD (dBm)	Chain 2 PPSD (dBm)	Chain 3 PPSD (dBm)	Total PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	5260	1.242	1.159	1.243	5.99	6.01	-0.024
Middle	5300	1.199	1.115	1.118	5.92	6.01	-0.095
High	5320	1.289	1.267	1.157	6.01	6.01	-0.001

CHAIN 1 POWER SPECTRAL DENSITY

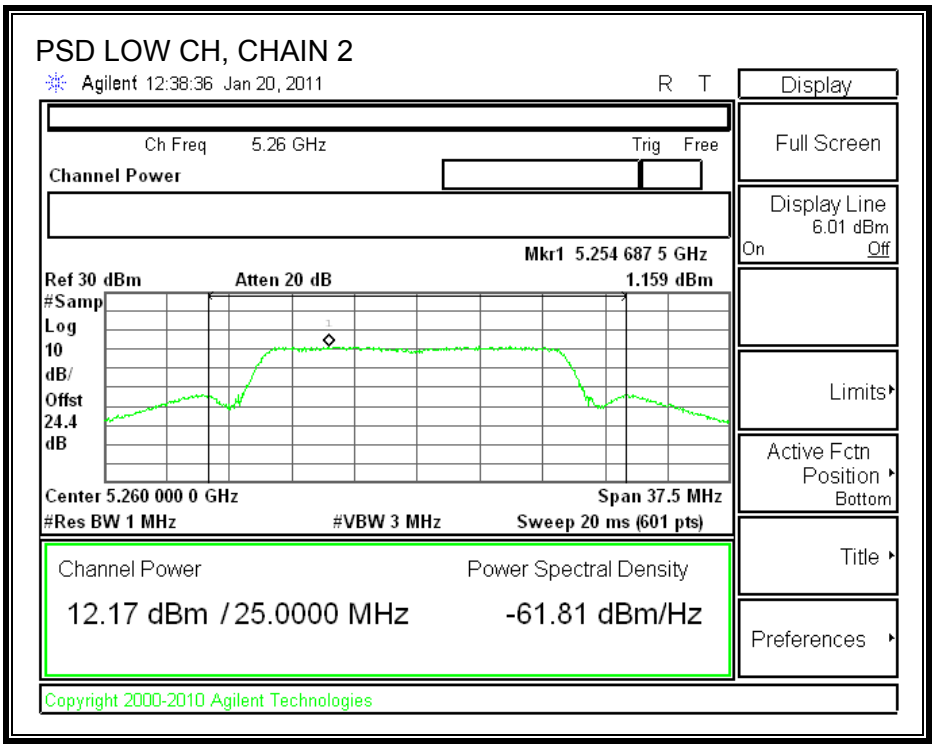


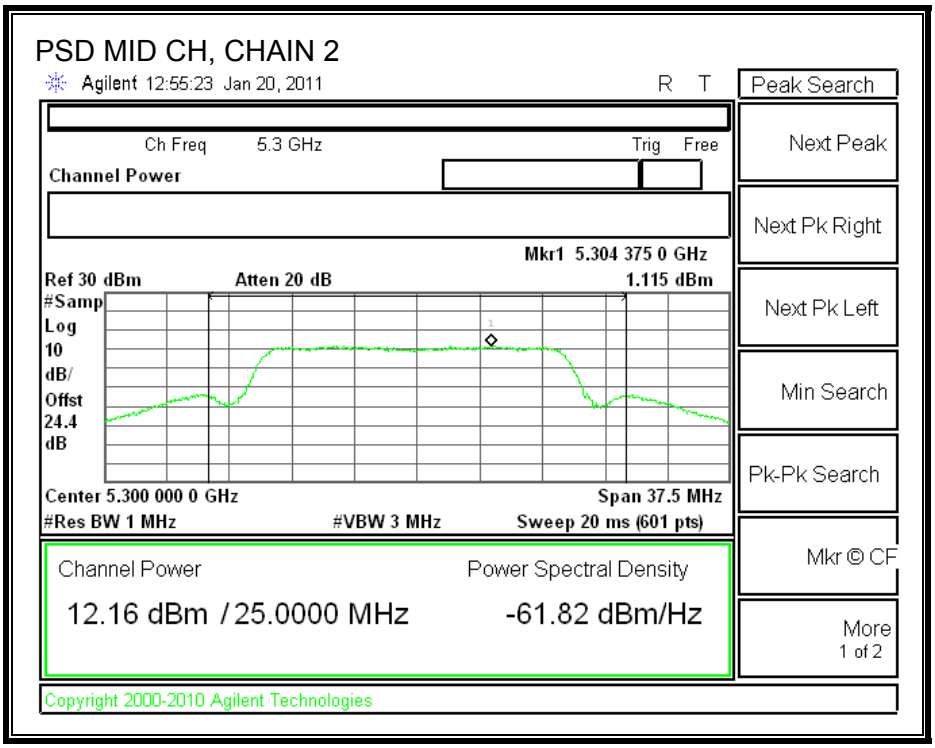


PSD HIGH CH, CHAIN 1

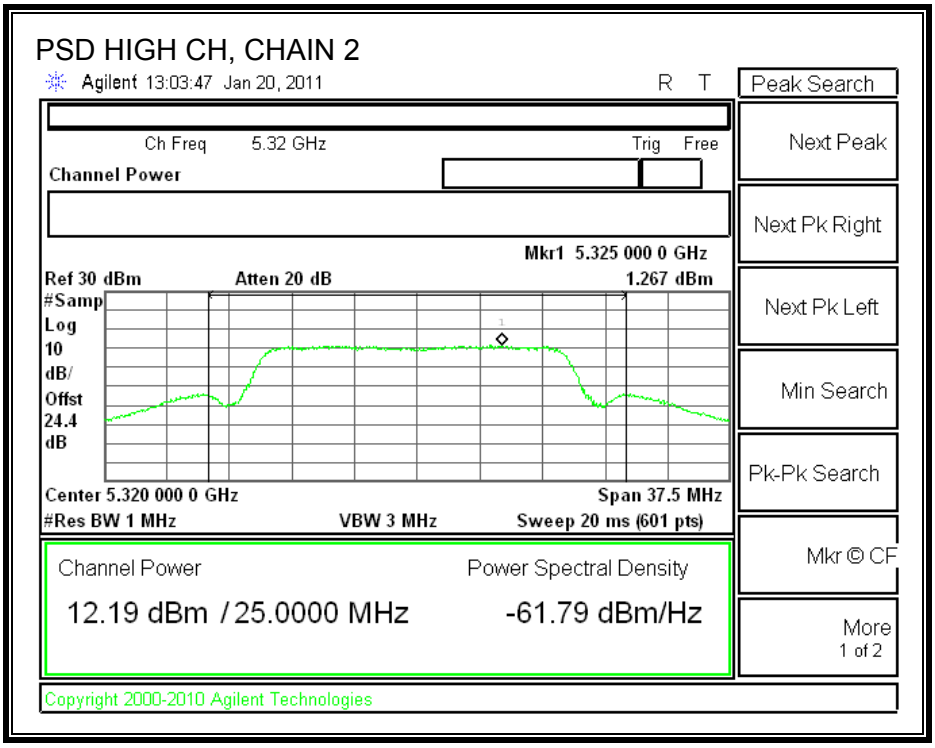


CHAIN 2 POWER SPECTRAL DENSITY

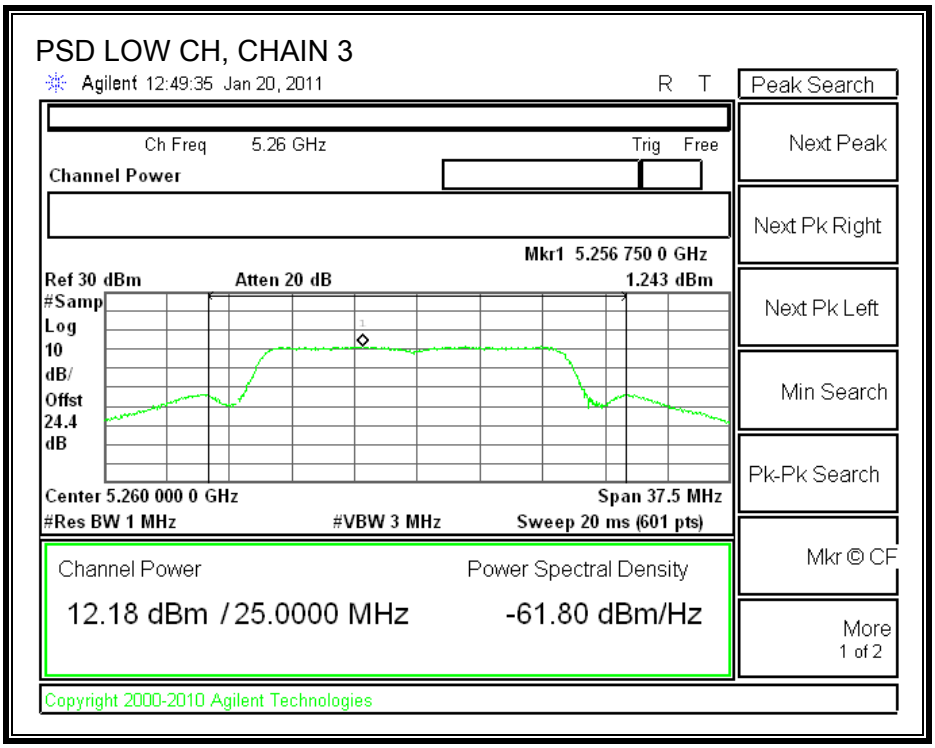


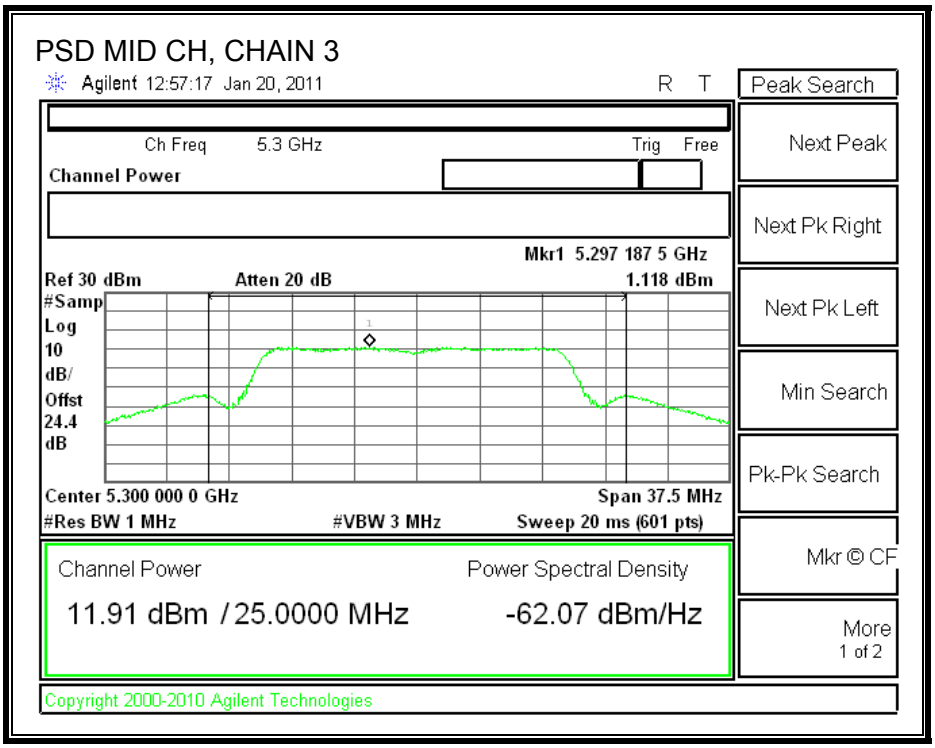


PSD HIGH CH, CHAIN 2

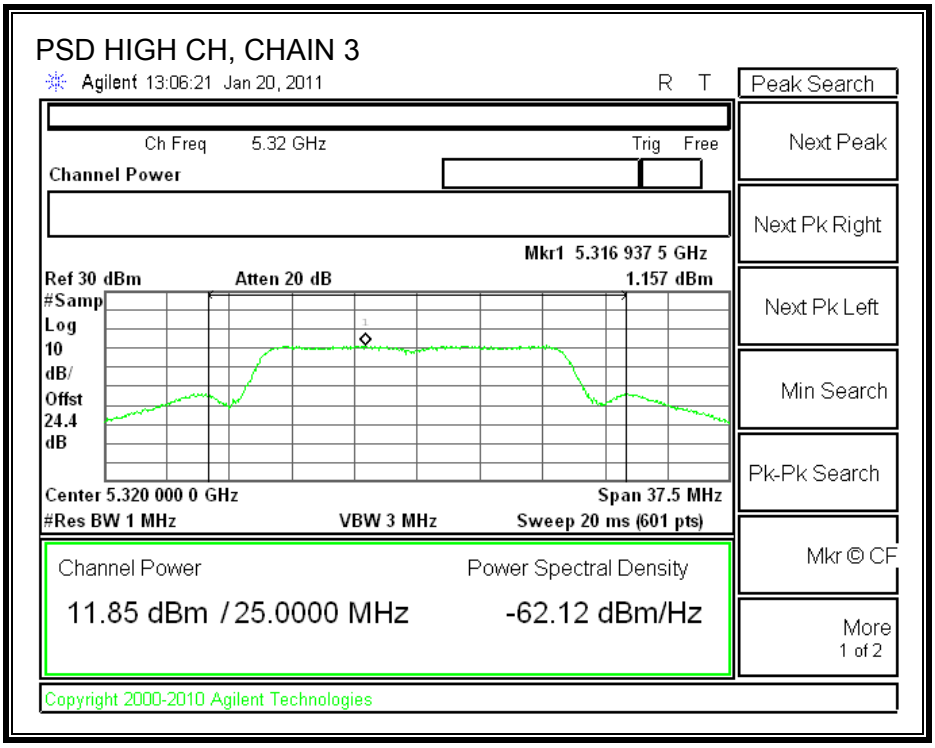


CHAIN 3 POWER SPECTRAL DENSITY





PSD HIGH CH, CHAIN 3



7.7.4. PEAK EXCURSION

LIMITS

FCC §15.407 (a) (6)

The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

TEST PROCEDURE

The transmitter outputs are connected to the spectrum analyzer via a combiner.

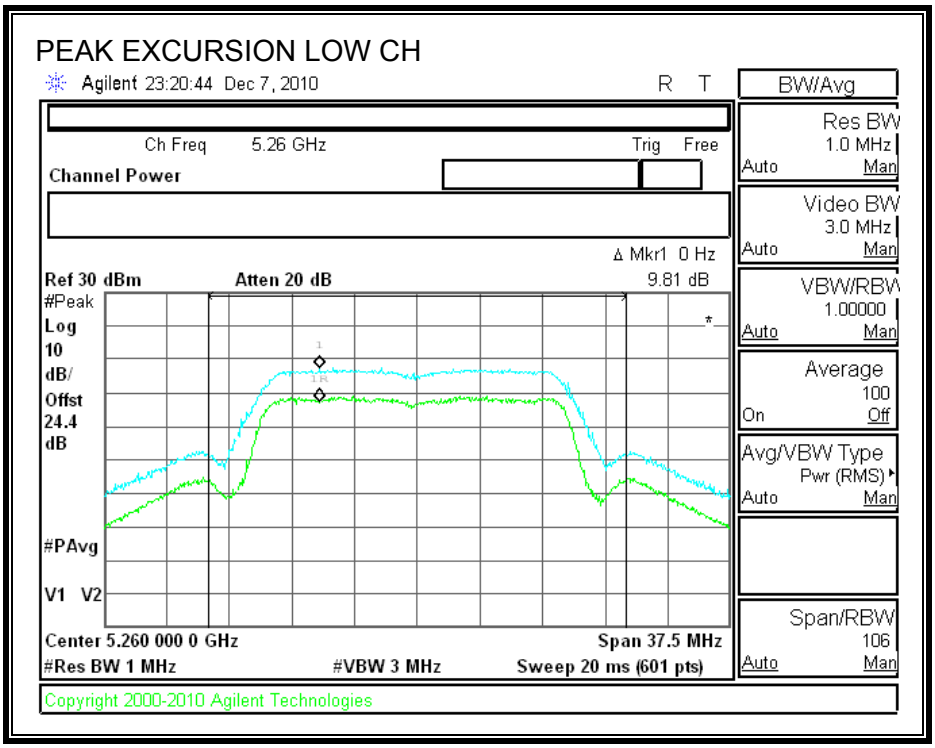
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

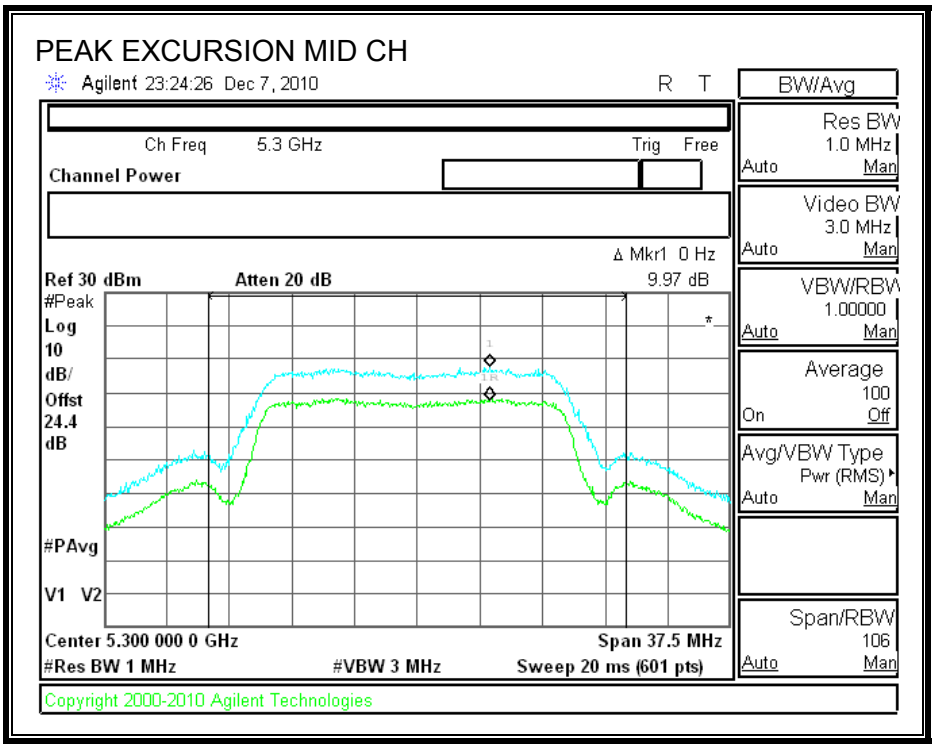
Since Method # 1 was used for peak power measurements, Method # 1 settings are used for the second PPSD trace.

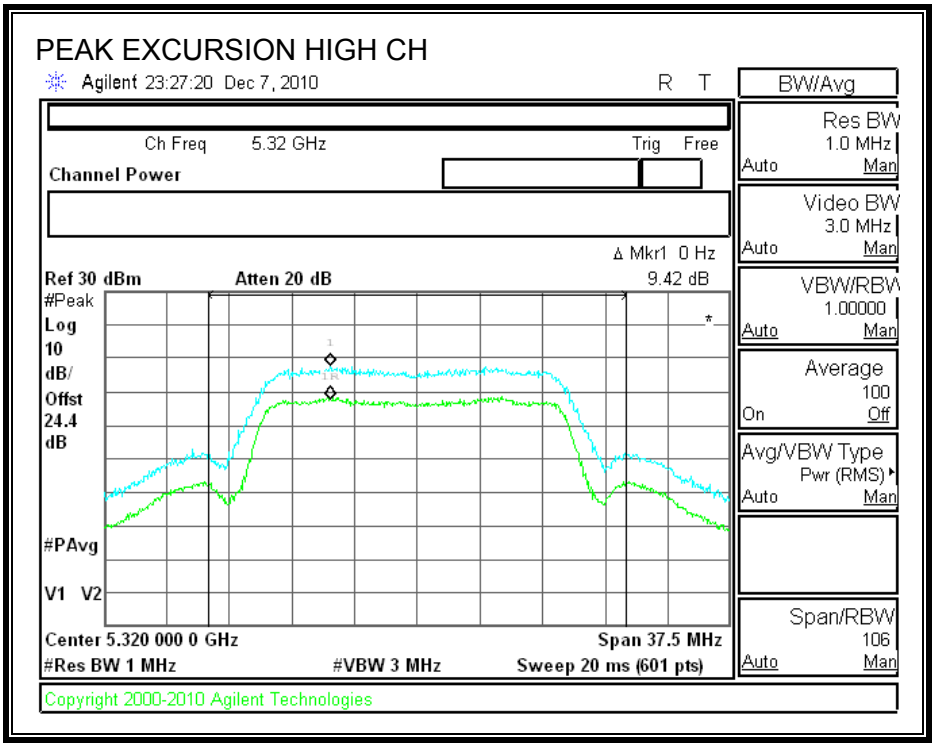
RESULTS

Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5260	9.81	13	-3.19
Middle	5300	9.97	13	-3.03
High	5320	9.42	13	-3.58

PEAK EXCURSION







7.7.5. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.407 (b) (2)

IC RSS-210 A9.3 (2)

For transmitters operating in the 5.25-5.35 GHz band: all emissions outside of the 5.25-5.35 GHz band shall not exceed an EIRP of -27 dBm / MHz.

Devices operating in the 5.25-5.35 GHz band that generate emissions in the 5.15-5.25 GHz band must meet all applicable technical requirements for operation in the 5.15-5.25 GHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5.15-5.25 GHz band.

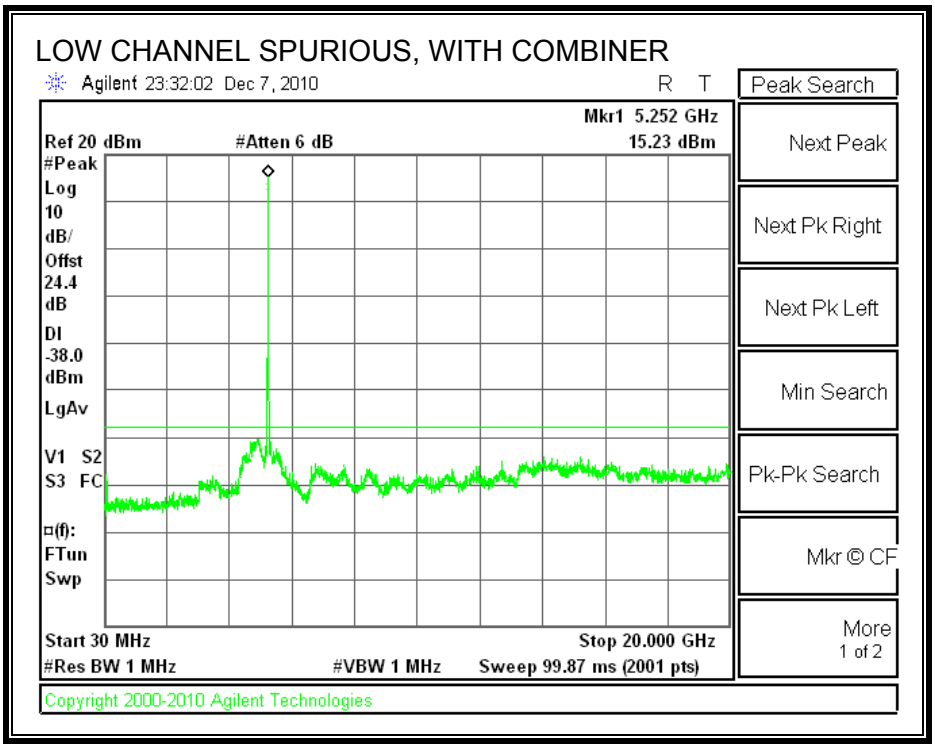
TEST PROCEDURE

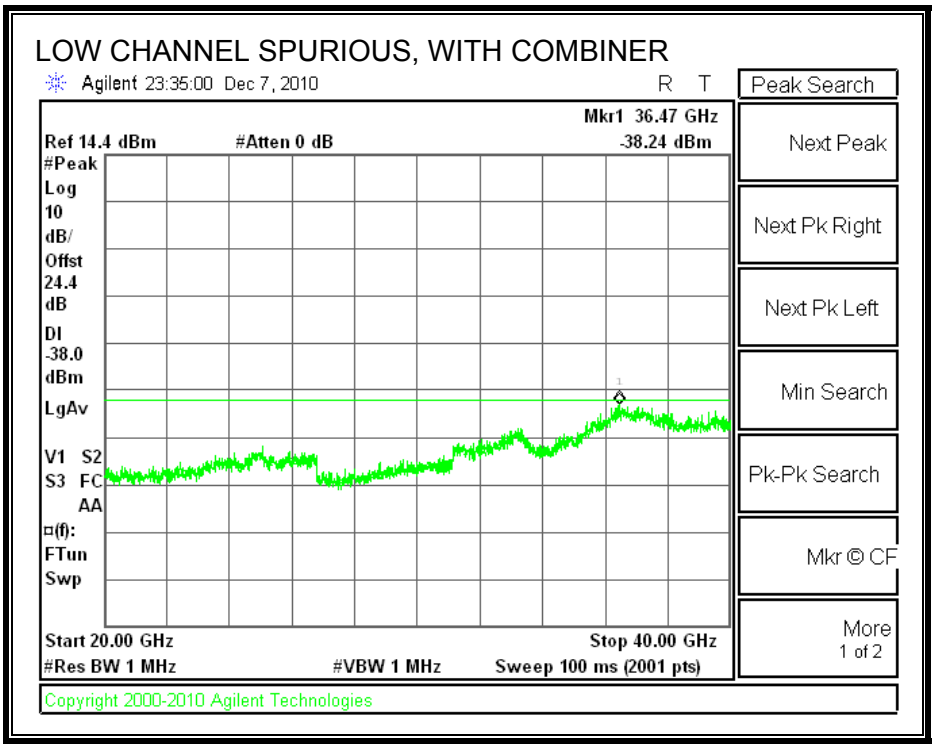
Conducted RF measurements of the transmitter output are made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 1 MHz. Peak detection measurements are compared to EIRP limit, adjusted for the maximum antenna gain.

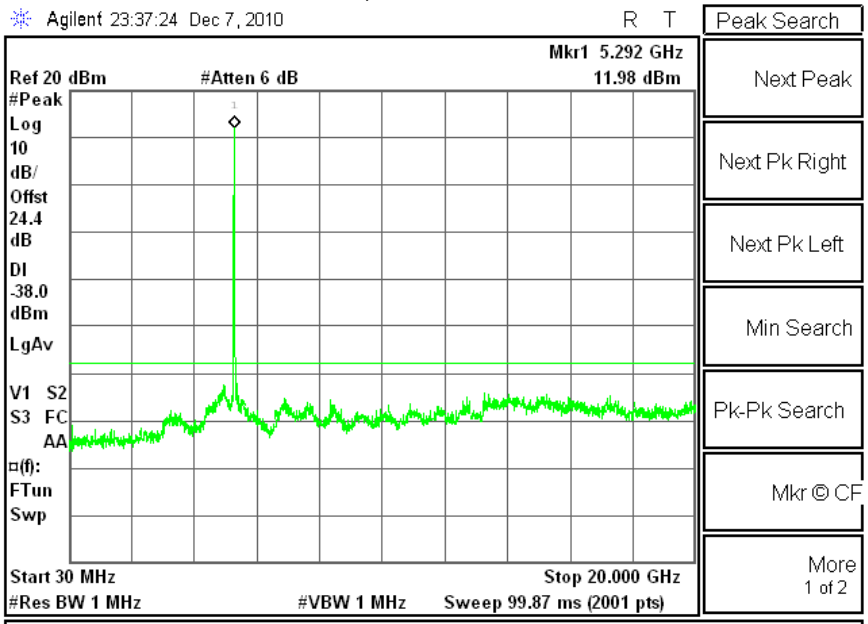
Measurements are made over the 30 MHz to 40 GHz range with the transmitter set to the lowest, middle, and highest channels.

SPURIOUS EMISSIONS WITH COMBINER

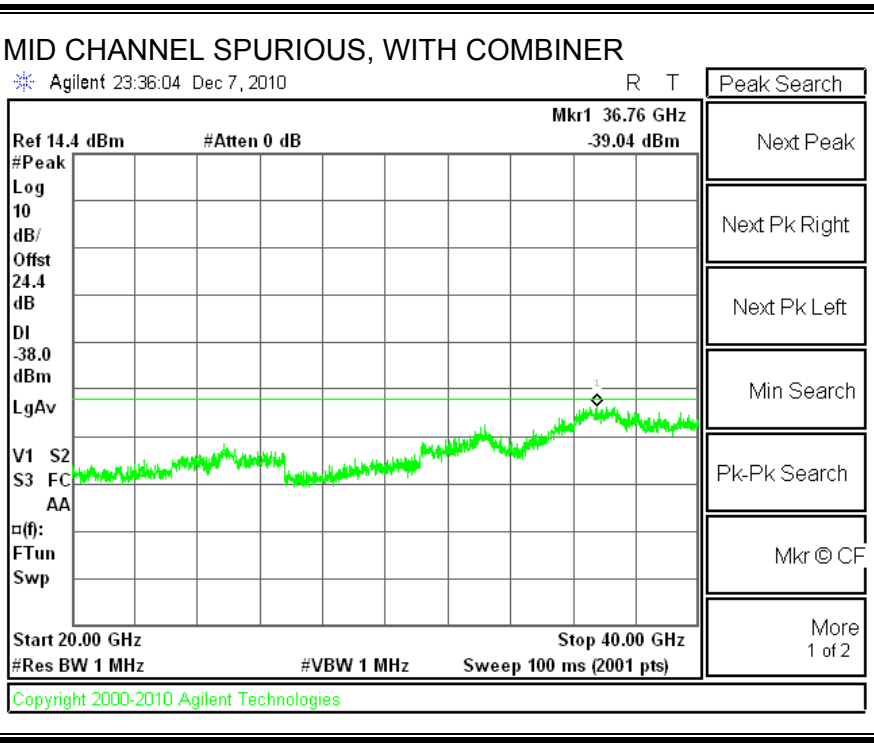




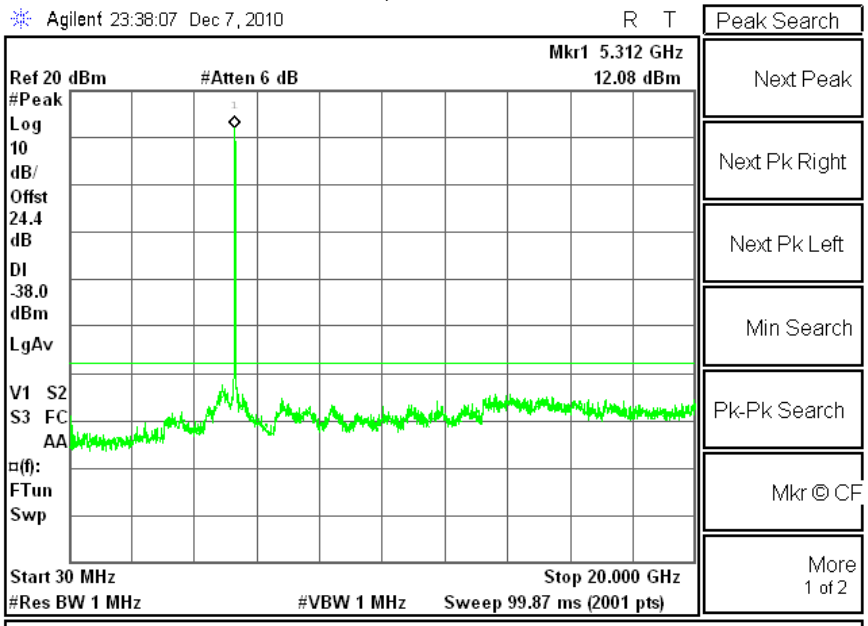
MID CHANNEL SPURIOUS, WITH COMBINER



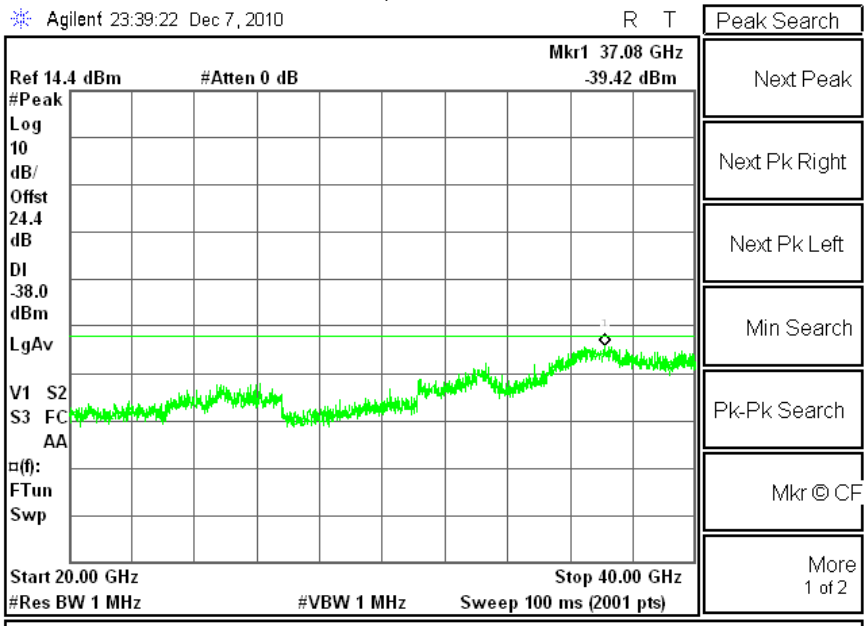
MID CHANNEL SPURIOUS, WITH COMBINER



HIGH CHANNEL SPURIOUS, WITH COMBINER



HIGH CHANNEL SPURIOUS, WITH COMBINER



SDM MCS21

7.7.6. 26 dB and 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

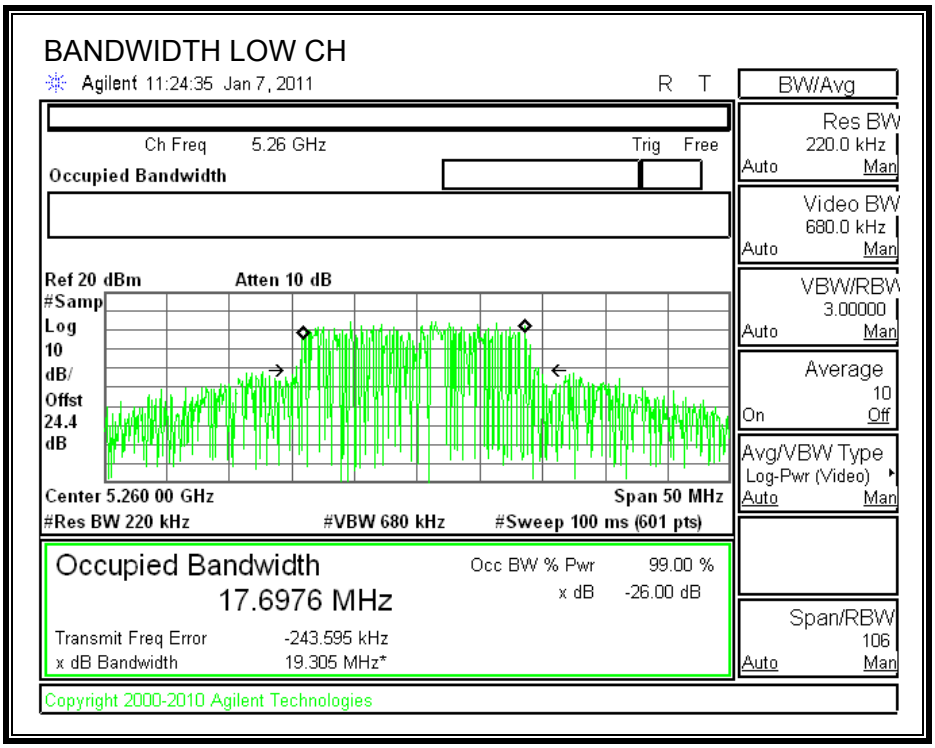
TEST PROCEDURE

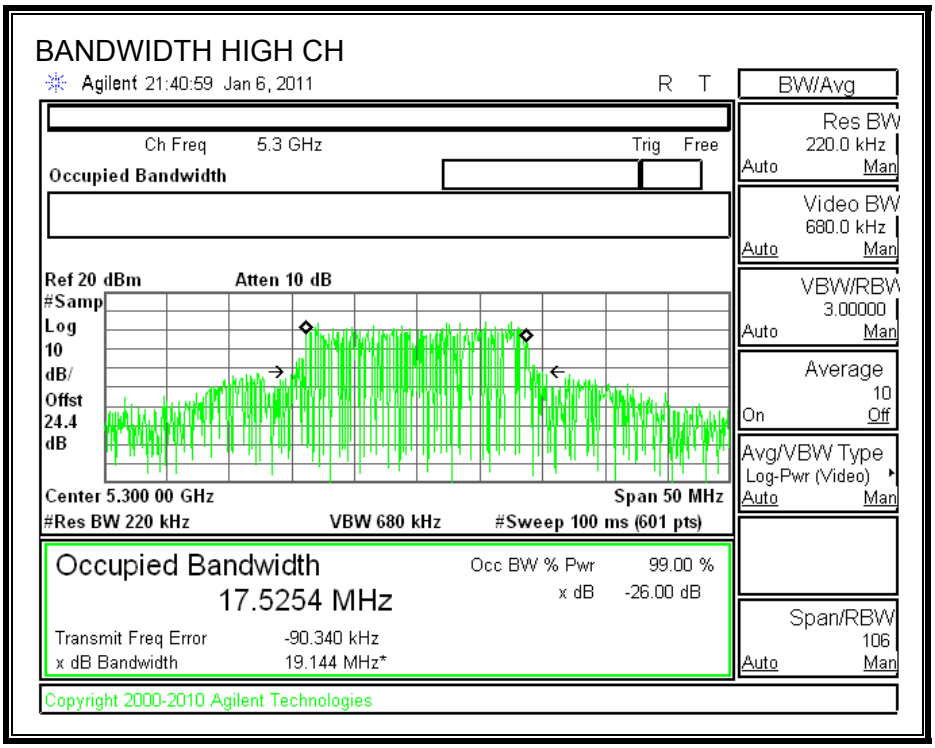
The transmitter outputs are connected to the spectrum analyzer via a combiner. The RBW is set to 1% to 3% of the measured bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth function is utilized.

RESULTS

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5260	19.035	17.6976
High	5300	19.144	17.5240

26 dB and 99% BANDWIDTH





7.7.7. OUTPUT POWER

LIMITS

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

For the 5.25-5.35 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26-dB emission bandwidth in MHz. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

TEST PROCEDURE

The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

The transmitter output operates continuously therefore Method # 1 is used.

RESULTS

Limit

Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	11 + 10 Log B Limit (dBm)	Antenna Gain (dBi)	Limit (dBm)
Low	5260	23.98	19.035	23.80	6.80	23.00
High	5300	23.98	19.144	23.82	6.80	23.02

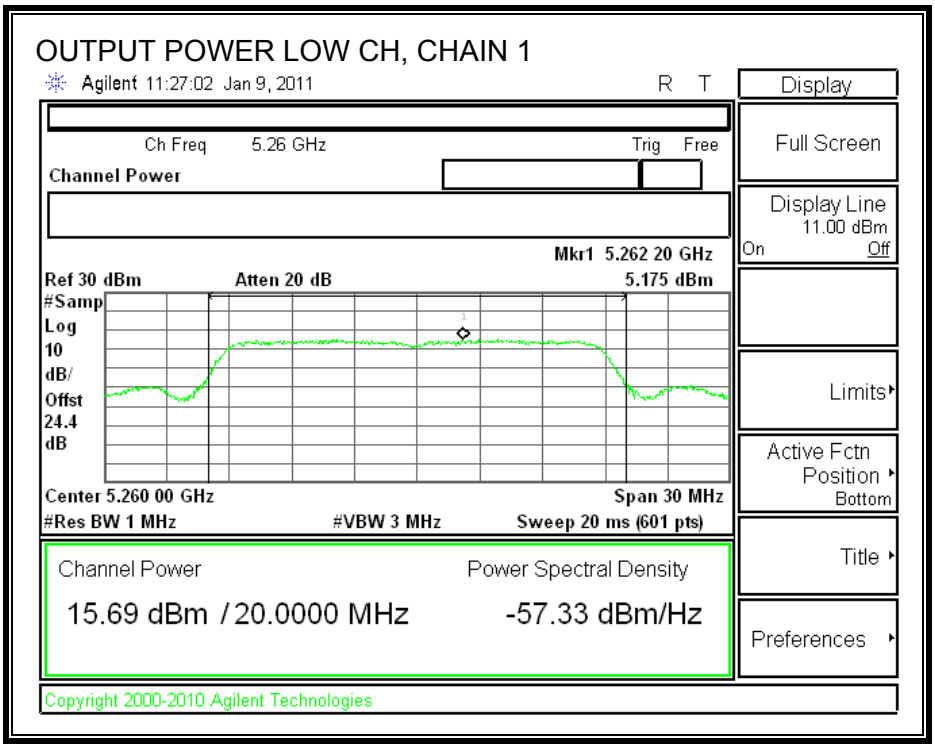
Individual Chain Results

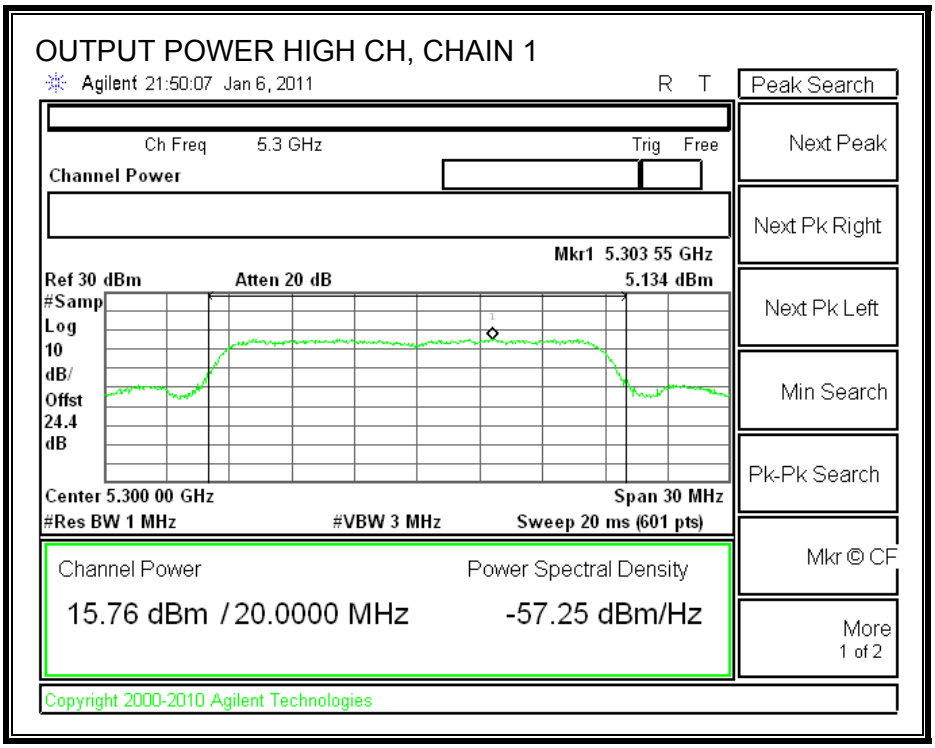
Channel	Frequency (MHz)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Chain 3 Power (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)
Low	5260	15.69	15.66	15.53	20.40	23.00	-2.60
High	5300	15.76	15.73	15.80	20.53	23.02	-2.49

TPC Results

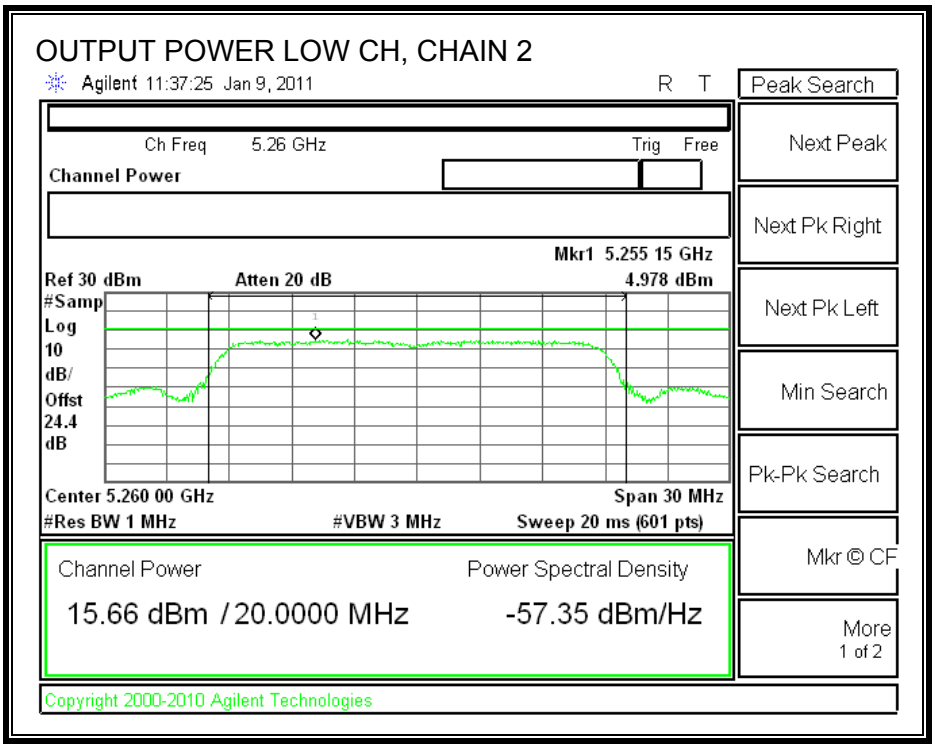
TPC Delta Power		Chain 0	Chain 1	Chain 2			
		4.80	4.70	4.57			
Worst-case TPC Power		Chain 0	Chain 1	Chain 2	Total Power	Ant Gain	EIRP
High	5300	10.96	11.03	11.23	15.85	6.80	22.65
						TPC Limit (dBm)	24
						Margin (dB)	-1.35

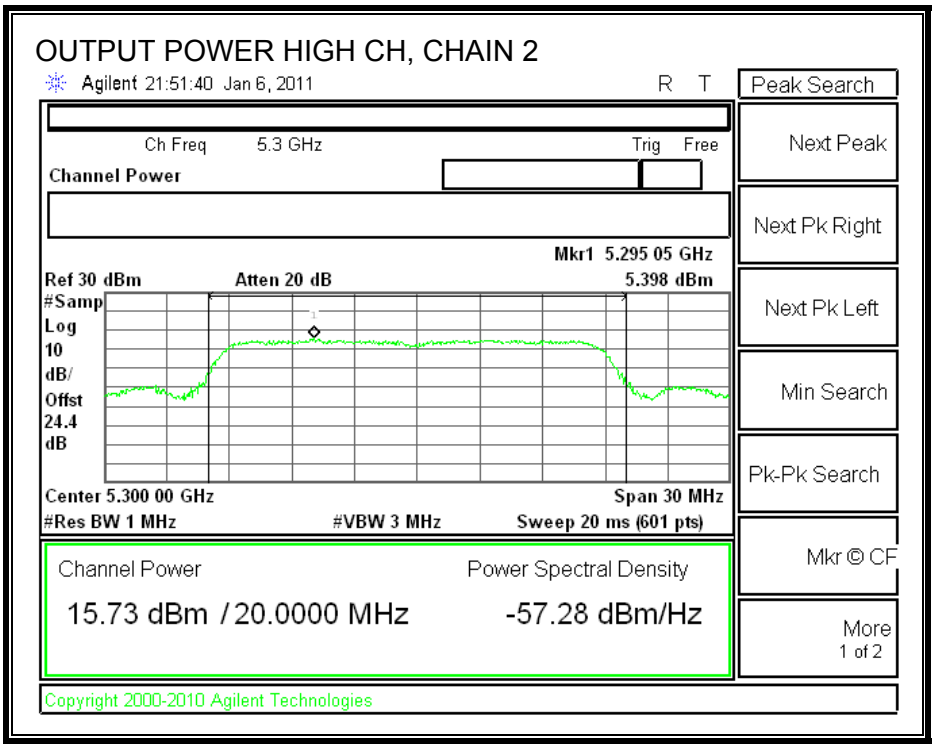
CHAIN 1 OUTPUT POWER



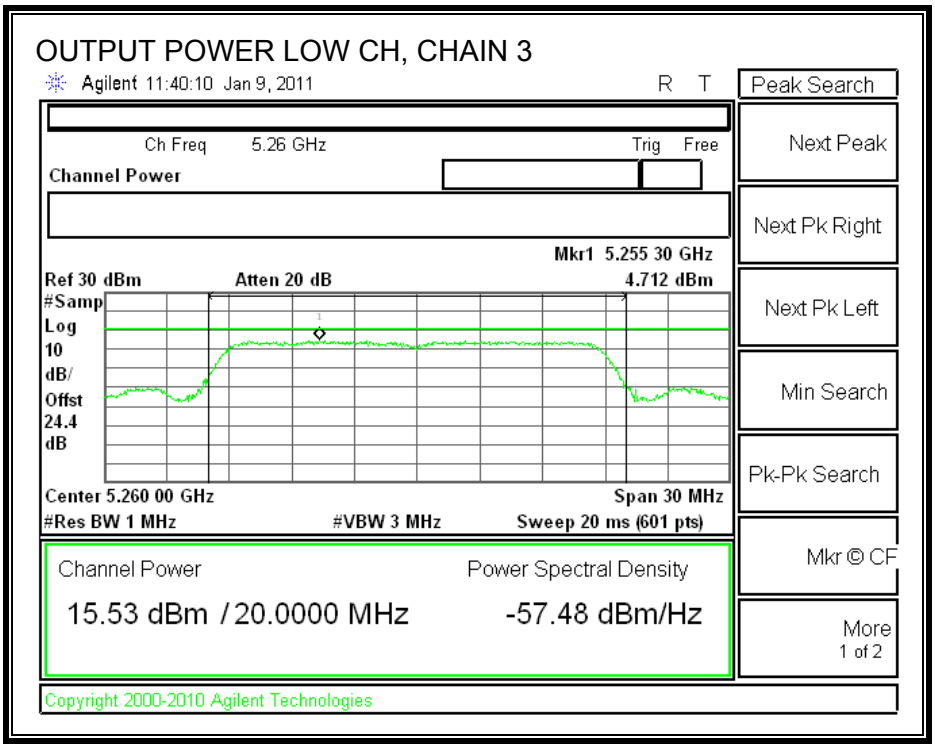


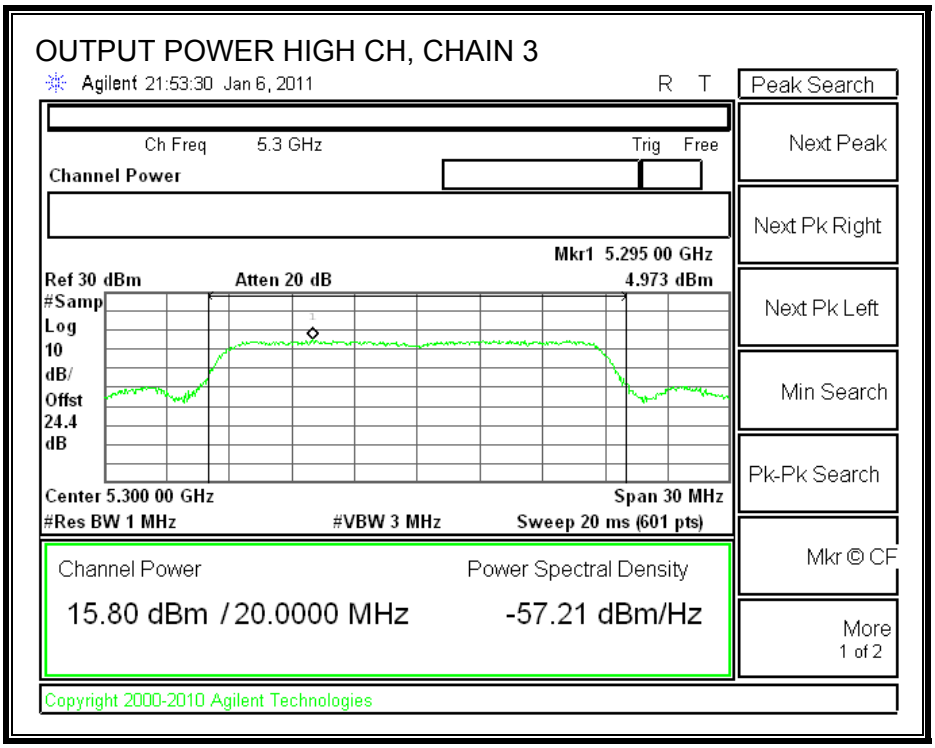
CHAIN 2 OUTPUT POWER





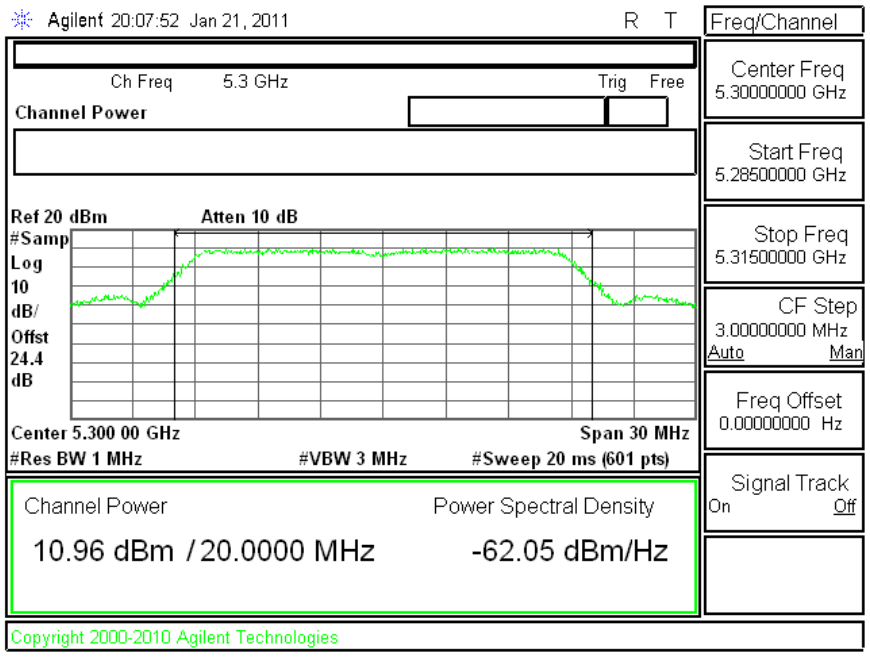
CHAIN 3 OUTPUT POWER



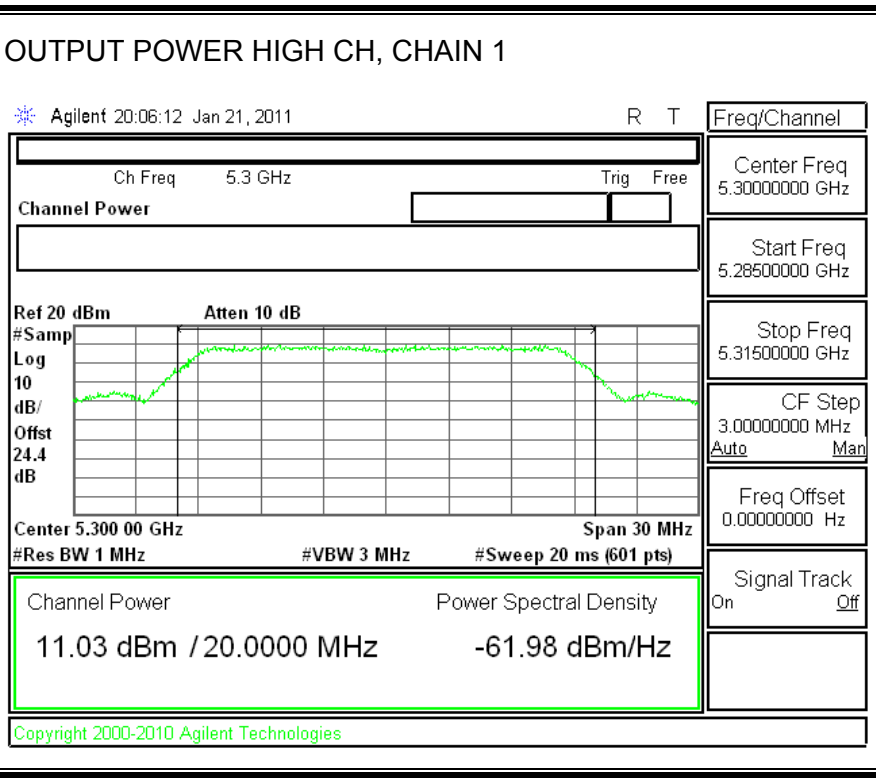


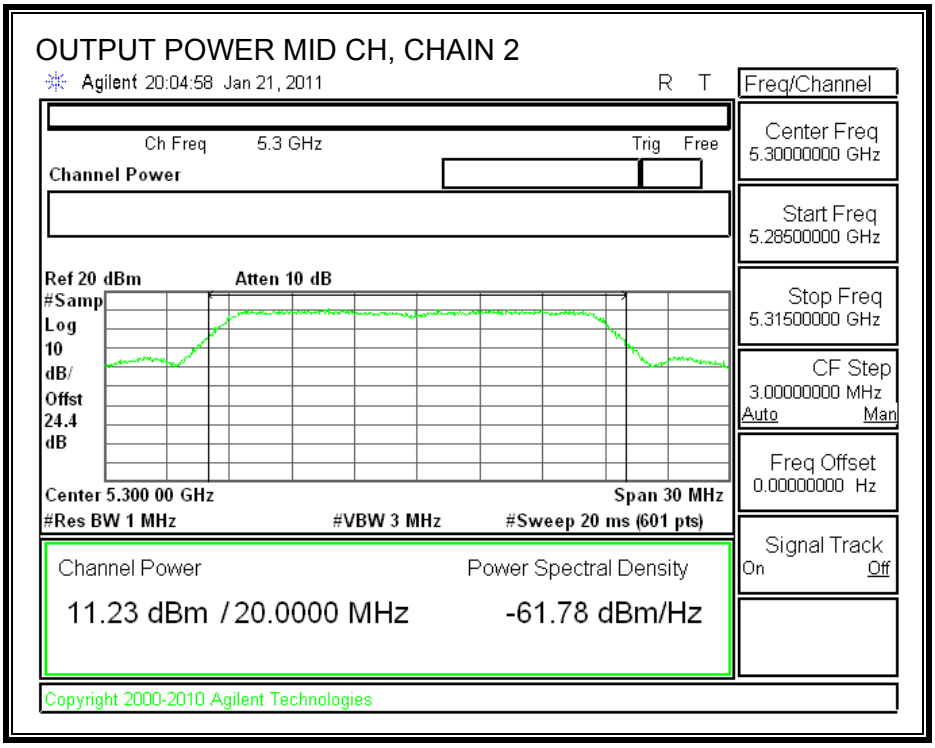
TPC OUTPUT POWER

OUTPUT POWER HIGH CH, CHAIN 0



OUTPUT POWER HIGH CH, CHAIN 1





7.7.8. PEAK POWER SPECTRAL DENSITY

LIMITS

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

For the 5.25–5.35 GHz band, the peak power spectral density shall not exceed 11 dBm in any 1 MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The maximum antenna gain is equal to 6.80 dBi, therefore the limit is 10.20 dBm.

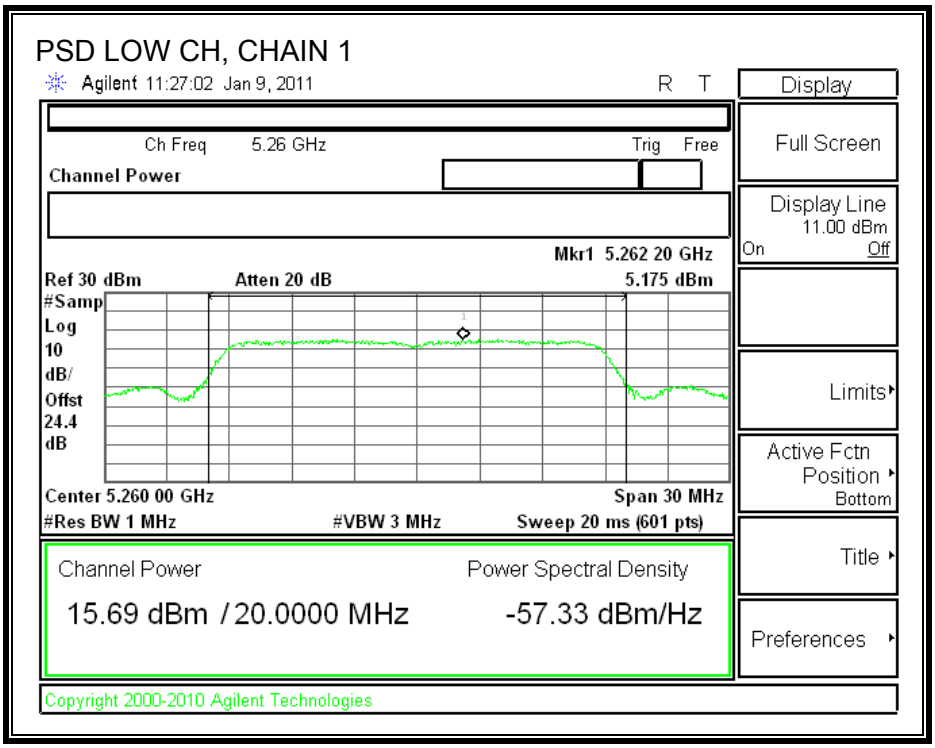
TEST PROCEDURE

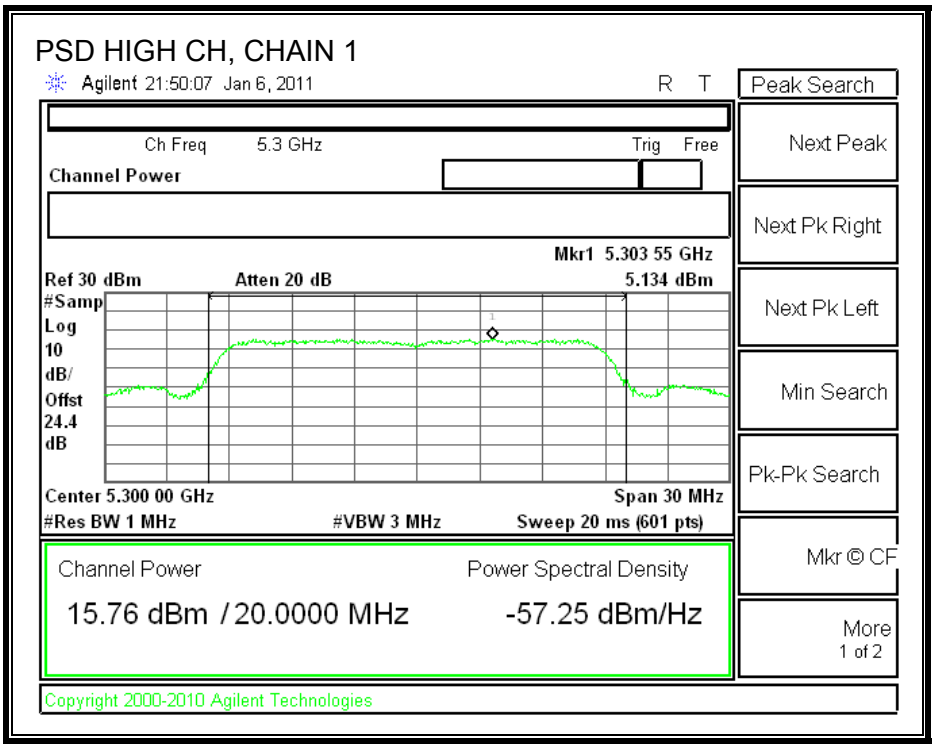
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002. PPSD method #2 was used.

RESULTS

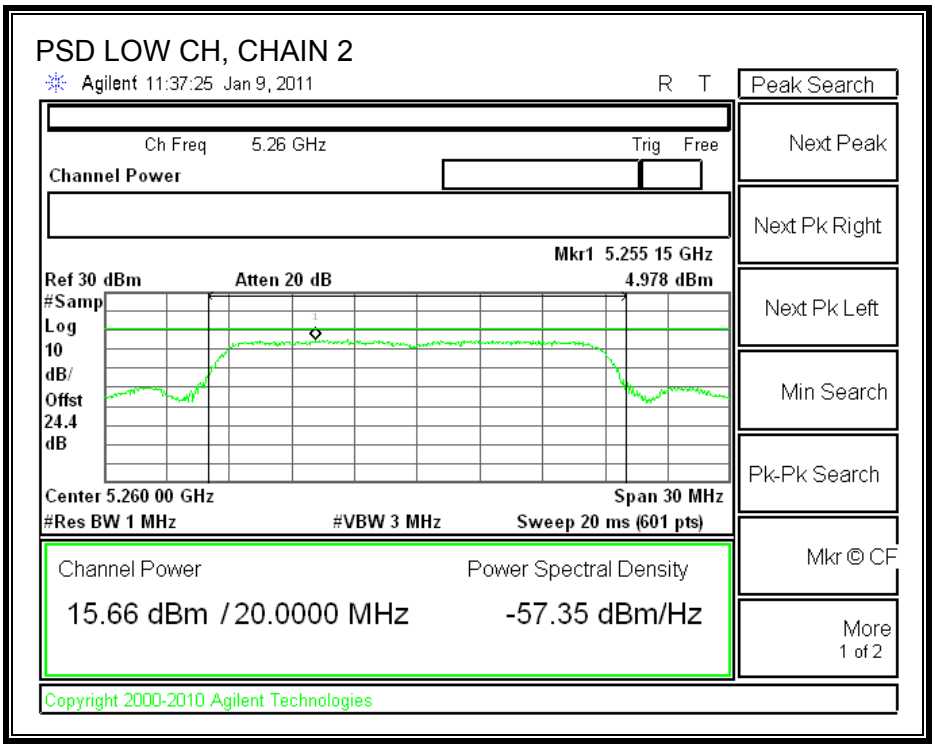
Channel	Frequency (MHz)	Chain 1 PPSD (dBm)	Chain 2 PPSD (dBm)	Chain 3 PPSD (dBm)	Total PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	5260	5.175	4.978	4.712	9.73	10.20	-0.47
High	5300	5.134	5.398	4.973	9.94	10.20	-0.26

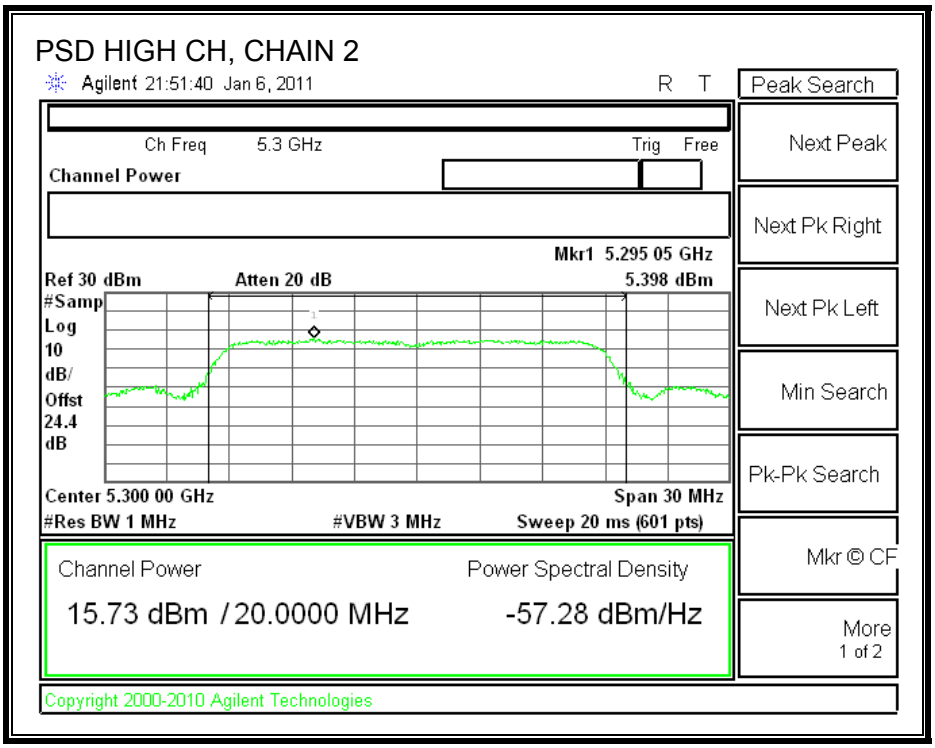
CHAIN 1 POWER SPECTRAL DENSITY



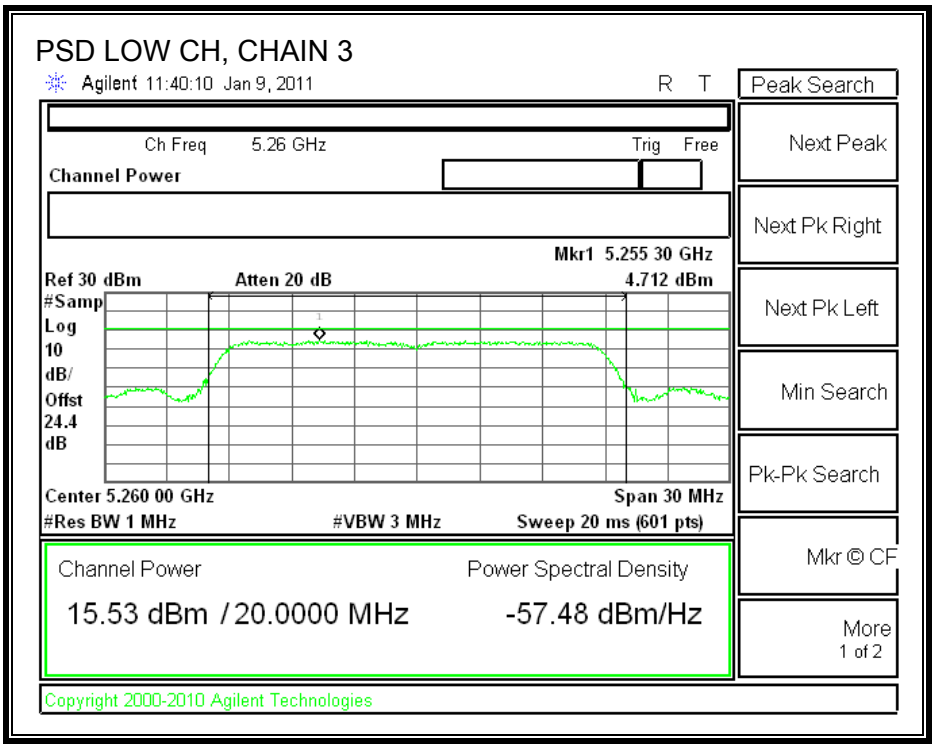


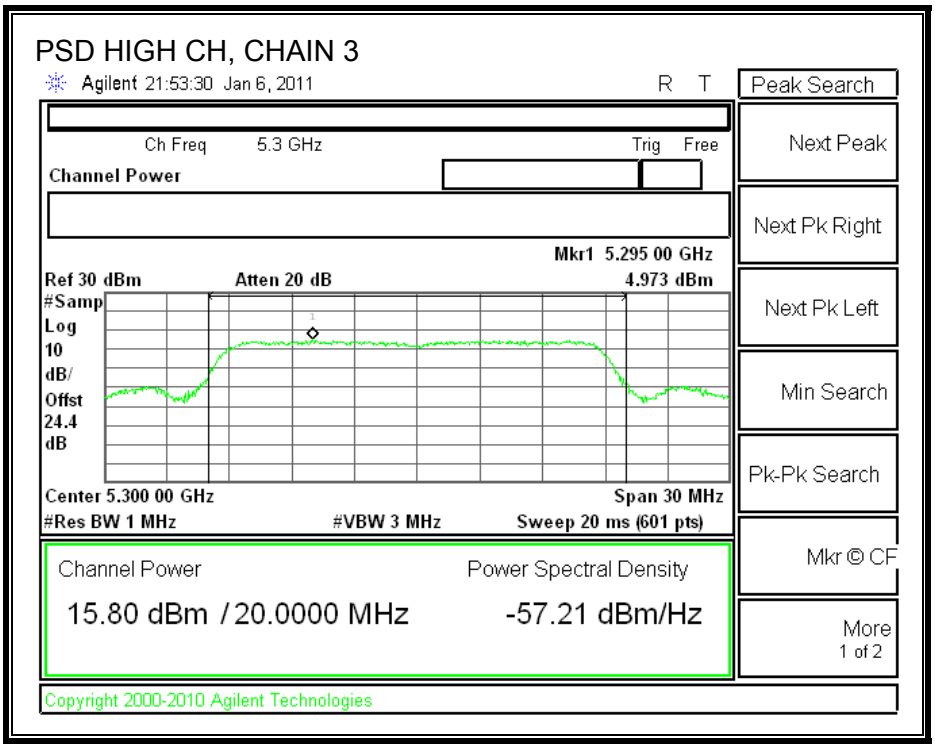
CHAIN 2 POWER SPECTRAL DENSITY





CHAIN 3 POWER SPECTRAL DENSITY





7.7.9. PEAK EXCURSION

LIMITS

FCC §15.407 (a) (6)

The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

TEST PROCEDURE

The transmitter outputs are connected to the spectrum analyzer via a combiner.

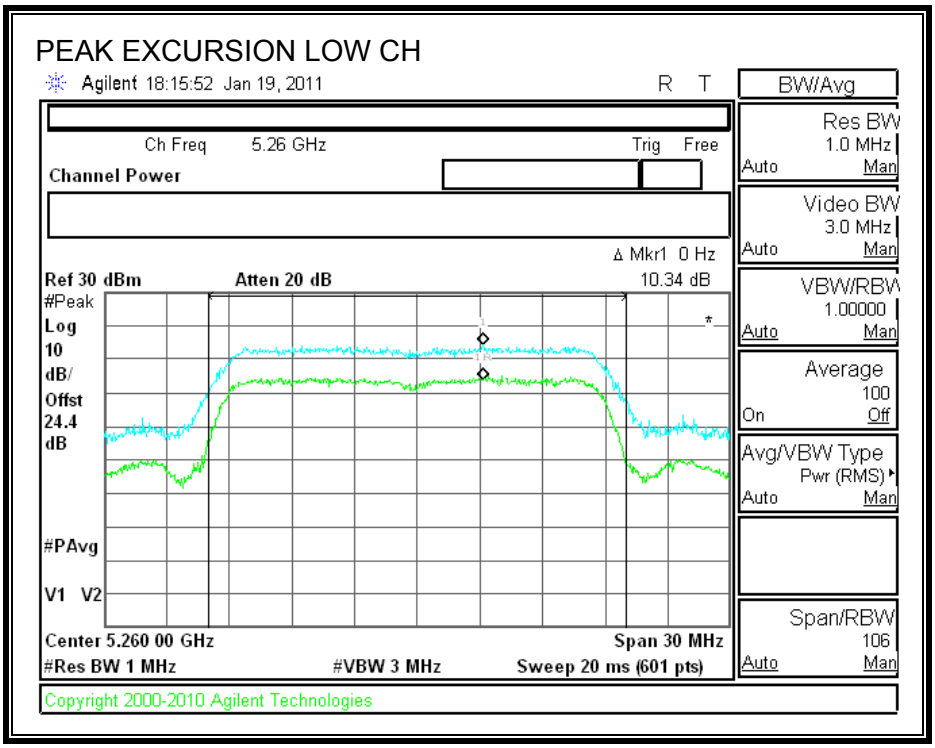
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

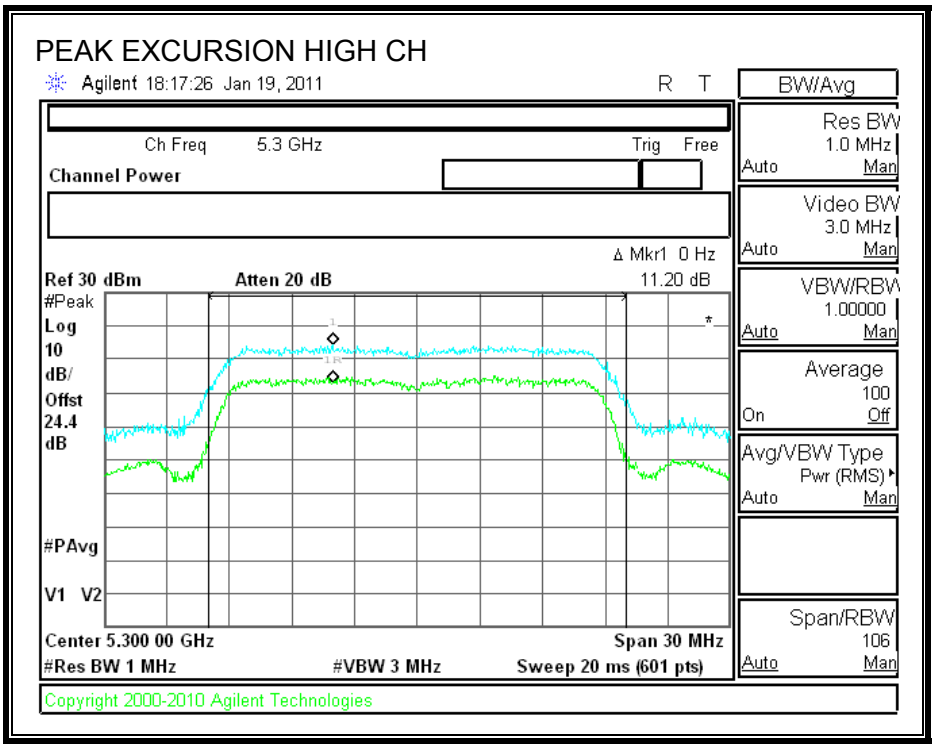
Since Method # 1 was used for peak power measurements, Method # 1 settings are used for the second PPSD trace.

RESULTS

Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5260	10.34	13	-2.66
High	5300	11.20	13	-1.80

PEAK EXCURSION





7.7.10. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.407 (b) (2)

IC RSS-210 A9.3 (2)

For transmitters operating in the 5.25-5.35 GHz band: all emissions outside of the 5.25-5.35 GHz band shall not exceed an EIRP of -27 dBm / MHz.

Devices operating in the 5.25-5.35 GHz band that generate emissions in the 5.15-5.25 GHz band must meet all applicable technical requirements for operation in the 5.15-5.25 GHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5.15-5.25 GHz band.

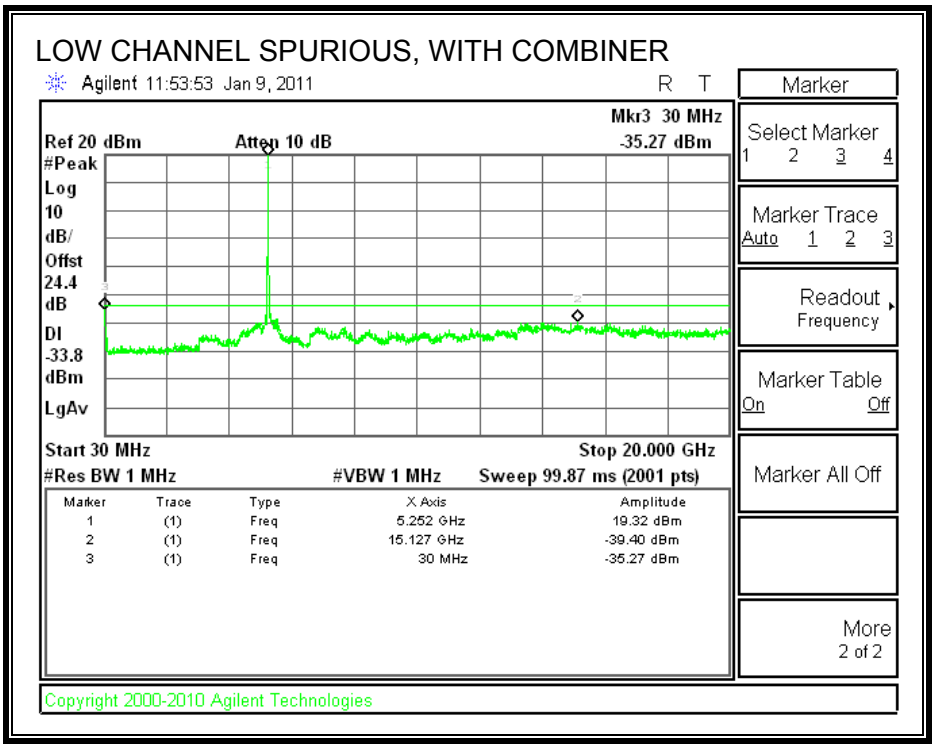
TEST PROCEDURE

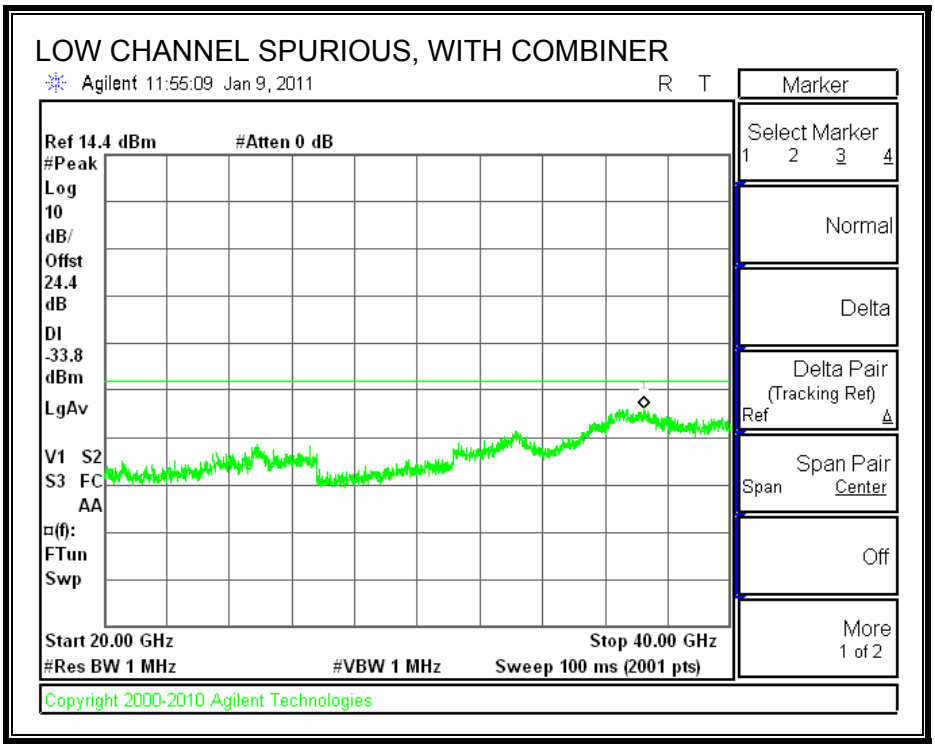
Conducted RF measurements of the transmitter output are made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 1 MHz. Peak detection measurements are compared to EIRP limit, adjusted for the maximum antenna gain.

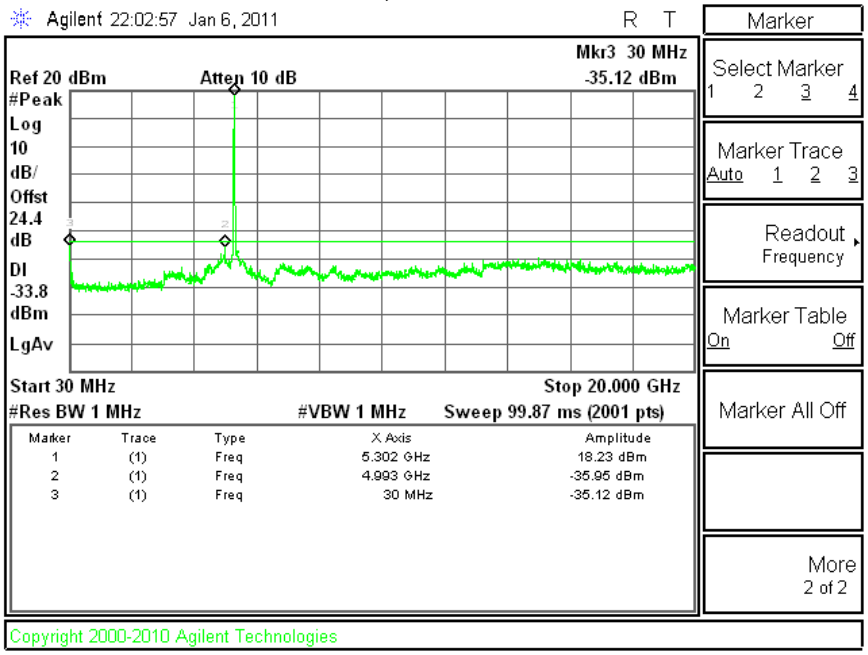
Measurements are made over the 30 MHz to 40 GHz range with the transmitter set to the lowest, middle, and highest channels.

SPURIOUS EMISSIONS WITH COMBINER

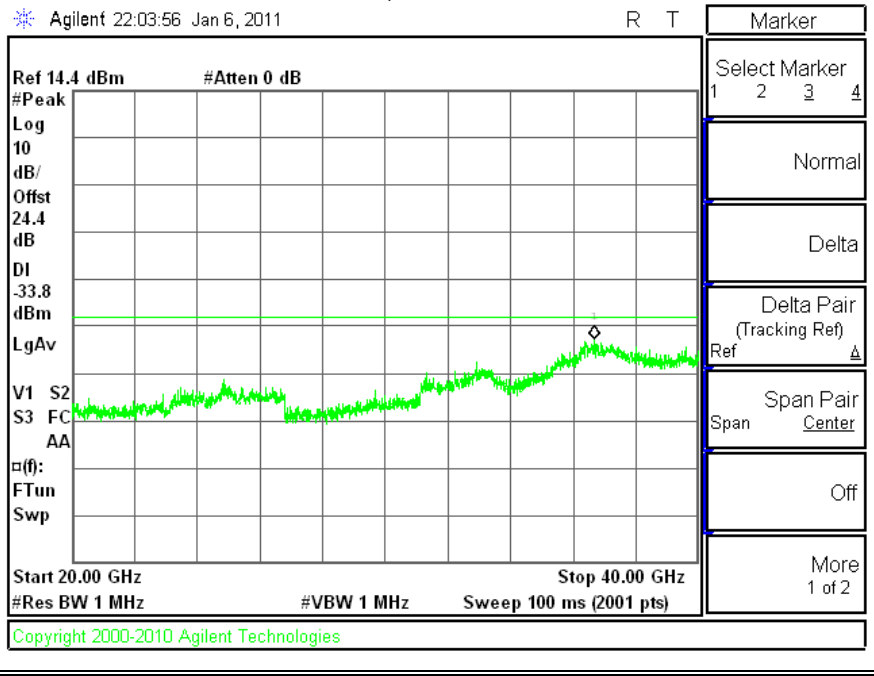




HIGH CHANNEL SPURIOUS, WITH COMBINER



HIGH CHANNEL SPURIOUS, WITH COMBINER



7.8. 802.11n HT SISO 40 MODE IN THE 5.3 GHz BAND

SISO

7.8.1. 26 dB and 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

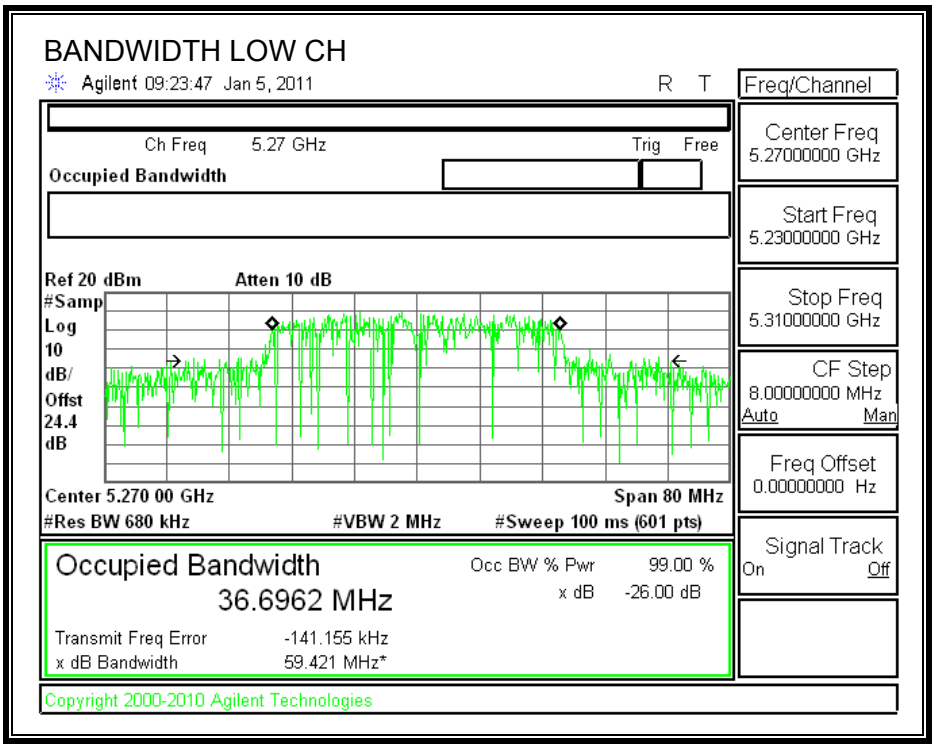
TEST PROCEDURE

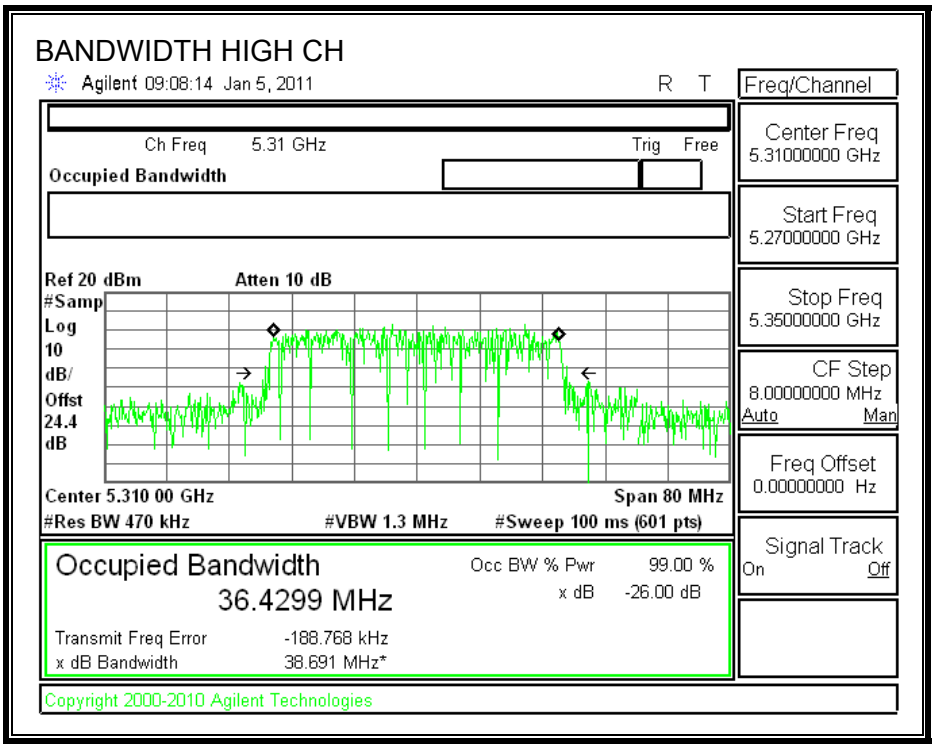
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the measured bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth function is utilized.

RESULTS

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5270	59.421	36.6962
High	5310	38.691	36.4299

26 dB and 99% BANDWIDTH





7.8.2. OUTPUT POWER

LIMITS

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

For the 5.25-5.35 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26-dB emission bandwidth in MHz. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

TEST PROCEDURE

The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

The transmitter output operates continuously therefore Method # 1 is used.

RESULTS

Limit

Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	11 + 10 Log B Limit (dBm)	Antenna Gain (dBi)	Limit (dBm)
Low	5270	24	59.421	28.74	6.80	23.20
High	5310	24	38.691	26.88	6.80	23.20

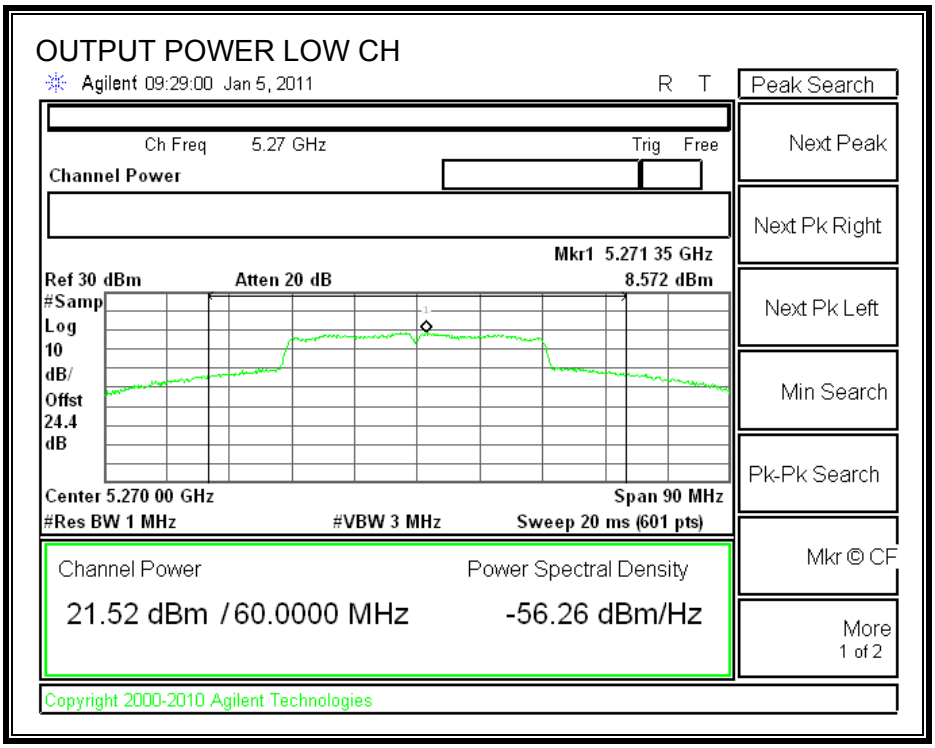
Results

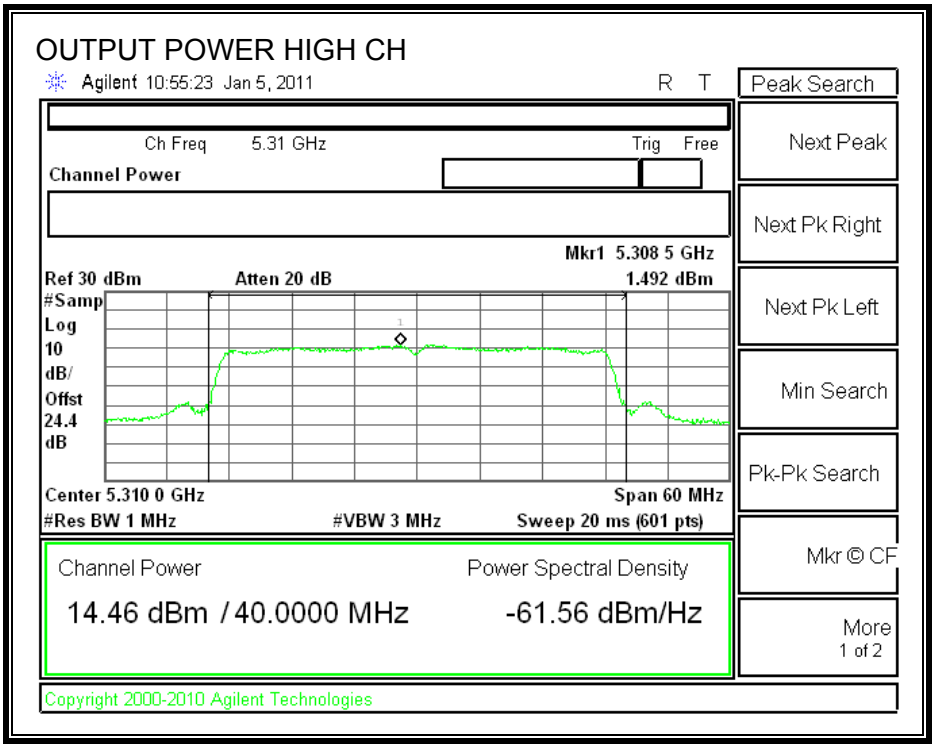
Channel	Frequency (MHz)	Power (dBm)	Limit (dBm)	Margin (dB)
Low	5270	21.52	23.20	-1.68
High	5310	14.46	23.20	-8.74

TPC Results

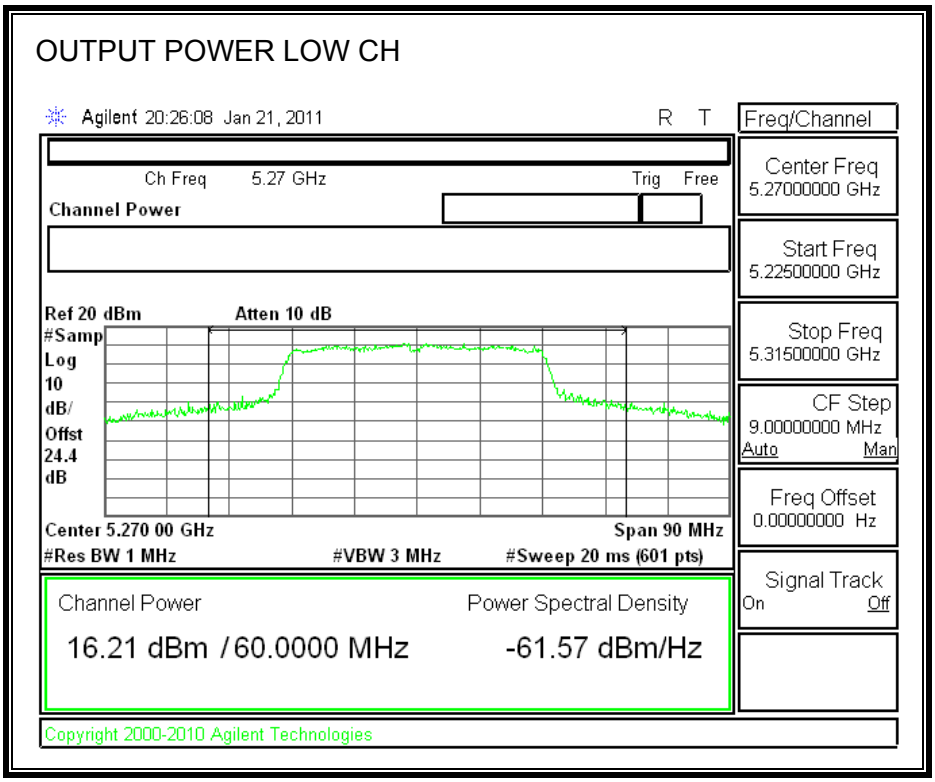
TPC Delta Power		Chain 0		
		5.31		
Worst-case TPC Power		Chain 0	Ant Gain	EIRP
Low	5270	16.21	6.80	23.01
			TPC Limit (dBm)	24
			Margin (dB)	-0.99

OUTPUT POWER





TPC OUTPUT POWER



7.8.3. PEAK POWER SPECTRAL DENSITY

LIMITS

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

For the 5.25–5.35 GHz band, the peak power spectral density shall not exceed 11 dBm in any 1 MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The maximum antenna gain is equal to 6.80 dBi, therefore the limit is 10.20dBm.

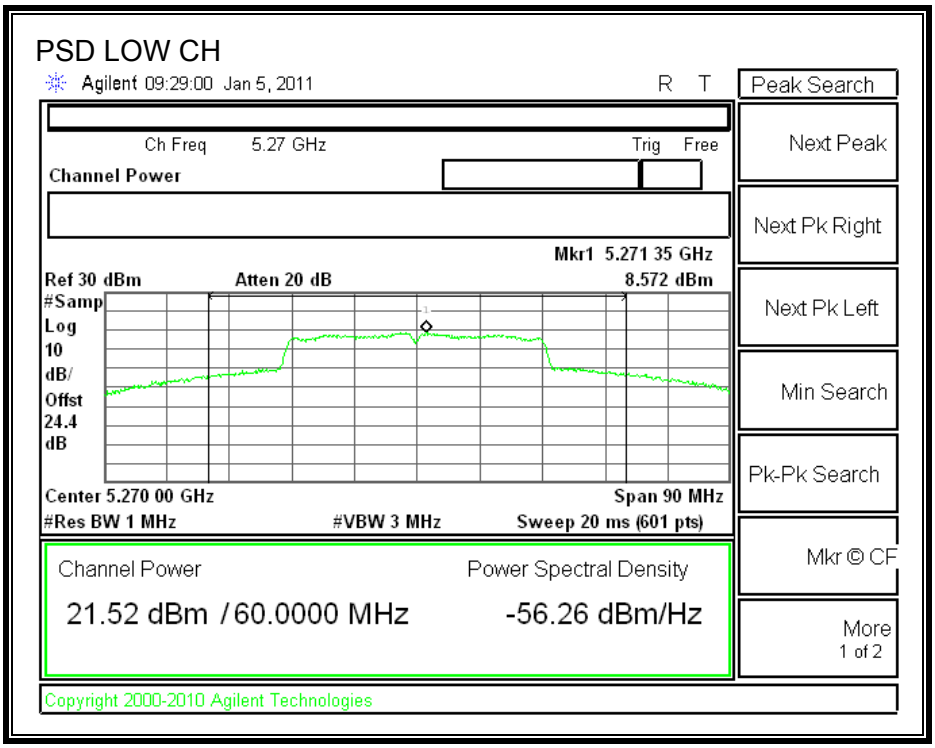
TEST PROCEDURE

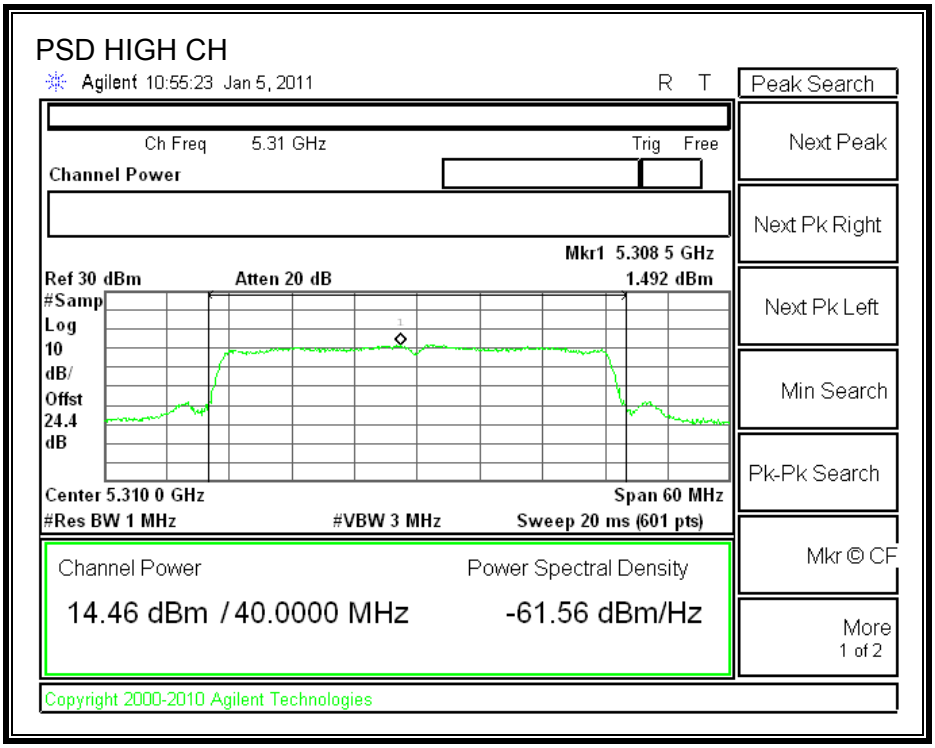
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002. PPSD method #2 was used.

RESULTS

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	5270	8.57	10.20	-1.63
High	5310	1.49	10.20	-8.71

POWER SPECTRAL DENSITY





7.8.4. PEAK EXCURSION

LIMITS

FCC §15.407 (a) (6)

The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

TEST PROCEDURE

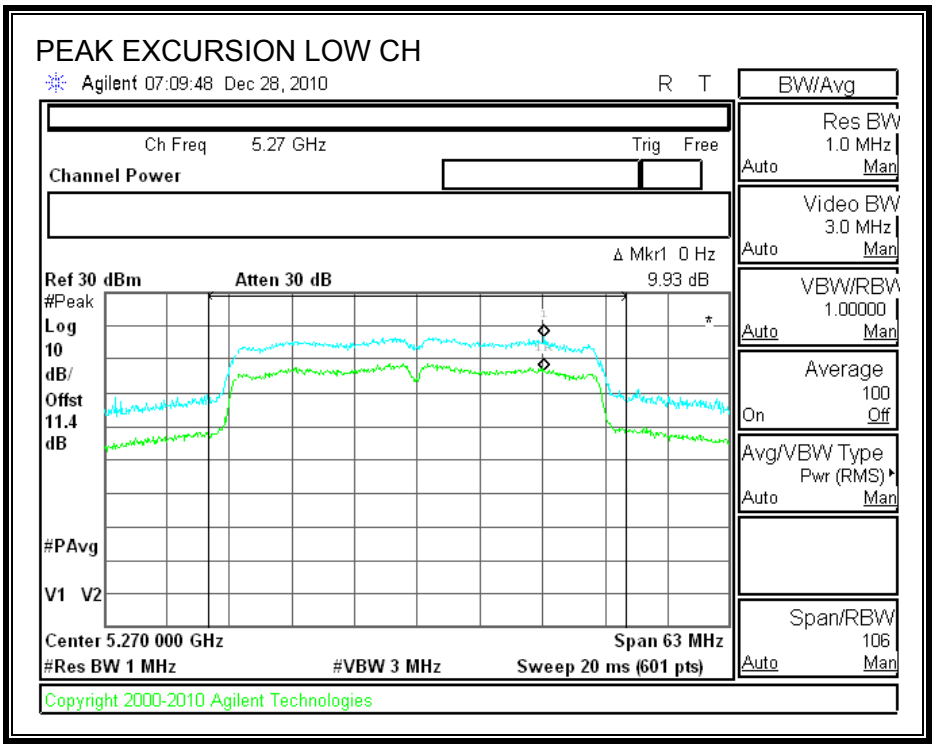
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

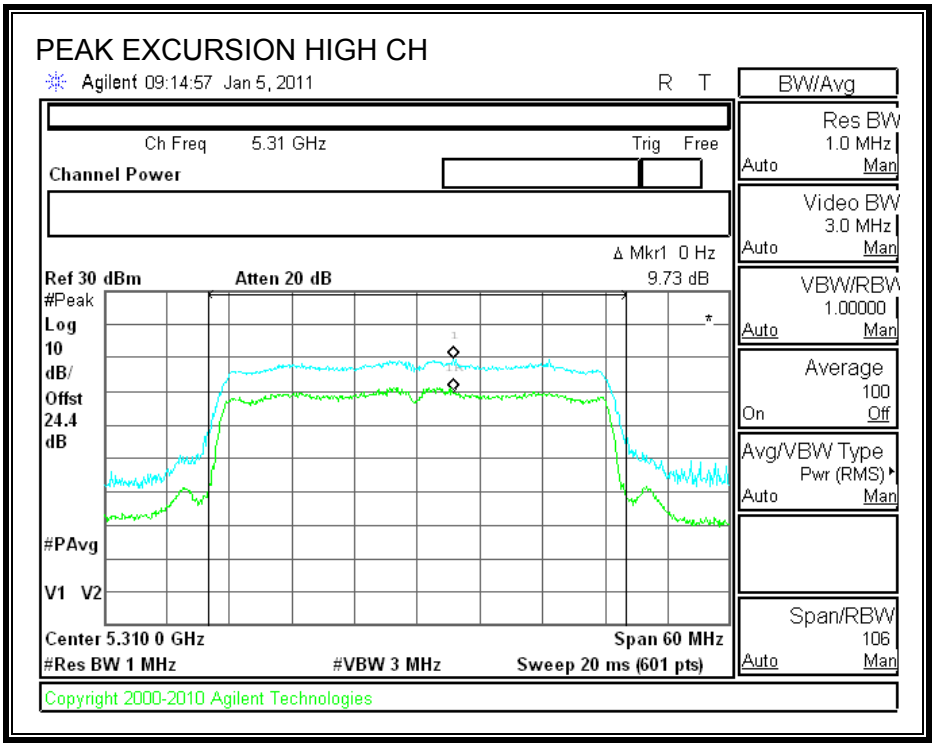
Since Method # 1 was used for peak power measurements, Method # 1 settings are used for the second PPSD trace.

RESULTS

Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5270	9.93	13	-3.07
High	5310	9.73	13	-3.27

PEAK EXCURSION





7.8.5. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.407 (b) (2)

IC RSS-210 A9.3 (2)

For transmitters operating in the 5.25-5.35 GHz band: all emissions outside of the 5.25-5.35 GHz band shall not exceed an EIRP of -27 dBm / MHz.

Devices operating in the 5.25-5.35 GHz band that generate emissions in the 5.15-5.25 GHz band must meet all applicable technical requirements for operation in the 5.15-5.25 GHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5.15-5.25 GHz band.

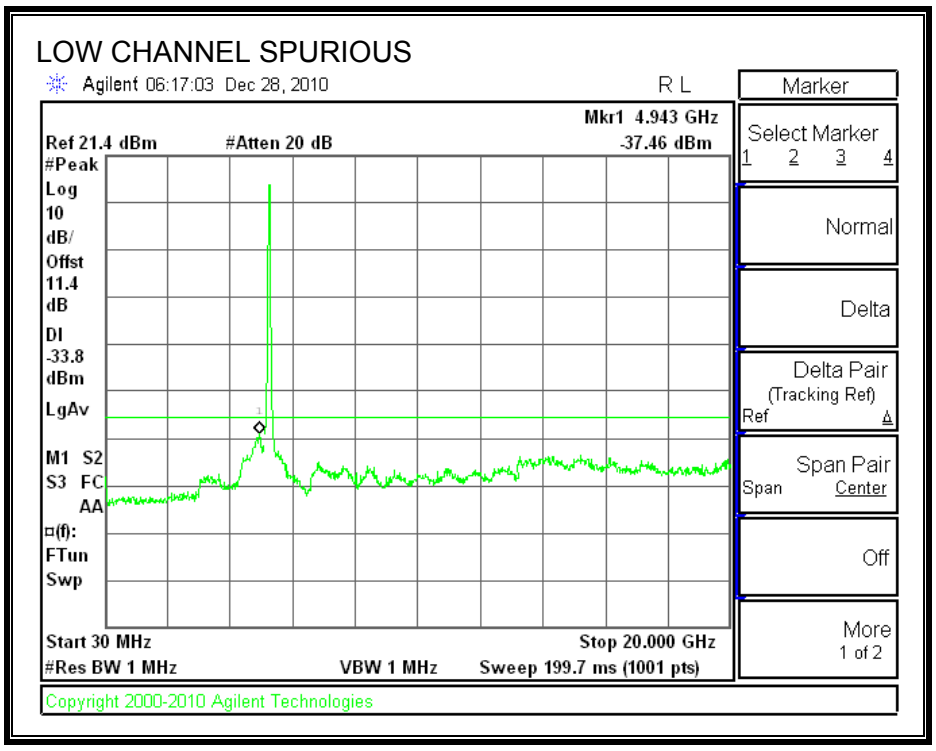
TEST PROCEDURE

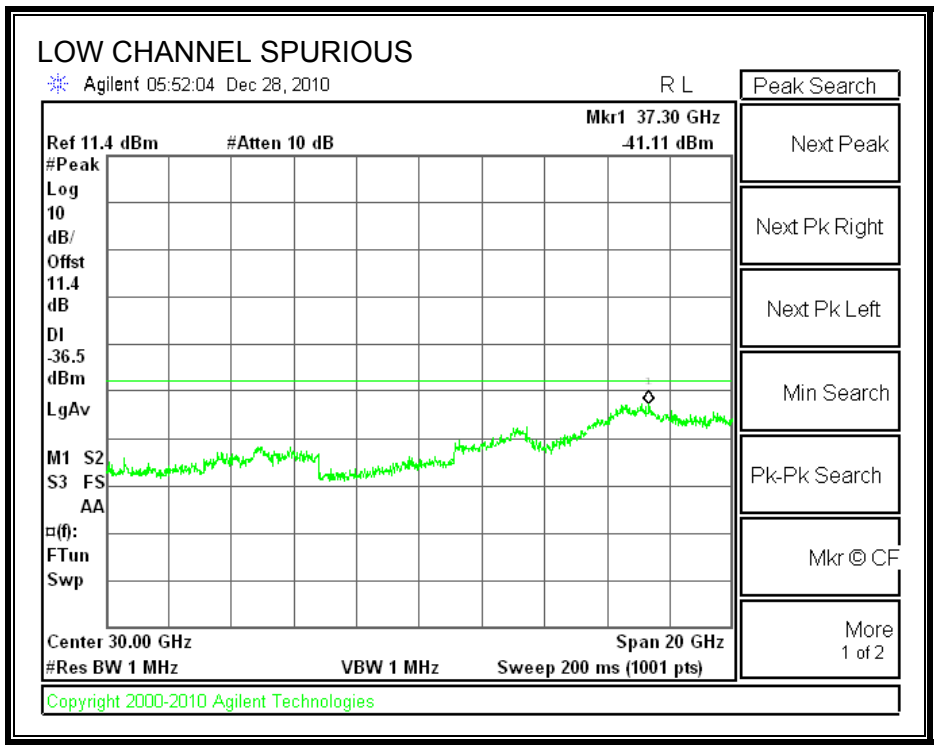
Conducted RF measurements of the transmitter output are made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

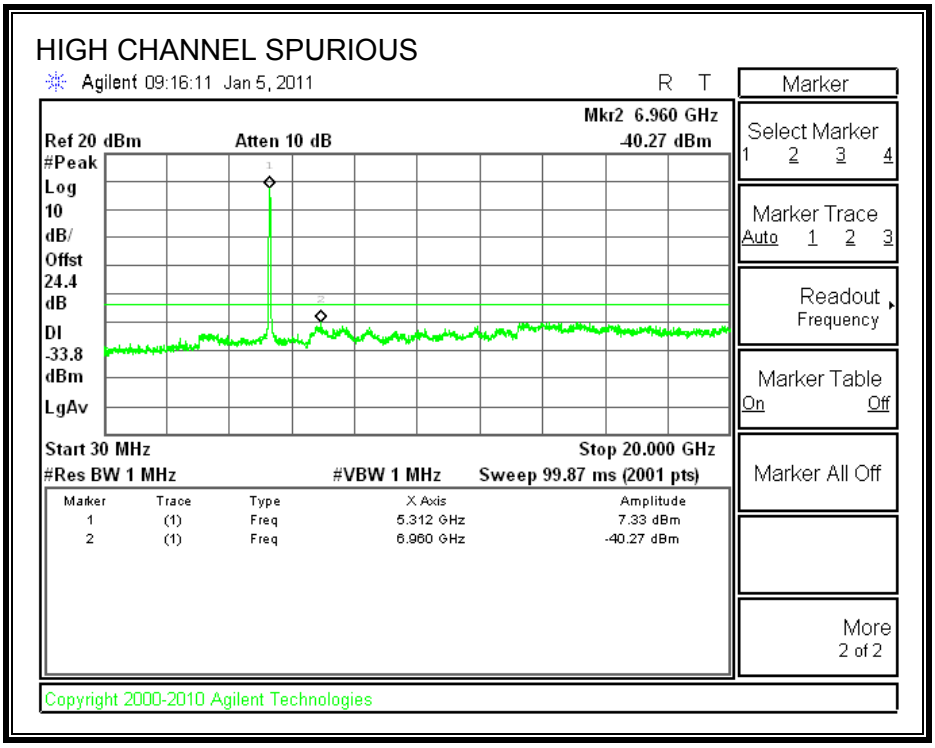
The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 1 MHz. Peak detection measurements are compared to EIRP limit, adjusted for the maximum antenna gain.

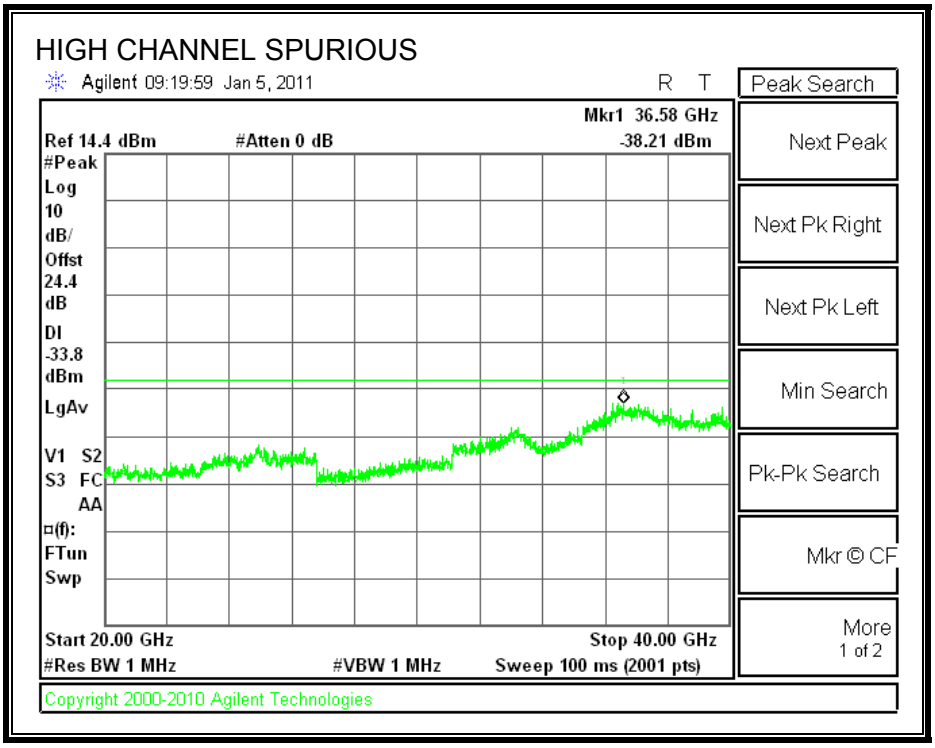
Measurements are made over the 30 MHz to 40 GHz range with the transmitter set to the lowest, middle, and highest channels.

SPURIOUS EMISSIONS









7.9. 802.11n THREE CHAINS HT40 MODE IN THE 5.3 GHz BAND

CDD MCS 0

7.9.1. 26 dB and 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

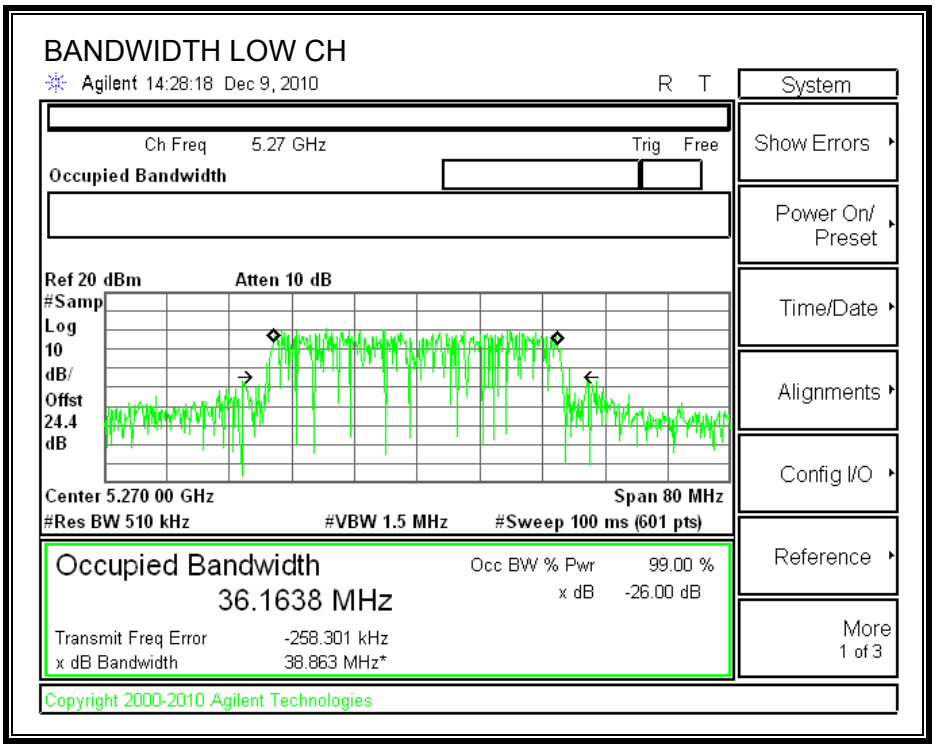
TEST PROCEDURE

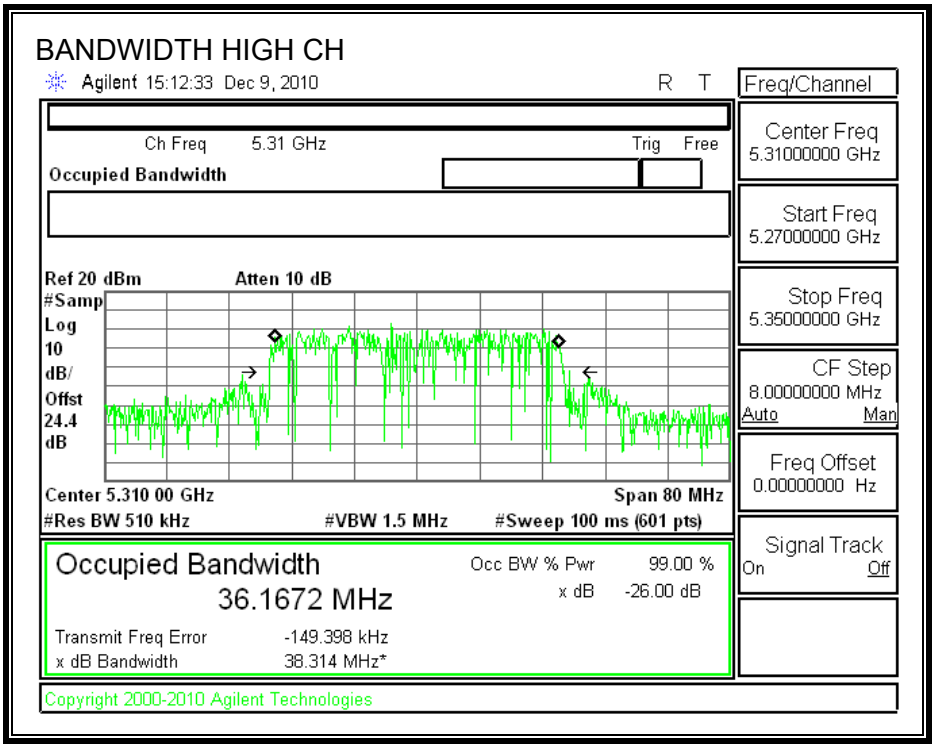
The transmitter outputs are connected to the spectrum analyzer via a combiner. The RBW is set to 1% to 3% of the measured bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth function is utilized.

RESULTS

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5270	38.863	36.1638
High	5310	38.314	36.1672

26 dB and 99% BANDWIDTH





7.9.2. OUTPUT POWER

LIMITS

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

For the 5.25-5.35 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26-dB emission bandwidth in MHz. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

TEST PROCEDURE

The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

The transmitter output operates continuously therefore Method # 1 is used.

RESULTS

Limit

Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	11 + 10 Log B Limit (dBm)	Antenna Gain (dBi)	Limit (dBm)
Low	5270	23.98	38.863	26.90	10.99	18.99
High	5310	23.98	38.314	26.83	10.99	18.99

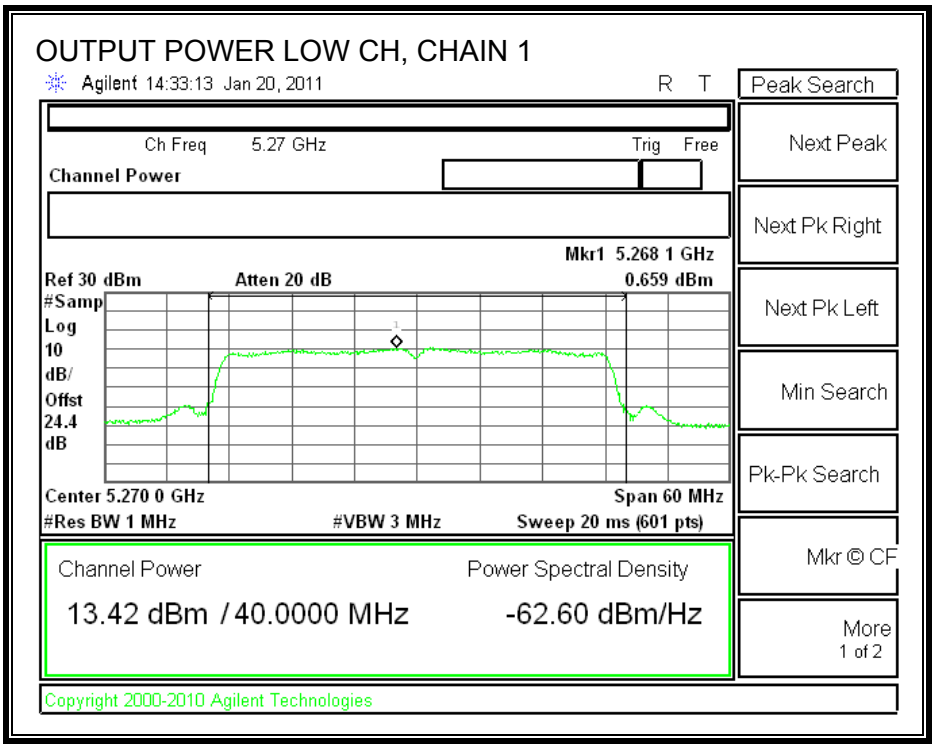
Individual Chain Results

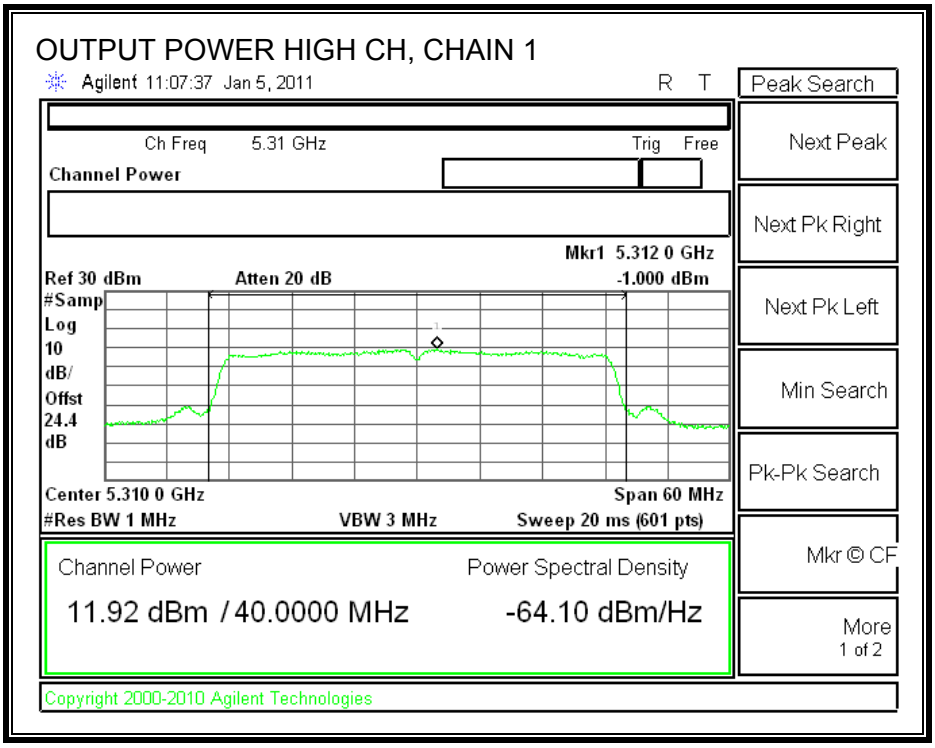
Channel	Frequency (MHz)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Chain 3 Power (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)
Low	5270	13.42	14.32	13.81	18.64	18.99	-0.35
High	5310	11.92	12.68	12.21	17.05	18.99	-1.94

TPC Results

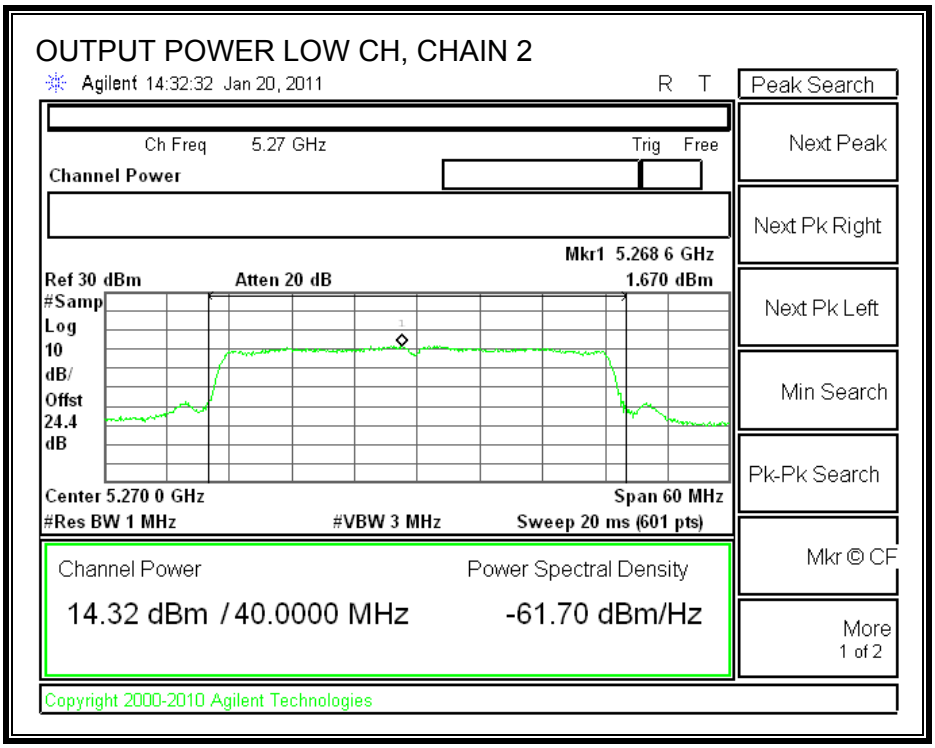
TPC Delta Power		Chain 0	Chain 1	Chain 2			
		5.28	7.02	5.72			
Worst-case TPC Power		Chain 0	Chain 1	Chain 2	Total Power	Ant Gain	EIRP
Low	5270	8.14	7.30	8.09	12.63	10.99	23.62
						TPC Limit (dBm)	24
						Margin (dB)	-0.38

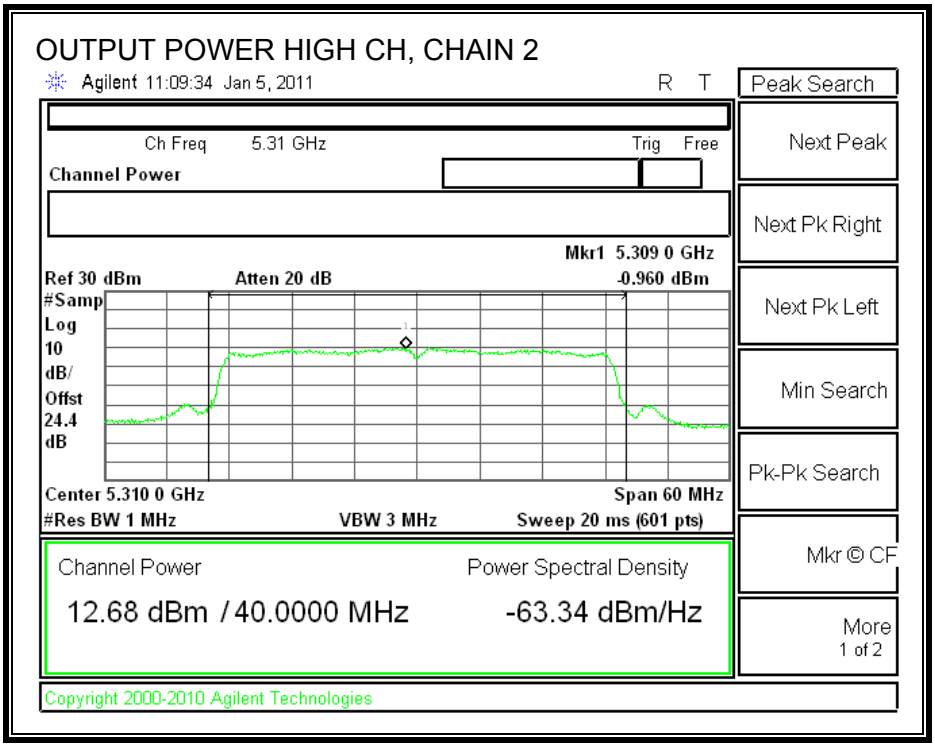
CHAIN 1 OUTPUT POWER



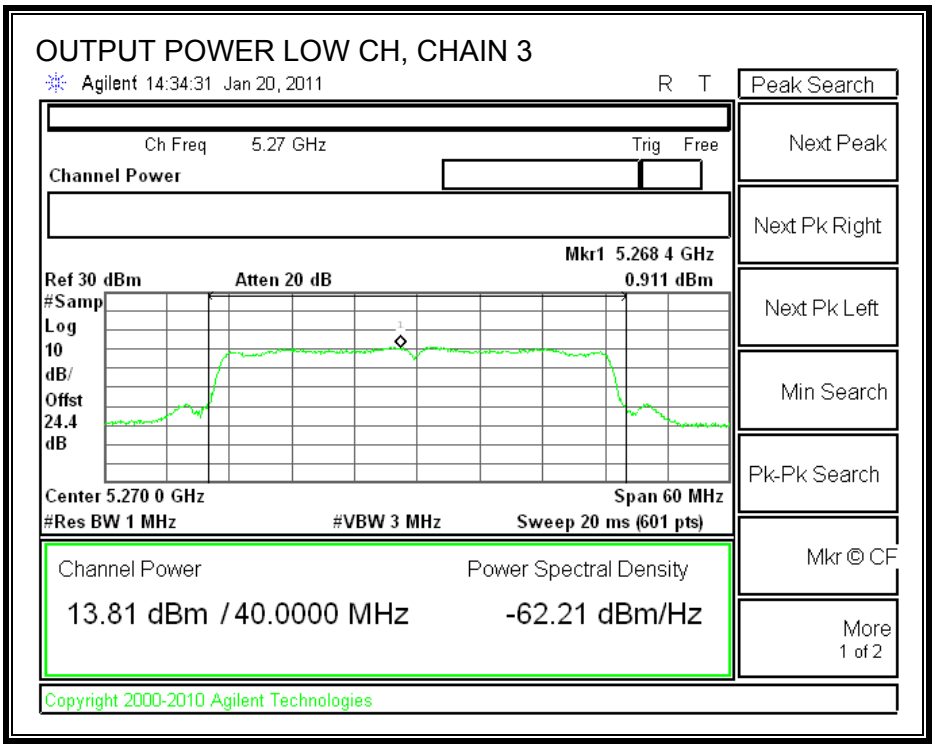


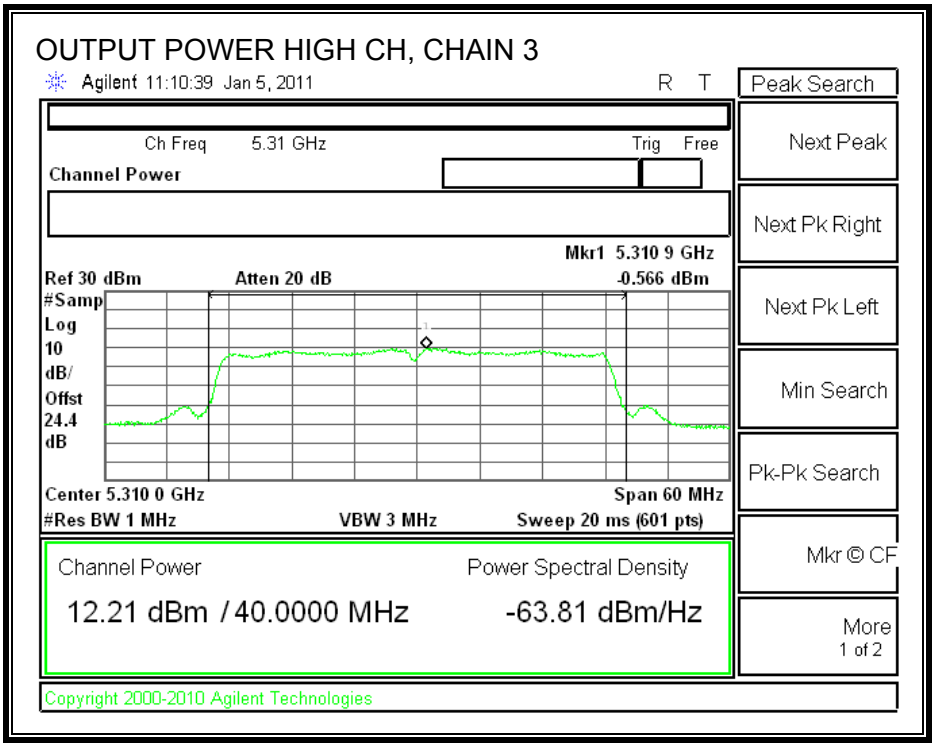
CHAIN 2 OUTPUT POWER



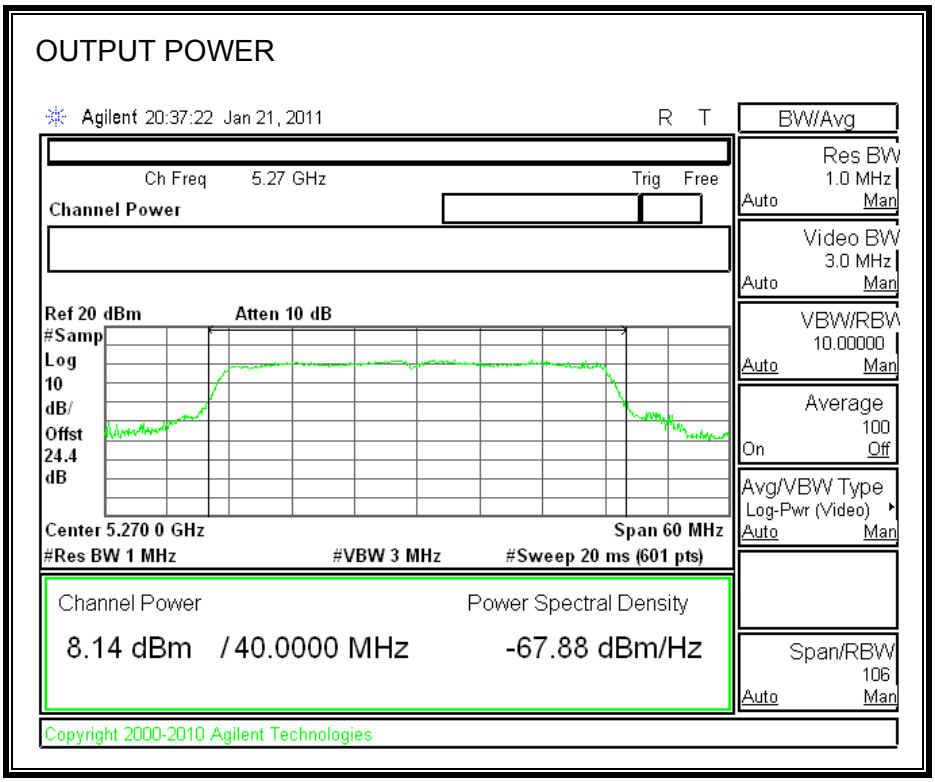


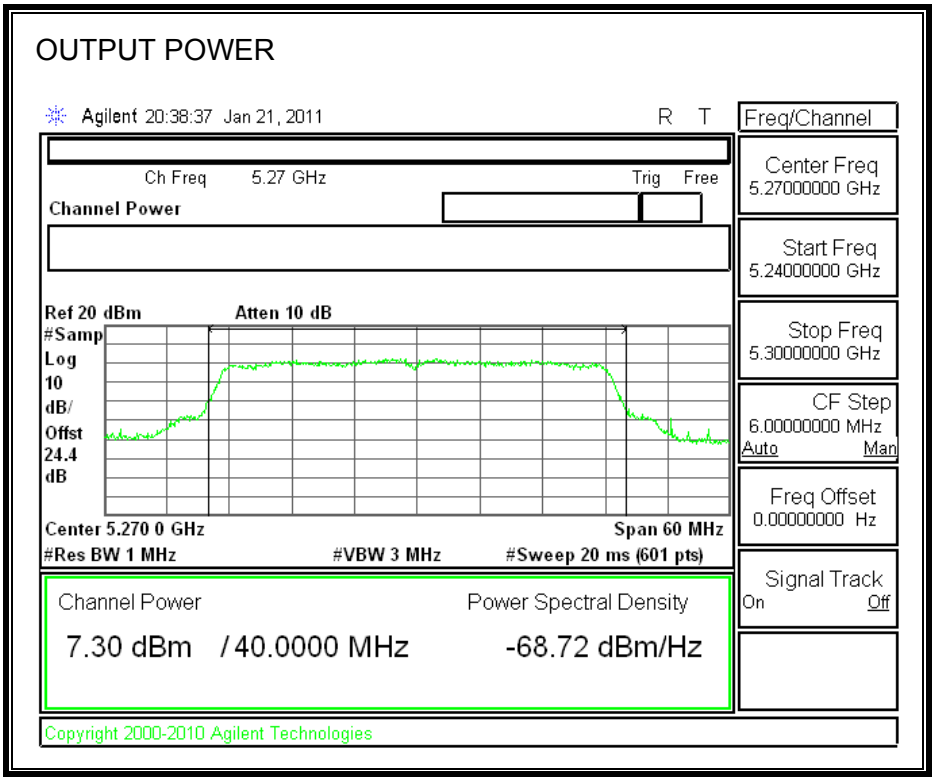
CHAIN 3 OUTPUT POWER



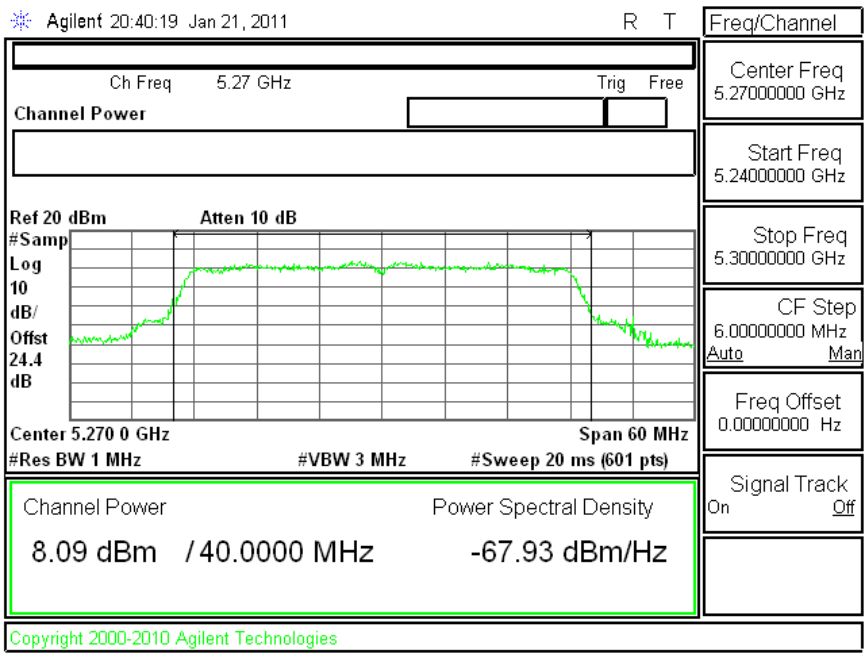


TPC OUTPUT POWER





OUTPUT POWER



7.9.3. PEAK POWER SPECTRAL DENSITY

LIMITS

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

For the 5.25–5.35 GHz band, the peak power spectral density shall not exceed 11 dBm in any 1 MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The composite antenna gain is equal to 10.99 dBi, therefore the limit is 6.01 dBm.

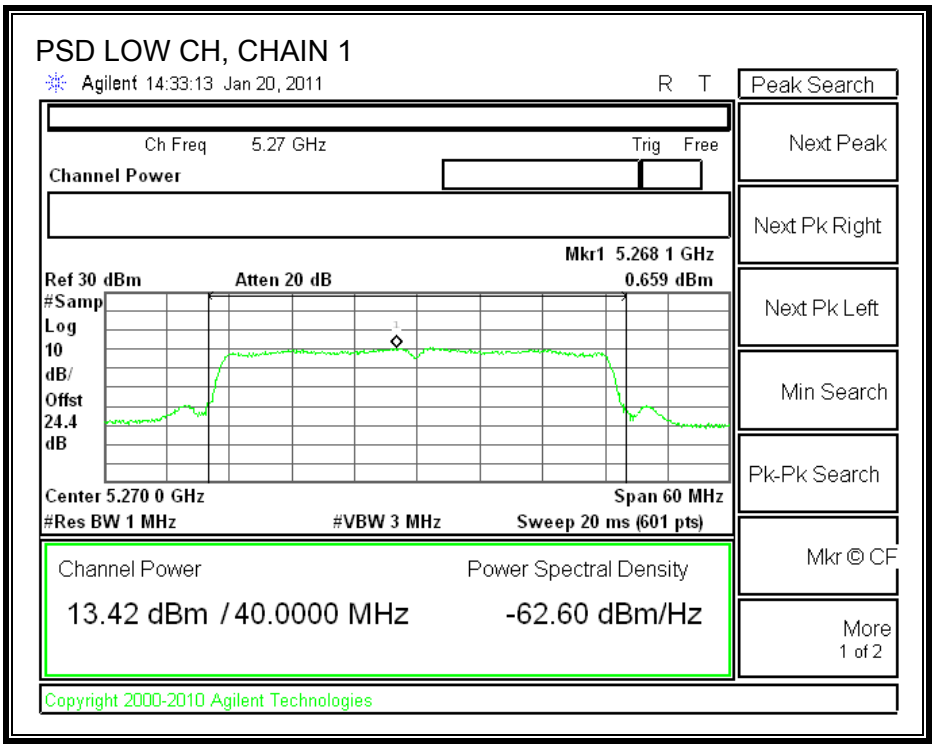
TEST PROCEDURE

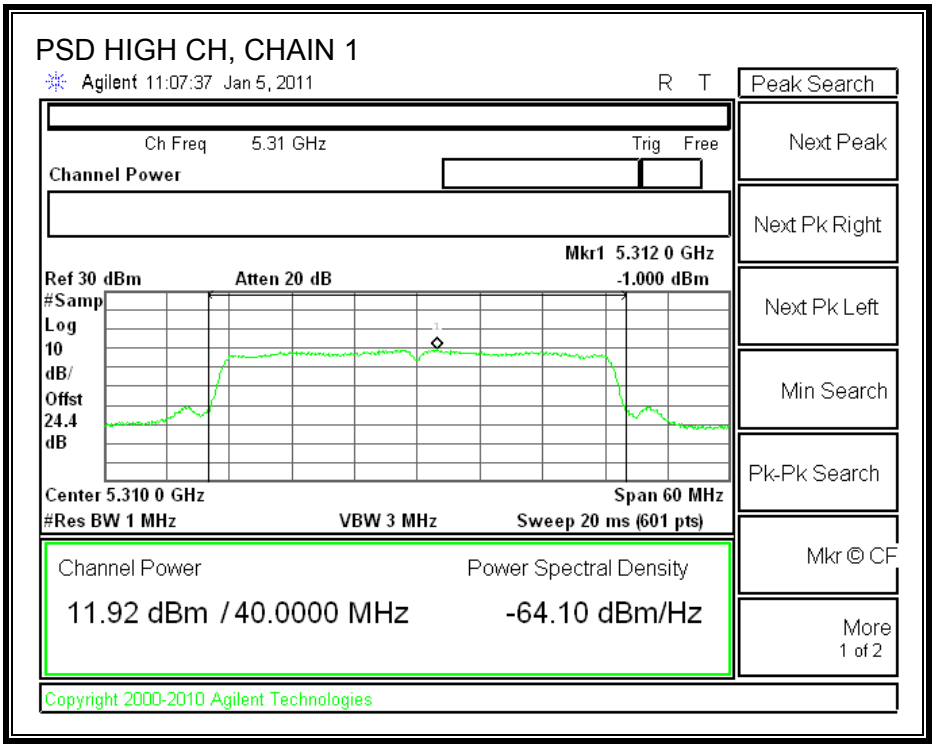
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002. PPSD method #2 was used.

RESULTS

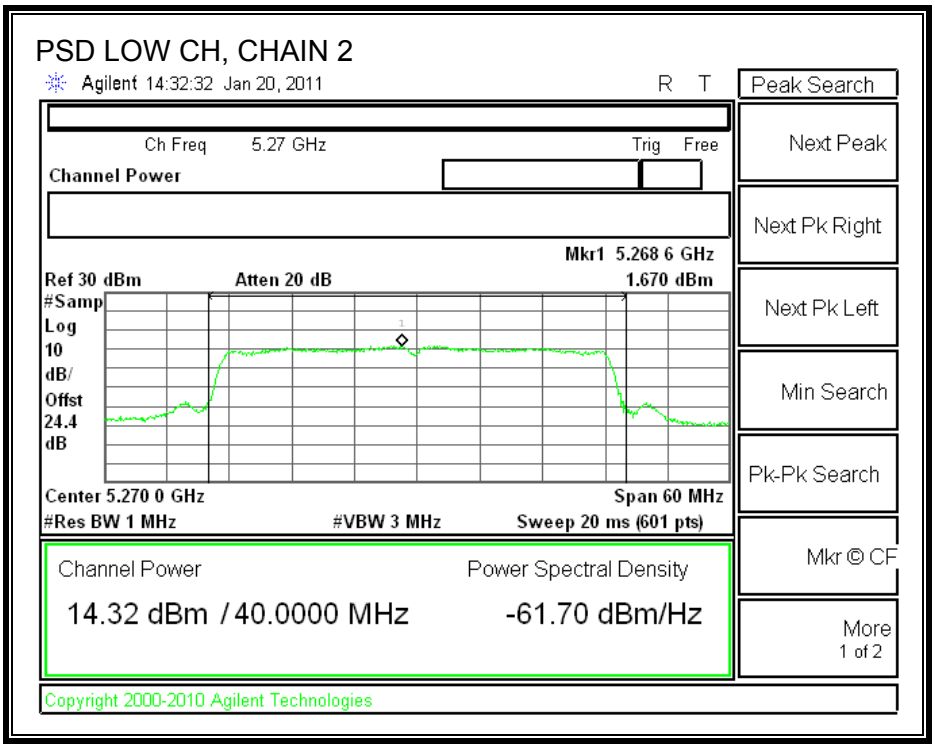
Channel	Frequency (MHz)	Chain 1 PPSD (dBm)	Chain 2 PPSD (dBm)	Chain 3 PPSD (dBm)	Total PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	5270	0.659	1.670	0.911	5.87	6.01	-0.14
High	5310	-1.000	-0.960	-0.566	3.93	6.01	-2.08

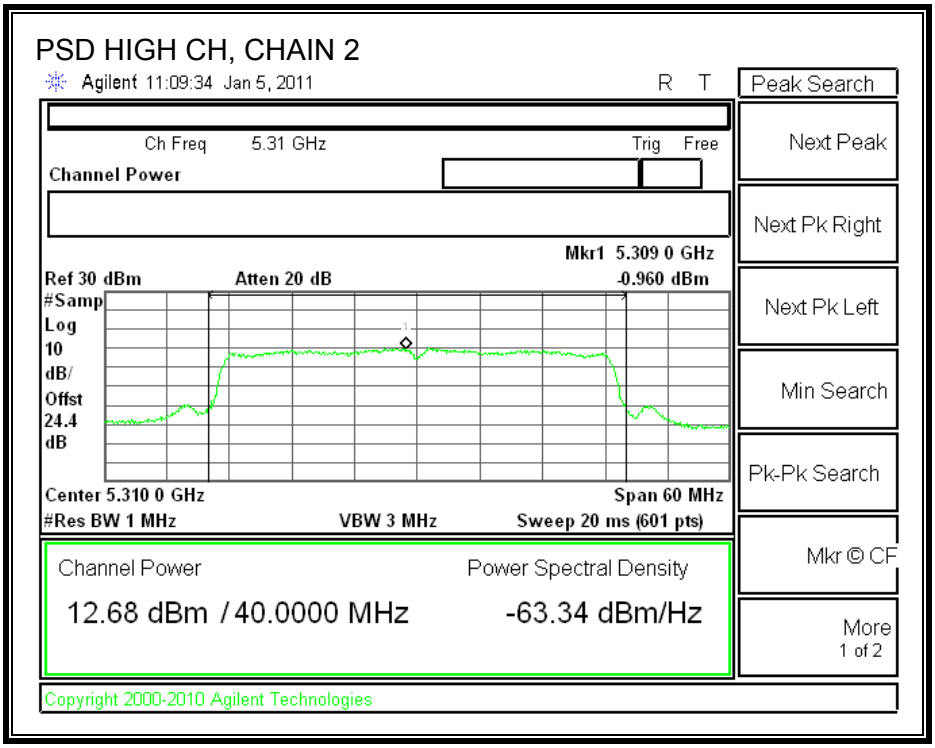
CHAIN 1 POWER SPECTRAL DENSITY



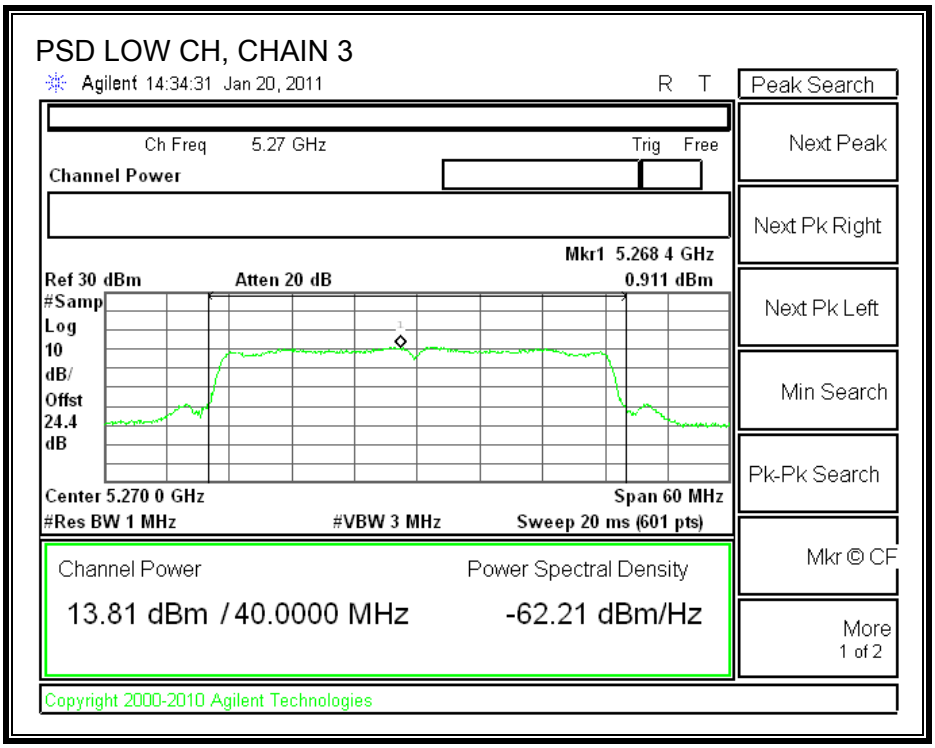


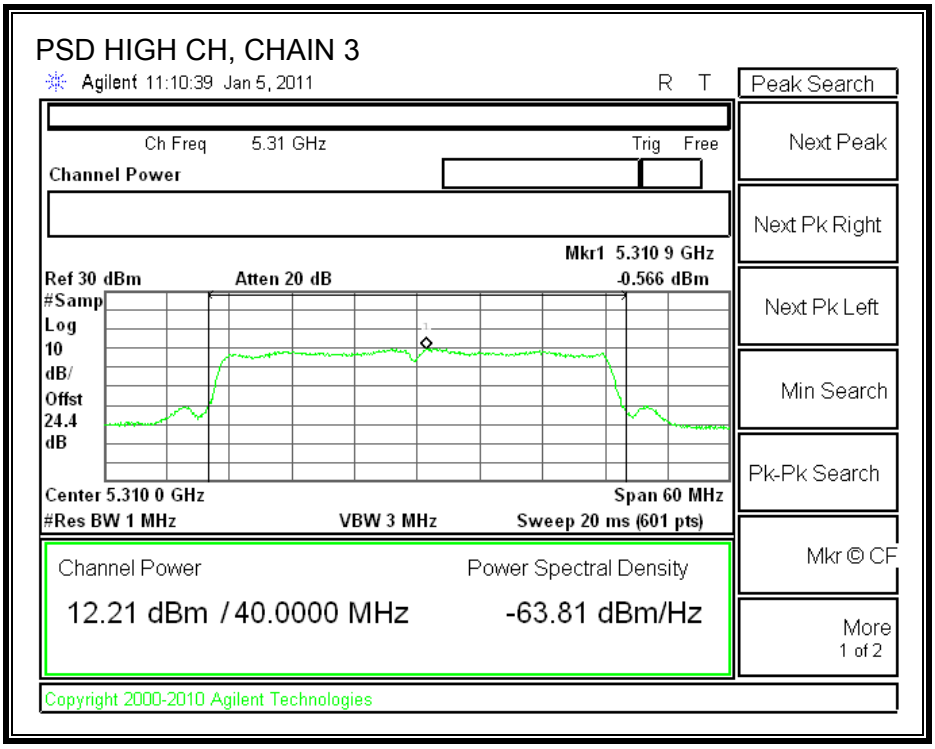
CHAIN 2 POWER SPECTRAL DENSITY





CHAIN 3 POWER SPECTRAL DENSITY





7.9.4. PEAK EXCURSION

LIMITS

FCC §15.407 (a) (6)

The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

TEST PROCEDURE

The transmitter outputs are connected to the spectrum analyzer via a combiner.

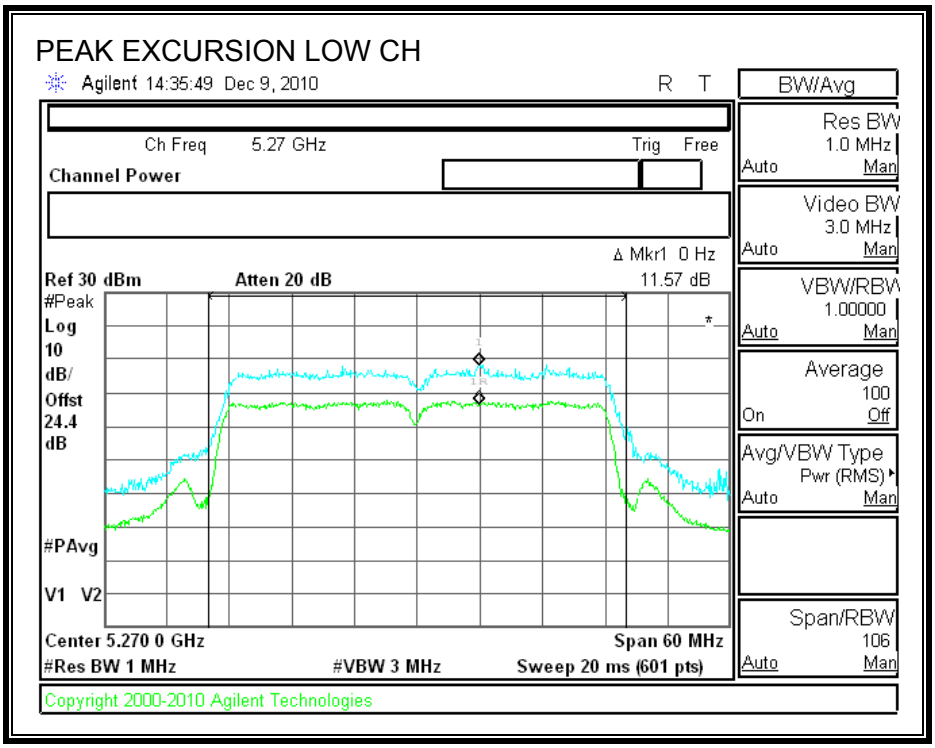
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

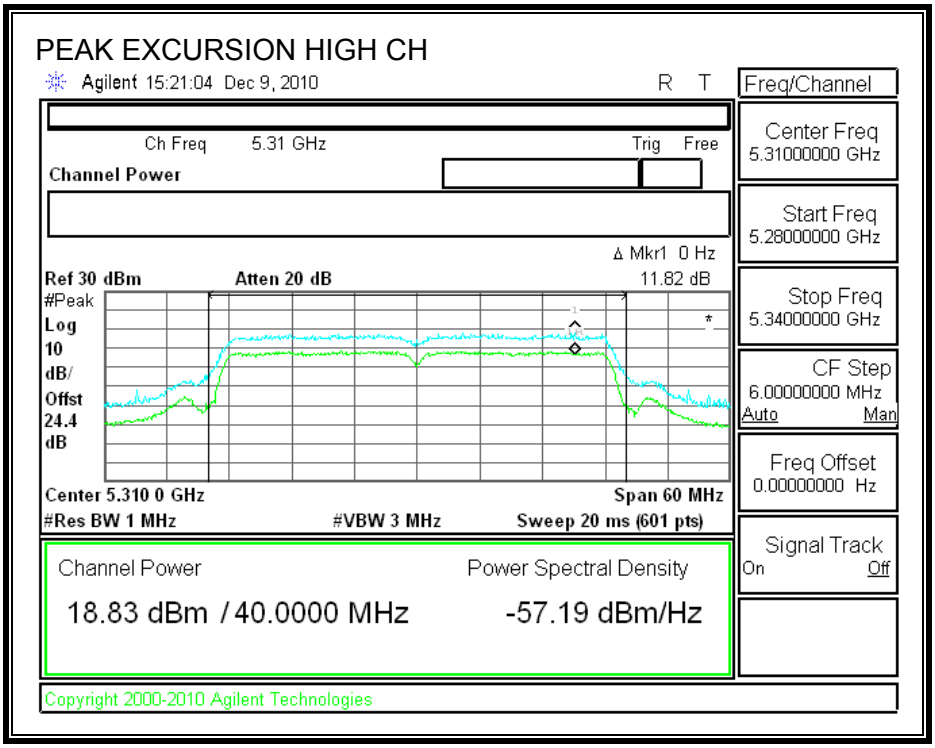
Since Method # 1 was used for peak power measurements, Method # 1 settings are used for the second PPSD trace.

RESULTS

Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5290	11.57	13	-1.43
High	5310	11.82	13	-1.18

PEAK EXCURSION





7.9.5. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.407 (b) (2)

IC RSS-210 A9.3 (2)

For transmitters operating in the 5.25-5.35 GHz band: all emissions outside of the 5.25-5.35 GHz band shall not exceed an EIRP of -27 dBm / MHz.

Devices operating in the 5.25-5.35 GHz band that generate emissions in the 5.15-5.25 GHz band must meet all applicable technical requirements for operation in the 5.15-5.25 GHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5.15-5.25 GHz band.

TEST PROCEDURE

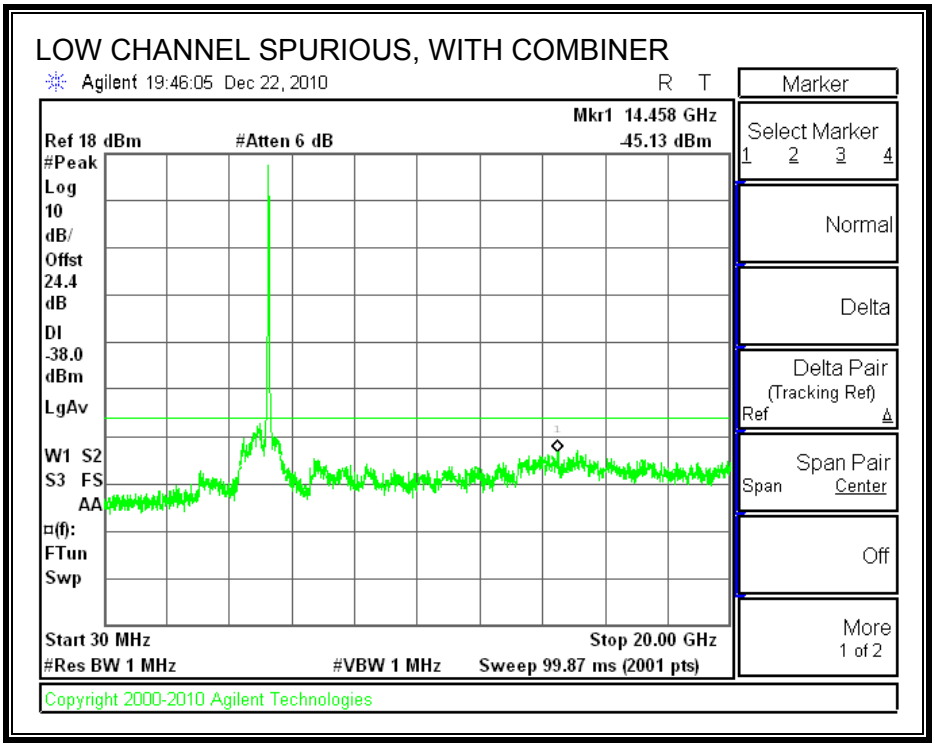
Conducted RF measurements of the transmitter output are made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

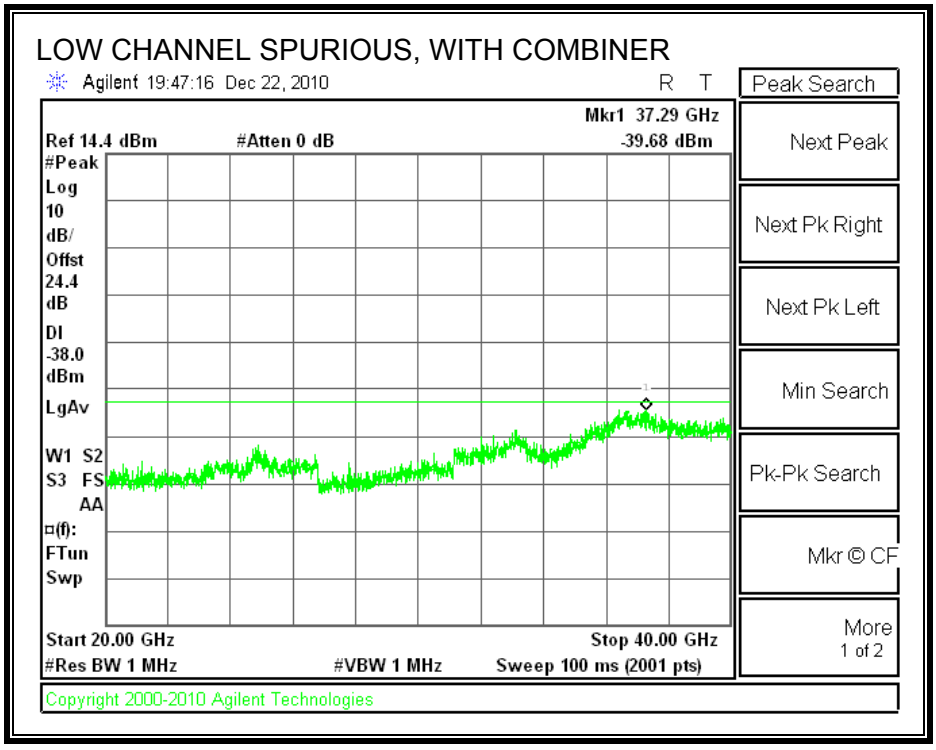
The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 1 MHz. Peak detection measurements are compared to EIRP limit, adjusted for the maximum antenna gain.

Measurements are made over the 30 MHz to 40 GHz range with the transmitter set to the lowest, middle, and highest channels.

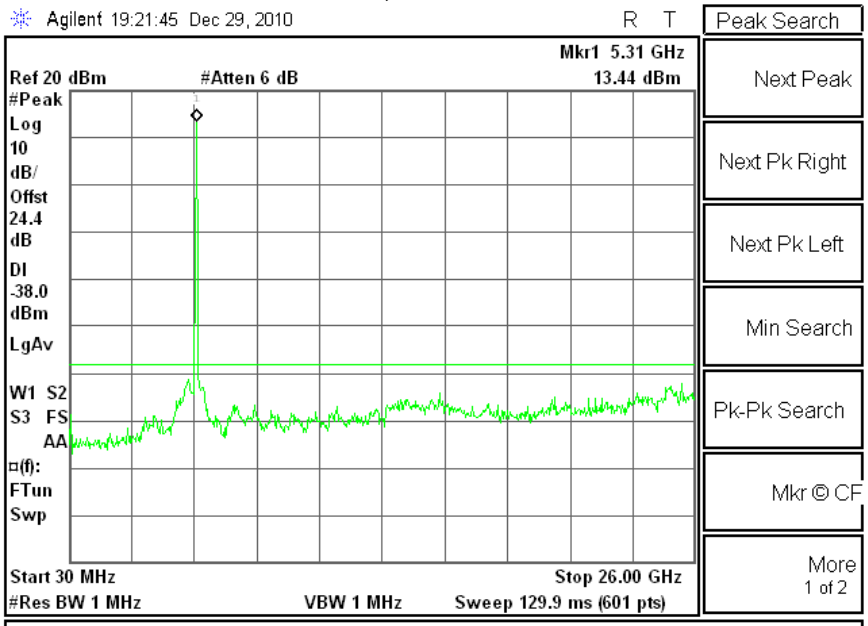
RESULTS

SPURIOUS EMISSIONS WITH COMBINER

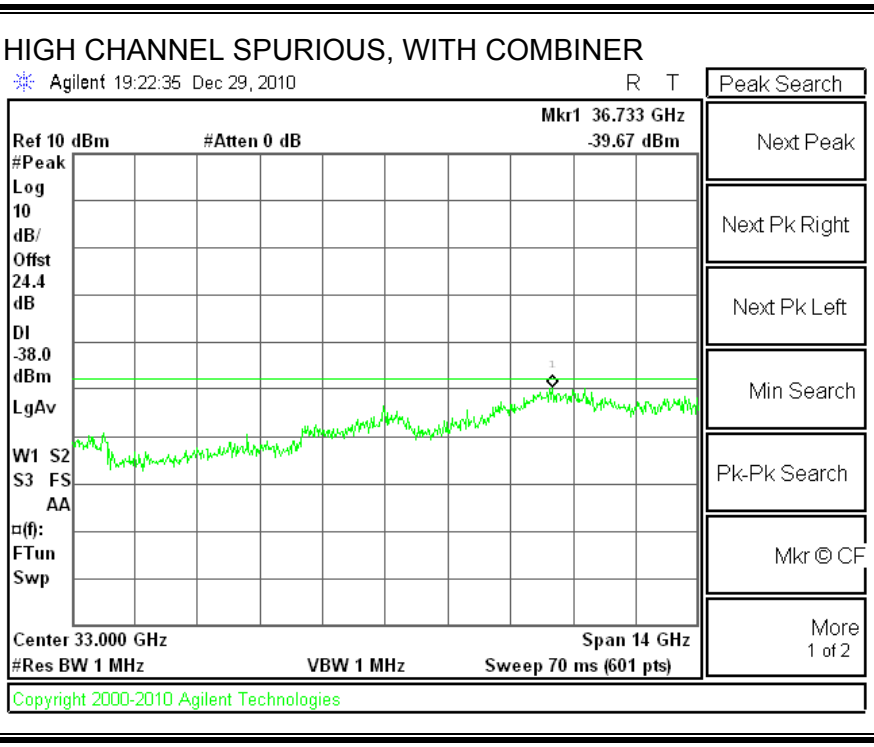




HIGH CHANNEL SPURIOUS, WITH COMBINER



HIGH CHANNEL SPURIOUS, WITH COMBINER



SDM MCS21

7.9.6. 26 dB and 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter outputs are connected to the spectrum analyzer via a combiner. The RBW is set to 1% to 3% of the measured bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth function is utilized.

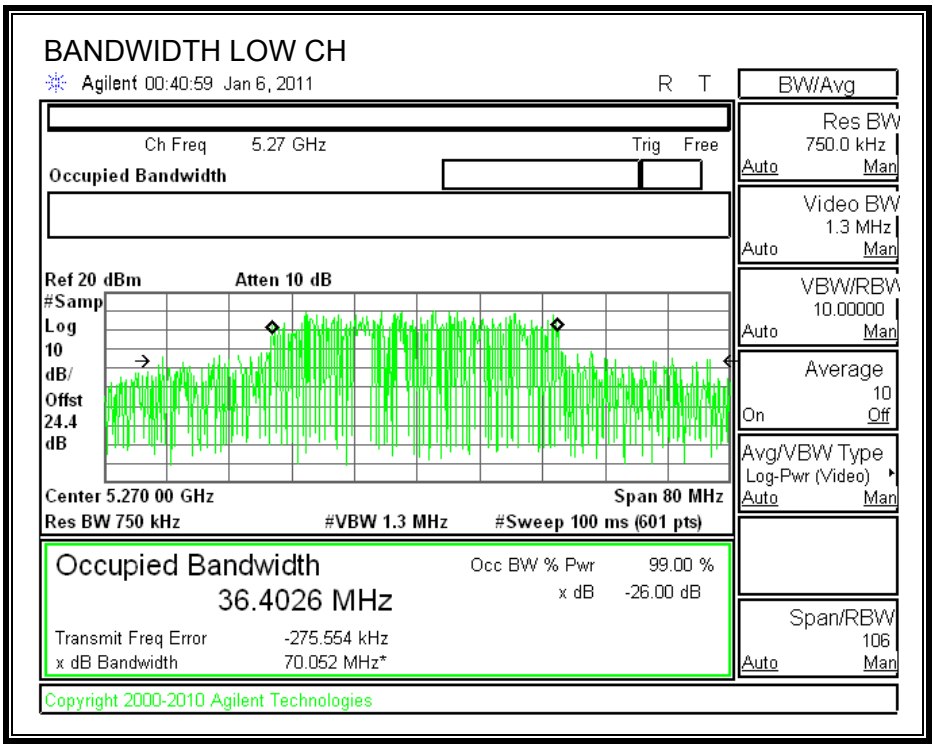
RESULTS

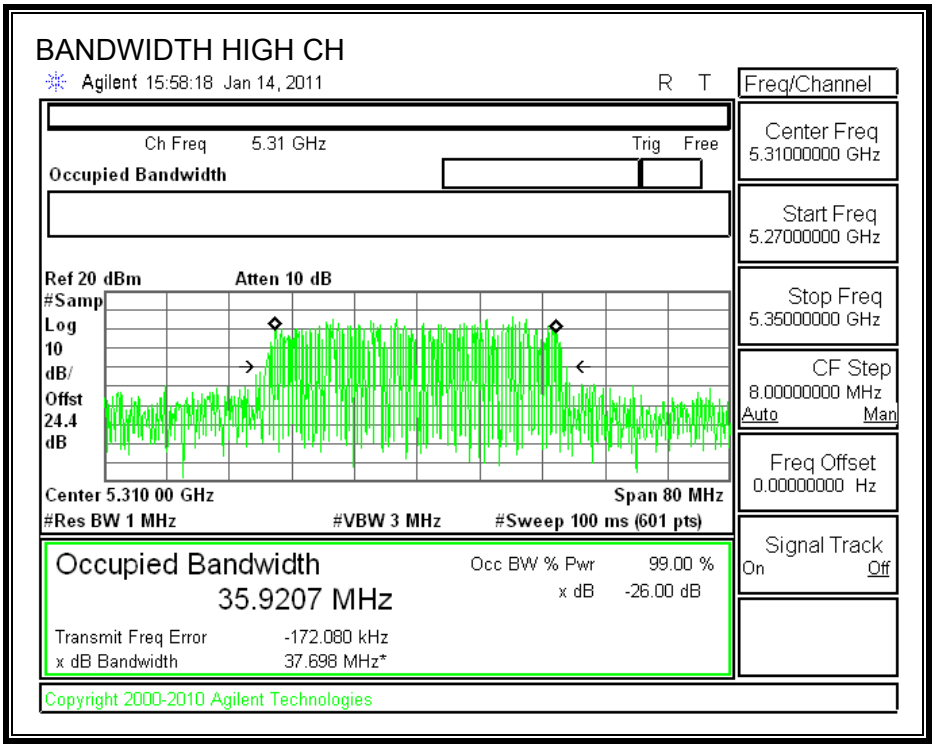
CHAIN 1

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5270	70.052	36.4026
High	5310	37.698	35.9207

CHAIN 1

26 dB and 99% BANDWIDTH





7.9.7. OUTPUT POWER

LIMITS

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

For the 5.25-5.35 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26-dB emission bandwidth in MHz. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

TEST PROCEDURE

The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

The transmitter output operates continuously therefore Method # 1 is used.

RESULTS

Limit

Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	11 + 10 Log B Limit (dBm)	Antenna Gain (dBi)	Limit (dBm)
Low	5270	23.98	70.052	29.45	6.80	23.18
High	5310	23.98	37.698	26.76	6.80	23.18

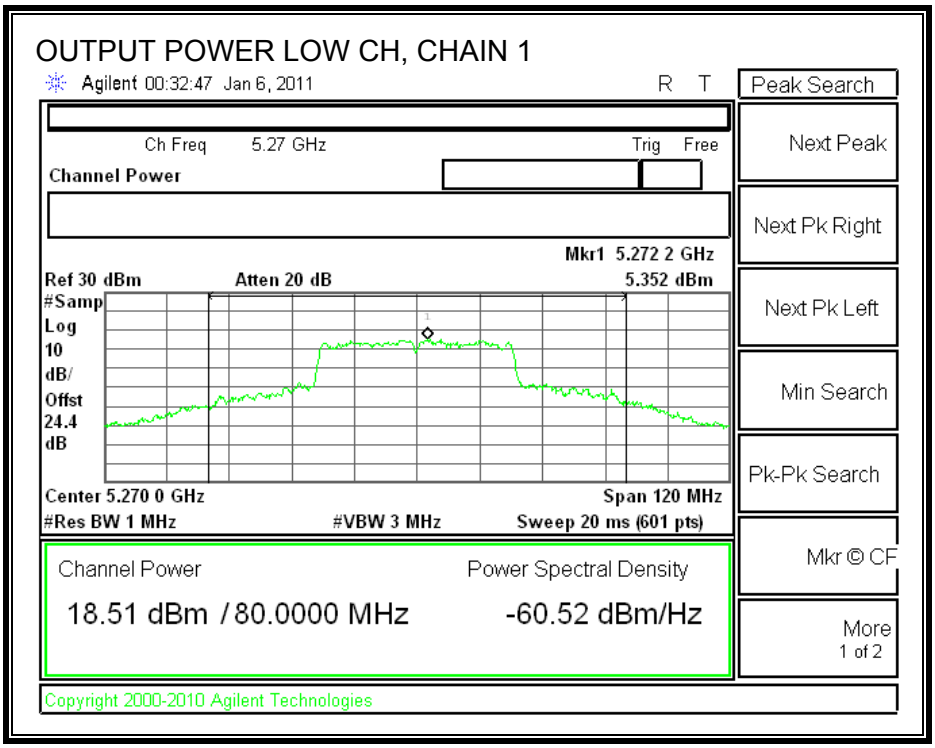
Individual Chain Results

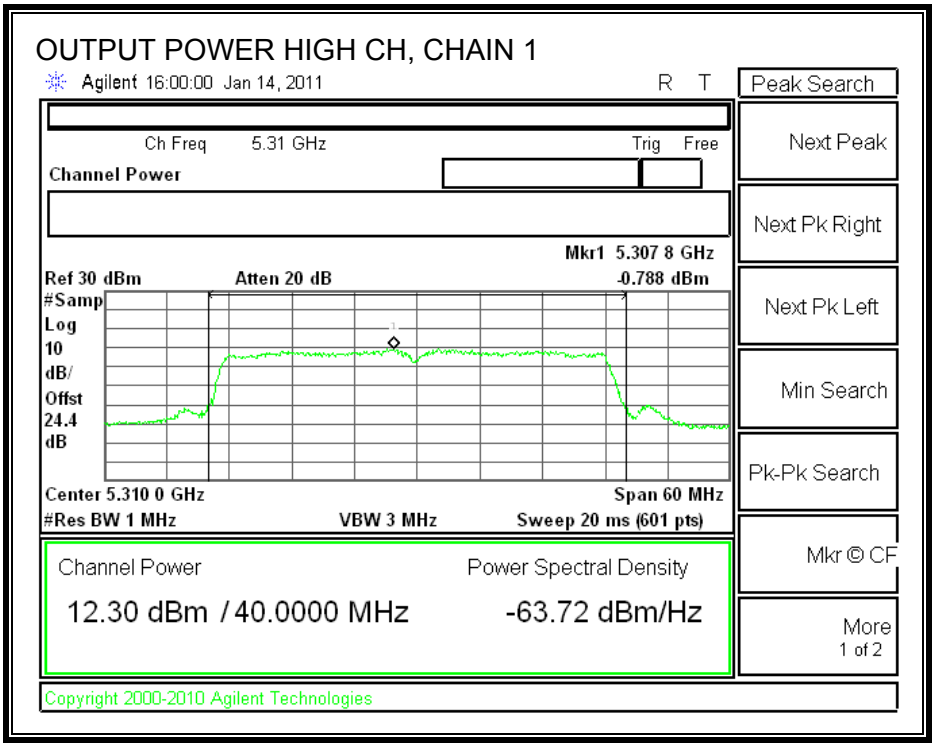
Channel	Frequency (MHz)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Chain 3 Power (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)
Low	5270	18.51	18.58	17.91	23.11	23.18	-0.07
High	5310	12.30	13.26	12.49	17.47	23.18	-5.71

TPC Results

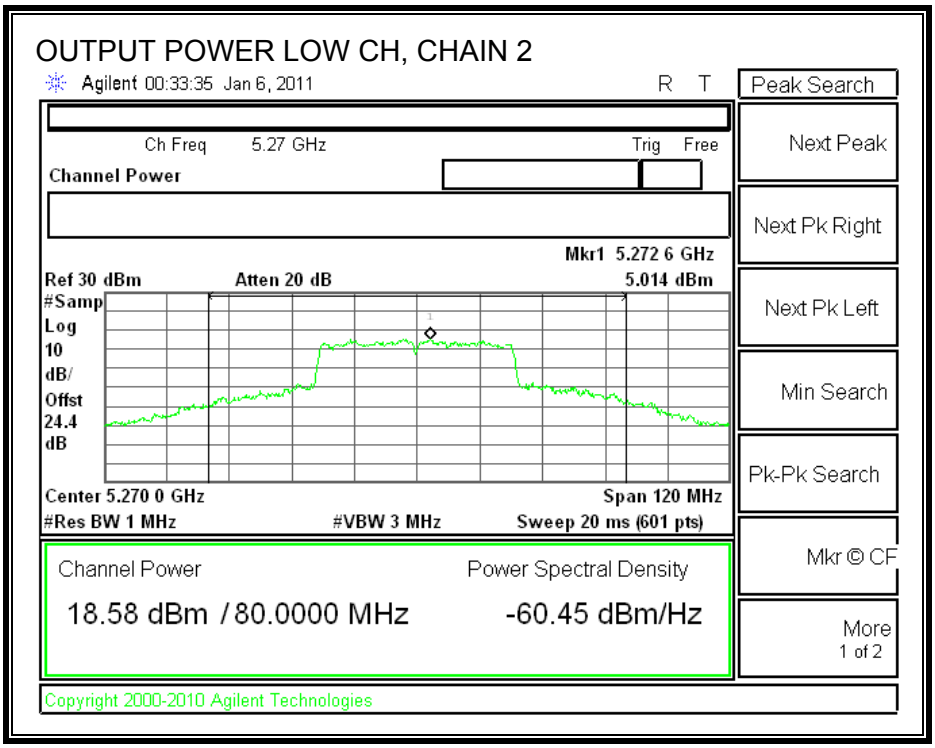
TPC Delta Power		Chain 0	Chain 1	Chain 2			
		8.12	8.88	8.46			
Worst-case TPC Power		Chain 0	Chain 1	Chain 2	Total Power	Ant Gain	EIRP
Mid	5270	10.39	9.70	9.46	14.64	6.80	21.44
						TPC Limit (dBm)	24
						Margin (dB)	-2.56

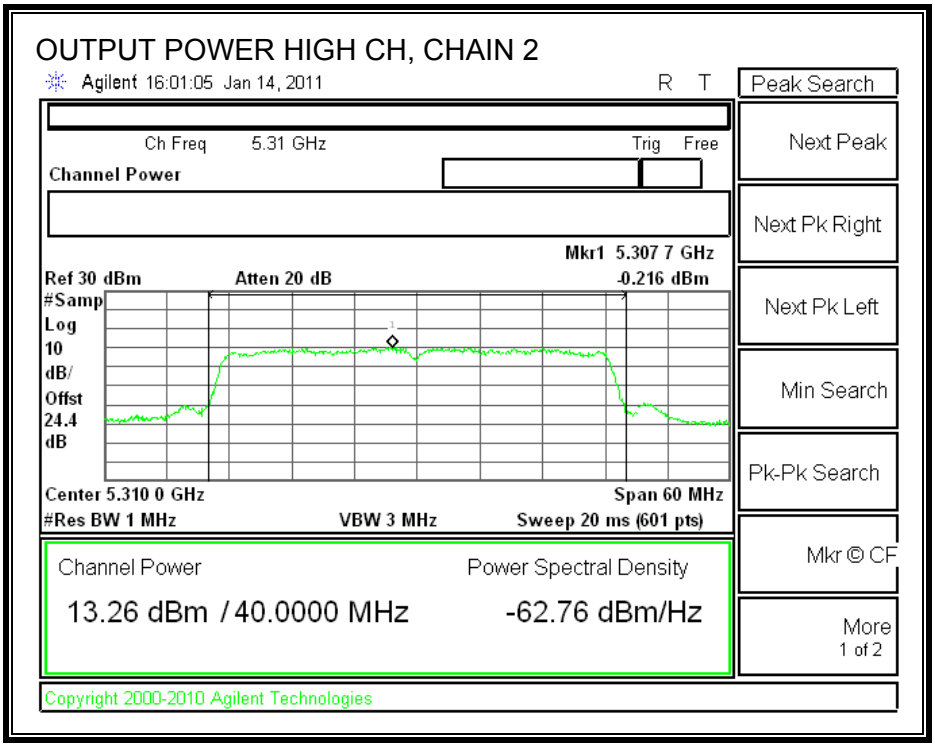
CHAIN 1 OUTPUT POWER



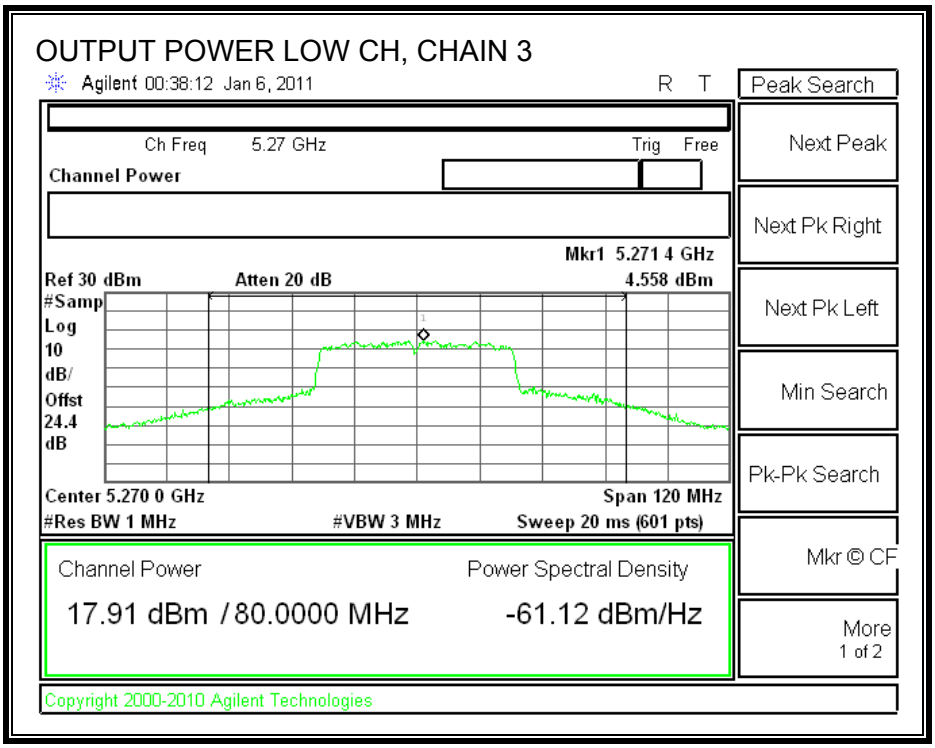


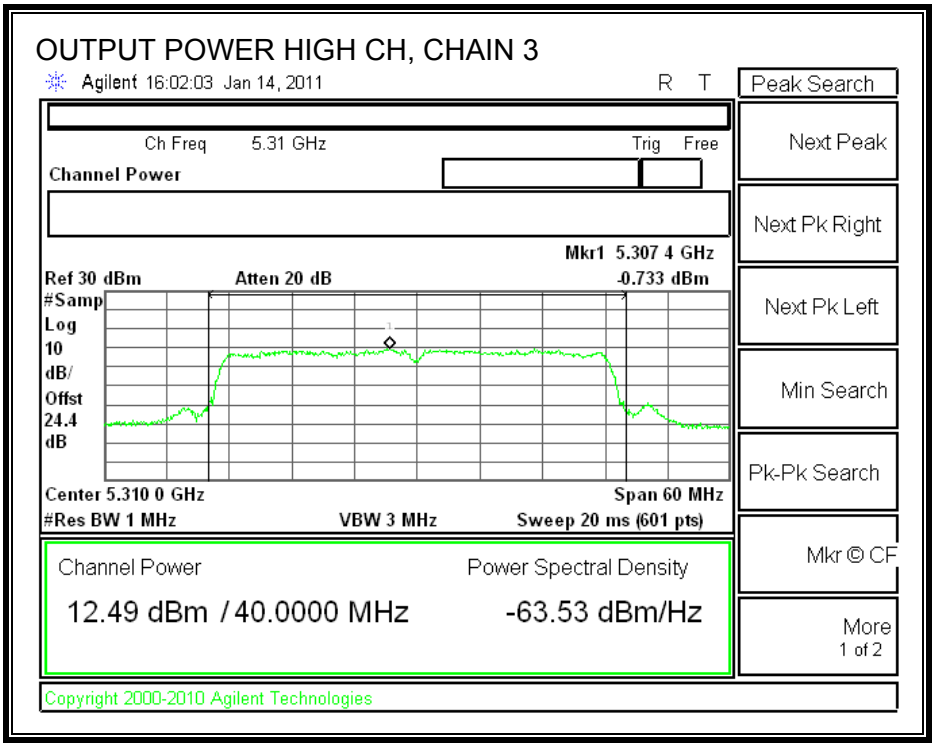
CHAIN 2 OUTPUT POWER



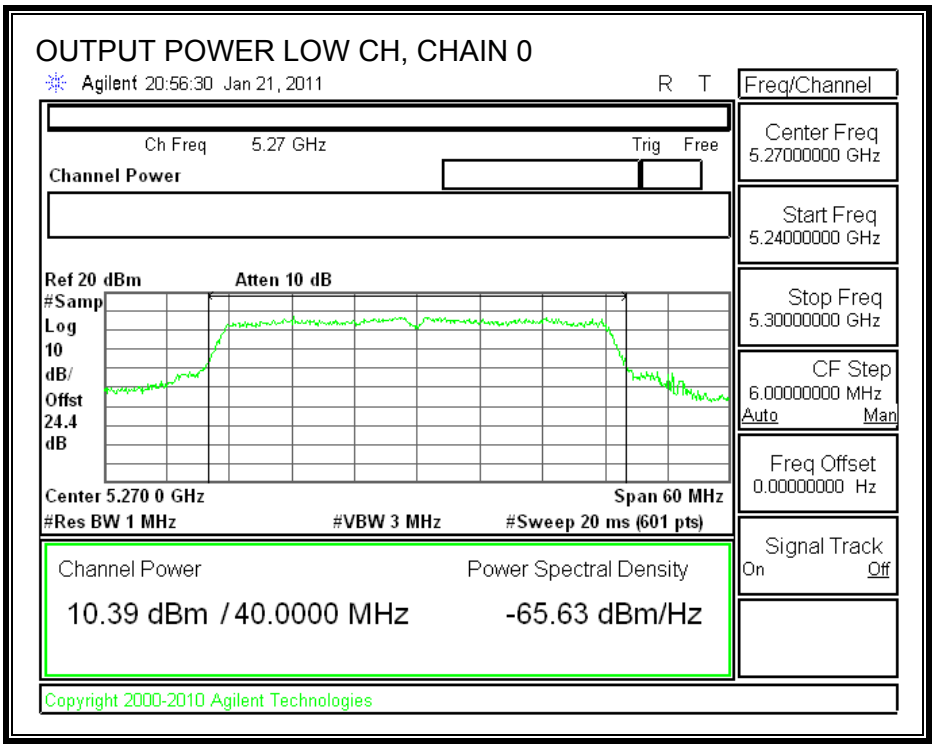


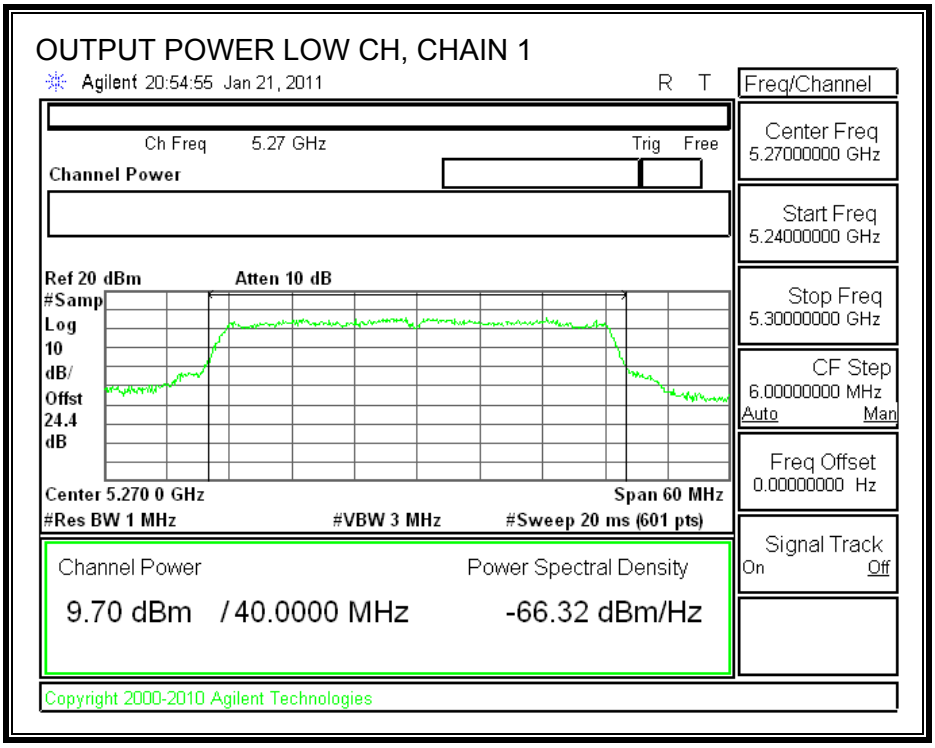
CHAIN 3 OUTPUT POWER

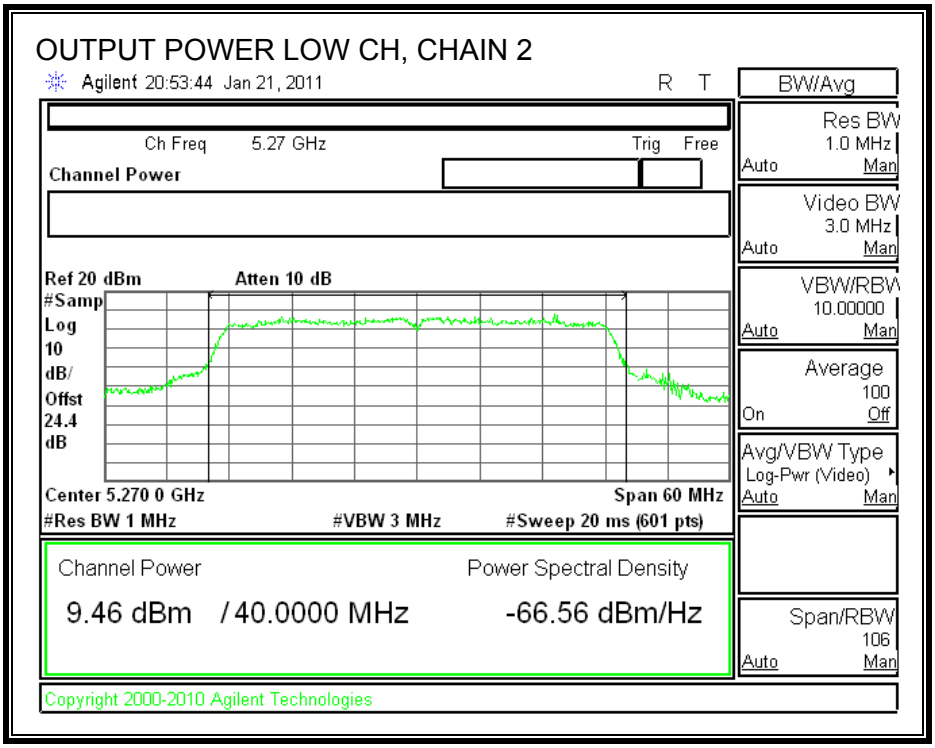




TPC OUTPUT POWER







7.9.8. PEAK POWER SPECTRAL DENSITY

LIMITS

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

For the 5.25–5.35 GHz band, the peak power spectral density shall not exceed 11 dBm in any 1 MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The composite antenna gain is equal to 6.80 dBi, therefore the limit is 10.20dBm.

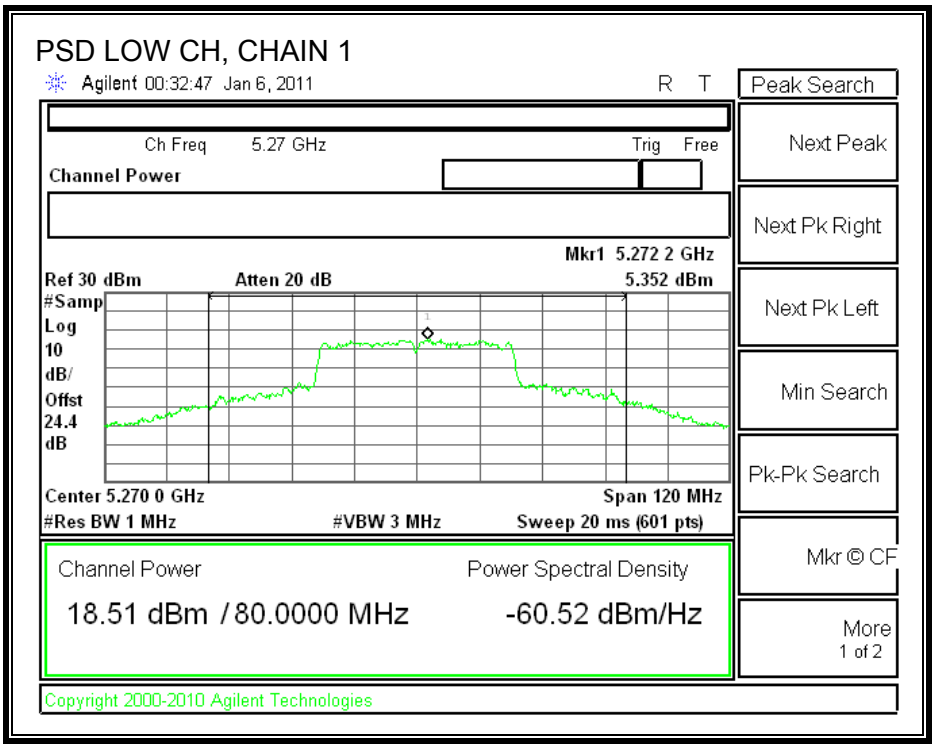
TEST PROCEDURE

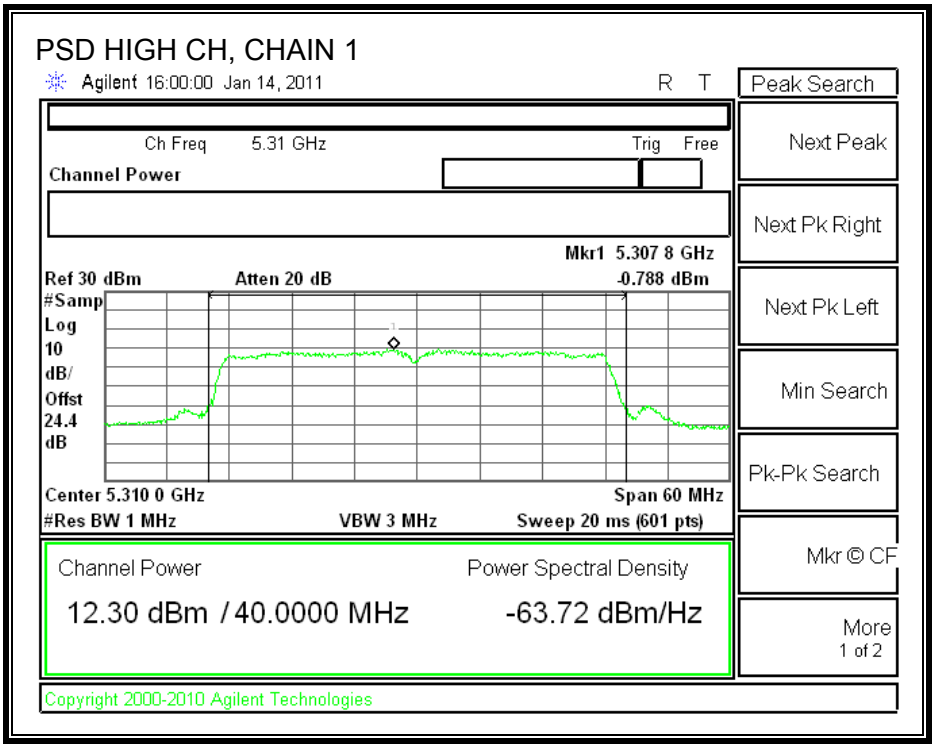
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002. PPSD method #2 was used.

RESULTS

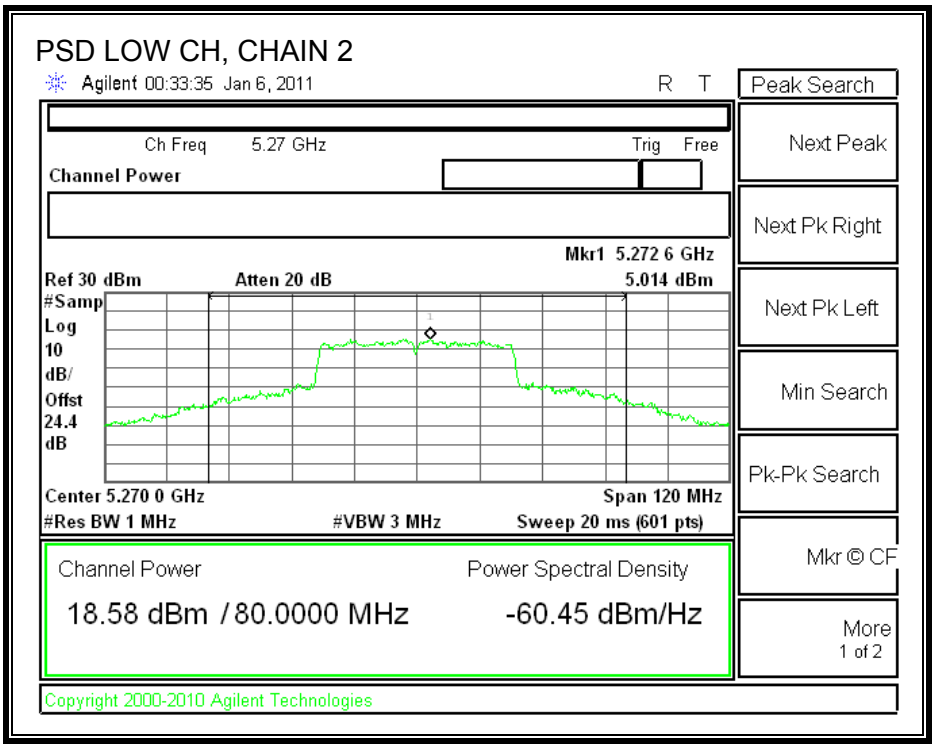
Channel	Frequency (MHz)	Chain 1 PPSD (dBm)	Chain 2 PPSD (dBm)	Chain 3 PPSD (dBm)	Total PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	5270	5.352	5.014	4.558	9.76	10.20	-0.44
High	5310	-0.788	-0.216	-0.733	4.20	10.20	-6.00

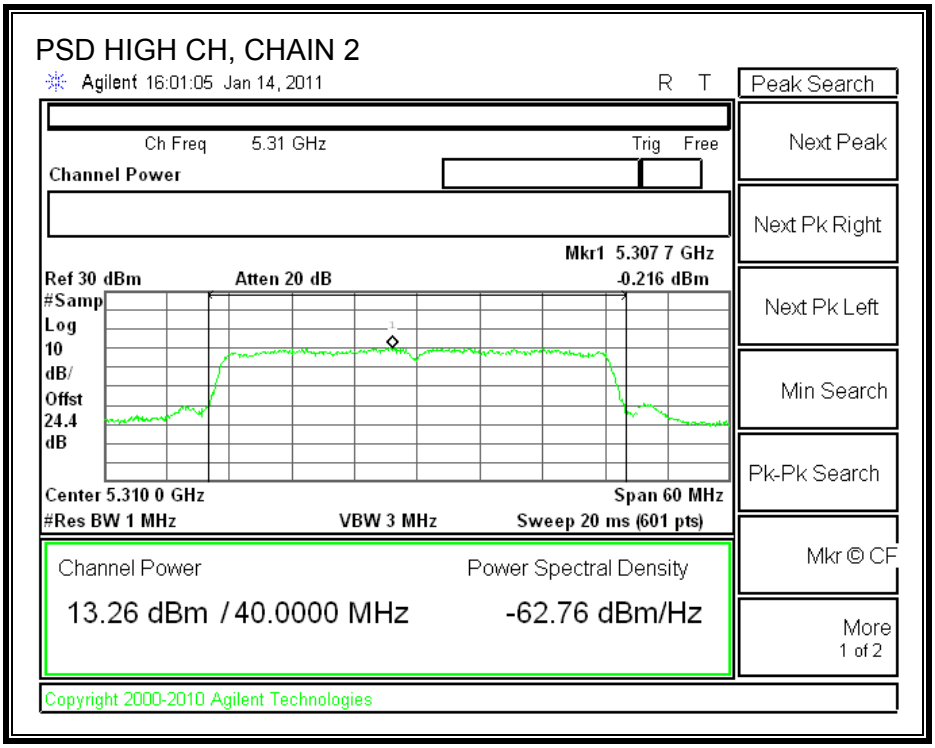
CHAIN 1 POWER SPECTRAL DENSITY



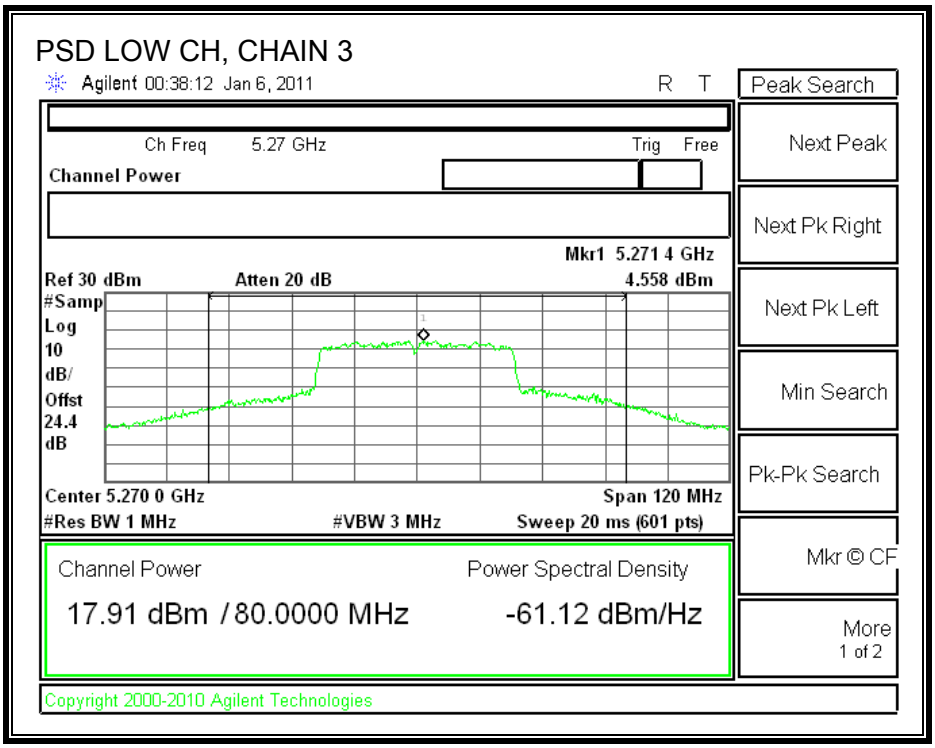


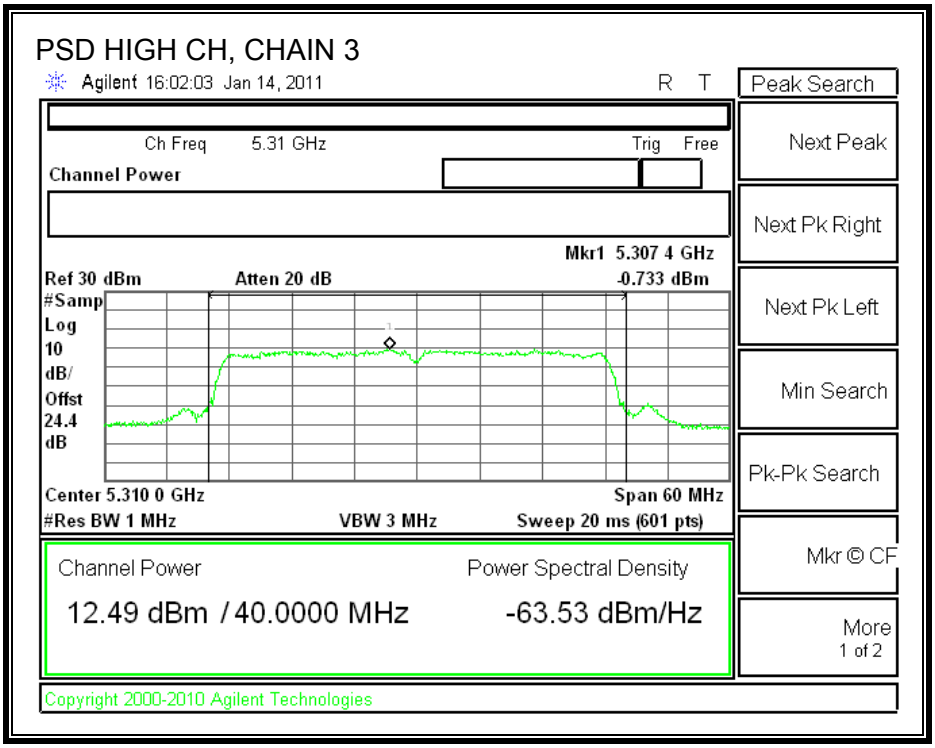
CHAIN 2 POWER SPECTRAL DENSITY





CHAIN 3 POWER SPECTRAL DENSITY





7.9.9. PEAK EXCURSION

LIMITS

FCC §15.407 (a) (6)

The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

TEST PROCEDURE

The transmitter outputs are connected to the spectrum analyzer via a combiner.

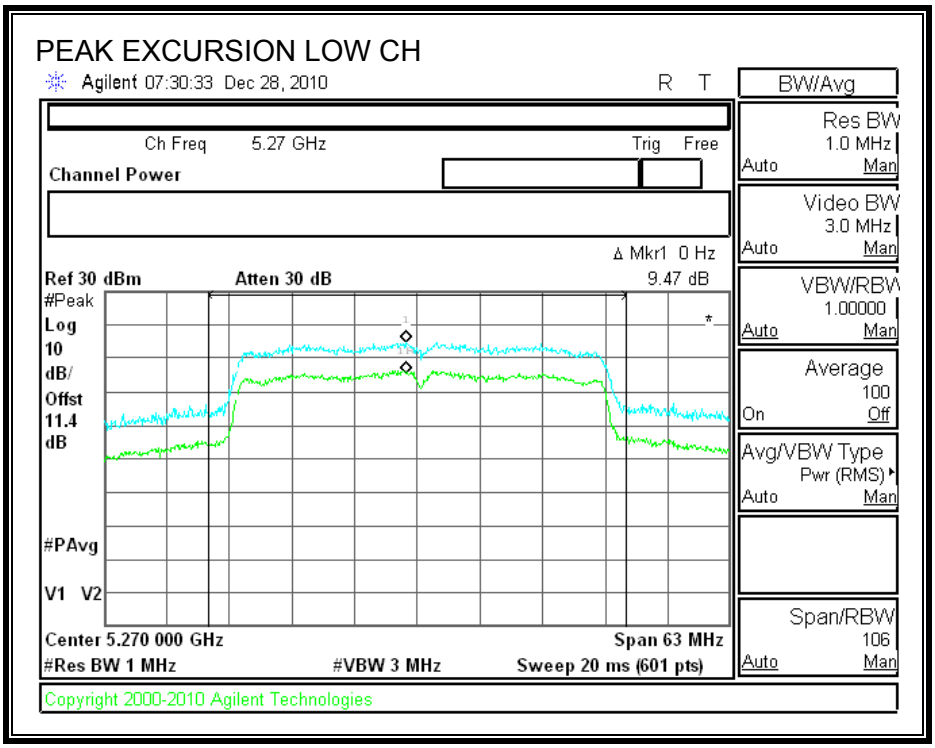
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

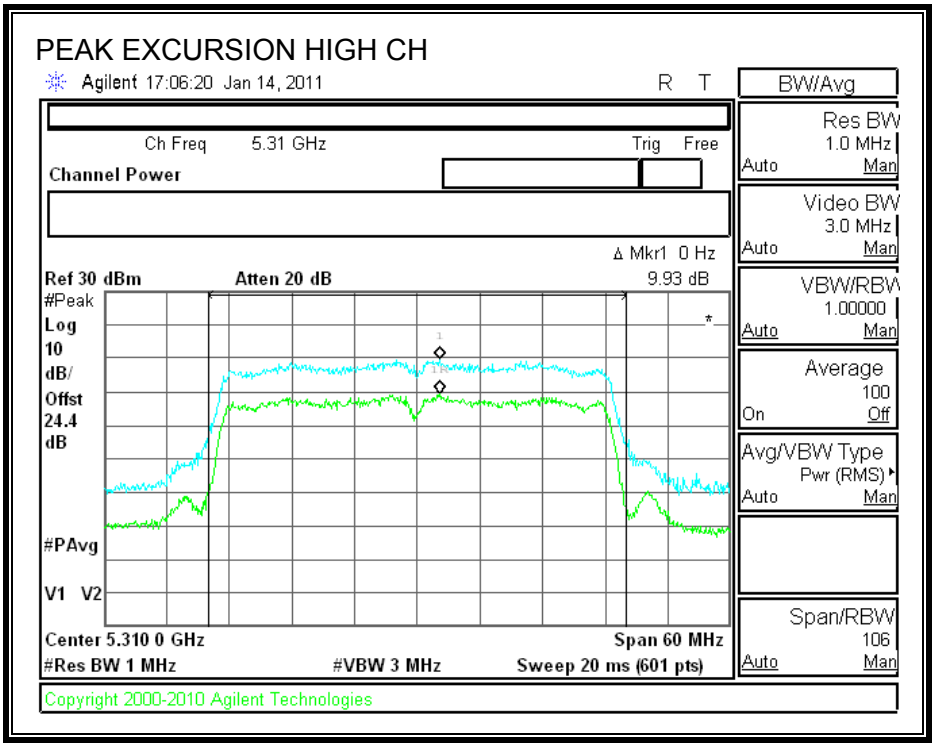
Since Method # 1 was used for peak power measurements, Method # 1 settings are used for the second PPSD trace.

RESULTS

Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5270	9.47	13	-3.53
High	5310	9.93	13	-3.07

PEAK EXCURSION





7.9.10. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.407 (b) (2)

IC RSS-210 A9.3 (2)

For transmitters operating in the 5.25-5.35 GHz band: all emissions outside of the 5.25-5.35 GHz band shall not exceed an EIRP of -27 dBm / MHz.

Devices operating in the 5.25-5.35 GHz band that generate emissions in the 5.15-5.25 GHz band must meet all applicable technical requirements for operation in the 5.15-5.25 GHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5.15-5.25 GHz band.

TEST PROCEDURE

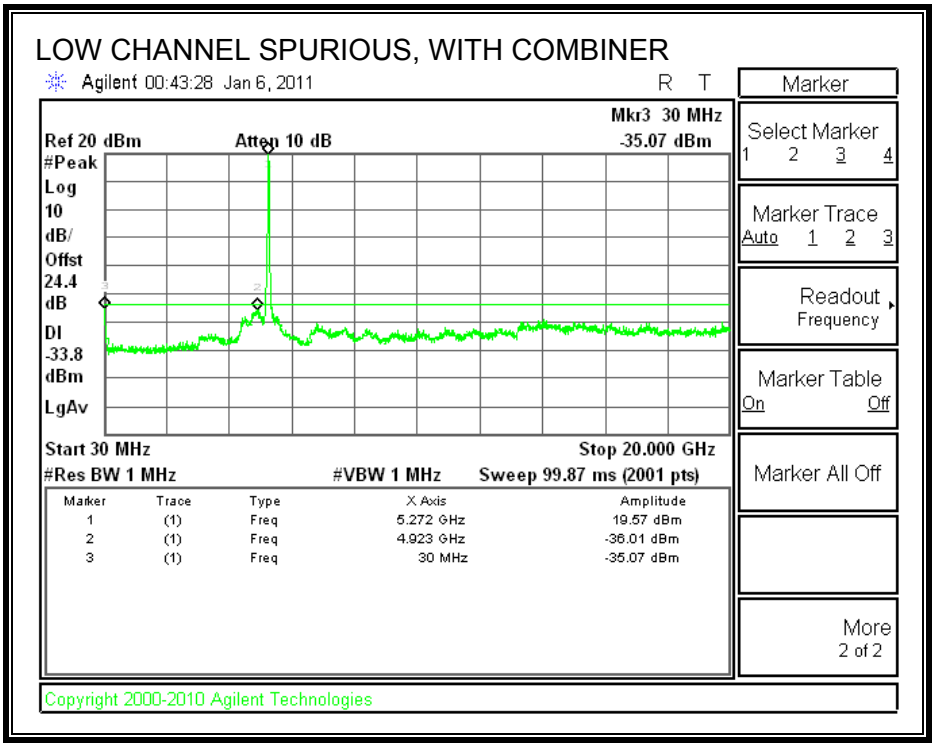
Conducted RF measurements of the transmitter output are made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

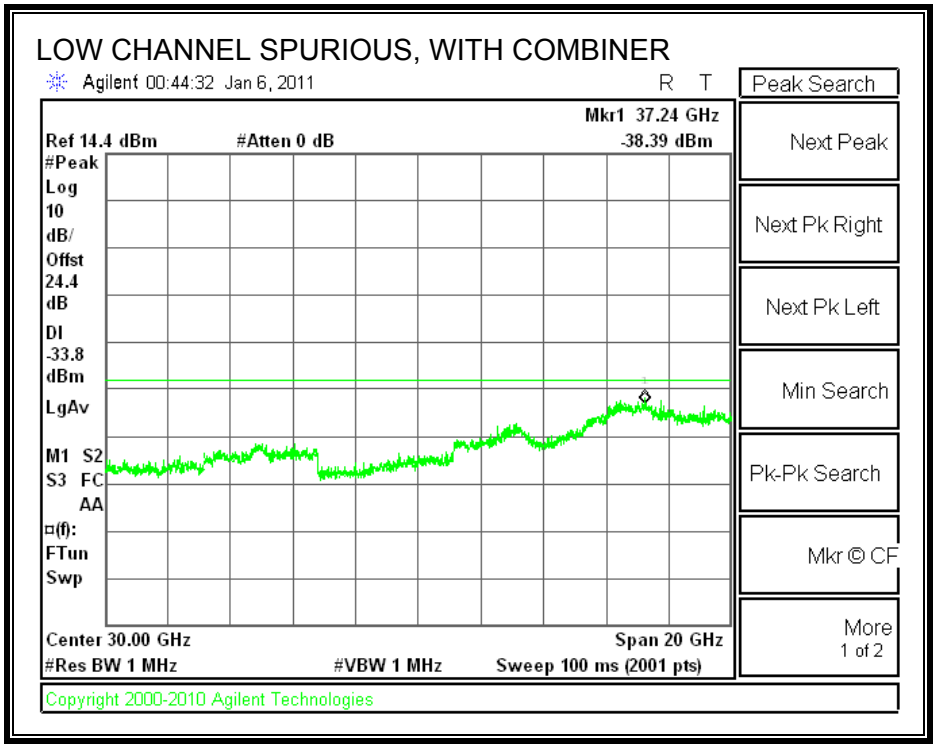
The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 1 MHz. Peak detection measurements are compared to EIRP limit, adjusted for the maximum antenna gain.

Measurements are made over the 30 MHz to 40 GHz range with the transmitter set to the lowest, middle, and highest channels.

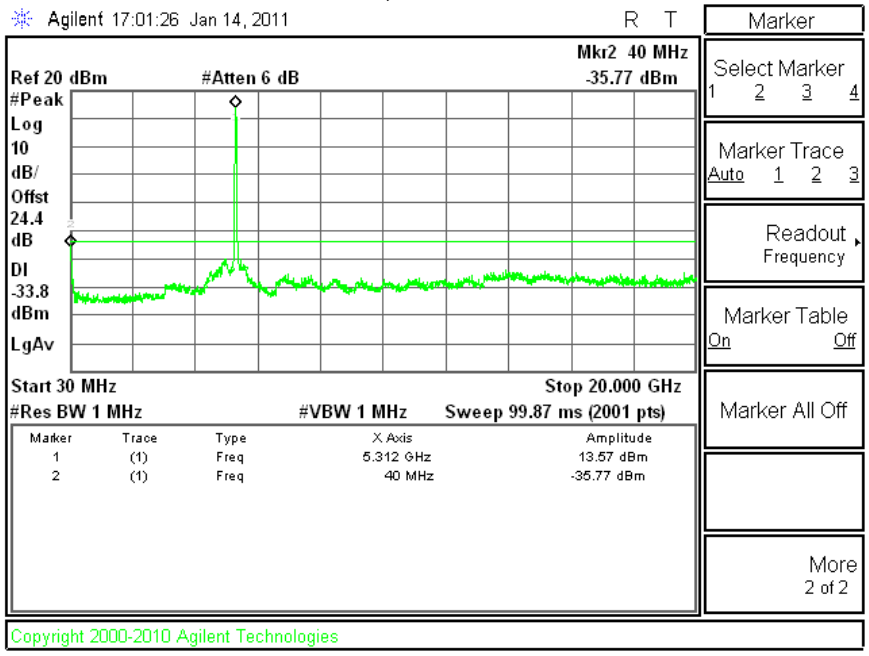
RESULTS

SPURIOUS EMISSIONS WITH COMBINER





HIGH CHANNEL SPURIOUS, WITH COMBINER



HIGH CHANNEL SPURIOUS, WITH COMBINER