



FCC CFR47 PART 15 SUBPART E

CERTIFICATION TEST REPORT

FOR

Cellular/PCS GPRS/EDGE, AWS/PCS WCDMA Tablet with 802.11abgn, BT3.0

MODEL NUMBER: SGH-T869

FCC ID: A3LSGHT869

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Prepared for

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--	10/06/11	Initial Issue	F. Ibrahim
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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: SAMSUNG ELECTRONICS CO., LTD
416, MAETAN 3-DONG, YEONGTONG-GU
SUWON CITY, GYEONGGI-DO 443-742, SOUTH KOREA

EUT DESCRIPTION: Cellular/PCS GPRS/EDGE, AWS/PCS WCDMA Tablet with
802.11abgn, BT3.0

MODEL: SGH-T869

SERIAL NUMBER: 001 AND 02058

DATE TESTED: AUGUST 30 – OCTOBER 14, 2011

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart E	Pass

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

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

Approved & Released For UL CCS By:

Tested By:



FRANK IBRAHIM
EMC SUPERVISOR
UL CCS

DAVID GARCIA
EMC ENGINEER
UL CCS

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2009, FCC CFR 47 Part 2, FCC CFR 47 Part 15, and FCC 06-96.

3. FACILITIES AND ACCREDITATION

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

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

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

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

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

$$\begin{aligned} \text{Field Strength (dBuV/m)} &= \text{Measured Voltage (dBuV)} + \text{Antenna Factor (dB/m)} + \\ &\text{Cable Loss (dB)} - \text{Preamplifier Gain (dB)} \\ 36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} &= 28.9 \text{ dBuV/m} \end{aligned}$$

4.3. MEASUREMENT UNCERTAINTY

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

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

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a Cellular/PCS GPRS/EDGE, AWS/PCS WCDMA Tablet with 802.11abgn, BT3.0

The radio module is manufactured by Qualcomm.

5.2. MAXIMUM OUTPUT POWER

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

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5180 - 5240	802.11a	9.09	8.11
5180 - 5240	802.11n HT20	9.10	8.13
5190 - 5230	802.11n HT40	9.32	8.55
5260 - 5320	802.11a	8.23	6.65
5260 - 5320	802.11n HT20	8.58	7.21
5270 - 5310	802.11n HT40	9.46	8.83
5500 - 5700	802.11a	9.22	8.36
5500 - 5700	802.11n HT20	9.22	8.36
5510 - 5670	802.11n HT40	9.89	9.75

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an 802.11 a/b/g/n and a Bluetooth antenna, with a maximum gain as stated in the table below:

Frequency	Eff. (%)	Ave. Gain (dBi)	Peak Gain (dBi)	Directivity (dBi)
2412 MHz	42	-3.80	0.12	3.92
2424 MHz	41	-3.90	0.12	4.02
2436 MHz	41	-3.86	0.28	4.14
2448 MHz	40	-3.97	0.31	4.28
2460 MHz	36	-4.39	-0.01	4.38
2472 MHz	40	-3.95	0.48	4.43
5180 MHz	52	-2.82	3.20	6.02
5305 MHz	60	-2.25	3.61	5.86
5430 MHz	60	-2.22	3.41	5.63
5555 MHz	54	-2.70	2.79	5.49
5680 MHz	28	-5.48	-0.12	5.36
5805 MHz	24	-6.24	-0.91	5.33

5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was Wifi : Firmware Rev 3.1.1.40.

The EUT driver software installed in the equipment during testing was WlanTest: HW REV1.2
SW : P6200.002.

5.5. WORST-CASE CONFIGURATION AND MODE

The worst-case channel is determined as the channel with the highest output power.

For the fundamental investigation, since the EUT is a portable device that has three orientations; therefore X, Y and Z orientations have been investigated, also with AC/DC adapter, and earphone, and the worst case was found to be at Y orientation with AC Adapter

Worst-case data rates used for the testing as provided by the client were as follows:

802.11a Mode: 6Mbps
802.11n HT20 Mode: MCS0
802.11n HT40 Mode: MCS0

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
AC Adapter	Samsung	GB4943-2001	N/A	N/A

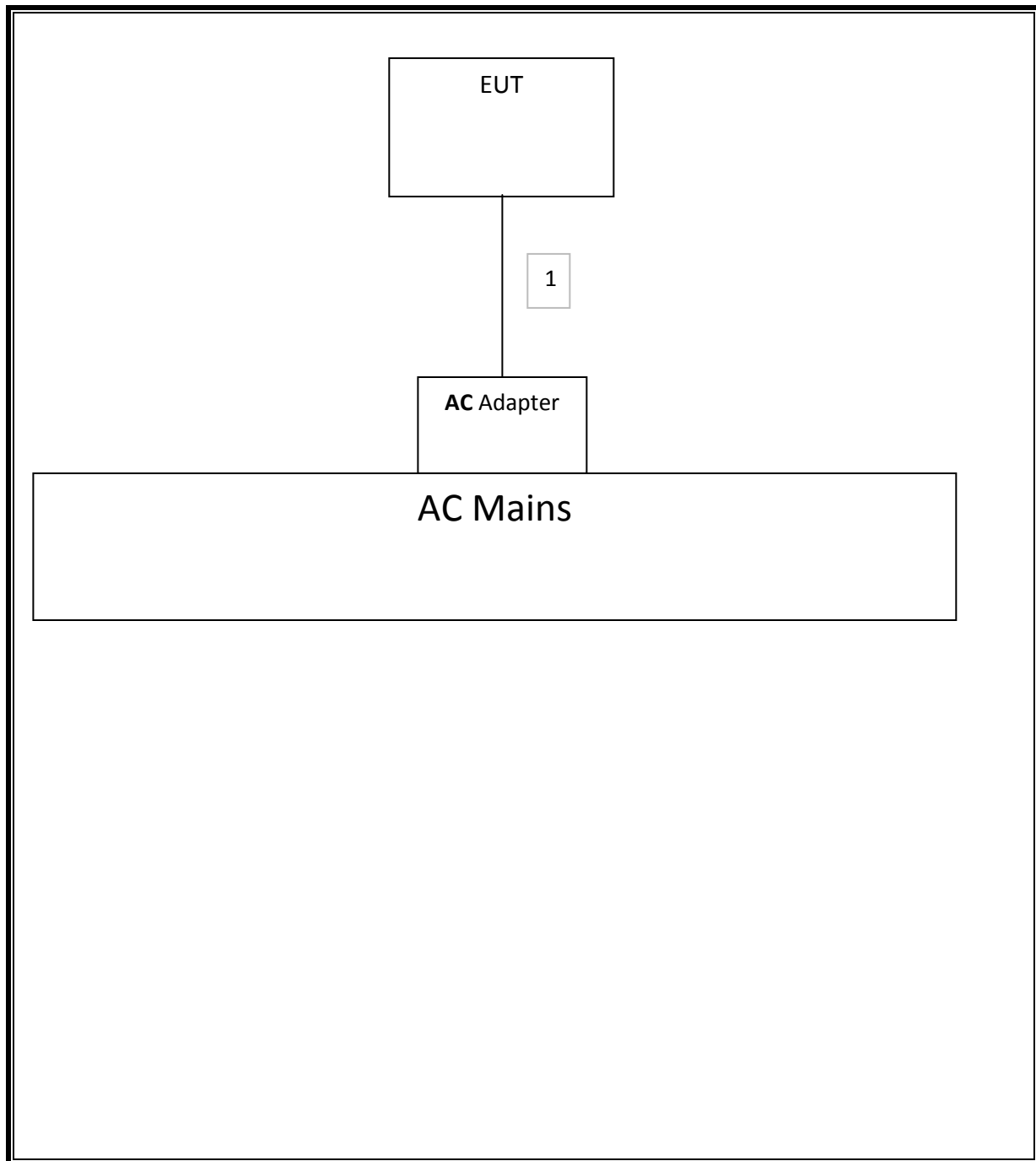
I/O CABLES

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	Mini USB	1	USB	shielded	1m	

TEST SETUP

The EUT is a standalone device.

SETUP DIAGRAM FOR TESTS



6. TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST					
Description	Manufacturer	Model	Asset	Cal Date	Cal Due
Spectrum Analyzer, 26.5 GHz	Agilent / HP	E4440A	C01176	08/04/11	08/04/12
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C00986	12/17/10	12/17/11
EMI Test Receiver, 9 kHz-7 GHz	R & S	ESCI 7	1000741	07/06/11	07/06/12
Antenna, Bilog, 2 GHz	Sundt Sciences	JB1	C01011	07/16/11	07/16/12
Antenna, Horn, 18 GHz	EMCO	3115	C00872	06/29/11	06/29/12
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00558	01/27/11	01/27/12
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C00749	07/18/11	07/18/12
Power Meter	Agilent / HP	437B		07/28/11	07/28/12
Power Sensor, 18 GHz	Agilent / HP	8481A	N02782	07/29/11	07/29/13
LISN, 30 MHz	FCC	LISN-50/250-25-2	N02625	11/10/10	11/10/11
Antenna, Horn, 26.5 GHz	ARA	MMH-1826/B	C00589	07/28/11	07/28/12
Antenna, Horn, 40 GHz	ARA	MMH-2640/B	C00981	06/14/11	06/14/12
Preamplifier, 40 GHz	Miteq	NSP4000-SP2	C00990	08/02/11	08/02/12

7. ANTENNA PORT TEST RESULTS

7.1. 802.11a MODE IN THE 5.2 GHz BAND

7.1.1. 26 dB BANDWIDTH

LIMITS

None; for reporting purposes only.

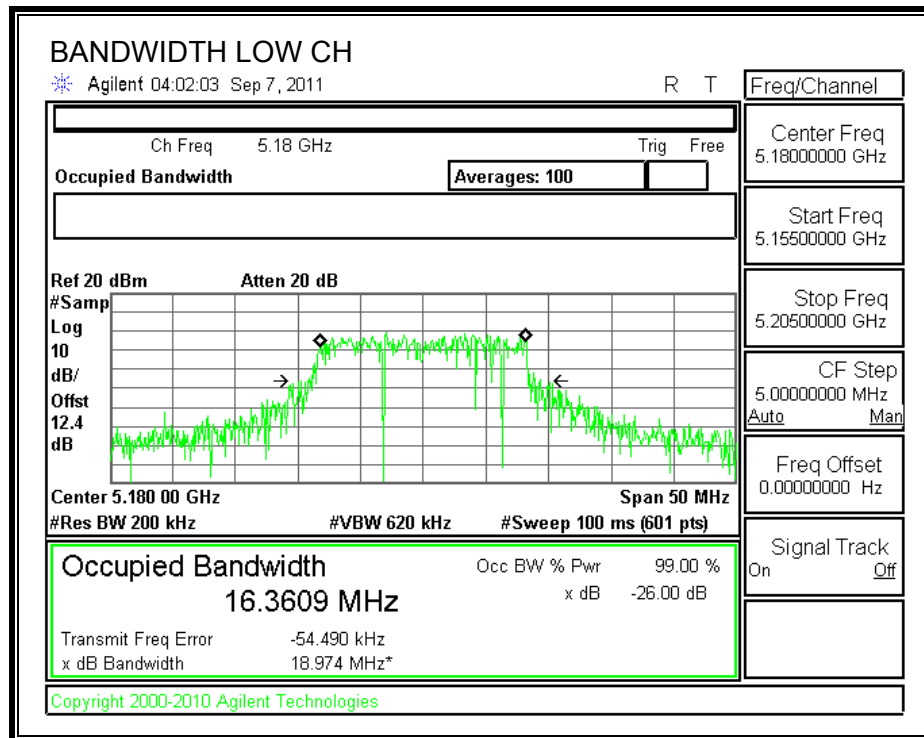
TEST PROCEDURE

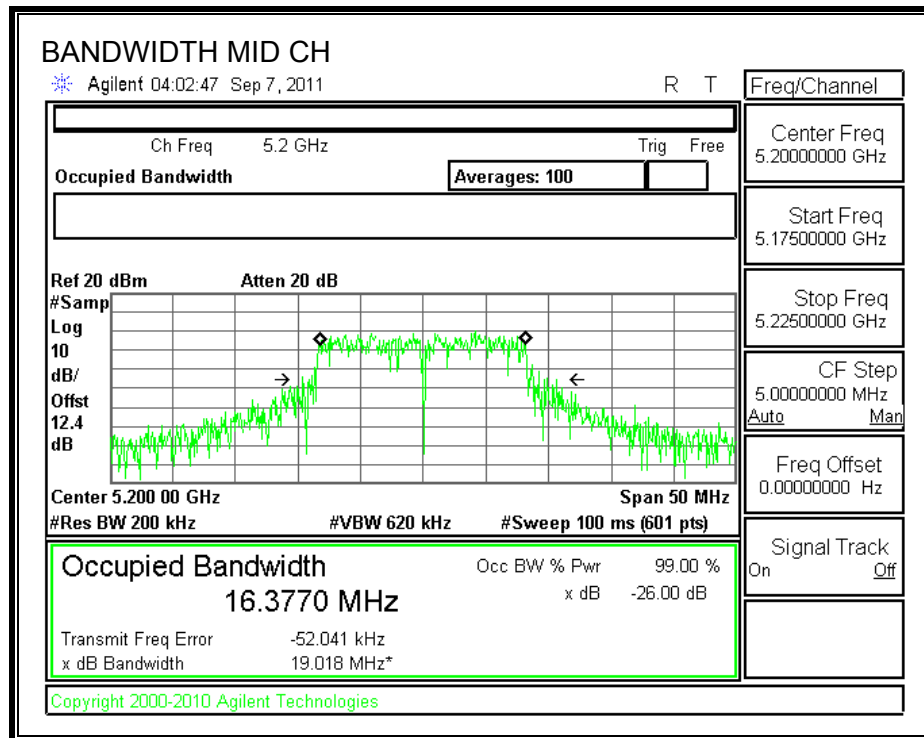
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the measured bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth function is utilized.

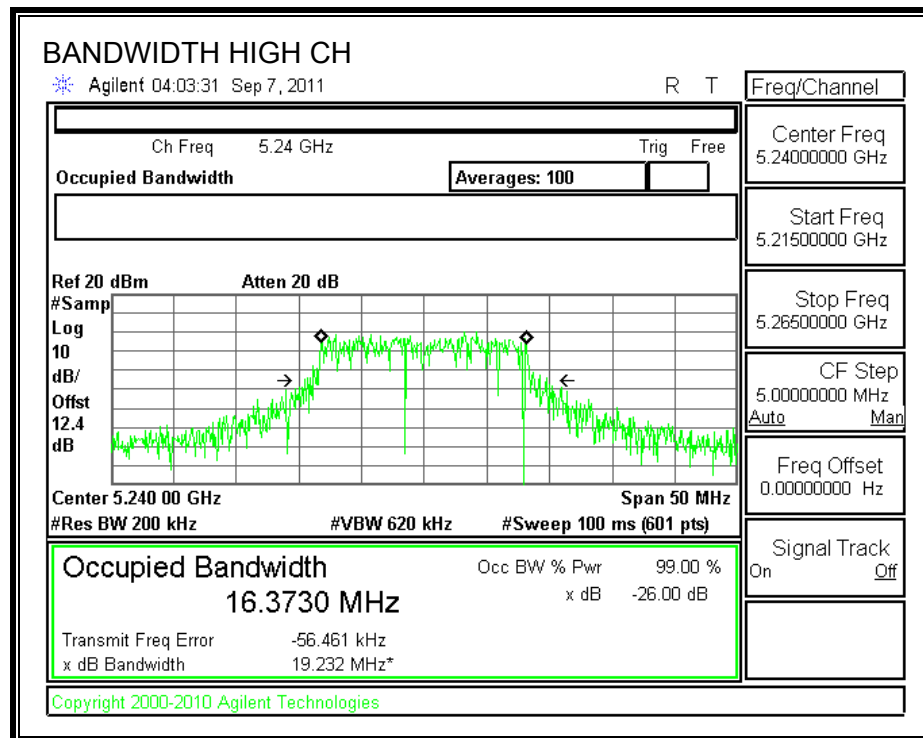
RESULTS

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5180	18.974
Middle	5200	19.018
High	5240	19.232

26 dB BANDWIDTH







7.1.2. OUTPUT POWER

LIMITS

FCC §15.407 (a) (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 $4 \text{ dBm} + 10 \log B$, 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

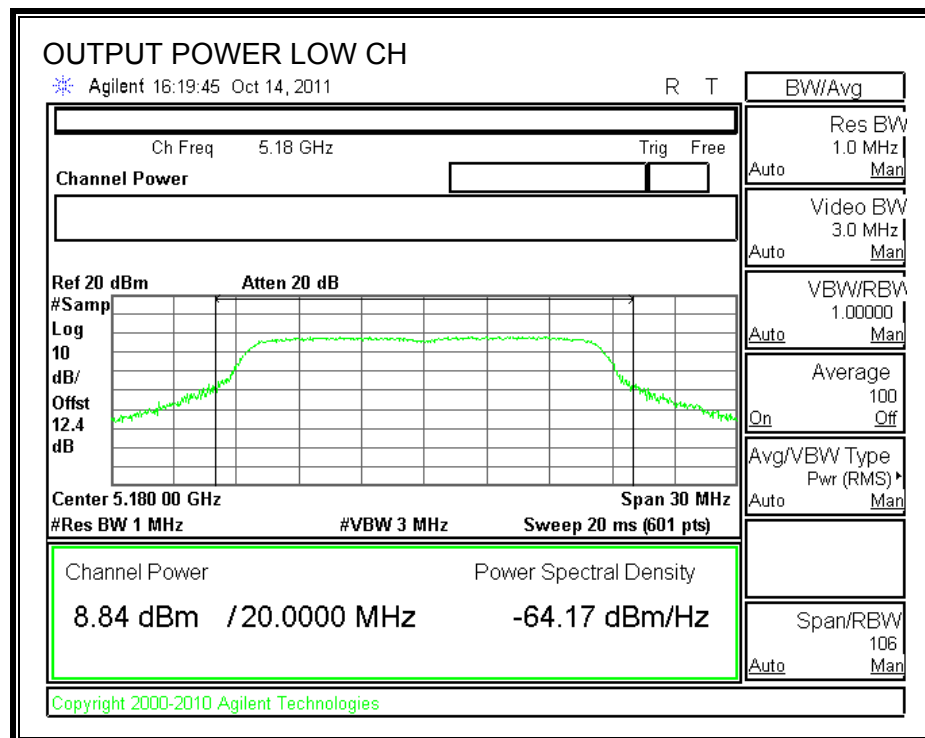
Limit

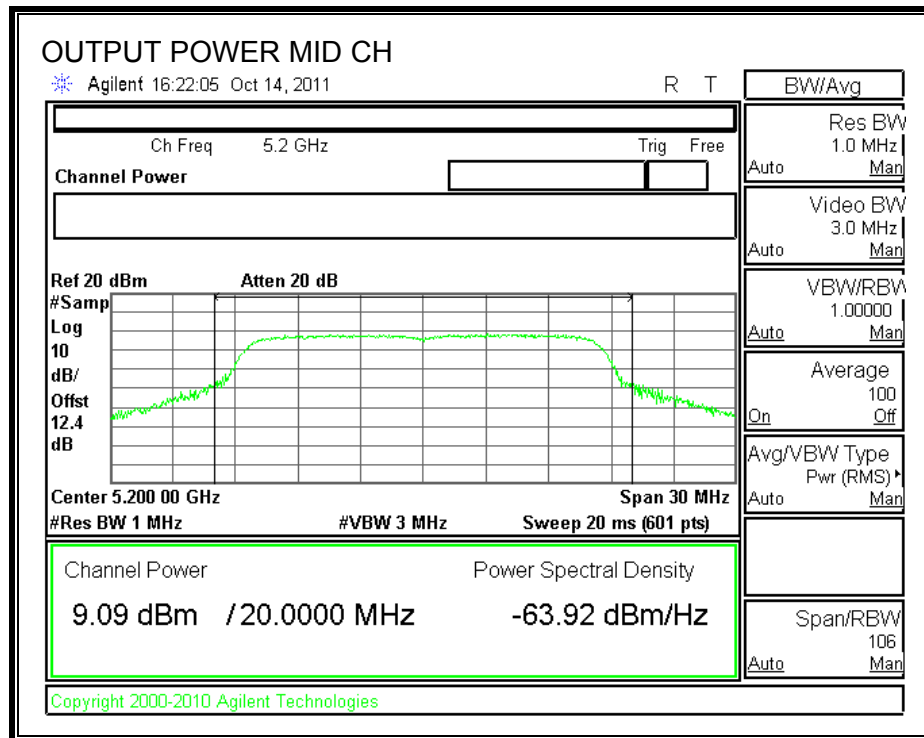
Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	4 + 10 Log B Limit (dBm)	Antenna Gain (dBi)	Limit (dBm)
Low	5180	17	18.974	16.78	3.20	16.78
Mid	5200	17	19.018	16.79	3.27	16.79
High	5240	17	19.232	16.84	3.40	16.84

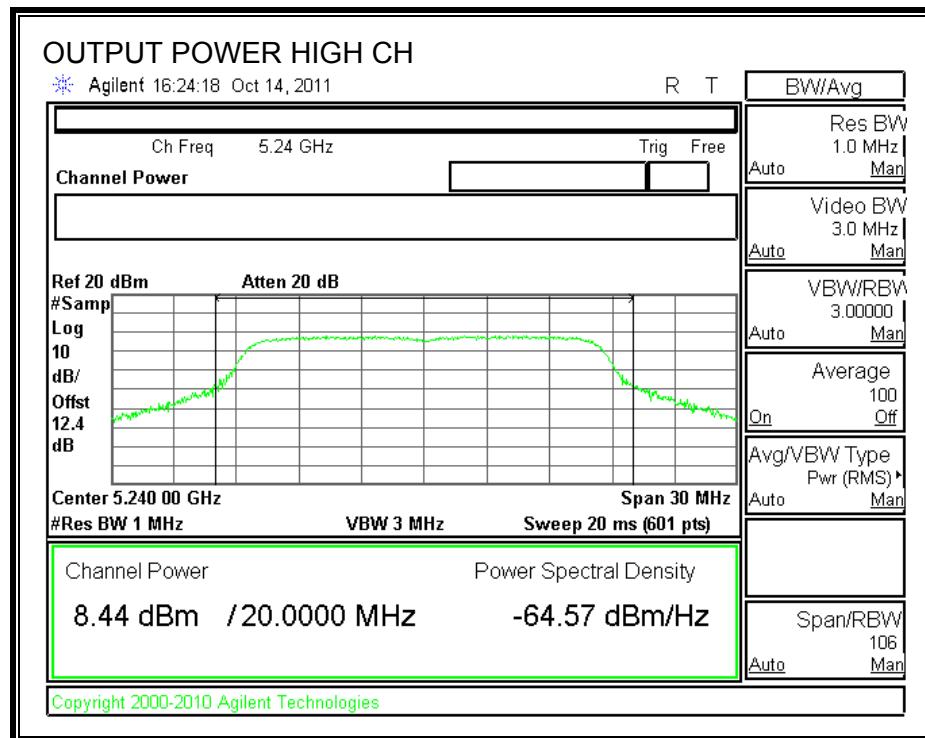
Results

Channel	Frequency (MHz)	Power (dBm)	Limit (dBm)	Margin (dB)
Low	5180	8.84	16.78	-7.94
Mid	5200	9.09	16.79	-7.70
High	5240	8.44	16.84	-8.40

OUTPUT POWER







7.1.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 12.4 dB (including 10 dB pad and 2.4 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Frequency (MHz)	Power (dBm)
5180	7.85
5200	8.01
5240	7.48

7.1.4. PEAK POWER SPECTRAL DENSITY

LIMITS

FCC §15.407 (a) (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 less than or equal to 6 dBi, therefore the limit is 4 dBm.

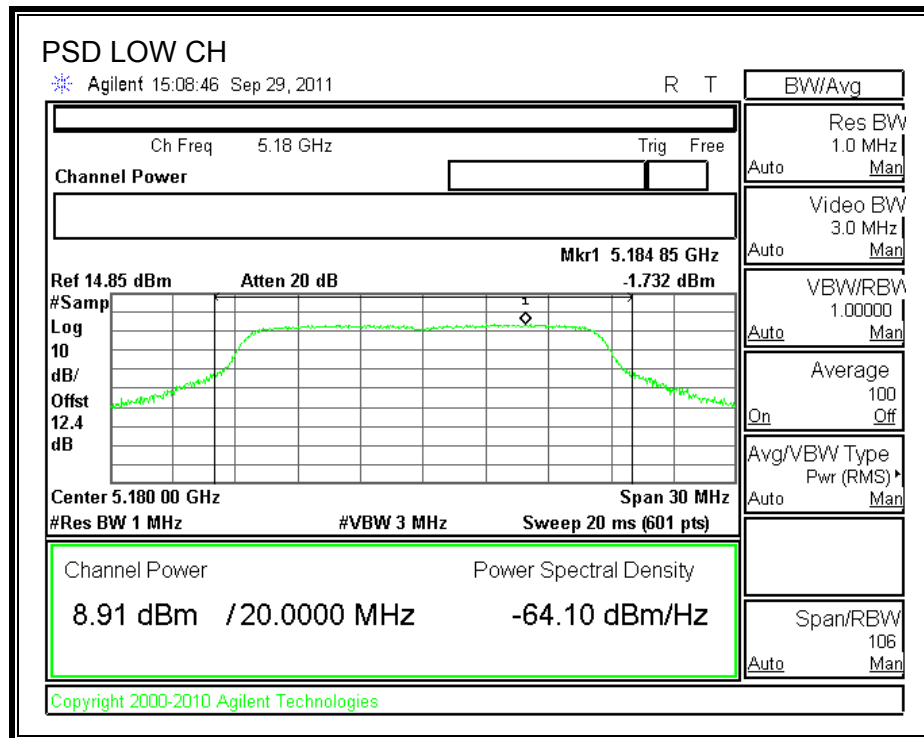
TEST PROCEDURE

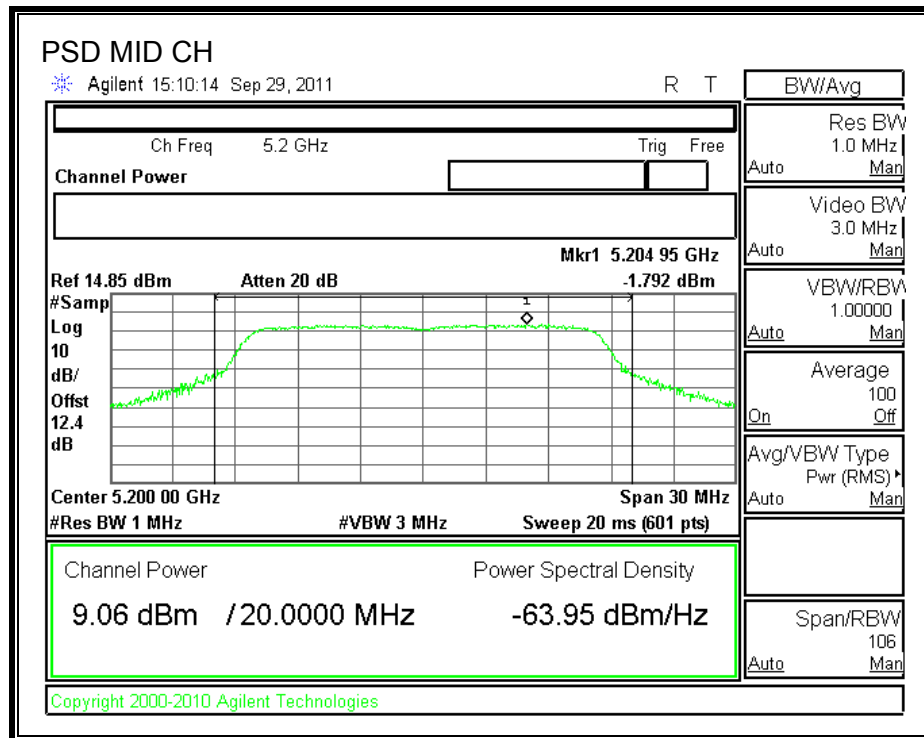
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002. PPSD method #2 was used.

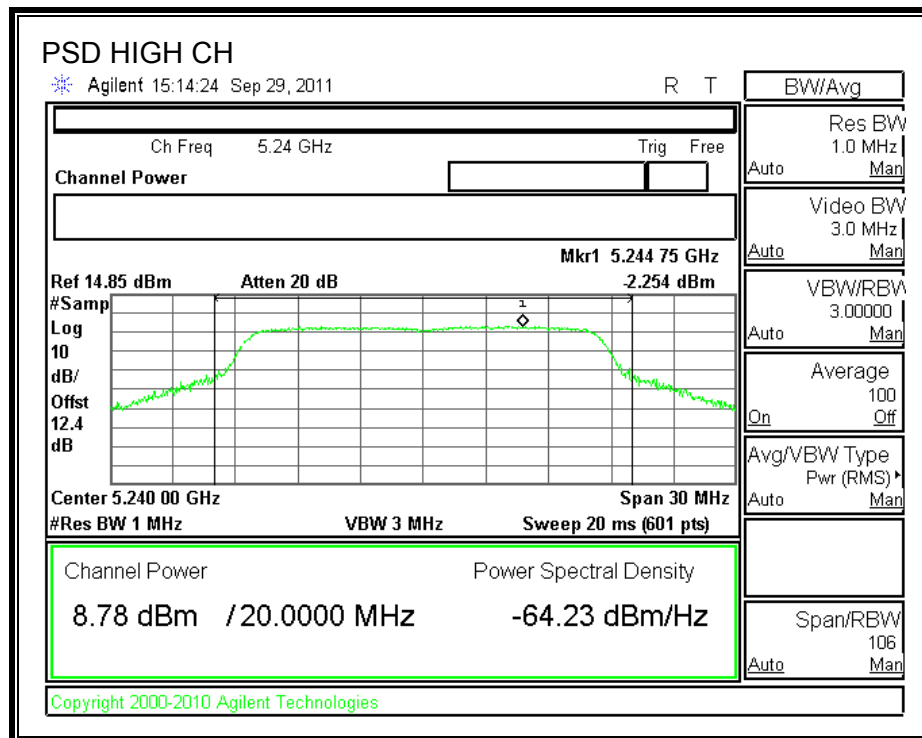
RESULTS

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	5180	-1.732	4	-5.73
Middle	5200	-1.792	4	-5.79
High	5240	-2.254	4	-6.25

POWER SPECTRAL DENSITY







7.1.5. 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

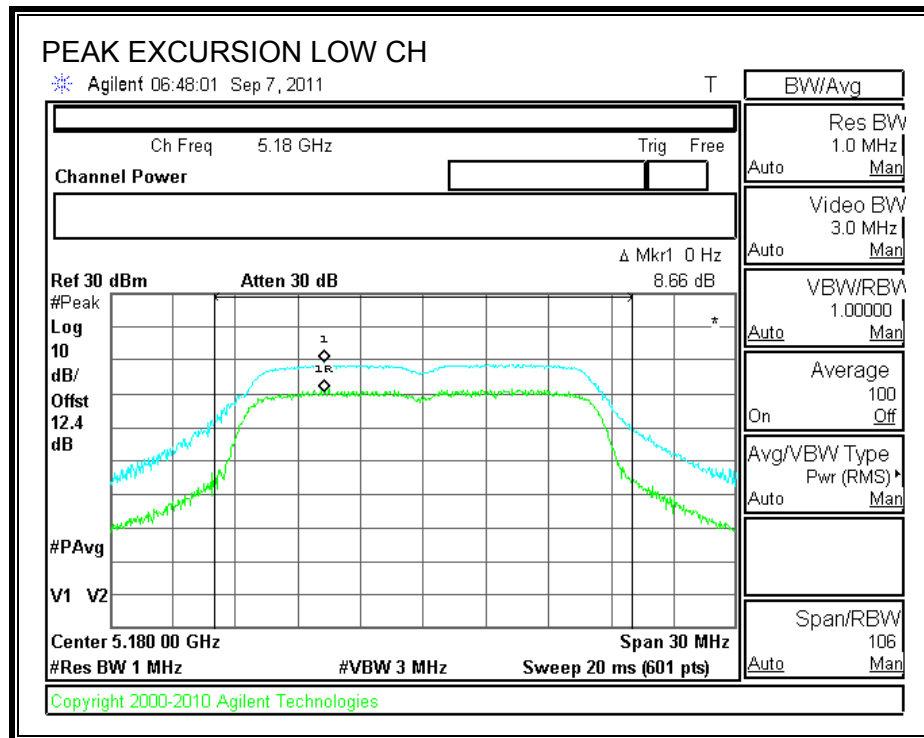
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

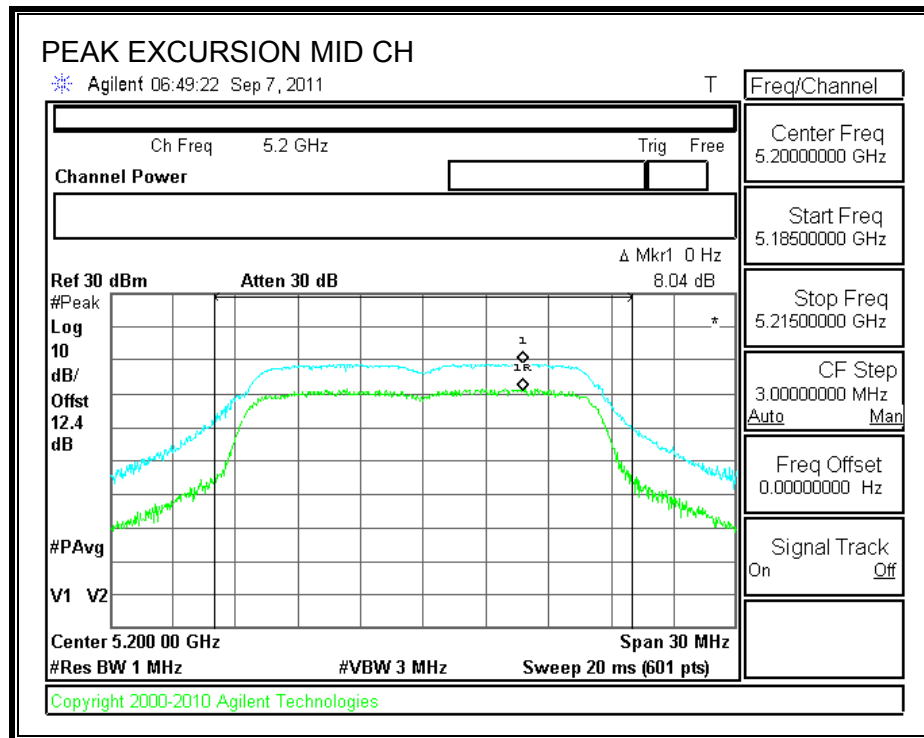
Since Method # 1 was used for peak power measurements, Method # 1 settings are used for the second PPSD trace.

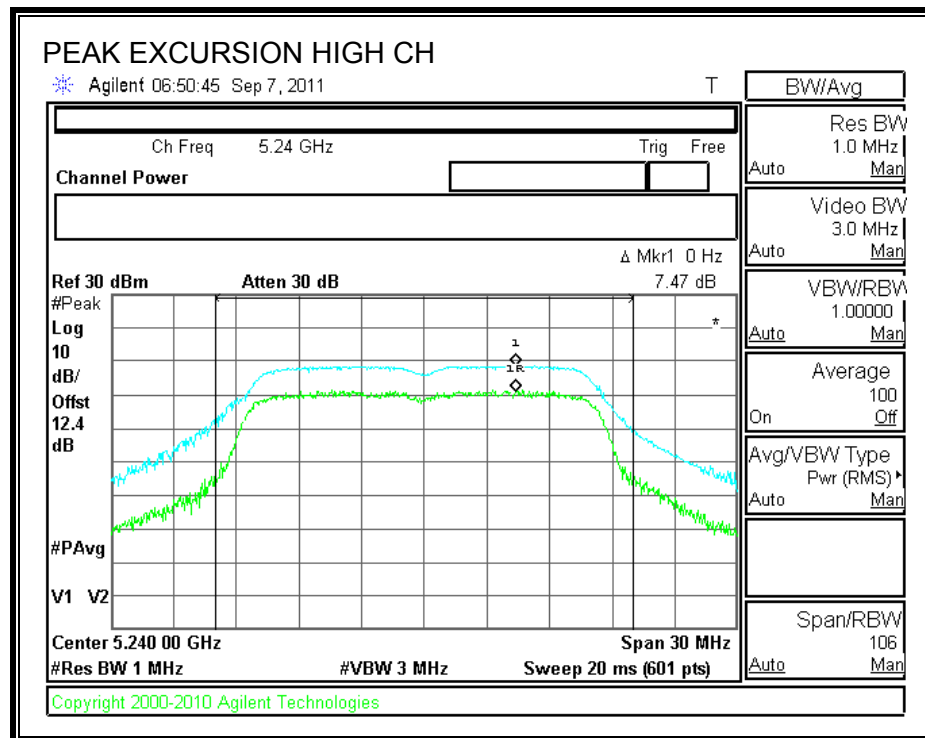
RESULTS

Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5180	8.66	13	-4.34
Middle	5200	8.04	13	-4.96
High	5240	7.47	13	-5.53

PEAK EXCURSION







7.1.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.407 (b) (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

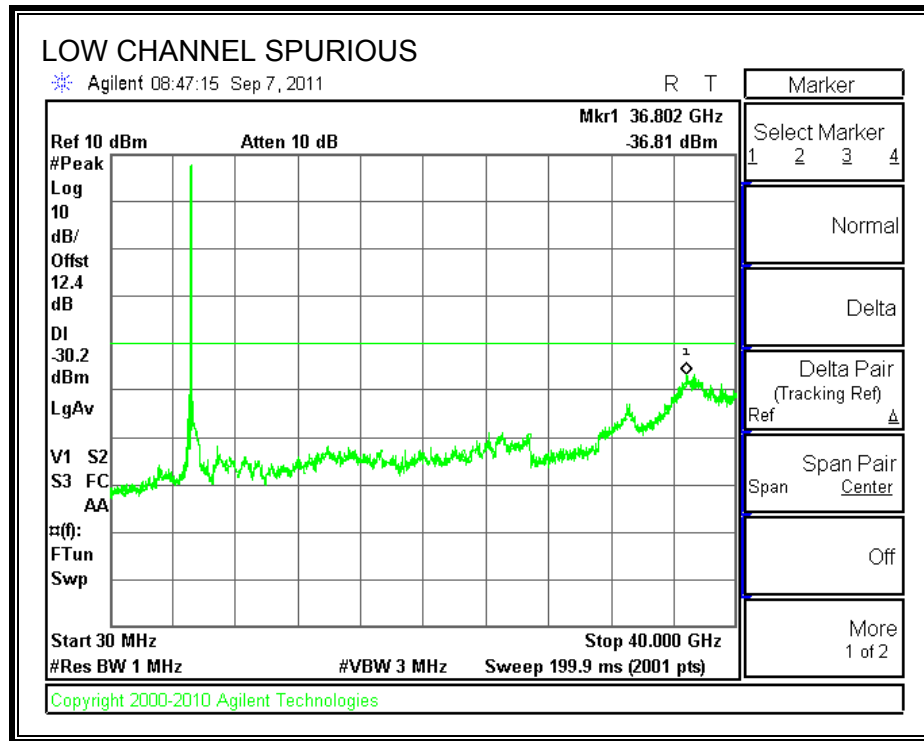
Conducted RF measurements of the transmitter output are made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

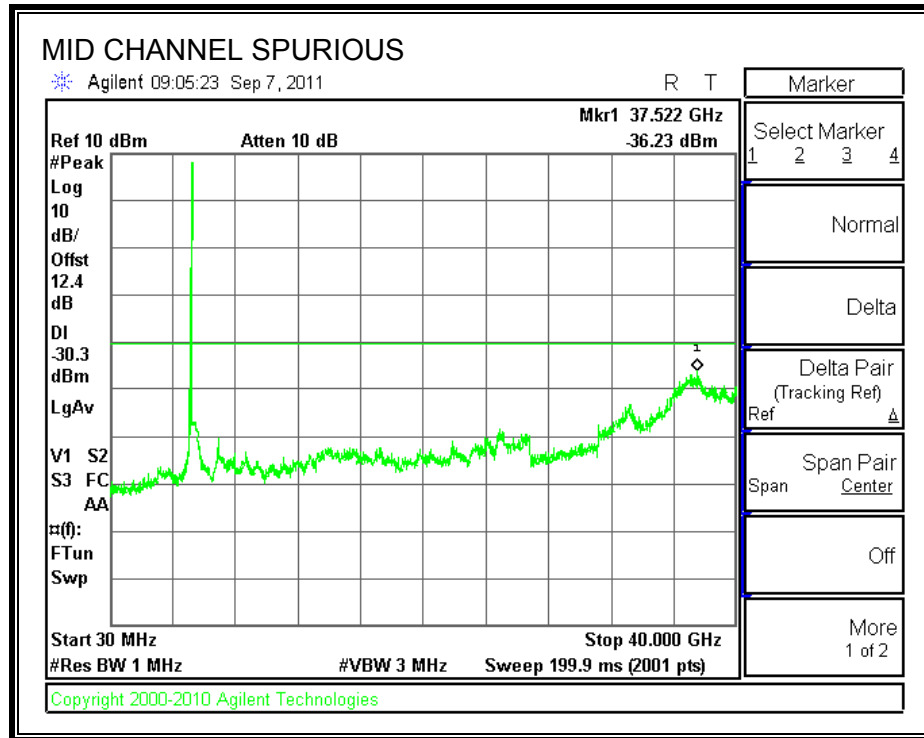
The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 3 MHz. Peak detection measurements are compared to EIRP limit, adjusted for the maximum antenna gain.

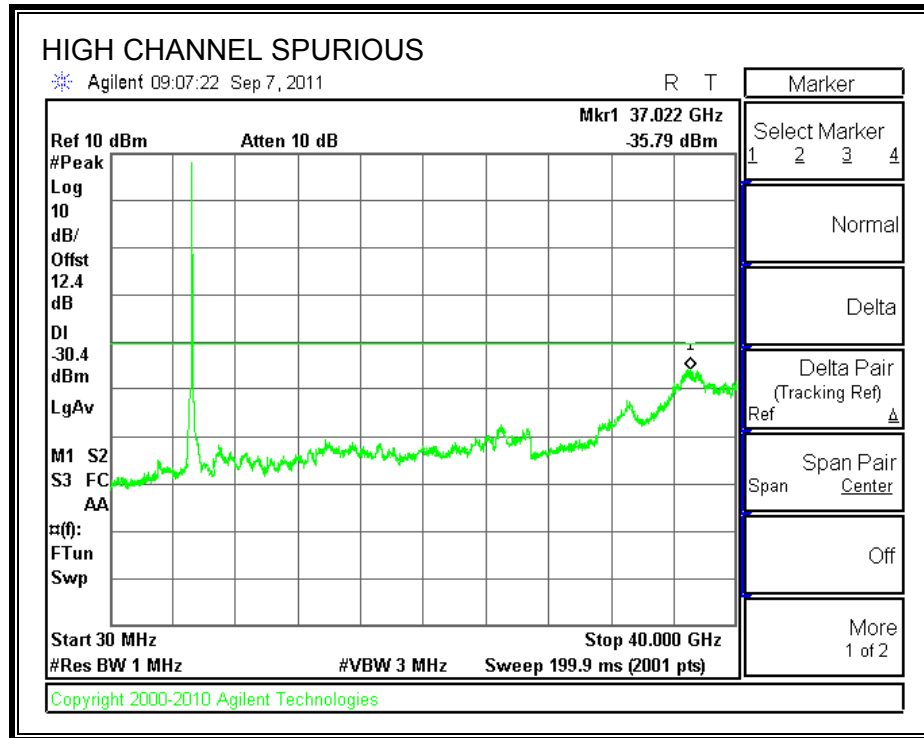
Measurements are made over the 30 MHz to 40 GHz range with the transmitter set to the lowest, middle, and highest channels.

RESULTS

SPURIOUS EMISSIONS







7.2. 802.11n HT20 MODE IN THE 5.2 GHz BAND

7.2.1. 26 dB BANDWIDTH

LIMITS

None; for reporting purposes only.

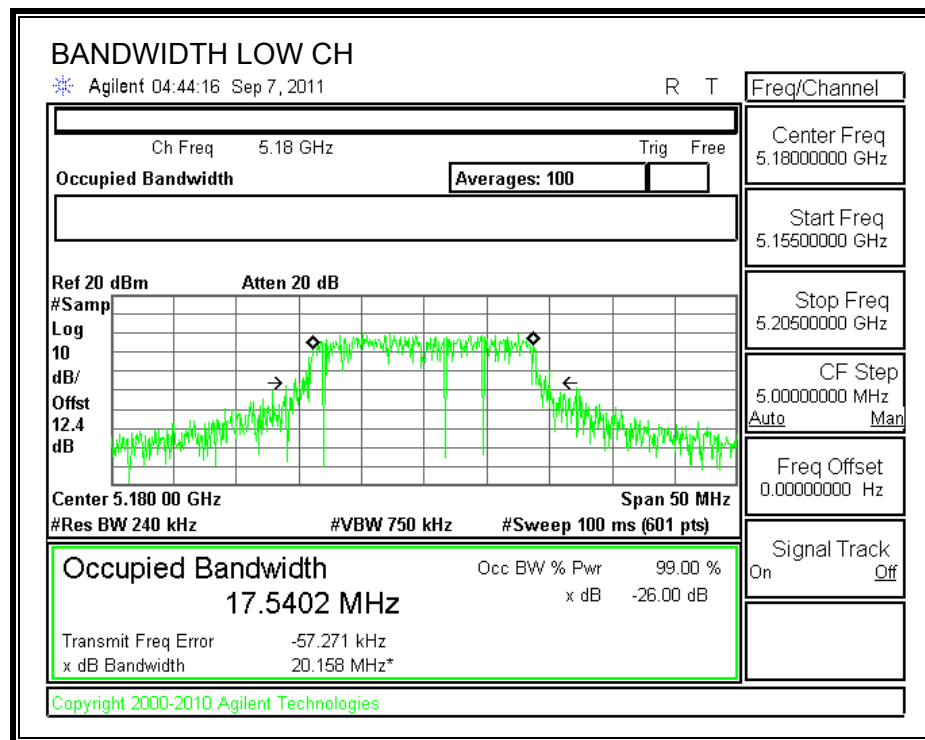
TEST PROCEDURE

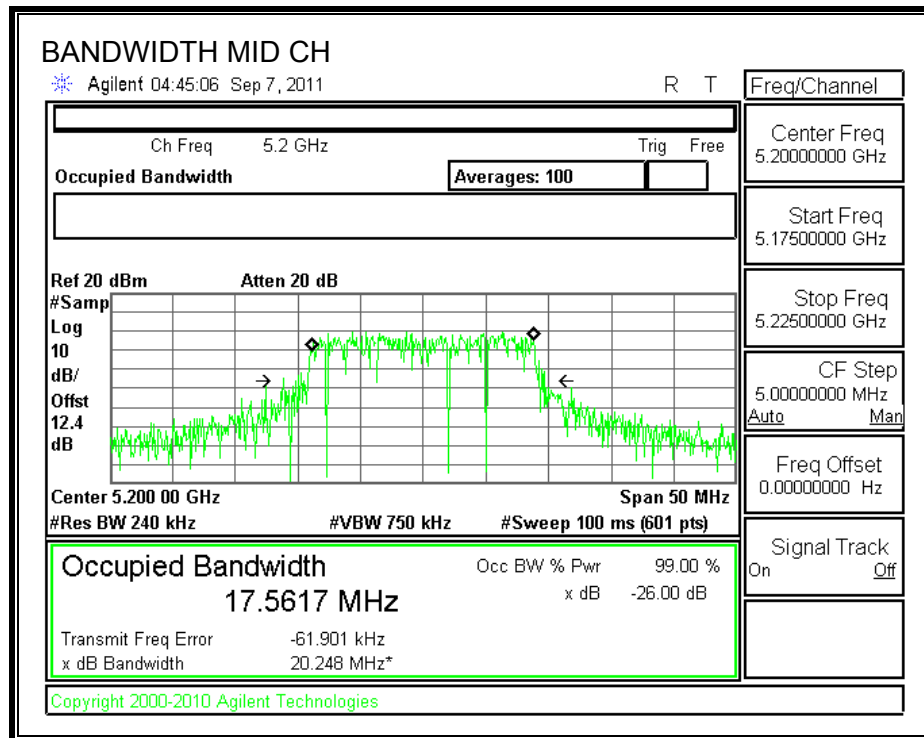
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the measured bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth function is utilized.

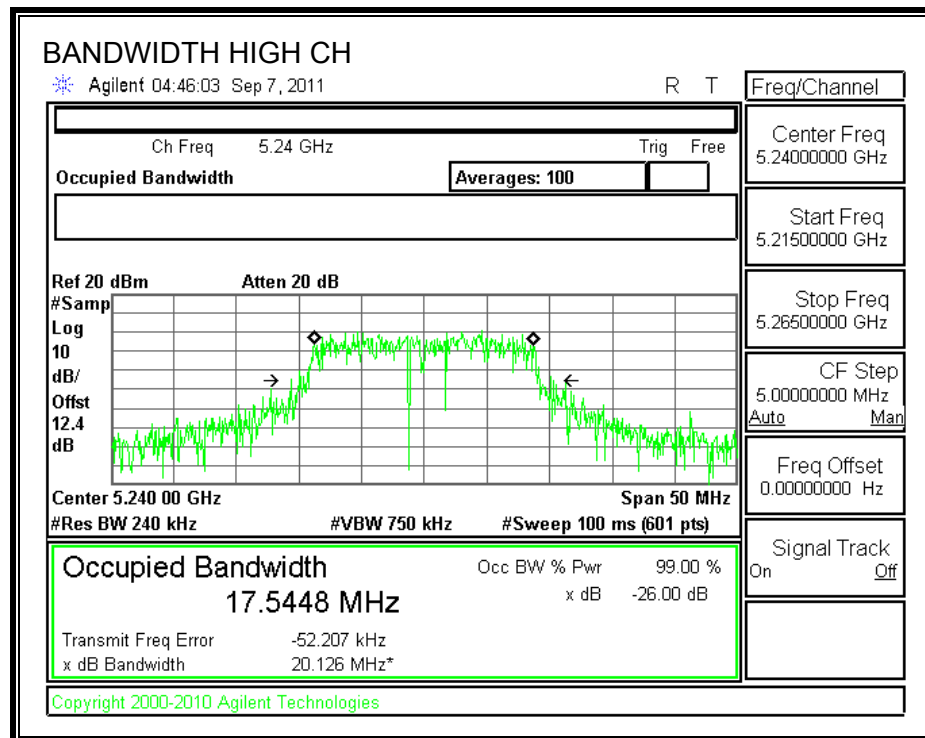
RESULTS

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5180	20.158
Middle	5200	20.248
High	5240	20.126

26 dB BANDWIDTH







7.2.2. OUTPUT POWER

LIMITS

FCC §15.407 (a) (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 $4 \text{ dBm} + 10 \log B$, 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

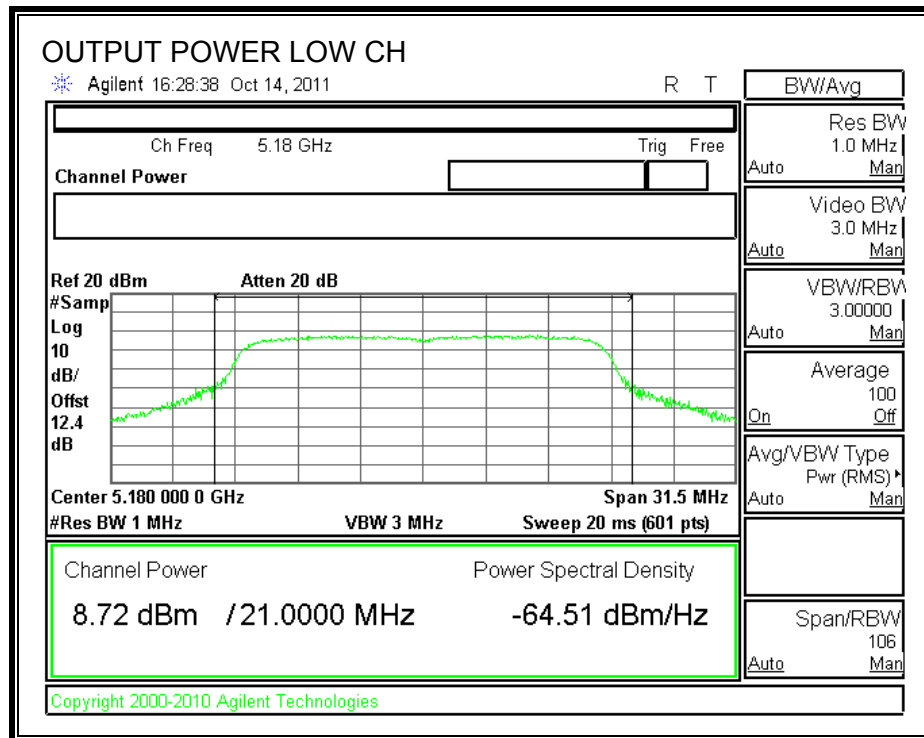
Limit

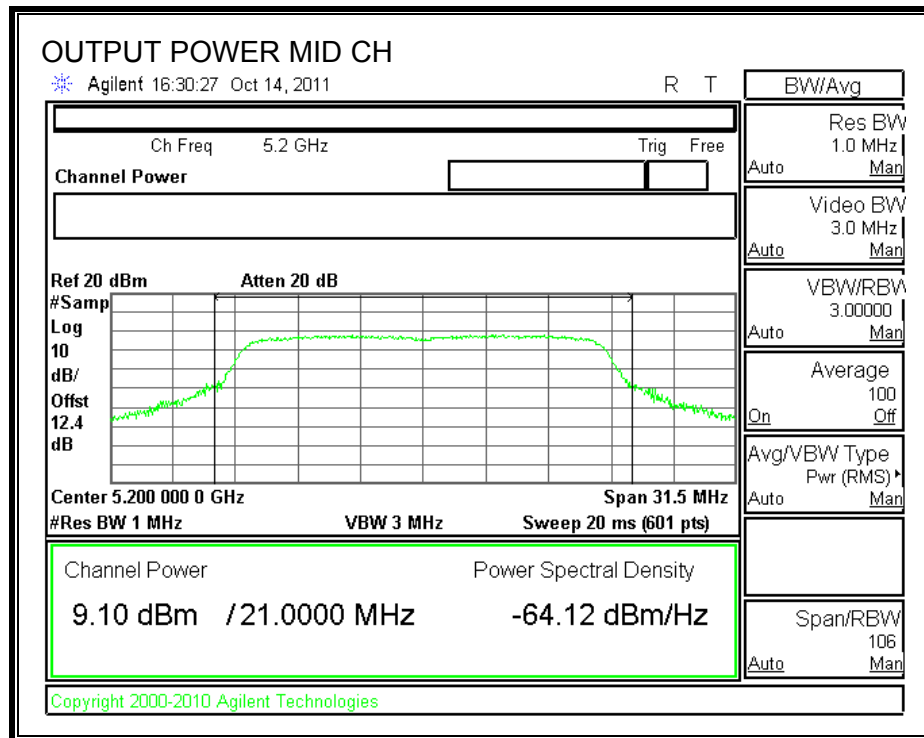
Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	4 + 10 Log B Limit (dBm)	Antenna Gain (dBi)	Limit (dBm)
Low	5180	17	20.158	17.04	3.20	17.00
Mid	5200	17	20.248	17.06	3.27	17.00
High	5240	17	20.126	17.04	3.40	17.00

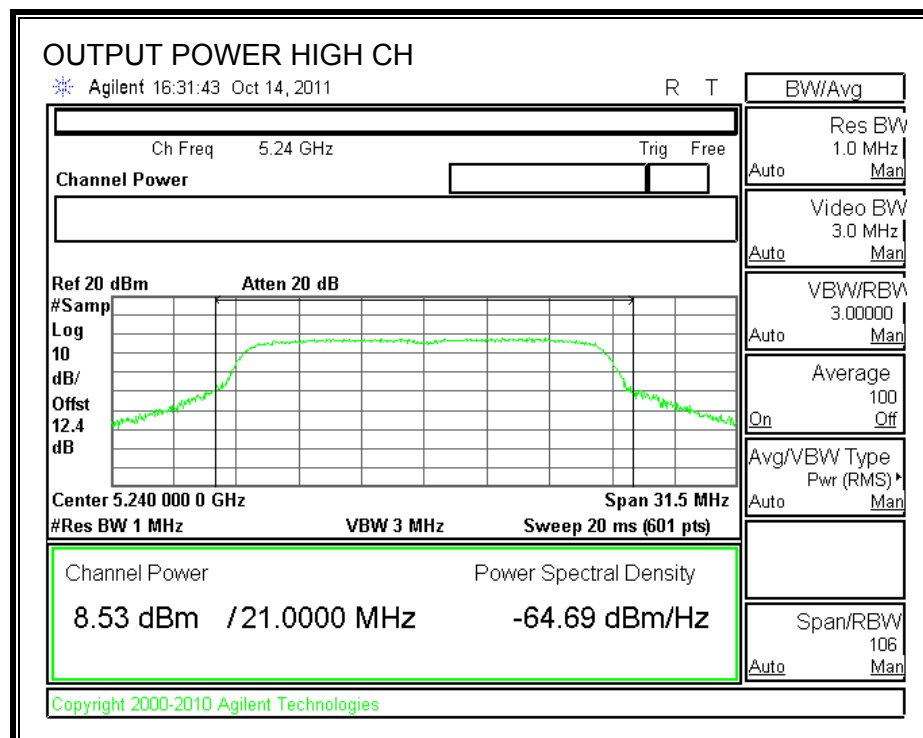
Results

Channel	Frequency (MHz)	Power (dBm)	Limit (dBm)	Margin (dB)
Low	5180	8.72	17.00	-8.28
Mid	5200	9.10	17.00	-7.90
High	5240	8.53	17.00	-8.47

OUTPUT POWER







7.2.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 12.4 dB (including 10 dB pad and 2.4 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Frequency (MHz)	Power (dBm)
5180	7.72
5200	7.89
5240	7.35

7.2.4. PEAK POWER SPECTRAL DENSITY

LIMITS

FCC §15.407 (a) (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 less than or equal to 6 dBi, therefore the limit is 4 dBm.

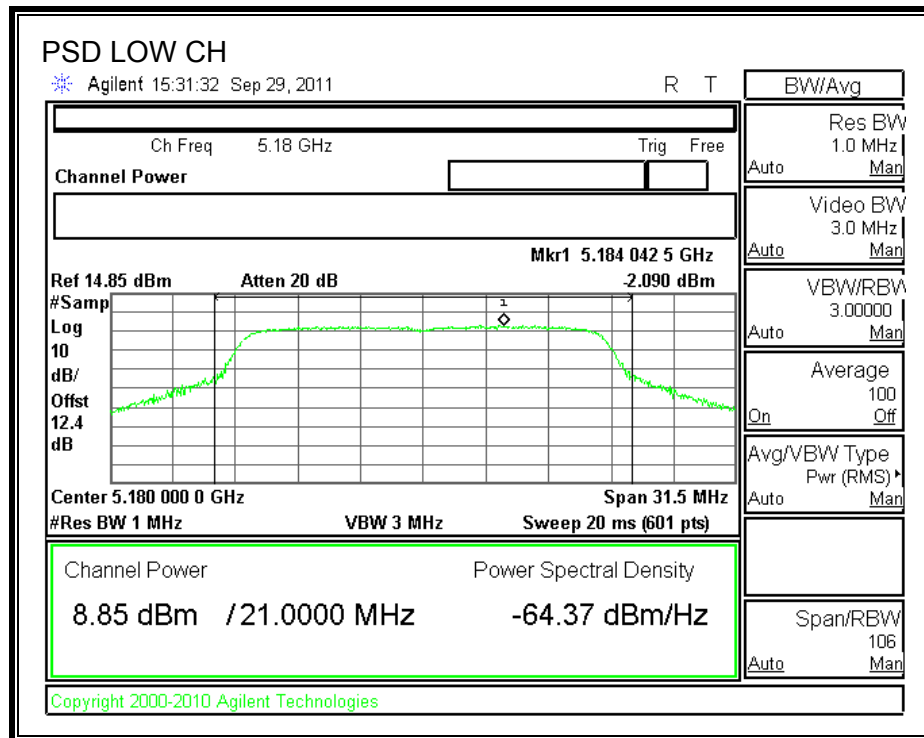
TEST PROCEDURE

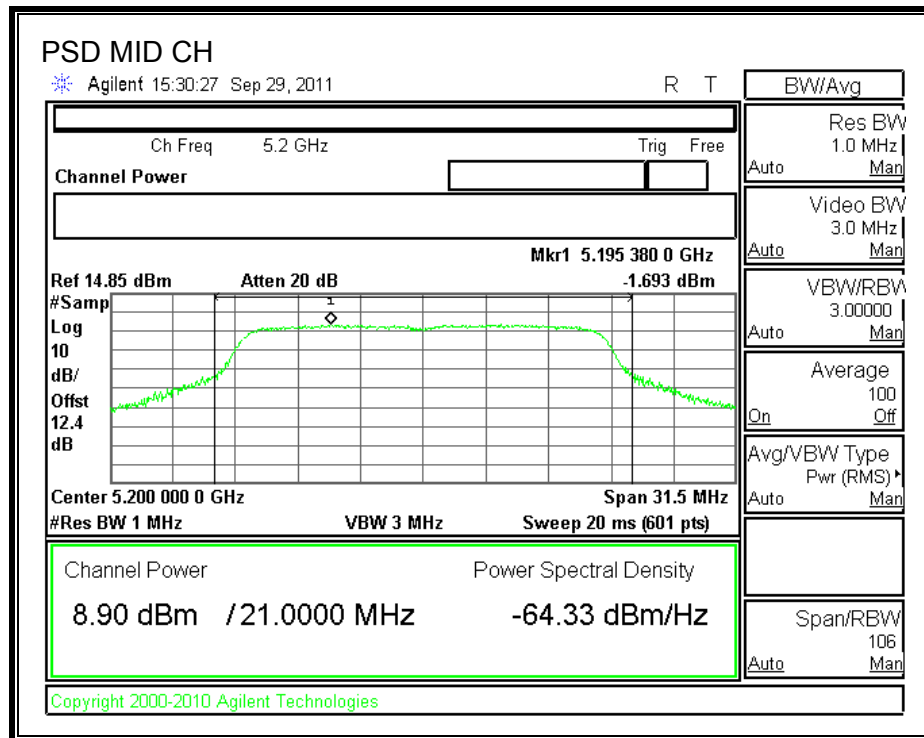
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002. PPSD method #2 was used.

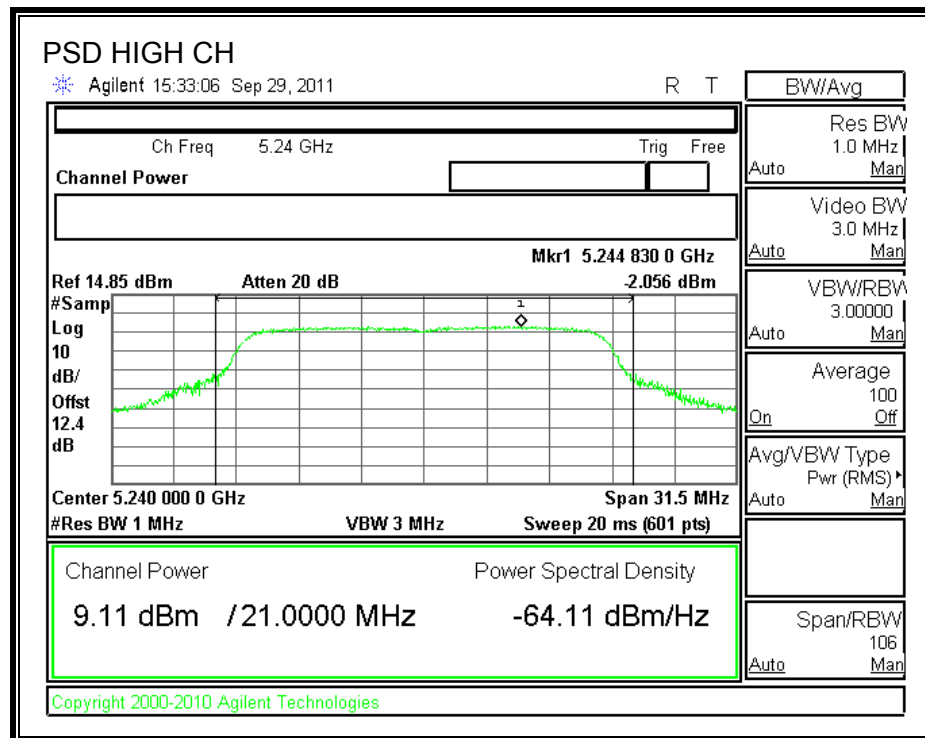
RESULTS

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	5180	-2.090	4	-6.09
Middle	5200	-1.693	4	-5.69
High	5240	-2.056	4	-6.06

POWER SPECTRAL DENSITY







7.2.5. 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

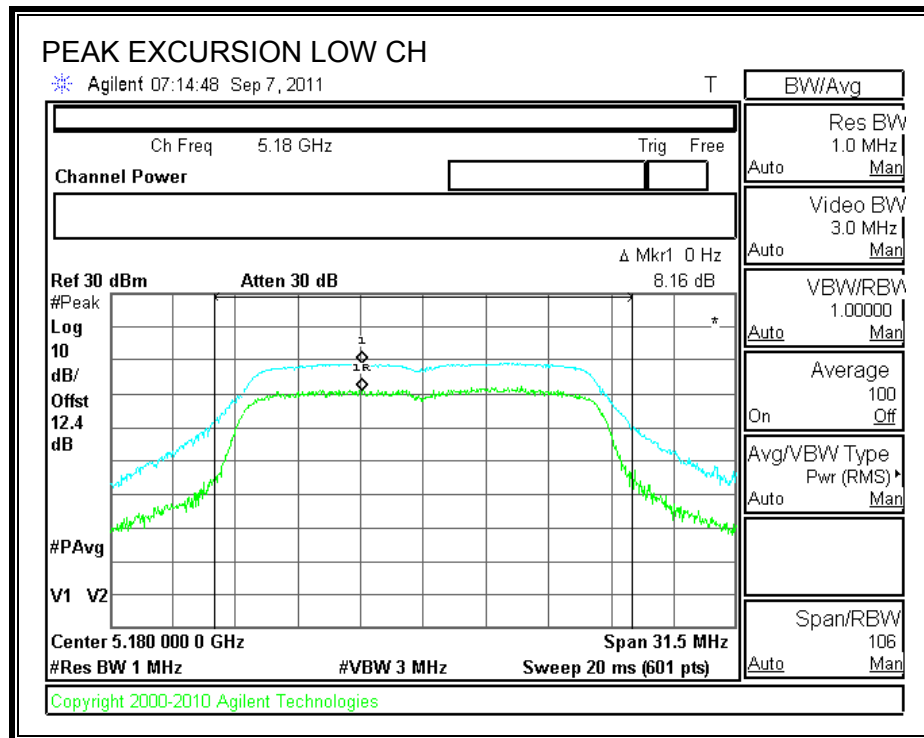
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

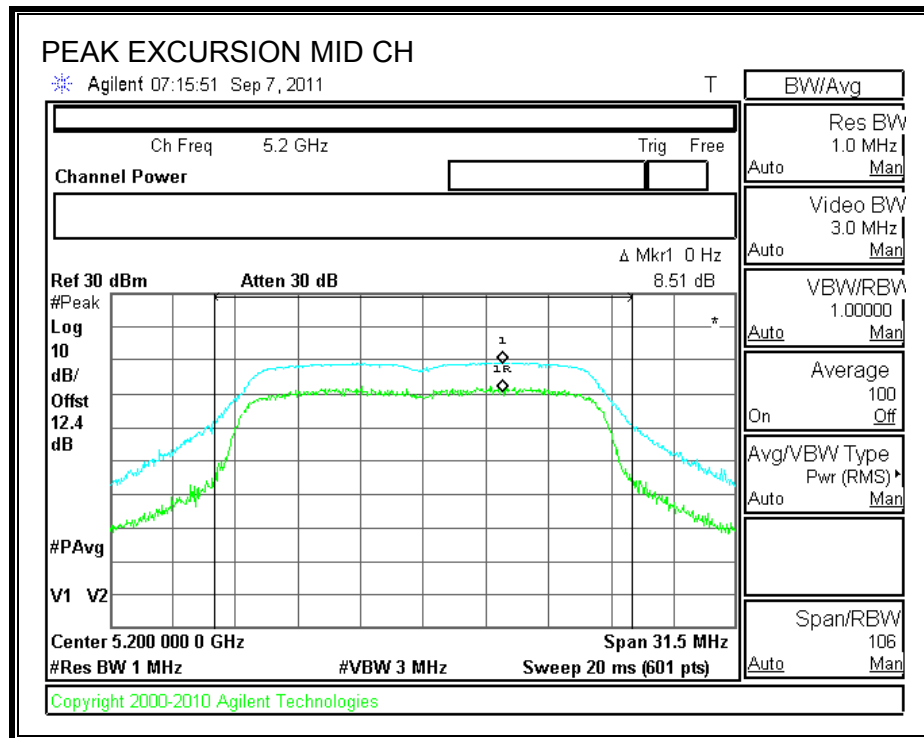
Since Method # 1 was used for peak power measurements, Method # 1 settings are used for the second PPSD trace.

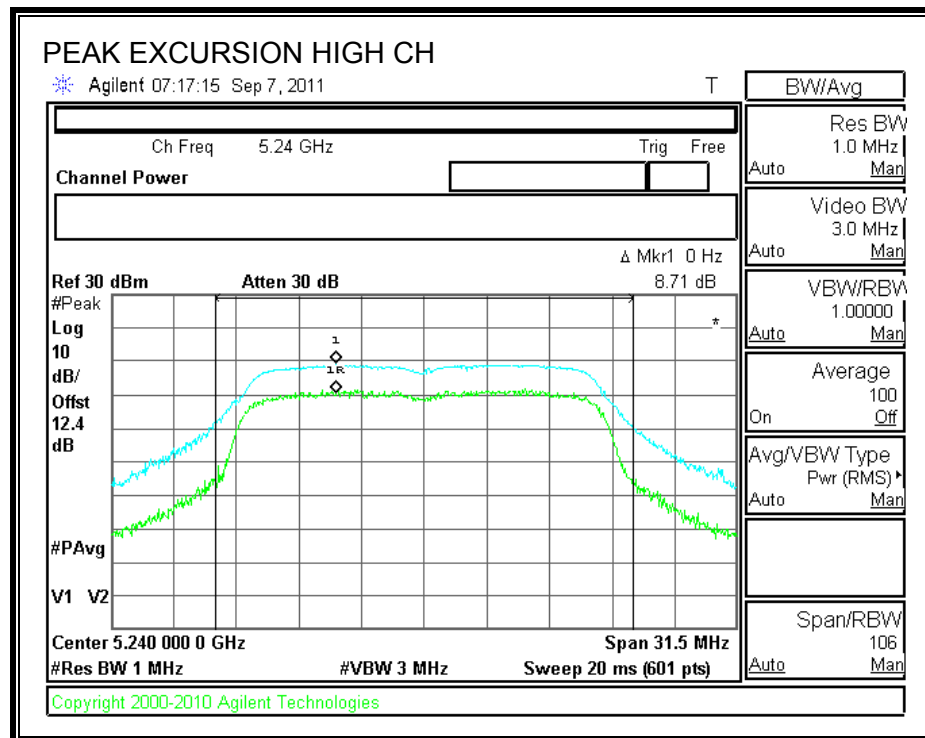
RESULTS

Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5180	8.16	13	-4.84
Middle	5200	8.51	13	-4.49
High	5240	8.71	13	-4.29

PEAK EXCURSION







7.2.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.407 (b) (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

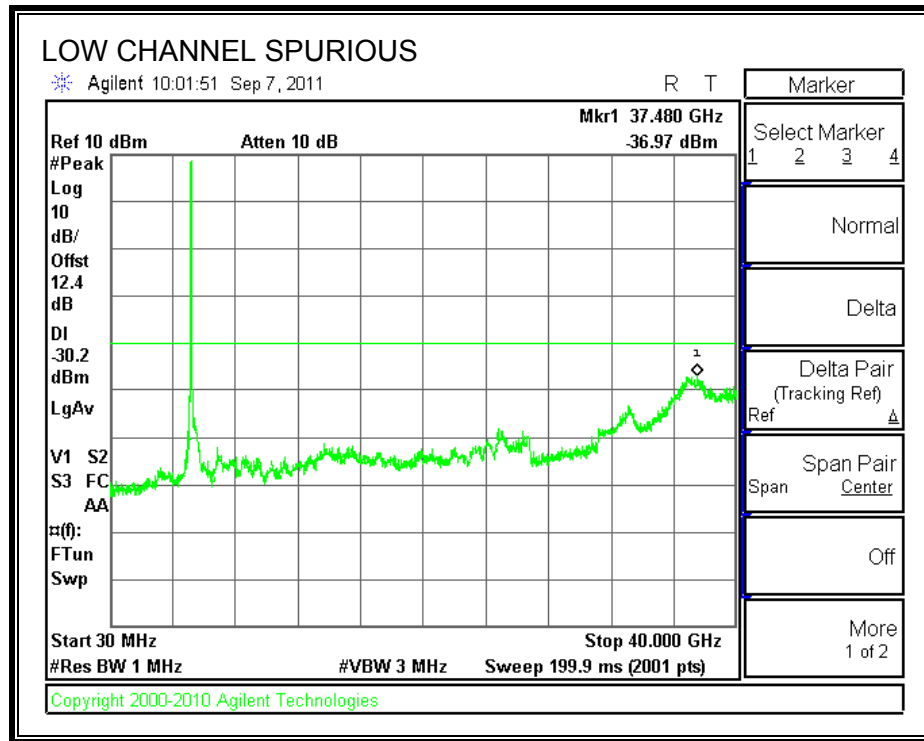
Conducted RF measurements of the transmitter output are made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

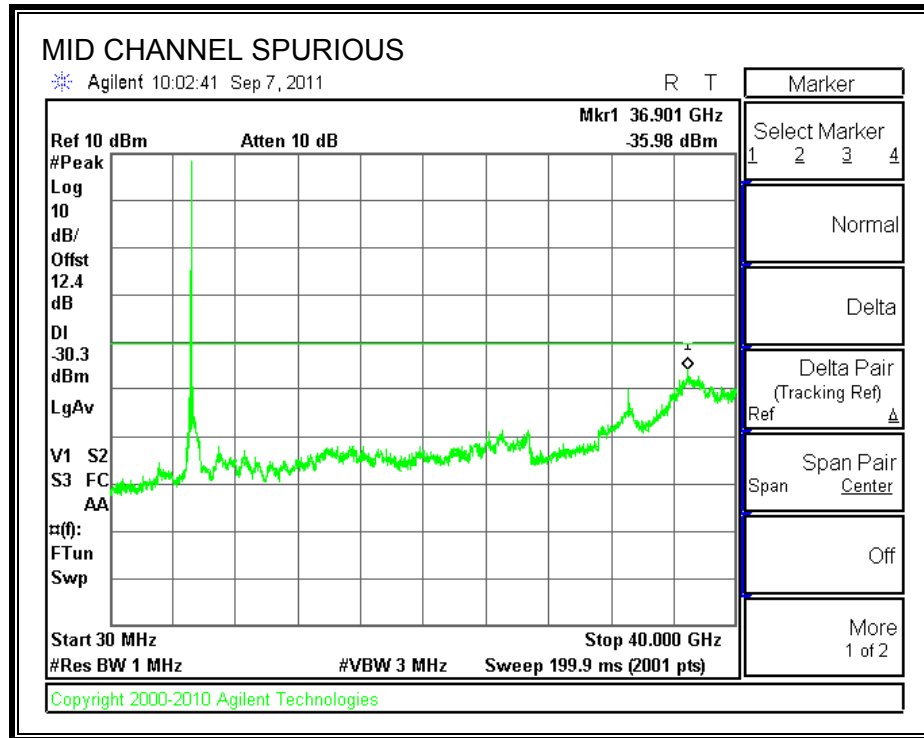
The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 3 MHz. Peak detection measurements are compared to EIRP limit, adjusted for the maximum antenna gain.

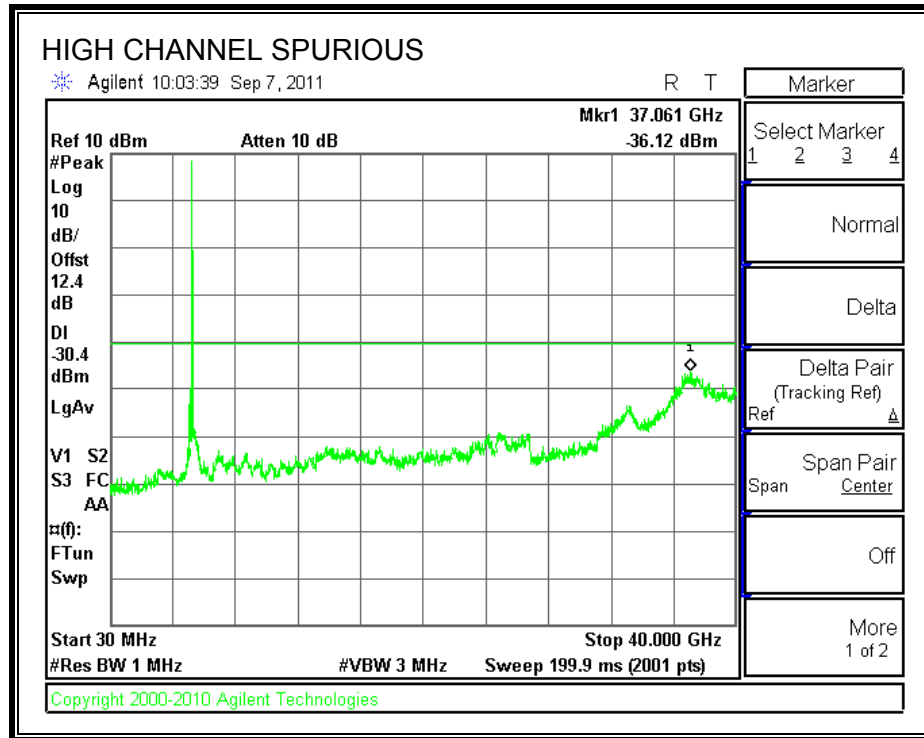
Measurements are made over the 30 MHz to 40 GHz range with the transmitter set to the lowest, middle, and highest channels.

RESULTS

SPURIOUS EMISSIONS







7.3. 802.11n HT40 MODE IN THE 5.2 GHz BAND

7.3.1. 26 dB BANDWIDTH

LIMITS

None; for reporting purposes only.

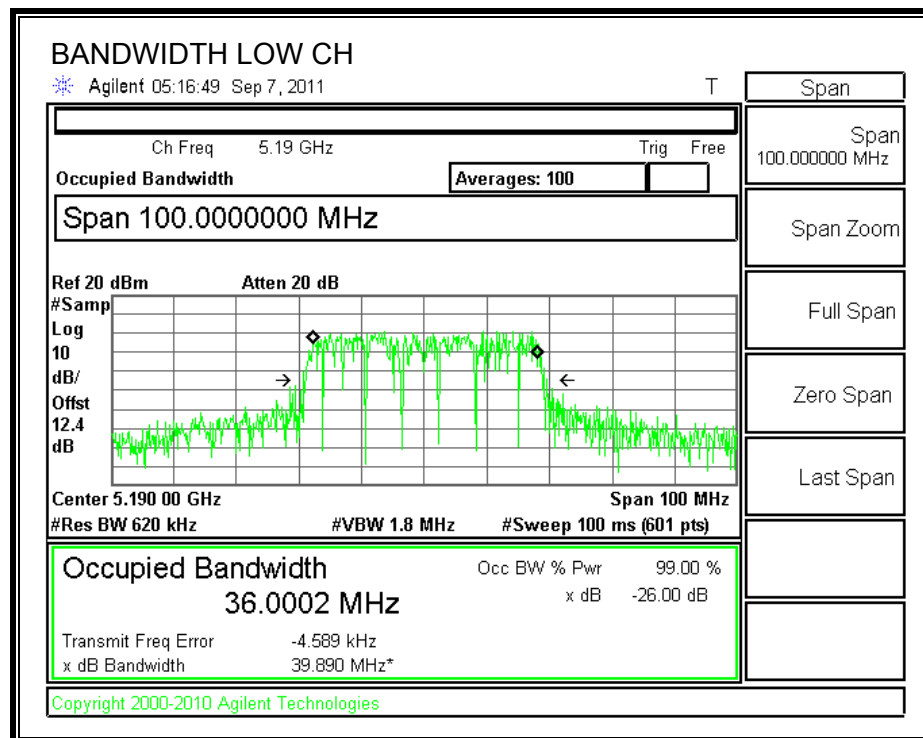
TEST PROCEDURE

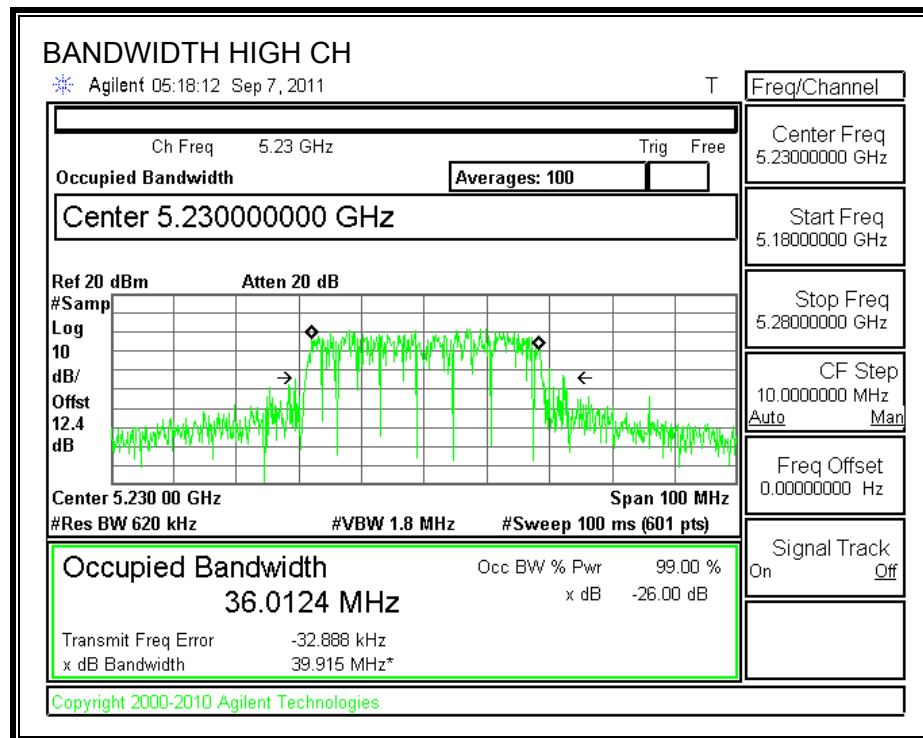
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the measured bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth function is utilized.

RESULTS

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5190	39.89
High	5230	39.915

26 dB BANDWIDTH





7.3.2. OUTPUT POWER

LIMITS

FCC §15.407 (a) (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 $4 \text{ dBm} + 10 \log B$, 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

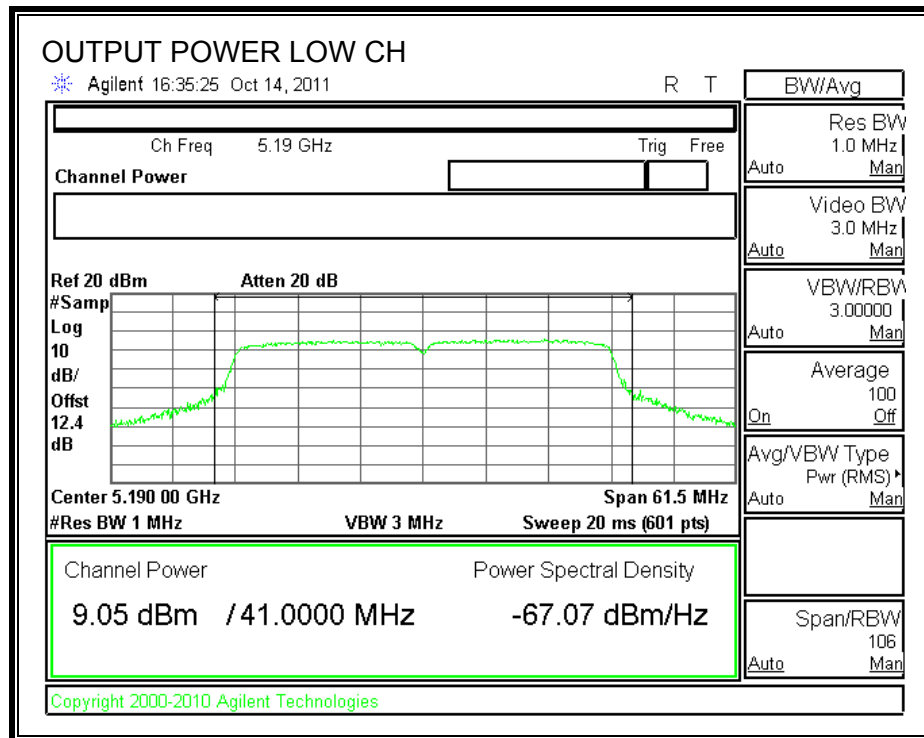
Limit

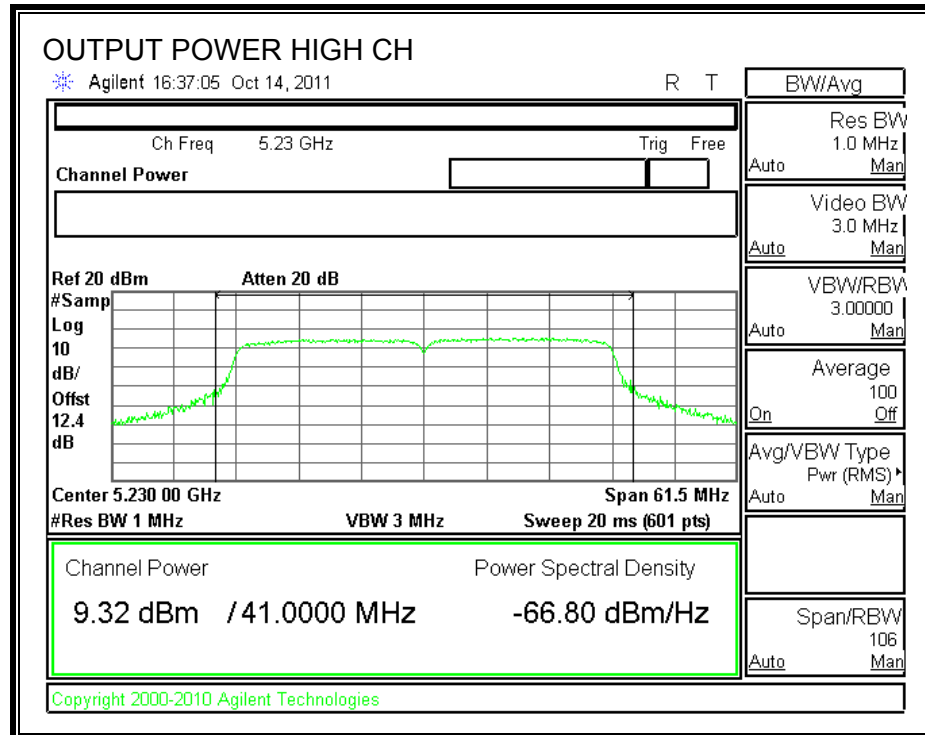
Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	4 + 10 Log B Limit (dBm)	Antenna Gain (dBi)	Limit (dBm)
Low	5190	17	39.89	20.01	3.20	17.00
High	5230	17	39.915	20.01	3.27	17.00

Results

Channel	Frequency (MHz)	Power (dBm)	Limit (dBm)	Margin (dB)
Low	5190	9.05	17.00	-7.95
High	5230	9.32	17.00	-7.68

OUTPUT POWER





7.3.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 12.4 dB (including 10 dB pad and 2.4 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Power (dBm)
Low	5190	8.48
High	5230	8.36

7.3.4. PEAK POWER SPECTRAL DENSITY

LIMITS

FCC §15.407 (a) (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 less than or equal to 6 dBi, therefore the limit is 4 dBm.

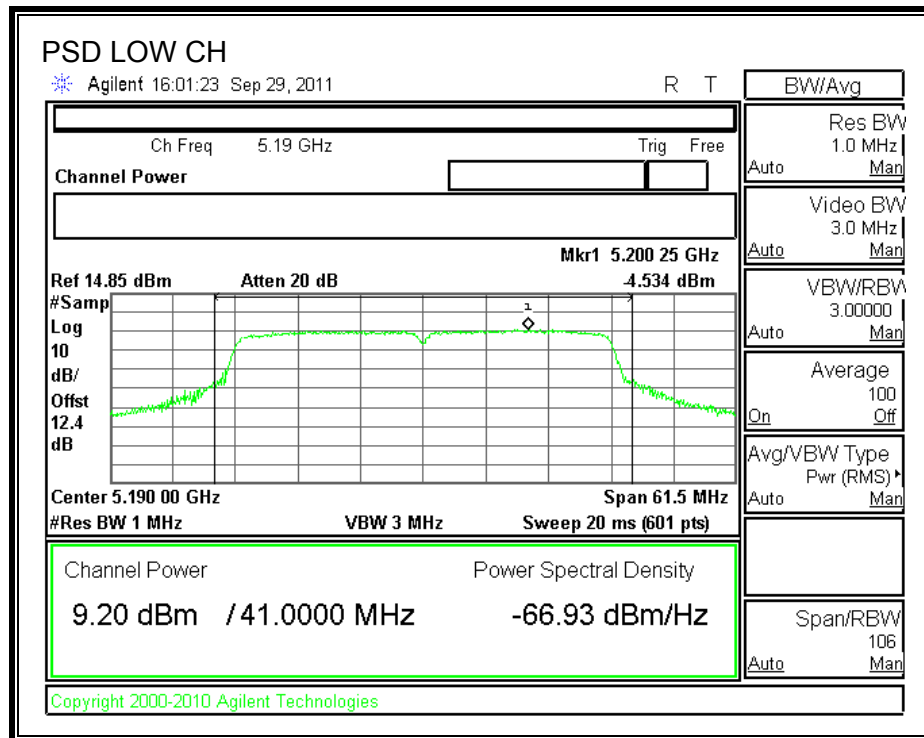
TEST PROCEDURE

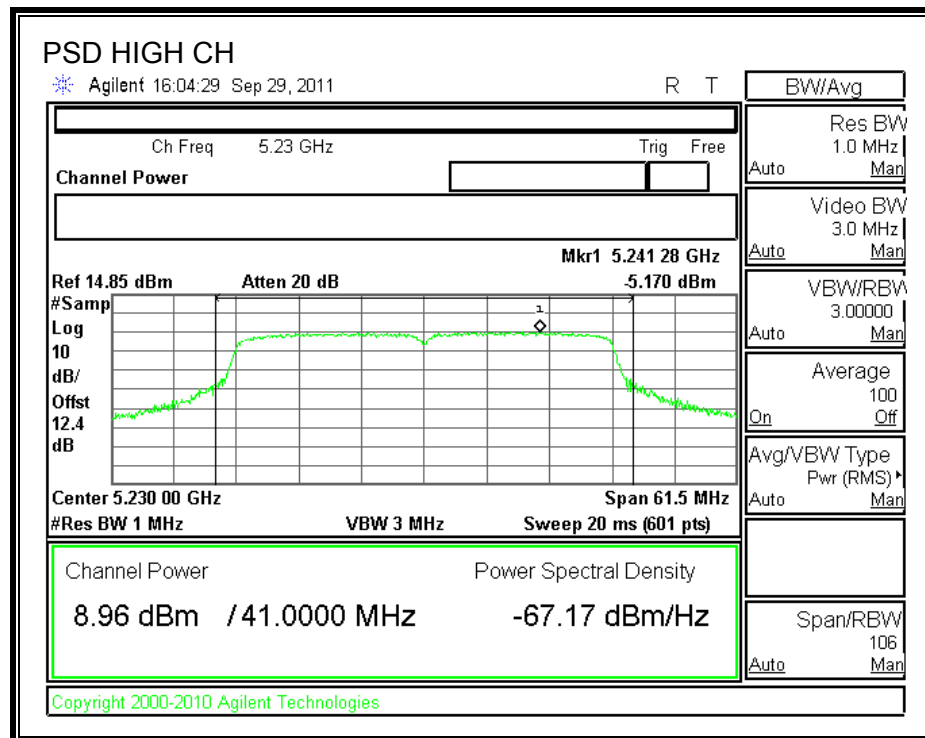
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002. PPSD method #2 was used.

RESULTS

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	5190	-4.534	4	-8.53
High	5230	-5.170	4	-9.17

POWER SPECTRAL DENSITY





7.3.5. 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

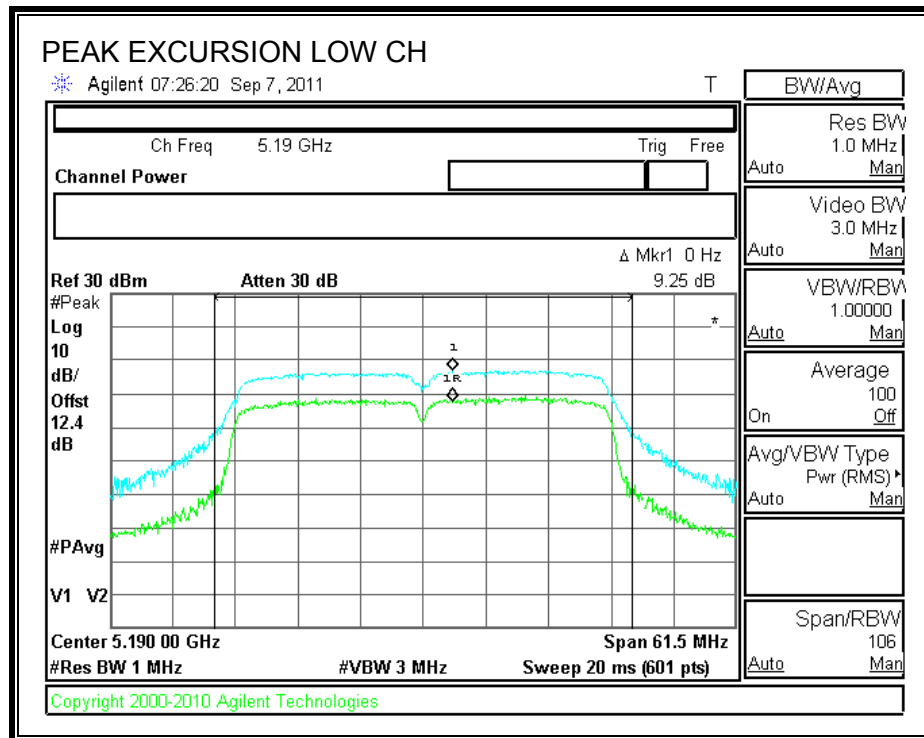
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

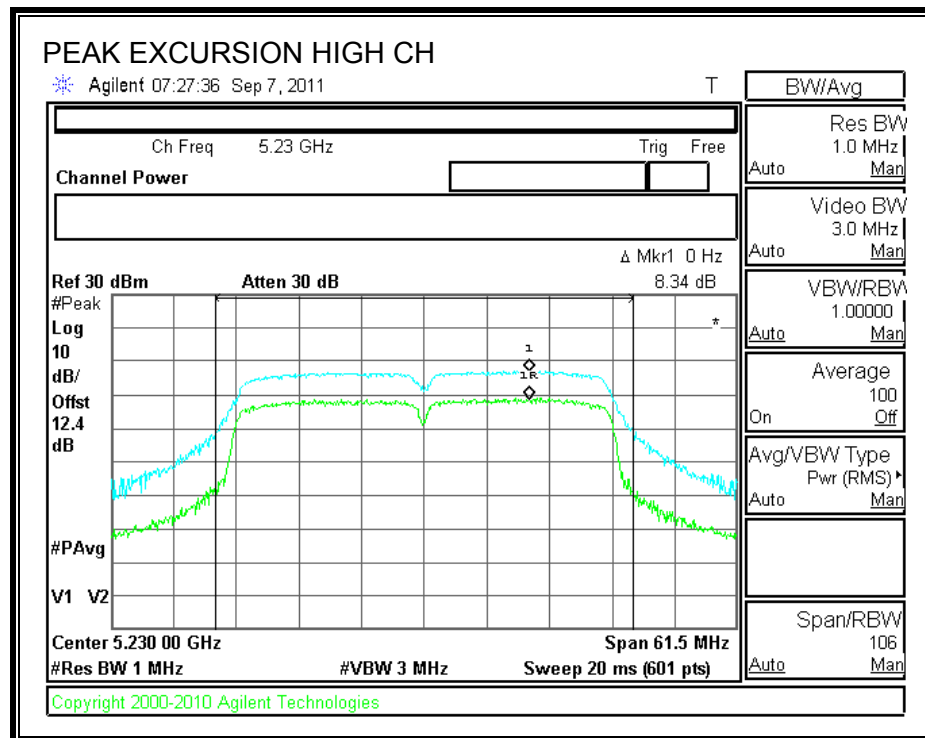
Since Method # 1 was used for peak power measurements, Method # 1 settings are used for the second PPSD trace.

RESULTS

Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5190	9.25	13	-3.75
High	5230	8.34	13	-4.66

PEAK EXCURSION





7.3.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.407 (b) (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

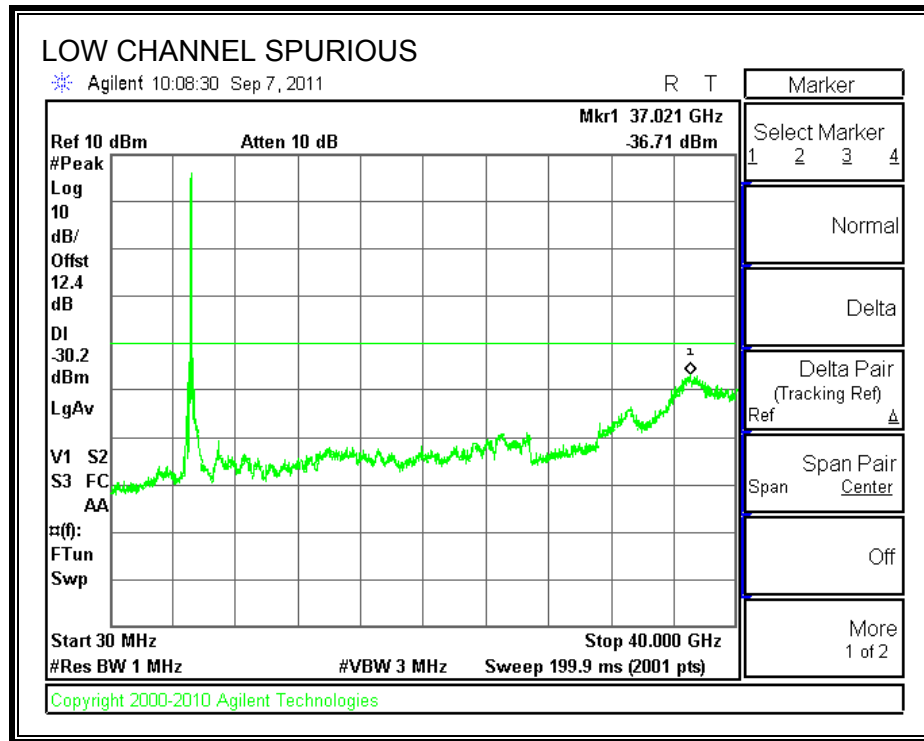
Conducted RF measurements of the transmitter output are made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

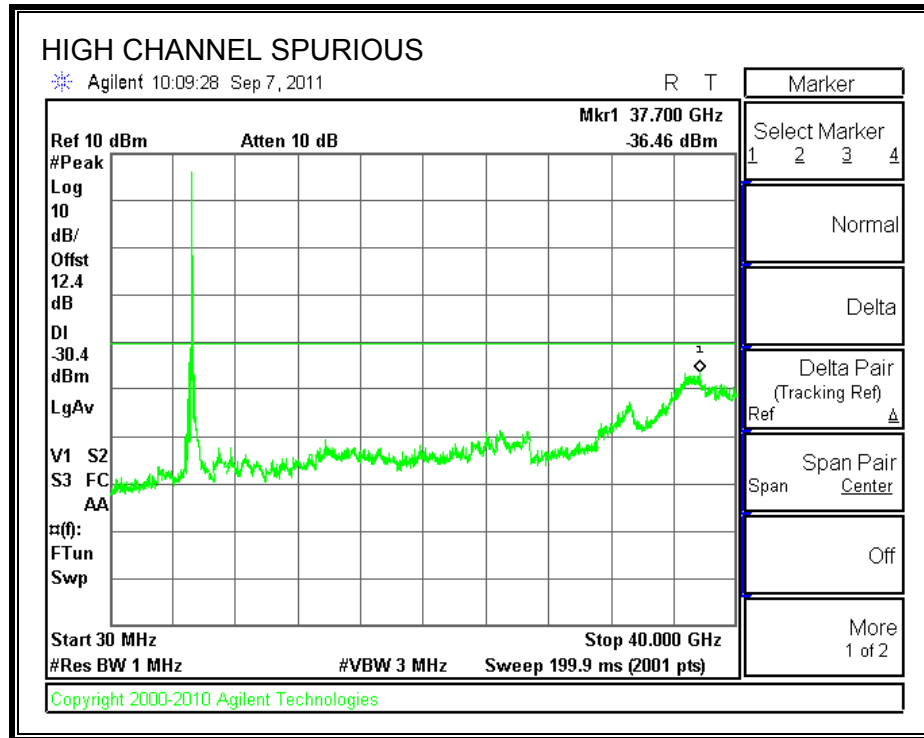
The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 3 MHz. Peak detection measurements are compared to EIRP limit, adjusted for the maximum antenna gain.

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





7.4. 802.11a MODE IN THE 5.3 GHz BAND

7.4.1. 26 dB BANDWIDTH

LIMITS

None; for reporting purposes only.

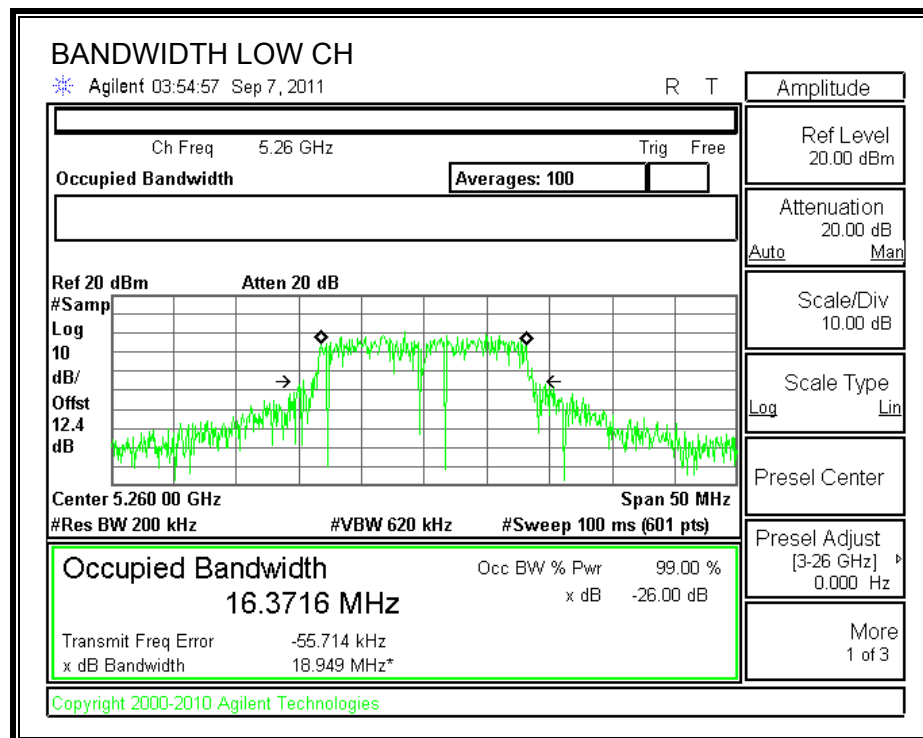
TEST PROCEDURE

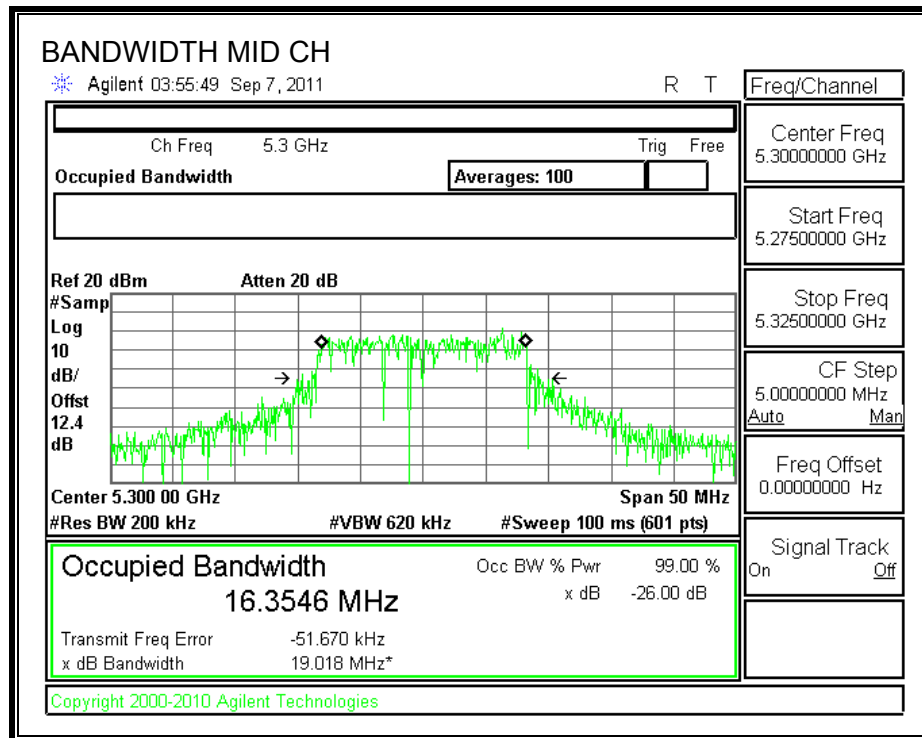
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the measured bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth function is utilized.

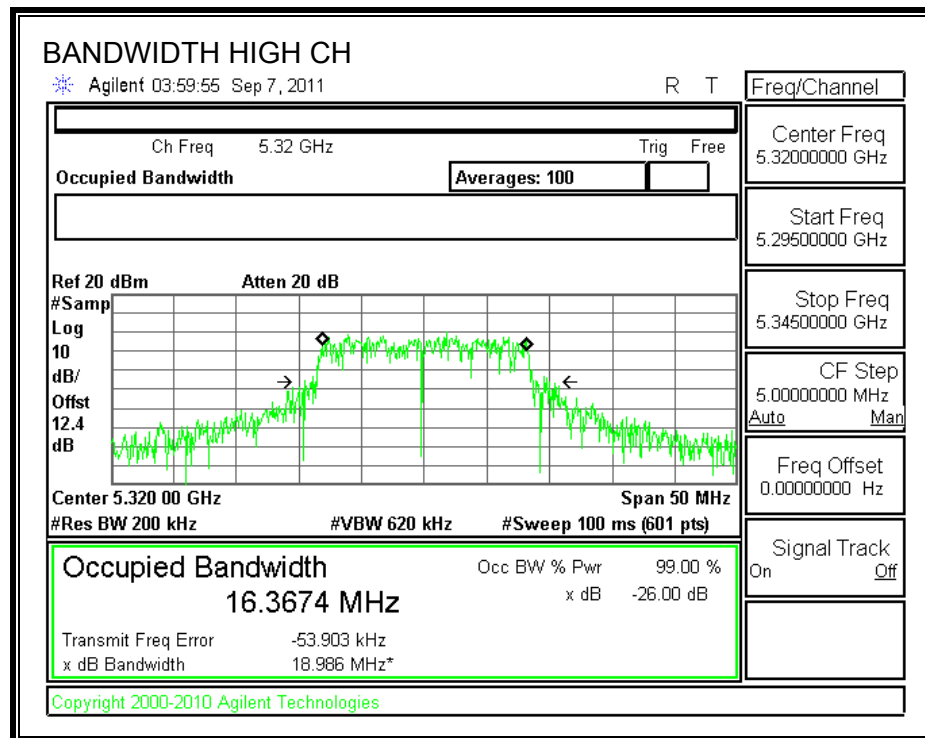
RESULTS

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5260	18.949
Middle	5300	19.018
High	5320	18.986

26 dB BANDWIDTH







7.4.2. OUTPUT POWER

LIMITS

FCC §15.407 (a) (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 $11 \text{ dBm} + 10 \log B$, 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

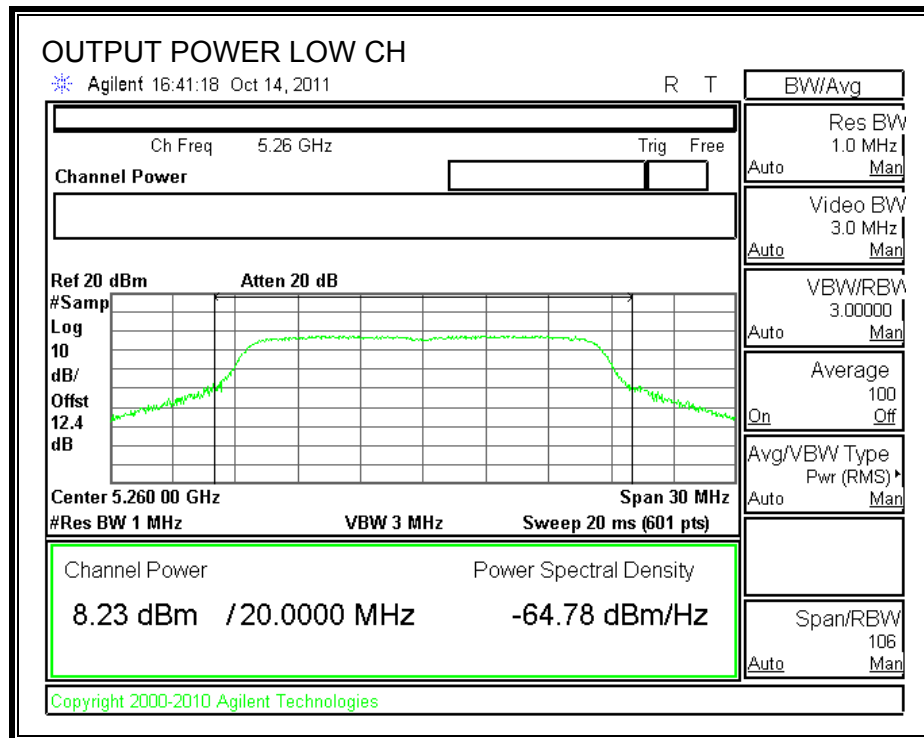
Limit

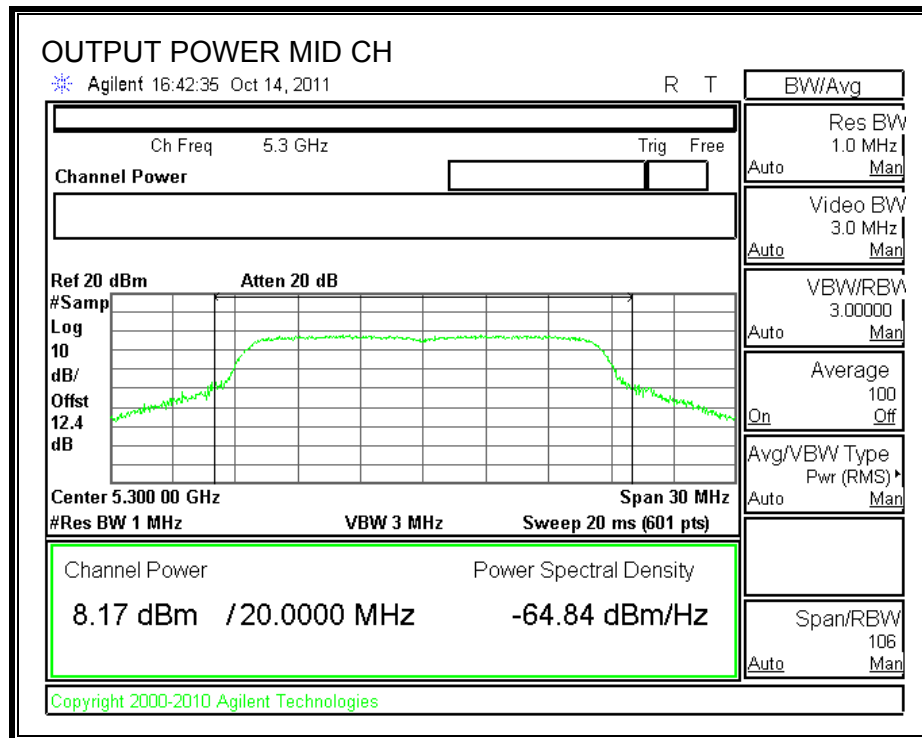
Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	11 + 10 Log B Limit (dBm)	Antenna Gain (dBi)	Limit (dBm)
Low	5260	24	18.949	23.78	3.46	23.78
Mid	5300	24	19.018	23.79	3.59	23.79
High	5320	24	18.986	23.78	3.59	23.78

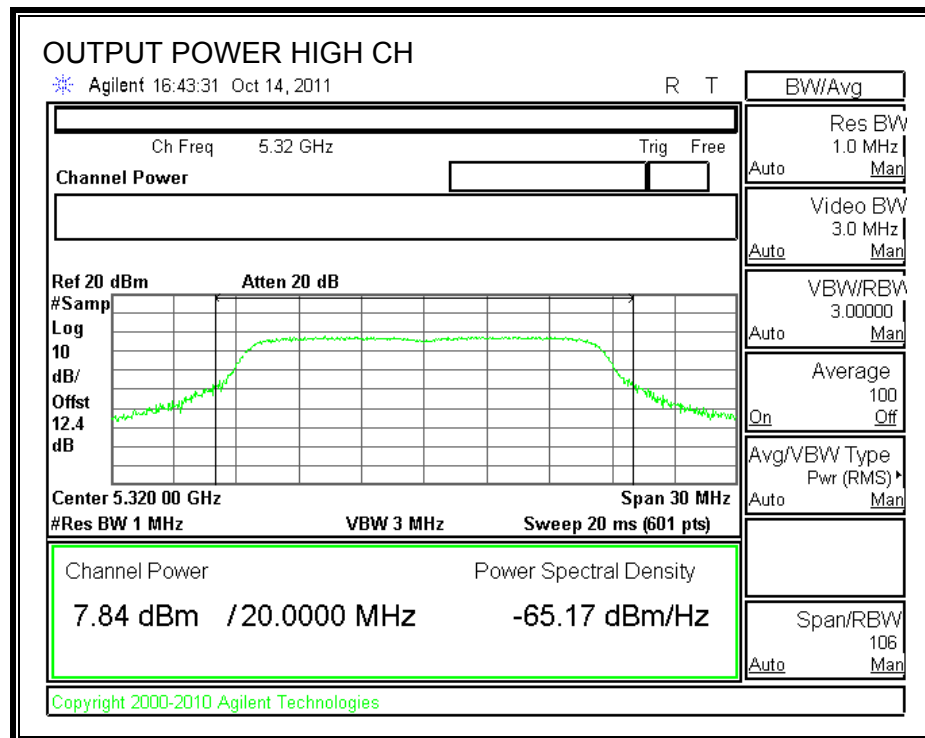
Results

Channel	Frequency (MHz)	Power (dBm)	Limit (dBm)	Margin (dB)
Low	5260	8.23	23.78	-15.55
Mid	5300	8.17	23.79	-15.62
High	5320	7.84	23.78	-15.94

OUTPUT POWER







7.4.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 12.4 dB (including 10 dB pad and 2.4 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Power (dBm)
Low	5260	7.54
Middle	5300	7.75
High	5320	7.39

7.4.4. PEAK POWER SPECTRAL DENSITY

LIMITS

FCC §15.407 (a) (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 less than or equal to 6 dBi, therefore the limit is 11 dBm.

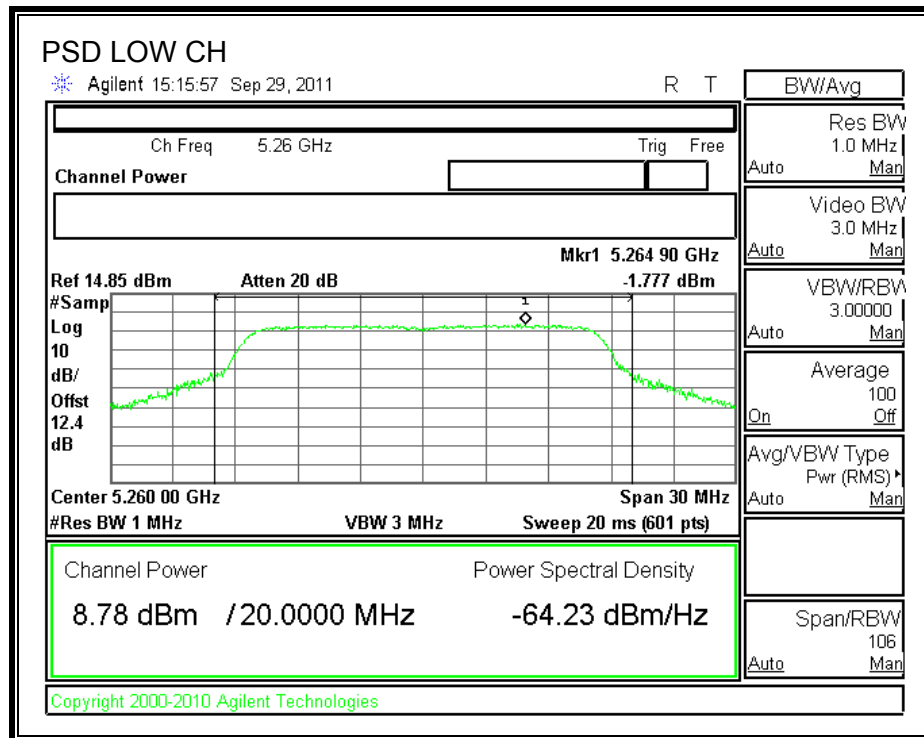
TEST PROCEDURE

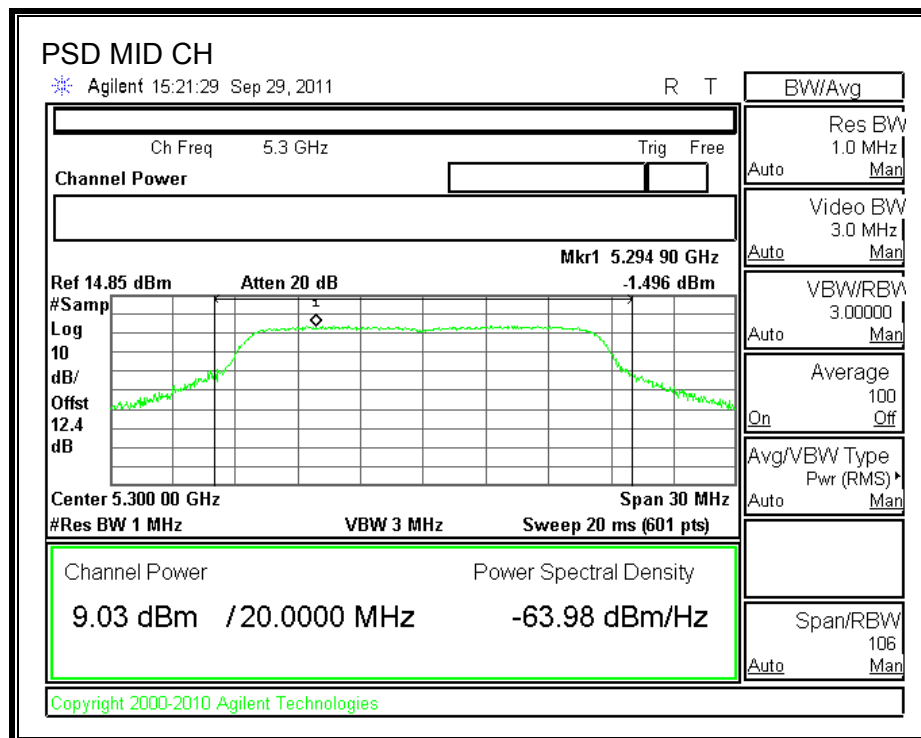
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002. PPSD method #2 was used.

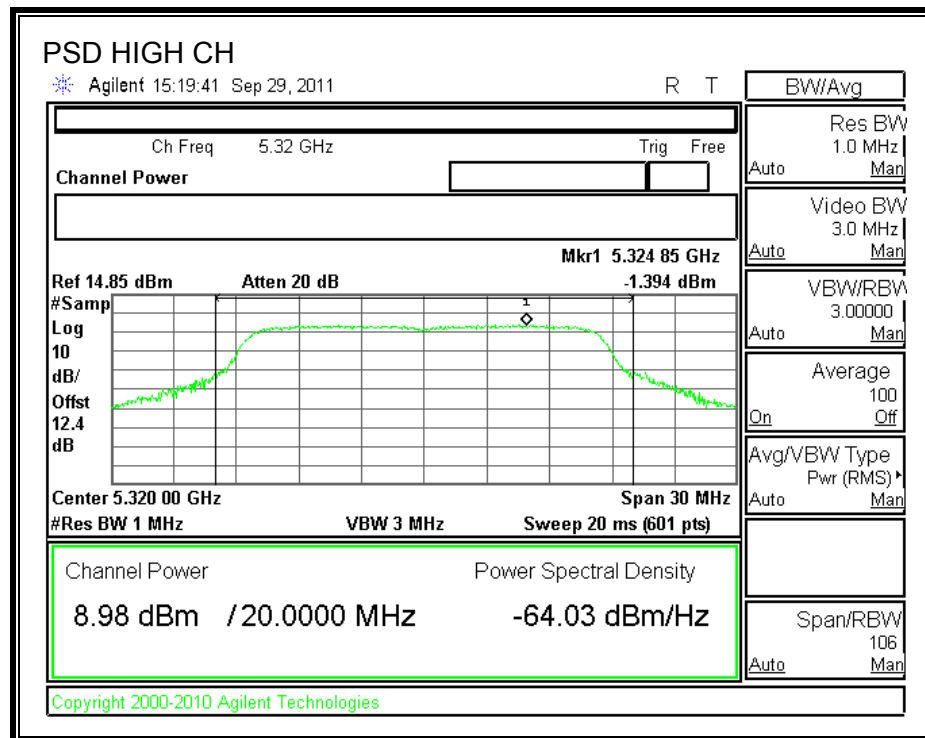
RESULTS

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	5260	-1.777	11	-12.78
Middle	5300	-1.496	11	-12.50
High	5320	-1.394	11	-12.39

POWER SPECTRAL DENSITY







7.4.5. 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

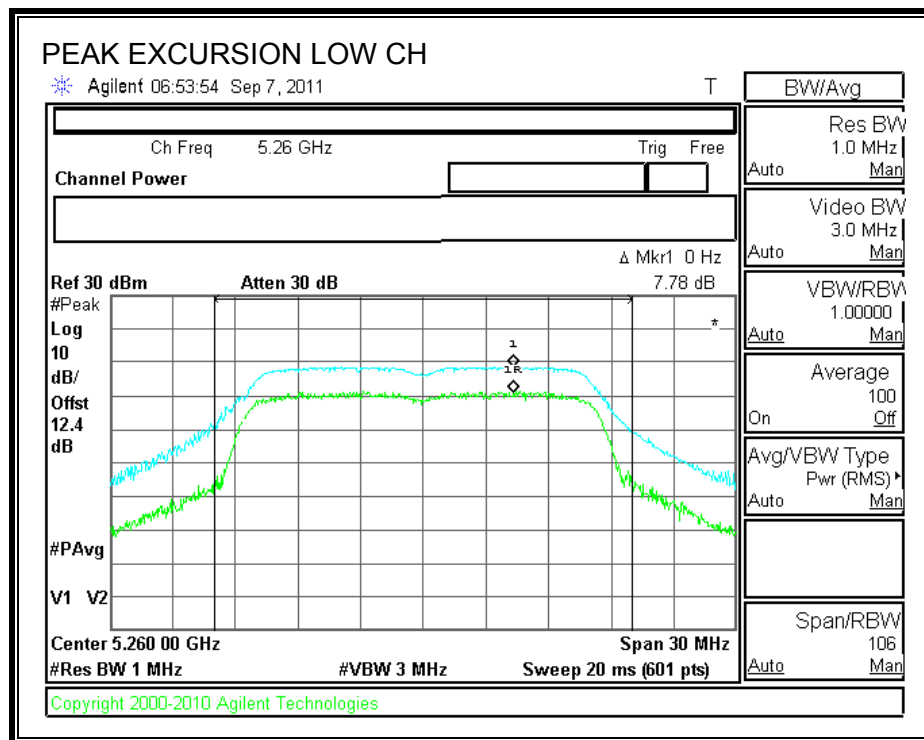
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

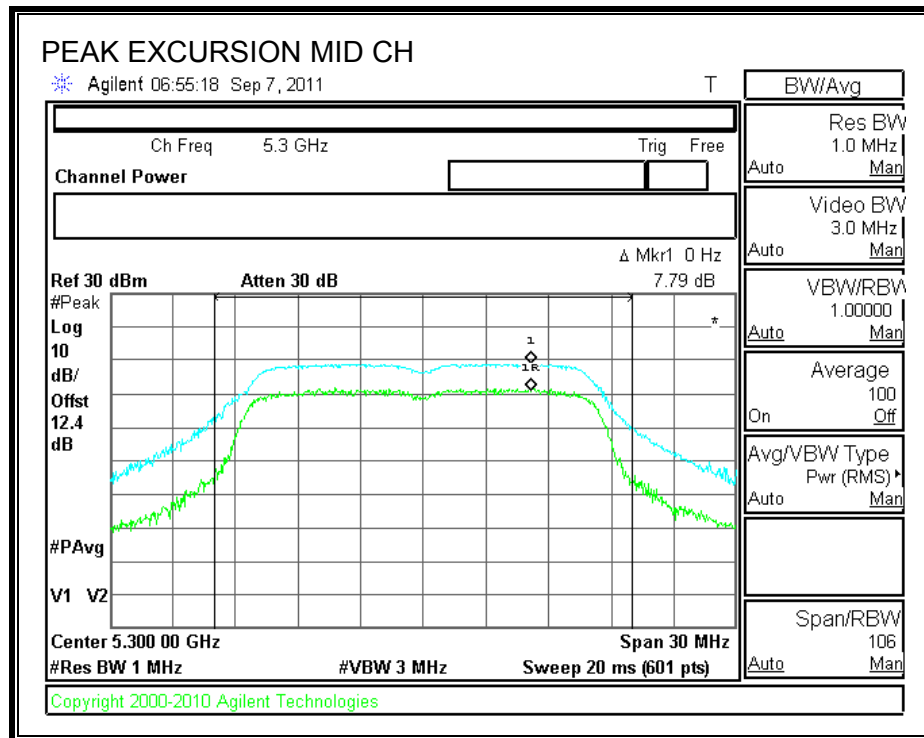
Since Method # 1 was used for peak power measurements, Method # 1 settings are used for the second PPSD trace.

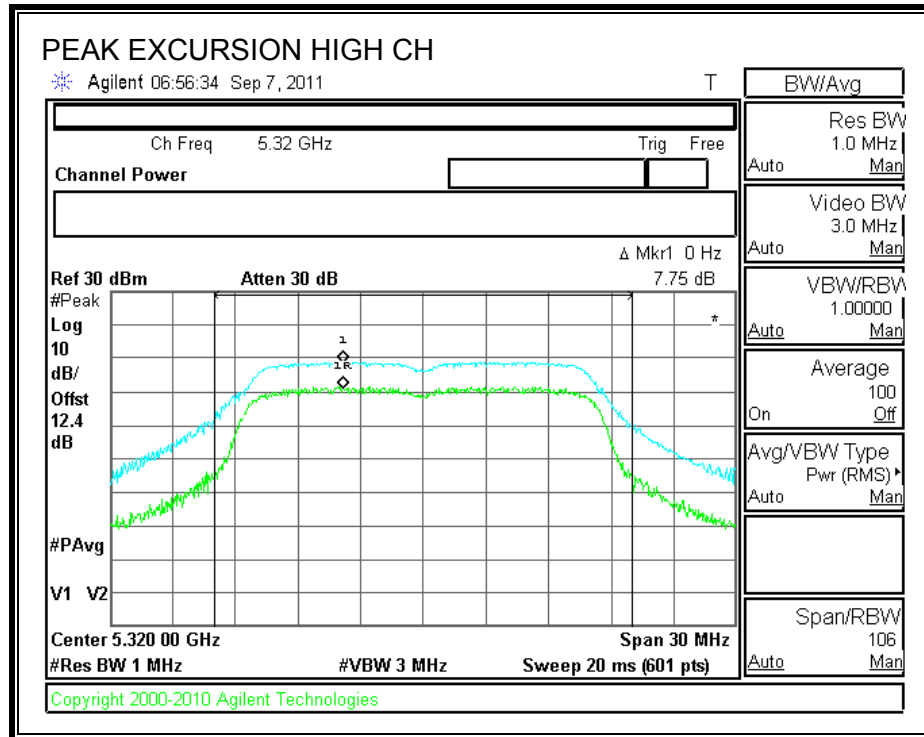
RESULTS

Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5260	7.78	13	-5.22
Middle	5300	7.79	13	-5.21
High	5320	7.75	13	-5.25

PEAK EXCURSION







7.4.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.407 (b) (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

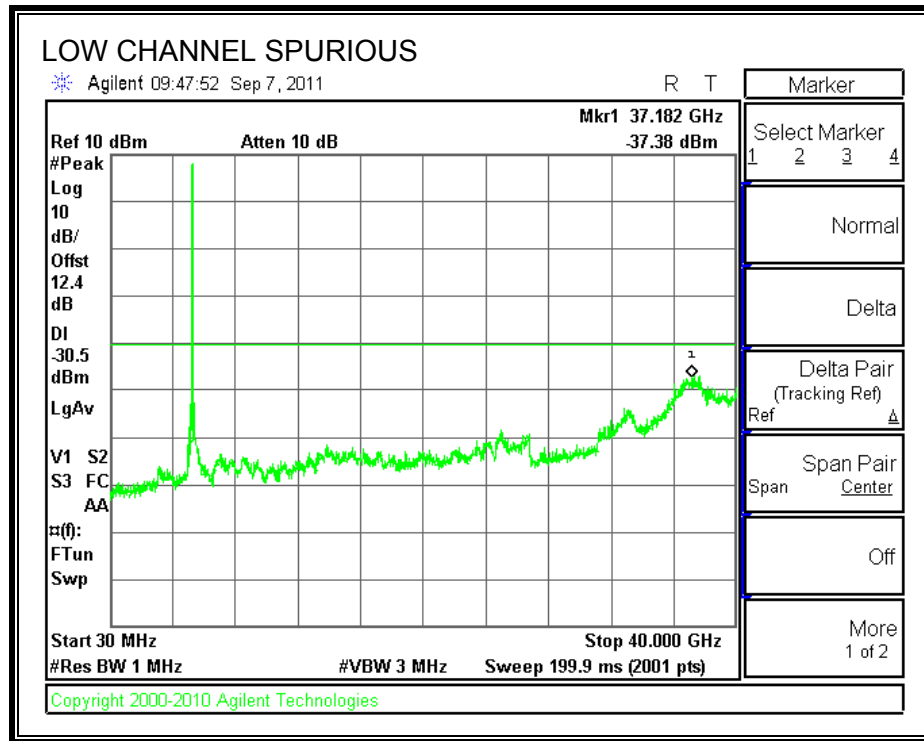
Conducted RF measurements of the transmitter output are made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

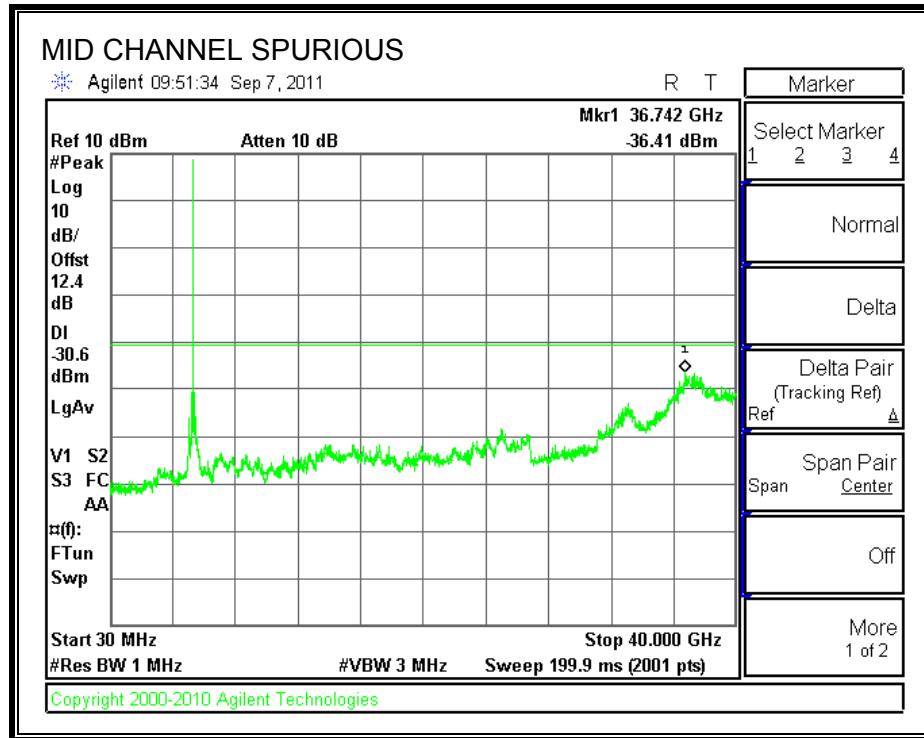
The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 3 MHz. Peak detection measurements are compared to EIRP limit, adjusted for the maximum antenna gain.

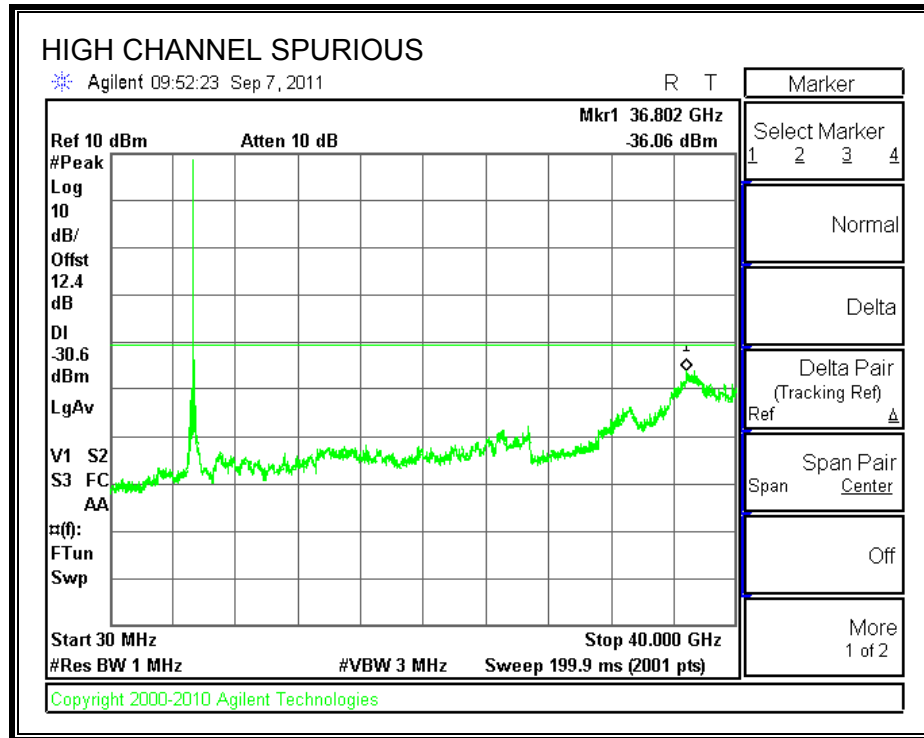
Measurements are made over the 30 MHz to 40 GHz range with the transmitter set to the lowest, middle, and highest channels.

RESULTS

SPURIOUS EMISSIONS







7.5. 802.11n HT20 MODE IN THE 5.3 GHz BAND

7.5.1. 26 dB BANDWIDTH

LIMITS

None; for reporting purposes only.

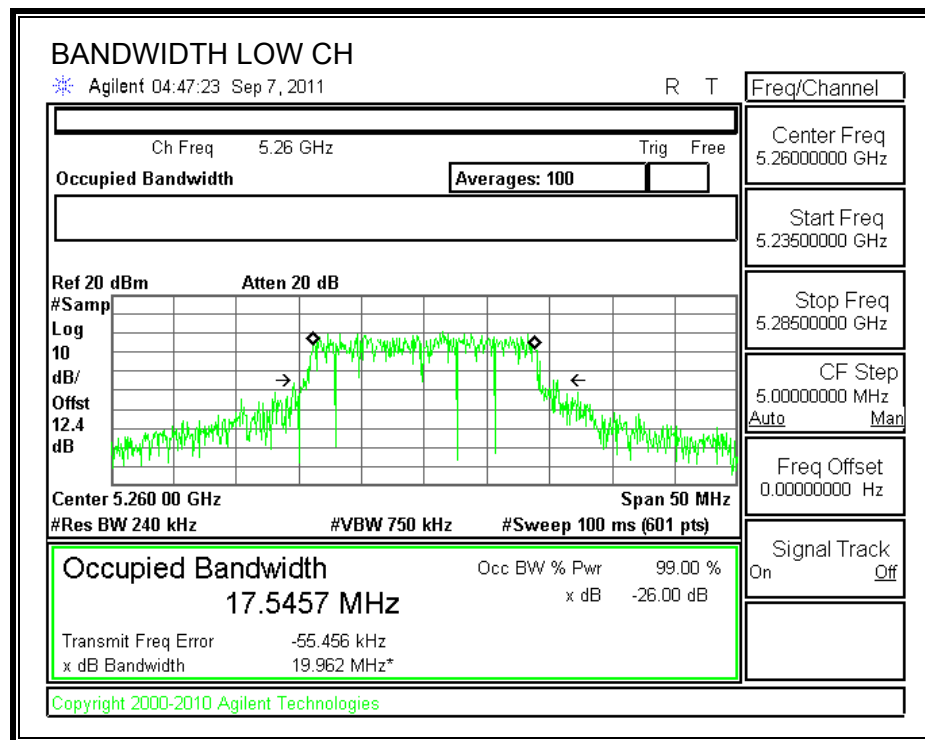
TEST PROCEDURE

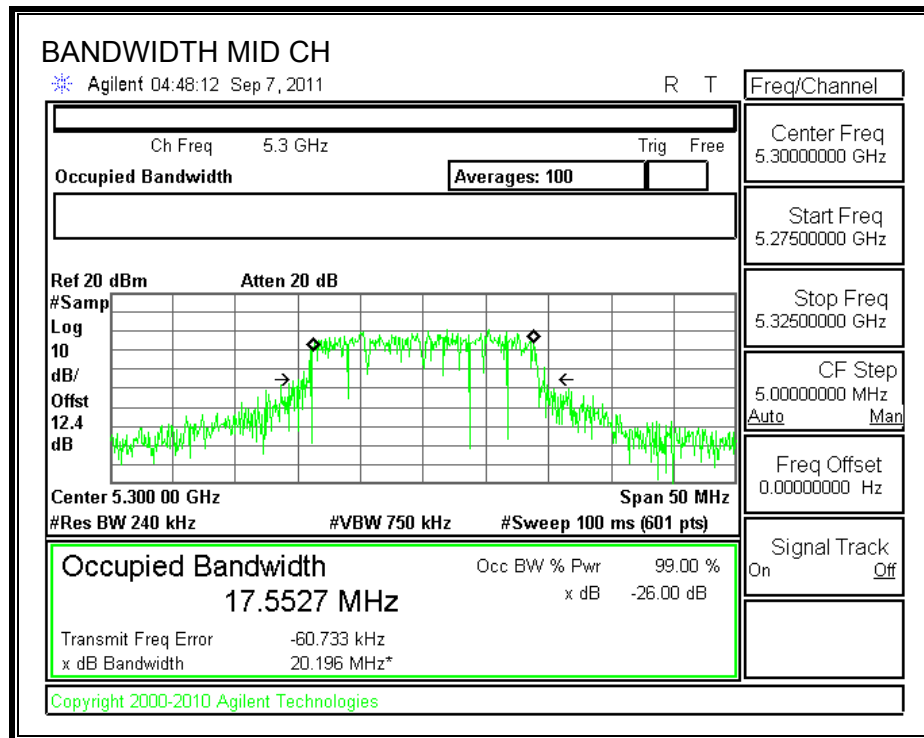
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the measured bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth function is utilized.

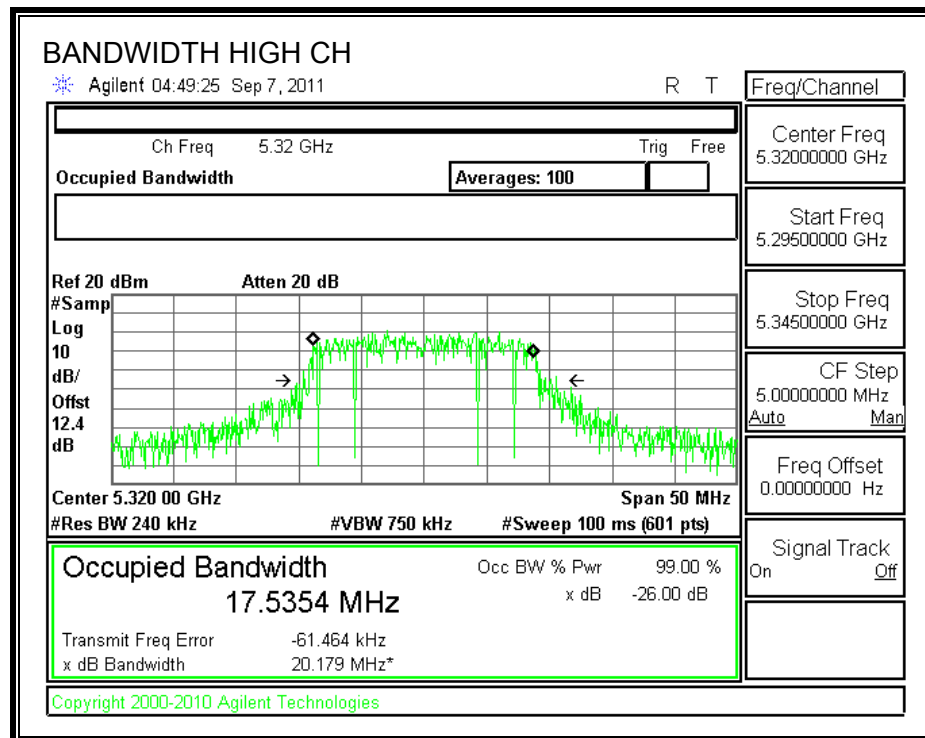
RESULTS

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5260	19.962
Middle	5300	20.196
High	5320	20.179

26 dB BANDWIDTH







7.5.2. OUTPUT POWER

LIMITS

FCC §15.407 (a) (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 $11 \text{ dBm} + 10 \log B$, 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

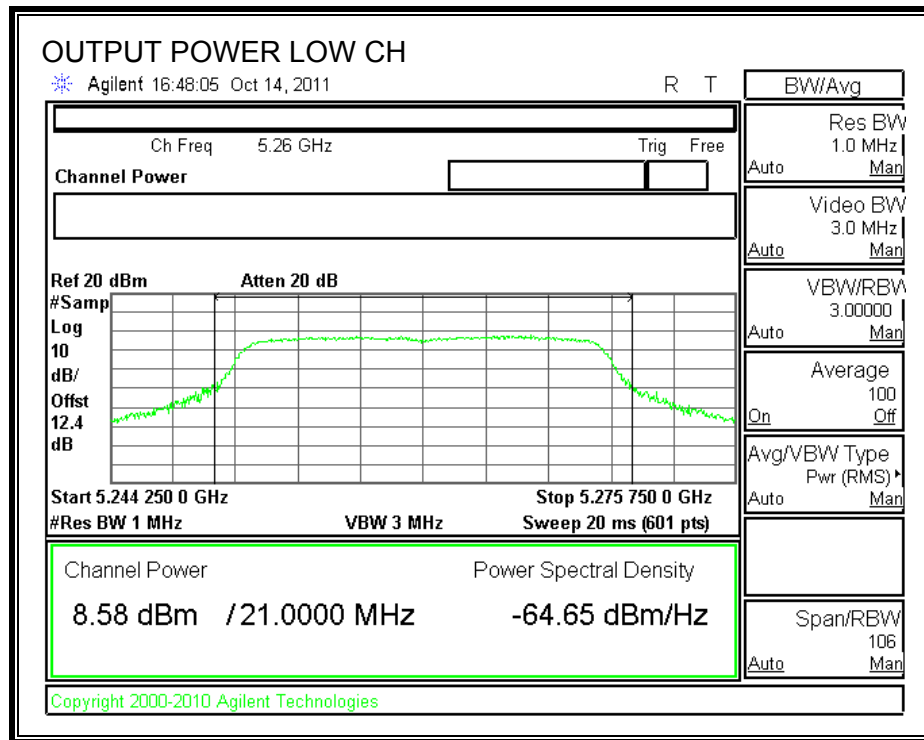
Limit

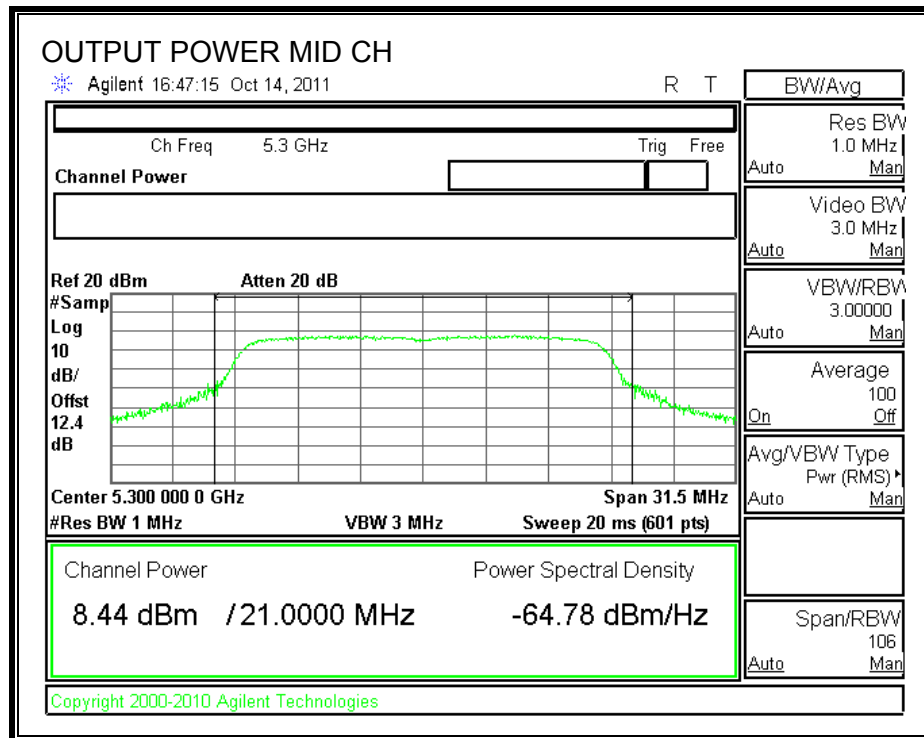
Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	11 + 10 Log B Limit (dBm)	Antenna Gain (dBi)	Limit (dBm)
Low	5260	24	19.962	24.00	3.46	24.00
Mid	5300	24	20.196	24.05	3.59	24.00
High	5320	24	20.179	24.05	3.59	24.00

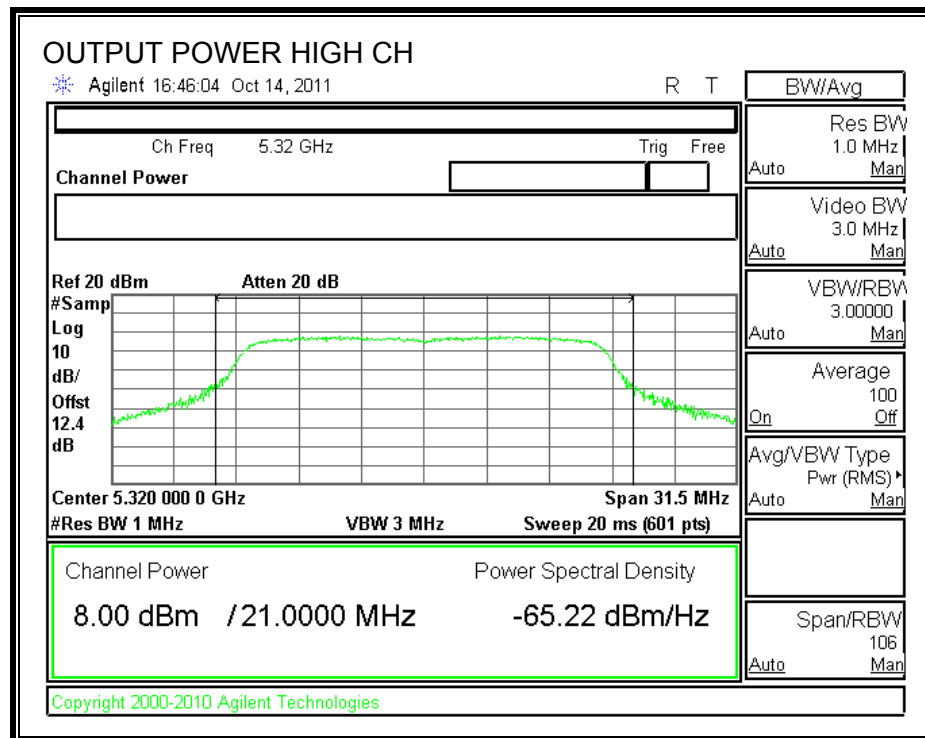
Results

Channel	Frequency (MHz)	Power (dBm)	Limit (dBm)	Margin (dB)
Low	5260	8.58	24.00	-15.42
Mid	5300	8.44	24.00	-15.56
High	5320	8.00	24.00	-16.00

OUTPUT POWER







7.5.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 12.4 dB (including 10 dB pad and 2.4 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Frequency (MHz)	Power (dBm)
5260	7.37
5300	7.48
5320	7.25

7.5.4. PEAK POWER SPECTRAL DENSITY

LIMITS

FCC §15.407 (a) (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 less than or equal to 6 dBi, therefore the limit is 11 dBm.

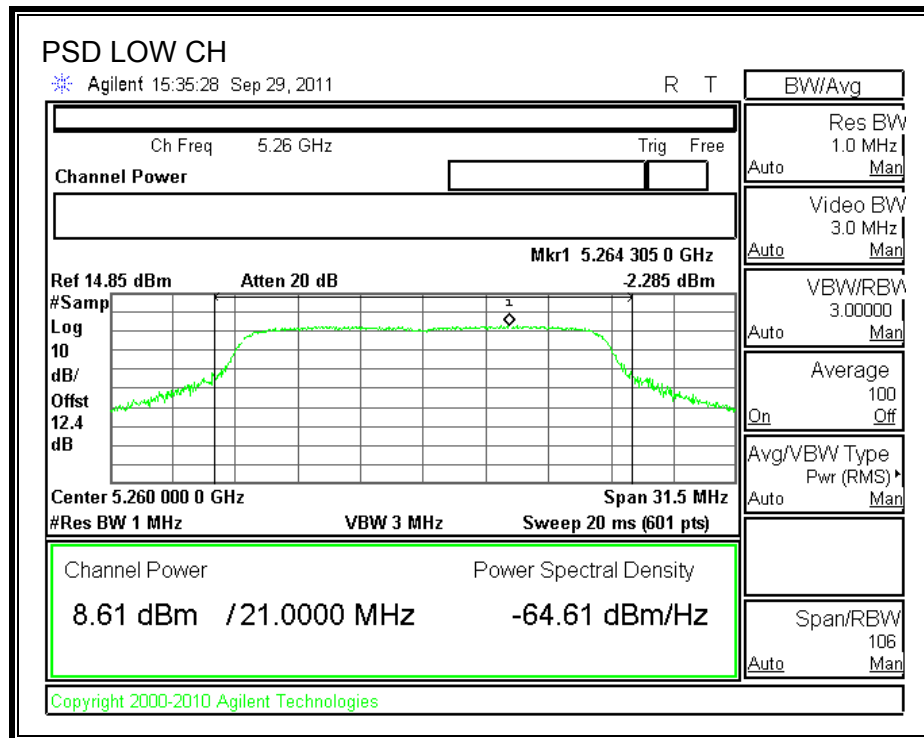
TEST PROCEDURE

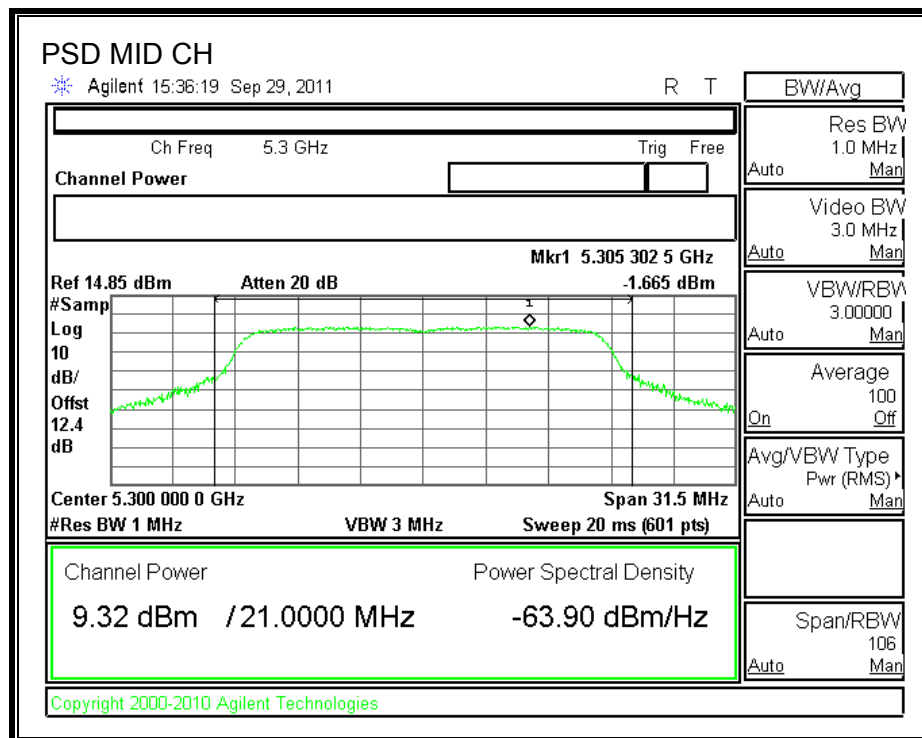
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002. PPSD method #2 was used.

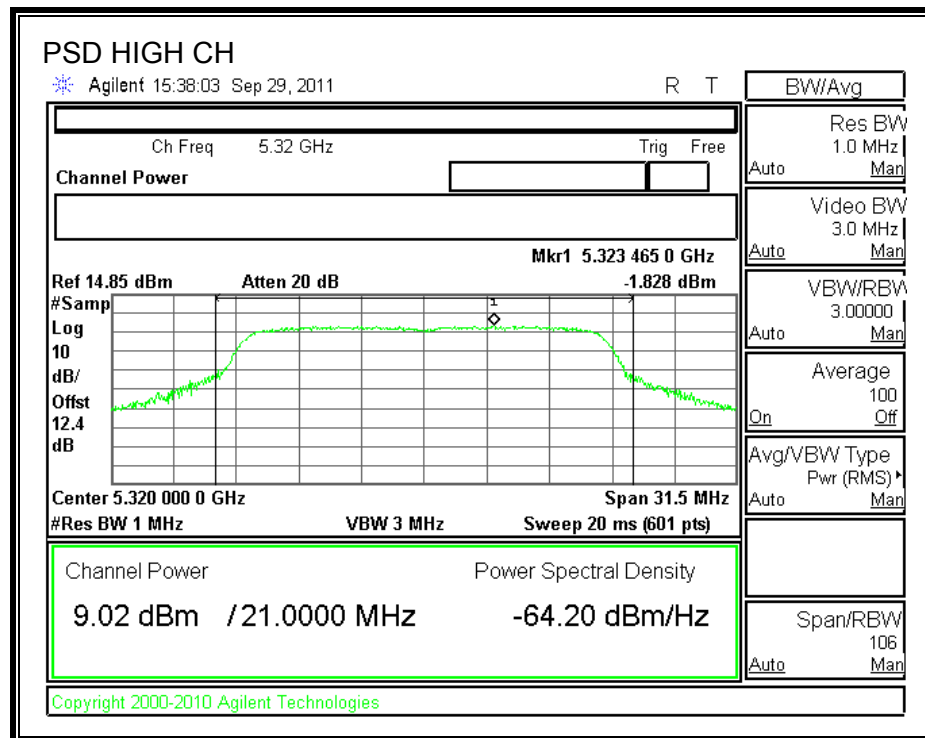
RESULTS

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	5260	-2.285	11	-13.29
Middle	5300	-1.665	11	-12.67
High	5320	-1.828	11	-12.83

POWER SPECTRAL DENSITY







7.5.5. 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

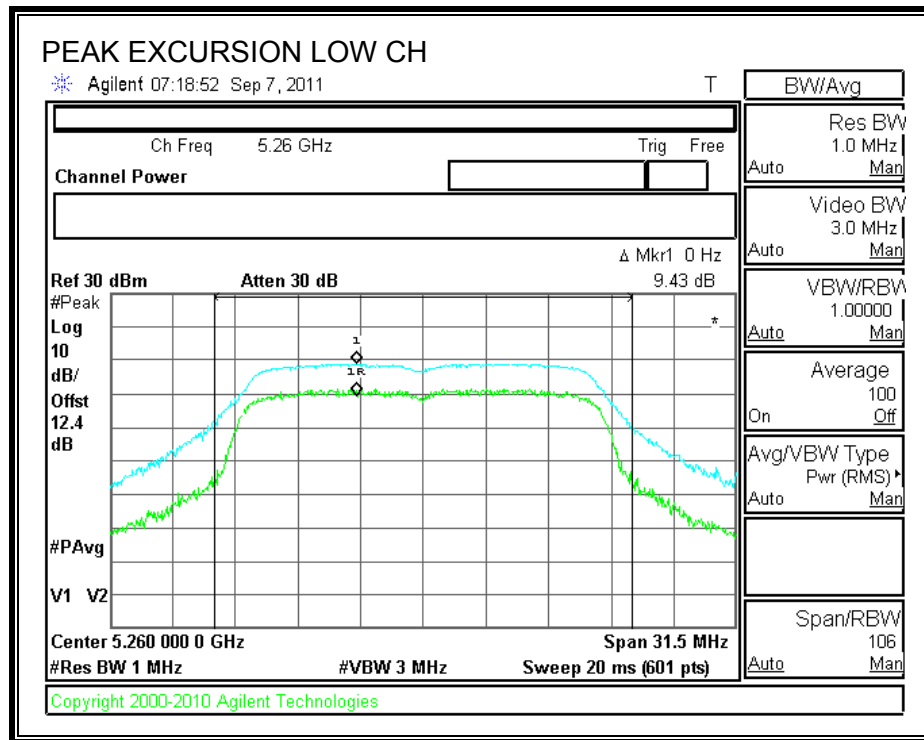
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

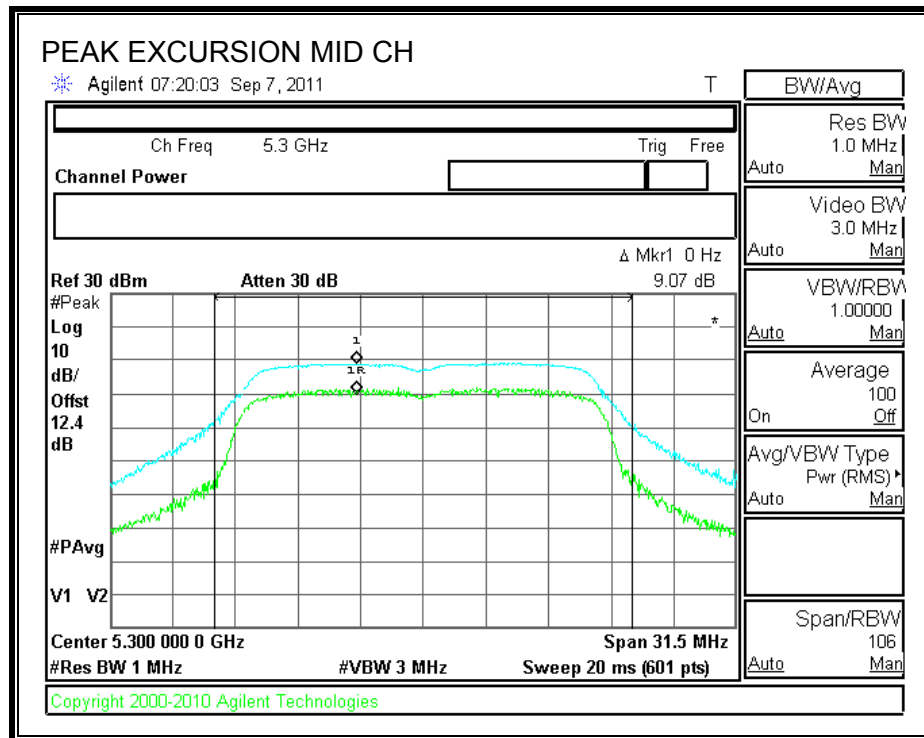
Since Method # 1 was used for peak power measurements, Method # 1 settings are used for the second PPSD trace.

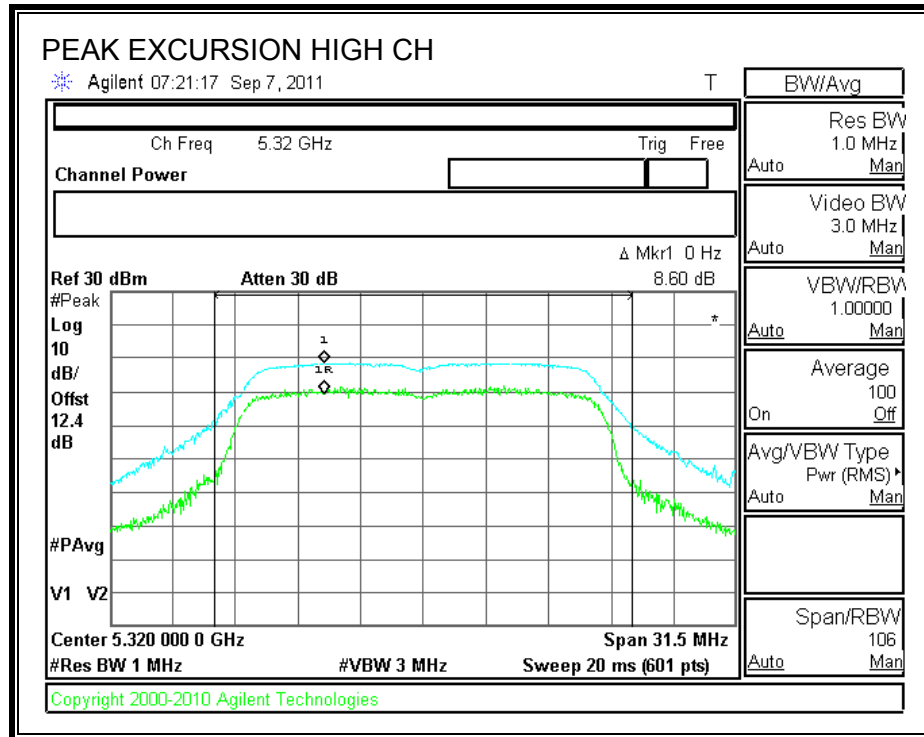
RESULTS

Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5260	9.43	13	-3.57
Middle	5300	9.07	13	-3.93
High	5320	8.60	13	-4.40

PEAK EXCURSION







7.5.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.407 (b) (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

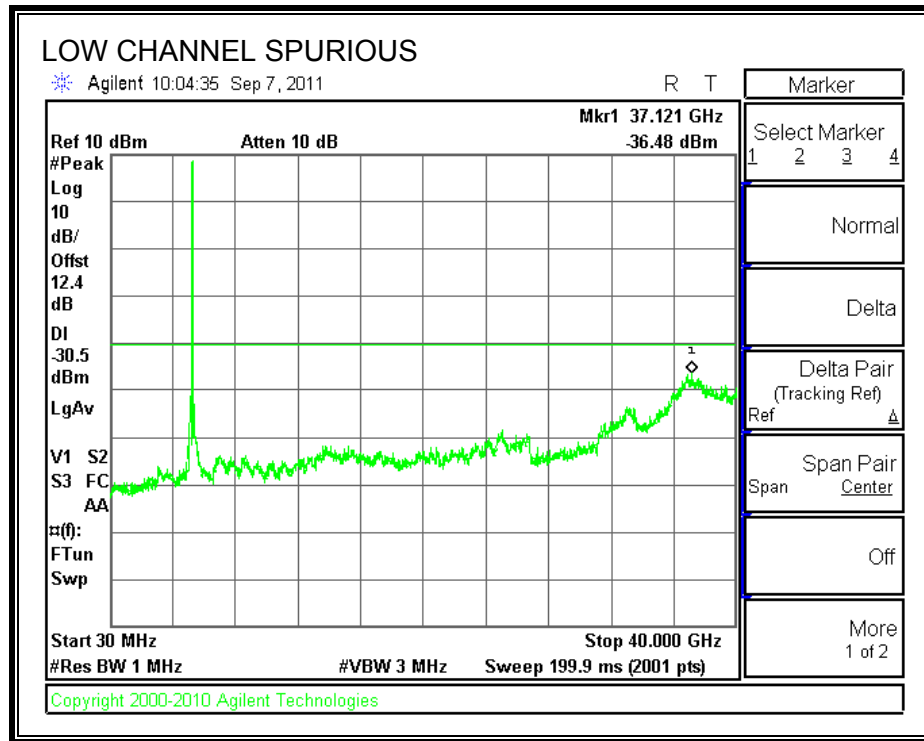
Conducted RF measurements of the transmitter output are made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

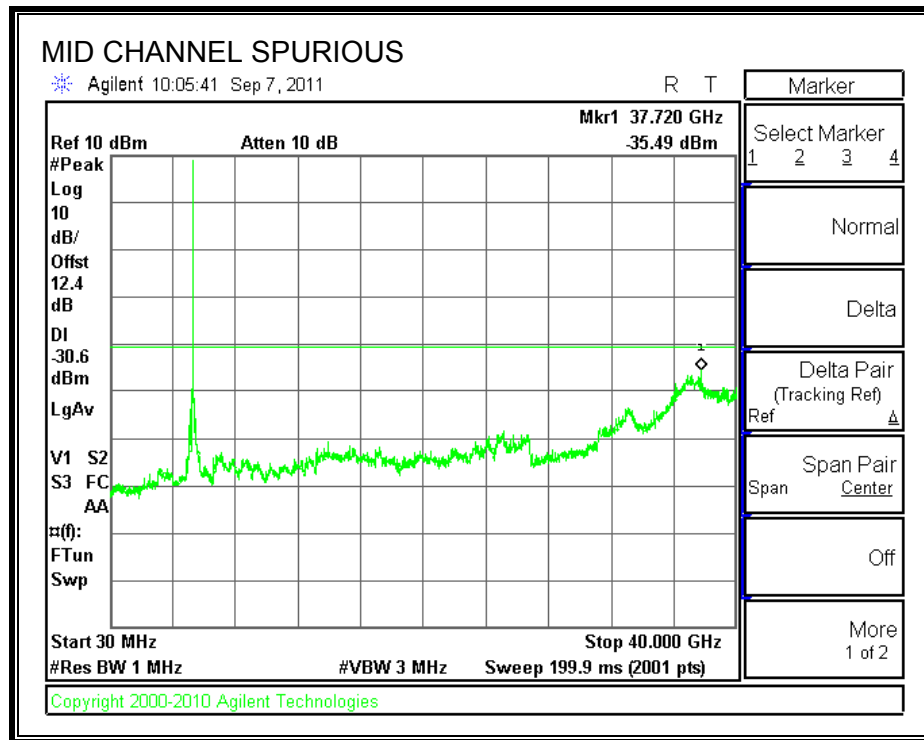
The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 3 MHz. Peak detection measurements are compared to EIRP limit, adjusted for the maximum antenna gain.

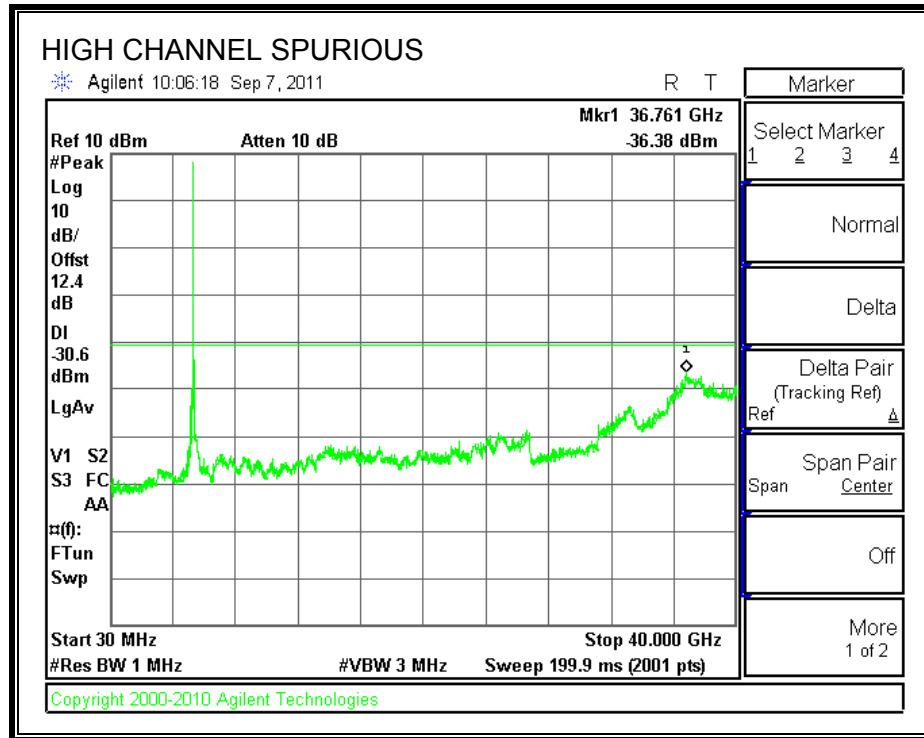
Measurements are made over the 30 MHz to 40 GHz range with the transmitter set to the lowest, middle, and highest channels.

RESULTS

SPURIOUS EMISSIONS







7.6. 802.11n HT40 MODE IN THE 5.3 GHz BAND

7.6.1. 26 dB BANDWIDTH

LIMITS

None; for reporting purposes only.

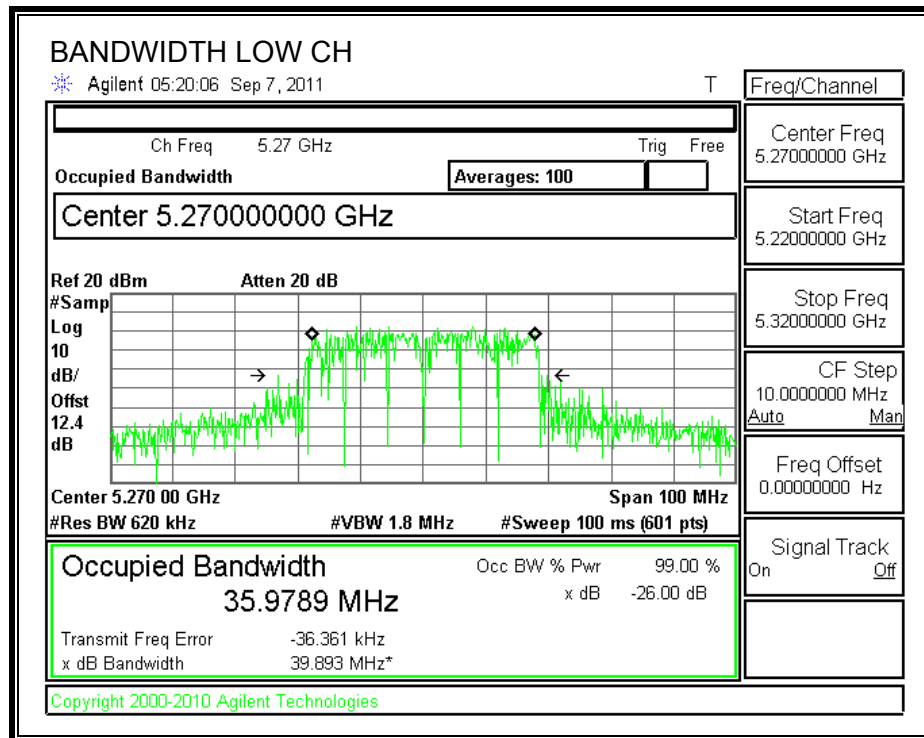
TEST PROCEDURE

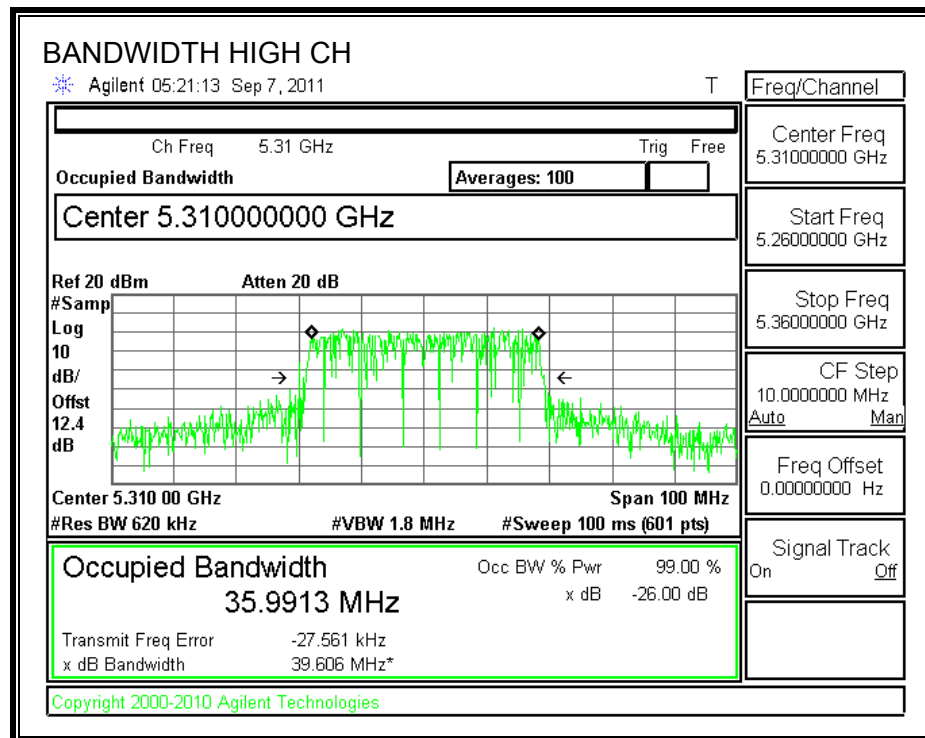
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the measured bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth function is utilized.

RESULTS

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5270	39.893
High	5310	39.606

26 dB BANDWIDTH





7.6.2. OUTPUT POWER

LIMITS

FCC §15.407 (a) (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 $11 \text{ dBm} + 10 \log B$, 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

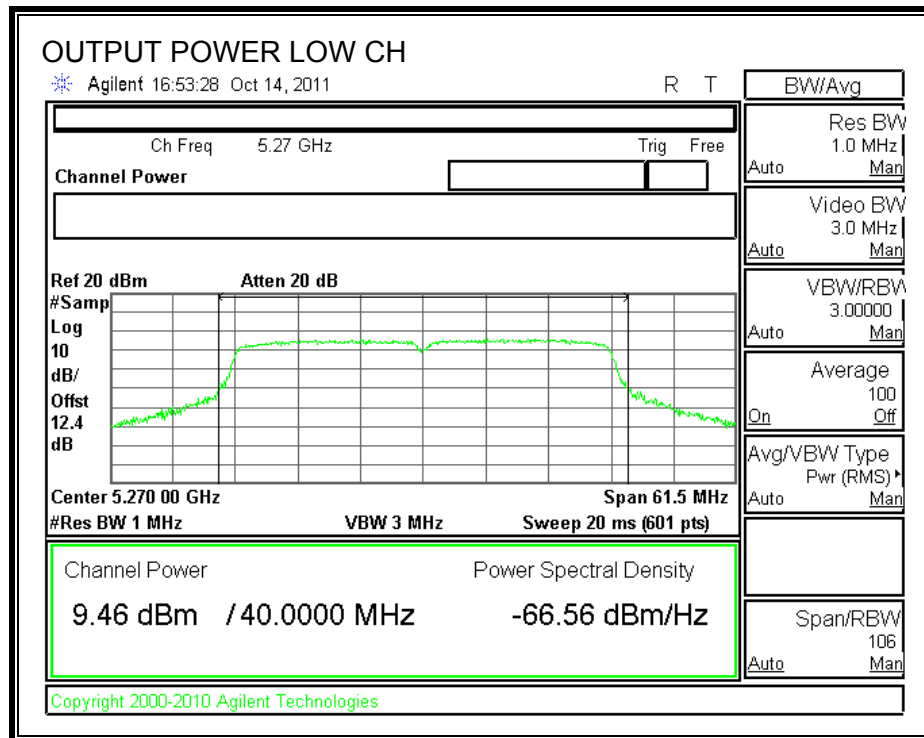
Limit

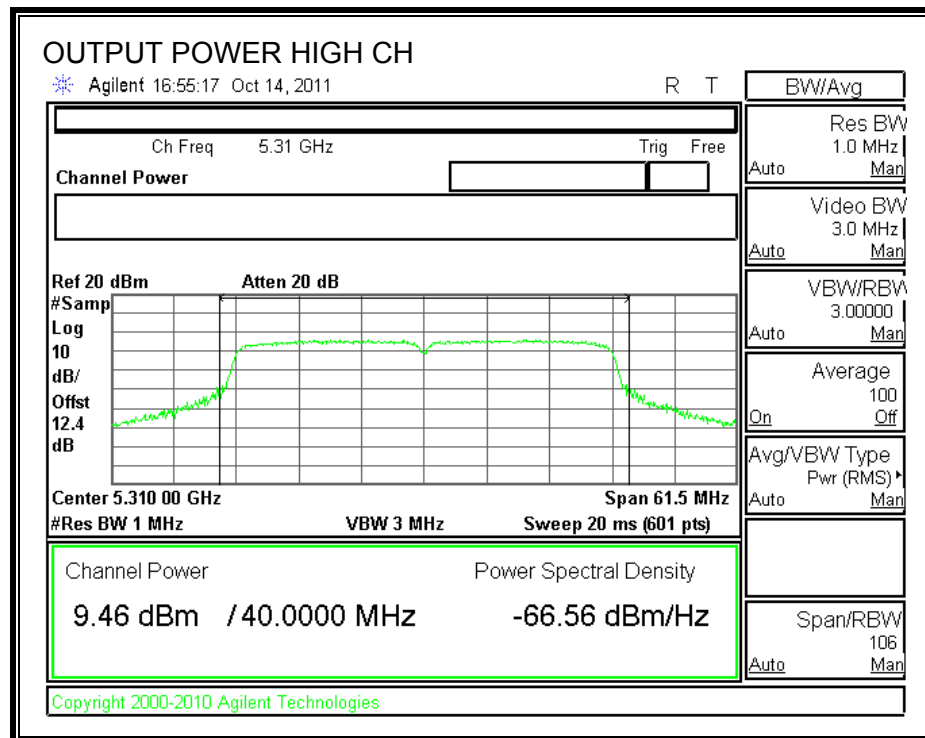
Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	11 + 10 Log B Limit (dBm)	Antenna Gain (dBi)	Limit (dBm)
Low	5270	24	39.893	27.01	3.46	24.00
High	5310	24	39.606	26.98	3.59	24.00

Results

Channel	Frequency (MHz)	Power (dBm)	Limit (dBm)	Margin (dB)
Low	5270	9.46	24.00	-14.54
High	5310	9.46	24.00	-14.54

OUTPUT POWER





7.6.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 12.4 dB (including 10 dB pad and 2.4 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Frequency (MHz)	Power (dBm)
5270	8.09
5310	8.48

7.6.4. PEAK POWER SPECTRAL DENSITY

LIMITS

FCC §15.407 (a) (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 less than or equal to 6 dBi, therefore the limit is 11 dBm.

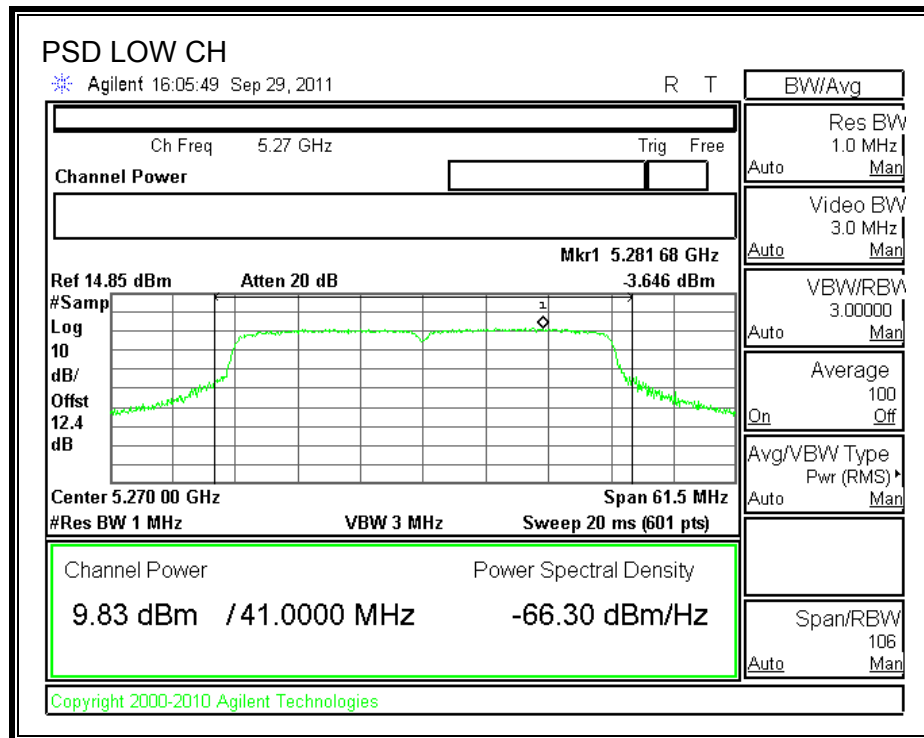
TEST PROCEDURE

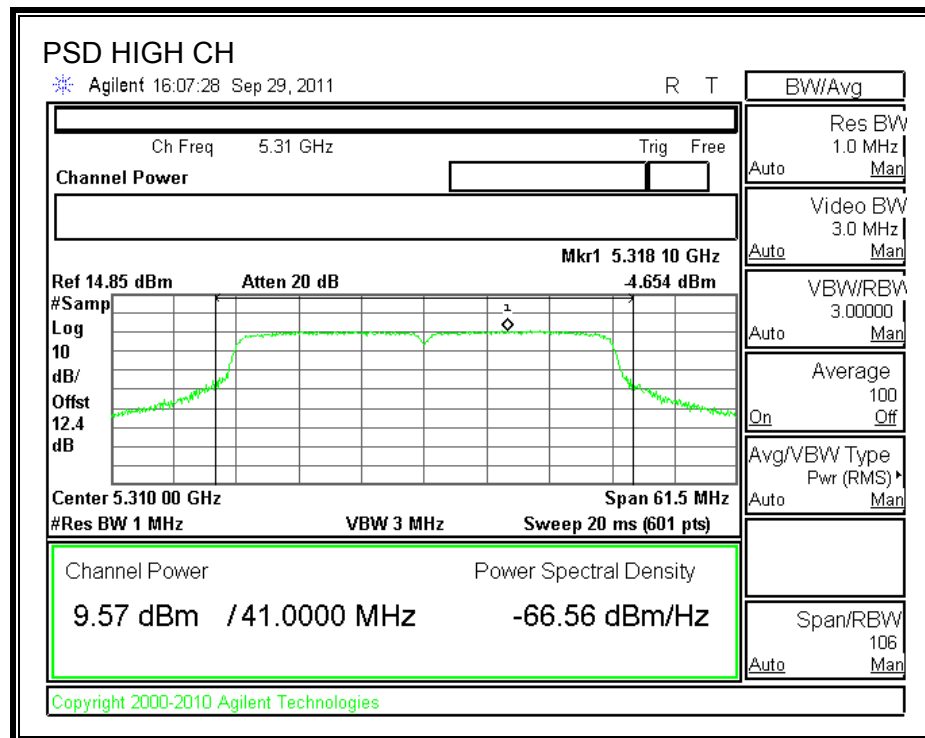
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002. PPSD method #2 was used.

RESULTS

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	5270	-3.646	11	-14.65
High	5310	-4.654	11	-15.65

POWER SPECTRAL DENSITY





7.6.5. 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

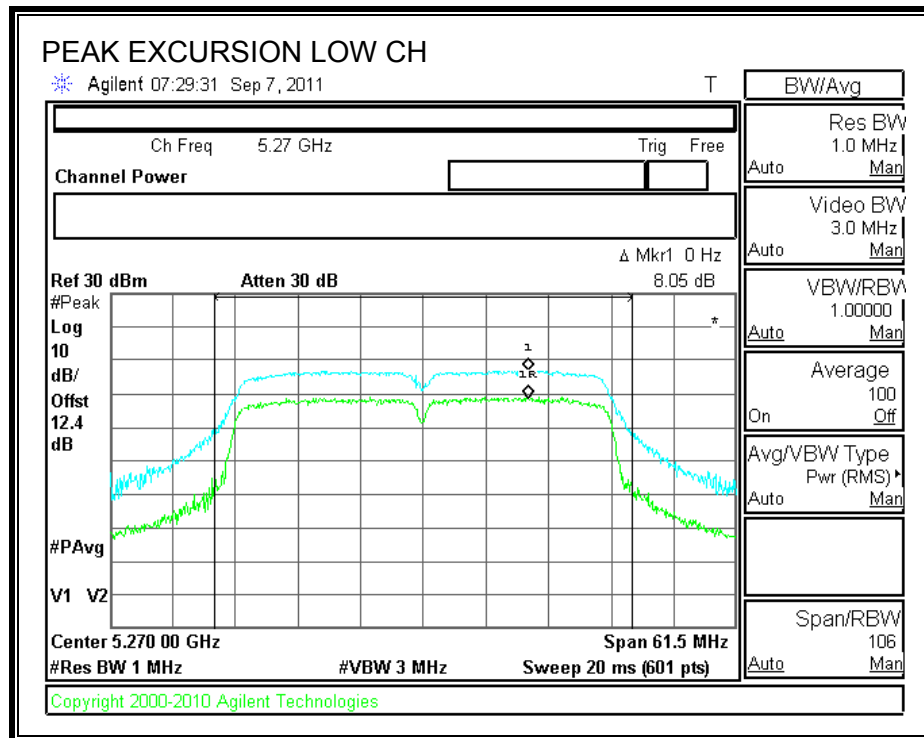
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

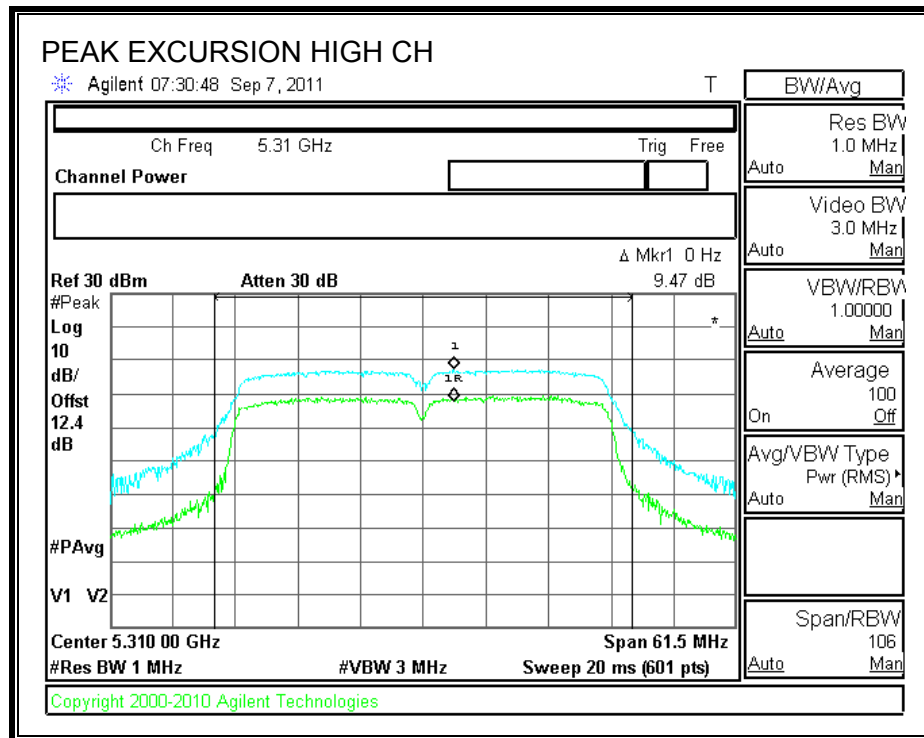
Since Method # 1 was used for peak power measurements, Method # 1 settings are used for the second PPSD trace.

RESULTS

Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5270	8.05	13	-4.95
High	5310	9.47	13	-3.53

PEAK EXCURSION





7.6.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.407 (b) (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

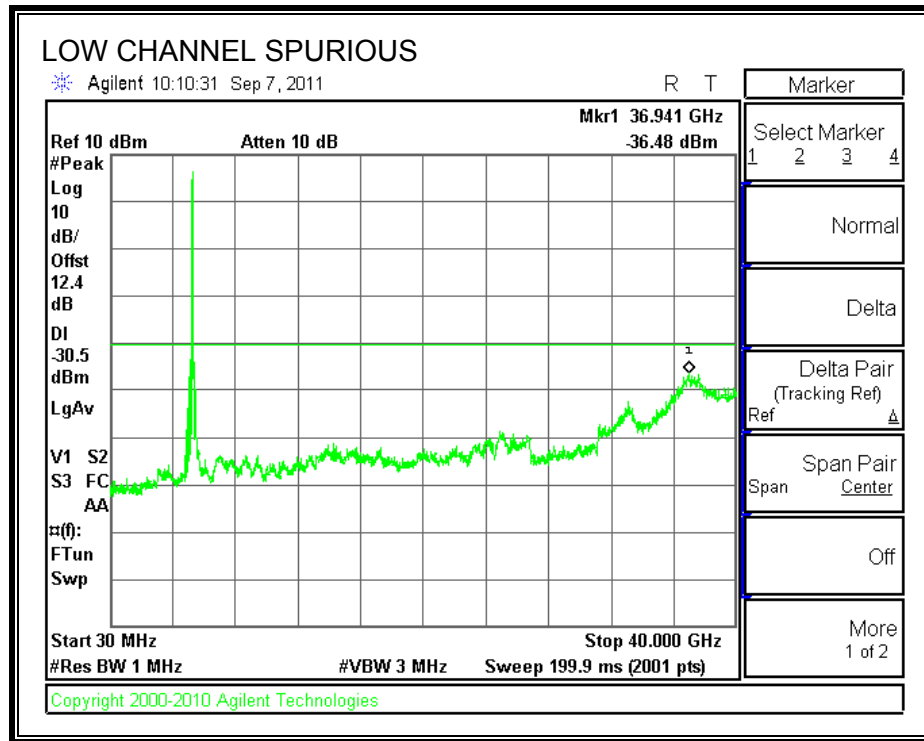
Conducted RF measurements of the transmitter output are made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

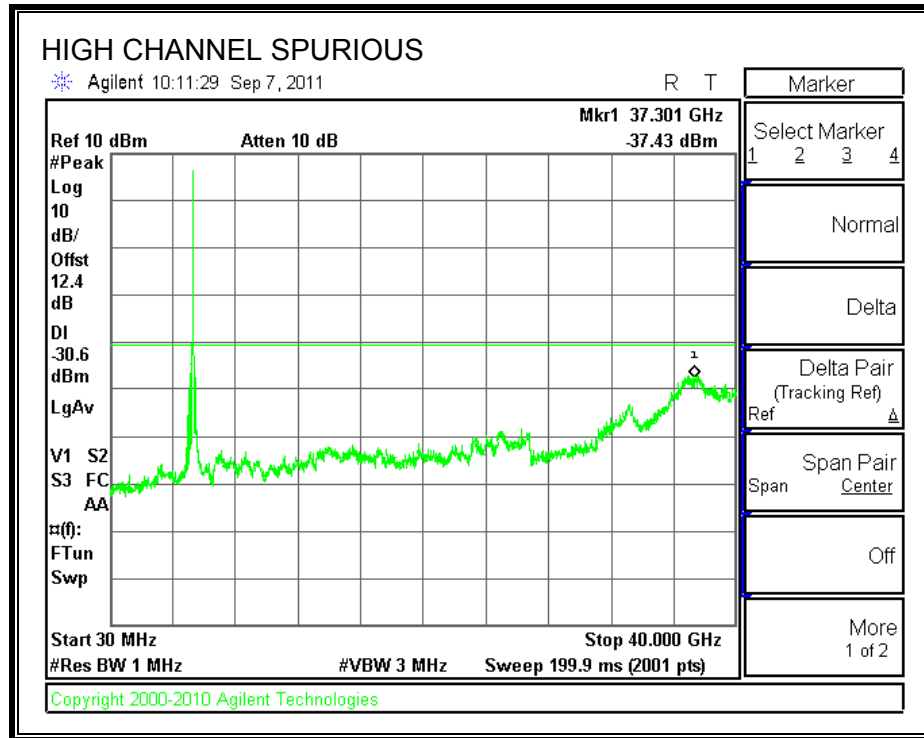
The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 3 MHz. Peak detection measurements are compared to EIRP limit, adjusted for the maximum antenna gain.

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. 802.11a MODE IN THE 5.6 GHz BAND

7.7.1. 26 dB BANDWIDTH

LIMITS

None; for reporting purposes only.

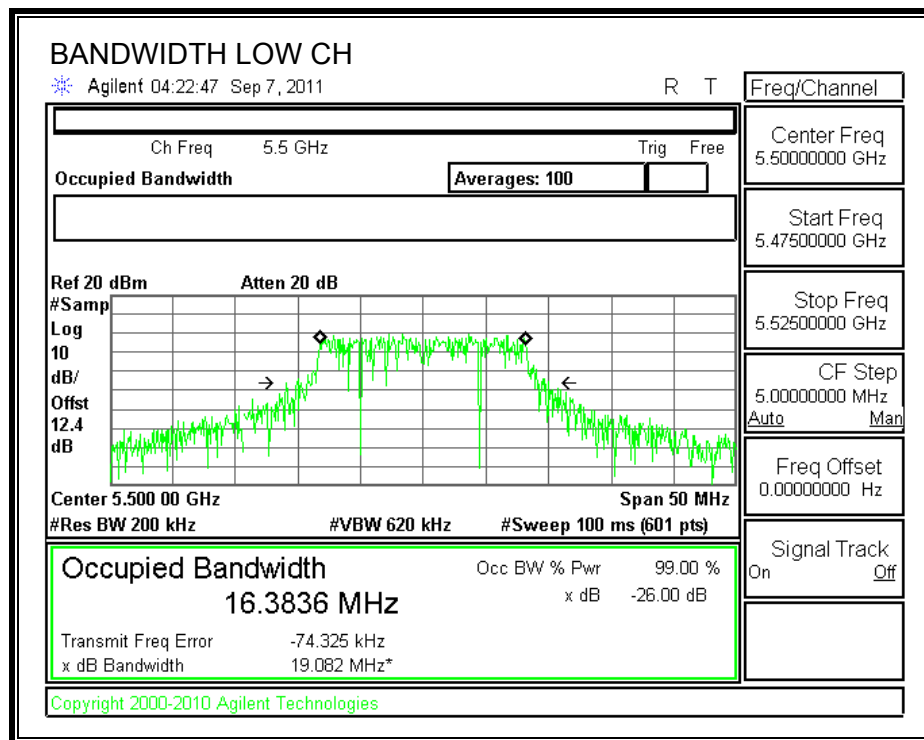
TEST PROCEDURE

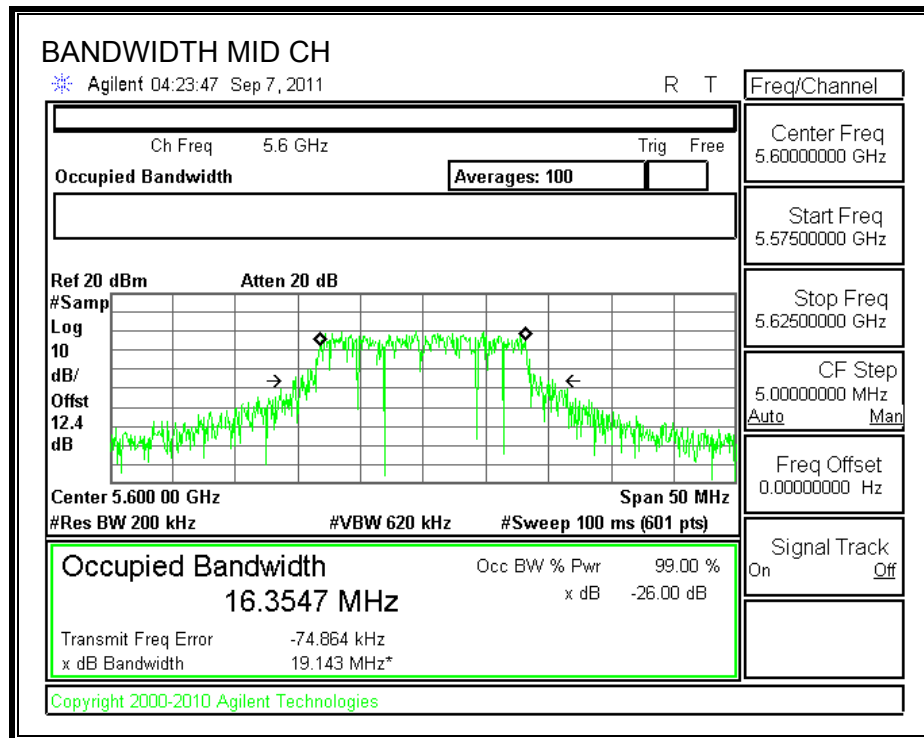
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the measured bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth function is utilized.

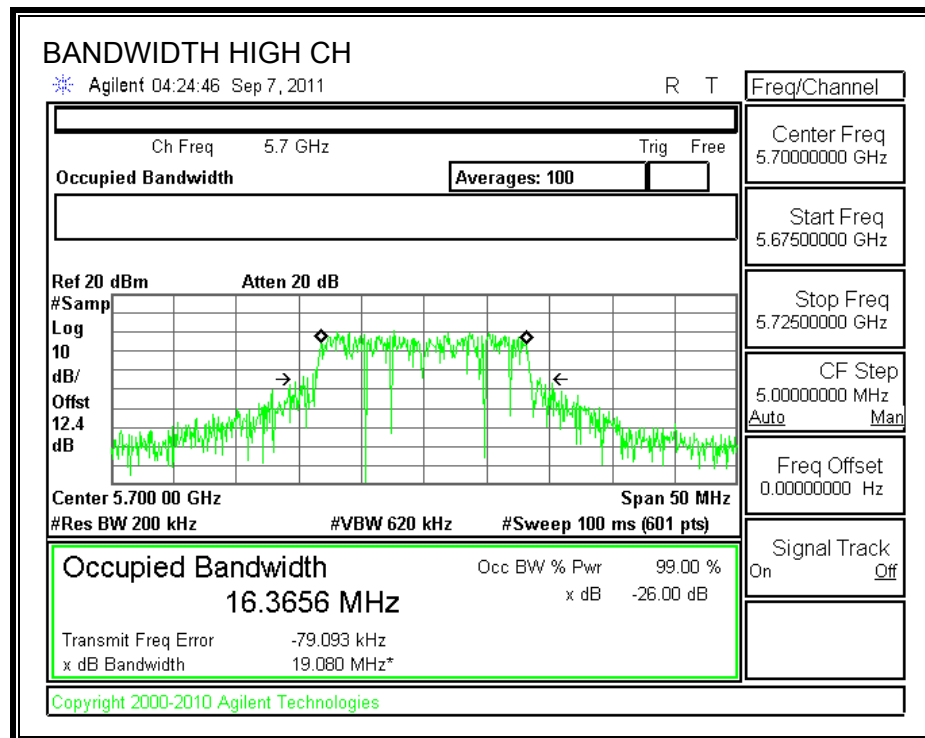
RESULTS

Channel	Frequency (MHz)	26 dB Bandwidth
Low	5500	19.082
Middle	5600	19.143
High	5700	19.080

26 dB BANDWIDTH







7.7.2. OUTPUT POWER

LIMITS

FCC §15.407 (a) (2)

For the 5.47-5.725 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, 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

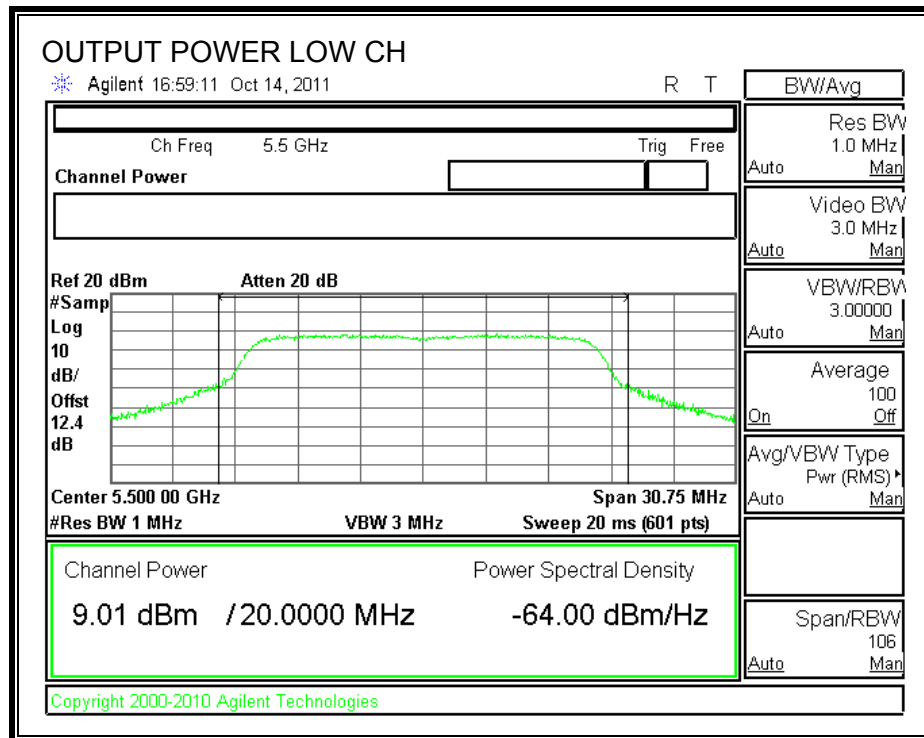
Limit

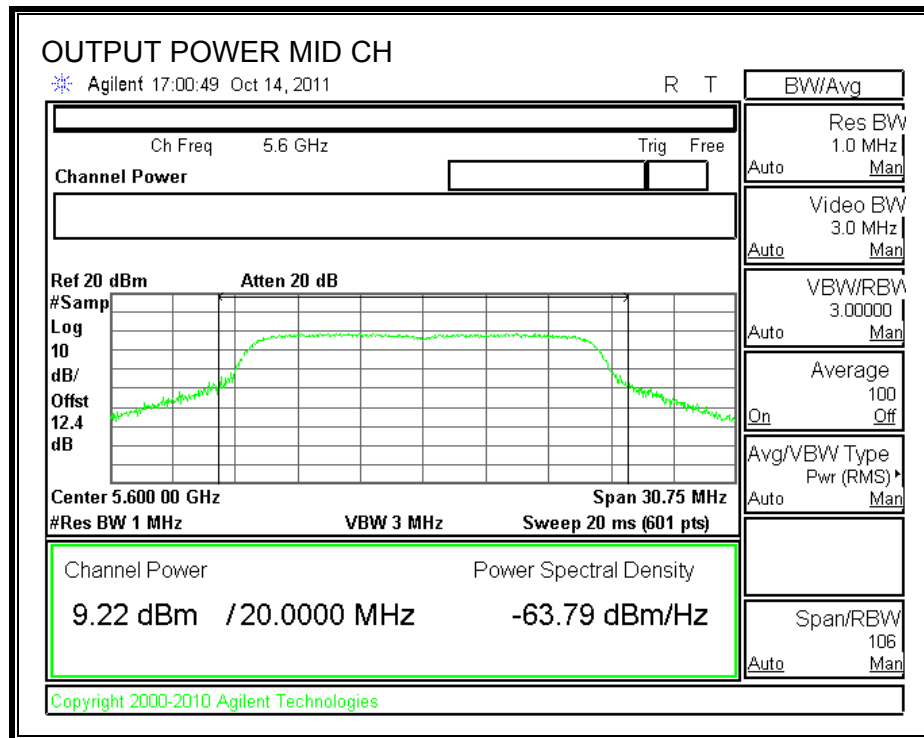
Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	11 + 10 Log B Limit (dBm)	Antenna Gain (dBi)	Limit (dBm)
Low	5500	24	19.082	23.81	3.06	23.81
Mid	5600	24	19.143	23.82	1.74	23.82
High	5700	24	19.08	23.81	-0.25	23.81

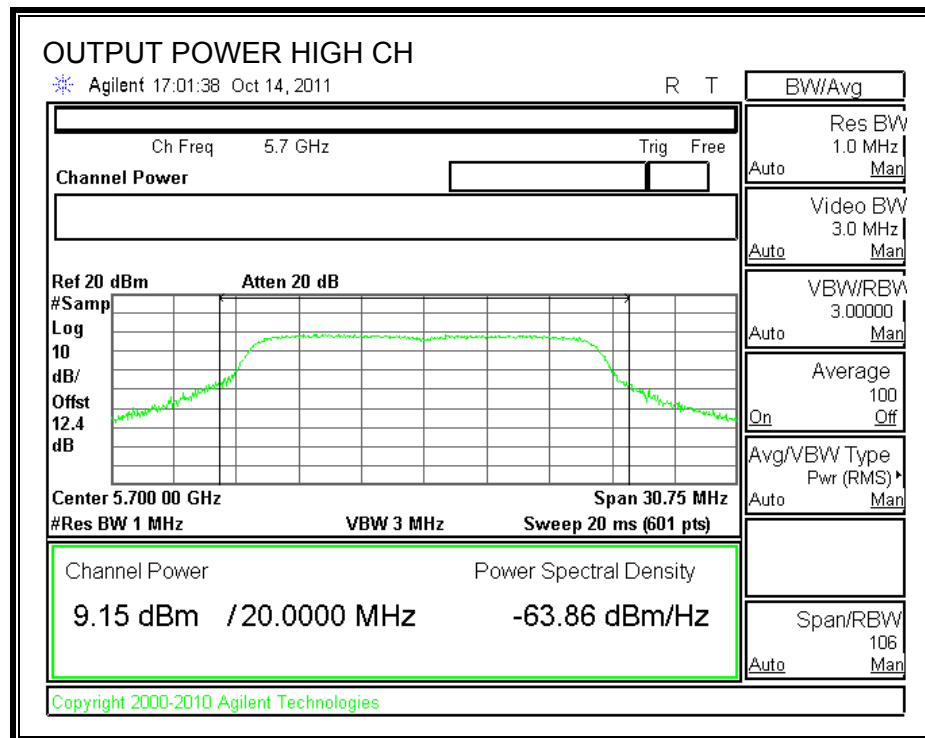
Results

Channel	Frequency (MHz)	Power (dBm)	Limit (dBm)	Margin (dB)
Low	5500	9.01	23.81	-14.80
Mid	5600	9.22	23.82	-14.60
High	5700	9.15	23.81	-14.66

OUTPUT POWER







7.7.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 12.4 dB (including 10 dB pad and 2.4 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Power (dBm)
Low	5500	8.09
Middle	5600	8.68
High	5700	8.65

7.7.4. PEAK POWER SPECTRAL DENSITY

LIMITS

FCC §15.407 (a) (2)

For the 5.47-5.725 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 less than or equal to 6 dBi, therefore the limit is 11 dBm.

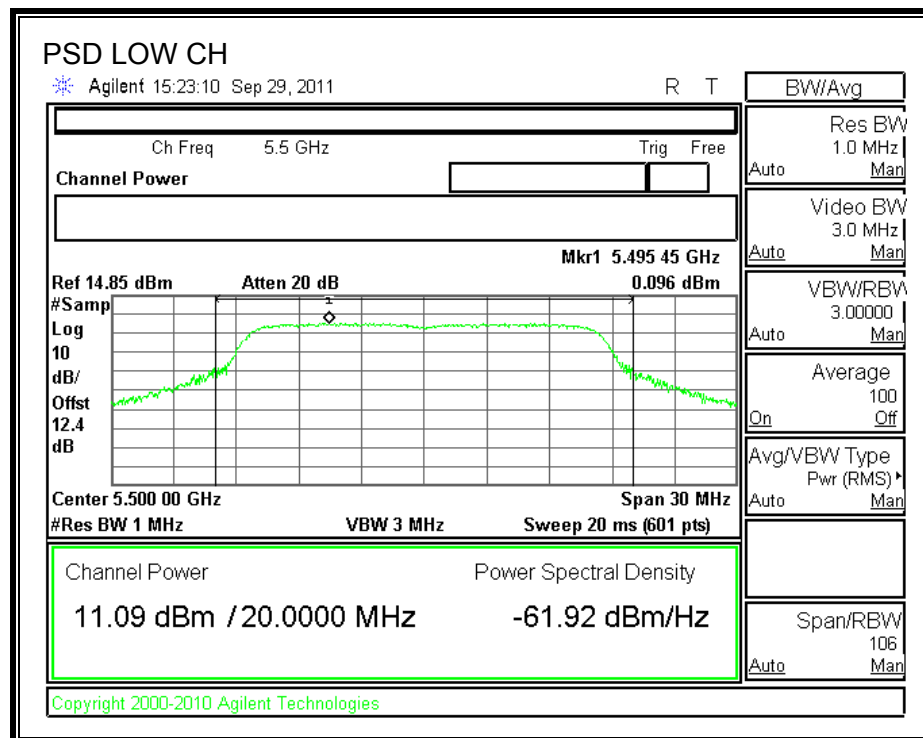
TEST PROCEDURE

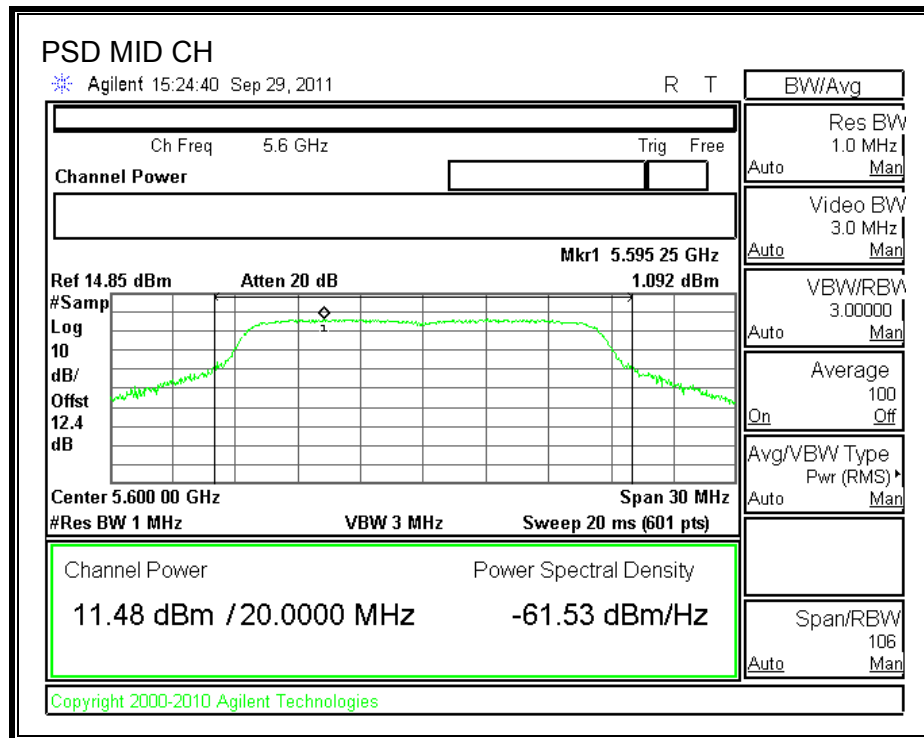
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002. PPSD method #2 was used.

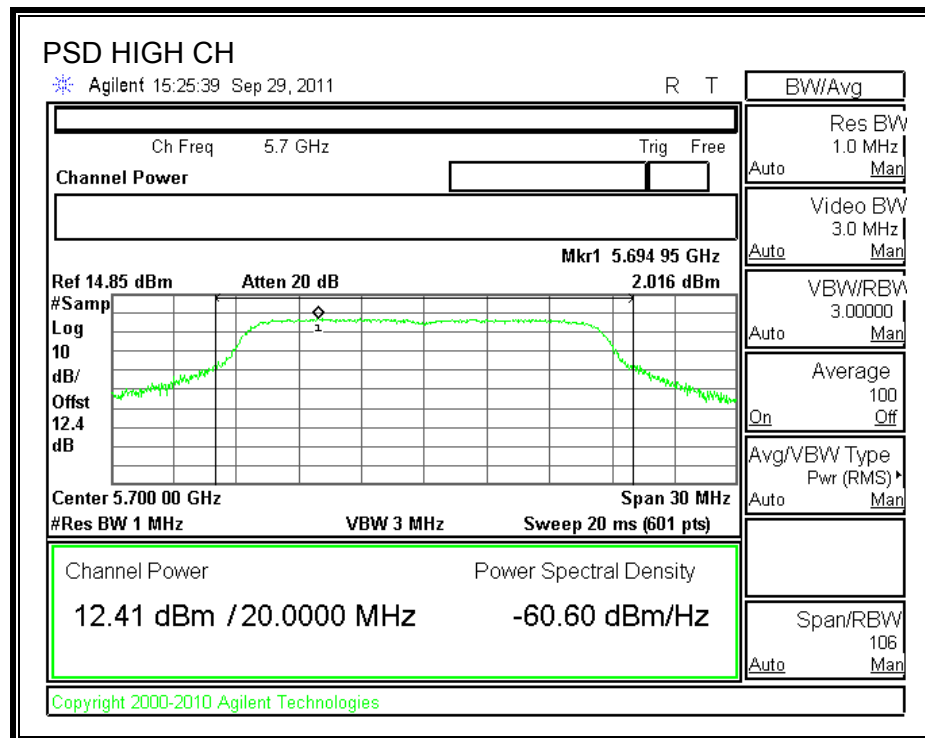
RESULTS

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	5500	0.096	11	-10.90
Middle	5600	1.092	11	-9.91
High	5700	2.016	11	-8.98

POWER SPECTRAL DENSITY







7.7.5. 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

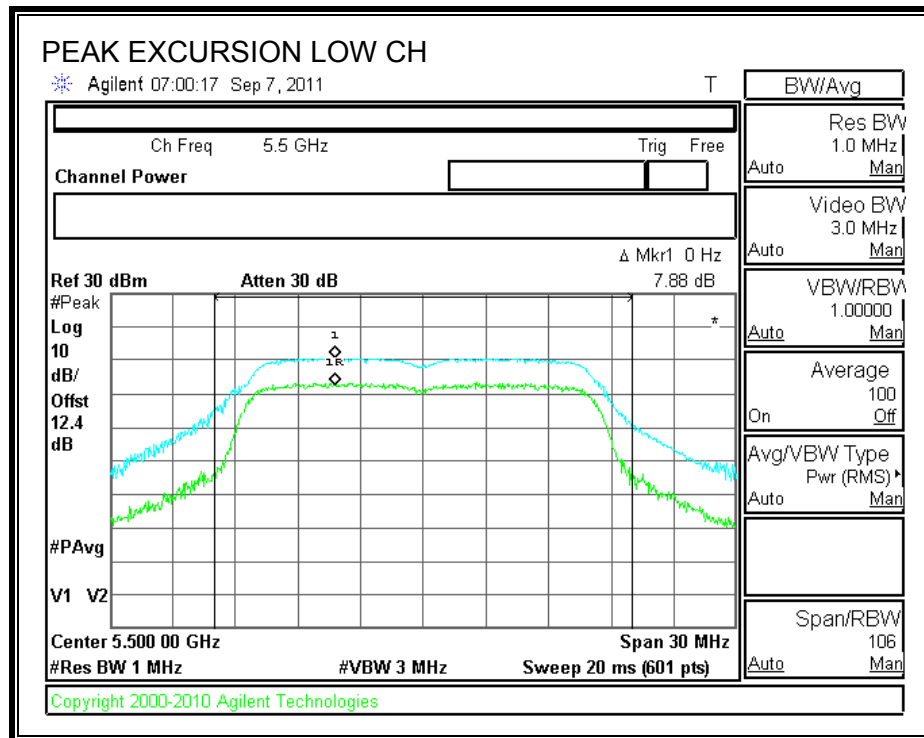
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

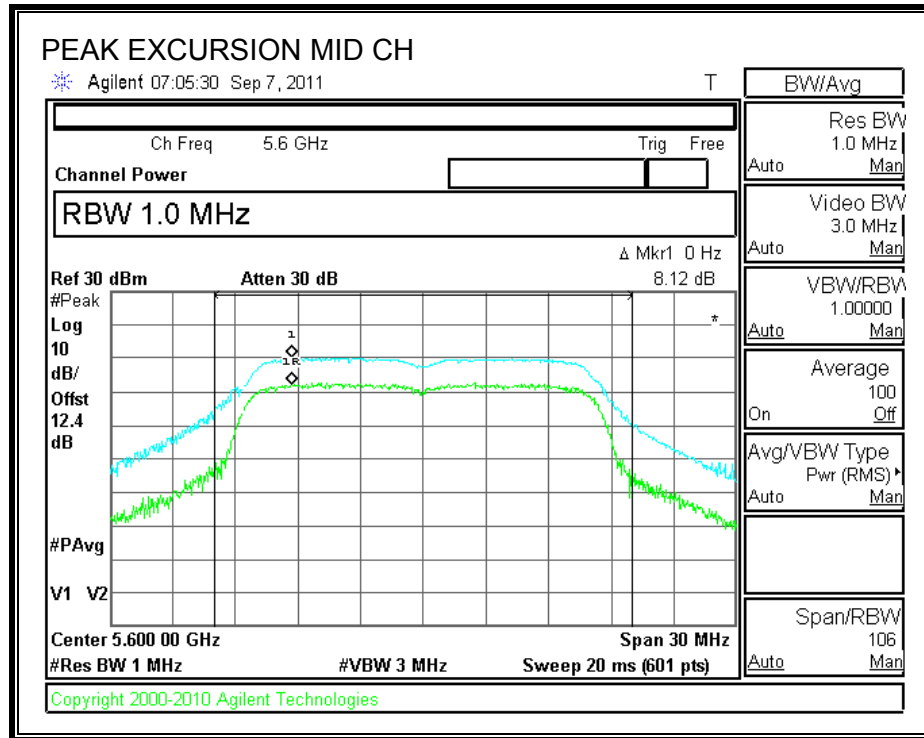
Since Method # 1 was used for peak power measurements, Method # 1 settings are used for the second PPSD trace.

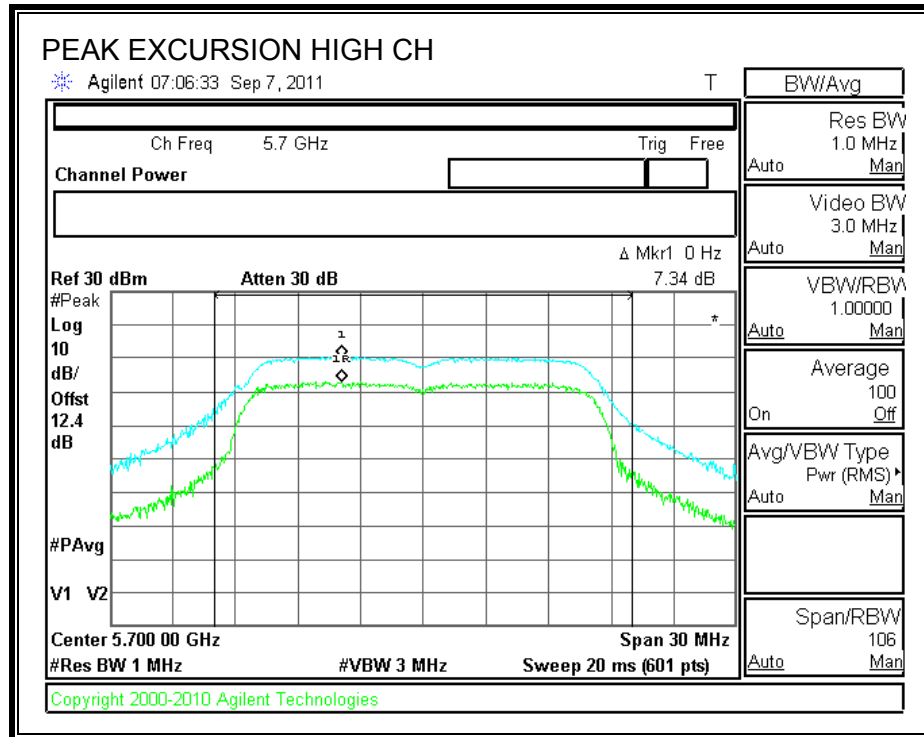
RESULTS

Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5500	7.88	13	-5.12
Middle	5600	8.12	13	-4.88
High	5700	7.34	13	-5.66

PEAK EXCURSION







7.7.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.407 (b) (3)

For transmitters operating in the 5.47-5.725 GHz band: all emissions outside of the 5.47-5.725 GHz band shall not exceed an EIRP of -27 dBm / MHz.

TEST PROCEDURE

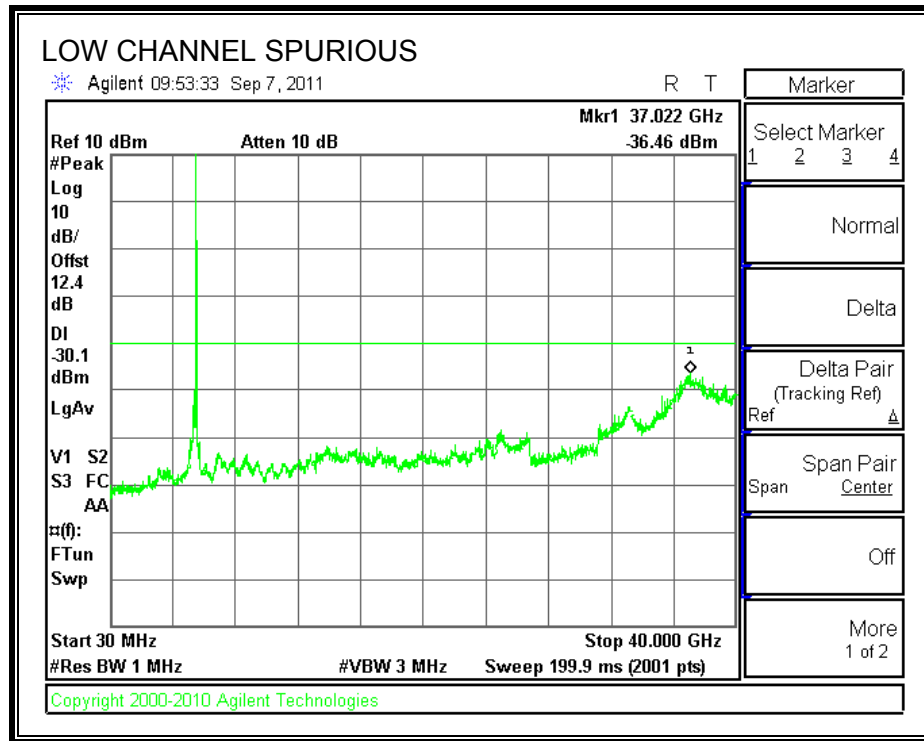
Conducted RF measurements of the transmitter output are made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

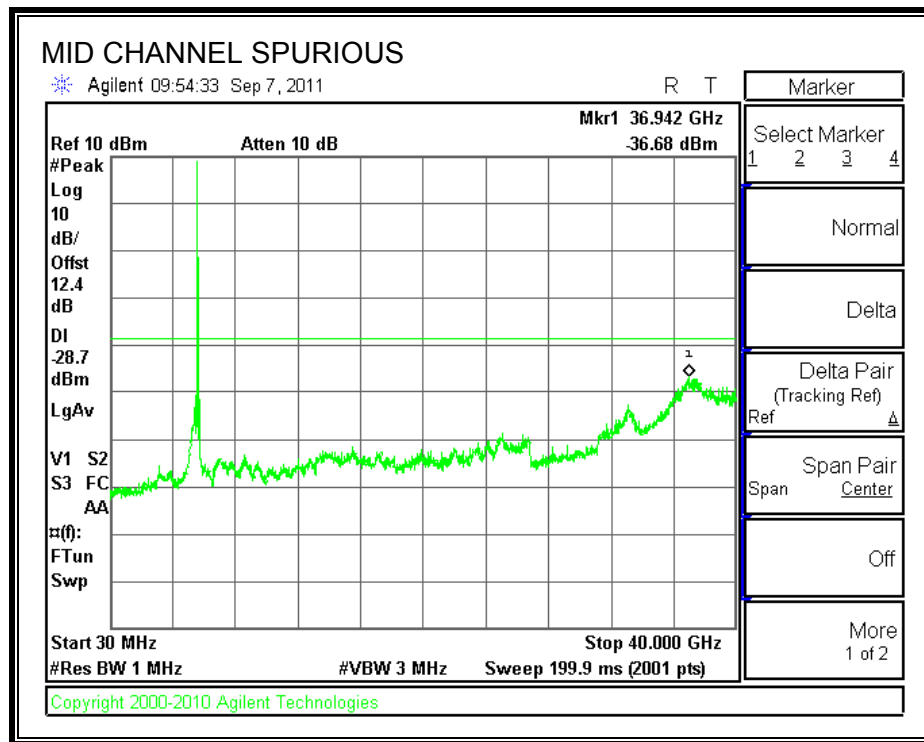
The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 3 MHz. Peak detection measurements are compared to EIRP limit, adjusted for the maximum antenna gain.

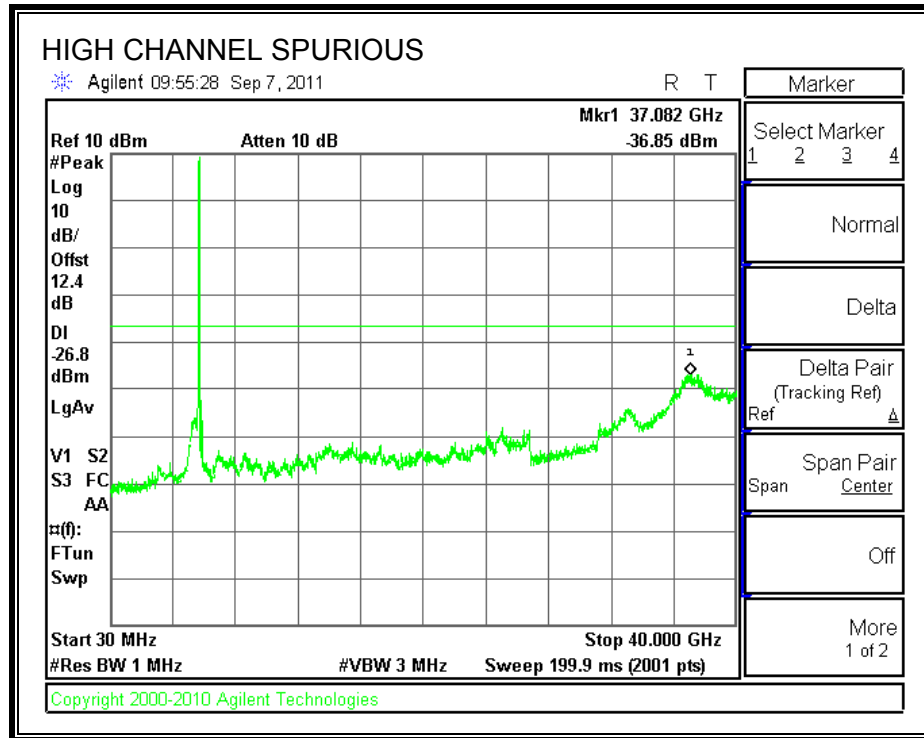
Measurements are made over the 30 MHz to 40 GHz range with the transmitter set to the lowest, middle, and highest channels.

RESULTS

SPURIOUS EMISSIONS







7.8. 802.11n HT20 MODE IN THE 5.6 GHz BAND

7.8.1. 26 dB BANDWIDTH

LIMITS

None; for reporting purposes only.

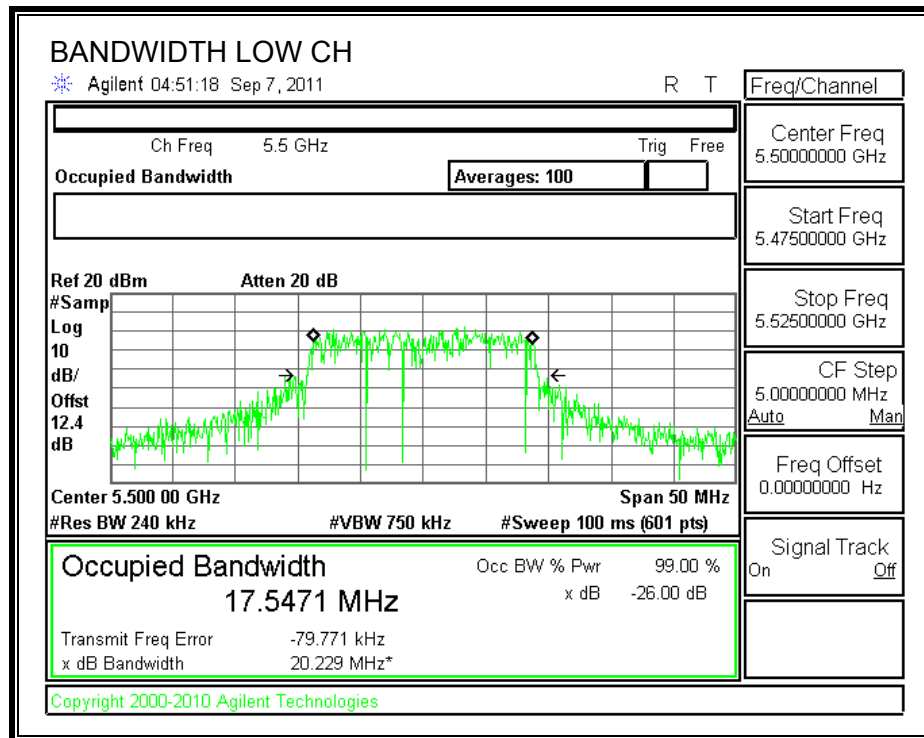
TEST PROCEDURE

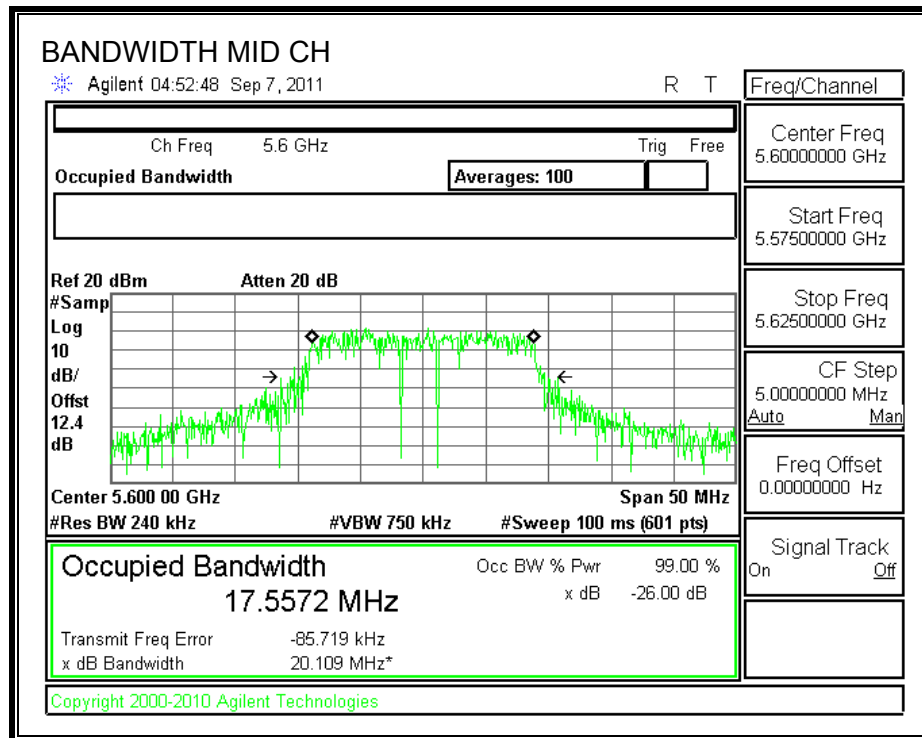
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the measured bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth function is utilized.

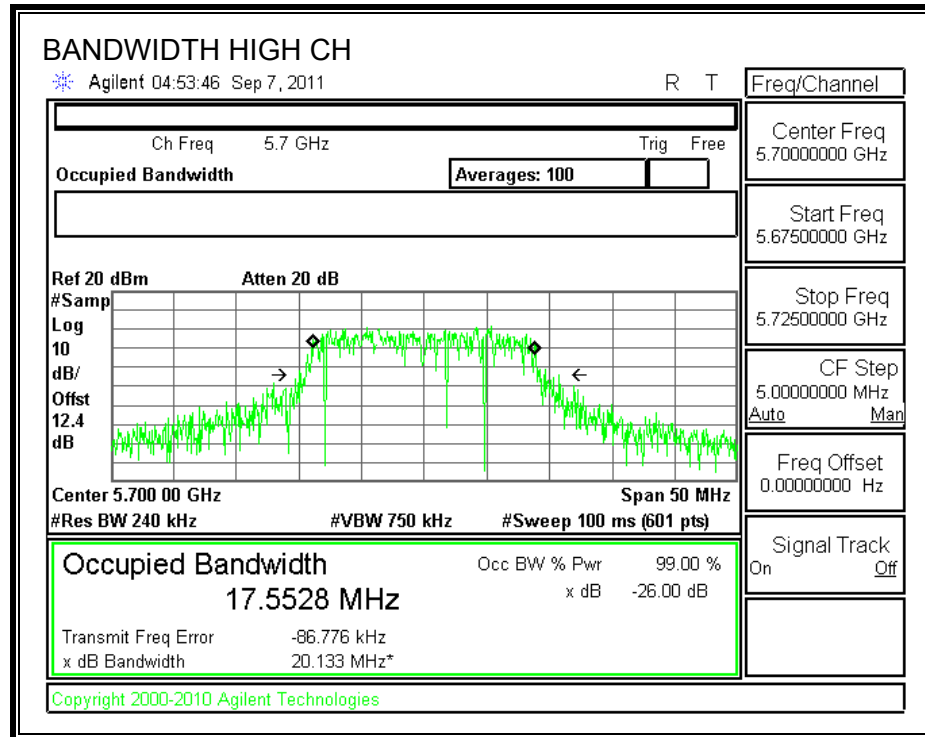
RESULTS

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5500	20.229
Middle	5600	20.109
High	5700	20.133

26 dB BANDWIDTH







7.8.2. OUTPUT POWER

LIMITS

FCC §15.407 (a) (2)

For the 5.47-5.725 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, 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

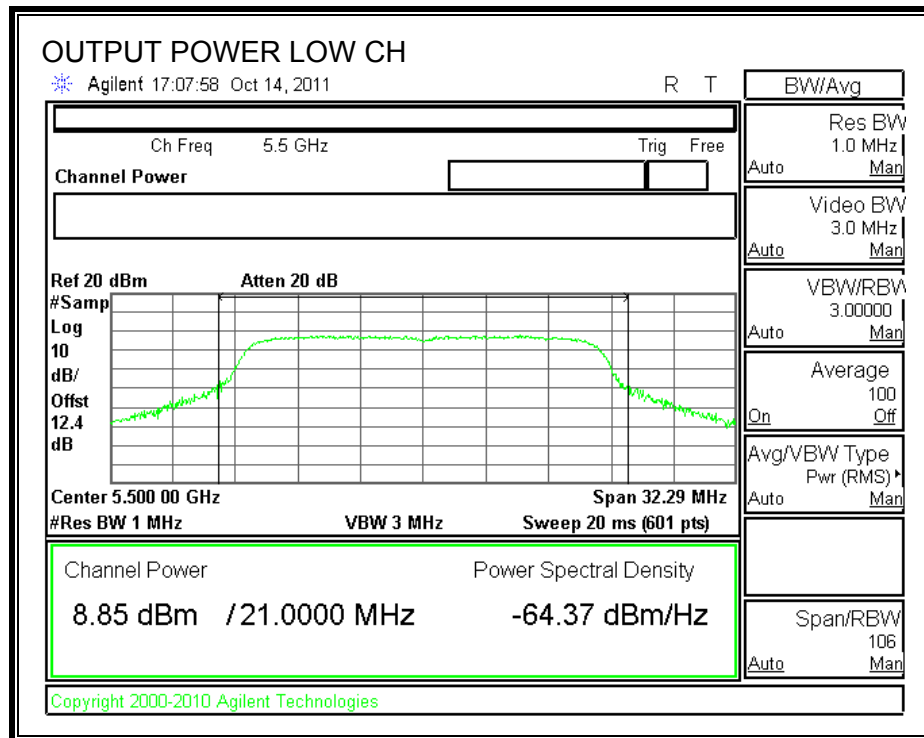
Limit

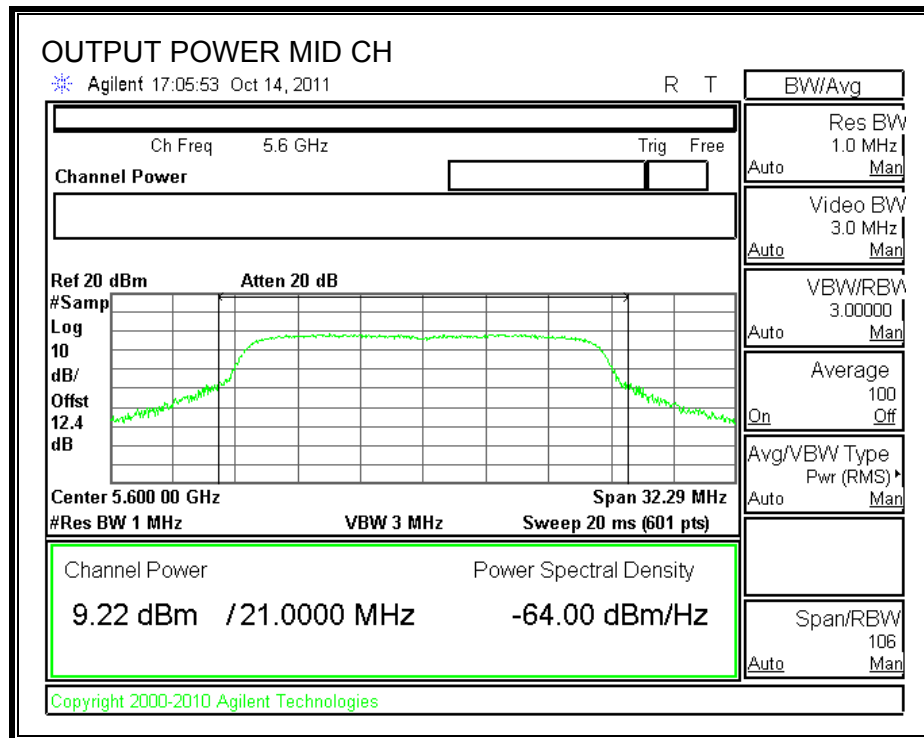
Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	11 + 10 Log B Limit (dBm)	Antenna Gain (dBi)	Limit (dBm)
Low	5500	24	20.229	24.06	3.06	24.00
Mid	5600	24	20.109	24.03	1.74	24.00
High	5700	24	20.133	24.04	-0.25	24.00

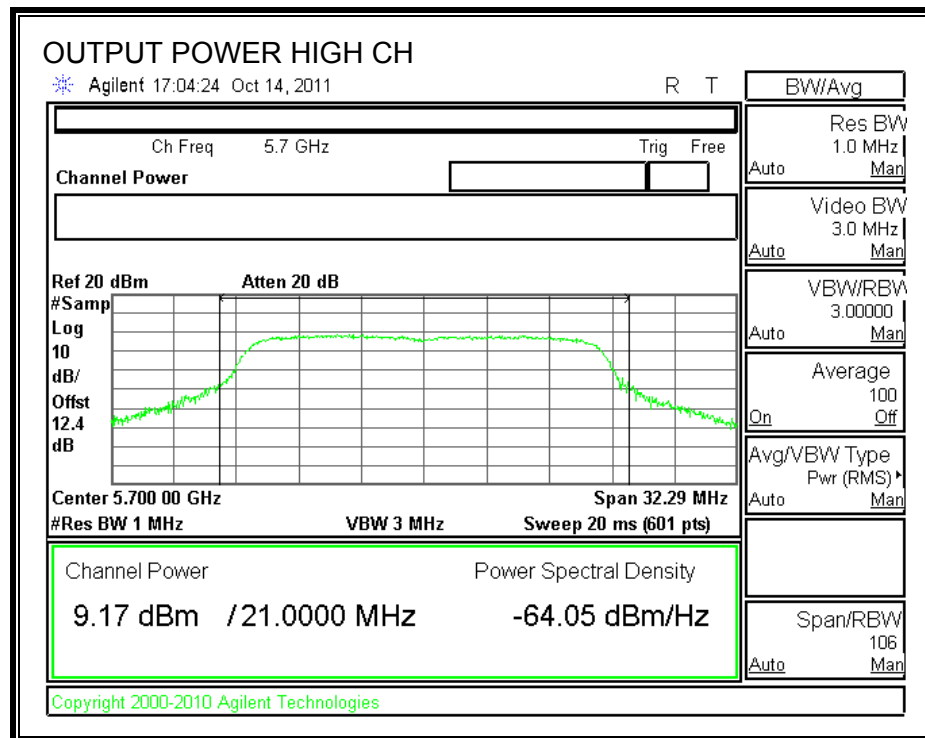
Results

Channel	Frequency (MHz)	Power (dBm)	Limit (dBm)	Margin (dB)
Low	5500	8.85	24.00	-15.15
Mid	5600	9.22	24.00	-14.78
High	5700	9.17	24.00	-14.83

OUTPUT POWER







7.8.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 12.4 dB (including 10 dB pad and 2.4 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Frequency (MHz)	Power (dBm)
5500	7.63
5600	8.65
5700	8.34

7.8.4. PEAK POWER SPECTRAL DENSITY

LIMITS

FCC §15.407 (a) (2)

For the 5.47-5.725 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 less than or equal to 6 dBi, therefore the limit is 11 dBm.

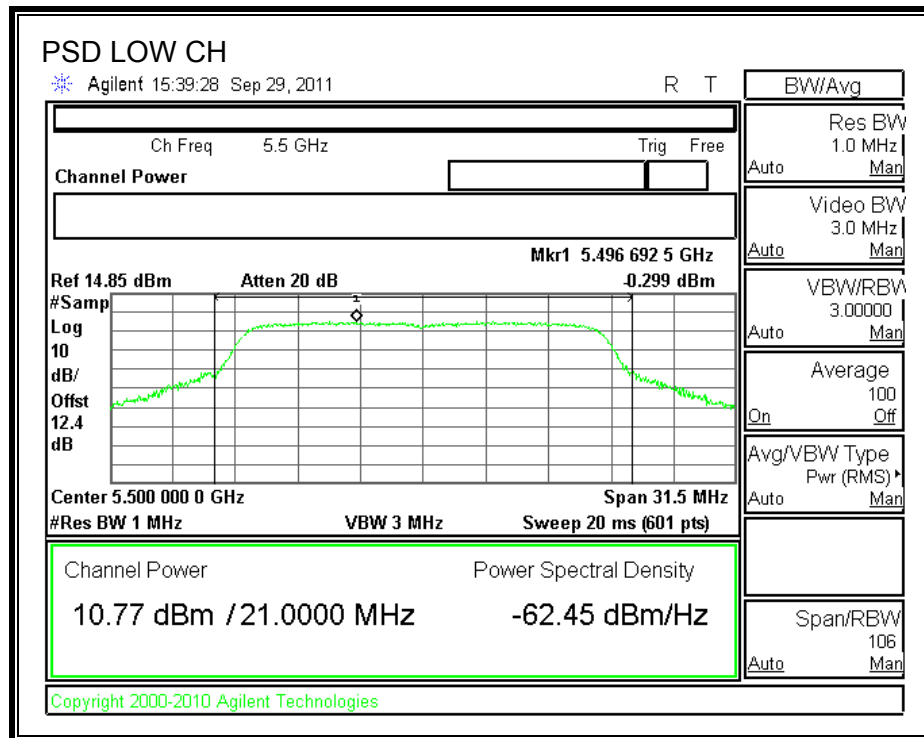
TEST PROCEDURE

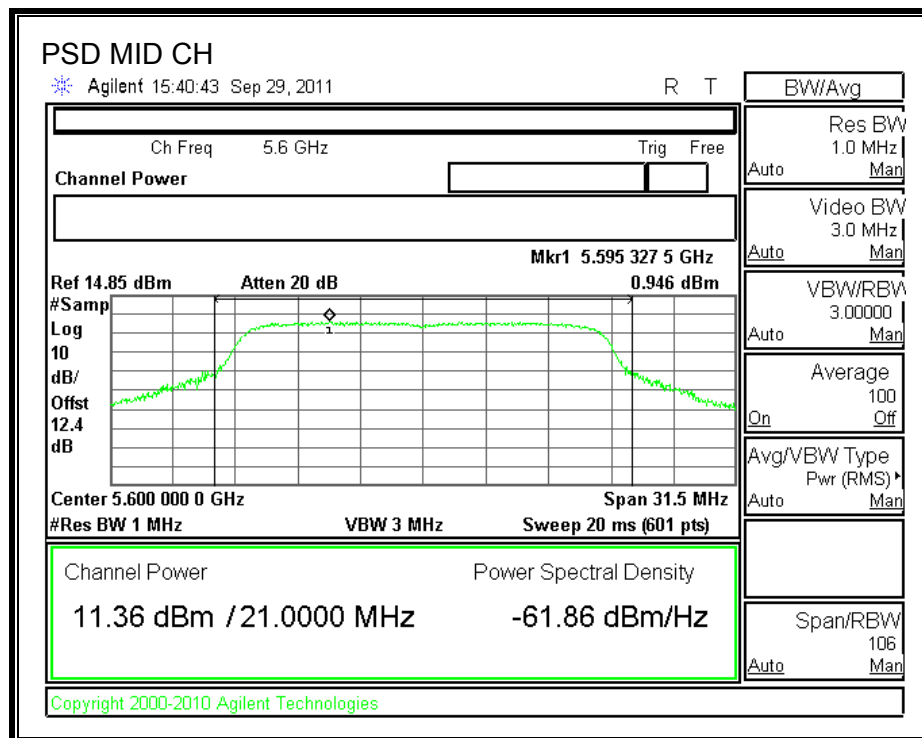
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002. PPSD method #2 was used.

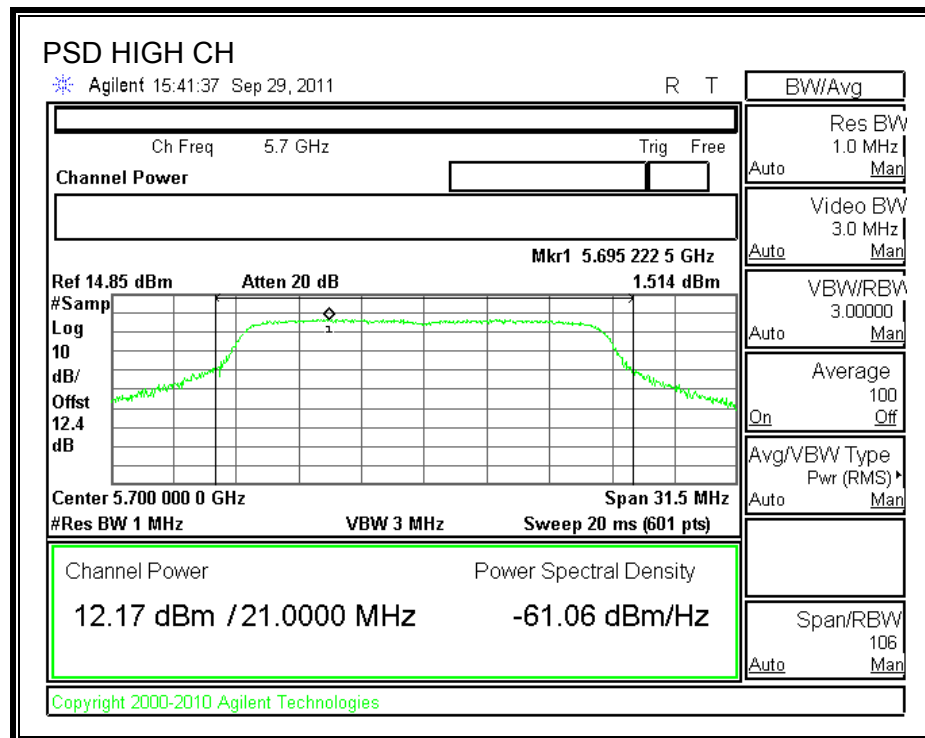
RESULTS

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	5500	-0.299	11	-11.30
Middle	5600	0.946	11	-10.05
High	5700	1.514	11	-9.49

POWER SPECTRAL DENSITY







7.8.5. 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

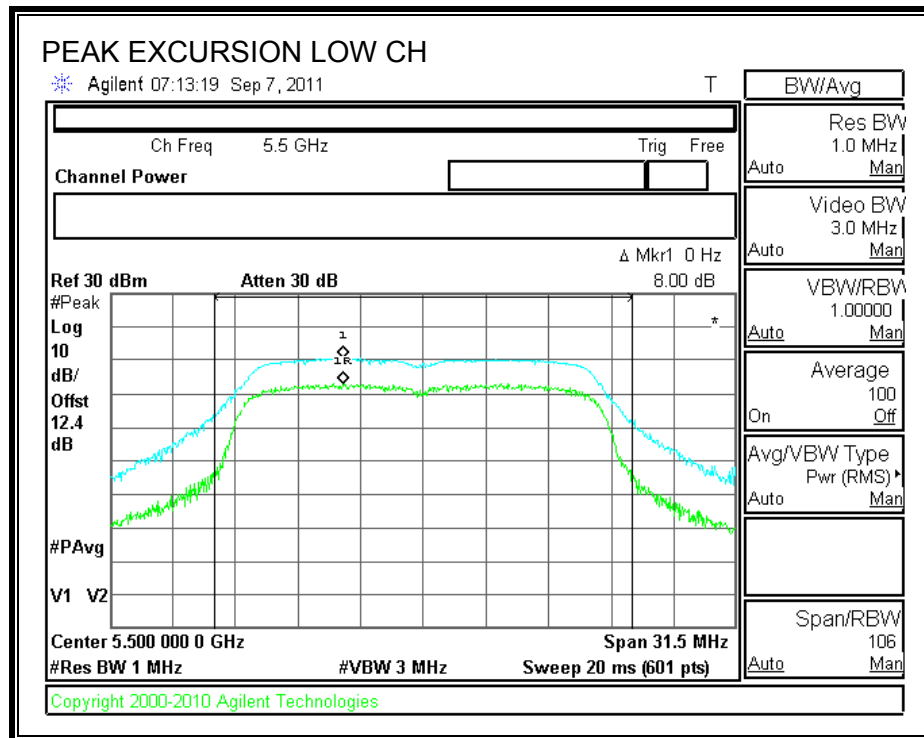
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

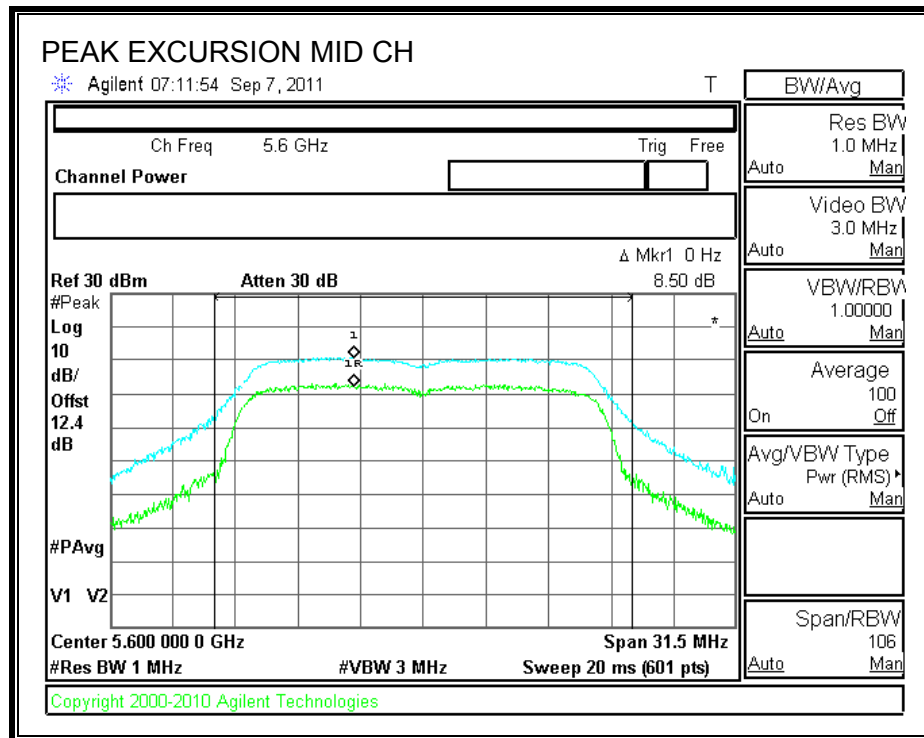
Since Method # 1 was used for peak power measurements, Method # 1 settings are used for the second PPSD trace.

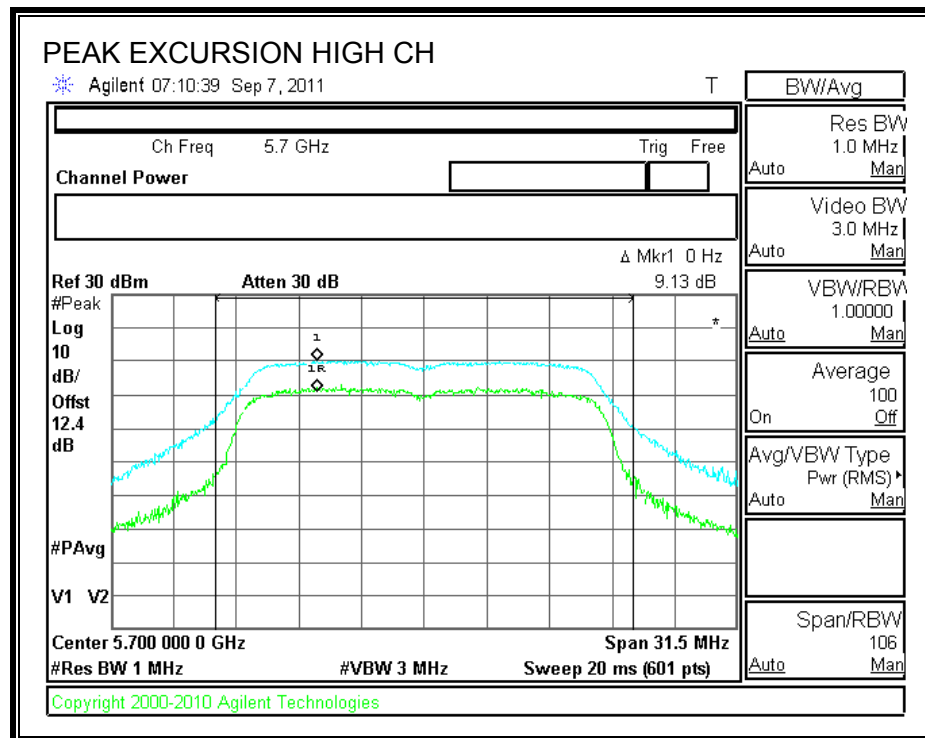
RESULTS

Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5500	8.00	13	-5.00
Middle	5600	8.50	13	-4.50
High	5700	9.13	13	-3.87

PEAK EXCURSION







7.8.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.407 (b) (3)

For transmitters operating in the 5.47-5.725 GHz band: all emissions outside of the 5.47-5.725 GHz band shall not exceed an EIRP of -27 dBm / MHz.

TEST PROCEDURE

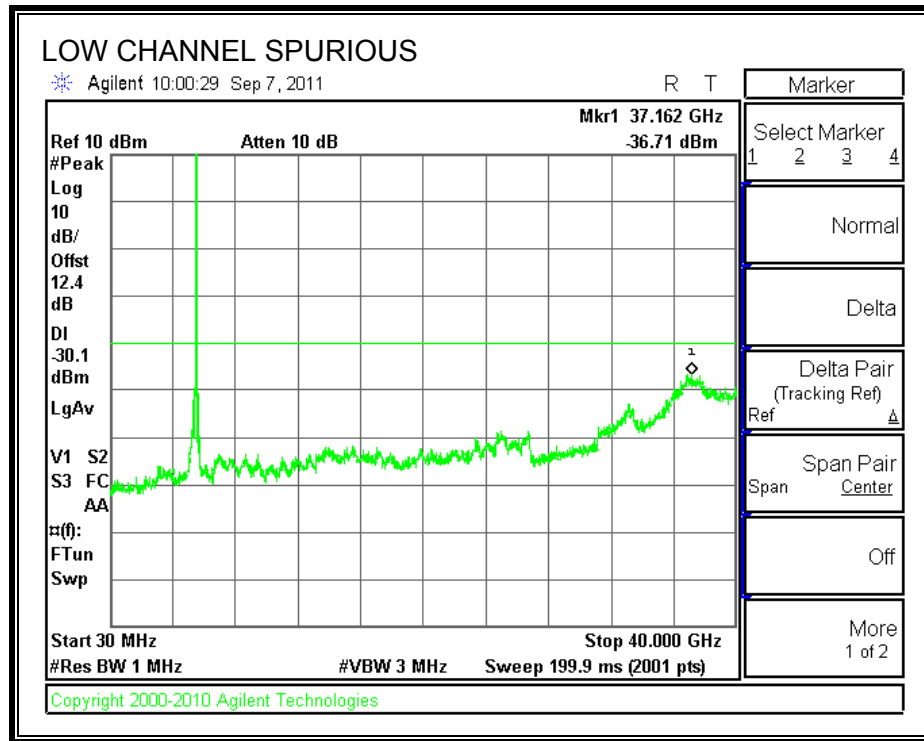
Conducted RF measurements of the transmitter output are made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

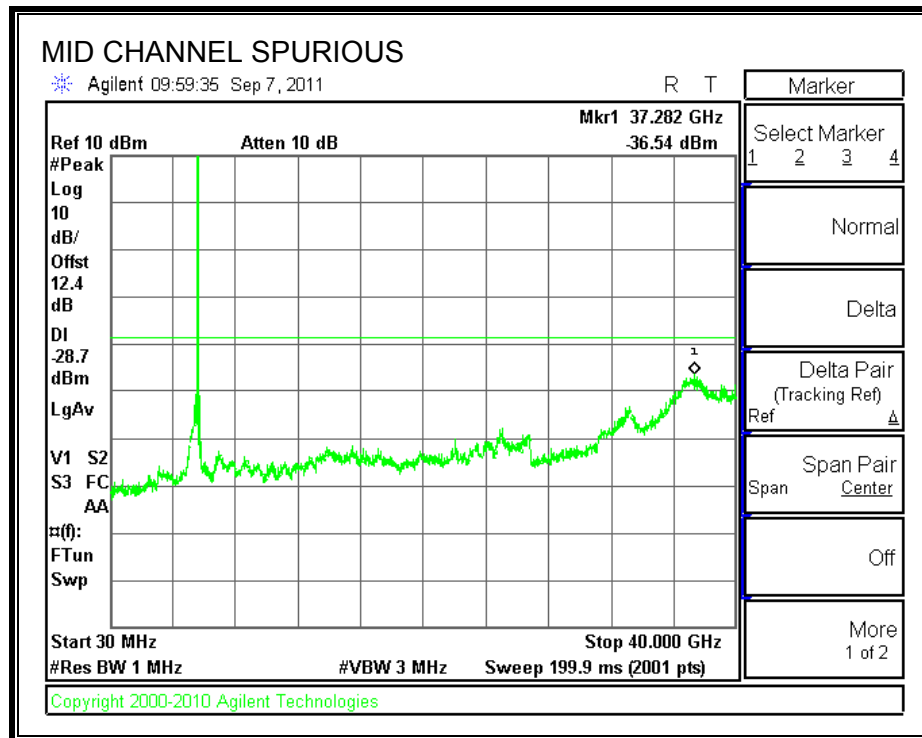
The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 3 MHz. Peak detection measurements are compared to EIRP limit, adjusted for the maximum antenna gain.

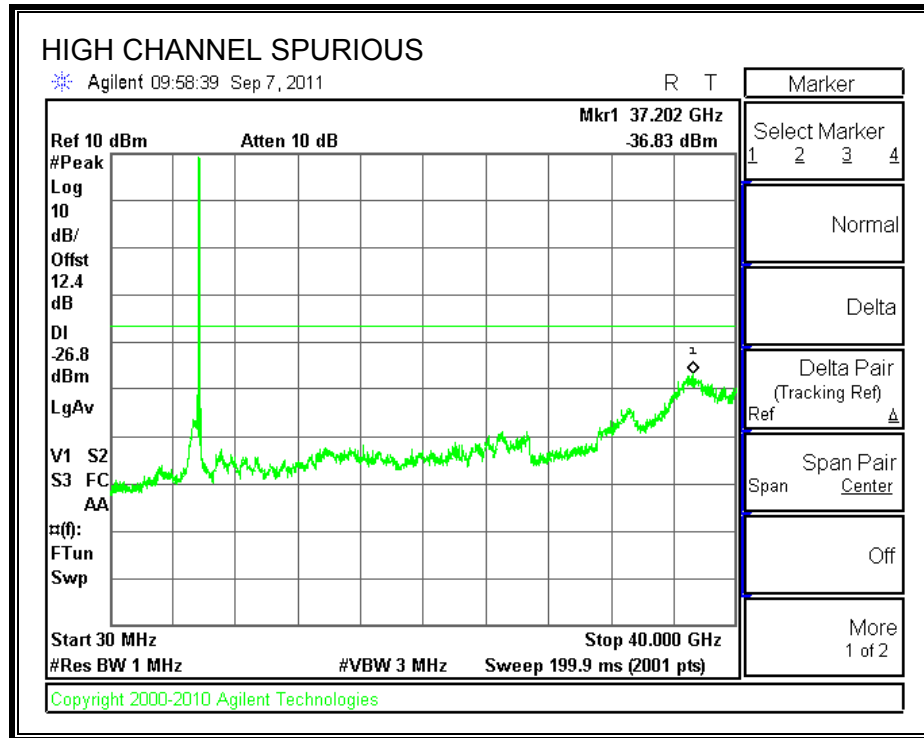
Measurements are made over the 30 MHz to 40 GHz range with the transmitter set to the lowest, middle, and highest channels.

RESULTS

SPURIOUS EMISSIONS







7.9. 802.11n HT40 MODE IN THE 5.6 GHz BAND

7.9.1. 26 dB BANDWIDTH

LIMITS

None; for reporting purposes only.

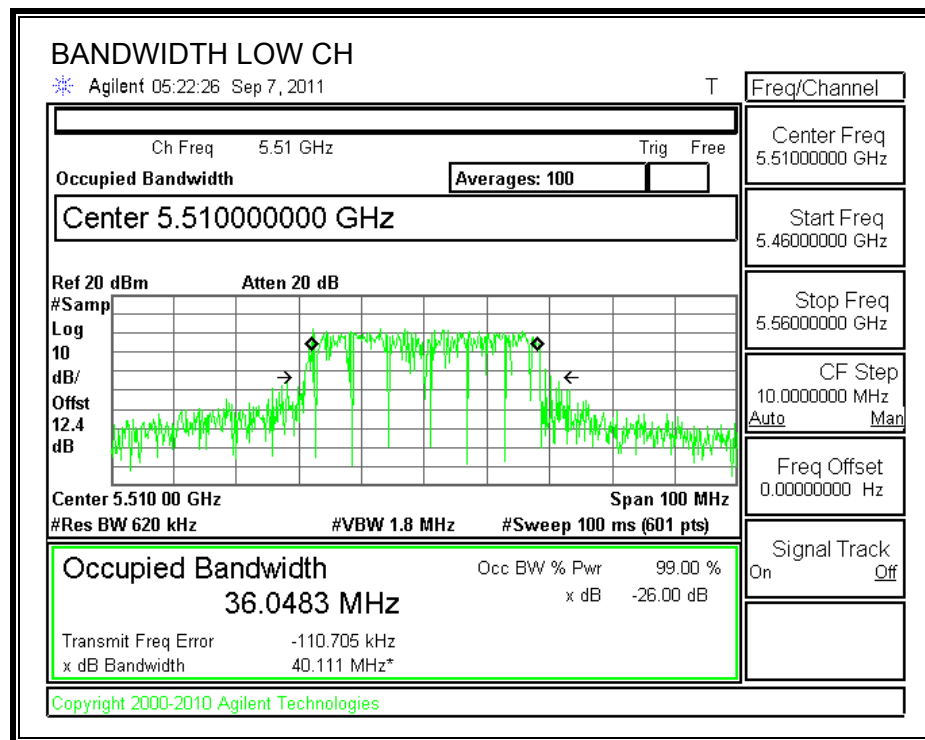
TEST PROCEDURE

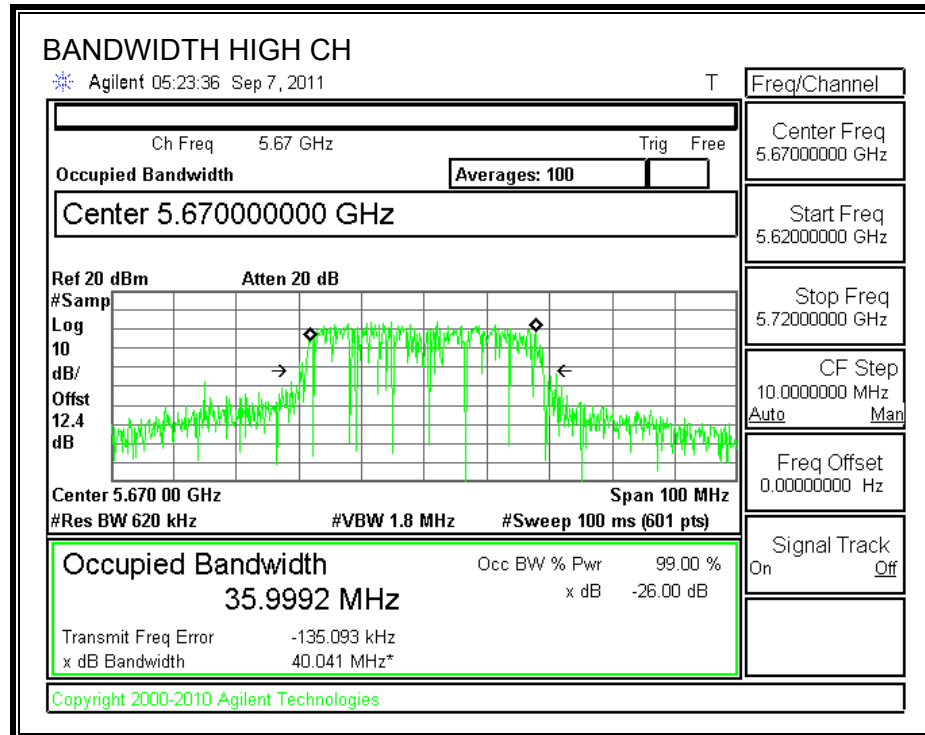
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the measured bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth function is utilized.

RESULTS

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5510	40.111
High	5670	40.041

26 dB BANDWIDTH





7.9.2. OUTPUT POWER

LIMITS

FCC §15.407 (a) (2)

For the 5.47-5.725 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, 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

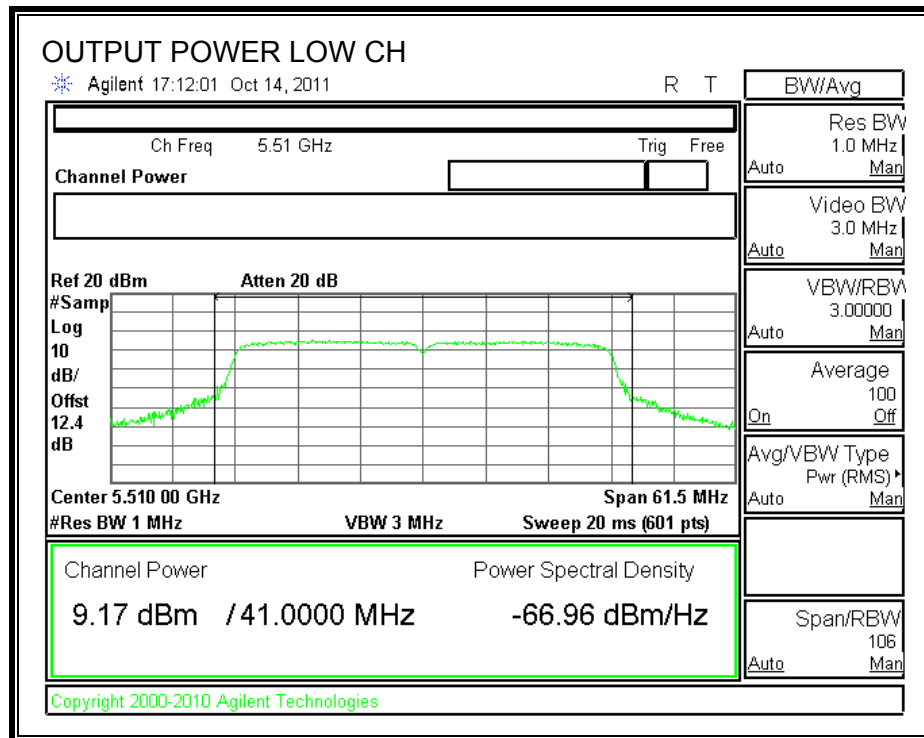
Limit

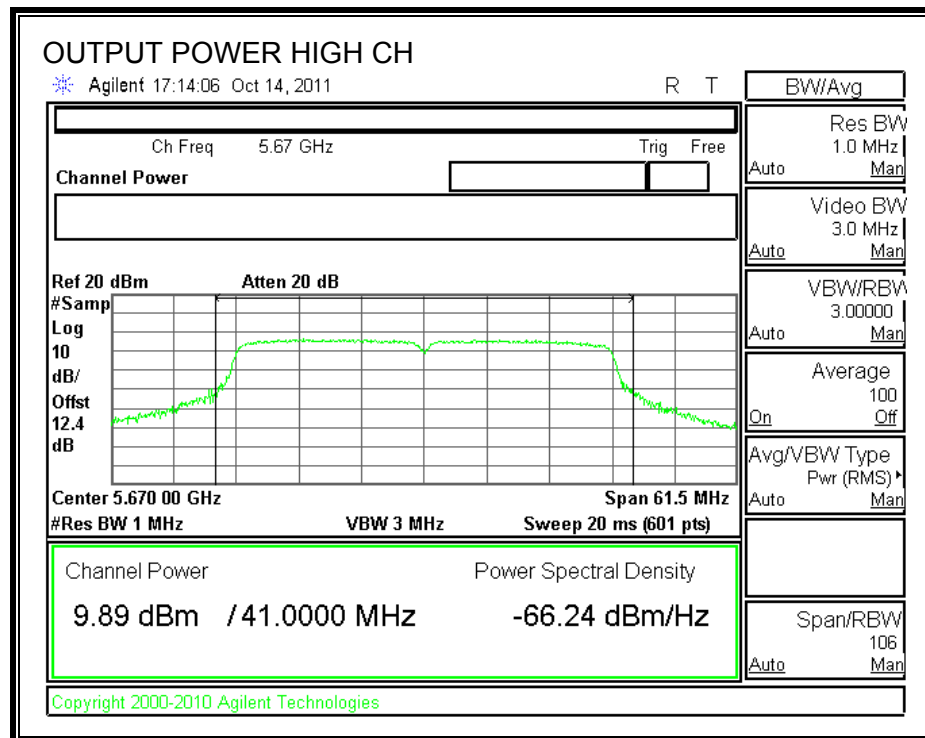
Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	11 + 10 Log B Limit (dBm)	Antenna Gain (dBi)	Limit (dBm)
Low	5510	24	40.111	27.03	3.06	24.00
High	5670	24	40.041	27.03	-0.25	24.00

Results

Channel	Frequency (MHz)	Power (dBm)	Limit (dBm)	Margin (dB)
Low	5510	9.17	24.00	-14.83
High	5670	9.89	24.00	-14.11

OUTPUT POWER





7.9.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 12.4 dB (including 10 dB pad and 2.4 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Frequency (MHz)	Power (dBm)
5510	8.72
5670	9.32

7.9.4. PEAK POWER SPECTRAL DENSITY

LIMITS

FCC §15.407 (a) (2)

For the 5.47-5.725 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 less than or equal to 6 dBi, therefore the limit is 11 dBm.

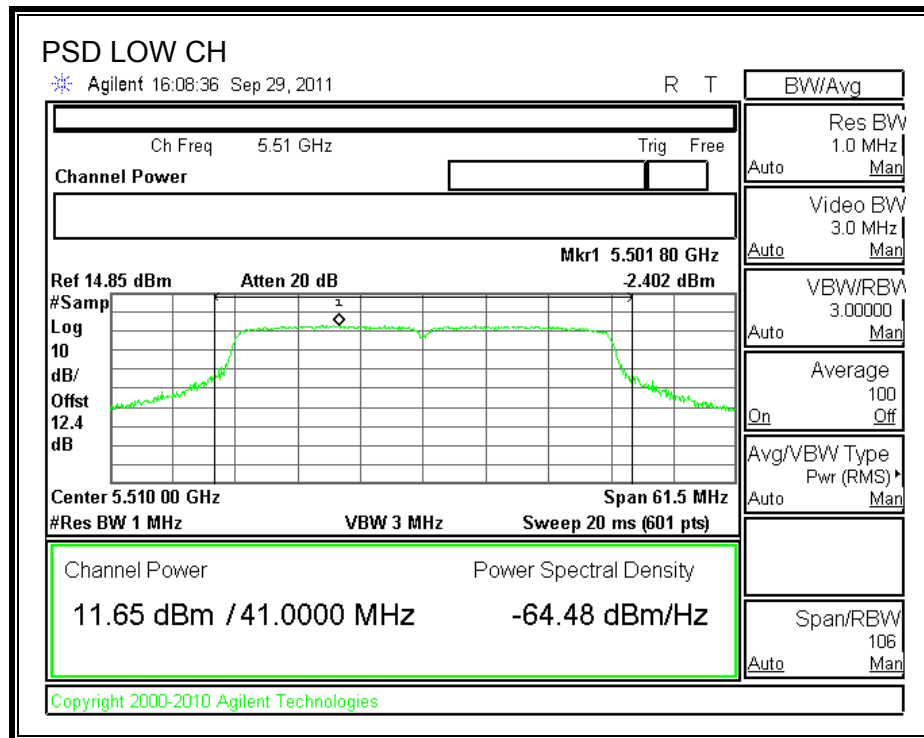
TEST PROCEDURE

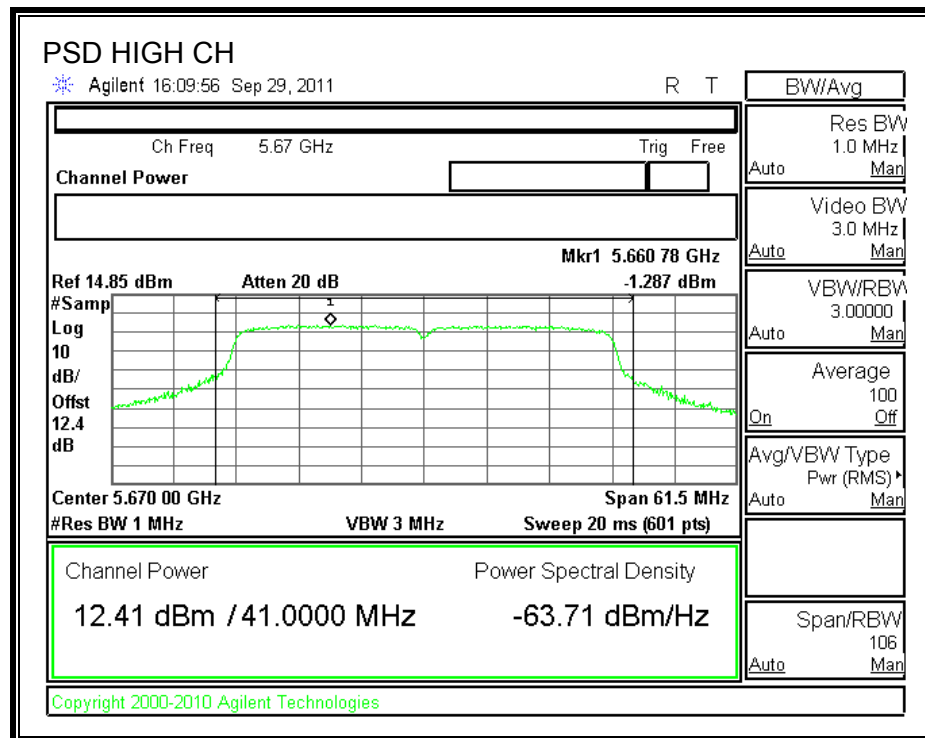
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002. PPSD method #2 was used.

RESULTS

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	5510	-2.402	11	-13.40
High	5670	-1.287	11	-12.29

POWER SPECTRAL DENSITY





7.9.5. 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

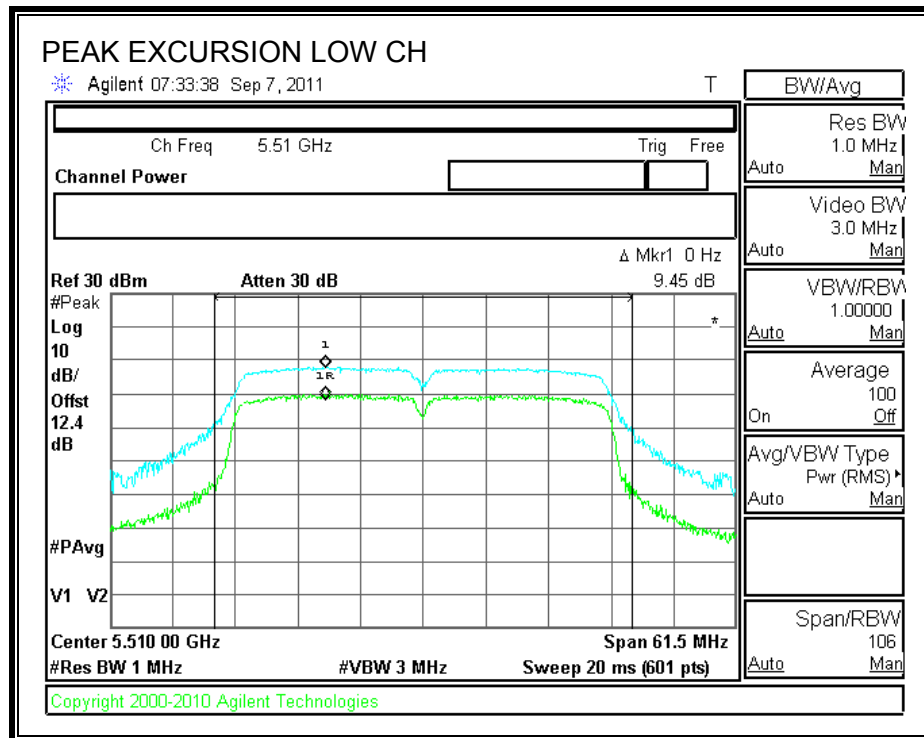
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

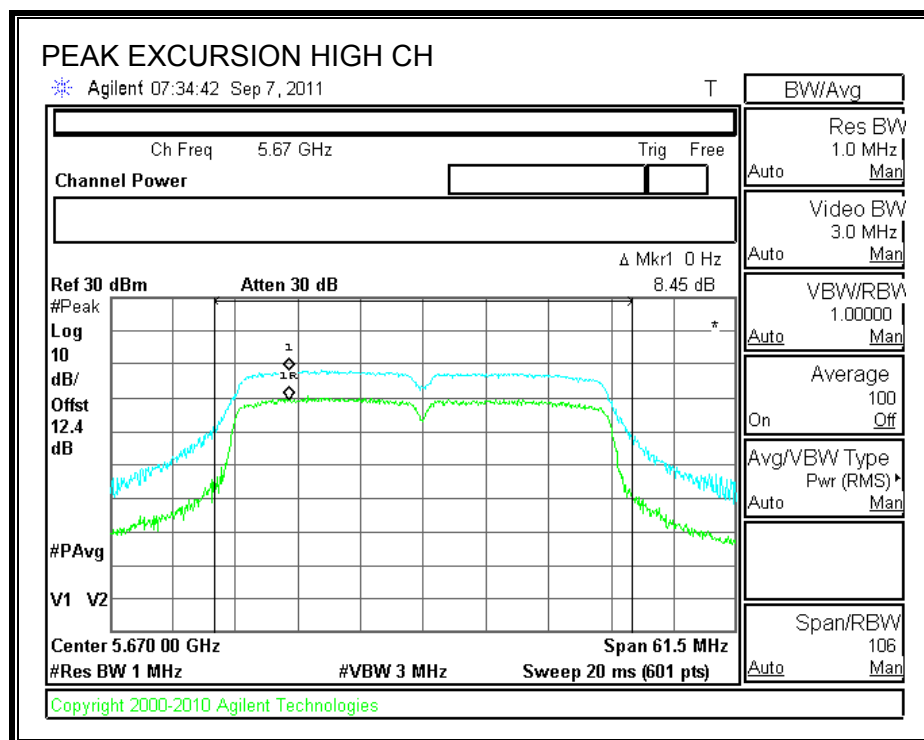
Since Method # 1 was used for peak power measurements, Method # 1 settings are used for the second PPSD trace.

RESULTS

Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5510	9.45	13	-3.55
High	5670	8.45	13	-4.55

PEAK EXCURSION





7.9.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.407 (b) (3)

For transmitters operating in the 5.47-5.725 GHz band: all emissions outside of the 5.47-5.725 GHz band shall not exceed an EIRP of -27 dBm / MHz.

TEST PROCEDURE

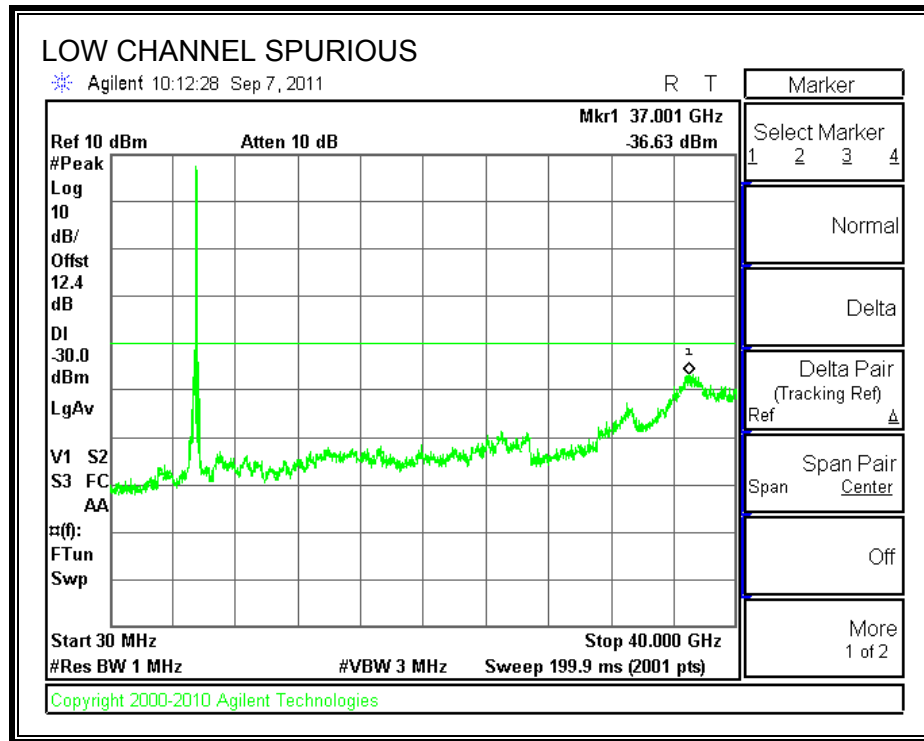
Conducted RF measurements of the transmitter output are made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

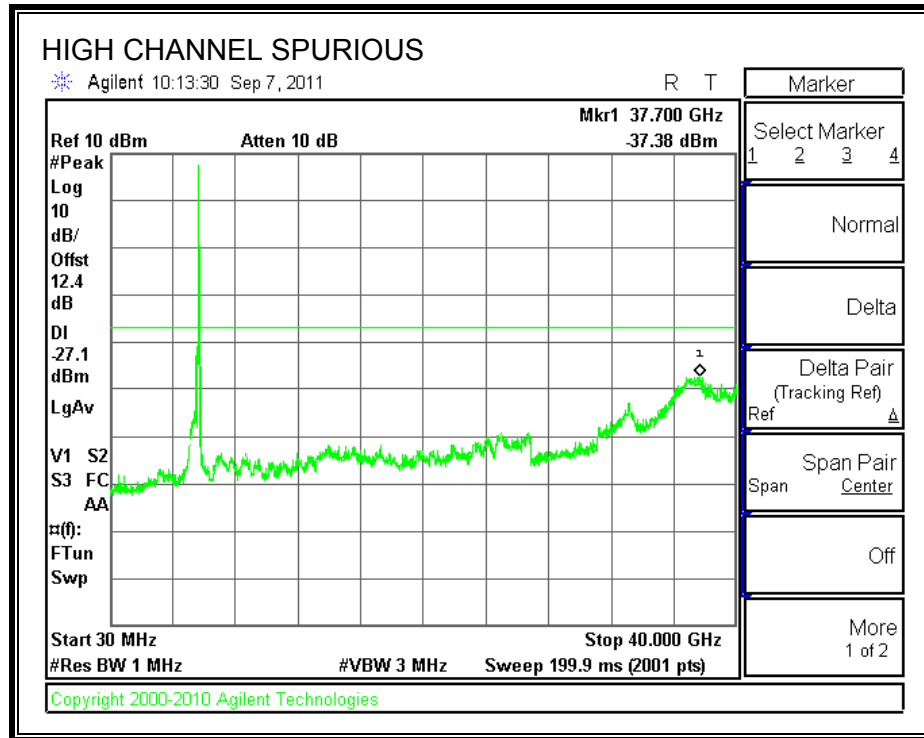
The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 3 MHz. Peak detection measurements are compared to EIRP limit, adjusted for the maximum antenna gain.

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





8. RADIATED TEST RESULTS

8.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

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

TEST PROCEDURE

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

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

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

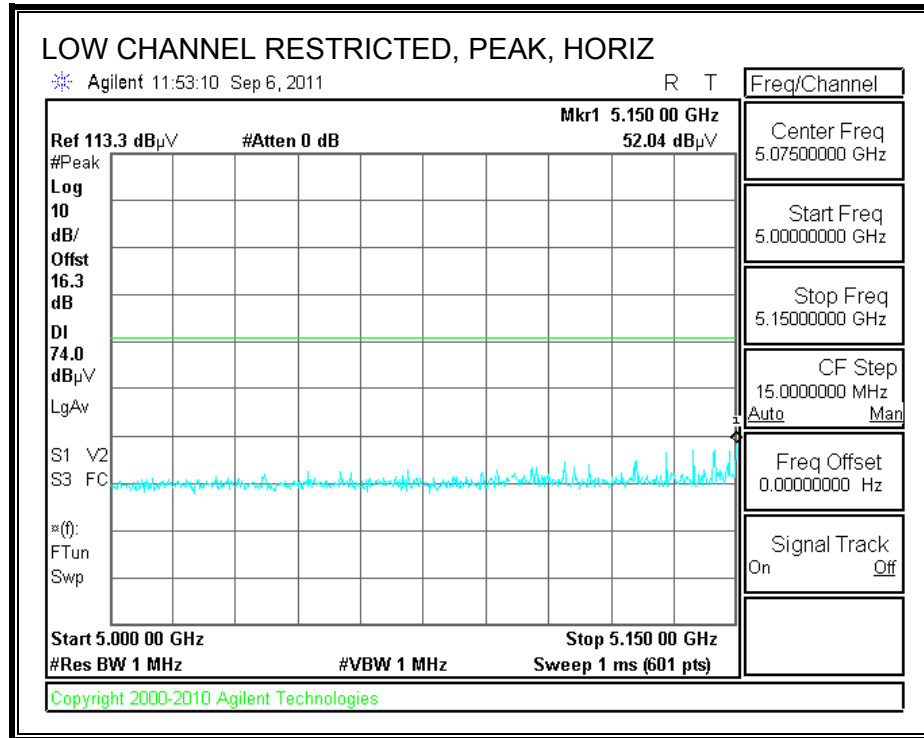
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.

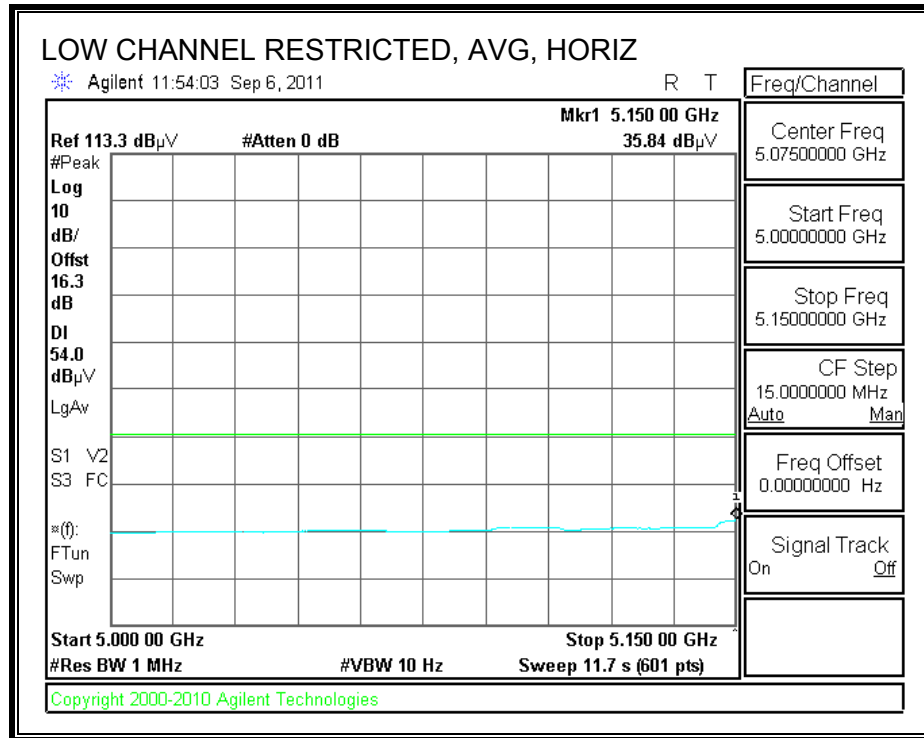
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

8.2. TRANSMITTER ABOVE 1 GHz

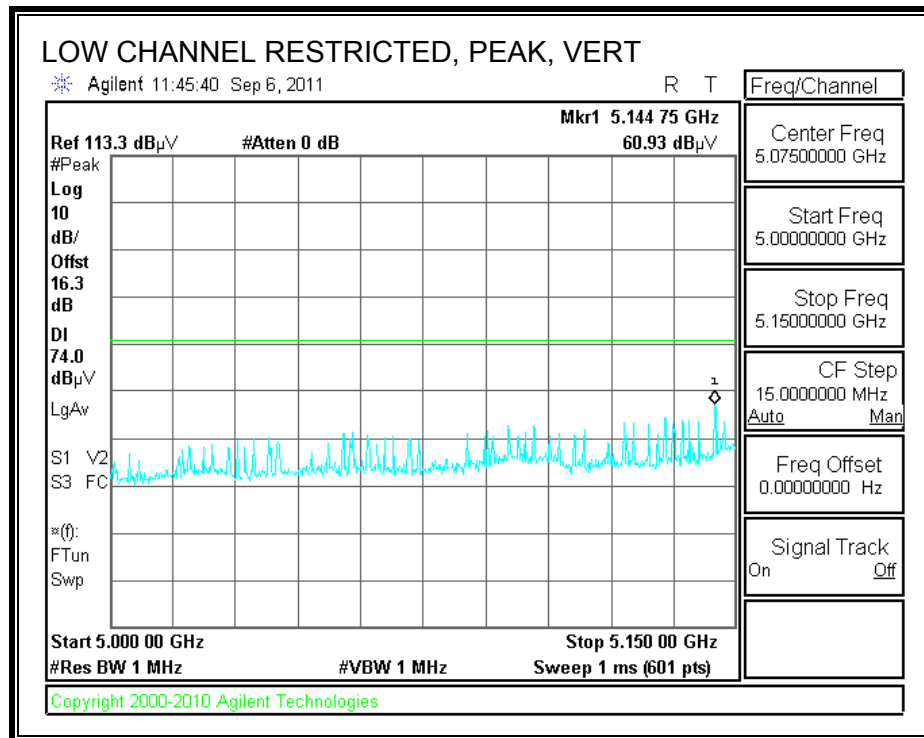
8.2.1. TX ABOVE 1 GHz FOR 802.11a MODE IN THE LOWER 5.2 GHz BAND

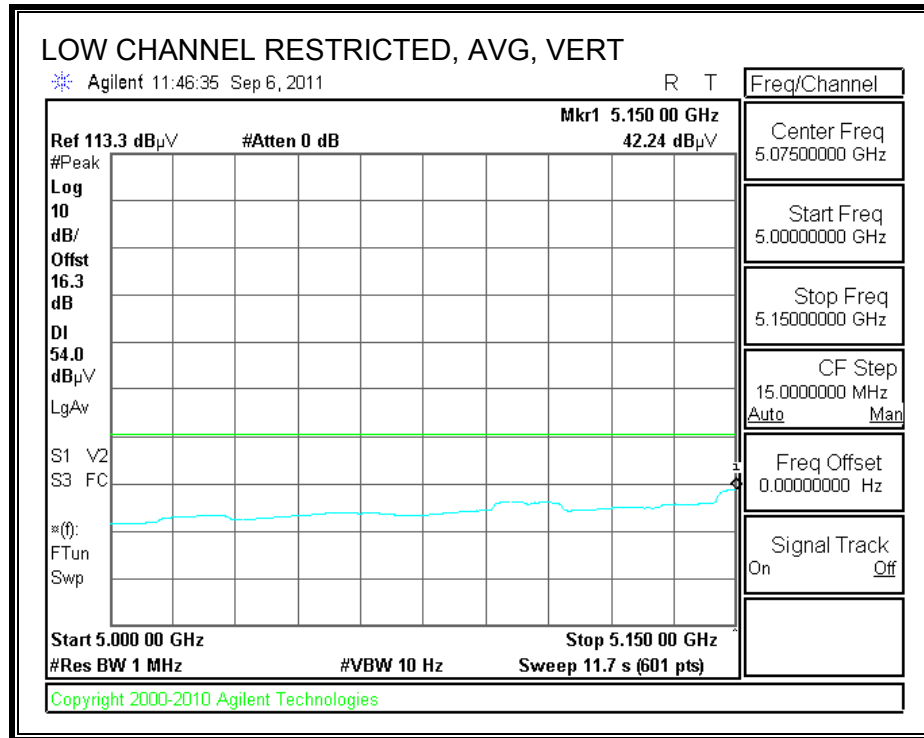
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)





RESTRICTED BANEDGE (LOW CHANNEL, VERTICAL)





HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement

Compliance Certification Services, Fremont 5m Chamber

Test Engr: William Zhuang
Date: 09/06/11
Project #: 11I14017
Company: Samsung
Test Target:
Mode Oper: Tx On , 5.2 GHz, a Mode, Worst Position Y

f	Measurement Frequency	Amp	Preamp Gain	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter	

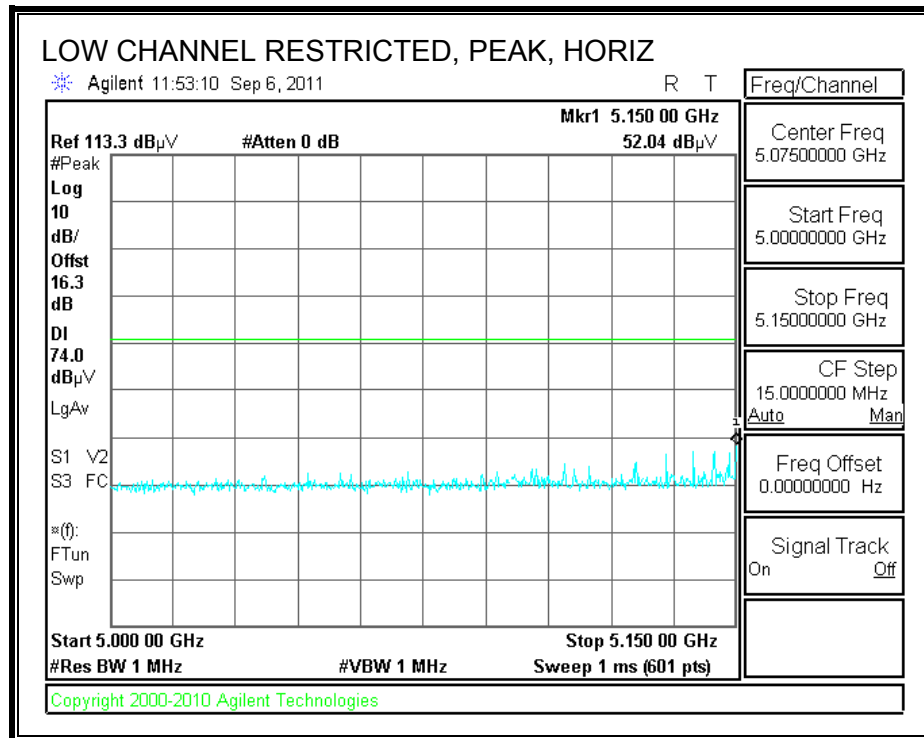
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filtr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Ant.High cm	Table Angle Degree	Notes
Low Ch.															
15.540	3.0	34.7	39.3	12.2	-34.0	0.0	0.7	52.9	74.0	-21.1	V	P	167.4	21.2	
15.540	3.0	22.1	39.3	12.2	-34.0	0.0	0.7	40.3	54.0	-13.7	V	A	167.4	21.2	
15.540	3.0	34.6	39.3	12.2	-34.0	0.0	0.7	52.7	74.0	-21.3	H	P	188.5	178.6	
15.540	3.0	22.1	39.3	12.2	-34.0	0.0	0.7	40.3	54.0	-13.7	H	A	188.5	178.6	
Mid Ch.															
15.600	3.0	34.4	39.2	12.2	-34.0	0.0	0.7	52.5	74.0	-21.5	V	P	125.5	82.8	
15.600	3.0	22.2	39.2	12.2	-34.0	0.0	0.7	40.4	54.0	-13.6	V	A	125.5	82.8	
15.600	3.0	34.3	39.2	12.2	-34.0	0.0	0.7	52.4	74.0	-21.6	H	P	145.9	50.8	
15.600	3.0	22.2	39.2	12.2	-34.0	0.0	0.7	40.4	54.0	-13.6	H	A	145.9	50.8	
High Ch.															
15.720	3.0	34.1	39.1	12.3	-34.0	0.0	0.7	52.3	74.0	-21.7	V	P	100.0	0.2	
15.720	3.0	22.0	39.1	12.3	-34.0	0.0	0.7	40.2	54.0	-13.8	V	A	100.0	0.2	
15.720	3.0	34.2	39.1	12.3	-34.0	0.0	0.7	52.4	74.0	-21.6	H	P	112.0	297.6	
15.720	3.0	22.0	39.1	12.3	-34.0	0.0	0.7	40.2	54.0	-13.8	H	A	112.0	297.6	

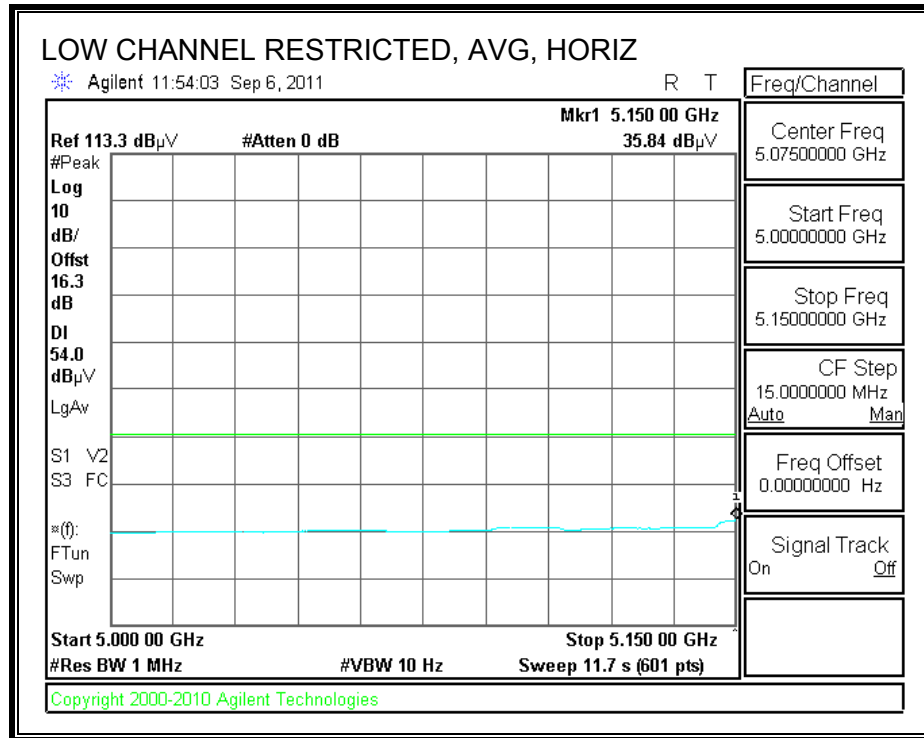
Rev. 4.1.2.7

Note: No other emissions were detected above the system noise floor.

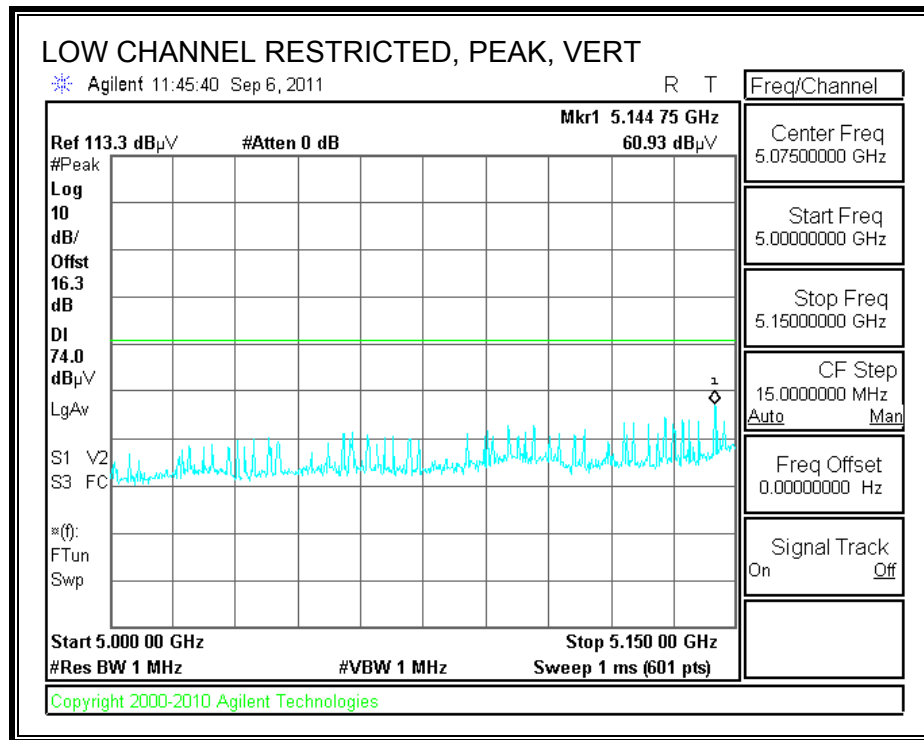
8.2.2. TX ABOVE 1 GHz FOR 802.11n HT20 MODE IN THE LOWER 5.2 GHz BAND

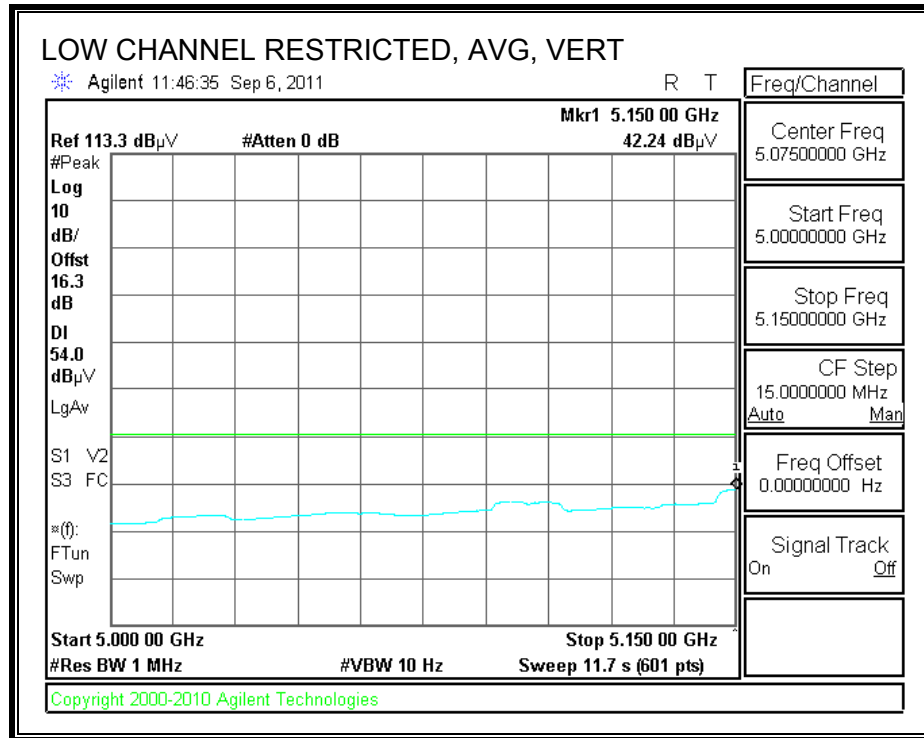
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)





RESTRICTED BANEDGE (LOW CHANNEL, VERTICAL)





HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement

Compliance Certification Services, Fremont 5m Chamber

Test Engr: William Zhuang
Date: 09/06/11
Project #: 11I14017
Company: Samsung
Test Target:
Mode Oper: Tx On , 5.2 GHz, HT20, Worst Position Y

f	Measurement Frequency	Amp	Preamp Gain	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter	

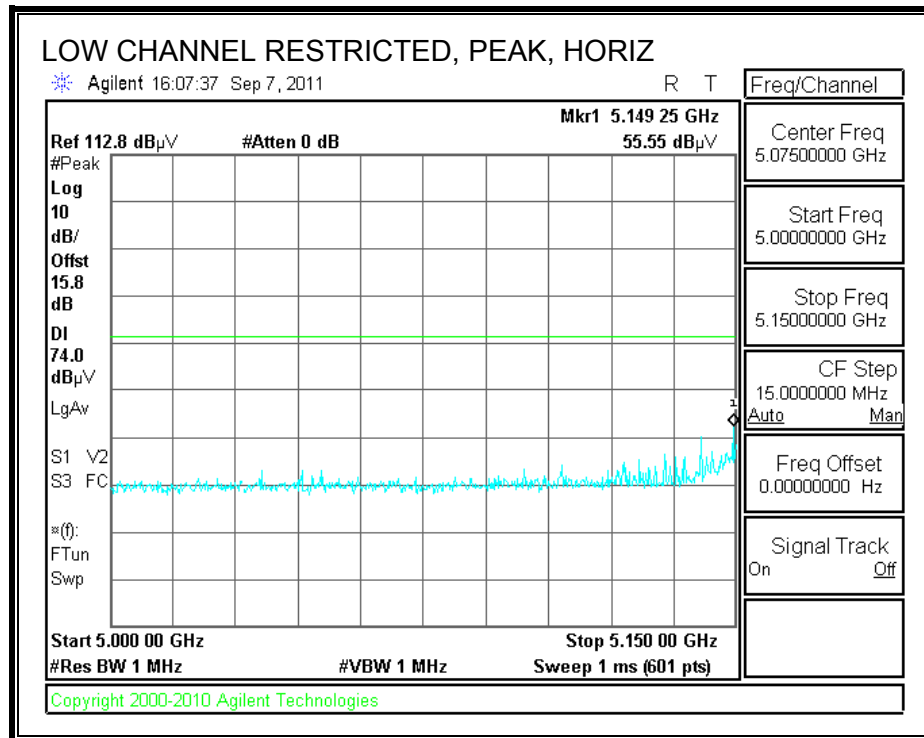
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filtr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Ant.High cm	Table Angle Degree	Notes
Low Ch.															
15.540	3.0	34.1	39.3	12.2	-34.0	0.0	0.7	52.3	74.0	-21.7	V	P	100.0	82.9	
15.540	3.0	22.2	39.3	12.2	-34.0	0.0	0.7	40.3	54.0	-13.7	V	A	100.0	82.9	
15.540	3.0	34.2	39.3	12.2	-34.0	0.0	0.7	52.4	74.0	-21.6	H	P	193.0	1.9	
15.540	3.0	22.1	39.3	12.2	-34.0	0.0	0.7	40.3	54.0	-13.7	H	A	193.0	1.9	
Mid Ch.															
15.600	3.0	34.1	39.2	12.2	-34.0	0.0	0.7	52.3	74.0	-21.7	V	P	100.5	127.5	
15.600	3.0	22.2	39.2	12.2	-34.0	0.0	0.7	40.3	54.0	-13.7	V	A	100.5	127.5	
15.600	3.0	34.4	39.2	12.2	-34.0	0.0	0.7	52.5	74.0	-21.5	H	P	101.7	273.1	
15.600	3.0	22.1	39.2	12.2	-34.0	0.0	0.7	40.3	54.0	-13.7	H	A	101.7	273.1	
High Ch.															
15.720	3.0	33.7	39.1	12.3	-34.0	0.0	0.7	51.9	74.0	-22.1	V	P	101.6	0.5	
15.720	3.0	21.9	39.1	12.3	-34.0	0.0	0.7	40.1	54.0	-13.9	V	A	101.6	0.5	
15.720	3.0	33.9	39.1	12.3	-34.0	0.0	0.7	52.1	74.0	-21.9	H	P	165.5	103.0	
15.720	3.0	21.9	39.1	12.3	-34.0	0.0	0.7	40.1	54.0	-13.9	H	A	165.5	103.0	

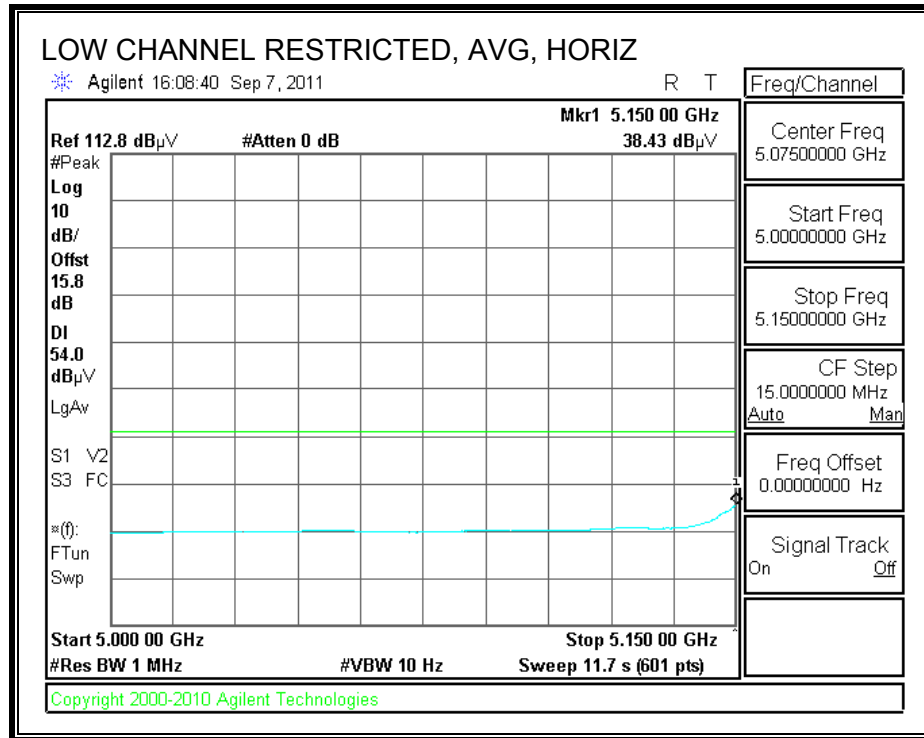
Rev. 4.1.2.7

Note: No other emissions were detected above the system noise floor.

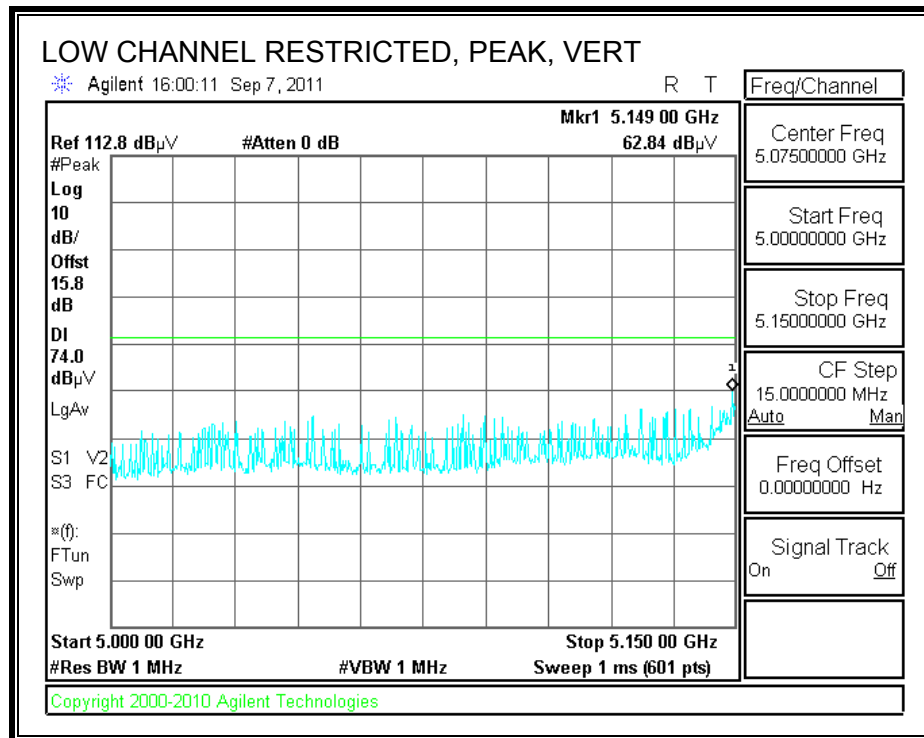
8.2.3. TX ABOVE 1 GHz FOR 802.11n HT40 MODE IN THE LOWER 5.2 GHz BAND

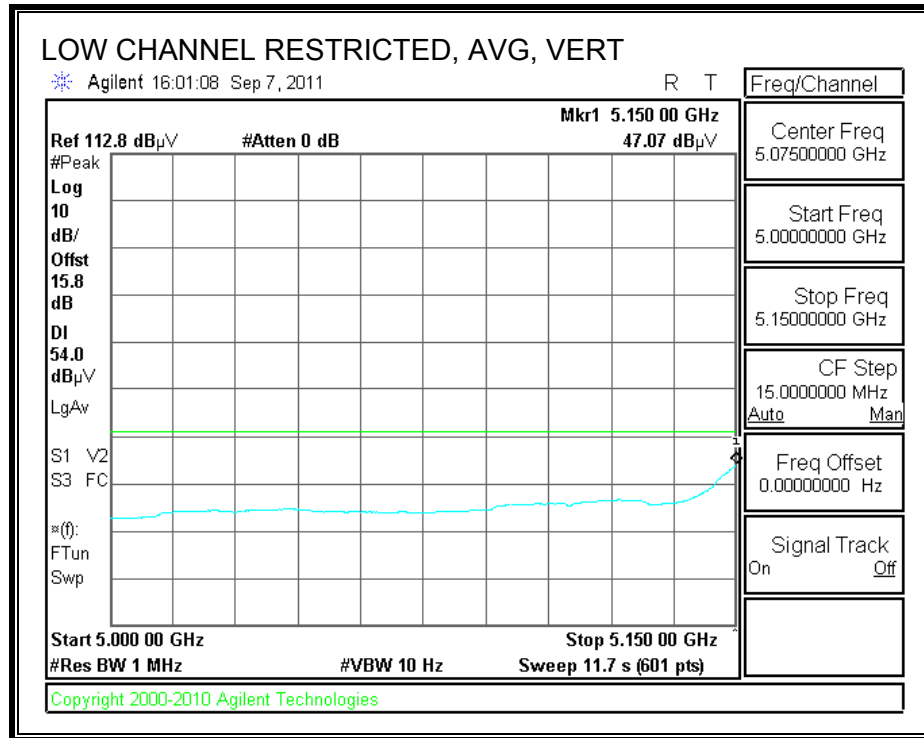
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)





RESTRICTED BANEDGE (LOW CHANNEL, VERTICAL)





HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement

Compliance Certification Services, Fremont 5m Chamber

Test Engr: William Zhuang
Date: 09/07/11
Project #: 11I14017
Company: Samsung
Test Target:
Mode Oper: Tx On , 5.2 GHz, HT40, Worst Position Y

f	Measurement Frequency	Amp	Preamp Gain	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter	

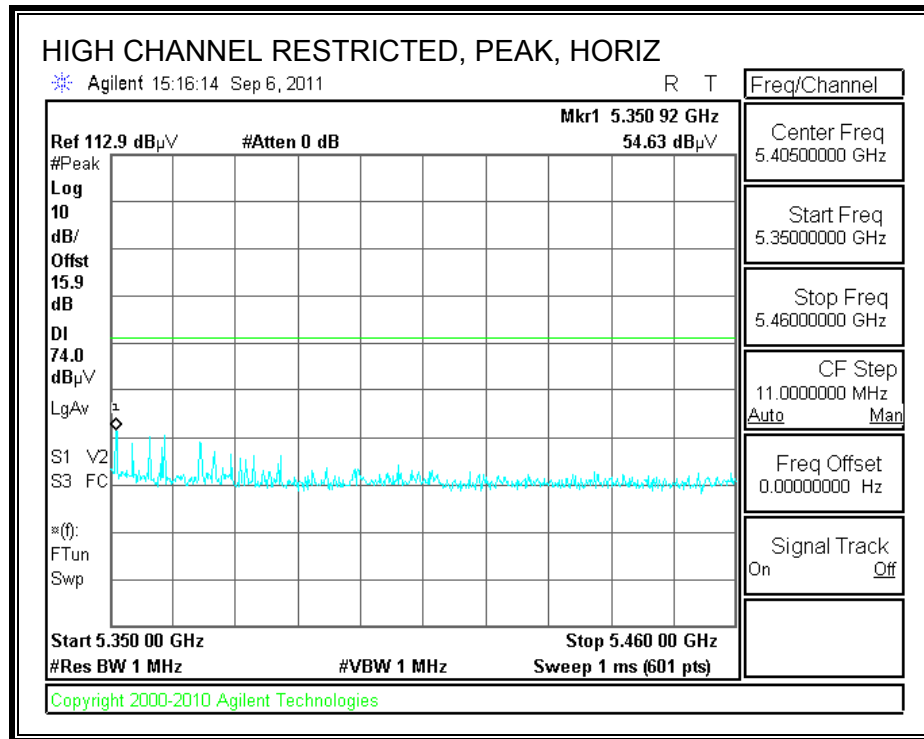
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filtr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Ant.High cm	Table Angle Degree	Notes
Low Ch. 5190 MHz															
15.570	3.0	35.1	39.2	12.2	-34.0	0.0	0.7	53.2	74.0	-20.8	V	P	185.4	149.7	
15.570	3.0	22.1	39.2	12.2	-34.0	0.0	0.7	40.3	54.0	-13.7	V	A	185.4	149.7	
15.570	3.0	34.6	39.2	12.2	-34.0	0.0	0.7	52.7	74.0	-21.3	H	P	183.3	194.8	
15.570	3.0	22.1	39.2	12.2	-34.0	0.0	0.7	40.3	54.0	-13.7	H	A	183.3	194.8	
High Ch. 5230 MHz															
15.690	3.0	34.8	39.2	12.3	-34.0	0.0	0.7	53.0	74.0	-21.0	V	P	102.7	43.6	
15.690	3.0	22.0	39.2	12.3	-34.0	0.0	0.7	40.2	54.0	-13.8	V	A	102.7	43.6	
15.690	3.0	34.1	39.2	12.3	-34.0	0.0	0.7	52.2	74.0	-21.8	H	P	101.4	268.7	
15.690	3.0	22.0	39.2	12.3	-34.0	0.0	0.7	40.2	54.0	-13.8	H	A	101.4	268.7	

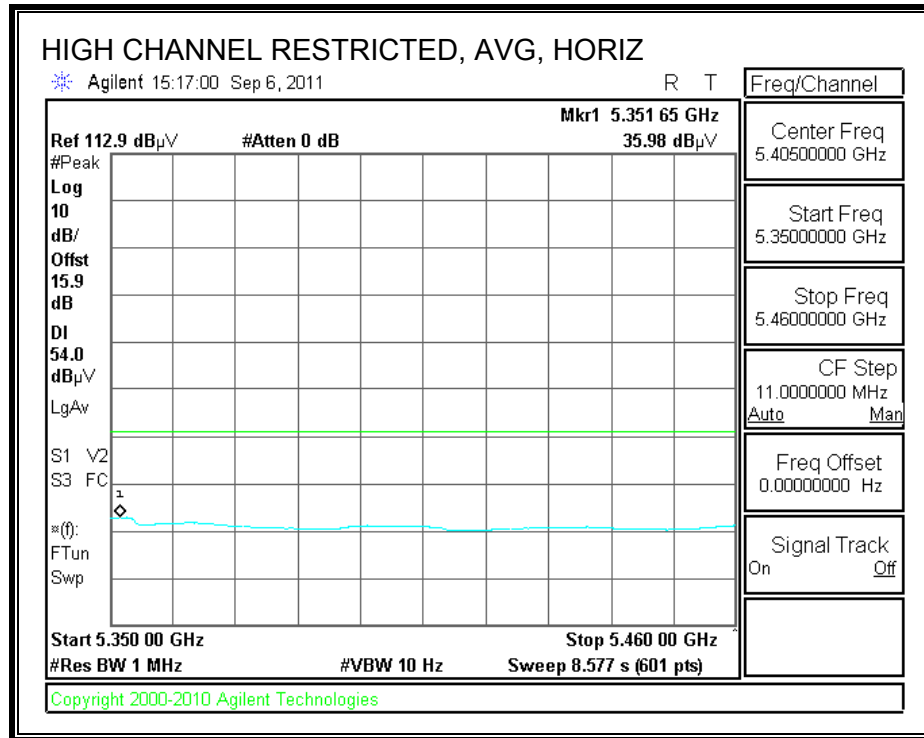
Rev. 4.1.2.7

Note: No other emissions were detected above the system noise floor.

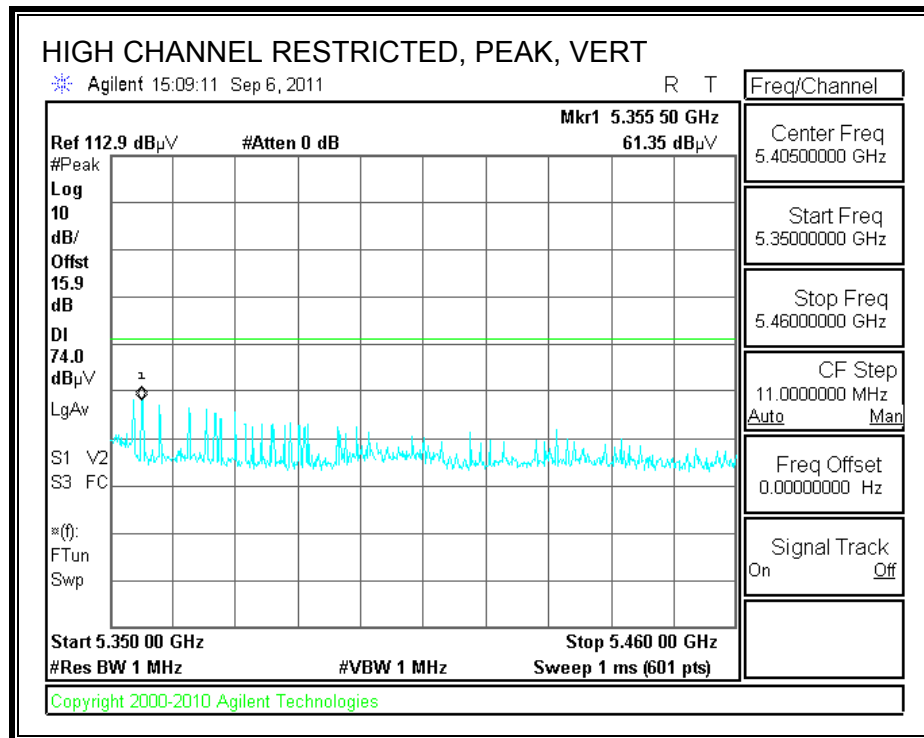
8.2.4. TX ABOVE 1 GHz FOR 802.11a MODE IN THE UPPER 5.2 GHz BAND

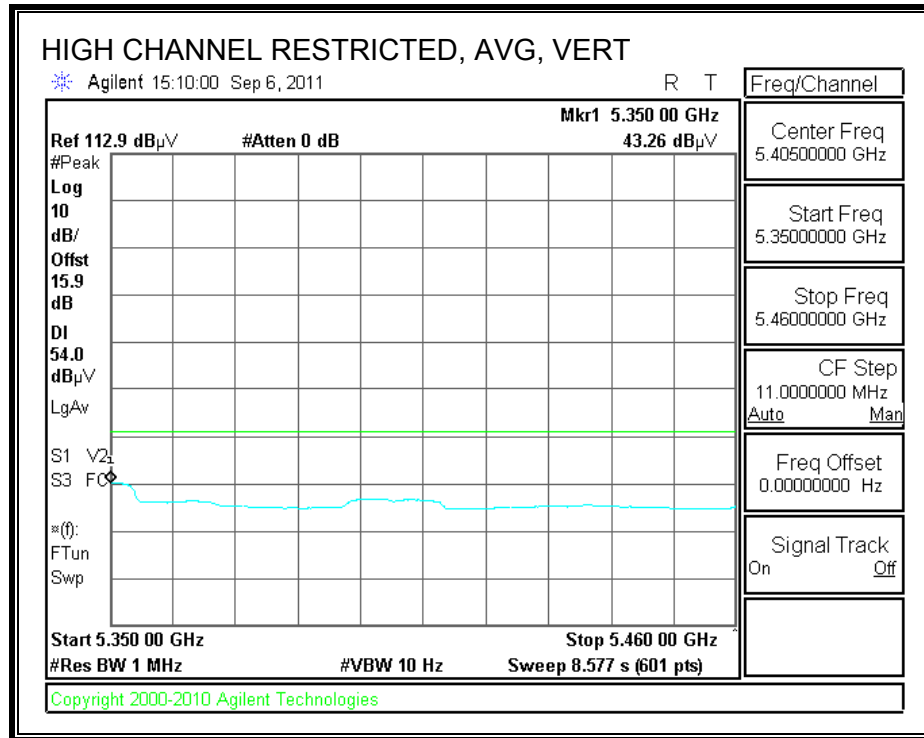
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)





RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)





HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement Compliance Certification Services, Fremont 5m Chamber

Test Engr: William Zhuang
Date: 09/06/11
Project #: 11I14017
Company: Samsung
Test Target:
Mode Oper: Tx On, 5.3 GHz, a Mode, Worst Position Y

f	Measurement Frequency	Amp	Preamp Gain	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter	

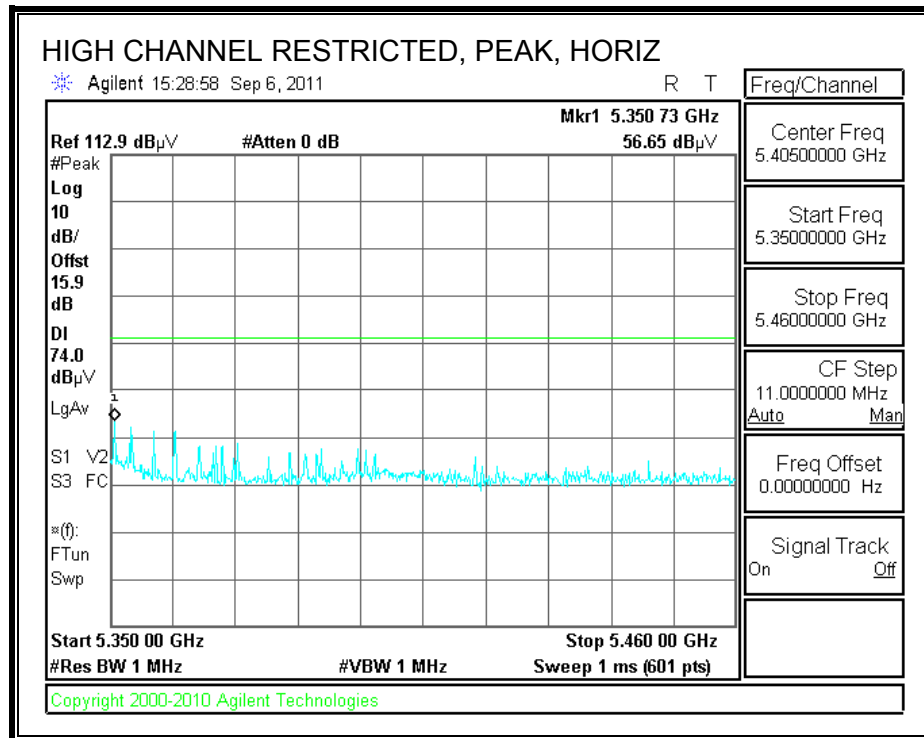
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filtr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Ant.High cm	Table Angle Degree	Notes
Low Ch.															
15.780	3.0	34.3	39.1	12.3	-33.9	0.0	0.7	52.5	74.0	-21.5	V	P	151.0	348.7	
15.780	3.0	22.3	39.1	12.3	-33.9	0.0	0.7	40.5	54.0	-13.5	V	A	151.0	348.7	
15.780	3.0	34.3	39.1	12.3	-33.9	0.0	0.7	52.5	74.0	-21.5	H	P	124.0	171.8	
15.780	3.0	22.3	39.1	12.3	-33.9	0.0	0.7	40.5	54.0	-13.5	H	A	124.0	171.8	
Mid Ch.															
10.600	3.0	35.2	38.7	9.7	-35.7	0.0	0.8	48.6	74.0	-25.4	V	P	137.2	160.0	
10.600	3.0	22.5	38.7	9.7	-35.7	0.0	0.8	35.9	54.0	-18.1	V	A	137.2	160.0	
10.600	3.0	34.4	38.7	9.7	-35.7	0.0	0.8	47.8	74.0	-26.2	H	P	149.2	15.4	
10.600	3.0	22.5	38.7	9.7	-35.7	0.0	0.8	36.0	54.0	-18.0	H	A	149.2	15.4	
High Ch.															
10.640	3.0	34.6	38.7	9.8	-35.7	0.0	0.8	48.1	74.0	-25.9	V	P	103.1	83.5	
10.640	3.0	22.4	38.7	9.8	-35.7	0.0	0.8	35.9	54.0	-18.1	V	A	103.1	83.5	
10.640	3.0	34.1	38.7	9.8	-35.7	0.0	0.8	47.5	74.0	-26.5	H	P	177.5	219.8	
10.640	3.0	22.4	38.7	9.8	-35.7	0.0	0.8	35.9	54.0	-18.1	H	A	177.5	219.8	

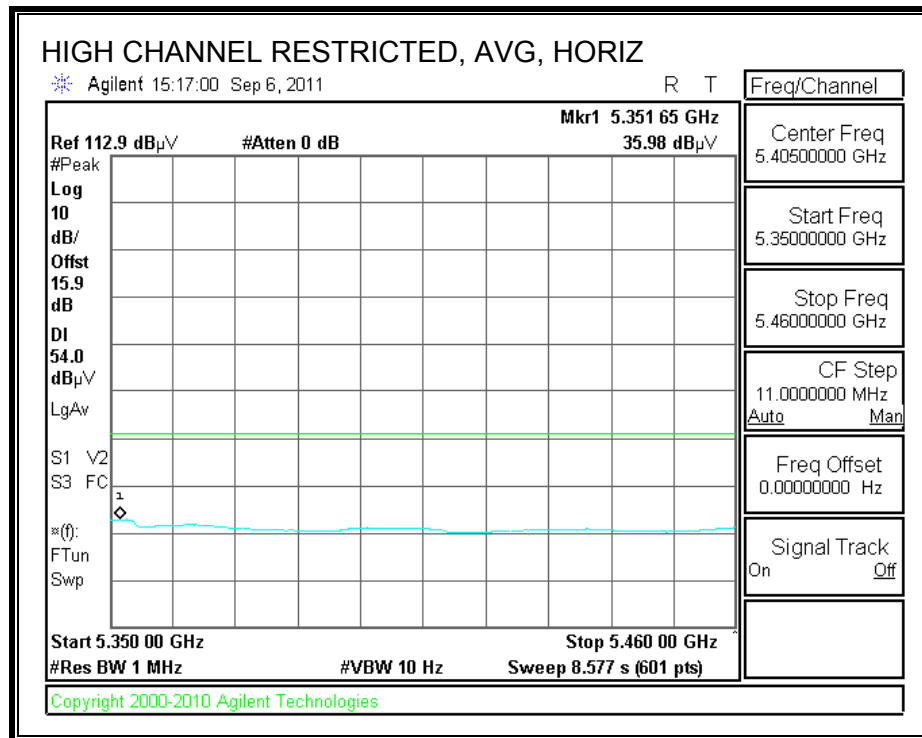
Rev. 4.1.2.7

Note: No other emissions were detected above the system noise floor.

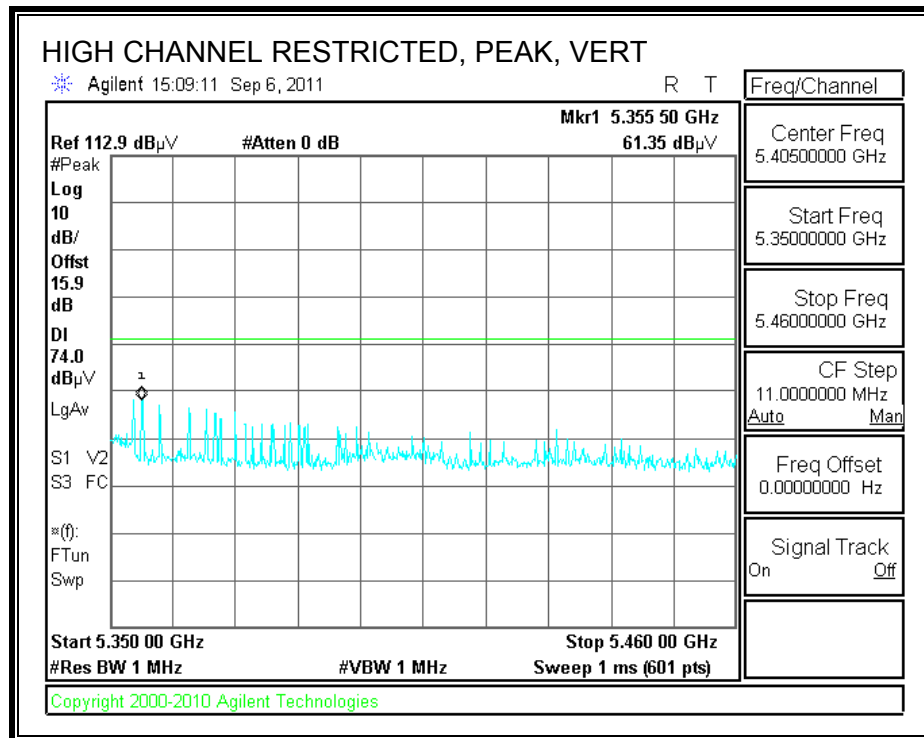
8.2.5. TX ABOVE 1 GHz FOR 802.11n HT20 MODE IN THE UPPER 5.2 GHz BAND

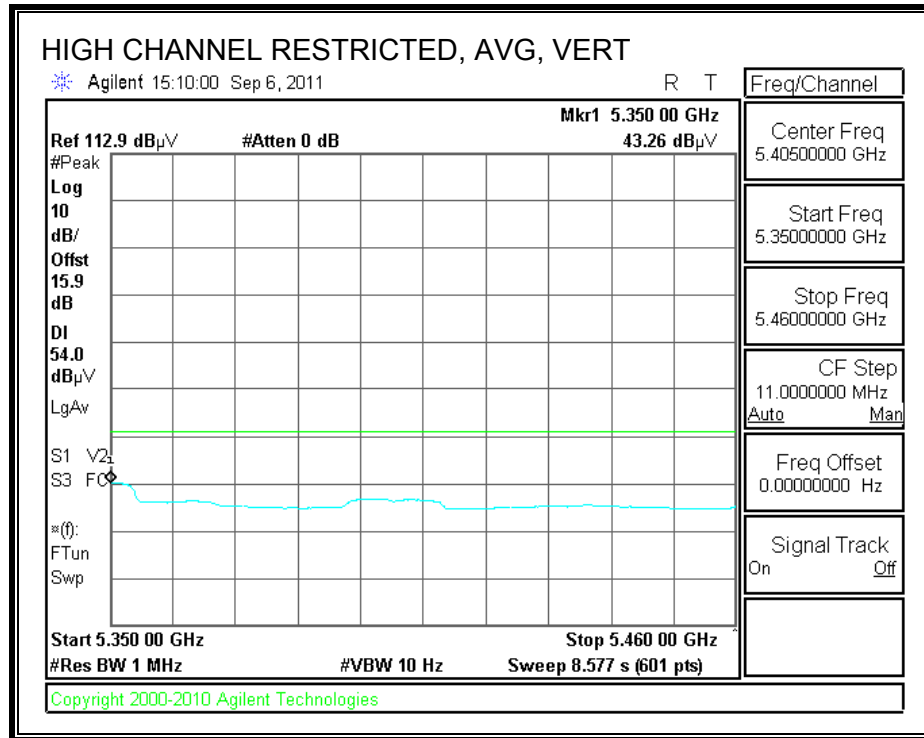
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)





RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)





HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement Compliance Certification Services, Fremont 5m Chamber

Test Engr: William Zhuang
Date: 09/06/11
Project #: 11I14017
Company: Samsung
Test Target:
Mode Oper: Tx On, 5.3 GHz, HT20, Worst Position Y

f	Measurement Frequency	Amp	Preamp Gain	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter	

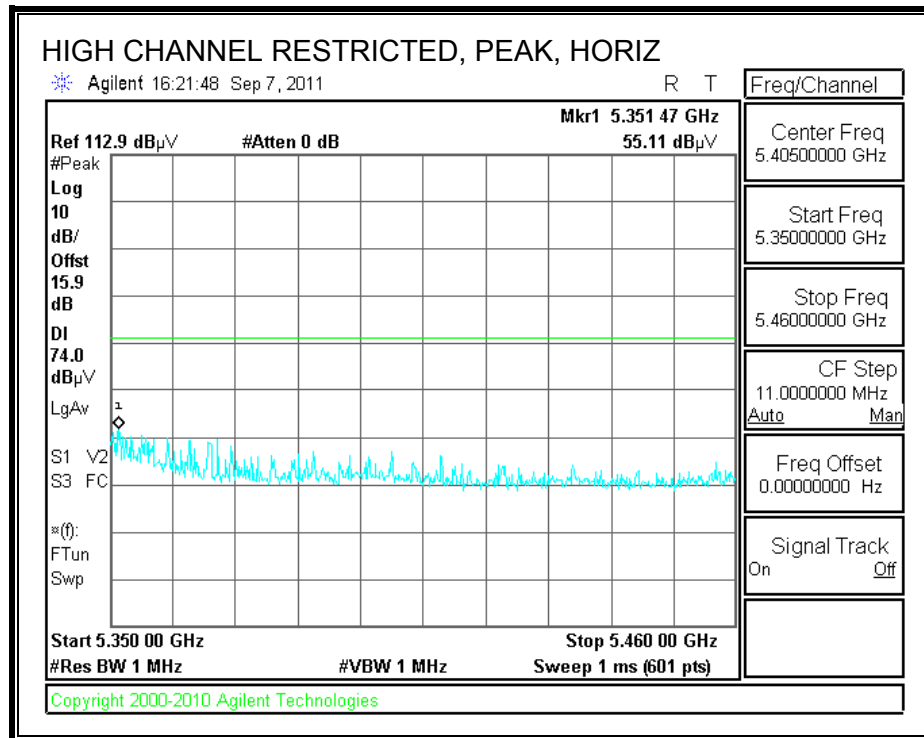
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filtr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Ant.High cm	Table Angle Degree	Notes
Low Ch.															
15.780	3.0	34.9	39.1	12.3	-33.9	0.0	0.7	53.1	74.0	-20.9	V	P	197.2	68.1	
15.780	3.0	22.4	39.1	12.3	-33.9	0.0	0.7	40.6	54.0	-13.4	V	A	197.2	68.1	
15.780	3.0	34.3	39.1	12.3	-33.9	0.0	0.7	52.5	74.0	-21.5	H	P	128.6	112.9	
15.780	3.0	22.4	39.1	12.3	-33.9	0.0	0.7	40.6	54.0	-13.4	H	A	128.6	112.9	
Mid Ch.															
10.600	3.0	34.9	38.7	9.7	-35.7	0.0	0.8	48.3	74.0	-25.7	V	P	126.9	352.3	
10.600	3.0	22.7	38.7	9.7	-35.7	0.0	0.8	36.1	54.0	-17.9	V	A	126.9	352.3	
10.600	3.0	34.4	38.7	9.7	-35.7	0.0	0.8	47.8	74.0	-26.2	H	P	162.6	163.1	
10.600	3.0	22.5	38.7	9.7	-35.7	0.0	0.8	35.9	54.0	-18.1	H	A	162.6	163.1	
High Ch.															
10.640	3.0	34.5	38.7	9.8	-35.7	0.0	0.8	48.0	74.0	-26.0	V	P	185.2	88.3	
10.640	3.0	22.4	38.7	9.8	-35.7	0.0	0.8	35.9	54.0	-18.1	V	A	185.2	88.3	
10.640	3.0	34.4	38.7	9.8	-35.7	0.0	0.8	47.8	74.0	-26.2	H	P	133.2	326.7	
10.640	3.0	22.4	38.7	9.8	-35.7	0.0	0.8	35.9	54.0	-18.1	H	A	133.2	326.7	

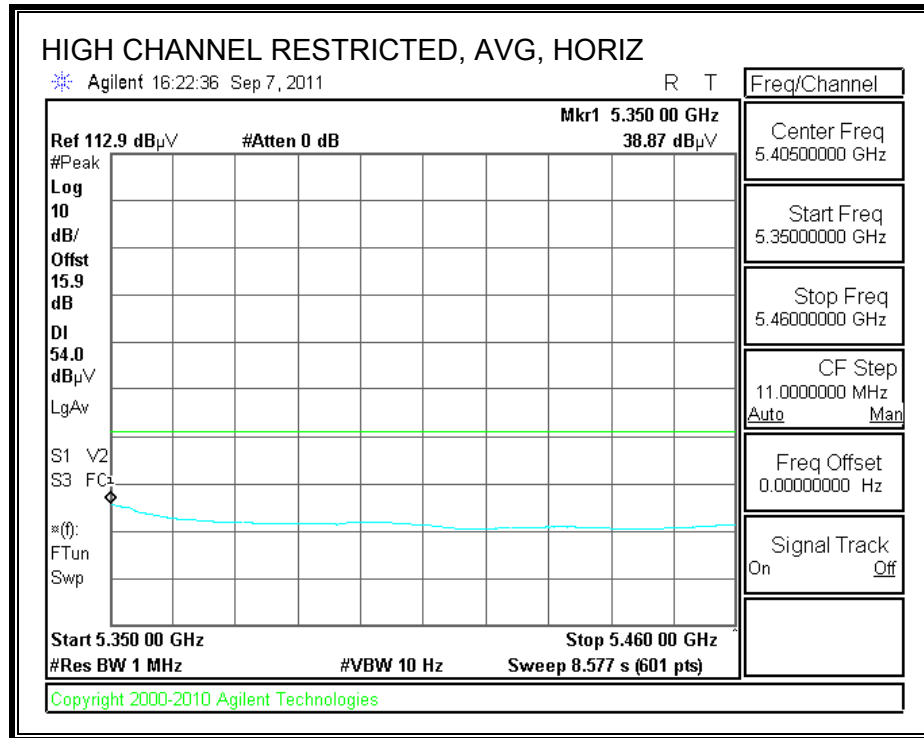
Rev. 4.1.2.7

Note: No other emissions were detected above the system noise floor.

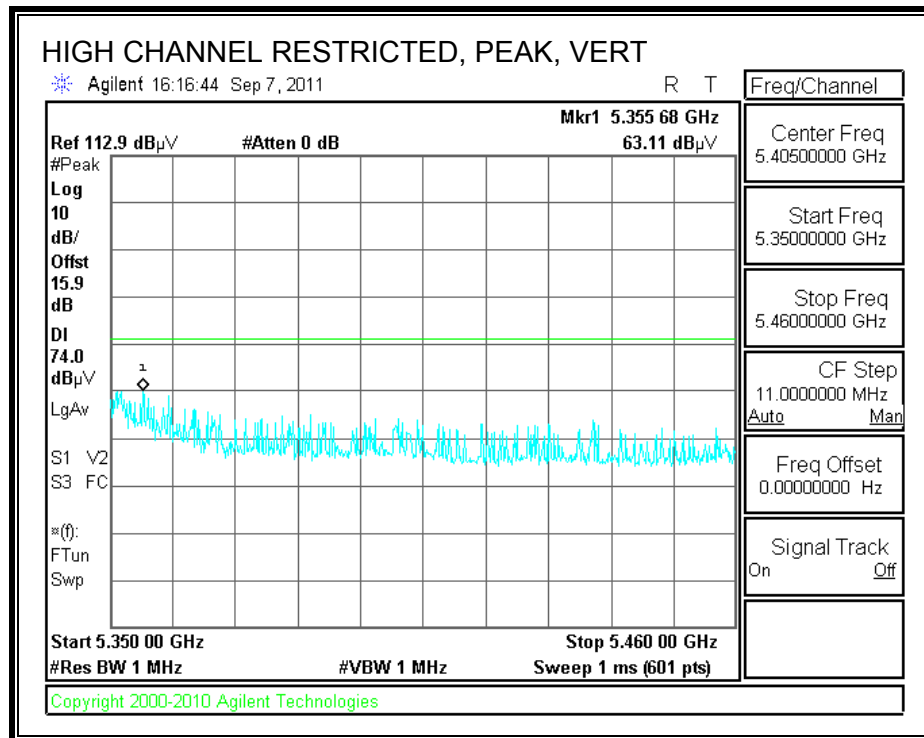
8.2.6. TX ABOVE 1 GHz FOR 802.11n HT40 MODE IN THE UPPER 5.2 GHz BAND

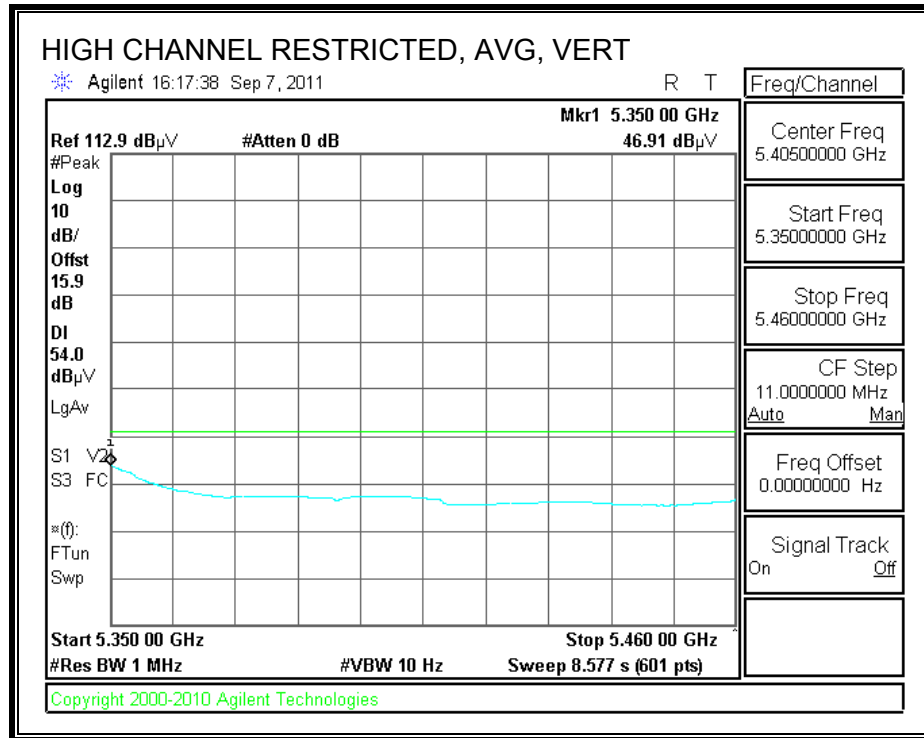
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)





RESTRICTED BANEDGE (HIGH CHANNEL, VERTICAL)





HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement Compliance Certification Services, Fremont 5m Chamber

Test Engr: William Zhuang
Date: 09/07/11
Project #: 11I14017
Company: Samsung
Test Target:
Mode Oper: Tx On , 5.3 GHz, HT40, Worst Position Y

f	Measurement Frequency	Amp	Preamp Gain	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter	

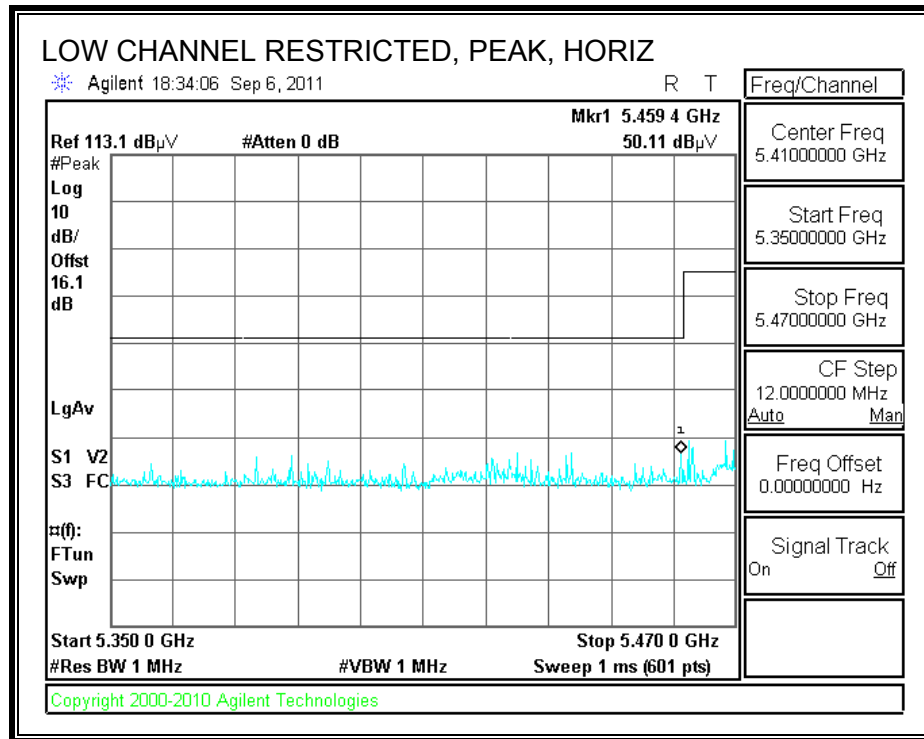
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fitr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Ant.High cm	Table Angle Degree	Notes
Low Ch. 5270 MHz															
15.810	3.0	35.4	39.1	12.3	-33.9	0.0	0.7	53.6	74.0	-20.4	V	P	164.9	320.7	
15.810	3.0	22.6	39.1	12.3	-33.9	0.0	0.7	40.8	54.0	-13.2	V	A	164.9	320.7	
15.810	3.0	35.2	39.1	12.3	-33.9	0.0	0.7	53.5	74.0	-20.6	H	P	100.0	230.8	
15.810	3.0	22.6	39.1	12.3	-33.9	0.0	0.7	40.8	54.0	-13.2	H	A	100.0	230.8	
High Ch. 5310 MHz															
15.930	3.0	35.5	39.0	12.4	-33.9	0.0	0.7	53.7	74.0	-20.3	V	P	160.7	59.7	
15.930	3.0	22.4	39.0	12.4	-33.9	0.0	0.7	40.6	54.0	-13.4	V	A	160.7	59.7	
15.930	3.0	34.3	39.0	12.4	-33.9	0.0	0.7	52.6	74.0	-21.4	H	P	199.1	54.9	
15.930	3.0	22.4	39.0	12.4	-33.9	0.0	0.7	40.6	54.0	-13.4	H	A	199.1	54.9	

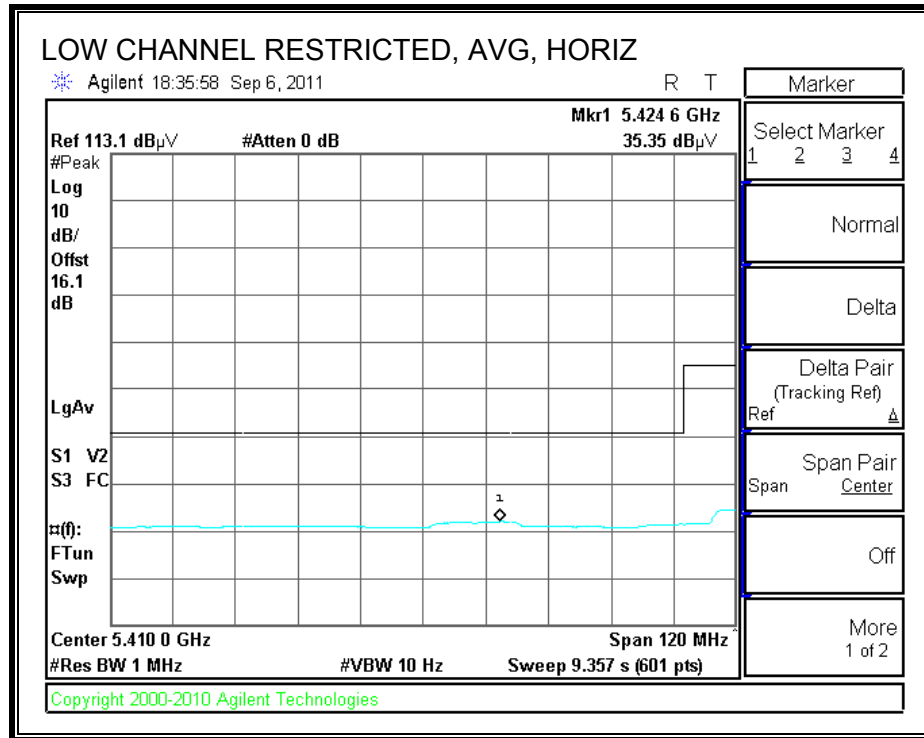
Rev. 4.1.2.7

Note: No other emissions were detected above the system noise floor.

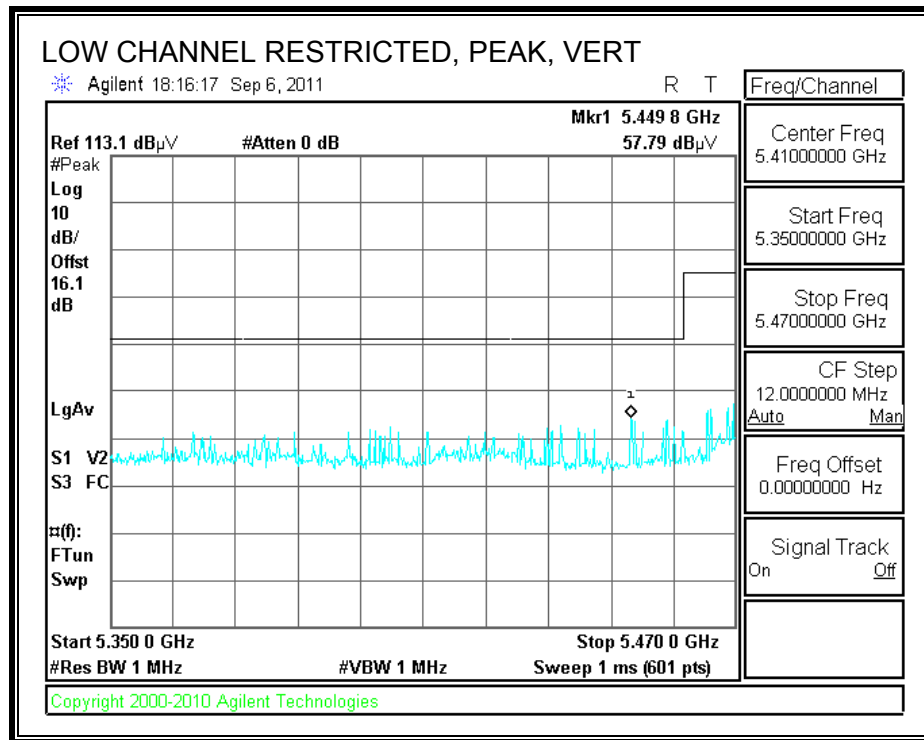
8.2.7. TX ABOVE 1 GHz FOR 802.11a MODE IN THE 5.6 GHz BAND

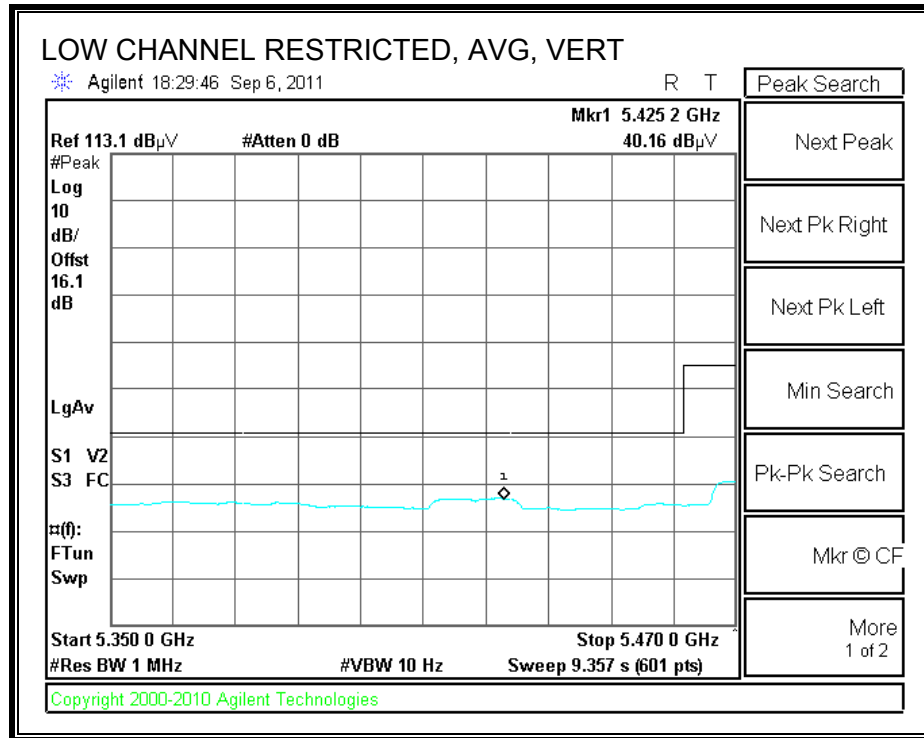
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



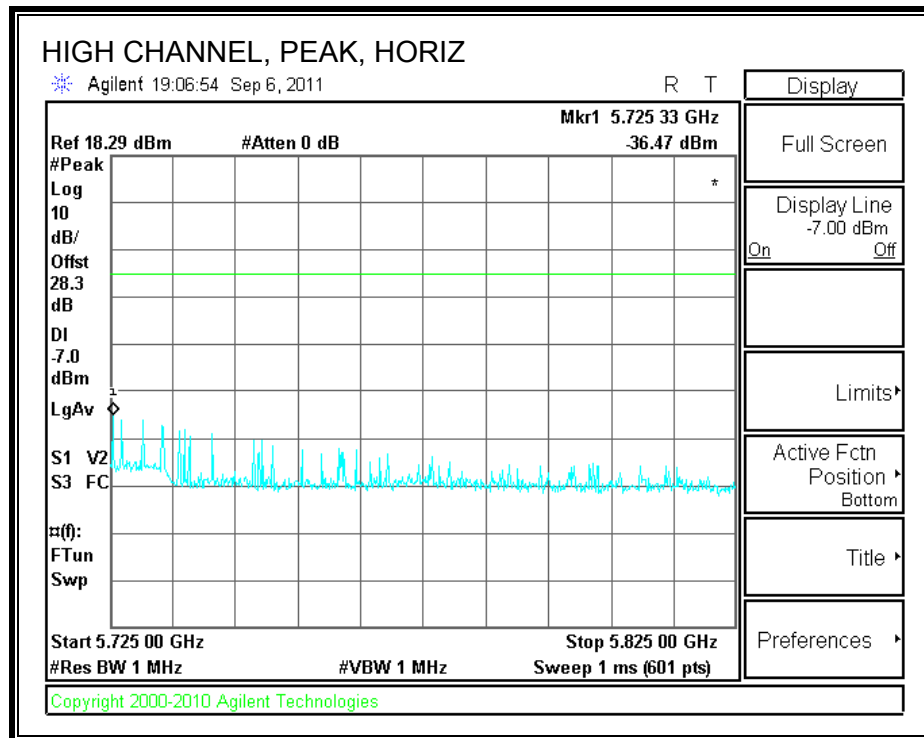


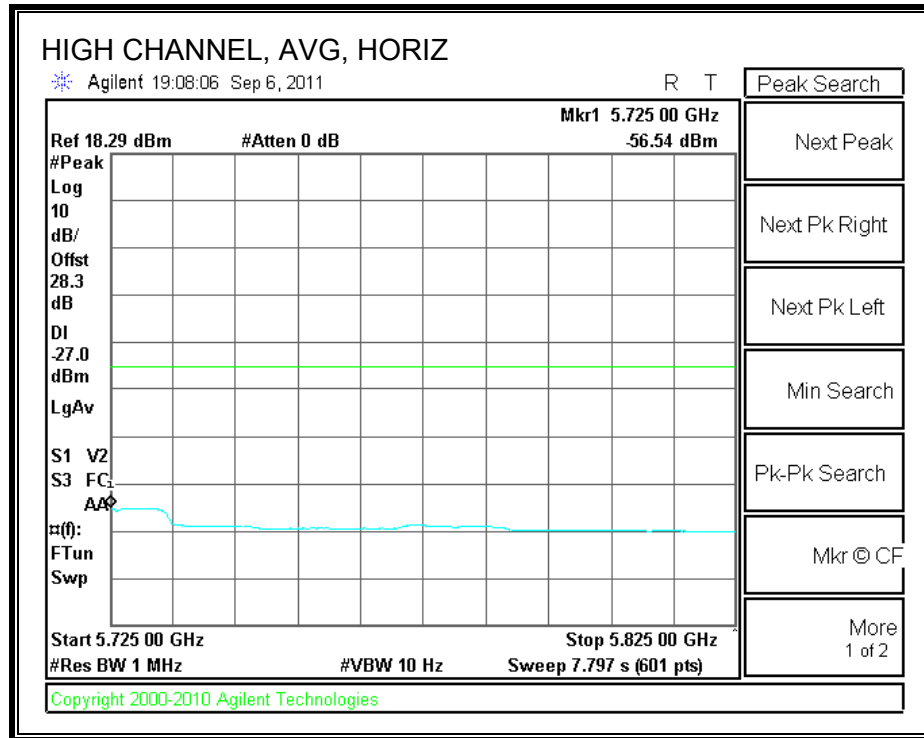
RESTRICTED BANEDGE (LOW CHANNEL, VERTICAL)



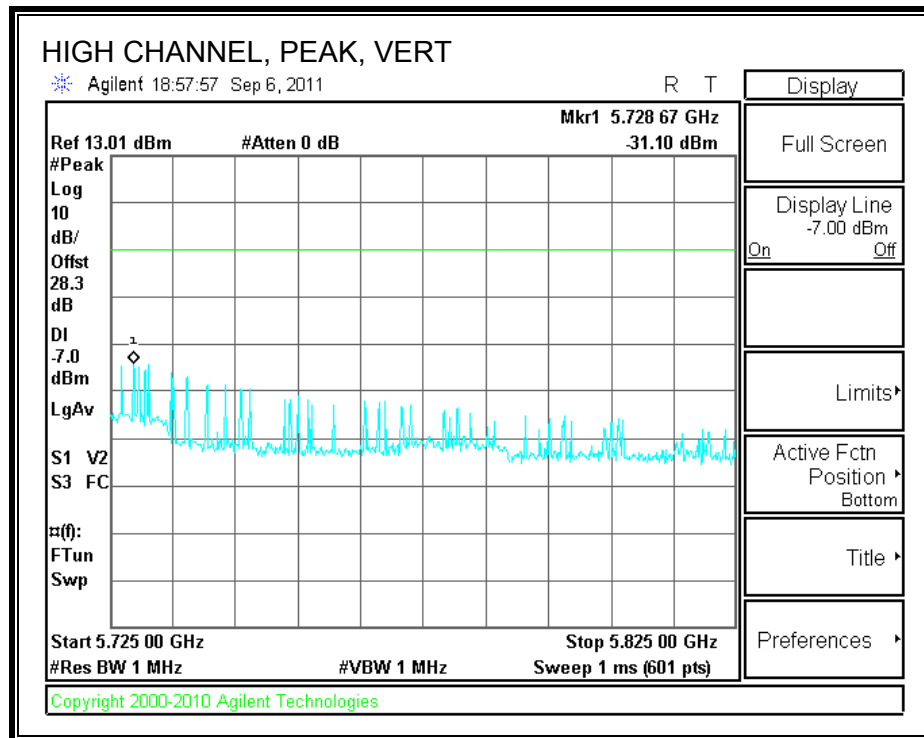


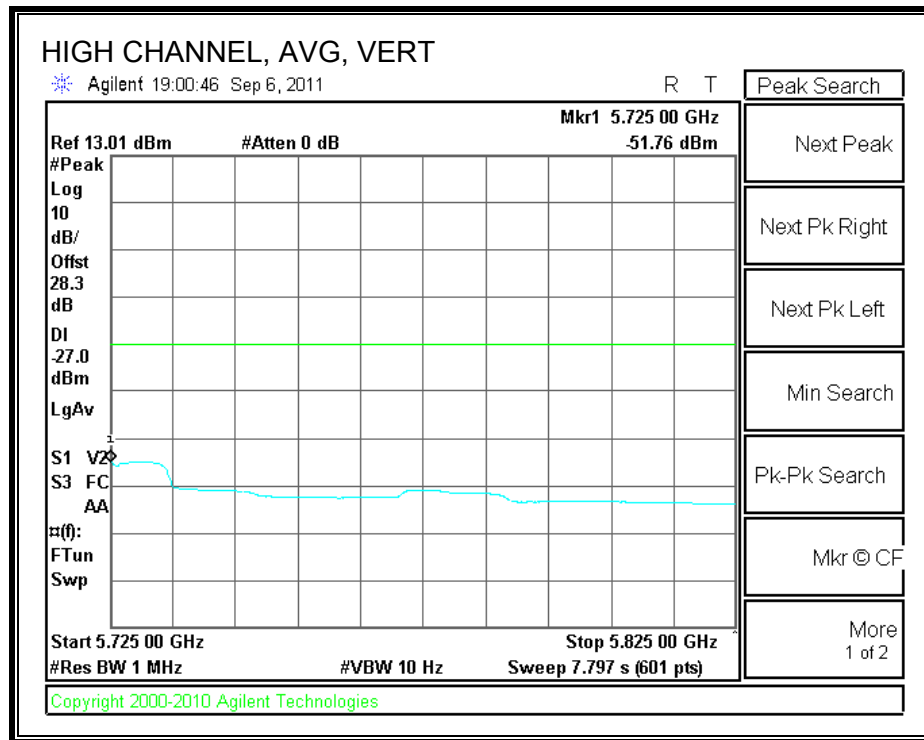
AUTHORIZED BANDEDGE (HIGH CHANNEL, HORIZONTAL)





AUTHORIZED BANDEDGE (HIGH CHANNEL, VERTICAL)





HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement Compliance Certification Services, Fremont 5m Chamber

Test Engr: William Zhuang
Date: 09/07/11
Project #: 11I14017
Company: Samsung
Test Target:
Mode Oper: Tx On, 5.5 GHz, a Mode, Worst Position Y

f	Measurement Frequency	Amp	Preamp Gain	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter	

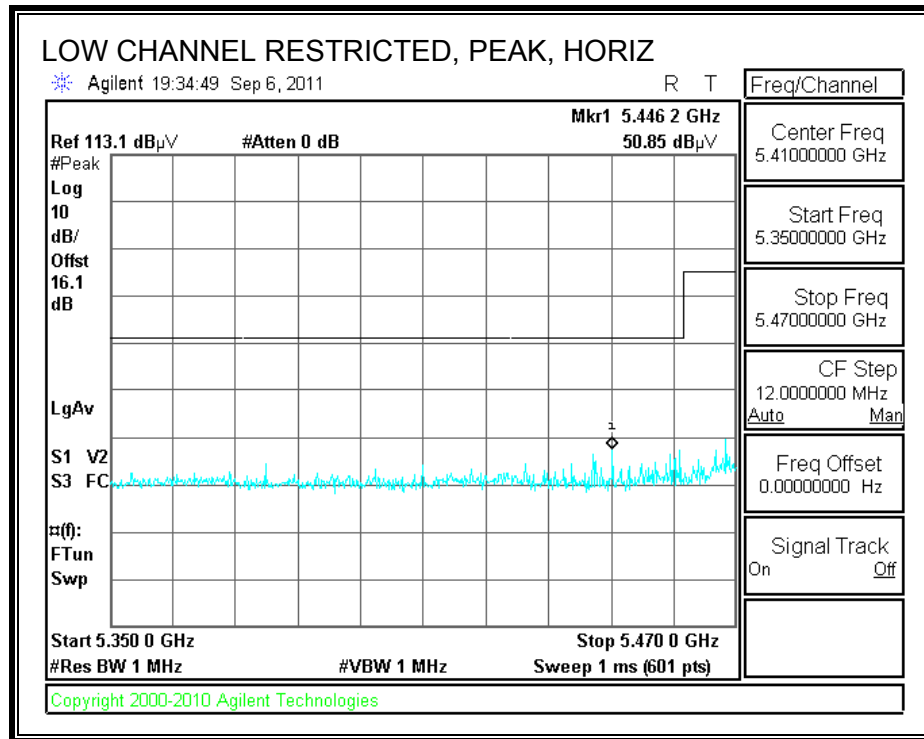
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filtr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Ant.High cm	Table Angle Degree	Notes
Low Ch. 5500 MHz															
11.000	3.0	34.6	38.7	10.2	-35.6	0.0	0.7	48.6	74.0	-25.4	V	P	110.1	59.2	
11.000	3.0	22.2	38.7	10.2	-35.6	0.0	0.7	36.2	54.0	-17.8	V	A	110.1	59.2	
11.000	3.0	34.8	38.7	10.2	-35.6	0.0	0.7	48.8	74.0	-25.2	H	P	173.5	144.1	
11.000	3.0	22.1	38.7	10.2	-35.6	0.0	0.7	36.1	54.0	-17.9	H	A	173.5	144.1	
Mid Ch. 5600 MHz															
11.200	3.0	34.3	38.7	10.3	-35.6	0.0	0.7	48.5	74.0	-25.5	V	P	103.7	264.7	
11.200	3.0	22.5	38.7	10.3	-35.6	0.0	0.7	36.7	54.0	-17.3	V	A	103.7	264.7	
11.200	3.0	34.7	38.7	10.3	-35.6	0.0	0.7	48.9	74.0	-25.1	H	P	106.2	174.0	
11.200	3.0	22.5	38.7	10.3	-35.6	0.0	0.7	36.7	54.0	-17.3	H	A	106.2	174.0	
High Ch. 5700 MHz															
11.400	3.0	35.5	38.7	10.6	-35.6	0.0	0.7	50.0	74.0	-24.0	V	P	140.3	229.6	
11.400	3.0	22.6	38.7	10.6	-35.6	0.0	0.7	37.1	54.0	-16.9	V	A	140.3	229.6	
11.400	3.0	34.5	38.7	10.6	-35.6	0.0	0.7	49.0	74.0	-25.0	H	P	199.8	337.8	
11.400	3.0	22.6	38.7	10.6	-35.6	0.0	0.7	37.1	54.0	-16.9	H	A	199.8	337.8	

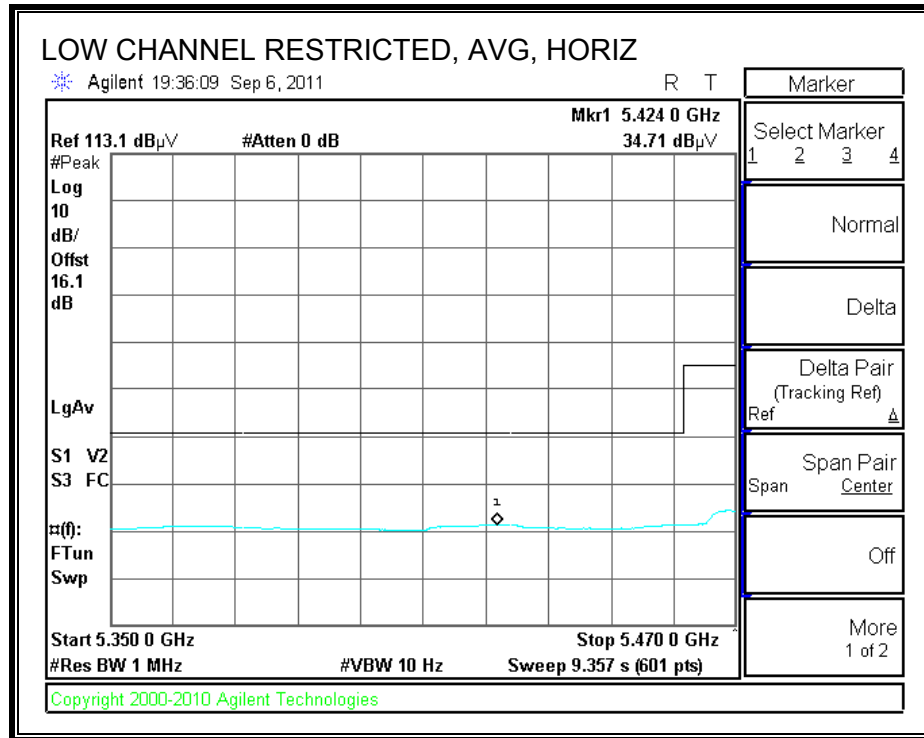
Rev. 4.1.2.7

Note: No other emissions were detected above the system noise floor.

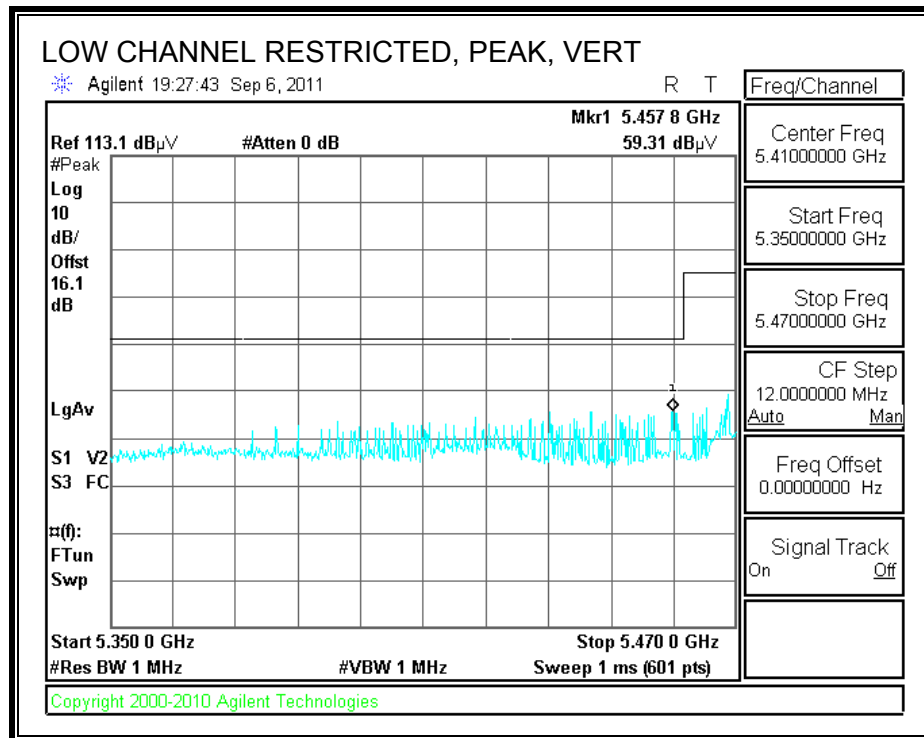
8.2.8. TX ABOVE 1 GHz FOR 802.11n HT20 MODE IN THE 5.6 GHz BAND

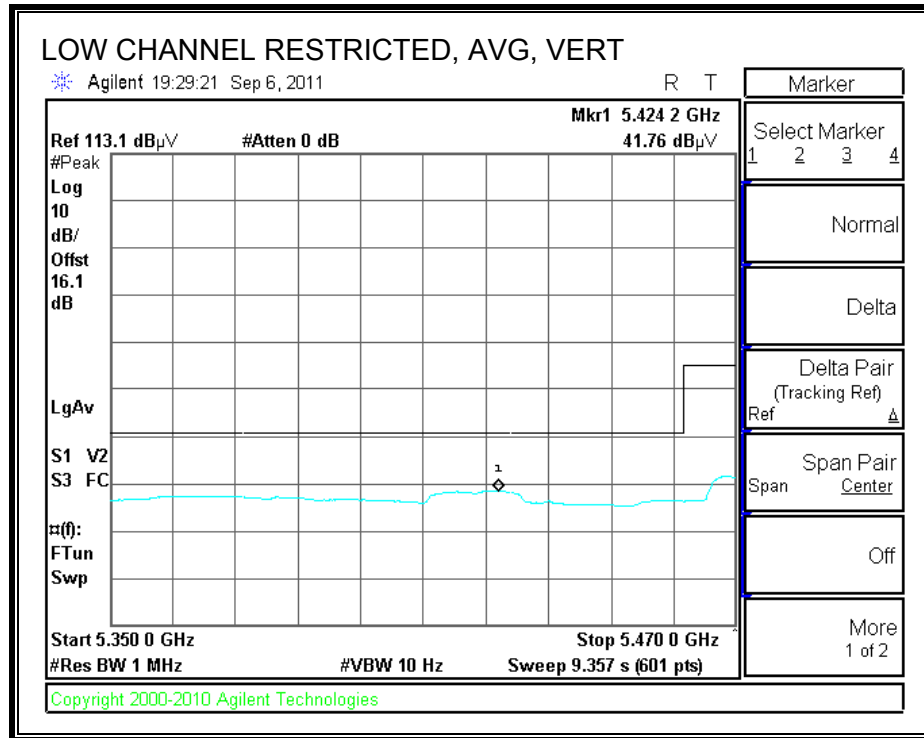
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



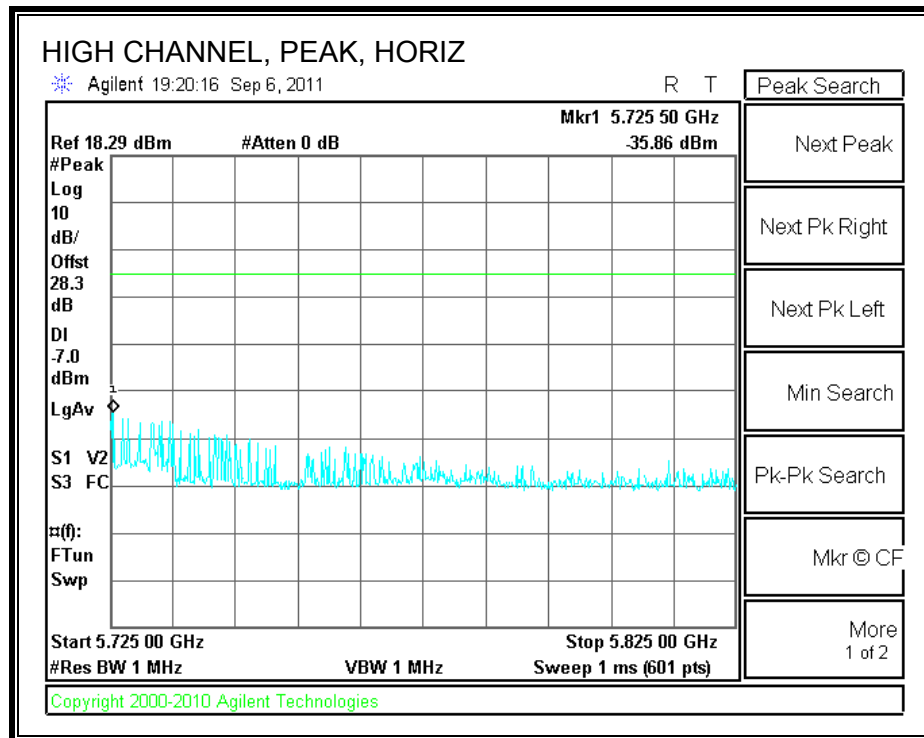


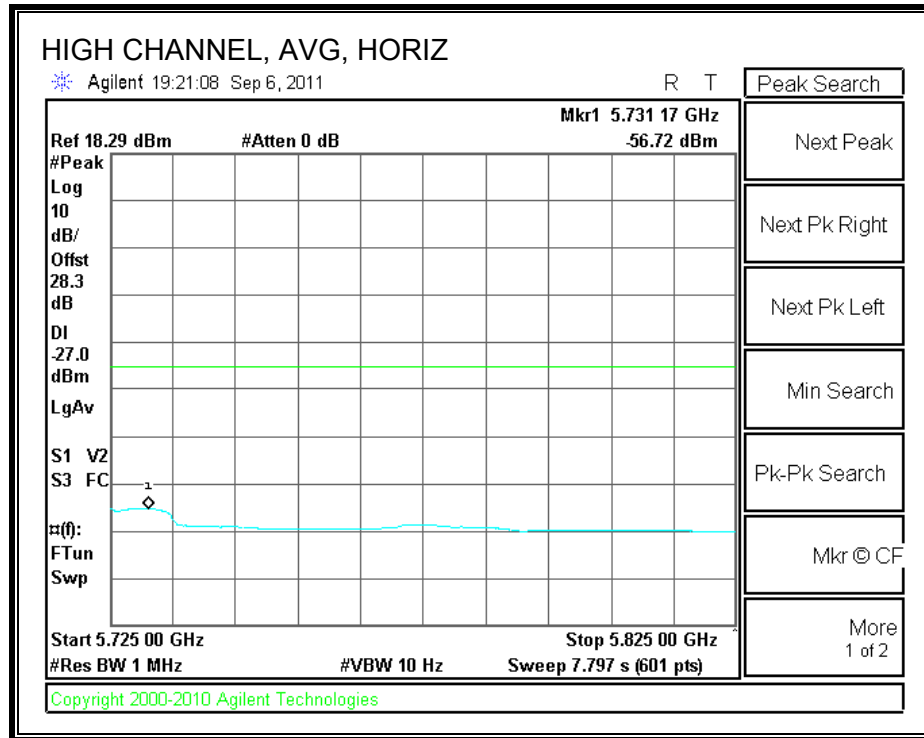
RESTRICTED BANEDGE (LOW CHANNEL, VERTICAL)



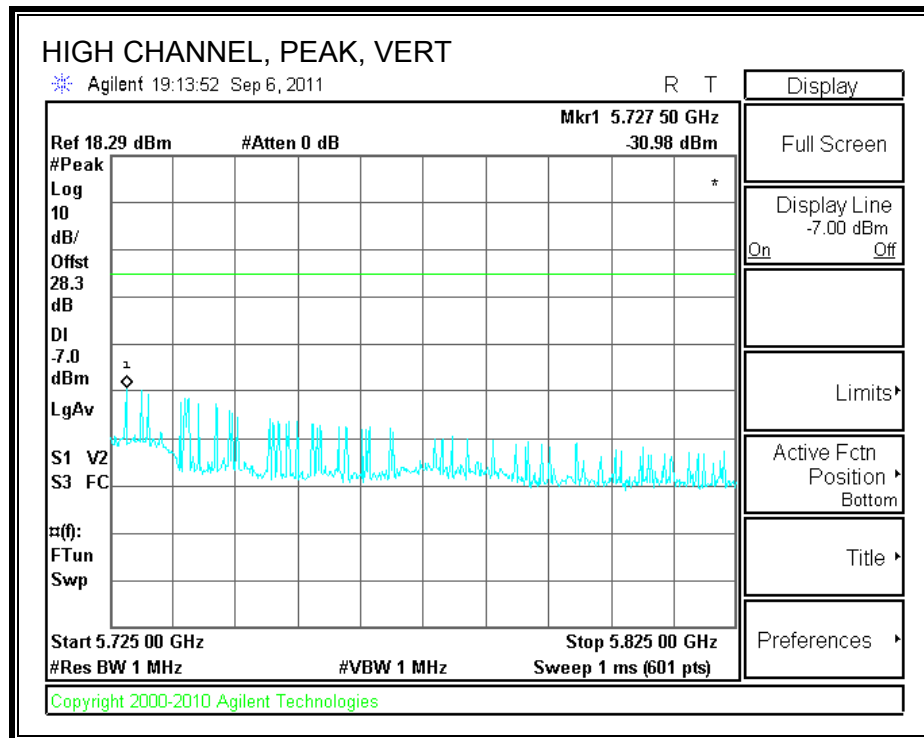


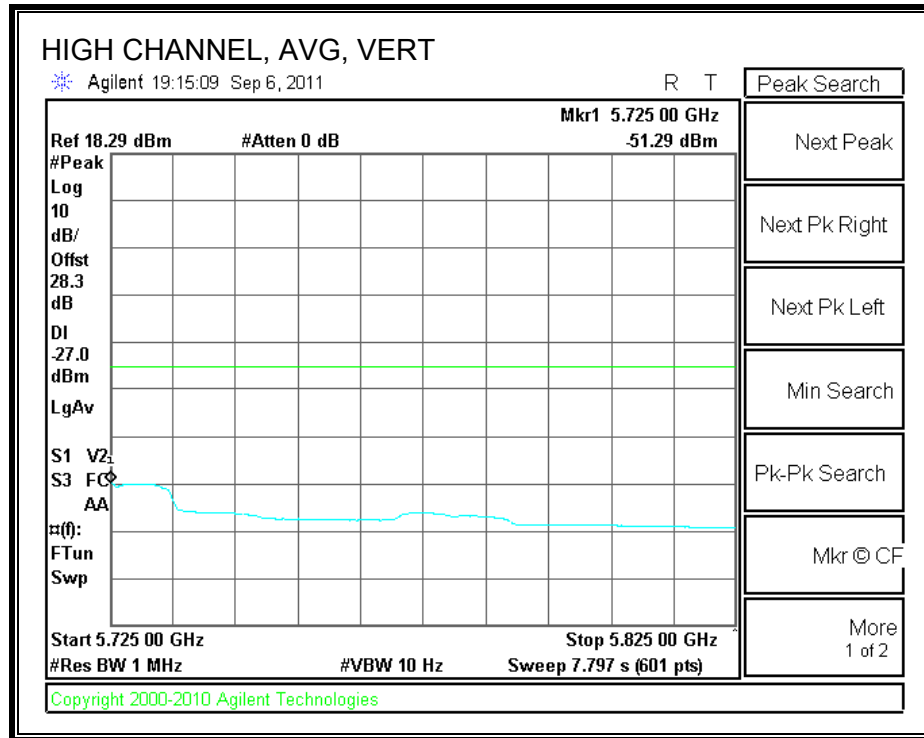
AUTHORIZED BANDEDGE (HIGH CHANNEL, HORIZONTAL)





AUTHORIZED BANDEDGE (HIGH CHANNEL, VERTICAL)





HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Test Engr: William Zhuang
Date: 09/07/11
Project #: 11I14017
Company: Samsung
Test Target:
Mode Oper: Tx On , 5.5 GHz, HT20 Mode, Worst Position Y

f	Measurement Frequency	Amp	Preamp Gain	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter	

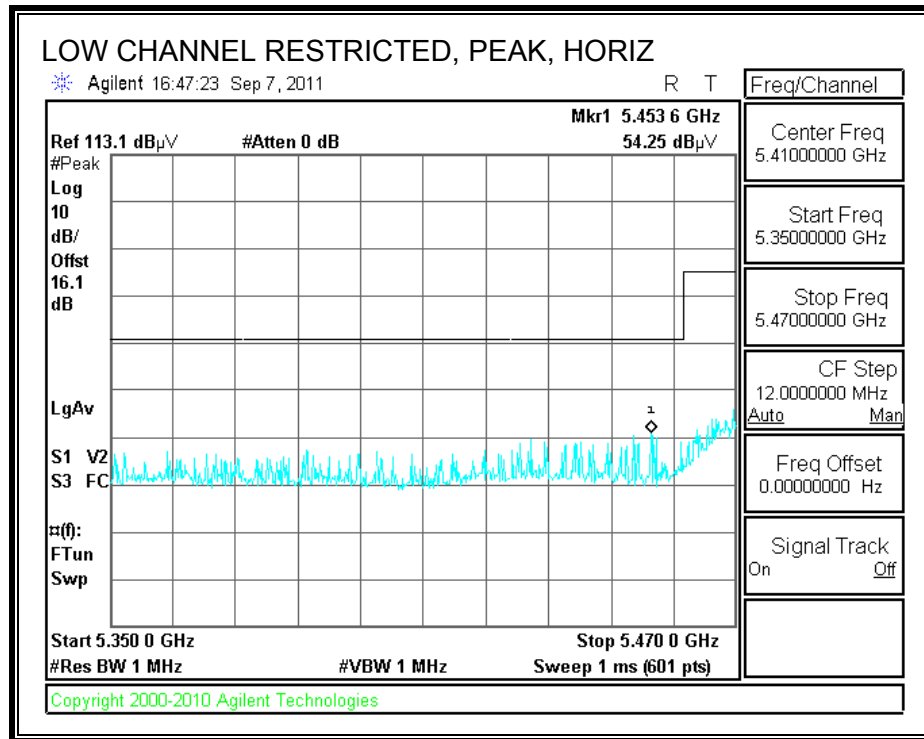
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filtr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Ant.High cm	Table Angle Degree	Notes
Low Ch. 5500 MHz															
11.000	3.0	34.1	38.7	10.2	-35.6	0.0	0.7	48.1	74.0	-25.9	V	P	107.2	359.9	
11.000	3.0	22.0	38.7	10.2	-35.6	0.0	0.7	36.0	54.0	-18.0	V	A	107.2	359.9	
11.000	3.0	34.3	38.7	10.2	-35.6	0.0	0.7	48.3	74.0	-25.7	H	P	198.7	122.4	
11.000	3.0	22.0	38.7	10.2	-35.6	0.0	0.7	36.0	54.0	-18.0	H	A	198.7	122.4	
Mid Ch. 5600 MHz															
11.200	3.0	34.4	38.7	10.3	-35.6	0.0	0.7	48.6	74.0	-25.4	V	P	196.3	221.6	
11.200	3.0	22.4	38.7	10.3	-35.6	0.0	0.7	36.6	54.0	-17.4	V	A	196.3	221.6	
11.200	3.0	35.7	38.7	10.3	-35.6	0.0	0.7	49.9	74.0	-24.1	H	P	124.3	286.6	
11.200	3.0	22.4	38.7	10.3	-35.6	0.0	0.7	36.6	54.0	-17.4	H	A	124.3	286.6	
High Ch. 5700 MHz															
11.400	3.0	34.4	38.7	10.6	-35.6	0.0	0.7	49.0	74.0	-25.0	V	P	101.2	246.5	
11.400	3.0	22.6	38.7	10.6	-35.6	0.0	0.7	37.1	54.0	-16.9	V	A	101.2	246.5	
11.400	3.0	34.9	38.7	10.6	-35.6	0.0	0.7	49.4	74.0	-24.6	H	P	175.9	127.0	
11.400	3.0	22.6	38.7	10.6	-35.6	0.0	0.7	37.1	54.0	-16.9	H	A	175.9	127.0	

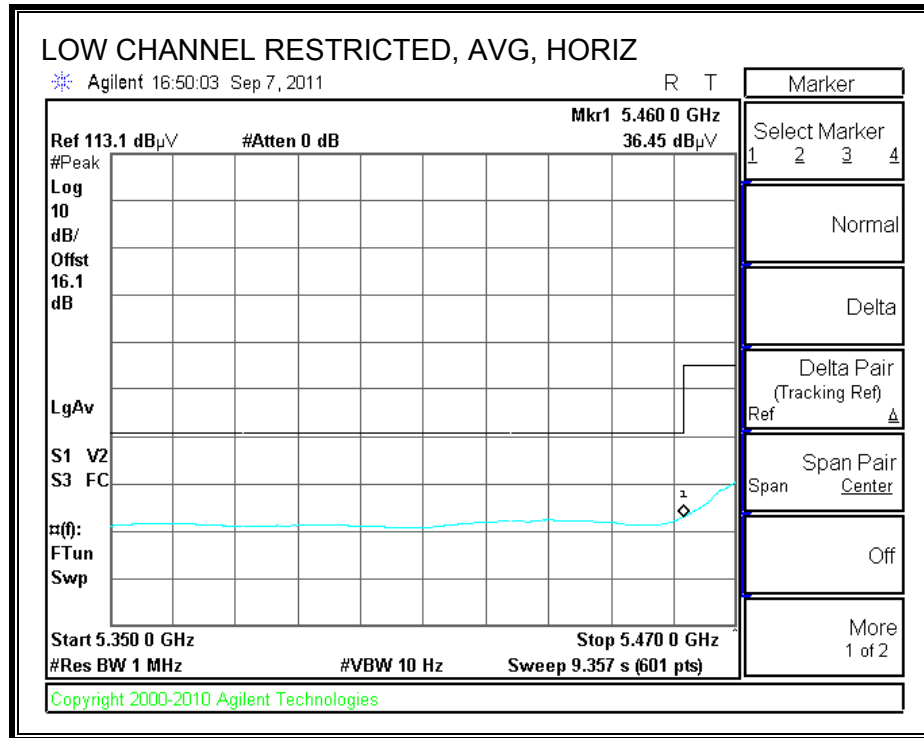
Rev. 4.1.2.7

Note: No other emissions were detected above the system noise floor.

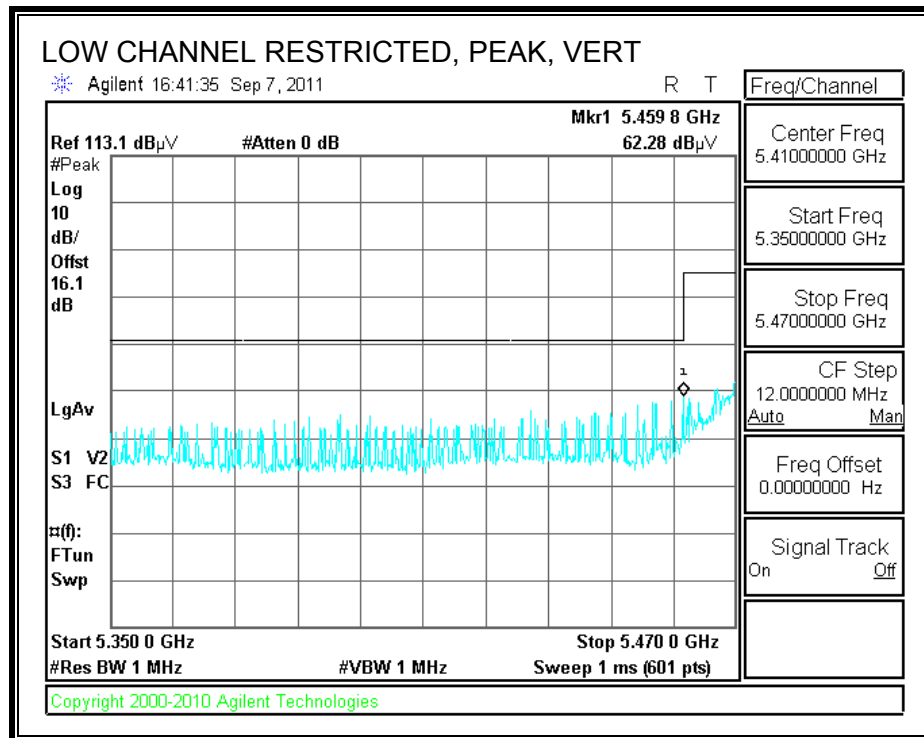
8.2.9. TX ABOVE 1 GHz FOR 802.11n HT40 MODE IN THE 5.6 GHz BAND

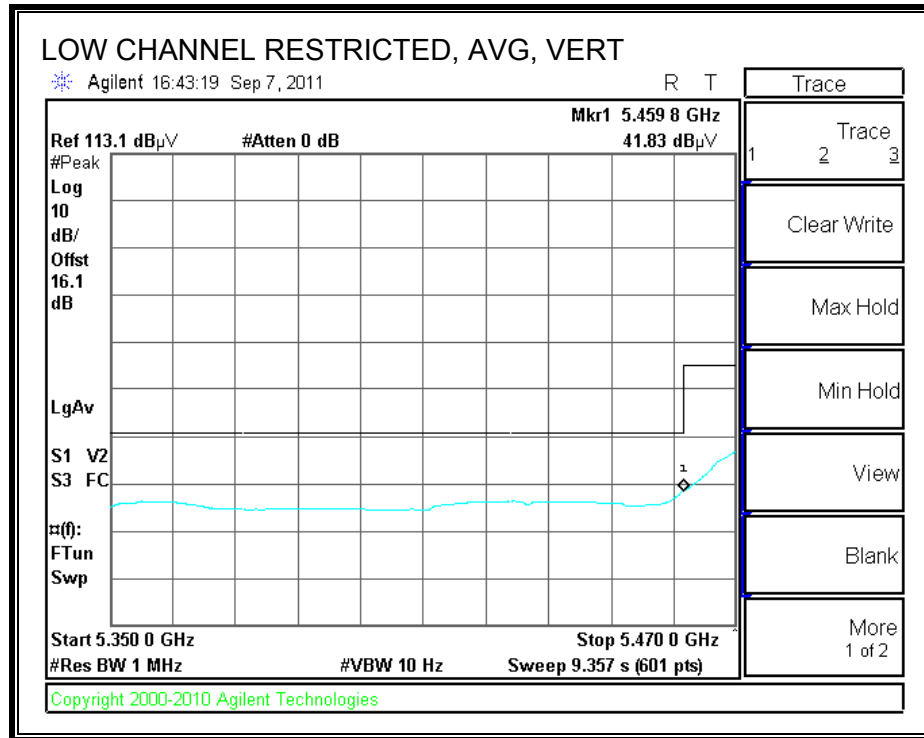
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



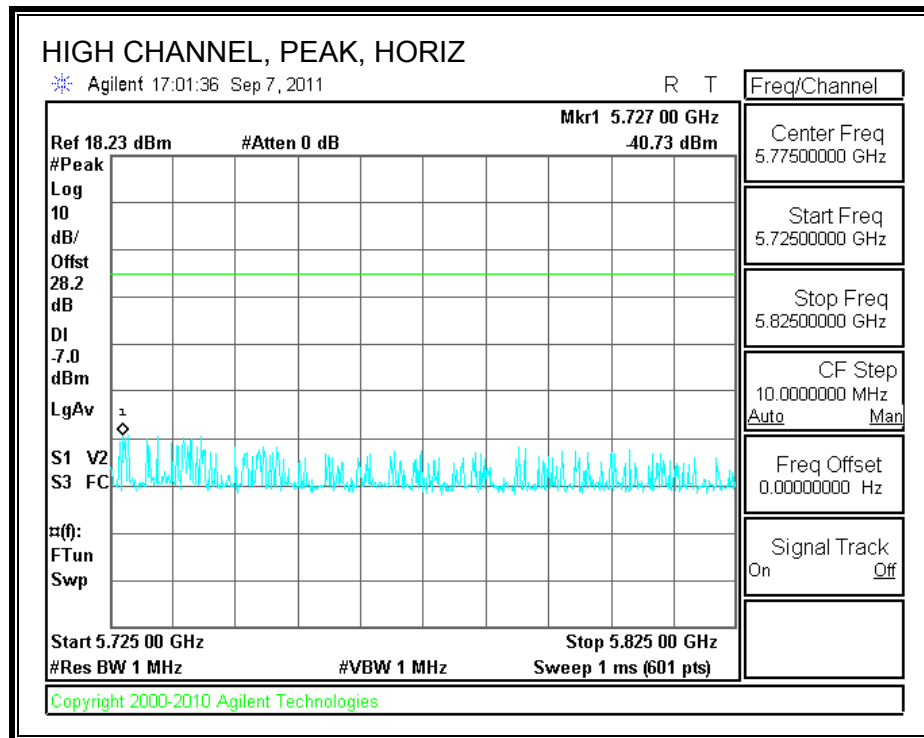


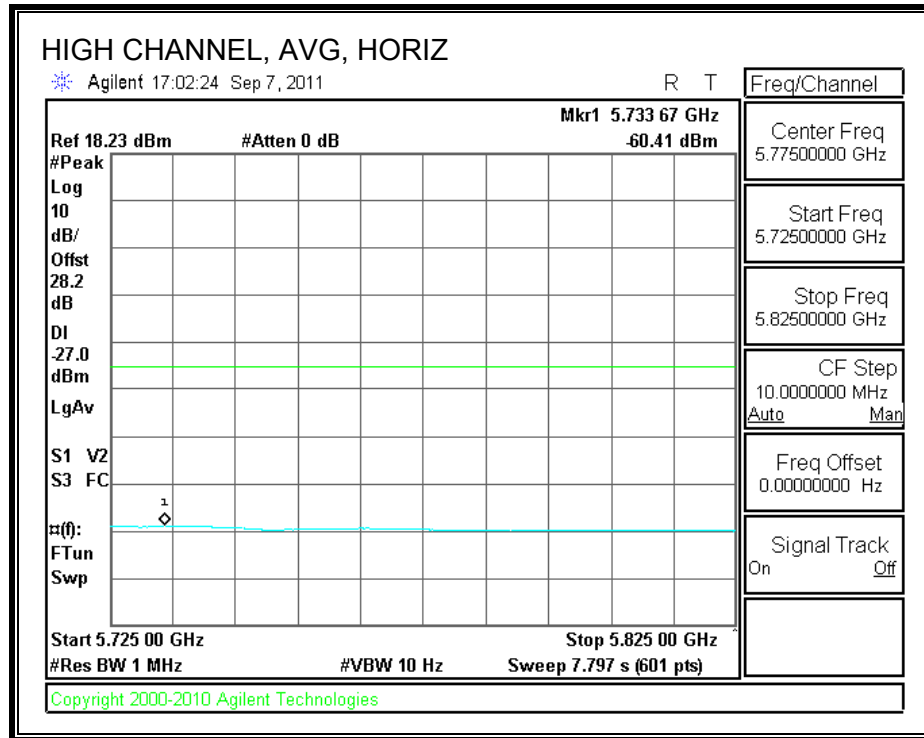
RESTRICTED BANEDGE (LOW CHANNEL, VERTICAL)



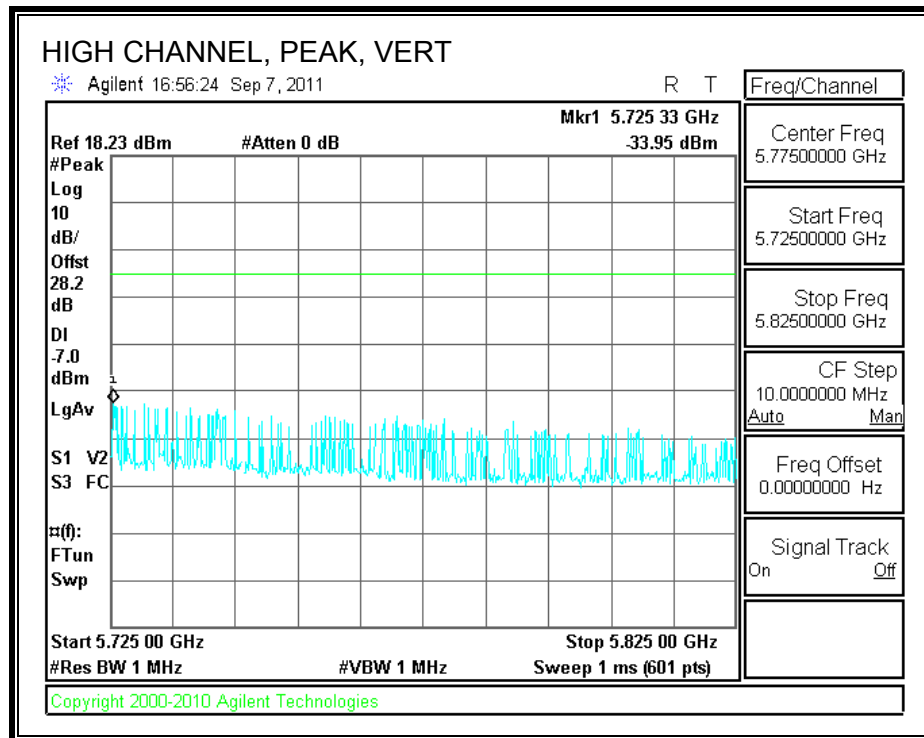


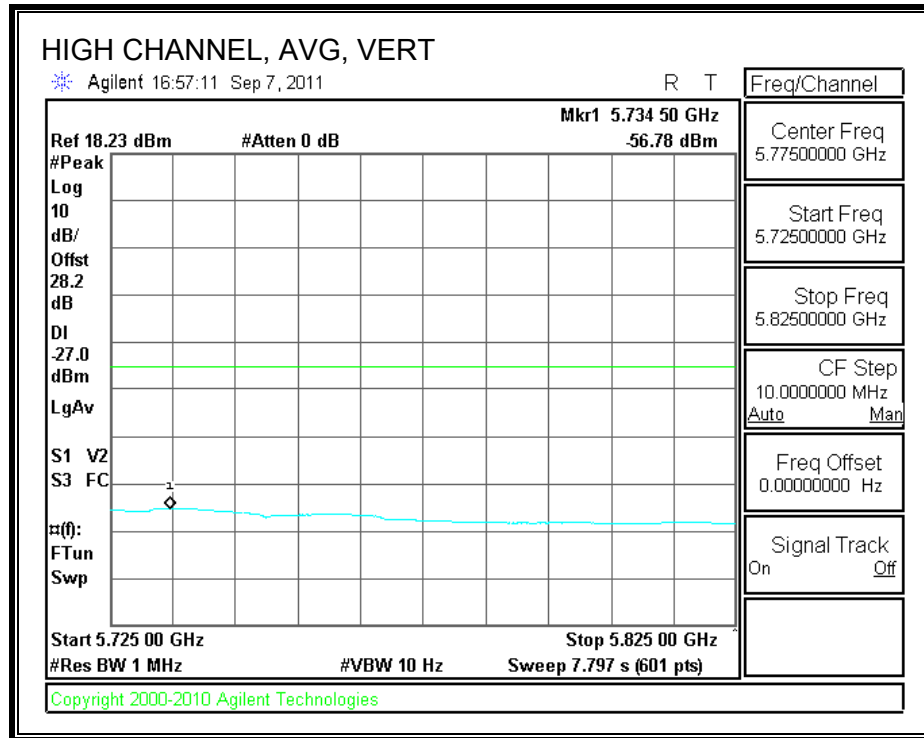
AUTHORIZED BANDEDGE (HIGH CHANNEL, HORIZONTAL)





AUTHORIZED BANDEDGE (HIGH CHANNEL, VERTICAL)





HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Test Engr: William Zhuang
Date: 09/07/11
Project #: 11I14017
Company: Samsung
Test Target:
Mode Oper: Tx On , 5.5 GHz, HT40 Mode, Worst Position Y

f	Measurement Frequency	Amp	Preamp Gain	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter	

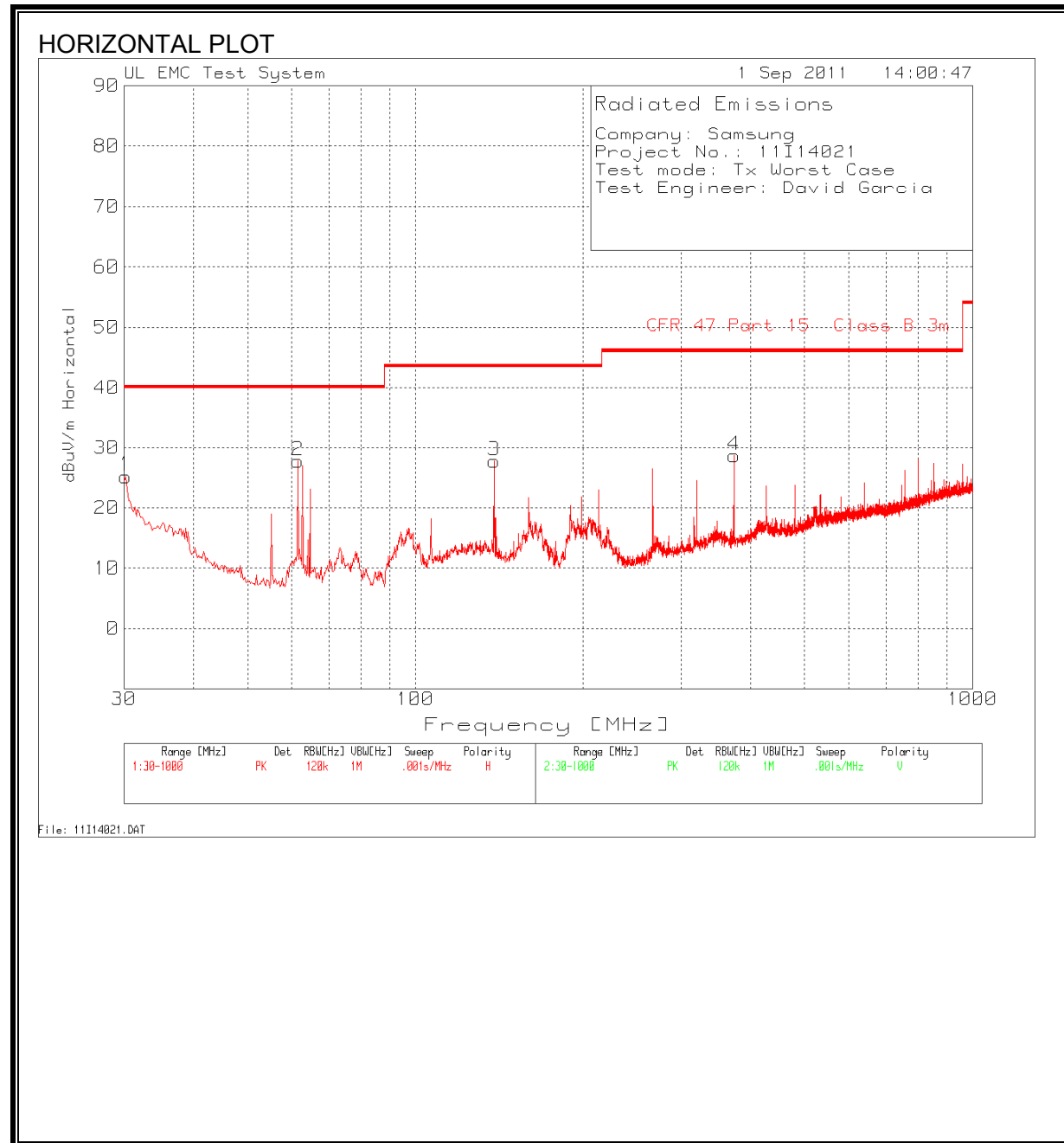
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Ftr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Ant.High cm	Table Angle Degree	Notes
Low Ch. 5510 MHz															
11.020	3.0	34.7	38.7	10.2	-35.6	0.0	0.7	48.7	74.0	-25.3	V	P	177.2	184.6	
11.020	3.0	22.5	38.7	10.2	-35.6	0.0	0.7	36.5	54.0	-17.5	V	A	177.2	184.6	
11.020	3.0	34.2	38.7	10.2	-35.6	0.0	0.7	48.2	74.0	-25.8	H	P	100.0	0.0	
11.020	3.0	22.5	38.7	10.2	-35.6	0.0	0.7	36.5	54.0	-17.5	H	A	100.0	0.0	
Mid Ch. 5590 MHz															
11.180	3.0	34.0	38.7	10.3	-35.6	0.0	0.7	48.1	74.0	-25.9	V	P	200.0	204.1	
11.180	3.0	22.2	38.7	10.3	-35.6	0.0	0.7	36.3	54.0	-17.7	V	A	200.0	204.1	
11.180	3.0	34.4	38.7	10.3	-35.6	0.0	0.7	48.5	74.0	-25.5	H	P	160.6	50.3	
11.180	3.0	22.2	38.7	10.3	-35.6	0.0	0.7	36.3	54.0	-17.7	H	A	160.6	50.3	
High Ch. 5670 MHz															
11.340	3.0	34.4	38.7	10.6	-35.6	0.0	0.7	48.9	74.0	-25.2	V	P	155.2	157.5	
11.340	3.0	22.4	38.7	10.6	-35.6	0.0	0.7	36.8	54.0	-17.2	V	A	155.2	157.5	
11.340	3.0	35.5	38.7	10.6	-35.6	0.0	0.7	50.0	74.0	-24.0	H	P	152.3	334.9	
11.340	3.0	22.4	38.7	10.6	-35.6	0.0	0.7	36.8	54.0	-17.2	H	A	152.3	334.9	

Rev. 4.1.2.7

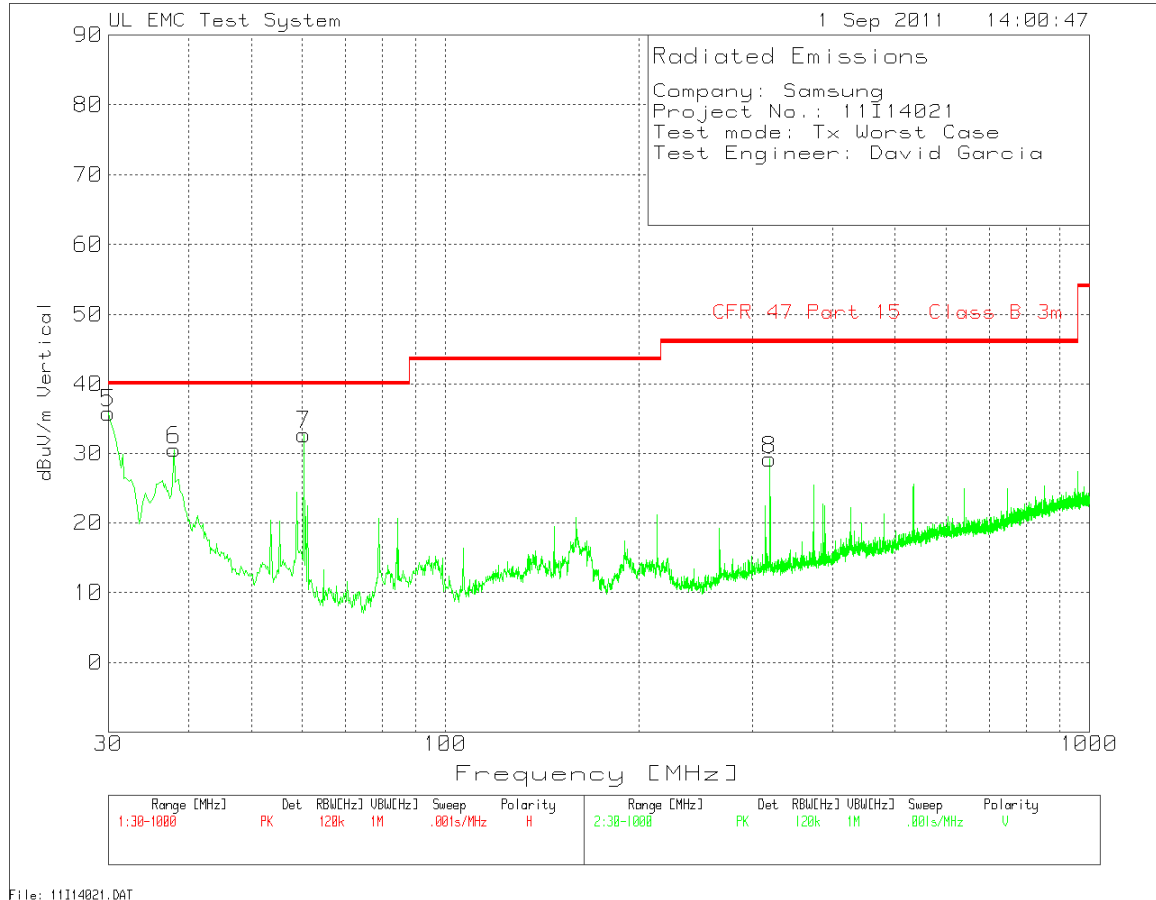
Note: No other emissions were detected above the system noise floor.

8.3. WORST-CASE BELOW 1 GHz

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



VERTICAL PLOT



HORIZONTAL AND VERTICAL DATA

Company: Samsung										
Project No.: 11I14017										
Test mode: Tx Worst Case										
Test Engineer: David Garcia										
Test Frequency	Meter Reading	Detector	3m below 1GHz Cable.TXT [dB]	3m T15 PreAmp below 1GHz.TXT [dB]	3m Bilog T185 below 1GHz.TXT [dB]	dBuV/m	CFR 47 Part 15 Class B 3m	Margin	Height [cm]	Polarity
30.1938	33.02	PK	0.6	-28.3	19.9	25.22	40	-14.78	99	Horz
61.5967	47.05	PK	0.9	-28.2	8	27.75	40	-12.25	99	Horz
138.3593	41.28	PK	1.2	-27.9	13.2	27.78	43.5	-15.72	176	Horz
373.2994	39.8	PK	2	-27.7	14.6	28.7	46	-17.3	99	Horz
30	43.58	PK	0.6	-28.3	20	35.88	40	-4.12	101	Vert
37.9476	42.96	PK	0.7	-28.2	15.1	30.56	40	-9.44	101	Vert
60.4337	52.15	PK	0.9	-28.2	7.9	32.75	40	-7.25	176	Vert
319.2166	41.02	PK	1.8	-27.4	13.8	29.22	46	-16.78	176	Vert

9. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

RSS-Gen 7.2.2

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

^{*} Decreases with the logarithm of the frequency.

TEST PROCEDURE

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.4.

The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

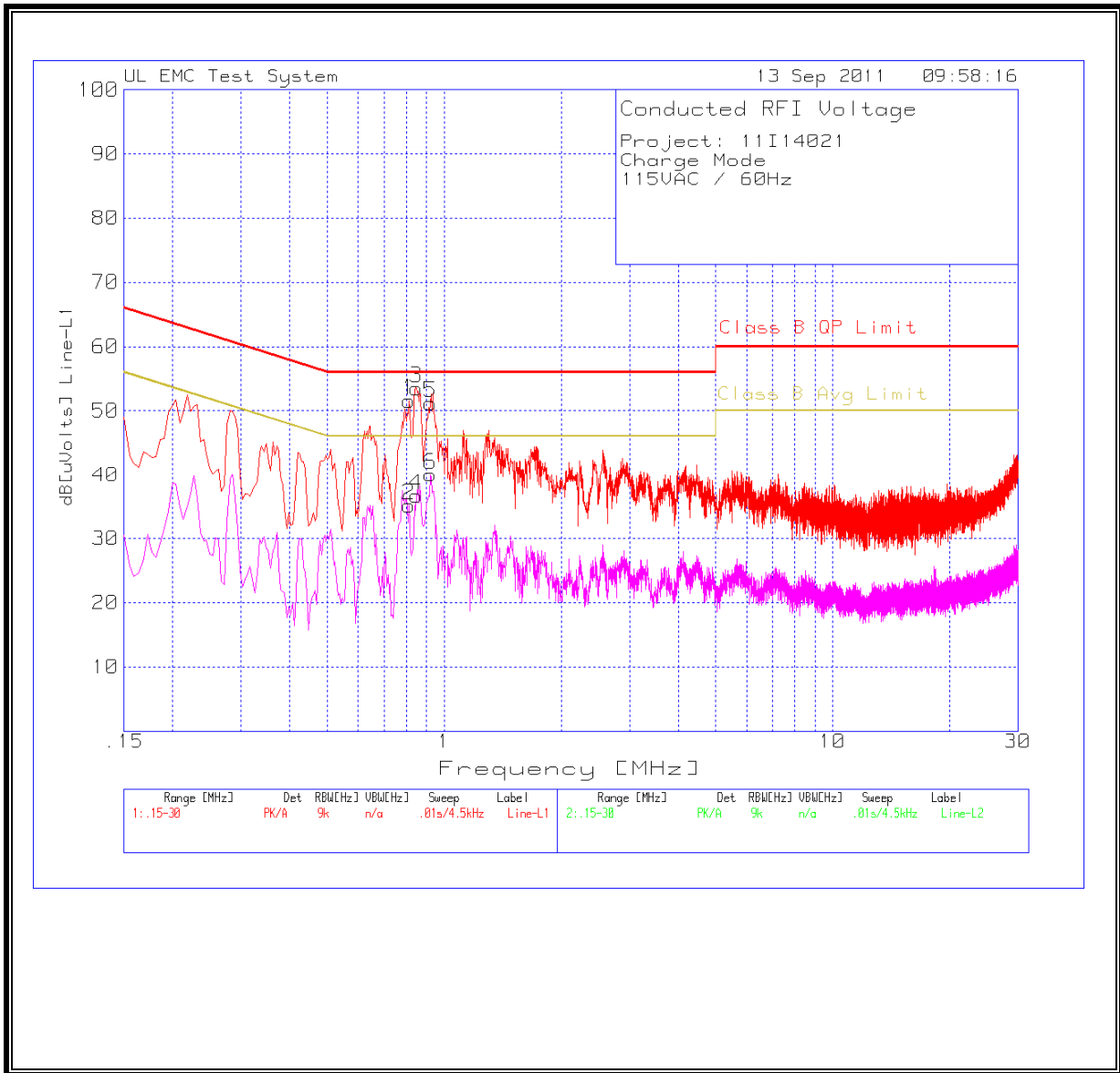
Line conducted data is recorded for both NEUTRAL and HOT lines.

RESULTS

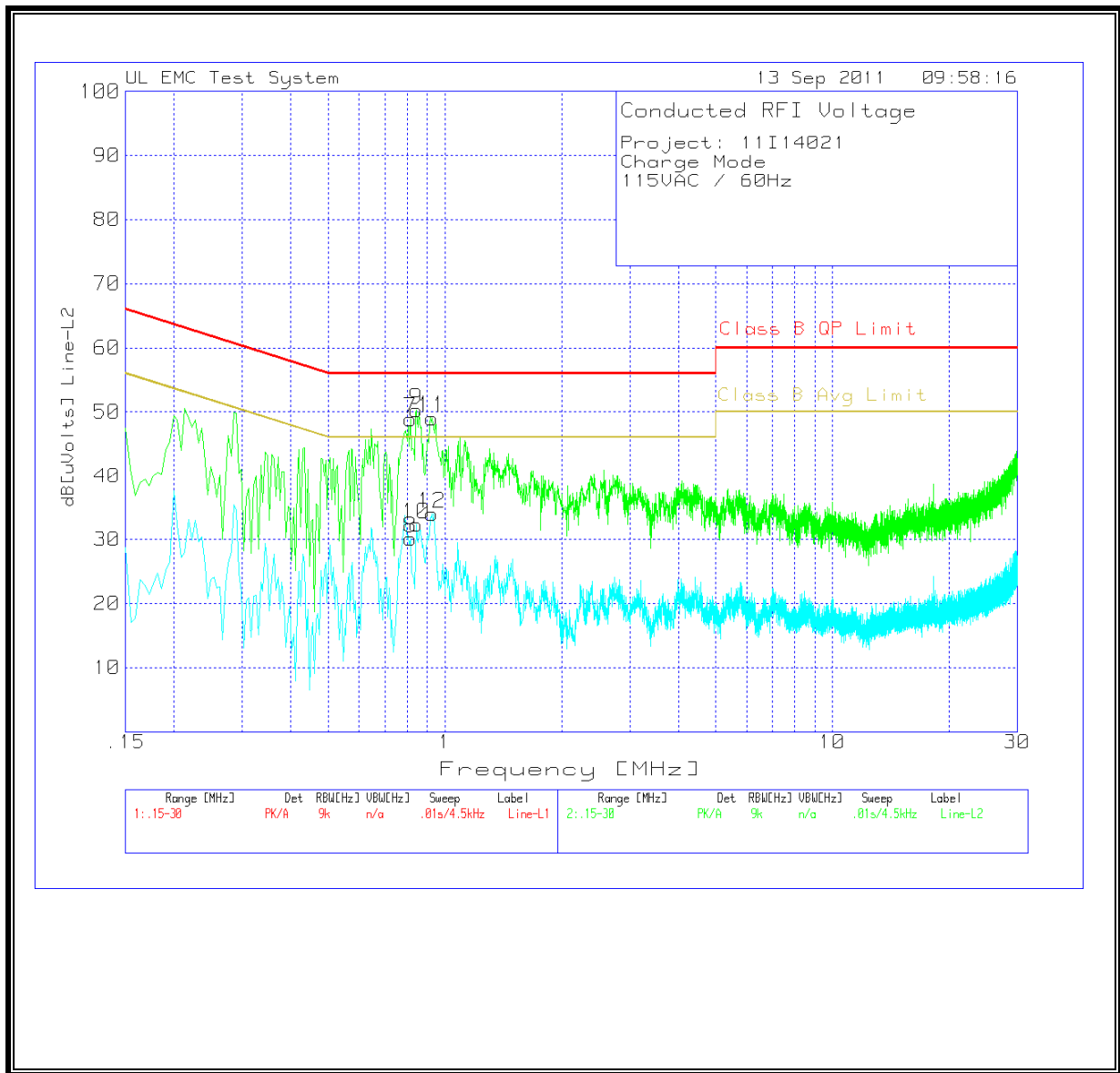
6 WORST EMISSIONS

Project: 11I14021									
Charge Mode									
115VAC / 60Hz									
Line-L1 .15 - 30MHz									
Test Freq. (MHz)	Meter Reading	Detector	LISN [dB]	Conducted Emission Cable [dB]	Correct Reading (dBuVolts)	Class B Quasi-peak Limit	Quasi- Peak Margin	Class B Average Limit	Average Margin
0.8115	51.54	PK	0	0	51.54	56	-4.46	--	--
0.8115	35.11	Av	0	0	35.11	--	--	46	-10.89
0.8475	53.52	PK	0	0	53.52	56	-2.48	--	--
0.8475	36.63	Av	0	0	36.63	--	--	46	-9.37
0.9195	51.23	PK	0	0	51.23	56	-4.77	--	--
0.9195	40.01	Av	0	0	40.01	--	--	--	--
Line-L2 .15 - 30MHz									
Test Freq. (MHz)	Meter Reading	Detector	LISN [dB]	Conducted Emission Cable [dB]	Correct Reading (dBuVolts)	Class B Quasi-peak Limit	Quasi- Peak Margin	Class B Average	Average Margin
0.816	48.88	PK	0	0	48.88	56	-7.12	--	--
0.816	30.08	Av	0	0	30.08	--	--	46	-15.92
0.843	50.32	PK	0	0	50.32	56	-5.68	--	--
0.843	32.36	Av	0	0	32.36	--	--	46	-13.64
0.924	49.07	PK	0	0	49.07	56	-6.93	--	--
0.924	33.95	Av	0	0	33.95	--	--	46	-12.05

LINE 1 RESULTS



LINE 2 RESULTS



10. DYNAMIC FREQUENCY SELECTION

10.1. OVERVIEW

10.1.1. LIMITS

INDUSTRY CANADA

IC RSS-210 is closely harmonized with FCC Part 15 DFS rules. The deviations are as follows:

RSS-210 Issue 7 A9.4 (b) (ii) **Channel Availability Check Time:** ...

Additional requirements for the band 5600-5650 MHz: Until further notice, devices subject to this Section shall not be capable of transmitting in the band 5600-5650 MHz, so that Environment Canada weather radars operating in this band are protected.

RSS-210 Issue 7 A9.4 (b) (iv) **Channel closing time:** the maximum channel closing time is 260 ms.

FCC

§15.407 (h) and FCC 06-96 APPENDIX "COMPLIANCE MEASUREMENT PROCEDURES FOR UNLICENSED-NATIONAL INFORMATION INFRASTRUCTURE DEVCIES OPERATING IN THE 5250-5350 MHz AND 5470-5725 MHz BANDS INCORPORATING DYNAMIC FREQUENCY SELECTION".

Table 1: Applicability of DFS requirements prior to use of a channel

Requirement	Operational Mode		
	Master	Client (without radar detection)	Client (with radar detection)
Non-Occupancy Period	Yes	Not required	Yes
DFS Detection Threshold	Yes	Not required	Yes
Channel Availability Check Time	Yes	Not required	Not required
Uniform Spreading	Yes	Not required	Not required

Table 2: Applicability of DFS requirements during normal operation

Requirement	Operational Mode		
	Master	Client (without DFS)	Client (with DFS)
DFS Detection Threshold	Yes	Not required	Yes
Channel Closing Transmission Time	Yes	Yes	Yes
Channel Move Time	Yes	Yes	Yes

Table 3: Interference Threshold values, Master or Client incorporating In-Service Monitoring

Maximum Transmit Power	Value (see note)
≥ 200 milliwatt	-64 dBm
< 200 milliwatt	-62 dBm
Note 1: This is the level at the input of the receiver assuming a 0 dBi receive antenna Note 2: Throughout these test procedures an additional 1 dB has been added to the amplitude of the test transmission waveforms to account for variations in measurement equipment. This will ensure that the test signal is at or above the detection threshold level to trigger a DFS response.	

Table 4: DFS Response requirement values

Parameter	Value
<i>Non-occupancy period</i>	30 minutes
<i>Channel Availability Check Time</i>	60 seconds
<i>Channel Move Time</i>	10 seconds
<i>Channel Closing Transmission Time</i>	200 milliseconds + approx. 60 milliseconds over remaining 10 second period
The instant that the <i>Channel Move Time</i> and the <i>Channel Closing Transmission Time</i> begins is as follows: For the Short pulse radar Test Signals this instant is the end of the <i>Burst</i>. For the Frequency Hopping radar Test Signal, this instant is the end of the last radar burst generated. For the Long Pulse radar Test Signal this instant is the end of the 12 second period defining the radar transmission. The Channel Closing Transmission Time is comprised of 200 milliseconds starting at the beginning of the Channel Move Time plus any additional intermittent control signals required to facilitate channel changes (an aggregate of approximately 60 milliseconds) during the remainder of the 10 second period. The aggregate duration of control signals will not count quiet periods in between transmissions.	

Table 5 – Short Pulse Radar Test Waveforms

Radar Type	Pulse Width (Microseconds)	PRI (Microseconds)	Pulses	Minimum Percentage of Successful Detection	Minimum Trials
1	1	1428	18	60%	30
2	1-5	150-230	23-29	60%	30
3	6-10	200-500	16-18	60%	30
4	11-20	200-500	12-16	60%	30
Aggregate (Radar Types 1-4)				80%	120

Table 6 – Long Pulse Radar Test Signal

Radar Waveform	Bursts	Pulses per Burst	Pulse Width (µsec)	Chirp Width (MHz)	PRI (µsec)	Minimum Percentage of Successful Detection	Minimum Trials
5	8-20	1-3	50-100	5-20	1000-2000	80%	30

Table 7 – Frequency Hopping Radar Test Signal

Radar Waveform	Pulse Width (µsec)	PRI (µsec)	Burst Length (ms)	Pulses per Hop	Hopping Rate (kHz)	Minimum Percentage of Successful Detection	Minimum Trials
6	1	333	300	9	.333	70%	30

SYSTEM OVERVIEW

The short pulse and long pulse signal generating system utilizes the NTIA software. The Vector Signal Generator has been validated by the NTIA. The hopping signal generating system utilizes the CCS simulated hopping method and system, which has been validated by the DoD, FCC and NTIA. The software selects waveform parameters from within the bounds of the signal type on a random basis using uniform distribution.

The short pulse types 2, 3 and 4, and the long pulse type 5 parameters are randomized at run-time.

The hopping type 6 pulse parameters are fixed while the hopping sequence is based on the August 2005 NTIA Hopping Frequency List. The initial starting point randomized at run-time and each subsequent starting point is incremented by 475. Each frequency in the 100-length segment is compared to the boundaries of the EUT Detection Bandwidth and the software creates a hopping burst pattern in accordance with Section 7.4.1.3 Method #2 Simulated Frequency Hopping Radar Waveform Generating Subsystem of FCC 06-96 APPENDIX. The frequency of the signal generator is incremented in 1 MHz steps from F_L to F_H for each successive trial. This incremental sequence is repeated as required to generate a minimum of 30 total trials and to maintain a uniform frequency distribution over the entire Detection Bandwidth.

The signal monitoring equipment consists of a spectrum analyzer. The aggregate ON time is calculated by multiplying the number of bins above a threshold during a particular observation period by the dwell time per bin, with the analyzer set to peak detection and max hold.

SYSTEM CALIBRATION

A 50-ohm load is connected in place of the spectrum analyzer, and the spectrum analyzer is connected to a horn antenna via a coaxial cable, with the reference level offset set to (horn antenna gain – coaxial cable loss). The signal generator is set to CW mode. The amplitude of the signal generator is adjusted to yield a level of –64 dBm as measured on the spectrum analyzer.

Without changing any of the instrument settings, the spectrum analyzer is reconnected to the Common port of the Spectrum Analyzer Combiner/Divider. The Reference Level Offset of the spectrum analyzer is adjusted so that the displayed amplitude of the signal is –64 dBm.

The spectrum analyzer displays the level of the signal generator as received at the antenna ports of the Master Device. The interference detection threshold may be varied from the calibrated value of –64 dBm and the spectrum analyzer will still indicate the level as received by the Master Device.

ADJUSTMENT OF DISPLAYED TRAFFIC LEVEL

A link is established between the Master and Slave and the distance between the units is adjusted as needed to provide a suitable received level at the Master and Slave devices. The video test file is streamed to generate WLAN traffic. The monitoring antenna is adjusted so that the WLAN traffic level, as displayed on the spectrum analyzer, is at lower amplitude than the radar detection threshold.

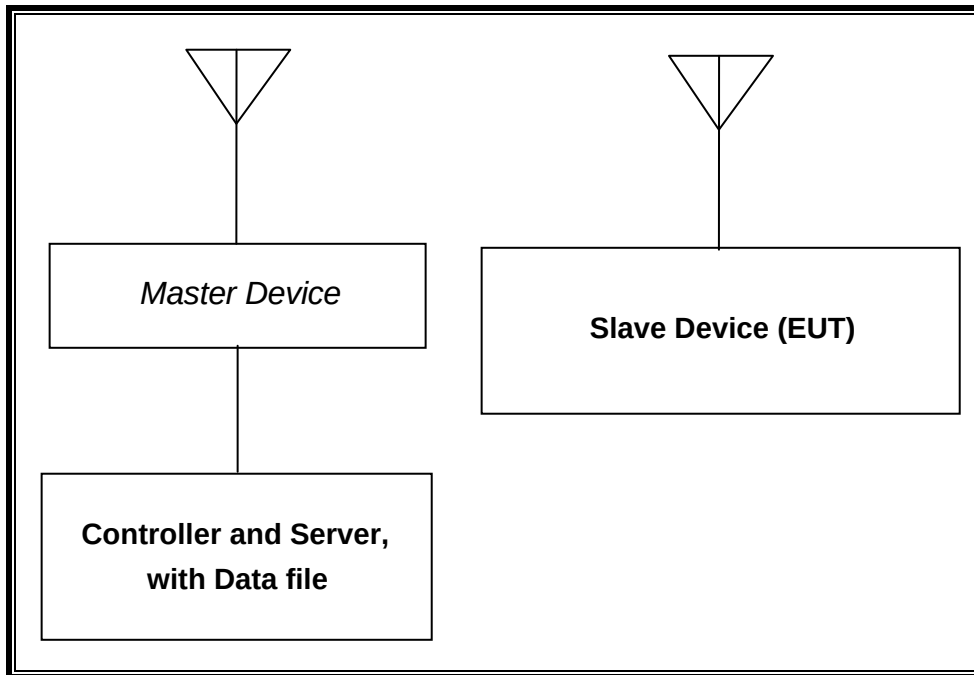
TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST				
Description	Manufacturer	Model	Asset Number	Cal Due
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C00169	04/07/12
Vector Signal Generator, 20GHz	Agilent / HP	E8267C	C01066	02/12/12

10.1.3. SETUP OF EUT

RADIATED METHOD EUT TEST SETUP



SUPPORT EQUIPMENT

The following support equipment was utilized for the DFS tests documented in this report:

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
Wireless Access Point	Cisco	AIR-AP1252AG-A-K9	FTX120690N2	LDK102061
AC Adapter (AP)	Delta Electronics	EADP-45BB B	DTH112490BD	DoC
Notebook PC (Controller/Server)	Dell	PP18L	10657517725	DoC
AC Adapter (Controller)	Dell	LA65SN0-00	CN-ODF263-71615-6AU-1019	DoC

10.1.4. DESCRIPTION OF EUT

The EUT operates over the 5250-5350 MHz and 5470-5725 MHz ranges.

The EUT is a Slave Device without Radar Detection.

The highest power level within these bands is 13.44 dBm EIRP in the 5250-5350 MHz band and 15.20 dBm EIRP in the 5470-5725 MHz band.

The only antenna assembly utilized with the EUT has a gain of 3.61 dBi in the 5250-5350 MHz band and 2.79 dBi in the 5470-5725 MHz band.

The rated output power of the Master unit is $> 23\text{dBm}$ (EIRP). Therefore the required interference threshold level is -64 dBm . After correction for procedural adjustments, the required radiated threshold at the antenna port is $-64 + 1 = -63\text{ dBm}$.

The calibrated radiated DFS Detection Threshold level is set to -64 dBm . The tested level is lower than the required level hence it provides a margin to the limit.

The EUT one transmitter/receiver chain connected to an antenna to perform radiated tests.

Traffic is generated by transferring a 4.1Gbyte file from the controller/server PC to the EUT using FTP software package FileZilla version 3.5.0 as referenced in FCC email dated 10/3/2011.

TPC is not required since the maximum EIRP is less than 500 mW (27 dBm).

The EUT utilizes the 802.11a/n architecture. Two nominal channel bandwidths are implemented: 20 MHz and 40 MHz.

The software installed in the access point is 12.4(25d)JA1.

MANUFACTURER'S STATEMENT REGARDING UNIFORM CHANNEL SPREADING

This statement is in a separate document.

OVERVIEW OF MASTER DEVICE WITH RESPECT TO §15.407 (h) REQUIREMENTS

The Master Device is a Cisco Access Point, FCC ID: LDK102061. The minimum antenna gain for the Master Device is 3.5 dBi.

The rated output power of the Master unit is $> 23\text{dBm}$ (EIRP). Therefore the required interference threshold level is -64 dBm . After correction for procedural adjustments, the required radiated threshold at the antenna port is $-64 + 1 = -63\text{ dBm}$.

The calibrated radiated DFS Detection Threshold level is set to -64 dBm . The tested level is lower than the required level hence it provides margin to the limit.

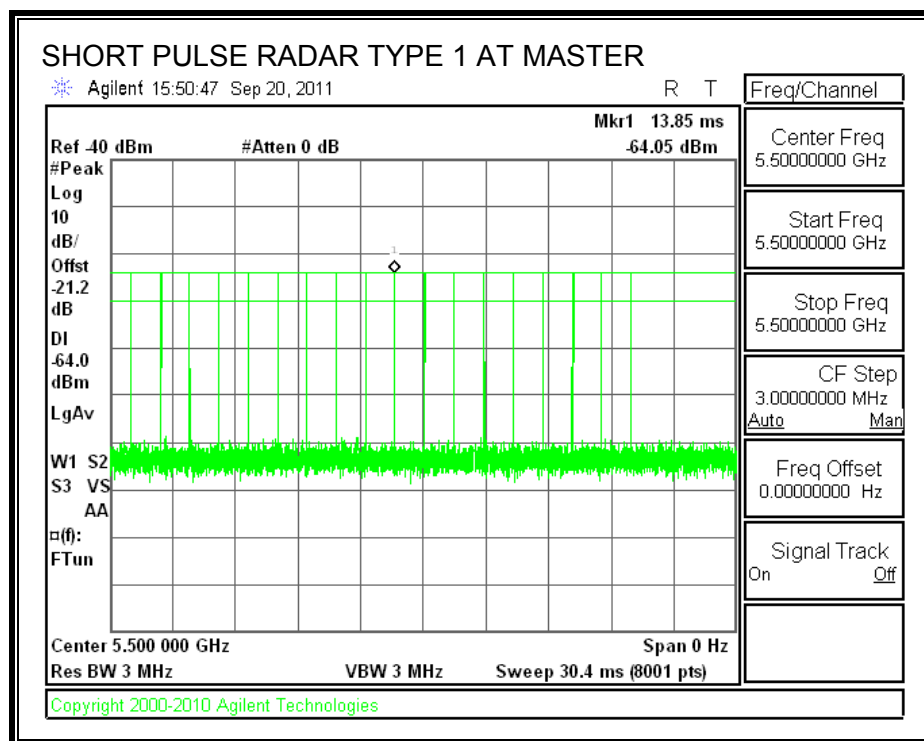
10.2. RESULTS FOR 20 MHz BANDWIDTH

10.2.1. TEST CHANNEL

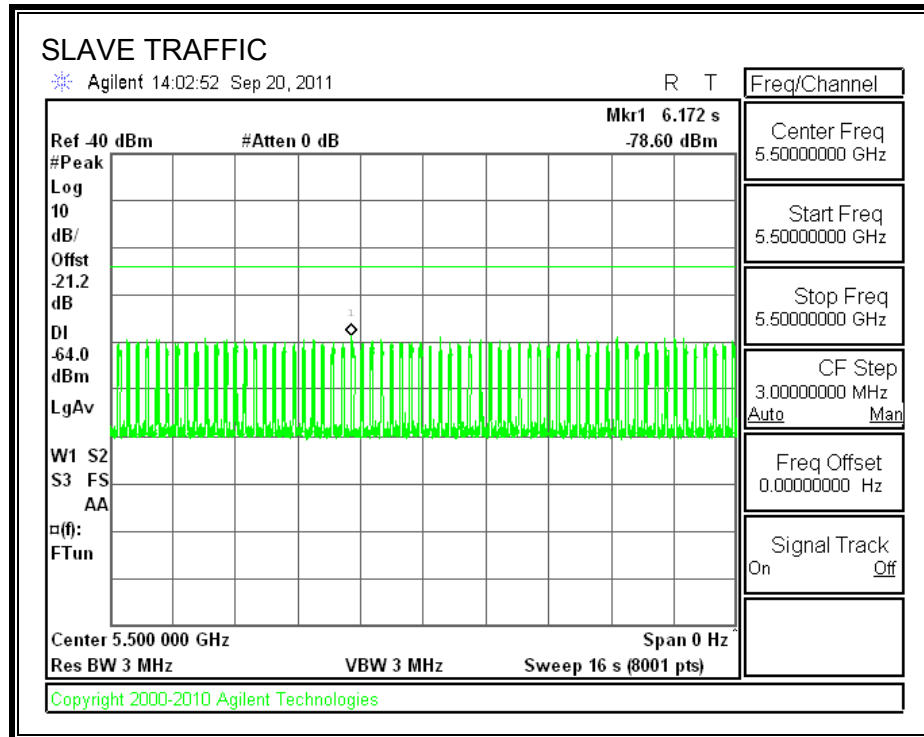
All tests were performed at a channel center frequency of 5500 MHz.

10.2.2. RADAR WAVEFORM AND TRAFFIC

RADAR WAVEFORM



TRAFFIC



10.2.3. OVERLAPPING CHANNEL TESTS

RESULTS

These tests are not applicable.

10.2.4. MOVE AND CLOSING TIME

REPORTING NOTES

The reference marker is set at the end of last radar pulse.

The delta marker is set at the end of the last WLAN transmission following the radar pulse. This delta is the channel move time.

The aggregate channel closing transmission time is calculated as follows:

Aggregate Transmission Time =
(Number of analyzer bins showing transmission) * (dwell time per bin)

The observation period over which the FCC aggregate time is calculated begins at (Reference Marker + 200 msec) and ends no earlier than (Reference Marker + 10 sec).

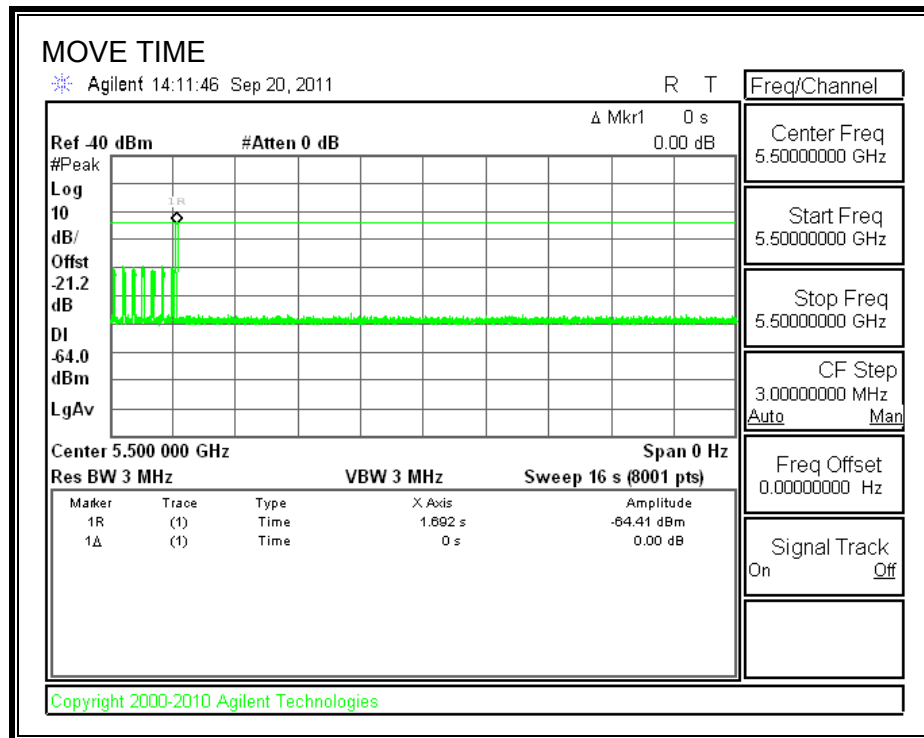
The observation period over which the IC aggregate time is calculated begins at (Reference Marker) and ends no earlier than (Reference Marker + 10 sec).

RESULTS

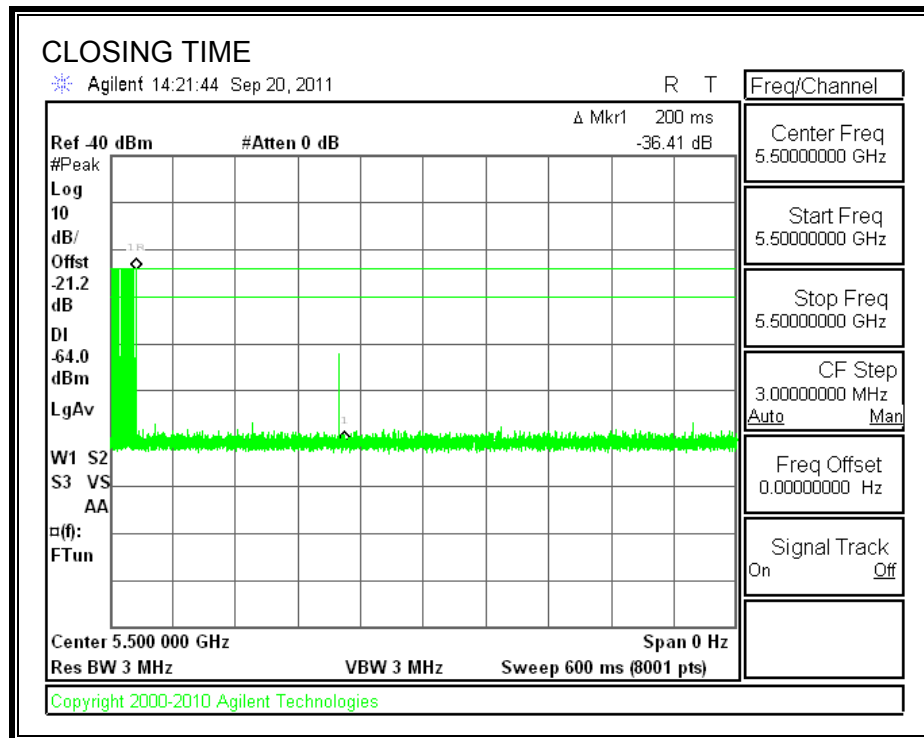
Agency	Channel Move Time (sec)	Limit (sec)
FCC / IC	0.000	10

Agency	Aggregate Channel Closing Transmission Time (msec)	Limit (msec)
FCC	0.0	60
IC	0.0	260

MOVE TIME

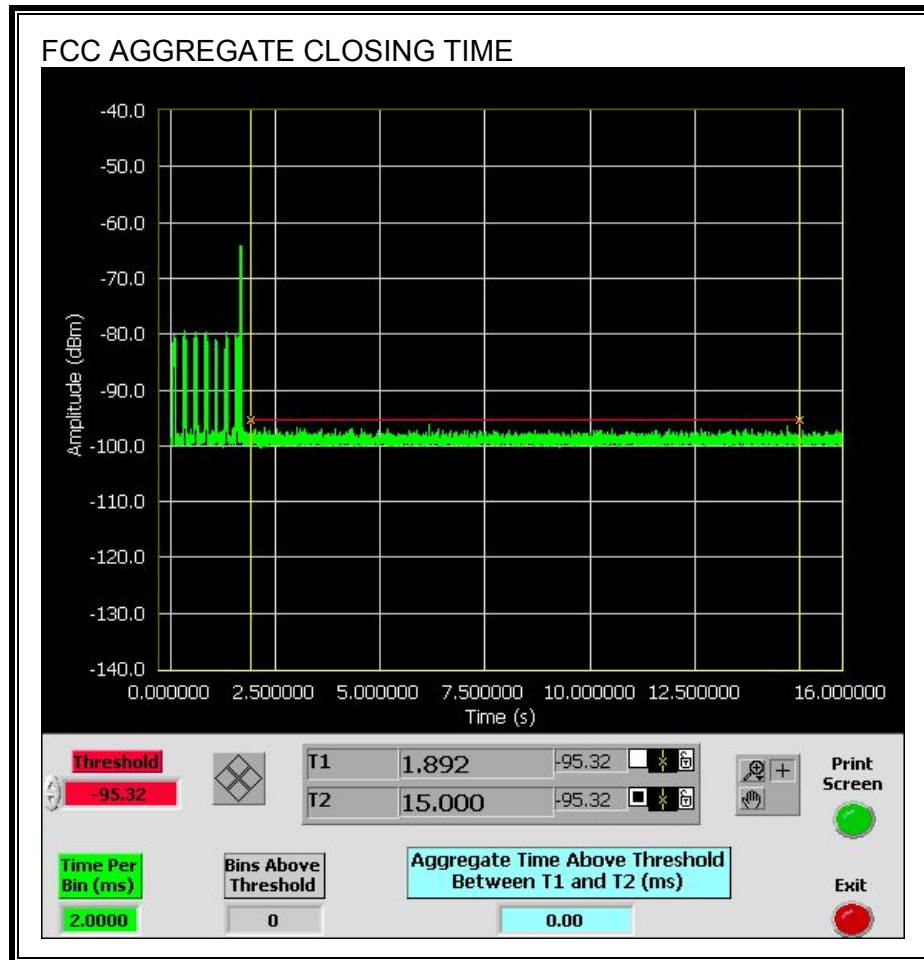


CHANNEL CLOSING TIME

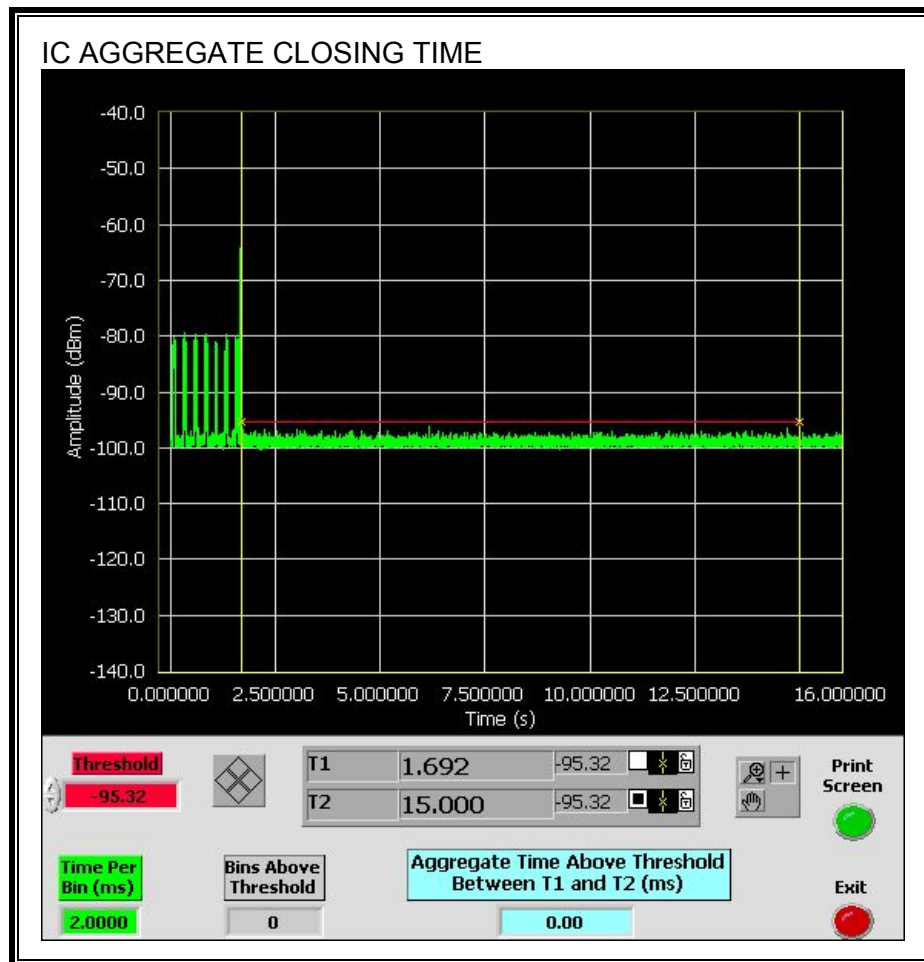


AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

No transmissions are observed during the FCC aggregate monitoring period.



No transmissions are observed during the IC aggregate monitoring period.



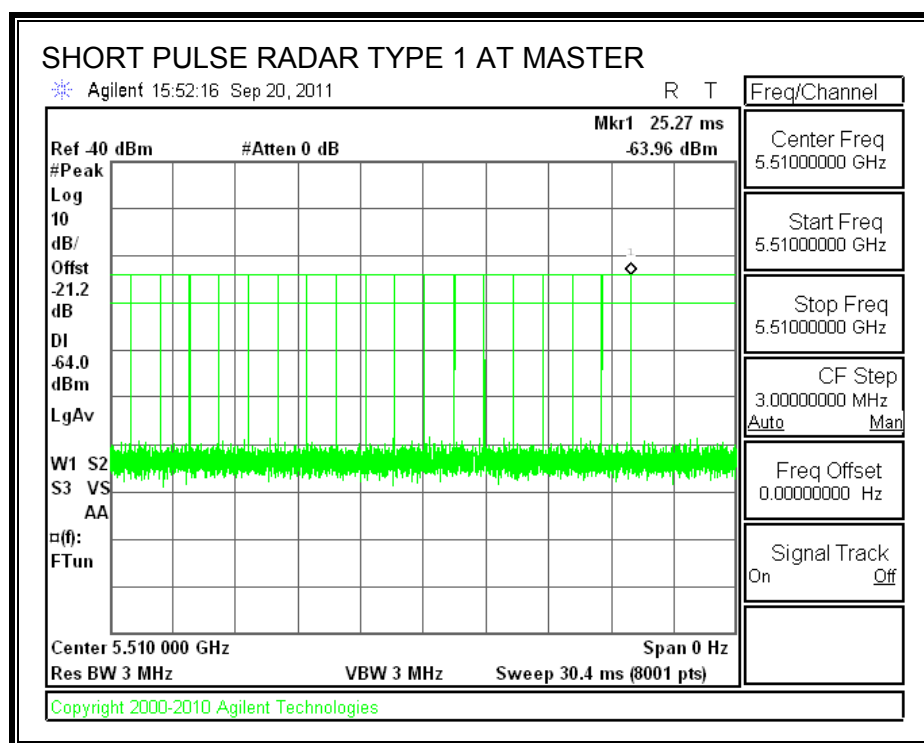
10.3. RESULTS FOR 40 MHz BANDWIDTH

10.3.1. TEST CHANNEL

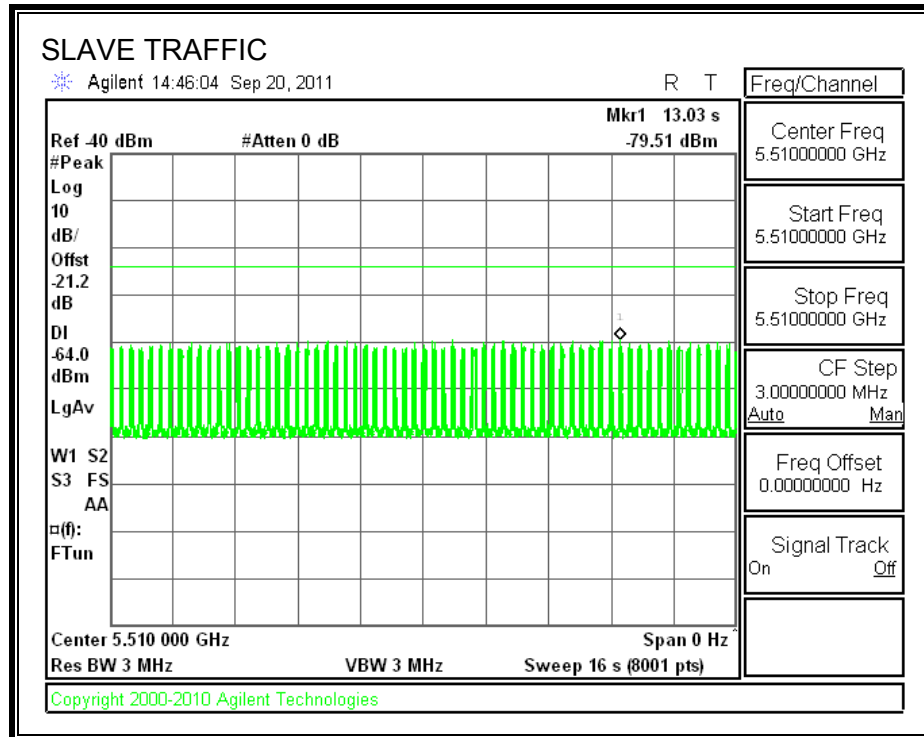
All tests were performed at a channel center frequency of 5510 MHz.

10.3.2. RADAR WAVEFORM AND TRAFFIC

RADAR WAVEFORM



TRAFFIC



10.3.3. OVERLAPPING CHANNEL TESTS

RESULTS

These tests are not applicable.

10.3.4. MOVE AND CLOSING TIME

REPORTING NOTES

The reference marker is set at the end of last radar pulse.

The delta marker is set at the end of the last WLAN transmission following the radar pulse. This delta is the channel move time.

The aggregate channel closing transmission time is calculated as follows:

Aggregate Transmission Time =
(Number of analyzer bins showing transmission) * (dwell time per bin)

The observation period over which the FCC aggregate time is calculated begins at (Reference Marker + 200 msec) and ends no earlier than (Reference Marker + 10 sec).

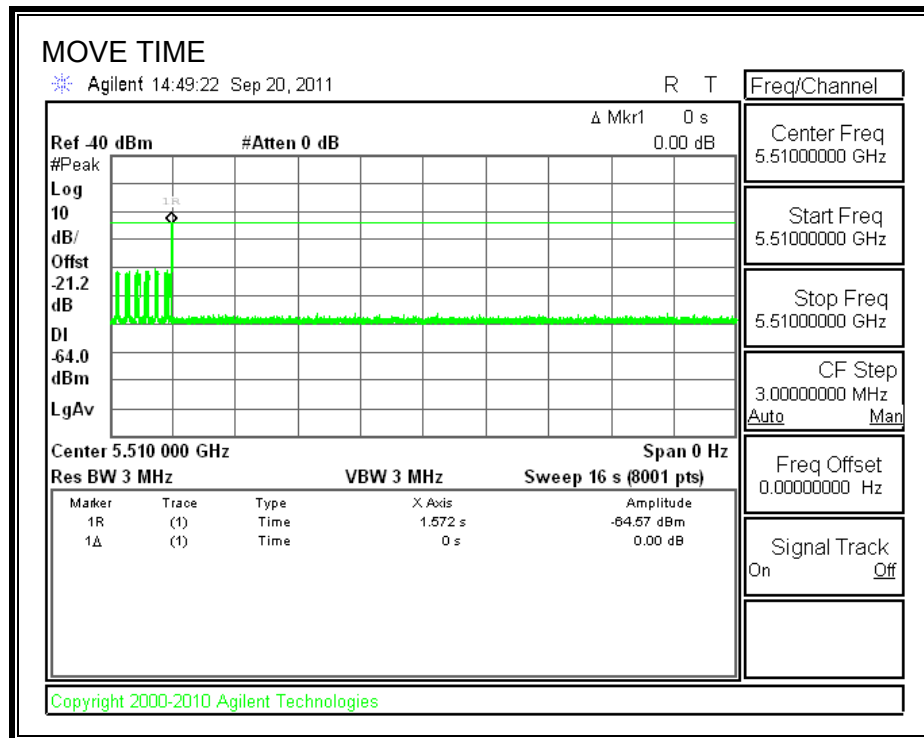
The observation period over which the IC aggregate time is calculated begins at (Reference Marker) and ends no earlier than (Reference Marker + 10 sec).

RESULTS

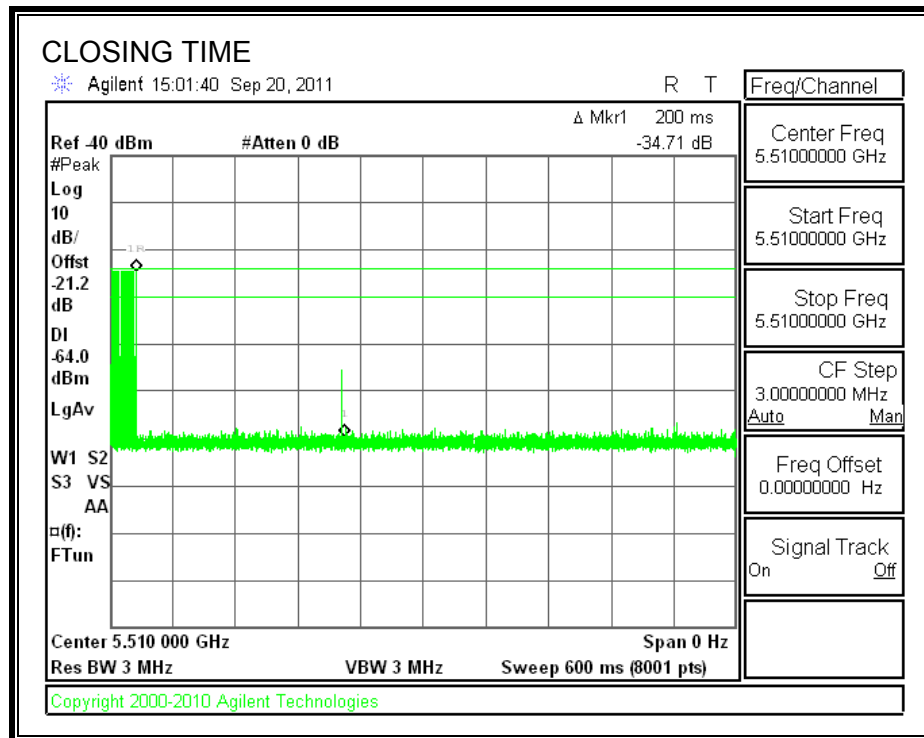
Agency	Channel Move Time (sec)	Limit (sec)
FCC / IC	0.000	10

Agency	Aggregate Channel Closing Transmission Time (msec)	Limit (msec)
FCC	0.0	60
IC	0.0	260

MOVE TIME

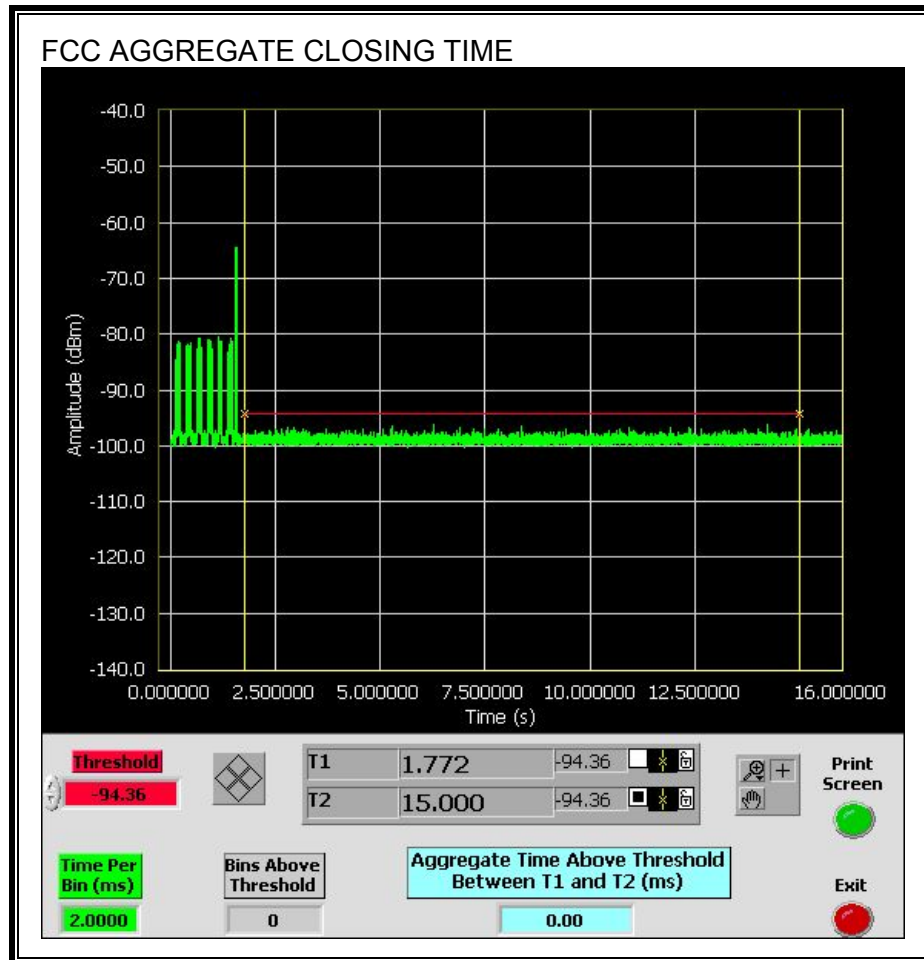


CHANNEL CLOSING TIME

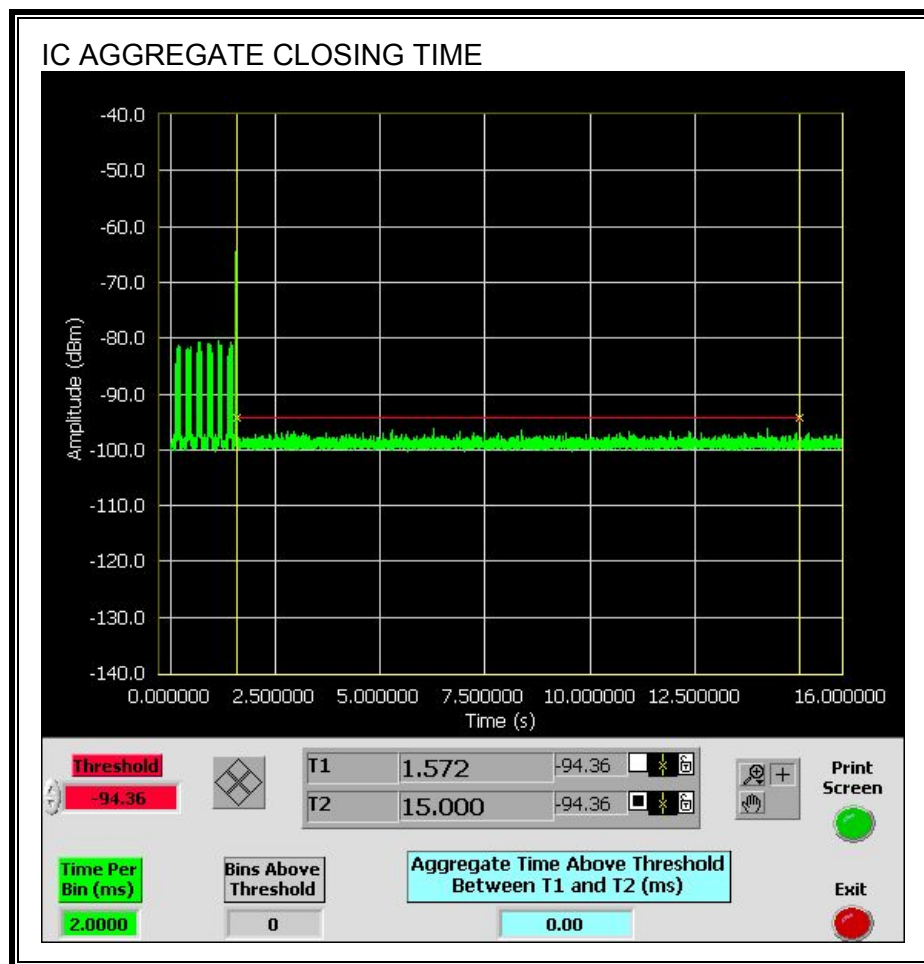


AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

No transmissions are observed during the FCC aggregate monitoring period.



No transmissions are observed during the IC aggregate monitoring period.



10.3.5. NON-OCCUPANCY PERIOD

RESULTS

No EUT transmissions were observed on the test channel during the 30-minute observation time.

