FCC 47 CFR PART 15 SUBPART E

CERTIFICATION TEST REPORT

FOR

GSM Phone + Bluetooth & DTS/UNII a/b/g/n/ac + ANT

MODEL NUMBER: SM-G9098

FCC ID: A3LSMG9098

REPORT NUMBER: 14U16938-5

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

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

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UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701J
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: **SAMSUNG ELECTRONICS CO., LTD.**

EUT DESCRIPTION: **GSM Phone + Bluetooth & DTS/UNII a/b/g/n/ac + ANT**

MODEL: **SM-G9098**

SERIAL NUMBER: **FL-011-C (Radiated)**
FL-011-D (Conducted)

DATE TESTED: **JANUAUARY 7 - 24, 2014**

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

UL Verification Services Inc. 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 Verification Services Inc. 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 Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. 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 Verification Services Inc. By:

PHILIP KIM
WiSE PROGRAM MANAGER
UL Verification Services Inc.

Tested By:

CHARLES VERGONIO
Wise LAB TECHNICIAN
UL Verification Services Inc.

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2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, FCC 06-96, FCC KDB 789033, ANSI C63.10-2009, RSS-GEN Issue 3, FCC KDB 644545 D01.

3. FACILITIES AND ACCREDITATION

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

UL Verification Services Inc. 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:

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

4.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	3.52 dB
Radiated Disturbance, 30 to 18000 MHz	4.94 dB

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

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5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a GSM Phone + Bluetooth & DTS/UNII a/b/g/n/ac + ANT

5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted output power as follows:

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5180-5240	802.11a	14.77	29.99
5180-5240	802.11n HT20	14.92	31.05
5190-5230	802.11n HT40	13.39	21.83
5210	802.11ac HT80	12.69	18.58
5260-5320	802.11a	14.6	28.84
5260-5320	802.11n HT20	14.57	28.64
5270-5310	802.11n HT40	13.41	21.93
5290	802.11ac HT80	12.78	18.97
5500-5700	802.11a	14.11	25.76
5500-5700	802.11n HT20	14.09	25.64
5510-5670	802.11n HT40	13.07	20.28
5530	802.11ac HT80	13.03	20.09

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an FPCB antenna, with a maximum gain of 1.68 dBi.

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5.4. WORST-CASE CONFIGURATION AND MODE

Radiated emission and power line conducted emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.

The fundamental of the EUT was investigated in three orthogonal orientations X,Y,Z, it was determined that the X orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in the X orientation.

Based on the baseline scan, the worst-case data rates were:

802.11a mode: 6 Mbps
802.11n HT20mode: MCS0
802.11n HT40mode: MCS0
802.11ac HT80mode: MCS0

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5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
AC Adapter	SAMSUNG	ETA-U90CBC	N/A	N/A
Earphone	SAMSUNG	N/A	N/A	N/A

I/O CABLES

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	DC Power	1	Mini-USB	Shielded	1.2m	N/A
2	Audio	1	Mini-Jack	Unshielded	1.0m	N/A

TEST SETUP

The EUT is setup as a stand-alone device.

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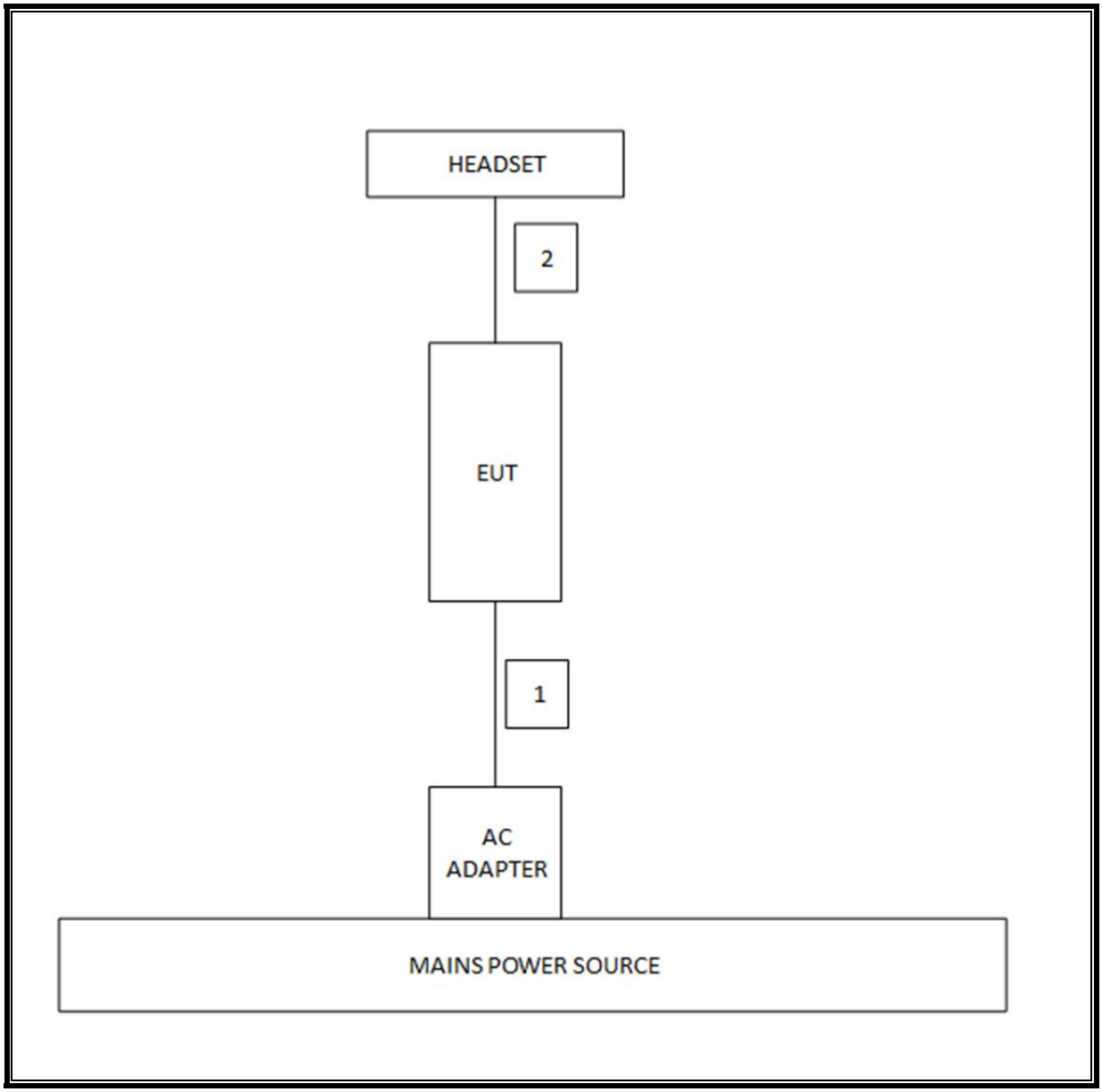
SETUP DIAGRAM FOR TESTS



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6. TEST AND MEASUREMENT EQUIPMENT

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

Test Equipment List				
Description	**Manufacturer**	**Model**	**Asset**	**Cal Due**
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C00986	4/1/2014
Spectrum Analyzer, 26.5 GHz	Agilent / HP	E4440A	C01179	2/26/2014
EMI Test Receiver, 30 MHz	R & S	ESHS 20	N02396	8/8/2014
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00580	1/28/2014
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01063	10/22/2014
Preamplifier, 40 GHz	Miteq	NSP4000-SP2	C00990	8/2/2014
Antenna, Bilog, 30MHz-1 GHz	Sunol Sciences	JB1	N/A	3/6/2014
Antenna, Horn, 18 GHz	ETS	3117	C01022	2/21/2014
Antenna, Horn, 26.5 GHz	ARA	MWH-1826/B	C00589	12/17/2014
Peak Power Meter	Agilent / HP	E4416A	C00963	12/13/2014
Peak / Average Power Sensor	Agilent / HP	E9327A	C00964	12/13/2014
LISN, 30 MHz	FCC	50/250-25-2	C00626	01/14/15
Reject Filter, 5.725-5.825 GHz	Micro-Tronics	BRC13192	N02676	CNR

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7. SUMMARY TABLE

FCC Part Section	Test Description	Test Limit	Test Condition	Test Result	Worst Case
15.247 (a)	Occupied Band width (26dB)	N/A	Conducted	Pass	85.20MHz
2.1051, 15.407 (b)	Band Edge / Conducted Spurious Emission	54dBuV/m (avg)		Pass	47.157dBuV
15.407 (a)(1)	TX Cond. Power 5.15-2.25	<17dBm or 4+10Log(OBW)		Pass	14.92dBM
15.407 (a)(2)	TX Cond. Power 5.25-5.35 & 5.47-5.725	<24dBm or 11+10Log(OBW)		Pass	14.6dBm
15.407 (a)(5)	PSD	<4dBm for 5.2G <11dBm for 5.3;5.5G		Pass	3.46dBm
15.407 (a)(6)	Peak Excursion Ratio	13dB		Pass	9.39dBm
15.207 (a)	AC Power Line conducted emissions	Section 10	Radiated	Pass	24.69dBuV
15.407 (b) & 15.209	Radiated Spurious Emission	< 54dBuV/m		Pass	52.6dBuV
15.407 (h)(2)	Dynamic Frequency Selection	N/A	Radiated / Condcuted	Pass	N/A

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8. ON TIME, DUTY CYCLE AND MEASUREMENT METHODS

LIMITS

None; for reporting purposes only.

PROCEDURE

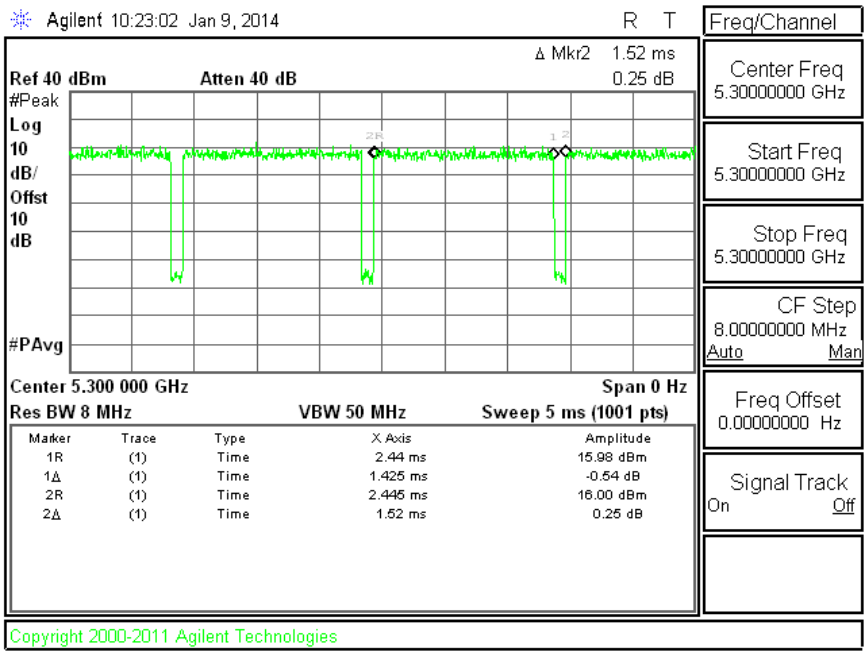
KDB 789033 Zero-Span Spectrum Analyzer Method.

8.1. ON TIME AND DUTY CYCLE RESULTS

Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/T Minimum VBW (kHz)
802.11a	1.43	1.52	0.938	93.8%	0.28	0.702
802.11ac HT80	0.33	0	0.764	76.4%	1.17	3.030
802.11n HT20	1.34	1	0.930	93.0%	0.32	0.749
802.11n HT40	0.66	1	0.866	86.6%	0.62	1.511

8.2. DUTY CYCLE PLOTS

DUTY CYCLE 802.11a MODE



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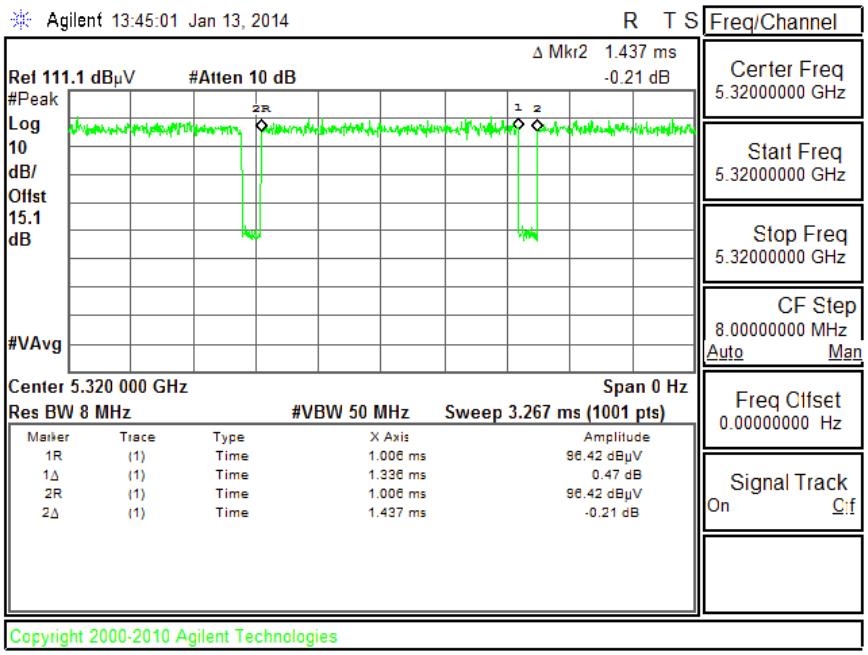
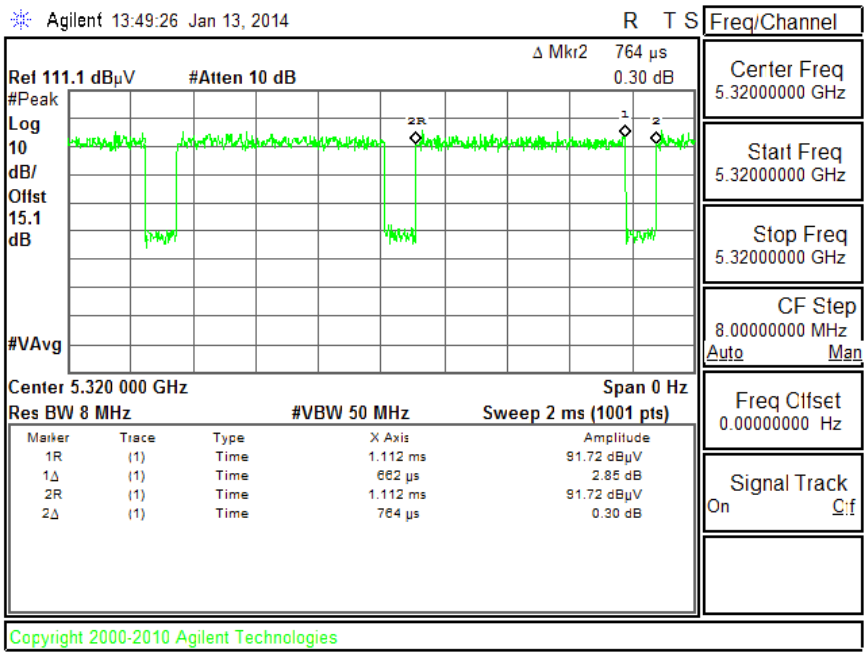
DUTY CYCLE 802.11n HT20 MODE



DUTY CYCLE 802.11n HT40 MODE



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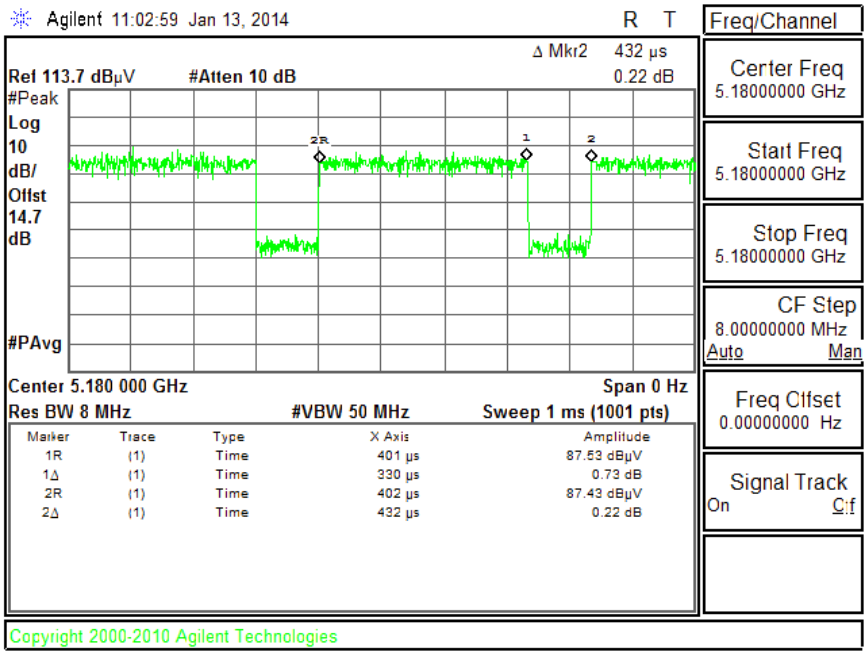
DUTY CYCLE 802.11ac HT80 MODE



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9. MEASUREMENT METHOD

The Duty Cycle is less than 98% and consistent therefore KDB 789033 Method SA-2 is used for .power and PPSD

The Duty Cycle is less than 98% and consistent, KDB 789033 Method AD with Power RMS Averaging and duty cycle correction is used.

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10. ANTENNA PORT TEST RESULTS

10.1. 26 dB BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

10.1.1. 802.11a MODE IN THE 5.2 GHz BAND

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5180	22.26
Mid	5200	22.47
High	5240	22.35
Worst		22.47

10.1.2. 802.11n HT20 MODE IN THE 5.2 GHz BAND

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5180	22.74
Mid	5200	22.68
High	5240	22.68
Worst		22.74

10.1.3. 802.11n HT40 MODE IN THE 5.2 GHz BAND

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5190	41.700
Mid	5230	41.880
Worst		41.880

10.1.4. 802.11ac HT80 MODE IN THE 5.2 GHz BAND

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5210	85.200

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10.1.1. 802.11a MODE IN THE 5.3 GHz BAND

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5260	22.29
Mid	5300	22.32
High	5320	22.50
Worst		22.50

10.1.1. 802.11n HT20 MODE IN THE 5.3 GHz BAND

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5260	22.62
Mid	5300	22.77
High	5320	22.86
Worst		22.86

10.1.2. 802.11n HT40 MODE IN THE 5.3 GHz BAND

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5270	42.5
High	5310	41.6
Worst		42.5

10.1.3. 802.11ac HT80 MODE IN THE 5.3 GHz BAND

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5290	84.840

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10.1.4. 802.11a MODE IN THE 5.5 GHz BAND

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5500	22.230
Mid	5580	22.440
High	5700	22.530
Worst		22.530

10.1.5. 802.11n HT20 MODE IN THE 5.5 GHz BAND

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5500	22.710
Mid	5580	22.530
High	5700	22.680
Worst		22.710

10.1.6. 802.11n HT40 MODE IN THE 5.5 GHz BAND

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5510	41.6
Mid	5550	41.8
High	5670	41.6
Worst		41.8

10.1.7. 802.11ac HT80 MODE IN THE 5.5 GHz BAND

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5530	85.200
High	5690	85.200
Worst		85.2

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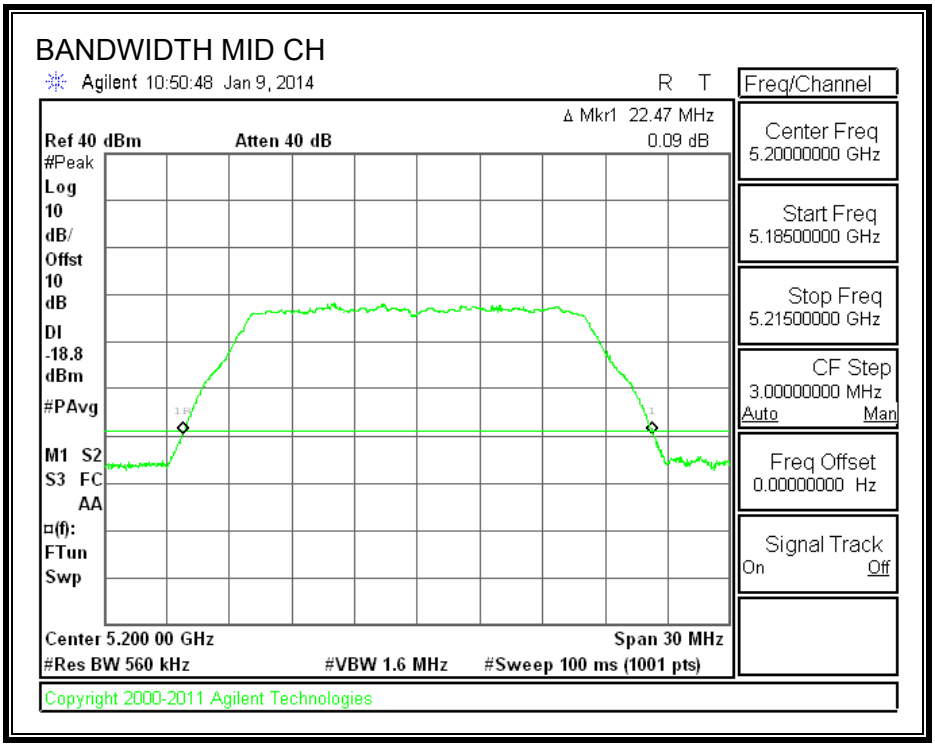
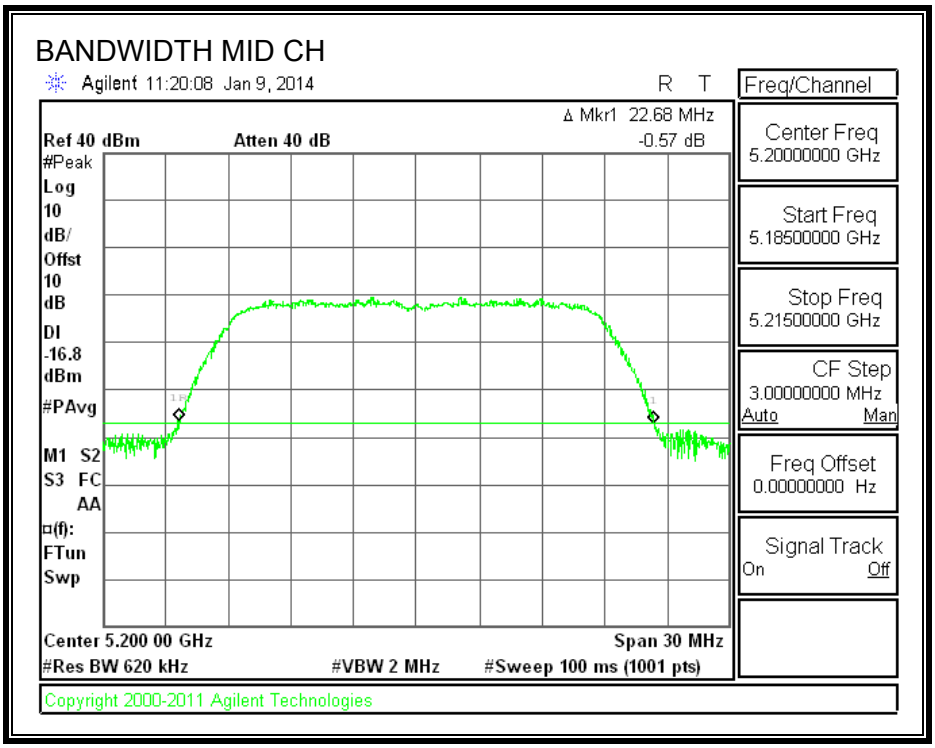
802.11a 5.2G 26 dB BANDWIDTH



802.11n HT20 5.2G 26 dB BANDWIDTH



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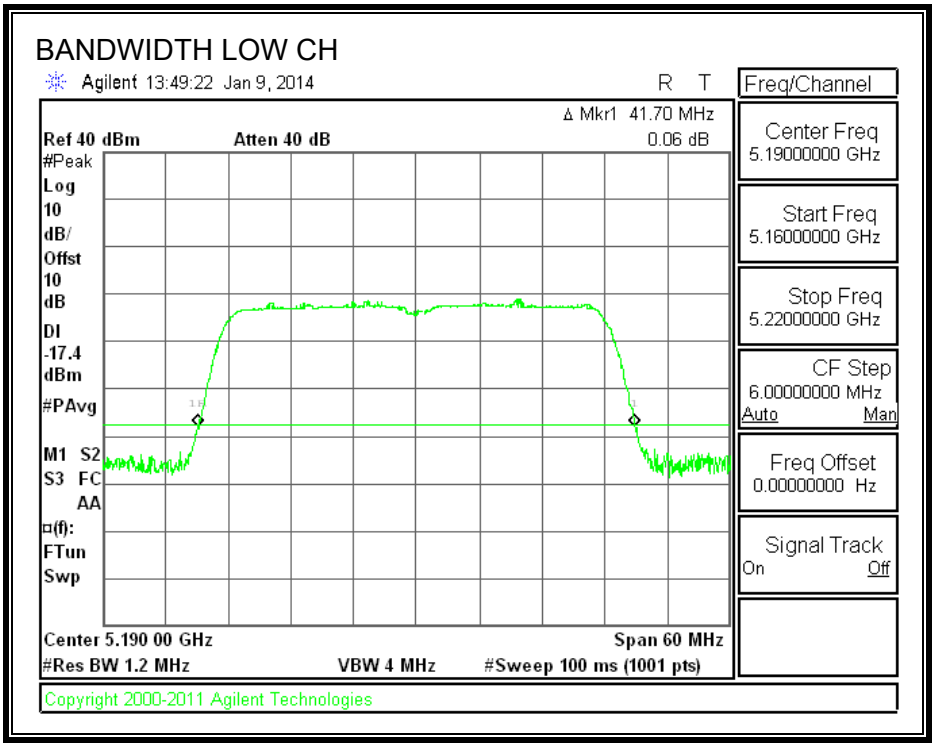
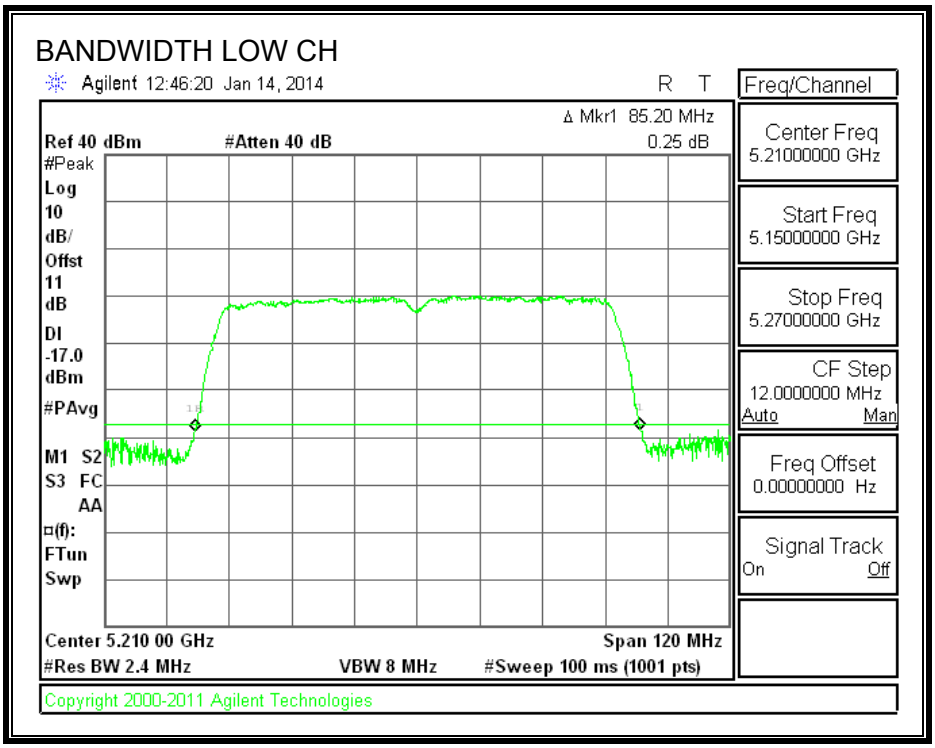
802.11n HT40 5.2G 26 dB BANDWIDTH



802.11ac HT80 5.2G 26 dB BANDWIDTH



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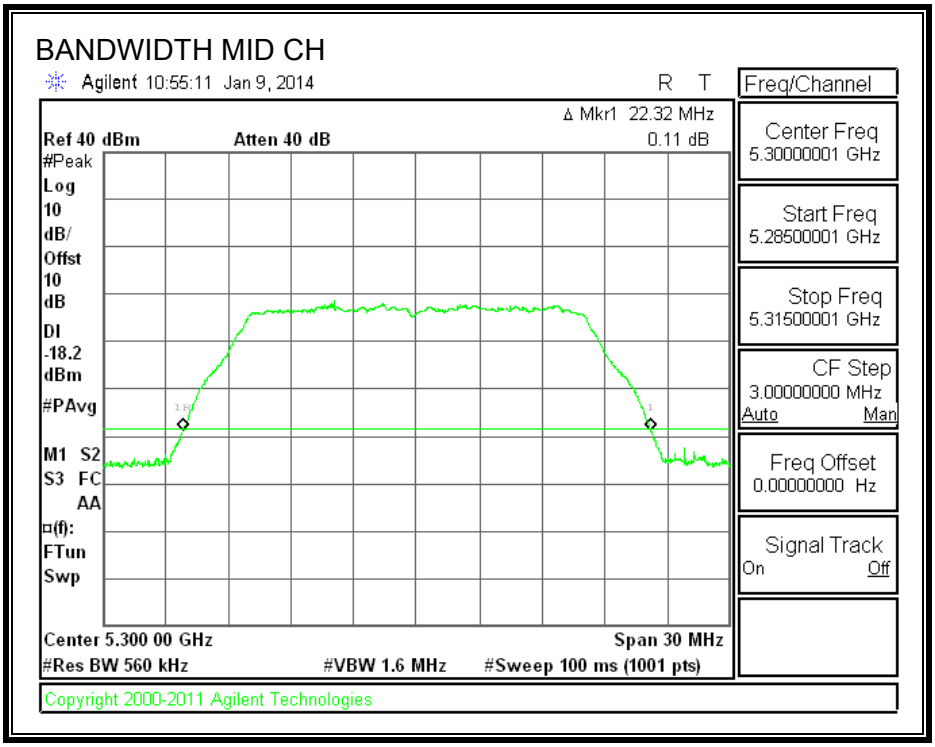
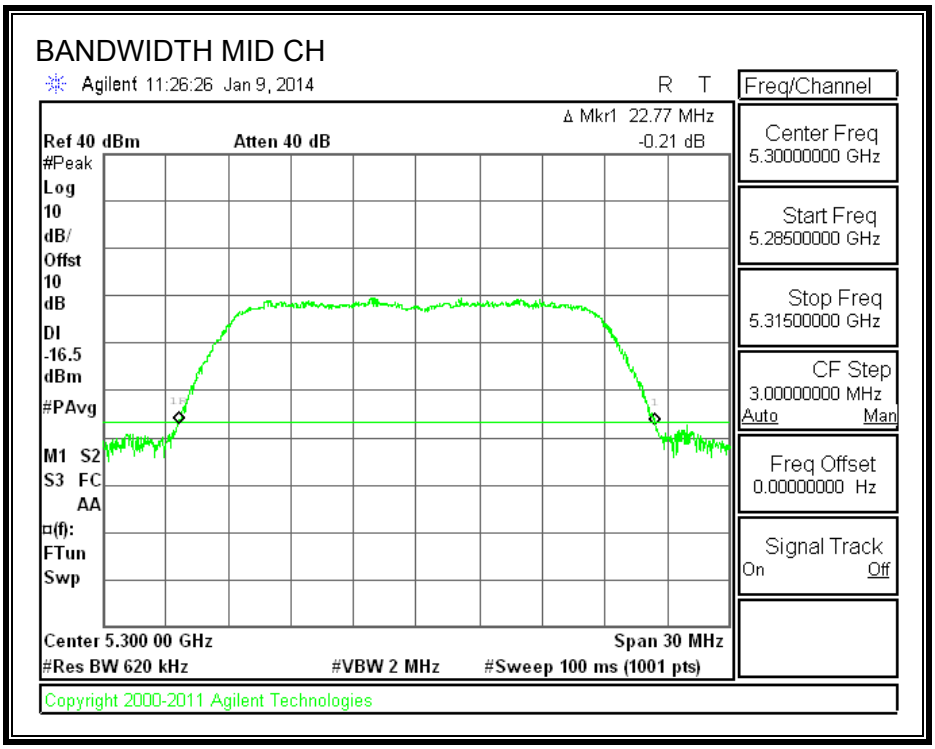
802.11a 5.3G 26 dB BANDWIDTH



802.11n HT20 5.3G 26 dB BANDWIDTH



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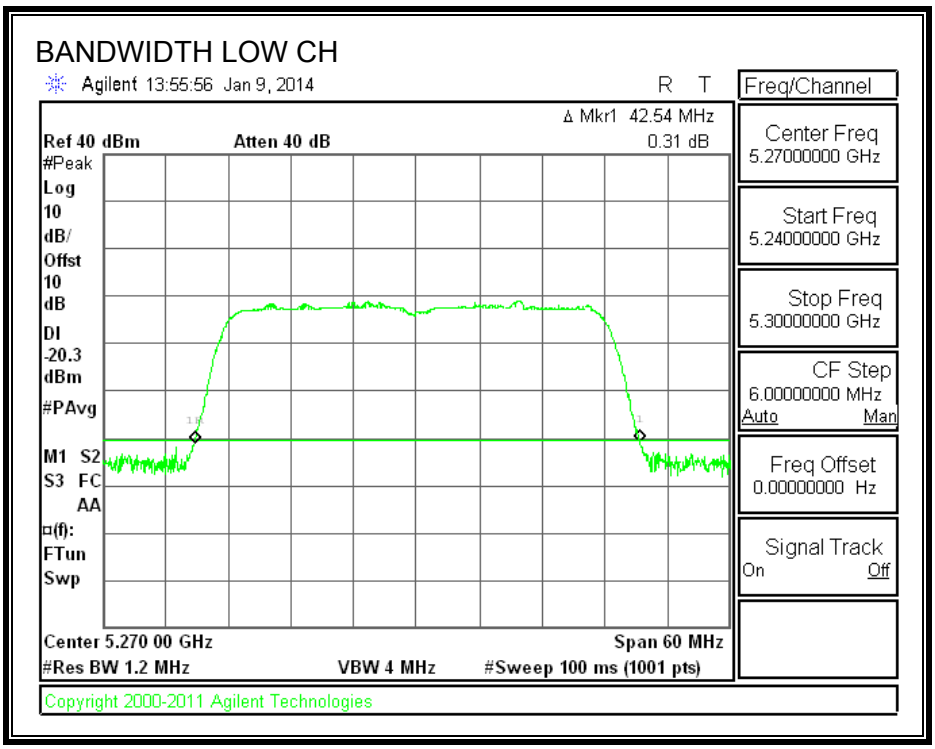
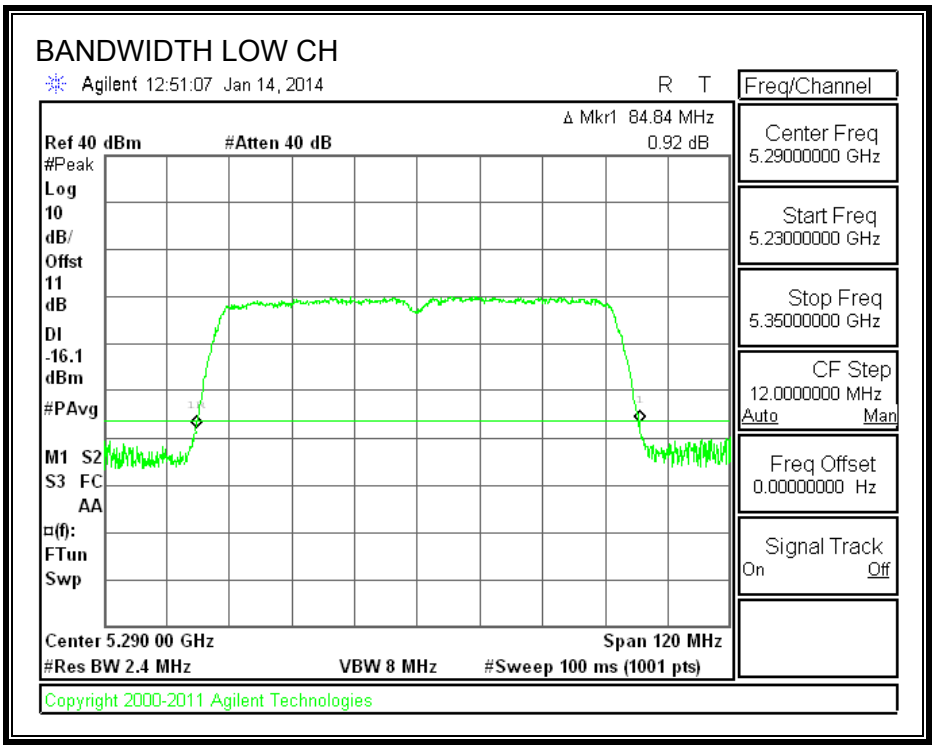
802.11n HT40 5.3G 26 dB BANDWIDTH



802.11ac HT80 5.3G 26 dB BANDWIDTH



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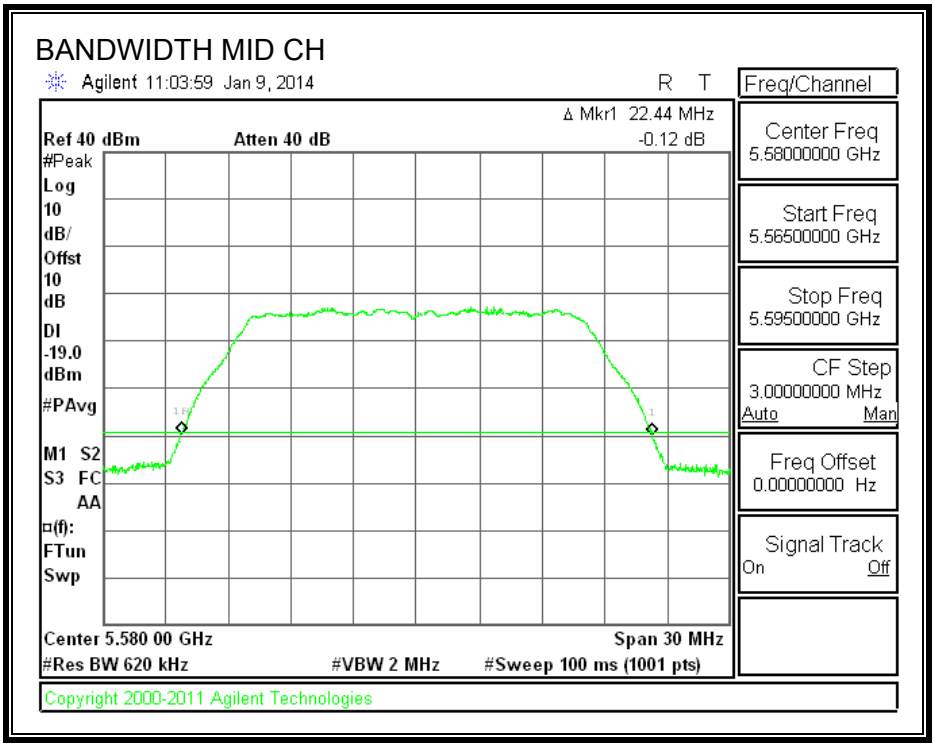
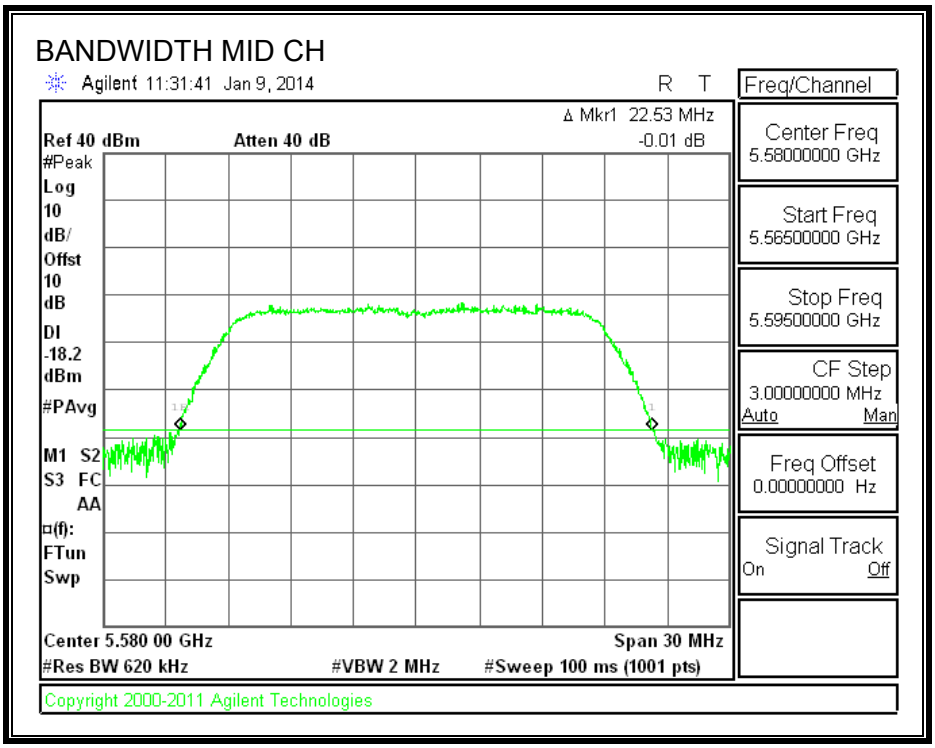
802.11a 5.5G 26 dB BANDWIDTH



802.11n HT20 5.5G 26 dB BANDWIDTH



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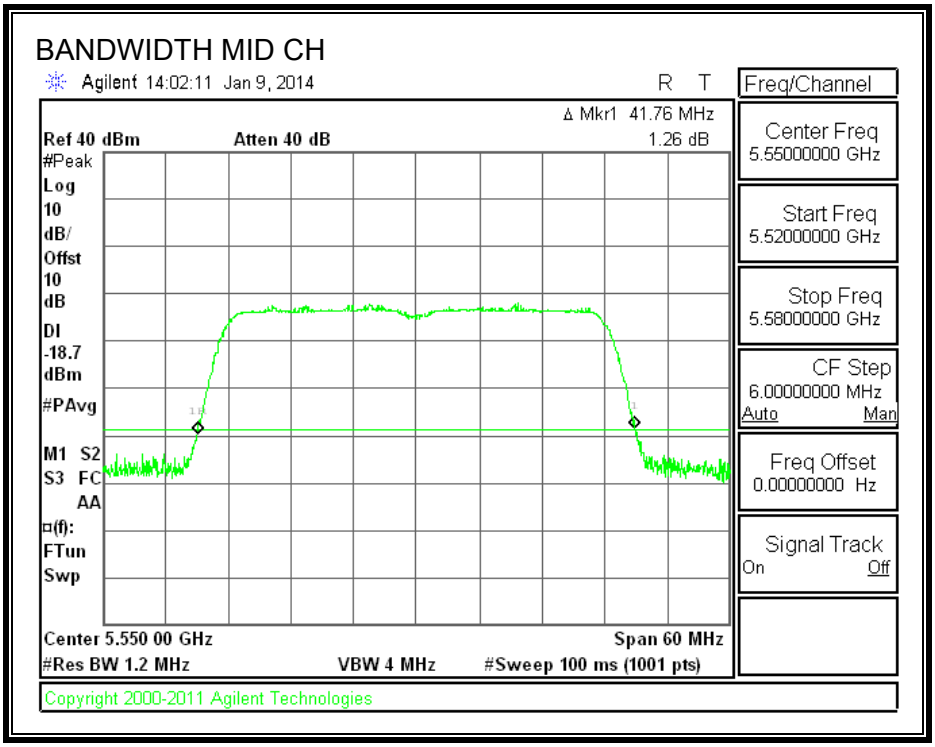
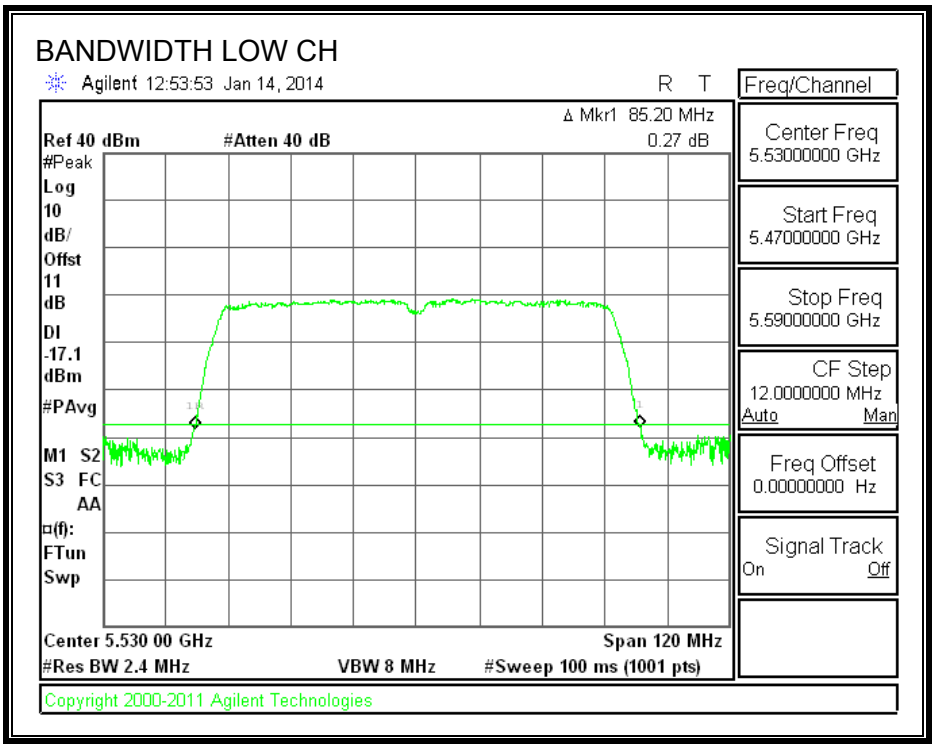
802.11n HT40 5.5G 26 dB BANDWIDTH



802.11ac HT80 5.5G 26 dB BANDWIDTH



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10.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

10.2.1. 802.11a MODE IN THE 5.2 GHz BAND

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5180	16.73
Mid	5200	16.72
High	5240	16.71
Worst		16.73

10.2.2. 802.11n HT20 MODE IN THE 5.2 GHz BAND

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5180	17.88
Mid	5200	17.89
High	5240	17.89
Worst		17.89

10.2.3. 802.11n HT40 MODE IN THE 5.2 GHz BAND

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5190	36.406
Mid	5230	36.411
Worst		36.411

10.2.4. 802.11ac HT80 MODE IN THE 5.2 GHz BAND

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5210	75.943

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10.2.5. 802.11a MODE IN THE 5.3 GHz BAND

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5260	16.73
Mid	5300	16.71
High	5320	16.72
Worst		16.73

10.2.6. 802.11n HT20 MODE IN THE 5.3 GHz BAND

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5260	17.85
Mid	5300	17.89
High	5320	17.89
Worst		17.89

10.2.7. 802.11n HT40 MODE IN THE 5.3 GHz BAND

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5270	36.4
High	5310	36.4
Worst		36.4

10.2.8. 802.11ac HT80 MODE IN THE 5.3 GHz BAND

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5290	75.913

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10.2.9. 802.11a MODE IN THE 5.5 GHz BAND

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5500	16.716
Mid	5580	16.720
High	5700	16.732
Worst		16.732

10.2.10. 802.11n HT20 MODE IN THE 5.5 GHz BAND

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5500	17.893
Mid	5580	17.890
High	5700	17.910
Worst		17.910

10.2.11. 802.11n HT40 MODE IN THE 5.5 GHz BAND

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5510	36.4
Mid	5550	36.4
High	5670	36.4
Worst		36.4

10.2.12. 802.11ac HT80 MODE IN THE 5.5 GHz BAND

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5530	76.018
High	5690	76.046
Worst		76.0

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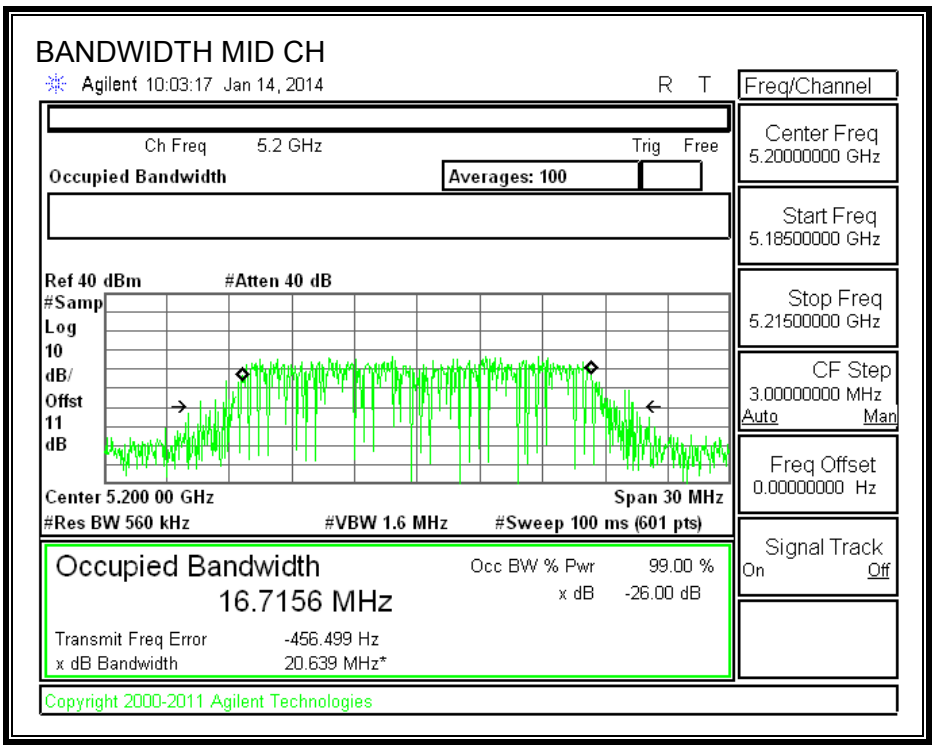
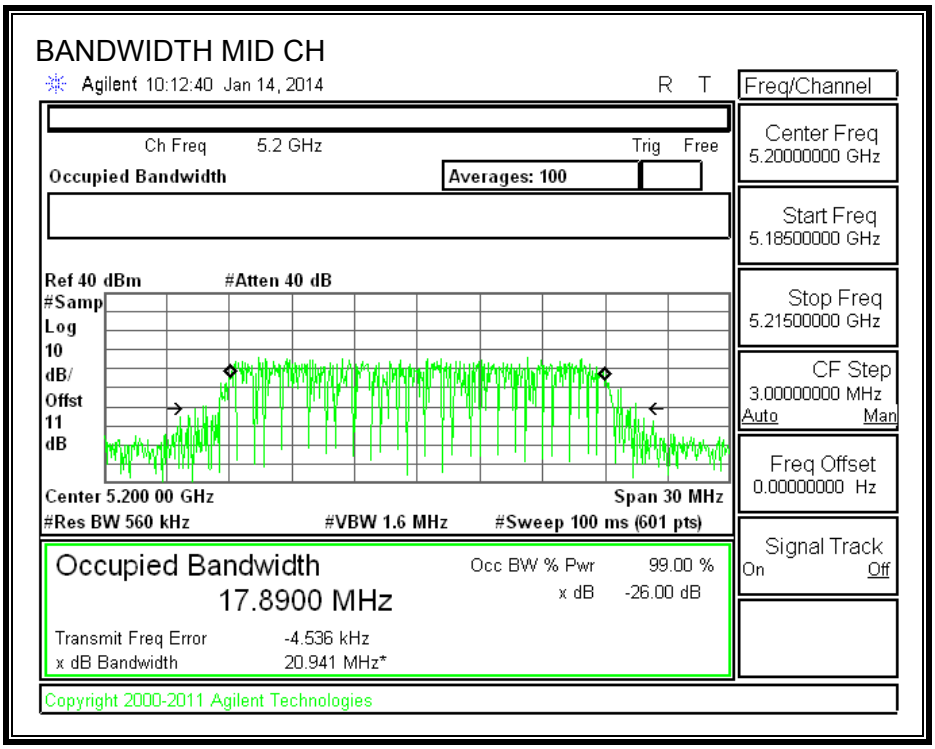
802.11a 5.2G 99% BANDWIDTH



802.11n HT20 5.2G 99% BANDWIDTH



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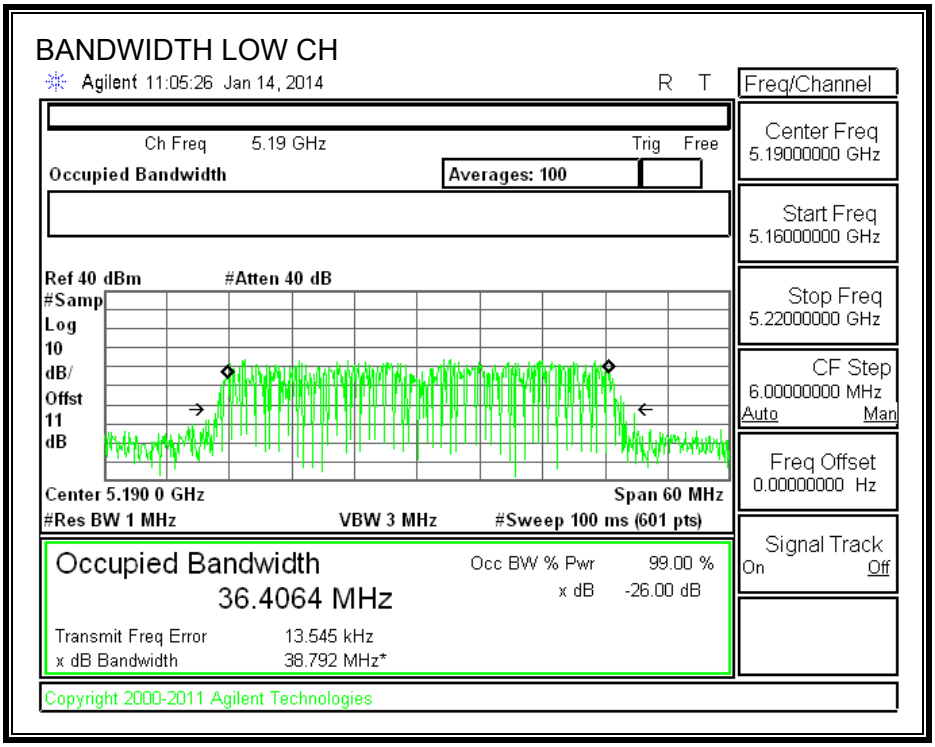
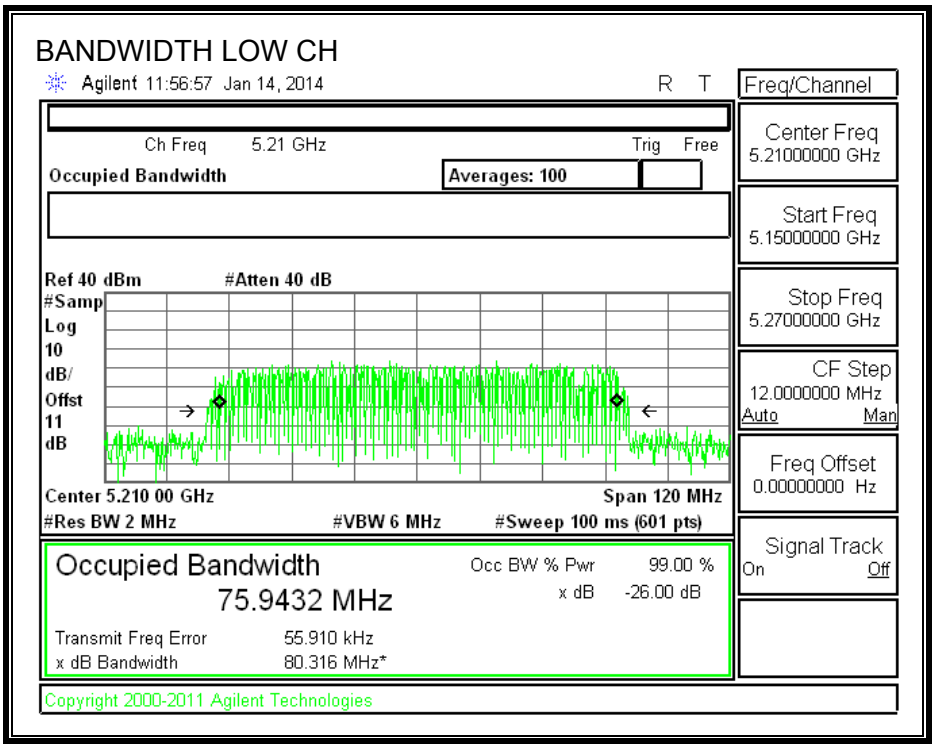
802.11n HT40 5.2G 99% BANDWIDTH



802.11ac HT80 5.2G 99% BANDWIDTH



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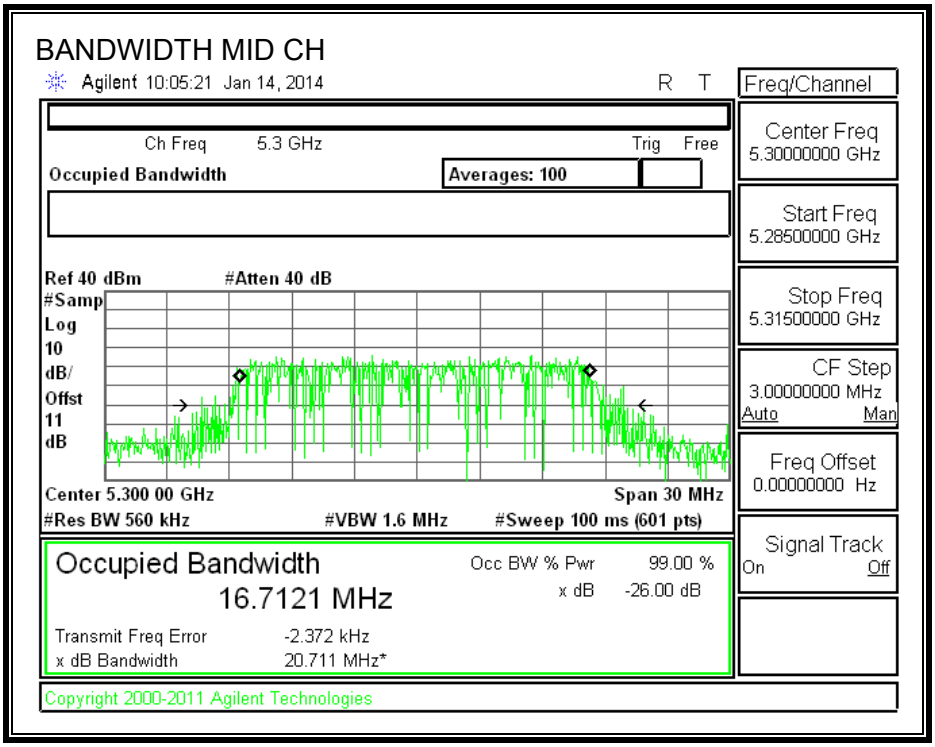
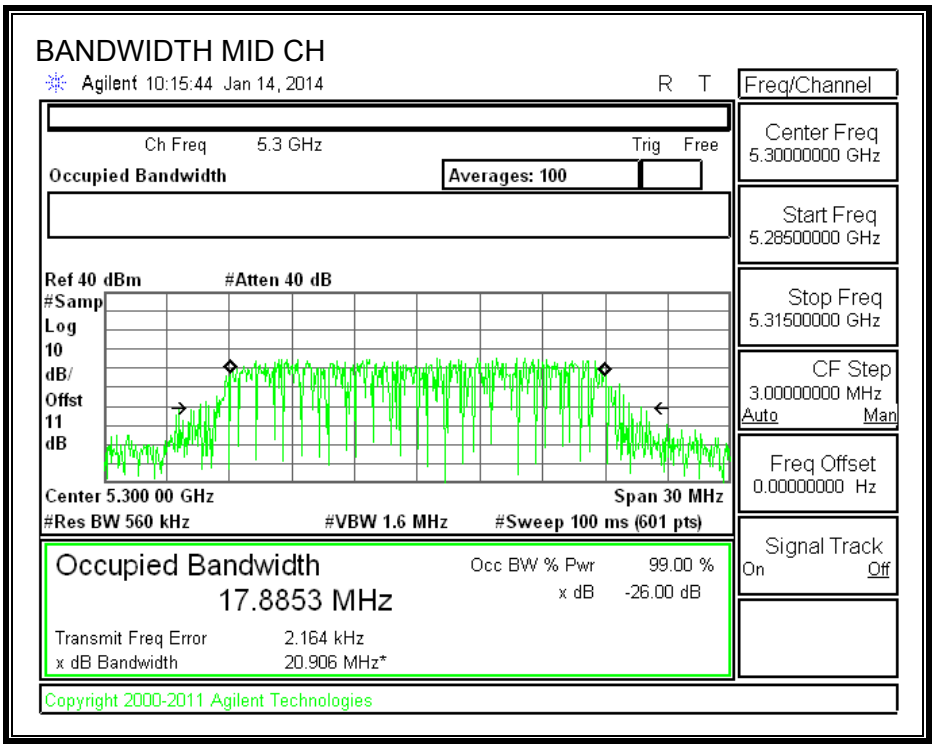
802.11a 5.3G 99% BANDWIDTH



802.11n HT20 5.3G 99% BANDWIDTH



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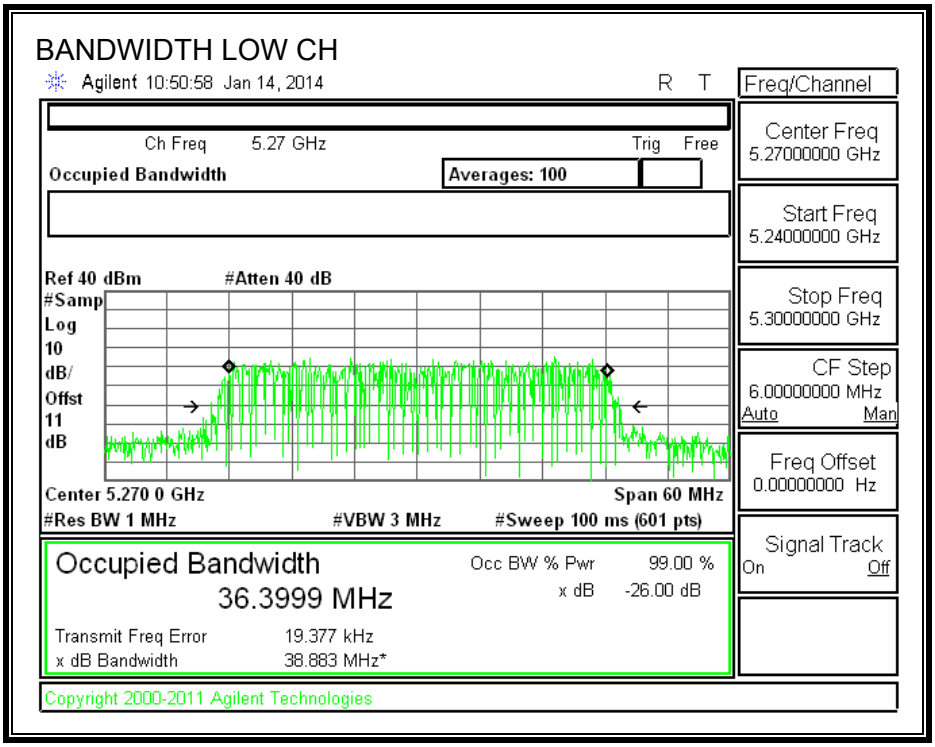
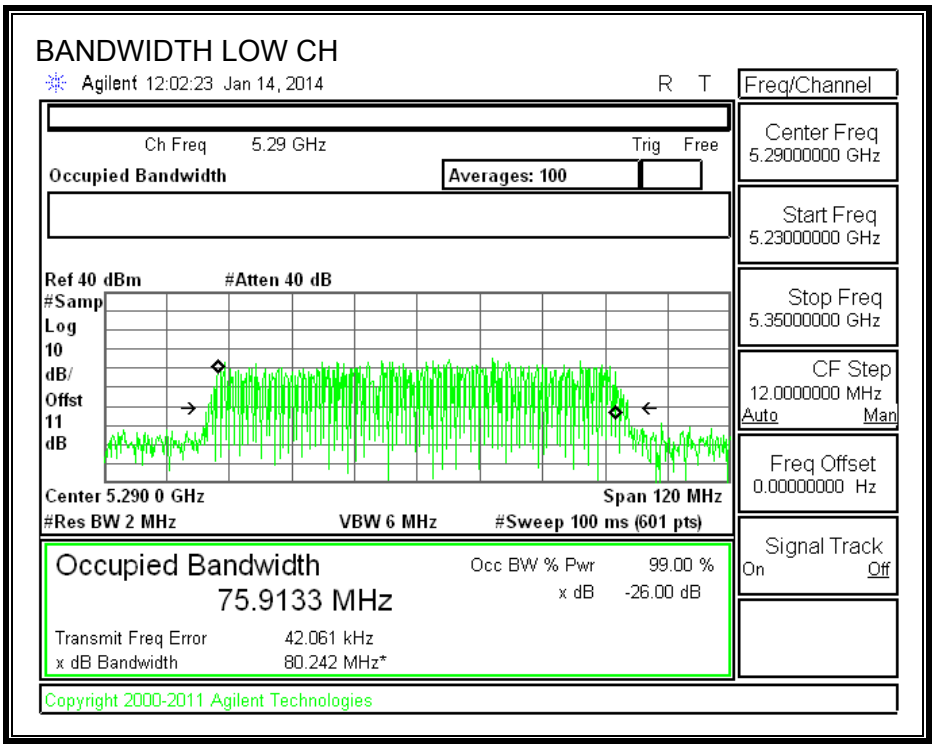
802.11n HT40 5.3G 99% BANDWIDTH



802.11ac HT80 5.3G 99% BANDWIDTH



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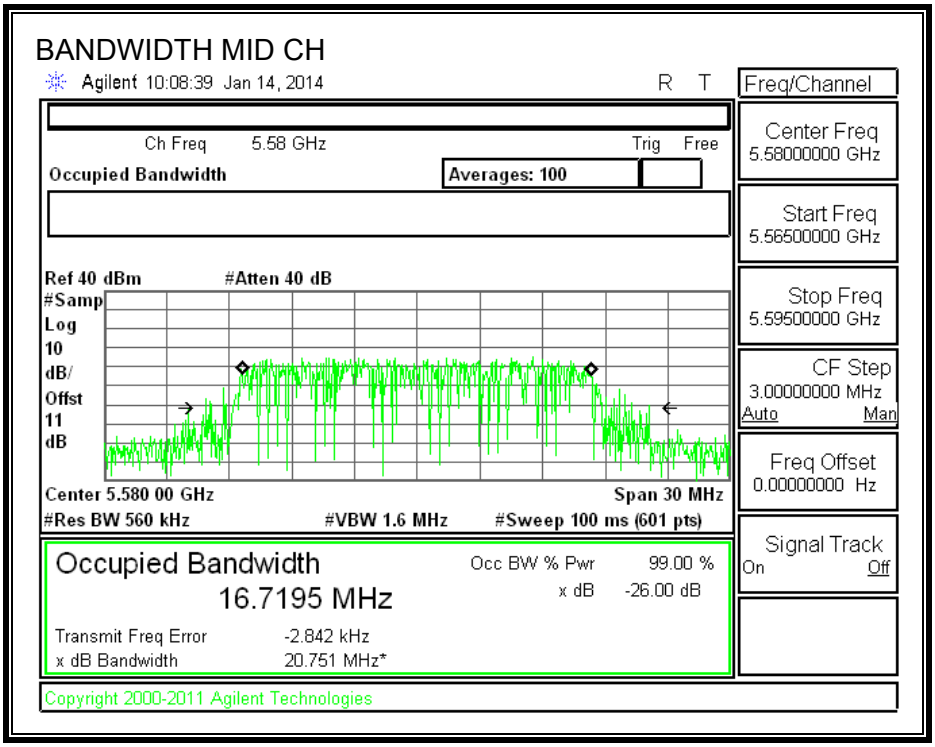
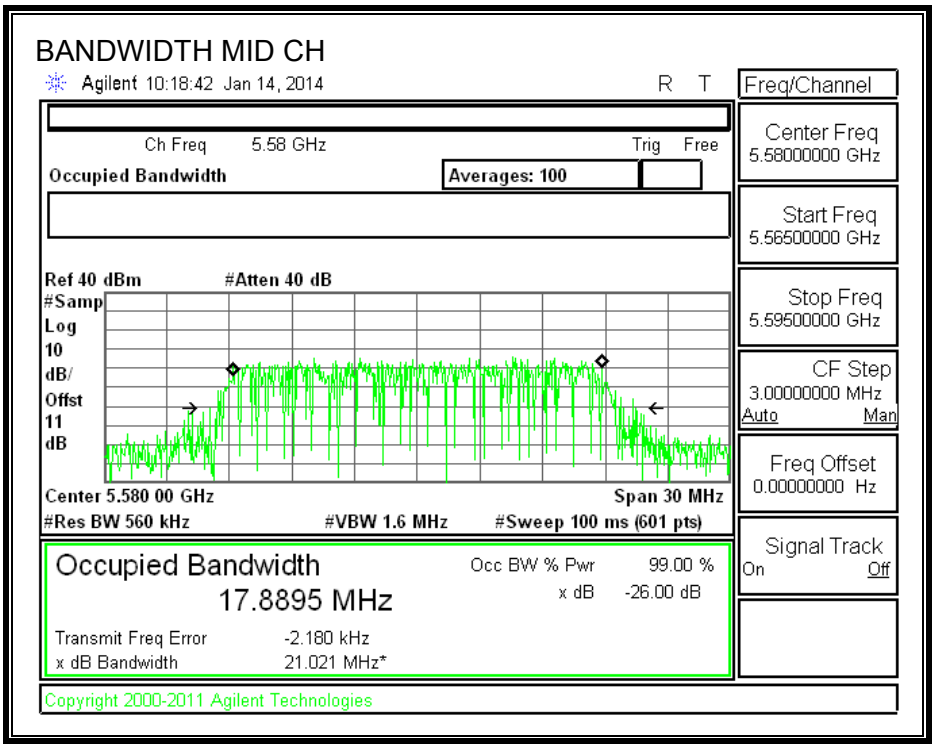
802.11a 5.5G 99% BANDWIDTH



802.11n HT20 5.5G 99% BANDWIDTH



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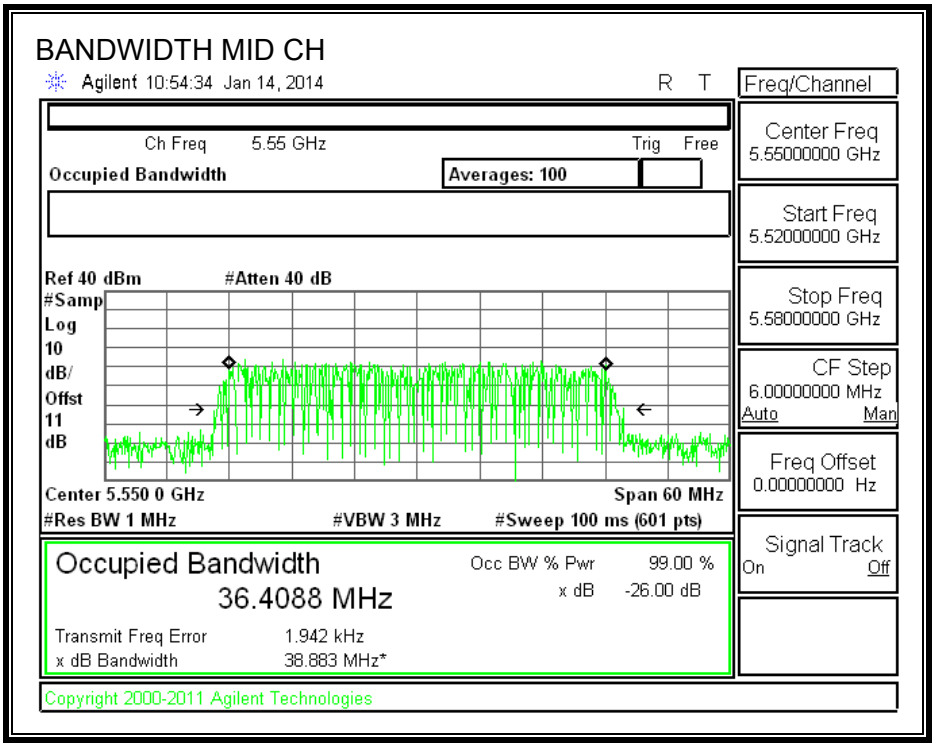
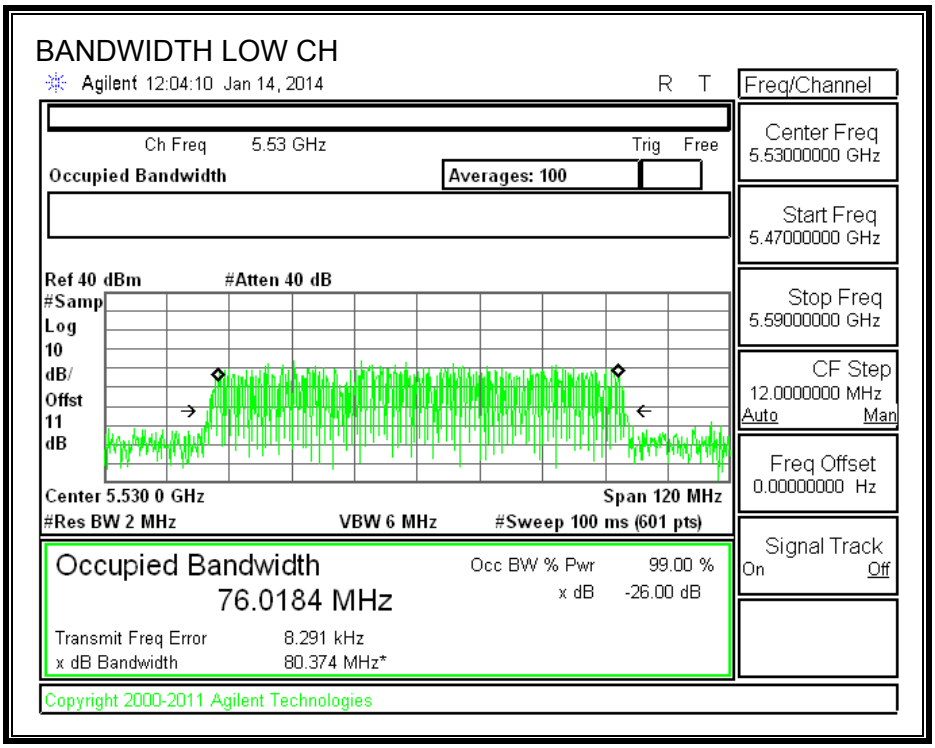
802.11n HT40 5.5G 99% BANDWIDTH



802.11ac HT80 5.5G 99% BANDWIDTH



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10.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

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

RESULTS

10.3.1. 802.11a MODE IN THE 5.2 GHz BAND

Channel	Frequency (MHz)	Avg Power (dBm)
Low	5180	12.30
Mid	5200	12.20
High	5240	12.20
Worst		12.30

10.3.2. 802.11n HT20 MODE IN THE 5.2 GHz BAND

Channel	Frequency (MHz)	Avg Power (dBm)
Low	5180	12.00
Mid	5200	12.00
High	5240	12.00
Worst		12.00

10.3.3. 802.11n HT40 MODE IN THE 5.2 GHz BAND

Channel	Frequency (MHz)	Avg Power (dBm)
Low	5190	11.000
Mid	5230	11.000
Worst		11.000

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10.3.4. 802.11ac HT80 MODE IN THE 5.2 GHz BAND

Channel	Frequency (MHz)	Avg Power (dBm)
Low	5210	11.000

10.3.5. 802.11a MODE IN THE 5.3 GHz BAND

Channel	Frequency (MHz)	Avg Power (dBm)
Low	5260	12.20
Mid	5300	12.20
High	5320	12.20
Worst		12.20

10.3.6. 802.11n HT20 MODE IN THE 5.3 GHz BAND

Channel	Frequency (MHz)	Avg Power (dBm)
Low	5260	12.00
Mid	5300	12.00
High	5320	12.00
Worst		12.00

10.3.7. 802.11n HT40 MODE IN THE 5.3 GHz BAND

Channel	Frequency (MHz)	Avg Power (dBm)
Low	5270	11.0
High	5310	11.0
Worst		11.0

10.3.8. 802.11ac HT80 MODE IN THE 5.3 GHz BAND

Channel	Frequency (MHz)	Avg Power (dBm)
Low	5290	11.000

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10.3.9. 802.11a MODE IN THE 5.5 GHz BAND

Channel	Frequency (MHz)	Avg Power (dBm)
Low	5500	12.000
Mid	5580	12.000
High	5700	12.000
Worst		12.000

10.3.10. 802.11n HT20 MODE IN THE 5.5 GHz BAND

Channel	Frequency (MHz)	Avg Power (dBm)
Low	5500	12.000
Mid	5580	12.000
High	5700	12.000
Worst		12.000

10.3.11. 802.11n HT40 MODE IN THE 5.5 GHz BAND

Channel	Frequency (MHz)	Avg Power (dBm)
Low	5510	11.0
Mid	5550	11.0
High	5670	11.0
Worst		11.0

10.3.12. 802.11ac HT80 MODE IN THE 5.5 GHz BAND

Channel	Frequency (MHz)	Avg Power (dBm)
Low	5530	11.000
Worst		11.0

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10.4. OUTPUT POWER AND PPSD

LIMITS

FCC §15.407 (a) (1)

For the band 5.15–5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW or 4 dBm + 10 log B, where B is the 26–dB emission bandwidth in MHz. In addition, 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 maximum conducted output 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.

IC RSS-210 A9.2 (1)

The maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 log10 B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

DIRECTIONAL ANTENNA GAIN

There is only one transmitter output therefore the directional gain is equal to the antenna gain.

Test Methodology

FCC KDB 644545 D02(Alternative Guidance for 802 11ac V01) was followed to test 5.8GHz DTS band under UNII band.

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RESULTS

10.4.1. 802.11a MODE IN THE 5.2 GHz BAND

Bandwidth and Antenna Gain

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Min 99% BW (MHz)	Directional Gain (dBi)
Low	5180	22.260	16.726	1.68
Mid	5200	22.470	16.716	1.68
High	5240	22.350	16.715	1.68

Limits

Channel	Frequency (MHz)	FCC Power Limit (dBm)	IC EIRP Limit (dBm)	Max IC Power (dBm)	Power Limit (dBm)	FCC PPSD Limit (dBm)	IC eirp PSD Limit (dBm)	PPSD Limit (dBm)
Low	5180	17.00	22.23	20.55	17.00	4.00	10.00	4.00
Mid	5200	17.00	22.23	20.55	17.00	4.00	10.00	4.00
High	5240	17.00	22.23	20.55	17.00	4.00	10.00	4.00

Duty Cycle CF (dB)	0.28	Included in Calculations of Corr'd Power & PPSD

Output Power Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5180	14.604	14.88	17.00	-2.12
Mid	5200	14.443	14.72	17.00	-2.28
High	5240	14.493	14.77	17.00	-2.23

PPSD Results

Channel	Frequency (MHz)	Chain 0 Meas PPSD (dBm)	Total Corr'd PPSD (dBm)	PPSD Limit (dBm)	PPSD Margin (dB)
Low	5180	1.260	1.54	4.00	-2.46
Mid	5200	1.130	1.41	4.00	-2.59
High	5240	1.100	1.38	4.00	-2.62

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10.4.2. 802.11n HT20 MODE IN THE 5.2 GHz BAND

Bandwidth and Antenna Gain

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Min 99% BW (MHz)	Directional Gain (dBi)
Low	5180	22.740	17.883	1.68
Mid	5200	22.680	17.890	1.68
High	5240	22.680	17.885	1.68

Limits

Channel	Frequency (MHz)	FCC Power Limit (dBm)	IC EIRP Limit (dBm)	Max IC Power (dBm)	Power Limit (dBm)	FCC PPSD Limit (dBm)	IC eirp PSD Limit (dBm)	PPSD Limit (dBm)
Low	5180	17.00	22.52	20.84	17.00	4.00	10.00	4.00
Mid	5200	17.00	22.53	20.85	17.00	4.00	10.00	4.00
High	5240	17.00	22.52	20.84	17.00	4.00	10.00	4.00

Duty Cycle CF (dB)	0.32	Included in Calculations of Corr'd Power & PPSD

Output Power Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5180	14.365	14.69	17.00	-2.32
Mid	5200	14.365	14.69	17.00	-2.32
High	5240	14.595	14.92	17.00	-2.09

PPSD Results

Channel	Frequency (MHz)	Chain 0 Meas PPSD (dBm)	Total Corr'd PPSD (dBm)	PPSD Limit (dBm)	PPSD Margin (dB)
Low	5180	2.790	3.11	4.00	-0.89
Mid	5200	2.440	2.76	4.00	-1.24
High	5240	3.140	3.46	4.00	-0.54

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10.4.3. 802.11n HT40 MODE IN THE 5.2 GHz BAND

Bandwidth and Antenna Gain

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Min 99% BW (MHz)	Directional Gain (dBi)
Low	5190	41.7	36.406	1.68
Mid	5230	41.88	36.411	1.68

Limits

Channel	Frequency (MHz)	FCC Power Limit (dBm)	IC EIRP Limit (dBm)	Max IC Power (dBm)	Power Limit (dBm)	FCC PPSD Limit (dBm)	IC eirp PSD Limit (dBm)	PPSD Limit (dBm)
Low	5190	17.00	23.00	21.32	17.00	4.00	10.00	4.00
Mid	5230	17.00	23.00	21.32	17.00	4.00	10.00	4.00
Duty Cycle CF (dB)		0.62	Included in Calculations of Corr'd Power & PPSD					

Output Power Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5190	12.652	13.27	17.00	-3.73
Mid	5230	12.770	13.39	17.00	-3.61

PPSD Results

Channel	Frequency (MHz)	Chain 0 Meas PPSD (dBm)	Total Corr'd PPSD (dBm)	PPSD Limit (dBm)	PPSD Margin (dB)
Low	5190	-1.780	-1.16	4.00	-5.16
Mid	5230	-1.780	-1.16	4.00	-5.16

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10.4.4. 802.11ac HT80 MODE IN THE 5.2 GHz BAND

Bandwidth and Antenna Gain

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Min 99% BW (MHz)	Directional Gain (dBi)
Low	5210	85.200	75.943	1.68

Limits

Channel	Frequency (MHz)	FCC Power Limit (dBm)	IC EIRP Limit (dBm)	Max IC Power (dBm)	Power Limit (dBm)	FCC PPSD Limit (dBm)	IC eirp PSD Limit (dBm)	PPSD Limit (dBm)
Low	5210	17.00	23.00	21.32	17.00	4.00	10.00	4.00
Duty Cycle CF (dB)		1.17	Included in Calculations of Corr'd Power & PPSD					

Output Power Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5210	11.516	12.69	17.00	-4.31

PPSD Results

Channel	Frequency (MHz)	Chain 0 Meas PPSD (dBm)	Total Corr'd PPSD (dBm)	PPSD Limit (dBm)	PPSD Margin (dB)
Low	5210	-5.690	-4.52	4.00	-8.52

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10.4.5. 802.11a MODE IN THE 5.3 GHz BAND

Bandwidth and Antenna Gain

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Min 99% BW (MHz)	Directional Gain (dBi)
Low	5260	22.29	16.727	1.68
Mid	5300	22.32	16.712	1.68
High	5320	22.50	16.718	1.68

Limits

Channel	Frequency (MHz)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Power Limit (dBm)	FCC PPSD Limit (dBm)	IC PSD Limit (dBm)	PPSD Limit (dBm)
Low	5260	24.00	23.23	29.23	23.23	11.00	11.00	11.00
Mid	5300	24.00	23.23	29.23	23.23	11.00	11.00	11.00
High	5320	24.00	23.23	29.23	23.23	11.00	11.00	11.00

Duty Cycle CF (dB)	0.28	Included in Calculations of Corr'd Power & PPSD

Output Power Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5260	14.316	14.60	23.23	-8.64
Mid	5300	14.174	14.45	23.23	-8.78
High	5320	14.165	14.45	23.23	-8.79

PPSD Results

Channel	Frequency (MHz)	Chain 0 Meas PPSD (dBm)	Total Corr'd PPSD (dBm)	PPSD Limit (dBm)	PPSD Margin (dB)
Low	5260	2.860	3.14	11.00	-7.86
Mid	5300	3.030	3.31	11.00	-7.69
High	5320	2.400	2.68	11.00	-8.32

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10.4.6. 802.11n HT20 MODE IN THE 5.3 GHz BAND

Bandwidth and Antenna Gain

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Min 99% BW (MHz)	Directional Gain (dBi)
Low	5260	22.62	17.855	1.68
Mid	5300	22.77	17.885	1.68
High	5320	22.86	17.891	1.68

Limits

Channel	Frequency (MHz)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Power Limit (dBm)	FCC PPSD Limit (dBm)	IC PSD Limit (dBm)	PPSD Limit (dBm)
Low	5260	24.00	23.52	29.52	23.52	11.00	11.00	11.00
Mid	5300	24.00	23.52	29.52	23.52	11.00	11.00	11.00
High	5320	24.00	23.53	29.53	23.53	11.00	11.00	11.00

Duty Cycle CF (dB)	0.32	Included in Calculations of Corr'd Power & PPSD

Output Power Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5260	14.247	14.57	23.52	-8.95
Mid	5300	14.100	14.42	23.52	-9.10
High	5320	13.496	13.82	23.53	-9.71

PPSD Results

Channel	Frequency (MHz)	Chain 0 Meas PPSD (dBm)	Total Corr'd PPSD (dBm)	PPSD Limit (dBm)	PPSD Margin (dB)
Low	5260	2.410	2.73	11.00	-8.27
Mid	5300	2.580	2.90	11.00	-8.10
High	5320	1.610	1.93	11.00	-9.07

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10.4.7. 802.11n HT40 MODE IN THE 5.3 GHz BAND

Bandwidth and Antenna Gain

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Min 99% BW (MHz)	Directional Gain (dBi)
Low	5270	42.5	36.399	1.68
High	5310	41.6	36.412	1.68

Limits

Channel	Frequency (MHz)	FCC Power Limit (dBm)	IC EIRP Limit (dBm)	Max IC Power (dBm)	Power Limit (dBm)	FCC PPSD Limit (dBm)	IC eirp PSD Limit (dBm)	PPSD Limit (dBm)
Low	5270	17.00	23.00	21.32	17.00	4.00	10.00	4.00
High	5310	17.00	23.00	21.32	17.00	4.00	10.00	4.00
Duty Cycle CF (dB)		0.62	Included in Calculations of Corr'd Power & PPSD					

Output Power Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5270	12.758	13.38	17.00	-3.62
High	5310	12.789	13.41	17.00	-3.59

PPSD Results

Channel	Frequency (MHz)	Chain 0 Meas PPSD (dBm)	Total Corr'd PPSD (dBm)	PPSD Limit (dBm)	PPSD Margin (dB)
Low	5270	-1.860	-1.24	4.00	-5.24
High	5310	-1.960	-1.34	4.00	-5.34

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10.4.8. 802.11ac HT80 MODE IN THE 5.3 GHz BAND

Bandwidth and Antenna Gain

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Min 99% BW (MHz)	Directional Gain (dBi)
Low	5290	84.84	75.9133	1.68

Limits

Channel	Frequency (MHz)	FCC Power Limit (dBm)	IC EIRP Limit (dBm)	Max IC Power (dBm)	Power Limit (dBm)	FCC PPSD Limit (dBm)	IC eirp PSD Limit (dBm)	PPSD Limit (dBm)
Low	5290	17.00	23.00	21.32	17.00	4.00	10.00	4.00

Duty Cycle CF (dB)	1.17	Included in Calculations of Corr'd Power & PPSD

Output Power Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5290	11.607	12.78	17.00	-4.22

PPSD Results

Channel	Frequency (MHz)	Chain 0 Meas PPSD (dBm)	Total Corr'd PPSD (dBm)	PPSD Limit (dBm)	PPSD Margin (dB)
Low	5290	-5.840	-4.67	4.00	-8.67

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10.4.9. 802.11a MODE IN THE 5.5 GHz BAND

Bandwidth and Antenna Gain

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Min 99% BW (MHz)	Directional Gain (dBi)
Low	5500	22.23	16.716	1.68
Mid	5580	22.44	16.720	1.68
High	5700	22.53	16.732	1.68

Limits

Channel	Frequency (MHz)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Power Limit (dBm)	FCC PPSD Limit (dBm)	IC PSD Limit (dBm)	PPSD Limit (dBm)
Low	5500	24.00	23.23	29.23	23.23	11.00	11.00	11.00
Mid	5580	24.00	23.23	29.23	23.23	11.00	11.00	11.00
High	5700	24.00	23.24	29.24	23.24	11.00	11.00	11.00

Duty Cycle CF (dB)	0.28	Included in Calculations of Corr'd Power & PPSD

Output Power Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5500	13.830	14.11	23.23	-9.12
Mid	5580	13.497	13.78	23.23	-9.46
High	5700	12.867	13.15	23.24	-10.09

PPSD Results

Channel	Frequency (MHz)	Chain 0 Meas PPSD (dBm)	Total Corr'd PPSD (dBm)	PPSD Limit (dBm)	PPSD Margin (dB)
Low	5500	0.580	0.86	11.00	-10.14
Mid	5580	2.290	2.57	11.00	-8.43
High	5700	1.470	1.75	11.00	-9.25

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10.4.10. 802.11n HT20 MODE IN THE 5.5 GHz BAND

Bandwidth and Antenna Gain

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Min 99% BW (MHz)	Directional Gain (dBi)
Low	5500	22.71	17.893	1.68
Mid	5580	22.53	17.890	1.68
High	5700	22.68	17.910	1.68

Limits

Channel	Frequency (MHz)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Power Limit (dBm)	FCC PPSD Limit (dBm)	IC PSD Limit (dBm)	PPSD Limit (dBm)
Low	5500	24.00	23.53	29.53	23.53	11.00	11.00	11.00
Mid	5580	24.00	23.53	29.53	23.53	11.00	11.00	11.00
High	5700	24.00	23.53	29.53	23.53	11.00	11.00	11.00

Duty Cycle CF (dB)	0.32	Included in Calculations of Corr'd Power & PPSD

Output Power Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5500	13.768	14.09	23.53	-9.44
Mid	5580	13.500	13.82	23.53	-9.71
High	5700	12.739	13.06	23.53	-10.47

PPSD Results

Channel	Frequency (MHz)	Chain 0 Meas PPSD (dBm)	Total Corr'd PPSD (dBm)	PPSD Limit (dBm)	PPSD Margin (dB)
Low	5500	0.160	0.48	11.00	-10.52
Mid	5580	-0.310	0.01	11.00	-10.99
High	5700	0.720	1.04	11.00	-9.96

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10.4.11. 802.11n HT40 MODE IN THE 5.5 GHz BAND

Bandwidth and Antenna Gain

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Min 99% BW (MHz)	Directional Gain (dBi)
Low	5510	41.6	36.405	1.68
Mid	5550	41.8	36.409	1.68
High	5670	41.6	36.415	1.68

Limits

Channel	Frequency (MHz)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Power Limit (dBm)	FCC PPSD Limit (dBm)	IC PSD Limit (dBm)	PPSD Limit (dBm)
Low	5510	24.00	24.00	30.00	24.00	11.00	11.00	11.00
Mid	5550	24.00	24.00	30.00	24.00	11.00	11.00	11.00
High	5670	24.00	24.00	30.00	24.00	11.00	11.00	11.00

Duty Cycle CF (dB)	0.62	Included in Calculations of Corr'd Power & PPSD

Output Power Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5510	12.449	13.07	24.00	-10.93
Mid	5550	12.126	12.75	24.00	-11.25
High	5670	11.840	12.46	24.00	-11.54

PPSD Results

Channel	Frequency (MHz)	Chain 0 Meas PPSD (dBm)	Total Corr'd PPSD (dBm)	PPSD Limit (dBm)	PPSD Margin (dB)
Low	5510	-1.900	-1.28	11.00	-12.28
Mid	5550	-2.310	-1.69	11.00	-12.69
High	5670	-2.600	-1.98	11.00	-12.98

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10.4.12. 802.11ac HT80 MODE IN THE 5.5 GHz BAND

Bandwidth and Antenna Gain

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Min 99% BW (MHz)	Directional Gain (dBi)
Low	5530	85.200	76.018	1.68

Limits

Channel	Frequency (MHz)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Power Limit (dBm)	FCC PPSD Limit (dBm)	IC PSD Limit (dBm)	PPSD Limit (dBm)
Low	5530	24.00	24.00	30.00	24.00	11.00	11.00	11.00

Duty Cycle CF (dB)	1.17	Included in Calculations of Corr'd Power & PPSD

Output Power Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5530	11.864	13.03	24.00	-10.97

PPSD Results

Channel	Frequency (MHz)	Chain 0 Meas PPSD (dBm)	Total Corr'd PPSD (dBm)	PPSD Limit (dBm)	PPSD Margin (dB)
Low	5530	-5.440	-4.27	11.00	-15.27

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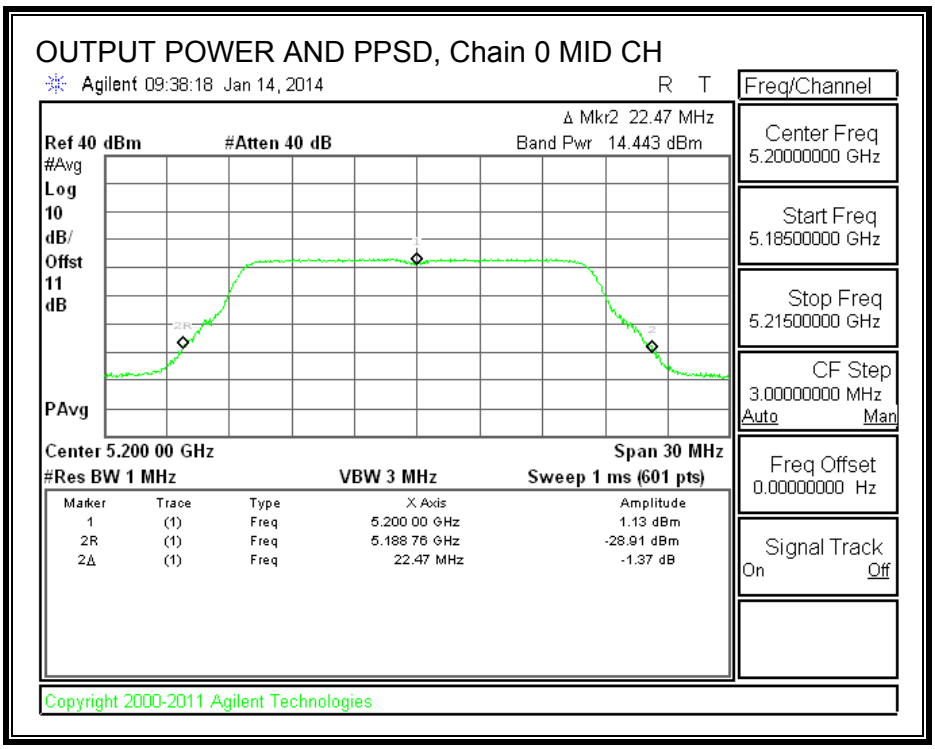
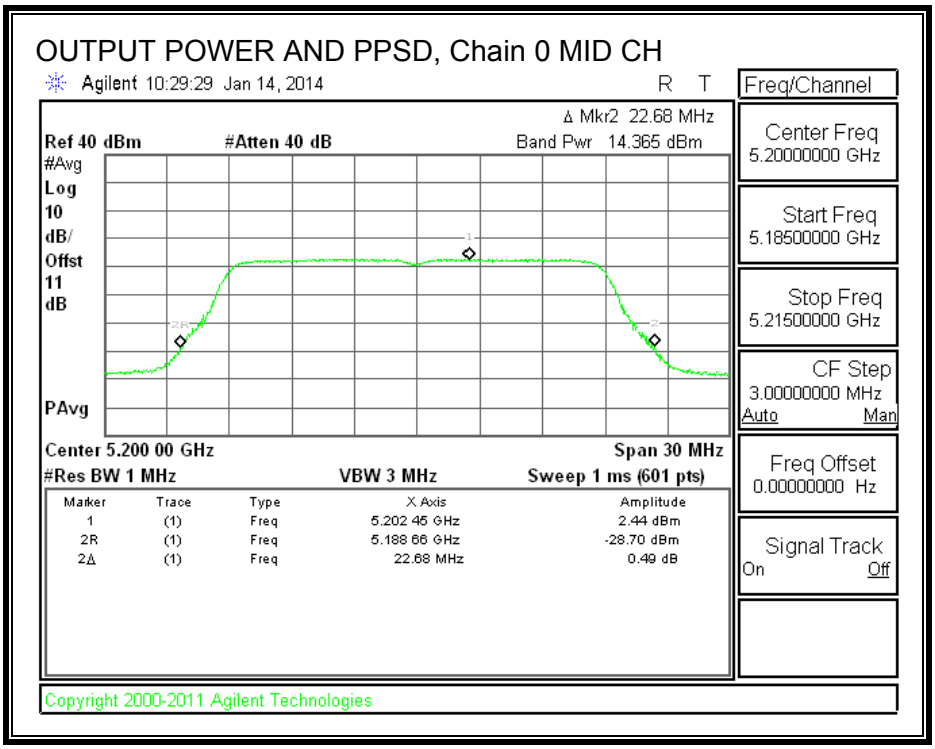
10.4.13. 802.11a 5.2G OUTPUT POWER AND PPSD, Chain 0



802.11n HT20 5.2G OUTPUT POWER AND PPSD, Chain 0



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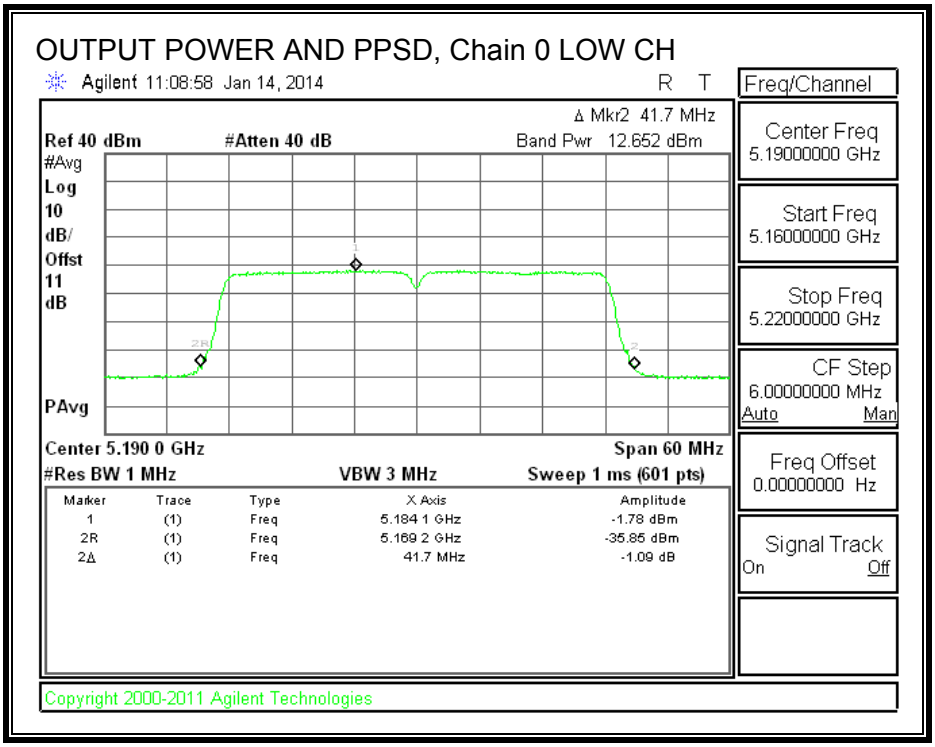
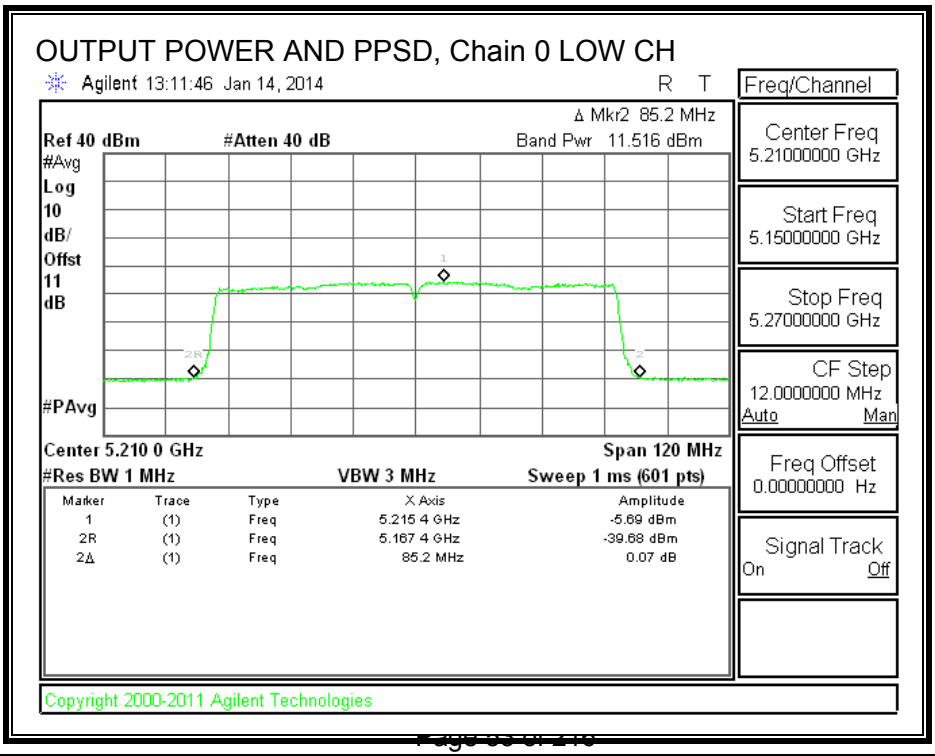
802.11n HT40 5.2G OUTPUT POWER AND PPSD, Chain 0



802.11ac HT80 5.2G OUTPUT POWER AND PPSD, Chain 0



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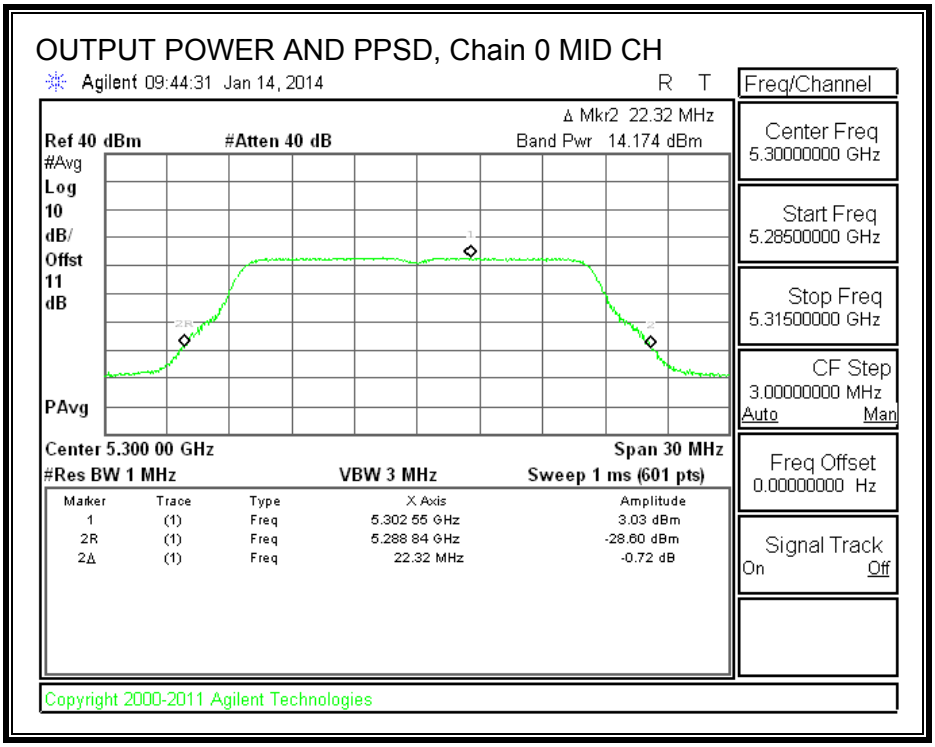
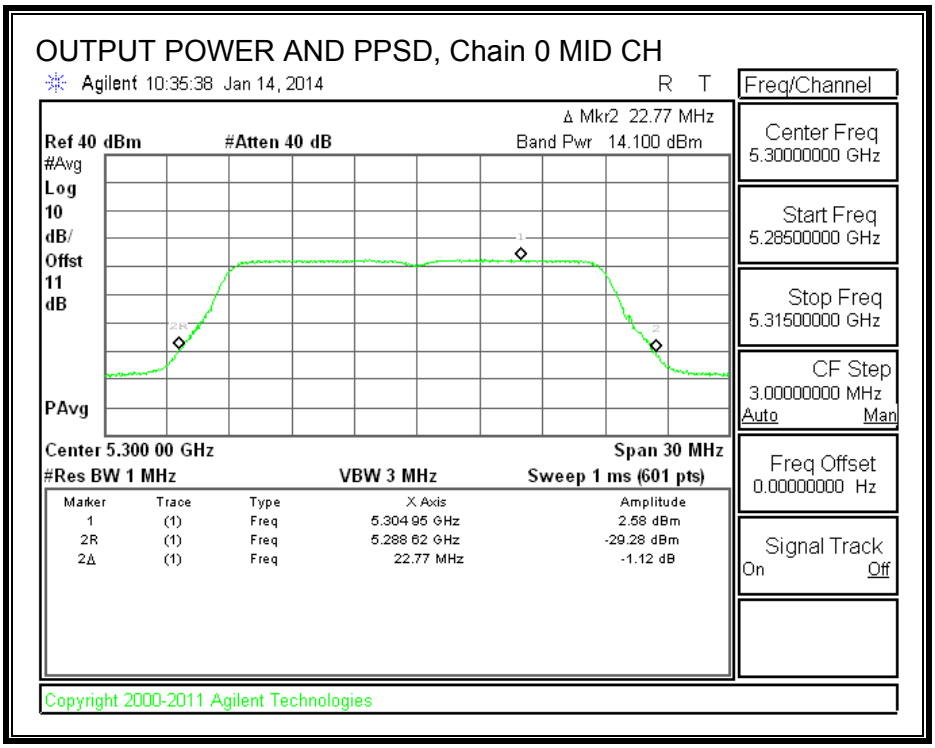
802.11a 5.3G OUTPUT POWER AND PPSD, Chain 0



802.11n HT20 5.3G OUTPUT POWER AND PPSD, Chain 0



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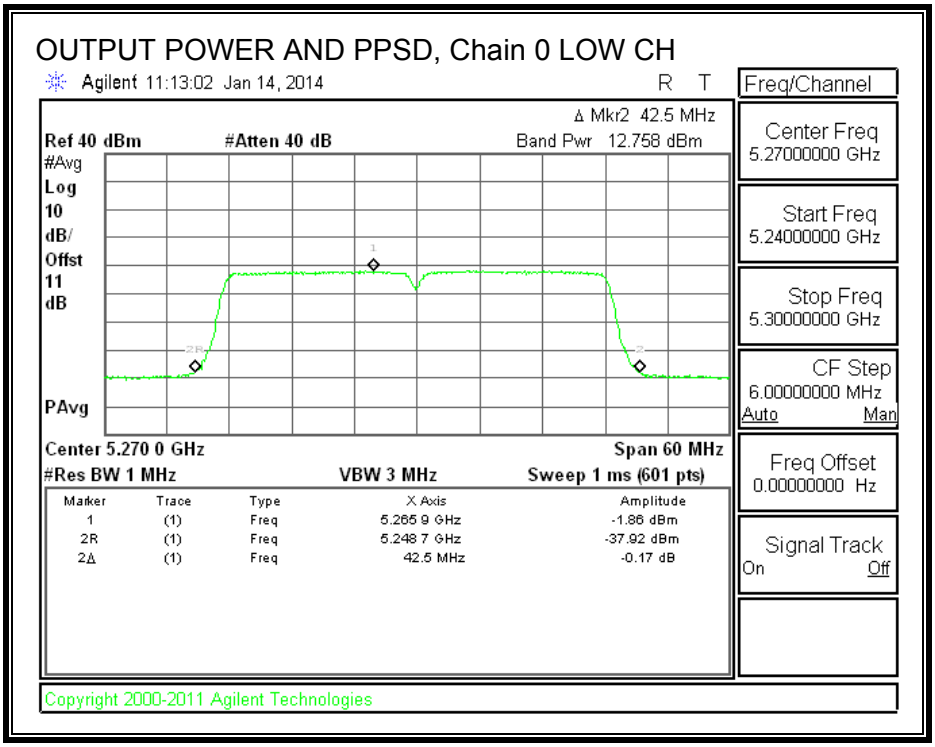
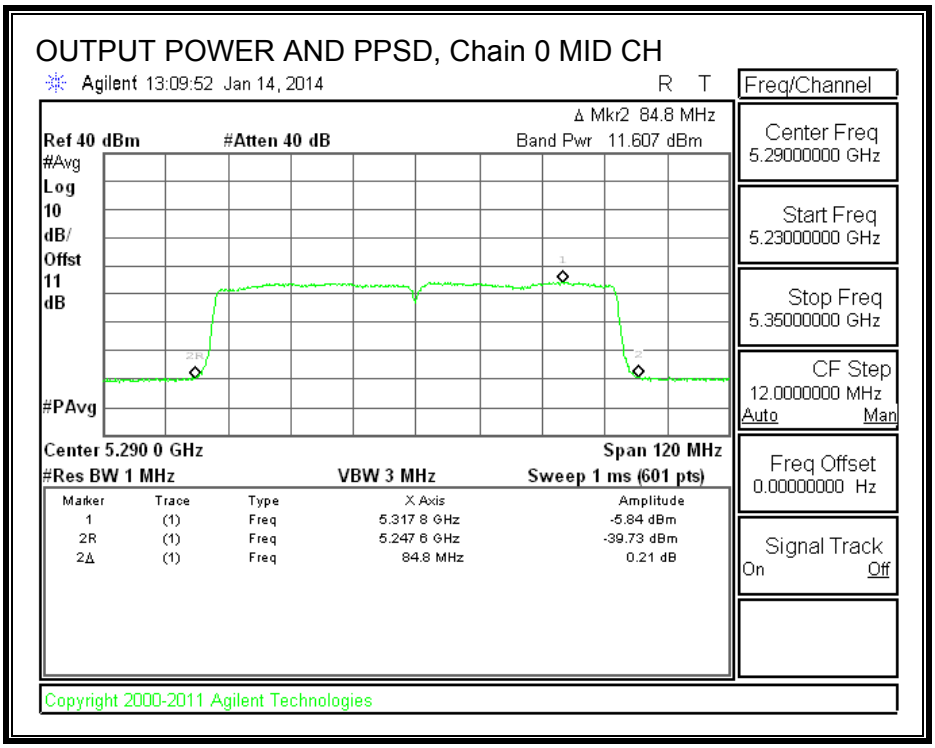
802.11n HT40 5.3G OUTPUT POWER AND PPSD, Chain 0



802.11ac HT80 5.3G OUTPUT POWER AND PPSD, Chain 0



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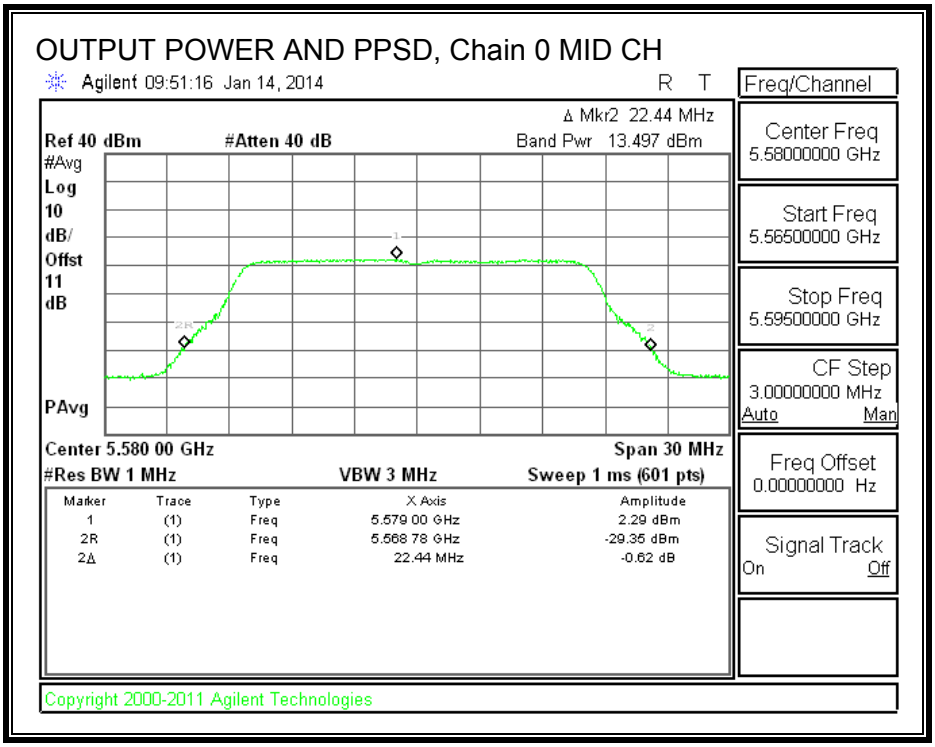
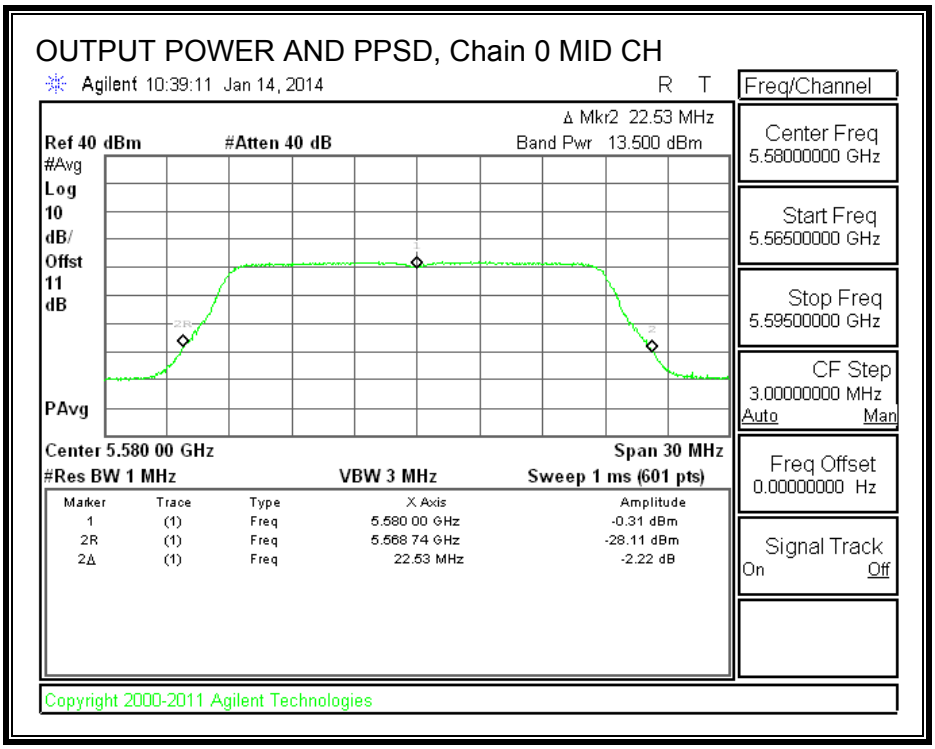
802.11a 5.5G OUTPUT POWER AND PPSD, Chain 0



802.11n HT20 5.5G OUTPUT POWER AND PPSD, Chain 0



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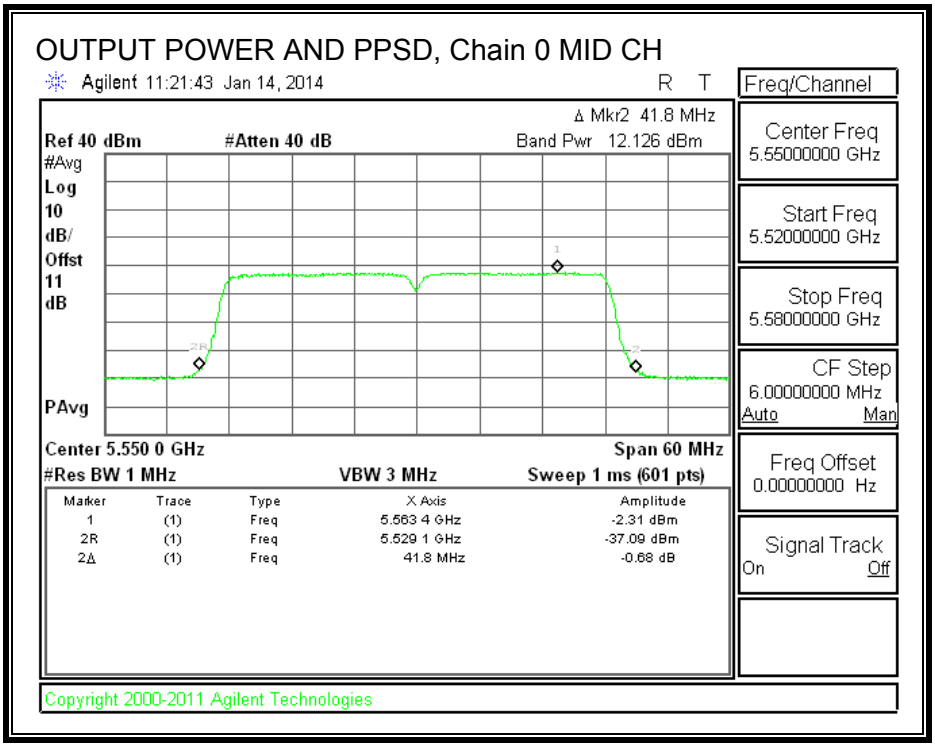
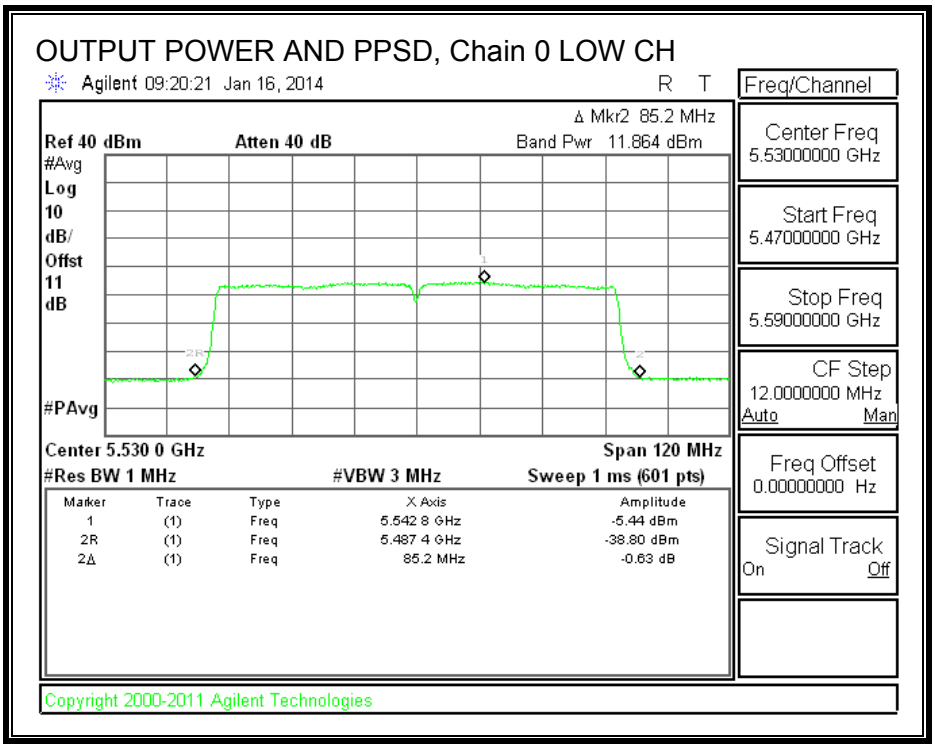
802.11n HT40 5.5G OUTPUT POWER AND PPSD, Chain 0



802.11ac HT80 5.5G OUTPUT POWER AND PPSD, Chain 0



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10.5. PEAK EXCURSION

LIMITS

FCC §15.407 (a) (6)

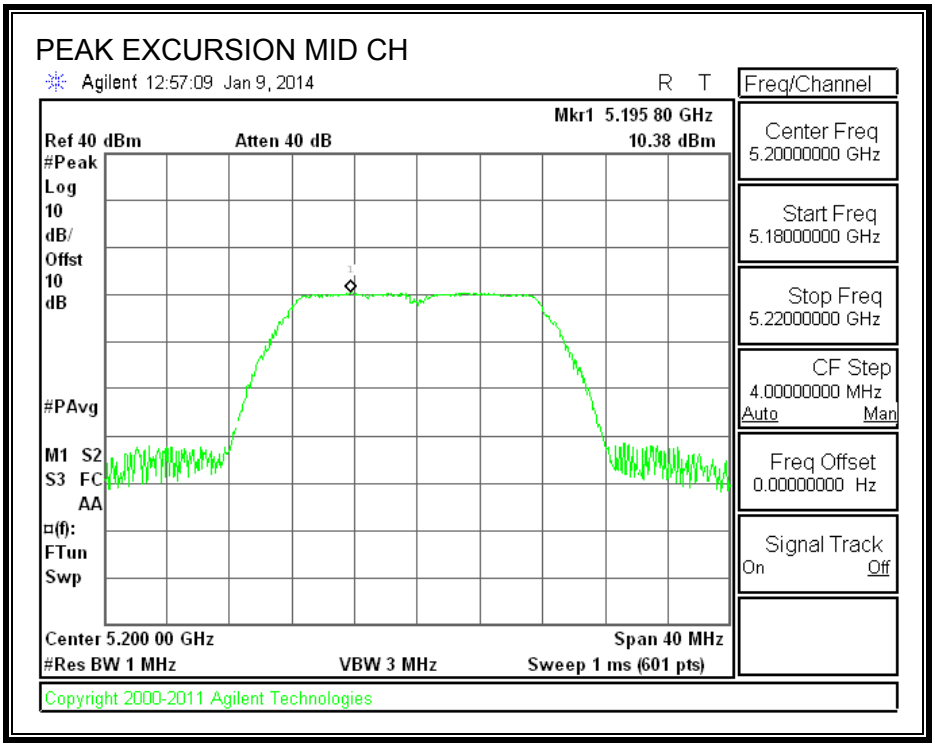
The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

RESULTS

10.5.1. 802.11a MODE IN THE 5.2 GHz BAND

Channel	Frequency (MHz)	PK Level (dBm)	PSD (dBm)	DCCF (dB)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Mid	5200	10.380	1.13	0.32	8.93	13	-4.07

PEAK EXCURSION



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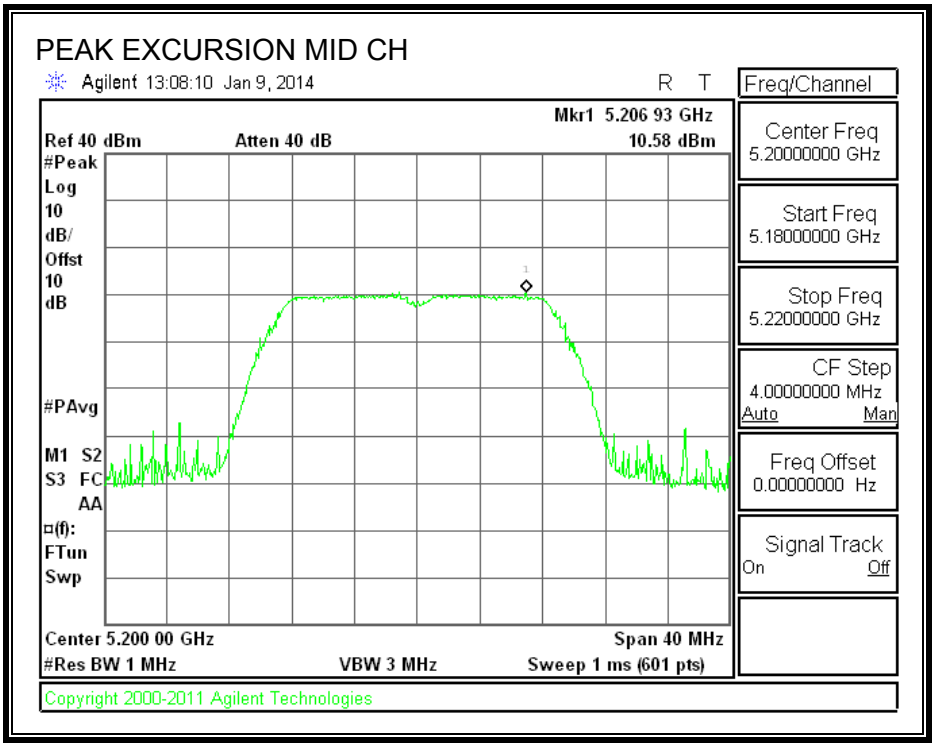
10.5.1. 802.11n HT20 MODE IN THE 5.2 GHz BAND

Channel	Frequency (MHz)	PK Level (dBm)	PSD (dBm)	DCCF (dB)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Mid	5200	10.580	2.44	0.32	7.82	13	-5.18

PEAK EXCURSION



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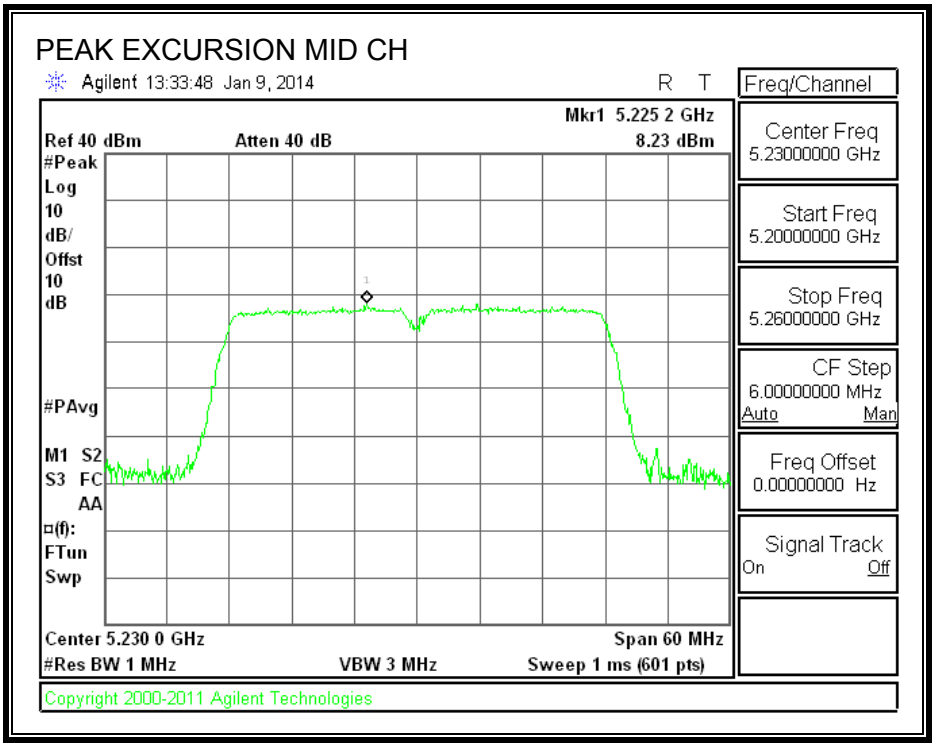
10.5.1. 802.11n HT40 MODE IN THE 5.2 GHz BAND

Channel	Frequency (MHz)	PK Level (dBm)	PSD (dBm)	DCCF (dB)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
HIGH	5230	8.230	-1.78	0.62	9.39	13	-3.61

PEAK EXCURSION



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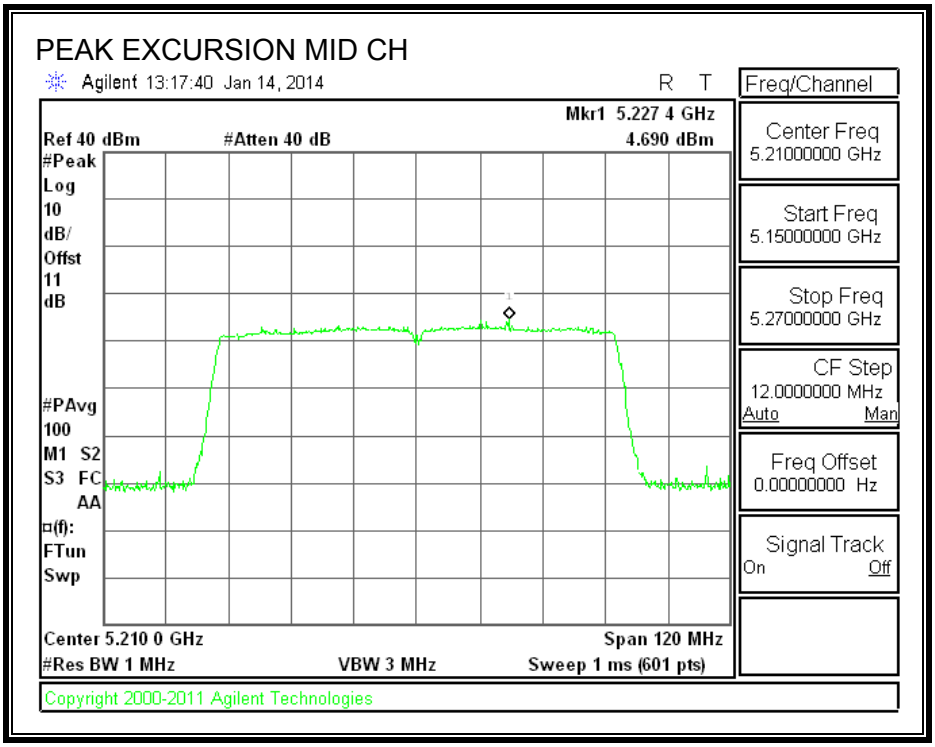
10.5.2. 802.11ac MODE IN THE 5.2 GHz BAND

Channel	Frequency (MHz)	PK Level (dBm)	PSD (dBm)	DCCF (dB)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Mid	5210	4.690	-5.69	1.17	9.21	13	-3.79

PEAK EXCURSION



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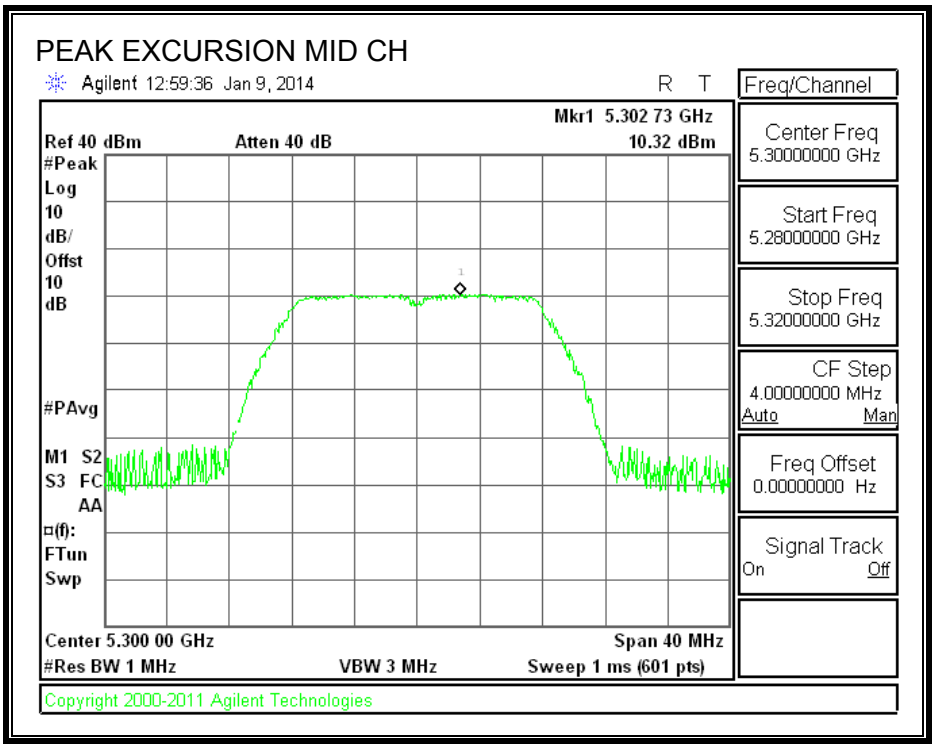
10.5.3. 802.11a HT20 MODE IN THE 5.3 GHz BAND

Channel	Frequency (MHz)	PK Level (dBm)	PSD (dBm)	DCCF (dB)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Mid	5300	10.320	3.03	0.28	7.01	13	-5.99

PEAK EXCURSION



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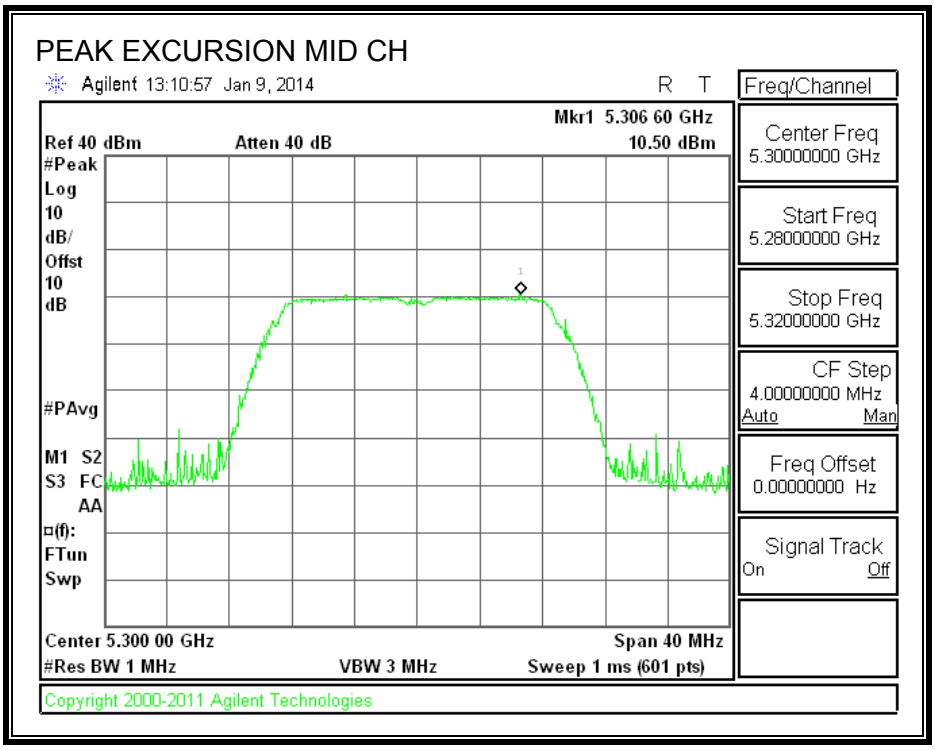
10.5.4. 802.11n HT20 MODE IN THE 5.3 GHz BAND

Channel	Frequency (MHz)	PK Level (dBm)	PSD (dBm)	DCCF (dB)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Mid	5300	10.500	2.58	0.32	7.60	13	-5.40



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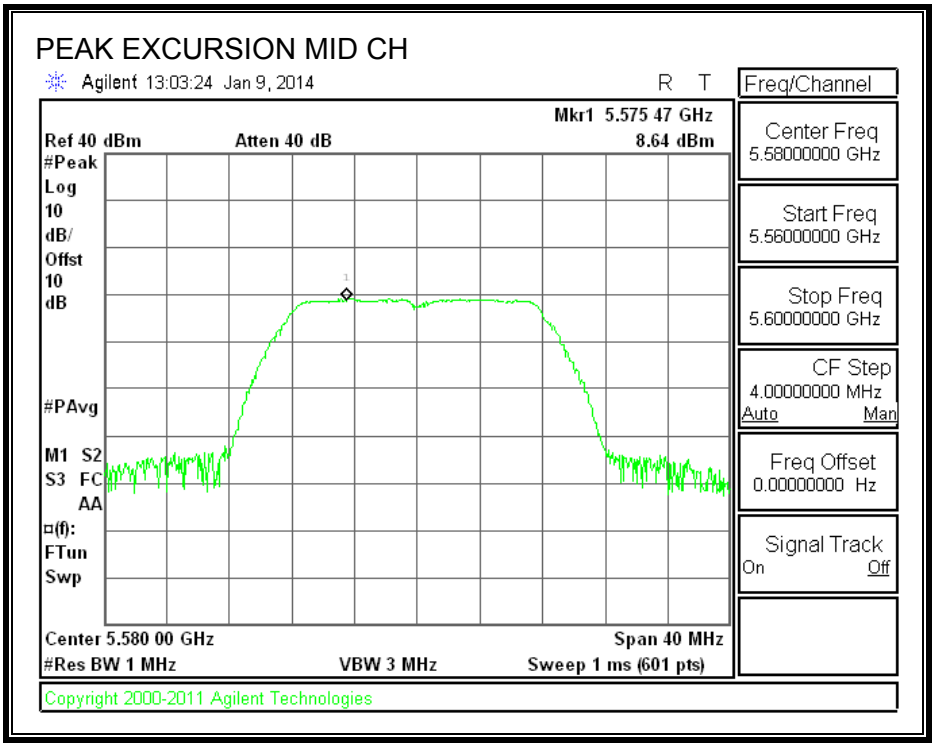
10.5.5. 802.11a HT20 MODE IN THE 5.5 GHz BAND

Channel	Frequency (MHz)	PK Level (dBm)	PSD (dBm)	DCCF (dB)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Mid	5580	8.640	2.29	0.28	6.07	13	-6.93



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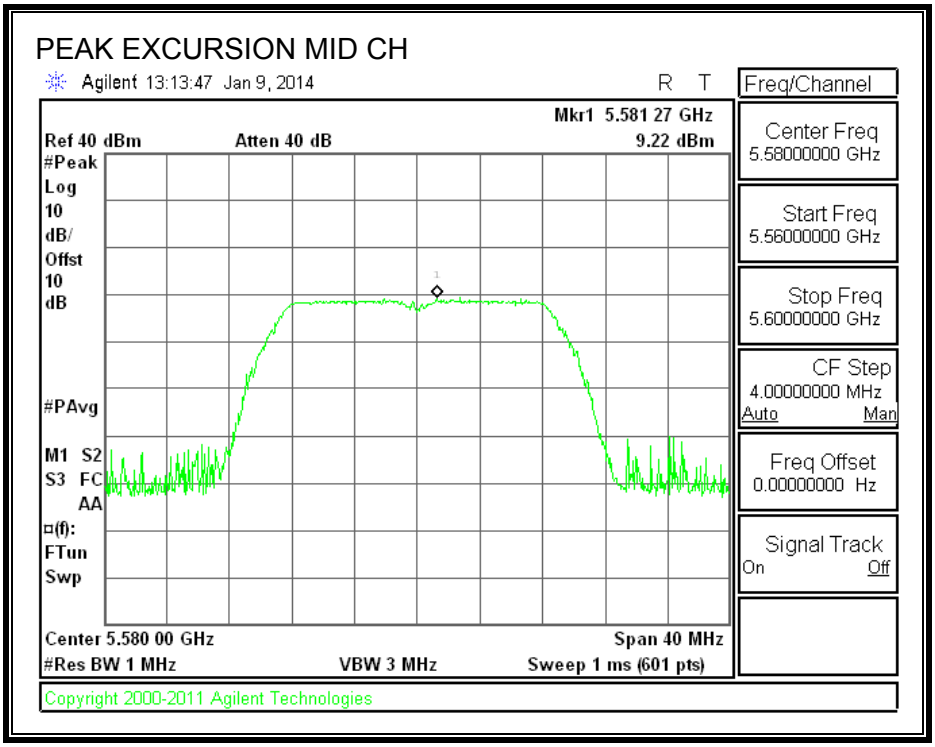
10.5.6. 802.11n HT20 MODE IN THE 5.5 GHz BAND

Channel	Frequency (MHz)	PK Level (dBm)	PSD (dBm)	DCCF (dB)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Mid	5580	9.220	-0.31	0.32	9.21	13	-3.79



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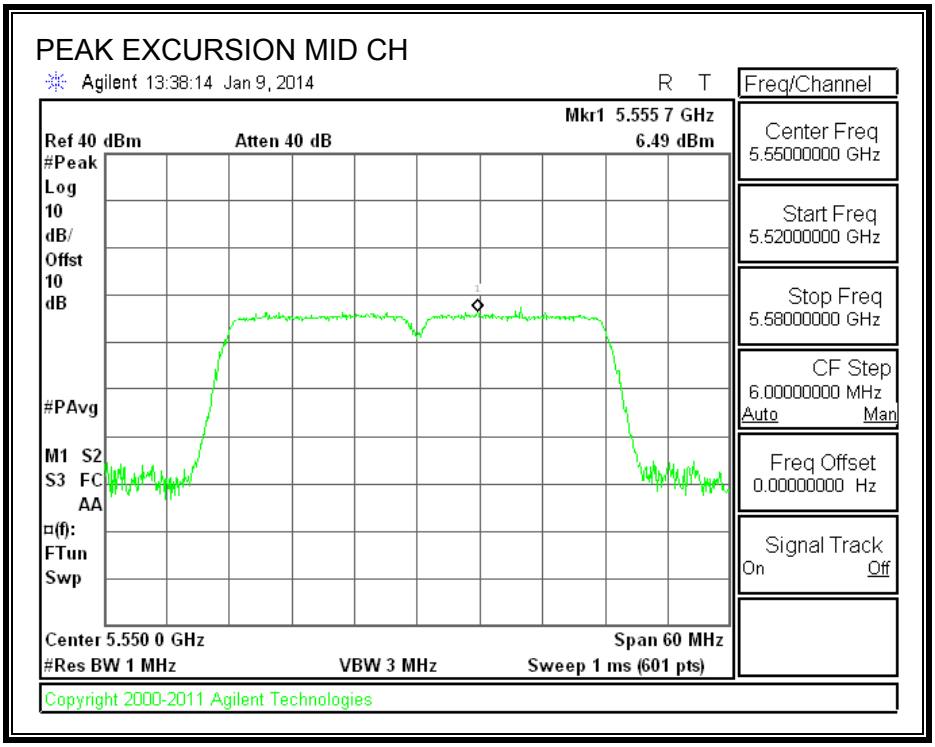
10.5.1. 802.11n HT40 MODE IN THE 5.5 GHz BAND

Channel	Frequency (MHz)	PK Level (dBm)	PSD (dBm)	DCCF (dB)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Mid	5550	6.490	-2.31	0.62	8.18	13	-4.82



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11. TRANSMITTER ABOVE 1 GHz

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.

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.

Reference to KDB 789033 UNII part H) 6) d) Method VB:
For measurements above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 3 MHz for peak measurements and add duty cycle factor to the reading offset 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.

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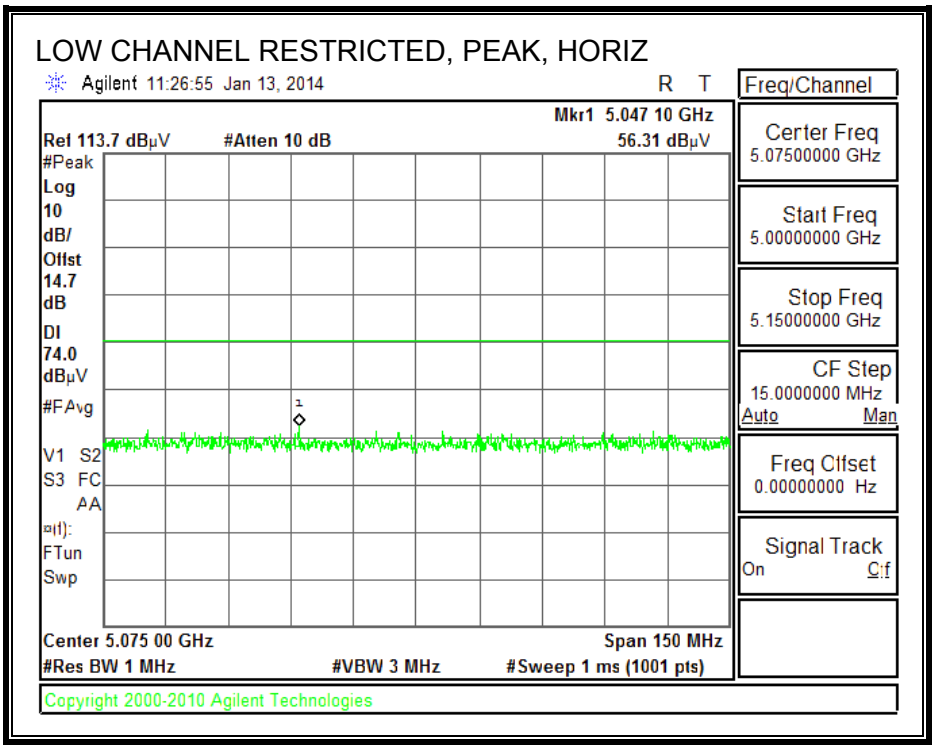
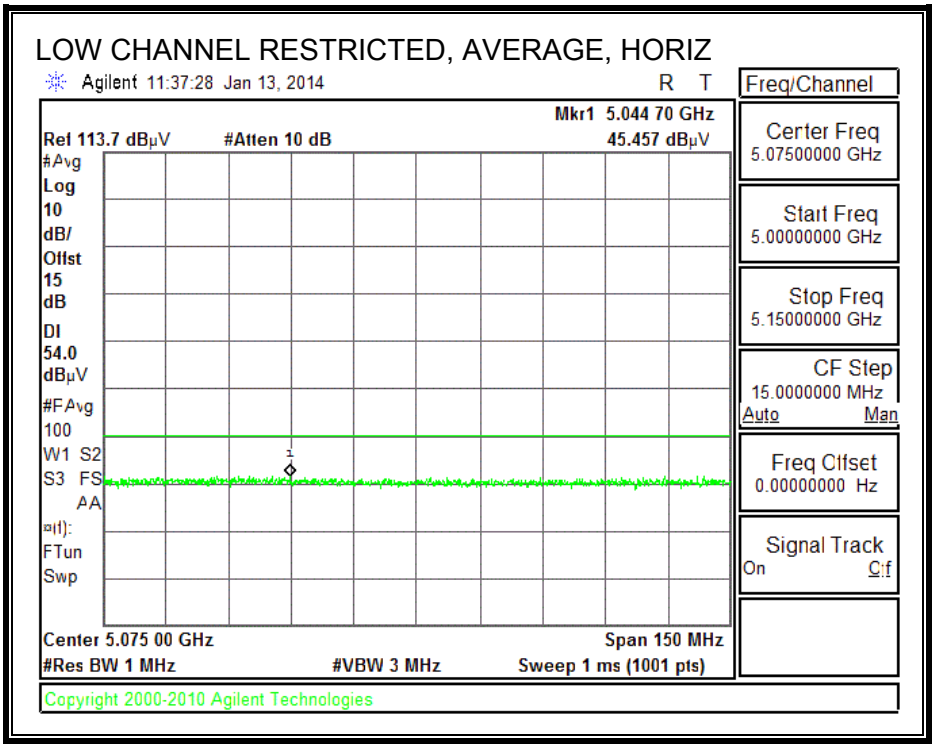
11.1. 5.2 GHz

11.1.1. TX ABOVE 1 GHz 802.11a MODE IN THE 5.2 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL)





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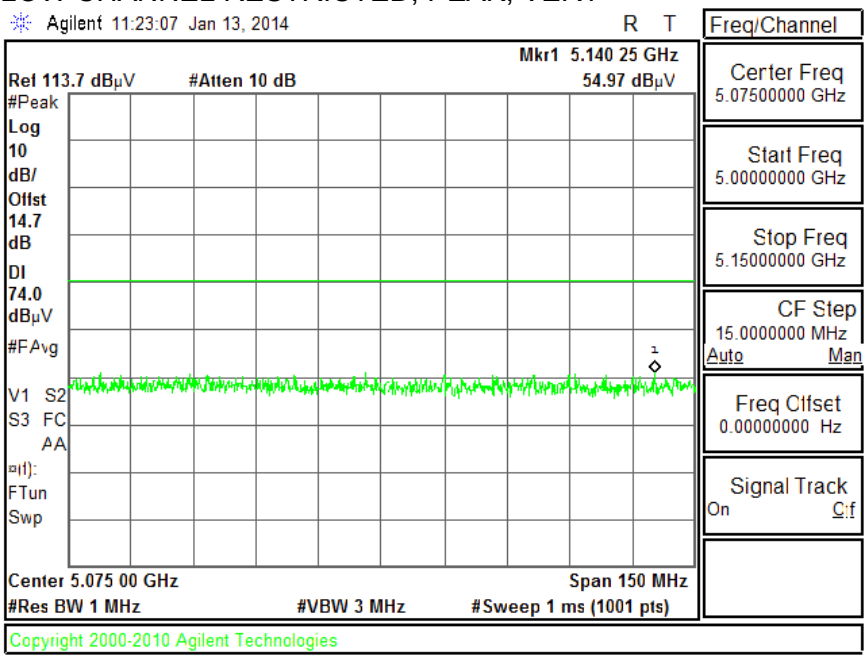
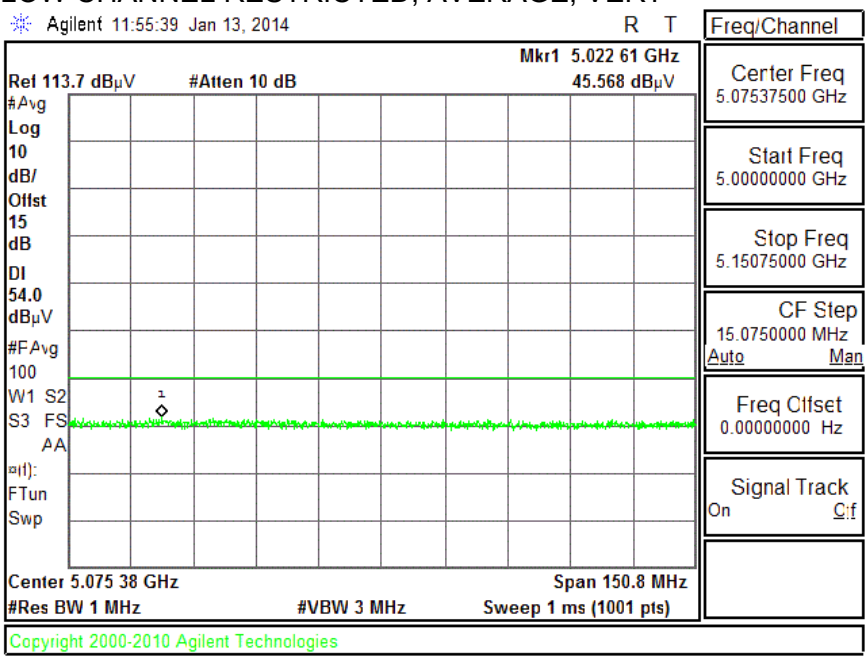
LOW CHANNEL RESTRICTED, PEAK, VERT



LOW CHANNEL RESTRICTED, AVERAGE, VERT



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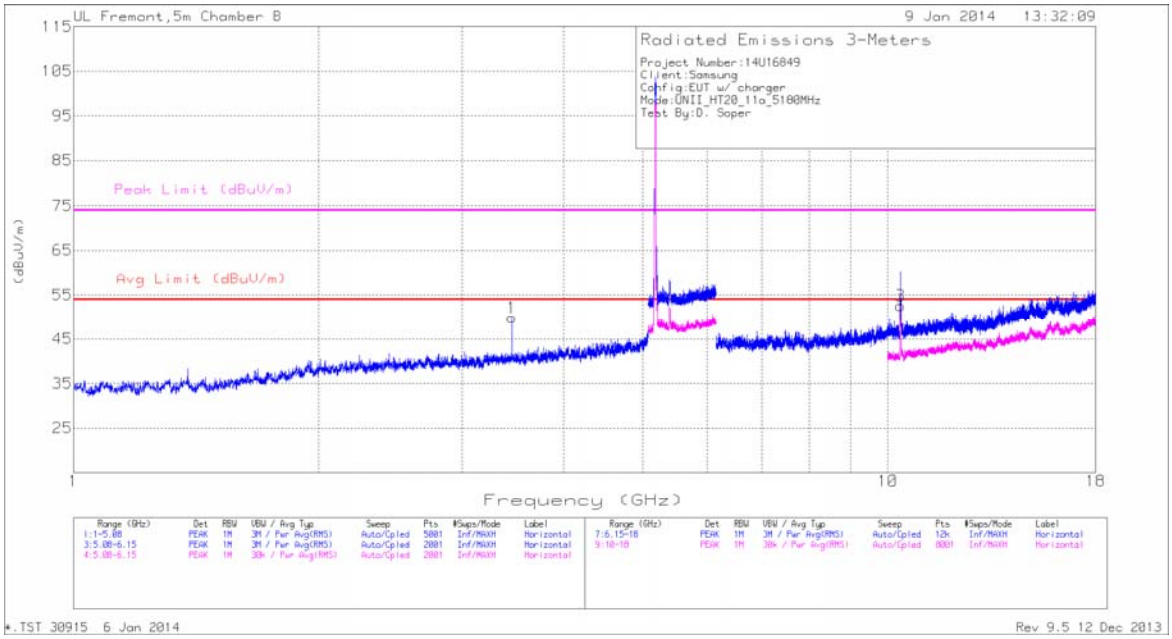
HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL
HORIZONTAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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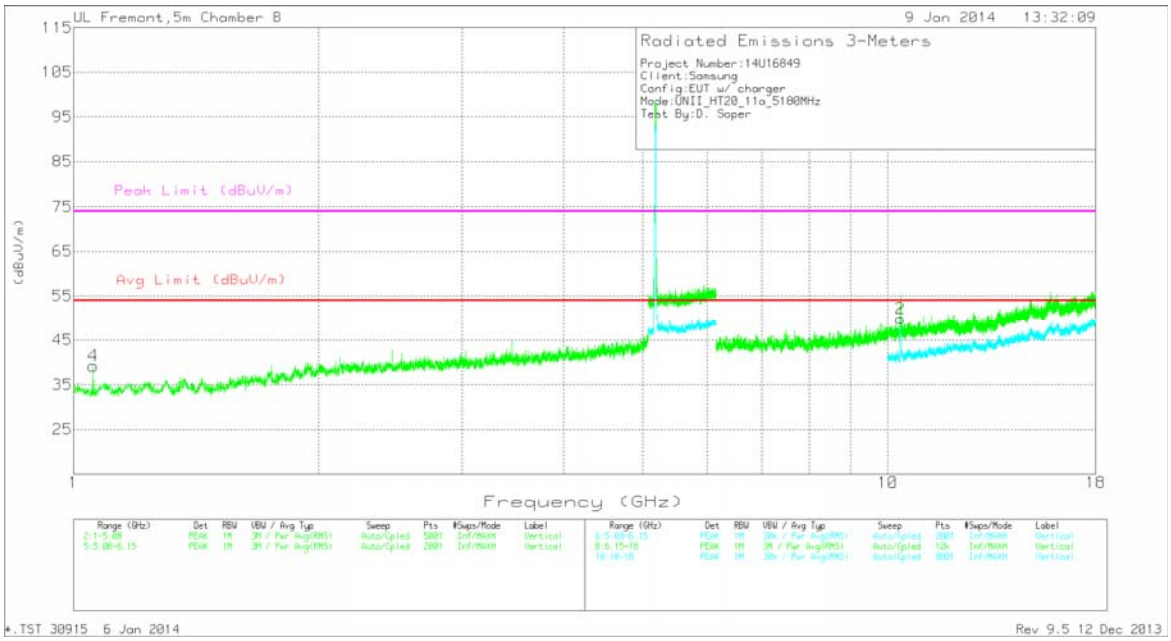
VERTICAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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LOW CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	1.057	45.9	PK	27.7	-34.4	39.2	54	-14.8	74	-34.8	0-360	99	V
1	3.454	47.96	PK	33.2	-31.3	49.86	54	-4.14	74	-24.14	0-360	202	H
2	10.359	35	Avg	38.1	-23.2	49.9	54	-4.1	-	-	0-360	202	V
3	10.362	37.6	Avg	38.1	-23.1	52.6	54	-1.4	-	-	0-360	99	H

PK - Peak detector

Avg - Video bandwidth < Resolution bandwidth

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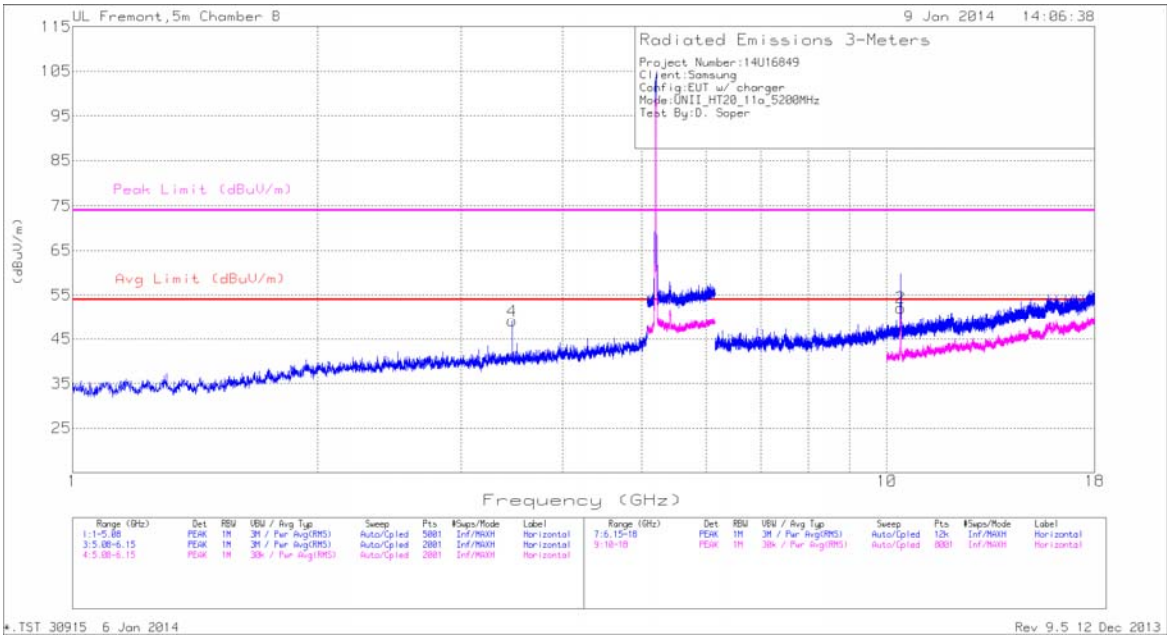
MID CHANNEL
HORIZONTAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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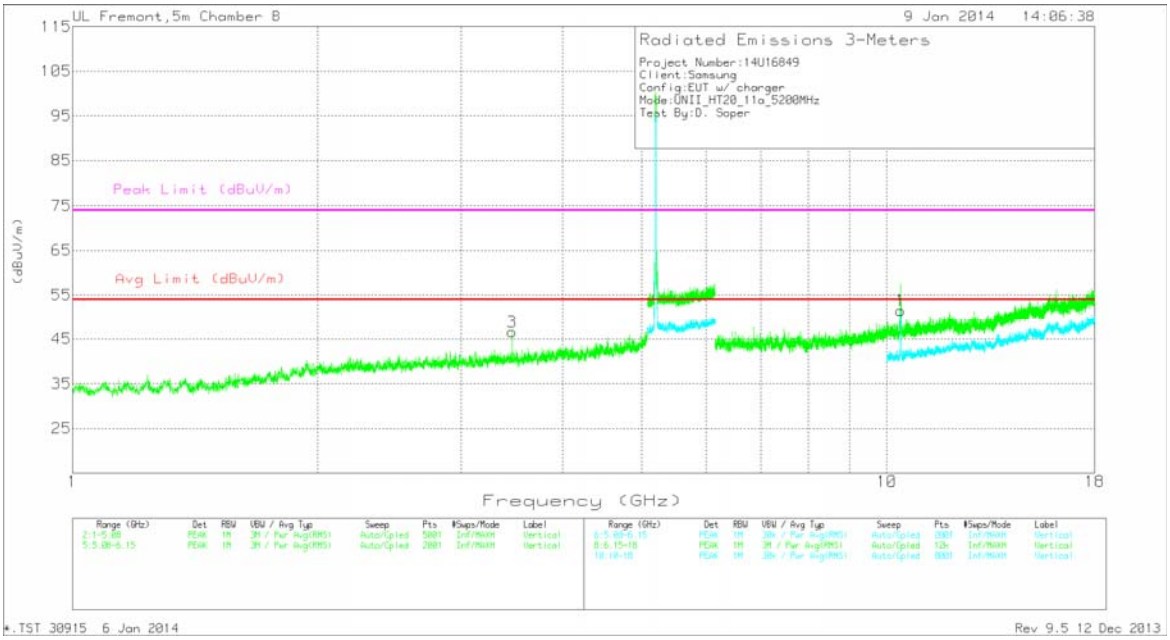
VERTICAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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MID CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	3.467	47.41	PK	33.2	-31.5	49.11	54	-4.89	74	-24.89	0-360	99	H
3	3.467	44.88	PK	33.2	-31.5	46.58	54	-7.42	74	-27.42	0-360	99	V
1	10.4	36.59	Avg	38.1	-23.2	51.49	54	-2.51	-	-	0-360	202	V
2	10.401	37.21	Avg	38.1	-23.2	52.11	54	-1.89	-	-	0-360	99	H

PK - Peak detector

Avg - Video bandwidth < Resolution bandwidth

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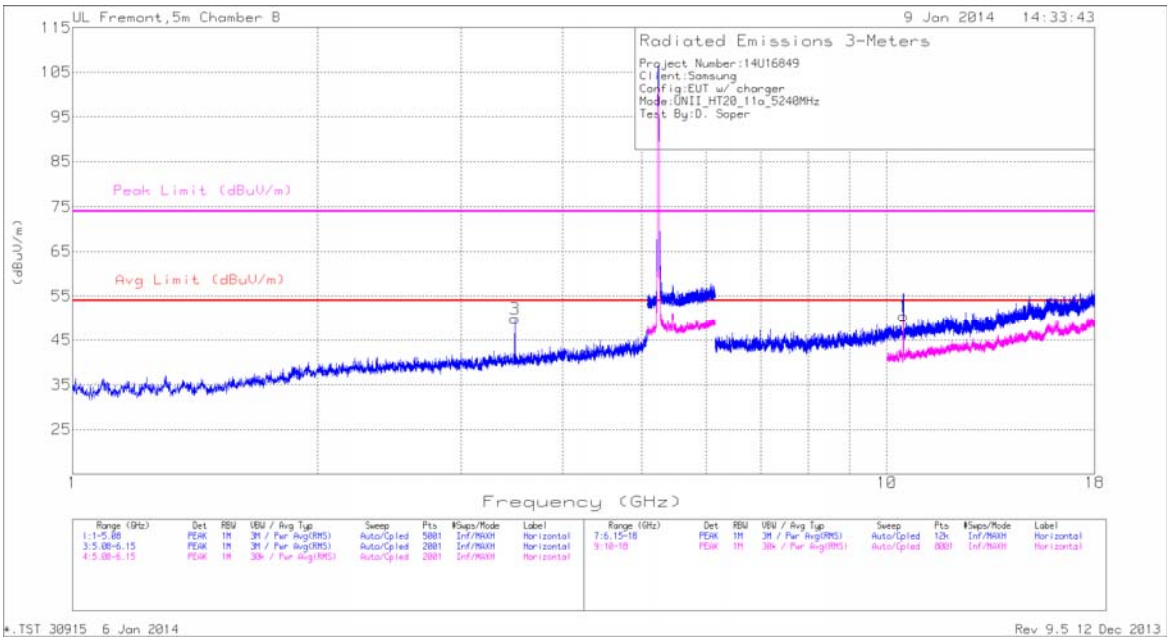
HIGH CHANNEL
HORIZONTAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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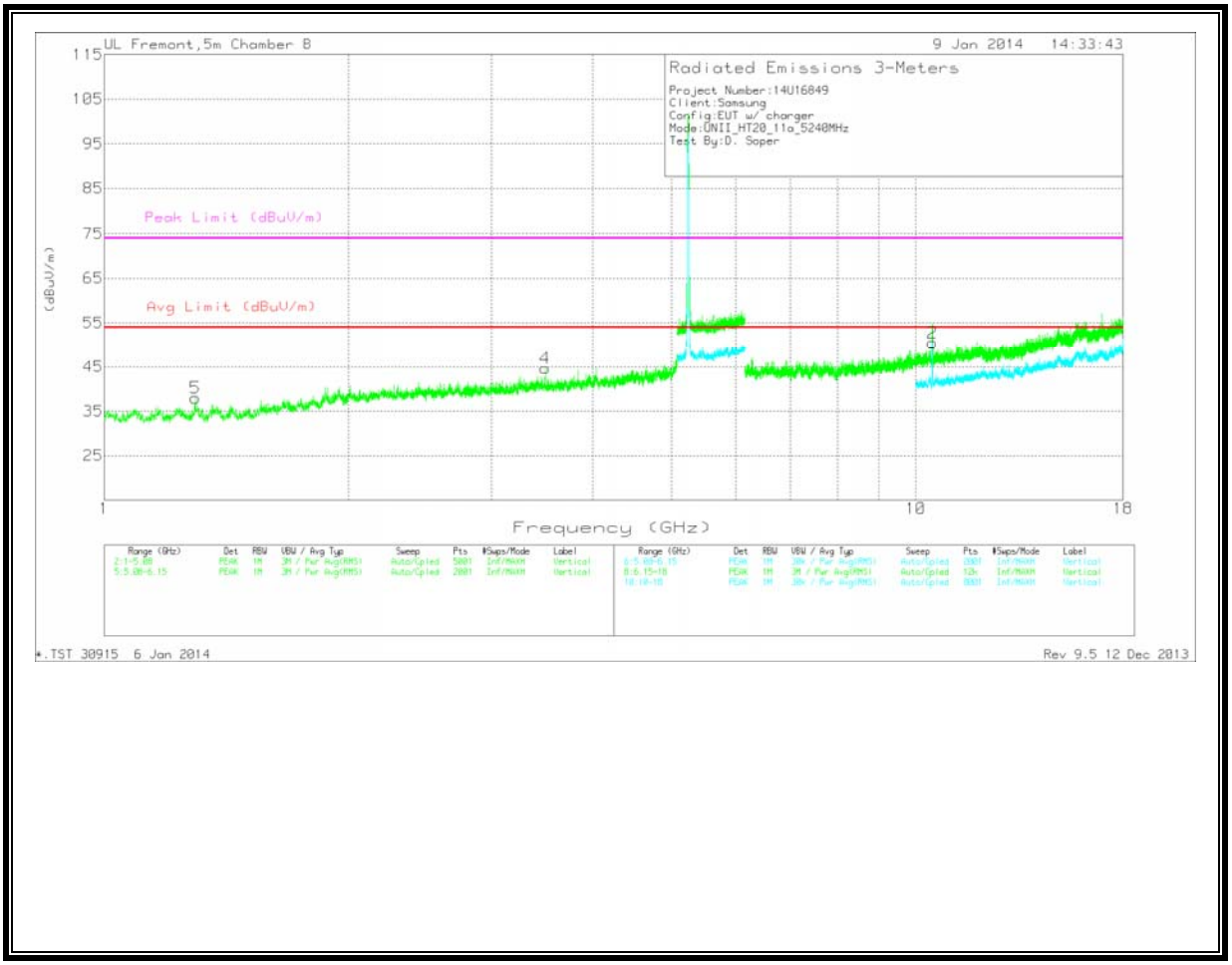
VERTICAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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HIGH CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
5	1.295	43.79	PK	28.5	-34.3	37.99	54	-16.01	74	-36.01	0-360	99	V
3	3.493	48.57	PK	33.2	-31.9	49.87	54	-4.13	74	-24.13	0-360	201	H
4	3.494	43.37	PK	33.2	-31.9	44.67	54	-9.33	74	-29.33	0-360	99	V
2	10.478	36.11	Avg	38.2	-23.8	50.51	54	-3.49	-	-	0-360	202	V
1	10.482	36.01	Avg	38.2	-23.8	50.41	54	-3.59	-	-	0-360	99	H

PK - Peak detector
Avg - Video bandwidth < Resolution bandwidth

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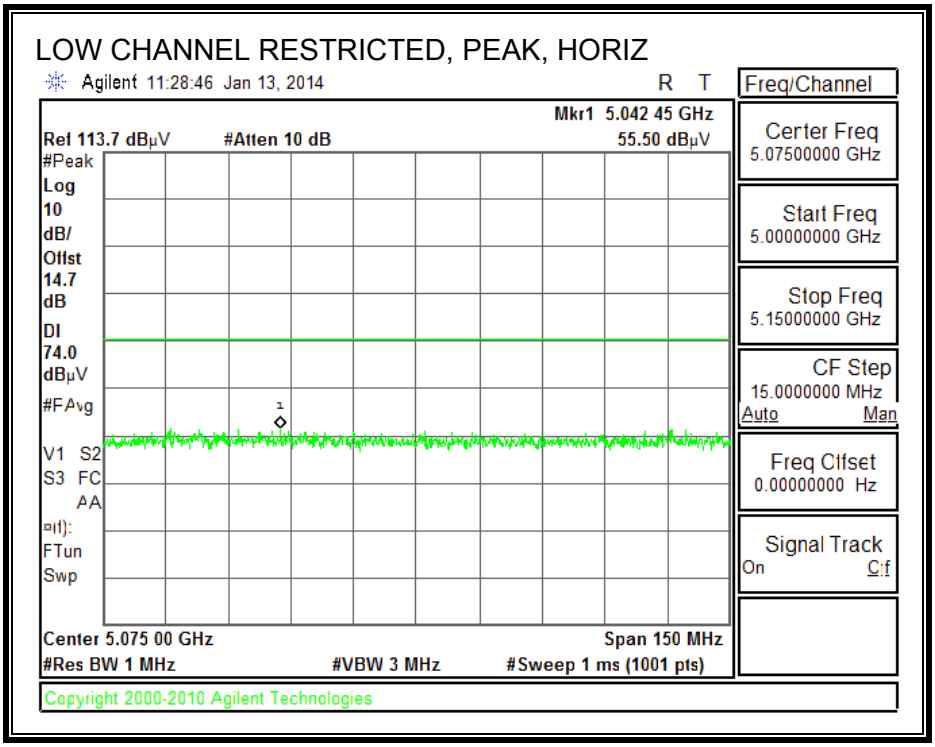
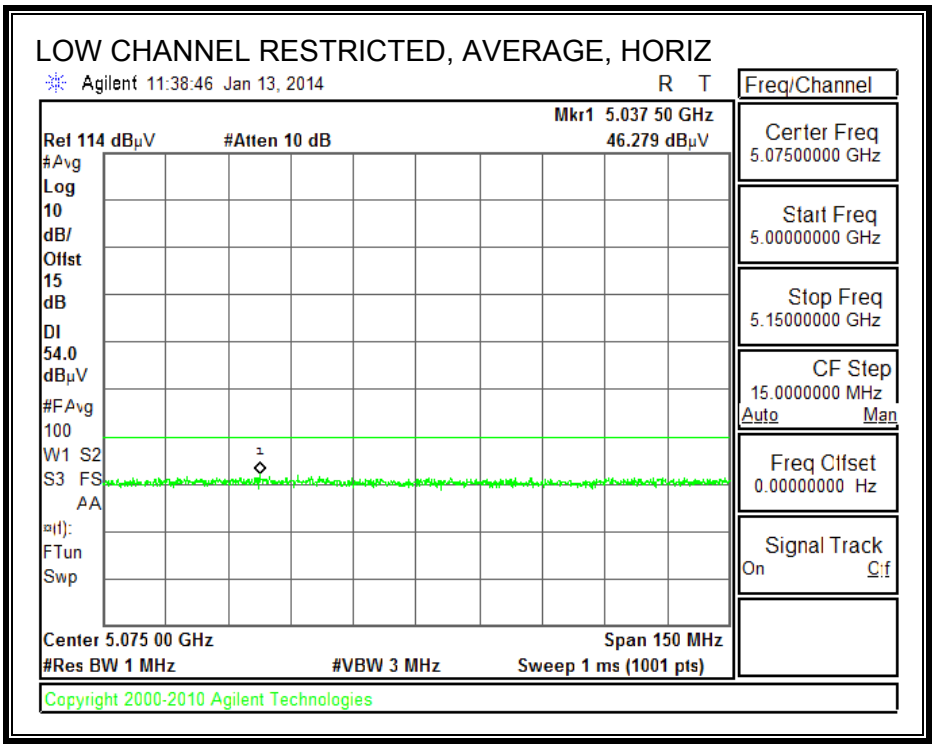
11.1.2. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 5.2 GHz BAND RESTRICTED BANDEDGE (LOW CHANNEL)





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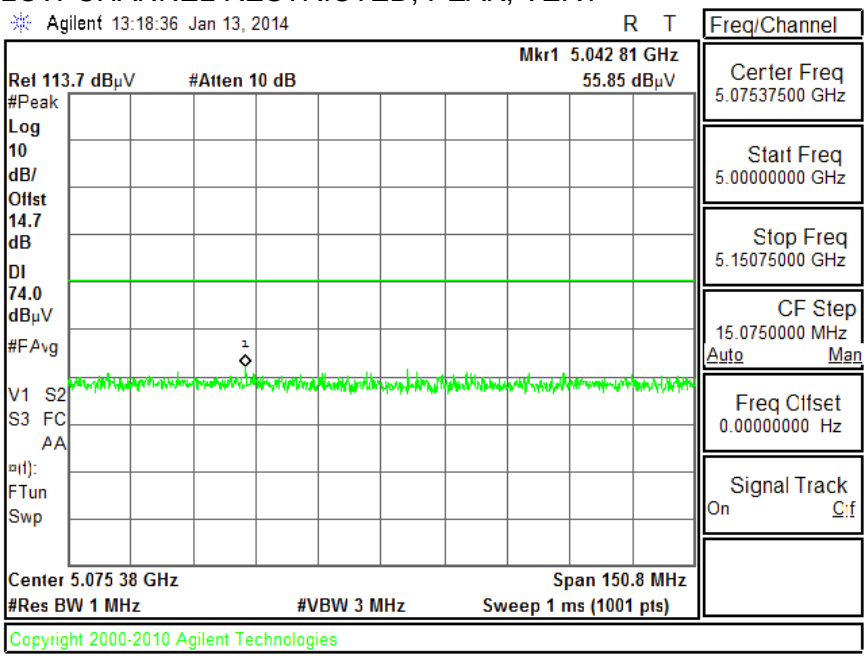
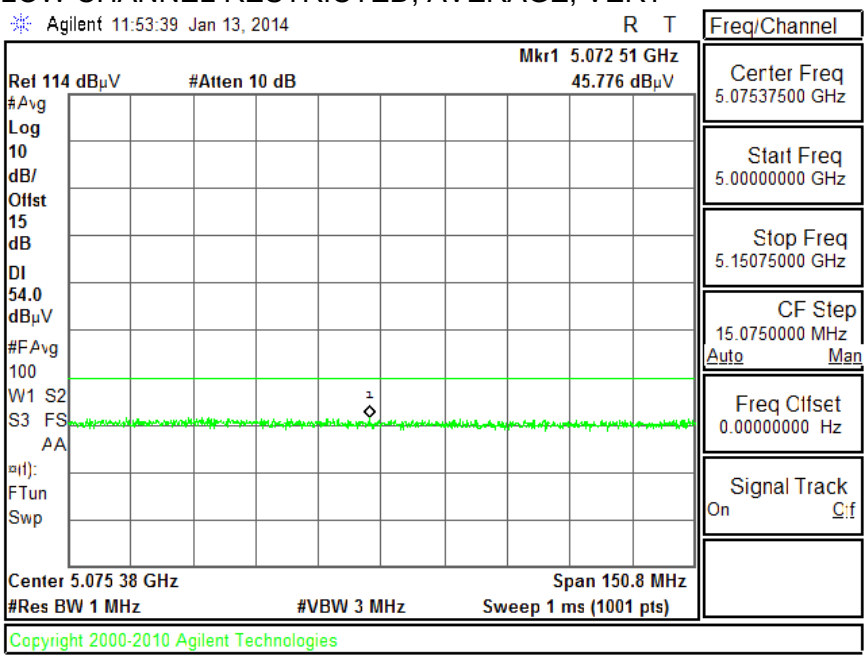
LOW CHANNEL RESTRICTED, PEAK, VERT



LOW CHANNEL RESTRICTED, AVERAGE, VERT



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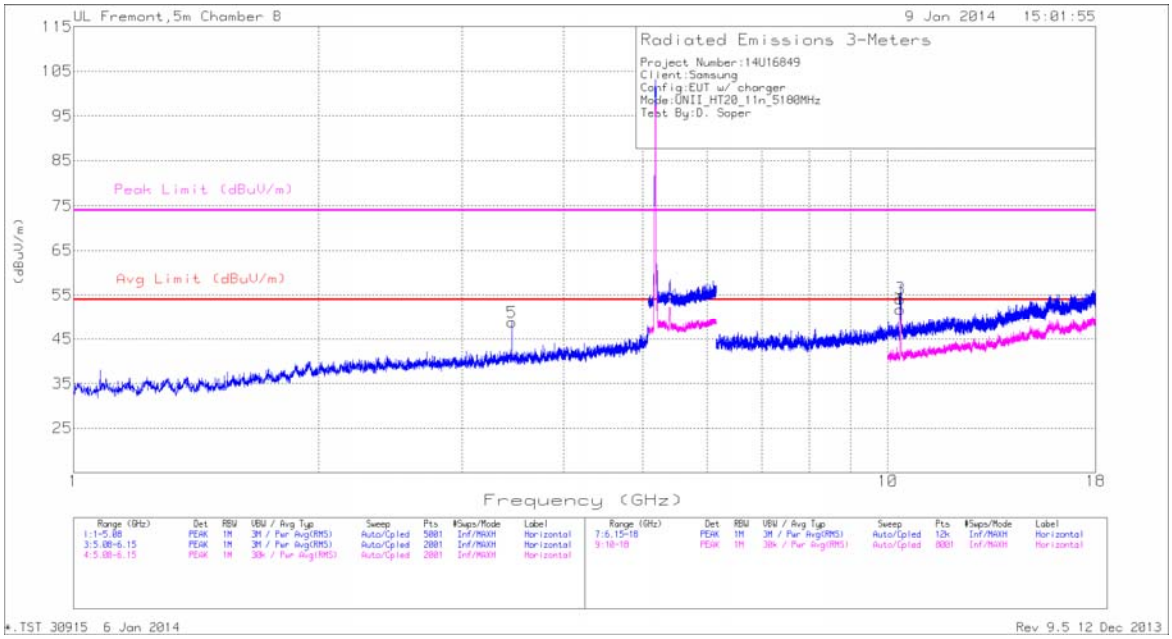
HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL
HORIZONTAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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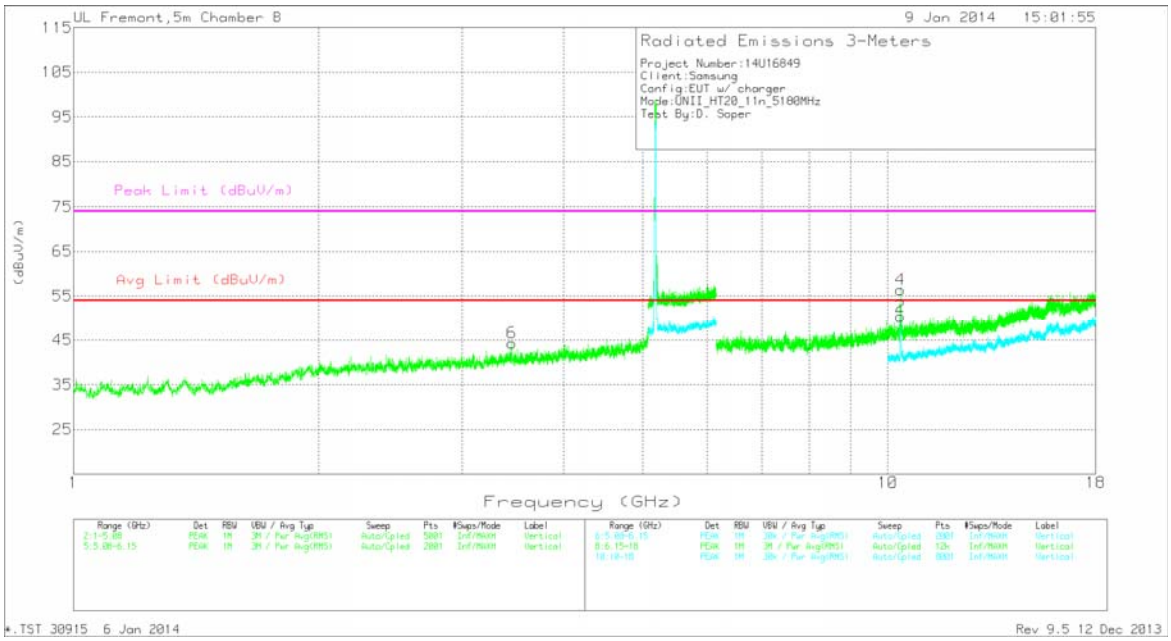
VERTICAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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LOW CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
5	3.454	46.91	PK	33.2	-31.3	48.81	54	-5.19	74	-25.19	0-360	99	H
6	3.454	42.42	PK	33.2	-31.3	44.32	54	-9.68	74	-29.68	0-360	99	V
3*	10.357	39.26	PK	38.1	-23.2	54.16			74	-19.84	0-360	99	H
1	10.358	36.91	Avg	38.1	-23.2	51.81	54	-2.19	-	-	0-360	202	H
4*	10.363	41.43	PK	38.1	-23.1	56.43			74	-17.57	0-360	202	V
2	10.364	35.36	Avg	38.1	-23.1	50.36	54	-3.64	-	-	0-360	202	V

*Peak measurement was averaged

PK - Peak detector

Avg - Video bandwidth < Resolution bandwidth

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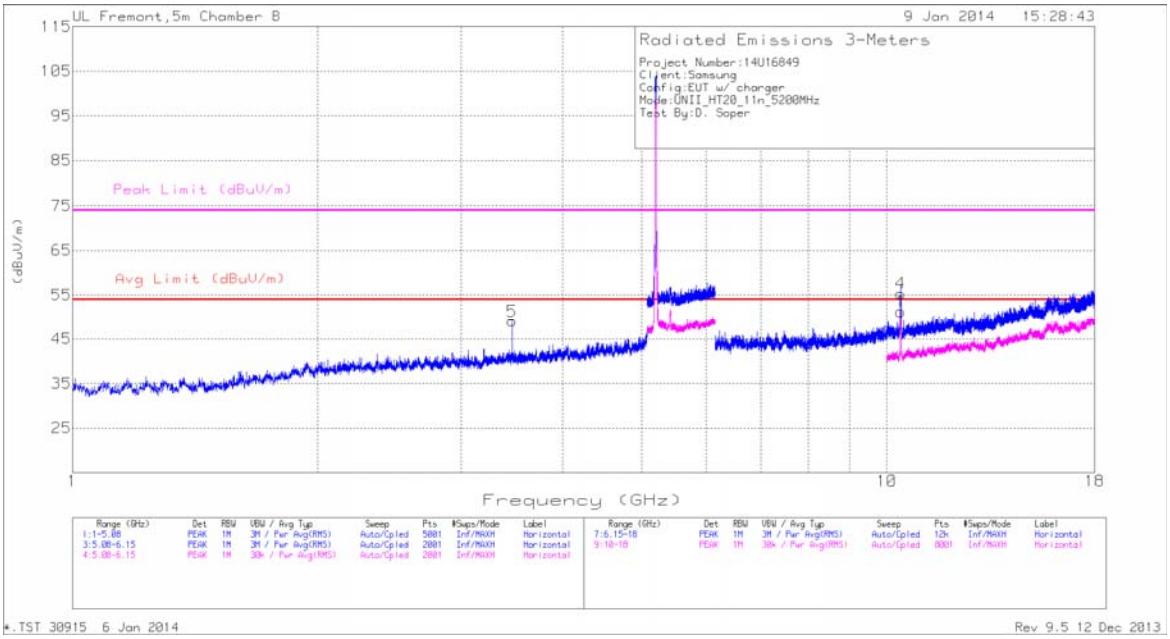
MID CHANNEL
HORIZONTAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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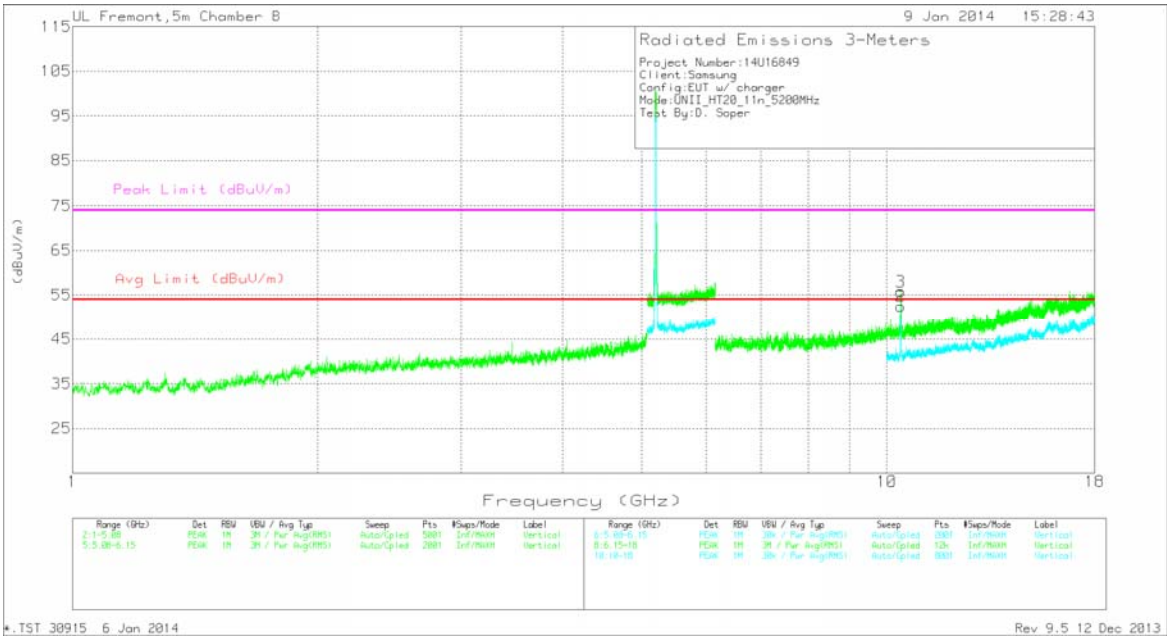
VERTICAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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MID CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
5	3.467	47.32	PK	33.2	-31.5	49.02	54	-4.98	74	-24.98	0-360	99	H
4	10.397	40.35	PK	38.1	-23.1	55.35			74	-18.65	0-360	99	H
3	10.398	40.73	PK	38.1	-23.1	55.73			74	-18.27	0-360	99	V
2	10.398	37.5	Avg	38.1	-23.1	52.5	54	-1.5	-	-	0-360	202	V
1	10.4	36.41	Avg	38.1	-23.2	51.31	54	-2.69	-	-	0-360	99	H

PK - Peak detector

Avg - Video bandwidth < Resolution bandwidth

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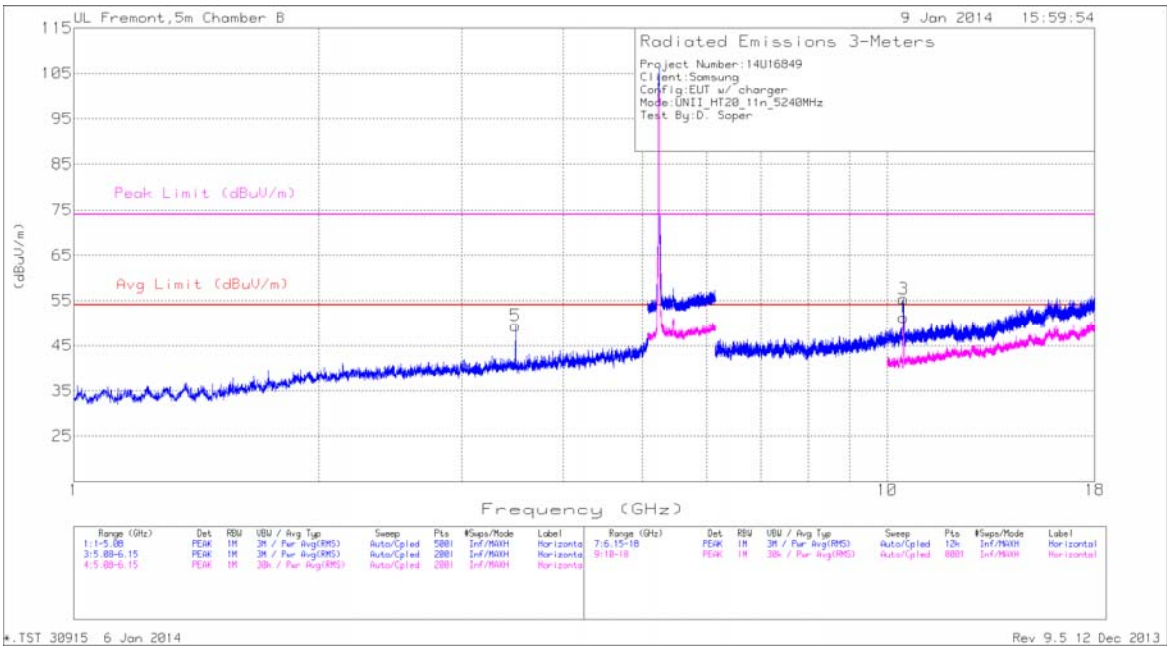
HIGH CHANNEL
HORIZONTAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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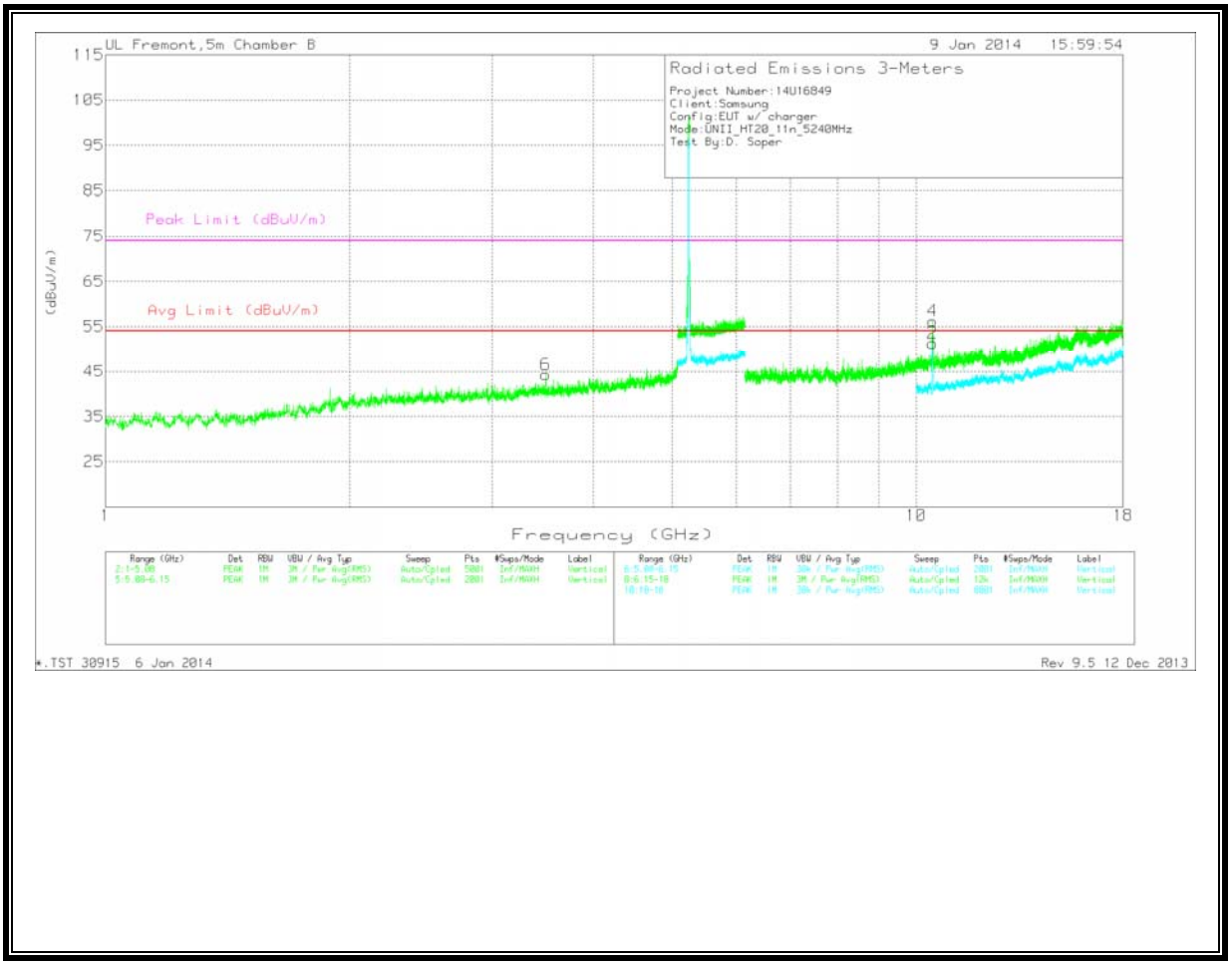
VERTICAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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HIGH CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
5	3.494	48.13	PK	33.2	-31.9	49.43	54	-4.57	74	-24.57	0-360	202	H
6	3.494	42.99	PK	33.2	-31.9	44.29	54	-9.71	74	-29.71	0-360	99	V
3	10.48	40.97	PK	38.2	-23.8	55.37			74	-18.63	0-360	99	H
1	10.48	36.88	Avg	38.2	-23.8	51.28	54	-2.72	-	-	0-360	202	H
2	10.48	36.91	Avg	38.2	-23.8	51.31	54	-2.69	-	-	0-360	202	V
4	10.481	41.84	PK	38.2	-23.8	56.24			74	-17.76	0-360	202	V

PK - Peak detector

Avg - Video bandwidth < Resolution bandwidth

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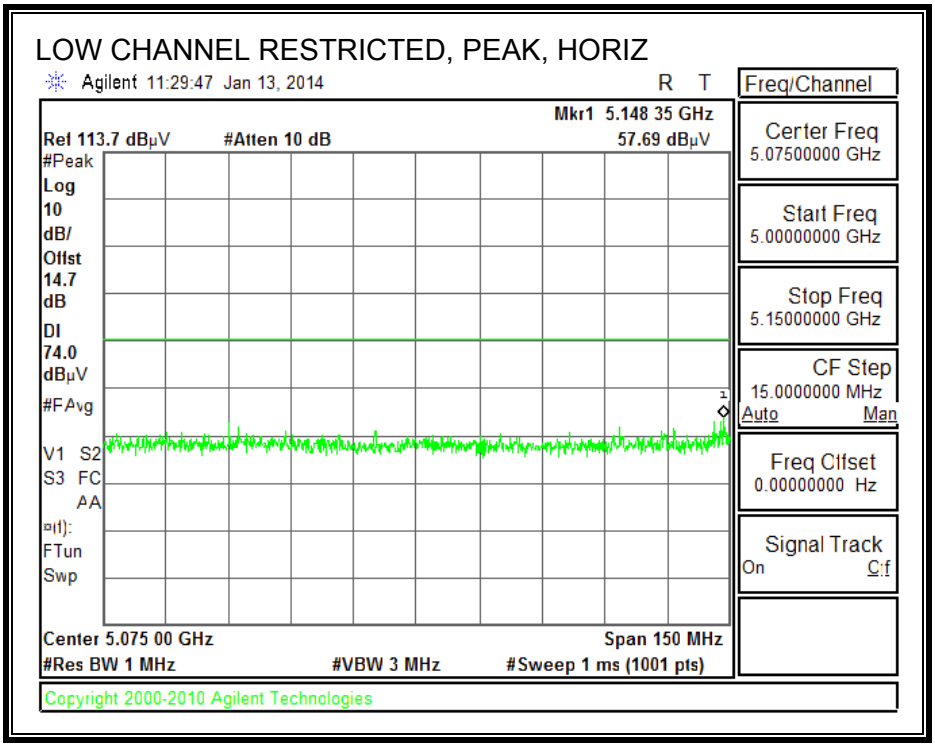
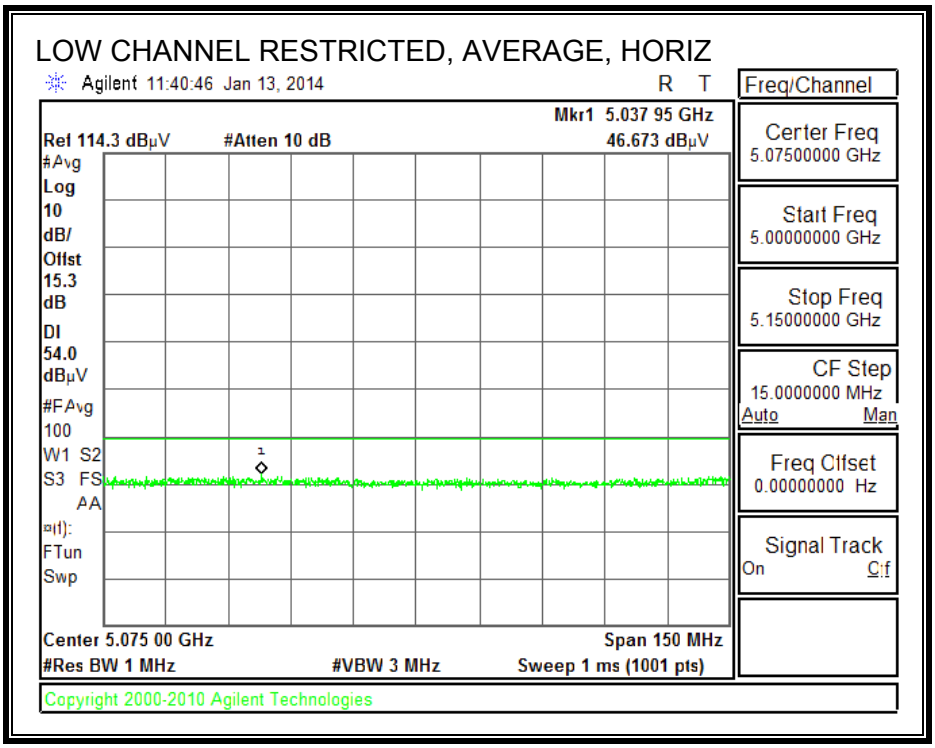
11.1.3. TX ABOVE 1 GHz 802.11n HT40 MODE IN THE 5.2 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL)





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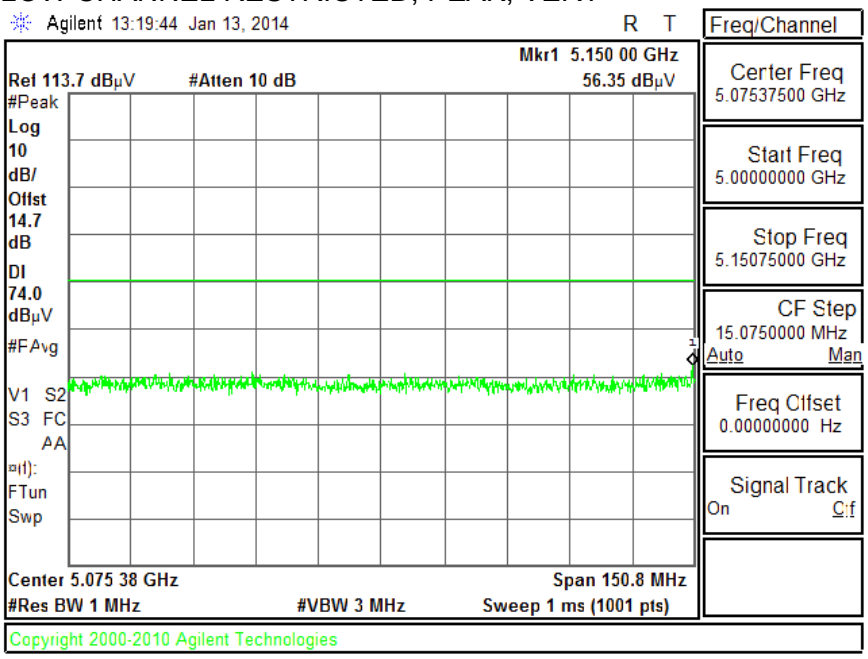
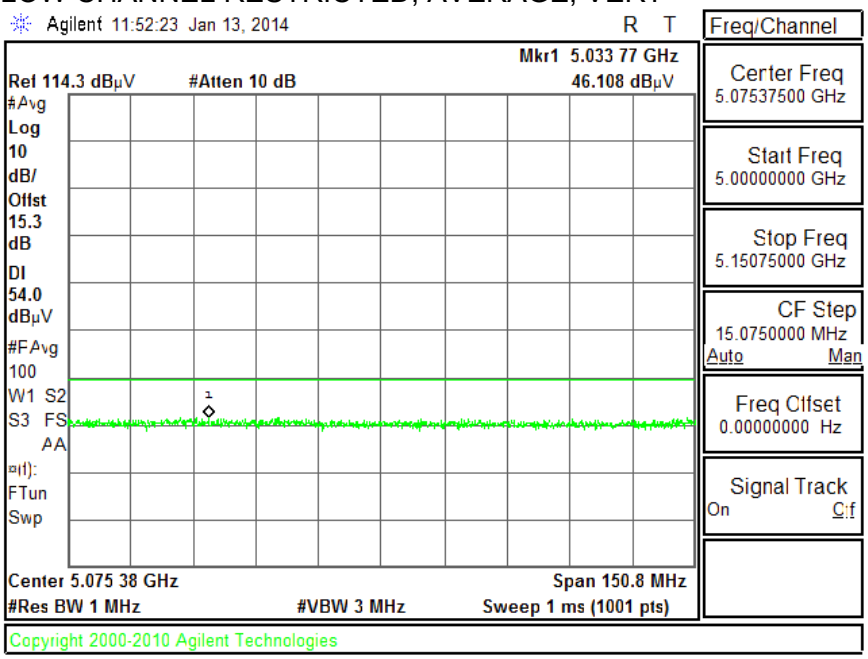
LOW CHANNEL RESTRICTED, PEAK, VERT



LOW CHANNEL RESTRICTED, AVERAGE, VERT



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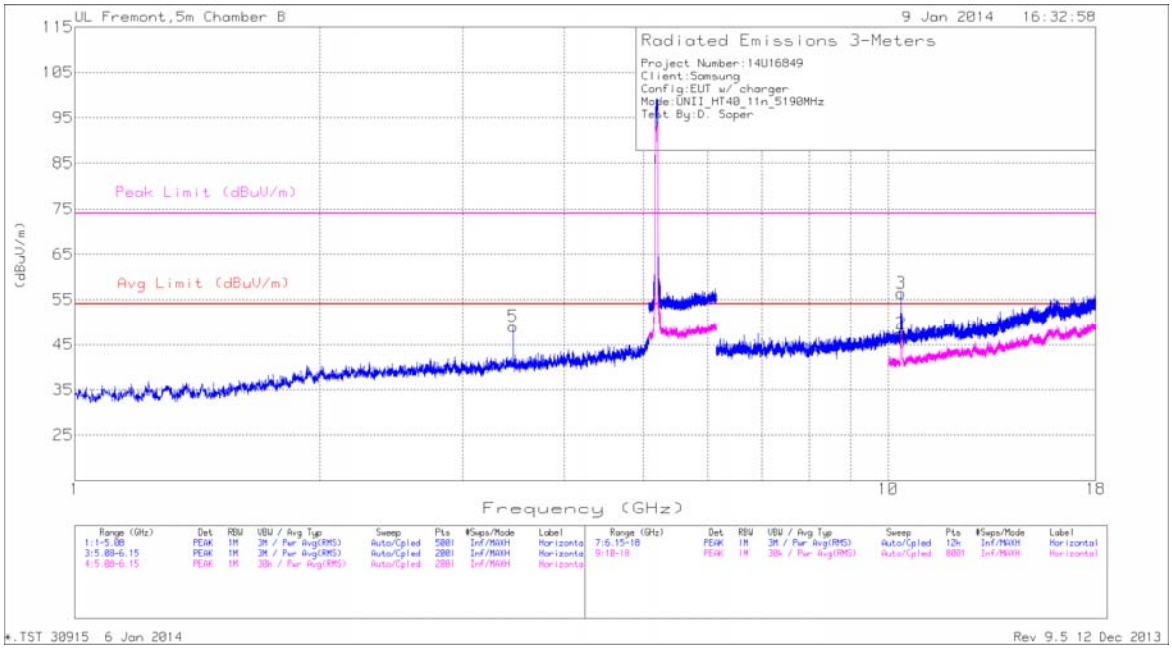
HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL
HORIZONTAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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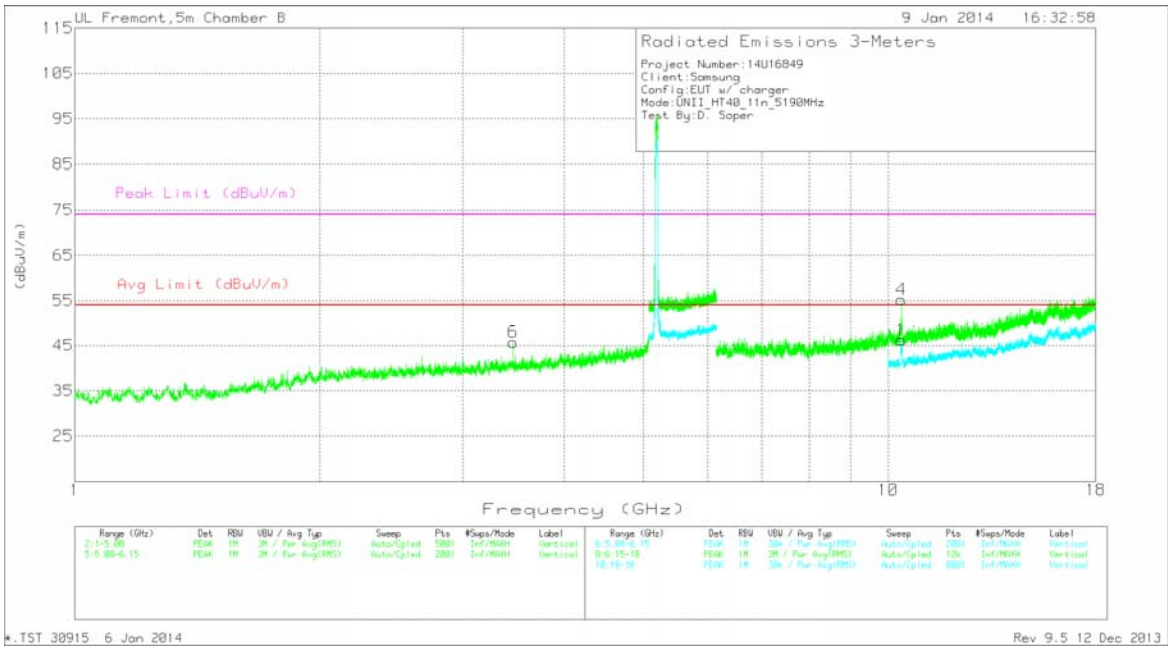
VERTICAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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LOW CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
5	3.46	47.21	PK	33.2	-31.4	49.01	54	-4.99	74	-24.99	0-360	201	H
6	3.46	43.93	PK	33.2	-31.4	45.73	54	-8.27	74	-28.27	0-360	99	V
3	10.375	41.33	PK	38.1	-23	56.43			74	-17.57	0-360	201	H
1	10.376	31.12	Avg	38.1	-23	46.22	54	-7.78	-	-	0-360	202	V
2	10.387	32.37	Avg	38.1	-23	47.47	54	-6.53	-	-	0-360	99	H
4	10.388	40.09	PK	38.1	-23	55.19			74	-18.81	0-360	99	V

PK - Peak detector

Avg - Video bandwidth < Resolution bandwidth

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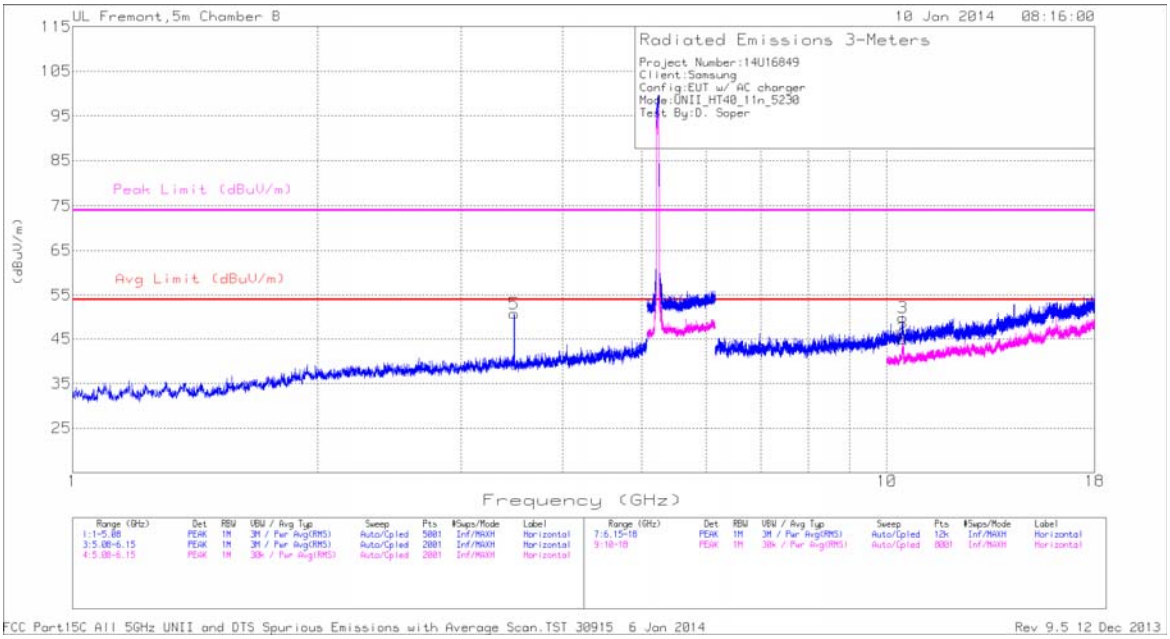
HIGH CHANNEL
HORIZONTAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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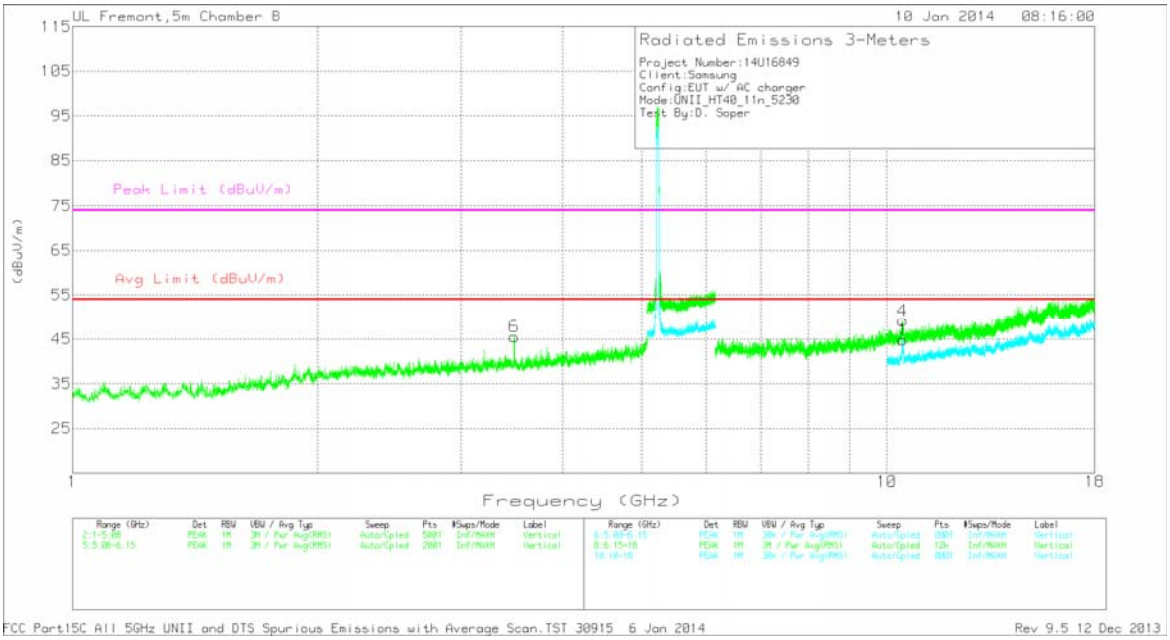
VERTICAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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MID CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
5	3.486	49.4	PK	33.2	-31.8	50.8	54	-3.2	74	-23.2	0-360	99	H
6	3.486	44.15	PK	33.2	-31.8	45.55	54	-8.45	74	-28.45	0-360	99	V
4	10.459	34.76	PK	38.2	-23.8	49.16	54	-4.84	74	-24.84	0-360	99	V
2	10.459	30.59	Avg	38.2	-23.8	44.99	54	-9.01	-	-	0-360	99	H
3	10.46	35.5	PK	38.2	-23.8	49.9	54	-4.1	74	-24.1	0-360	99	H
1	10.462	30.41	Avg	38.2	-23.8	44.81	54	-9.19	-	-	0-360	202	V

PK - Peak detector

Avg - Video bandwidth < Resolution bandwidth

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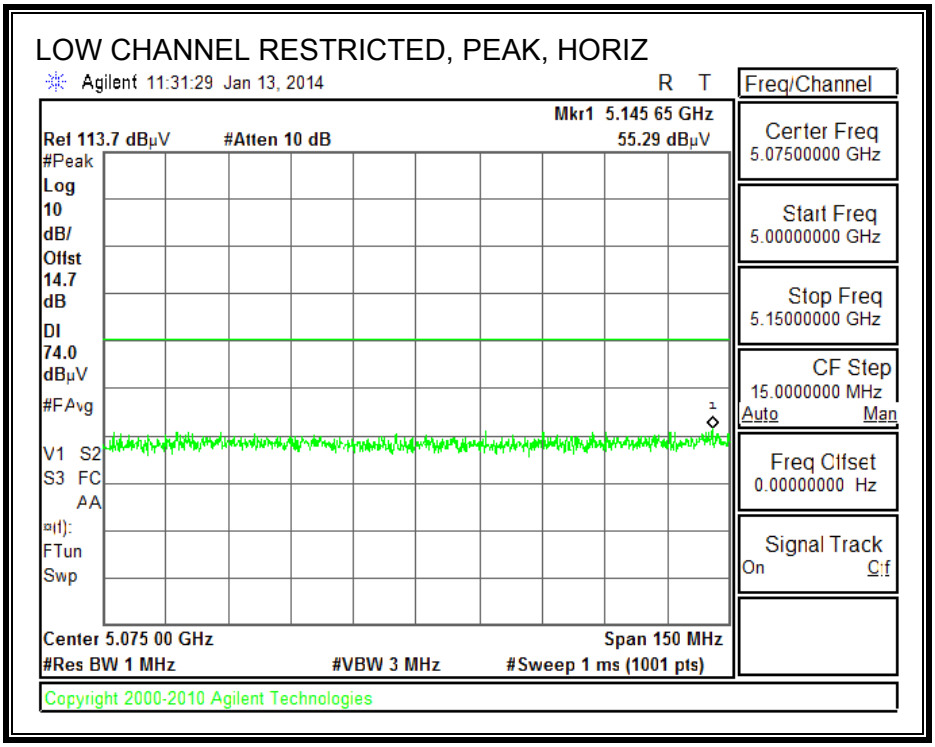
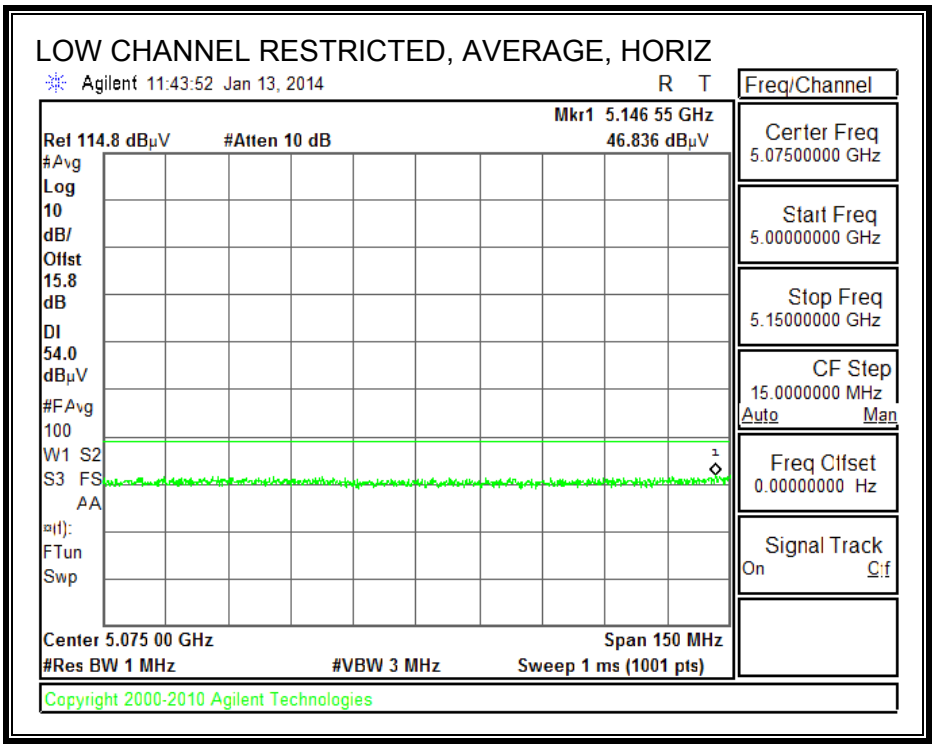
11.1.4. TX ABOVE 1 GHz 802.11ac HT80 MODE IN THE 5.2 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL)





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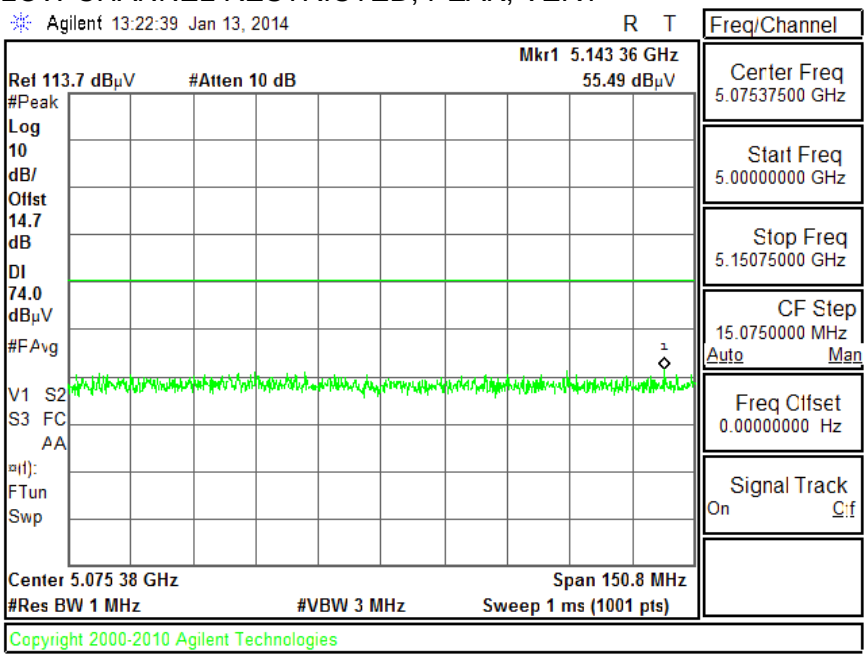
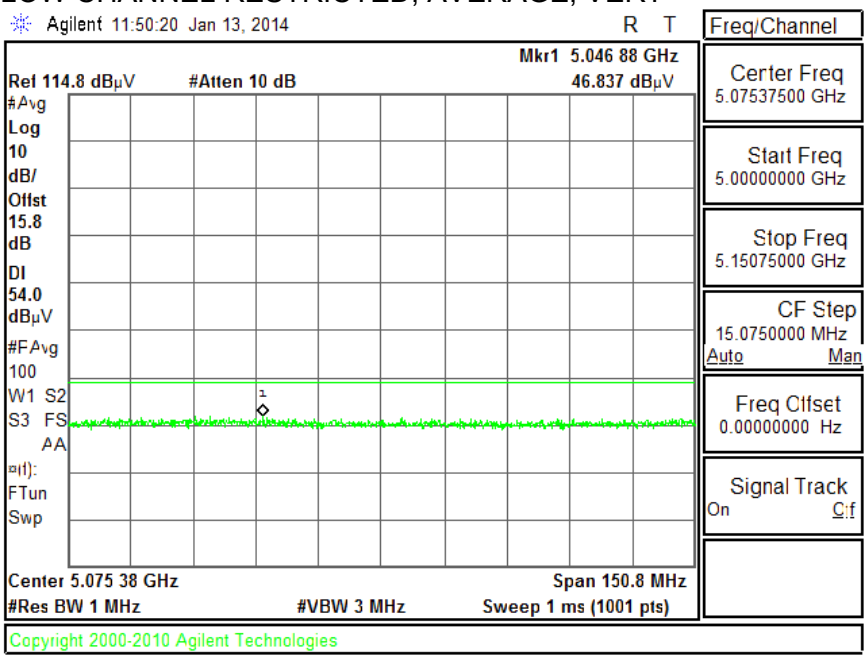
LOW CHANNEL RESTRICTED, PEAK, VERT



LOW CHANNEL RESTRICTED, AVERAGE, VERT



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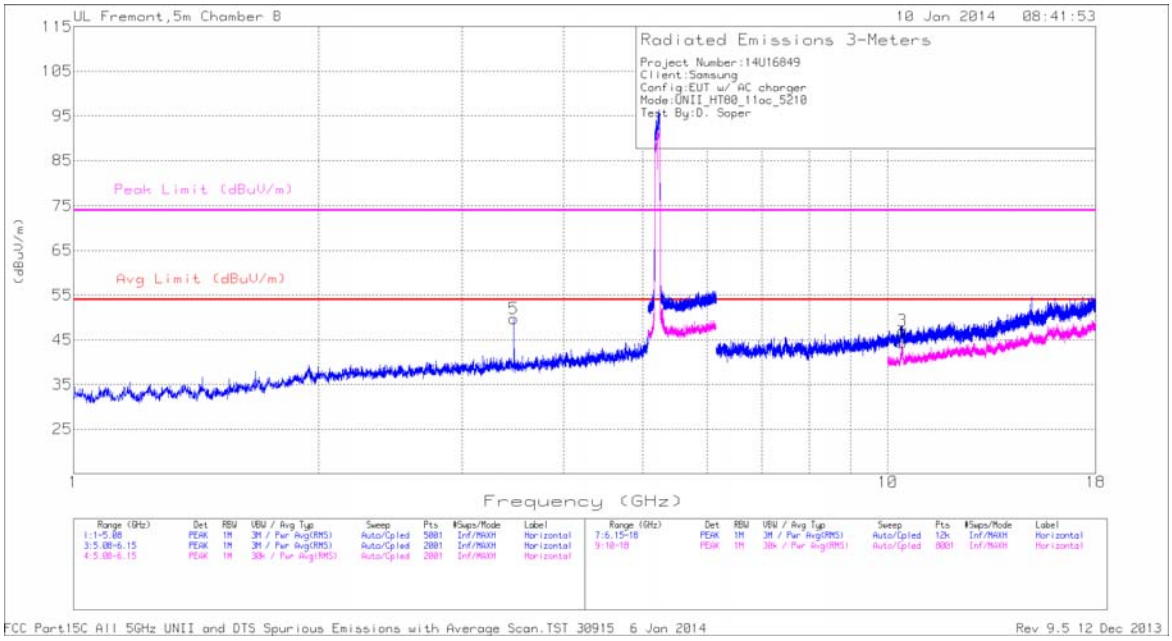
HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL
HORIZONTAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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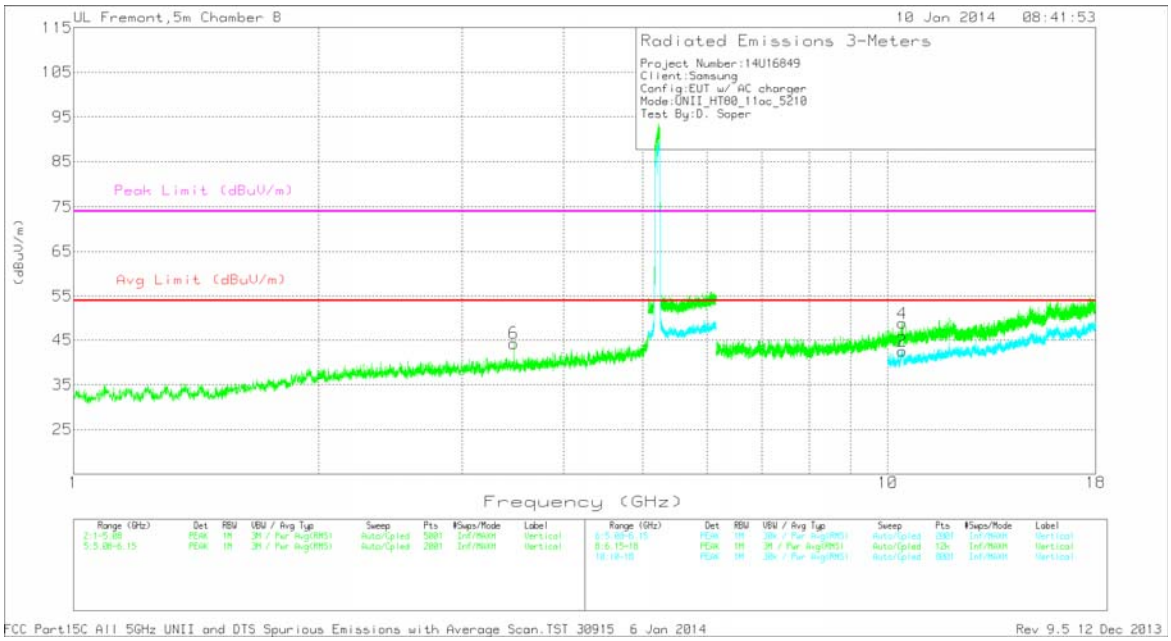
VERTICAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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LOW CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
5	3.473	48.1	PK	33.2	-31.6	49.7	54	-4.3	74	-24.3	0-360	202	H
6	3.473	42.63	PK	33.2	-31.6	44.23	54	-9.77	74	-29.77	0-360	202	V
3	10.419	32.18	PK	38.1	-23.3	46.98	54	-7.02	74	-27.02	0-360	99	H
1	10.42	29.48	Avg	38.1	-23.3	44.28	54	-9.72	-	-	0-360	99	H
4	10.421	34.01	PK	38.1	-23.3	48.81	54	-5.19	74	-25.19	0-360	202	V
2	10.421	27.74	Avg	38.1	-23.3	42.54	54	-11.46	-	-	0-360	202	V

PK - Peak detector

Avg - Video bandwidth < Resolution bandwidth

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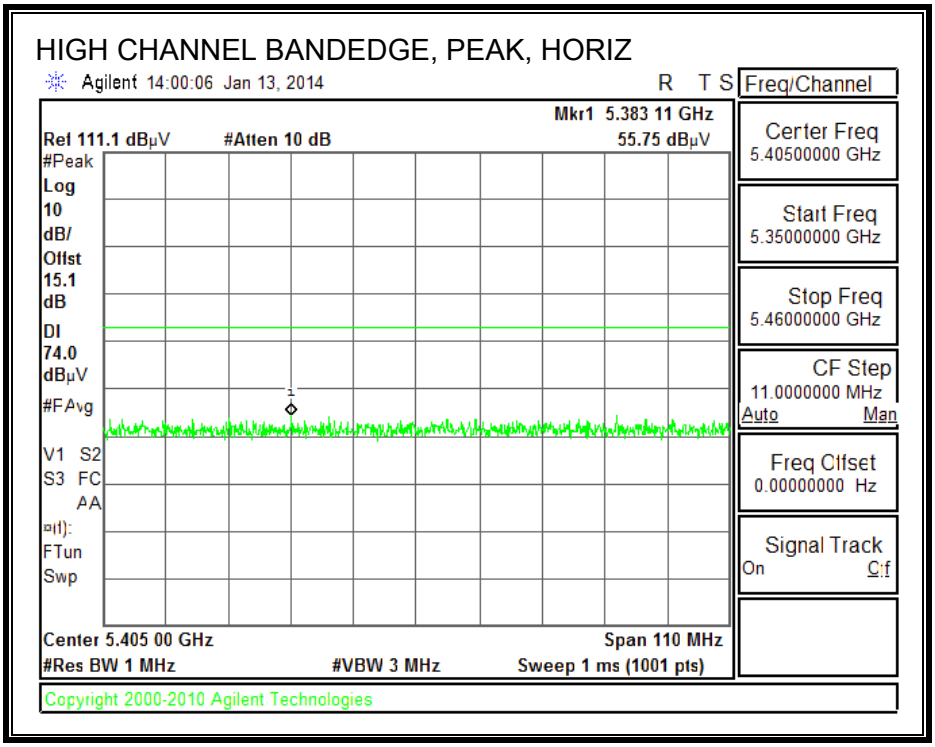
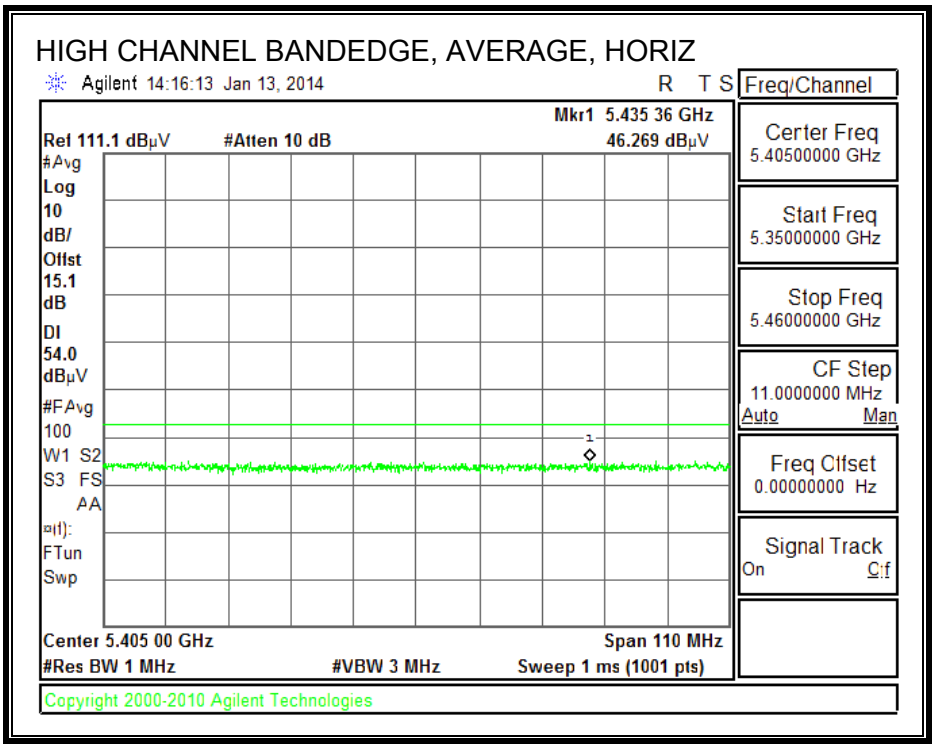
11.2. 5.3 GHz

11.2.1. TX ABOVE 1 GHz 802.11a MODE IN THE 5.3 GHz BAND

AUTHORIZED BANDEDGE (HIGH CHANNEL)





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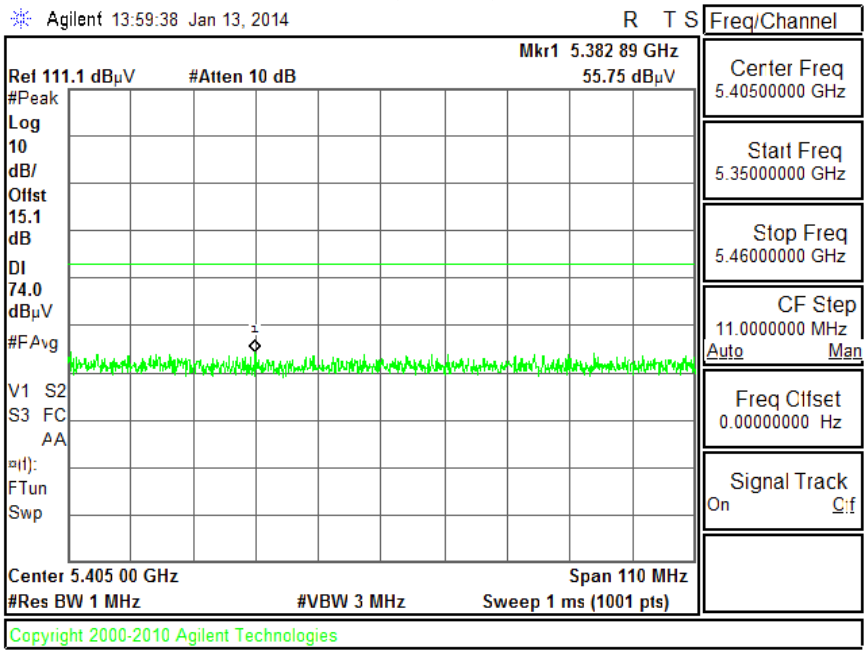
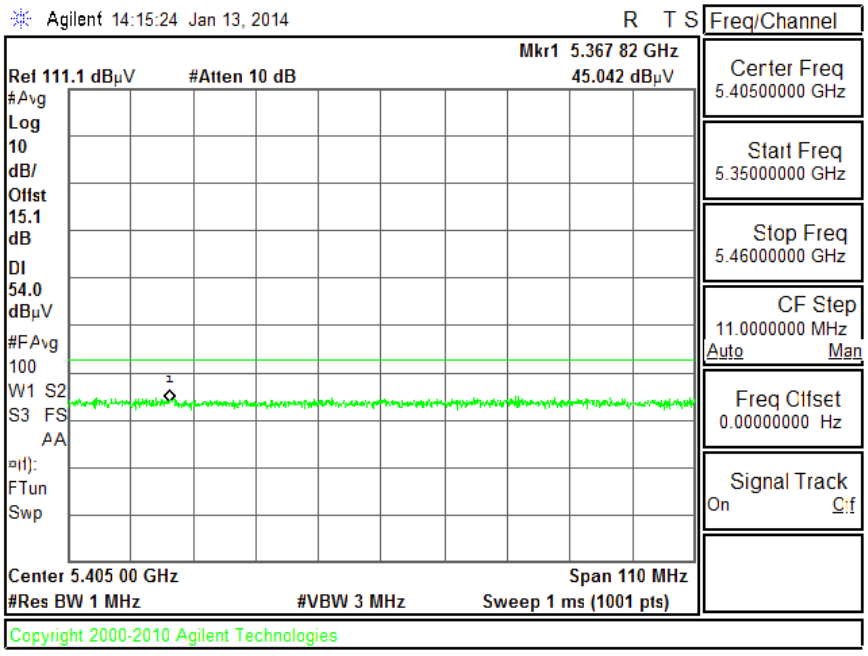
HIGH CHANNEL BANDEDGE, PEAK, VERT



HIGH CHANNEL BANDEDGE, AVERAGE, VERT



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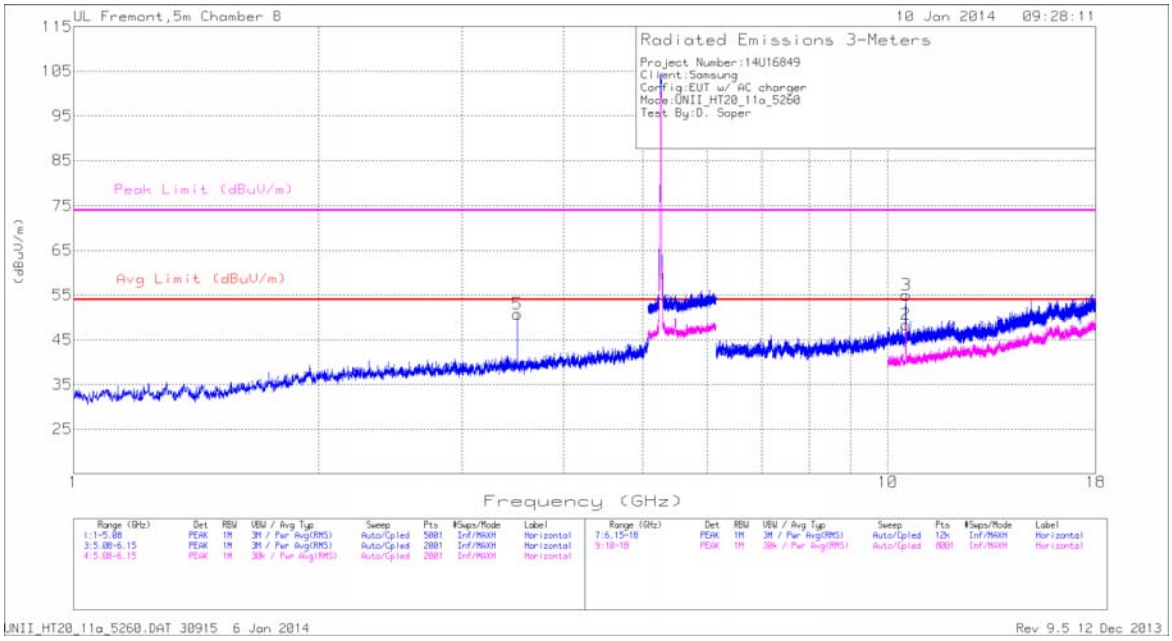
HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL
HORIZONTAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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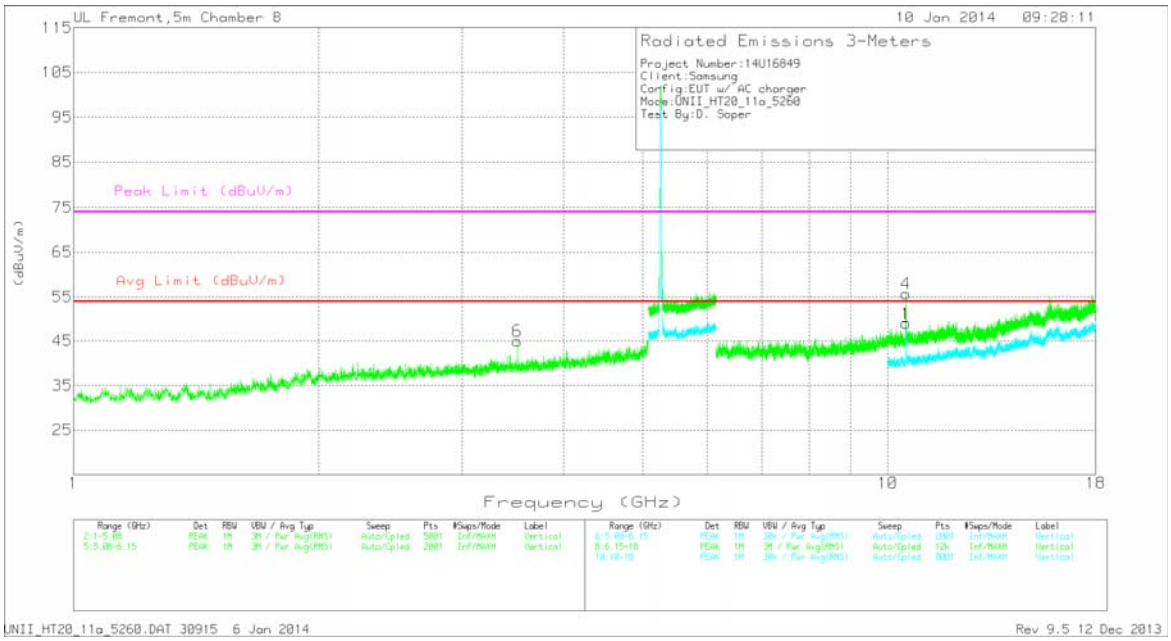
VERTICAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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LOW CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
5	3.507	49.37	PK	33.2	-31.8	50.77	54	-3.23	74	-23.23	0-360	202	H
6	3.507	43.54	PK	33.2	-31.8	44.94	54	-9.06	74	-29.06	0-360	99	V
4	10.521	41.3	PK	38.2	-23.8	55.7			74	-18.3	0-360	202	V
2	10.521	34	Avg	38.2	-23.8	48.4	54	-5.6	-	-	0-360	202	H
1	10.521	34.58	Avg	38.2	-23.8	48.98	54	-5.02	-	-	0-360	202	V
3	10.53	40.6	PK	38.2	-23.8	55			74	-19	0-360	202	H

PK - Peak detector

Avg - Video bandwidth < Resolution bandwidth

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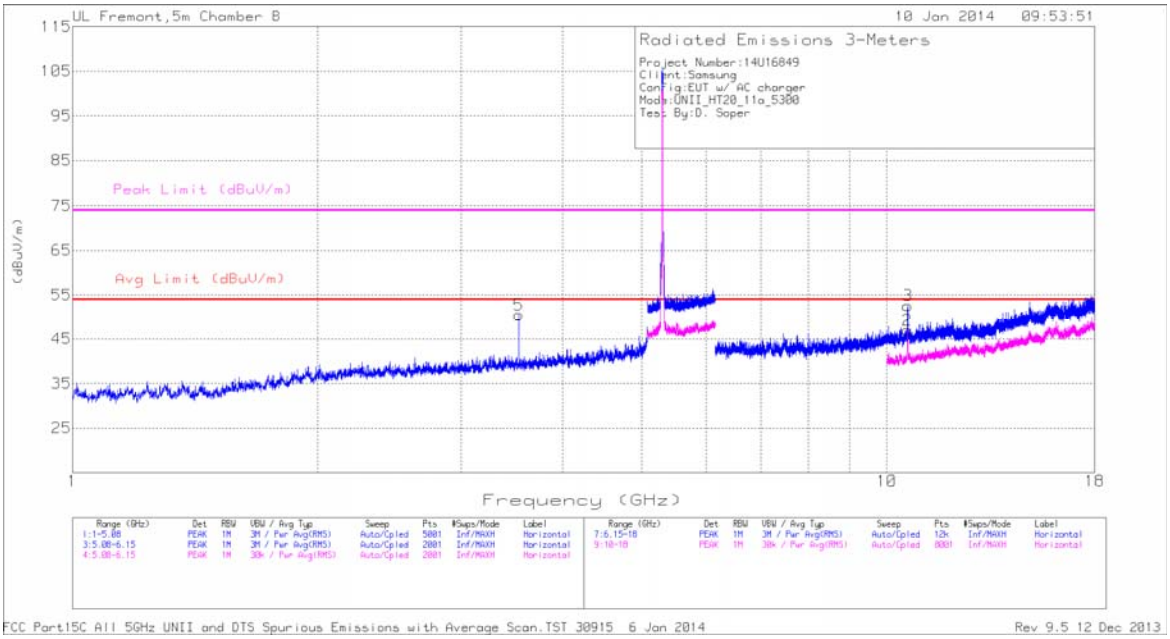
MID CHANNEL
HORIZONTAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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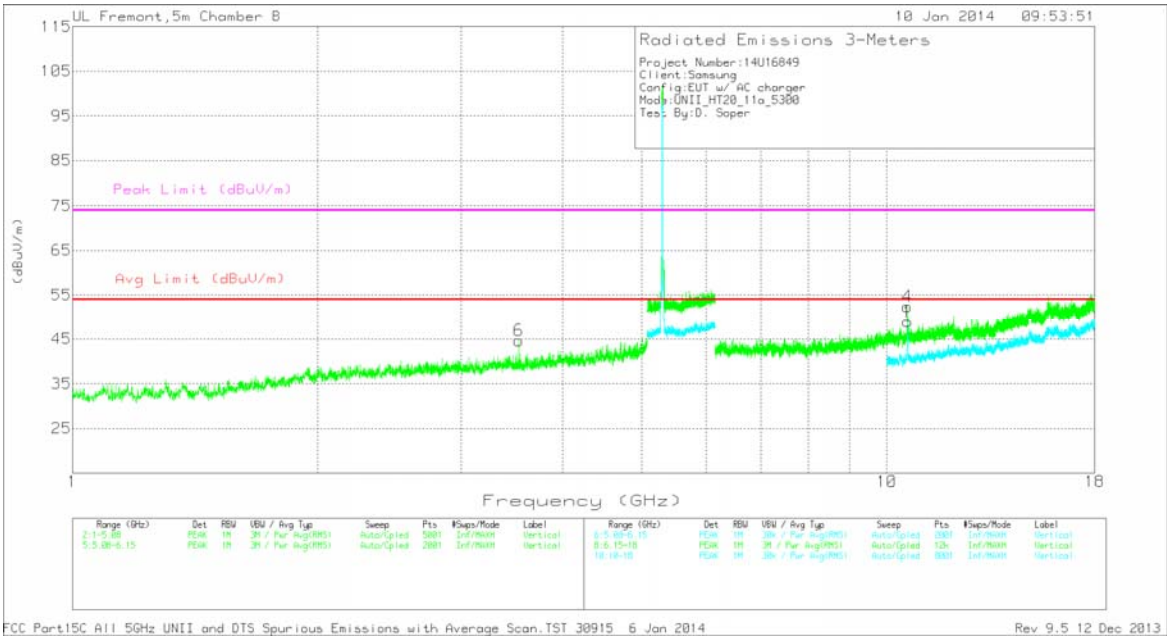
VERTICAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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MID CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
5	3.534	49.21	PK	33.3	-32	50.51	54	-3.49	74	-23.49	0-360	202	H
6	3.534	43.33	PK	33.3	-32	44.63	54	-9.37	74	-29.37	0-360	99	V
4	10.598	37.41	PK	38.2	-23.2	52.41	54	-1.59	74	-21.59	0-360	202	V
2	10.6	31.95	Avg	38.2	-23.2	46.95	54	-7.05	-	-	0-360	201	H
1	10.603	33.92	Avg	38.2	-23.2	48.92	54	-5.08	-	-	0-360	202	V
3	10.61	37.52	PK	38.2	-23.1	52.62	54	-1.38	74	-21.38	0-360	201	H

PK - Peak detector

Avg - Video bandwidth < Resolution bandwidth

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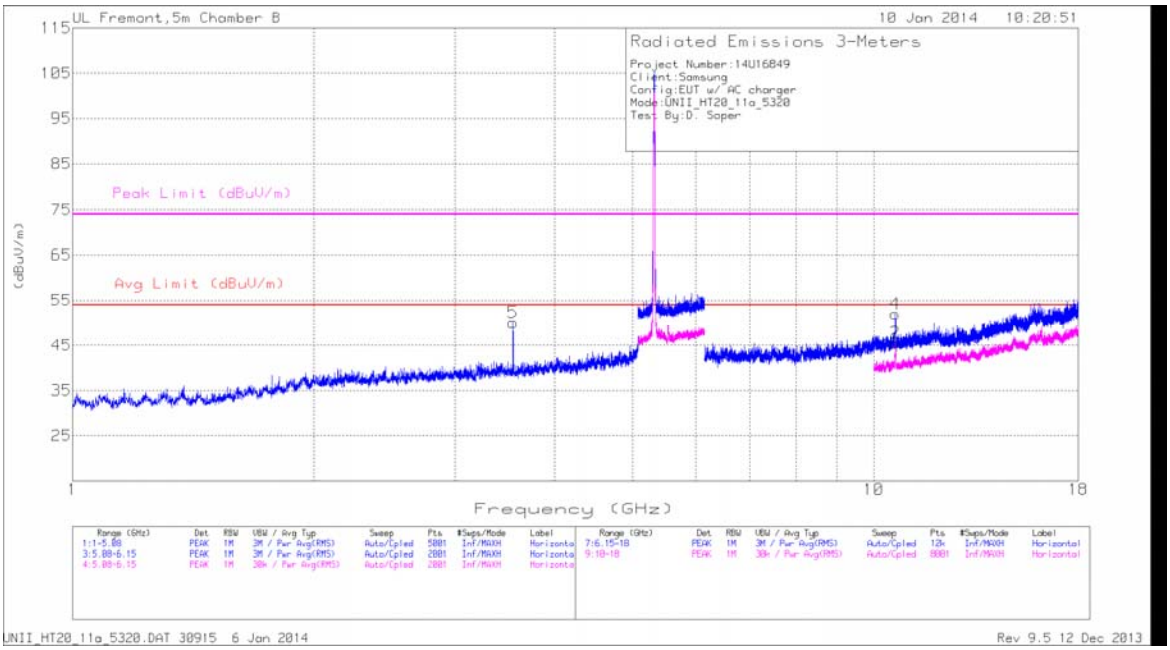
HIGH CHANNEL
HORIZONTAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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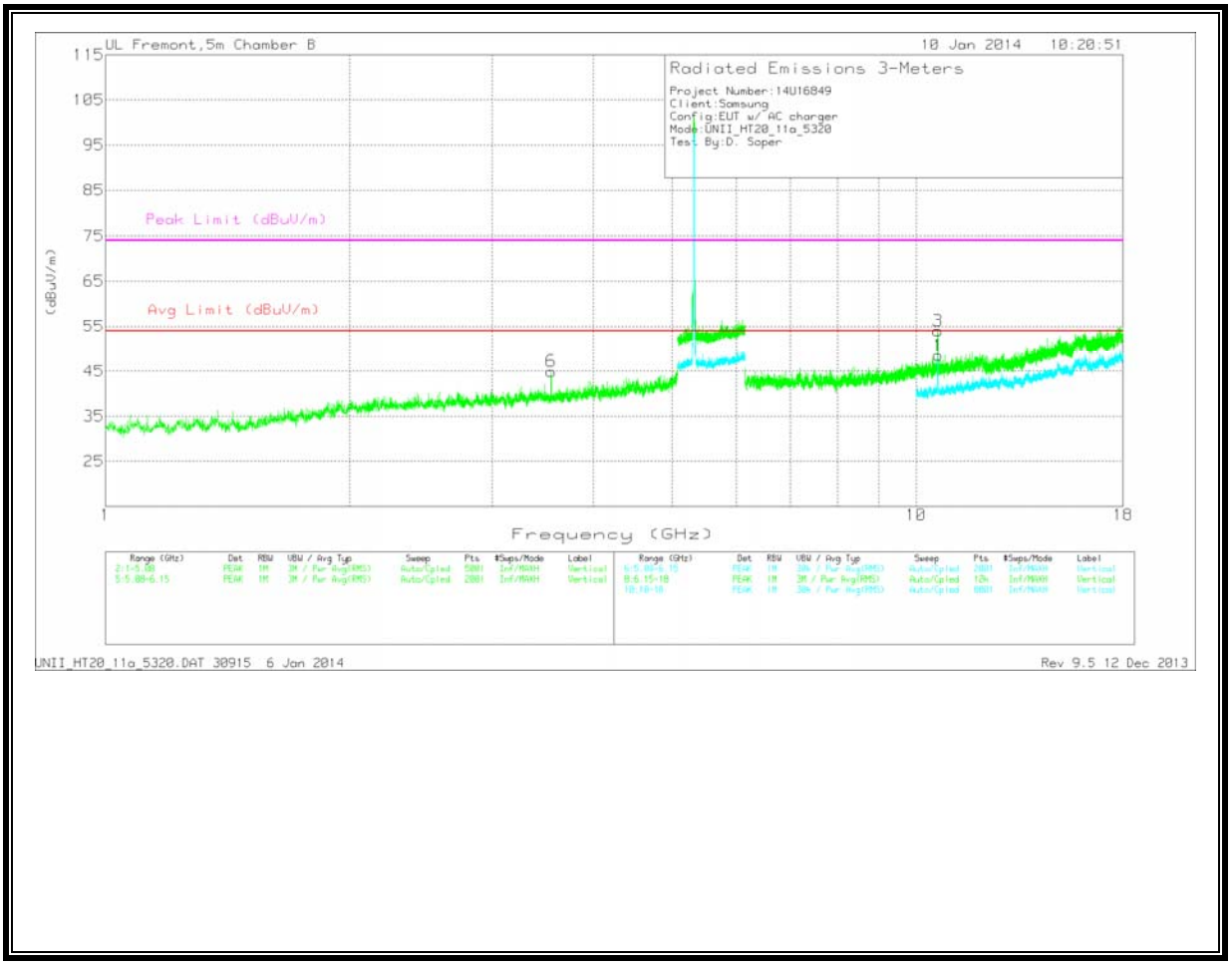
VERTICAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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HIGH CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
5	3.547	48.56	PK	33.3	-31.8	50.06	54	-3.94	74	-23.94	0-360	202	H
6	3.547	43.43	PK	33.3	-31.8	44.93	54	-9.07	74	-29.07	0-360	202	V
3	10.636	38.91	PK	38.3	-23.2	54.01			74	-19.99	0-360	202	V
4	10.642	36.89	PK	38.3	-23.2	51.99	54	-2.01	74	-22.01	0-360	202	H
2	10.643	30.37	Avg	38.3	-23.2	45.47	54	-8.53	-	-	0-360	99	H
1	10.646	33.42	Avg	38.3	-23.2	48.52	54	-5.48	-	-	0-360	202	V

PK - Peak detector

Avg - Video bandwidth < Resolution bandwidth

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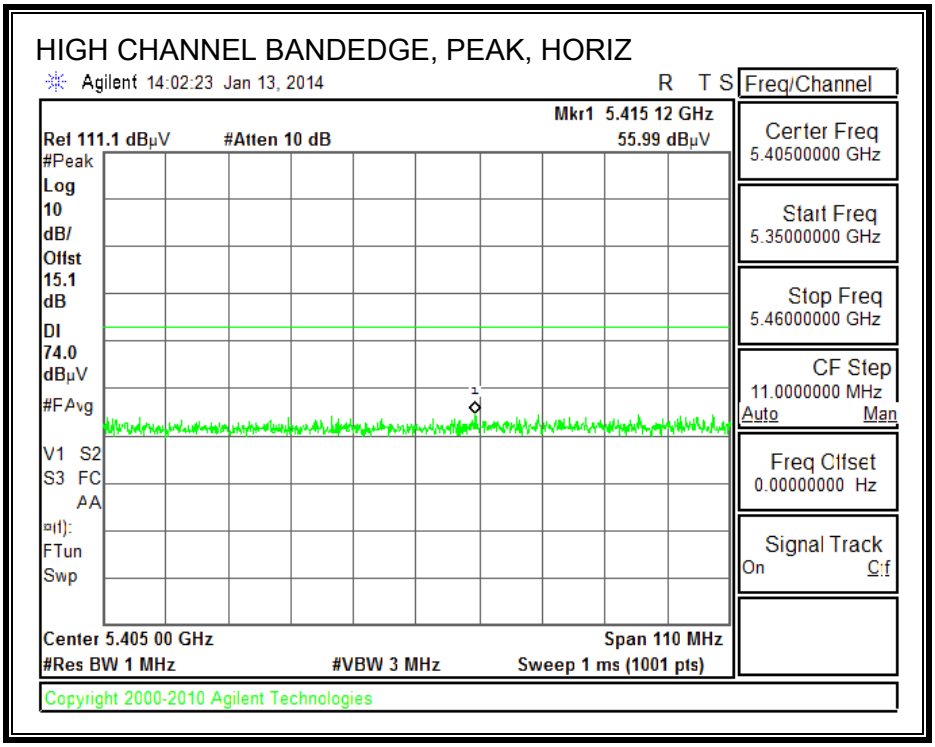
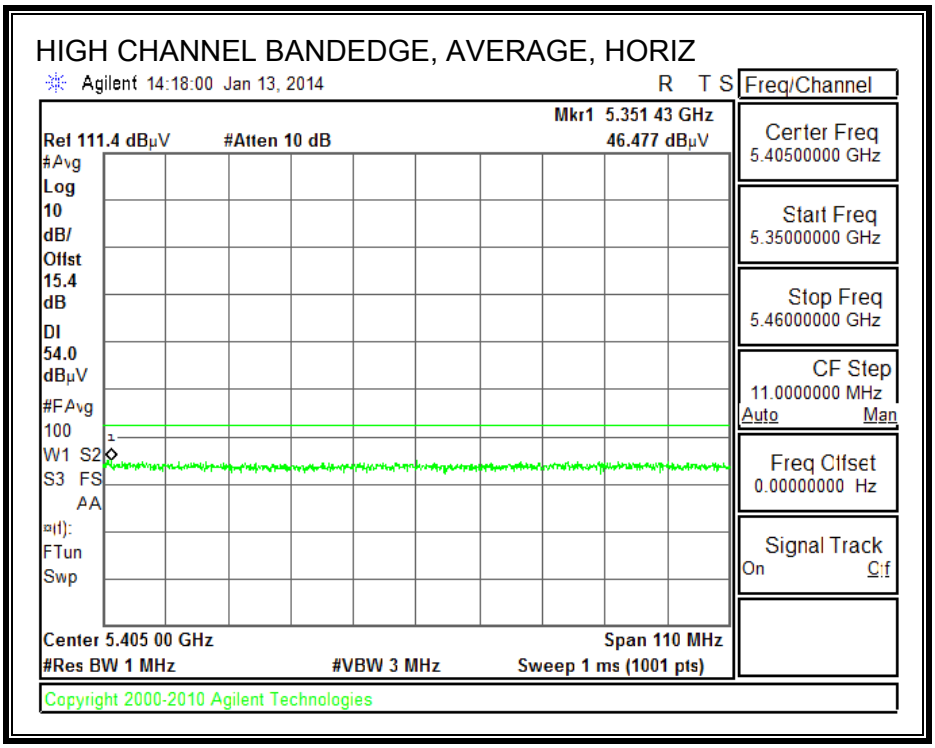
11.2.3. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 5.3 GHz BAND AUTHORIZED BANDEDGE (HIGH CHANNEL)





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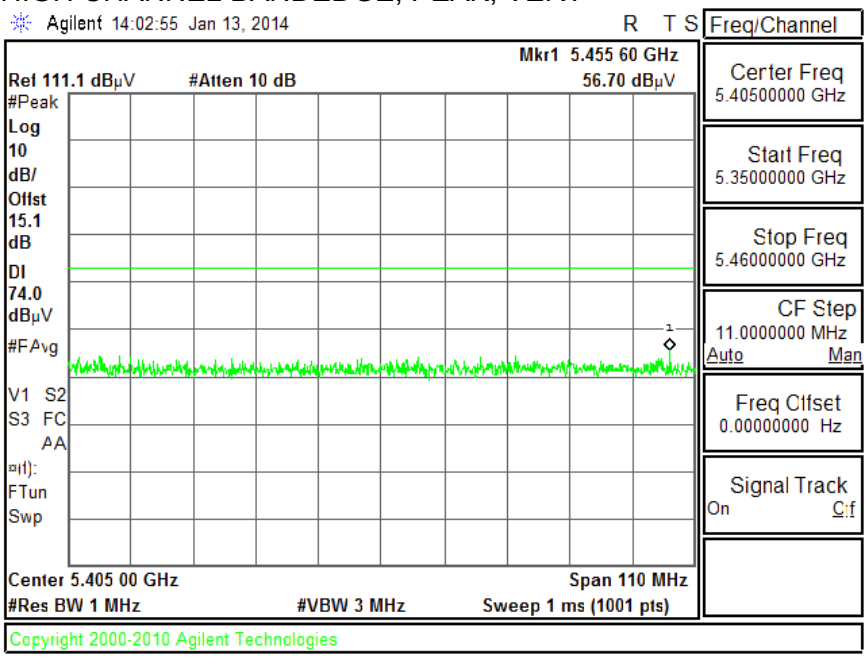
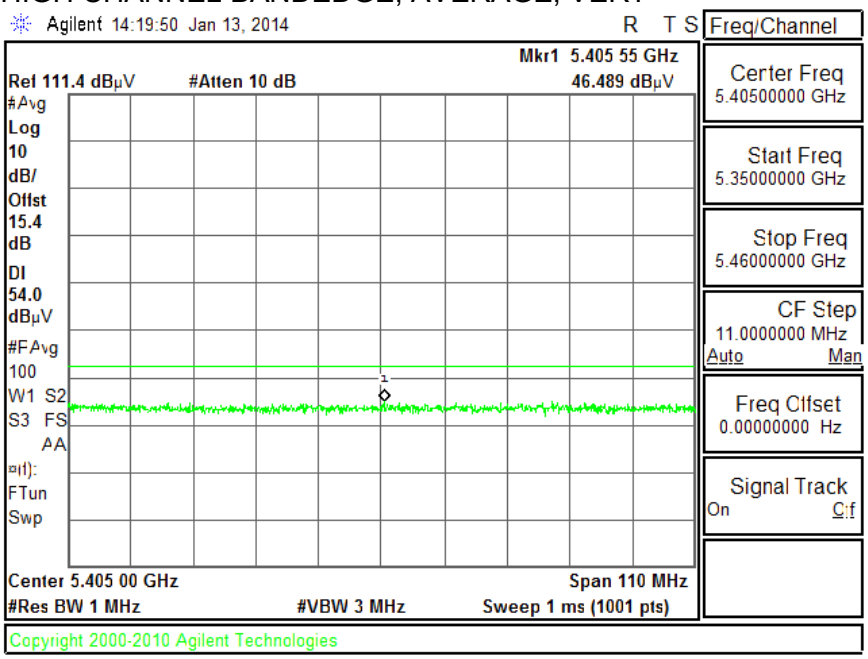
HIGH CHANNEL BANDEDGE, PEAK, VERT



HIGH CHANNEL BANDEDGE, AVERAGE, VERT



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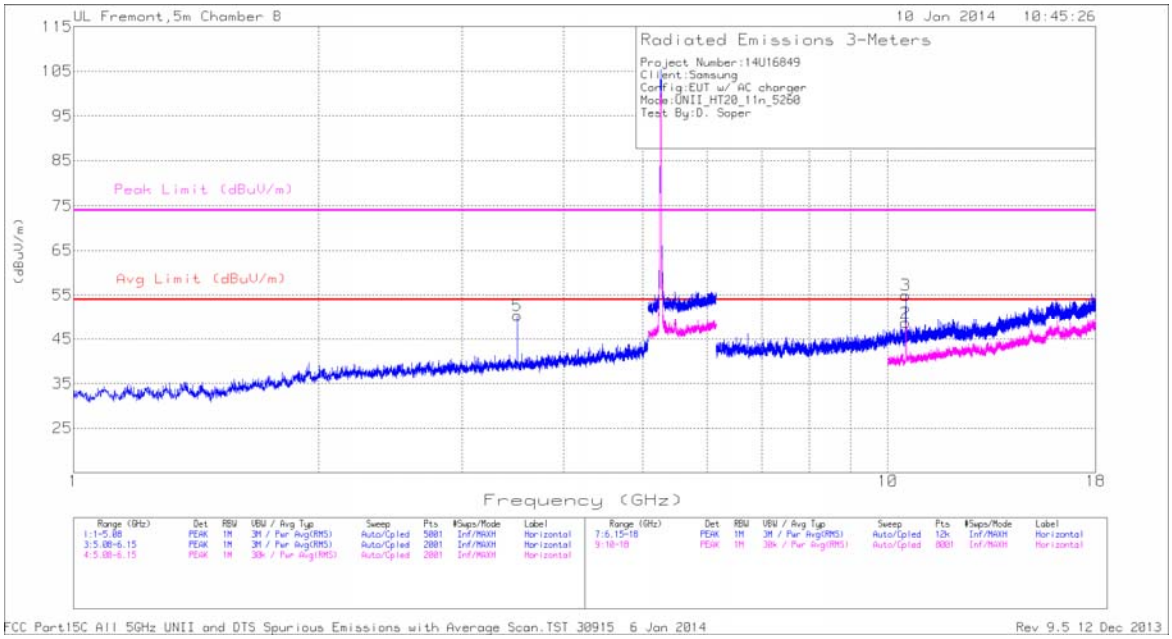
HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL
HORIZONTAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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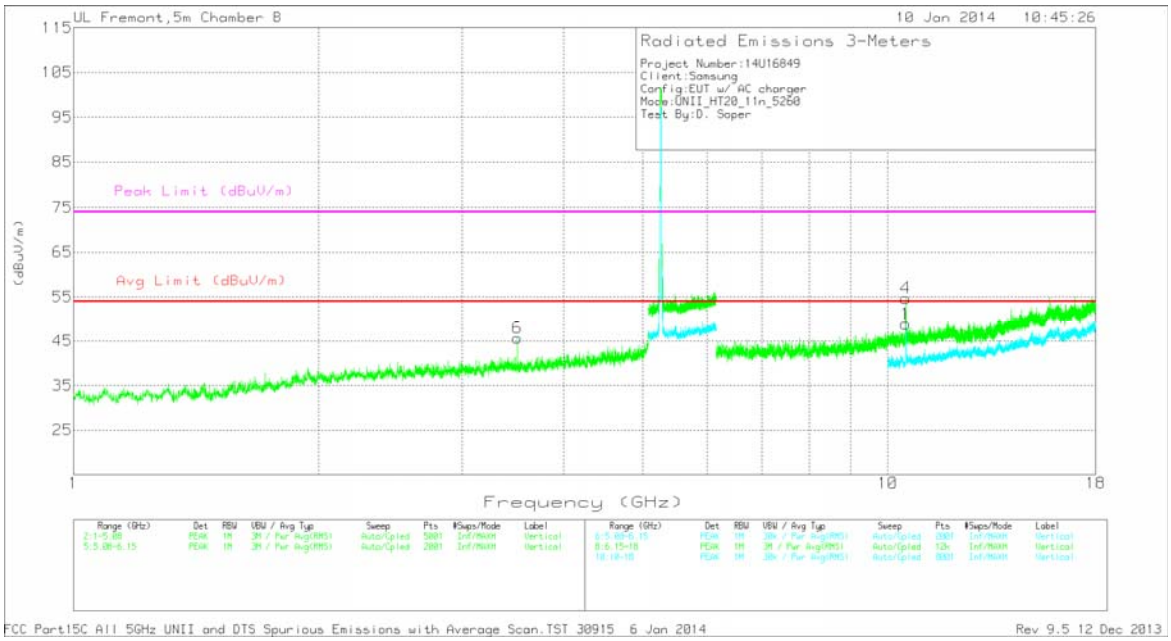
VERTICAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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LOW CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
5	3.507	48.93	PK	33.2	-31.8	50.33	54	-3.67	74	-23.67	0-360	202	H
6	3.507	44.29	PK	33.2	-31.8	45.69	54	-8.31	74	-28.31	0-360	99	V
1	10.517	34.57	Avg	38.2	-23.9	48.87	54	-5.13	-	-	0-360	202	V
3	10.518	40.65	PK	38.2	-23.9	54.95			74	-19.05	0-360	202	H
4	10.518	40.41	PK	38.2	-23.9	54.71			74	-19.29	0-360	202	V
2	10.52	34.25	Avg	38.2	-23.8	48.65	54	-5.35	-	-	0-360	99	H

PK - Peak detector

Avg - Video bandwidth < Resolution bandwidth

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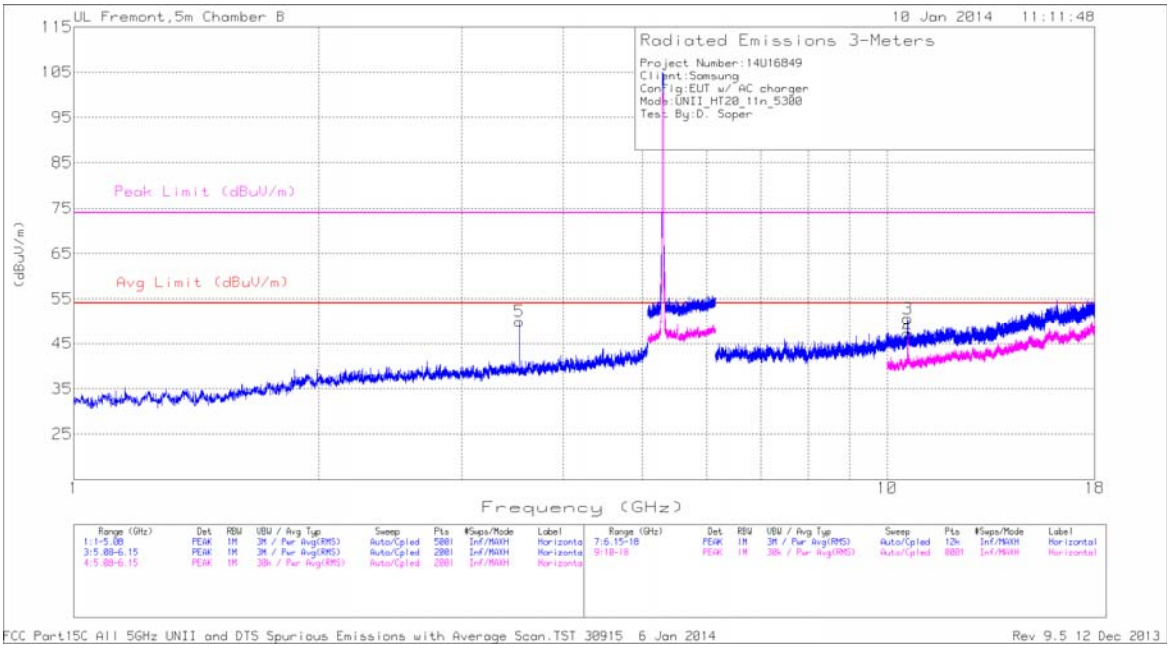
MID CHANNEL
HORIZONTAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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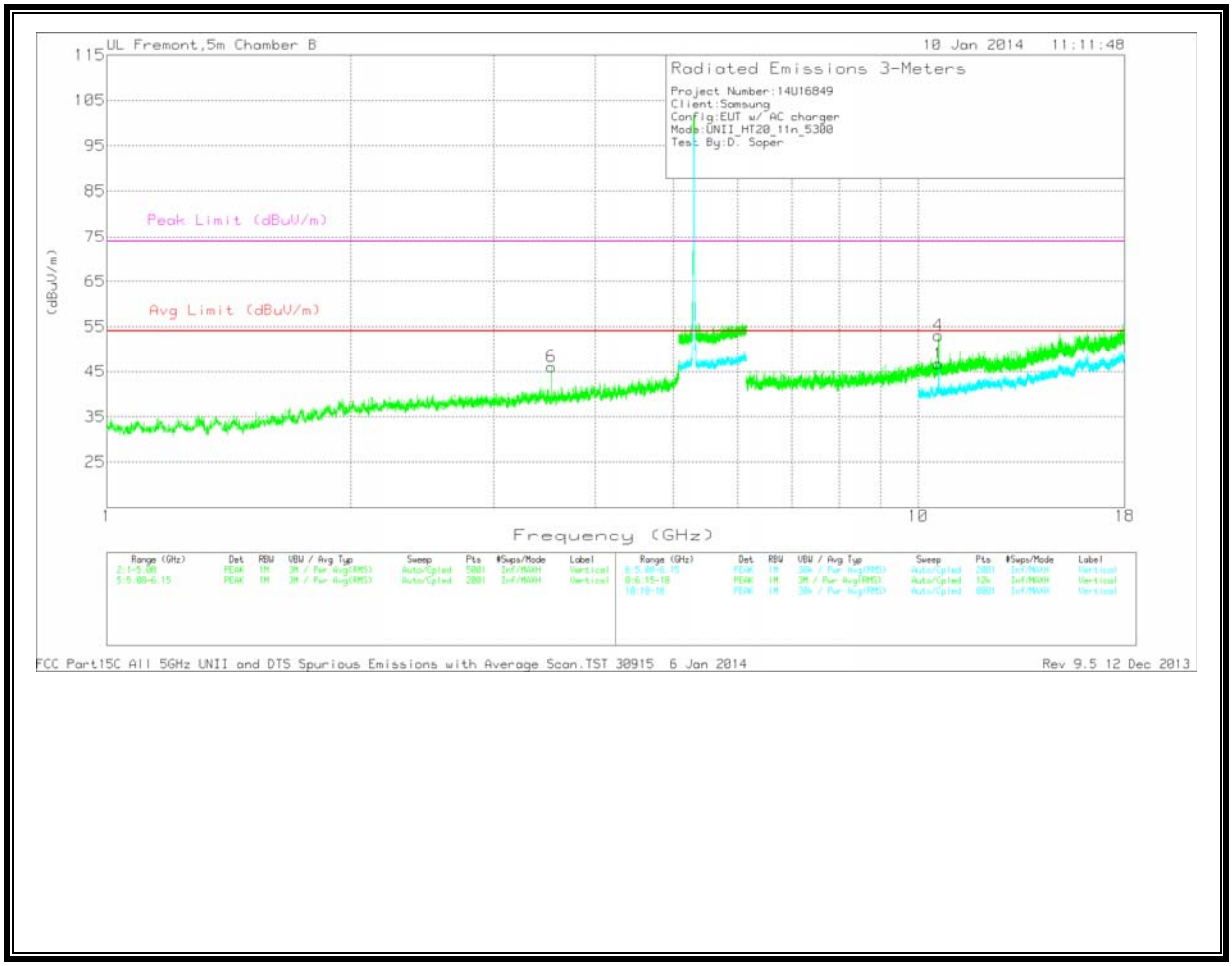
VERTICAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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MID CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
5	3.534	48.64	PK	33.3	-32	49.94	54	-4.06	74	-24.06	0-360	201	H
6	3.534	44.75	PK	33.3	-32	46.05	54	-7.95	74	-27.95	0-360	99	V
4	10.594	38.06	PK	38.2	-23.2	53.06	54	-.94	74	-20.94	0-360	202	V
1	10.596	31.74	Avg	38.2	-23.2	46.74	54	-7.26	-	-	0-360	202	V
3	10.599	35.57	PK	38.2	-23.2	50.57	54	-3.43	74	-23.43	0-360	99	H
2	10.602	32.2	Avg	38.2	-23.2	47.2	54	-6.8	-	-	0-360	201	H

PK - Peak detector

Avg - Video bandwidth < Resolution bandwidth

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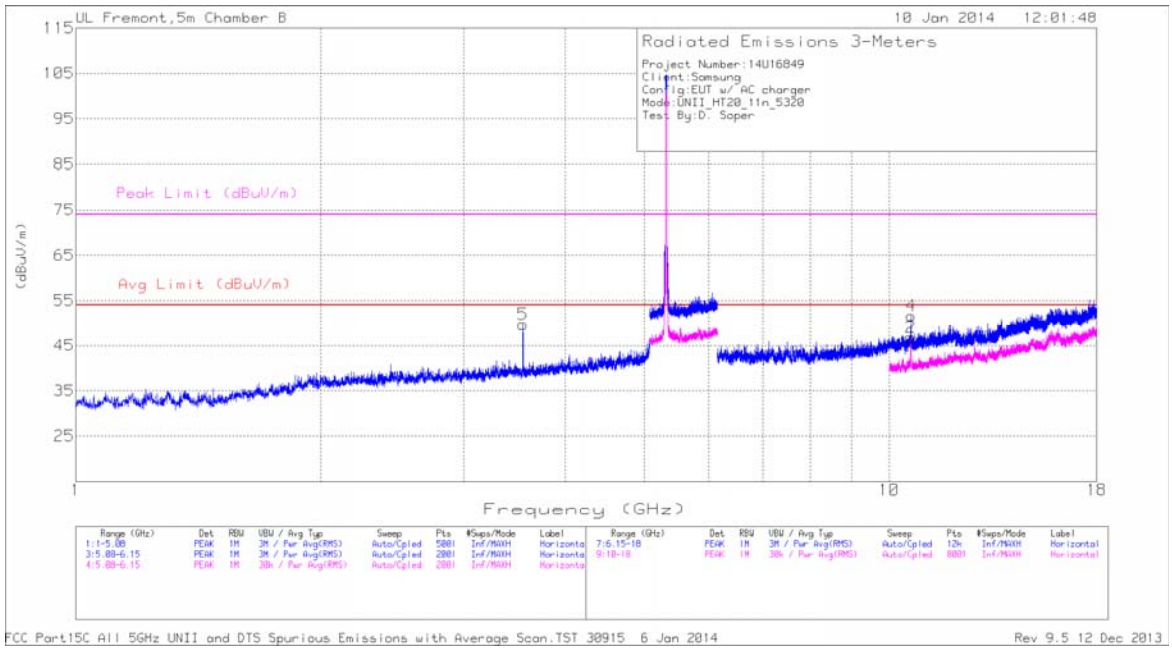
HIGH CHANNEL
HORIZONTAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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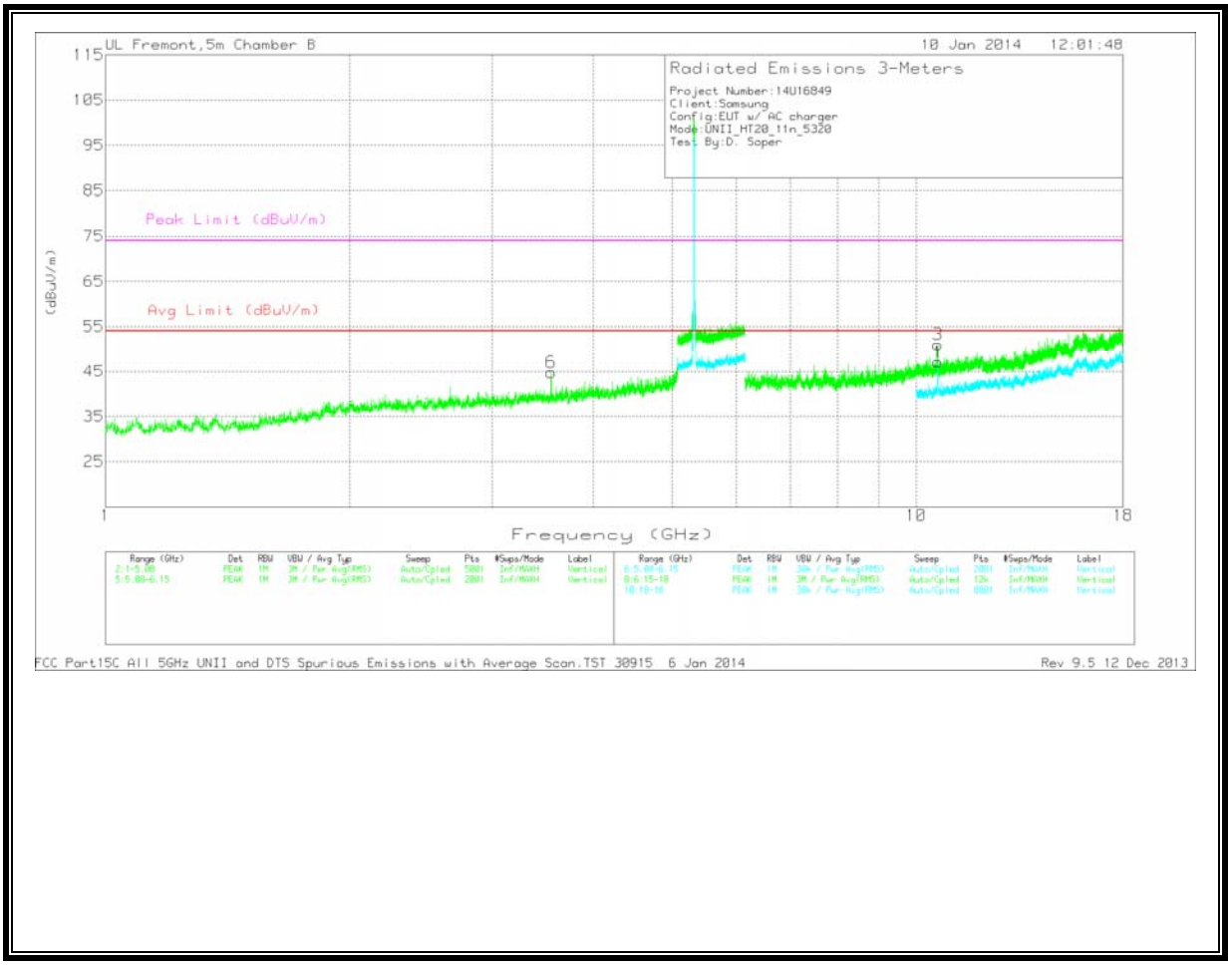
VERTICAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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HIGH CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
5	3.547	48.26	PK	33.3	-31.8	49.76	54	-4.24	74	-24.24	0-360	202	H
6	3.547	43.28	PK	33.3	-31.8	44.78	54	-9.22	74	-29.22	0-360	99	V
2	10.64	31.68	Avg	38.3	-23.2	46.78	54	-7.22	-	-	0-360	202	H
3	10.641	35.93	PK	38.3	-23.2	51.03	54	-2.97	74	-22.97	0-360	202	V
1	10.642	32.01	Avg	38.3	-23.2	47.11	54	-6.89	-	-	0-360	202	V
4	10.647	36.56	PK	38.3	-23.2	51.66	54	-2.34	74	-22.34	0-360	202	H

PK - Peak detector

Avg - Video bandwidth < Resolution bandwidth

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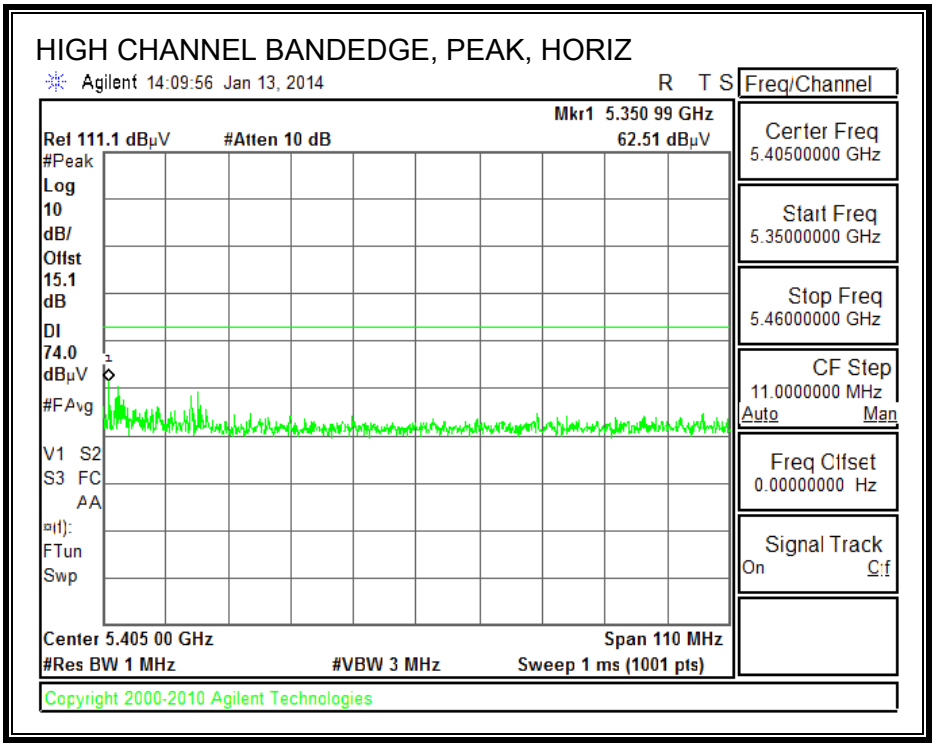
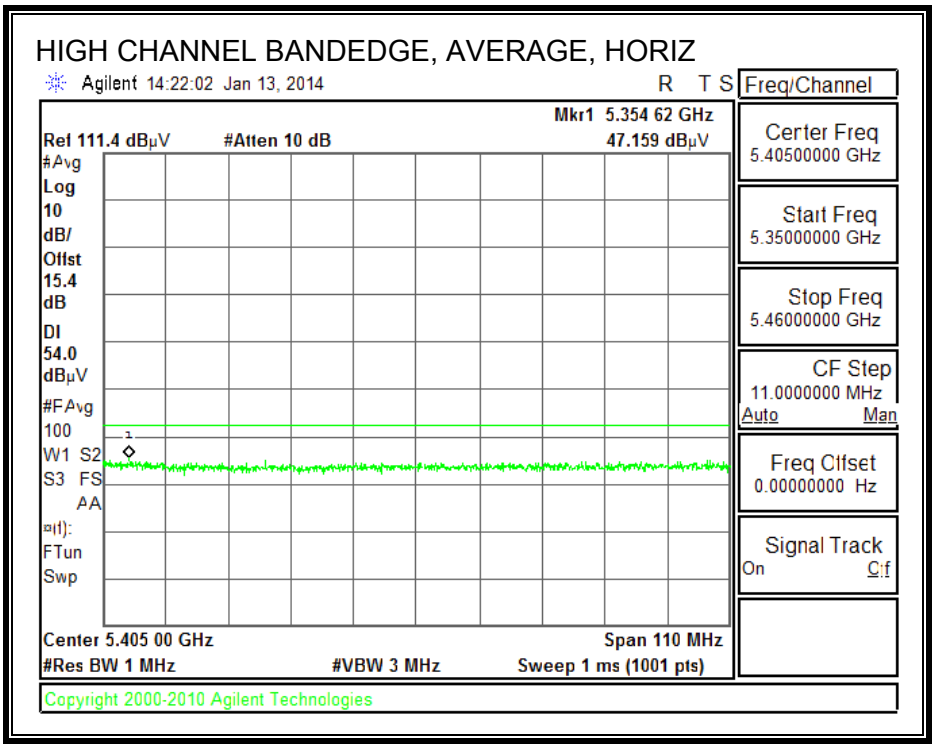
11.2.5. TX ABOVE 1 GHz 802.11n HT40 MODE IN THE 5.3 GHz BAND AUTHORIZED BANDEDGE (HIGH CHANNEL)





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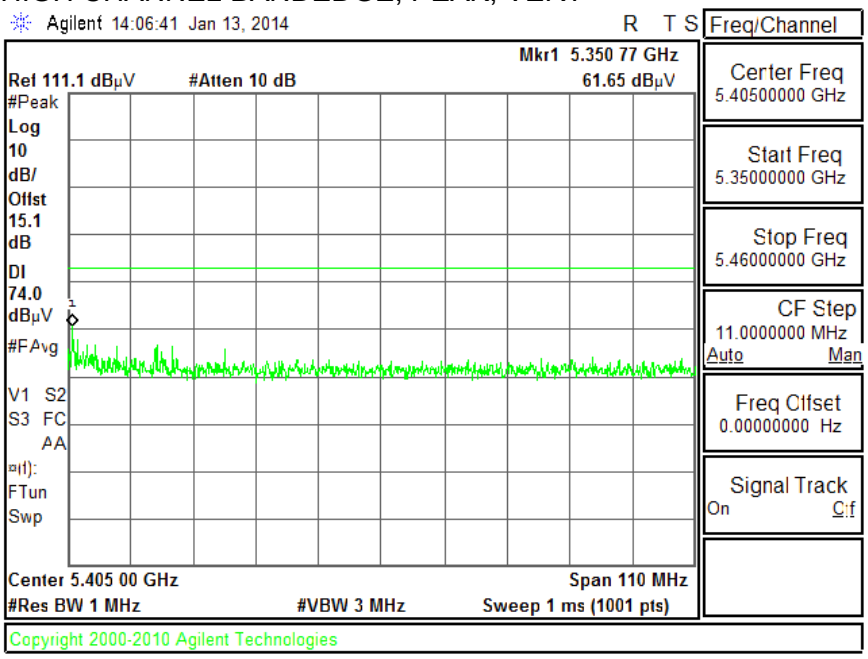
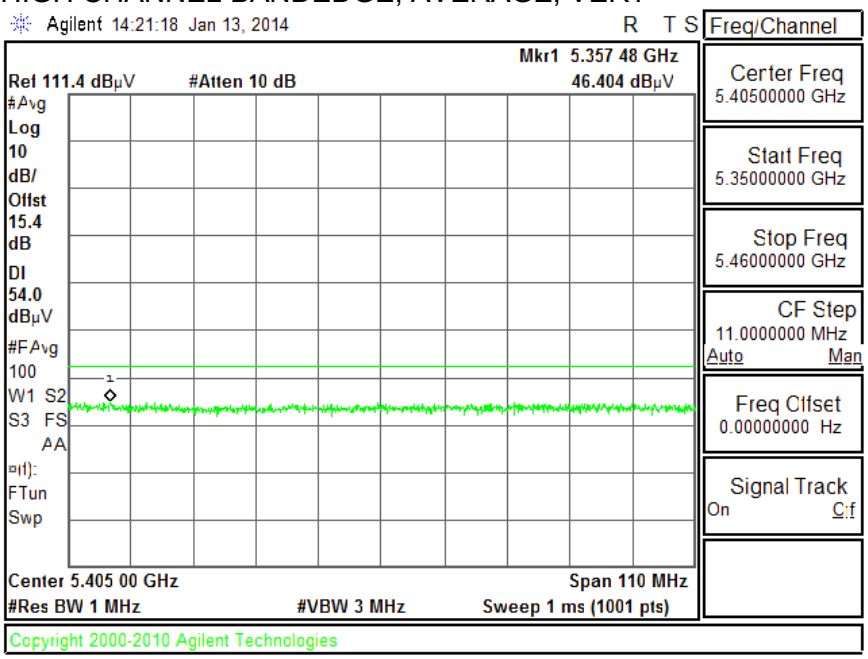
HIGH CHANNEL BANDEDGE, PEAK, VERT



HIGH CHANNEL BANDEDGE, AVERAGE, VERT



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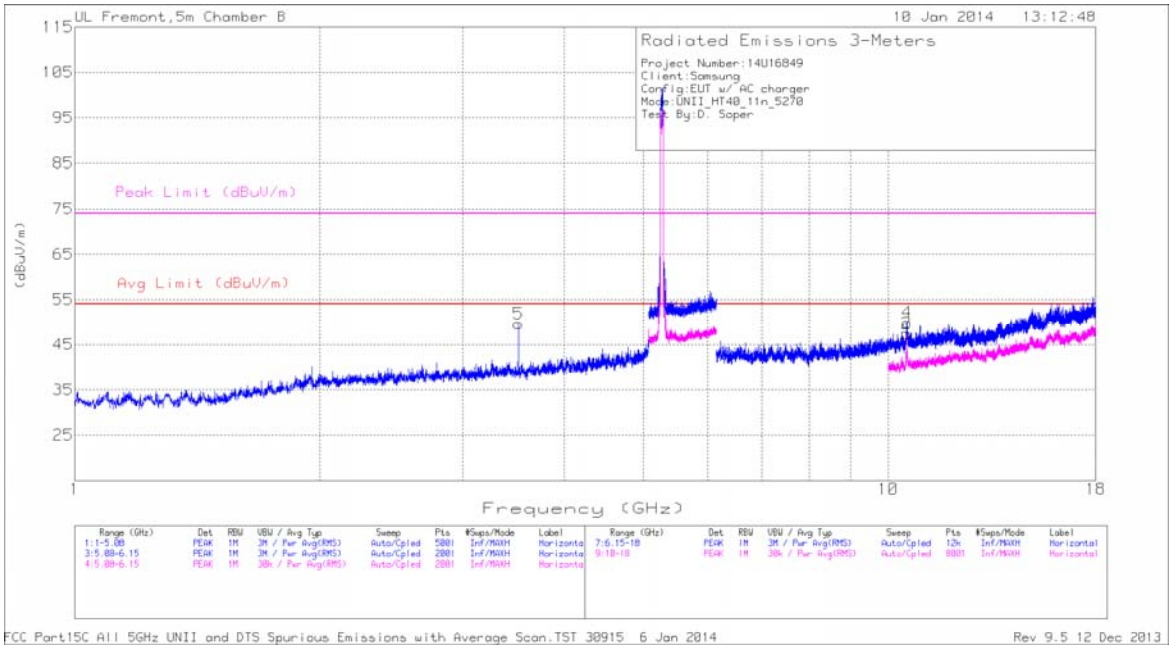
HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL
HORIZONTAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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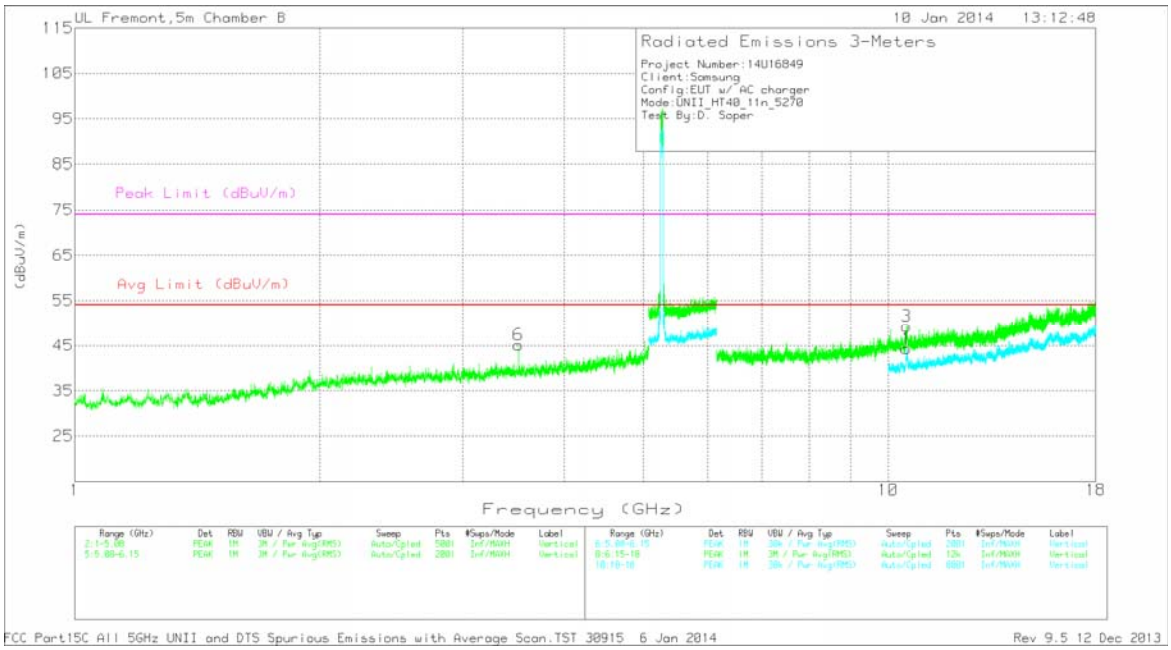
VERTICAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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LOW CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
5	3.513	48.25	PK	33.2	-31.8	49.65	54	-4.35	74	-24.35	0-360	202	H
6	3.513	43.72	PK	33.2	-31.8	45.12	54	-8.88	74	-28.88	0-360	99	V
1	10.534	29.88	Avg	38.2	-23.8	44.28	54	-9.72	-	-	0-360	202	V
3	10.539	34.89	PK	38.2	-23.8	49.29	54	-4.71	74	-24.71	0-360	99	V
2	10.541	33.03	Avg	38.2	-23.8	47.43	54	-6.57	-	-	0-360	201	H
4	10.554	35.3	PK	38.2	-23.6	49.9	54	-4.1	74	-24.1	0-360	202	H

PK - Peak detector

Avg - Video bandwidth < Resolution bandwidth

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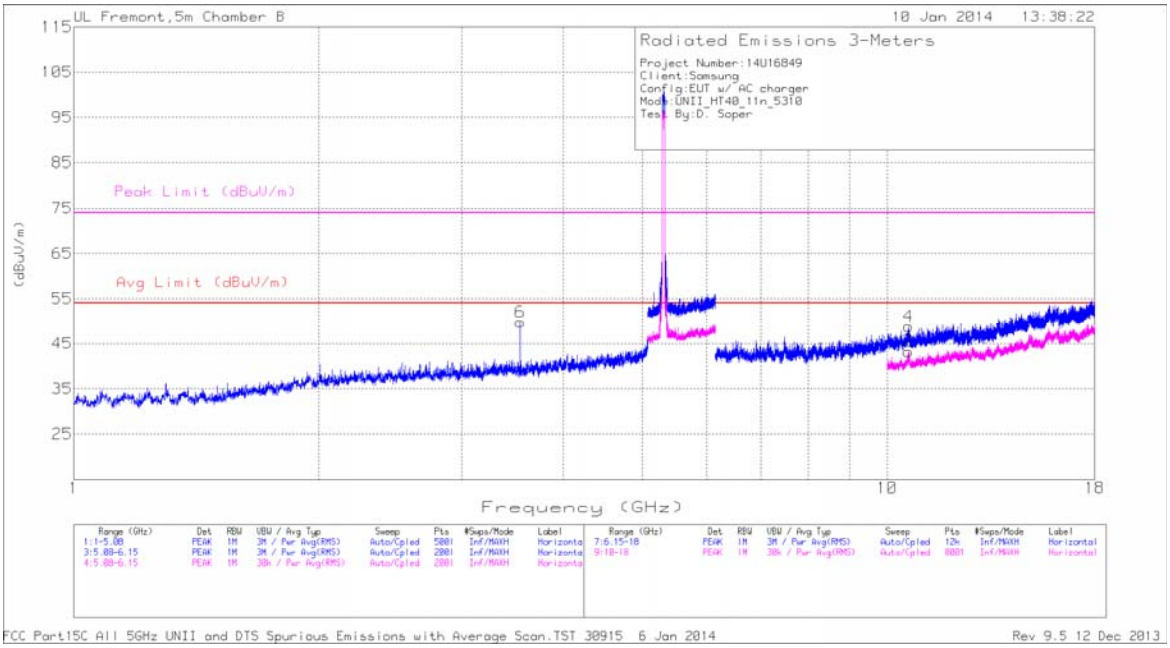
HIGH CHANNEL
HORIZONTAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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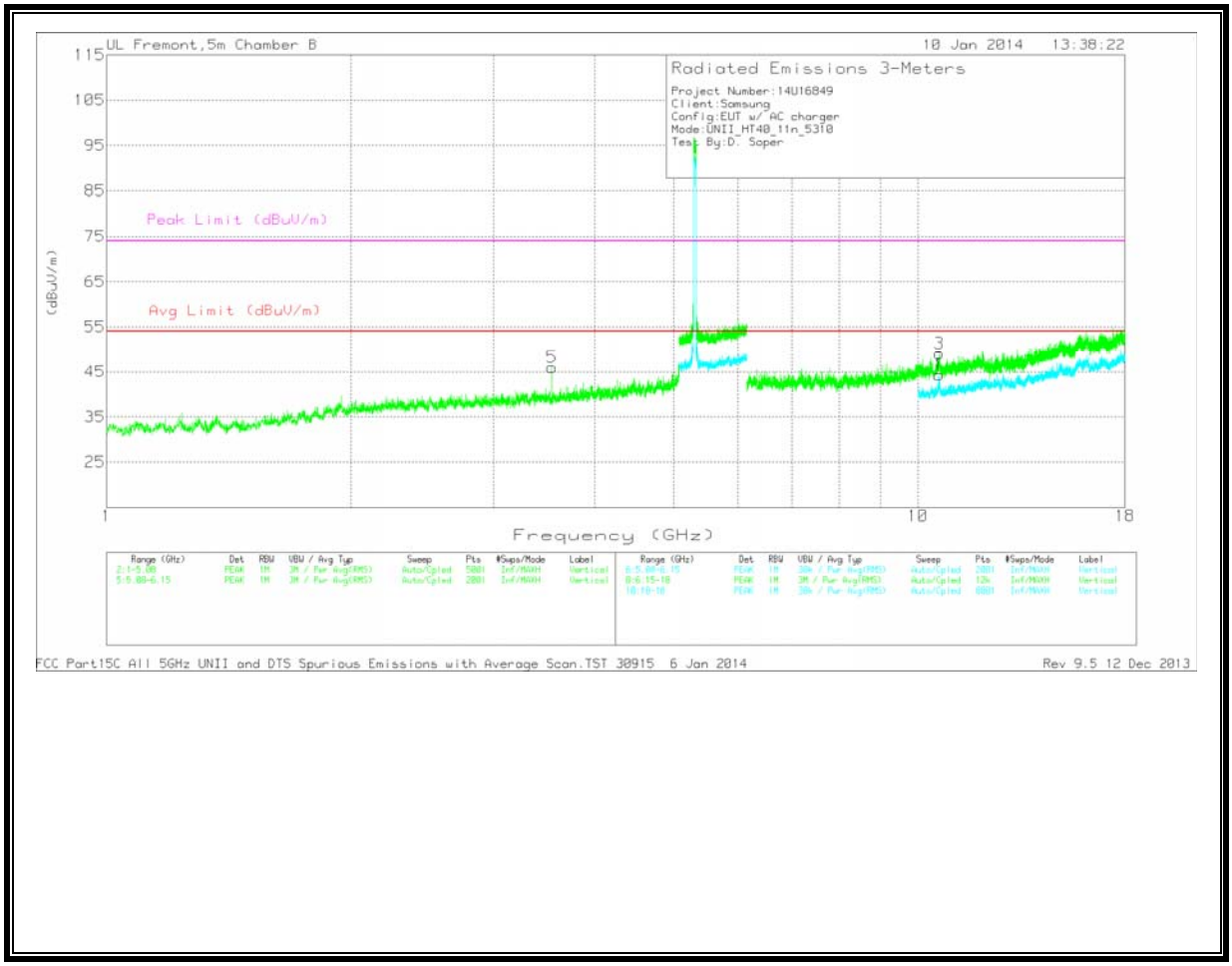
VERTICAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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MID CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
6	3.54	48.49	PK	33.3	-32	49.79	54	-4.21	74	-24.21	0-360	201	H
5	3.54	44.7	PK	33.3	-32	46	54	-8	74	-28	0-360	99	V
1	10.617	29.21	Avg	38.2	-23.1	44.31	54	-9.69	-	-	0-360	99	V
2	10.621	28.16	Avg	38.2	-23.1	43.26	54	-10.74	-	-	0-360	202	H
4	10.628	33.72	PK	38.3	-23.2	48.82	54	-5.18	74	-25.18	0-360	201	H
3	10.628	33.95	PK	38.3	-23.2	49.05	54	-4.95	74	-24.95	0-360	202	V

PK - Peak detector

Avg - Video bandwidth < Resolution bandwidth

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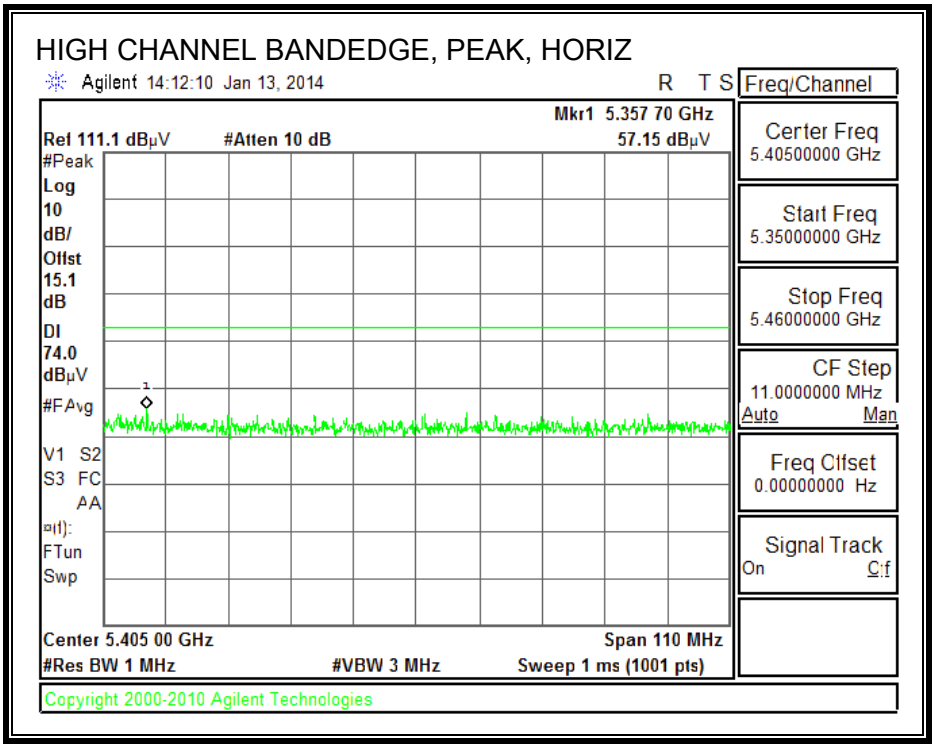
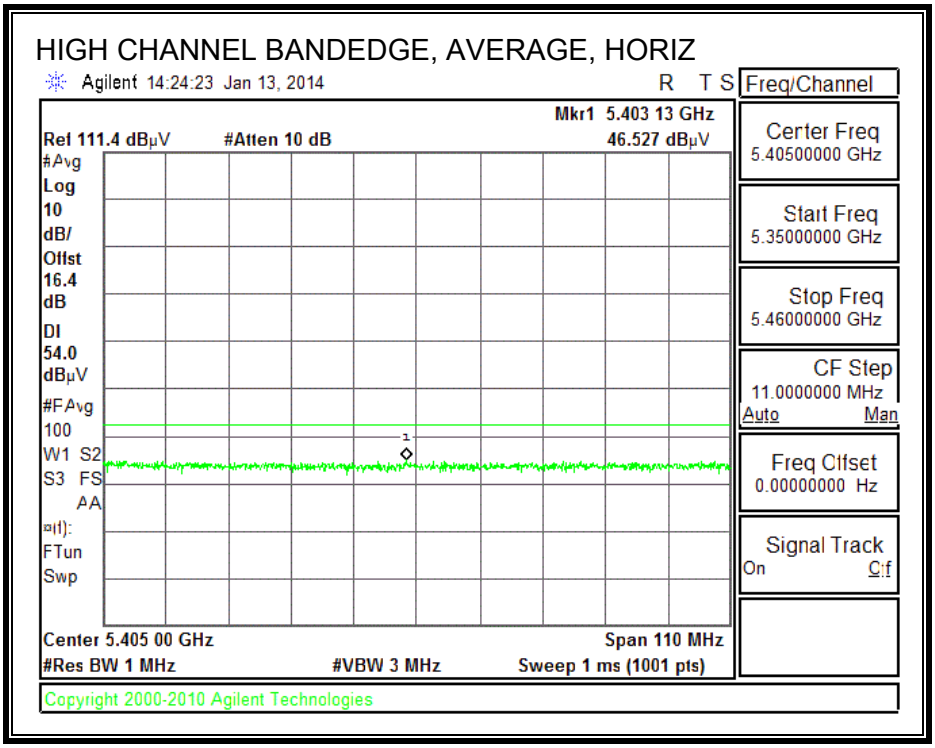
11.2.7. TX ABOVE 1 GHz 802.11ac HT80 MODE IN THE 5.3 GHz BAND AUTHORIZED BANDEDGE (HIGH CHANNEL)





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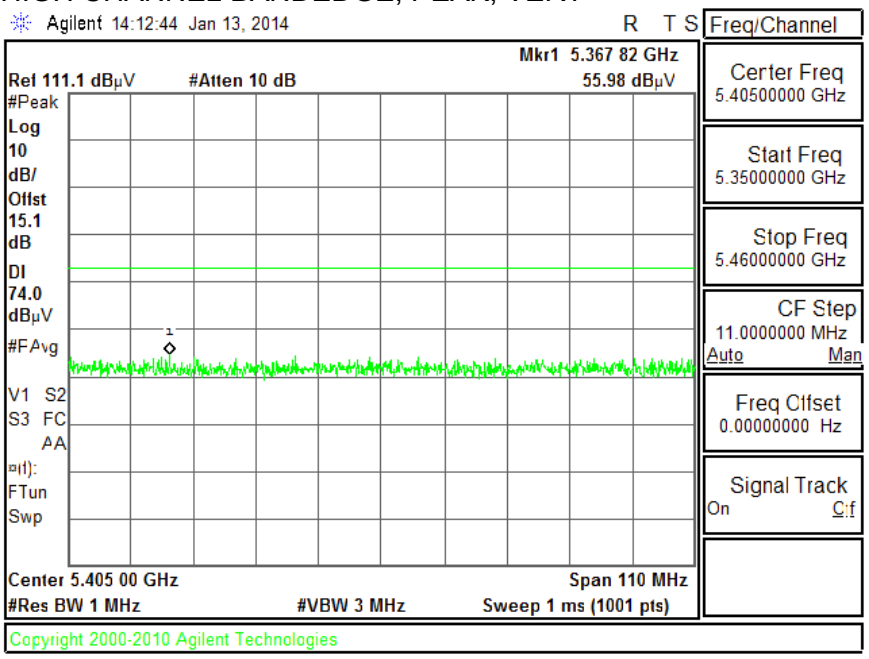
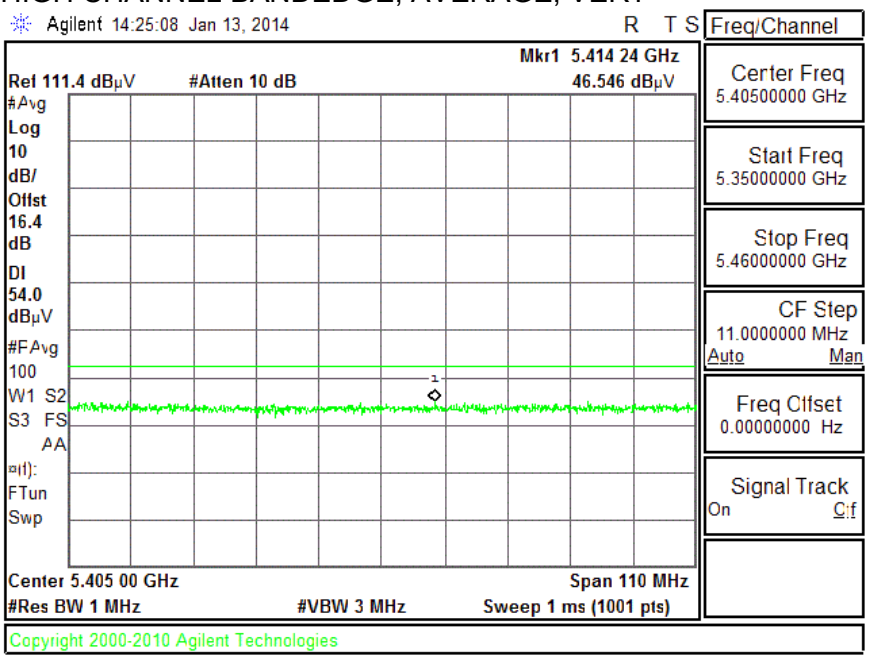
HIGH CHANNEL BANDEDGE, PEAK, VERT



HIGH CHANNEL BANDEDGE, AVERAGE, VERT



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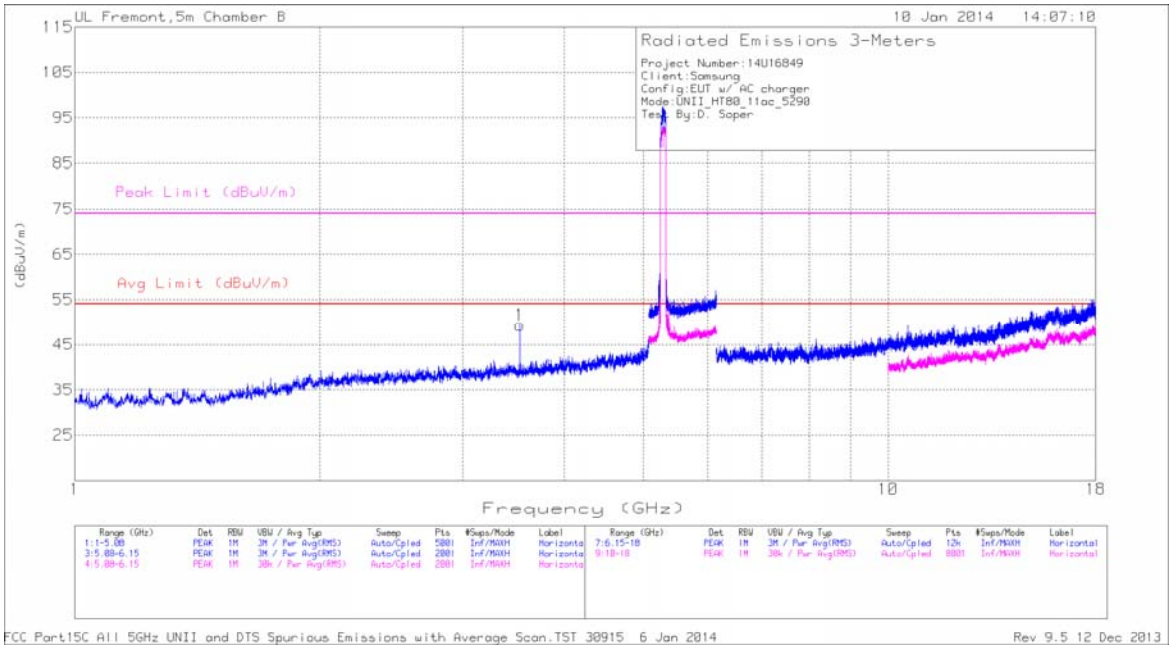
HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL
HORIZONTAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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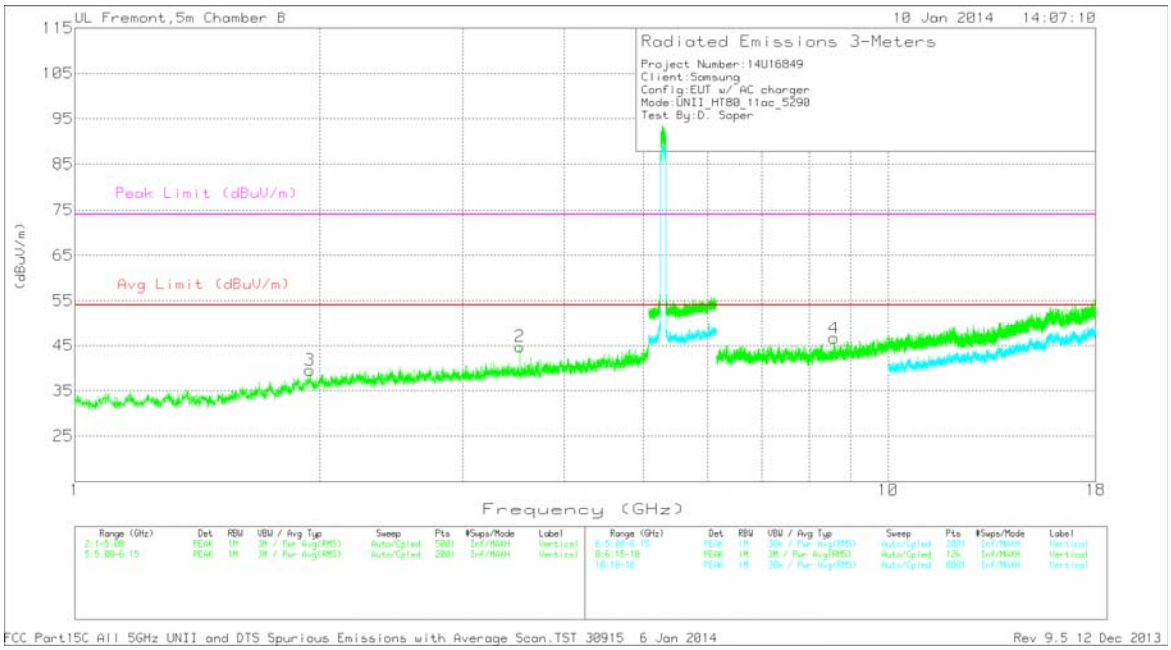
VERTICAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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LOW CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	1.947	40.69	PK	31.4	-32.5	39.59	54	-14.41	74	-34.41	0-360	99	V
1	3.526	48.05	PK	33.3	-32	49.35	54	-4.65	74	-24.65	0-360	201	H
2	3.526	43.41	PK	33.3	-32	44.71	54	-9.29	74	-29.29	0-360	99	V
4	8.577	36.54	PK	36.3	-26.2	46.64	54	-7.36	74	-27.36	0-360	99	V

PK - Peak detector

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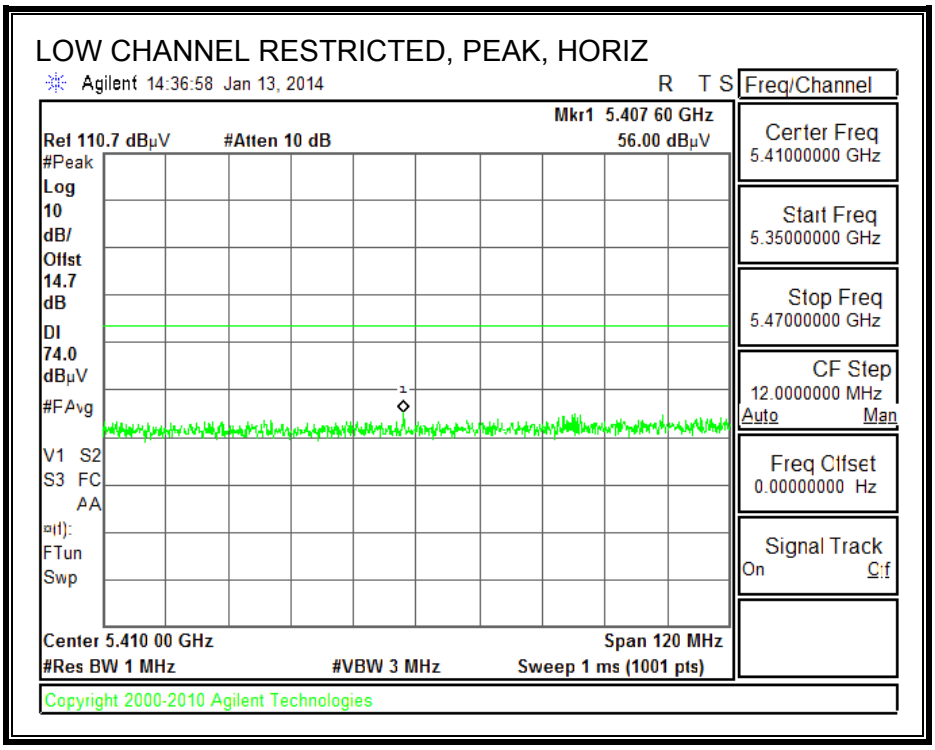
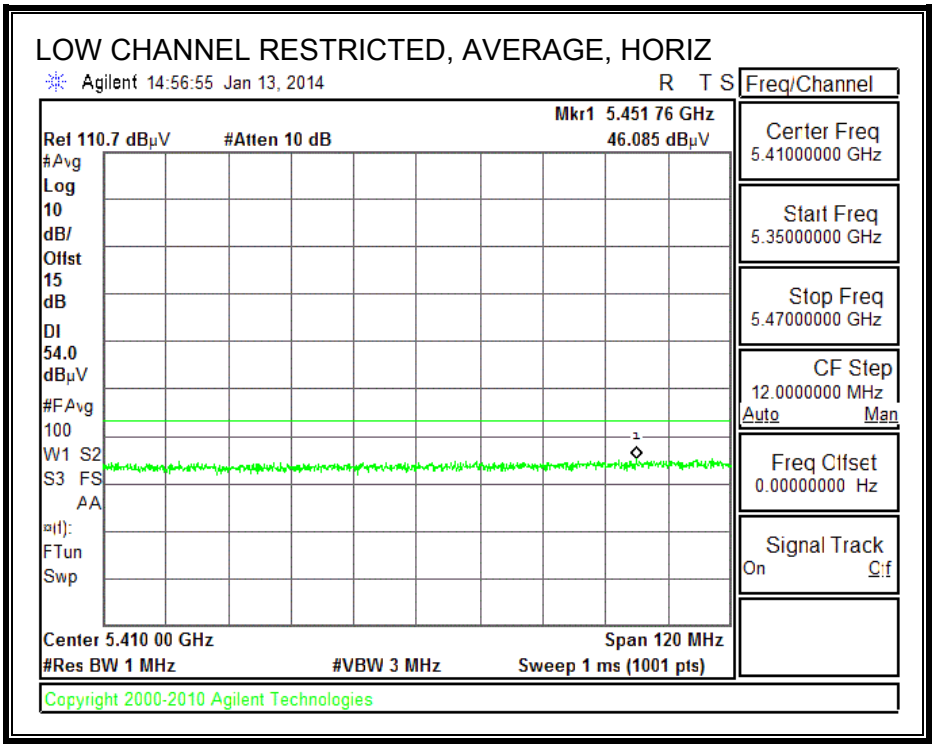
11.3. 5.5-5.6 GHz

11.3.1. TX ABOVE 1 GHz 802.11a MODE IN THE 5.5 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL)





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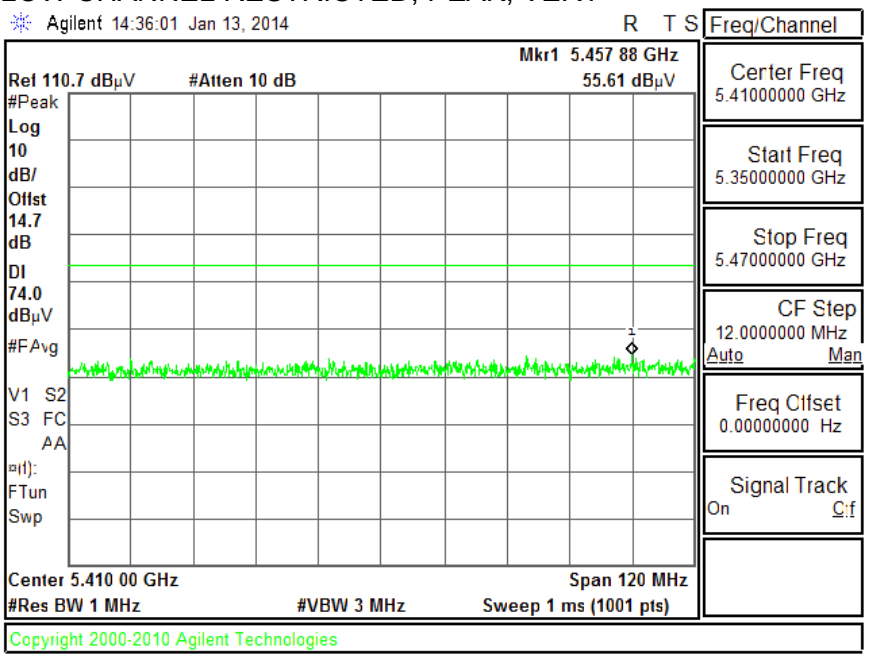
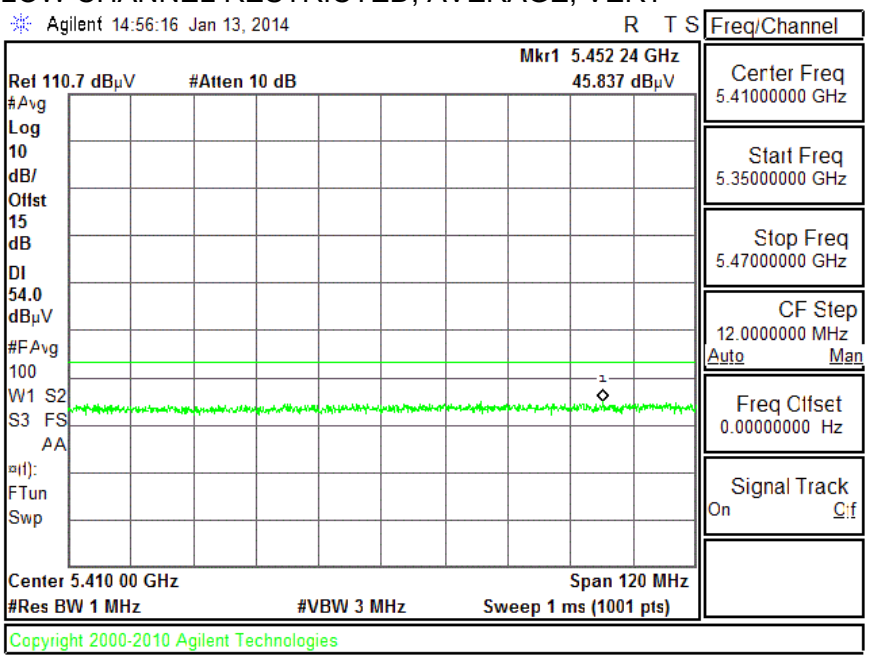
LOW CHANNEL RESTRICTED, PEAK, VERT



LOW CHANNEL RESTRICTED, AVERAGE, VERT



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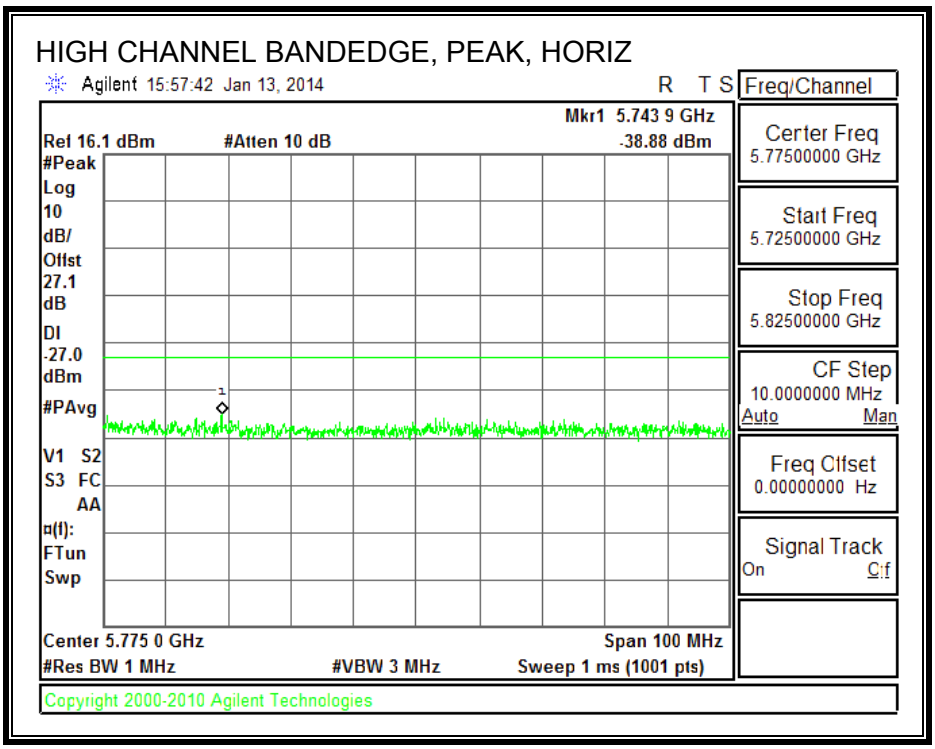
AUTHORIZED BANDEDGE (HIGH CHANNEL)



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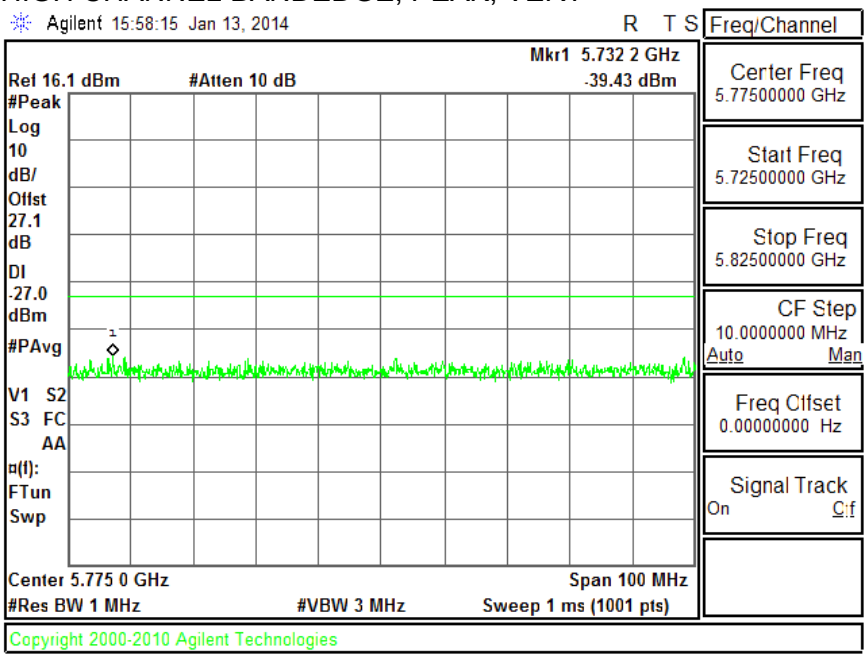
HIGH CHANNEL BANDEDGE, PEAK, VERT



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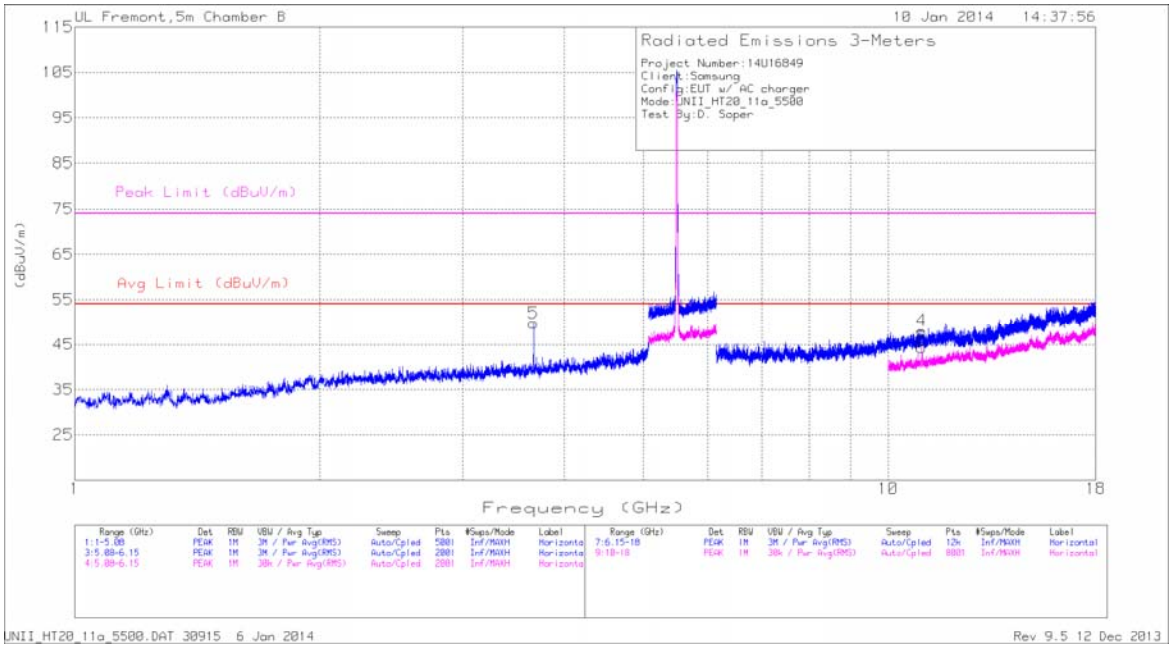
HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL
HORIZONTAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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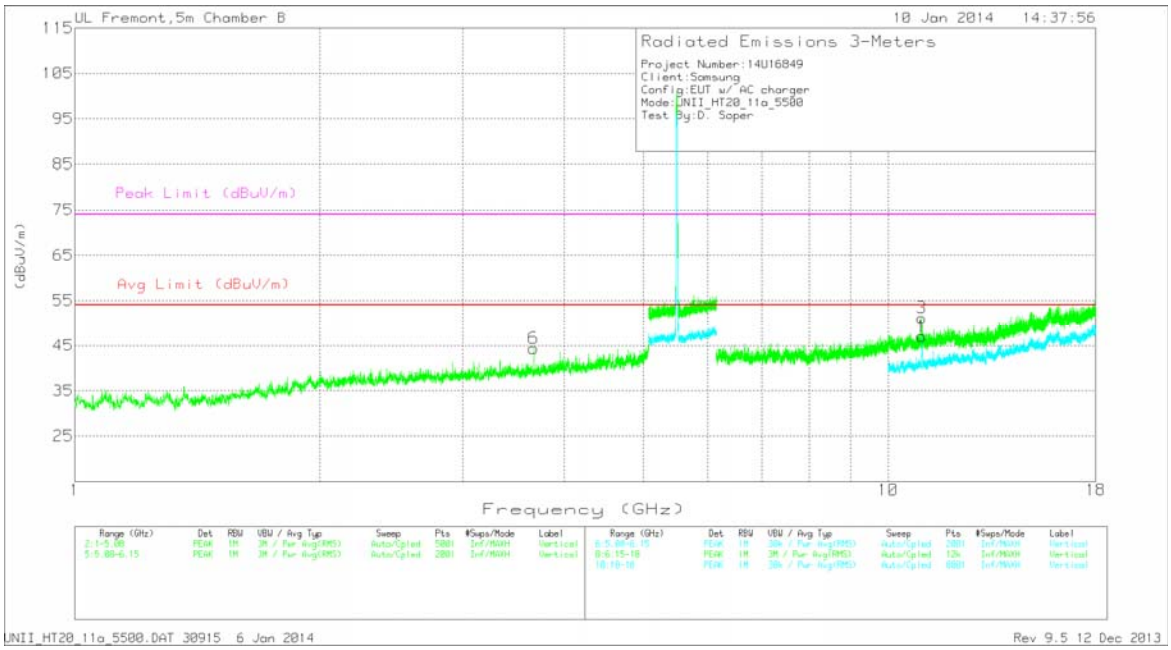
VERTICAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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LOW CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
5	3.667	47.28	PK	33.6	-31.1	49.78	54	-4.22	74	-24.22	0-360	99	H
6	3.667	41.91	PK	33.6	-31.1	44.41	54	-9.59	74	-29.59	0-360	99	V
2	10.998	29.37	Avg	38.3	-23.3	44.37	54	-9.63	-	-	0-360	202	H
4	10.999	33.07	PK	38.3	-23.3	48.07	54	-5.93	74	-25.93	0-360	202	H
3	10.999	36.16	PK	38.3	-23.3	51.16	54	-2.84	74	-22.84	0-360	202	V
1	10.999	32.03	Avg	38.3	-23.3	47.03	54	-6.97	-	-	0-360	202	V

PK - Peak detector

Avg - Video bandwidth < Resolution bandwidth

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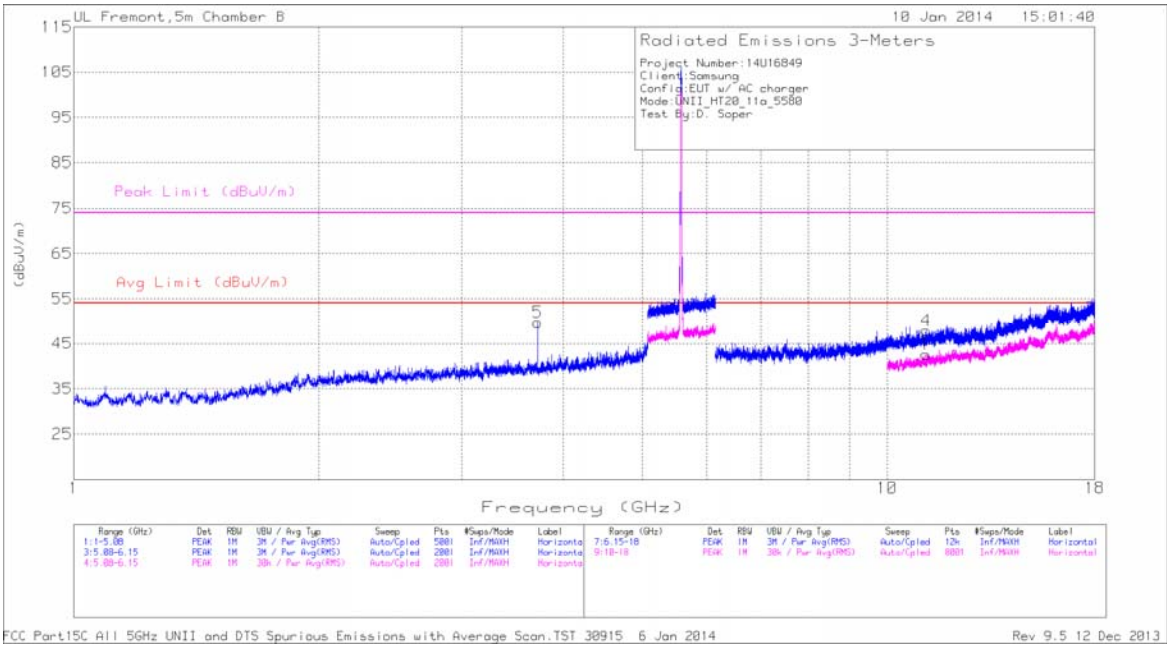
MID CHANNEL
HORIZONTAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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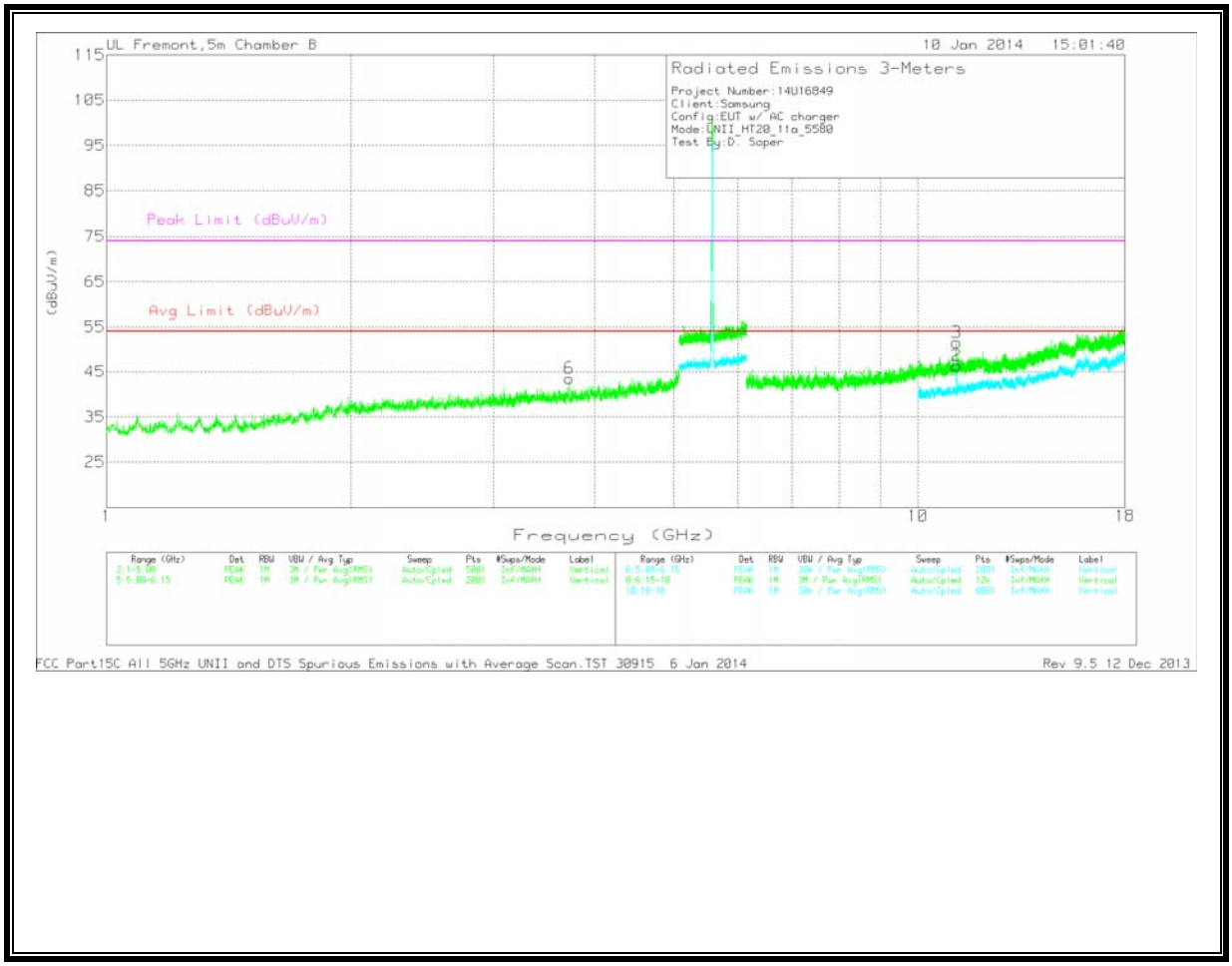
VERTICAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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MID CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
5	3.72	47.56	PK	33.7	-31.5	49.76	54	-4.24	74	-24.24	0-360	99	H
6	3.721	41.31	PK	33.7	-31.5	43.51	54	-10.49	74	-30.49	0-360	99	V
3	11.158	36.49	PK	38.4	-23.3	51.59	54	-2.41	74	-22.41	0-360	202	V
1	11.163	27.5	Avg	38.4	-23.3	42.6	54	-11.4	-	-	0-360	201	H
2	11.163	31.28	Avg	38.4	-23.3	46.38	54	-7.62	-	-	0-360	99	V
4	11.17	32.71	PK	38.4	-23.2	47.91	54	-6.09	74	-26.09	0-360	201	H

PK - Peak detector

Avg - Video bandwidth < Resolution bandwidth

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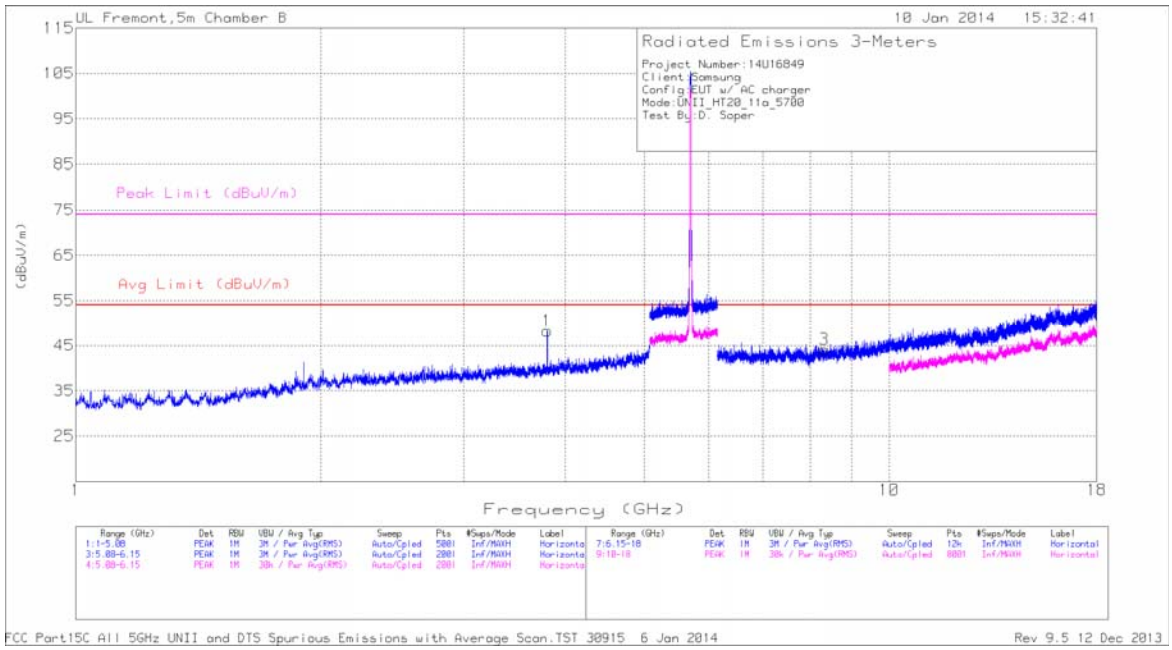
HIGH CHANNEL
HORIZONTAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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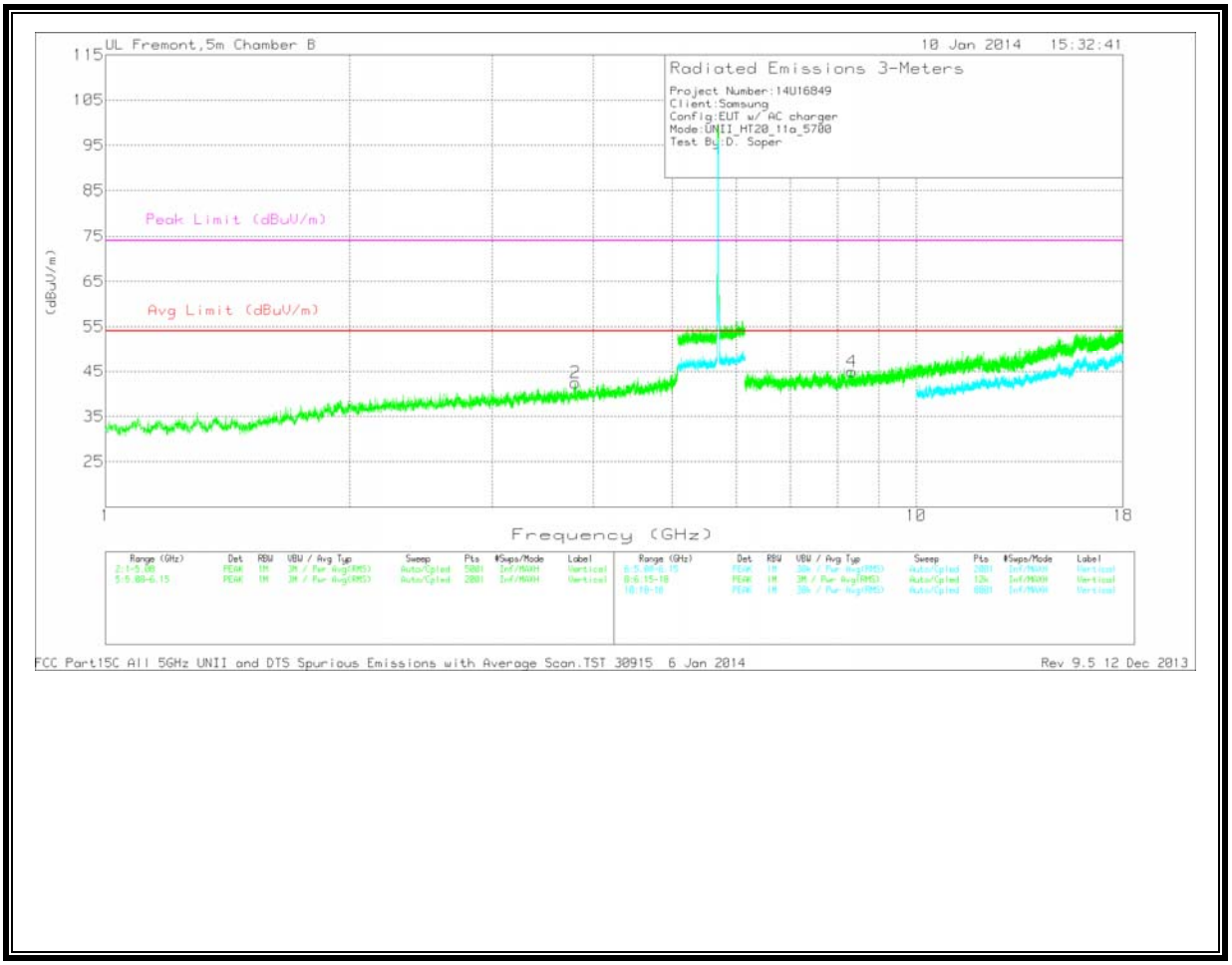
VERTICAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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HIGH CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	3.8	45.46	PK	33.8	-31	48.26	54	-5.74	74	-25.74	0-360	99	H
2	3.8	39.68	PK	33.8	-31	42.48	54	-11.52	74	-31.52	0-360	202	V
3	8.322	34.6	PK	36.1	-26.6	44.1	54	-9.9	74	-29.9	0-360	202	H
4	8.334	35.56	PK	36.1	-26.7	44.96	54	-9.04	74	-29.04	0-360	99	V

PK - Peak detector

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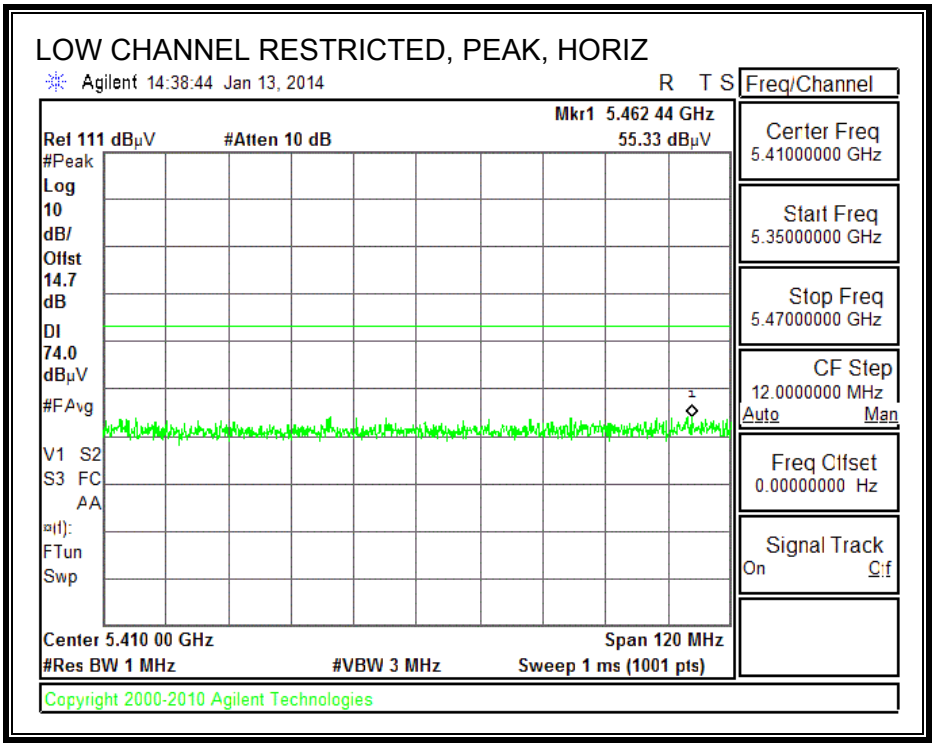
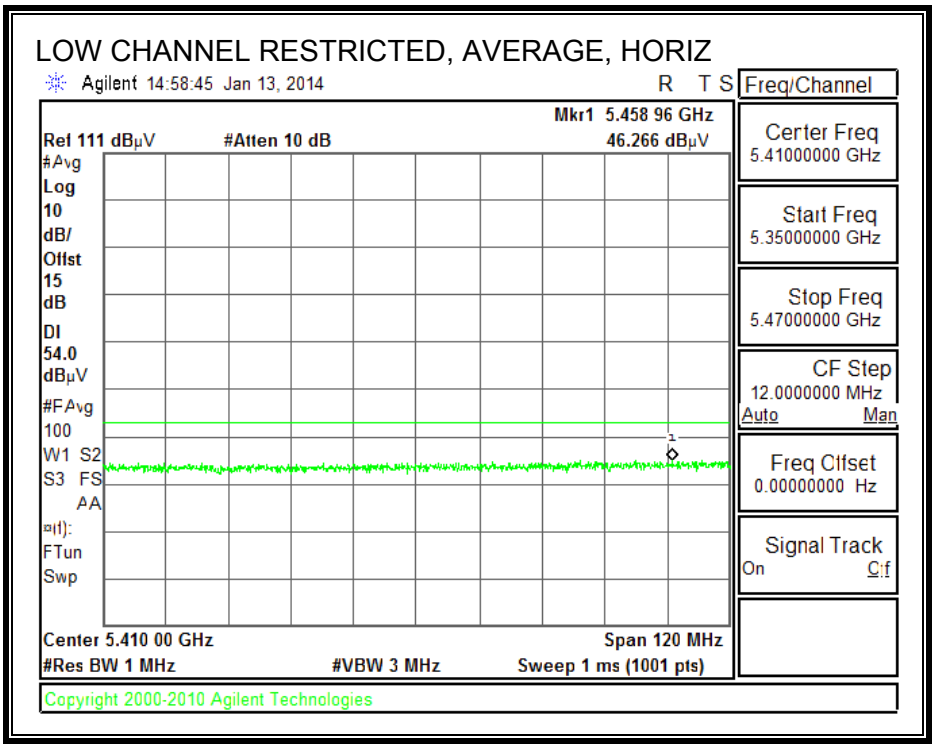
11.3.3. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 5.5 GHz BAND RESTRICTED BANDEDGE (LOW CHANNEL)





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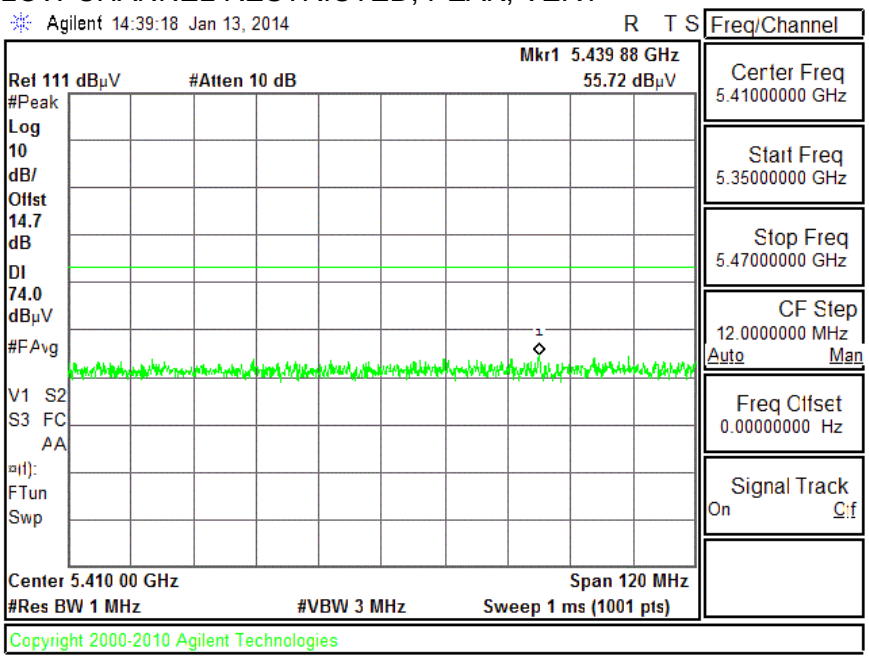
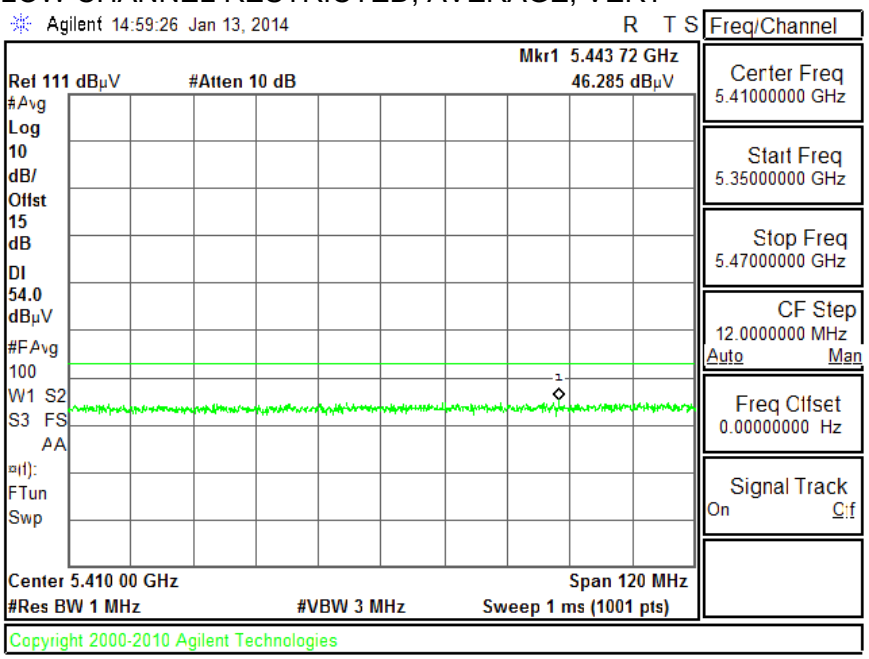
LOW CHANNEL RESTRICTED, PEAK, VERT



LOW CHANNEL RESTRICTED, AVERAGE, VERT



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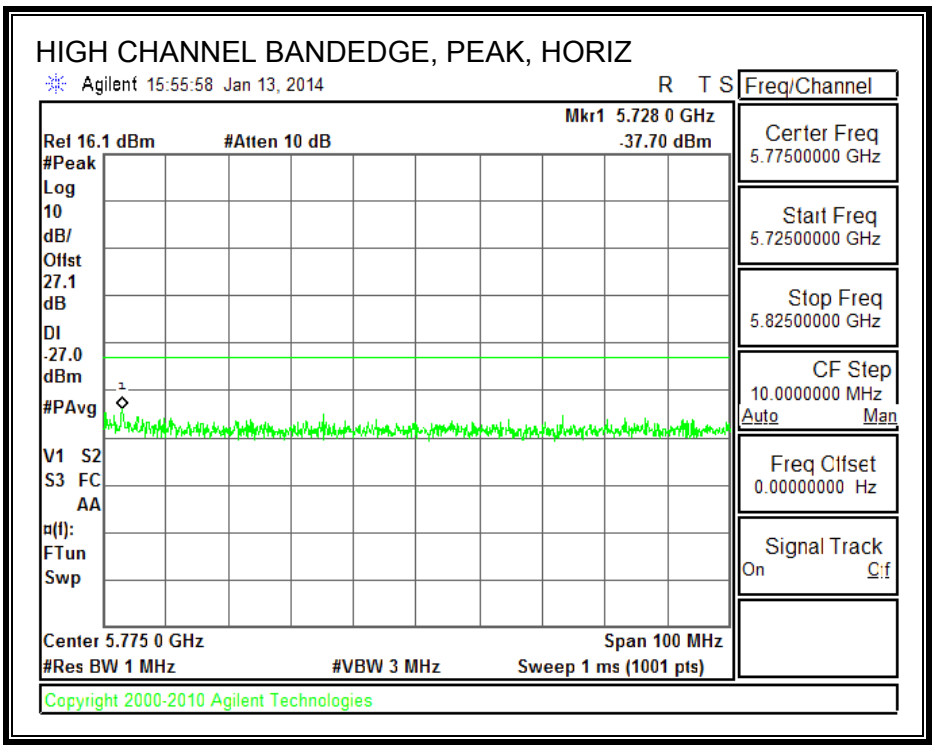
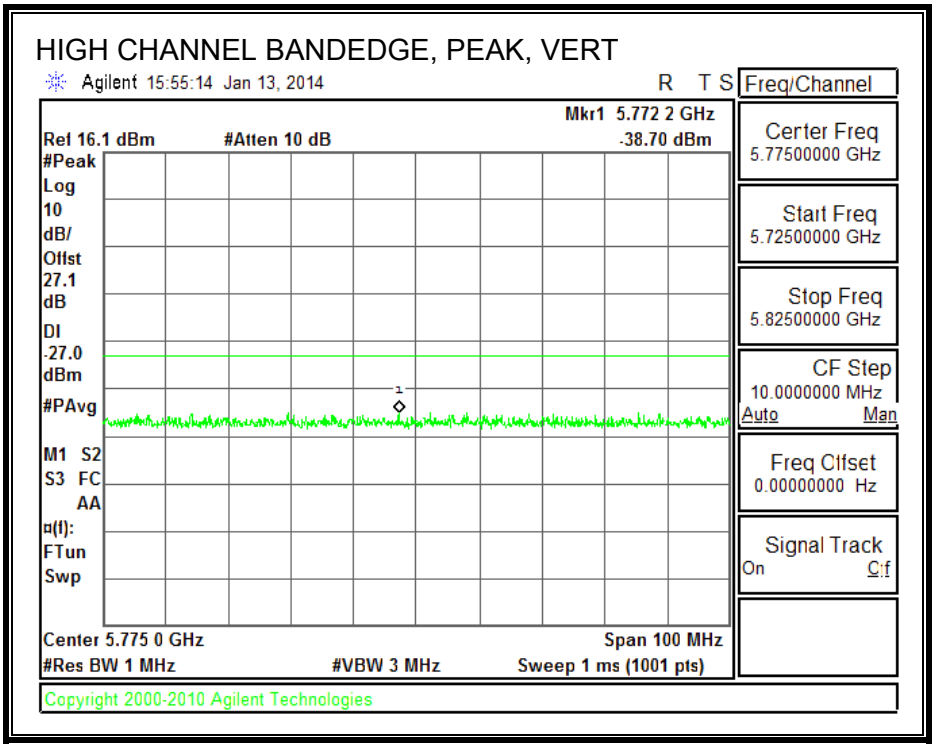
AUTHORIZED BANDEDGE (HIGH CHANNEL)





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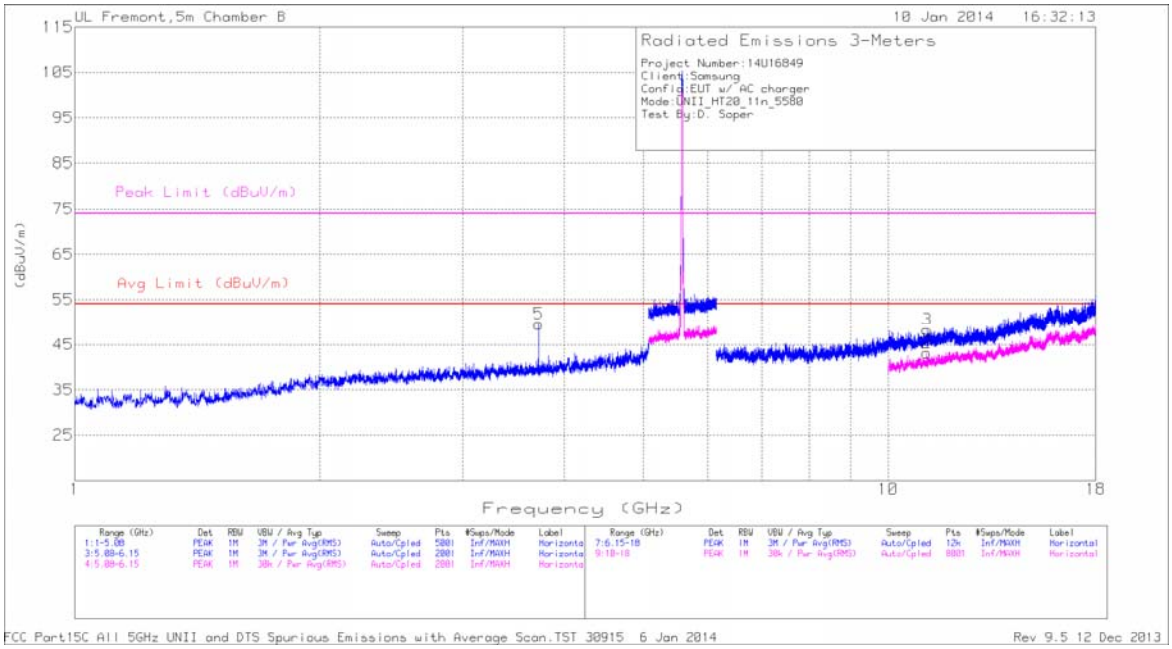
HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL
HORIZONTAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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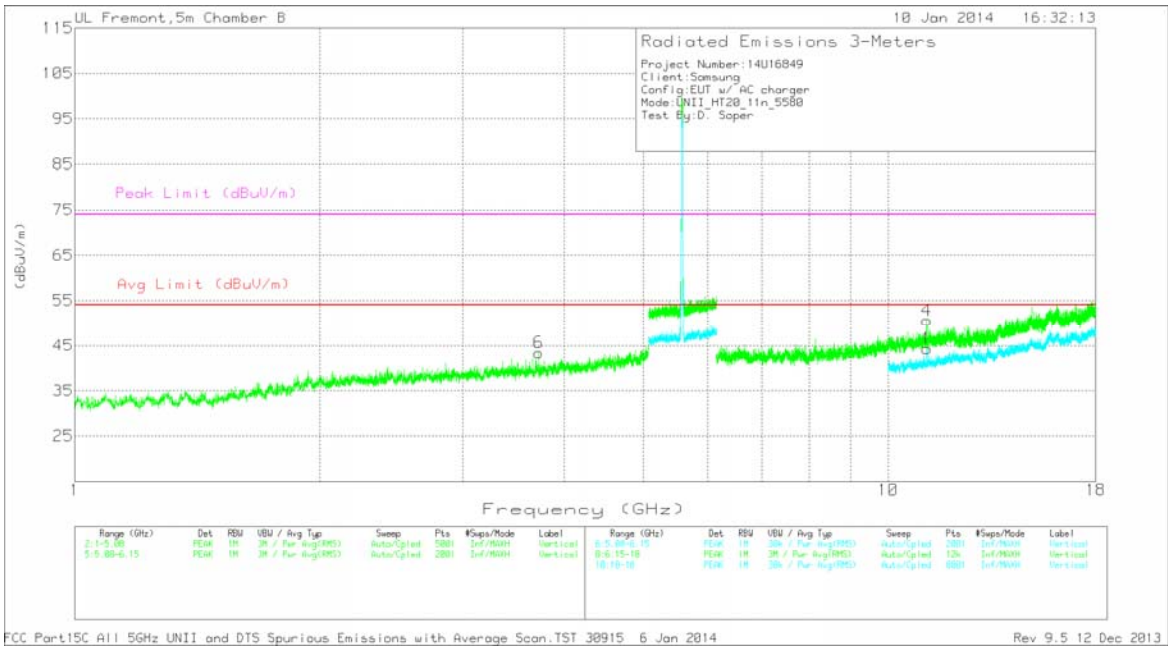
VERTICAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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LOW CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
5	3.72	47.38	PK	33.7	-31.5	49.58	54	-4.42	74	-24.42	0-360	99	H
6	3.721	41.2	PK	33.7	-31.5	43.4	54	-10.6	74	-30.6	0-360	99	V
2	11.157	28.04	Avg	38.4	-23.3	43.14	54	-10.86	-	-	0-360	202	H
1	11.158	29.23	Avg	38.4	-23.3	44.33	54	-9.67	-	-	0-360	99	V
4	11.159	35.48	PK	38.4	-23.3	50.58	54	-3.42	74	-23.42	0-360	202	V
3	11.169	33.12	PK	38.4	-23.2	48.32	54	-5.68	74	-25.68	0-360	202	H

PK - Peak detector

Avg - Video bandwidth < Resolution bandwidth

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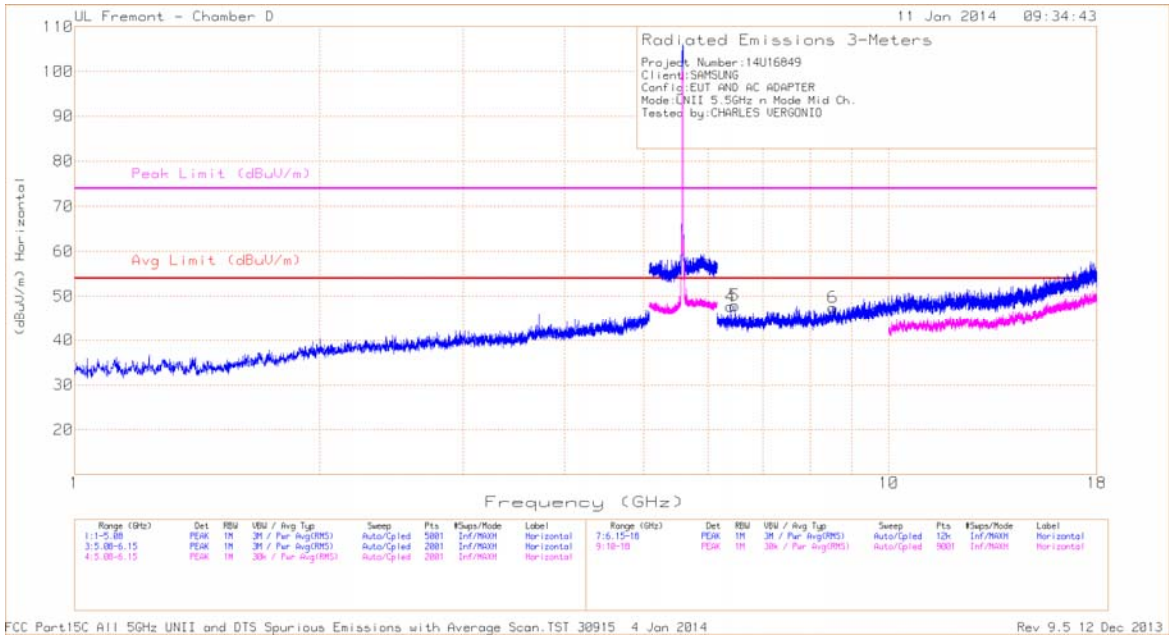
MID CHANNEL
HORIZONTAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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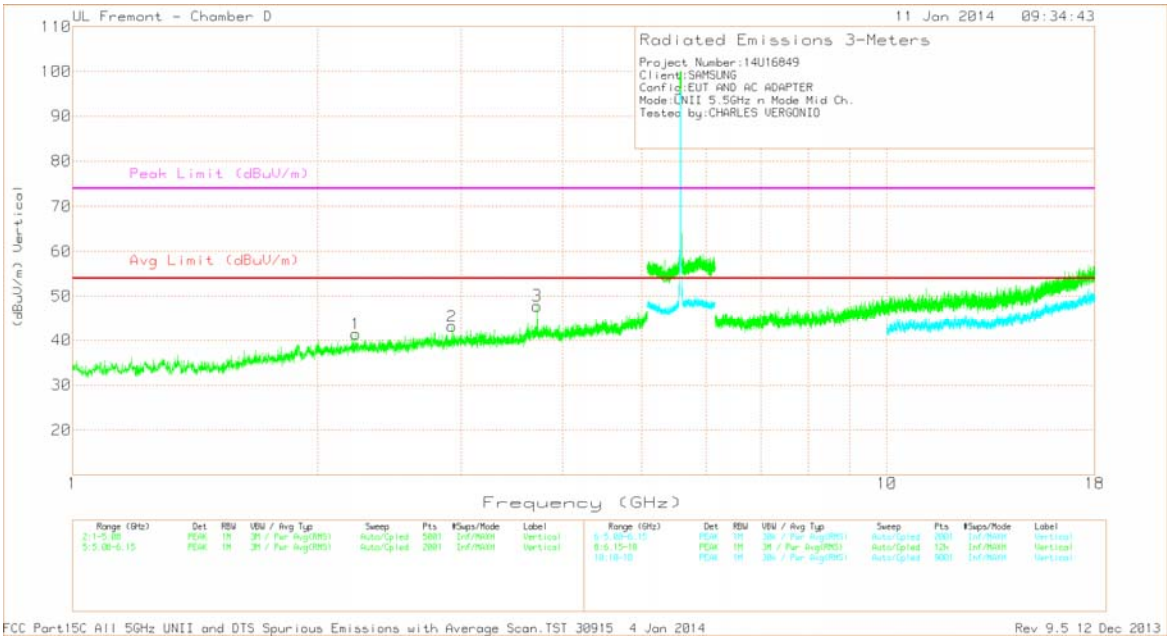
VERTICAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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MID CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/5 GHz LPF	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.229	39.32	PK	32.3	-30.2	41.42	54	-12.58	74	-32.58	0-360	201	V
2	2.923	40.06	PK	33	-29.9	43.16	54	-10.84	74	-30.84	0-360	100	V
3	3.721	42.8	PK	33.7	-28.7	47.8	54	-6.2	74	-26.2	0-360	201	V

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/6 GHz HPF	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	6.395	37.68	PK	35.9	-25.9	47.68	54	-6.32	74	-26.32	0-360	100	H
5	6.47	37.92	PK	35.8	-25.8	47.92	54	-6.08	74	-26.08	0-360	100	H
6	8.538	34.49	PK	36.2	-23.2	47.49	54	-6.51	74	-26.51	0-360	100	H

PK - Peak detector

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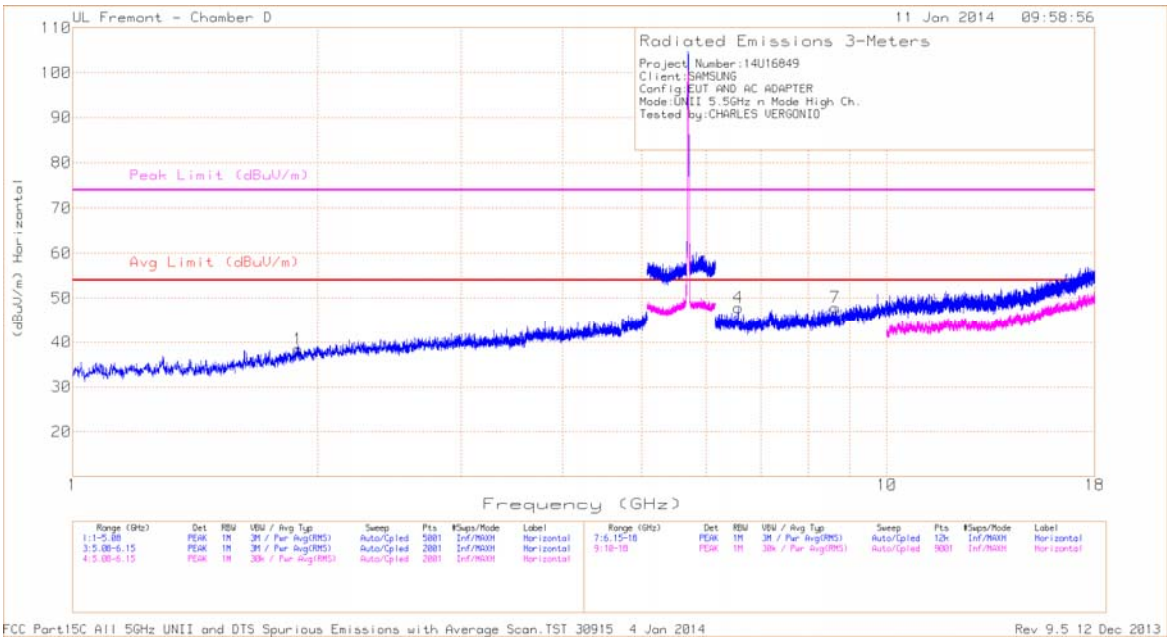
HIGH CHANNEL
HORIZONTAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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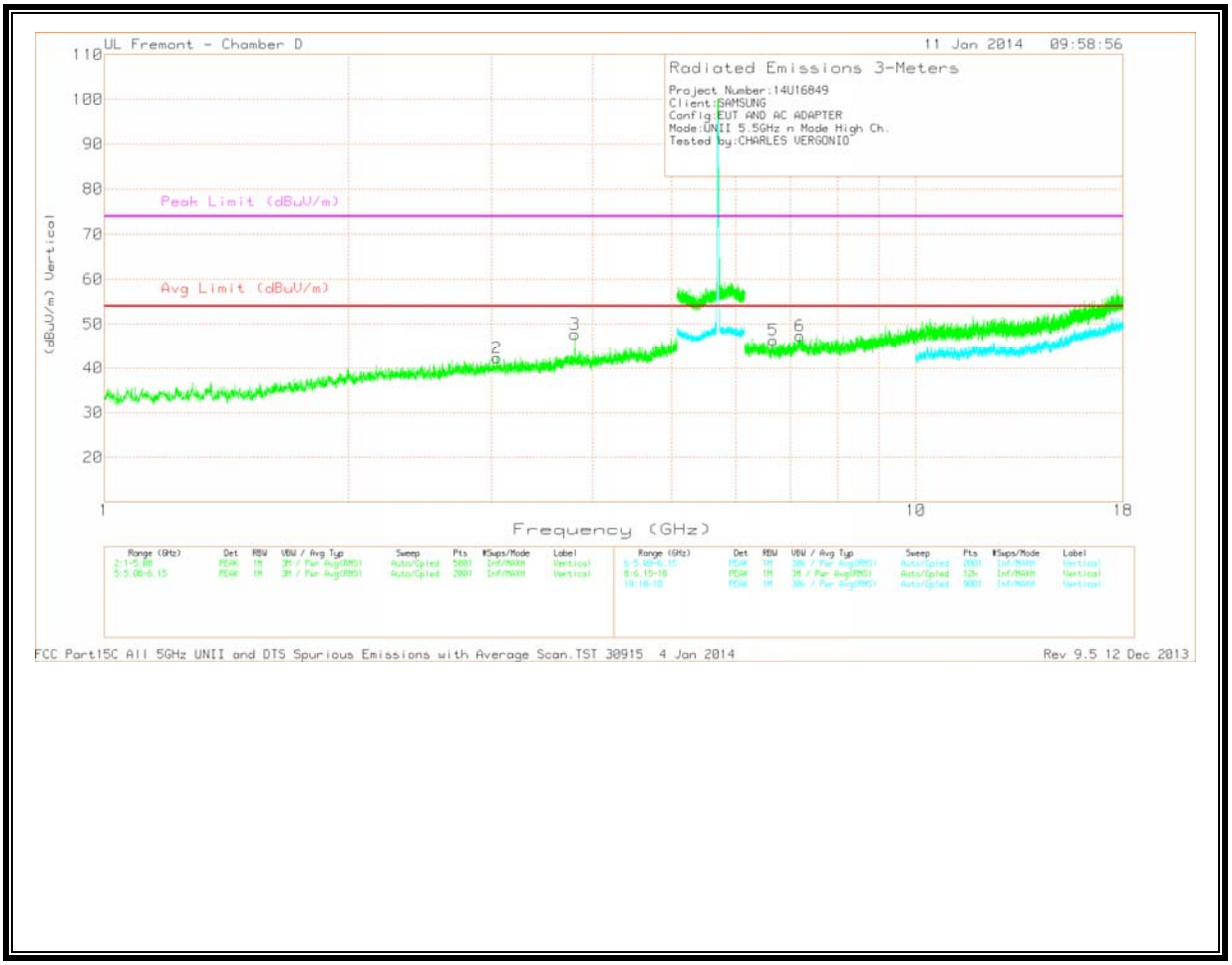
VERTICAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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HIGH CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/5 GHz LPF	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	1.892	37.75	PK	31	-30.3	38.45	54	-15.55	74	-35.55	0-360	201	H
2	3.046	37.93	PK	33.1	-28.7	42.33	54	-11.67	74	-31.67	0-360	201	V
3	3.801	42.79	PK	33.8	-28.9	47.69	54	-6.31	74	-26.31	0-360	100	V

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/6 GHz HPF	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	6.571	37.37	PK	35.8	-25.3	47.87	54	-6.13	74	-26.13	0-360	201	H
5	6.673	36.6	PK	35.7	-25.9	46.4	54	-7.6	74	-27.6	0-360	201	V
6	7.195	35.16	PK	35.9	-23.7	47.36	54	-6.64	74	-26.64	0-360	201	V
7	8.641	34.98	PK	36.3	-23.4	47.88	54	-6.12	74	-26.12	0-360	201	H

PK - Peak detector

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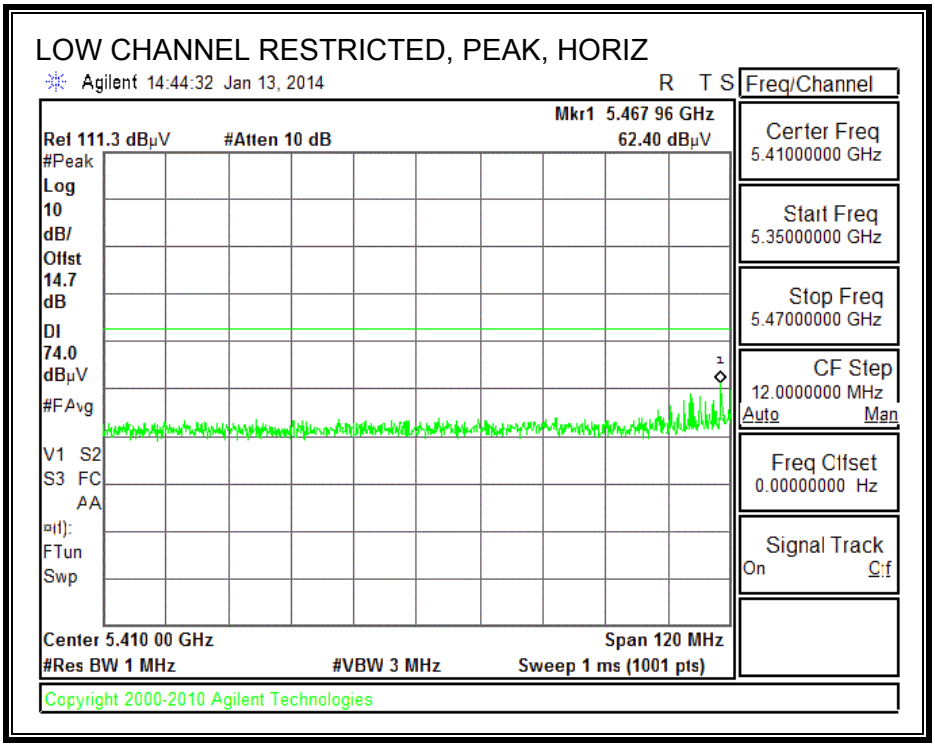
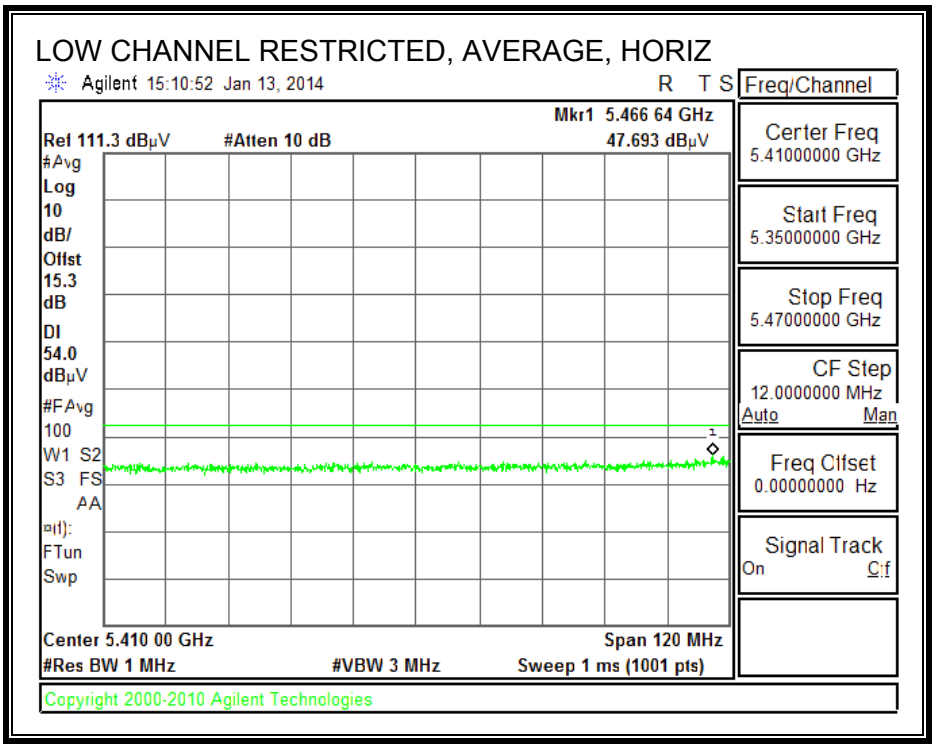
11.3.5. TX ABOVE 1 GHz 802.11n HT40 MODE IN THE 5.5 GHz BAND RESTRICTED BANDEDGE (LOW CHANNEL)





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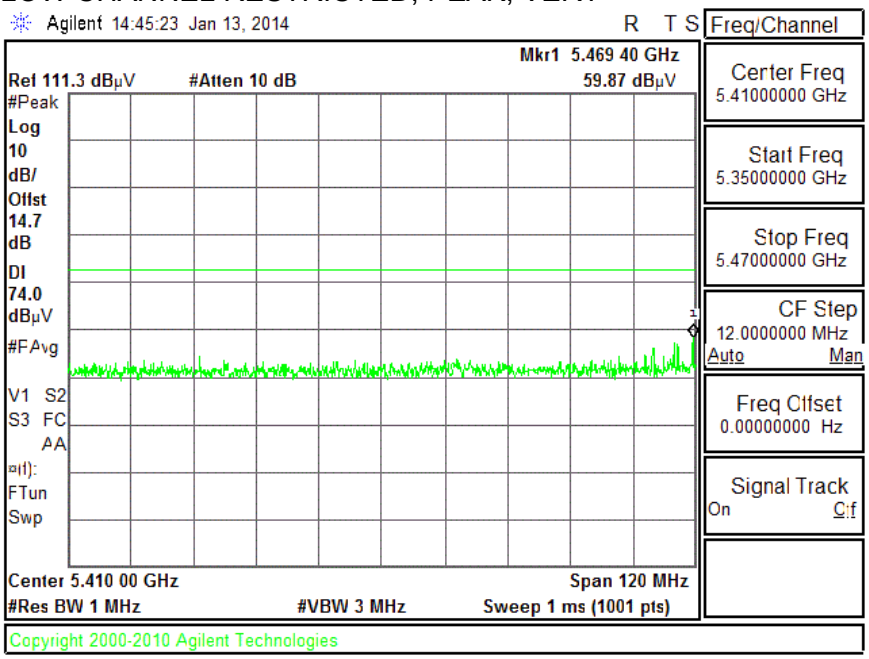
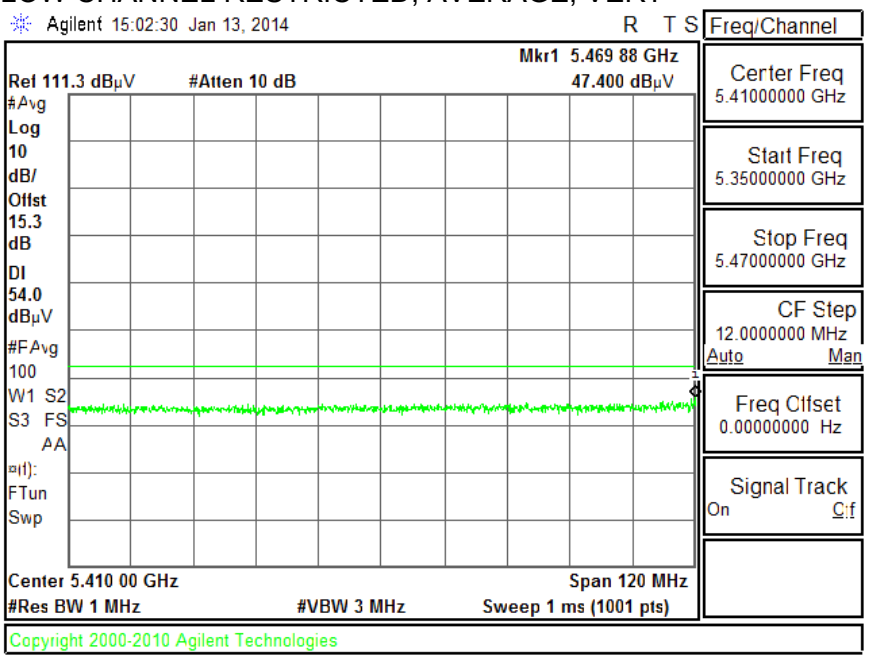
LOW CHANNEL RESTRICTED, PEAK, VERT



LOW CHANNEL RESTRICTED, AVERAGE, VERT



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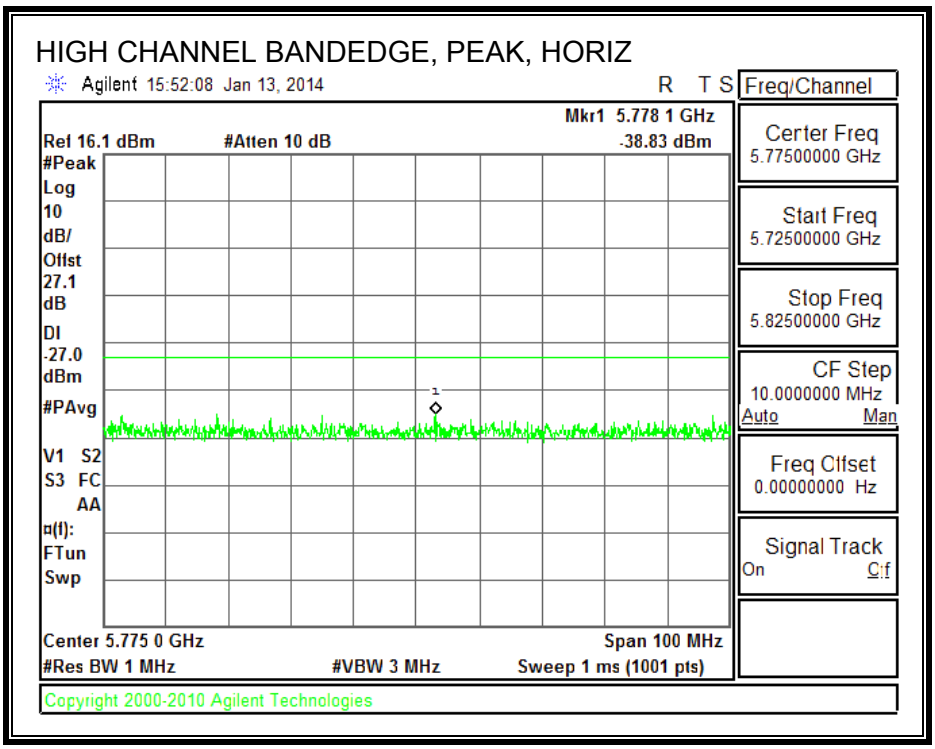
AUTHORIZED BANDEDGE (HIGH CHANNEL)



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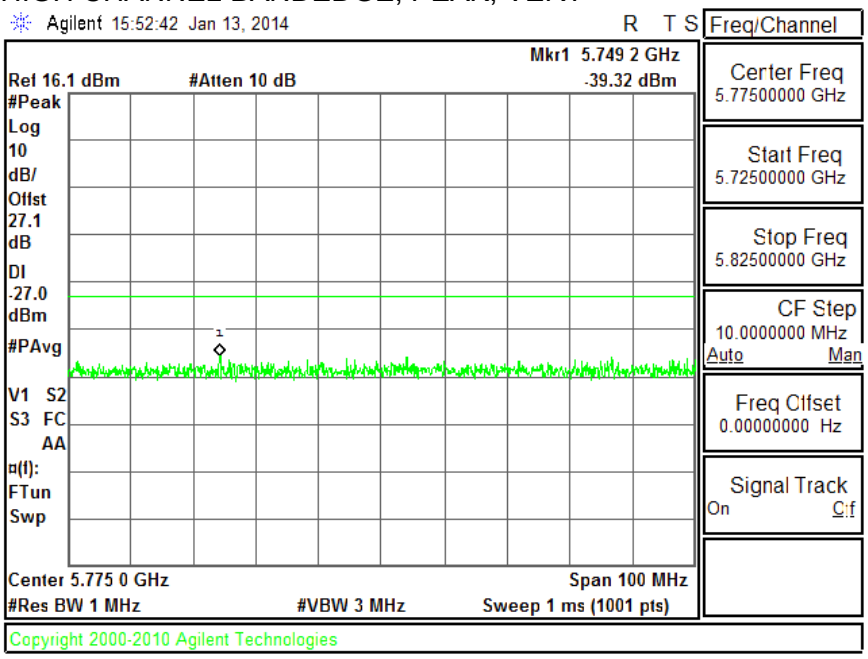
HIGH CHANNEL BANDEDGE, PEAK, VERT



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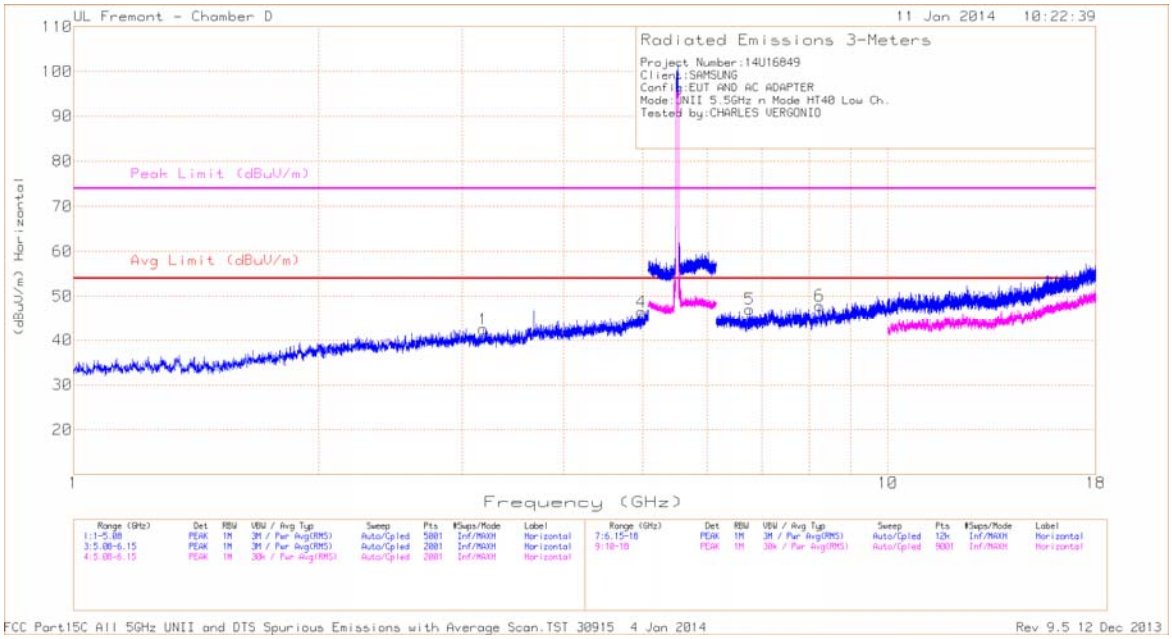
HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL
HORIZONTAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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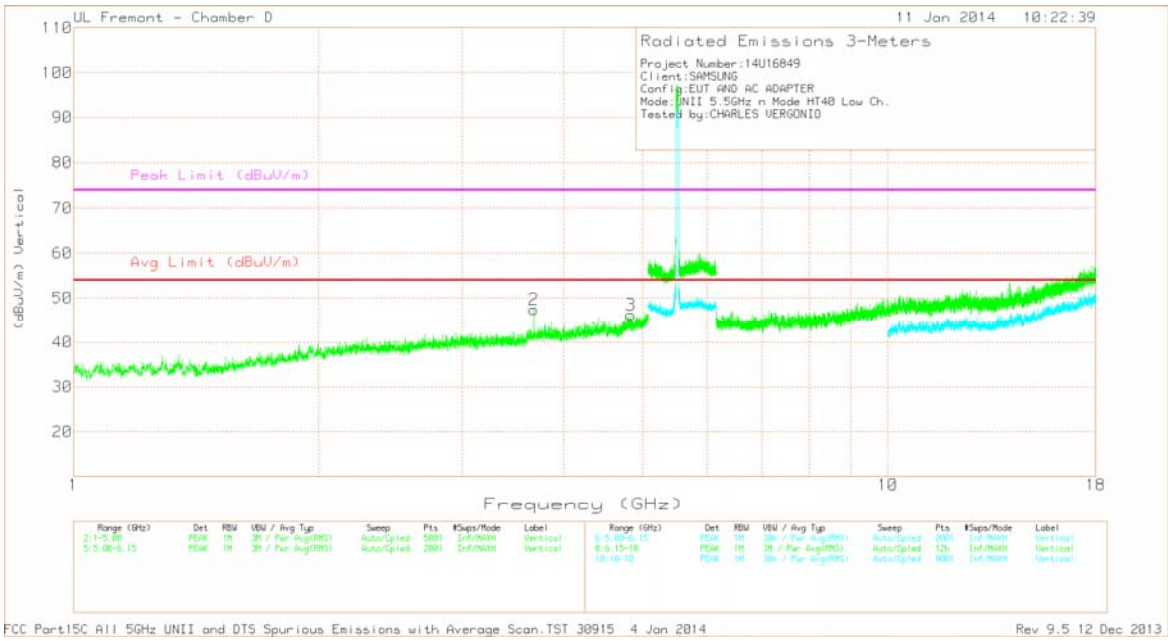
VERTICAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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LOW CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/5 GHz LPF	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	3.185	39.1	PK	33.2	-29.8	42.5	54	-11.5	74	-31.5	0-360	201	H
2	3.675	42.31	PK	33.6	-28.5	47.41	54	-6.59	74	-26.59	0-360	201	V
3	4.834	39.2	PK	34.4	-27.4	46.2	54	-7.8	74	-27.8	0-360	100	V
4	4.983	38.15	PK	34.3	-26	46.45	54	-7.55	74	-27.55	0-360	100	H

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/6 GHz HPF	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
5	6.768	37.67	PK	35.7	-26.3	47.07	54	-6.93	74	-26.93	0-360	100	H
6	8.245	36.04	PK	36	-24.2	47.84	54	-6.16	74	-26.16	0-360	201	H

PK - Peak detector

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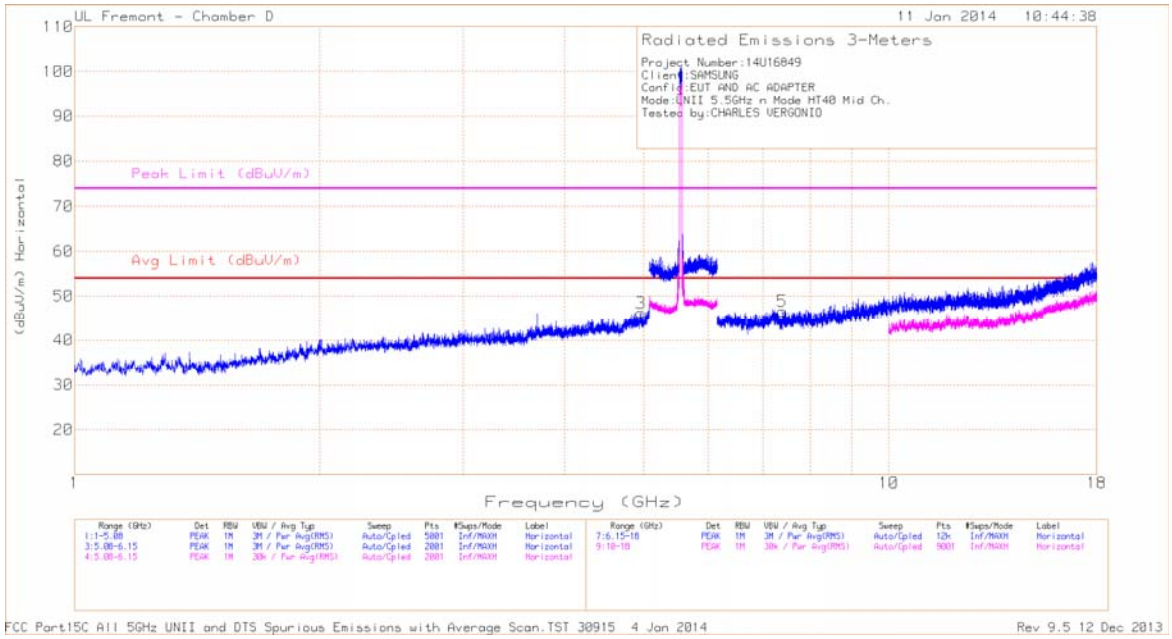
MID CHANNEL
HORIZONTAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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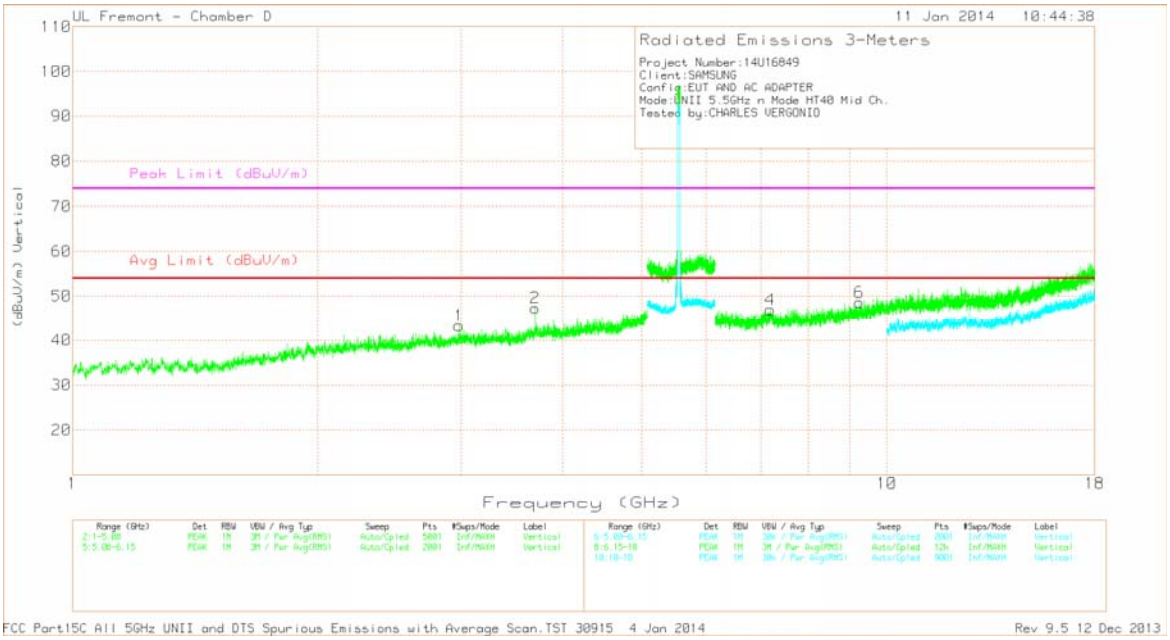
VERTICAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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MID CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/5 GHz LPF	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.983	39.32	PK	33.1	-29.1	43.32	54	-10.68	74	-30.68	0-360	100	V
2	3.7	42.15	PK	33.7	-28.5	47.35	54	-6.65	74	-26.65	0-360	201	V
3	4.961	37.97	PK	34.3	-26.1	46.17	54	-7.83	74	-27.83	0-360	201	H

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/6 GHz HPF	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	7.192	34.86	PK	35.9	-23.8	46.96	54	-7.04	74	-27.04	0-360	100	V
5	7.399	35.87	PK	35.9	-25.2	46.57	54	-7.43	74	-27.43	0-360	201	H
6	9.249	34.18	PK	36.9	-22.5	48.58	54	-5.42	74	-25.42	0-360	100	V

PK - Peak detector

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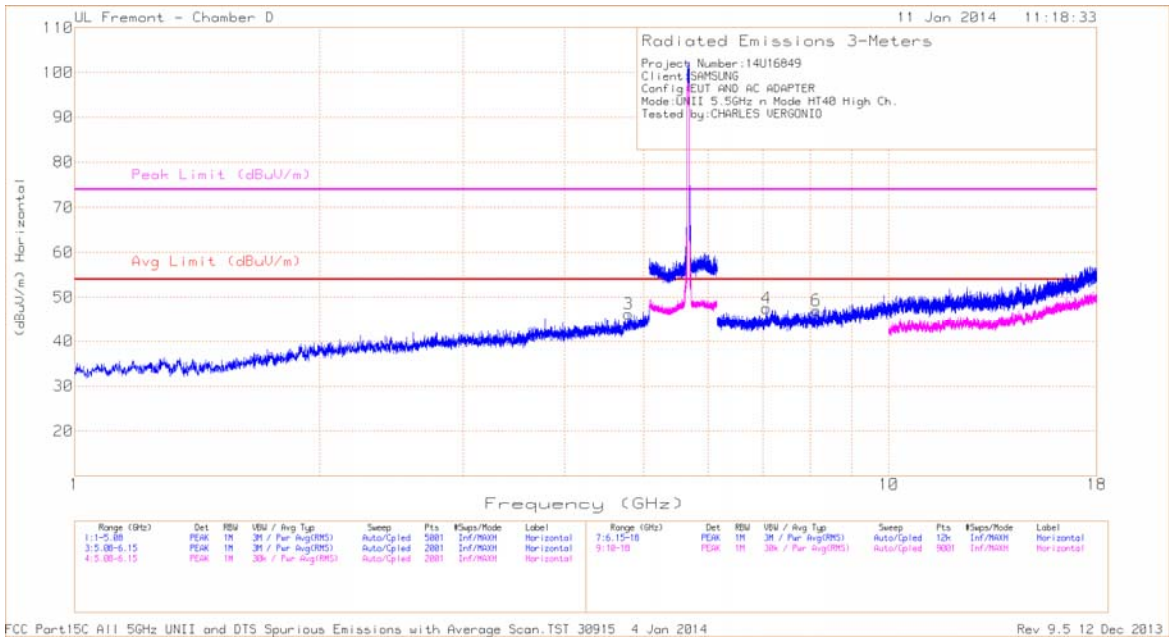
HIGH CHANNEL
HORIZONTAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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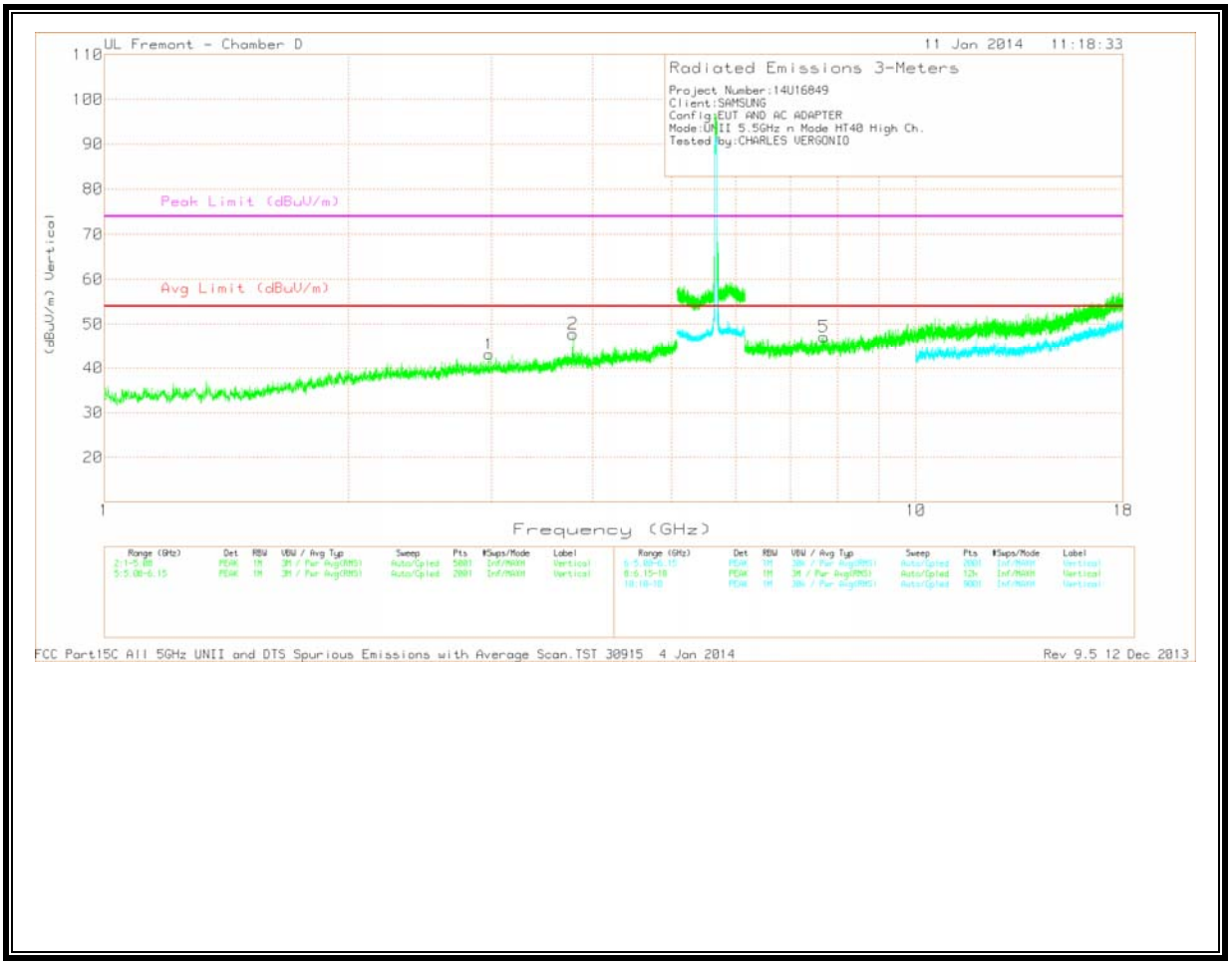
VERTICAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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HIGH CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/5 GHz LPF	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.98	39.13	PK	33.1	-29.1	43.13	54	-10.87	74	-30.87	0-360	201	V
2	3.781	42.81	PK	33.8	-28.8	47.81	54	-6.19	74	-26.19	0-360	201	V
3	4.787	38.77	PK	34.4	-26.9	46.27	54	-7.73	74	-27.73	0-360	100	H

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/6 GHz HPF	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	7.077	37.24	PK	35.9	-25.6	47.54	54	-6.46	74	-26.46	0-360	100	H
5	7.701	35.29	PK	36.1	-24.2	47.19	54	-6.81	74	-26.81	0-360	201	V
6	8.144	35.34	PK	36	-24.3	47.04	54	-6.96	74	-26.96	0-360	100	H

PK - Peak detector

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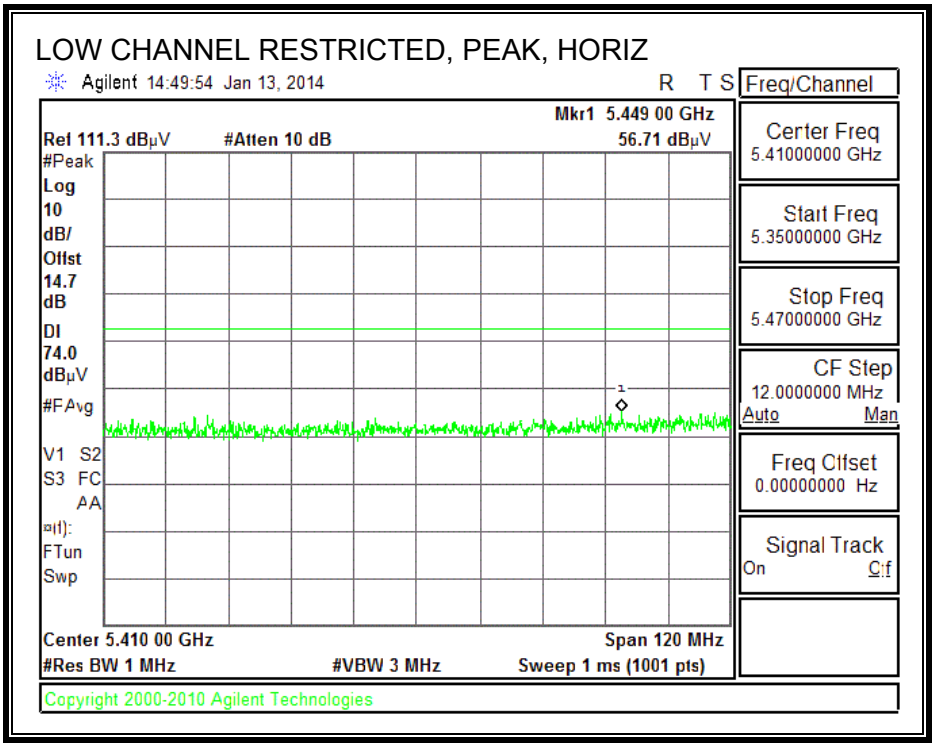
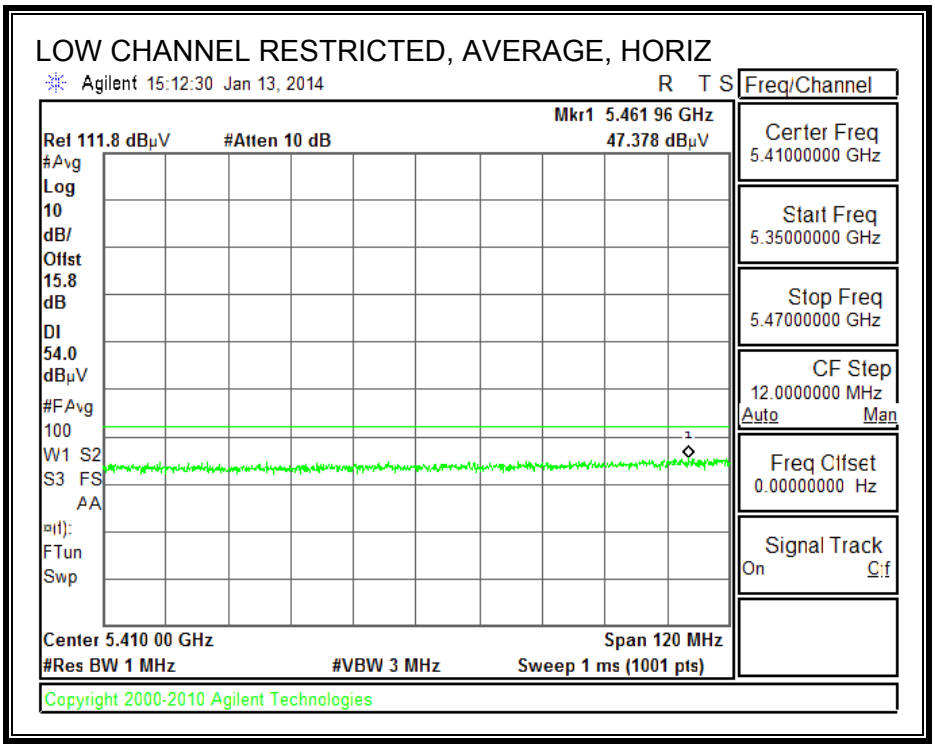
11.3.7. TX ABOVE 1 GHz 802.11ac HT80 MODE IN THE 5.5 GHz BAND RESTRICTED BANDEDGE (LOW CHANNEL)





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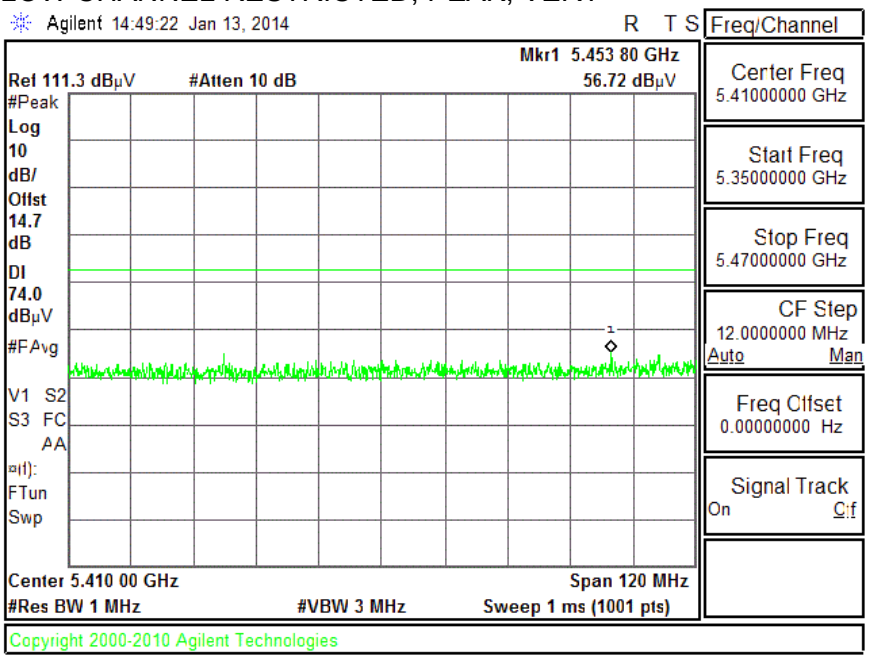
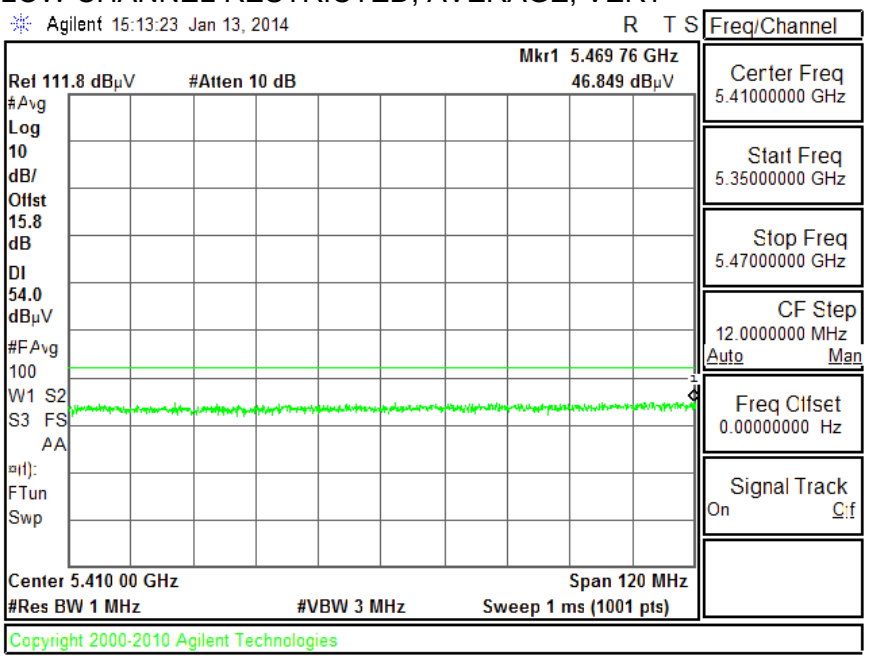
LOW CHANNEL RESTRICTED, PEAK, VERT



LOW CHANNEL RESTRICTED, AVERAGE, VERT



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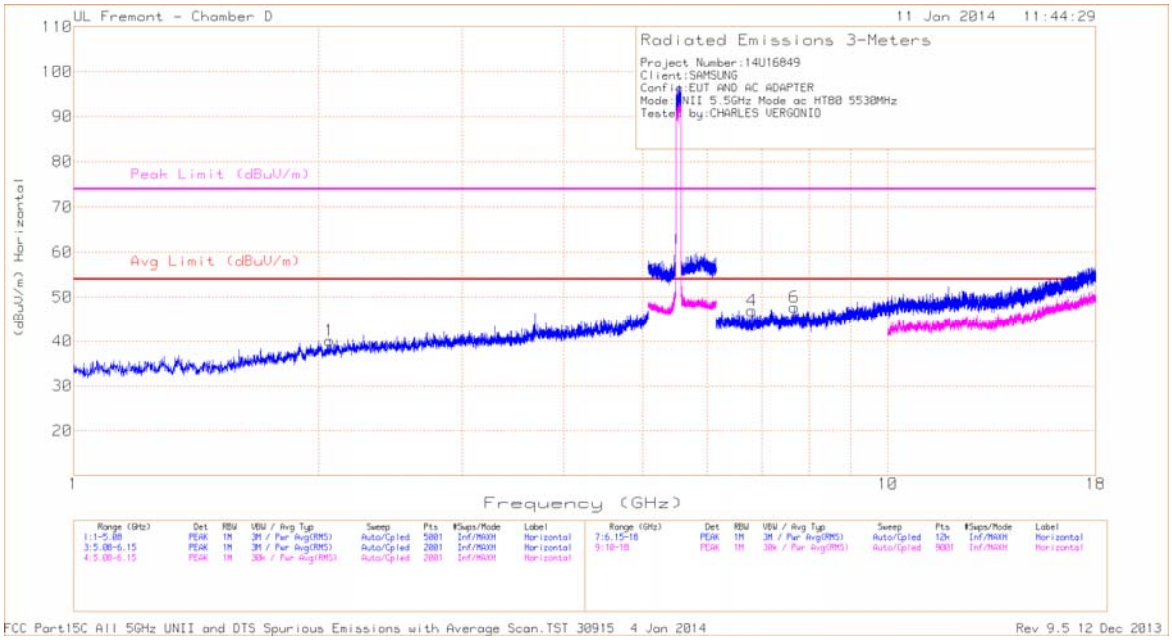
HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL
HORIZONTAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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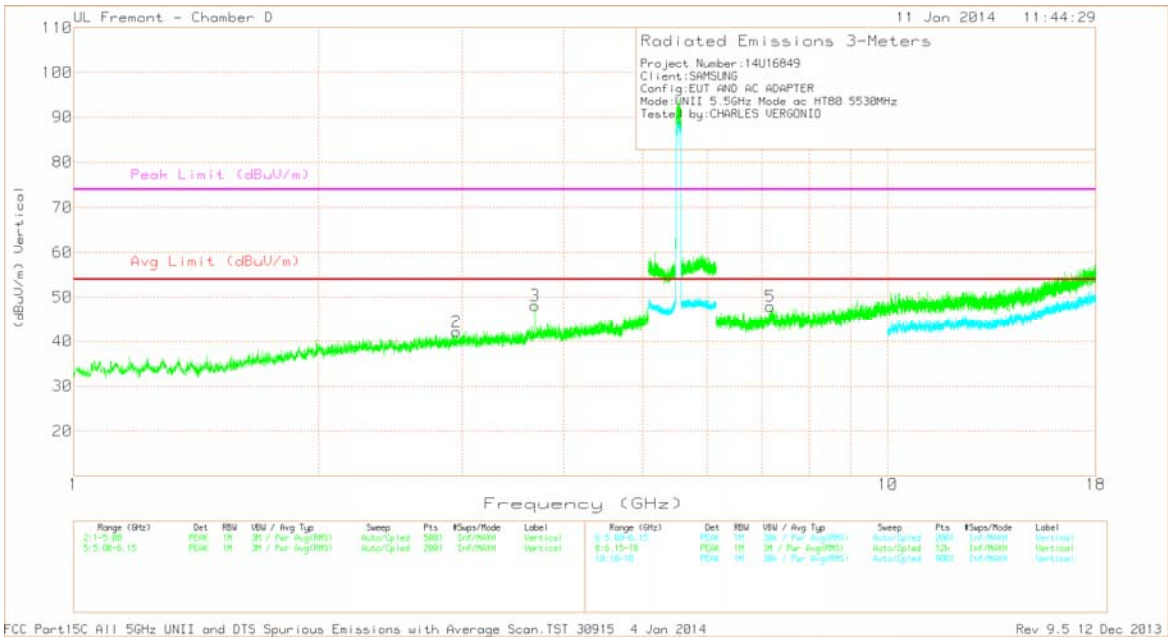
VERTICAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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LOW CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/5 GHz LPF	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.062	39.14	PK	31.9	-30.9	40.14	54	-13.86	74	-33.86	0-360	201	H
2	2.954	38.57	PK	33.1	-29.5	42.17	54	-11.83	74	-31.83	0-360	100	V
3	3.687	42.99	PK	33.7	-28.6	48.09	54	-5.91	74	-25.91	0-360	100	V

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/6 GHz HPF	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	6.809	37.18	PK	35.7	-25.9	46.98	54	-7.02	74	-27.02	0-360	201	H
5	7.171	36.21	PK	35.9	-24.2	47.91	54	-6.09	74	-26.09	0-360	201	V
6	7.679	36.34	PK	36	-24.6	47.74	54	-6.26	74	-26.26	0-360	201	H

PK - Peak detector

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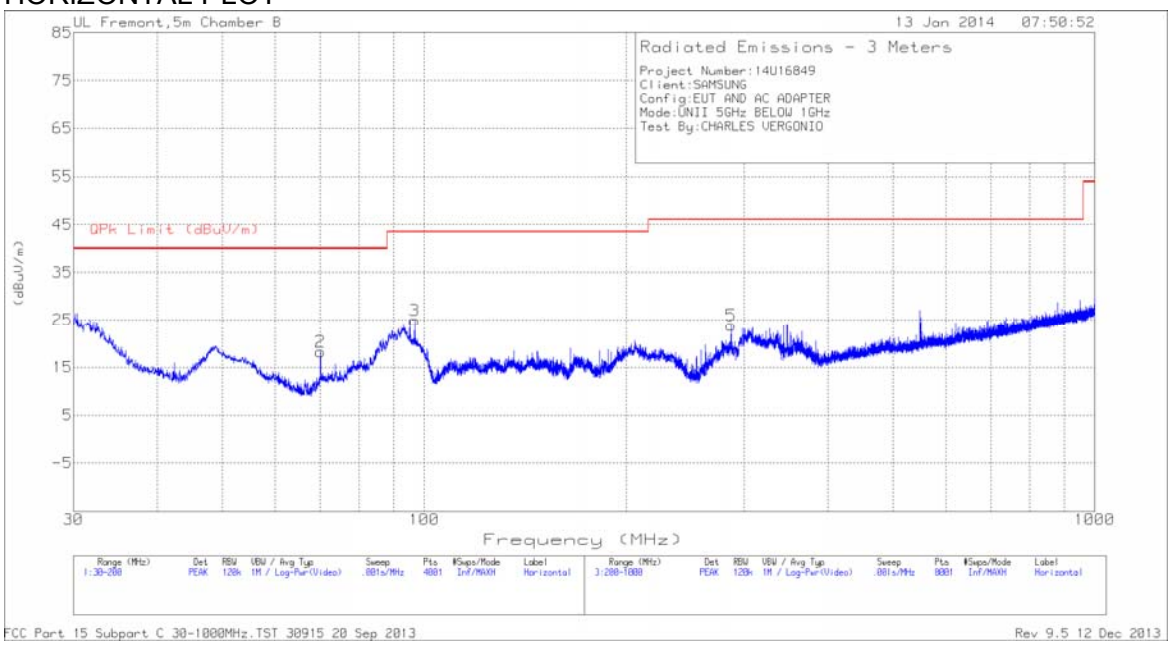
12. WORST-CASE BELOW 1 GHz (in the 5.2 GHz Band)

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

HORIZONTAL PLOT



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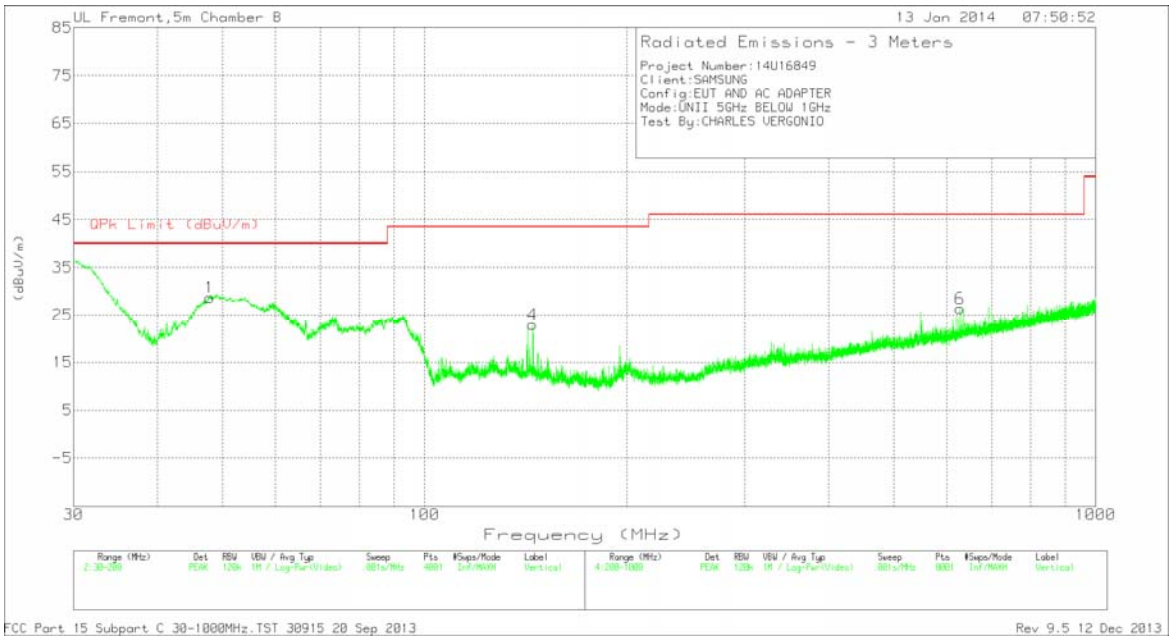
SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL)

VERTICAL PLOT



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Worst Case Data

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T243 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	47.85	48.72	PK	8.6	-28.6	28.72	40	-11.28	0-360	101	V
2	70.035	38.79	PK	7.9	-28.4	18.29	40	-21.71	0-360	100	H
3	96.7675	43.9	PK	9.1	-28.1	24.9	43.52	-18.62	0-360	200	H
4	144.9625	37.95	PK	12.6	-27.6	22.95	43.52	-20.57	0-360	101	V
5	286.9	36.56	PK	13.4	-26.1	23.86	46.02	-22.16	0-360	101	H
6	628	32.37	PK	19.3	-25.3	26.37	46.02	-19.65	0-360	200	V

PK - Peak detector

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13. 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

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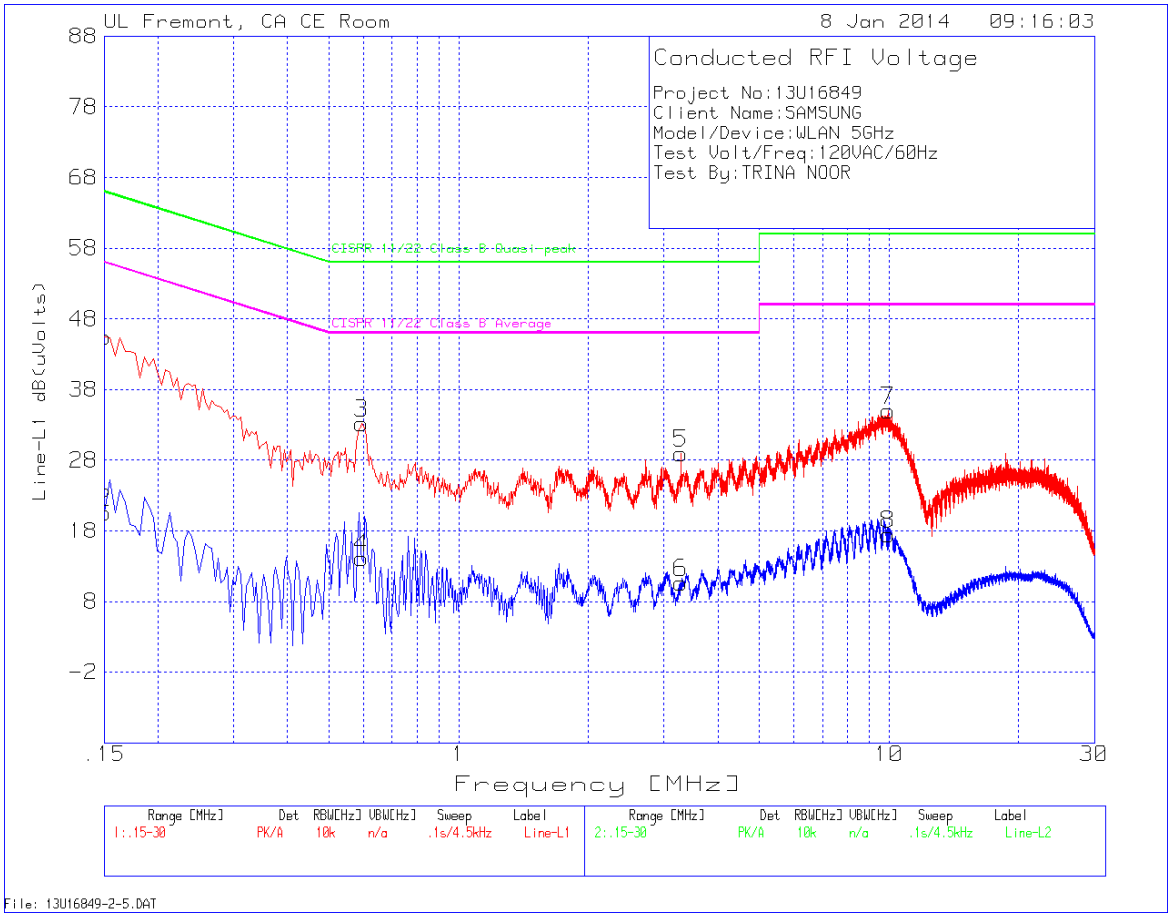
6 WORST EMISSIONS



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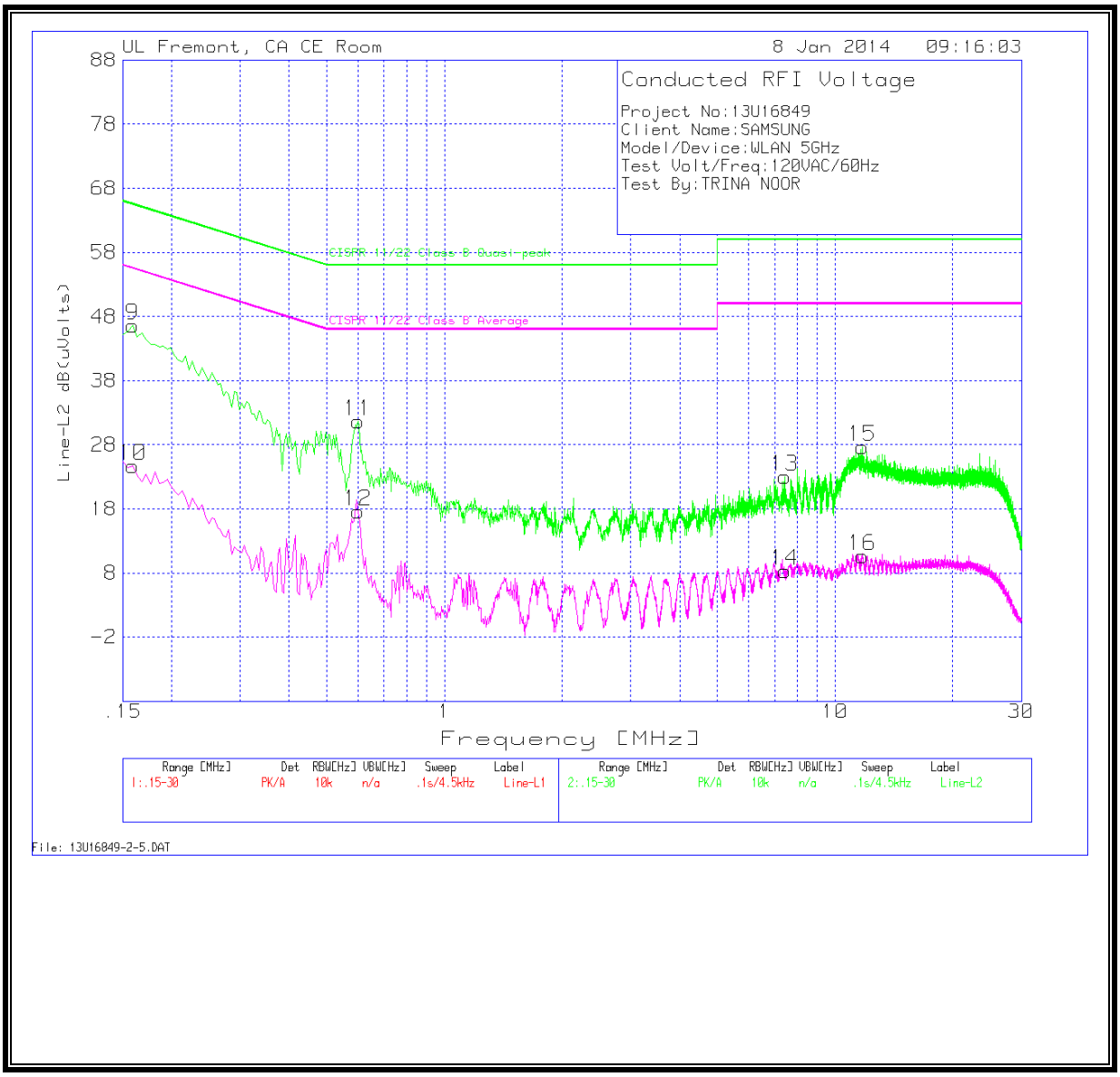
LINE 2 RESULTS



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LINE 1 RESULTS

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L1 (dB)	LC Cables 1&3 (dB)	Corrected Reading dB(uVolts)	CISPR 11/22 Class B Quasi-peak	Margin to Limit (dB)	CISPR 11/22 Class B Average	Margin to Limit (dB)
1	.15	45.33	PK	.1	0	45.43	66	-20.57	-	-
2	.15	20.51	Av	.1	0	20.61	-	-	56	-35.39
3	.5955	33.05	PK	.1	0	33.15	56	-22.85	-	-
4	.5955	14.04	Av	.1	0	14.14	-	-	46	-31.86
5	3.2865	28.8	PK	.1	.1	29	56	-27	-	-
6	3.2865	10.43	Av	.1	.1	10.63	-	-	46	-35.37
7	9.9555	34.66	PK	.1	.2	34.96	60	-25.04	-	-
8	9.9555	17.2	Av	.1	.2	17.5	-	-	50	-32.5

LINE 2 RESULTS

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L2 (dB)	LC Cables 2&3 (dB)	Corrected Reading dB(uVolts)	CISPR 11/22 Class B Quasi-peak	Margin to Limit (dB)	CISPR 11/22 Class B Average	Margin to Limit (dB)
9	.159	46.56	PK	.1	0	46.66	65.5	-18.84	-	-
10	.159	24.59	Av	.1	0	24.69	-	-	55.5	-30.81
11	.6	31.52	PK	.1	0	31.62	56	-24.38	-	-
12	.6	17.5	Av	.1	0	17.6	-	-	46	-28.4
13	7.4445	22.77	PK	.1	.1	22.97	60	-37.03	-	-
14	7.4445	8.17	Av	.1	.1	8.37	-	-	50	-41.63
15	11.7285	27.25	PK	.2	.2	27.65	60	-32.35	-	-
16	11.7285	10.27	Av	.2	.2	10.67	-	-	50	-39.33

PK - Peak detector

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14. DYNAMIC FREQUENCY SELECTION

14.1. OVERVIEW

14.1.1. 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.

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".

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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.	

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Table 4: DFS Response requirement values

Parameter	Value
Non-occupancy period	30 minutes
Channel Availability Check Time	60 seconds
Channel Move Time	10 seconds
Channel Closing Transmission Time	200 milliseconds + approx. 60 milliseconds over remaining 10 second period
The instant that the *Channel Move Time* and the *Channel Closing Transmission Time* begins is as follows: For the Short pulse radar Test Signals this instant is the end of the *Burst*. 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

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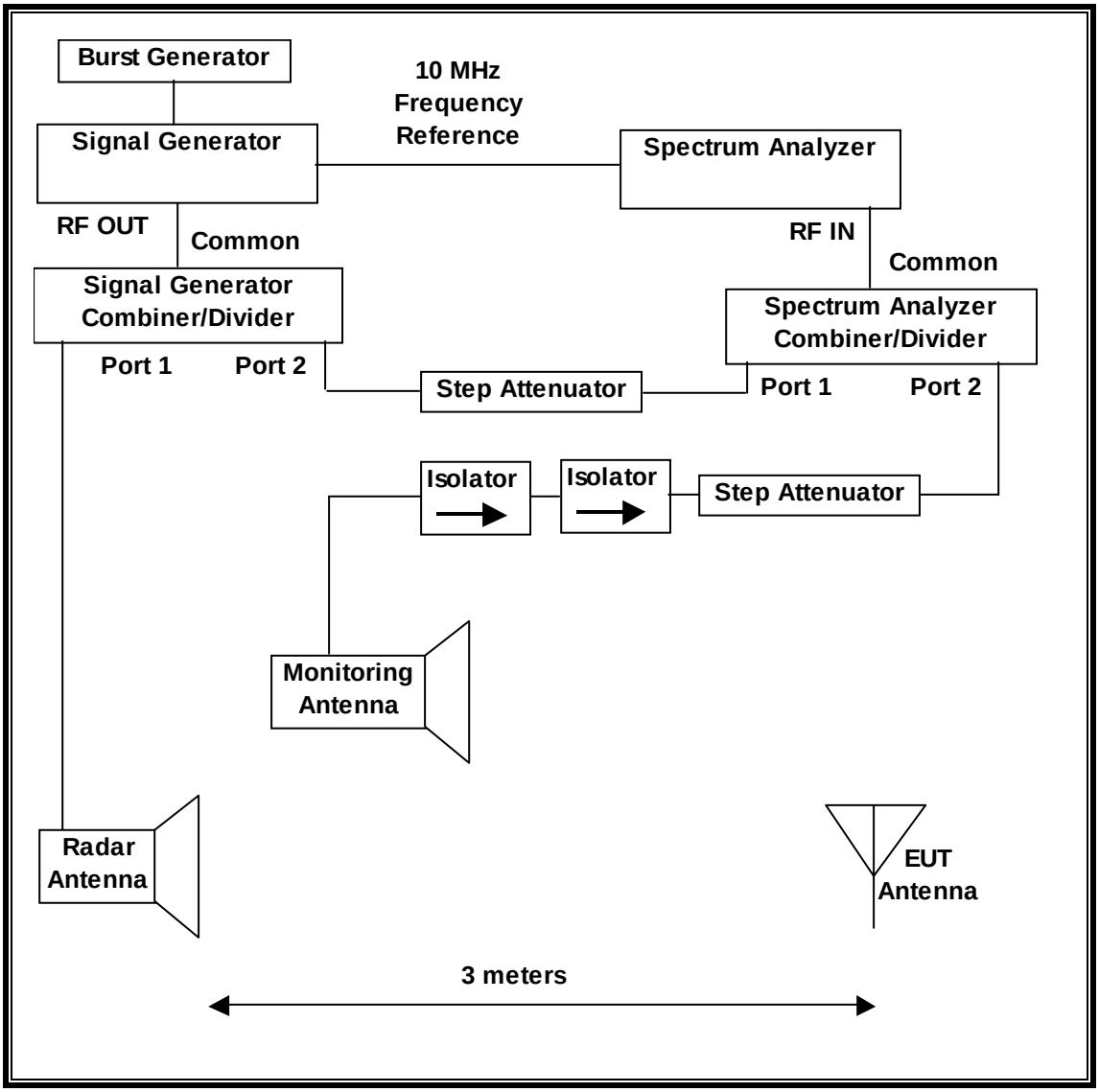
14.1.2. TEST AND MEASUREMENT SYSTEM

RADIATED METHOD SYSTEM BLOCK DIAGRAM



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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 Freqeuncy 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.

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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, 26.5 GHz	Agilent / HP	E4440A	C01178	09/10/14
Vector Signal Generator, 20GHz	Agilent / HP	E8267C	C01066	09/12/14

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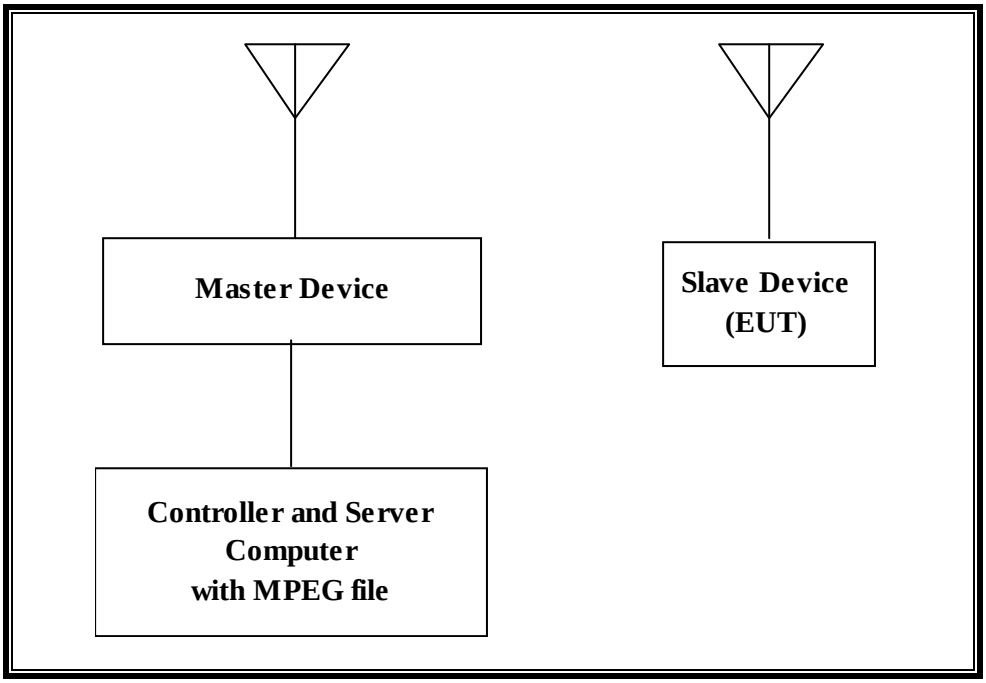
14.1.3. SETUP OF EUT

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/Server PC)	Dell	LA65SN0-00	CN-ODF263-71615-6AU-1019	DoC

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14.1.4. DESCRIPTION OF EUT

The EUT operates over the 5250-5350 MHz and 5470-5725 MHz ranges excluding the 5600-5650 MHz range.

The EUT is a Slave Device without Radar Detection.

The highest power level within these bands is 14.6 dBm EIRP in the 5250-5350 MHz band and 14.11 dBm EIRP in the 5470-5725 MHz band.

The only antenna assembly utilized with the EUT has a gain of 1.68 dBi.

The rated output power of the Master unit is > 23dBm (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 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.

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

WLAN traffic is generated by streaming the video file TestFile.mp2 “6 ½ Magic Hours” from the Master to the Slave in full motion video mode using the media player with the V2.61 Codec package.

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 revision G9098.001.

UNIFORM CHANNEL SPREADING

This requirement is not applicable to Slave radio devices.

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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 > 23dBm (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 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.

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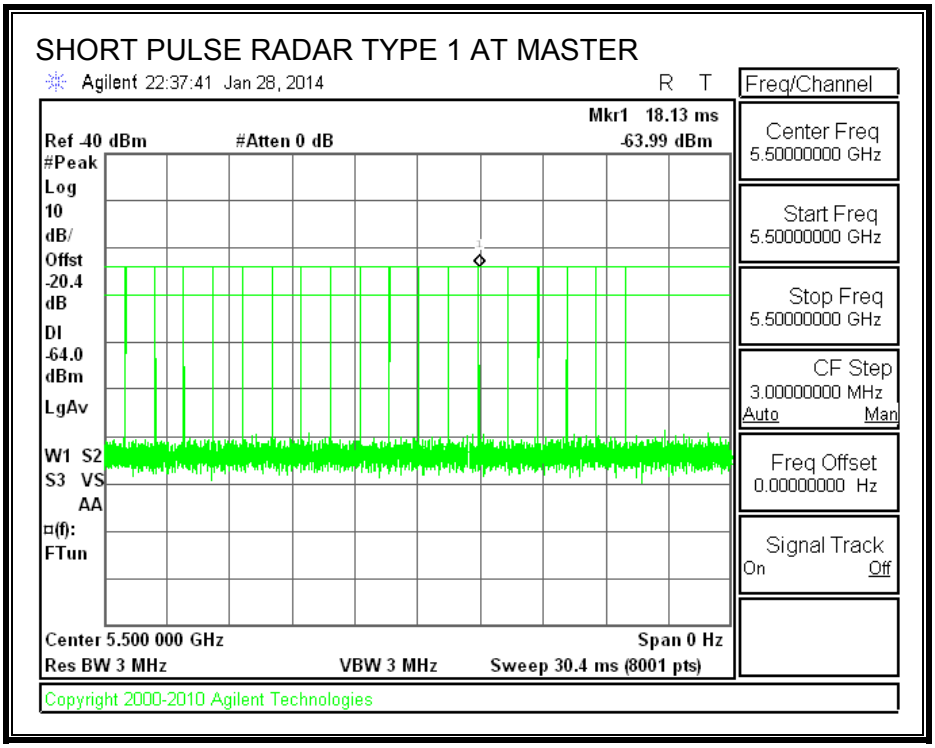
14.2. RESULTS FOR 20 MHz BANDWIDTH

14.2.1. TEST CHANNEL

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

14.2.2. RADAR WAVEFORM AND TRAFFIC

RADAR WAVEFORM



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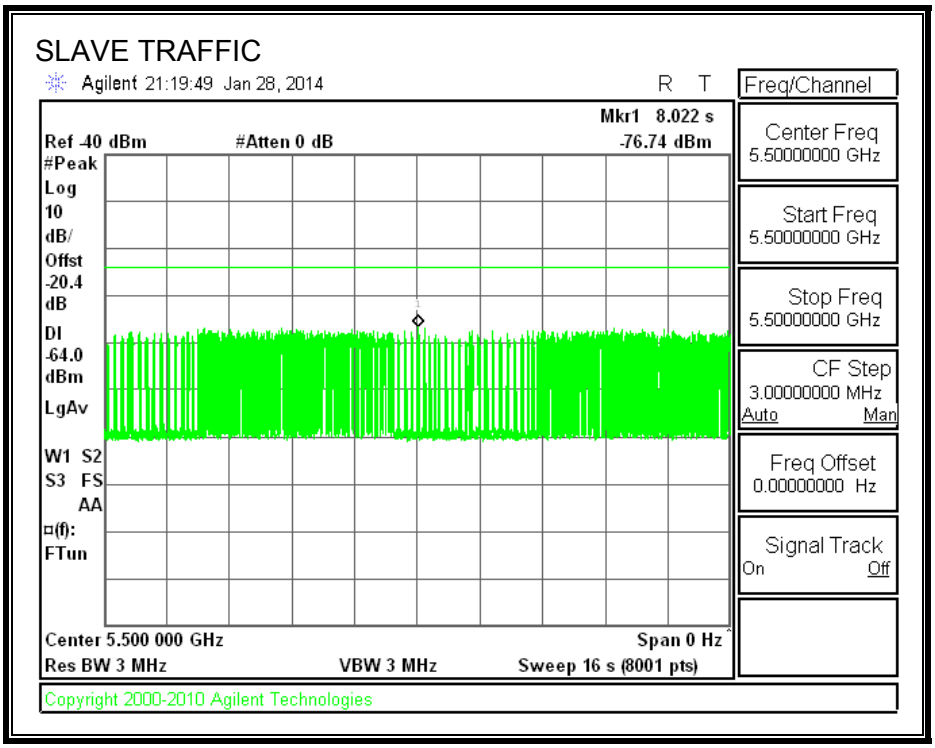
TRAFFIC



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14.2.3. OVERLAPPING CHANNEL TESTS

RESULTS

These tests are not applicable.

14.2.4. 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 aggregate time is calculated begins at (Reference Marker + 200 msec) and ends no earlier than (Reference Marker + 10 sec).

RESULTS

Channel Move Time (sec)	Limit (sec)
0.478	10

Aggregate Channel Closing Transmission Time (msec)	Limit (msec)
6.0	60

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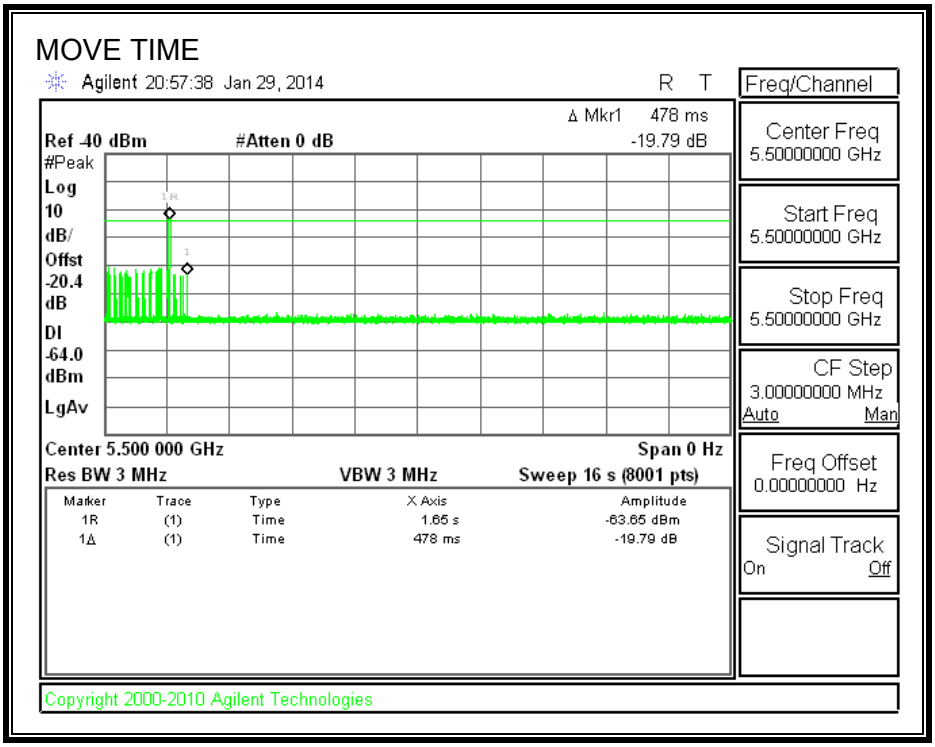
MOVE TIME



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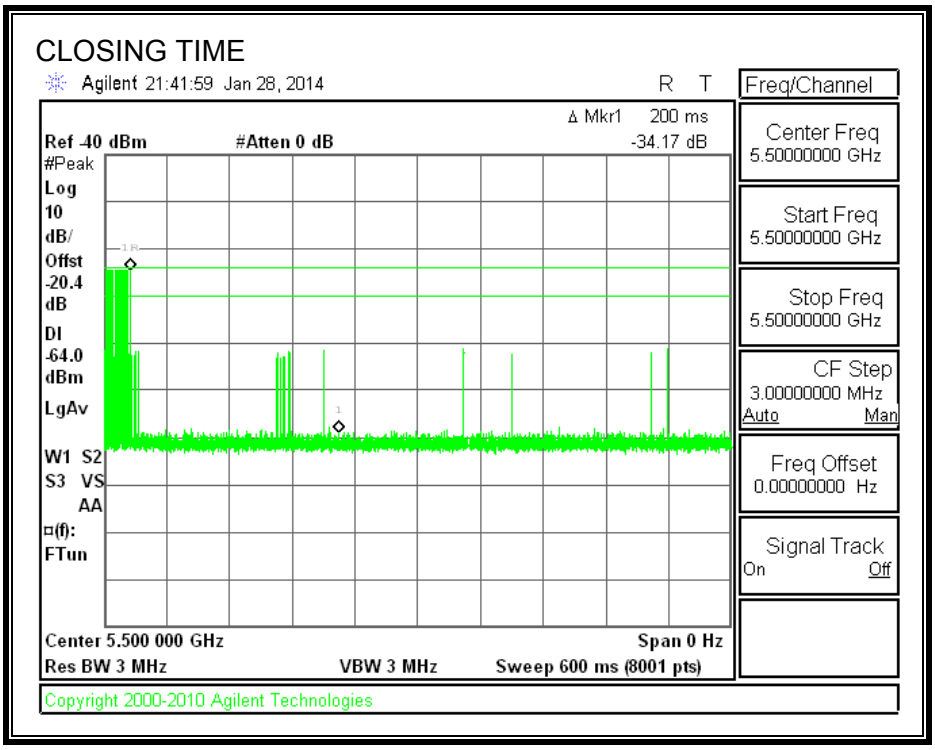
CHANNEL CLOSING TIME



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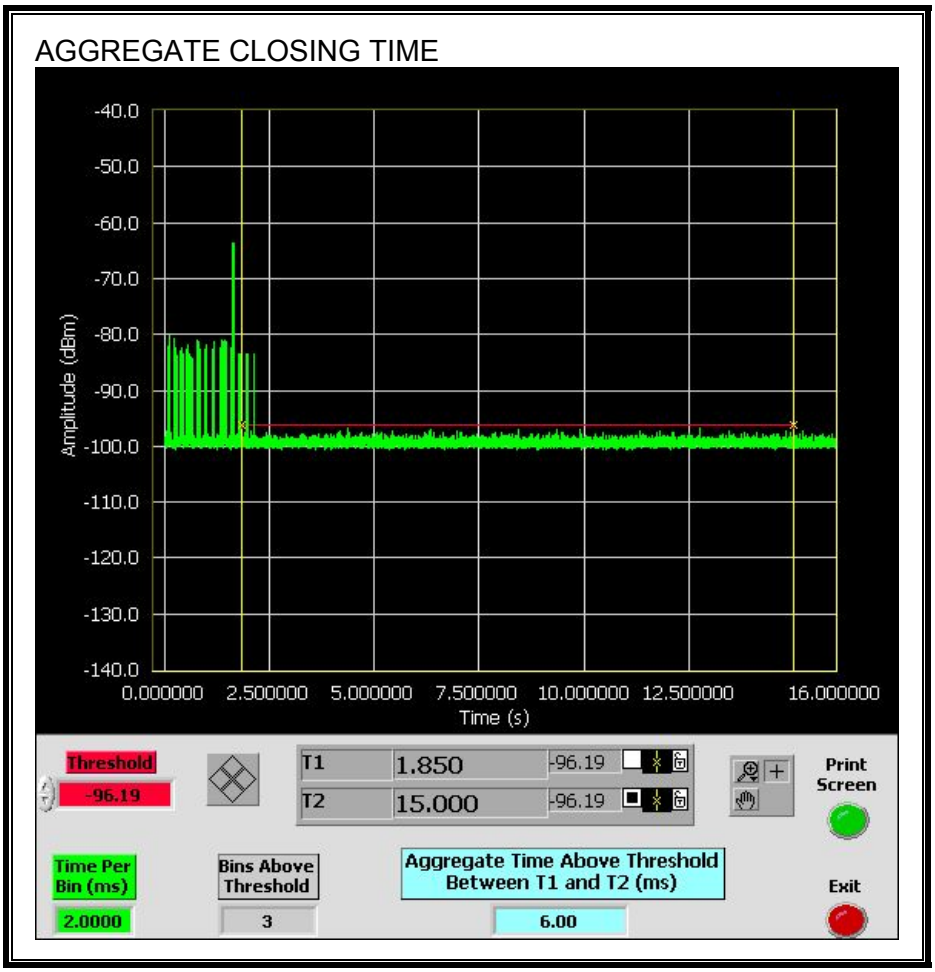
AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

Only intermittent transmissions are observed during the aggregate monitoring period.



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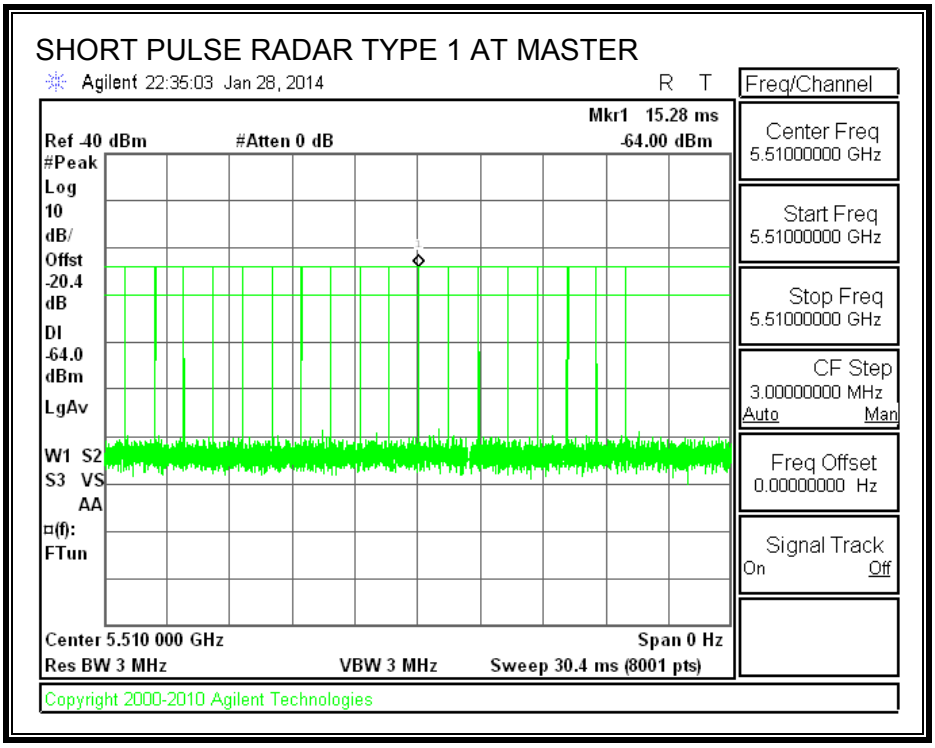
14.3. RESULTS FOR 40 MHz BANDWIDTH

14.3.1. TEST CHANNEL

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

14.3.2. RADAR WAVEFORM AND TRAFFIC

RADAR WAVEFORM



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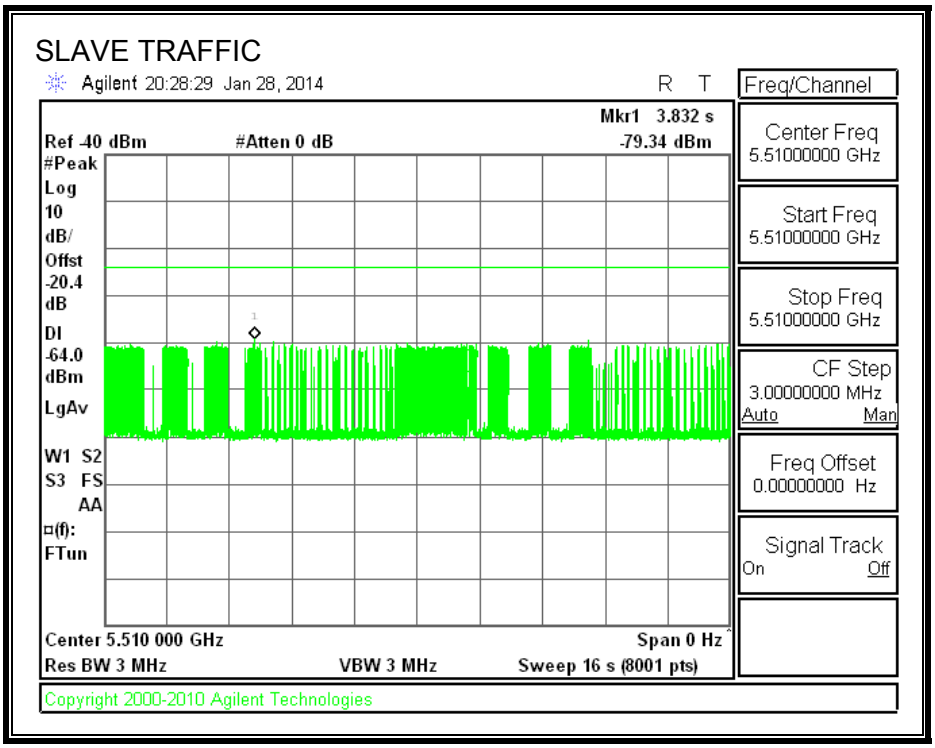
TRAFFIC



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14.3.3. OVERLAPPING CHANNEL TESTS

RESULTS

These tests are not applicable.

14.3.4. 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 aggregate time is calculated begins at (Reference Marker + 200 msec) and ends no earlier than (Reference Marker + 10 sec).

RESULTS

Channel Move Time (sec)	Limit (sec)
0.194	10

Aggregate Channel Closing Transmission Time (msec)	Limit (msec)
0.00	60

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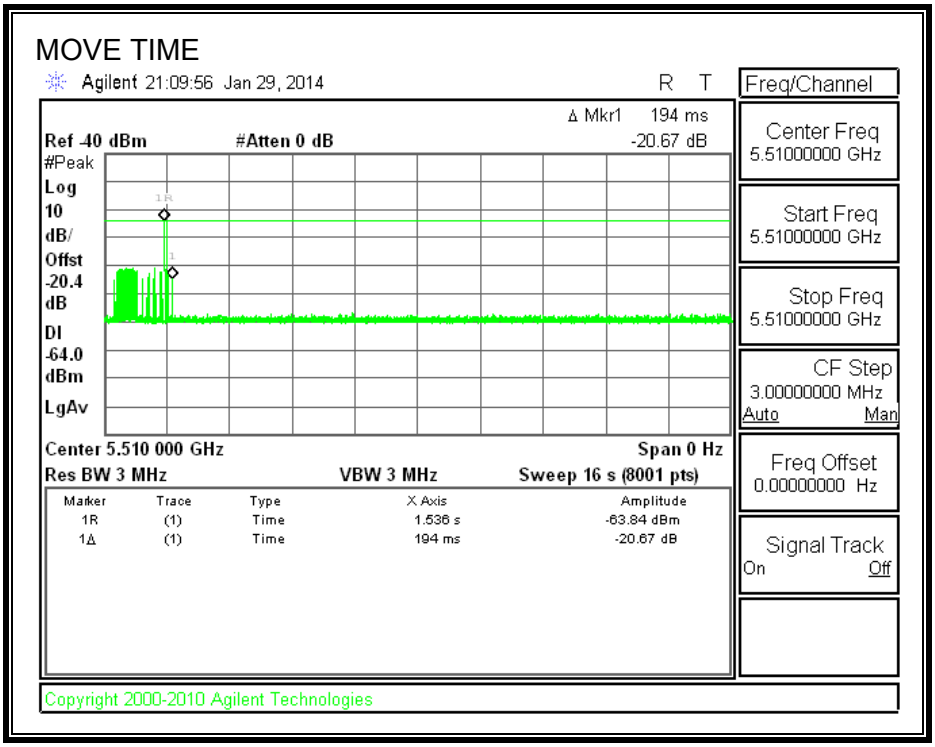
MOVE TIME



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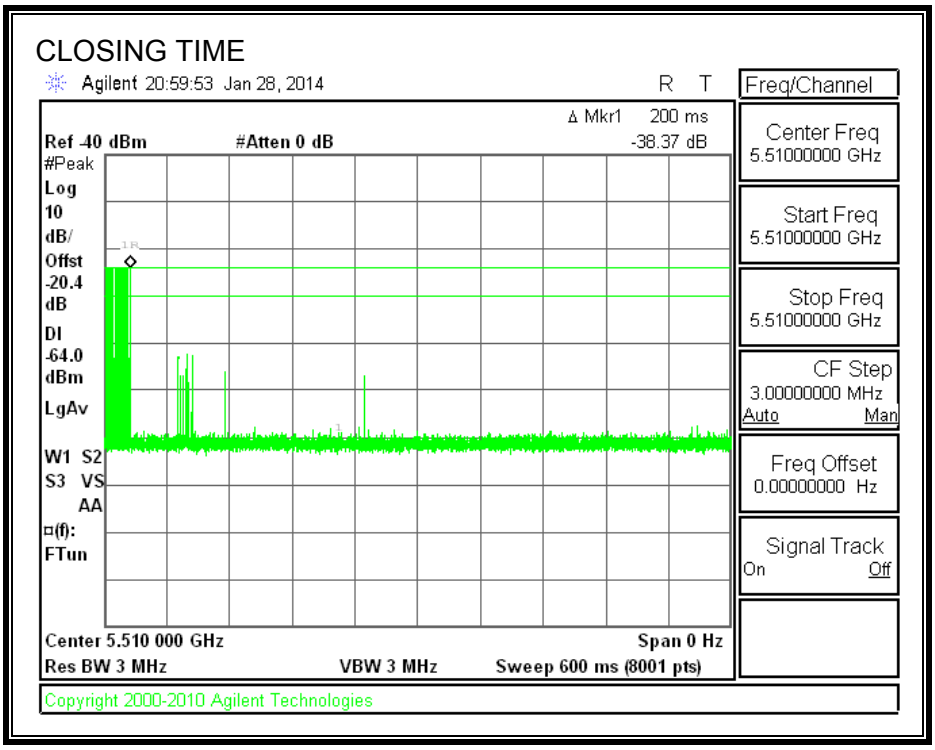
CHANNEL CLOSING TIME



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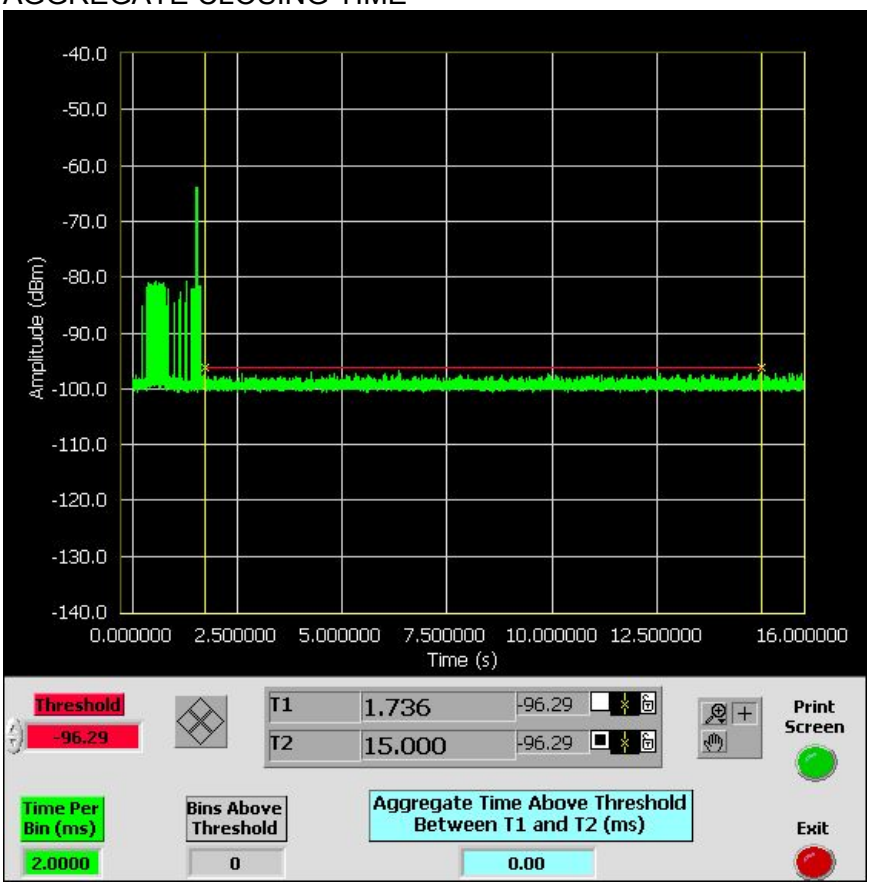
AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

Only intermittent transmissions are observed during the aggregate monitoring period.

AGGREGATE CLOSING TIME



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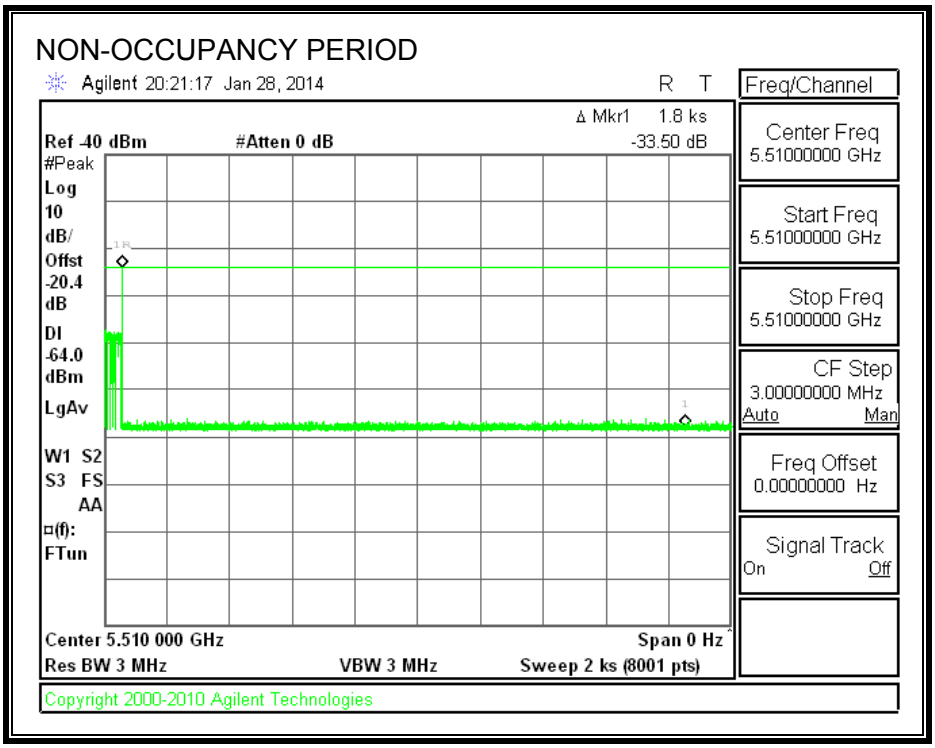
14.3.5. NON-OCCUPANCY PERIOD

RESULTS

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



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